V2161

REPORT NUMBER: CAL-95-N05

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

MAZDA MOTOR CORPORATION
1995 MAZDA PROTEGE DX
4-DOOR SEDAN

NHTSA NUMBER: MS5402

CALSPAN TEST NUMBER: 8227-5

November 8, 1994

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FINAL REPORT

PREPARED FOR:

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

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APR 17 1995

Date of Report Acceptance

Contracting Officer's Tech. Rep. (COTR)

APR 17 1995

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. *Report No.* CAL-95-N05	2. *Government Accession No.*	3. *Recipient's Catalog No.*
4. *Title and Subtitle* NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test of a 1995 Mazda Protege DX 4-Door Sedan		5. *Report Date* November 8, 1994 6. *Performing Organization Code* CAL
7. *Author(s)* Cathryn A. Harrower, Author Michael J. Kilgallon, Project Engineer David J. Travale, Program Manager		8. *Performing Organization Report No.* 8227-5
9. *Performing Organization Name and Address* Calspan Advanced Technology Center 4455 Genesee Street Buffalo, New York 14225		10. *Work Unit No.* X069-5-1468 11. *Contract or Grant No.* DTNH22-90-D-02121
12. *Sponsoring Agency Name and Address* U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh , S.W. Washington, D.C. 20590		13. *Type of Report and Period Covered* Final Report November - December 1994 14. *Sponsoring Agency Code* DOT/NHTSA/RM/OMI
15. *Supplementary Notes*		

16. *Abstract*

A frontal load cell barrier test of a 1995 Mazda Protege DX 4-Door Sedan was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York, on November 8, 1994.

The impact velocity was 56.6 kph and the temperature at the barrier face was 14°C. The maximum post-test vehicle crash was 513 mm. The test vehicle was equipped with a 3-point continuous belt system at each of the front outboard seating positions. The 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" the driver appears to exceed the maximum 3 millisecond chest resultant. Passenger chest data is not available.

17. *Key Words*	18. *Distribution Statement* Copies of this report are available from: Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Washington, DC 20590		
19. *Security Classif. (of this report)* UNCLASSIFIED	20. *Security Classif. (of this page)* UNCLASSIFIED	21. *No. of Pages*	22. *Price*

Form DOT F1700.7 (8-69)

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Section 1

PURPOSE AND TEST PROCEDURE

This 56.6 kph frontal barrier impact test is part of the Composite FY 92 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-02121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.6 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 MS5402

A load cell barrier consisting of 36 load cells was impacted by a 1995 Mazda Protege DX 4-Door Sedan at a velocity of 56.6 kph. The test was performed at the Calspan Corporation Advanced Technology Center on November 8, 1994. 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. 45) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 93 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 - Chest X, Y and Z - did not record accurately.

The driver's HIC was 845.6. The maximum chest deceleration over 3 milliseconds was 60.4 g's and maximum chest deflection was 40.8 mm. Femur loads were -3322.4 newtons on the left femur and -2363.5 newtons on the right femur.

The right front passenger's HIC was 996.3. Maximum chest deceleration is not available. The maximum chest deflection was 36.7 mm. Femur loads were -6118.0 newtons on the left and -5563.8 newtons on the right.

Table 1

GENERAL TEST AND VEHICLE DATA

Vehicle Year/Make/Model/Body Style: 1995 Mazda Protege DX 4-Door Sedan

NHTSA Test No.: MS5402 VIN.: JM1BA1410S0102786

Body Color: Tan Date of Manufacture: 6/94

Date Received: 9/9/94

Odometer Reading: 00021

Engine:	4	Cylinders;	-	C.I.D.;	1.5	Liters;	-	CC
	X	Gas;	-	Diesel;	-	Turbocharged		
	-	Longitudinal;			X	Transverse		
Transmission:	4	Speed;	-	Manual;	X	Automatic;	X	Overdrive
Final Drive:	X	Front Wheel;	-	Rear Wheel;	-	Four Wheel		
Accessories:	X	A/C;	X	P/S;	X	P/B;	-	P/wdo
	X	Tilt Wheel;	-	P/seats;	-	Cruise Control	-	Other

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

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

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

Recommended Tire Size: P175/70R13

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

Tires on Vehicle: P175/70R13 Manufacturer: Bridgestone

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) = 385 kgs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 45 kgs.

GVWR 1580 kgs. GAWR: Front 850 kgs. Rear 740 kgs.

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

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

Right Front = 355 kgs. Right Rear = 190 kgs.

Left Front = 353.5 kgs. Left Rear = 203.5 kgs.

TOTAL FRONT WEIGHT = 708.5 kgs. (64.3 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 393.5 kgs. (35.7 % of Total Vehicle Weight)

TOTAL DELIVERED WEIGHT = 1,102.0 kgs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1102 kgs.

VCW = Vehicle Capacity Weight 385 kgs.

DSC = Designated Seating Capacity 5

RCLW = VCW - 68 (DSC) = 45 kgs.

Target Test Weight = UDW + RCLW + (2 dummies x 74.4 kgs./ dummy)

Target Test Weight = 1295

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 30 KGS CARGO:

Right Front = 370 kgs. Right Rear = 267 kgs.

Left Front = 379 kgs. Left Rear = 264 kgs.

TOTAL FRONT WEIGHT = 749 kgs. (58.5 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 531 kgs. (41.5 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 1,280 kgs.

Weight of ballast secured in vehicle trunk area = 0 kgs.

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude:	RF	656	LF	649	RR	675	LR	675
Test Attitude:	RF	650	LF	647	RR	617	LR	615

Wheel Base: 2605 mm.; C.G. = 1094 mm. rearward of front wheel C/L

Remarks: 46.5 liters of stoddard solvent was placed in the fuel tank.

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

POST -IMPACT DATA:

Type of Test:	Frontal Barrier	Impact Angle:	0°
Date of Test:	November 8, 1994	Time of Test:	14:25

Ambient Temperature: 14 ° C at impact area

Temperature in Occupant Compartment: 21 ° C

Windshield Molding Temperature: 21 ° C

Required Impact Velocity Range: 55.5 to 57.1 kph

Impact Velocity: primary = 56.6 kph, secondary = 56.6 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	4275	C_L	4430	L	4291
	Post-test = R	3839	C_L	3917	L	3865
	Crush = R	436	C_L	513	L	426

Distance from front of test vehicle to point of impact:

R	415	C_L	396	L	426

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Airbag	Airbag
Chest	No contact	No contact
Abdomen	No contact	No contact
Left Knee	Lower dash and steering column	Glove box door
Right Knee	Lower dash	Glove box door

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

	Front		Rear	
	Left	Right	Left	Right
Door Opening	Operable	Operable	Operable	Operable

	Front		Rear	
Seat Movement	Left	Right	Left	Right
Seat Back Failure	None	None	N/A	N/A
Seat Shift (mm.)	0.0	0.0	N/A	N/A

Glazing Damage

Backlight/Windshield: Windshield sustained stress fractures but remained intact

Other Notable Impact Effects: None.

Section 3

OCCUPANT AND VEHICLE INFORMATION

I. DATA

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

Table 2

DUMMY INJURY CRITERIA VALUES

NHTSA No.: MS5402 Vehicle: 1995 Mazda Protege DX 4-Door Sedan

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-76.8	-15.9	23.2	80.3
Position #2 - Passenger	-74.2	11.3	35.1	80.1

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R*
Position #1 - Driver	-61.6	8.9	-9.7	60.4
Position #2 - Passenger	N/A	N/A	N/A	N/A

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

	MAXIMUM FORCE - FEMUR LOAD (nwt)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	-3322.4	-2363.5
Position #2 - Passenger	-6118.0	-5563.8

	MAXIMUM FORCE - SEAT BELT LOADS (nwt)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	8616.9	-	2538.8
Position #2 - Passenger	7768.3	2422.1	-

	HEAD INJURY CRITERIA (HIC)			
	HIC**	t_1 (mSec)	t_2 (mSec)	Average Acceleration t_1 to t_2
Position #1 - Driver	845.6	51.84	87.12	56.47
Position #2 - Passenger	996.3	54.0	83.04	65.19

** HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

Table 3

HYBRID III NECK AND CHEST DATA SHEET

Vehicle Year/Make/Model/Body Style: 1995 Mazda Protege DX 4-Door Sedan

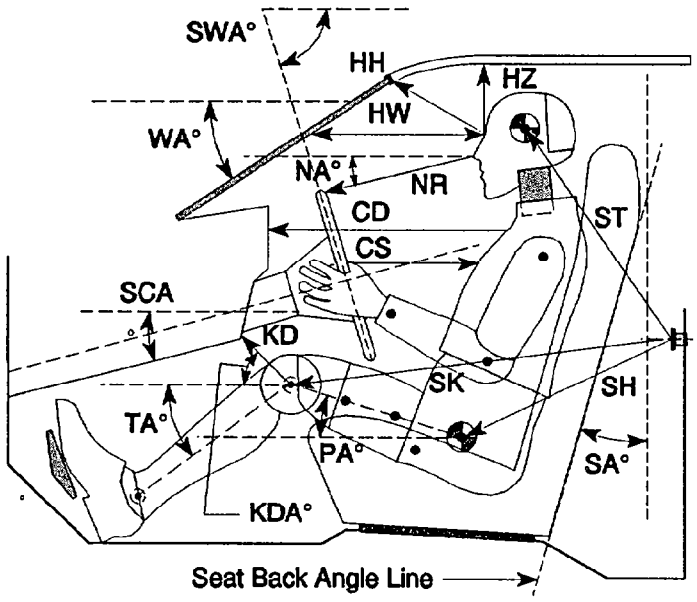
Vehicle NHTSA No.: MS5402 Test Date: November 8, 1994

MAXIMUM VALUES	DRIVER DUMMY ID #150:	PASSENGER DUMMY ID #45:
Neck Load X (nwt)	422.4	-943.2
Neck Load Y (nwt)	199.0	150.8
Neck Load Z (nwt)	2594.9	2277.8
Neck Moment X (nwt-m)	21.2	-12.8
Neck Moment Y (nwt-m)	-28.5	58.5
Neck Moment Z (nwt-m)	18.6	15.4
Chest Deflection X (mm.)	40.8	36.7
Time of Max. Occurrence (msec)	73.6	68.4

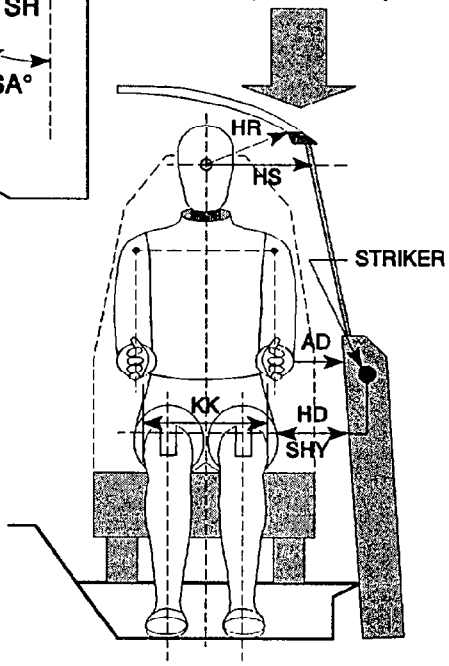
Note: All values listed occur during the primary impact event.

Figure 1

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



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



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

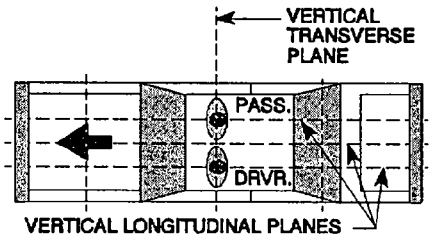


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Table 4

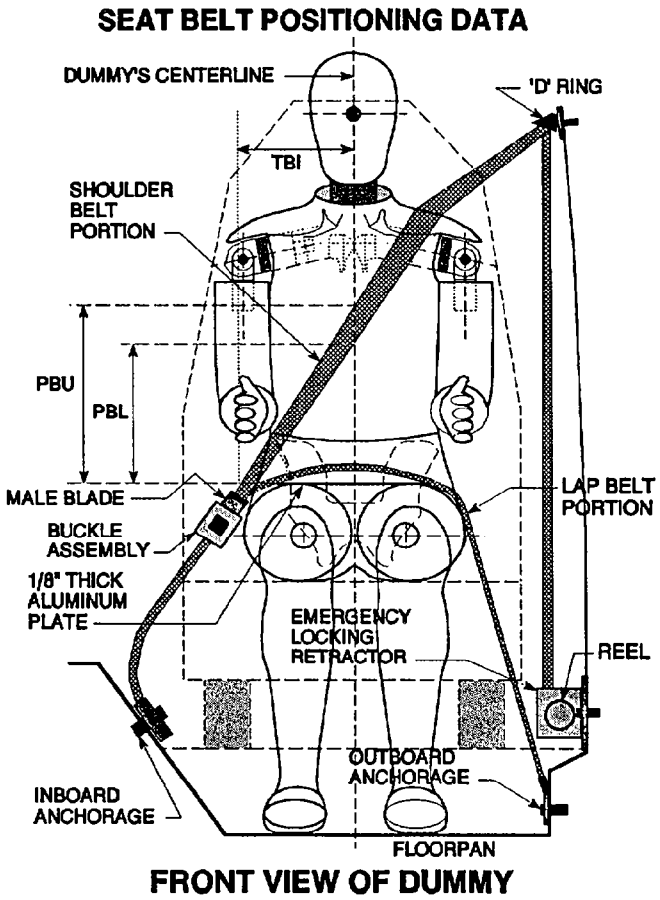
FRONT SEAT OCCUPANT MEASUREMENTS

	DRIVER (Serial #150)			PASS. (Serial # 45)		
WA°	28 deg.			N/A		
SWA°	20 deg.			N/A		
SCA°	70 deg.			N/A		
SA°	*			*		
HZ	175			175		
HH	298			303		
HW	540			536		
HR	233			234		
NR	362	Angle	105 deg.	N/A		
CD	510			488		
CS	265			N/A		
RA	170			N/A		
KDL	152	Angle (KDA)	40 deg.	110		
KDR	160			110	Angle (KDA)	40 deg.
PA°	24 deg.			25 deg.		
TA°	45 deg.			38 deg.		
KK	270			200		
ST	540	Angle	15 deg.	528	Angle	15 deg.
SK	610	Angle	93 deg.	650	Angle	90 deg.
SH	254	Angle	120 deg.	272	Angle	118 deg.
SHY	210			210		
HS	250			270		
HD	188			180		
AD	130			125		

* Seat back adjusted to 5th notch as recommended.

Figure 2

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	320	310
PBL-- Top surface of alum. plate to belt lower edge	240	230
LAP BELT TENSION	-	-
SHOULDER BELT TENSION	Retractor	Retractor

Table 5

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	1940 mm	1940 mm
Shoulder belt length as measured on Part 572 Dummy.	910 mm	910 mm
Lap belt length as measured on Part 572 Dummy.	860 mm	860 mm
SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis.	38 mm	38 mm
As determined mechanically.	35 mm	36 mm
As determined electronically.	N/A	N/A
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	130 mm/M	200 mm/M
Measured mechanically.	50 mm/M	0.0 mm/M

Figure 3

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 6.

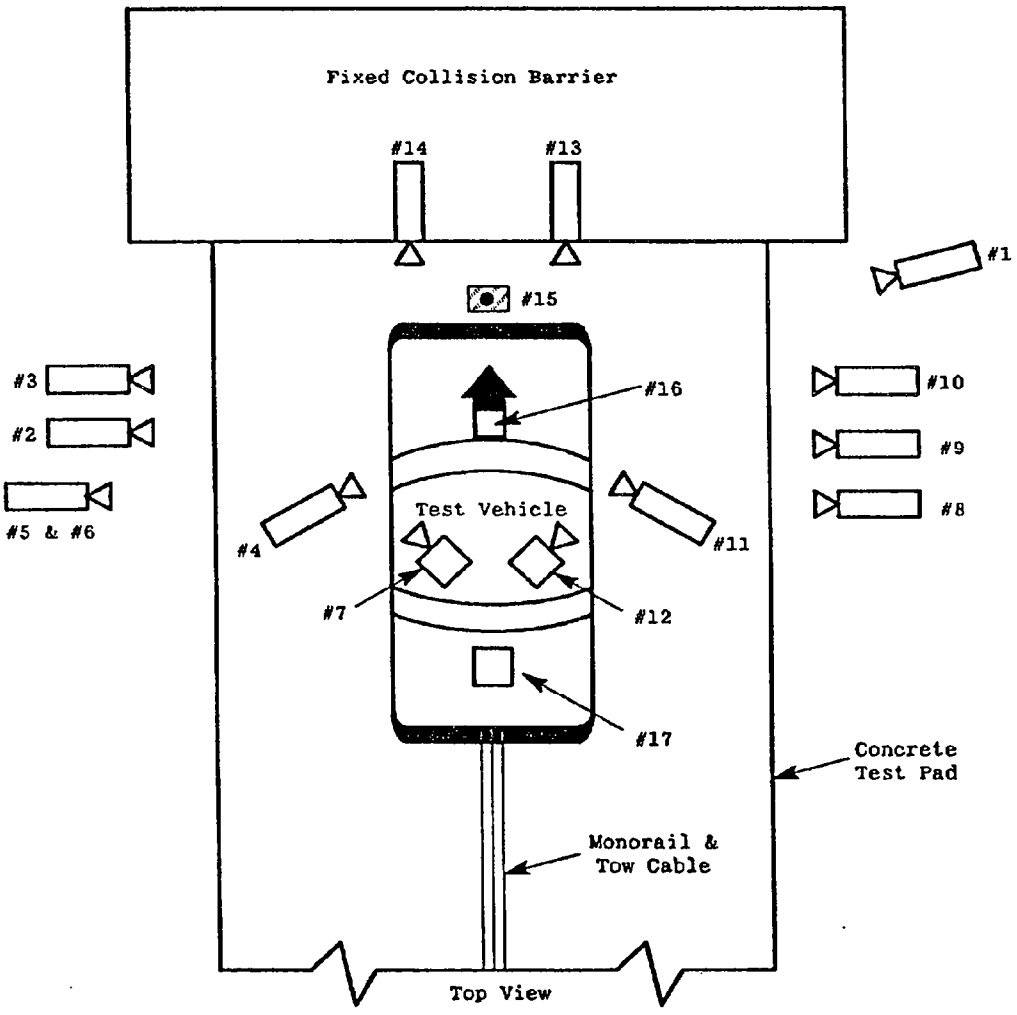


Table 6
HIGH-SPEED CAMERA LOCATIONS

Test No. MS5402 Vehicle: 1995 Mazda Protege DX 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (MM.)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	6020	1550	1041	-3	5617	13	1010
3	Left Side View	8382	1016	1041	-3	7979	25	990
4	Driver and Interior View	2946	2464	1753	-19	2543	13	950
5	Steering Column (Bottom)	7162	1956	1168	-4	6759	25	1110
6	Steering Column (Top)	7162	1956	1778	-9	6759	25	1080
7	Left Belt	-	-	-	-	-	8	660
8	Overall Right Side	6042	2108	1067	-4	5639	13	1050
9	Right Side View	8382	2134	1041	-3	7979	25	990
10	Right Passenger View	8390	1498	1473	-4	7987	35	800
11	Passenger and Interior View	2718	2336	1753	-20	2315	13	1070
12	Right Belt	-	-	-	-	-	8	N.T.
13	Passenger Front View	560	127	1778	-40	-	13	1000
14	Driver Front View	560	127	1778	-40	-	13	1010
15	Windshield View	0	0	3048	-60	-	13	1090
16	Pit View of Engine	0	510	-3058	90	-	13	890
17	Pit View of Fuel Tank	0	3440	-3058	90	-	13	940

*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	327
B	517
C	892
D	2260
E	160
F	1525
G	892
H	890
I	116
J	1254
K	1006
L	1278
M	160
N	100
O	891
P	892
Q	1278
R	991
S	1269

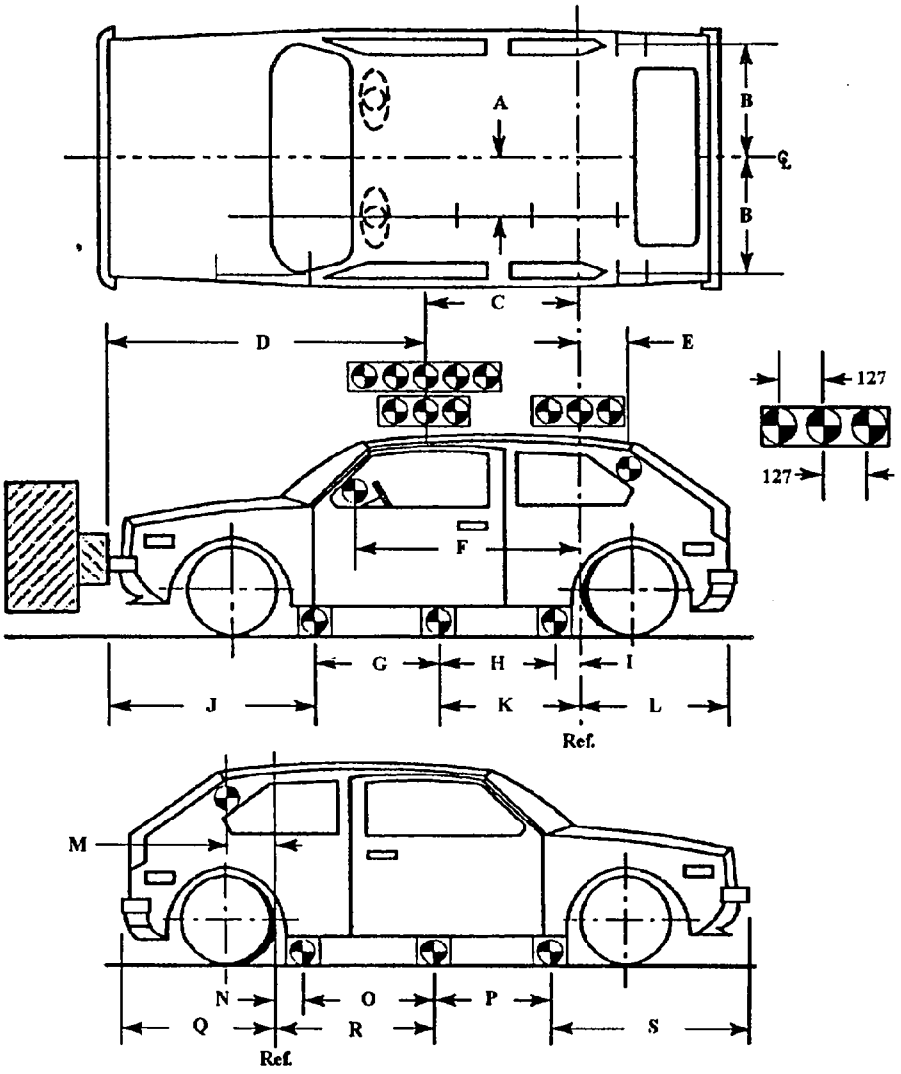
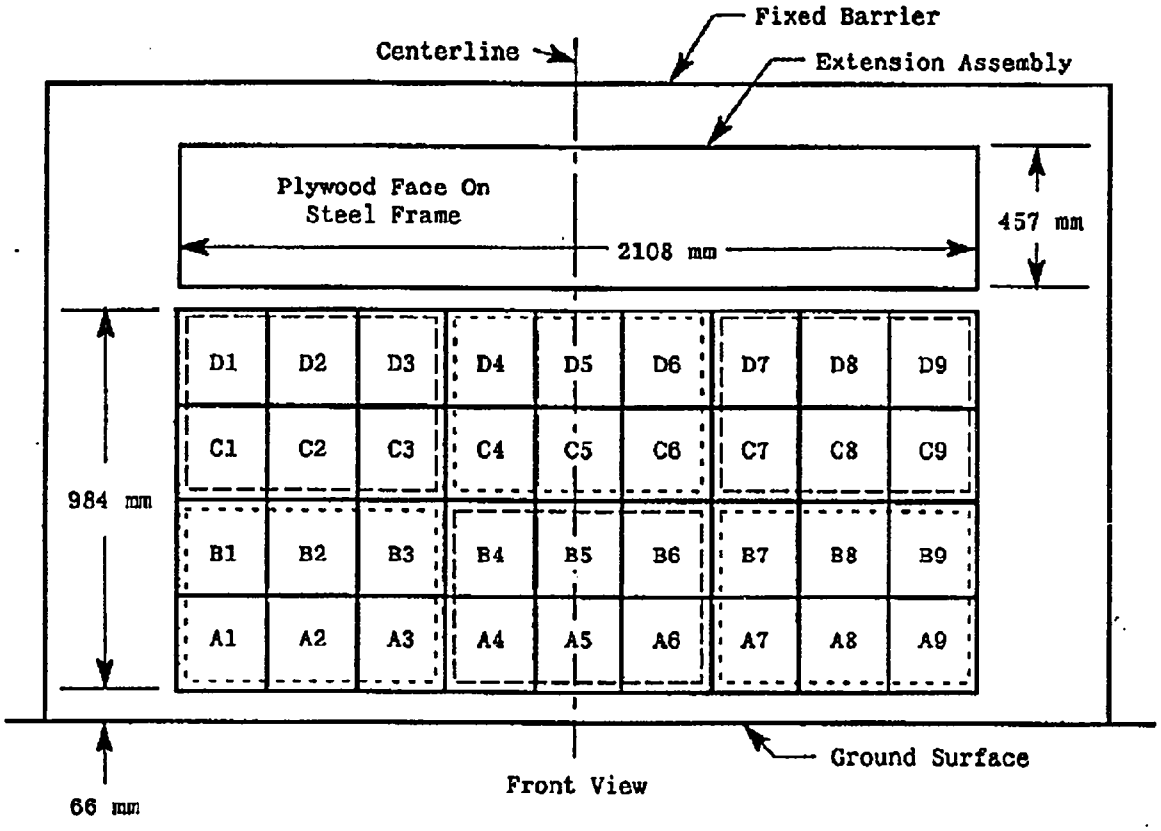


Figure 5

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

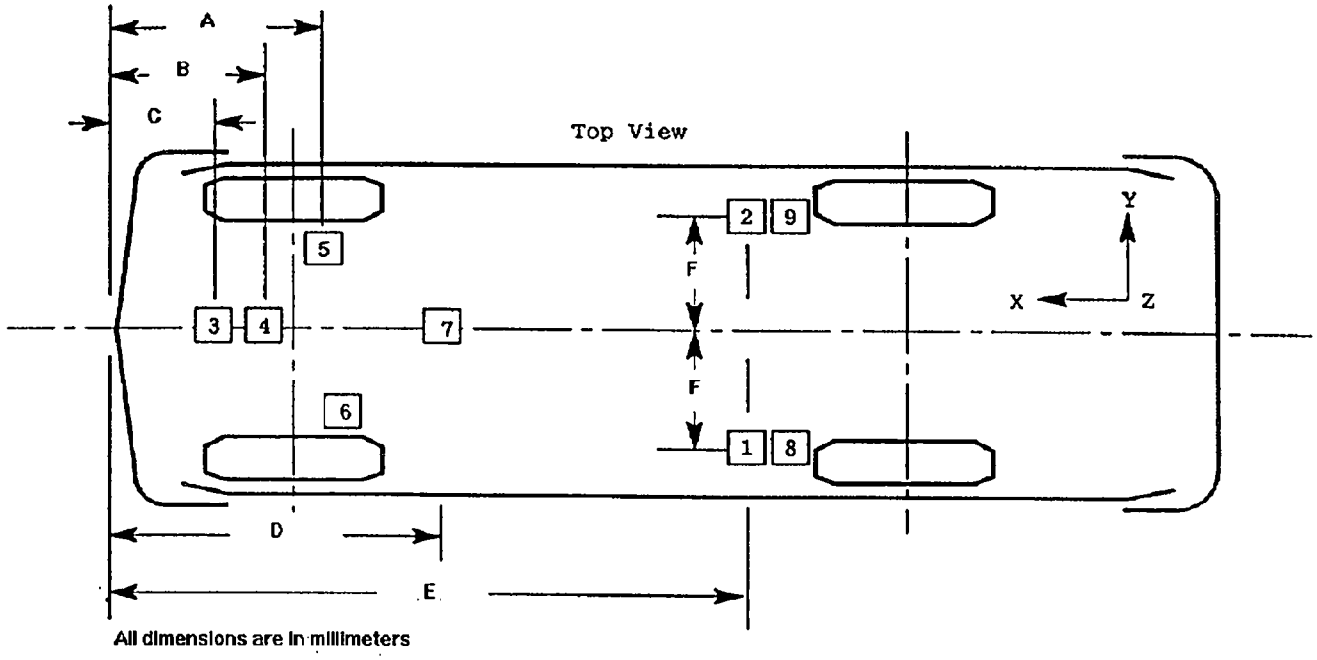
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

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

Figure 6

VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	Distances From Vehicle Front All dimensions in millimeters	
1	Left Rear Seat Crossmember [E/F]	X = 2684	Y = 427
2	Right Rear Seat Crossmember [E/F]	X = 2684	Y = 427
3	Top of engine [C]	710	
4	Bottom of engine [B]	780	
5	Right Disc Brake Caliper [A]	892	
6	Left Disc Brake Caliper [A]	892	
7	Instrument Panel [D]	1623	
8	Left Rear Seat Crossmember [E/F]	X = 2684	Y = 427
9	Right Rear Seat Crossmember [E/F]	X = 2684	Y = 427

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

Figure 7

TEST VEHICLE MEASUREMENTS

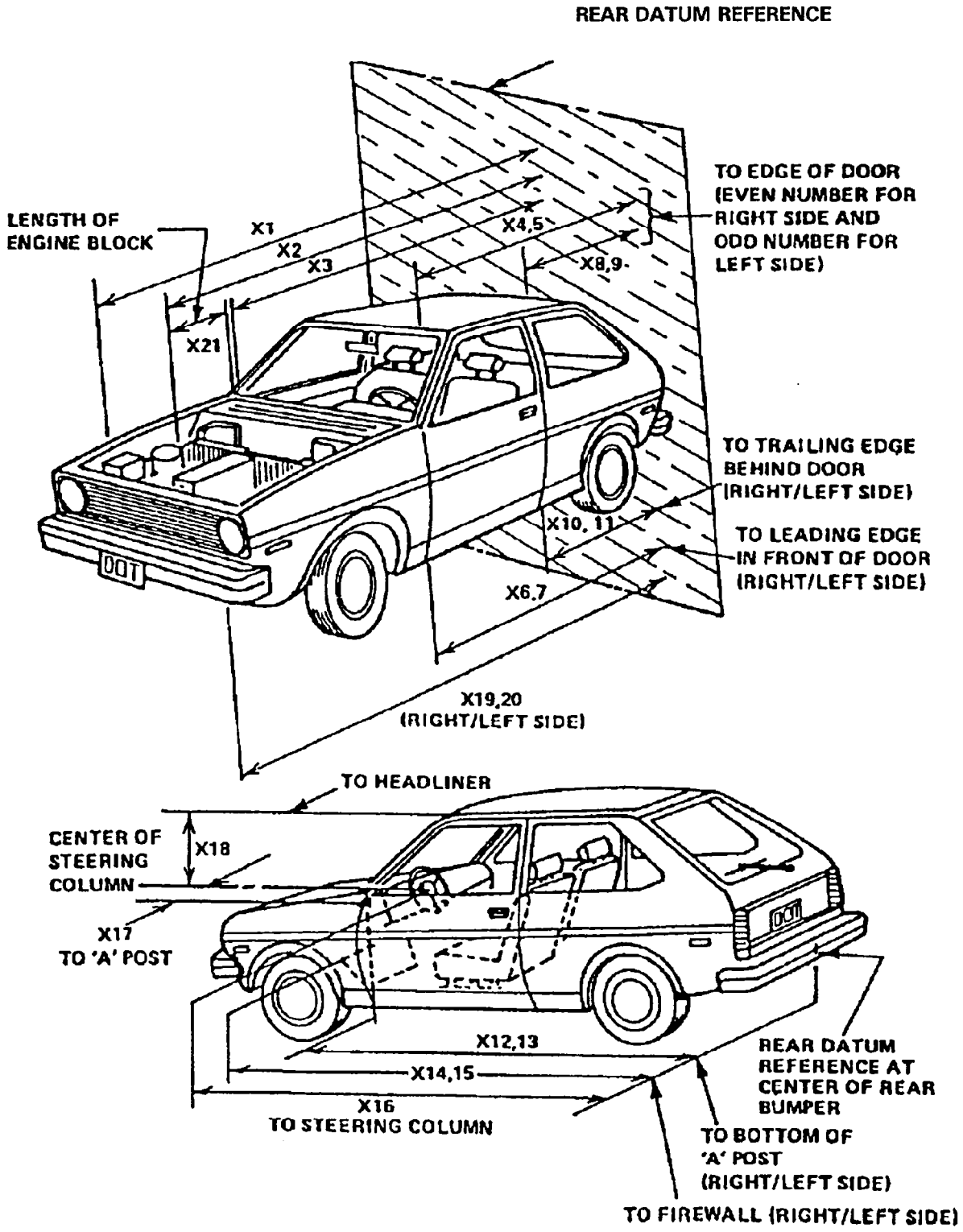


Table 7

VEHICLE MEASUREMENTS

		All Dimensions in mm		
No.		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	4430	3917	513
X2	Rear Surface of Vehicle to Front of Engine	3930	3685	245
X3	Rear Surface of Vehicle to Firewall	3460	3270	190
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3075	3076	-1
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3086	3099	-13
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3081	3071	10
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3094	3093	1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2035	2047	-12
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2061	2069	-8
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2026	2024	2
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2045	2041	4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3061	3060	1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3080	3067	13
X14	Rear Surface of Vehicle to Firewall, Right Side	3392	3310	82
X15	Rear Surface of Vehicle to Firewall, Left Side	3411	3320	91
X16	Rear Surface of Vehicle to Steering Column	2670	2670	0
X17	Center of Steering Column to "A" Post	412	395	17
X18	Center of Steering Column to Headliner	440	400	40
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4275	3839	436
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4291	3865	426
X21	Length of Engine Block	390	390	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2830	2805	25
CD	Rear Surface of Vehicle to Center of Dash Panel	2830	2830	0
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2835	2830	5

Table 8

ACCIDENT INVESTIGATION DIVISION DATA

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Mazda Protege DX 4-Door Sedan

Vehicle NHTSA No.: MS5402 VIN: JM1BA1410S0102786

Model Year: 1995 Build Date: 6/94 Test Date: November 8, 1994

Vehicle Size Category: Compact Test Weight: 1280 Kgs

Vehicle Wheelbase: 2605 mm; Front Overhang: 1261 mm; Overall Width: 1475 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions:

C1 = 410 mm

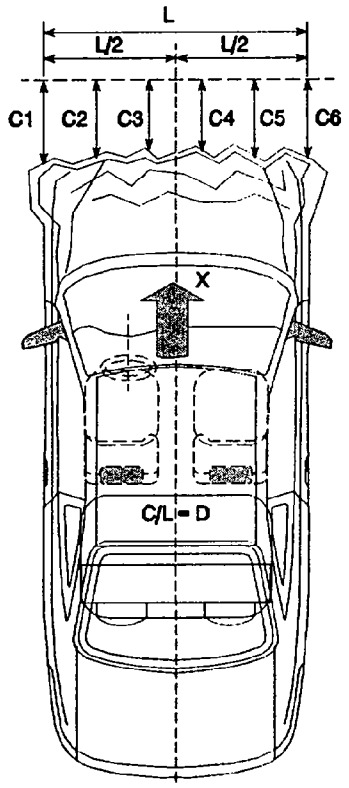
C2 = 470 mm

C3 = 501 mm

C4 = 508 mm

C5 = 487 mm

C6 = 418 mm



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

Longitude Length of Damaged Region: L= 1475 mm

Section 4

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

"Windshield Mounting" FMVSS No. 212 Data

"Windshield Zone Intrusion" FMVSS No. 219 Data

"Fuel System Integrity" FMVSS No. 301

Figure 8

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

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

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

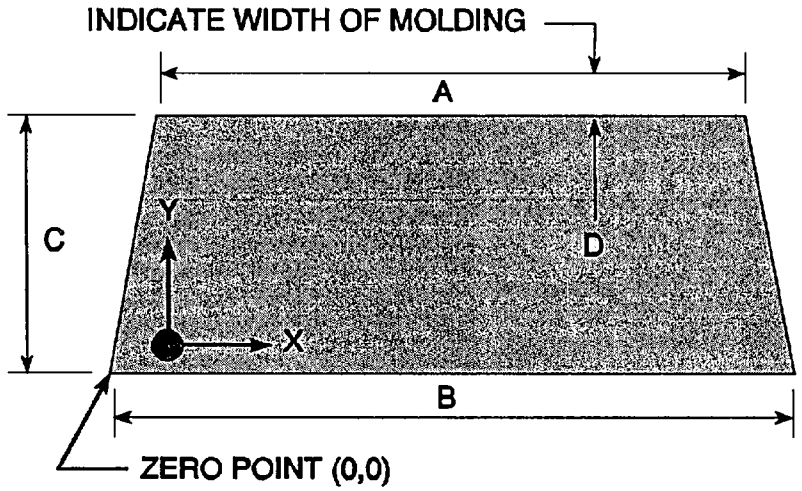
FMVSS 212 REQUIREMENTS:

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

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST(mm)	% OF RETENTION
RIGHT SIDE	2052.5	2052.5	100
LEFT SIDE	2052.5	2052.5	100
TOTAL	4,105	4,105	100

AREA OF RETENTION FAILURE:



FRONT VIEW OF WINDSHIELD

DIMENSIONS	
A	1092
B	1473
C	770
D	17

FAILURE DETAILS: None

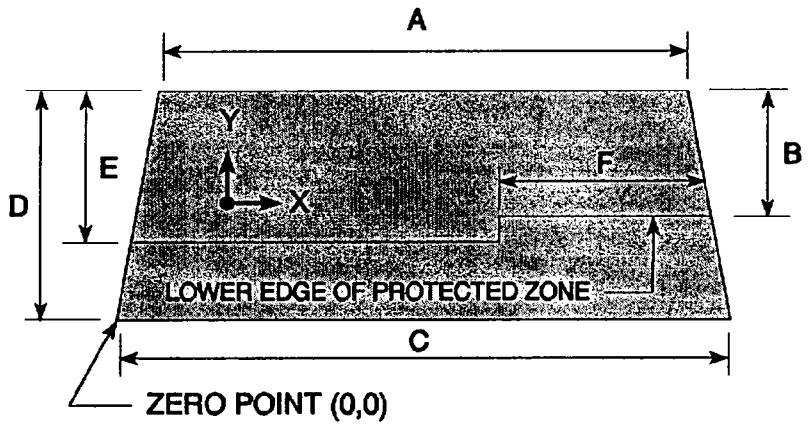
Figure 9

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA: (Dimensions in mm)



FRONT VIEW OF WINDSHIELD

DIMENSIONS	
A	1092
B	430
C	1473
D	770
E	505
F	715

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.: MS5402 TEST DATE: November 8, 1994

VEHICLE MAKE/MODEL: 1995 Mazda Protege DX

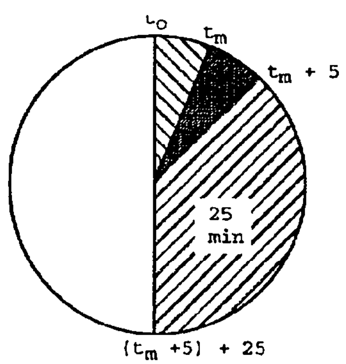
The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

= =

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:



	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	1 oz.
2. For 5 minute period after vehicle motion ceases	0	5 oz.
3. For next 25 minutes	0	1 oz./min.

SOLVENT SPILLAGE DETAILS:

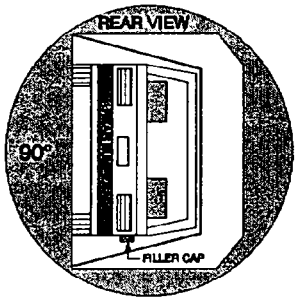
None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

Vehicle NHTSA ID No.
MS5402



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

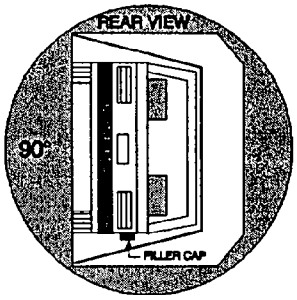
IV. SOLVENT SPILLAGE LOCATION(S): None

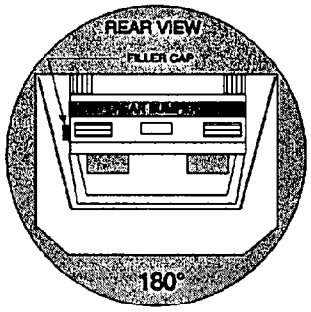
Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

Vehicle NHTSA ID No.
MS5402





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
TOTAL	7	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.

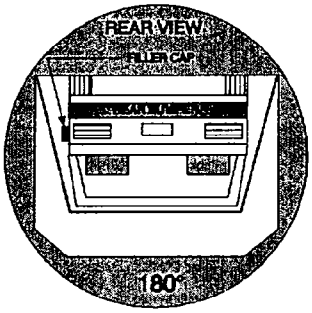
IV. SOLVENT SPILLAGE LOCATION(S): None

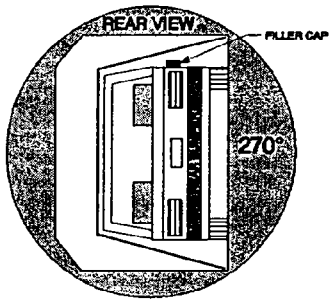
Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

Vehicle NHTSA ID No.
MS5402





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes)	2	minutes	45	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	7	minutes	45	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.

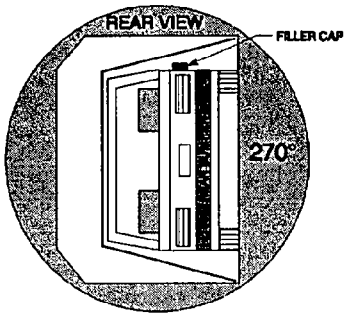
IV. SOLVENT SPILLAGE LOCATION(S): None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

Vehicle NHTSA ID No.
MS5402



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes)	2	minutes	50	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	7	minutes	50	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

Appendix A

PHOTOGRAPHS

PHOTOGRAPHS

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

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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

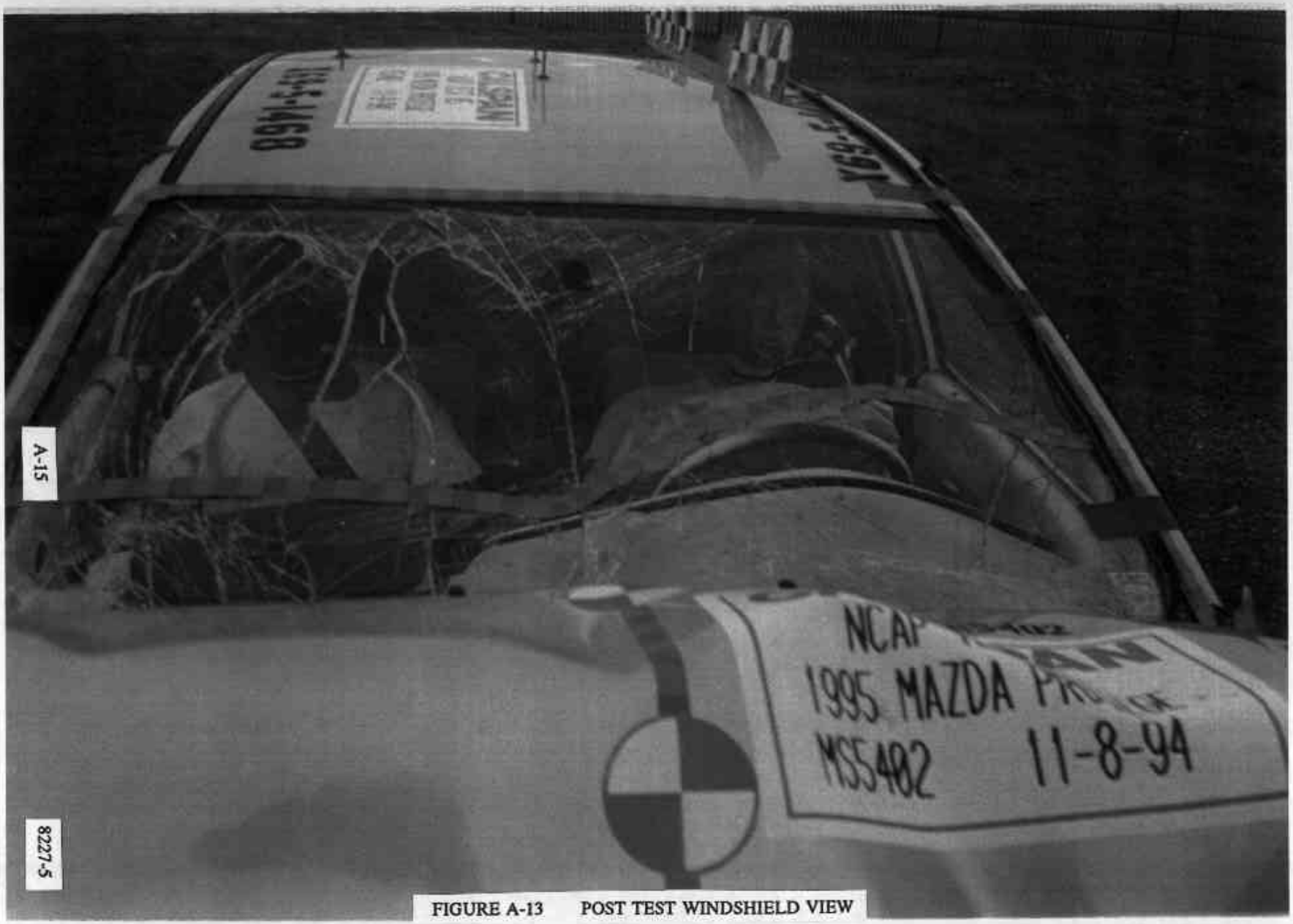

FIGURE A-13 POST TEST WINDSHIELD VIEW

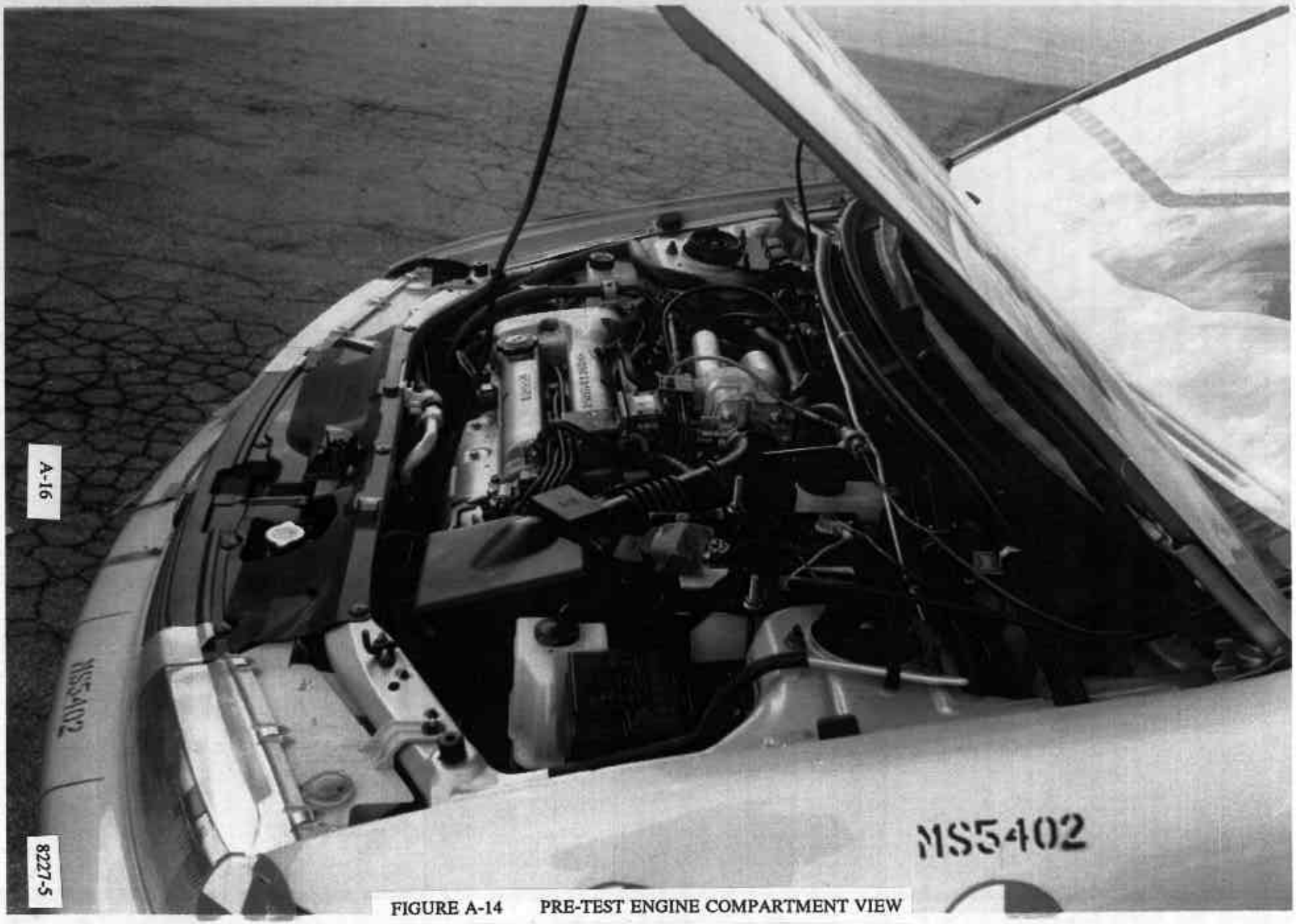

FIGURE A-14 PRE-TEST ENGINE COMPARTMENT VIEW

FIGURE A-15 FUEL CAP VIEW

FIGURE A-16 PRE-TEST FRONT UNDERBODY VIEW

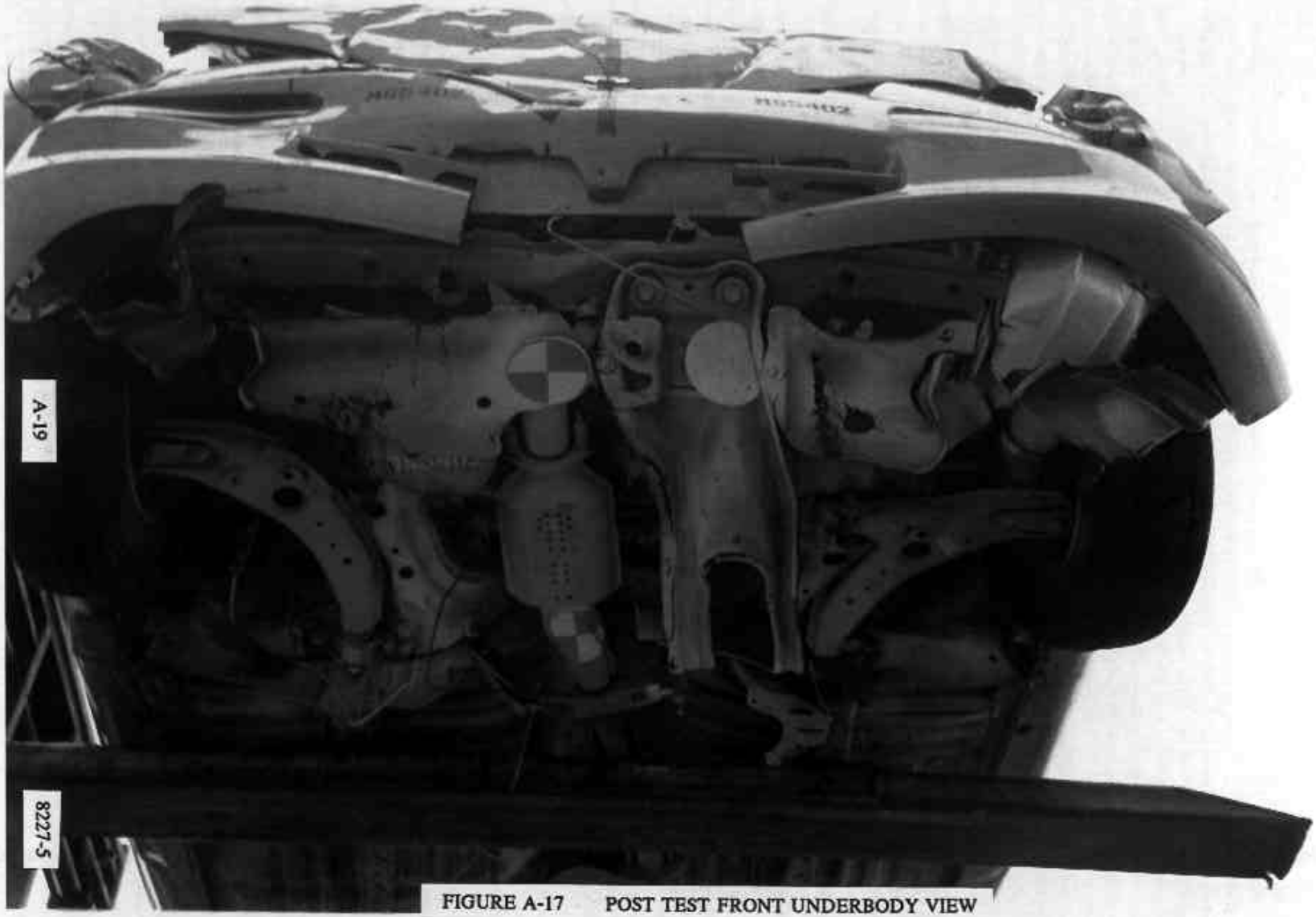

FIGURE A-17 POST TEST FRONT UNDERBODY VIEW

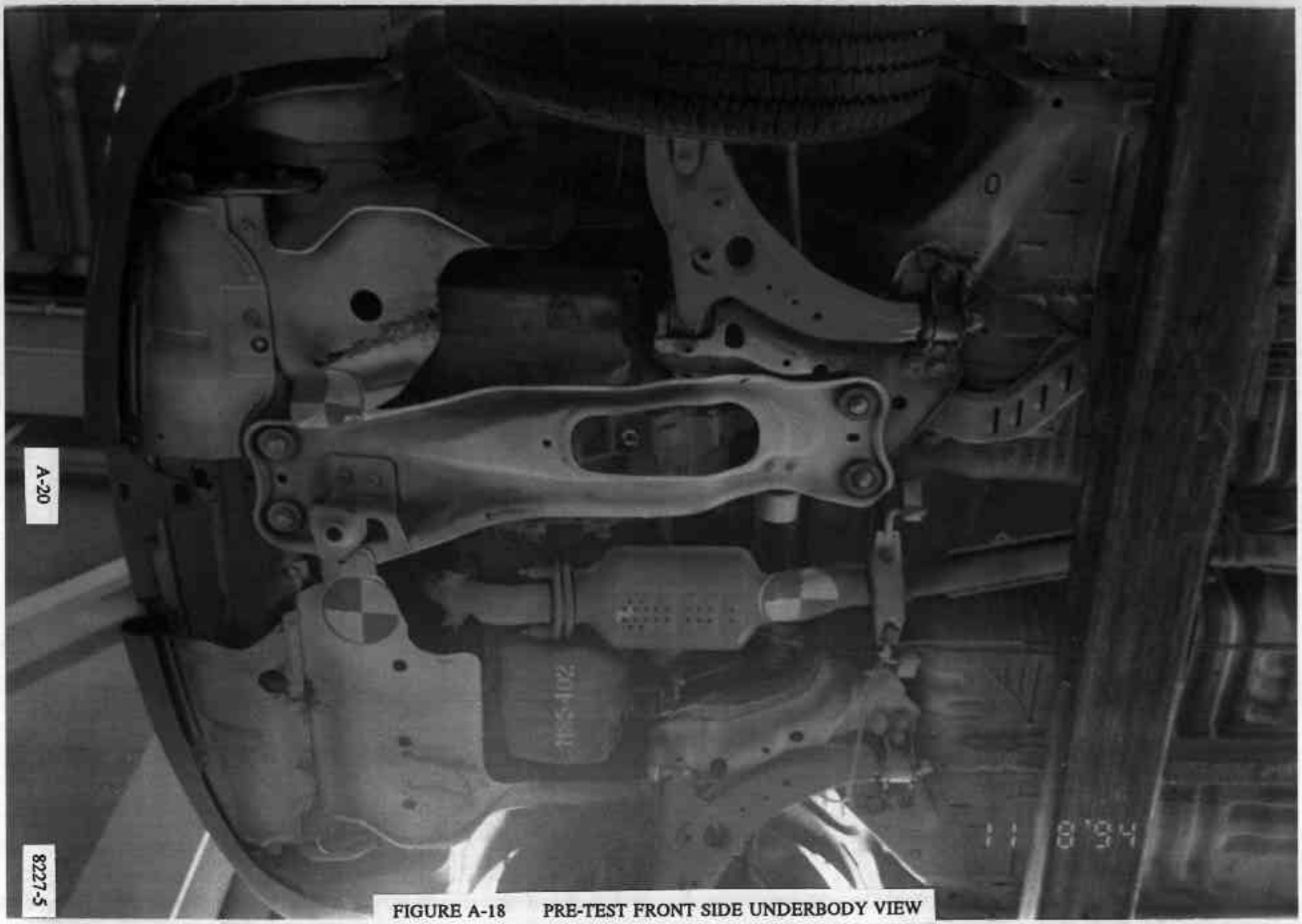

FIGURE A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

FIGURE A-19 POST TEST FRONT SIDE UNDERBODY VIEW

FIGURE A-20 PRE-TEST REAR UNDERBODY VIEW

FIGURE A-21 POST TEST REAR UNDERBODY VIEW

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FIGURE A-22 PRE-TEST DRIVER POSITION VIEW

FIGURE A-23 POST TEST DRIVER POSITION VIEW

FIGURE A-24 PRE-TEST PASSENGER POSITION VIEW

FIGURE A-25 POST TEST PASSENGER POSITION VIEW

FIGURE A-26 PRE-TEST DRIVER AND INTERIOR VIEW

FIGURE A-27 POST TEST DRIVER AND INTERIOR VIEW

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FIGURE A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

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FIGURE A-29 POST TEST PASSENGER AND INTERIOR VIEW

FIGURE A-30 IMPACT VIEW

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

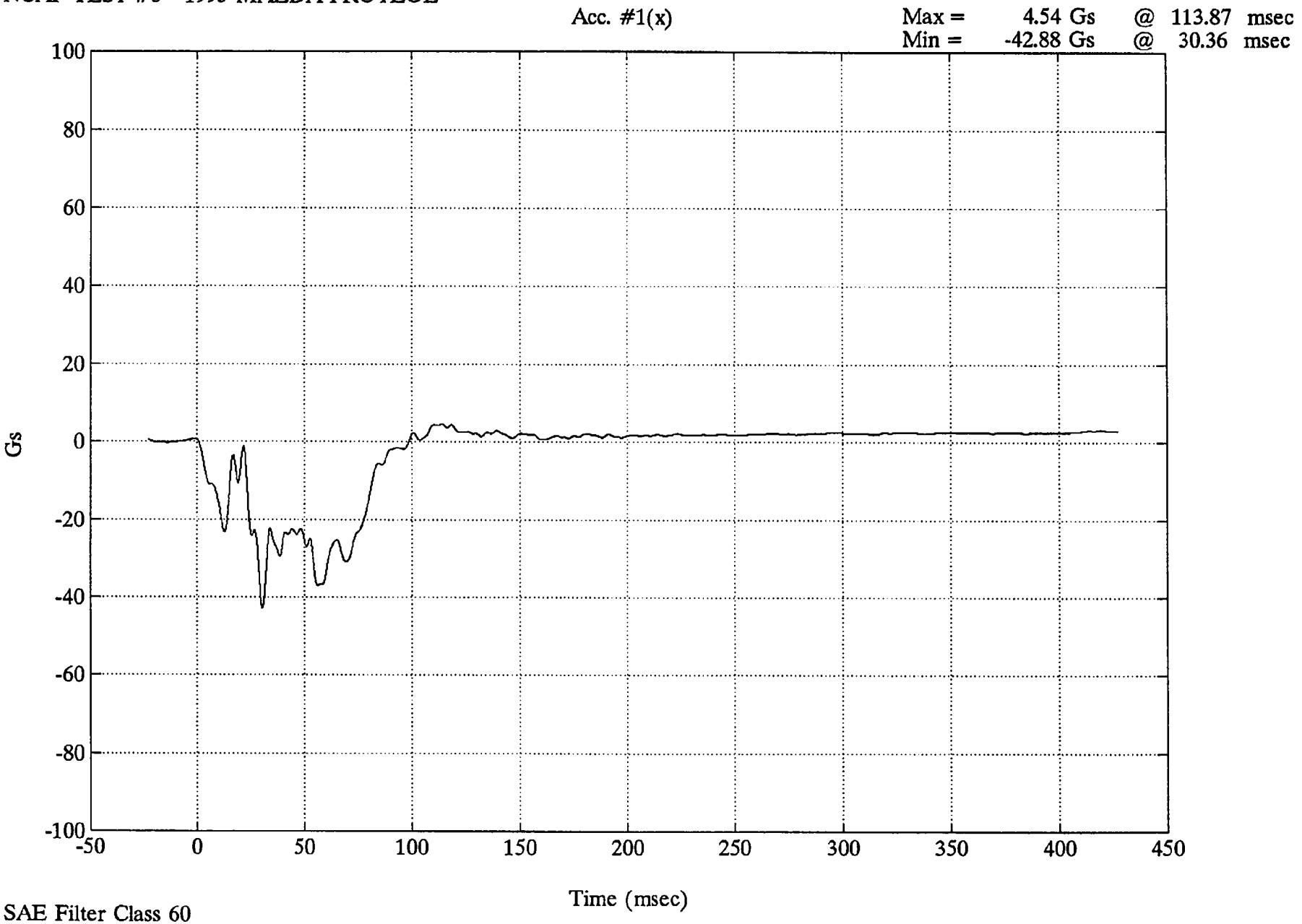
TEST NO. MS5402

VEHICLE DATA

FILTER CHANNEL CLASS

60

NCAP TEST #5 - 1995 MAZDA PROTEGE



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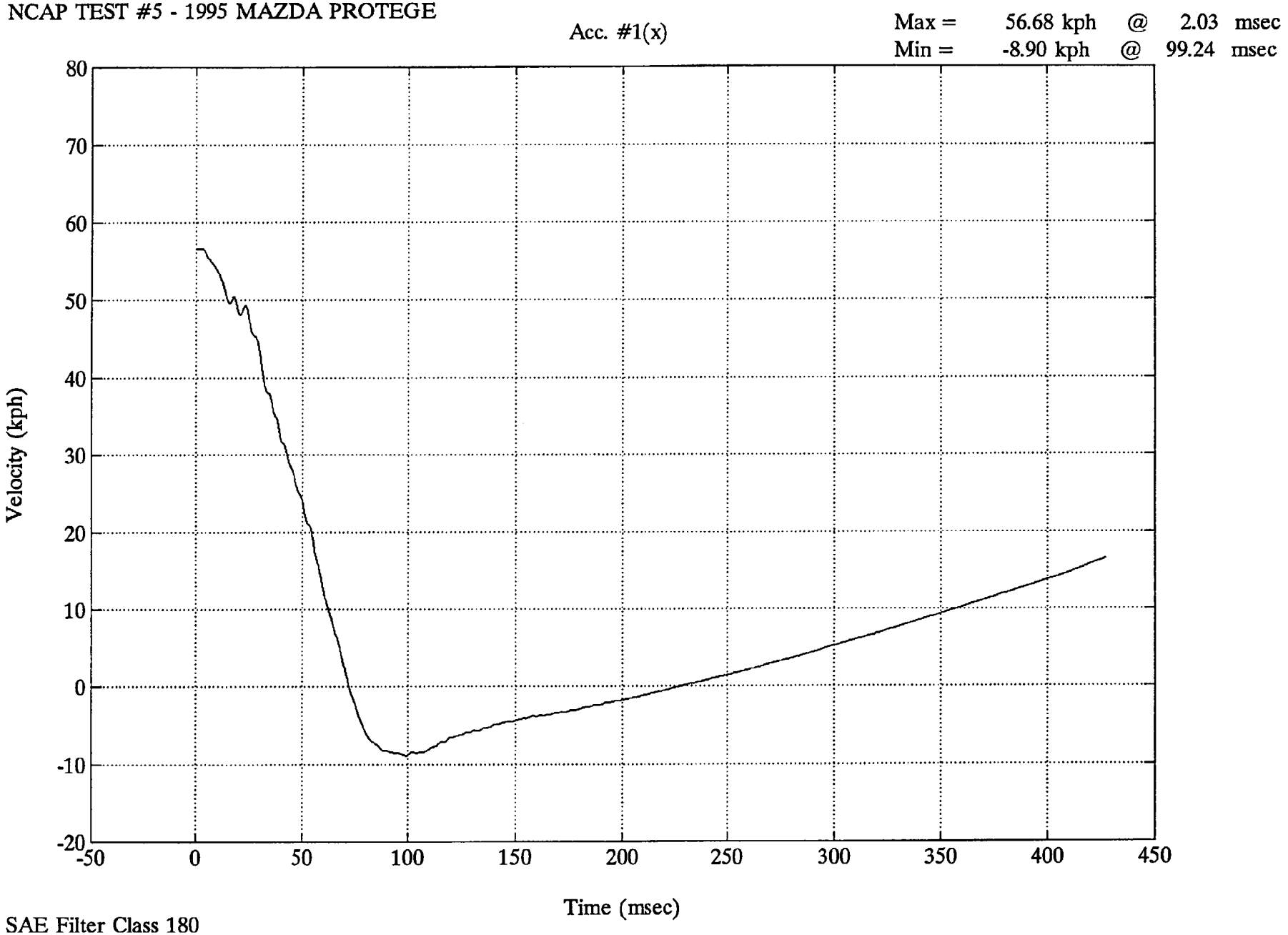
8227-5

SAE Filter Class 60

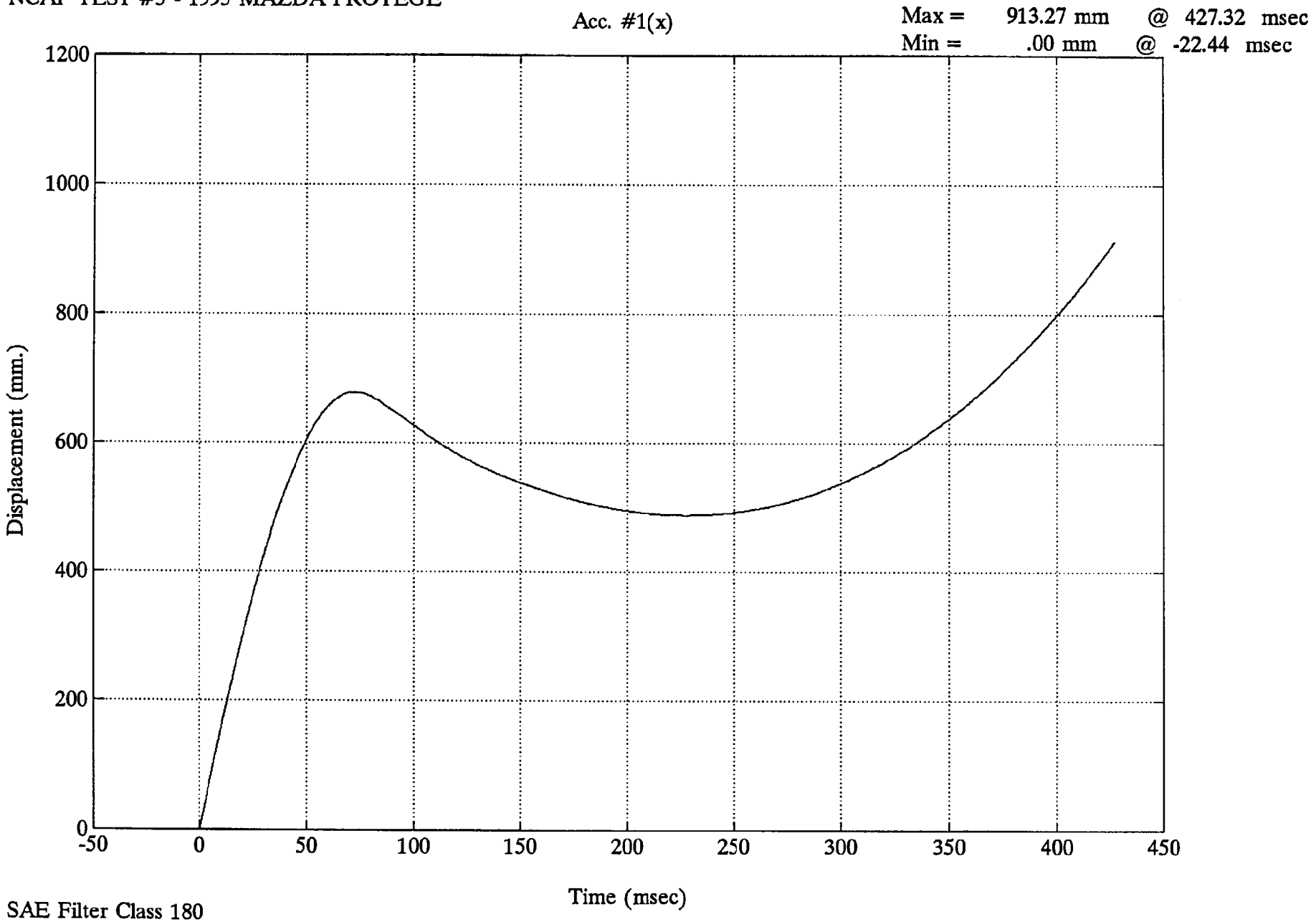
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

