

REPORT NUMBER: CAL-91-N10

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

**CHRYSLER CORPORATION  
1991 CHRYSLER NEW YORKER SALON  
4-DOOR SEDAN**

NHTSA NUMBER: MM0302

CALSPAN TEST NUMBER: 7893-6

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March 26, 1991



FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation  
National Highway Traffic Safety Administration  
Office of Market Incentives  
400 Seventh Street, S.W.  
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Washington, DC 20590

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| 16. Abstract<br><br>A frontal load cell barrier test of a 1991 Chrysler New Yorker Salon 4-Door Sedan was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York on March 26, 1991.<br><br>The impact speed was 35.0 mph and the ambient temperature at the barrier face at the time of impact was 55°F. The maximum post-test vehicle crush was 30.1 inches. The test vehicle was equipped with a 3-point restraint system in both of the front seating positions. The driver position was also equipped with a driver side air bag.<br><br>With regard to FMVSS 208 "Occupant Crash Protection," injury criteria, the driver appears to satisfy the head, chest, and femur requirement. Head and chest data for the passenger dummy is not available. The passenger dummy did satisfy the femur requirements. |  |                                                      |                                                                                                                                                                                                                                |                                                                      |  |
| 17. Key Words<br>35 mph Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |                                                      | 18. Distribution Statement<br>Copies of this report are available from:<br>Technical Reference Division<br>National Highway Traffic Safety Admin.<br>Nassif Building, Room 5108<br>400 Seventh St., S.W., Washington, DC 20590 |                                                                      |  |
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## Section 1

### PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 90 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 30 mph requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

## Section 2

### SUMMARY OF TEST NUMBER MM0302

A load cell barrier consisting of 36 load cells was impacted by a 1991 Chrysler New Yorker Salon 4-Door Sedan at a velocity of 35.0 mph. The test was performed at the Calspan Corporation Advanced Technology center on March 26, 1991. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 15 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572-E, 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 ATD (Serial No. 45) and the right-front passenger ATD (Serial No. 245) were used on one previous test (MM0105). Injury criteria values were not exceeded in that test.. Certification details, along with instrumentation calibration data, can be found in Appendices C and D.

The 83 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces. During the impact the floor pan of the vehicle buckled. This resulted in the passenger's head (Z) and chest (Z) accelerometer connectors being crimped between the amplifiers and the floor of the vehicle. Data for these channels are not available. Consequently the HIC and maximum chest resultant for the passenger dummy are not available for this test. Position #1 - Belt Elongation is not accurate from 98 to 107 msec. Vehicle accelerometer #5 (X) lost data 70 msec after  $T_0$ . Position #1 - Upper Neck (FZ) did not record accurately.

The driver's head struck the airbag; the HIC was 510.7. The maximum chest deceleration over 3 milliseconds was 55.0 g's and femur loads were 709.8 and 1133.4 pounds.

The right front passenger's HIC and maximum chest deceleration are not available for this test. The passenger's femur loads were 958.5 and 793.6 pounds.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1991 Chrysler New Yorker Salon 4-Door Sedan

NHTSA No.: MM0302 VIN.: 1C3XC66R6MD101822

Body Color: Blue Date Of Manufacture: August 1990

Engine: 6 Cylinders; - C.I.D.; 3.3 Liters; - CC  
X Gas; - Diesel; - Turbocharged  
- Longitudinal; X Transverse

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

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

Date Received: 2-21-91 Odometer Reading: 69 miles

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

Type of Occupant Restraint: 3-point continuous restraint system with  
driver side airbag.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 32 psi, Rear 32 psi

Recommended Tire Size: P195/75R14

Recommended Cold Tire Pressure: Front 29 psi, Rear 29 psi

Tires on Vehicle: P195/75R14; Manufacturer: Good Year Invicta

Number of Occupants: 3 Front; 3 Rear; - 3rd Seat; 6 TOTAL

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

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

Vehicle Capacity Weight (VCW) = 1100 lbs. (A)

No. of Occupants x 150 lbs. = 900 lbs. (B)

Rated Cargo and Luggage

Weight (RCLW) A-B = 200 lbs.

GVWR 4599 lbs. GAWR: Front 2493 lbs. Rear 2156 lbs.

Table 1

## GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 1050 lbs.      Right Rear = 600 lbs.  
 Left Front = 1070 lbs.      Left Rear = 590 lbs.  
 TOTAL FRONT WEIGHT = 2120 lbs.    (64 % of Total Vehicle Weight)  
 TOTAL REAR WEIGHT = 1190 lbs.    (36 % of Total Vehicle Weight)  
 TOTAL DELIVERY WEIGHT = 3310 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3310 lbs.)  
 VCW = Vehicle Capacity Weight (1100 lbs.)  
 DSC = Designated Seating Capacity (6)  
 RCLW = VCW - 150 (DSC) = 200 lbs.  
 Target Test Weight = UDW + RCLW + (2 dummies x 167 lbs./dummy)  
 Target Test Weight = 3844 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 194 POUNDS CARGO:

Right Front = 1150 lbs.      Right Rear = 800 lbs.  
 Left Front = 1120 lbs.      Left Rear = 770 lbs.  
 TOTAL FRONT WEIGHT = 2270 lbs.    (59 % of Total Vehicle Weight)  
 TOTAL REAR WEIGHT = 1570 lbs.    (41 % of Total Vehicle Weight)  
 TOTAL TEST WEIGHT = 3840 lbs.  
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude:    RF 28.1    LF 28.1    RR 27.7    LR 27.6  
 Test Attitude:        RF 27.1    LF 27.2    RR 25.5    LR 25.8  
 Wheel Base:    104.2 in.;    C.G. = 42.6 in. rearward of front wheel C/L  
 Remarks: 14.9 gallons of stoddard solution was placed in the fuel tank.

Table 1

## GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0°  
 Date of Test: March 26, 1991 Time of Test: 12:10  
 Ambient Temperature: 55 °F at impact area  
 Temperature in Occupant Compartment: 70 °F  
 Windshield Molding Temperature: 70 °F  
 Required Impact Velocity Range: 34.5 to 35.5 mph  
 Impact Velocity: primary = 35.0 mph, secondary = 35.0 mph  
 Distance From Front Bumper to Barrier Face When  
     Entering Speed Trap: 52 inches  
     Exiting Speed Trap: 12 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length: Pre-test = R 190.4 C<sub>L</sub> 192.6 L 190.4  
                   Post-test = R 164.0 C<sub>L</sub> 162.5 L 162.5  
                   Crush = R 26.4 C<sub>L</sub> 30.1 L 27.9

Distance from front of test vehicle to point of impact:

R 16.5 C<sub>L</sub> 13.7 L 15.7

VISIBLE DUMMY CONTACT POINTS:

|            | <u>Driver</u>     | <u>Passenger</u>              |
|------------|-------------------|-------------------------------|
| Head       | <u>Air Bag</u>    | <u>Top of Dash Panel</u>      |
| Chest      | <u>Air Bag</u>    | <u>None</u>                   |
| Abdomen    | <u>None</u>       | <u>None</u>                   |
| Left Knee  | <u>Dash Panel</u> | <u>Glove Compartment Door</u> |
| Right Knee | <u>Dash Panel</u> | <u>Glove Compartment Door</u> |

Table 1

## GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

|              | <u>Front</u>              |                           | <u>Rear</u>     |                 |
|--------------|---------------------------|---------------------------|-----------------|-----------------|
|              | <u>Left</u>               | <u>Right</u>              | <u>Left</u>     | <u>Right</u>    |
|              | <u>Tools<br/>Required</u> | <u>Tools<br/>Required</u> | <u>Required</u> | <u>Required</u> |
| Door Opening |                           |                           |                 |                 |

| <u>Seat Movement</u> | <u>Front</u> |              | <u>Rear</u> |              |
|----------------------|--------------|--------------|-------------|--------------|
|                      | <u>Left</u>  | <u>Right</u> | <u>Left</u> | <u>Right</u> |
|                      | <u>None</u>  | <u>None</u>  | <u>-</u>    | <u>-</u>     |
| Seat Back Failure    | None         | None         | -           | -            |
| Seat Shift (in.)     | 1 Notch<br>* | *            | -           | -            |

Glazing Damage

Backlight/Windshield Windshield sustained stress fractures but remained intact.

Other Notable Impact Effects: During the impact the floor pan buckled under the front seats forcing the back of the seat upward and the front of the seat downward. Both the lap belt anchor points were displaced due to excessive buckling of the floor nearer the rear cross-member and the B-pillar.

\*Both outboard seating tracks contained substantial movement by seat.

Front left seating position: the outboard mechanism gear moved approximately 5 detents forward (4.2 inches).

Right front seating position: the outboard mechanism gear moved approximately 4.5 detents forward (3.4 inches).

Section 3  
OMI FINAL DATA

Occupant and Vehicle Information

I.    OMI DATA

1.    Dummy Injury Criteria Data Summary
2.    Dummy Positioning Data
3.    Seat Belt Positioning Data
4.    Seat Belt Performance Assessment Data
5.    Driver Dummy to Steering Column Dimensions
6.    Camera Locations
7.    Vehicle Target Locations

II.   OVR DATA

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

Table 2

## DUMMY INJURY CRITERIA VALUES

NHTSA No.: MM0302 Vehicle: 1991 Chrysler New Yorker Salon 4-Dr. Sedan

|                         | MAXIMUM HEAD ACCELERATION (g's) |       |      |      |
|-------------------------|---------------------------------|-------|------|------|
|                         | X                               | Y     | Z    | R    |
| Position #1 - Driver    | -57.8                           | -21.5 | 17.8 | 61.9 |
| Position #2 - Passenger | -129.2                          | -6.0  | N/A  | N/A  |

|                         | MAXIMUM CHEST ACCELERATION (g's) |       |       |      |
|-------------------------|----------------------------------|-------|-------|------|
|                         | X                                | Y     | Z     | R    |
| Position #1 - Driver    | -64.5                            | -9.2  | -15.0 | 55.0 |
| Position #2 - Passenger | -48.0                            | -10.1 | N/A   | N/A  |

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

|                         | MAXIMUM FORCE - FEMUR LOAD (lbs.) |             |
|-------------------------|-----------------------------------|-------------|
|                         | LEFT FEMUR                        | RIGHT FEMUR |
| Position #1 - Driver    | 709.8                             | 1133.4      |
| Position #2 - Passenger | 958.5                             | 793.6       |

|                         | MAXIMUM FORCE - SEAT BELT LOADS (lbs.) |                              |                             |
|-------------------------|----------------------------------------|------------------------------|-----------------------------|
|                         | SHOULDER STRAP<br>UPPER BELT LOAD      | LAP STRAP<br>RIGHT BELT LOAD | LAP STRAP<br>LEFT BELT LOAD |
| Position #1 - Driver    | 1191.5                                 | -                            | 1931.2                      |
| Position #2 - Passenger | 1645.2                                 | 1422.8                       | -                           |

|                         | HEAD INJURY CRITERIA (HIC) |                      |                      |                                                          |
|-------------------------|----------------------------|----------------------|----------------------|----------------------------------------------------------|
|                         | HIC                        | t <sub>1</sub> (SEC) | t <sub>2</sub> (SEC) | Average Acceleration<br>t <sub>1</sub> TO t <sub>2</sub> |
| Position #1 - Driver    | 510.7                      | 0.06000              | 0.09228              | 47.8                                                     |
| Position #2 - Passenger | N/A                        | N/A                  | N/A                  | N/A                                                      |

HIC is as defined in FMVSS 208. The maximum time interval from t<sub>1</sub> to t<sub>2</sub> is 36 milliseconds.

Table 3  
HYBRID III NECK AND CHEST DATA SHEET

Vehicle Year/Make/Model/Body Style: 1991 Chrysler New Yorker Salon 4-Door Sedan

Vehicle NHTSA No.: MM0302 Test Date: March 26, 1991

| MAXIMUM<br>VALUES        | DRIVER DUMMY<br>ID # <u>45</u> | PASSENGER DUMMY<br>ID # <u>245</u> |
|--------------------------|--------------------------------|------------------------------------|
| Neck Load X              | -227.5 lbs.                    | 256.2 lbs.                         |
| Neck Load Y              | 190.9 lbs.                     | 77.8 lbs. .                        |
| Neck Load Z              | N/A                            | 763.1 lbs.                         |
| Neck Moment X            | 539.6 ft/lbs                   | -306.4 ft/lbs                      |
| Neck Moment Y            | 620.6 ft/lbs                   | -713.8 ft/lbs                      |
| Neck Moment Z            | 800.8 ft/lbs                   | 137.7 ft/lbs                       |
| Chest Deflection X (in.) | 1.4 in.                        | 1.2 in.                            |
| Time of Max. Occurance   | 71.0 msec                      | 102 msec                           |

NOTE: All values listed must be occurring during primary impact event.

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

Test No.: MM0302 Vehicle: 1991 Chrysler New Yorker Salon 4-Dr. Sedan

SEAT TYPE:

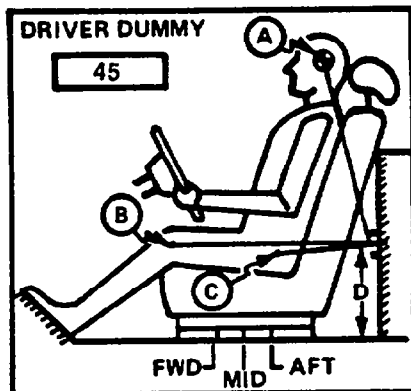
- Bench  
- Bucket  
X Split Bench

ADJUSTER TYPE:

X Manual  
- Power

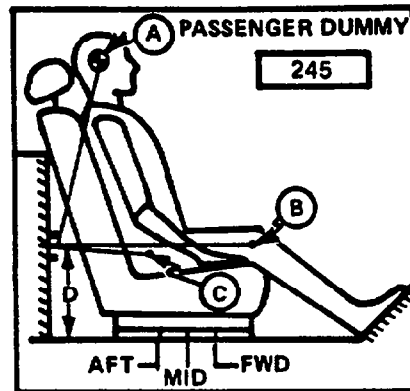
SEAT BACK TYPE:

- Fixed  
X Adjustable Reclining



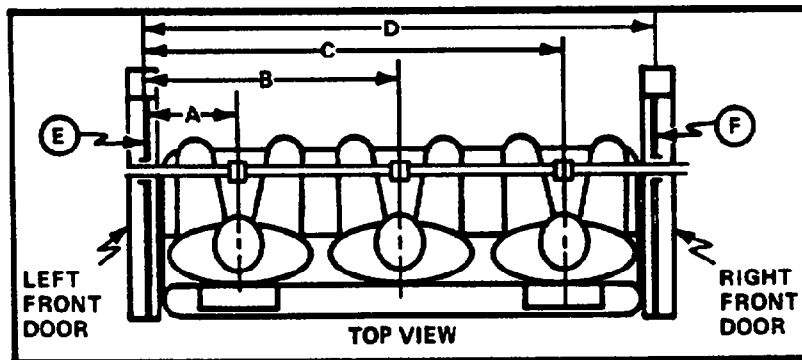
MEASUREMENT LOCATION

- A - Head Target
- B - Knee Joint
- C - Approximate 'H' Point
- D - Sill to Reference Point



A = 21.2 in. 16 Degrees  
 B = 25.7 in. 95 Degrees  
 C = 10.4 in. 121 Degrees  
 D = 14.5 in.

A = 21.5 in. 14 Degrees  
 B = 25.2 in. 92 Degrees  
 C = 10.4 in. 119 Degrees  
 D = 14.5 in.



S/N 45

DUMMY ID

245

A = Left Door to Driver Centerline 13.8 in.  
 B = Left Door to Center Passenger Centerline - in.  
 C = Left Door to Right Passenger Centerline 40.7 in.  
 D = Left Door to Right Door 54.2 in.  
 E,F = Window Glass Height (Right and Left Must Be Equal) 10.5 in.

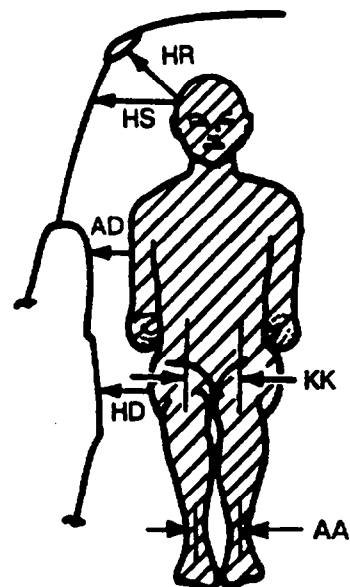
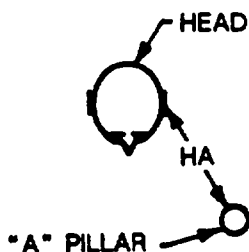
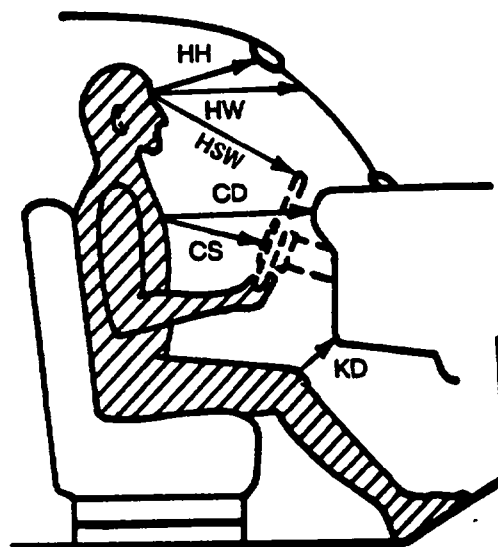
**Figure 2**  
**OCCUPANT CLEARANCE DIMENSIONS**

|     | DRIVER   | PASSENGER |
|-----|----------|-----------|
| HH  | 11.4     | 11.6      |
| HW  | 16.8     | 16.7      |
| CD  | 17.7     | 17.7      |
| CS  | 9.9      | -         |
| KDL | 2.2      | 2.5       |
| KDR | 2.9      | 2.1       |
| SA  | See Note | See Note  |
| TA  | 22°      | 22°       |
| HSW | 14.9     | -         |

HH = Head to Windshield Header  
HW = Head to Windshield  
HSW = Head to Steering Wheel  
CD = Chest to Dash  
CS = Chest to Steering Wheel  
KD(L/R) = Knee to Dash (Left/Right)  
SA = Seat Back Angle  
TA = Torso Angle

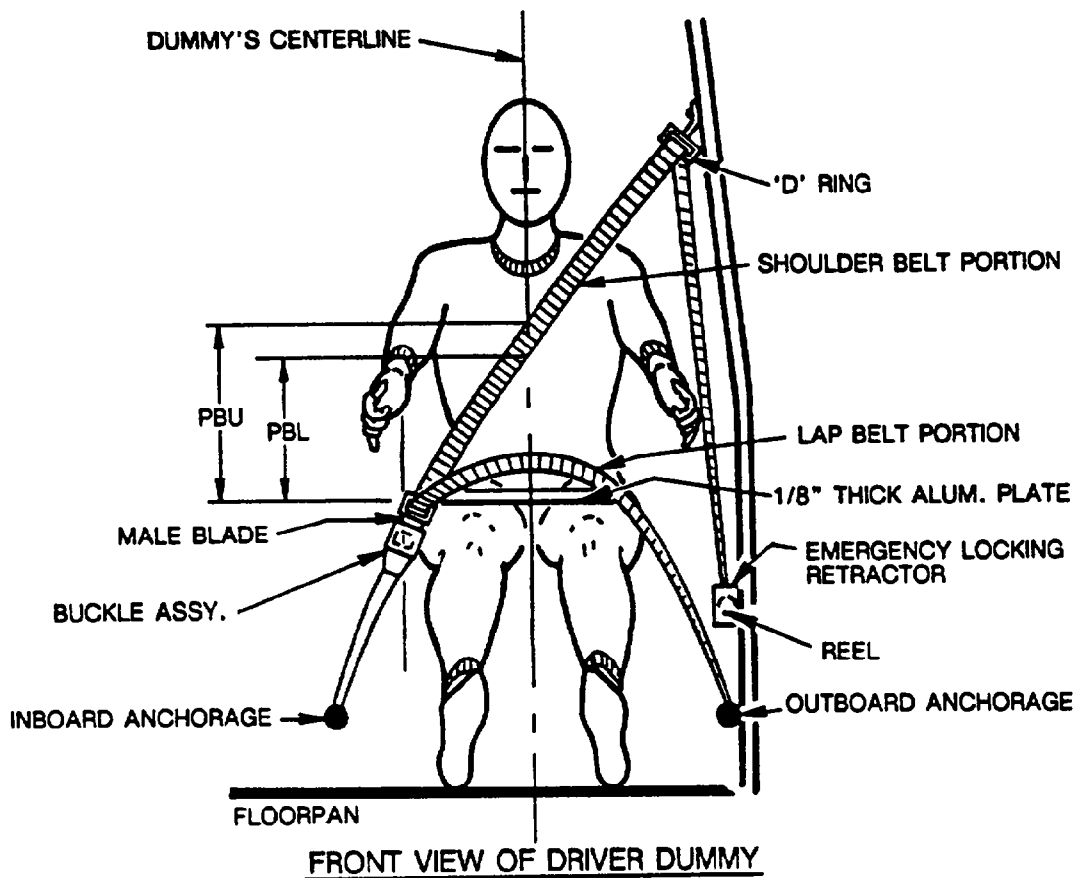
HA = Head Target to "A" Pillar  
HR = Head to Side Roof  
HS = Head to Side Window  
AD = Arm to Door  
HD = Hip to Door  
KK = Knee to Knee  
AA = Ankle to Ankle

|    | DRIVER | PASSENGER |
|----|--------|-----------|
| HR | 7.4    | 7.4       |
| HS | 10.6   | 10.3      |
| AD | 5.0    | 4.7       |
| HD | 7.3    | 6.9       |
| KK | 9.1    | 7.1       |
| HA | 15.7   | 15.7      |
| AA | 10.0   | 5.5       |



Note: Seat was positioned as specified by manufacturer.

Figure 3  
SEAT BELT POSITIONING DATA

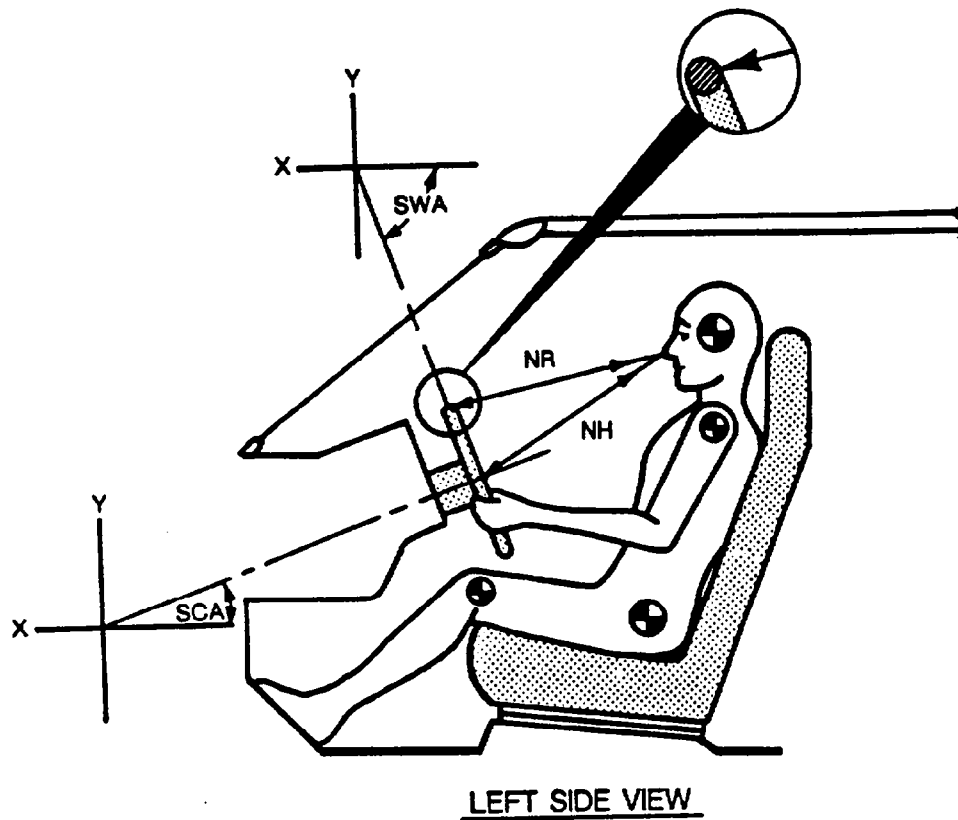


|                                                                | DRIVER DUMMY<br>(inches) | PASSENGER DUMMY<br>(inches) |
|----------------------------------------------------------------|--------------------------|-----------------------------|
| <u>PBU</u> -- Top surface of alum. plate to<br>upper edge      | 12.9                     | 12.9                        |
| <u>PBL</u> -- Top surface of alum. plate to<br>belt lower edge | 9.9                      | 9.9                         |
| <u>LAP BELT TENSION</u>                                        | 2.0 lbs.                 | 2.0 lbs.                    |
| <u>SHOULDER BELT TENSION</u>                                   | —                        | —                           |

Table 4  
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

| <u>BELT LENGTH DATA:</u>                                                     | <u>Driver</u>    | <u>Passenger</u> |
|------------------------------------------------------------------------------|------------------|------------------|
| Shoulder belt length as measured<br>on Part 572 Dummy.                       | <u>86.0"</u>     | <u>86.0"</u>     |
| Shoulder belt length as measured<br>on Part 572 Dummy.                       | <u>35.0"</u>     | <u>35.0"</u>     |
| Lap belt length as measured<br>on Part 572 Dummy.                            | <u>29.5"</u>     | <u>29.5"</u>     |
| <u>SHOULDER BELT SPOOL-OFF DATA:</u>                                         |                  |                  |
| As determined by film analysis.                                              | <u>3.0"</u>      | <u>3.0"</u>      |
| As determined mechanically.                                                  | <u>3.1"</u>      | <u>2.5"</u>      |
| As determined electronically.                                                | <u>3.2"</u>      | <u>4.3"</u>      |
| <u>BELT STRETCH DATA:</u>                                                    |                  |                  |
| Measured electronically between shoulder<br>belt load cell and the "D" ring. | <u>1.2 in/ft</u> | <u>0.0 in/ft</u> |
| Measured mechanically                                                        | <u>0.0 in/ft</u> | <u>0.0 in/ft</u> |

Figure 4  
DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



|            |                                                                                | MEASUREMENTS |         |
|------------|--------------------------------------------------------------------------------|--------------|---------|
| <u>NR</u>  | -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim | 13.8         | Inches  |
| <u>NH</u>  | -- Distance from tip of dummy's nose to center of steering column hub          | 13.9         | Inches  |
| <u>SCA</u> | -- Angle of steering column relative to the horizontal X axis                  | 24.0         | Degrees |
| <u>SWA</u> | -- Angle of steering wheel relative to the horizontal X axis                   | -66.0        | Degrees |

Figure 5  
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

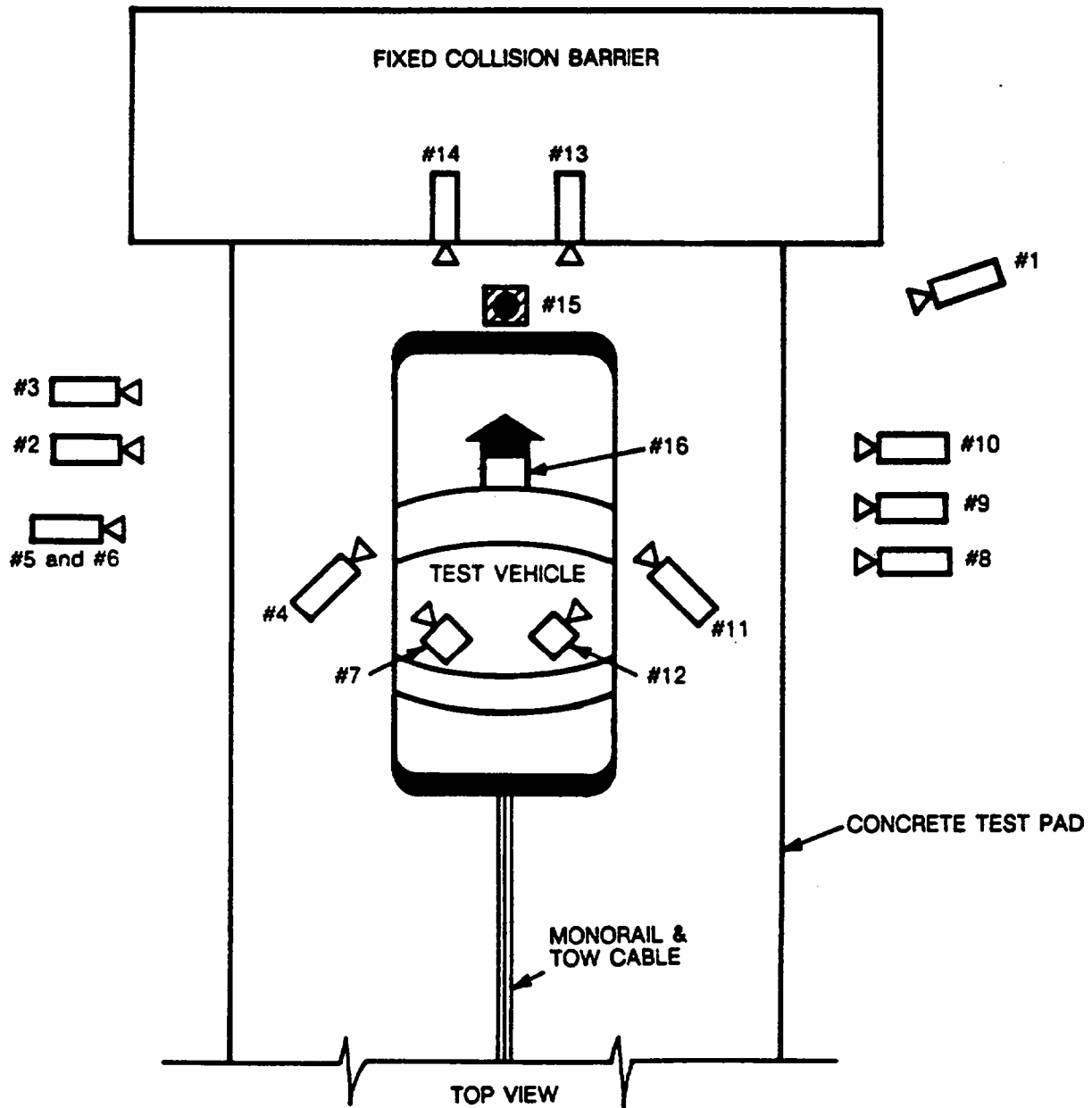


Table 5

## HIGH-SPEED CAMERA LOCATIONS

Test No. MM0302 Vehicle: 1991 Chrysler New Yorker Salon 4-Door Sedan

| CAMERA NO. | VIEW                        | CAMERA POSITIONS (in)* |     |      | ANGLE** (deg) | FILM PLANE TO HEAD TARGET | LENS (mm) | SPEED (fps) |
|------------|-----------------------------|------------------------|-----|------|---------------|---------------------------|-----------|-------------|
|            |                             | X                      | Y   | Z    |               |                           |           |             |
| 1          | Real-Time Camera            | -                      | -   | -    | -             | -                         | -         | 24          |
| 2          | Overall Left Side           | 223                    | 57  | 41   | -7            | 206                       | 13        | 550         |
| 3          | Left Side View              | 305                    | 27  | 41   | -3            | 288                       | 25        | 570         |
| 4          | Driver and Interior View    | 107                    | 102 | 67   | -16           | 90                        | 13        | 655         |
| 5          | Steering Column (Bottom)    | 279                    | 68  | 46   | -4            | 262                       | 25        | 555         |
| 6          | Steering Column (Top)       | 279                    | 68  | 70   | -10           | 262                       | 25        | 550         |
| 7          | Left Belt                   | -                      | -   | -    | -             | -                         | 8         | 540         |
| 8          | Overall Right Side          | 236                    | 78  | 42   | -5            | 219                       | 13        | 855         |
| 9          | Right Side View             | 302                    | 58  | 41   | 0             | 285                       | 25        | 615         |
| 10         | Right Passenger View        | 294                    | 80  | 53   | -4            | 277                       | 35        | 525         |
| 11         | Passenger and Interior View | 104                    | 105 | 66   | -21           | 87                        | 25        | 540         |
| 12         | Right Belt                  | -                      | -   | -    | -             | -                         | 8         | 400         |
| 13         | Passenger Front View        | 24                     | -5  | 72   | -35           | -                         | 13        | 540         |
| 14         | Driver Front View           | 24                     | -5  | 72   | -35           | -                         | 13        | 535         |
| 15         | Windshield View             | 0                      | 0   | 125  | -45           | -                         | 13        | 550         |
| 16         | Pit View of Engine          | 0                      | 32  | -120 | 90            | -                         | 13        | 735         |

\*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

\*\* = referenced to horizontal plane

Technical drawings of a vehicle showing top, side, and rear views with dimensions in inches.

**Top View:** Shows the vehicle's footprint. Dimensions include a width of 14.3 inches between the centerlines of the front and rear seats, and a height of 22.8 inches from the centerline to the top edge of the vehicle body.

**Side View:** Shows the vehicle's profile. Dimensions include a total length of 90.7 inches, a wheelbase of 60.7 inches, and a height of 44.0 inches to the top of the roof. A detail view of the roof shows a 5.0 inch spacing between the centerlines of the front and rear roof rails. The front view shows a 10.0 inch height to the top of the front fender. The rear view shows a 10.0 inch height to the top of the rear fender. The bottom view shows a 10.0 inch height to the top of the rear fender. The bottom view also shows a 10.0 inch height to the top of the front fender. The bottom view shows a 10.0 inch height to the top of the front fender. The bottom view shows a 10.0 inch height to the top of the front fender.

**Rear View:** Shows the vehicle's rear profile. Dimensions include a total width of 61.8 inches, a wheelbase of 60.7 inches, and a height of 44.0 inches to the top of the roof. A detail view of the roof shows a 5.0 inch spacing between the centerlines of the front and rear roof rails. The front view shows a 10.0 inch height to the top of the front fender. The rear view shows a 10.0 inch height to the top of the rear fender. The rear view shows a 10.0 inch height to the top of the rear fender. The rear view shows a 10.0 inch height to the top of the rear fender.

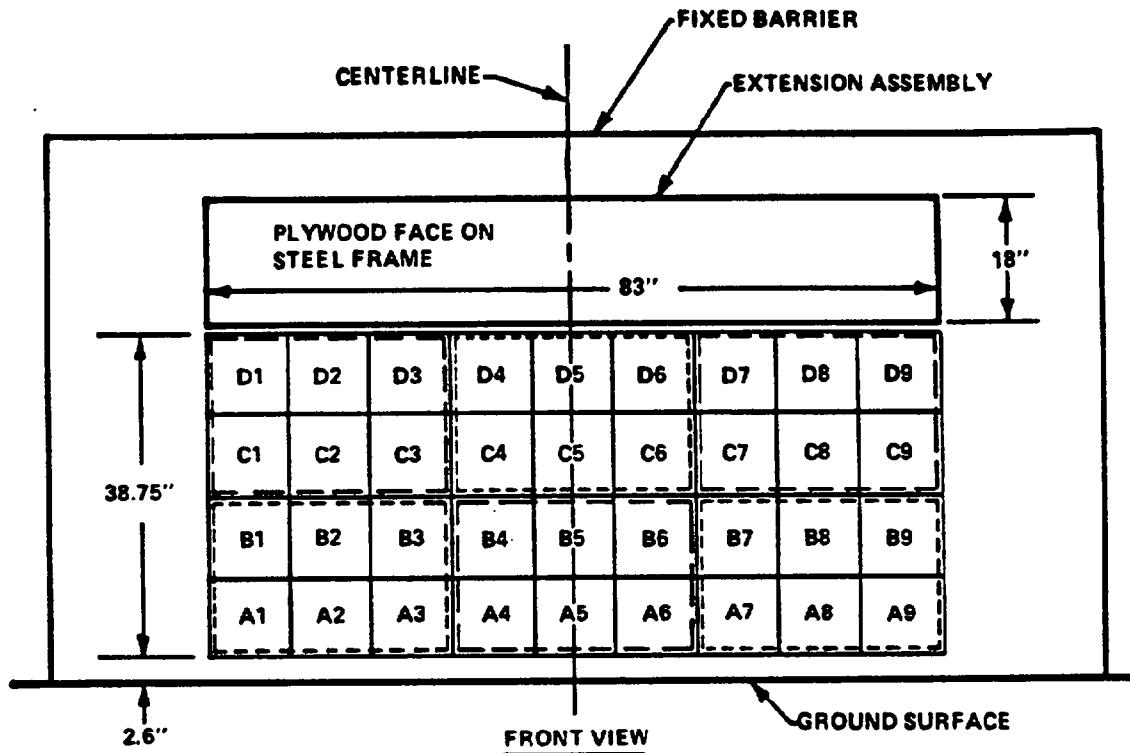
**Dimensions (inches):**

- Top View: 14.3 (width between seats), 22.8 (height from centerline to top edge).
- Side View: 90.7 (total length), 60.7 (wheelbase), 44.0 (height to top of roof), 10.0 (height to top of front fender).
- Rear View: 61.8 (total width), 60.7 (wheelbase), 44.0 (height to top of roof), 10.0 (height to top of rear fender).
- Detail View: 5.0 (spacing between roof rails).

**(DIMENSIONS IN INCHES)**

Figure 7  
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

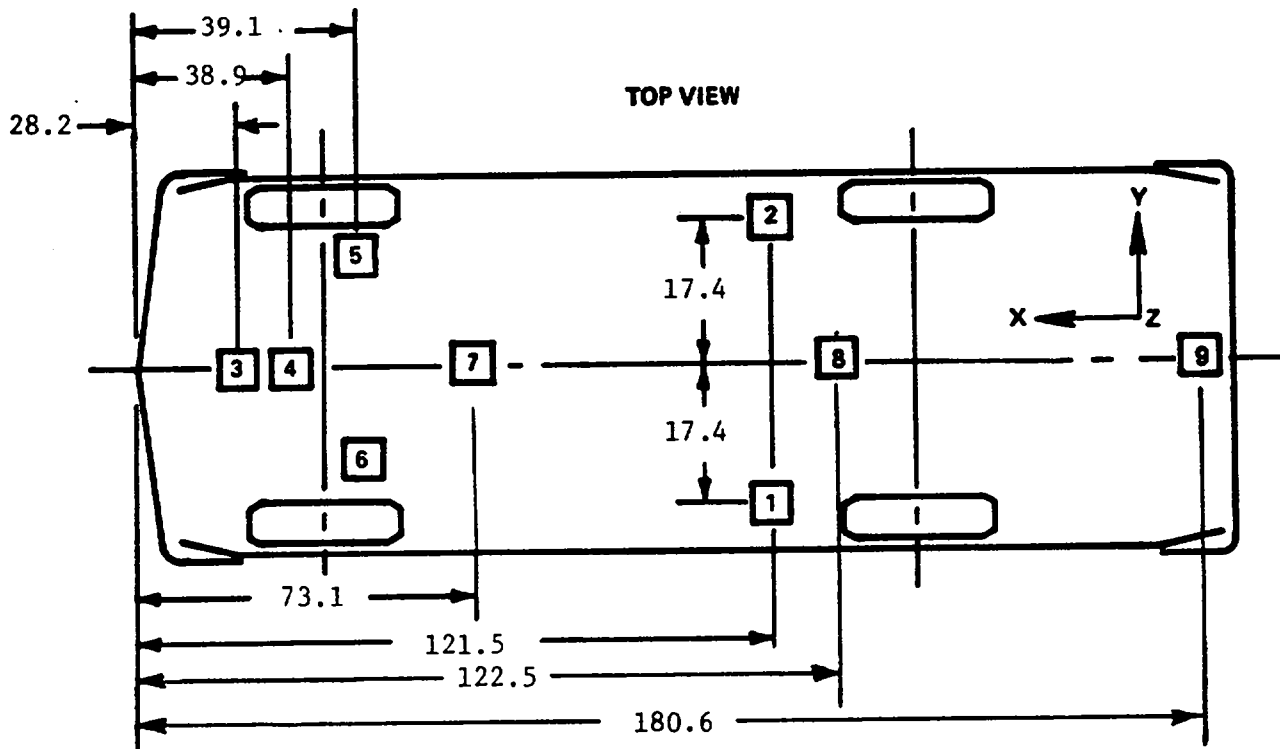
|            |            |            |
|------------|------------|------------|
| Group 4    | Group 5    | Group 6    |
| C1 thru D3 | C4 thru D6 | C7 thru D9 |
| Group 1    | Group 2    | Group 3    |
| A1 thru B3 | A4 thru B6 | A7 thru B9 |

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 8

## VEHICLE ACCELEROMETER LOCATIONS



(All Measurements in Inches)

| ACCELEROMETER<br>NUMBER* | ACCELEROMETER LOCATION       | DIRECTION |   |   |
|--------------------------|------------------------------|-----------|---|---|
|                          |                              | X         | Y | Z |
| 1                        | Left Rear Seat Crossmember   | X         |   |   |
| 2                        | Right Rear Seat Crossmember  | X         |   |   |
| 3                        | Top of Engine                | X         |   |   |
| 4                        | Bottom of Engine             | X         |   |   |
| 5                        | Right Disc Brake Caliper     | x         |   |   |
| 6                        | Left Disk Brake Caliper      | X         |   |   |
| 7                        | Instrument Panel             | X         |   |   |
| 8                        | Center Rear Seat Crossmember |           |   | X |
| 9                        | Rear Trunk Centerline        |           |   | X |

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

Figure 9  
TEST VEHICLE MEASUREMENTS

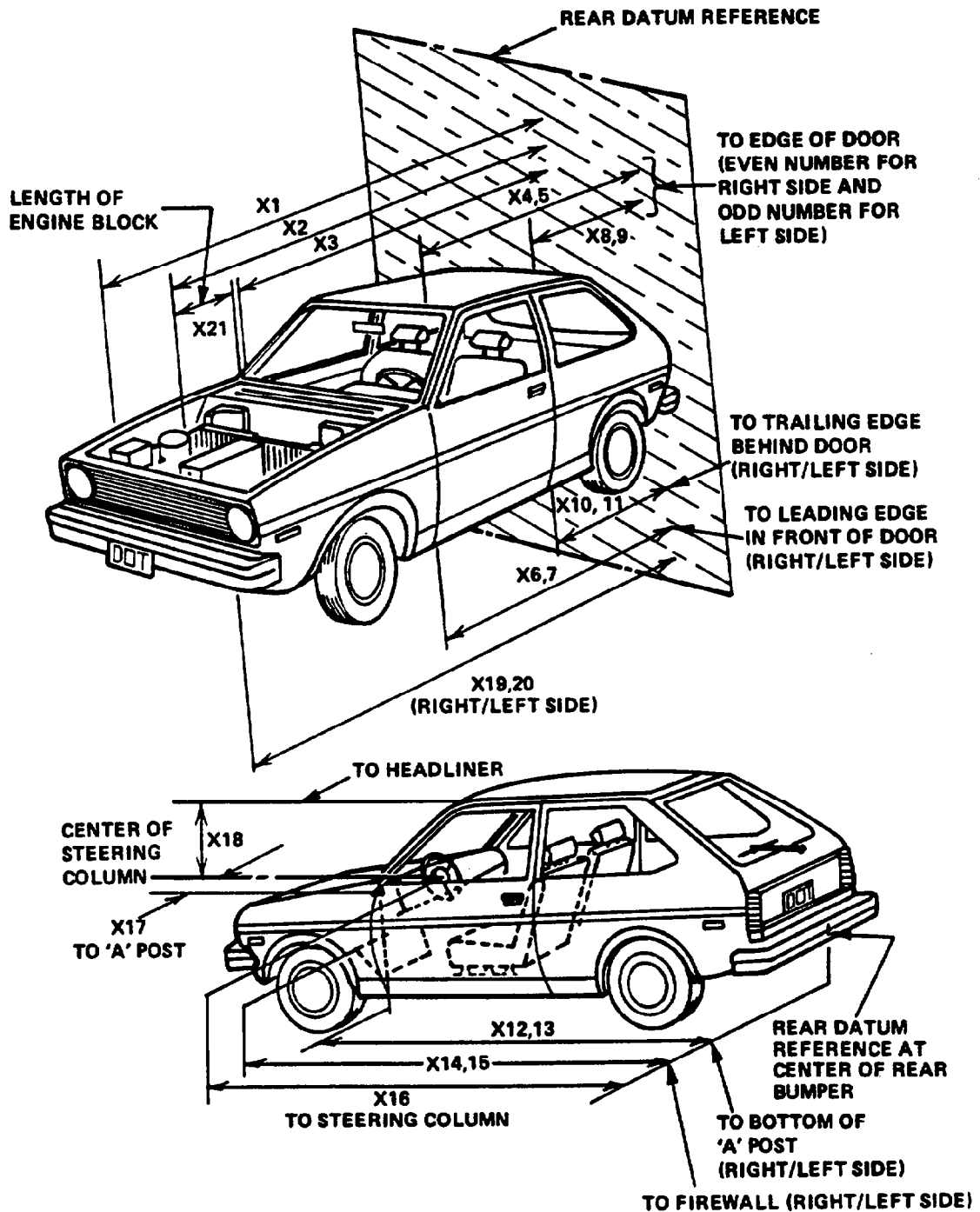


Table 6

## VEHICLE MEASUREMENTS

| No. |                                                              | All Dimensions in Inches |           |             |
|-----|--------------------------------------------------------------|--------------------------|-----------|-------------|
|     |                                                              | Pre-Test                 | Post-Test | Differences |
| X1  | Total Length of Vehicle at Centerline                        | 192.6                    | 162.5     | 30.1        |
| X2  | Rear Surface of Vehicle to Front of Engine                   | 165.1                    | 154.0     | 11.1        |
| X3  | Rear Surface of Vehicle to Firewall                          | 141.5                    | 134.0     | 7.5         |
| X4  | Rear Surface of Vehicle to Upper Leading Edge of Right Door  | 128.2                    | 127.8     | 0.4         |
| X5  | Rear Surface of Vehicle to Upper Leading Edge of Left Door   | 128.6                    | 128.3     | 0.3         |
| X6  | Rear Surface of Vehicle to Lower Leading Edge of Right Door  | 127.8                    | 125.8     | 3.0         |
| X7  | Rear Surface of Vehicle to Lower Leading Edge of Left Door   | 127.8                    | 126.2     | 1.6         |
| X8  | Rear Surface of Vehicle to Upper Trailing Edge of Right Door | 88.2                     | 87.4      | 0.8         |
| X9  | Rear Surface of Vehicle to Upper Trailing Edge of Left Door  | 88.4                     | 87.5      | 0.9         |
| X10 | Rear Surface of Vehicle to Lower Trailing Edge of Right Door | 88.5                     | 86.3      | 2.2         |
| X11 | Rear Surface of Vehicle to Lower Trailing Edge of Left Door  | 88.5                     | 87.3      | 1.2         |
| X12 | Rear Surface of Vehicle to Bottom of "A" Post of Right Side  | 126.5                    | 124.2     | 2.3         |
| X13 | Rear Surface of Vehicle to Bottom of "A" Post of Left Side   | 126.6                    | 124.4     | 2.2         |
| X14 | Rear Surface of Vehicle to Firewall, Right Side              | 142.1                    | 137.8     | 4.3         |
| X15 | Rear Surface of Vehicle to Firewall, Left Side               | 141.7                    | 138.2     | 3.5         |
| X16 | Rear Surface of Vehicle to Steering Column                   | 110.9                    | 110.8     | 0.1         |
| X17 | Center of Steering Column to "A" Post                        | 15.8                     | 15.4      | 0.4         |
| X18 | Center of Steering Column to Headliner                       | 16.2                     | 14.0      | 2.2         |
| X19 | Rear Surface of Vehicle to Right Side of Front Bumper        | 190.4                    | 164.0     | 26.4        |
| X20 | Rear Surface of Vehicle to Left Side of Front Bumper         | 190.4                    | 162.5     | 27.9        |
| X21 | Length of Engine Block                                       | 18.0                     | 18.0      | 0.0         |
| RD  | Rear Surface of Vehicle to Right Side of Dash Panel          | 119.8                    | 119.0     | 0.8         |
| CD  | Rear Surface of Vehicle to Center of Dash Panel              | 118.8                    | 118.3     | 0.5         |
| LD  | Rear Surface of Vehicle to Left Side of Dash Panel           | 119.6                    | 119.3     | 0.3         |

**Appendix A**

**PHOTOGRAPHS**

# PHOTOGRAPHS

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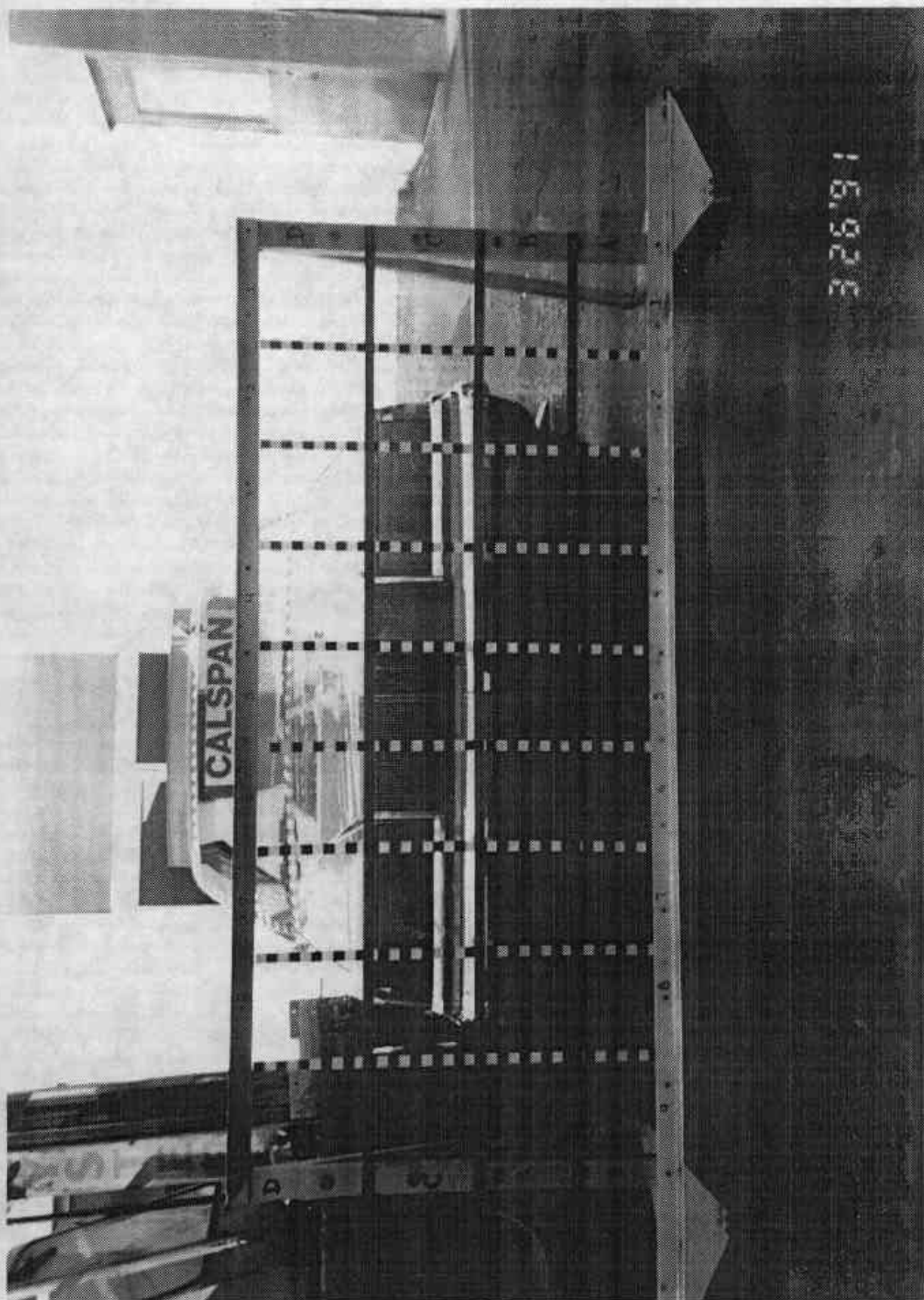


Figure A-1 LOAD CELL LOCATIONS



FIGURE A-2 PRE-TEST FRONT VIEW

A-4

7893-6

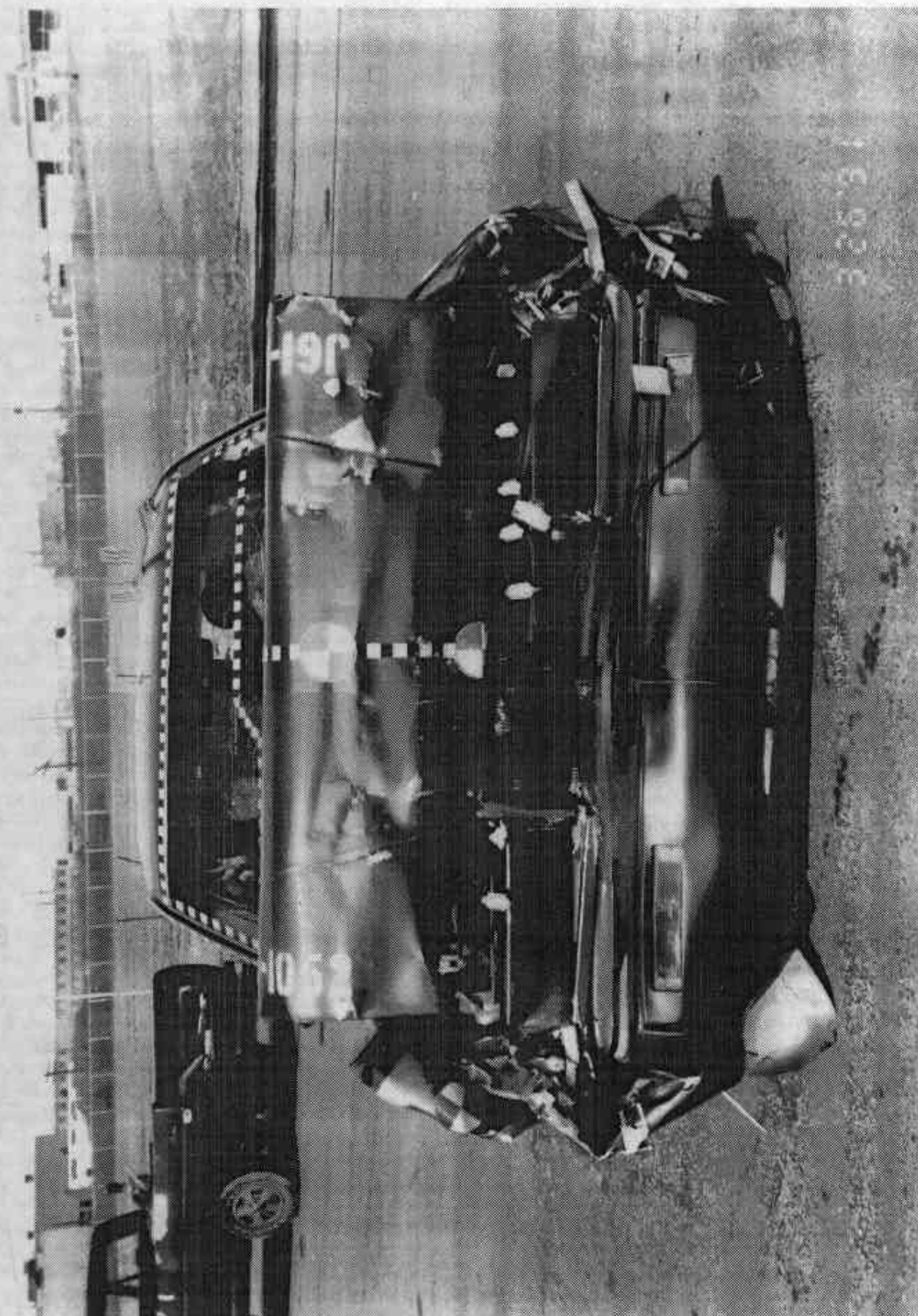


FIGURE A-3 POST TEST FRONT VIEW

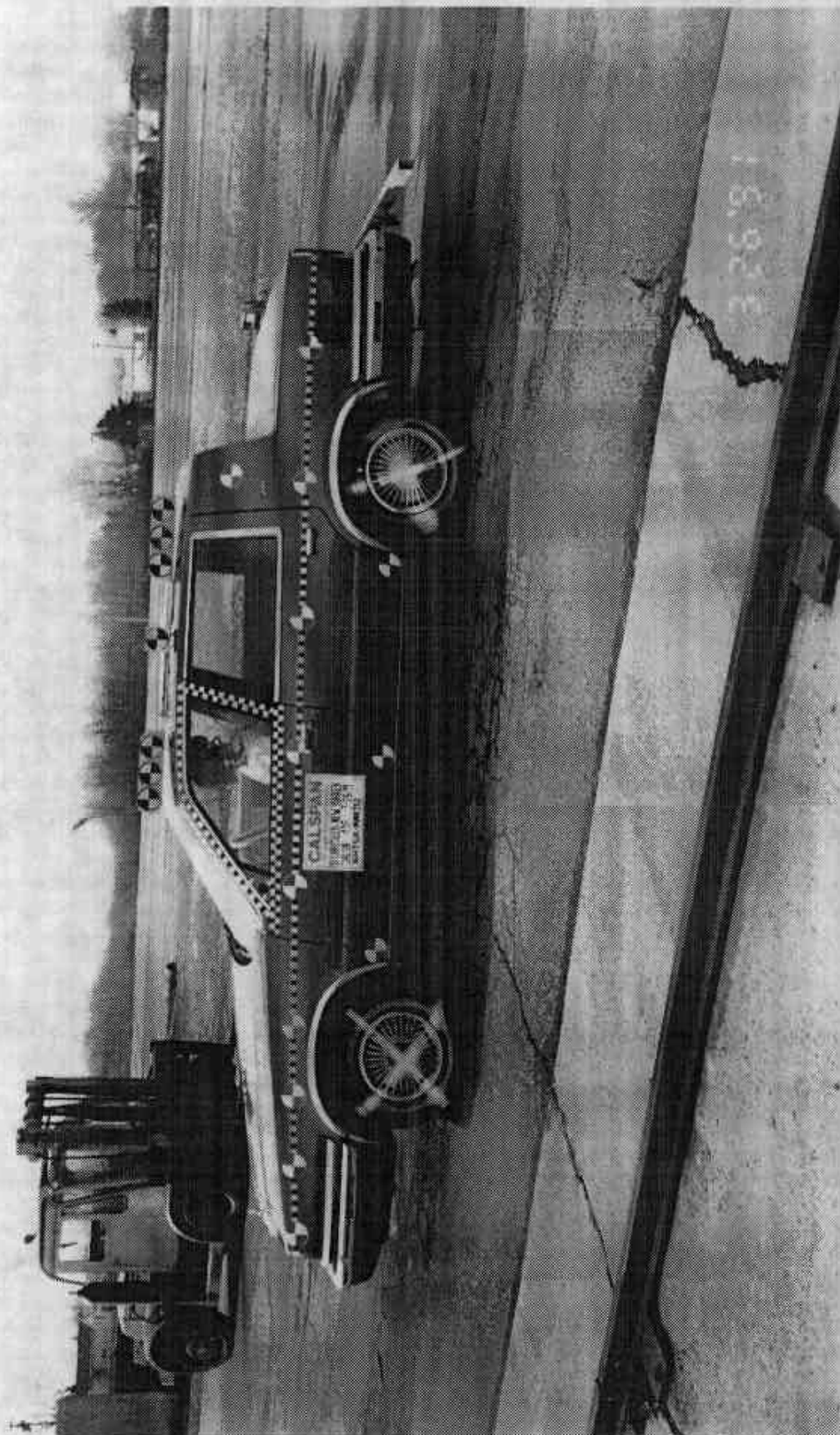
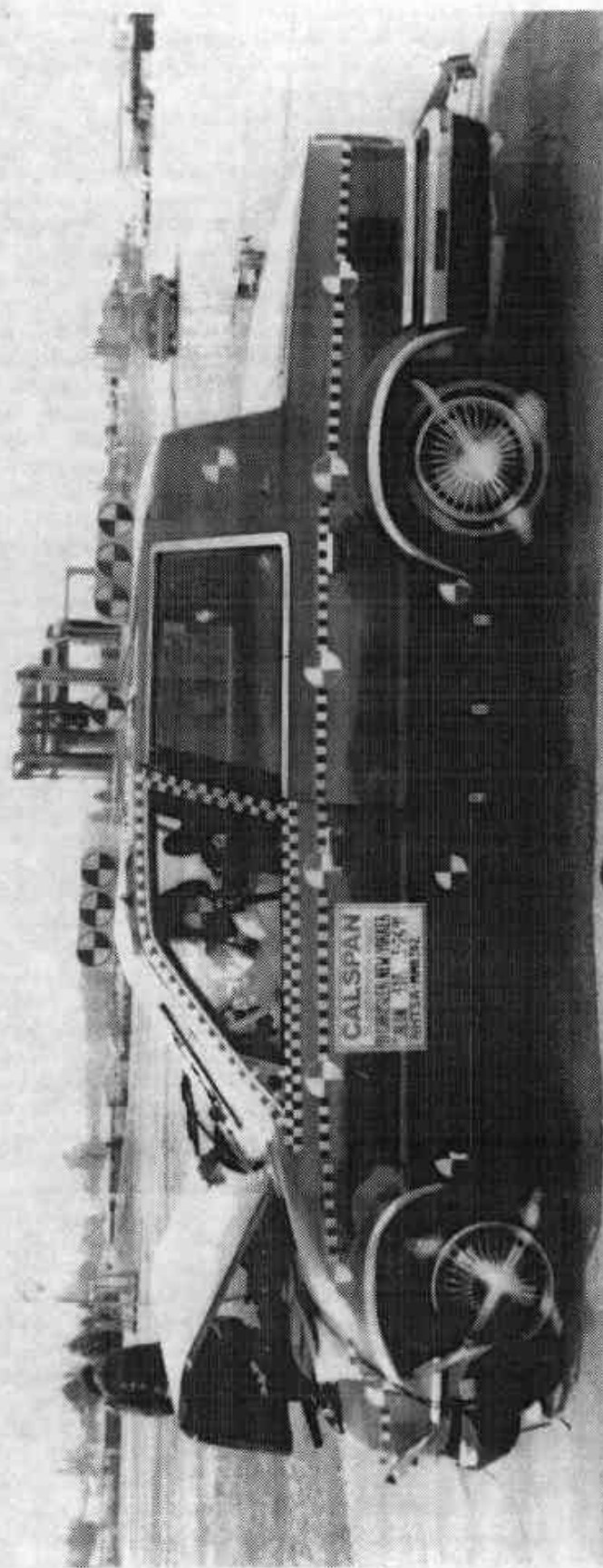


