

V2341

REPORT NUMBER: CAL-96-N01

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

**GENERAL MOTORS CORPORATION
1996 PONTIAC GRAND AM
4-DOOR SEDAN**

NHTSA NUMBER: MT0105

CALSPAN TEST NUMBER: 8313-1

November 17, 1995

**CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225**



FINAL REPORT

PREPARED FOR:

**U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Market Incentives
400 Seventh Street, S. W.
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Prepared: Michael J. Kilgallon
Michael J. Kilgallon, Project Engineer

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

FINAL REPORT ACCEPTED BY:

[Signature]
Manager, New Car Assessment Program (NCAP)

Date of Report Acceptance

Ha S. Chan
Contracting Officer's Tech. Rep. (COTR)

Date of Report Acceptance

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16. <i>Abstract</i> A frontal load cell barrier test of a 1996 Pontiac Grand Am 4-Door Sedan was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York, on November 17, 1995. The impact velocity was 57.0 kph and the temperature at the barrier face was 21°C. The maximum post-test vehicle crush was 545 mm. The test vehicle was equipped with a 3-point continuous belt system at each of the front outboard seating positions. The test vehicle was also equipped with supplemental airbags at each of the front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appear to comply with the head, chest and femur requirements.			
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Section 1

PURPOSE AND TEST PROCEDURE

This 57.0 kph frontal barrier impact test is part of the Composite FY 92 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-02121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 57.0 kph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

Section 1

PURPOSE AND TEST PROCEDURE

This 57.0 kph frontal barrier impact test is part of the Composite FY 92 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-02121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 57.0 kph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

Section 2

SUMMARY OF TEST MT0105

A load cell barrier consisting of 36 load cells was impacted by a 1996 Pontiac Grand Am 4-Door Sedan at a velocity of 57.0 kph. The test was performed at the Calspan Corporation Advanced Technology Center on November 17, 1995. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 150) and the right-front passenger ATD (Serial No. 064) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 133 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Position 2 - Pelvic Z did not record. Barrier Load Cell B2 did not record. These data traces have been removed from this report. Vehicle accelerometer #4 - Engine Bottom - did not record after 100 msec. Integrations for this channel have been removed from this report.

The driver's HIC was 535.3. The maximum chest deceleration over 3 milliseconds was 48.4 g's and maximum chest deflection was -31.9 mm. Femur loads were -5589.5 newtons on the left femur and -3190.1 newtons on the right femur.

The right front passenger's HIC was 604.3. Maximum chest deceleration over 3 milliseconds was 49.1 g's and maximum chest deflection was -27.0 mm. Femur loads were -9127.0 newtons on the left femur and -5445.4 newtons on the right femur.

Table 1

GENERAL TEST AND VEHICLE DATA

Vehicle Year/Make/Model/Body Style: 1996 Pontiac Grand Am 4-Door Sedan

NHTSA Test No.: MT0105 VIN.: 1G2NE52M7TC707866

Body Color: White Date of Manufacture: 8/95

Date Received: 11/13/95

Odometer Reading: 00020

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

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

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

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

Type of Occupant Restraint: 3 point restraint system with supplemental driver and passenger airbags.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 210 kPa, Rear 210 kPa

Recommended Tire Size: P195/65 R15

Recommended Cold Tire Pressure: Front 210 kPa, Rear 210 kPa

Tires on Vehicle: P196/65 R15 Manufacturer: BF Goodrich

Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 TOTAL

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

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

Vehicle Capacity Weight (VCW) = 400 kgs. (A)

No. of Occupants x 68 kgs. = 340 kgs. (B)

Rated Cargo and Luggage Weight (RCLW) A-B = 60 kgs.

GVWR 1753 kgs. GAWR: Front 983 kgs. Rear 770 kgs.

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids) = UDW:

Right Front	=	<u>448</u>	kgs.	Right Rear	=	<u>234</u>	kgs.
Left Front	=	<u>449</u>	kgs.	Left Rear	=	<u>224</u>	kgs.
TOTAL FRONT WEIGHT	=	<u>897</u>	kgs.	(<u>66</u> % of Total Vehicle Weight)			
TOTAL REAR WEIGHT	=	<u>458</u>	kgs.	(<u>34</u> % of Total Vehicle Weight)			
TOTAL DELIVERED WEIGHT	=	<u>1,355</u>	kgs.				

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight	<u>1355</u>	kgs.
VCW = Vehicle Capacity Weight	<u>400</u>	kgs.
DSC = Designated Seating Capacity	<u>5</u>	
RCLW = VCW - 68 (DSC) =	<u>60</u>	kgs.
Target Test Weight = UDW + RCLW + (2 dummies x 74.4 kgs./ dummy)		
Target Test Weight =	<u>1564</u>	

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 56 KGS CARGO:

Right Front	=	<u>480</u>	kgs.	Right Rear	=	<u>307</u>	kgs.
Left Front	=	<u>482</u>	kgs.	Left Rear	=	<u>291</u>	kgs.
TOTAL FRONT WEIGHT	=	<u>962</u>	kgs.	(<u>62</u> % of Total Vehicle Weight)			
TOTAL REAR WEIGHT	=	<u>598</u>	kgs.	(<u>38</u> % of Total Vehicle Weight)			
TOTAL TEST WEIGHT	=	<u>1,560</u>	kgs.				
Weight of ballast secured in vehicle trunk area = <u>0</u> kgs.							

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude:	RF	<u>682</u>	LF	<u>683</u>	RR	<u>717</u>	LR	<u>715</u>
Test Attitude:	RF	<u>670</u>	LF	<u>671</u>	RR	<u>685</u>	LR	<u>675</u>
Wheel Base: <u>2627</u> mm.; C.G. = <u>998.3</u> mm. rearward of front wheel C/L								
Remarks: <u>14.1 gallons of stoddard was placed in the fuel tank.</u>								

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)POST -IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0°
 Date of Test: November 17, 1995 Time of Test: 14:14
 Ambient Temperature: 6 ° C at impact area
 Temperature in Occupant Compartment: 21 ° C
 Windshield Molding Temperature: 21 ° C
 Required Impact Velocity Range: 55.5 to 57.1 kph
 Impact Velocity: primary = 57.0 kph, secondary = 57.0 kph
 Distance From Front Bumper to Barrier Face When
 Entering Speed Trap: 1321 mm
 Exiting Speed Trap: 305 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length:	Pre-test = R	<u>5105</u>	C _L	<u>5225</u>	L	<u>5080</u>
	Post-test = R	<u>4660</u>	C _L	<u>4680</u>	L	<u>4625</u>
	Crush = R	<u>445</u>	C _L	<u>545</u>	L	<u>455</u>

Distance from front of test vehicle to point of impact:
 R 460 C_L 355 L 494

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Airbag</u>	<u>Airbag</u>
Chest	<u>Airbag</u>	<u>Airbag</u>
Abdomen	<u>-</u>	<u>-</u>
Left Knee	<u>Lower dash</u>	<u>Glove box door</u>
Right Knee	<u>Lower dash</u>	<u>Glove box door</u>

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>closed/operable</u>	<u>closed/operable</u>	<u>closed/operable</u>	<u>closed/operable</u>
<u>Seat Movement</u>	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>None</u>	<u>None</u>	<u>N/A</u>	<u>N/A</u>
Seat Shift (mm.)	<u>0.0</u>	<u>0.0</u>	<u>N/A</u>	<u>N/A</u>
<u>Glazing Damage</u>				
Backlight/Windshield:	<u>Windshield cracked throughout</u>			
Other Notable Impact Effects:	<u>Driver and passenger floor pan intruded.</u>			

Section 3

OCCUPANT AND VEHICLE INFORMATION

I.

DATA

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

Table 2

DUMMY INJURY CRITERIA VALUESNHTSA No.: MT0105 Vehicle: 1996 Pontiac Grand Am 4-Door Sedan

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-63.4	17.6	18.6	66.1
Position #2 - Passenger	-61.2	-8.1	39.5	67.3

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R*
Position #1 - Driver	-50.0	-7.9	-15.8	48.4
Position #2 - Passenger	-49.8	9.8	-19.3	49.1

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

	MAXIMUM FORCE - FEMUR LOAD (nwt)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	-5589.5	-3190.1
Position #2 - Passenger	-9127.0	-5445.4

	MAXIMUM FORCE - SEAT BELT LOADS (nwt)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	5376.6	-	4025.5
Position #2 - Passenger	5045.8	4545.0	-

	HEAD INJURY CRITERIA (HIC)			
	HIC**	t ₁ (mSec)	t ₂ (mSec)	Average Acceleration t ₁ to t ₂
Position #1 - Driver	535.3	57.12	91.32	47.63
Position #2 - Passenger	604.3	56.28	88.68	51.09

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

Table 3

HYBRID III NECK AND CHEST DATA SHEET

Vehicle Year/Make/Model/Body Style: 1996 Pontiac Grand Am 4-Door Sedan
 Vehicle NHTSA No.: MT0105 Test Date: November 17, 1995

MAXIMUM VALUES	DRIVER DUMMY ID #150:	PASSENGER DUMMY ID #064:
Neck Load X (nwt)	658.5	909.9
Neck Load Y (nwt)	599.1	382.0
Neck Load Z (nwt)	2034.6	1631.8
Neck Moment X (nwt-m)	29.0	21.1
Neck Moment Y (nwt-m)	59.5	121.9
Neck Moment Z (nwt-m)	-14.5	12.1
Chest Deflection X (mm.)	-31.9	-27.0
Time of Max. Occurrence (msec)	72.8	65.9

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

Figure 1

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

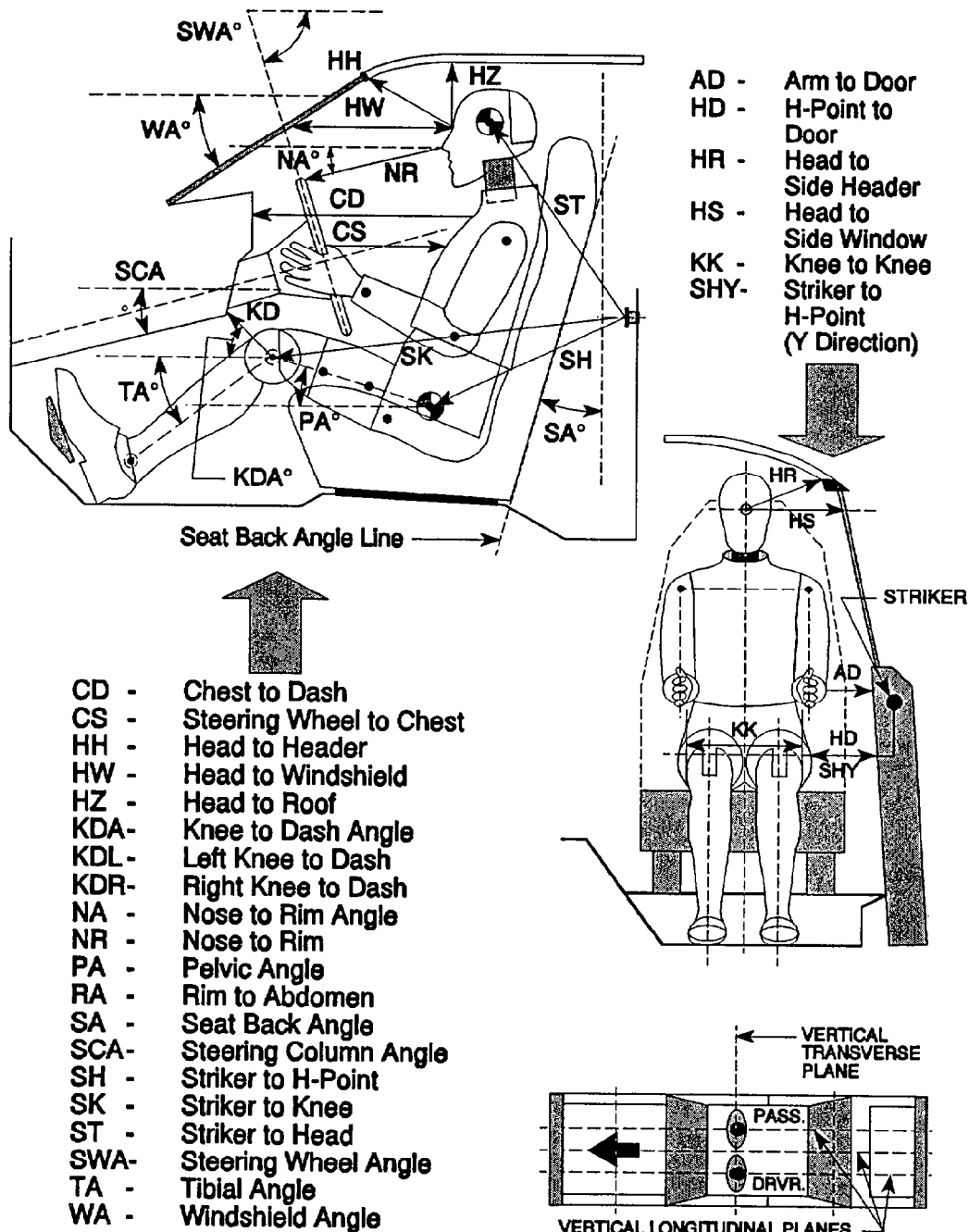


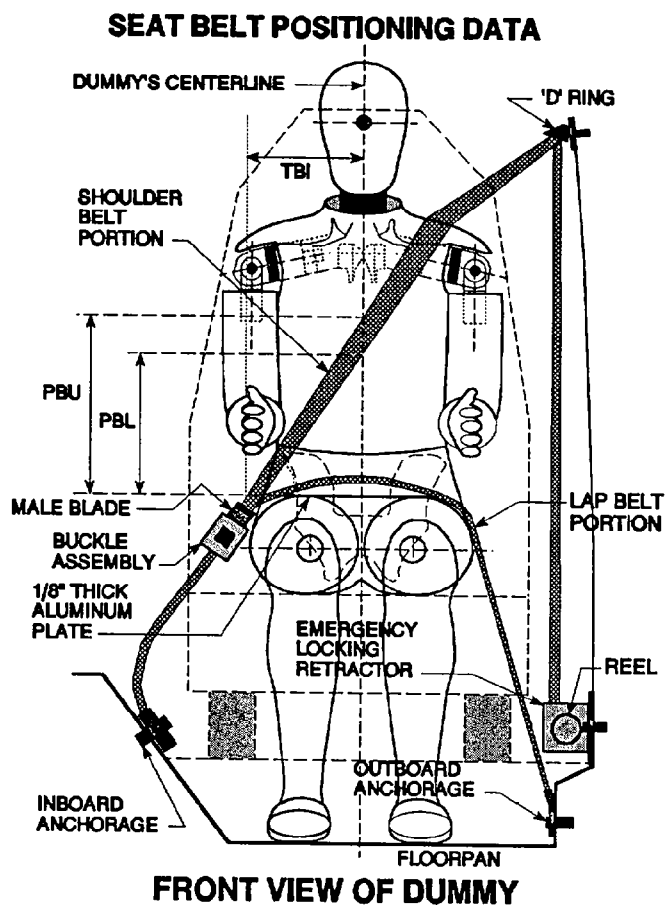
Table 4

FRONT SEAT OCCUPANT MEASUREMENTS

	DRIVER (Serial #150)			PASS. (Serial # 064)		
WA°	29 deg.			N/A		
SWA°	69 deg.			N/A		
SCA°	21 deg.			N/A		
SA°	27 deg.			27 deg.		
HZ	140			115		
HH	272			255		
HW	479			472		
HR	174			166		
NR	344	Angle	12 deg.	N/A		
CD	486			475		
CS	262			N/A		
RA	173			N/A		
KDL	152	Angle (KDA)	45 deg.	153		
KDR	157			150	Angle (KDA)	44 deg.
PA°	21 deg.			24 deg.		
TA°	38 deg.			40 deg.		
KK	325			311		
ST	532	Angle	124 deg.	541	Angle	9 deg.
SK	611	Angle	94 deg.	609	Angle	94 deg.
SH	260	Angle	124 deg.	253	Angle	125 deg.
SHY	200			220		
HS	272			275		
HD	103			121		
AD	79			86		

Figure 2

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	318	345
PBL-- Top surface of alum. plate to belt lower edge	230	268
<u>LAP BELT TENSION</u>	3 lbs.	3 lbs.
<u>SHOULDER BELT TENSION</u>	3 lbs.	3 lbs.

Table 5

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

<u>BELT LENGTH DATA:</u>	<u>Driver</u>	<u>Passenger</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	1960 mm	1930 mm
Shoulder belt length as measured on Part 572 Dummy.	1020 mm	1020 mm
Lap belt length as measured on Part 572 Dummy.	590 mm	560 mm
<u>SHOULDER BELT SPOOL-OFF DATA:</u>		
As determined by film analysis.	38 mm	50 mm
As determined mechanically.	42 mm	52 mm
As determined electronically.	51 mm	64 mm
<u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	55 mm/M	73 mm/M
Measured mechanically.	0 mm/M	0 mm/M

Figure 3

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 6.

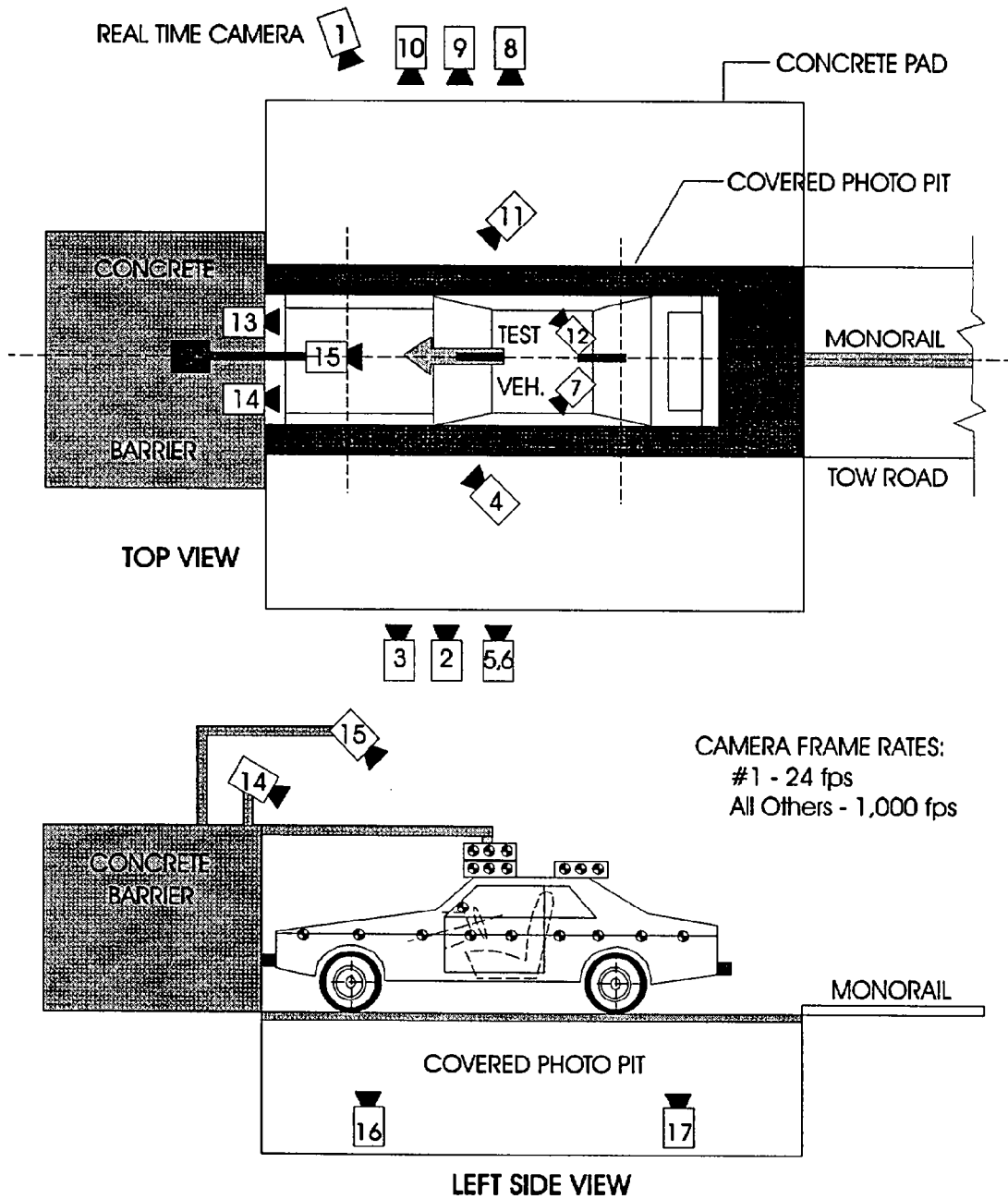


Table 6
HIGH-SPEED CAMERA LOCATIONS

Test No.	MT0105	Vehicle:	1996 Pontiac Grand Am 4-Door Sedan					
CAMERA NO.	VIEW	CAMERA POSITIONS (MM.)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	9070	1220	1050	-1	8669	25	1015
3	Left Side View	7680	900	1060	-2	7279	28	1105
4	Driver and Interior View	2830	4100	1880	-15	-	25	1055
5	Steering Column (Bottom)	7470	1930	1160	-3	7069	35	960
6	Steering Column (Top)	7470	1930	1780	-7	7069	35	1040
7	Left Belt	-	-	-	-	-	8	590
8	Overall Right Side	9210	1710	1030	0	8809	25	780
9	Right Side View	8260	1220	1100	-2	7859	28	775
10	Right Passenger View	7550	2270	1480	-4	7149	35	830
11	Passenger and Interior View	2520	4290	1850	-15	-	25	1005
12	Right Belt	-	-	-	-	-	8	620
13	Passenger Front View	580	0	2000	-33	-	13	1005
14	Driver Front View	580	0	2000	-35	-	13	1105
15	Windshield View	0	-530	3048	-45	-	13	1100
16	Pit View of Engine	0	505	-3048	90	-	13	1100
17	Pit View of Fuel Tank	0	3432	-3048	90	-	13	935

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

N.T. indicates No Timing

Figure 4

VEHICLE TARGET LOCATIONS

(Dimensions in millimeters)

A	325
B	480
C	1210
D	2167
E	200
F	1553
G	885
H	890
I	110
J	1479
K	1000
L	1368
M	200
N	120
O	882
P	880
Q	1368
R	1002
S	1495

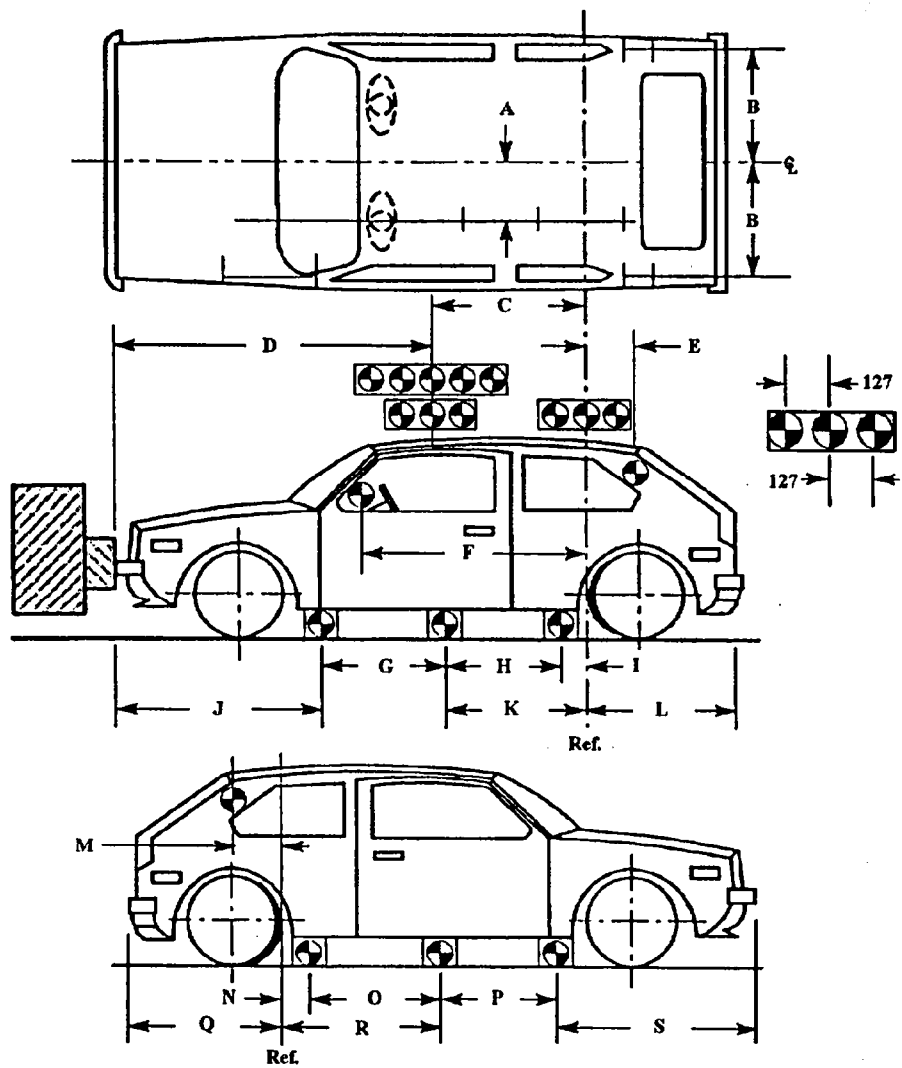
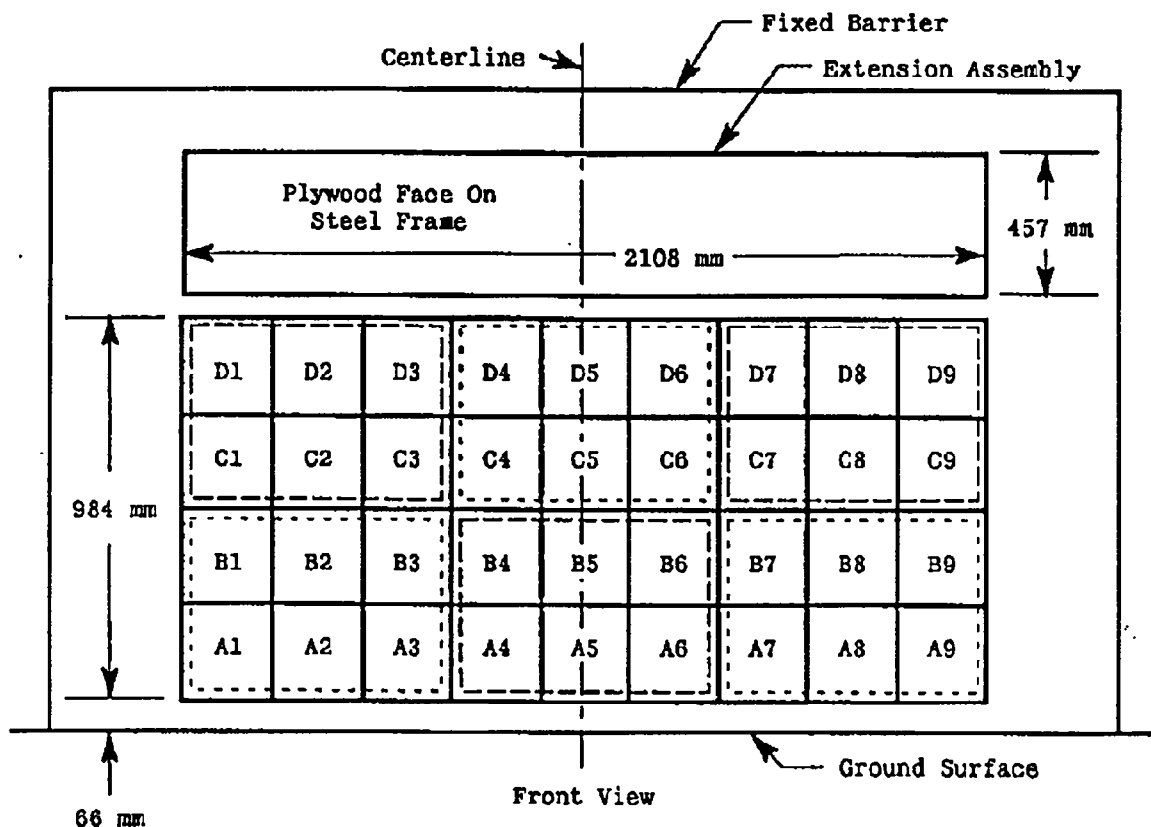


Figure 5

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

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

The following data is presented in Appendix B:

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

Figure 6

VEHICLE ACCELEROMETER LOCATIONS

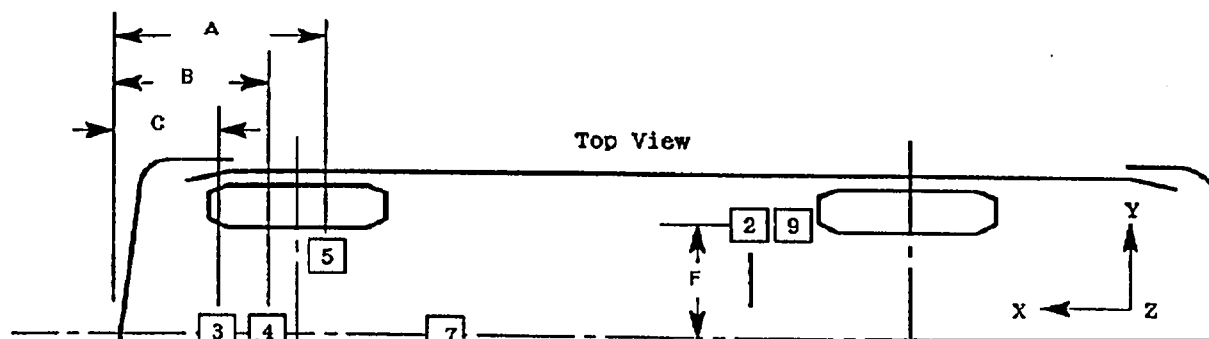


Figure 7

TEST VEHICLE MEASUREMENTS

REAR DATUM REFERENCE

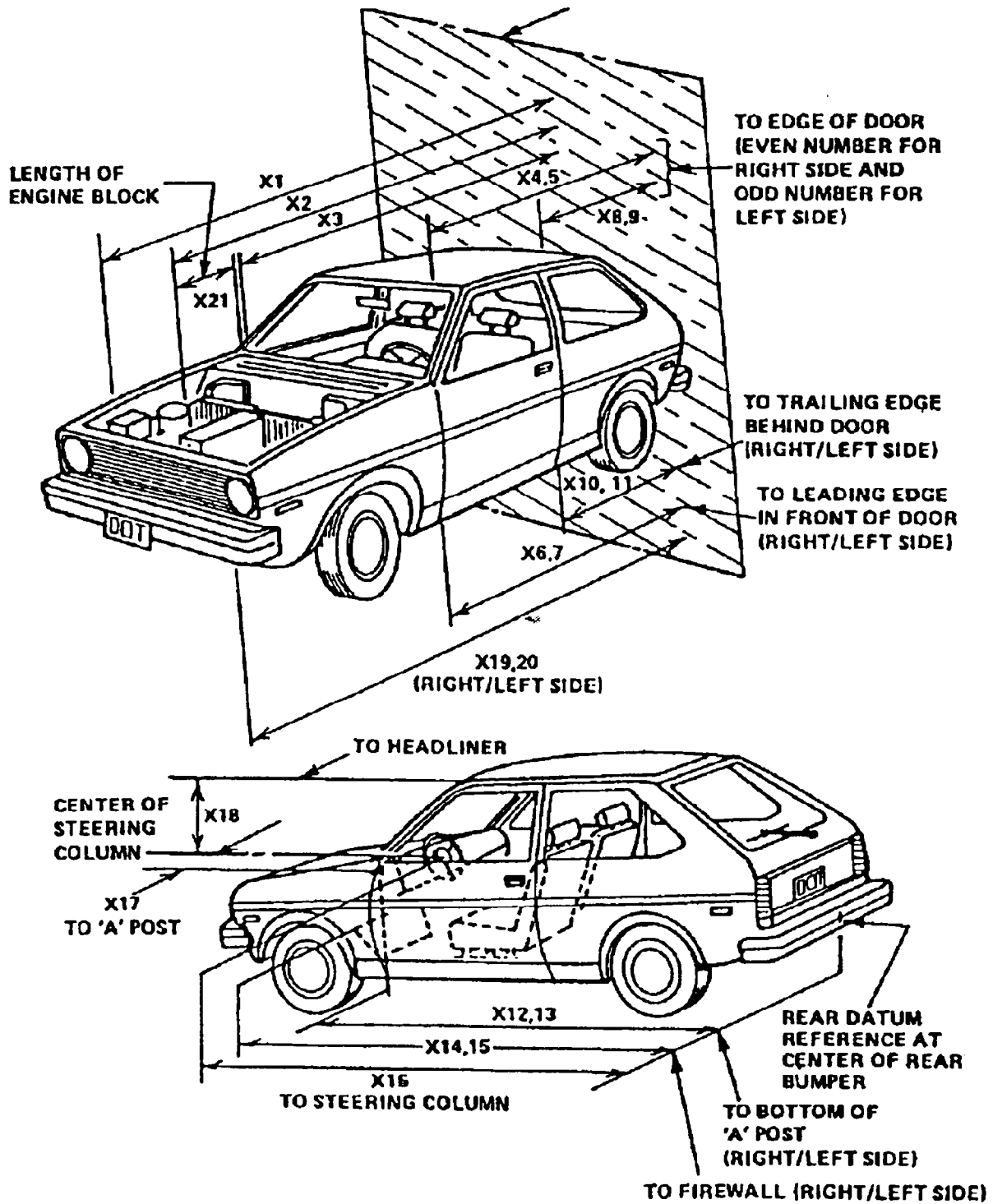


Table 7

VEHICLE MEASUREMENTS

No.		All Dimensions in mm			Differences
		Pre-Test	Post-Test		
X1	Total Length of Vehicle at Centerline	5225	4680		545
X2	Rear Surface of Vehicle to Front of Engine	4895	4592		303
X3	Rear Surface of Vehicle to Firewall	4515	4420		95
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	4370	4320		50
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	4355	4287		68
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	4374	4345		29
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	4350	4305		45
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	3350	3317		33
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	3332	3270		62
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	3338	3320		18
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	3316	3275		41
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3805	3790		15
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3780	3738		42
X14	Rear Surface of Vehicle to Firewall, Right Side	4435	4420		15
X15	Rear Surface of Vehicle to Firewall, Left Side	4525	4355		170
X16	Rear Surface of Vehicle to Steering Column	3890	3870		20
X17	Center of Steering Column to "A" Post	425	445		-20
X18	Center of Steering Column to Headliner	510	445		65
X19	Rear Surface of Vehicle to Right Side of Front Bumper	5105	4660		445
X20	Rear Surface of Vehicle to Left Side of Front Bumper	5080	4625		455
X21	Length of Engine Block	520	520		0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	4160	4150		10
CD	Rear Surface of Vehicle to Center of Dash Panel	4150	4125		25
LD	Rear Surface of Vehicle to Left Side of Dash Panel	4170	4110		60

Table 8

ACCIDENT INVESTIGATION DIVISION DATA
FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Pontiac Grand Am 4-Door Sedan

Vehicle NHTSA No.: MT0105 VIN: 1G2NE52M7TC707866

Model Year: 1996 Build Date: 8/95 Test Date: November 17, 1995

Vehicle Size Category: Mid-size Test Weight: 1560 Kgs

Vehicle Wheelbase: 2627 mm; Front Overhang: 1487 mm; Overall Width: 1840 mm

Collision Deformation Classification (CDC) Code: 12FDEW2

Crush Depth Dimensions:

C1 = 465 mm

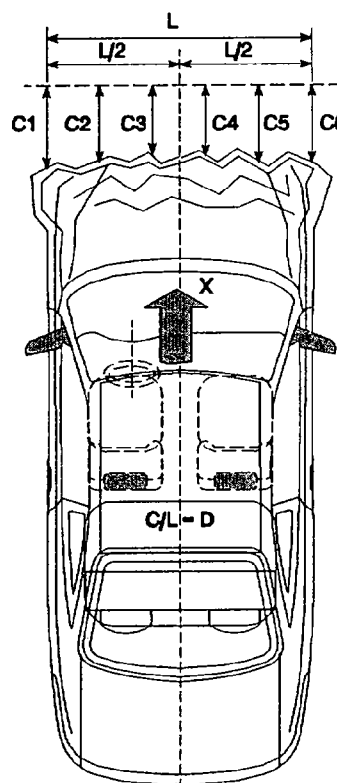
C2 = 490 mm

C3 = 520 mm

C4 = 520 mm

C5 = 480 mm

C6 = 440 mm



Midpoint of Damage: $D = \frac{\text{Vehicle Centerline}}{(\text{Longitud.})}$

Longitude Length of Damaged Region: $L = \underline{1840}$ mm

Section 4

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

"Windshield Mounting" FMVSS No. 212 Data

"Windshield Zone Intrusion" FMVSS No. 219 Data

"Fuel System Integrity" FMVSS No. 301

Figure 8

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

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

Windshield is bonded in place and covered with 18 mm. molding.

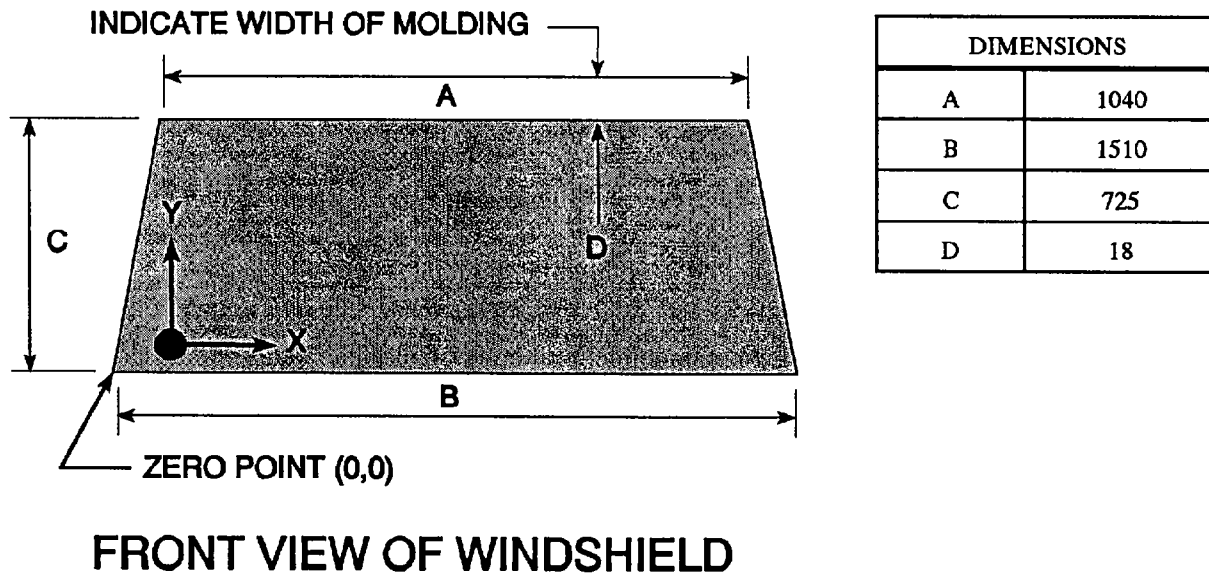
FMVSS 212 REQUIREMENTS:

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

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST(mm)	
RIGHT SIDE	2000	2000	100
LEFT SIDE	2000	2000	100
TOTAL	4,000	4,000	100

AREA OF RETENTION FAILURE:



FAILURE DETAILS: None

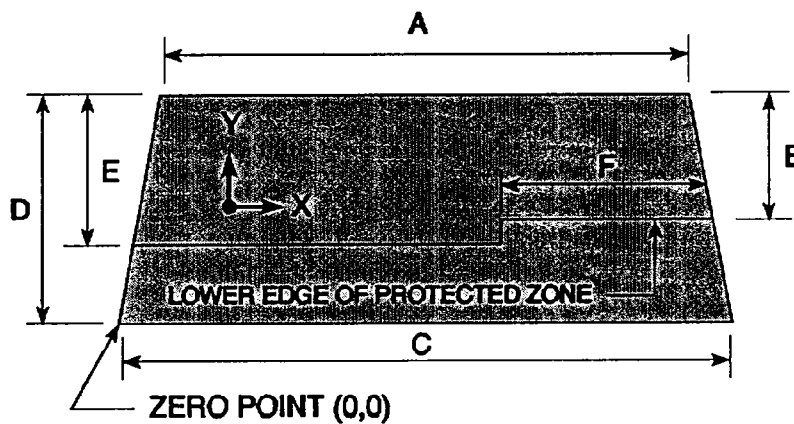
Figure 9

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA: (Dimensions in mm)



DIMENSIONS	
A	1040
B	425
C	1510
D	725
E	535
F	605

FRONT VIEW OF WINDSHIELD

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

(Show location of penetration on the above sketch)

COORDINATES		
	X	Y
1.		
2.		
3.		
4.		

Table 9

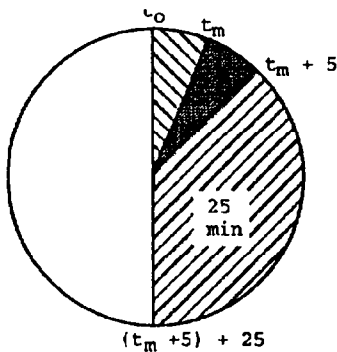
FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

TEST VEHICLE NHTSA No.: MT0105 TEST DATE: November 17, 1995
VEHICLE MAKE/MODEL: 1996 Pontiac Grand Am

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

=====

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

FUEL SPILLAGE MEASUREMENT:

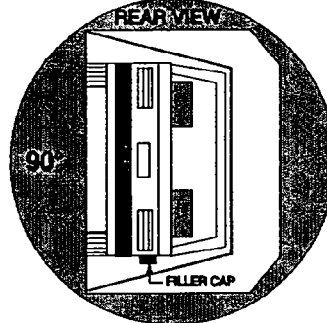
1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

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

SOLVENT SPILLAGE DETAILS:

None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEETTEST PHASE:Vehicle NHTSA ID No.
MT0105I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)2

minutes

30

seconds

FMVSS 301 Position Hold Time +

5

minutes

00

seconds

TOTAL7

minutes

30

seconds

Next whole minute interval

8

minutes

00

seconds

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

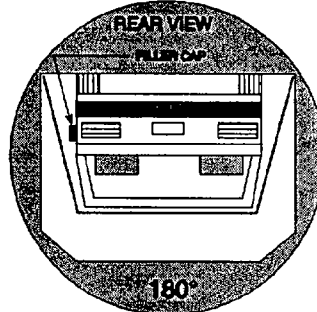
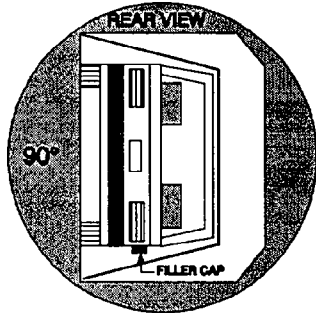
0	0	0	0
---	---	---	---

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET**TEST PHASE:**Vehicle NHTSA ID No.
MT0105**I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)

<u>2</u>	minutes	<u>30</u>	seconds
<u>5</u>	minutes	<u>00</u>	seconds

FMVSS 301 Position Hold Time +

TOTAL

<u>7</u>	minutes	<u>30</u>	seconds
<u>8</u>	minutes	<u>00</u>	seconds

Next whole minute interval

II. FMVSS 301 REQUIREMENTS:**(1) Time Period**

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

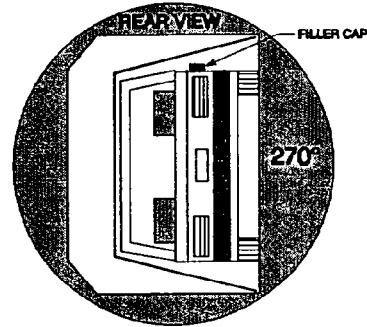
0	0	0	0
---	---	---	---

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET**TEST PHASE:**Vehicle NHTSA ID No.
MT0105**I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)2

minutes

40

seconds

FMVSS 301 Position Hold Time +

5

minutes

00

seconds

TOTAL7

minutes

40

seconds

Next whole minute interval

8

minutes

00

seconds

II. FMVSS 301 REQUIREMENTS:**(1) Time Period**

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

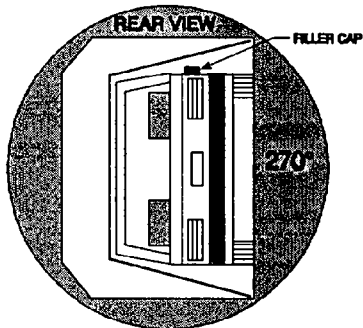
0	0	0	0
---	---	---	---

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEETTEST PHASE:Vehicle NHTSA ID No.
MT0105I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:Rollover Fixture 90 deg. Rotation Time
(Spec. Range = 1 to 3 minutes)

2	minutes	30	seconds
---	---------	----	---------

FMVSS 301 Position Hold Time +

5	minutes	00	seconds
---	---------	----	---------

TOTAL

7	minutes	30	seconds
---	---------	----	---------

Next whole minute interval

8	minutes	00	seconds
---	---------	----	---------

II. FMVSS 301 REQUIREMENTS:(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

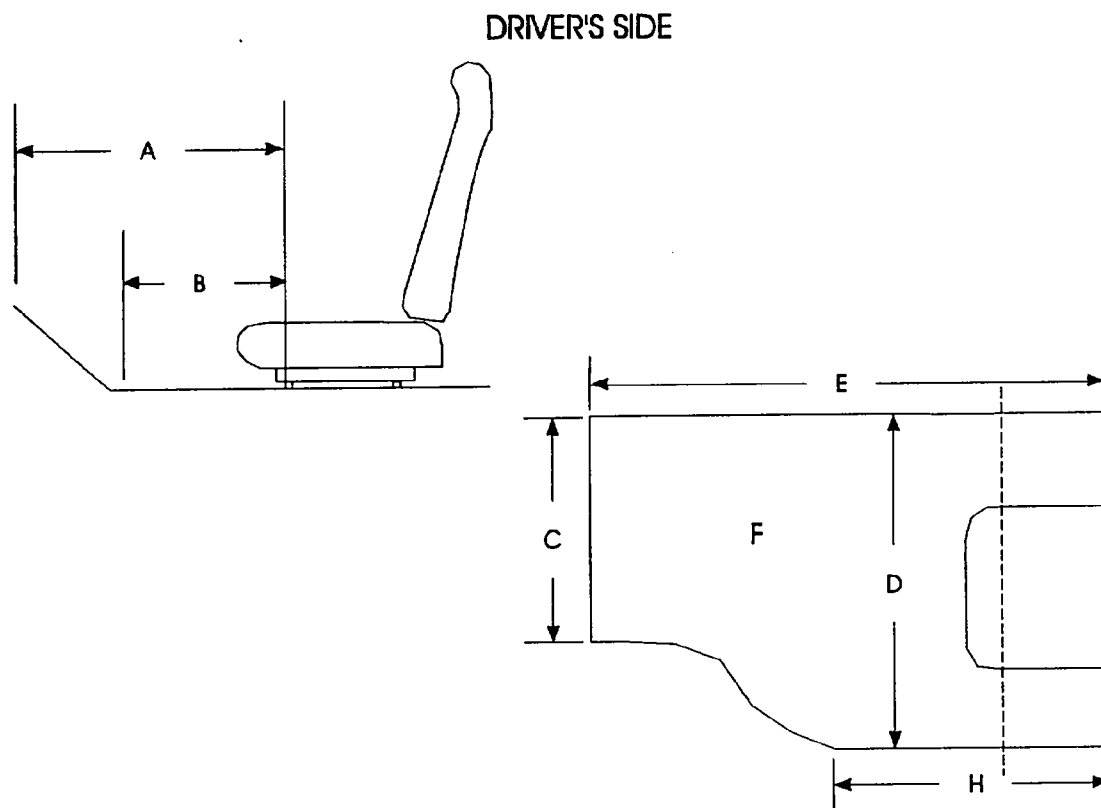
0	0	0	0
---	---	---	---

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Figure 10
DRIVER SIDE FLOORBOARD DEFORMATION

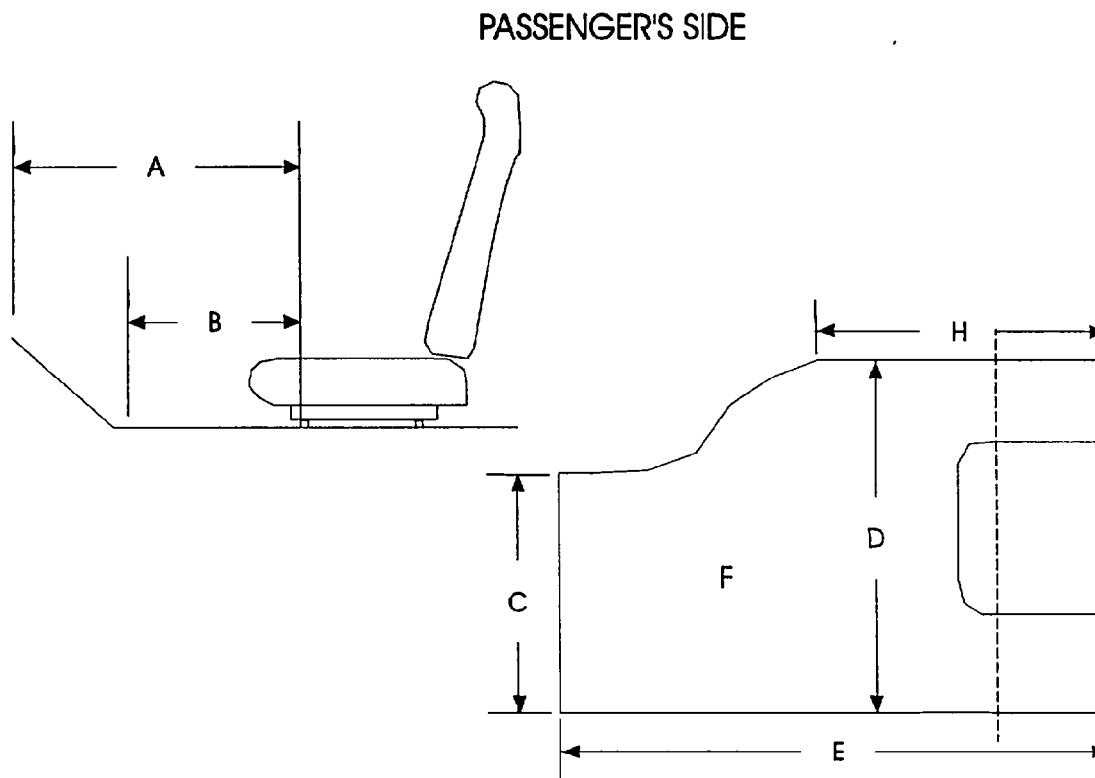


Measurement	Pre-Test	Post-Test	Difference
A	640	465	175
B	460	410	50
C	415	395	20
D	420	405	15
E	535	380	155
H	280	270	10
F (cm) ²	2234	1528	706

Units = mm

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

Figure 11
PASSENGER SIDE FLOORBOARD DEFORMATION

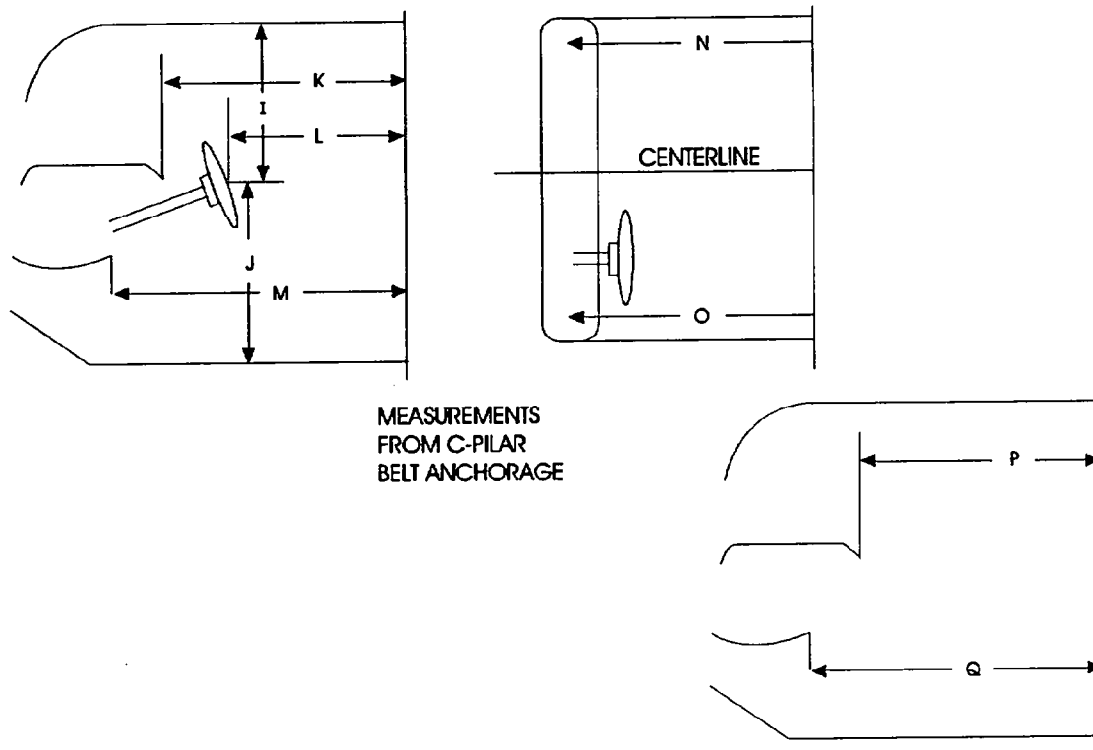


Measurement	Pre-Test	Post-Test	Difference
A	525	560	-35
B	500	435	65
C	390	N/A	N/A
D	360	340	20
E	500	435	65
H	135	125	10
F (cm) ²	1909	N/A	N/A

Units = mm

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

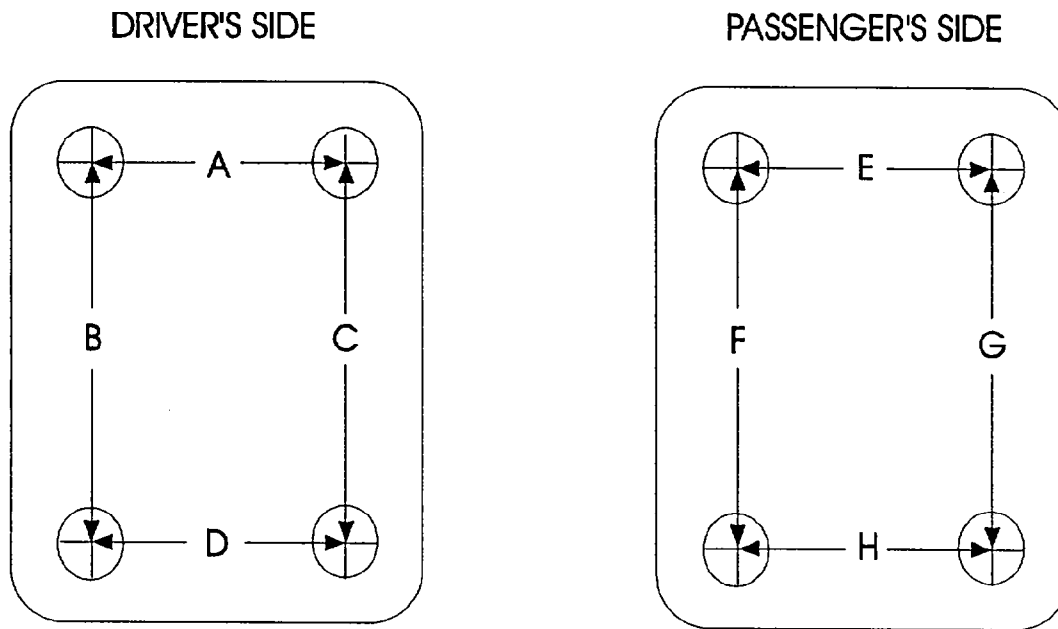
Figure 12
INTERIOR DEFORMATION



Measurement	Pre-Test	Post-Test	Difference
I	410	355	55
J	585	700	-115
K	1445	1425	20
L	1255	1190	65
M	1500	1375	125
N	1435	1415	20
O	1435	1425	10
P	1445	1425	20
Q	1500	1375	125

Units = mm

Figure 13
FLOORBOARD DEFORMATION



TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	278	260	18
B	685	570	115
C	682	610	72
D	260	260	0
E	273	245	28
F	640	590	50
G	580	604	-24
H	250	250	0

Units = mm

Appendix A
PHOTOGRAPHS

PHOTOGRAPHS

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A-28	PRE-TEST PASSENGER AND INTERIOR VIEW	A-31
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A-32	PRE-TEST PASSENGER HEAD LOCATION	A-35

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A-37	POST-TEST PASSENGER FLOOR PAN VIEW	A-40
A-38	ROLLOVER VIEW	A-41
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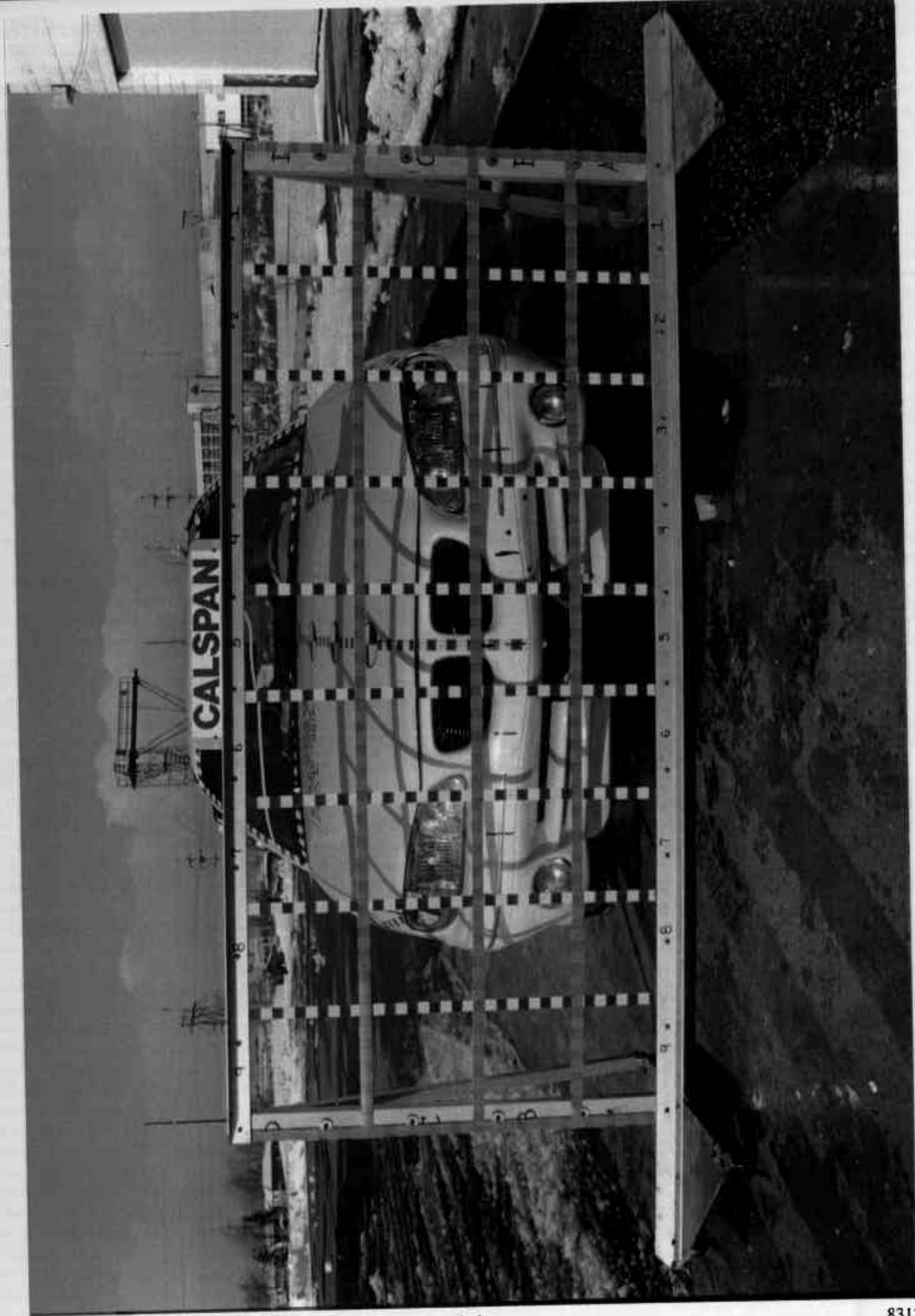


Figure A-1 LOAD CELL LOCATIONS



Figure A-2 PRE-TEST FRONT VIEW

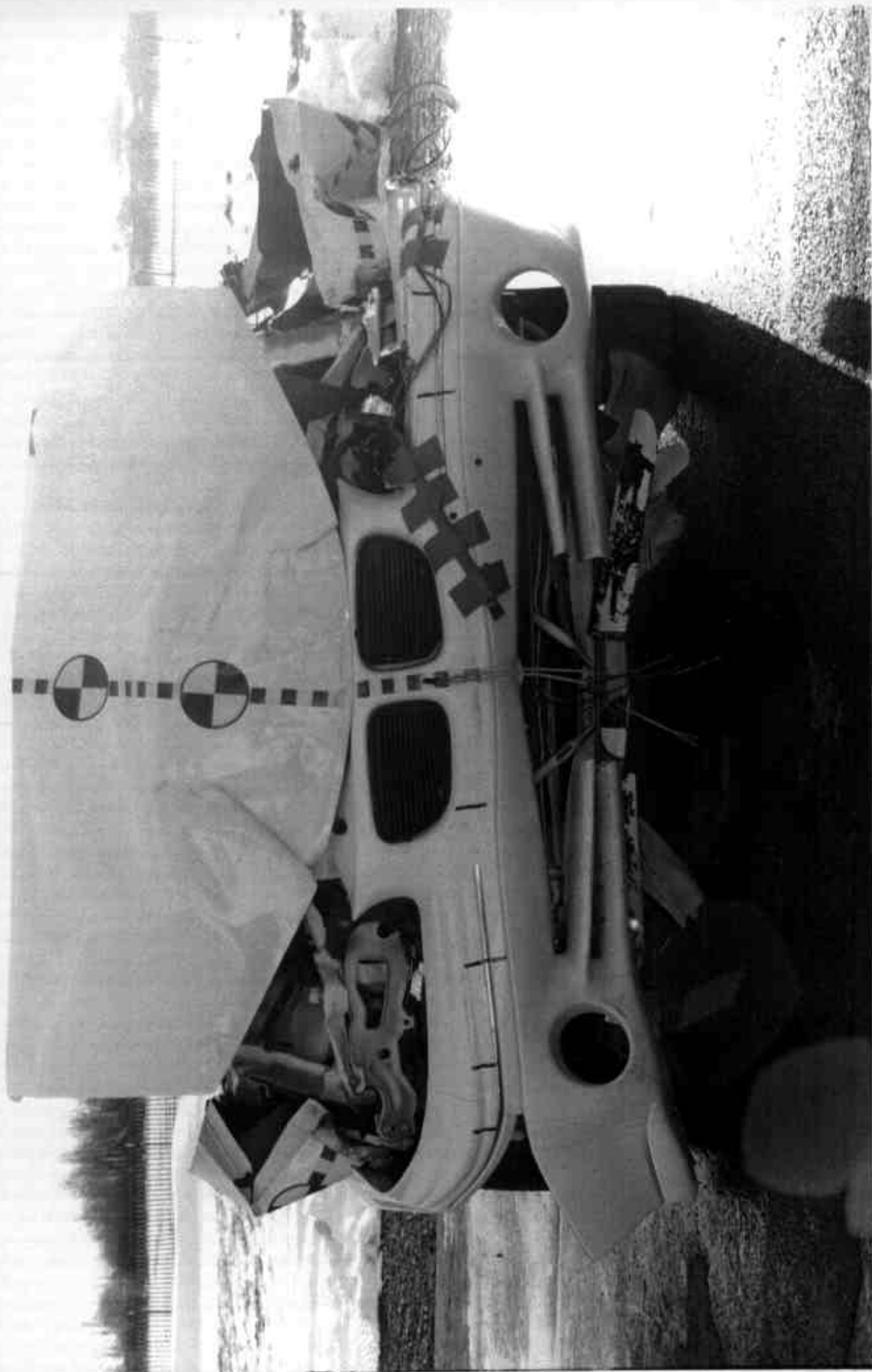


Figure A-3 POST-TEST FRONT VIEW

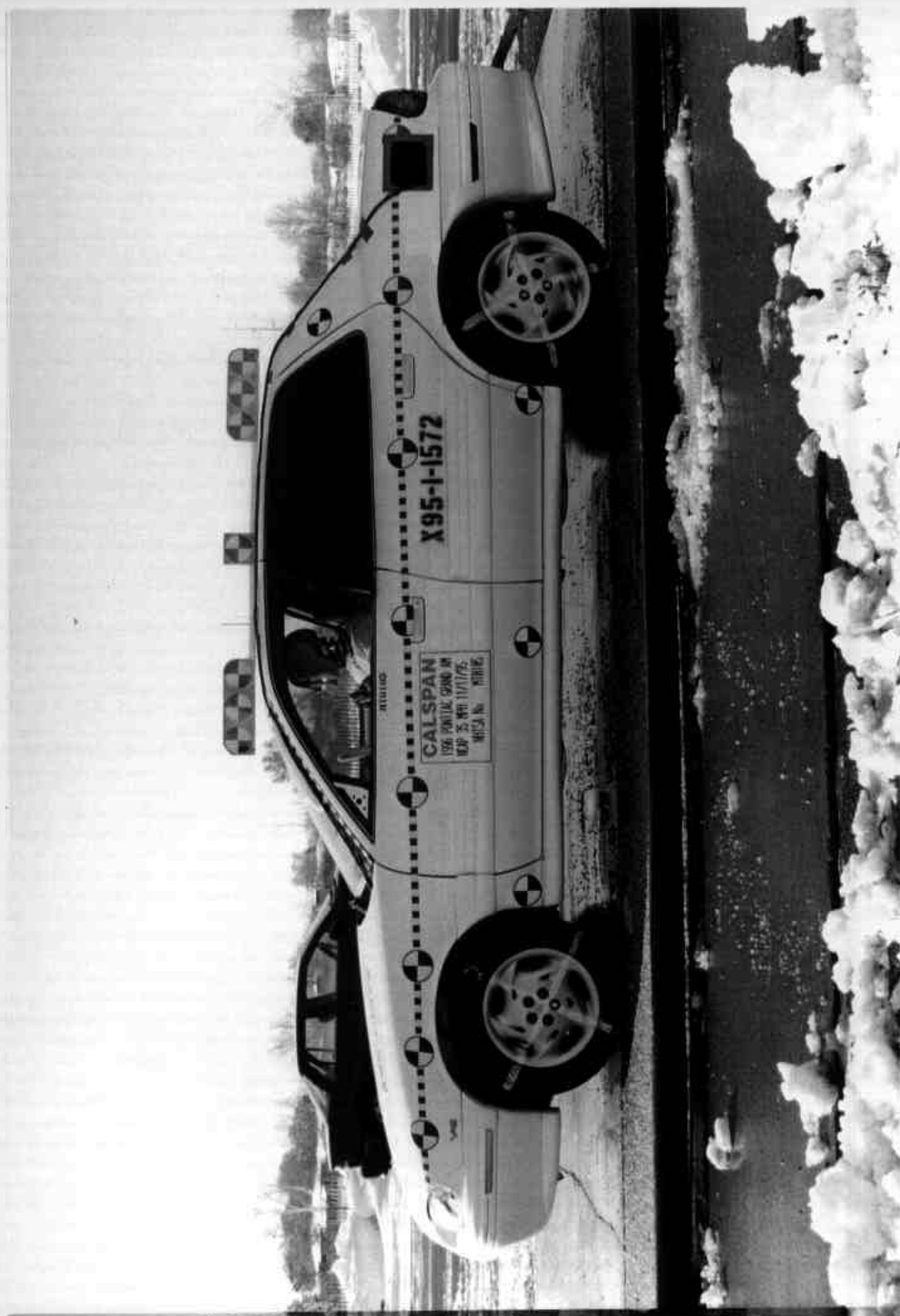


Figure A-4 PRE-TEST LEFT SIDE VIEW



Figure A-5 POST-TEST LEFT SIDE VIEW



Figure A-6 PRE-TEST RIGHT SIDE VIEW



Figure A-7 POST-TEST RIGHT SIDE VIEW



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

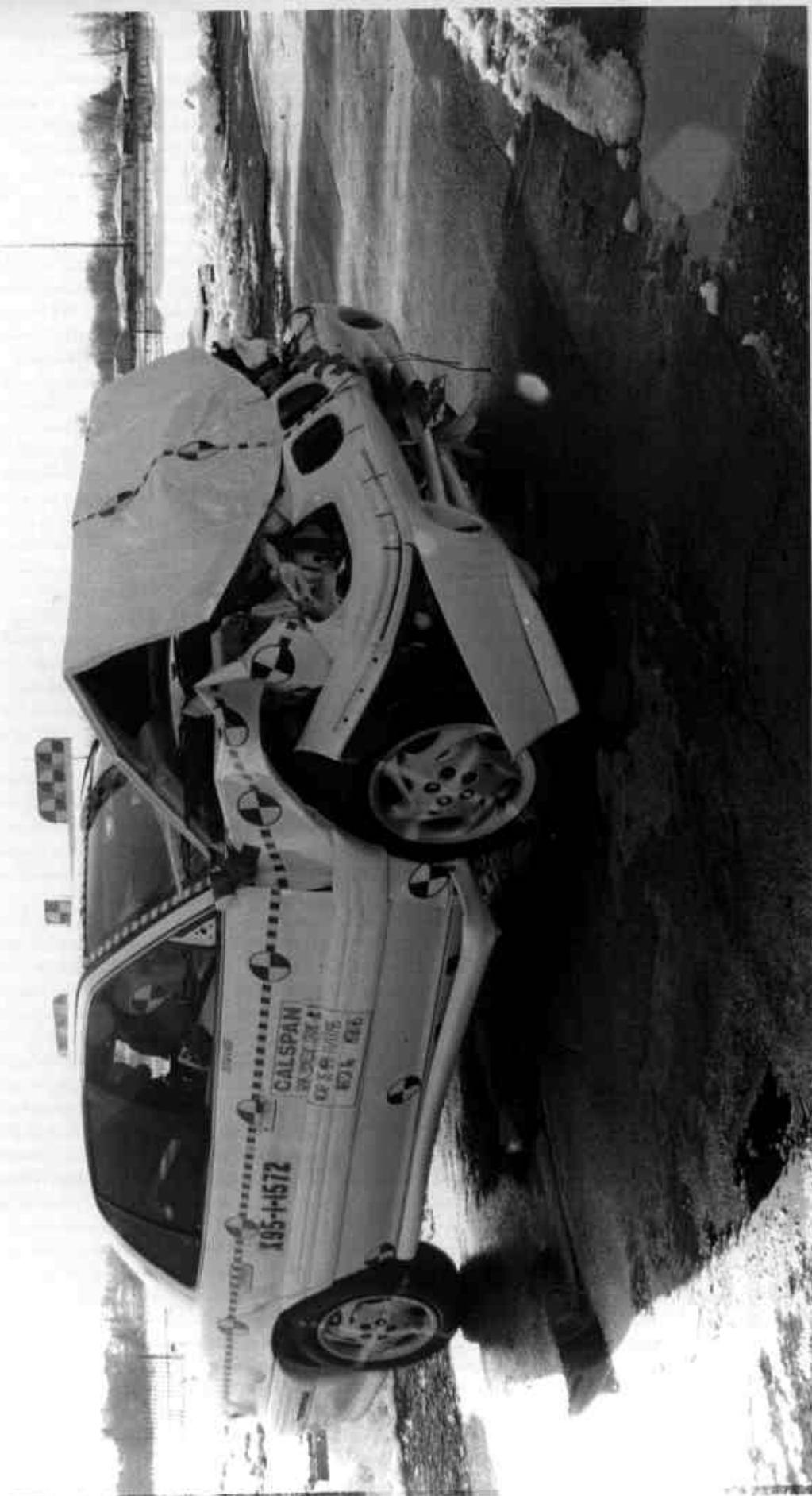


Figure A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



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



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

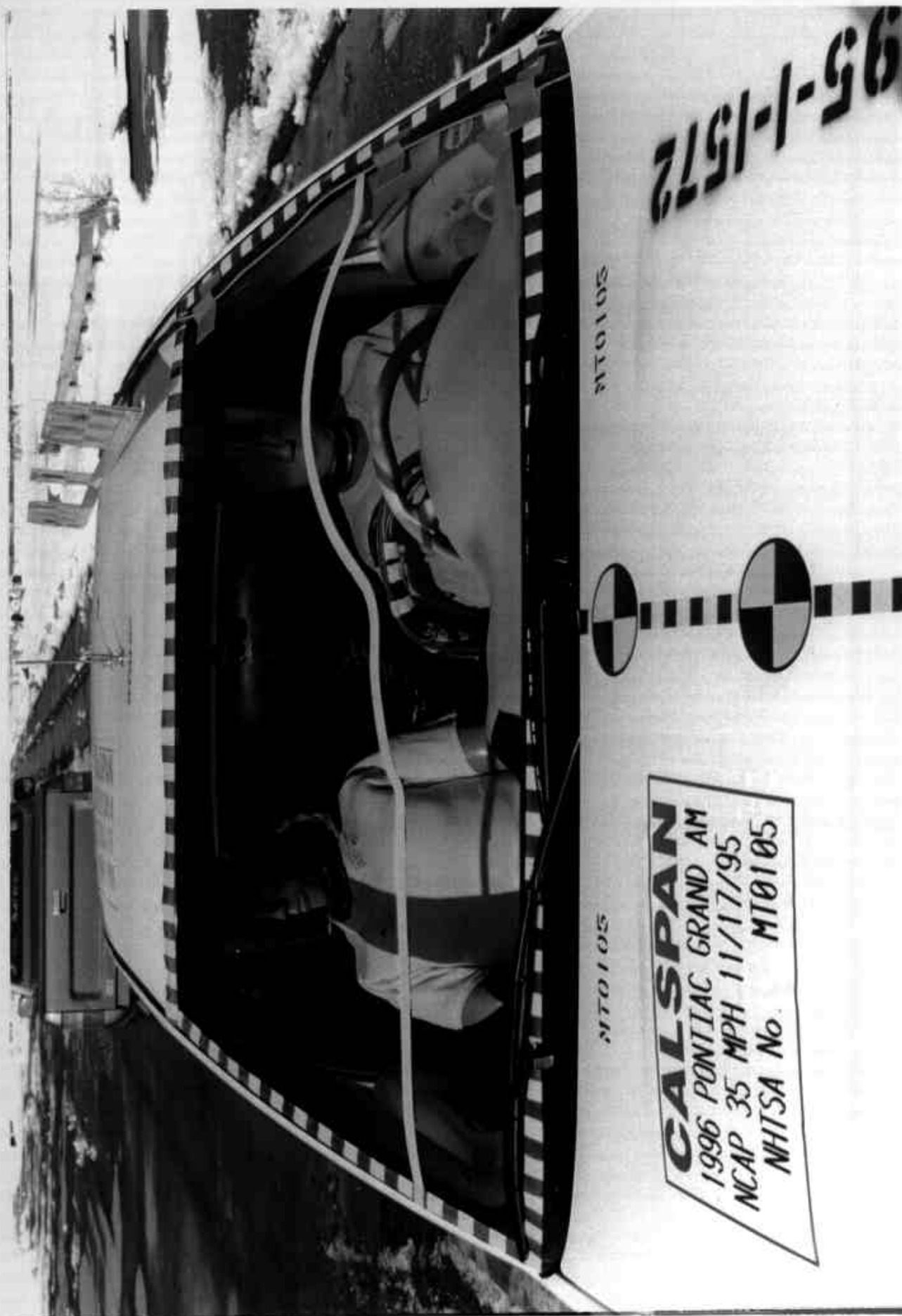


Figure A-12 PRE-TEST WINDSHIELD VIEW

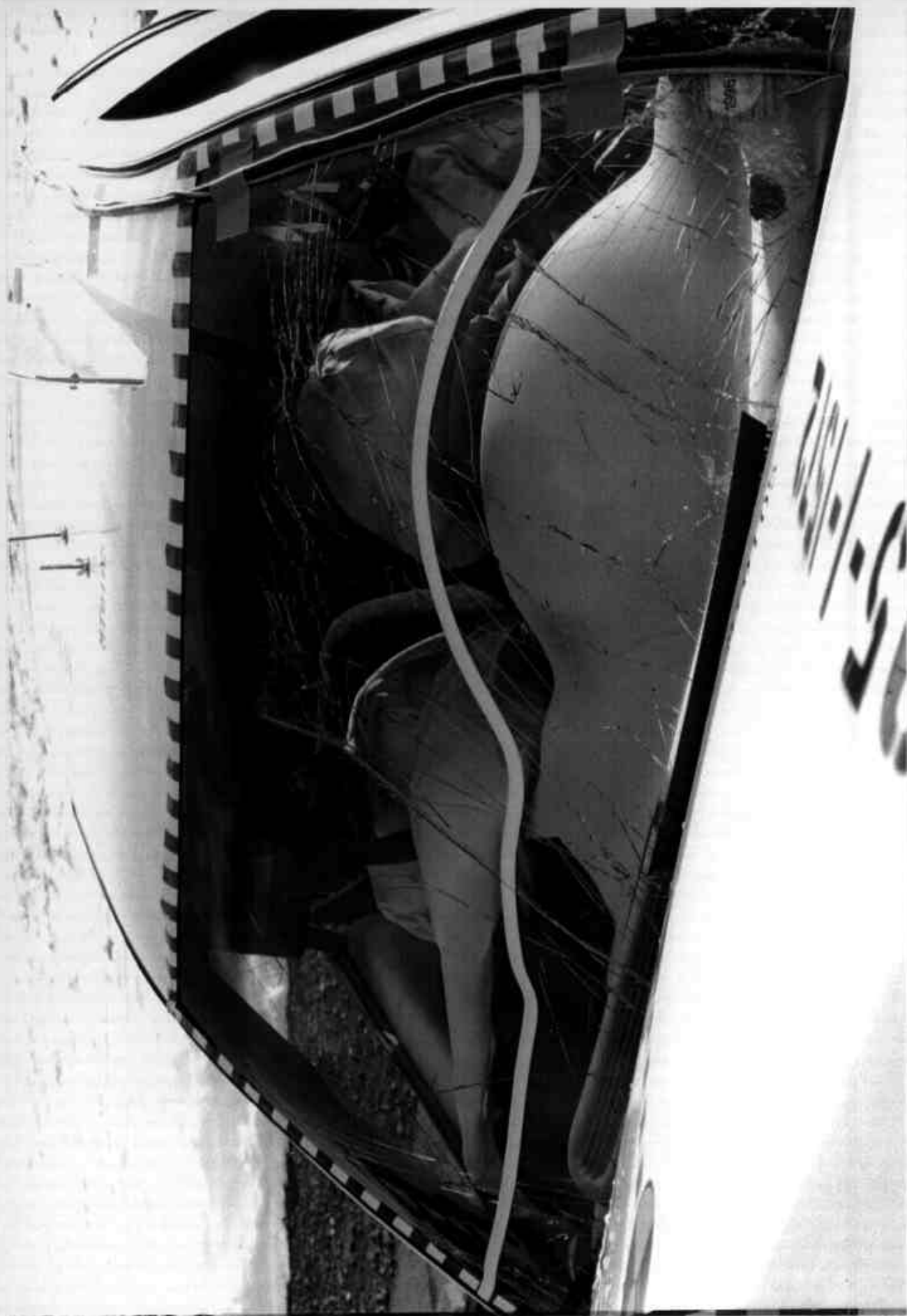


Figure A-13 POST-TEST WINDSHIELD VIEW



Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

1170105



Figure A-15 FUEL FILLER CAP

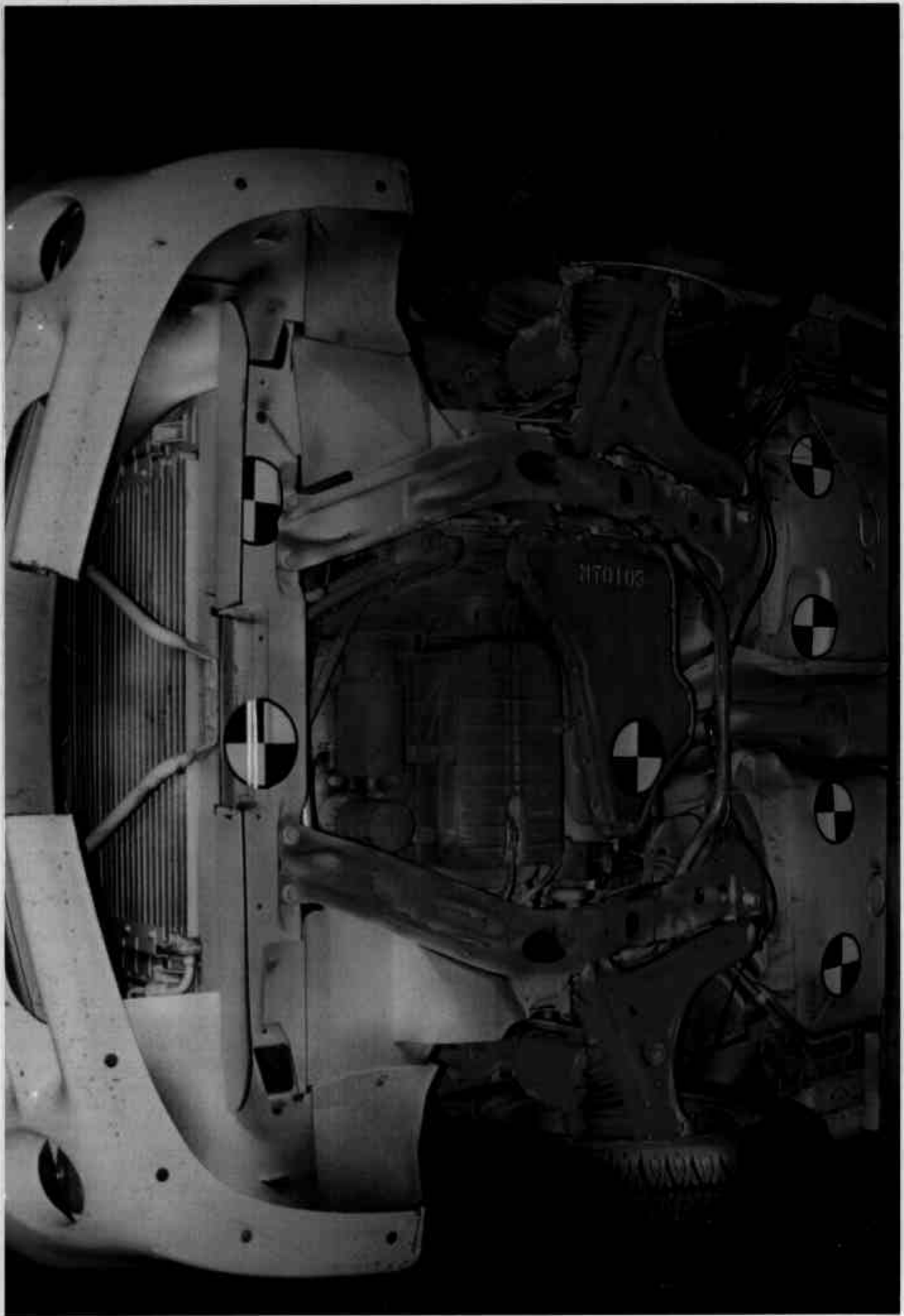


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW



Figure A-17 POST-TEST FRONT UNDERBODY VIEW

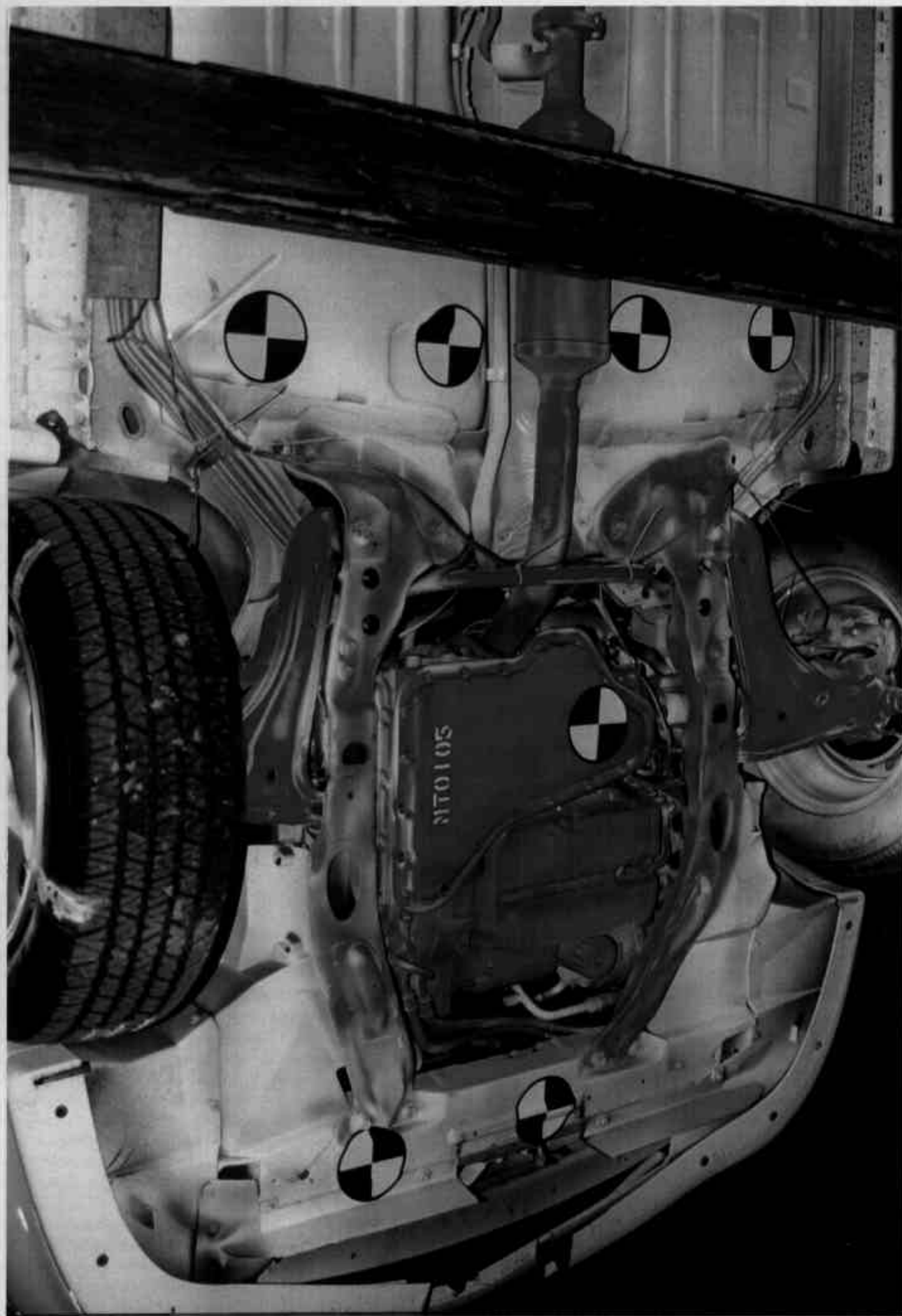


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW



Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW

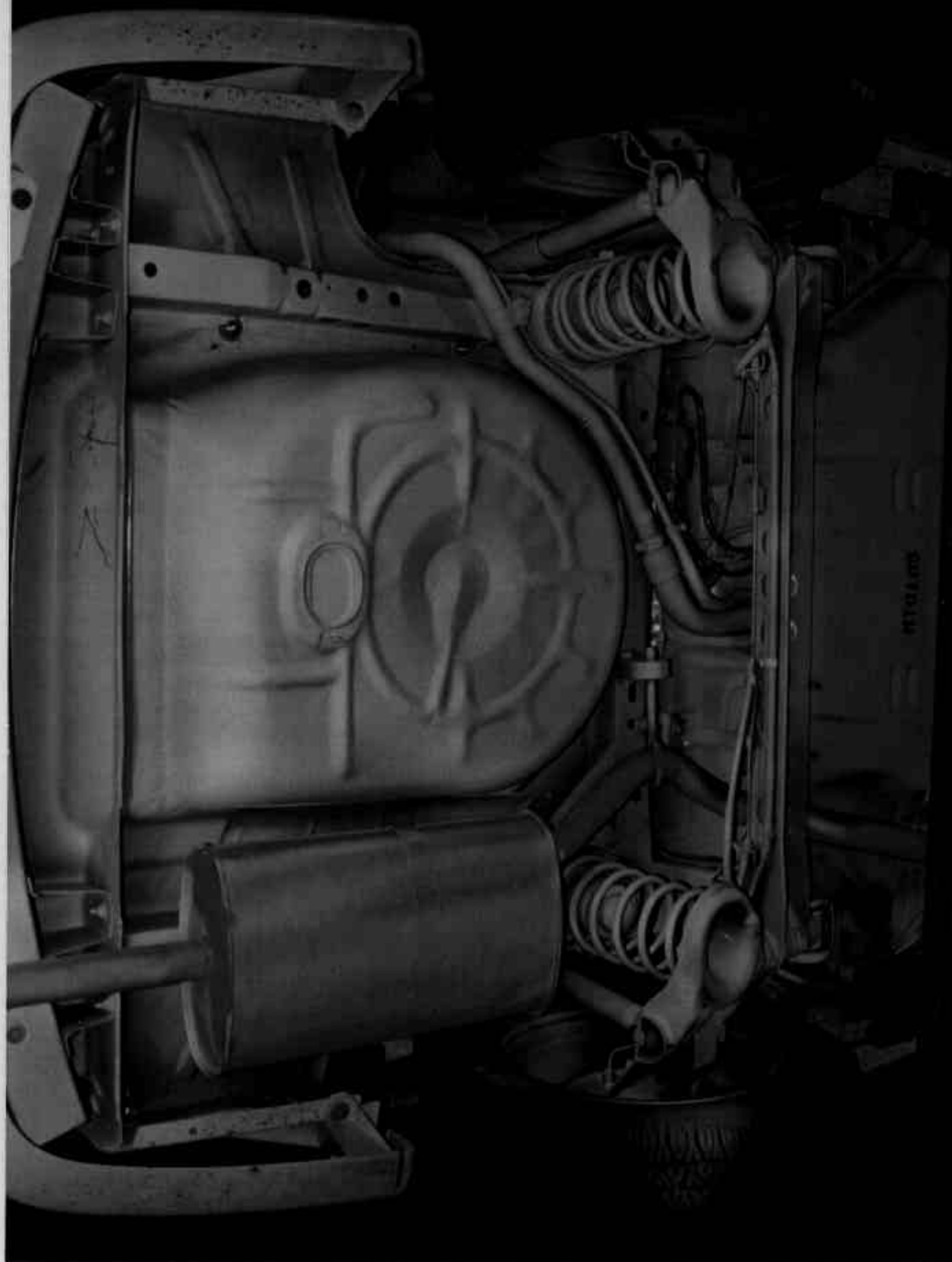


Figure A-20 PRE-TEST REAR UNDERBODY VIEW



Figure A-21 POST-TEST REAR UNDERBODY VIEW

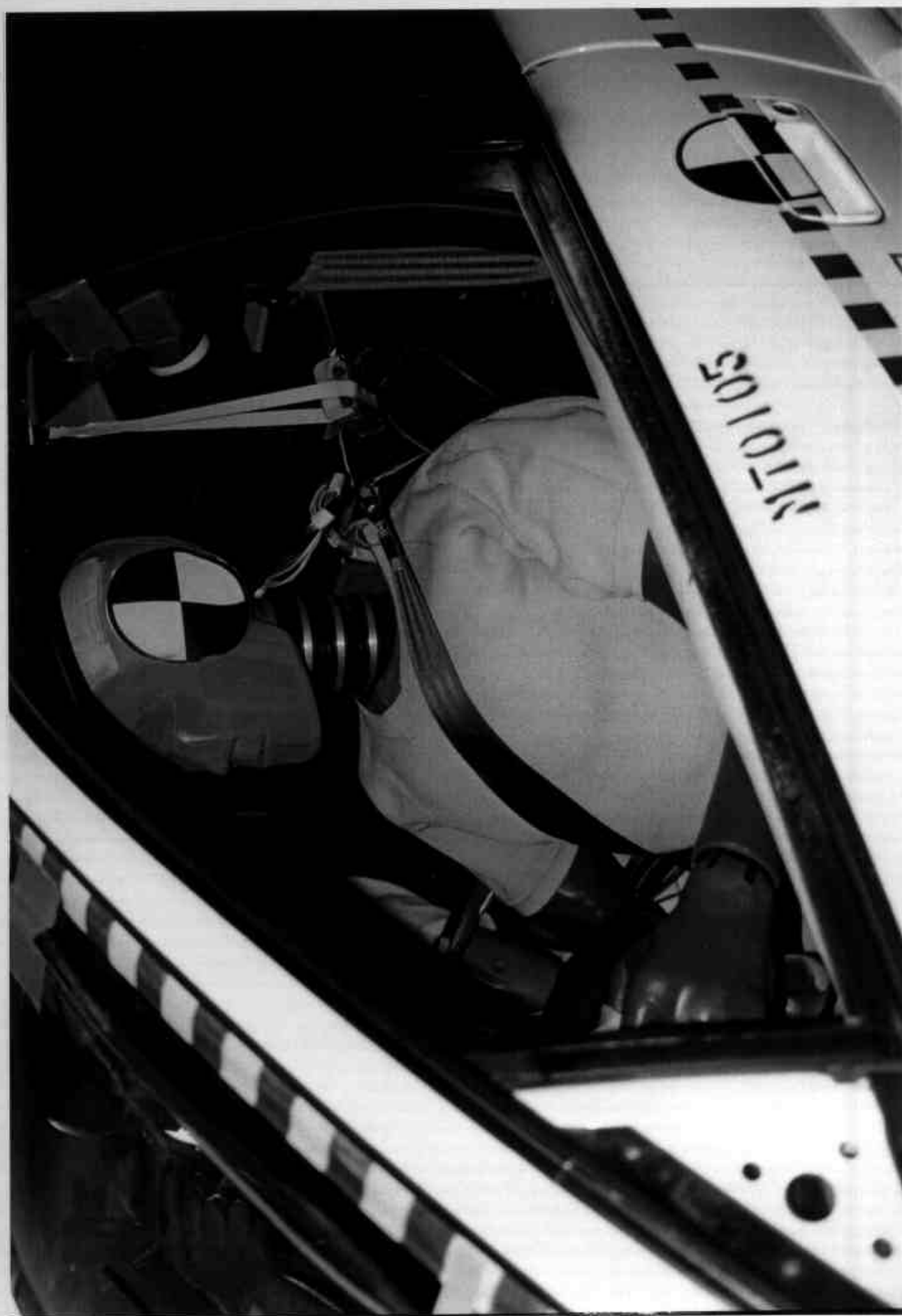


Figure A-22 PRE-TEST DRIVER POSITION VIEW



Figure A-23 POST-TEST DRIVER POSITION VIEW

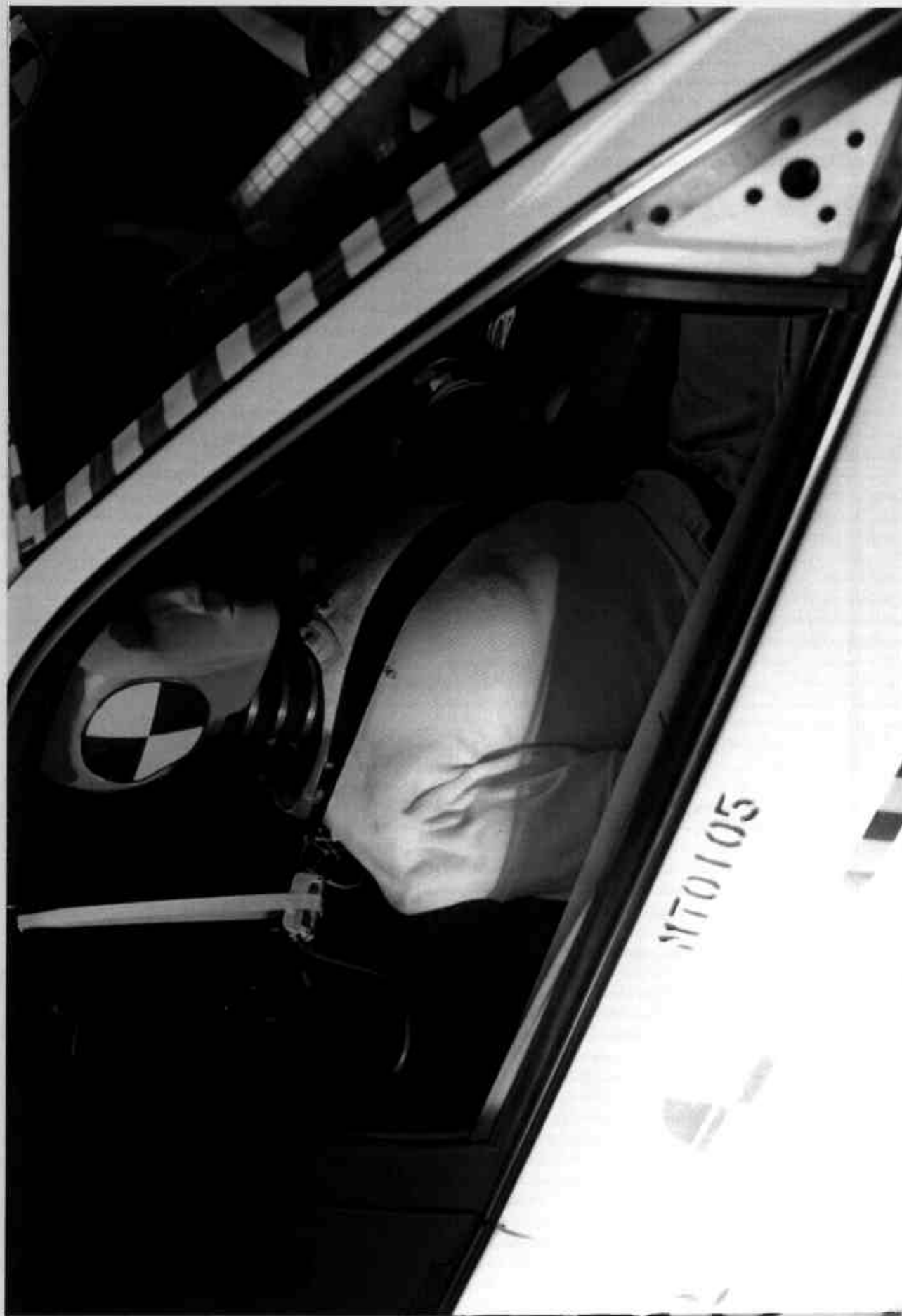


Figure A-24 PRE-TEST PASSENGER POSITION VIEW



Figure A-25 POST-TEST PASSENGER POSITION VIEW

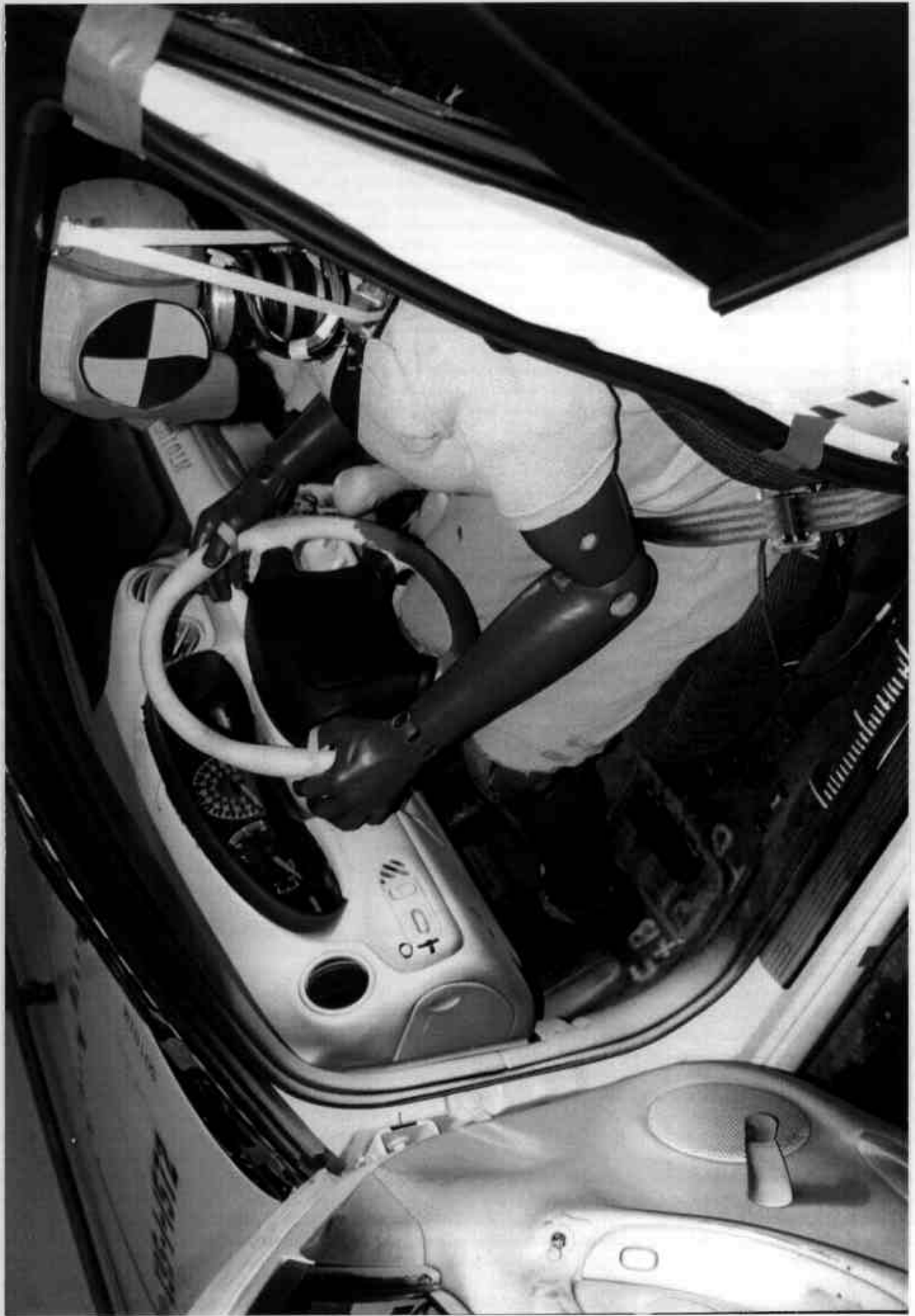


Figure A-26 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW



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



Figure A-28 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW



Figure A-29 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW

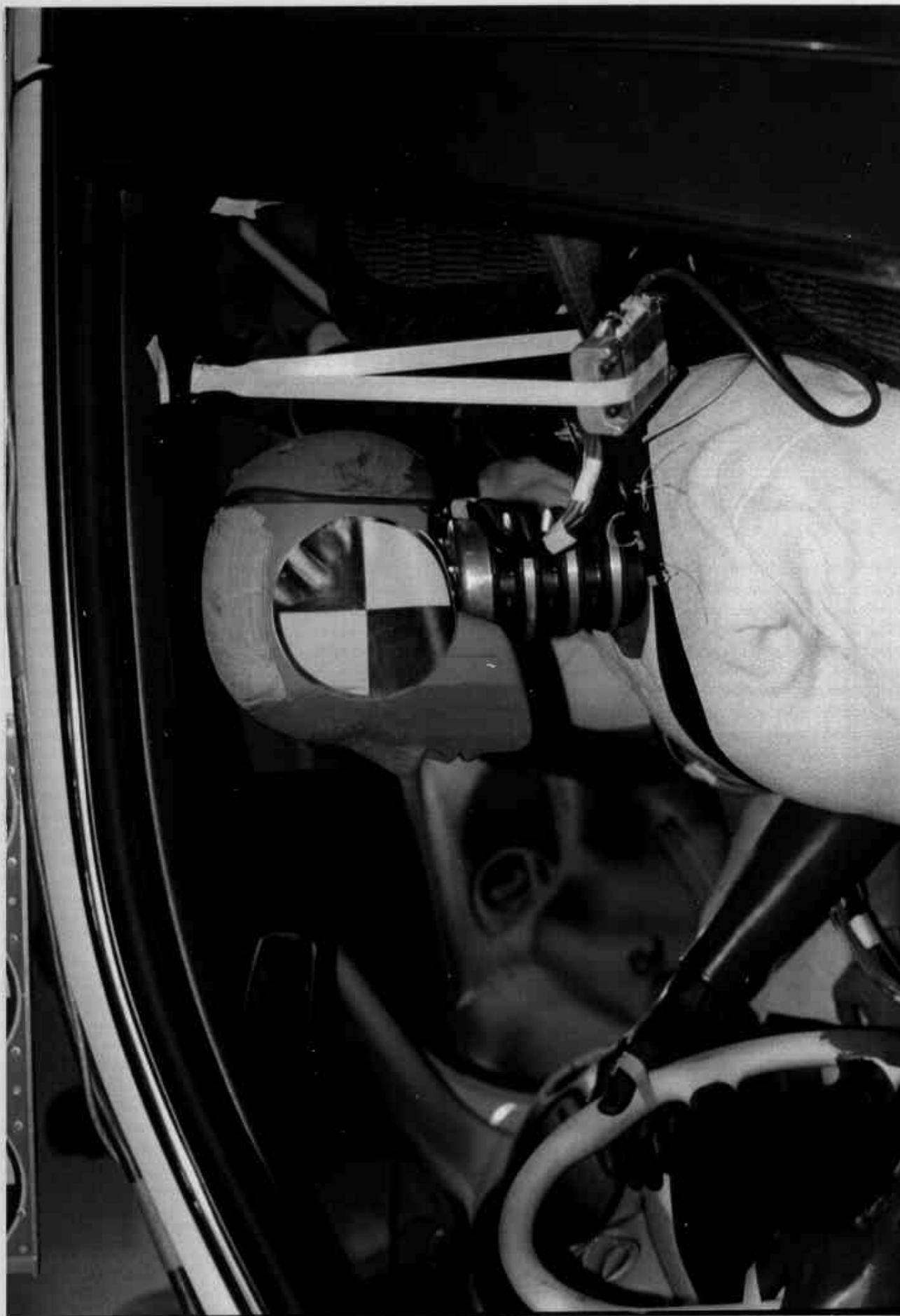


Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION



Figure A-32 PRE-TEST PASSENGER HEAD LOCATION



Figure A-33 POST-TEST PASSENGER HEAD LOCATION



Figure A-34 PRE-TEST DRIVER FLOOR PAN VIEW



Figure A-35 POST-TEST DRIVER FLOOR PAN VIEW



Figure A-36 PRE-TEST PASSENGER FLOOR PAN VIEW



Figure A-37 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-38 ROLLOVER VIEW