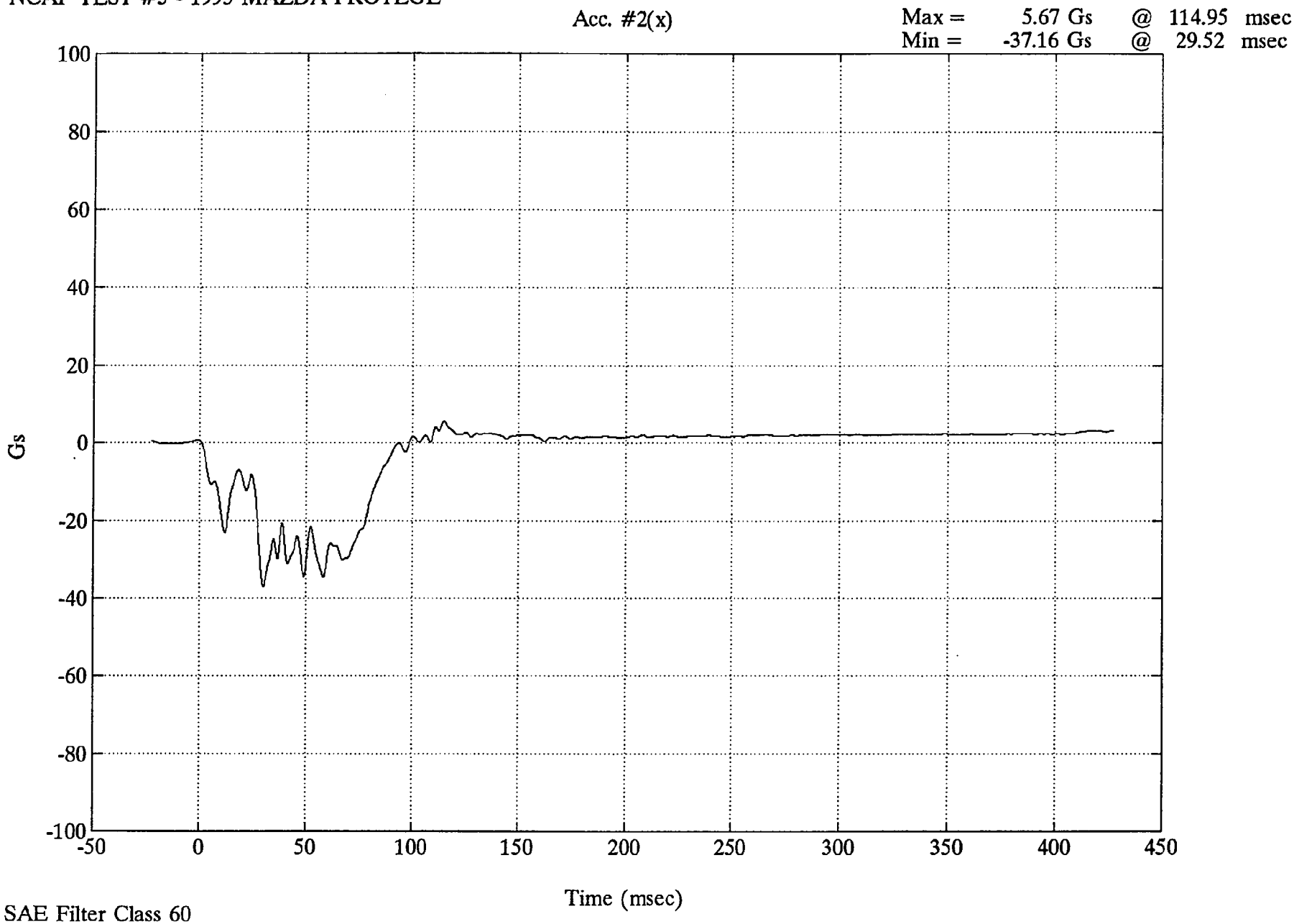
8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

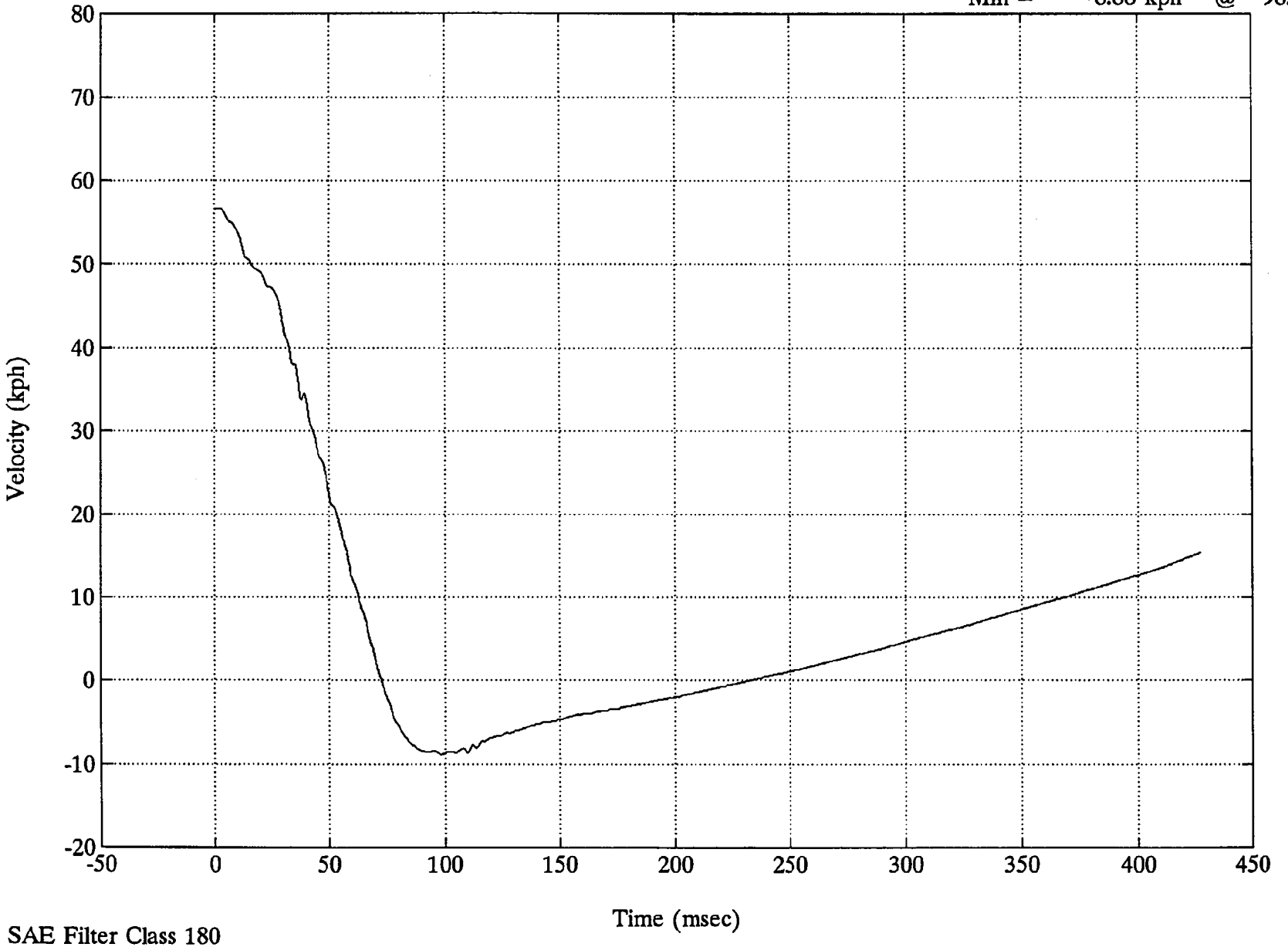


SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

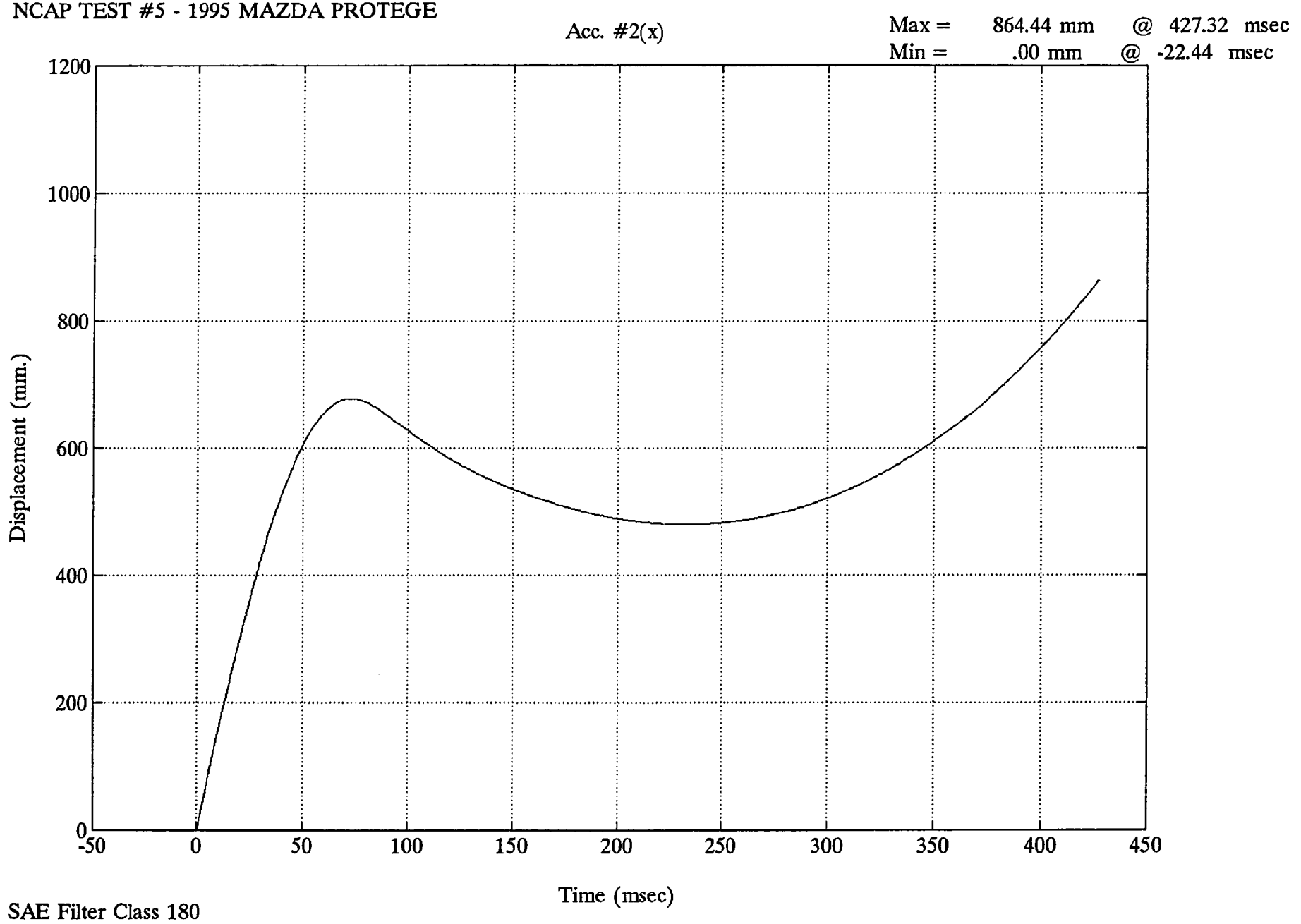
Acc. #2(x)

Max = 56.65 kph @ 2.27 msec
Min = -8.88 kph @ 98.28 msec



SAE Filter Class 180

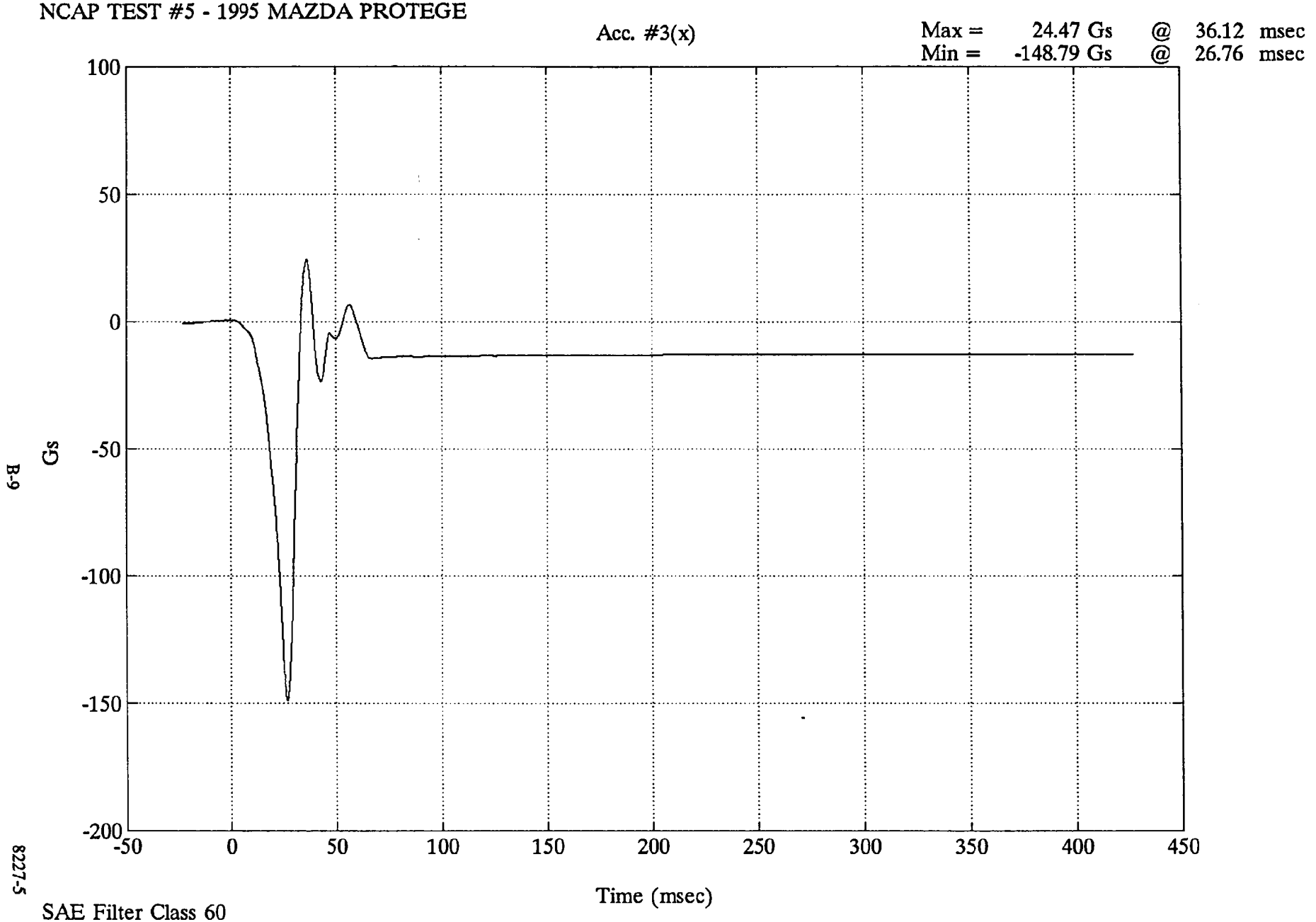
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



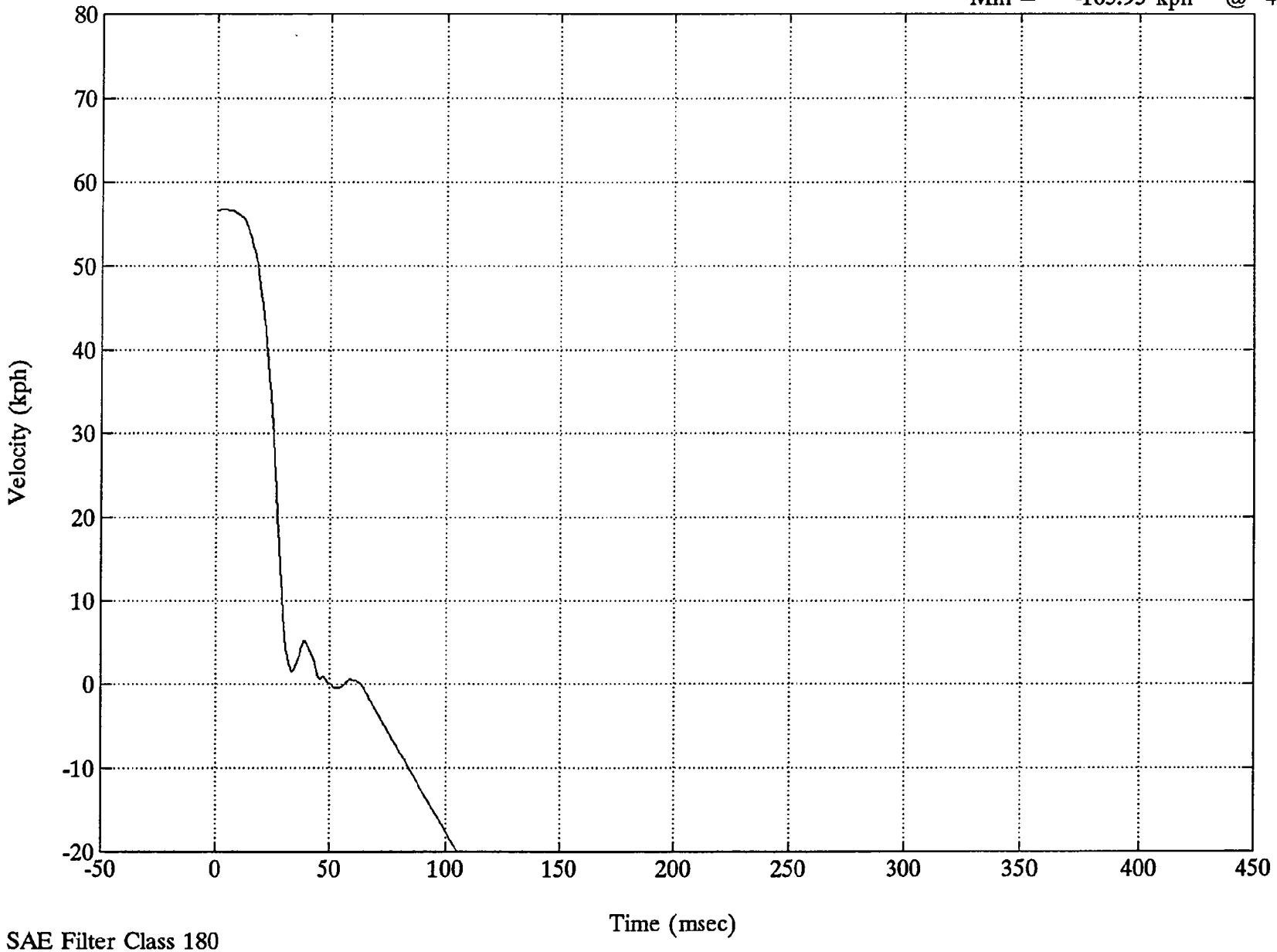
SAE Filter Class 60

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

Acc. #3(x)

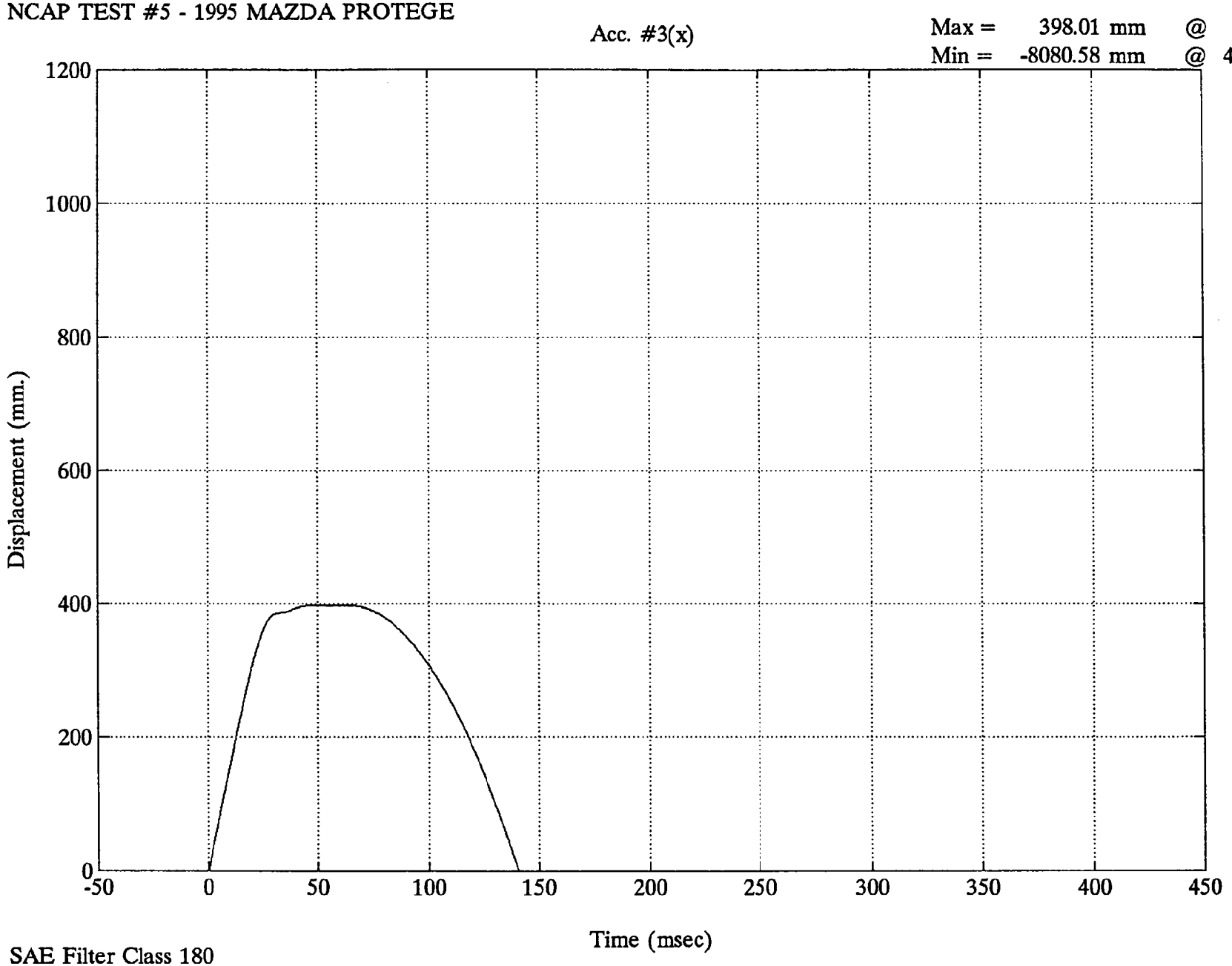
Max = 56.73 kph @ 3.71 msec
Min = -165.93 kph @ 427.32 msec



SAE Filter Class 180

8227-5

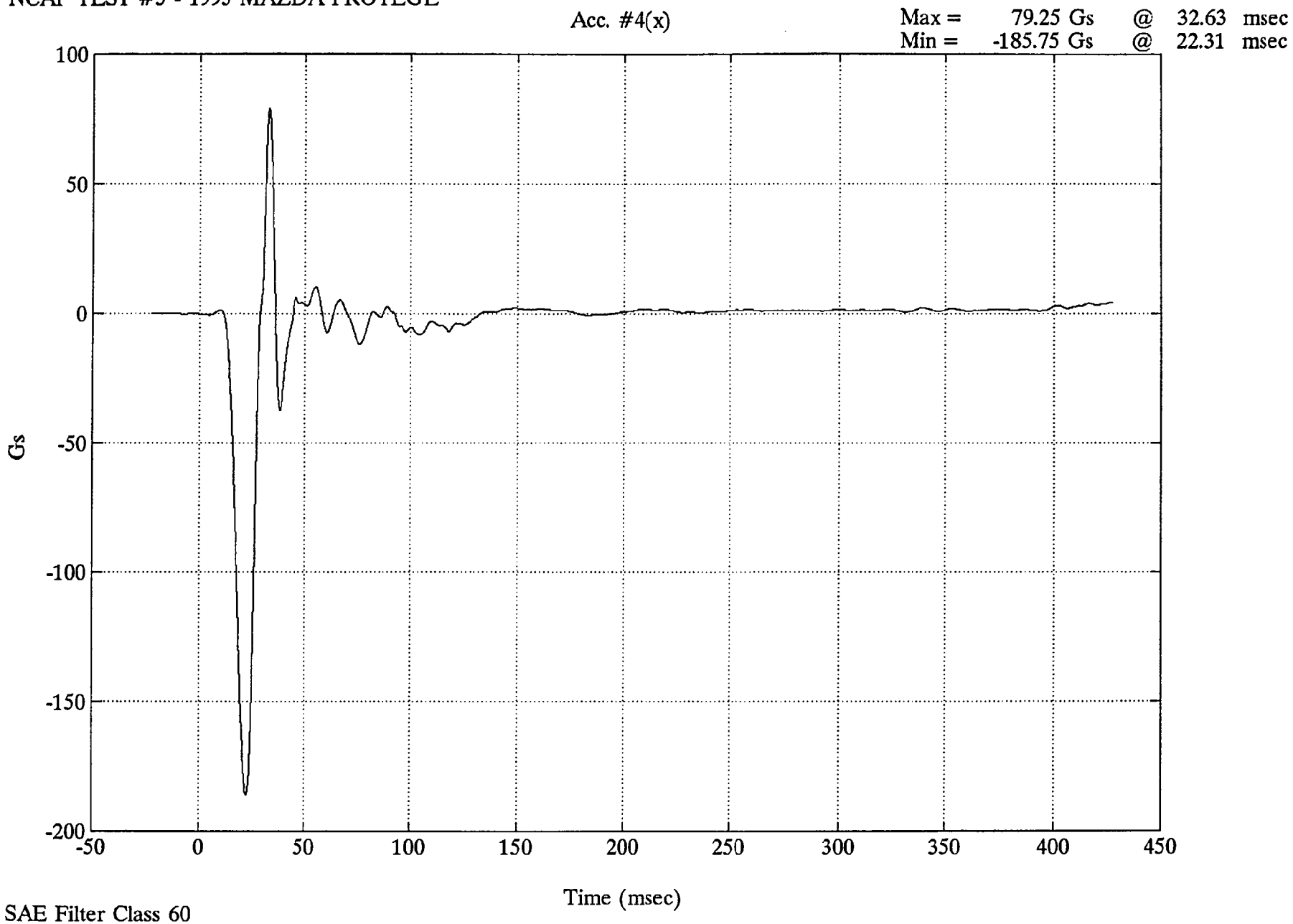
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-S

NCAP TEST #5 - 1995 MAZDA PROTEGE



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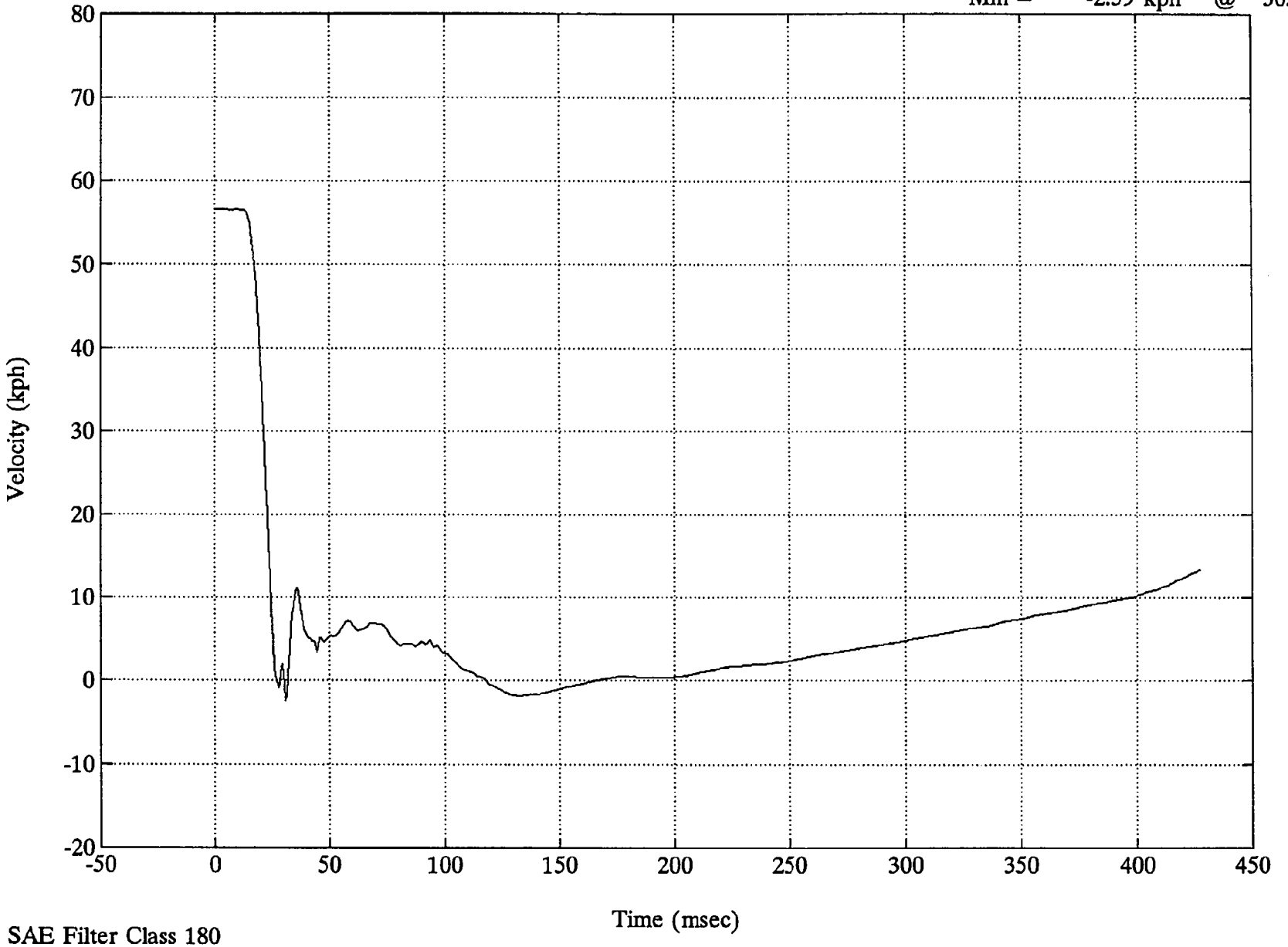
8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

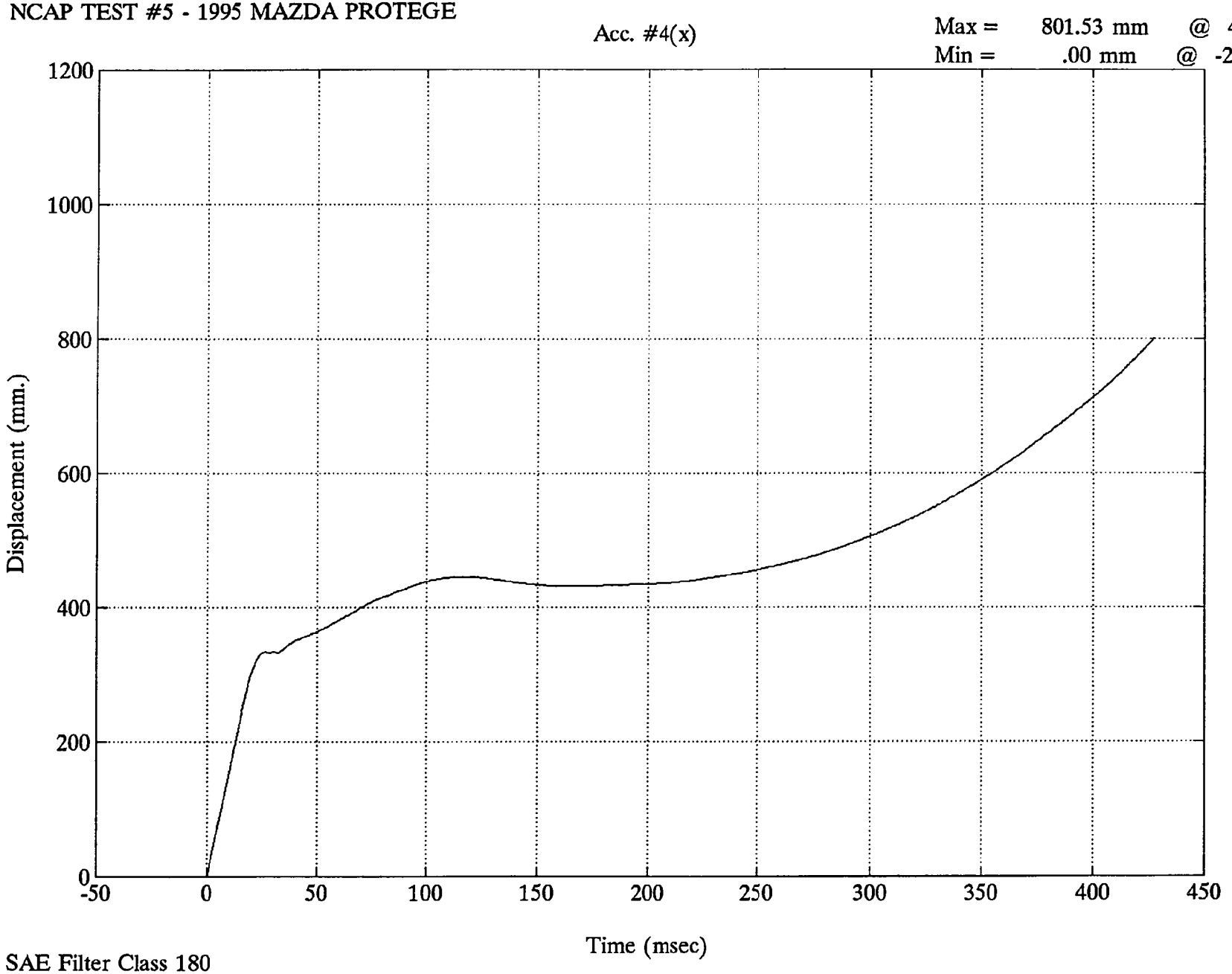
Acc. #4(x)

Max = 56.65 kph @ -0.00 msec
Min = -2.59 kph @ 30.72 msec



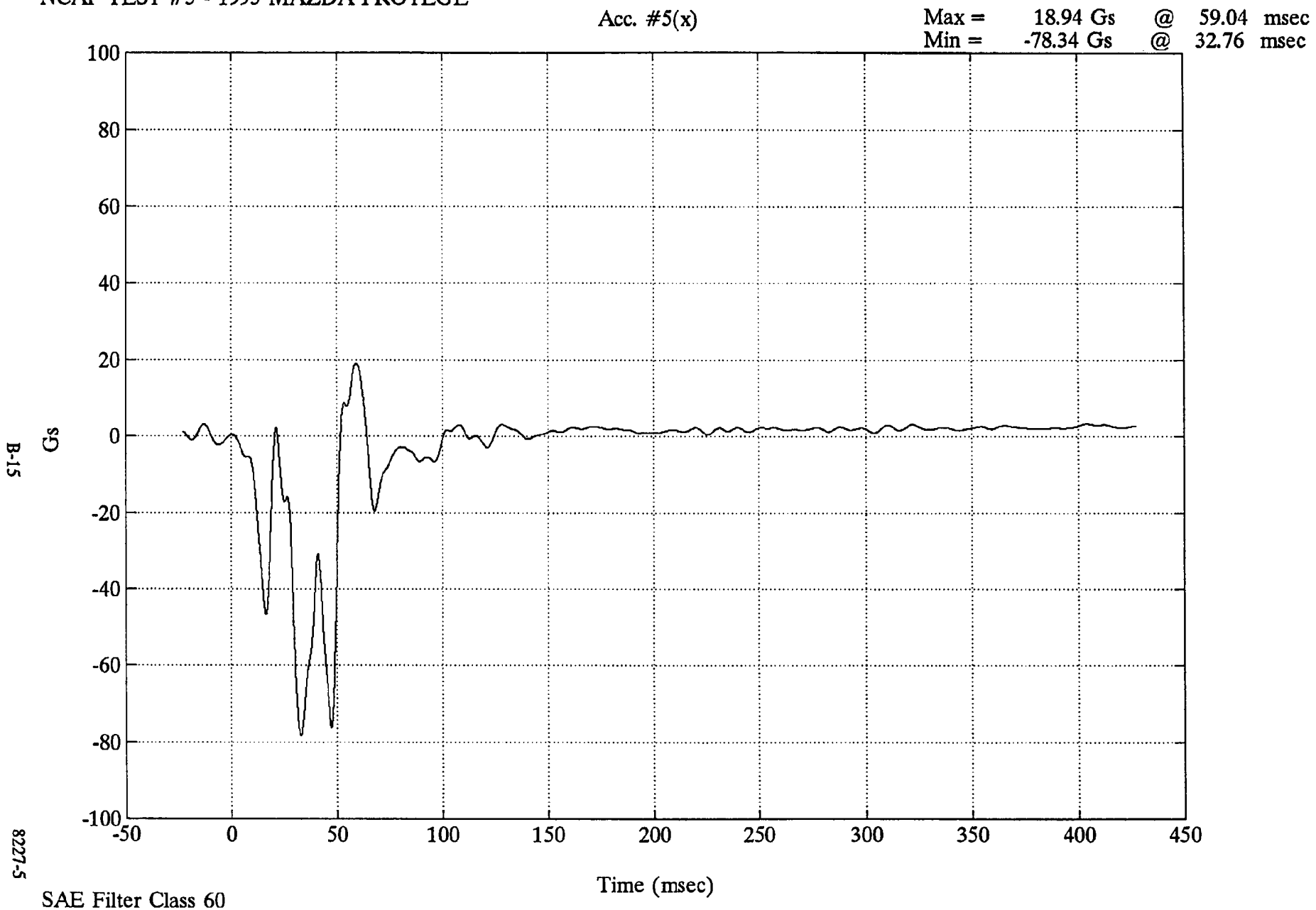
SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

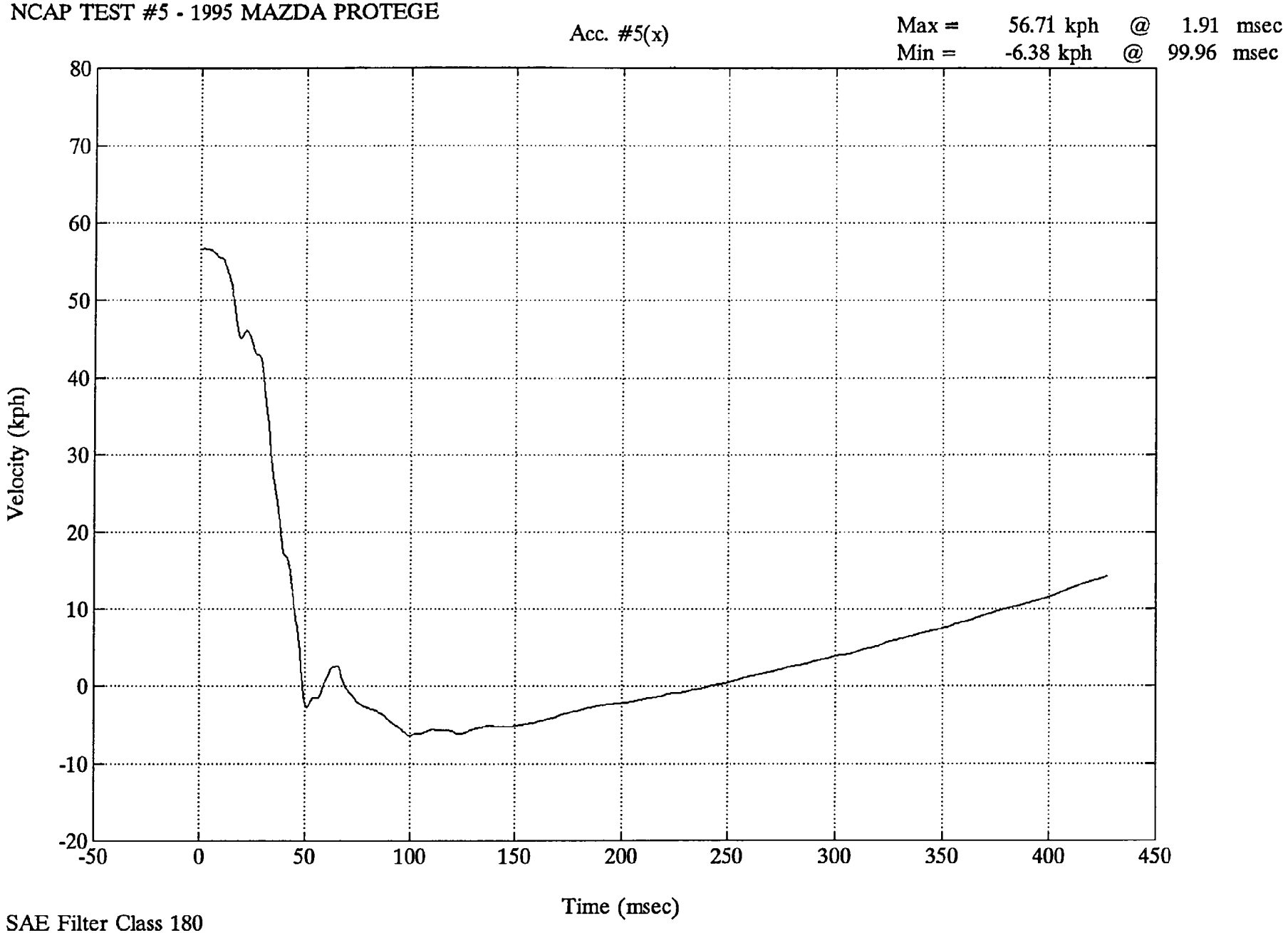
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

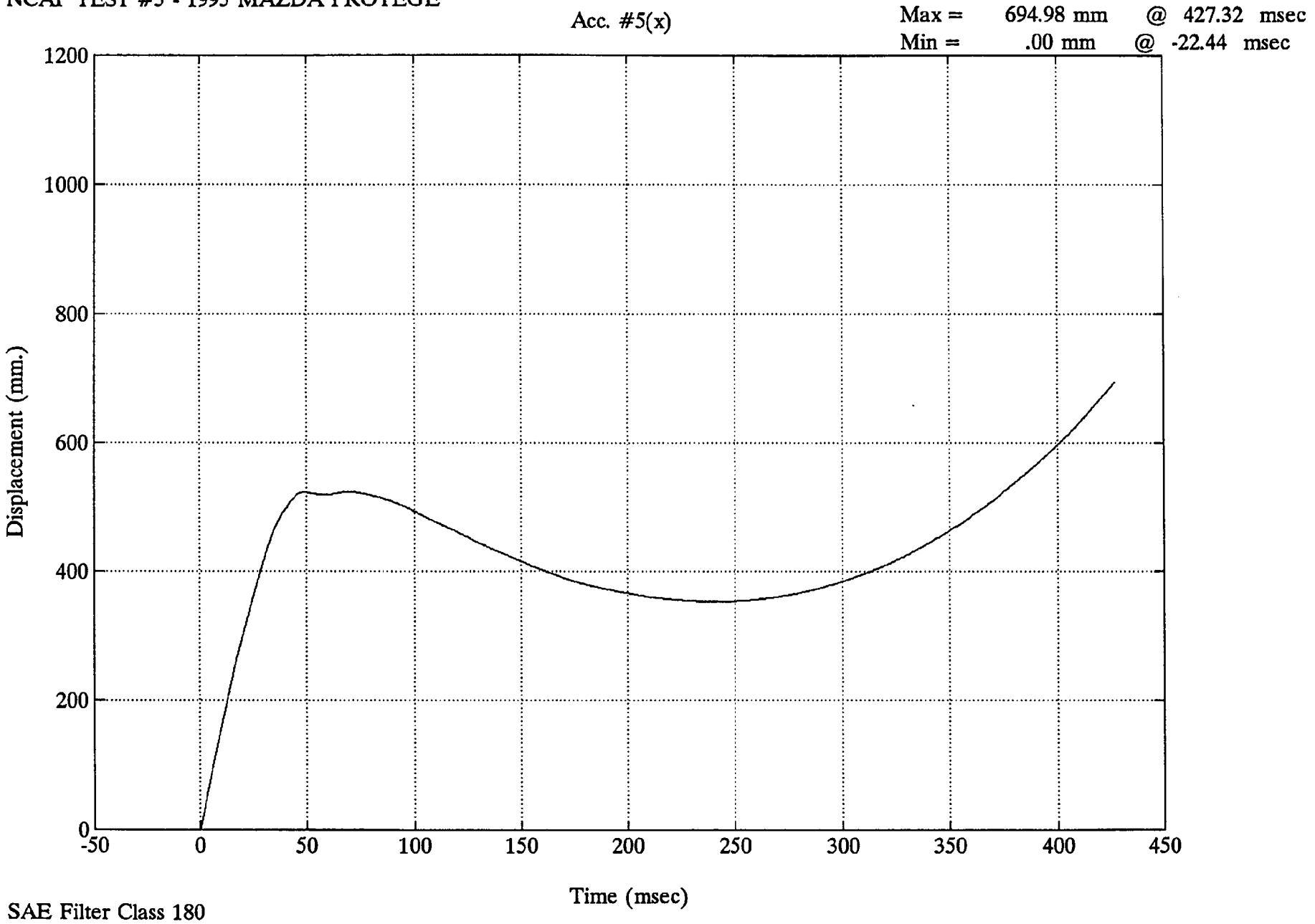
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



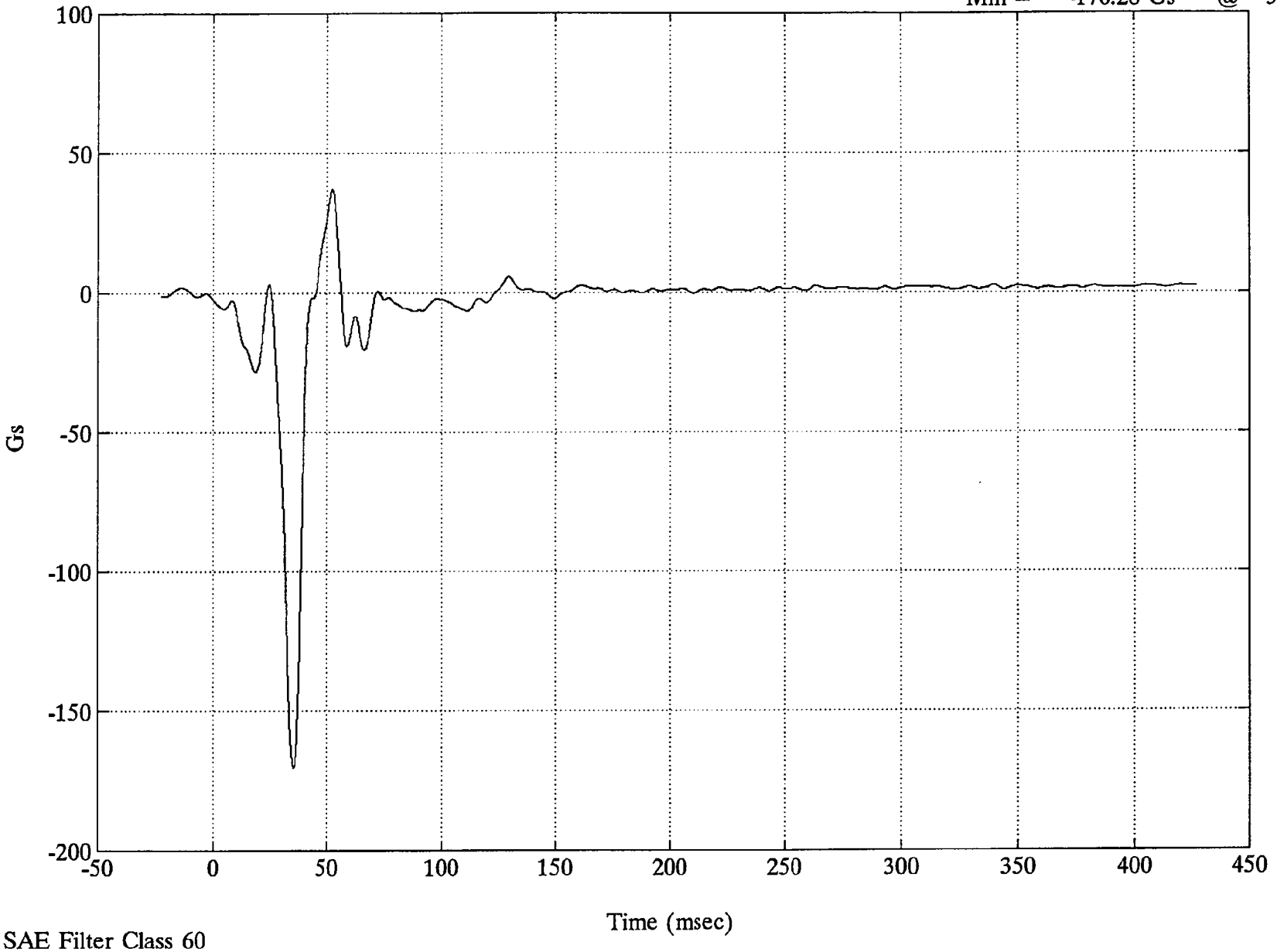
SAE Filter Class 180

8227-S

NCAP TEST #5 - 1995 MAZDA PROTEGE

Acc. #6(x)

Max = 37.13 Gs @ 52.31 msec
Min = -170.28 Gs @ 35.15 msec



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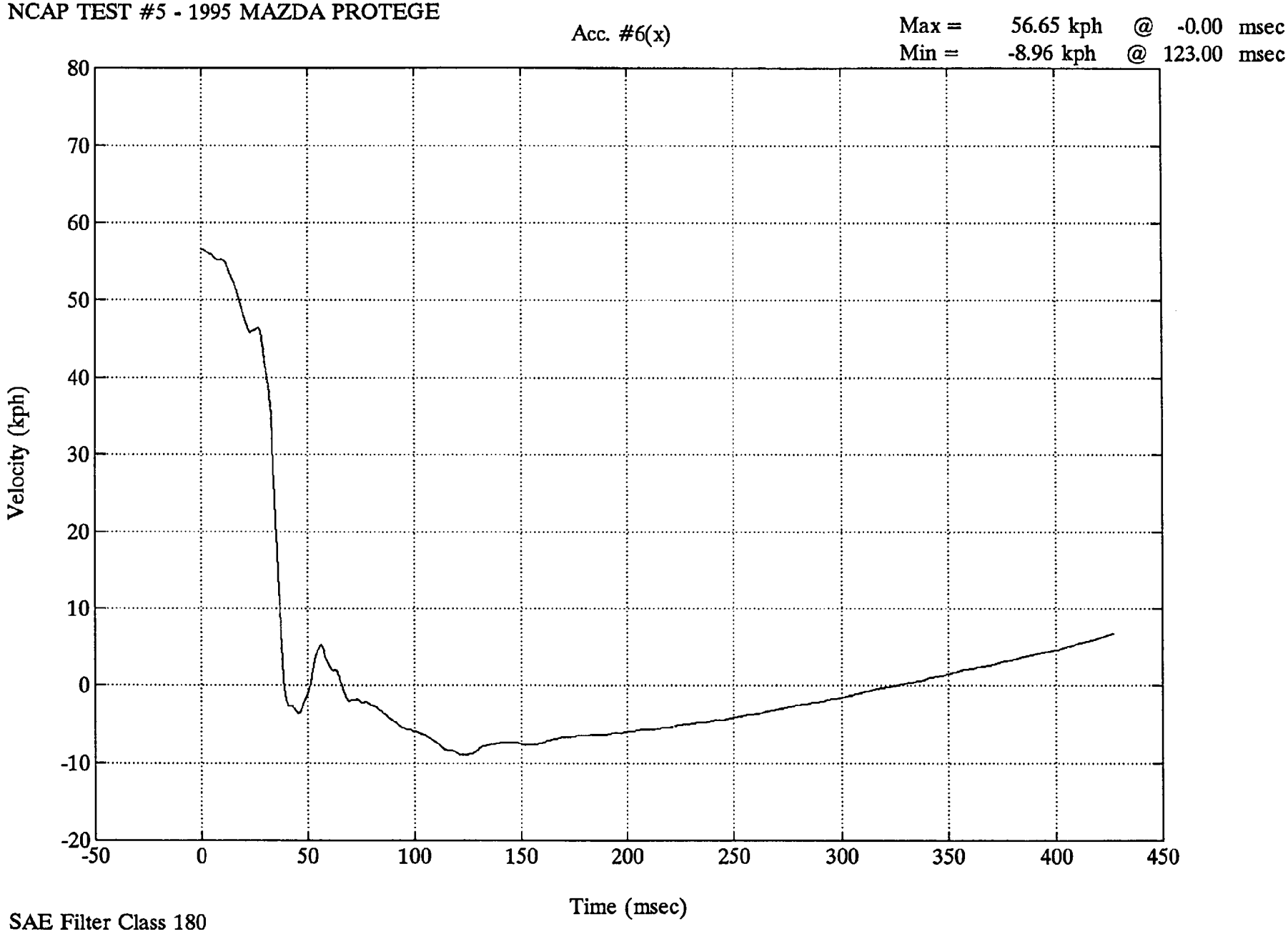
SAE Filter Class 60

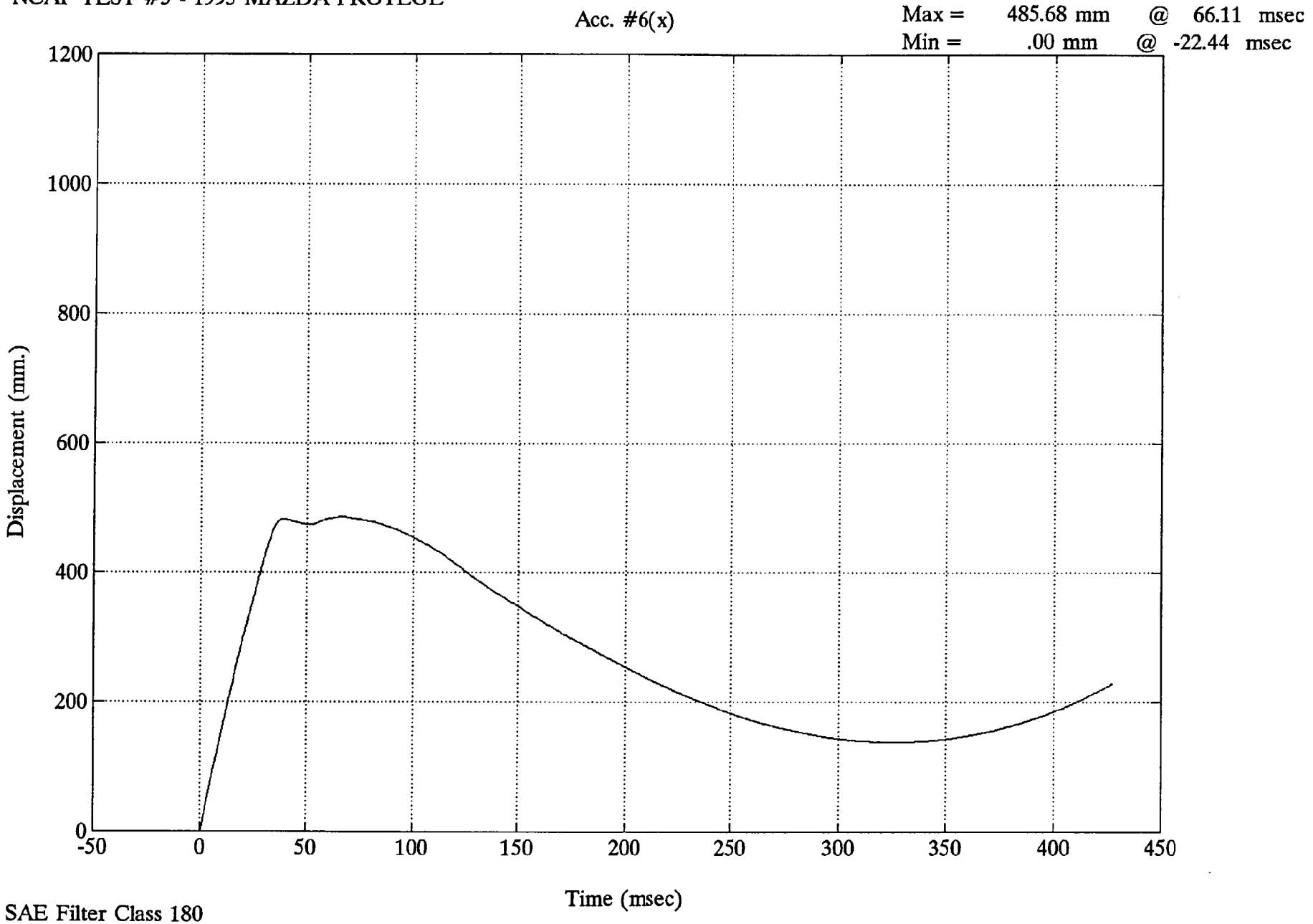
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-S

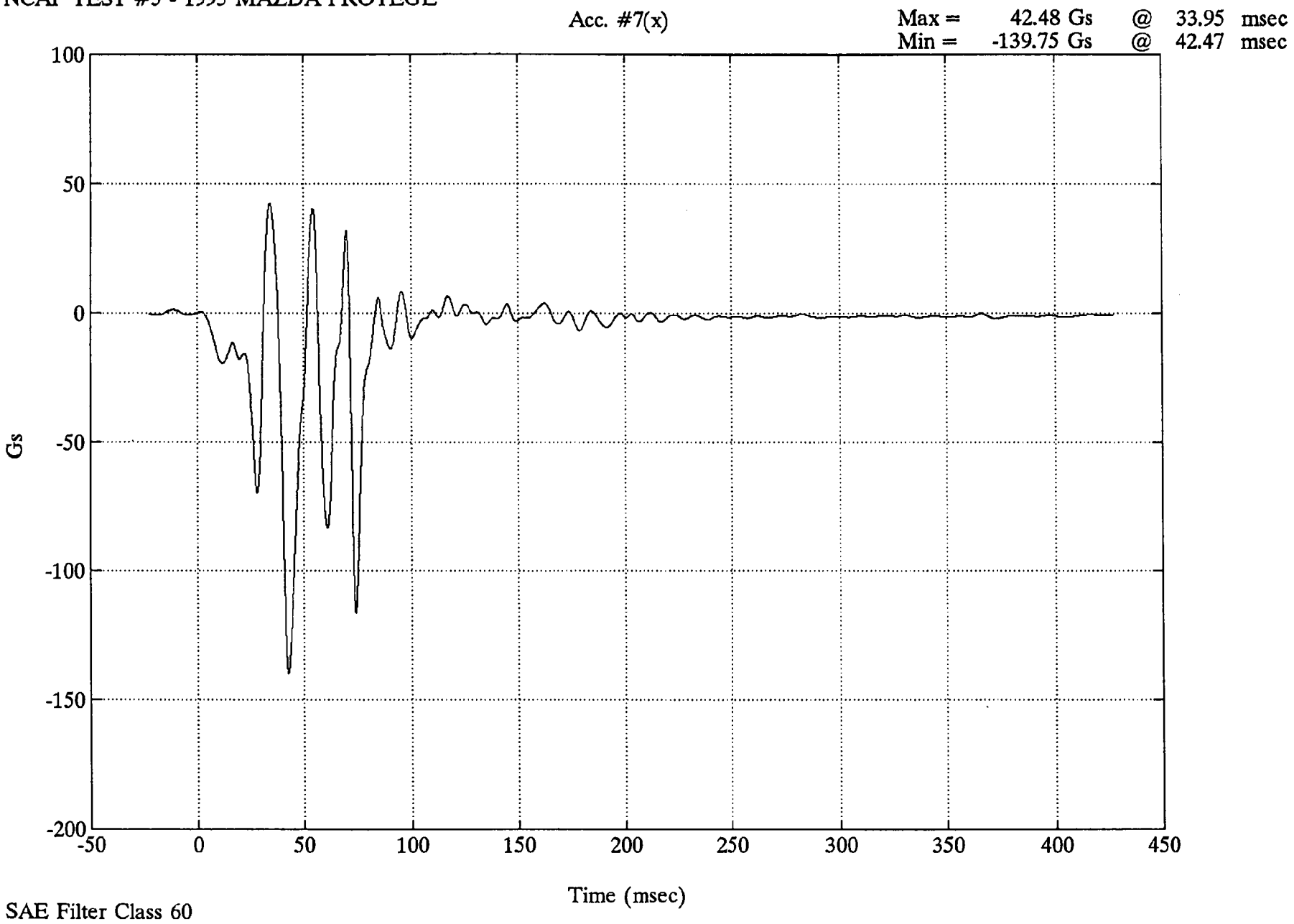
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



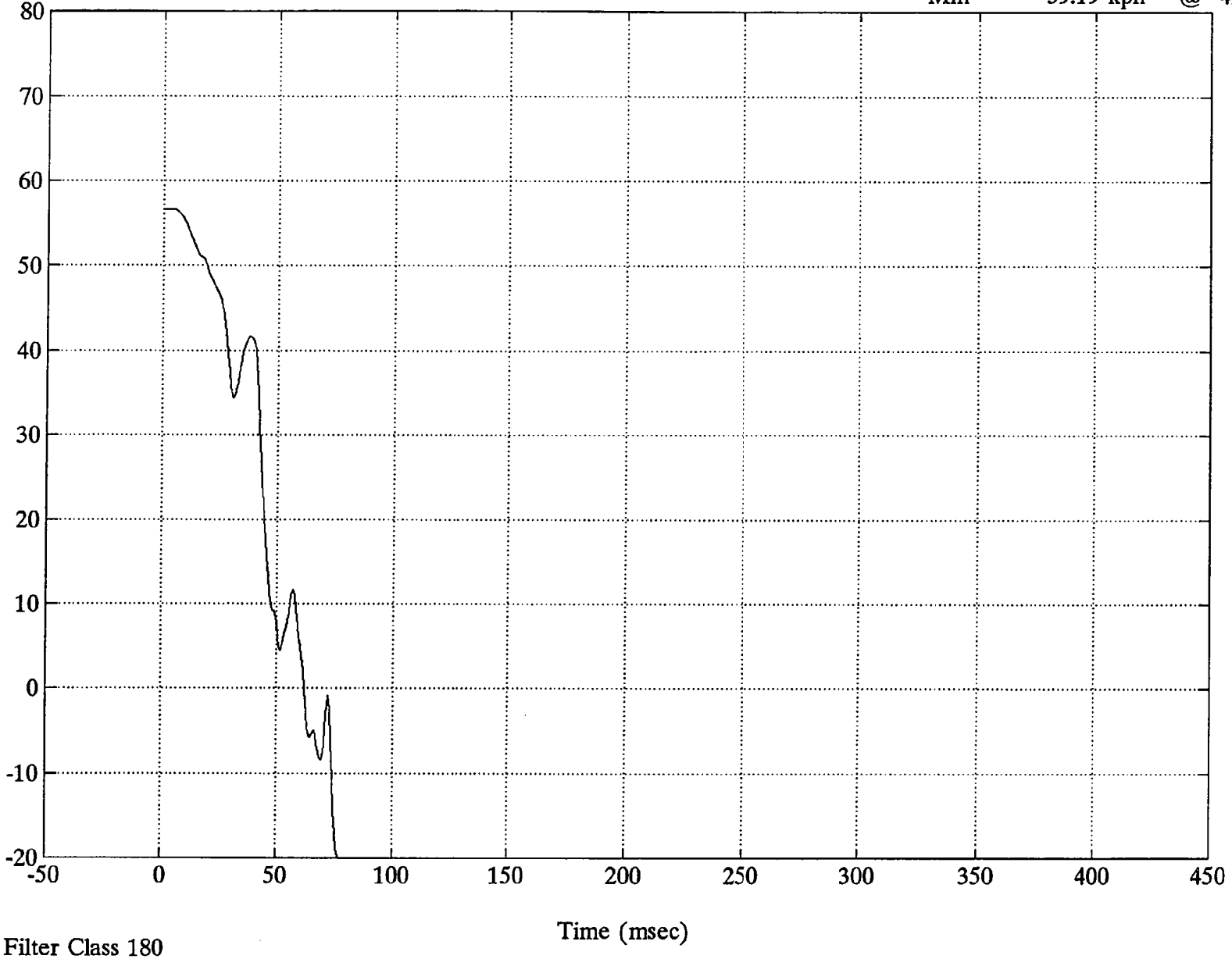
SAE Filter Class 60

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

Acc. #7(x)

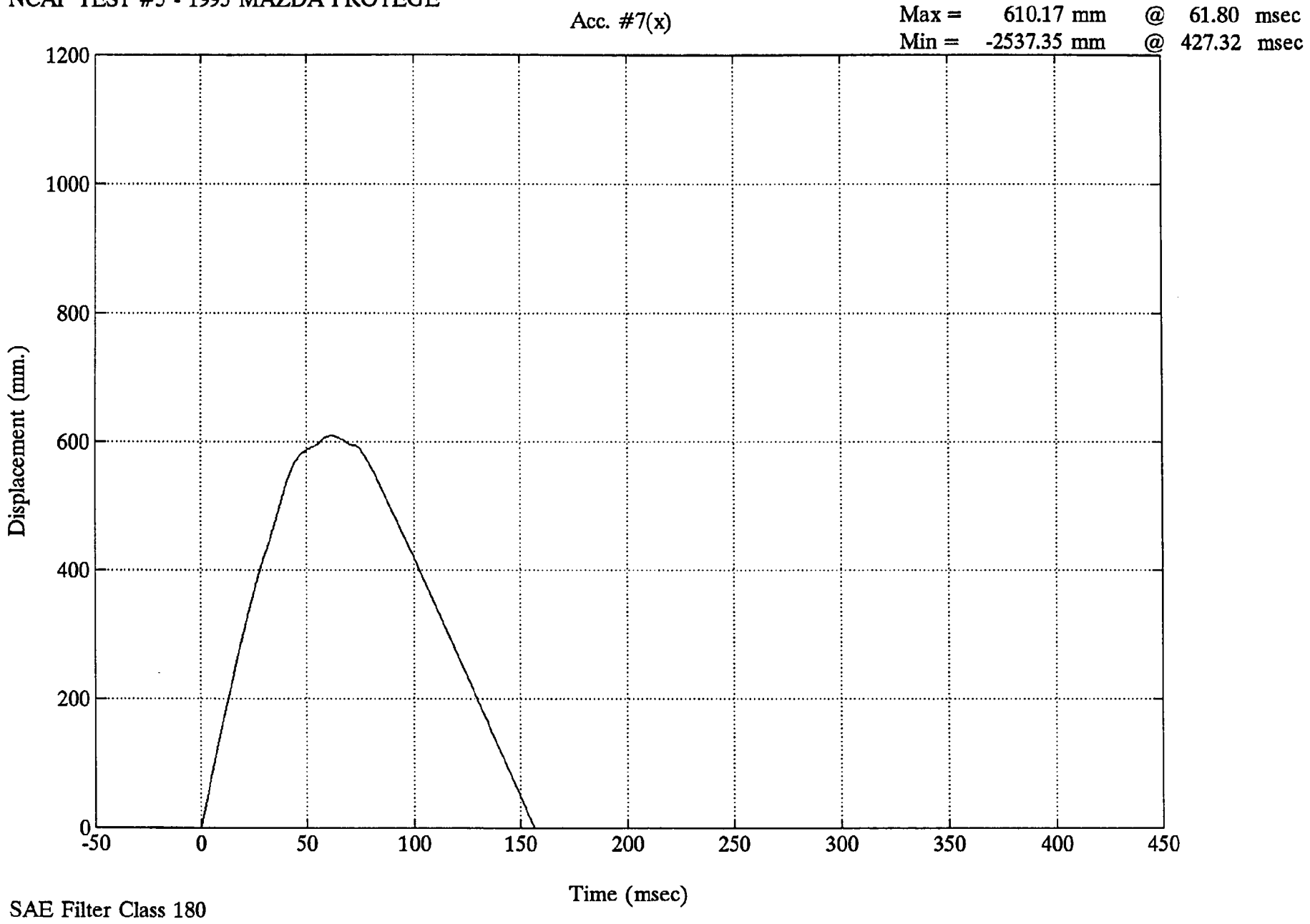
Max = 56.69 kph @ 3.83 msec
Min = -39.19 kph @ 427.32 msec



