REPORT NUMBER: CAL-91-N01

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

GENERAL MOTORS CORPORATION
1992 OLDSMOBILE 88 ROYALE
4-DOOR SEDAN

NHTSA NUMBER: MN0100

CALSPAN TEST NUMBER: 7946-1

CALSPAN CORPORATION
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September 6, 1991

FINAL REPORT

PREPARED FOR:

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

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16. Abstract

A frontal load cell barrier test of a 1992 Oldsmobile 88 Royale 4-Door Sedan was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York of September 6, 1992.

The impact speed was 35.2 mph and the ambient temperature at the barrier face at the time of impact was 82°F. The maximum post-test vehicle crush was 27.8 inches. The test vehicle was equipped with a 3 point continuous belt system at each of the front outboard seating positions. The test vehicle was also equipped with a driver side airbag as a supplemental restraint device.

With regard to FMVSS 208 "Occupant Crash Protection", injury criteria, both the driver and passenger dummies appear to comply with the maximum head, chest and femur requirements.

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Section 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 90 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-02121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph requirements.

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

Section 2

SUMMARY OF TEST NUMBER MN0100

A load cell barrier consisting of 36 load cells was impacted by a 1992 Oldsmobile 88 Royale 4-Door Sedan at a velocity of 35.2 mph. The test was performed at the Calspan Corporation Advanced Technology Center on September 6, 1991. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

Two Part 572, 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. 245) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 83 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Vehicle accelerometer #4, located on the bottom of the engine, did not record accurately. Load cell D1 did not record accurately. This load cell was not used in the load cell sums.

The driver's head struck the airbag; the HIC was 472.7. The maximum chest deceleration over 3 milliseconds was 48.6 g's and femur loads were 1074.0 and 1314.7 pounds.

The right front passenger's HIC was 828.8 and maximum chest deceleration over 3 milliseconds was 47.3 g's. Femur loads were 1132.2 and 1137.1 pounds.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1992 Oldsmobile 88 Royale 4-Door Sedan

NHTSA Test No.: MN0100 VIN.: 1G3HN53L4NH311110

Body Color: Silver Date of Manufacture: 6/91

Engine: 6 Cylinders; __ C.I.D.; 3.8 Liters; - CC

✓ Gas; - Diesel; - Turbocharged

- Longitudinal; ✓ Transverse

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

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

Date Received: 8-6-81 Odometer Reading: 23 mi.

✓ A/C; ✓ P/S; ✓ P/B; ✓ P/wdo;

✓ Tilt Wheel - P/seats; - Cruise Control

Type of Occupant Restraint: 3 point belt system with driver side airbag

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 35 psi, Rear 35 psi

Recommended Tire Size: P205/70R15

Recommended Cold Tire Pressure: Front 30 psi, Rear 30 psi

Tires on Vehicle: P205/70R15 ;Manufacturer: General

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

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

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

Vehicle Capacity Weight (VCW) = 1076 lbs. (A)

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

Rated Cargo and Luggage
Weight (RCLW) A-B = 176 lbs.

GVWR 4522 lbs. GAWR: 2497 Front lbs. Rear 2025 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 1070 lbs. Right Rear = 580 lbs.

Left Front = 1070 lbs. Left Rear = 580 lbs.

TOTAL FRONT WEIGHT = 2140 lbs. (65 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1160 lbs. (35 % of Total Vehicle Weight)

TOTAL DELIVERED WEIGHT = 3300 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3300 lbs.)

VCW = Vehicle Capacity Weight (1076 lbs.)

DSC = Designated Seating Capacity (6)

RCLW = VCW - 150 (DSC) = 176 lbs.

Target Test Weight = UDW + RCLW + (2 dummies x 167 lbs./dummy)

Target Test Weight = 3810 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 166 POUNDS CARGO:

Right Front = 1140 lbs. Right Rear = 760 lbs.

Left Front = 1140 lbs. Left Rear = 760 lbs.

TOTAL FRONT WEIGHT = 2280 lbs. (60 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1520 lbs. (40 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3800 lbs.

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

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 28.6 LF 28.8 RR 28.3 LR 28.2

Test Attitude: RF 28.2 LF 28.7 RR 26.0 LR 26.4

Wheel Base: 110.7 in.; C.G. = 44.3 in. rearward of front wheel C/L

Remarks: 16.7 gallons of stoddard solution was placed in the fuel tank

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0°

Date of Test: September 6, 1991 Time of Test: 12:40

Ambient Temperature: 82 °F at impact area

Temperature in Occupant Compartment: 70°F

Windshield Molding Temperature: 70°F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 35.2 mph, secondary = 35.1 mph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 52 inches

Exiting Speed Trap: 12 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length:	Pre-test	= R	195.2	C_L	200.2	L 195.0
	Post-test	= R	168.8	C_L	172.4	L 169.9
	Crush	= R	26.4	C_L	27.8	L 25.1

Distance from front of test vehicle to point of impact:

R 18.3 C_L 16.4 L 17.1

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Air Bag	Top of Head-Glove Box Door
Chest	Air Bag	No Contact
Abdomen	No Contact	No Contact
Left Knee	Dash Panel	Lower Instrument Panel
Right Knee	Dash Panel	Lower Instrument Panel

Table 1

GENERAL TEST AND VEHICLE PARAMETER 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	-	-
Seat Shift (in.)	0.0	0.0	-	-

Glazing Damage

Backlight/Windshield Sustained stress fractures but remained intact

Other Notable Impact Effects: _____

_____

Section 3

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

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

II. OVR DATA

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

Table 2

DUMMY INJURY CRITERIA VALUES

NHTSA No.: MN0100 Vehicle: 1991 Oldsmobile 88 Royale 4-Door Sedan

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-49.3	-6.4	-18.6	49.5
Position #2 - Passenger	93.3	-6.8	51.9	102.0

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	49.2	-4.1	-8.6	48.6
Position #2 - Passenger	47.6	-12.8	13.2	47.3

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

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	1074.0	1314.7
Position #2 - Passenger	1132.2	1137.1

	MAXIMUM FORCE - SEAT BELT LOADS (lbs.)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	1197.4	-	494.1
Position #2 - Passenger	1650.5	562.7	-

	HEAD INJURY CRITERIA (HIC)			
	HIC	t_1 (SEC)	t_2 (SEC)	Average Acceleration t_1 TO t_2
Position #1 - Driver	472.7	.074640	.110520	44.4
Position #2 - Passenger	828.8	.085320	.12120	55.6

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: 1992 Oldsmobile 88 Royale

Vehicle NHTSA No.: MN0100 Test Date: 9/6/91

MAXIMUM VALUES	DRIVER DUMMY ID # 150	PASSENGER DUMMY ID # 245
Neck Load X	-192.5 lbs.	356.4 lbs.
Neck Load Y	52.7 lbs.	-27.2 lbs.
Neck Load Z	265.8 lbs.	634.1 lbs.
Neck Moment X	87.4 in.-lbs.	-81.1 in.-lbs.
Neck Moment Y	374.1 in.-lbs.	729.6 in.-lbs.
Neck Moment Z	88.5 in.-lbs.	34.6 in.-lbs.
Chest Deflection X (in.)	1.4 in.	1.5 in.
Time of Max. Occurance	108.5 mSec.	102.1 mSec.

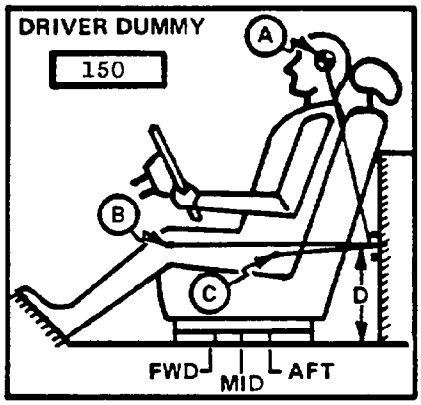
NOTE: All values listed must be occurring during primary impact event.

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

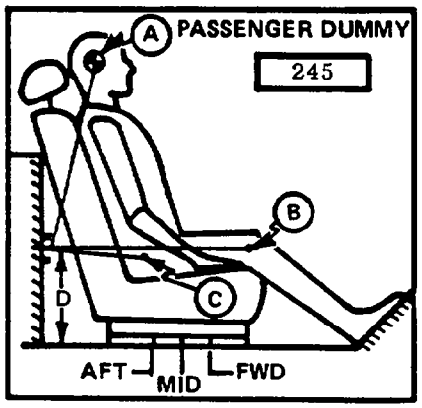
Test No.: MN0100 Vehicle: 1992 Oldsmobile 88 Royale

SEAT TYPE:	ADJUSTER TYPE:	SEAT BACK TYPE:
____ Bench	X Manual	X Fixed
____ Bucket	____ Power	____ Adjustable Reclining
X Split Bench		

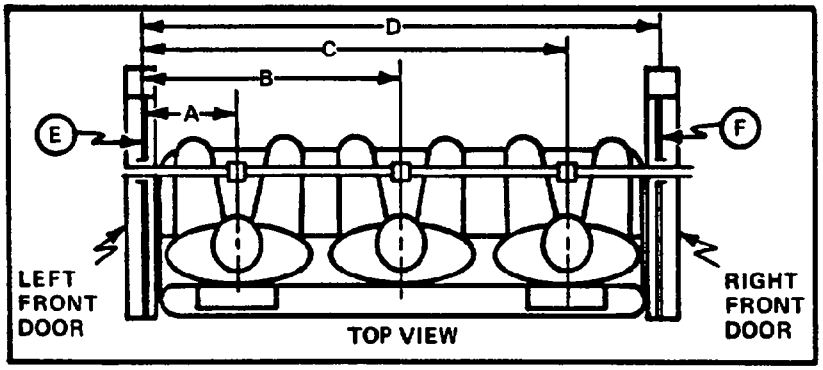


MEASUREMENT LOCATION

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



A = 20.3 in. 13 Degrees	A = 20.7 in. 12 Degrees
B = 24.2 in. 95 Degrees	B = 24.7 in. 97 Degrees
C = 10.7 in. 132 Degrees	C = 11.0 in. 130 Degrees
D = 13.6 in.	D = 13.6 in.



DUMMY ID

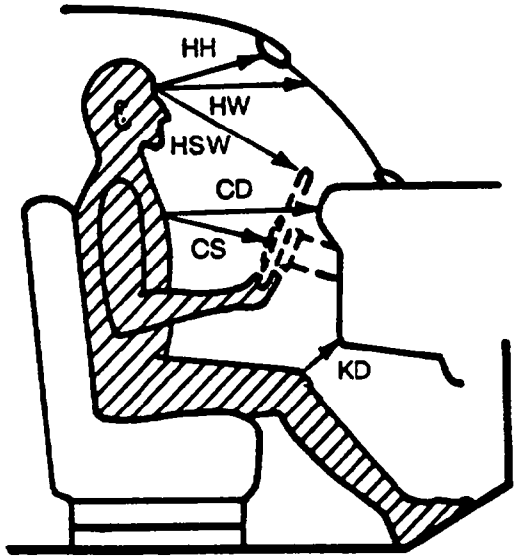
S/N 150 S/N 245

A	= Left Door to Driver Centerline	14.2 in.
B	= Left Door to Center Passenger Centerline	- in.
C	= Left Door to Right Passenger Centerline	44.0 in.
D	= Left Door to Right Door	59.0 in.
E,F	= Window Glass Height (Right and Left Must Be Equal)	10.0 in.

Figure 2

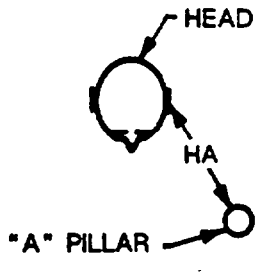
OCCUPANT CLEARANCE DIMENSIONS

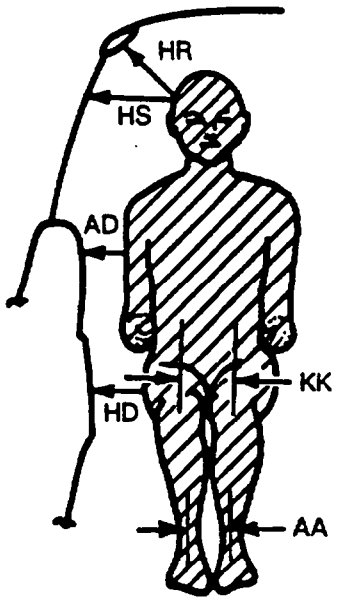
	DRIVER	PASSENGER
HH	13.4	13.5
HW	22.4	22.5
CD	19.0	19.7
CS	10.6	-
KDL	3.8	4.3
KDR	4.4	3.8
SA	Fixed	Fixed
TA	20°	20°
HSW	15.8	-



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

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

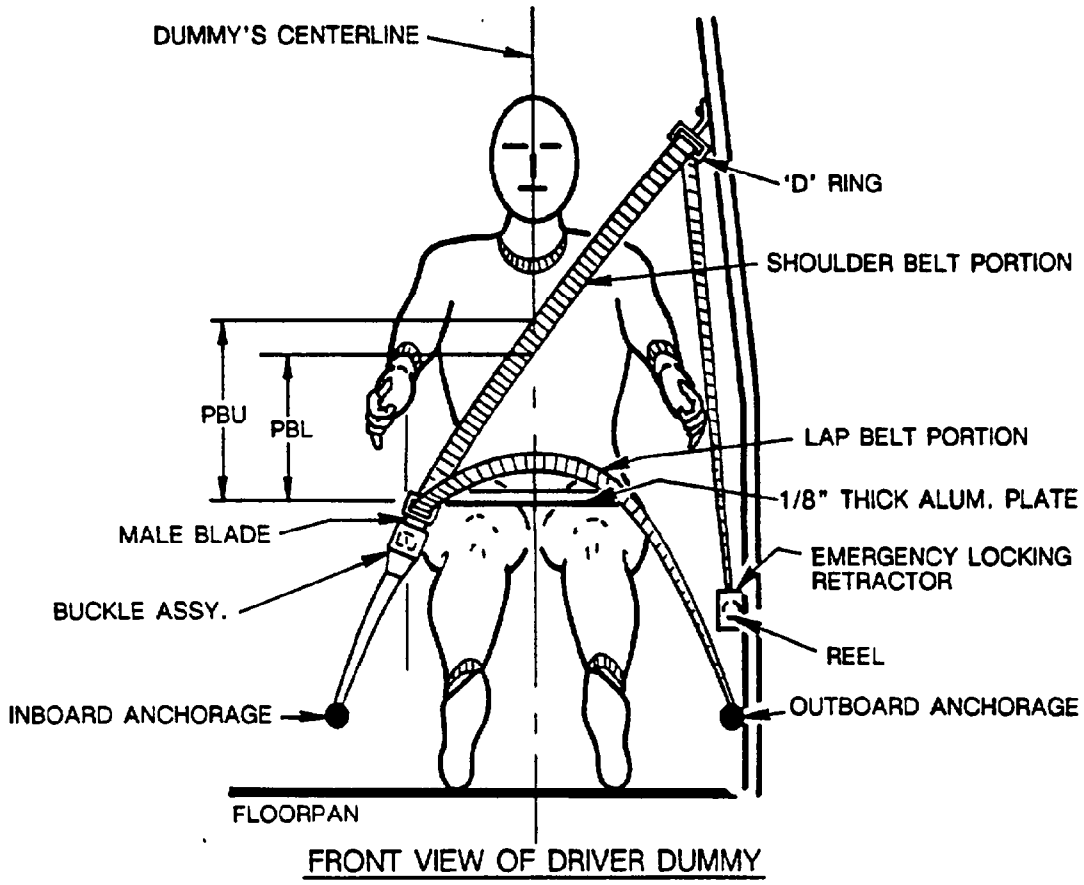




	DRIVER	PASSENGER
HR	7.8	7.7
HS	11.5	11.8
AD	5.4	5.7
HD	5.6	5.7
KK	9.0	7.5
HA	19.3	19.0
AA	11.3	7.0

Figure 3

SEAT BELT POSITIONING DATA



FRONT VIEW OF DRIVER DUMMY

	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	13.5	13.5
PBL -- Top surface of alum. plate to belt lower edge	10.5	10.5
LAP BELT TENSION	-	-
SHOULDER BELT TENSION	-	-

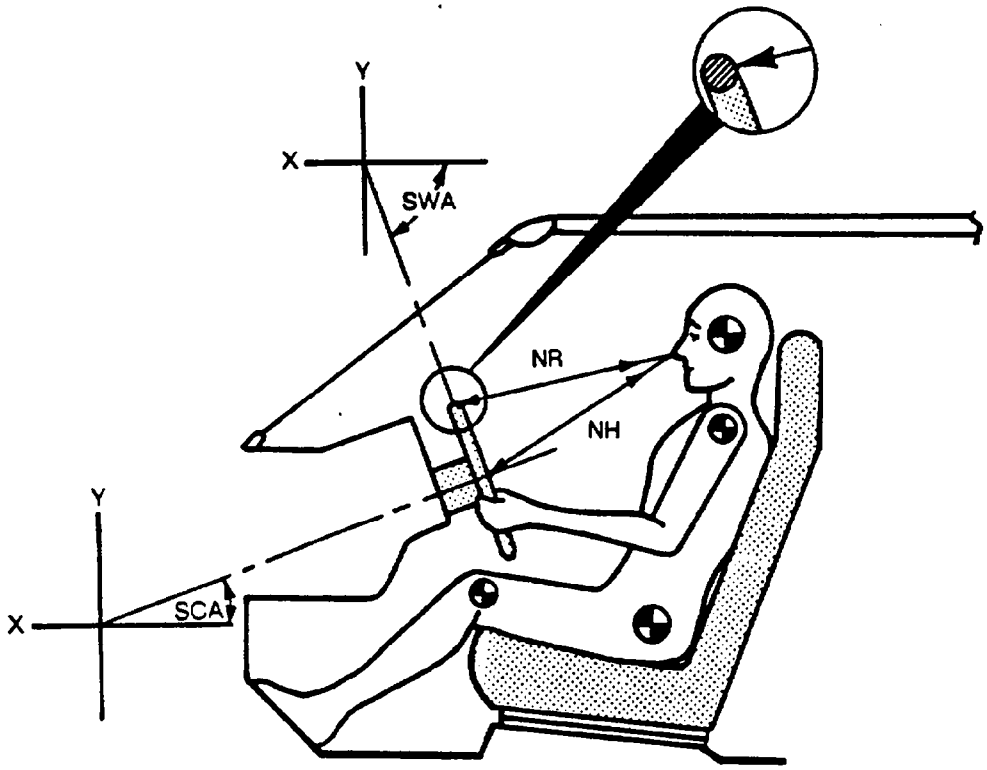
Table 4

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.	62.5"	60.5"
Shoulder belt length as measured on Part 572 Dummy.	35.5"	34.5"
Lap belt length as measured on Part 572 Dummy.	27.0"	26.0"
SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis.	2.5"	3.5"
As determined mechanically.	3.0"	4.3"
LAP BELT SPOOL-OFF DATA		
As determined mechanically.	1.0"	1.5"
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	.72 in/ft	.67 in/ft
Measured mechanically	0 in/ft	0 in/ft

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



LEFT SIDE VIEW

	MEASUREMENTS	
NR -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	14.0	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	14.7	Inches
SCA -- Angle of steering column relative to the horizontal X axis	20	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-70	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

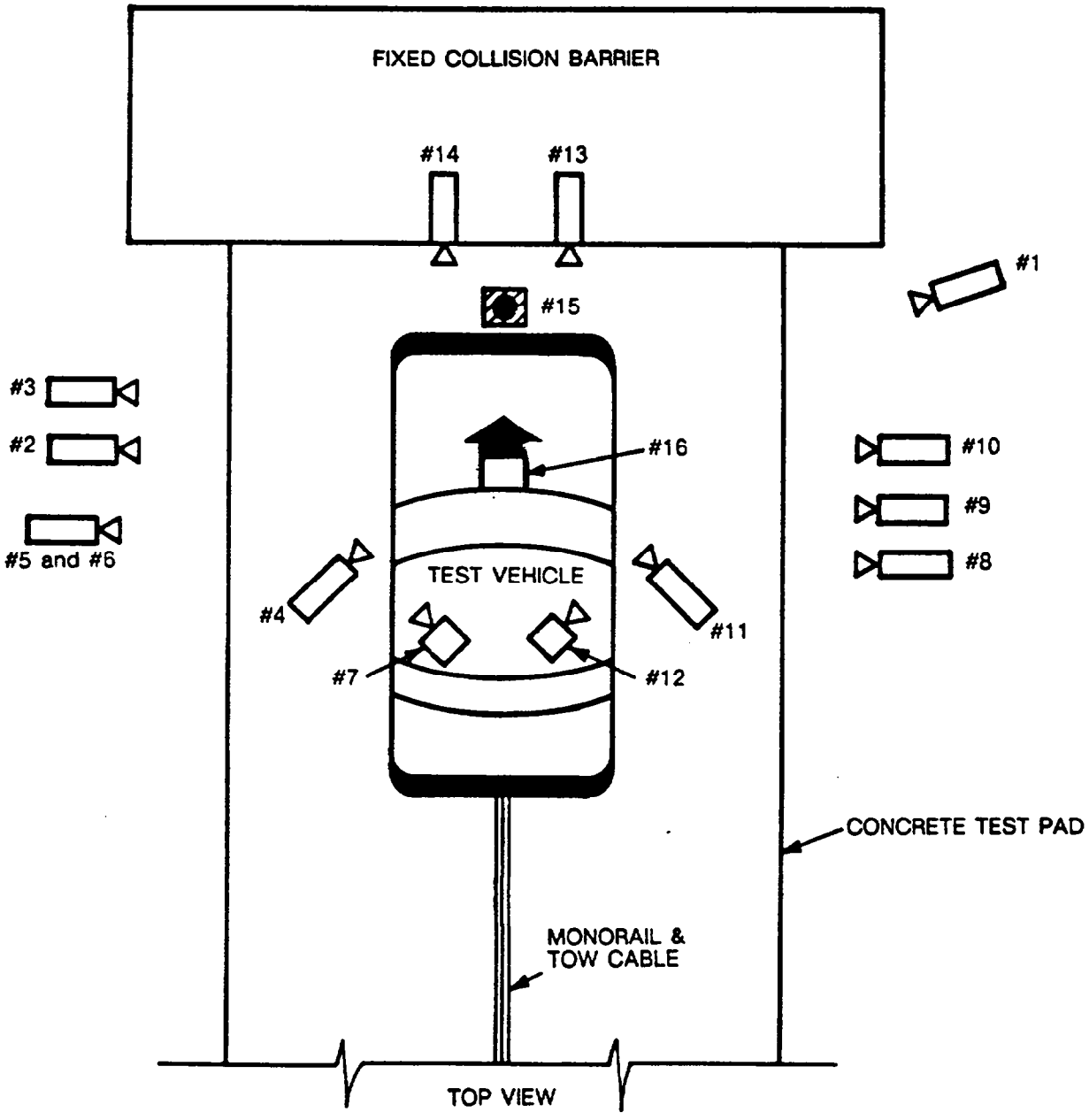


Table 5

HIGH-SPEED CAMERA LOCATIONS

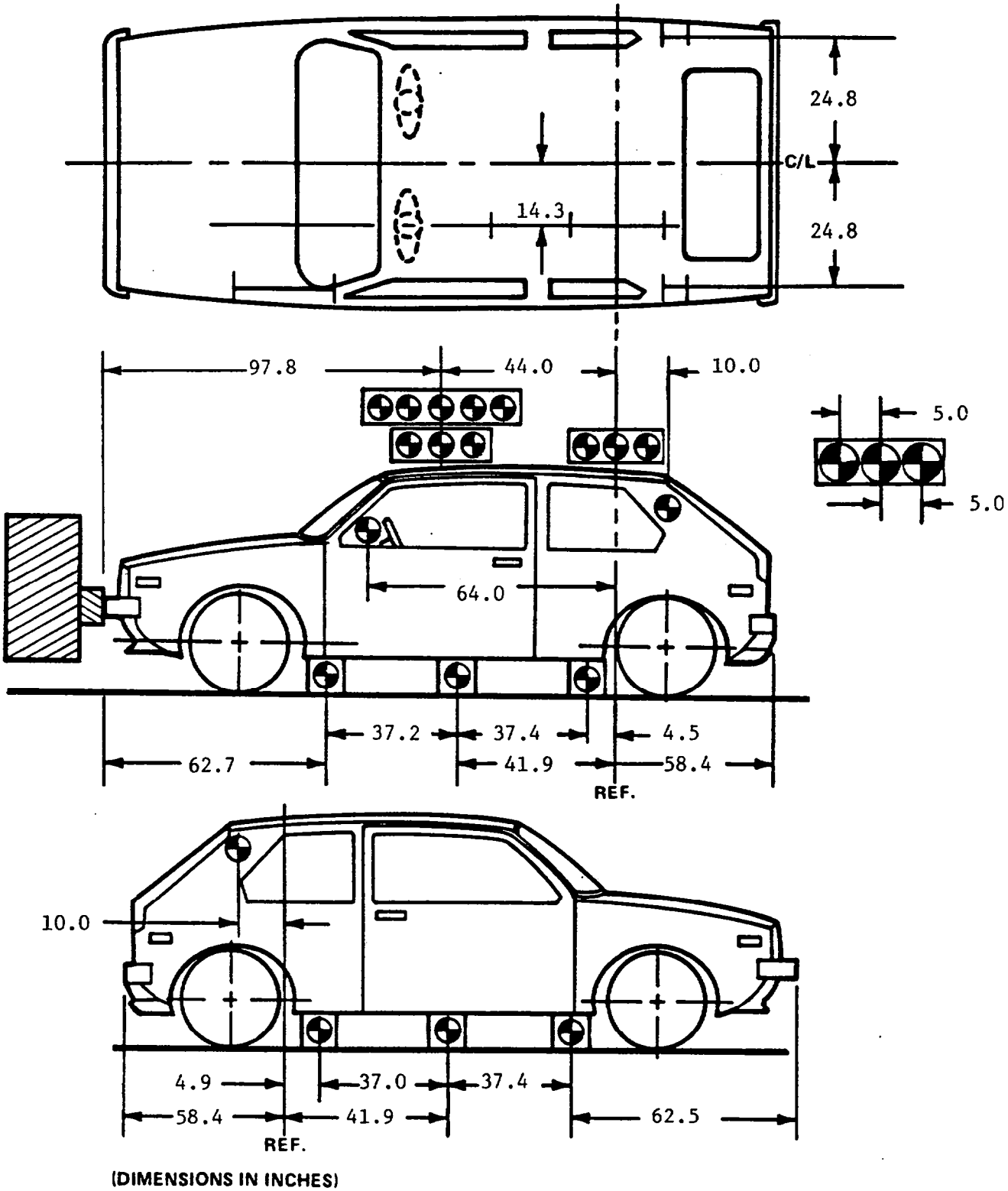
Test No. MN0100 Vehicle: 1992 Oldsmobile 88 Royale 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (in)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	238	75	41	-5	220	13	540
3	Left Side View	325	40	42	-3	307	25	570
4	Driver and Interior View	117	109	70	-14	99	13	650
5	Steering Column (Bottom)	290	90	46	-4	272	25	540
6	Steering Column (Top)	290	90	70	-9	272	25	520
7	Left Belt	-	-	-	-	-	8	580
8	Overall Right Side	253	74	42	-2	235	13	610
9	Right Side View	315	41	41	-2	297	25	600
10	Right Passenger View	332	72	55	-4	314	35	580
11	Passenger and Interior View	121	108	68	-17	103	25	490
12	Right Belt	-	-	--	-	-	8	N/A
13	Passenger Front View	24	-5	72	-35	-	13	540
14	Driver Front View	24	-5	72	-36	-	13	450
15	Windshield View	0	0	120	-45	-	13	540
16	Pit View of Engine	0	34	-120	90	-	13	770

*X = film plane to monorail centerline
Y = film plane to impact location
Z = film plan to ground
** = referenced to horizontal plane

Figure 6

VEHICLE TARGET LOCATIONS

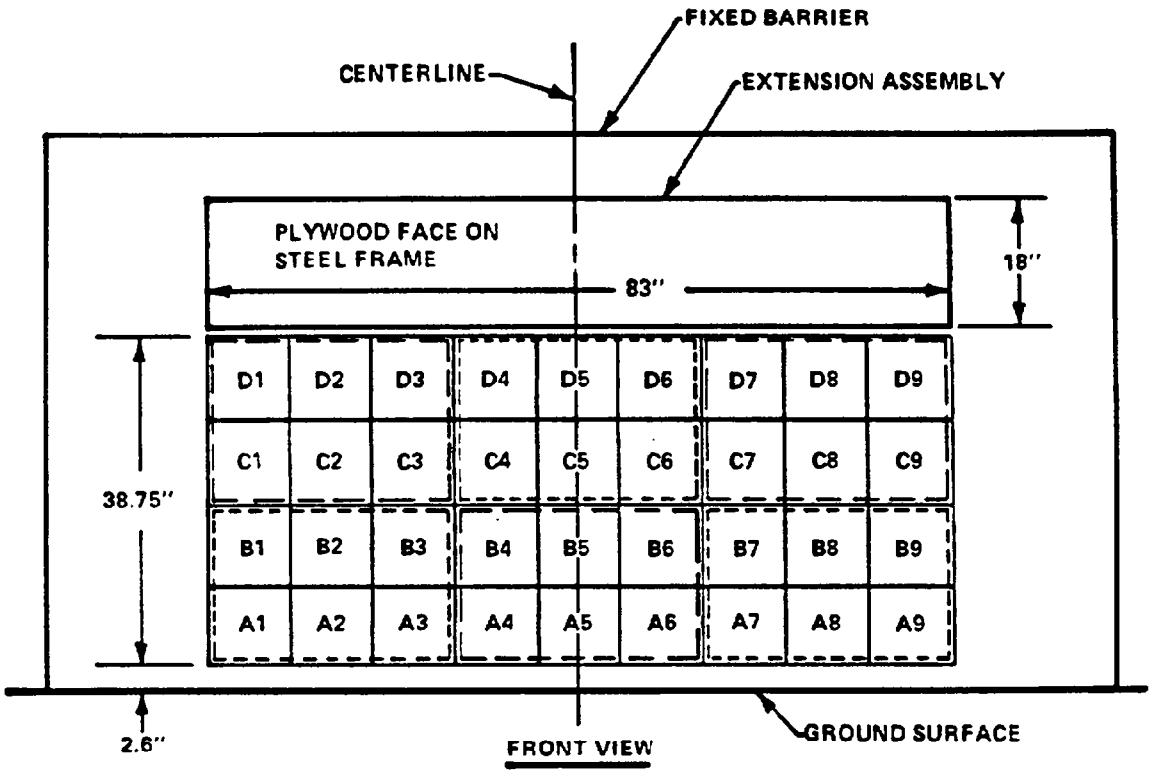


(DIMENSIONS IN INCHES)

Figure 7

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

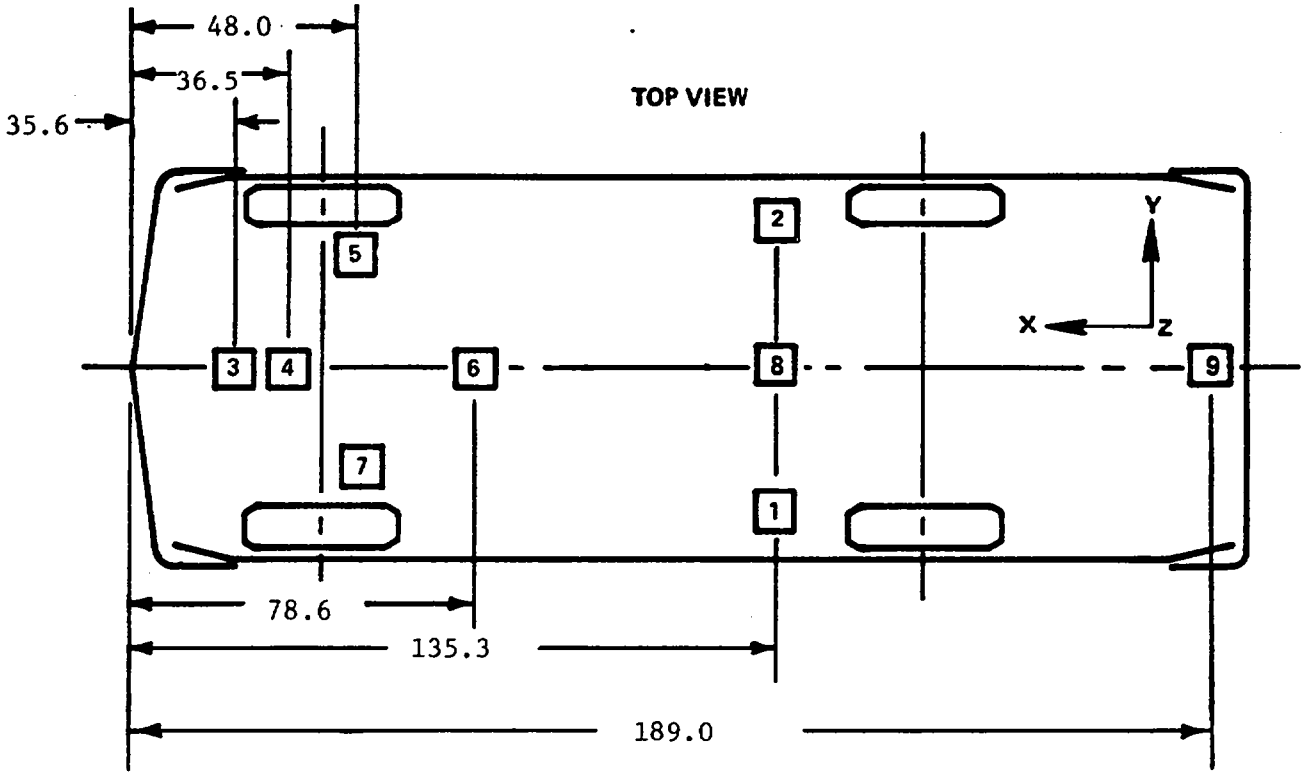
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

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 8

VEHICLE ACCELEROMETER LOCATIONS



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

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

Figure 9

TEST VEHICLE MEASUREMENTS

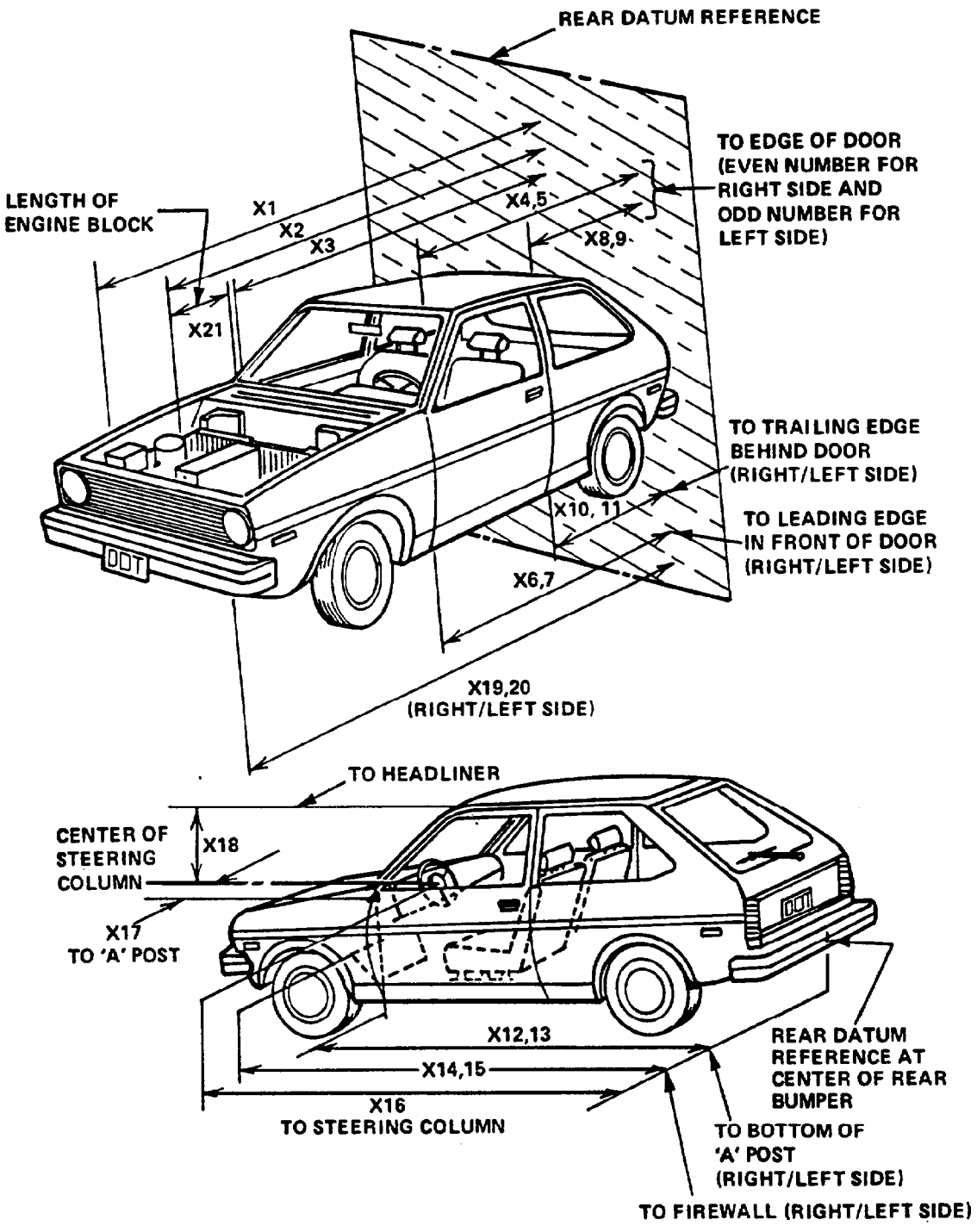


Table 6

VEHICLE MEASUREMENTS

		All Dimensions in Inches		
No.		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	200.2	172.4	27.8
X2	Rear Surface of Vehicle to Front of Engine	174.2	155.6	18.6
X3	Rear Surface of Vehicle to Firewall	145.2	142.8	2.4
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	131.3	130.8	0.5
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	131.4	130.8	0.6
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	133.3	132.9	0.4
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	133.2	132.7	0.5
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	91.8	90.8	1.0
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	92.0	90.8	1.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	92.0	91.7	0.3
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	91.8	91.5	0.3
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	133.5	132.8	0.7
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	133.5	132.9	0.6
X14	Rear Surface of Vehicle to Firewall, Right Side	143.2	141.4	1.8
X15	Rear Surface of Vehicle to Firewall, Left Side	143.6	141.7	1.9
X16	Rear Surface of Vehicle to Steering Column	114.0	116.0	-2.0
X17	Center of Steering Column to "A" Post	16.5	16.2	0.3
X18	Center of Steering Column to Headliner	17.2	16.5	0.7
X19	Rear Surface of Vehicle to Right Side of Front Bumper	195.2	168.8	26.4
X20	Rear Surface of Vehicle to Left Side of Front Bumper	195.0	169.9	25.1
X21	Length of Engine Block	20.8	20.8	0.0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	121.6	120.1	1.5
CD	Rear Surface of Vehicle to Center of Dash Panel	122.6	121.1	1.5
LD	Rear Surface of Vehicle to Left Side of Dash Panel	121.5	119.9	1.6