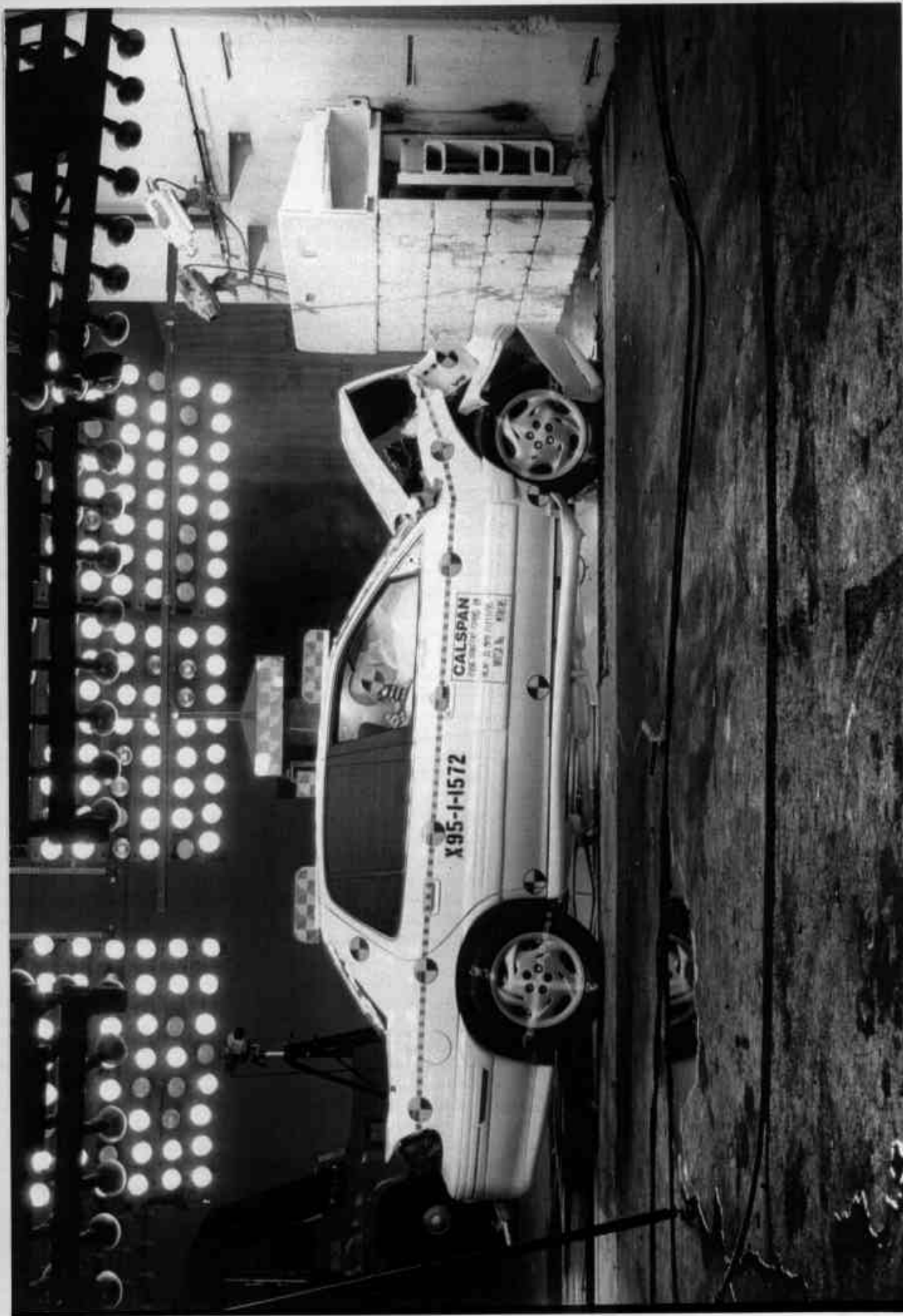


Figure A-39 IMPACT VIEW

Appendix B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

TEST NO. MT0105

DUMMY DATA

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

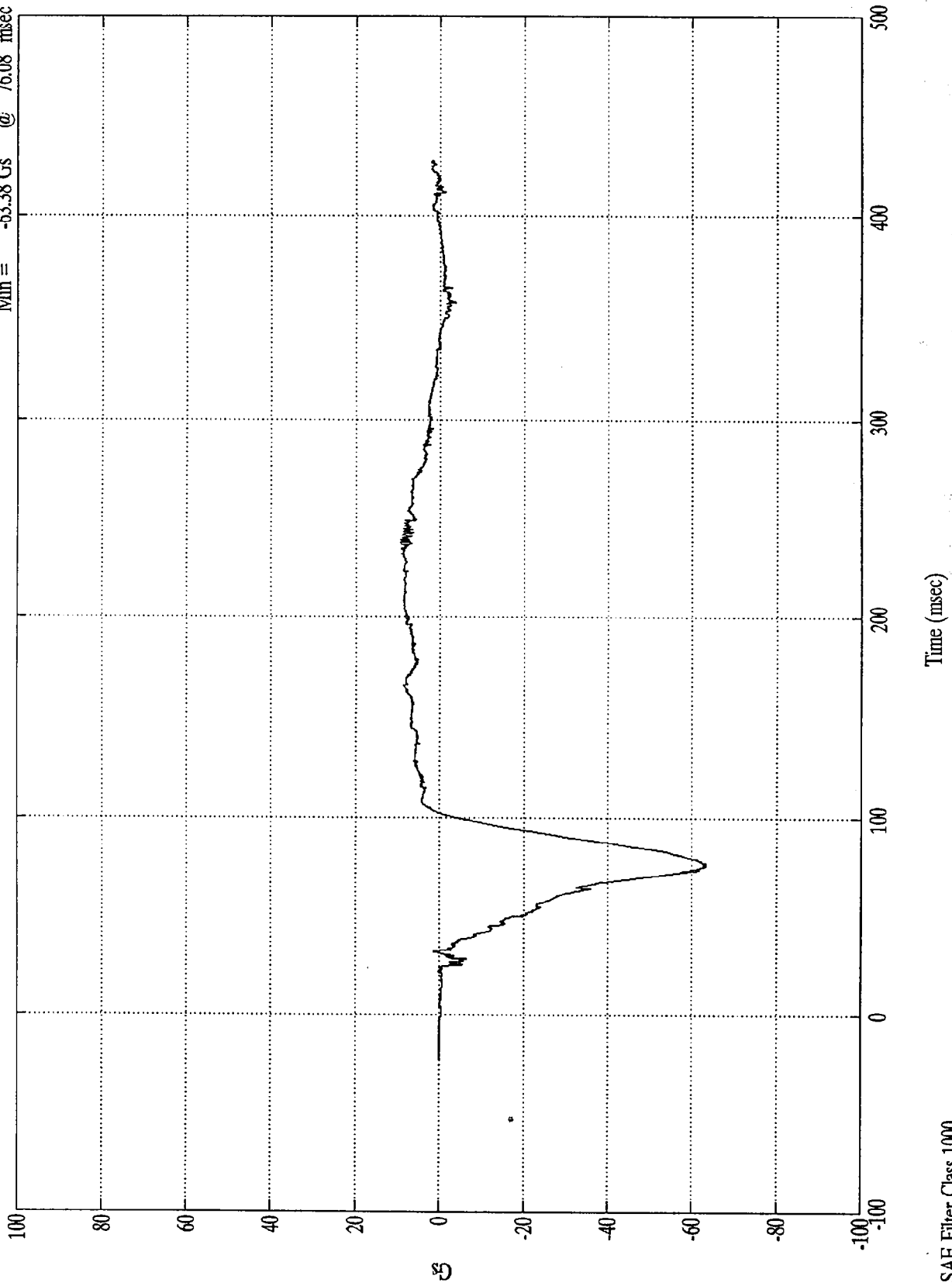
**Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers**

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

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Head X

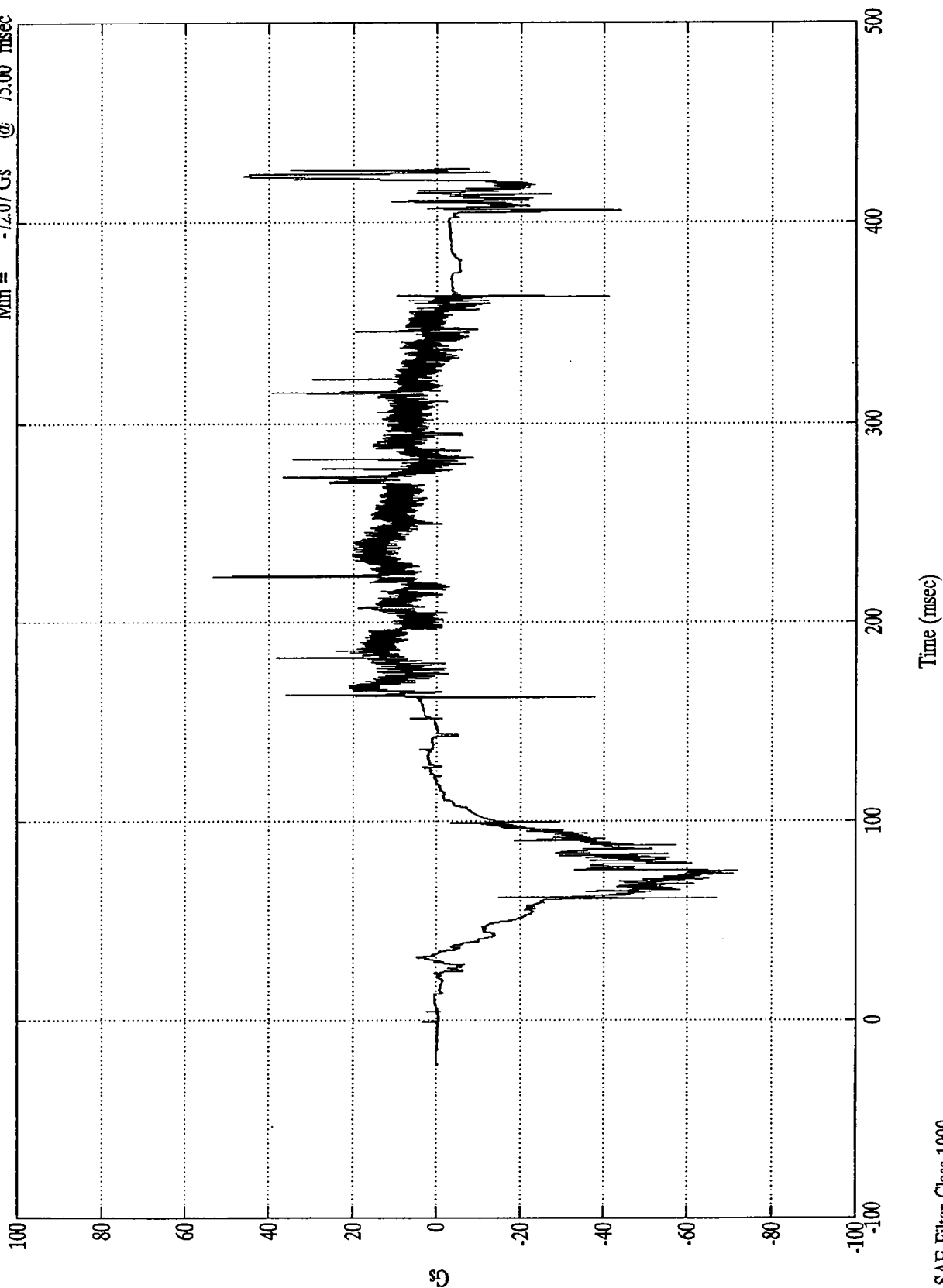
Max = 9.51 Gs @ 237.96 msec
Min = -53.38 Gs @ 76.08 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Head X(R)

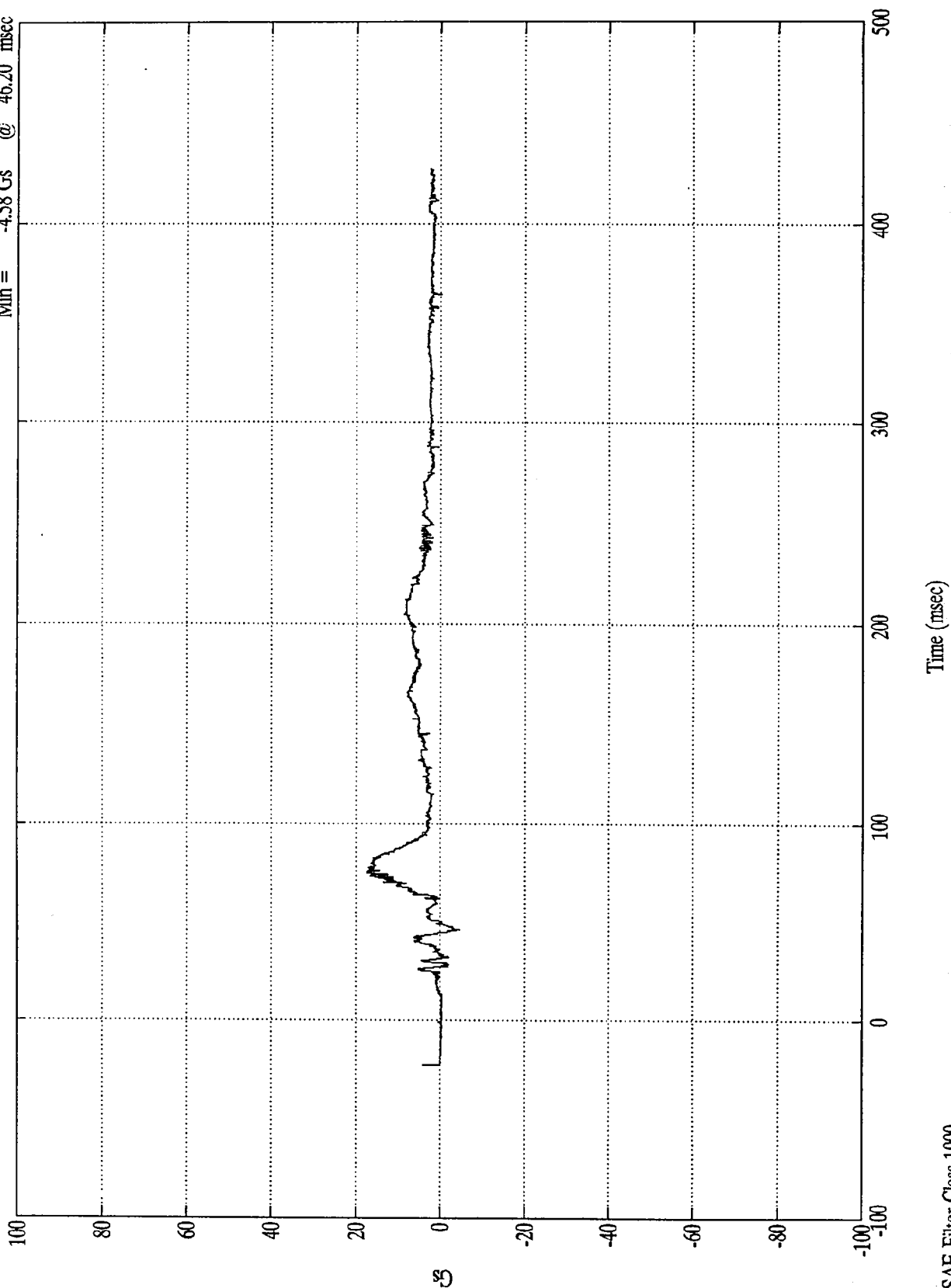
Max = 53.34 Gs @ 223.32 msec
Min = -72.07 Gs @ 75.00 msec



SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

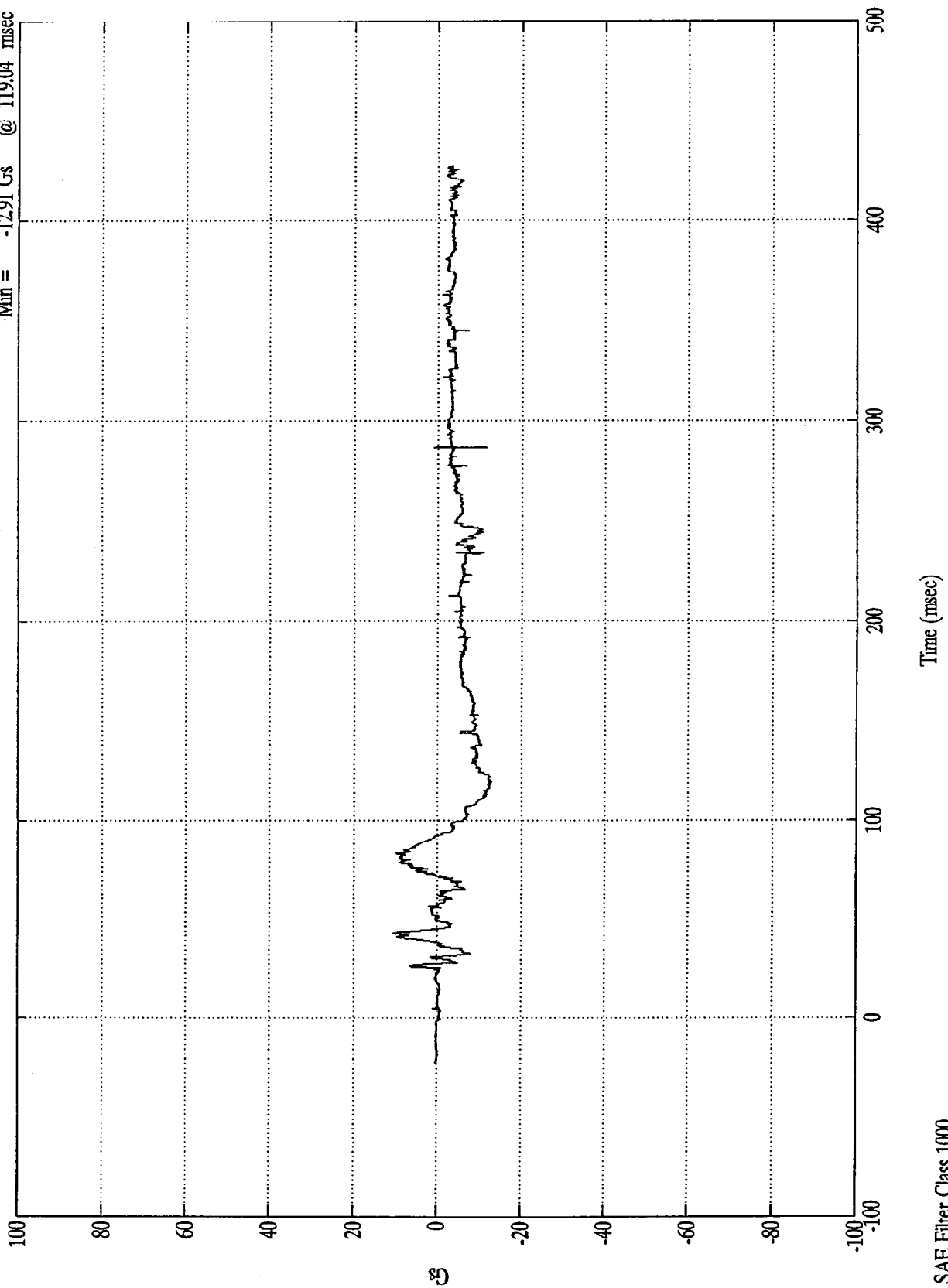
Pos. 1 Head Y
 Max = 17.55 Gs @ 75.60 msec
 Min = -4.58 Gs @ 46.20 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Head Y(R)

Max = 10.43 Gs @ 42.60 msec
Min = -12.91 Gs @ 119.04 msec

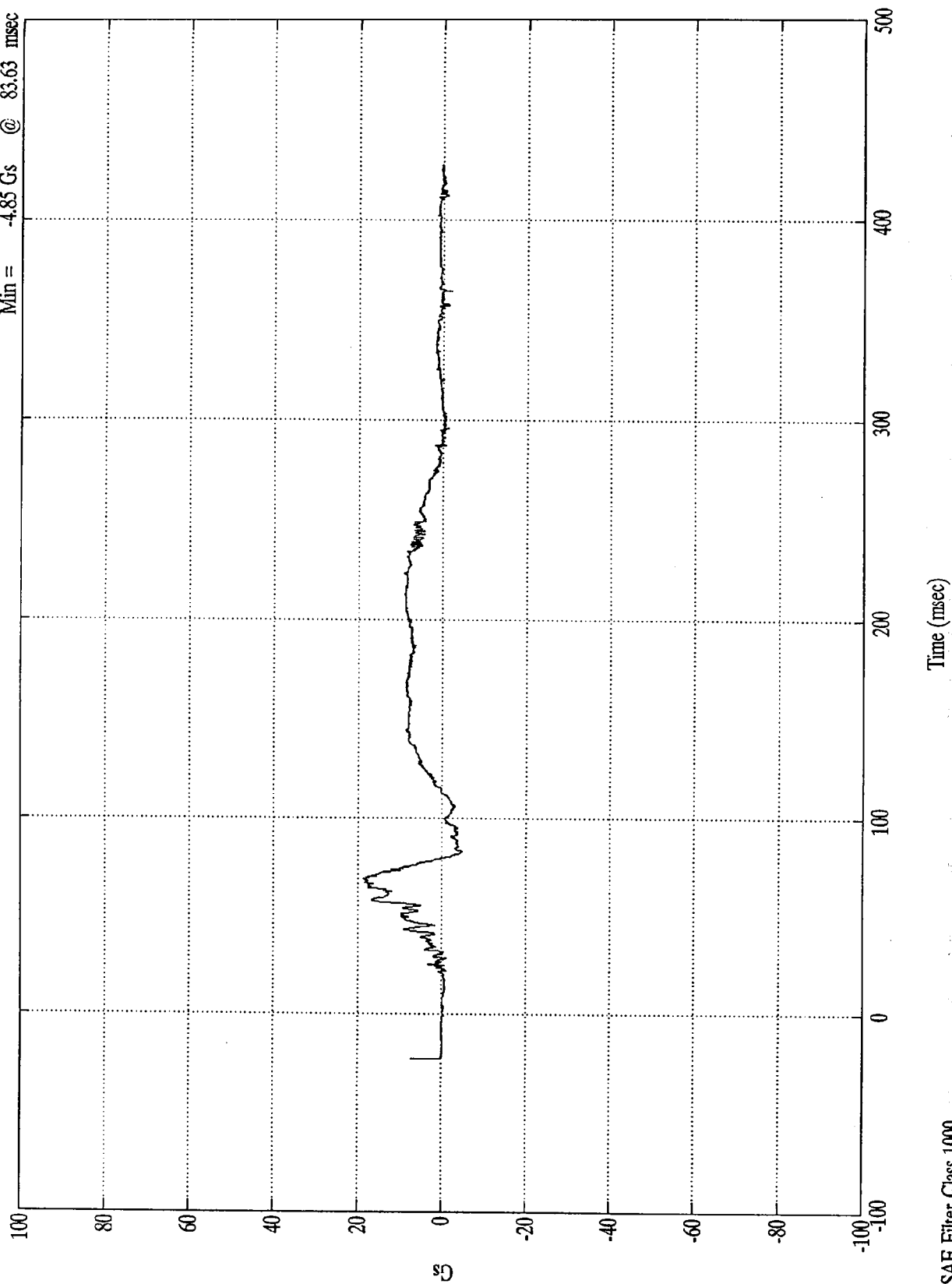


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Head Z

Max = 18.56 Gs @ 69.24 msec
Min = -4.85 Gs @ 83.63 msec

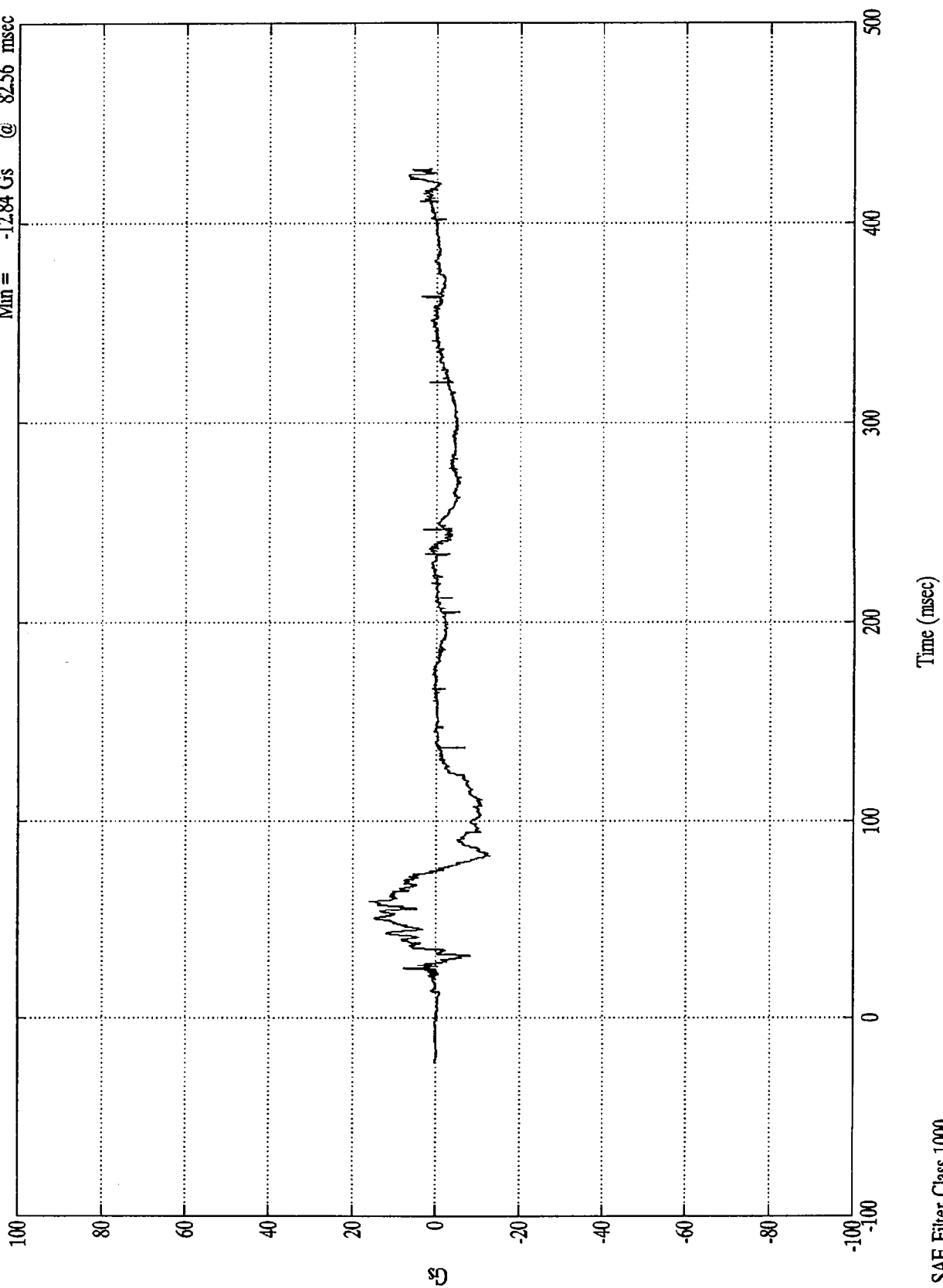


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Head Z(R)

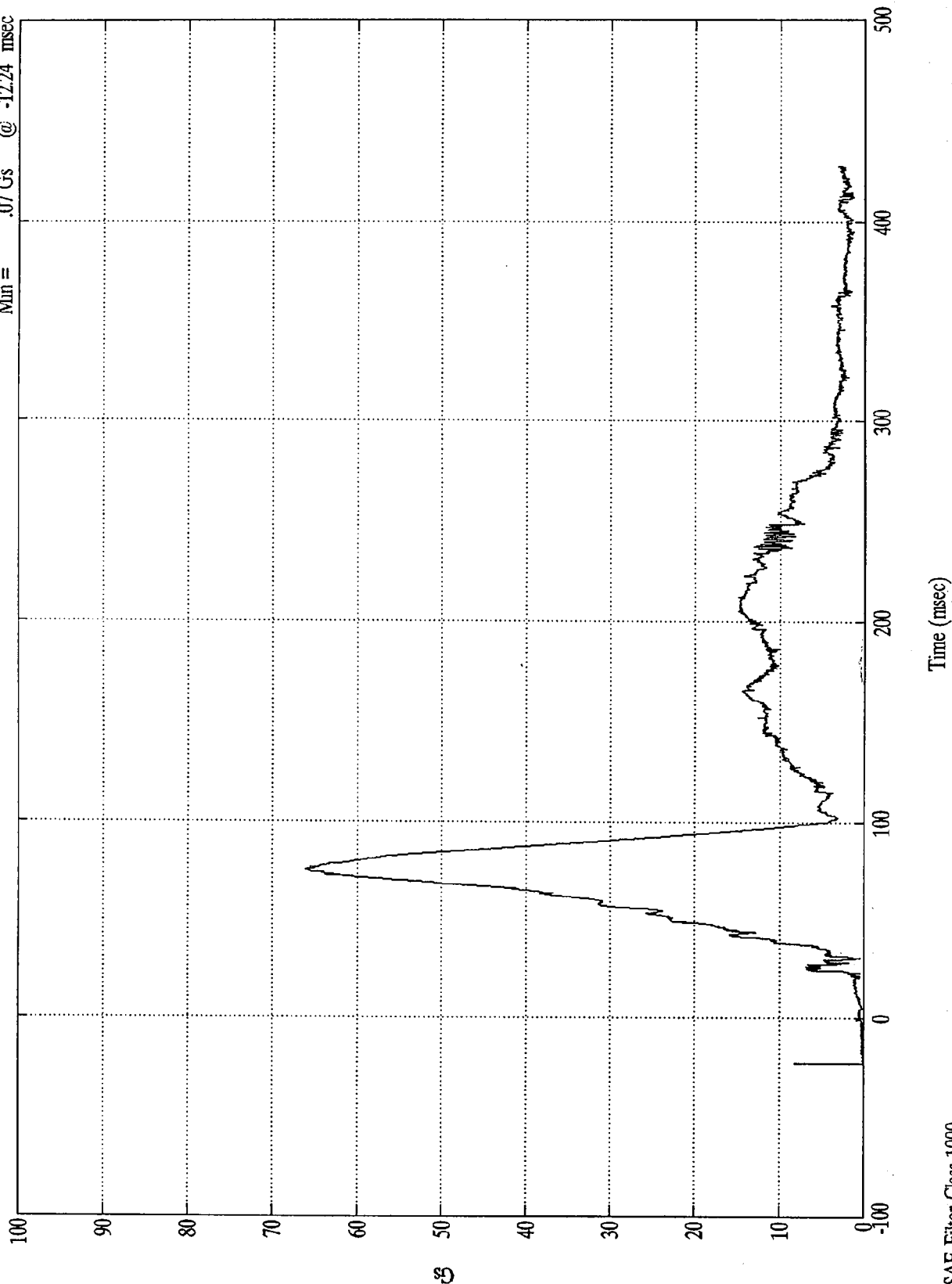
Max = 15.84 Gs @ 59.04 msec
Min = -12.84 Gs @ 82.56 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 66.12 Gs @ 76.08 msec
 Min = .07 Gs @ -12.24 msec

Pos. 1 Head Resultant

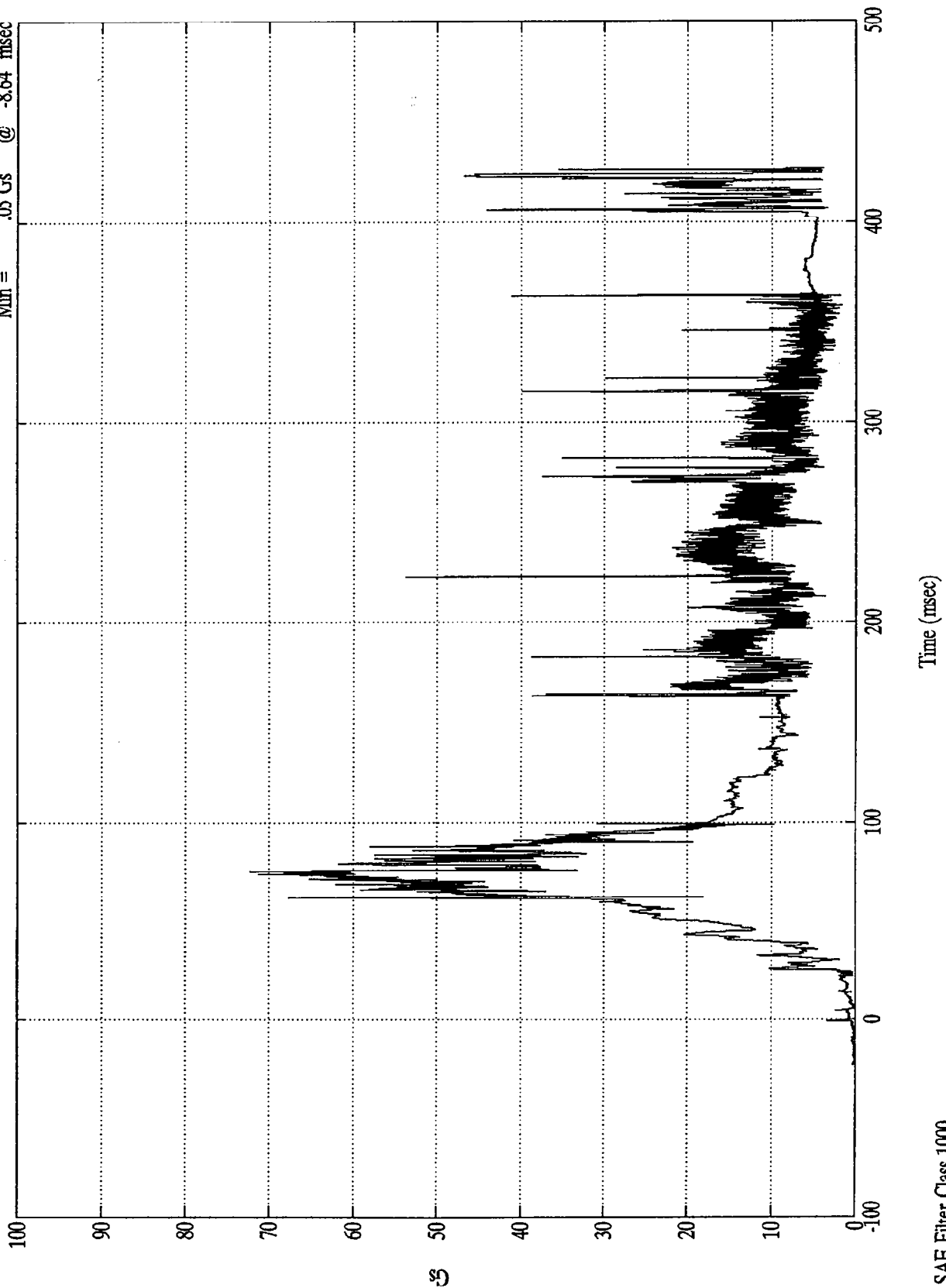


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Head Resultant(RR)

Max = 72.22 Gs @ 75.00 msec
Min = .05 Gs @ -8.64 msec

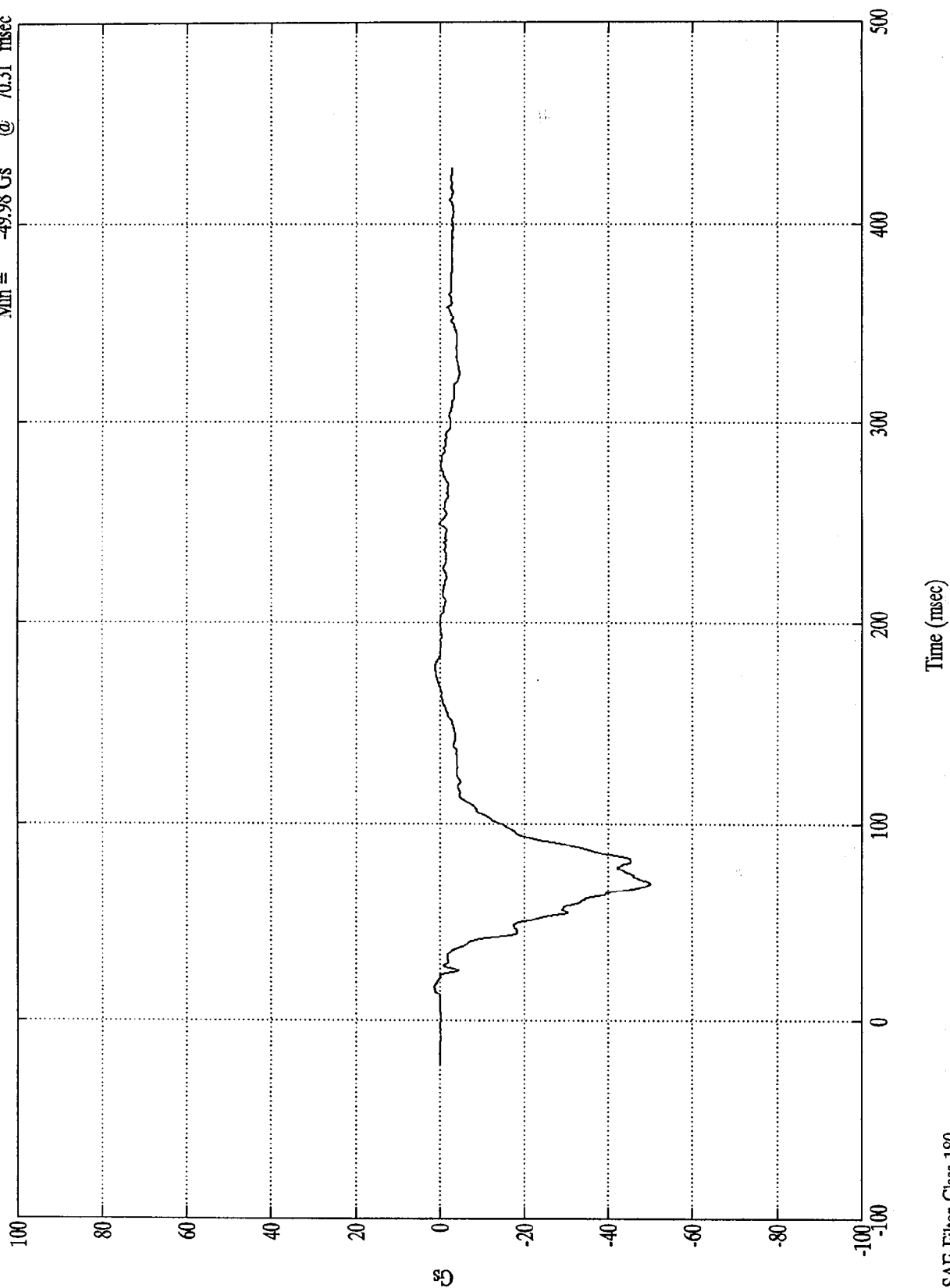


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Chest X

Max = 1.40 Gs @ 17.39 msec
Min = -49.98 Gs @ 70.31 msec

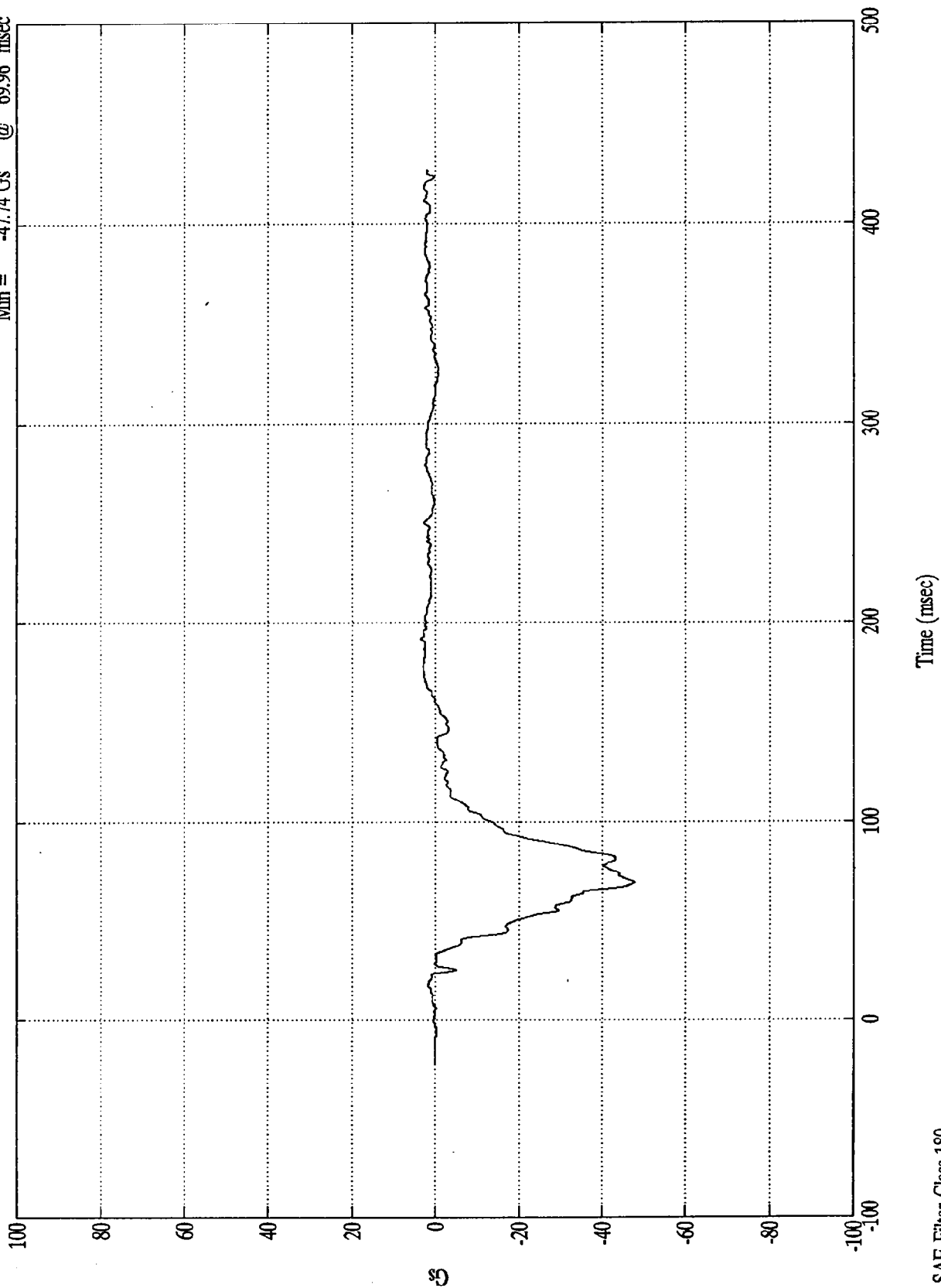


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

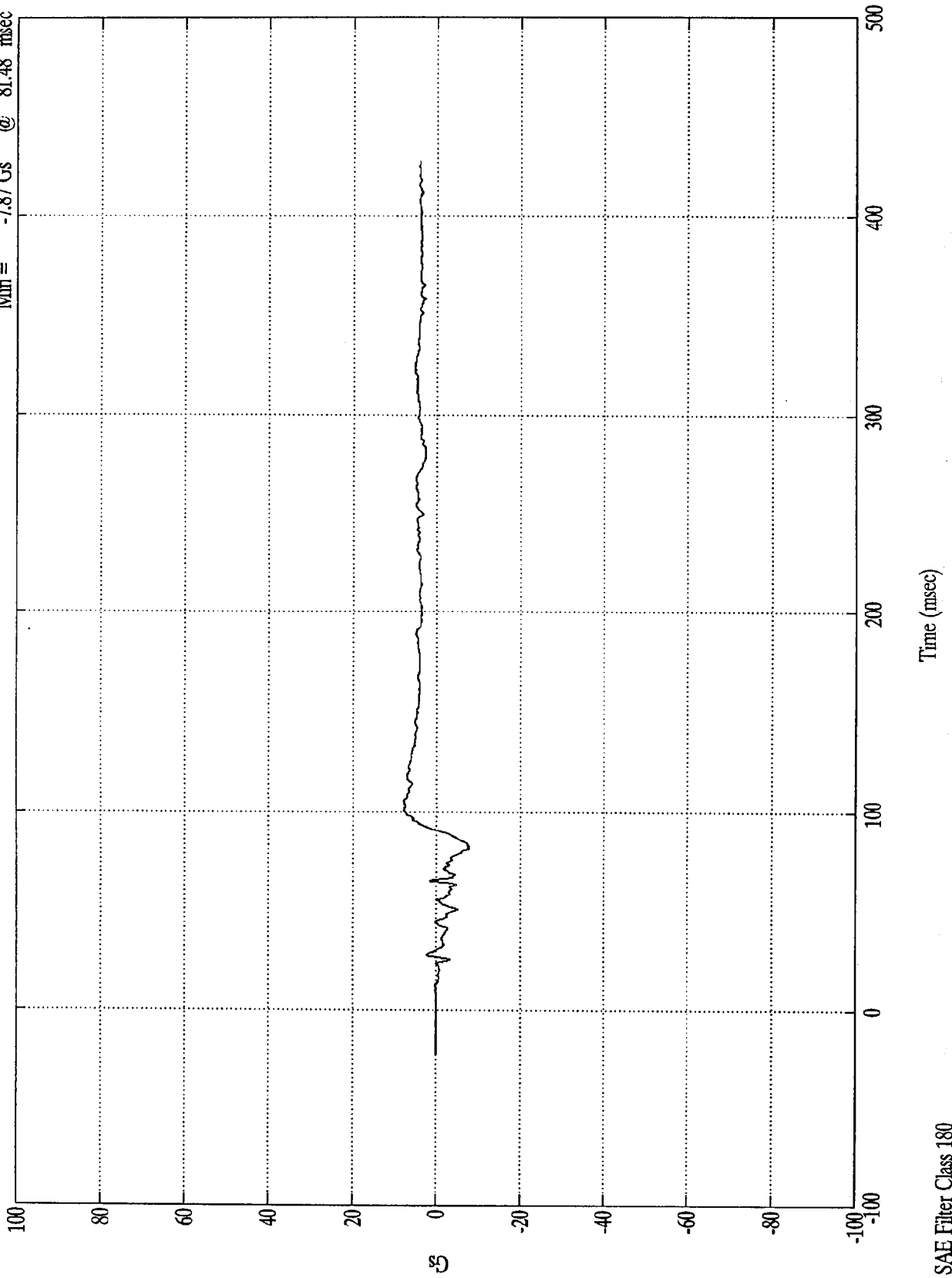
Pos. 1 Chest X(R)

Max = 3.61 Gs @ 192.00 msec
Min = -47.74 Gs @ 69.96 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

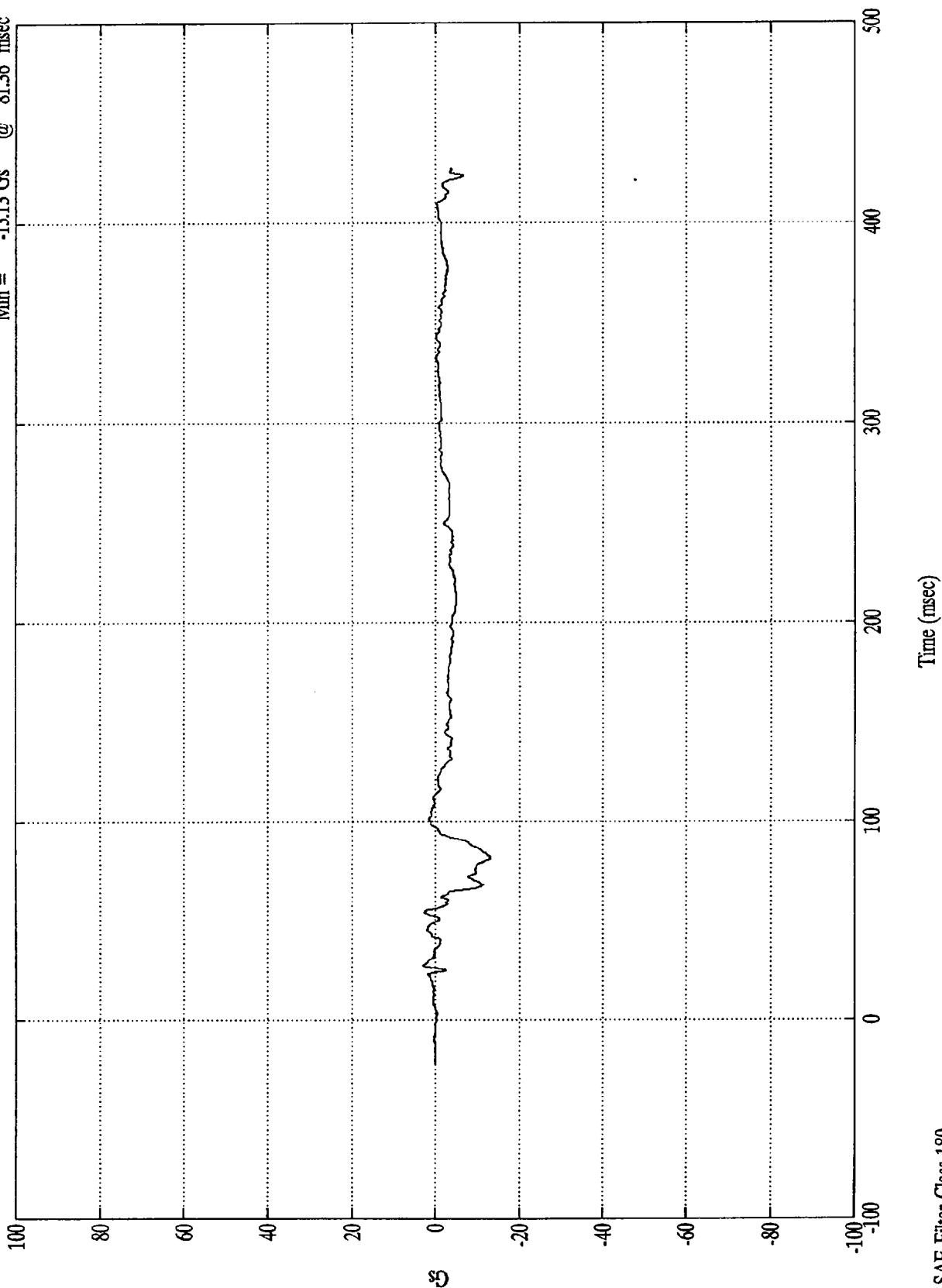
Pos. 1 Chest Y
Max = 7.79 Gs @ 105.96 msec
Min = -7.87 Gs @ 81.48 msec



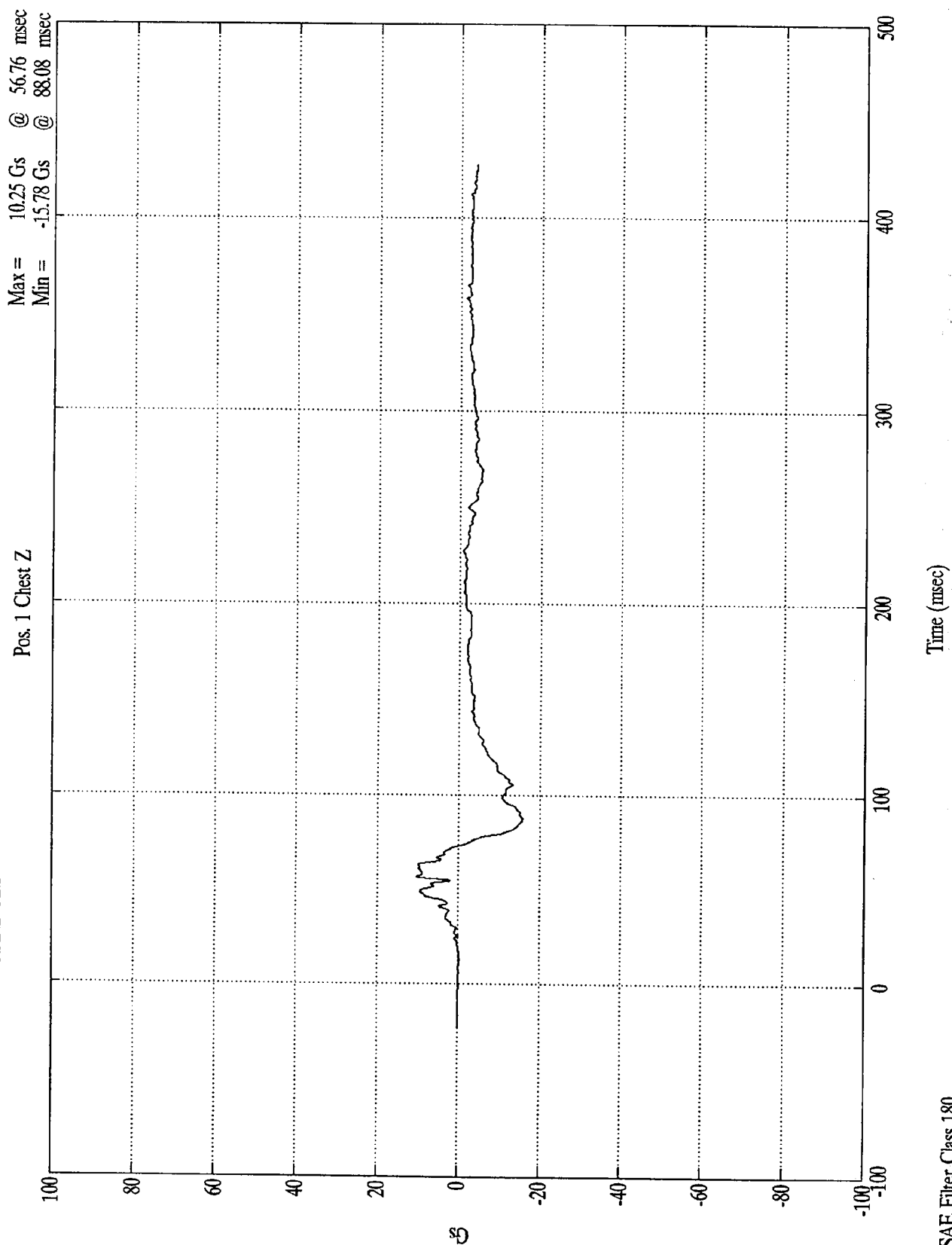
NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Chest Y(R)

Max = 2.94 Gs @ 27.72 msec
Min = -13.13 Gs @ 81.36 msec



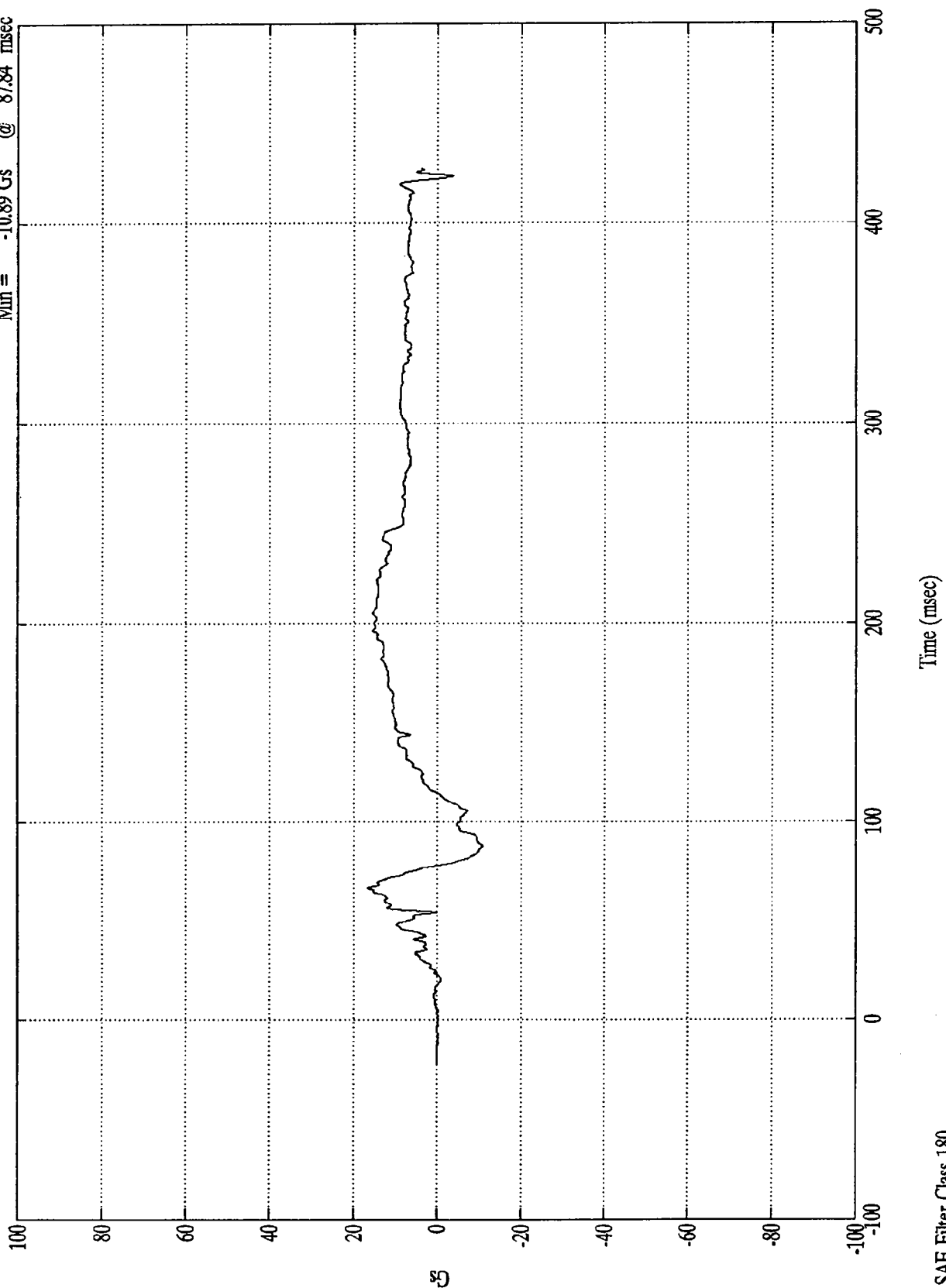
NCAP TEST #1 - 1996 PONTIAC GRAND AM



NCAP TEST #1 - 1996 PONTIAC GRAND AM

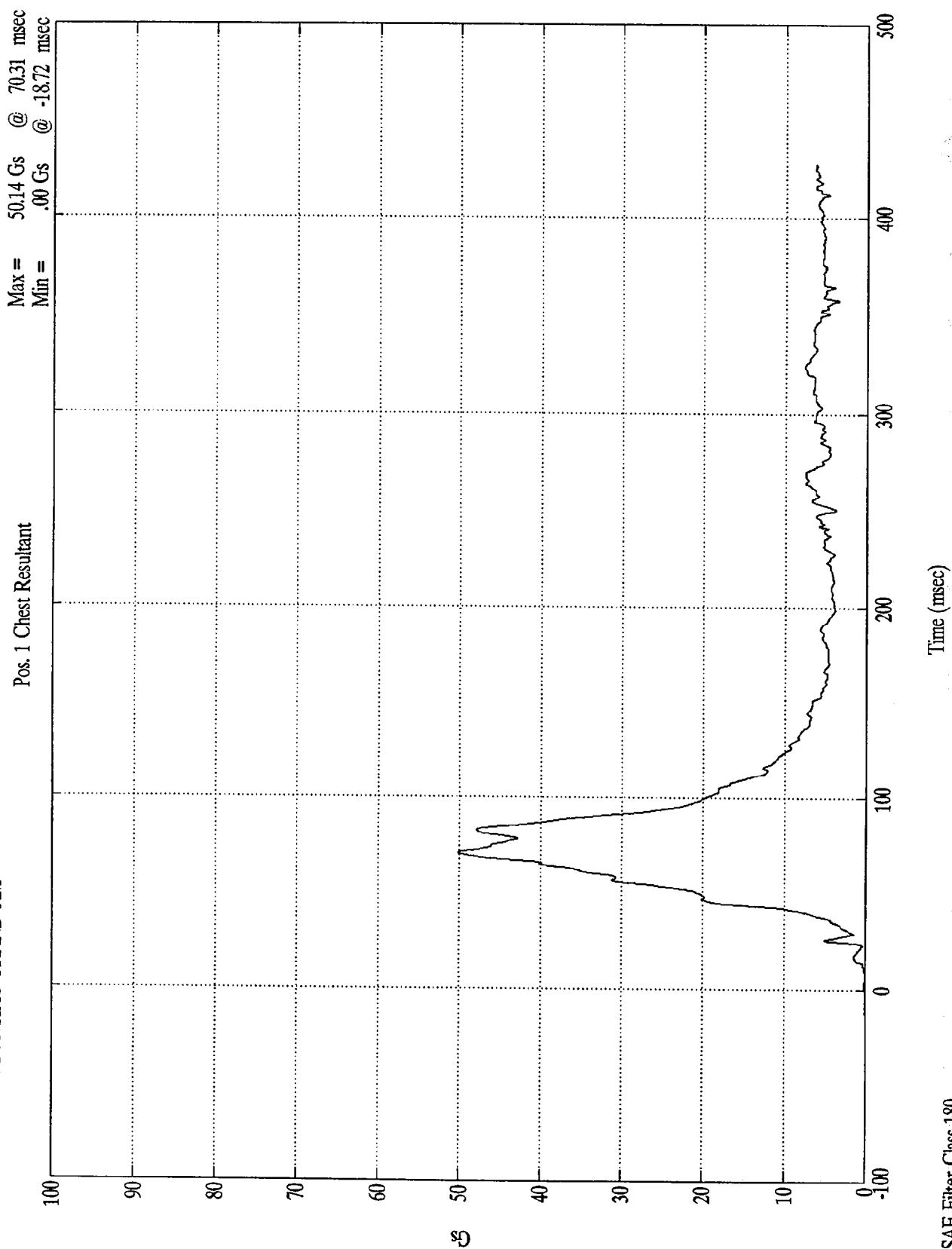
Pos. 1 Chest Z(R)

Max = 16.49 Gs @ 67.20 msec
Min = -10.89 Gs @ 87.84 msec



SAE Filter Class 180

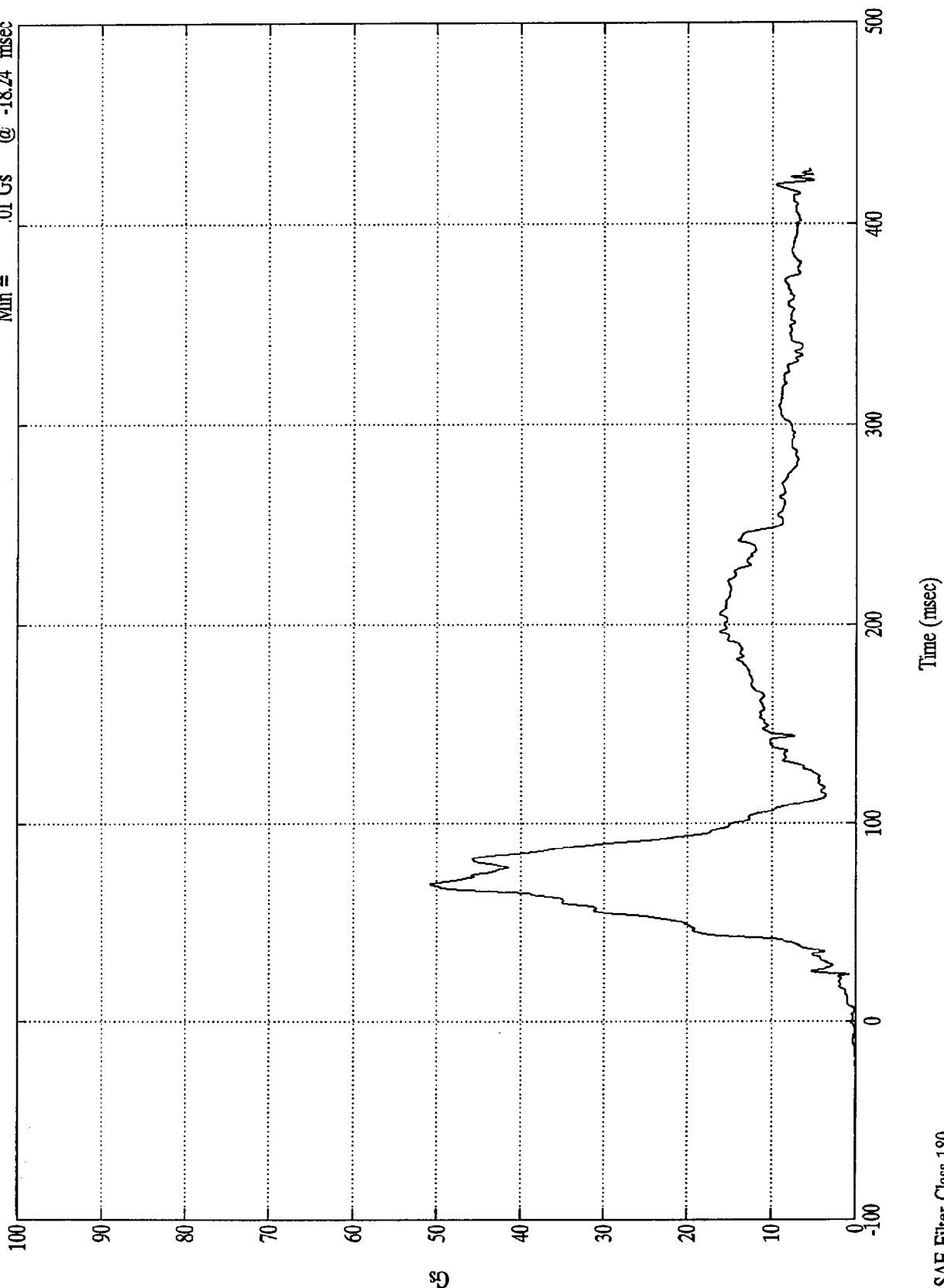
NCAP TEST #1 - 1996 PONTIAC GRAND AM



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Chest Res(RR)

Max = 50.84 Gs @ 69.83 msec
Min = .01 Gs @ -18.24 msec



SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

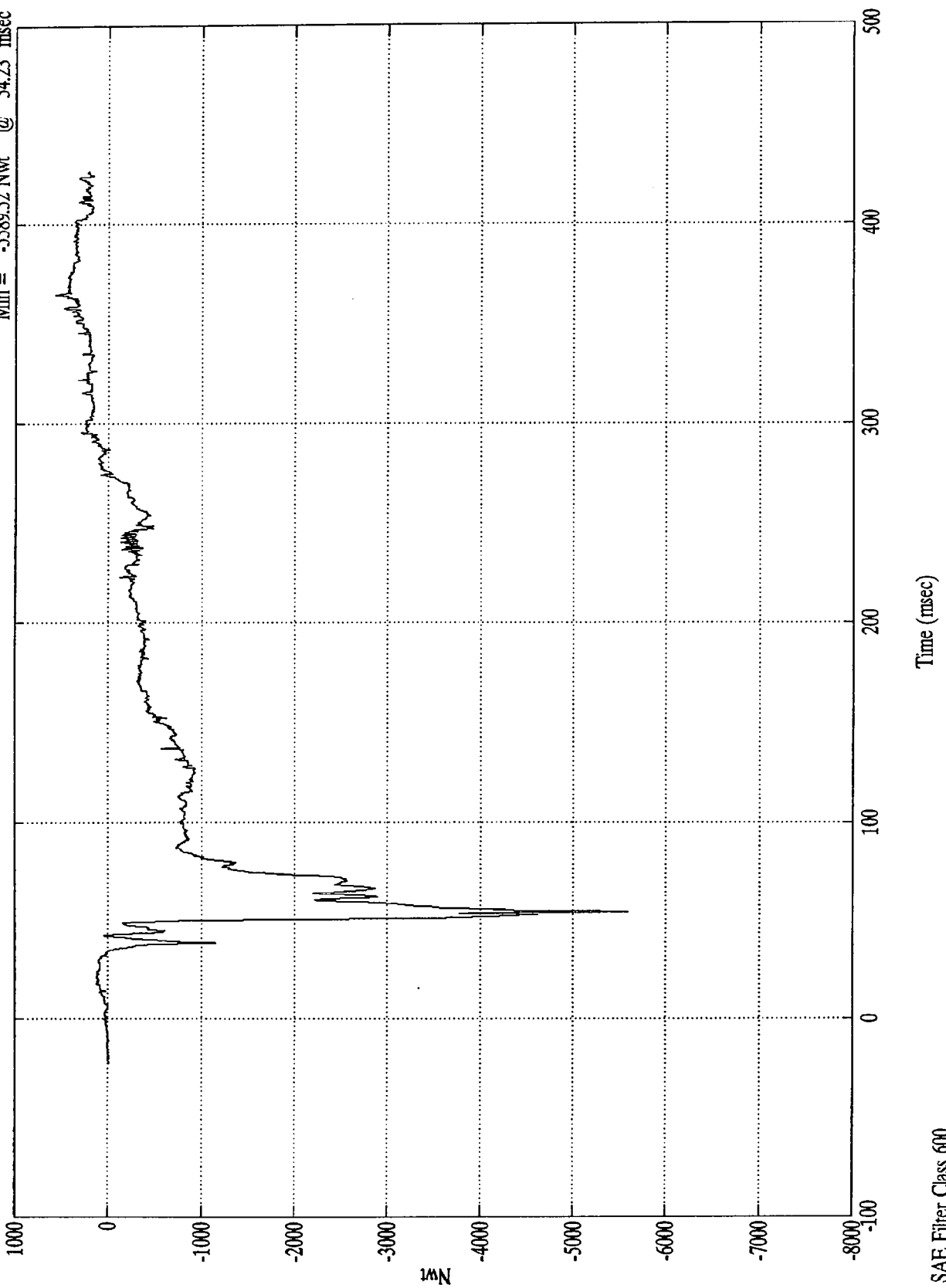
Pos. 1 Chest Disp.

Max = .20 mm @ 2.75 msec
Min = -31.92 mm @ 72.84 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

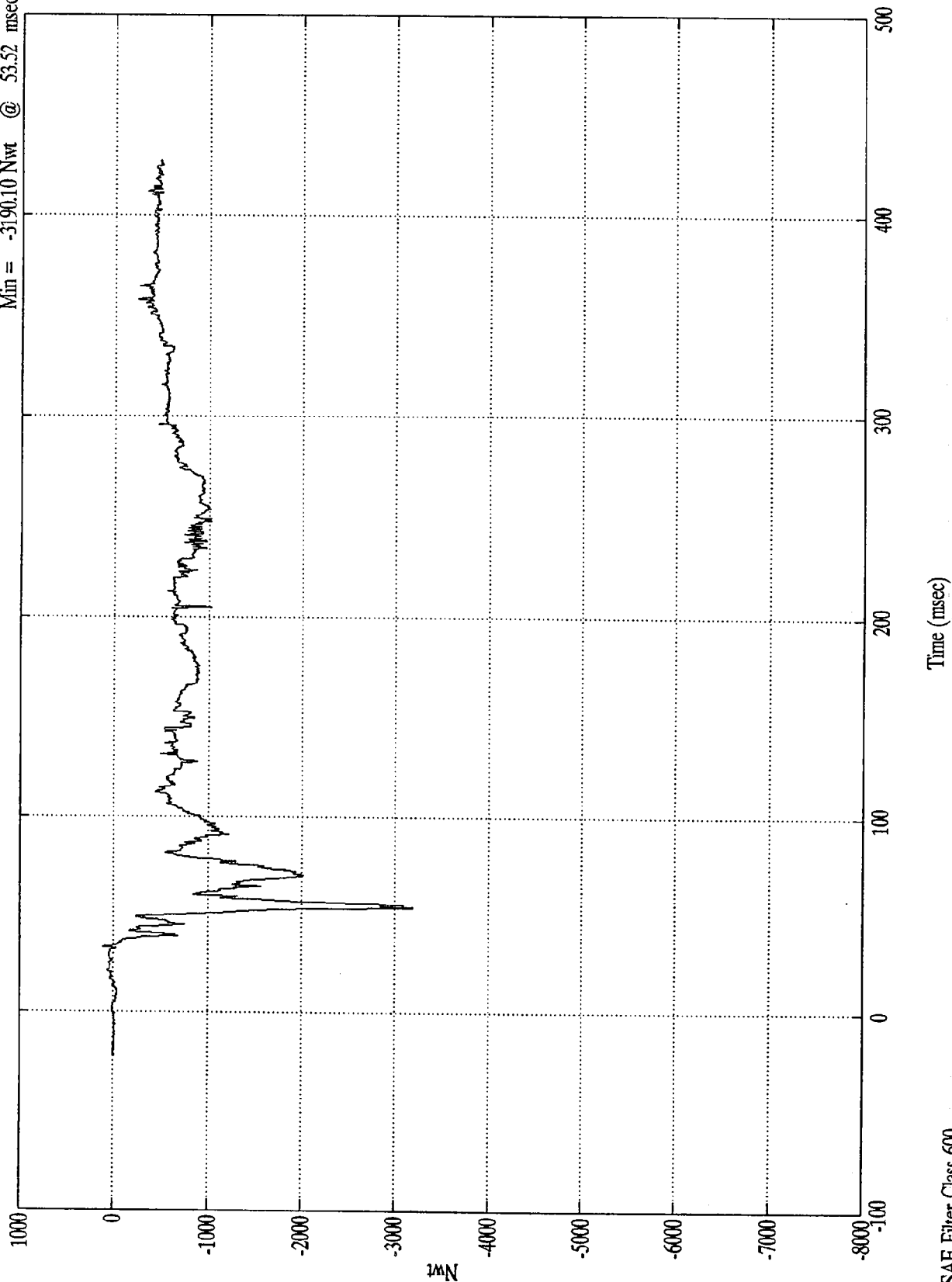
Pos. 1 Left Femur
Max = 564.61 Nwt @ 364.80 msec
Min = -5589.52 Nwt @ 54.23 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Right Femur

Max = 110.73 Nwt @ 32.76 msec
Min = -3190.10 Nwt @ 53.52 msec

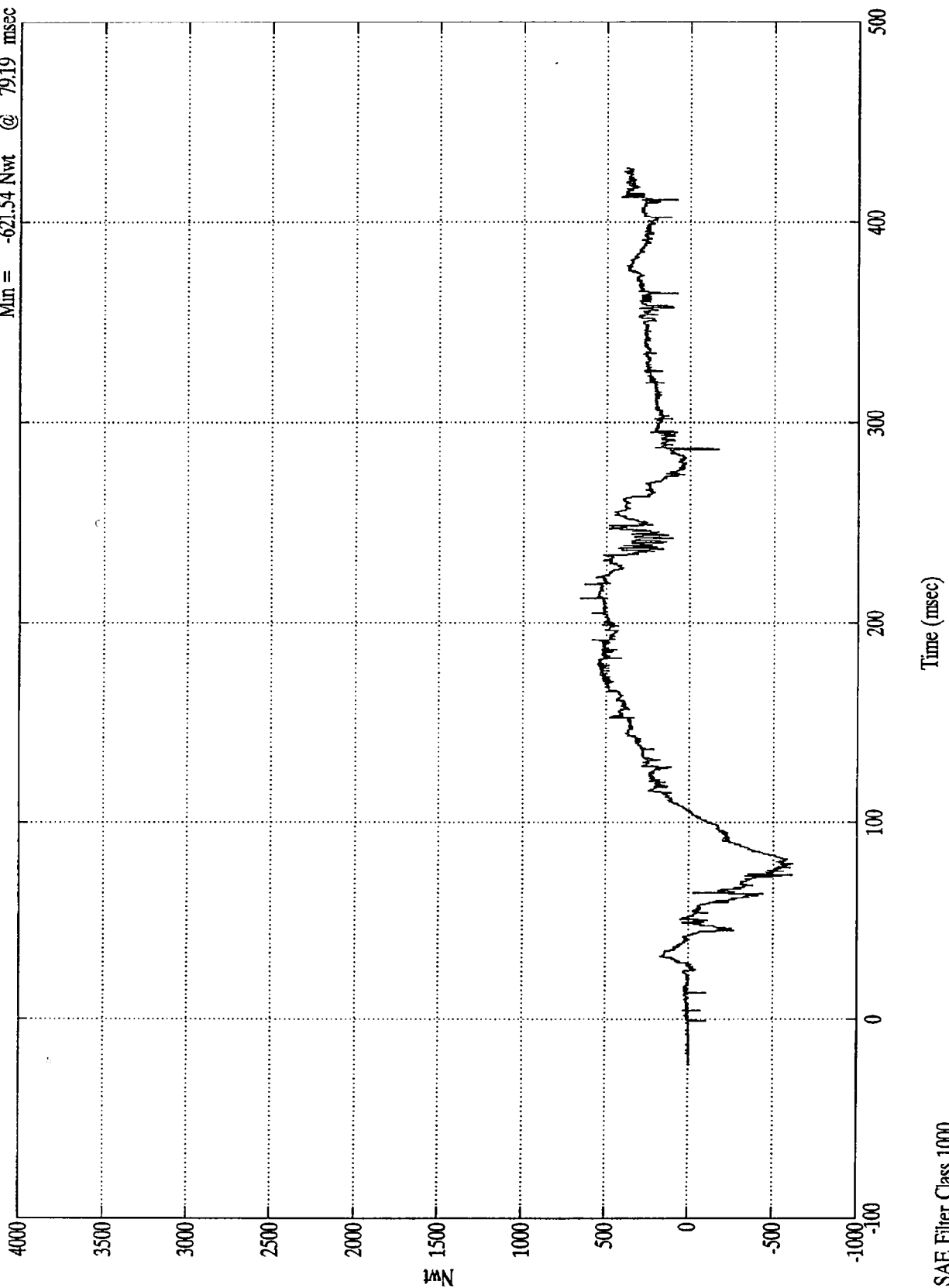


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Upper Neck Fx

Max = 658.49 Nwt @ 212.88 msec
Min = -621.54 Nwt @ 79.19 msec

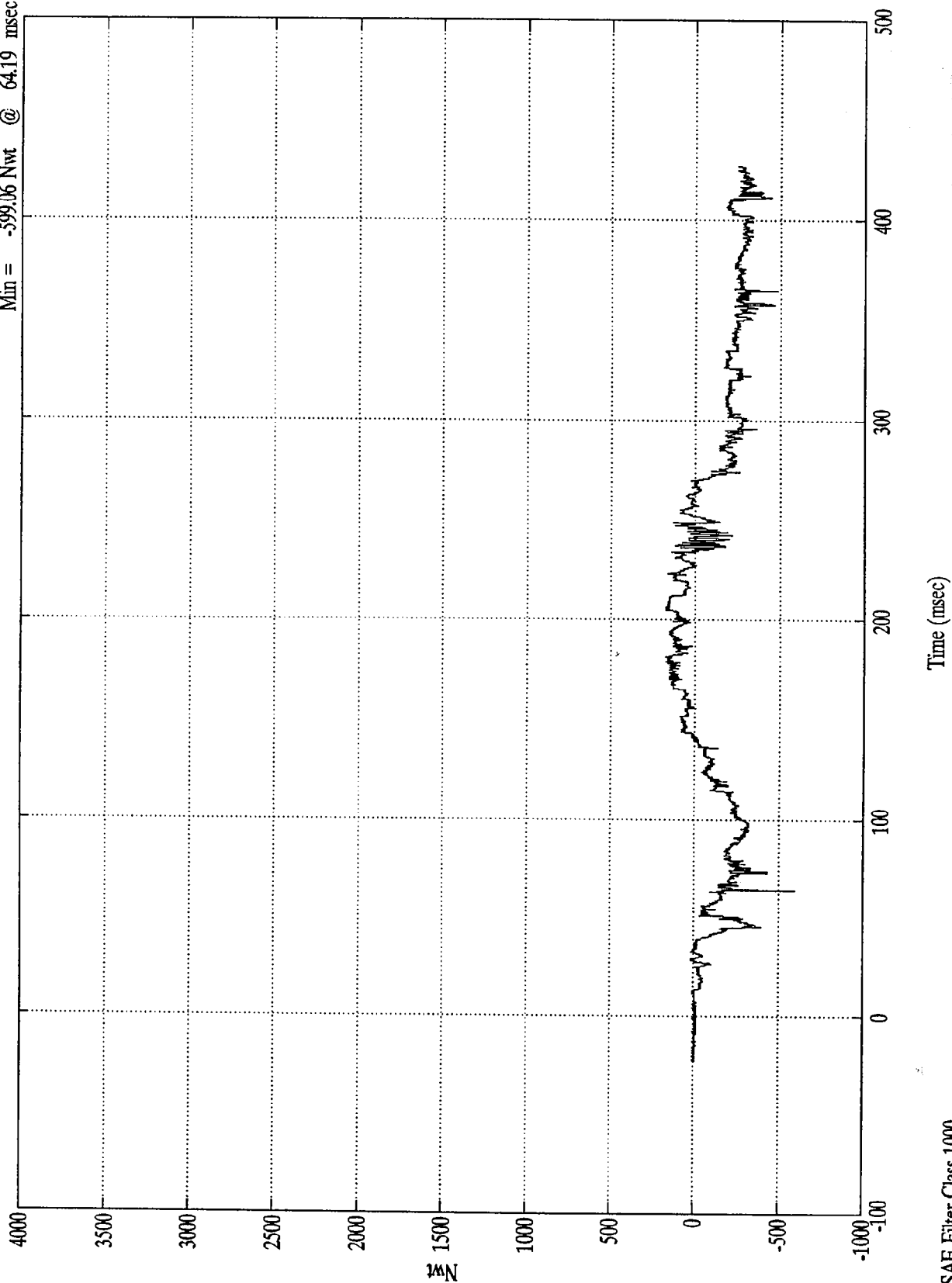


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Upper Neck Fy

Max = 172.58 Nwt @ 207.36 msec
Min = -599.06 Nwt @ 64.19 msec

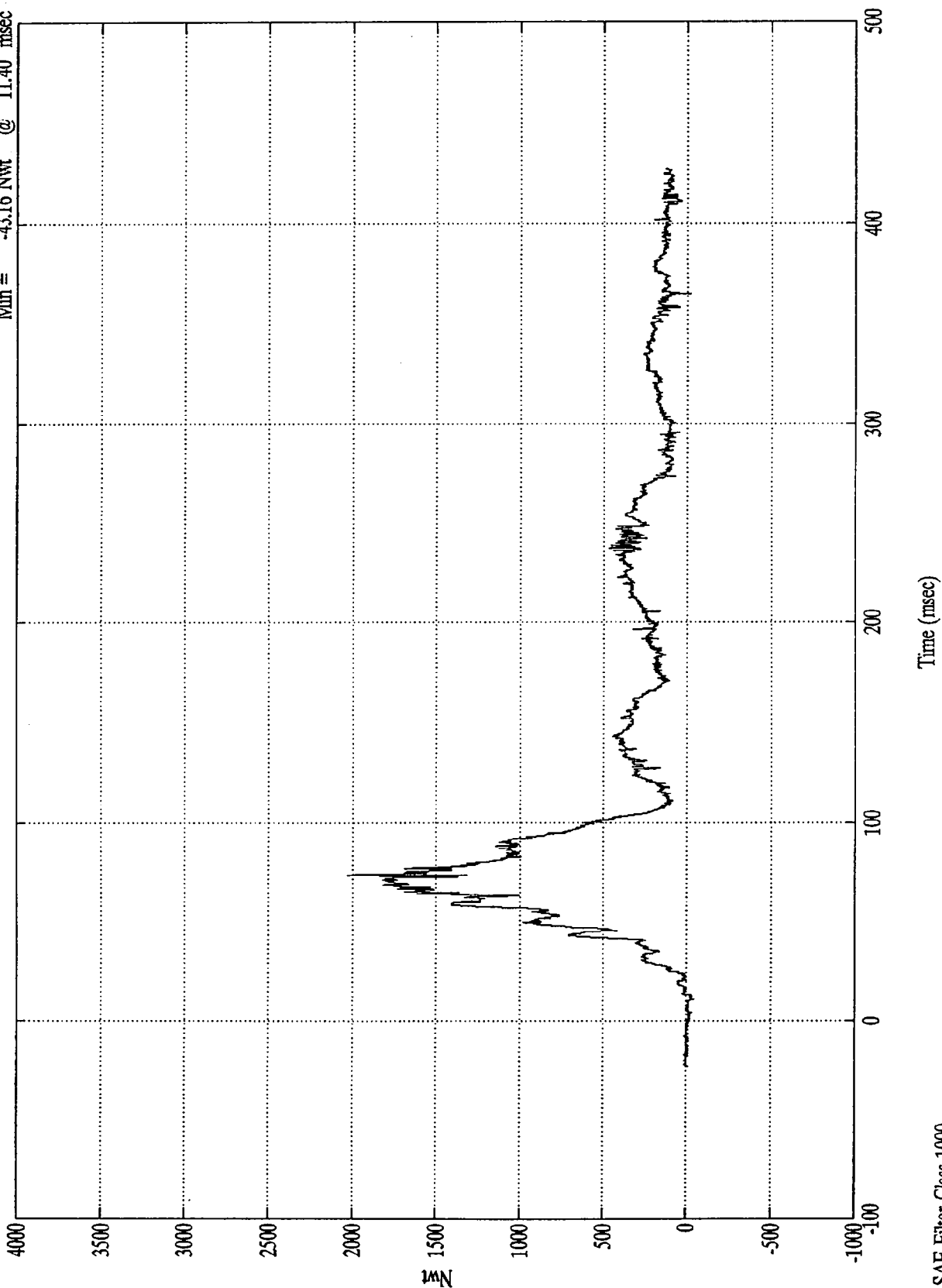


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Upper Neck Fz

Max = 2034.55 Nwt @ 73.80 msec
Min = -43.16 Nwt @ 11.40 msec

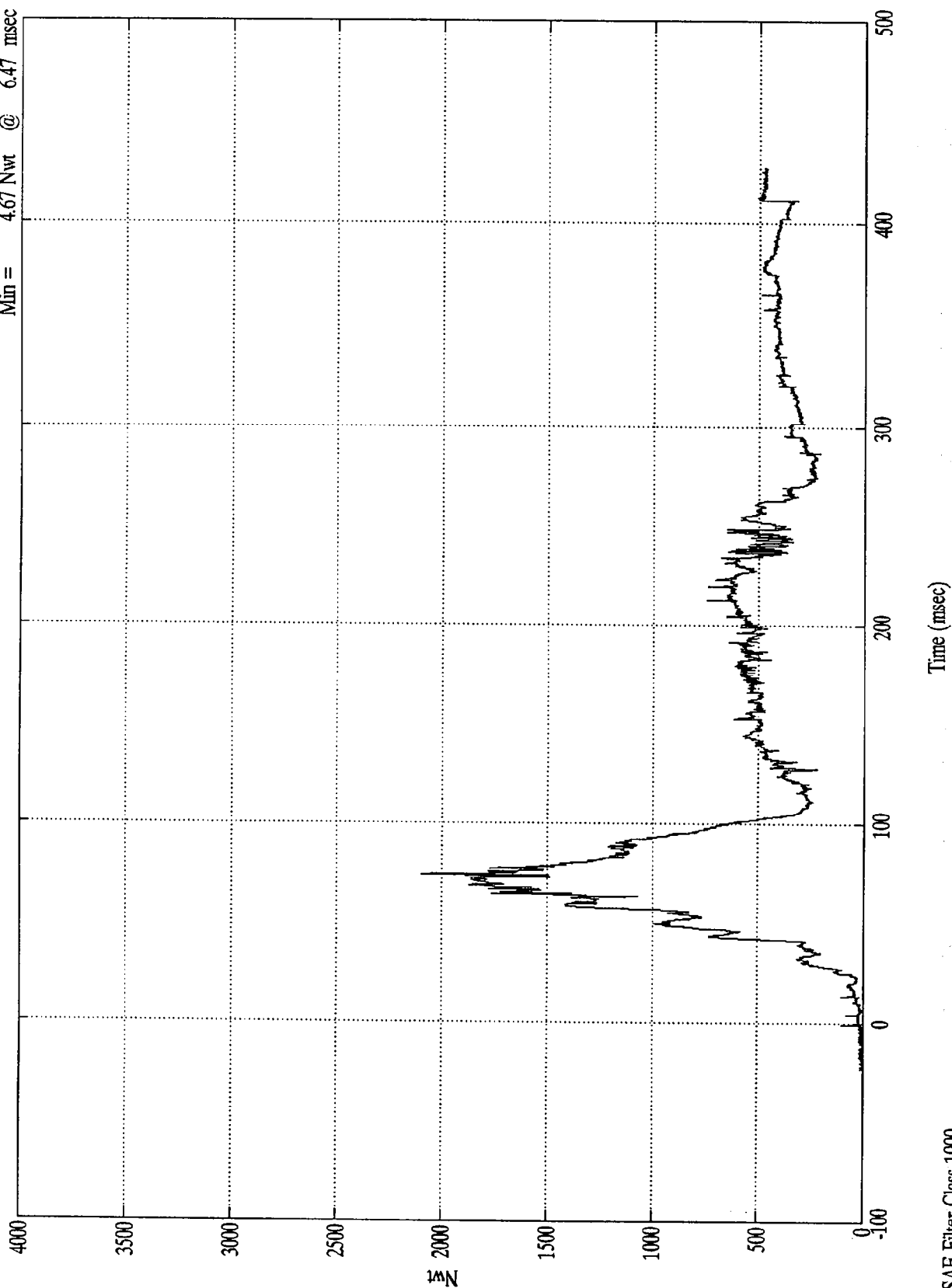


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Neck Force Res.