SAE Filter Class 180

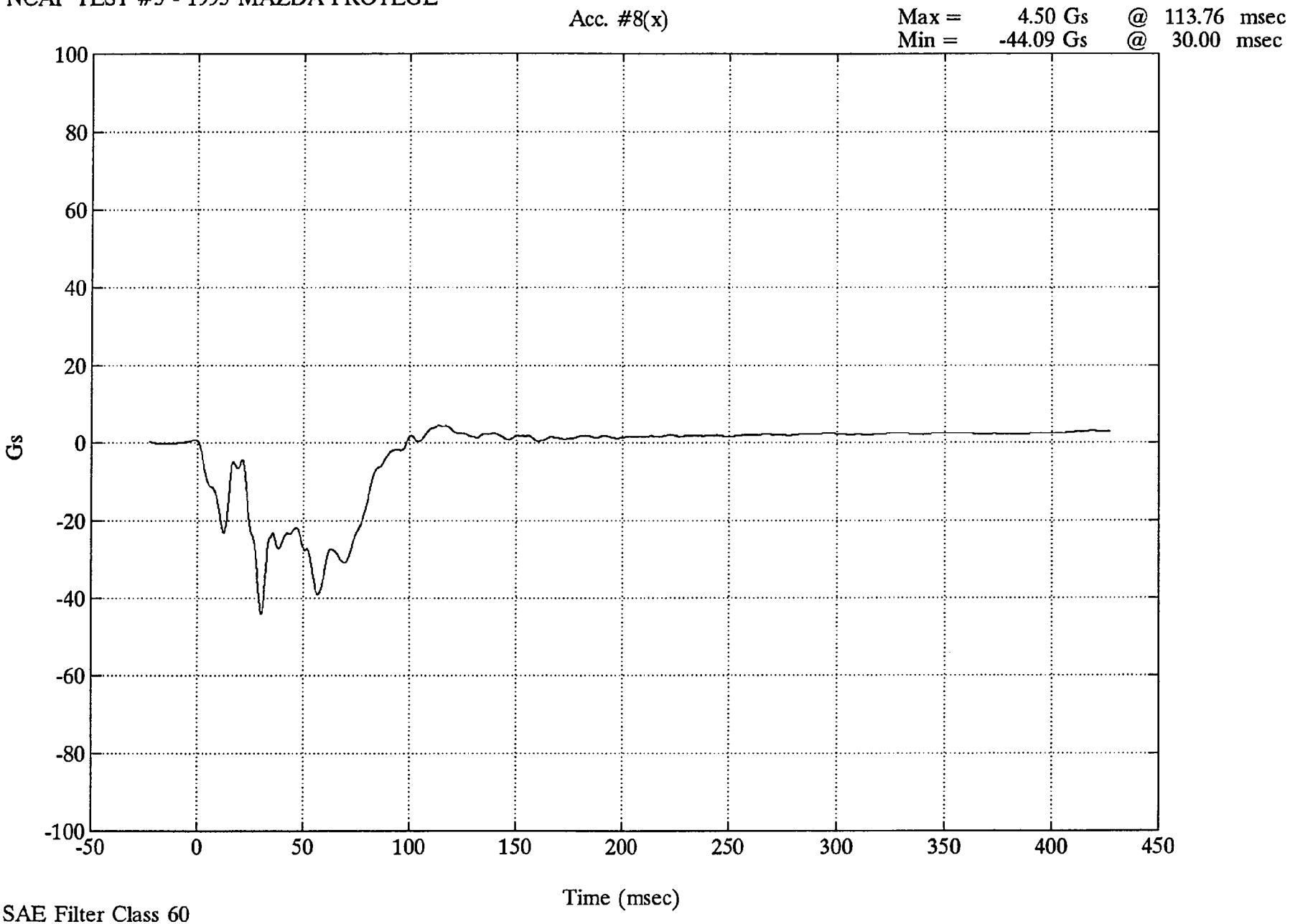
8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE



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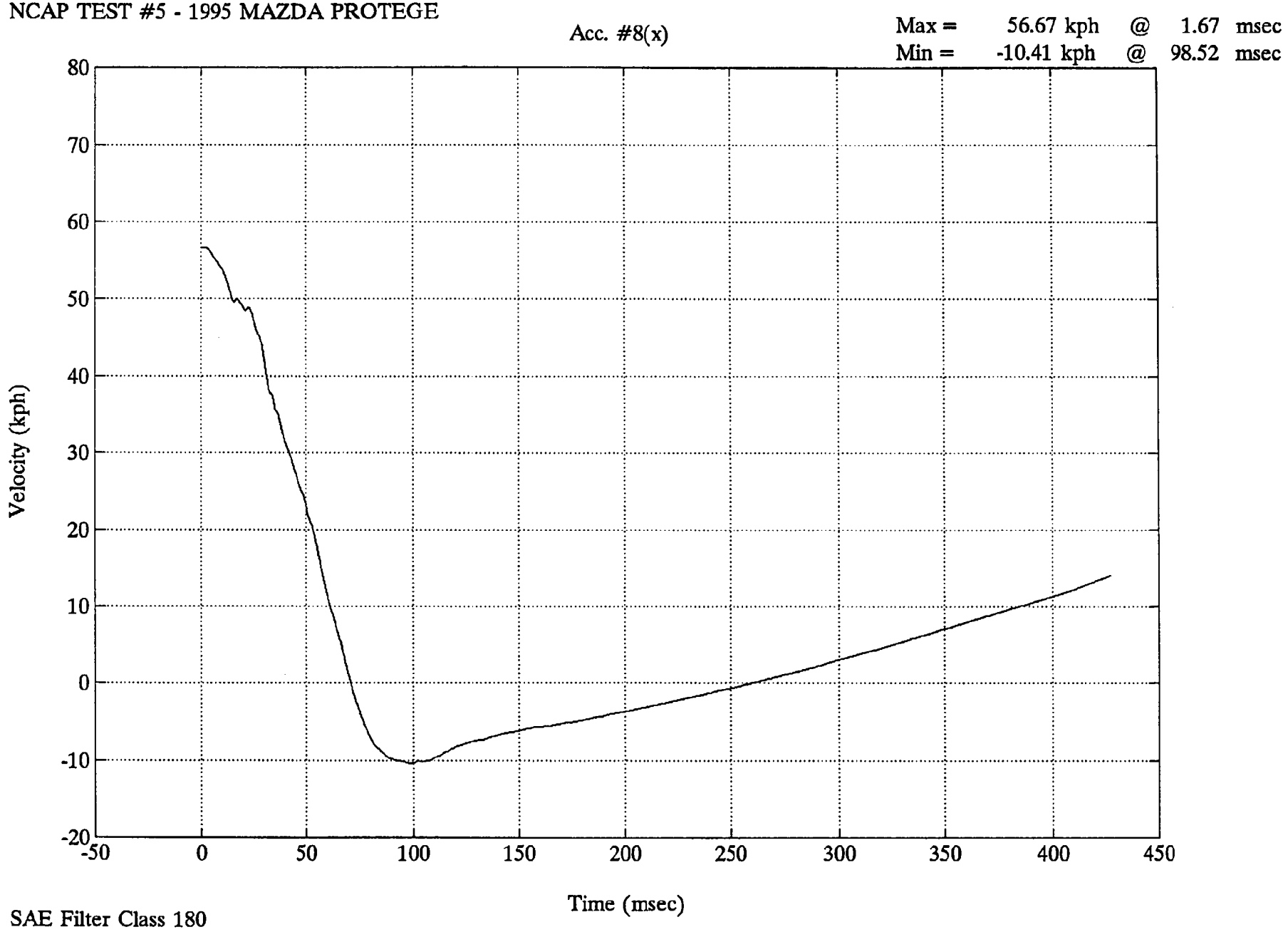
8227-5

SAE Filter Class 60

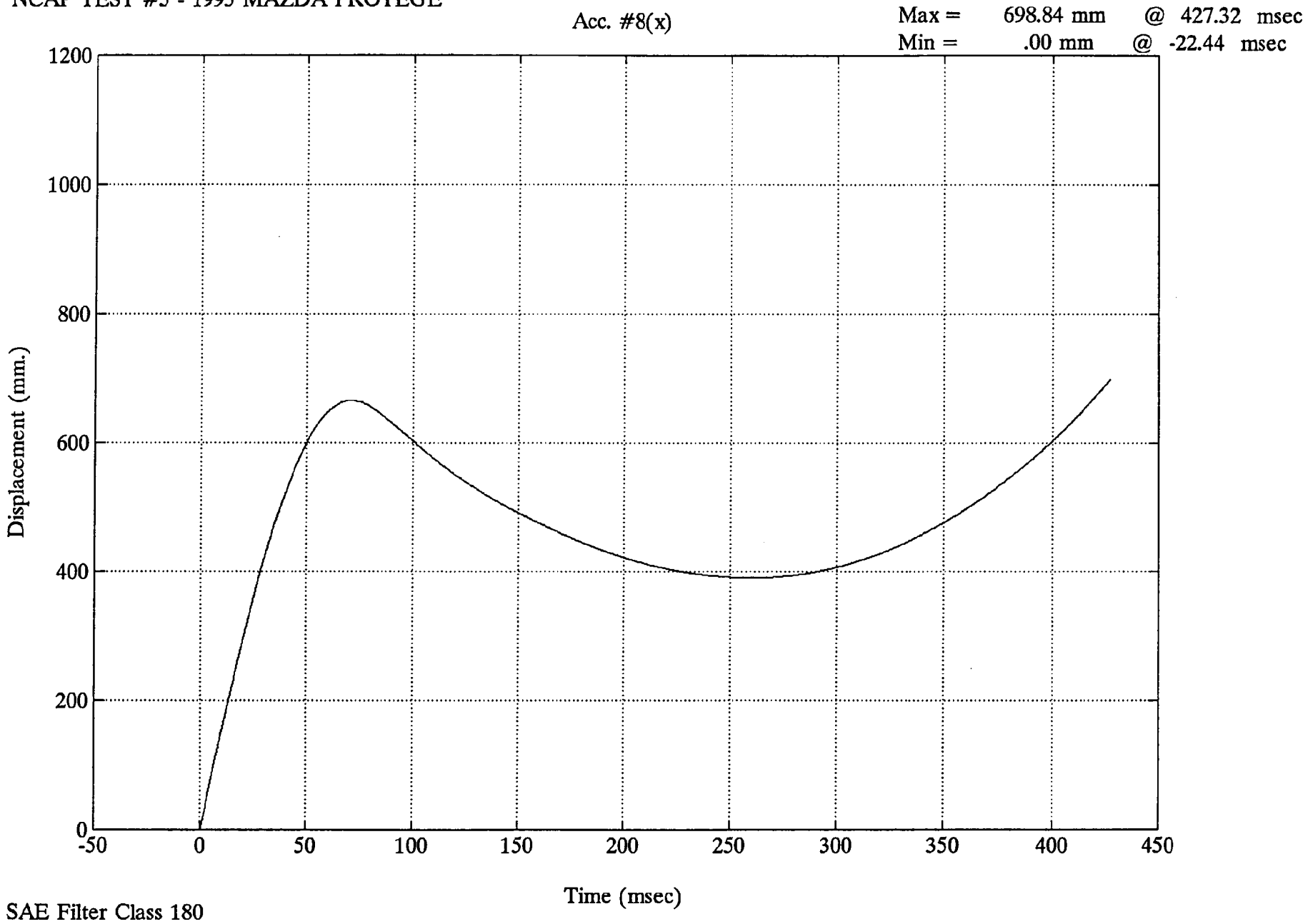
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-5

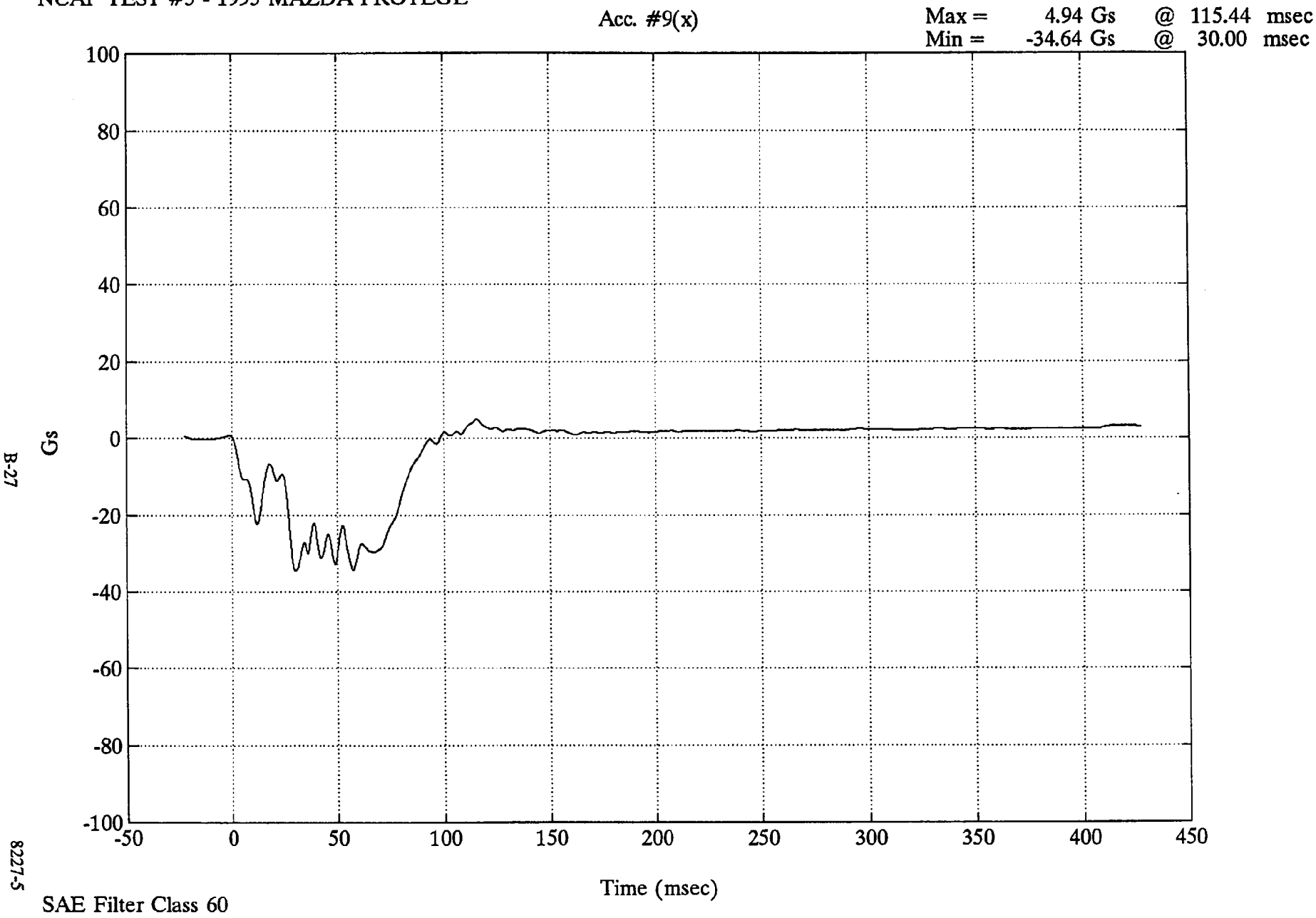
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-S

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-27

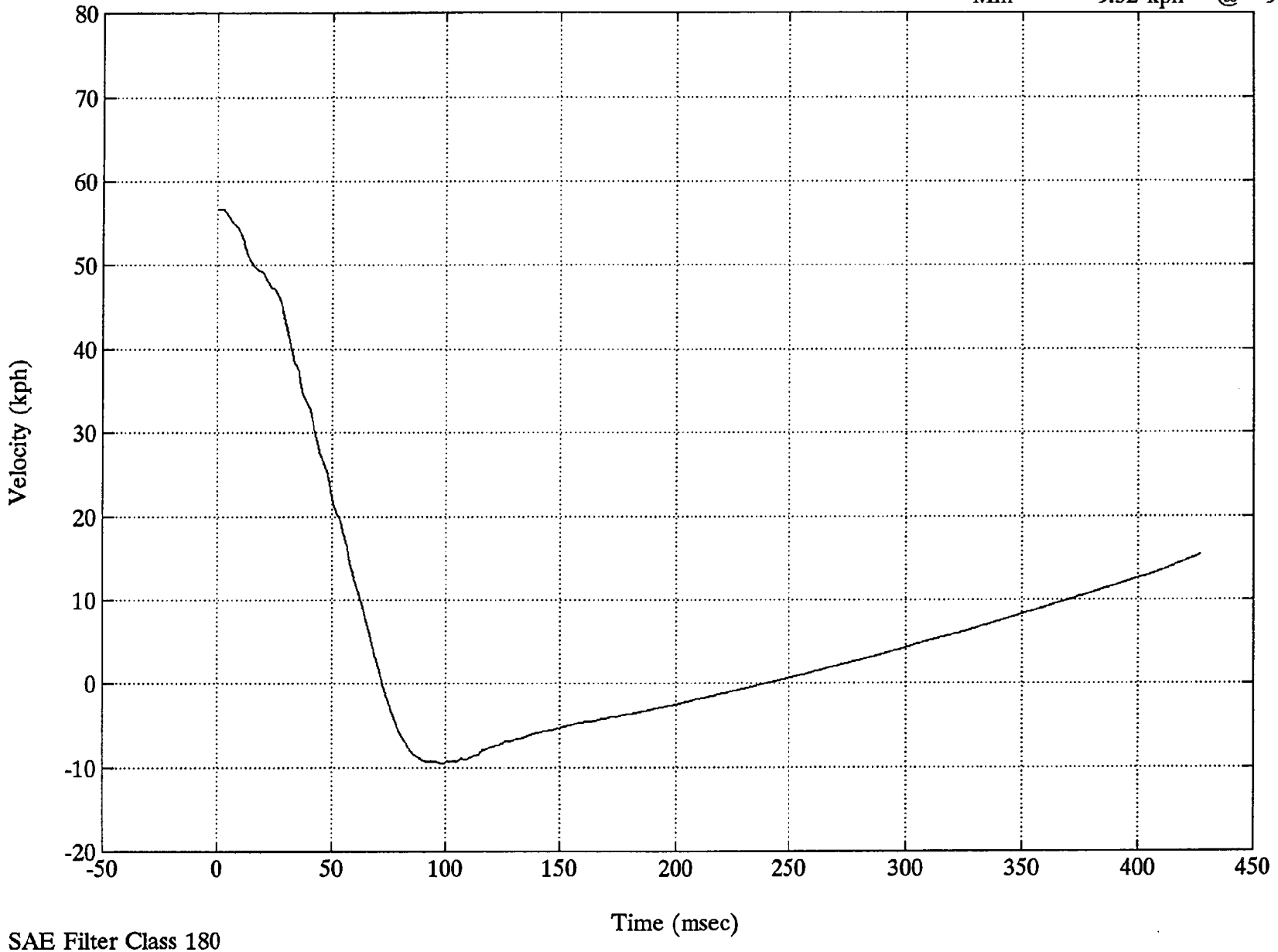
8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

Acc. #9(x)

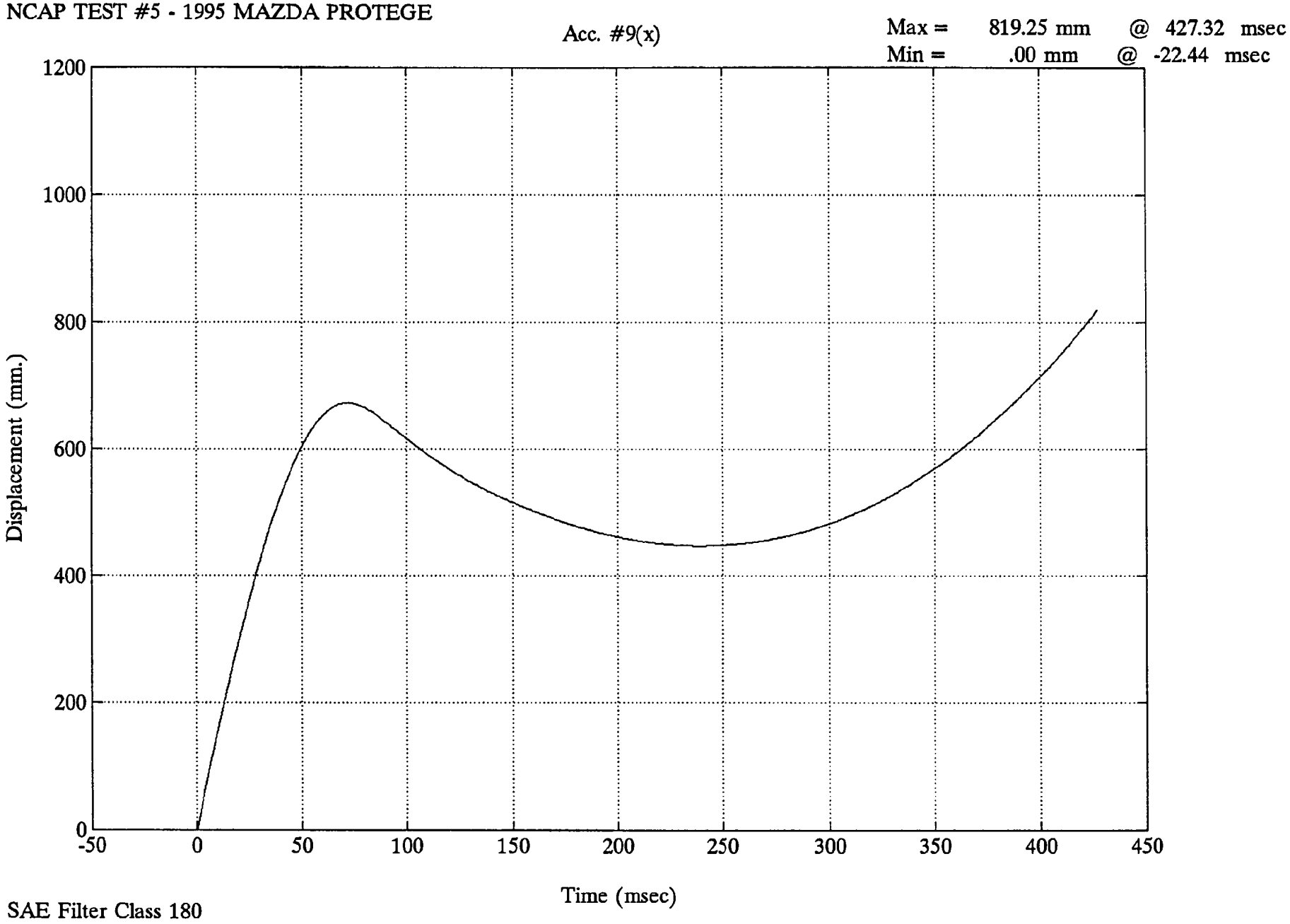
Max = 56.66 kph @ 1.79 msec
Min = -9.52 kph @ 98.52 msec



SAE Filter Class 180

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

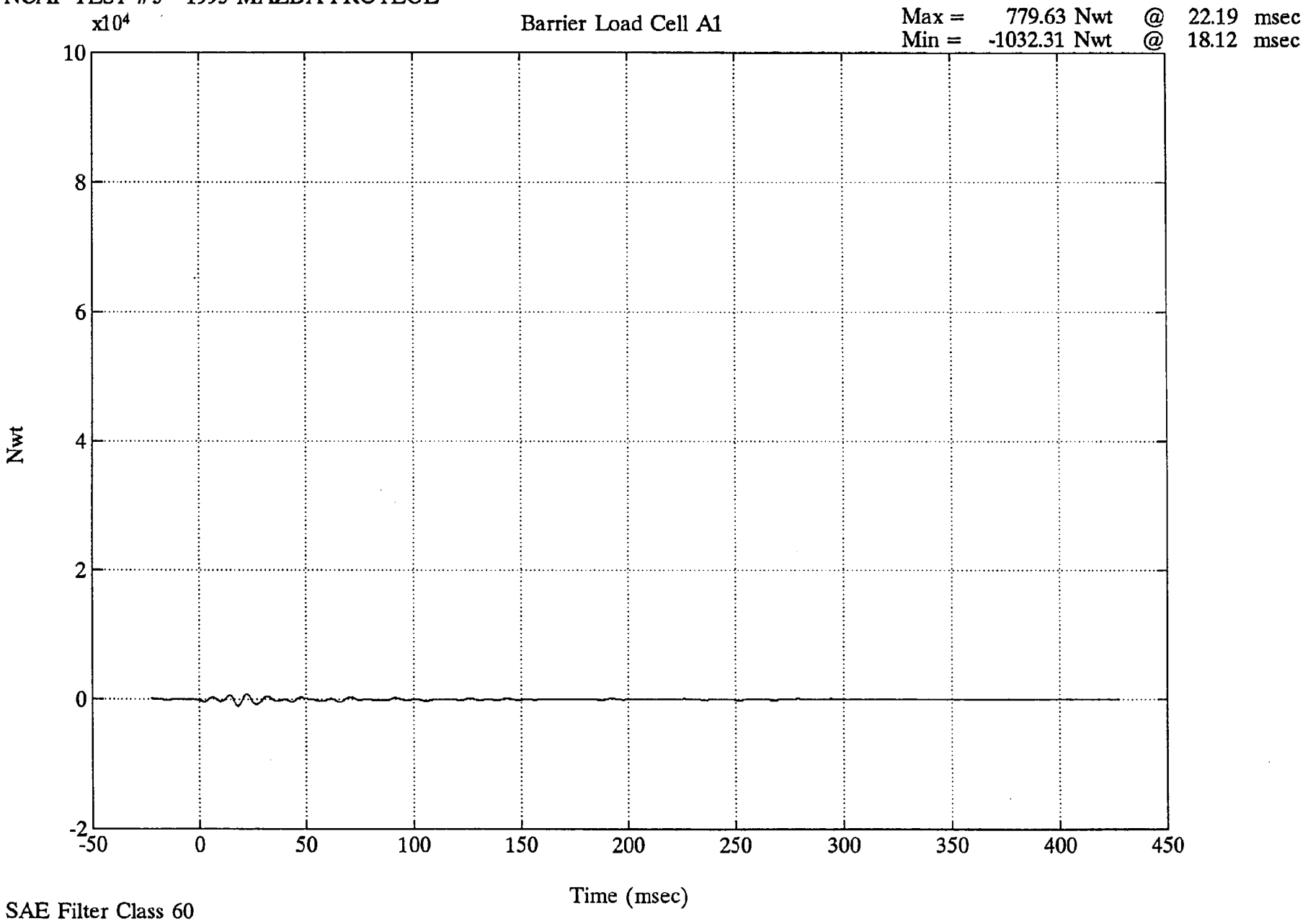
TEST NO. MS5402

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

60

NCAP TEST #5 - 1995 MAZDA PROTEGE

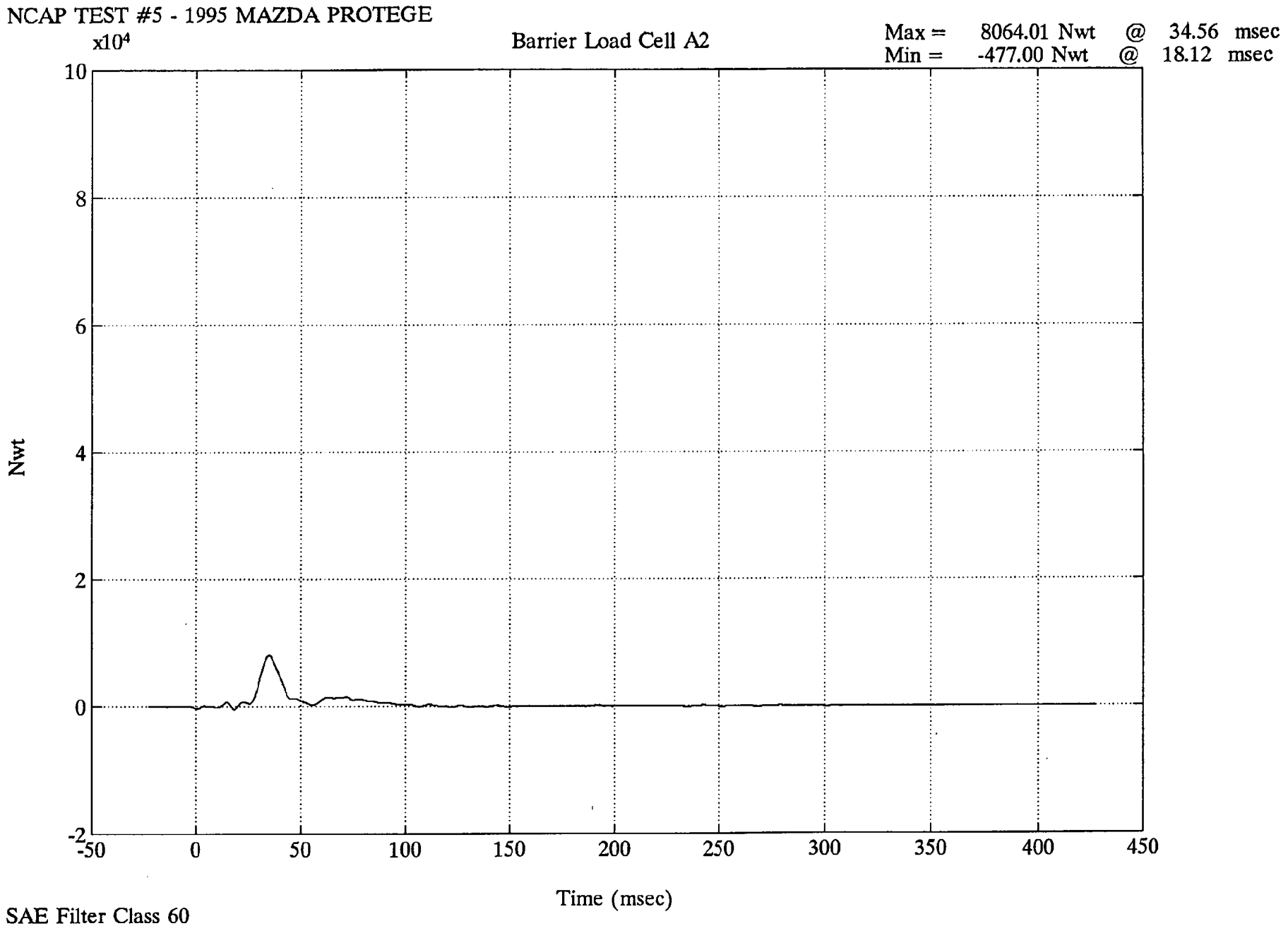


B-31

8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

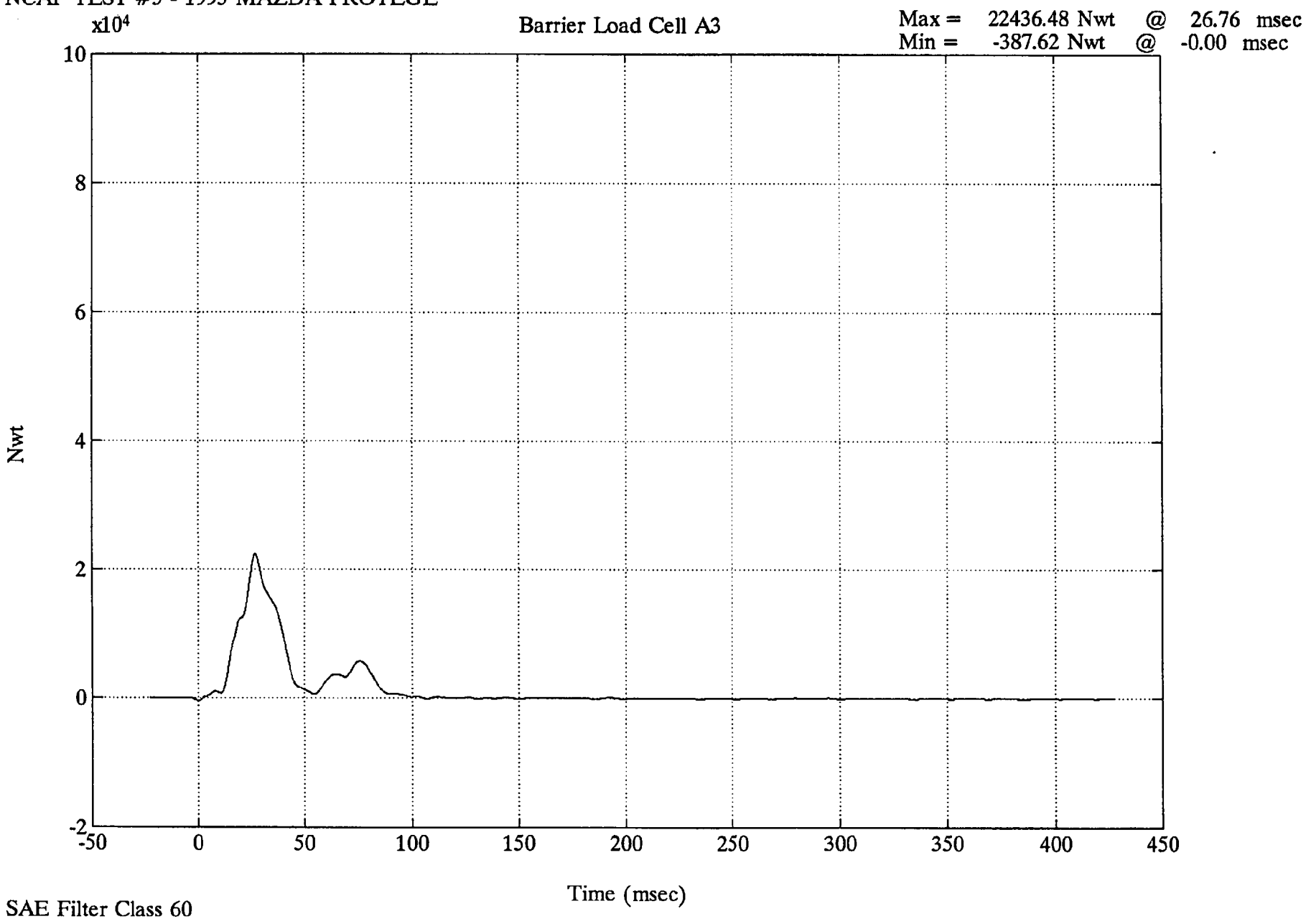


SAE Filter Class 60

B-32

8227-5

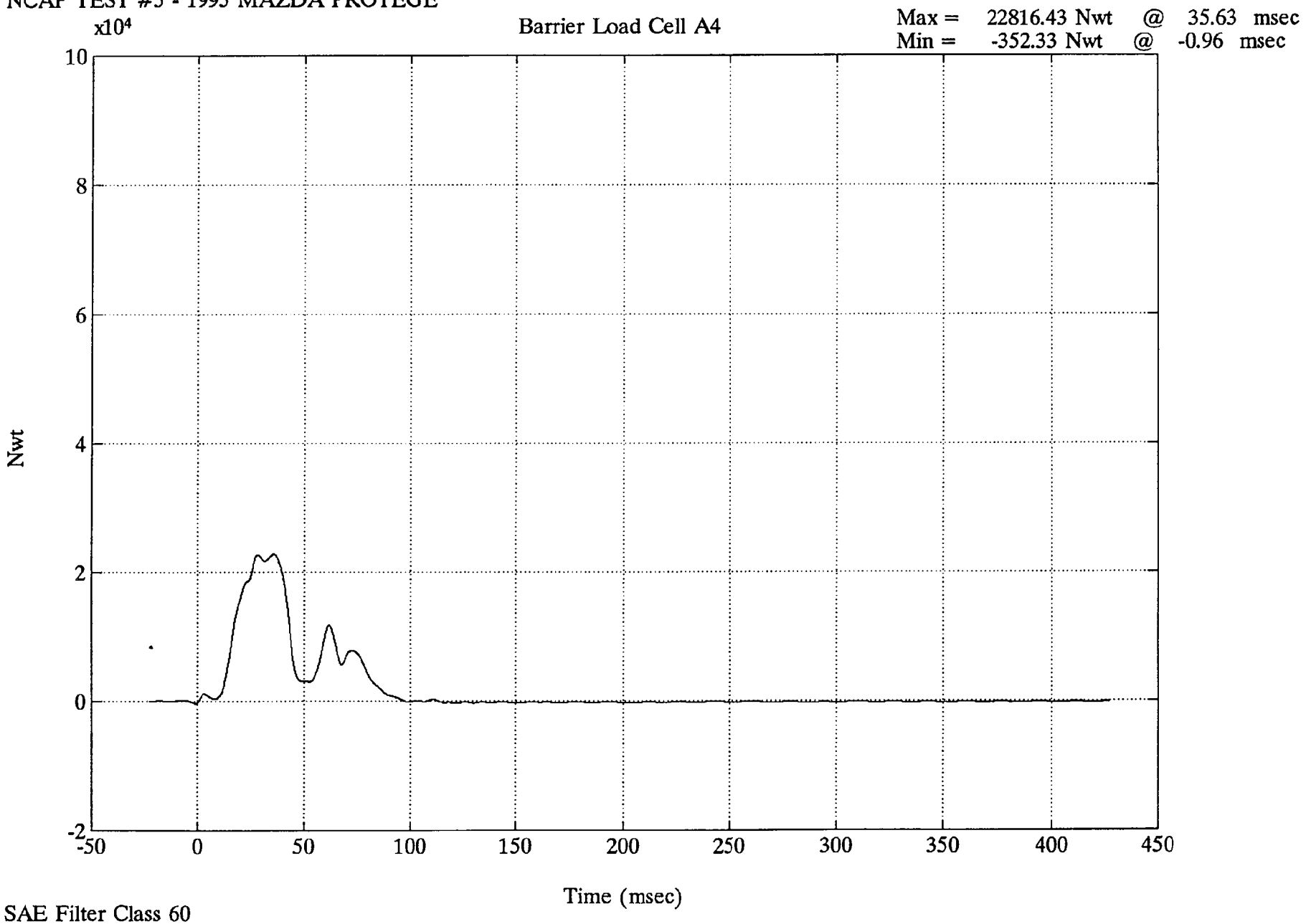
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

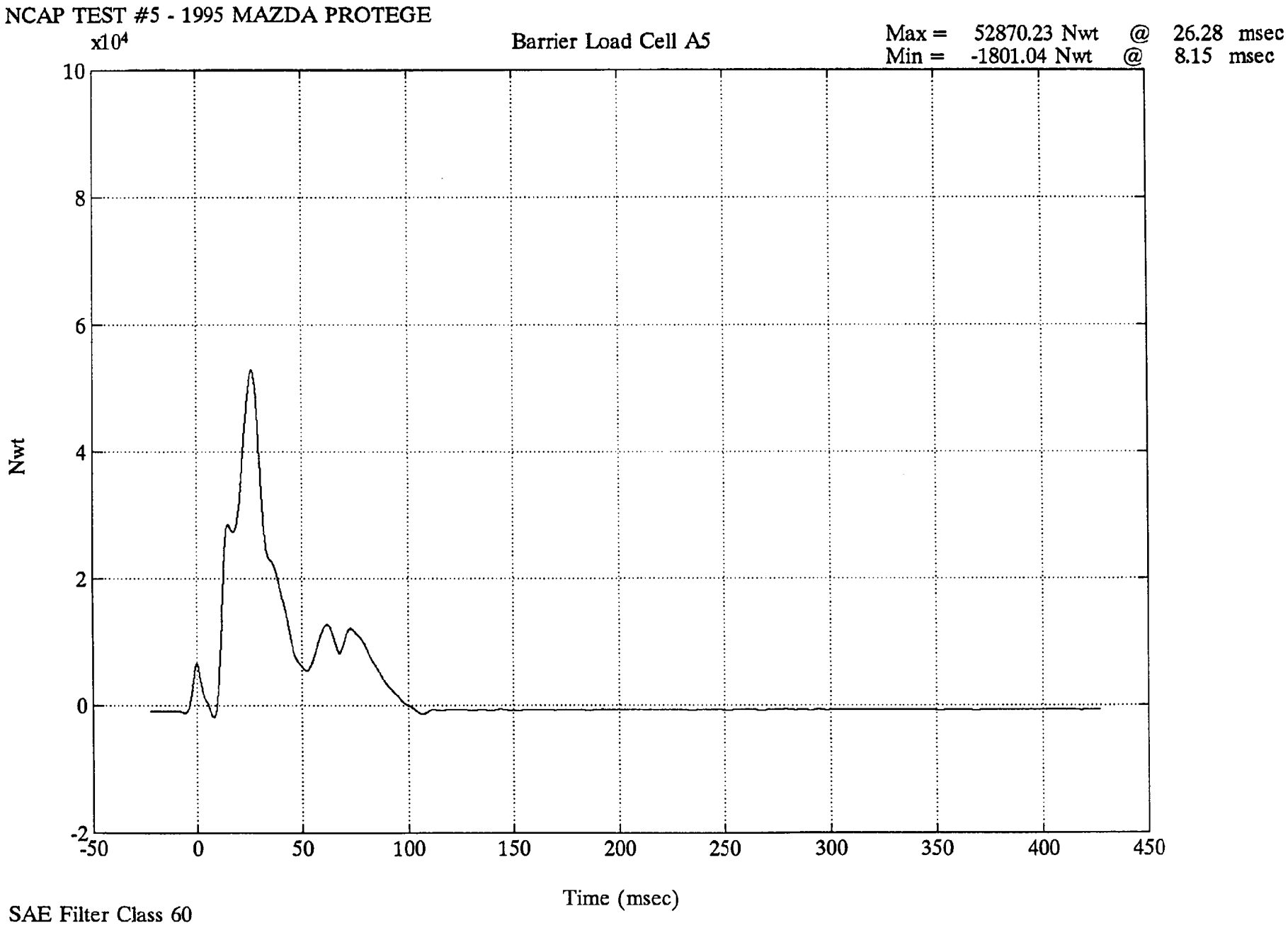
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

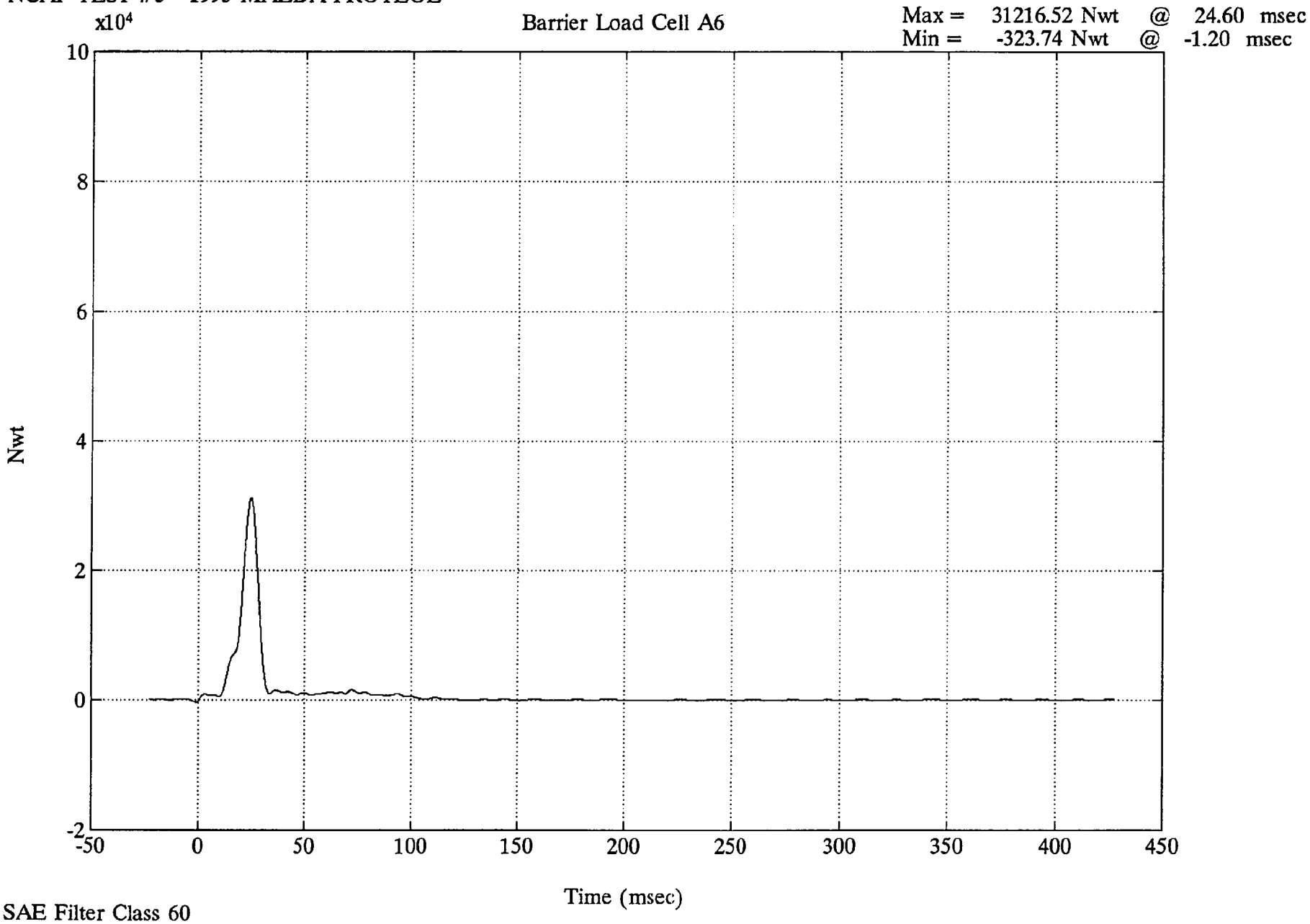
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

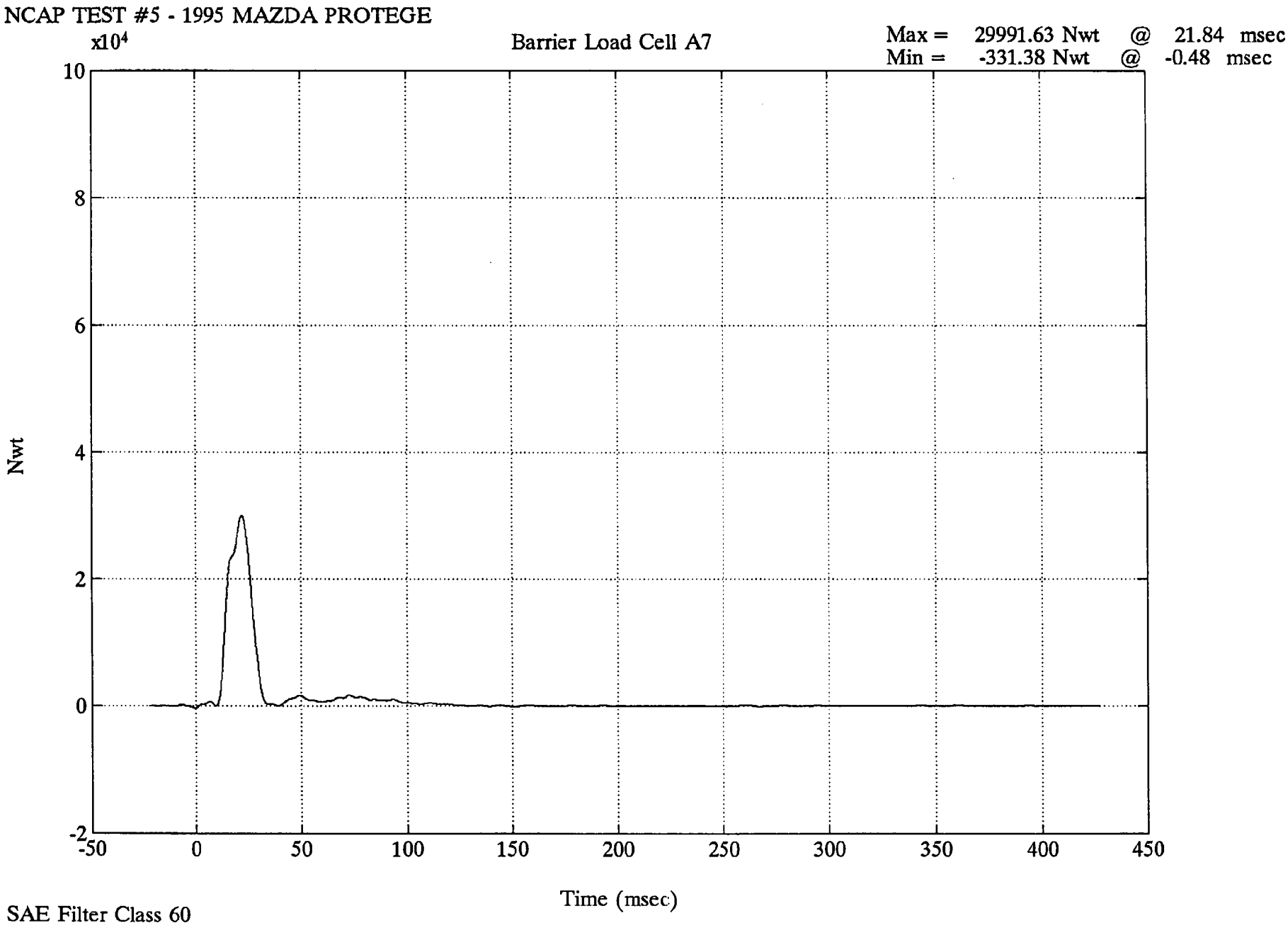
NCAP TEST #5 - 1995 MAZDA PROTEGE



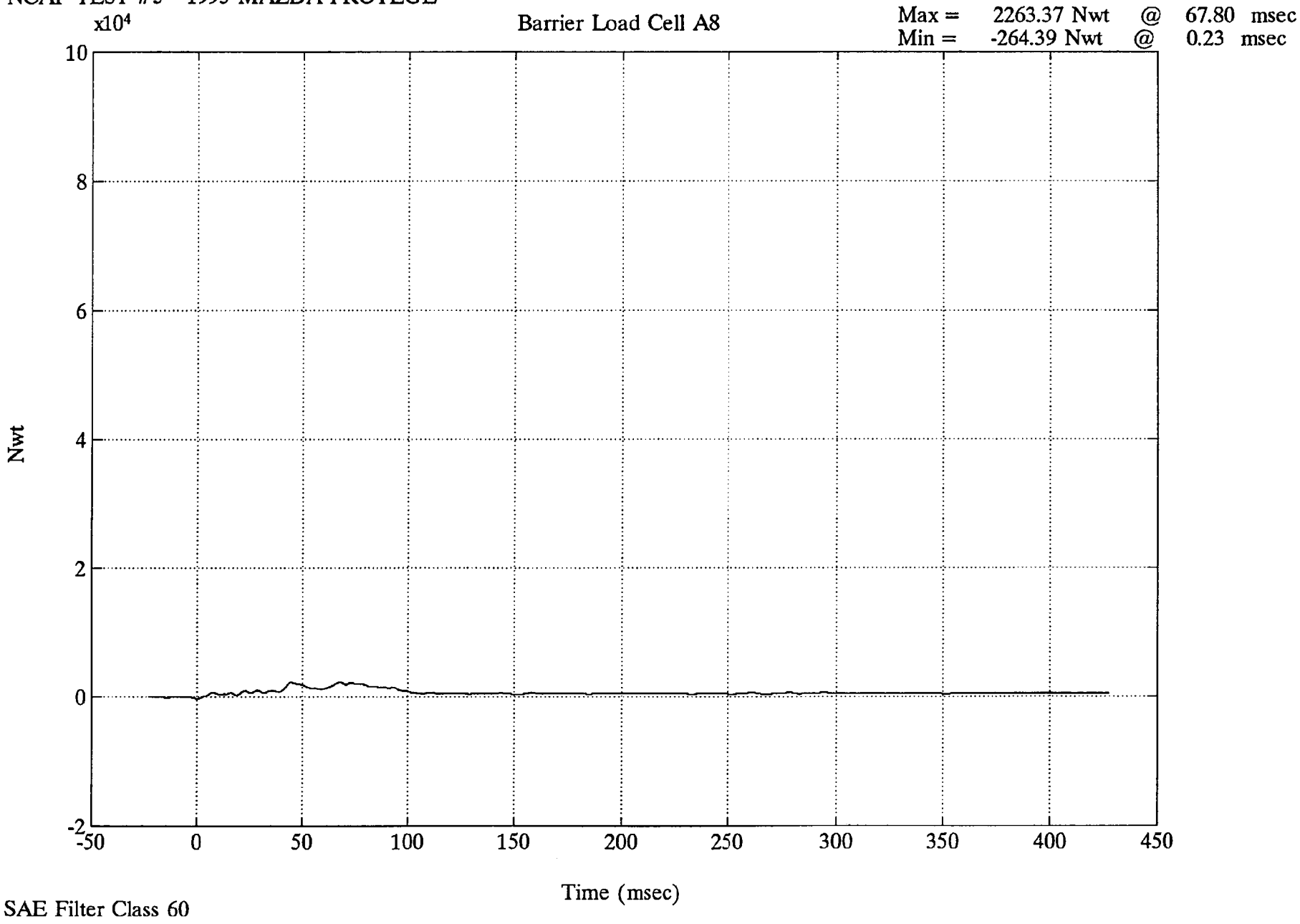
SAE Filter Class 60

B-36

8227-5

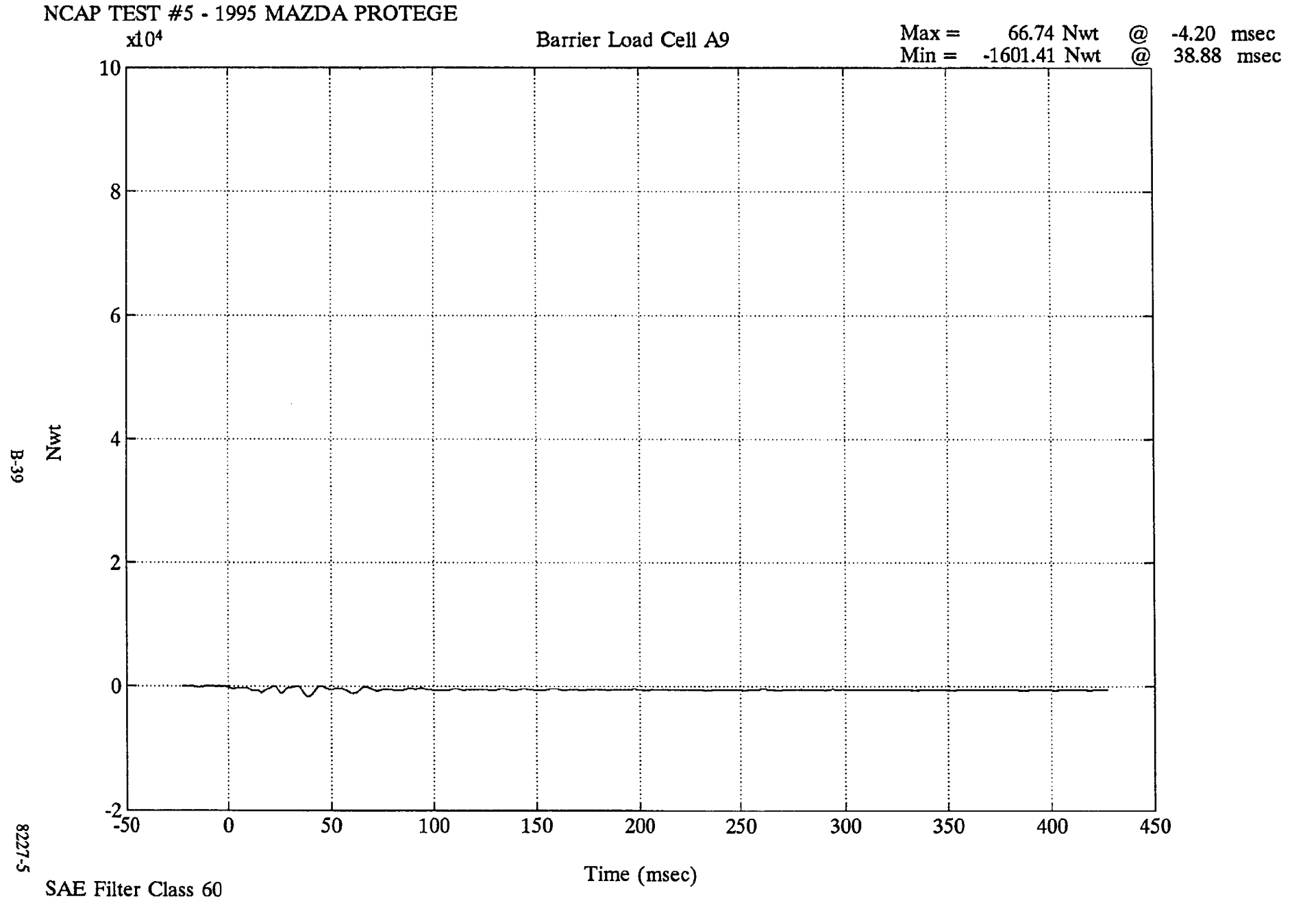

NCAP TEST #5 - 1995 MAZDA PROTEGE
x10^4
Barrier Load Cell A7
Max = 29991.63 Nwt @ 21.84 msec
Min = -331.38 Nwt @ -0.48 msec
10
8
6
4
2
0
-2
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

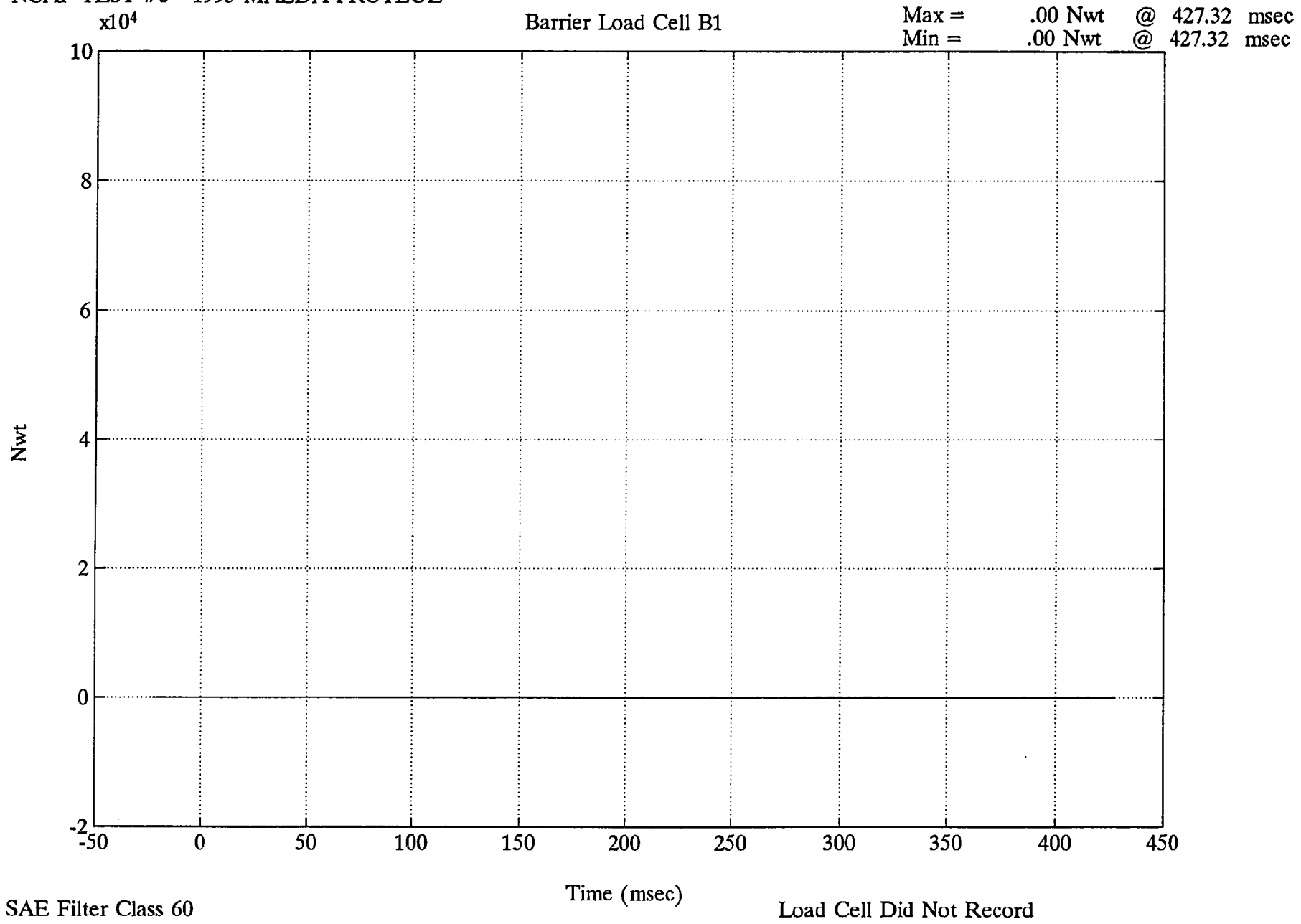


SAE Filter Class 60

8227-5


NCAP TEST #5 - 1995 MAZDA PROTEGE
x10⁴
Barrier Load Cell A9
Max = 66.74 Nwt @ -4.20 msec
Min = -1601.41 Nwt @ 38.88 msec
10
8
6
4
2
0
-2
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 60
B-39
8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

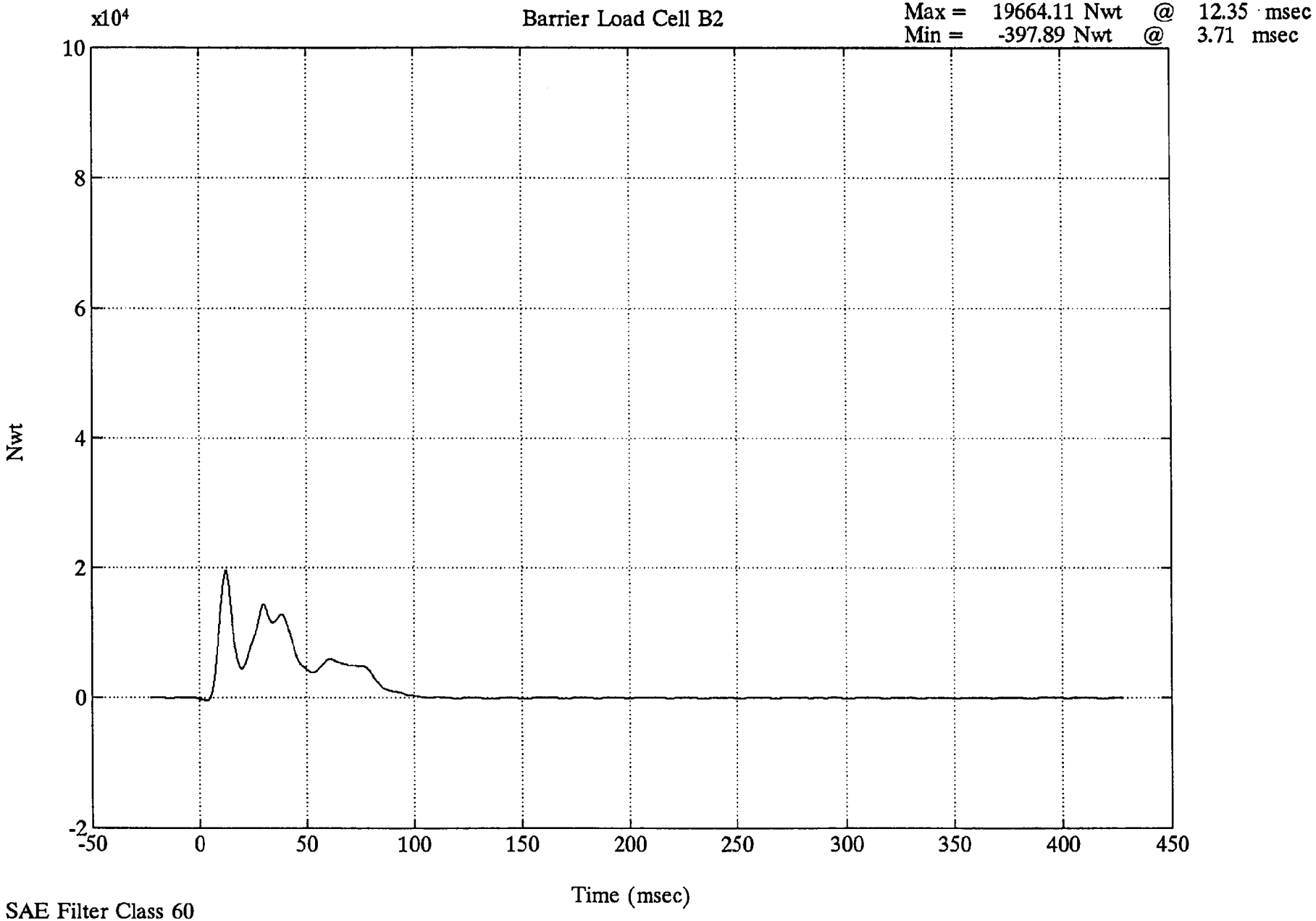


SAE Filter Class 60

Load Cell Did Not Record

8227-5

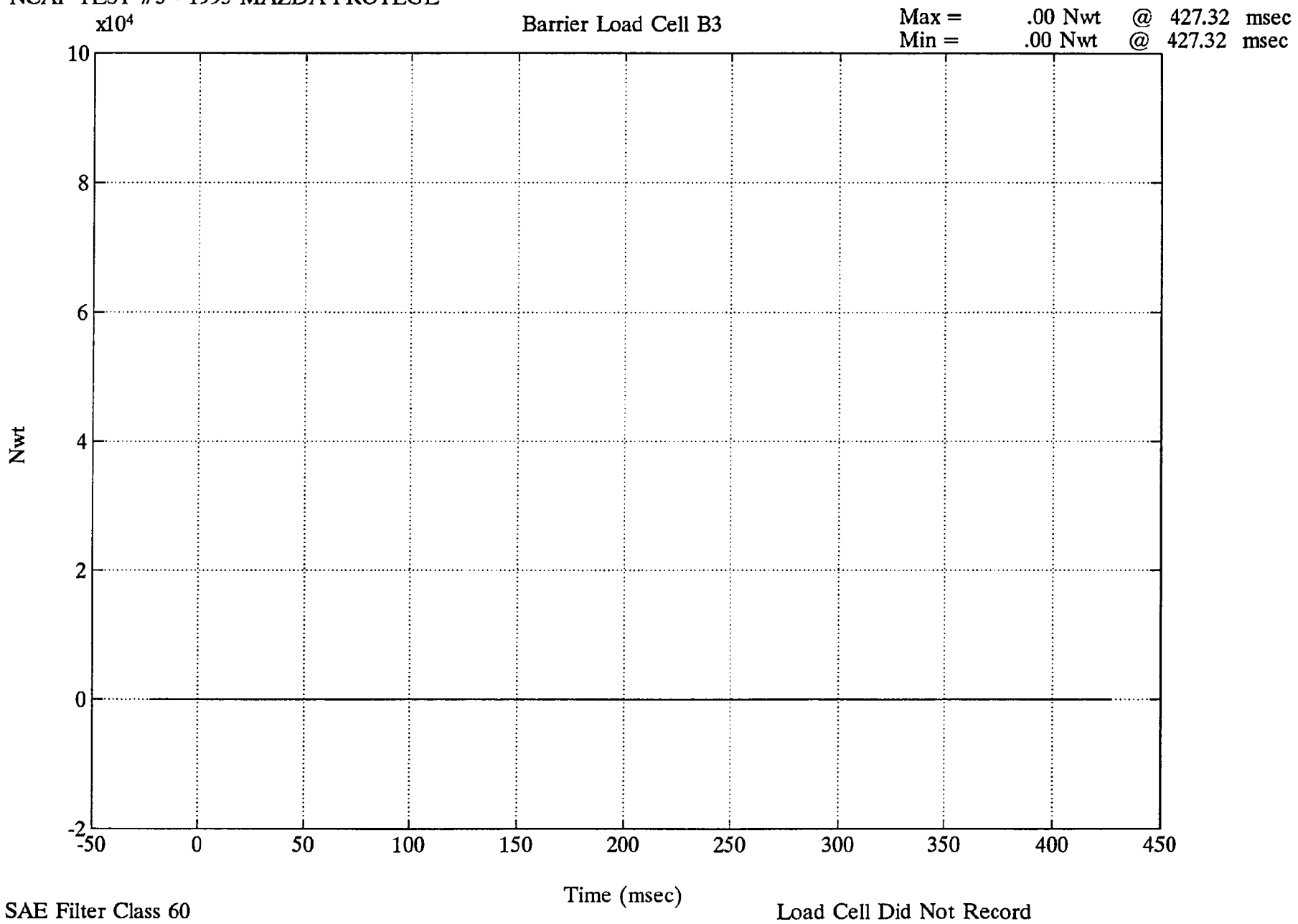
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