Appendix A

PHOTOGRAPHS

PHOTOGRAPHS

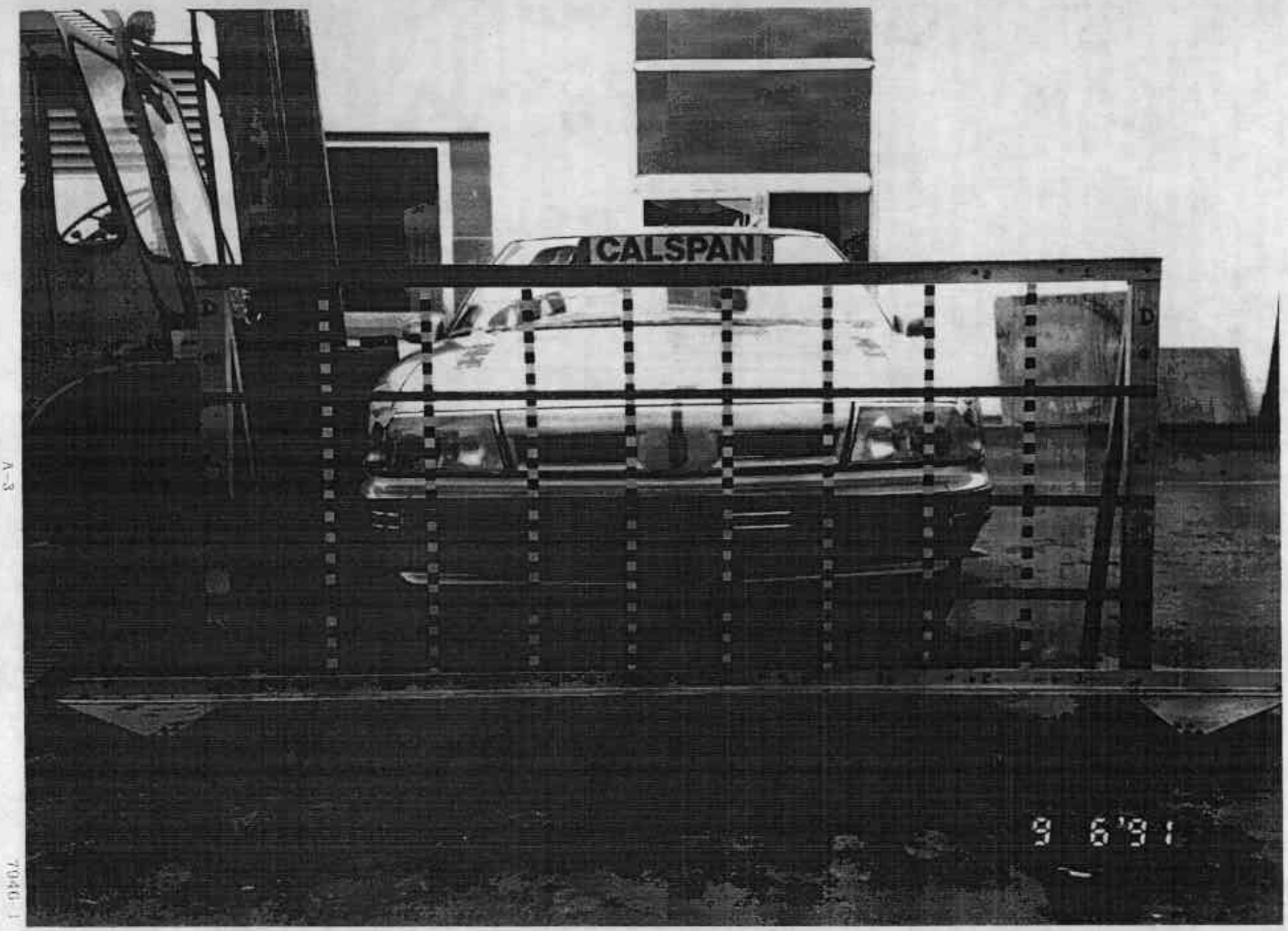


Figure A-1 LOAD CELL LOCATIONS

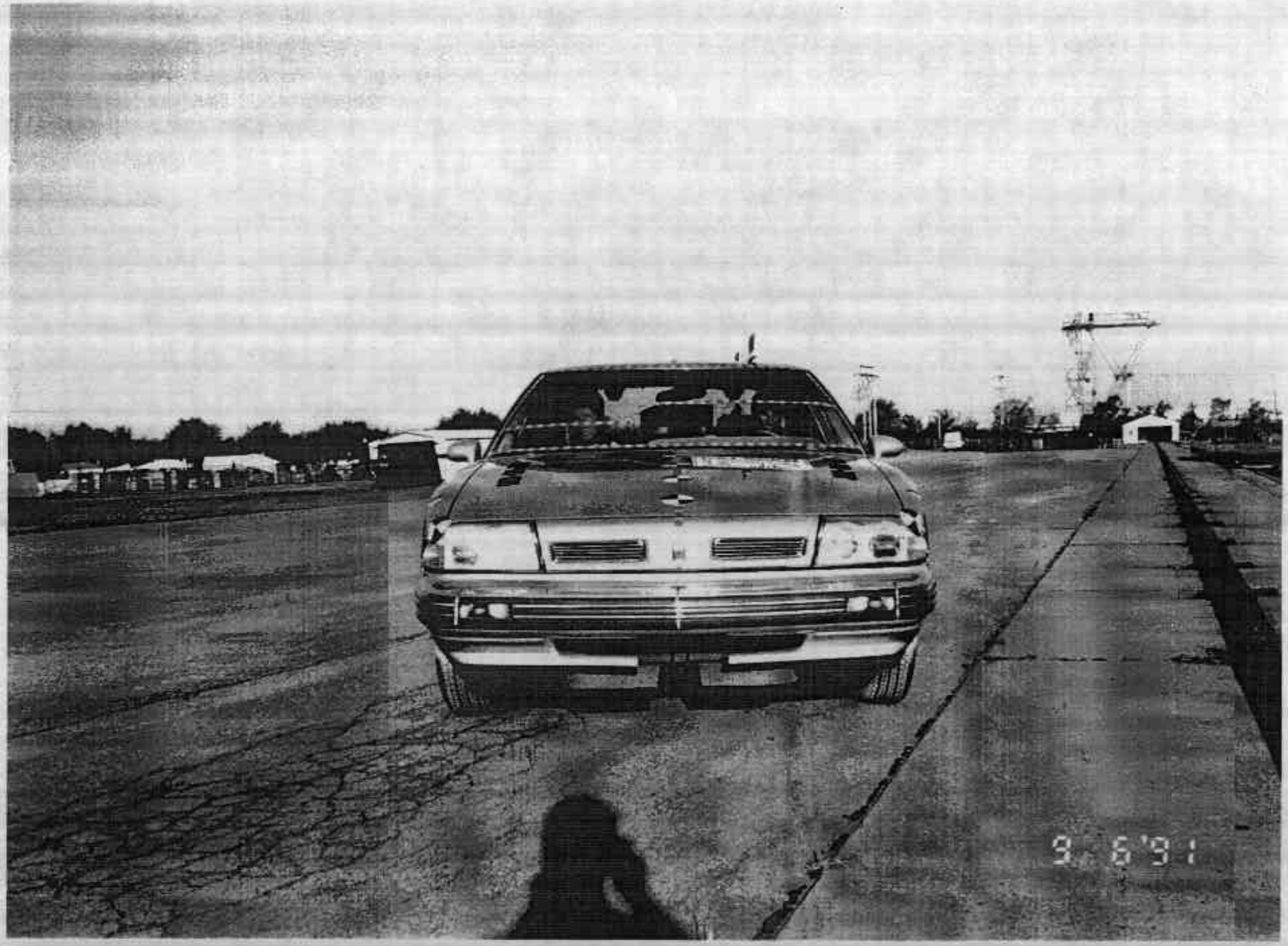


Figure A-2 PRE-TEST FRONT VIEW

7926-1

Figure A-3 POST TEST FRONT VIEW

A-6

79-16-1

Figure A-4 PRE-TEST LEFT SIDE VIEW

Figure A-8 POST TEST LEFT SIDE VIEW

Figure A-6 PRE-TEST RIGHT SIDE VIEW

Figure A-7 POST-TEST RIGHT SIDE VIEW

Figure A-6 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

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

7946-1

A-13

7260-1

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

7048-1

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

Figure A-12 PRE-TEST WINDSHIELD VIEW

A-15

7046-1

Figure A-13 POST-TEST WINDSHIELD VIEW

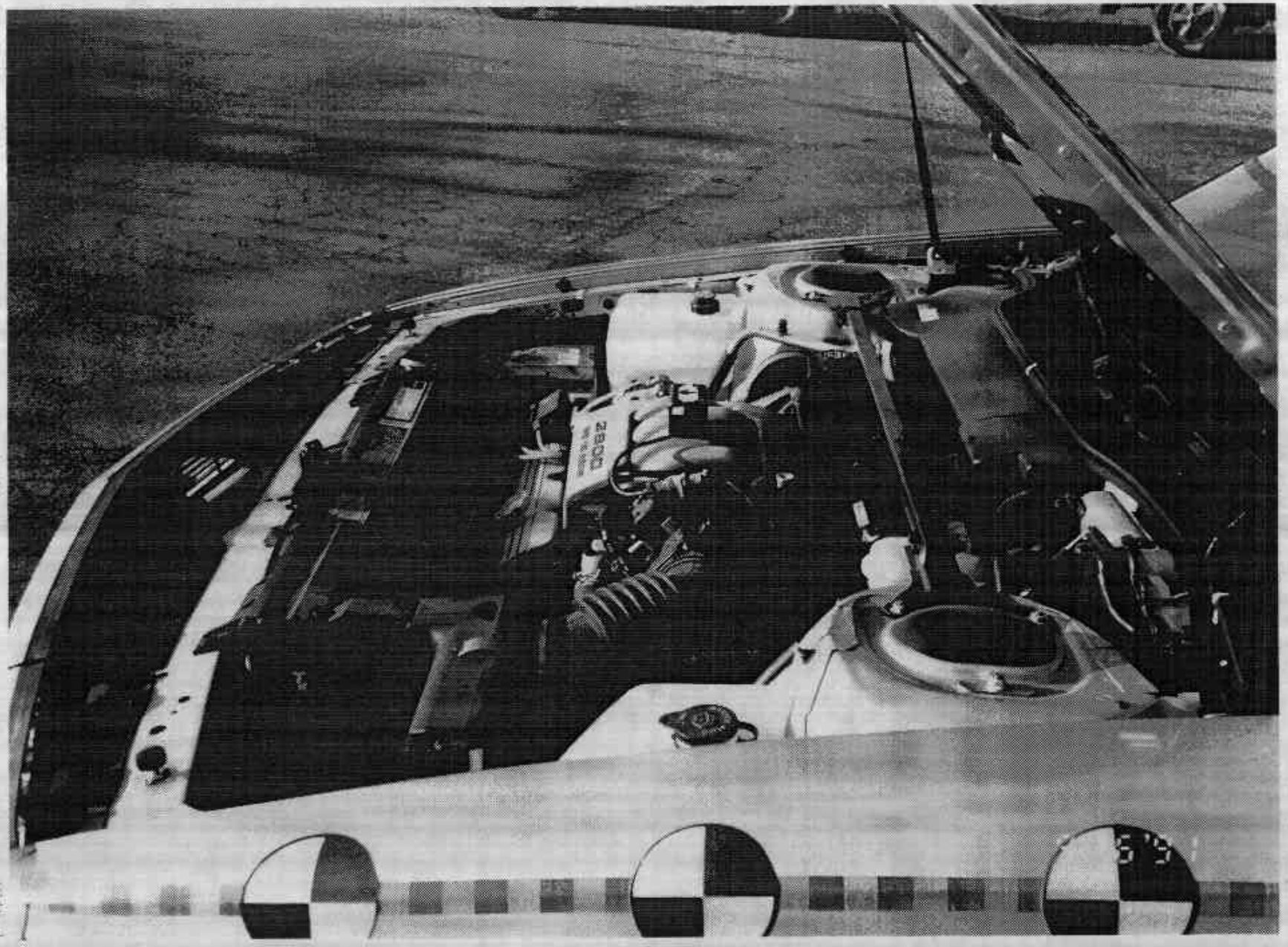


FIGURE C-14 PRE-TEST ENGINE COMPARTMENT VIEW

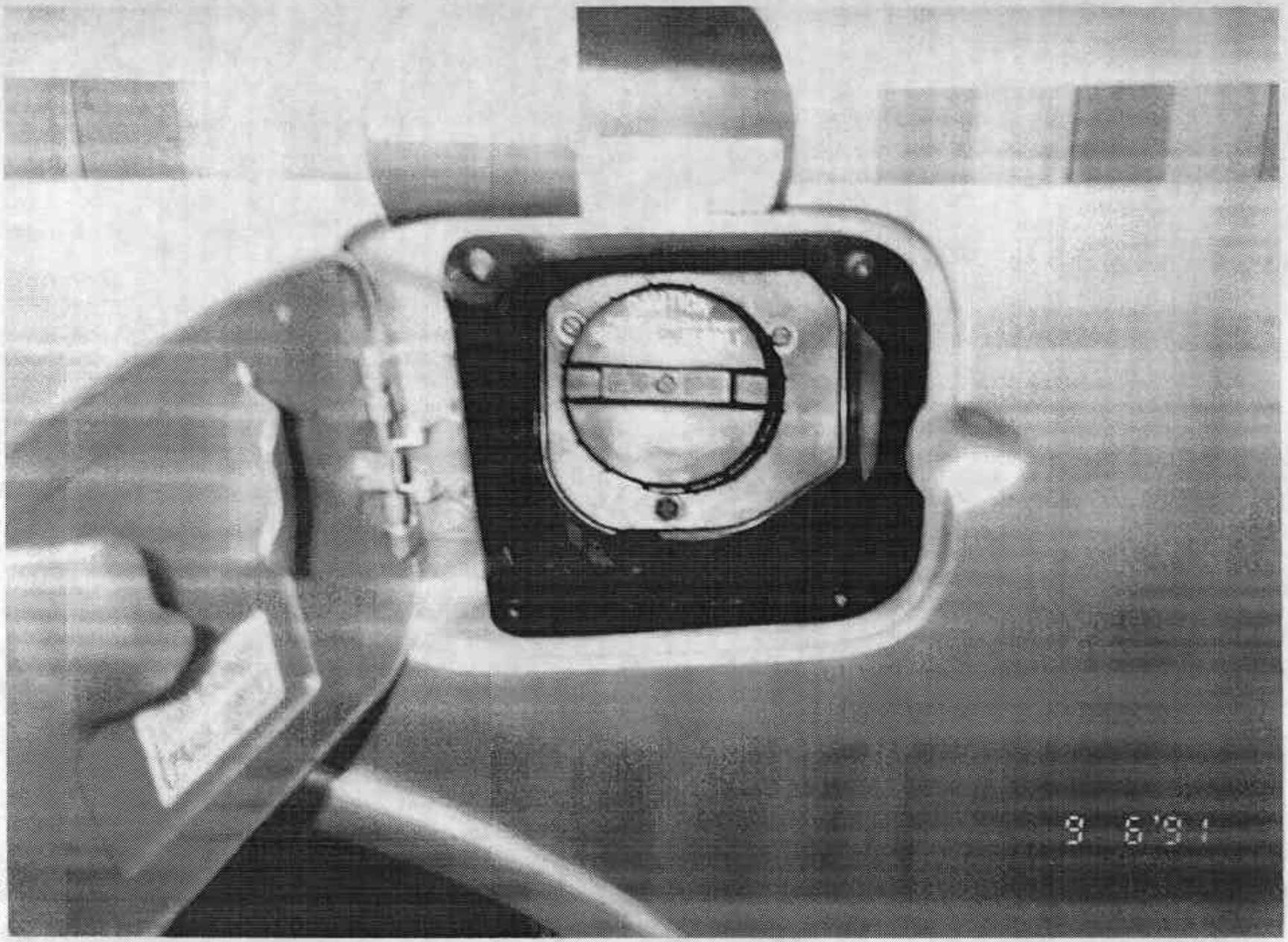


Figure A-15 FUEL CAP VIEW

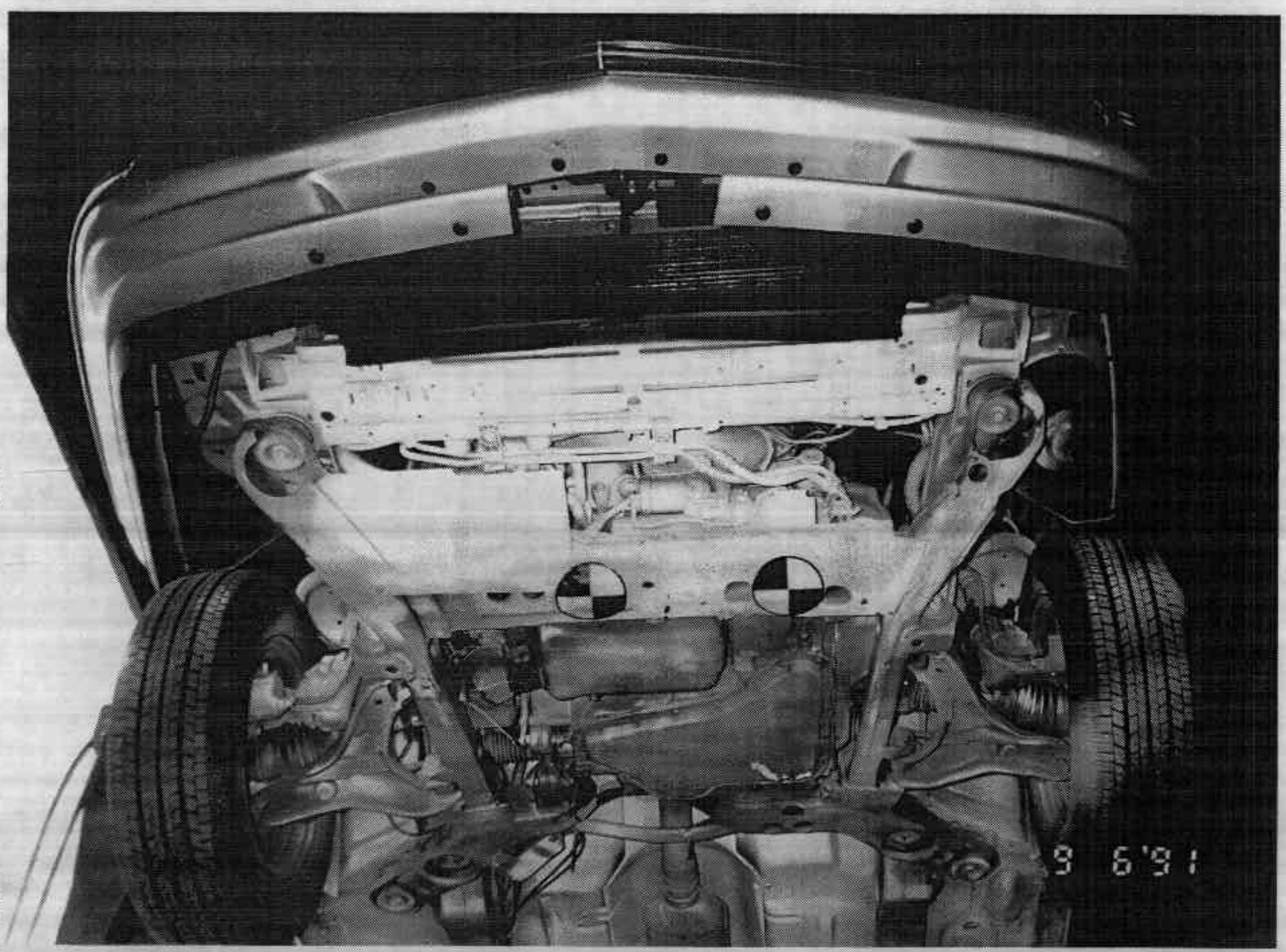


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

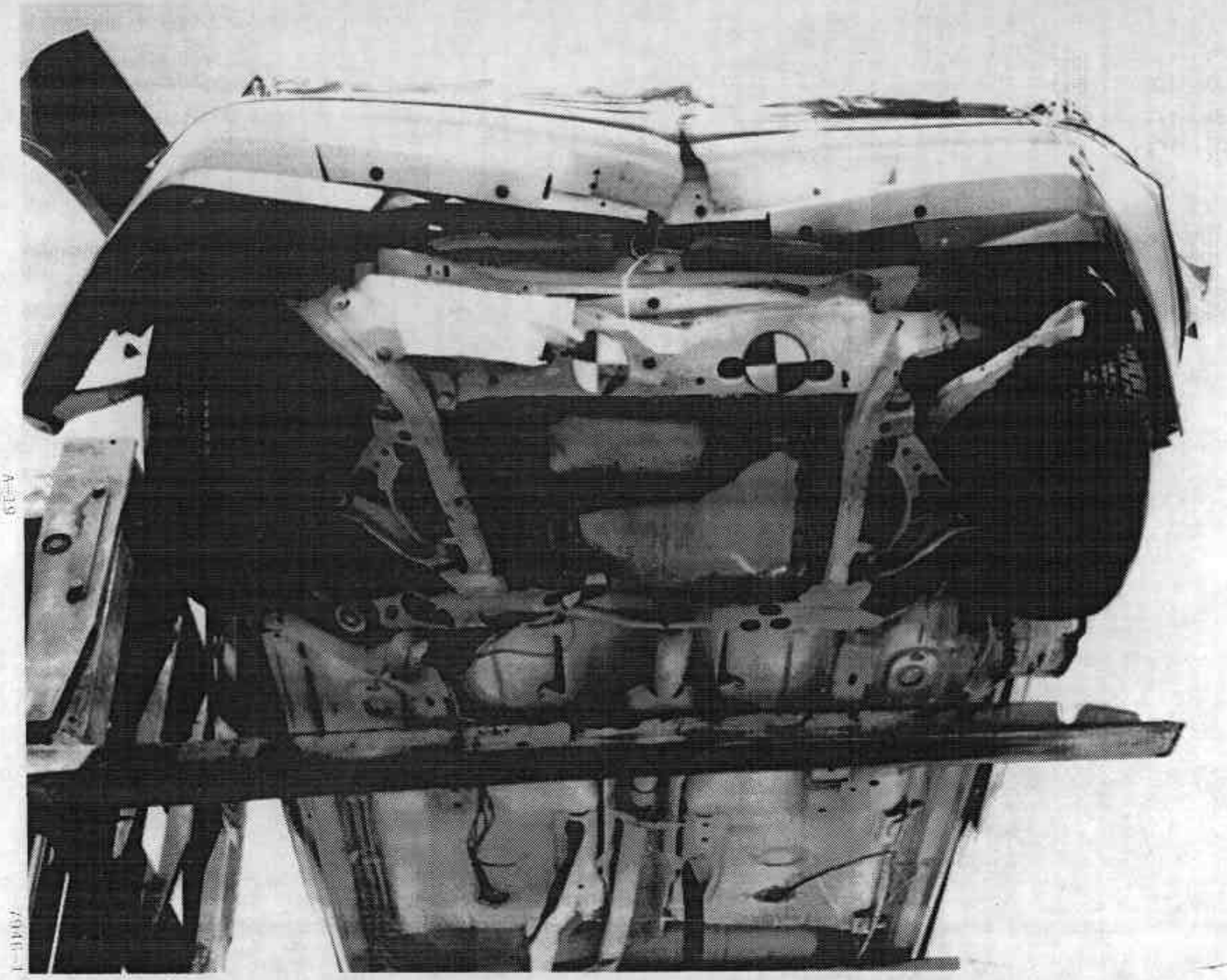


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

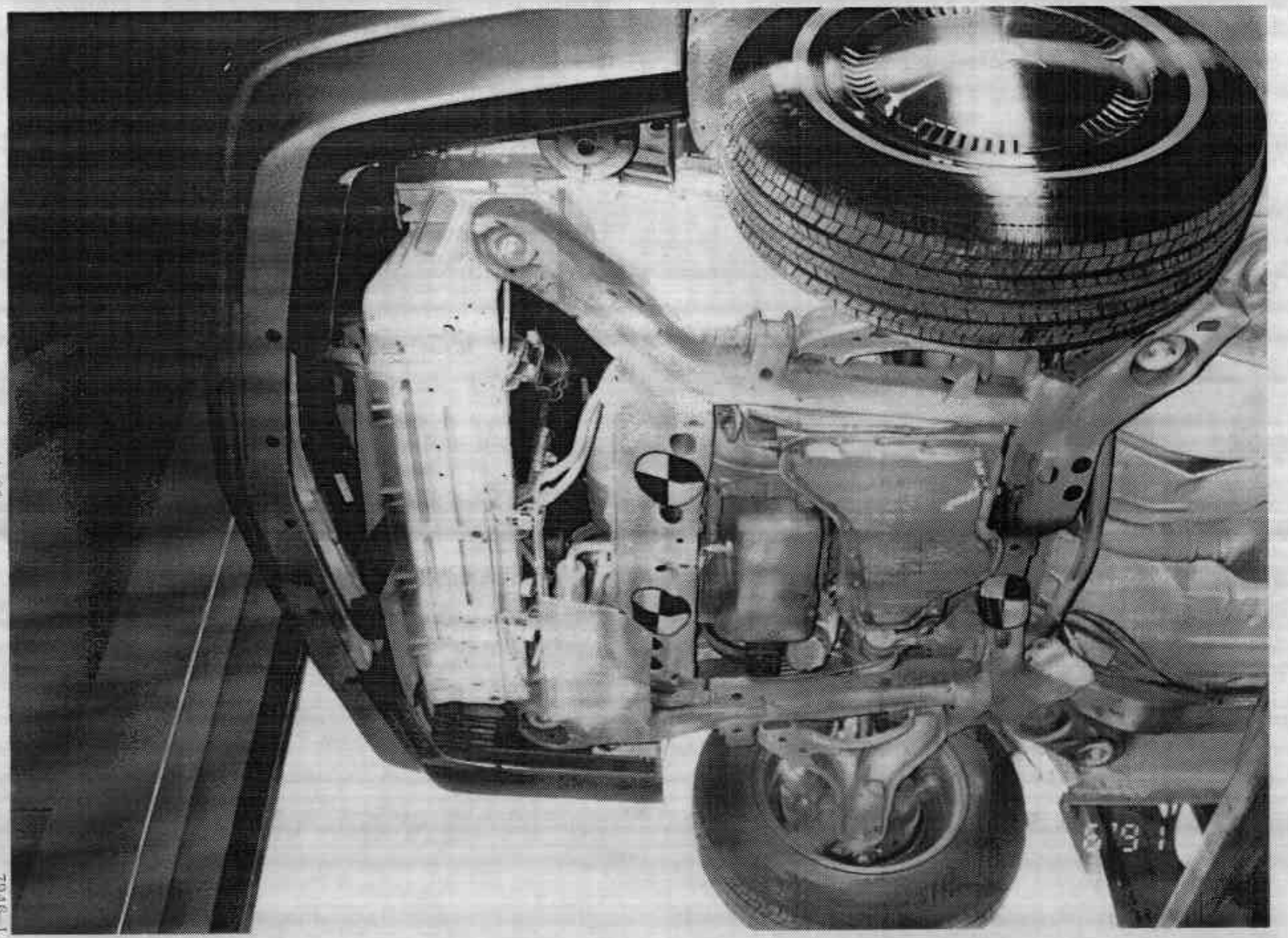


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

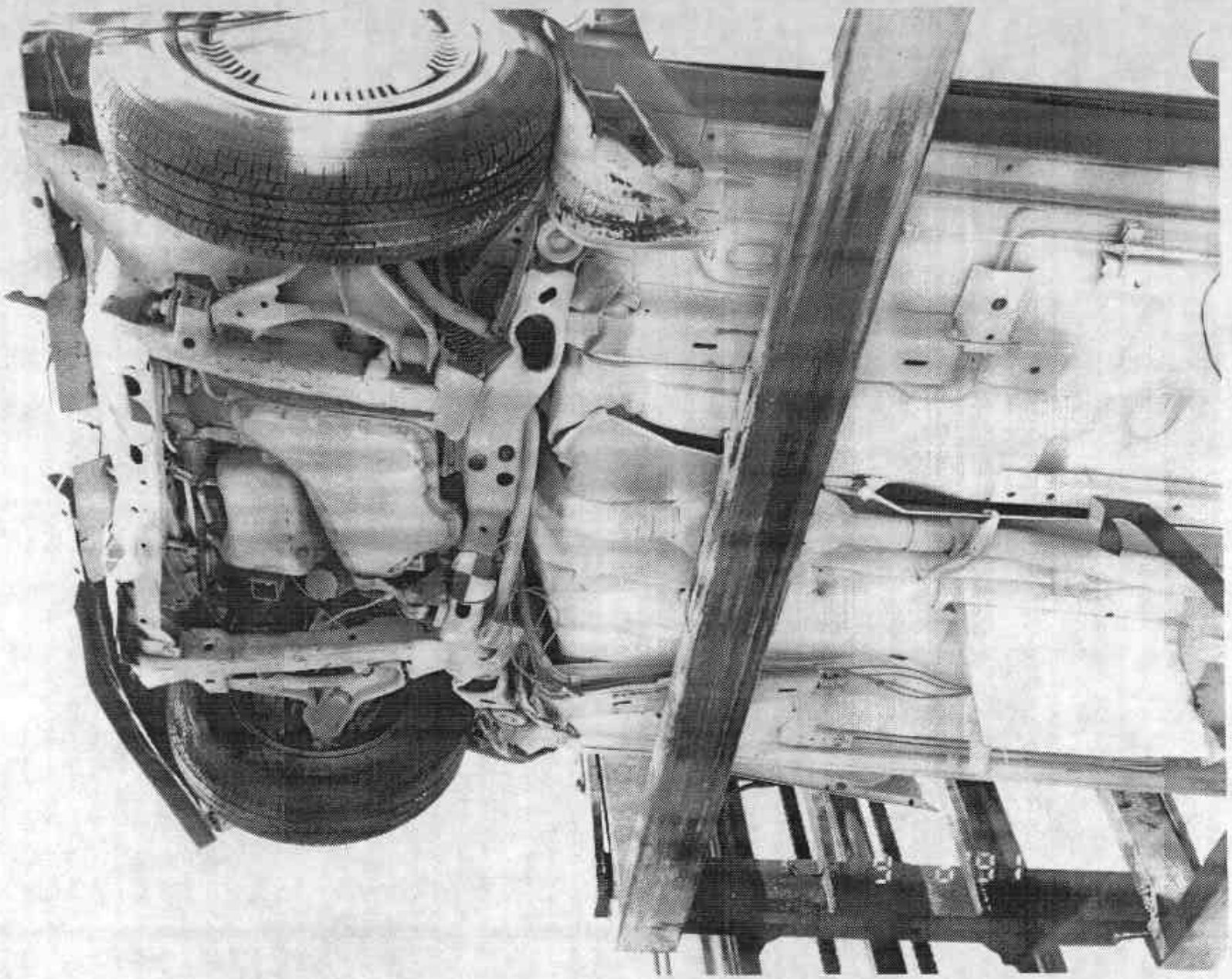


Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW

Figure A-20 PRE-TEST REAR UNDERBODY VIEW

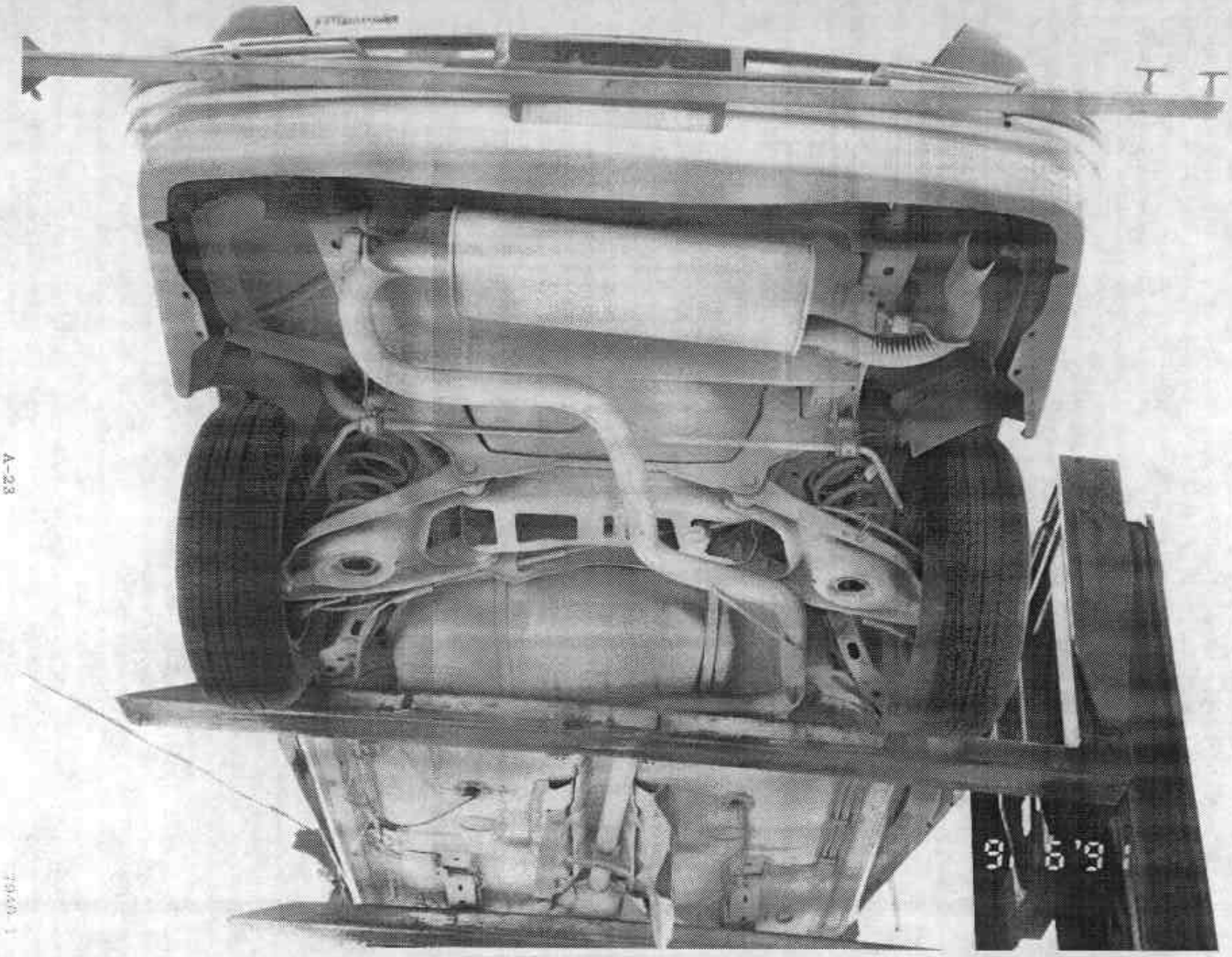


Figure A-21 POST-TEST REAR UNDERBODY VIEW

Figure A-22 PRE-TEST DRIVER POSITION VIEW

Figure A-23. POST-TEST DRIVER POSITION VIEW

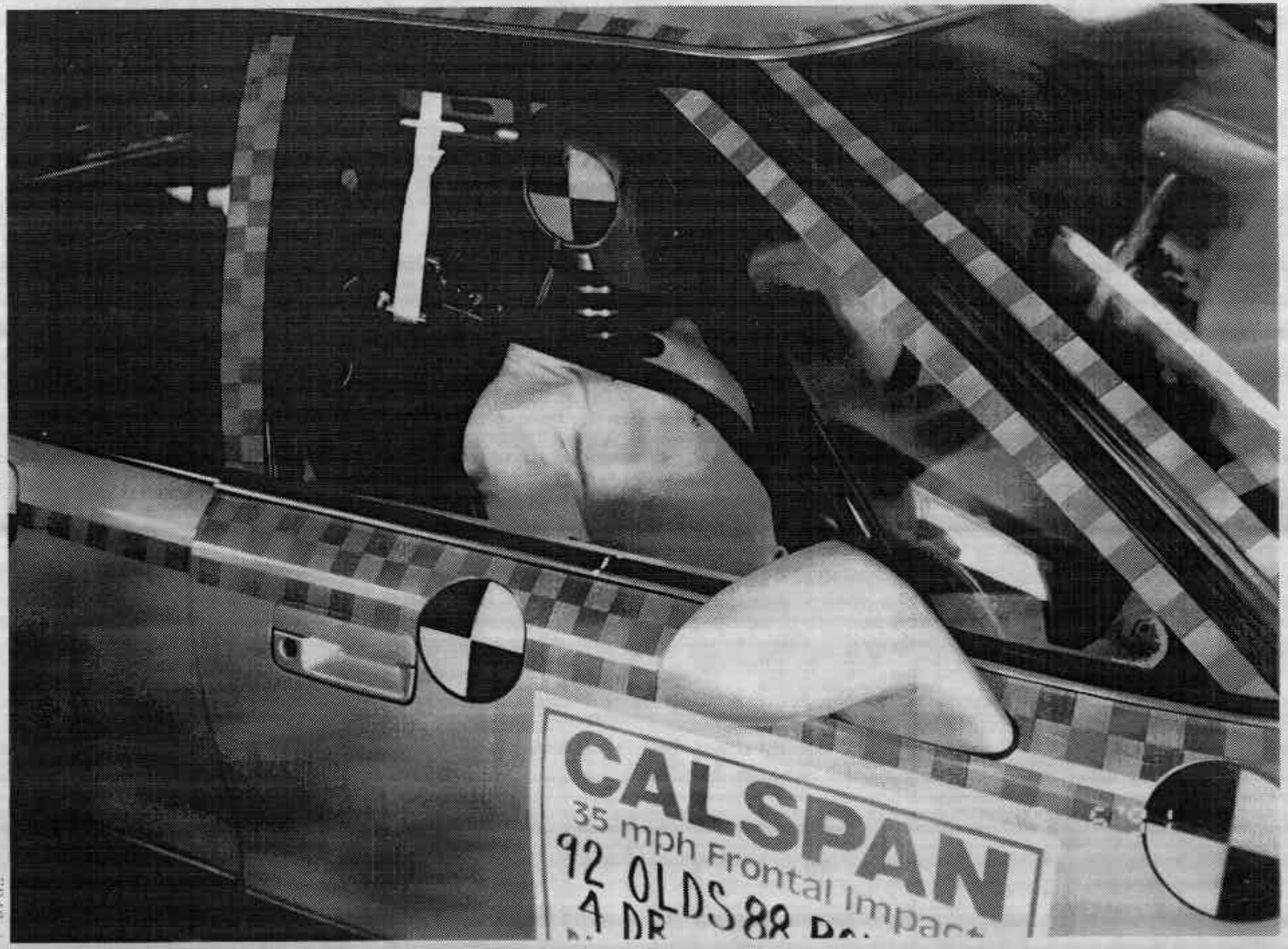


Figure A-24 PRE-TEST PASSENGER POSITION VIEW

Figure A-25 POST-TEST PASSENGER POSITION VIEW

7696-1

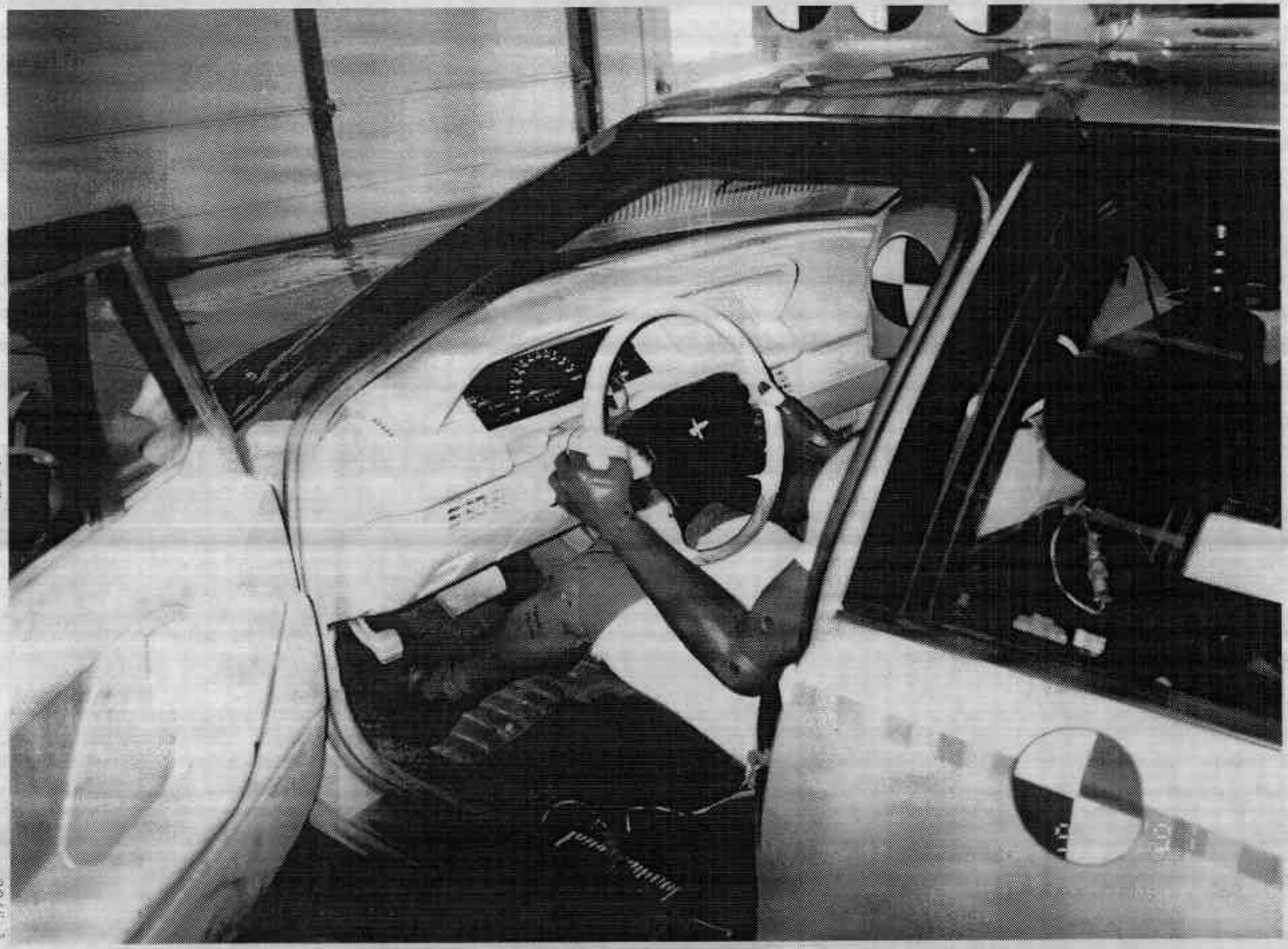