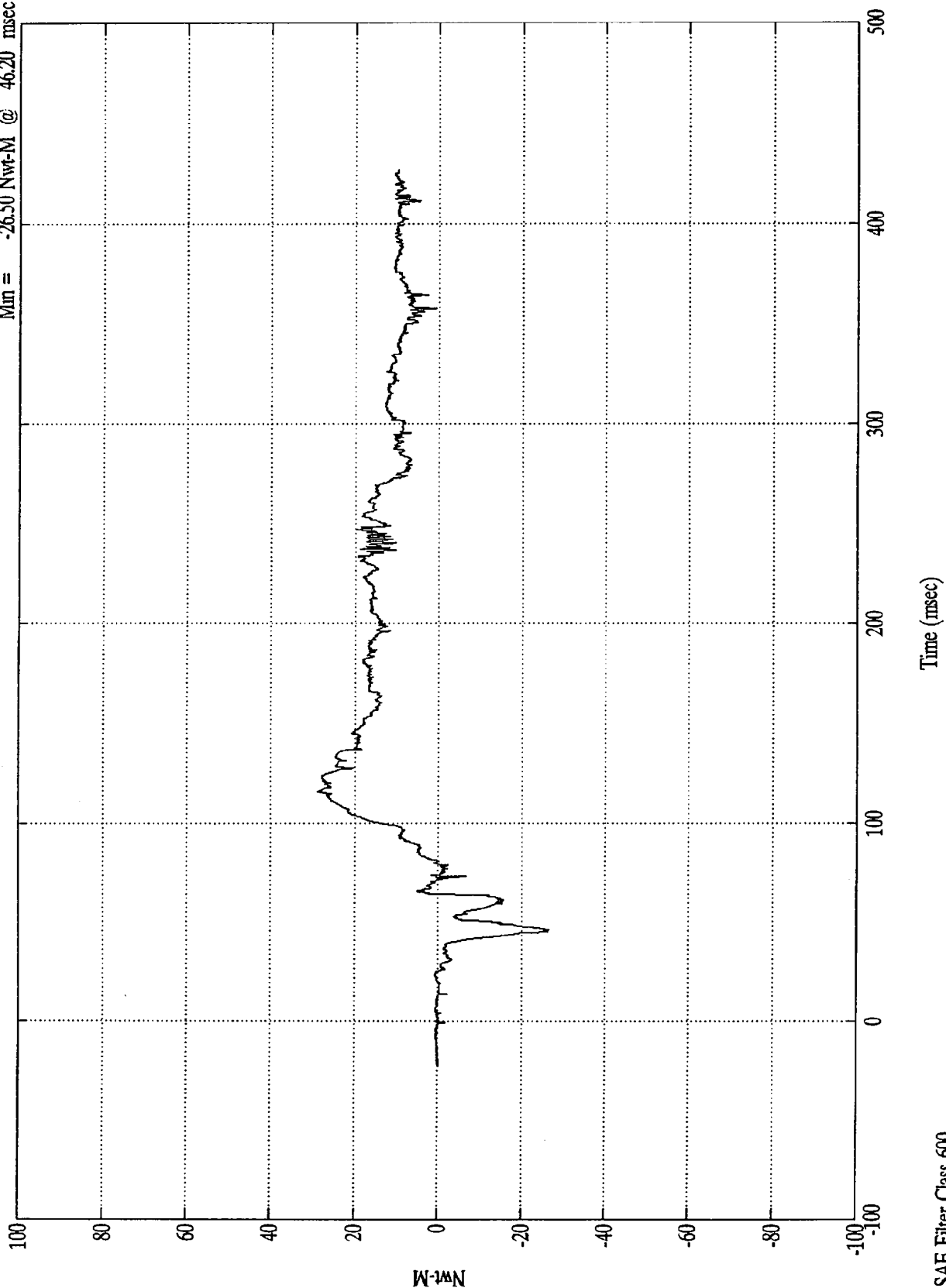
Max = 2099.71 Nwt @ 73.80 msec
 Min = 4.67 Nwt @ 6.47 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Upper Neck Mx

Max = 28.98 Nwt-M @ 115.92 msec
Min = -26.50 Nwt-M @ 46.20 msec

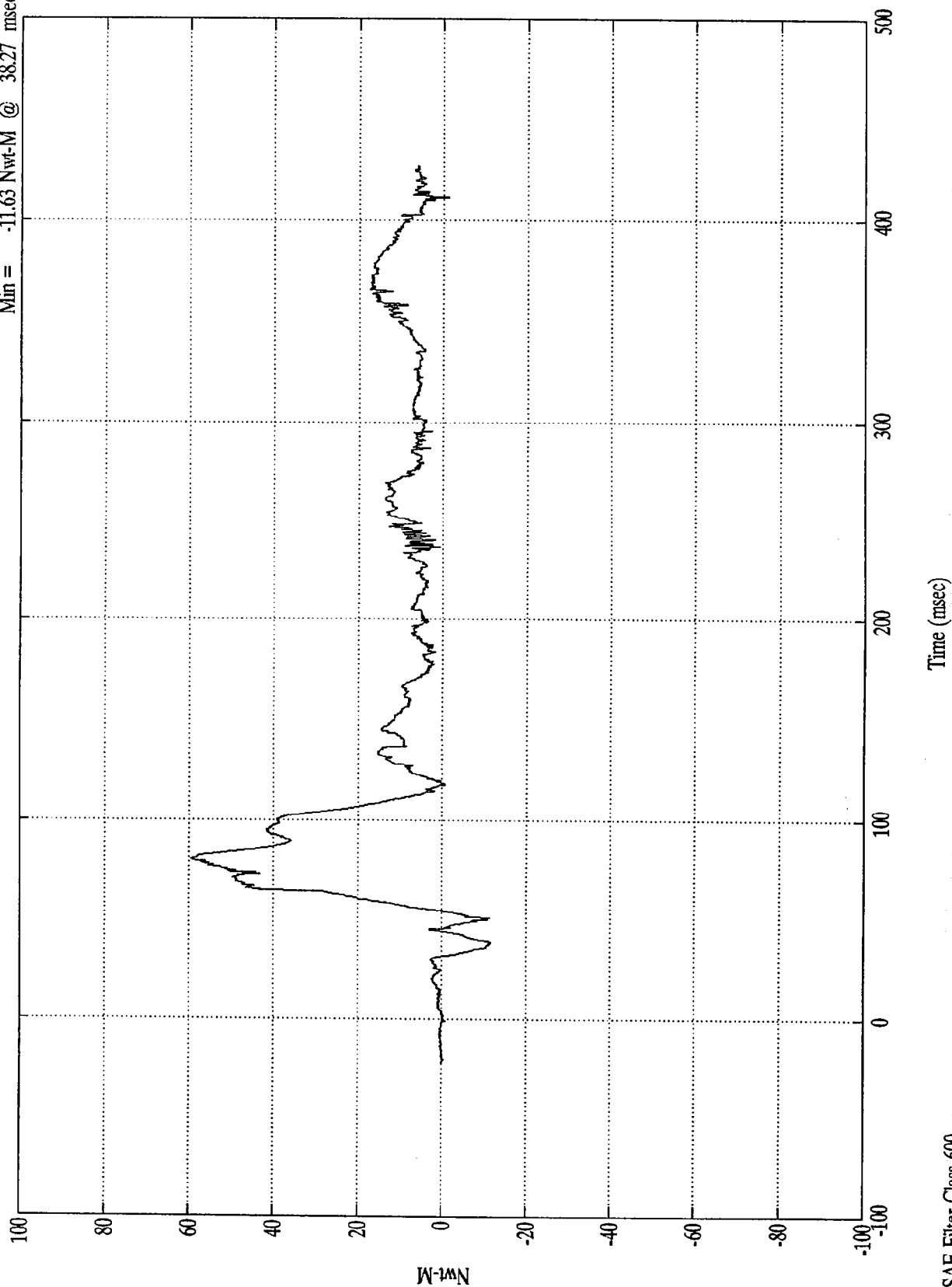


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

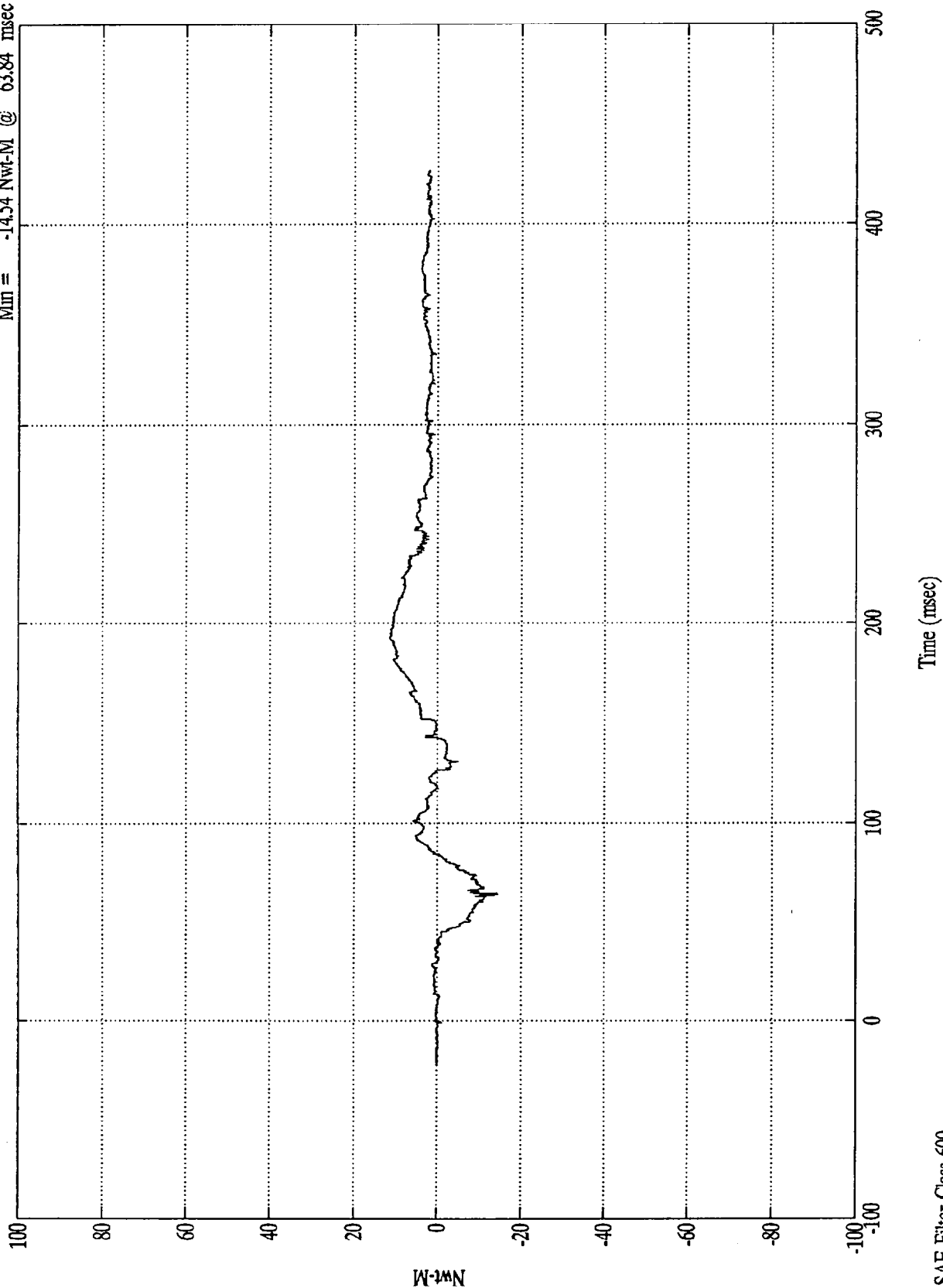
Pos. 1 Upper Neck My

Max = 59.48 Nwt-M @ 80.15 msec
Min = -11.63 Nwt-M @ 38.27 msec



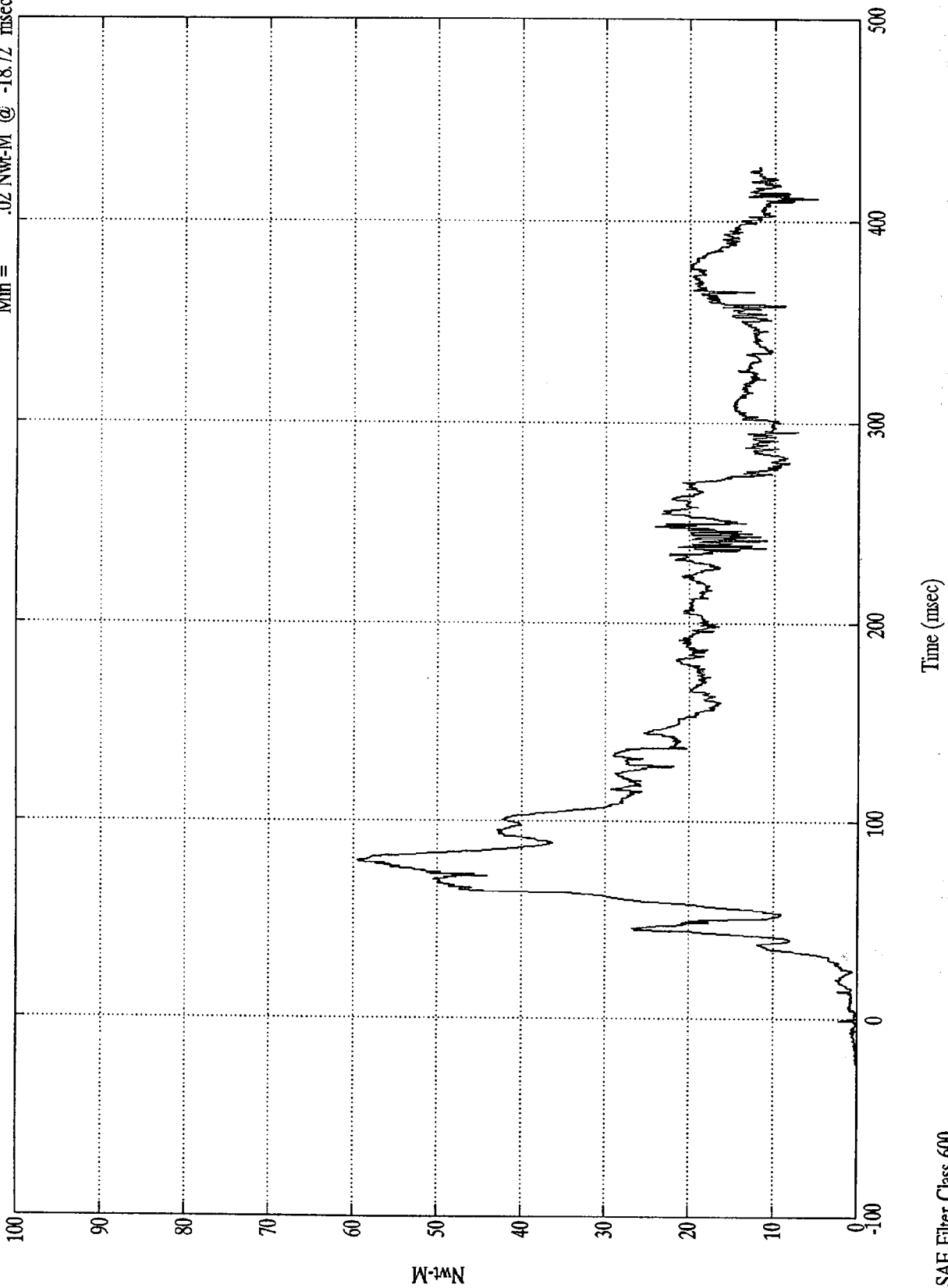
Pos. 1 Upper Neck Mz

Max = 11.42 Nwt-M @ 192.84 msec
Min = -14.54 Nwt-M @ 63.84 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

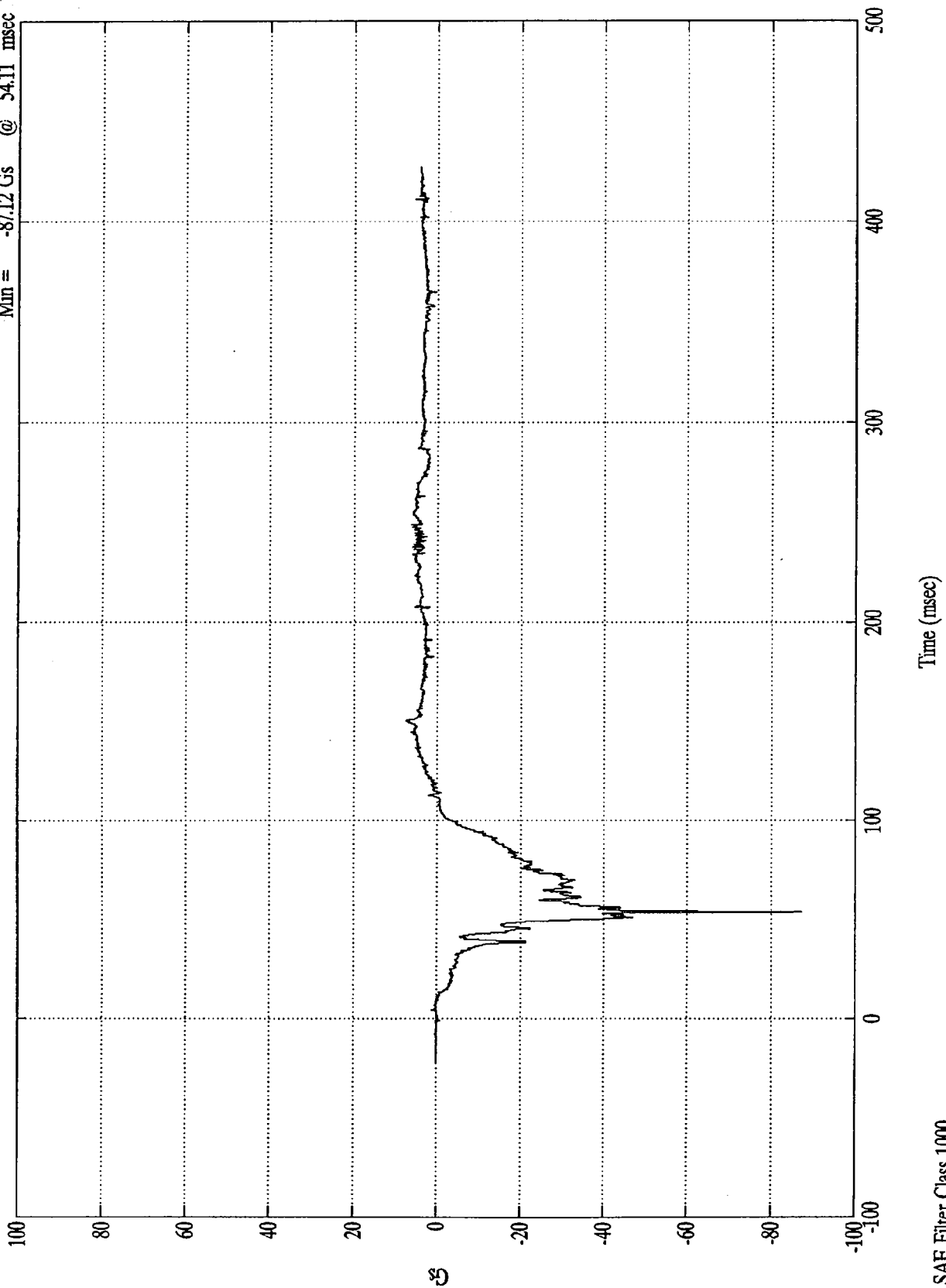
Pos. 1 Neck Moment Res.
Max = 59.56 Nwt-M @ 80.15 msec
Min = .02 Nwt-M @ -18.72 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Pelvic (X)

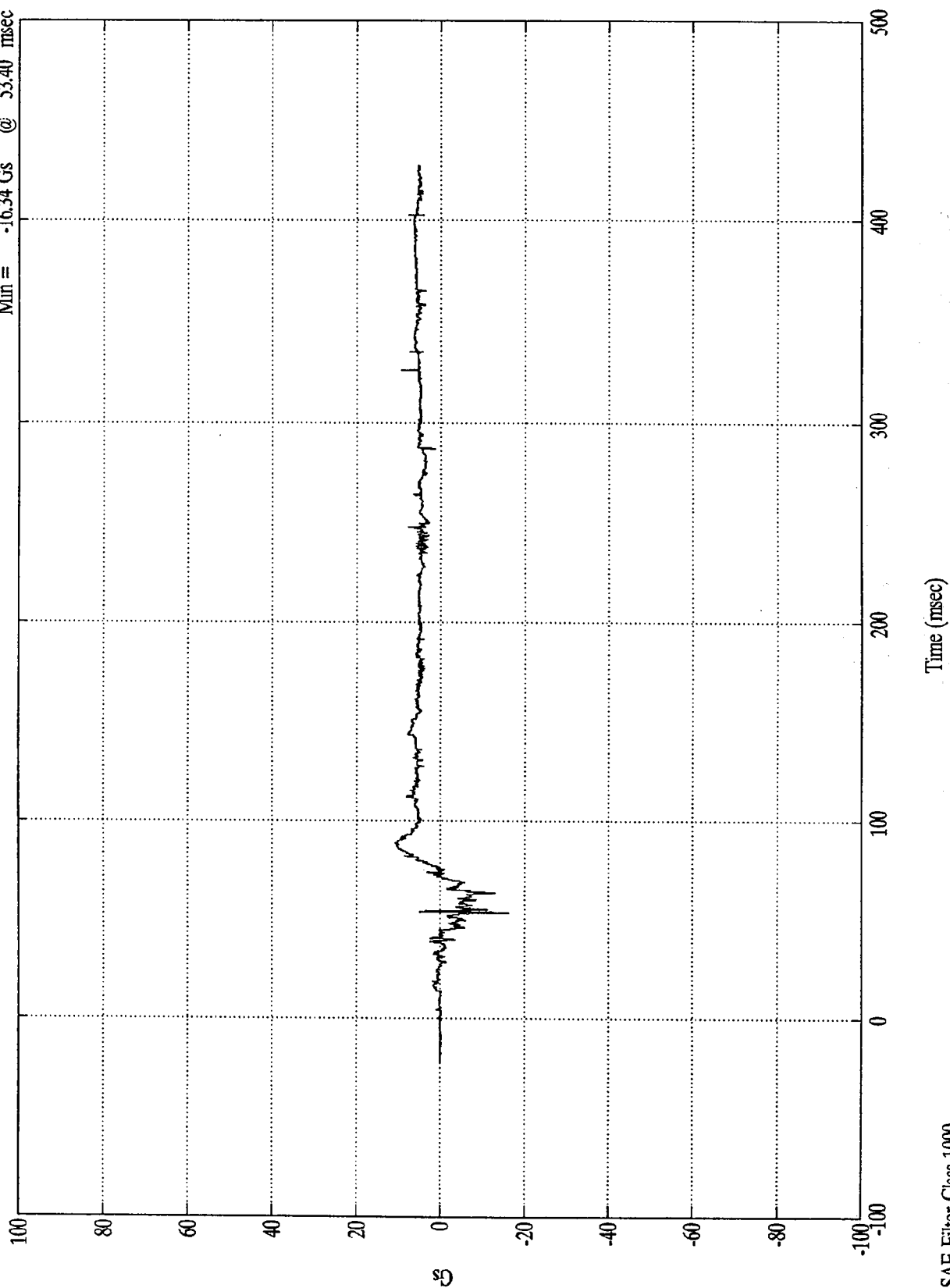
Max = 7.31 Gs @ 150.00 msec
Min = -87.12 Gs @ 54.11 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Pelvic (Y)

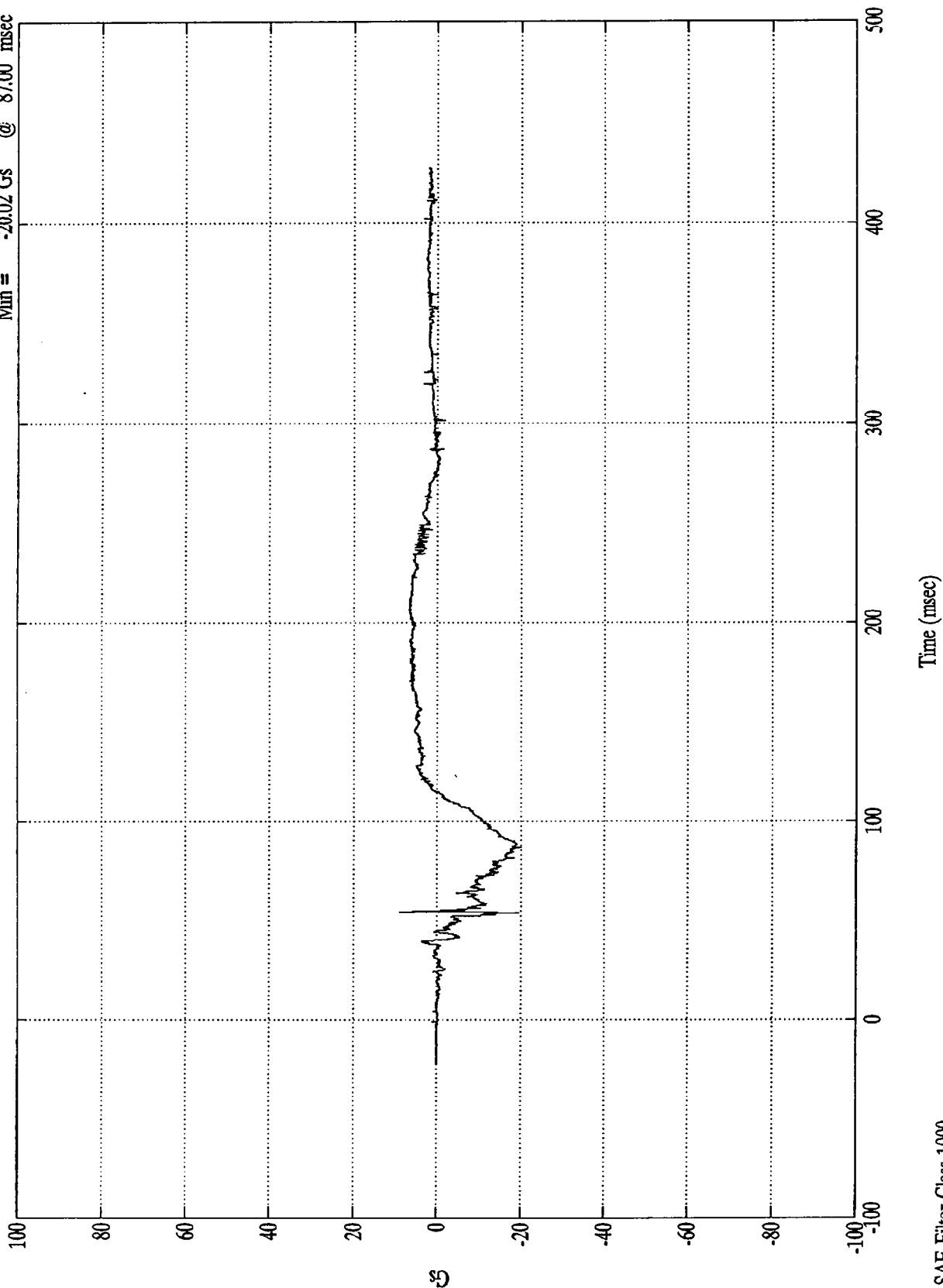
Max = 10.70 Gs @ 88.44 msec
Min = -16.34 Gs @ 53.40 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Pelvic (Z)

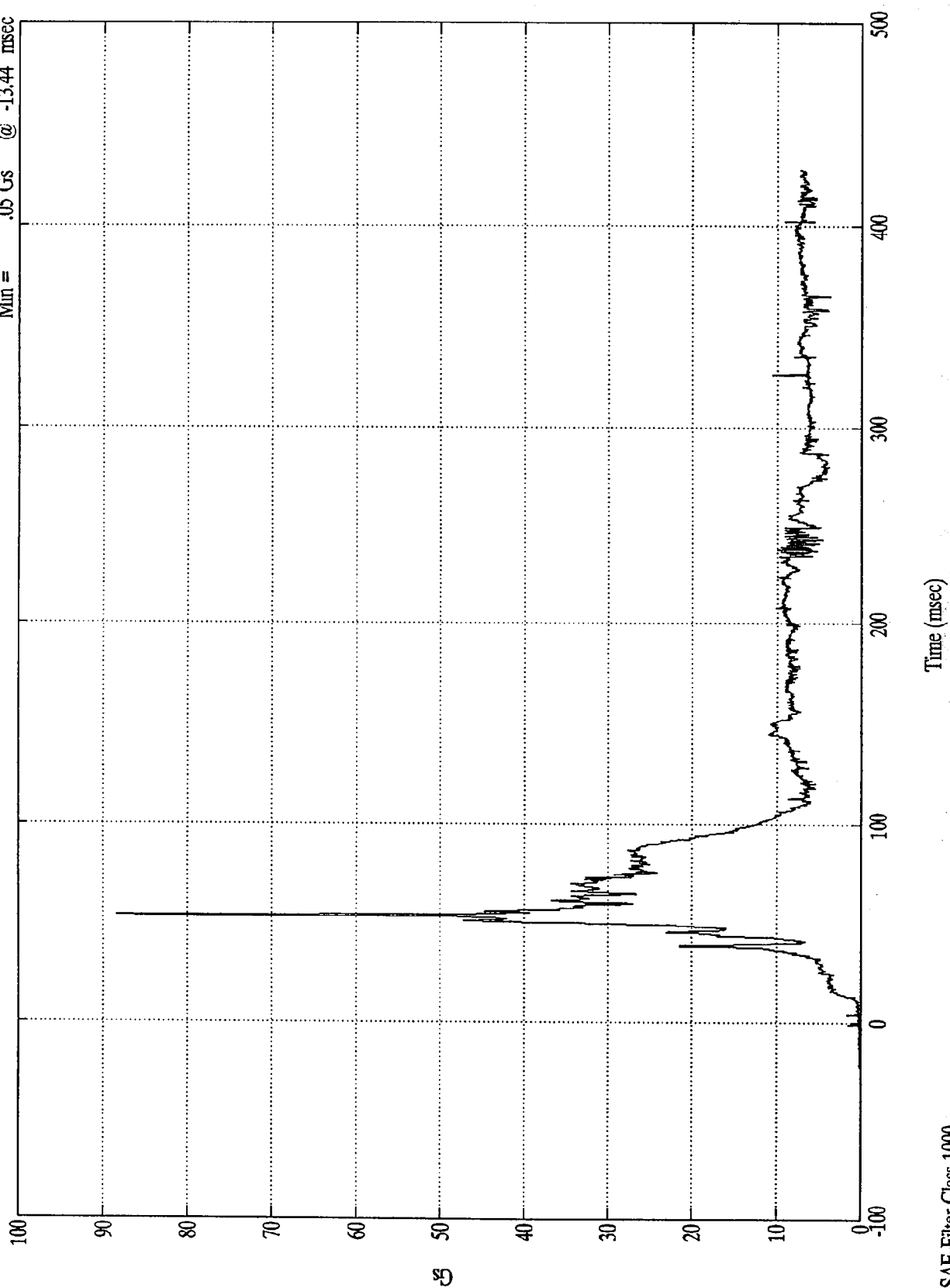
Max = 8.93 Gs @ 54.96 msec
Min = -20.02 Gs @ 87.00 msec



NCAP TEST #1 - 19% PONTIAC GRAND AM

Max = 88.37 Gs @ 54.11 msec
 Min = .05 Gs @ -13.44 msec

Pos. 1 Pelvic (R)

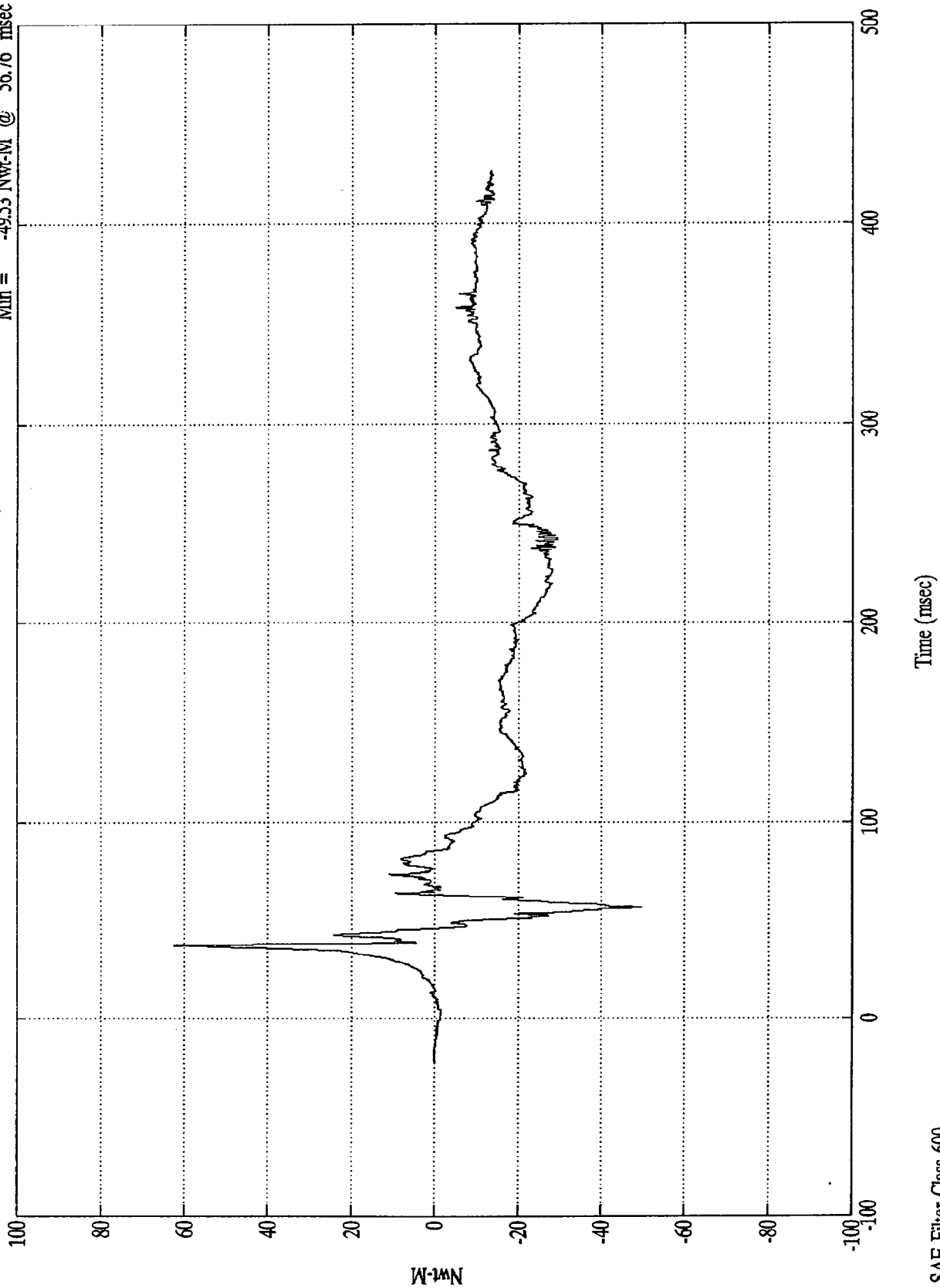


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Lt Upper Tibia Mx

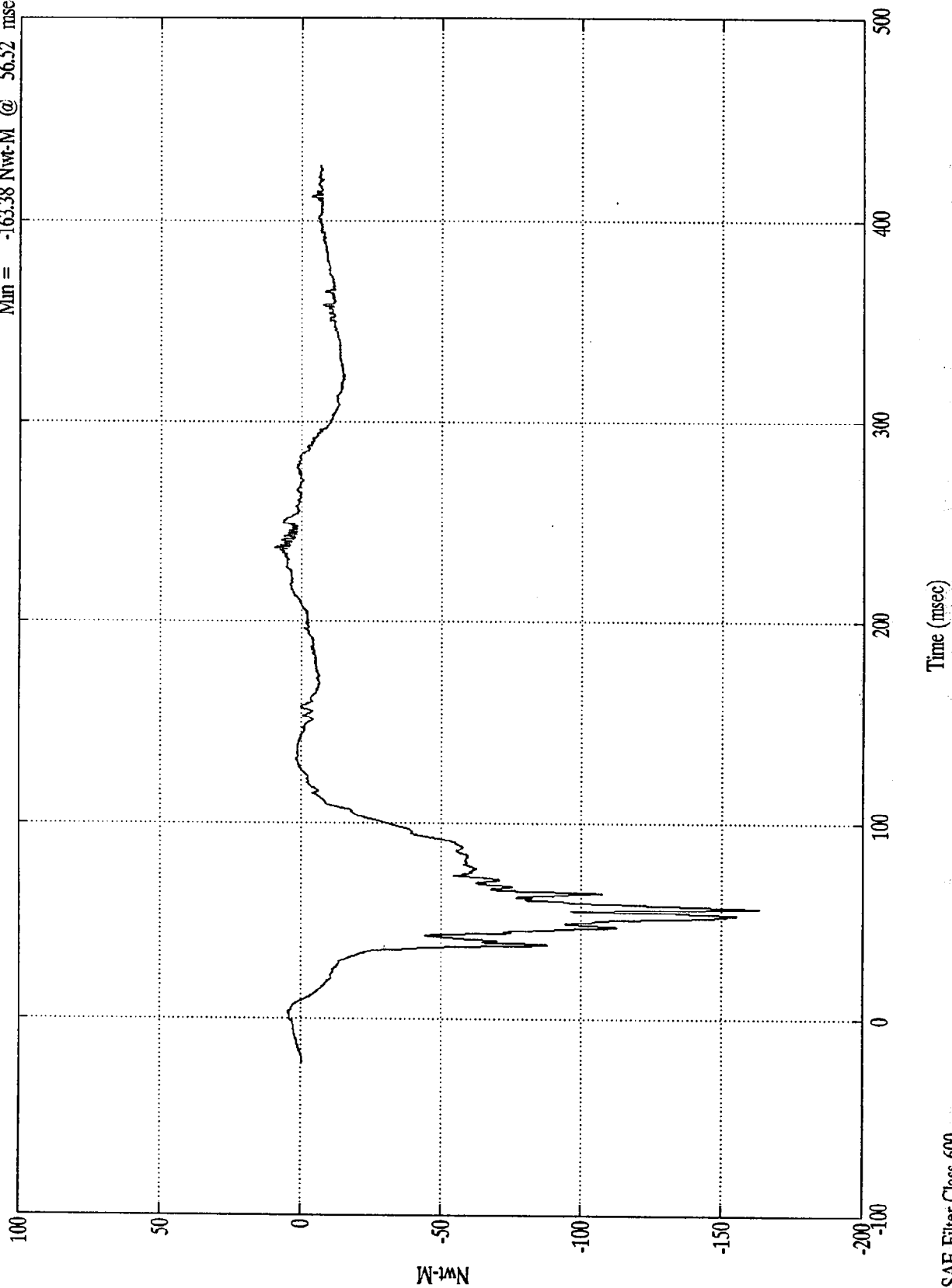
Max = 62.43 Nwt-M @ 37.56 msec
Min = -49.53 Nwt-M @ 56.76 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Lt Upper Tibia My

Max = 9.44 Nwt-M @ 237.48 msec
Min = -163.38 Nwt-M @ 56.52 msec

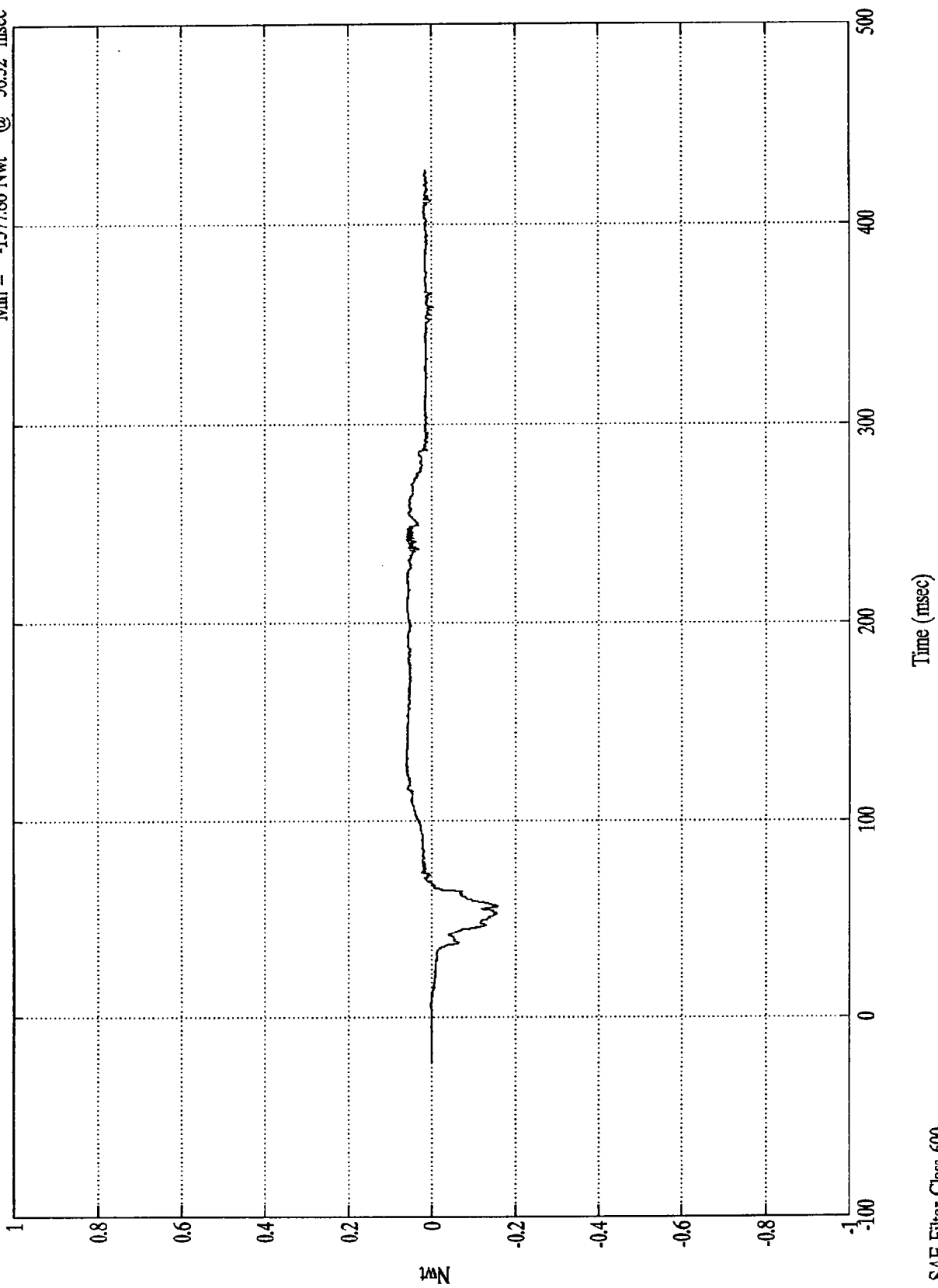


NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Lt Lower Tibia Fy

Max = 62017 Nwt @ 128.76 msec
Min = -157786 Nwt @ 56.52 msec

$\times 10^4$



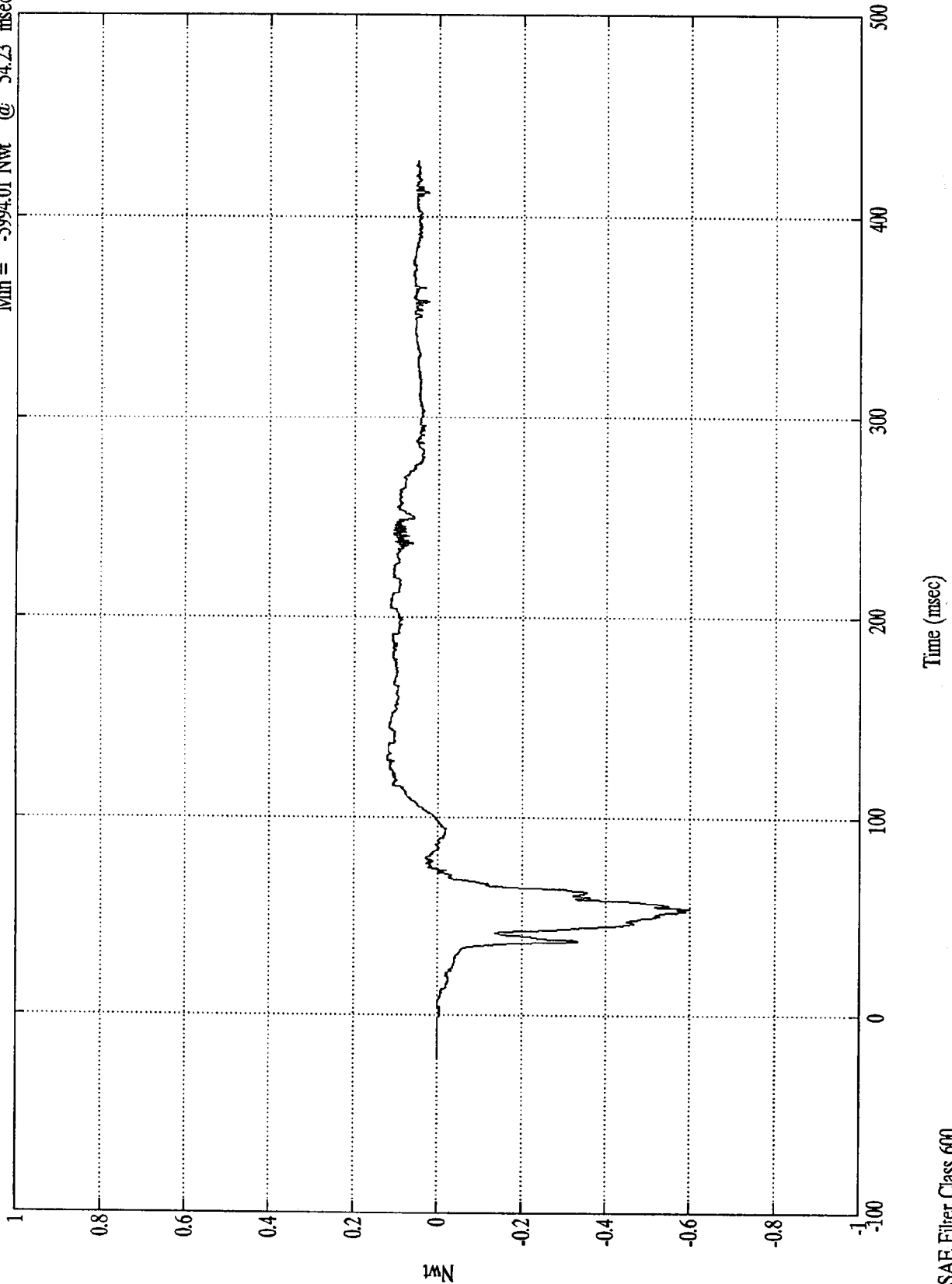
SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 1215.76 Nwt @ 129.24 msec
Min = -5994.01 Nwt @ 54.23 msec

P1 Lt Lower Tibia Fz

$\times 10^4$

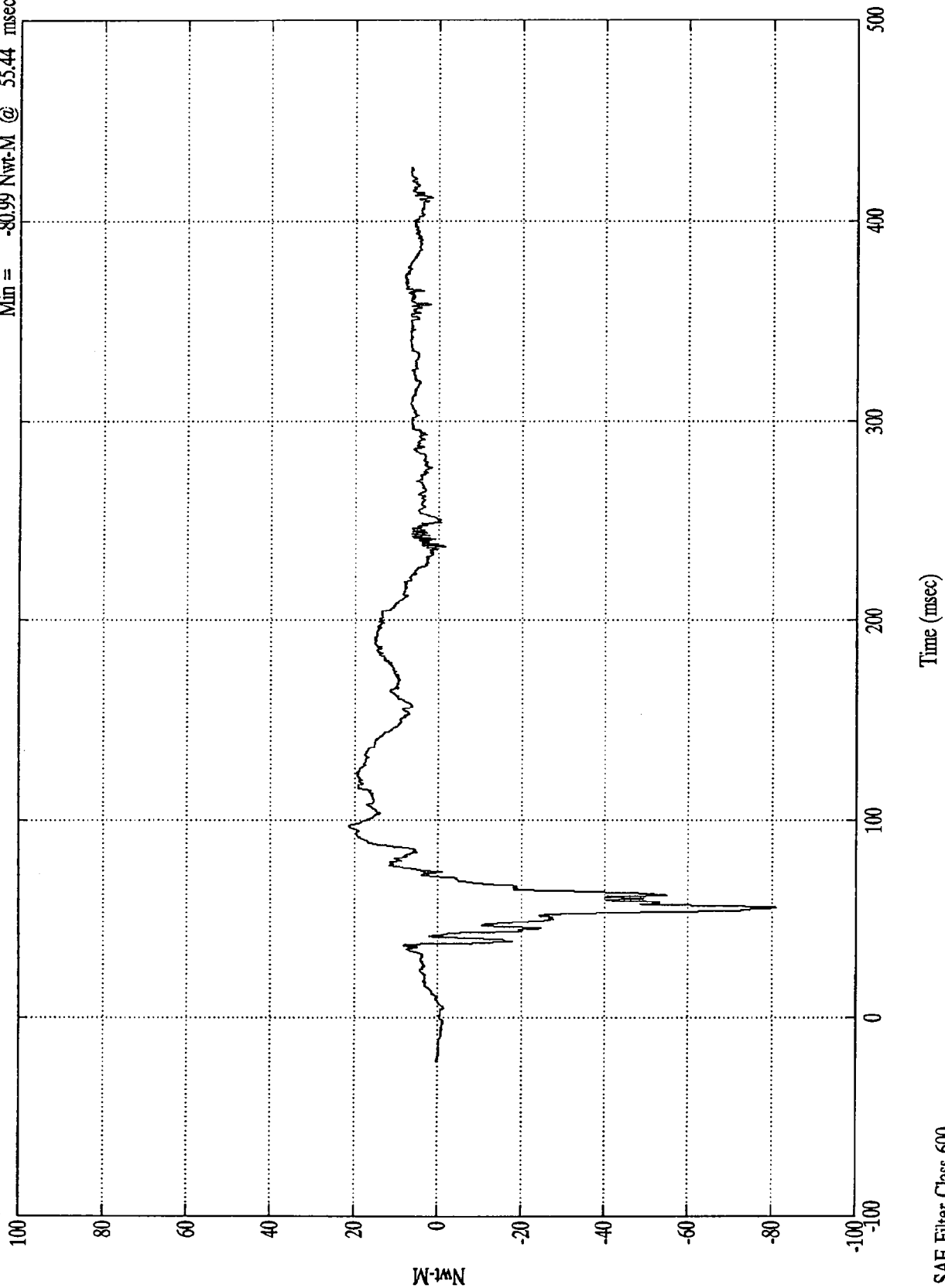


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Lt Lower Tibia Mx

Max = 21.37 Nwt-M @ 96.84 msec
Min = -80.99 Nwt-M @ 55.44 msec

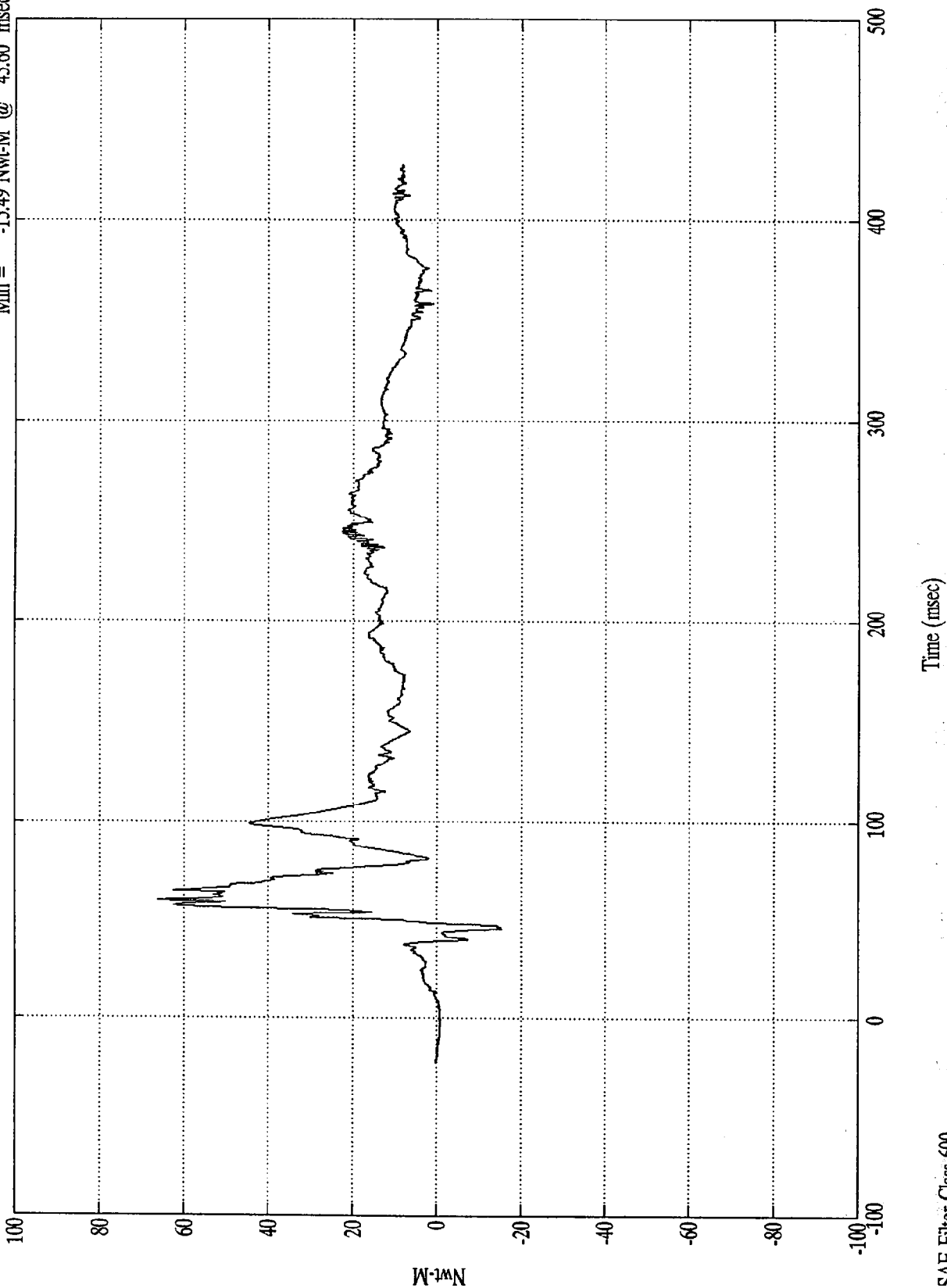


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Rt Upper Tibia Mx

Max = 66.18 Nwt-M @ 60.00 msec
Min = -15.49 Nwt-M @ 45.60 msec

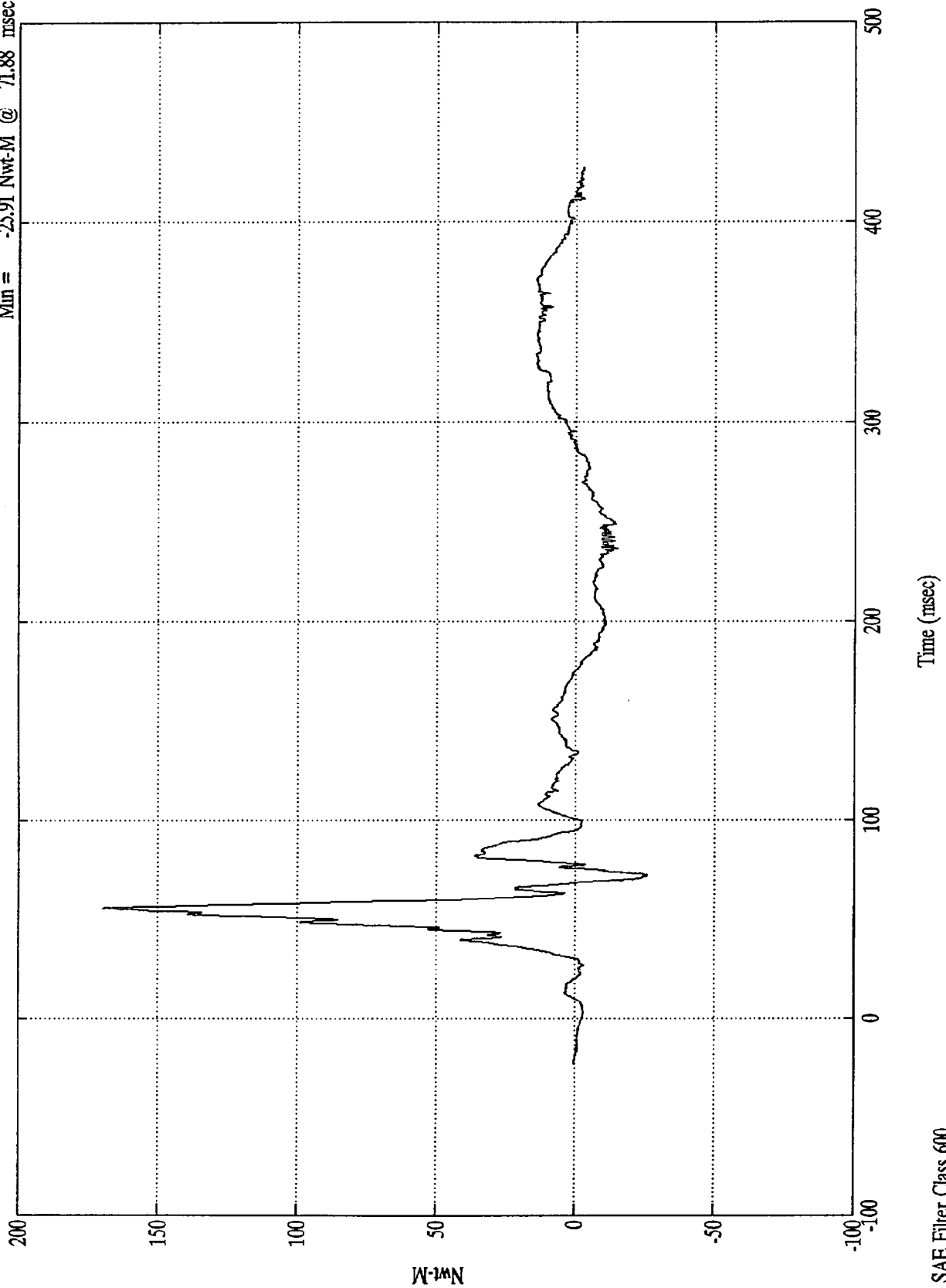


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Rt Upper Tibia My

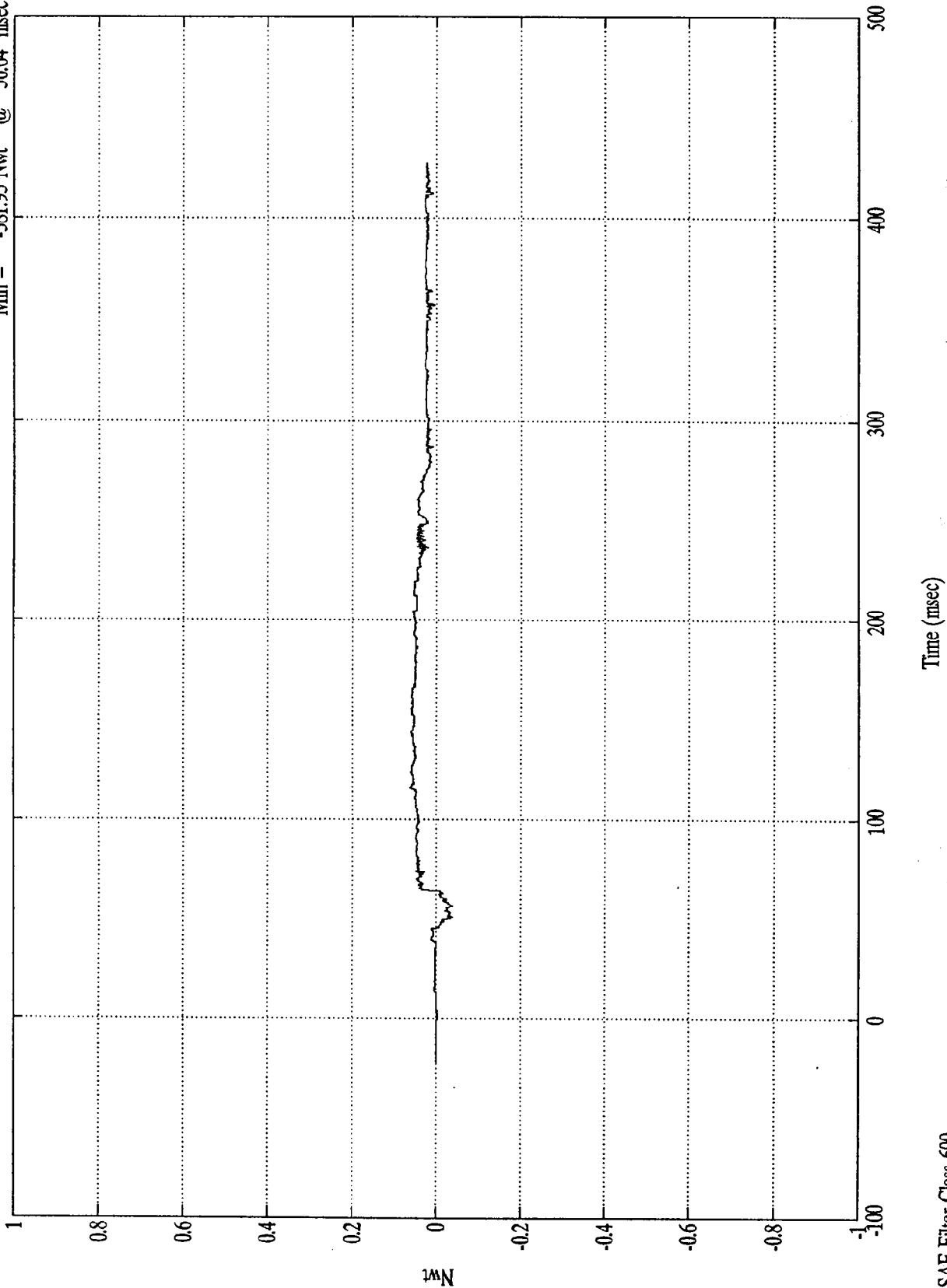
Max = 169.76 Nwt-M @ 54.96 msec
Min = -25.91 Nwt-M @ 71.88 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM
x10⁴

P1 Rt Lower Tibia Fy

Max = 622.04 Nwt @ 116.04 msec
Min = -381.95 Nwt @ 50.64 msec

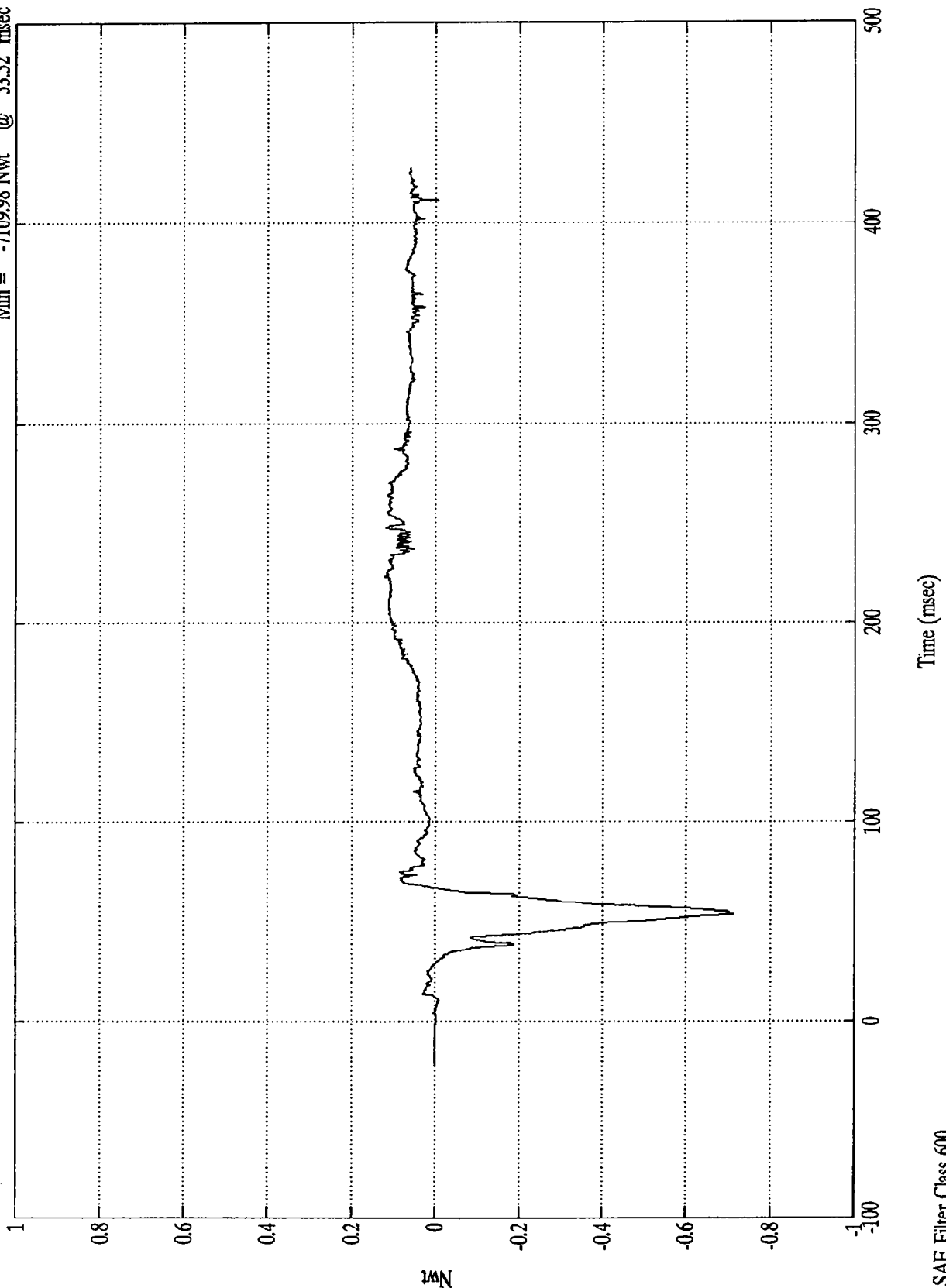


NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Rt Lower Tibia Fz

Max = 1237.40 Nwt @ 223.56 msec
Min = -7109.98 Nwt @ 53.52 msec

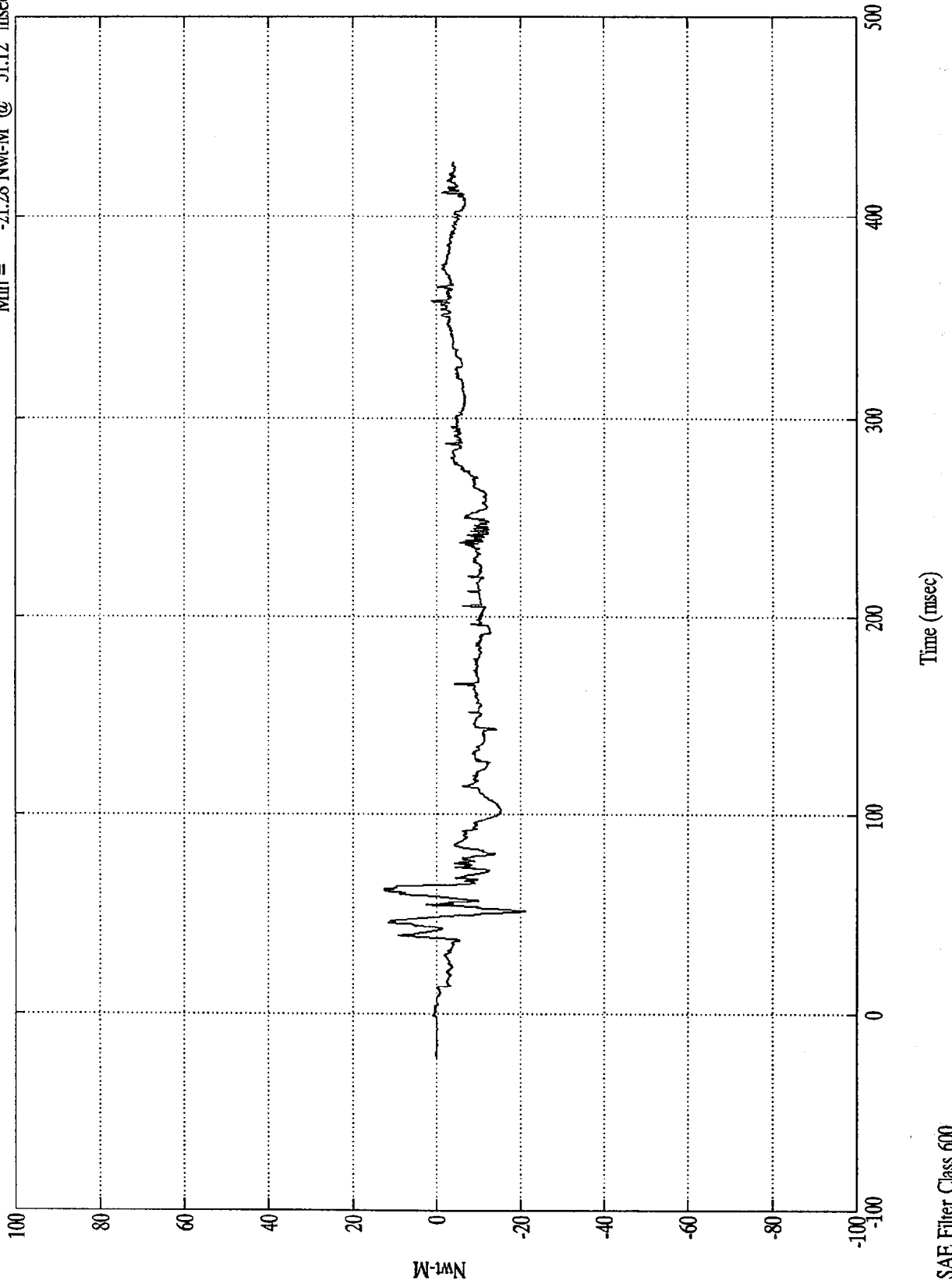
$\times 10^4$



NCAP TEST #1 - 1996 PONTIAC GRAND AM

P1 Rt Lower Tibia Mx

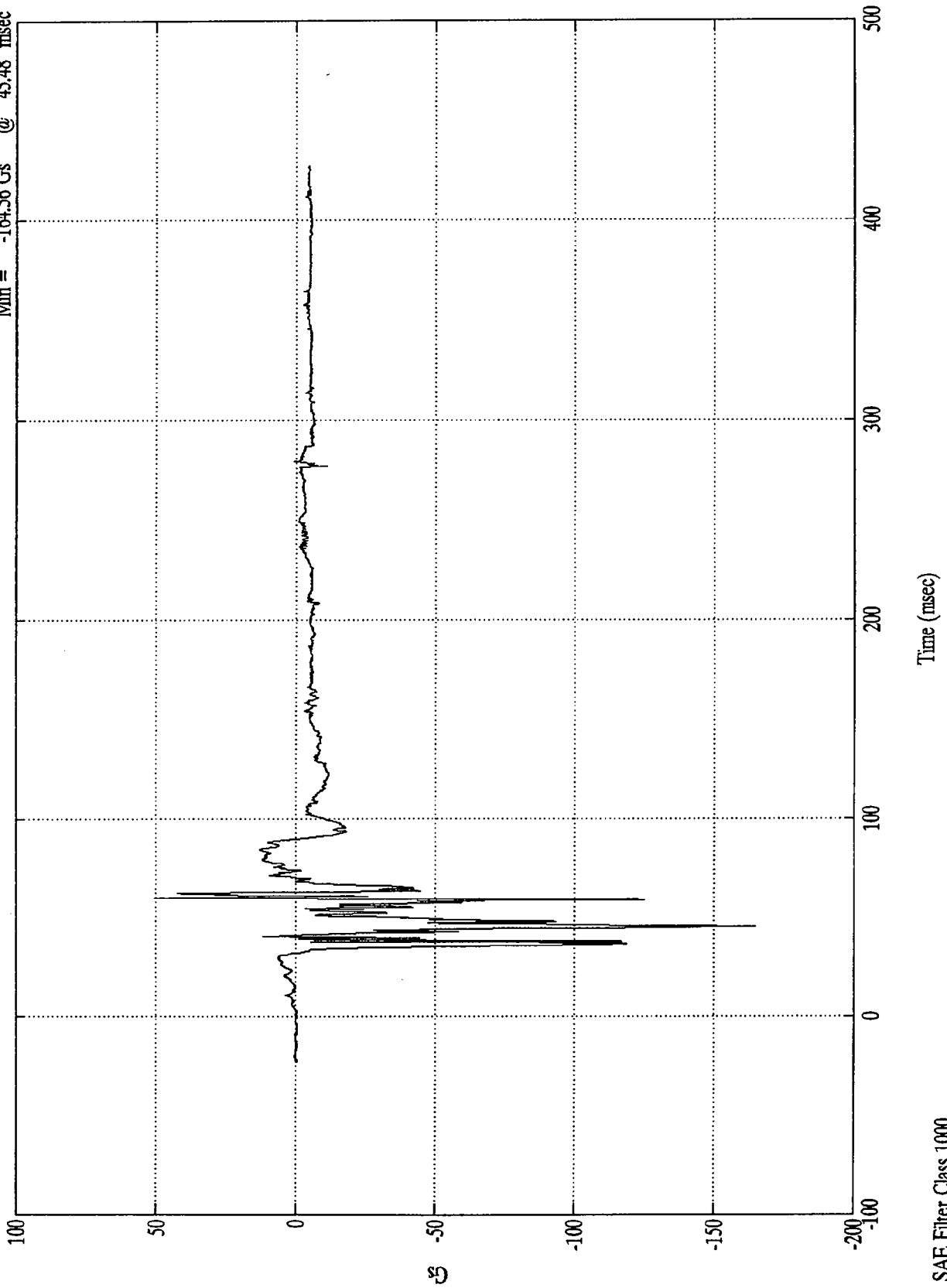
Max = 12.60 Nwt-M @ 62.76 msec
Min = -21.28 Nwt-M @ 51.12 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

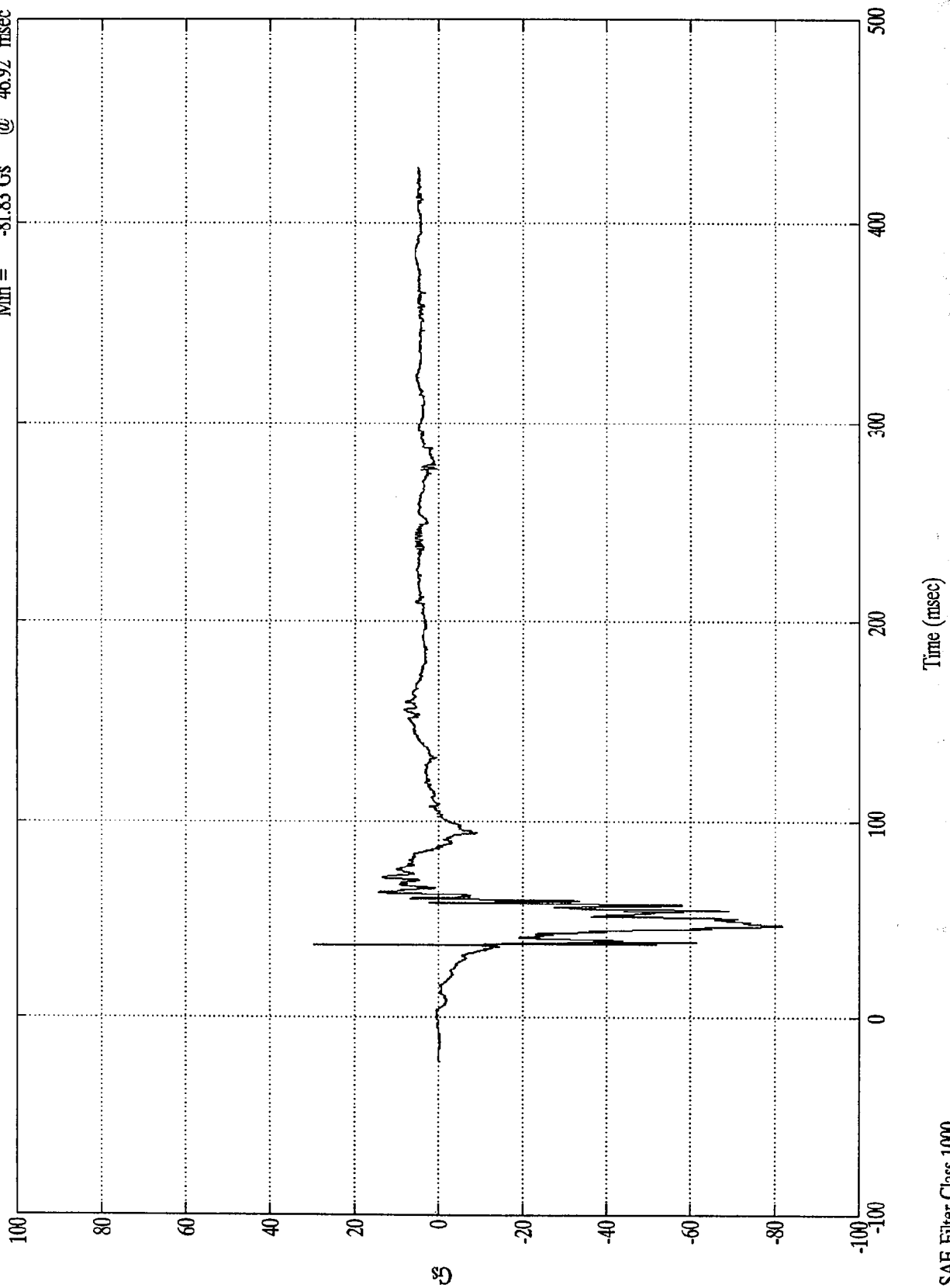
Pos. 1 L. Foot Front Z

Max = 50.38 Gs @ 59.52 msec
Min = -164.56 Gs @ 45.48 msec



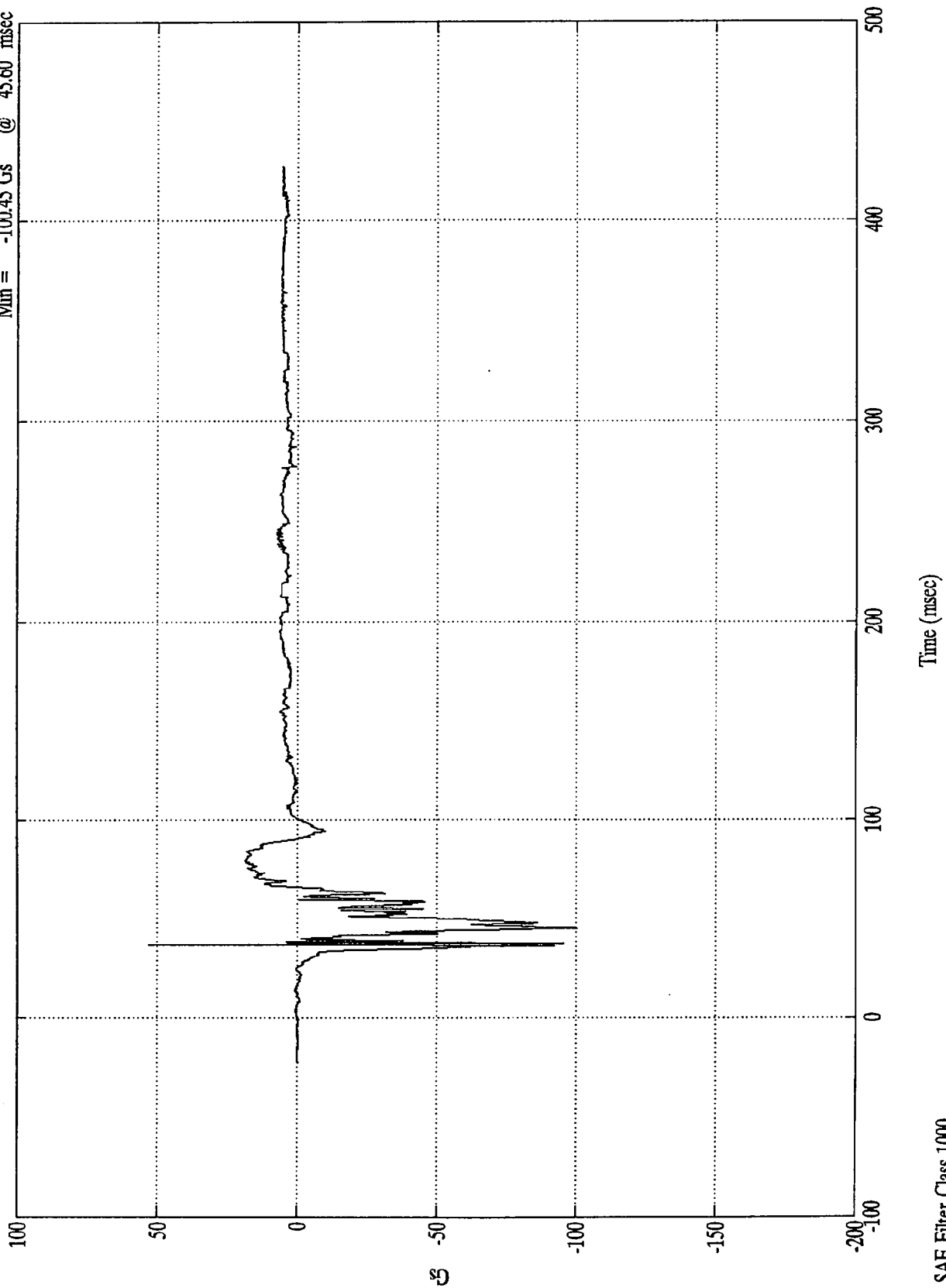
NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 L Foot Rear X
Max = 29.70 Gs @ 36.96 msec
Min = -81.83 Gs @ 46.92 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

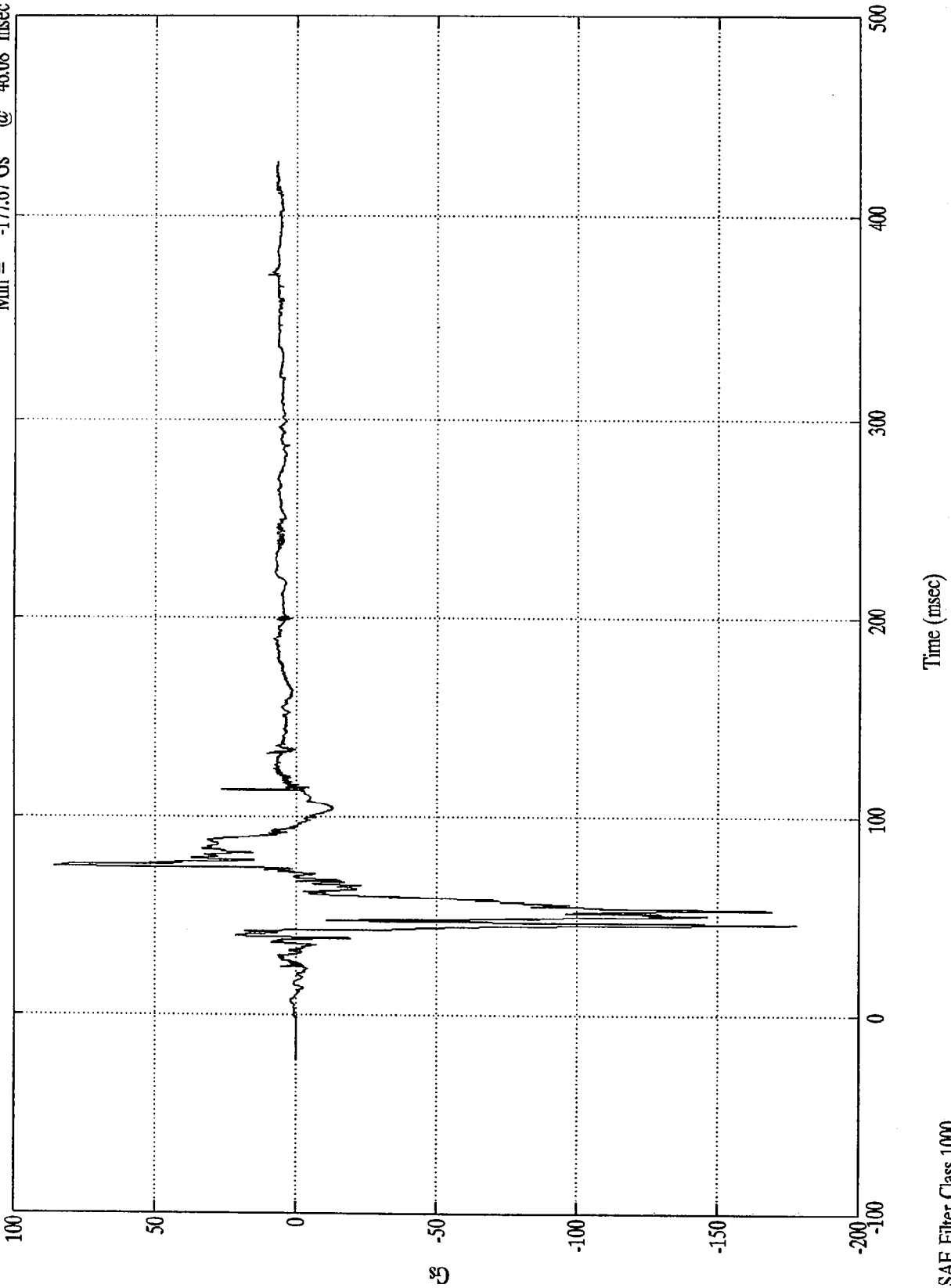
Pos. 1 L Foot Rear Z
Max = 53.14 Gs @ 37.31 msec
Min = -103.45 Gs @ 45.60 msec



SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 R. Foot Front Z
Max = 85.49 Gs @ 75.00 msec
Min = -177.67 Gs @ 46.08 msec

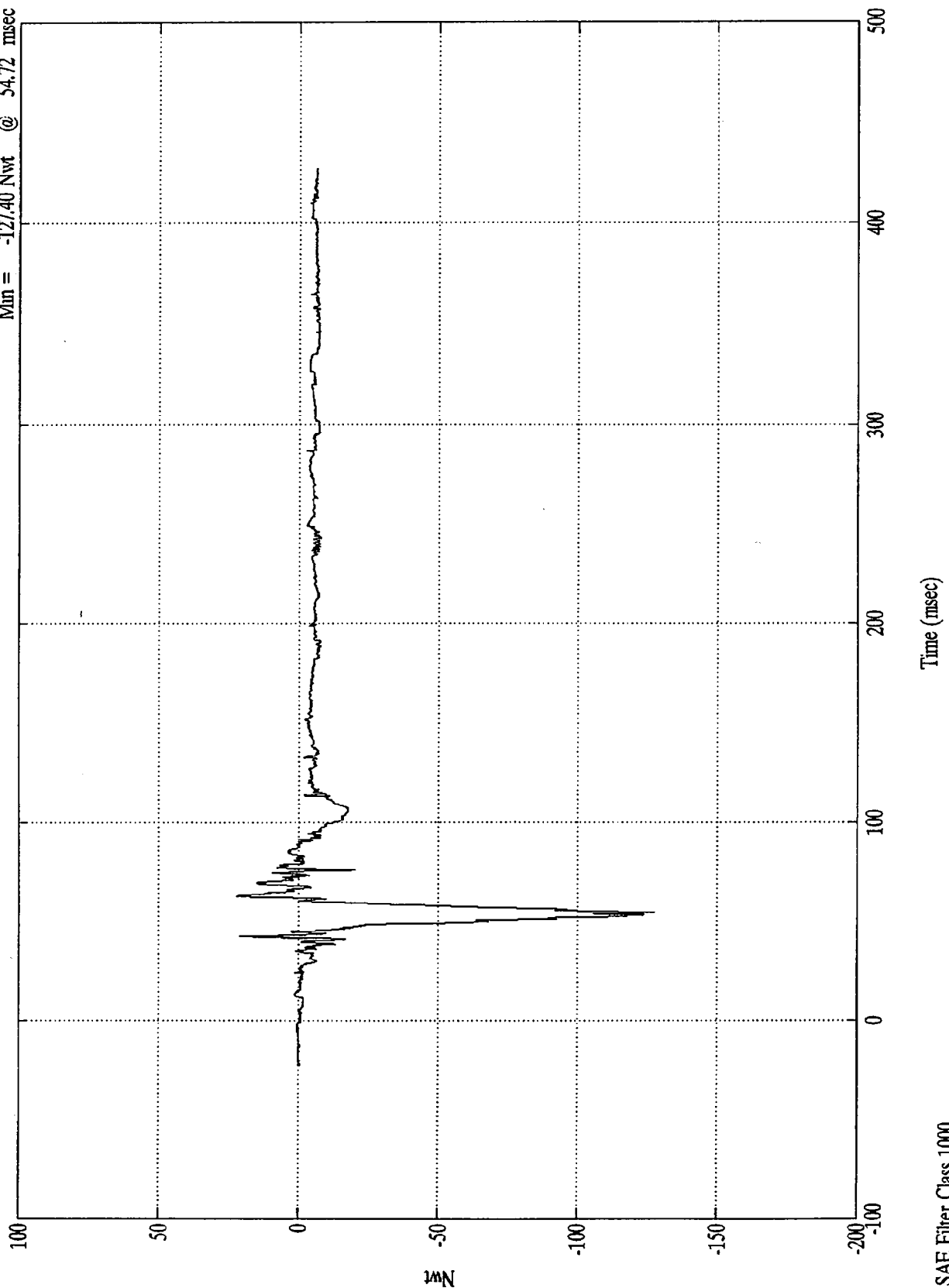


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 R.Foot Rear X

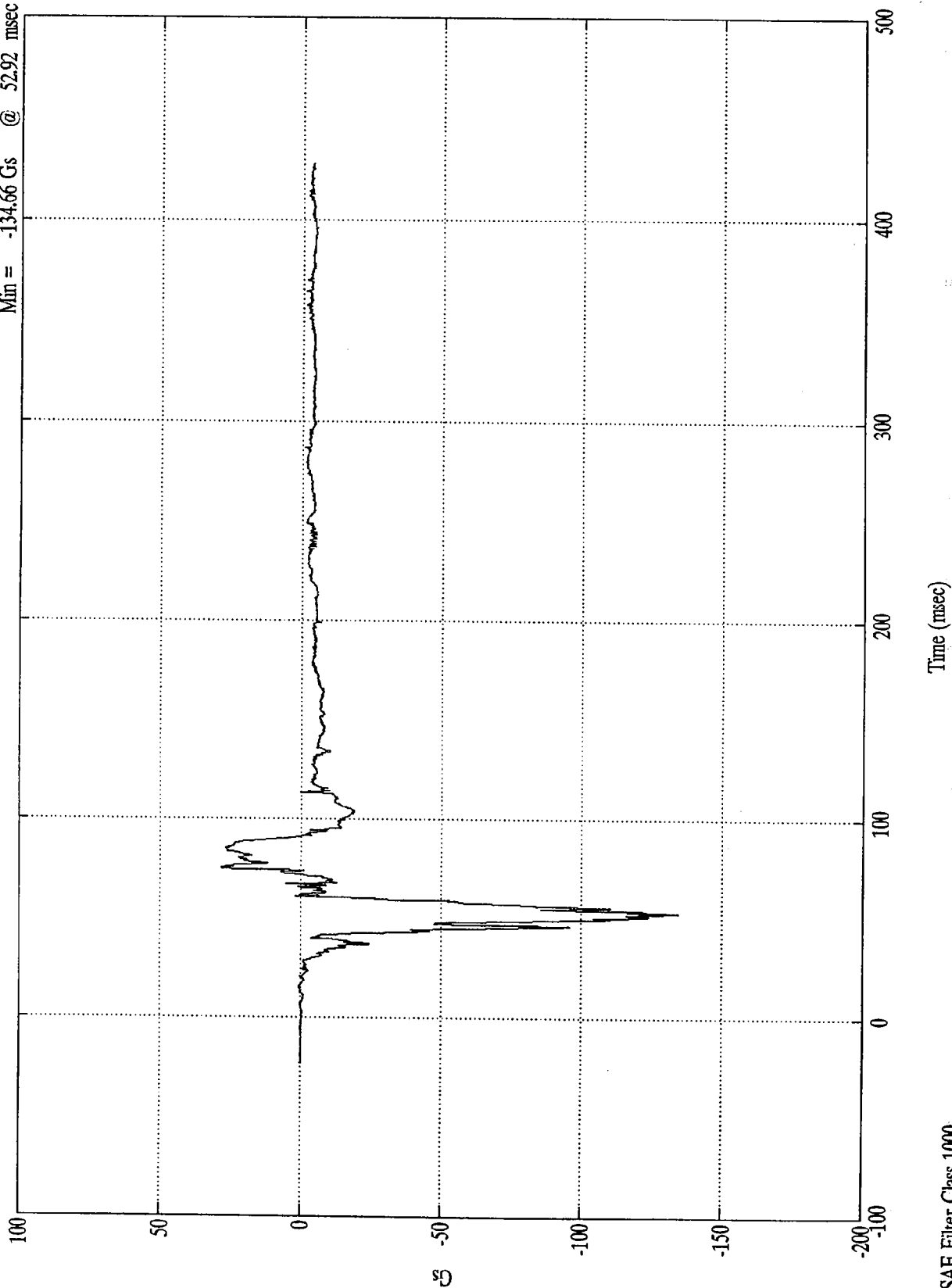
Max = 22.13 Nwt @ 63.48 msec
Min = -127.40 Nwt @ 54.72 msec



SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 R.Foot Rear Z
 Max = 28.31 Gs @ 75.00 msec
 Min = -134.66 Gs @ 52.92 msec

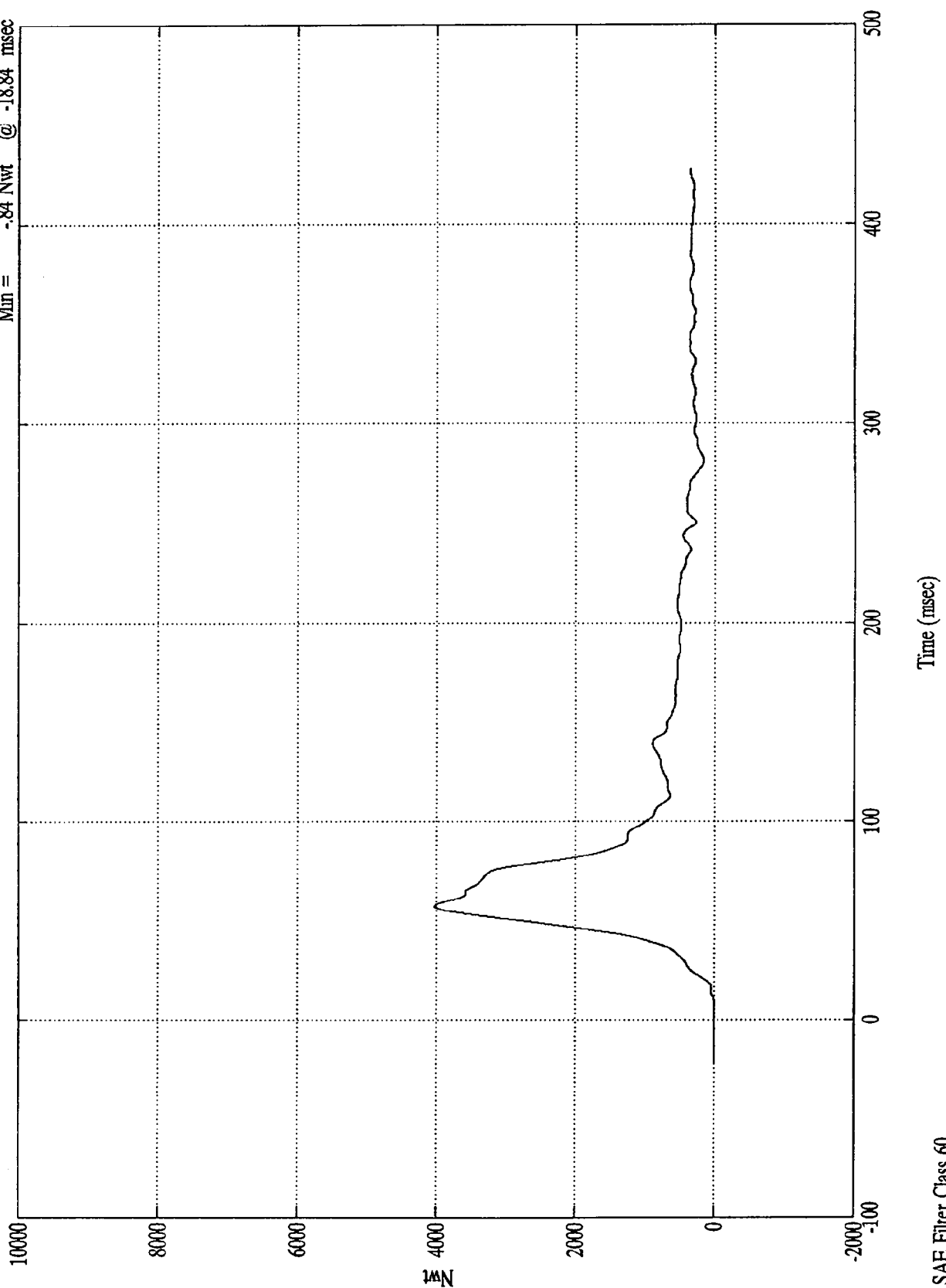


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Left Belt Load

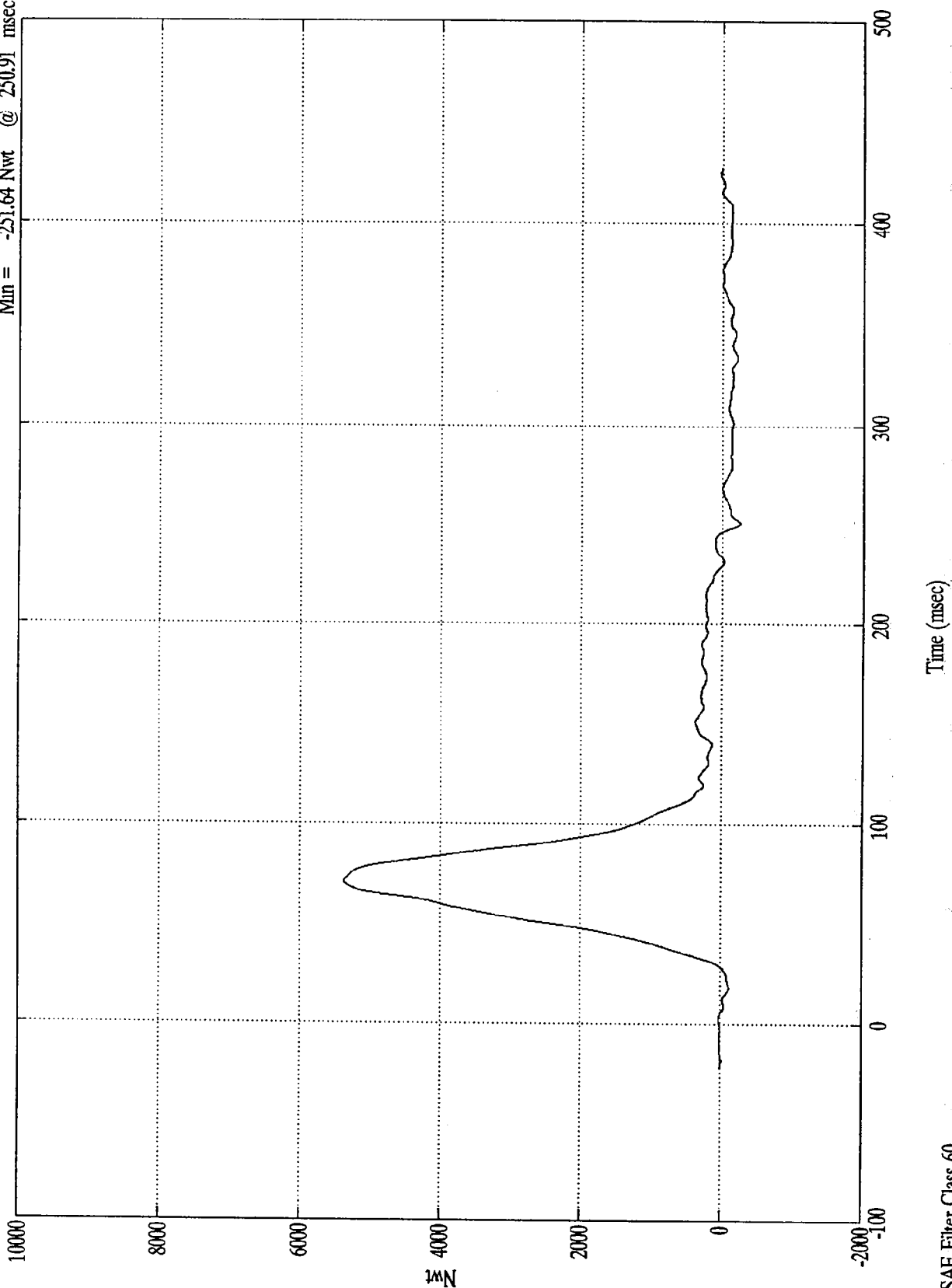
Max = 4025.46 Nwt @ 57.47 msec
Min = -.84 Nwt @ -18.84 msec