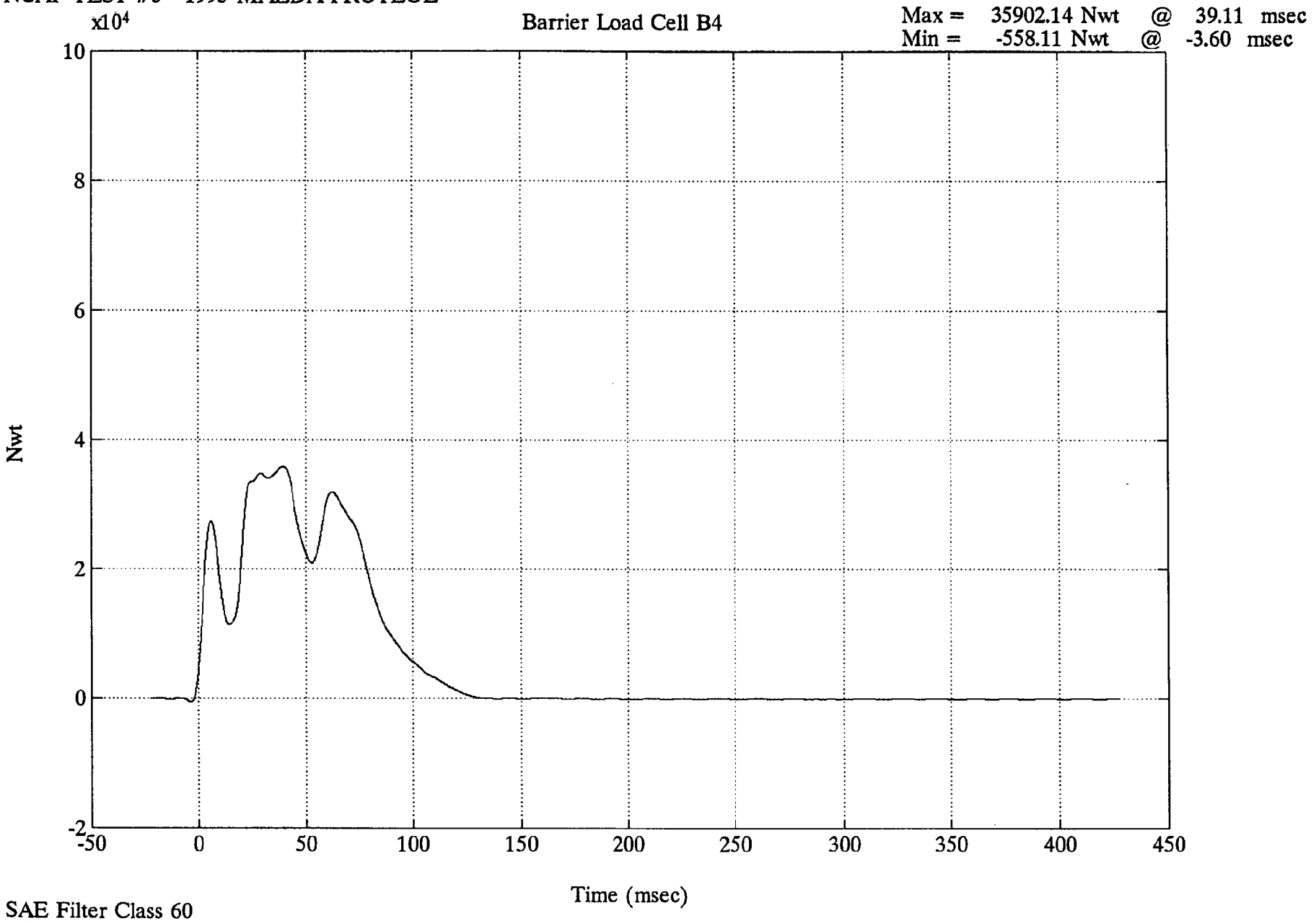
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

Load Cell Did Not Record

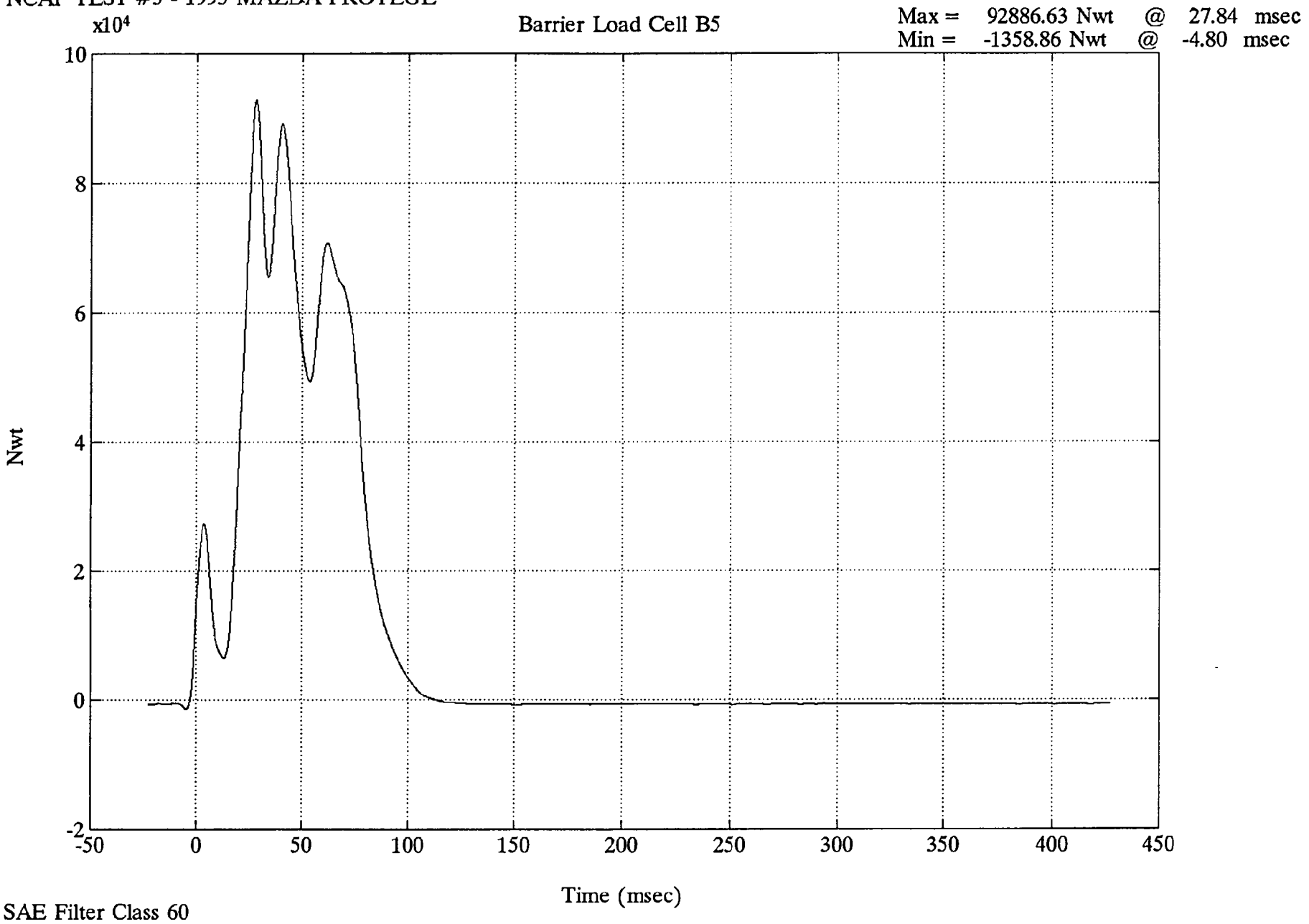
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

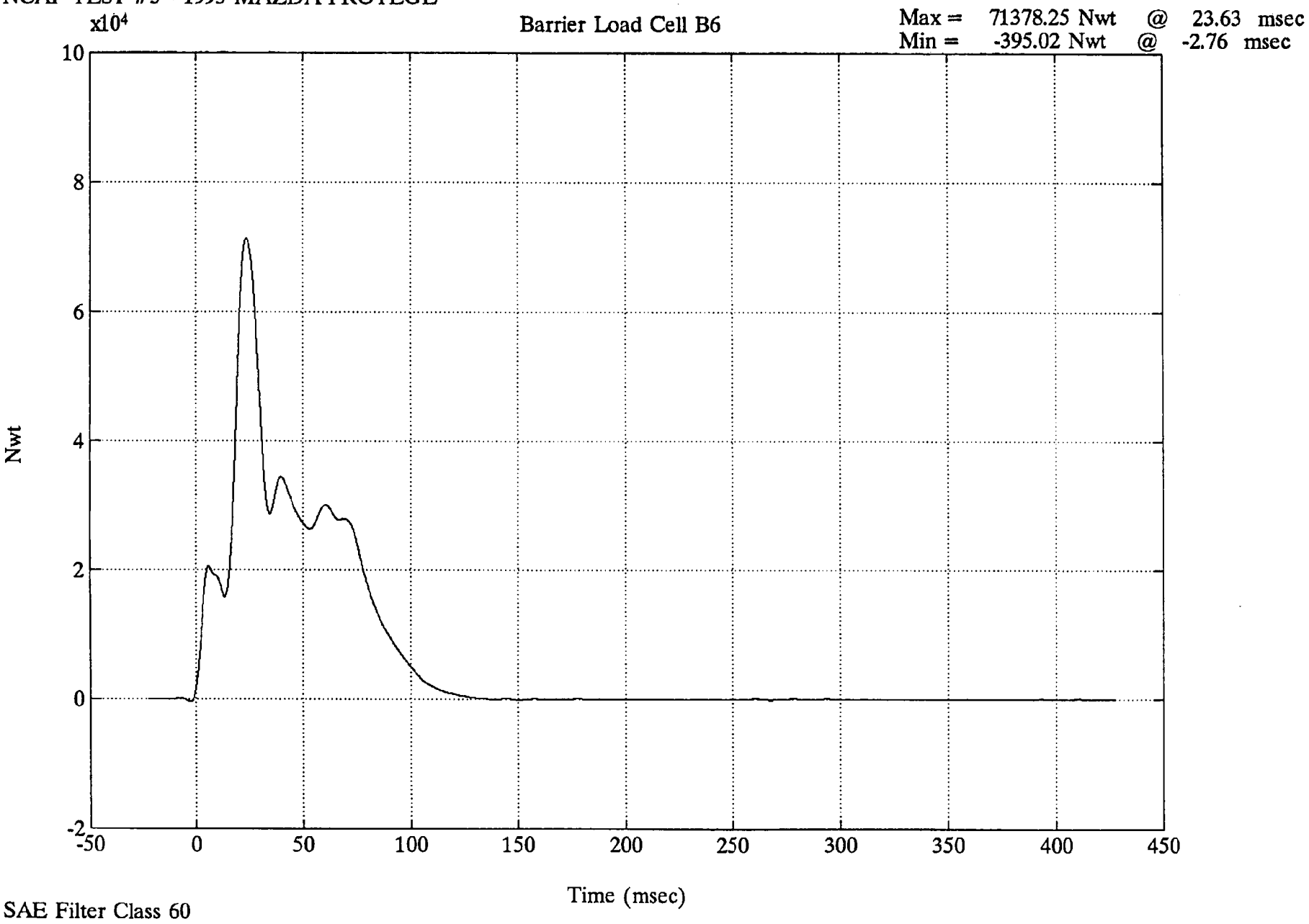
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

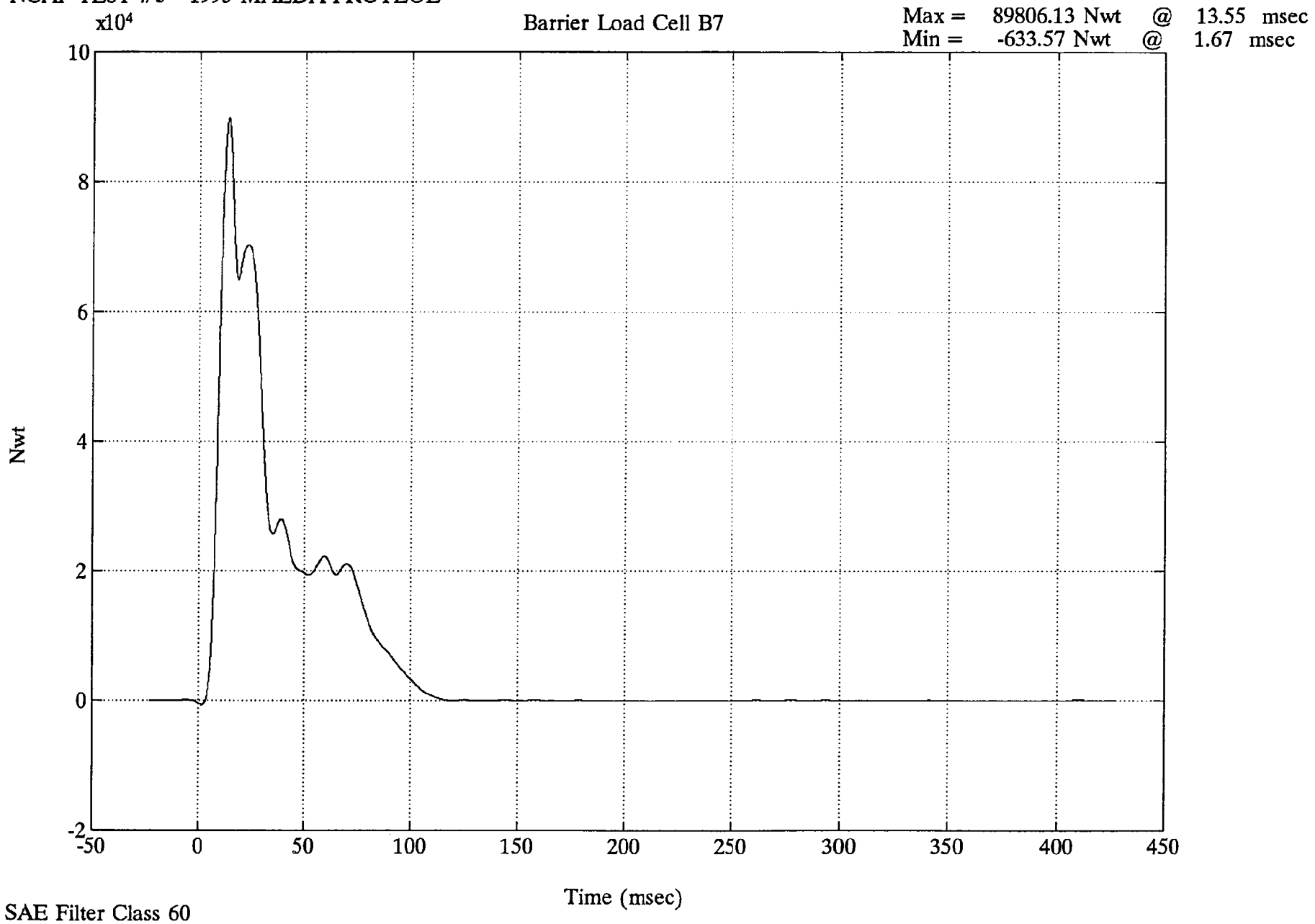
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

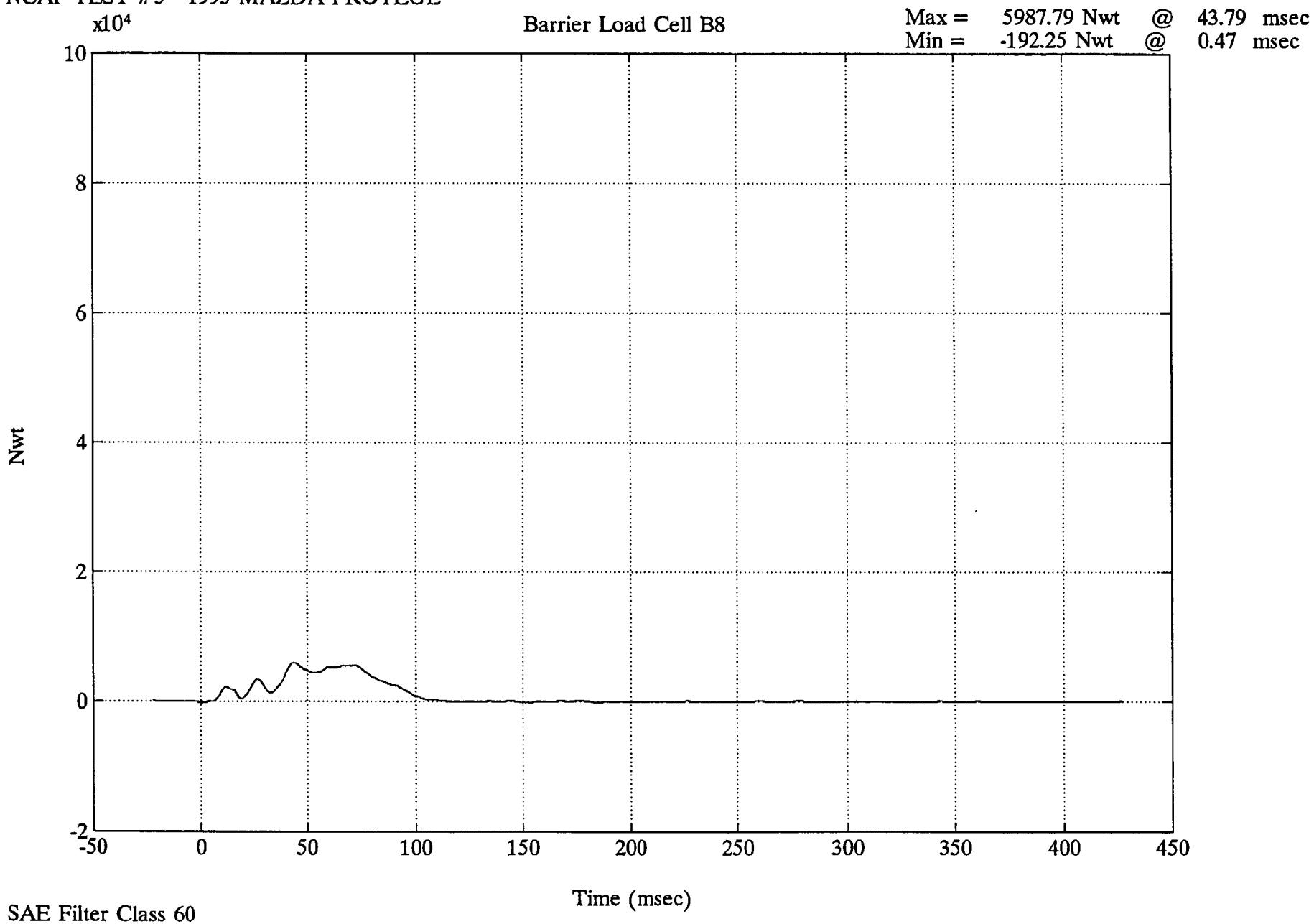
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

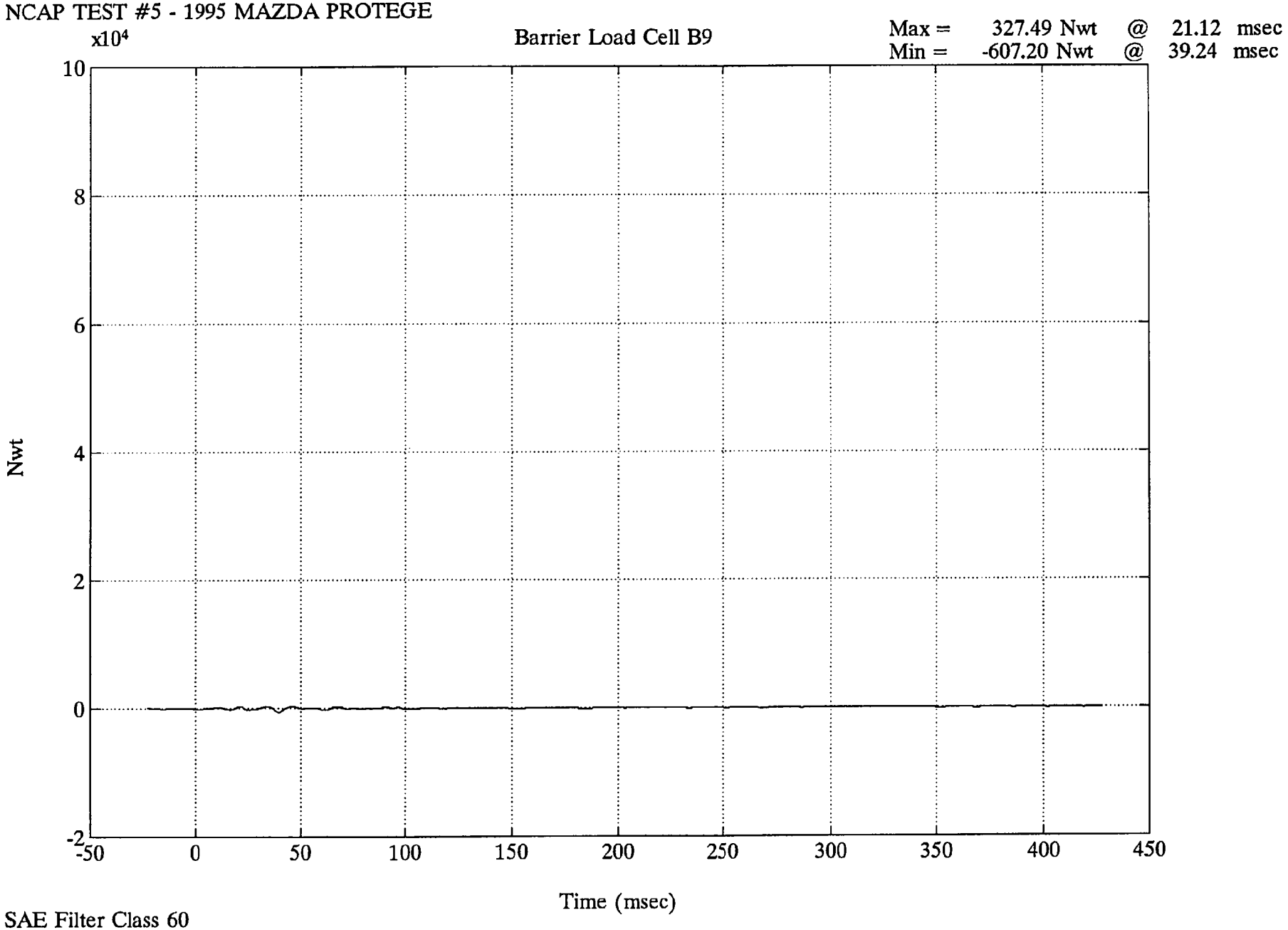
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

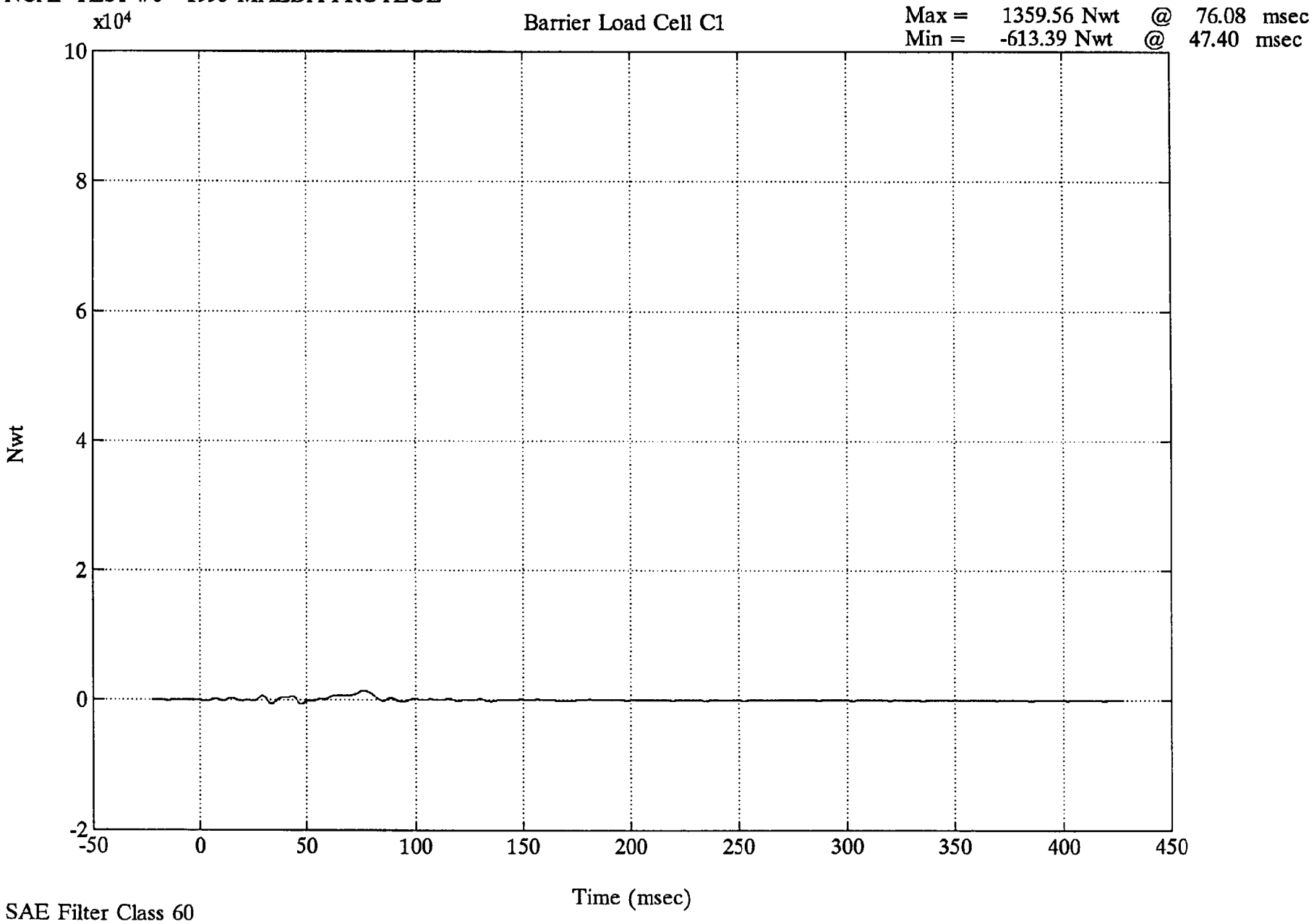
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

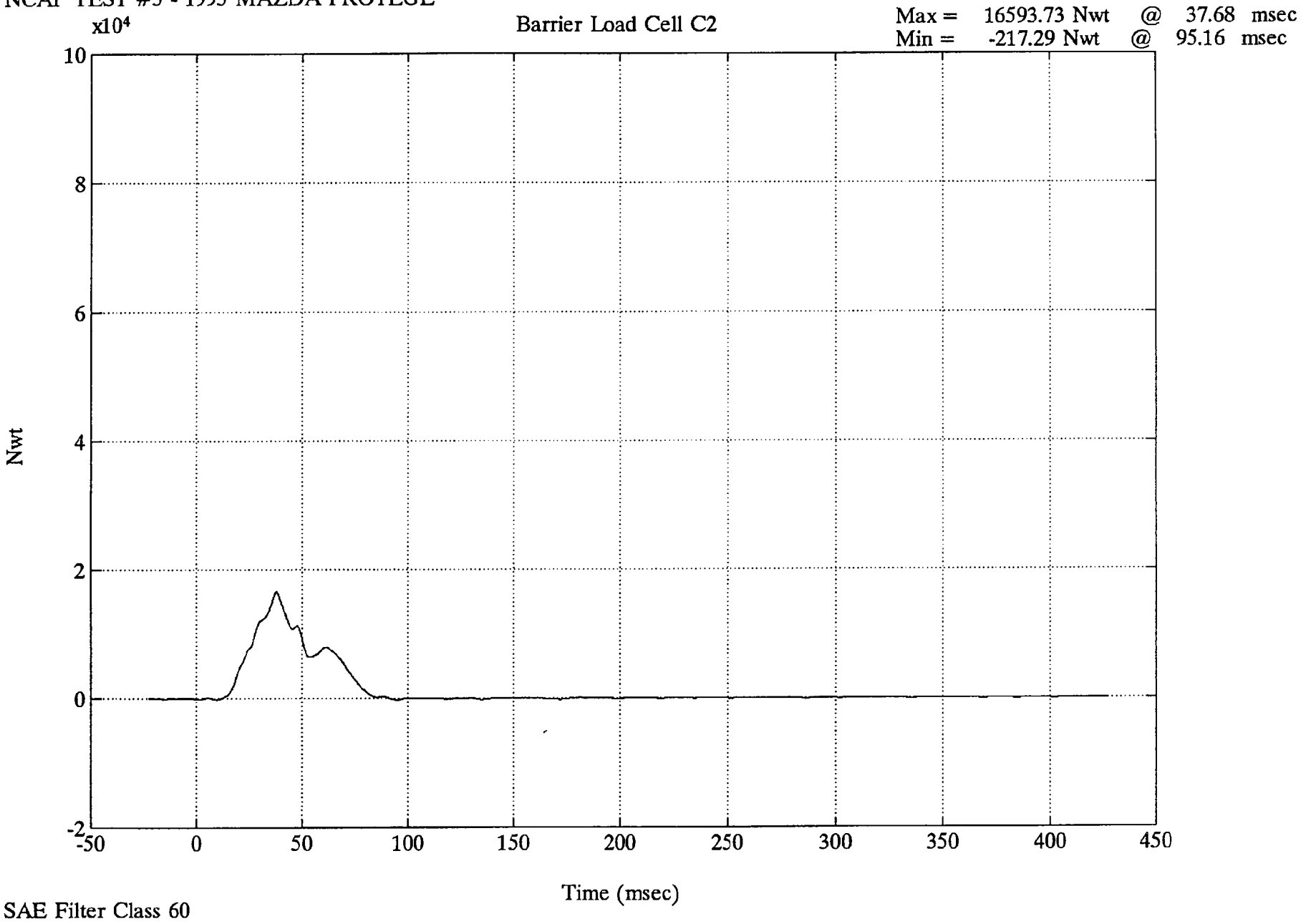
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

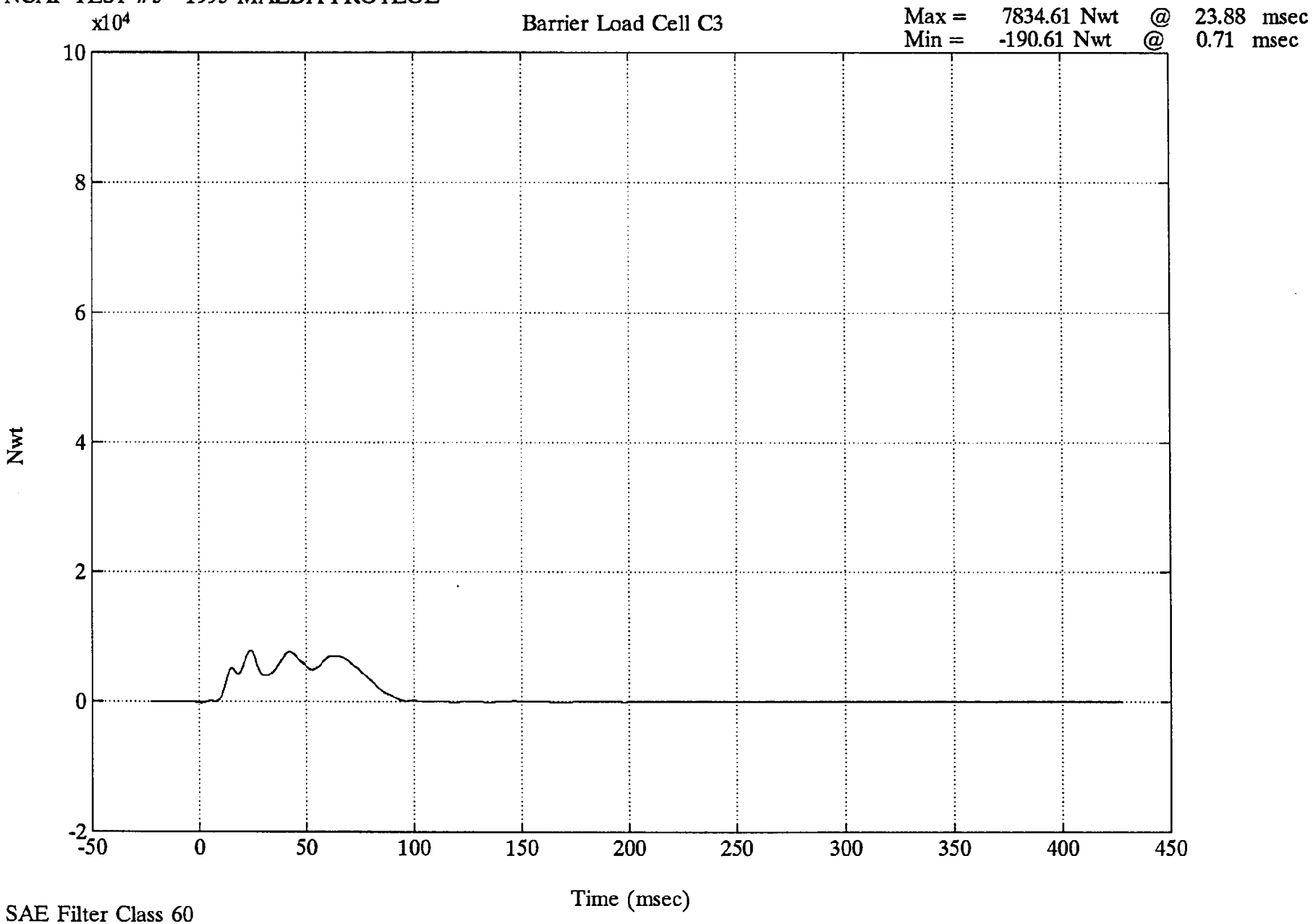


SAE Filter Class 60

B-50

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

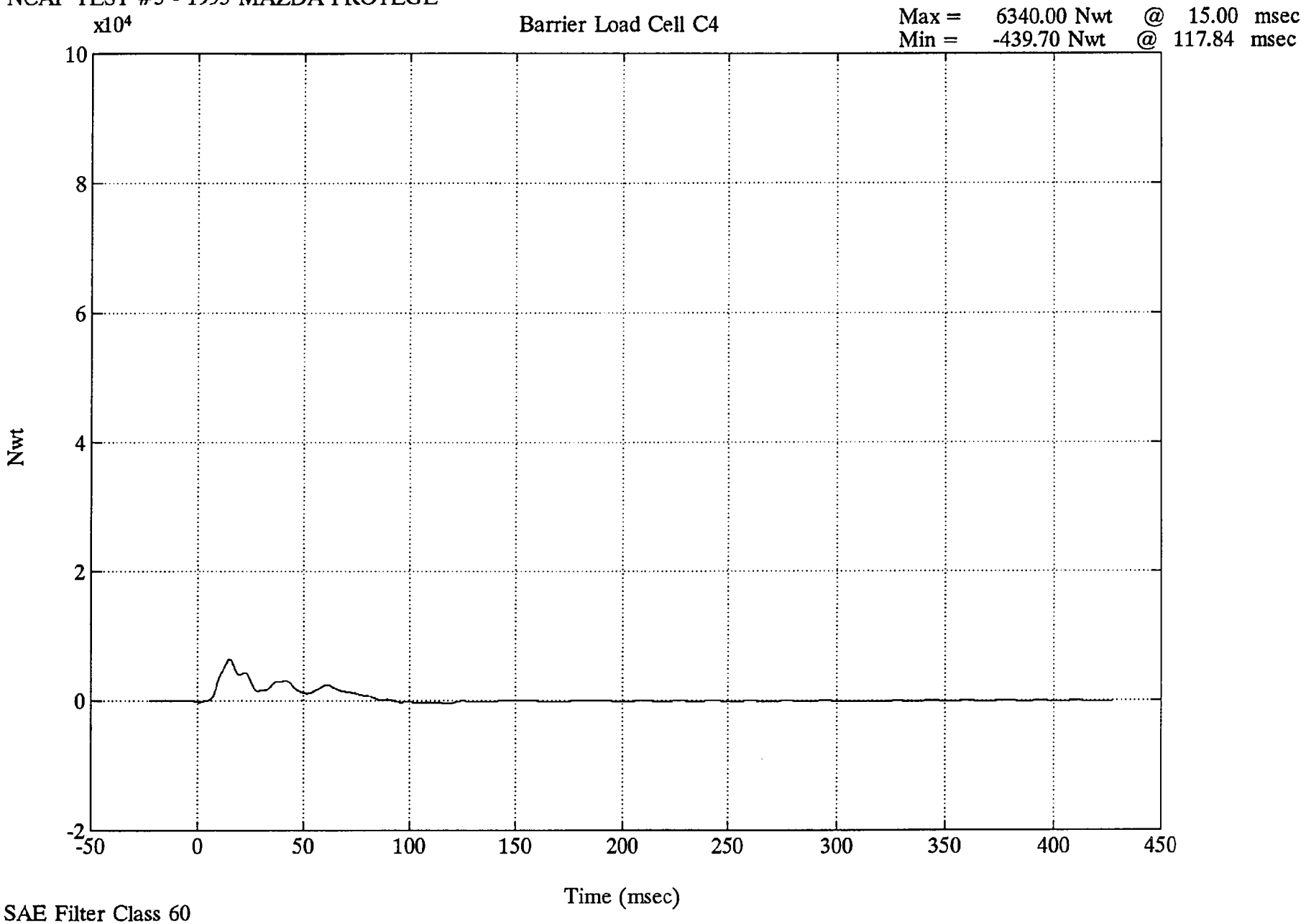


SAE Filter Class 60

B-51

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

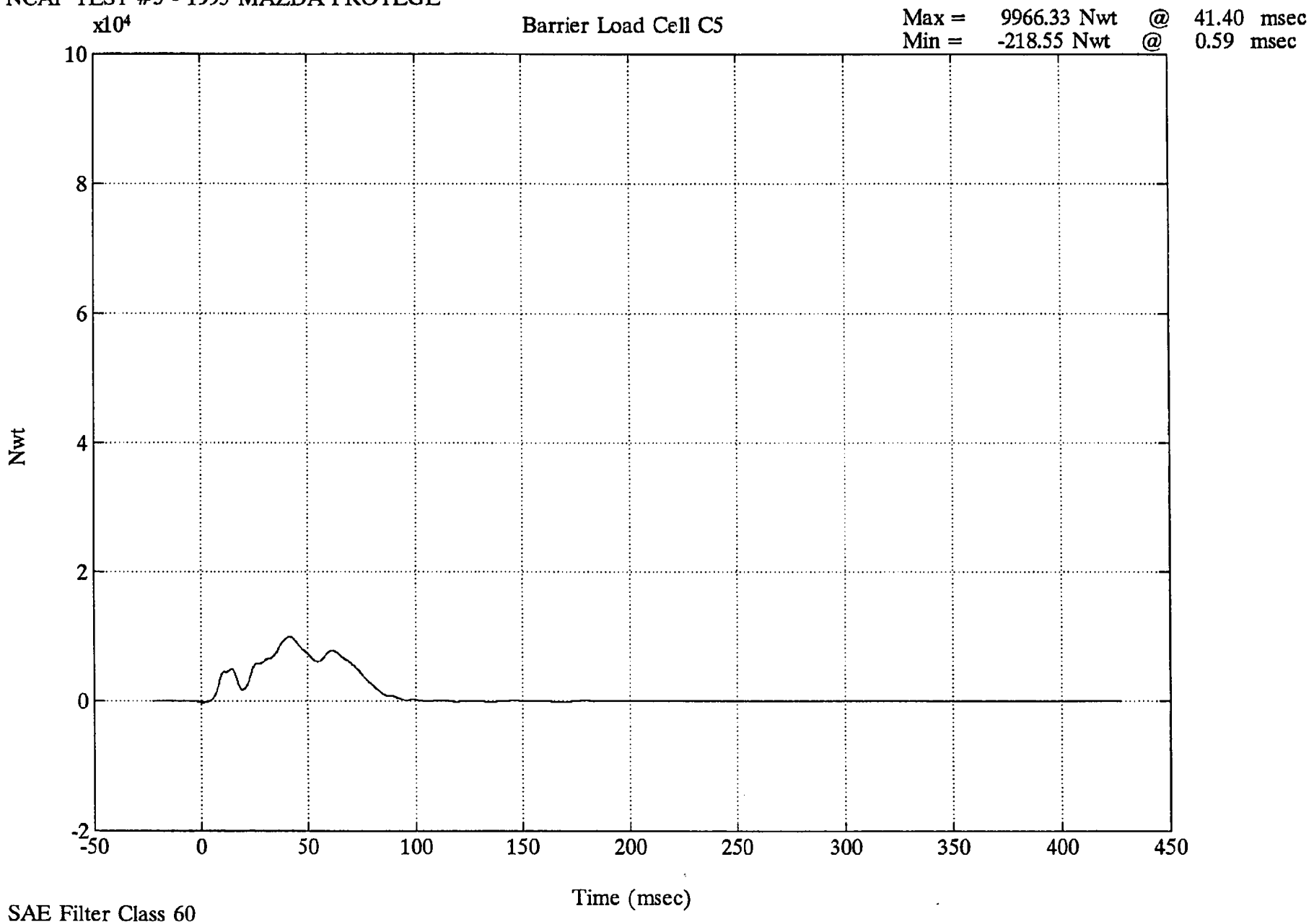


B-52

8227-5

SAE Filter Class 60

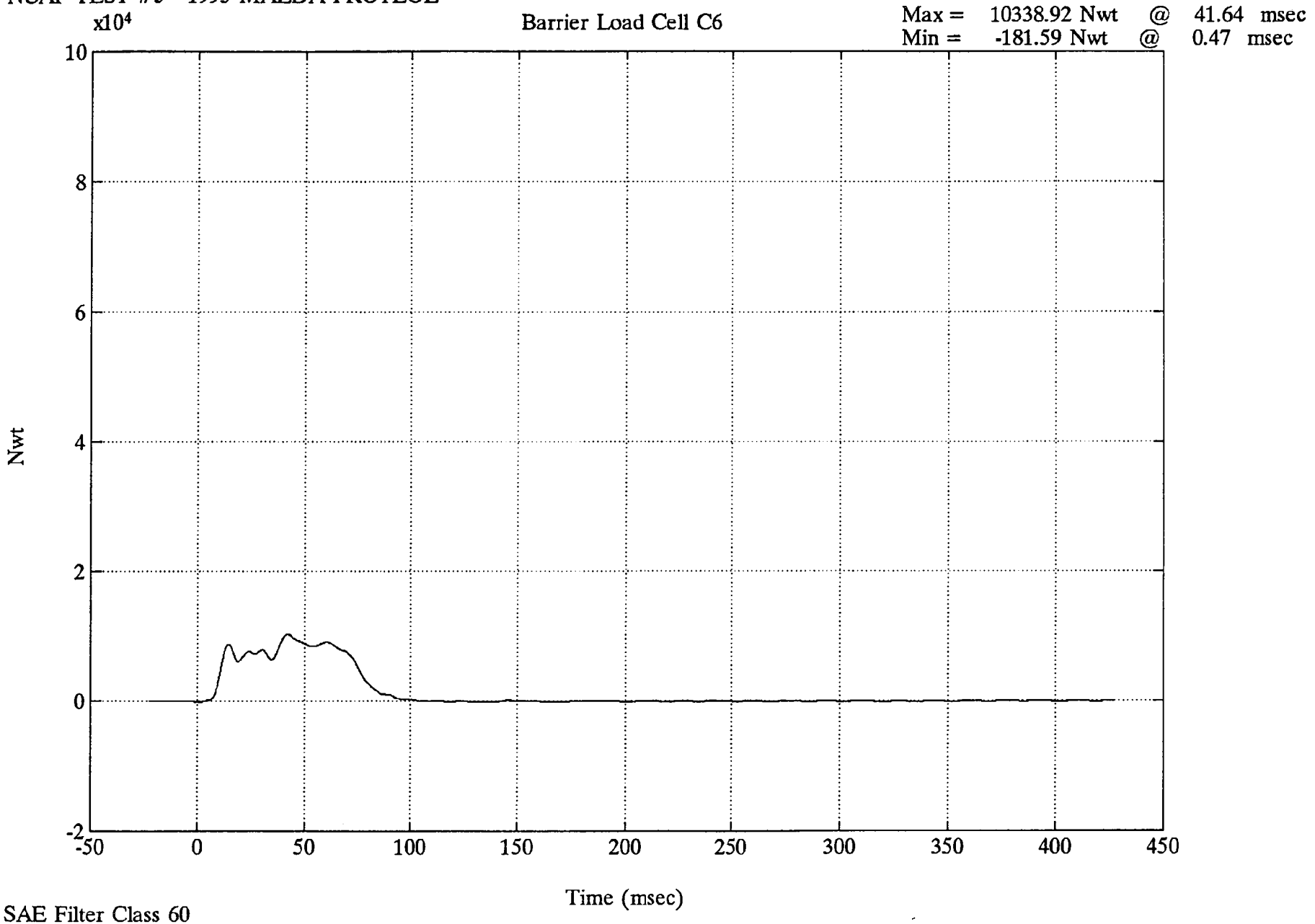
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

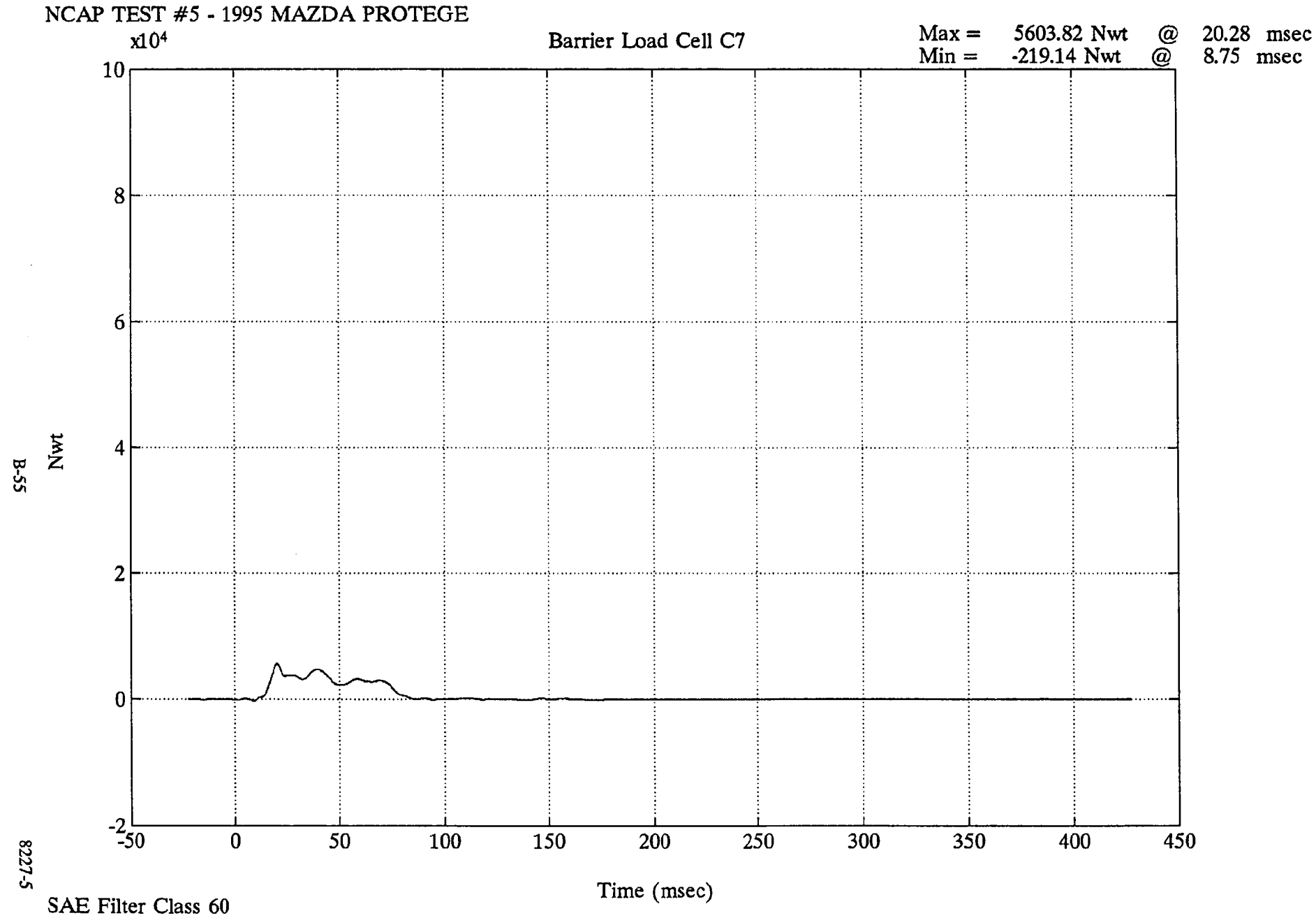
NCAP TEST #5 - 1995 MAZDA PROTEGE



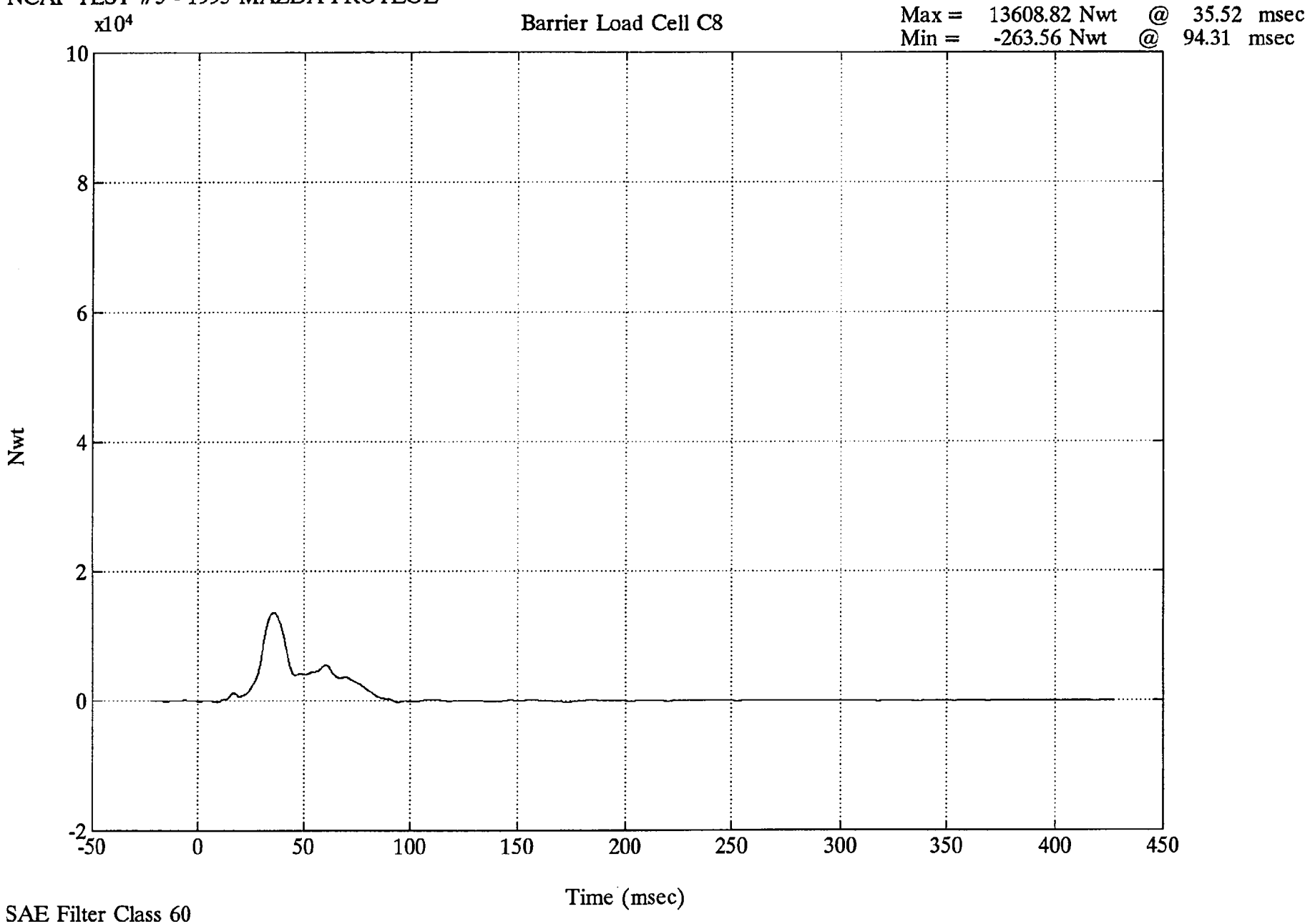
SAE Filter Class 60

B-54

8227-5


NCAP TEST #5 - 1995 MAZDA PROTEGE
x10⁴
Barrier Load Cell C7
Max = 5603.82 Nwt @ 20.28 msec
Min = -219.14 Nwt @ 8.75 msec
10
8
6
4
2
0
-2
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 60
B-55
8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

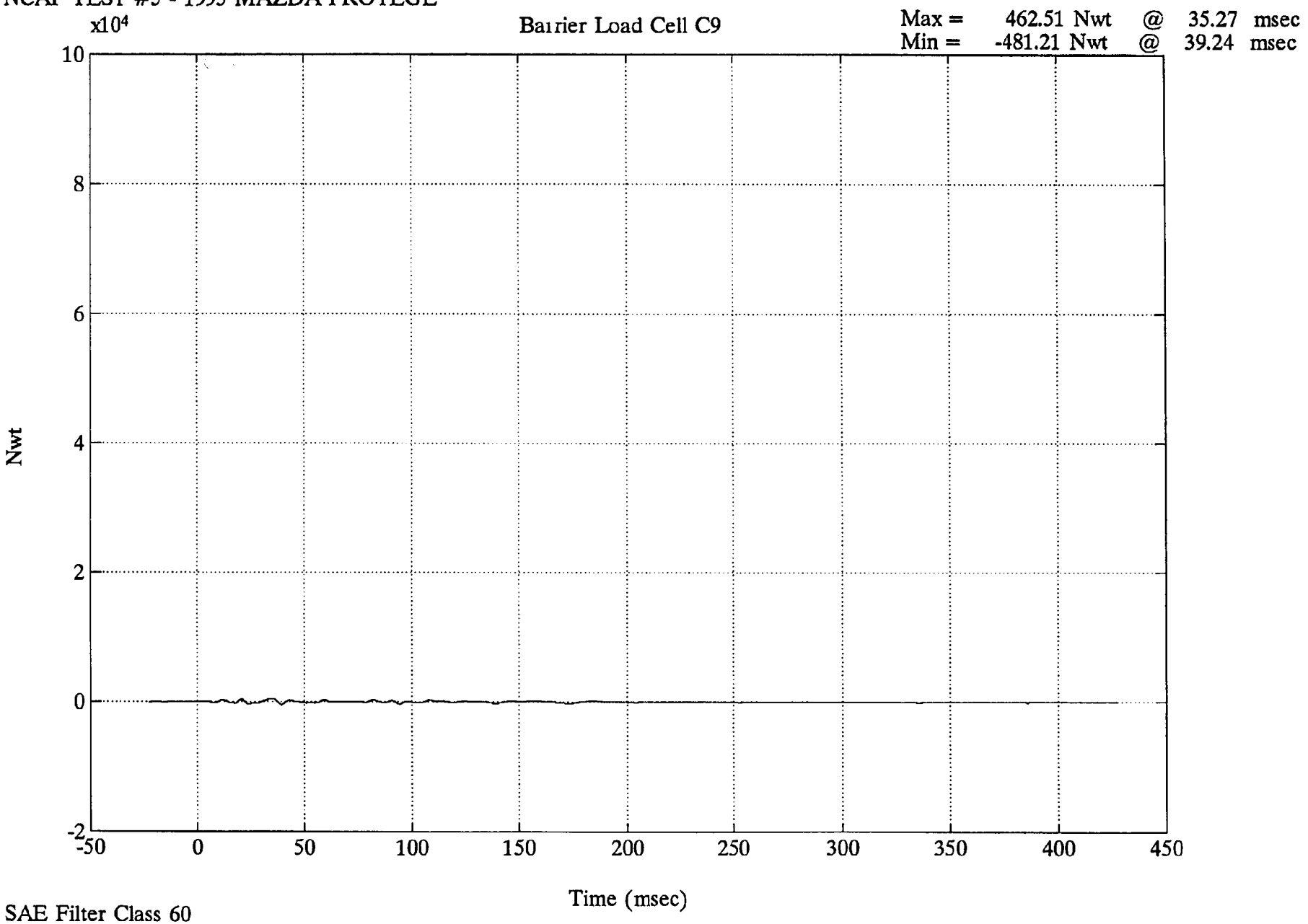


B-56

8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

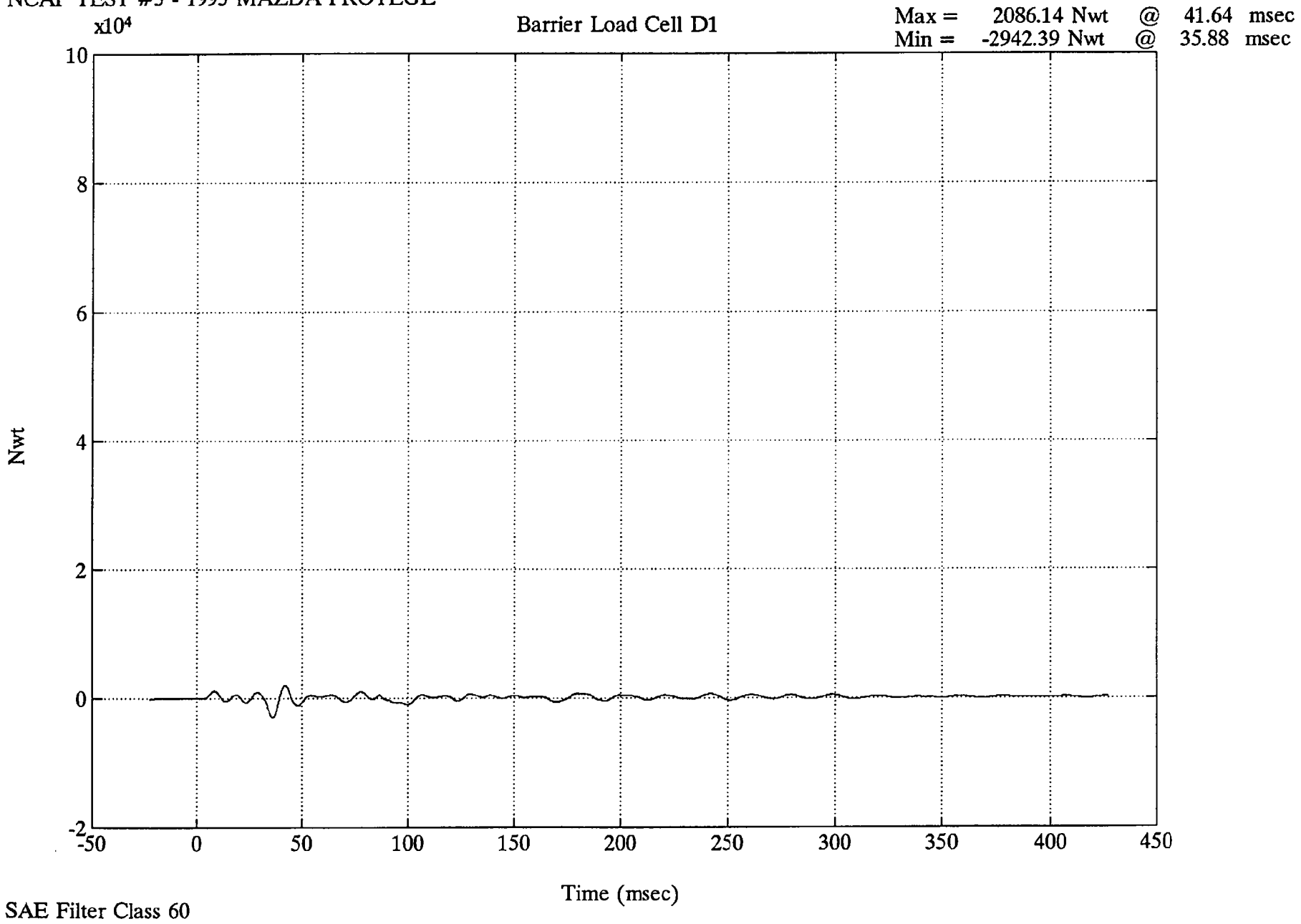


B-57

8227-5

SAE Filter Class 60

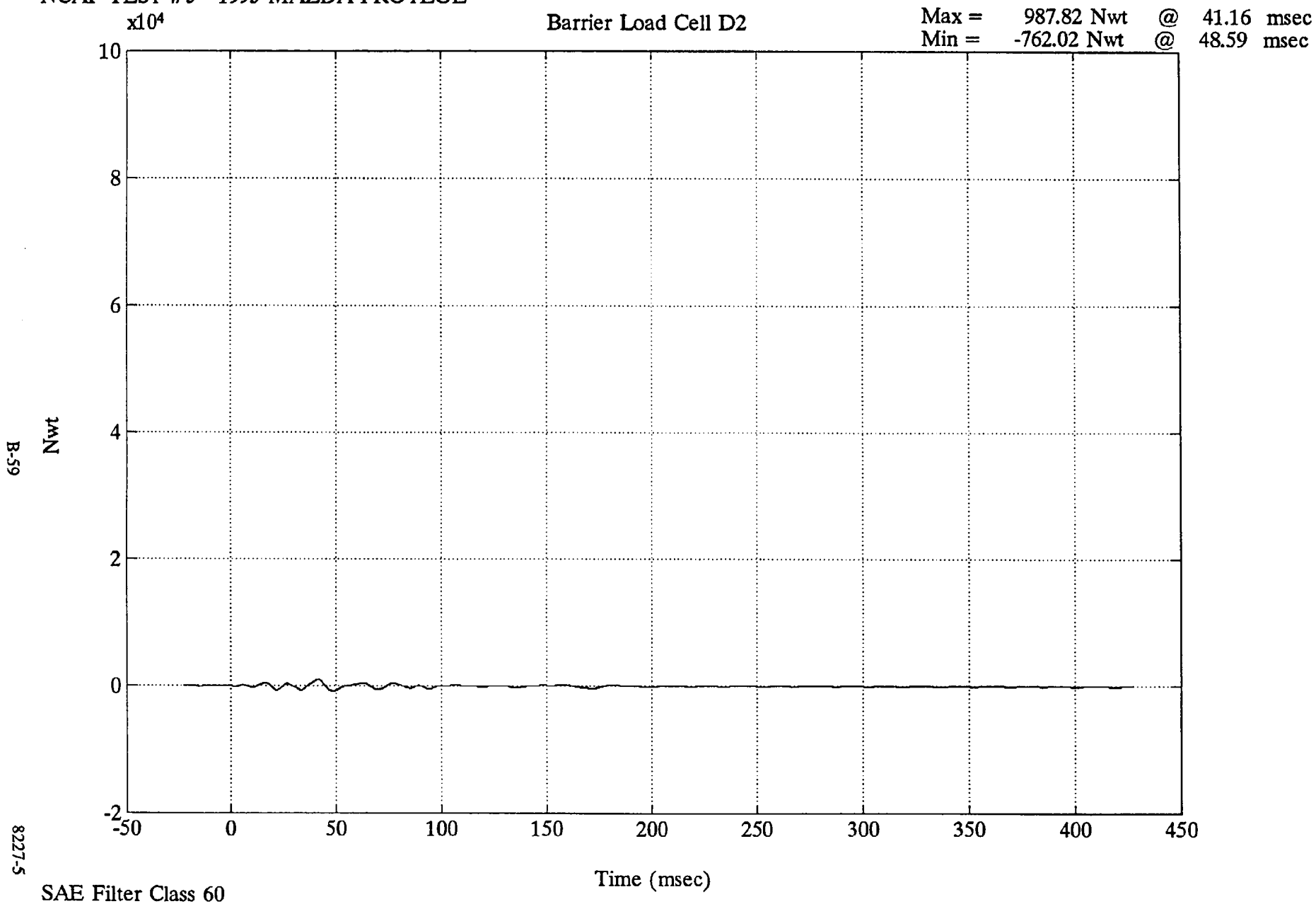
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