Figure A-28 PRE-TEST DRIVER AND INTERIOR VIEW

Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW

Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

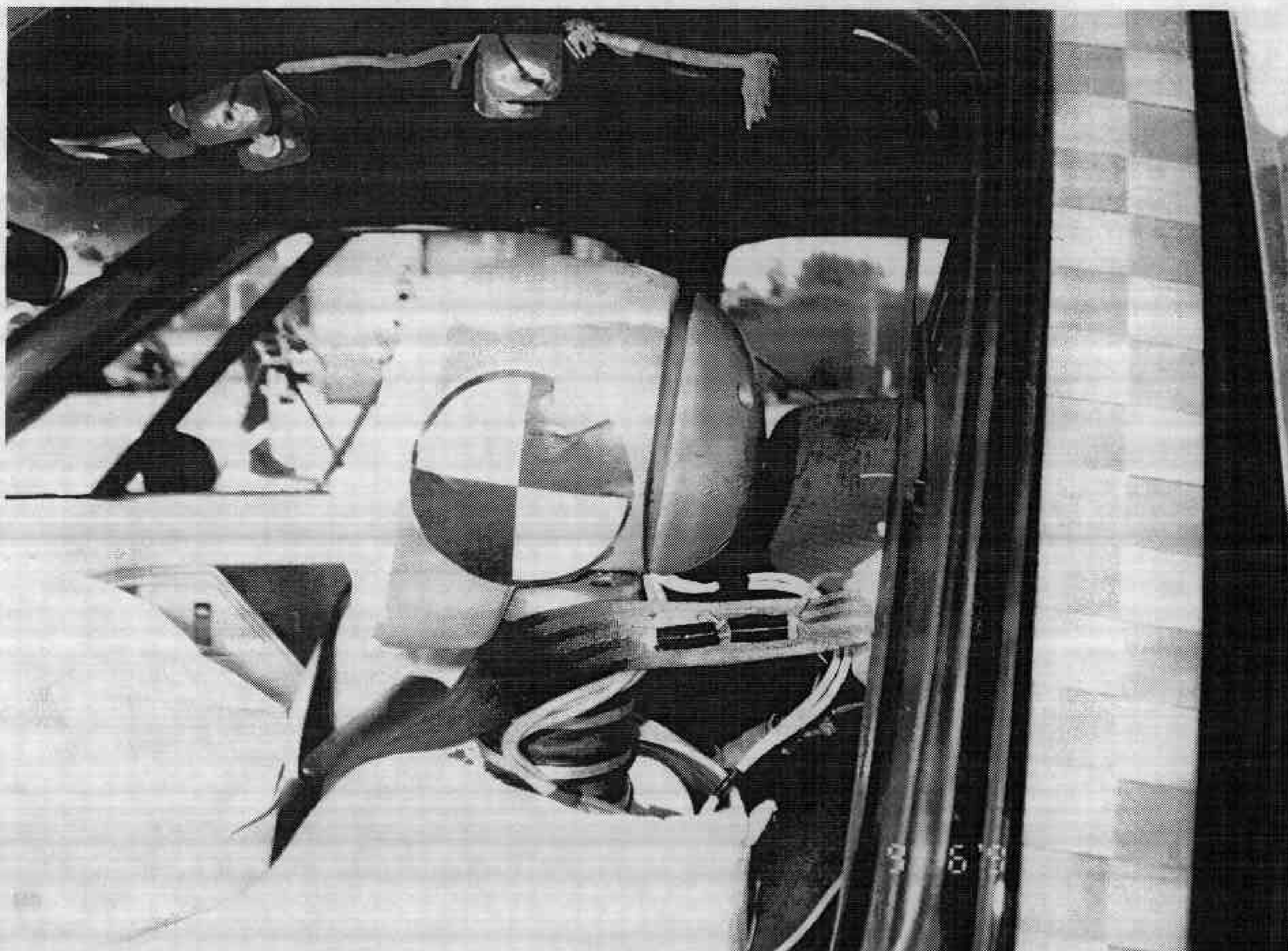


Figure A-30 POST-TEST DRIVER HEAD LOCATION

Figure A-31 POST-TEST PASSENGER HEAD LOCATION

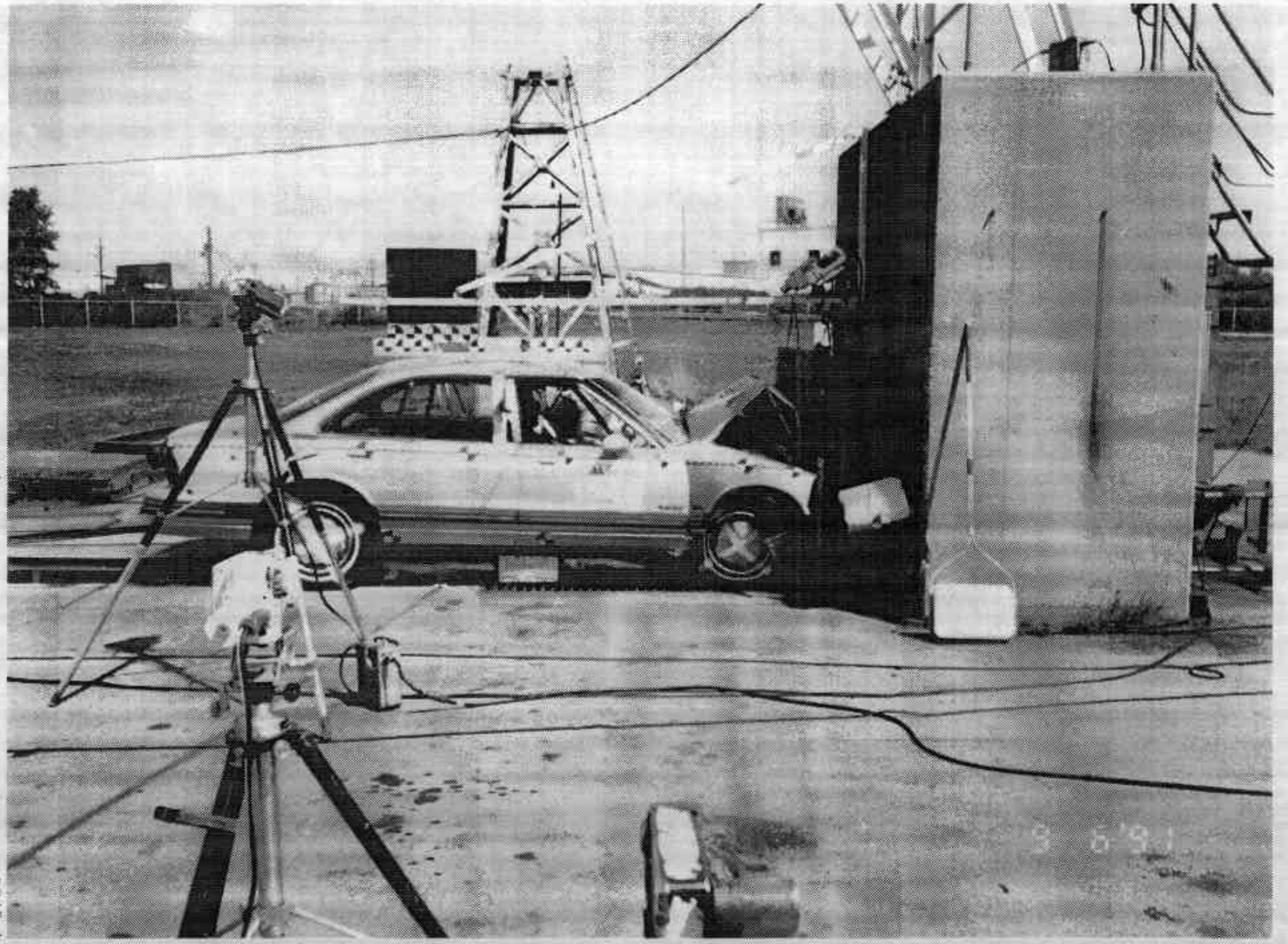


Figure A-32. IMPACT VIEW

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

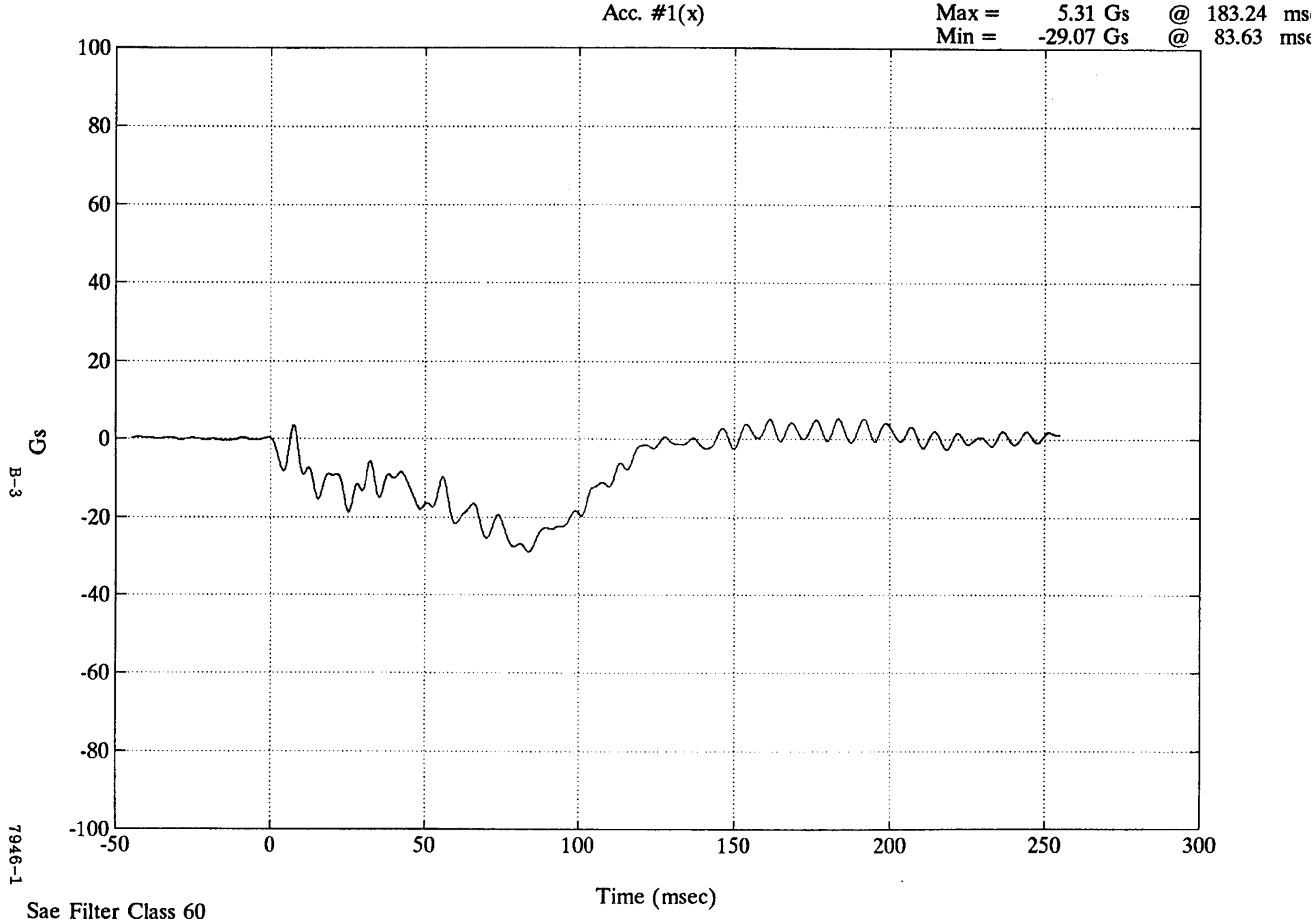
TEST NO. MN0100

VEHICLE DATA

FILTER CHANNEL CLASS

60

NCAP TEST #1 1992 OLDSMOBILE 88

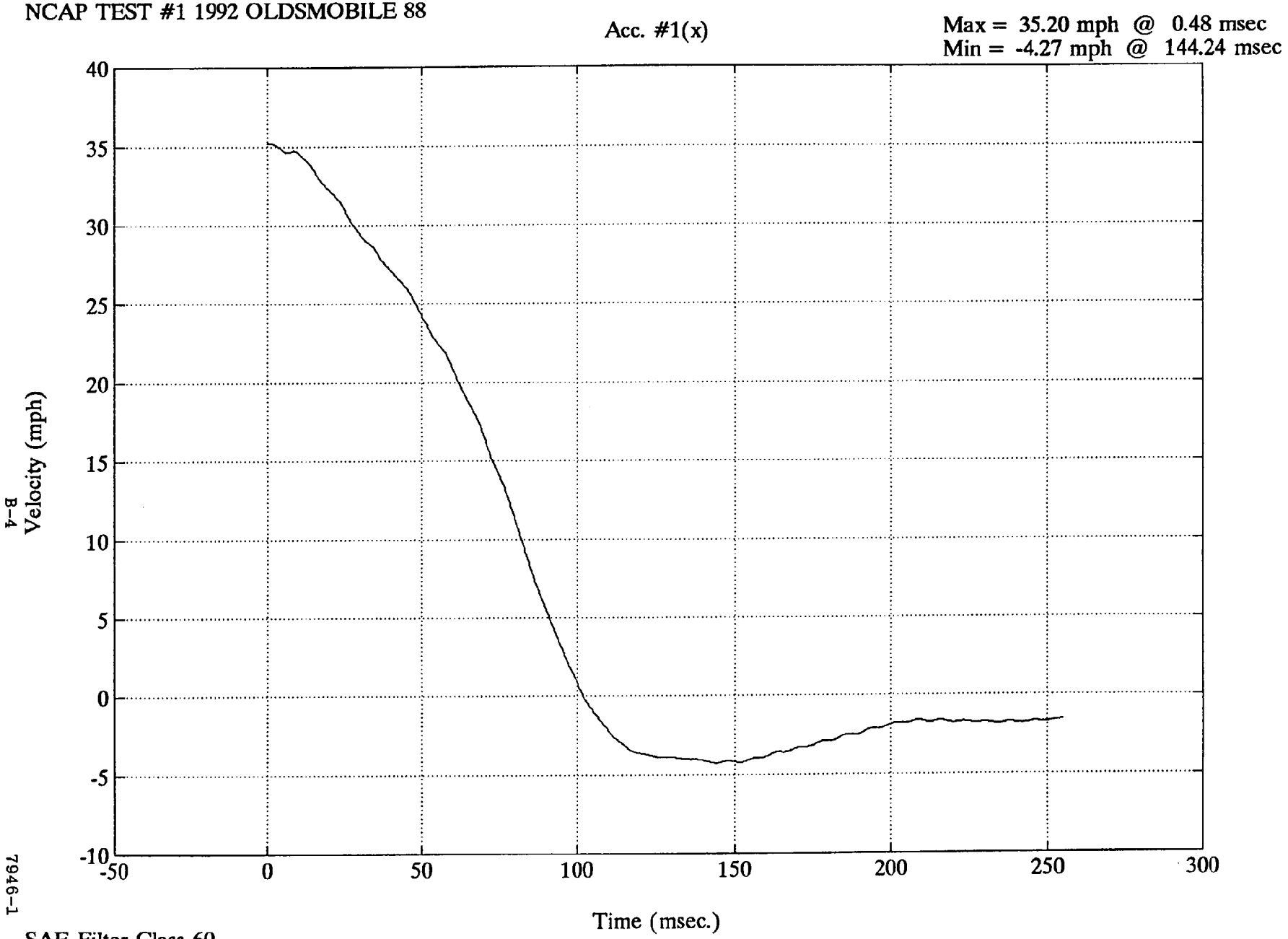


B-3

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

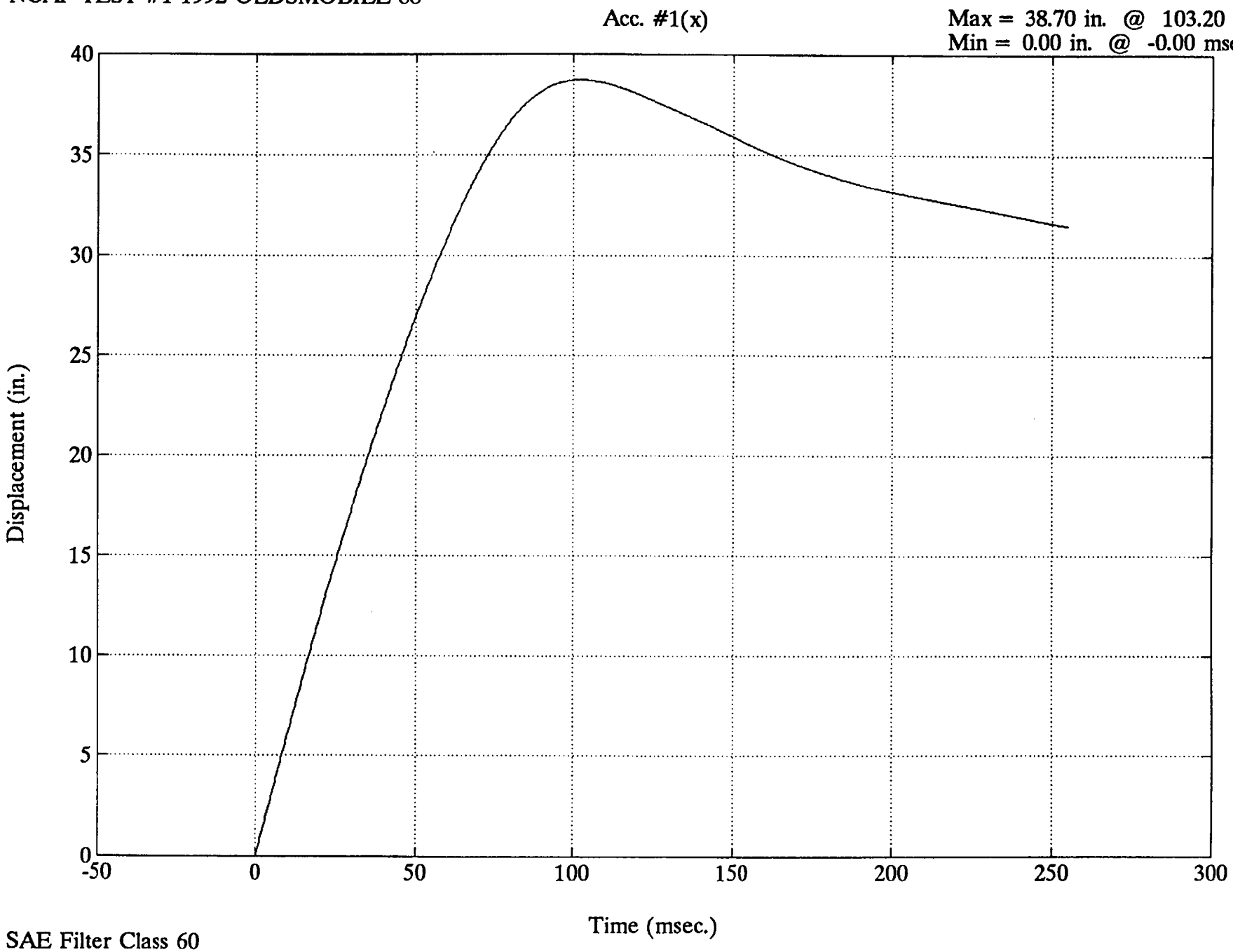


B-4

7946-1

SAE Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

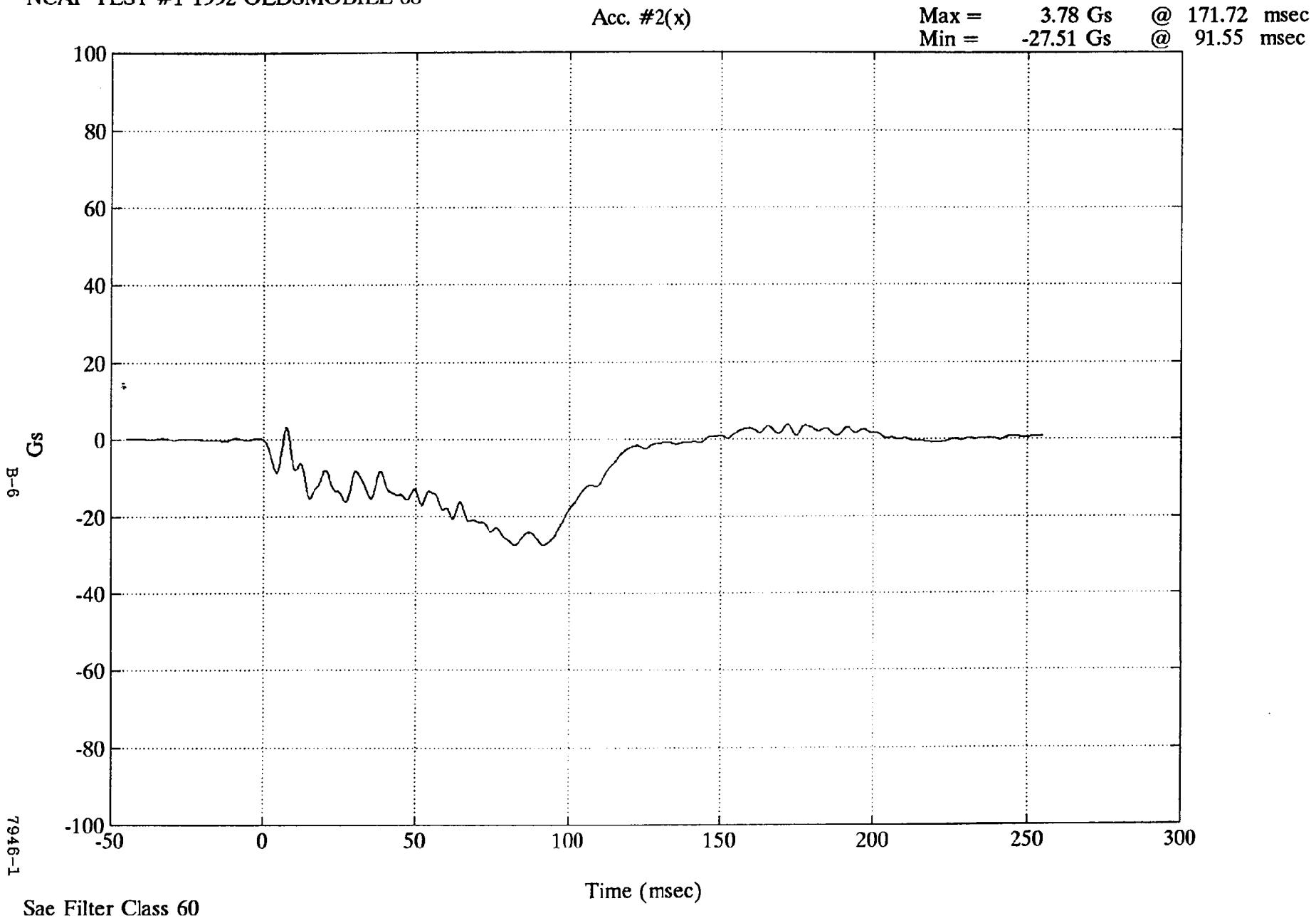


B-5

7946-1

SAE Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

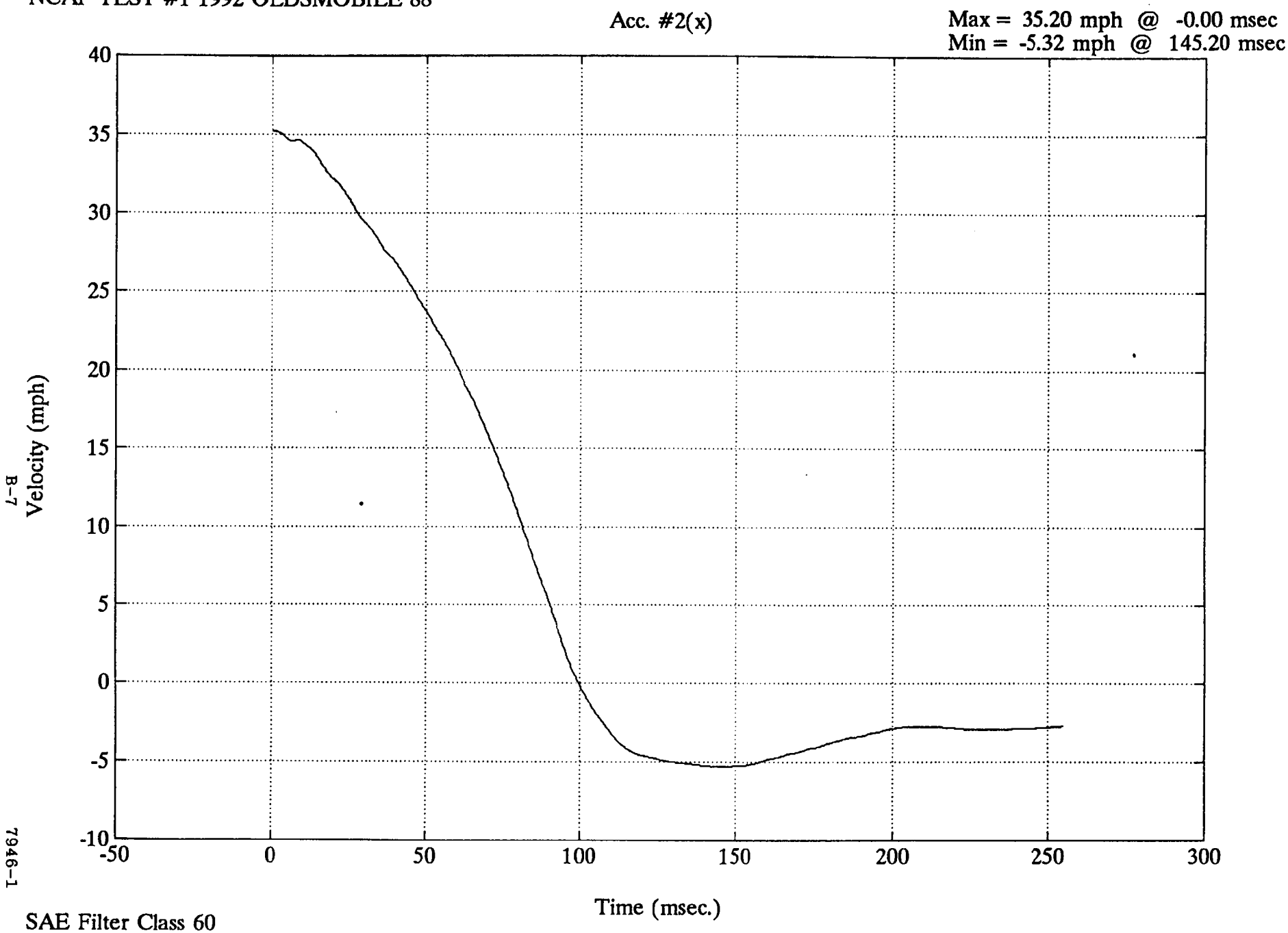


B-6

7946-1

Sae Filter Class 60

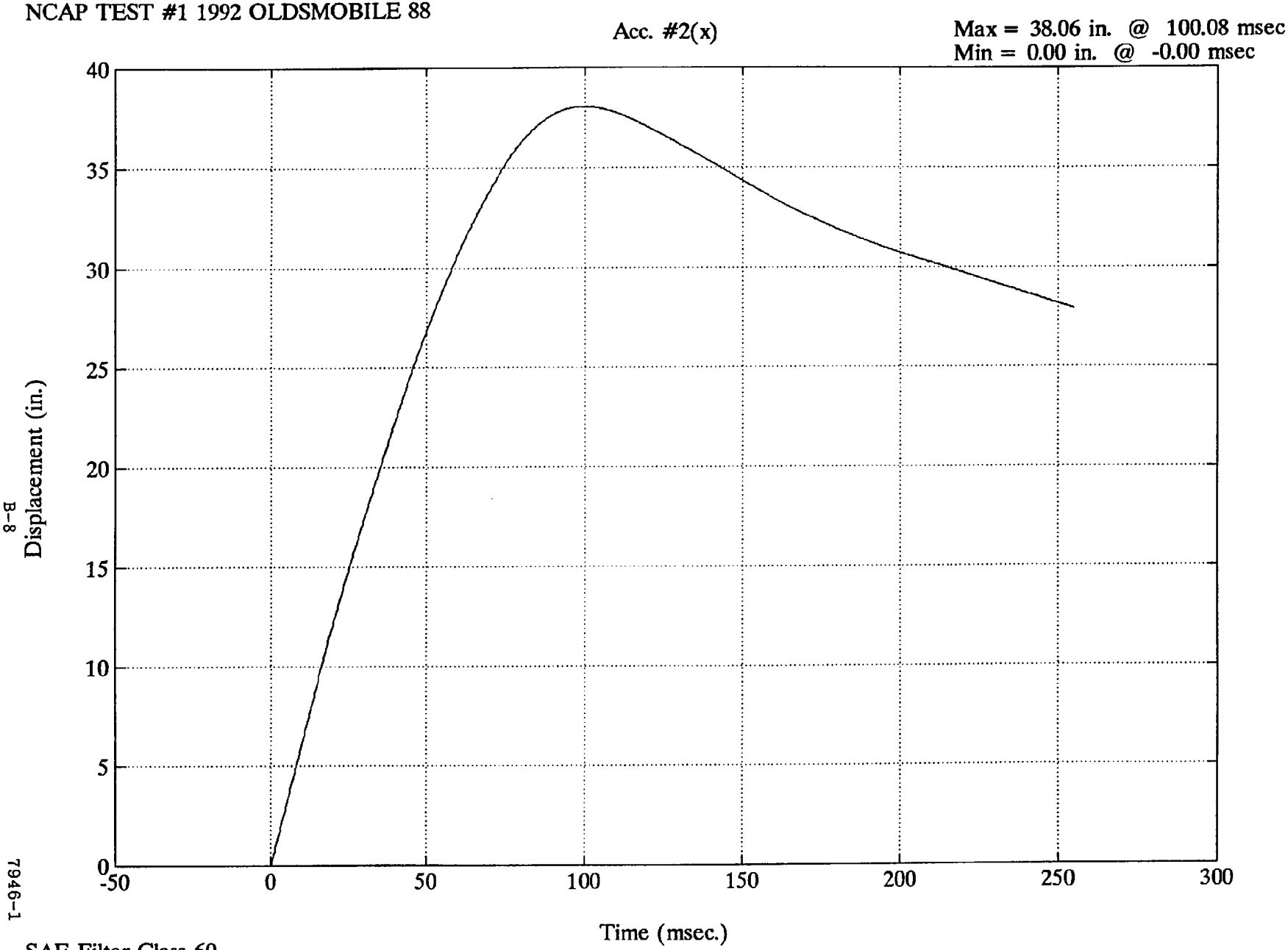
NCAP TEST #1 1992 OLDSMOBILE 88



SAE Filter Class 60

7946-1

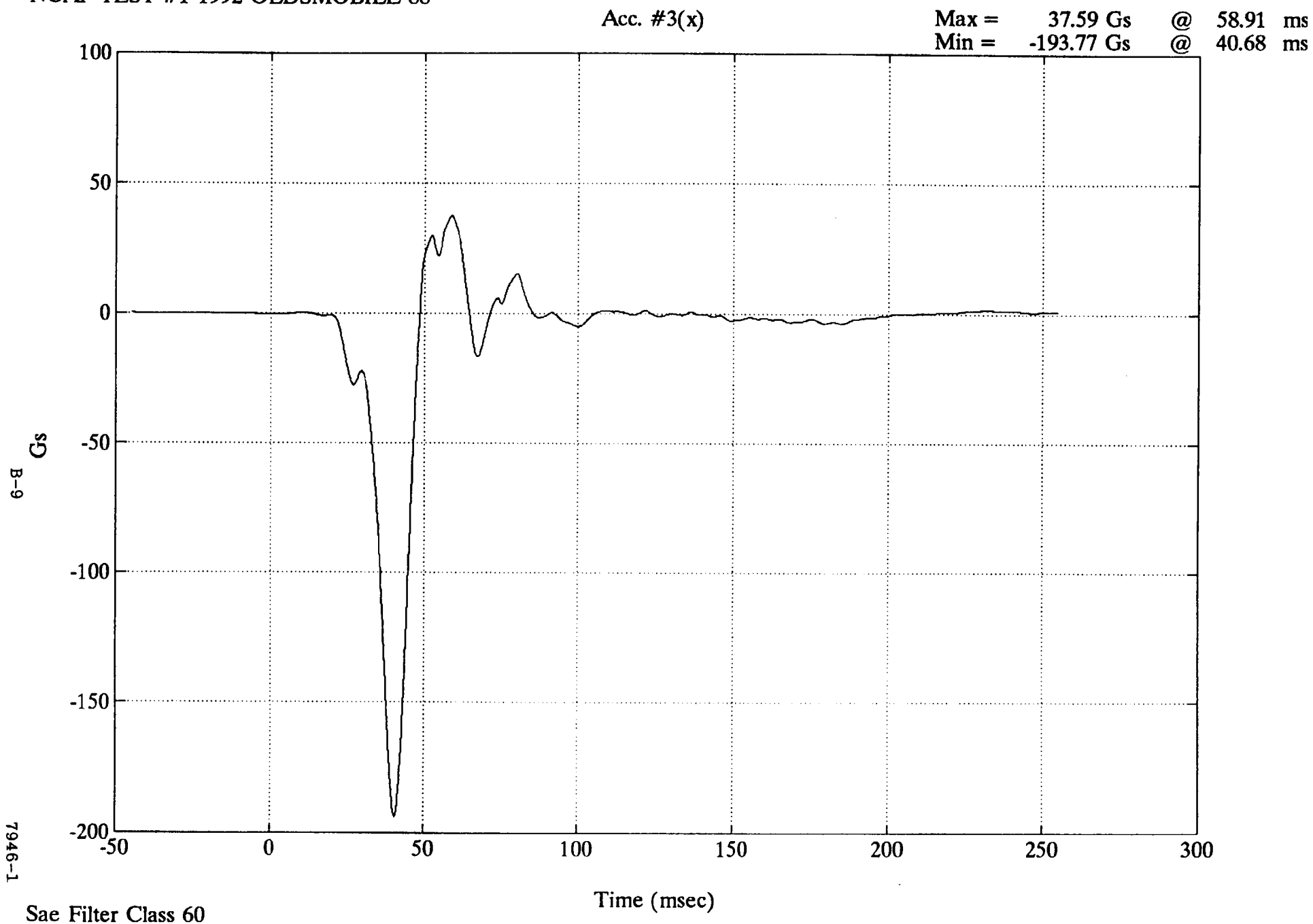
NCAP TEST #1 1992 OLDSMOBILE 88



SAE Filter Class 60

7946-1

NCAP TEST #1 1992 OLDSMOBILE 88

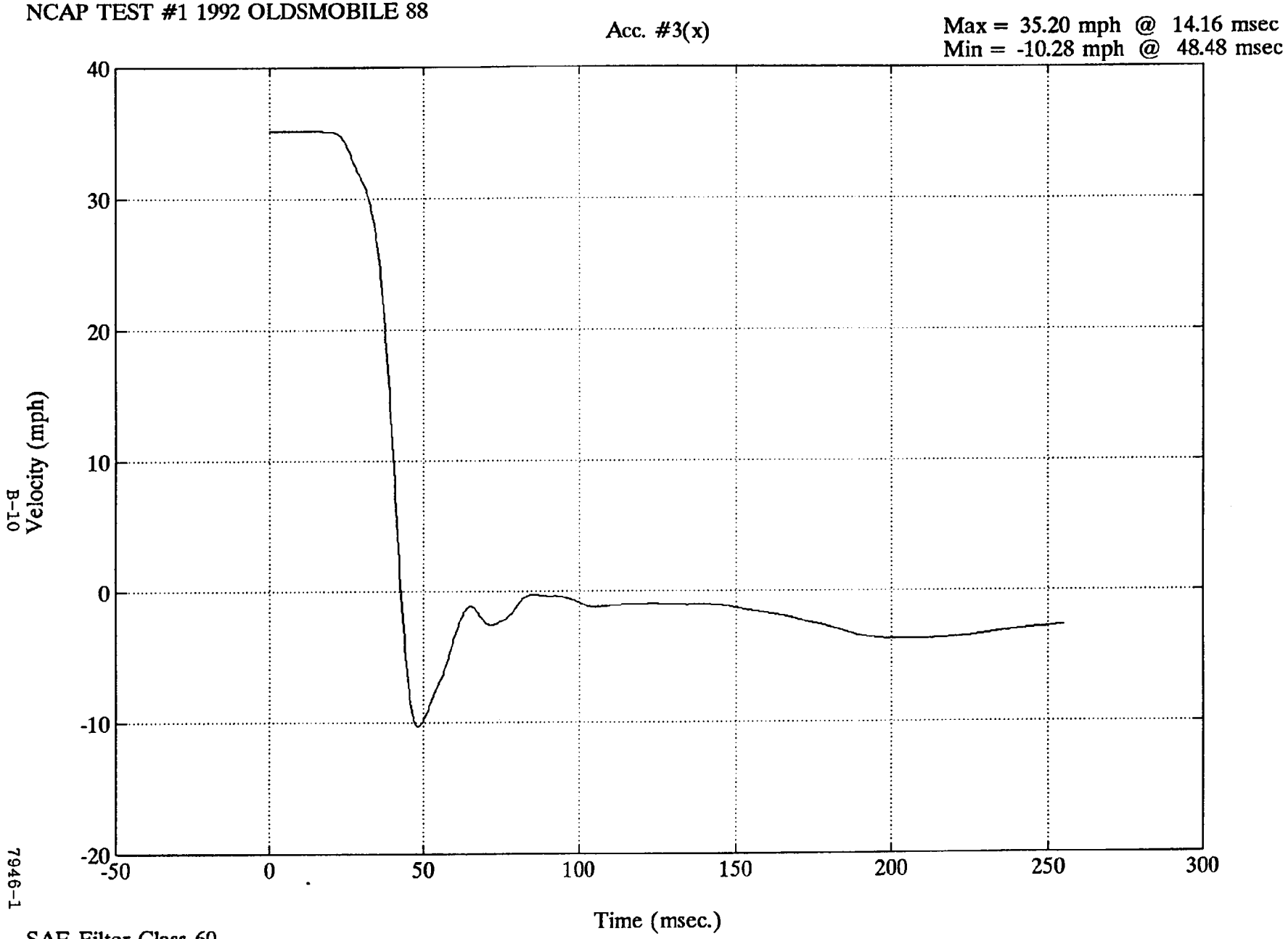


B-9

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

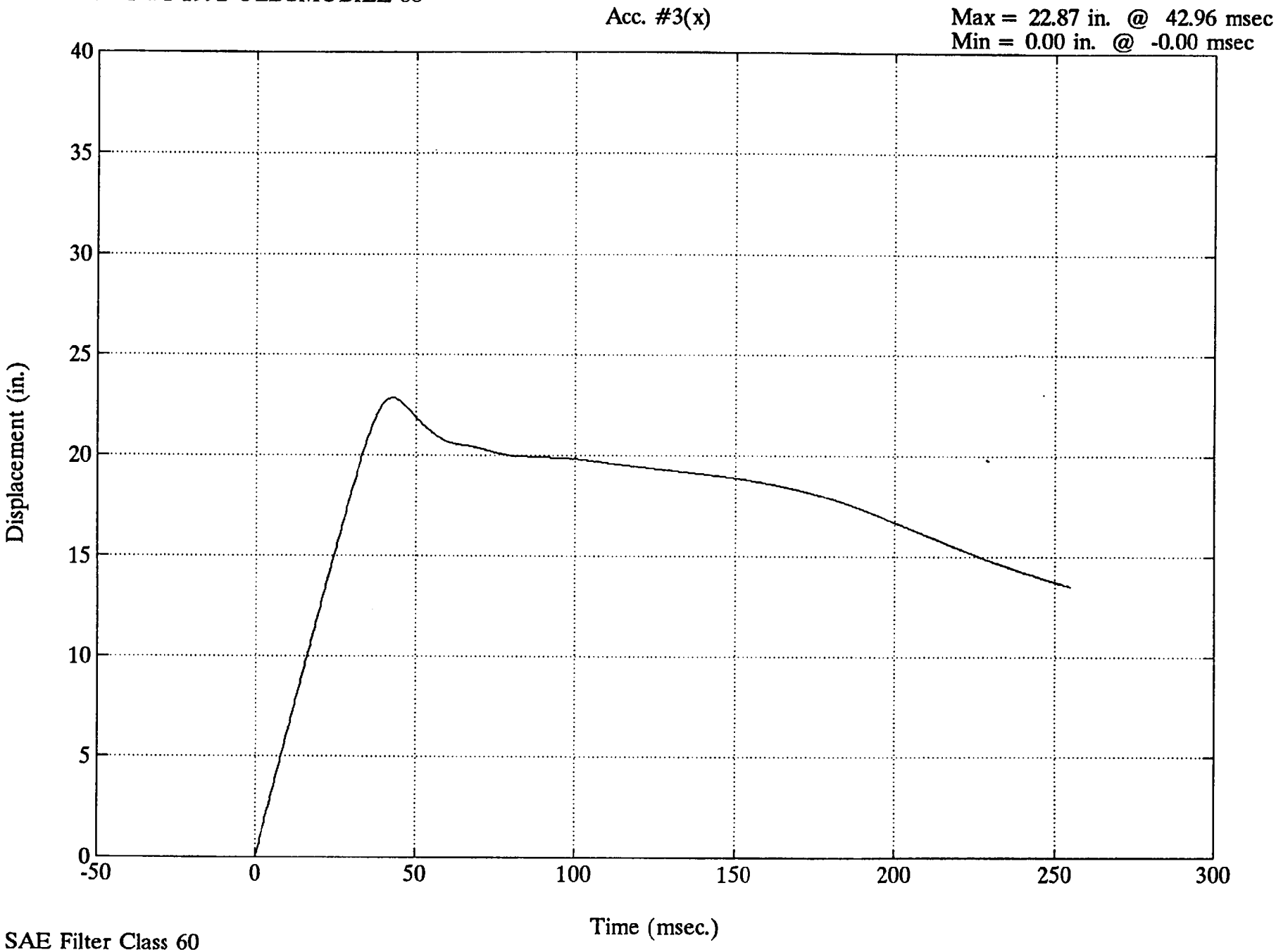


B-10

7946-1

SAE Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

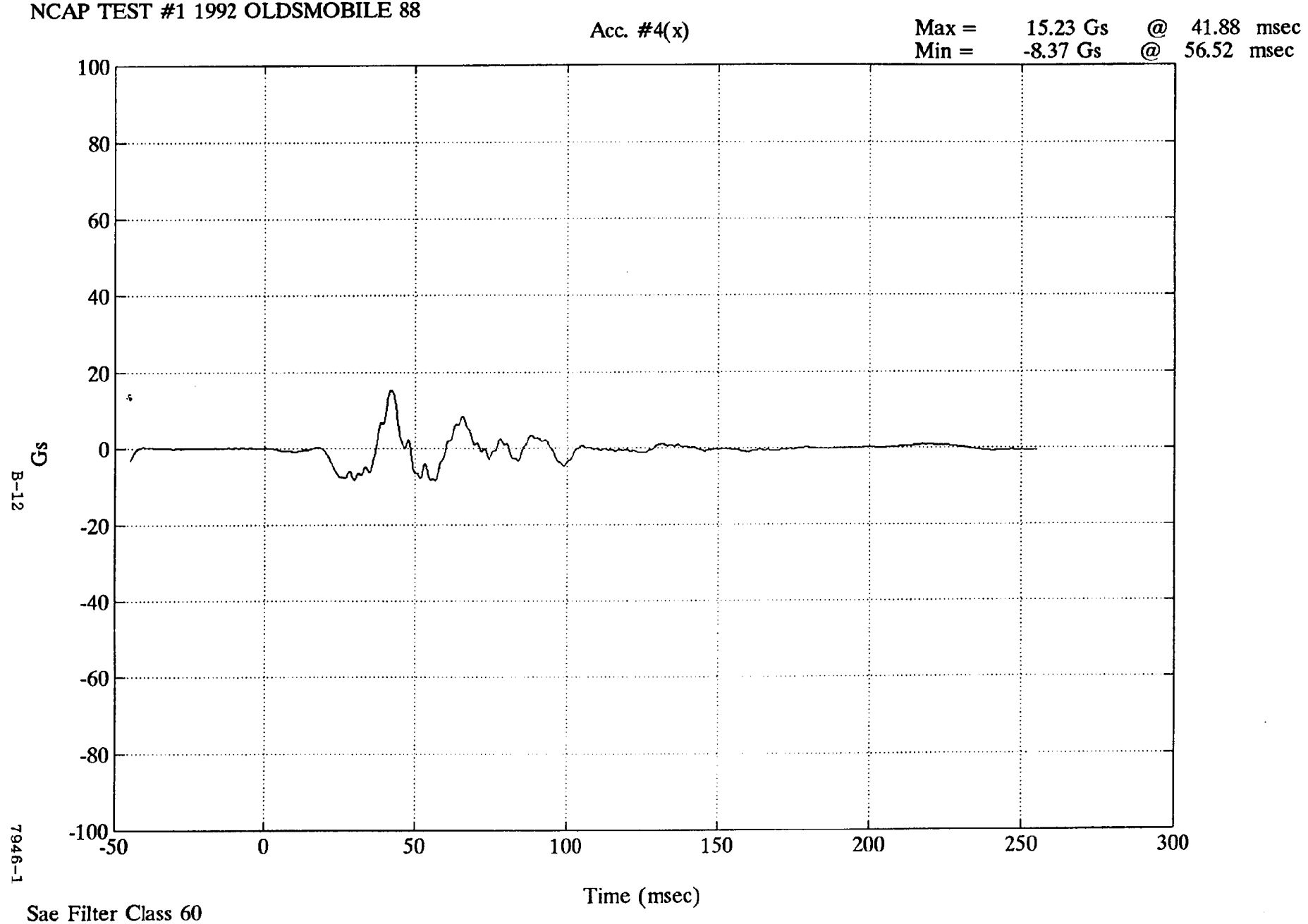


B-11

7946-1

SAE Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

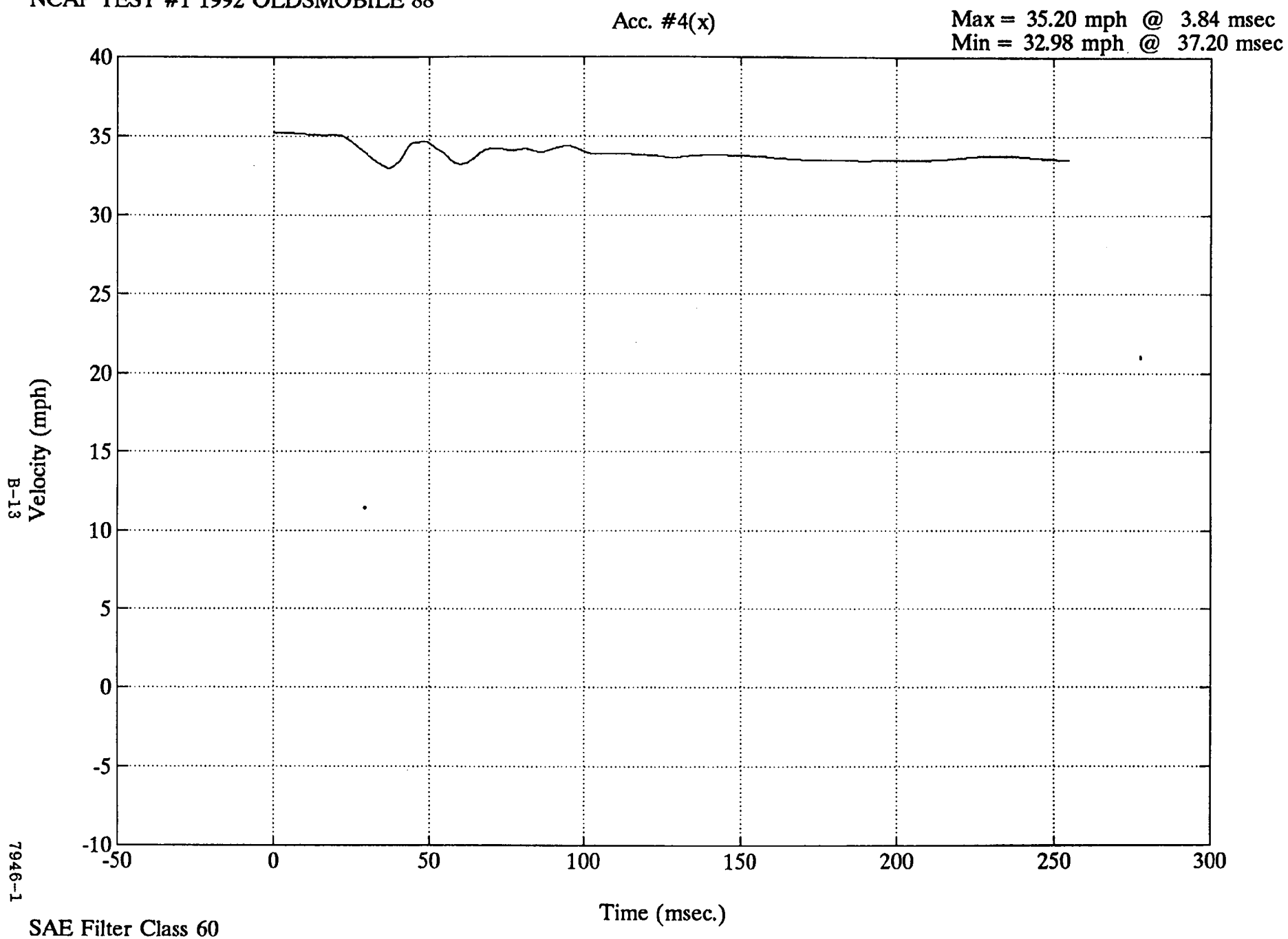


B-12

7946-1

Sae Filter Class 60

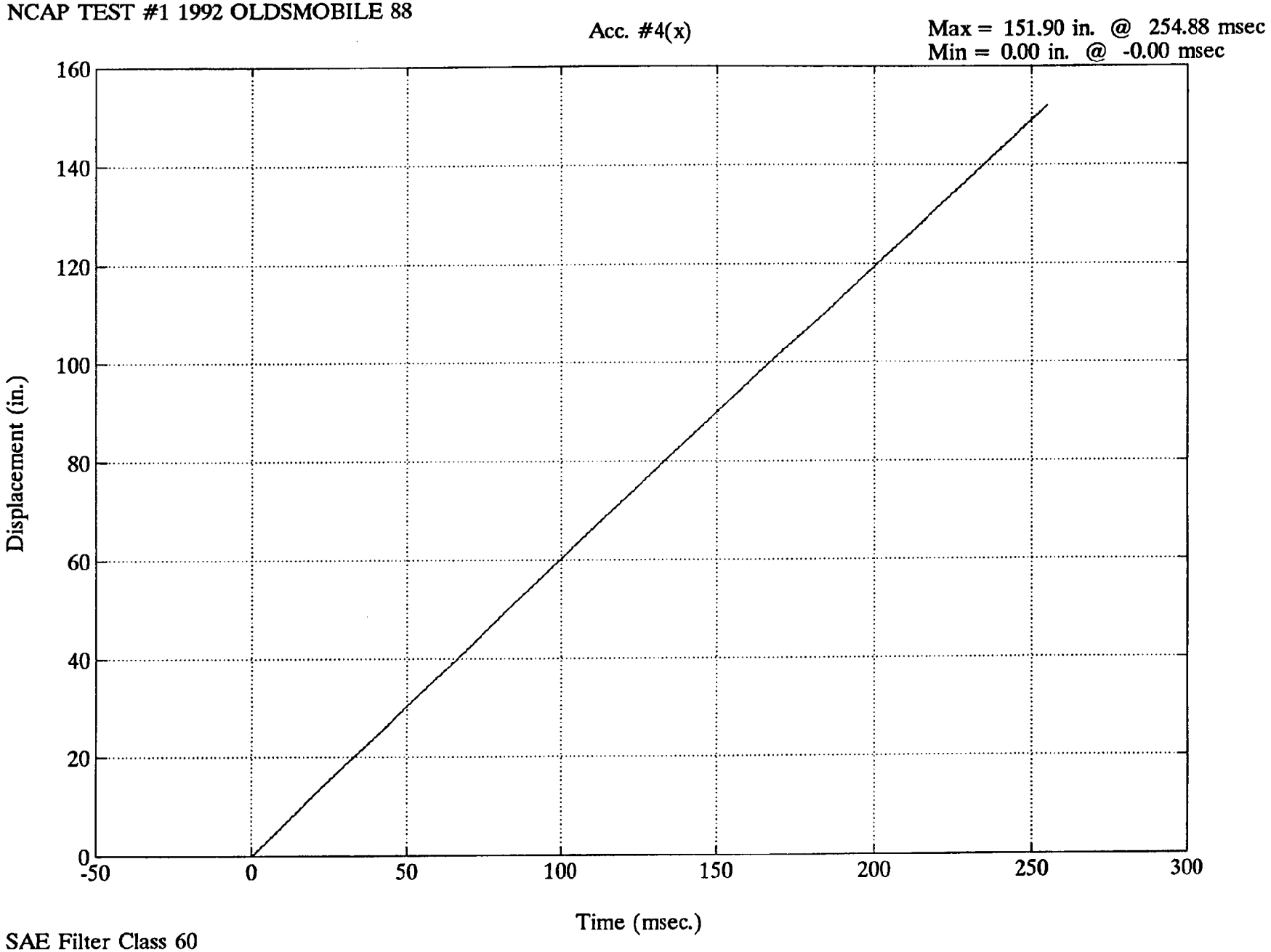