Figure A-4 PRE-TEST LEFT SIDE VIEW

A-6

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5 26 '91

Figure A-5 POST TEST LEFT SIDE VIEW

A-7

7893-6



Figure A-6 PRE-TEST RIGHT SIDE VIEW

A-8

7893-6

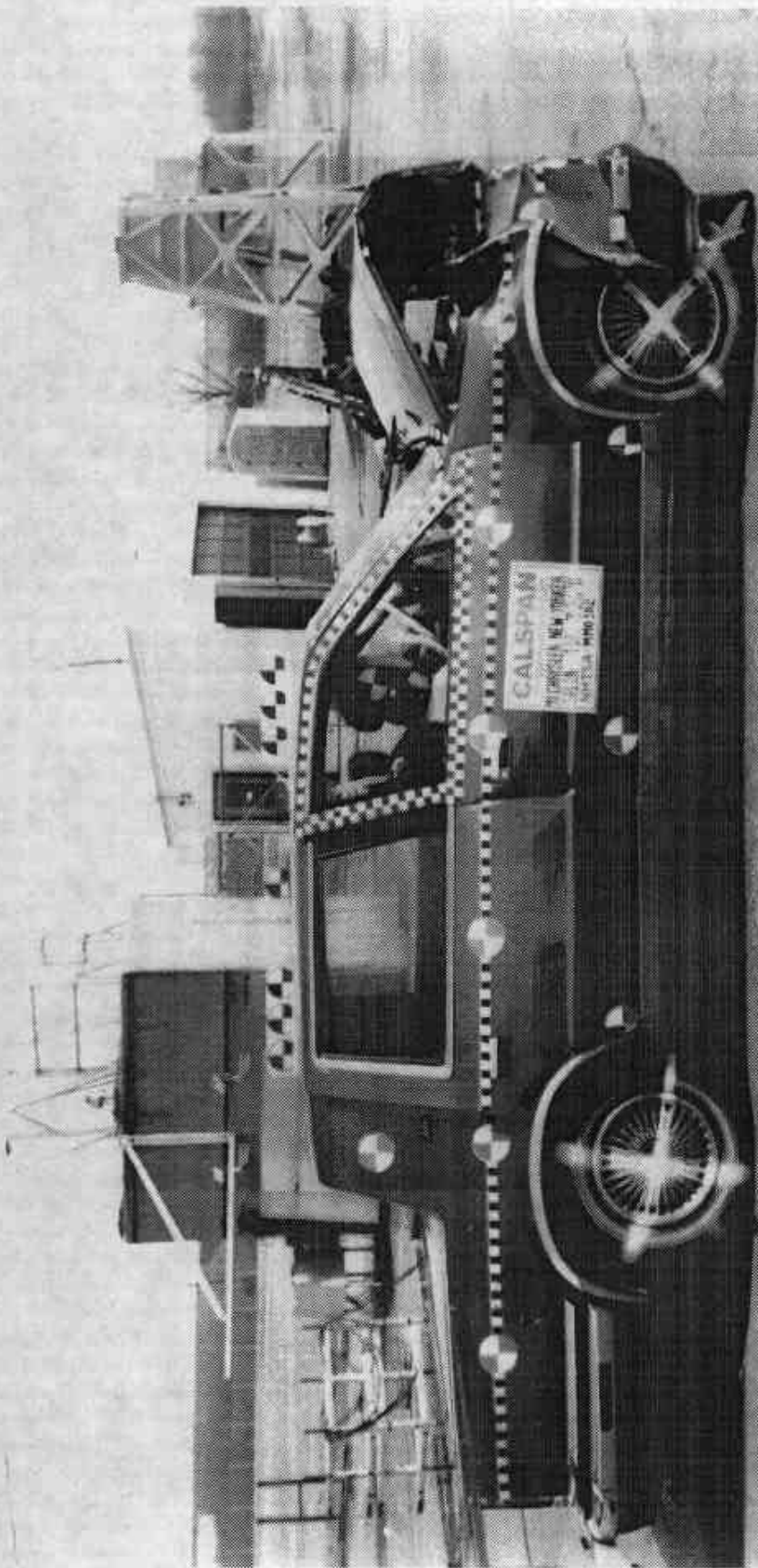


Figure A-7 POST-TEST RIGHT SIDE VIEW

A-9

7893-6

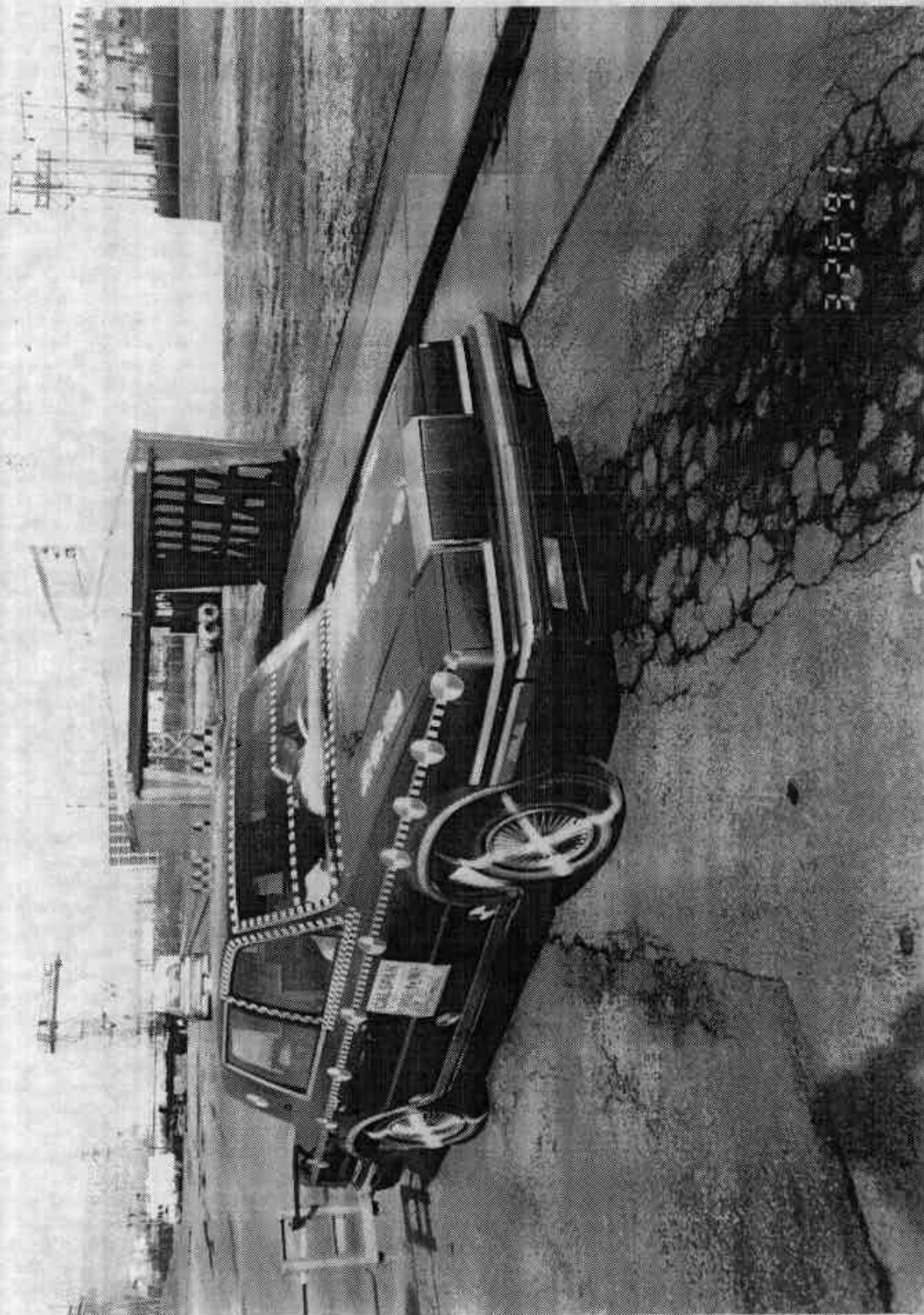


FIGURE A-8 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

7893-6

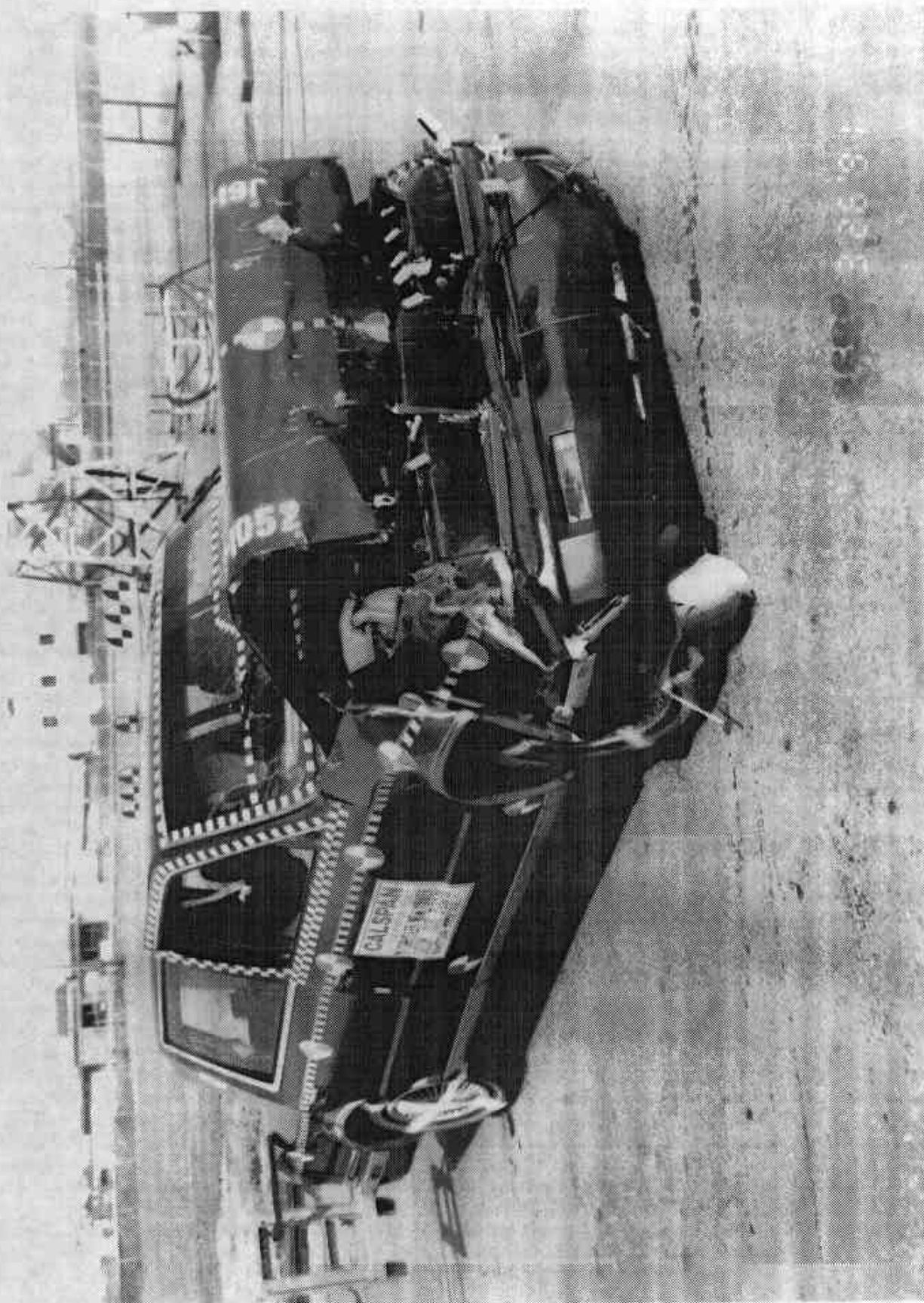


FIGURE A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



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

A-12

7893-6



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

A-13

7893-6

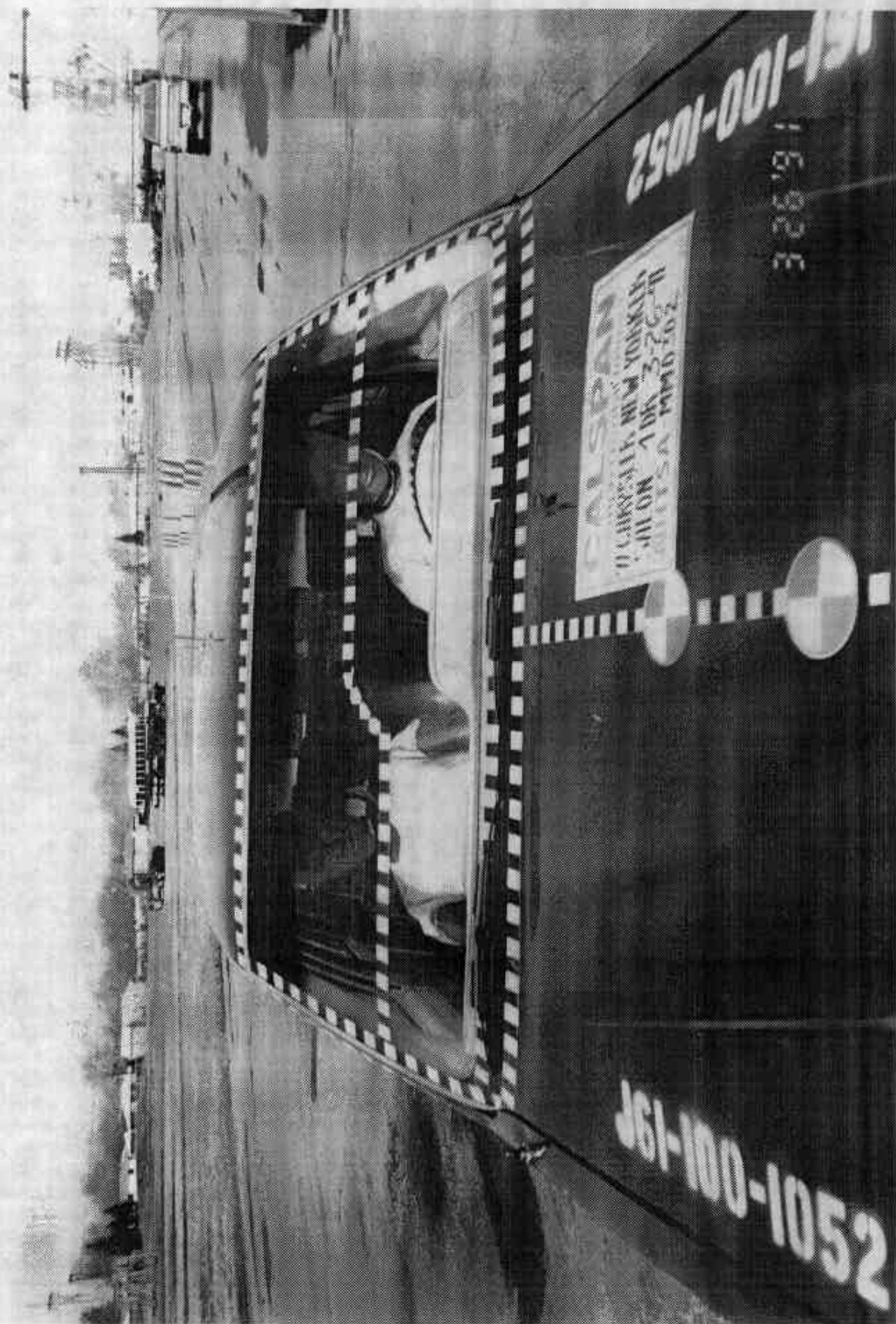


Figure A-12 PRE-TEST WINDSHIELD VIEW

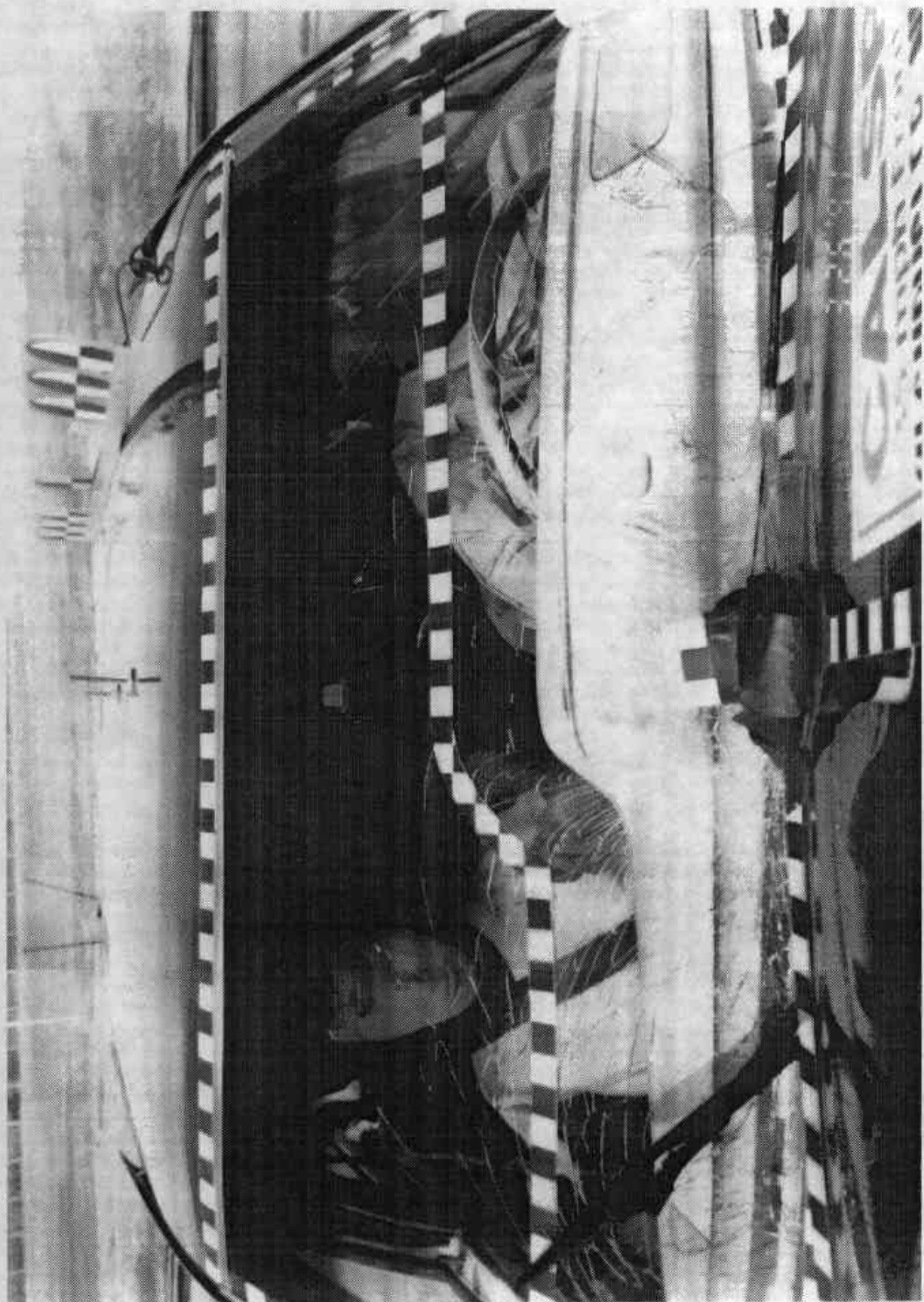


Figure A-13 POST-TEST WINDSHIELD VIEW

A-15

7893-6

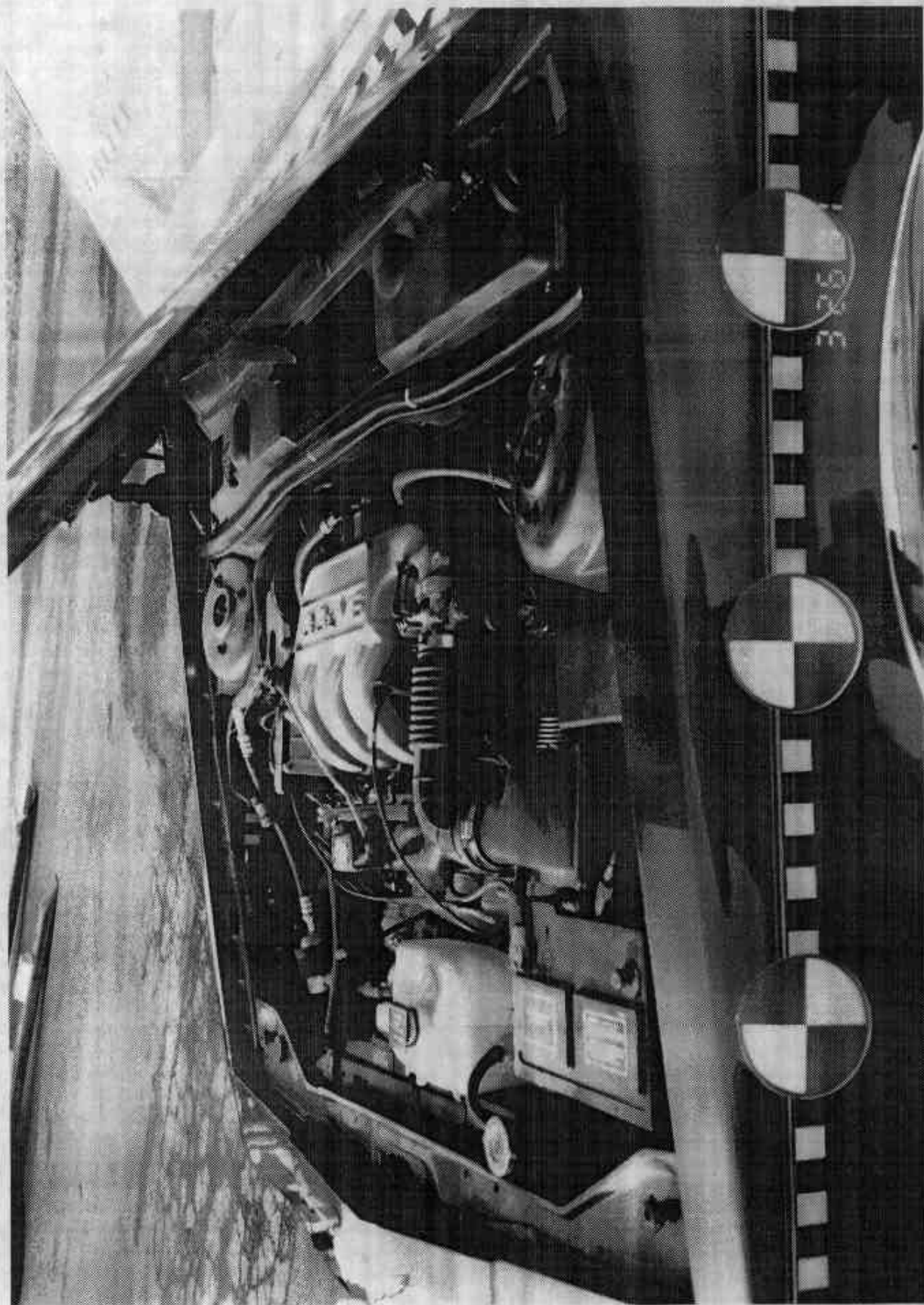


FIGURE A-14 PRE-TEST ENGINE COMPARTMENT VIEW

A-16

7893-6



Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

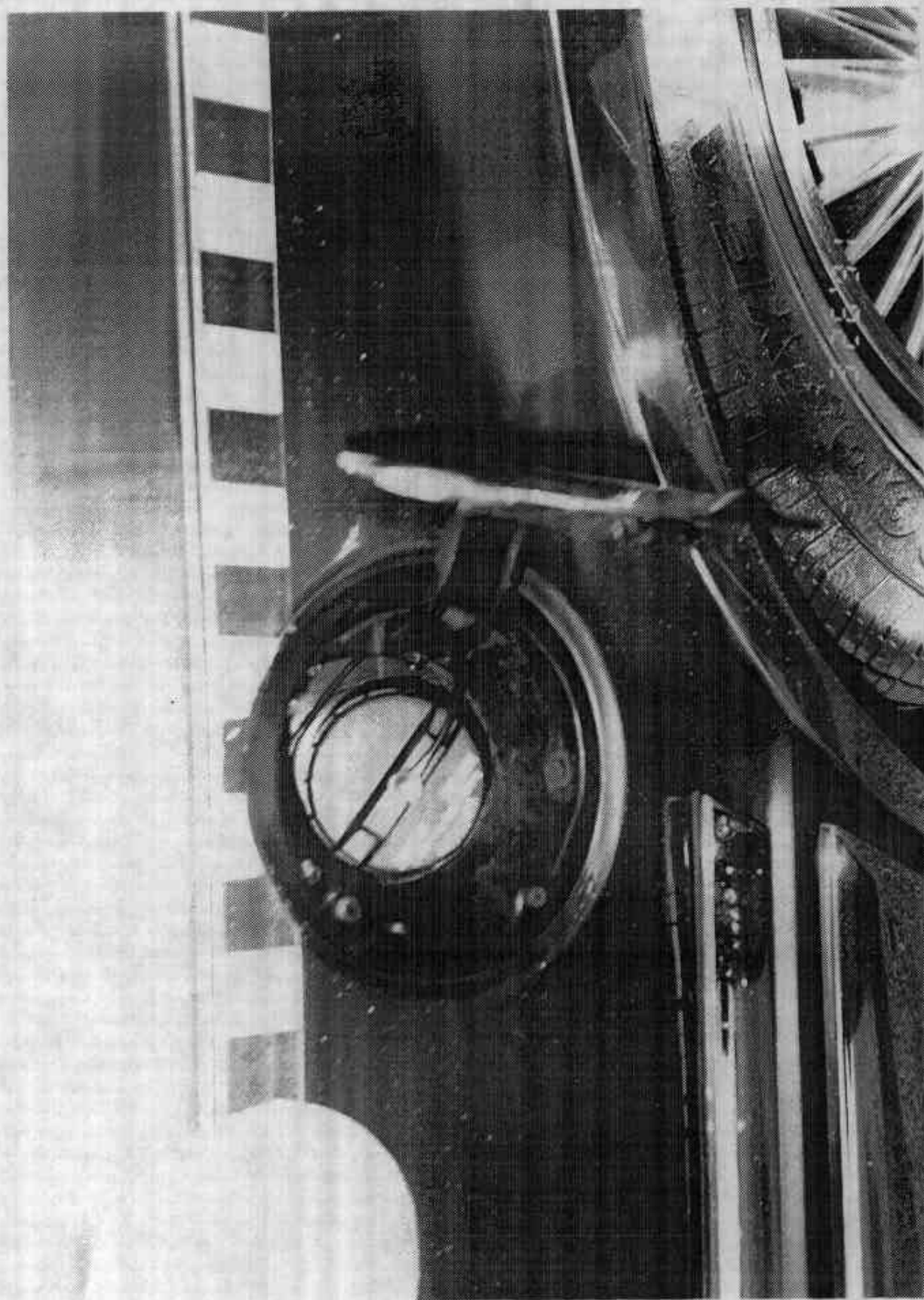


Figure A-16 FUEL CAP VIEW

A-18

7893-6

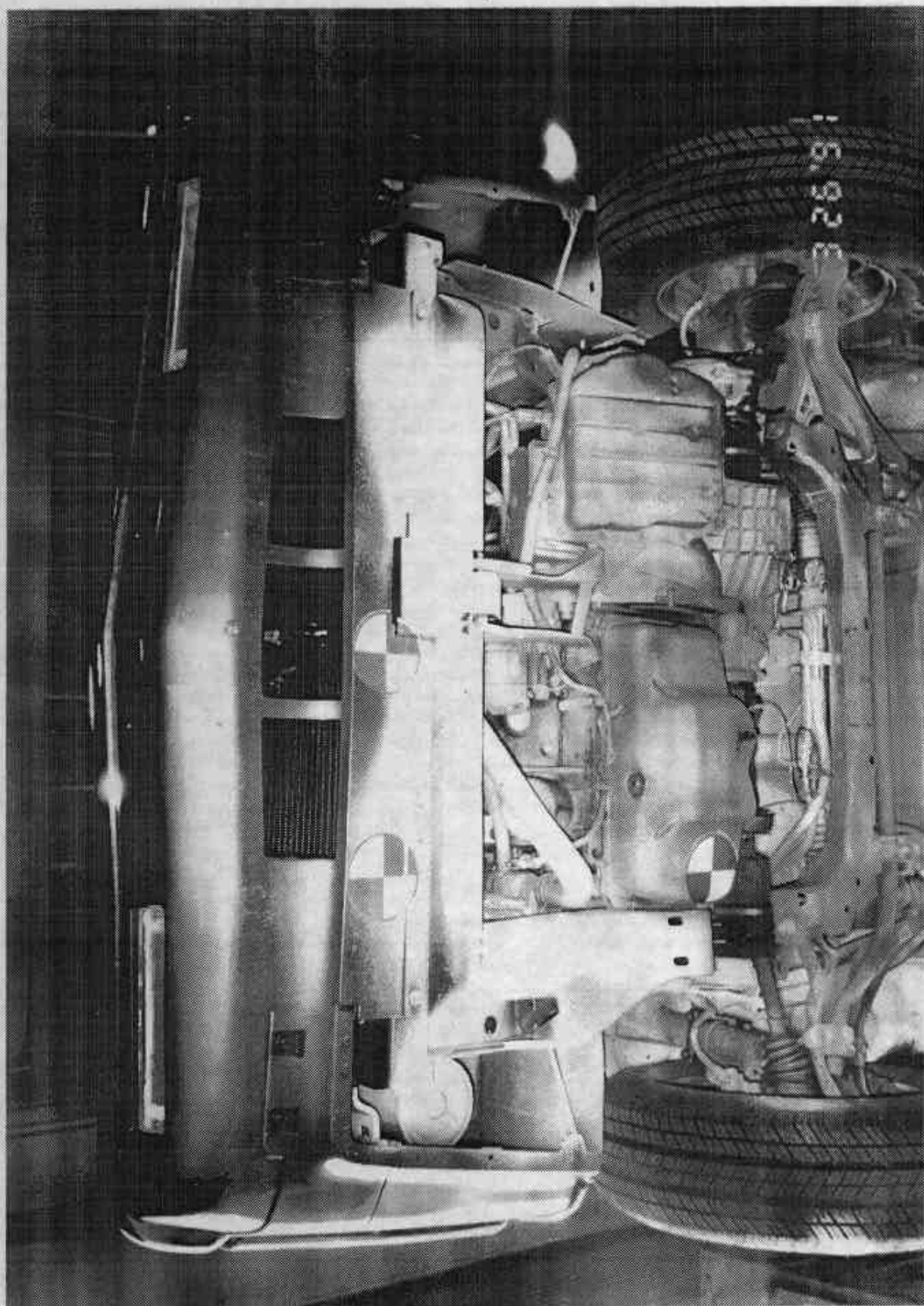


Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

A-19

7893-6

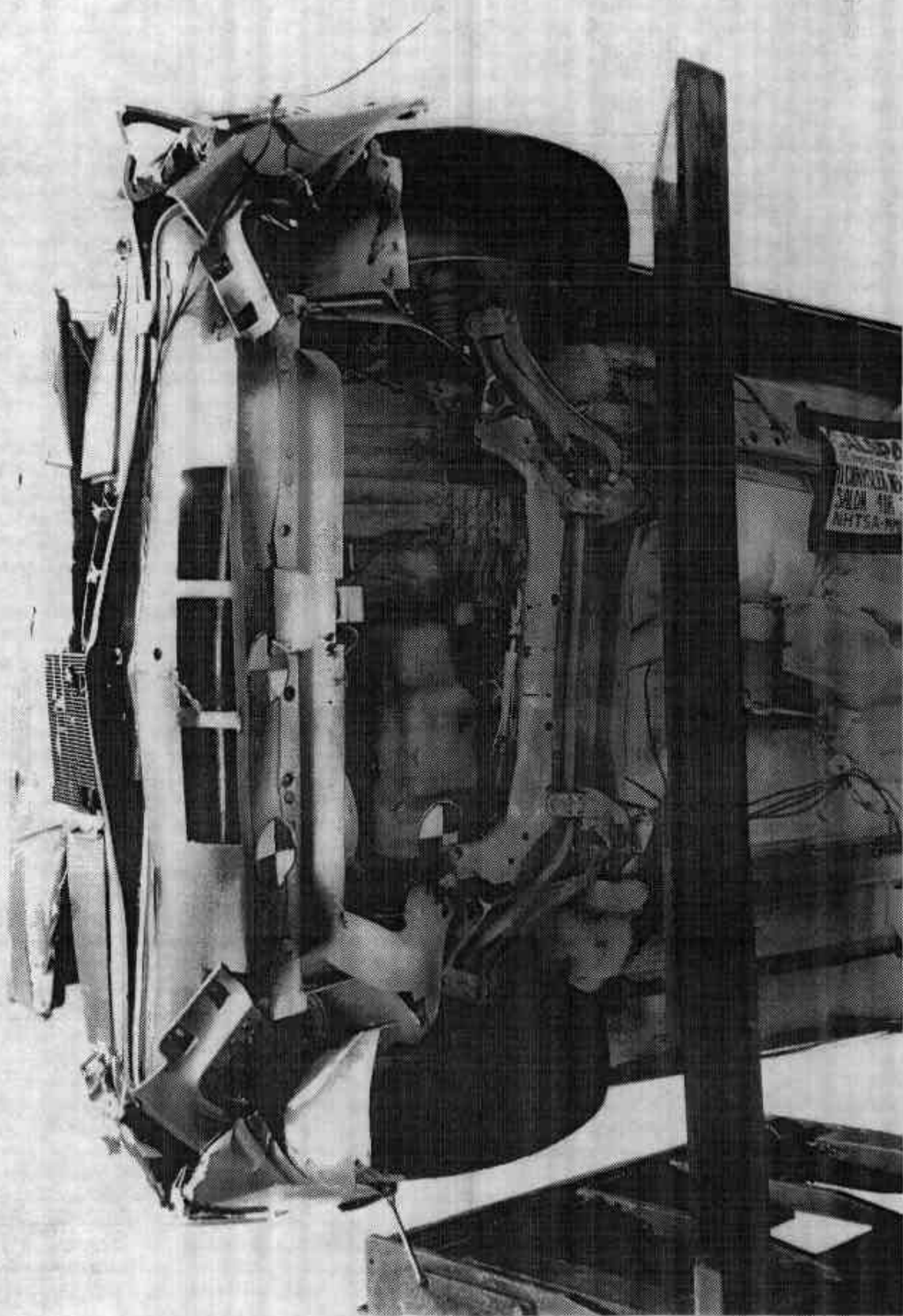


Figure A-18 POST TEST FRONT UNDERBODY VIEW

A-20

7893-6

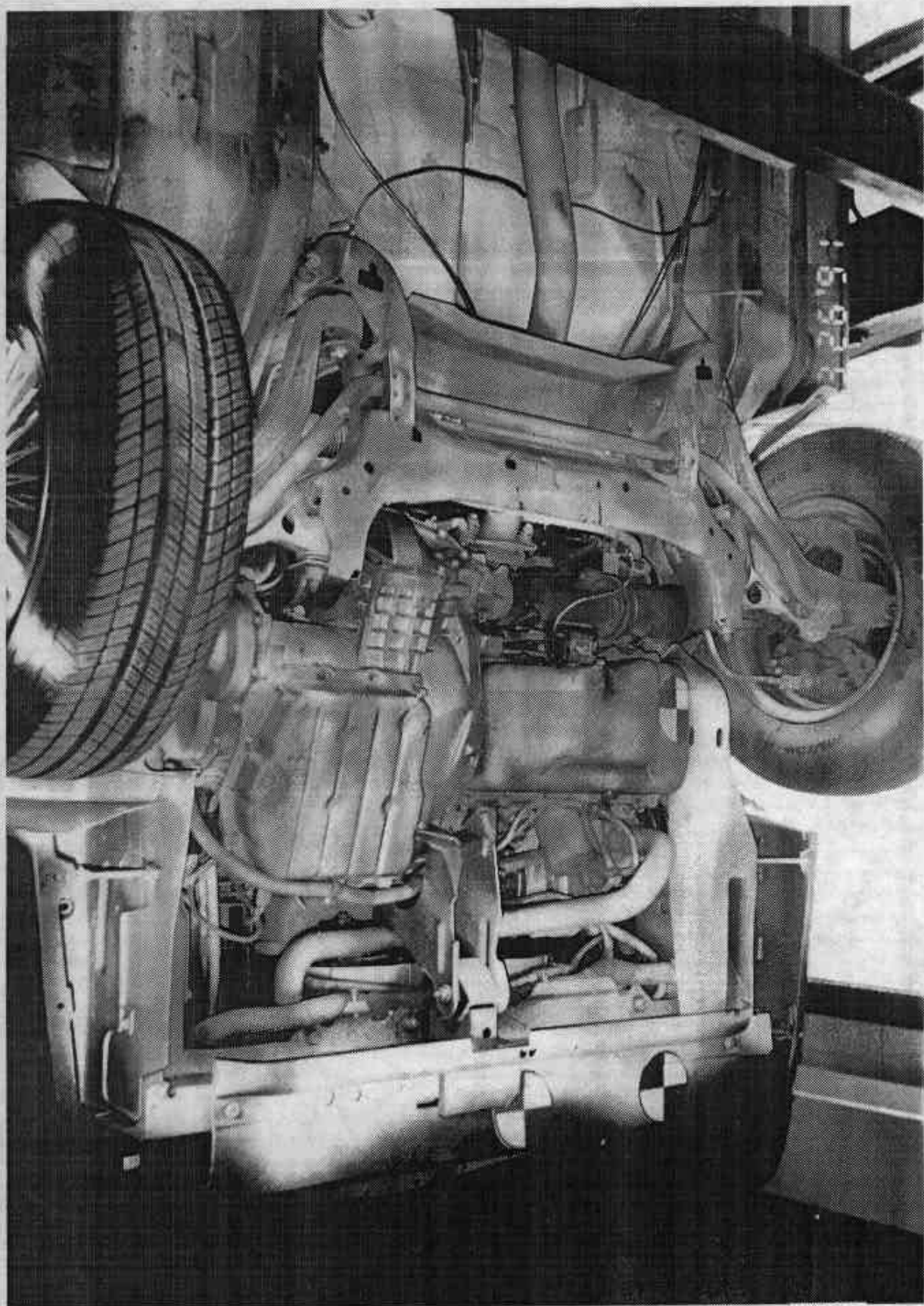


FIGURE A-19 PRE-TEST FRONT SIDE UNDERBODY VIEW

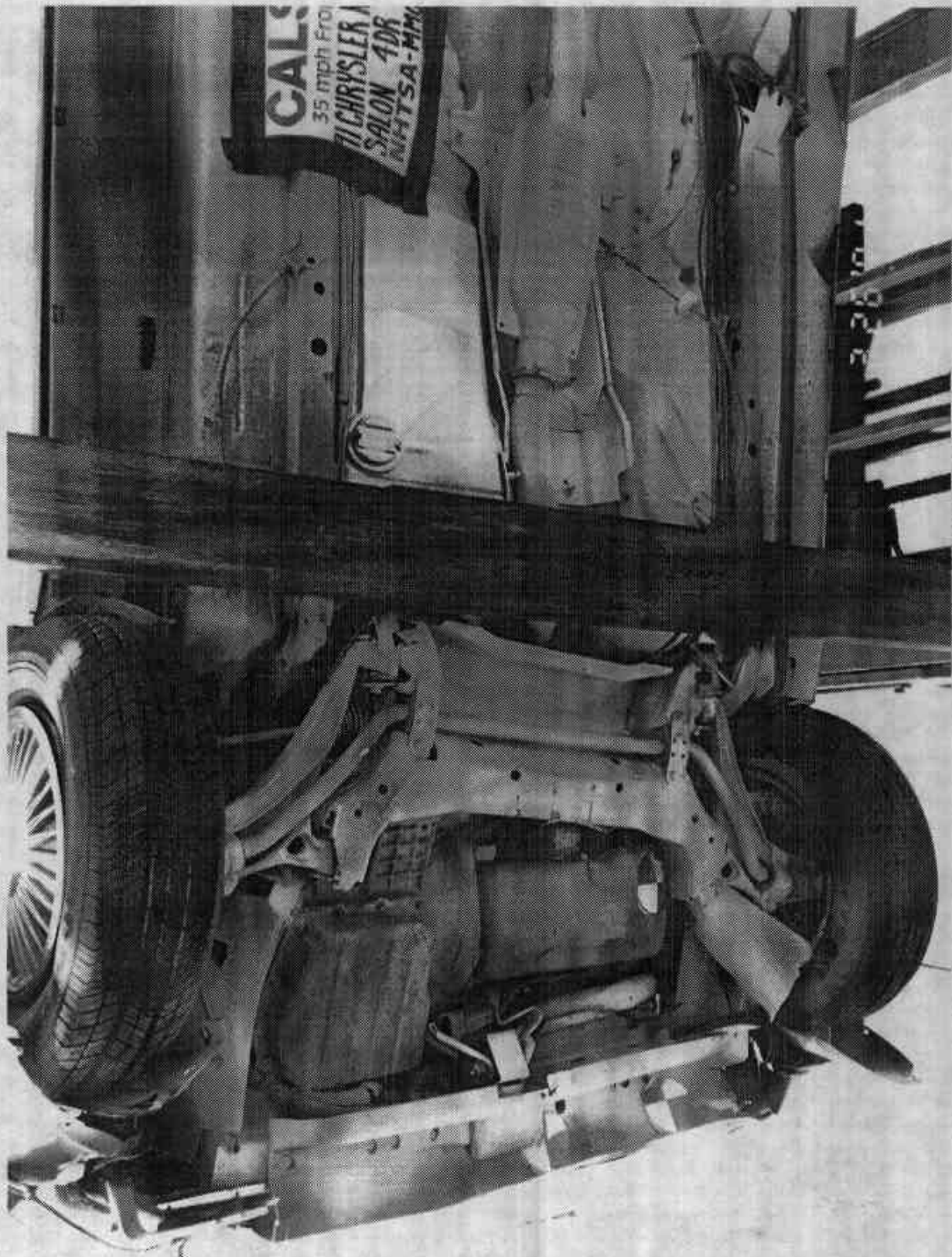


FIGURE A-20. POST-TEST FRONT SIDE UNDERBODY VIEW

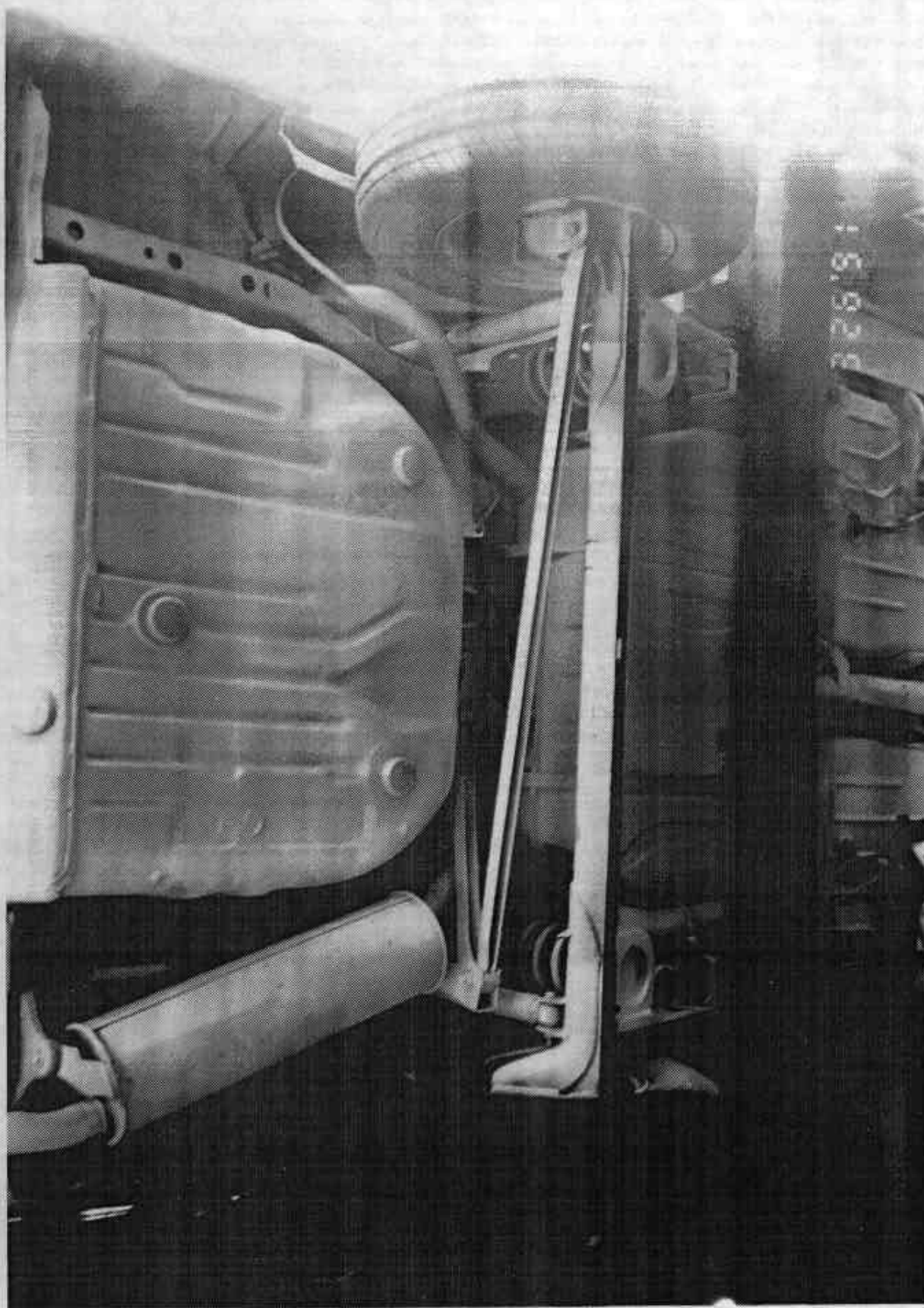


Figure A-21 PRE-TEST REAR UNDERBODY VIEW

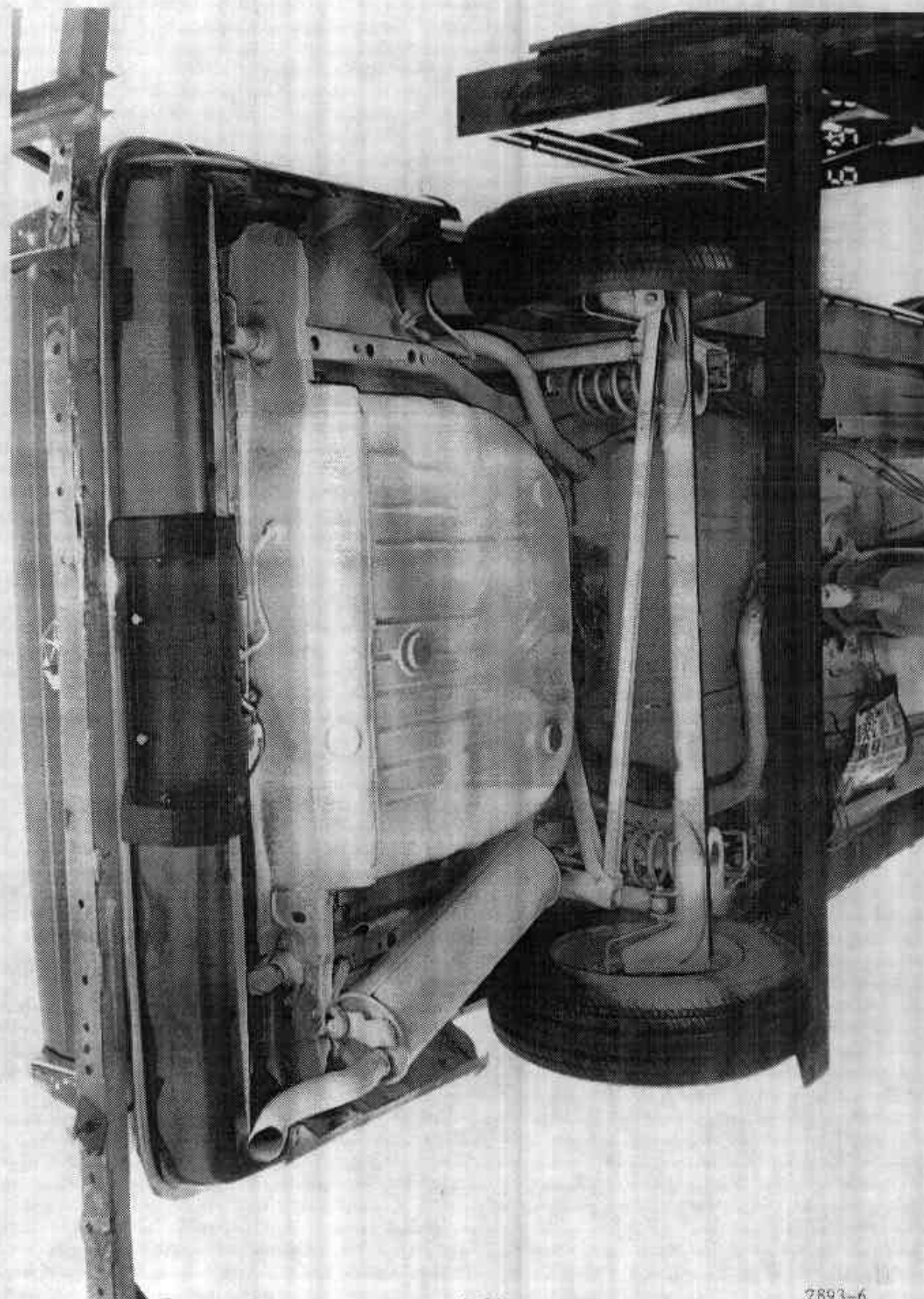


Figure A-22 POST-TEST BEAR UNDERBODY VIEW

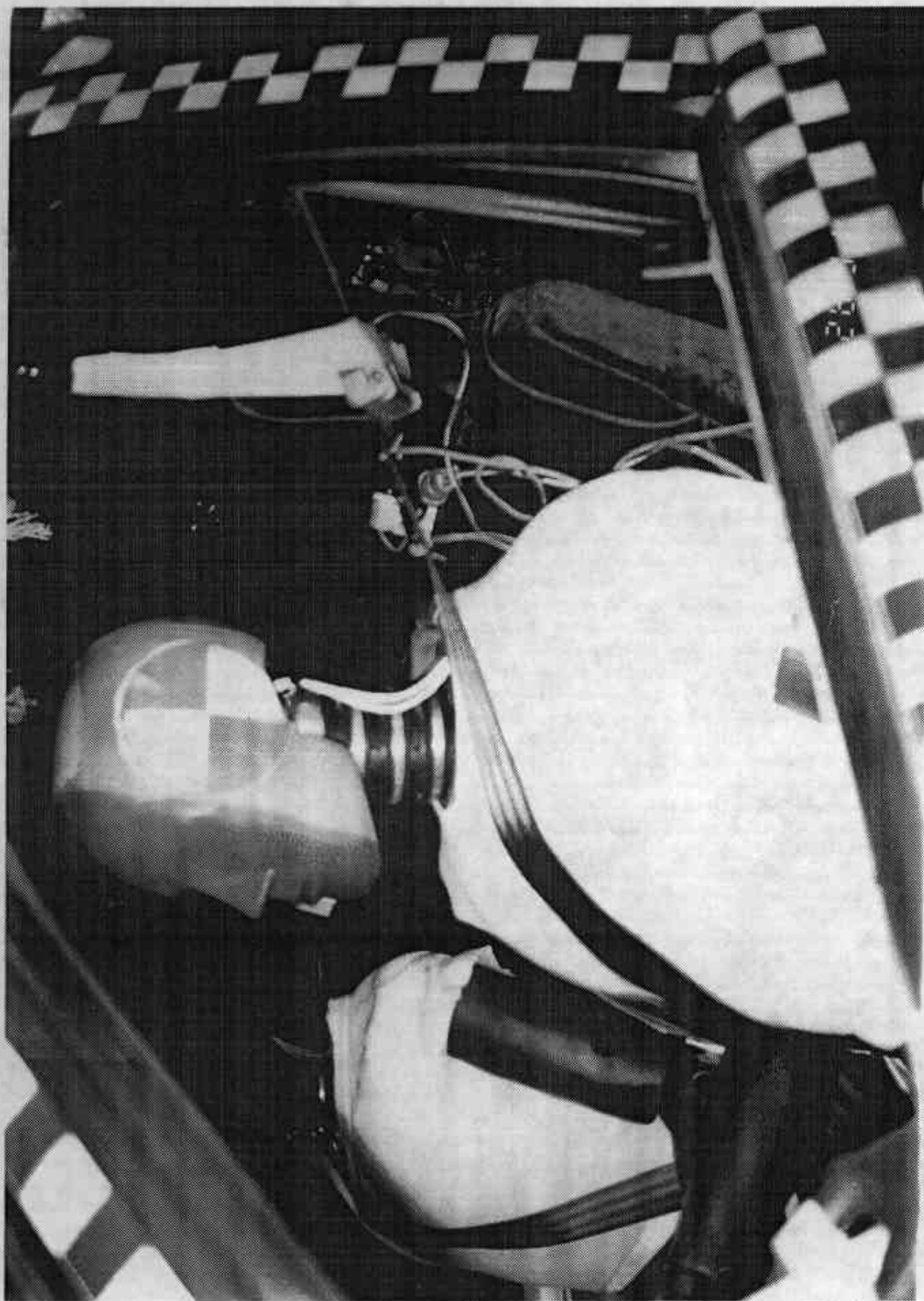


Figure A-23 PRE-TEST DRIVER POSITION VIEW

A-25

7893-6



Figure A-24 POST TEST DRIVER POSITION VIEW

A-26

7893-6

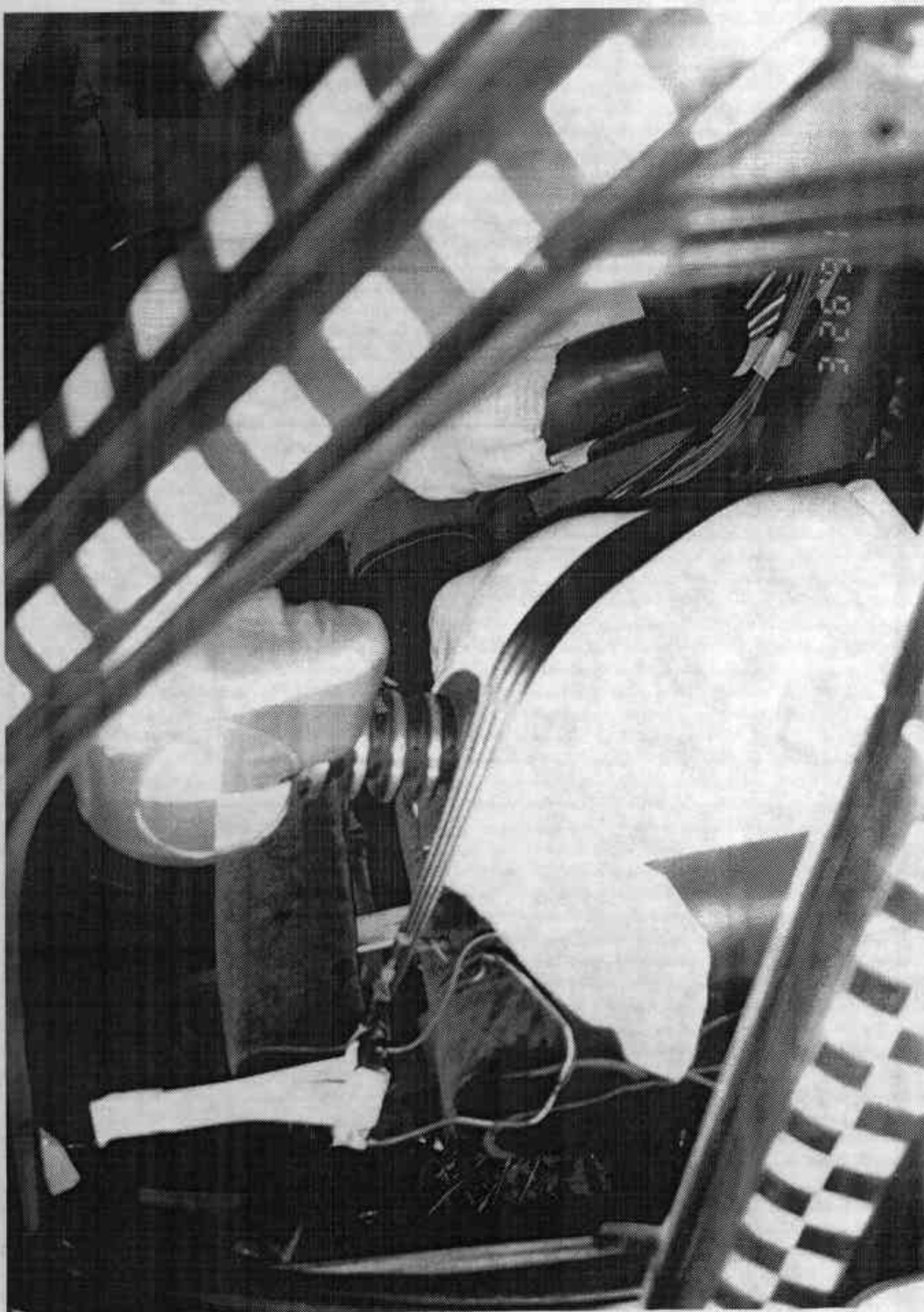


Figure A-25 PRE-TEST PASSENGER POSITION VIEW

A-27

7893-6



Figure A-26 POST-TEST PASSENGER POSITION VIEW

A-28

7893-6

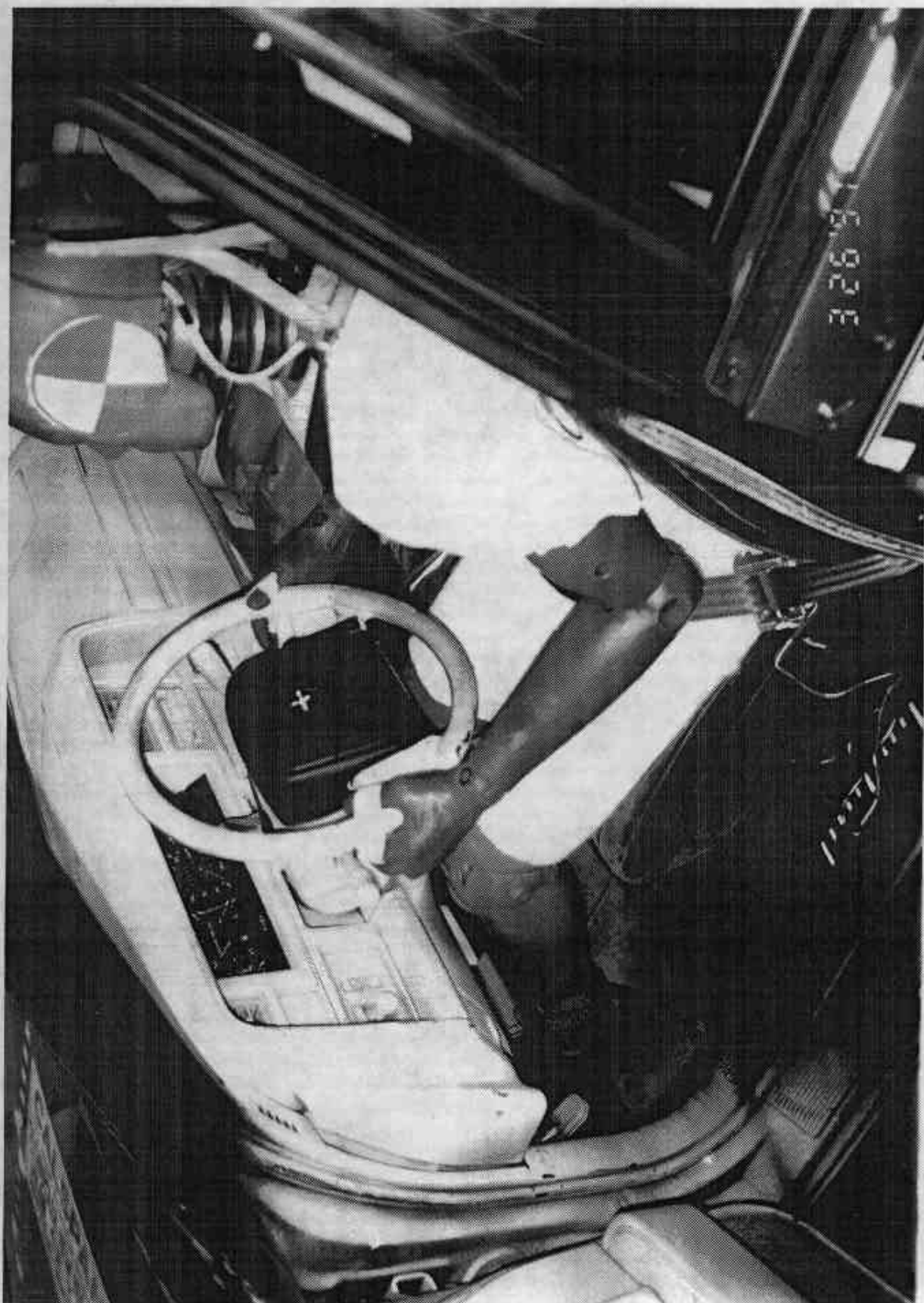


Figure A-27 PRE-TEST DRIVER AND INTERIOR VIEW



FIGURE A-28 POST-TEST DRIVER AND INTERIOR VIEW

A-30

7893-6

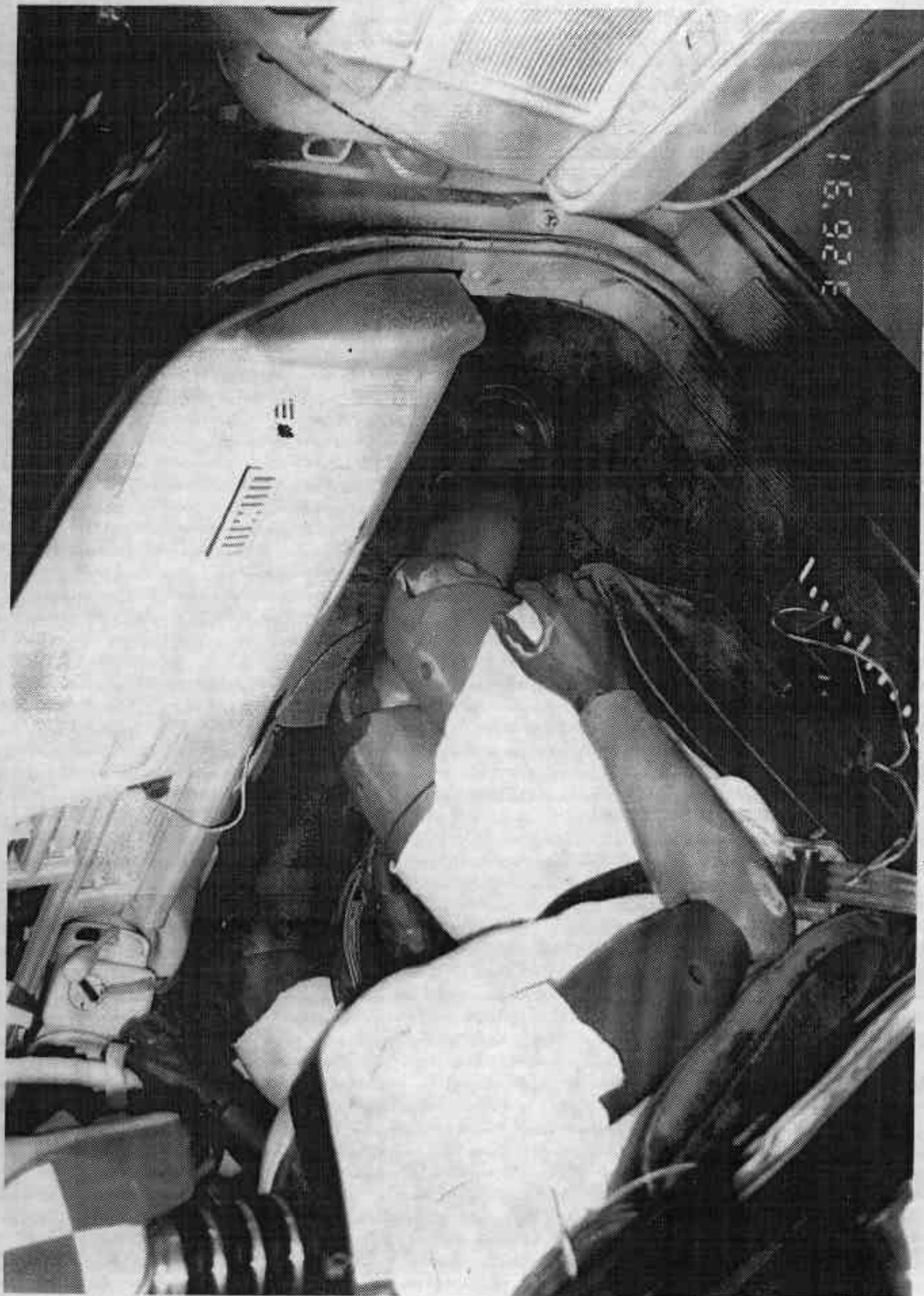


Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

A-31

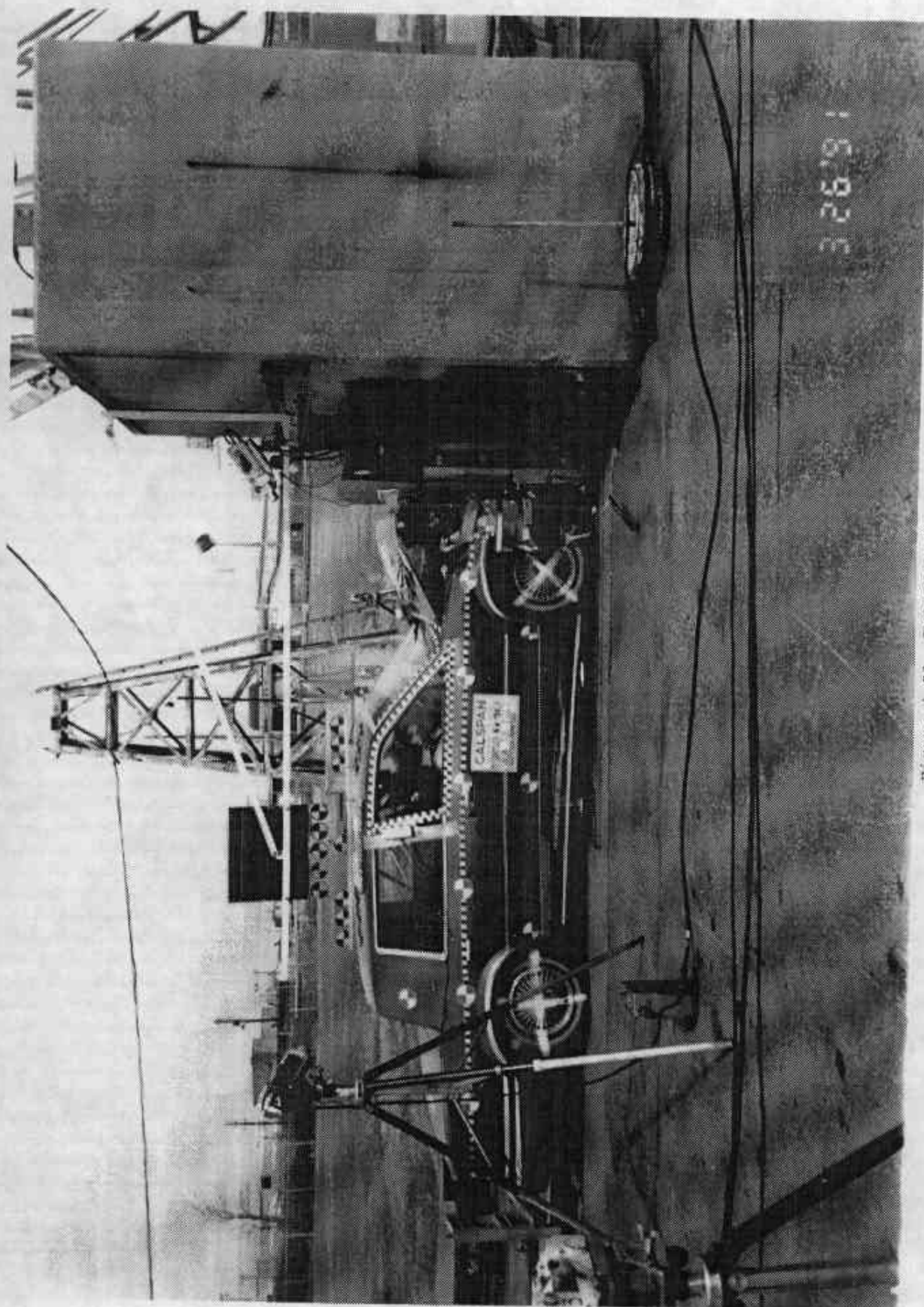
7893-6



FIGURE A-30 POST-TEST PASSENGER AND INTERIOR VIEW

A-32

7893-6



32891

FIGURE A-31 IMPACT VIEW

A-33

7893-6

## Appendix B

### VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MM0302

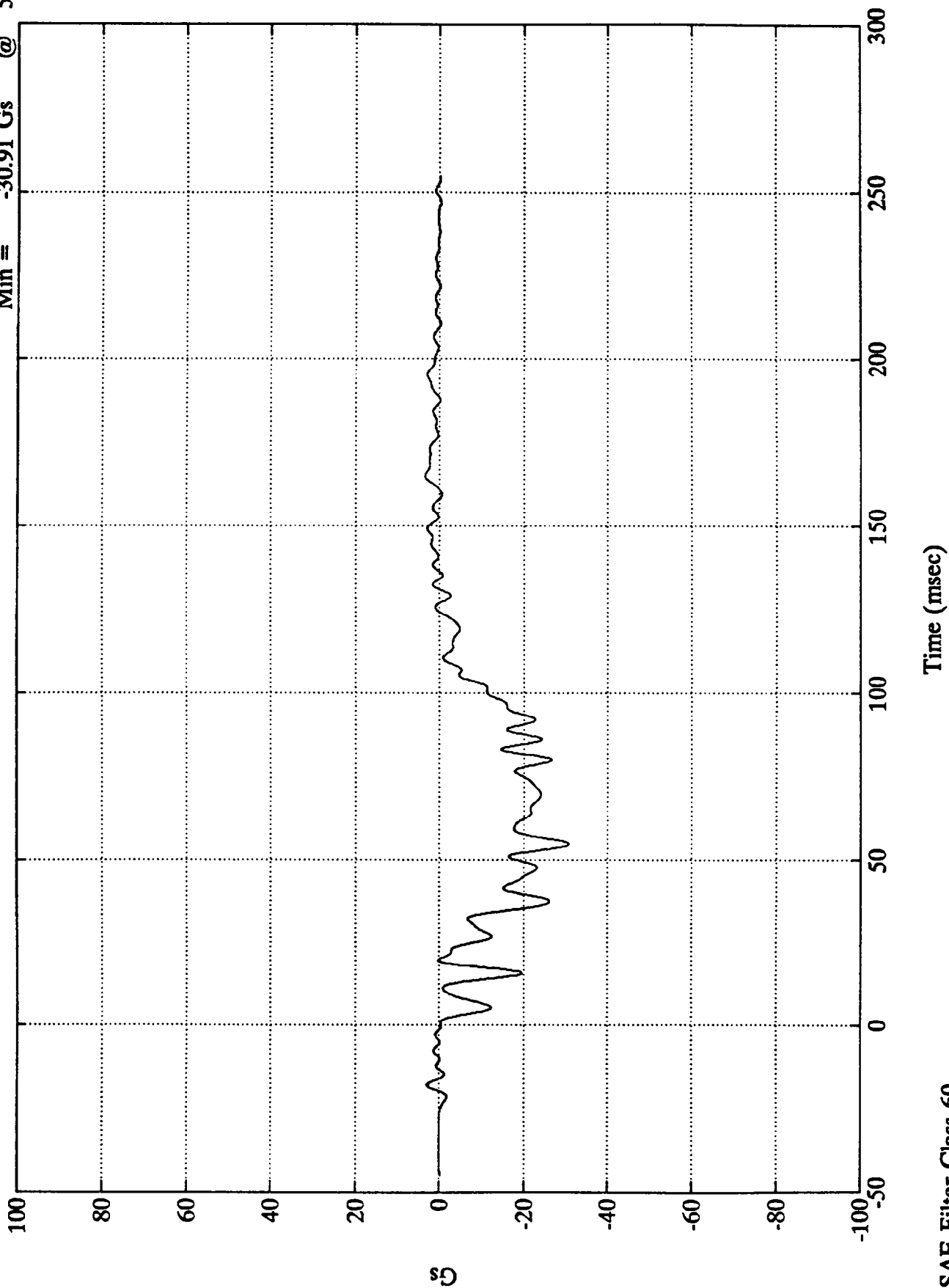
VEHICLE DATA

FILTER CHANNEL CLASS

60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

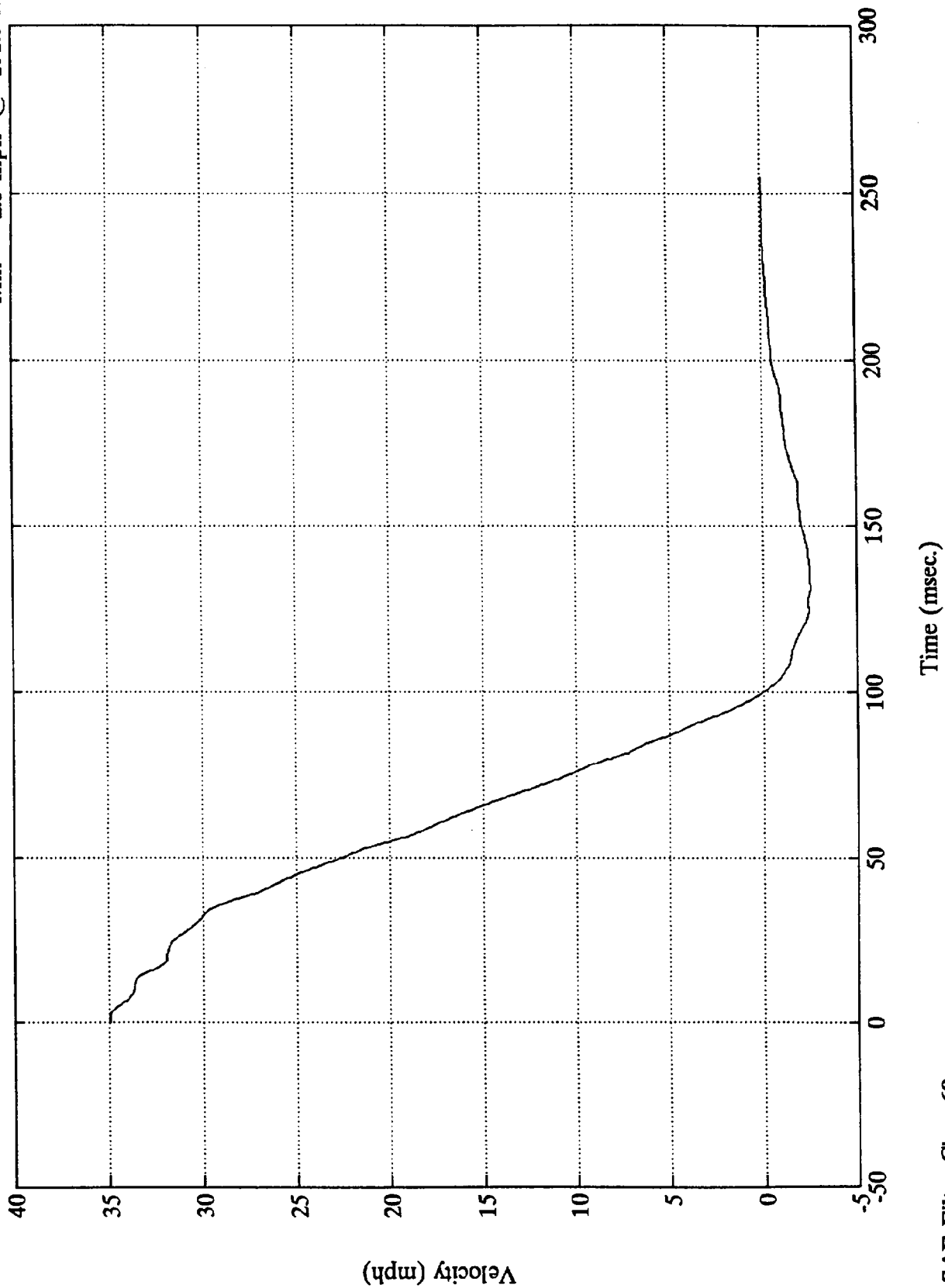
Acc. #1(x)      Max = 3.43 Gs      @ 164.88 ms  
Min = -30.91 Gs      @ 54.72 ms



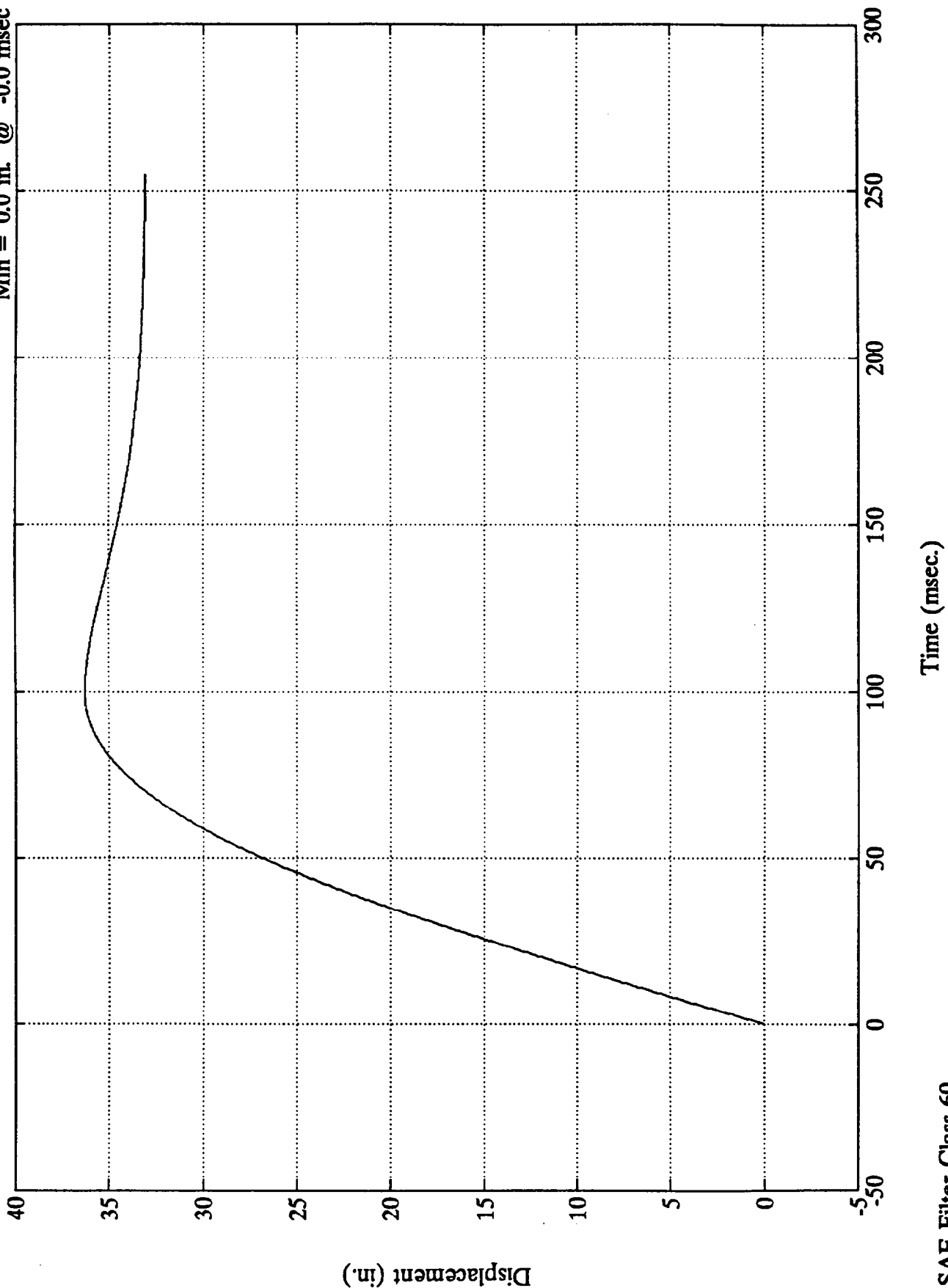
Max = 35.0 mph @ 0.5 msec  
Min = -2.5 mph @ 131.3 msec

Acc. #1(x)

NCAP TEST #10 1991 CHRYSLER NEW YORKER



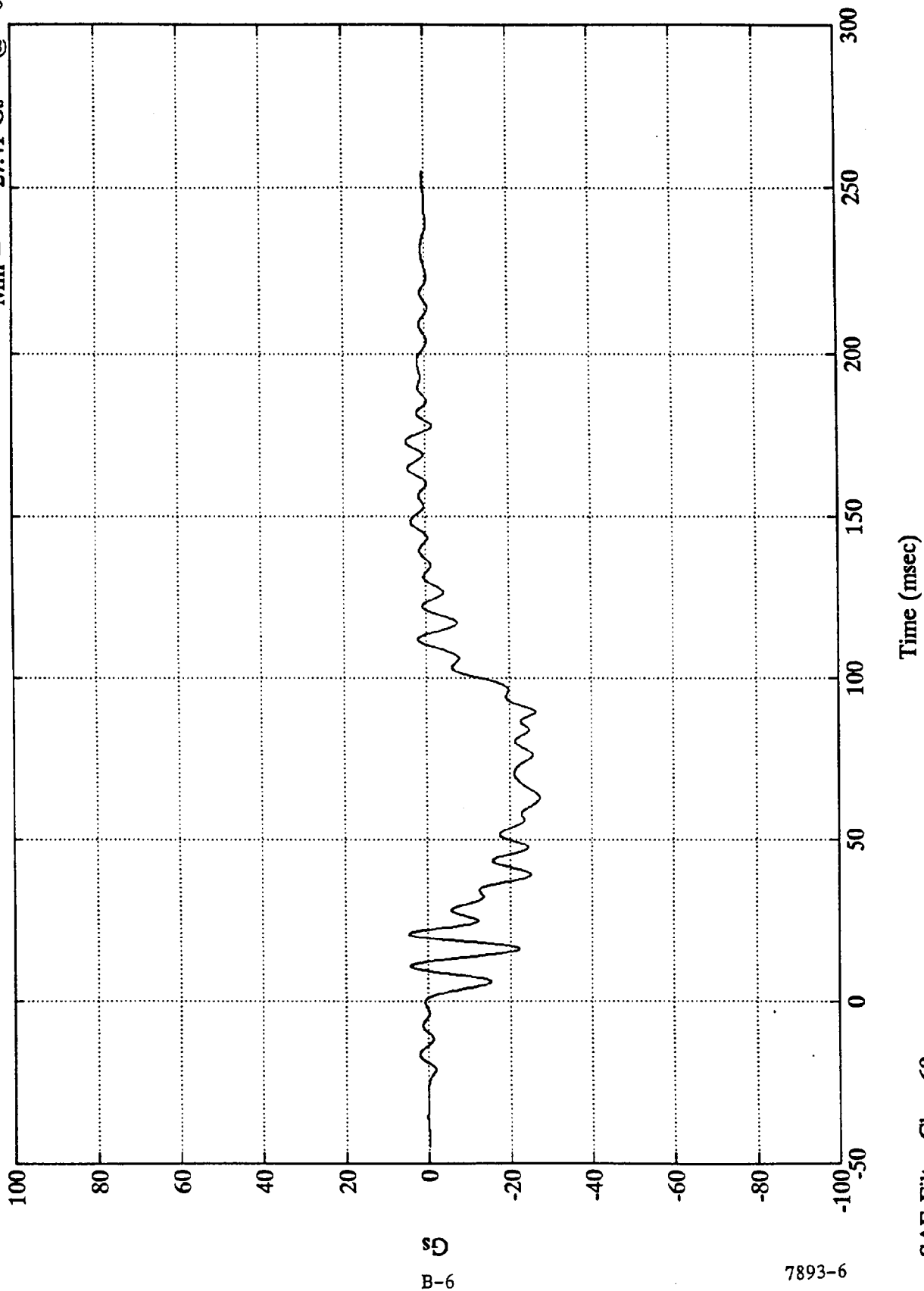
NCAP TEST #10 1991 CHRYSLER NEW YORKER      Acc. #1(x)      Max = 36.3 in. @ 101.3 msec  
Min = 0.0 in. @ -0.0 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Acc. #2(x)

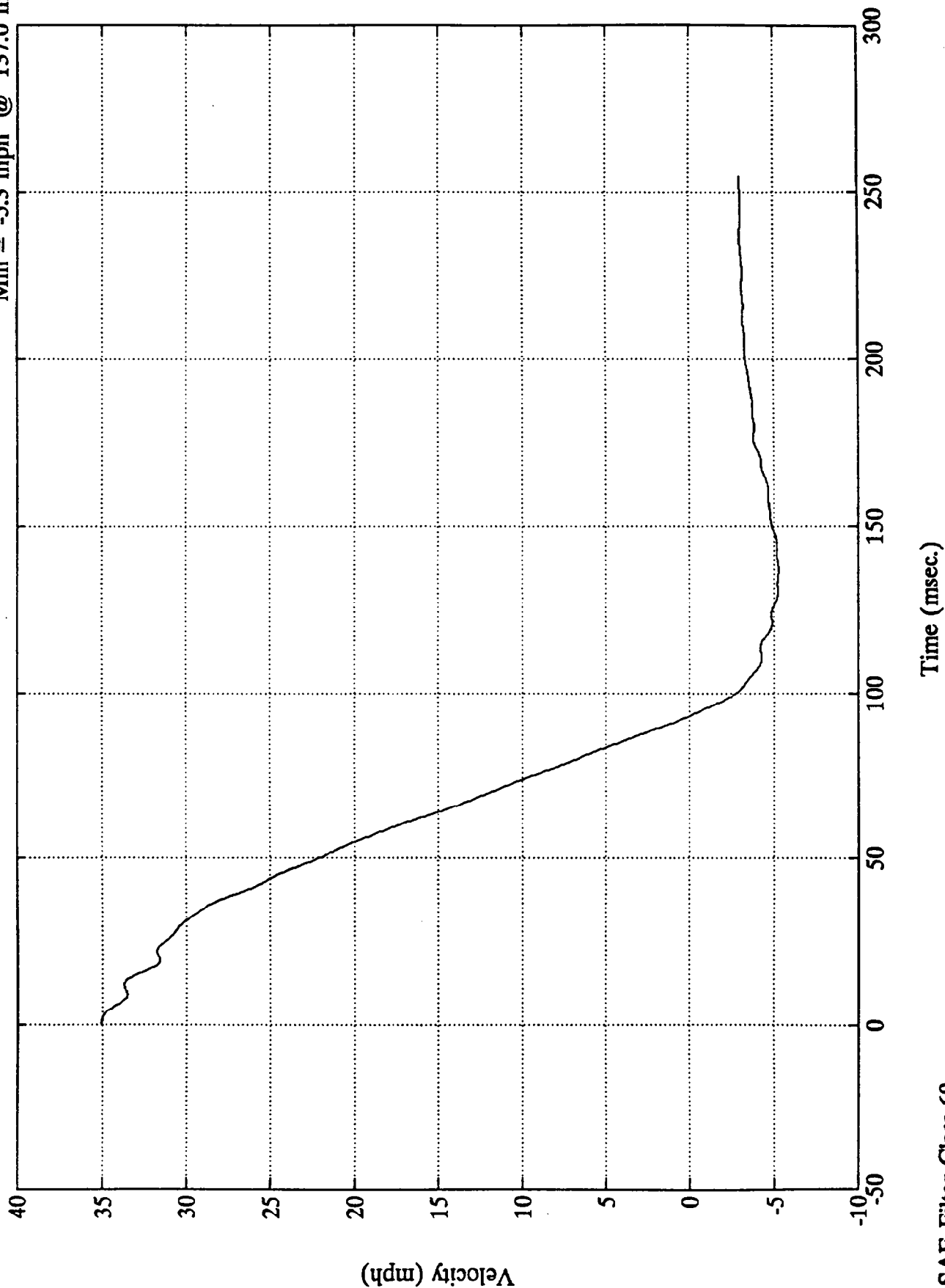
Max = 4.81 Gs @ 173.16 msec  
Min = -27.41 Gs @ 62.88 msec



SAE Filter Class 60

Max = 35.0 mph @ 1.2 msec  
Min = -5.3 mph @ 137.0 msec

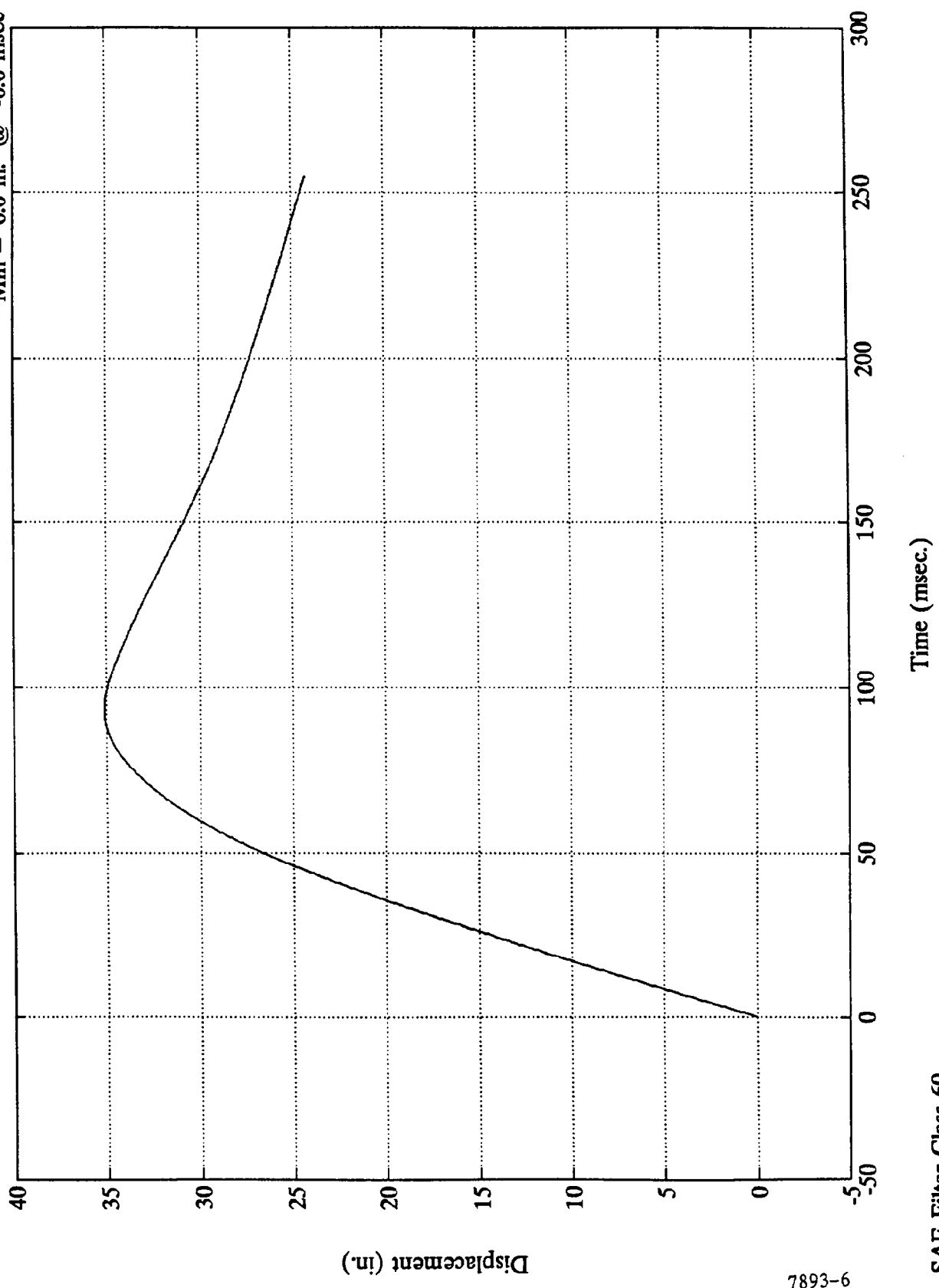
NCAP TEST #10 1991 CHRYSLER NEW YORKER Acc. #2(x)



Max = 35.1 in. @ 93.8 msec  
Min = 0.0 in. @ -0.0 msec

Acc. #2(x)