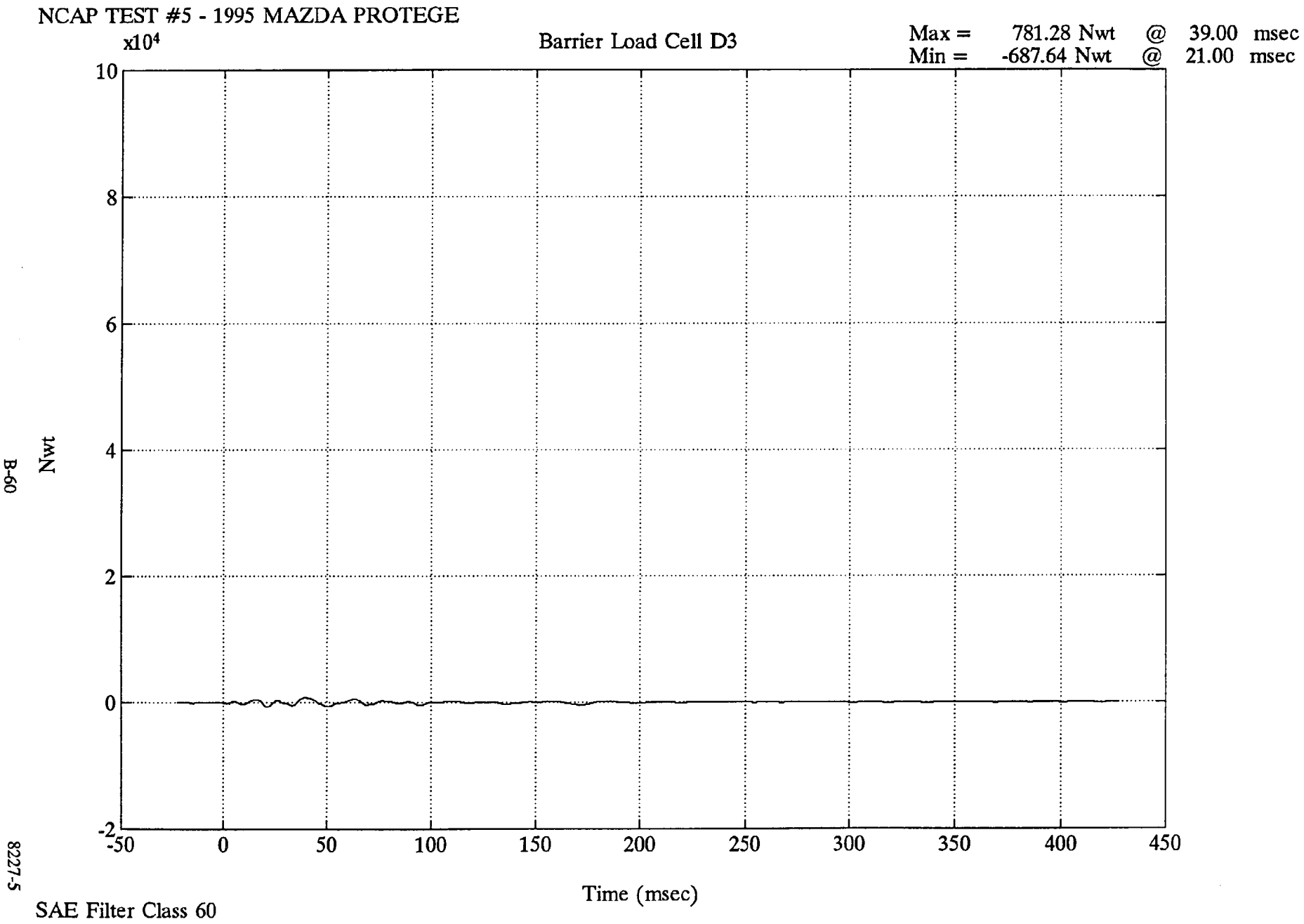


B-59

8227-5

SAE Filter Class 60

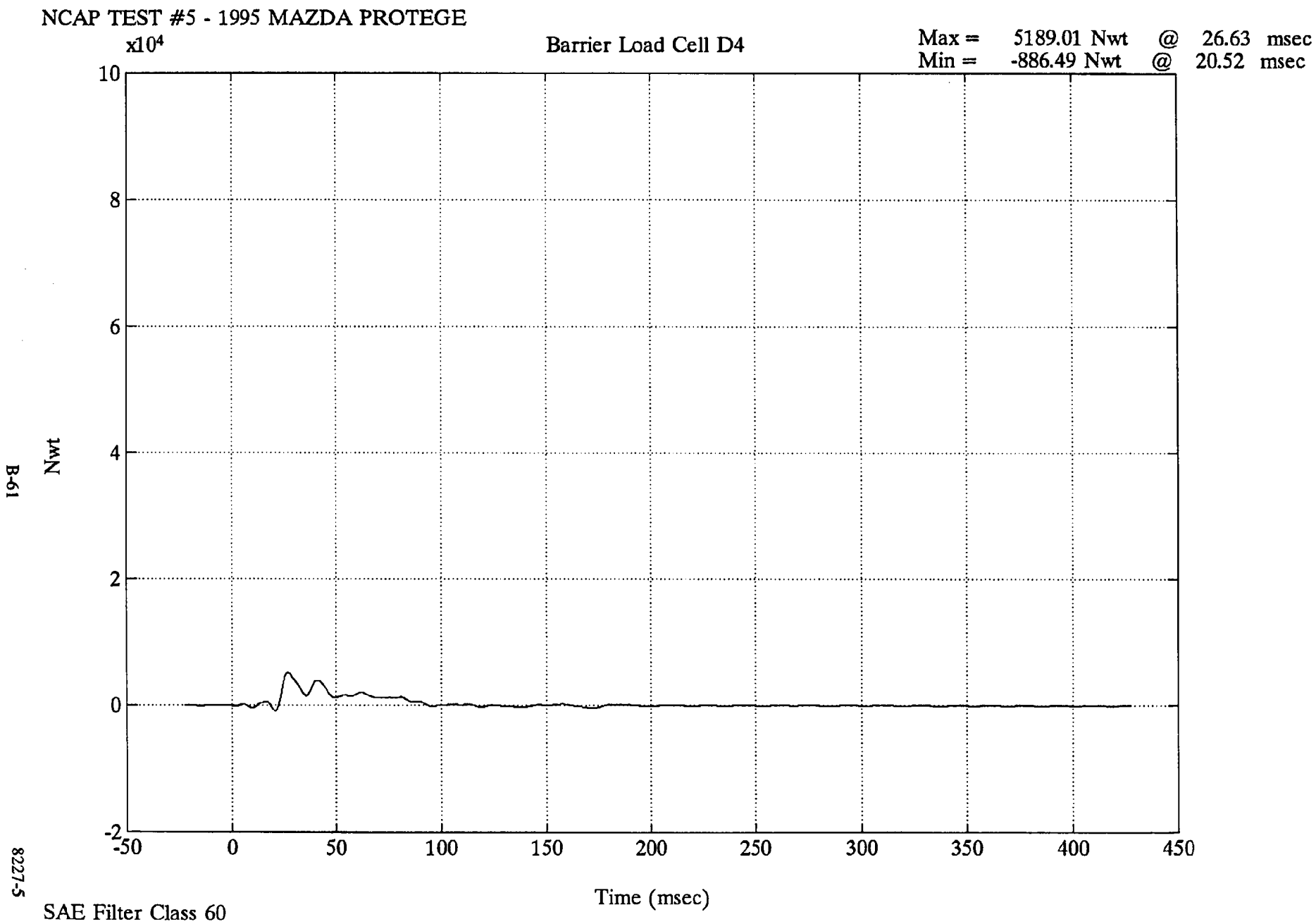
NCAP TEST #5 - 1995 MAZDA PROTEGE



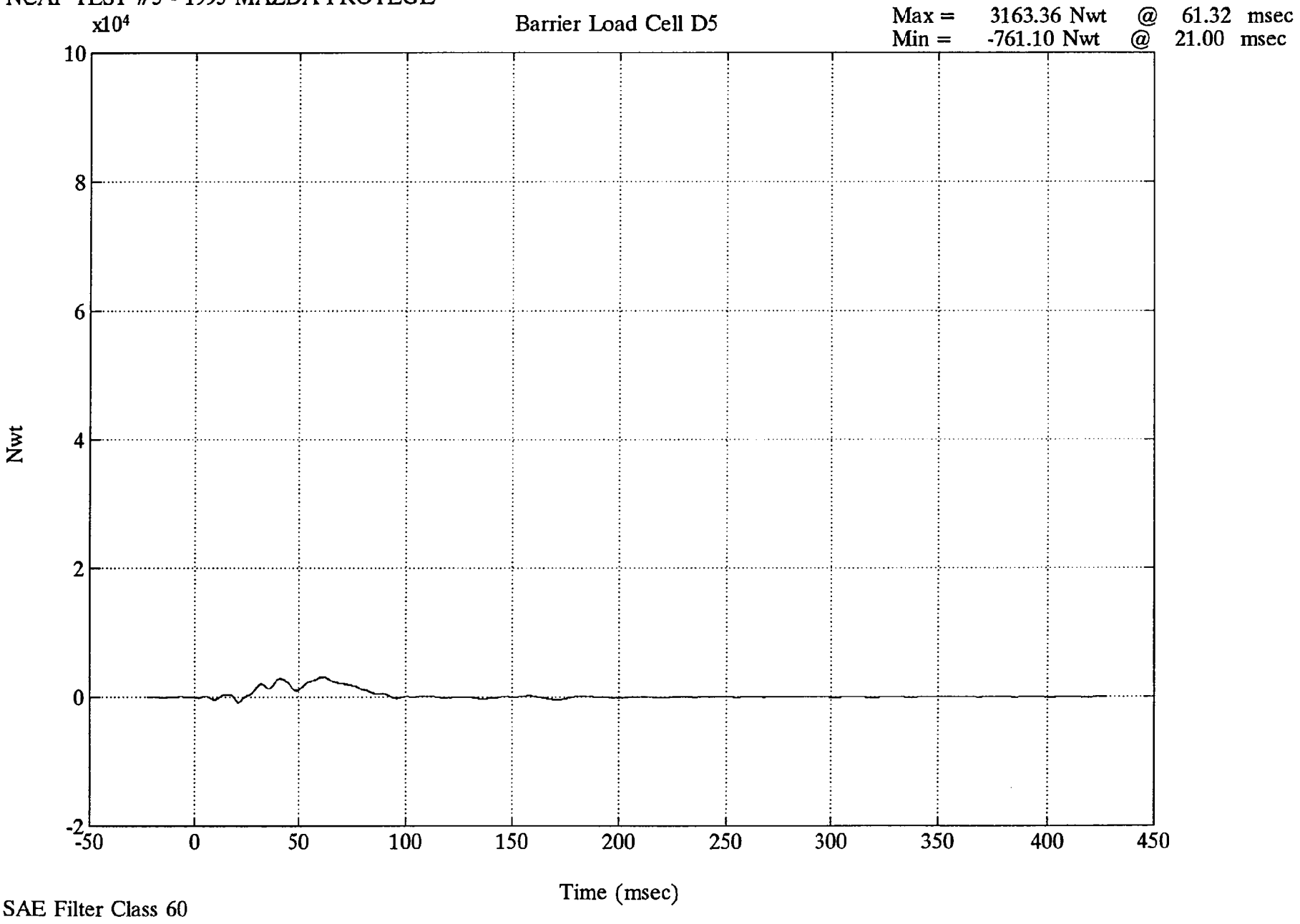
B-60

8227-5

SAE Filter Class 60

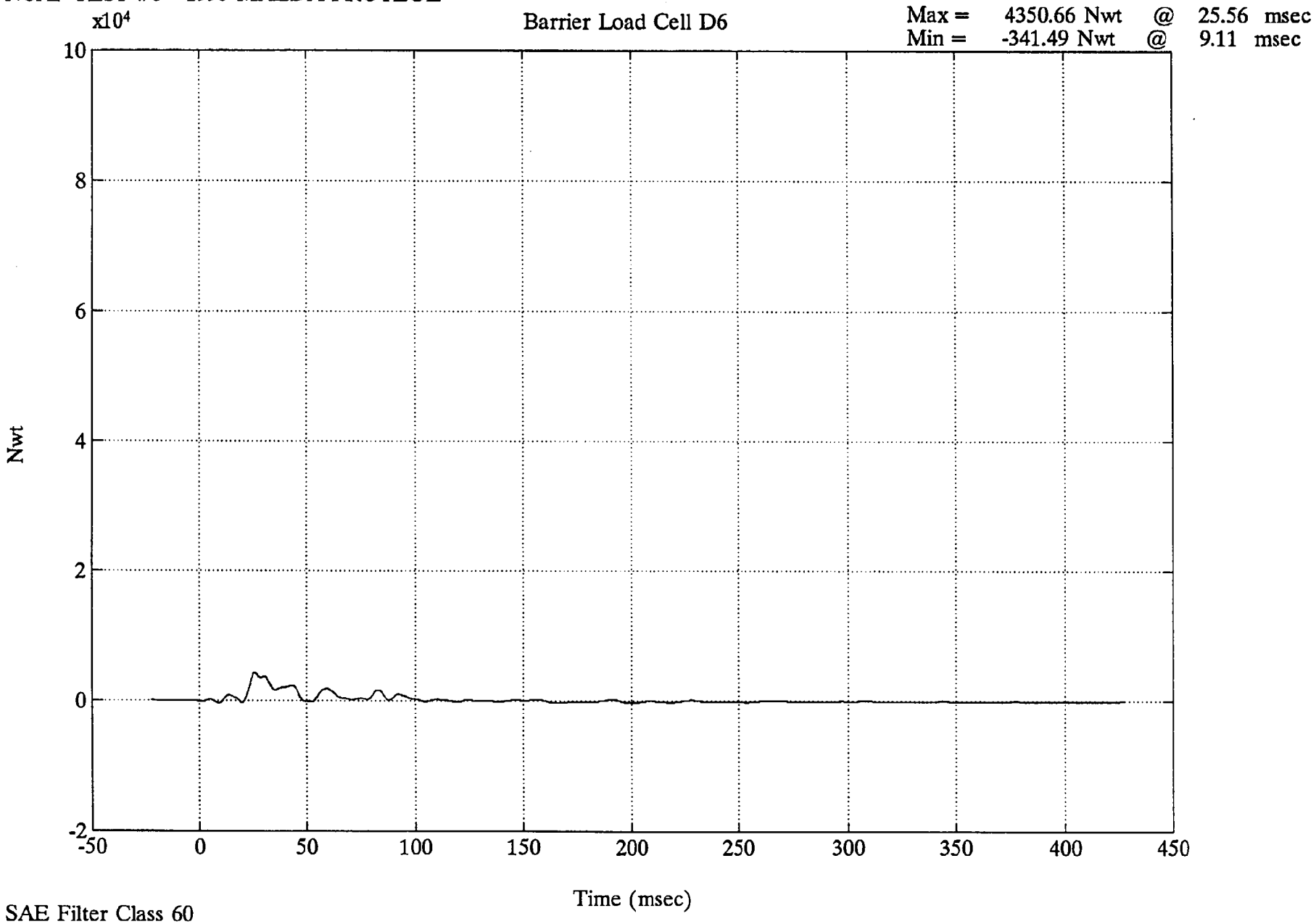

NCAP TEST #5 - 1995 MAZDA PROTEGE
x10^4
Barrier Load Cell D4
Max = 5189.01 Nwt @ 26.63 msec
Min = -886.49 Nwt @ 20.52 msec
10
8
6
4
2
0
-2
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 60
B-61
8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

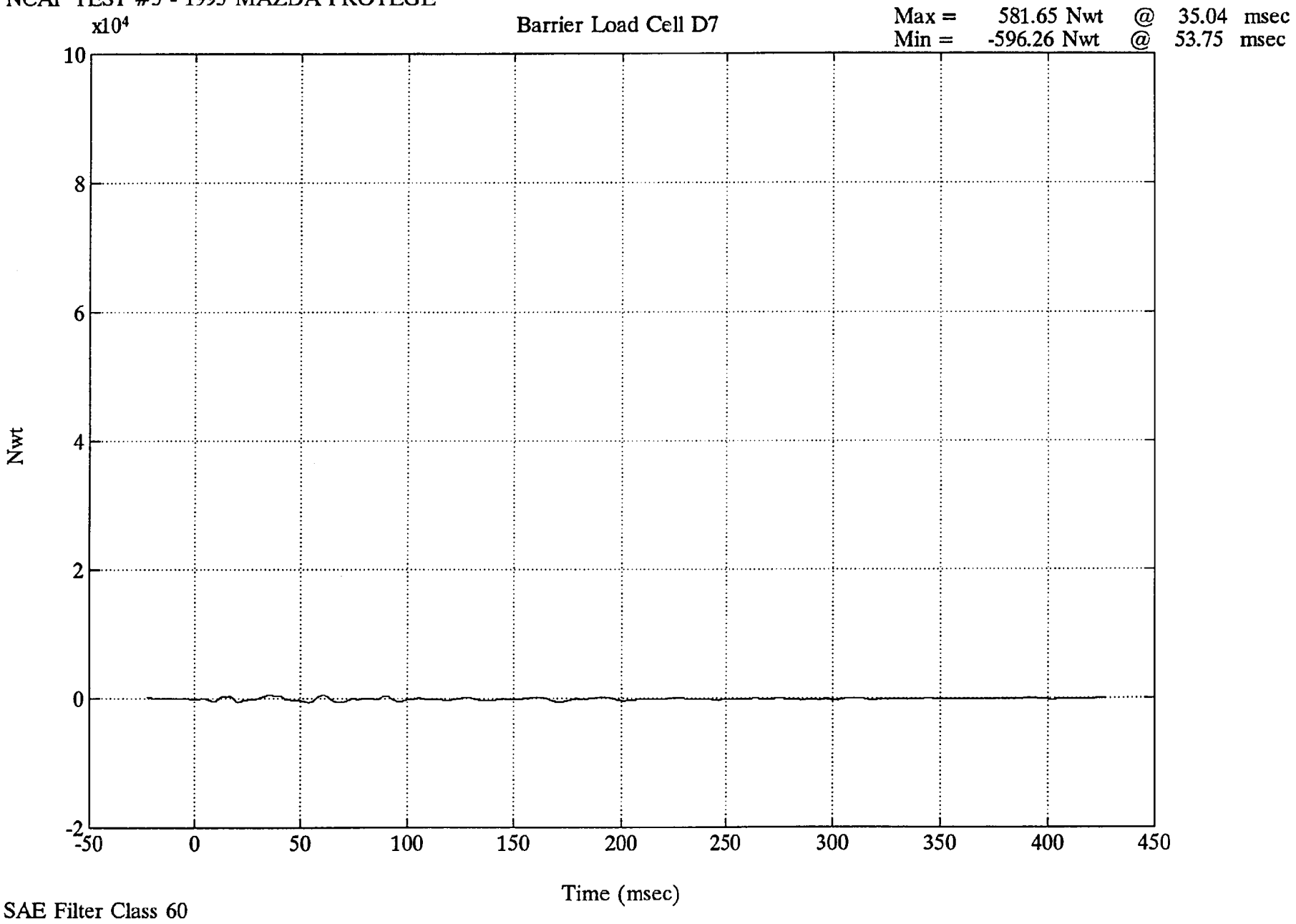
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-5

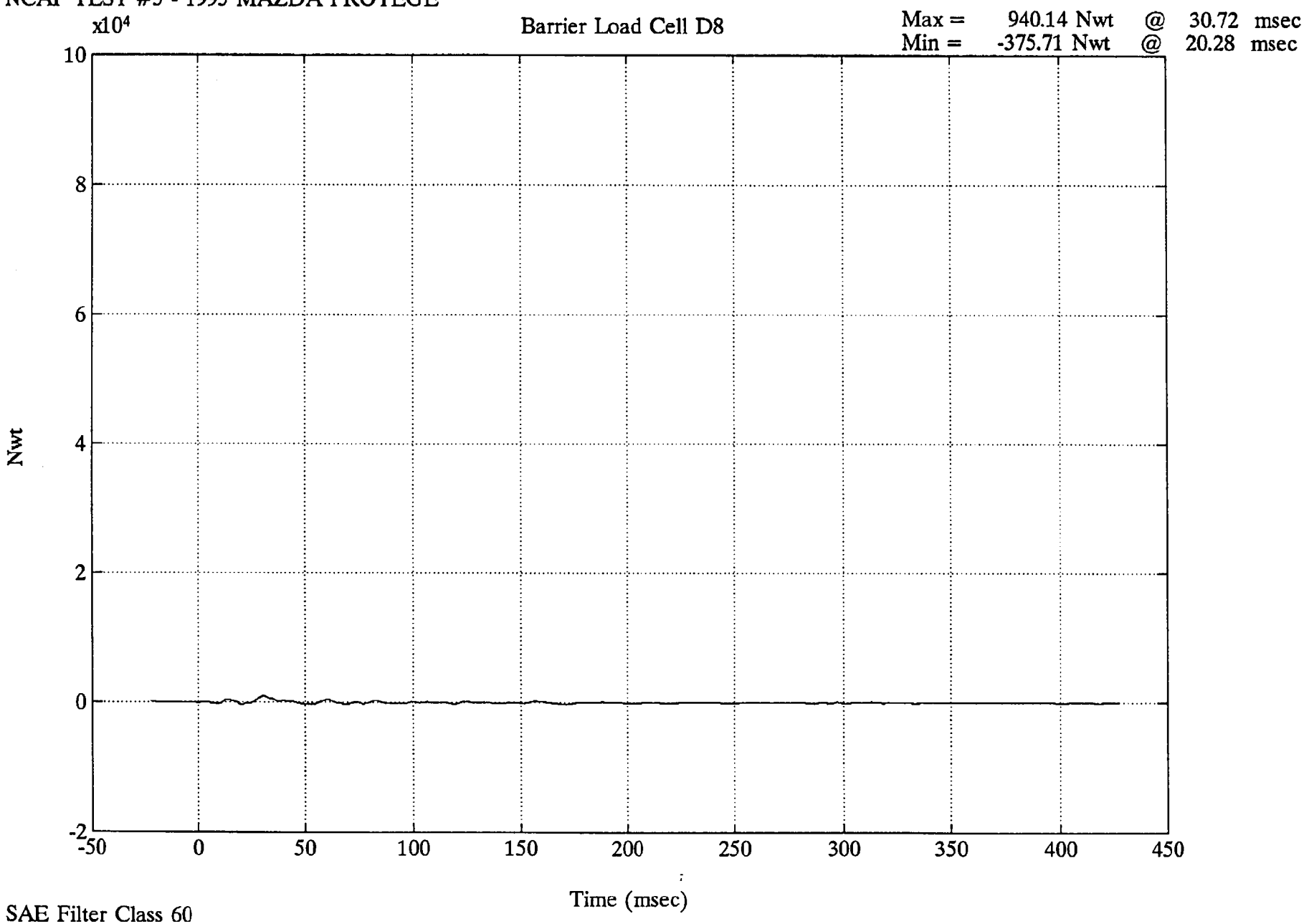
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 60

8227-S

NCAP TEST #5 - 1995 MAZDA PROTEGE

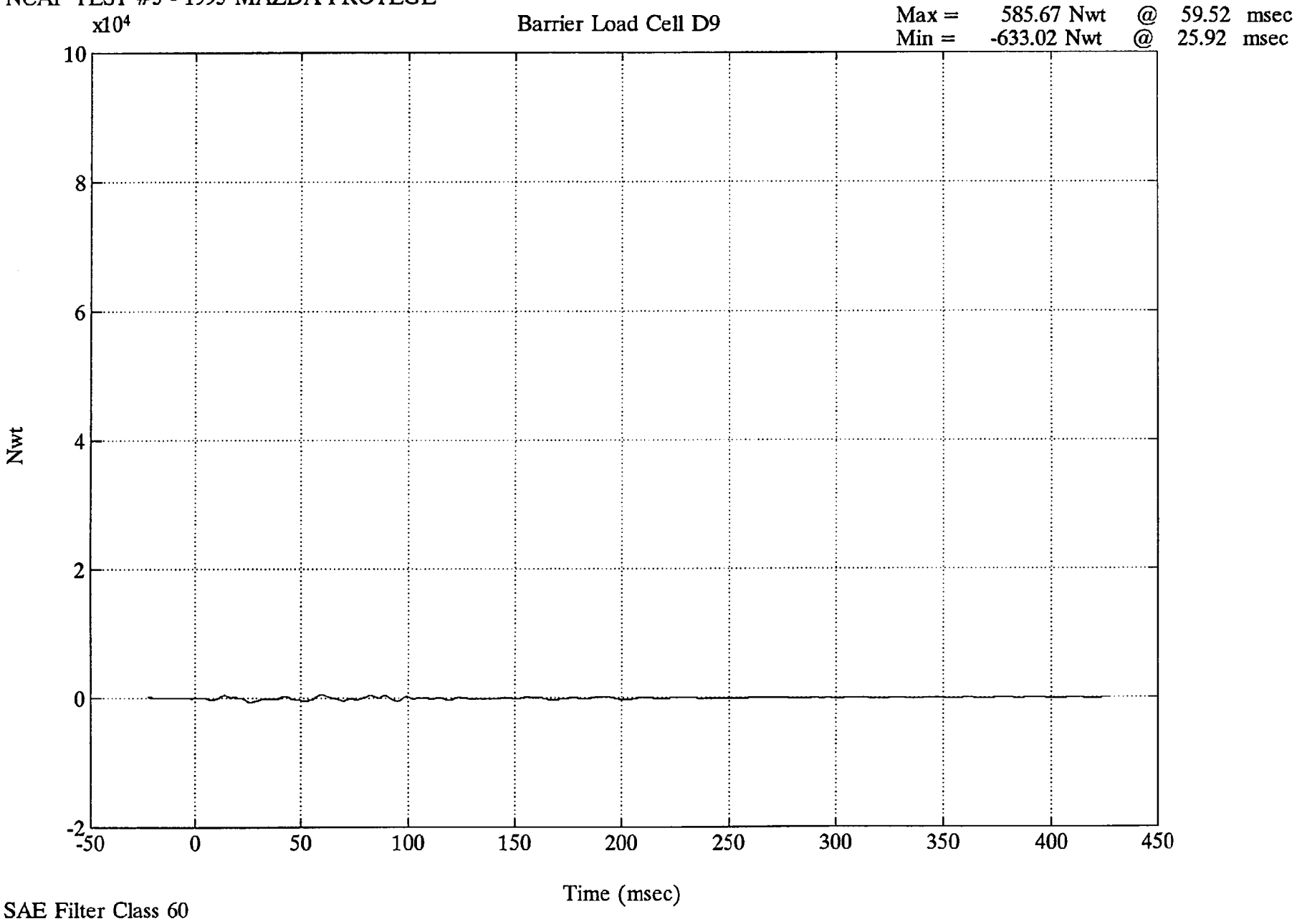


B-65

8227-5

SAE Filter Class 60

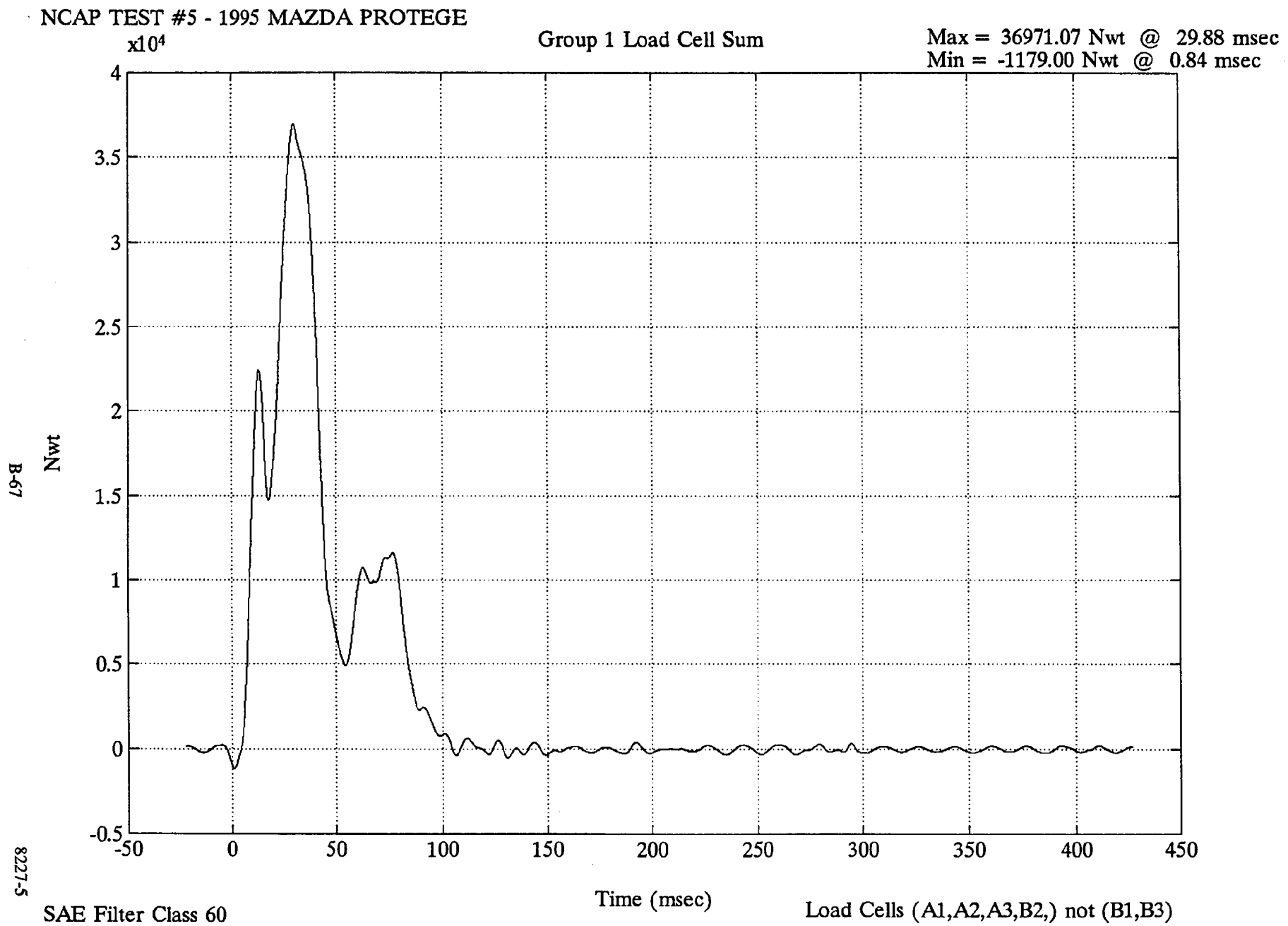
NCAP TEST #5 - 1995 MAZDA PROTEGE

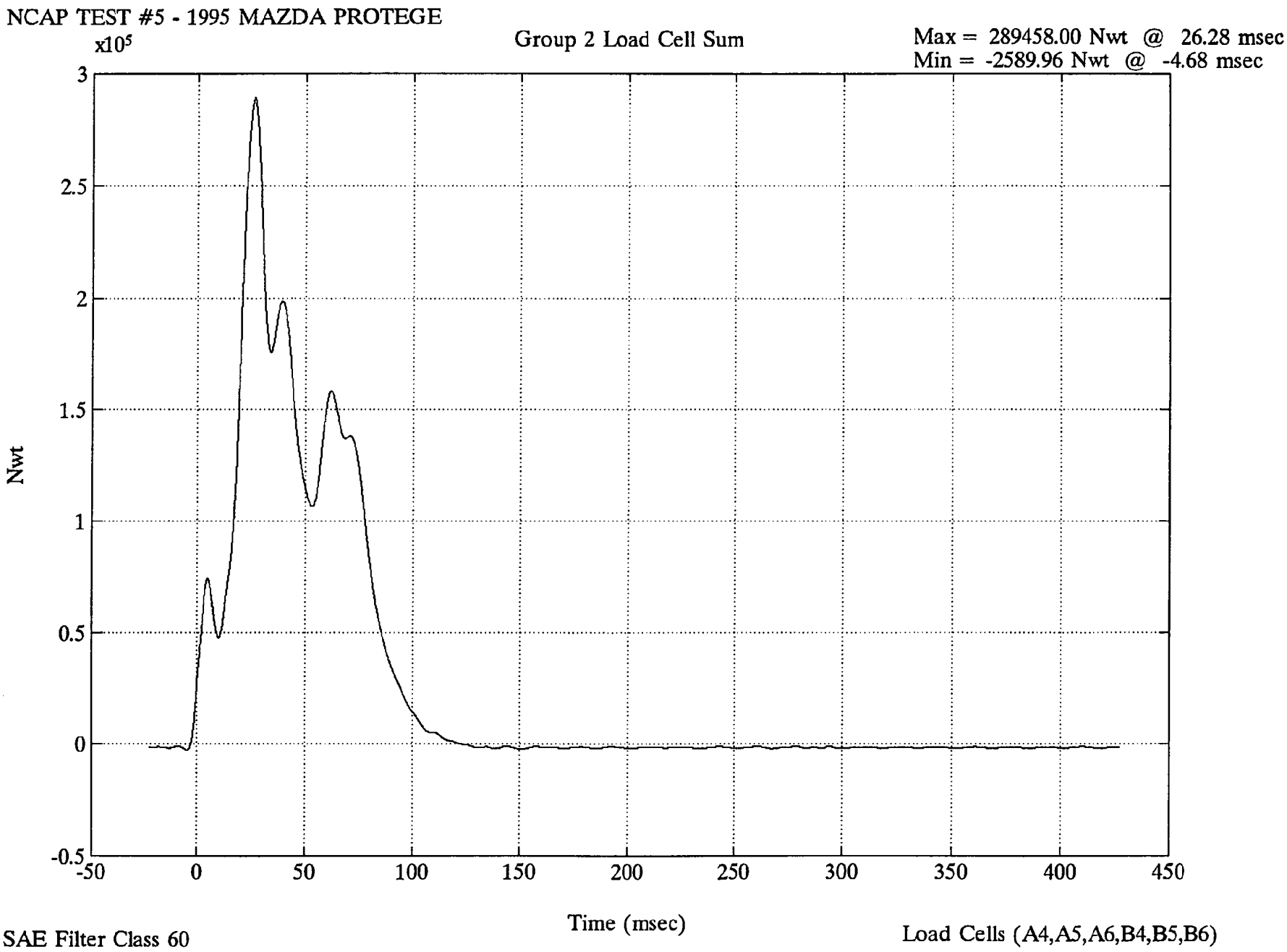


SAE Filter Class 60

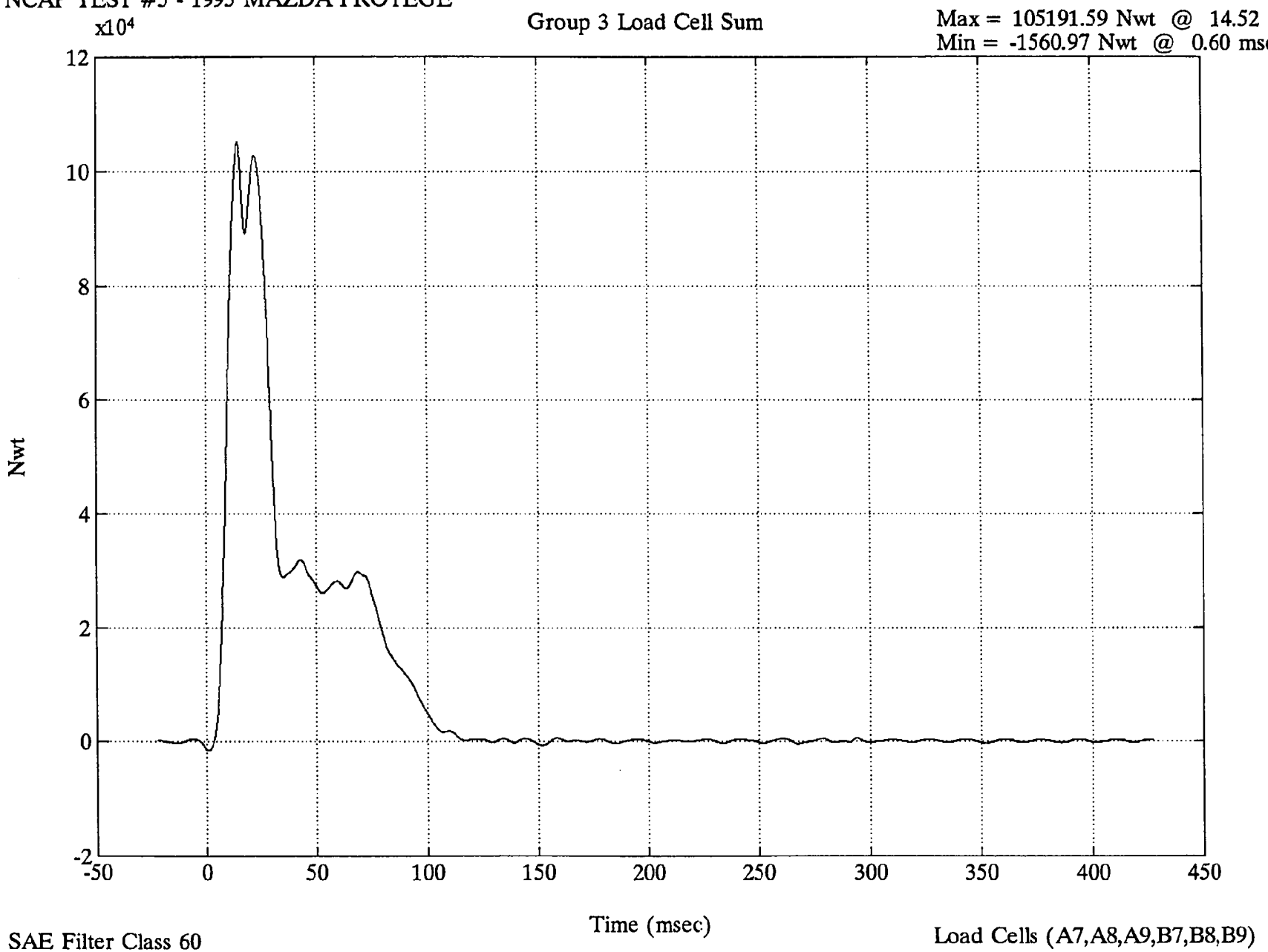
B-66

8227-5


NCAP TEST #5 - 1995 MAZDA PROTEGE
x10⁴
Group 1 Load Cell Sum
Max = 36971.07 Nwt @ 29.88 msec
Min = -1179.00 Nwt @ 0.84 msec
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 60
Load Cells (A1,A2,A3,B2,) not (B1,B3)
B-67
8227-5


NCAP TEST #5 - 1995 MAZDA PROTEGE
x10^5
Group 2 Load Cell Sum
Max = 289458.00 Nwt @ 26.28 msec
Min = -2589.96 Nwt @ -4.68 msec
3
2.5
2
1.5
1
0.5
0
-0.5
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
B-68
8227-5
SAE Filter Class 60
Load Cells (A4,A5,A6,B4,B5,B6)

NCAP TEST #5 - 1995 MAZDA PROTEGE

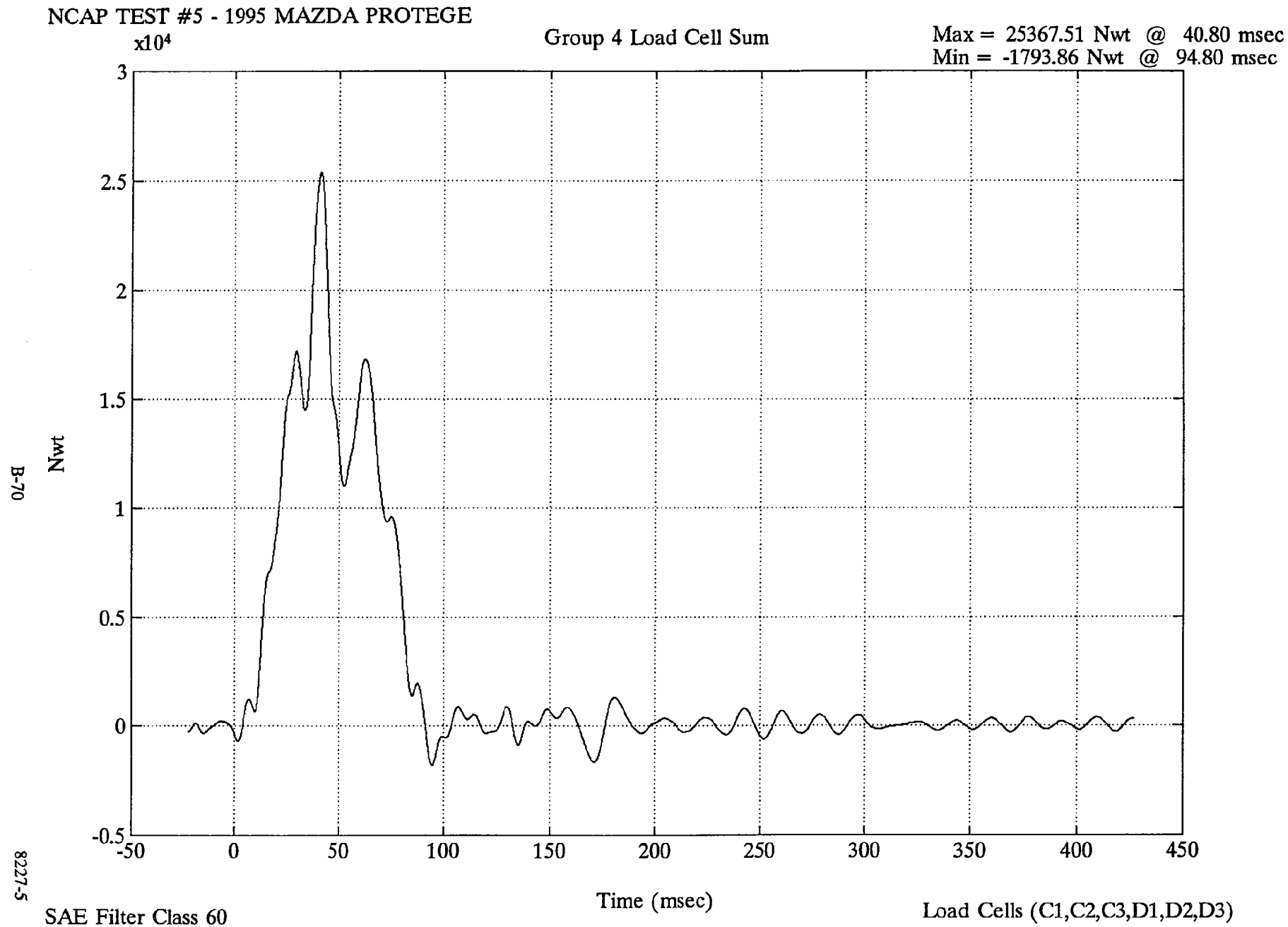


SAE Filter Class 60

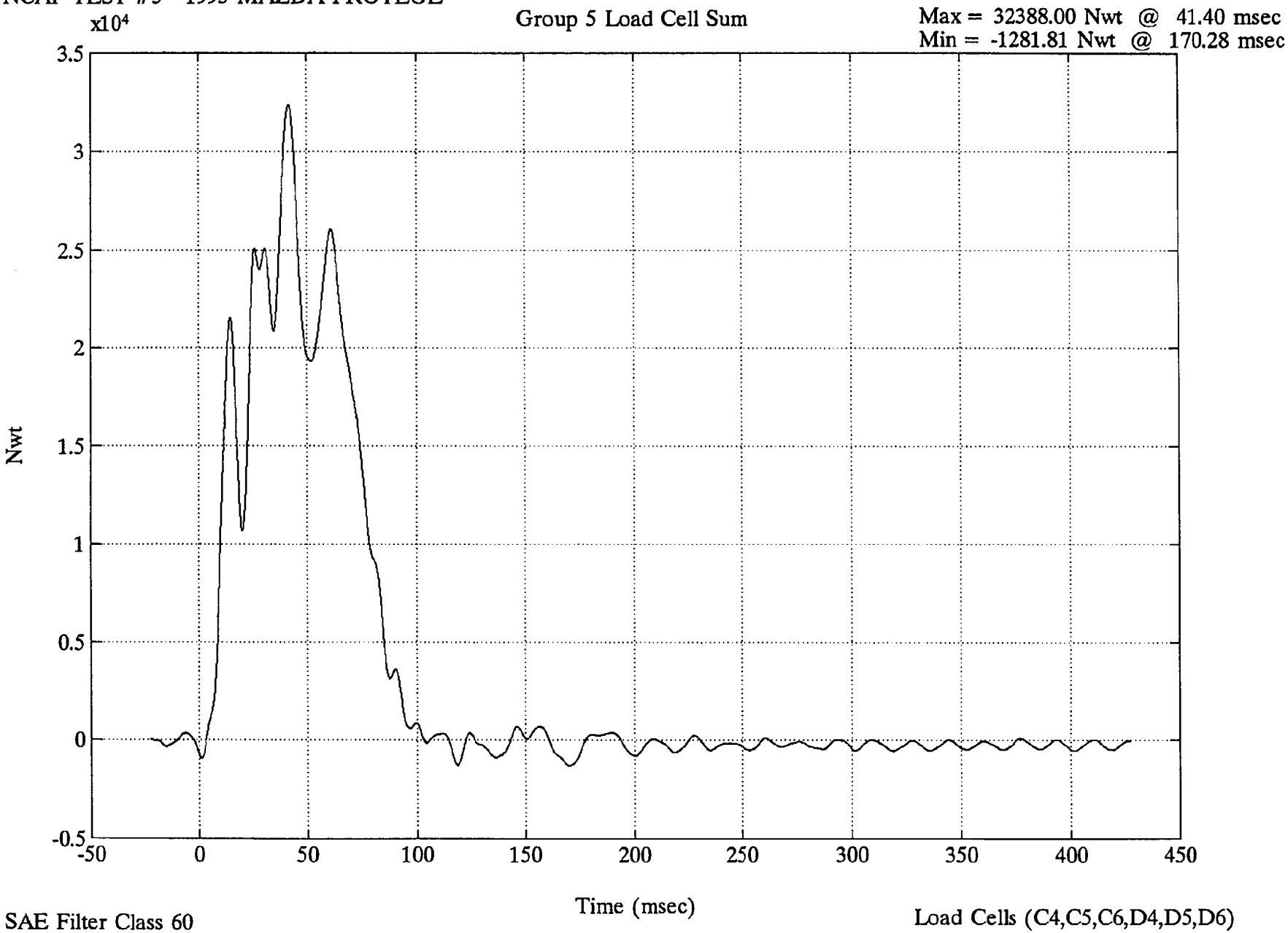
Load Cells (A7,A8,A9,B7,B8,B9)

B-69

8227-5


NCAP TEST #5 - 1995 MAZDA PROTEGE
x10^4
Group 4 Load Cell Sum
Max = 25367.51 Nwt @ 40.80 msec
Min = -1793.86 Nwt @ 94.80 msec
Nwt
Time (msec)
SAE Filter Class 60
Load Cells (C1,C2,C3,D1,D2,D3)
B-70
8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



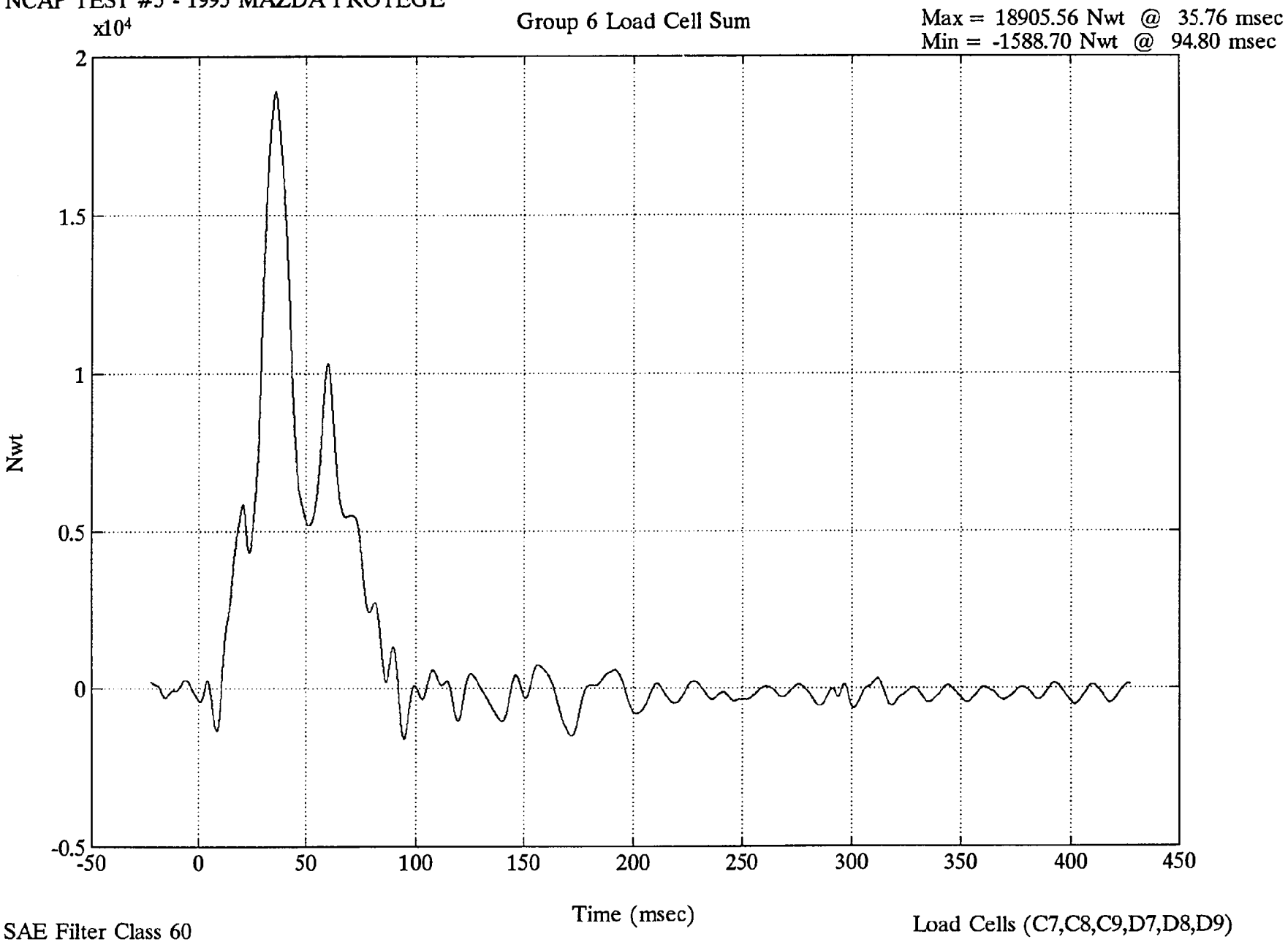
SAE Filter Class 60

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

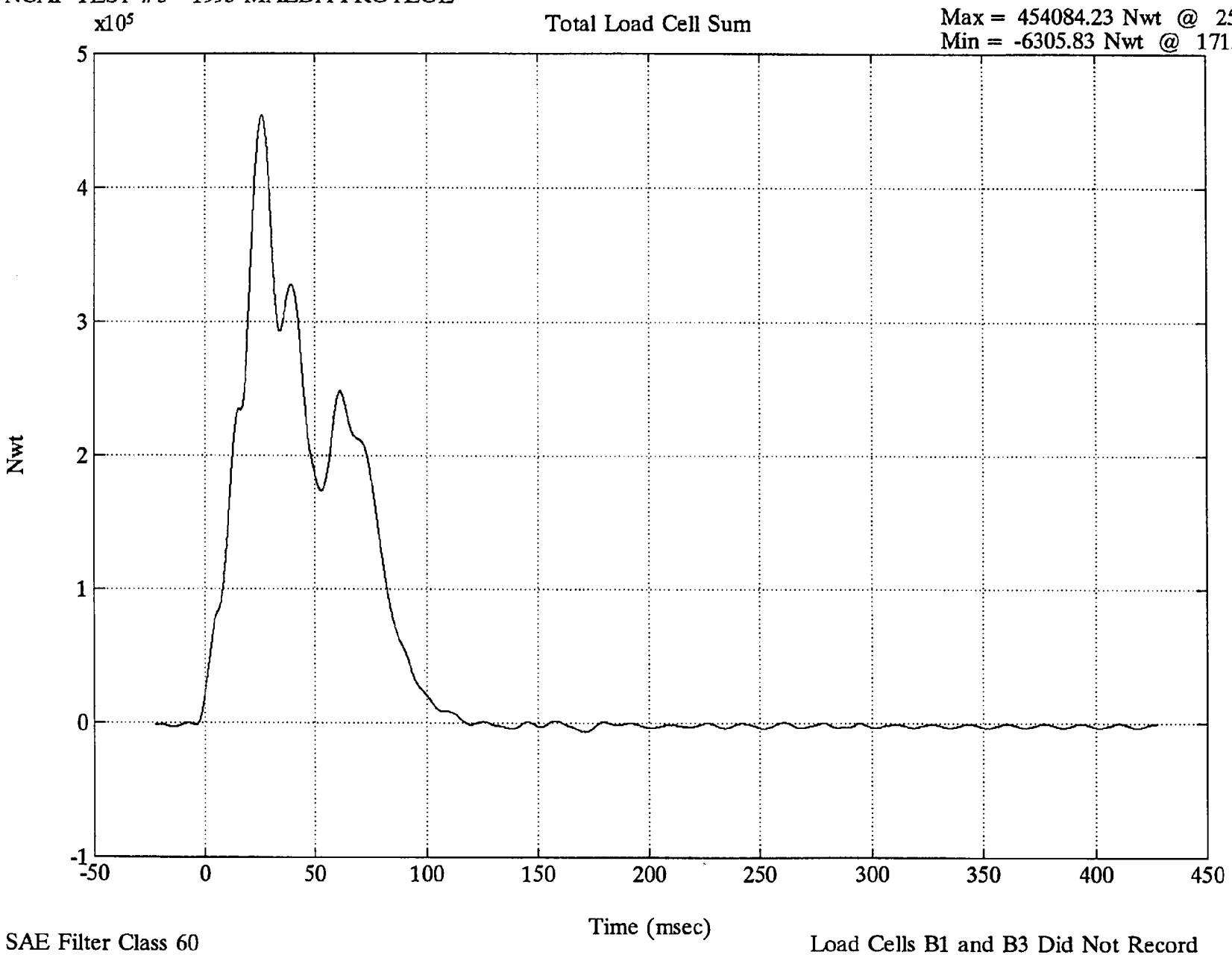
B-71

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



NCAP TEST #5 - 1995 MAZDA PROTEGE



B-73

8227-5

SAE Filter Class 60

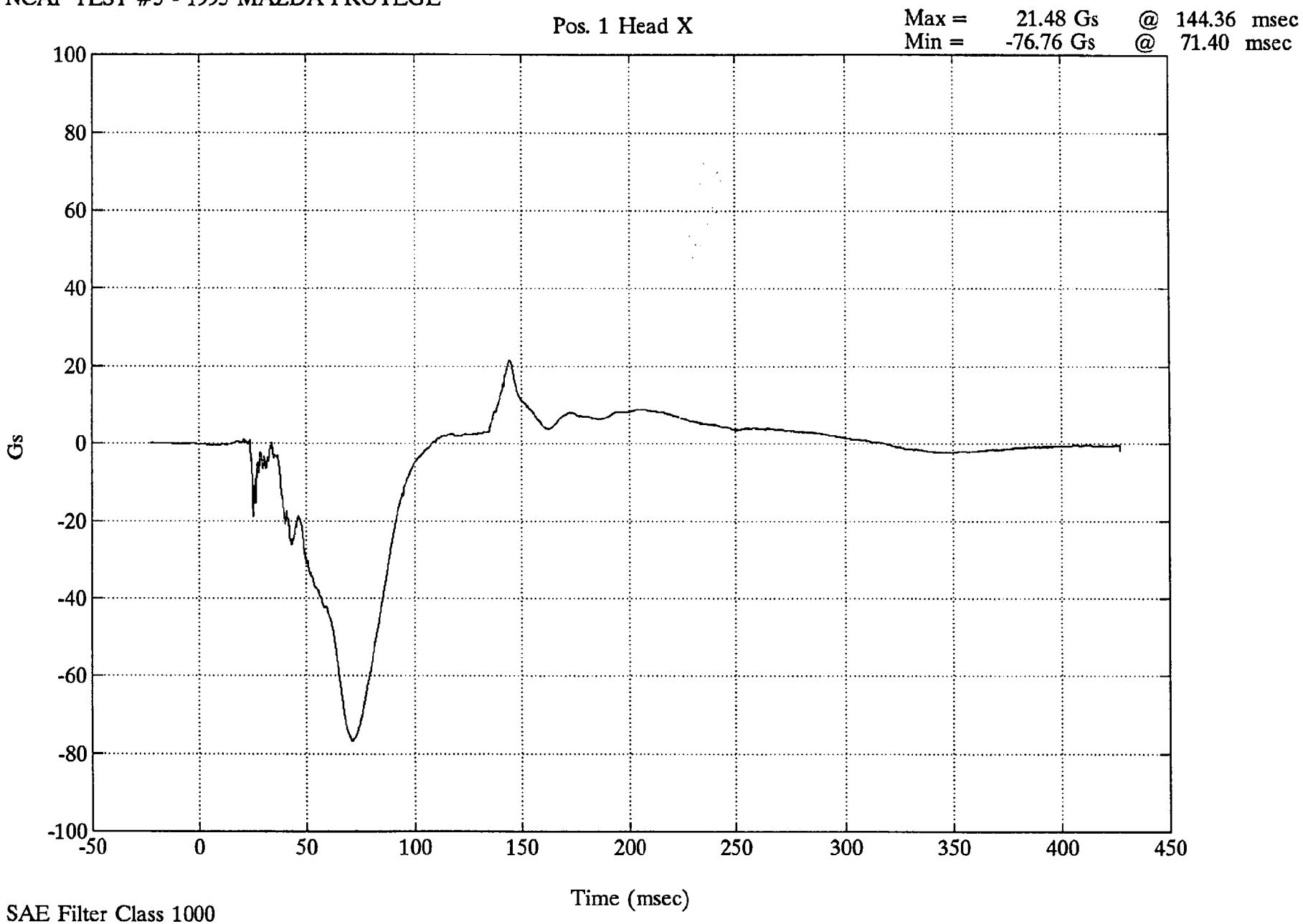
Load Cells B1 and B3 Did Not Record

TEST NO. MS5402

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

NCAP TEST #5 - 1995 MAZDA PROTEGE

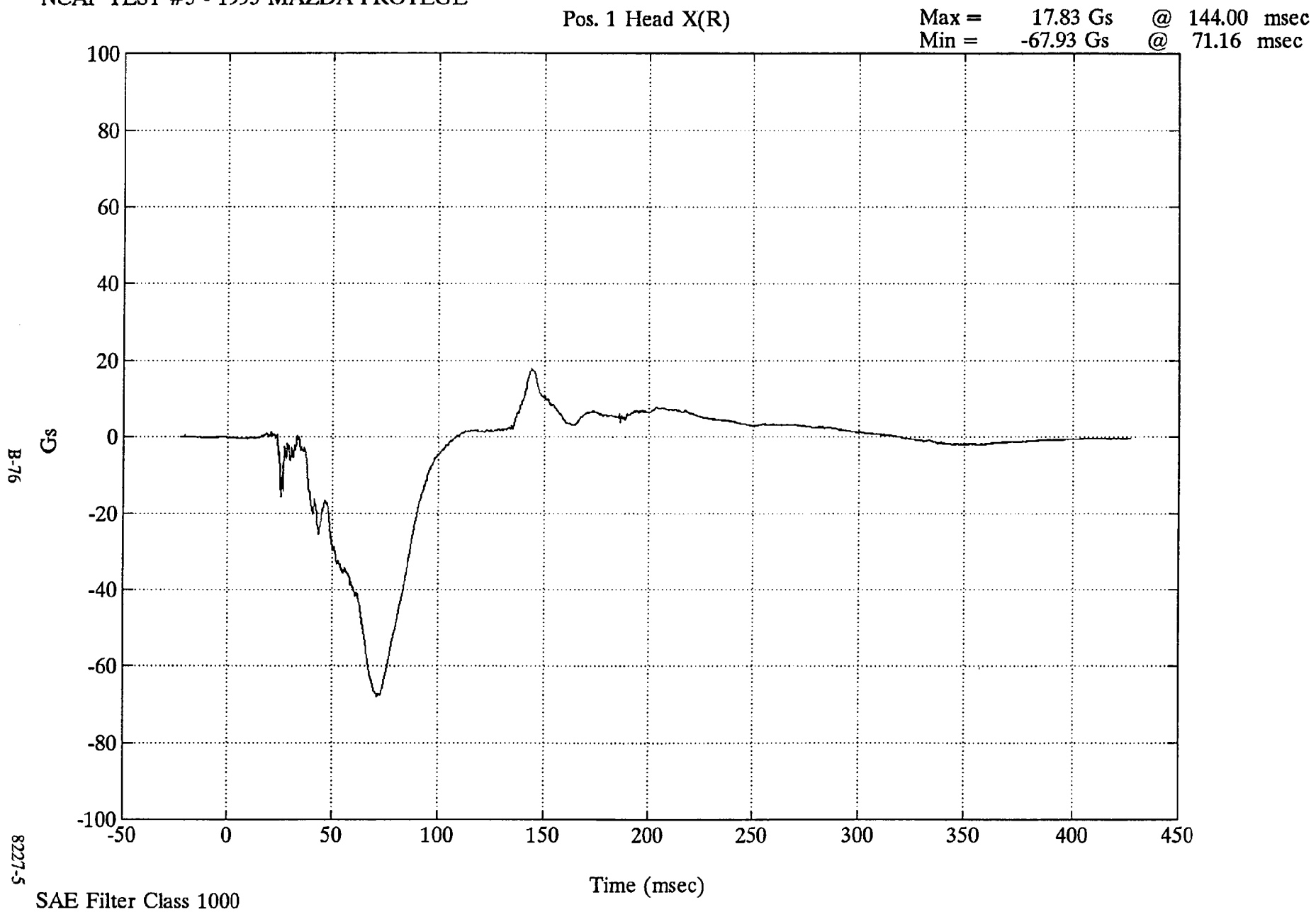


B-75

8227-5

SAE Filter Class 1000

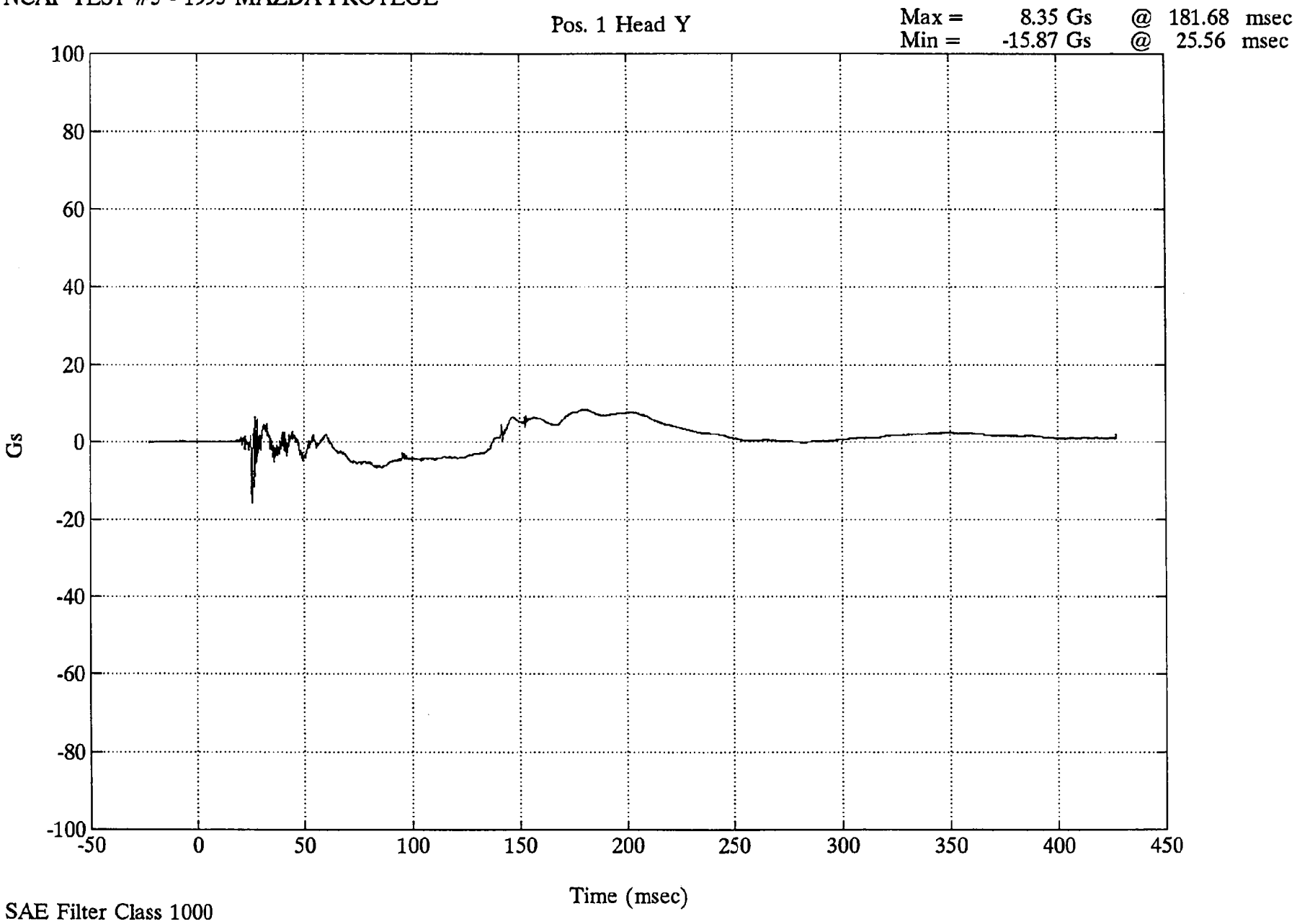
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 1000

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



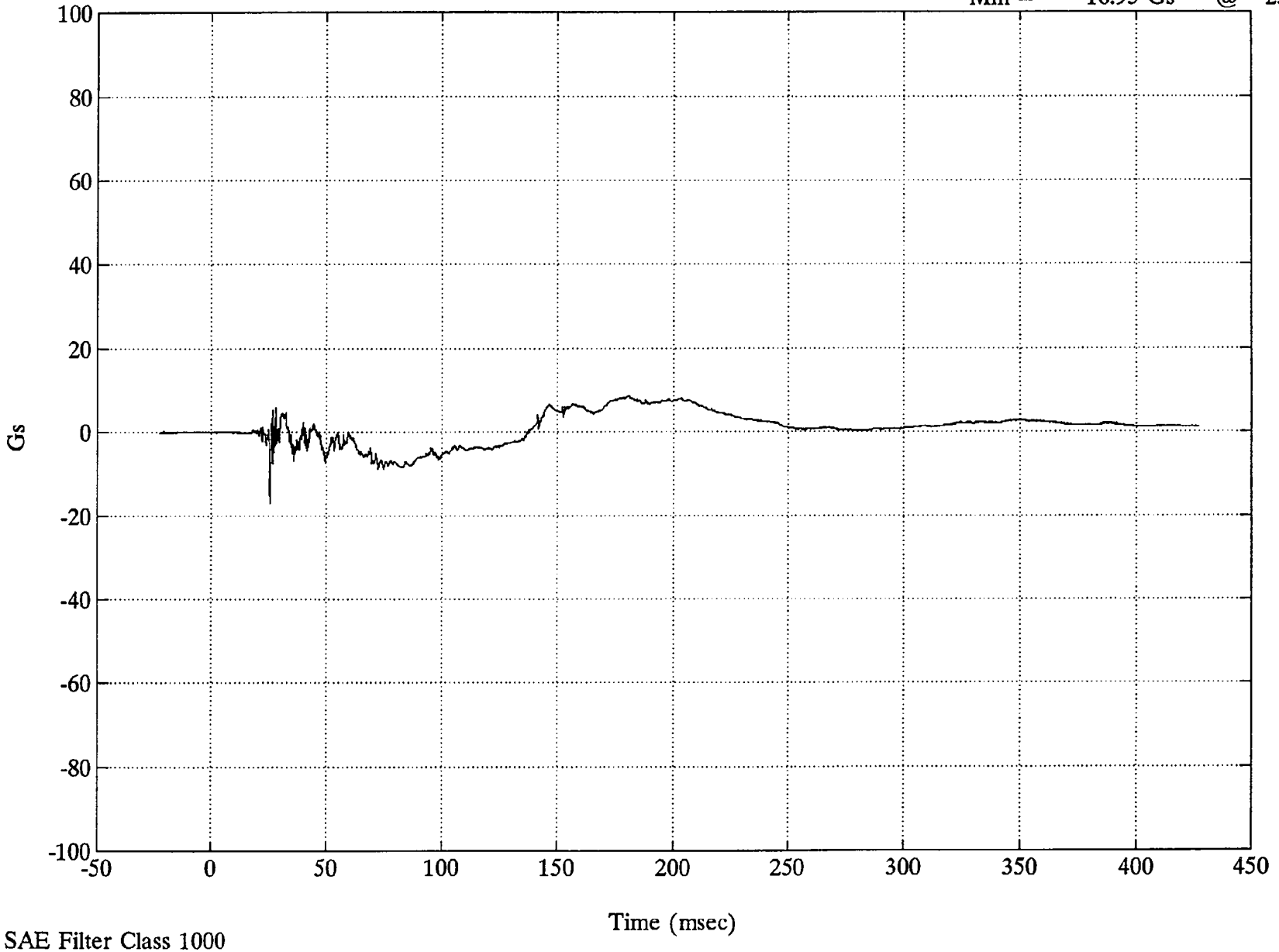
SAE Filter Class 1000

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Head Y(R)