NCAP TEST #1 1992 OLDSMOBILE 88



SAE Filter Class 60

7946-1

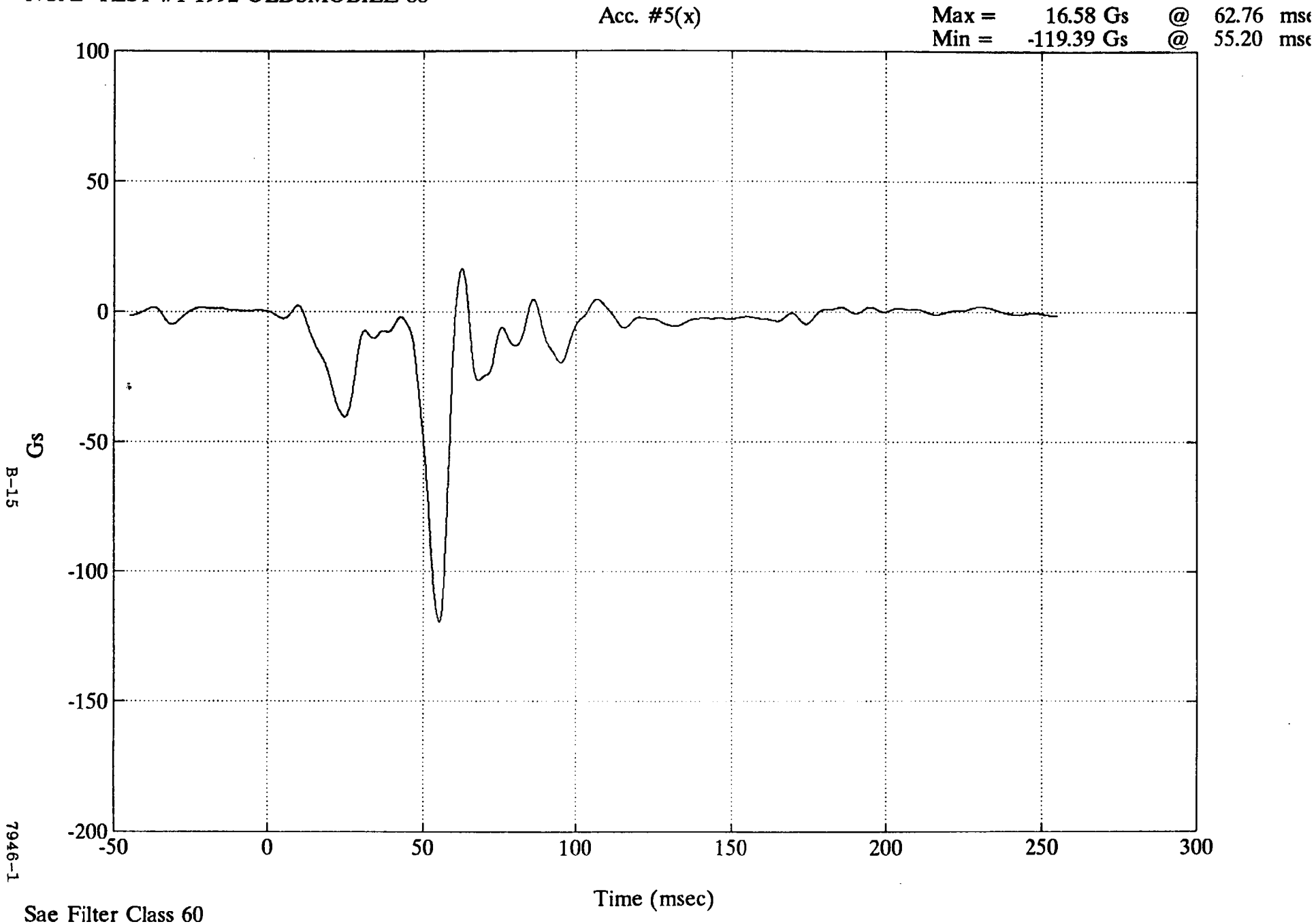
NCAP TEST #1 1992 OLDSMOBILE 88



SAE Filter Class 60

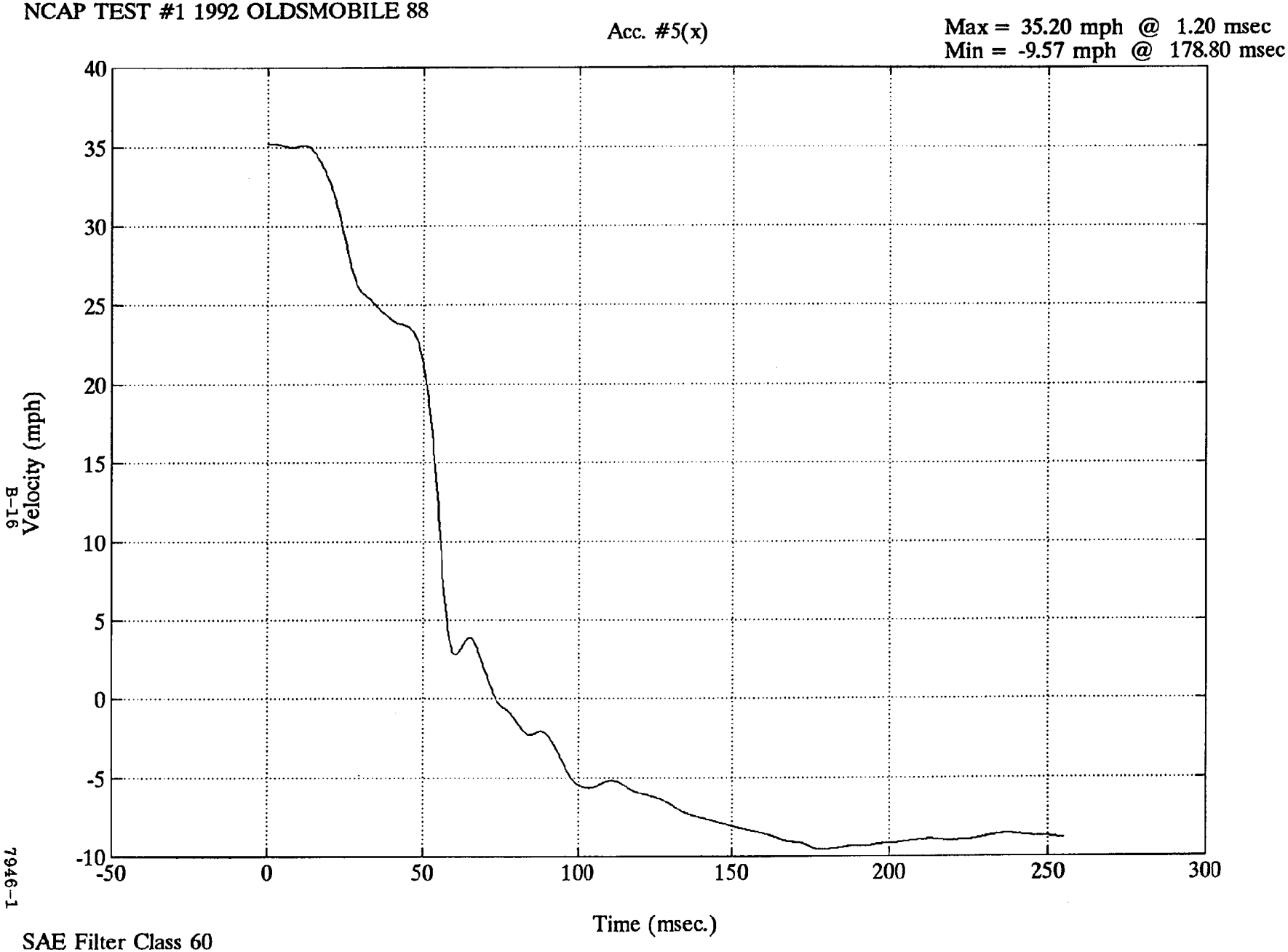
7946-1

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

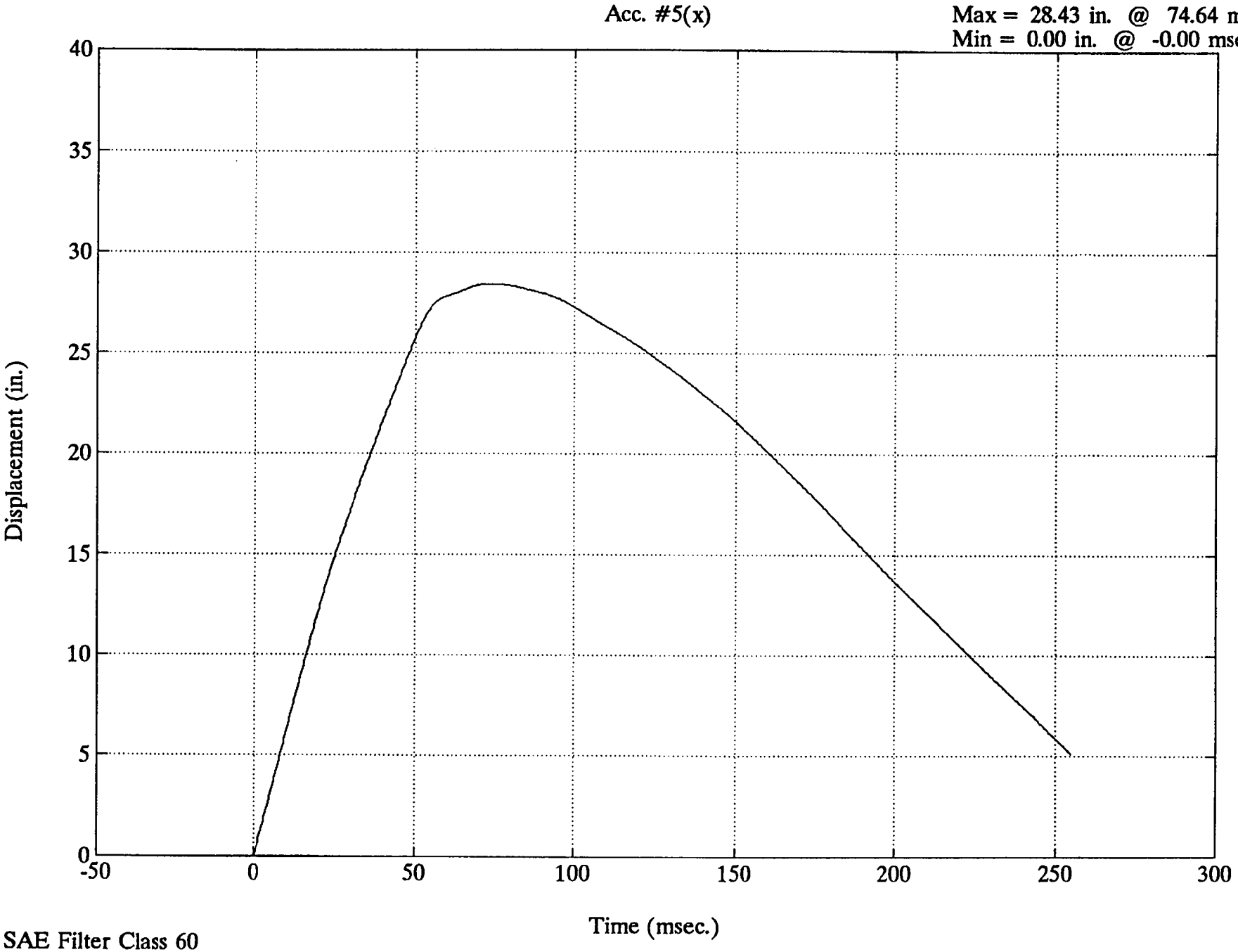


B-16

7946-1

SAE Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

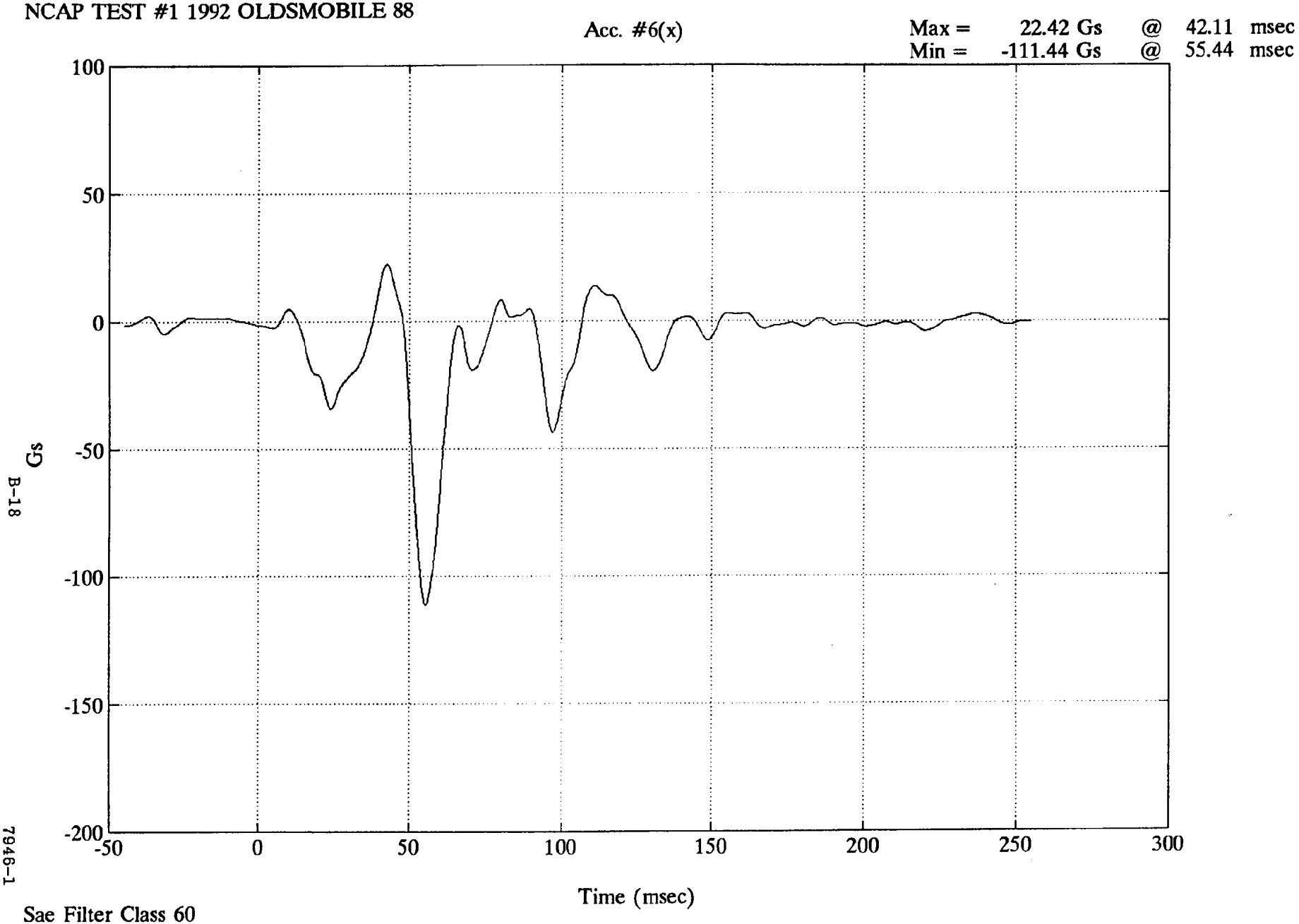


B-17

7946-1

SAE Filter Class 60

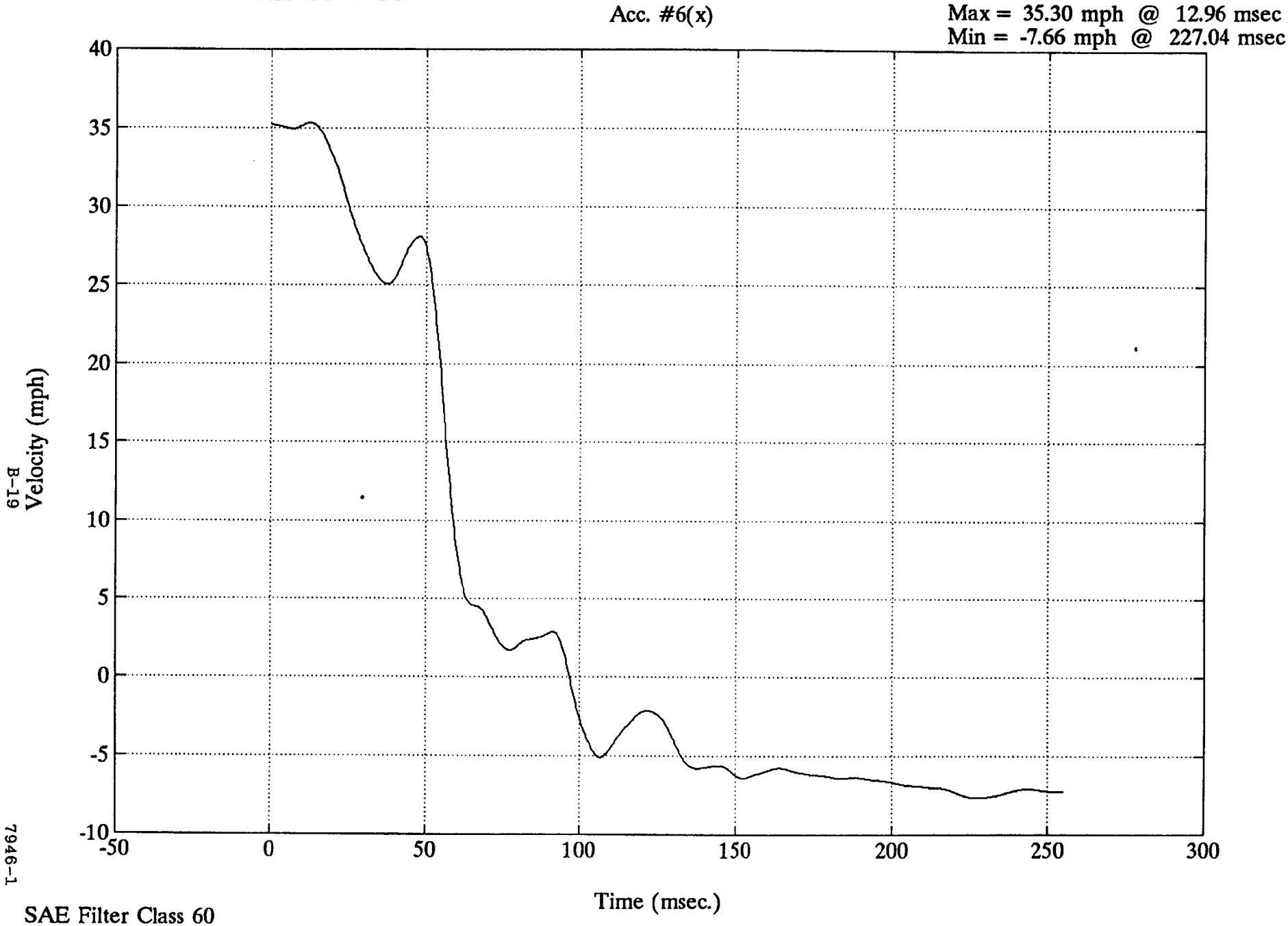
NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 60

7946-1

NCAP TEST #1 1992 OLDSMOBILE 88

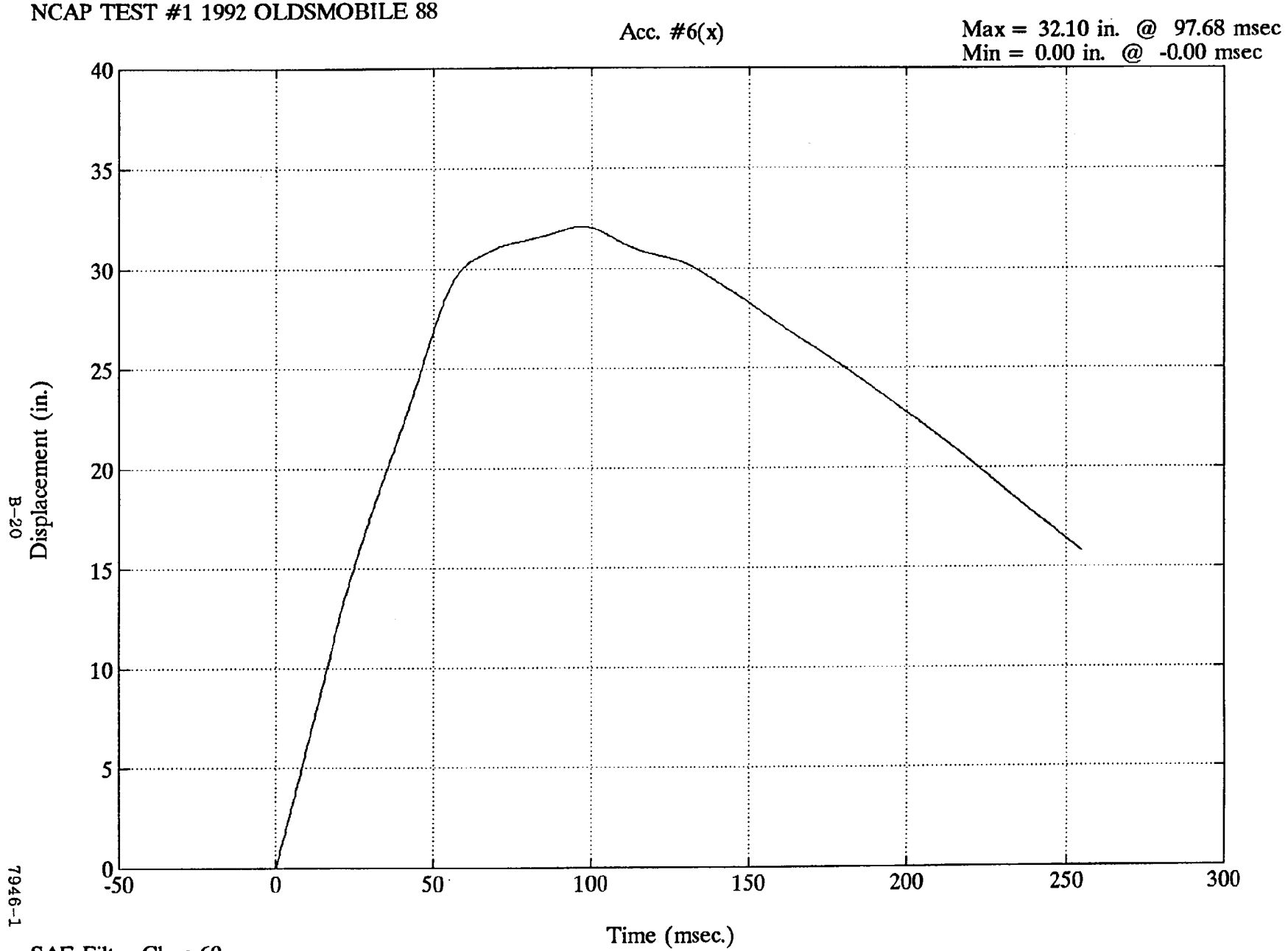


B-19

7946-1

SAE Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

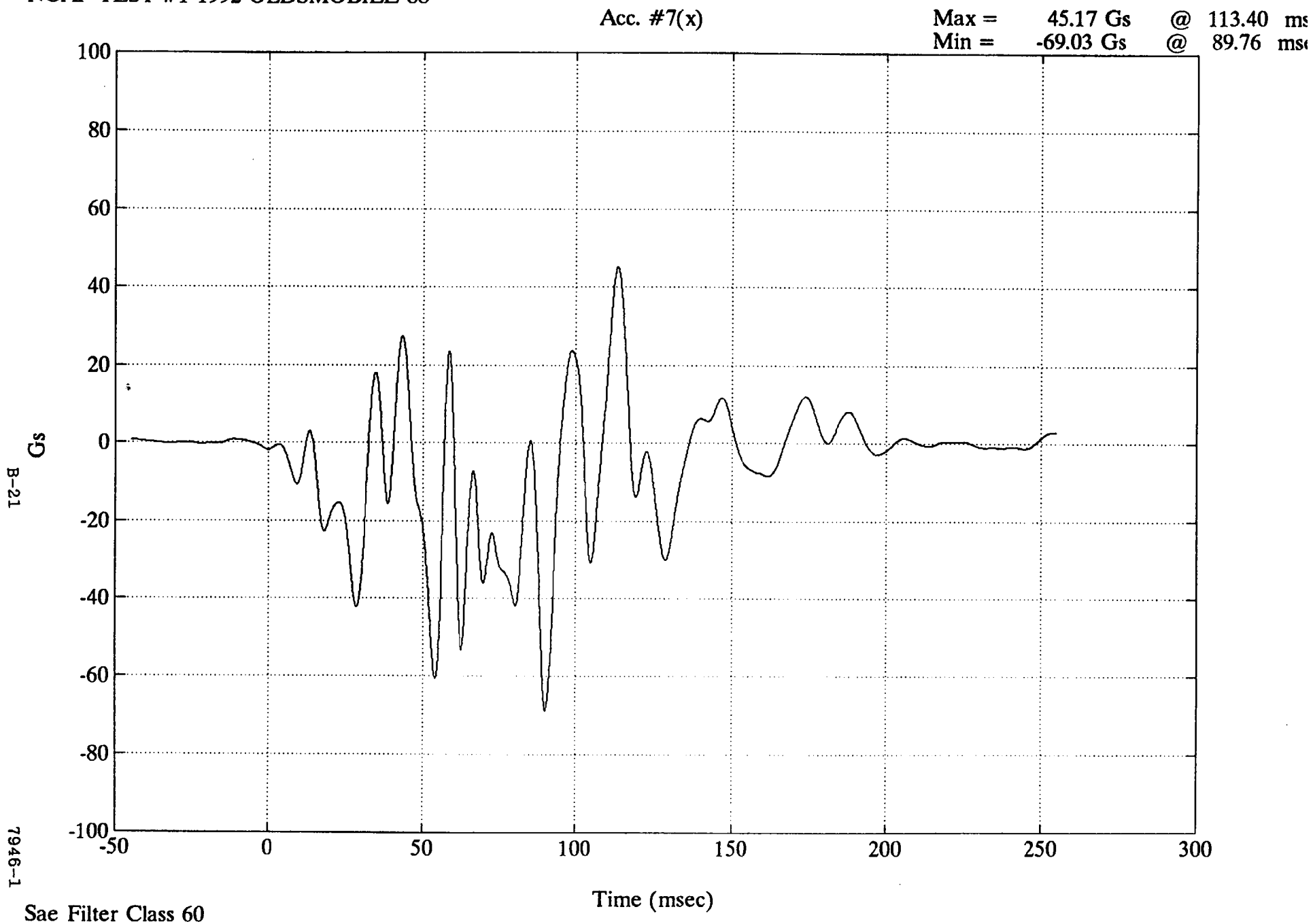


B-20

7946-1

SAE Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 60

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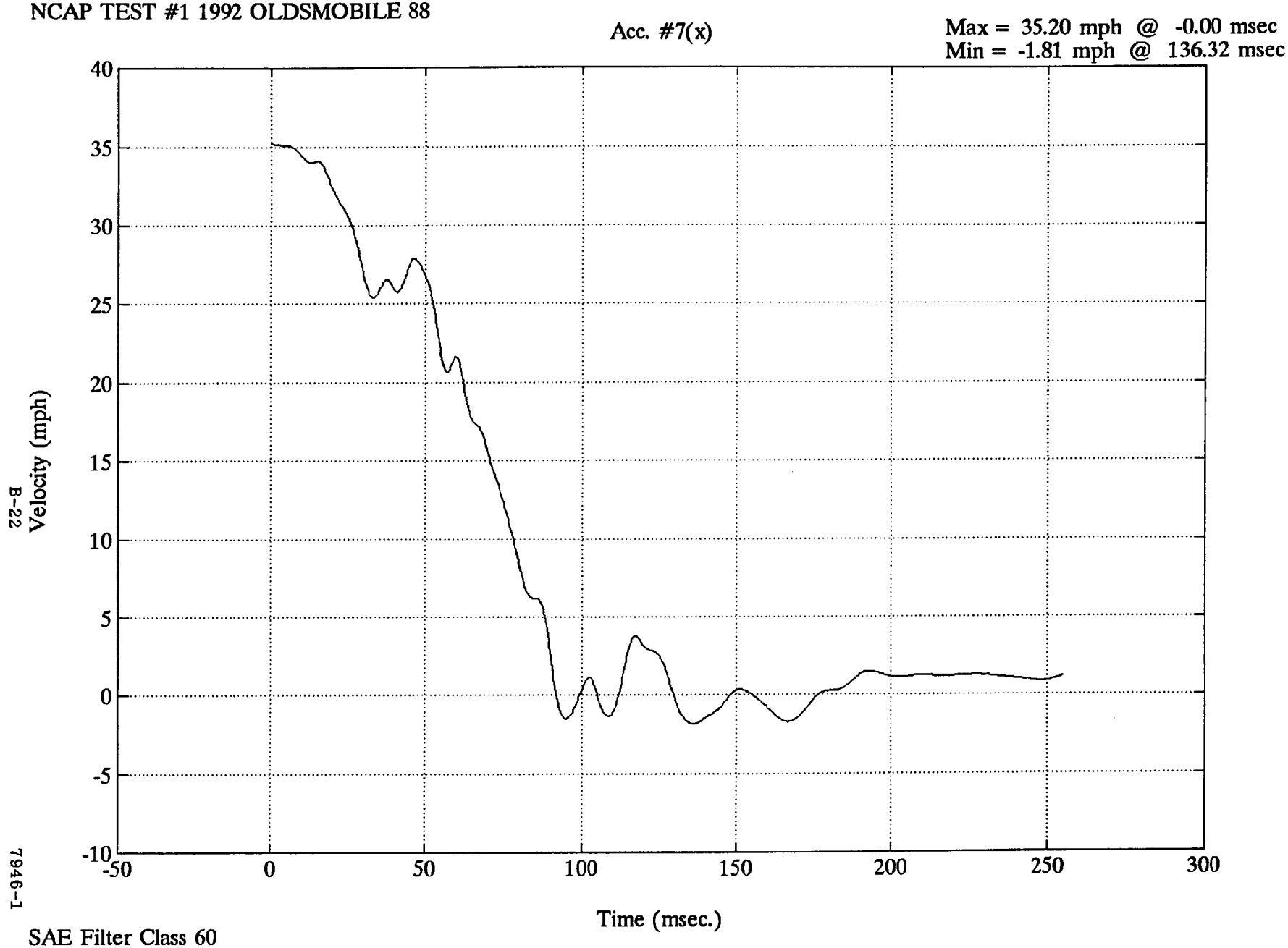
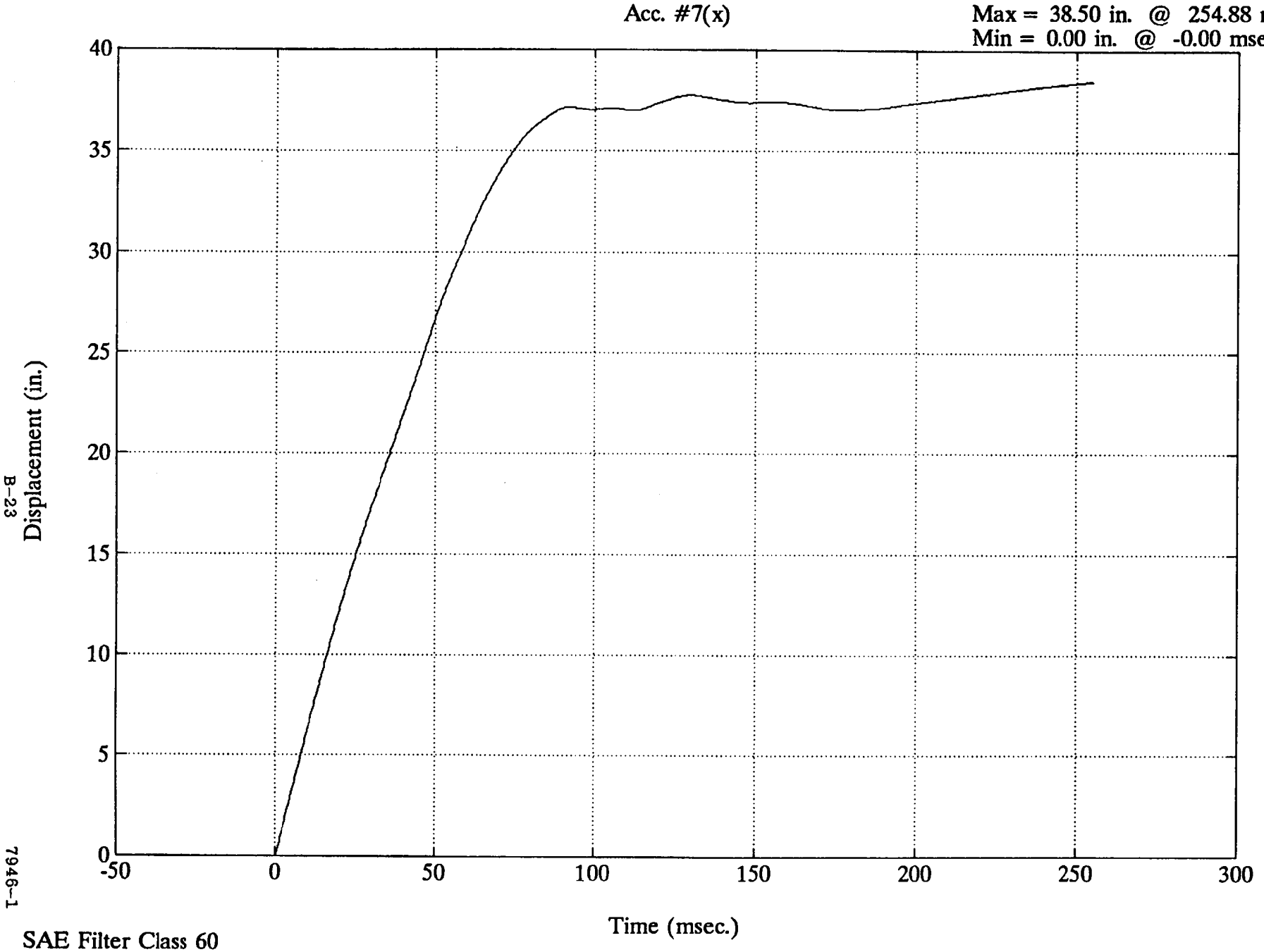


B-22

7946-1

SAE Filter Class 60

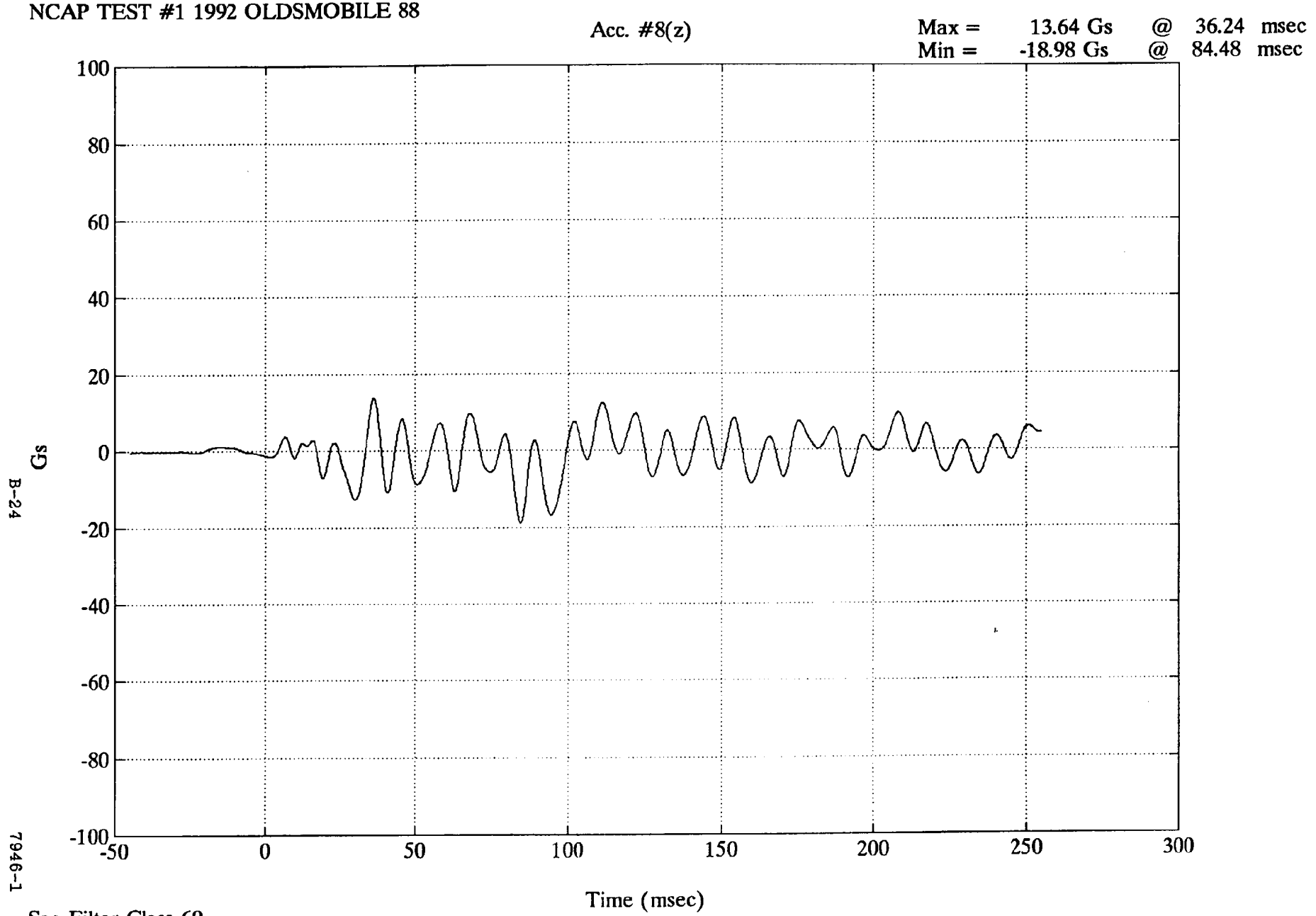
NCAP TEST #1 1992 OLDSMOBILE 88



SAE Filter Class 60

7949-1

NCAP TEST #1 1992 OLDSMOBILE 88



B-24

7946-1

Sae Filter Class 60

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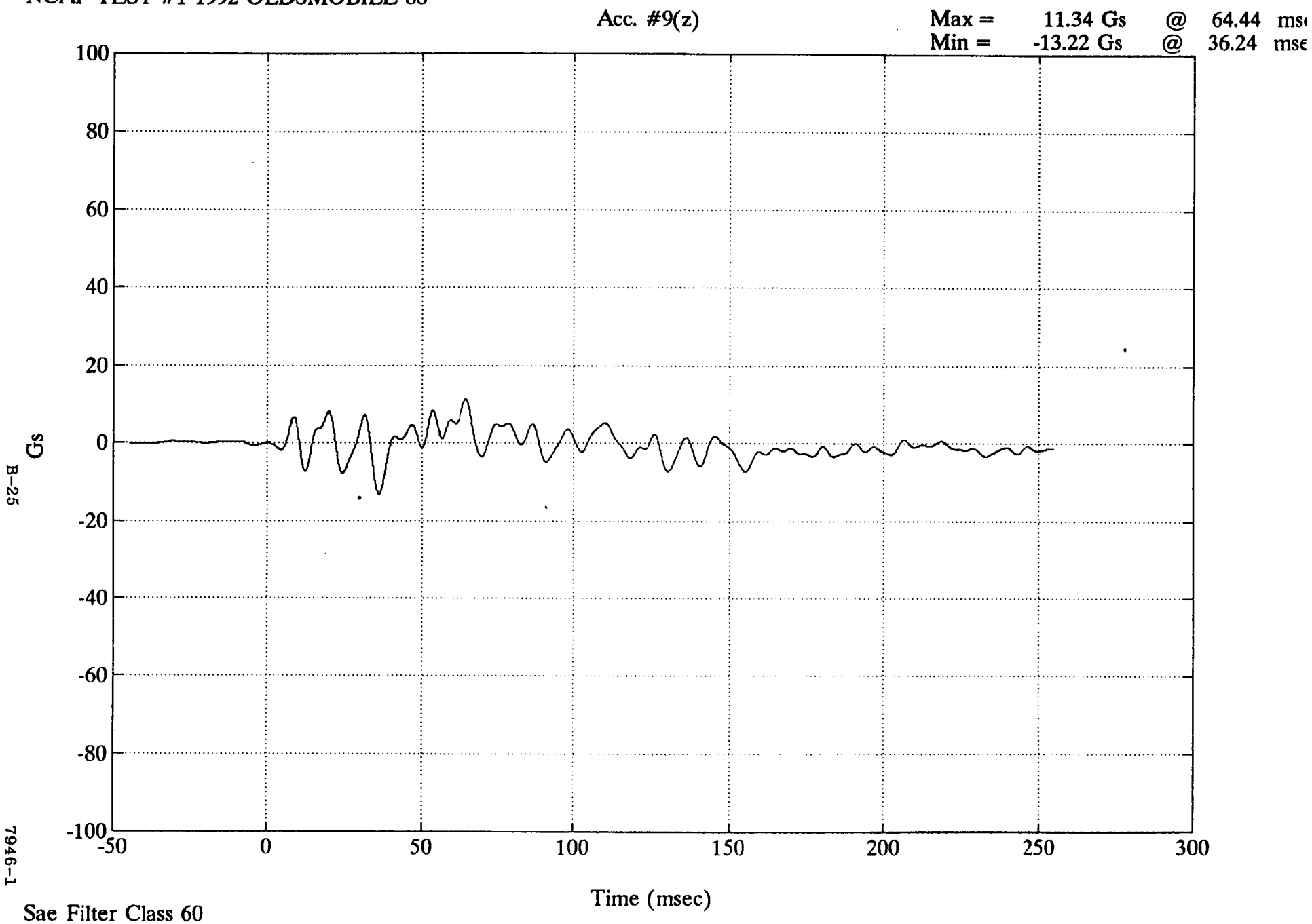


B-25

7946-1

Sae Filter Class 60

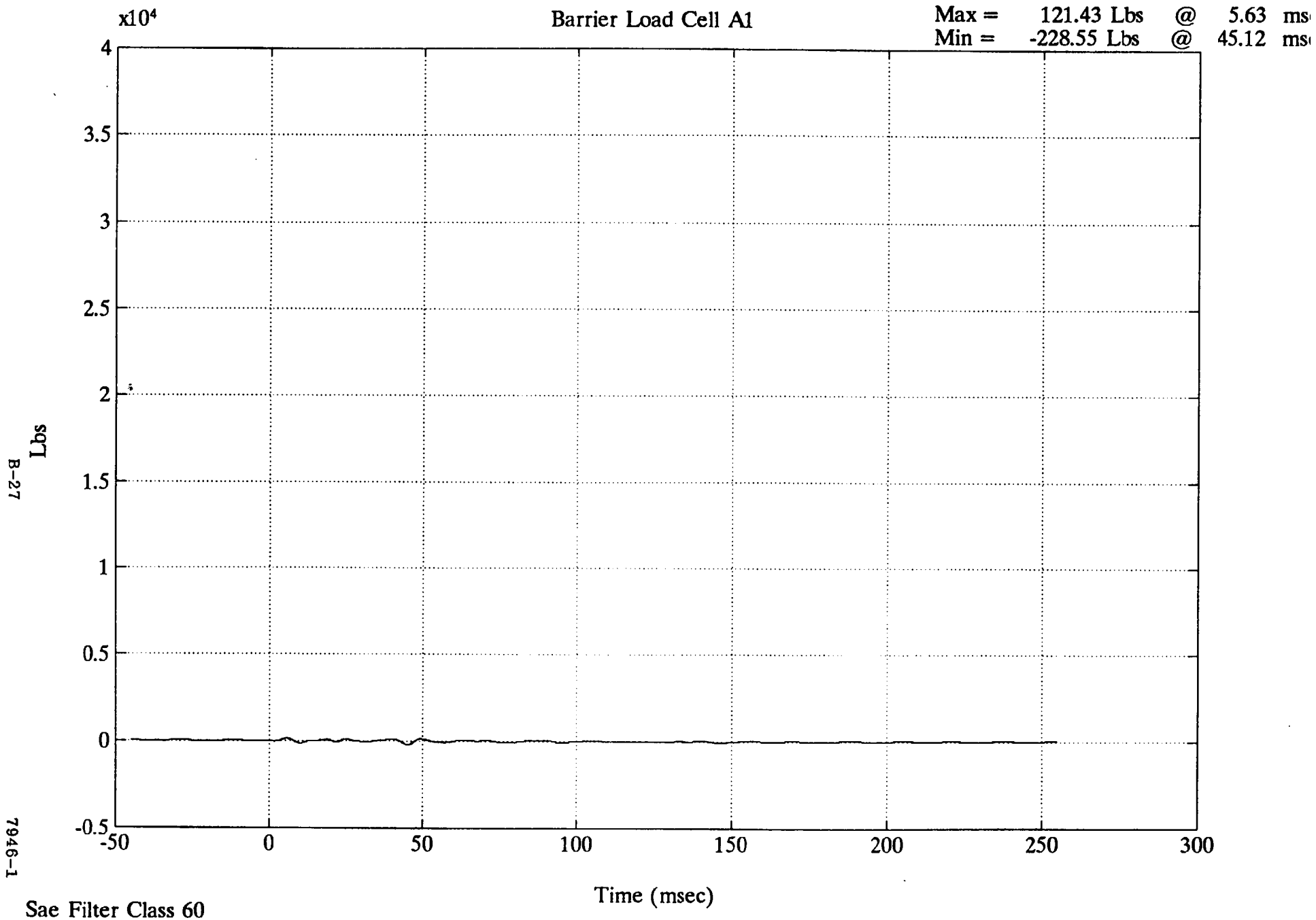
TEST NO. MN0100

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

60

NCAP TEST #1 1992 OLDSMOBILE 88

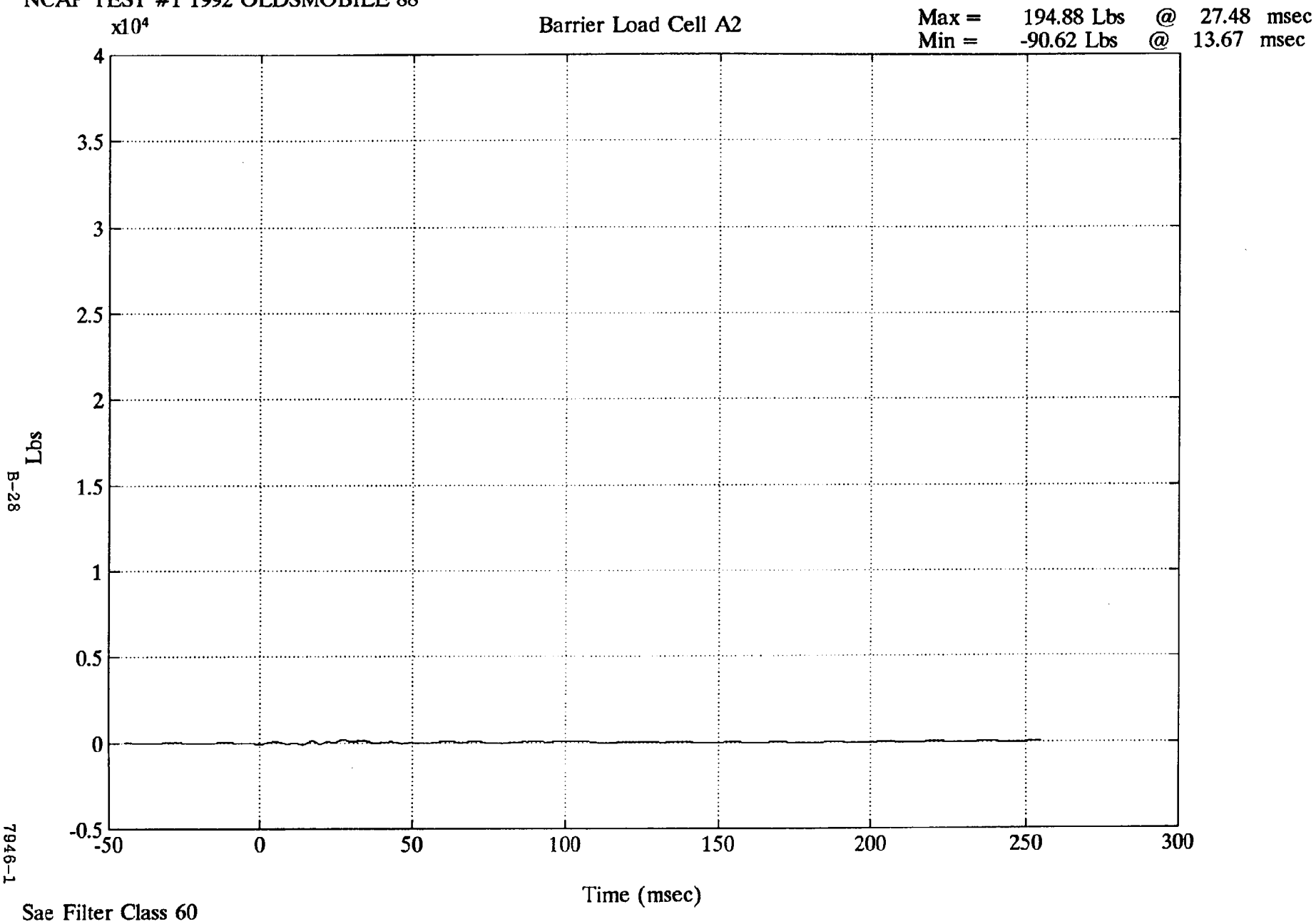


B-27

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88



B-28

7946-1

Sae Filter Class 60

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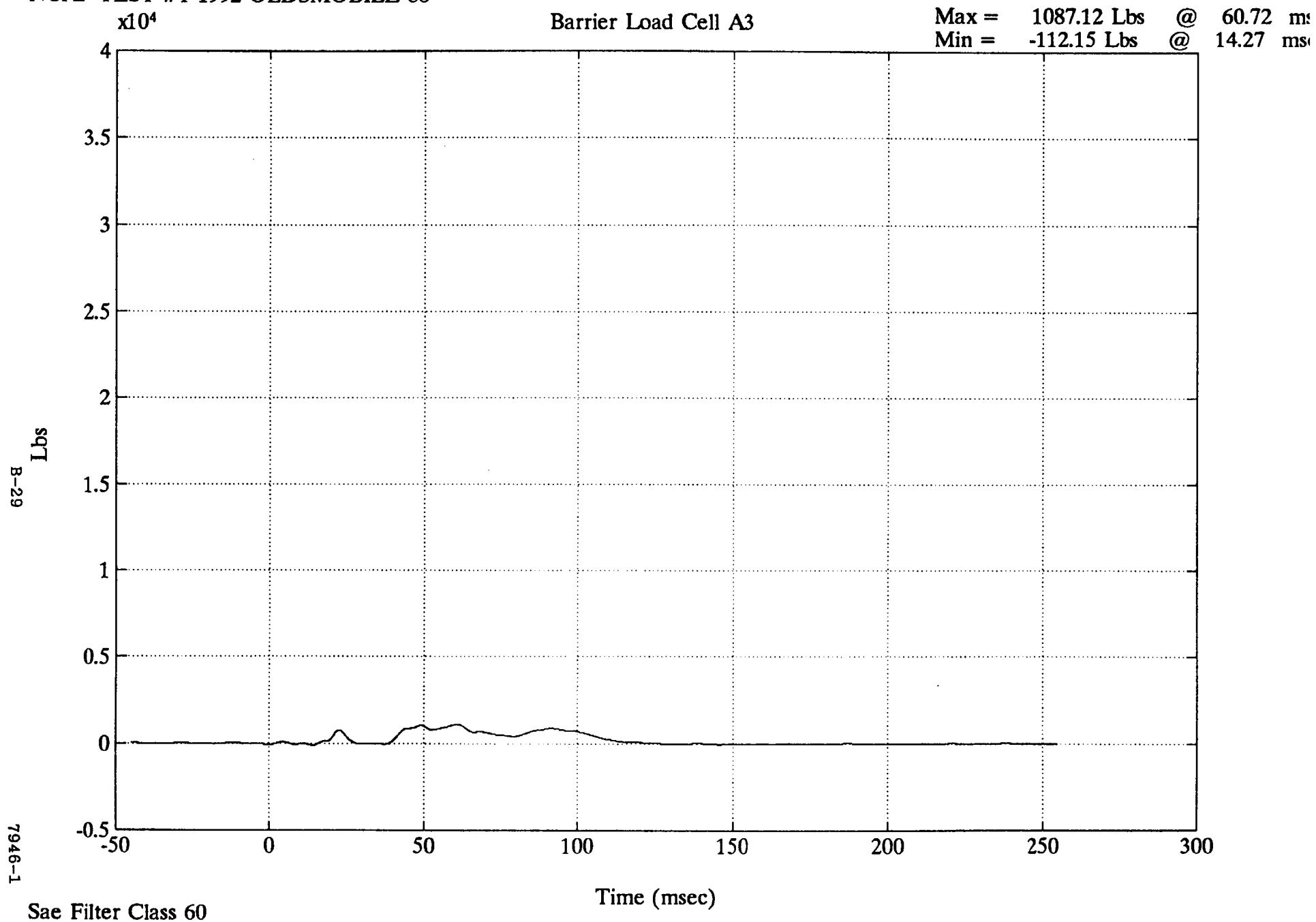