NCAP TEST #10 1991 CHRYSLER NEW YORKER

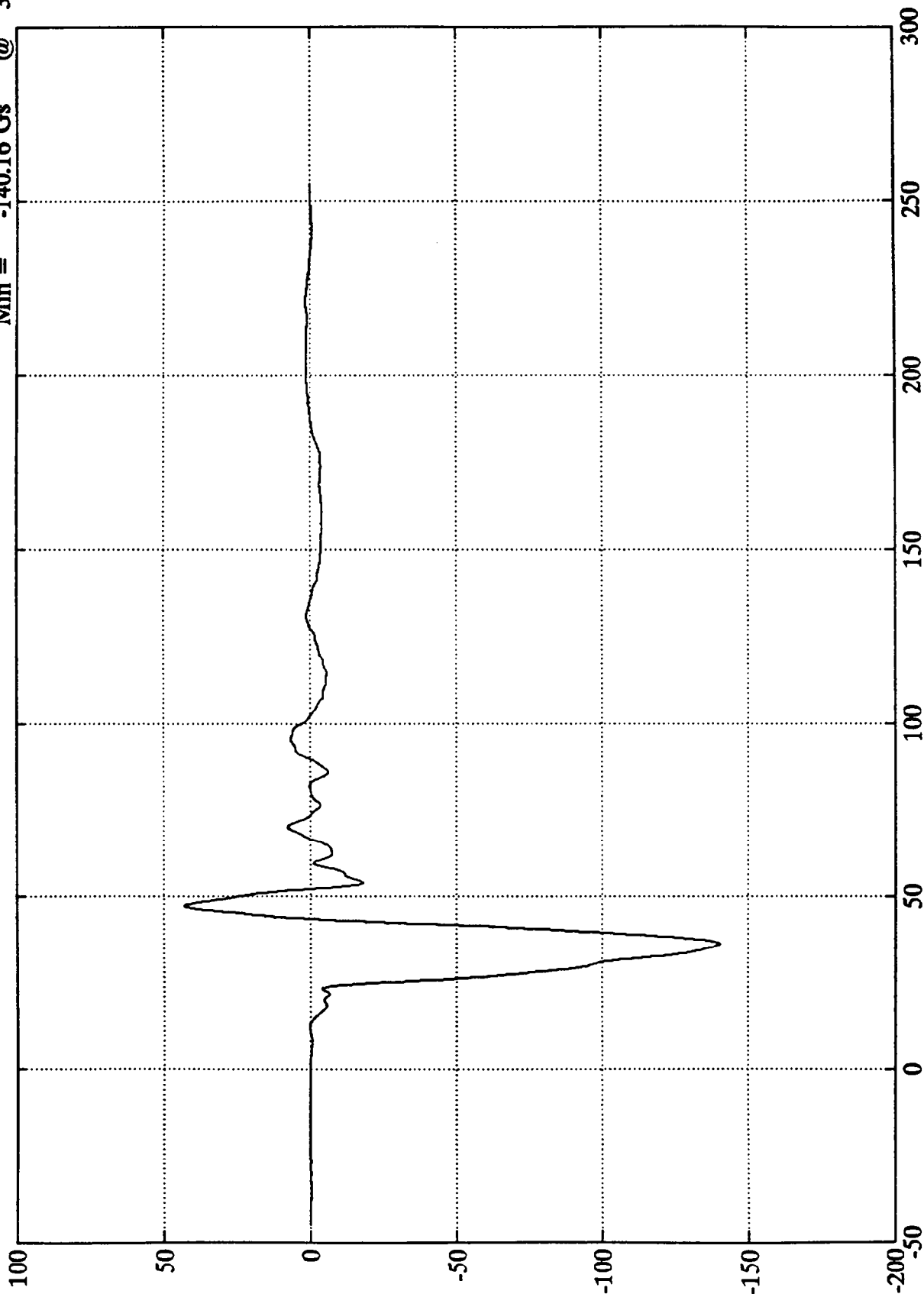


SAE Filter Class 60

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Acc. #3(x)

Max = 42.93 Gs @ 47.27 msec  
Min = -140.16 Gs @ 36.36 msec



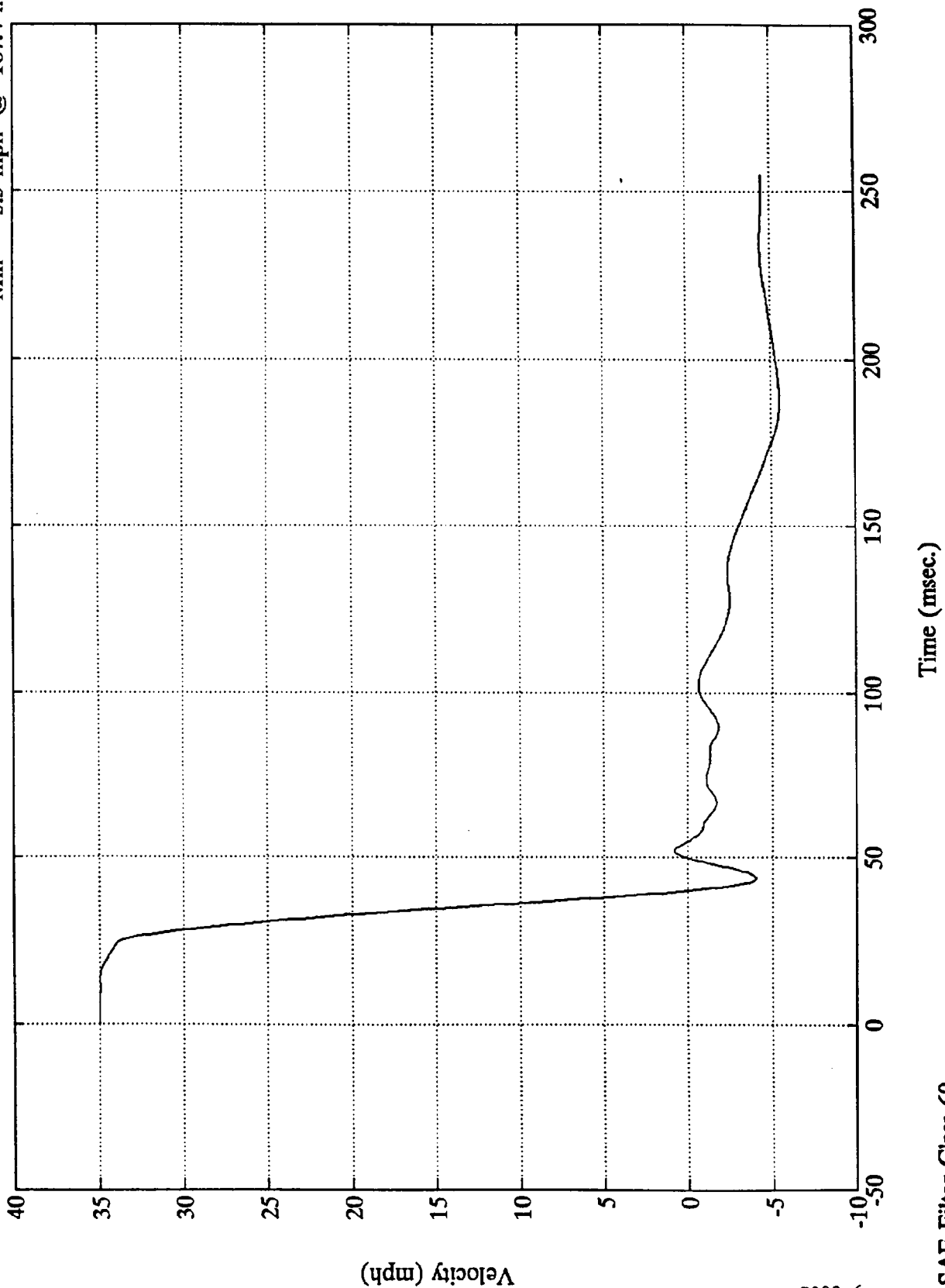
Time (msec)

SAE Filter Class 60

Max = 35.0 mph @ 3.8 msec  
Min = -5.5 mph @ 187.4 msec

Acc. #3(x)

NCAP TEST #10 1991 CHRYSLER NEW YORKER



SAE Filter Class 60

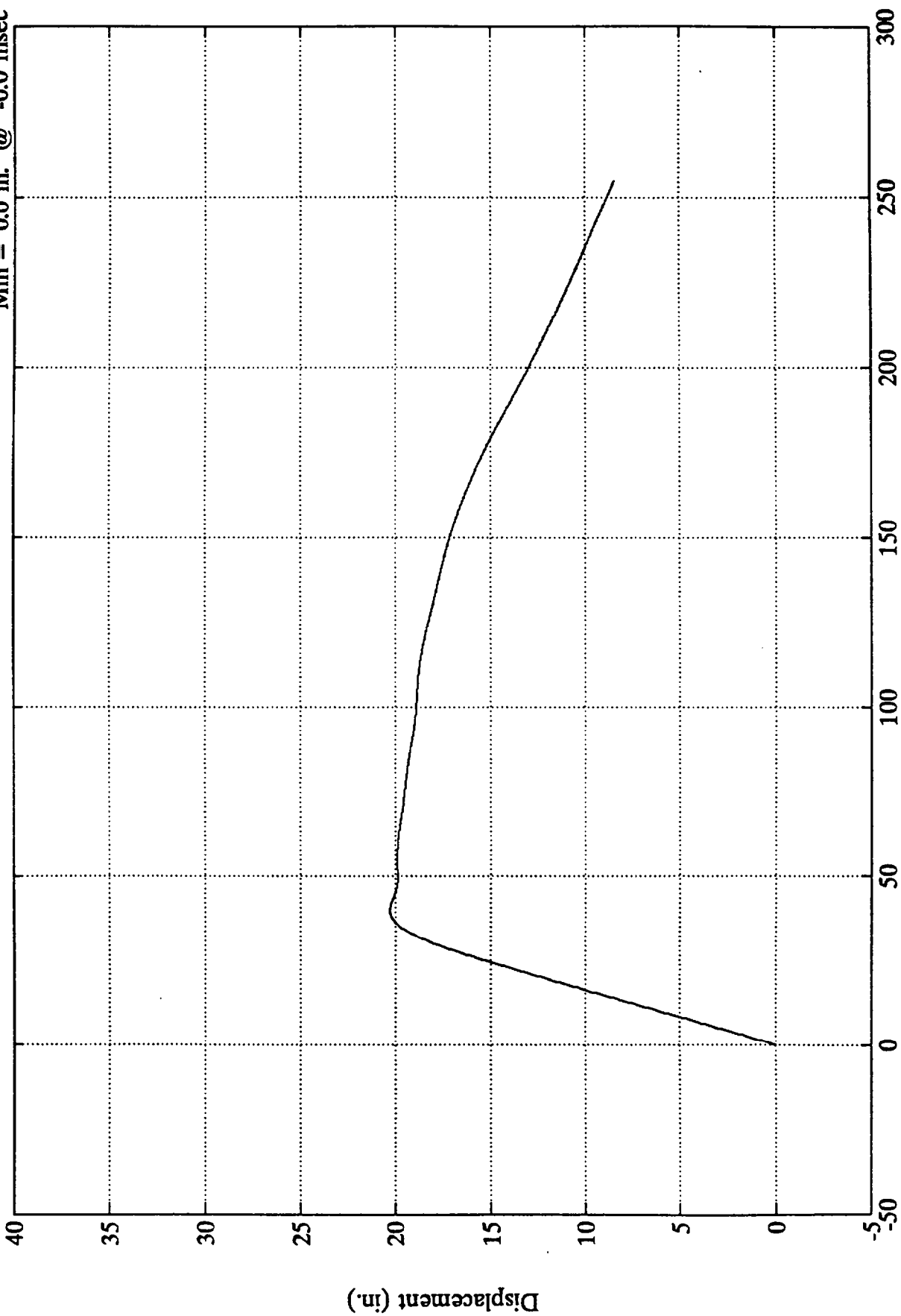
7893-6

B-10

Max = 20.3 in. @ 40.3 msec  
Min = 0.0 in. @ -0.0 msec

Acc. #3(x)

NCAP TEST #10 1991 CHRYSLER NEW YORKER



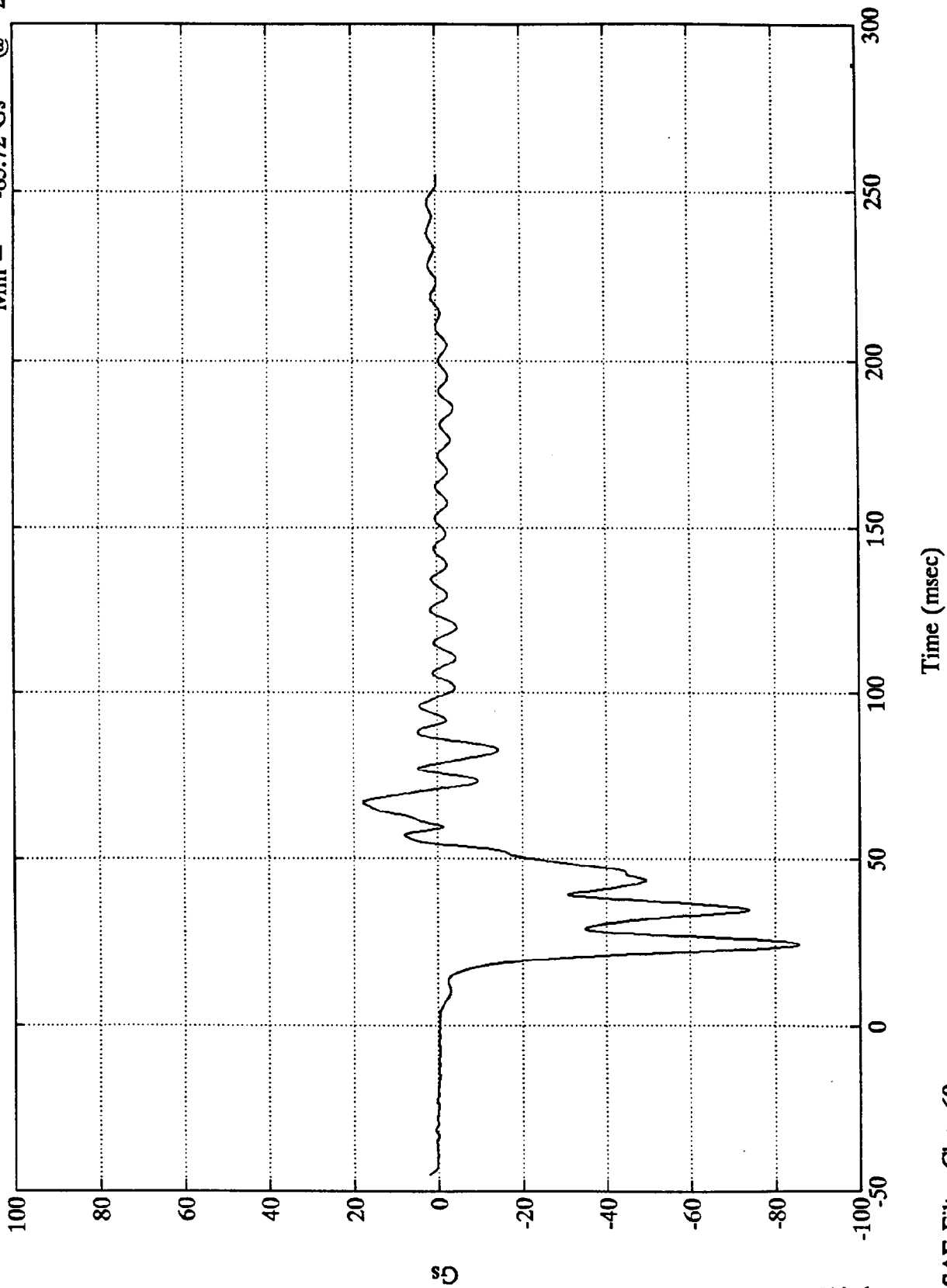
Time (msec.)

SAE Filter Class 60

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Acc. #4(x)

Max = 17.79 Gs @ 66.95 msec  
Min = -85.72 Gs @ 24.11 msec



gs  
B-12

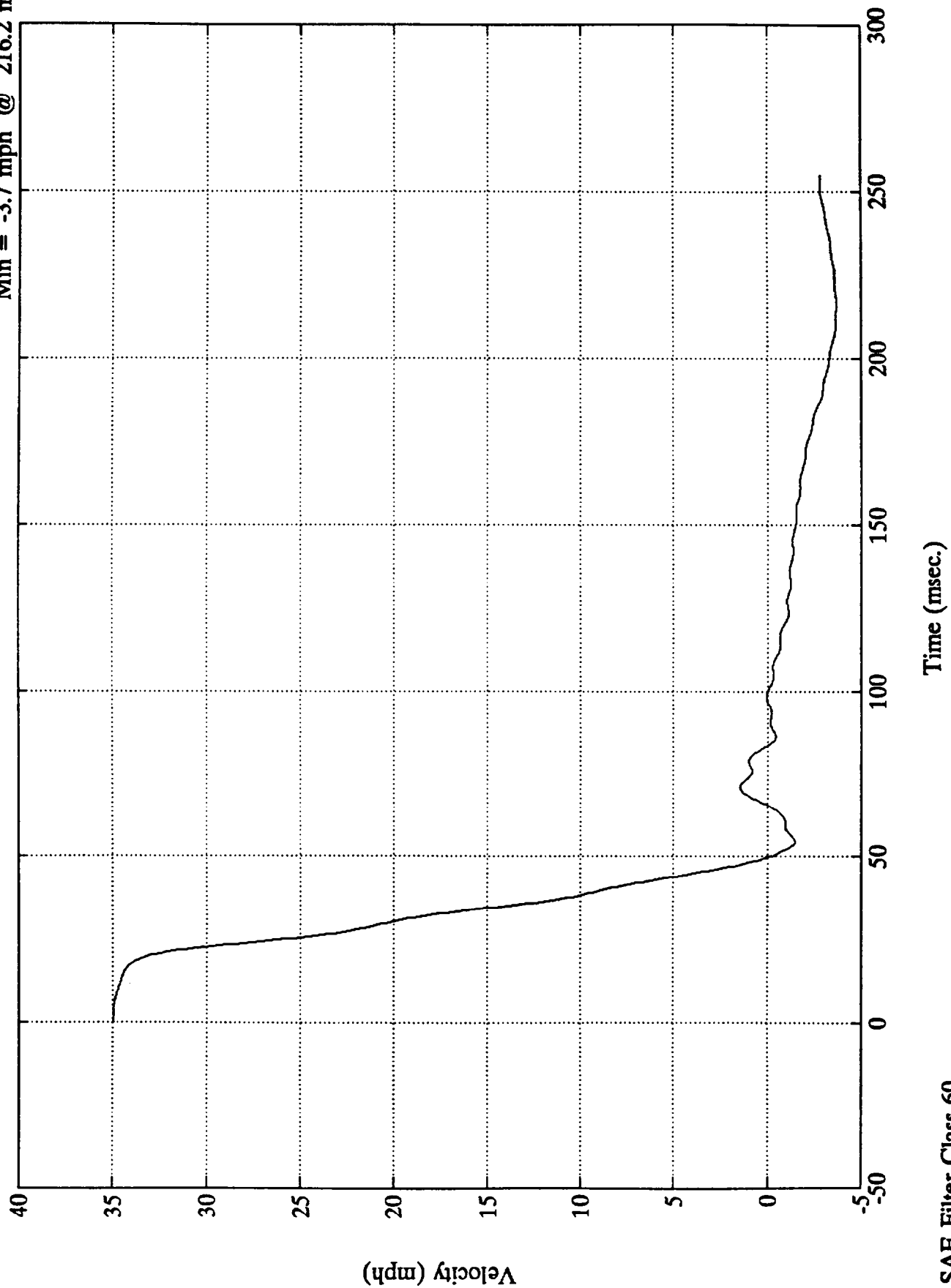
7893-6

SAE Filter Class 60

Max = 35.0 mph @ 0.5 msec  
Min = -3.7 mph @ 216.2 msec

Acc. #4(x)

NCAP TEST #10 1991 CHRYSLER NEW YORKER

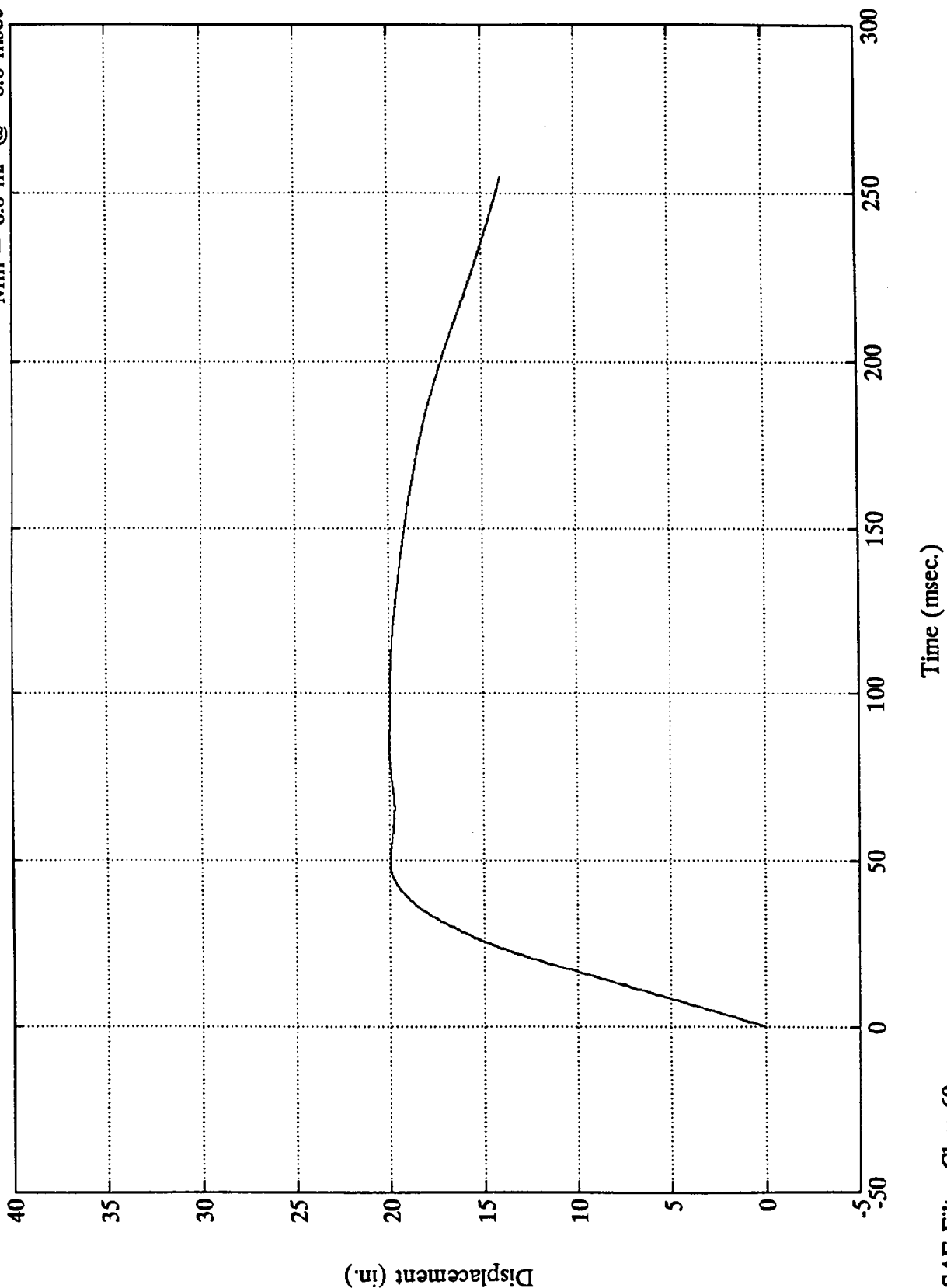


SAE Filter Class 60

Max = 20.0 in. @ 83.8 msec  
Min = 0.0 in. @ -0.0 msec

Acc. #4(x)

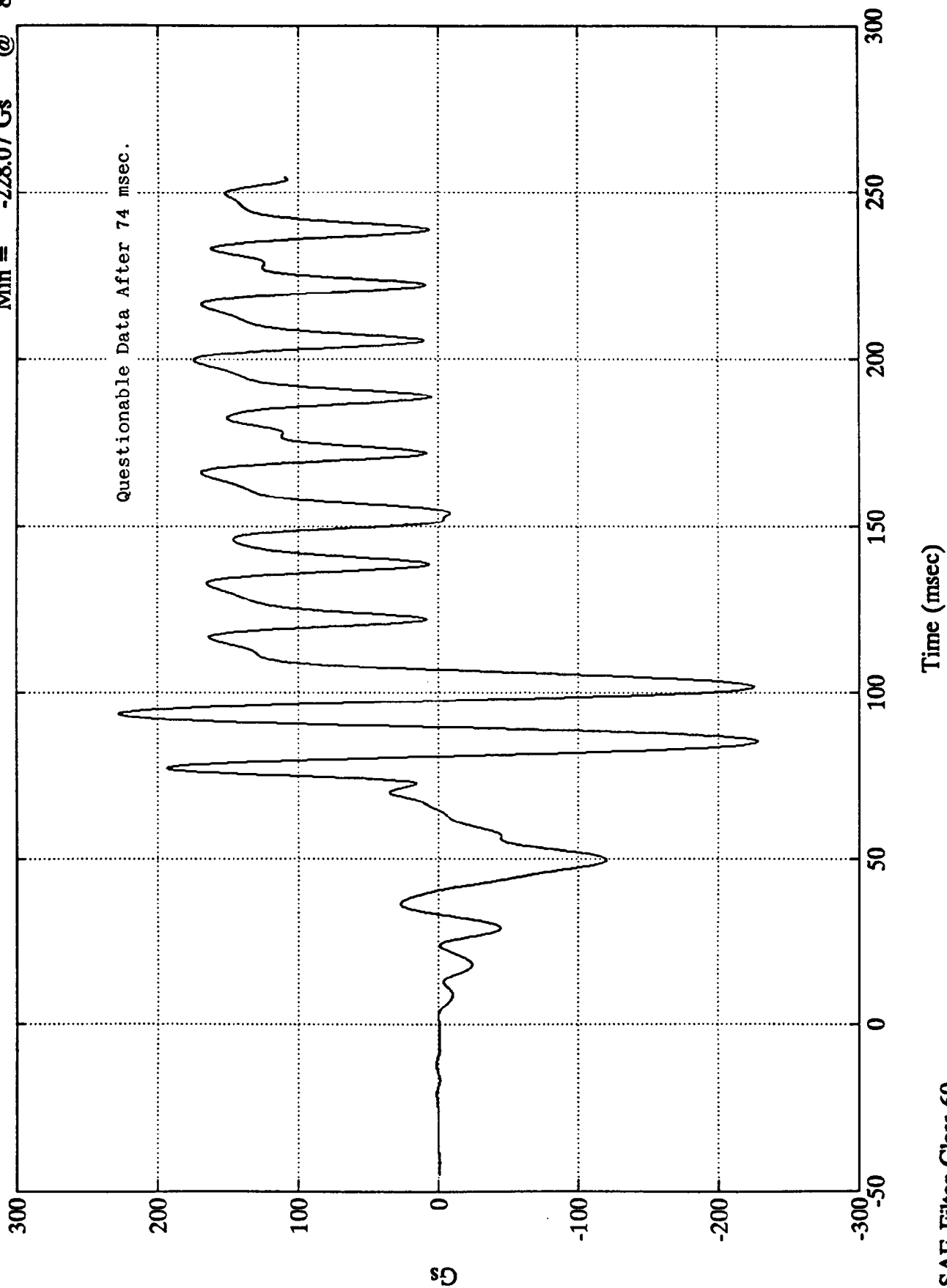
NCAP TEST #10 1991 CHRYSLER NEW YORKER



# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Acc. #5(x)

Max = 227.51 Gs @ 93.36 msec  
Min = -228.07 Gs @ 85.20 msec

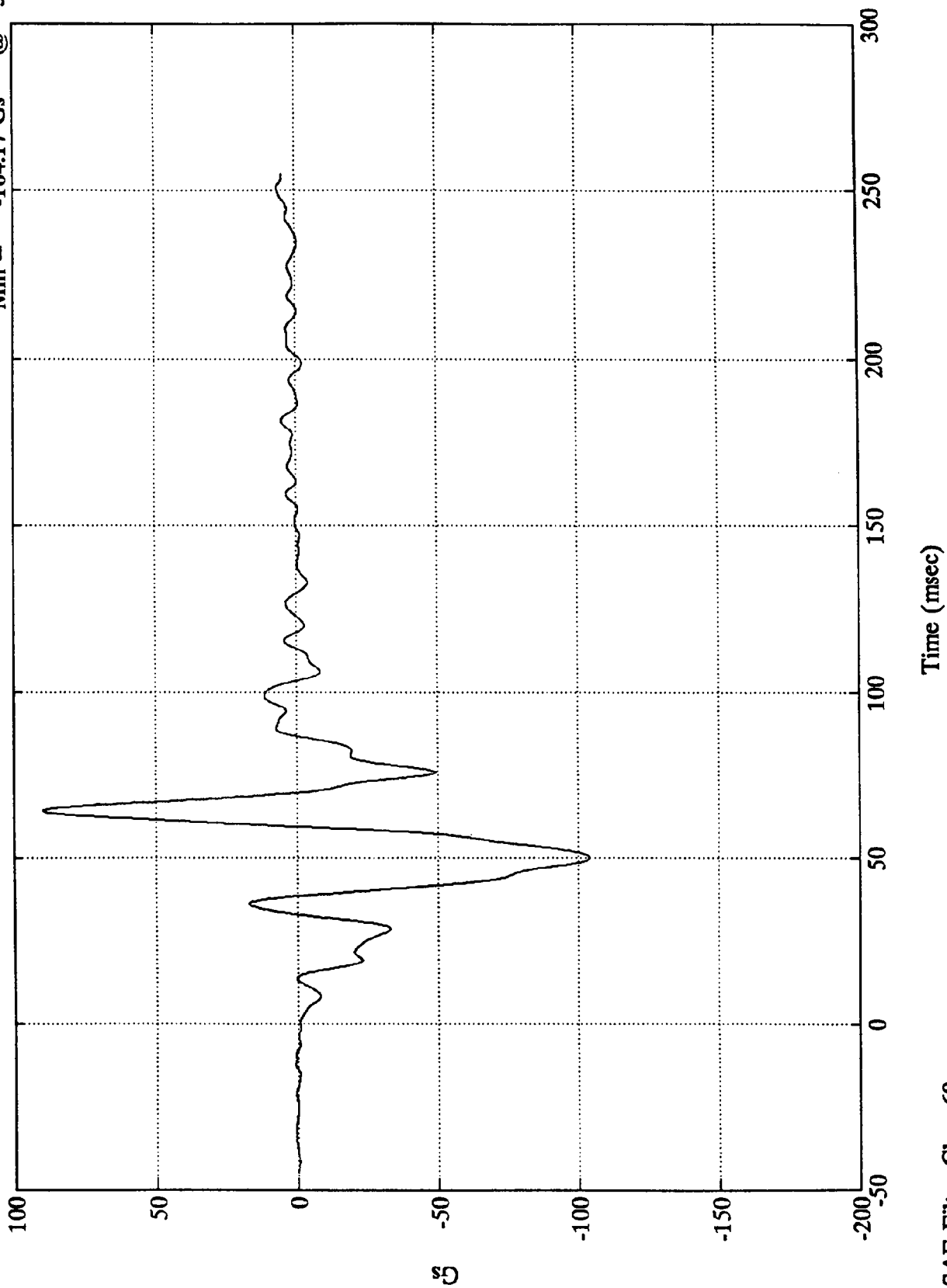


SAE Filter Class 60

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Acc. #6(x)

Max = 90.04 Gs @ 63.95 msec  
 Min = -104.17 Gs @ 50.16 msec

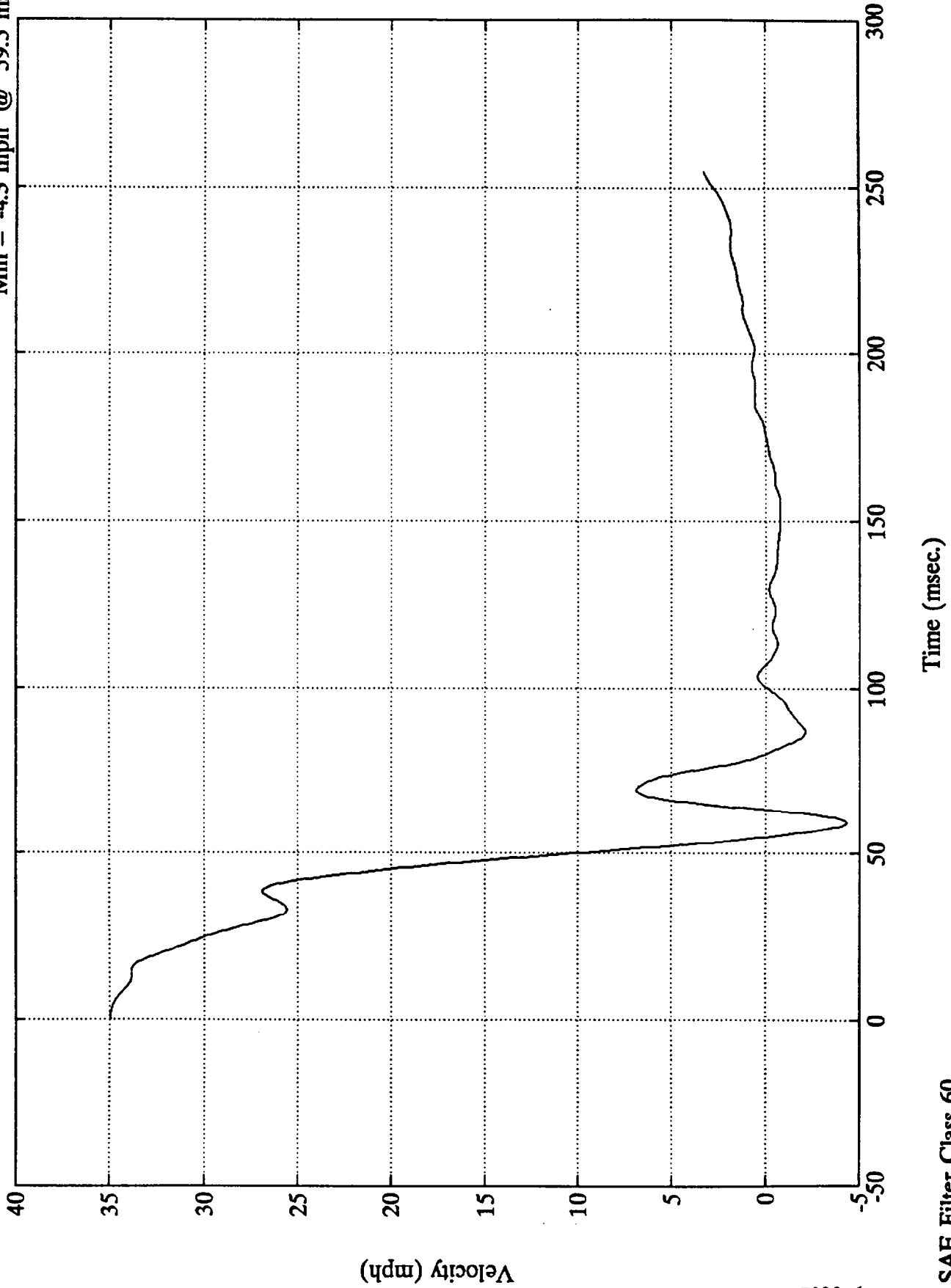


SAE Filter Class 60

Max = 35.0 mph @ 0.2 msec  
Min = -4.3 mph @ 59.5 msec

Acc. #6(x)

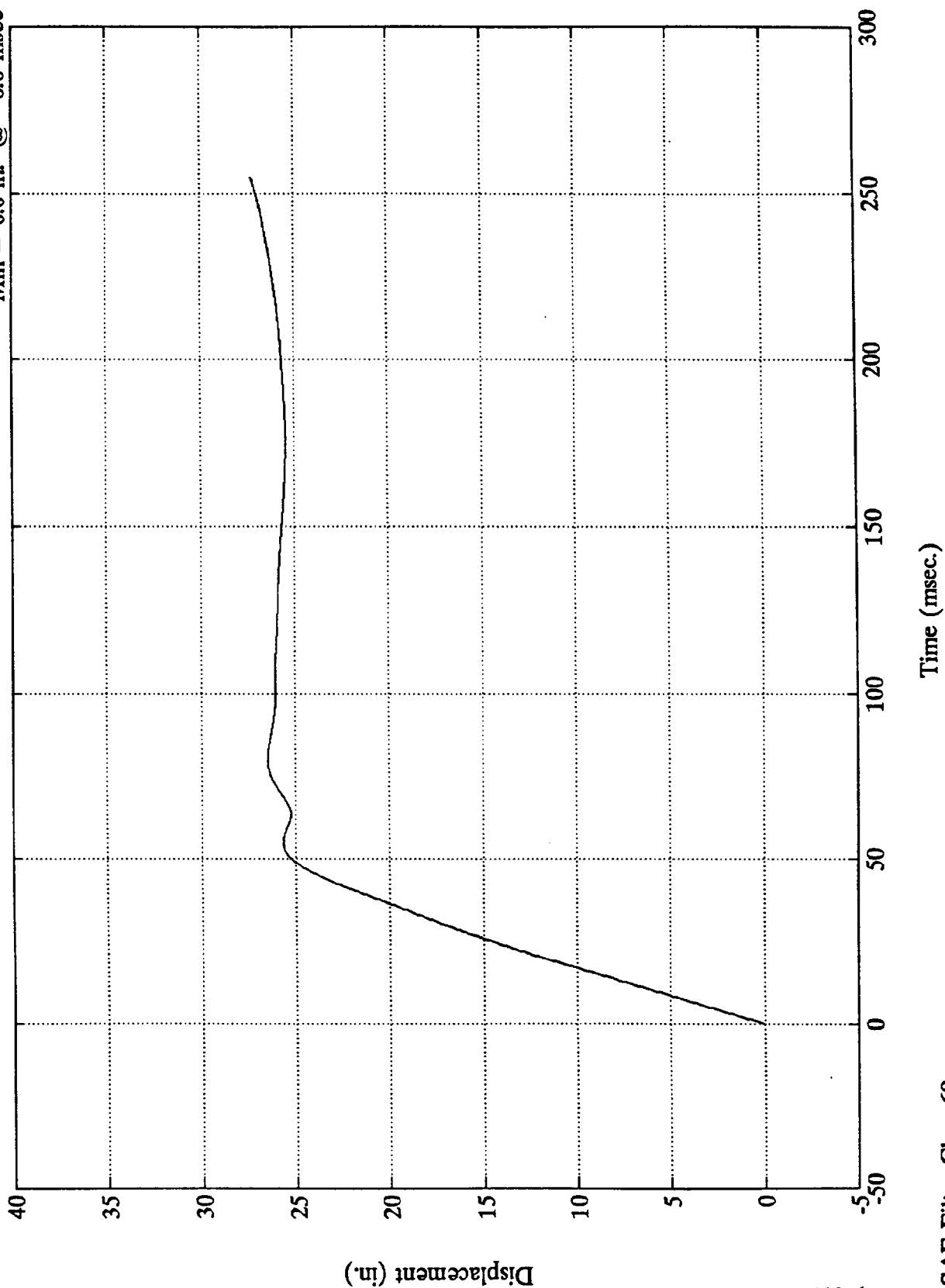
NCAP TEST #10 1991 CHRYSLER NEW YORKER



Max = 27.3 in. @ 254.9 msec  
Min = 0.0 in. @ -0.0 msec

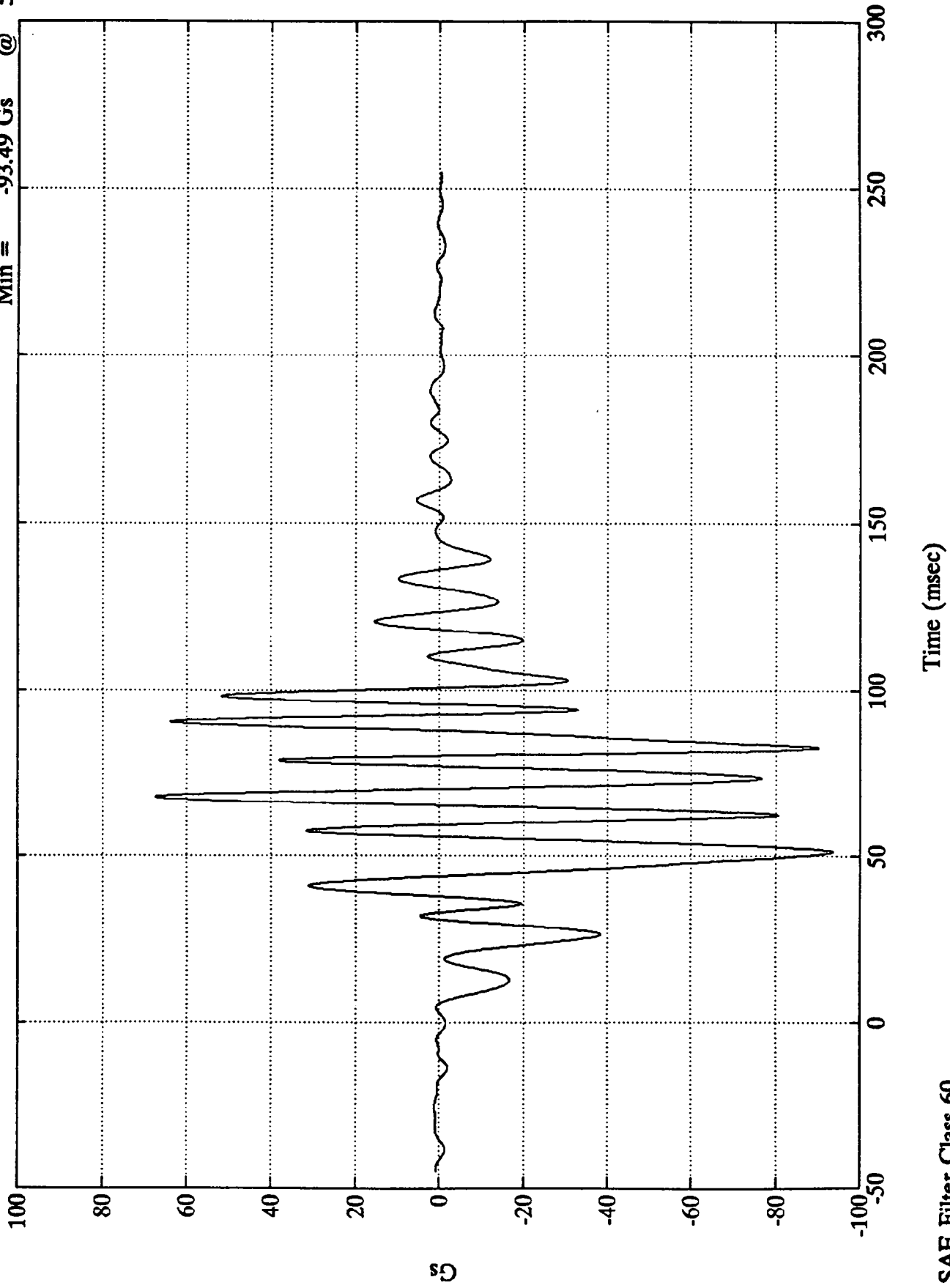
Acc. #6(x)

NCAP TEST #10 1991 CHRYSLER NEW YORKER



NCAP TEST #10 1991 CHRYSLER NEW YORKER

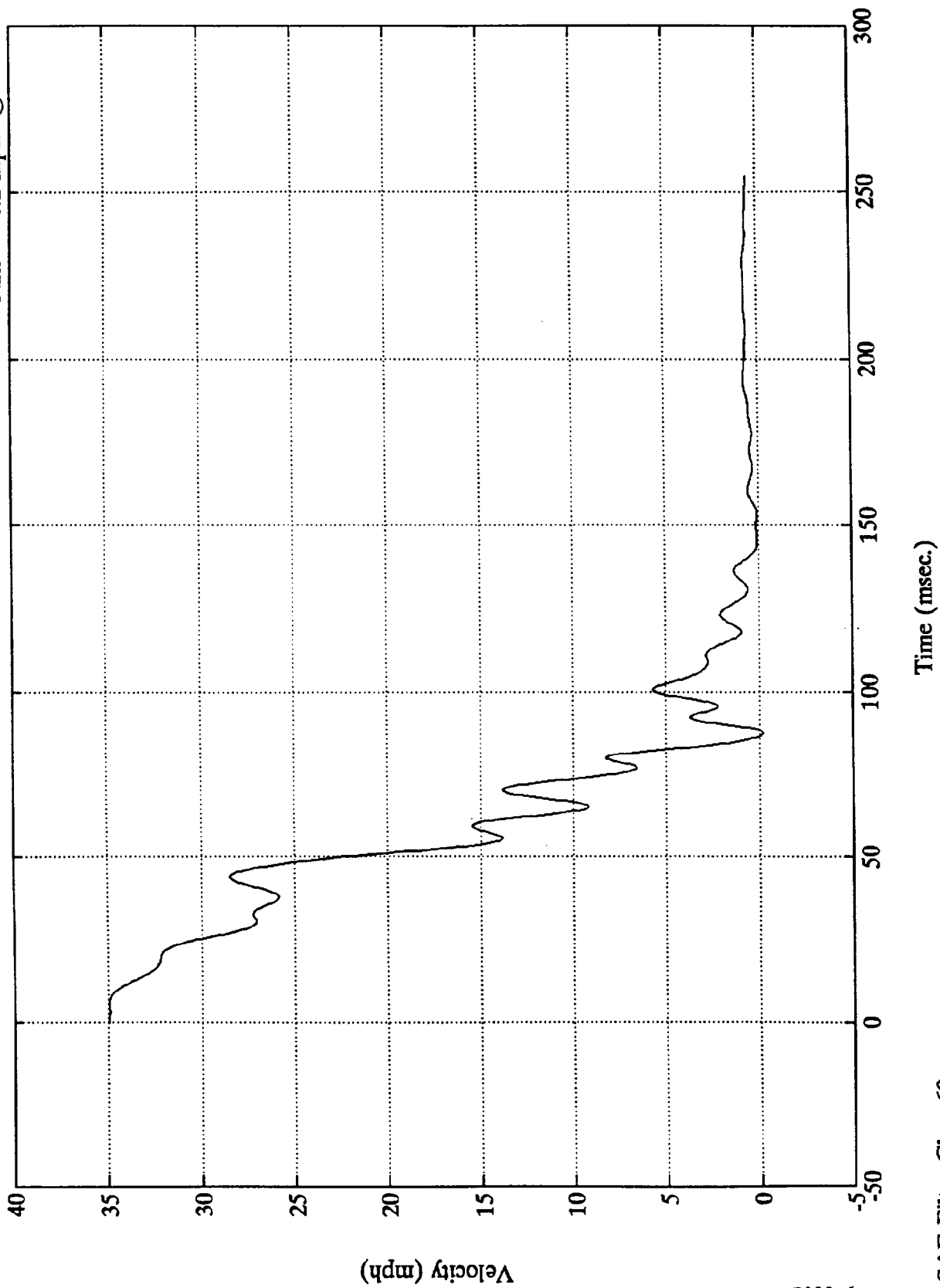
Acc. #7(x) Max = 67.42 Gs @ 67.91 msec  
Min = -93.49 Gs @ 51.24 msec



Max = 35.0 mph @ -0.0 msec  
Min = -0.2 mph @ 87.8 msec

Acc. #7(x)

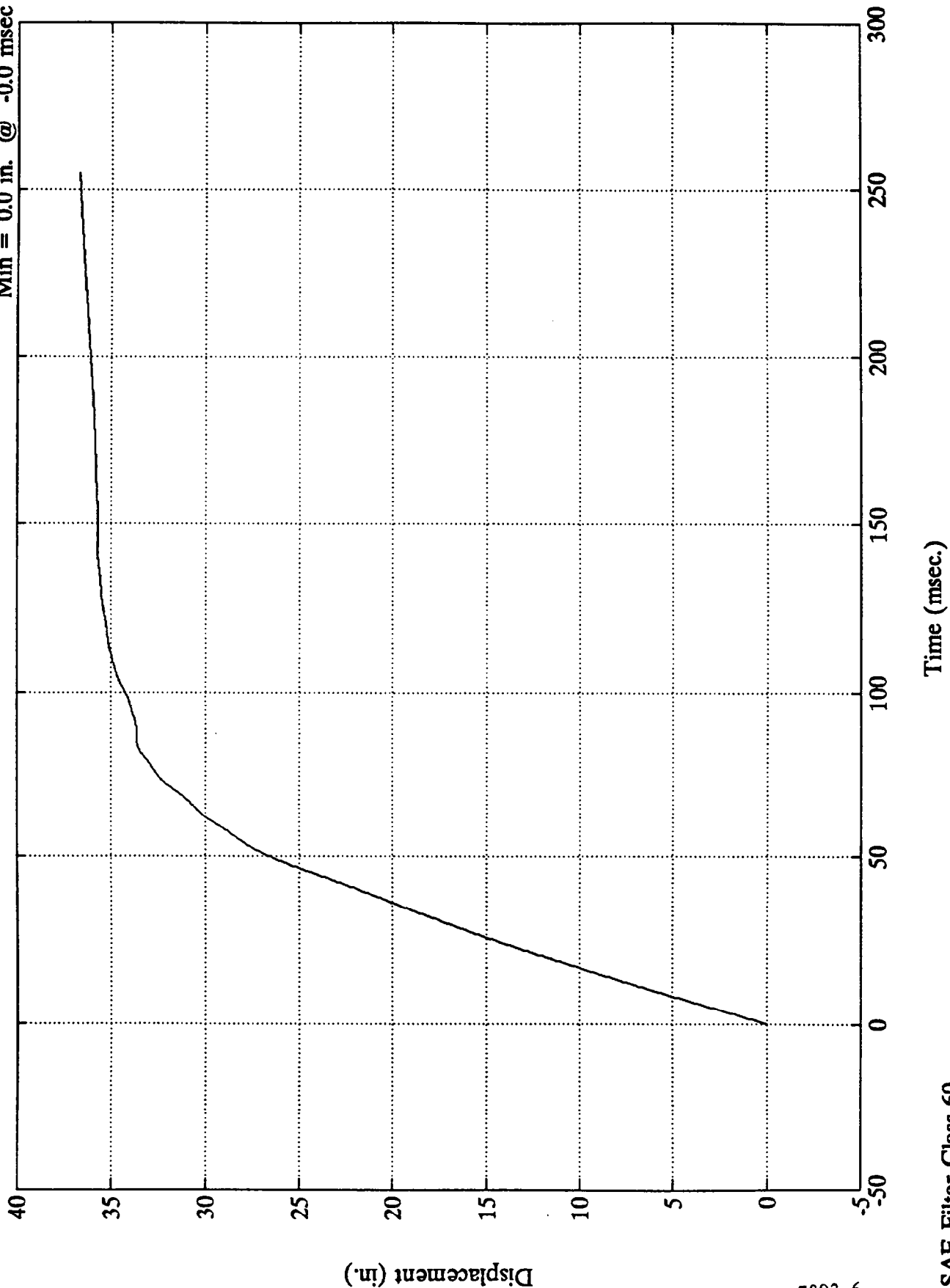
NCAP TEST #10 1991 CHRYSLER NEW YORKER



SAE Filter Class 60

7893-6

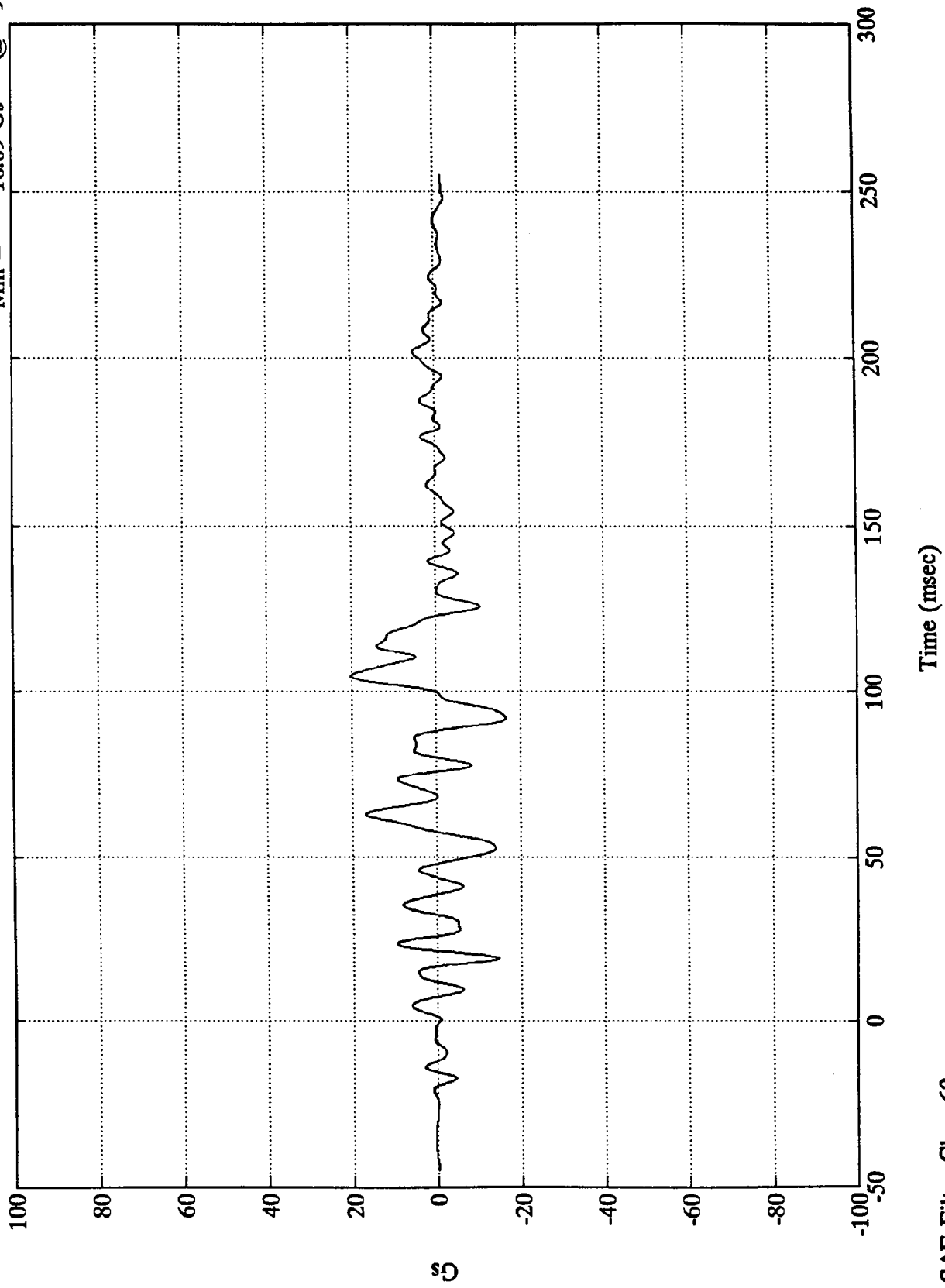
B-20



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Max = 20.17 Gs @ 104.52 msec  
Min = -16.69 Gs @ 92.04 msec

Acc. #8(z)



B-22

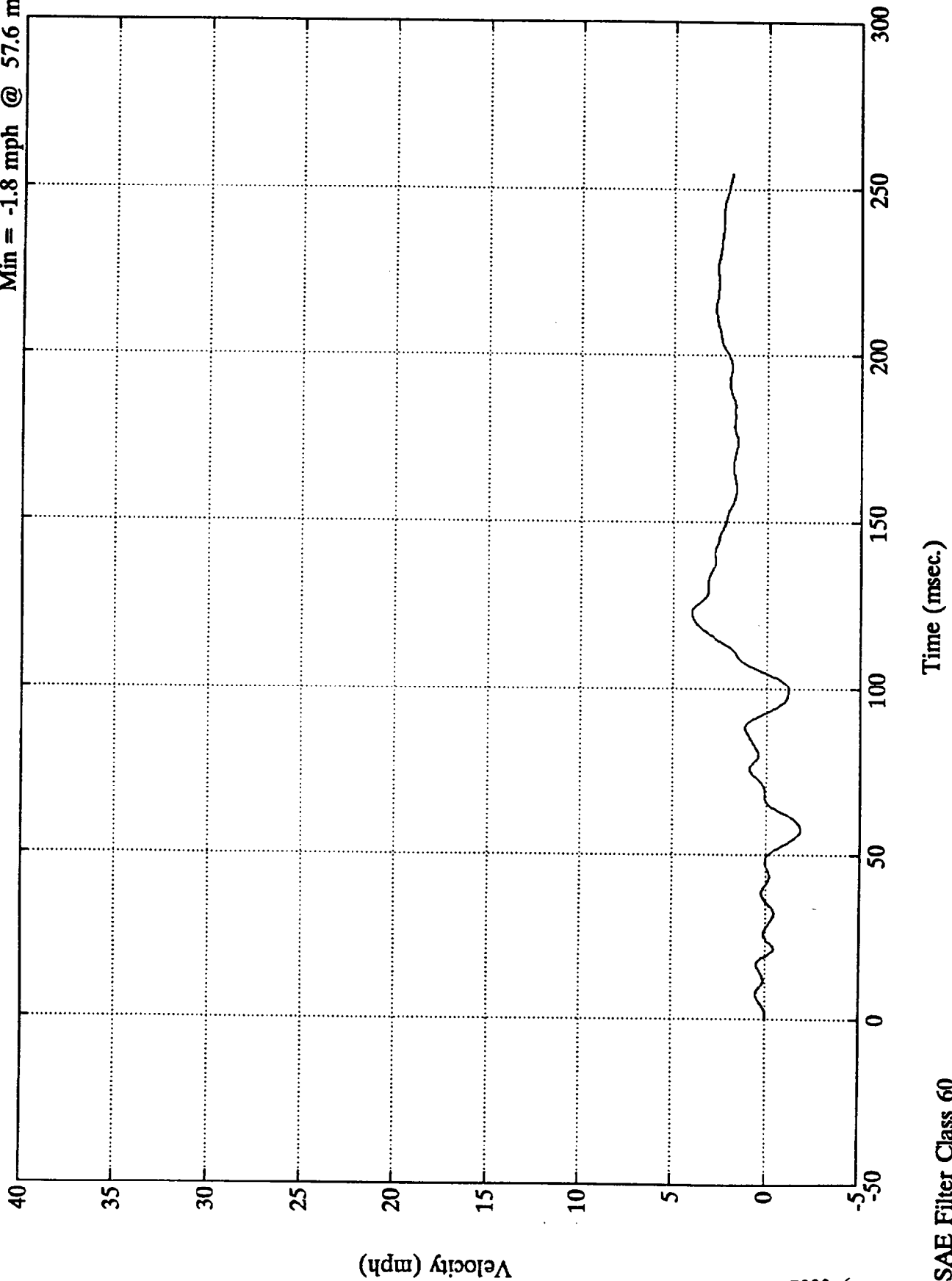
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Acc. #8(z)

Max = 4.0 mph @ 122.9 msec  
Min = -1.8 mph @ 57.6 msec



Velocity (mph)

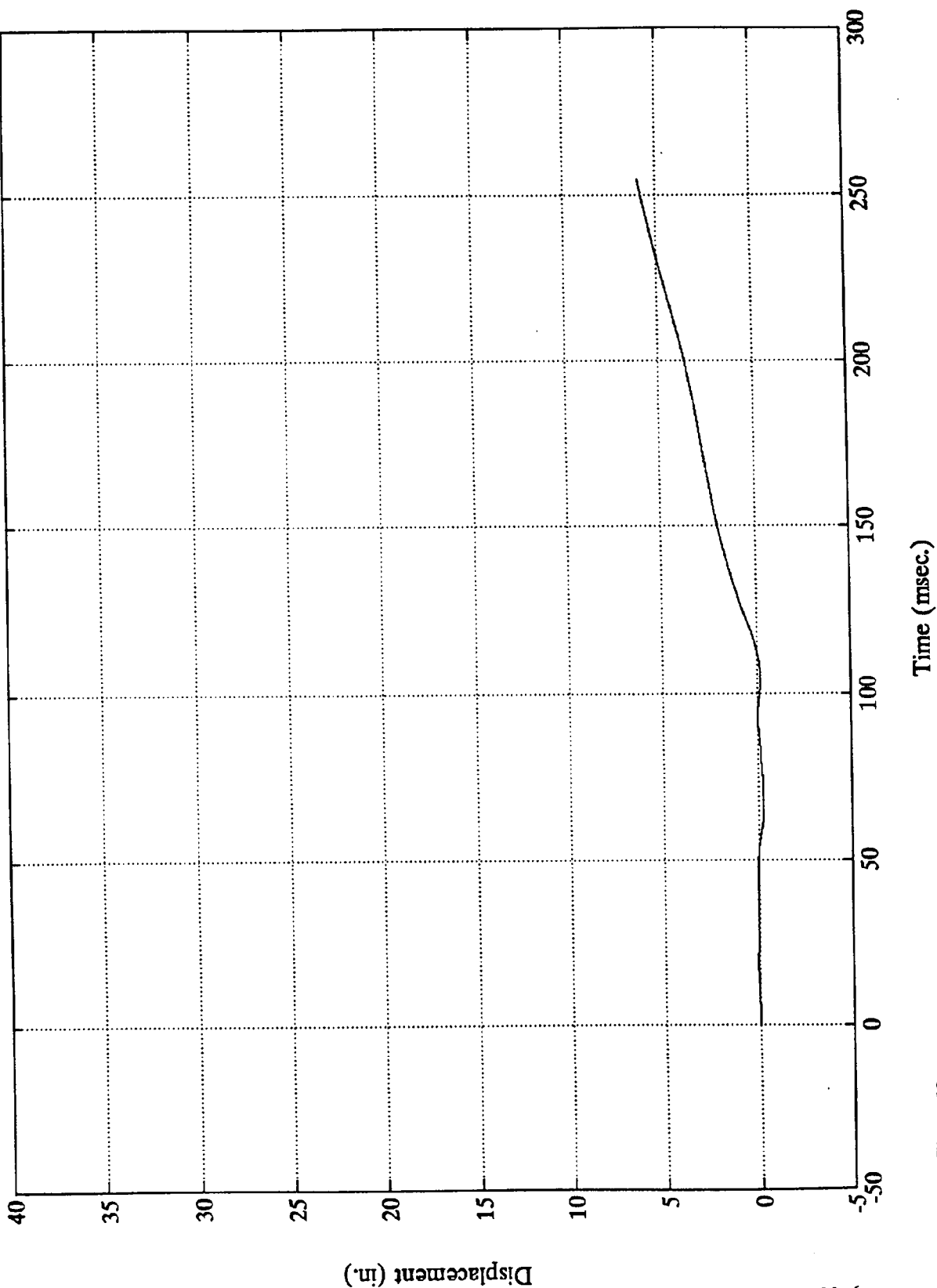
Time (msec.)

SAE Filter Class 60

Max = 6.0 in. @ 254.9 msec  
Min = -0.3 in. @ 66.0 msec

Acc. #8(z)

NCAP TEST #10 1991 CHRYSLER NEW YORKER



B-24

7893-6

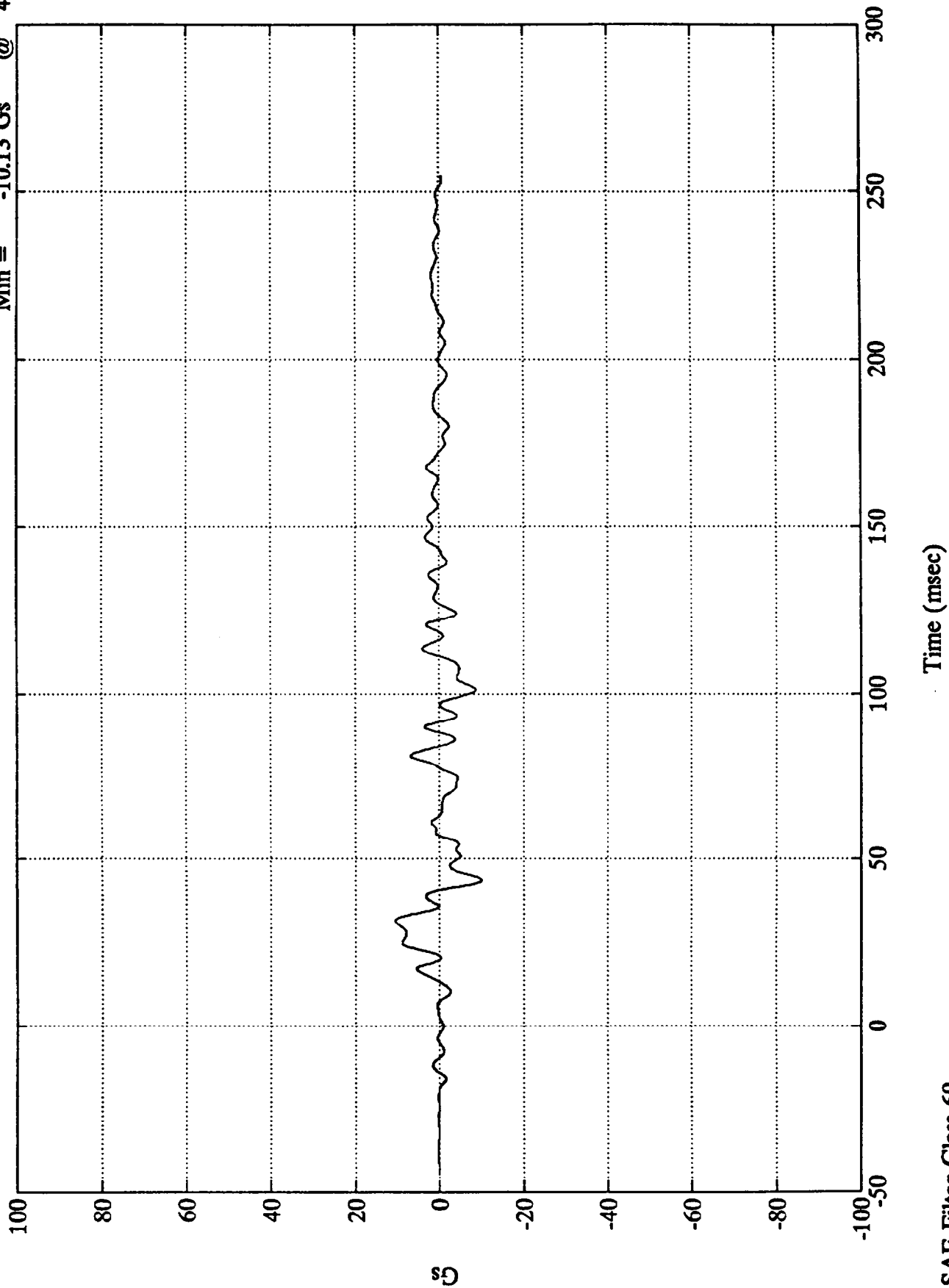
SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Acc. #9(z)

Max = 10.59 Gs  
Min = -10.13 Gs

@ 31.55 ms  
@ 43.56 ms



B-25

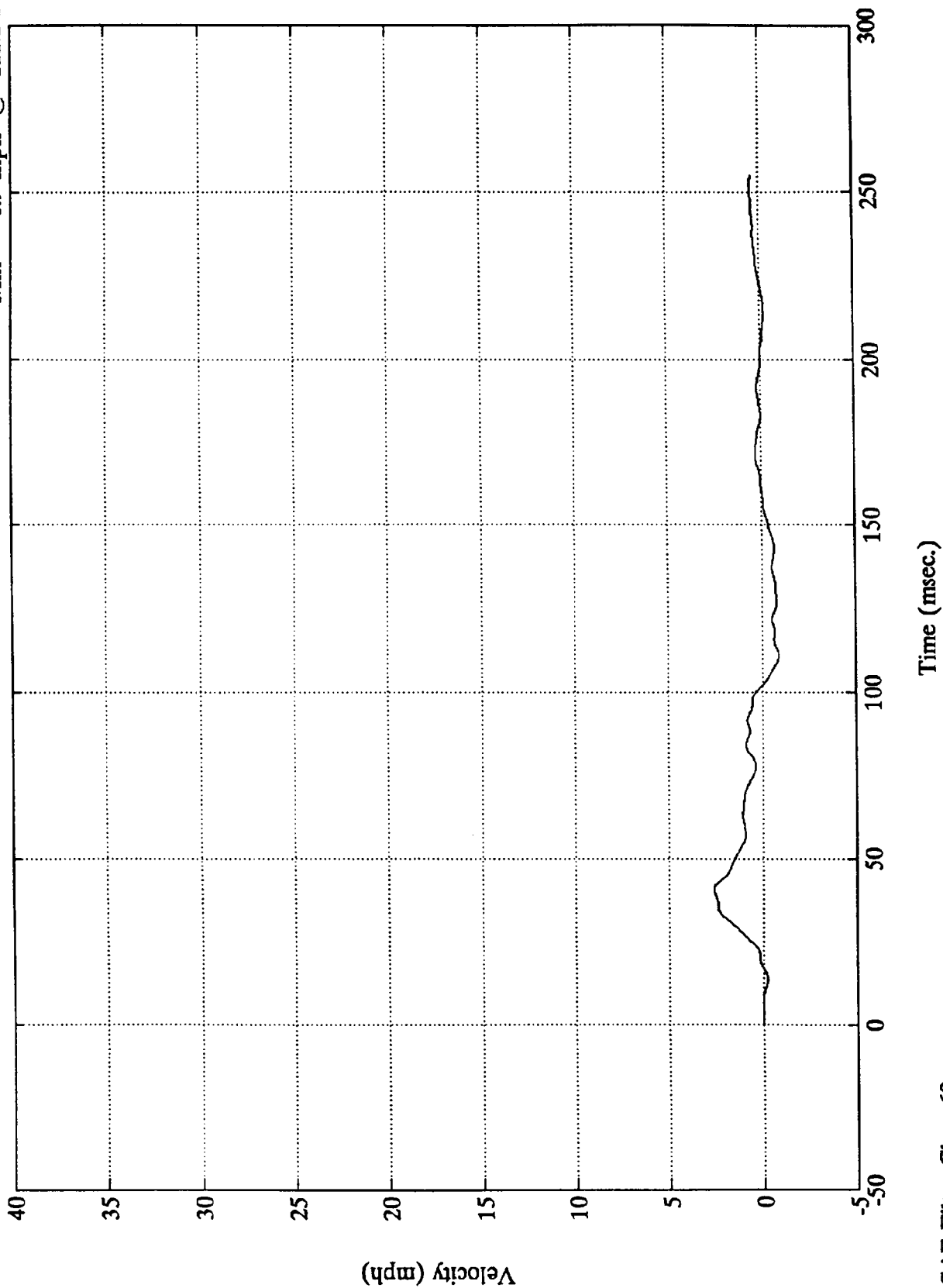
7893-6

SAE Filter Class 60

Max = 2.6 mph @ 40.8 msec  
Min = -0.9 mph @ 111.1 msec

Acc. #9(z)

NCAP TEST #10 1991 CHRYSLER NEW YORKER

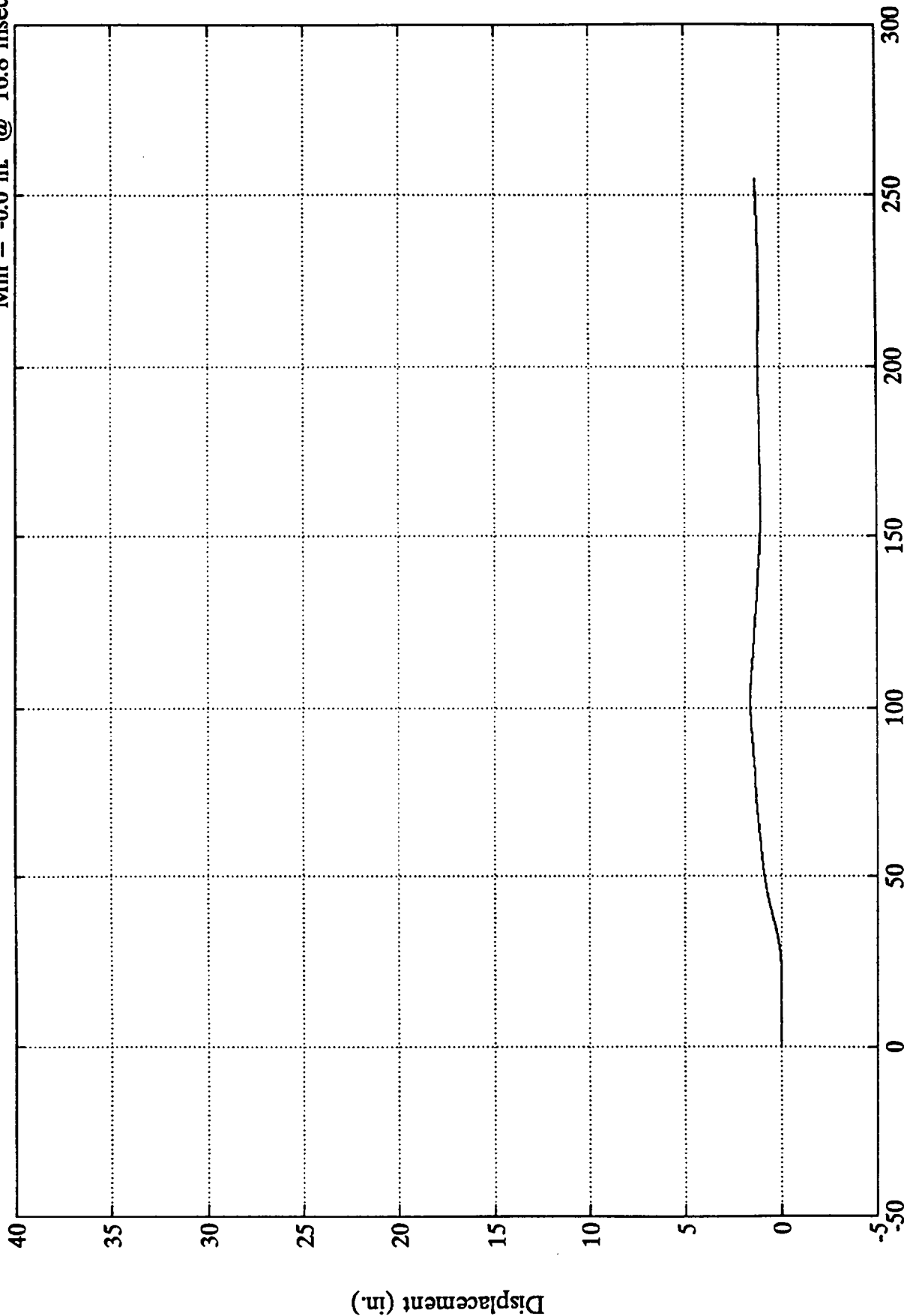


SAE Filter Class 60

Max = 1.6 in. @ 102.0 msec  
Min = -0.0 in. @ 16.8 msec

Acc. #9(z)

NCAP TEST #10 1991 CHRYSLER NEW YORKER



Time (msec.)