NCAP TEST #1 - 19% PONTIAC GRAND AM

Pos. 1 Torso Belt Load

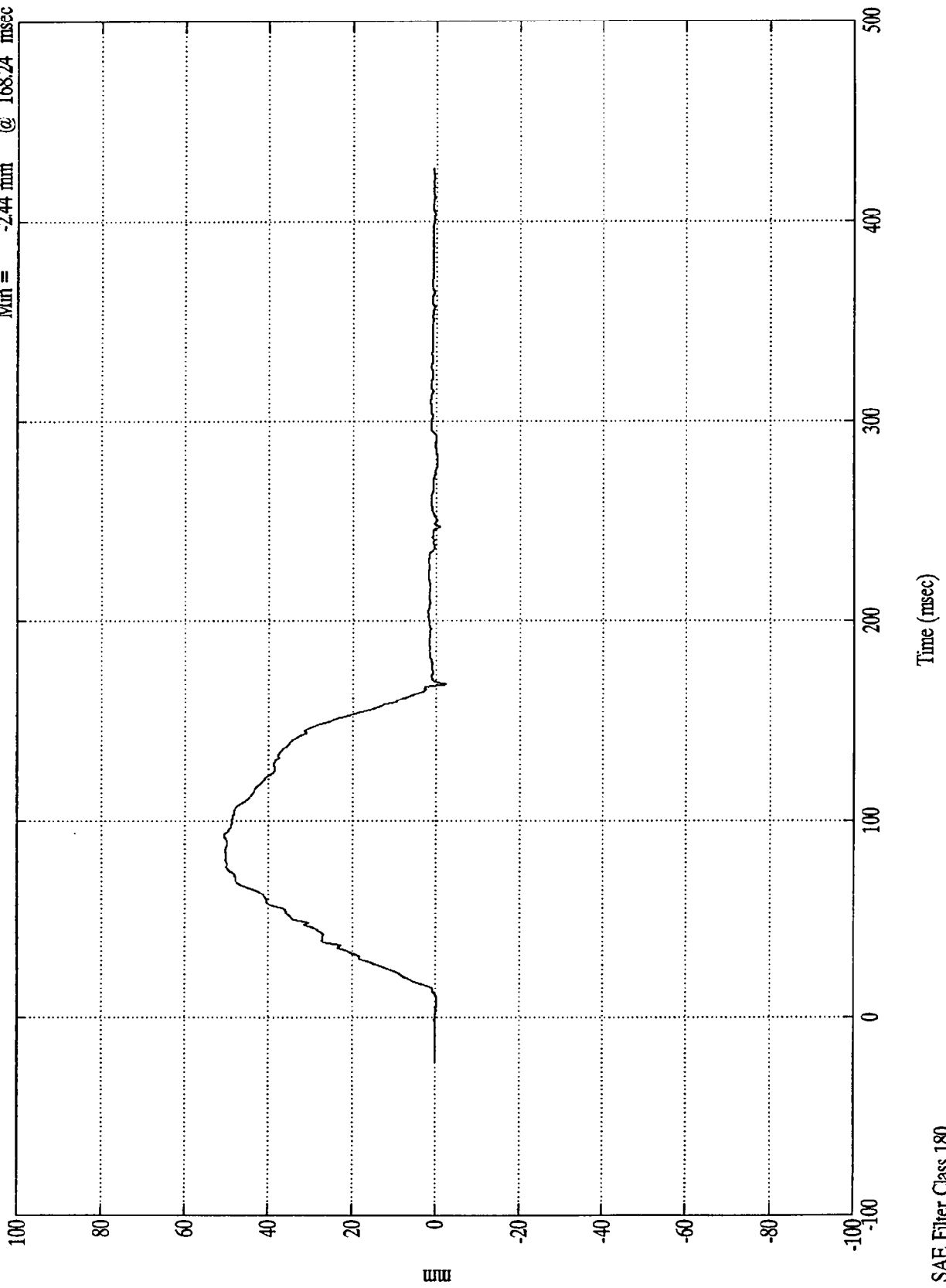
Max = 5376.55 Nwt @ 70.92 msec
Min = -251.64 Nwt @ 250.91 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Belt Spool Out

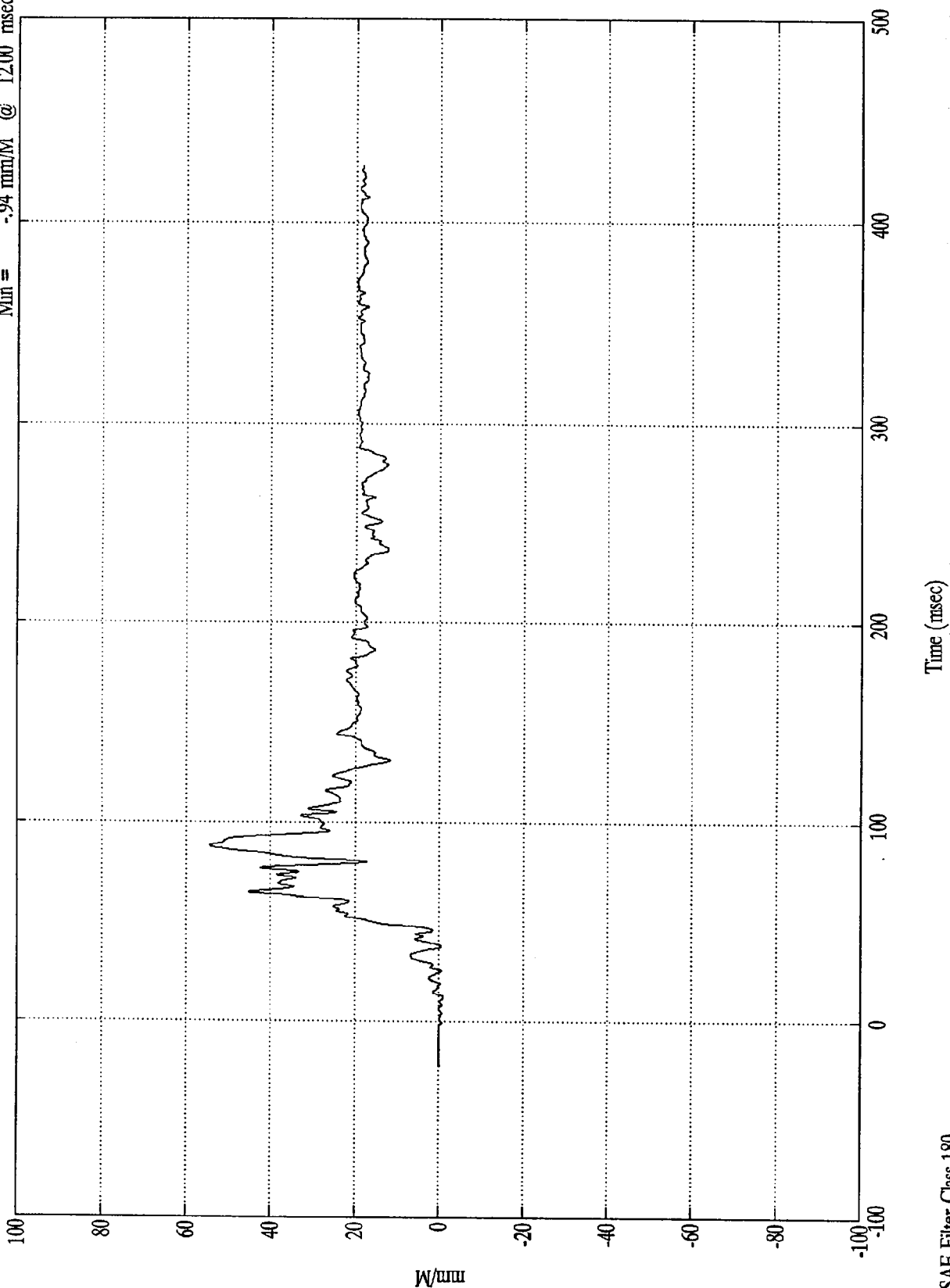
Max = 50.67 mm @ 92.64 msec
Min = -2.44 mm @ 168.24 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 1 Belt Elongation

Max = 54.47 mm/M @ 88.20 msec
Min = -94 mm/M @ 12.00 msec

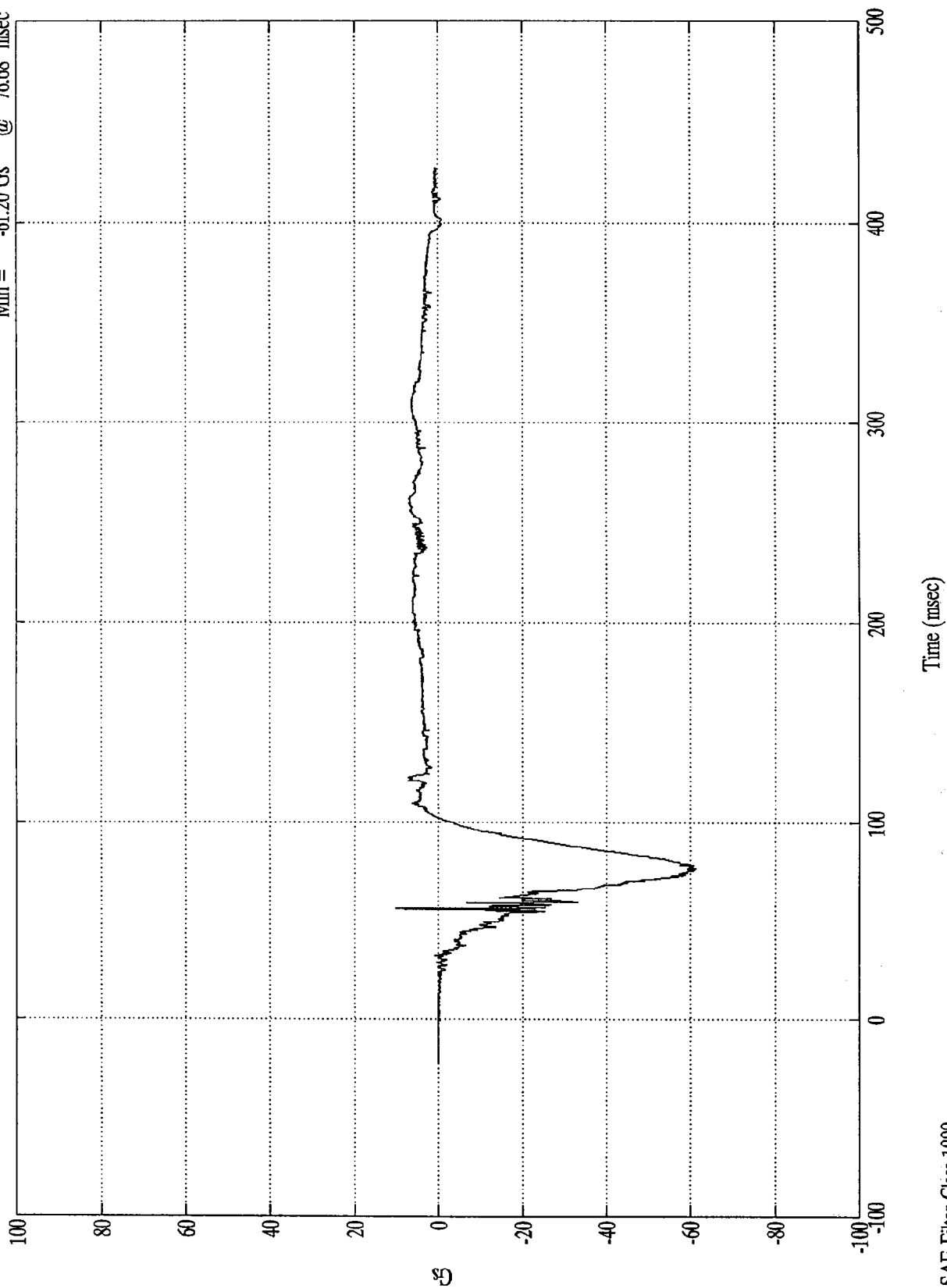


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Head X

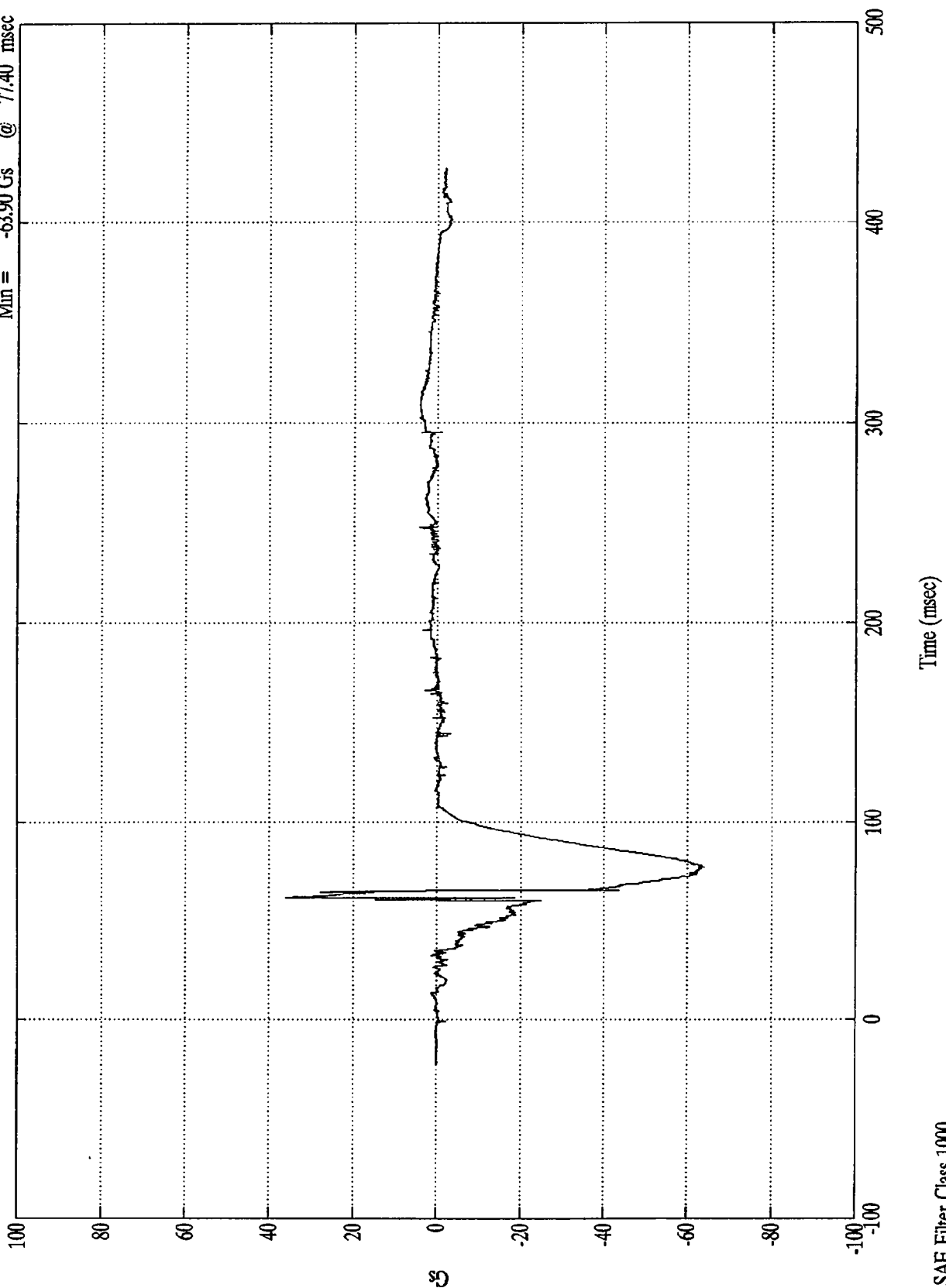
Max = 10.39 Gs @ 56.04 msec
Min = -61.20 Gs @ 76.68 msec



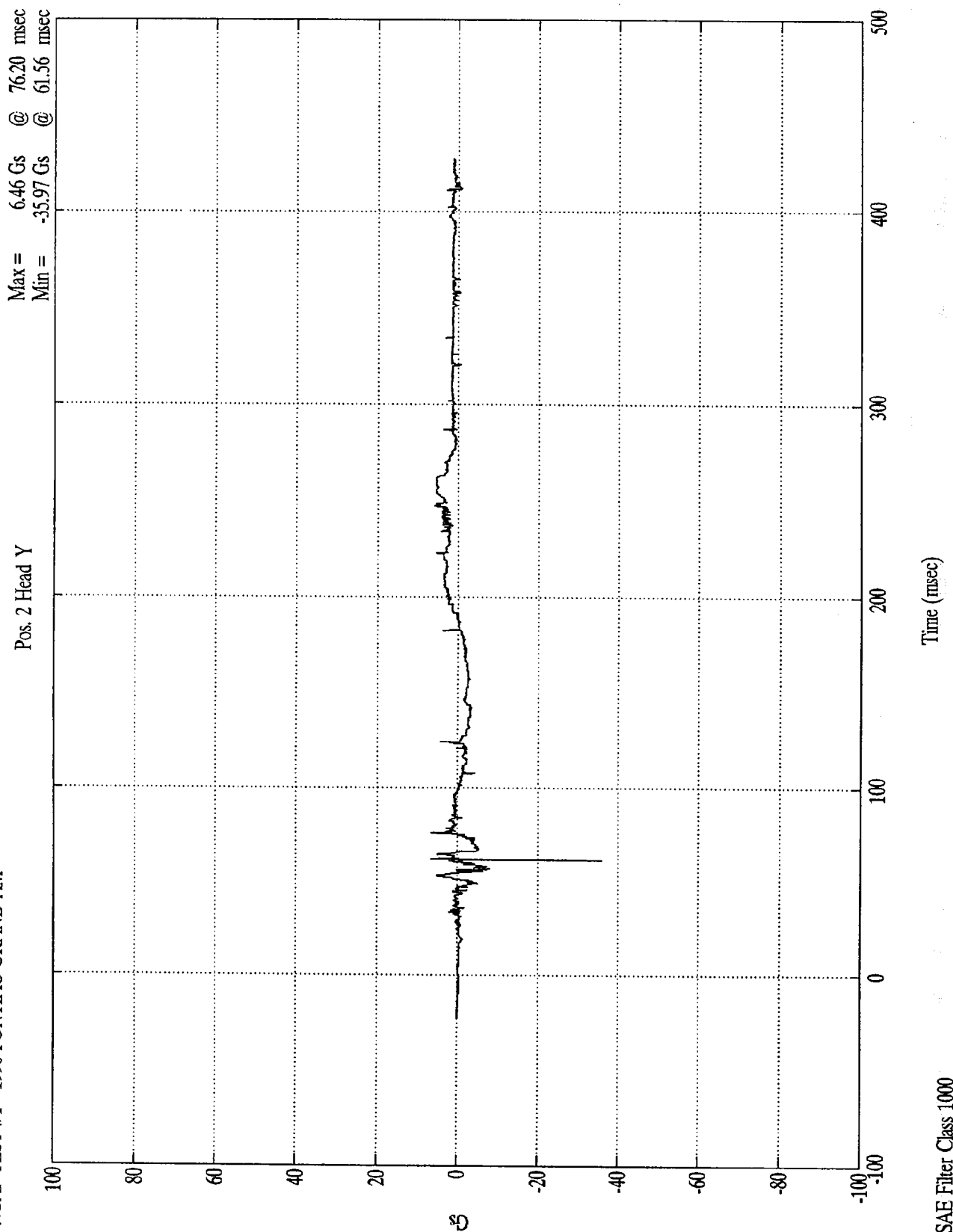
SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Head X(R)
Max = 36.04 Gs @ 62.04 msec
Min = -63.90 Gs @ 77.40 msec

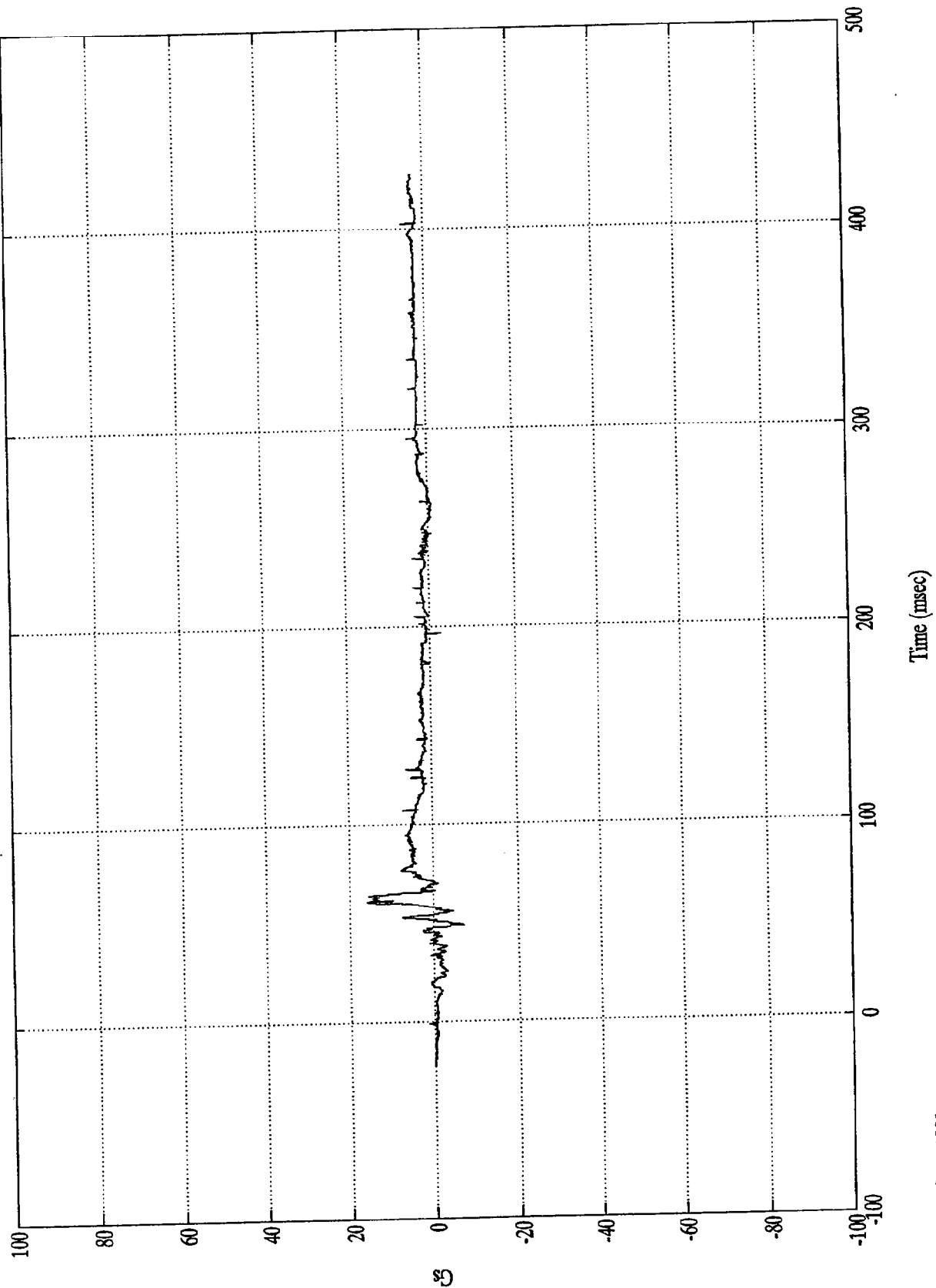


NCAP TEST #1 - 1996 PONTIAC GRAND AM



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Head Y(R)
Max = 15.81 Gs @ 61.20 msec
Min = -7.19 Gs @ 48.84 msec

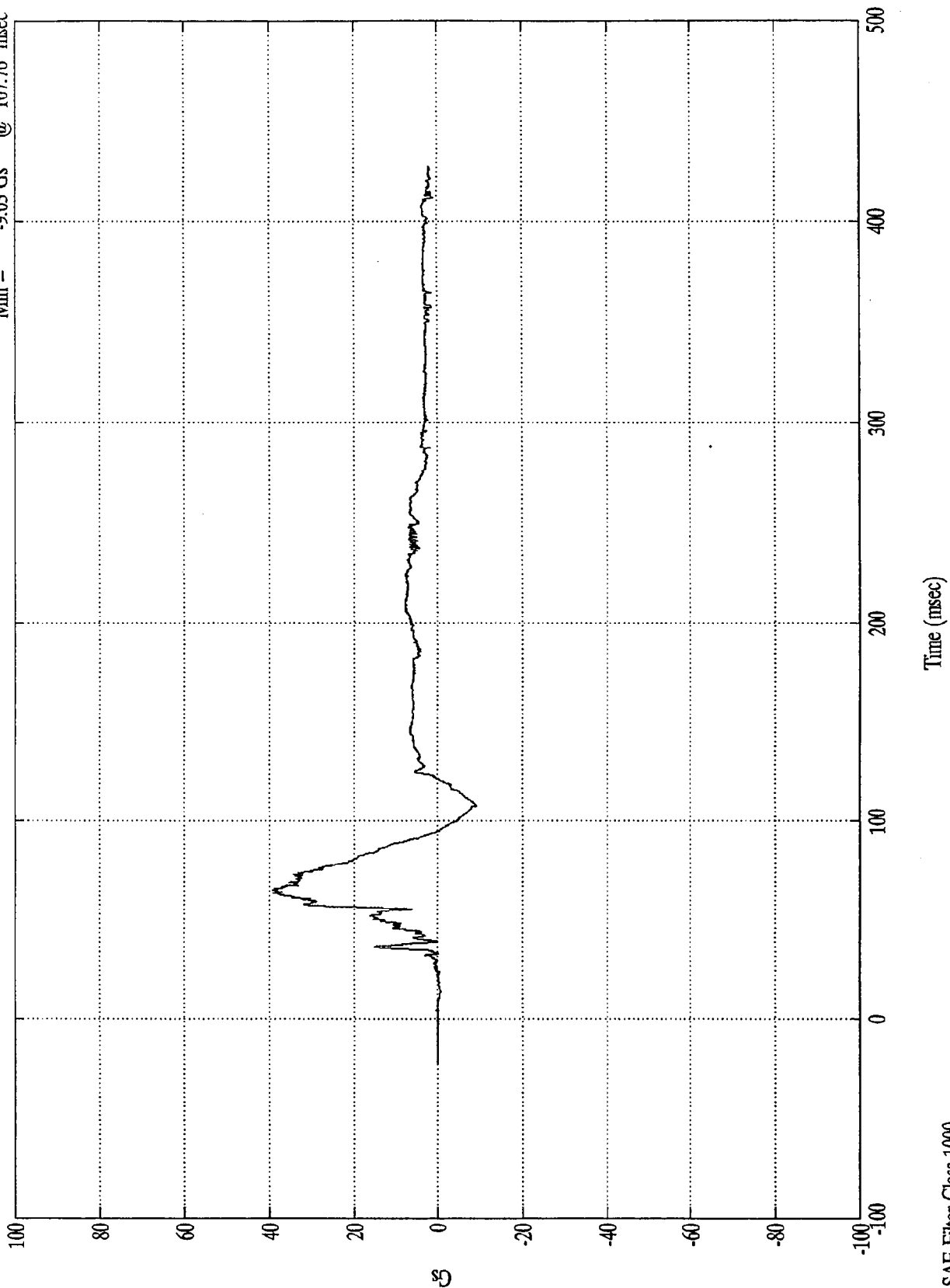


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 39.47 Gs @ 65.04 msec
Min = -9.03 Gs @ 107.76 msec

Pos. 2 Head Z

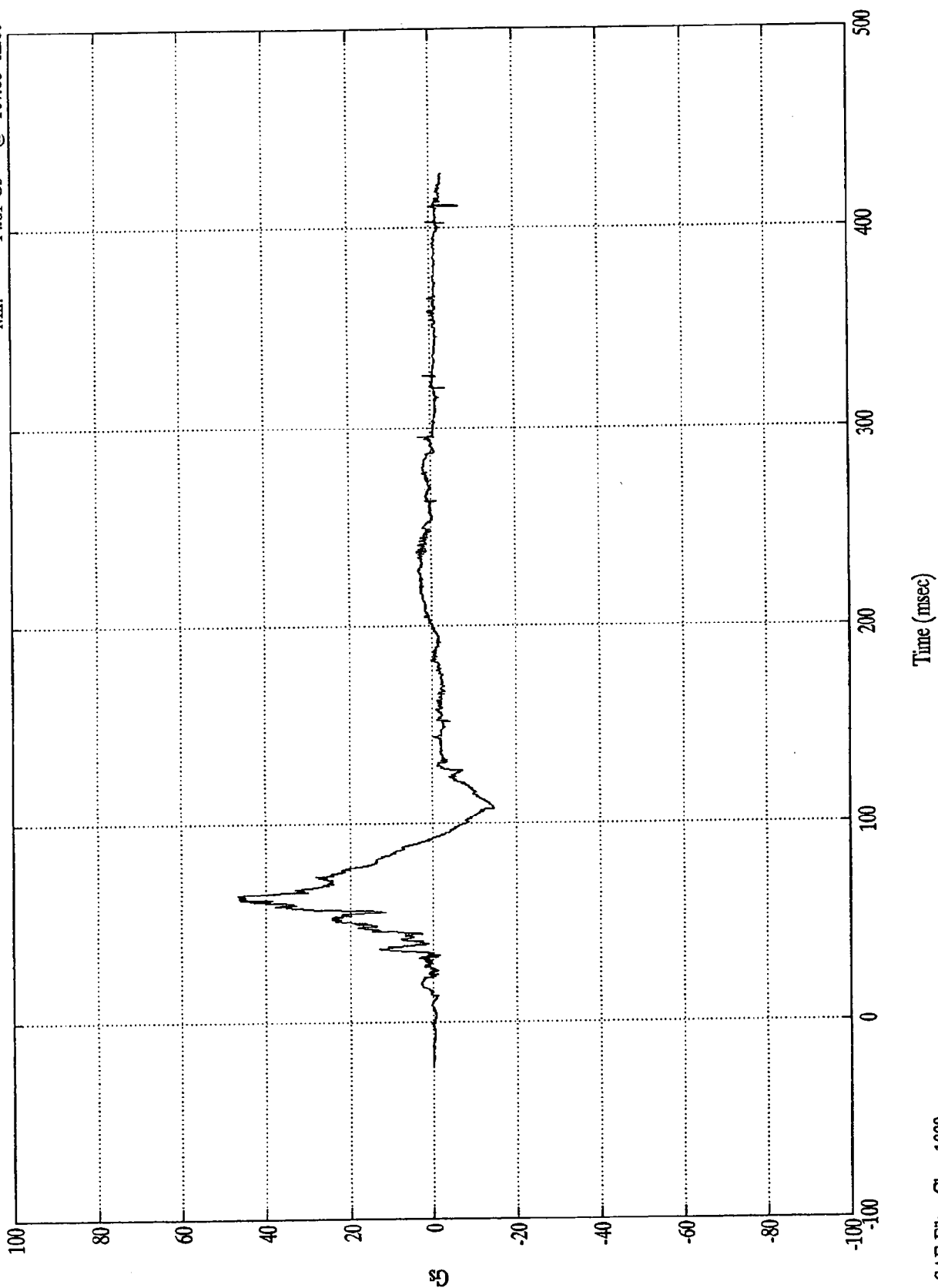


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Head Z(R)

Max = 46.48 Gs @ 63.95 msec
Min = -14.81 Gs @ 107.88 msec

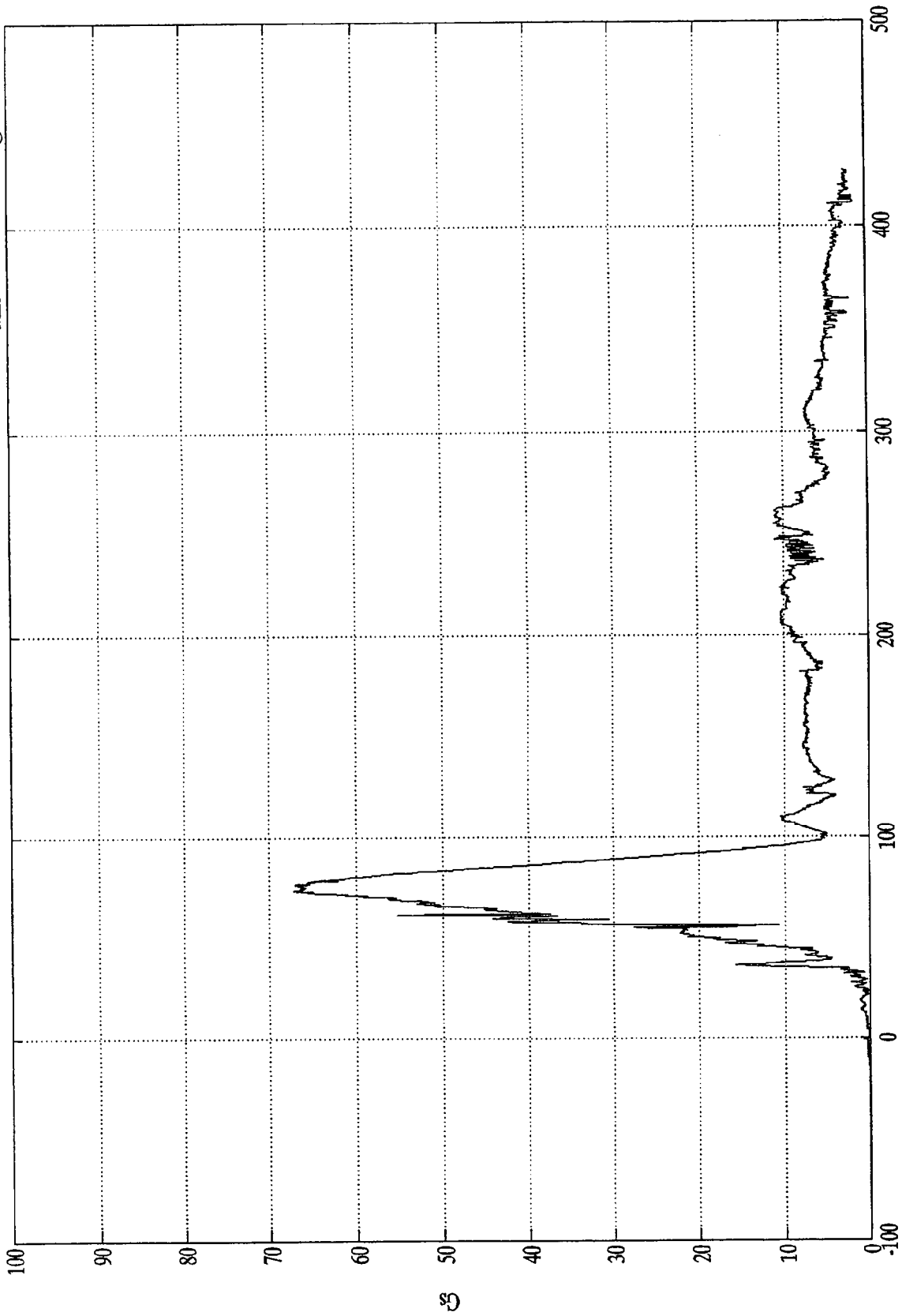


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Head Resultant

Max = 67.26 Gs @ 73.44 msec
Min = .03 Gs @ -16.56 msec



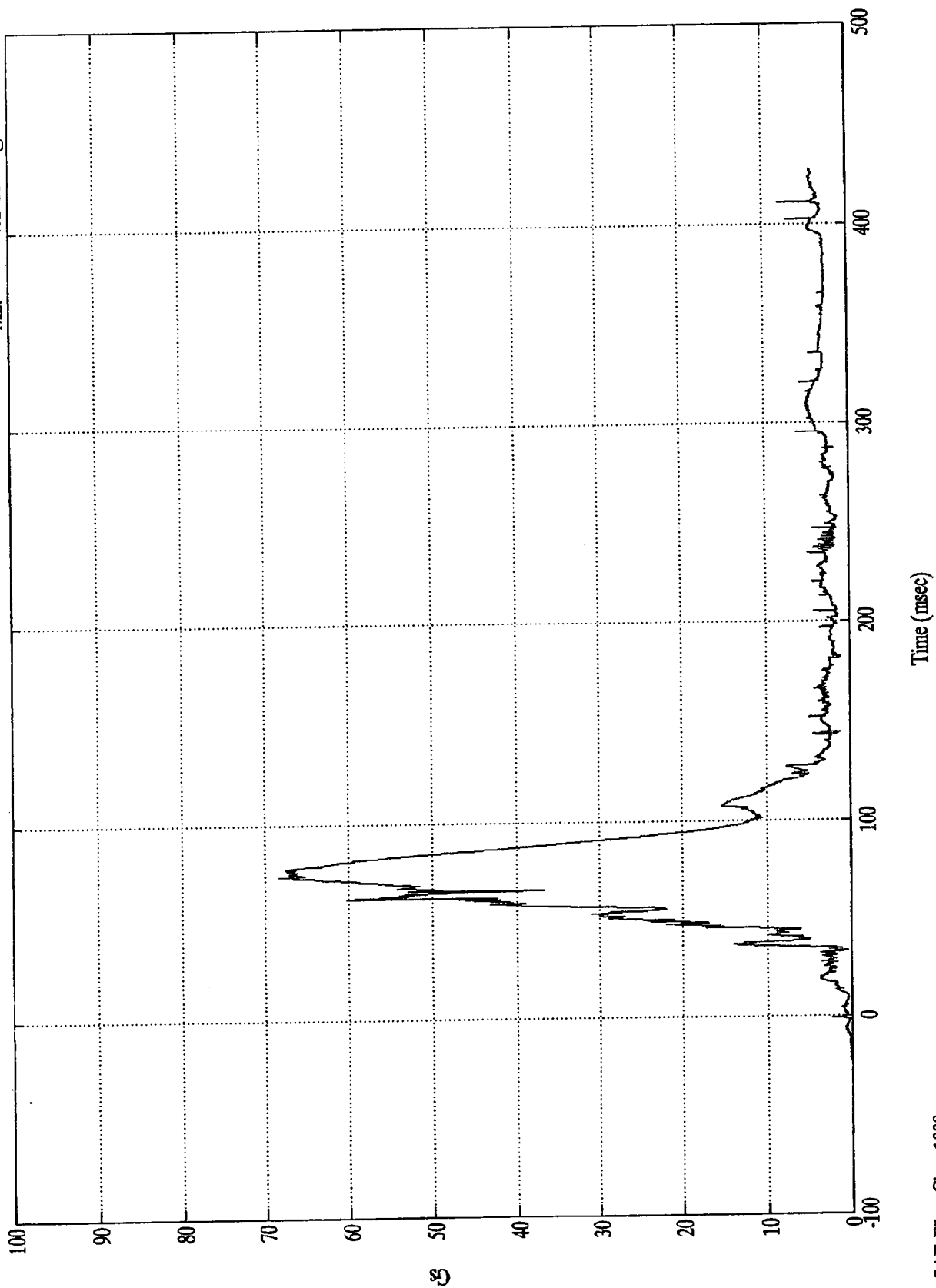
Time (msec)

SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Head Resultant(RR)

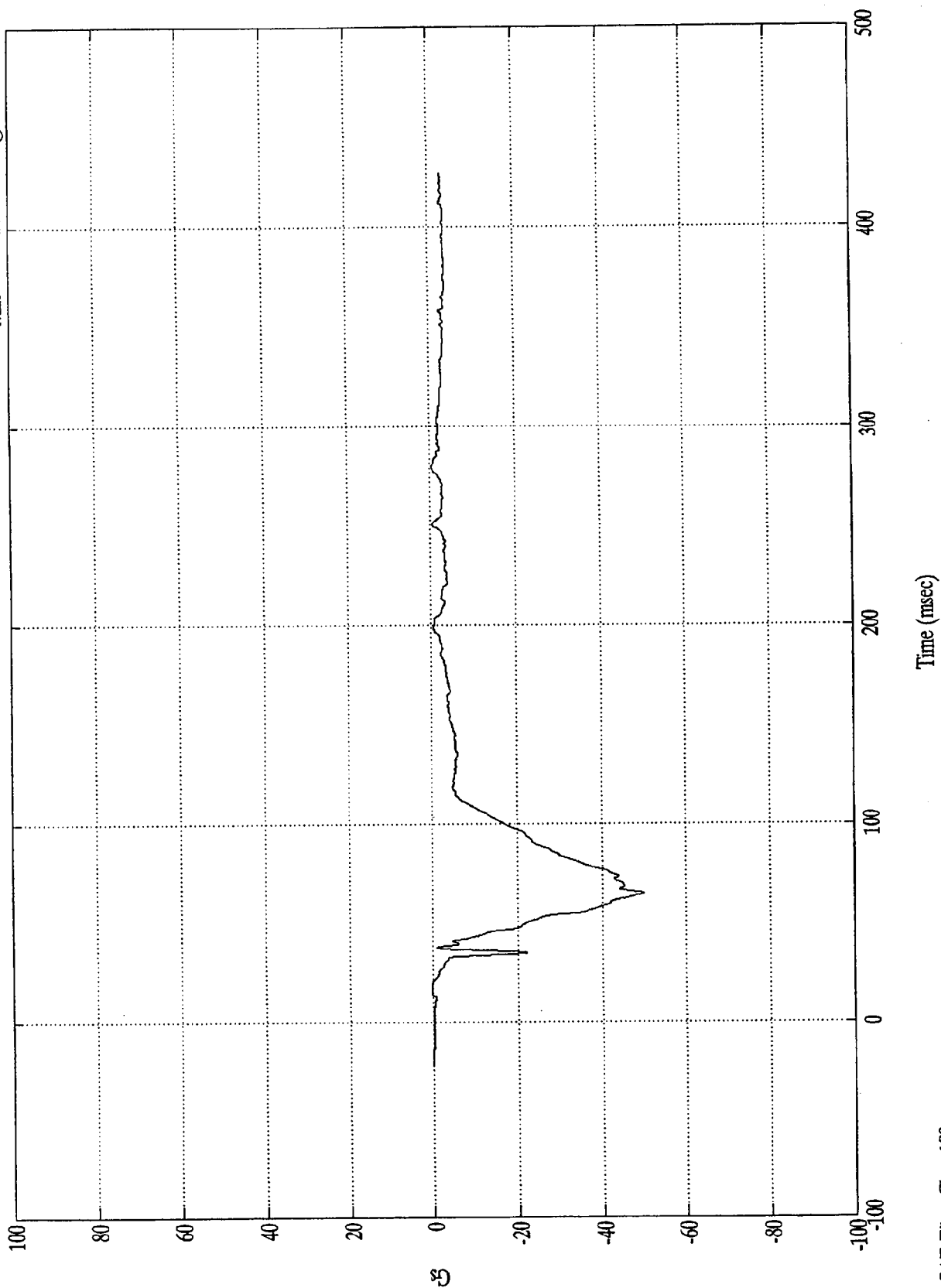
Max = 68.37 Gs @ 73.55 msec
Min = .01 Gs @ -16.44 msec



SAE Filter Class 1000

NCAP TEST #1 - 19% PONTIAC GRAND AM

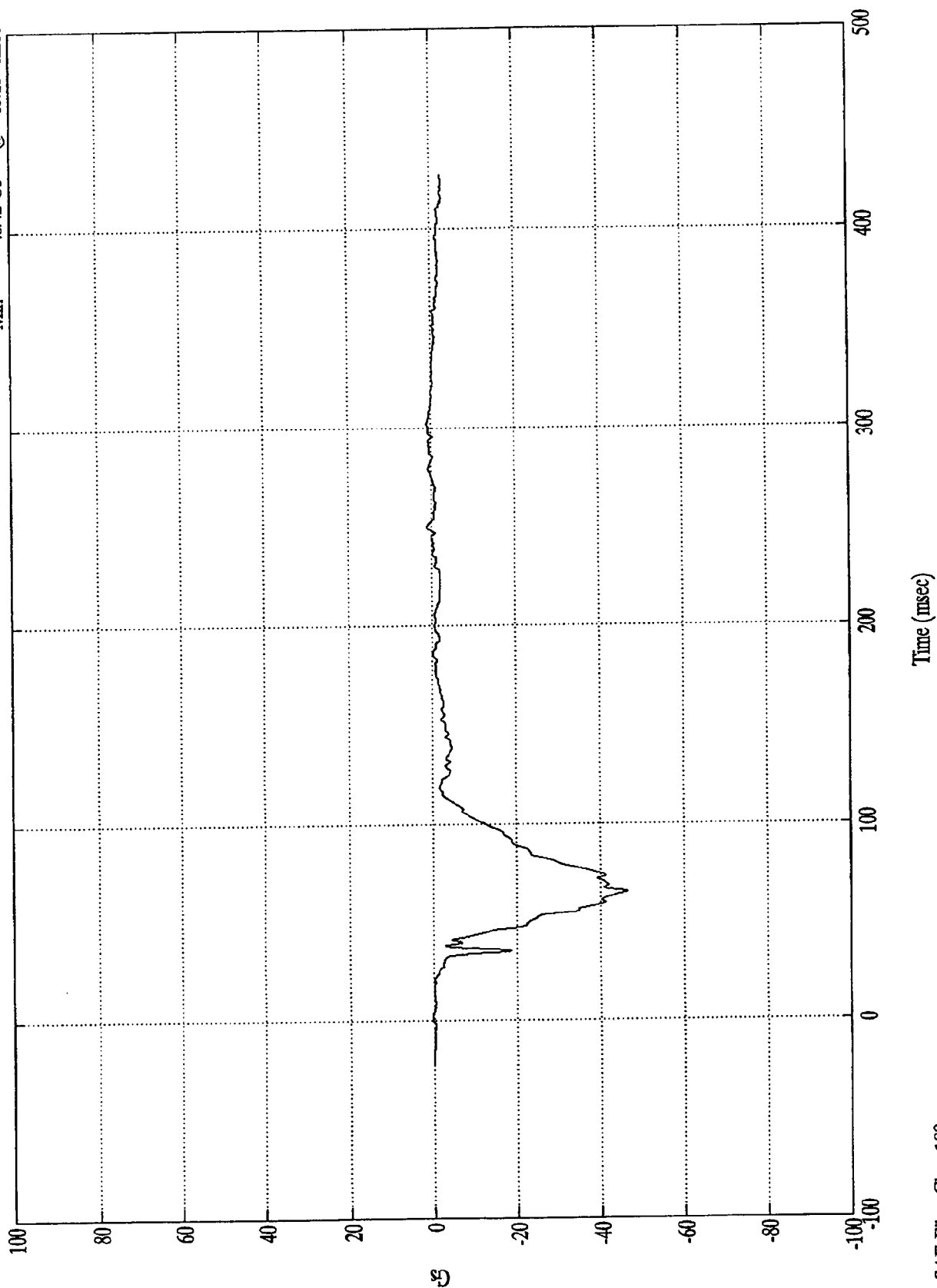
Pos. 2 Chest X
Max = .25 Gs @ 15.11 msec
Min = -49.78 Gs @ 64.91 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Chest X(R)

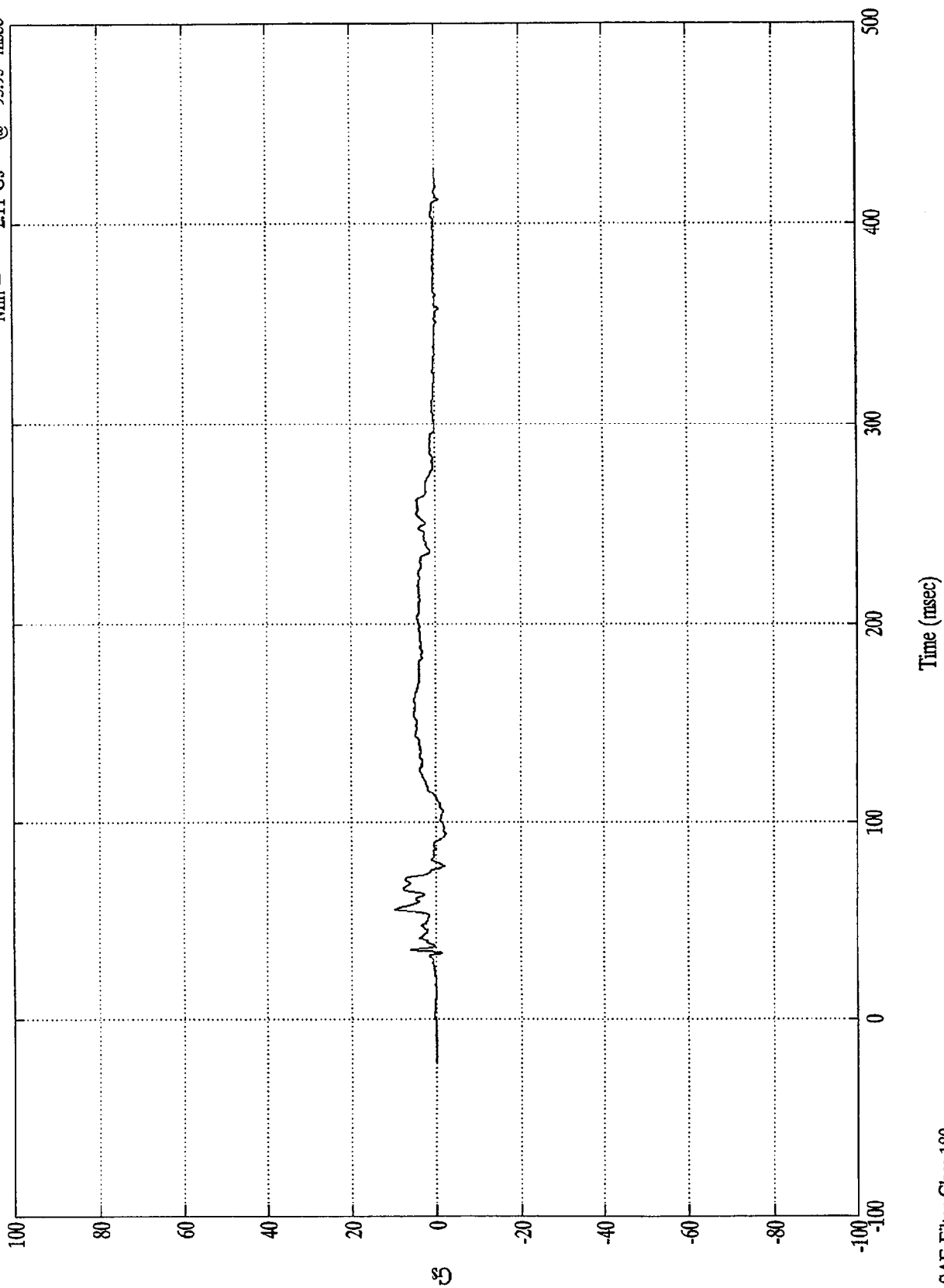
Max = 1.20 Gs @ 250.32 msec
Min = -46.42 Gs @ 65.15 msec



SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

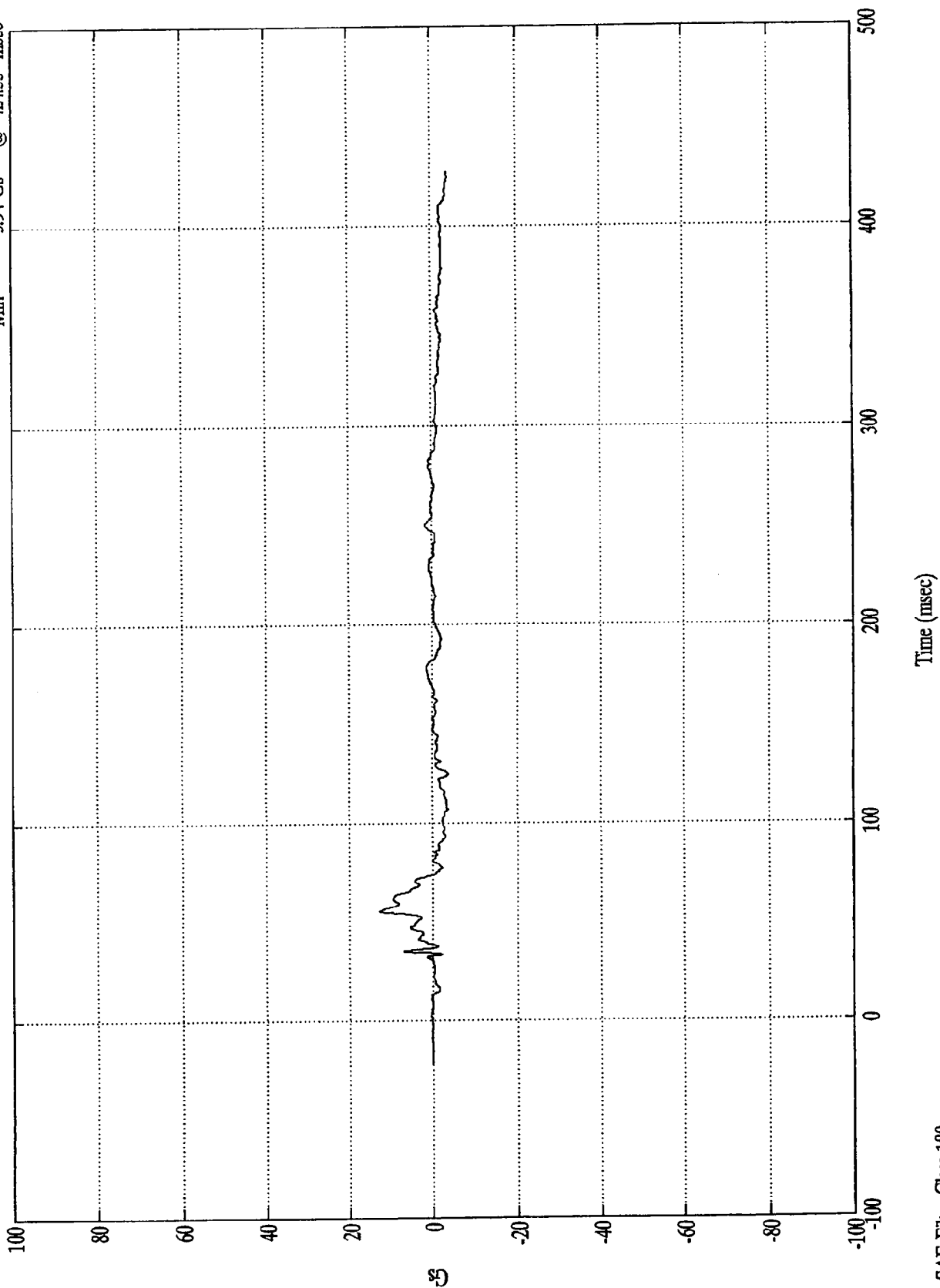
Pos. 2 Chest Y
Max = 9.81 Gs @ 55.56 msec
Min = -2.11 Gs @ 93.95 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Chest Y(R)

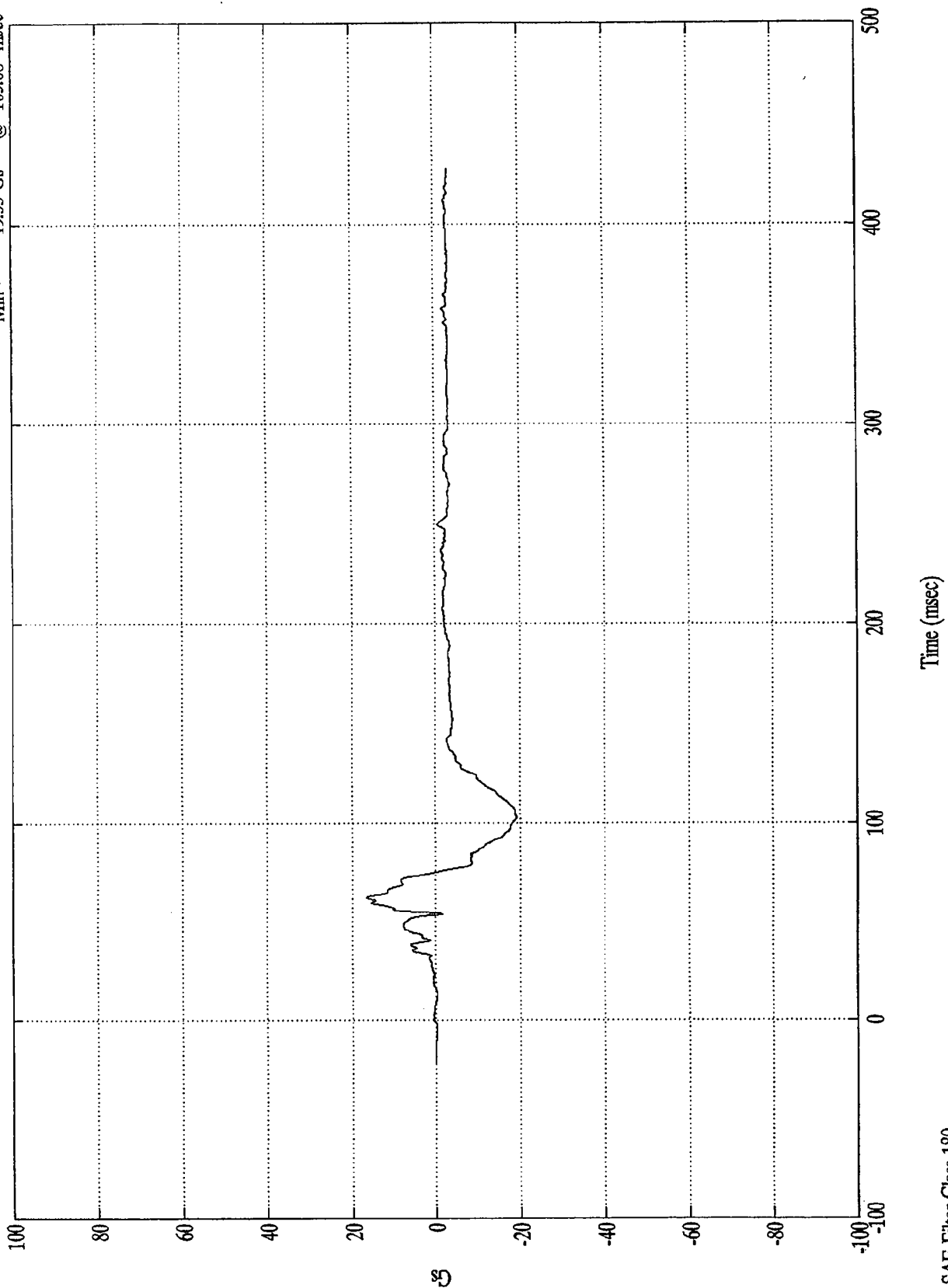
Max = 12.88 Gs @ 55.44 msec
Min = -3.94 Gs @ 424.55 msec



SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Chest Z
Max = 16.54 Gs @ 62.88 msec
Min = -19.33 Gs @ 103.08 msec

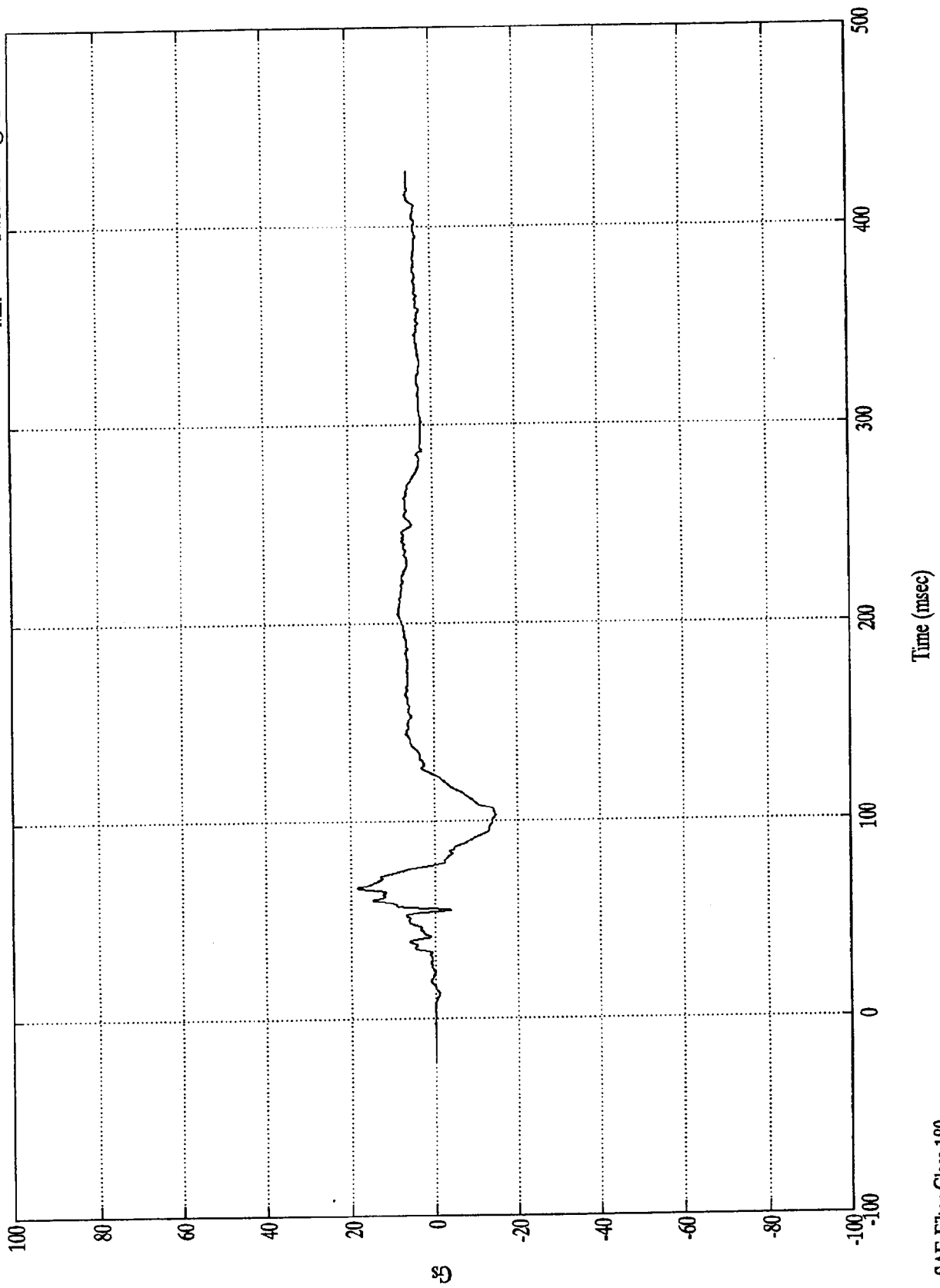


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Chest Z(R)

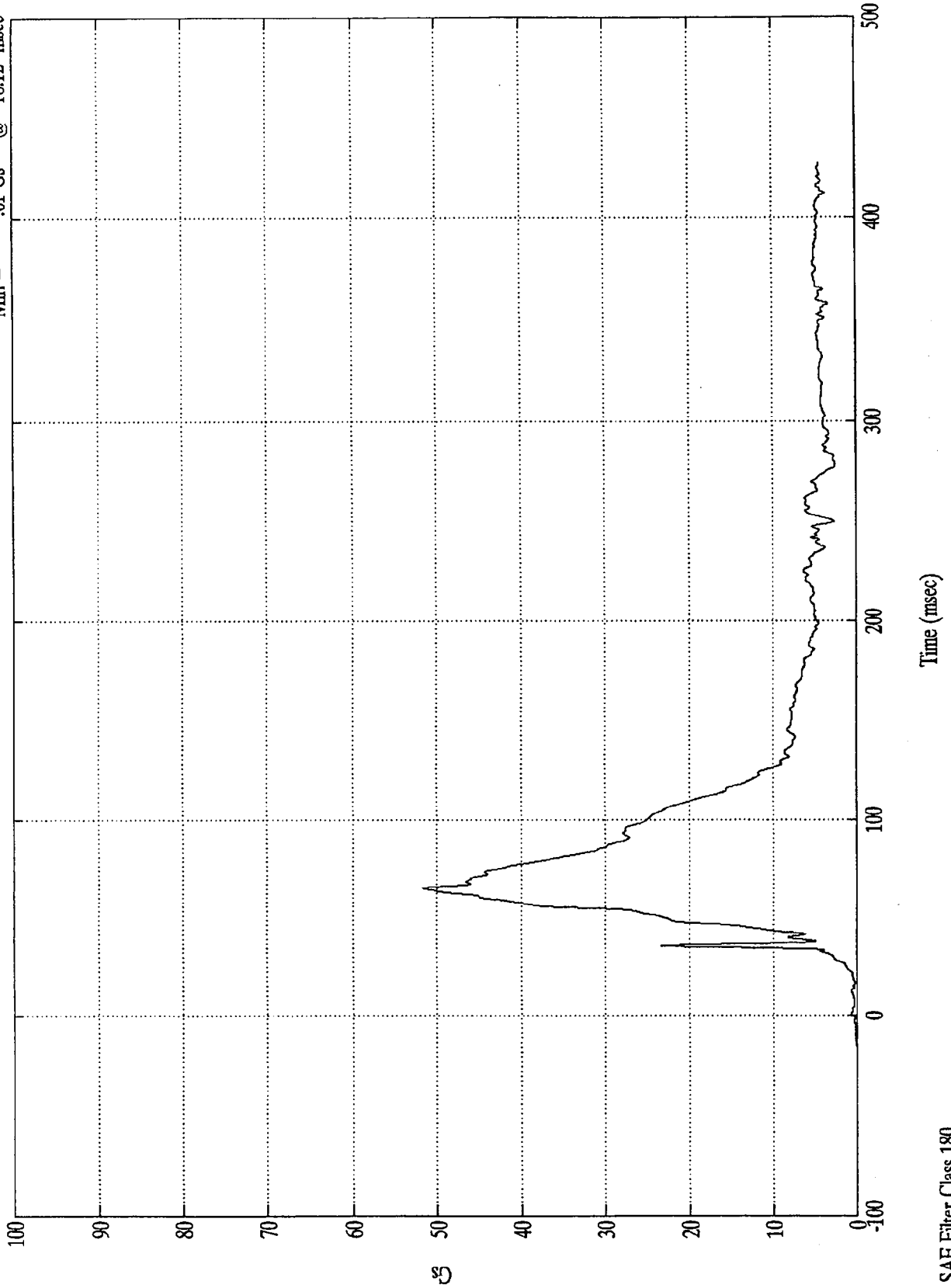
Max = 18.39 Gs @ 66.00 msec
Min = -14.85 Gs @ 102.84 msec



SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Chest Resultant
 Max = 51.64 Gs @ 64.91 msec
 Min = .01 Gs @ -18.12 msec

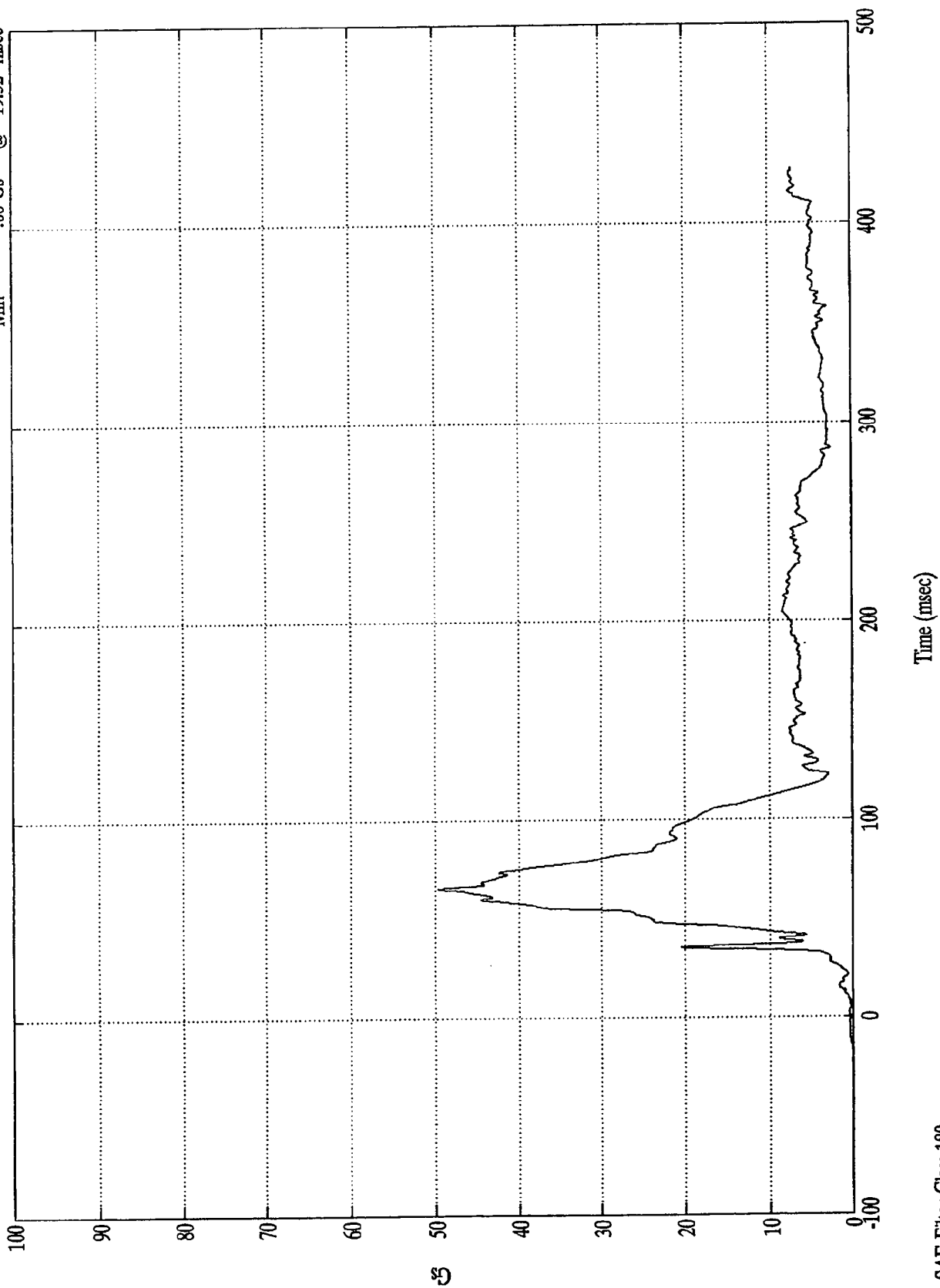


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Chest Res(RR)

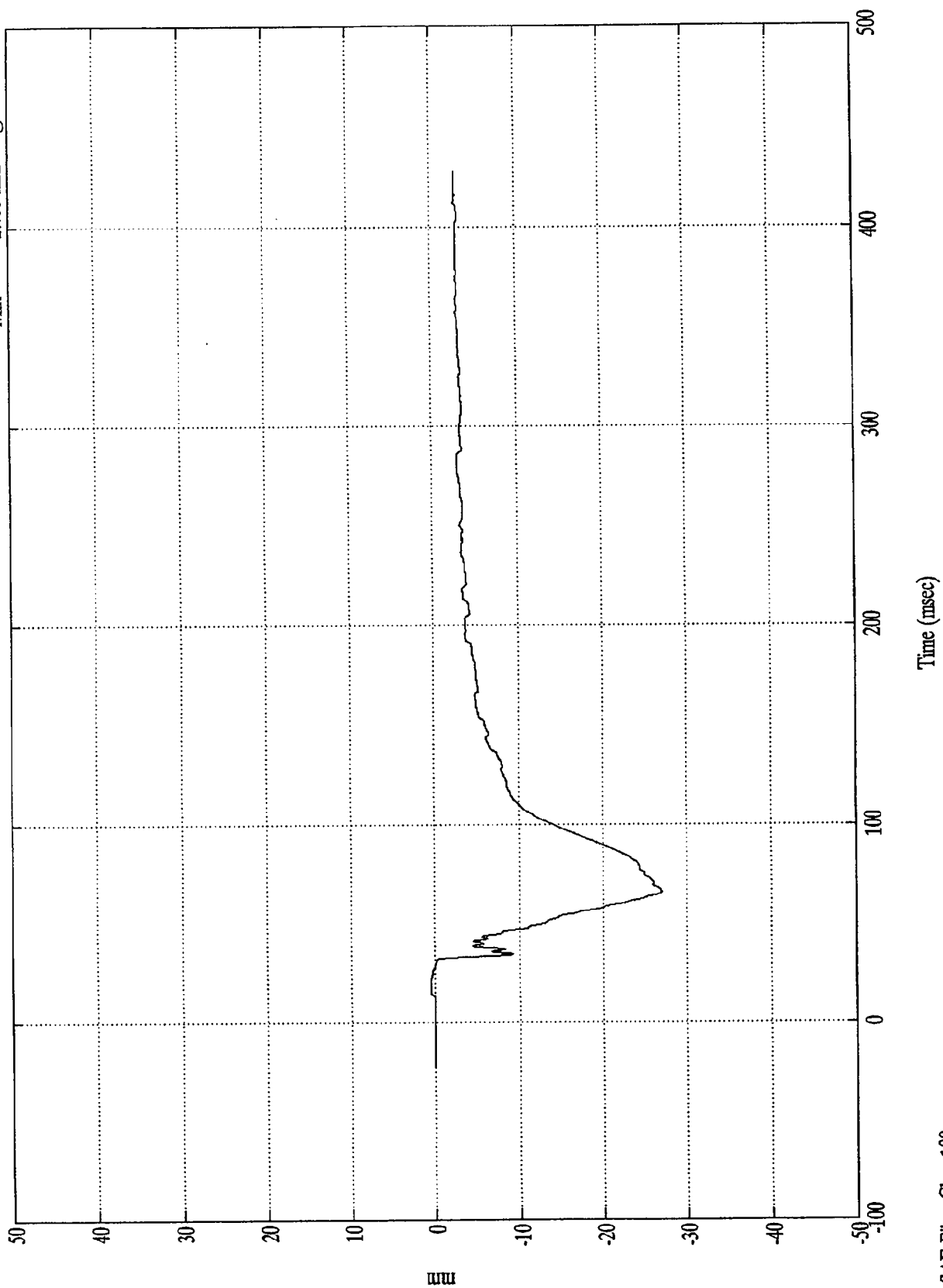
Max = 49.66 Gs @ 65.40 msec
Min = .00 Gs @ -19.32 msec



SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Chest Disp.
Max = .48 mm @ 15.23 msec
Min = -27.00 mm @ 65.87 msec

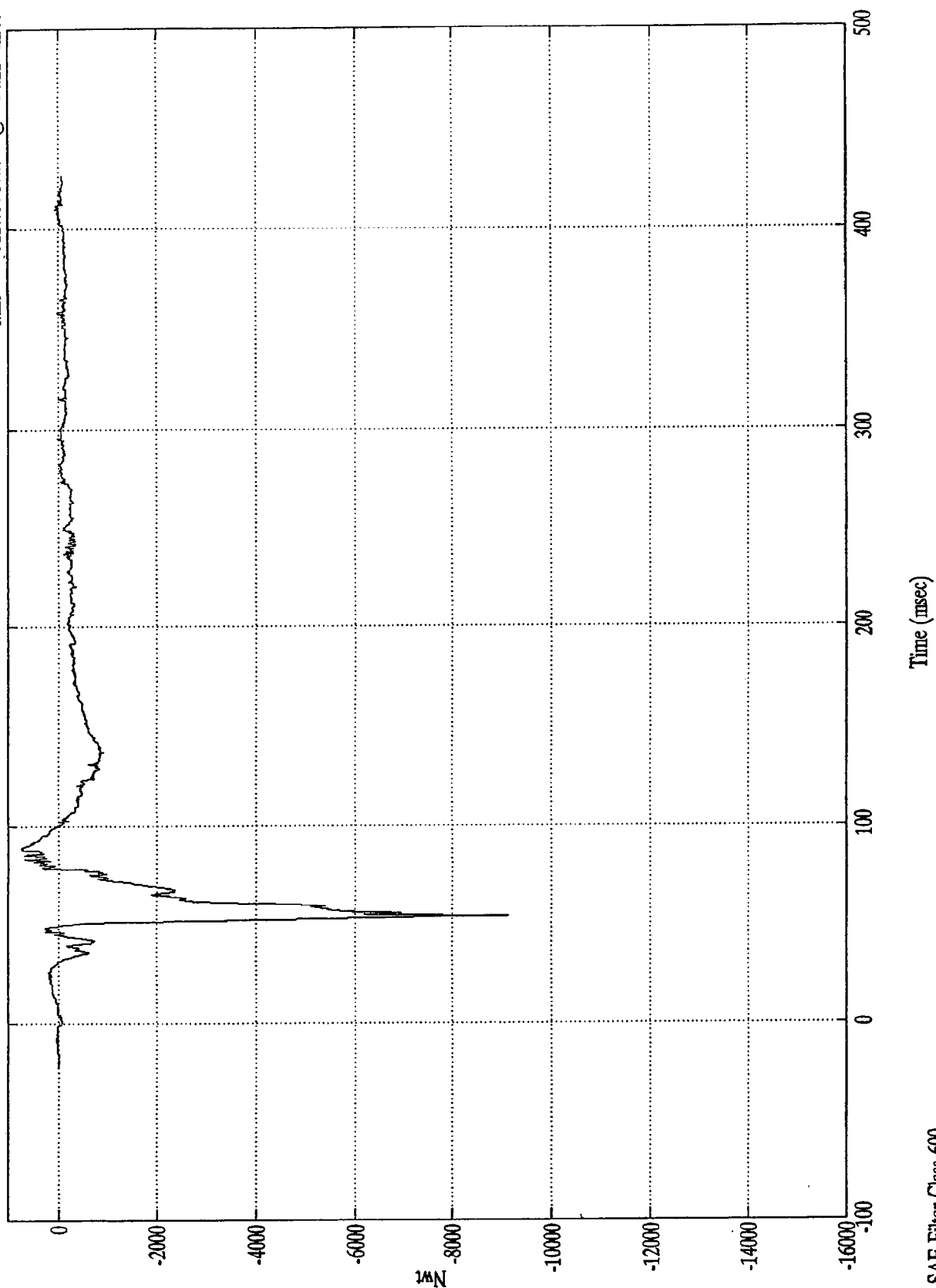


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 737.75 Nwt @ 88.80 msec
Min = -9127.04 Nwt @ 54.11 msec

Pos. 2 Left Femur



Nwt

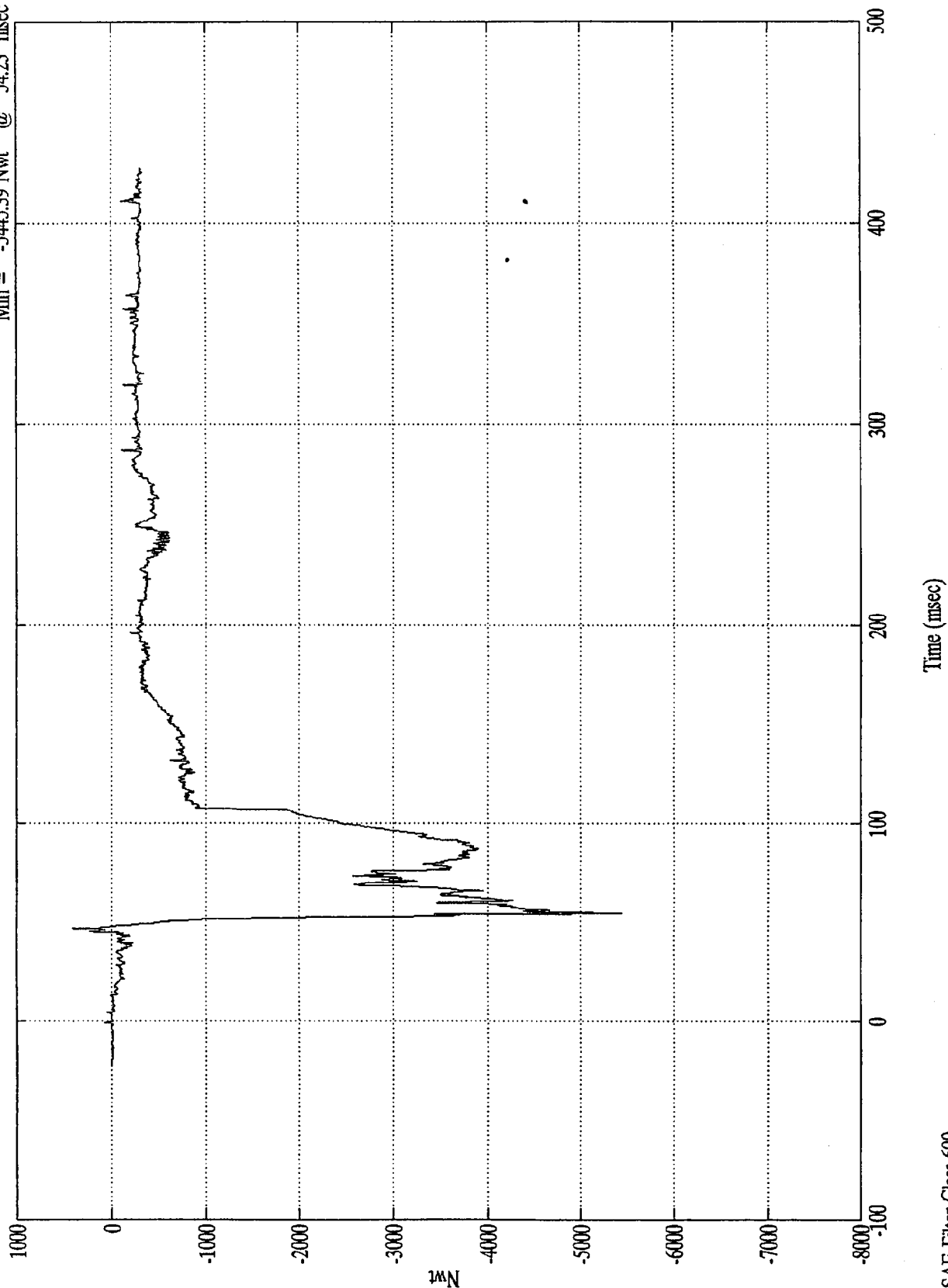
Time (msec)

SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Right Femur

Max = 419.55 Nwt @ 46.56 msec
Min = -5445.39 Nwt @ 54.23 msec

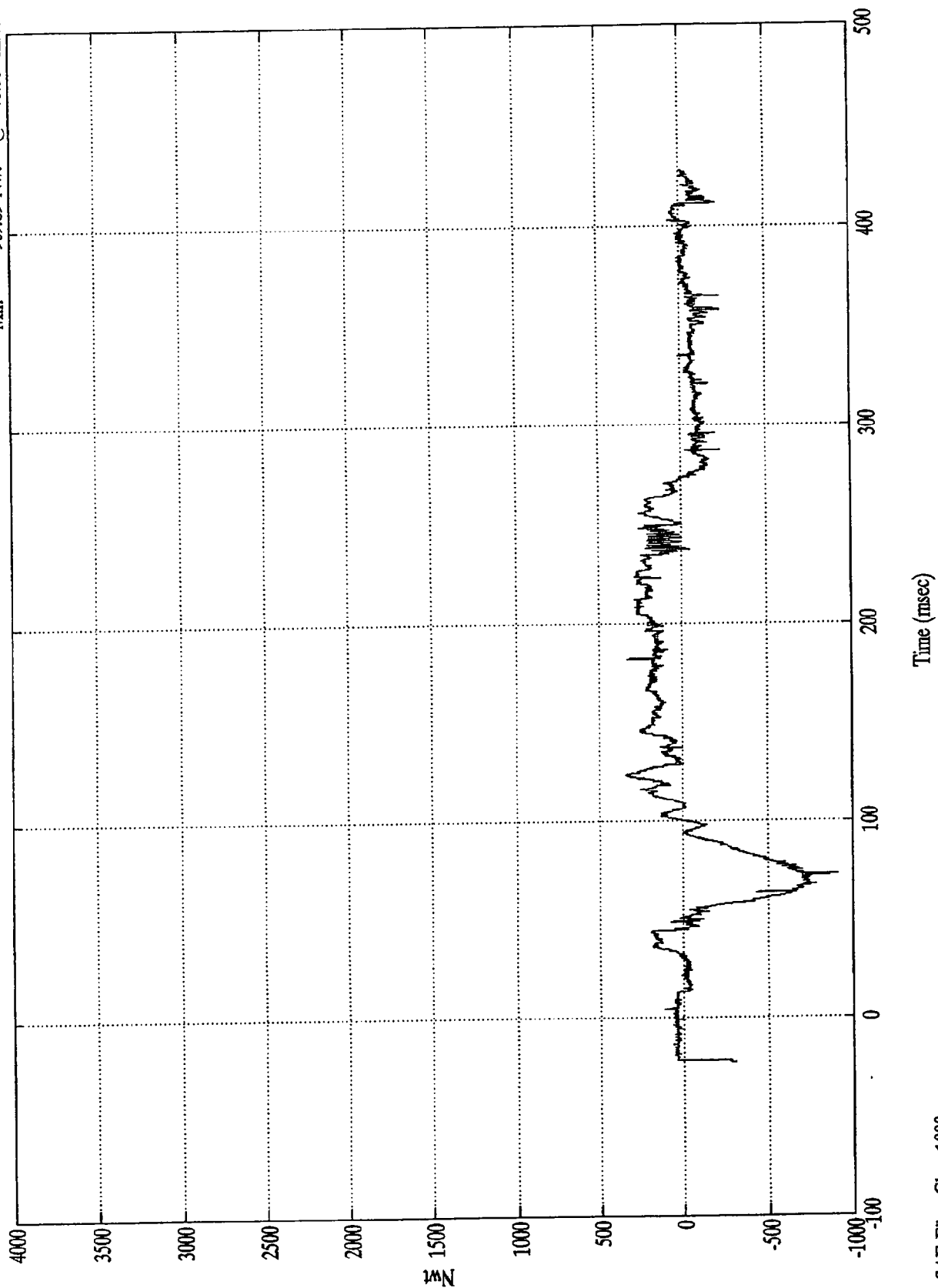


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Upper Neck Fx

Max = 341.31 Nwt @ 122.76 msec
Min = -909.89 Nwt @ 73.55 msec

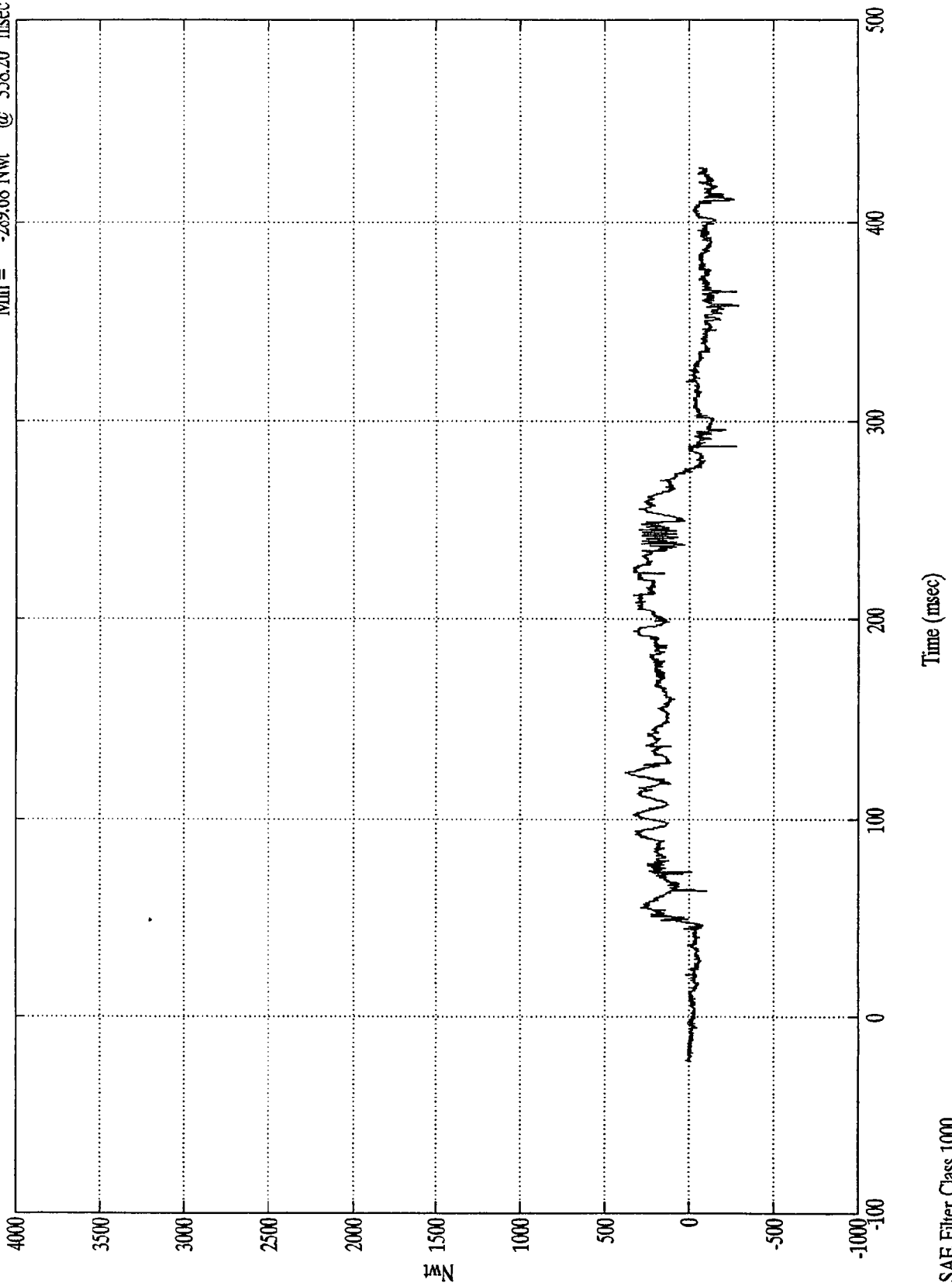


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Upper Neck Fy

Max = 382.03 Nwt @ 123.36 msec
Min = -289.68 Nwt @ 358.20 msec

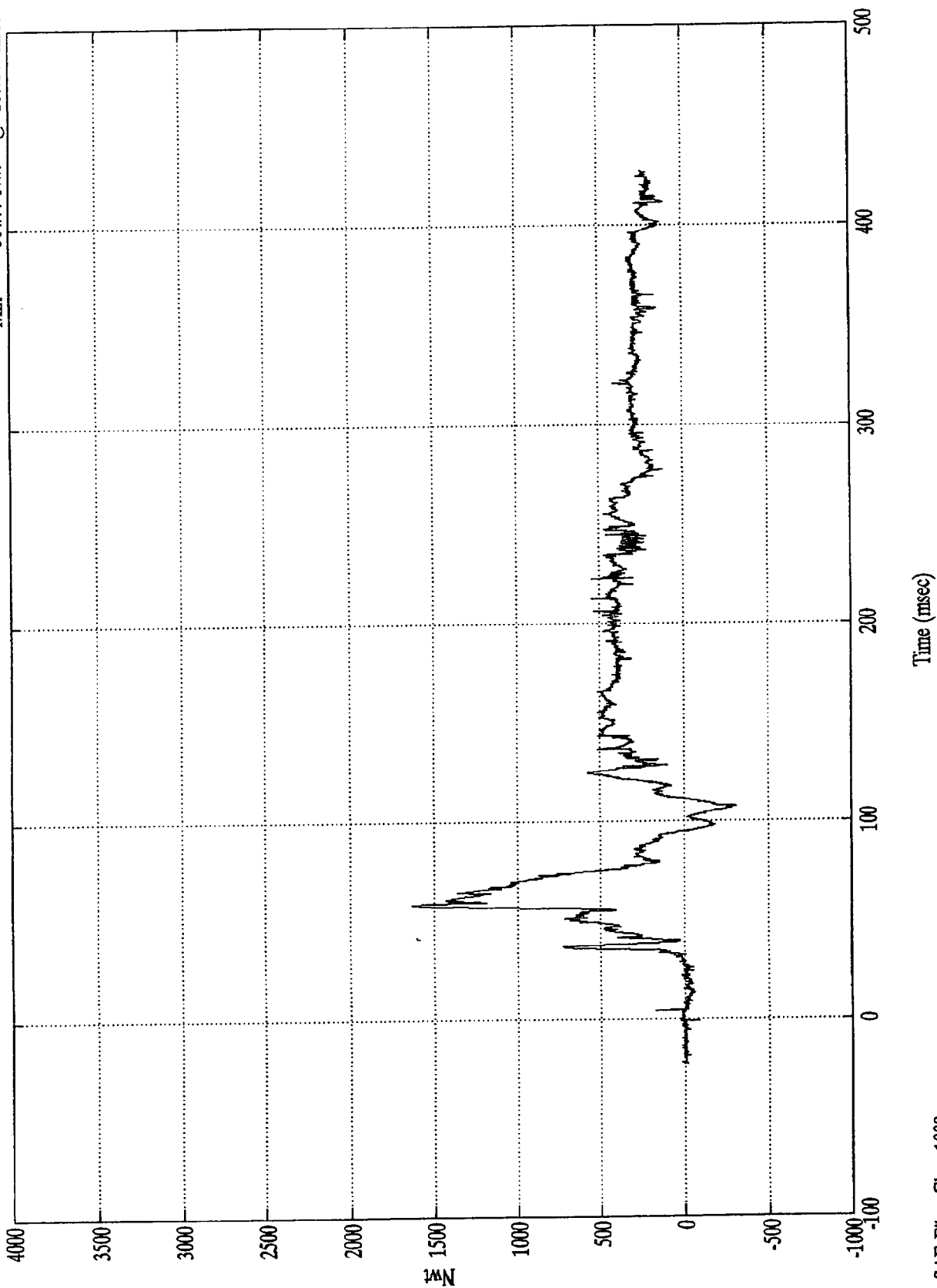


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Upper Neck Fz

Max = 1631.85 Nwt @ 58.43 msec
Min = -304.77 Nwt @ 107.64 msec

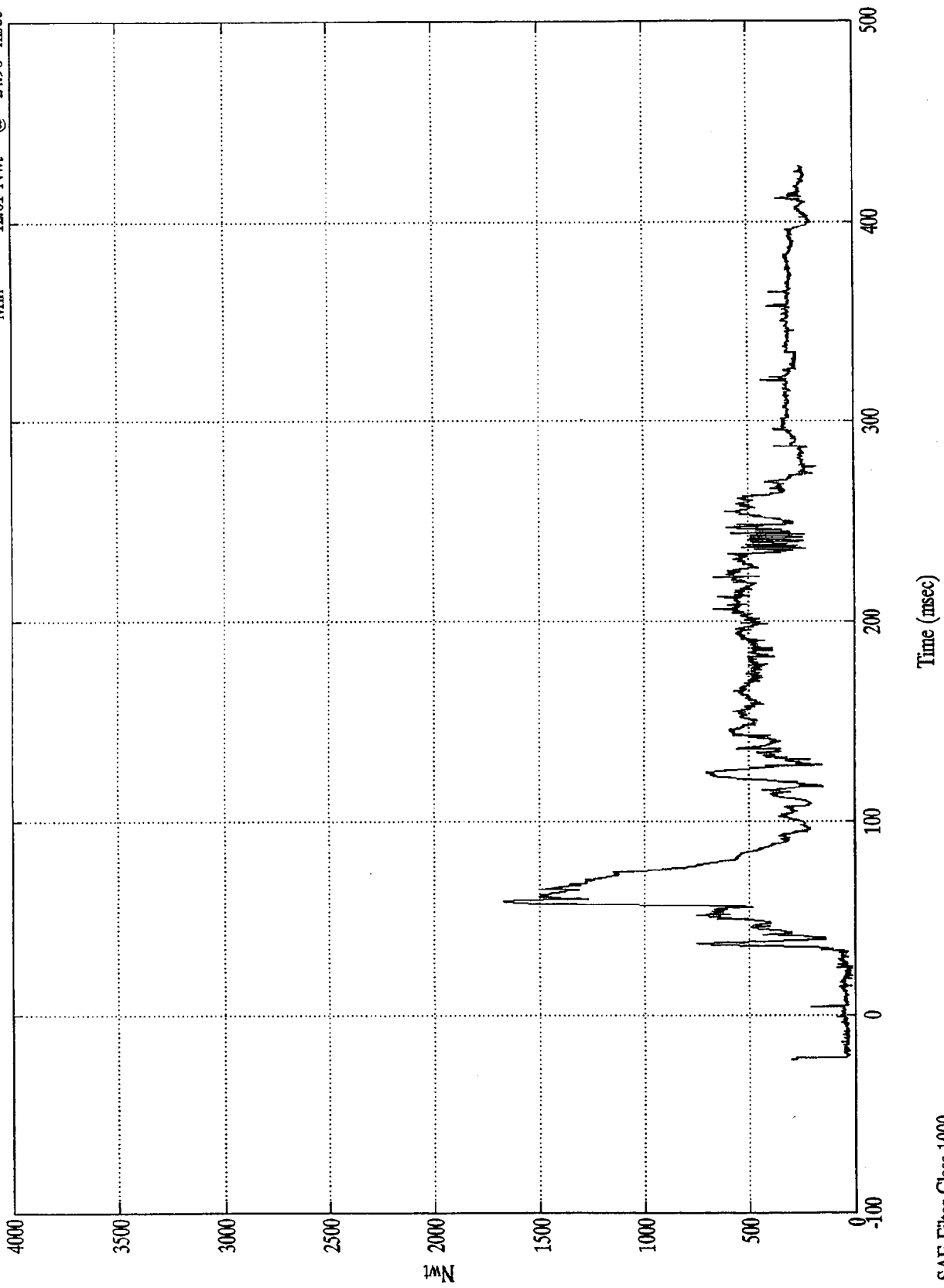


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Neck Force Res.