B-29

7946-1

Sae Filter Class 60

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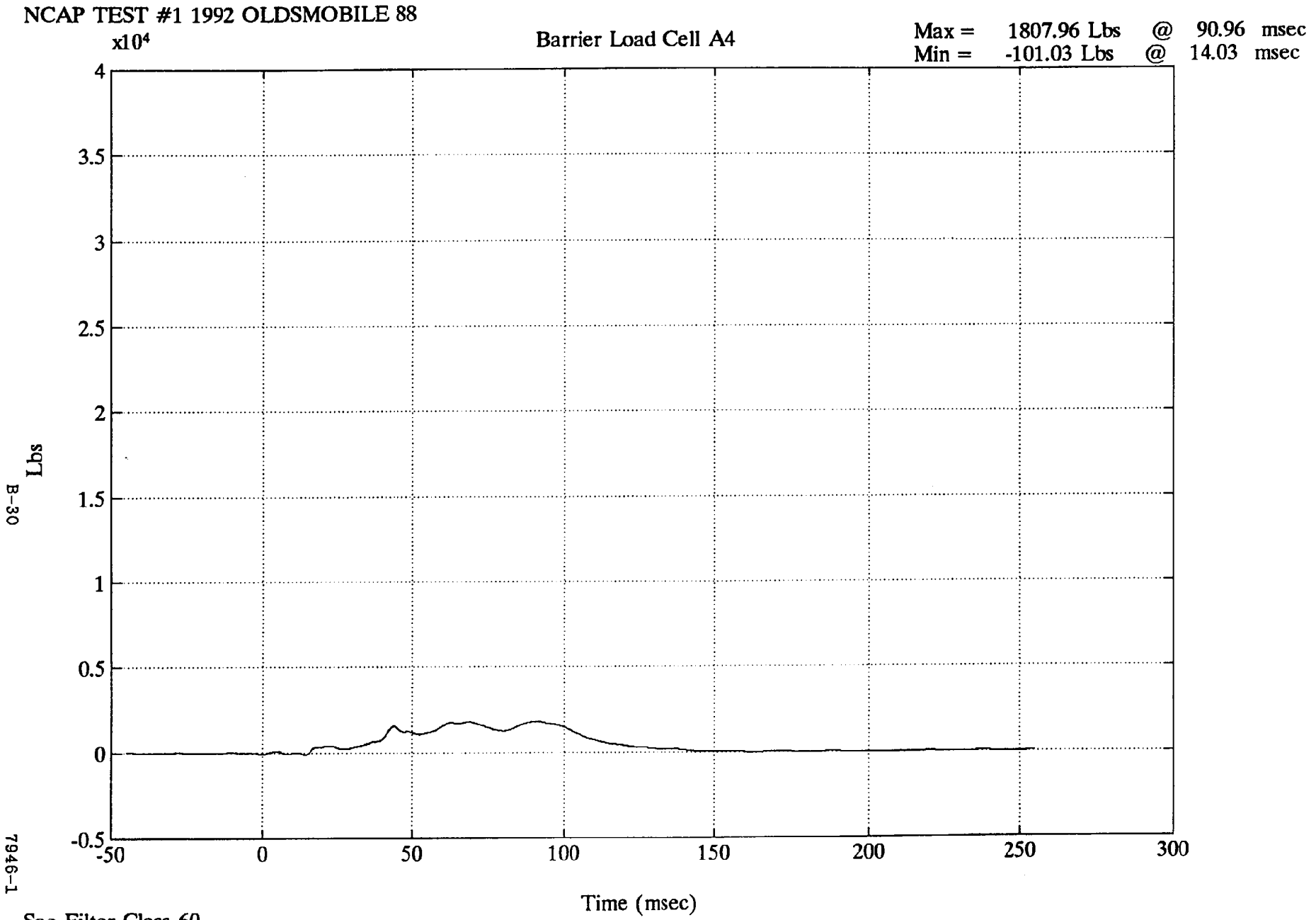
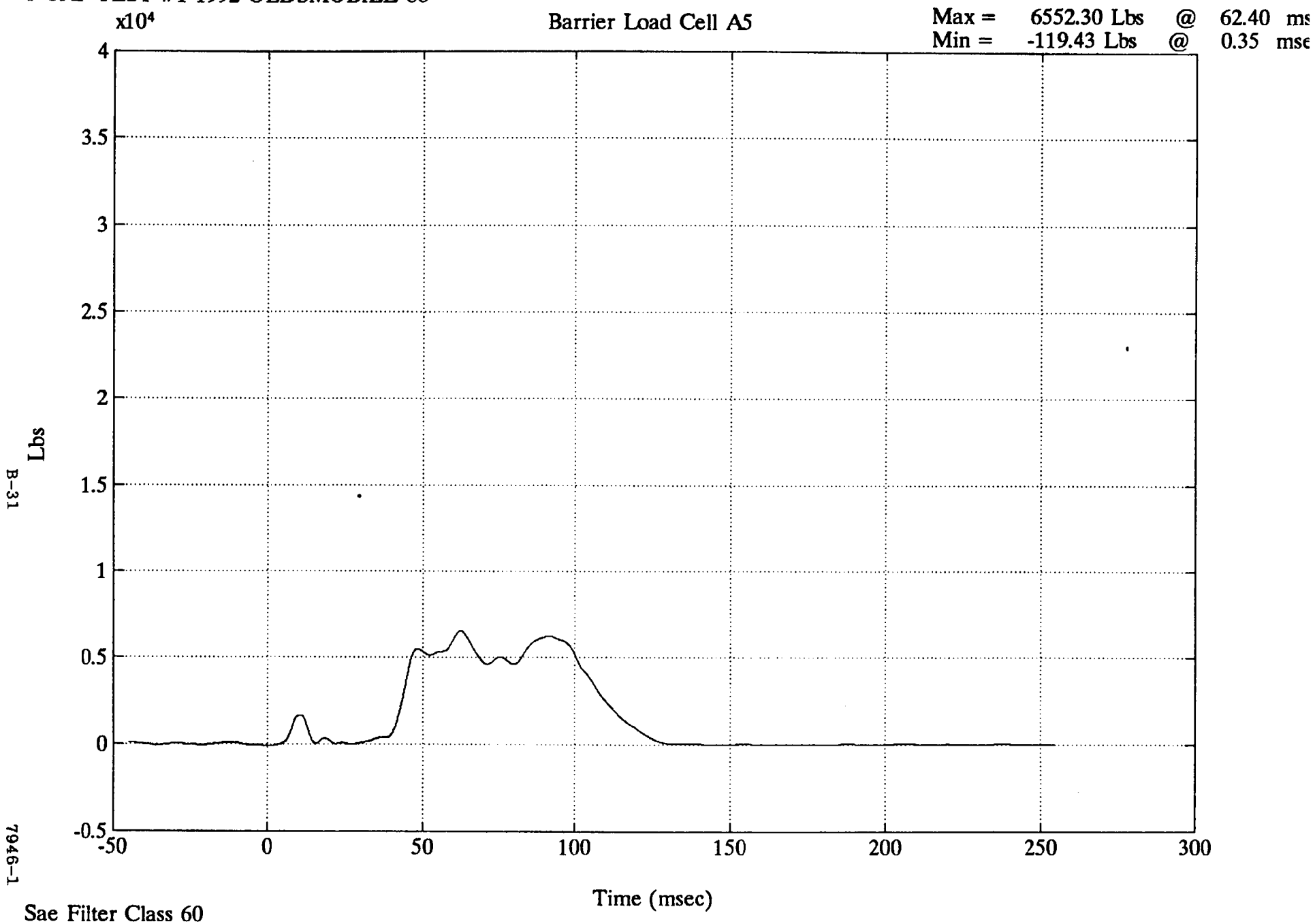


B-30

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

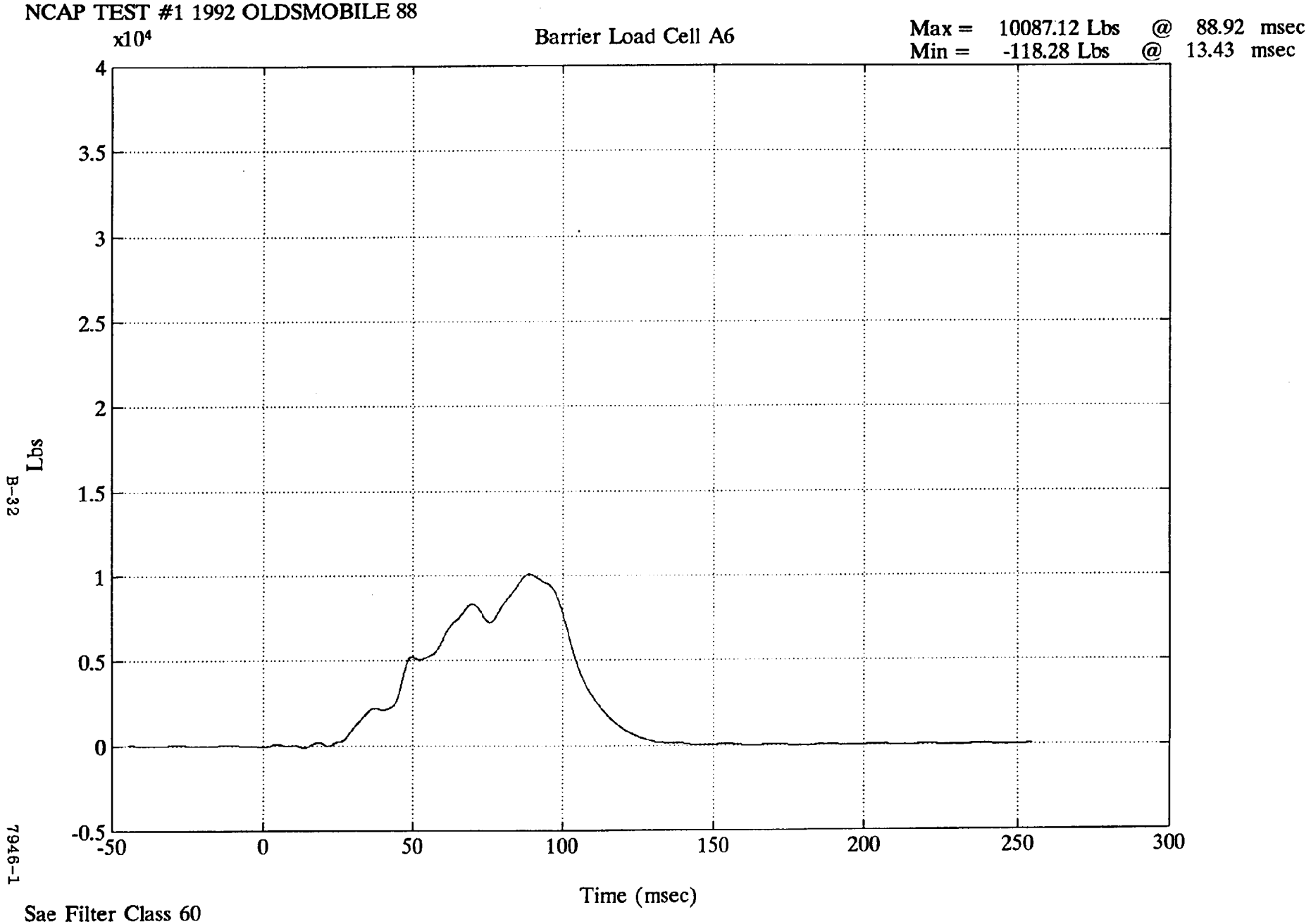


B-31

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

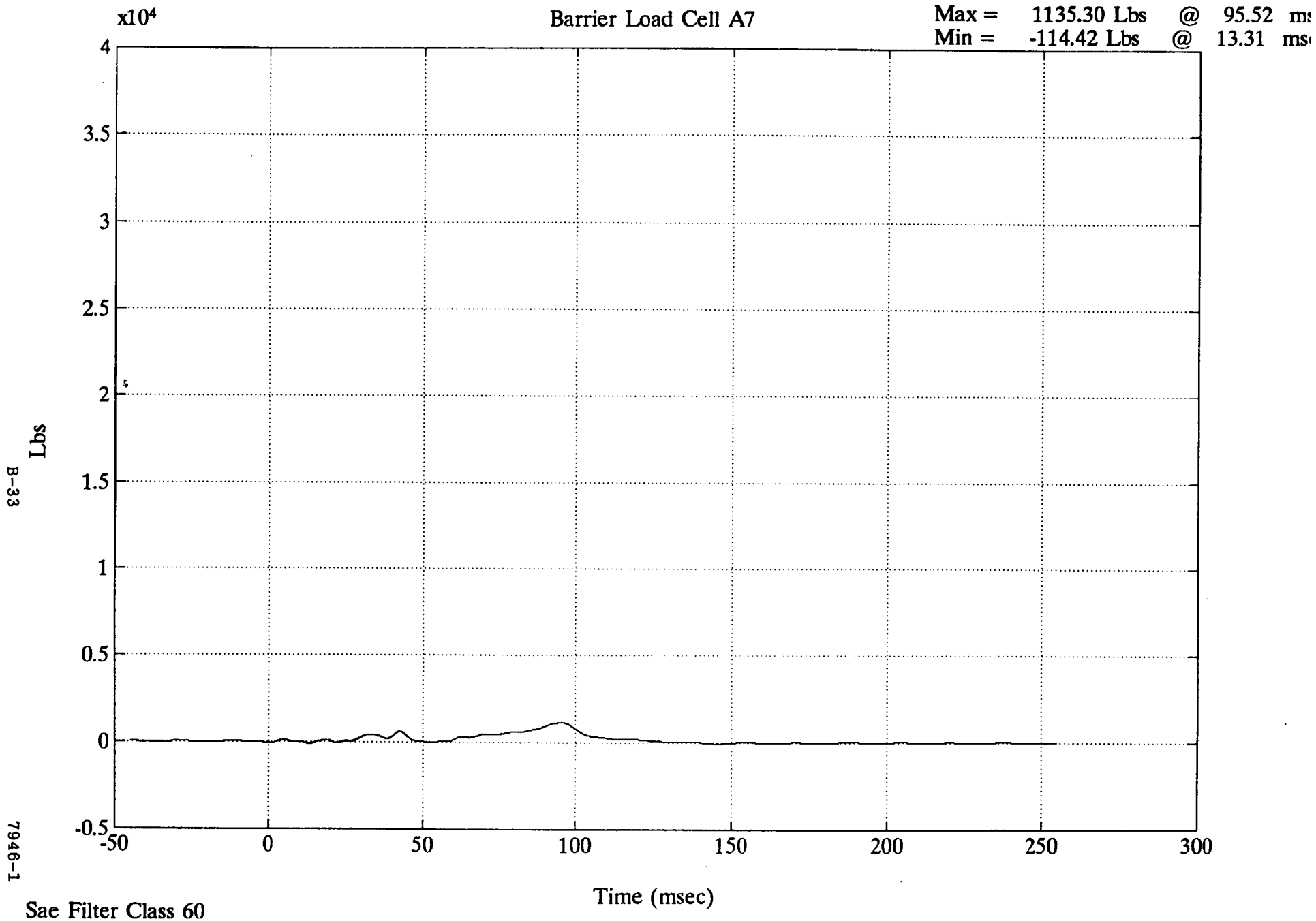


B-32

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

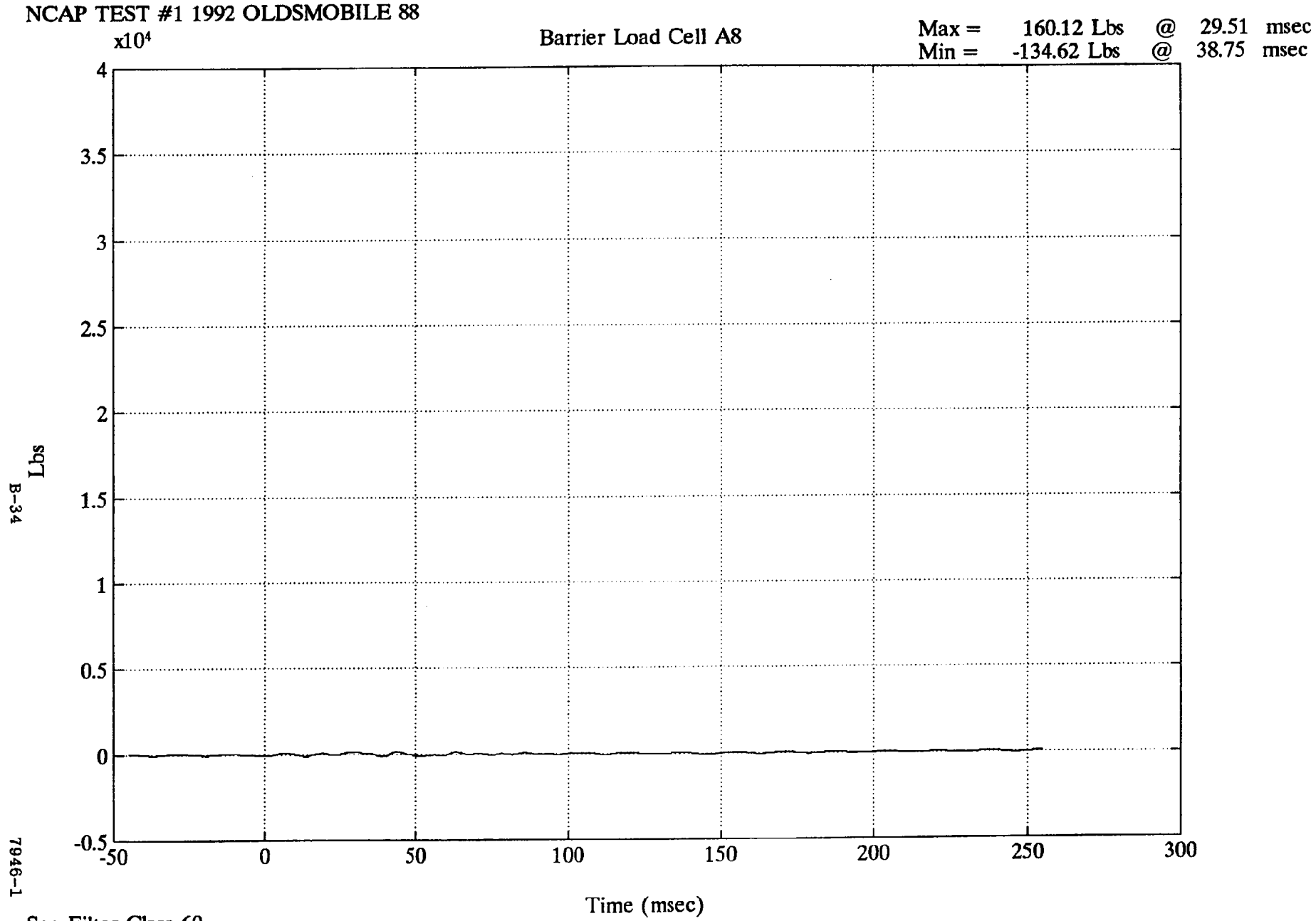


B-33

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

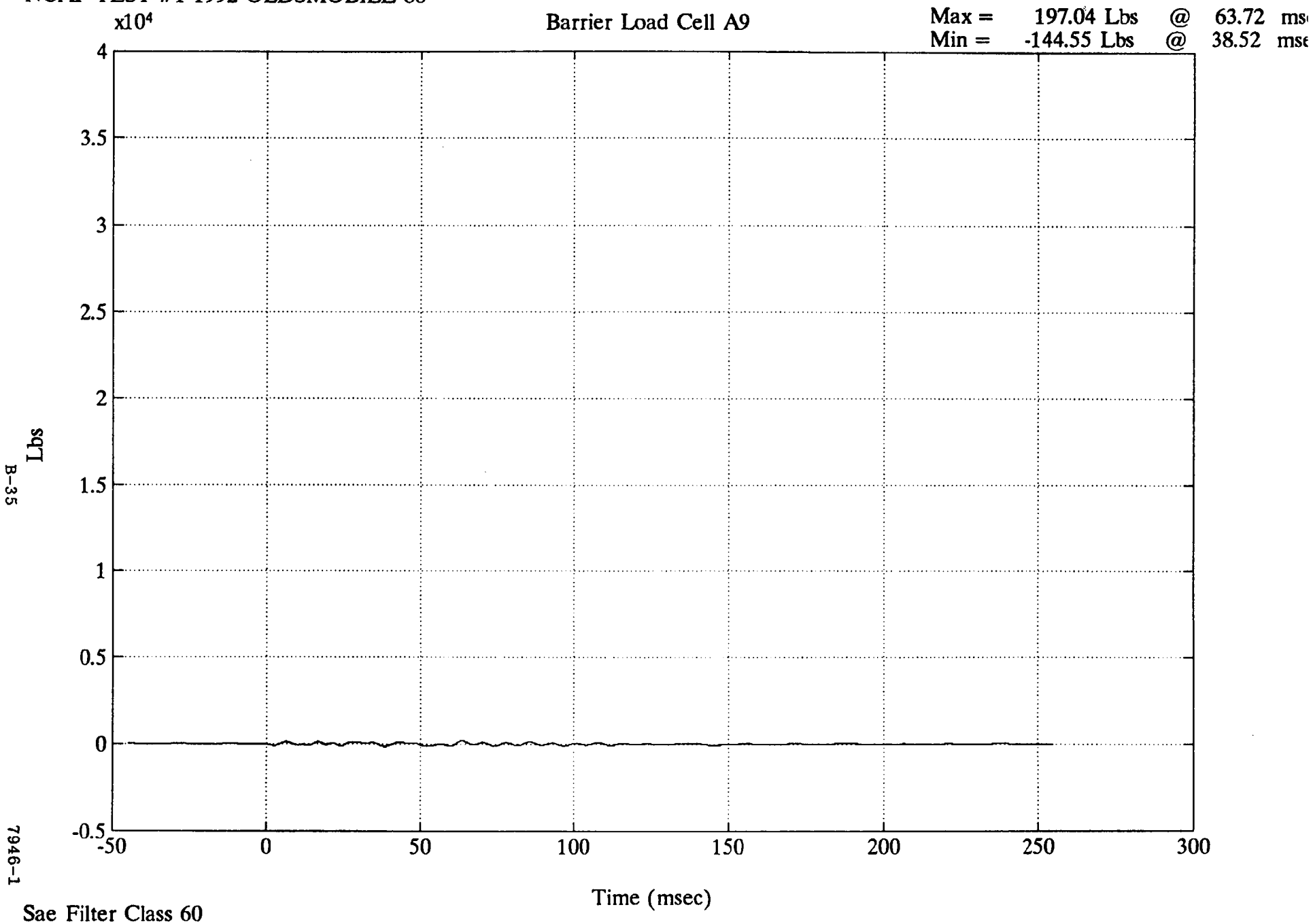


B-34

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88



B-35

7946-1

Sae Filter Class 60

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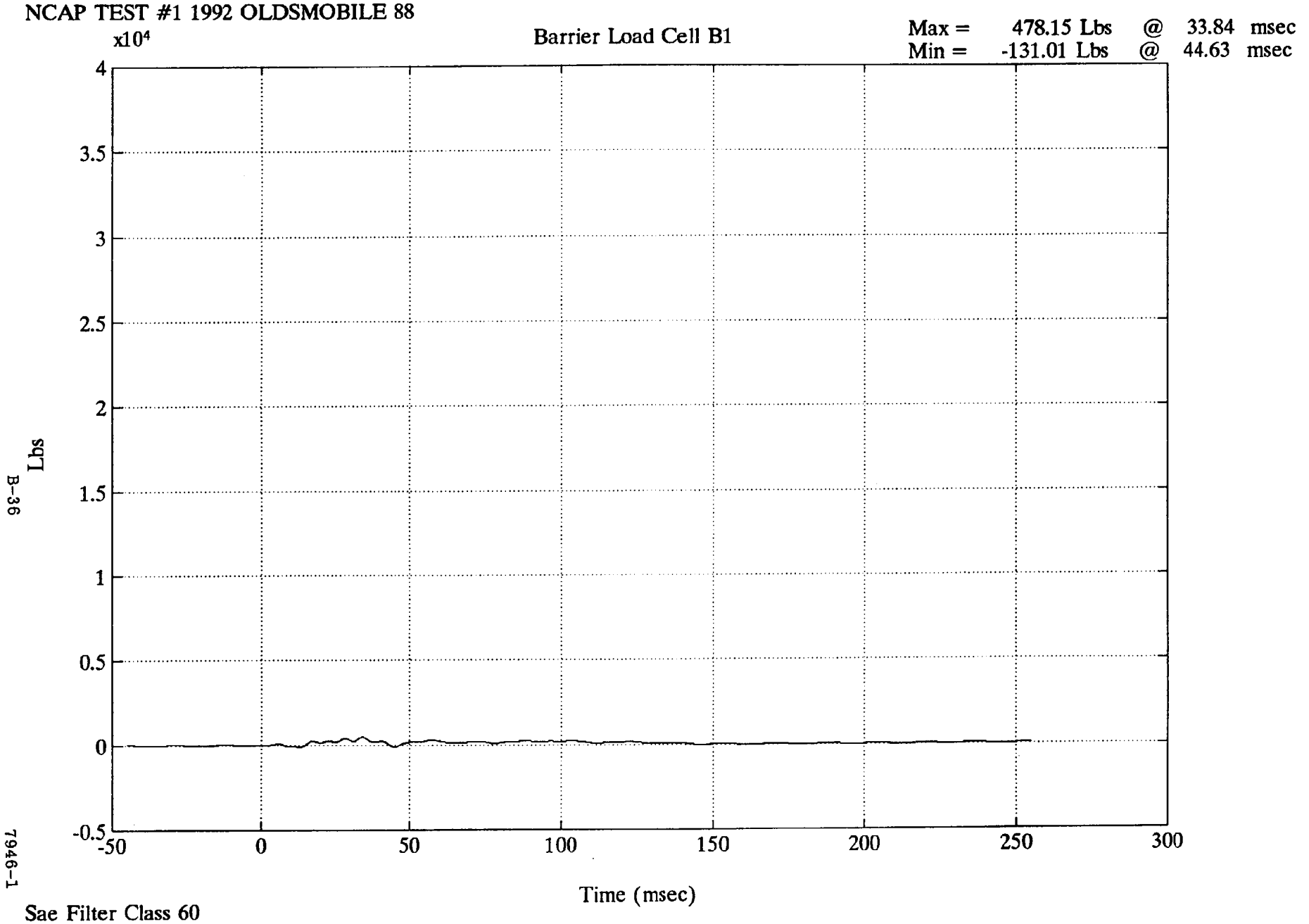

B-36

7946-1

Sae Filter Class 60

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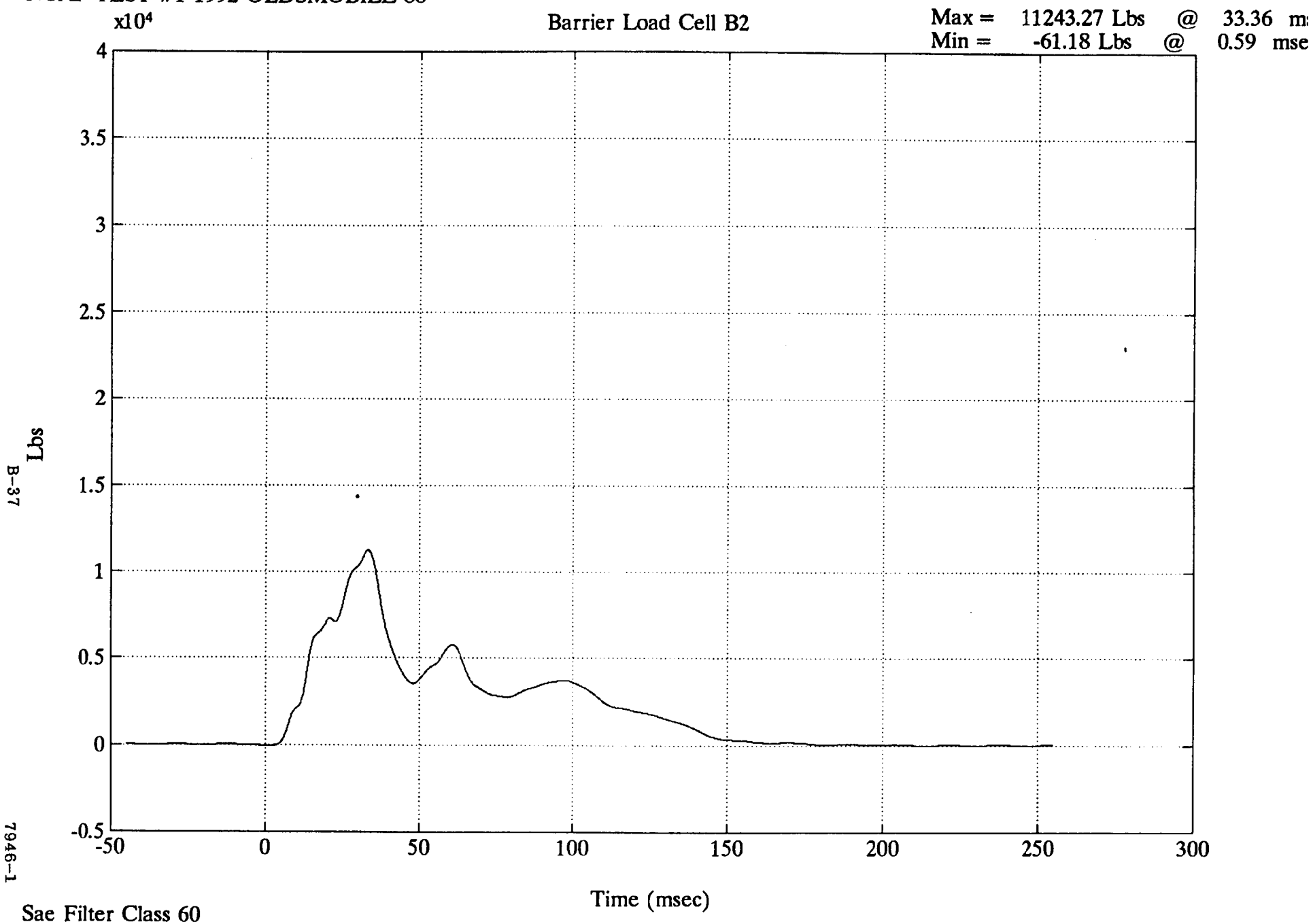

B-37

7946-1

Sae Filter Class 60

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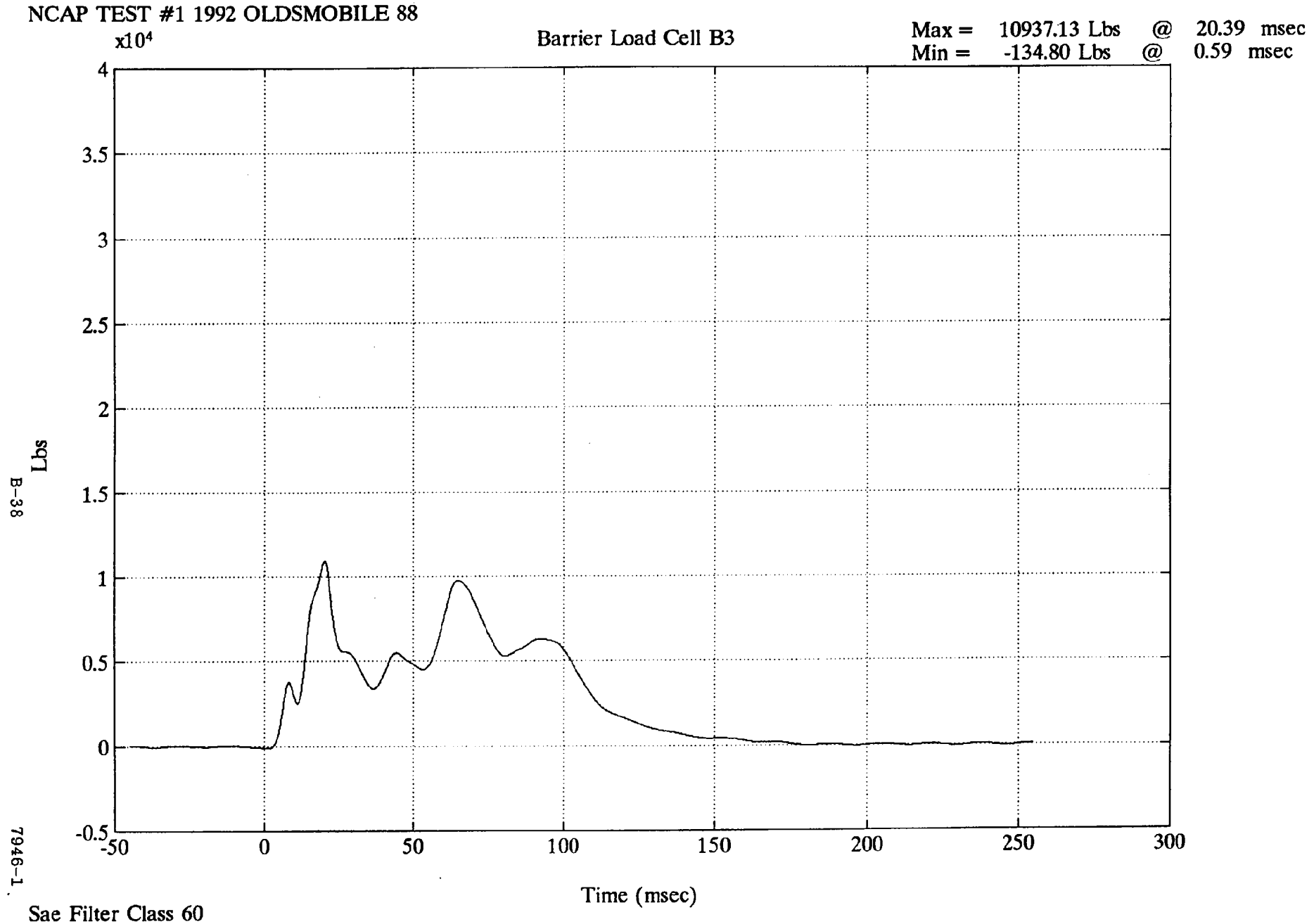
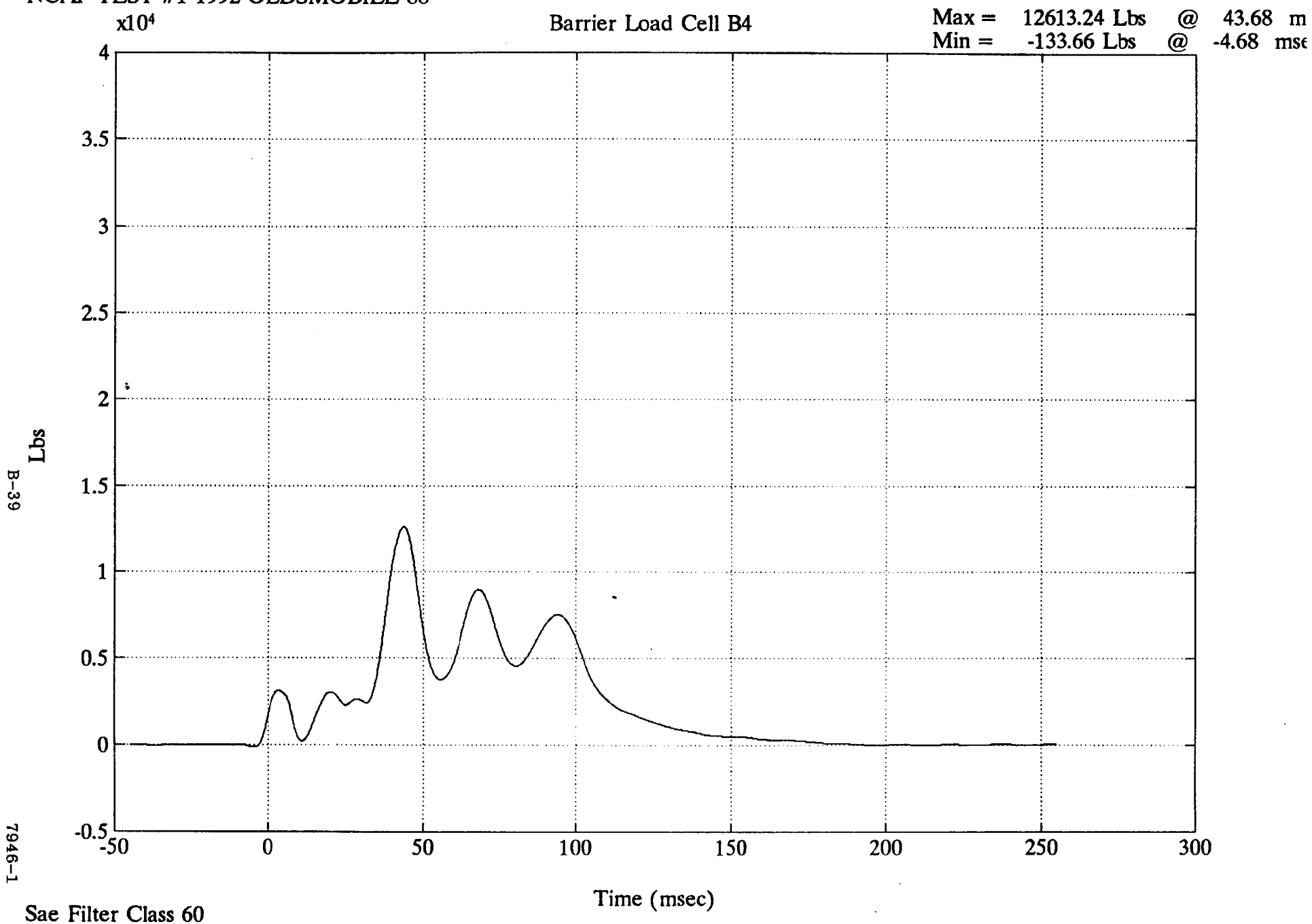