SAE Filter Class 60

TEST NO. MM0302

LOAD CELL BARRIER DATA

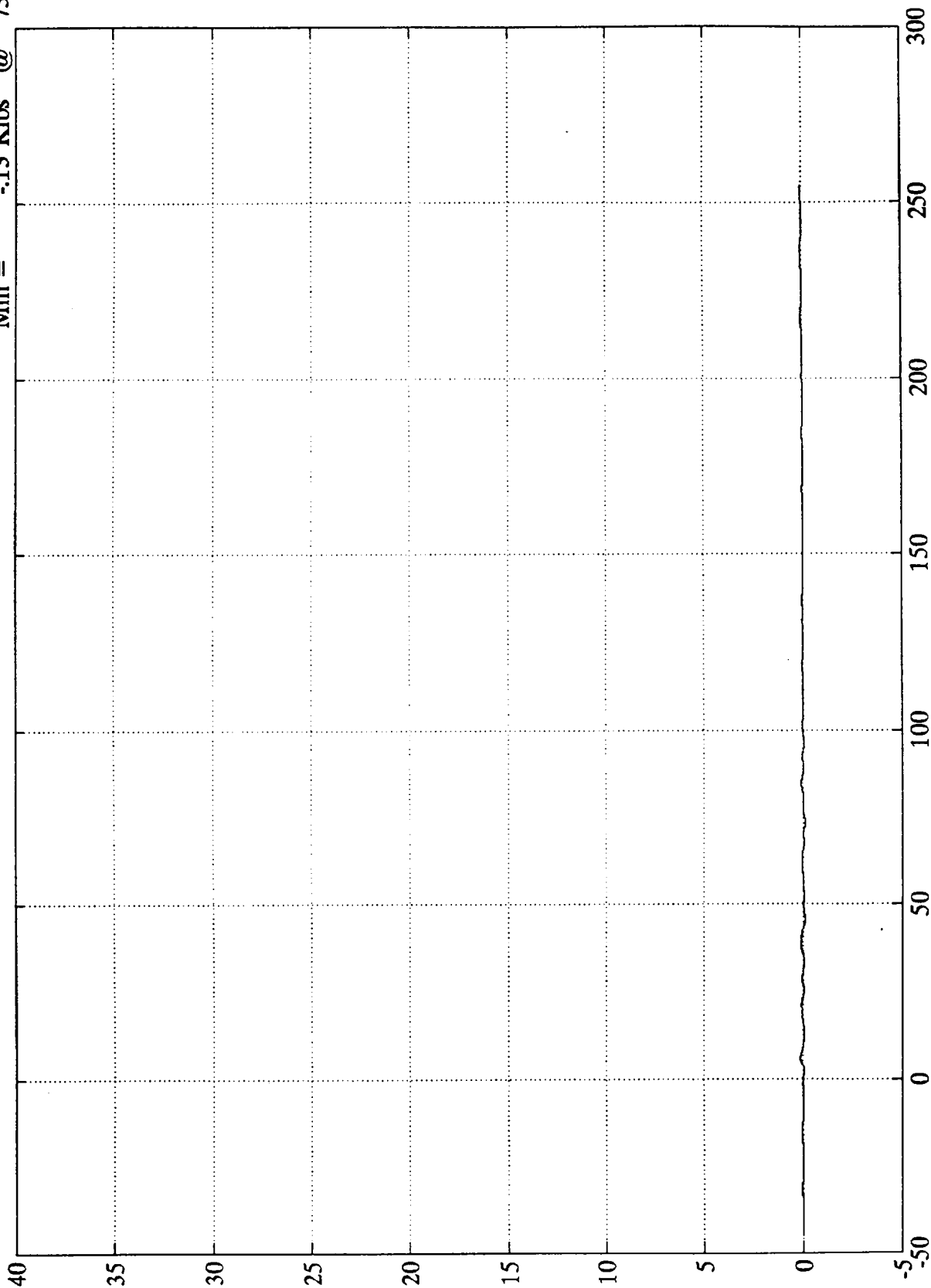
FILTER CHANNEL CLASS

60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A1

Max = .12 Klbs @ 5.75 msec  
Min = -.13 Klbs @ 73.55 msec



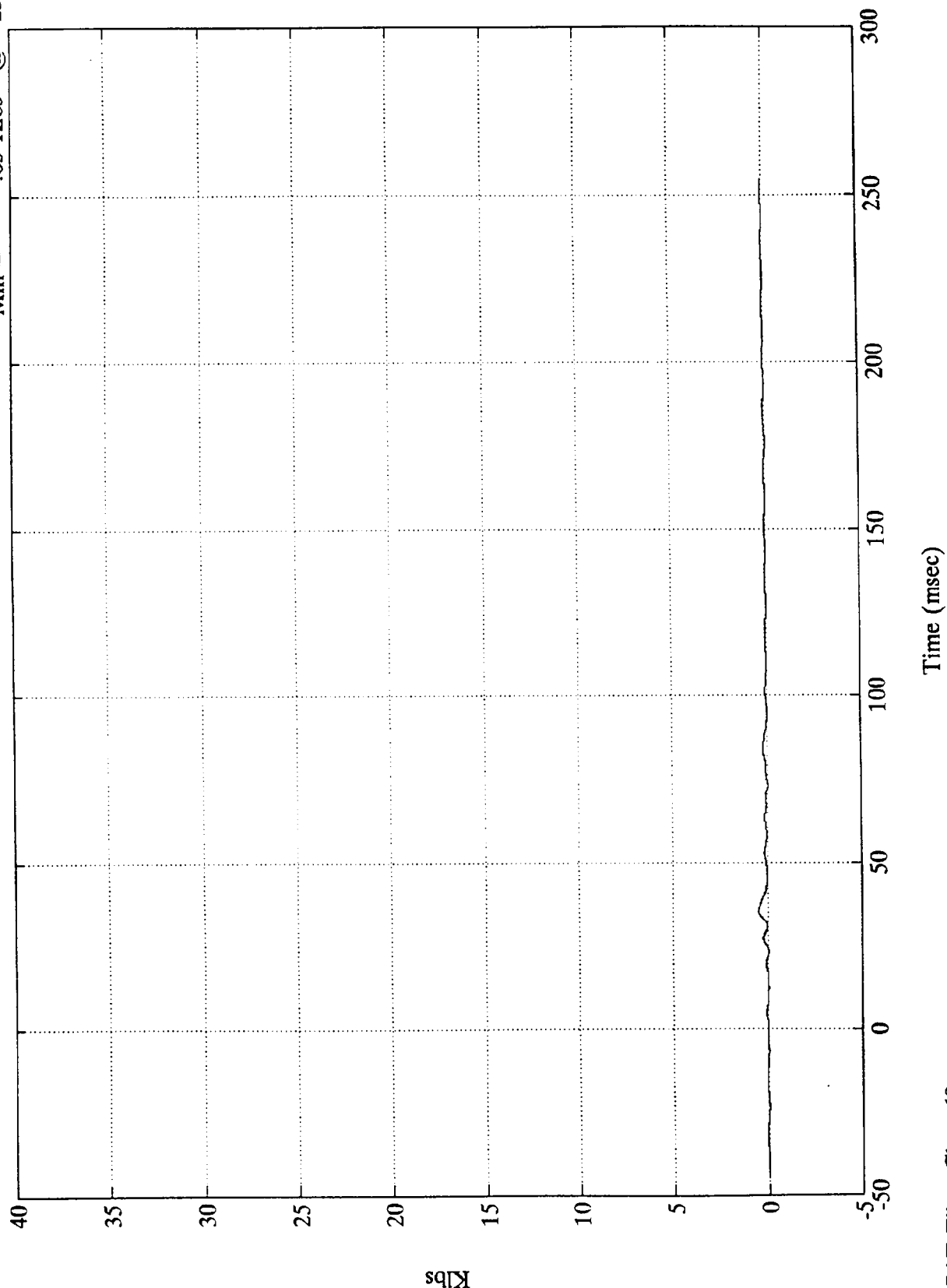
Time (msec)

SAE Filter Class 60

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A2

Max = .49 Klbs @ 35.27 msec  
 Min = -.05 Klbs @ 23.15 msec



B-30

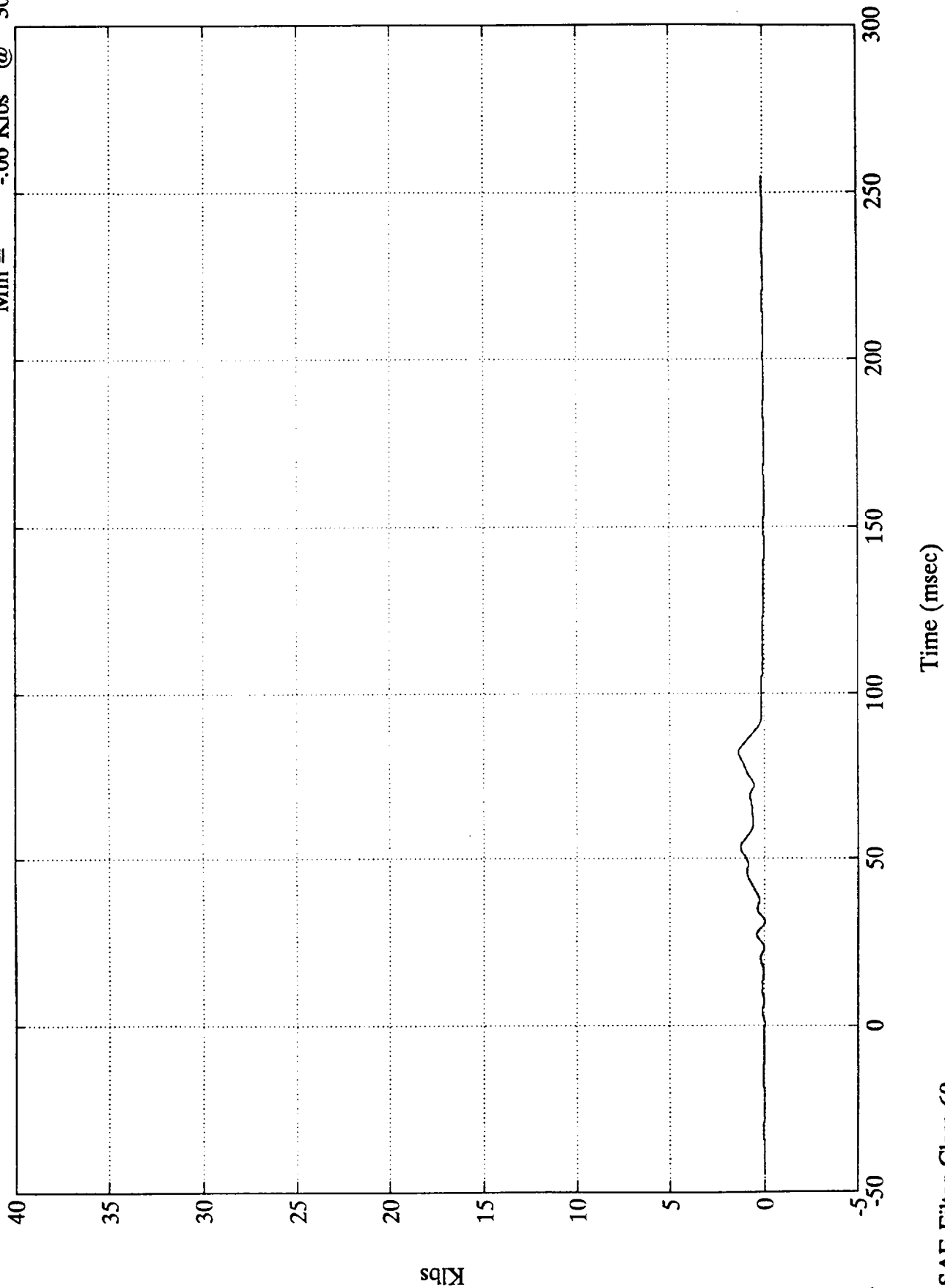
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A3

Max = 1.35 Klbs @ 82.19 msec  
Min = -0.06 Klbs @ 30.95 msec



B-31

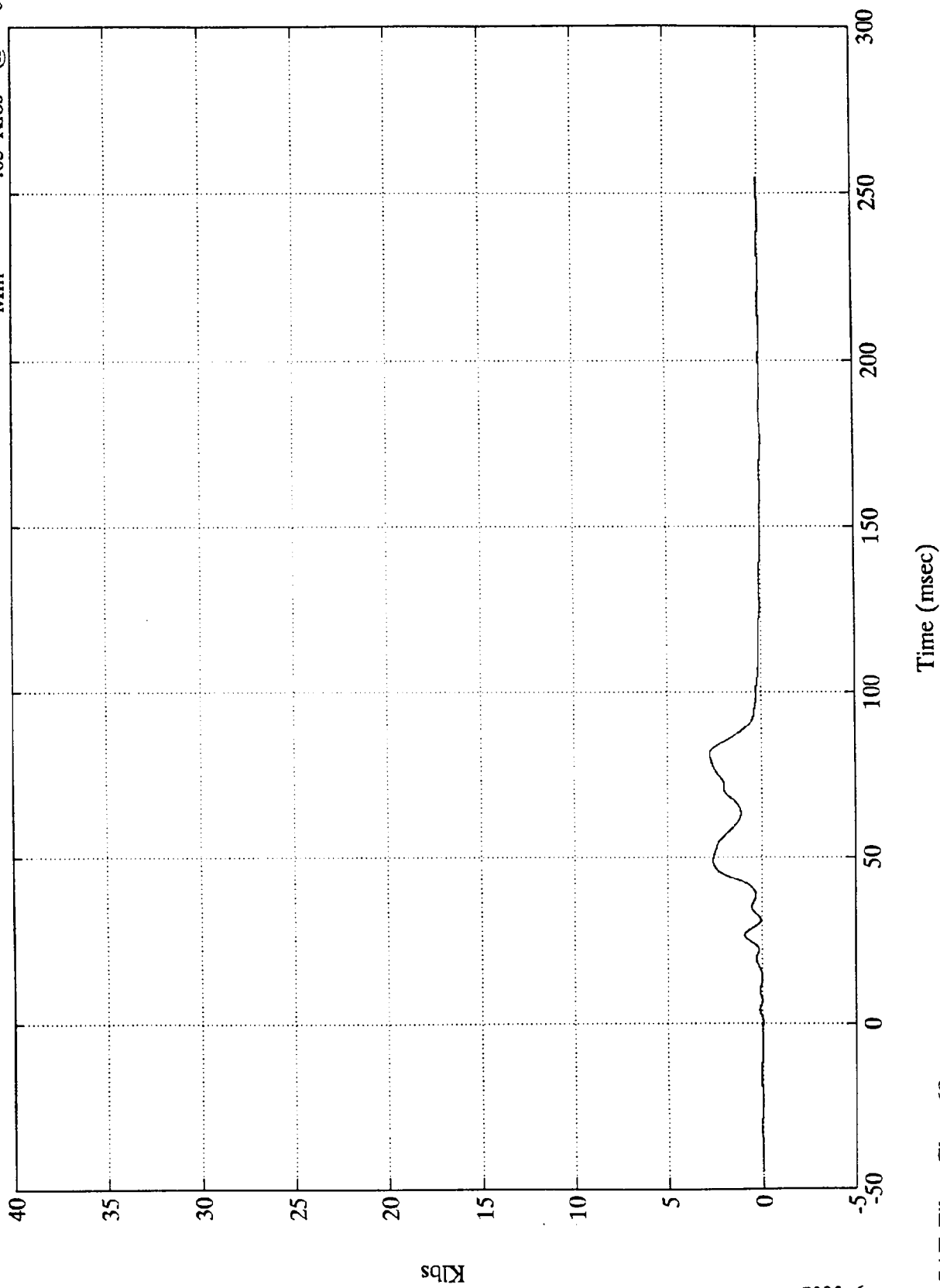
7893-6

SAE Filter Class 60

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A4

Max = 2.76 Klbs @ 81.23 msec  
 Min = -.05 Klbs @ 0.35 msec



B-32  
 Klbs

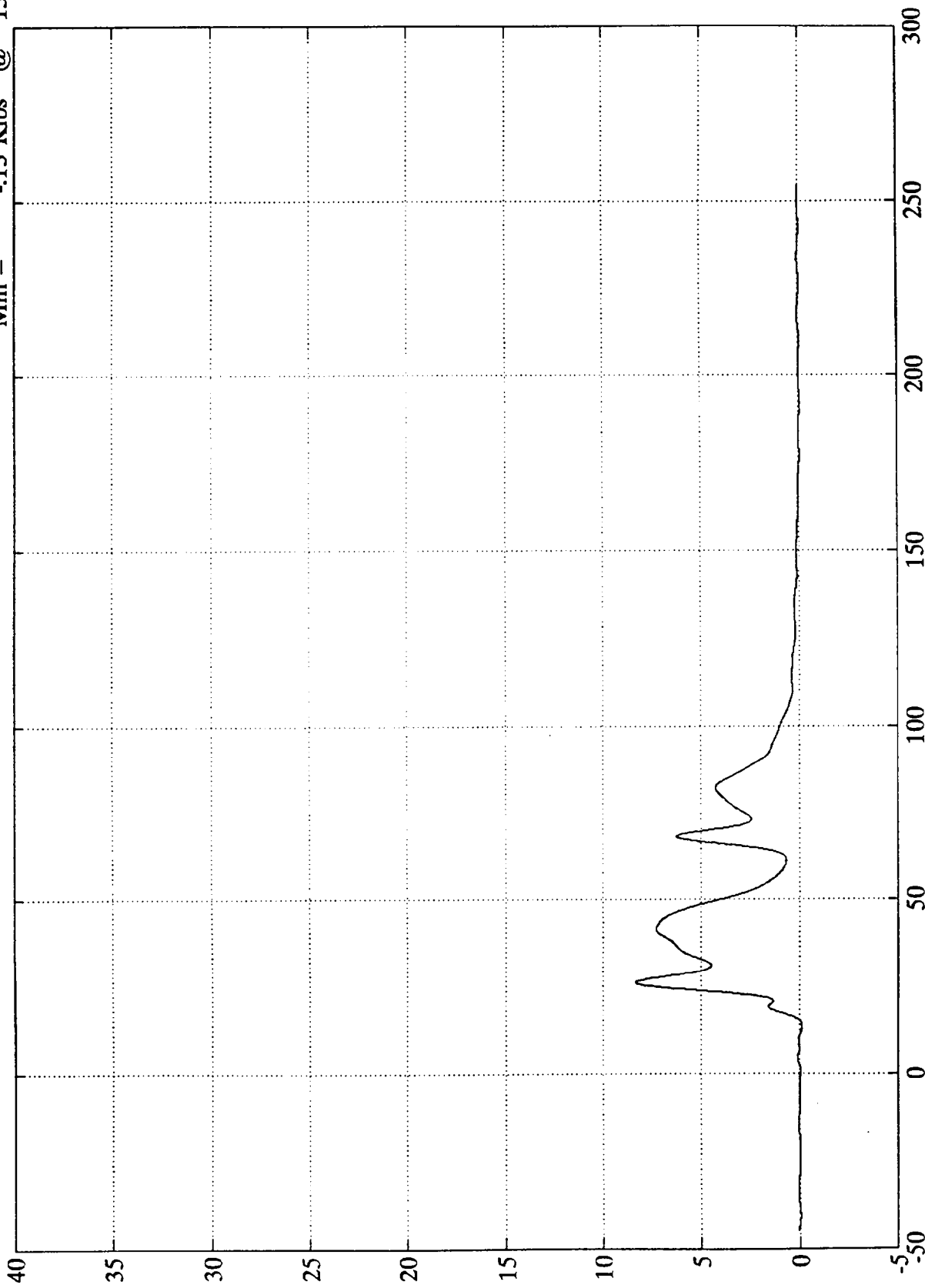
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A5

Max = 8.35 Klbs @ 26.03 ms  
Min = -.13 Klbs @ 13.31 ms



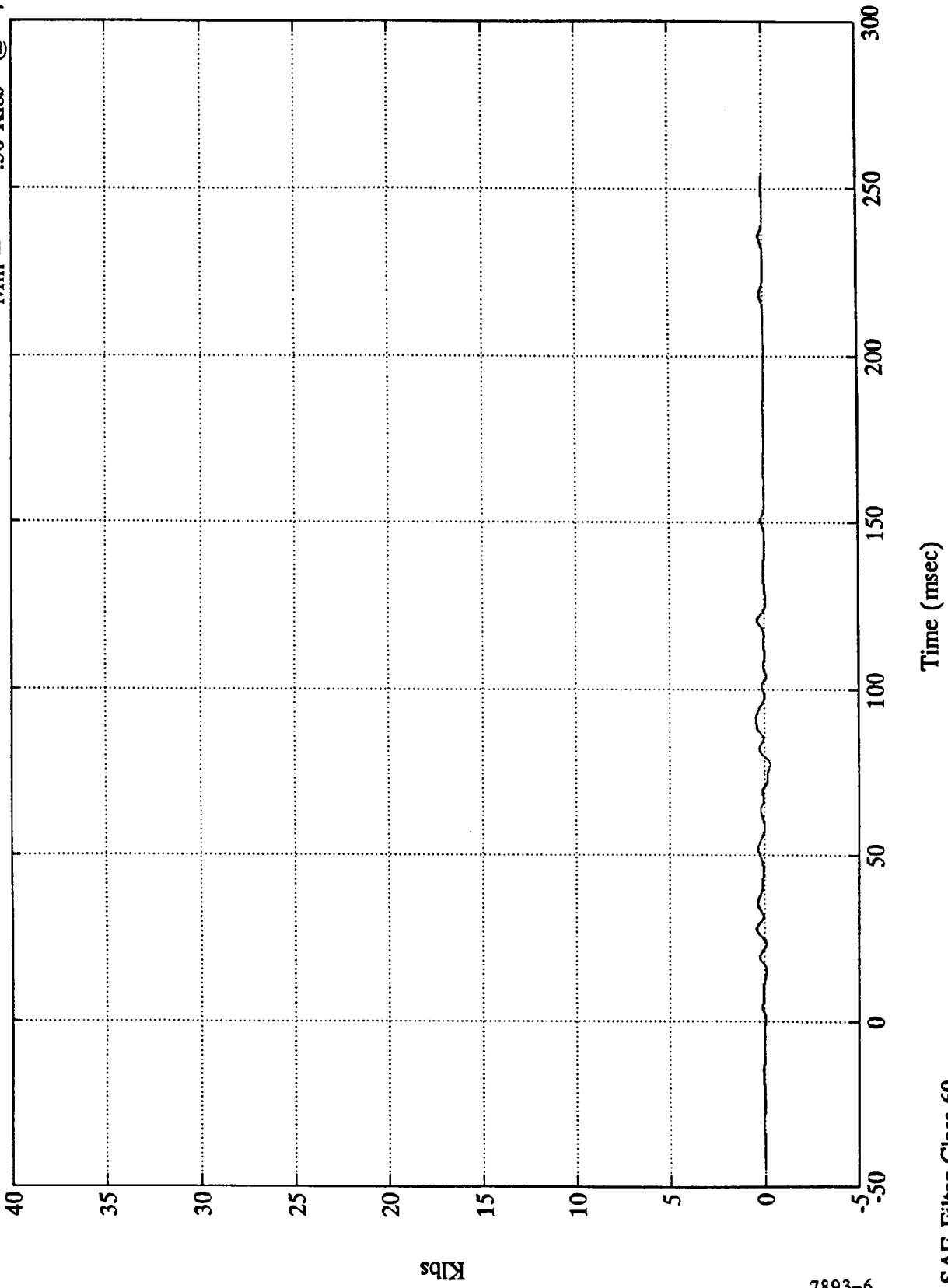
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A6

Max = .44 Klbs @ 91.20 msec  
Min = -.30 Klbs @ 78.00 msec



B-34  
Klbs

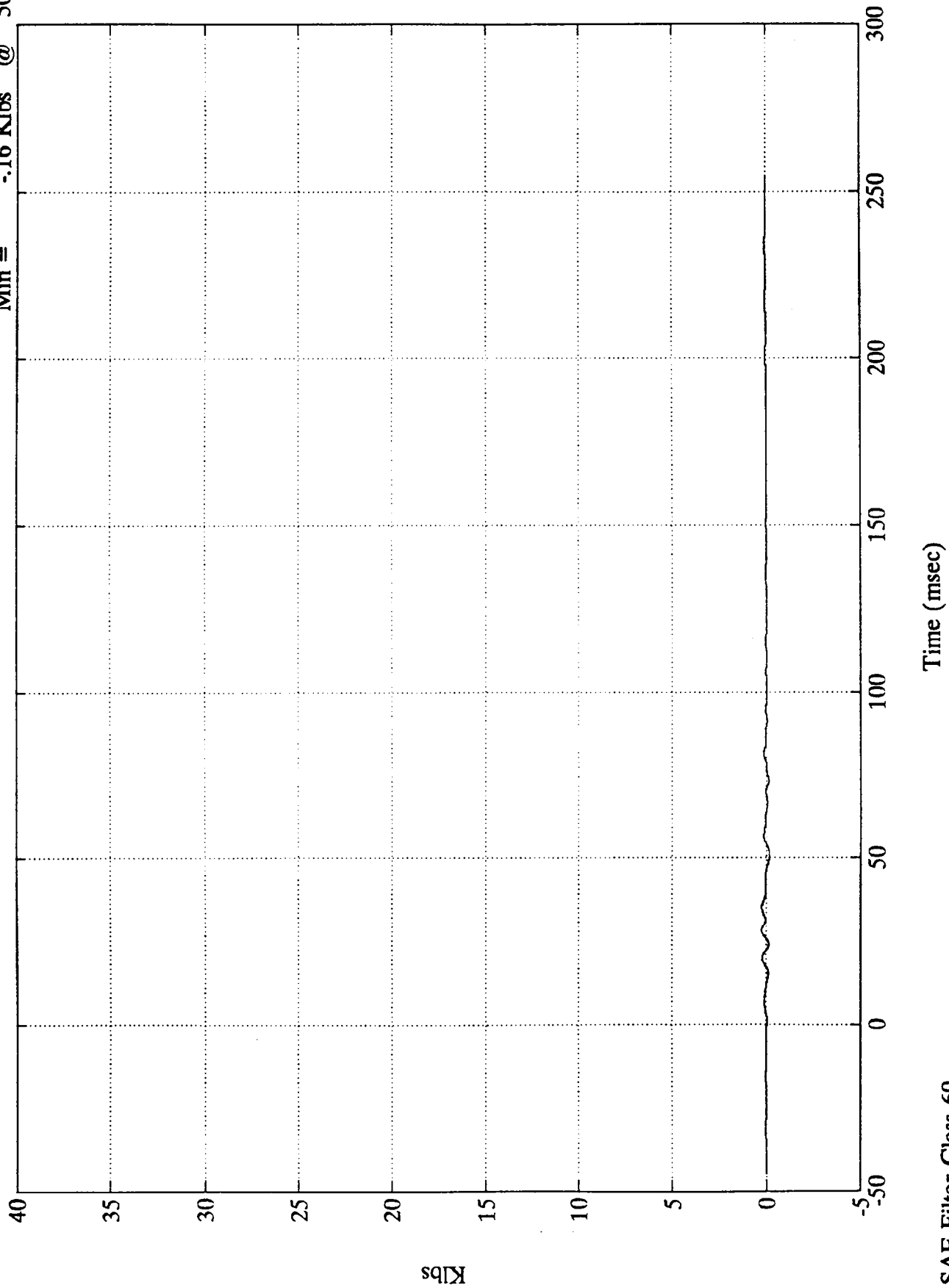
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A7

Max = .23 Klbs @ 28.07 msec  
Min = -.16 Klbs @ 50.88 msec



B-35

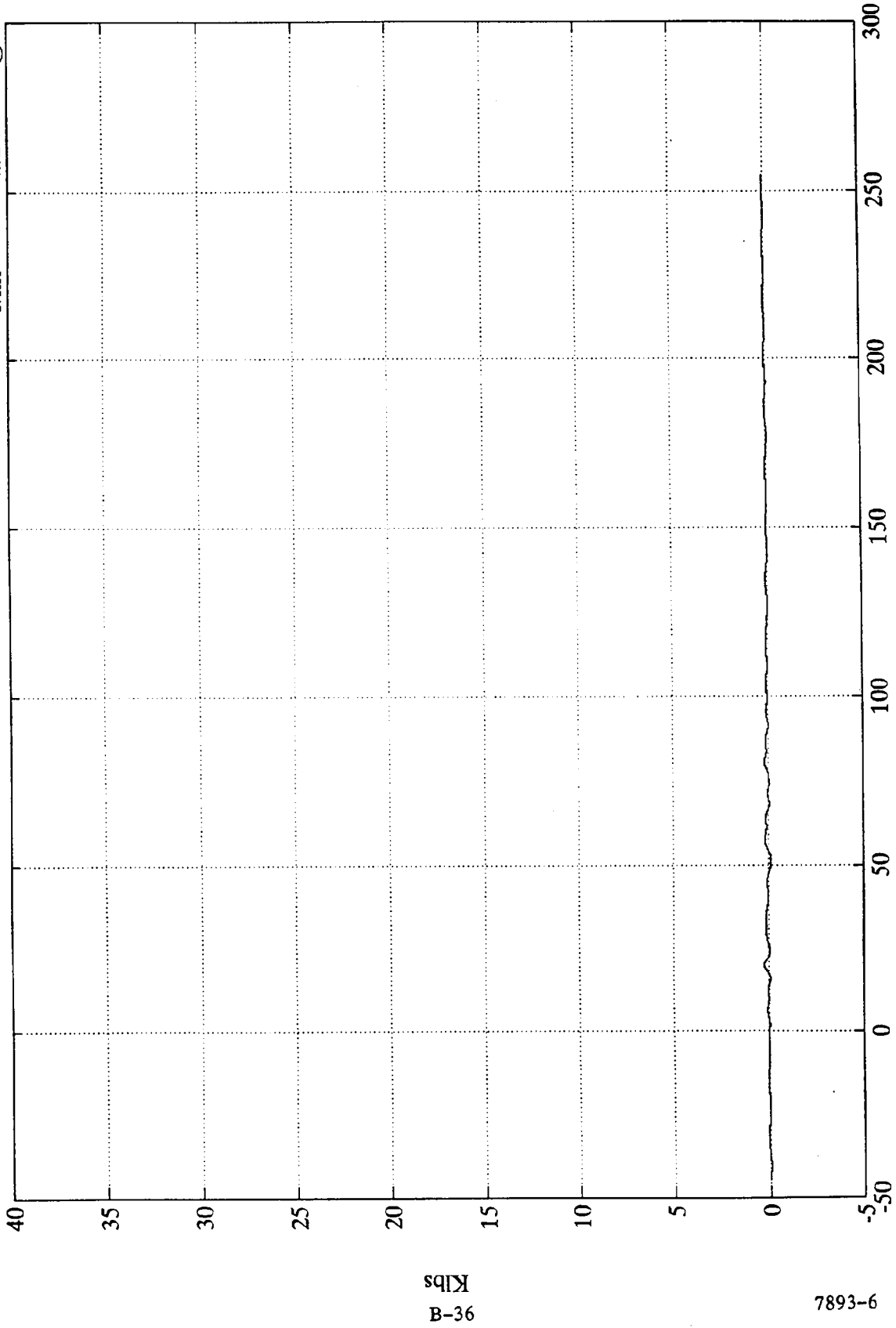
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A8

Max = .25 Klbs @ 19.91 msec  
Min = -.12 Klbs @ 51.36 msec



B-36  
Klbs

7893-6

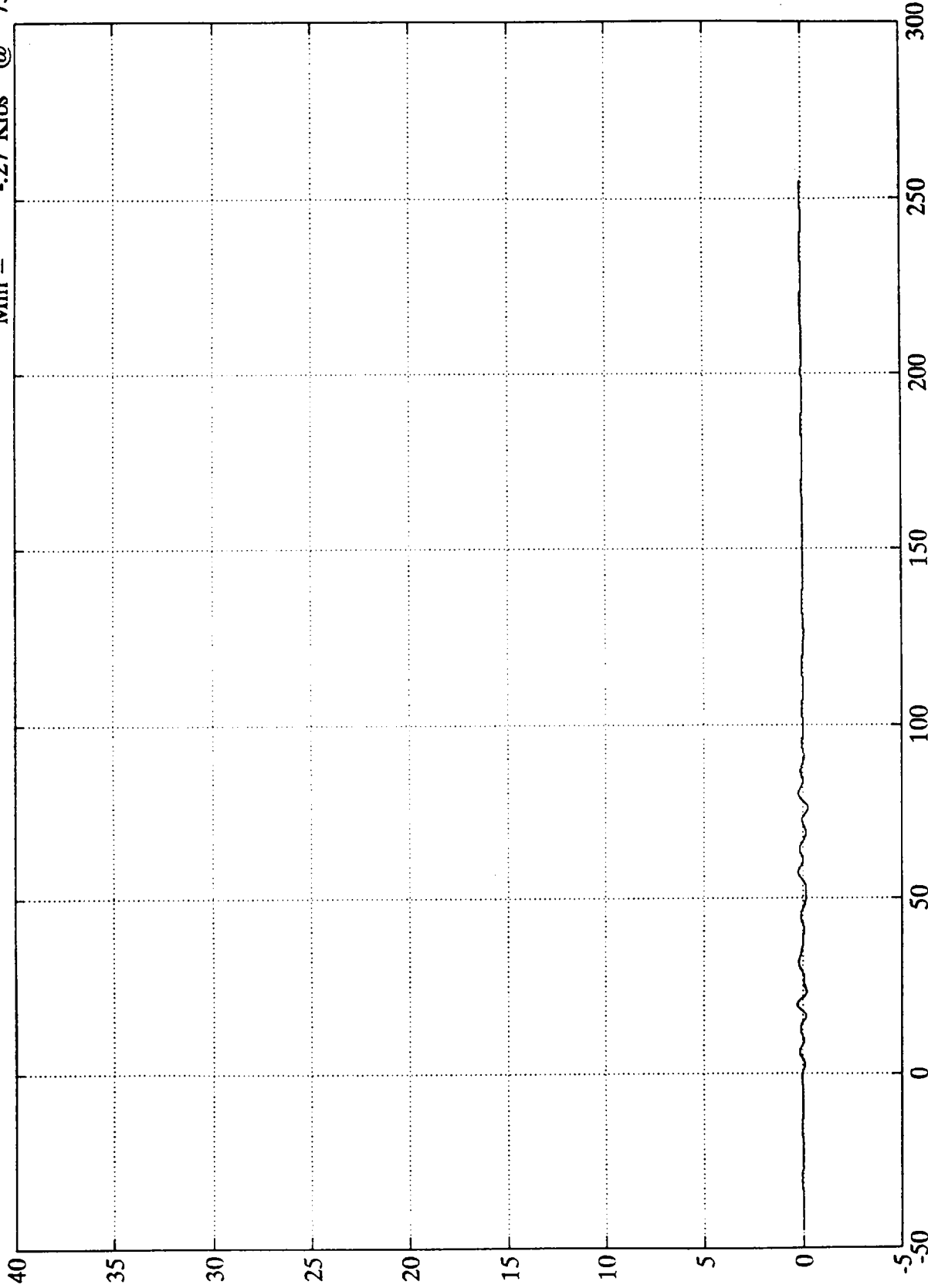
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell A9

Max = .27 Klbs @ 19.55 msec  
Min = -.27 Klbs @ 75.84 msec



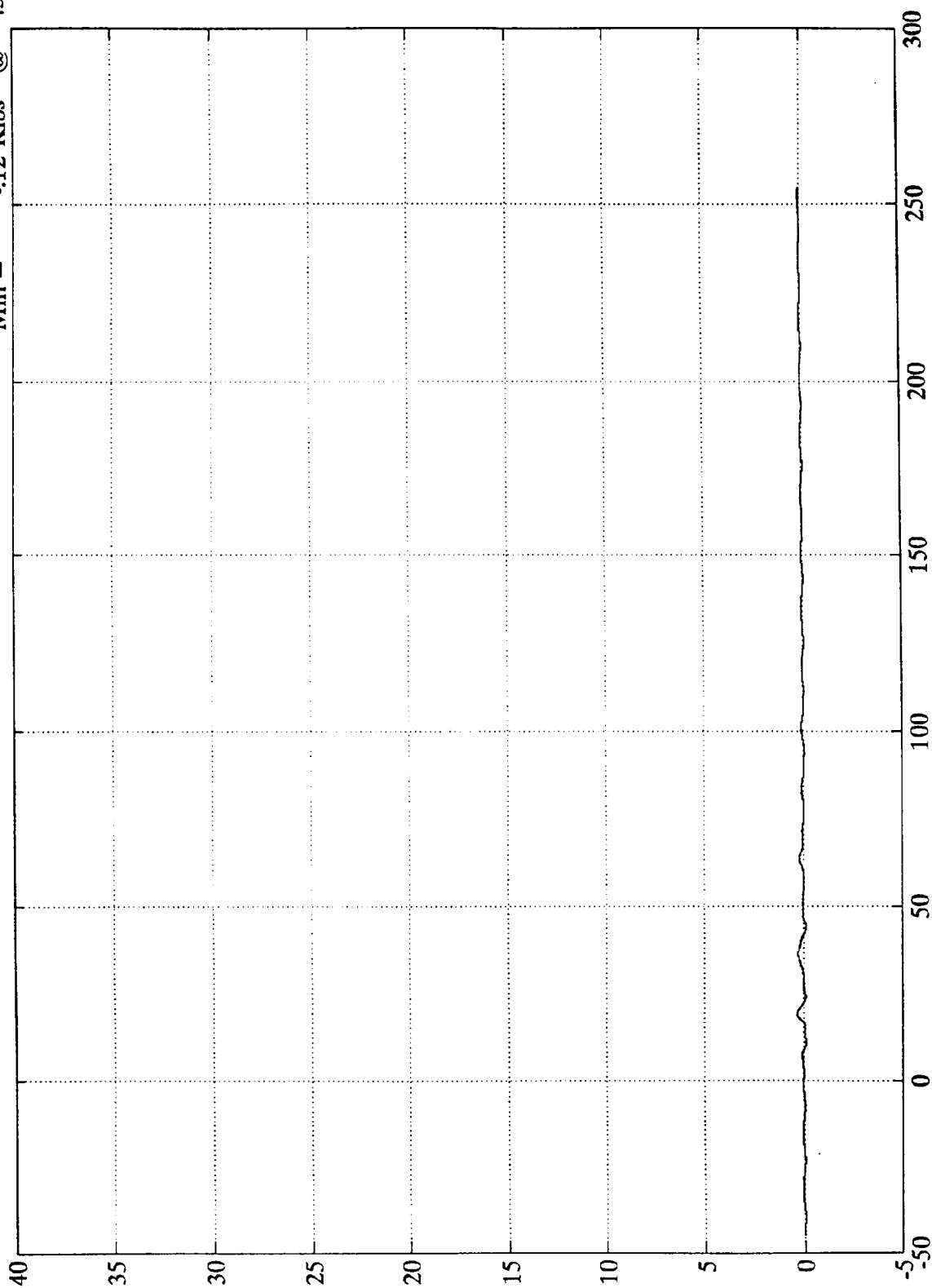
Time (msec)

SAE Filter Class 60

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B1

Max = .34 Klbs @ 19.19 msec  
 Min = -.12 Klbs @ 43.79 msec



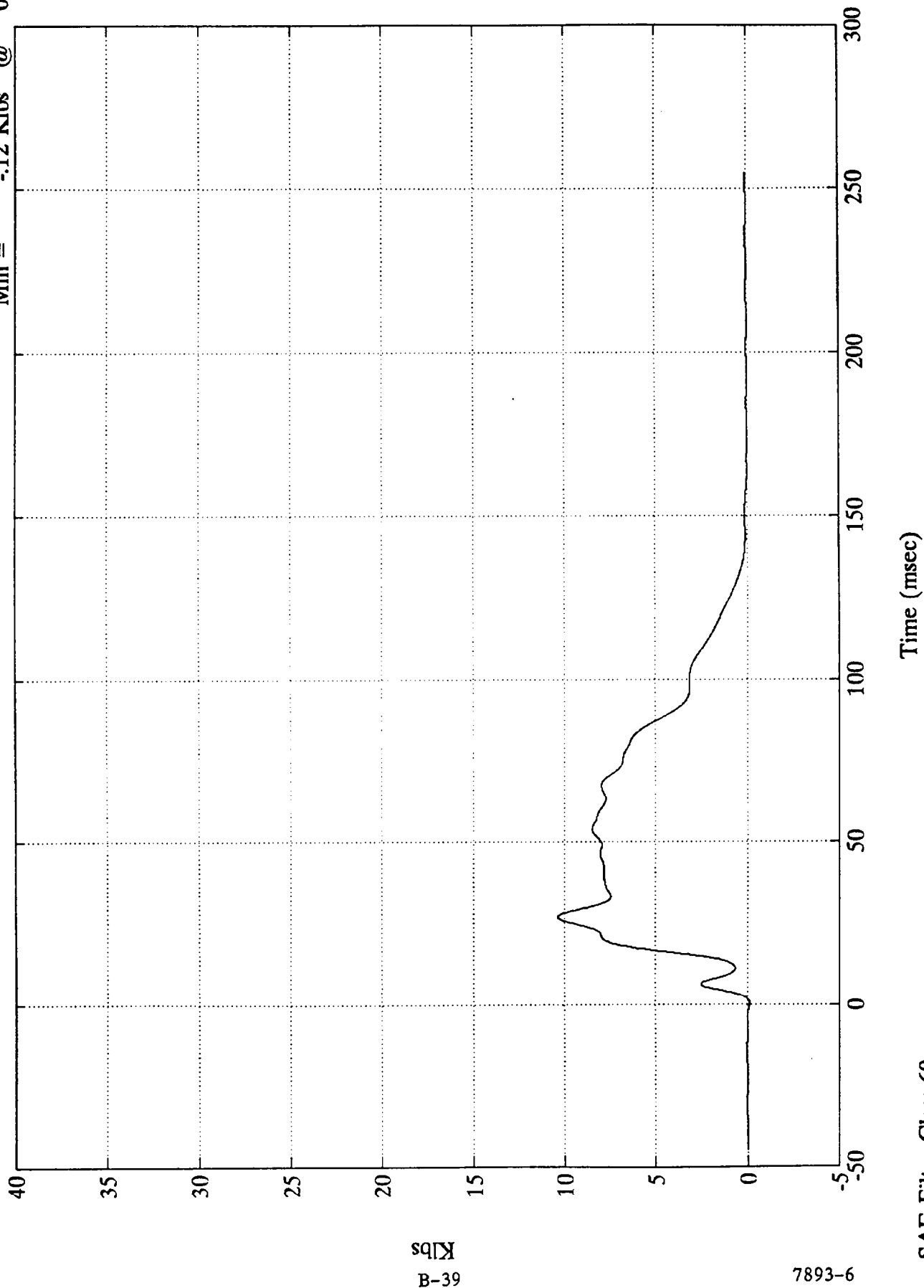
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B2

Max = 10.36 Klbs @ 27.00 msec  
Min = -.12 Klbs @ 0.35 msec



Klbs  
B-39

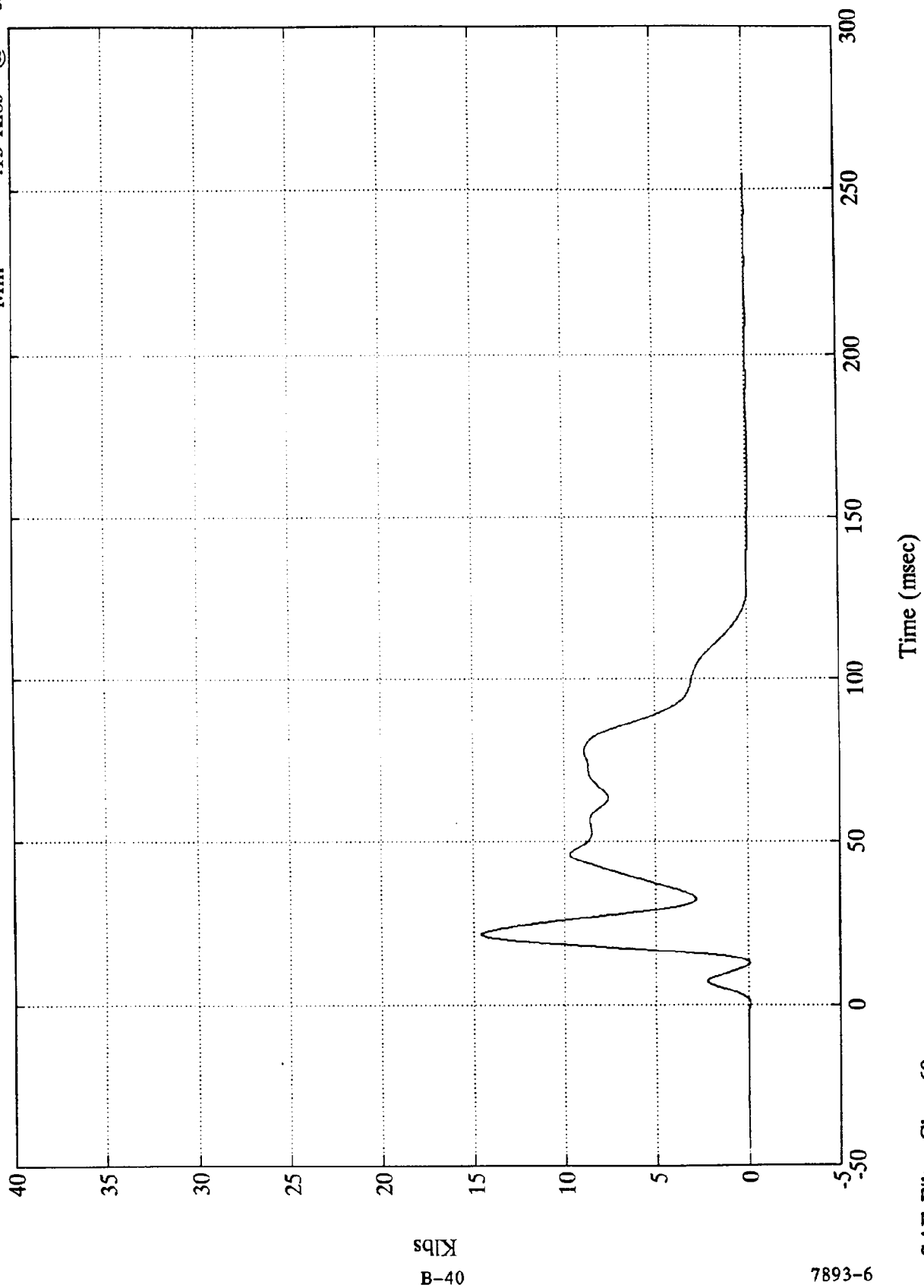
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B3

Max = 14.57 Klbs @ 21.47 msec  
Min = -.13 Klbs @ 0.35 msec



B-40

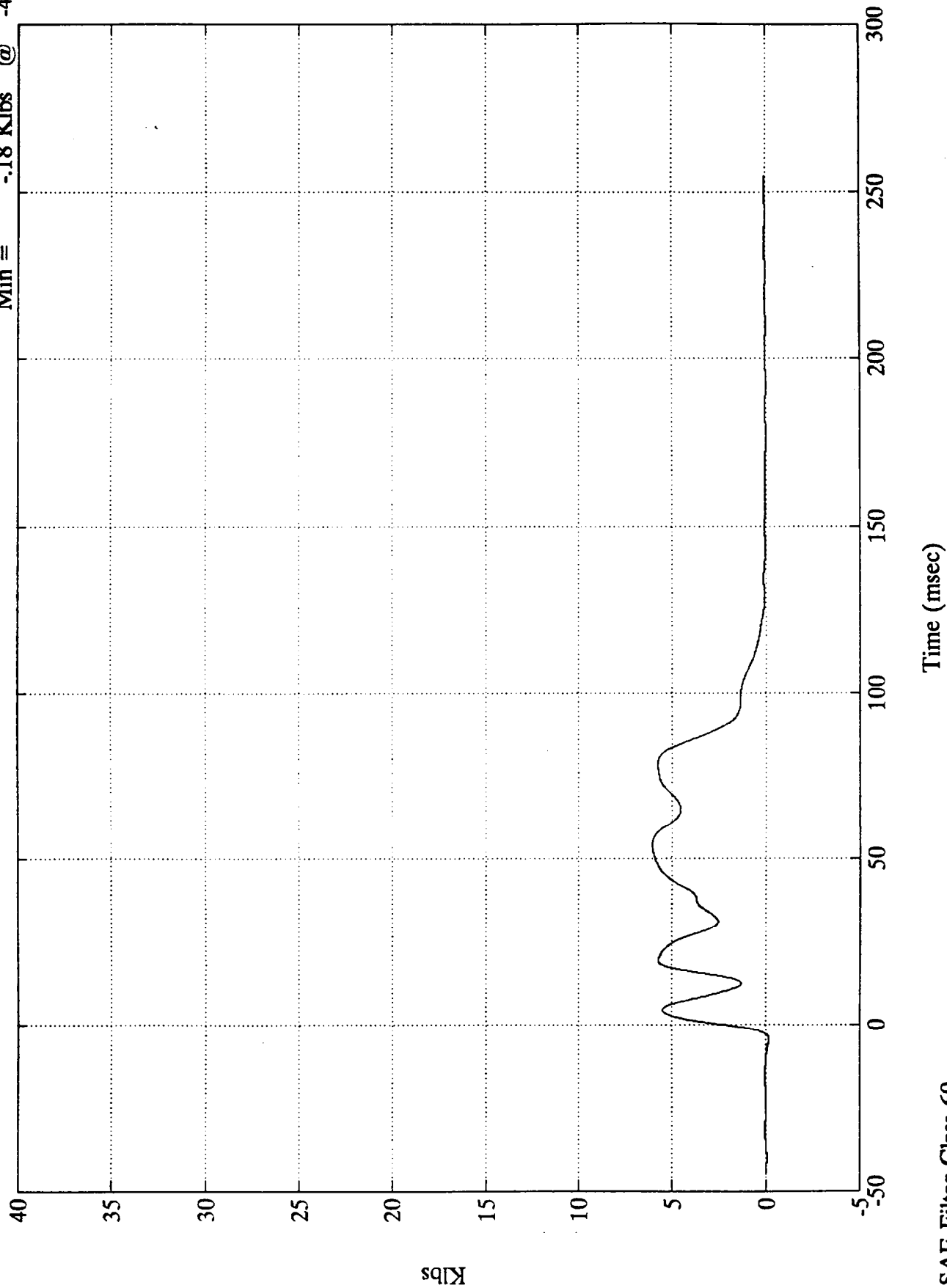
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B4

Max = 6.06 Klbs @ 54.11 ms  
Min = -1.8 Klbs @ -4.44 ms



B-41

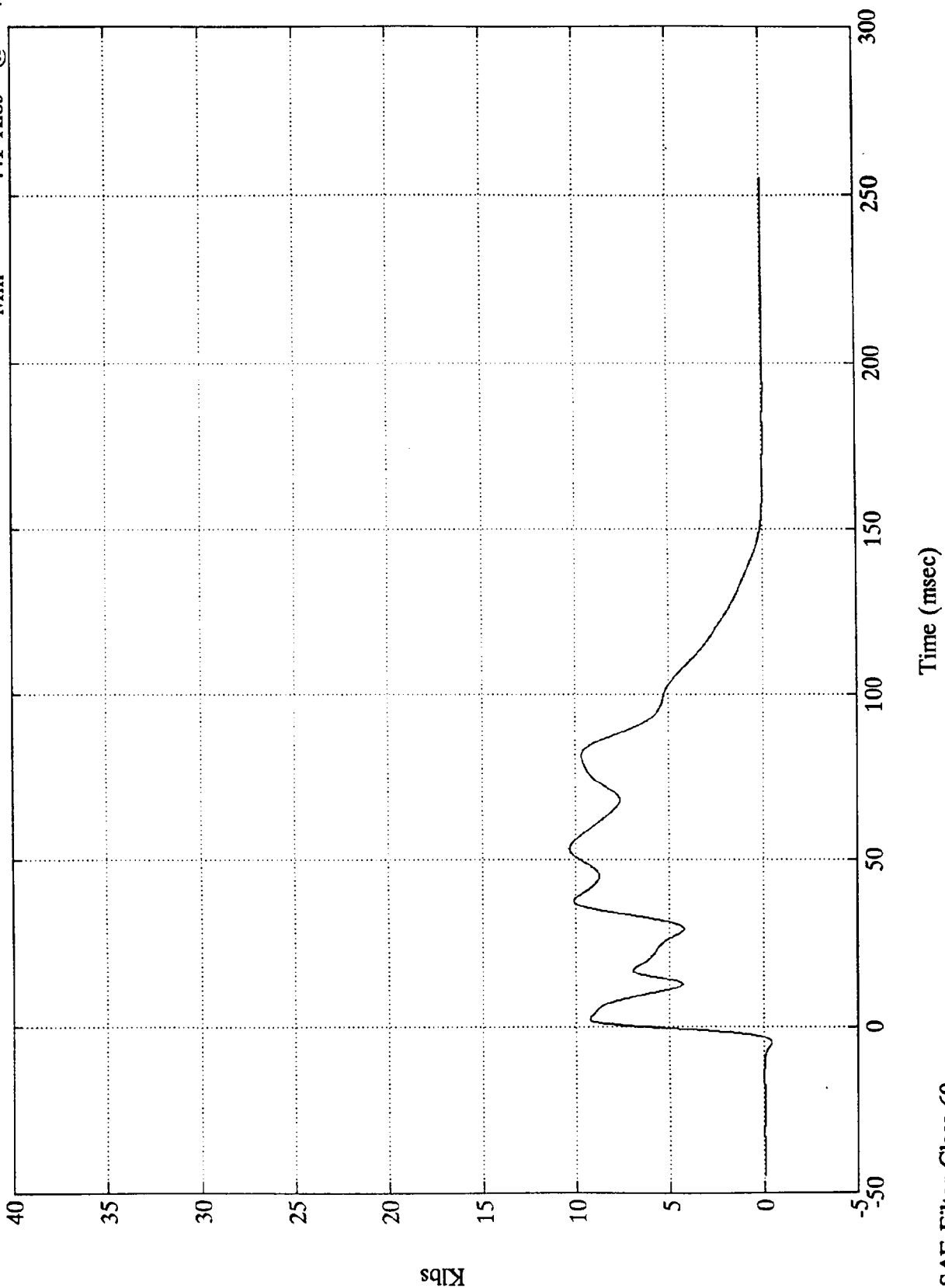
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B5

Max = 10.33 Klbs @ 53.27 msec  
Min = -4.80 Klbs @ -4.80 msec

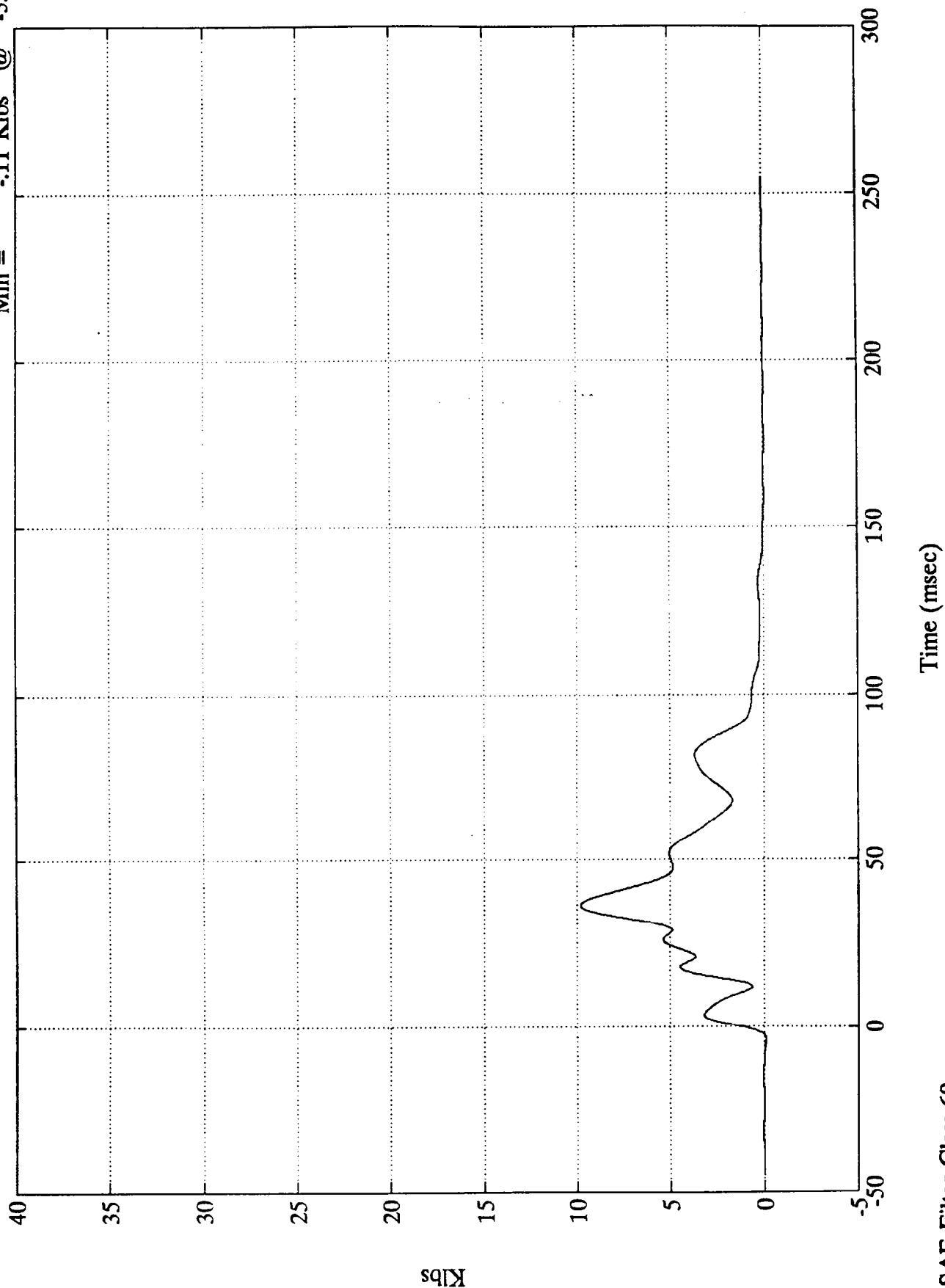


SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B6

Max = 9.79 Klbs @ 36.24 msec  
Min = -1.11 Klbs @ -3.96 msec



Klbs  
B-43

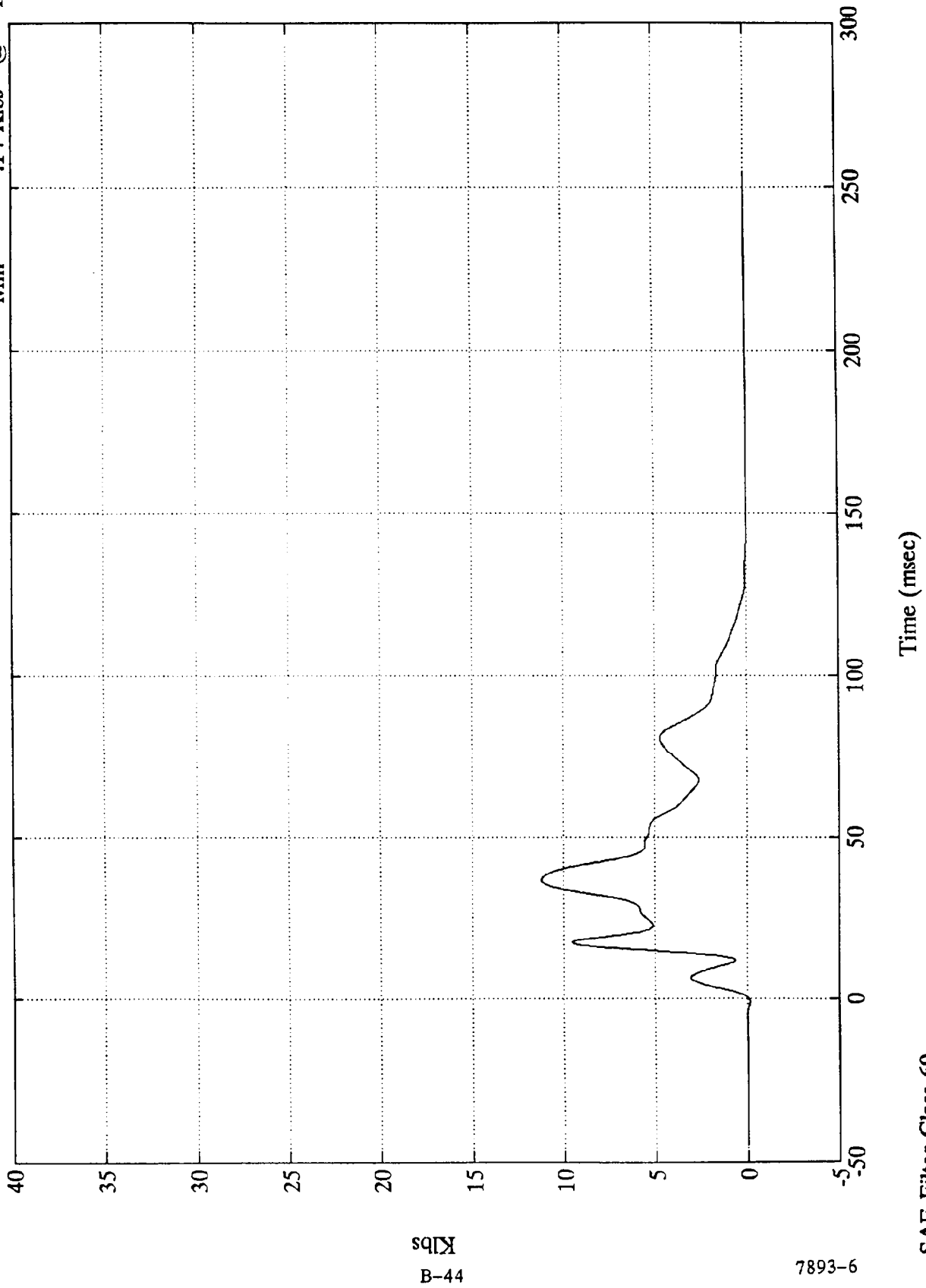
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B7

Max = 11.21 Klbs @ 36.60 msec  
Min = -1.14 Klbs @ -1.08 msec



B-44  
Klbs

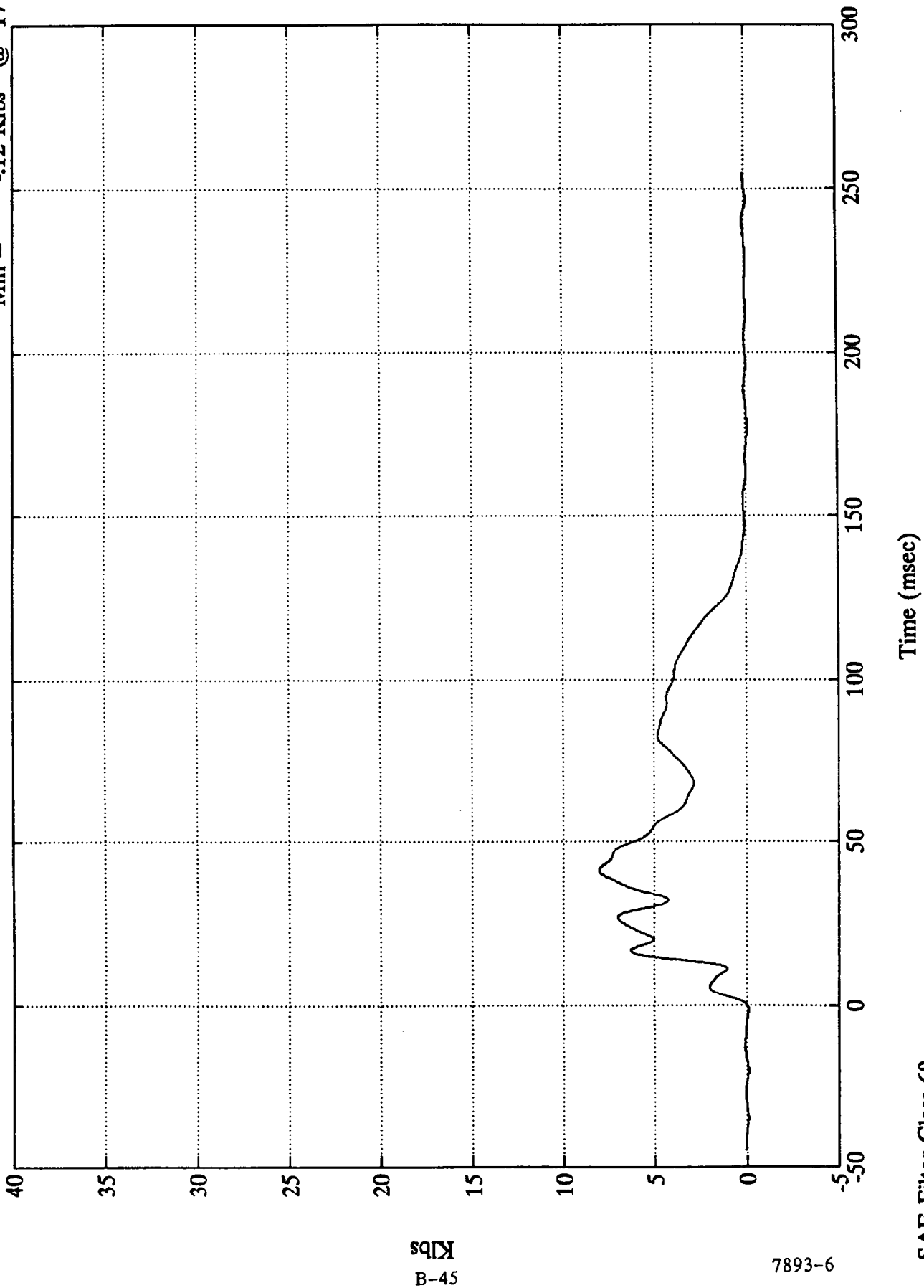
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B8

Max = 8.06 Klbs @ 41.15 msec  
Min = -.12 Klbs @ 177.24 msec



Klbs  
B-45

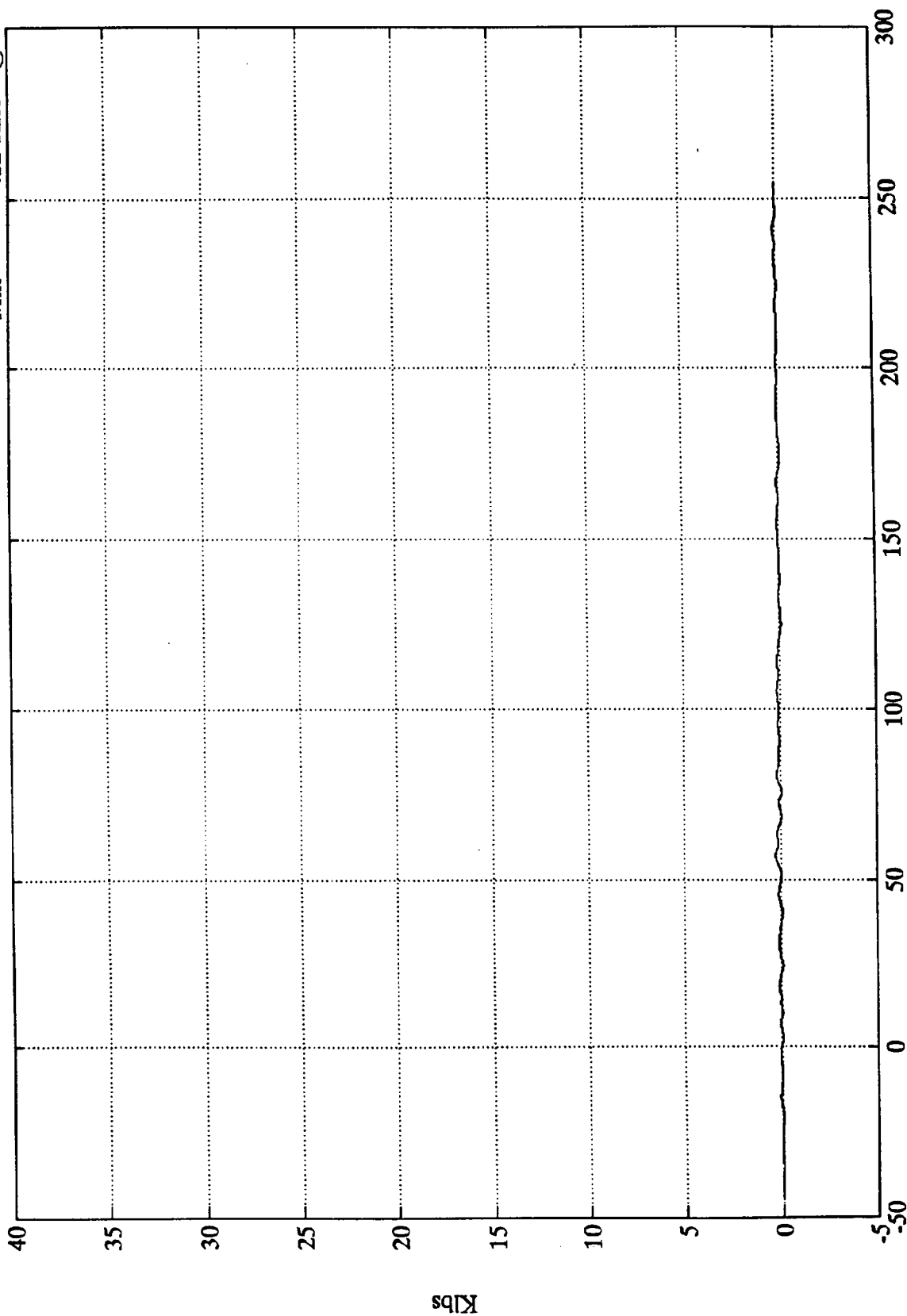
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell B9

Max = .27 Klbs @ 57.00 msec  
Min = -.12 Klbs @ 175.08 msec



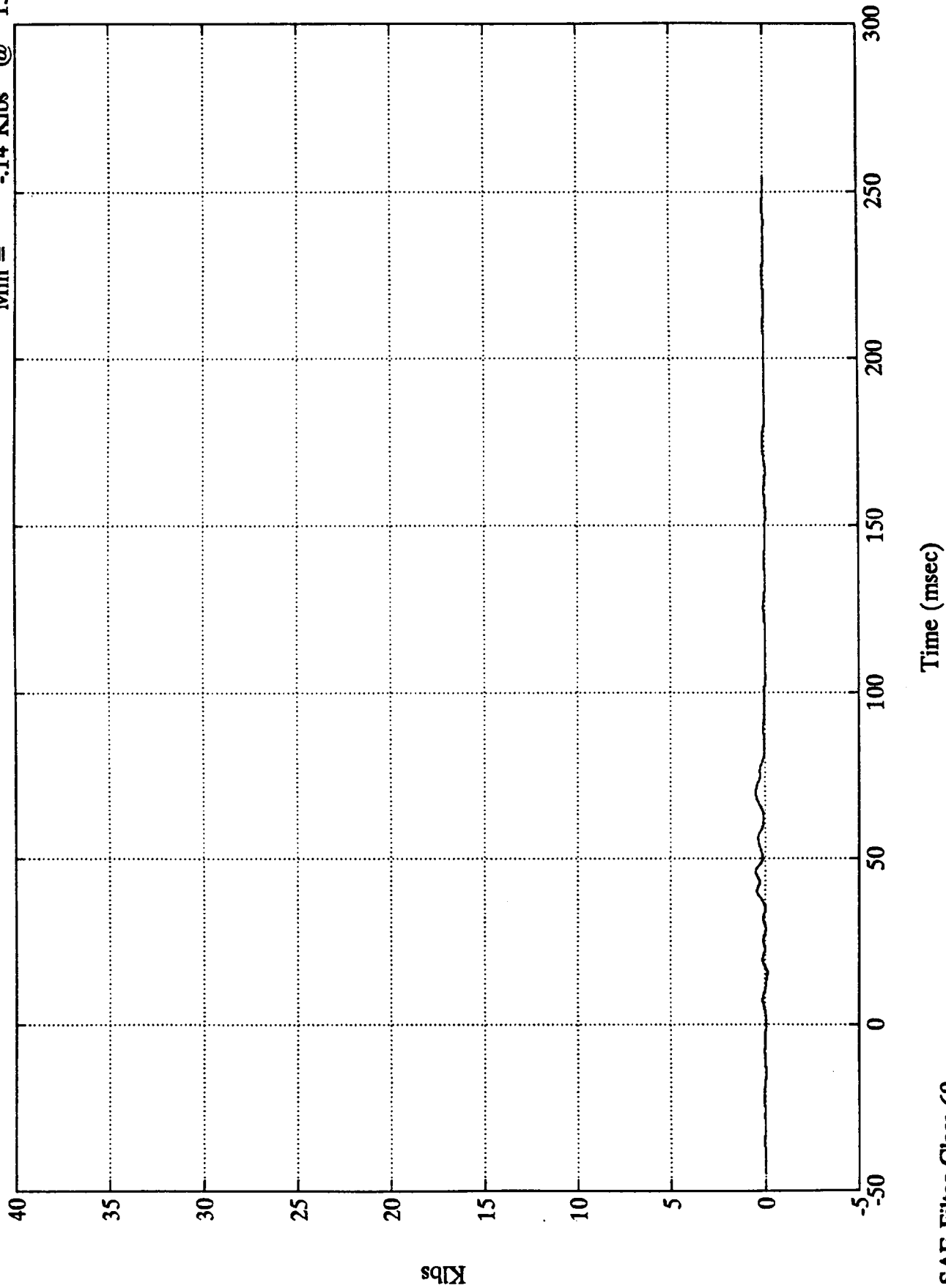
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C1

Max = .50 Klbs @ 46.08 msec  
Min = -.14 Klbs @ 15.47 msec



Klbs  
B-47

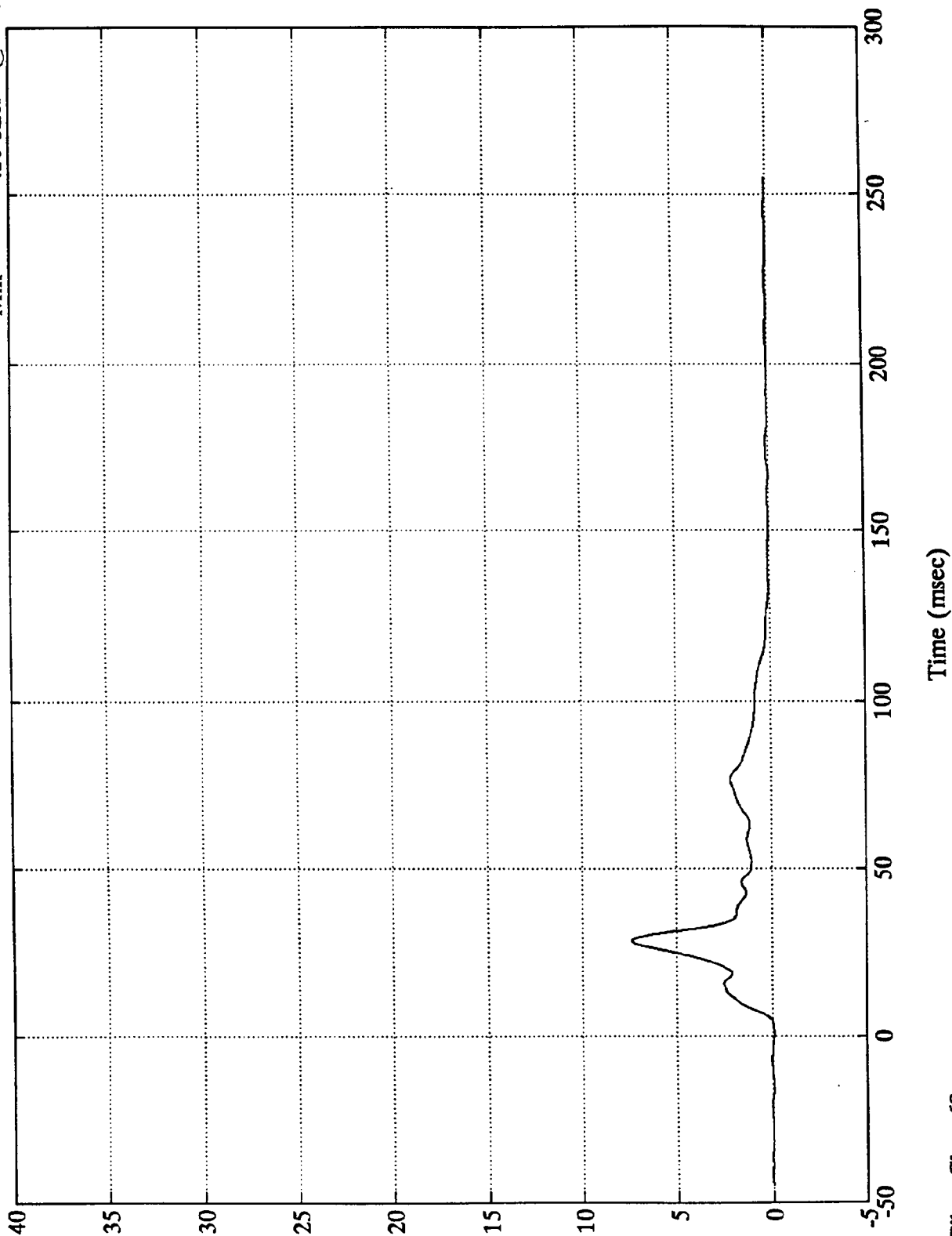
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C2

Max = 7.39 Klbs @ 28.44 msec  
Min = -.10 Klbs @ 0.59 msec



B-48

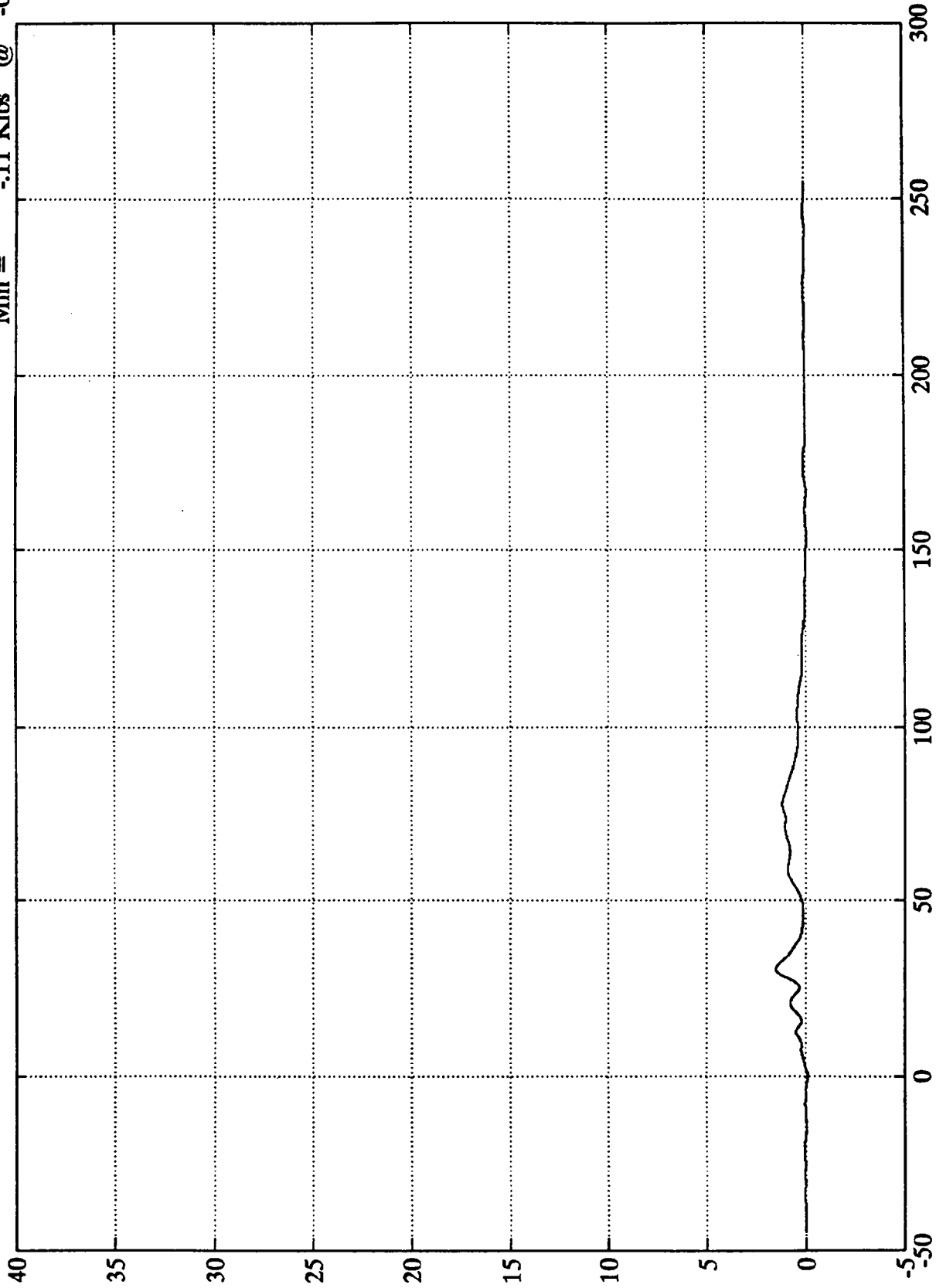
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C3