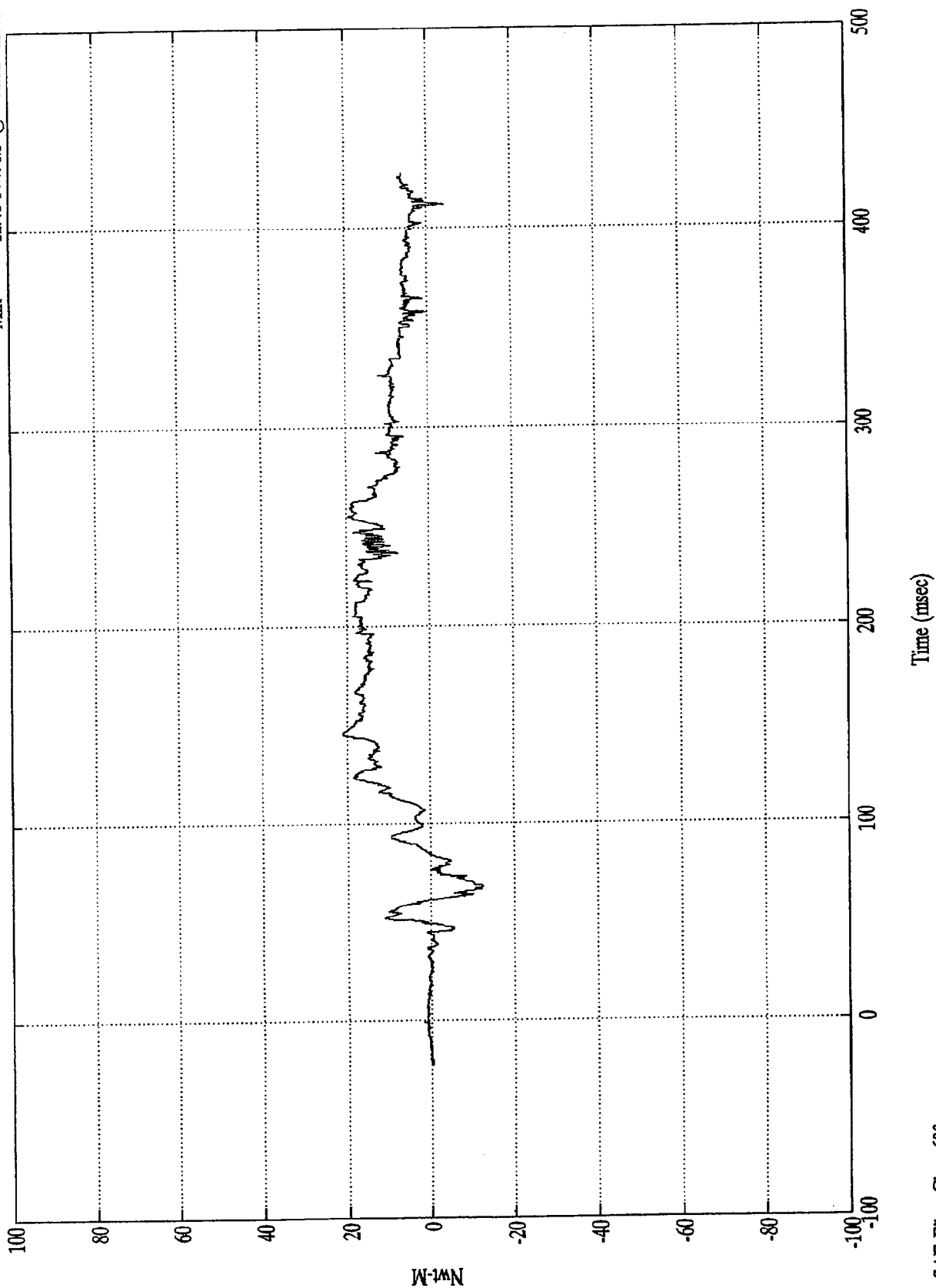
Max = 1668.65 Nwt @ 58.43 msec
Min = 12.61 Nwt @ 24.96 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Upper Neck Mx

Max = 21.09 Nwt-M @ 145.56 msec
Min = -12.48 Nwt-M @ 68.52 msec

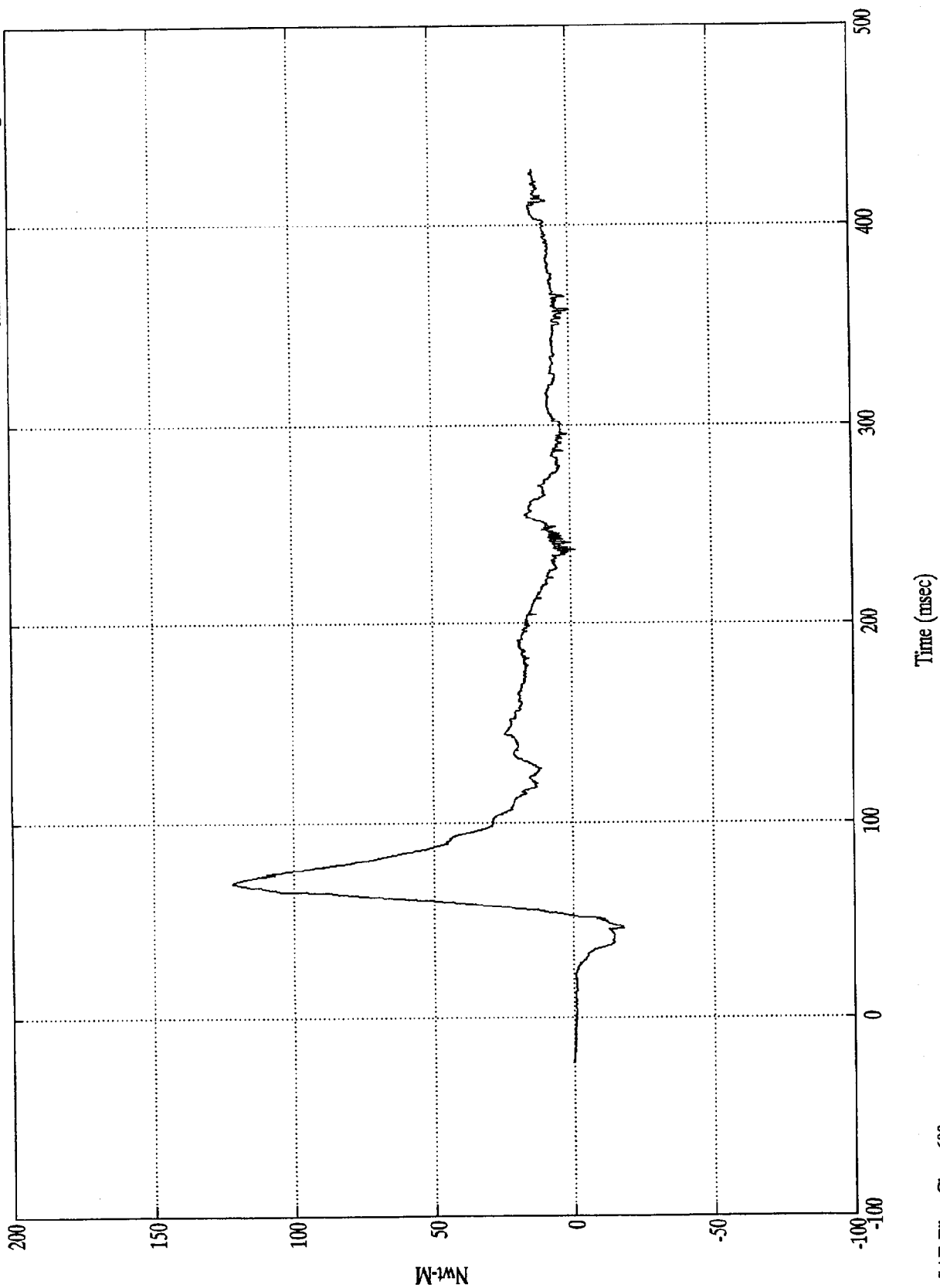


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Upper Neck My

Max = 121.93 Nwt-M @ 69.36 msec
Min = -18.13 Nwt-M @ 45.48 msec

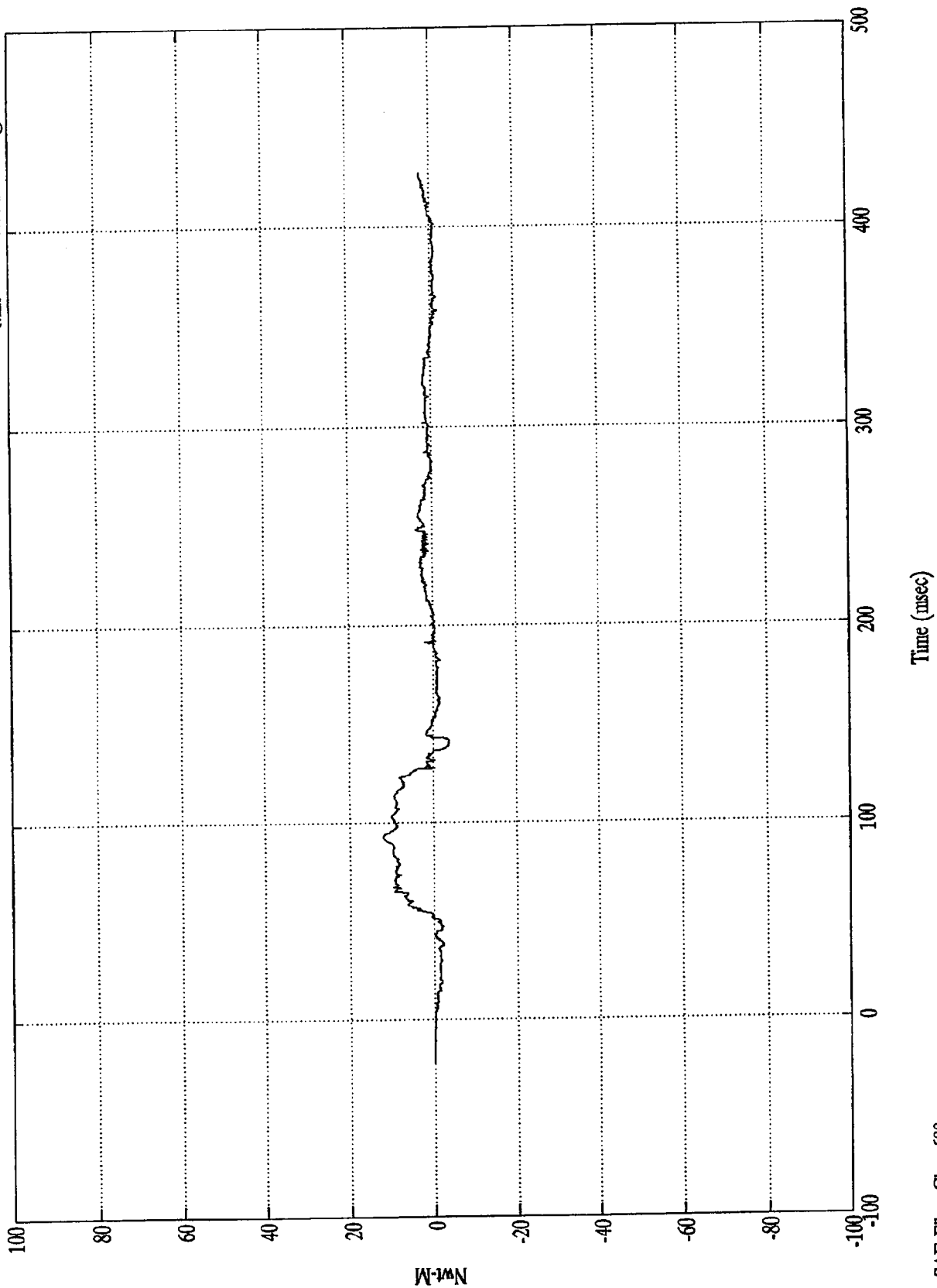


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 12.13 Nwt-M @ 92.64 msec
Min = -3.76 Nwt-M @ 140.40 msec

Pos. 2 Upper Neck Mz

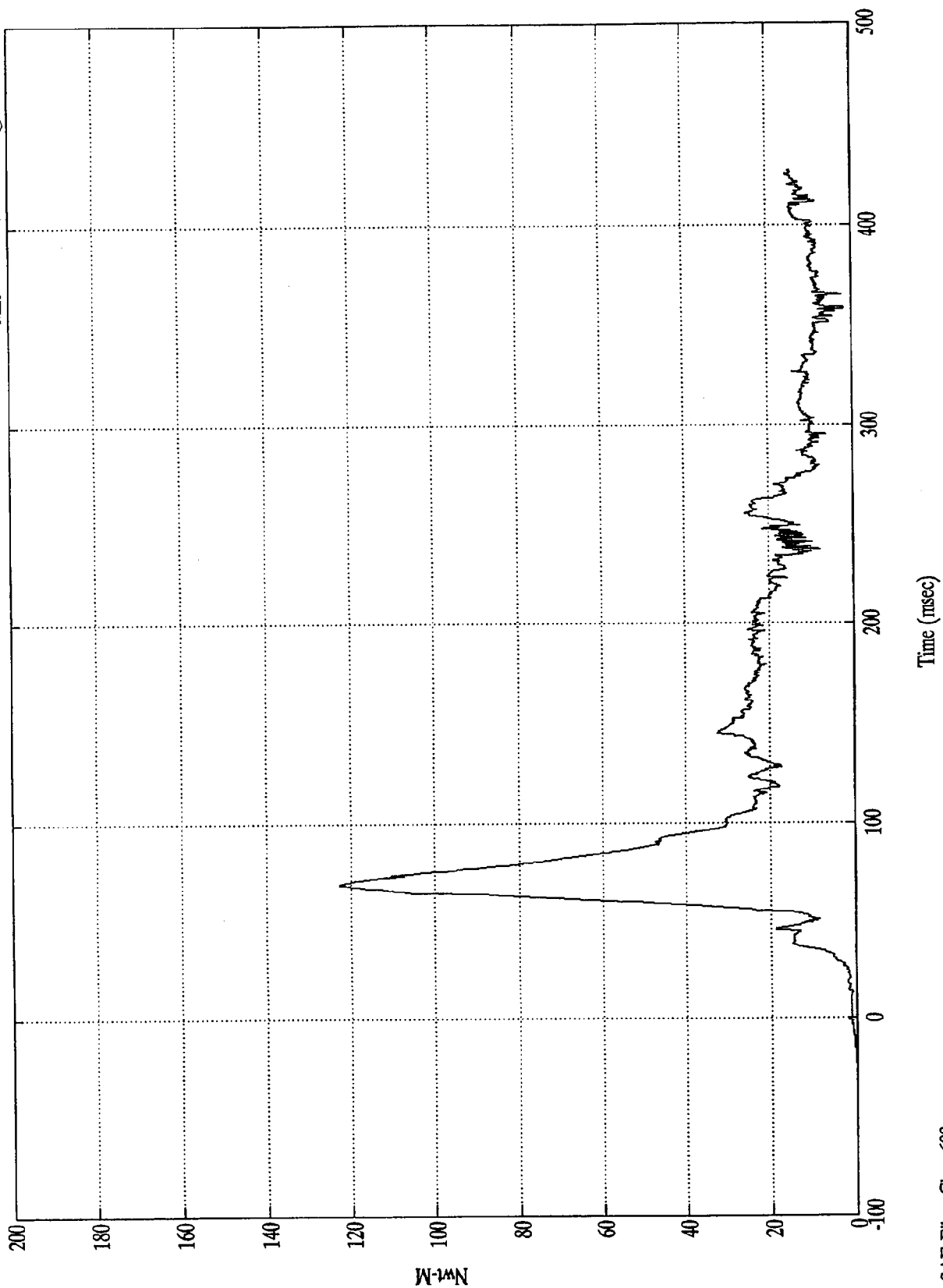


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 122.72 Nwt-M @ 69.24 msec
Min = .04 Nwt-M @ -18.36 msec

Pos. 2 Neck Moment Res.

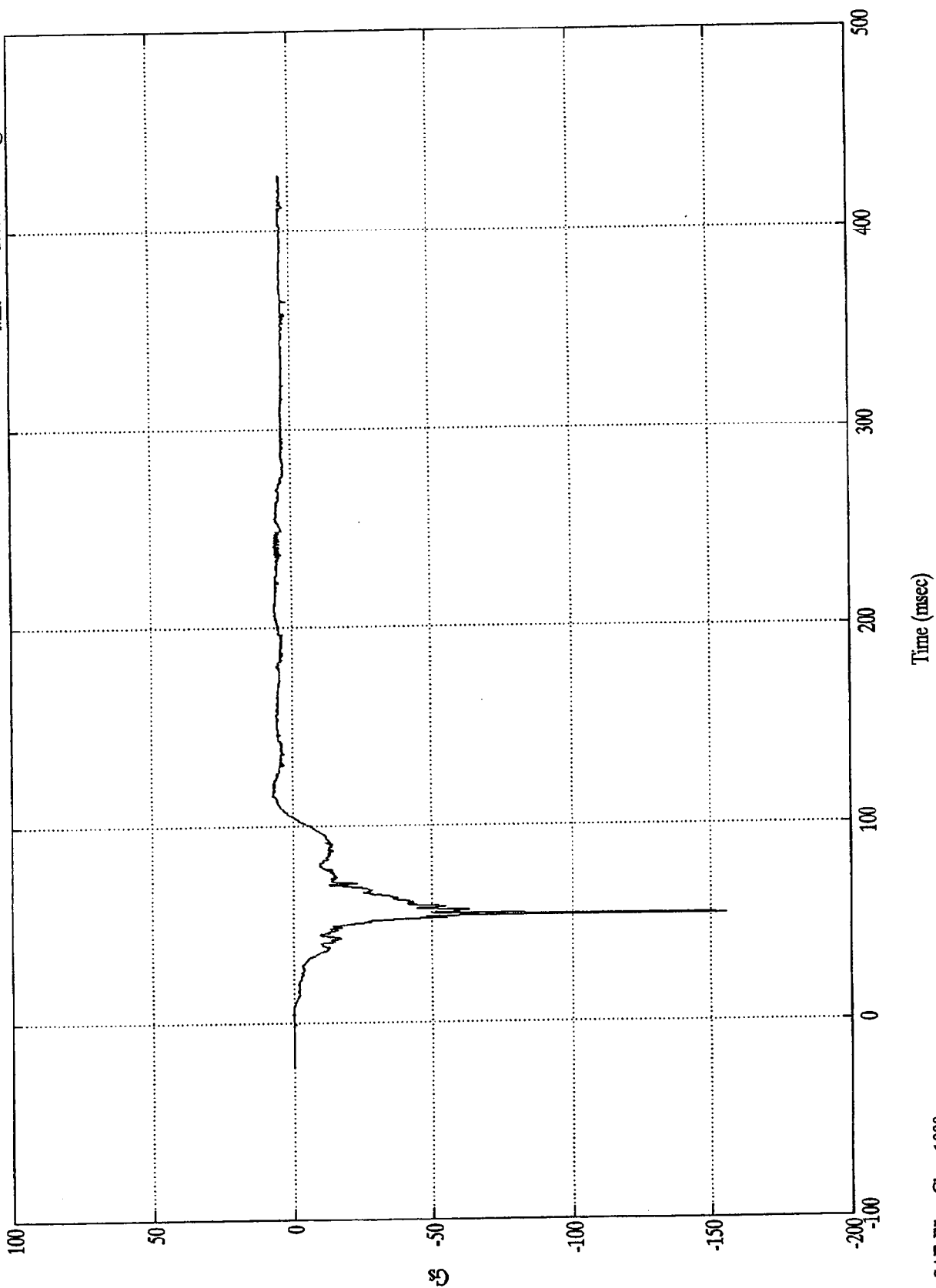


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Pelvic (X)

Max = 7.32 Gs @ 116.16 msec
Min = -155.45 Gs @ 54.00 msec

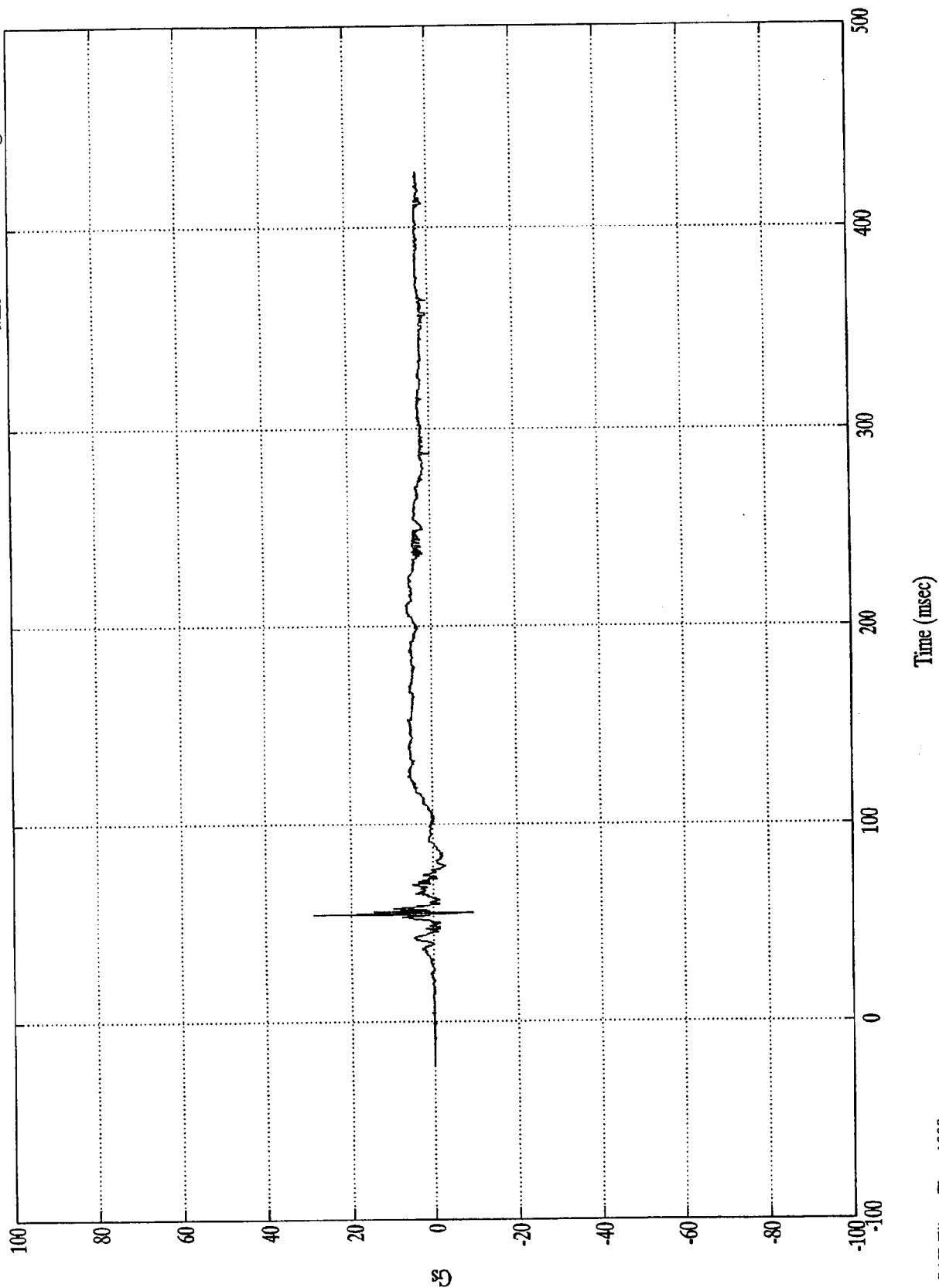


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Pelvic (Y)

Max = 28.97 Gs @ 53.88 msec
Min = -9.38 Gs @ 54.59 msec

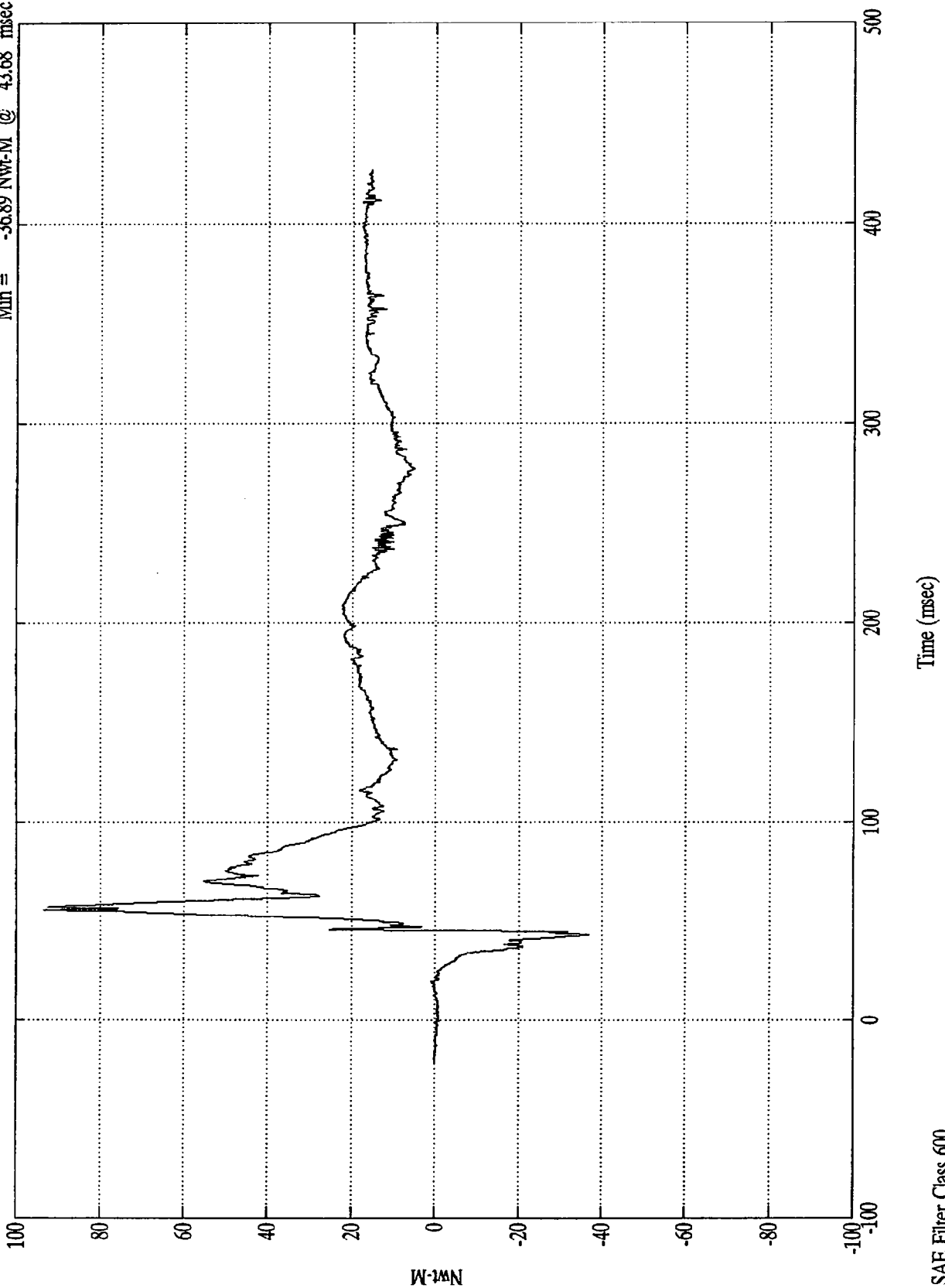


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Lt Upper Tibia Mx

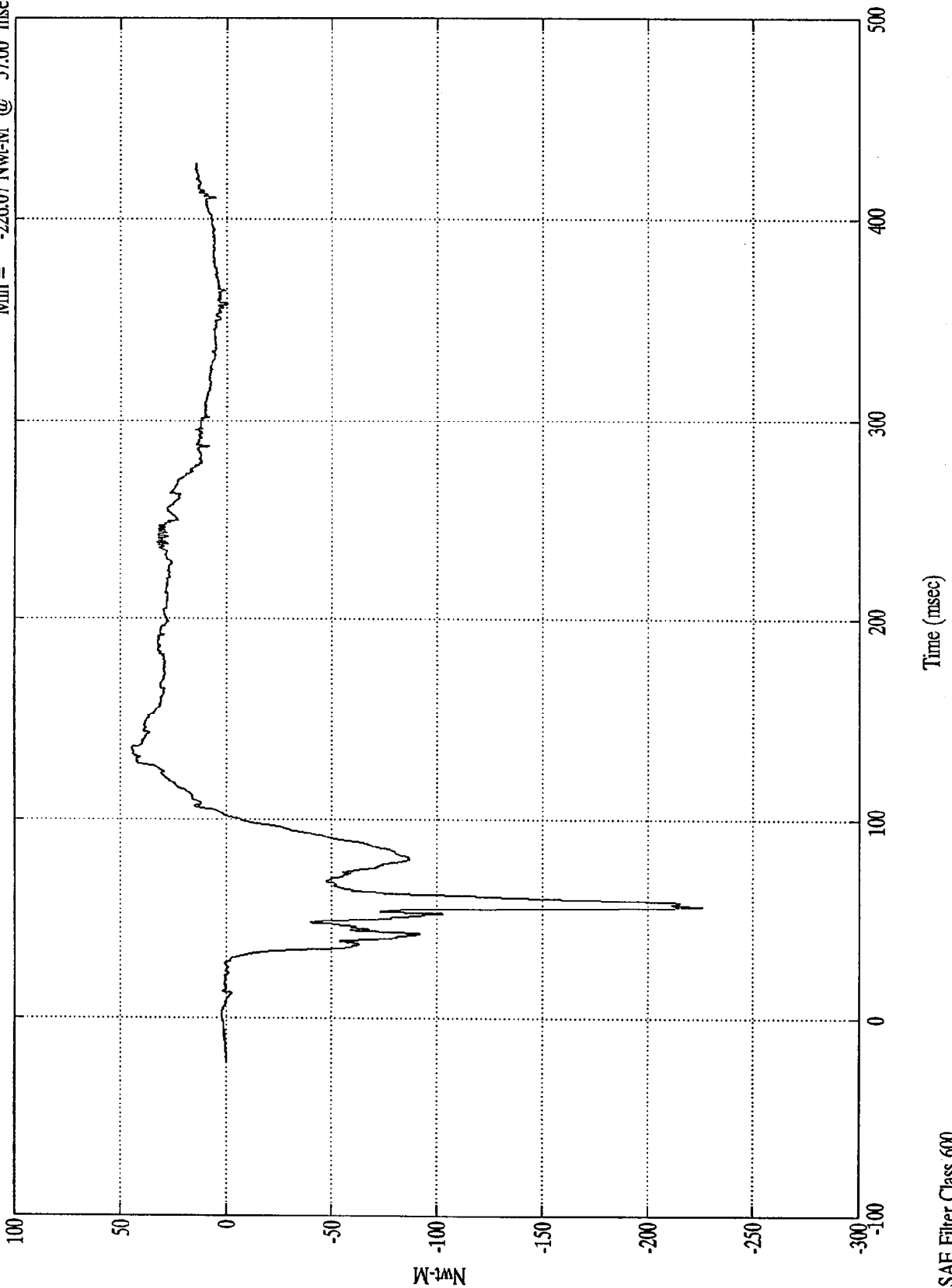
Max = 93.26 Nwt-M @ 55.80 msec
Min = -36.89 Nwt-M @ 43.68 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Lt Upper Tibia My

Max = 44.61 Nwt-M @ 136.20 msec
Min = -226.07 Nwt-M @ 57.00 msec



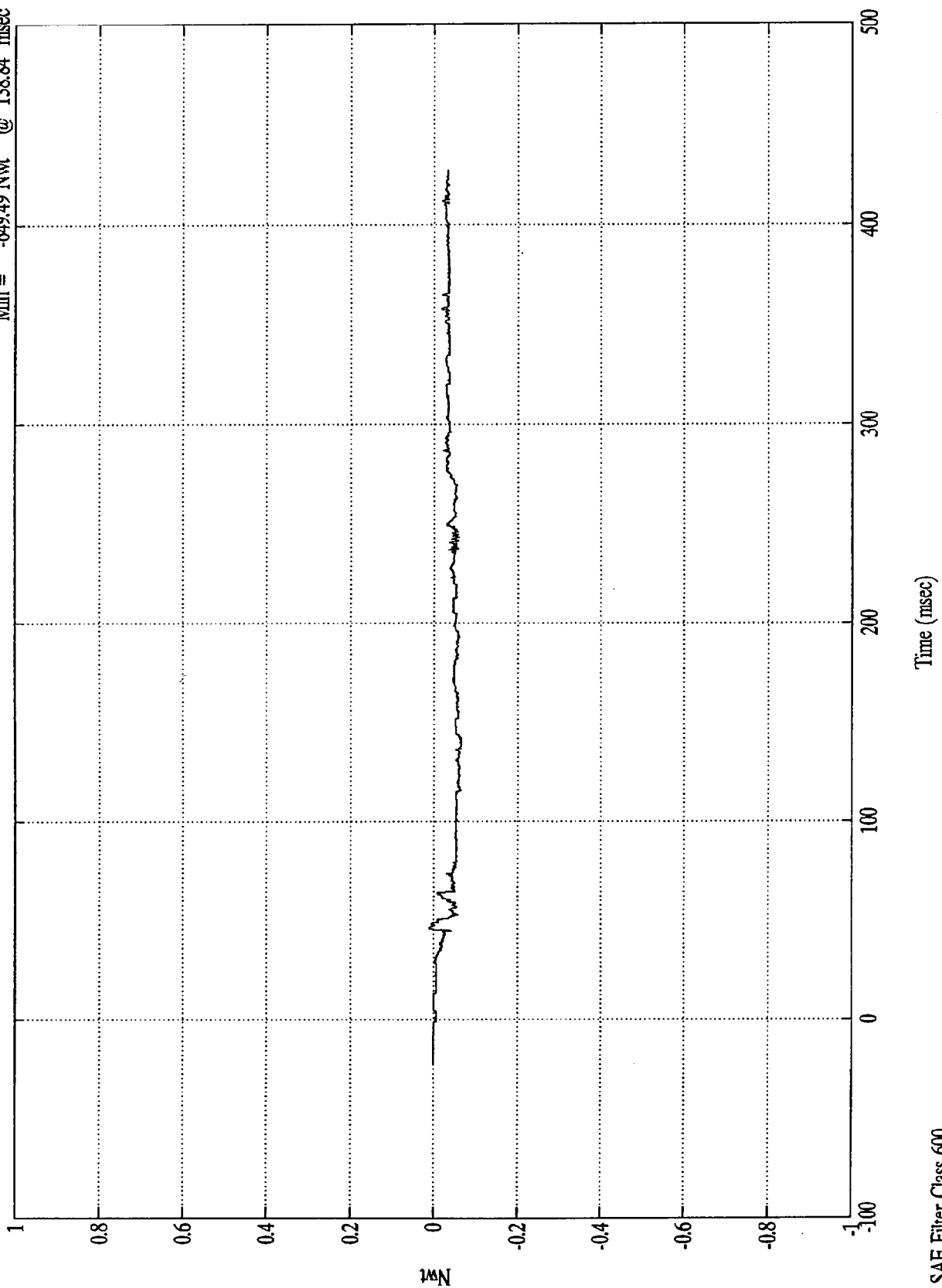
SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Lt Lower Tibia Fy

Max = 96.93 Nwt @ 46.08 msec
Min = -649.49 Nwt @ 138.84 msec

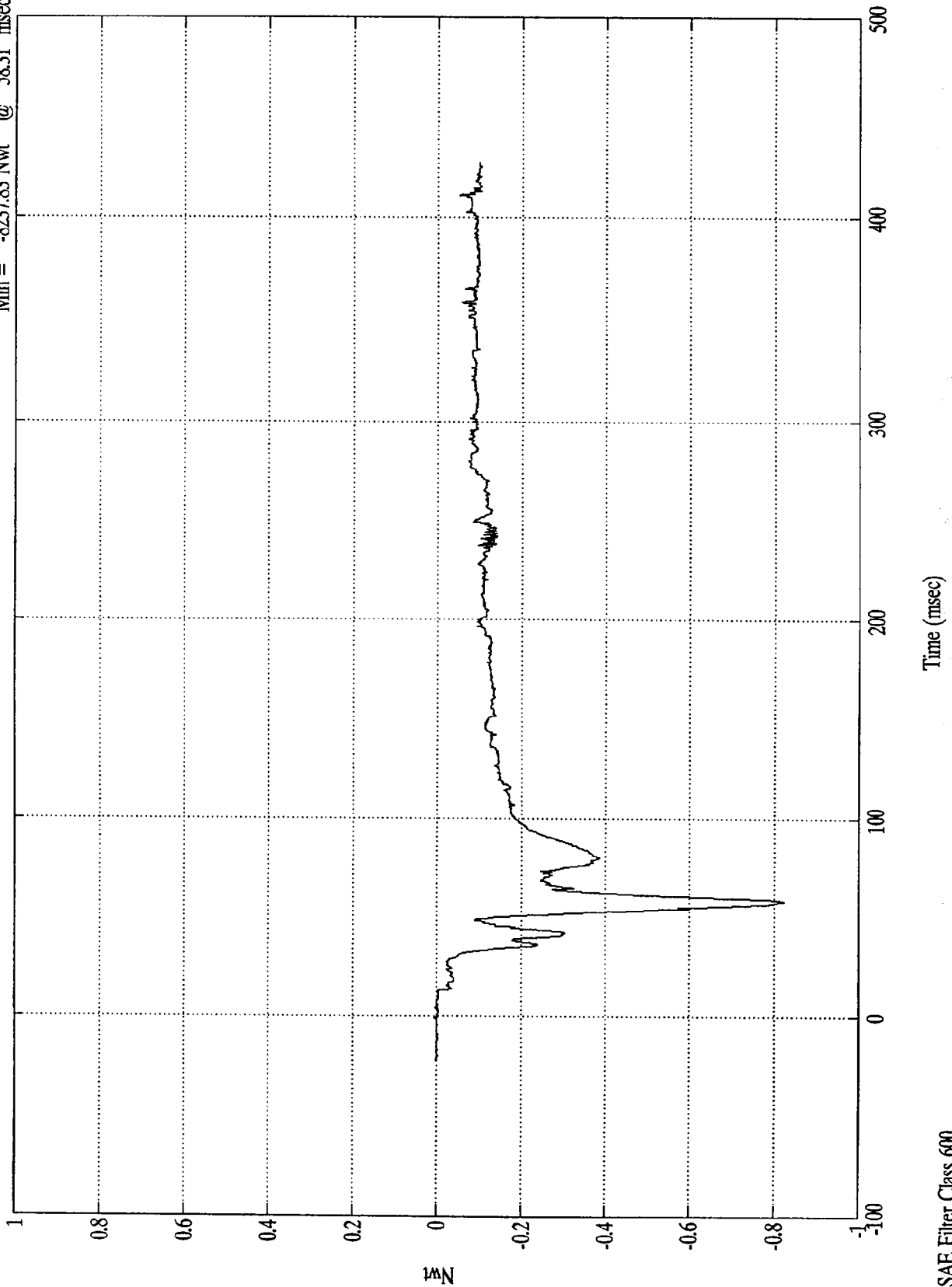
$\times 10^4$



NCAP TEST #1 - 1996 PONTIAC GRAND AM

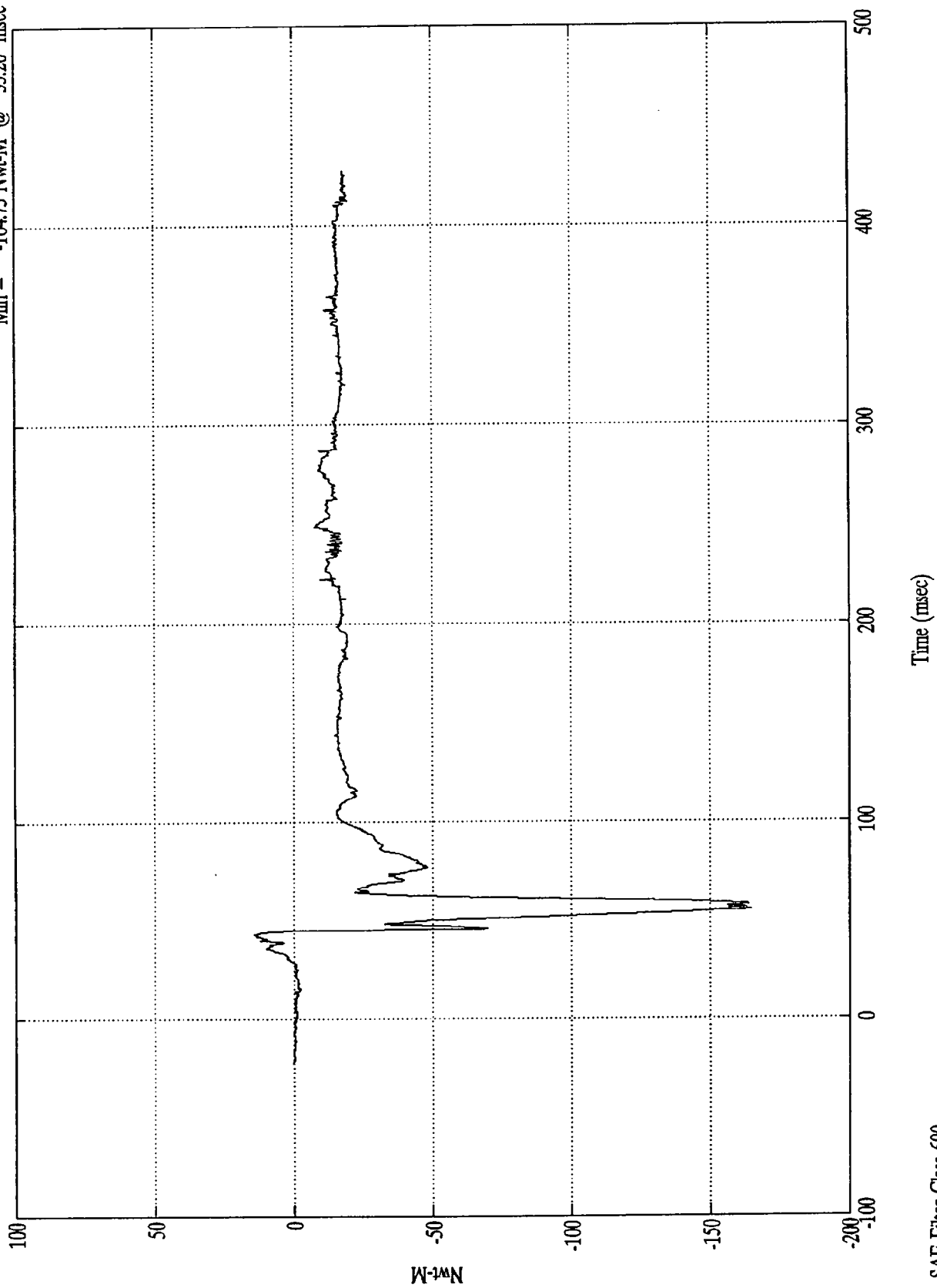
Pos. 2 Lt Lower Tibia Fz
Max = 60.36 Nwt @ -0.72 msec
Min = -8237.83 Nwt @ 58.31 msec

$\times 10^4$



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Lt Lower Tibia Mx
Max = 14.32 Nwt-M @ 42.84 msec
Min = -164.73 Nwt-M @ 55.20 msec

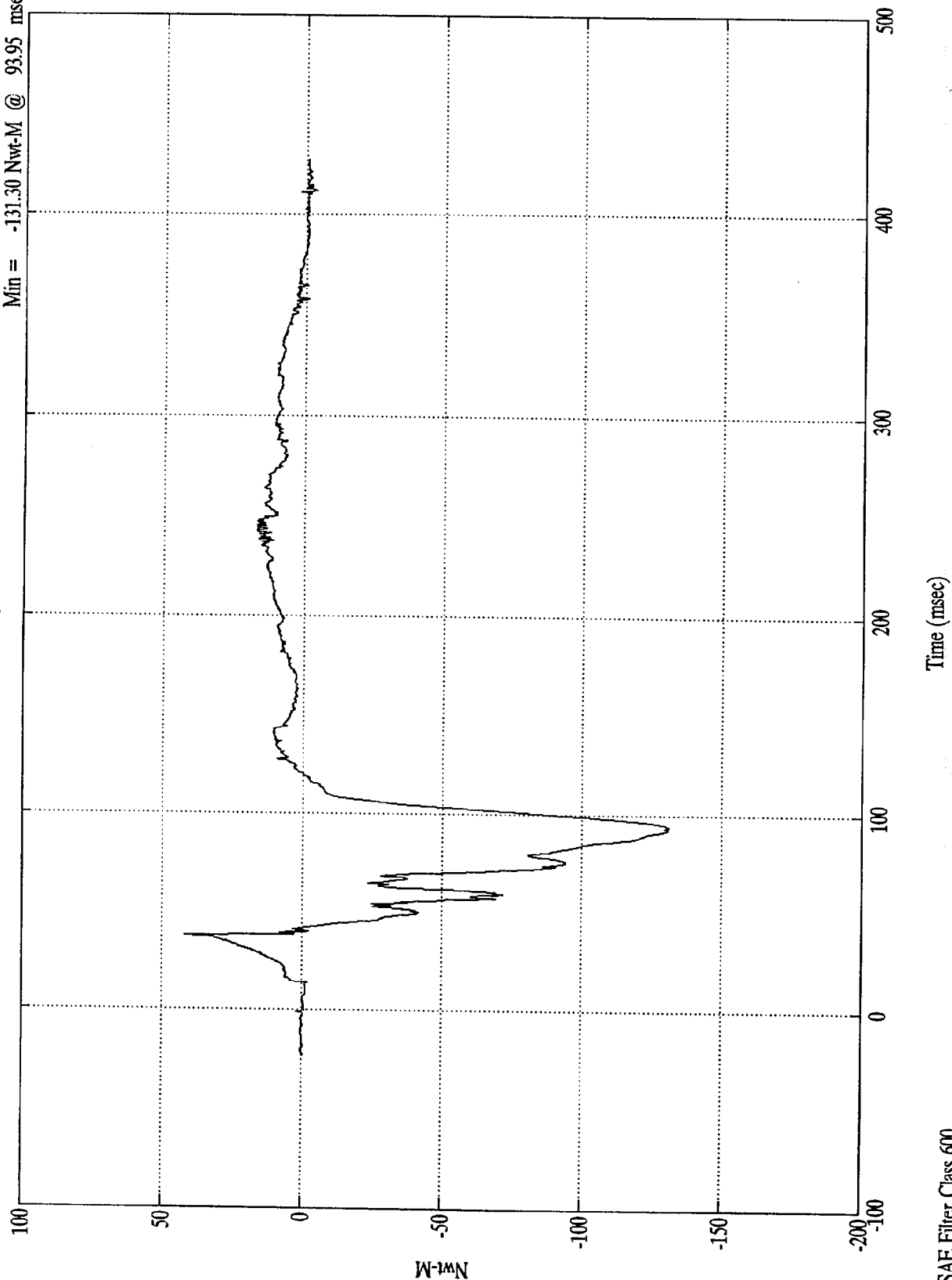


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Rt Upper Tibia Mx

Max = 41.86 Nwt-M @ 37.31 msec
Min = -131.30 Nwt-M @ 93.95 msec

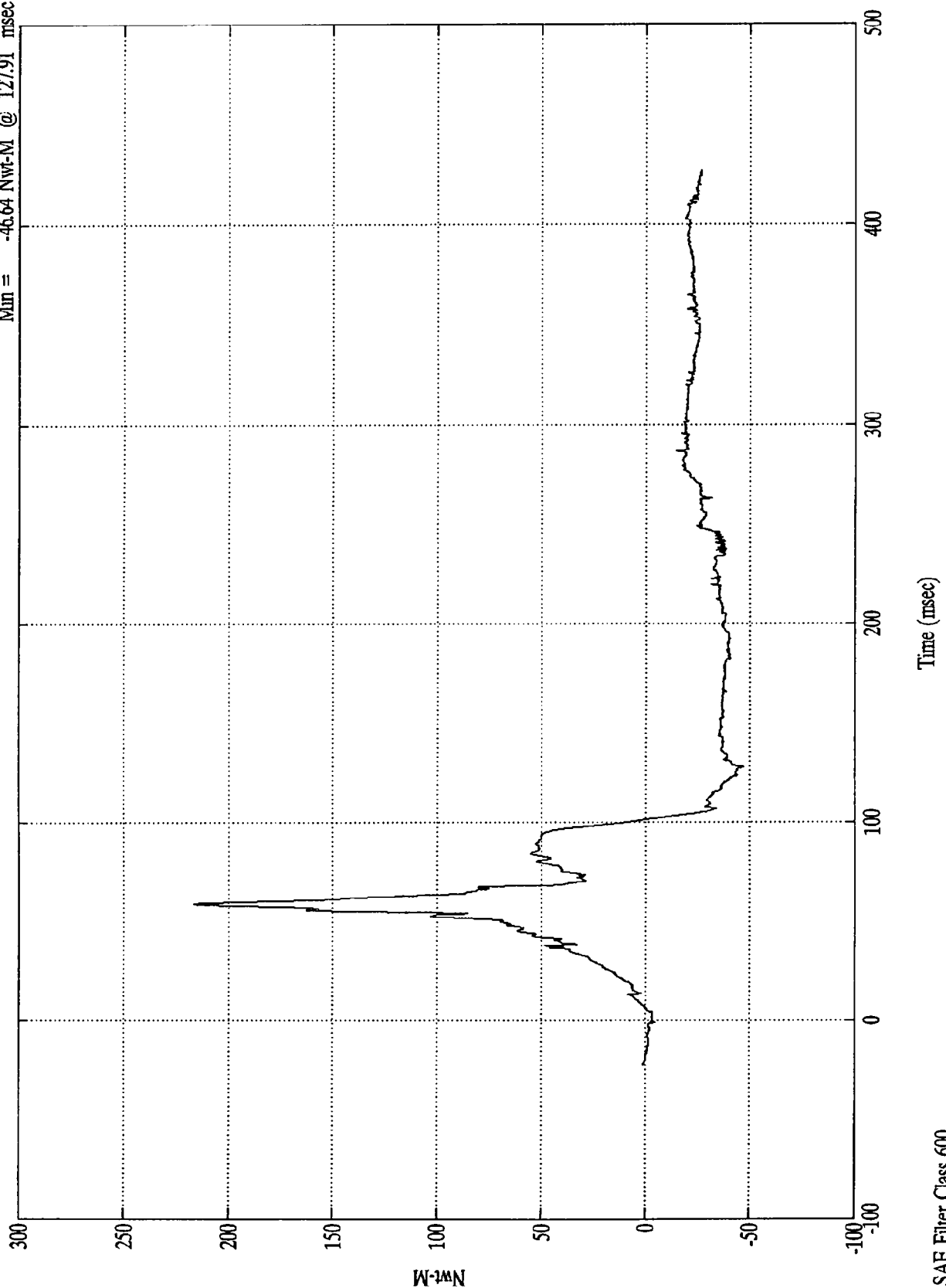


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Rt Upper Tibia My

Max = 216.40 Nwt-M @ 59.40 msec
Min = -46.64 Nwt-M @ 127.91 msec

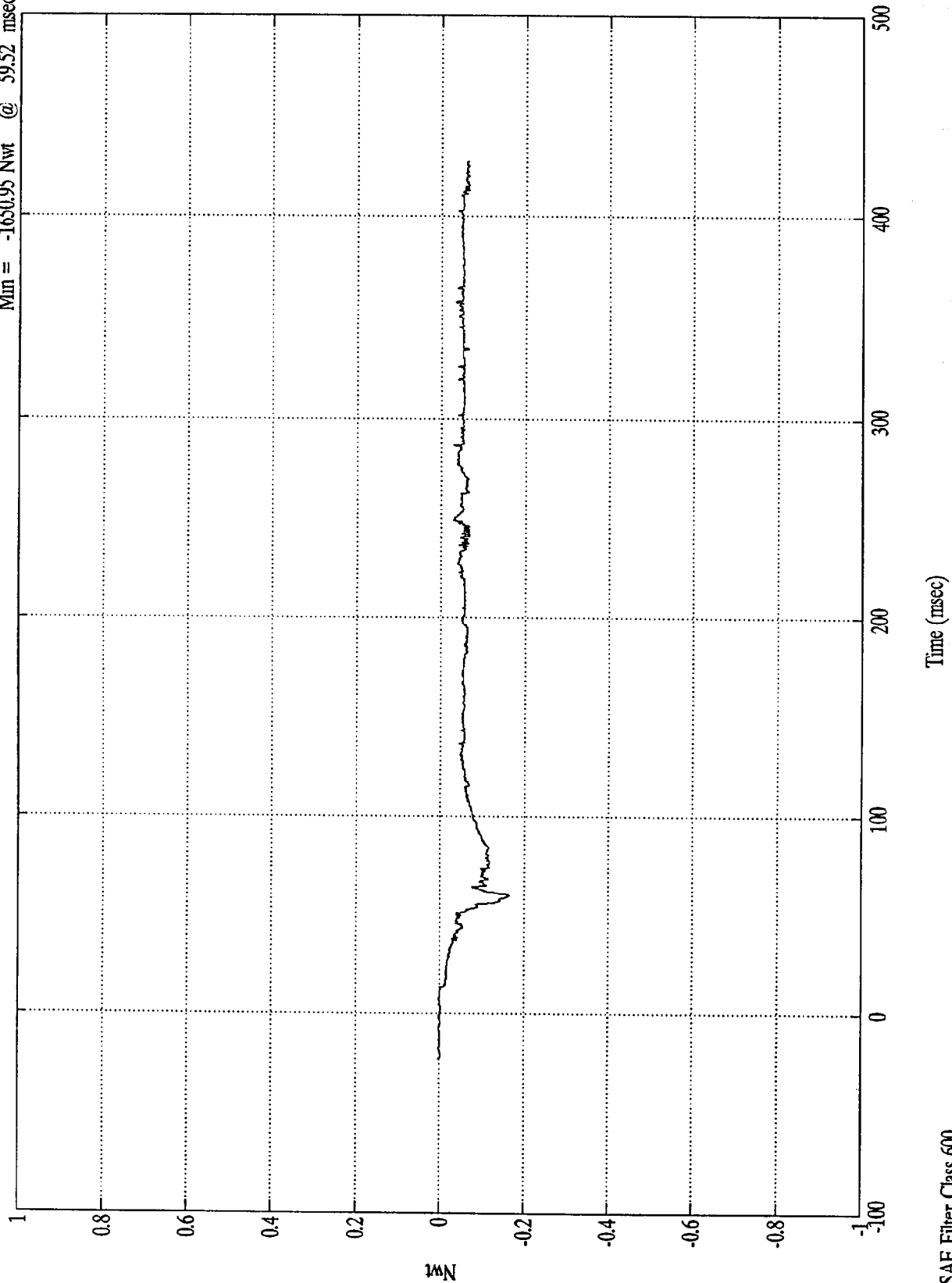


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Rt Lower Tibia Fy

Max = 26.62 Nwt @ -22.20 msec
Min = -1650.95 Nwt @ 59.52 msec



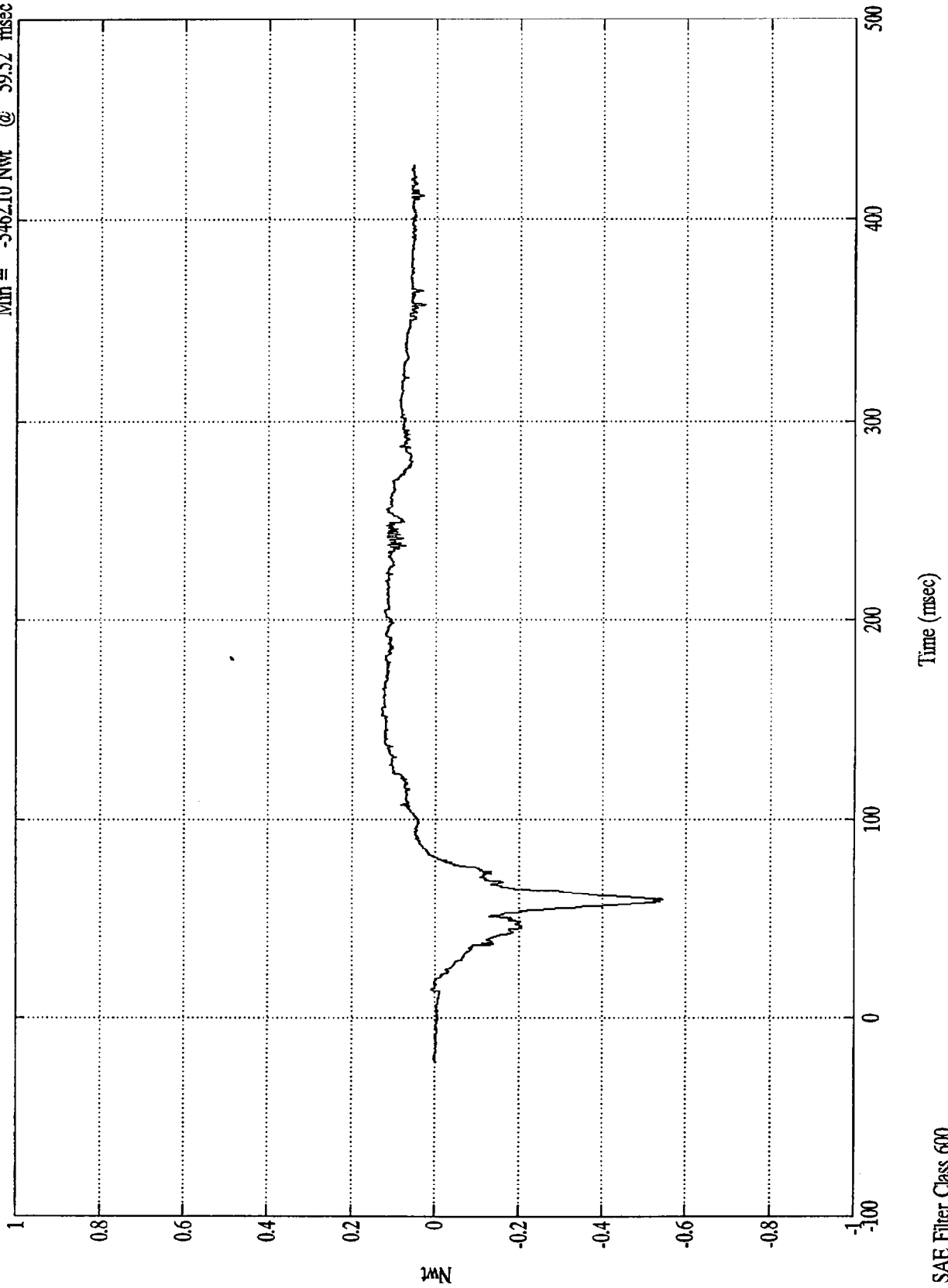
SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Pos. 2 Rt Lower Tibia Fz

Max = 1309.05 Nwt @ 152.27 msec
Min = -5462.10 Nwt @ 59.52 msec

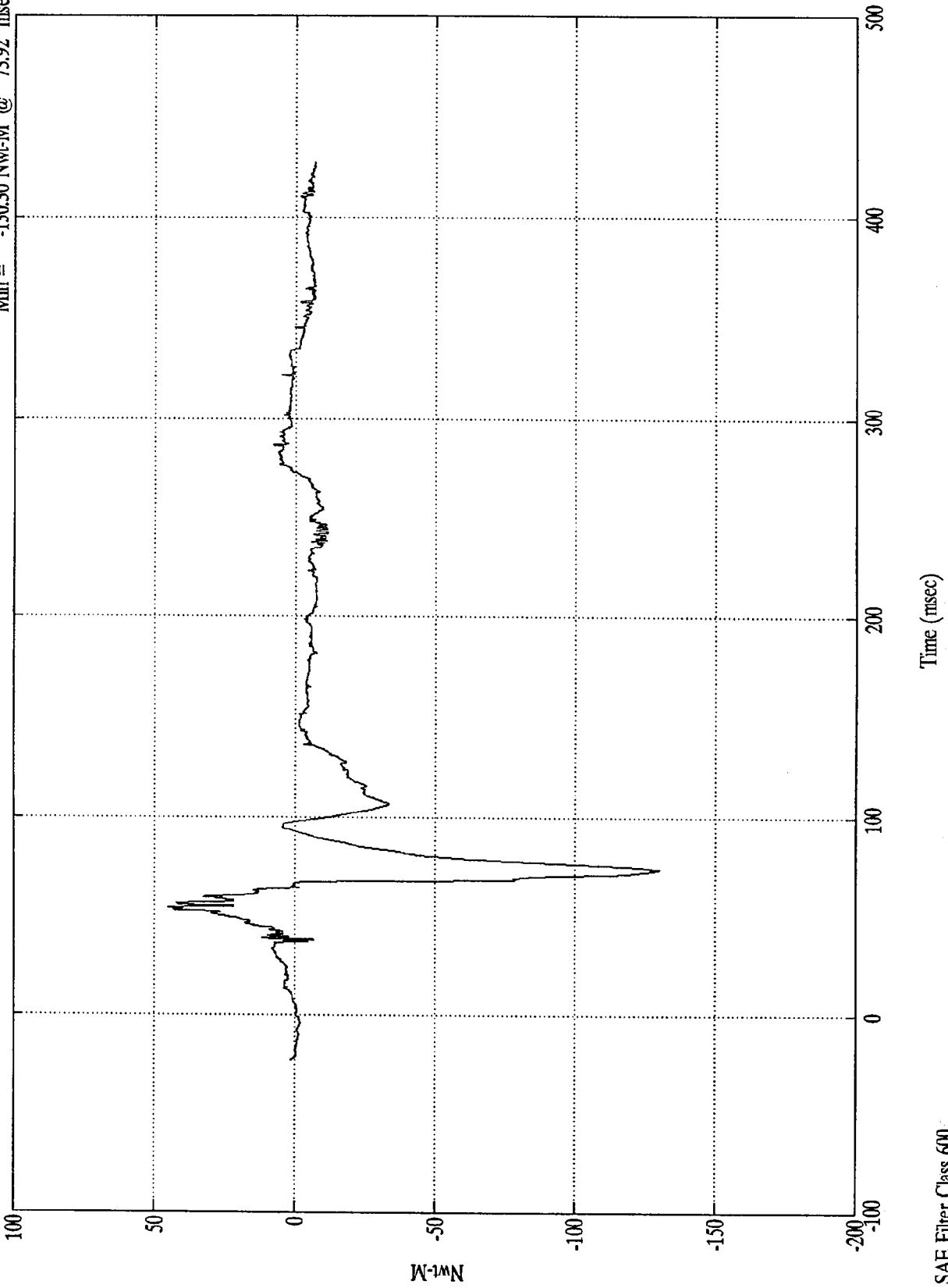


SAE Filter Class 600

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Rt Lower Tibia Mx

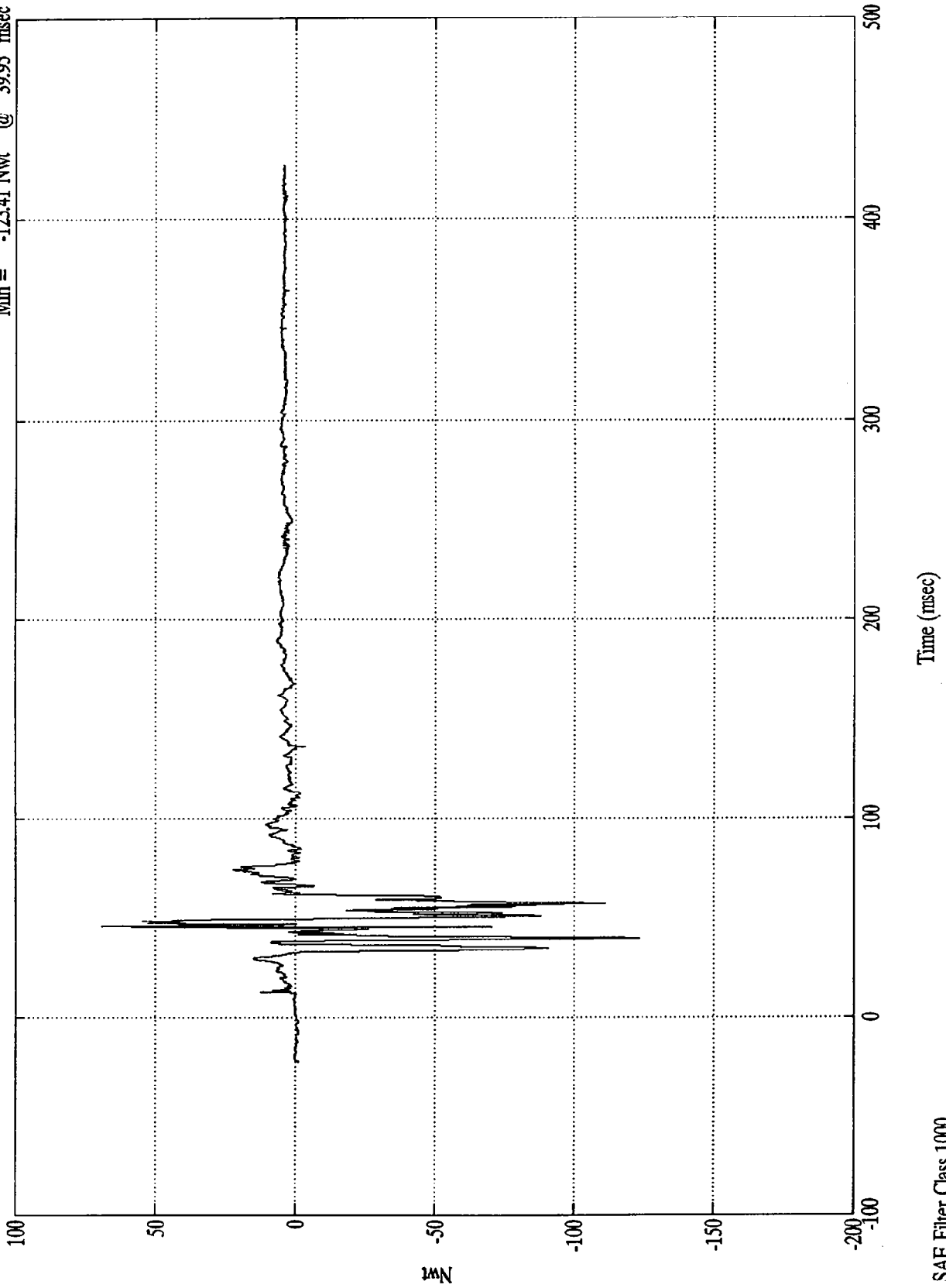
Max = 45.40 Nwt-M @ 54.23 msec
Min = -130.30 Nwt-M @ 73.92 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 LFoot Front Z

Max = 69.10 Nwt @ 45.72 msec
Min = -123.41 Nwt @ 39.95 msec

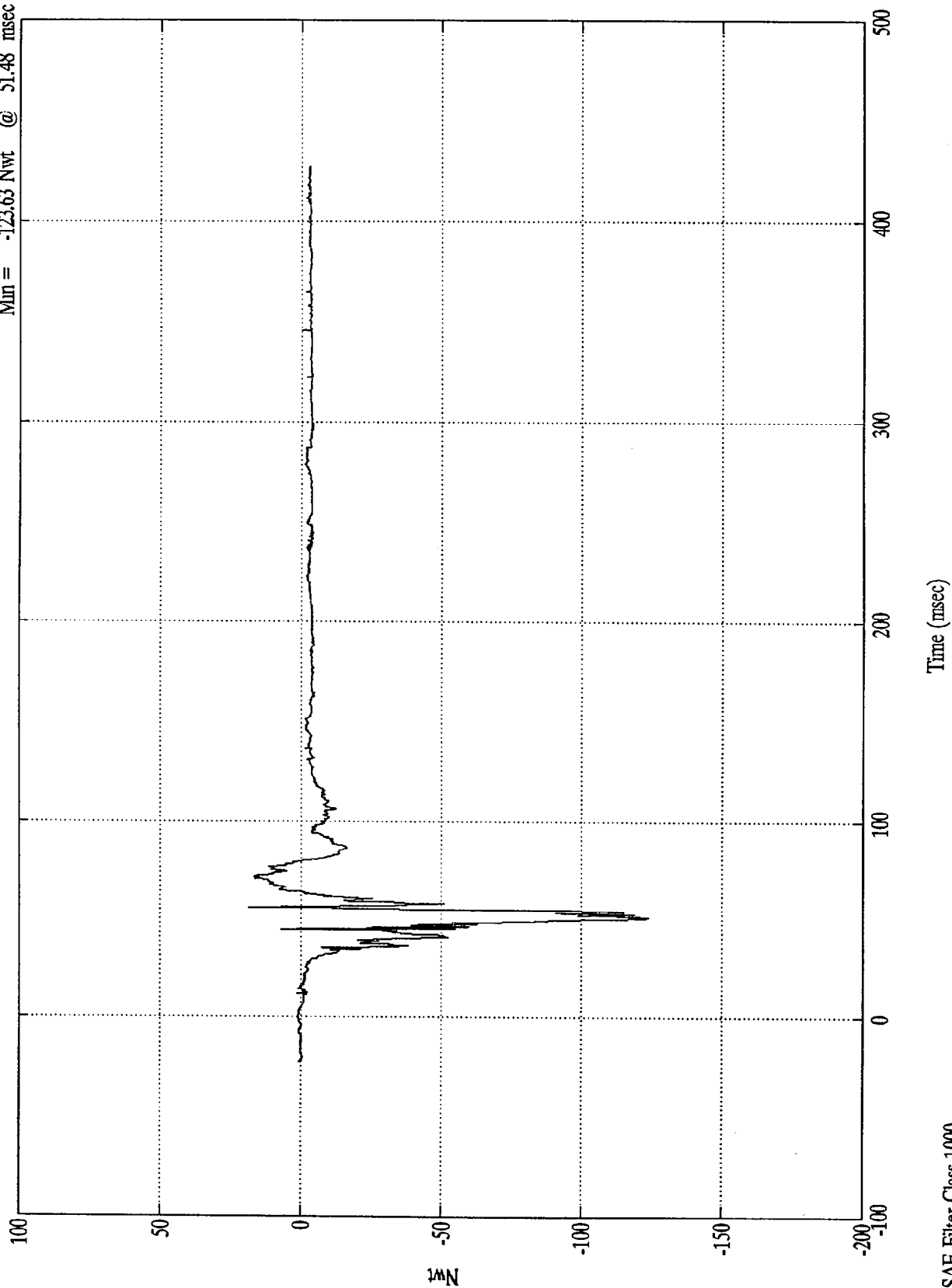


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 LFoot Rear X

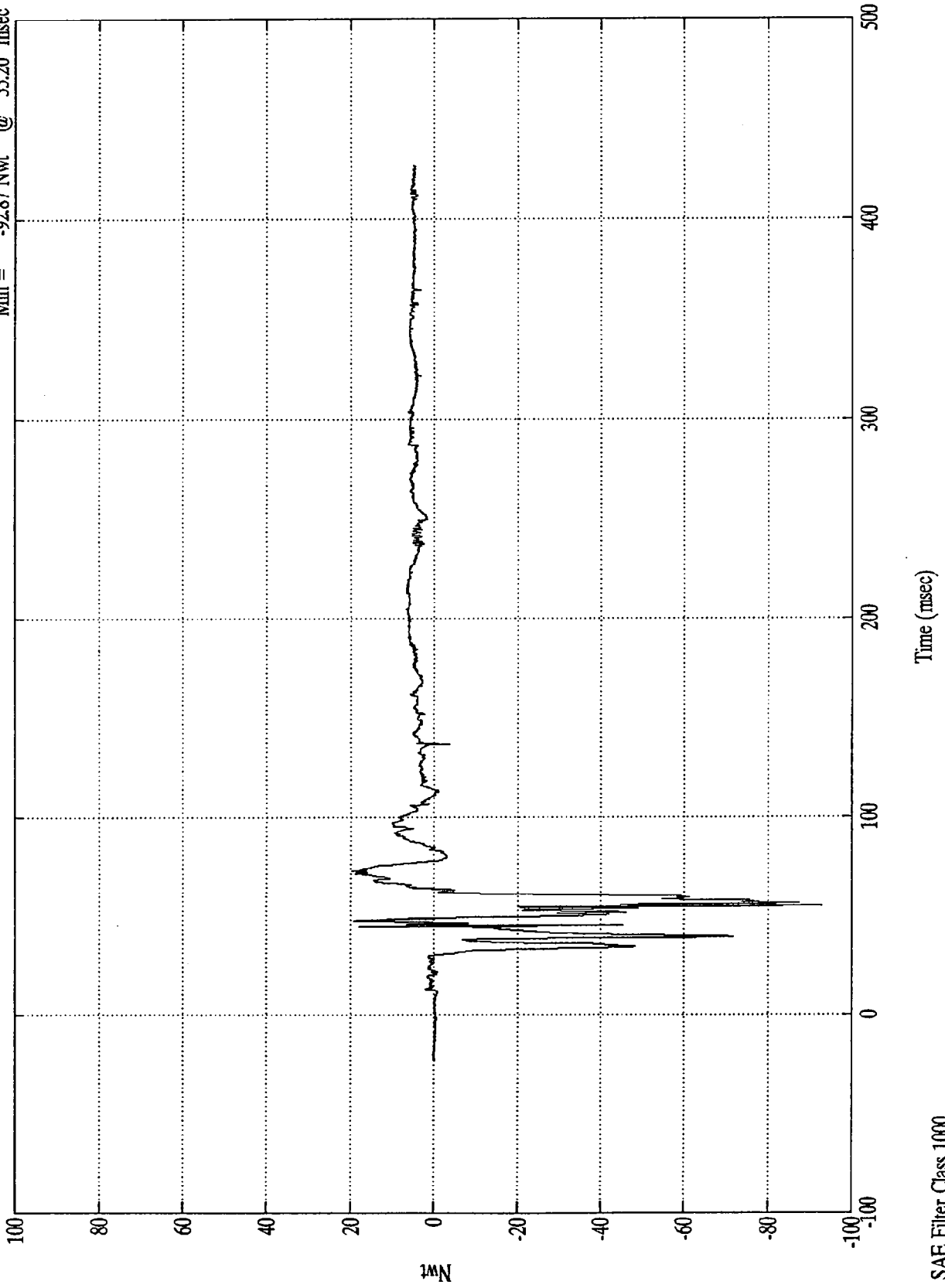
Max = 18.53 Nwt @ 56.28 msec
Min = -123.63 Nwt @ 51.48 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 LFoot Rear Z

Max = 19.73 Nwt @ 73.08 msec
Min = -92.87 Nwt @ 55.20 msec

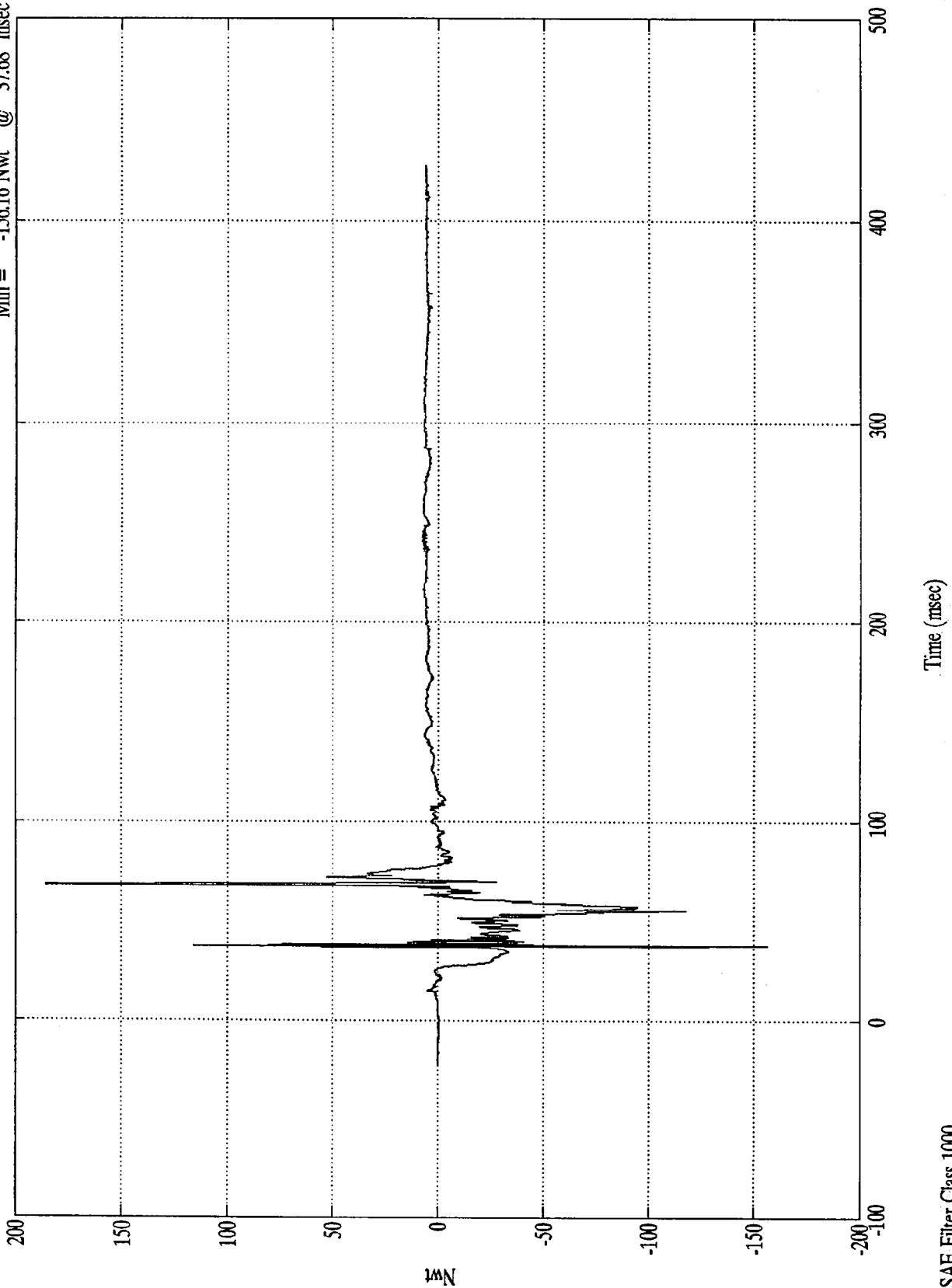


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 R.Foot Front Z

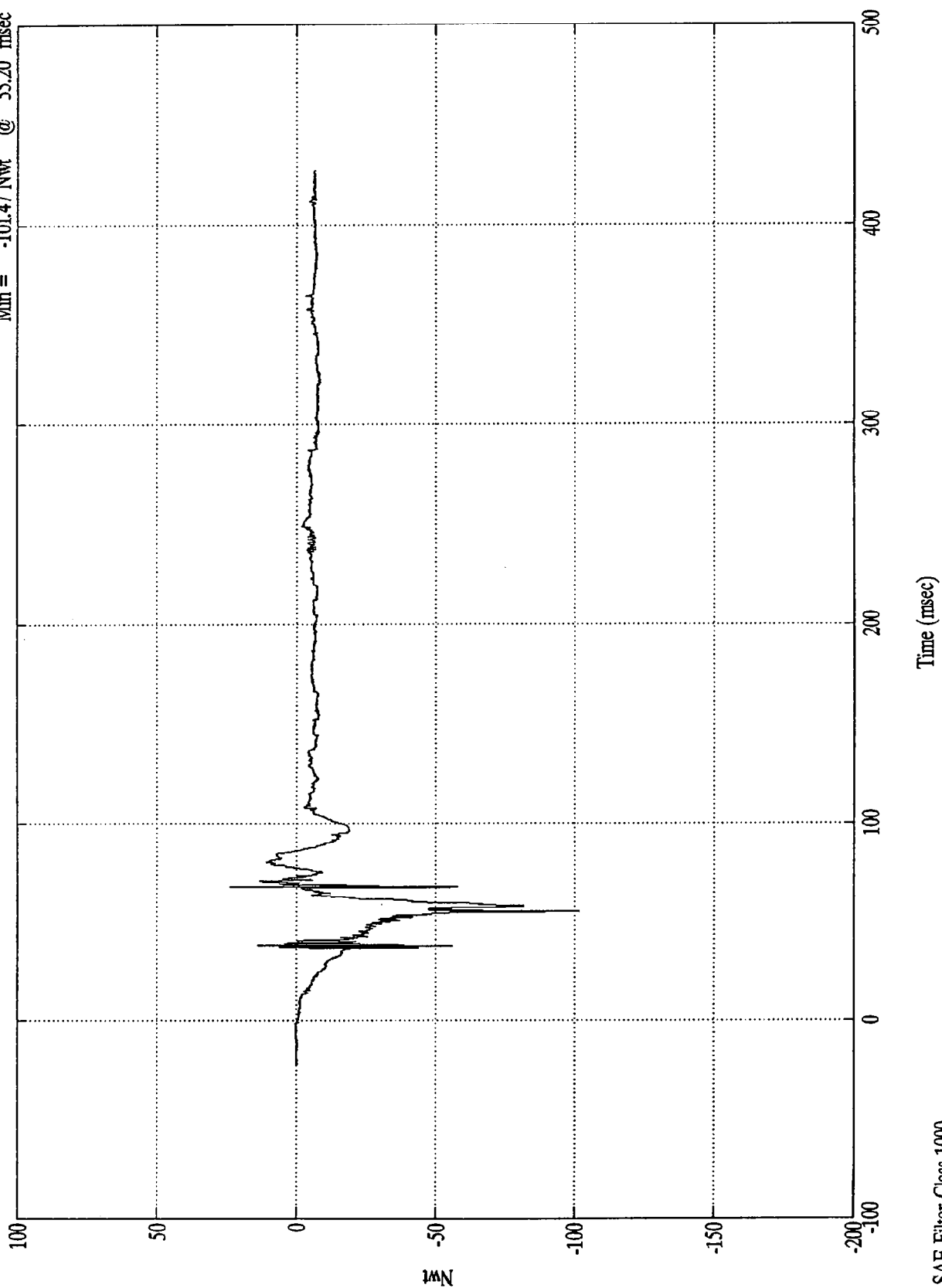
Max = 185.68 Nwt @ 68.28 msec
Min = -156.16 Nwt @ 37.68 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 R.Foot Rear X

Max = 23.99 Nwt @ 68.04 msec
Min = -101.47 Nwt @ 55.20 msec

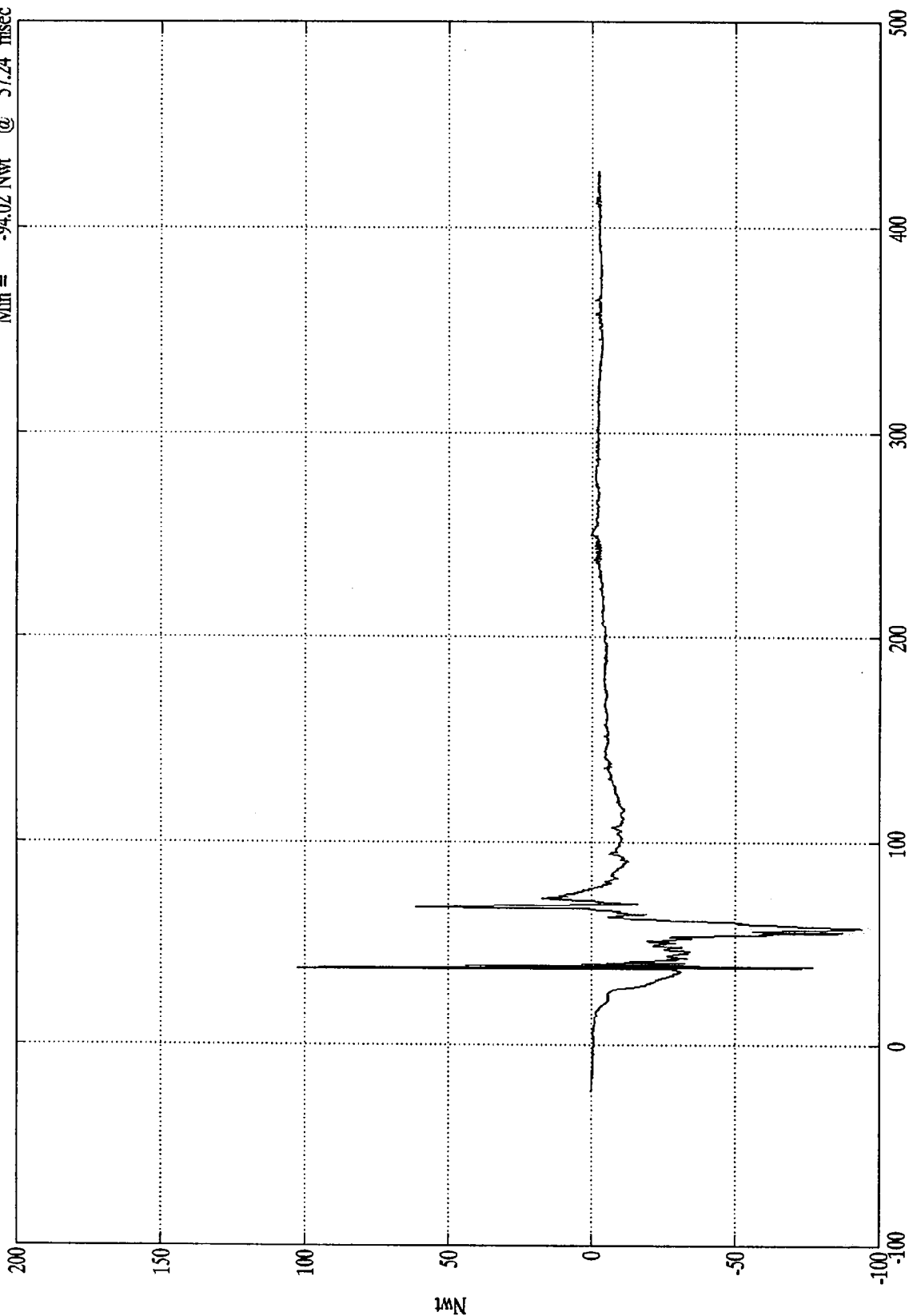


SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 R.Foot Rear Z

Max = 102.70 Nwt @ 37.08 msec
Min = -94.02 Nwt @ 57.24 msec



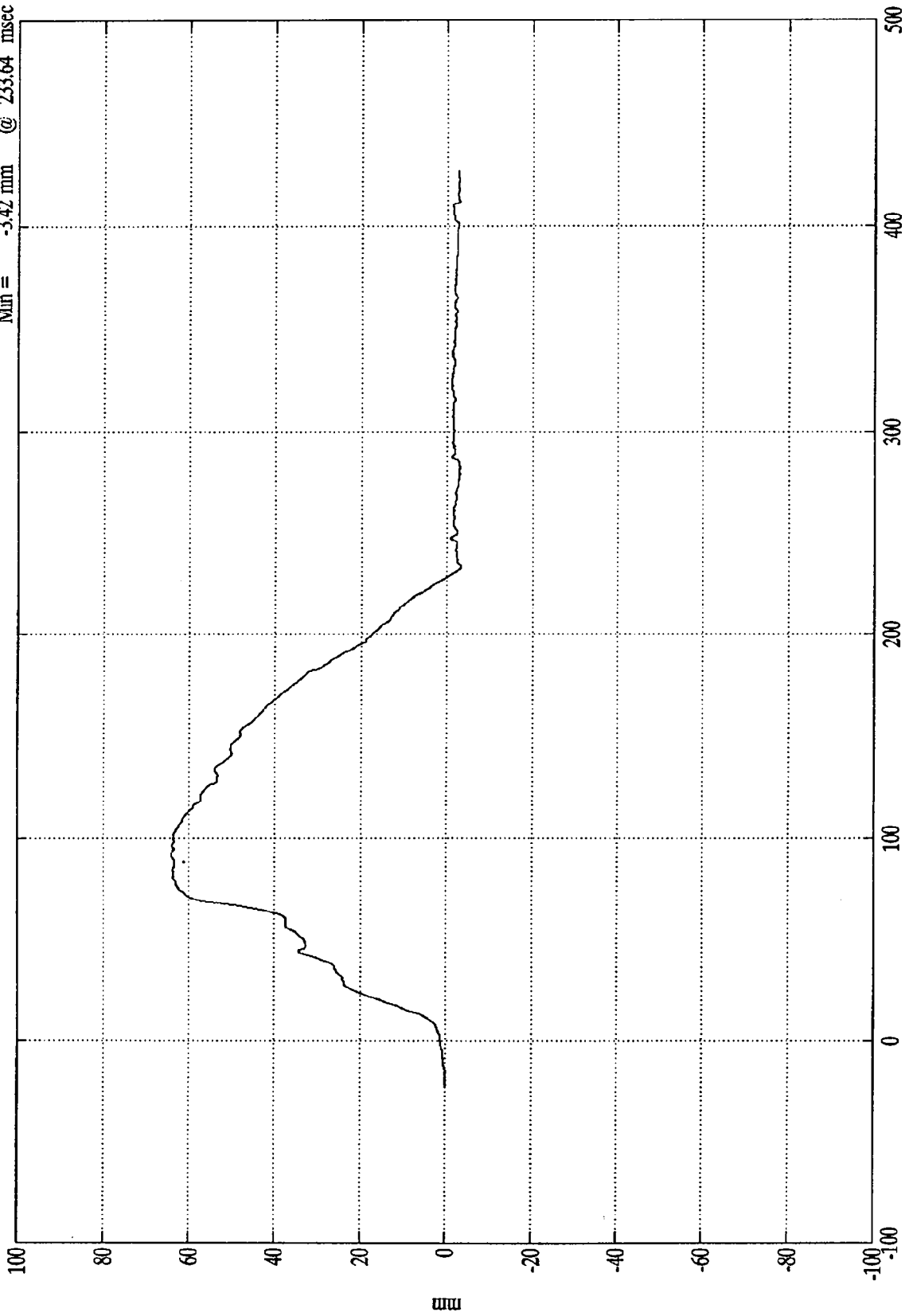
Time (msec)

SAE Filter Class 1000

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Belt Spool Out

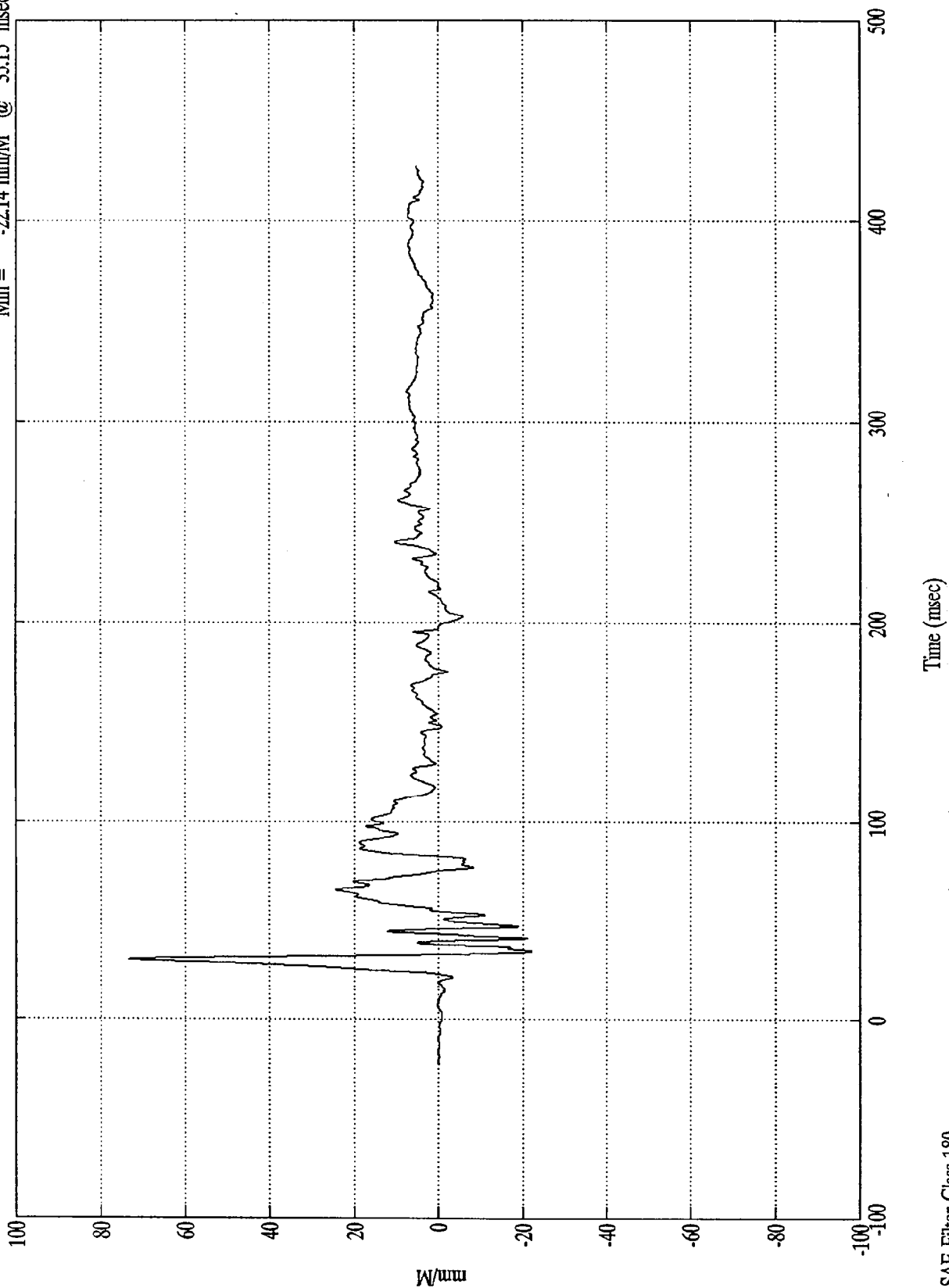
Max = 64.07 mm @ 91.08 msec
Min = -3.42 mm @ 233.64 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Belt Elongation