B-38

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

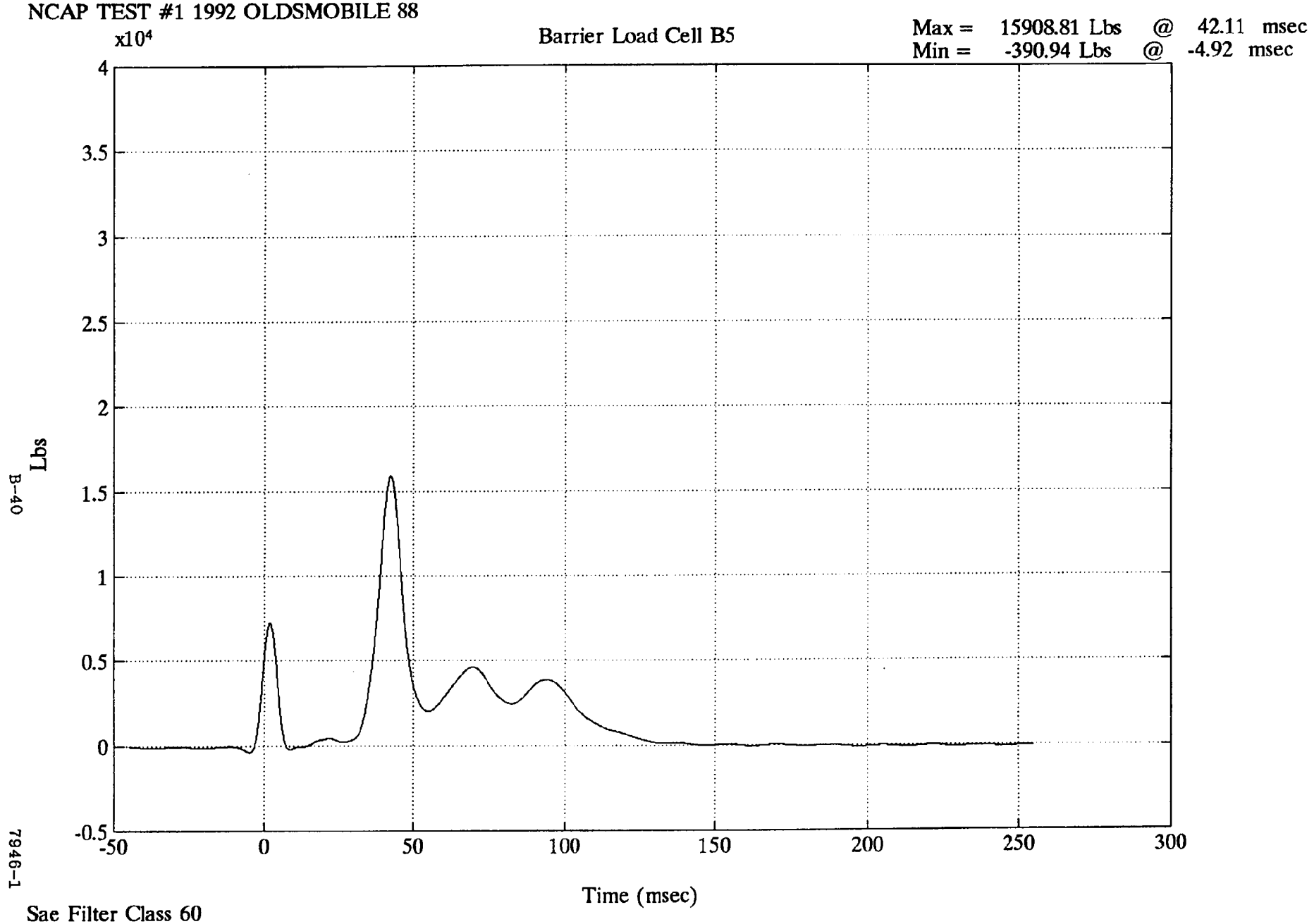


B-39

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

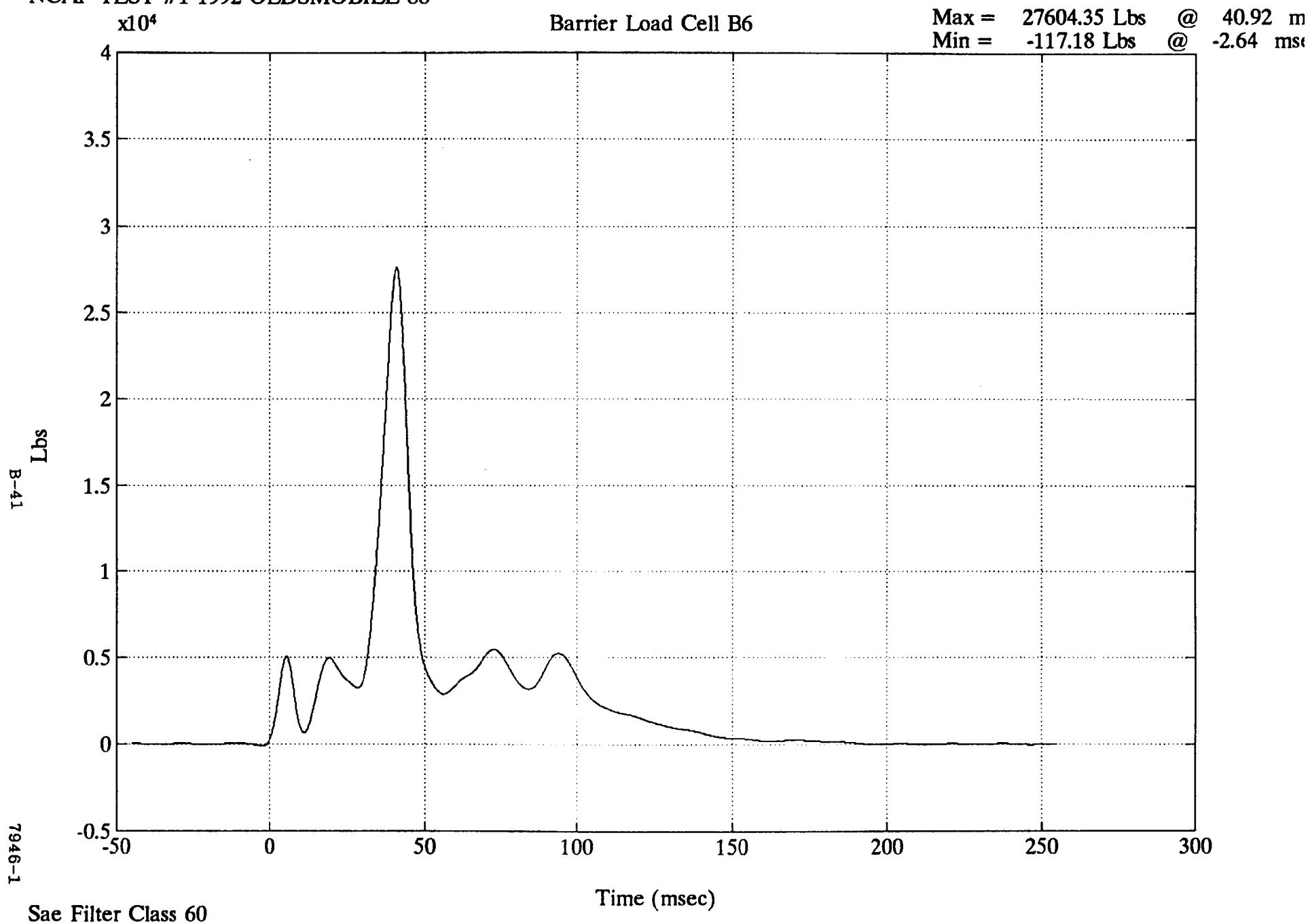


B-40

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

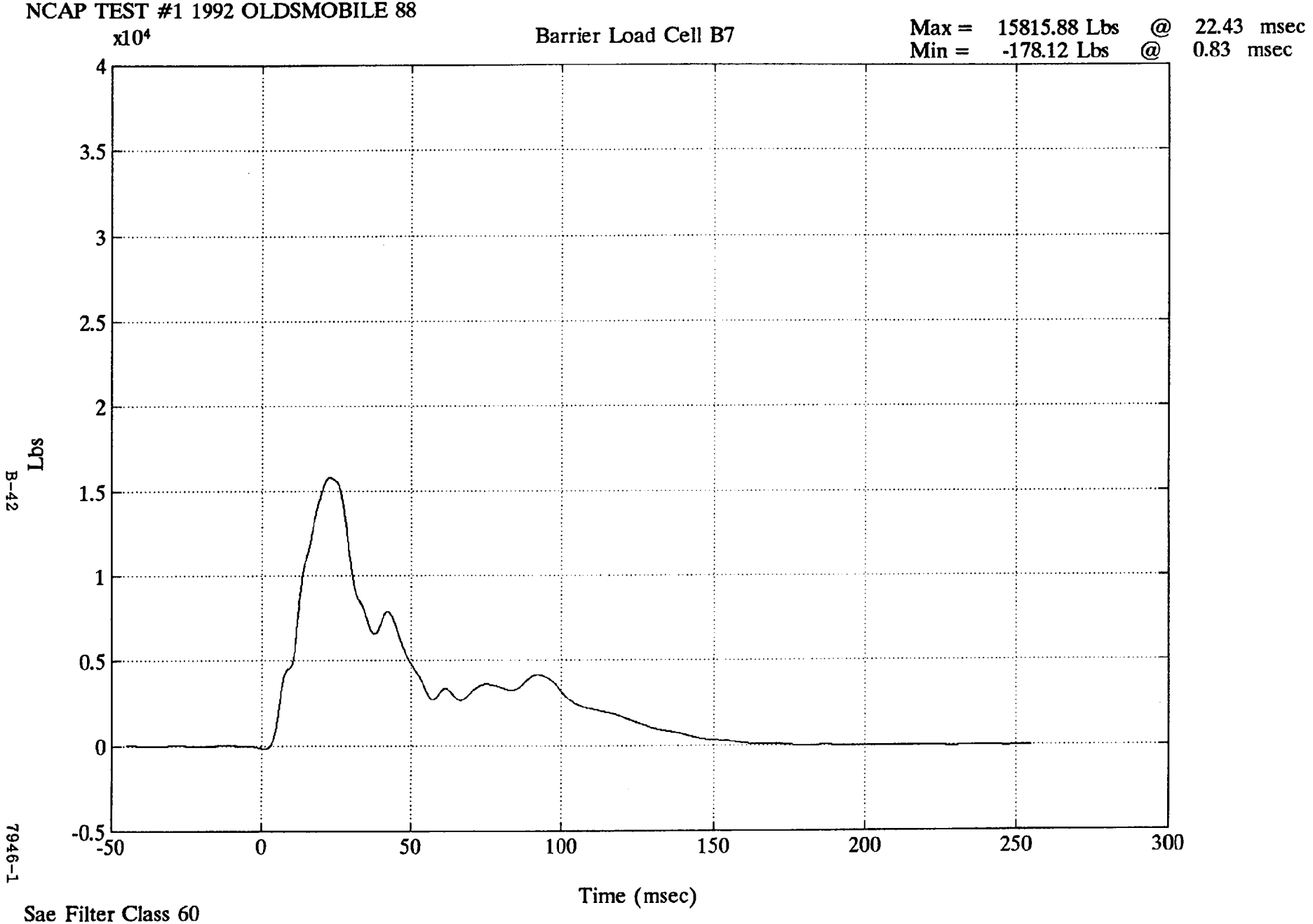


B-41

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

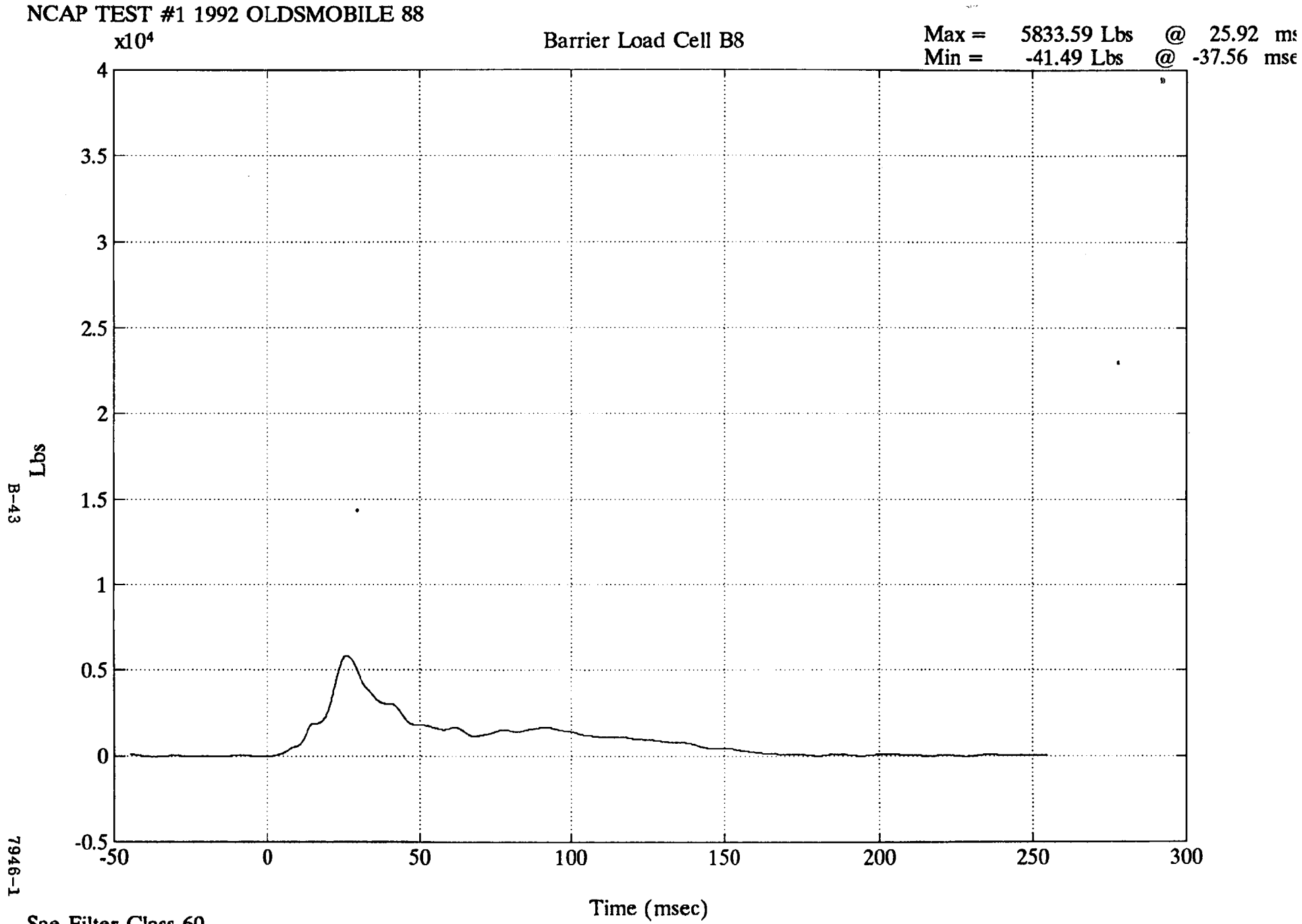


B-42

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

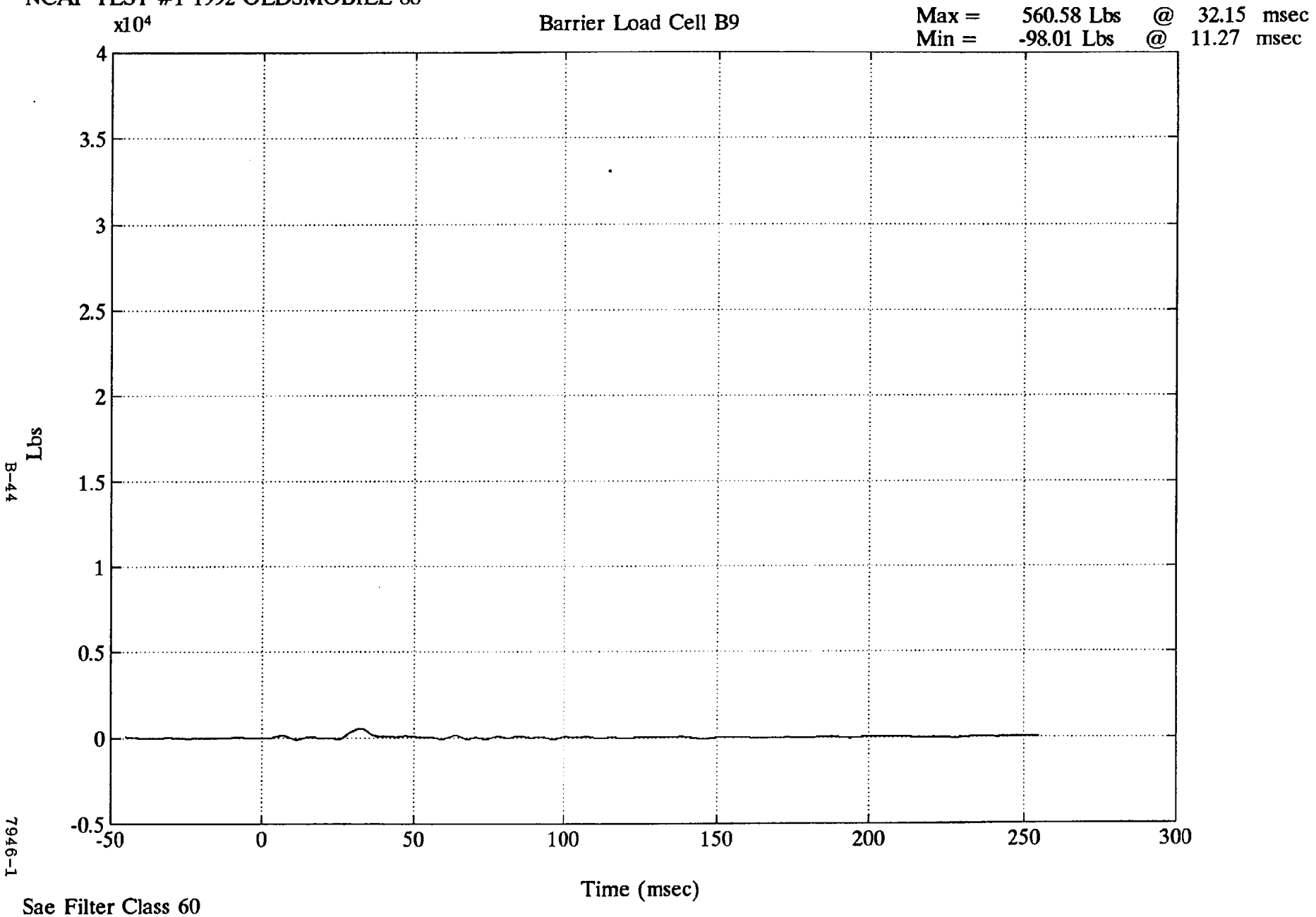


B-43

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

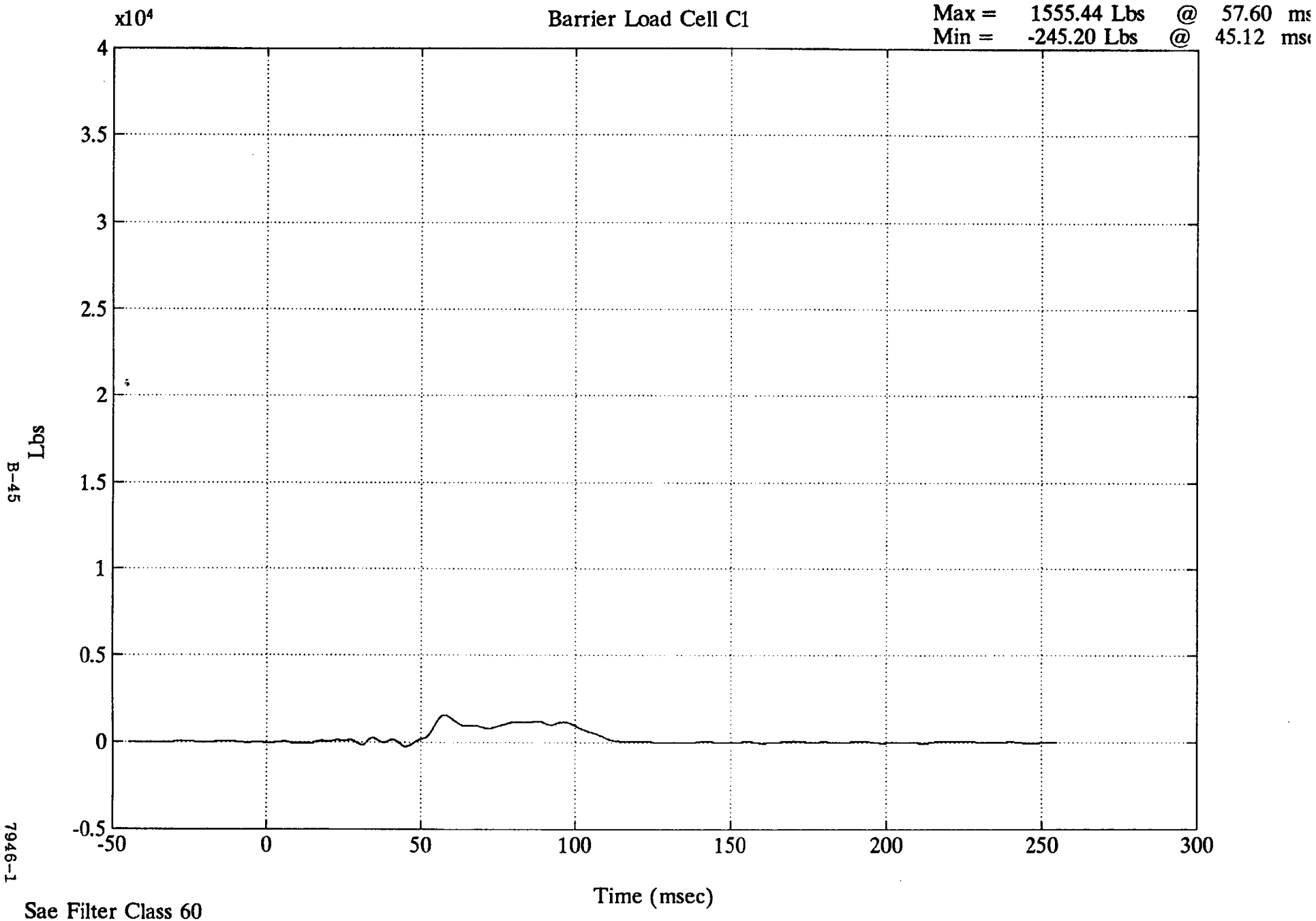


B-44

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

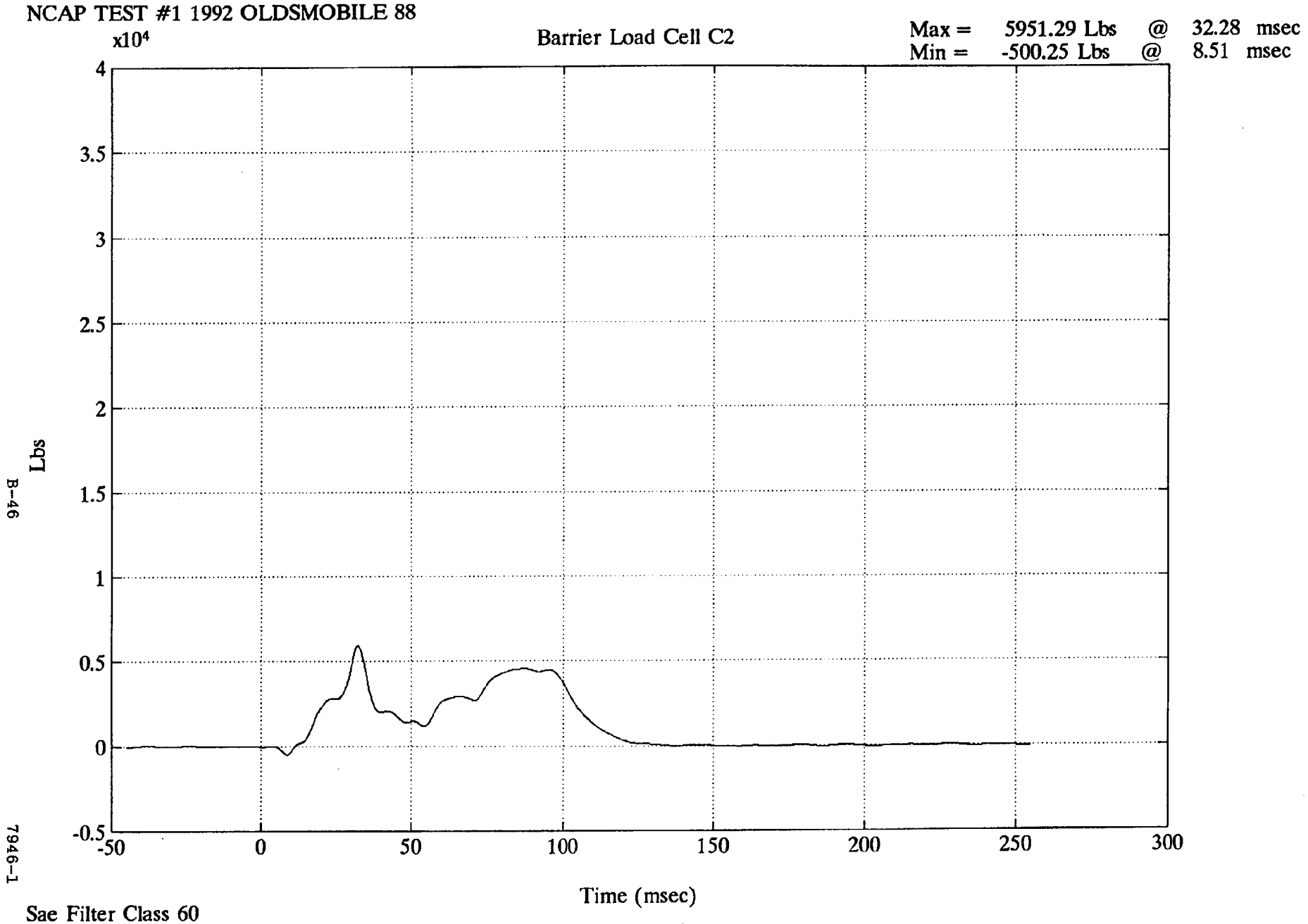


B-45

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

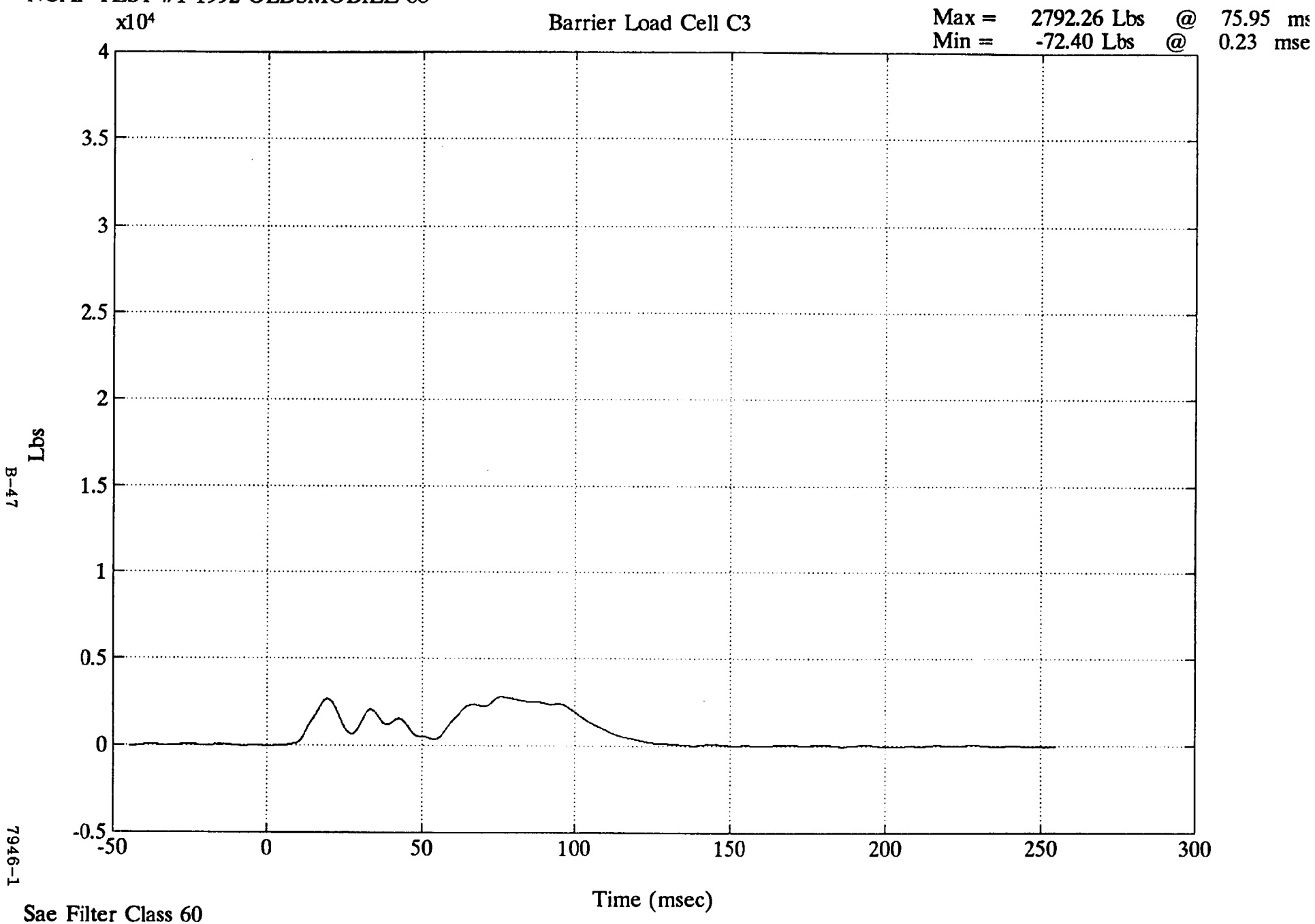


B-46

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

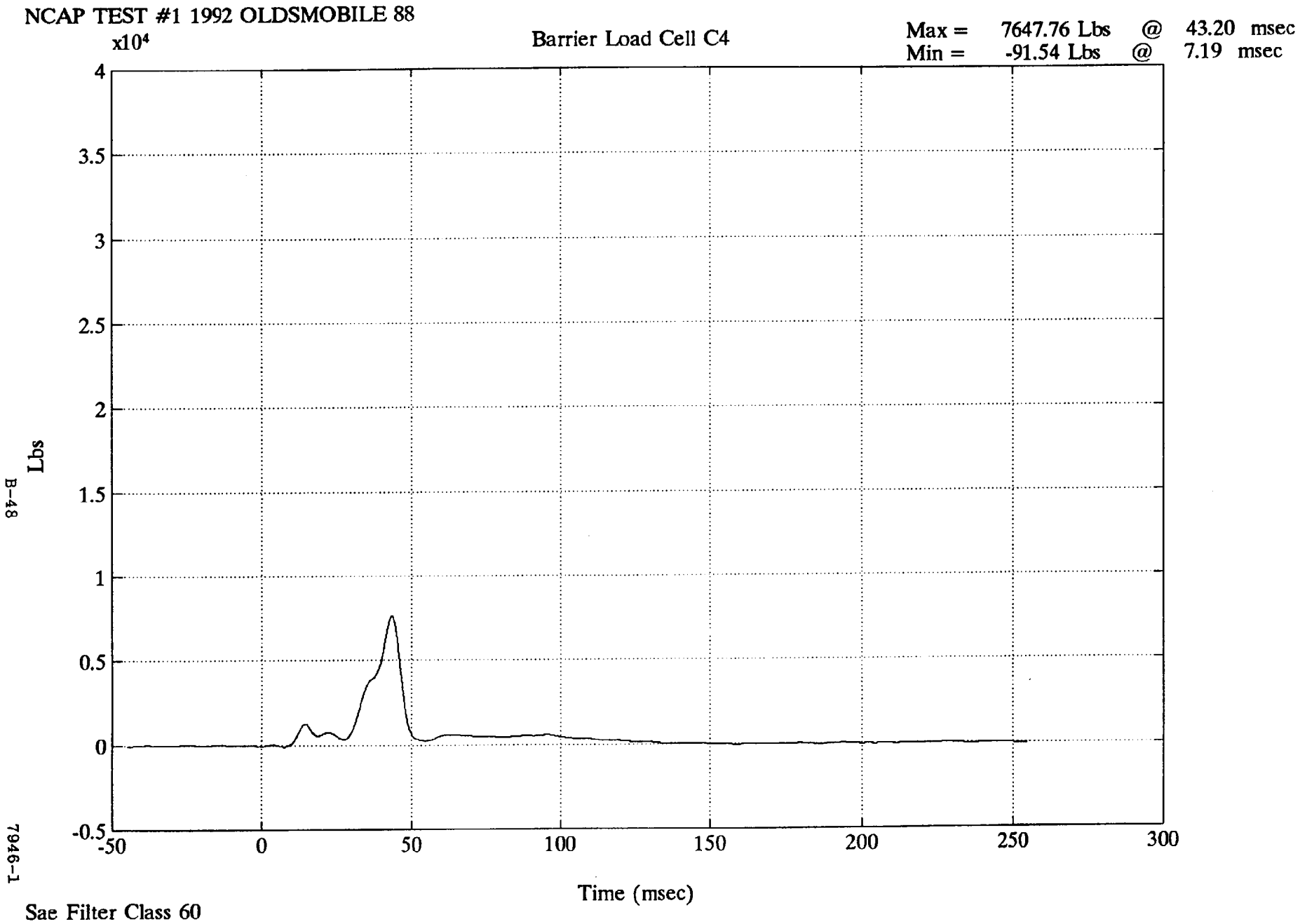


B-47

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

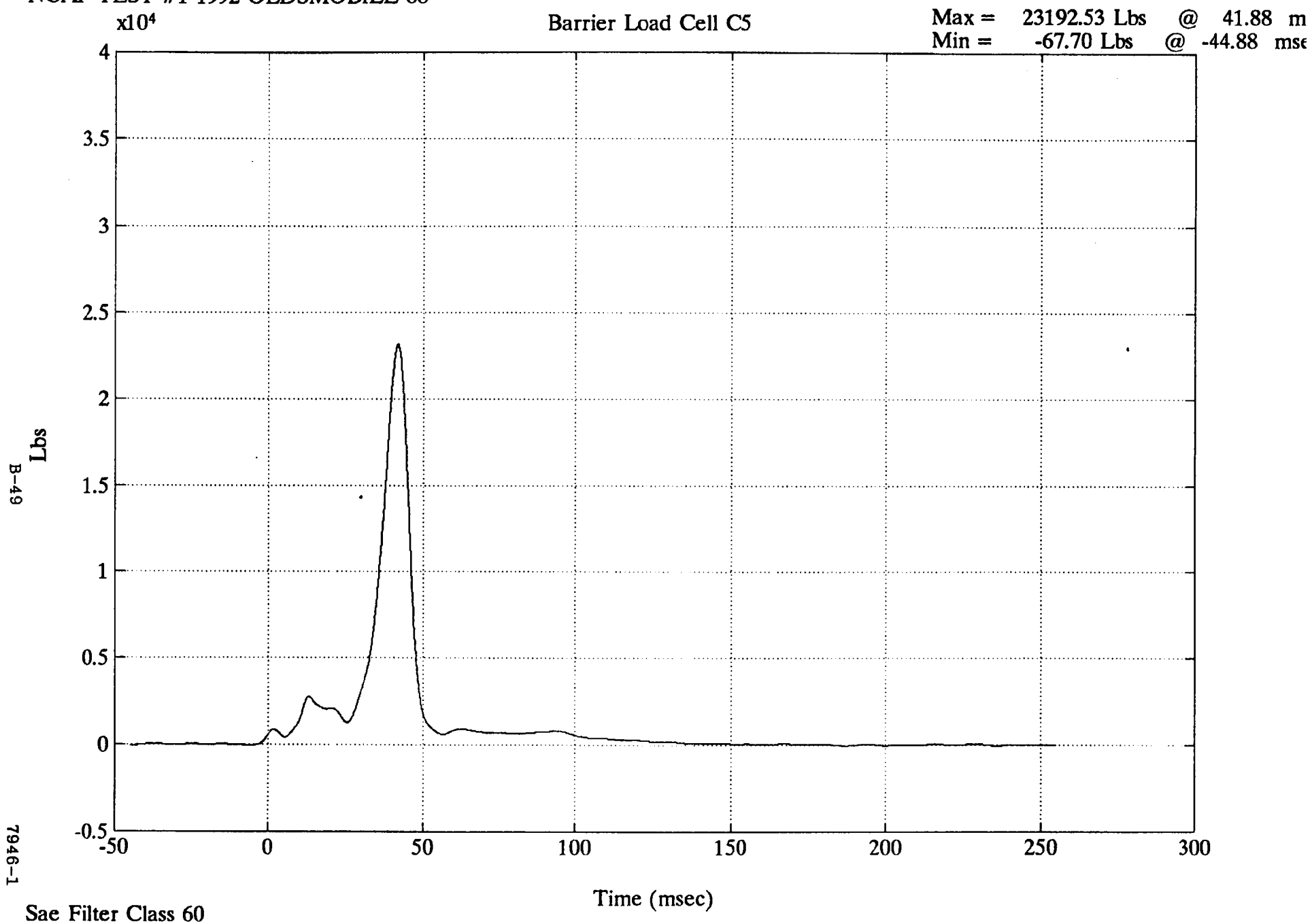


B-48

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

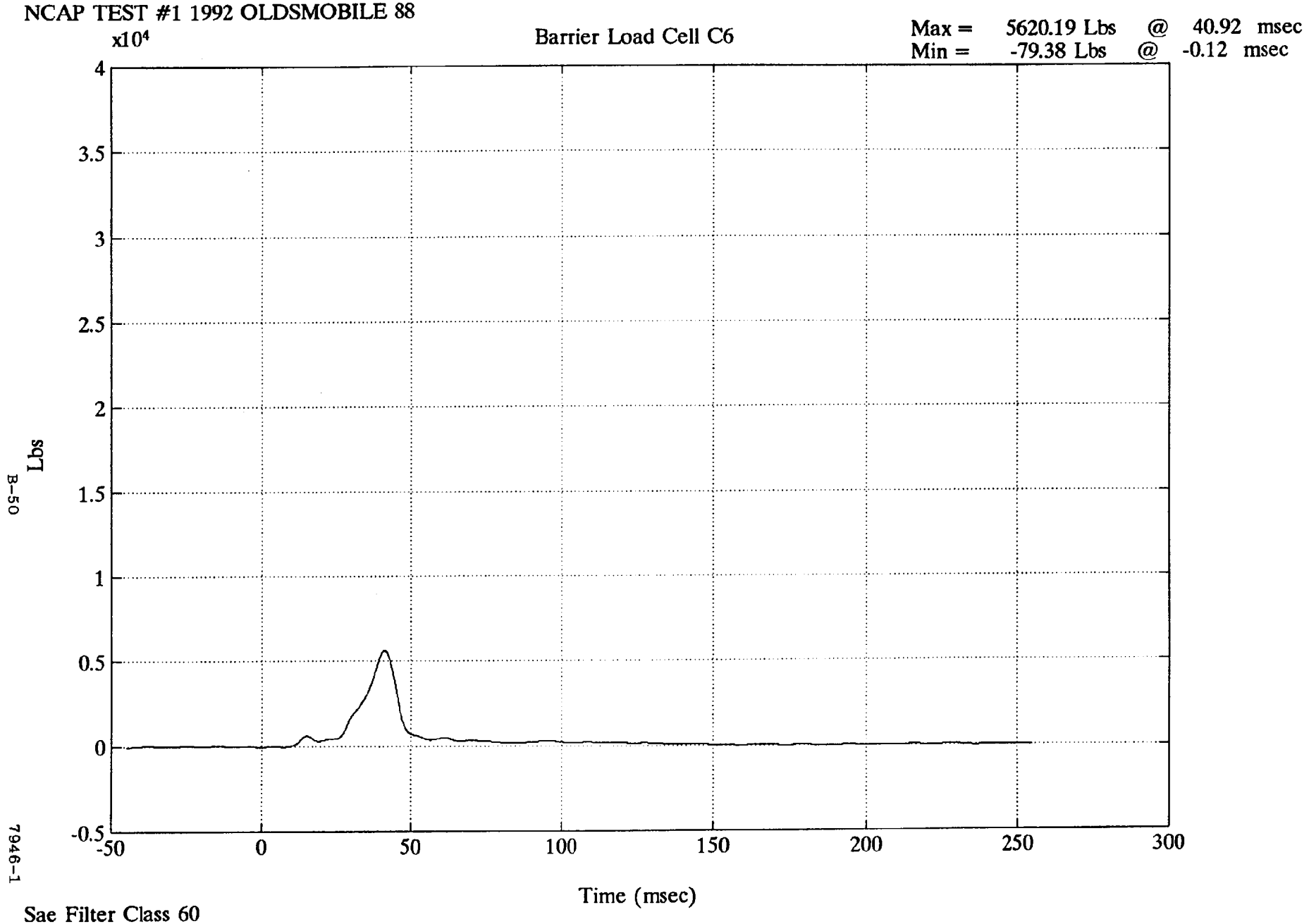


B-49

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

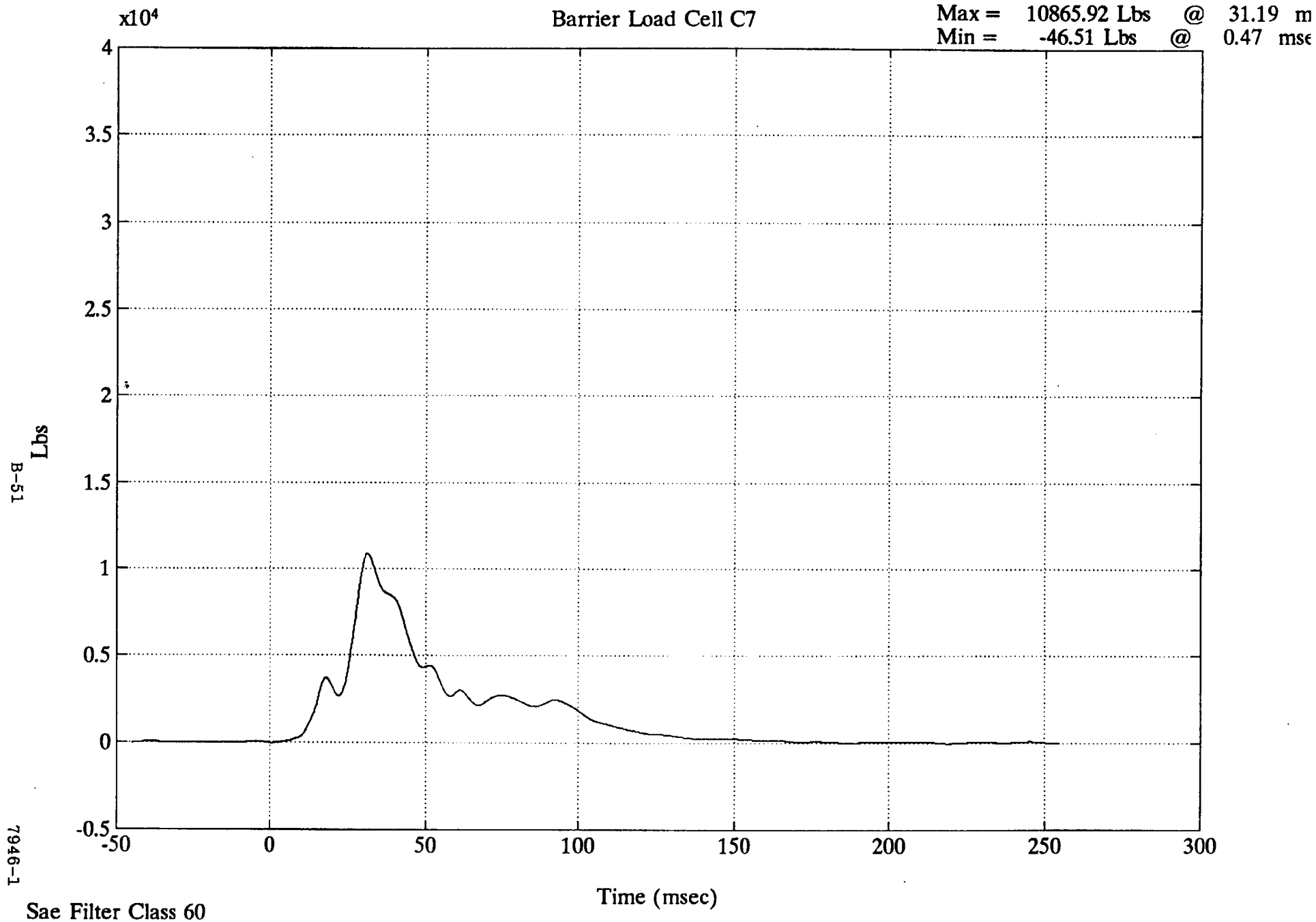