Max = 1.48 Klbs @ 30.47 msec  
Min = -.11 Klbs @ -0.12 msec



Klbs  
B-49

7893-6

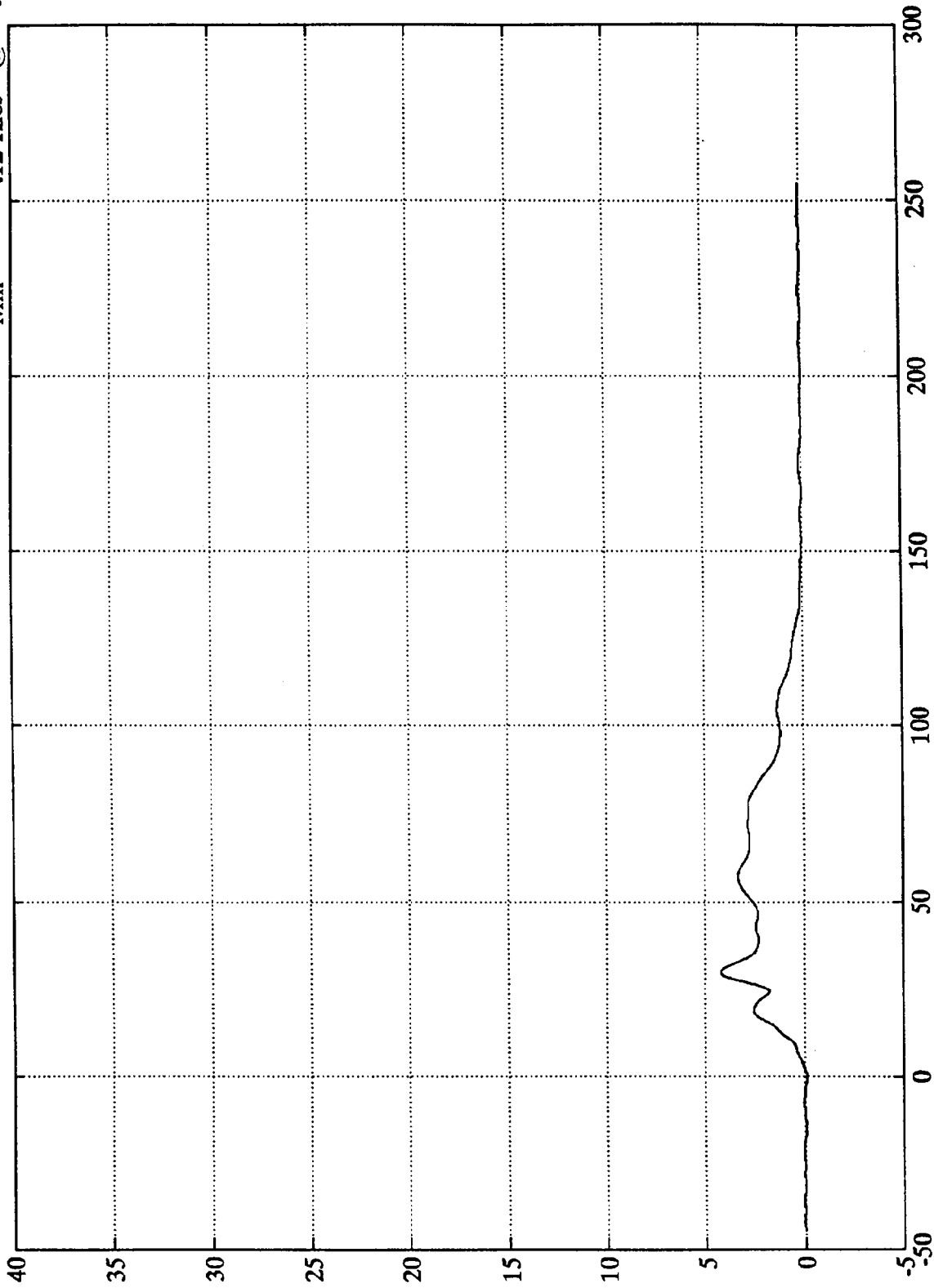
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C4

Max = 4.23 Klbs @ 29.76 msec  
Min = -.12 Klbs @ -0.24 msec



Klbs  
B-50

7893-6

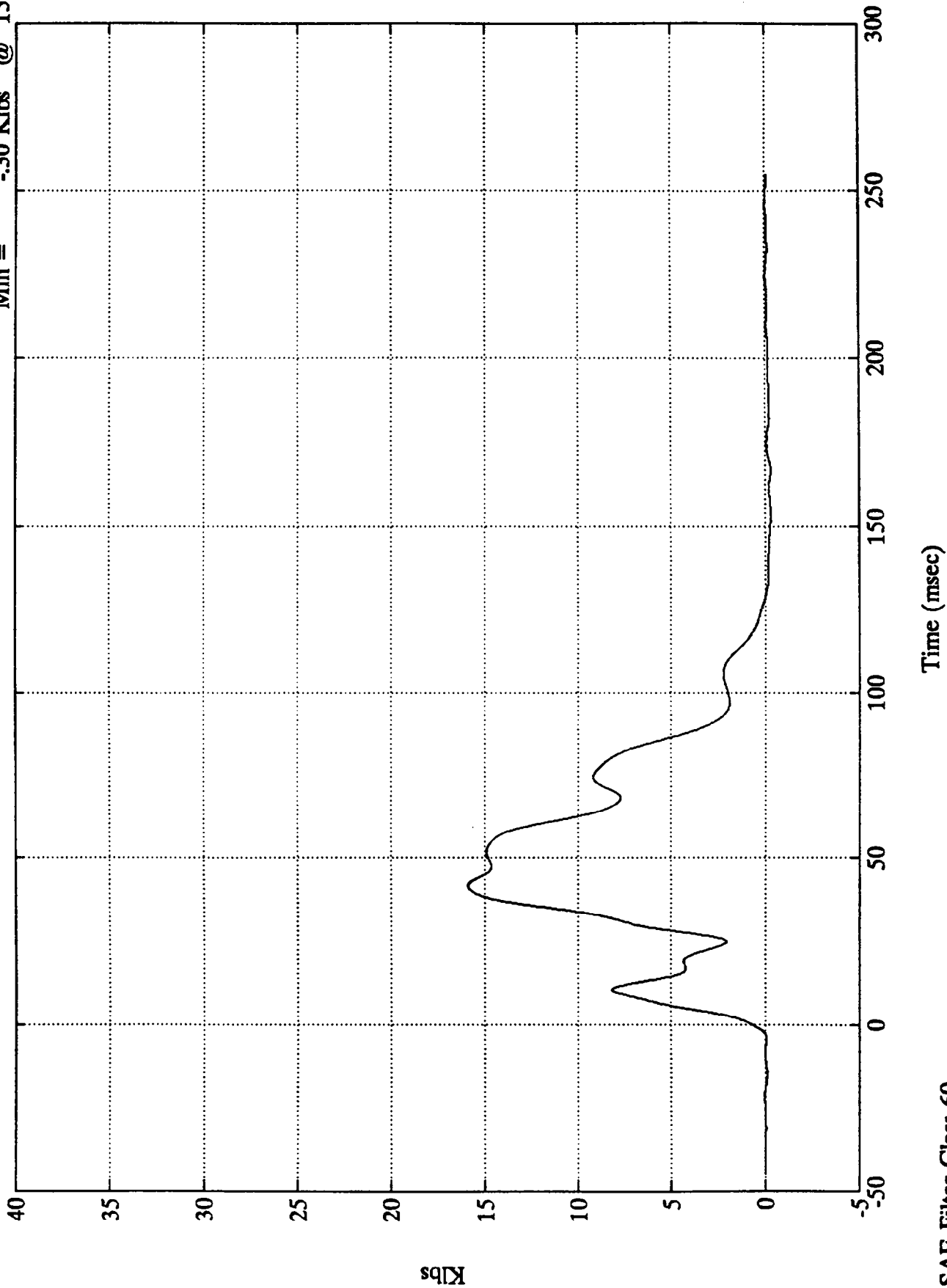
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C5

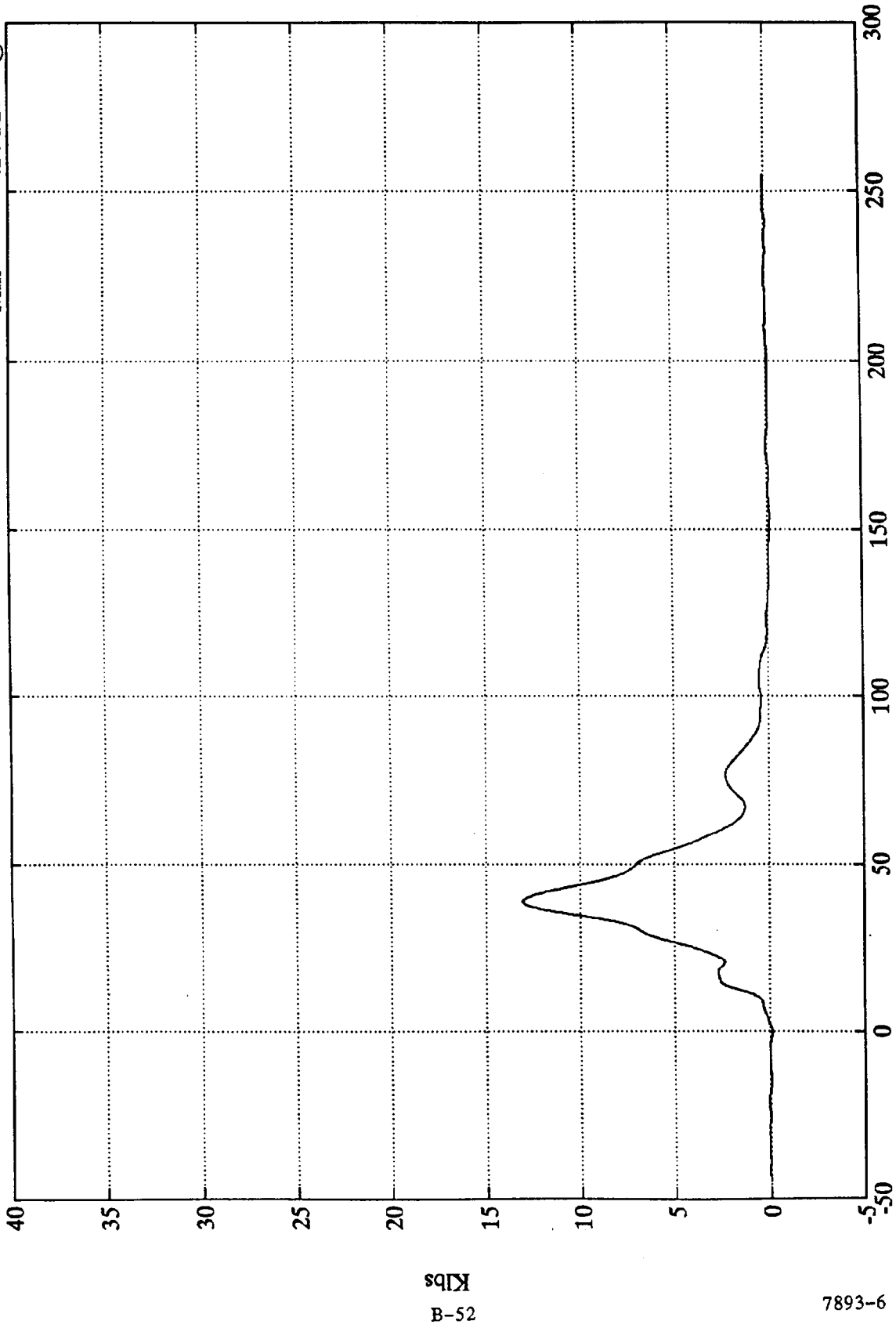
Max = 15.88 Klbs @ 41.63 msec  
Min = -30 Klbs @ 153.60 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C6

Max = 13.05 Klbs @ 38.40 msec  
Min = -.14 Klbs @ 153.96 msec



B-52  
Klbs

Time (msec)

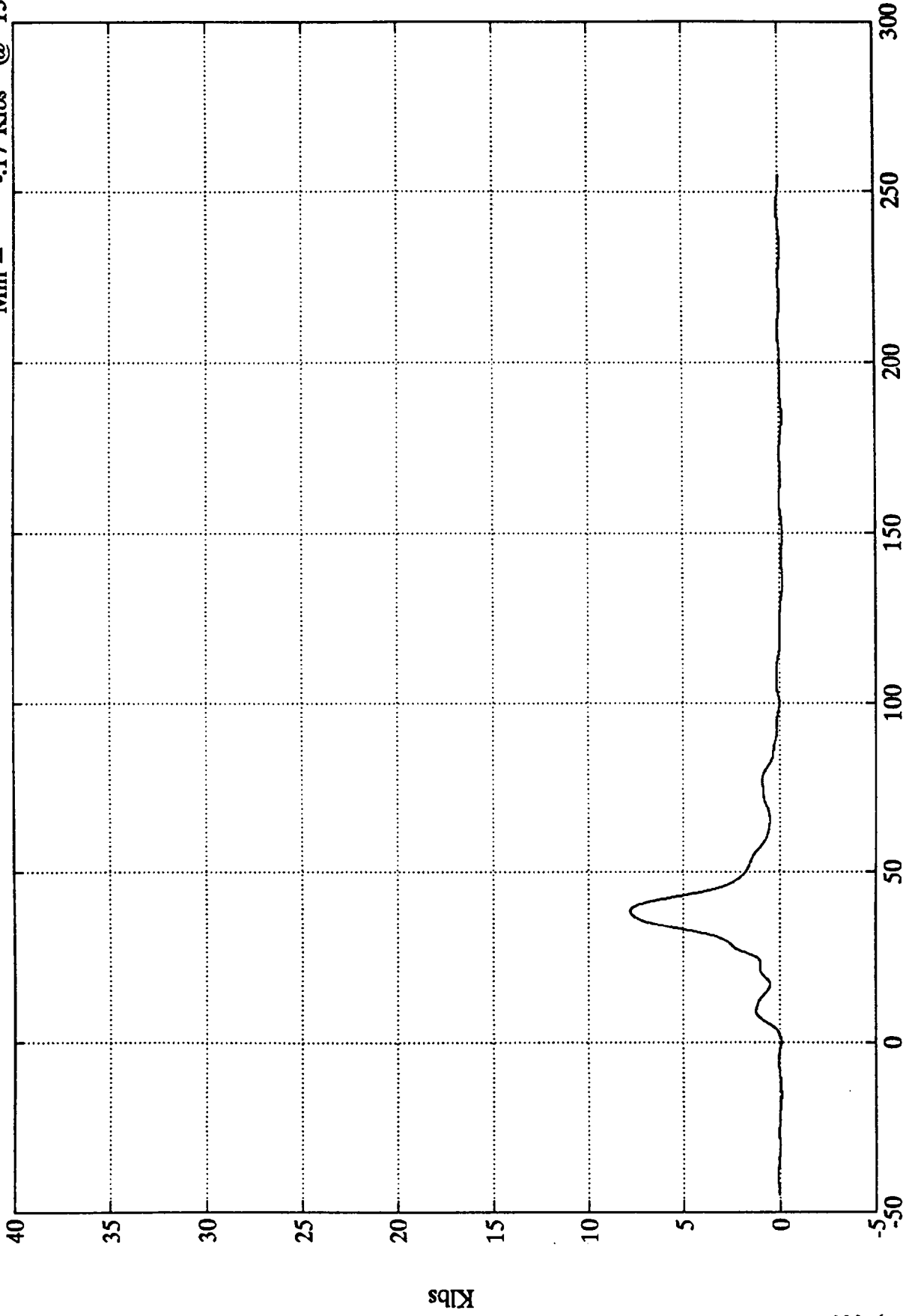
SAE Filter Class 60

7893-6

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C7

Max = 7.82 Klbs @ 38.63 msec  
Min = -.17 Klbs @ 136.20 msec



B-53

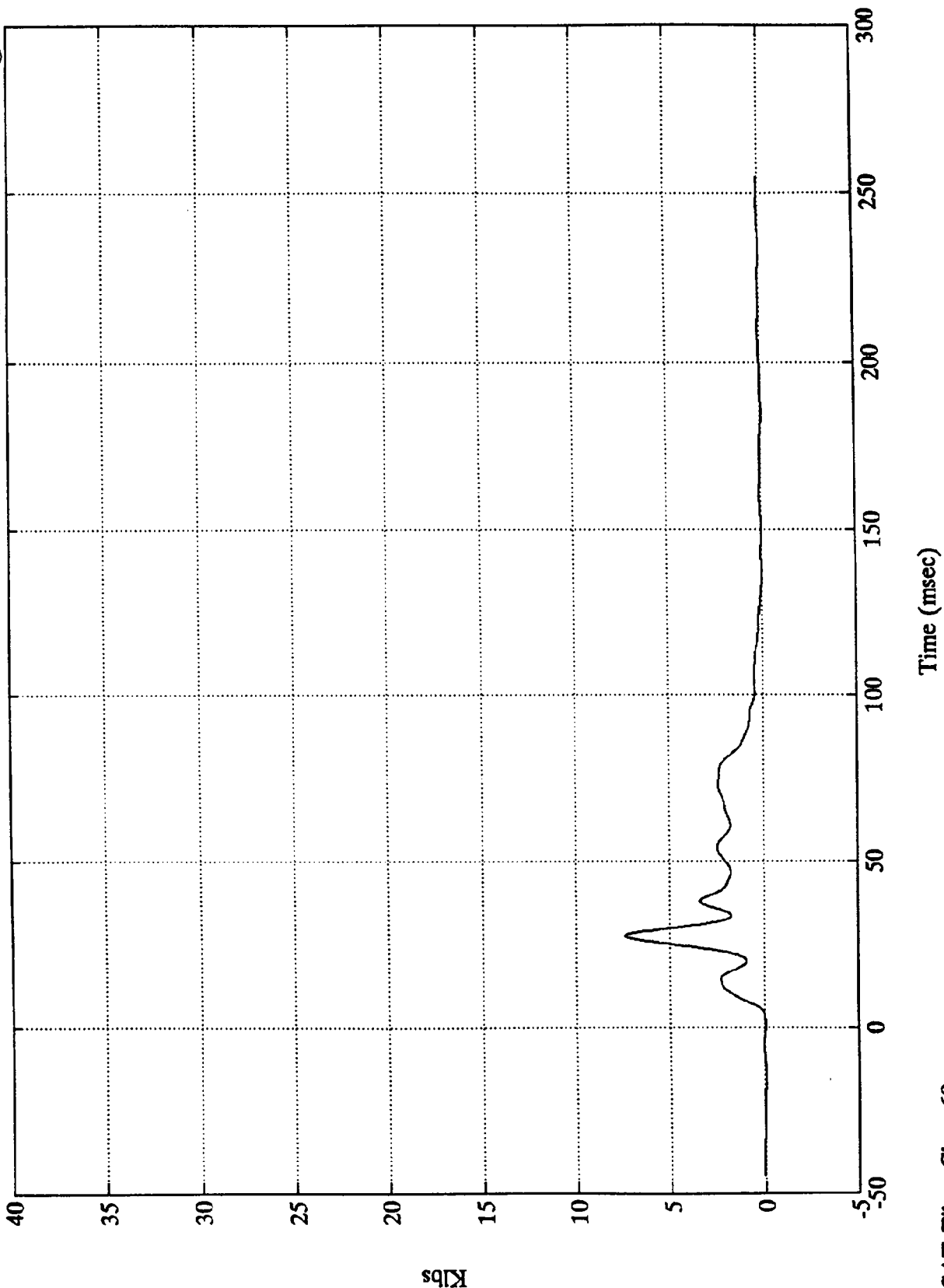
7893-6

SAE Filter Class 60

Time (msec)

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C8  
Max = 7.40 Klbs @ 27.36 msec  
Min = -0.07 Klbs @ -15.12 msec



45-B  
Klbs

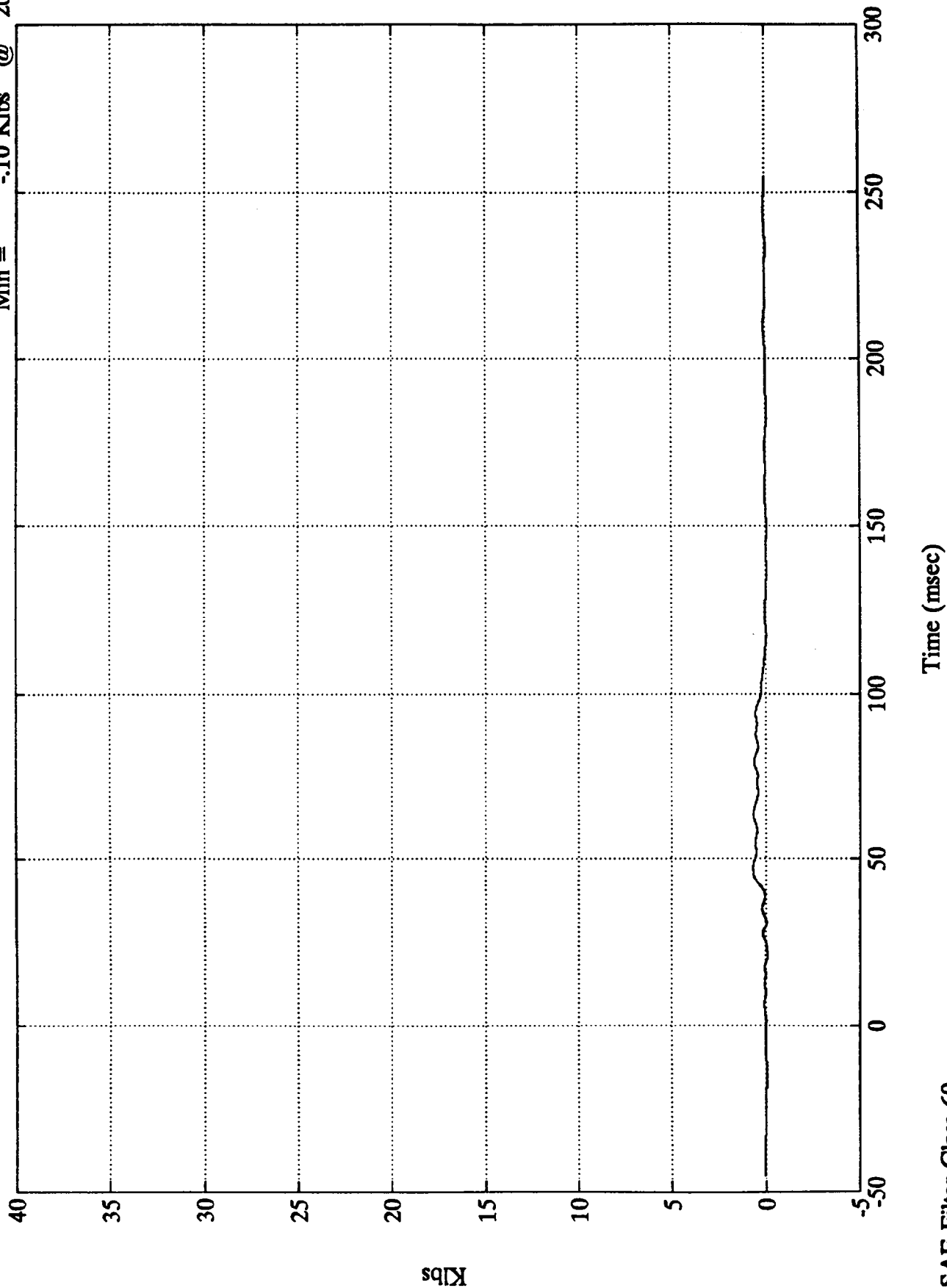
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell C9

Max = .67 Klbs @ 47.27 msec  
Min = -.10 Klbs @ 20.63 msec



B-55  
Klbs

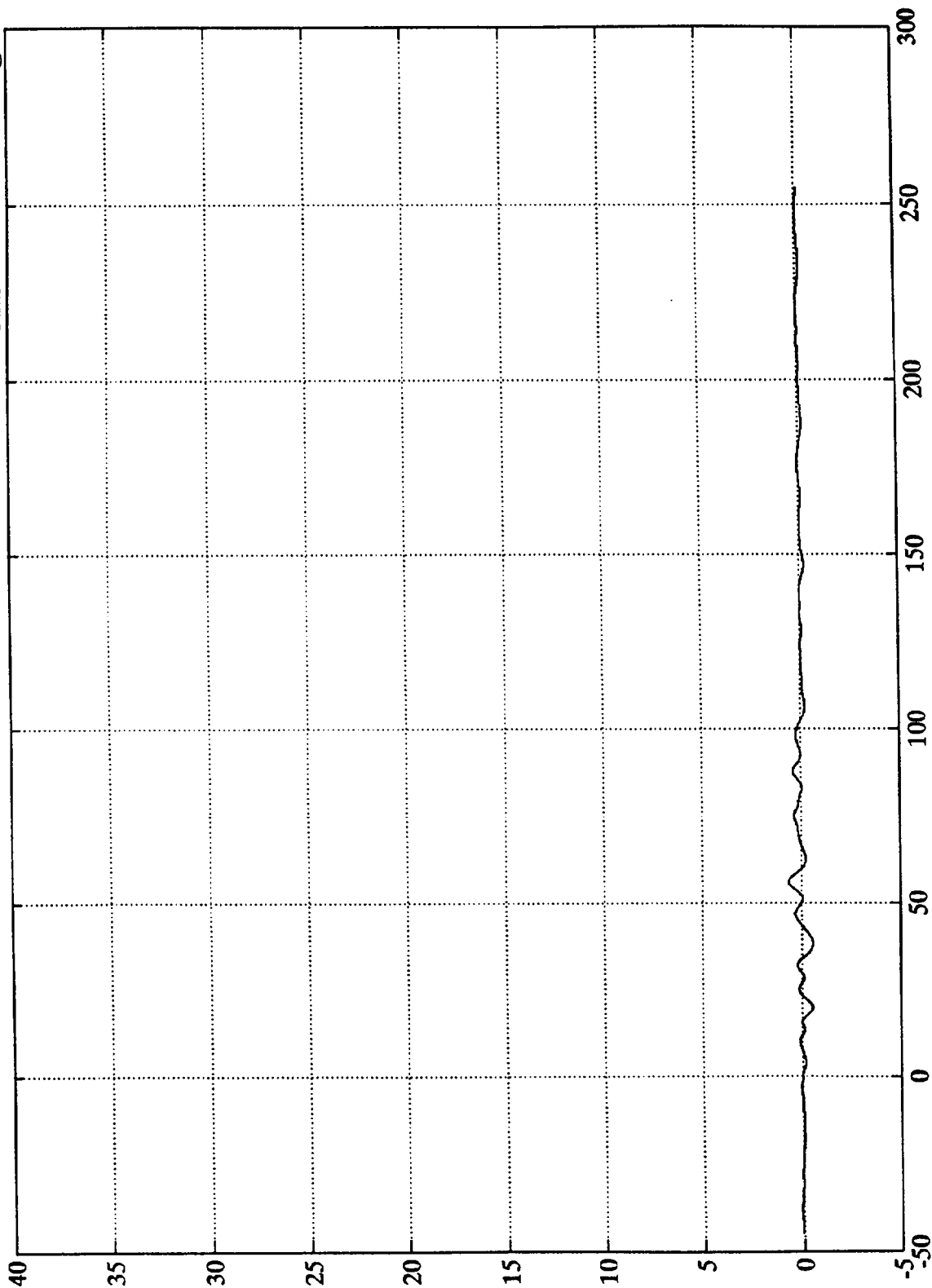
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D1

Max = .64 Klbs @ 55.92 msec  
Min = -.55 Klbs @ 38.15 msec



Klbs  
B-56

7893-6

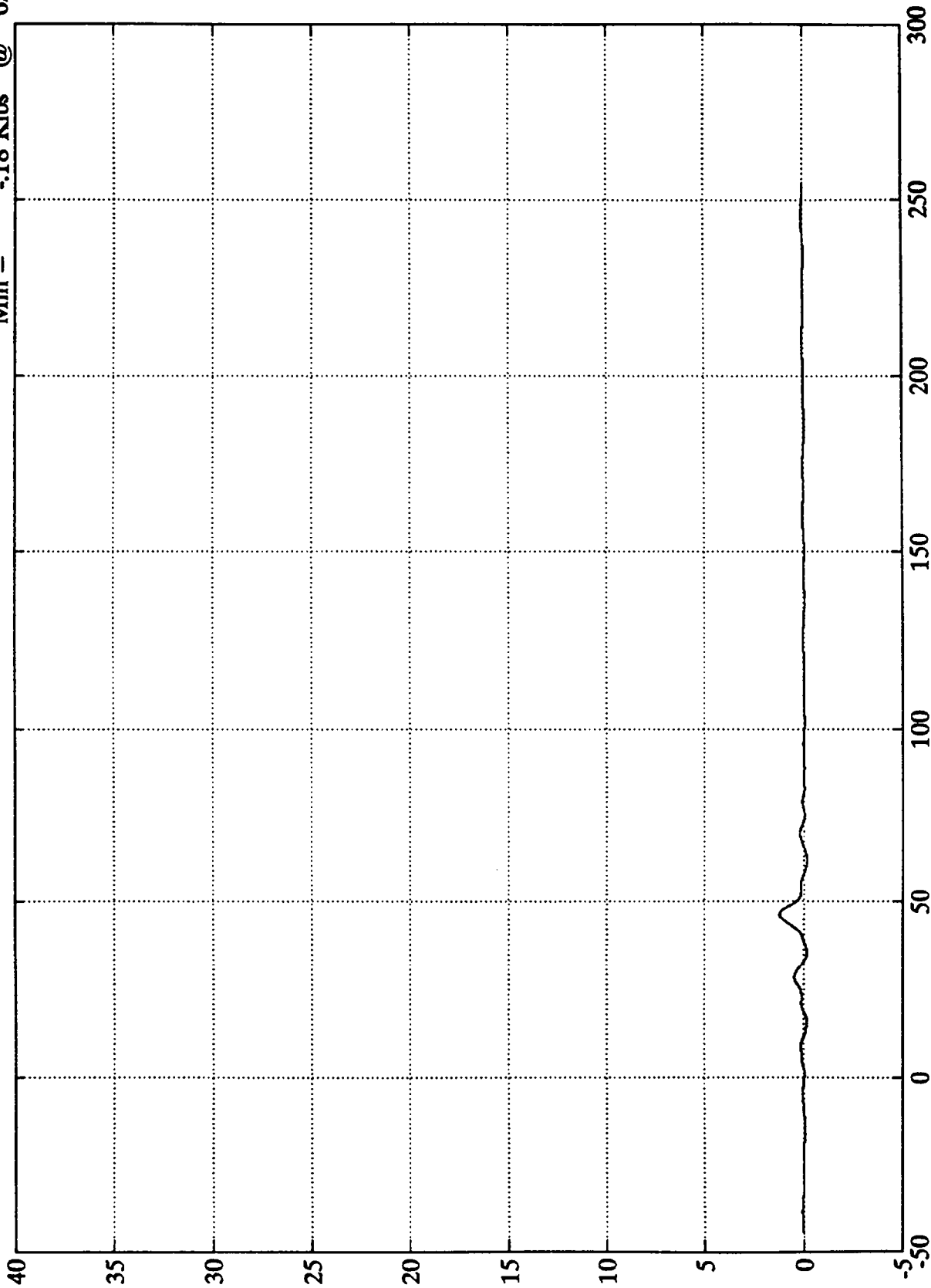
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D2

Max = 1.22 Klbs @ 46.31 msec  
Min = -1.18 Klbs @ 62.04 msec



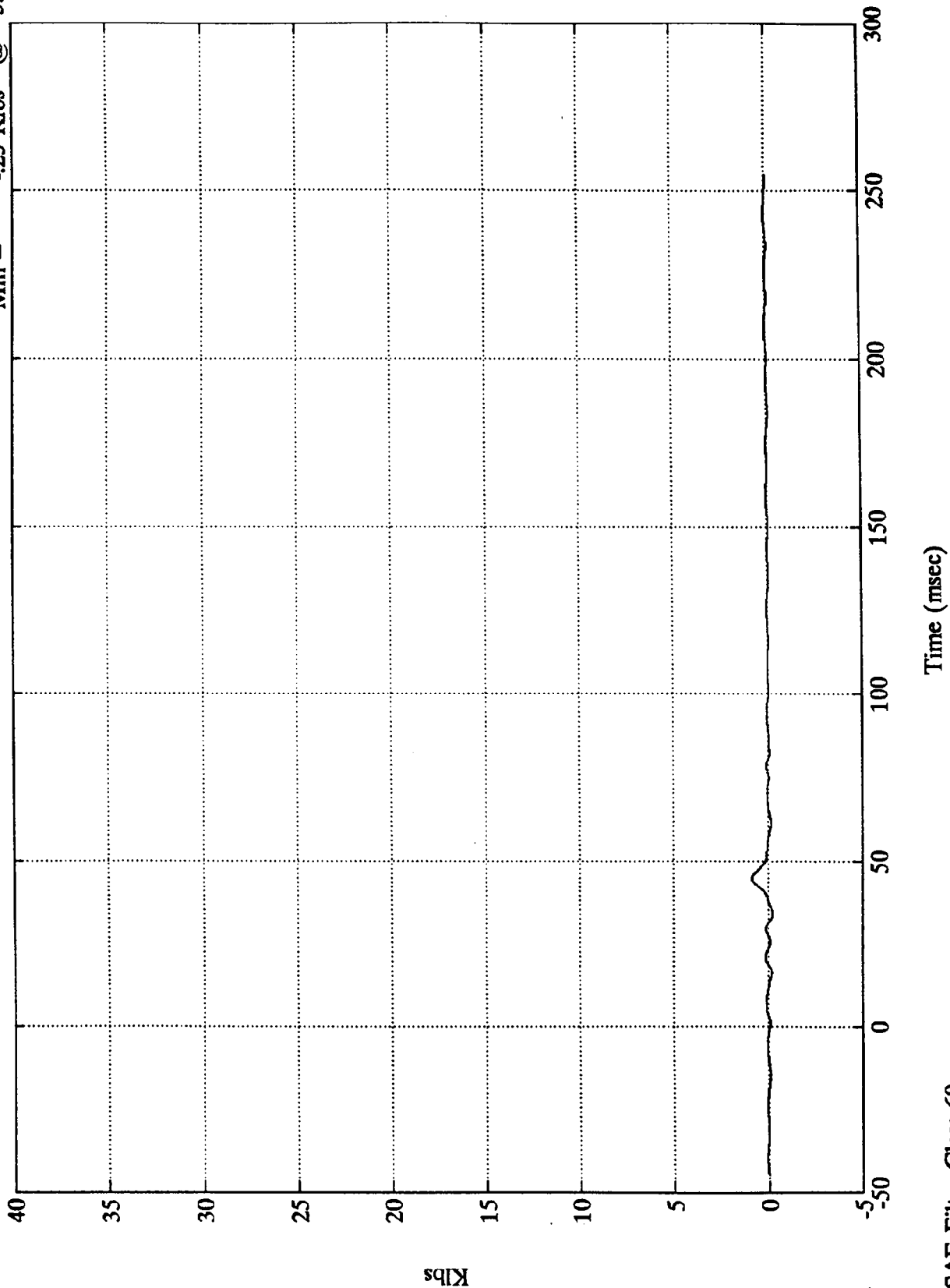
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D3

Max = .86 Klbs @ 44.75 msec  
Min = -.23 Klbs @ 33.59 msec



B-58  
Klbs

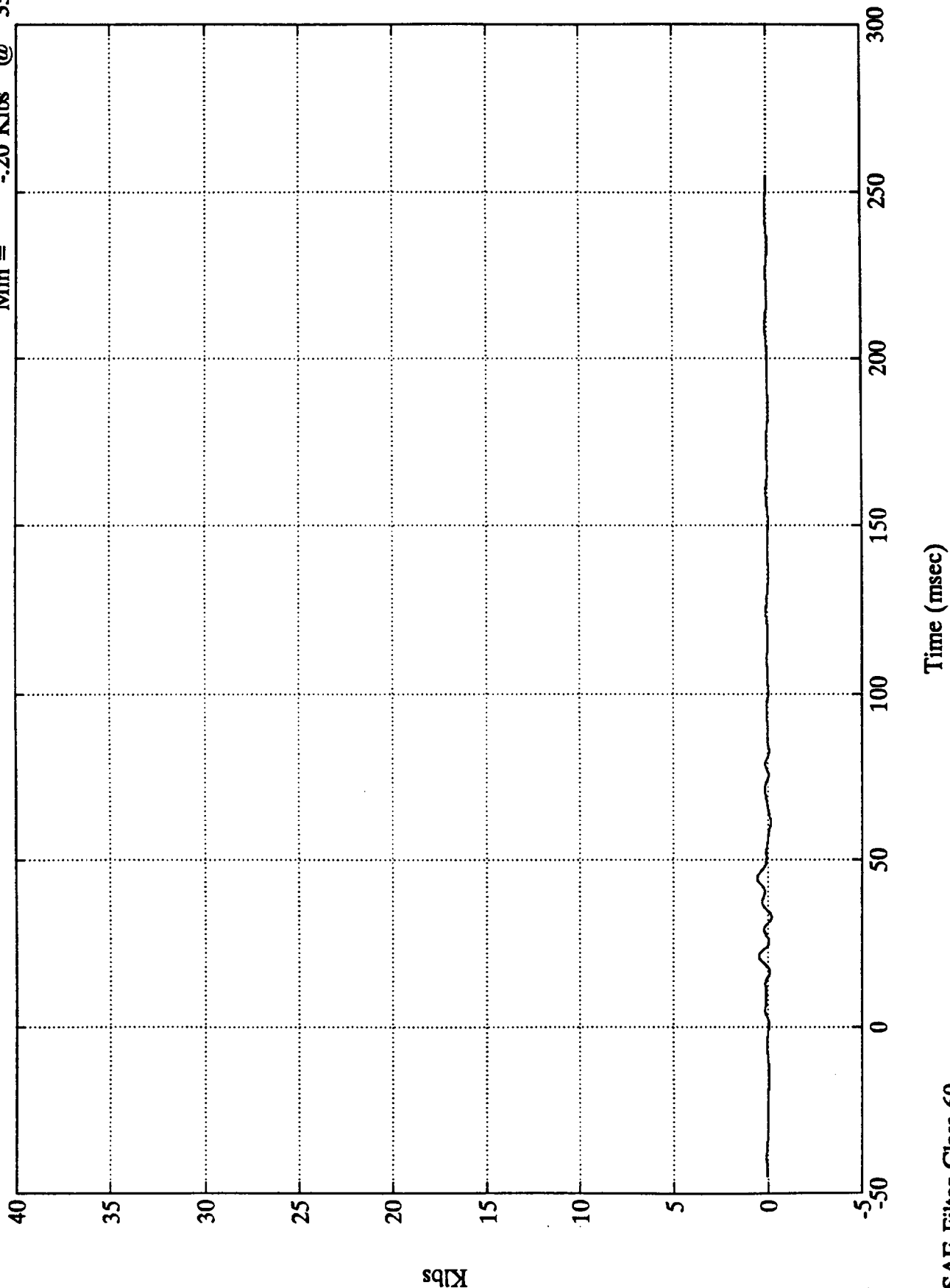
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D4

Max = .56 Klbs @ 44.63 msec  
Min = -.20 Klbs @ 33.00 msec



B-59

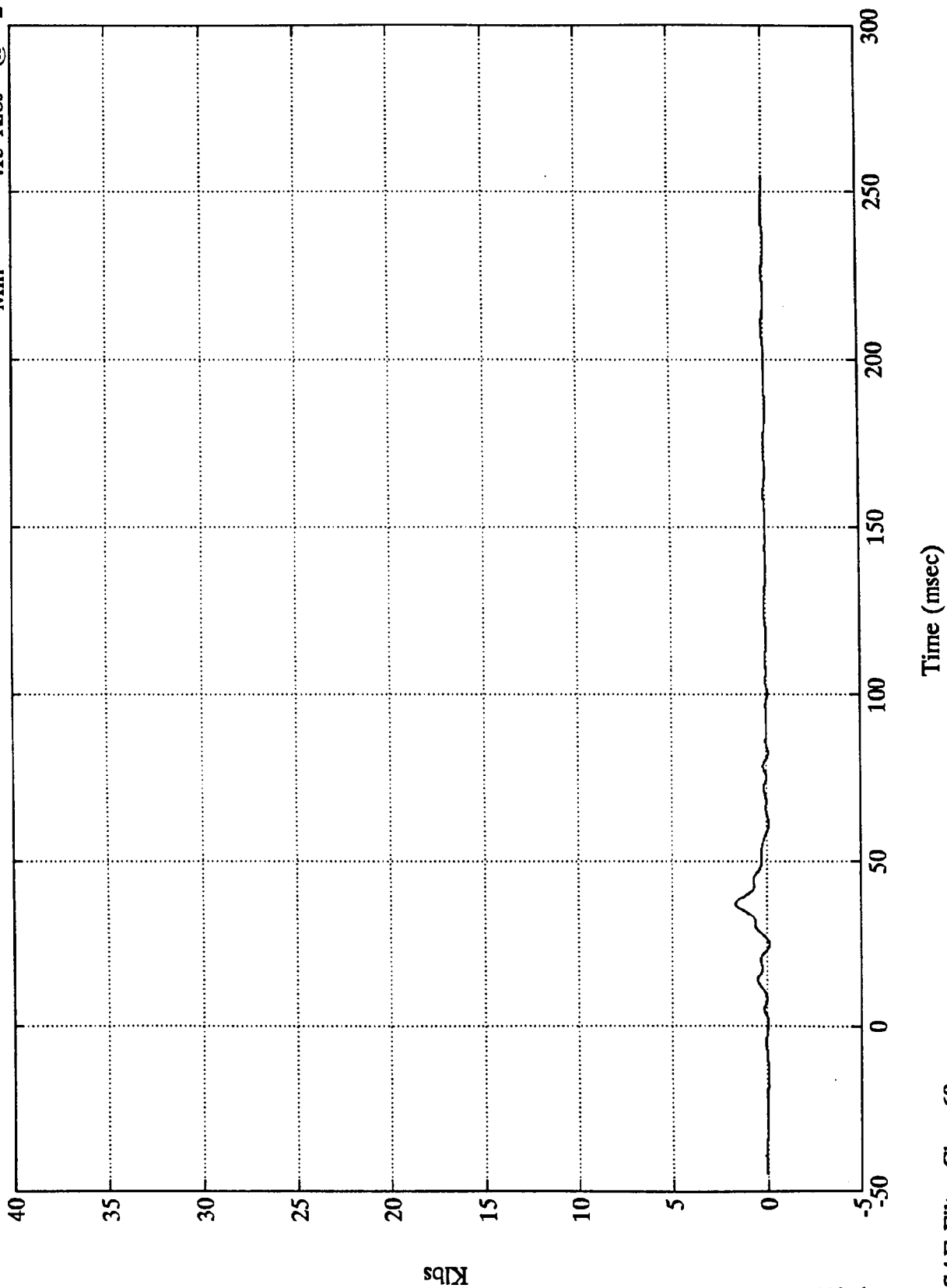
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D5

Max = 1.66 Klbs @ 36.84 msec  
Min = -1.15 Klbs @ 24.47 msec



SAE Filter Class 60

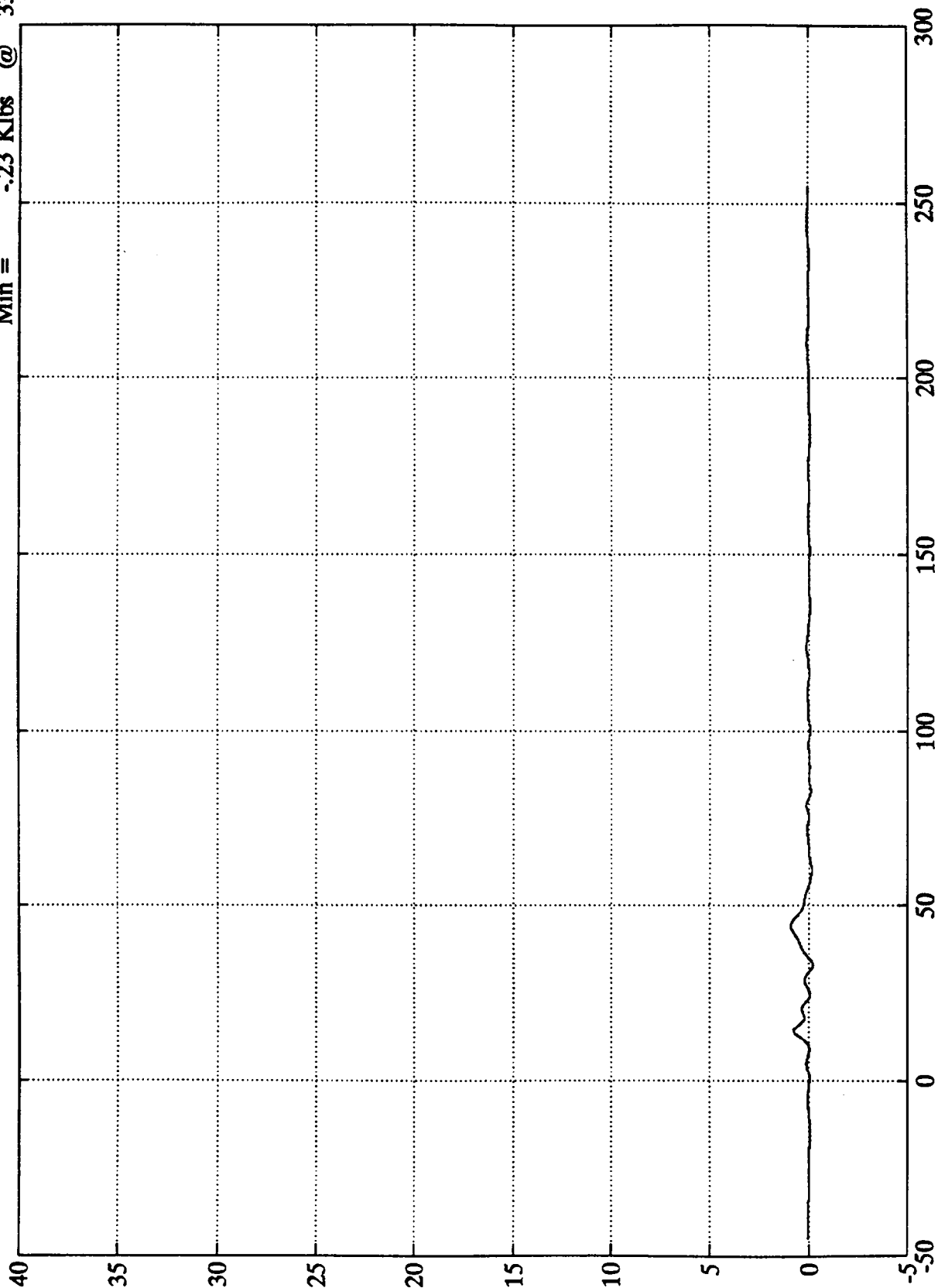
B-60

7893-6

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D6

Max = .90 Klbs @ 44.27 msec  
Min = -.23 Klbs @ 33.00 msec



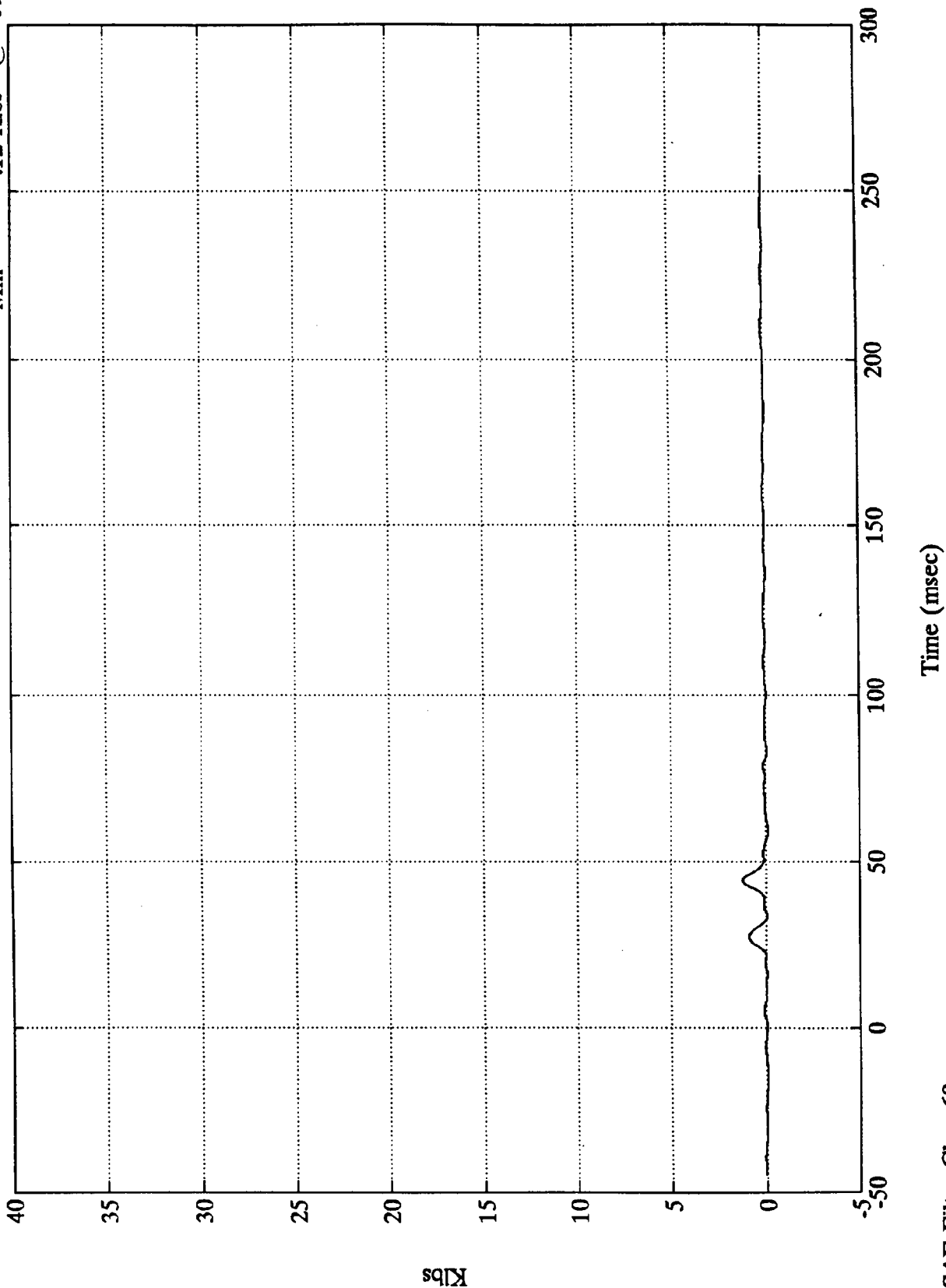
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D7

Max = 1.22 Klbs @ 44.27 msec  
Min = -12 Klbs @ 59.15 msec

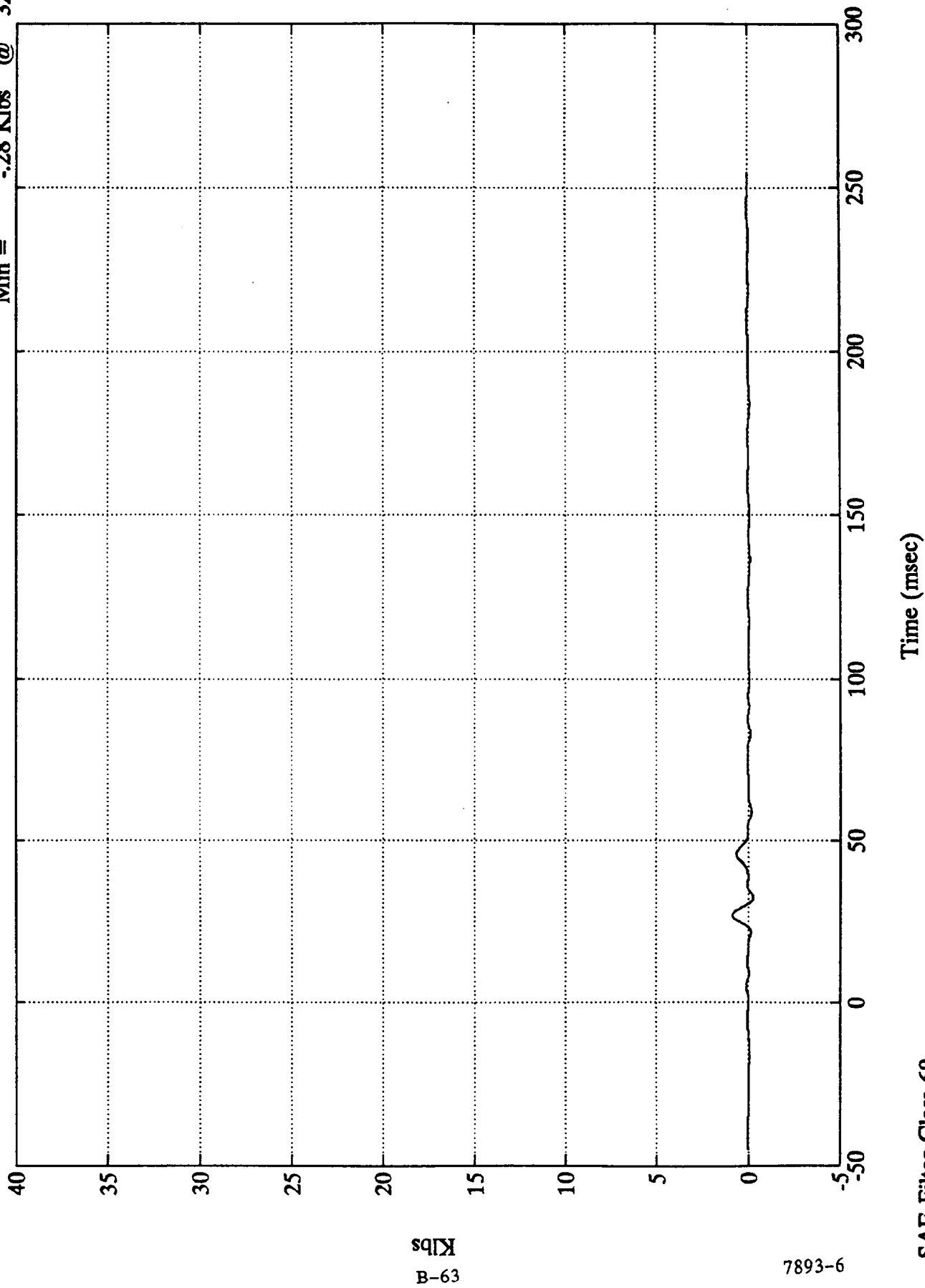


SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D8

Max = .86 Klbs @ 26.87 msec  
Min = -.28 Klbs @ 32.40 msec



B-63  
Klbs

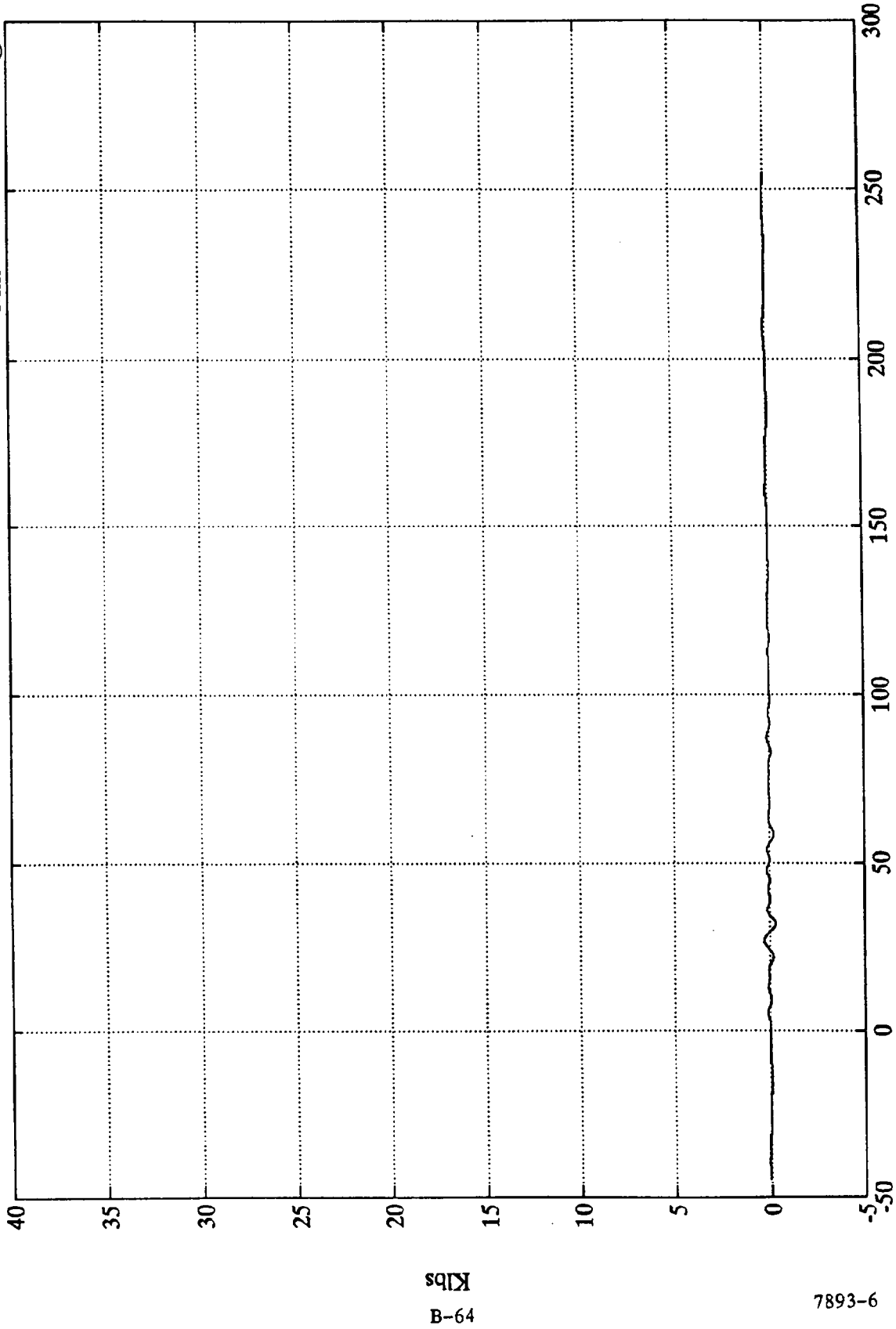
7893-6

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Barrier Load Cell D9

Max = .28 Klbs @ 26.63 msec  
Min = -.31 Klbs @ 31.67 msec



B-64  
Klbs

7893-6

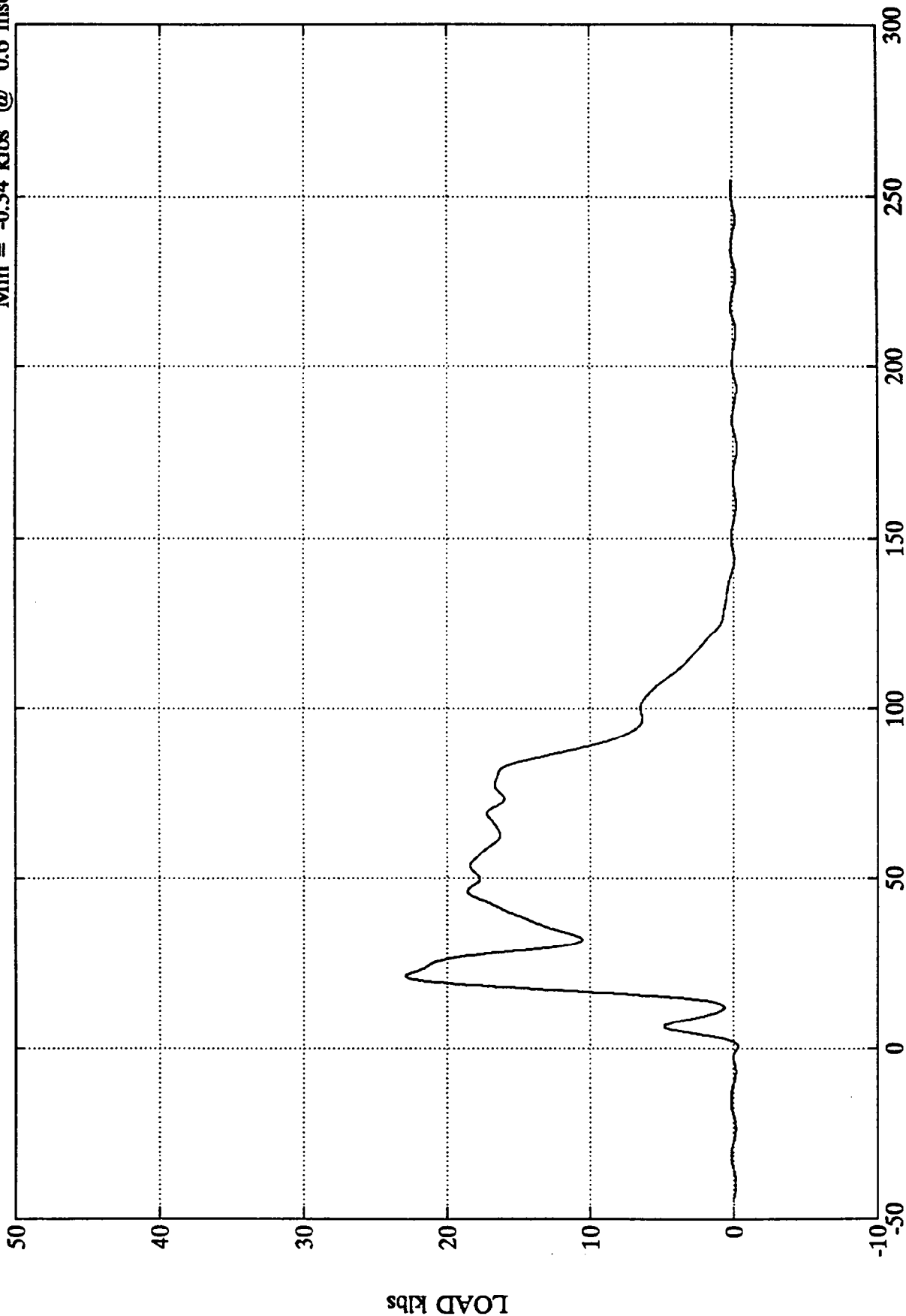
Time (msec)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Group 1 Load Cell Sum

Max = 22.89 klbs @ 21.2 msec  
Min = -0.34 klbs @ 0.6 msec



TIME (msec)

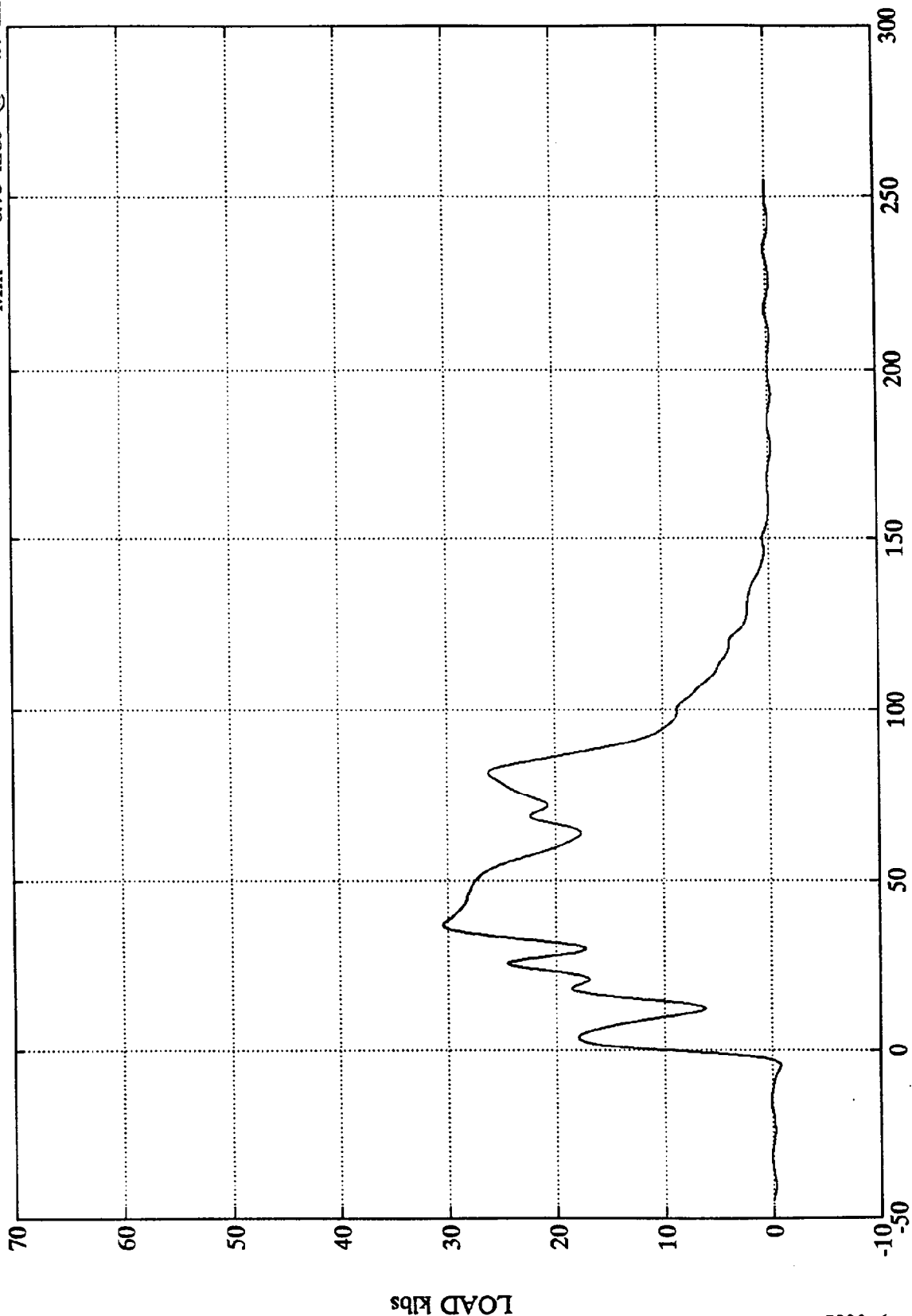
Load Cells (A1,A2,A3,B1,B2,B3)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Group 2 Load Cell Sum

Max = 30.46 klbs @ 37.0 msec  
Min = -0.75 klbs @ -4.7 msec



TIME (msec)

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

SAE Filter Class 60

LOAD klbs

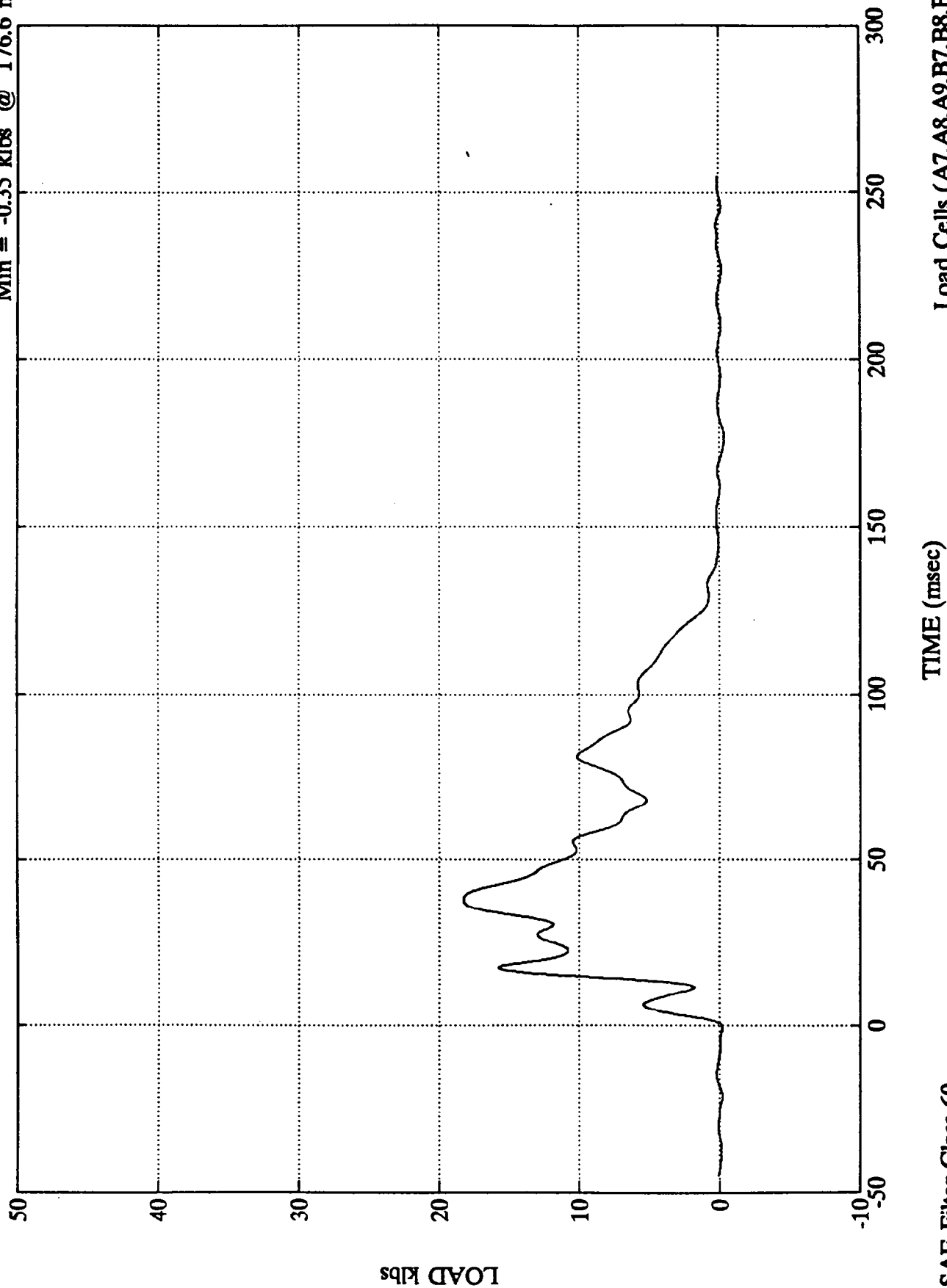
B-66

7893-6

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Group 3 Load Cell Sum

Max = 18.28 klbs @ 37.9 msec  
Min = -0.35 klbs @ 176.6 msec



SAE Filter Class 60

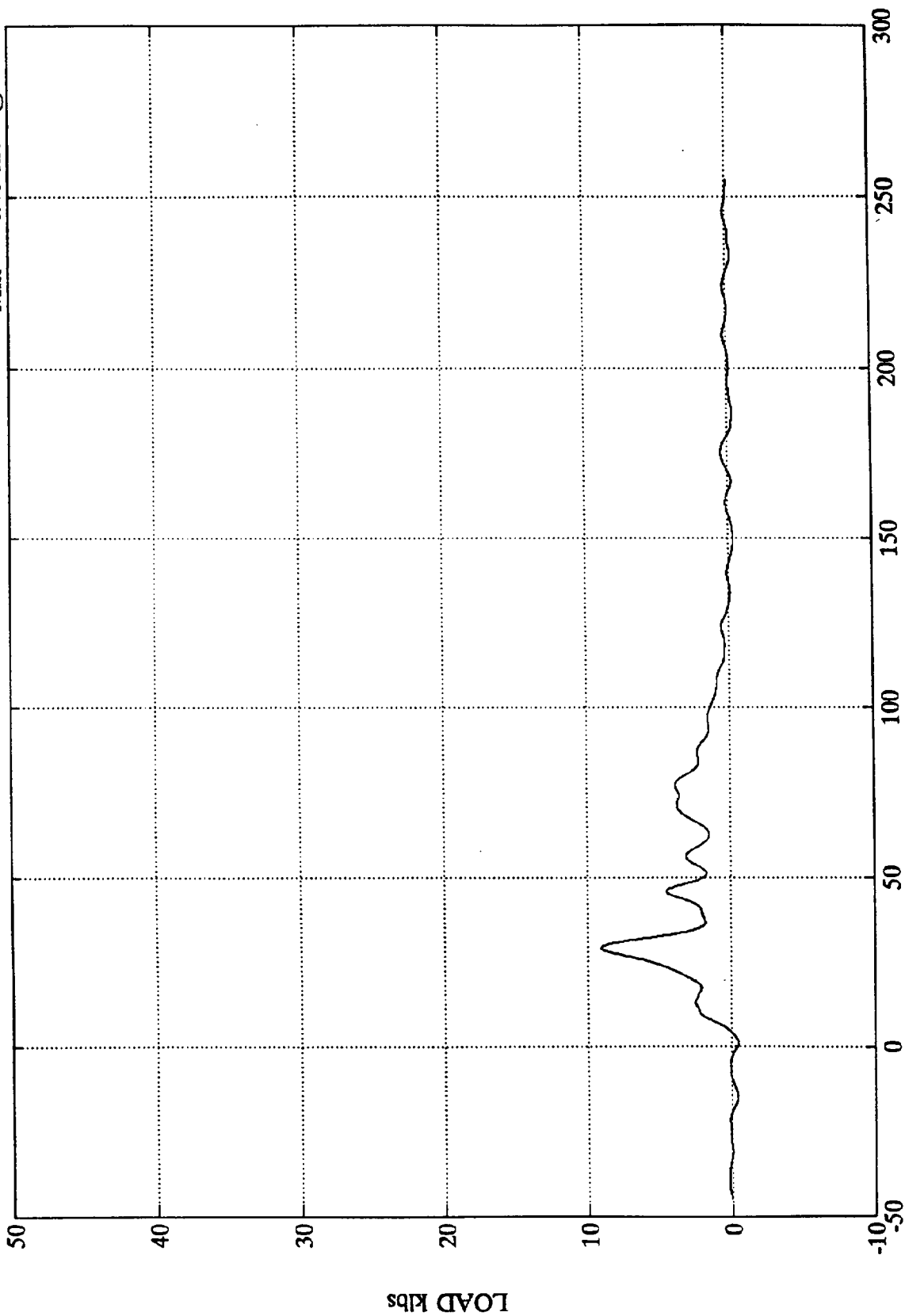
TIME (msec)

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

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Group 4 Load Cell Sum

Max = 9.05 klbs @ 29.0 msec  
Min = -0.48 klbs @ 0.8 msec



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

TIME (msec)

SAE Filter Class 60

LOAD klbs

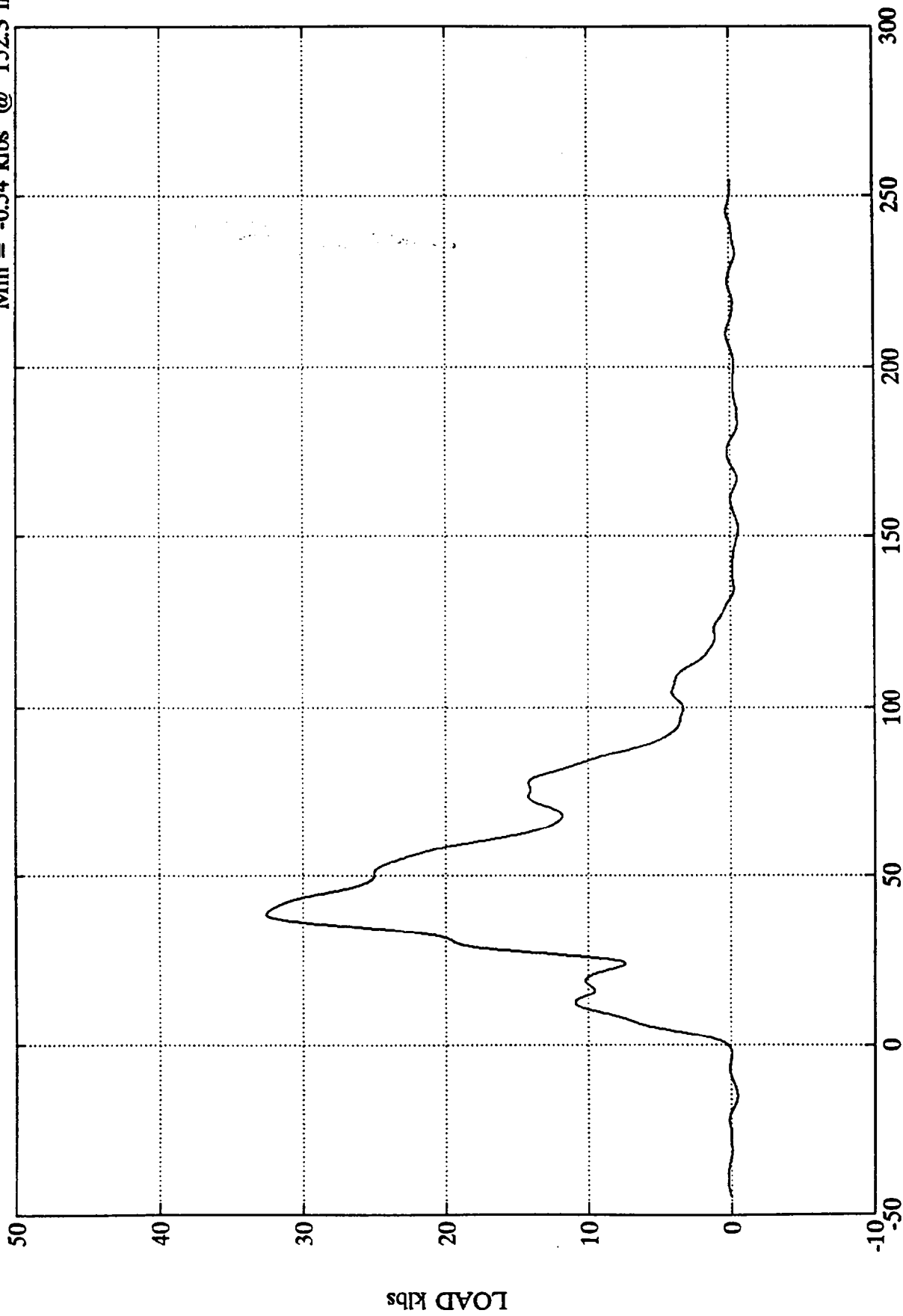
B-68

7893-6

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Group 5 Load Cell Sum

Max = 32.56 klbs @ 38.8 msec  
Min = -0.54 klbs @ 152.3 msec



TIME (msec)