Max = 73.34 mm/M @ 30.96 msec
Min = -22.14 mm/M @ 35.15 msec

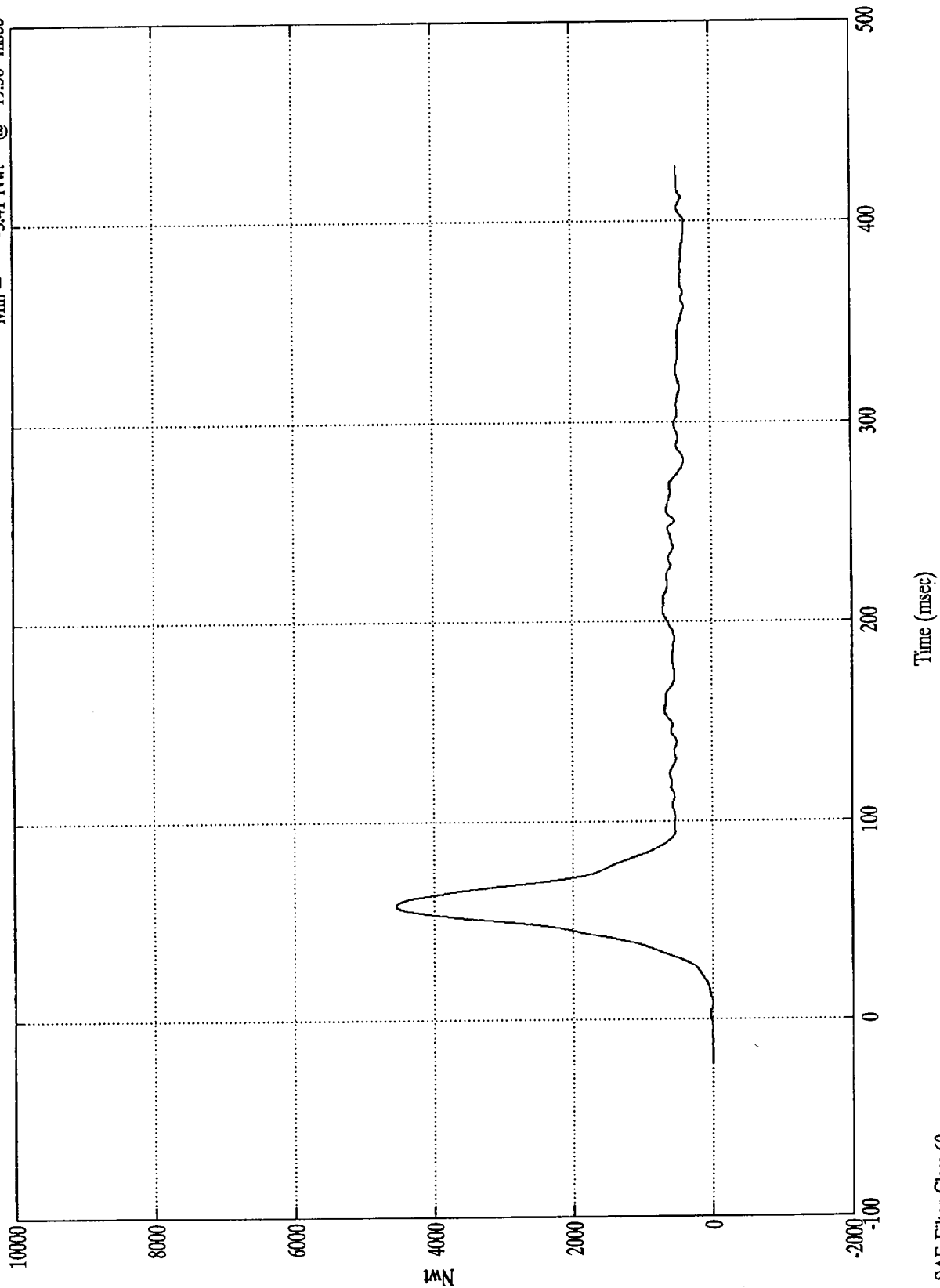


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Right Belt Load

Max = 4545.02 Nwt @ 57.47 msec
Min = -3.41 Nwt @ -19.56 msec

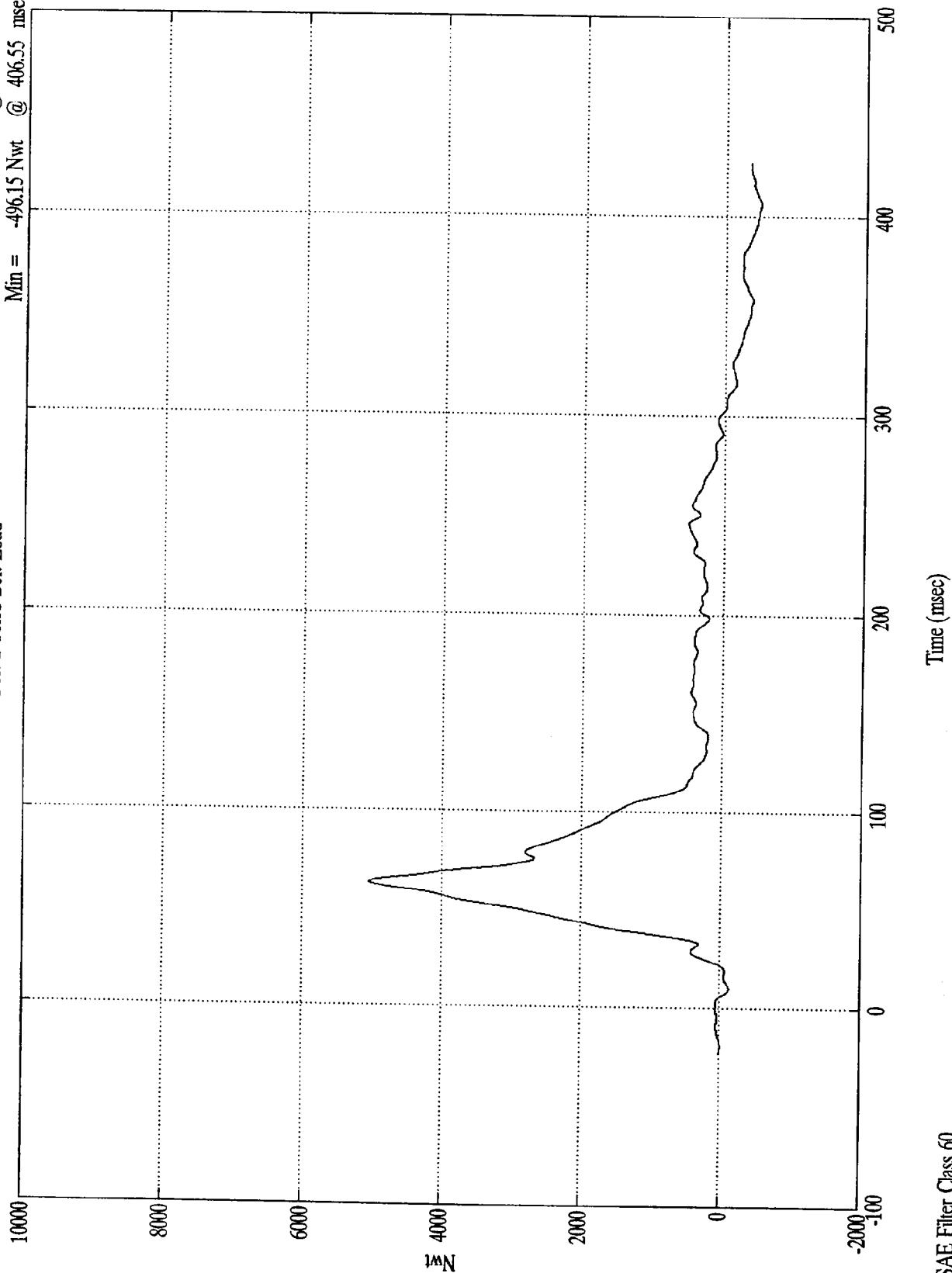


SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Pos. 2 Torso Belt Load

Max = 5045.81 Nwt @ 62.76 msec
Min = -496.15 Nwt @ 406.55 msec



SAE Filter Class 60

TEST NO. MT0105

VEHICLE DATA

Acceleration

Velocity

Displacement

FILTER CHANNEL CLASS

60

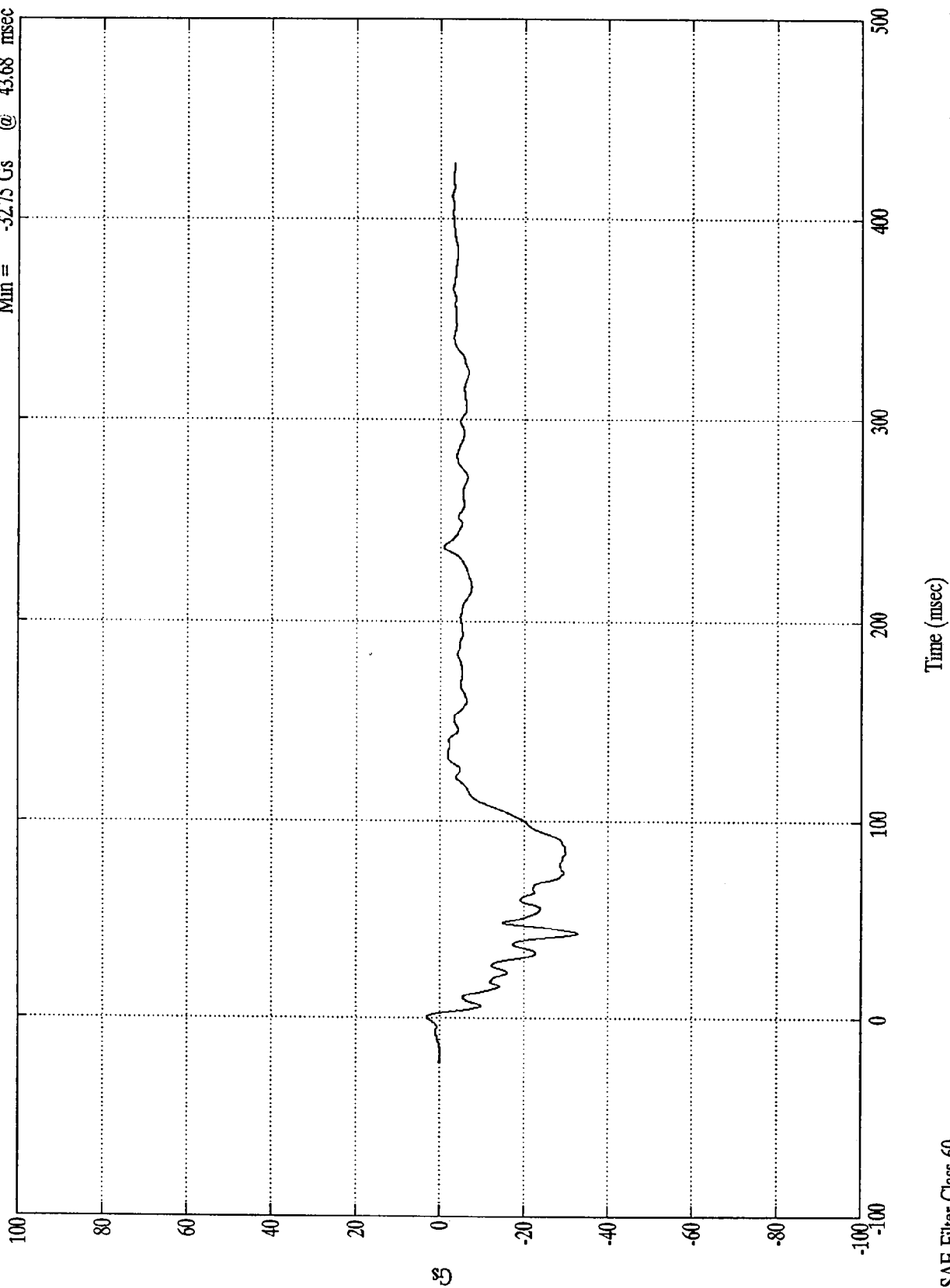
180

180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 3.02 Gs @ 0.47 msec
 Min = -32.75 Gs @ 43.68 msec

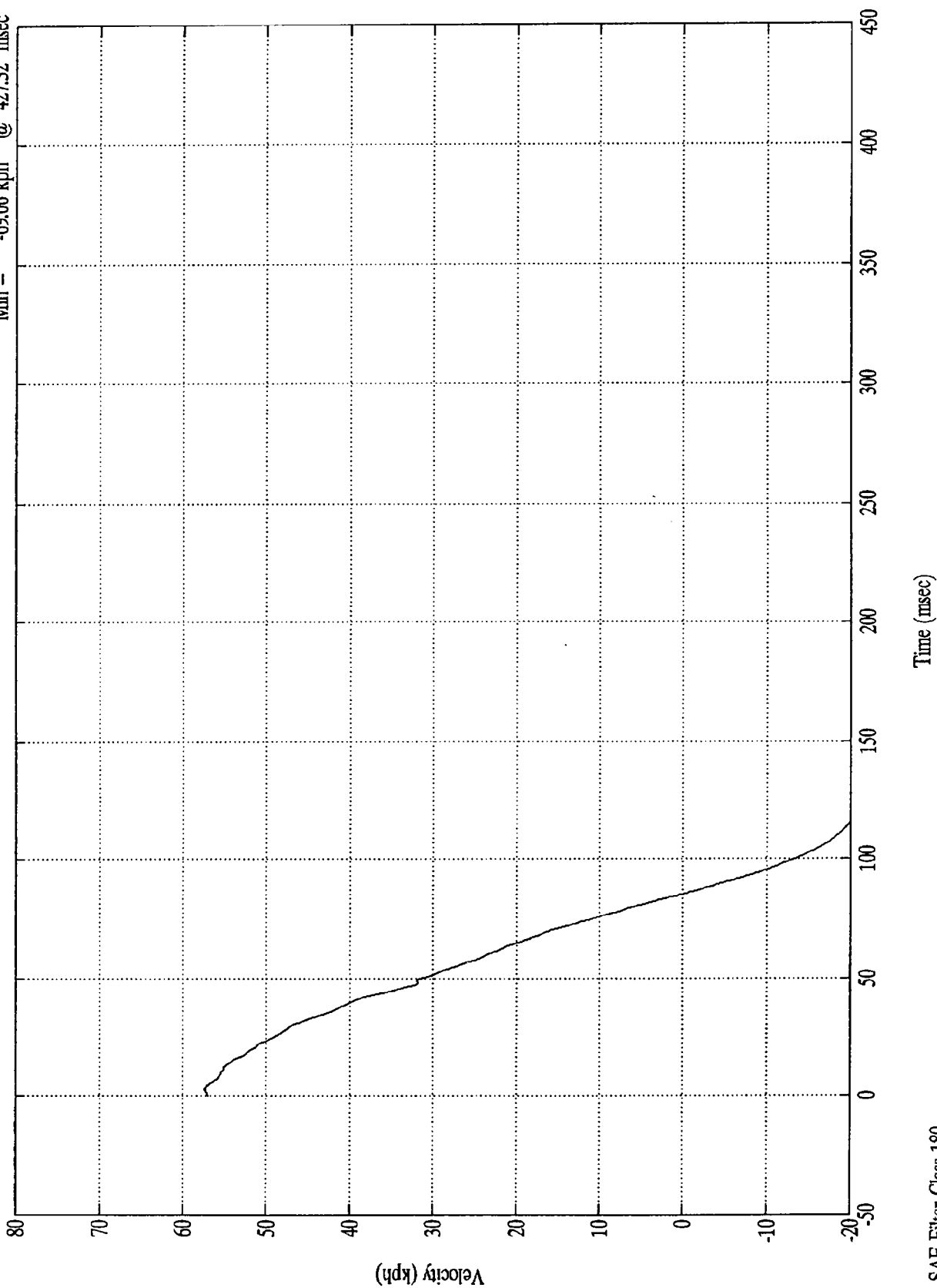
Acc. #1(x)



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 57.33 kph @ 3.35 msec
Min = -69.06 kph @ 427.32 msec

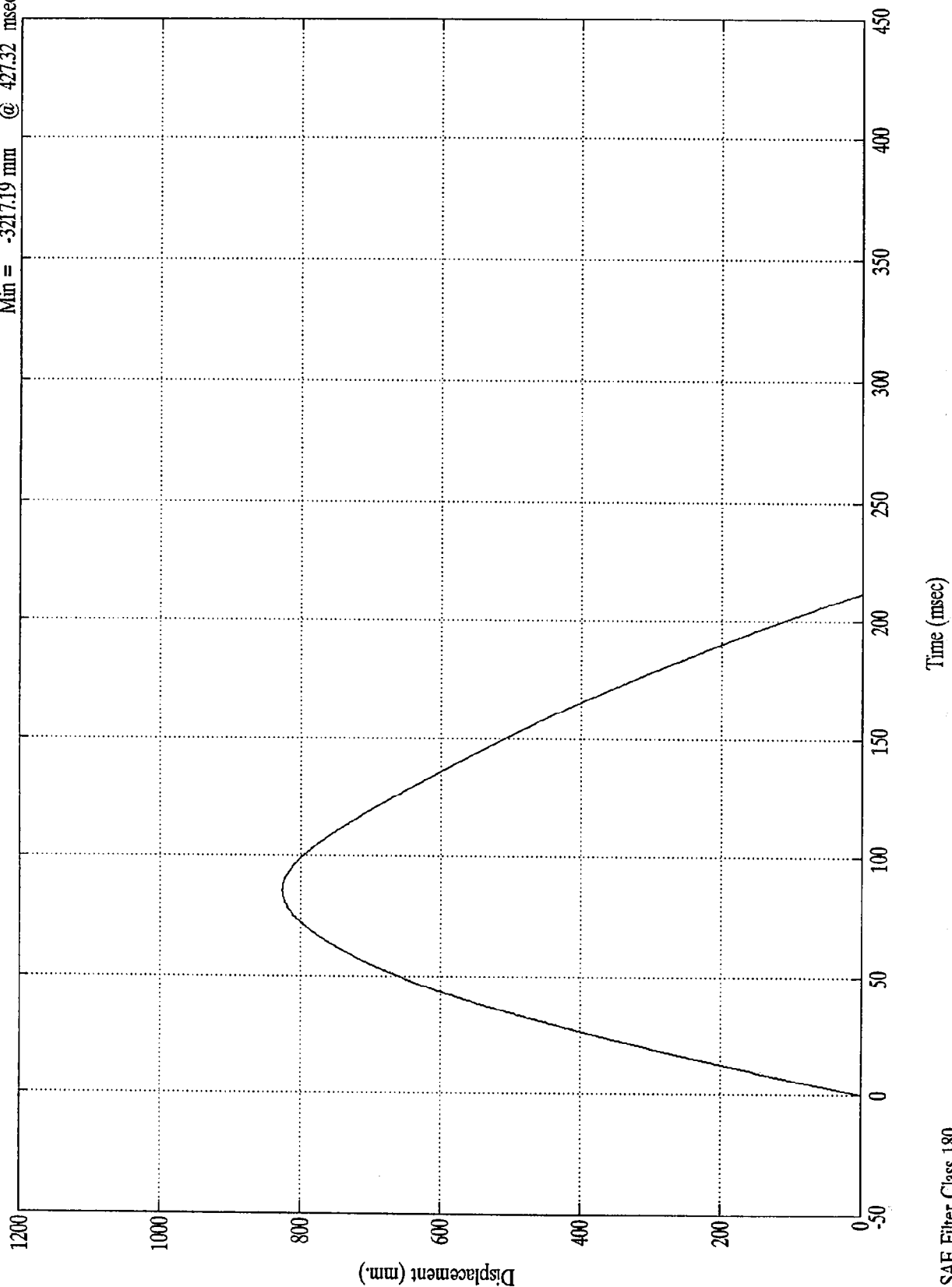
Acc. #1(x)



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 826.42 mm @ 85.44 msec
 Min = -321.719 mm @ 427.32 msec

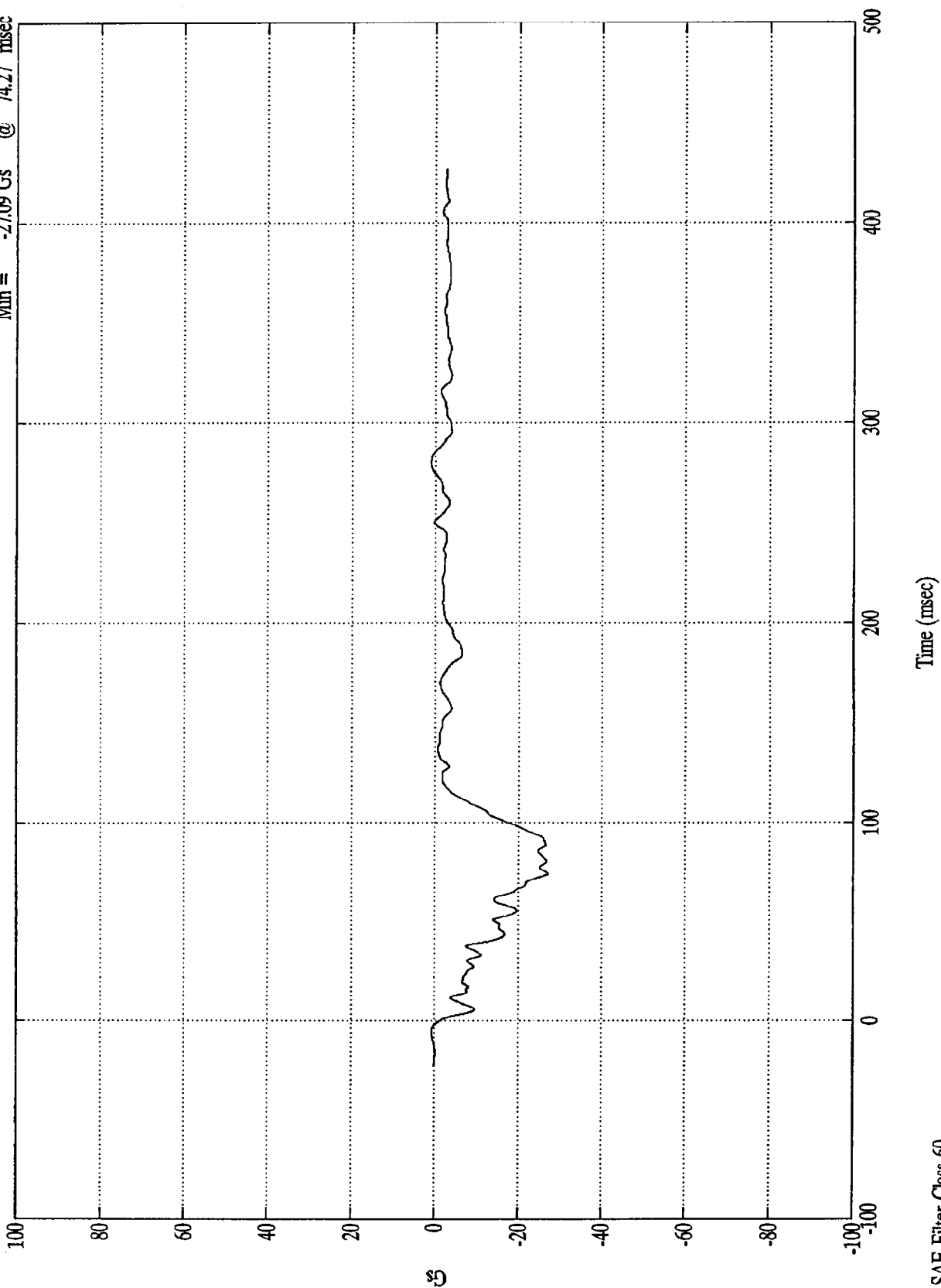
Acc. #1(x)



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #2(x)

Max = 1.05 Gs @ 280.20 msec
Min = -27.09 Gs @ 74.27 msec

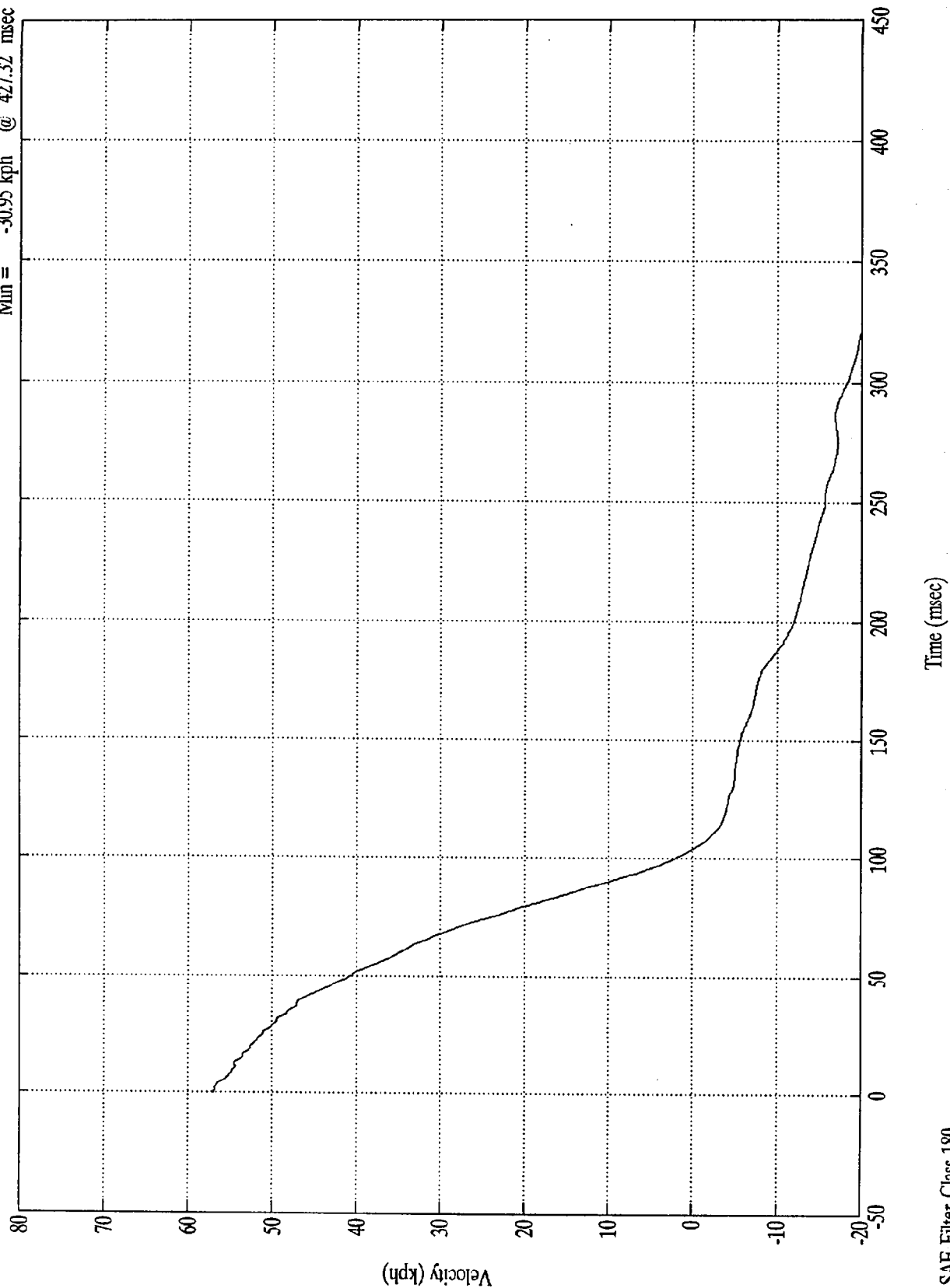


SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 56.97 kph @ -0.00 msec
Min = -30.95 kph @ 427.32 msec

Acc. #2(x)

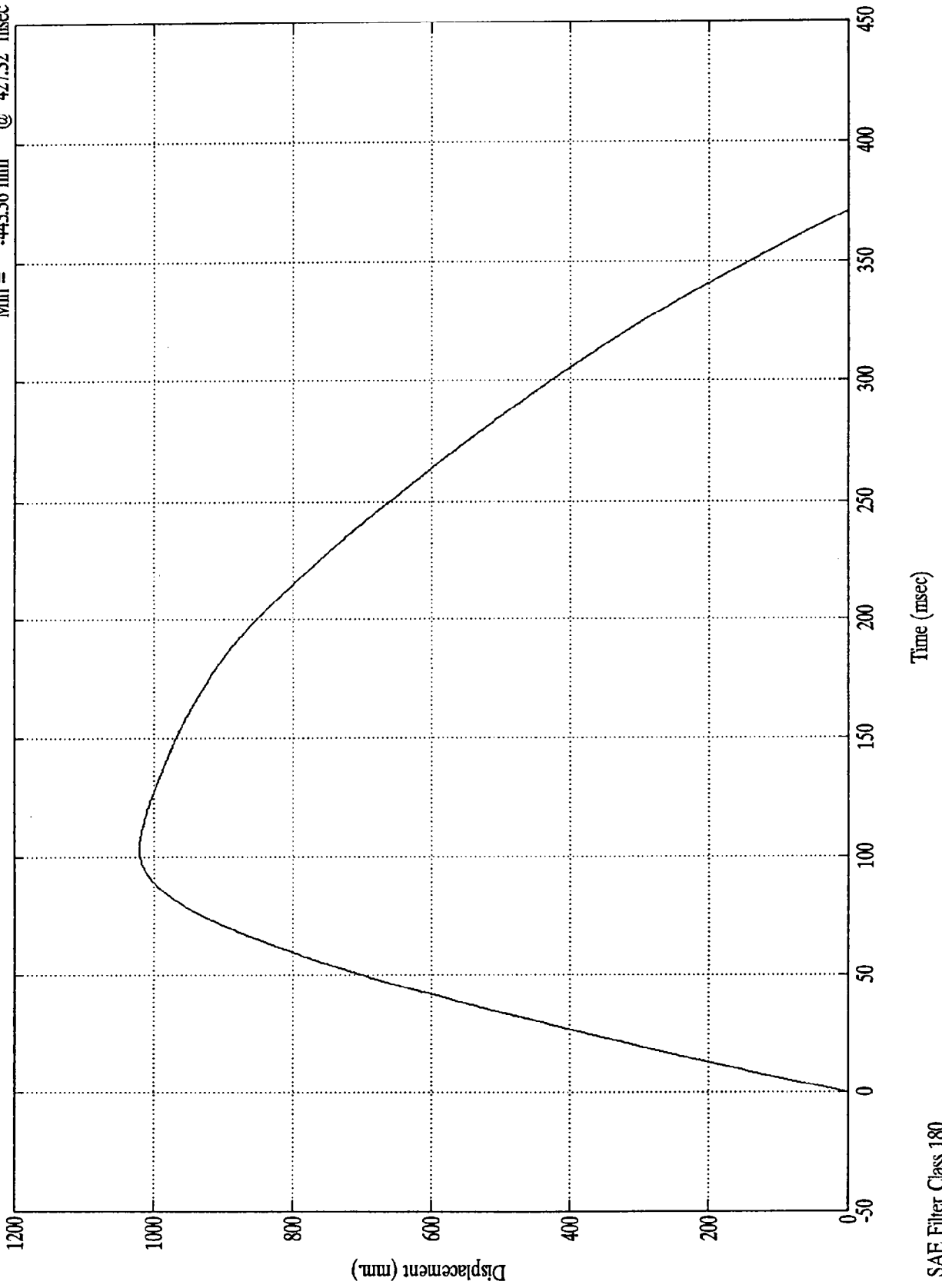


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #2(x)

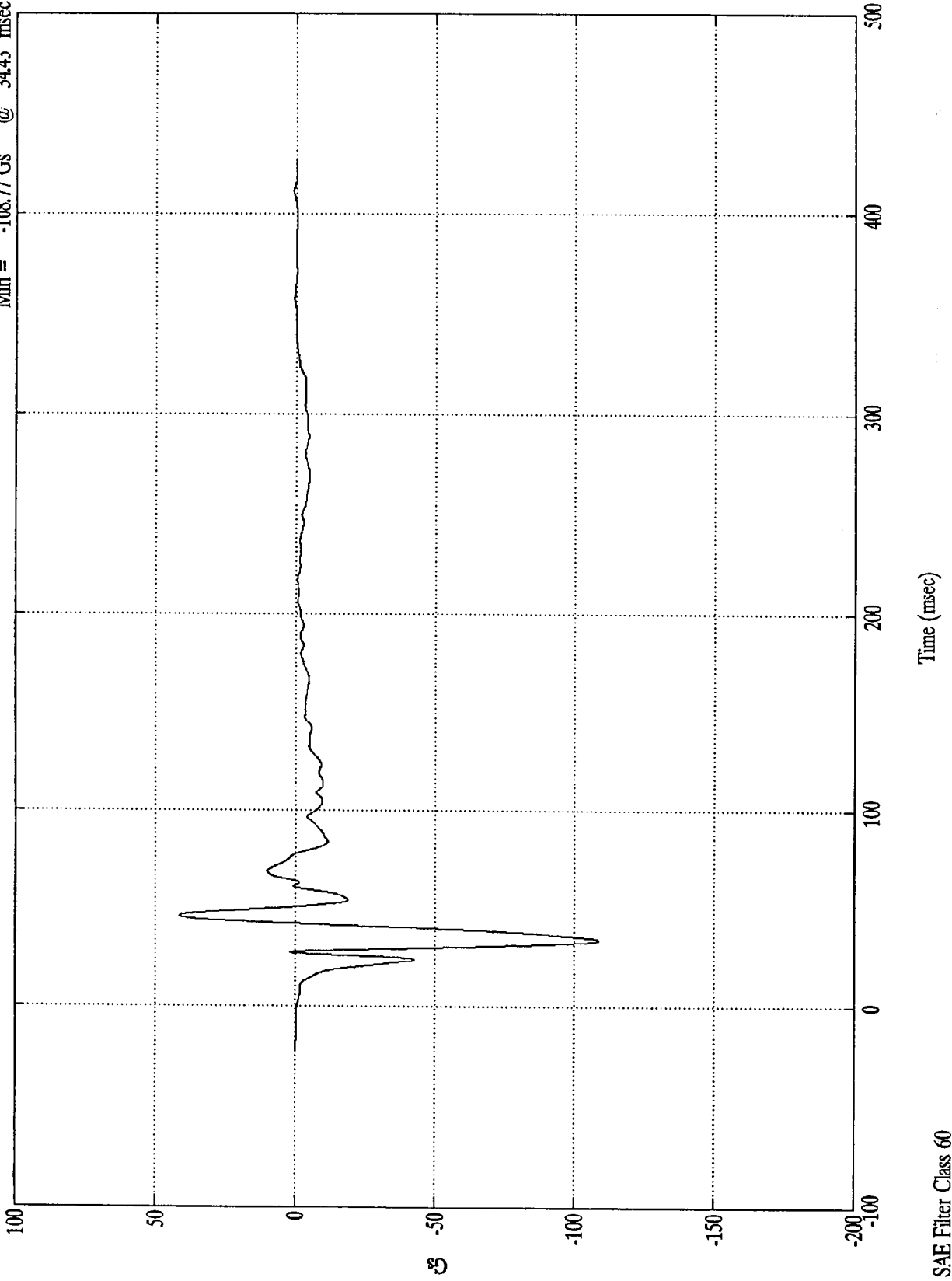
Max = 1020.18 mm @ 104.04 msec
Min = -443.36 mm @ 427.32 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 41.32 Gs @ 46.20 msec
Min = -108.77 Gs @ 34.43 msec

Acc. #3(x)

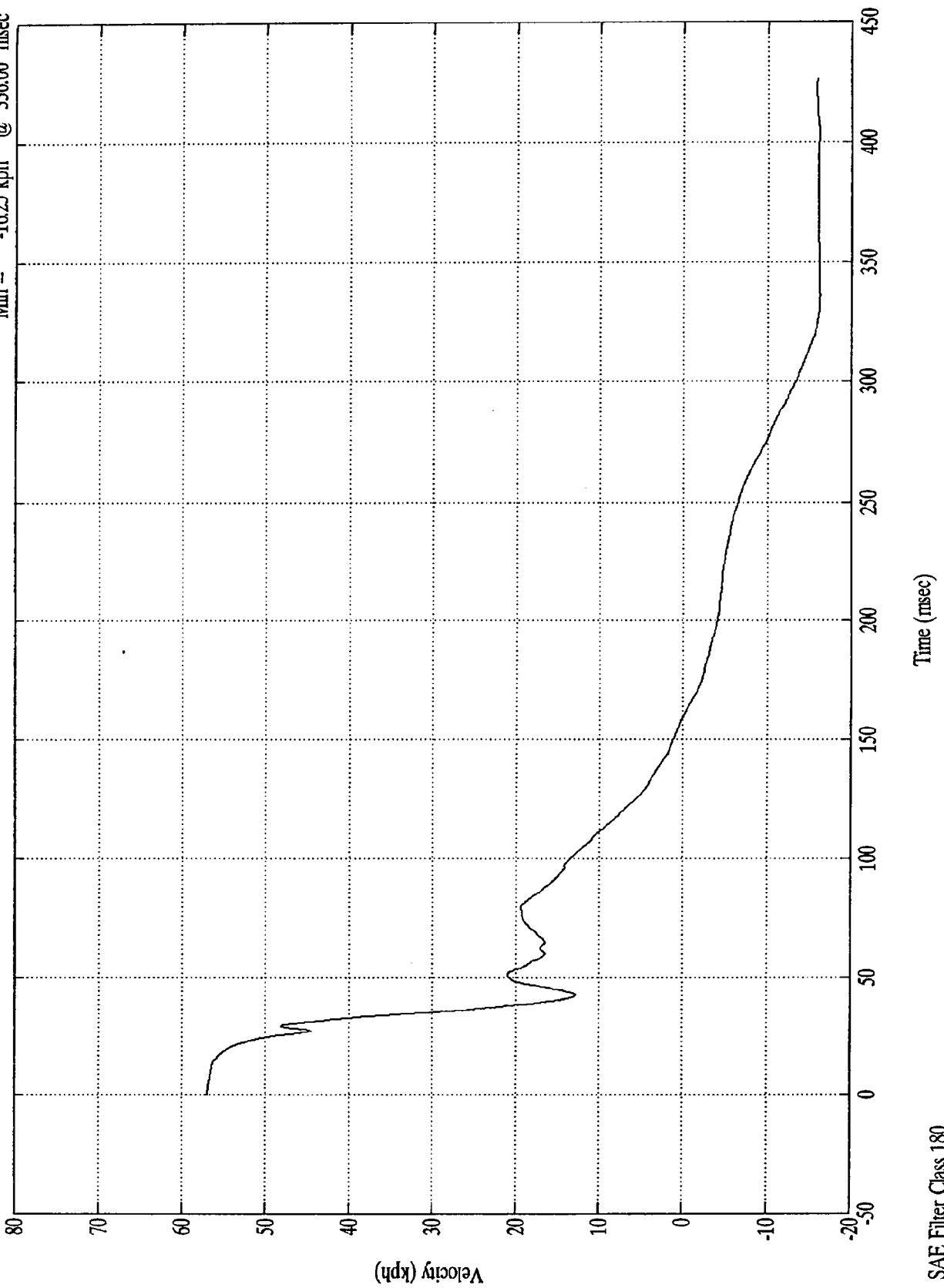


SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

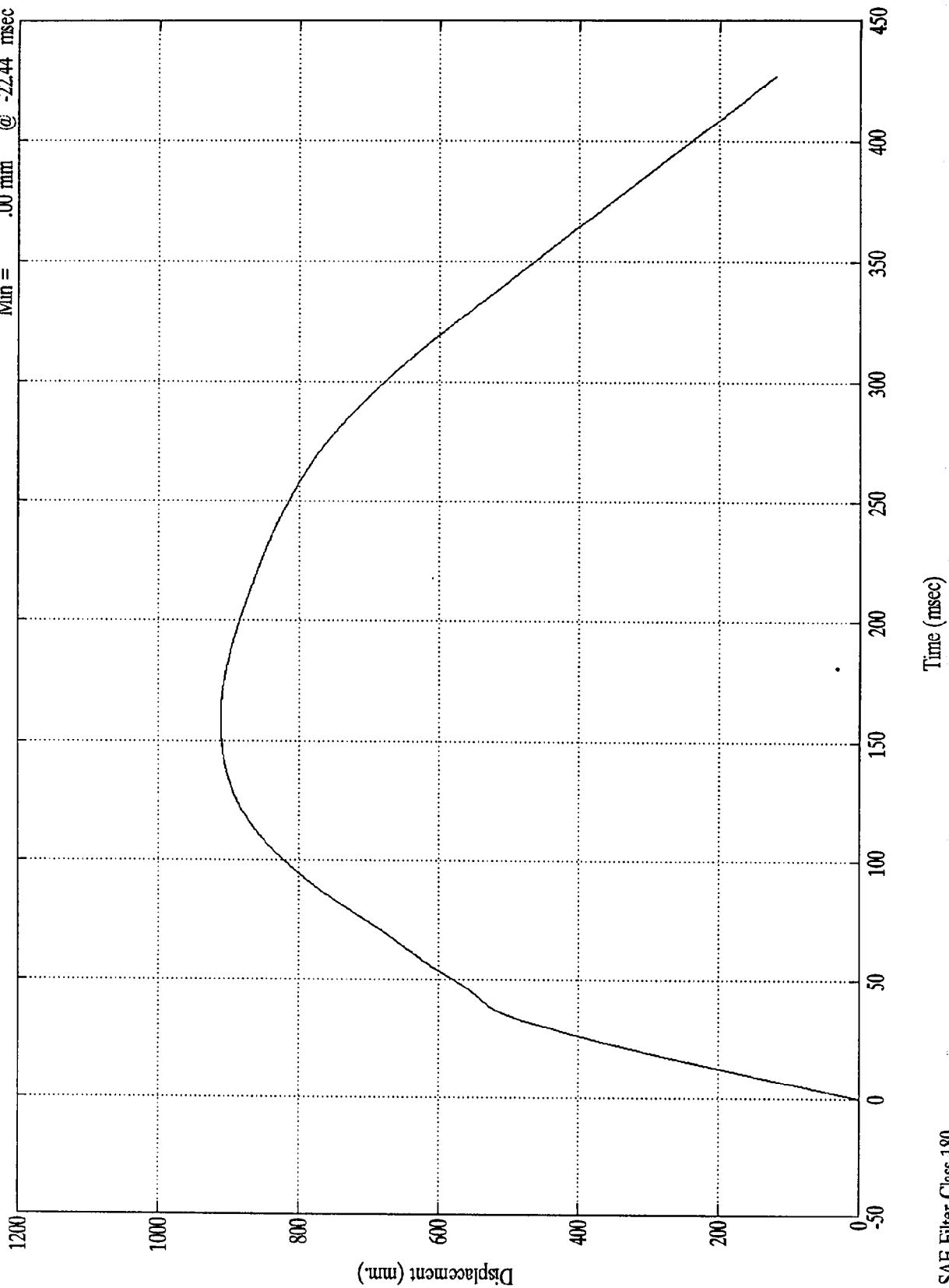
Max = 56.97 kph @ -0.00 msec
Min = -16.25 kph @ 336.00 msec

Acc. #3(x)



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #3(x)
Max = 912.16 mm @ 159.48 msec
Min = .00 mm @ -22.44 msec

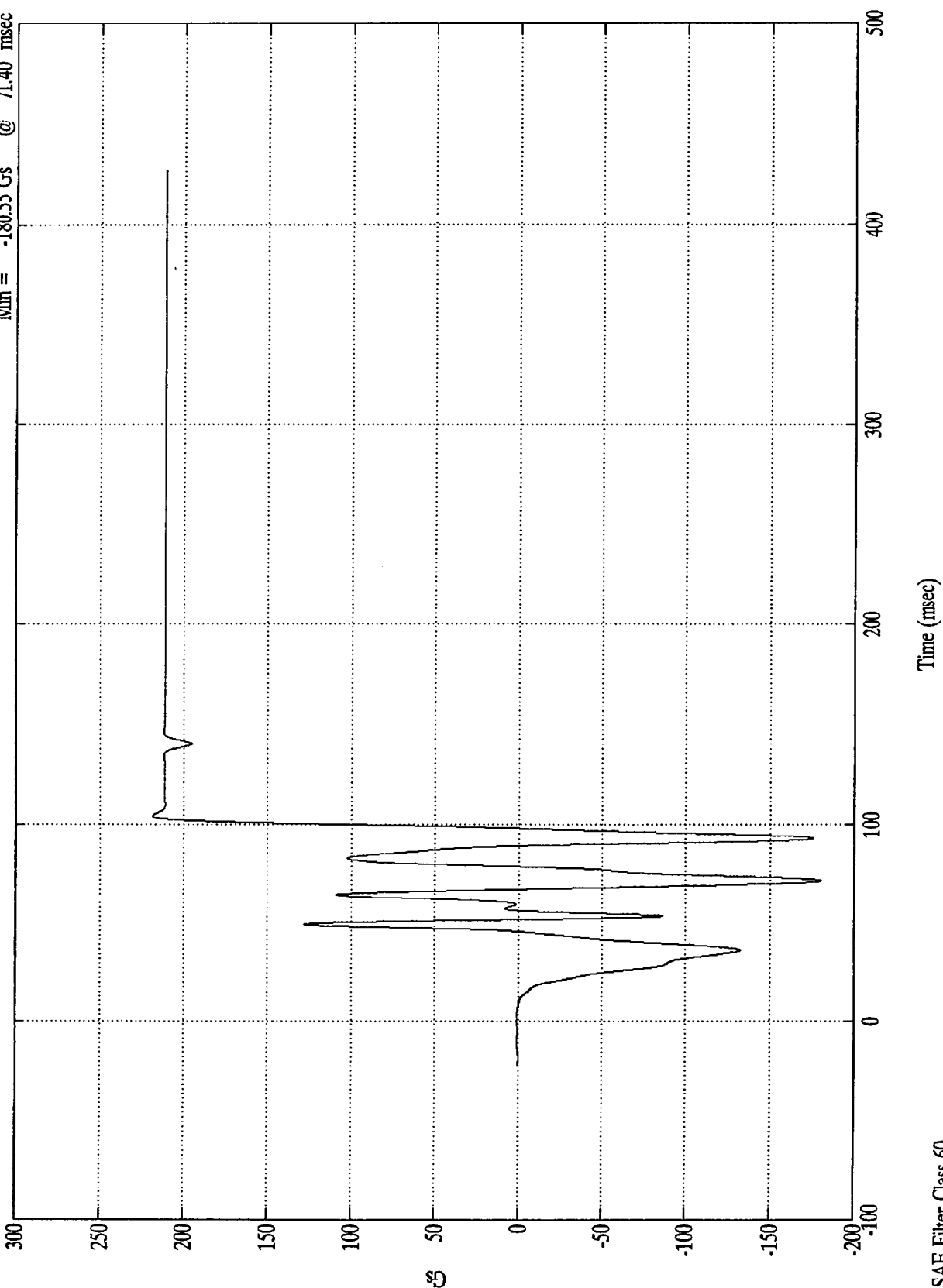


SAE Filter Class 180

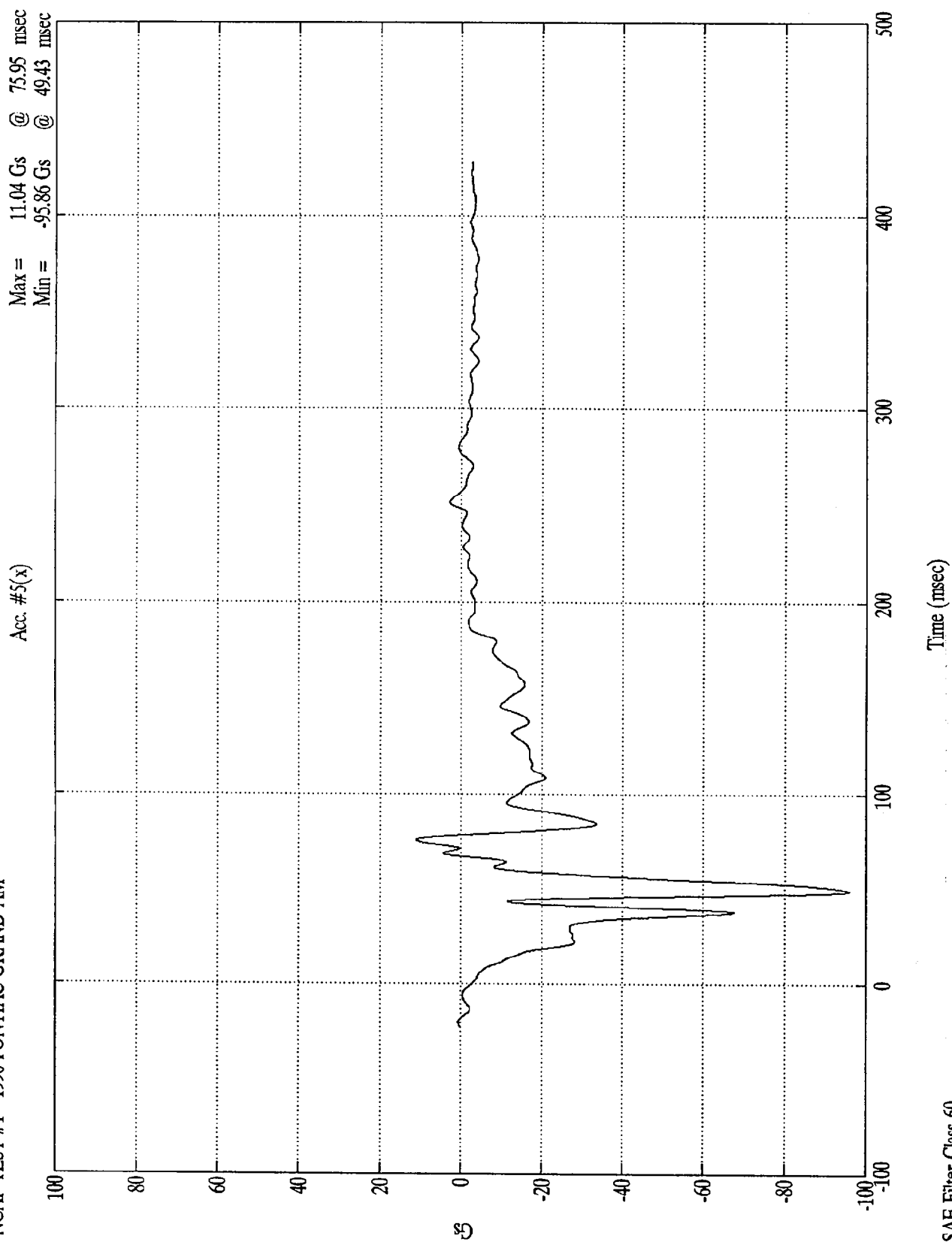
NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 218.44 Gs @ 104.04 msec
 Min = -180.55 Gs @ 71.40 msec

Acc. #4(x)



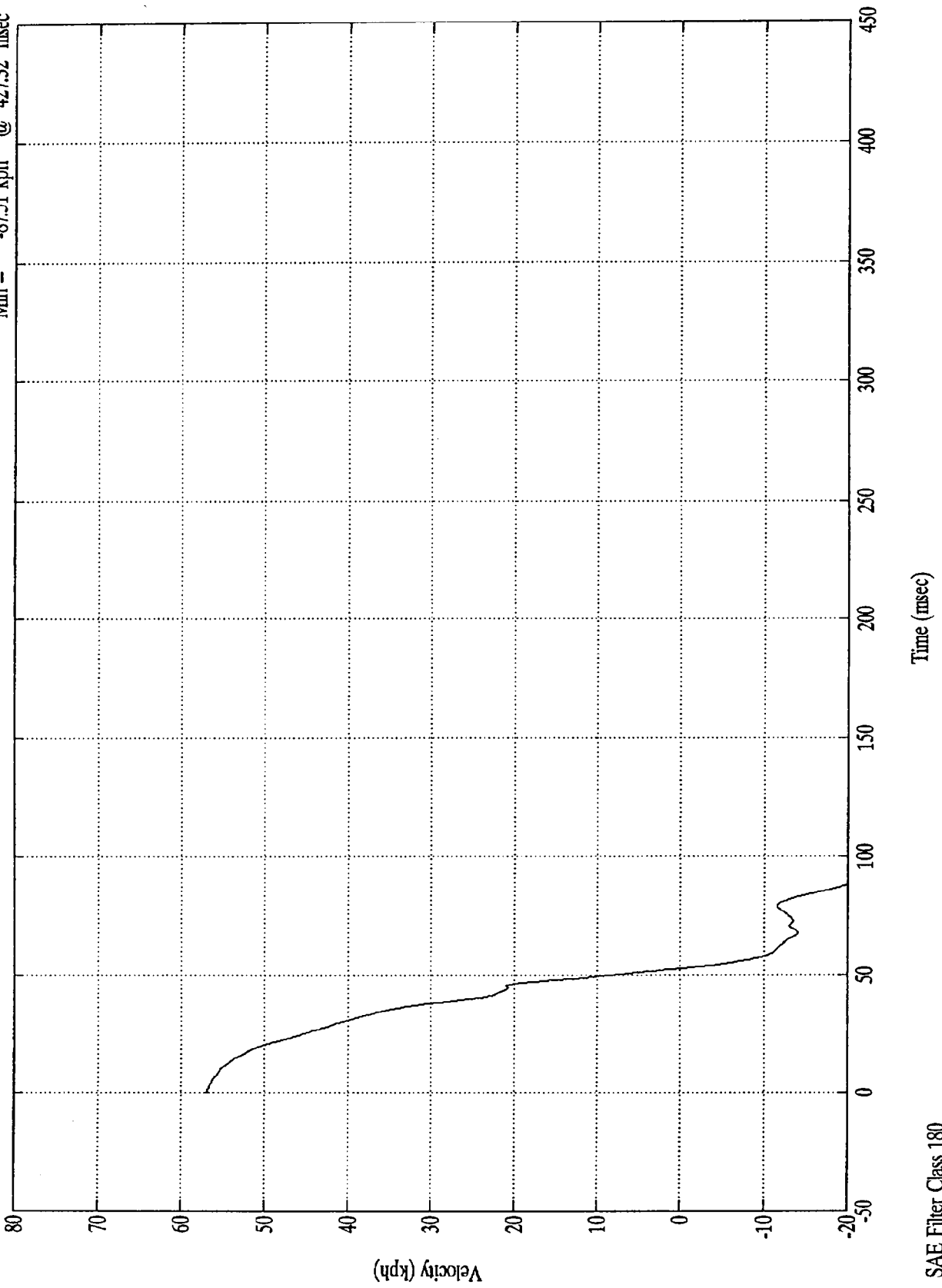
NCAP TEST #1 - 19% PONTIAC GRAND AM



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #5(x)

Max = 56.97 kph @ -0.00 msec
Min = -87.51 kph @ 427.32 msec

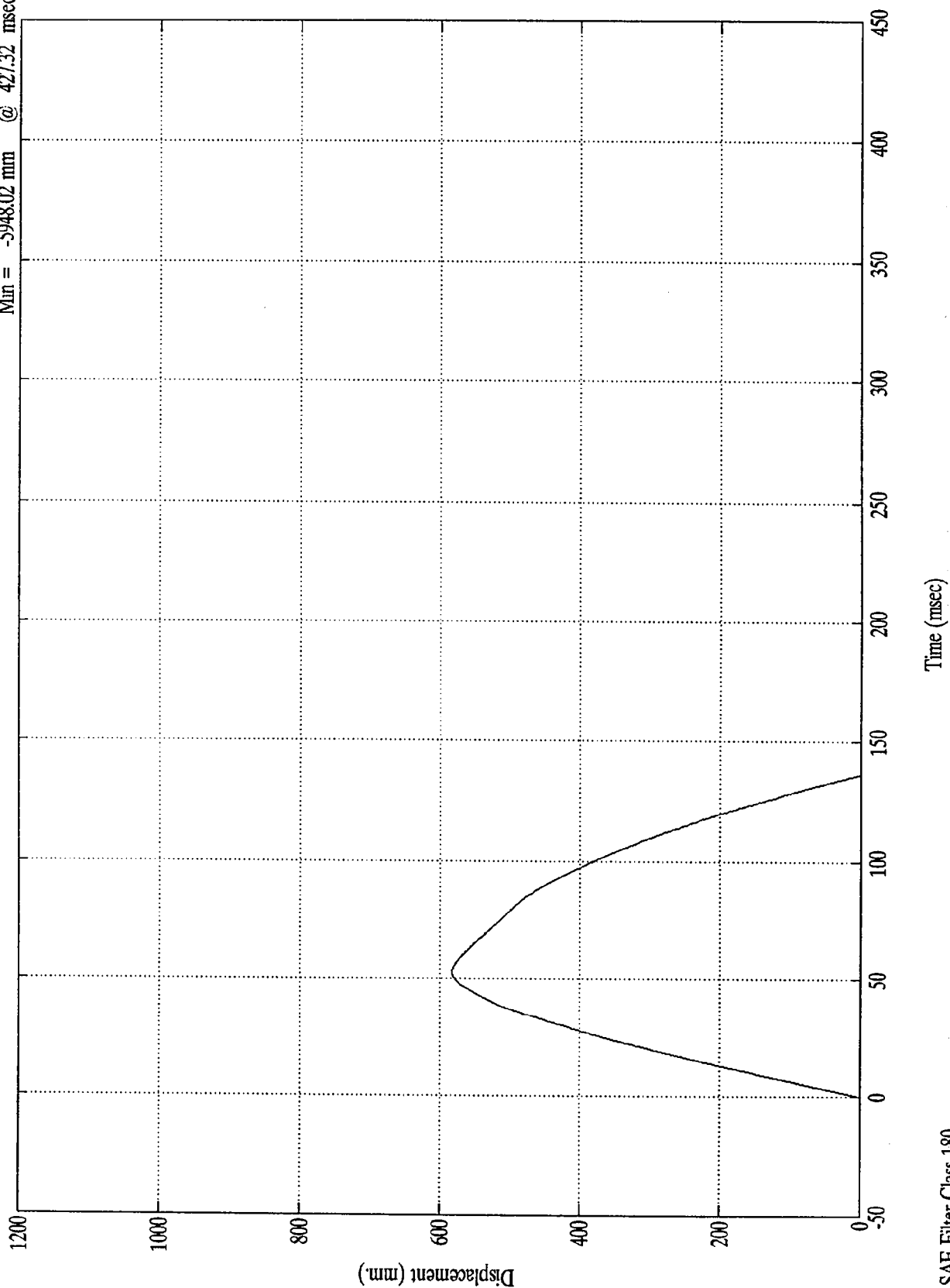


SAE Filter Class 180

NCAP TEST #1 - 19% PONTIAC GRAND AM

Max = 582.30 mm @ 52.68 msec
 Min = -5948.02 mm @ 427.32 msec

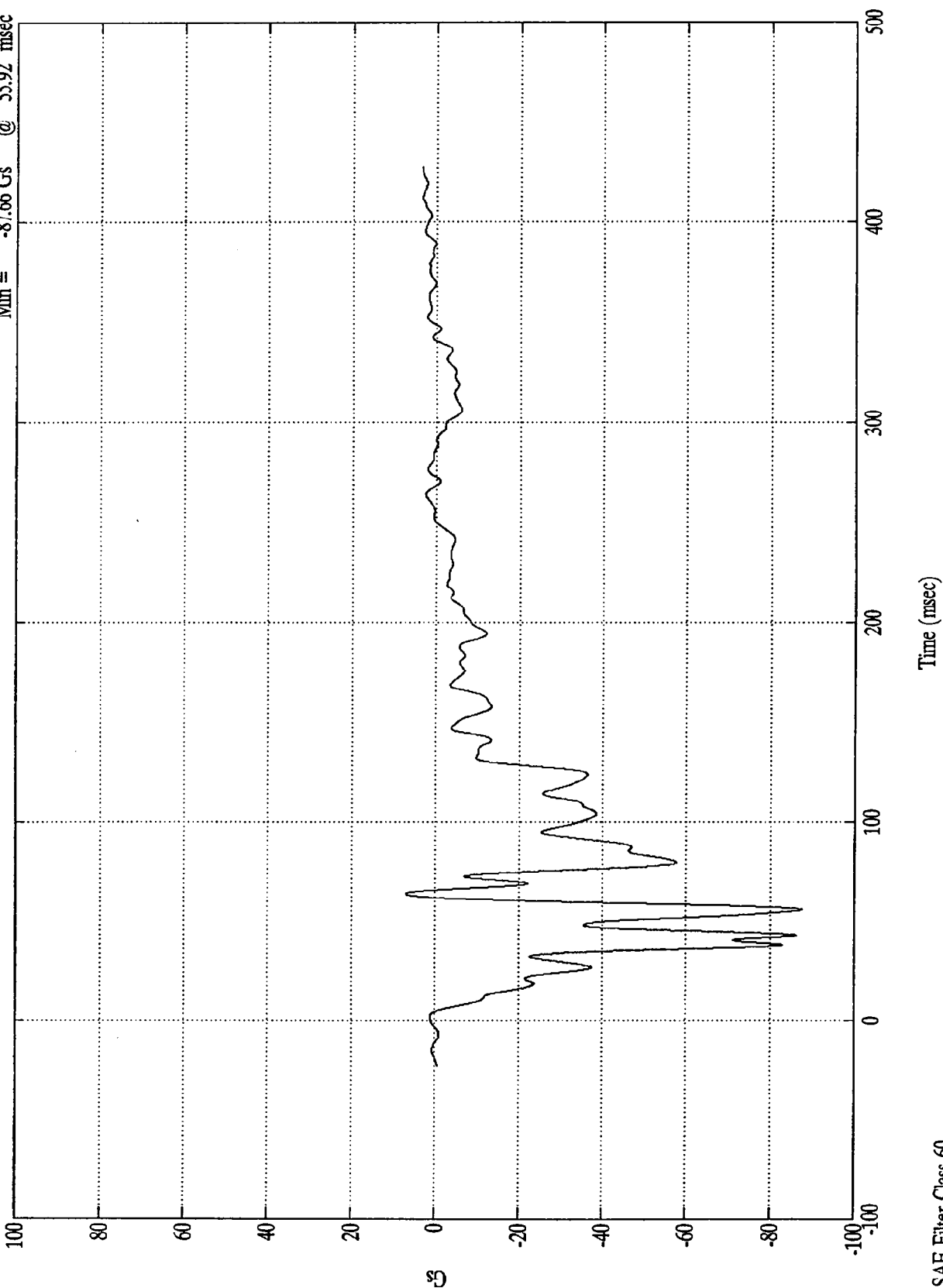
Acc. #5(x)



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 7.00 Gs @ 63.84 msec
 Min = -87.66 Gs @ 55.92 msec

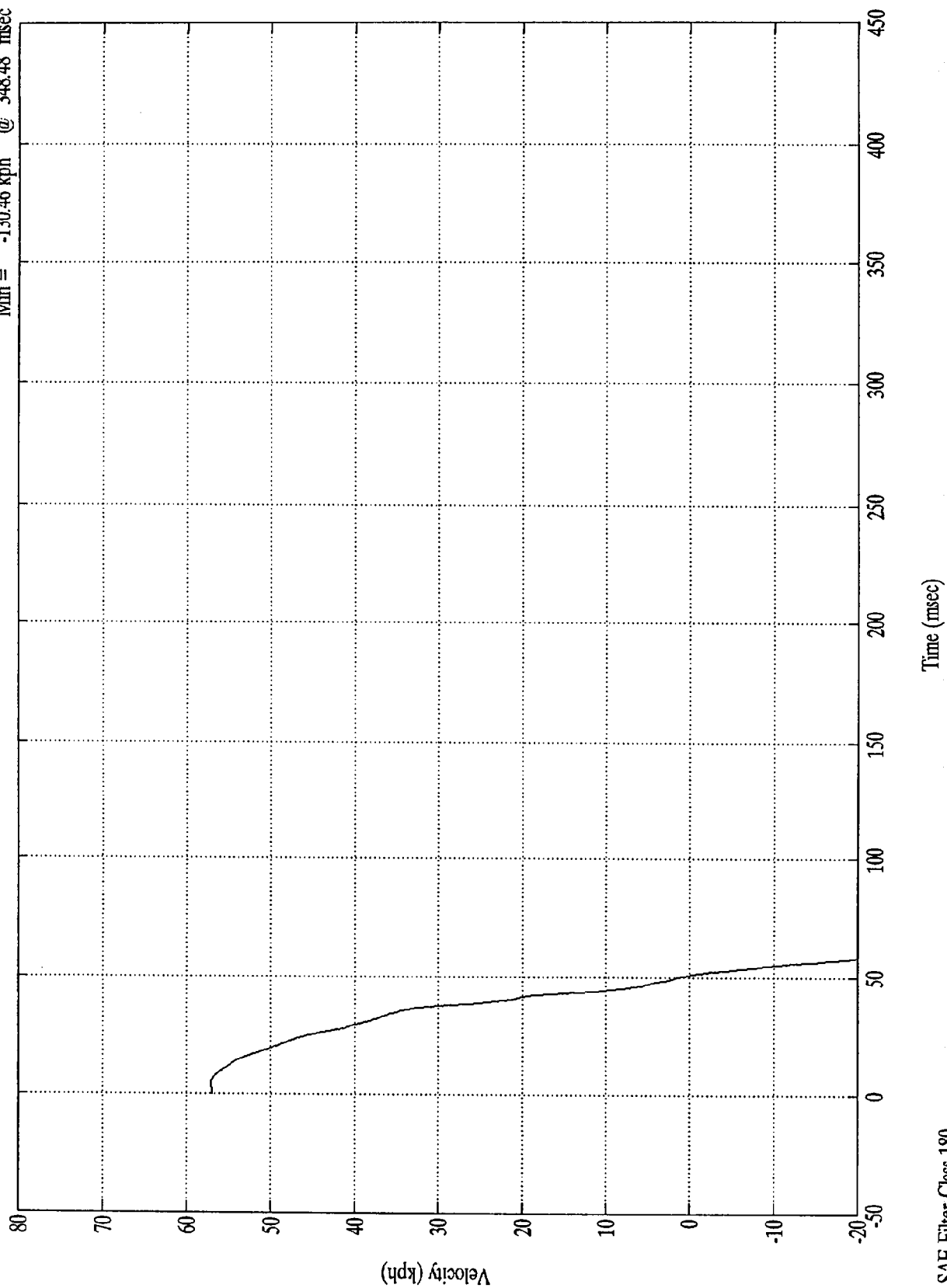
Acc. #6(x)



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 57.12 kph @ 5.03 msec
 Min = -130.46 kph @ 348.48 msec

Acc. #6(x)

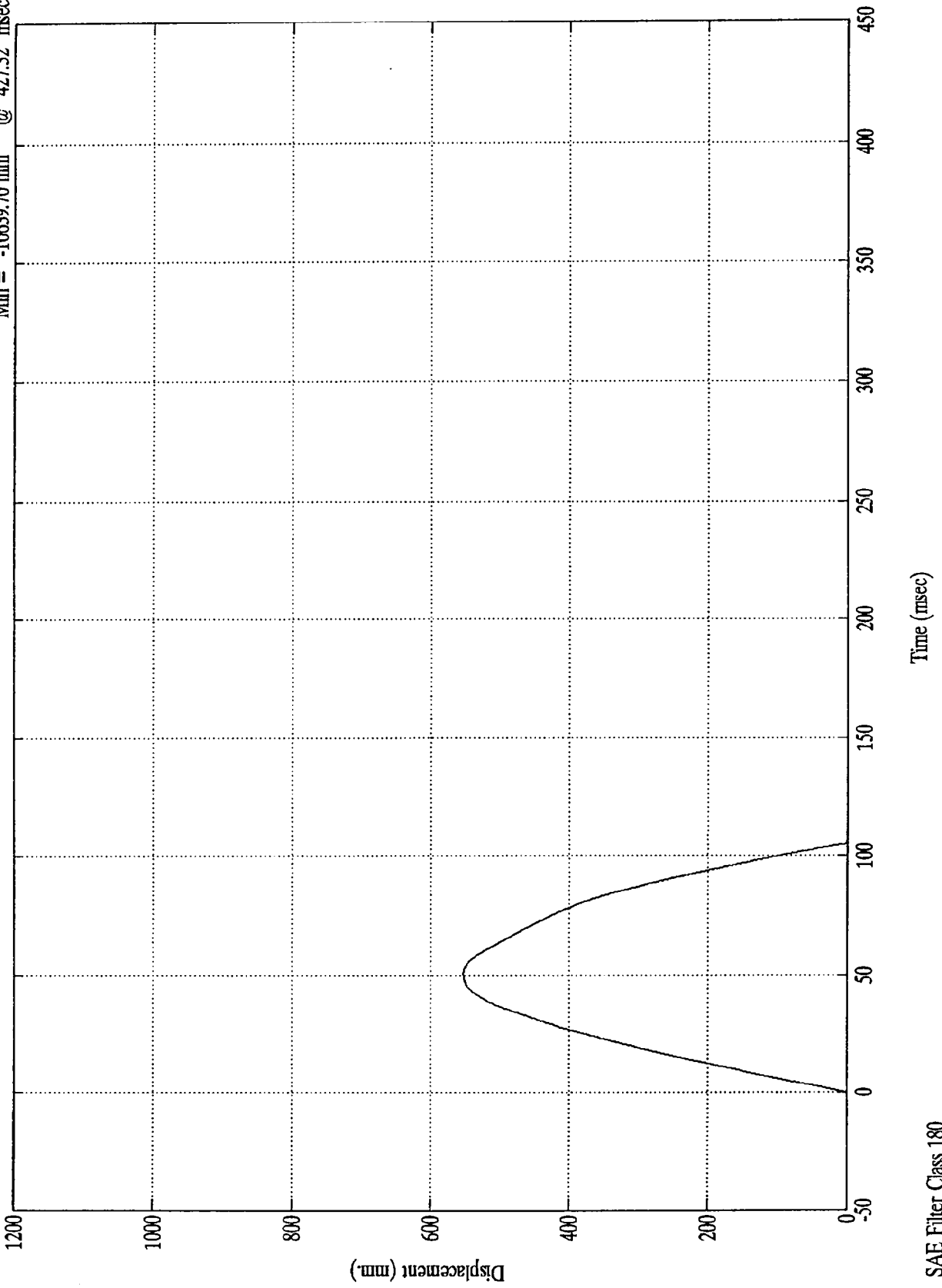


SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #6(x)

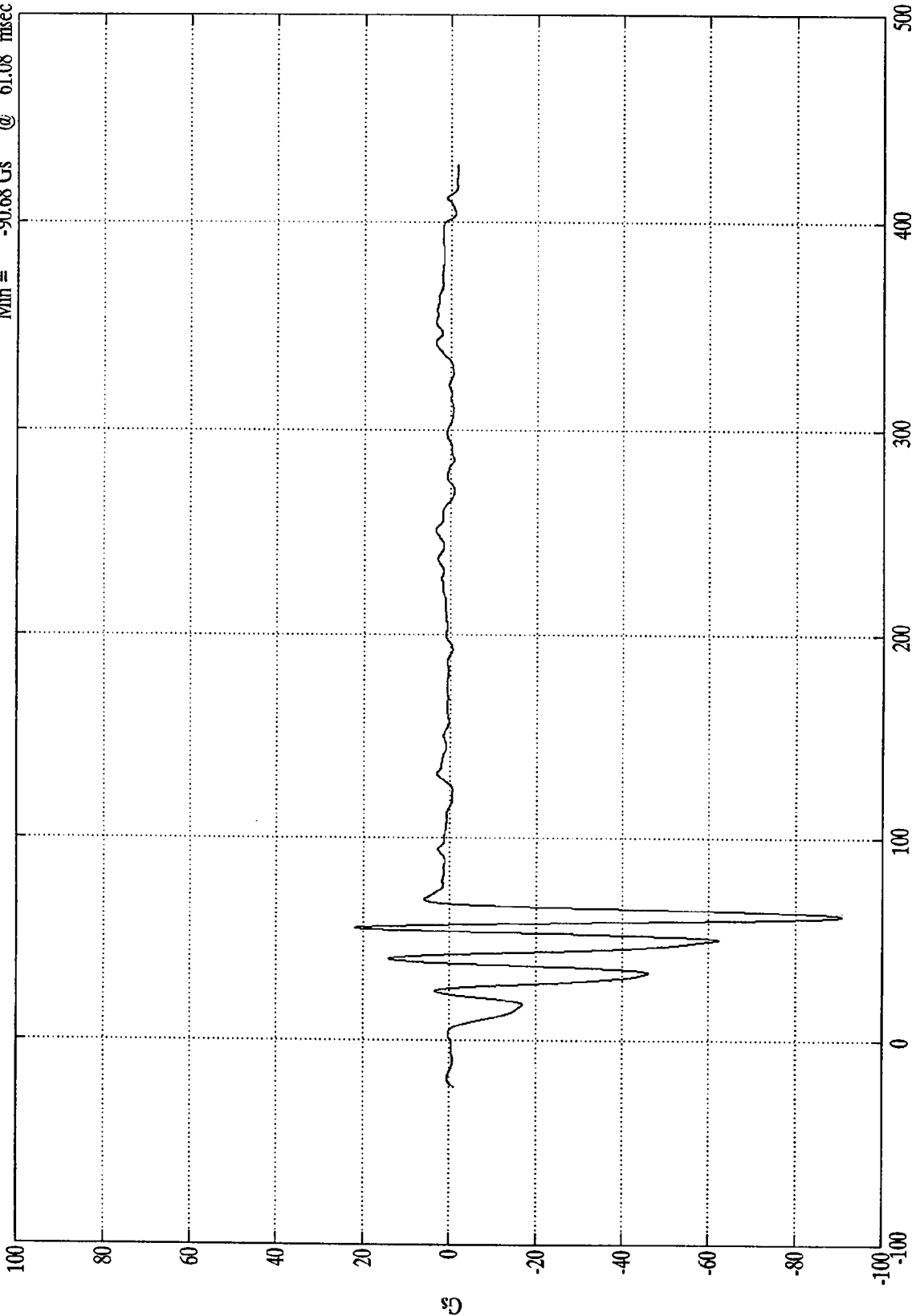
Max = 552.66 mm @ 50.87 msec
Min = -10639.70 mm @ 427.32 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 21.96 Gs @ 54.84 msec
 Min = -90.68 Gs @ 61.08 msec

Acc. #7(x)



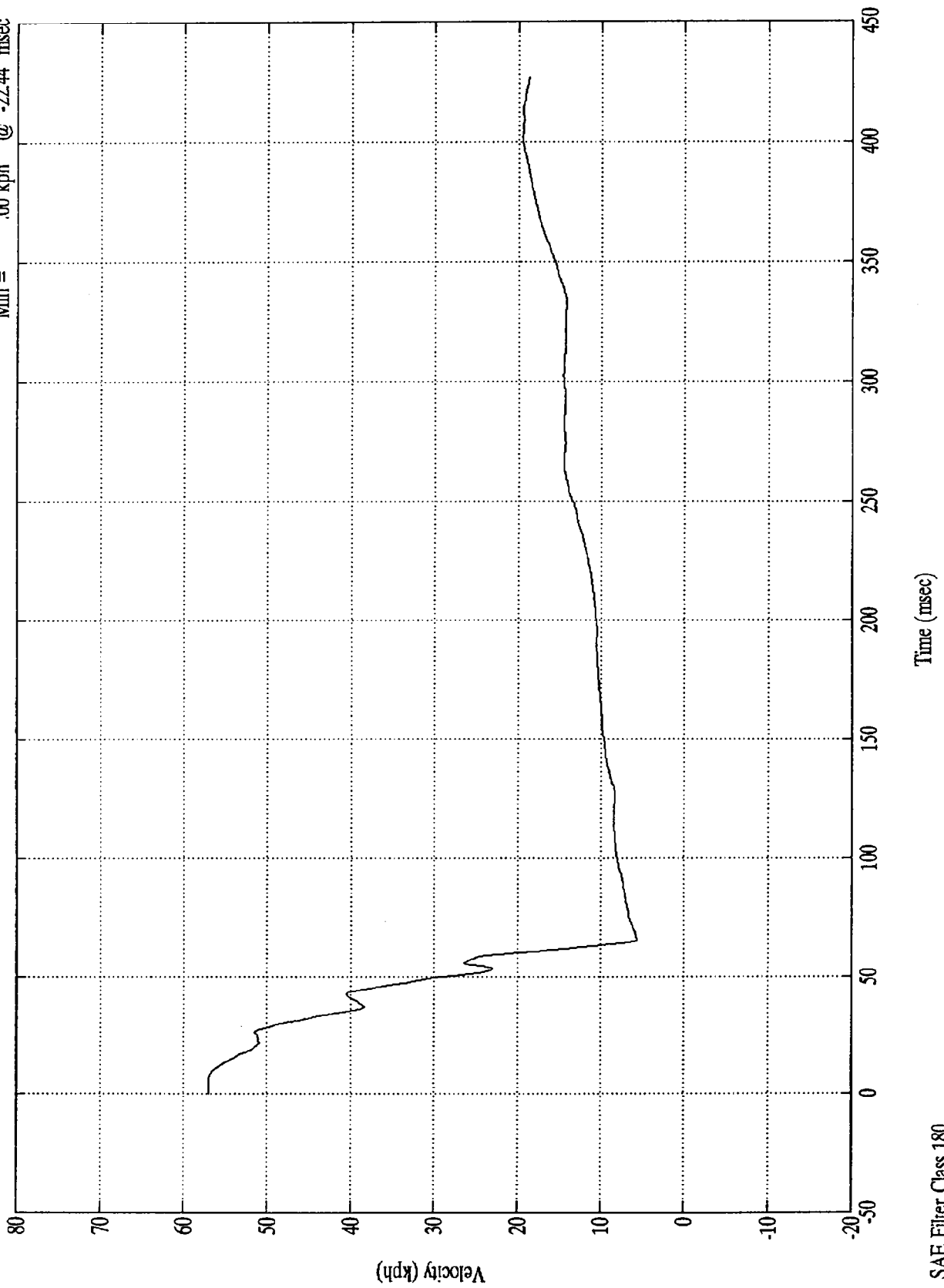
Time (msec)

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #7(x)

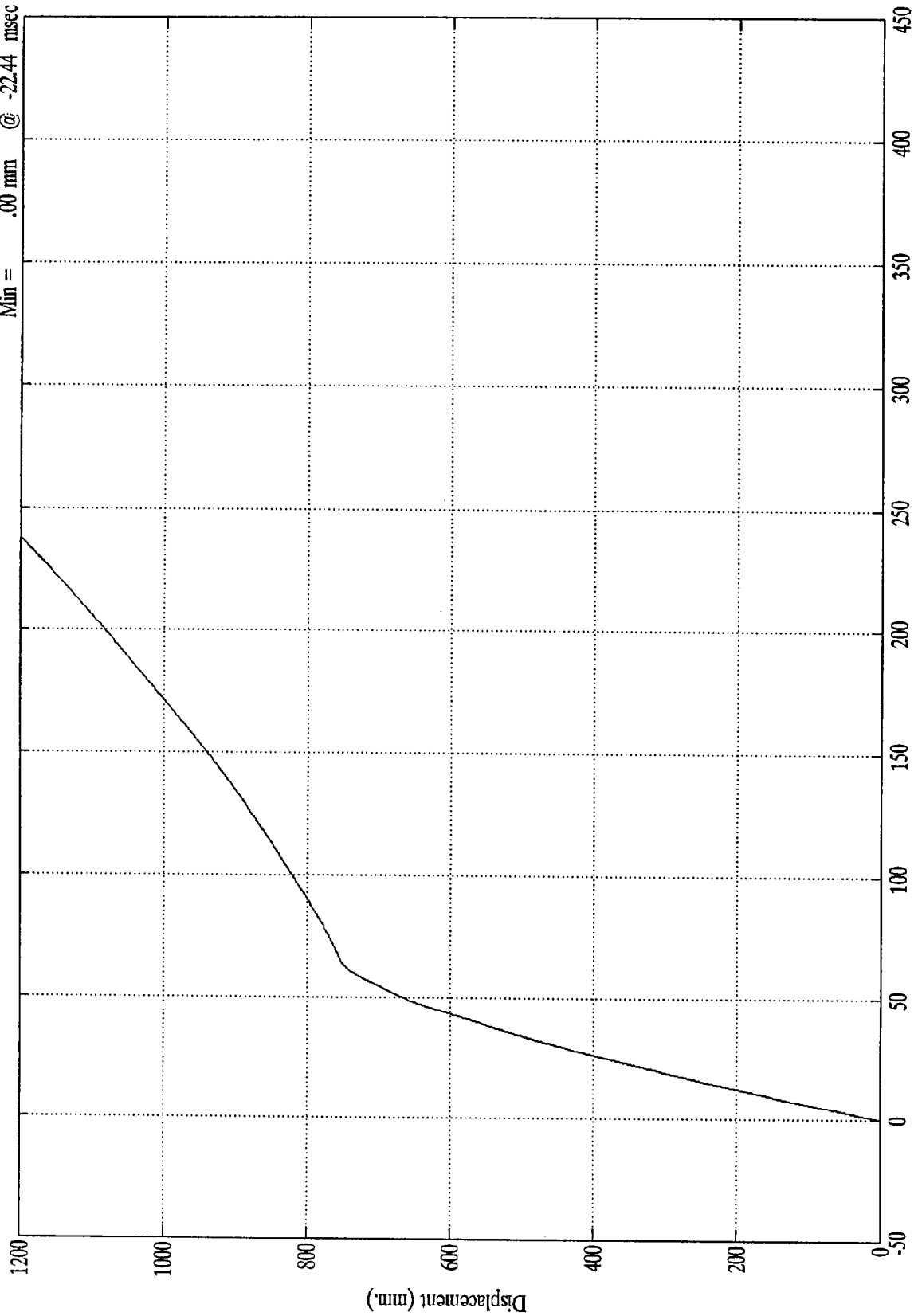
Max = 57.00 kph @ 3.71 msec
Min = .00 kph @ -22.44 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 2039.56 mm @ 427.32 msec
Min = .00 mm @ -22.44 msec

Acc. #7(x)



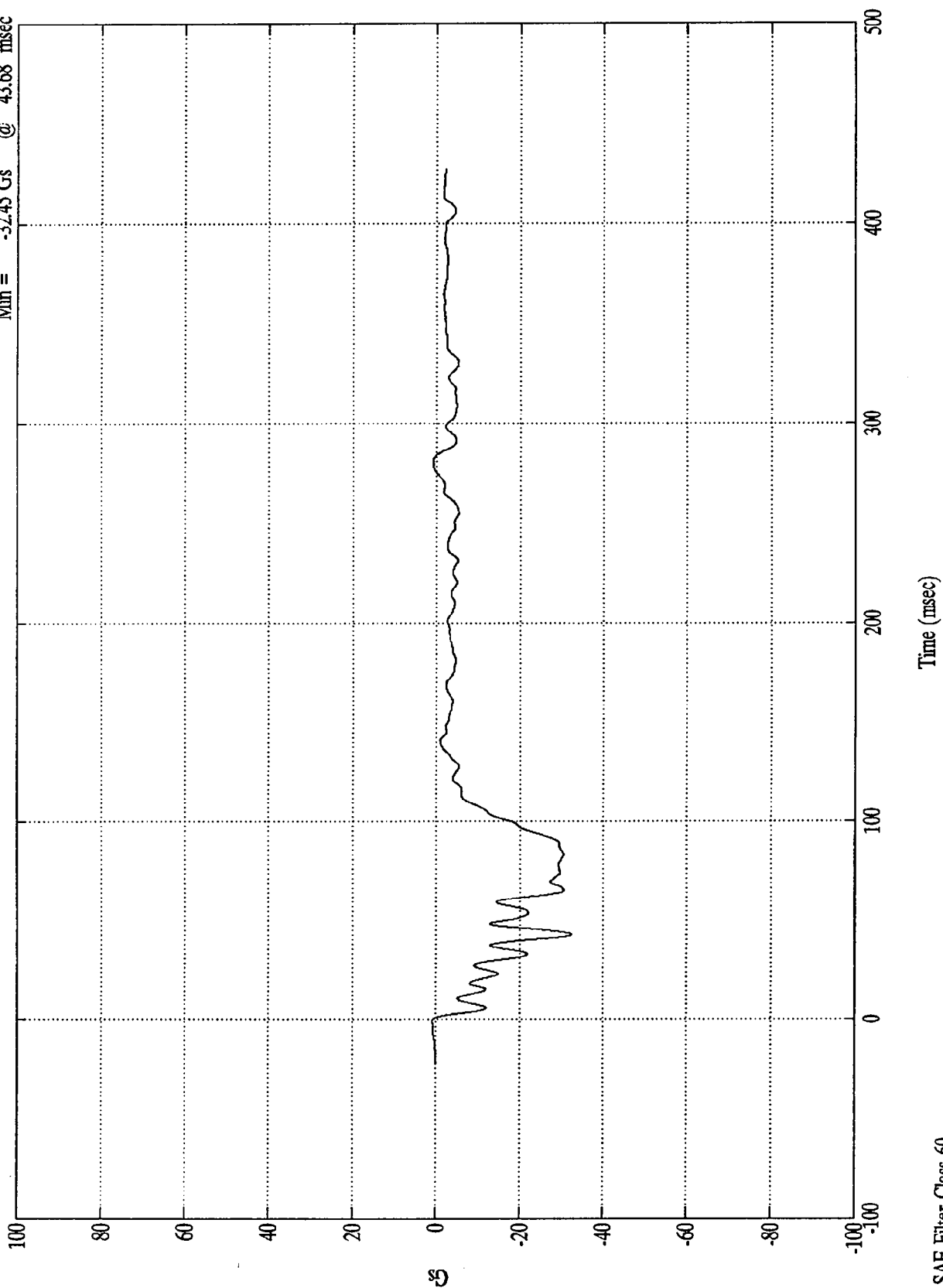
Time (msec)

SAE Filter Class 180

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = .85 Gs @ -0.96 msec
Min = -32.45 Gs @ 43.68 msec

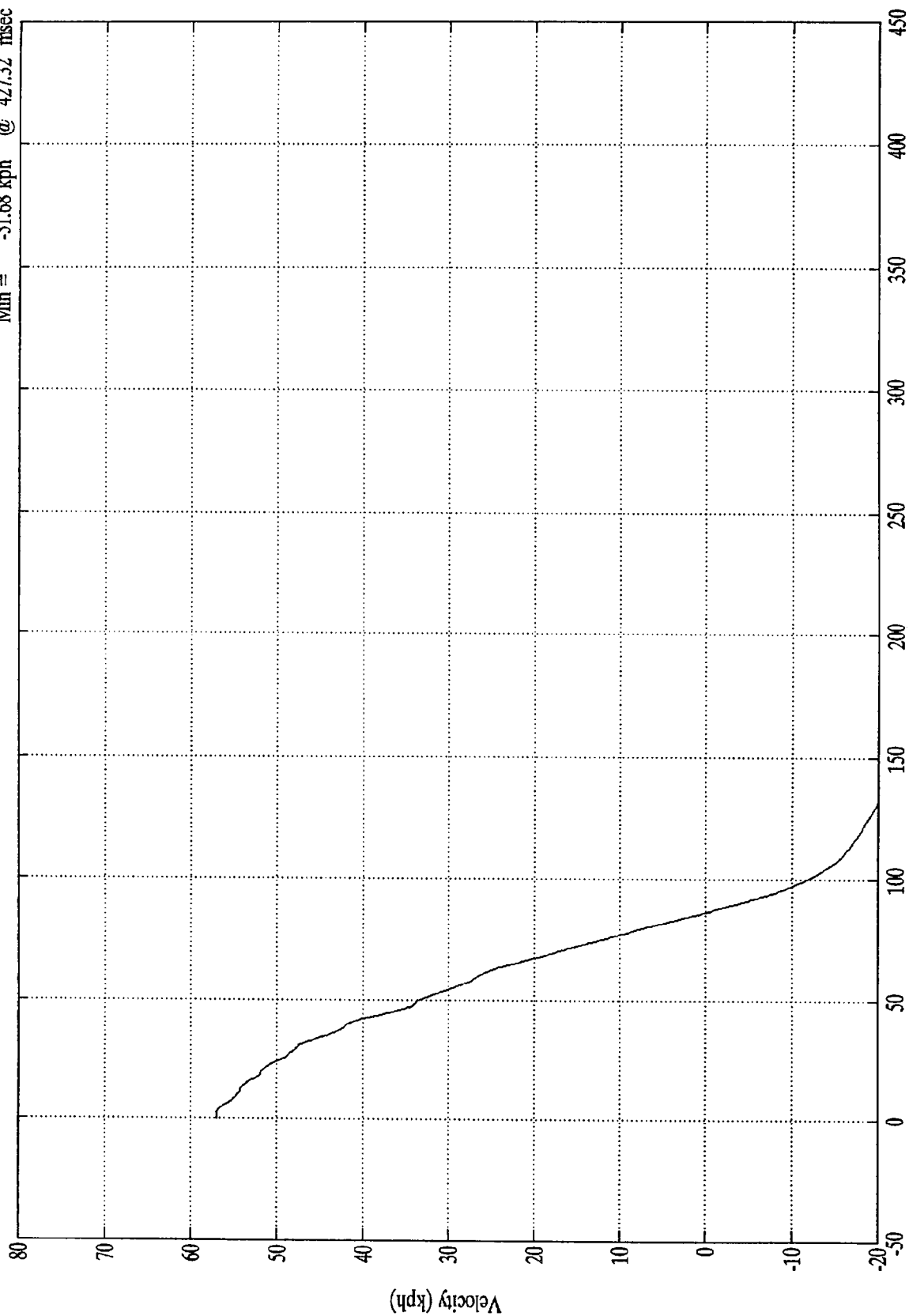
Acc. #8(x)



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 57.01 kph @ 2.15 msec
Min = -51.68 kph @ 427.32 msec

Acc. #8(x)

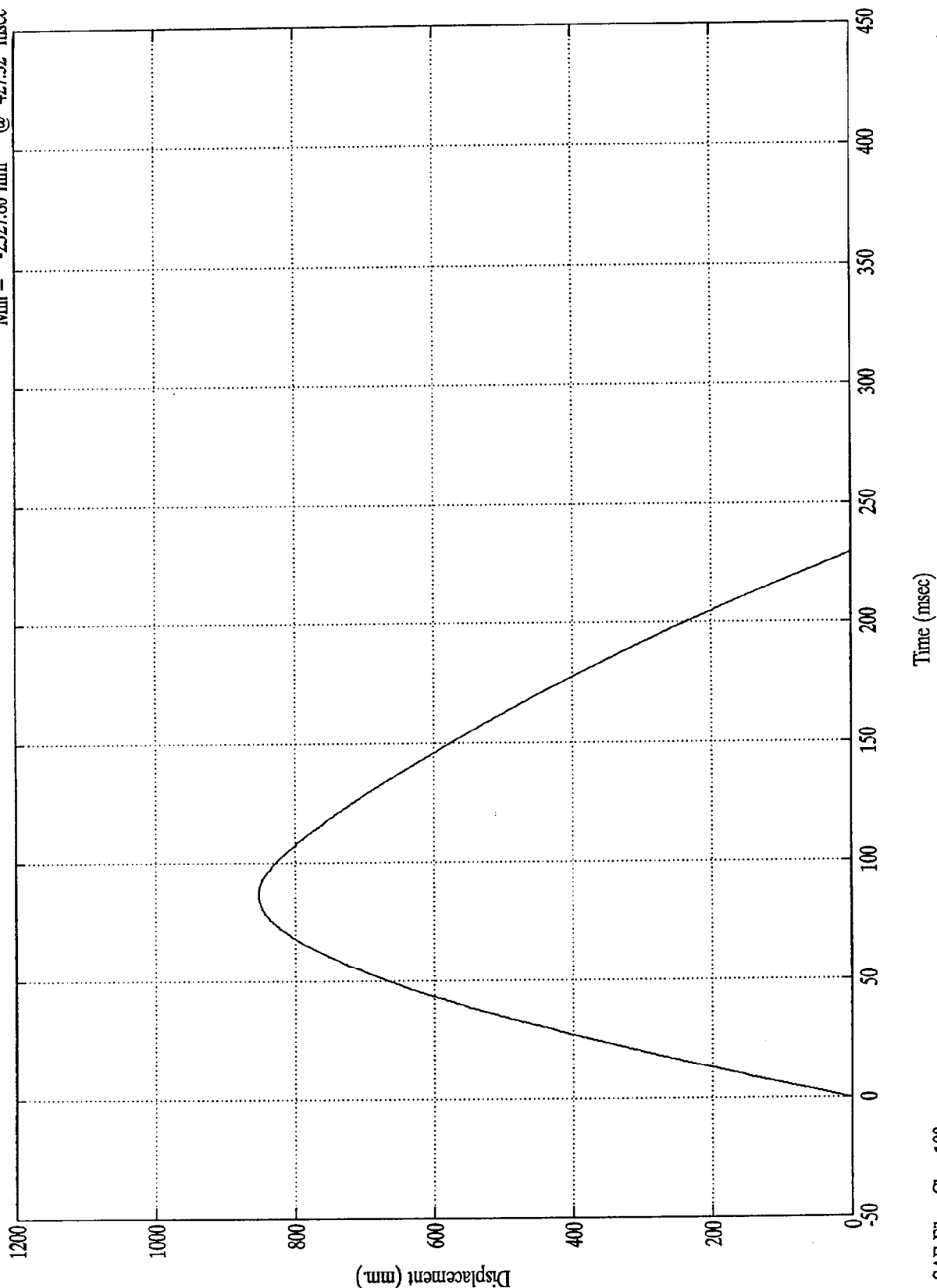


Time (msec)

SAE Filter Class 180

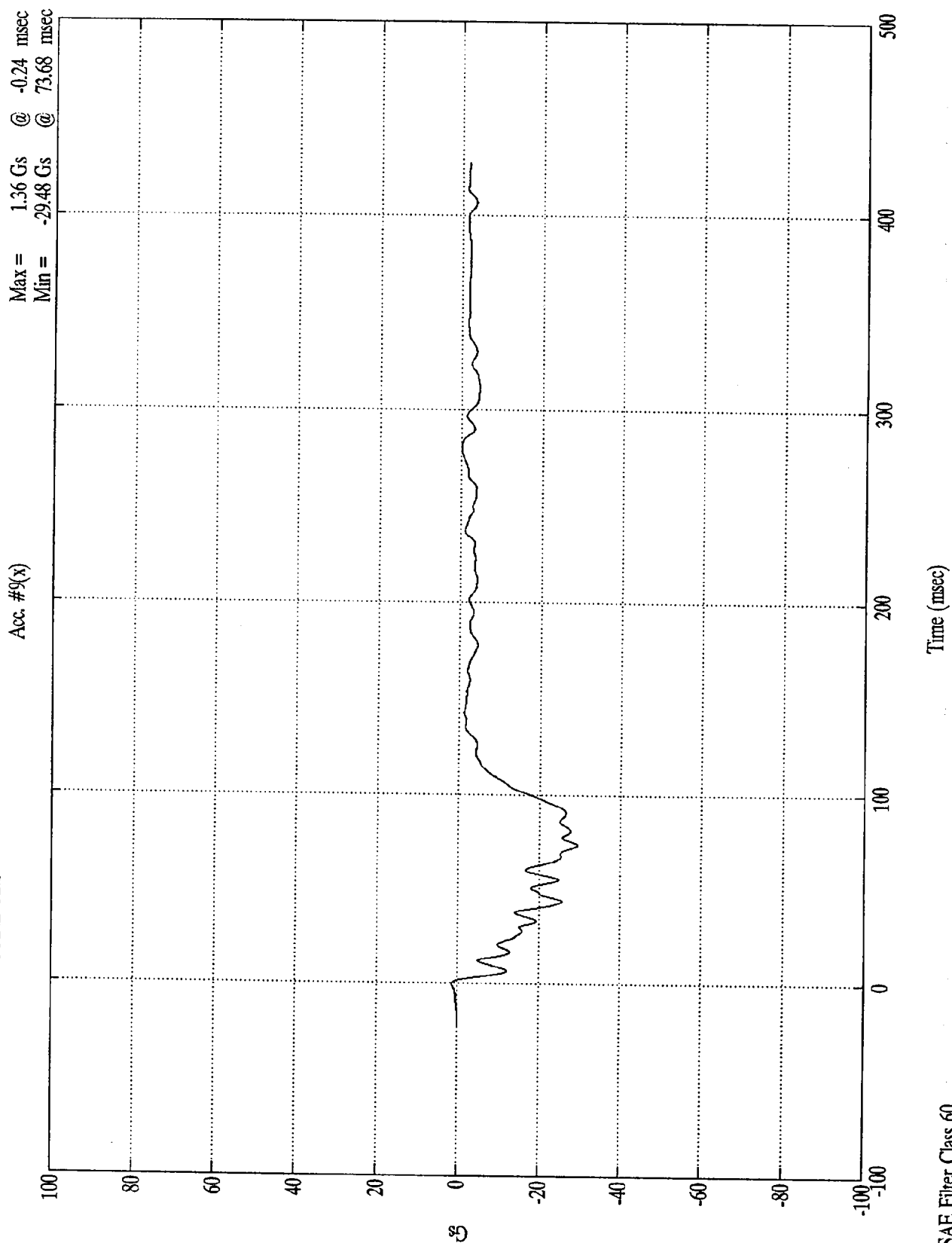
NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #8(x)
Max = 852.36 mm @ 86.64 msec
Min = -2327.80 mm @ 427.32 msec



SAE Filter Class 180

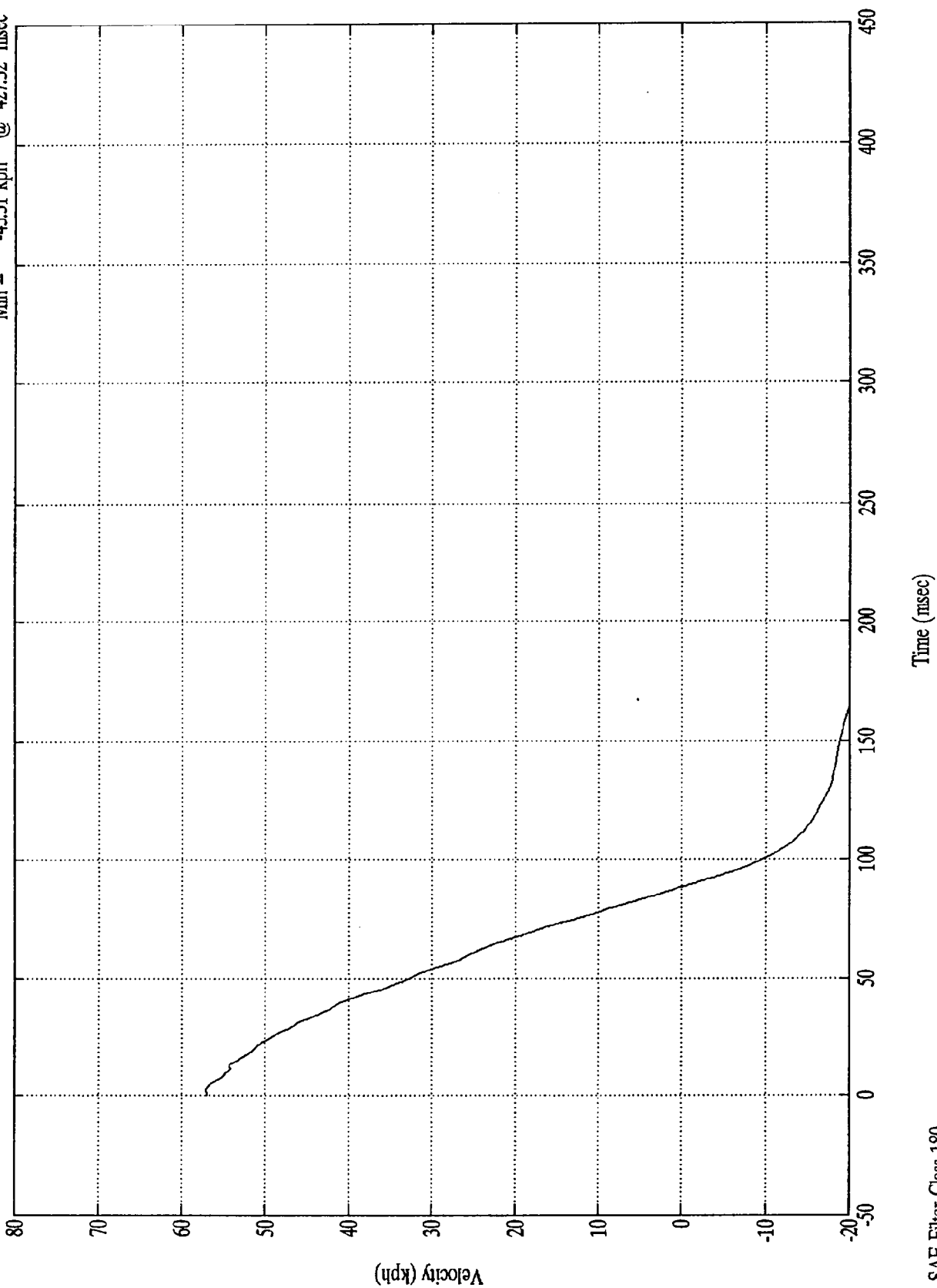
NCAP TEST #1 - 1996 PONTIAC GRAND AM



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #9(x)