B-50

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

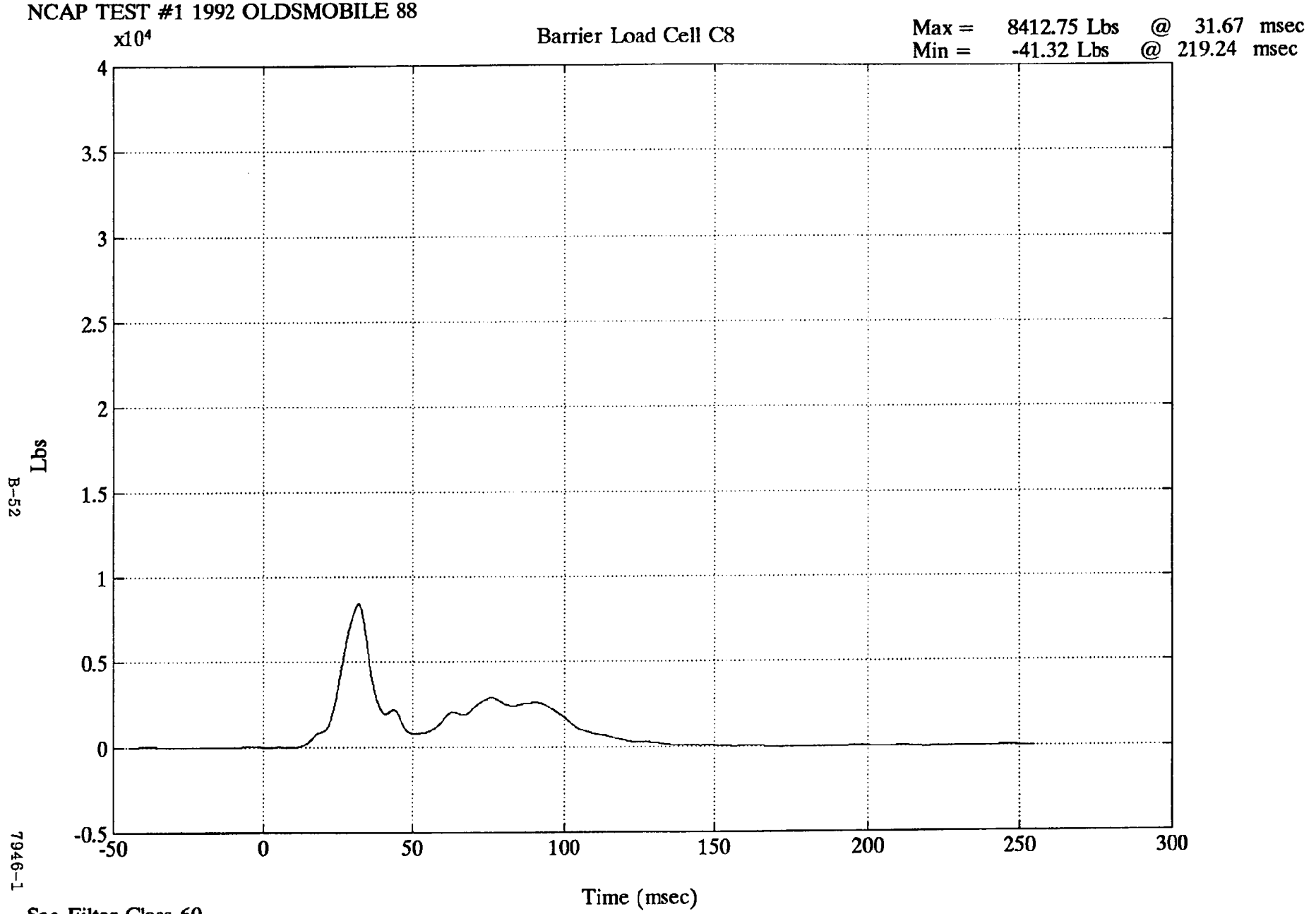


B-51

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

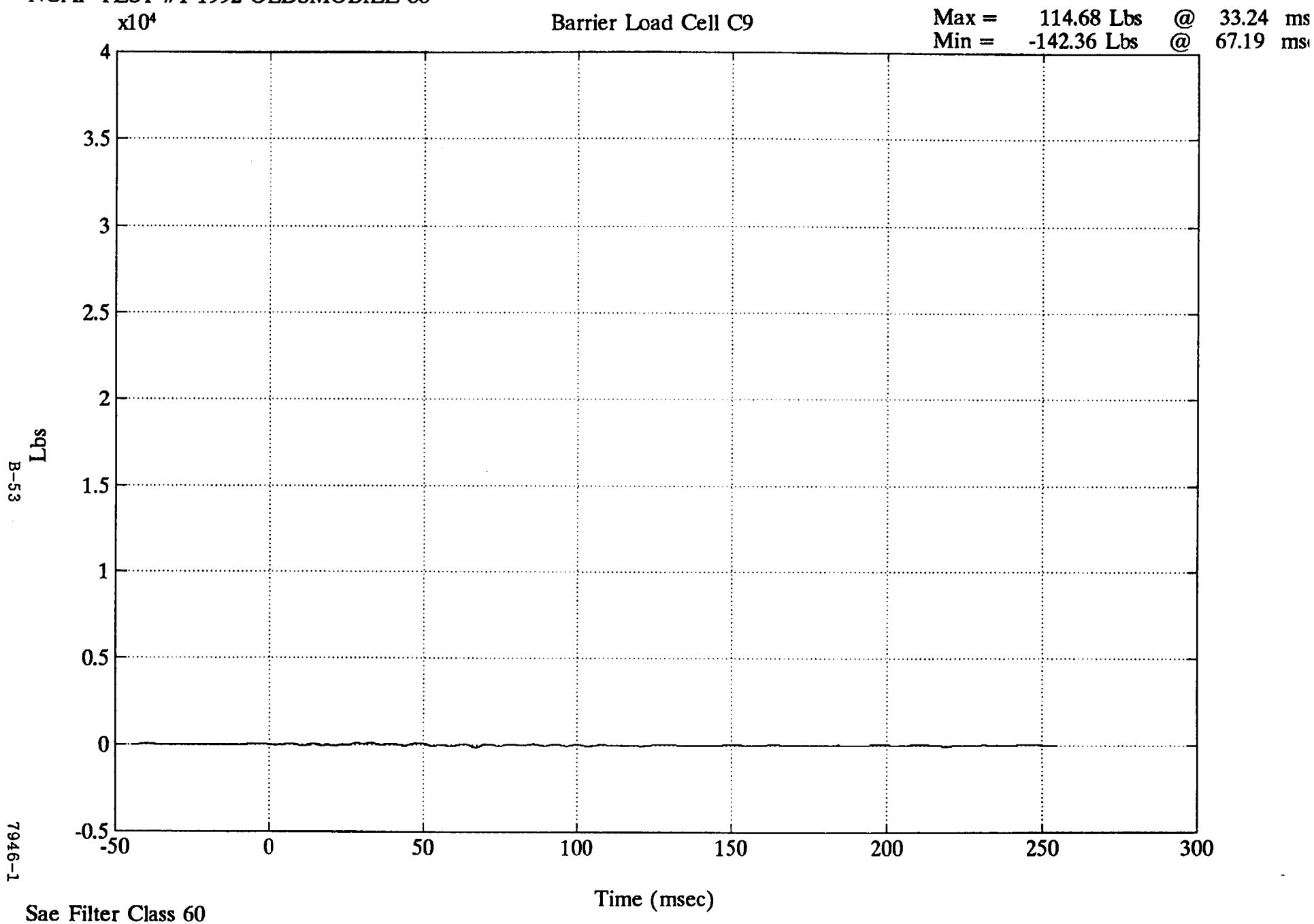


B-52

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

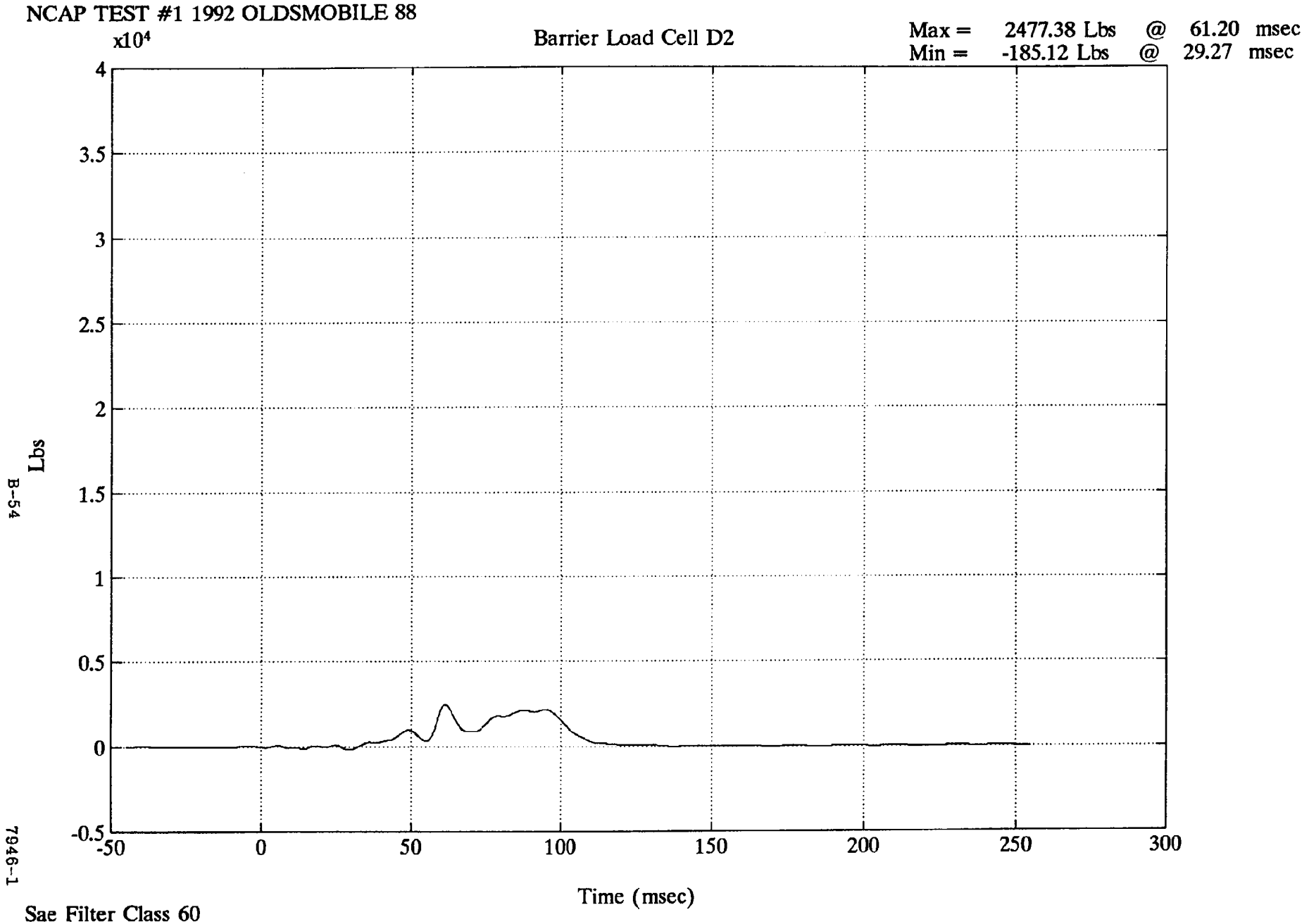


B-53

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

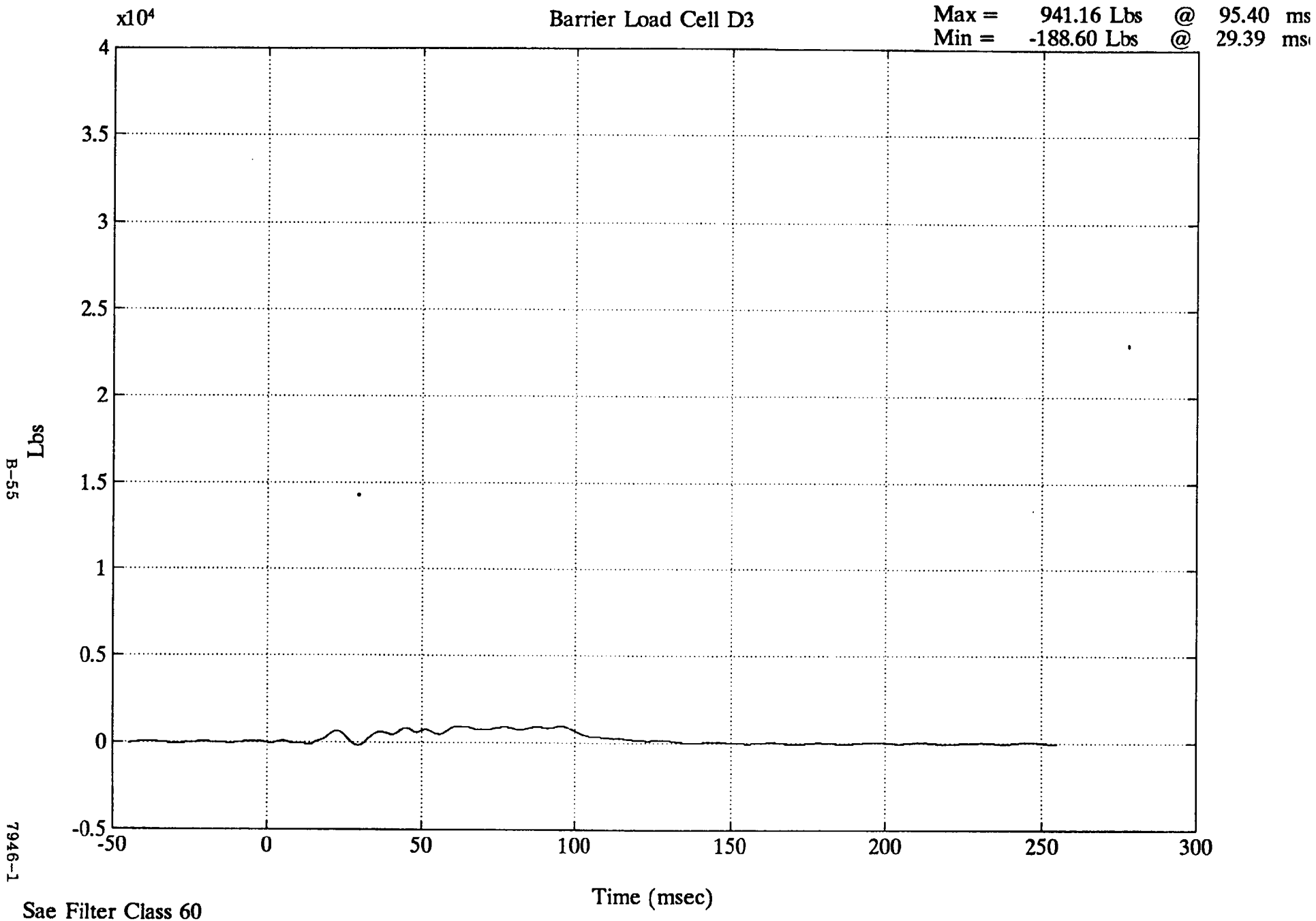


B-54

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

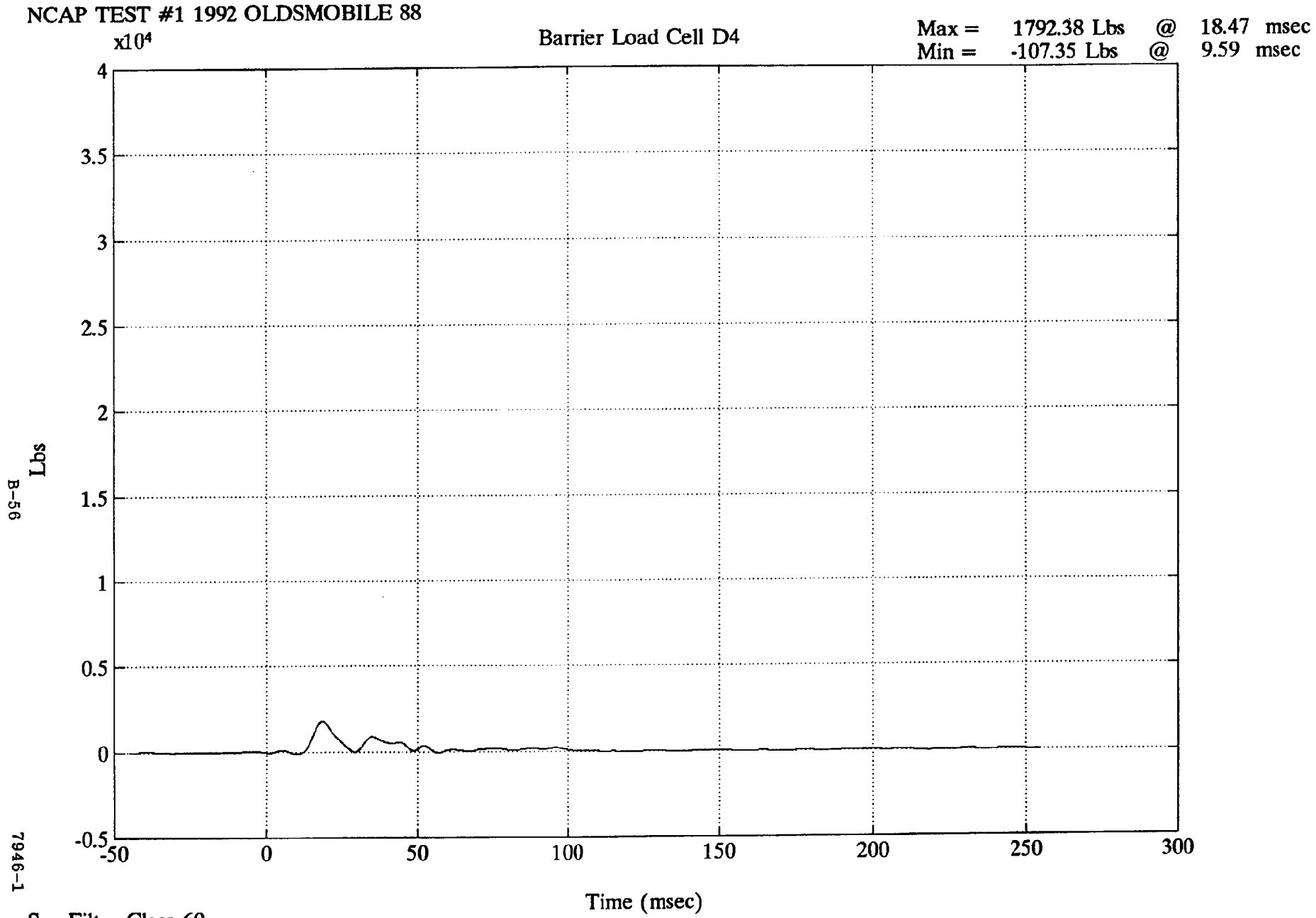


B-55

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

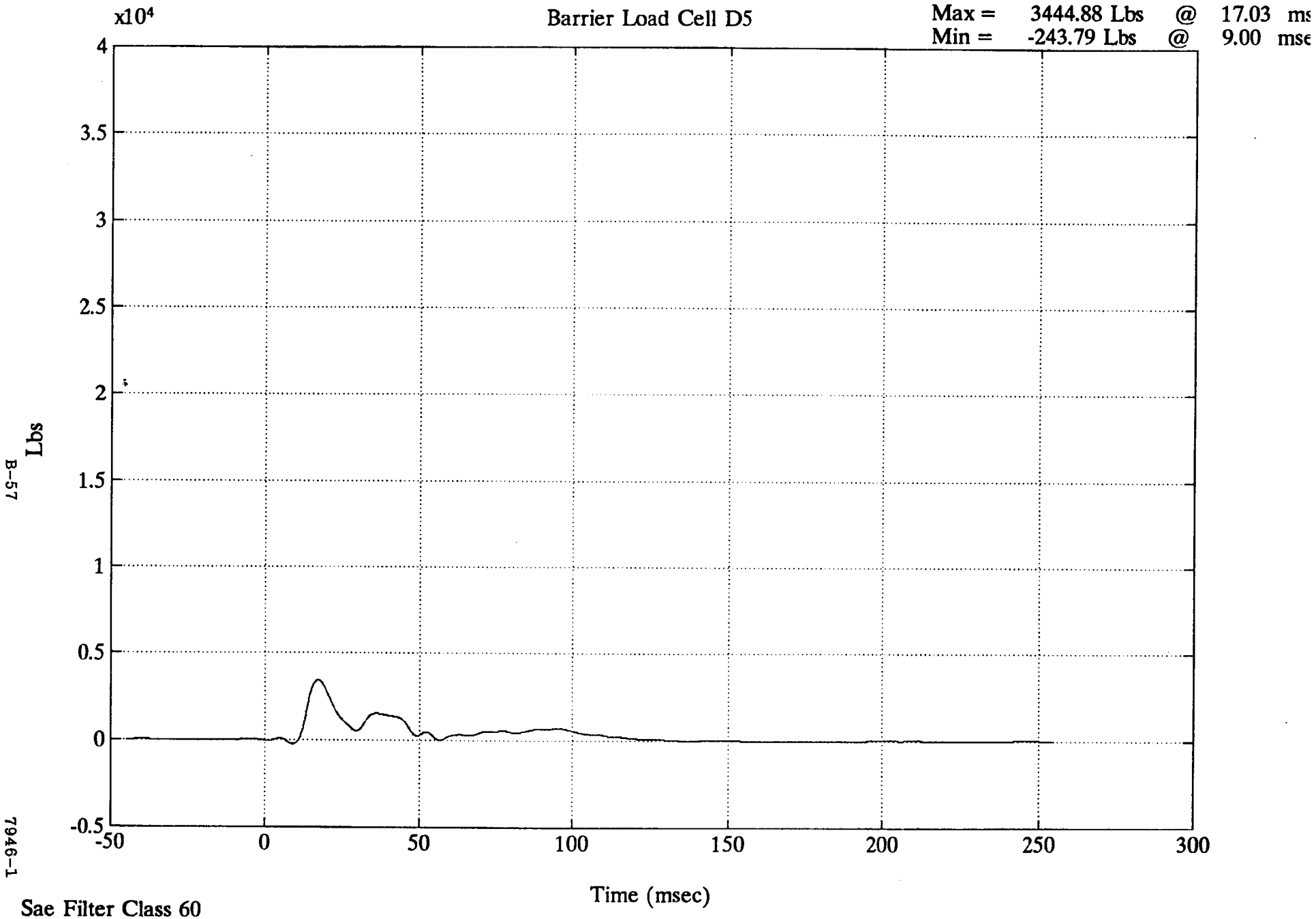


B-56

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

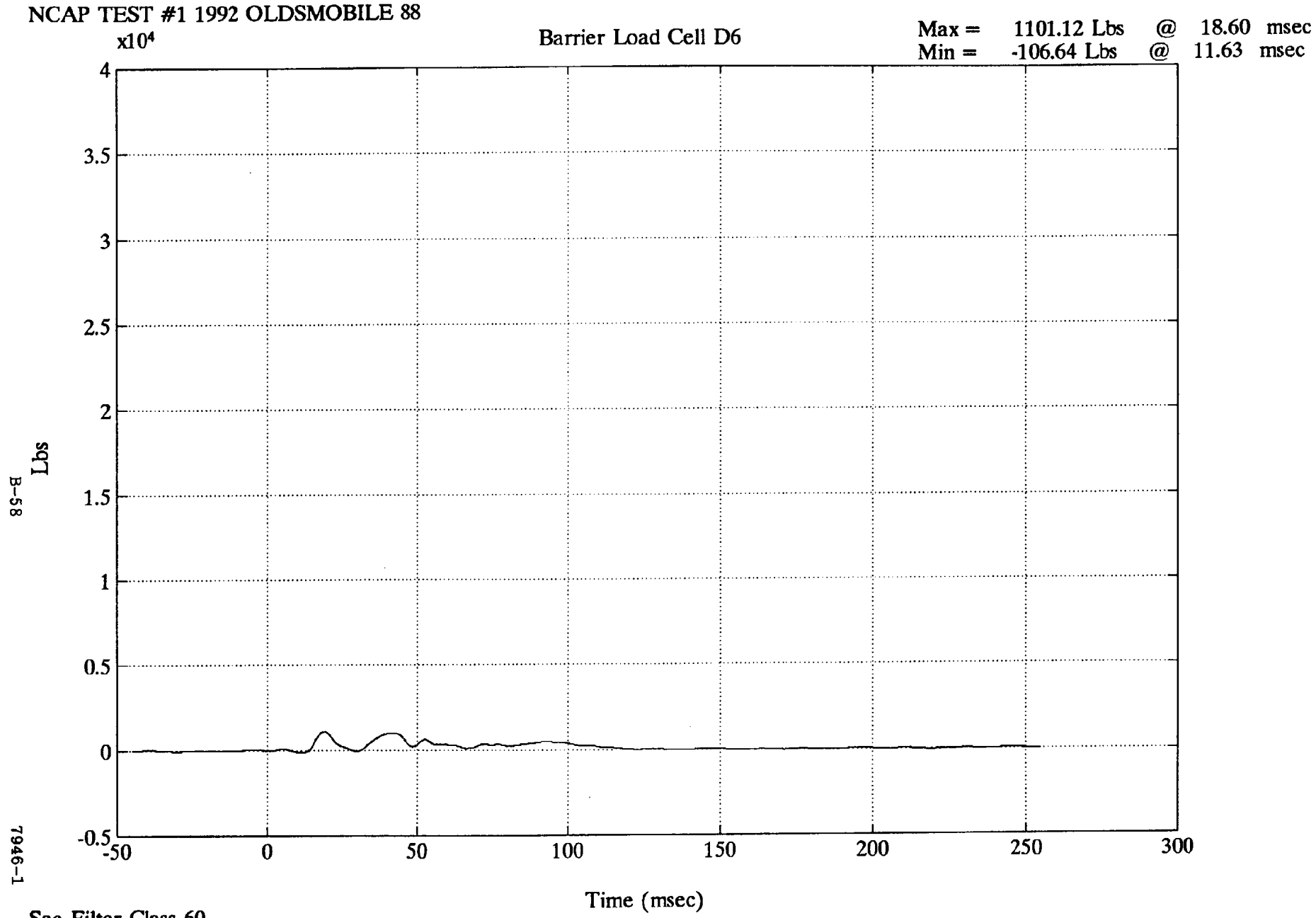


B-57

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

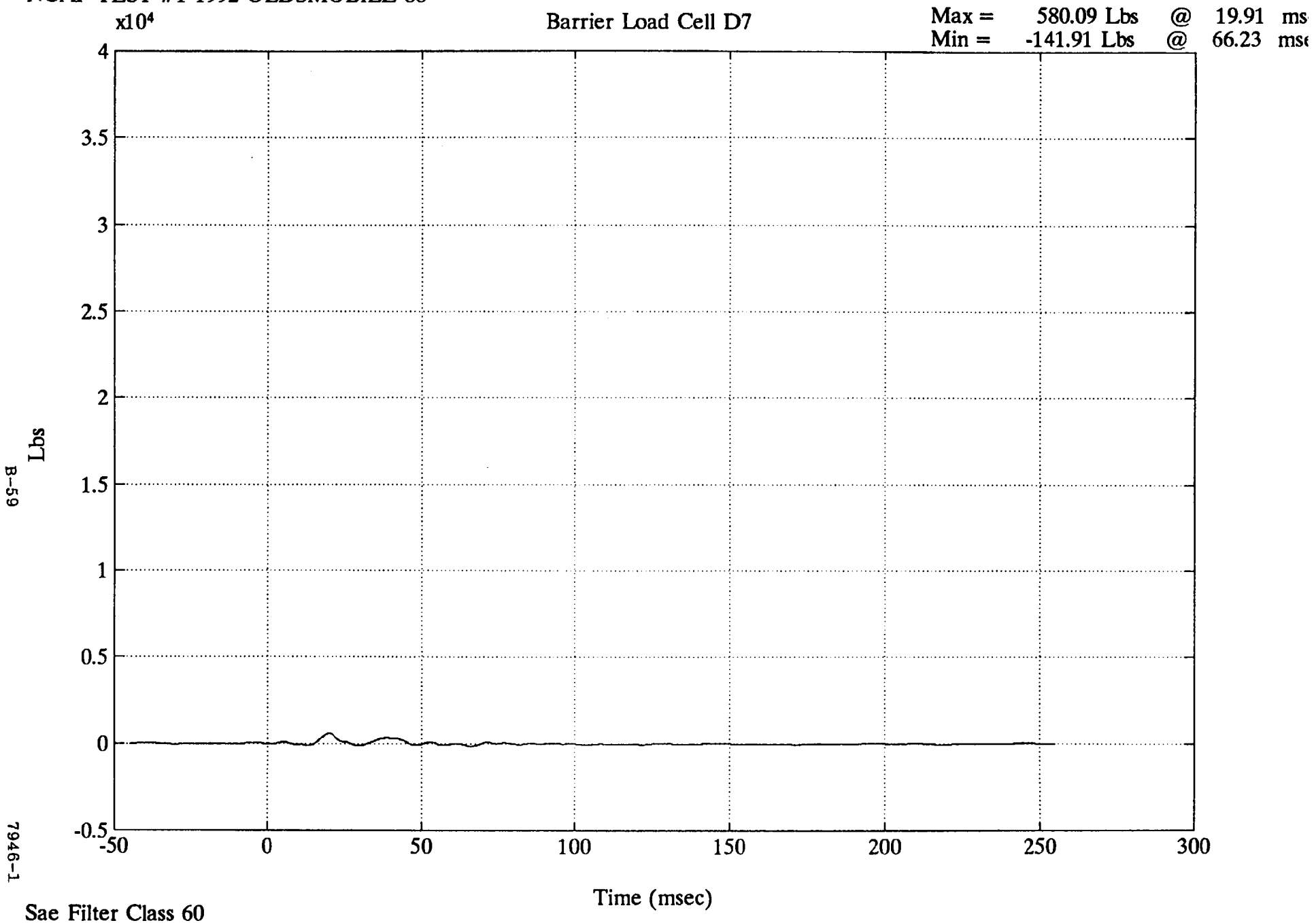


B-58

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

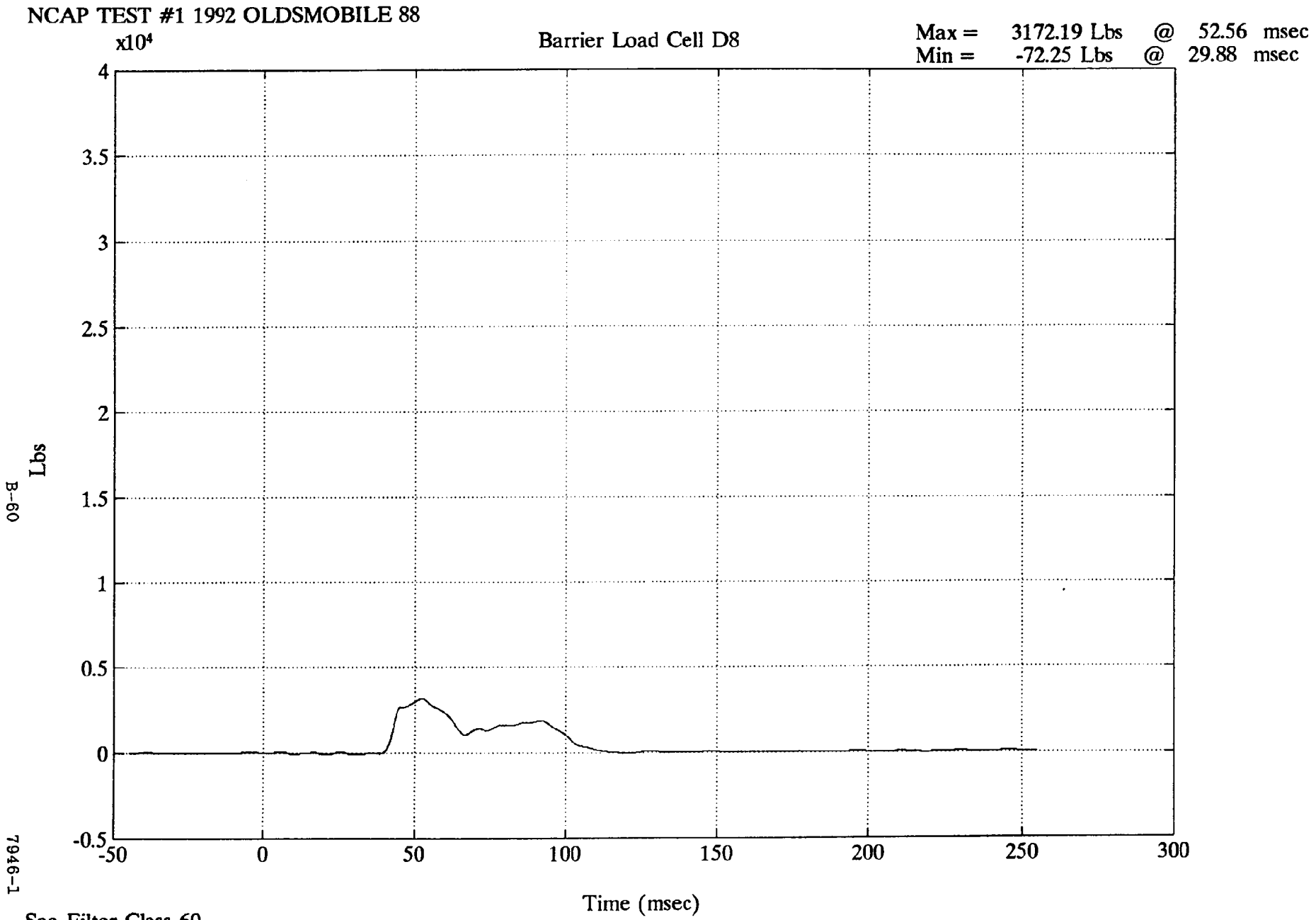


B-59

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

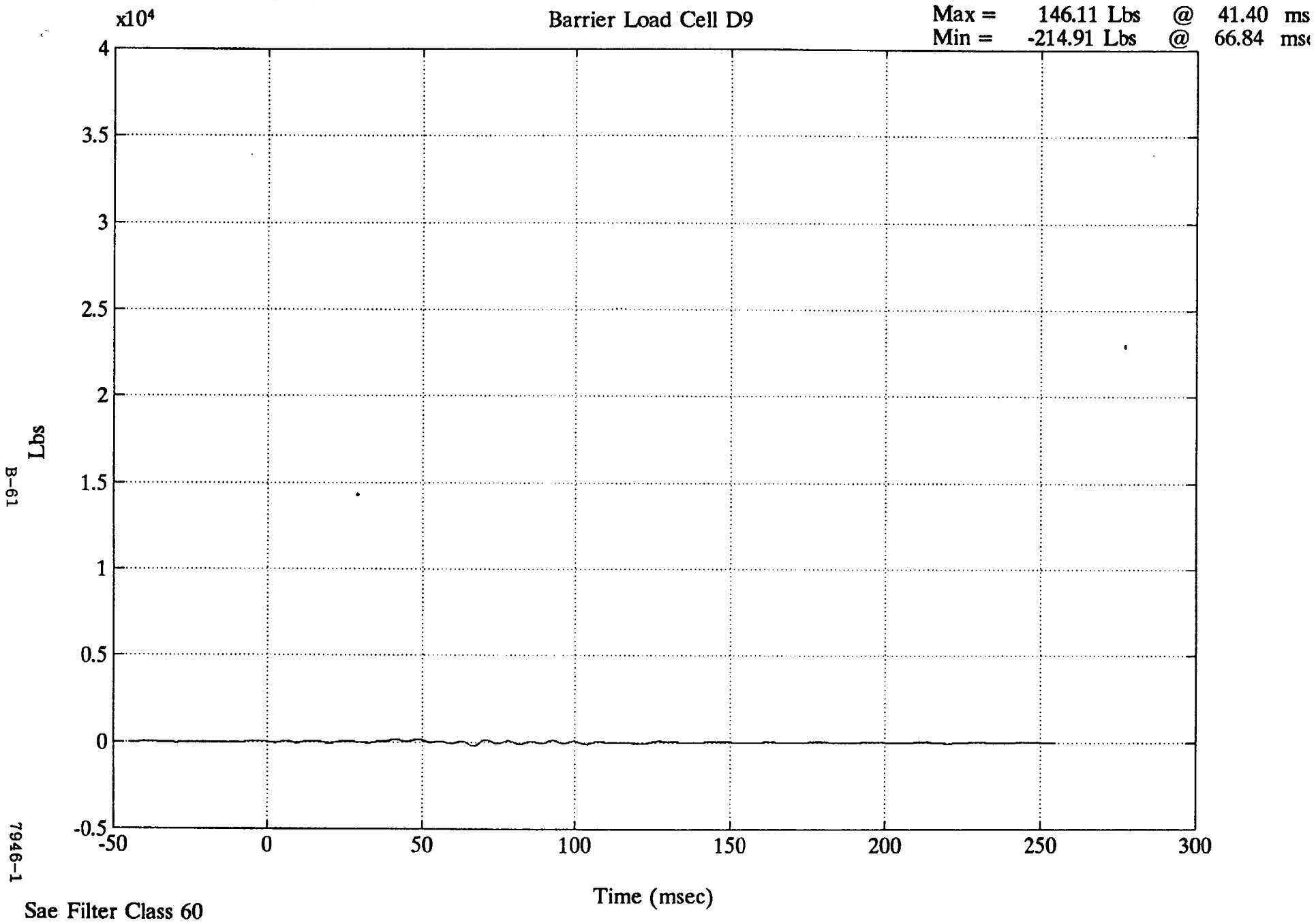


B-60

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88



B-61

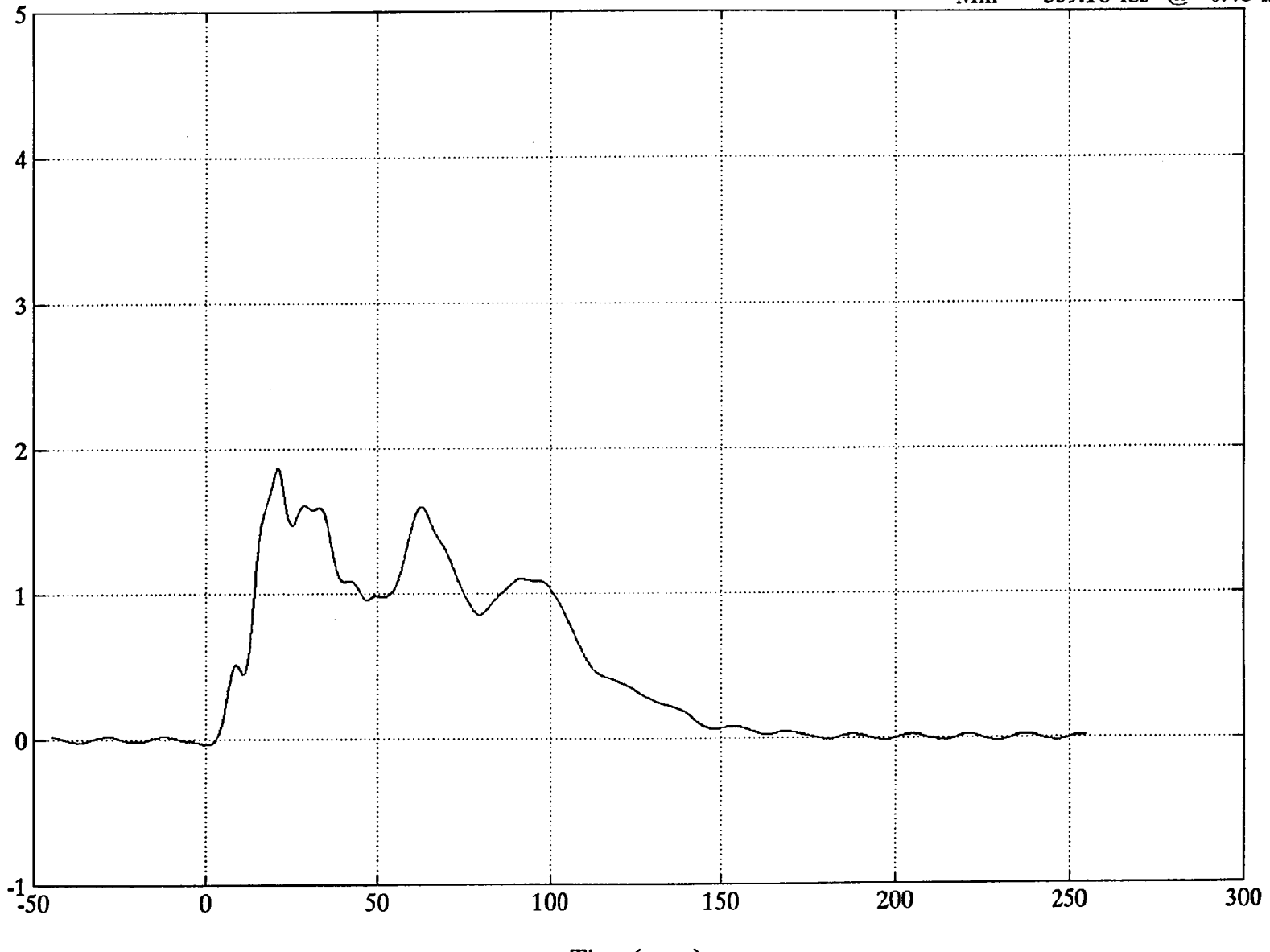
7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