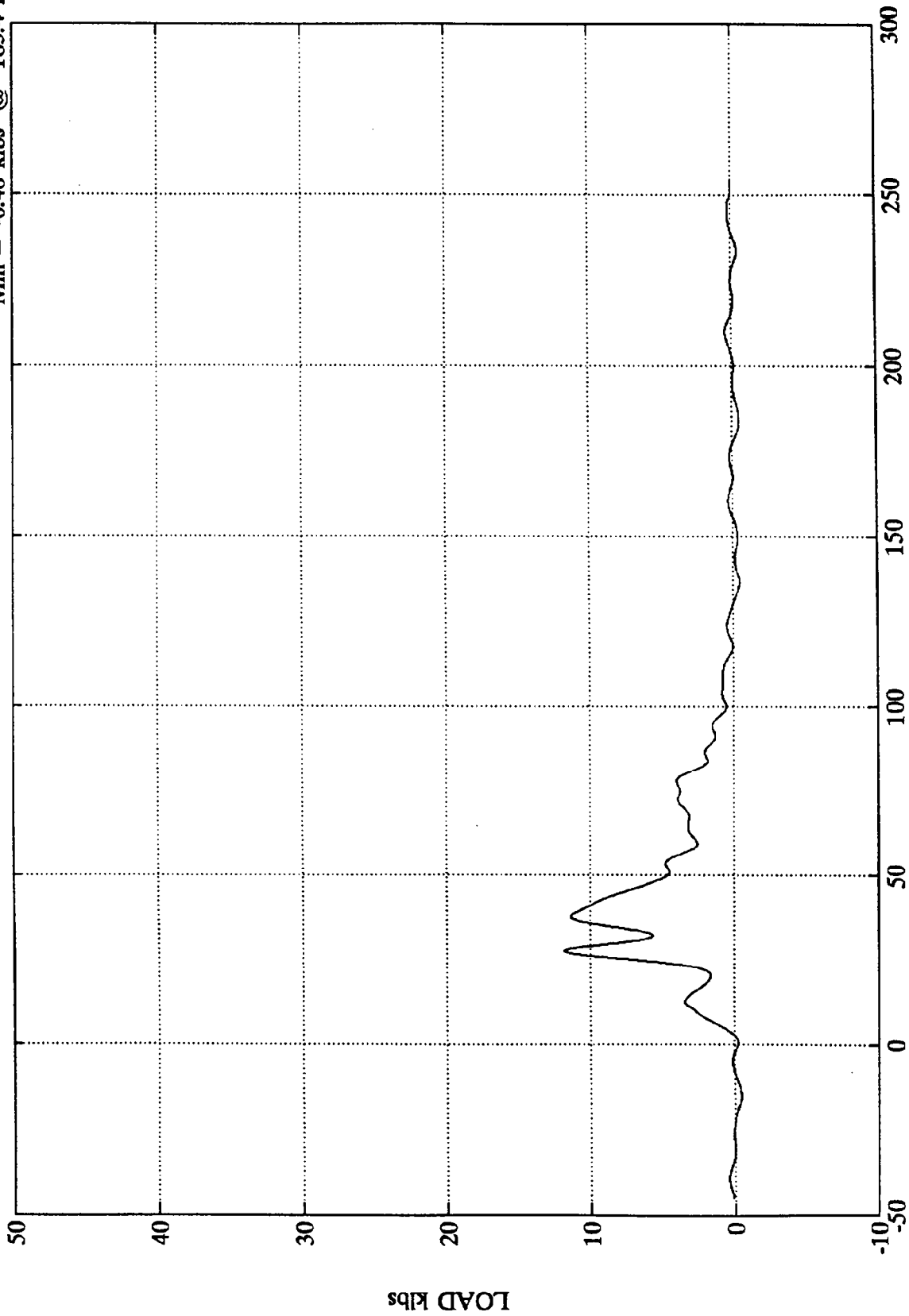
Load Cells (C4,C5,C6,D4,D5,D6)

SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Group 6 Load Cell Sum

Max = 11.79 klbs @ 27.5 msec  
Min = -0.48 klbs @ 183.4 msec



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

TIME (msec)

SAE Filter Class 60

LOAD klbs

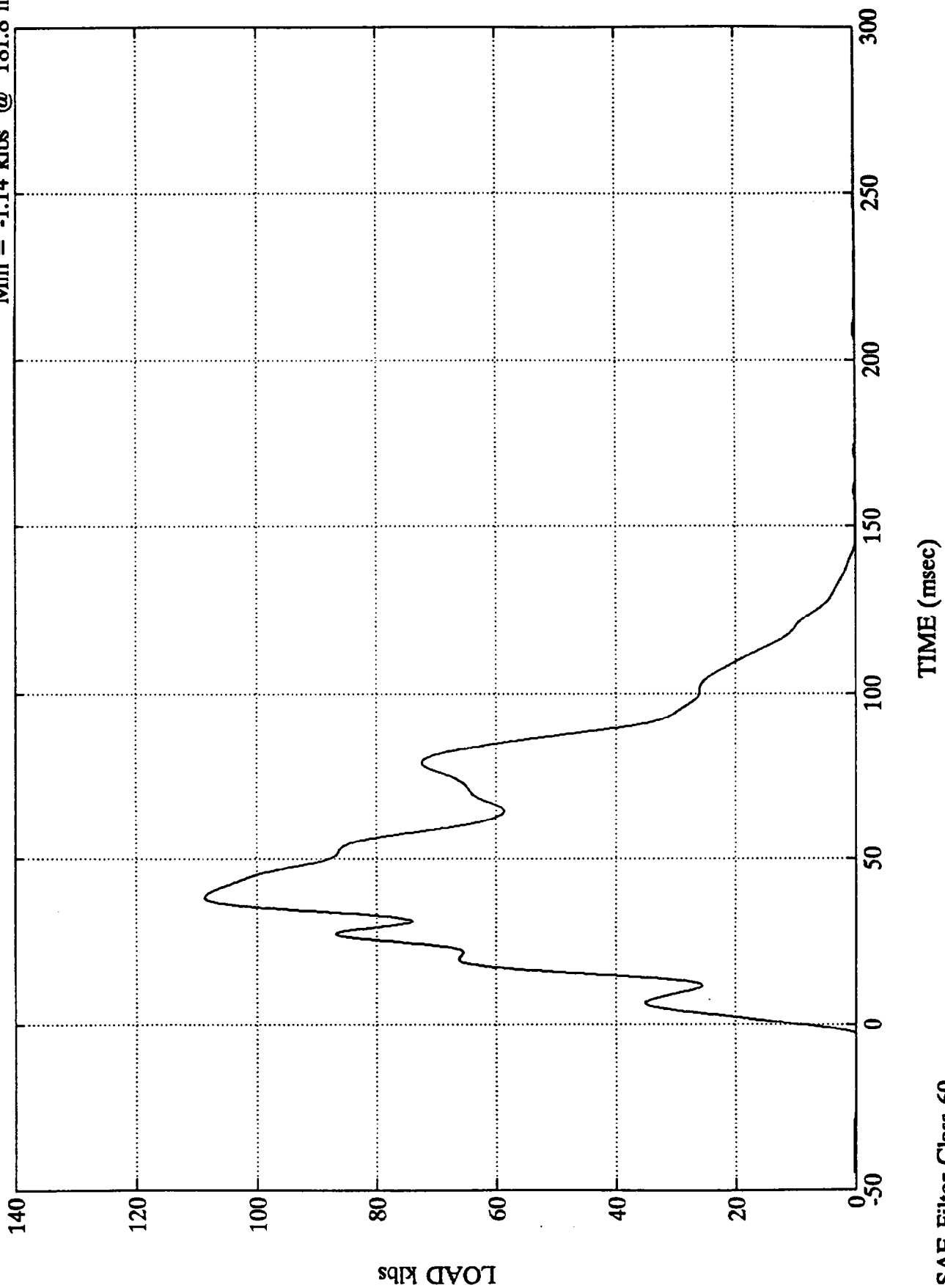
B-70

7893-6

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Max = 108.55 klbs @ 38.5 msec  
Min = -1.14 klbs @ 181.8 msec

Total Load Cell Sum



TEST NO. MM0302

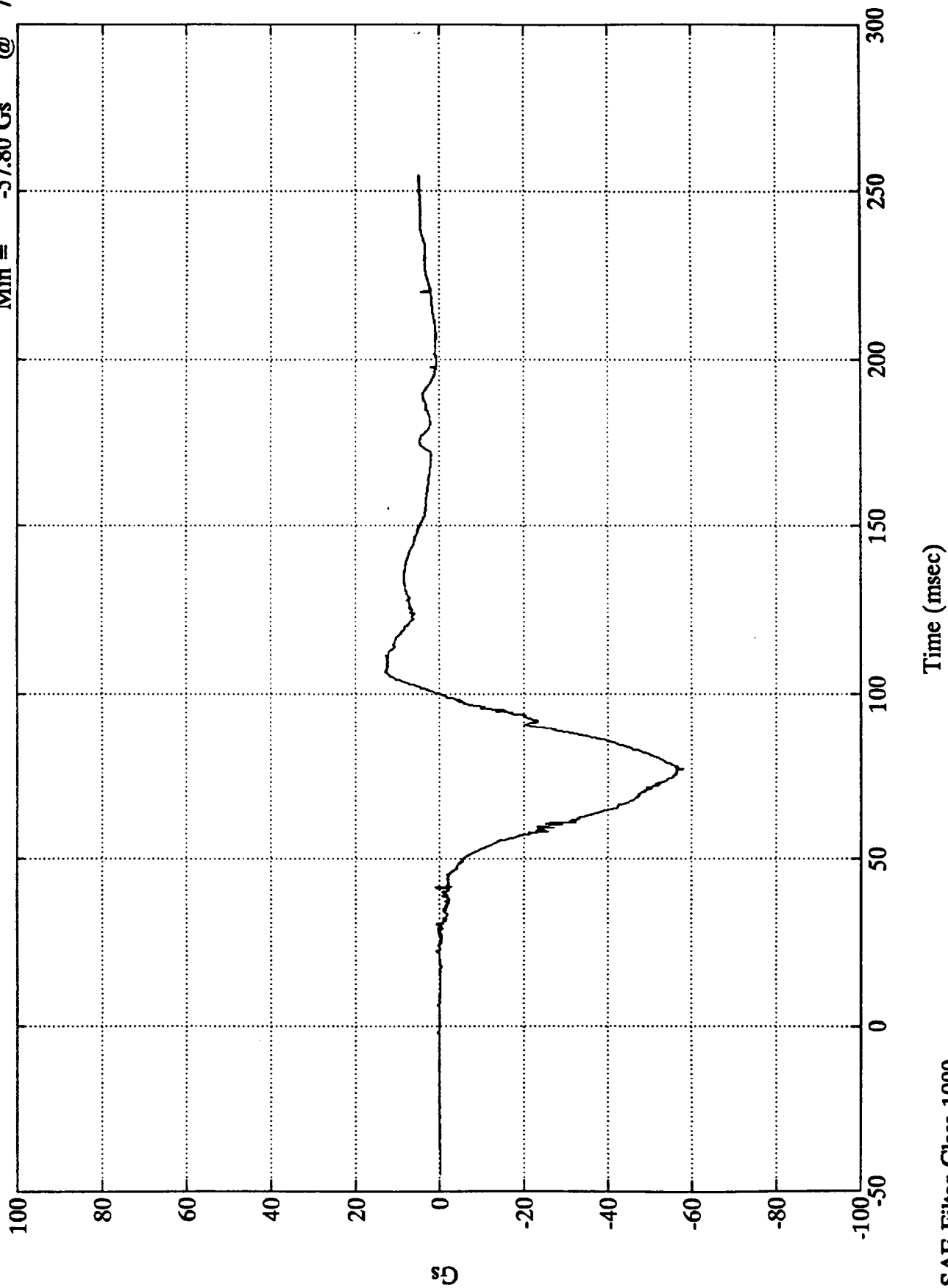
DUMMY DATA

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

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Head X

Max = 13.03 Gs @ 106.31 ms  
Min = -57.80 Gs @ 77.40 ms



Gs

B-73

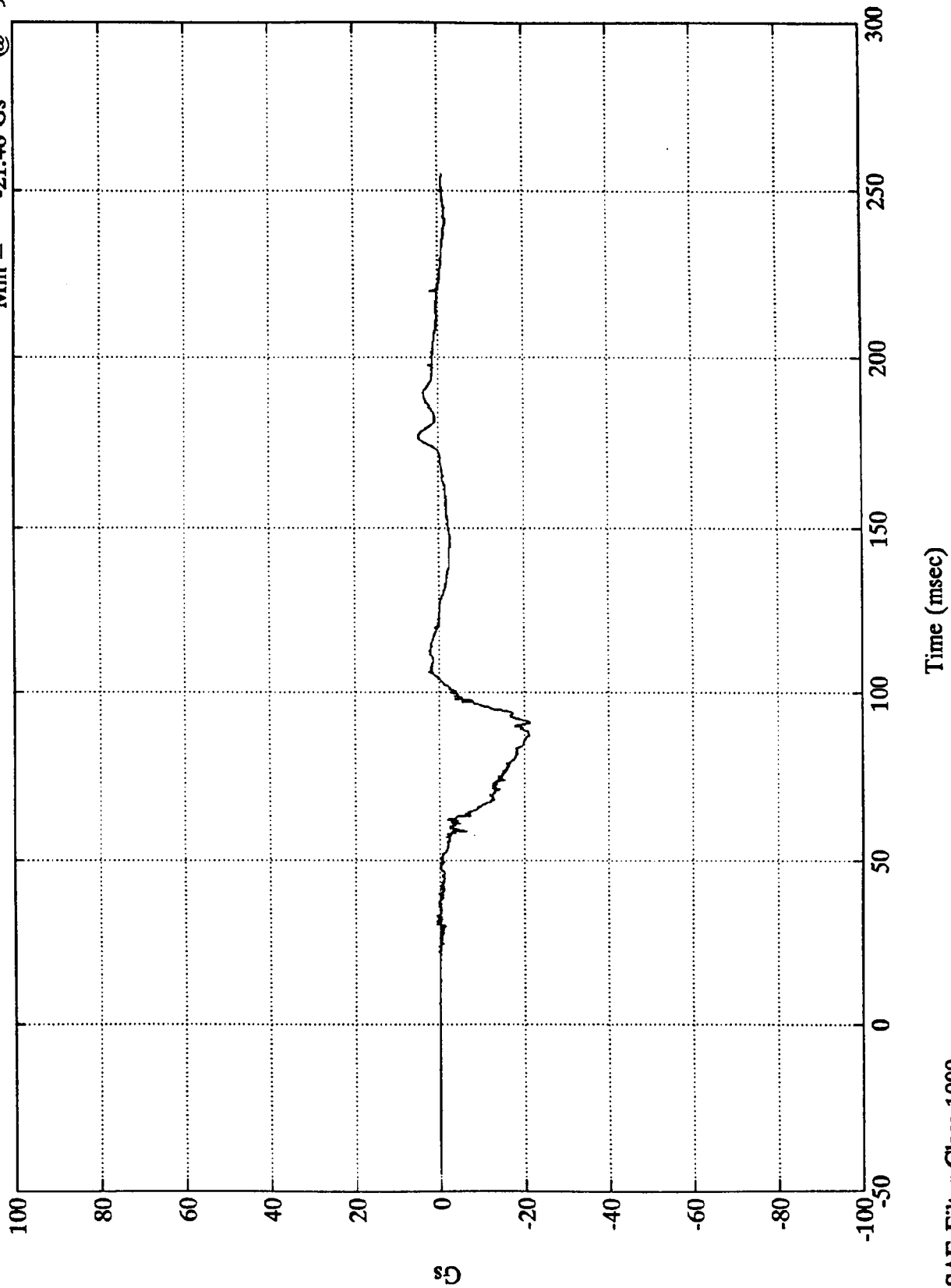
7893-6

SAE Filter Class 1000

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Max = 4.73 Gs @ 177.11 msec  
 Min = -21.48 Gs @ 91.08 msec

Pos. 1 Head Y

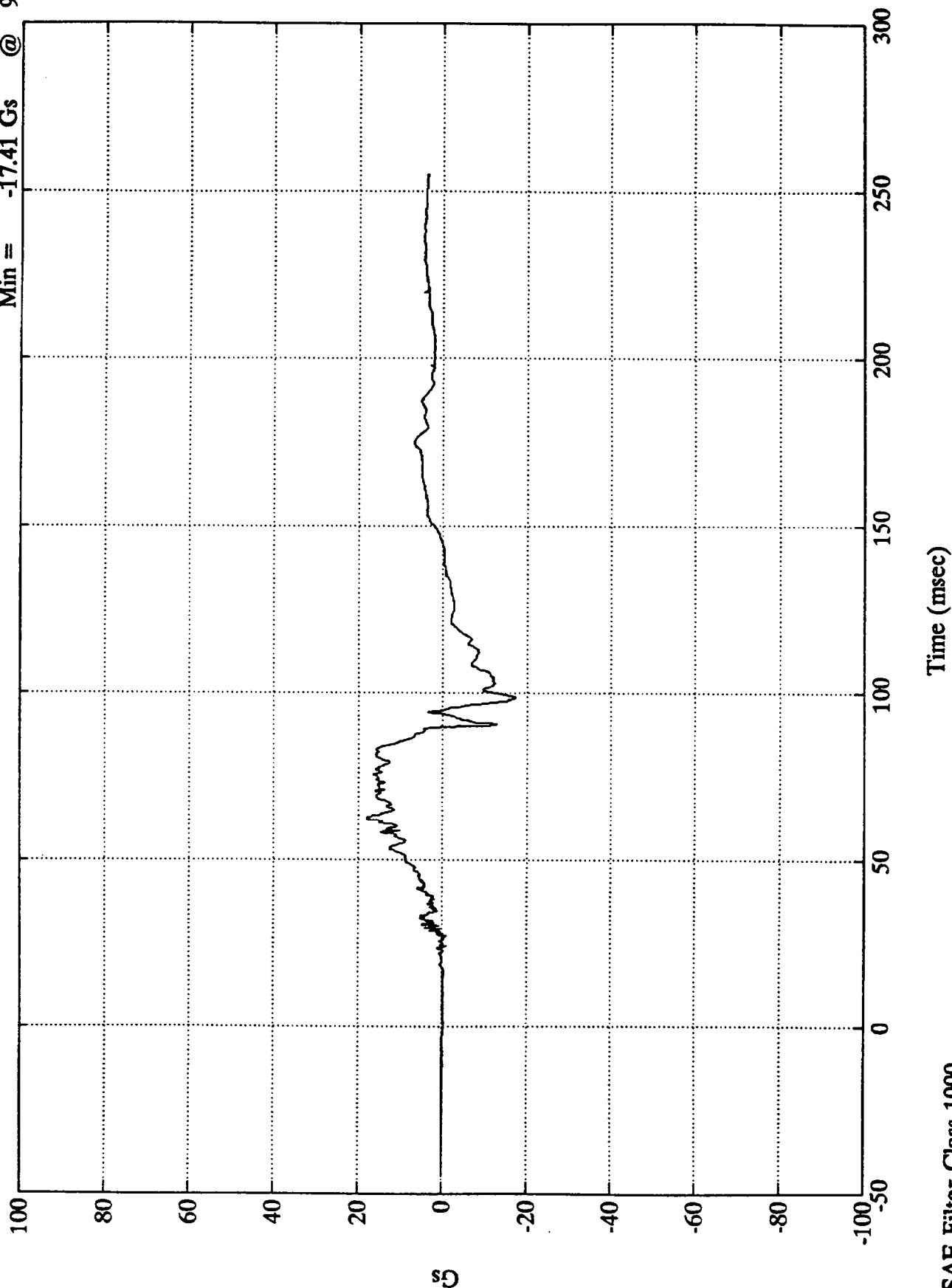


SAE Filter Class 1000

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Max = 17.88 Gs @ 62.76 ms  
Min = -17.41 Gs @ 98.52 ms

Pos. 1 Head Z



B-75

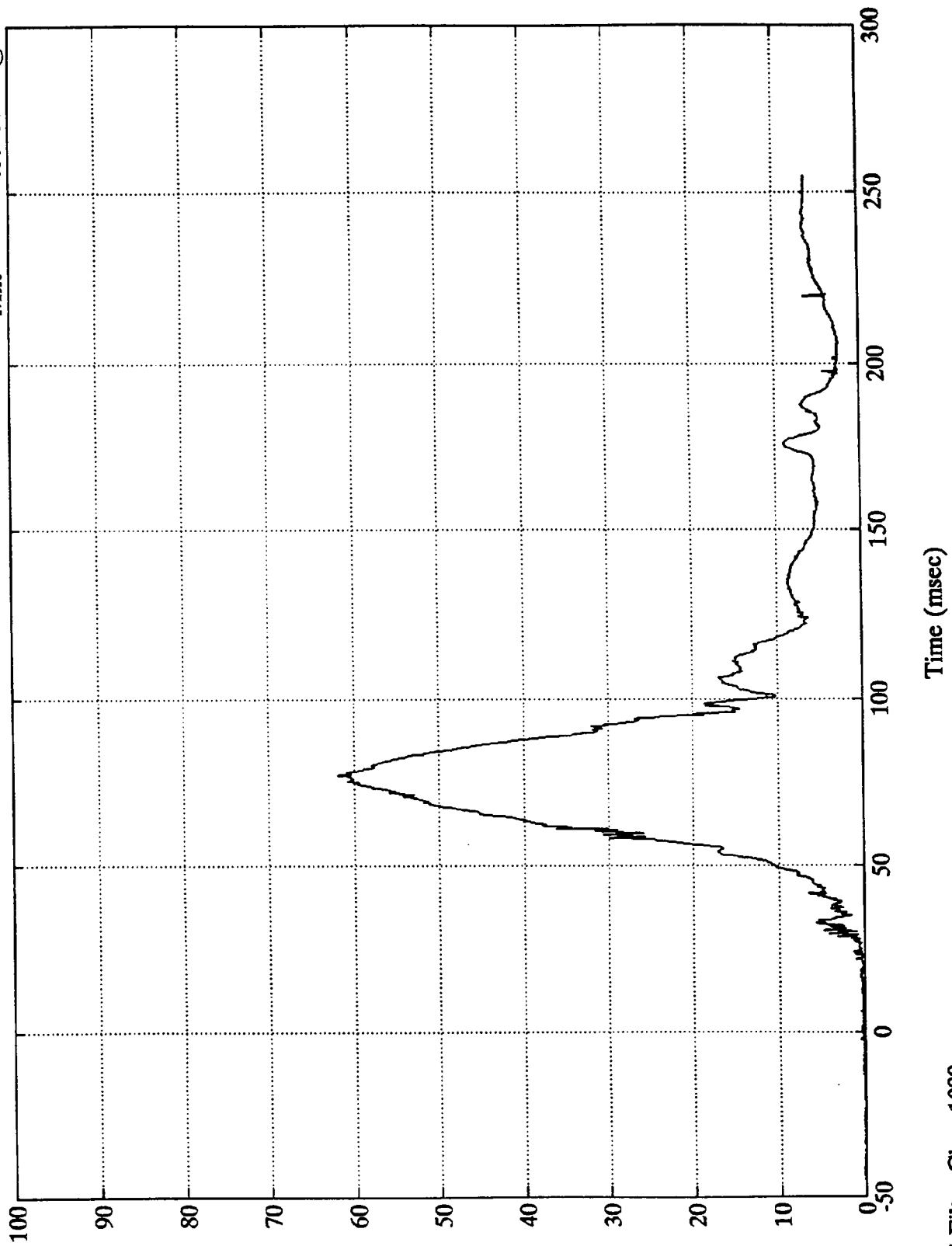
7893-6

SAE Filter Class 1000

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Head Resultant

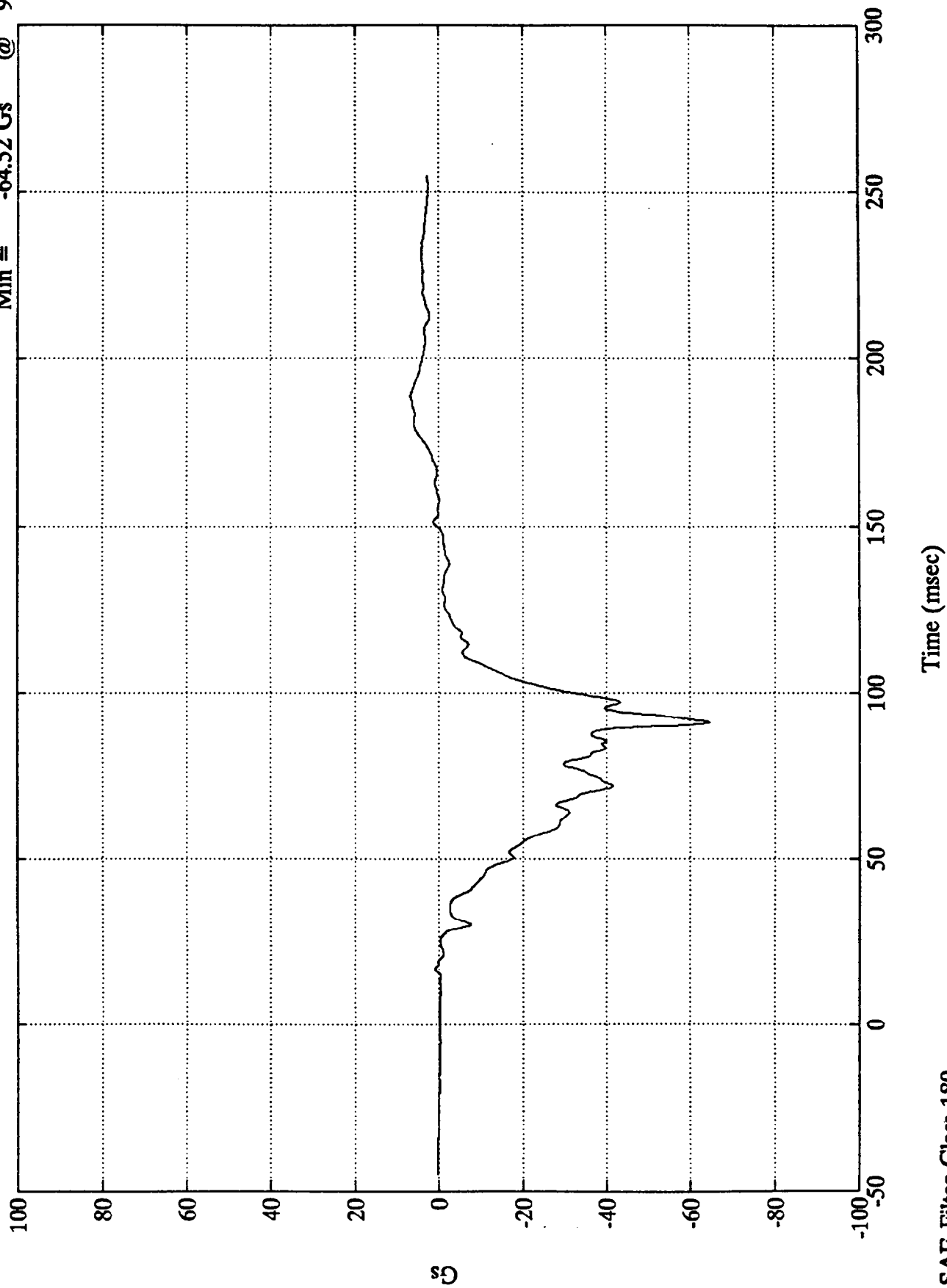
Max = 61.88 Gs @ 77.27 msec  
Min = .06 Gs @ -4.08 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

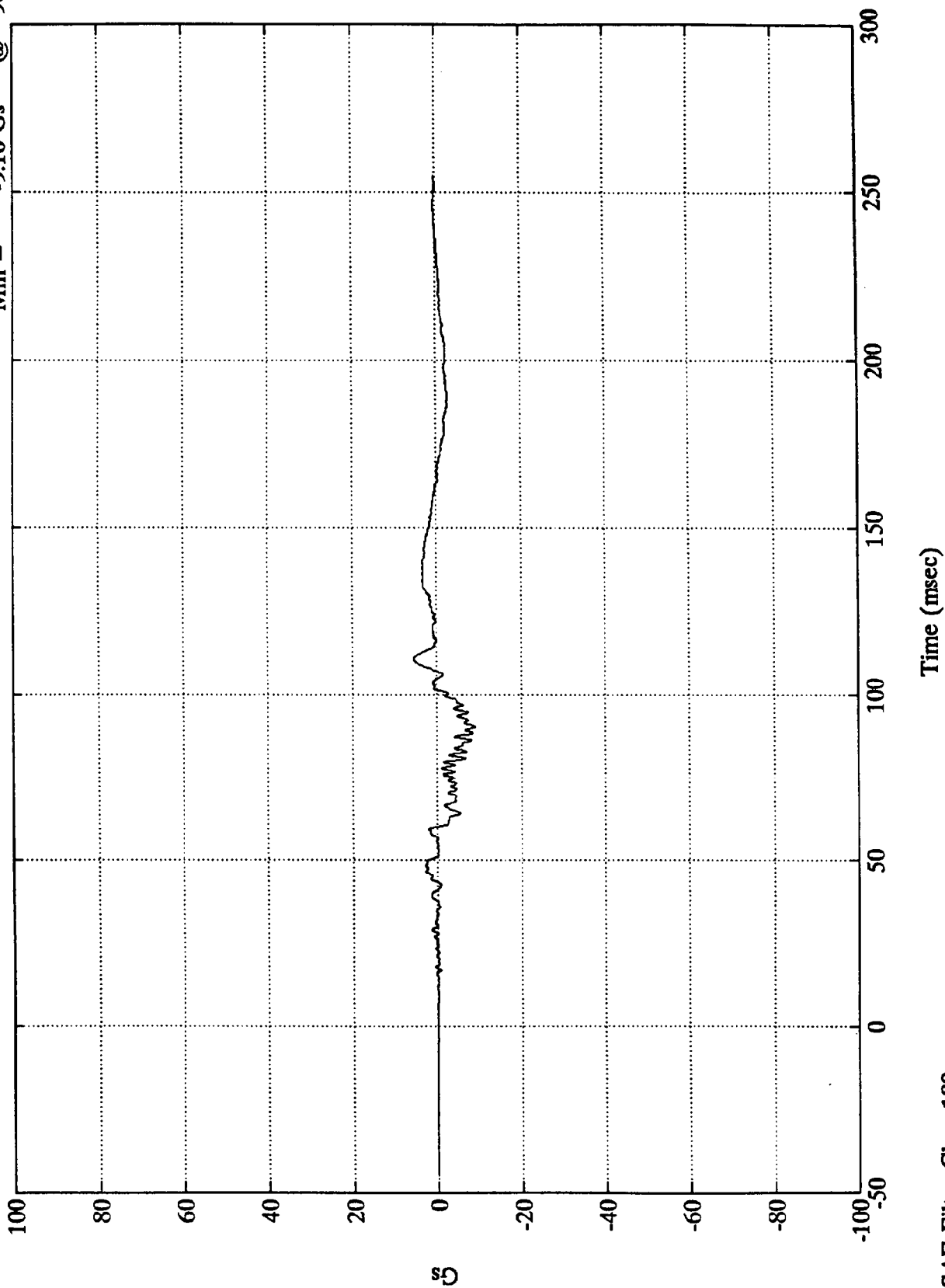
Max = 6.64 Gs @ 188.63 msec  
Min = -64.52 Gs @ 91.08 msec

Pos. 1 Chest X



NCAP TEST #10 1991 CHRYSLER NEW YORKER

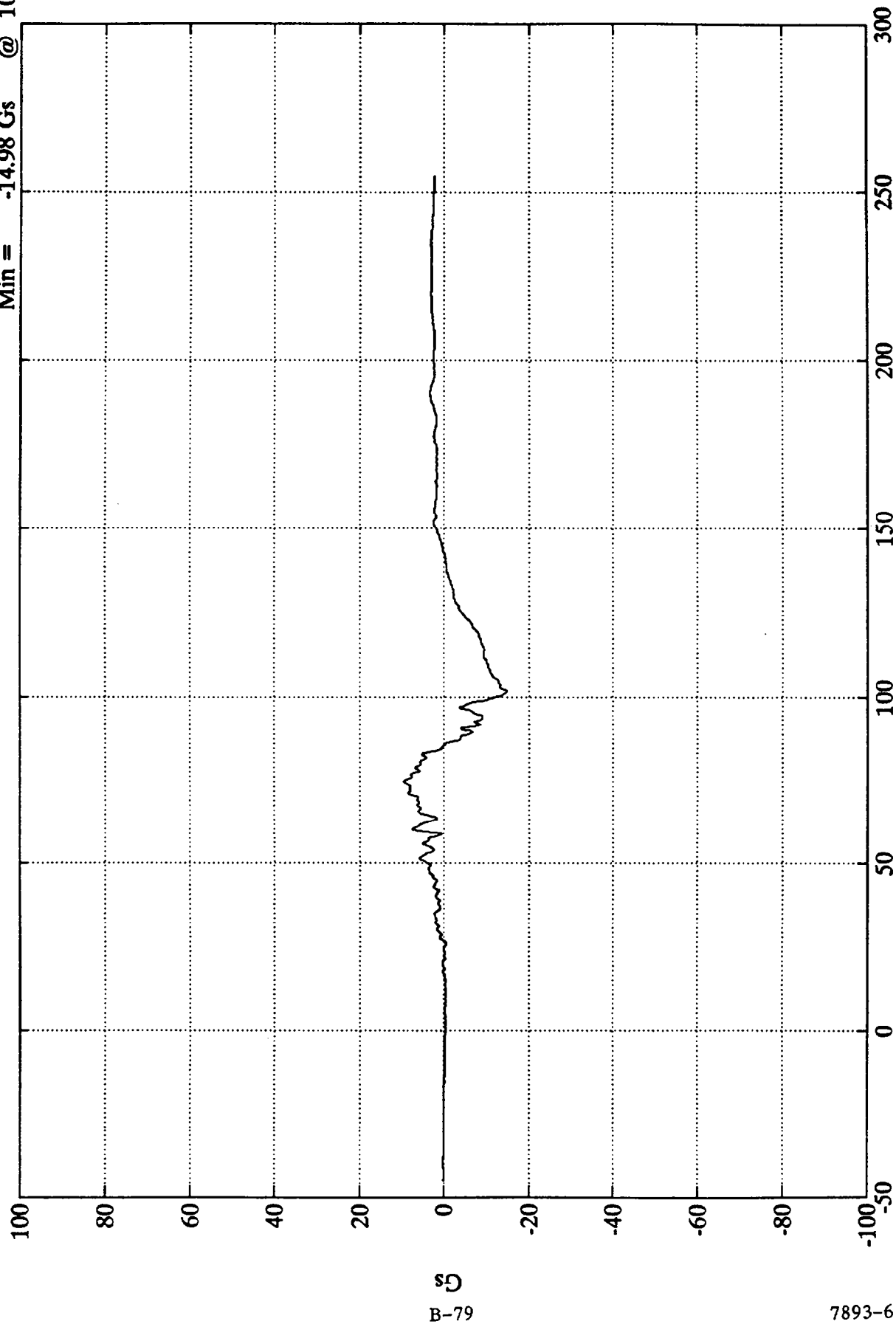
Pos. 1 Chest Y  
Max = 5.41 Gs @ 110.88 msec  
Min = -9.16 Gs @ 90.12 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Max = 9.53 Gs @ 74.63 msec  
Min = -14.98 Gs @ 101.63 msec

Pos. 1 Chest Z



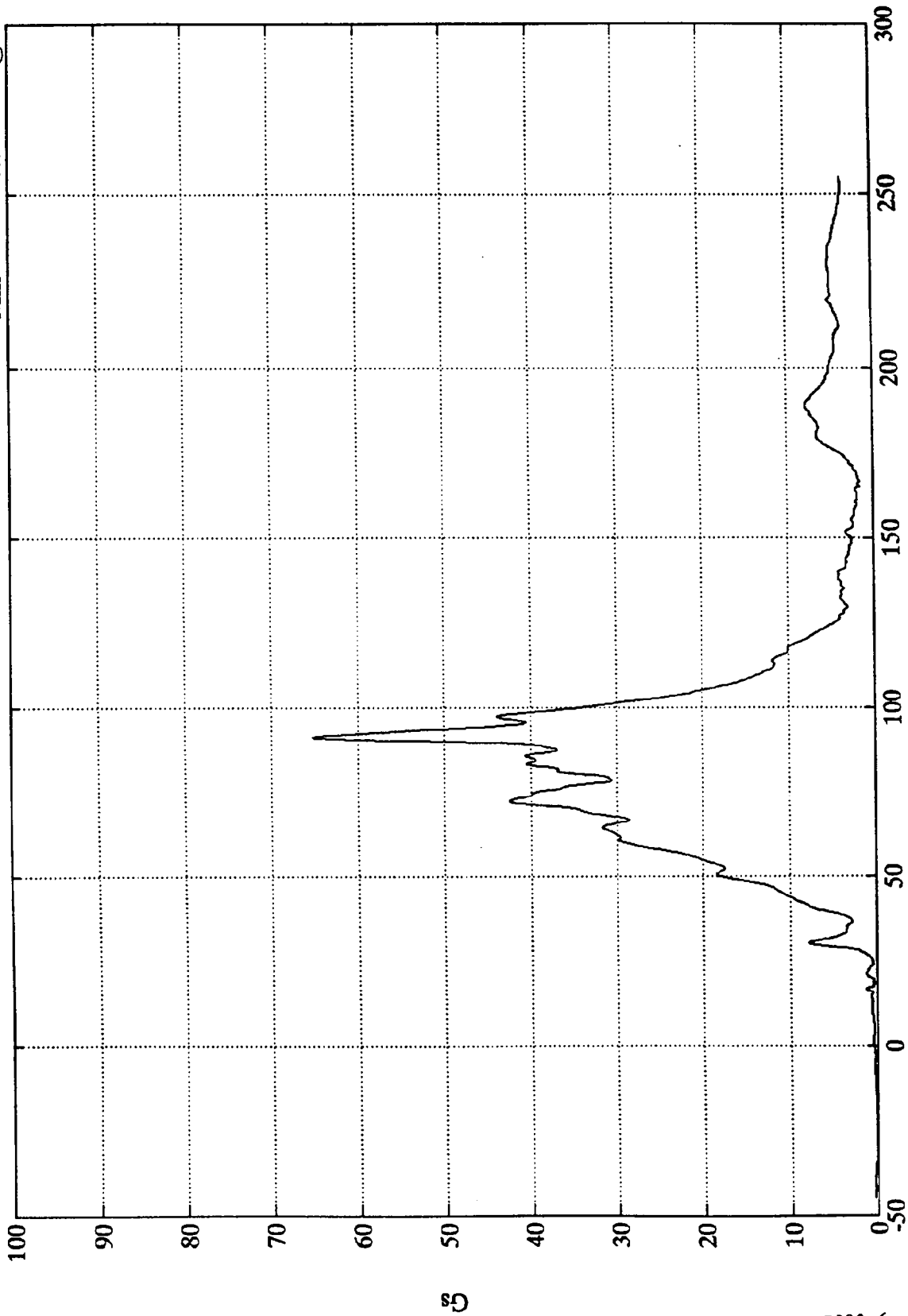
Time (msec)

SAE Filter Class 180

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Chest Resultant

Max = 65.17 Gs @ 91.08 msec  
Min = .09 Gs @ -16.20 msec



B-80

7893-6

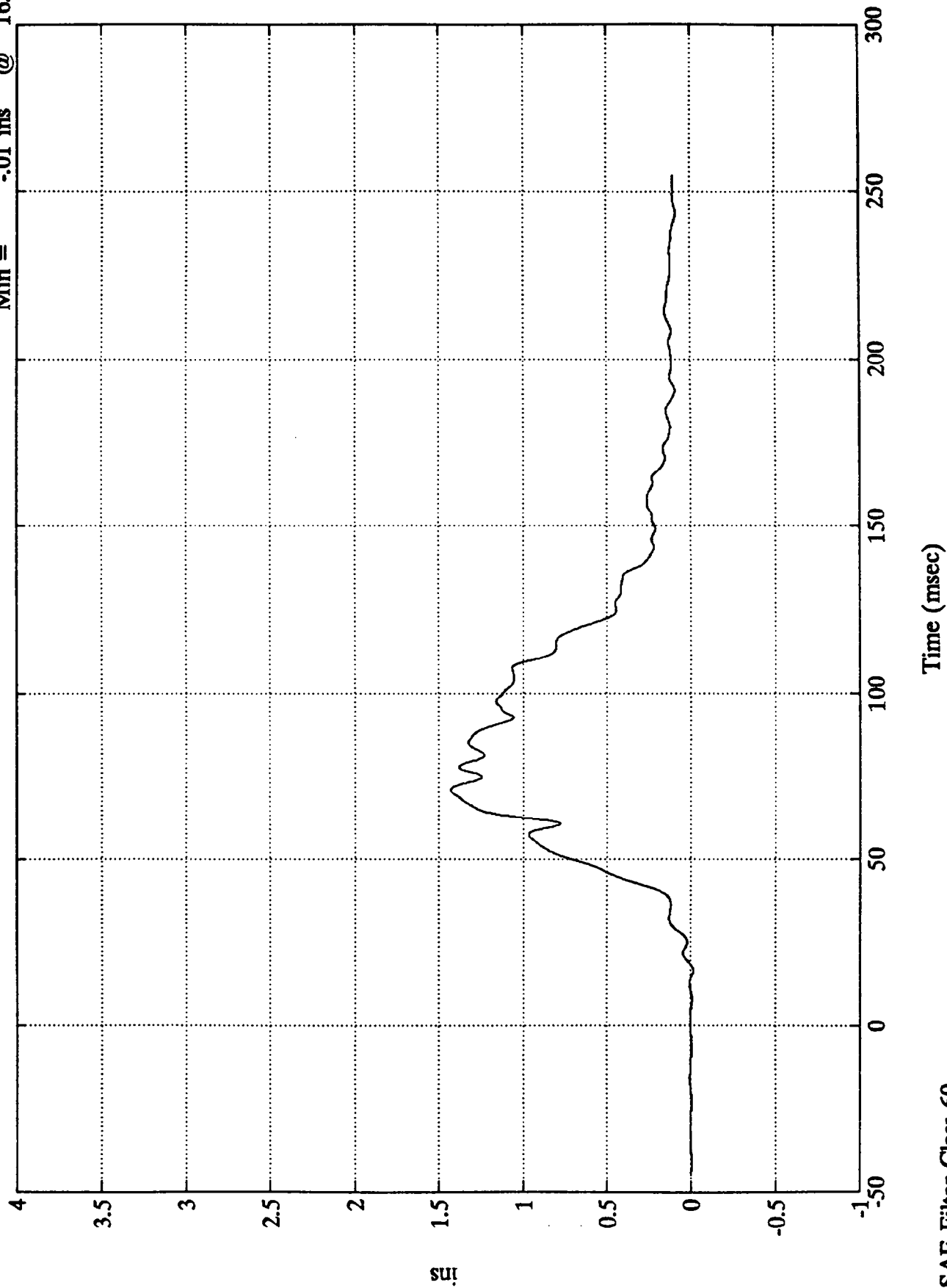
Time (msec)

SAE Filter Class 180

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Chest Disp.

Max = 1.42 ins @ 71.04 msec  
Min = -.01 ins @ 16.43 msec



SAE Filter Class 60

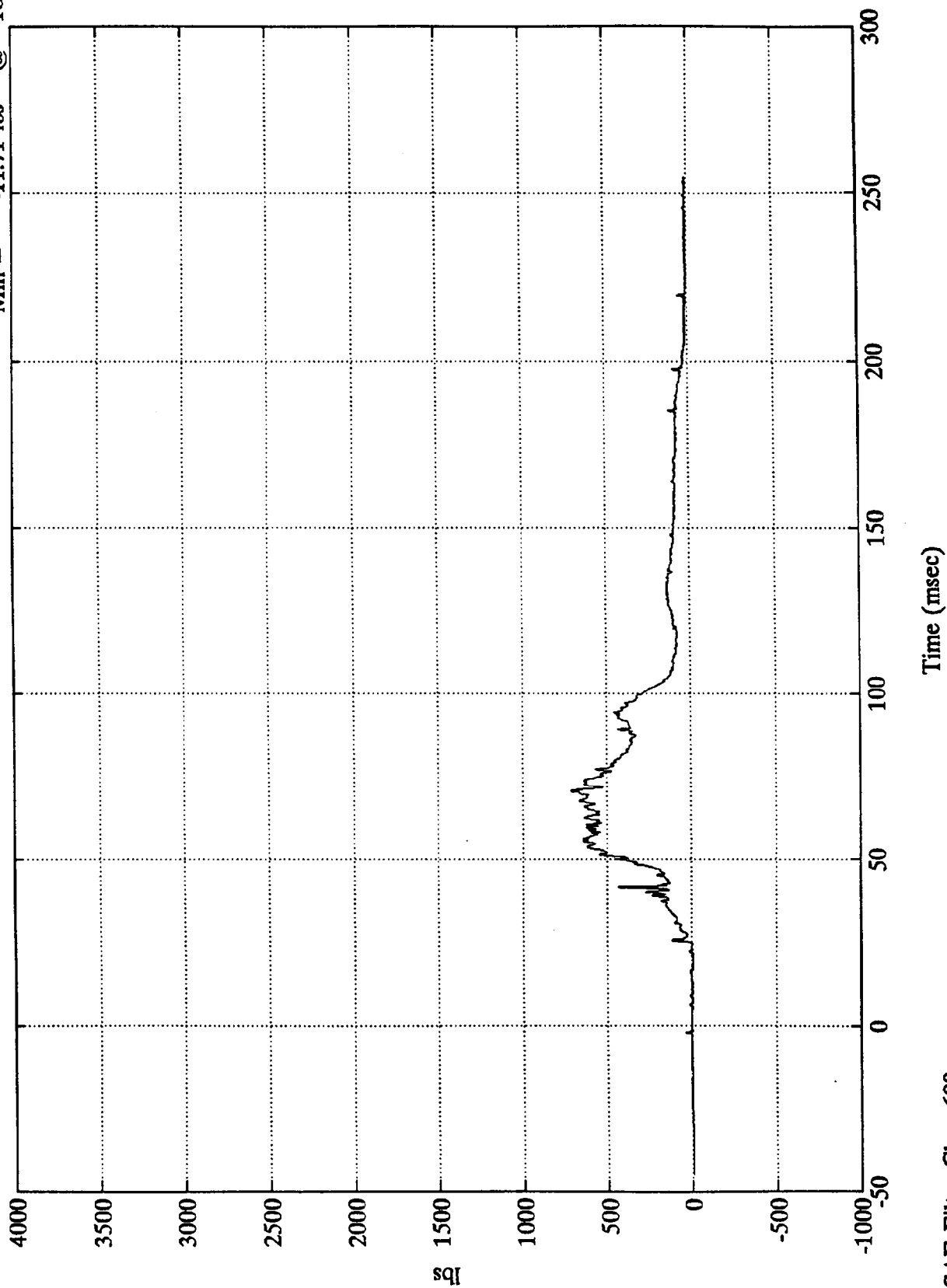
B-81

7893-6

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Left Femur

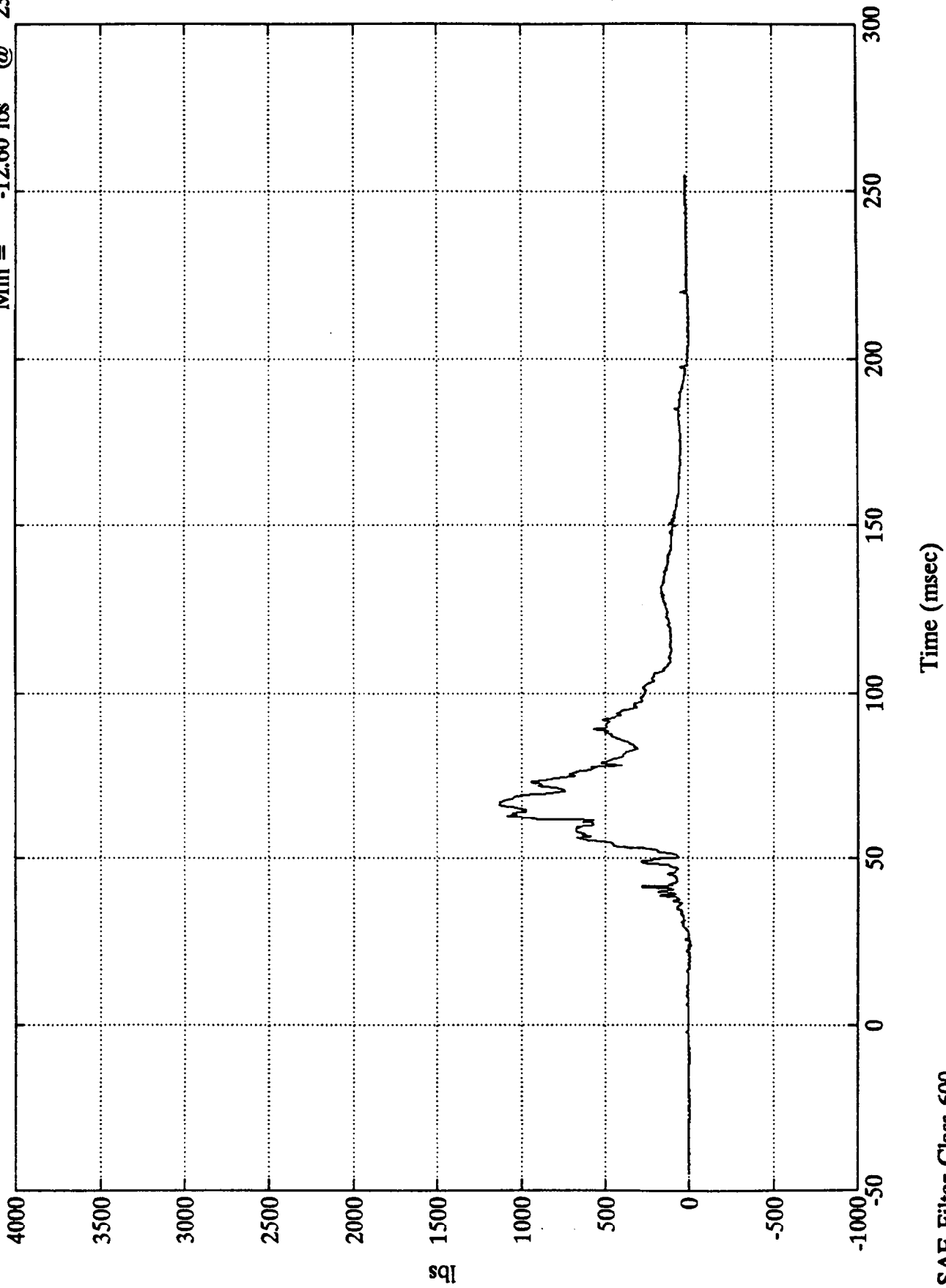
Max = 709.85 lbs @ 70.68 msec  
Min = -11.71 lbs @ 18.95 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Right Femur

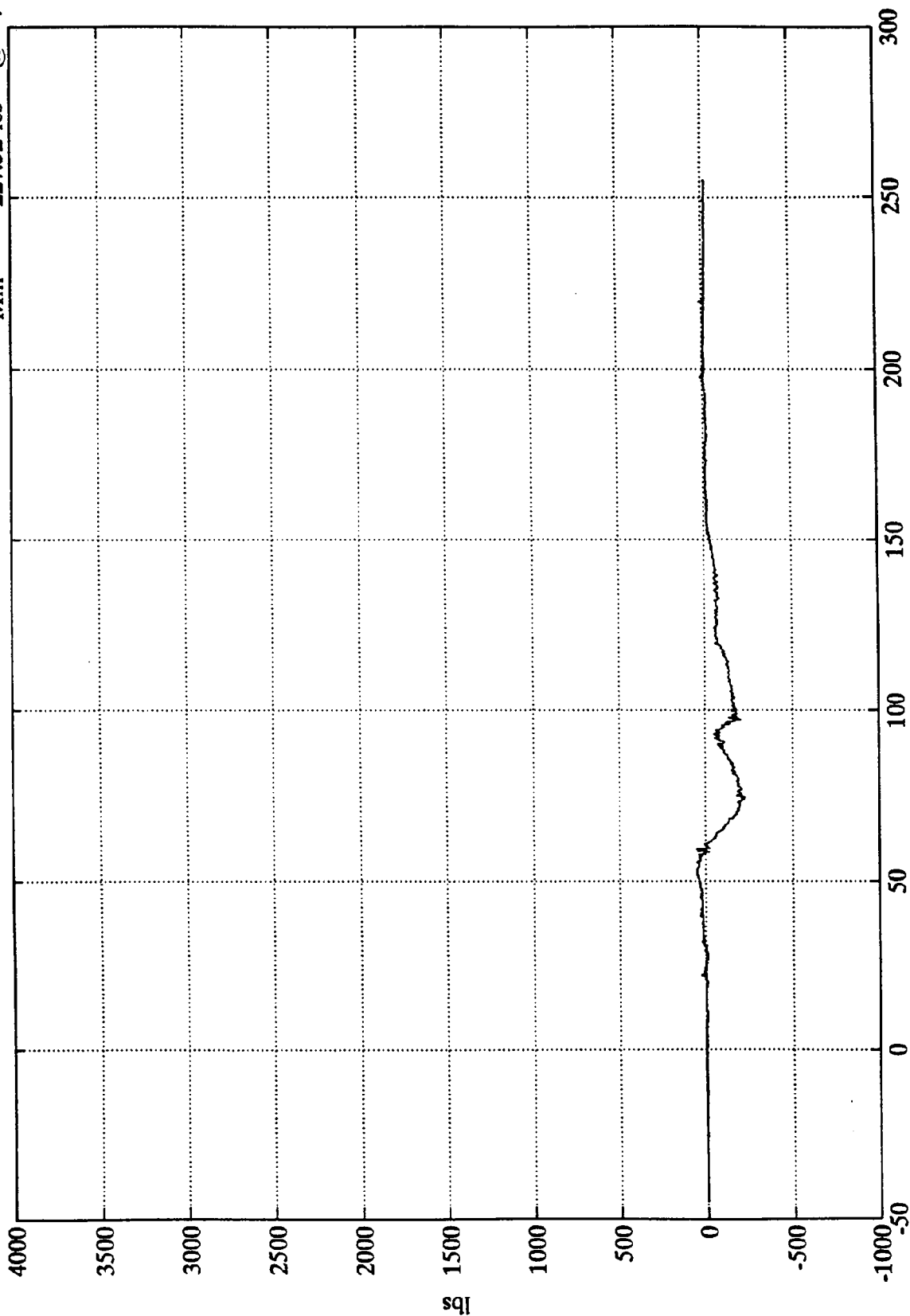
Max = 1133.39 lbs @ 66.48 msec  
Min = -12.60 lbs @ 23.52 msec



# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Upper Neck Fx

Max = 54.70 lbs @ 59.40 msec  
Min = -227.52 lbs @ 74.63 msec



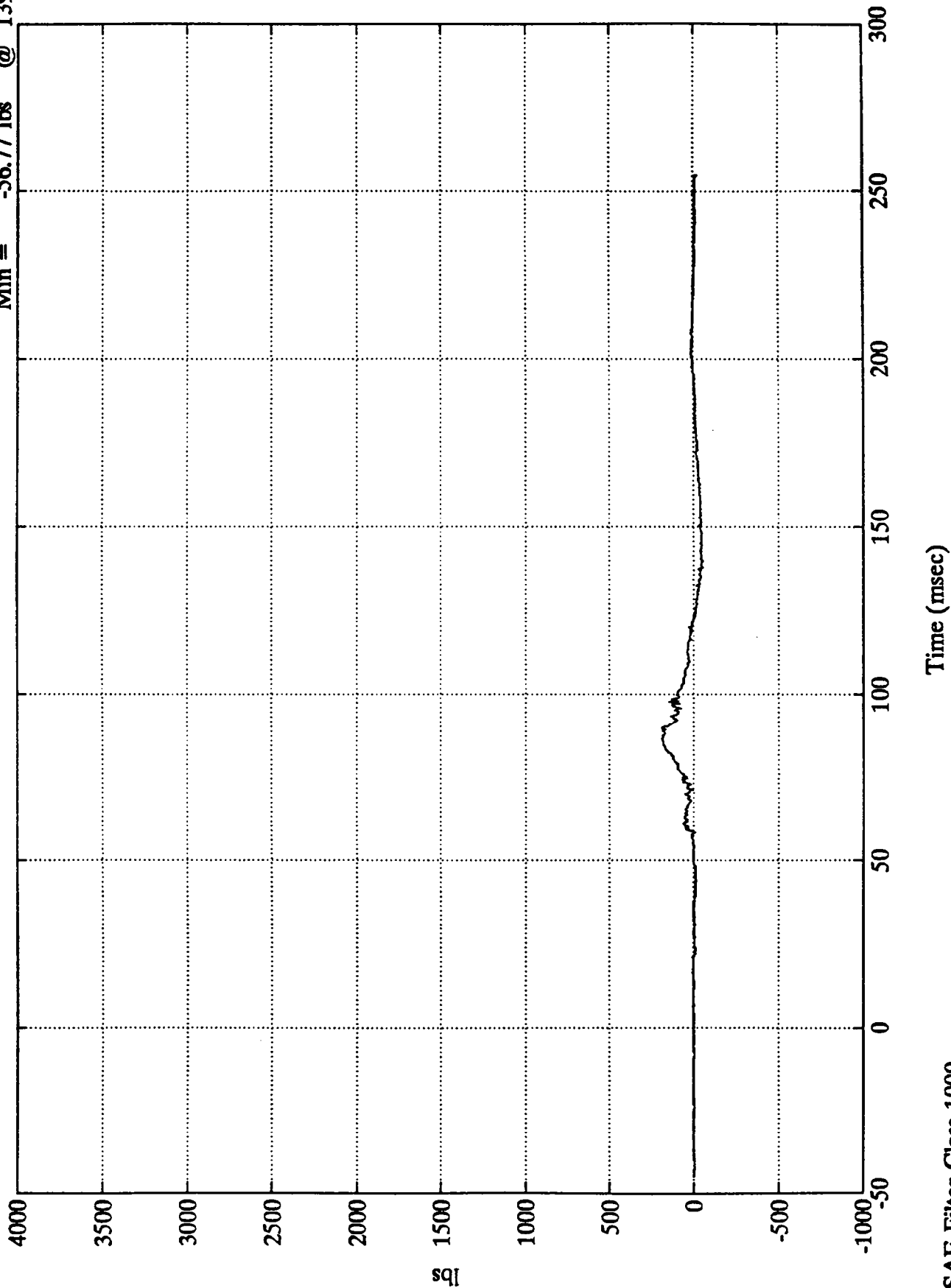
Time (msec)

SAE Filter Class 1000

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Upper Neck Fy

Max = 190.89 lbs @ 89.76 ms  
Min = -56.77 lbs @ 139.67 ms

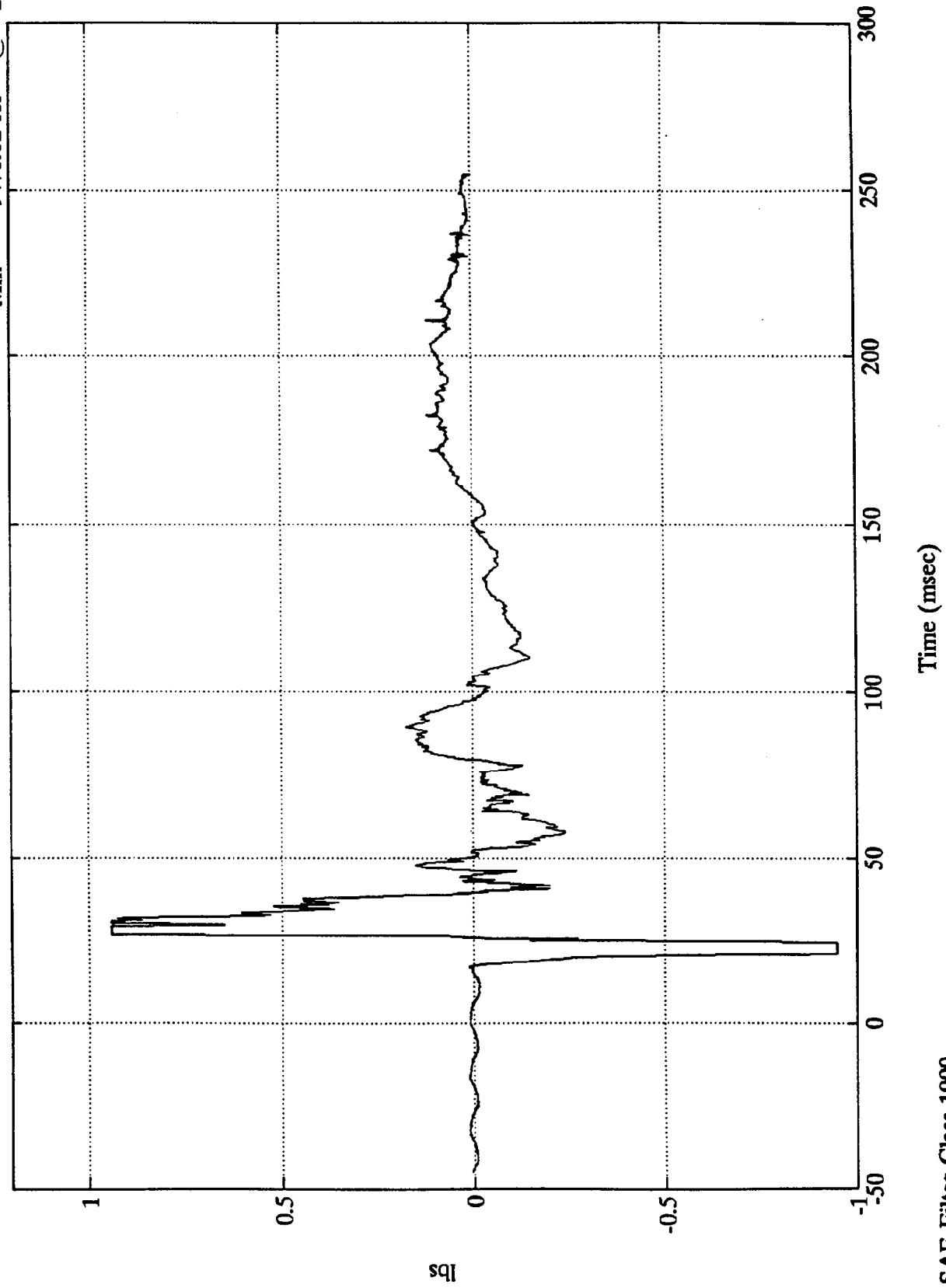


NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Upper Neck Fz

Max = 9413.04 lbs @ 30.71 msec  
Min = -9470.62 lbs @ 24.47 msec

$\times 10^4$

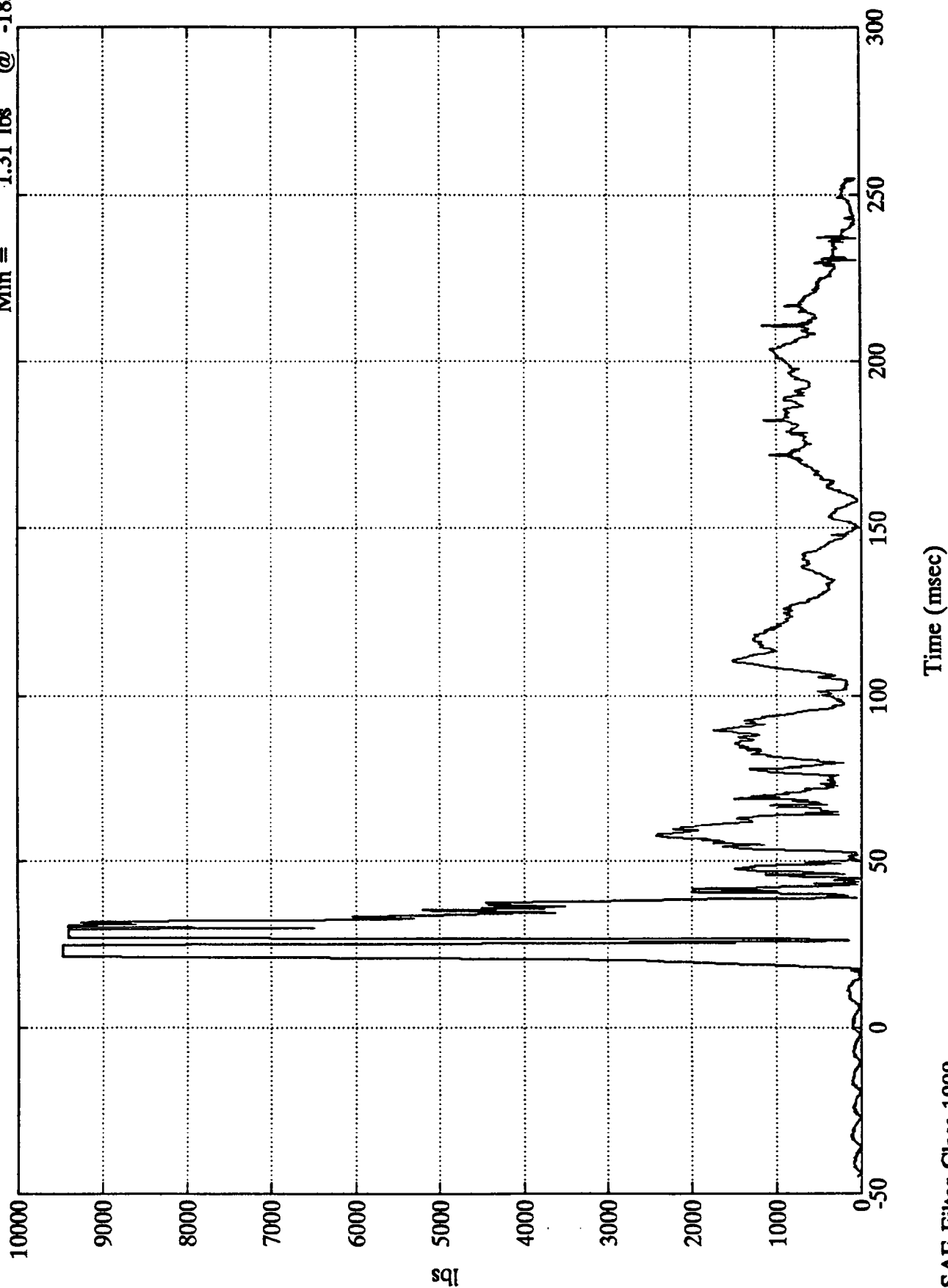


SAE Filter Class 1000

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Neck Force Res.

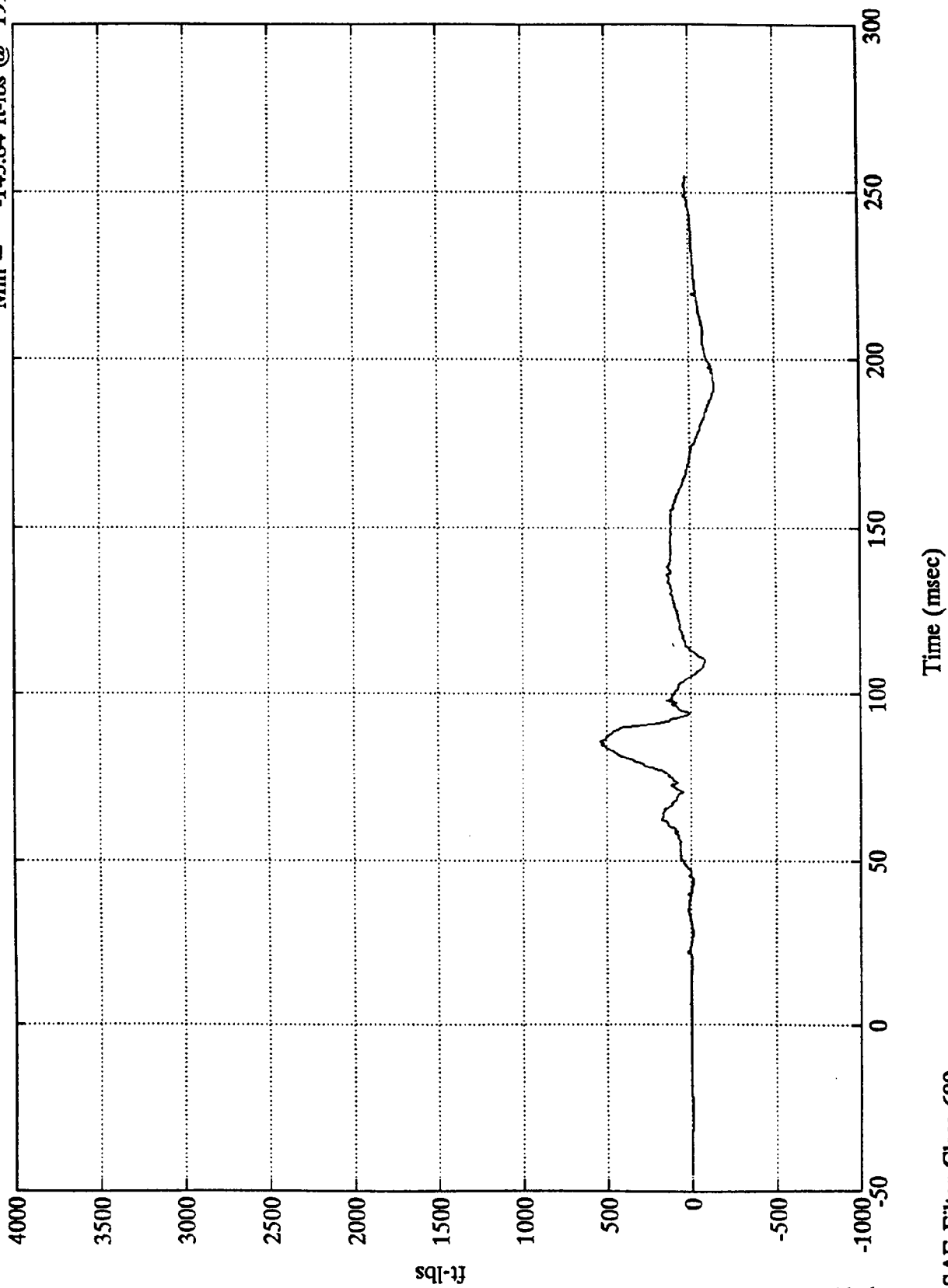
Max = 9470.67 lbs @ 22.07 ms  
Min = 1.31 lbs @ -18.84 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Upper Neck Mx

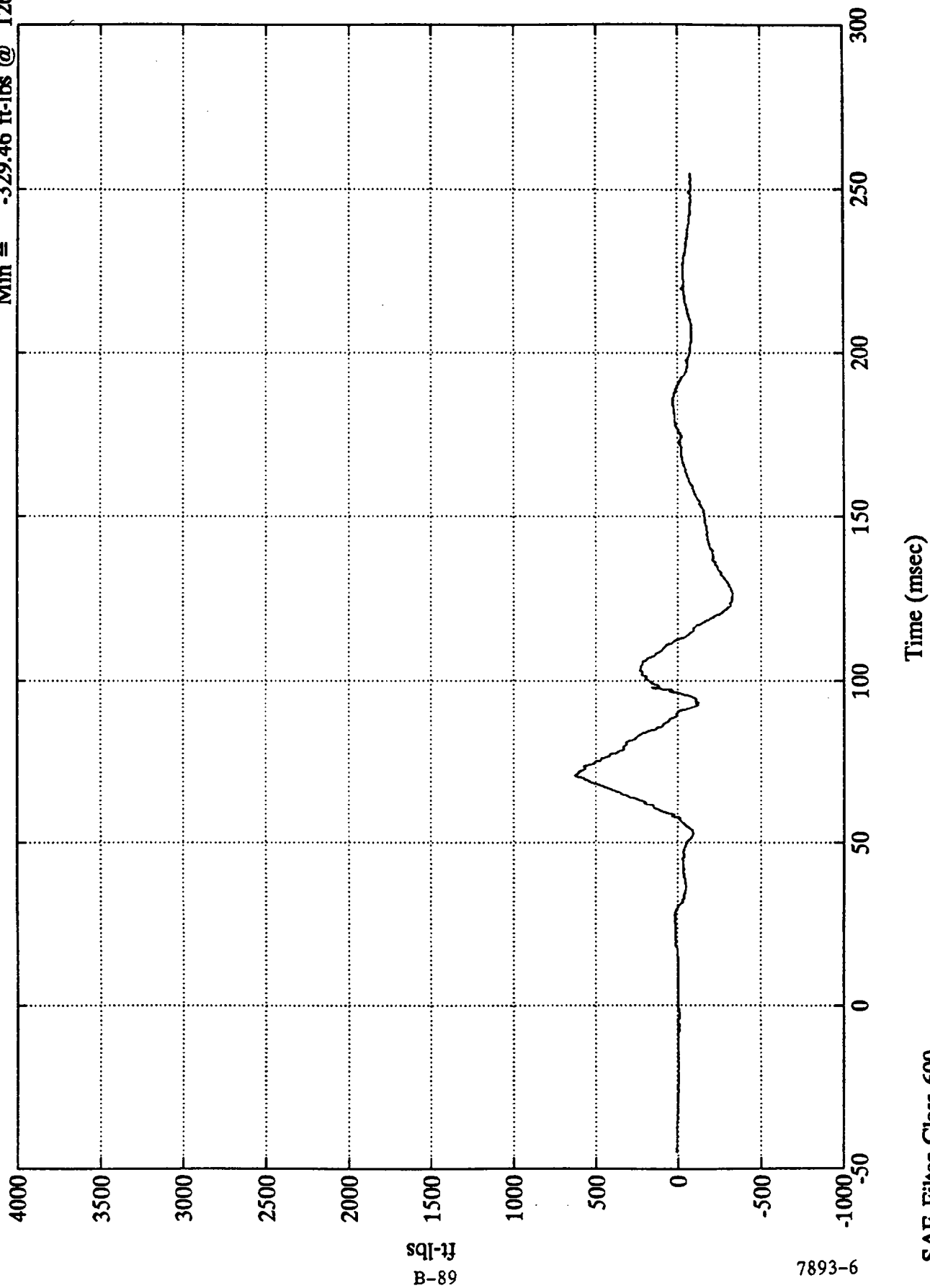
Max = 539.62 ft-lbs @ 85.80 msec  
Min = -145.84 ft-lbs @ 191.63 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Upper Neck My

Max = 620.64 ft-lbs @ 70.79 msec  
Min = -329.46 ft-lbs @ 126.96 msec



sqi-1j  
B-89

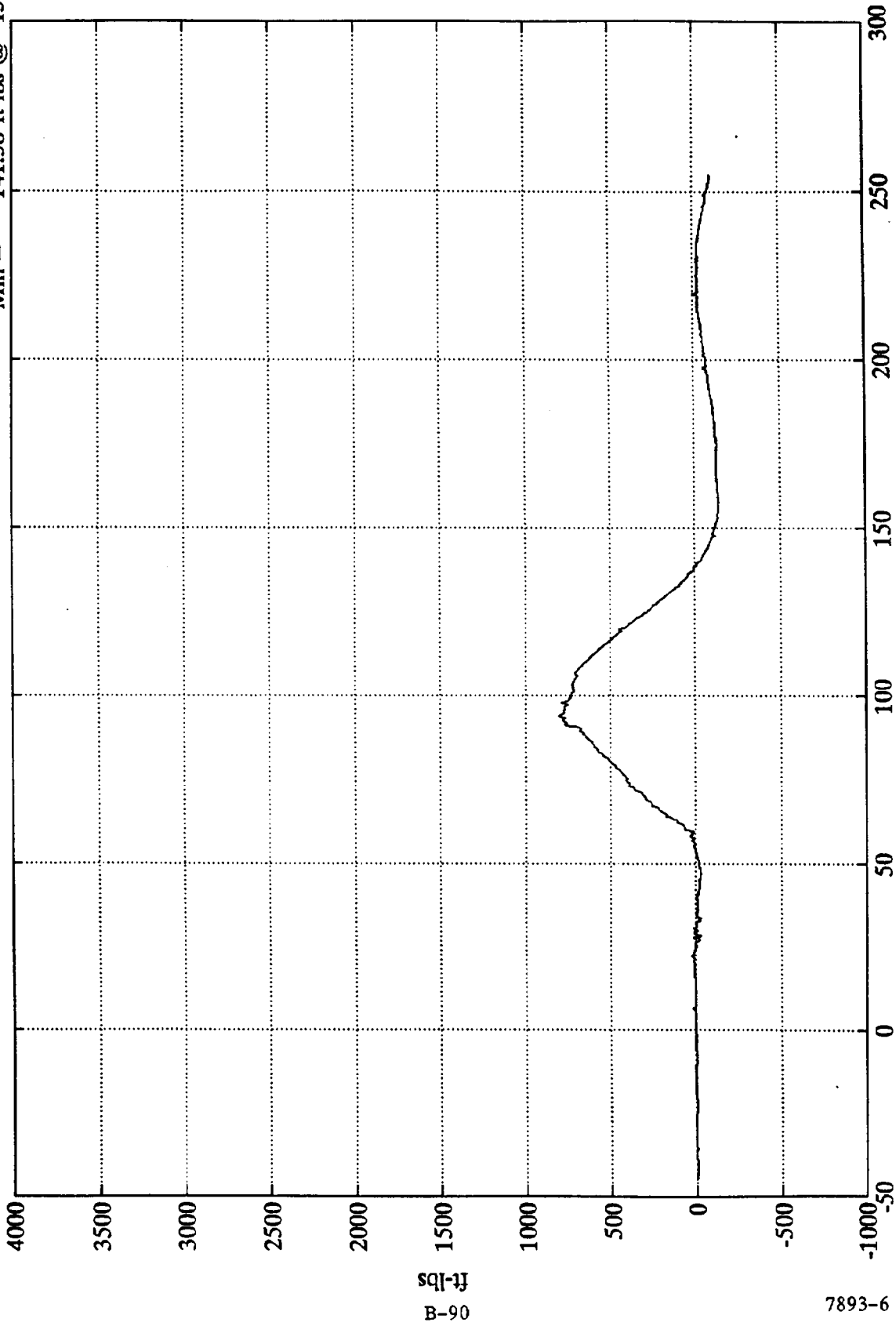
7893-6

SAE Filter Class 600

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Upper Neck Mz

Max = 800.84 ft-lbs @ 93.95 msec  
Min = -141.38 ft-lbs @ 157.68 msec



B-90

7893-6

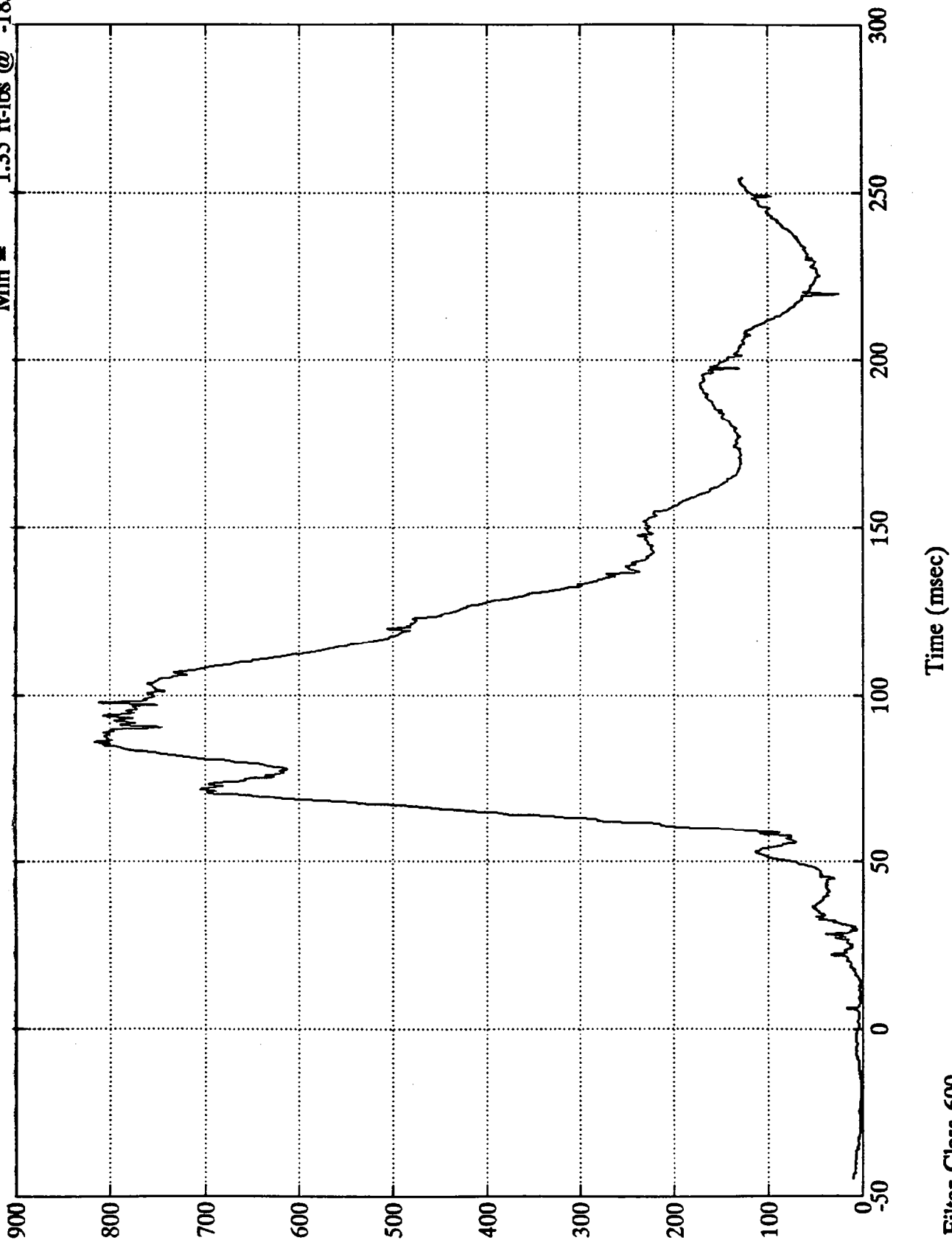
Time (msec)

SAE Filter Class 600

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Neck Moment Res.