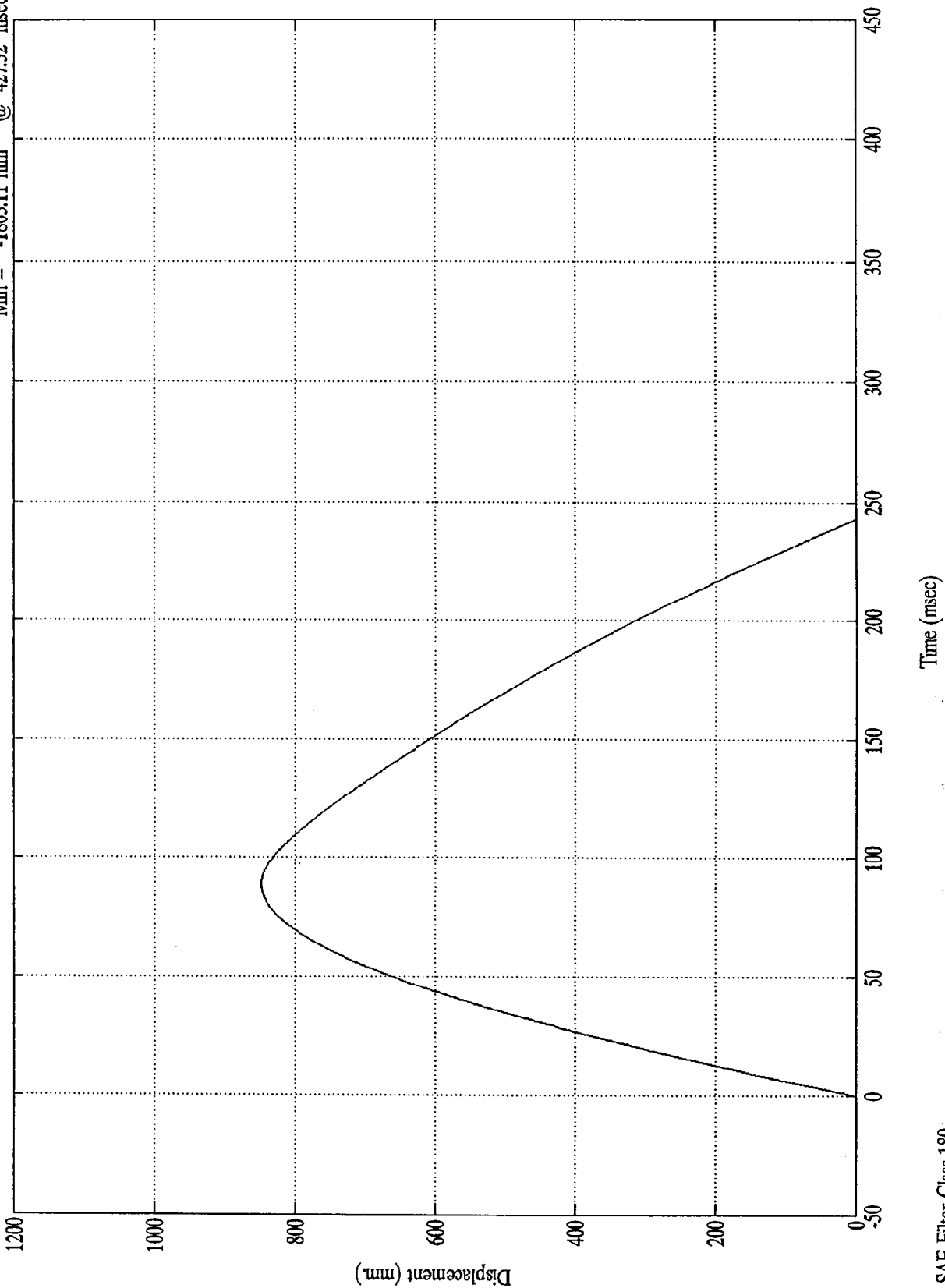
Max = 57.07 kph @ 2.63 msec
Min = -43.31 kph @ 427.32 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Acc. #9(x)

Max = 848.25 mm @ 88.44 msec
Min = -1863.11 mm @ 427.32 msec



SAE Filter Class 180

TEST NO. MT0105

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

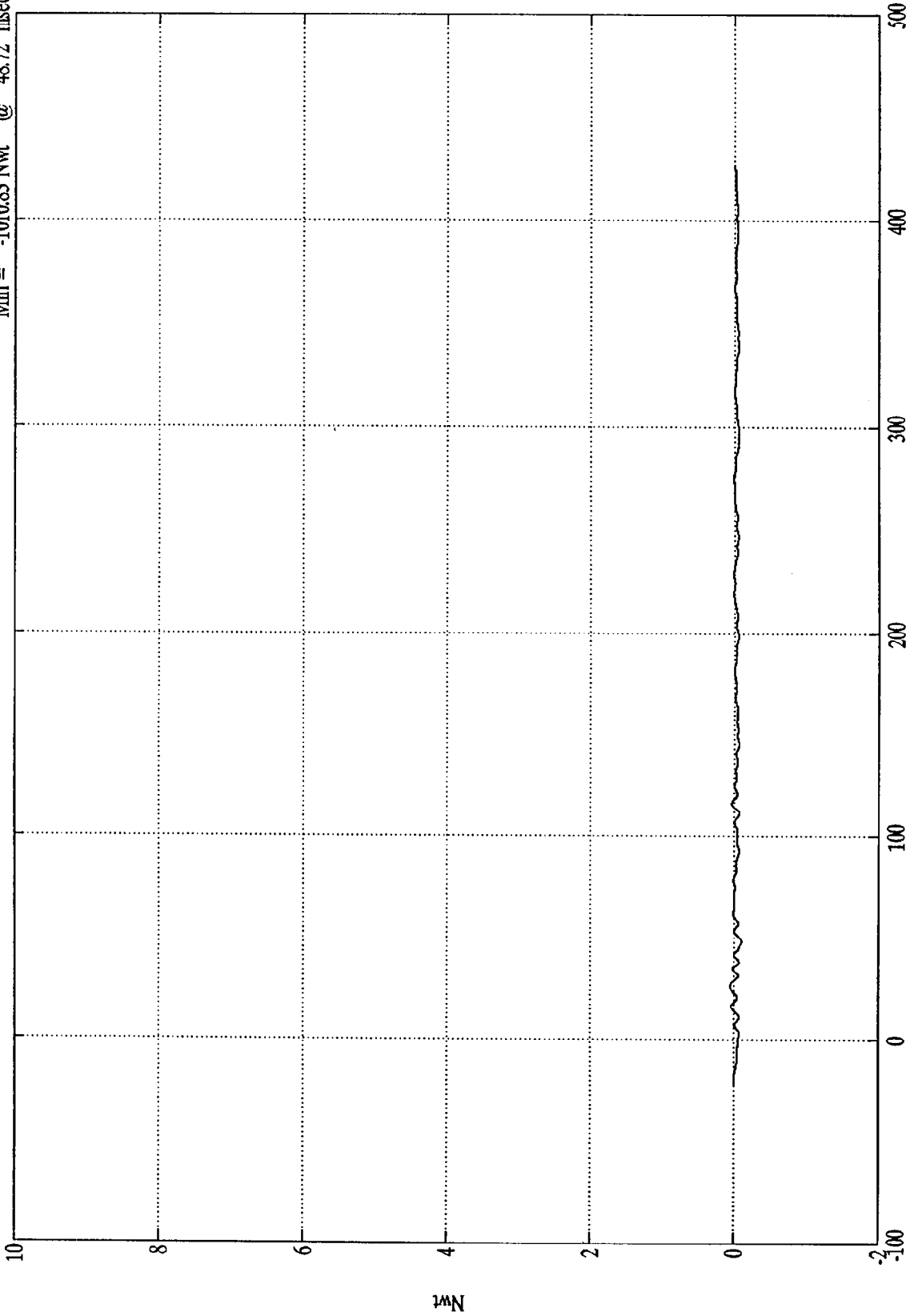
60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 524.71 Nwt @ 26.76 msec
 Min = -1010.83 Nwt @ 48.72 msec

Barrier Load Cell A1

$\times 10^4$



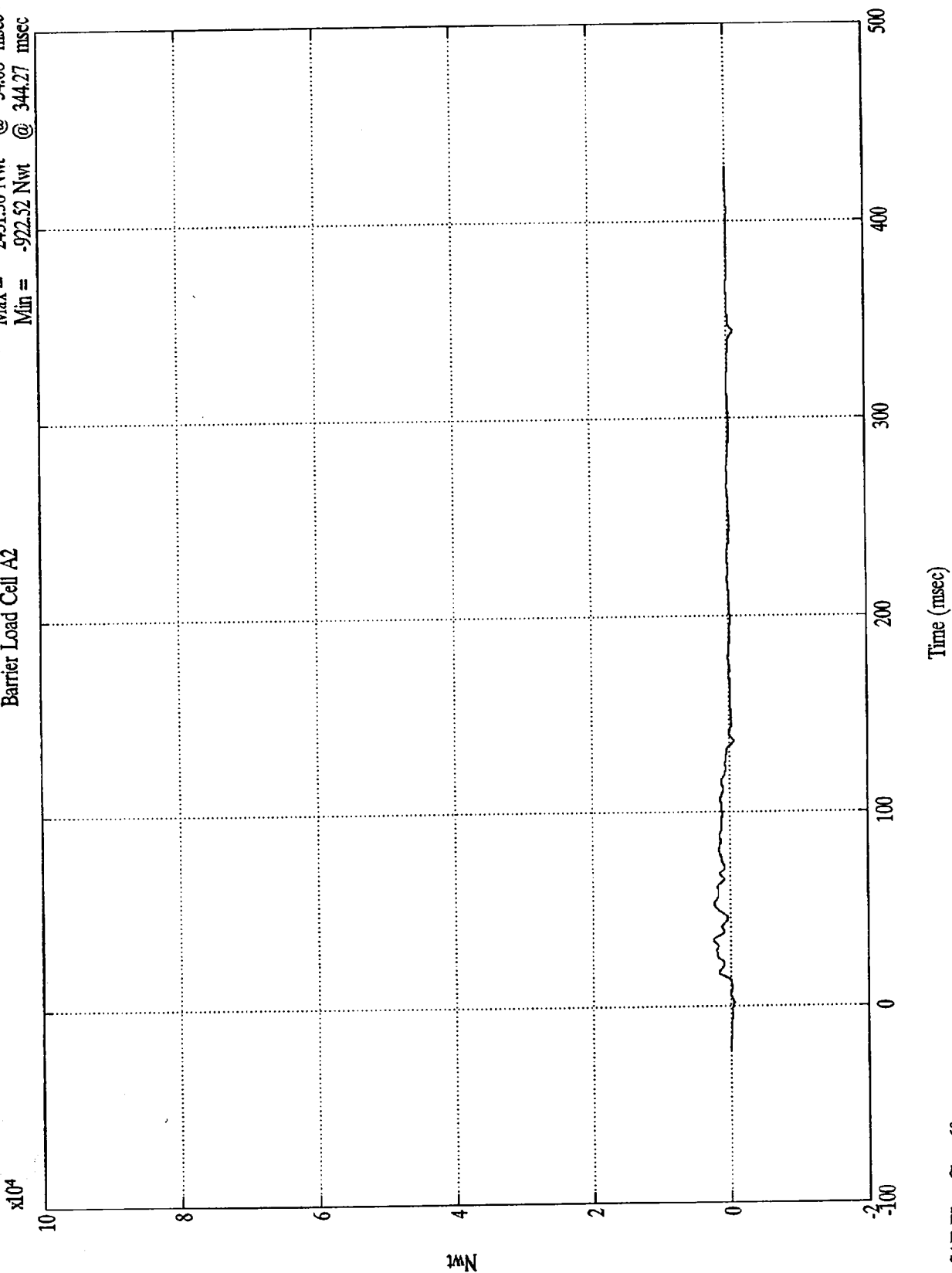
Time (msec)

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell A2

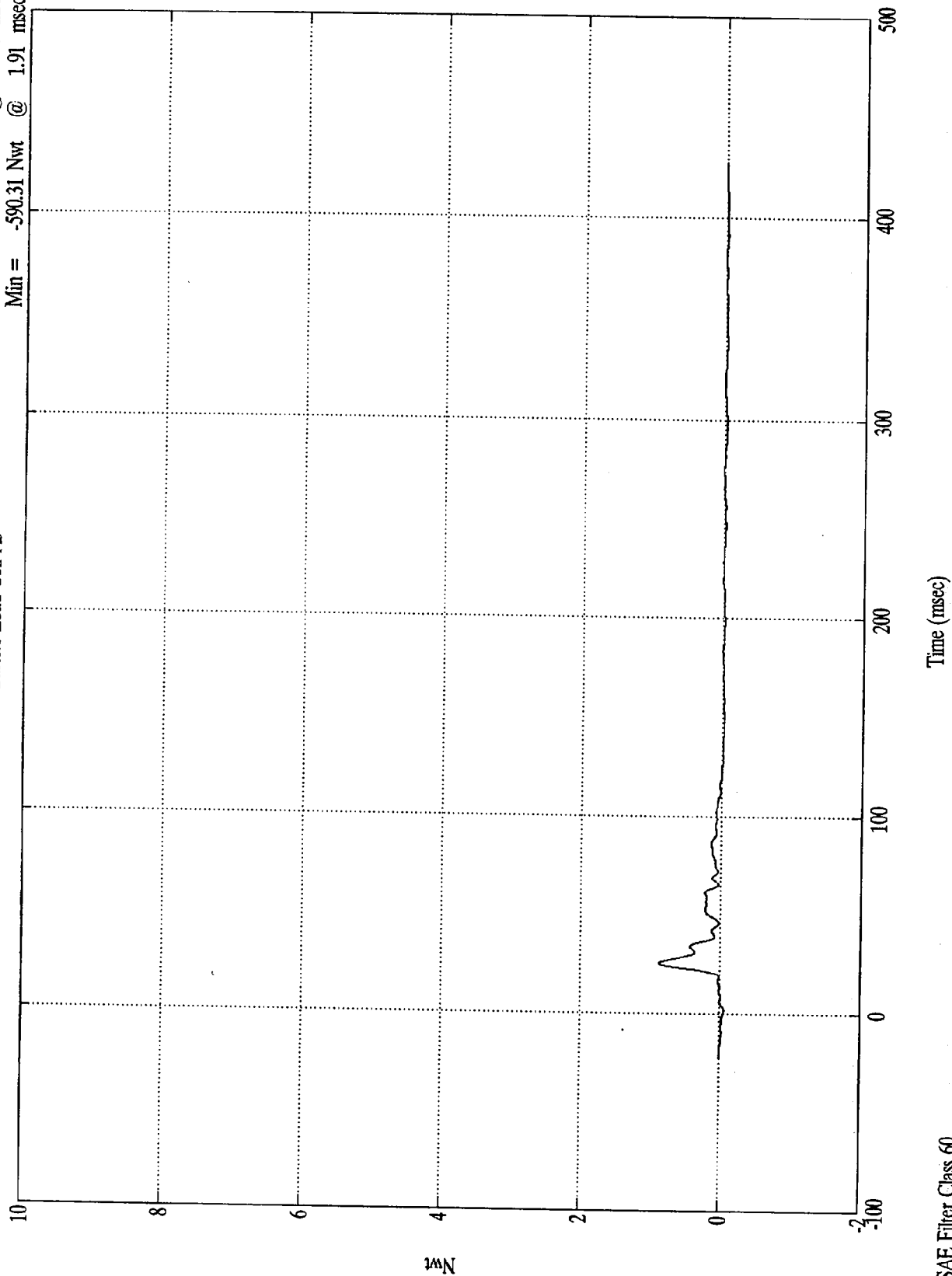
Max = 2431.36 Nwt @ 34.68 msec
Min = -922.52 Nwt @ 344.27 msec



SAE Filter Class 60

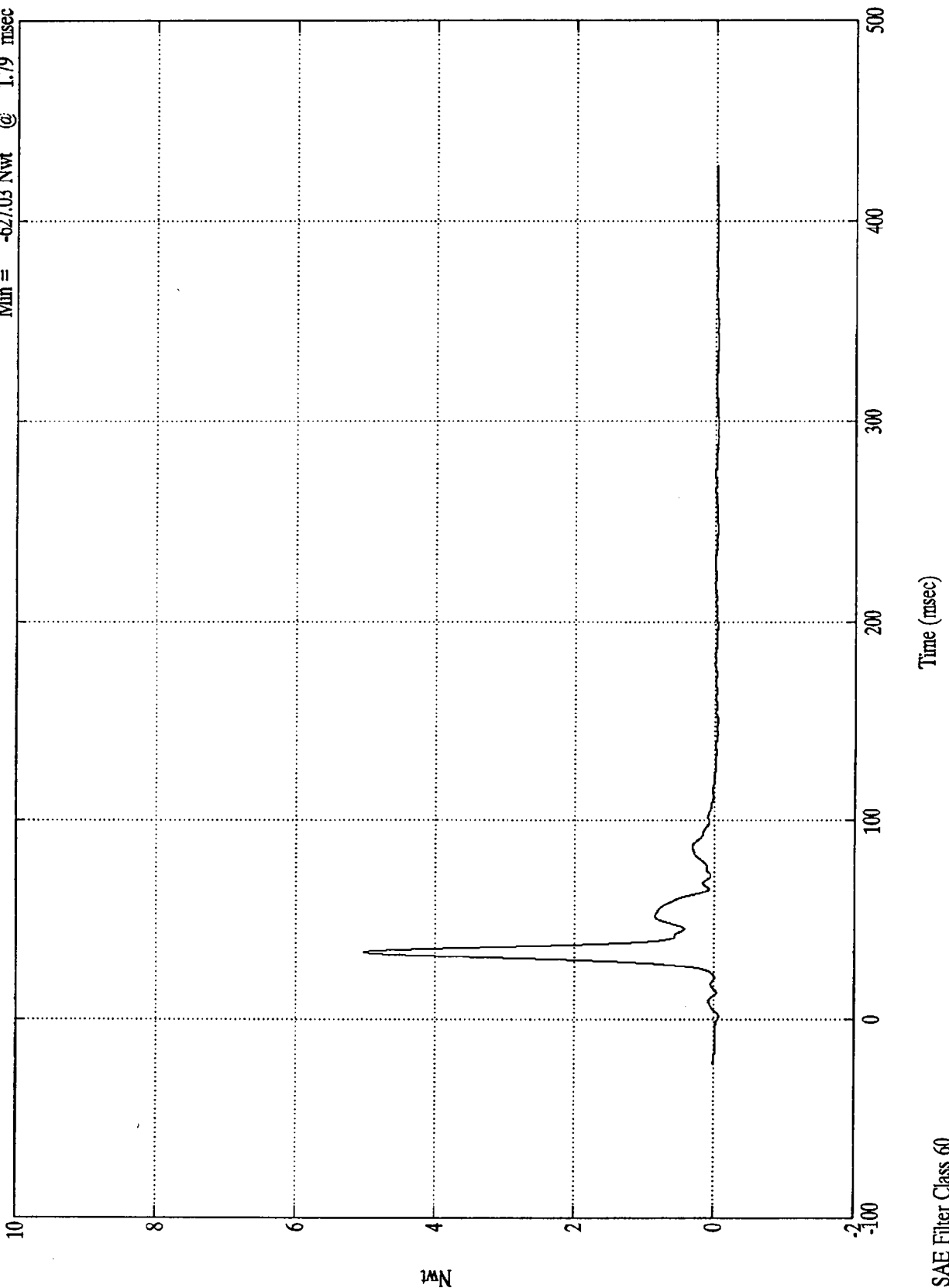
NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell A3
Max = 8744.88 Nwt @ 25.56 msec
Min = -590.31 Nwt @ 1.91 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

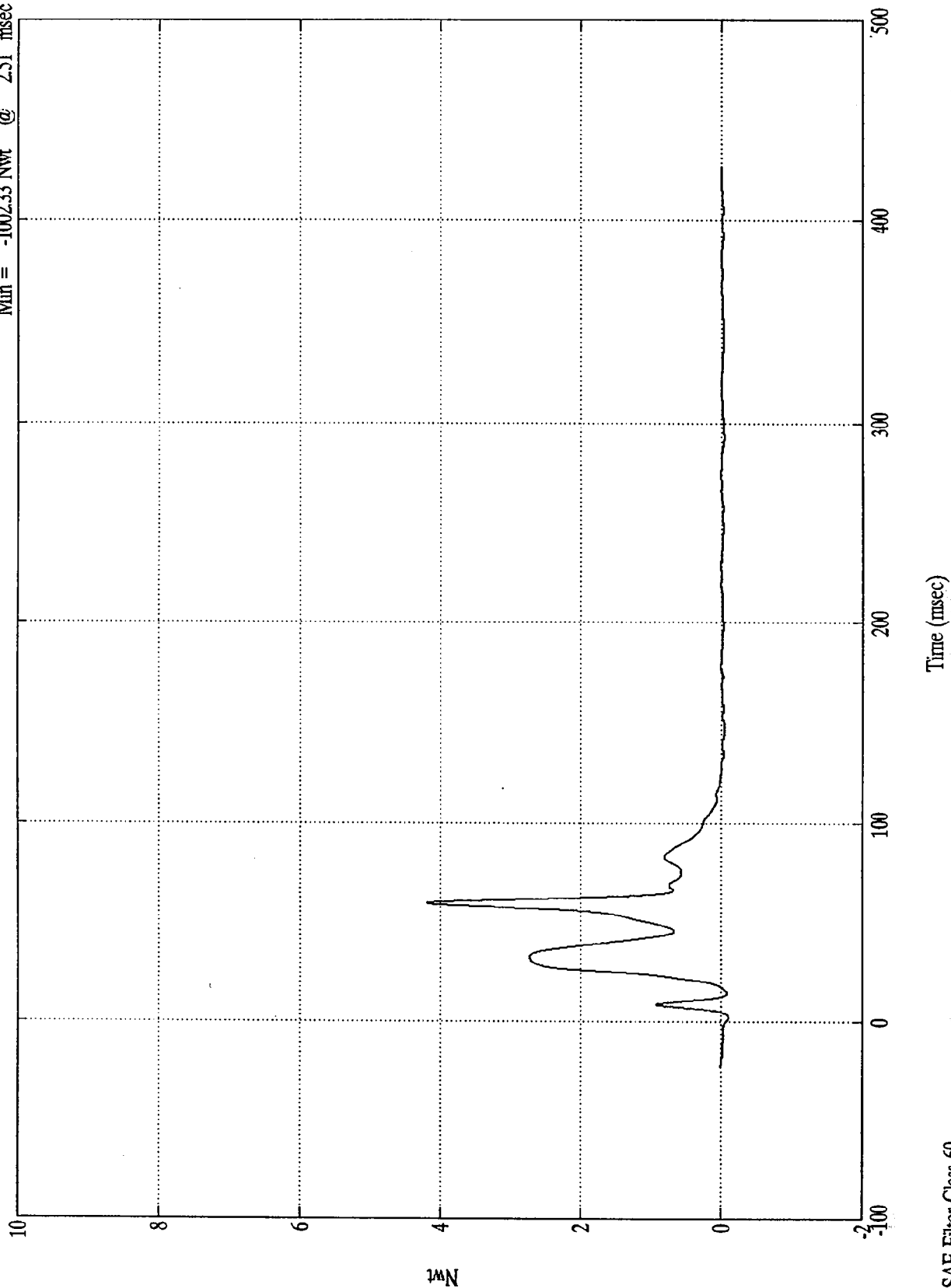
Barrier Load Cell A4
Max = 50259.55 Nwt @ 34.31 msec
Min = -627.03 Nwt @ 1.79 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell A5

Max = 41928.44 Nwt @ 59.64 msec
Min = -1002.33 Nwt @ 2.51 msec

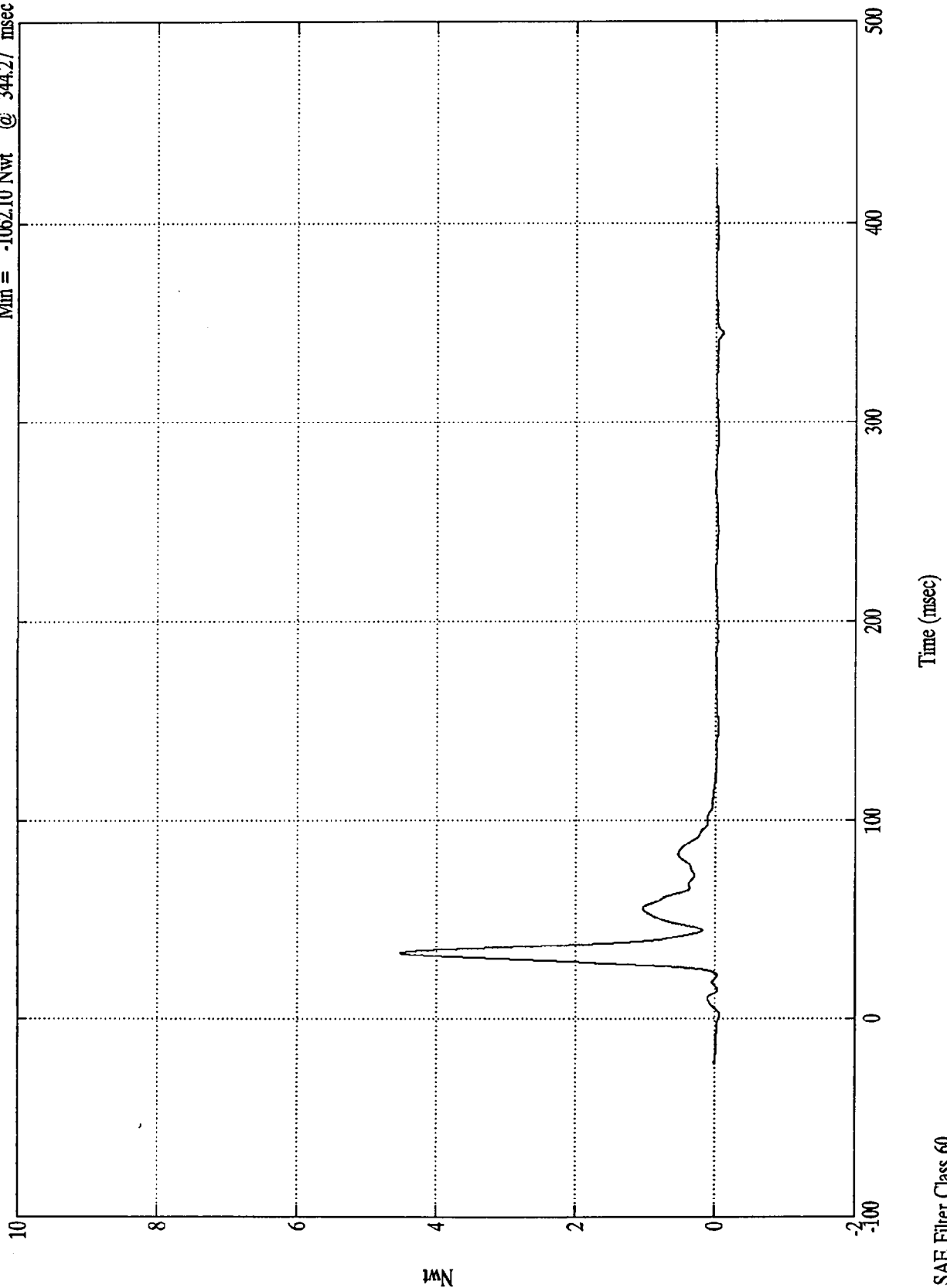


NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell A6

Max = 45297.75 Nwt @ 33.24 msec
Min = -1062.10 Nwt @ 344.27 msec

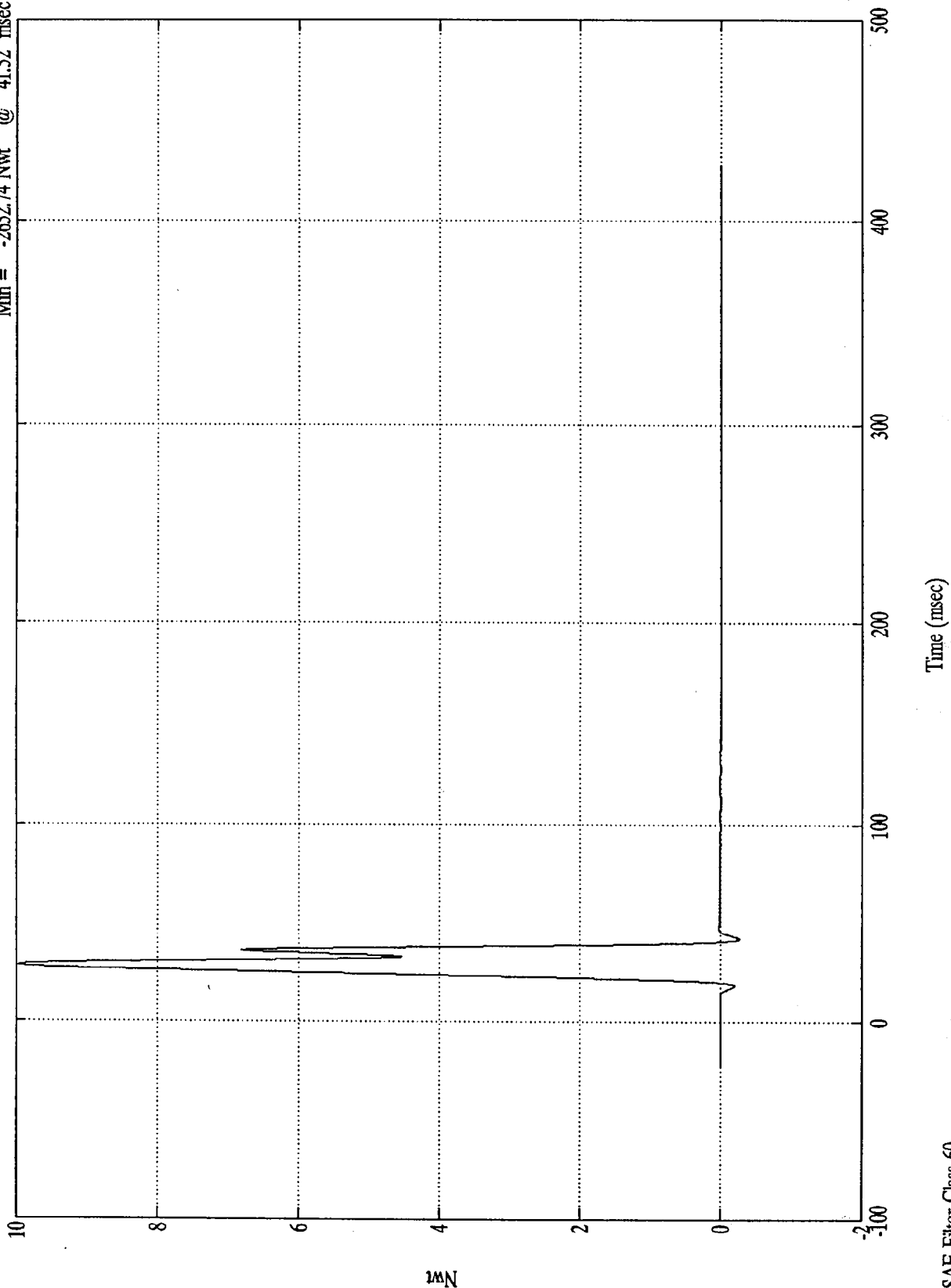


NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell A7

Max = 99721.89 Nwt @ 28.20 msec
Min = -2652.74 Nwt @ 41.52 msec



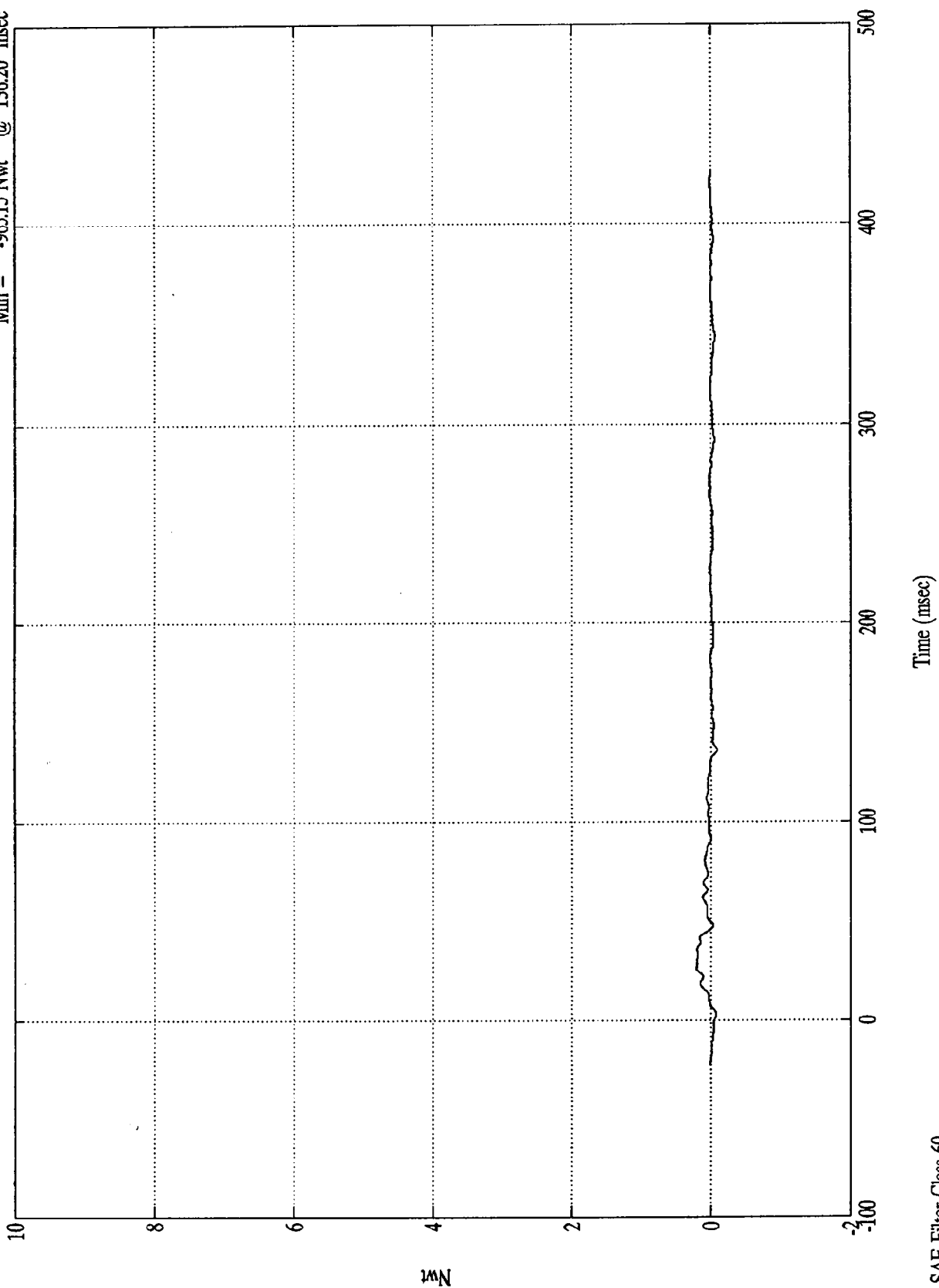
SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell A8

Max = 2127.57 Nwt @ 26.15 msec
Min = -965.15 Nwt @ 136.20 msec



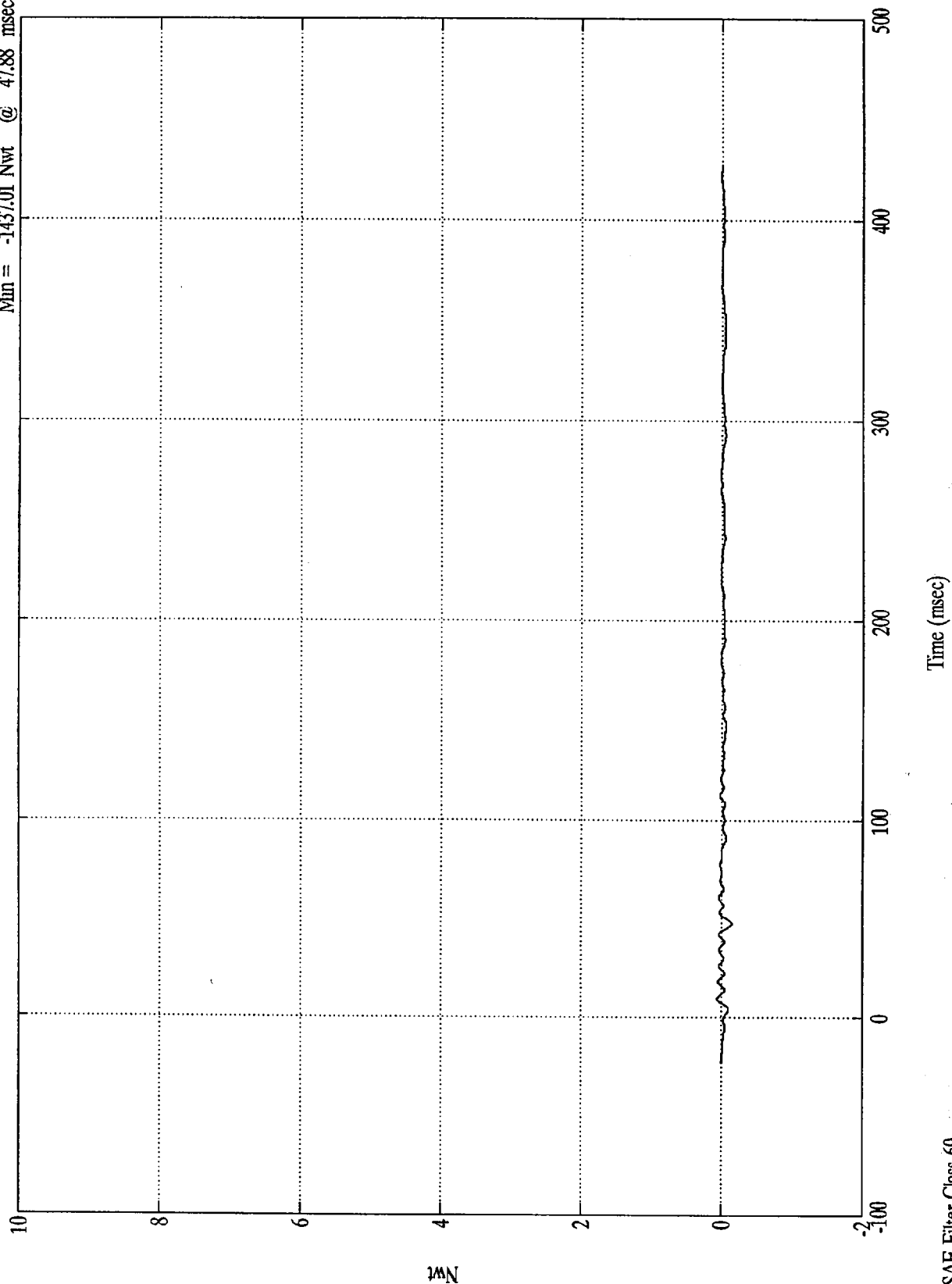
SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 660.73 Nwt @ 9.47 msec
 Min = -1437.01 Nwt @ 47.88 msec

Barrier Load Cell A9

x10⁴



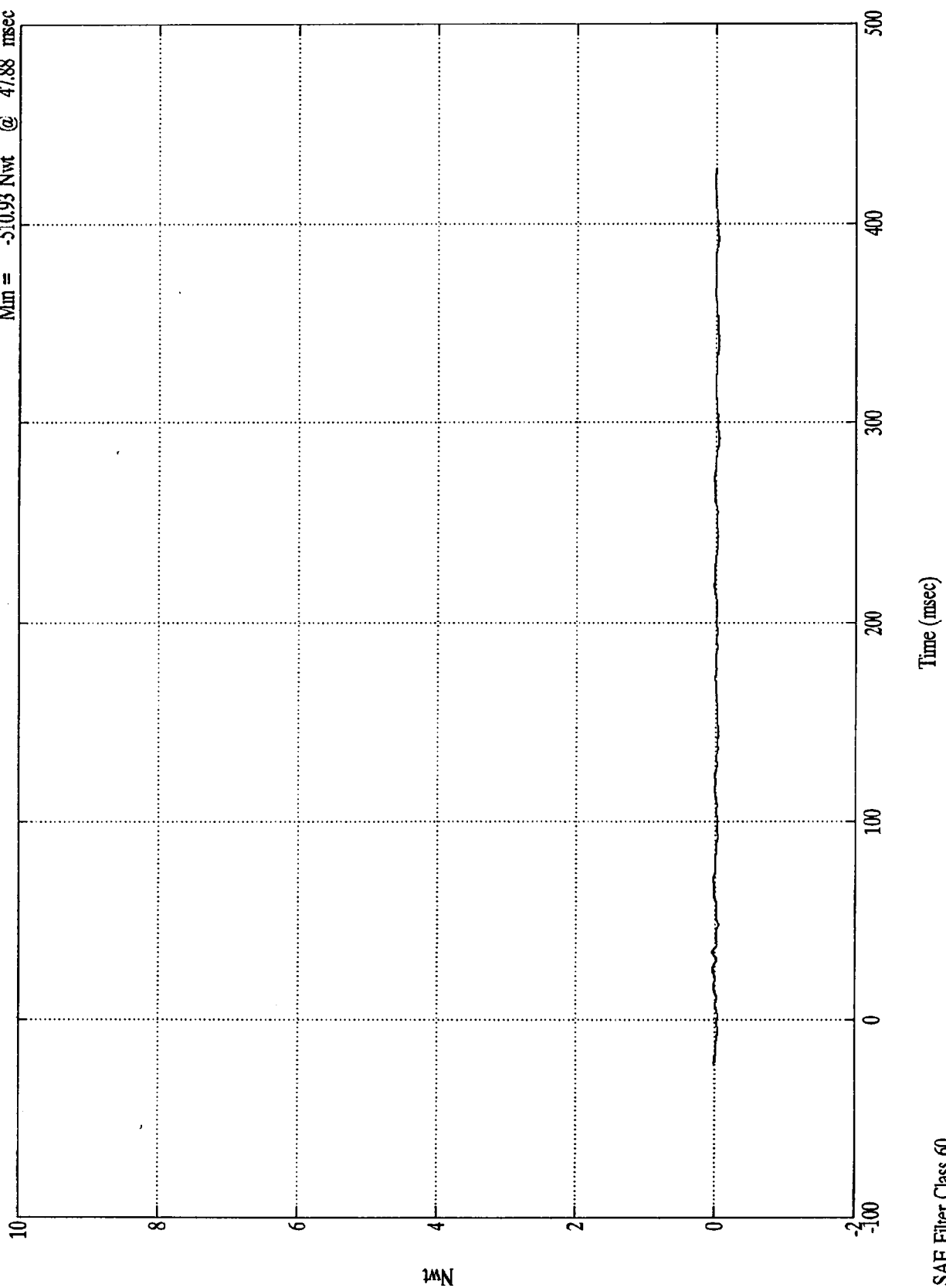
SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell B1

Max = 384.62 Nwt @ 34.08 msec
Min = -510.93 Nwt @ 47.88 msec



Nwt

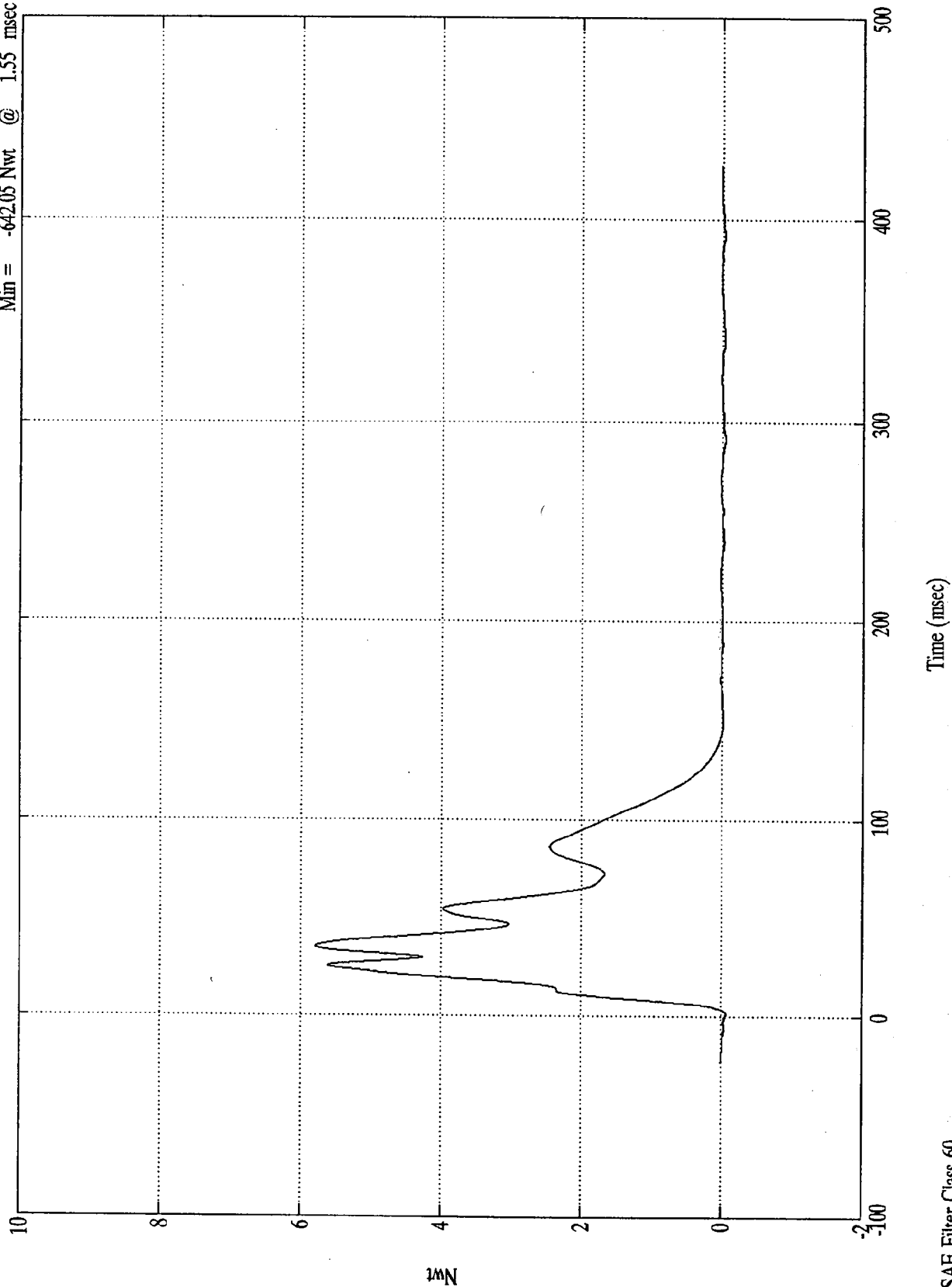
Time (msec)

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell B3

Max = 57927.67 Nwt @ 35.04 msec
Min = -642.05 Nwt @ 1.55 msec

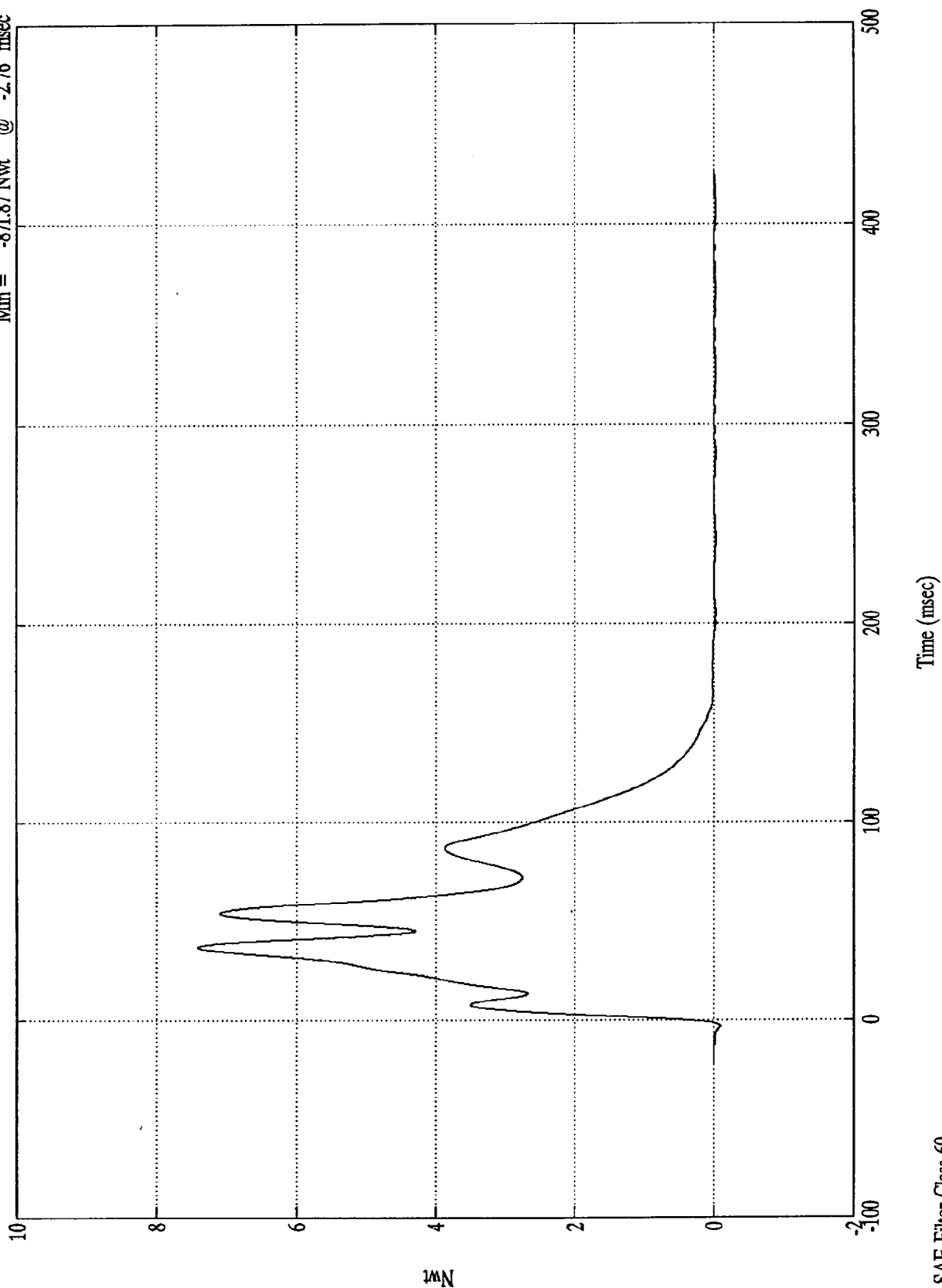


SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell B4
Max = 74146.67 Nwt @ 36.96 msec
Min = -871.87 Nwt @ -2.76 msec

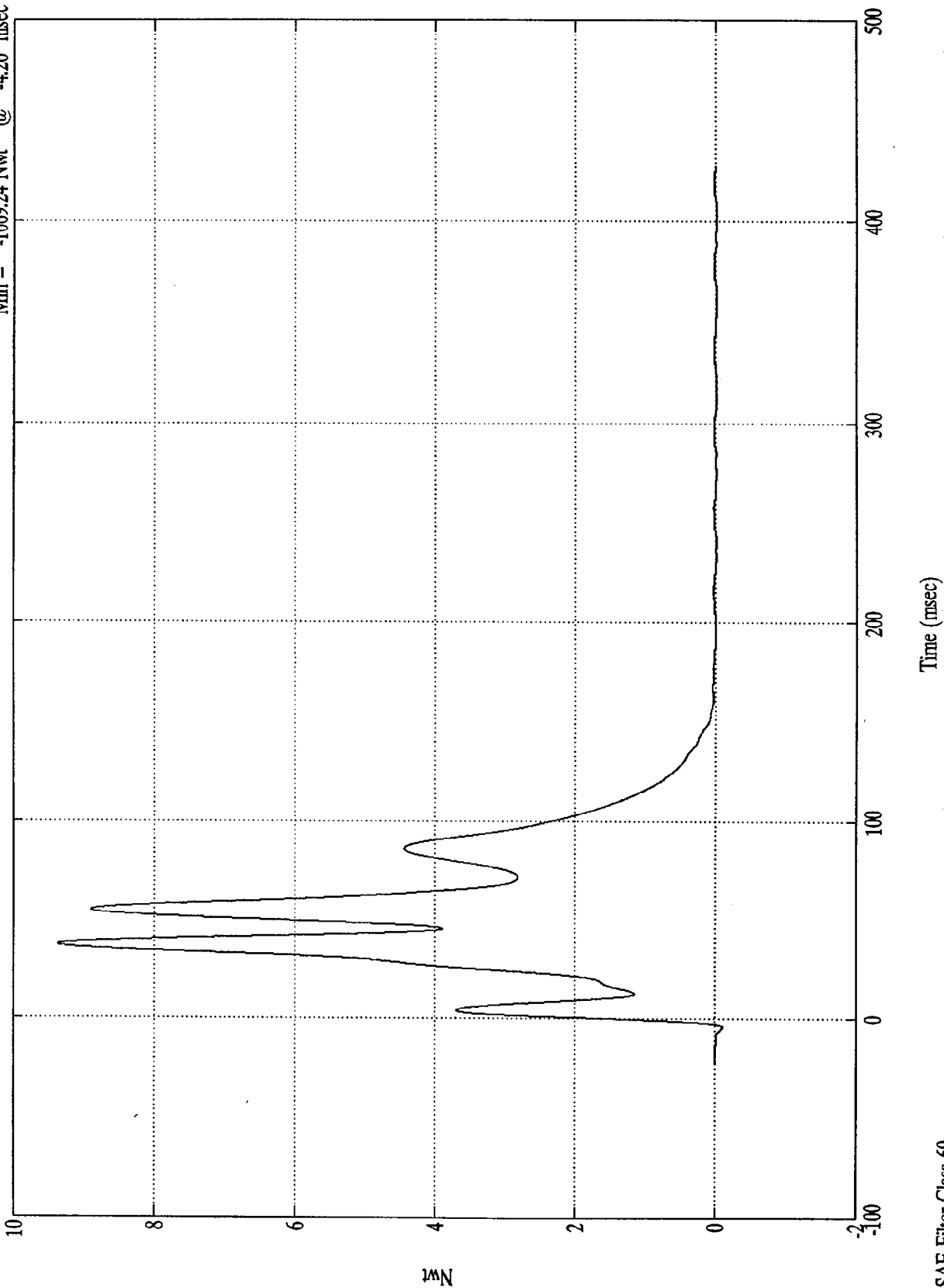
$\times 10^4$



NCAP TEST #1 - 1996 PONTIAC GRAND AM
x10⁴

Max = 93726.93 Nwt @ 37.31 msec
Min = -1069.24 Nwt @ -4.20 msec

Barrier Load Cell B5

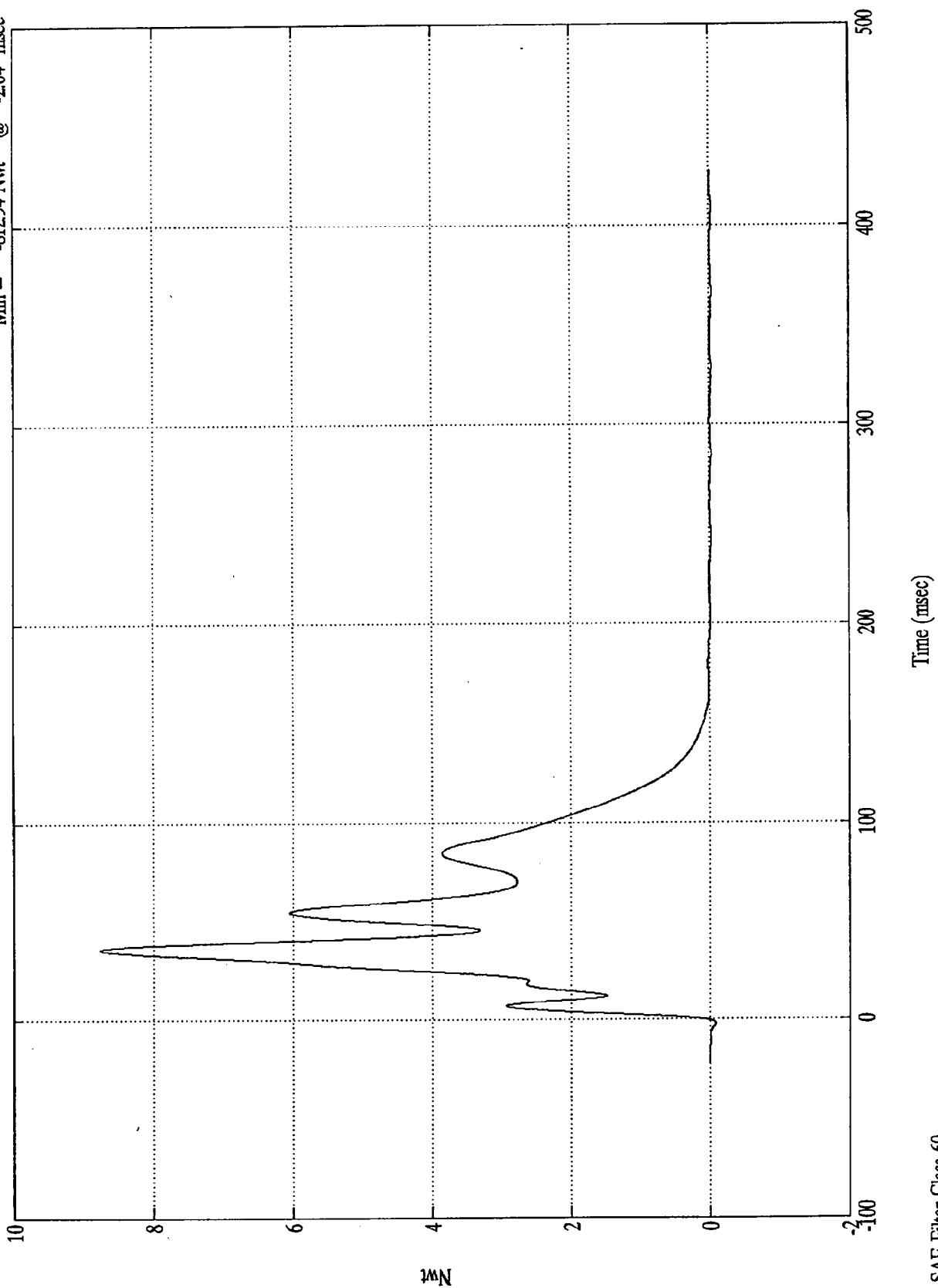


NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Max = 87735.38 Nwt @ 36.12 msec
Min = -812.94 Nwt @ -2.04 msec

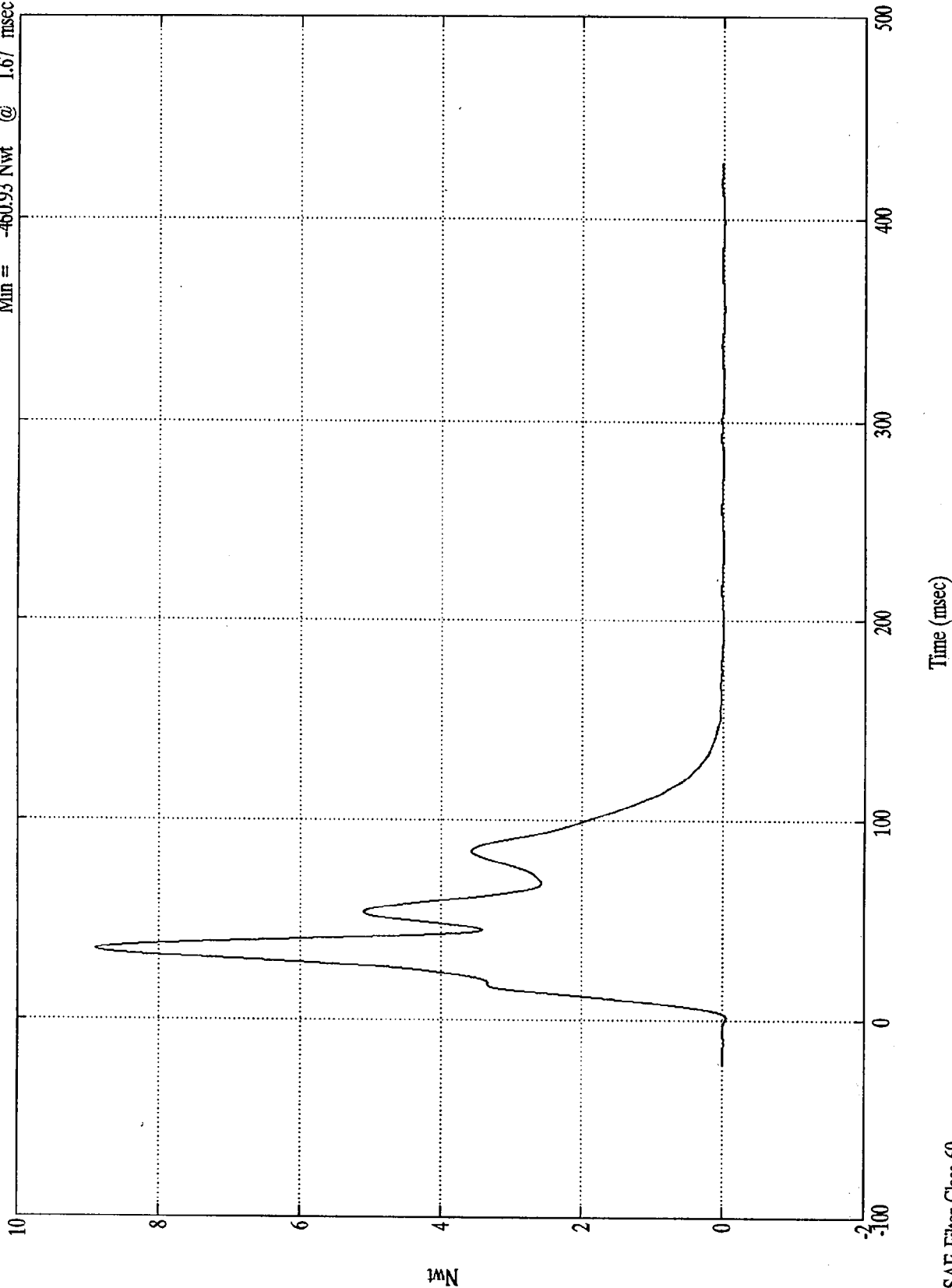
Barrier Load Cell B6



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 88988.05 Nwt @ 34.91 msec
Min = -460.93 Nwt @ 1.67 msec

Barrier Load Cell B7



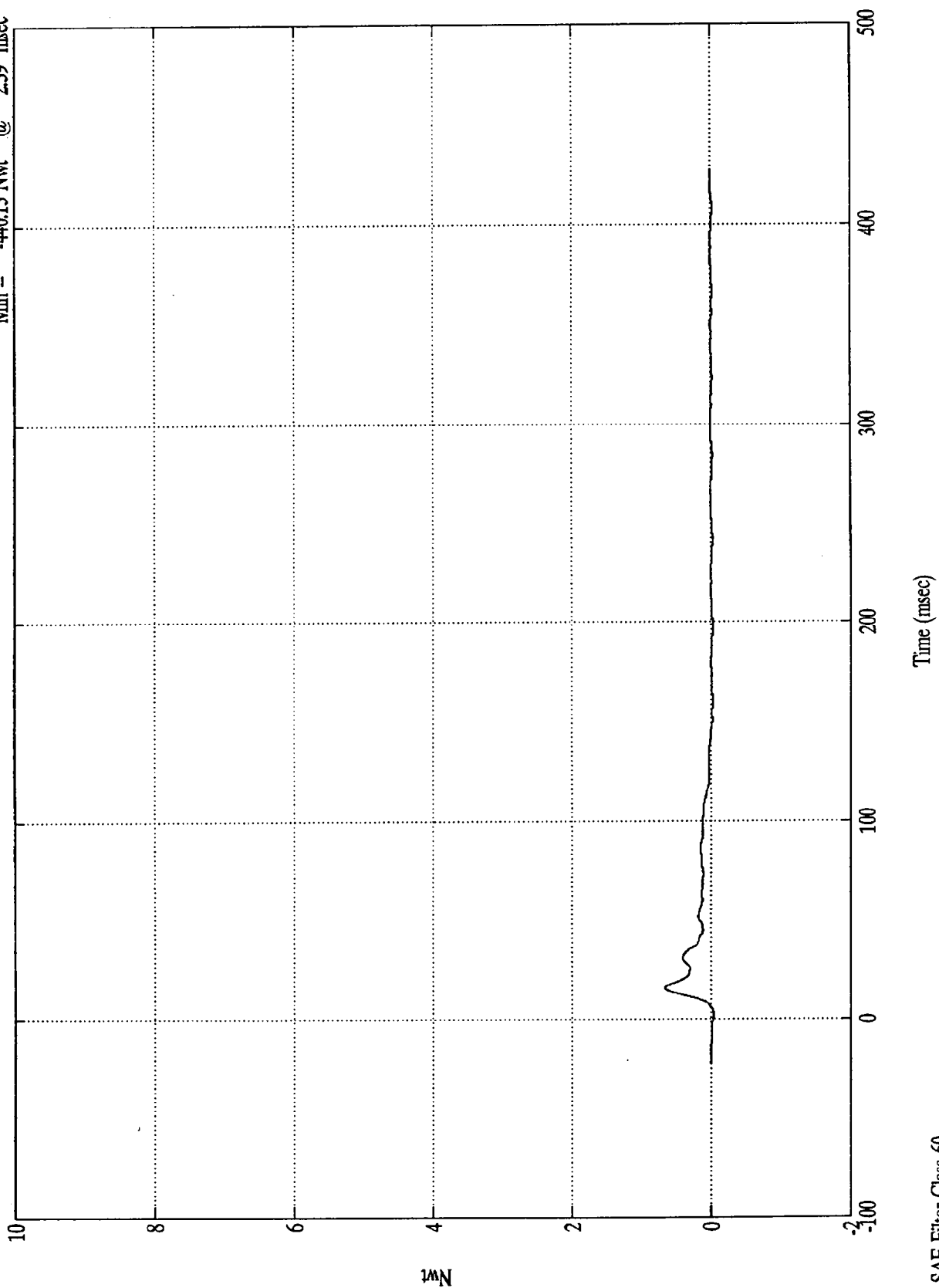
SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell B8

Max = 6569.05 Nwt @ 16.31 msec
Min = -440.13 Nwt @ 2.39 msec

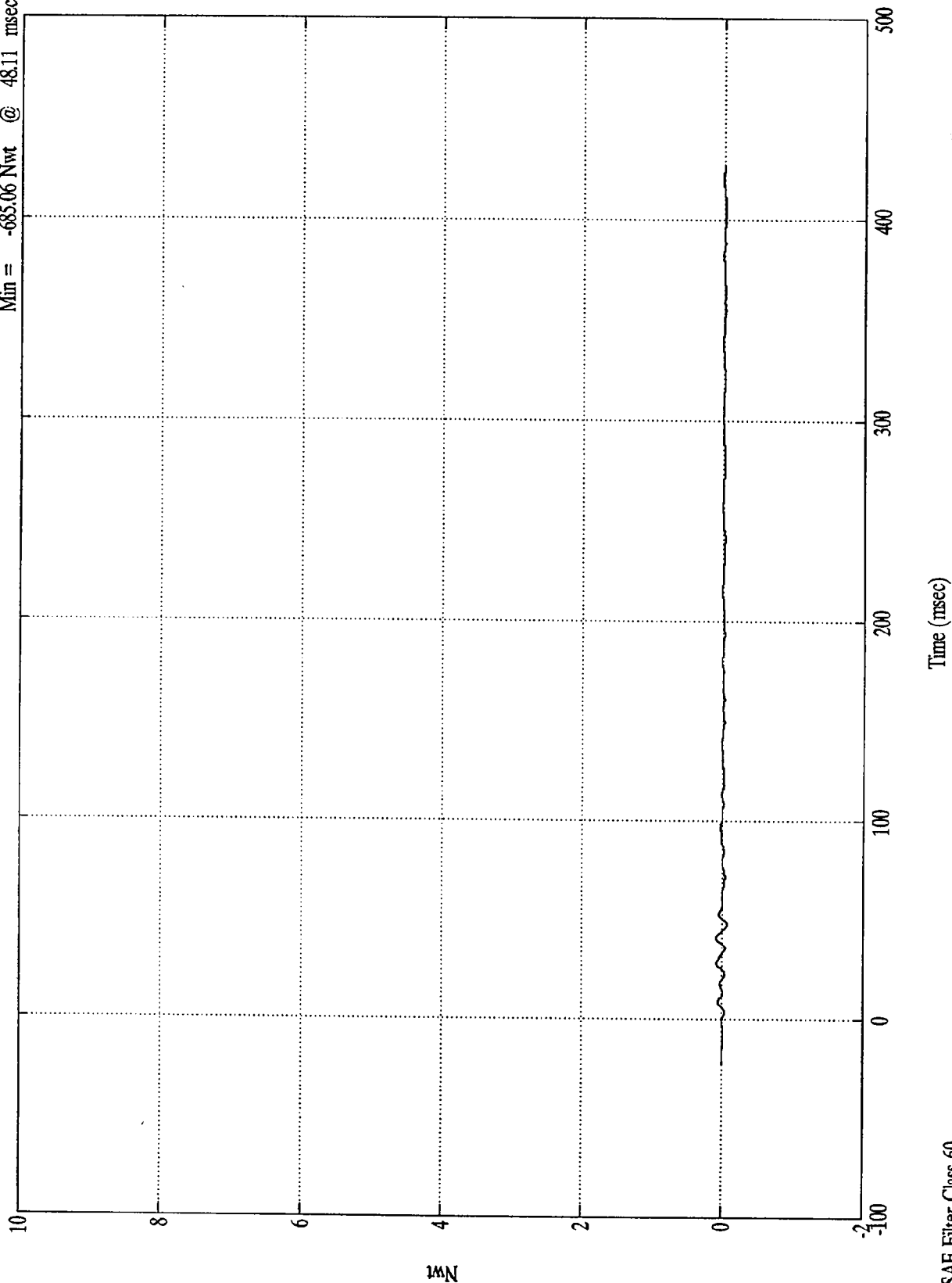


SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 849.33 Nwt @ 41.04 msec
Min = -685.06 Nwt @ 48.11 msec

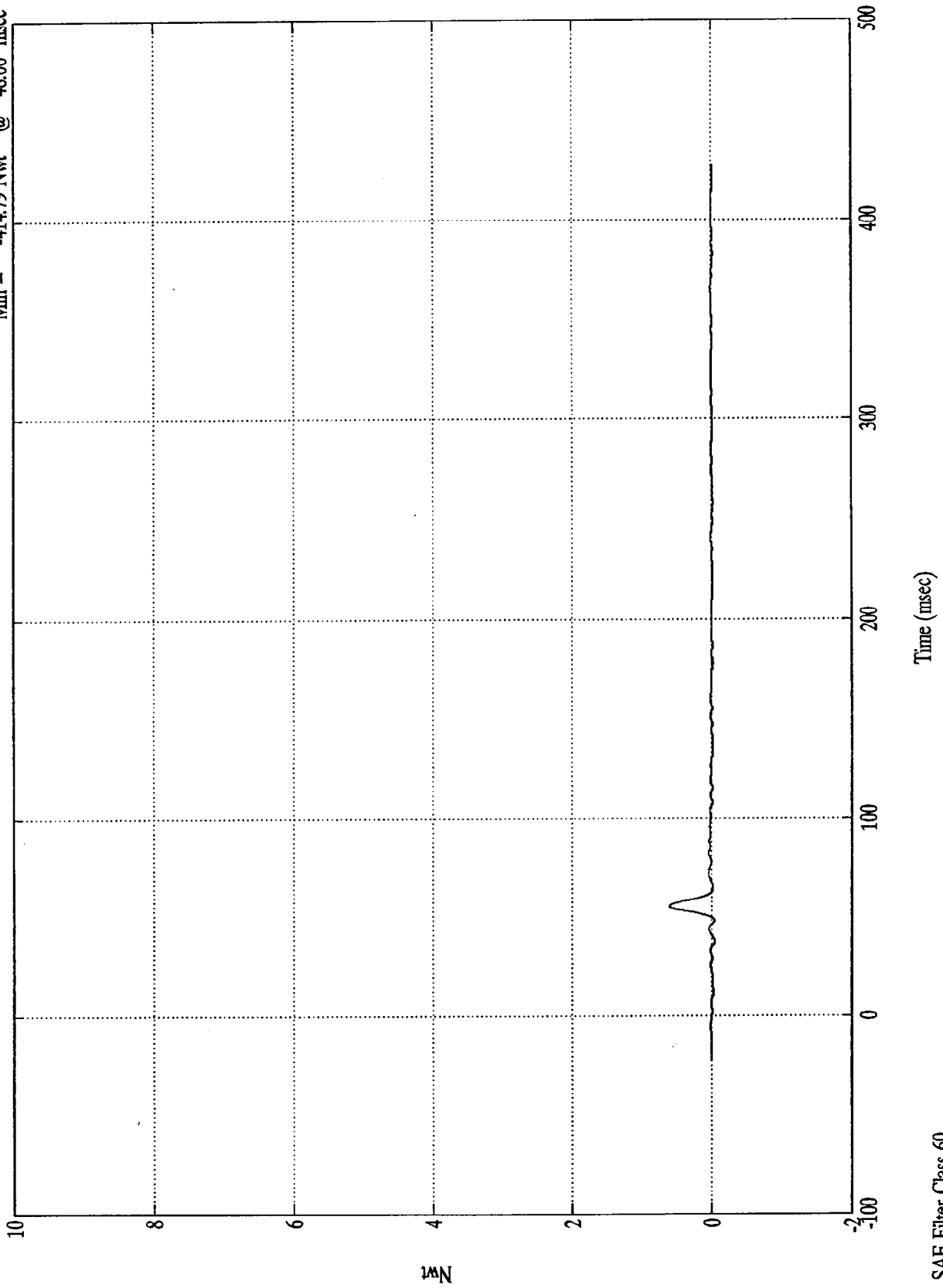
Barrier Load Cell B9



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell C1
Max = 6113.14 Nwt @ 55.44 msec
Min = -414.79 Nwt @ 48.00 msec

$\times 10^4$



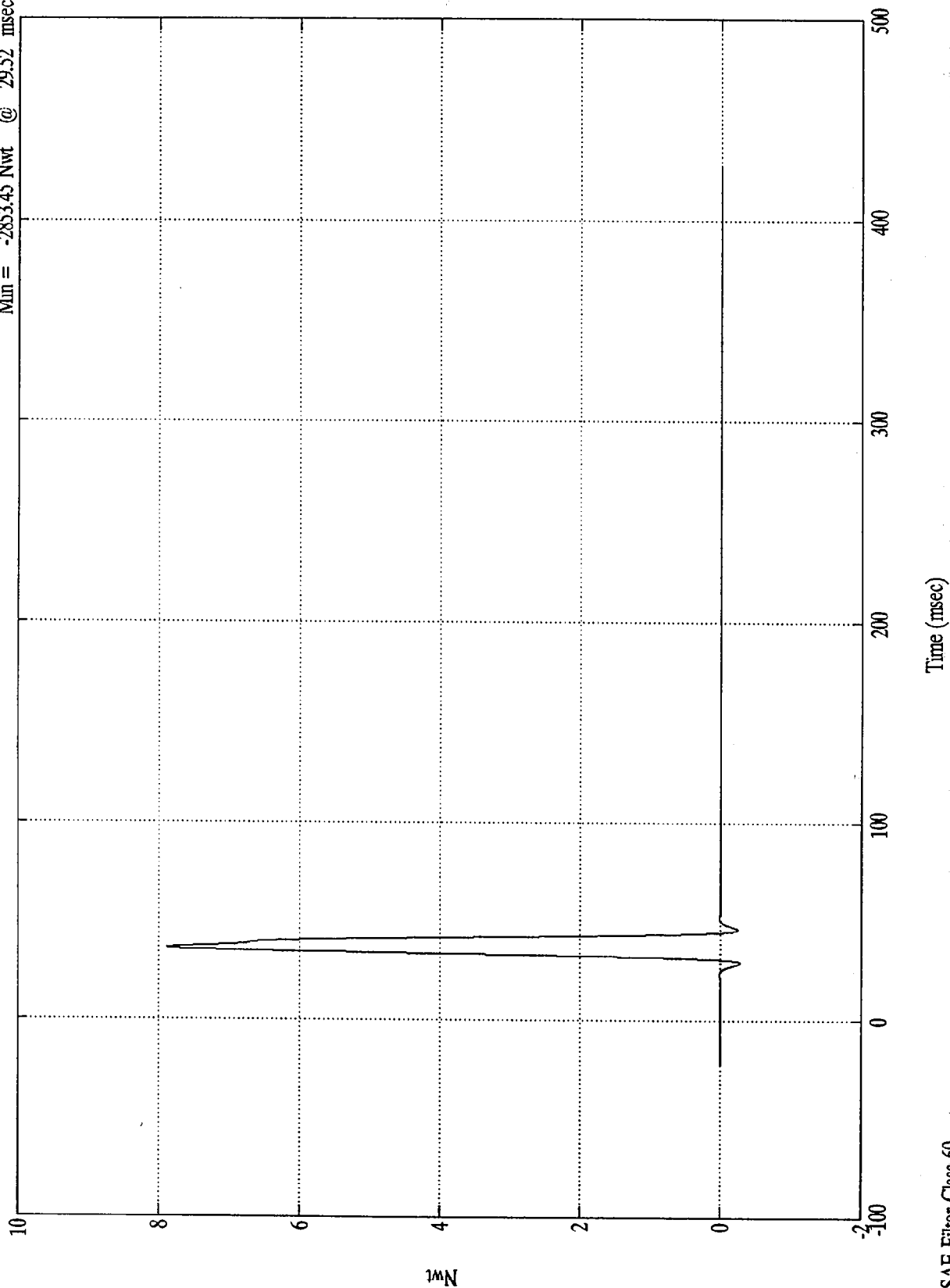
Nwt

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 78908.42 Nwt @ 36.24 msec
Min = -2853.45 Nwt @ 29.52 msec

Barrier Load Cell C2



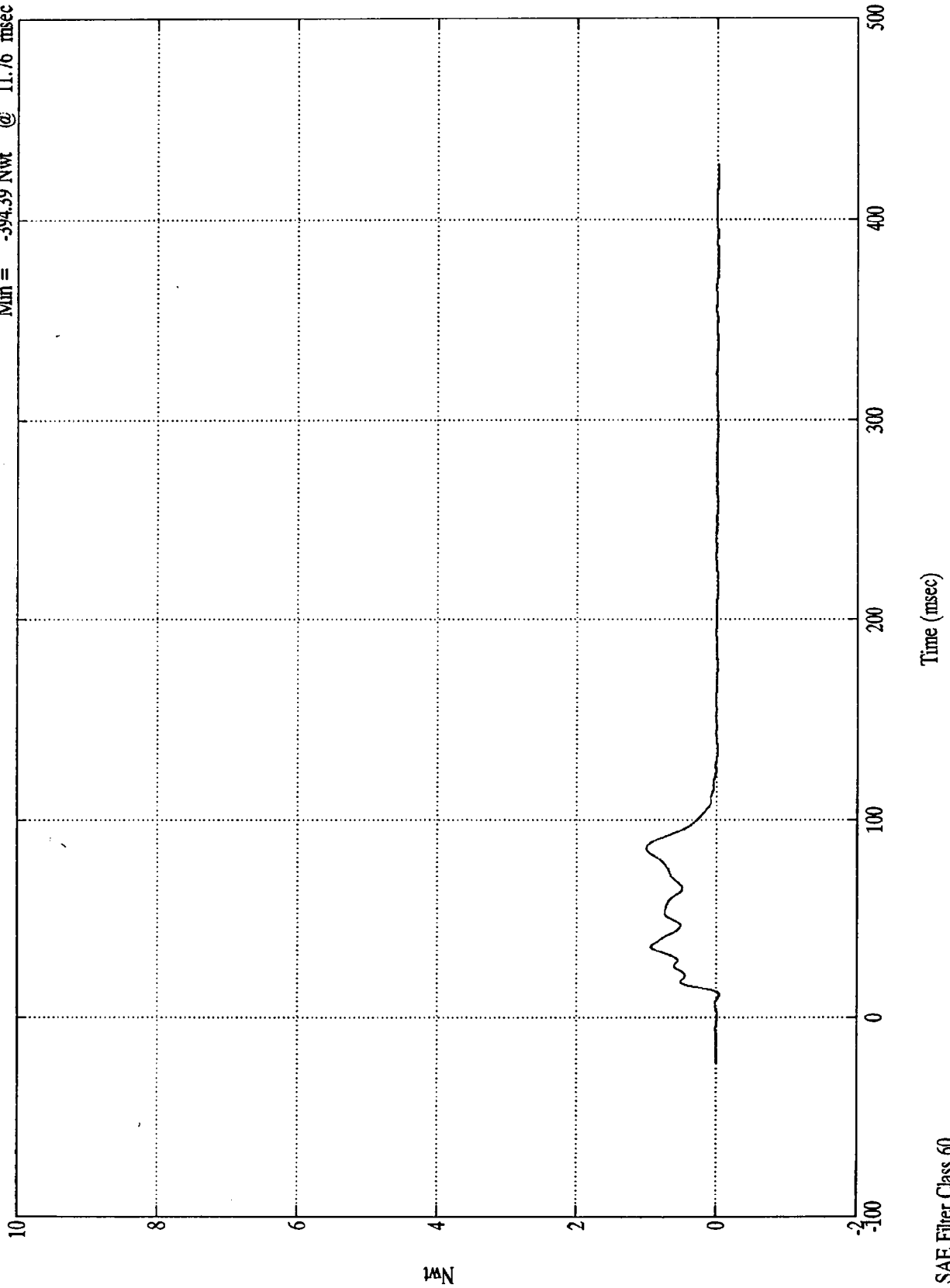
SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell C3

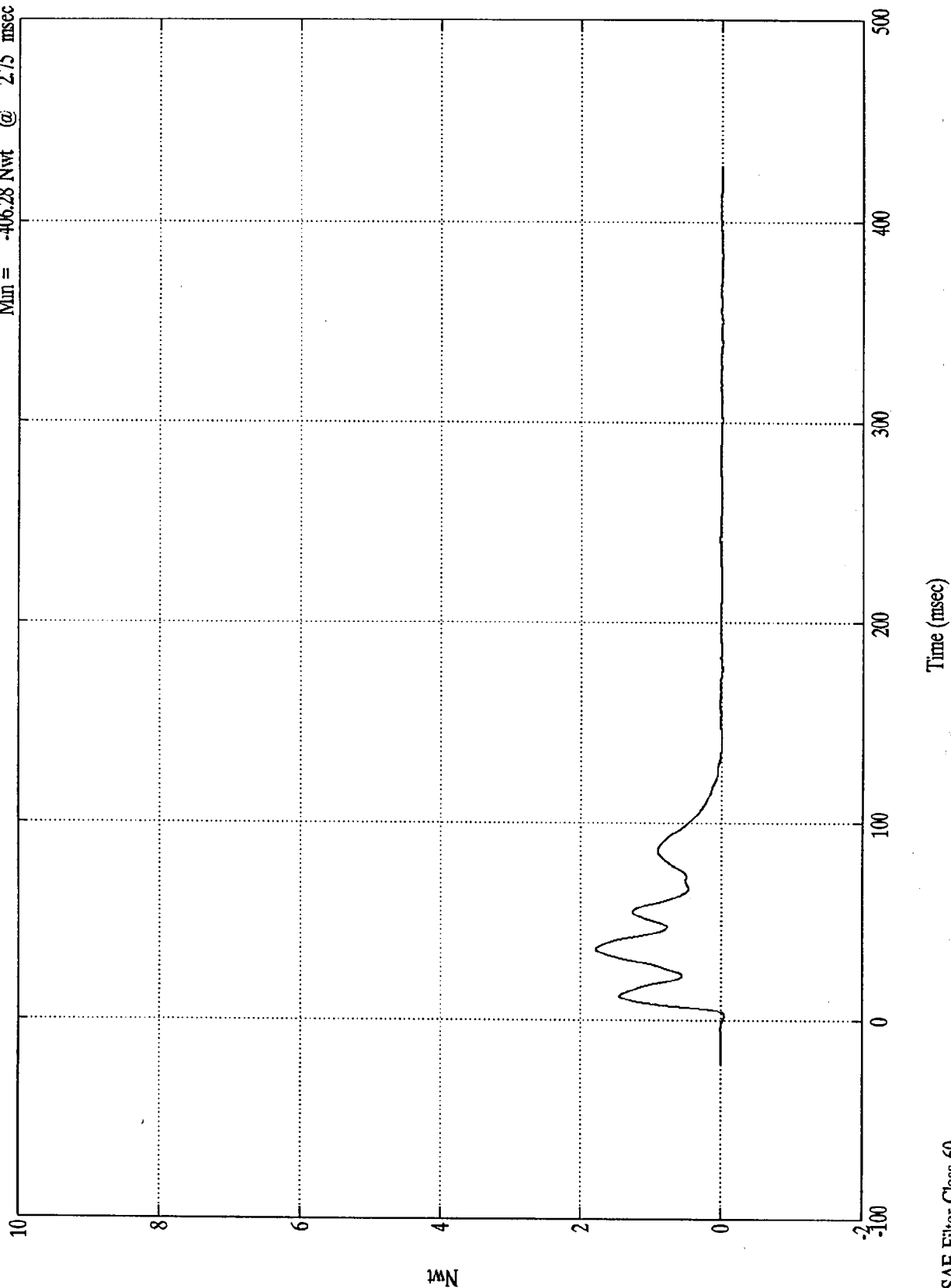
Max = 10023.80 Nwt @ 85.56 msec
Min = -394.39 Nwt @ 11.76 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 17896.57 Nwt @ 36.12 msec
Min = -406.28 Nwt @ 2.75 msec

Barrier Load Cell C4

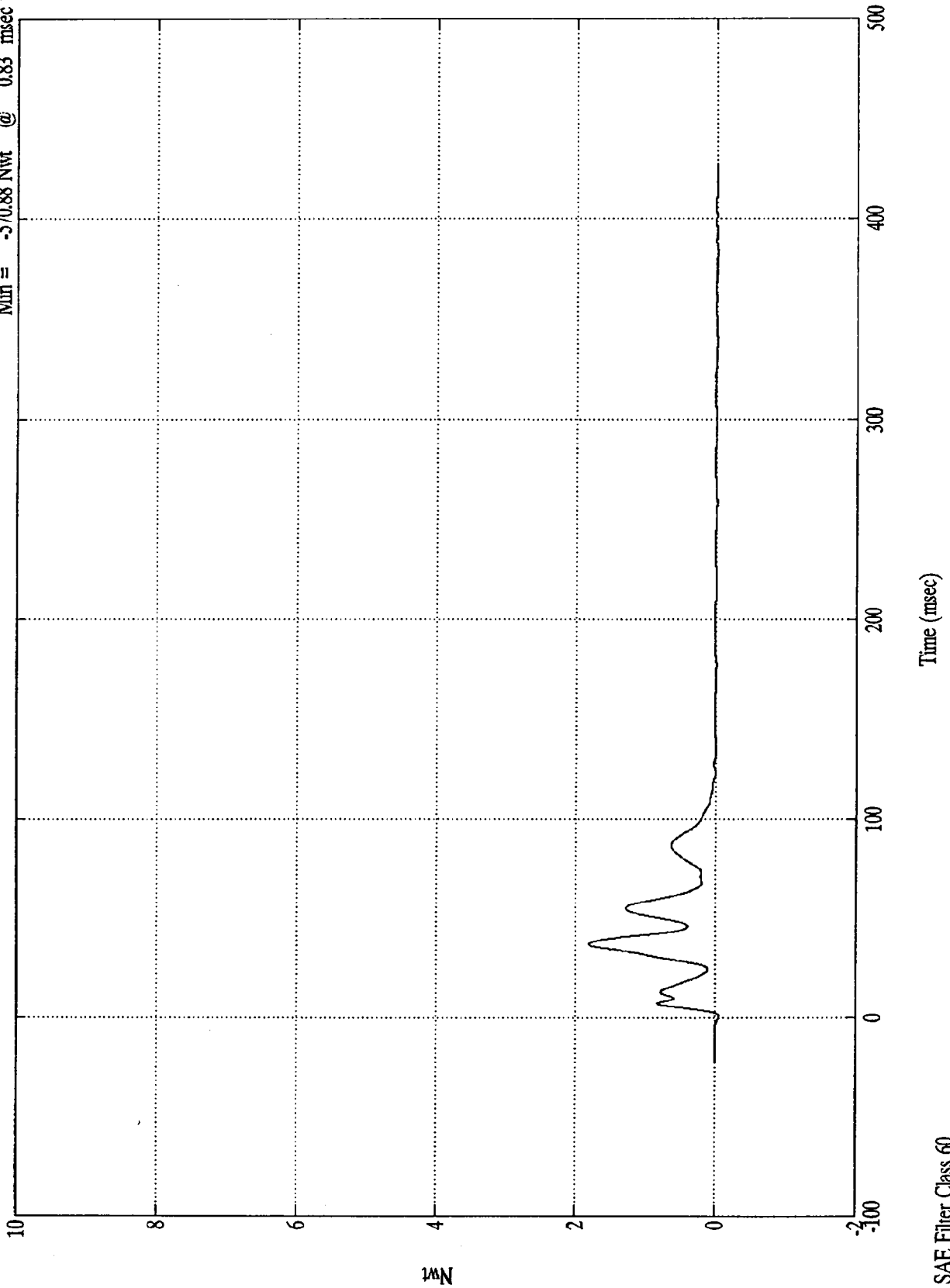


NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell C5

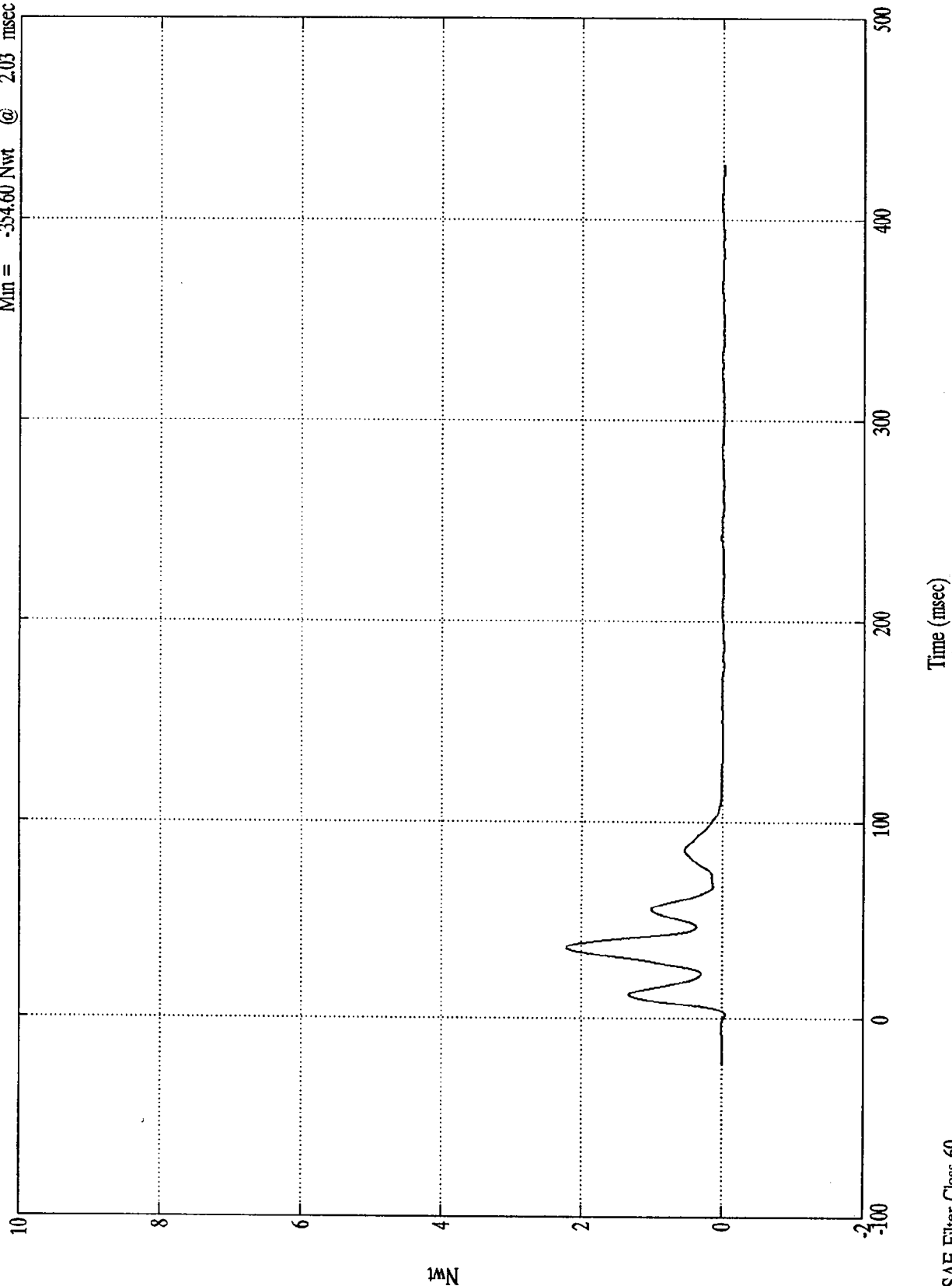
Max = 18150.60 Nwt @ 36.96 msec
Min = -570.88 Nwt @ 0.83 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 22228.86 Nwt @ 35.76 msec
Min = -354.60 Nwt @ 2.03 msec

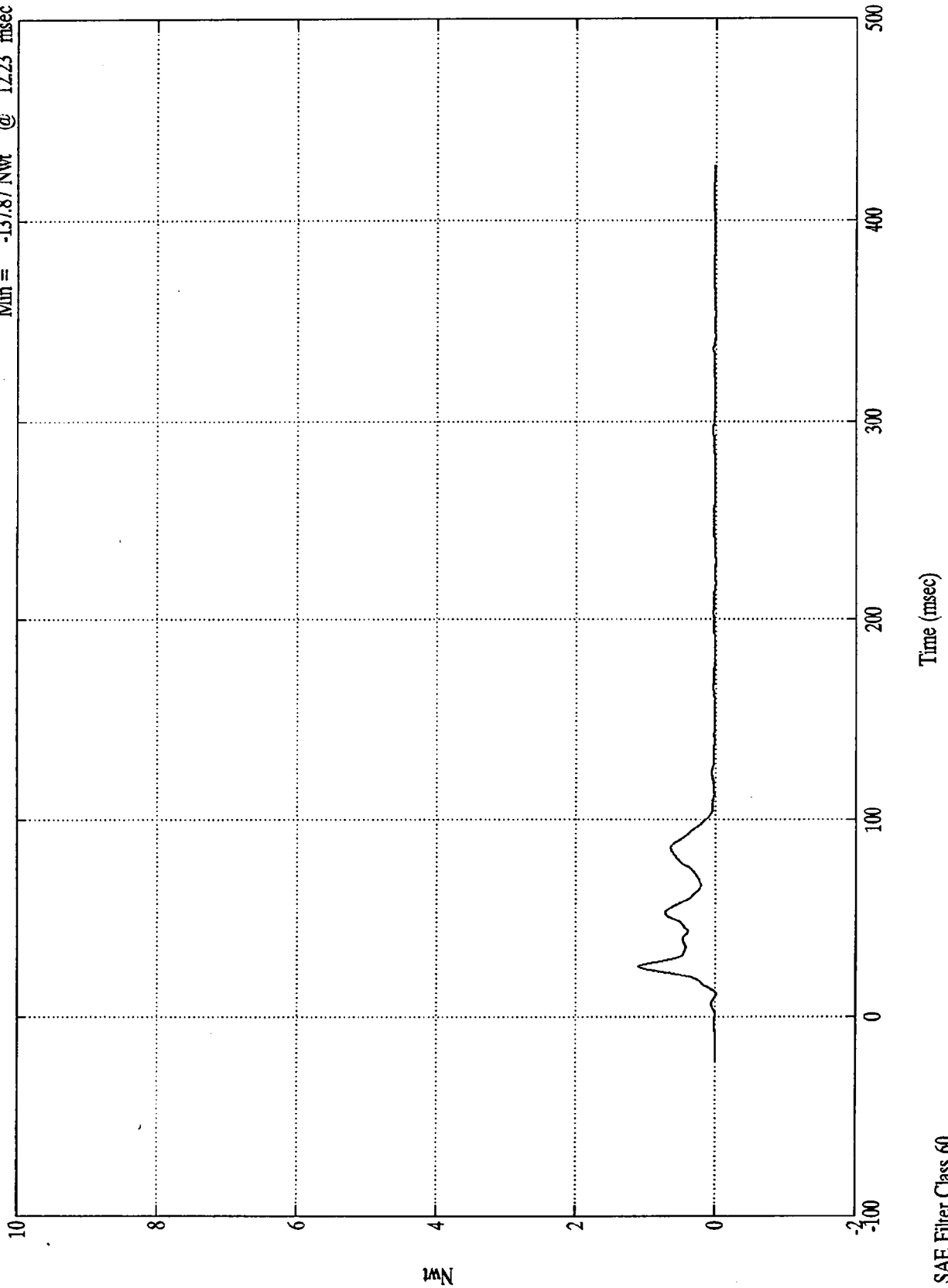
Barrier Load Cell C6



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell C7
Max = 10971.84 Nwt @ 25.80 msec
Min = -137.87 Nwt @ 12.23 msec