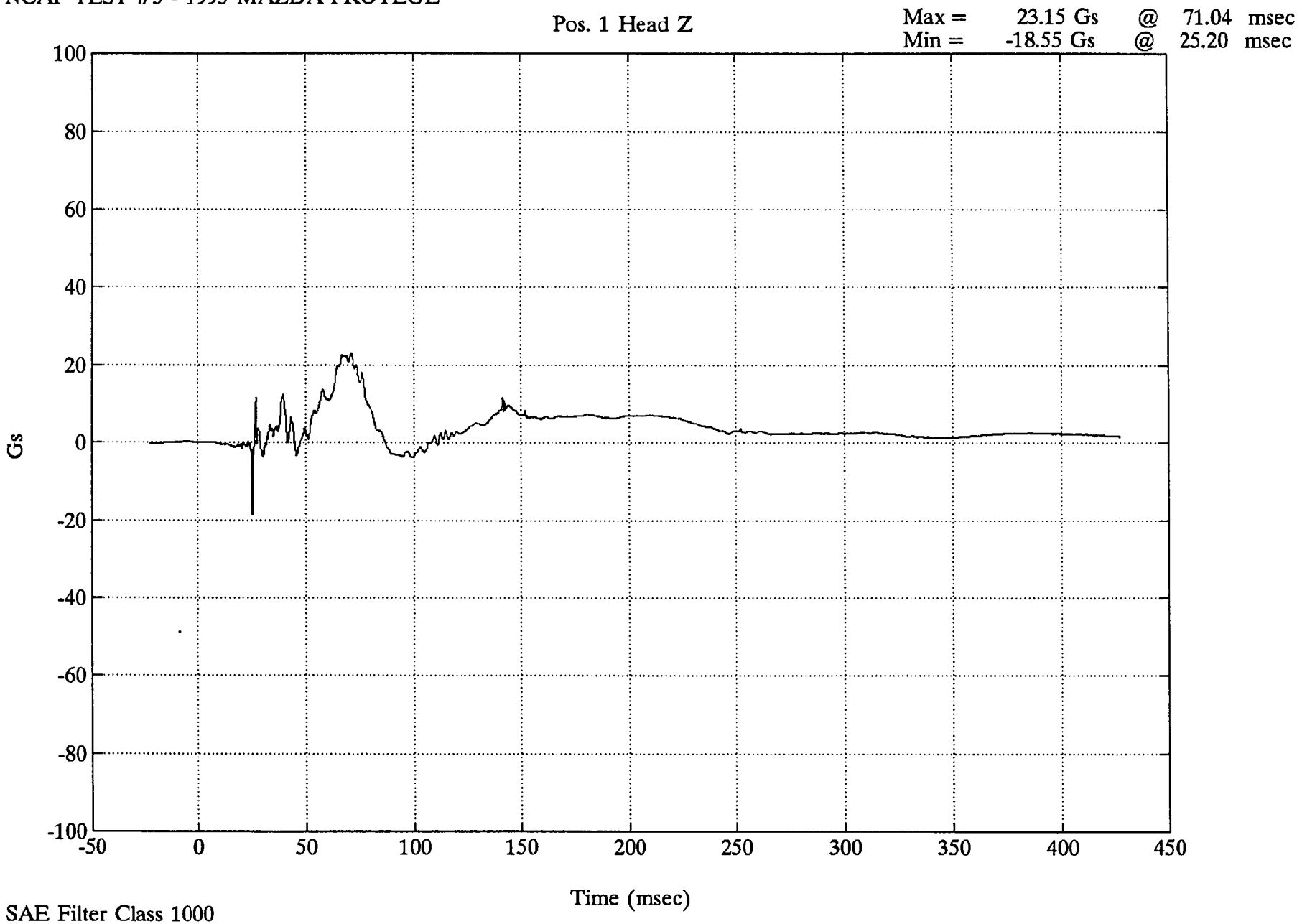
Max = 8.49 Gs @ 180.96 msec
Min = -16.95 Gs @ 25.56 msec



SAE Filter Class 1000

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 1000

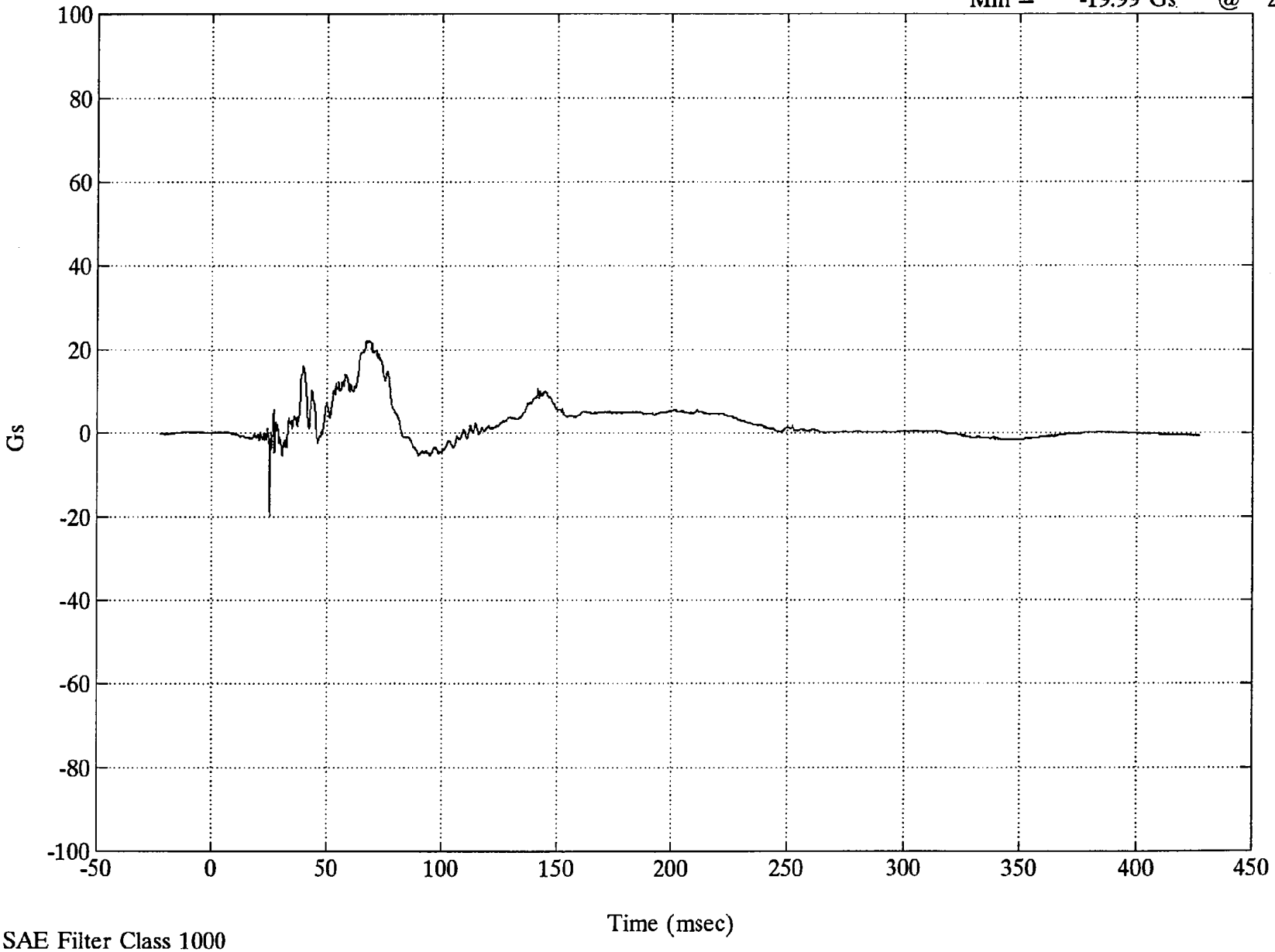
B-79

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Head Z(R)

Max = 22.11 Gs @ 68.04 msec
Min = -19.99 Gs @ 25.20 msec



SAE Filter Class 1000

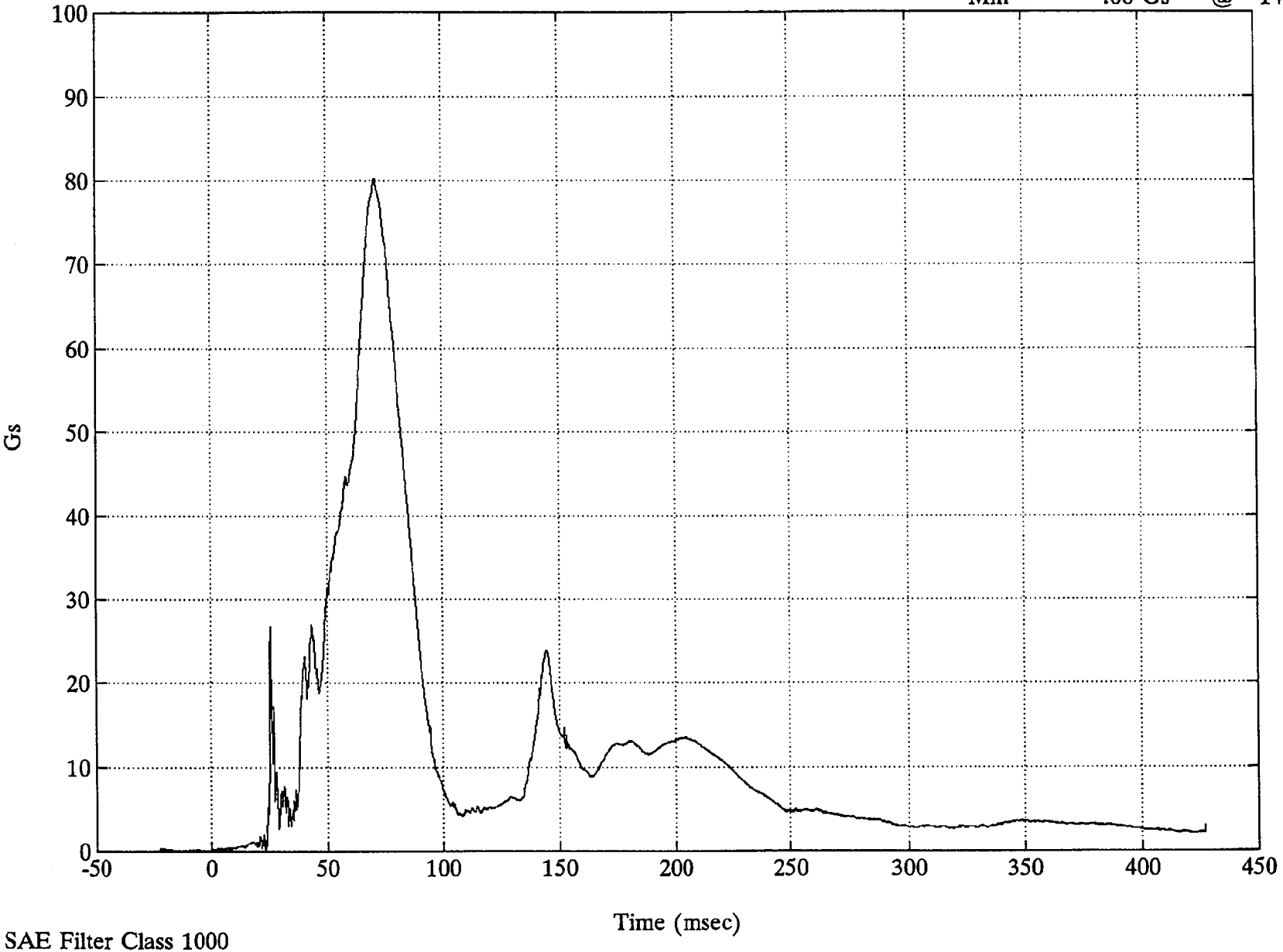
B-80

82275

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Head Resultant

Max = 80.26 Gs @ 71.27 msec
Min = .06 Gs @ -14.88 msec



SAE Filter Class 1000

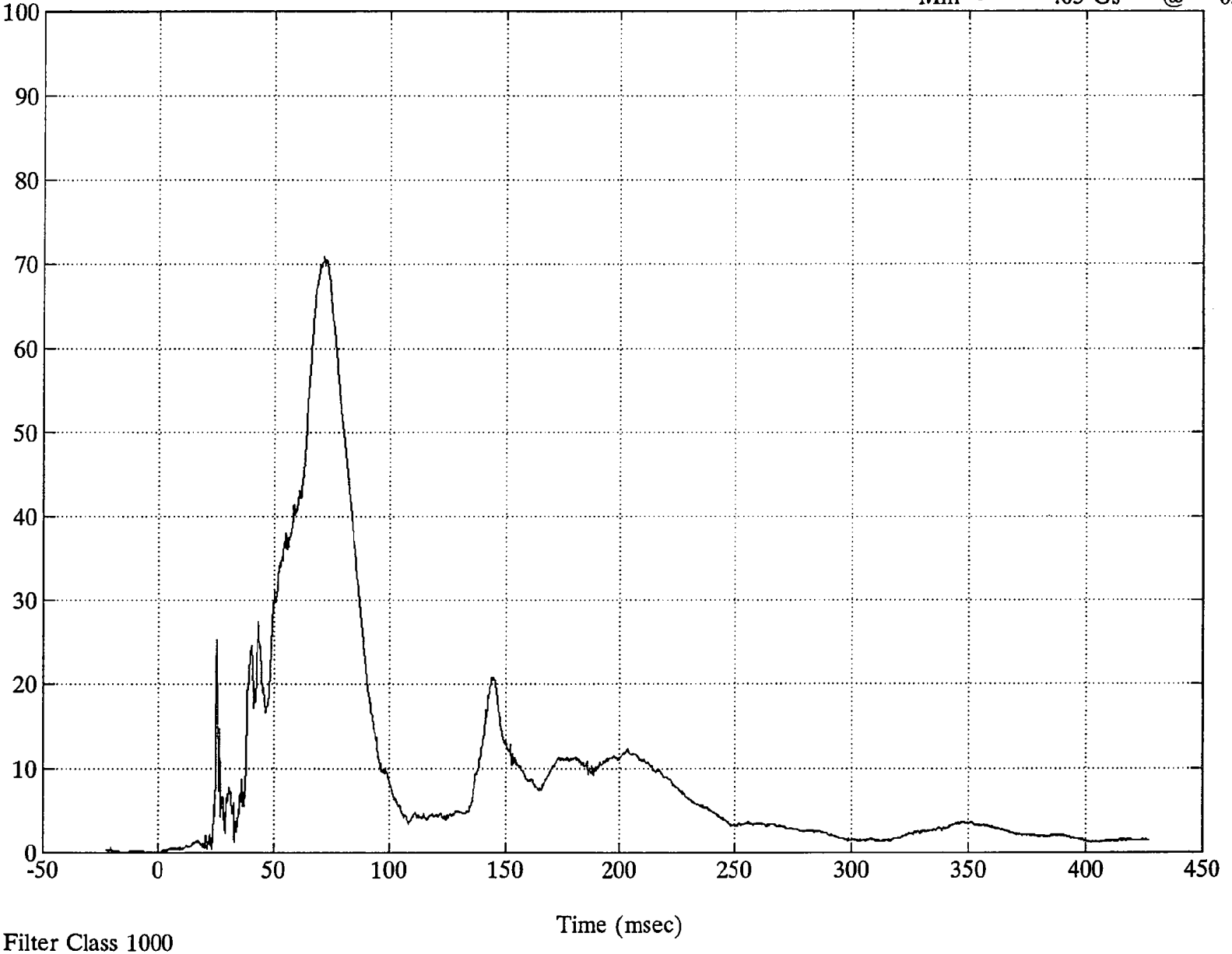
B-81

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Head Resultant(R)

Max = 70.92 Gs @ 71.04 msec
Min = .03 Gs @ -0.48 msec

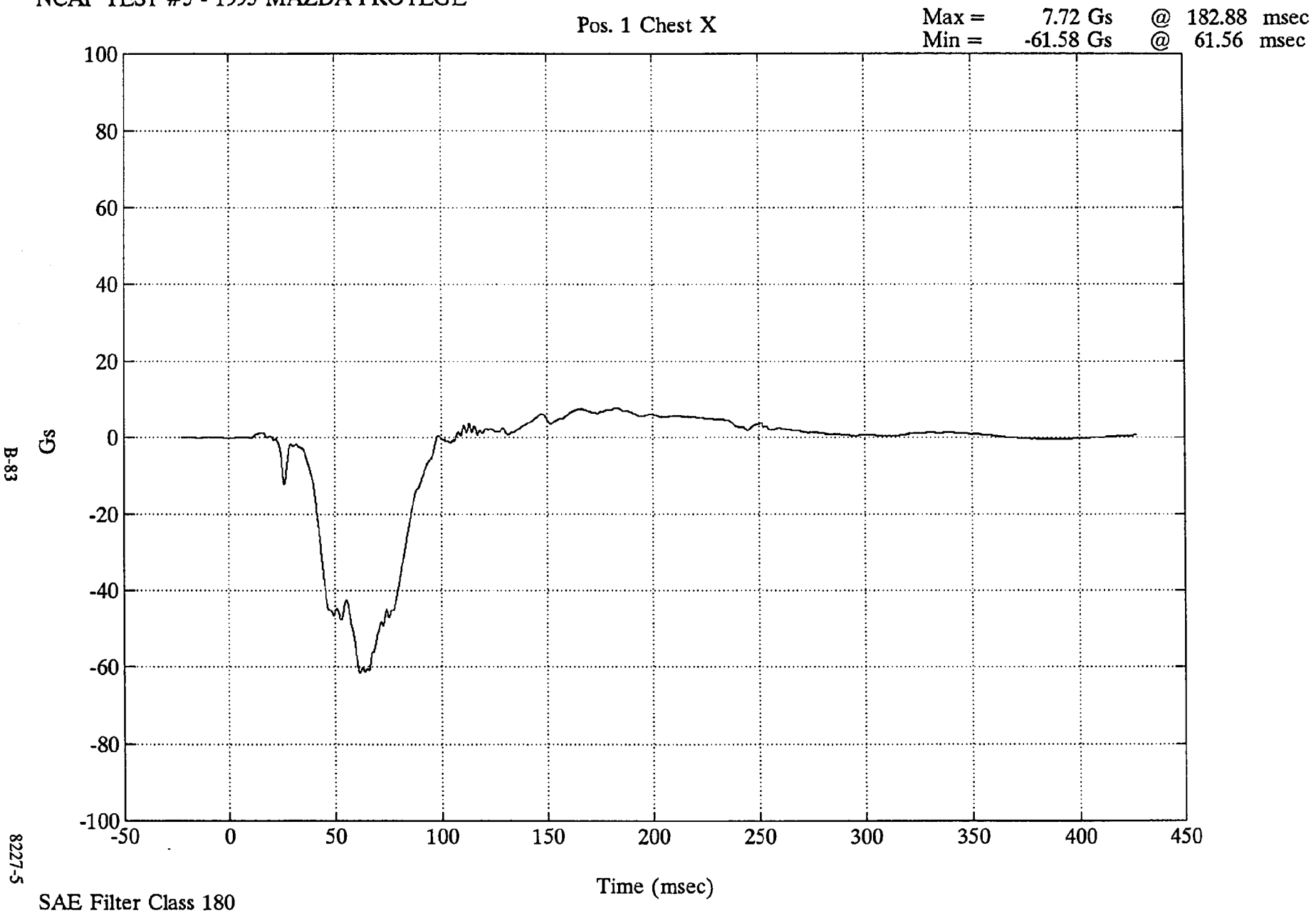


B-82

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

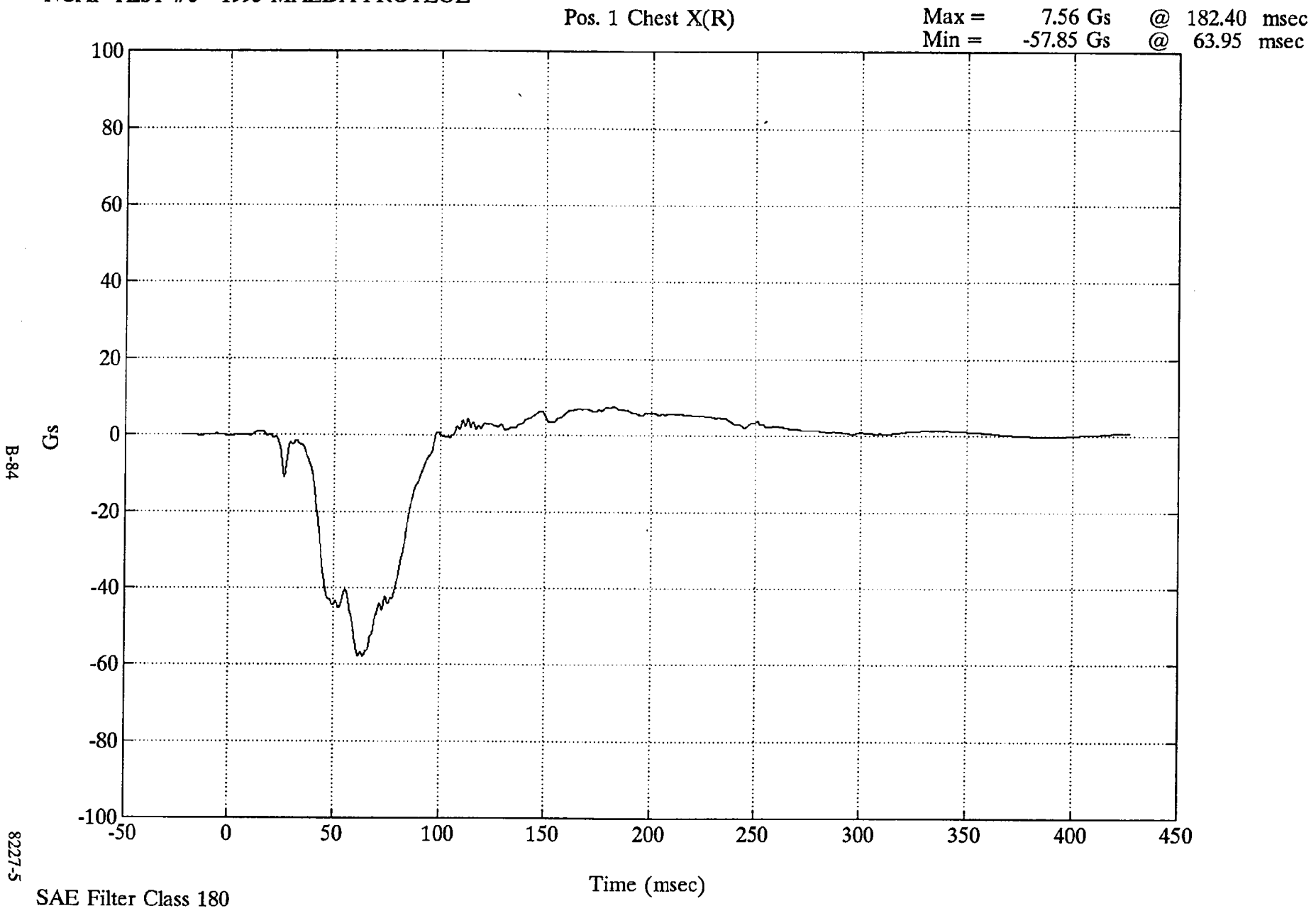


B-83

8227-5

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

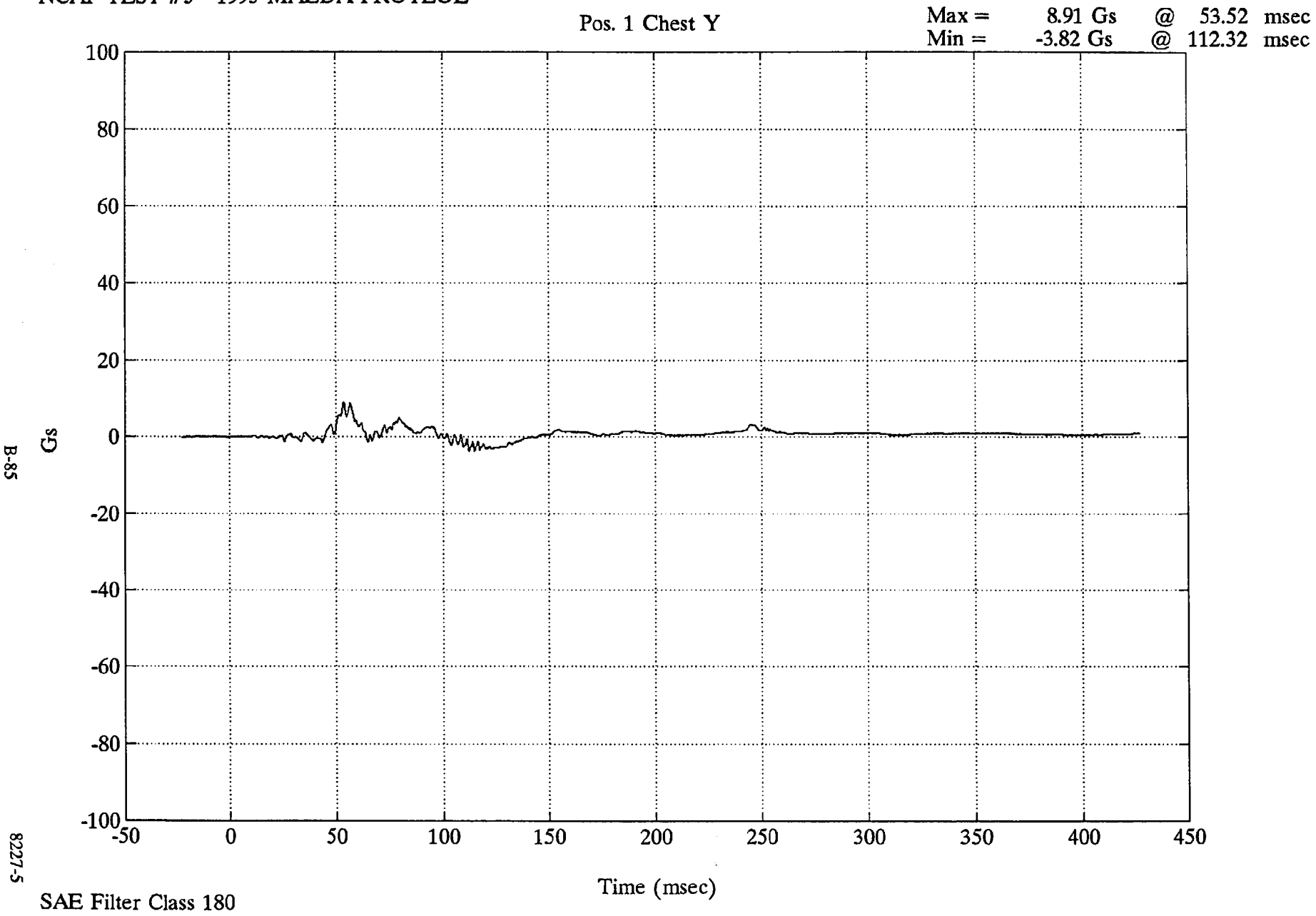


B-84

8227-5

SAE Filter Class 180

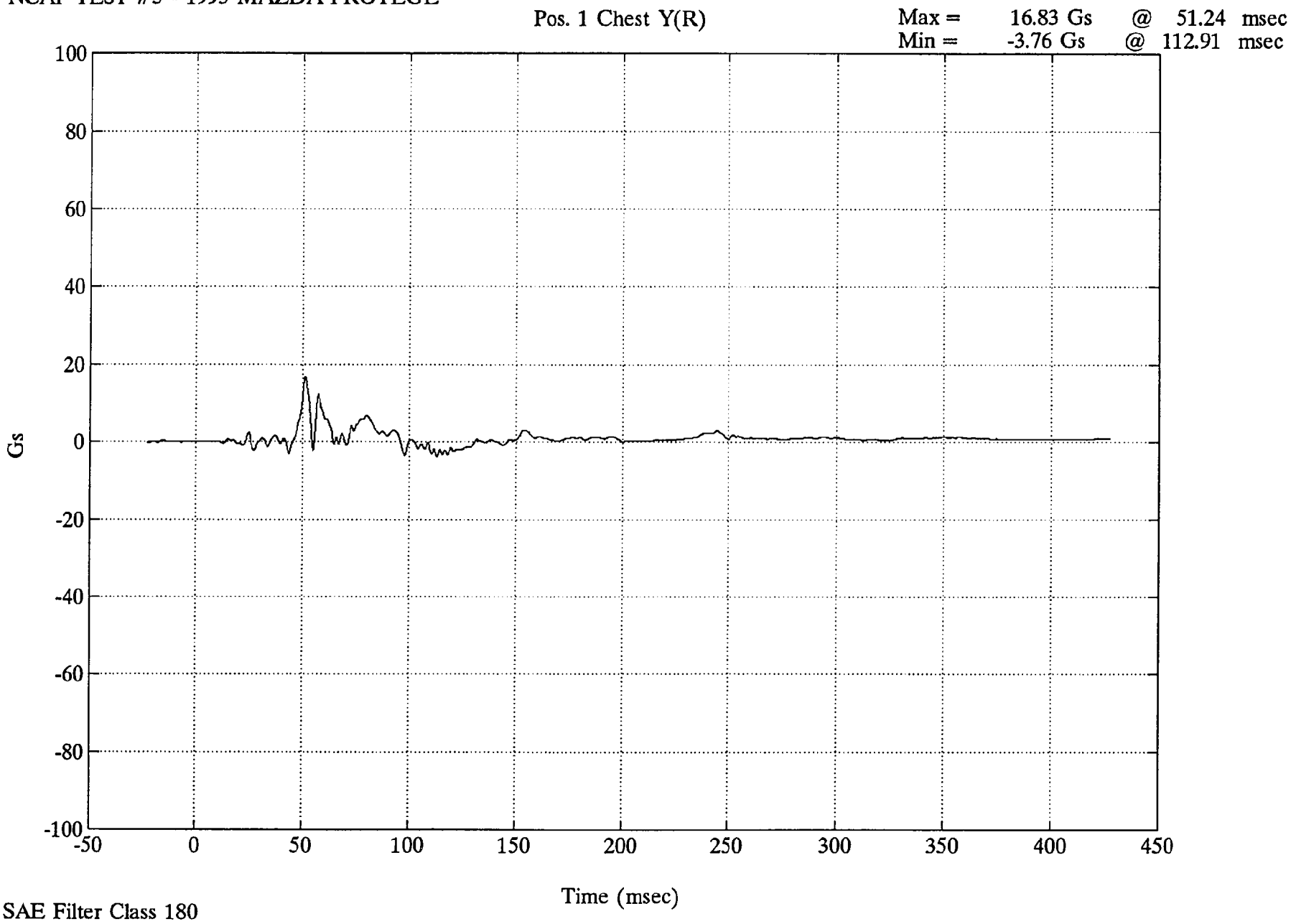
NCAP TEST #5 - 1995 MAZDA PROTEGE



SAE Filter Class 180

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

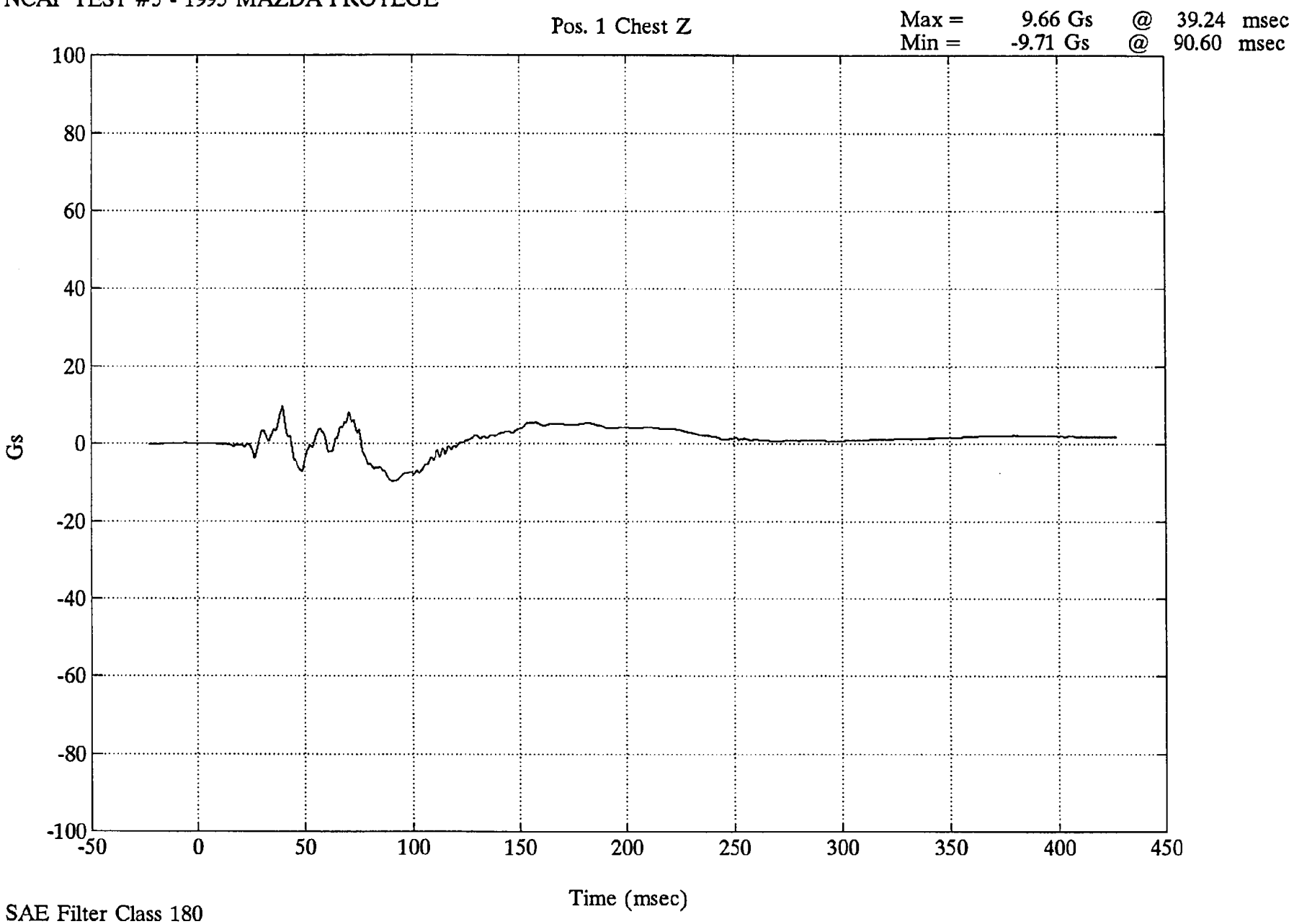


B-86

8227-5

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

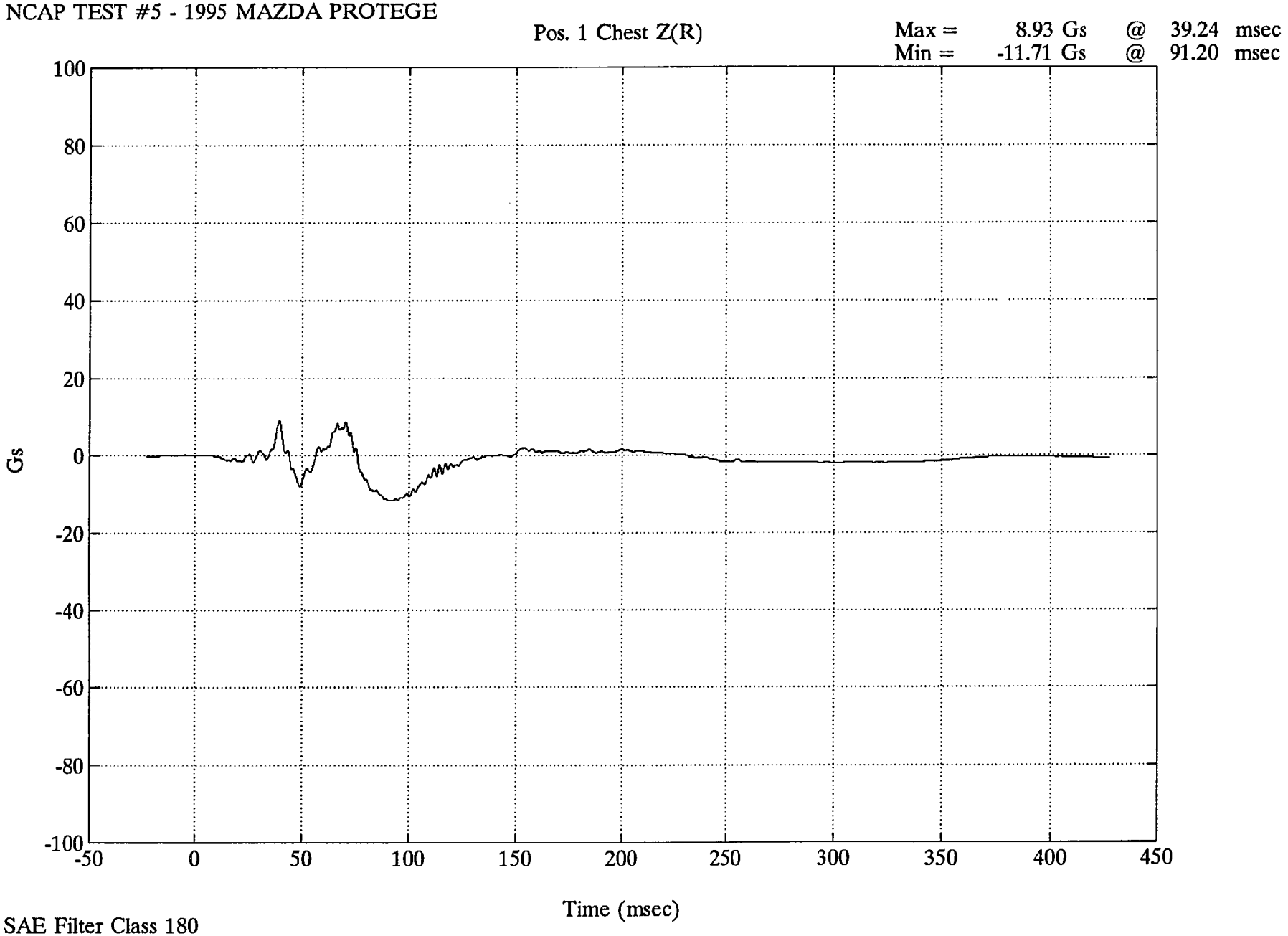


SAE Filter Class 180

B-87

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

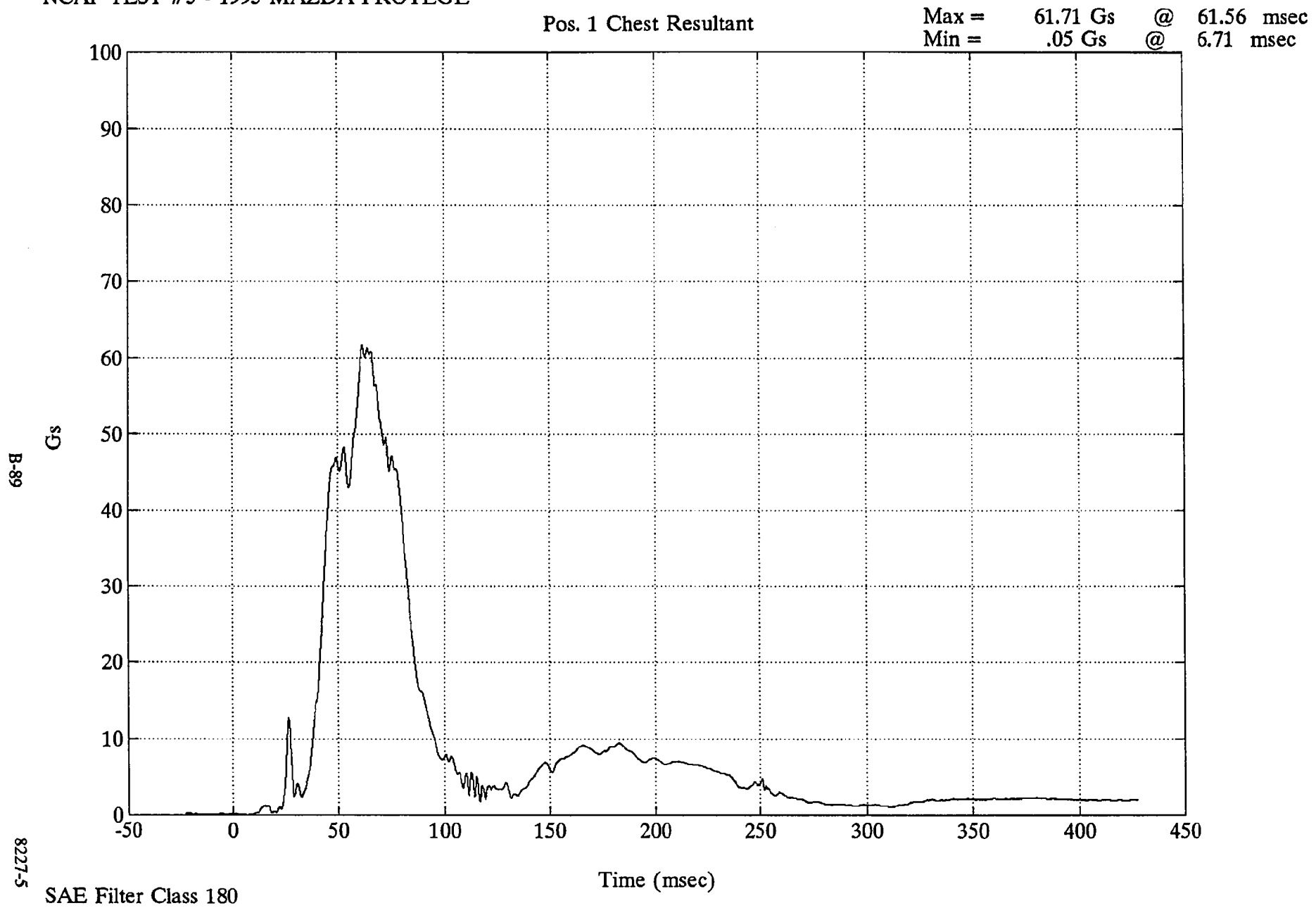


B-88

8227-5

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

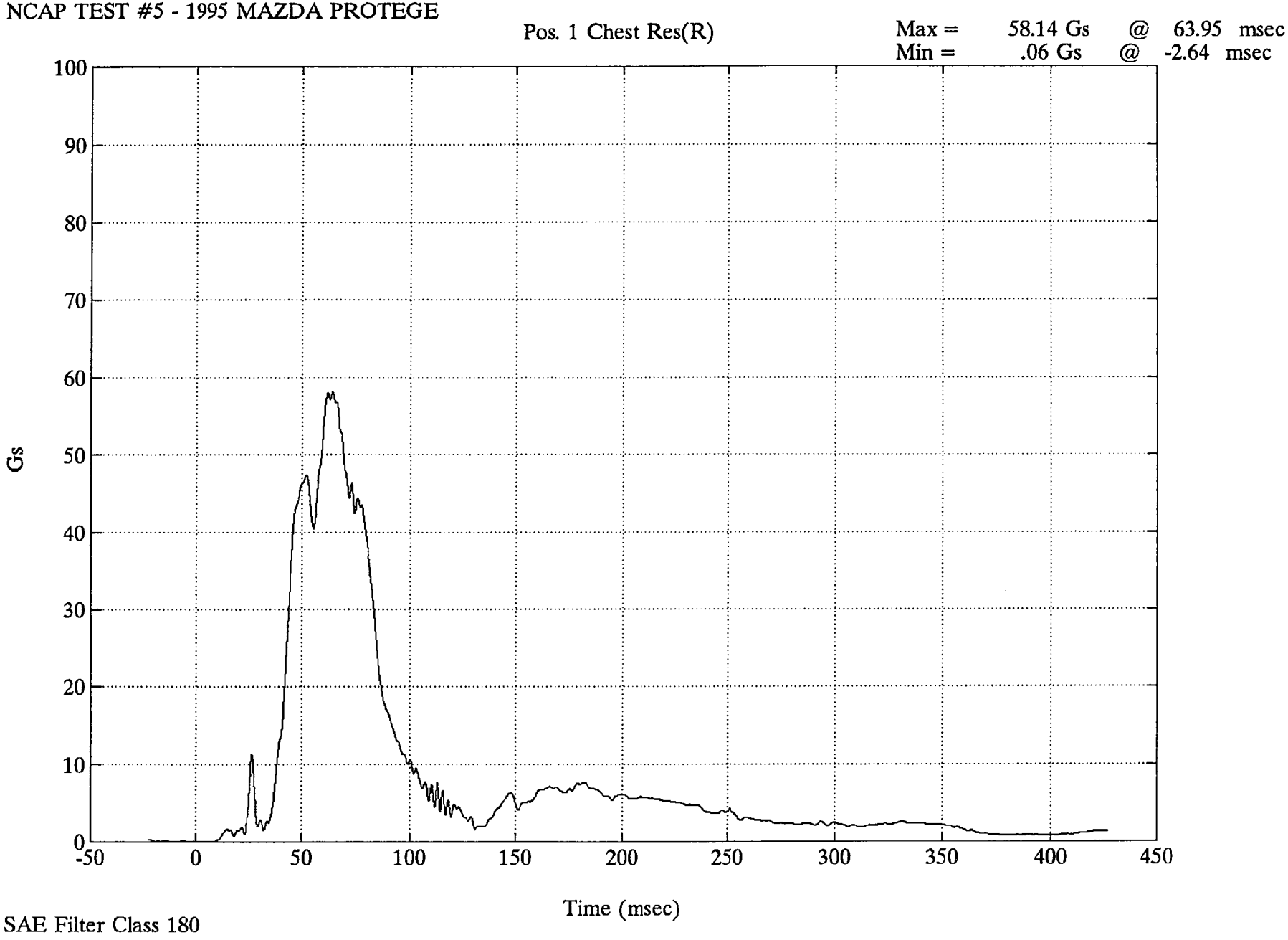


B-89

8227-5

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

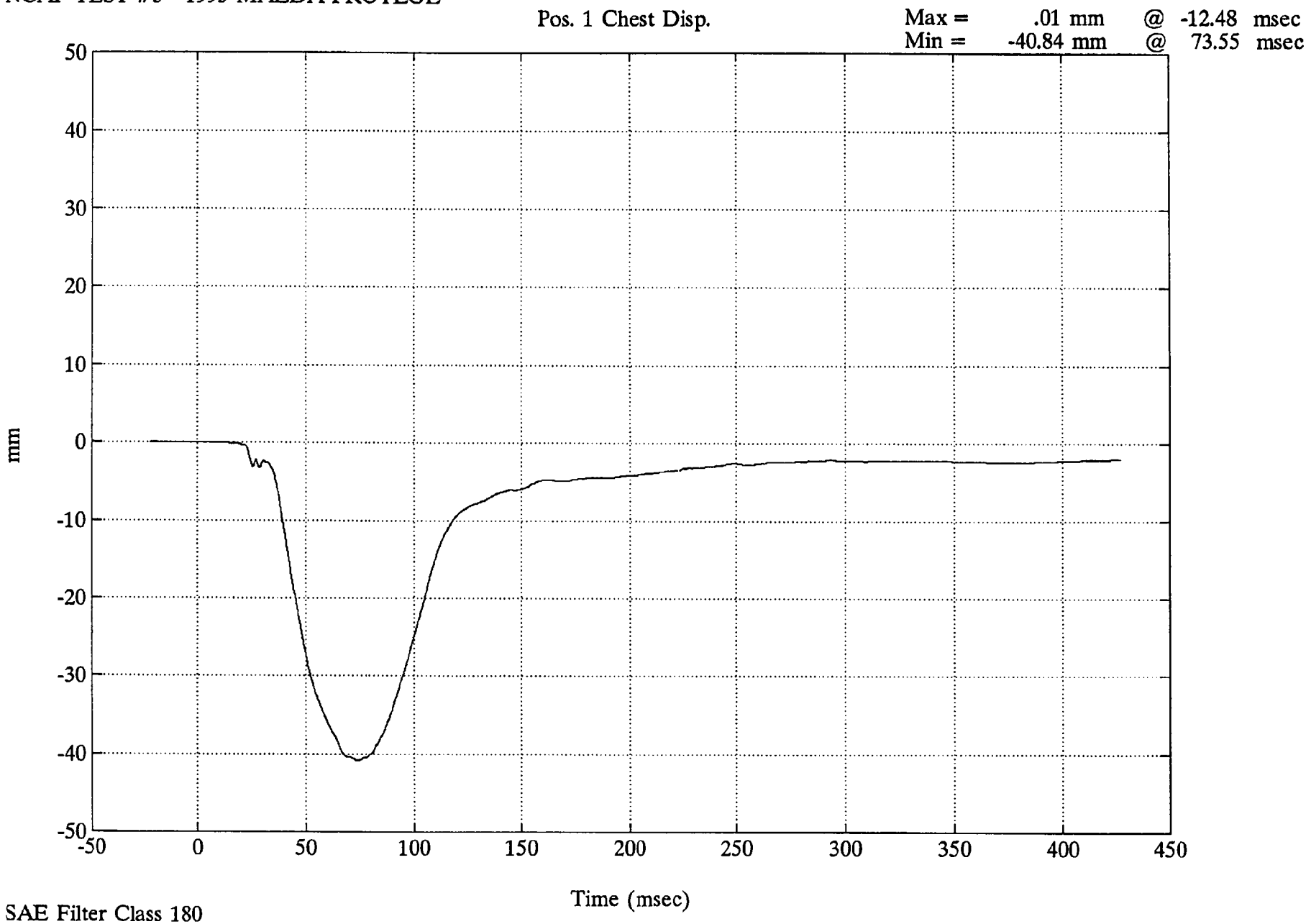


B-90

8227-S

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

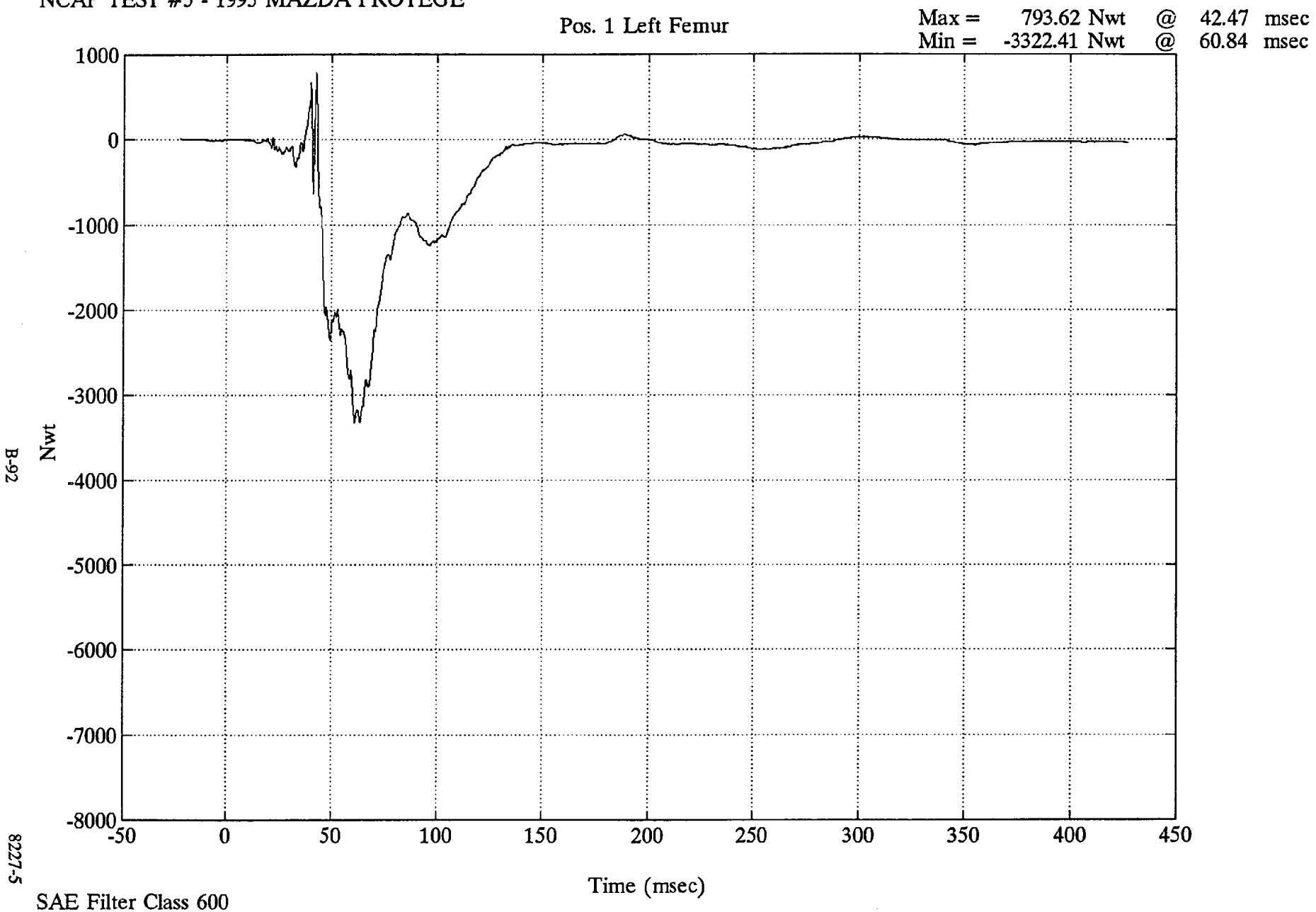


B-91

8227-5

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

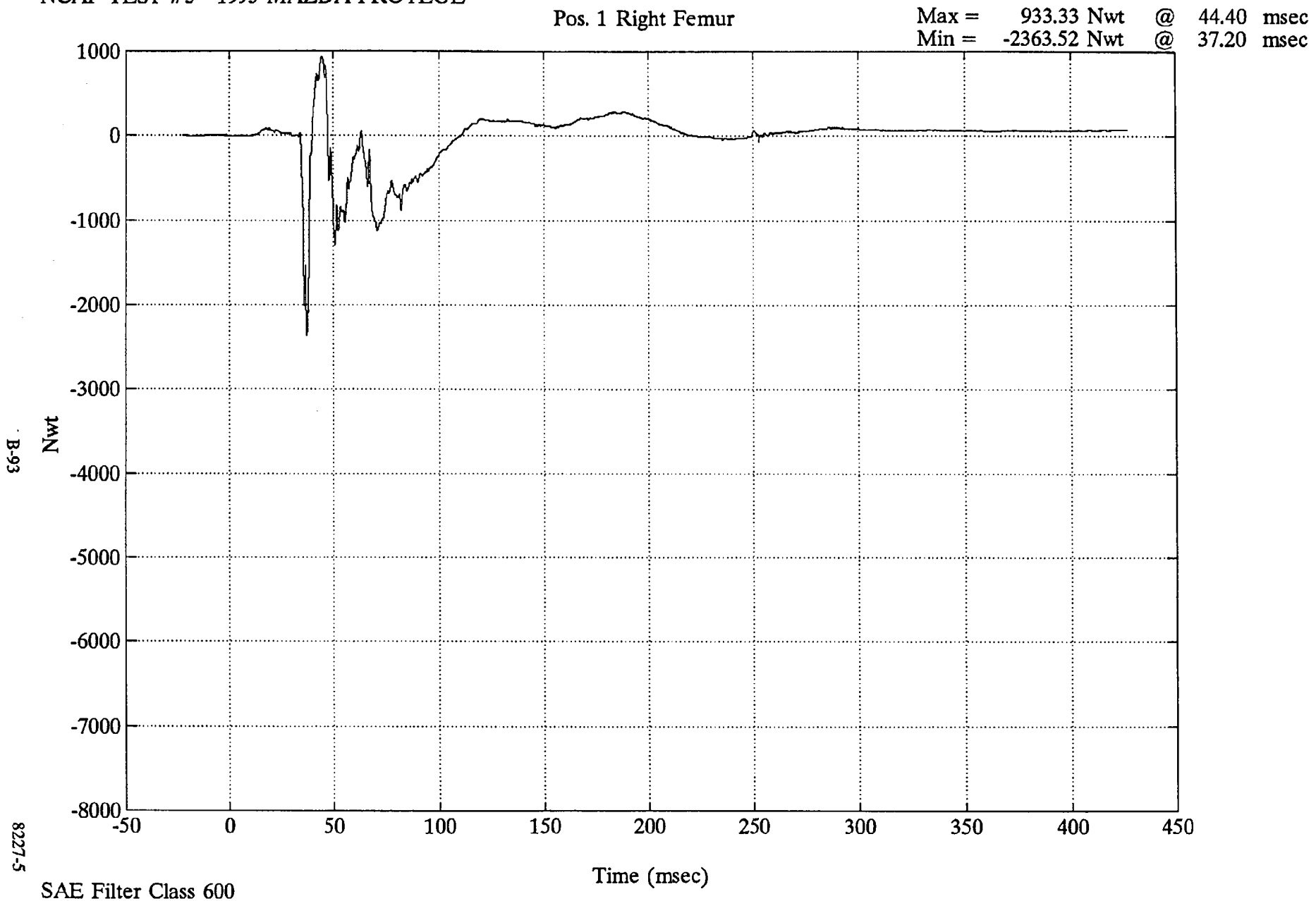


B-92

8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-93

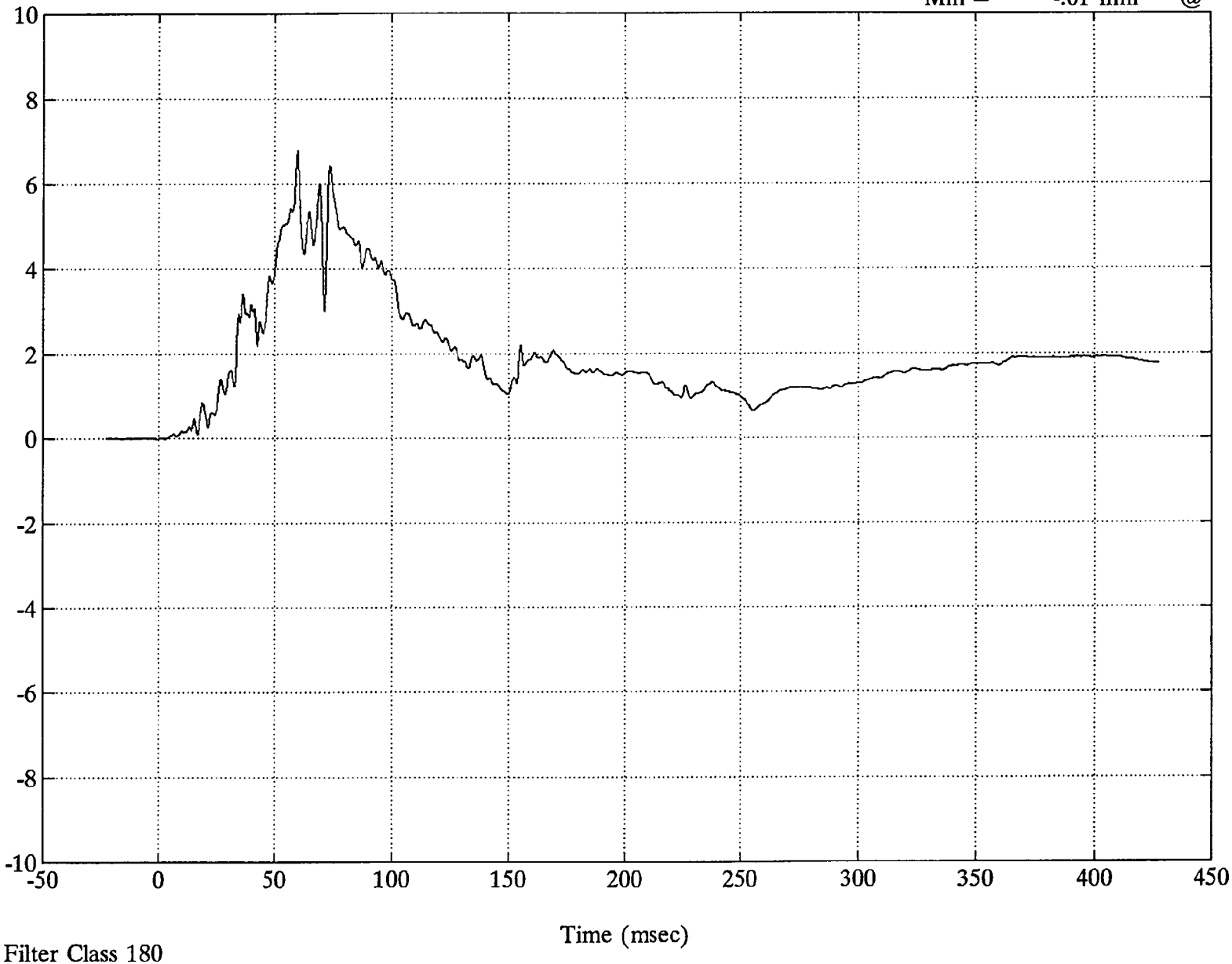
8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Belt Elongation

Max = 6.77 mm @ 59.64 msec
Min = -.01 mm @ 2.51 msec

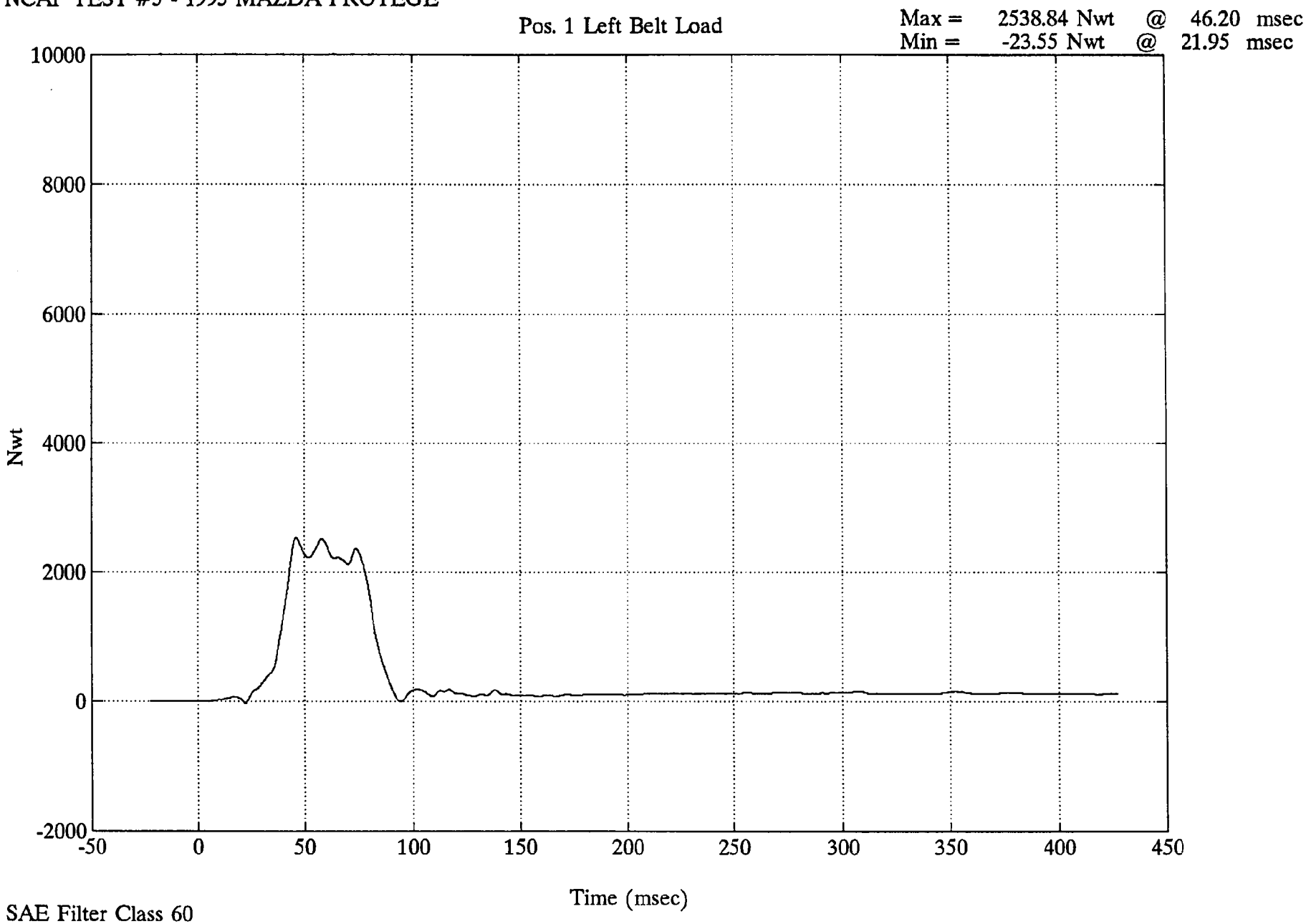


B-94

8227-5

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

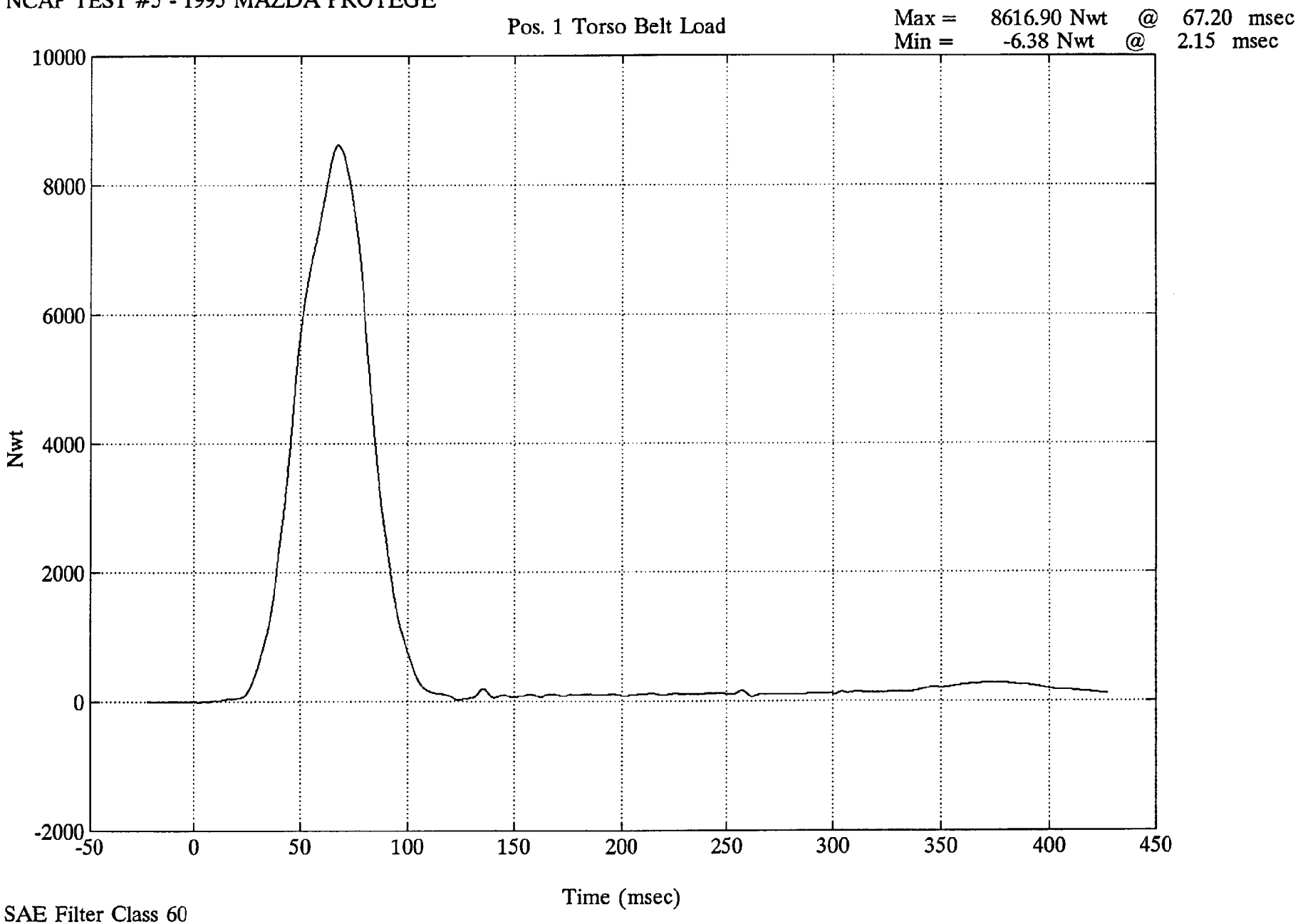


B-95

8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-96

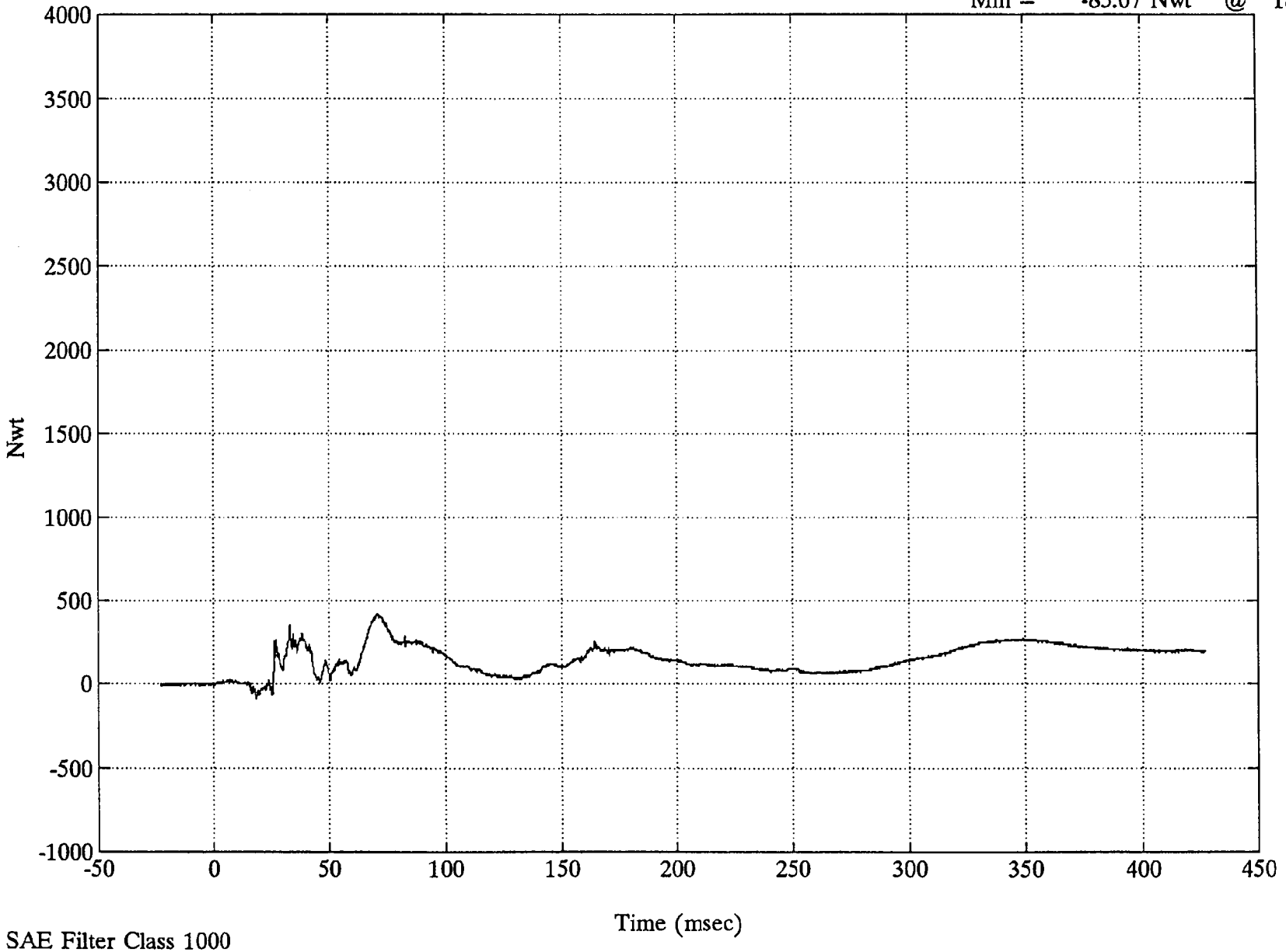
8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Upper Neck Fx