Max = 816.09 ft-lbs @ 85.80 msec  
Min = 1.35 ft-lbs @ -18.84 msec



B-91

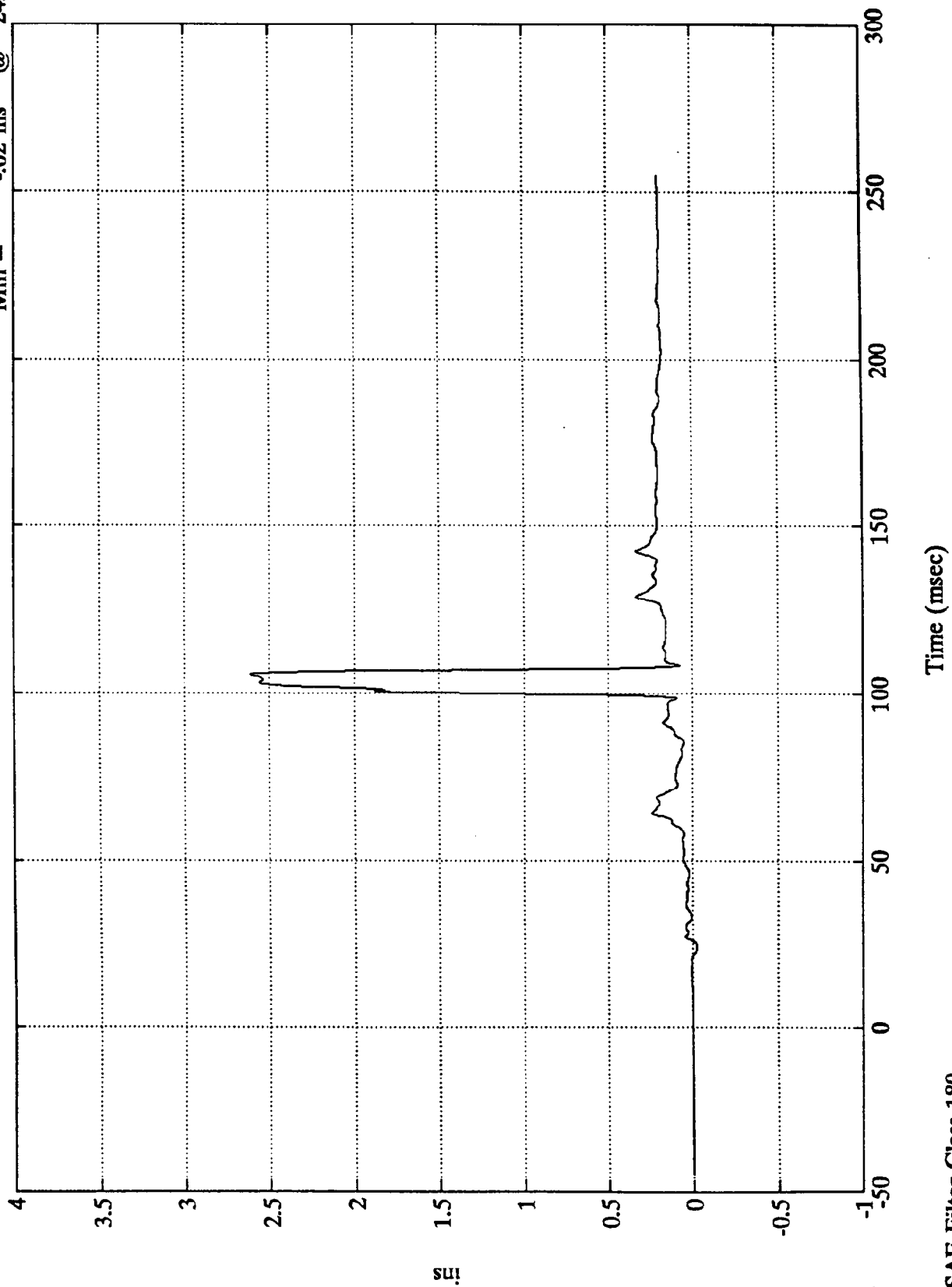
7893-6

SAE Filter Class 600

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Belt Elongation

Max = 2.61 ins @ 105.48 msec  
Min = -.02 ins @ 24.83 msec



ins  
B-92

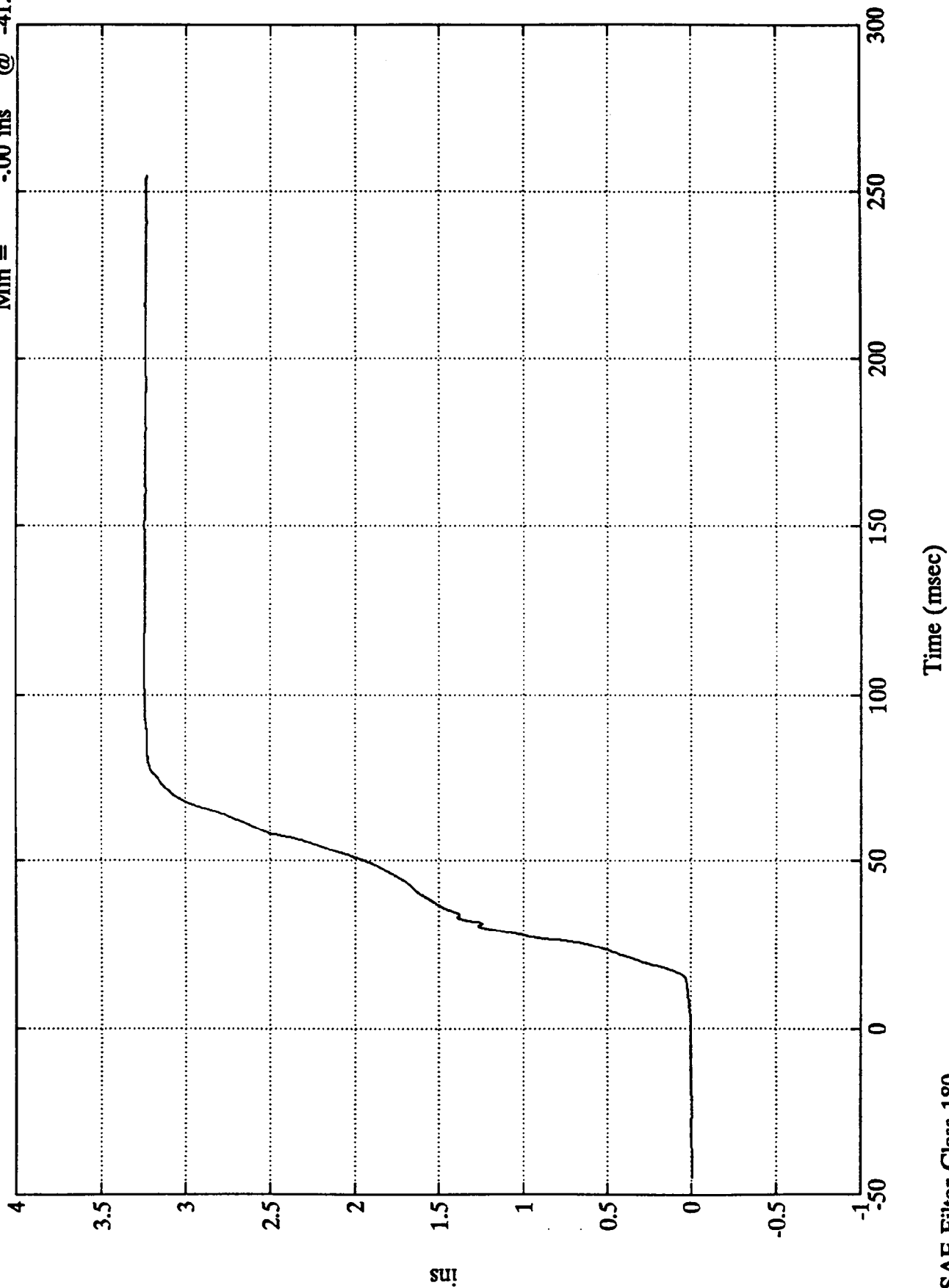
7893-6

SAE Filter Class 180

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Belt Spool Out

Max = 3.24 ins @ 105.12 ms  
Min = -.00 ins @ -41.16 ms



B-93

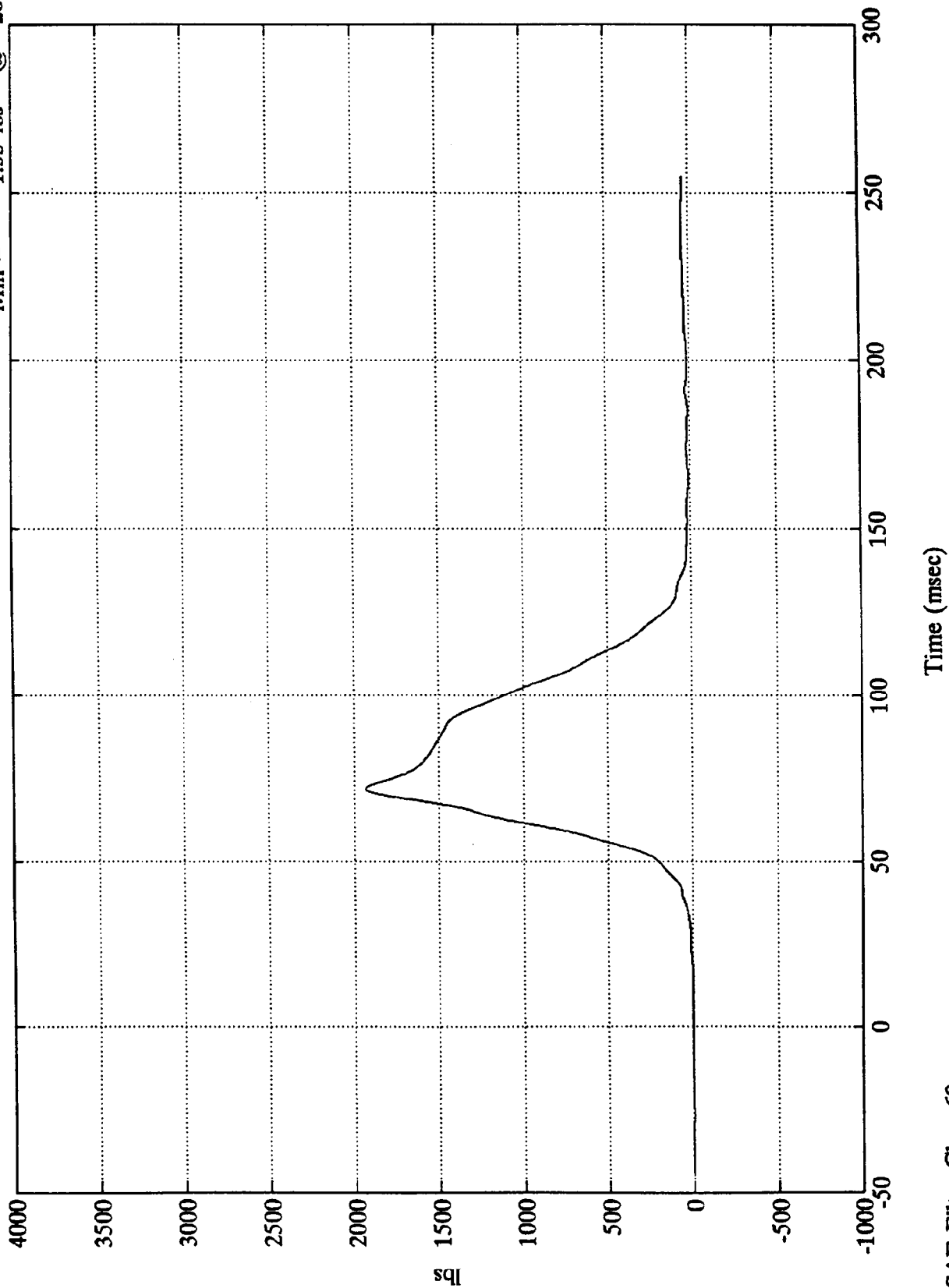
7893-6

SAE Filter Class 180

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Left Belt Load

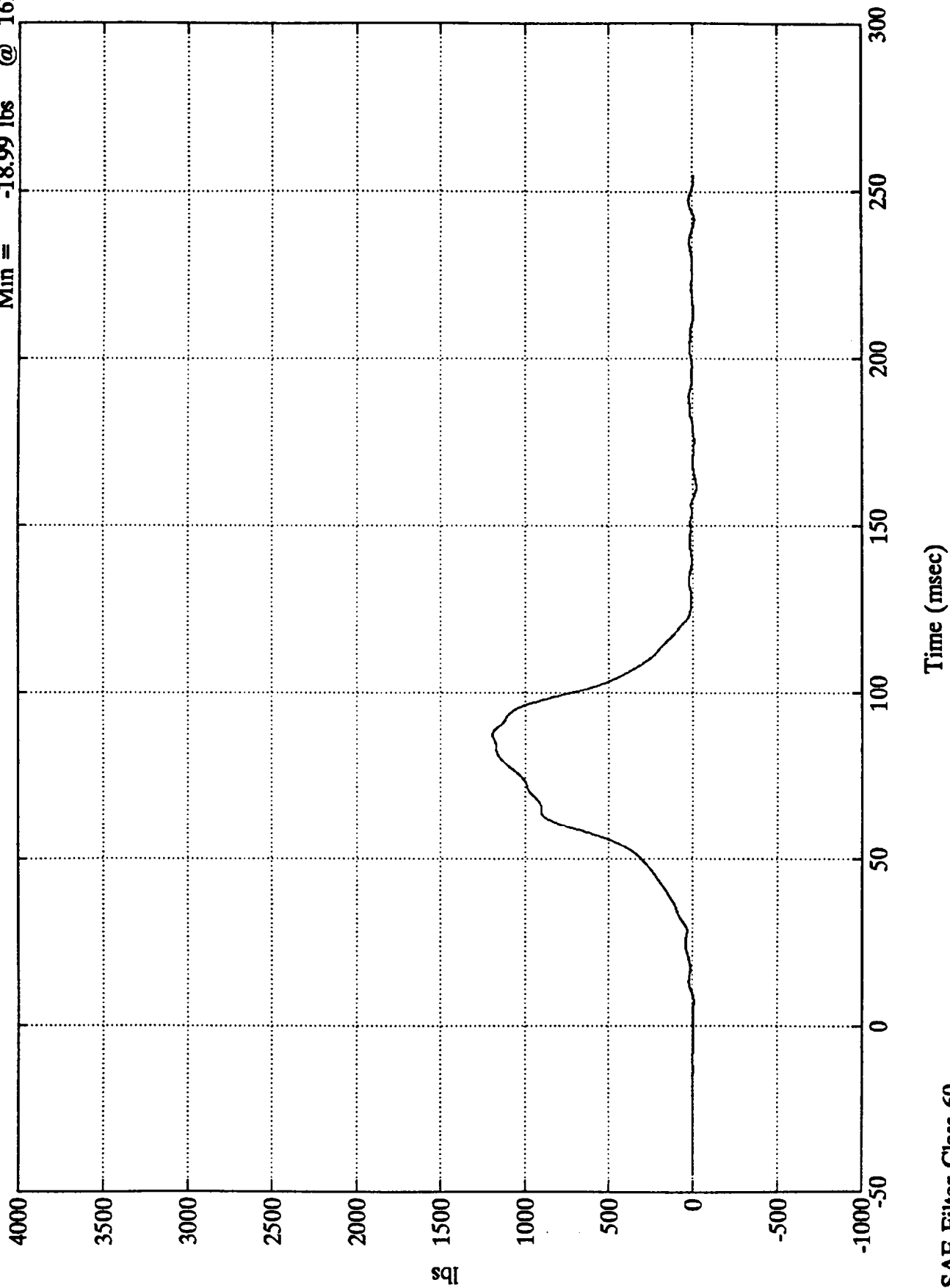
Max = 1931.24 lbs @ 72.12 msec  
Min = -1.55 lbs @ -26.40 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 1 Torso Belt Load

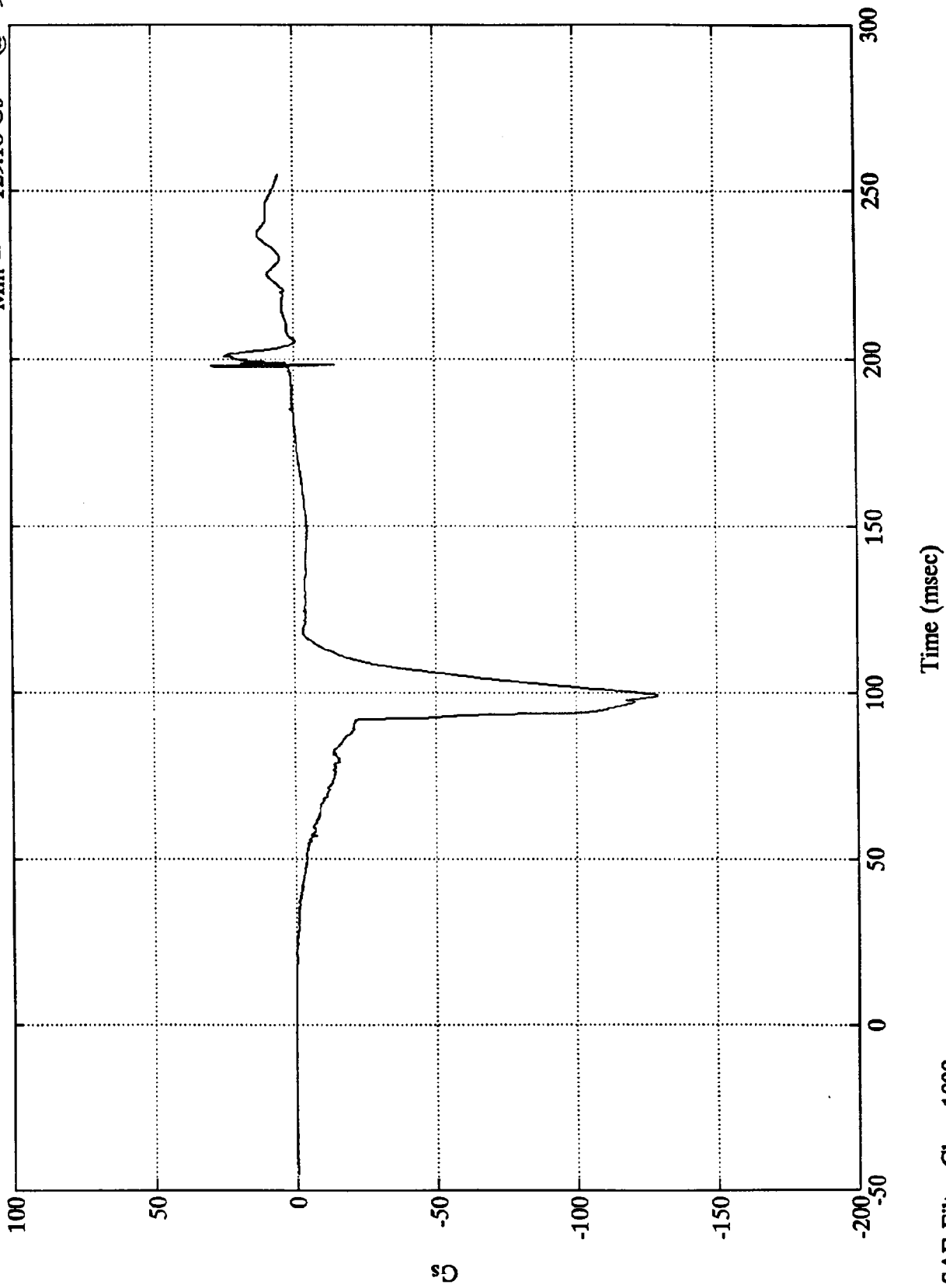
Max = 1191.55 lbs @ 87.36 ms  
Min = -18.99 lbs @ 161.63 ms



# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Head X

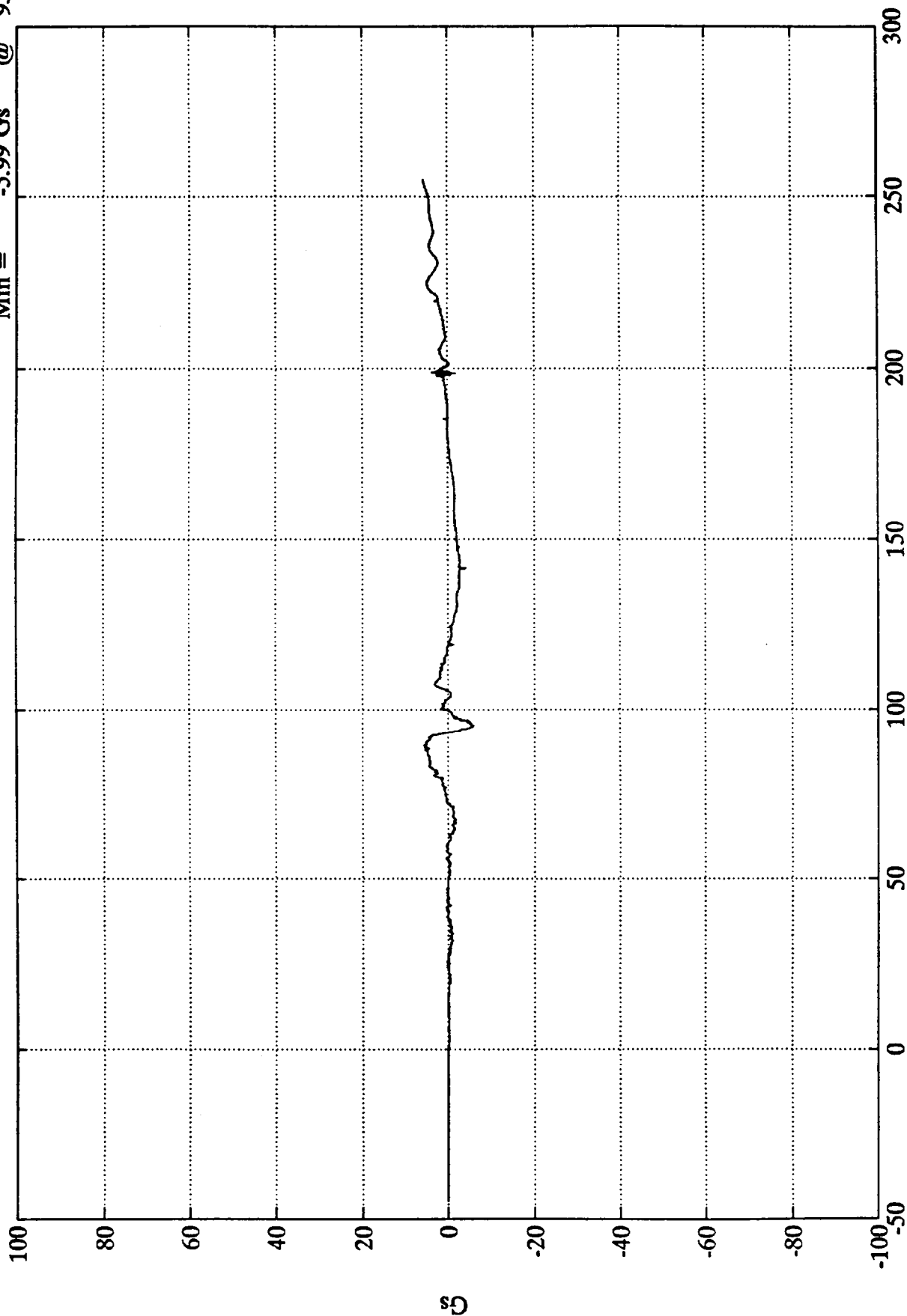
Max = 29.29 Gs @ 197.88 msec  
 Min = -129.18 Gs @ 99.12 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Max = 5.72 Gs @ 254.88 msec  
Min = -5.99 Gs @ 95.27 msec

Pos. 2 Head Y



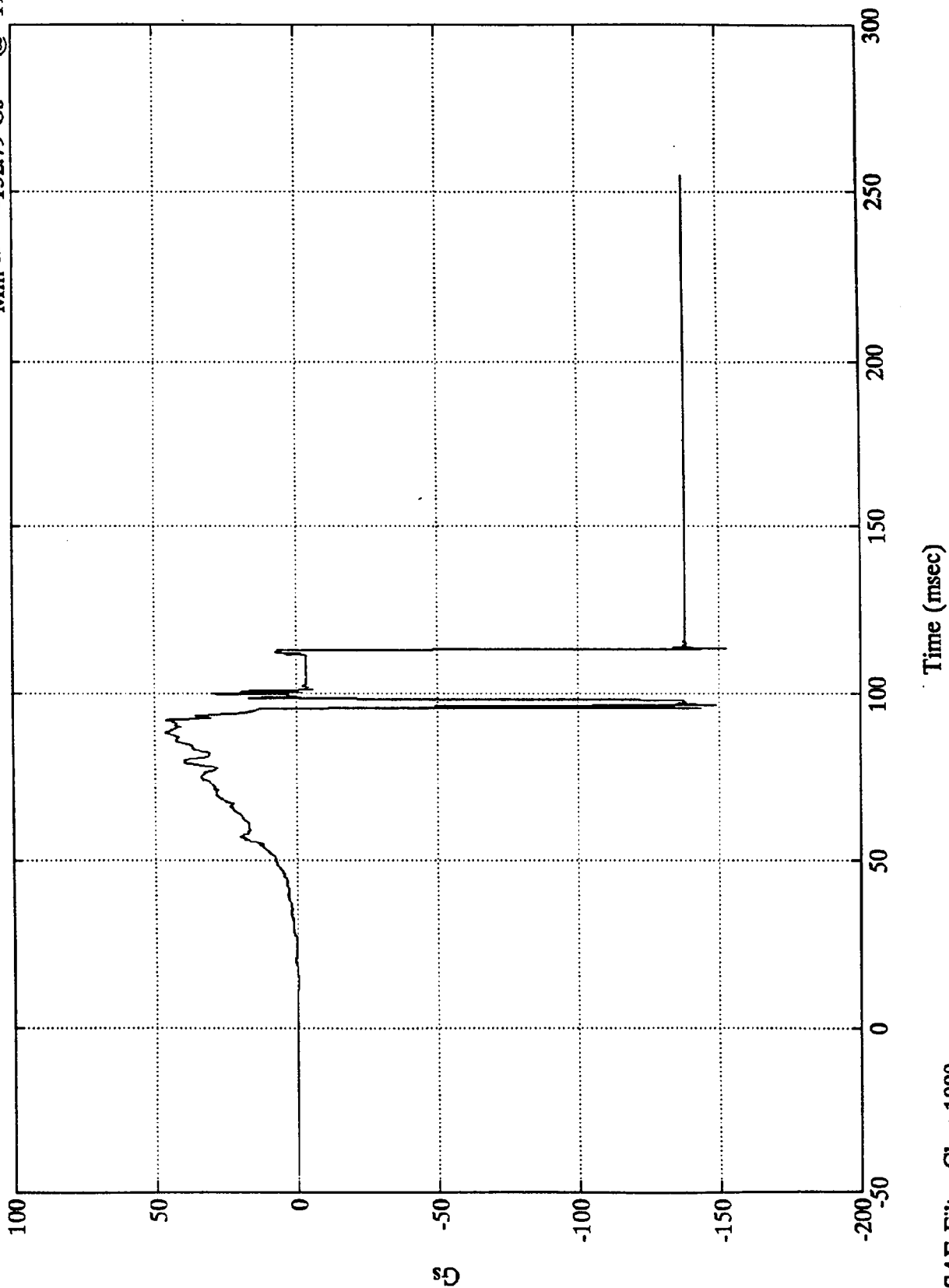
Time (msec)

SAE Filter Class 1000

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Head Z

Max = 46.49 Gs @ 88.31 msec  
Min = -152.79 Gs @ 113.40 msec

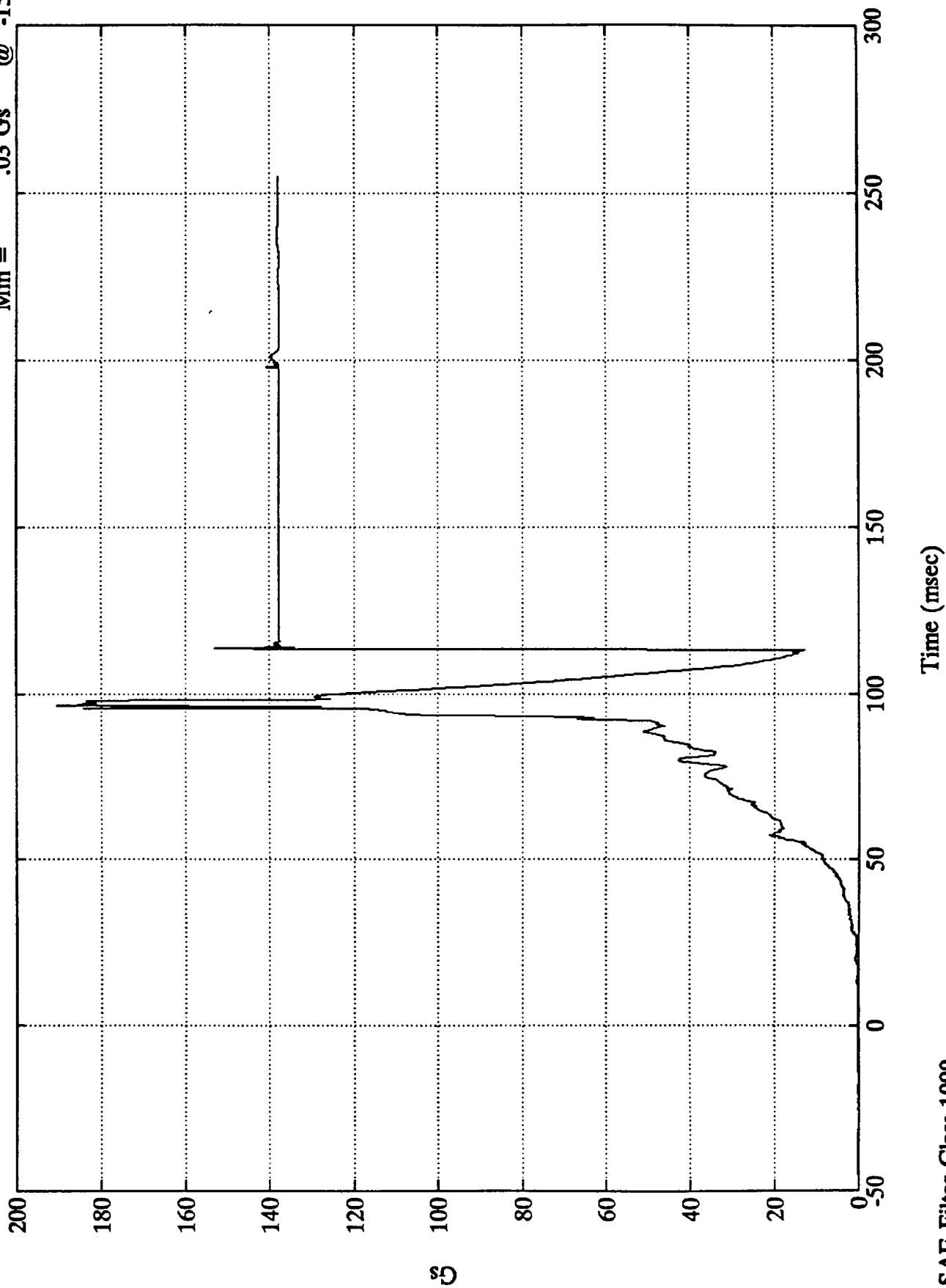


SAE Filter Class 1000

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Head Resultant

Max = 190.46 Gs @ 96.48 msec  
Min = .03 Gs @ -15.96 msec

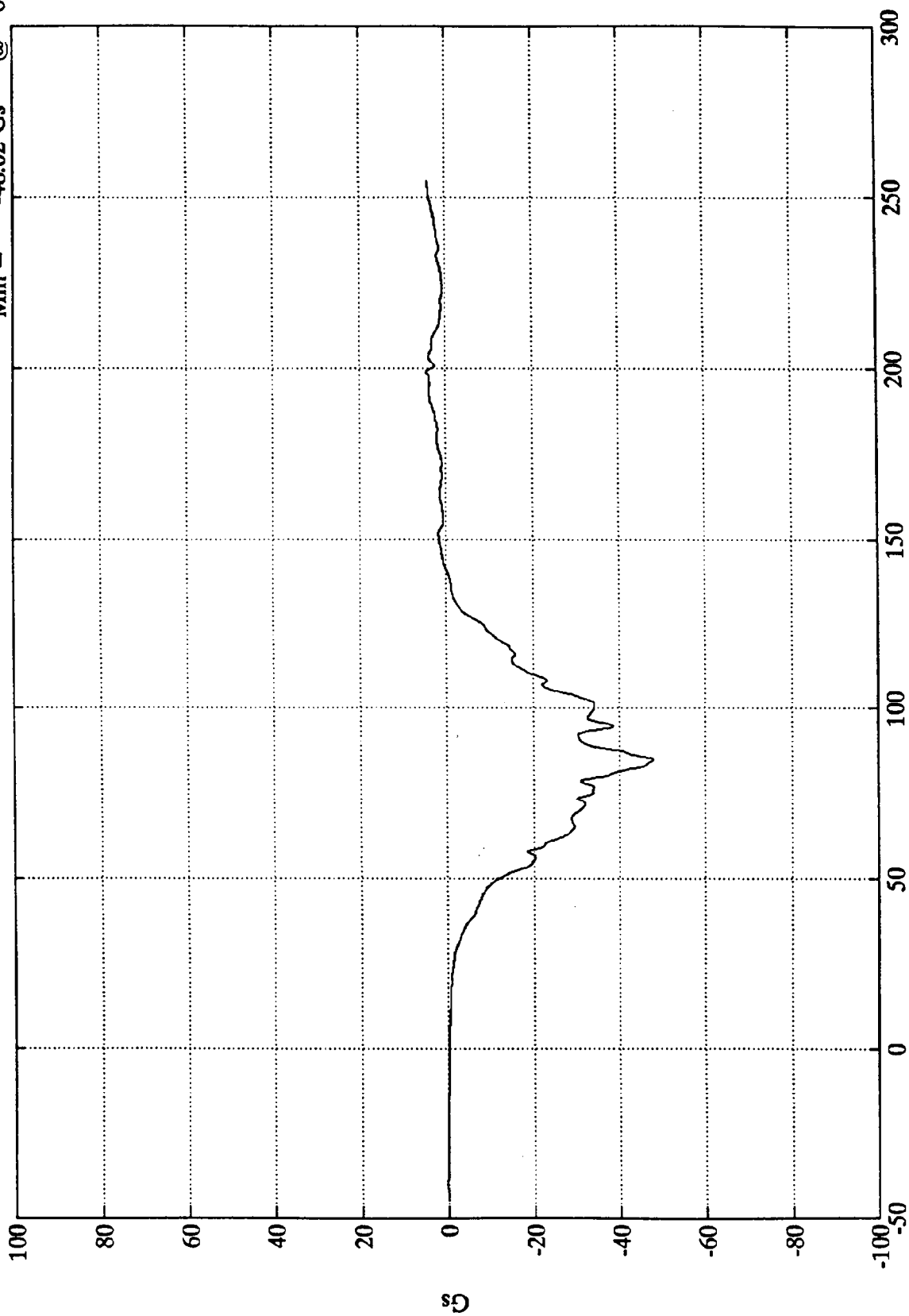


SAE Filter Class 1000

# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Chest X

Max = 4.58 Gs @ 198.96 msec  
Min = -48.02 Gs @ 84.95 msec

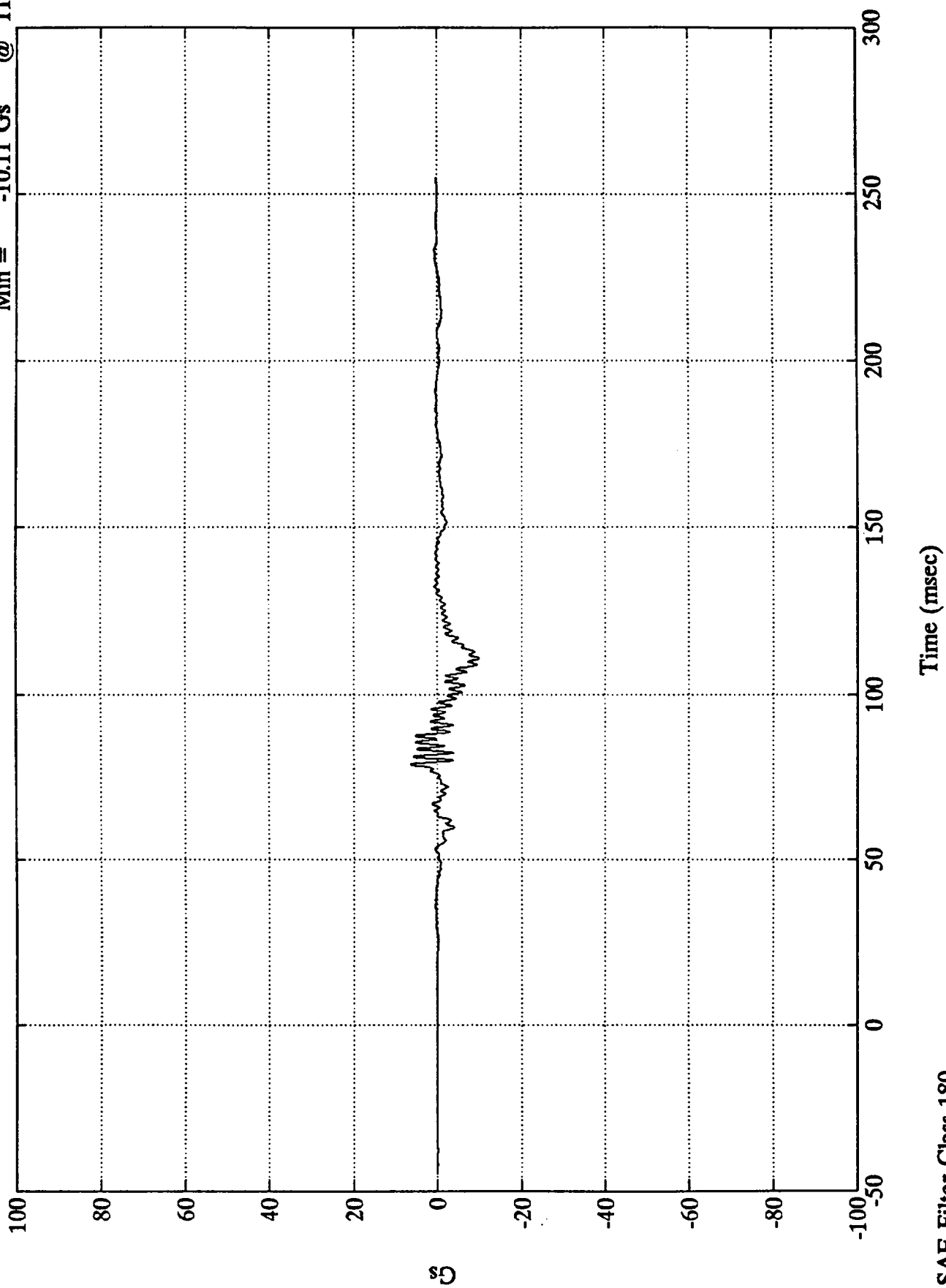


Time (msec)

SAE Filter Class 180

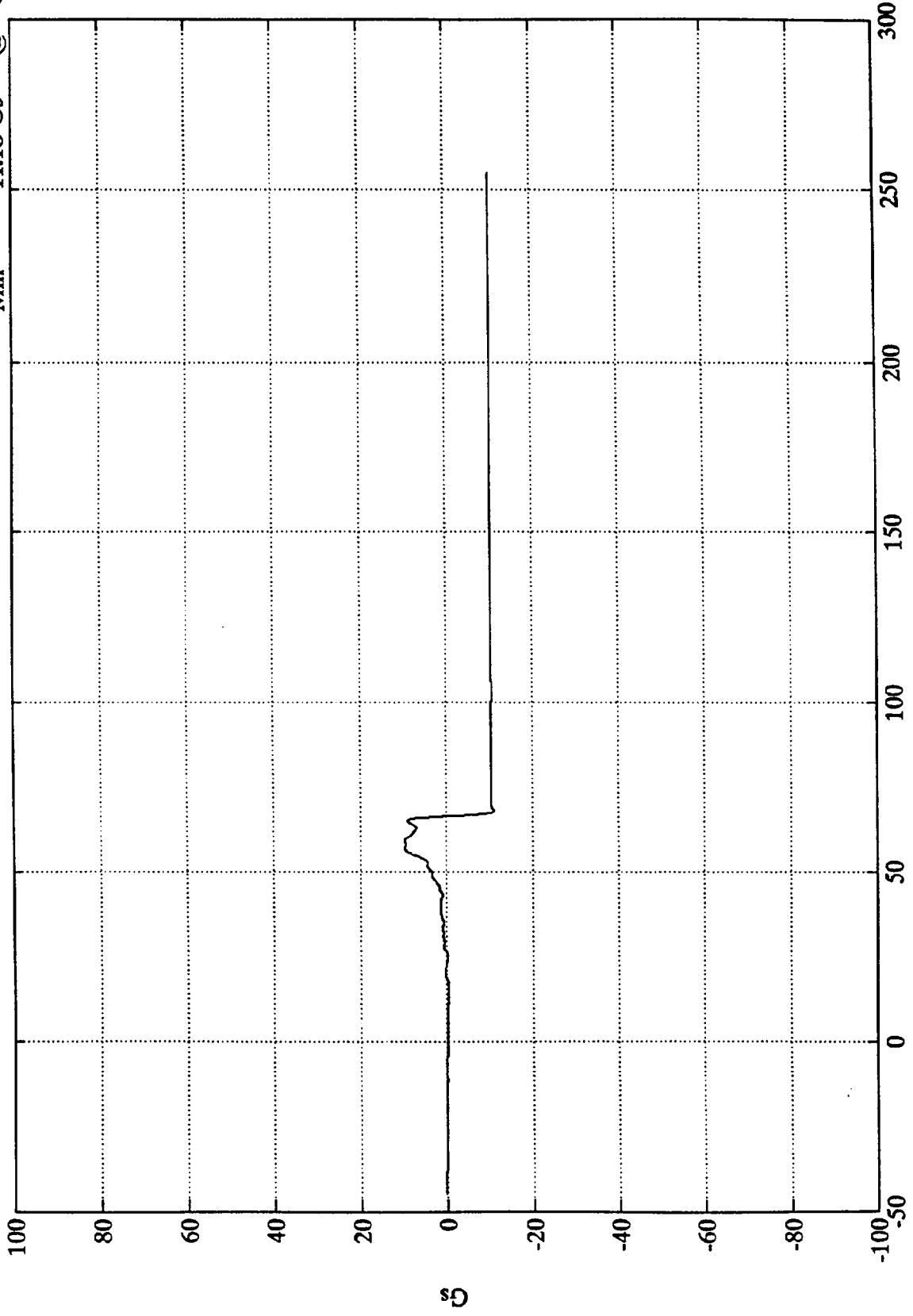
NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Chest Y  
Max = 6.30 Gs @ 78.84 msec  
Min = -10.11 Gs @ 110.88 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Chest Z  
Max = 9.73 Gs @ 59.27 msec  
Min = -11.18 Gs @ 67.80 msec



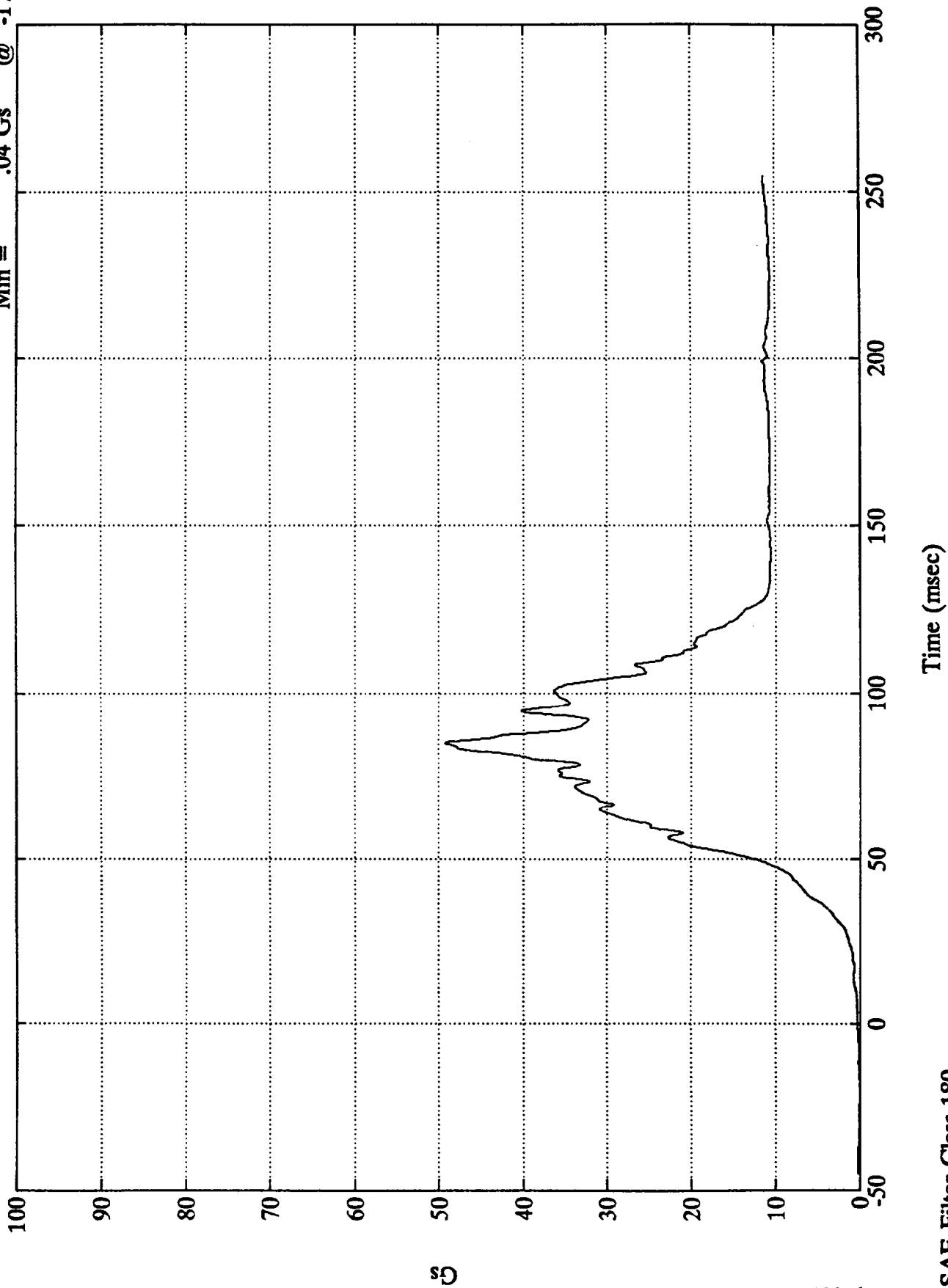
Time (msec)

SAE Filter Class 180

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Chest Resultant

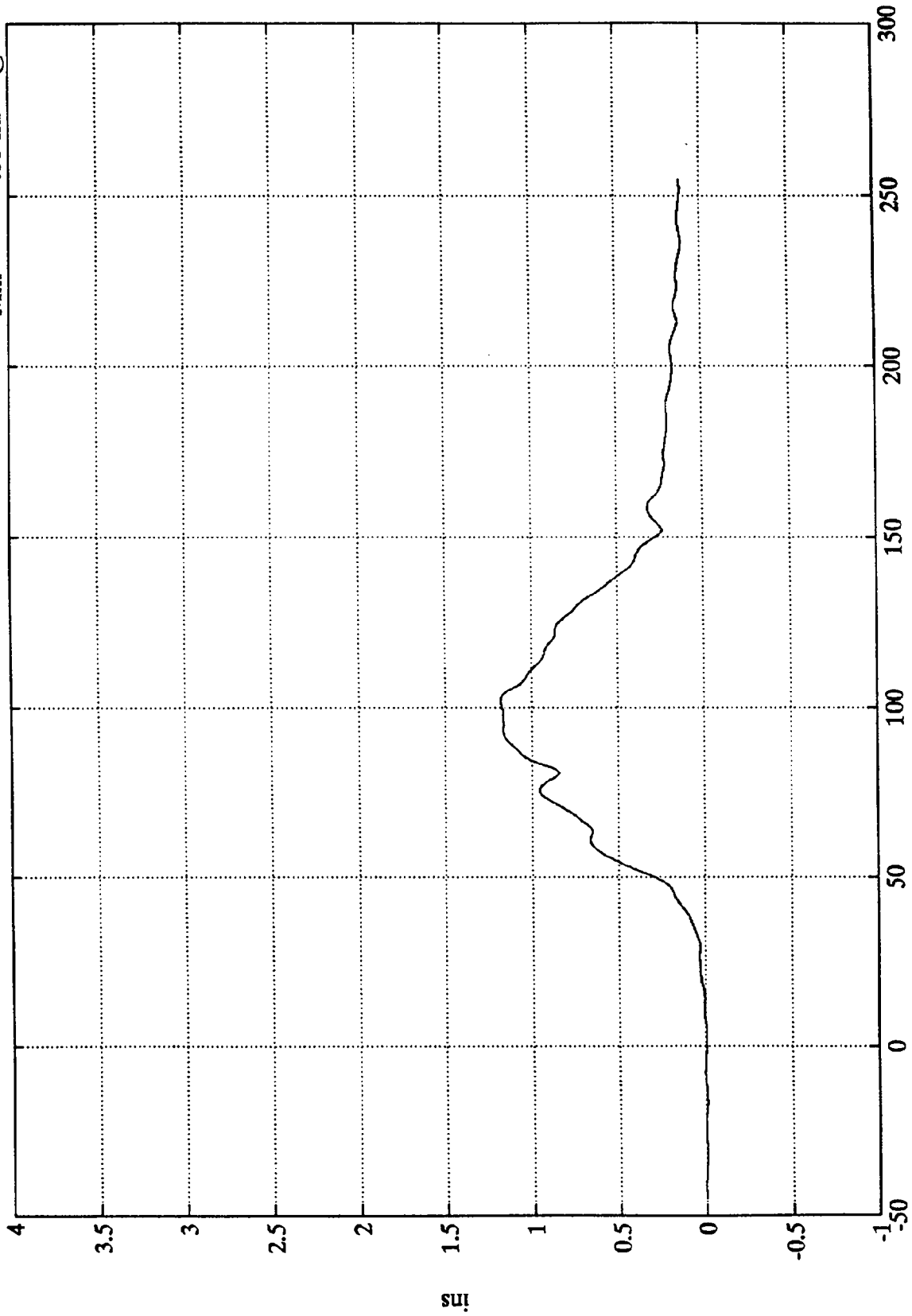
Max = 49.17 Gs @ 84.95 msec  
Min = .04 Gs @ -17.40 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Chest Disp.

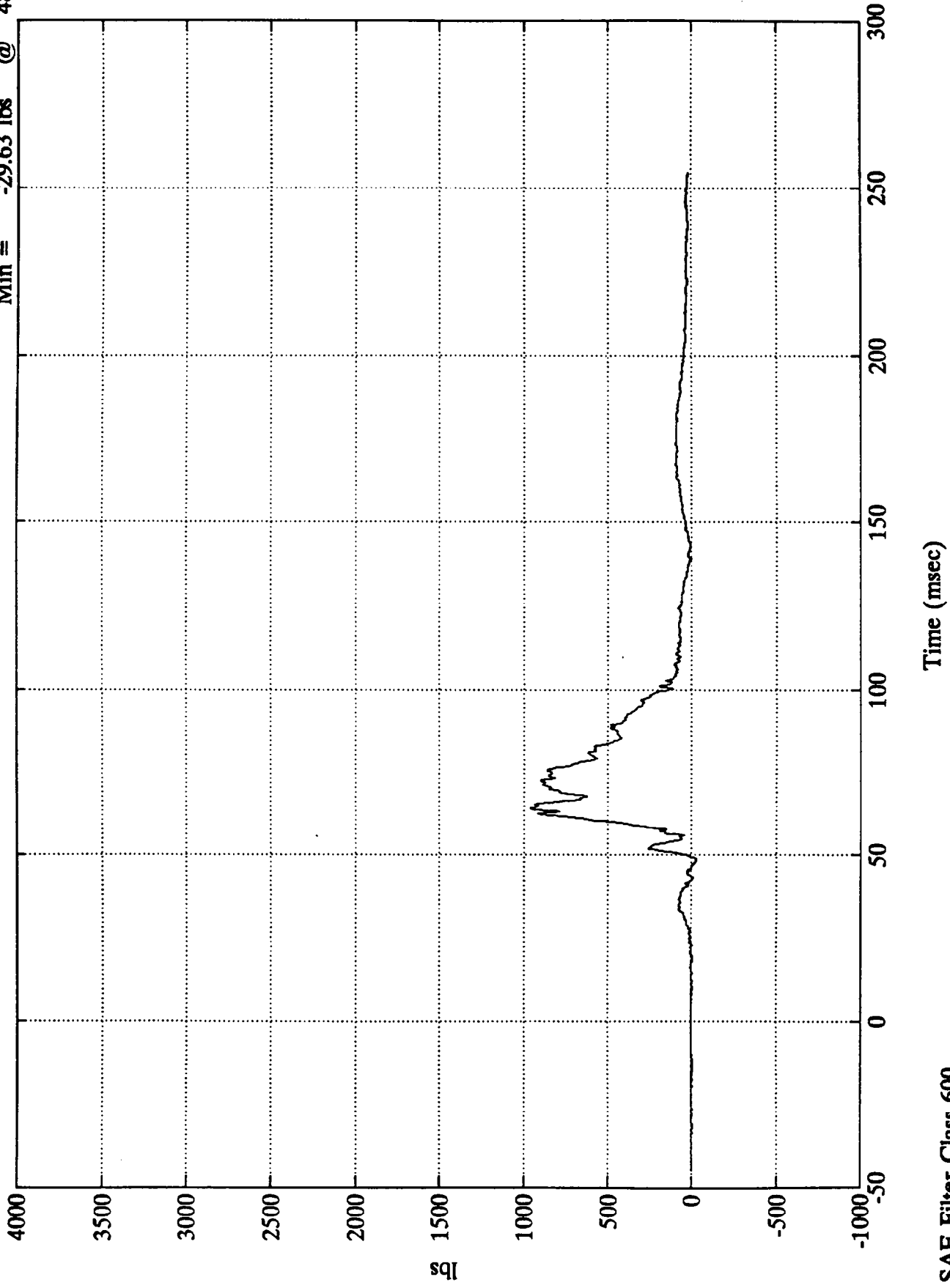
Max = 1.17 ins @ 102.00 msec  
Min = -.00 ins @ -16.68 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Left Femur

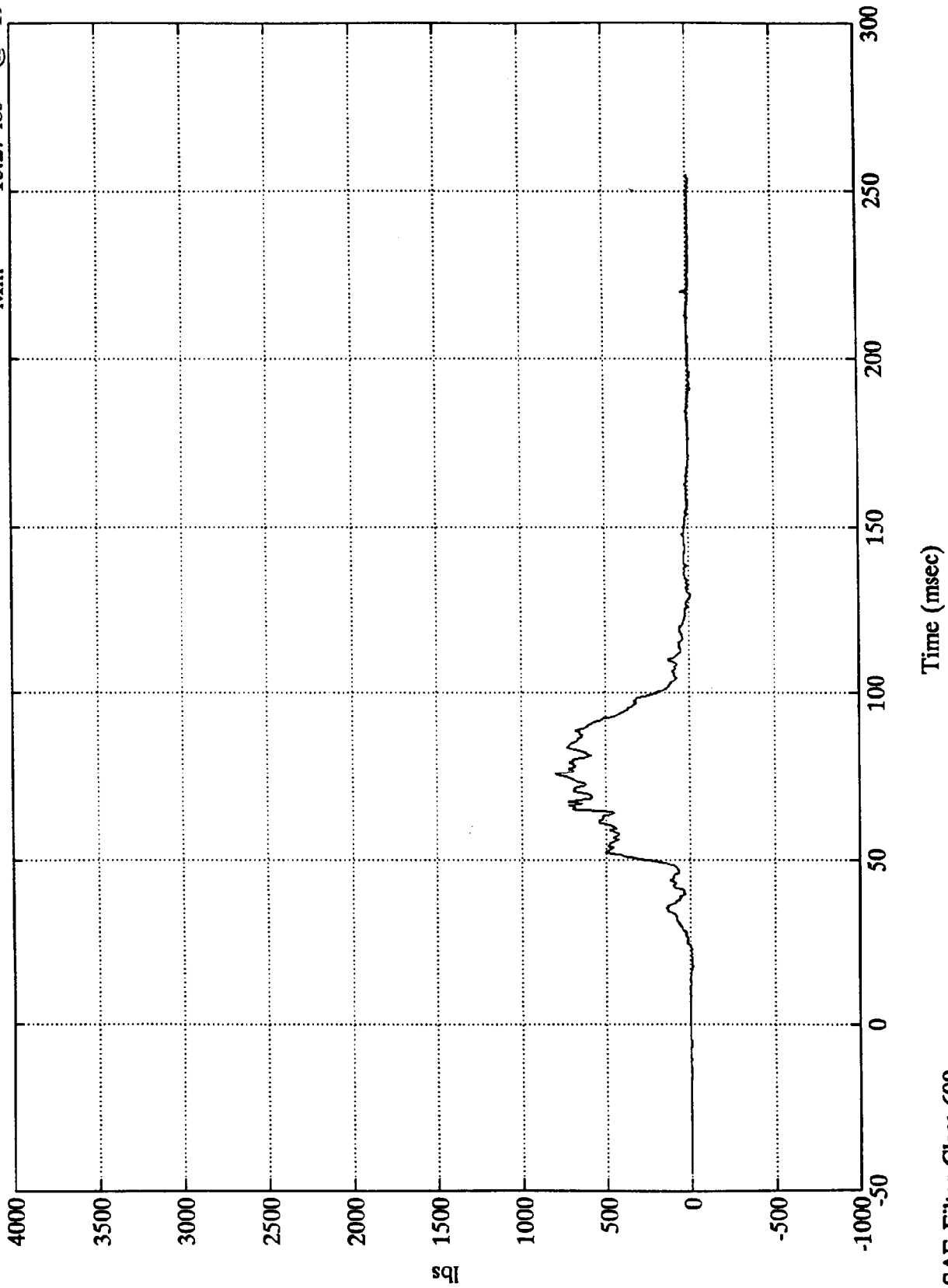
Max = 958.50 lbs @ 63.95 msec  
Min = -29.63 lbs @ 48.72 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Right Femur

Max = 793.60 lbs @ 75.72 msec  
Min = -15.27 lbs @ 190.80 msec

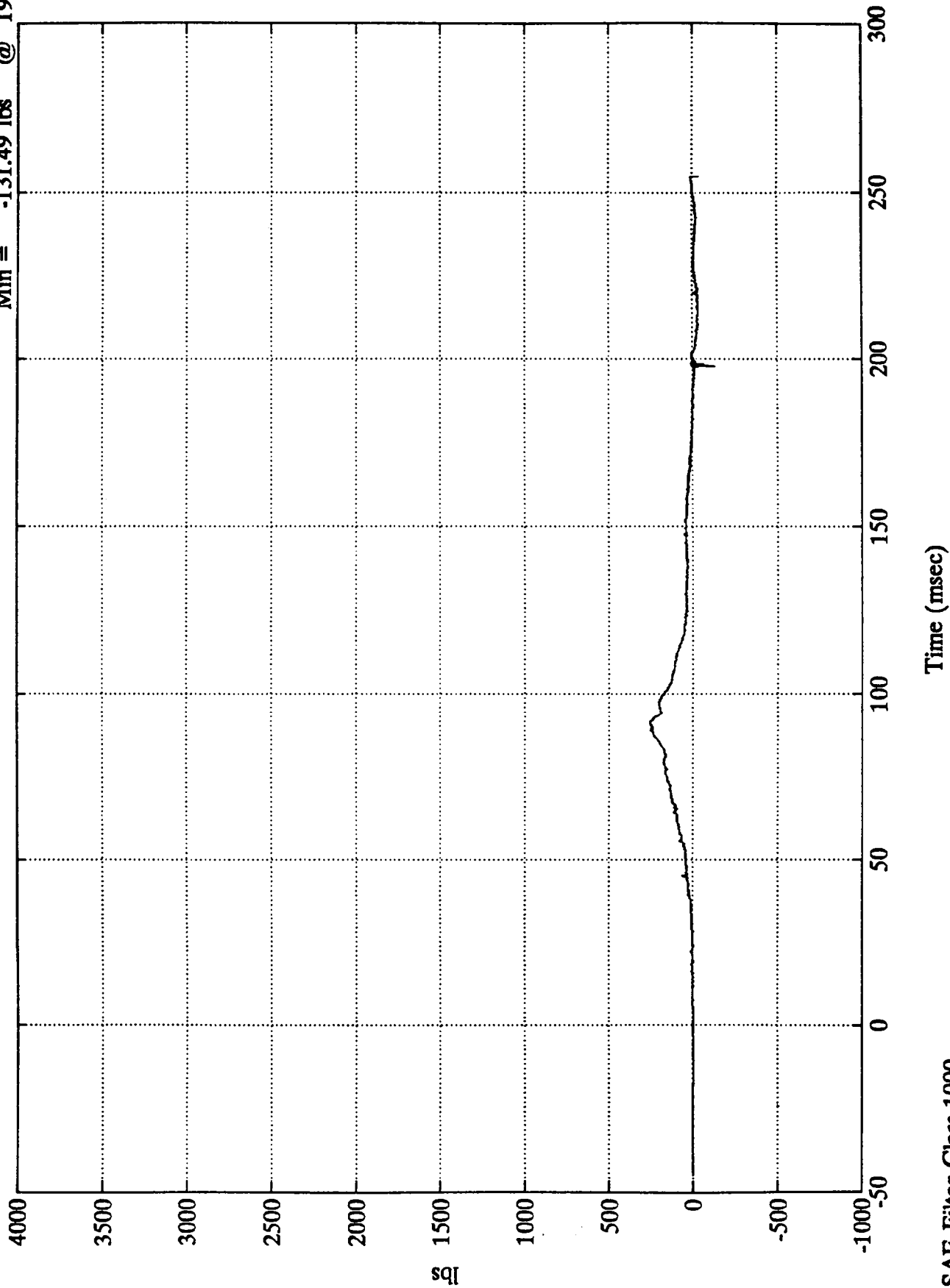


SAE Filter Class 600

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Upper Neck Fx

Max = 256.19 lbs @ 88.92 msec  
Min = -131.49 lbs @ 197.75 msec

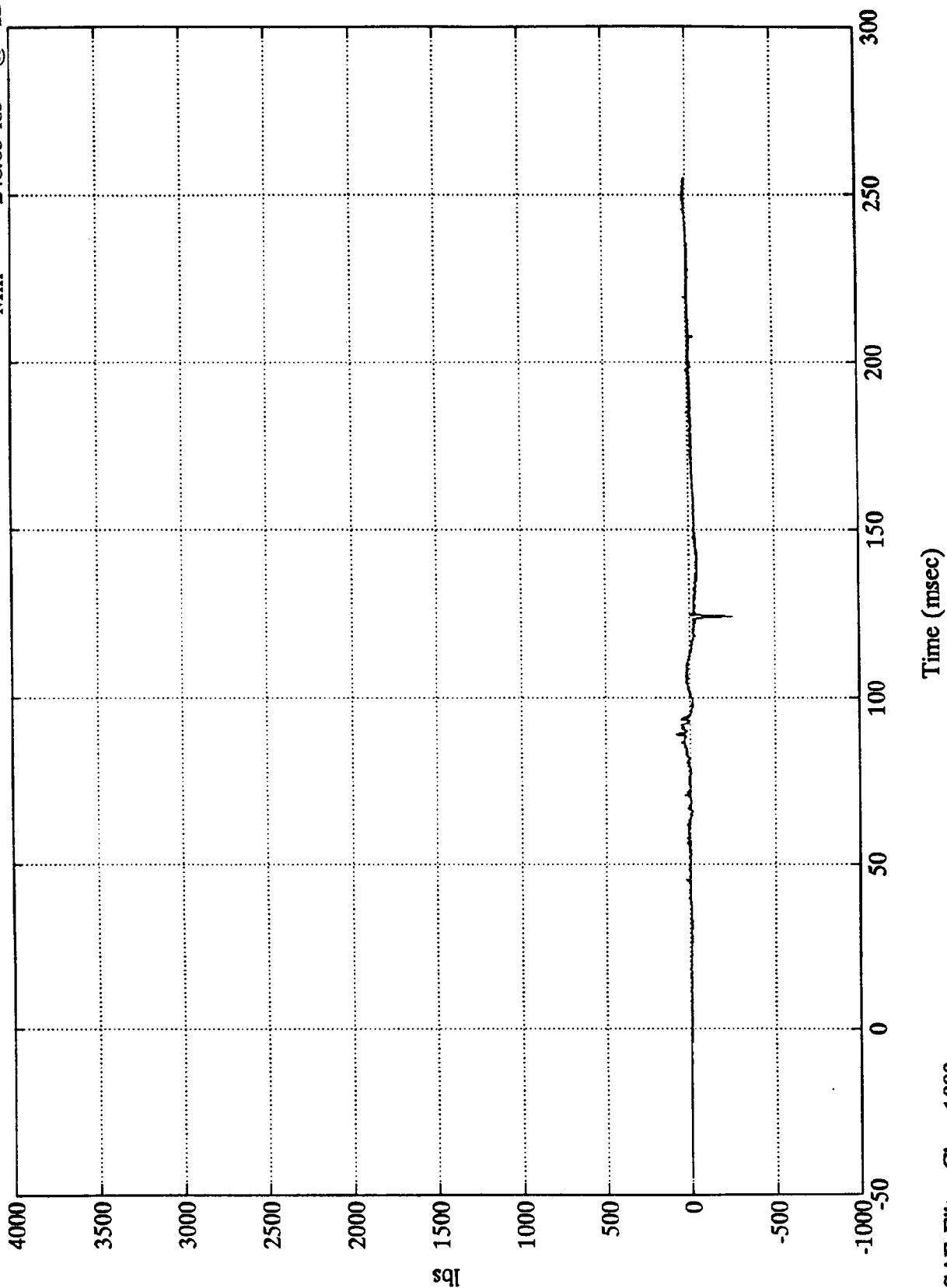


SAE Filter Class 1000

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Upper Neck Fy

Max = 77.81 lbs @ 88.92 msec  
Min = -248.63 lbs @ 124.56 msec

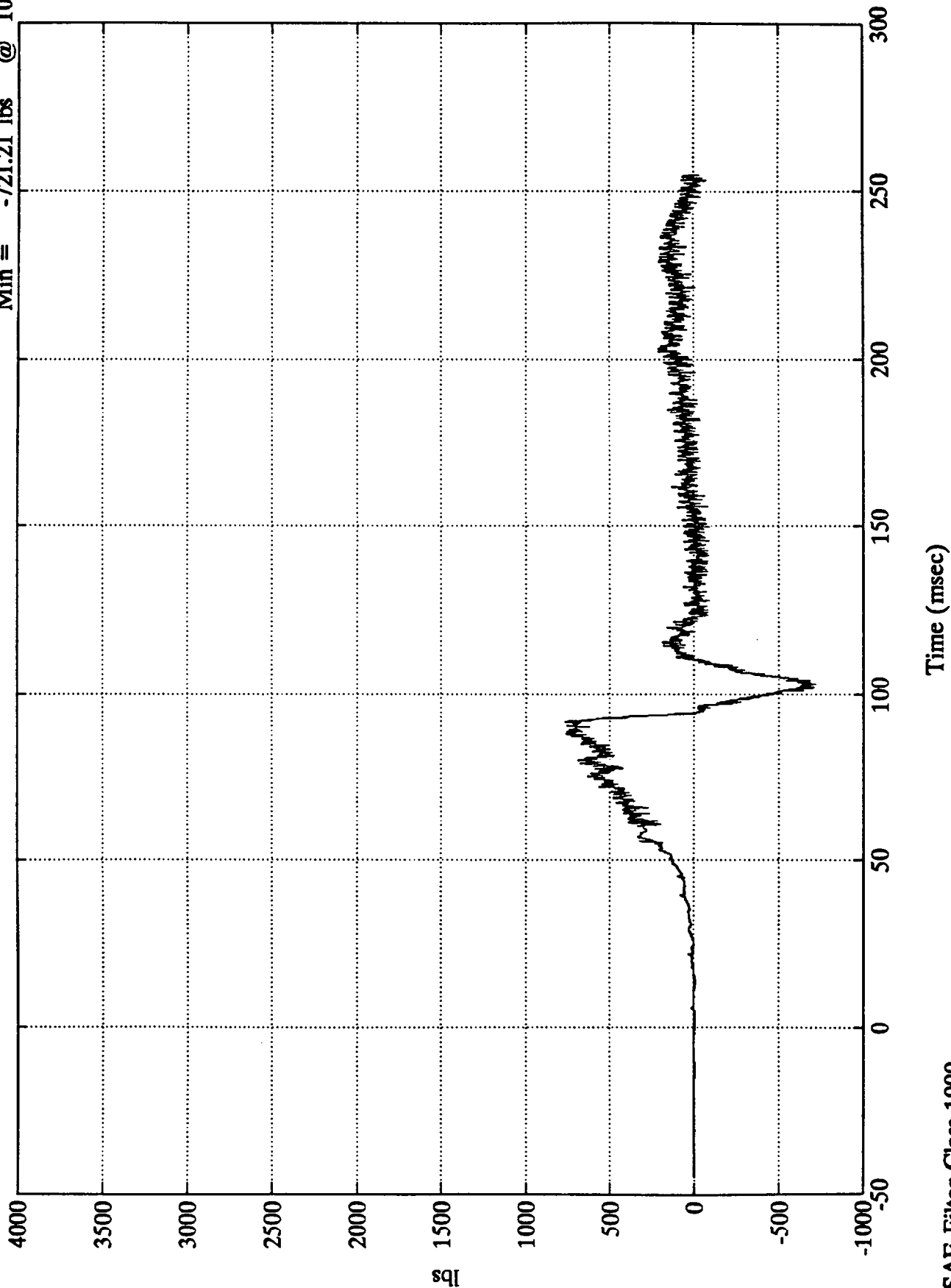


SAE Filter Class 1000

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Upper Neck Fz

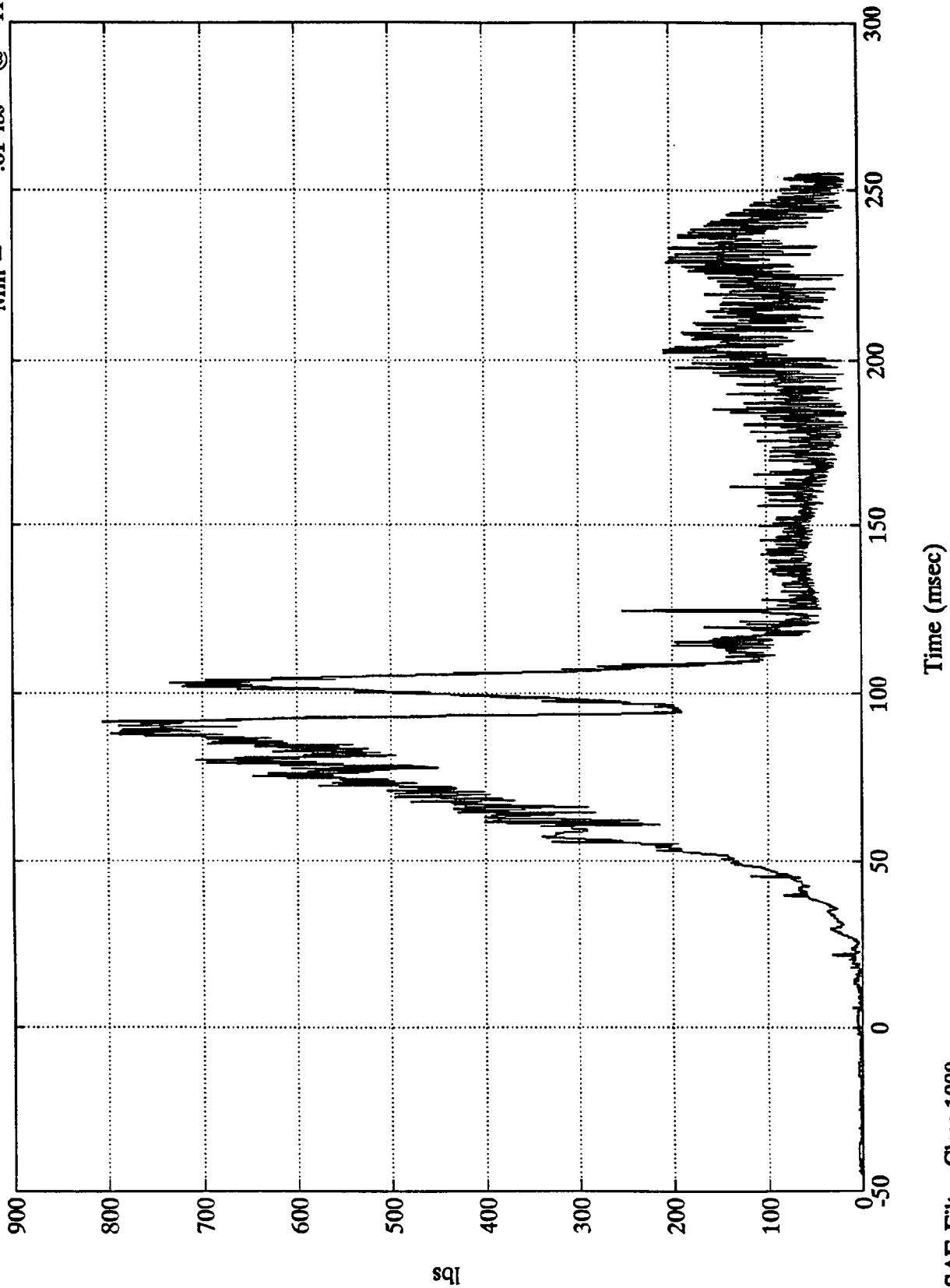
Max = 763.14 lbs @ 91.44 msec  
Min = -721.21 lbs @ 102.96 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Neck Force Res.