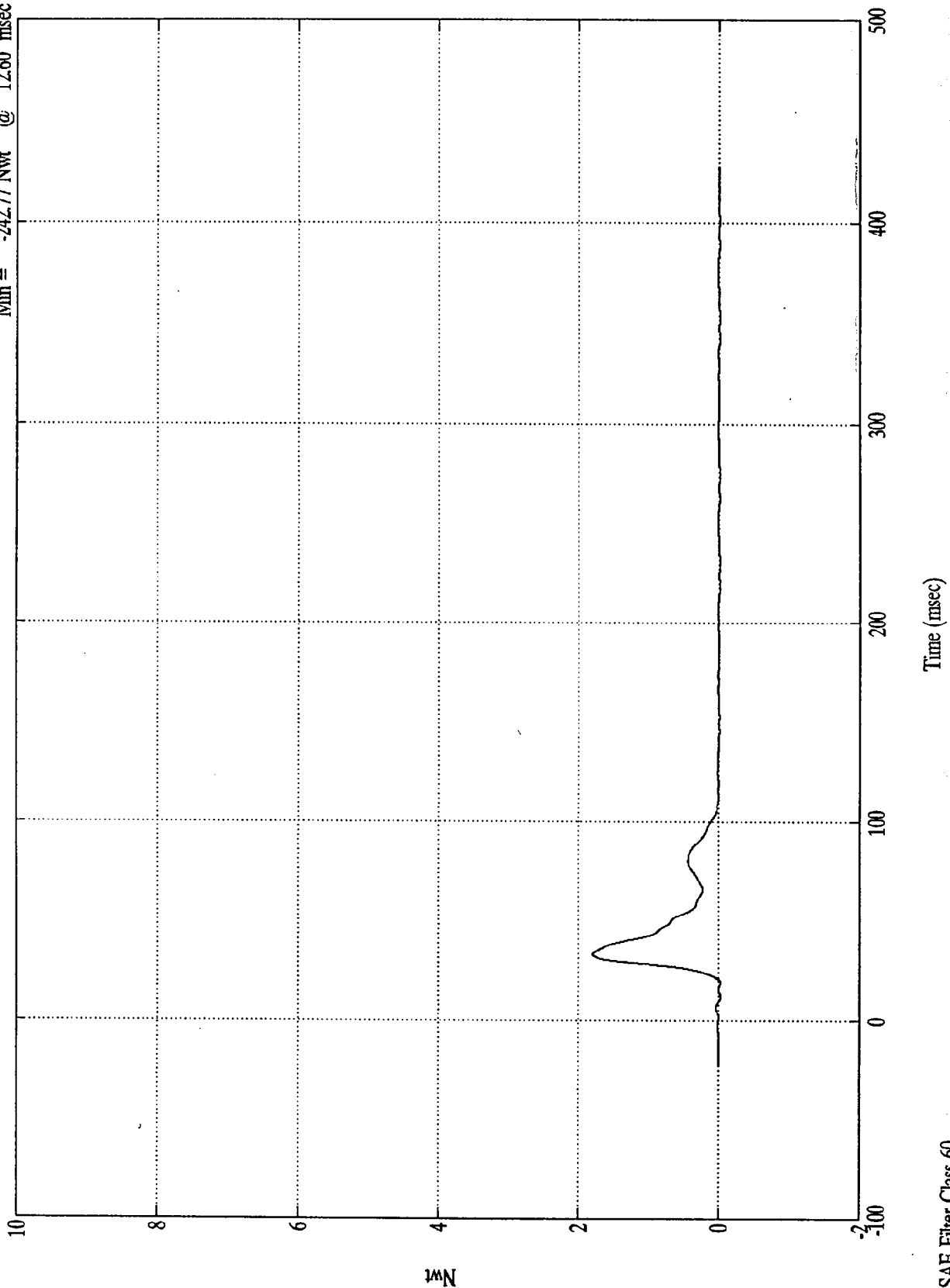
$\times 10^4$



NCAP TEST #1 - 19% PONTIAC GRAND AM

Barrier Load Cell C8

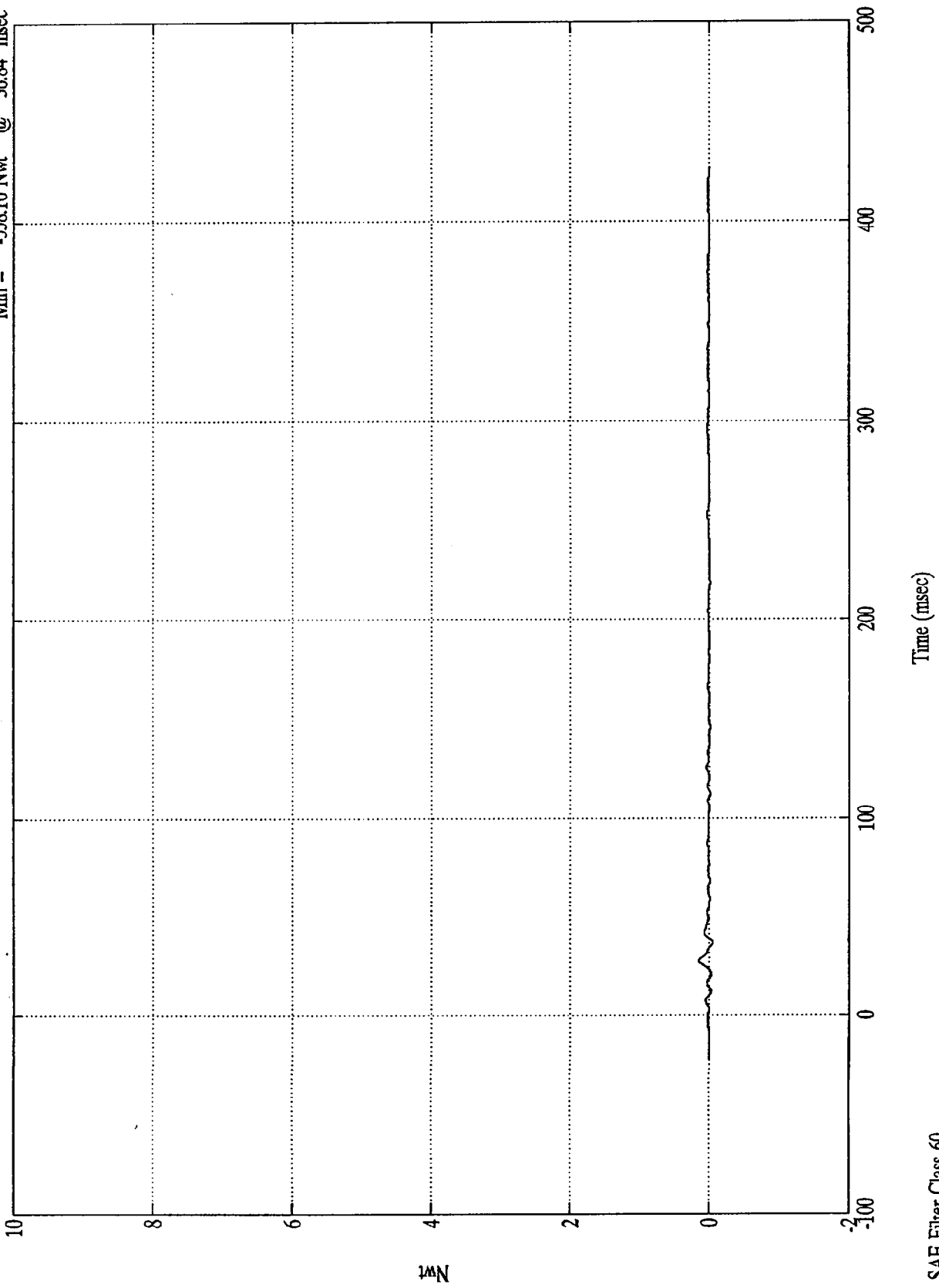
Max = 17976.11 Nwt @ 33.72 msec
Min = -242.77 Nwt @ 12.60 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell C9
Max = 1502.92 Nwt @ 27.72 msec
Min = -558.10 Nwt @ 36.84 msec

$\times 10^4$



Nwt

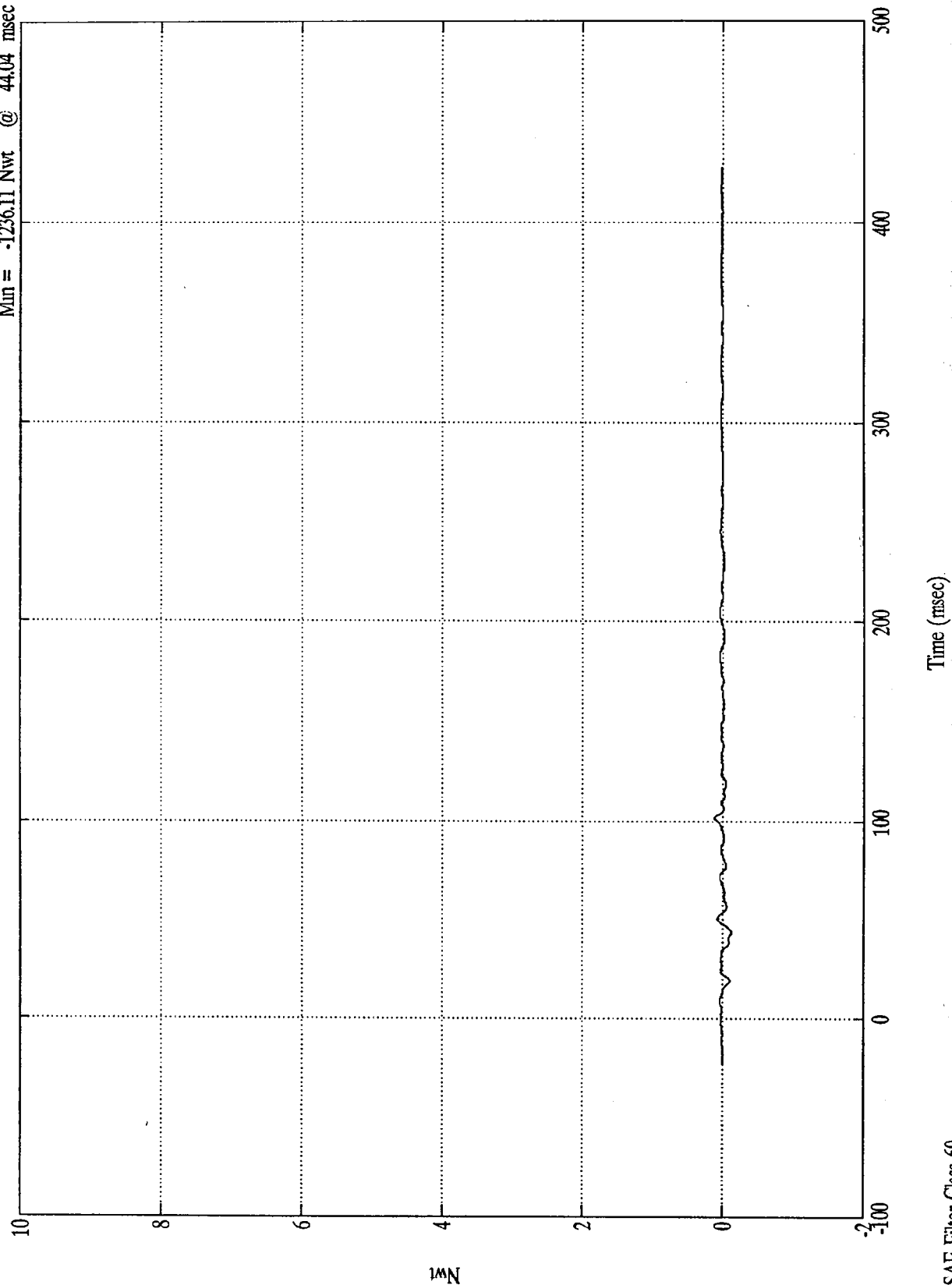
SAE Filter Class 60

Time (msec)

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 1195.85 Nwt @ 101.63 msec
Min = -1236.11 Nwt @ 44.04 msec

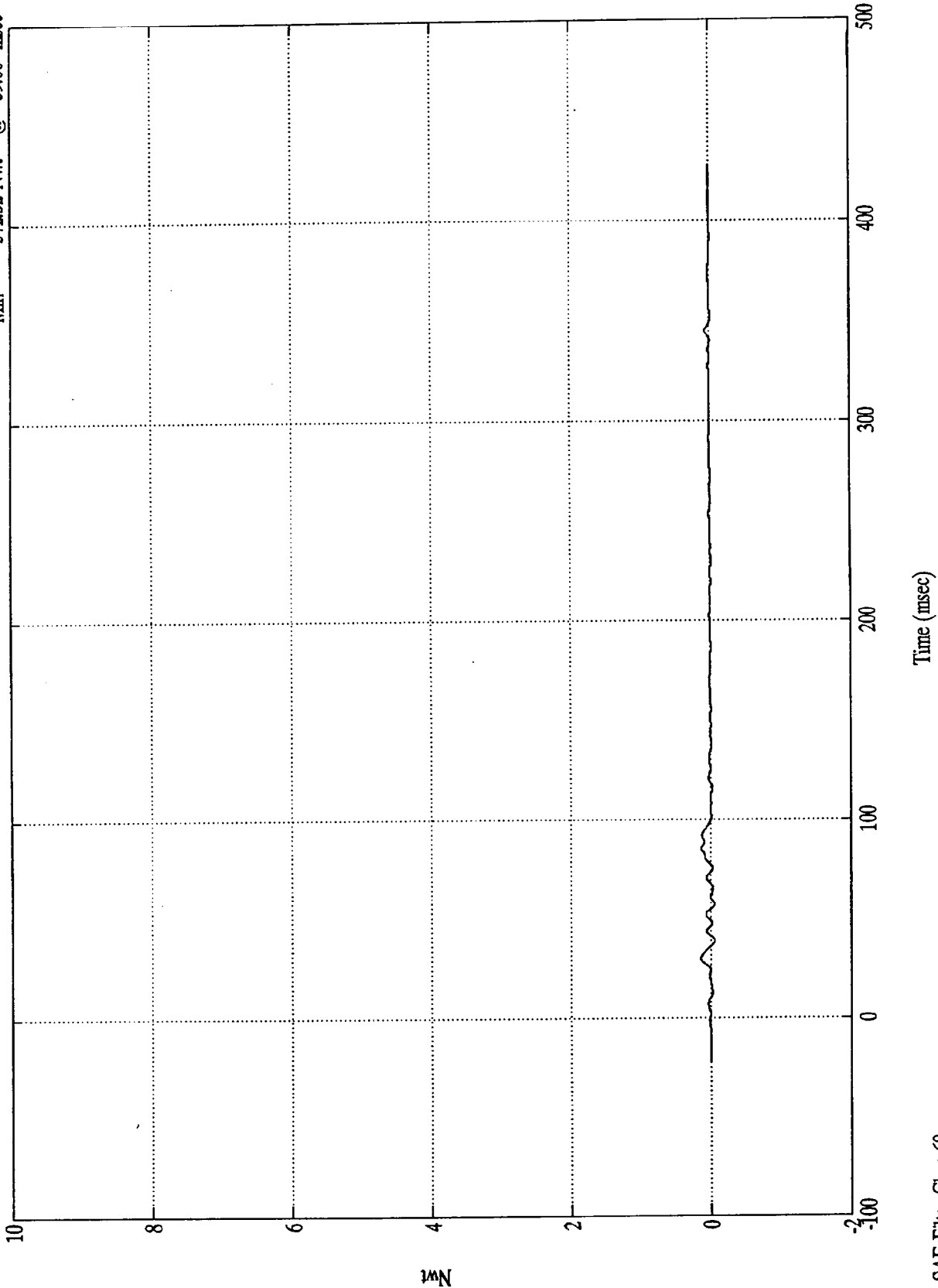
Barrier Load Cell D1



SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell D2
Max = 1451.95 Nwt @ 29.88 msec
Min = -572.32 Nwt @ 39.00 msec



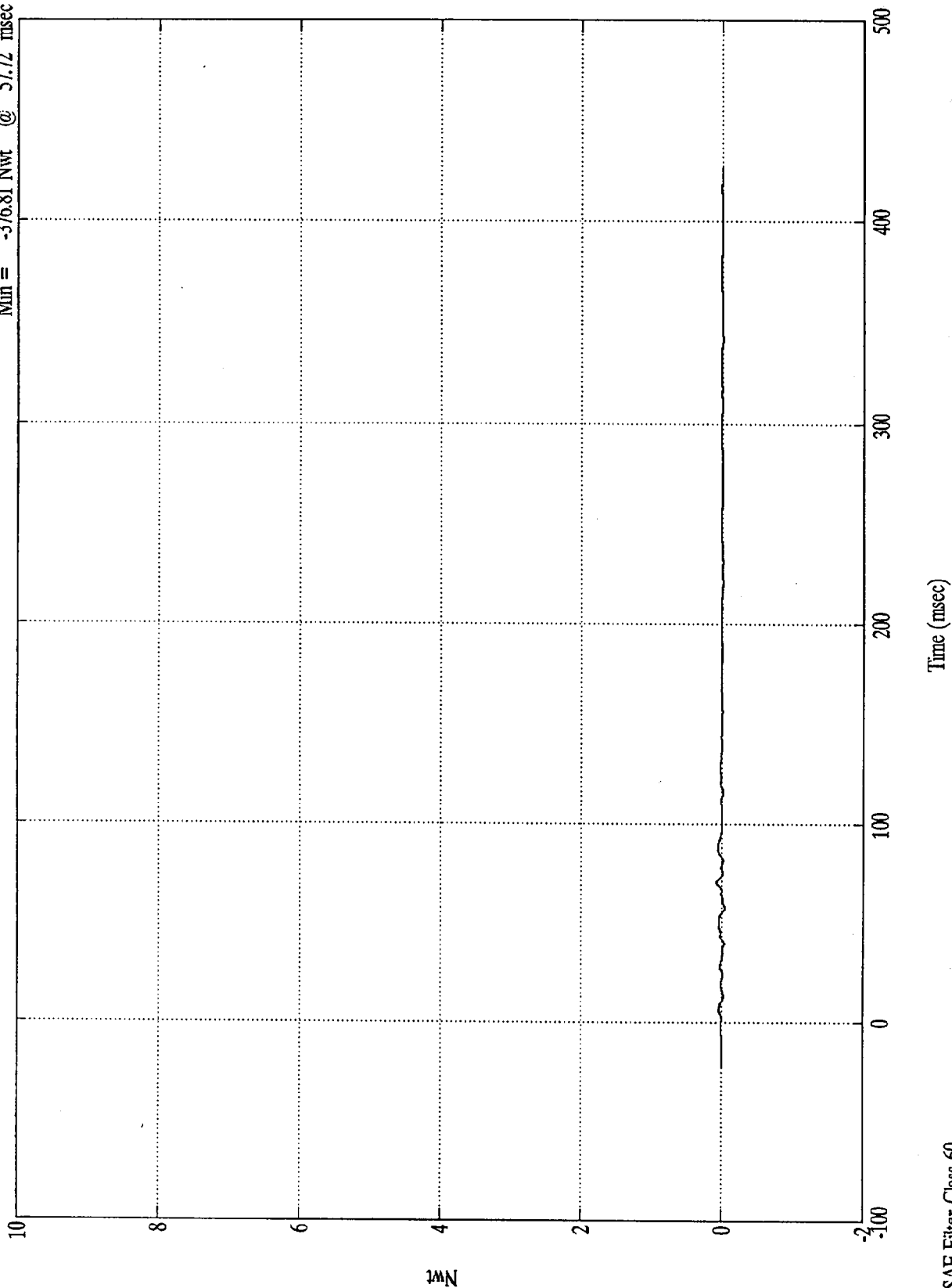
Nwt

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 764.96 Nwt @ 70.79 msec
Min = -376.81 Nwt @ 57.72 msec

Barrier Load Cell D3

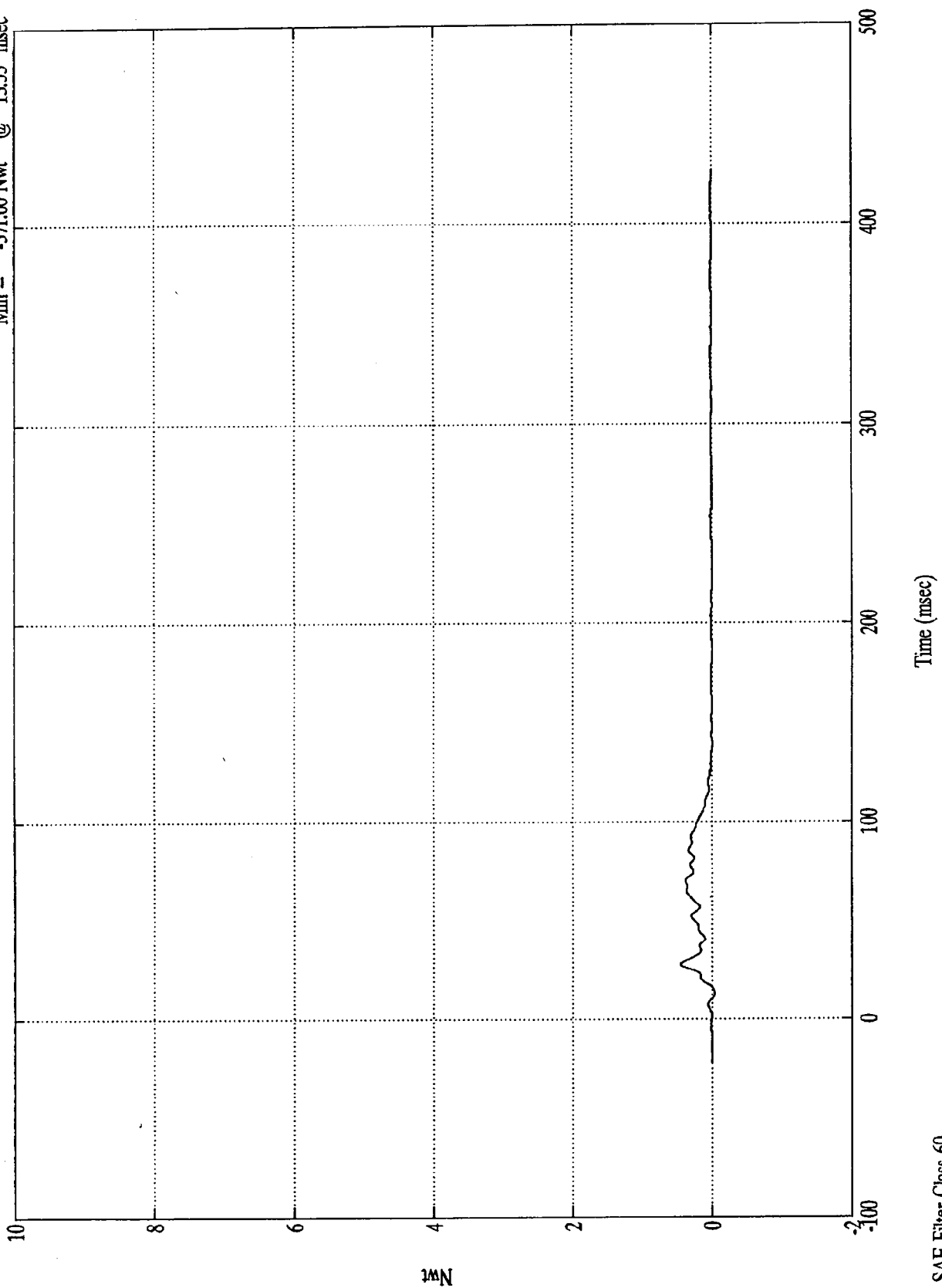


NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Barrier Load Cell D4

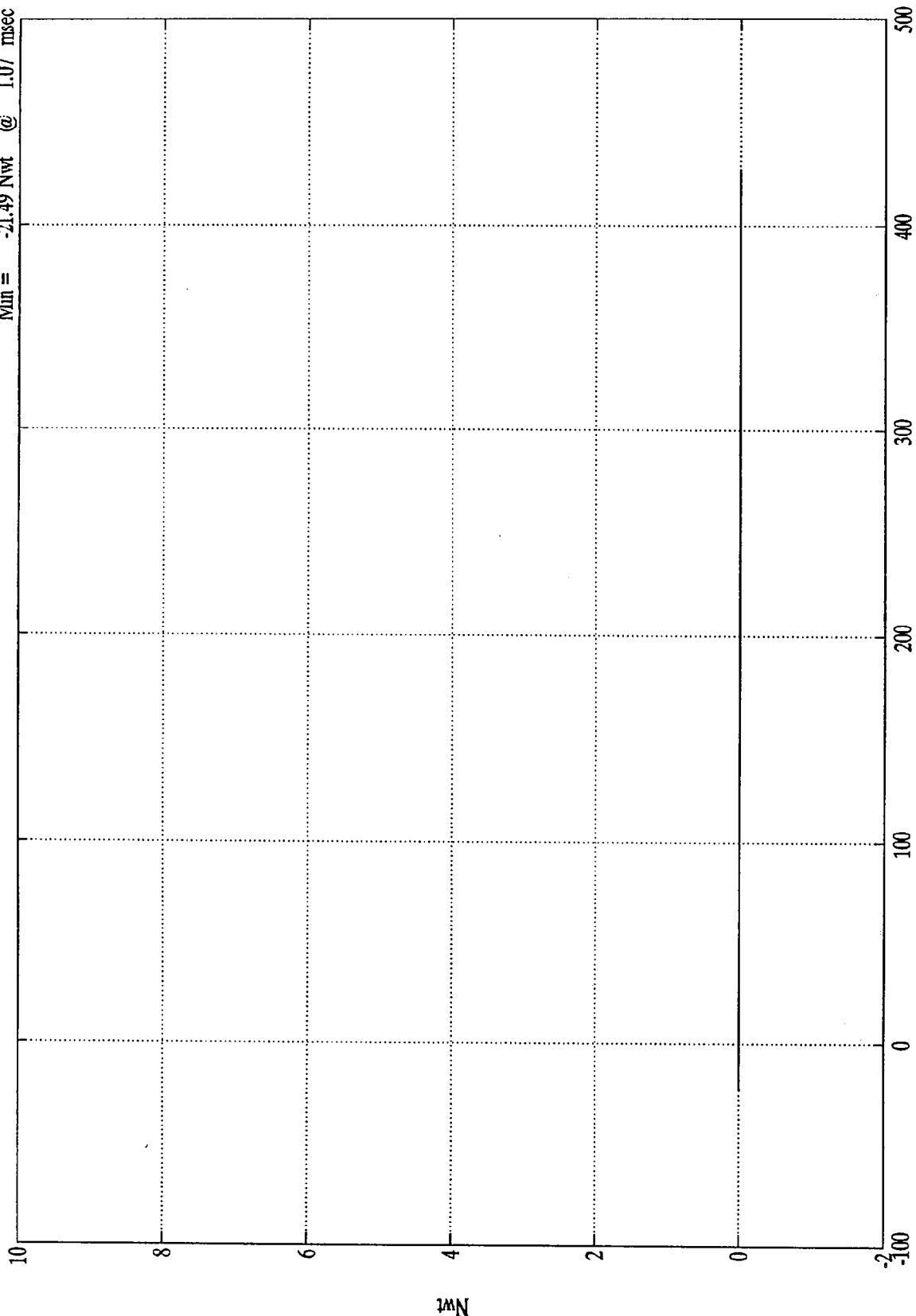
Max = 4444.88 Nwt @ 28.20 msec
Min = -371.00 Nwt @ 13.55 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 33.54 Nwt @ 48.84 msec
Min = -21.49 Nwt @ 1.07 msec

Barrier Load Cell D5



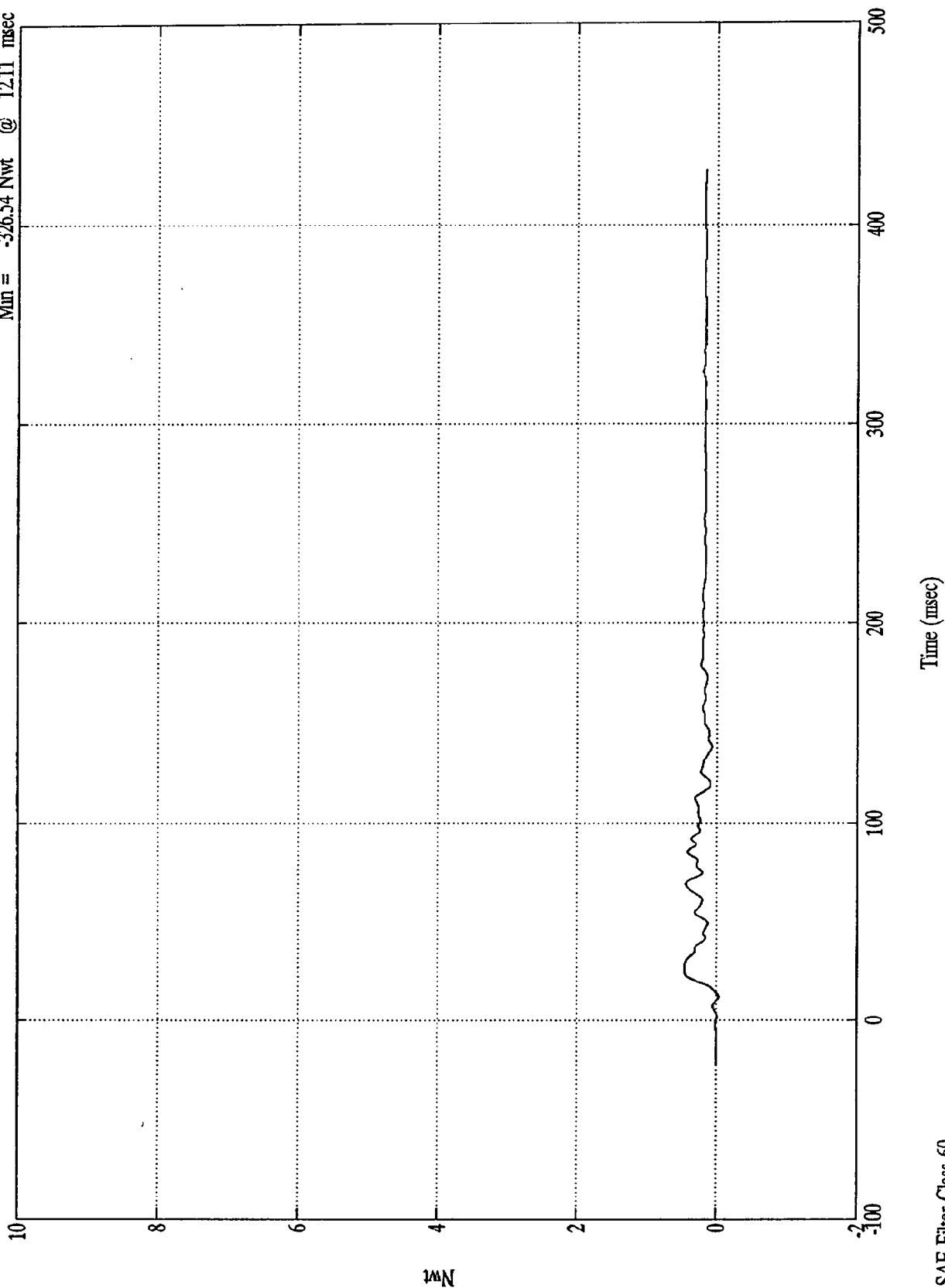
Time (msec)

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell D6

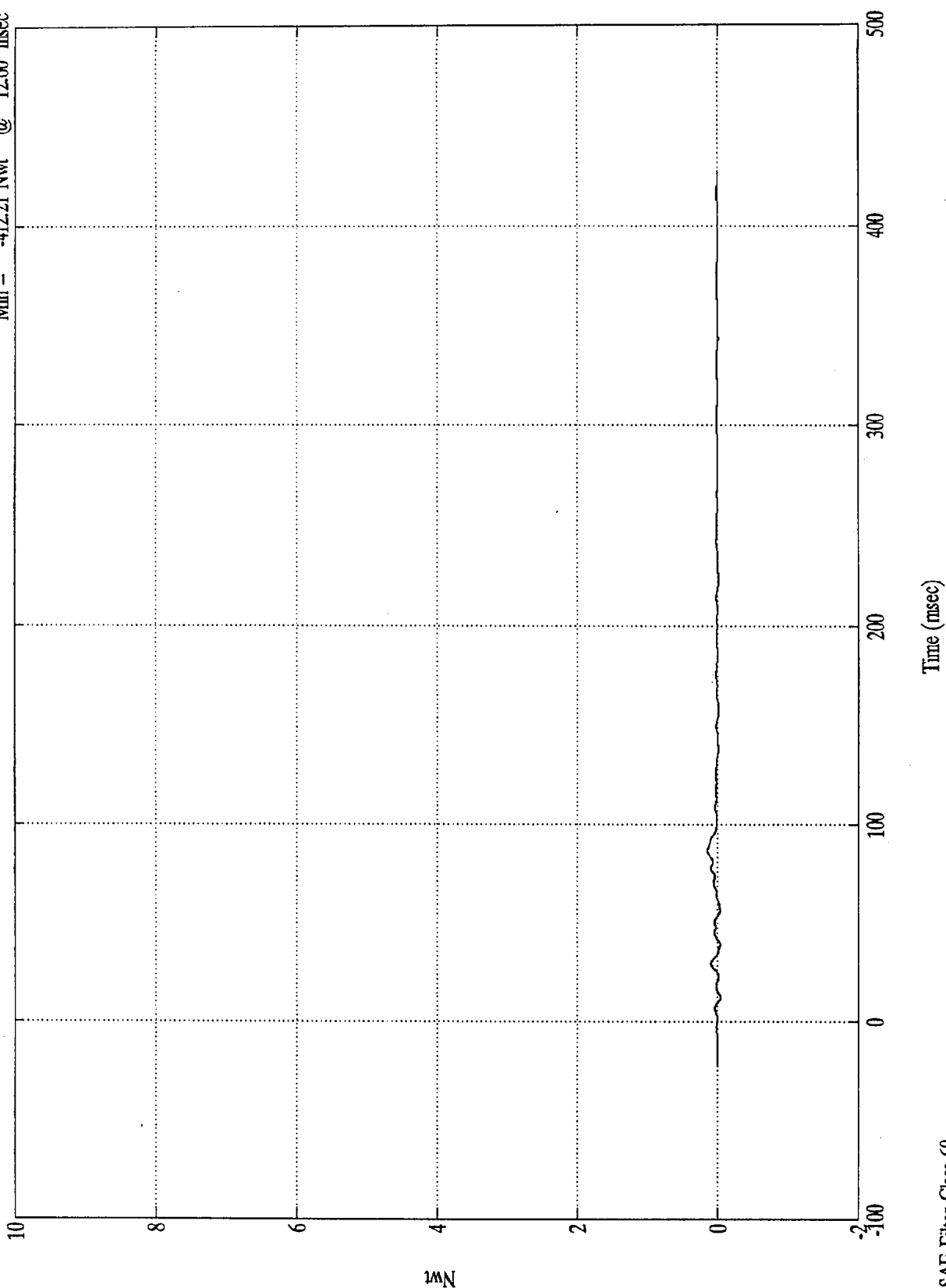
Max = 4595.70 Nwt @ 27.60 msec
Min = -326.54 Nwt @ 12.11 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 1460.54 Nwt @ 86.76 msec
Min = -412.21 Nwt @ 12.60 msec

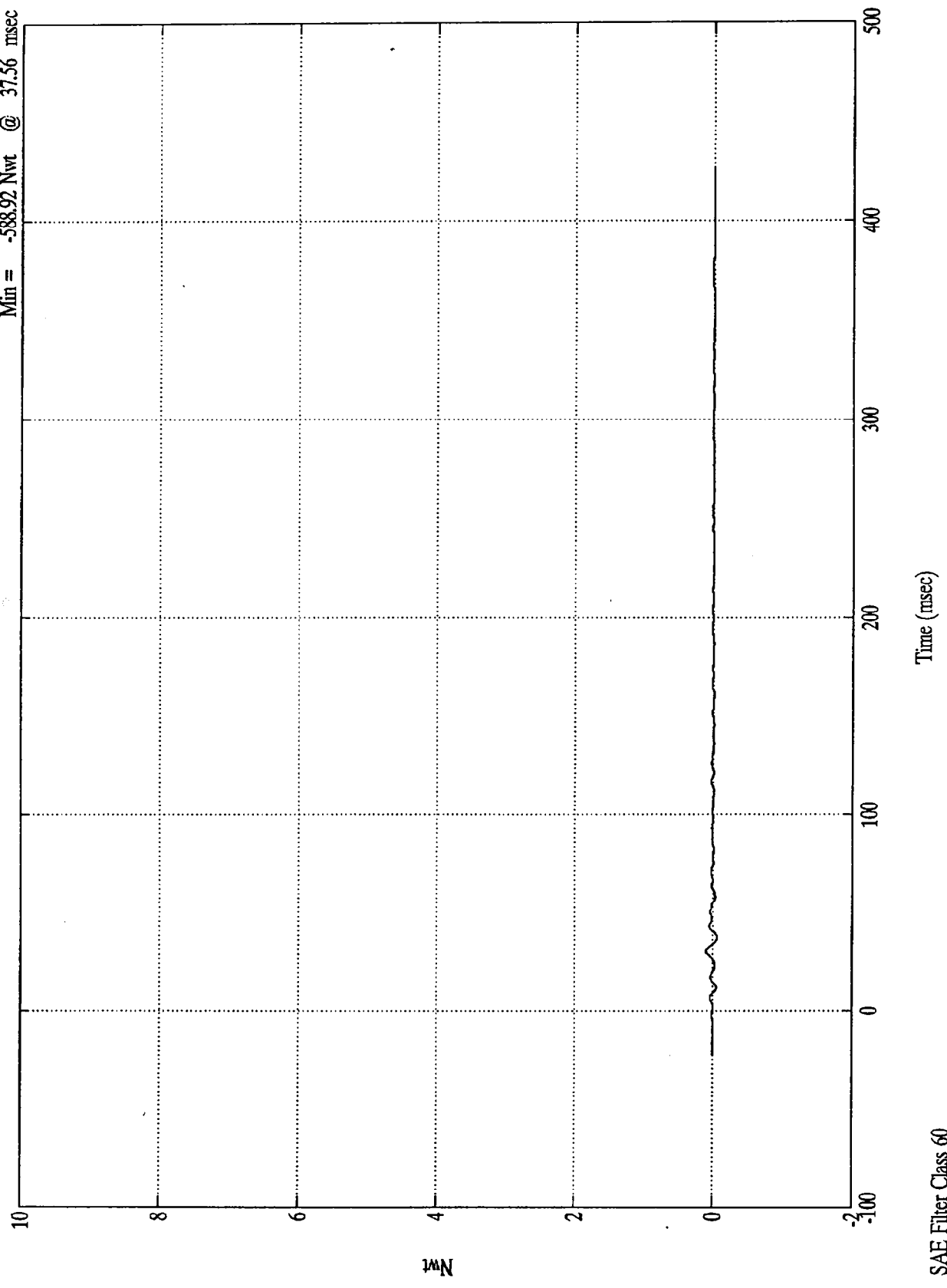
Barrier Load Cell D7



SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

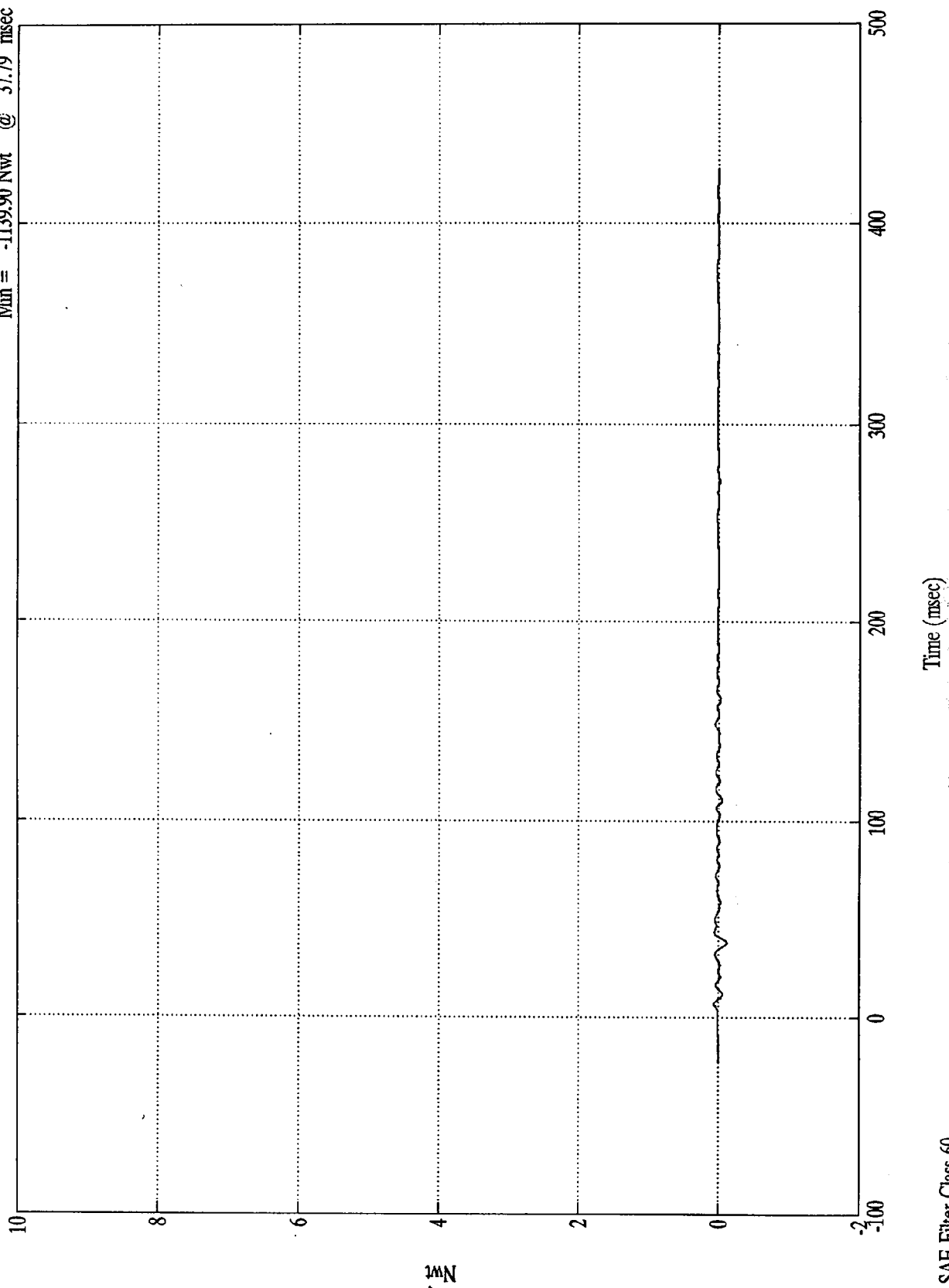
Barrier Load Cell D8
Max = 995.69 Nwt @ 30.72 msec
Min = -588.92 Nwt @ 37.56 msec



NCAP TEST #1 - 1996 PONTIAC GRAND AM

Barrier Load Cell D9
Max = 716.33 Nwt @ 7.07 msec
Min = -1139.90 Nwt @ 37.79 msec

$\times 10^4$

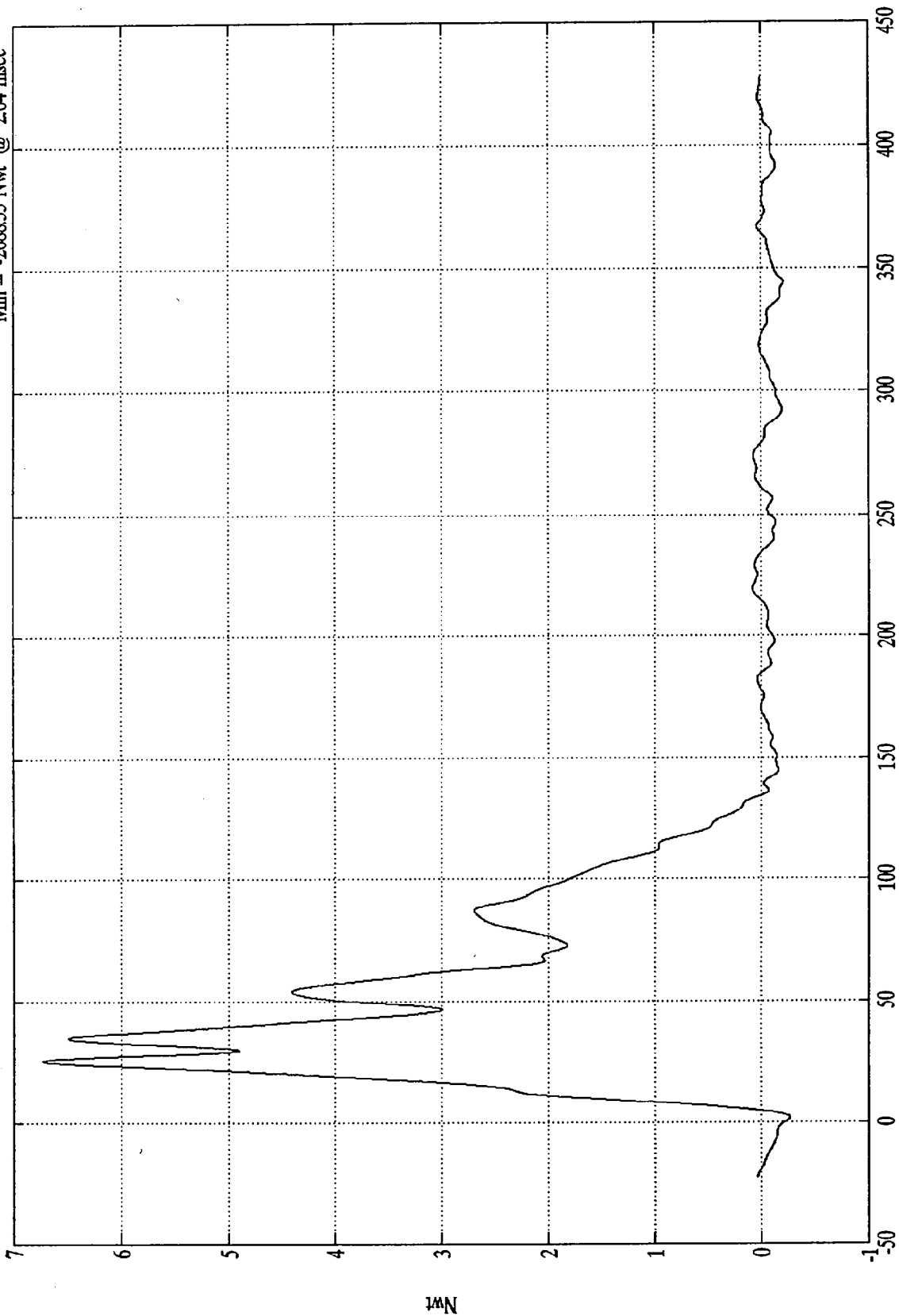


NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Group 1 Load Cell Sum

Max = 67286.57 Nwt @ 25.56 msec
Min = -2688.55 Nwt @ 2.04 msec



Load Cells (A1,A2,A3,B1,B3,)not (B2)

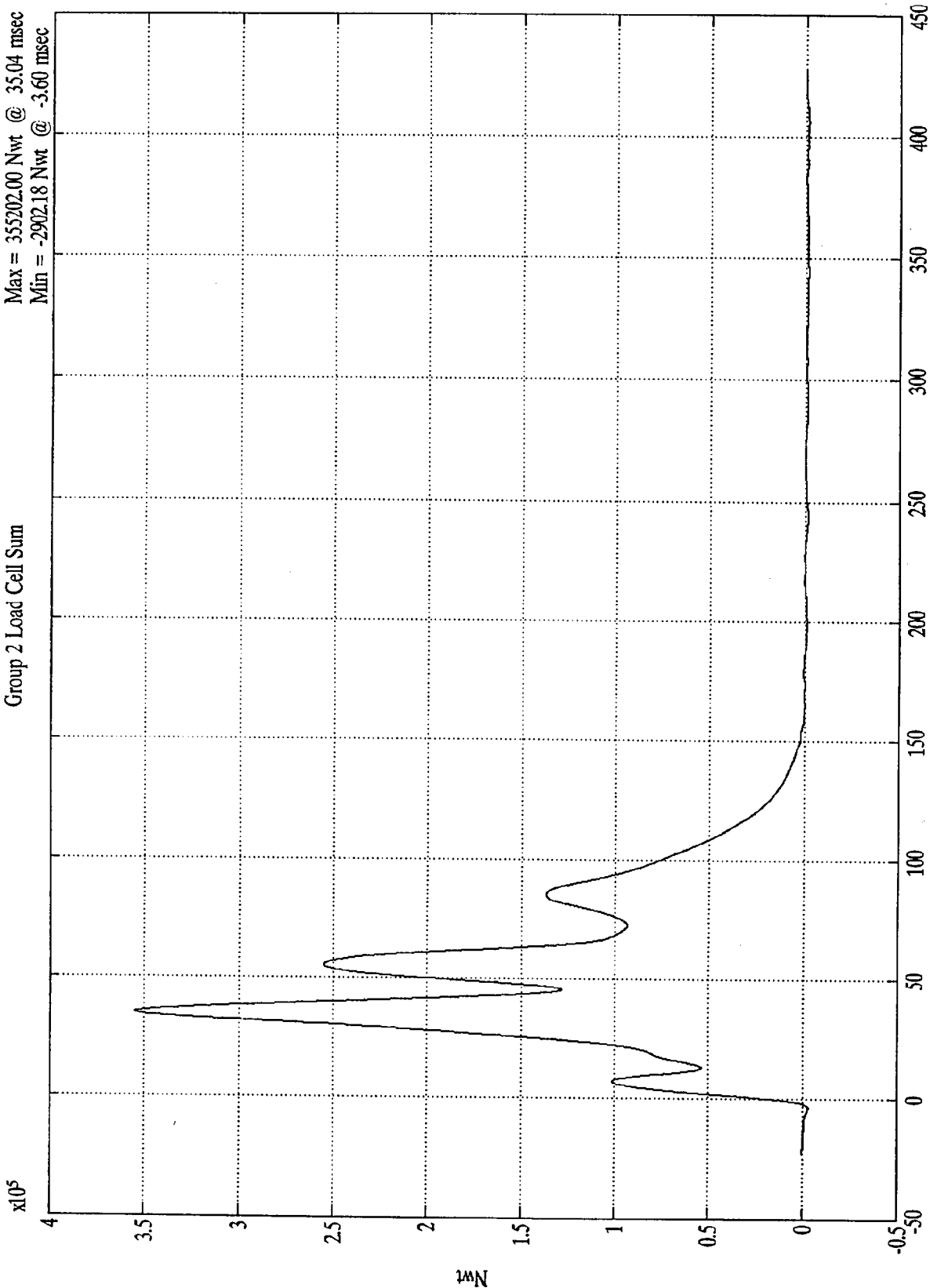
Time (msec)

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Group 2 Load Cell Sum

Max = 355202.00 Nwt @ 35.04 msec
Min = -2902.18 Nwt @ -3.60 msec



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

Time (msec)

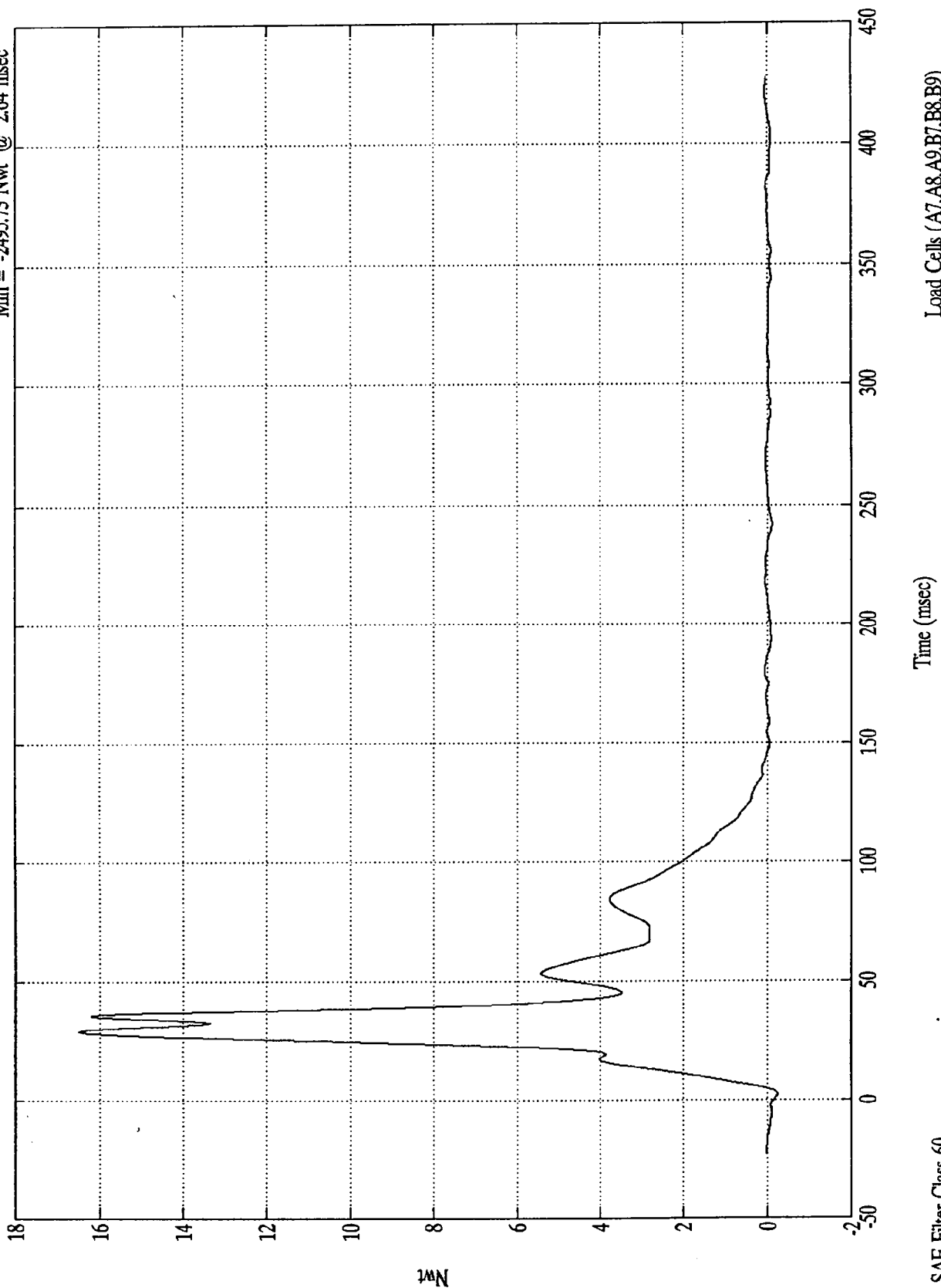
SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Group 3 Load Cell Sum

Max = 164707.69 Nwt @ 28.80 msec
Min = -2495.73 Nwt @ 2.64 msec

$\times 10^4$



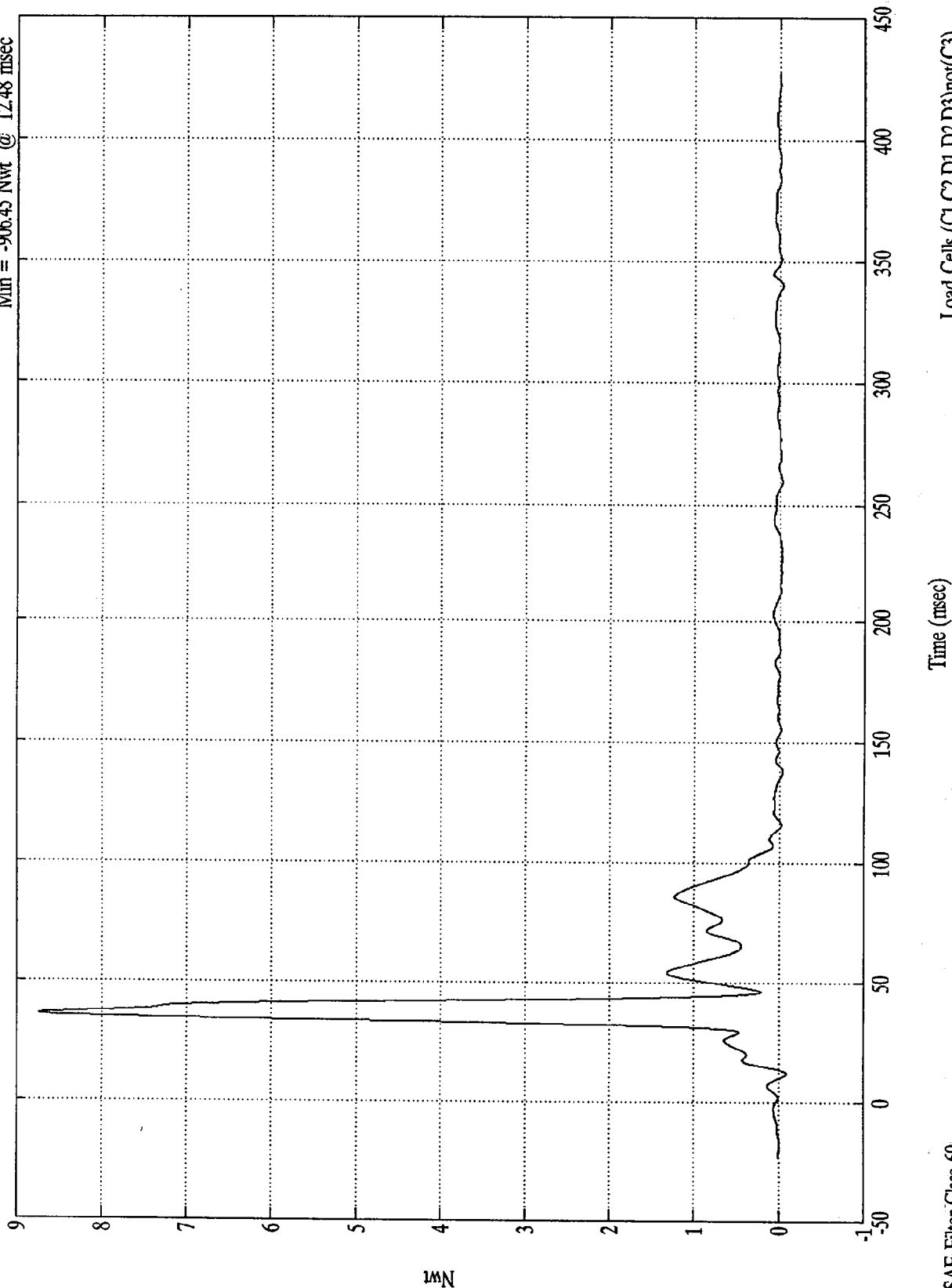
SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Group 4 Load Cell Sum

Max = 87482.76 Nwt @ 36.12 msec
Min = -906.45 Nwt @ 12.48 msec

$\times 10^4$



SAE Filter Class 60

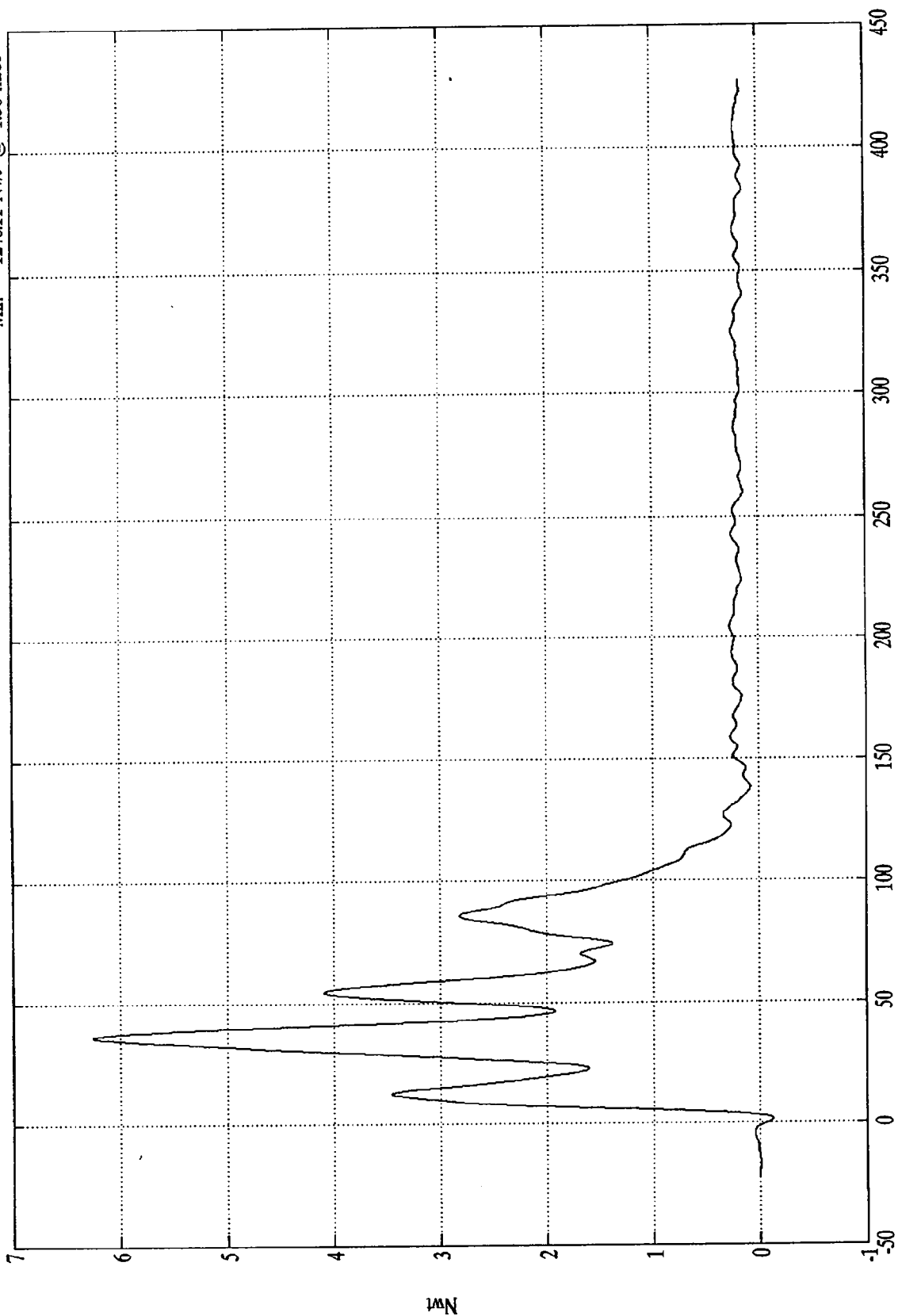
NCAP TEST #1 - 1996 PONTIAC GRAND AM

$\times 10^4$

Group 5 Load Cell Sum

Max = 62603.33 Nwt @ 36.36 msec

Min = -1240.11 Nwt @ 1.56 msec



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

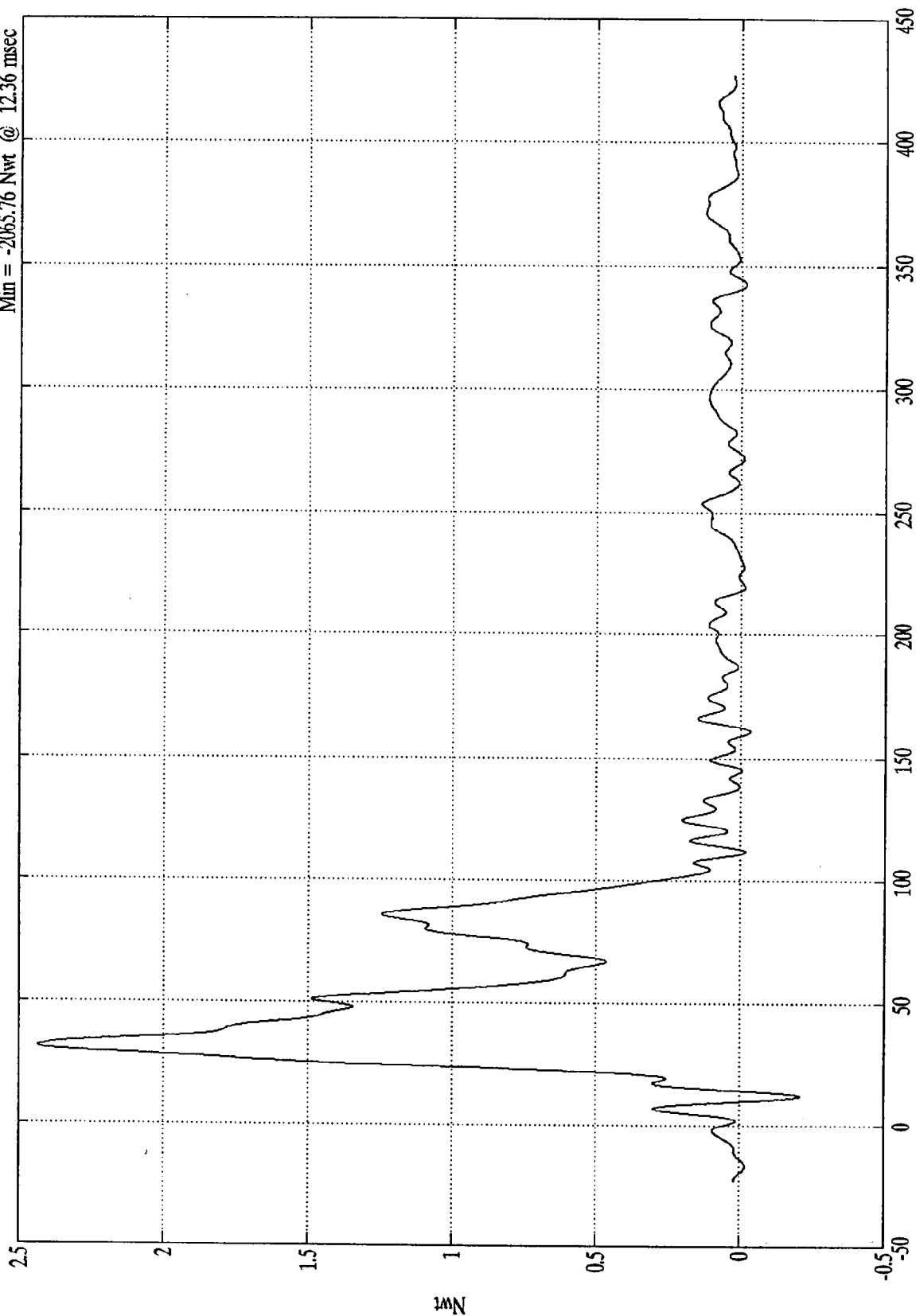
Time (msec)

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Group 6 Load Cell Sum

Max = 24333.12 Nwt @ 31.68 msec
Min = -2065.76 Nwt @ 12.36 msec



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

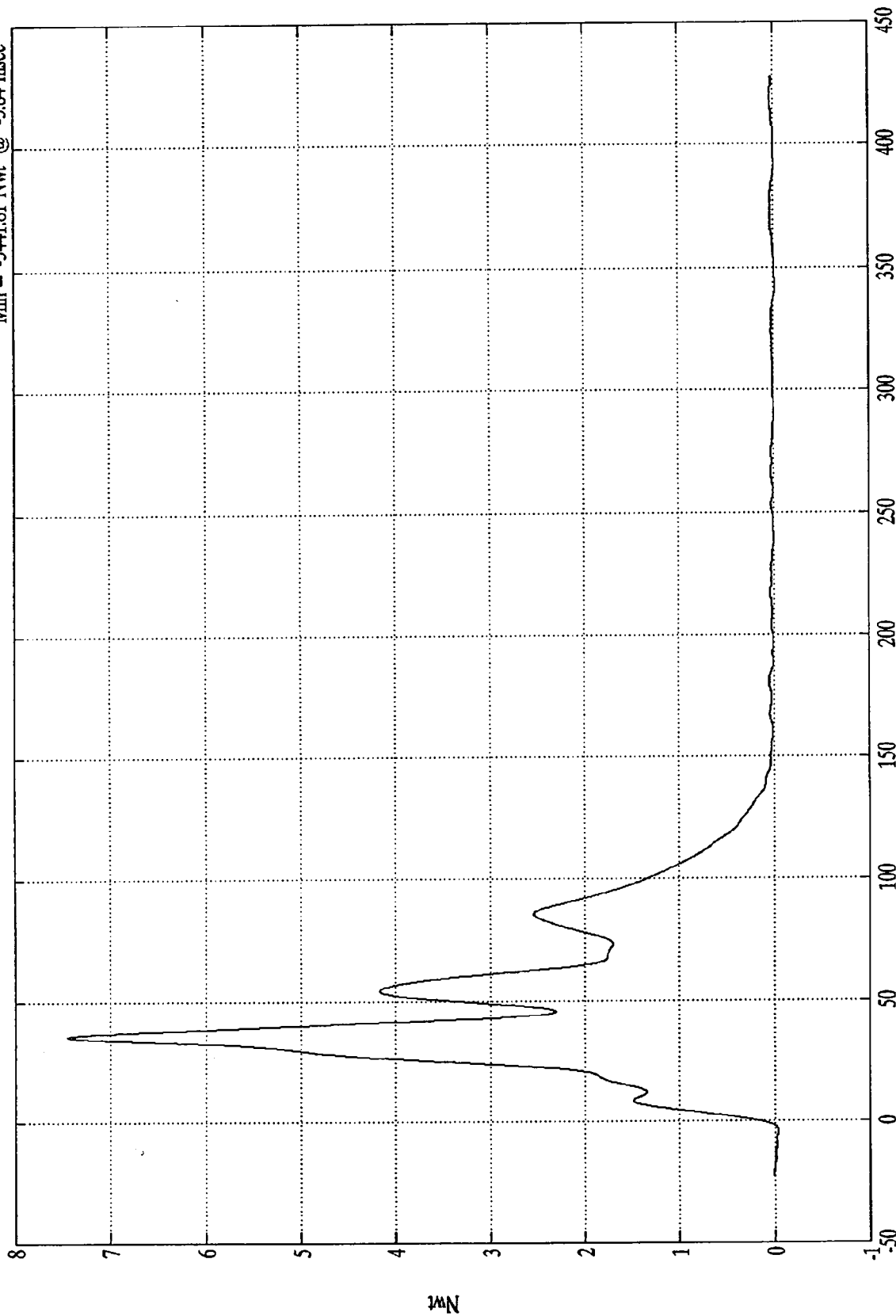
Time (msec)

SAE Filter Class 60

NCAP TEST #1 - 1996 PONTIAC GRAND AM

Max = 745501.85 Nwt @ 35.40 msec
Min = -3441.81 Nwt @ -3.84 msec

Total Load Cell Sum



Load Cell B2 Did Not Record

Time (msec)

SAE Filter Class 60

Nwt

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

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

The tests were conducted at the Dummy Certification Test Facility of Calspan 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>
150	11/9/95
064	11/9/95

Electronic Test Equipment

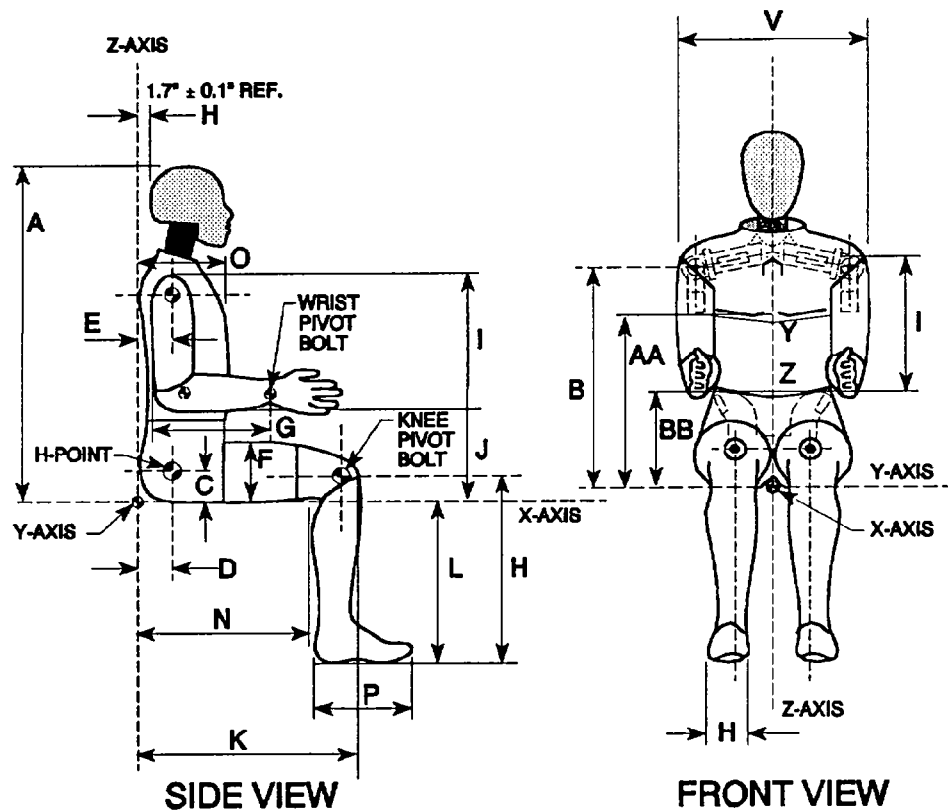
The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Inducant Testing Final Report No. 6525-V-

1.

Figure 14

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS
SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.
(REF: S572.31(A)(6))

HYBRID III EXTERNAL DIMENSIONS

S/N 150 HUMANOID

DUMMY SERIAL NO. 150

DATE: 11/09/95

TEMPERATURE		21 DEG. C
RELATIVE HUMIDITY		32 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	429-434 mm	431 mm
LOCATION FOR WAIST CIRCUMFERENCE (BB)	226-231 mm	228 mm
CHEST CIRCUMFERENCE (Y)	970-1001 mm	998 mm
WAIST CIRCUMFERENCE (Z)	836-866 mm	863 mm
CHEST DEPTH (O)	213-229 mm	213 mm
H-POINT HEIGHT (C)	84-89 mm	86.4 mm
H-POINT FROM SEAT BACK (D)	135-140 mm	137 mm
SKULL CAP TO BACKLINE (H)	41-46 mm	43.2 mm
TOTAL SITTING HEIGHT (A)	879-889 mm	884 mm
THIGH CLEARANCE (F)	140-155 mm	142 mm
BUTTOCK KNEE LENGTH (K)	580-605 mm	594 mm
BUTTOCK POPLITAL LENGTH (N)	452-477 mm	470 mm
POPLITEAL LENGTH (L)	430-455 mm	452 mm
KNEE PIVOT HEIGHT (M)	485-501 mm	498 mm
FOOT LENGTH (P)	252-267 mm	256 mm
FOOT BREADTH (W)	91-107 mm	96.5 mm
SHOULDER PIVOT FROM BACKLINE (E)	84-94 mm	94 mm
SHOULDER BREADTH (V)	422-437 mm	429 mm
SHOULDER PIVOT HEIGHT (B)	505-521 mm	513 mm
ELBOW REST HEIGHT (J)	190-211 mm	205 mm
SHOULDER-ELBOW LENGTH (I)	330-345 mm	338 mm
BACK OF ELBOW TO WRIST PIVOT (G)	290-305 mm	292 mm

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
NECK FLEXION TEST

HYBRID III

DATE : 11/6/95

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 150 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5-22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	38 %
IMPACT VELOCITY		24.8 - 25.7 KPH	25.3 KPH
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	22.81 G'S
	20 MS	17.60 - 22.60 G'S	19.63 G'S
	30 MS	12.50 - 18.50 G'S	15.47 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	15.47 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	37 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	64.88 DEG.
	TIME	57 - 64 MS	57.63 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88 - 108 N-M	93.3 N-M
	TIME	47 - 58 MS	50.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	98.88 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
NECK EXTENSION TEST
HYBRID III

DATE : 11/6/95

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 150 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	38 %
IMPACT VELOCITY		21.4 - 22.3 KPH	22.2 KPH
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	17.29 G'S
	20 MS	14.00 - 19.00 G'S	16.21 G'S
	30 MS	11.00 - 16.00 G'S	14.52 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	14.52 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	42.88 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	81.59 DEG.
	TIME	72 - 82 MS	74.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-80.0/-52.9 N-M	-56.8 N-M
	TIME	65 - 79 MS	66.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	151.63 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	122.5 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
HEAD DROP TEST
HYBRID III

DATE : 11/6/95

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 150 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	38 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	235.4 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	6.5 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
THORAX IMPACT TEST
HYBRID III

DATE : 11/9/95

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 150 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	32 %
PENDULUM VELOCITY	23.7 - 24.6 KPH	24.1 KPH
MAXIMUM DEFLECTION	64 - 73 mm	65 mm
MAXIMUM RESISTIVE FORCE	5160 - 5894 NEWTONS	5604 NEWTONS
INTERNAL HYSTERESIS	69% - 85%	74.5 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
KNEE IMPACT TEST
HYBRID III

DATE : 11/3/95

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 150 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	48 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	4870 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
KNEE IMPACT TEST
HYBRID III

DATE : 11/3/95

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 150 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	48 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	4728 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 150

A. DUMMY INSTRUMENTS

1. HEAD ACCELEROMETER

HX LONGITUDINAL

HY LATERAL

HZ VERTICAL

2. CHEST ACCELEROMETER

CX LONGITUDINAL

CY LATERAL

CZ VERTICAL

3. FEMUR LOAD CELLS

LEFT SIDE

RIGHT SIDE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	ADL98	10/95	4/96
ENDEVCO	AE8K0	10/95	4/96
ENDEVCO	ADMB6	10/95	4/96
ENDEVCO	A26A	10/95	4/96
ENDEVCO	A27A	10/95	4/96
ENDEVCO	A51A	10/95	4/96
GSE	951	6/95	12/95
GSE	952	6/95	12/95

B. CALIBRATION LABORATORY INSTRUMENTS

1. PENDULUM ACC.

2. TEST PROBE ACCELEROMETER

3. LUMBAR FLEXION TEST PUSH FORCE GAUGE

4. ABDOMINAL COMPRESS. TEST FORCE GAUGE

5. ABDOMINAL COMPRESS. TEST FORCE GAUGE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
CEC	A160	8/95	2/96
CEC	A177	8/95	2/96
TRANS- DUCER INC	20051	6/95	12/95
BLH	72952	6/95	12/95
CIC	567-11	6/95	12/95

HYBRID III EXTERNAL DIMENSIONS

S/N 064 HUMANOID

DUMMY SERIAL NO. 064

DATE: 11/09/95

TEMPERATURE		21 DEG. C
RELATIVE HUMIDITY		32 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	429-434 mm	432 mm
LOCATION FOR WAIST CIRCUMFERENCE (BB)	226-231 mm	229 mm
CHEST CIRCUMFERENCE (Y)	970-1001 mm	985 mm
WAIST CIRCUMFERENCE (Z)	836-866 mm	843 mm
CHEST DEPTH (O)	213-229 mm	216 mm
H-POINT HEIGHT (C)	84-89 mm	86.3 mm
H-POINT FROM SEAT BACK (D)	135-140 mm	137 mm
SKULL CAP TO BACKLINE (H)	41-46 mm	43.2 mm
TOTAL SITTING HEIGHT (A)	879-889 mm	884 mm
THIGH CLEARANCE (F)	140-155 mm	152 mm
BUTTOCK KNEE LENGTH (K)	580-605 mm	599 mm
BUTTOCK POPLITAL LENGTH (N)	452-477 mm	470 mm
POPLITEAL LENGTH (L)	430-455 mm	442 mm
KNEE PIVOT HEIGHT (M)	485-501 mm	495 mm
FOOT LENGTH (P)	252-267 mm	257 mm
FOOT BREADTH (W)	91-107 mm	96.5 mm
SHOULDER PIVOT FROM BACKLINE (E)	84-94 mm	88.9 mm
SHOULDER BREADTH (V)	422-437 mm	427 mm
SHOULDER PIVOT HEIGHT (B)	505-521 mm	518 mm
ELBOW REST HEIGHT (J)	190-211 mm	203 mm
SHOULDER-ELBOW LENGTH (I)	330-345 mm	338 mm
BACK OF ELBOW TO WRIST PIVOT (G)	290-305 mm	295 mm

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: BRIAN SWIECICKI

CALSPAN CORPORATION
 TRANSPORTATION RESEARCH DEPARTMENT
NECK FLEXION TEST
 HYBRID III

DATE : 11/6/95

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 064 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5-22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	38 %
IMPACT VELOCITY		24.8 - 25.7 KPH	25.1 KPH
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	24.08 G'S
	20 MS	17.60 - 22.60 G'S	19.4 G'S
	30 MS	12.50 - 18.50 G'S	16.28 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	16.28 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	36.25 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	68.89 DEG.
	TIME	57 - 64 MS	61.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88 - 108 N-M	88.9 N-M
	TIME	47 - 58 MS	51.5 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	119.63 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	105.88 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
NECK EXTENSION TEST
HYBRID III

DATE : 11/6/95

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 064 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	38 %
IMPACT VELOCITY		21.4 - 22.3 KPH	21.6 KPH
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	18.08 G'S
	20 MS	14.00 - 19.00 G'S	17.44 G'S
	30 MS	11.00 - 16.00 G'S	14.28 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	14.28 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	41.38 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	97 DEG.
	TIME	72 - 82 MS	78.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-80.0/-52.9 N-M	-53.8 N-M
	TIME	65 - 79 MS	70.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	159.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	129.25 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
HEAD DROP TEST
HYBRID III

DATE : 11/6/95

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 064 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	38 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	237.1 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	7.6 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
THORAX IMPACT TEST
HYBRID III

DATE : 11/8/95

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 064 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	34 %
PENDULUM VELOCITY	23.7 - 24.6 KPH	23.8 KPH
MAXIMUM DEFLECTION	64 - 73 mm	64.3 mm
MAXIMUM RESISTIVE FORCE	5160 - 5894 NEWTONS	5640 NEWTONS
INTERNAL HYSTERESIS	69% - 85%	75.4 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
KNEE IMPACT TEST
HYBRID III

DATE : 11/3/95

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 064 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	40 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5395 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
KNEE IMPACT TEST
HYBRID III

DATE : 11/3/95

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 064 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	48 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5480 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 064

A. DUMMY INSTRUMENTS

1. HEAD ACCELEROMETER

HX LONGITUDINAL

HY LATERAL

HZ VERTICAL

2. CHEST ACCELEROMETER

CX LONGITUDINAL

CY LATERAL

CZ VERTICAL

3. FEMUR LOAD CELLS

LEFT SIDE

RIGHT SIDE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	AD4A9	10/95	4/96
ENDEVCO	AE8T7	10/95	4/96
ENDEVCO	AF5R1	10/95	4/96
ENDEVCO	AE8R7	10/95	4/96
ENDEVCO	AF5H9	10/95	4/96
ENDEVCO	AH5L8	10/95	4/96
GSE	418	7/95	1/96
GSE	419	7/95	1/96

B. CALIBRATION LABORATORY INSTRUMENTS

1. PENDULUM ACC.

2. TEST PROBE ACCELEROMETER

3. LUMBAR FLEXION TEST PUSH FORCE GAUGE

4. ABDOMINAL COMPRESS. TEST FORCE GAUGE

5. ABDOMINAL COMPRESS. TEST FORCE GAUGE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
CEC	A160	8/95	2/96
CEC	A177	8/95	2/96
TRANS- DUCER INC	20051	6/95	12/95
BLH	72952	6/95	12/95
CIC	567-11	6/95	12/95

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	ADL98	ENDEVCO	10/95	4/96
Y	AE8K0	ENDEVCO	10/95	4/96
Z	ADMB6	ENDEVCO	10/95	4/96
Chest				
X	A26A	ENDEVCO	10/95	4/96
Y	A27A	ENDEVCO	10/95	4/96
Z	A51A	ENDEVCO	10/95	4/96
Right Femur Load Cell	952	GSE	6/95	12/95
Left Femur Load Cell	951	GSE	6/95	12/95
Neck Load Cell	269	DENTON	11/95	5/96
X				
Y	269	DENTON	11/95	5/96
Z	269	DENTON	11/95	5/96
Neck Moment	269	DENTON	11/95	5/96
X				
Y	269	DENTON	11/95	5/96
Z	269	DENTON	11/95	5/96
Chest Deflection Gauge	150	HUMANOID	7/95	1/96
Hybrid III Use Only				
Lap Belt Load Cells	706	LEBOW	7/95	1/96
Shoulder Belt Load Cells	707	LEBOW	7/95	1/96
Spool-Out Potentiometer		MAGNETEK	11/95	5/96
Belt Stretch Transducer		CALSPAN	11/95	5/96

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X (R)	AC827	ENDEVCO	9/95	3/96
Y (R)	AC8F6	ENDEVCO	8/95	2/96
Z (R)	ACCW0	ENDEVCO	9/95	3/96
Chest				
X (R)	AHRC9	ENDEVCO	10/95	4/96
Y (R)	AC7W8	ENDEVCO	8/95	2/96
Z (R)	ACC06	ENDEVCO	10/95	9/96
Pelvic				
X	AL6N5	ENDEVCO	6/95	12/95
Y	AL6R7	ENDEVCO	6/95	12/95
Z	A12C	ENDEVCO	6/95	12/95
Left Upper Tibia				
Mx	038	DENTON	6/95	12/95
Left Upper Tibia				
My	038	DENTON	6/95	12/95
Left Lower Tibia				
Fy	032	DENTON	6/95	12/95
Left Lower Tibia				
Fz	032	DENTON	6/95	12/95
Left Lower Tibia				
Mx	032	DENTON	6/95	12/95
Right Upper Tibia				
Mx	045	DENTON	6/95	12/95
Right Upper Tibia				
My	045	DENTON	6/95	12/95
Right Lower Tibia				
Fy	041	DENTON	6/95	12/95
Right Lower Tibia				
Fz	041	DENTON	6/95	12/95
Right Lower Tibia				
Mx	041	DENTON	6/95	12/95

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY	Serial #	Manufacture	Calibration	
			Last	Next
Left Foot Front Z	AET34	ENDEVCO	9/95	3/96
Left Foot Rear X	AKD93	ENDEVCO	9/95	3/96
Left Foot Rear Z	AEW70	ENDEVCO	9/95	3/96
Right Foot Front Z	AET76	ENDEVCO	7/95	1/96
Right Foot Rear X	AA4C5	ENDEVCO	7/95	1/96
Right Foot Rear Z	AET22	ENDEVCO	7/95	1/96

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X	AD4A9	ENDEVCO	10/95	4/96
Y	AE8T7	ENDEVCO	10/95	4/96
Z	AF5R1	ENDEVCO	10/95	4/96
Chest				
X	AE8R7	ENDEVCO	10/95	4/96
Y	AF5H9	ENDEVCO	10/95	4/96
Z	AH5L8	ENDEVCO	10/95	4/96
Right Femur Load Cell	419	GSE	7/95	1/96
Left Femur Load Cell	418	GSE	7/95	1/96
Neck Load Cell	446	DENTON	11/95	5/96
X				
Y	446	DENTON	11/95	5/96
Z	446	DENTON	11/95	5/96
Neck Moment	446	DENTON	11/95	5/96
X				
Y	446	DENTON	11/95	5/96
Z	446	DENTON	11/95	5/96
Chest Deflection Gauge	064	HUMANOID	11/95	5/96
Hybrid III Use Only				
Lap Belt Load Cells	710	LEBOW	7/95	1/96
Shoulder Belt Load Cells	711	LEBOW	7/95	1/96
Spool-Out Potentiometer	M8	MAGNETEK	11/95	5/96
Belt Stretch Transducer	E7	CALSPAN	11/95	5/96

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacturer	Calibration	
			Last	Next
Head				
X (R)	AC7Y3	ENDEVCO	10/95	4/96
Y (R)	AC824	ENDEVCO	10/95	4/96
Z (R)	AC814	ENDEVCO	10/95	4/96
Chest				
X (R)	AP1E0	ENDEVCO	8/95	2/96
Y (R)	AJ9E0	ENDEVCO	8/95	2/96
Z (R)	AP1A2	ENDEVCO	8/95	2/96
Pelvic				
X	AH5F3	ENDEVCO	6/95	12/95
Y	AL6H7	ENDEVCO	6/95	12/95
Z	AL6C8	ENDEVCO	6/95	12/95
Left Upper Tibia	Mx	DENTON	6/95	12/95
Left Upper Tibia	My	DENTON	6/95	12/95
Left Lower Tibia	Fy	DENTON	6/95	12/95
Left Lower Tibia	Fz	DENTON	6/95	12/95
Left Lower Tibia	Mx	DENTON	6/95	12/95
Right Upper Tibia	Mx	DENTON	6/95	12/95
Right Upper Tibia	My	DENTON	6/95	12/95
Right Lower Tibia	Fy	DENTON	6/95	12/95
Right Lower Tibia	Fz	DENTON	6/95	12/95
Right Lower Tibia	Mx	DENTON	6/95	12/95

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacture	Calibration	
			Last	Next
Left Foot Front Z	AEW29	ENDEVCO	10/95	4/96
Left Foot Rear X	AEYW0	ENDEVCO	9/95	3/96
Left Foot Rear Z	AEW71	ENDEVCO	8/95	2/96
Right Foot Front Z	AEWE3	ENDEVCO	7/95	1/96
Right Foot Rear X	AEWJ5	ENDEVCO	7/95	1/96
Right Foot Rear Z	AEWK1	ENDEVCO	7/95	1/96

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	A147	CEC	9/95	3/96
Right Rear Seat Crossmember	A129	CEC	9/95	3/96
Top of Engine	A217	CEC	8/95	2/96
Bottom of Engine	A183	CEC	9/95	3/96
Left Disc Brake Caliper	A56	CEC	9/95	3/96
Right Disc Brake Caliper	A164	CEC	8/95	2/96
Instrument Panel	A69	CEC	9/95	3/96
Left Seat Rear Crossmember (R)	X85	ICS	10/95	4/96
Right Seat Rear Crossmember (R)	X81	ICS	10/95	4/96

Appendix E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

How to Wear Safety Belts Properly

Adults

This part is only for people of adult size.

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

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

We'll start with the driver position.

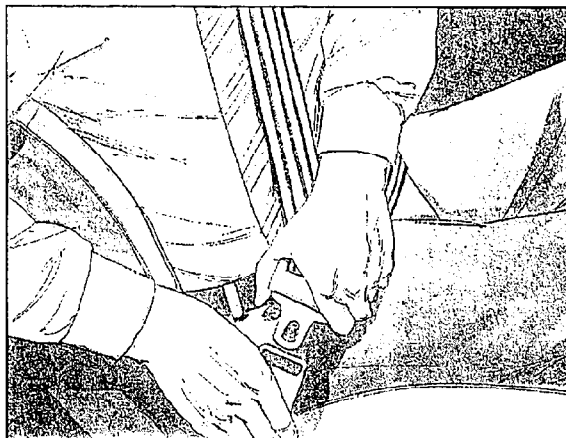
Driver Position

This part describes the driver's restraint system.

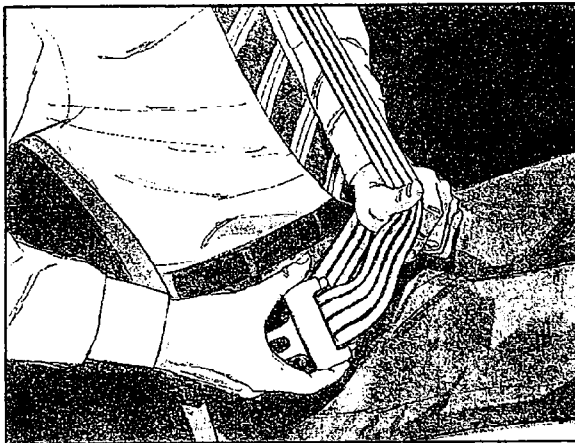
Lap-Shoulder Belt

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

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



3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.
4. Push the latch plate into the buckle until it clicks.



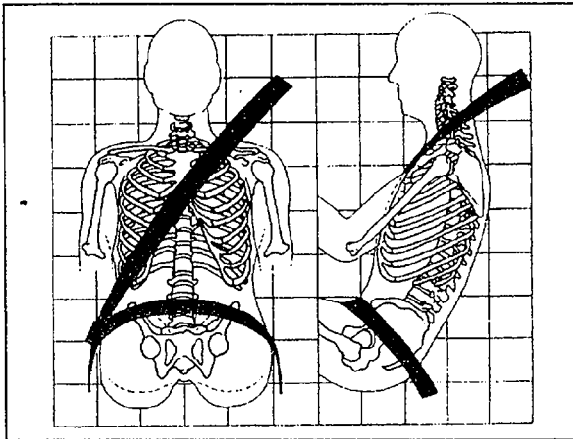
If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle the belt.

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

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



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



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

The safety belt locks if there's a sudden stop or crash.

Shoulder Belt Height Adjuster (4-Door Models)

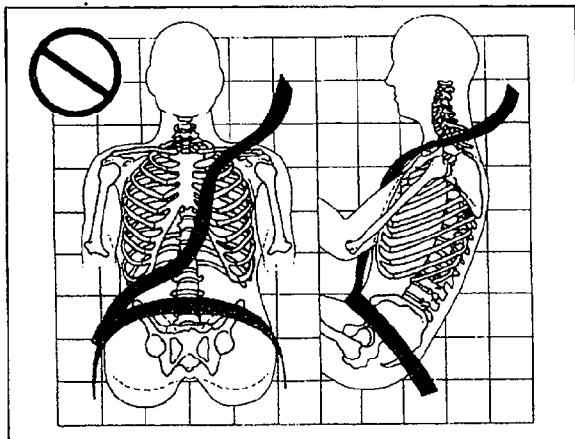
Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.



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

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

Q: What's wrong with this?

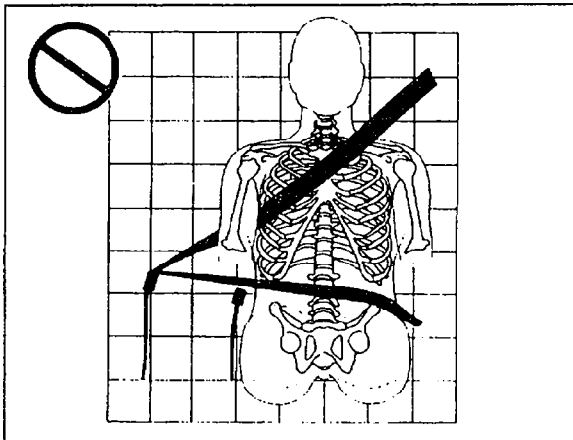


A: The shoulder belt is too loose. It won't give nearly as much protection this way.

⚠ CAUTION:

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

Q: What's wrong with this?



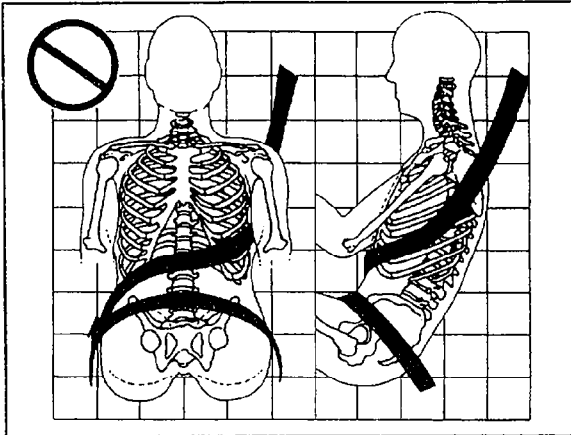
A: The belt is buckled in the wrong place.



CAUTION:

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

Q: What's wrong with this?

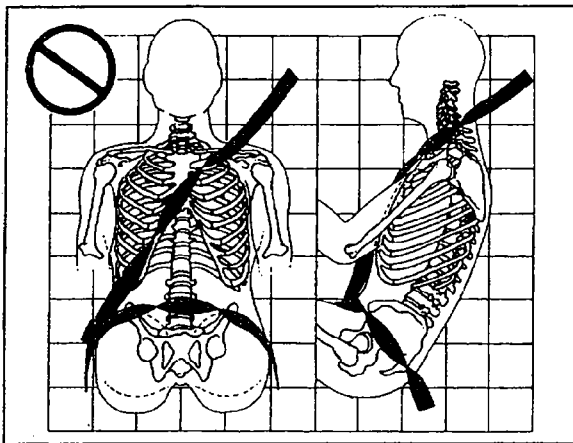


⚠ CAUTION:

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

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

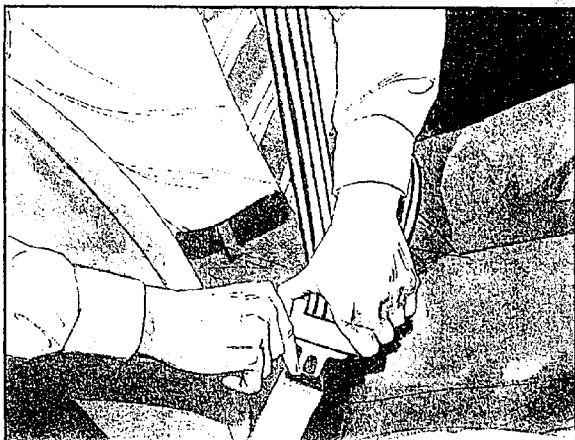
Q: What's wrong with this?



A: The belt is twisted across the body.

⚠ CAUTION:

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



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

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

Supplemental Restraint System (SRS)

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

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

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

CAUTION:

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



CAUTION:

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



CAUTION:

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

AIR
BAG

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

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

How the Air Bag System Works



Where is the air bag?

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



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



CAUTION:

Don't put anything on, or attach anything to, the steering wheel or instrument panel. Also, don't put anything (such as pets or objects) between any occupant and the steering wheel or instrument panel. If something is between an occupant and an air bag, it could affect the performance of the air bag -- or worse, it could cause injury.

When should an air bag inflate?

The air bag is designed to inflate in moderate to severe frontal or near-frontal crashes. The air bag will inflate only if the impact speed is above the system's designed "threshold level." If your vehicle goes straight into a wall that doesn't move or deform, the threshold level is about 9 to 16 mph (14 to 26 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range. If your

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

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. Inflation is determined by the angle of the impact and the vehicle's deceleration. Vehicle damage is only one indication of this.

What makes an air bag inflate?

In a frontal or near-frontal impact of sufficient severity, the air bag sensing system detects that the vehicle is suddenly stopping as a result of a crash. The sensing system triggers a chemical reaction of the sodium azide sealed in the inflator. The reaction produces nitrogen gas, which inflates the air bag. The inflator, air bag and related hardware are all part of the air bag modules packed inside the steering wheel and in the instrument panel in front of the right front passenger.