Max = 422.42 Nwt @ 71.16 msec
Min = -85.07 Nwt @ 18.47 msec

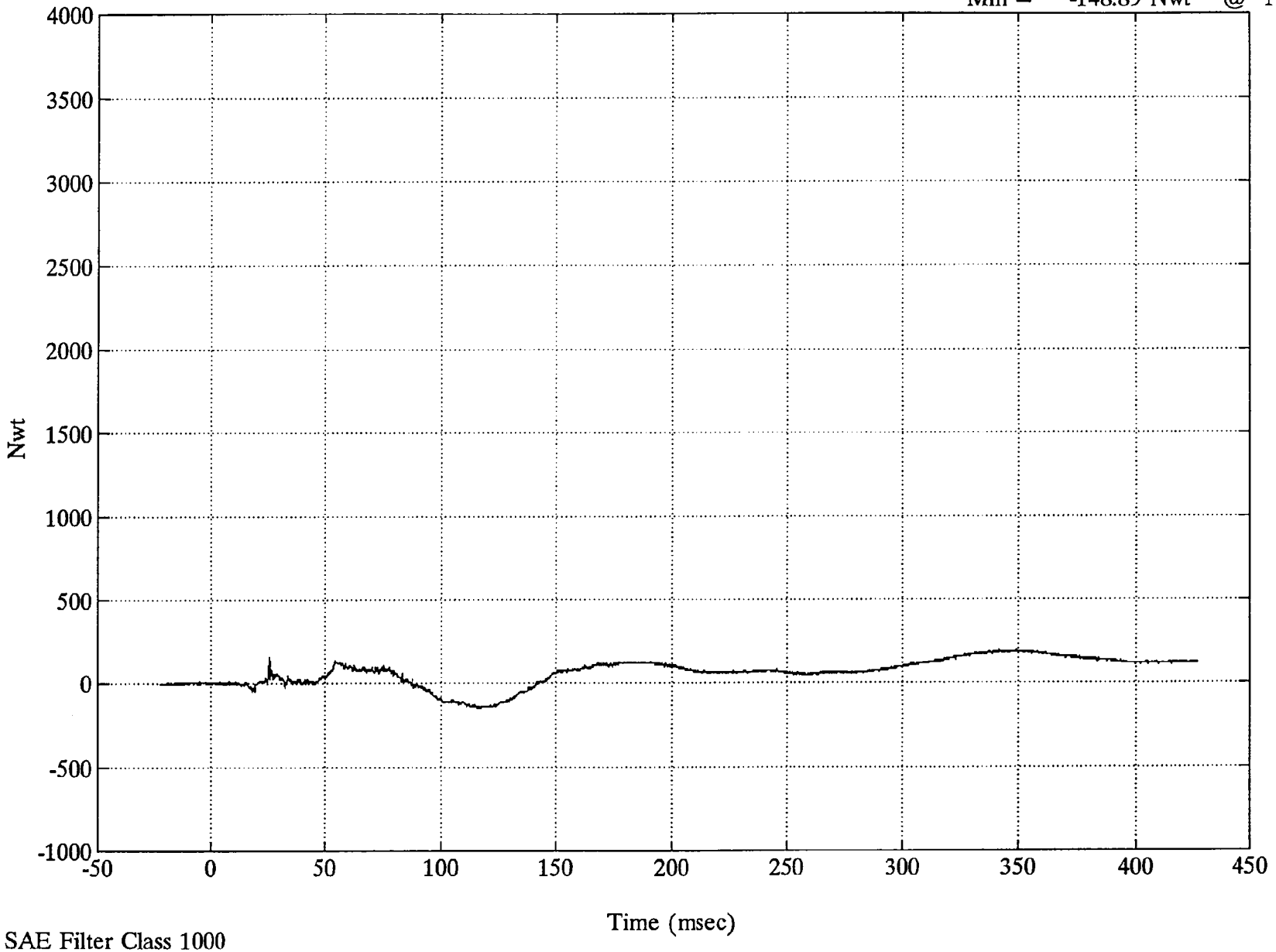


SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Upper Neck Fy

Max = 199.01 Nwt @ 348.96 msec
Min = -148.89 Nwt @ 117.24 msec

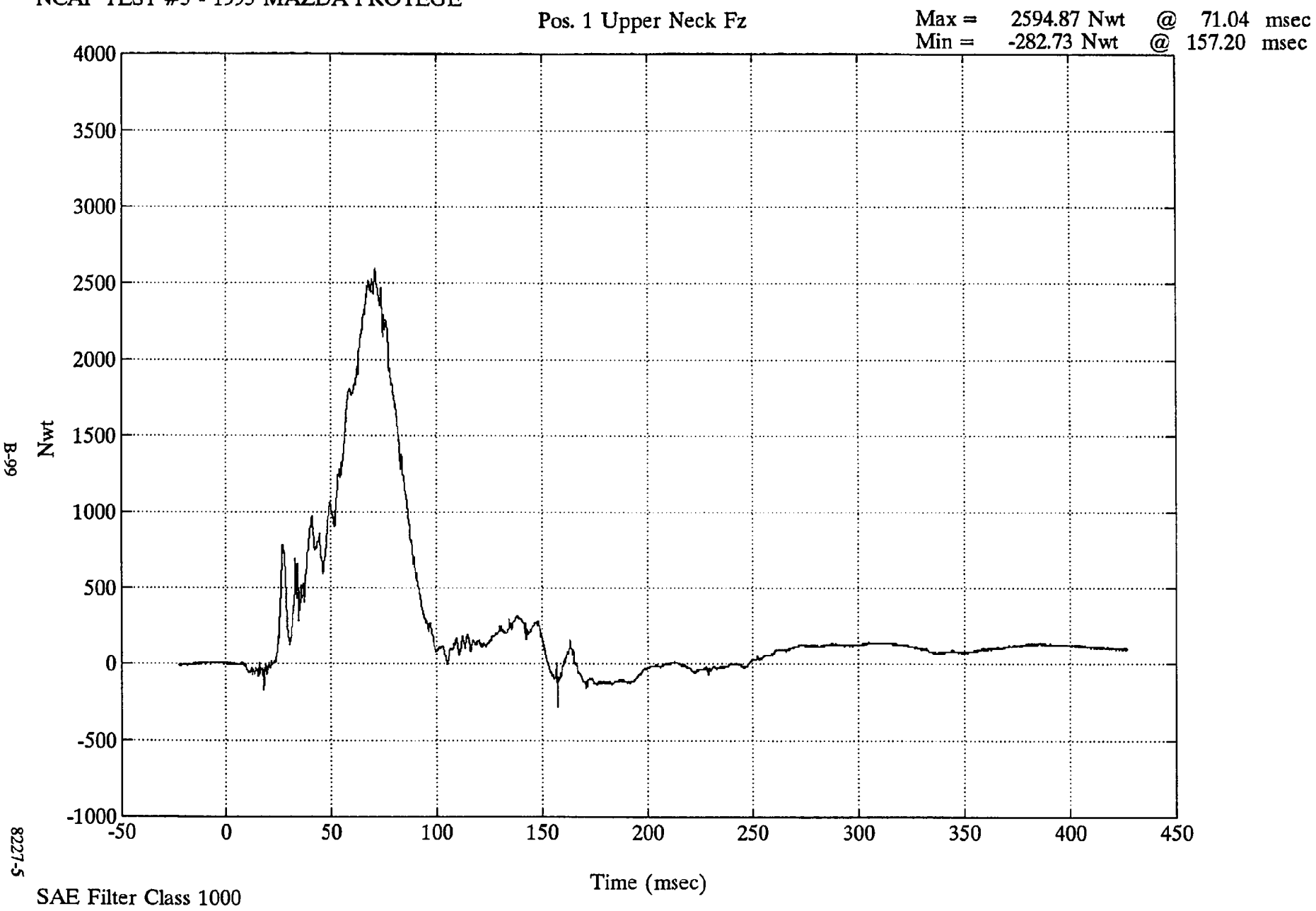


B-98

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

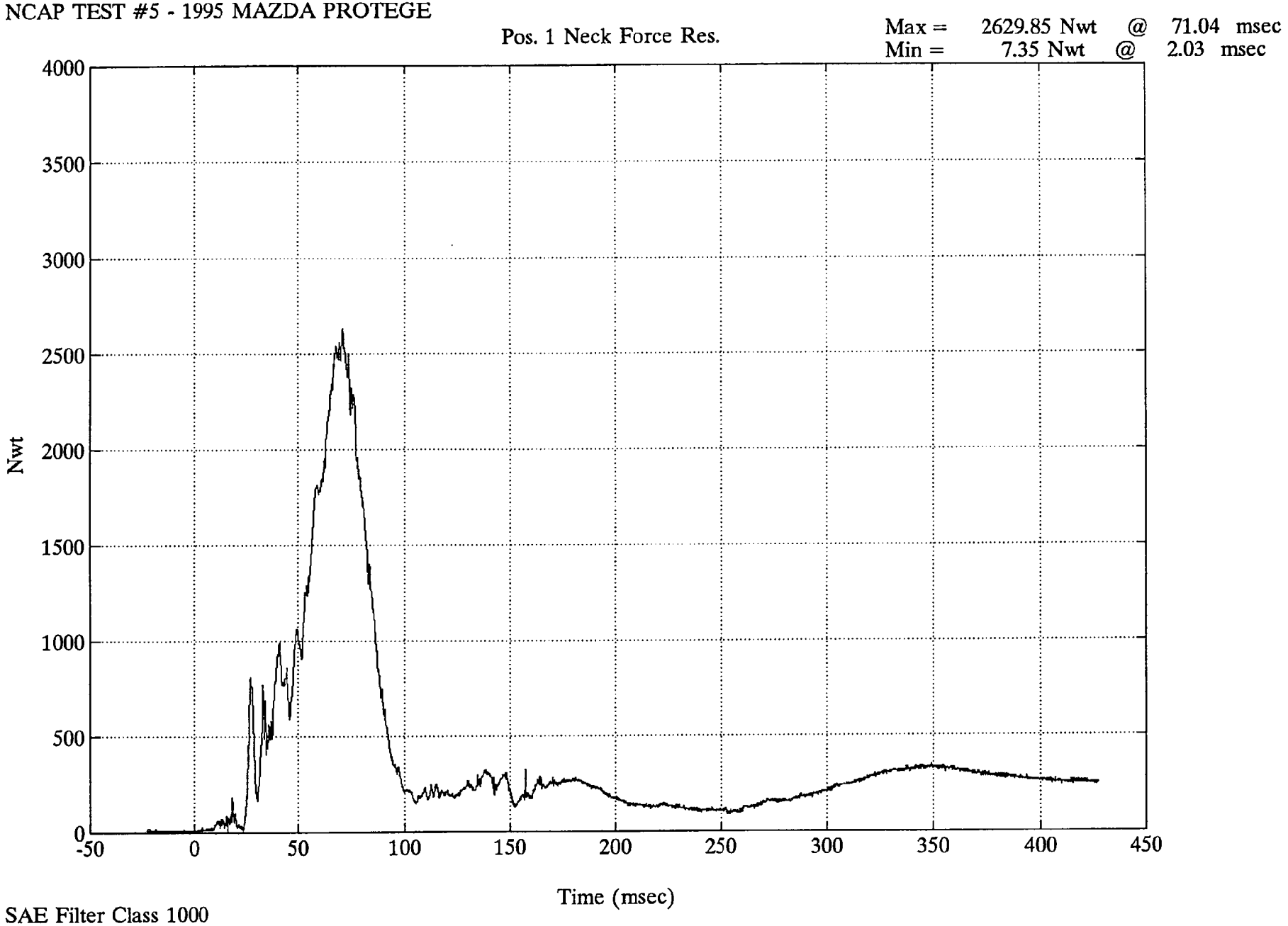


B-99

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

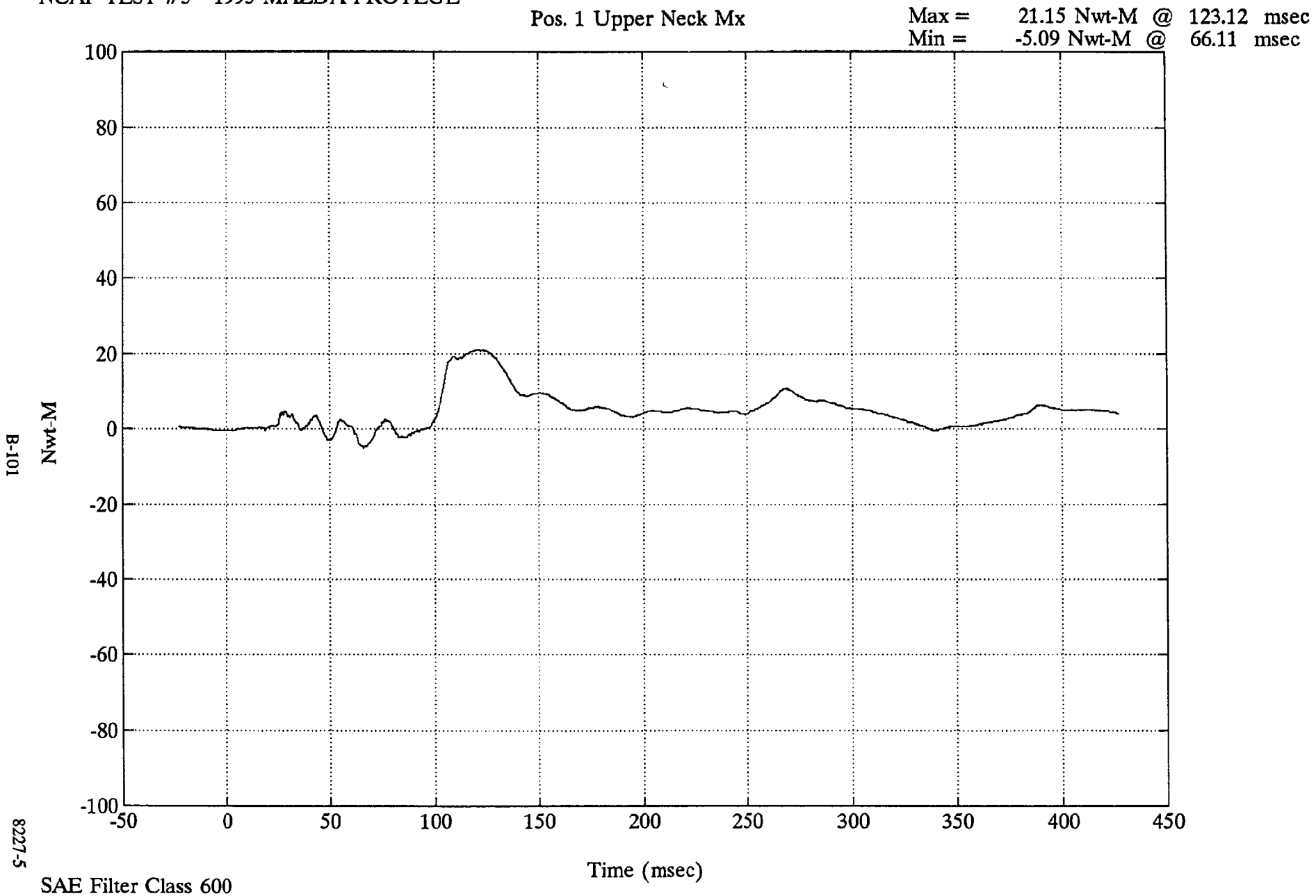


B-100

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-101

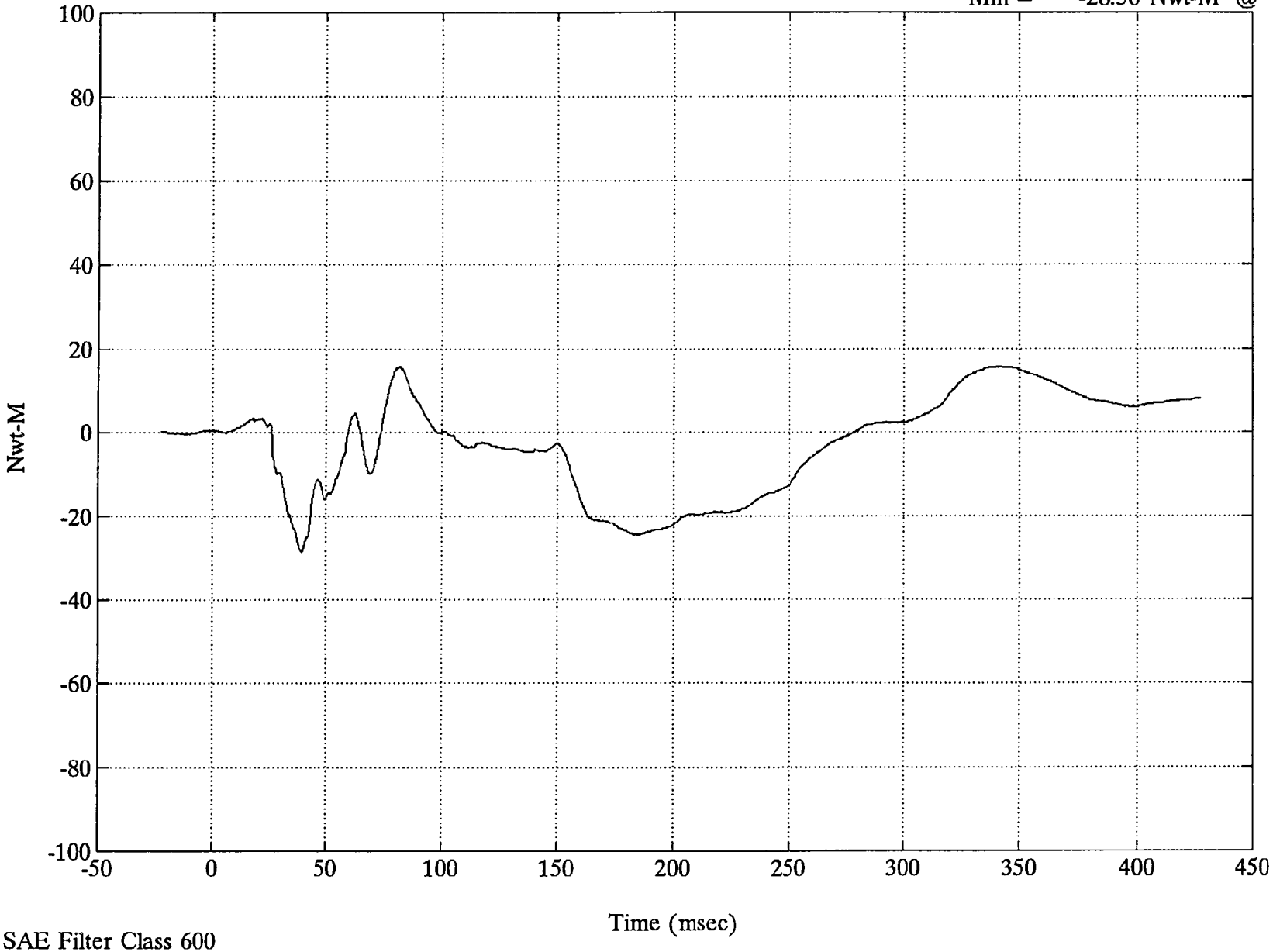
8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Upper Neck My

Max = 15.73 Nwt-M @ 81.84 msec
Min = -28.50 Nwt-M @ 39.00 msec



B-102

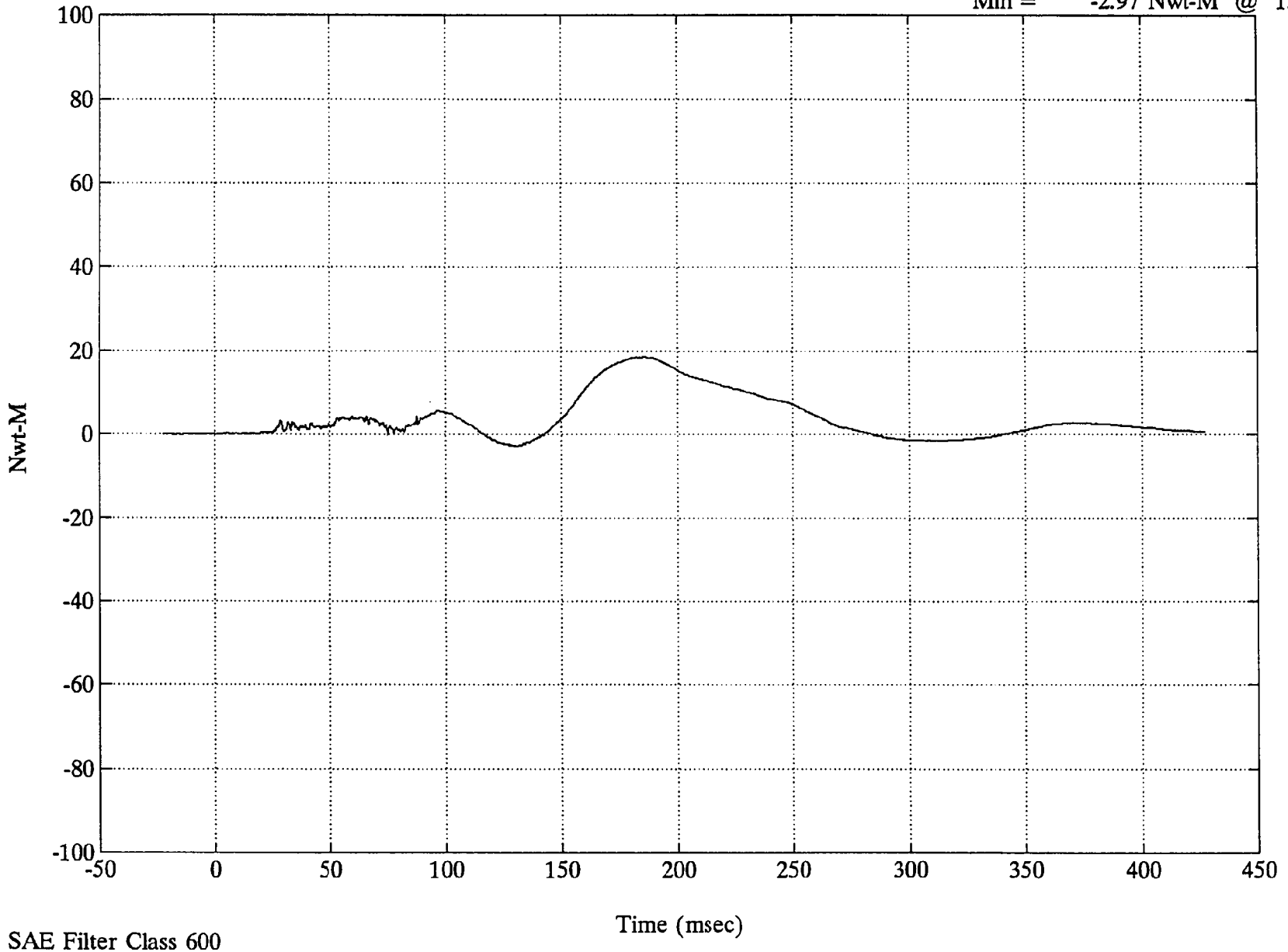
8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Upper Neck Mz

Max = 18.55 Nwt-M @ 185.04 msec
Min = -2.97 Nwt-M @ 130.80 msec



SAE Filter Class 600

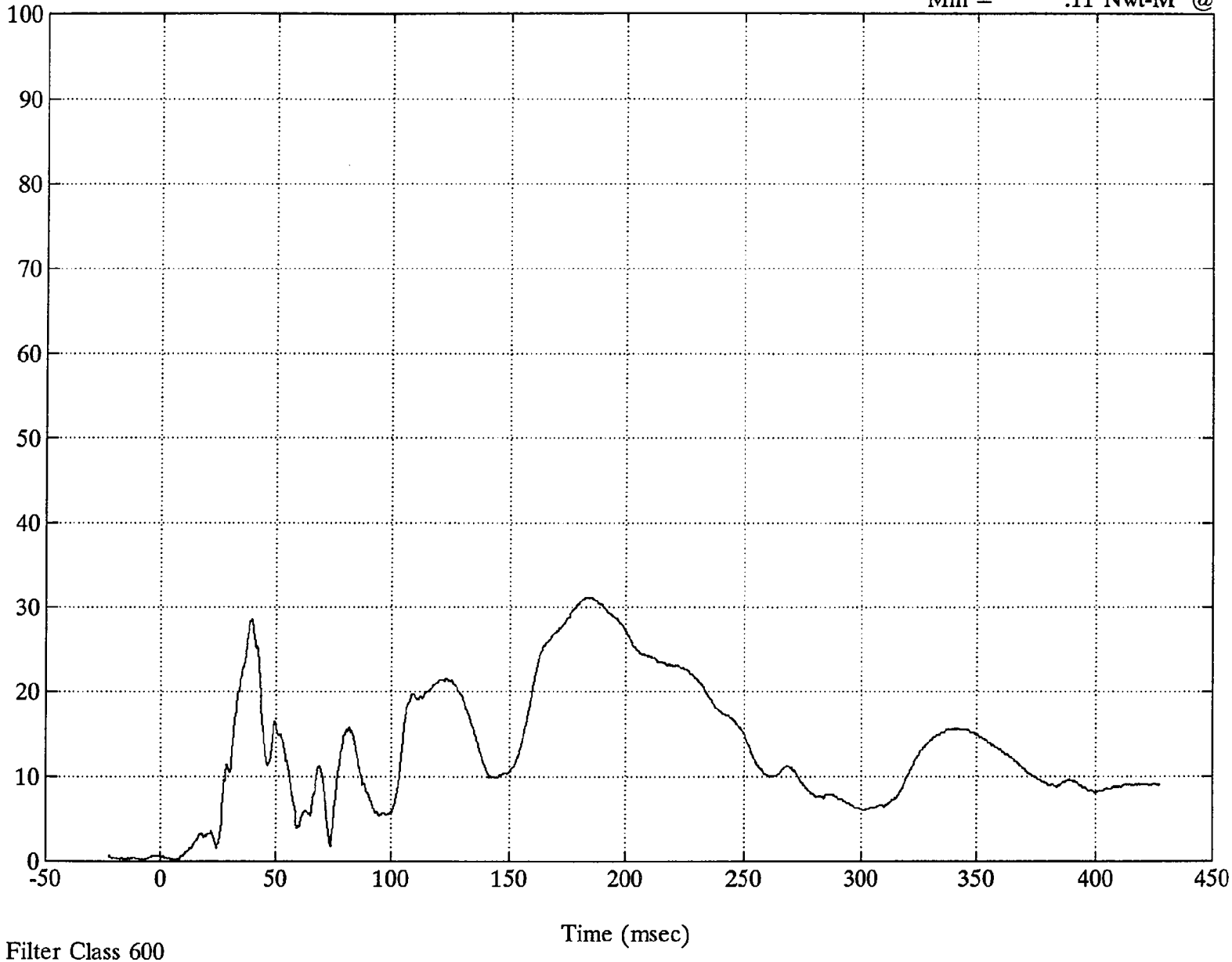
B-103

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 1 Neck Moment Res.

Max = 31.15 Nwt-M @ 183.96 msec
Min = .11 Nwt-M @ -6.96 msec

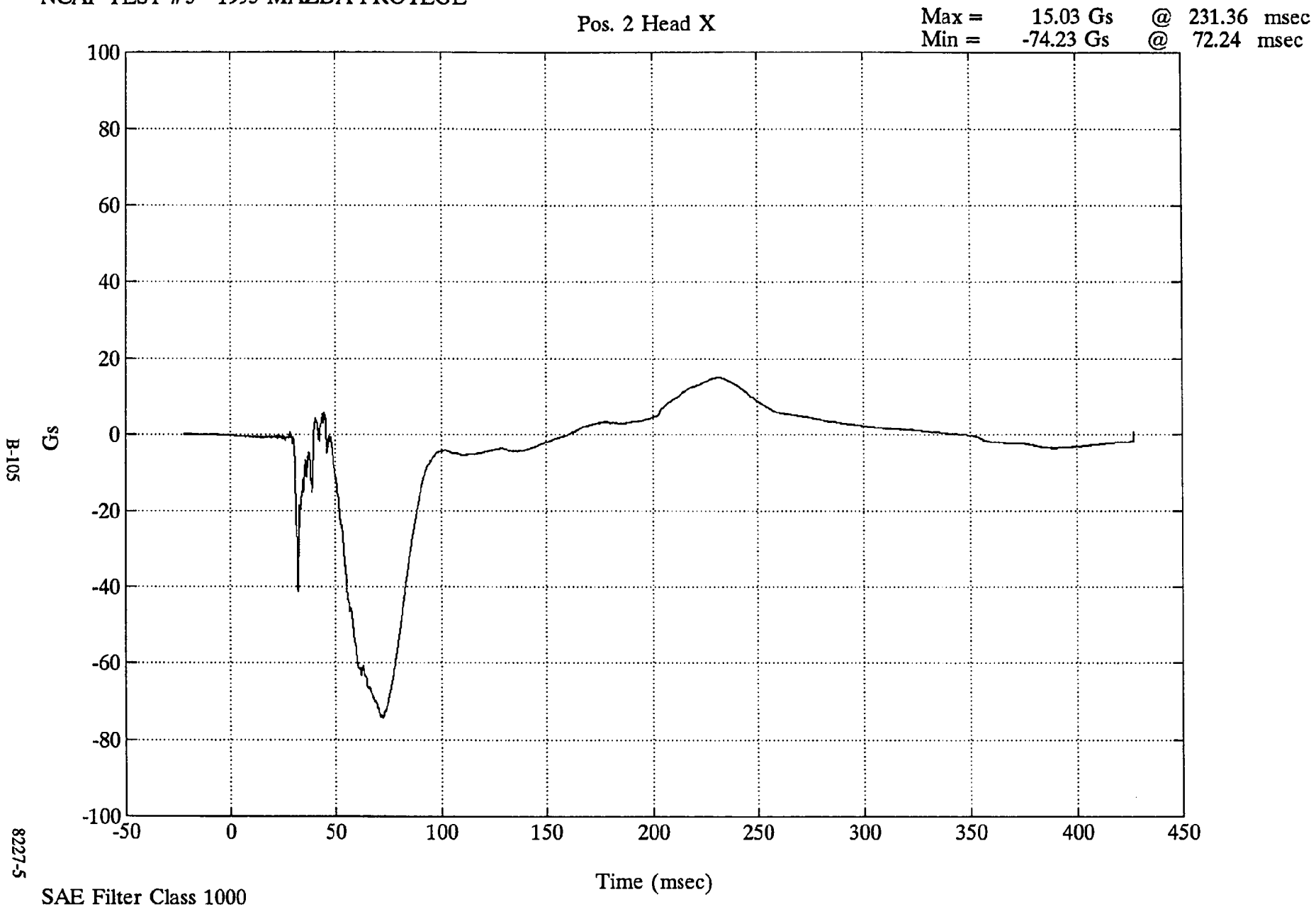


B-104

8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

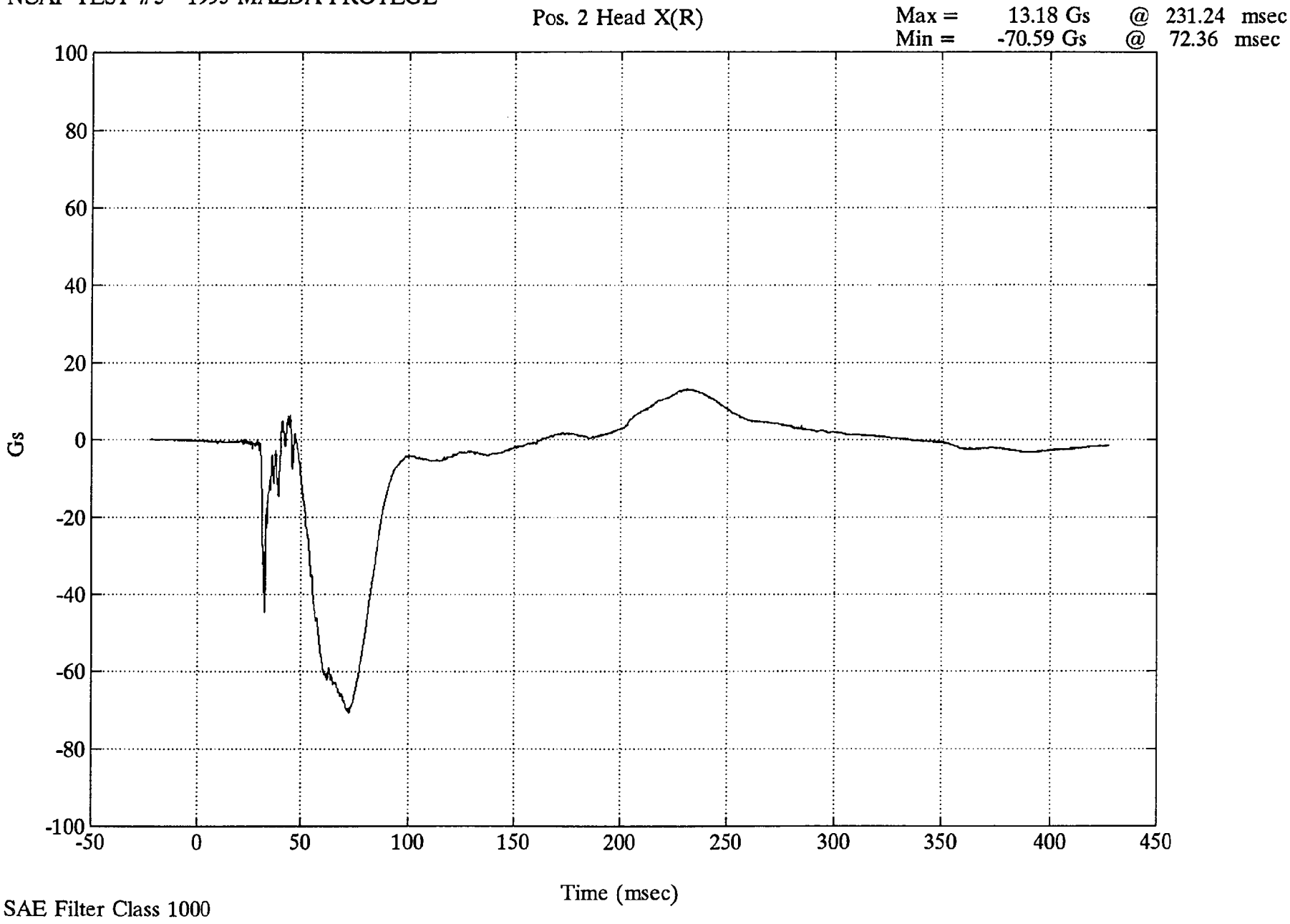


B-105

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

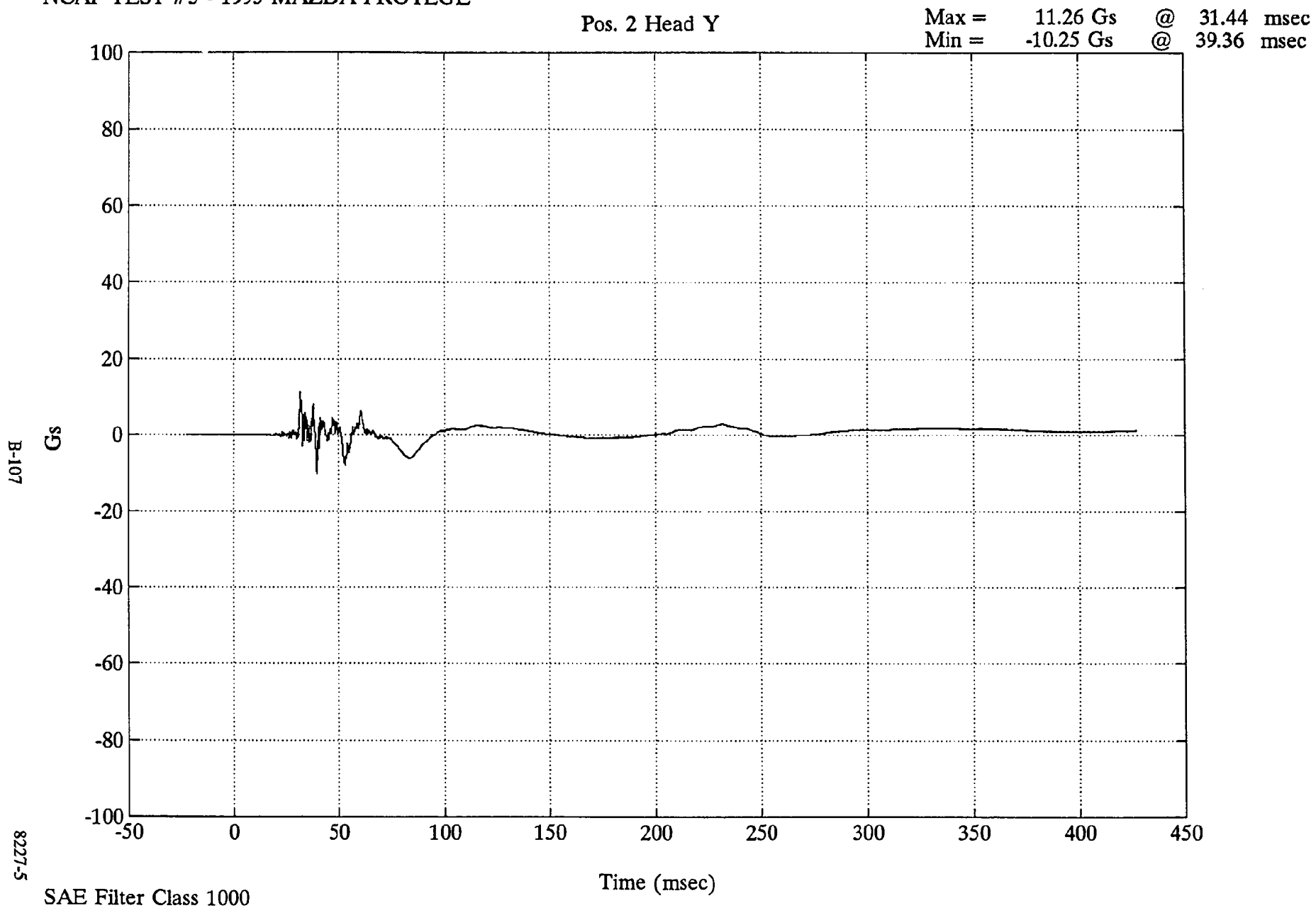


SAE Filter Class 1000

B-106

8227-5

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-107

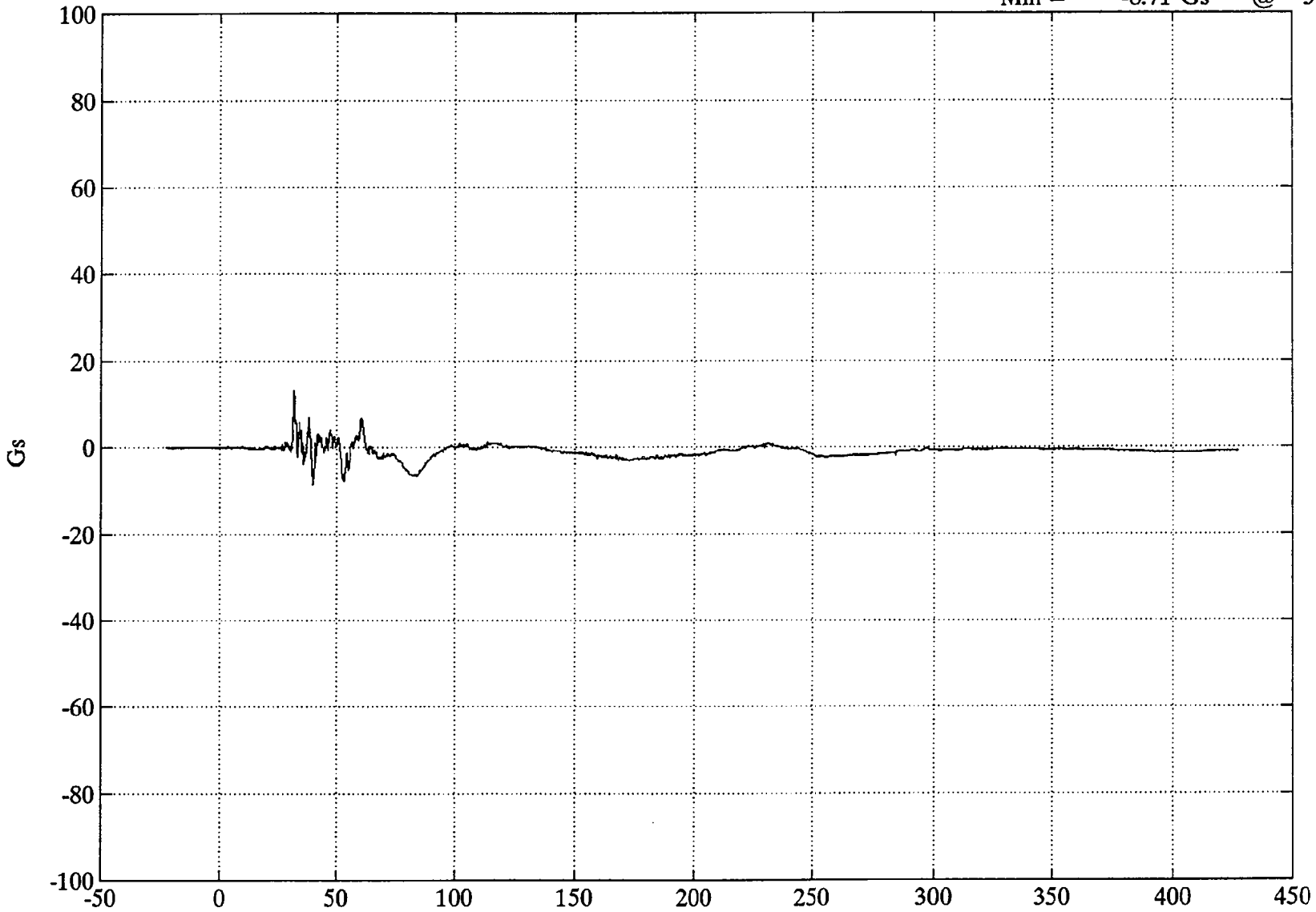
8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 2 Head Y(R)

Max = 13.29 Gs @ 31.55 msec
Min = -8.71 Gs @ 39.47 msec

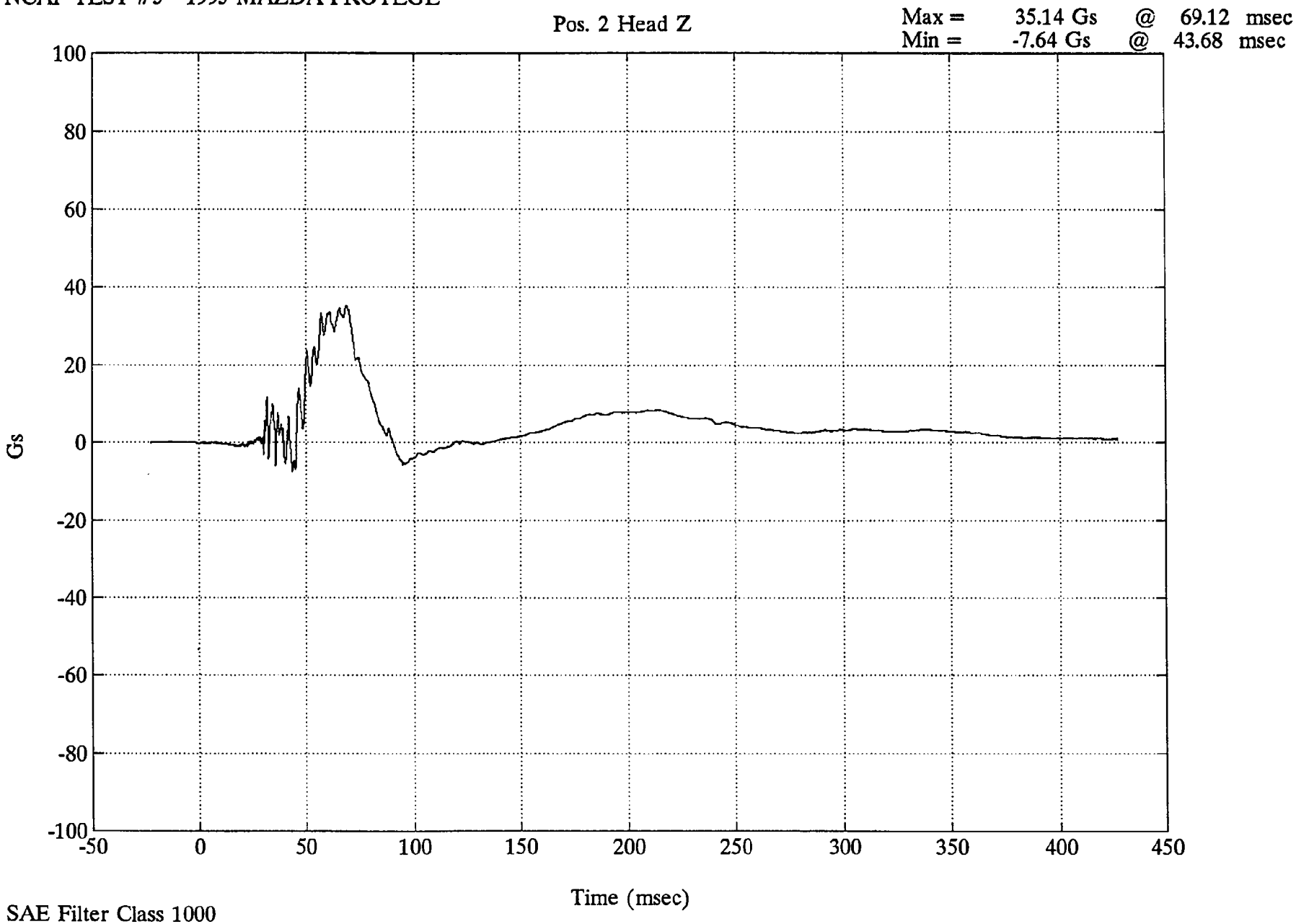


B-108

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

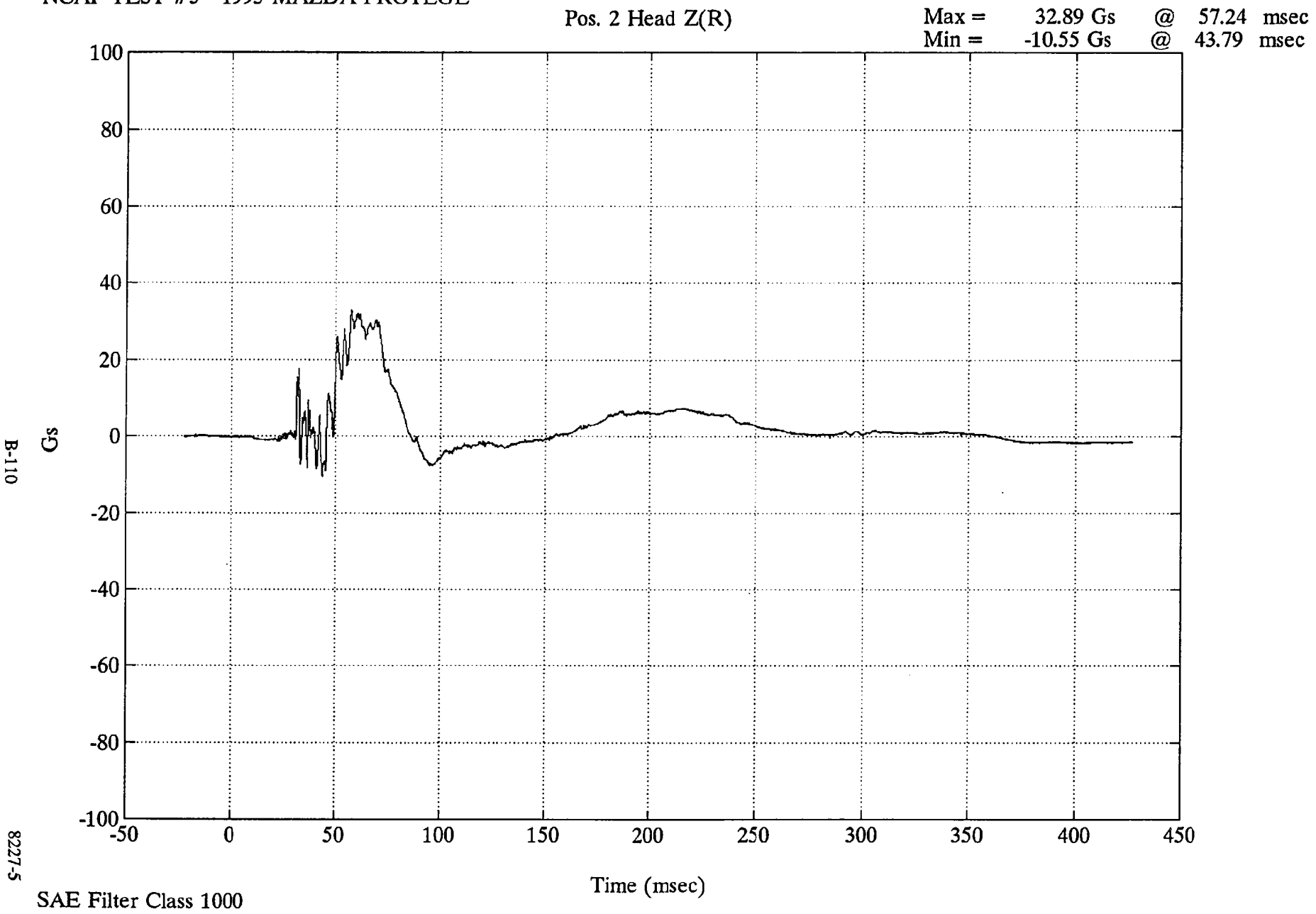


B-109

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

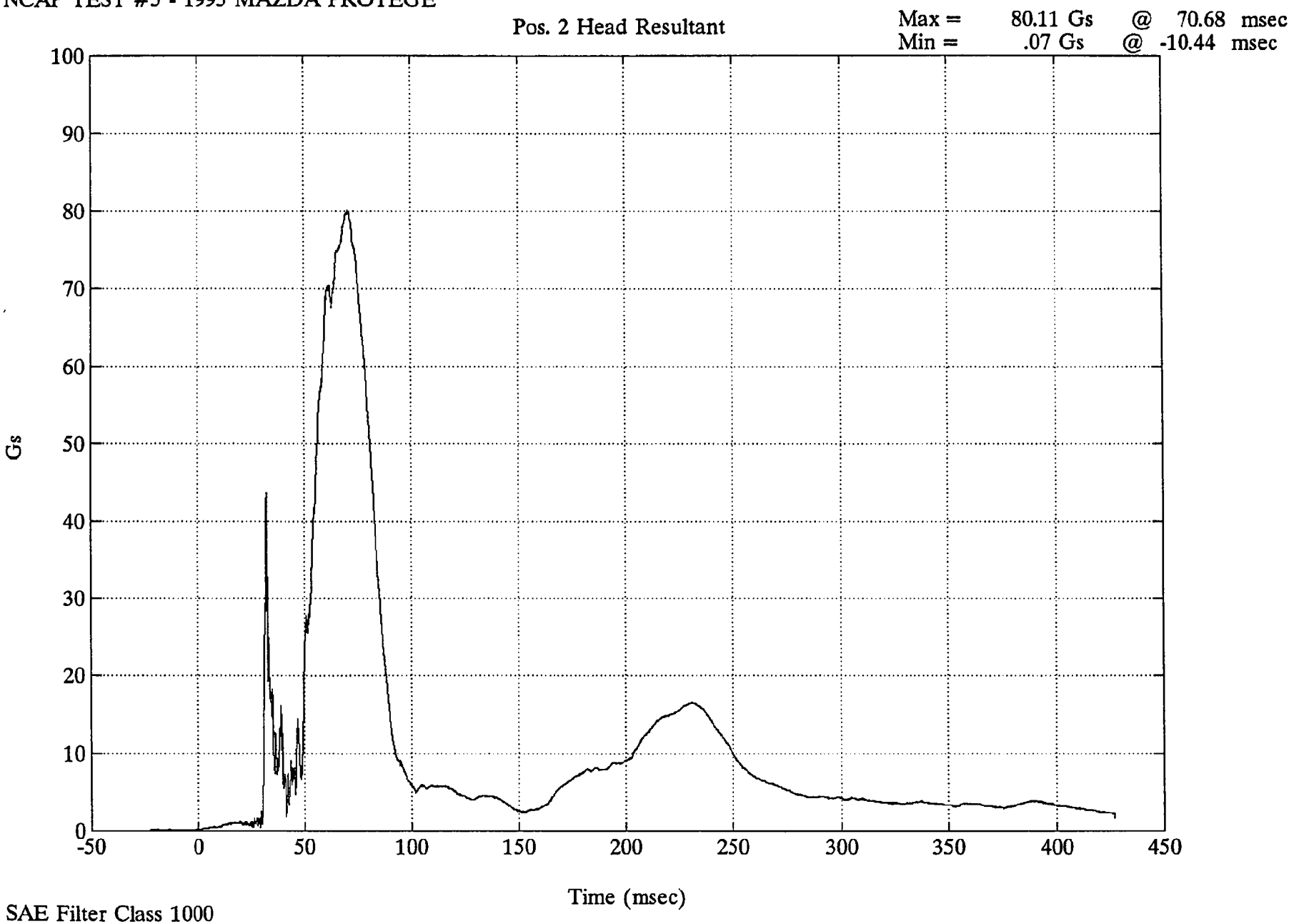


B-110

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

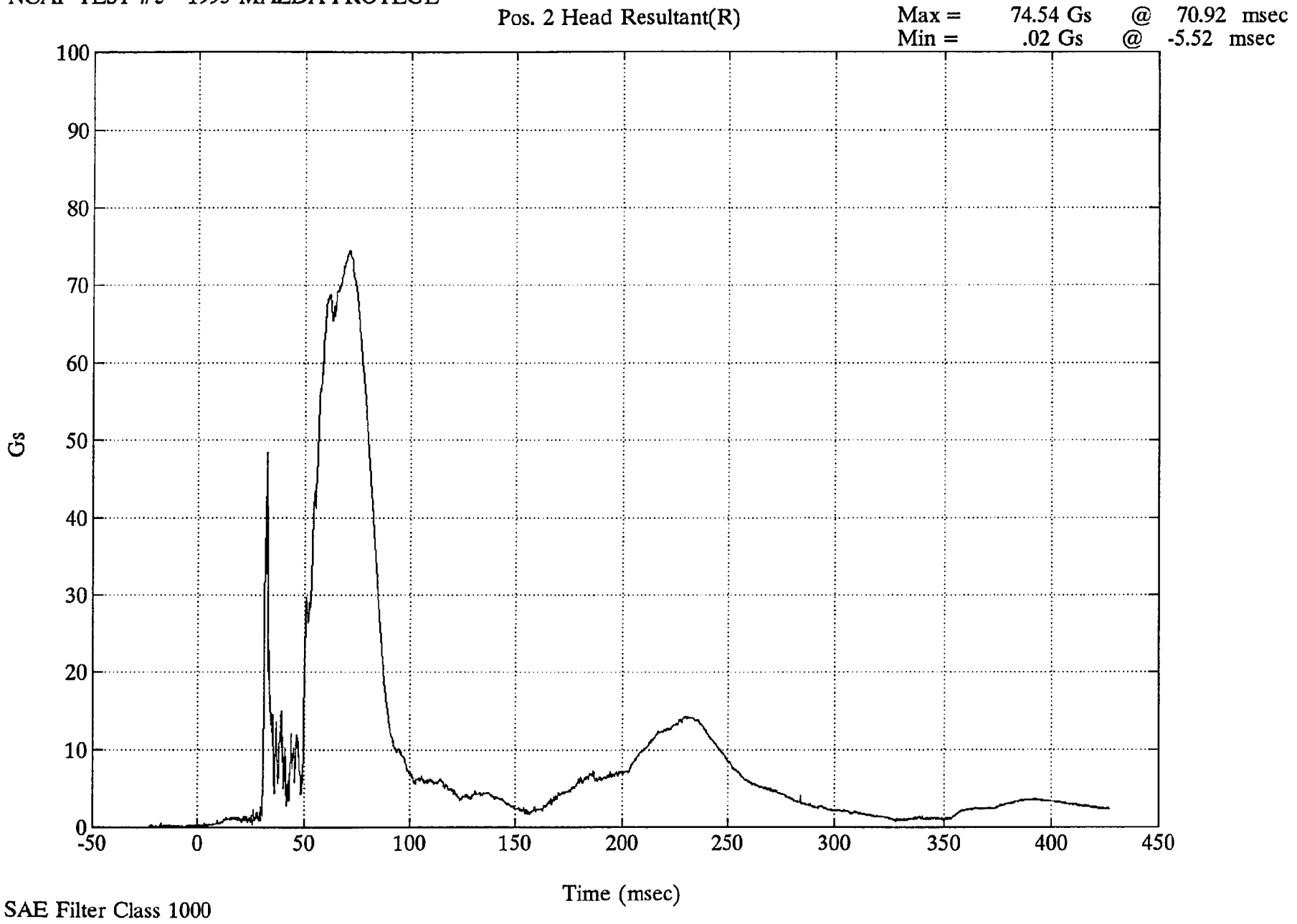


B-111

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-112

8227-5

SAE Filter Class 1000

POSITION #2 - CHEST X

DATA NOT AVAILABLE

POSITION #2 - CHEST X (R)

DATA NOT AVAILABLE

POSITION #2 - CHEST Y

DATA NOT AVAILABLE

POSITION #2 - CHEST Y (R)

DATA NOT AVAILABLE

POSITION #2 - CHEST Z

DATA NOT AVAILABLE

POSITION #2 - CHEST Z (R)

DATA NOT AVAILABLE

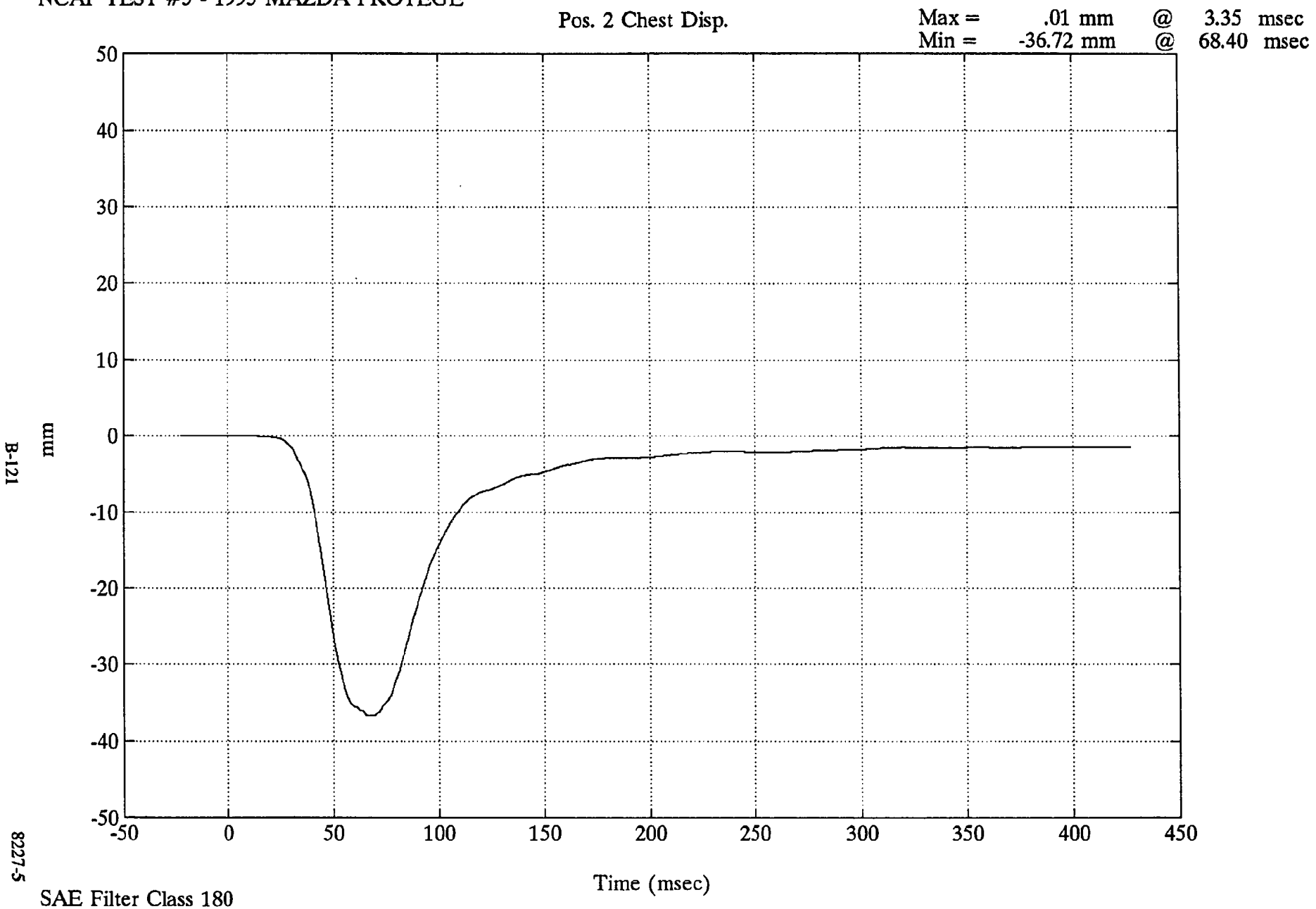
POSITION #2 - CHEST RESULTANT

DATA NOT AVAILABLE

POSITION #2 - CHEST RESULTANT (R)