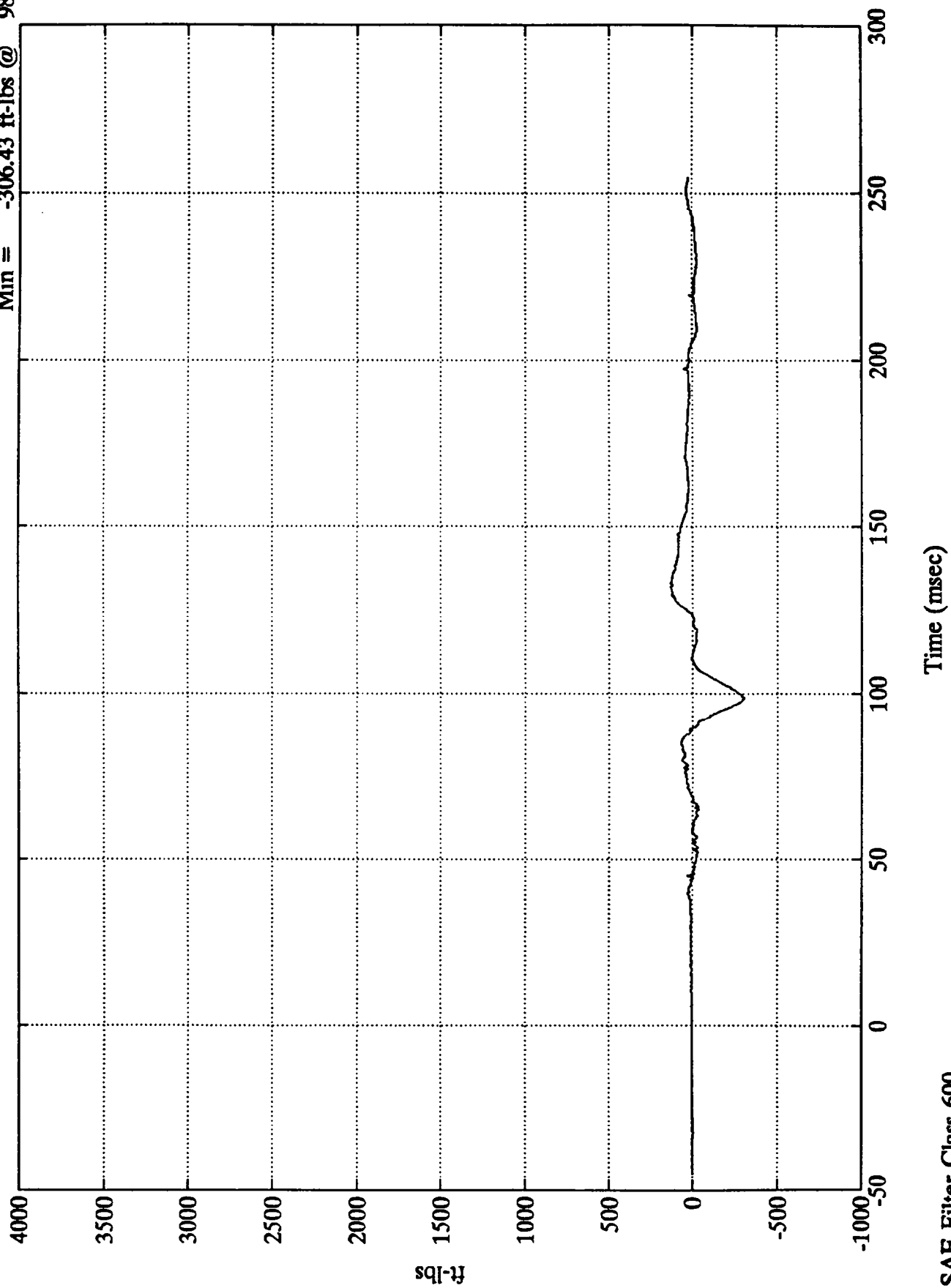
Max = 805.79 lbs @ 91.44 msec  
Min = .61 lbs @ 11.39 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Upper Neck Mx

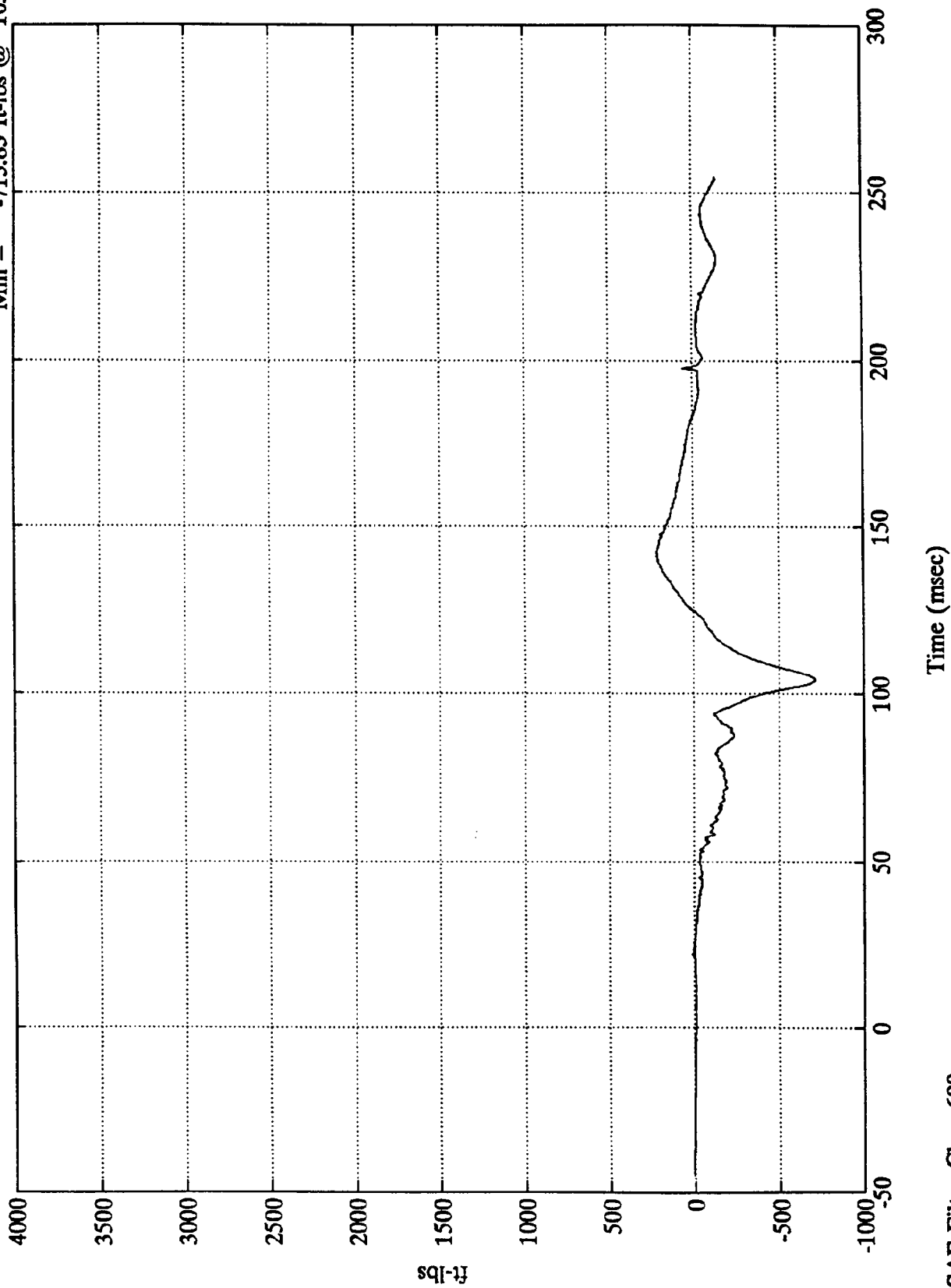
Max = 129.89 ft-lbs @ 132.00 msec  
Min = -306.43 ft-lbs @ 98.63 msec



# NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Upper Neck My

Max = 217.95 ft-lbs @ 141.11 msec  
 Min = -713.83 ft-lbs @ 103.92 msec



sqi-1j  
 B-112

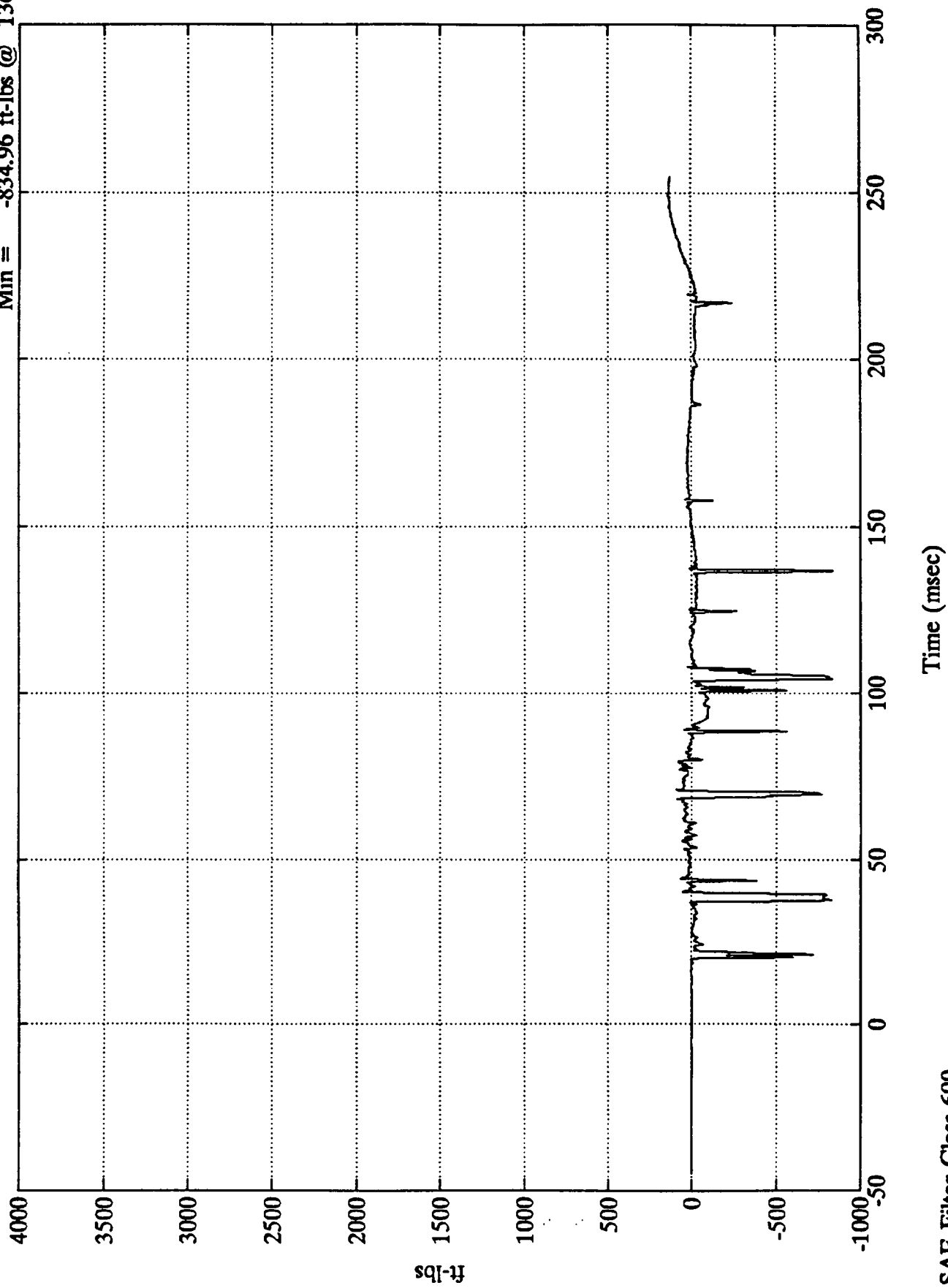
7893-6

SAE Filter Class 600

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Upper Neck Mz

Max = 137.79 ft-lbs @ 249.12 msec  
Min = -834.96 ft-lbs @ 136.91 msec



sqi-1j

B-113

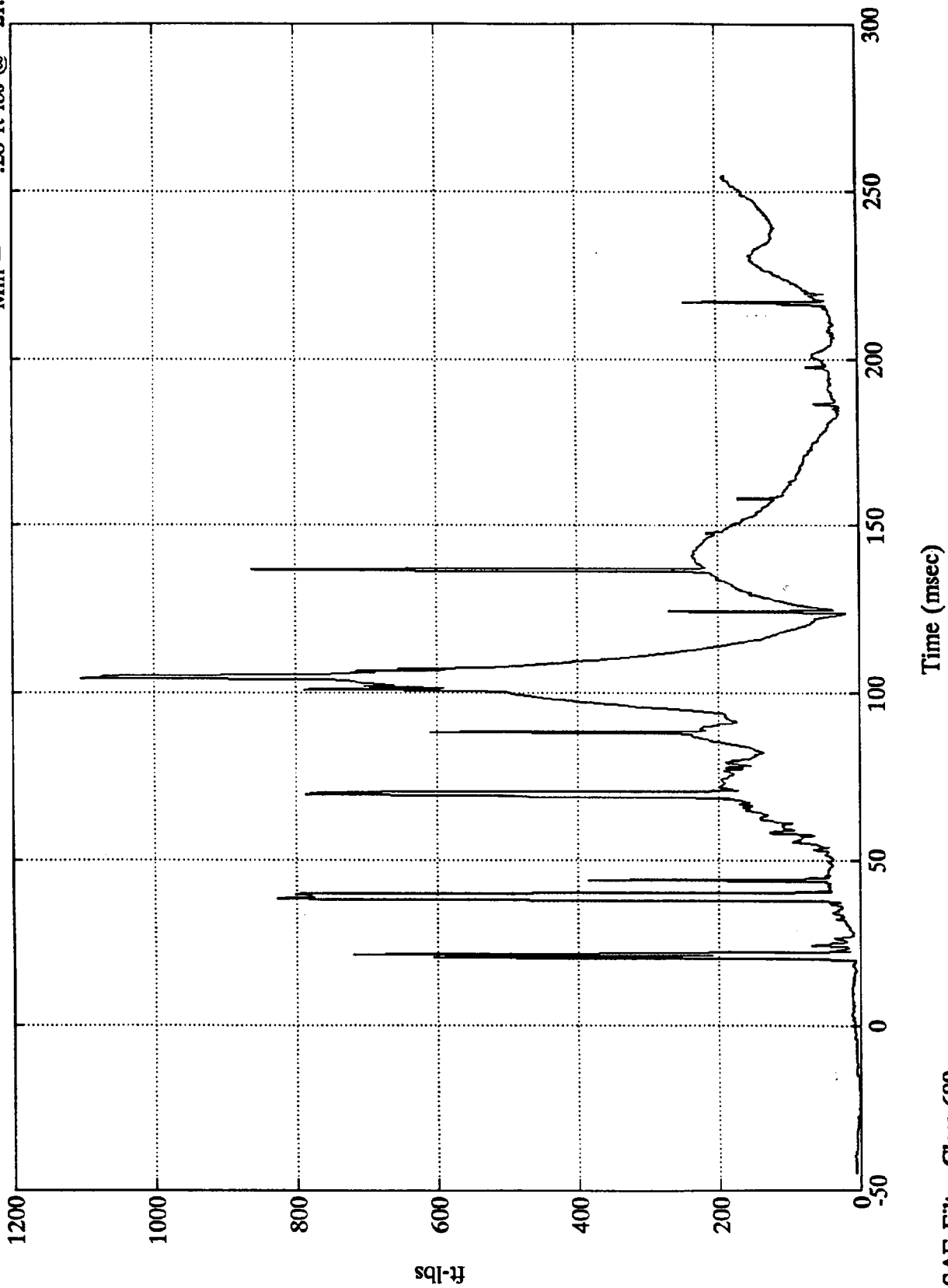
7893-6

SAE Filter Class 600

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Neck Moment Res.

Max = 1103.62 ft-lbs @ 104.27 msec  
Min = .28 ft-lbs @ -21.48 msec



B-114

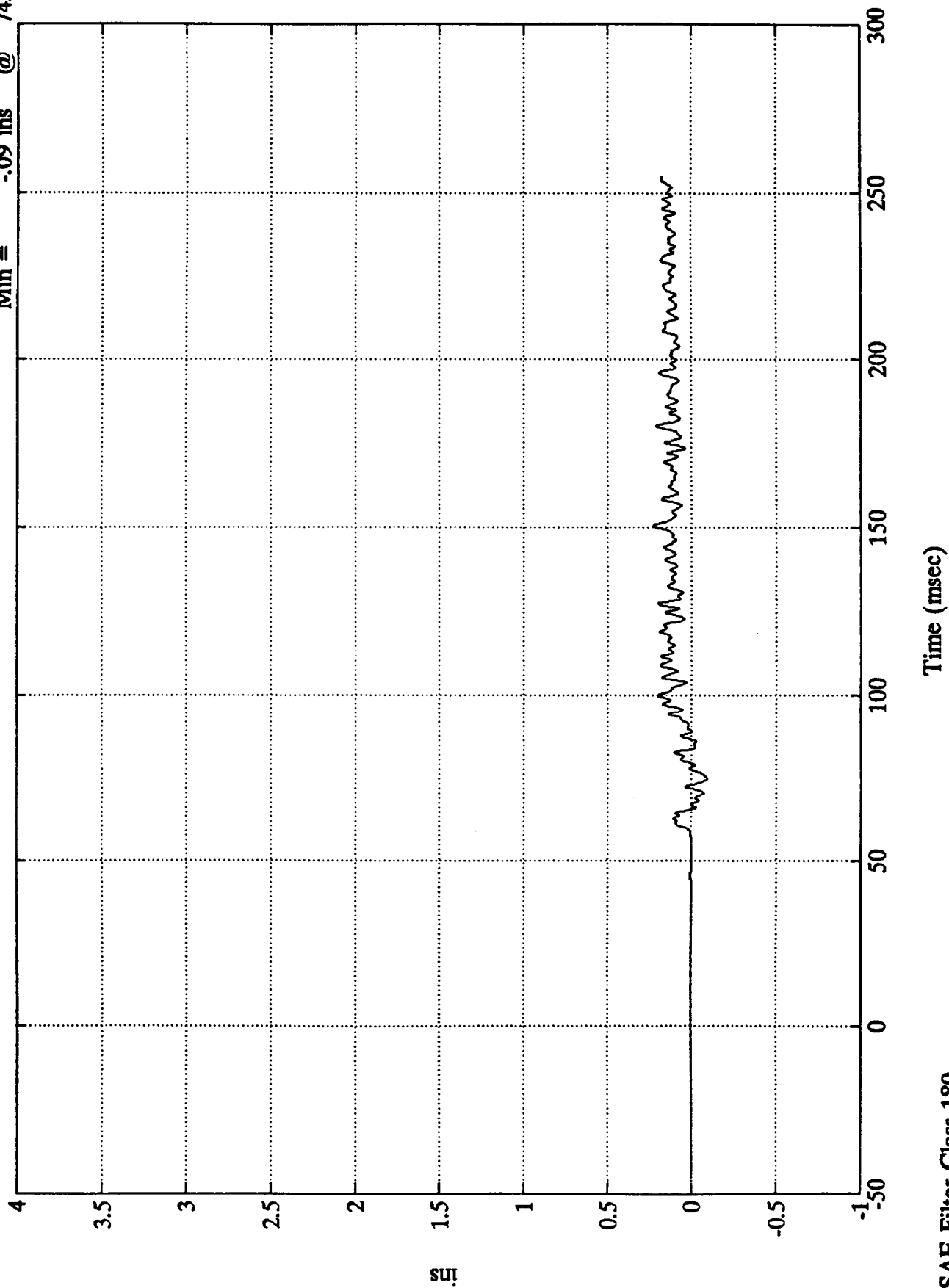
7893-6

SAE Filter Class 600

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Belt Elongation

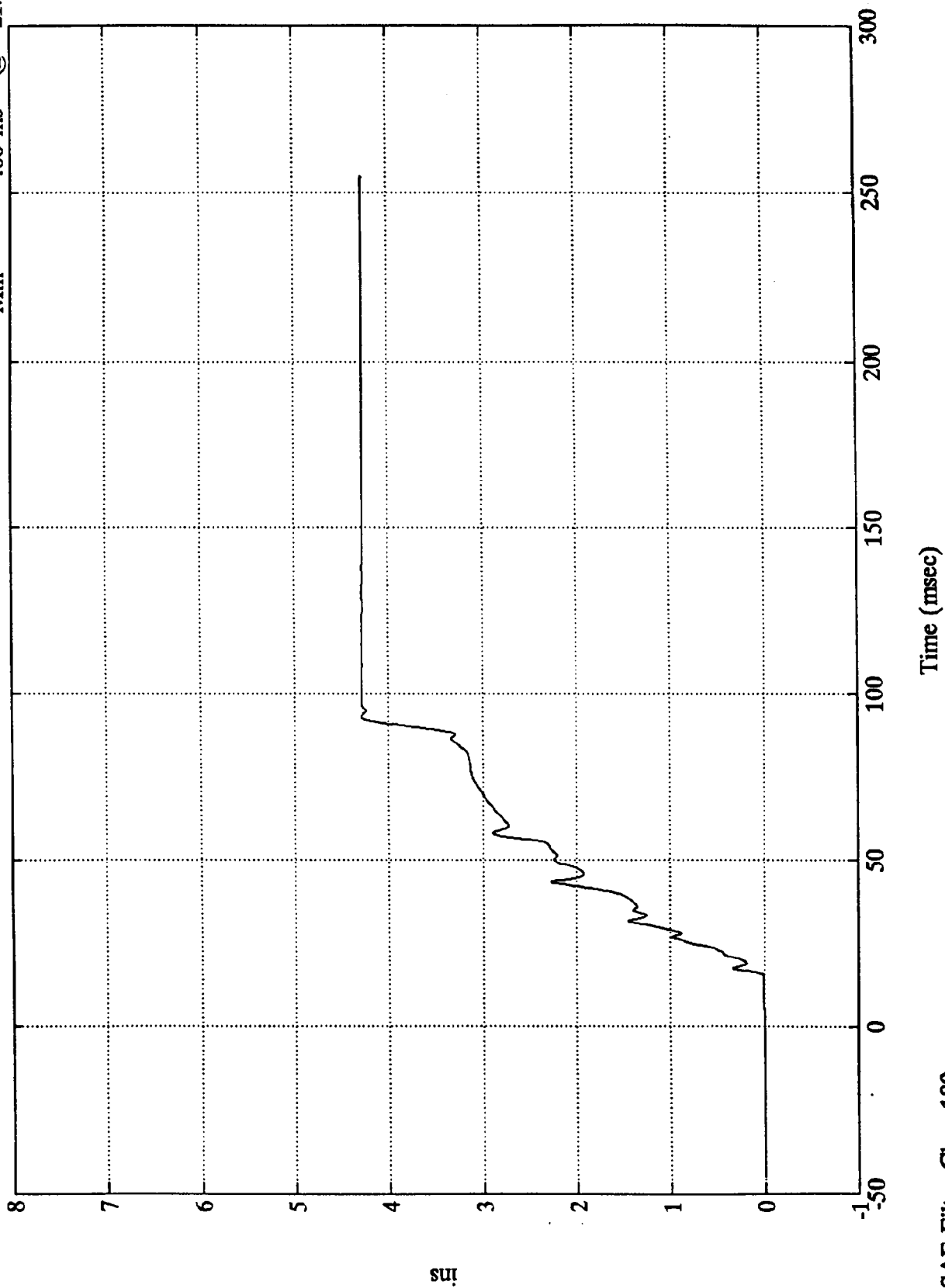
Max = .22 ins @ 150.47 msec  
Min = -.09 ins @ 74.76 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Belt Spool Out

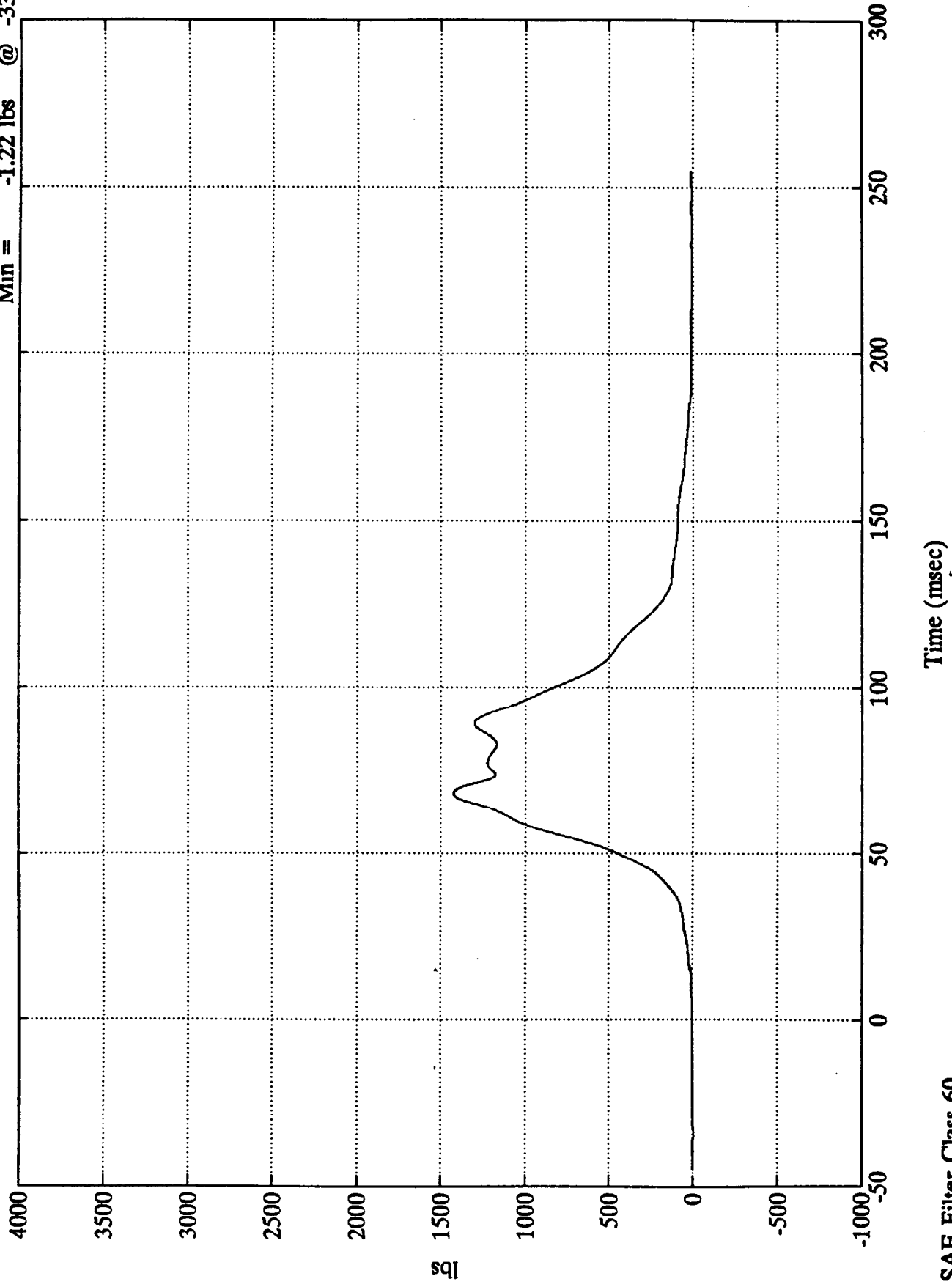
Max = 4.28 ins @ 93.00 msec  
Min = -.00 ins @ -21.24 msec



NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Right Belt Load

Max = 1422.77 lbs @ 68.04 msec  
Min = -1.22 lbs @ -33.84 msec

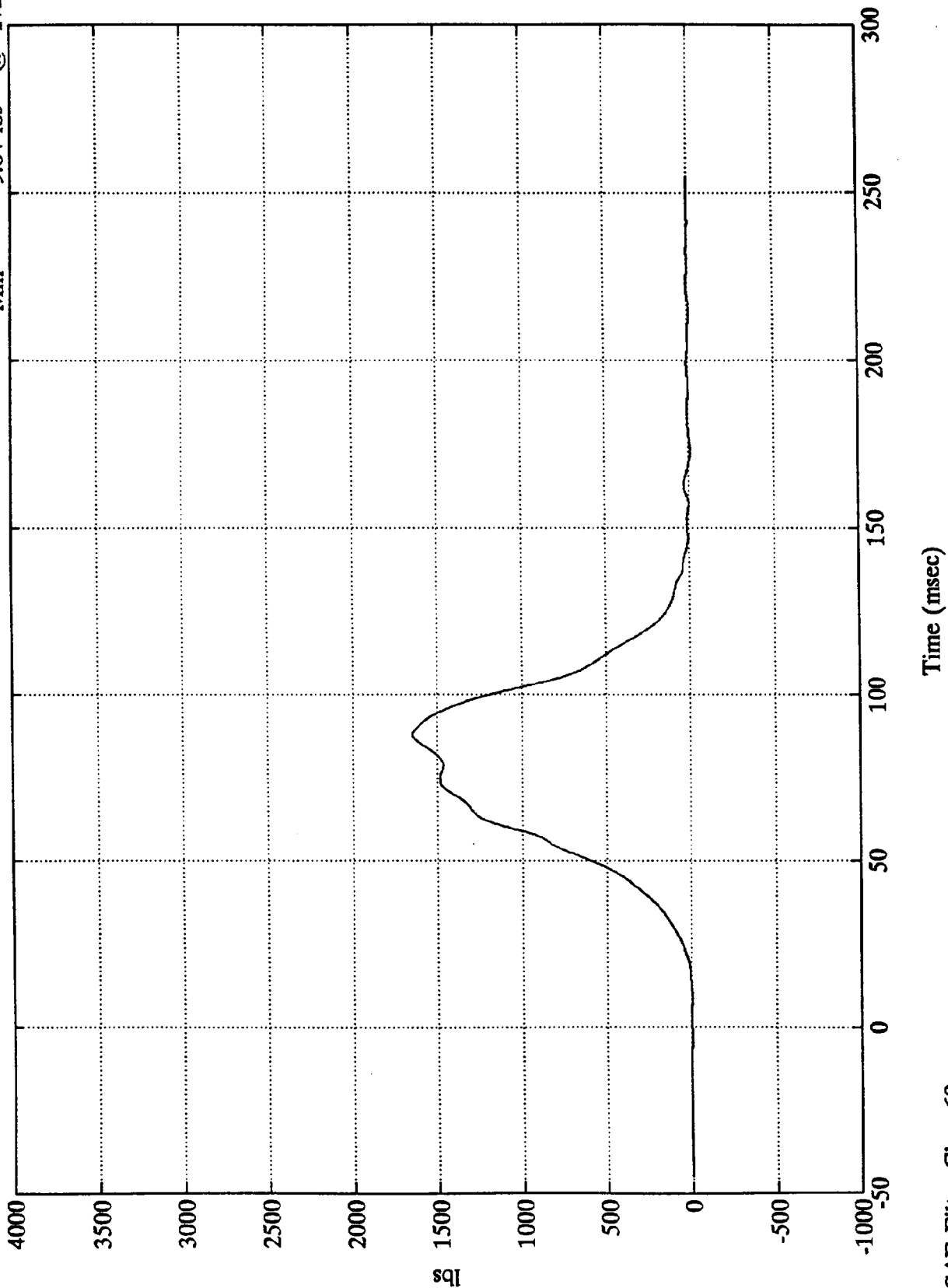


SAE Filter Class 60

NCAP TEST #10 1991 CHRYSLER NEW YORKER

Pos. 2 Torso Belt Load

Max = 1645.22 lbs @ 87.83 msec  
Min = -9.64 lbs @ 172.44 msec



**Appendix C**

**PART 572-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 Corporation, Advanced Technology Center. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

| <u>Serial No.</u> | <u>Completion Date</u> |
|-------------------|------------------------|
| 45                | 3-20-91                |
| 245               | 11-27-91               |

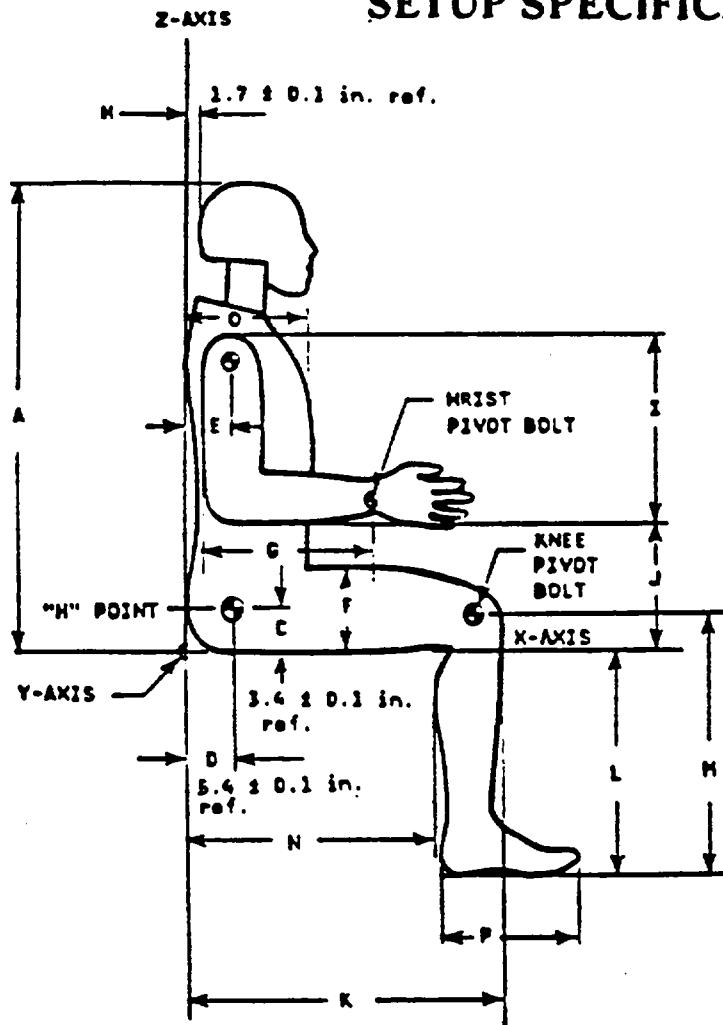
#### Electronic Test Equipment

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

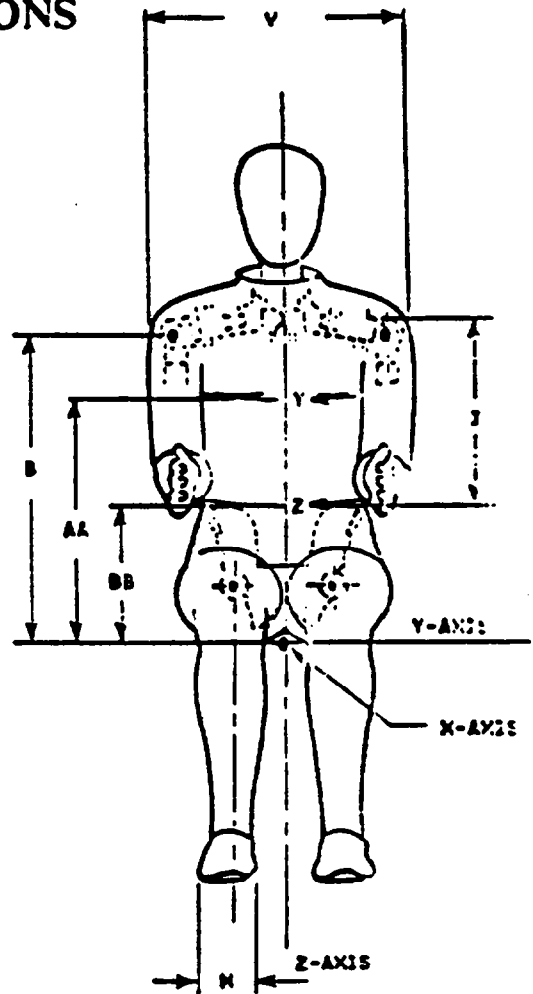
Figure 10

DUMMY CONFIGURATION DIMENSIONS

**EXTERNAL DIMENSIONS  
SETUP SPECIFICATIONS**



**SIDE VIEW**



**FRONT VIEW**

NOTE: FIGURE IS REFERENCED TO THE ERECT SEATED POSITION. THE CURVED LUMBAR DOES NOT ALLOW THE DUMMY III TO BE POSITIONED IN A PERFECT ERECT ATTITUDE.

**HYBRID III EXTERNAL DIMENSIONS**  
**S/N 45 HUMANOID**

**DUMMY SERIAL NO. 45**

**DATE: 3-18-91**

|                                       |              |           |
|---------------------------------------|--------------|-----------|
| TEMPERATURE                           |              | 70 DEG. F |
| RELATIVE HUMIDITY                     |              | 50 %      |
| LOCATION FOR CHEST CIRCUMFERENCE (AA) | 16.9-17.1 IN | 17.1 IN   |
| LOCATION FOR WAIST CIRCUMFERENCE (BB) | 8.9-9.1 IN   | 9.0 IN    |
| CHEST CIRCUMFERENCE (Y)               | 38.2-39.4 IN | 38.8 IN   |
| WAIST CIRCUMFERENCE (Z)               | 32.1-34.1 IN | 33.3 IN   |
| CHEST DEPTH (O)                       | 8.4-9.0 IN   | 8.7 IN    |
| H-POINT HEIGHT (C)                    | 3.3-3.5 IN   | 3.4 IN    |
| H-POINT FROM SEAT BACK (D)            | 5.3-5.5 IN   | 5.4 IN    |
| SKULL CAP TO BACKLINE (H)             | 1.6-1.8 IN   | 1.6 IN    |
| TOTAL SITTING HEIGHT (A)              | 34.6-35.0 IN | 34.8 IN   |
| THIGH CLEARANCE (F)                   | 5.5-6.1 IN   | 5.7 IN    |
| BUTTOCK KNEE LENGTH (K)               | 22.8-23.8 IN | 23.4 IN   |
| BUTTOCK POPLITAL LENGTH (N)           | 17.8-18.8 IN | 17.9 IN   |
| POPLITEAL LENGTH (L)                  | 16.9-17.9 IN | 17.4 IN   |
| KNEE PIVOT HEIGHT (M)                 | 19.1-19.7 IN | 19.3 IN   |
| FOOT LENGTH (P)                       | 9.9-10.5 IN  | 10.2 IN   |
| FOOT BREADTH (W)                      | 3.6-4.2 IN   | 4.1 IN    |
| SHOULDER PIVOT FROM BACKLINE (E)      | 3.3-3.7 IN   | 3.6 IN    |
| SHOULDER BREADTH (V)                  | 16.6-17.2 IN | 16.9 IN   |
| SHOULDER PIVOT HEIGHT (B)             | 19.9-20.5 IN | 20.0 IN   |
| ELBOW REST HEIGHT (J)                 | 7.5-8.3 IN   | 7.9 IN    |
| SHOULDER-ELBOW LENGTH (I)             | 13.0-13.6 IN | 13.3 IN   |
| BACK OF ELBOW TO WRIST PIVOT (G)      | 11.4-12.0 IN | 11.9 IN   |

**DUMMY MEETS SPECIFICATIONS**

**TECHNICIAN IVAN MINKIEWICZ**

**CALSPAN CORPORATION**  
**TRANSPORTATION RESEARCH DEPARTMENT**  
**HEAD DROP TEST**  
**HYBRID III**

**DATE : 3-18-91**

**CALSPAN SEQUENTIAL NUMBER 3**

**HY3 SN 45**

**HEAD DROP CAL**

| TEST PARAMETER                  | SPECIFICATION  | TEST RESULTS |
|---------------------------------|----------------|--------------|
| TEMPERATURE                     | 68 - 78 DEG. F | 69 DEG. F    |
| RELATIVE HUMIDITY               | 10% - 70%      | 34 %         |
| PEAK RESULTANT ACCELERATION     | 225 - 275 G    | 257 G        |
| PEAK LATERAL ACCELERATION       | 15 G MAX       | 5.4 G        |
| IS ACCELERATION CURVE UNIMODAL? | YES            | YES          |

**DUMMY COMPONENT MEETS SPECIFICATIONS**

**TECHNICIAN** IVAN MINKIEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
NECK FLEXION TEST  
HYBRID III

DATE : 3-18-91

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 3

HY3 SN 45 CAL NECK FLEXION

| TEST PARAMETER                                   |       | SPECIFICATION    | TEST RESULTS   |
|--------------------------------------------------|-------|------------------|----------------|
| TEMPERATURE                                      |       | 69 - 72 DEG. F   | 70 DEG. F      |
| RELATIVE HUMIDITY                                |       | 10% - 70%        | 35 %           |
| IMPACT VELOCITY                                  |       | 22.6 - 23.4 FPS  | 22.7 FPS       |
| PENDULUM<br>DECELERATION                         | 10 MS | 22.50 - 27.50 G  | 23.34 G        |
|                                                  | 20 MS | 17.60 - 22.60 G  | 21.16 G        |
|                                                  | 30 MS | 12.50 - 18.50 G  | 17.49 G        |
| MAX PENDULUM G ABOVE 30 MS                       |       | 29 G MAX         | 17.49 G        |
| DECELERATION-TIME CURVE<br>DECAY TIME TO 5 G     |       | 34 - 42 MS       | 41.13 MS       |
| D PLANE<br>ROTATION                              | MAX   | 64 - 78 DEG.     | 77.41 DEG.     |
|                                                  | TIME  | 57 - 64 MS       | 60.50 MS       |
| MOMENT ABOUT<br>OCCIPITAL<br>CONDYLE             | MAX   | 65 - 80 FT.-LBS. | 79.72 FT.-LBS. |
|                                                  | TIME  | 47 - 58 MS       | 55.88 MS       |
| ROTATION ANGLE-TIME CURVE<br>DECAY TIME TO ZERO  |       | 113 - 128 MS     | 118.0 MS       |
| POSITIVE MOMENT-TIME CURVE<br>DECAY TIME TO ZERO |       | 97 - 107 MS      | 103.63 MS      |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
NECK EXTENSION TEST  
HYBRID III

DATE : 3-18-91

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 3

HY3 SN 45 CAL NECK EXTENSION

| TEST PARAMETER                                   |       | SPECIFICATION        | TEST RESULTS    |
|--------------------------------------------------|-------|----------------------|-----------------|
| TEMPERATURE                                      |       | 69 - 72 DEG. F       | 70 DEG. F       |
| RELATIVE HUMIDITY                                |       | 10% - 70%            | 35 %            |
| IMPACT VELOCITY                                  |       | 19.50 - 20.30 FPS    | 19.6 FPS        |
| PENDULUM<br>DECELERATION                         | 10 MS | 17.20 - 21.20 G      | 17.48 G         |
|                                                  | 20 MS | 14.00 - 19.00 G      | 16.98 G         |
|                                                  | 30 MS | 11.00 - 16.00 G      | 15.67 G         |
| MAX PENDULUM G ABOVE 30 MS                       |       | 22 G MAX             | 15.67 G         |
| DECELERATION-TIME CURVE<br>DECAY TIME TO 5 G     |       | 38 - 46 MS           | 45.88 MS        |
| D PLANE<br>ROTATION                              | MAX   | 81 - 106 DEG.        | 97.7 DEG.       |
|                                                  | TIME  | 72 - 82 MS           | 77.63 MS        |
| MOMENT ABOUT<br>OCCIPITAL<br>CONDYLE             | MAX   | -59.0/-39.0 FT.-LBS. | -57.91 FT.-LBS. |
|                                                  | TIME  | 65 - 79 MS           | 73.63 MS        |
| ROTATION ANGLE-TIME CURVE<br>DECAY TIME TO ZERO  |       | 147 - 174 MS         | 154.75 MS       |
| POSITIVE MOMENT-TIME CURVE<br>DECAY TIME TO ZERO |       | 120 - 148 MS         | 136.63 MS       |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
THORAX IMPACT TEST  
HYBRID III

DATE : 3-19-91

CALSPAN SEQUENTIAL NUMBER 3

HY3 SN 45

H.S. THORAX

CAL

| TEST PARAMETER          | HIGH SPEED TEST    | TEST RESULTS |
|-------------------------|--------------------|--------------|
|                         | SPECIFICATION      |              |
| TEMPERATURE             | 69 - 72 DEG. F     | 70 DEG. F    |
| RELATIVE HUMIDITY       | 10% - 70%          | 33 %         |
| PENDULUM VELOCITY       | 21.6 - 22.4 FT/SEC | 21.6 FT/SEC  |
| MAXIMUM DEFLECTION      | 2.50 - 2.86 INCHES | 2.69 INCHES  |
| MAXIMUM RESISTIVE FORCE | 1080 - 1245 POUNDS | 1238 POUNDS  |
| INTERNAL HYSTERESIS     | 69% - 85%          | 71.5 %       |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN \_\_\_\_IVAN MINKEWICZ\_\_\_\_

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
KNEE IMPACT TEST  
HYBRID III

DATE : 3-20-91

KNEE : LEFT

CALSPAN SEQUENTIAL NUMBER 3

HY3 SN 45 KNEE 11LB. CAL

| TEST PARAMETER         | SPECIFICATION    | TEST RESULTS |
|------------------------|------------------|--------------|
| TEMPERATURE            | 68 - 78 DEG. F   | 69 DEG. F    |
| RELATIVE HUMIDITY      | 10% - 70%        | 33 %         |
| PROBE VELOCITY         | 6.8 - 7.0 FT/SEC | 7.0 FT/SEC   |
| PEAK KNEE IMPACT FORCE | 996 - 1566 LBS.  | 1061 LBS.    |
| PROBE WEIGHT           | 11 LBS.          |              |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN \_\_\_\_\_ IVAN MINKEWICZ \_\_\_\_\_

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
KNEE IMPACT TEST  
HYBRID III

DATE : 3-20-91

KNEE : RIGHT

CALSPAN SEQUENTIAL NUMBER 3

HY3 SN 45 KNEE 11LB. CAL

| TEST PARAMETER         | SPECIFICATION    | TEST RESULTS |
|------------------------|------------------|--------------|
| TEMPERATURE            | 68 - 78 DEG. F   | 69 DEG. F    |
| RELATIVE HUMIDITY      | 10% - 70%        | 33 %         |
| PROBE VELOCITY         | 6.8 - 7.0 FT/SEC | 7.0 FT/SEC   |
| PEAK KNEE IMPACT FORCE | 996 - 1566 LBS.  | 1075 LBS.    |
| PROBE WEIGHT           | 11 LBS.          |              |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN \_\_\_\_\_IVAN MINKEWICZ\_\_\_\_\_

# **INSTRUMENT CALIBRATION INFORMATION**

NHTSA DUMMY ID NUMBER 45

| DUMMY INSTRUMENT--                           | MFG                 | SERIAL<br>NUMBER | DATE LAST<br>CALIBRATED | DATE OF NEXT<br>CALIBRATION |
|----------------------------------------------|---------------------|------------------|-------------------------|-----------------------------|
| 1. HEAD ACCELEROMETER--                      |                     |                  |                         |                             |
| HX LONGITUDINAL--                            | ENDEVCO             | CS75             | 10-90                   | 4-91                        |
| HY LATERAL--                                 | ENDEVCO             | CY89             | 9-90                    | 3-91                        |
| HZ VERTICAL--                                | ENDEVCO             | CE76             | 10-90                   | 4-91                        |
| 2. CHEST ACCELEROMETER--                     |                     |                  |                         |                             |
| CX LONGITUDINAL--                            | CEC                 | A147             | 10-90                   | 4-91                        |
| CY LATERAL--                                 | ENDEVCO             | CJ54             | 10-90                   | 4-91                        |
| CZ VERTICAL--                                | CEC                 | A148             | 10-90                   | 4-91                        |
| 3. FEMUR LOAD CELLS                          |                     |                  |                         |                             |
| LEFT SIDE                                    | GSE                 | 311              | 9-90                    | 3-91                        |
| RIGHT SIDE                                   | GSE                 | 312              | 9-90                    | 3-91                        |
| CALIBRATION LABORATORY<br>INSTRUMENTS--      |                     |                  |                         |                             |
| 1. PENDULUM ACC.--                           | CEC                 | A160             | 11-90                   | 5-91                        |
| 2. TEST PROBE<br>ACCELEROMETER--             | CEC                 | A161             | 11-90                   | 5-91                        |
| 3. LUMBAR FLEXION TEST<br>PUSH FORCE GAUGE-- | TRANS-<br>DUCER INC | 20051            | 1-91                    | 7-91                        |
| 4. ABDOMINAL COMPRESS.<br>TEST FORCE GAUGE-- | BLH                 | 72952            | 1-91                    | 7-91                        |
| 5. ABDOMINAL COMPRESS.<br>TEST FORCE GAUGE-- | CIC                 | 567-11           | 1-91                    | 7-91                        |

**HYBRID III EXTERNAL DIMENSIONS  
S/N 245 HUMANOID**

**DUMMY SERIAL NO. 245**

**DATE: 11-21-90**

|                                              |                     |                  |
|----------------------------------------------|---------------------|------------------|
| <b>TEMPERATURE</b>                           |                     | <b>72 DEG. F</b> |
| <b>RELATIVE HUMIDITY</b>                     |                     | <b>39 %</b>      |
| <b>LOCATION FOR CHEST CIRCUMFERENCE (AA)</b> | <b>16.9-17.1 IN</b> | <b>17.0 IN</b>   |
| <b>LOCATION FOR WAIST CIRCUMFERENCE (BB)</b> | <b>8.9-9.1 IN</b>   | <b>9.0 IN</b>    |
| <b>CHEST CIRCUMFERENCE (Y)</b>               | <b>38.2-39.4 IN</b> | <b>39.3 IN</b>   |
| <b>WAIST CIRCUMFERENCE (Z)</b>               | <b>32.1-34.1 IN</b> | <b>33.6 IN</b>   |
| <b>CHEST DEPTH (O)</b>                       | <b>8.4-9.0 IN</b>   | <b>8.4 IN</b>    |
| <b>H-POINT HEIGHT (C)</b>                    | <b>3.3-3.5 IN</b>   | <b>3.5 IN</b>    |
| <b>H-POINT FROM SEAT BACK (D)</b>            | <b>5.3-5.5 IN</b>   | <b>5.4 IN</b>    |
| <b>SKULL CAP TO BACKLINE (H)</b>             | <b>1.6-1.8 IN</b>   | <b>1.7 IN</b>    |
| <b>TOTAL SITTING HEIGHT (A)</b>              | <b>34.6-35.0 IN</b> | <b>35.0 IN</b>   |
| <b>THIGH CLEARANCE (F)</b>                   | <b>5.5-6.1 IN</b>   | <b>6.1 IN</b>    |
| <b>BUTTOCK KNEE LENGTH (K)</b>               | <b>22.8-23.8 IN</b> | <b>23.6 IN</b>   |
| <b>BUTTOCK POPLITAL LENGTH (N)</b>           | <b>17.8-18.8 IN</b> | <b>18.5 IN</b>   |
| <b>POPLITEAL LENGTH (L)</b>                  | <b>16.9-17.9 IN</b> | <b>17.1 IN</b>   |
| <b>KNEE PIVOT HEIGHT (M)</b>                 | <b>19.1-19.7 IN</b> | <b>19.3 IN</b>   |
| <b>FOOT LENGTH (P)</b>                       | <b>9.9-10.5 IN</b>  | <b>10.2 IN</b>   |
| <b>FOOT BREADTH (W)</b>                      | <b>3.6-4.2 IN</b>   | <b>3.8 IN</b>    |
| <b>SHOULDER PIVOT FROM BACKLINE (E)</b>      | <b>3.3-3.7 IN</b>   | <b>3.7 IN</b>    |
| <b>SHOULDER BREADTH (V)</b>                  | <b>16.6-17.2 IN</b> | <b>16.8 IN</b>   |
| <b>SHOULDER PIVOT HEIGHT (B)</b>             | <b>19.9-20.5 IN</b> | <b>20.4 IN</b>   |
| <b>ELBOW REST HEIGHT (J)</b>                 | <b>7.5-8.3 IN</b>   | <b>8.2 IN</b>    |
| <b>SHOULDER-ELBOW LENGTH (I)</b>             | <b>13.0-13.6 IN</b> | <b>13.3 IN</b>   |
| <b>BACK OF ELBOW TO WRIST PIVOT (G)</b>      | <b>11.4-12.0 IN</b> | <b>11.5 IN</b>   |

**DUMMY MEETS SPECIFICATIONS**

**TECHNICIAN IVAN MINKIEWICZ**

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
HEAD DROP TEST  
HYBRID III

DATE : 11-27-90

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245 HEAD DROP CAL

| TEST PARAMETER                     | SPECIFICATION  | TEST RESULTS |
|------------------------------------|----------------|--------------|
| TEMPERATURE                        | 68 - 78 DEG. F | 69 DEG. F    |
| RELATIVE HUMIDITY                  | 10% - 70%      | 43 %         |
| PEAK RESULTANT ACCELERATION        | 225 - 275 G    | 261 G        |
| PEAK LATERAL ACCELERATION          | 15 G MAX       | 5.9 G        |
| IS ACCELERATION CURVE<br>UNIMODAL? | YES            | YES          |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
NECK FLEXION TEST  
HYBRID III

DATE : 11-27-90

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245 CAL NECK FLEXION

| TEST PARAMETER                                   |       | SPECIFICATION    | TEST RESULTS   |
|--------------------------------------------------|-------|------------------|----------------|
| TEMPERATURE                                      |       | 69 - 72 DEG. F   | 69 DEG. F      |
| RELATIVE HUMIDITY                                |       | 10% - 70%        | 46 %           |
| IMPACT VELOCITY                                  |       | 22.6 - 23.4 FPS  | 22.7 FPS       |
| PENDULUM<br>DECELERATION                         | 10 MS | 22.50 - 27.50 G  | 23.01 G        |
|                                                  | 20 MS | 17.60 - 22.60 G  | 20.96 G        |
|                                                  | 30 MS | 12.50 - 18.50 G  | 17.80 G        |
| MAX PENDULUM G ABOVE 30 MS                       |       | 29 G MAX         | 17.80 G        |
| DECELERATION-TIME CURVE<br>DECAY TIME TO 5 G     |       | 34 - 42 MS       | 41.13 MS       |
| D PLANE                                          | MAX   | 64 - 78 DEG.     | 72.2 DEG.      |
| ROTATION                                         | TIME  | 57 - 64 MS       | 58.88 MS       |
| MOMENT ABOUT<br>OCCIPITAL<br>CONDYLE             | MAX   | 65 - 80 FT.-LBS. | 74.01 FT.-LBS. |
|                                                  | TIME  | 47 - 58 MS       | 54.63 MS       |
| ROTATION ANGLE-TIME CURVE<br>DECAY TIME TO ZERO  |       | 113 - 128 MS     | 114 MS         |
| POSITIVE MOMENT-TIME CURVE<br>DECAY TIME TO ZERO |       | 97 - 107 MS      | 101.63 MS      |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
NECK EXTENSION TEST  
HYBRID III

DATE : 11-27-90

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245 CAL NECK EXTENSION

| TEST PARAMETER                                   |       | SPECIFICATION        | TEST RESULTS    |
|--------------------------------------------------|-------|----------------------|-----------------|
| TEMPERATURE                                      |       | 69 - 72 DEG. F       | 71 DEG. F       |
| RELATIVE HUMIDITY                                |       | 10% - 70%            | 50 %            |
| IMPACT VELOCITY                                  |       | 19.50 - 20.30 FPS    | 20.0 FPS        |
| PENDULUM<br>DECELERATION                         | 10 MS | 17.20 - 21.20 G      | 17.62 G         |
|                                                  | 20 MS | 14.00 - 19.00 G      | 16.35 G         |
|                                                  | 30 MS | 11.00 - 16.00 G      | 14.29 G         |
| MAX PENDULUM G ABOVE 30 MS                       |       | 22 G MAX             | 14.29 G         |
| DECELERATION-TIME CURVE<br>DECAY TIME TO 5 G     |       | 38 - 46 MS           | 45.5 MS         |
| D PLANE<br>ROTATION                              | MAX   | 81 - 106 DEG.        | 101.24 DEG.     |
|                                                  | TIME  | 72 - 82 MS           | 74.25 MS        |
| MOMENT ABOUT<br>OCCIPITAL<br>CONDYLE             | MAX   | -59.0/-39.0 FT.-LBS. | -55.29 FT.-LBS. |
|                                                  | TIME  | 65 - 79 MS           | 69.13 MS        |
| ROTATION ANGLE-TIME CURVE<br>DECAY TIME TO ZERO  |       | 147 - 174 MS         | 148.5 MS        |
| POSITIVE MOMENT-TIME CURVE<br>DECAY TIME TO ZERO |       | 120 - 148 MS         | 128.75 MS       |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
THORAX IMPACT TEST  
HYBRID III

DATE : 11-26-90

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245

H.S. THORAX

CAL

| TEST PARAMETER          | HIGH SPEED TEST    | TEST RESULTS |
|-------------------------|--------------------|--------------|
|                         | SPECIFICATION      |              |
| TEMPERATURE             | 69 - 72 DEG. F     | 69 DEG. F    |
| RELATIVE HUMIDITY       | 10% - 70%          | 32 %         |
| PENDULUM VELOCITY       | 21.6 - 22.4 FT/SEC | 21.7 FT/SEC  |
| MAXIMUM DEFLECTION      | 2.50 - 2.86 INCHES | 2.53 INCHES  |
| MAXIMUM RESISTIVE FORCE | 1080 - 1245 POUNDS | 1228 POUNDS  |
| INTERNAL HYSTERESIS     | 69% - 85%          | 74.2 %       |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
KNEE IMPACT TEST  
HYBRID III

DATE : 11-21-90

KNEE : LEFT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245 KNEE 11LB. CAL

| TEST PARAMETER         | SPECIFICATION    | TEST RESULTS |
|------------------------|------------------|--------------|
| TEMPERATURE            | 68 - 78 DEG. F   | 70 DEG. F    |
| RELATIVE HUMIDITY      | 10% - 70%        | 34 %         |
| PROBE VELOCITY         | 6.8 - 7.0 FT/SEC | 7.0 FT/SEC   |
| PEAK KNEE IMPACT FORCE | 996 - 1566 LBS.  | 1140 LBS.    |
| PROBE WEIGHT           | 11 LBS.          |              |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN \_\_\_\_\_ IVAN MINKEWICZ \_\_\_\_\_

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
KNEE IMPACT TEST  
HYBRID III

DATE : 11-21-90

KNEE : RIGHT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245 KNEE 11LB. CAL

| TEST PARAMETER         | SPECIFICATION    | TEST RESULTS |
|------------------------|------------------|--------------|
| TEMPERATURE            | 68 - 78 DEG. F   | 70 DEG. F    |
| RELATIVE HUMIDITY      | 10% - 70%        | 33 %         |
| PROBE VELOCITY         | 6.8 - 7.0 FT/SEC | 7.0 FT/SEC   |
| PEAK KNEE IMPACT FORCE | 996 - 1566 LBS.  | 1140 LBS.    |
| PROBE WEIGHT           | 11 LBS.          |              |

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN \_\_\_\_\_IVAN MINKEWICZ\_\_\_\_\_

# **INSTRUMENT CALIBRATION INFORMATION**

**NHTSA DUMMY ID NUMBER**    245

| <b>DUMMY INSTRUMENT--</b>                       | <b>MFG</b>          | <b>SERIAL<br/>NUMBER</b> | <b>DATE LAST<br/>CALIBRATED</b> | <b>DATE OF NEXT<br/>CALIBRATION</b> |
|-------------------------------------------------|---------------------|--------------------------|---------------------------------|-------------------------------------|
| <b>1. HEAD ACCELEROMETER--</b>                  |                     |                          |                                 |                                     |
| HX LONGITUDINAL--                               | ENDEVCO             | ER72                     | 10-90                           | 4-91                                |
| HY LATERAL--                                    | ENDEVCO             | GD54                     | 10-90                           | 4-91                                |
| HZ VERTICAL--                                   | ENDEVCO             | CK11                     | 10-90                           | 4-91                                |
| <b>2. CHEST ACCELEROMETER--</b>                 |                     |                          |                                 |                                     |
| CX LONGITUDINAL--                               | CEC                 | A145                     | 10-90                           | 4-91                                |
| CY LATERAL--                                    | ENDEVCO             | FL04                     | 10-90                           | 4-91                                |
| CZ VERTICAL--                                   | CEC                 | A149                     | 10-90                           | 4-91                                |
| <b>3. FEMUR LOAD CELLS</b>                      |                     |                          |                                 |                                     |
| LEFT SIDE                                       | GSE                 | 548                      | 9-90                            | 3-91                                |
| RIGHT SIDE                                      | GSE                 | 549                      | 9-90                            | 3-91                                |
| <b>CALIBRATION LABORATORY<br/>INSTRUMENTS--</b> |                     |                          |                                 |                                     |
| 1. PENDULUM ACC.--                              | CEC                 | A160                     | 11-90                           | 5-91                                |
| 2. TEST PROBE<br>ACCELEROMETER--                | CEC                 | A161                     | 11-90                           | 5-91                                |
| 3. LUMBAR FLEXION TEST<br>PUSH FORCE GAUGE--    | TRANS-<br>DUCER INC | 20051                    | 1-91                            | 7-91                                |
| 4. ABDOMINAL COMPRESS.<br>TEST FORCE GAUGE--    | BLH                 | 72952                    | 1-91                            | 7-91                                |
| 5. ABDOMINAL COMPRESS.<br>TEST FORCE GAUGE--    | CIC                 | 567-11                   | 1-91                            | 7-91                                |

## Appendix D

### DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY  
(6 Month Calibration Minimum)

| DRIVER DUMMY                                  | Serial # | Manufacturer   | Calibration |      |
|-----------------------------------------------|----------|----------------|-------------|------|
|                                               |          |                | Last        | Next |
| Head                                          |          |                |             |      |
| X                                             | GS75     | ENDEVCO        | 10-90       | 4-91 |
| Y                                             | CY89     | ENDEVCO        | 9-90        | 3-91 |
| Z                                             | CE76     | ENDEVCO        | 10-90       | 4-91 |
| Chest                                         |          |                |             |      |
| X                                             | A147     | CEC            | 10-90       | 4-91 |
| Y                                             | CJ54     | ENDEVCO        | 10-90       | 4-91 |
| Z                                             | A148     | CEC            | 10-90       | 4-91 |
| Right Femur Load Cell                         | 312      | GSE            | 9-90        | 3-91 |
| Left Femur Load Cell                          | 311      | GSE            | 9-90        | 3-91 |
| Neck Load Cell                                |          |                |             |      |
| X                                             | 269      | DENTON         | 10-90       | 4-91 |
| Y                                             | 269      | DENTON         | 10-90       | 4-91 |
| Z                                             | 269      | DENTON         | 10-90       | 4-91 |
| Neck Moment                                   |          |                |             |      |
| X                                             | 269      | DENTON         | 10-90       | 4-91 |
| Y                                             | 269      | DENTON         | 10-90       | 4-91 |
| Z                                             | 269      | DENTON         | 10-90       | 4-91 |
| Chest Deflection Gauge<br>Hybrid III Use Only | 84892-15 | HUMANOID       | 10-90       | 4-91 |
| Lap Belt Load Cells                           | 123      | LEBOW          | 9-90        | 3-91 |
| Shoulder Belt Load Cells                      | 127      | LEBOW          | 9-90        | 3-91 |
| Spool-Out Potentiometer                       | 52       | SERVONIC INST. | 10-90       | 4-91 |
| Belt Stretch Transducer                       | E1       | CALSPAN        | 10-90       | 4-91 |

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY  
(6 Month Calibration Minimum)

| PASSENGER DUMMY                               | Serial # | Manufacturer   | Calibration |      |
|-----------------------------------------------|----------|----------------|-------------|------|
|                                               |          |                | Last        | Next |
| Head X<br>Y<br>Z                              | ER72     | ENDEVCO        | 10-90       | 4-91 |
|                                               | GD54     | ENDEVCO        | 10-90       | 4-91 |
|                                               | CK11     | ENDEVCO        | 10-90       | 4-91 |
| Chest X<br>Y<br>Z                             | A145     | CEC            | 10-90       | 4-91 |
|                                               | FL04     | ENDEVCO        | 10-90       | 4-91 |
|                                               | A149     | CEC            | 10-90       | 4-91 |
| Right Femur Load Cell                         | 549      | GSE            | 9-90        | 3-91 |
| Left Femur Load Cell                          | 548      | GSE            | 9-90        | 3-91 |
| Neck Load Cell X<br>Y<br>Z                    | 076      | DENTON         | 10-90       | 4-91 |
|                                               | 076      | DENTON         | 10-90       | 4-91 |
|                                               | 076      | DENTON         | 10-90       | 4-91 |
| Neck Moment X<br>Y<br>Z                       | 076      | DENTON         | 10-90       | 4-91 |
|                                               | 076      | DENTON         | 10-90       | 4-91 |
|                                               | 076      | DENTON         | 10-90       | 4-91 |
| Chest Deflection Gauge<br>Hybrid III Use Only | 150      | HUMANOID       | 10-90       | 4-91 |
|                                               |          |                |             |      |
| Lap Belt Load Cells                           | 133      | LEBOW          | 9-90        | 3-91 |
| Shoulder Belt Load Cells                      | 135      | LEBOW          | 9-90        | 3-91 |
| Spool-Out Potentiometer                       | 42       | SERVONIC INST. | 10-90       | 4-91 |
| Belt Stretch Transducer                       | E3       | CALSPAN        | 10-90       | 4-91 |

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS  
(6 Month Calibration Minimum)

|                             | Serial # | Manufacturer | Calibration |      |
|-----------------------------|----------|--------------|-------------|------|
|                             |          |              | Last        | Next |
| Left Seat Rear Crossmember  | A155     | CEC          | 9-90        | 3-91 |
| Right Rear Seat Crossmember | A156     | CEC          | 9-90        | 3-91 |
| Top of Engine               | A115     | CEC          | 9-90        | 3-91 |
| Bottom of Engine            | A83      | CEC          | 9-90        | 3-91 |
| Left Disc Brake Caliper     | A29      | CEC          | 1-91        | 7-91 |
| Right Disc Brake Caliper    | A164     | CEC          | 9-90        | 3-91 |
| Instrument Panel            | A179     | CEC          | 12-90       | 6-91 |
| Center Rear Crossmember Z   | A177     | CEC          | 12-91       | 6-91 |
| Vehicle Rear Z              | A170     | CEC          | 12-90       | 6-91 |

**INSTRUMENT CALIBRATION FOR LABORATORY INSTRUMENTS**  
(6 Month Calibration Minimum)

|                                      | Serial # | Manufacturer    | Calibration |      |
|--------------------------------------|----------|-----------------|-------------|------|
|                                      |          |                 | Last        | Next |
| Neck Bending<br>Pendulum Accel.      | A160     | CEC             | 11-90       | 5-91 |
| Neck Bending<br>Rotary Potentiometer | None     | BOURNS          | 1-91        | 7-91 |
| Femur Probe<br>Accelerometer         | A161     | CEC             | 11-90       | 5-91 |
| Chest/Thorax<br>Probe Accel.         | A161     | CEC             | 11-90       | 5-91 |
| Lumbar Flexion Force<br>Gauge        | 20051    | TRANSDUCER INC. | 1-91        | 7-91 |

Appendix E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

### Remote Trunk Lid Release

The trunk lid can be opened from inside the vehicle by pressing the switch located in the glove compartment.

When the ignition key must be left with the vehicle, such as for service or parking lot attendants, be sure that the glove box is locked to prevent unauthorized access into the trunk compartment.

### Power Trunk Lid Pulldown (if so equipped)

This feature reduces the effort required to close the trunk lid, eliminating the need to "slam" the trunk lid to close it securely.

To operate the system, close the trunk lid until the latch engages. The system then automatically closes the trunk lid to a secure position.

**WARNING!** To prevent possible injury, keep your hands and fingers away from the trunk edges during closing. Do not attempt to remove objects from the sealing edges or to stop the system once the initial latching cycle starts. When the Power Pulldown has stopped, the trunk may be unlatched in the normal manner.

### Cup Holder

Front cupholders are located in the front seat arm rest. Pull forward on the latch on the front of the arm rest to release the cup holder. Pull the cup holder forward until it latches. To return, push rearward until the cup holder latches.

### OCCUPANT RESTRAINTS

#### Seat Belts

Always use the seat belts. The chance of a serious injury is greatly reduced when the belts are properly used.

Seat belts provide protection against being thrown from

the vehicle as well as reducing the risk of an injury caused by striking the interior of the vehicle.

### Unibelts

The "UNIBELT", or single continuous-belt restraint system, incorporates an inertia sensitive belt webbing retractor which is designed to lock (i.e., prevent belt travel) only during very sudden stops or impacts. This feature allows the shoulder belt to move freely with the wearer under normal conditions. *The retractor will also lock if the belt webbing is jerked or pulled rapidly.*

### UNIBELT OPERATING INSTRUCTIONS

1. Enter the vehicle and close the door. Sit back and erect and adjust the seat. Note the latch plate of the unbelt in its stowed position.



2. Grasp the latch plate and slide it up the webbing as far as necessary to go around your lap as you pull out the webbing.



3. As you pull the webbing across your lap and over your shoulder, move the latch plate toward the buckle.

- Insert the latch plate into the buckle until a "click" is heard.



Do not wear the shoulder belt under your arm or otherwise out of position. Such use could increase the chance and/or severity of injury in a collision.

**4. Position the lap belt with the upper edge of the belt drawn across the thighs and snug against the hips. Slack will automatically be removed due to tension created by the retractor. If a snug fit in the lap belt portion is desired, pull up on the shoulder belt as shown. A snug belt reduces the risk of sliding under the belt in a collision.**



4

**5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. Any slack in the belt will be withdrawn automatically by the retractor.**



5

**6. To release the belt, push the red button marked "Press" on the buckle. The belt will automatically retract to its stowed position.**



6

**If needed, slide the latch plate down the webbing to allow the belt to fully retract.**

#### **DRIVER SUPPLEMENTAL RESTRAINT SYSTEM - AIRBAG (If so equipped)**

This vehicle is equipped with a supplemental airbag restraint system for the driver. The seat belt continues to be the primary restraint and should be worn whenever the vehicle is in motion. It is important to wear the seat belt because it helps to provide protection in collisions for which the airbag is not designed to deploy, either because of low impact speed or non-frontal direction of impact (such as lateral, rollover or rear impacts). The seat belt also helps to position the driver for higher-speed frontal collisions in which the airbag does deploy.

The steering wheel mounted airbag, lower instrument panel knee bolster and seat belt work together as a system to provide protection for the driver.

Service and general information labels about the airbag system can be found on the driver's sun visor, glove box door and in the engine compartment. Instructions on how to properly dispose of deployed airbags or airbag equipped vehicles can be obtained from your Chrysler Motors dealer.

The supplemental restraint system consists of the following items:

- impact sensors
- system diagnostic unit
- "AIRBAG" readiness lamp
- airbag module/inflator unit
- unique steering column and wheel
- interconnecting wiring
- instrument panel knee bolster

When the impact sensors located in the front of the car and in the passenger compartment detect a front end collision warranting airbag deployment, their internal switches complete an electrical circuit that actuates the inflator unit in the airbag module. This starts the process of generating a large quantity of non-toxic nitrogen gas which inflates the airbag. As the airbag inflates from its folded, stored position behind the steering wheel hub trim cover, the trim cover separates along seams and folds back out of the way to allow the airbag to inflate to its full size. The airbag fully inflates in about 50 milliseconds, about half the time it takes to blink your eye. It then begins to deflate by venting the non-toxic nitrogen gas through holes in the rear of the airbag so it will not

interfere with controlling the car, and within a short amount of time, the airbag is almost entirely deflated.

#### **Should A Deployment Occur**

The airbag system is designed to deploy when the impact sensors detect a moderate to severe frontal collision, and then immediately deflate.

**NOTE:** *A frontal collision that does not warrant airbag protection will not activate the system. This does not indicate something is wrong with the airbag system.*

Should you experience a frontal collision which deploys the airbag, any or all of the following events may occur.

The nylon airbag material may under certain conditions cause abrasions and/or skin reddening to the driver as the airbag deploys and unfolds itself from its stored position. The abrasions are similar in nature to friction type rope burns or those experienced by sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals, are not permanent and normally heal quickly. However, if significant healing has not occurred within a few days, or in the unlikely event that blistering occurs, seek the immediate advice of a personal physician.

As the airbag deflates from its fully inflated condition, some degree of smoke-like particles may be observed. The particles are a normal by-product of the process which generates the non-toxic nitrogen gas used for airbag inflation. These airborne particles may cause irritation of the skin, eyes, nose, or throat. Should skin or eye irritation occur, rinse the area with cool water. For nose or throat irritation, move to fresh air. If irritation continues, seek the advice of a personal physician.

Within a few seconds, the particles will begin to settle out and dissipate. As they do, the residue will

settle on the interior surfaces of the vehicle. Avoid prolonged contact with this residue as it could irritate the skin and/or eyes. Should any irritation occur, rinse the skin or eyes with cool water. If the irritation continues, seek the advice of a personal physician. Should the residue come in contact with clothing, follow the garment manufacturer's instructions for cleaning.

If the vehicle is safely driveable following the airbag deployment, the deployed airbag can be tucked back inside the opening in the steering wheel hub trim cover to make driving the vehicle somewhat easier. The airbag once deployed, will not re-deploy to provide occupant protection in a subsequent collision, and should be replaced by an authorized dealer as soon as possible.

#### **Readiness Indicator**

The diagnostic unit monitors the electrical portions of the airbag system components listed above, continuously whenever the ignition switch is in the "start" or "run" position. When the ignition switch is first turned on, the diagnostic unit will light the "AIRBAG" lamp in the instrument cluster for a period of 6 to 8 seconds and then turn the lamp off. This indicates the airbag system is ready to deploy for your protection in the event of an impact.

**NOTE:** *Should the "AIRBAG" lamp not come on at all, remain lit or light either momentarily or continuously while driving, a malfunction in one or more of the monitored components may have occurred and prompt service is required.*

#### **Important Maintenance**

To assure that the airbag will be ready to deploy in a collision, have the system serviced promptly by an authorized dealer if any of the following indications of a possible system malfunction occurs:

- the "AIRBAG" lamp does not light for 6 to 8 seconds when the ignition switch is first turned on;
- the "AIRBAG" lamp remains lit after the ignition switch is first turned on;
- the "AIRBAG" lamp flickers during the 6 to 8 second period when the ignition switch is first turned on;
- the "AIRBAG" lamp flickers or lights and remains lit while operating the vehicle.

**WARNING!** Failure to have the airbag system properly serviced by an authorized dealer should one of the above conditions exist may lead to possible injury in the event of an accident.

Aside from the maintenance required in response to the above "AIRBAG" lamp conditions, an inspection of the mechanical and electrical components of the system is included in the regular maintenance service recommended for every 3 years or 30,000 miles. (See SECTION 4 - MAINTENANCE.)

### System Precautions

**WARNING!** Modification to the airbag system components or wiring, including the addition of any kind of badges or stickers to the steering wheel hub trim cover or modifications to the front bumper or vehicle body structure, can adversely affect system performance and lead to possible injury.

Make sure the fuse access panel, located in the left lower portion of the knee bolster is in place before driving the vehicle, and do not mount or locate any aftermarket equipment on or behind the

knee bolster. This is important to provide proper knee impact protection in the event of a collision.

Do not attempt to repair any component of the airbag system yourself. You can be injured if you are too close to the steering wheel hub and the air bag inflates. Be sure to tell anyone who works on your vehicle that it is equipped with an airbag.

### Front Center and Rear Center Lap Belts

The lap belts should be worn with the upper edge of the belt drawn across the thighs and snug against the hips. To reduce the risk of sliding under the belt in a collision, it should be adjusted as tight as comfort will allow, while sitting back and erect in the seat.

The center front and center rear seat belts are lengthened by tilting the latch plate relative to the webbing and pulling. To shorten the belt, pull the loose end of the webbing.

*Never use the same lap belt on more than one person at a time.*

### Use of Seat Belts During Pregnancy

Chrysler Motors recommends that pregnant women use the available seat belts. This will reduce the likelihood of injury to both the woman and the unborn child. The lap belt should be worn across the thighs and as snug against the hips as possible, *but not across the waist.*

### Seat Belt Extender

If the seat belt is too short, even when fully extended, a seat belt extender can be obtained from your dealer. This extender should only be used if the existing belt is not long enough. When not required, it must be removed