DATA NOT AVAILABLE

NCAP TEST #5 - 1995 MAZDA PROTEGE

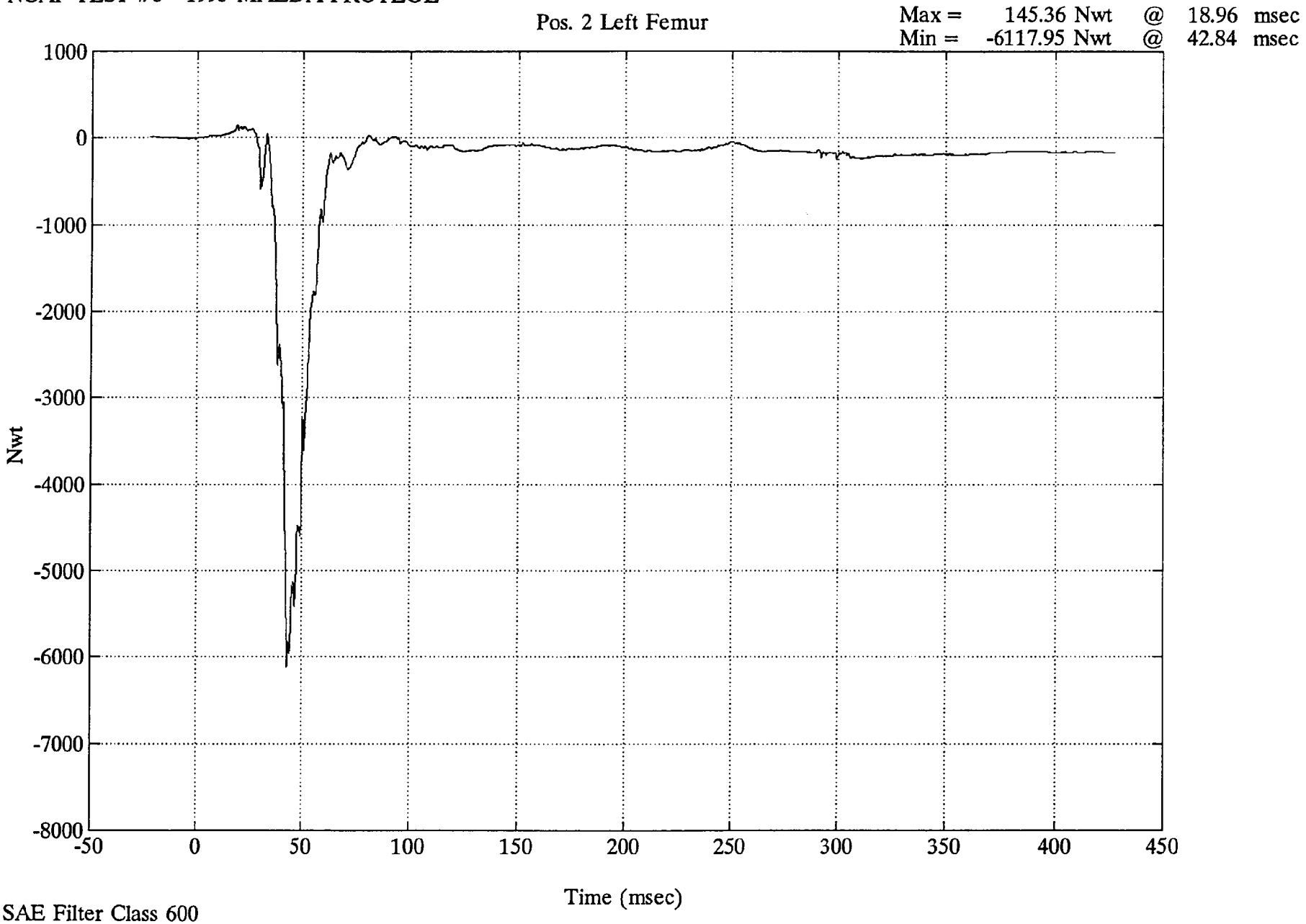


B-121

8227-5

SAE Filter Class 180

NCAP TEST #5 - 1995 MAZDA PROTEGE

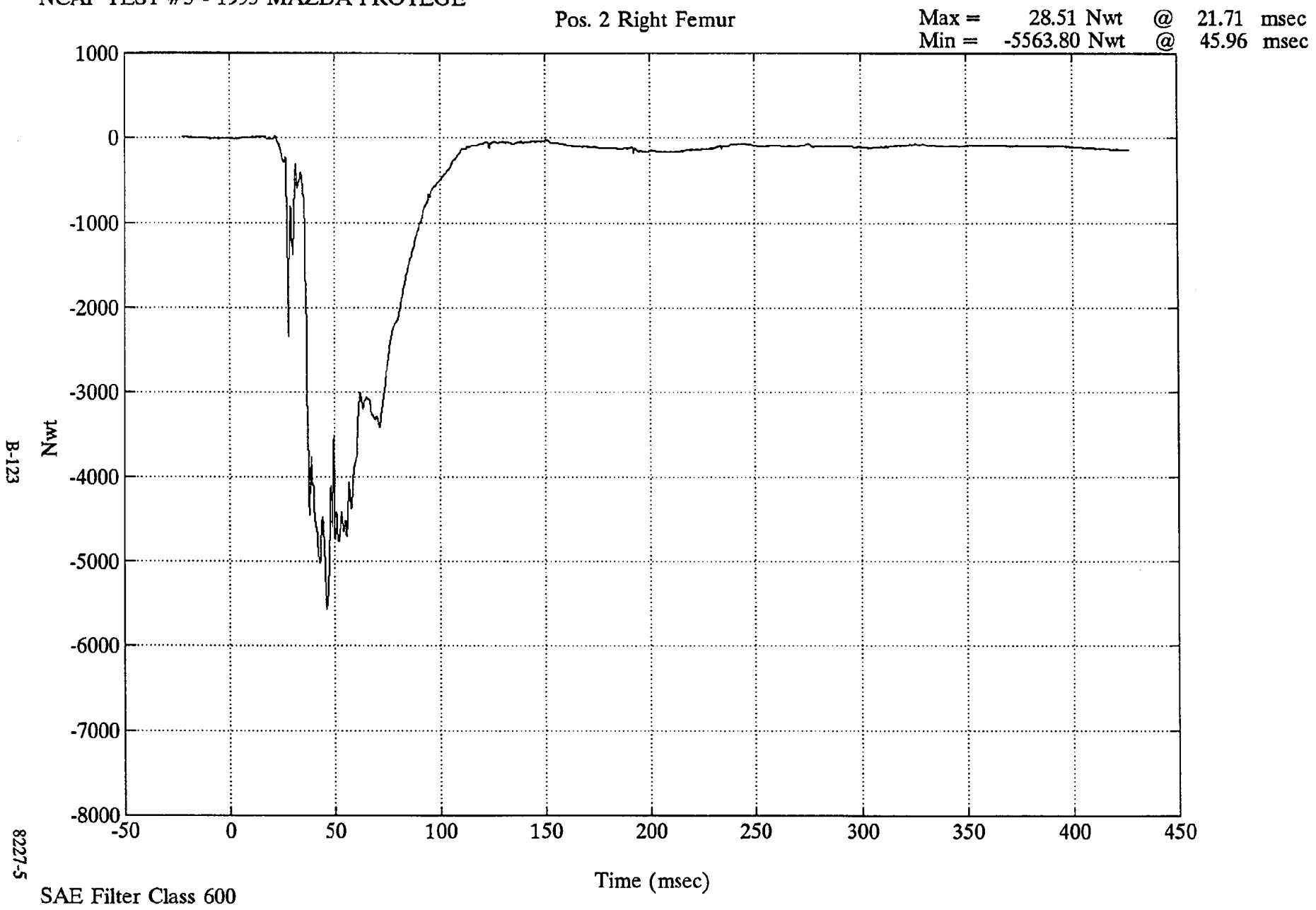


B-122

8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-123

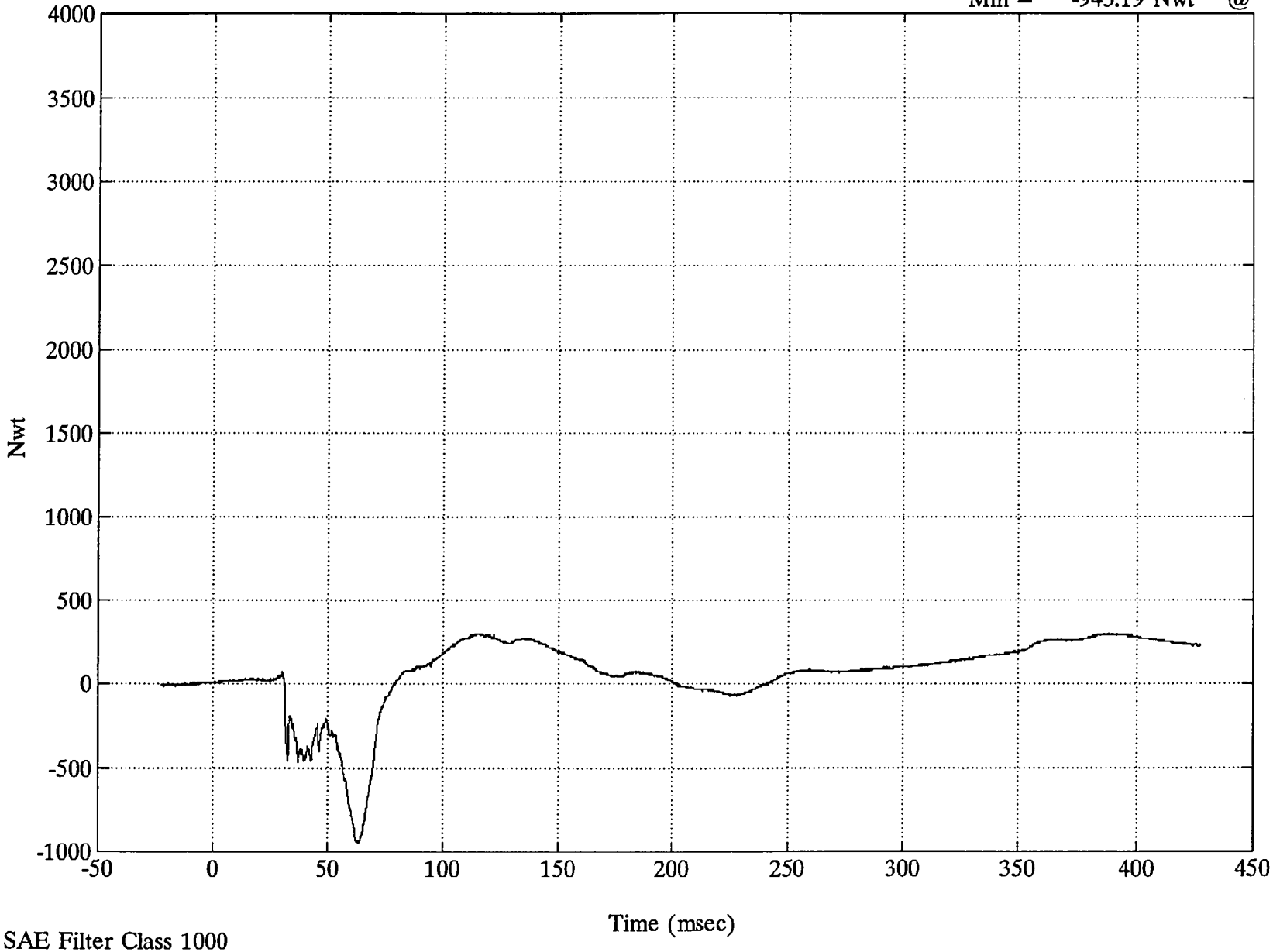
8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 2 Upper Neck Fx

Max = 300.64 Nwt @ 391.44 msec
Min = -943.19 Nwt @ 63.95 msec

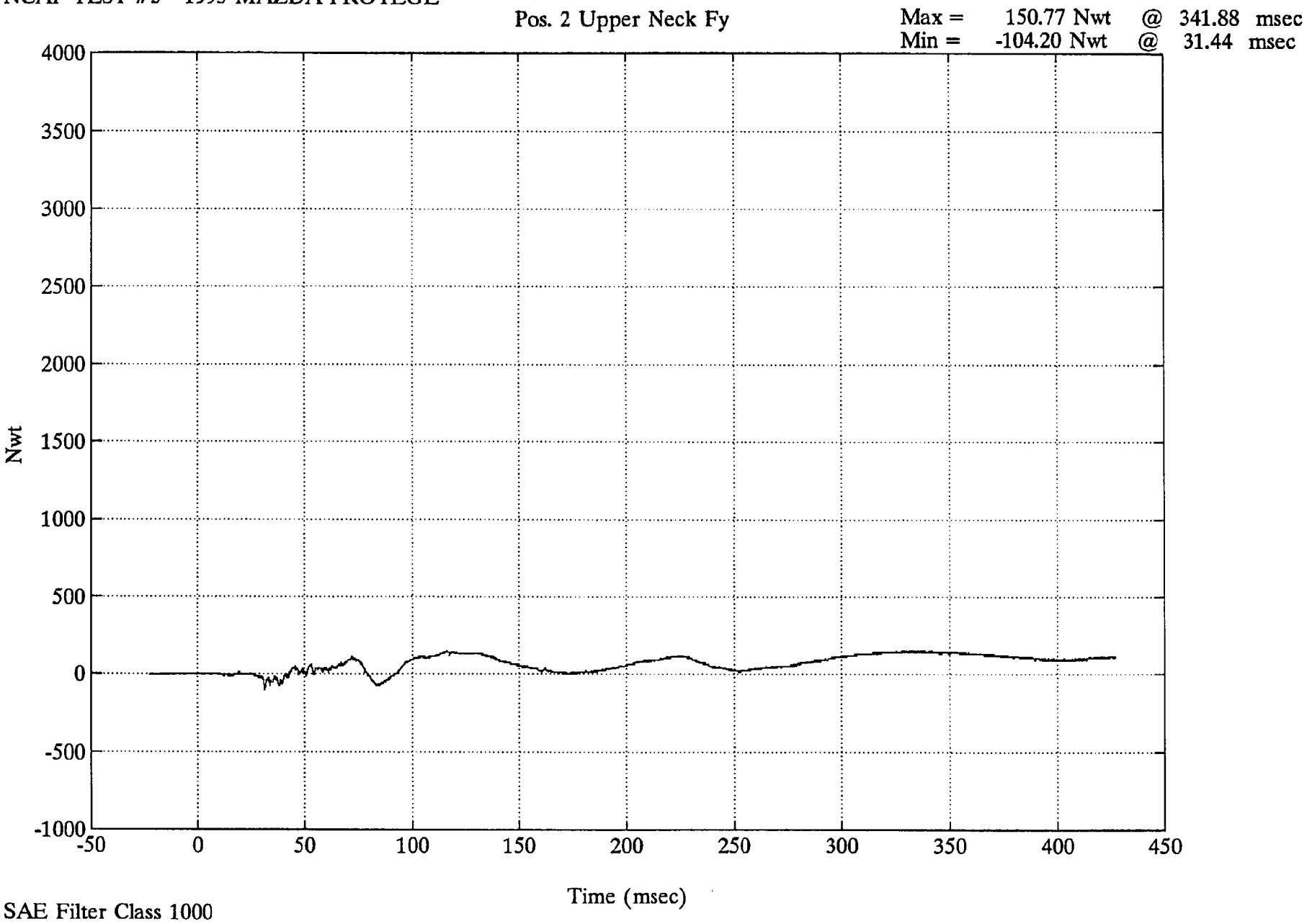


B-124

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

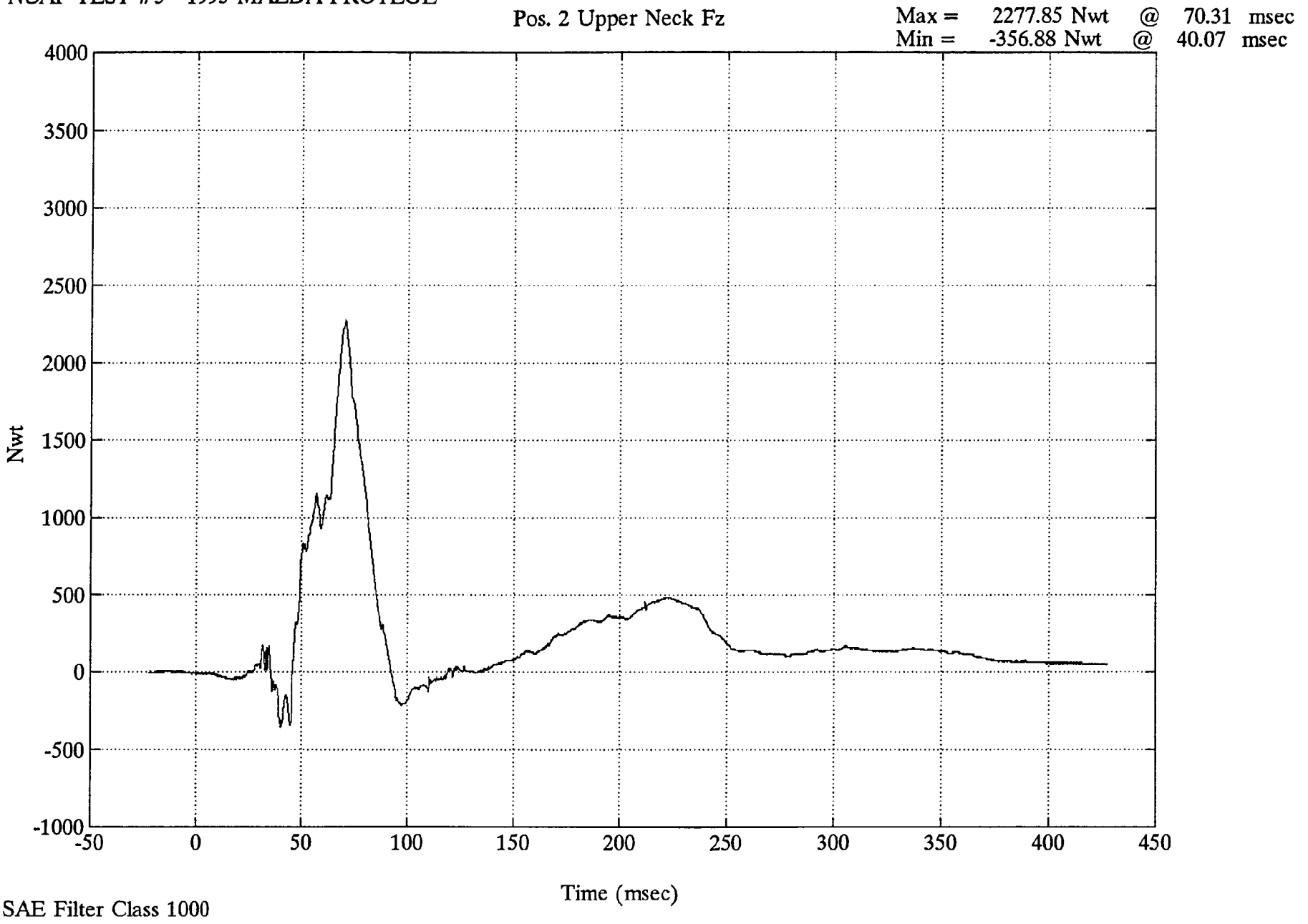


B-125

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

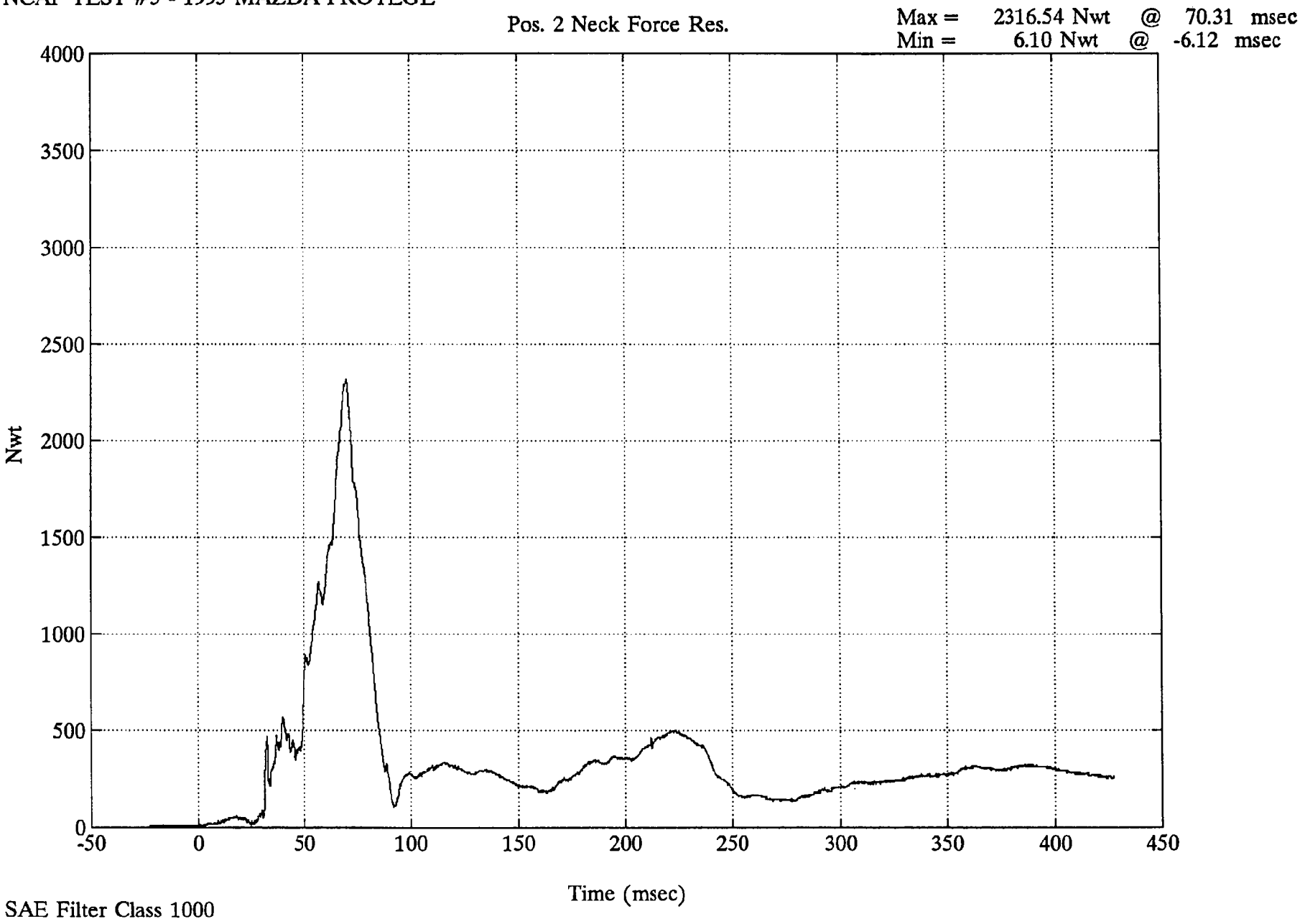


B-126

8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-127

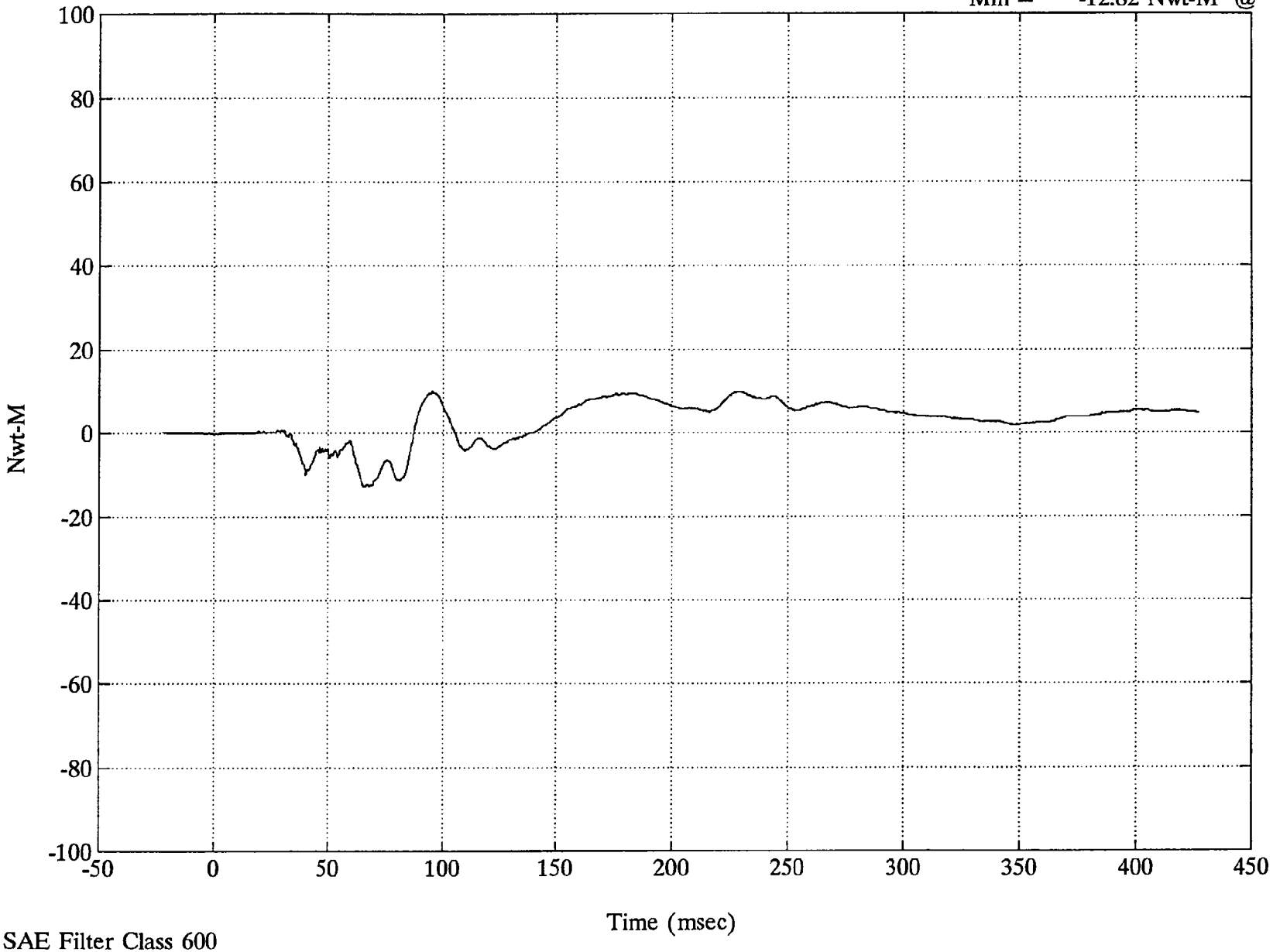
8227-5

SAE Filter Class 1000

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 2 Upper Neck Mx

Max = 10.00 Nwt-M @ 95.40 msec
Min = -12.82 Nwt-M @ 67.68 msec

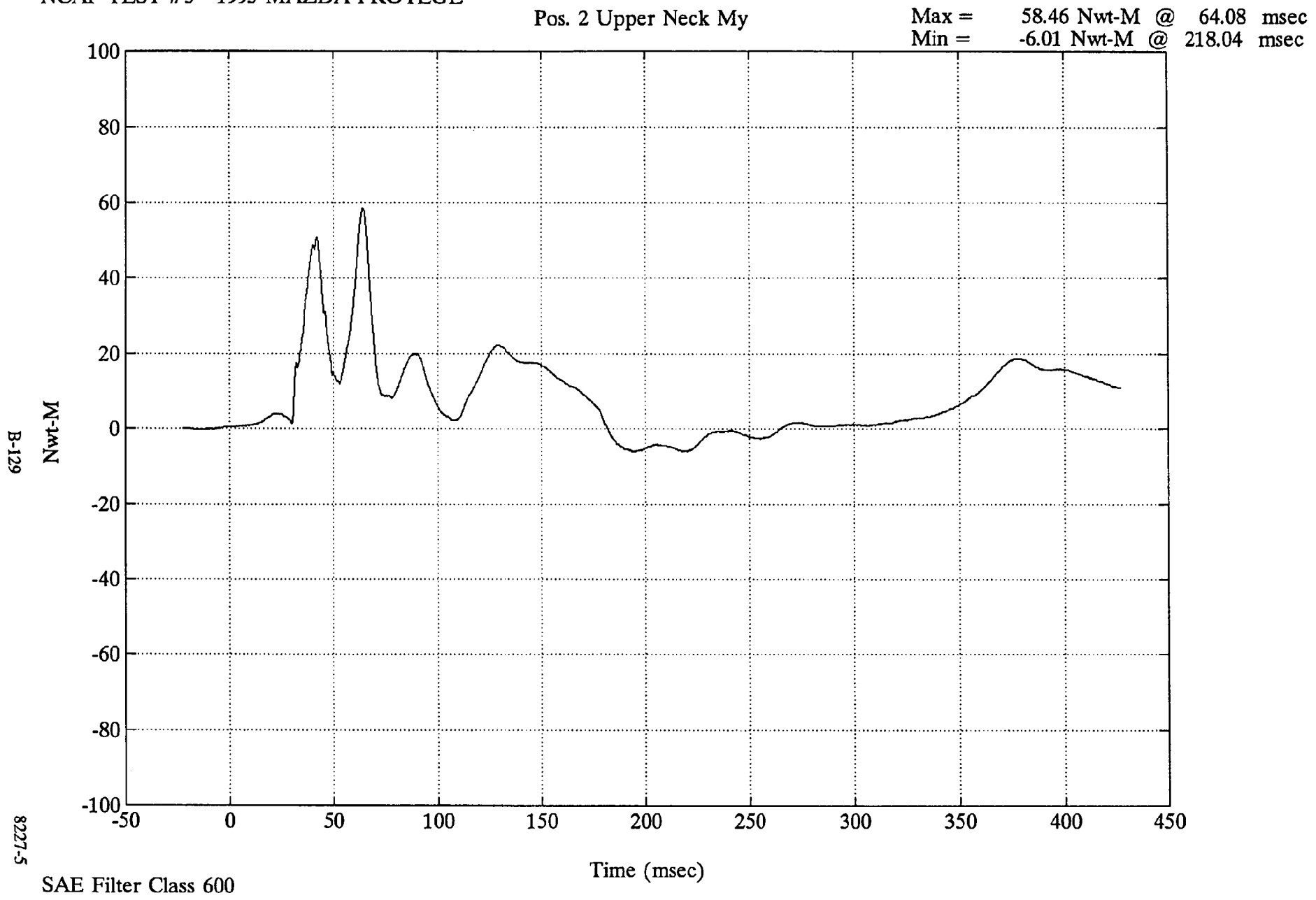


B-128

8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

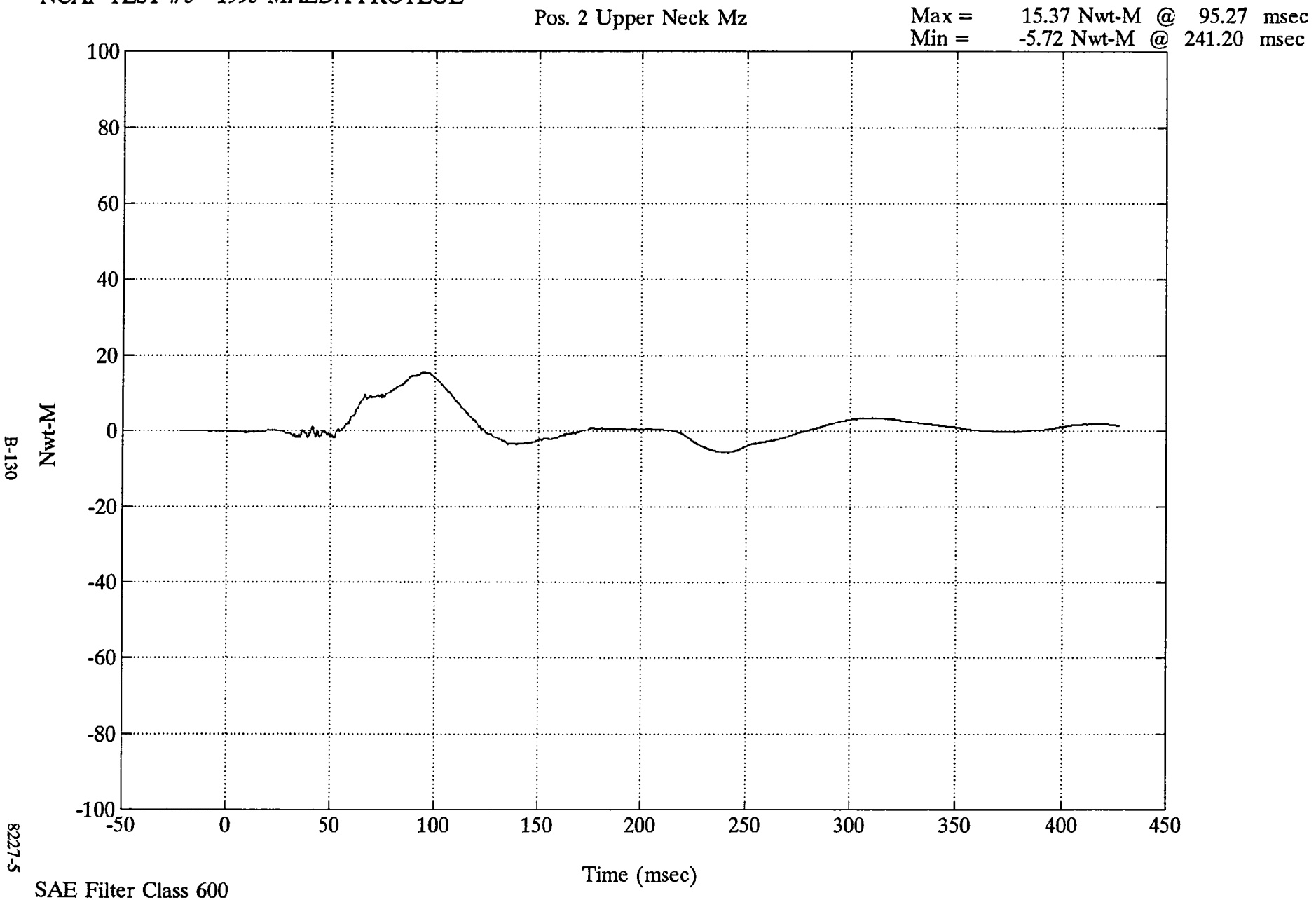


B-129

8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

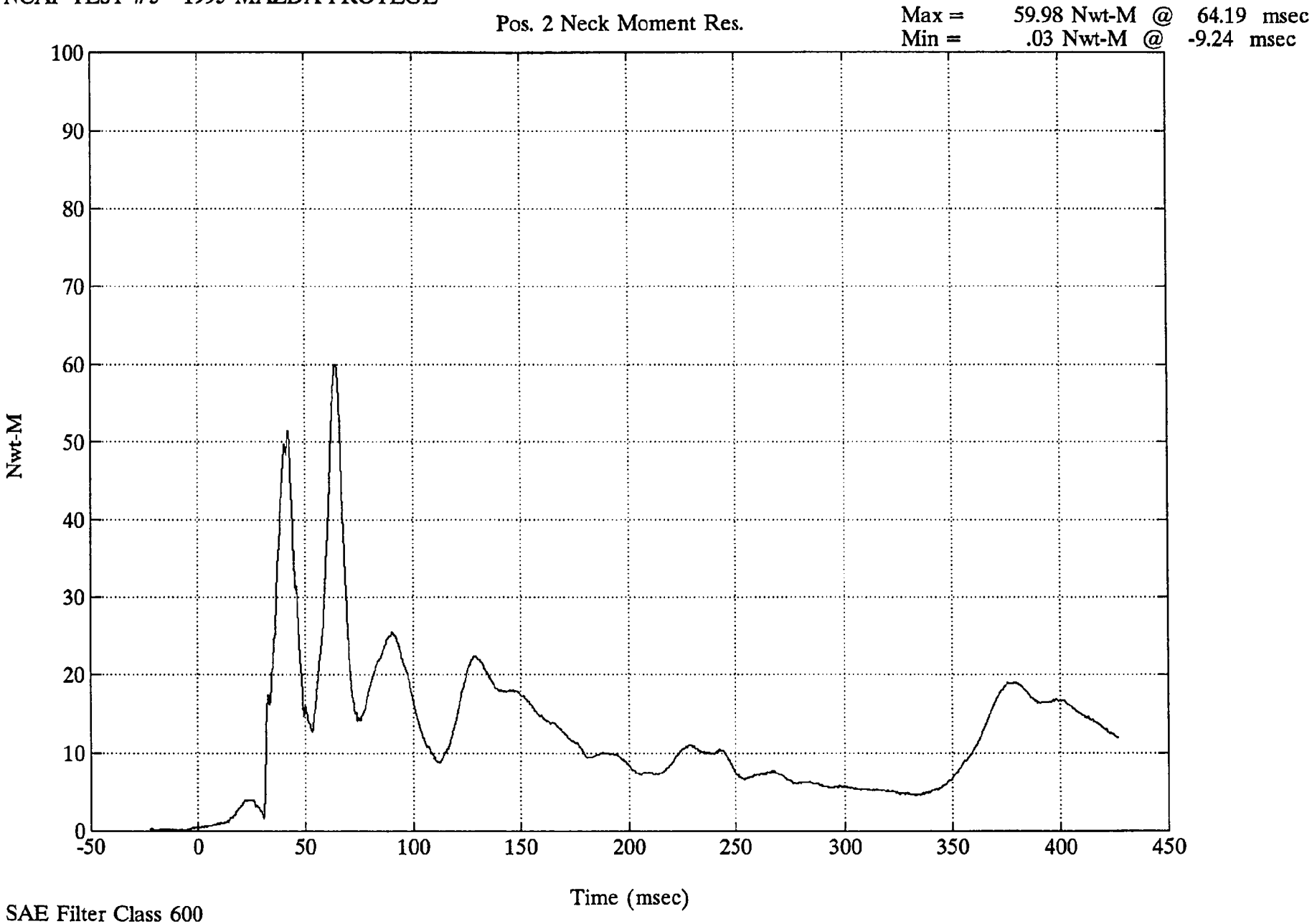


B-130

8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-131

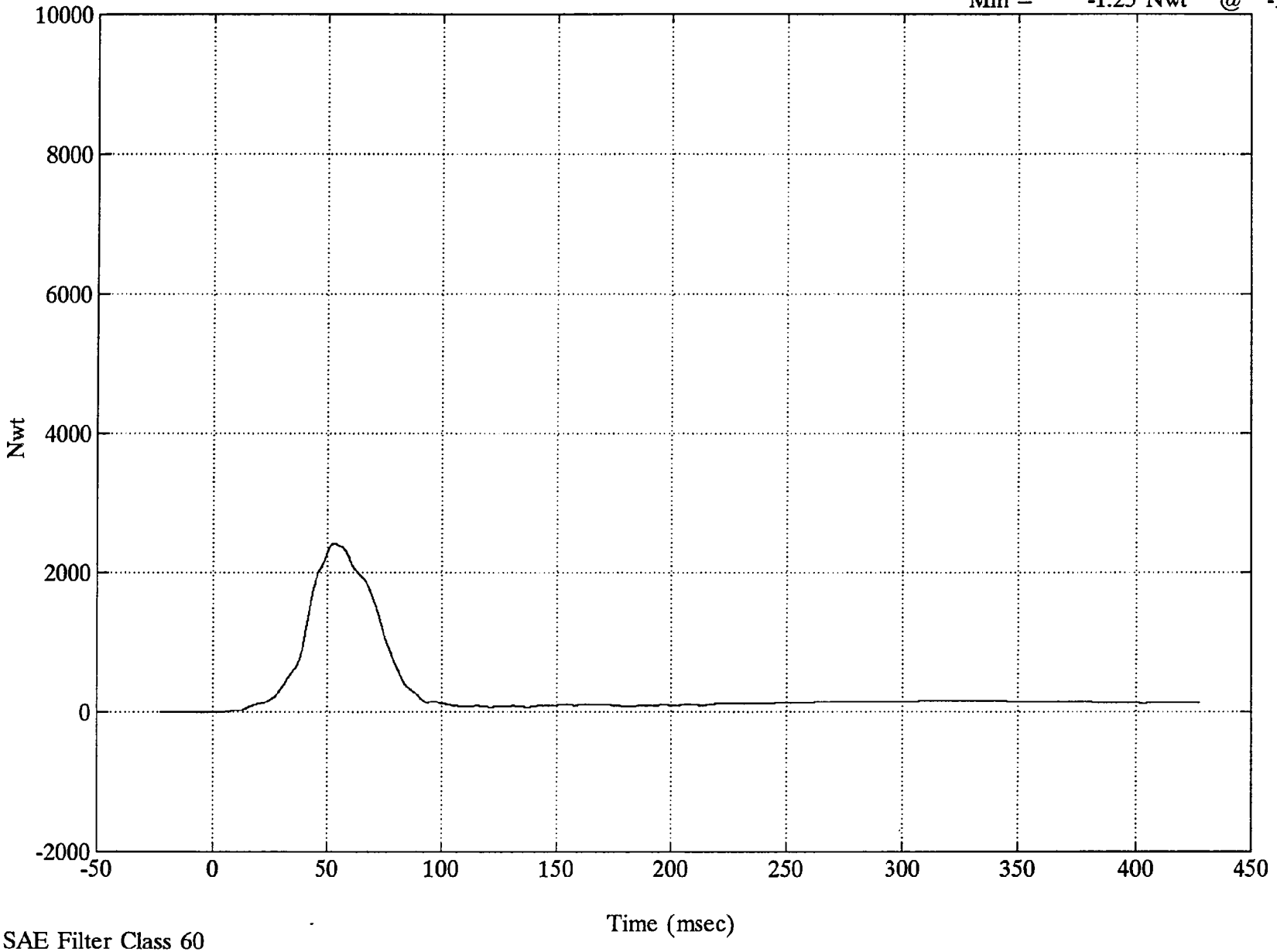
8227-5

SAE Filter Class 600

NCAP TEST #5 - 1995 MAZDA PROTEGE

Pos. 2 Right Belt Load

Max = 2422.09 Nwt @ 52.92 msec
Min = -1.25 Nwt @ -1.08 msec

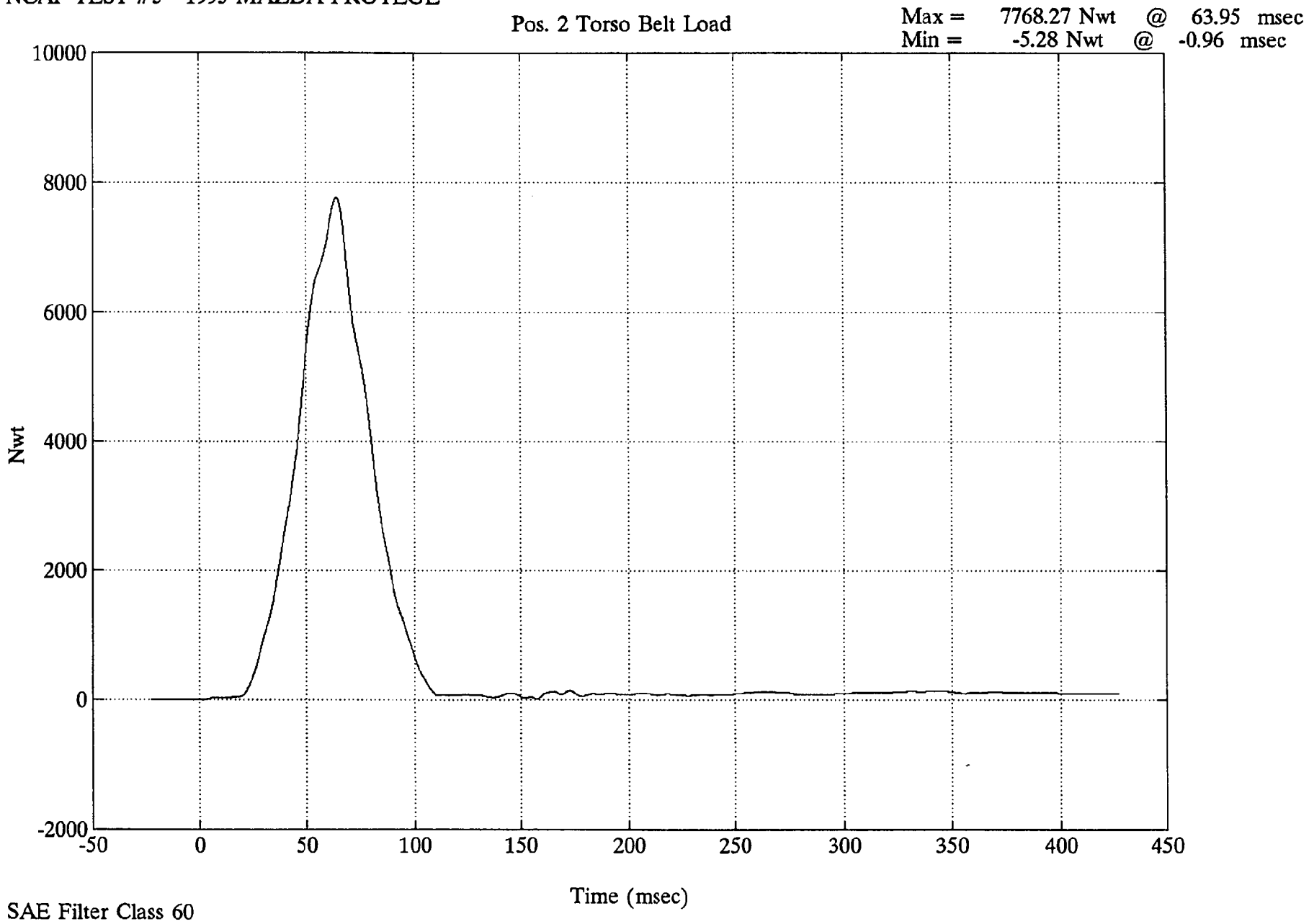


B-132

8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE

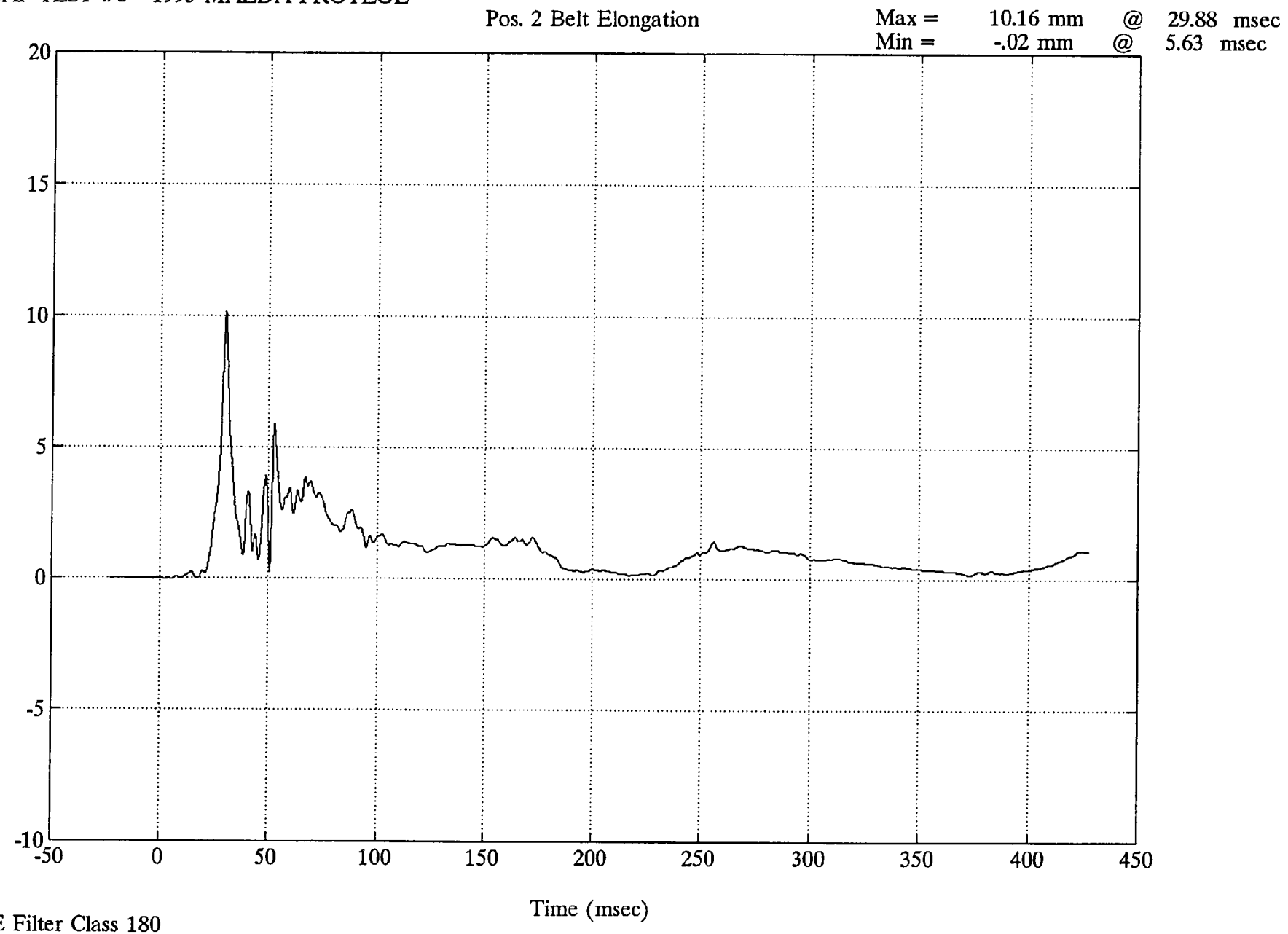


B-133

8227-5

SAE Filter Class 60

NCAP TEST #5 - 1995 MAZDA PROTEGE



B-134

8227-5

SAE Filter Class 180

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:

Serial No.	Completion Date
150	10/25/94
45	10/25/94

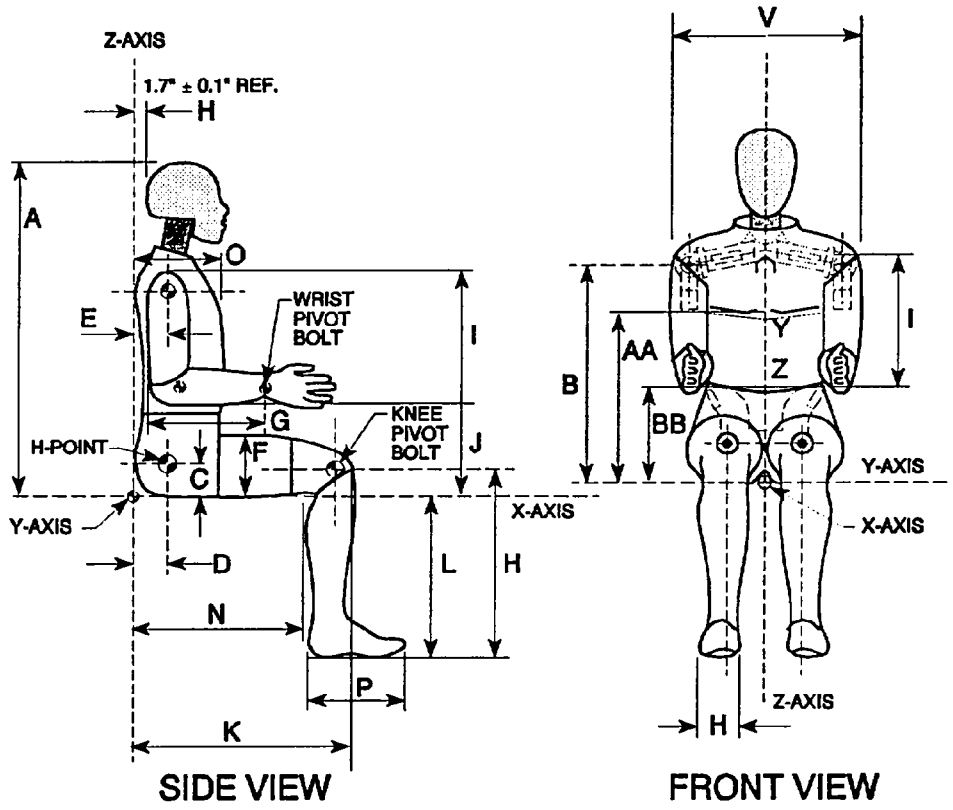
Electronic Test Equipment

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

Figure 7

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: 10/25/94

TEMPERATURE			20.5 DEG. C
RELATIVE HUMIDITY			43 %
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)	815-866 mm	863 mm
CHEST DEPTH	(O)	213-229 mm	213 mm
H-POINT HEIGHT	(C)	84-89 mm	88 mm
H-POINT FROM SEAT BACK	(D)	135-140 mm	137 mm
SKULL CAP TO BACKLINE	(H)	41-46 mm	43 mm
TOTAL SITTING HEIGHT	(A)	879-889 mm	881 mm
THIGH CLEARANCE	(F)	140-155 mm	142 mm
BUTTOCK KNEE LENGTH	(K)	580-605 mm	591 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	500 mm
FOOT LENGTH	(P)	252-267 mm	259 mm
FOOT BREADTH	(W)	91-107 mm	96 mm
SHOULDER PIVOT FROM BACKLINE	(E)	84-94 mm	94 mm
SHOULDER BREADTH	(V)	422-437 mm	429 mm
SHOULDER PIVOT HEIGTH	(B)	505-521 mm	513 mm
ELBOW REST HEIGHT	(J)	190-211 mm	208 mm
SHOULDER-ELBOW LENGTH	(I)	330-345 mm	337 mm
BACK OF ELBOW TO WRIST PIVOT	(G)	290-305 mm	292 mm

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 10/25/94

CALSPAN SEQUENTIAL NUMBER 2 HY3 SN: 150 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	43 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	234.9 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	6.2 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 10/24/94 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 2 HY3 SN:150 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5-22.2 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY		10% - 70%	49 %
IMPACT VELOCITY		24.8 - 25.7 KPH	25.2 KPH
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	22.74 G'S
	20 MS	17.60 - 22.60 G'S	18.82 G'S
	30 MS	12.50 - 18.50 G'S	15.73 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	15.73 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	42 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	73.1 DEG.
	TIME	57 - 64 MS	60.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88 - 108 N-M	99.45 N-M
	TIME	47 - 58 MS	54.25 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	119.75 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97.38 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 10/24/94 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 2 HY3 SN:150 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5 - 22.2 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY		10% - 70%	47 %
IMPACT VELOCITY		21.4 - 22.3 KPH	21.9 KPH
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	19.17 G'S
	20 MS	14.00 - 19.00 G'S	16.14 G'S
	30 MS	11.00 - 16.00 G'S	14.27 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	14.27 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	46 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	88.49 DEG.
	TIME	72 - 82 MS	72.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-80.0/-52.9 N-M	-79.3 N-M
	TIME	65 - 79 MS	67.75 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	147.75 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	127 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 10/25/94

CALSPAN SEQUENTIAL NUMBER 2 HY3 SN 150 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.5 - 22.2 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	45 %
PENDULUM VELOCITY	23.7 - 24.6 KPH	23.7 KPH
MAXIMUM DEFLECTION	64 - 73 mm	64 mm
MAXIMUM RESISTIVE FORCE	5160 - 5894 NEWTONS	5865 NEWTONS
INTERNAL HYSTERESIS	69% - 85%	75.2 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 10/24/94 KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 2 HY3 SN: 150 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	48 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5146 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 10/24/94 KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 2 HY3 SN: 150 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	48 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5146 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

HYBRID III EXTERNAL DIMENSIONS

S/N 45 HUMANOID

DUMMY SERIAL NO. 45 DATE: 10/25/94

TEMPERATURE		20.5 DEG. C
RELATIVE HUMIDITY		47 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	429-434 mm	432 mm
LOCATION FOR WAIST CIRCUMFERENCE (BB)	226-231 mm	228 mm
CHEST CIRCUMFERENCE (Y)	970-1001 mm	1000 mm
WAIST CIRCUMFERENCE (Z)	815-866 mm	866 mm
CHEST DEPTH (O)	213-229 mm	213 mm
H-POINT HEIGHT (C)	84-89 mm	89 mm
H-POINT FROM SEAT BACK (D)	135-140 mm	137 mm
SKULL CAP TO BACKLINE (H)	41-46 mm	43 mm
TOTAL SITTING HEIGHT (A)	879-889 mm	879 mm
THIGH CLEARANCE (F)	140-155 mm	147 mm
BUTTOCK KNEE LENGTH (K)	580-605 mm	602 mm
BUTTOCK POPLITAL LENGTH (N)	452-477 mm	475 mm
POPLITEAL LENGTH (L)	430-455 mm	447 mm
KNEE PIVOT HEIGHT (M)	485-501 mm	487 mm
FOOT LENGTH (P)	252-267 mm	259 mm
FOOT BREADTH (W)	91-107 mm	101 mm
SHOULDER PIVOT FROM BACKLINE (E)	84-94 mm	94 mm
SHOULDER BREADTH (V)	422-437 mm	426 mm
SHOULDER PIVOT HEIGTH (B)	505-521 mm	510 mm
ELBOW REST HEIGHT (J)	190-211 mm	195 mm
SHOULDER-ELBOW LENGTH (I)	330-345 mm	337 mm
BACK OF ELBOW TO WRIST PIVOT (G)	290-305 mm	292 mm

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 10/25/94

CALSPAN SEQUENTIAL NUMBER 4 HY3 SN: 045 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	43 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	240.3 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	7.8 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 10/25/94 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 4 HY3 SN:045 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5-22.2 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY		10% - 70%	48 %
IMPACT VELOCITY		24.8 - 25.7 KPH	25.2 KPH
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	25.79 G'S
	20 MS	17.60 - 22.60 G'S	22.56 G'S
	30 MS	12.50 - 18.50 G'S	17.69 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	17.69 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	38.88 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	74.69 DEG.
	TIME	57 - 64 MS	58.5 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88 - 108 N-M	97.8 N-M
	TIME	47 - 58 MS	50.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	120.63 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	98.38 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 10/24/94 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 4 HY3 SN:045 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5 - 22.2 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY		10% - 70%	47 %
IMPACT VELOCITY		21.4 - 22.3 KPH	22 KPH
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	19.01 G'S
	20 MS	14.00 - 19.00 G'S	17.19 G'S
	30 MS	11.00 - 16.00 G'S	13.97 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	13.97 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	45.63 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	86.97 DEG.
	TIME	72 - 82 MS	73.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-80.0/-52.9 N-M	-65.5 N-M
	TIME	65 - 79 MS	67.25 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	152.13 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	128.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 10/25/94

CALSPAN SEQUENTIAL NUMBER 4 HY3 SN 045 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.5 - 22.2 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	45 %
PENDULUM VELOCITY	23.7 - 24.6 KPH	23.7 KPH
MAXIMUM DEFLECTION	64 - 73 mm	64.3 mm
MAXIMUM RESISTIVE FORCE	5160 - 5894 NEWTONS	5782 NEWTONS
INTERNAL HYSTERESIS	69% - 85%	70.8 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 10/24/94 KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 4 HY3 SN: 045 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	47 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	4955 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 10/24/94 KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 4 HY3 SN: 045 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	20.5 DEG. C
RELATIVE HUMIDITY	10% - 70%	47 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	4942 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

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	AC2M6	ENDEVCO	8/94	2/95
	Y	AF5C9	ENDEVCO	8/94	2/95
	Z	ACT12	ENDEVCO	10/94	4/95
Chest	X	AF5P8	ENDEVCO	8/94	2/95
	Y	AF5C4	ENDEVCO	10/94	4/95
	Z	AE8K1	ENDEVCO	8/94	2/95
Right Femur Load Cell		952	GSE	7/94	1/95
Left Femur Load Cell		951	GSE	7/94	1/95
Neck Load Cell	X	269	DENTON	8/94	2/95
	Y	269	DENTON	8/94	2/95
	Z	269	DENTON	8/94	2/95
Neck Moment	X	269	DENTON	8/94	2/95
	Y	269	DENTON	8/94	2/95
	Z	269	DENTON	8/94	2/95
Chest Deflection Gauge		150	HUMANOID	8/94	2/95
Hybrid III Use Only					
Lap Belt Load Cells		706	LEBOW	7/94	1/95
Shoulder Belt Load Cells		707	LEBOW	7/94	1/95
Spool-Out Potentiometer		N/A	MAGNETEK	-	-
Belt Stretch Transduer		E6	CALSPAN	8/94	2/95

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X	AEW70	ENDEVCO	11/94	5/95
	Y	AET34	ENDEVCO	11/94	5/95
	Z	AKD93	ENDEVCO	11/94	5/95
Chest	X	AKD92	ENDEVCO	11/94	5/95
	Y	AFPJ7	ENDEVCO	11/94	5/95
	Z	AJP62	ENDEVCO	11/94	5/95
Right Femur Load Cell		955	GSE	7/94	1/95
Left Femur Load Cell		954	GSE	7/94	1/95
Neck Load Cell	X	076	DENTON	8/94	2/95
	Y	076	DENTON	8/94	2/95
	Z	076	DENTON	8/94	2/95
Neck Moment	X	076	DENTON	8/94	2/95
	Y	076	DENTON	8/94	2/95
	Z	076	DENTON	8/94	2/95
Chest Deflection Gauge		45	HUMANOID	8/94	2/95
Hybrid III Use Only					
Lap Belt Load Cells		710	LEBOW	7/94	1/95
Shoulder Belt Load Cells		711	LEBOW	7/94	1/95
Spool-Out Potentiometer		N/A	MAGNETEK	-	-
Belt Stretch Transduer		E7	CALSPAN	8/94	2/95

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	A185	CEC	7/94	1/95
Right Rear Seat Crossmember	A89	CEC	7/94	1/95
Top of Engine	A68	CEC	8/94	2/95
Bottom of Engine	A175	CEC	7/94	1/95
Left Disc Brake Caliper	A144	CEC	8/94	2/95
Right Disc Brake Caliper	A178	CEC	9/94	3/95
Instrument Panel	A152	CEC	5/94	11/94
Center Rear Crossmember	A183	CEC	9/94	3/95
Vehicle Rear Z	A69	CEC	9/94	3/95

Appendix E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Seat Belt System

Seat belts help decrease the possibility or severity of injury during accidents and sudden stops. Mazda recommends that the driver and passengers wear seat belts at all times.
The front seats have a lap/shoulder belt. These belts have retractors with inertia locks that keep them out of the way when not in use. The locks allow the belts to remain comfortable on users, but they'll lock in position during a collision.

The rear seat has lap/shoulder belts that have retractors with inertia locks for the door-side seats and a lap belt with manual adjustment for the center seat.

⚠ WARNING

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

⚠ WARNING

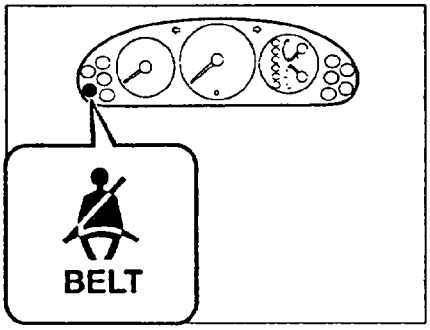
Damaged Seat Belts:
An accident can damage a seat belt in use. The belt webbing can be weakened and retractors and anchors can be bent or broken. Therefore a damaged seat belt may not provide adequate protection in a collision. Have a professional inspect all seat belt systems in use during an accident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

⚠ WARNING

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

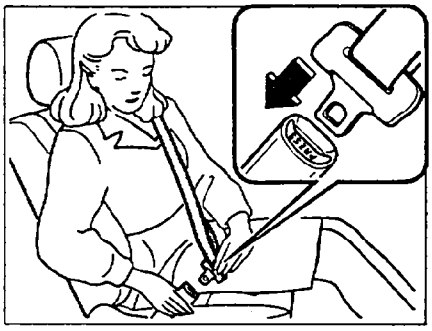
⚠ *WARNING*

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



■ Seat Belt Warning Light/Beep

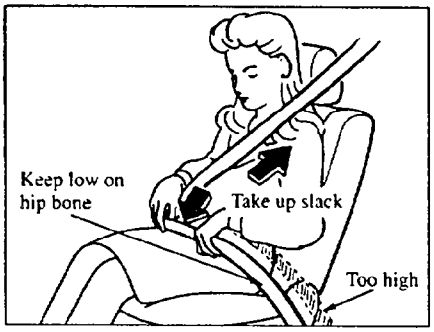
When you turn on the ignition before fastening your seat belt, a warning light will come on and a beep will sound (warning lights/beeps, page 4-25).



■ Front Seat Belts

To fasten:

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



⚠ WARNING

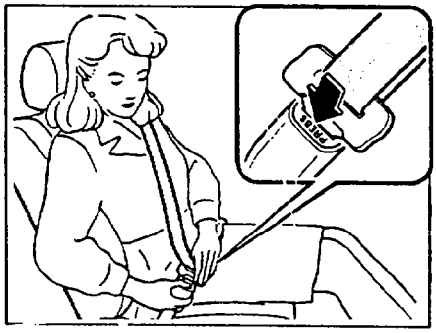
Positioning the Shoulder Portion of the Seat Belt:

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

⚠ WARNING

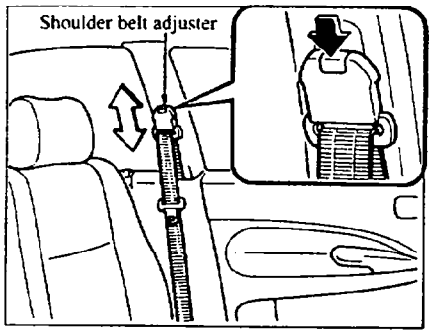
Positioning the Lap Portion of the Seat Belt:

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



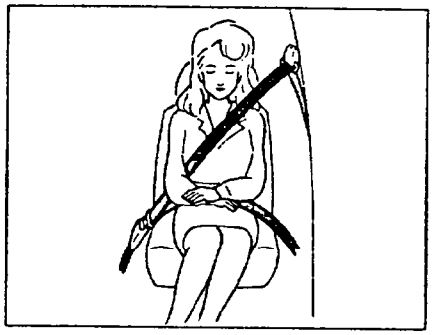
To unfasten:

Depress the buckle release.



▼ Shoulder belt adjuster

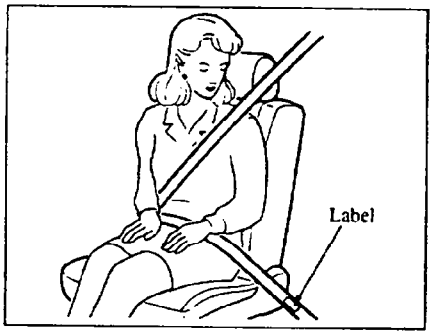
This adjusts the shoulder belt angle for a more comfortable fit. Simply push the button, move it to the desired position, and then release it. Make sure the adjuster is locked.



⚠ *WARNING*

Positioning the Shoulder Portion of the Seat Belt:

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



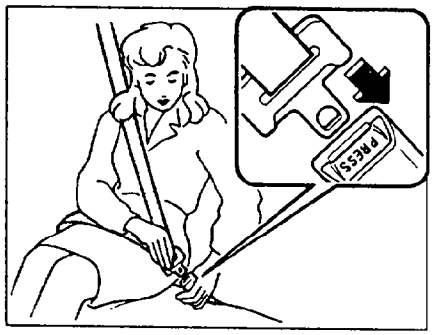
■ Seat Belt Caution Label

A caution label is inside the sleeve of each lap belt. If a belt is used in an accident, the stress will cause this label to be pulled from the sleeve.

This indicates that **the seat belt must be replaced.**

Also, if the seat belt undergoes excessive stress at any time, the belt's webbing, metal fittings, and anchor bolt may be damaged. The damage may not be apparent, so the

seat belt should be replaced after this kind of stress, even if the label is not exposed.



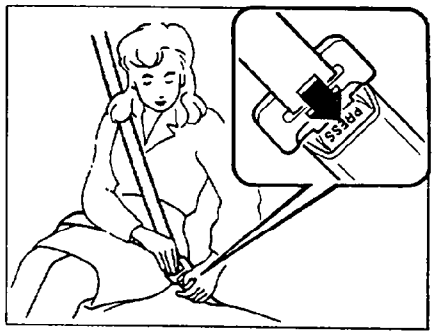
■ **Rear Seat Belts**

▼ **Lap/shoulder belt**

To fasten:

1. Grasp the tongue plate and pull it to the desired length.
2. Insert this plate into the buckle until you hear a click.

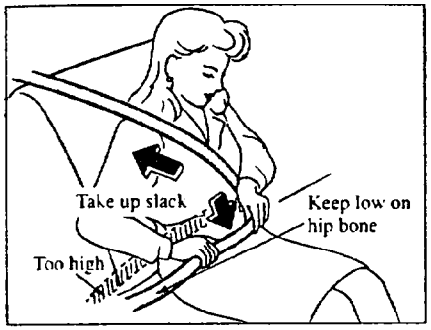
The retractor will take up excess belt and maintain tension.



To unfasten:

Depress the button on the buckle.

NOTE
If a belt does not fully retract, inspect it for kinks and twists.



⚠ WARNING

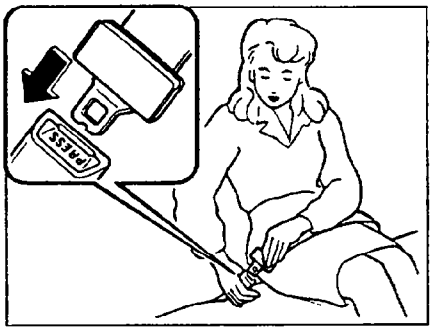
Positioning the Shoulder Portion of the Seat Belt:

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

⚠ WARNING

Positioning the Lap Portion of the Seat Belt:

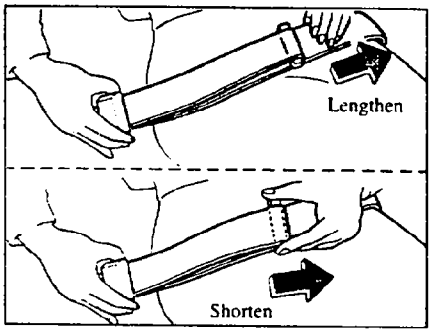
The lap portion of the seat belt worn too high can be dangerous. In a collision, this would concentrate the impact force directly on the abdominal area, causing serious injury. Wear the lap portion of the belt snugly and as low as possible.



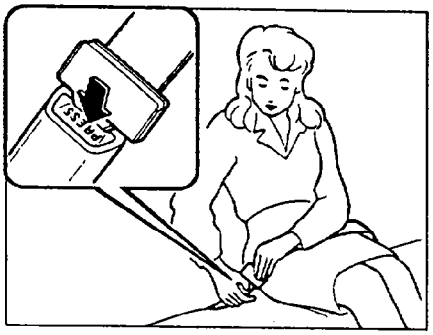
▼ Lap belt

To fasten:

1. Pull the tongue to the desired length.
2. Insert it into the buckle until you hear a click.

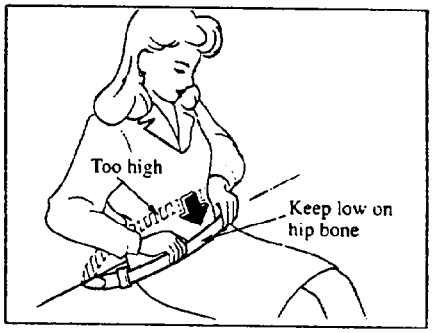


3. To lengthen the belt, hold the tongue at a right angle to the webbing and pull; to shorten, pull the loose end of the webbing.



To unfasten:

Depress the button on the buckle.



⚠ *WARNING*

Wearing the Lap Belt:

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