Group 1 Load Cell Sum

Max = 18682.00 lbs @ 20.64 msec
Min = -359.16 lbs @ 0.48 msec



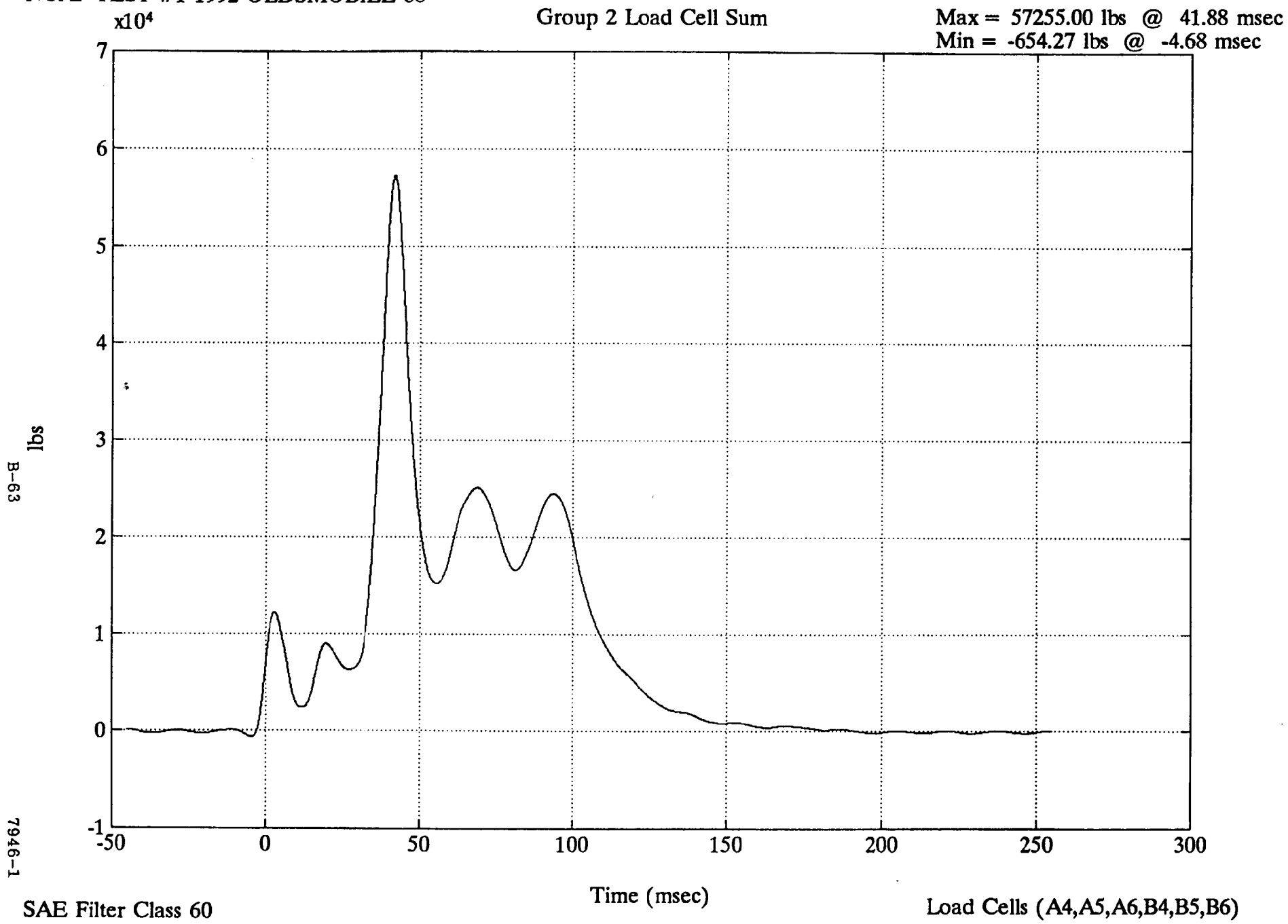
B-62

7946-1

SAE Filter Class 60

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

NCAP TEST #1 1992 OLDSMOBILE 88



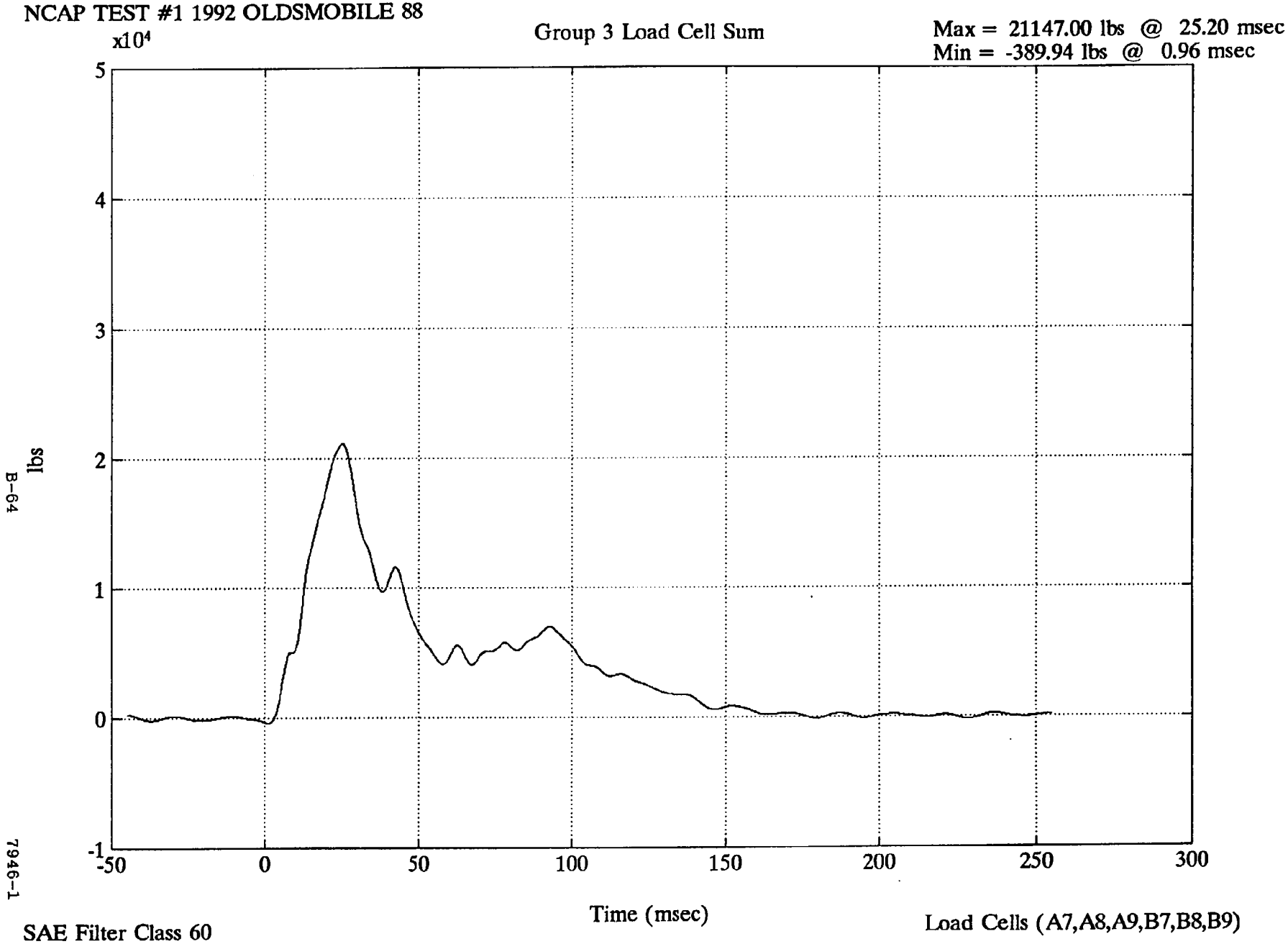
B-63

7946-1

SAE Filter Class 60

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

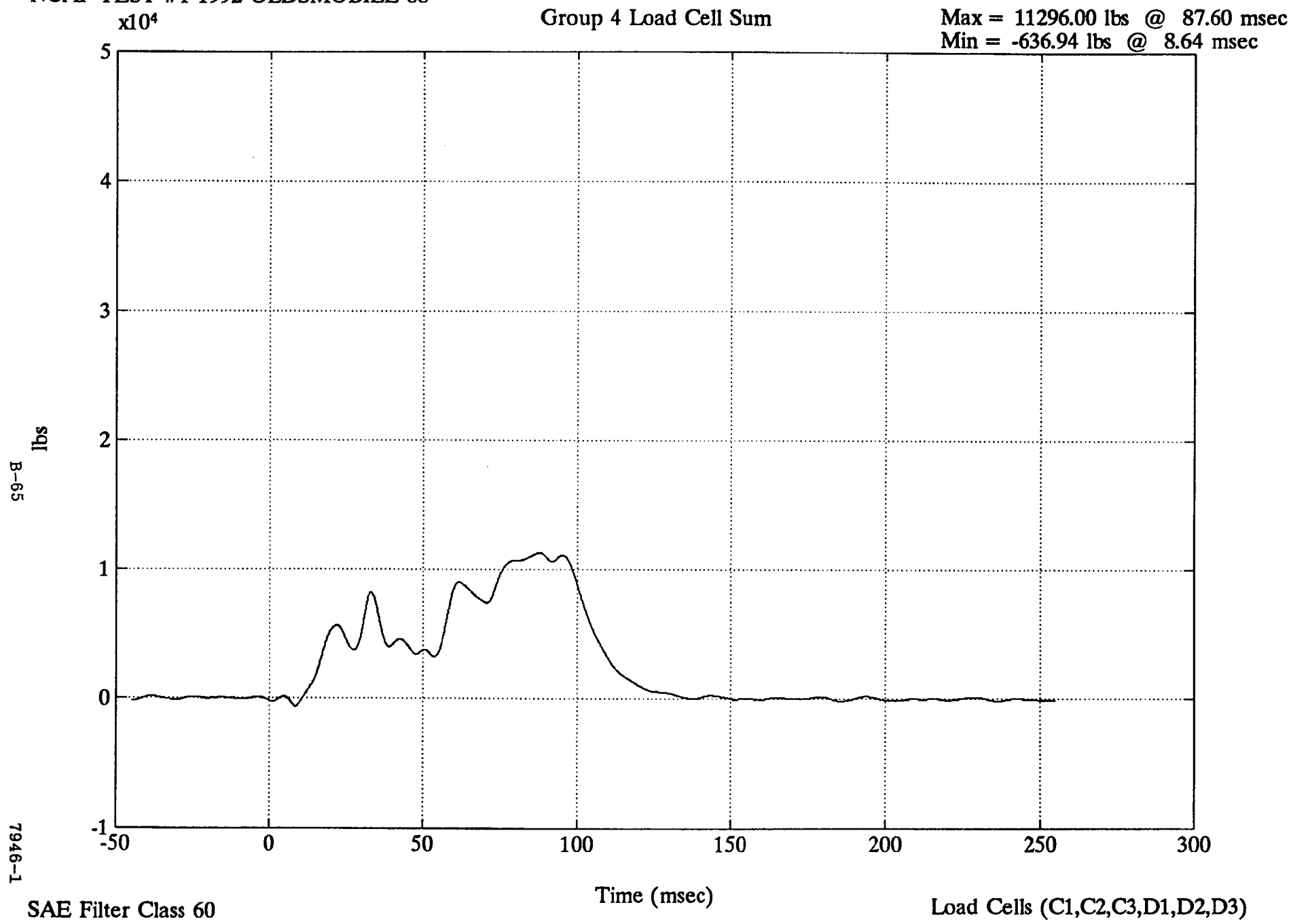
NCAP TEST #1 1992 OLDSMOBILE 88



SAE Filter Class 60

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

NCAP TEST #1 1992 OLDSMOBILE 88

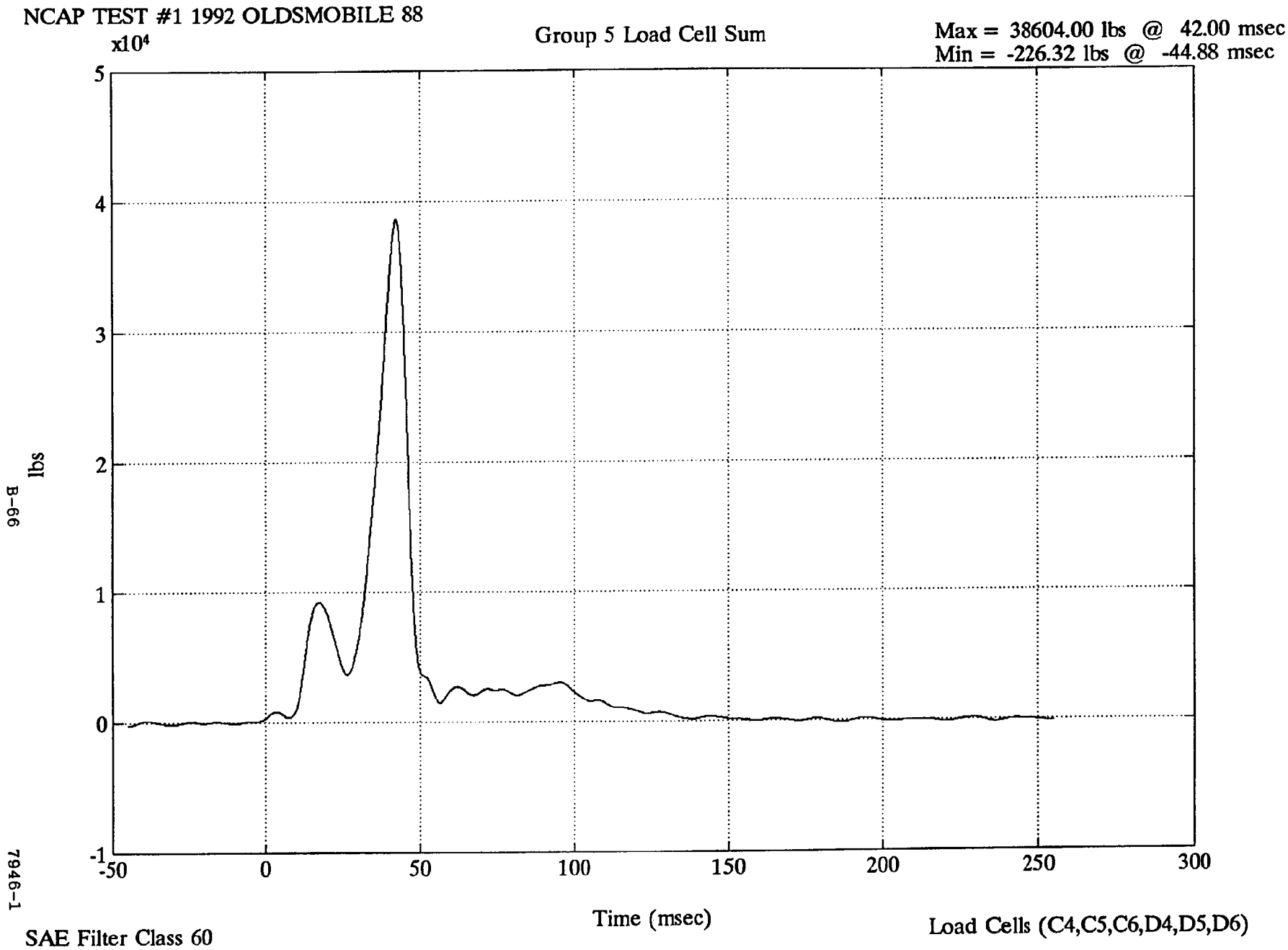


B-65

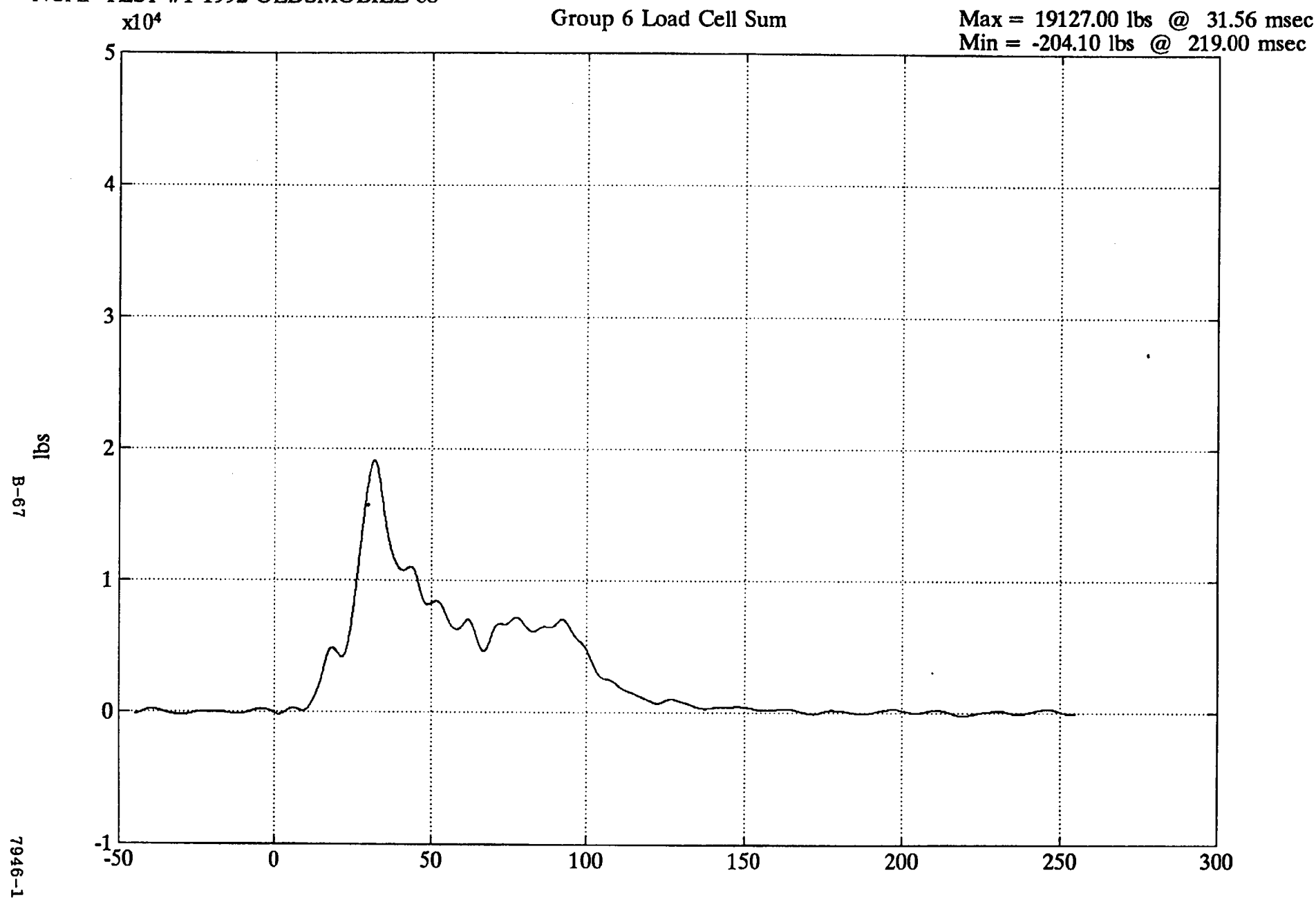
7946-1

SAE Filter Class 60

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


NCAP TEST #1 1992 OLDSMOBILE 88
x10⁴
Group 5 Load Cell Sum
Max = 38604.00 lbs @ 42.00 msec
Min = -226.32 lbs @ -44.88 msec
5
4
3
2
1
0
-1
lbs
-50
0
50
100
150
200
250
300
Time (msec)
Load Cells (C4,C5,C6,D4,D5,D6)
SAE Filter Class 60
B-66
7946-1

NCAP TEST #1 1992 OLDSMOBILE 88



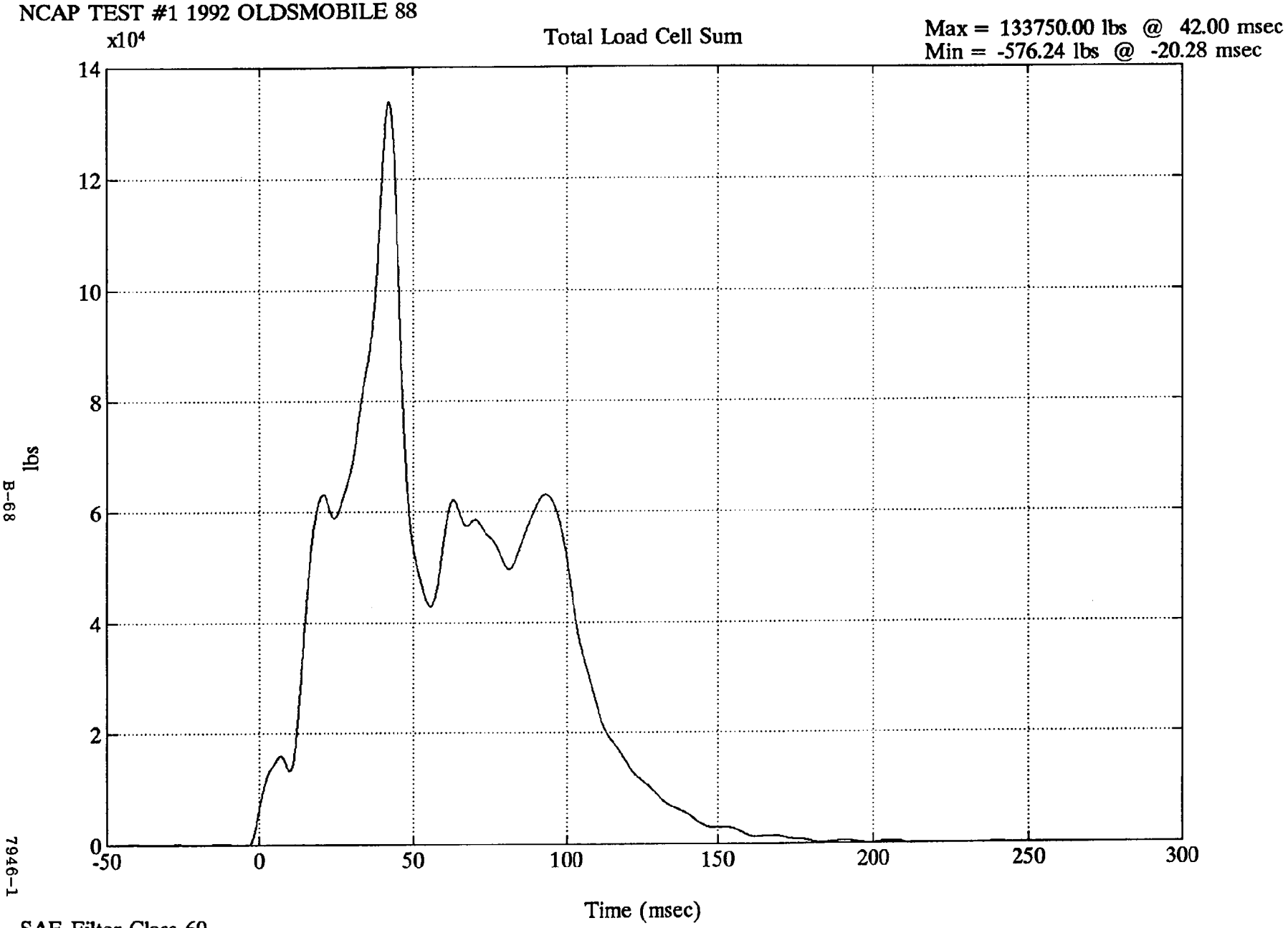
B-67

7946-1

SAE Filter Class 60

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

NCAP TEST #1 1992 OLDSMOBILE 88



SAE Filter Class 60

B-68

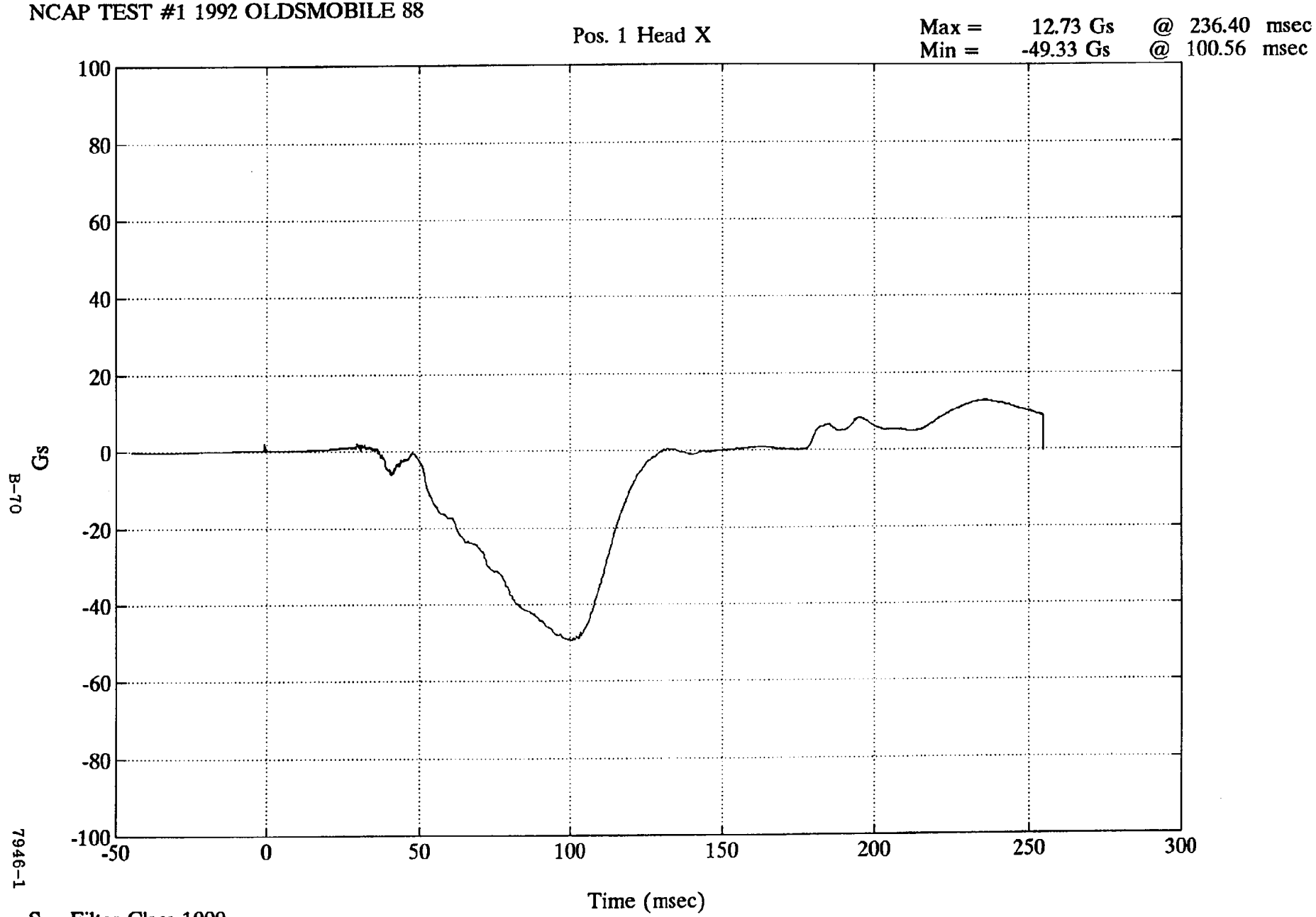
7946-1

TEST NO. MN0100

DUMMY DATA

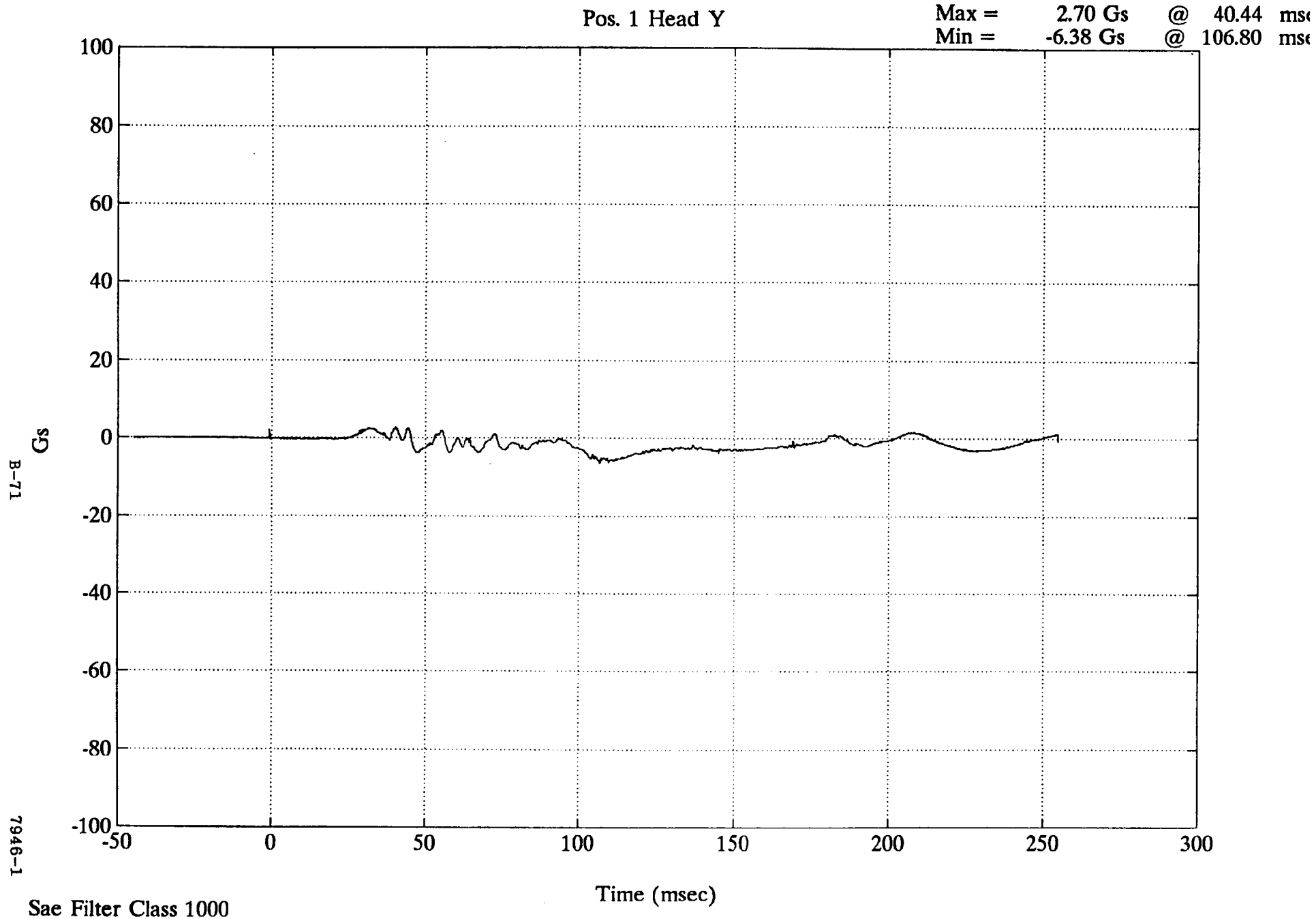
CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Chest Displacements	60
Femur Forces	600
Belt Loads	60
Belt Displacements	180
Neck Forces	1000
Neck Moments	600

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88

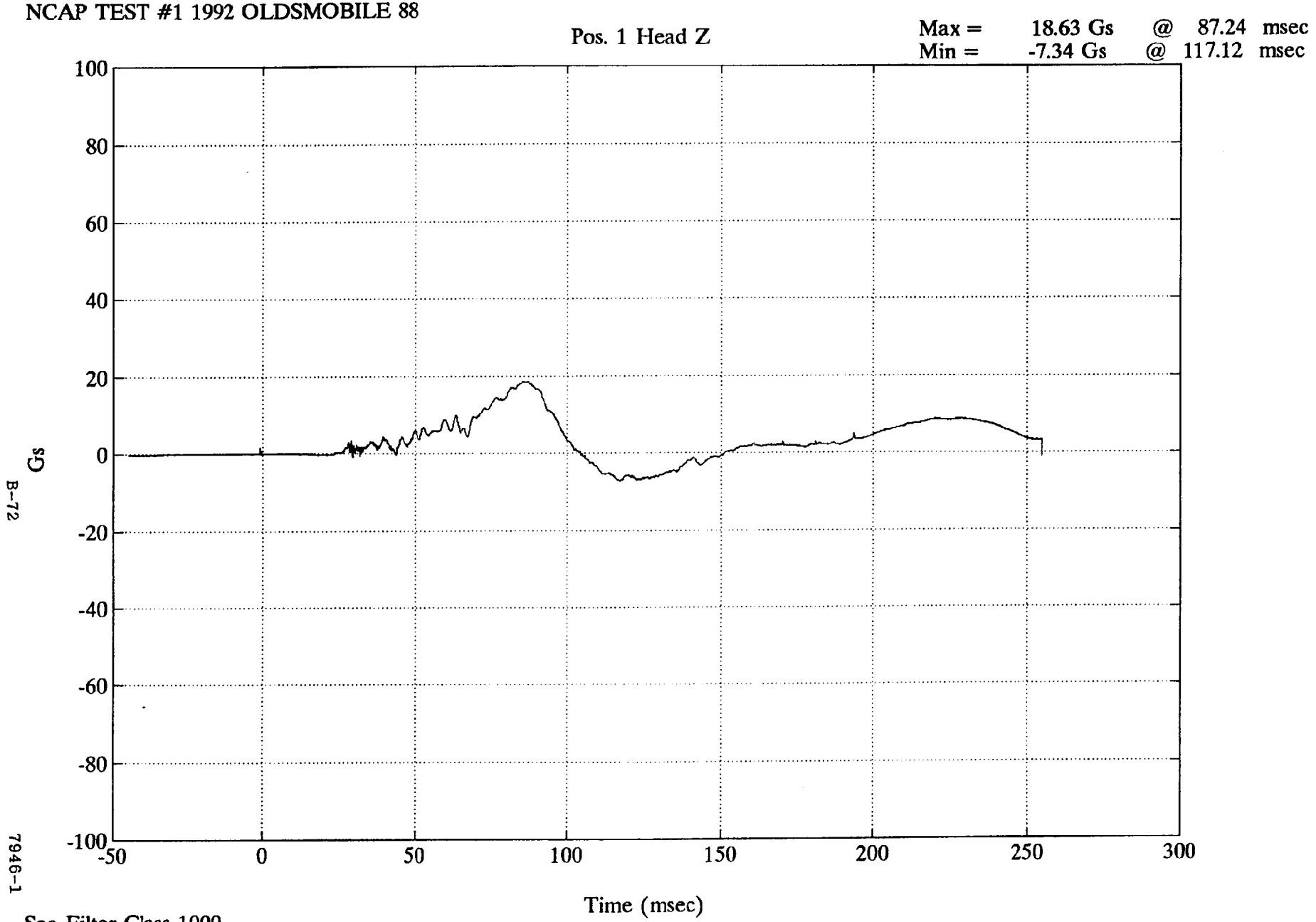


B-71

7946-1

Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88

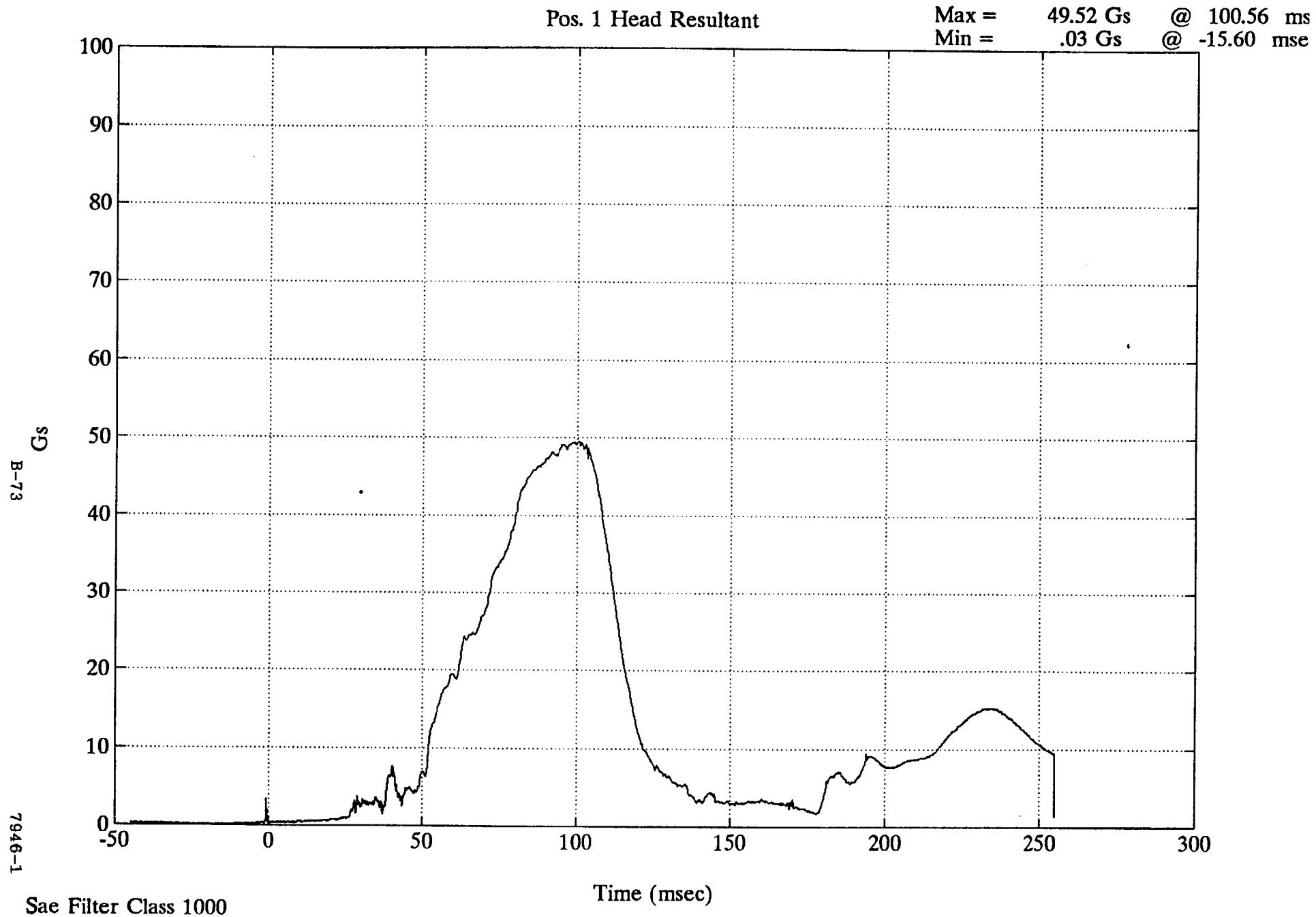


B-72

7946-1

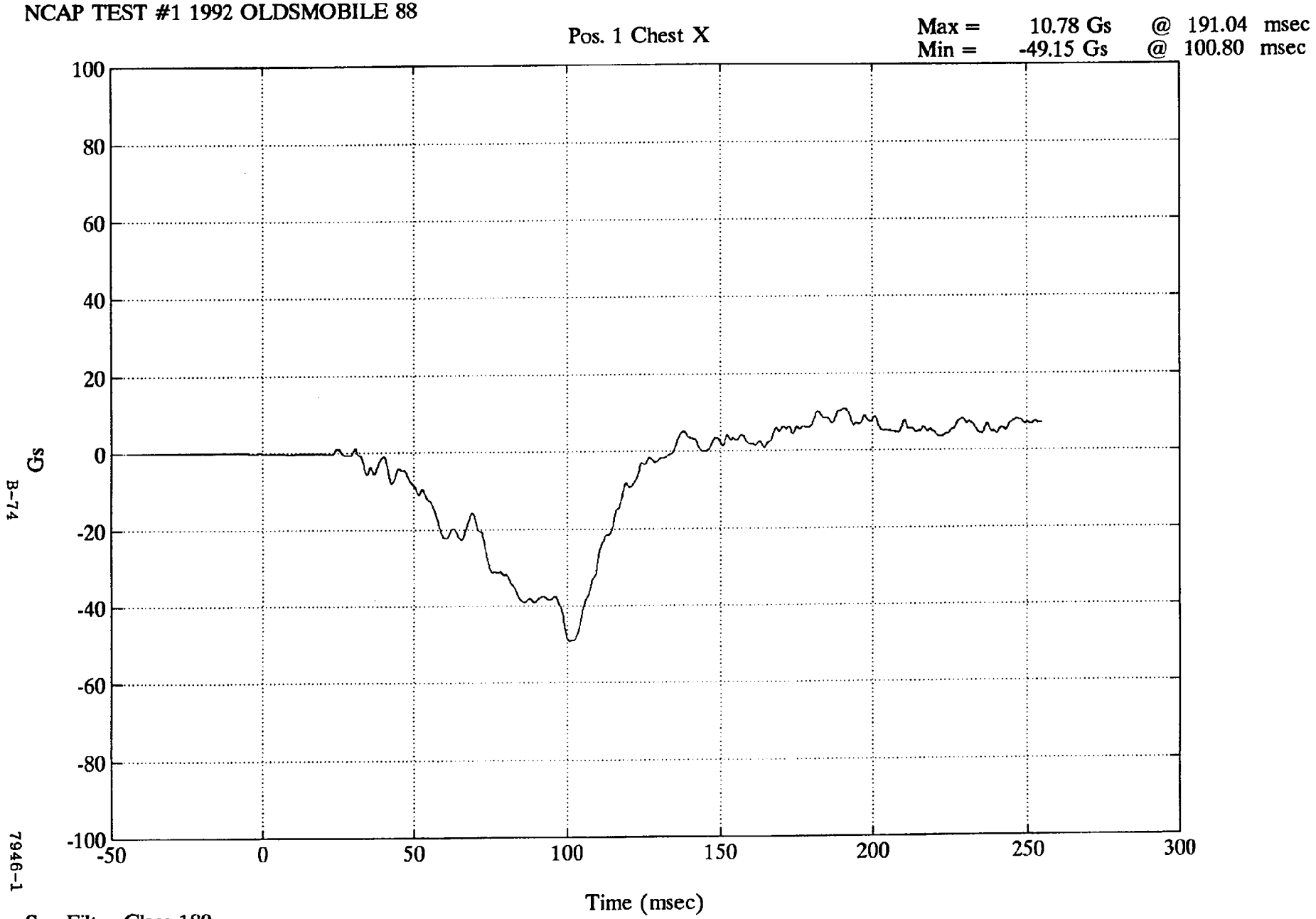
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88

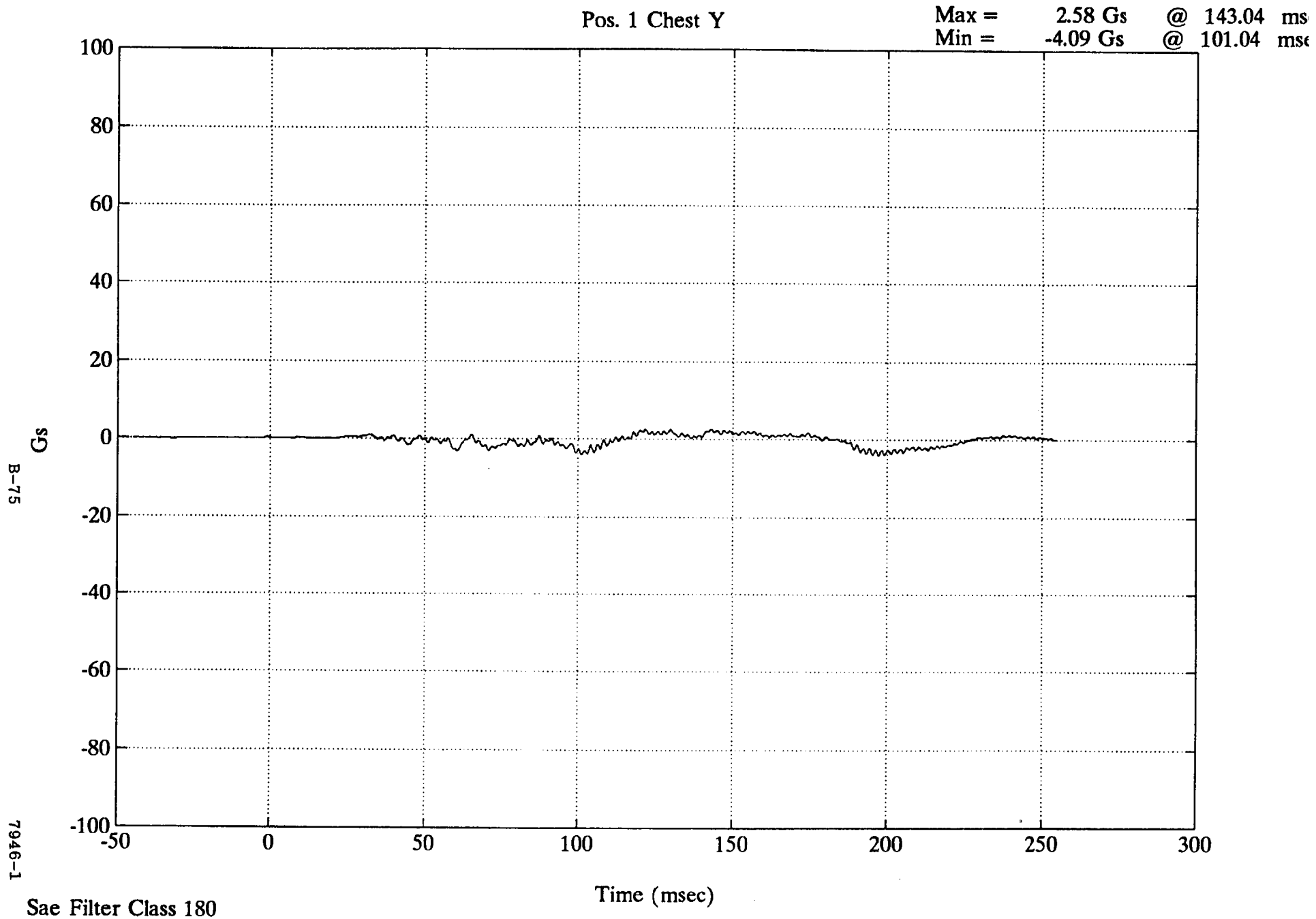


B-74

7946-1

Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88

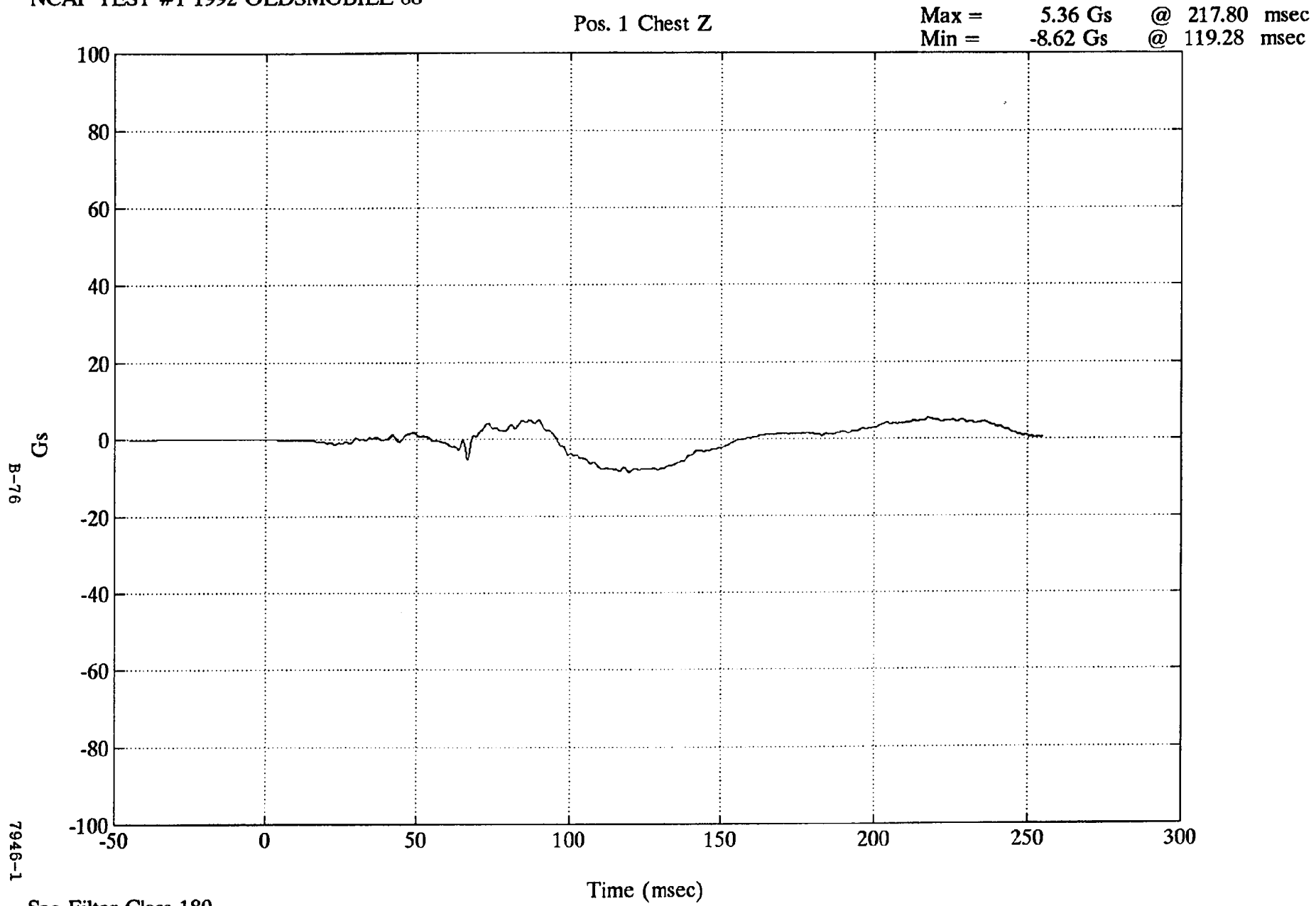


B-75

7946-1

Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88

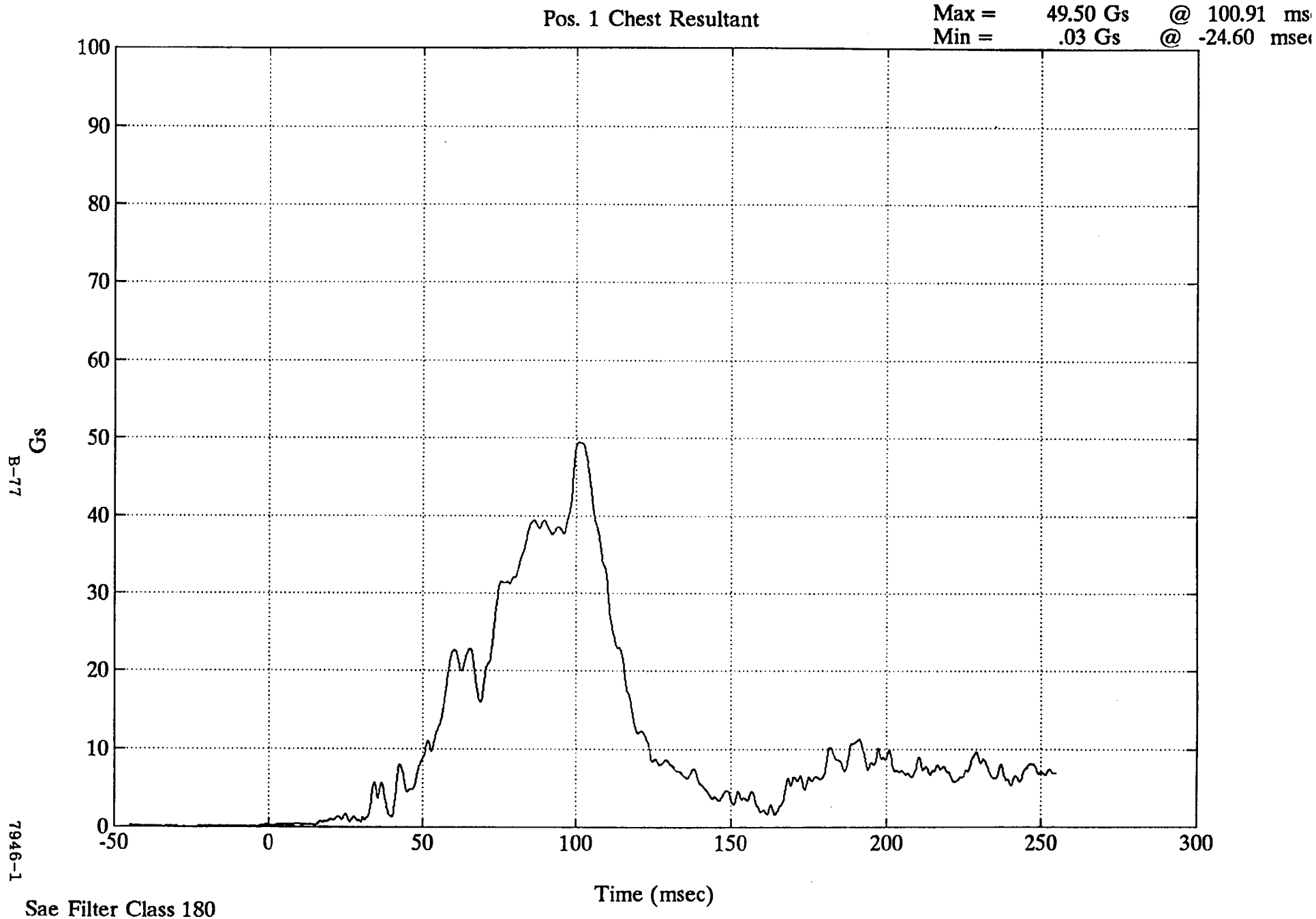


B-76

7946-1

Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88

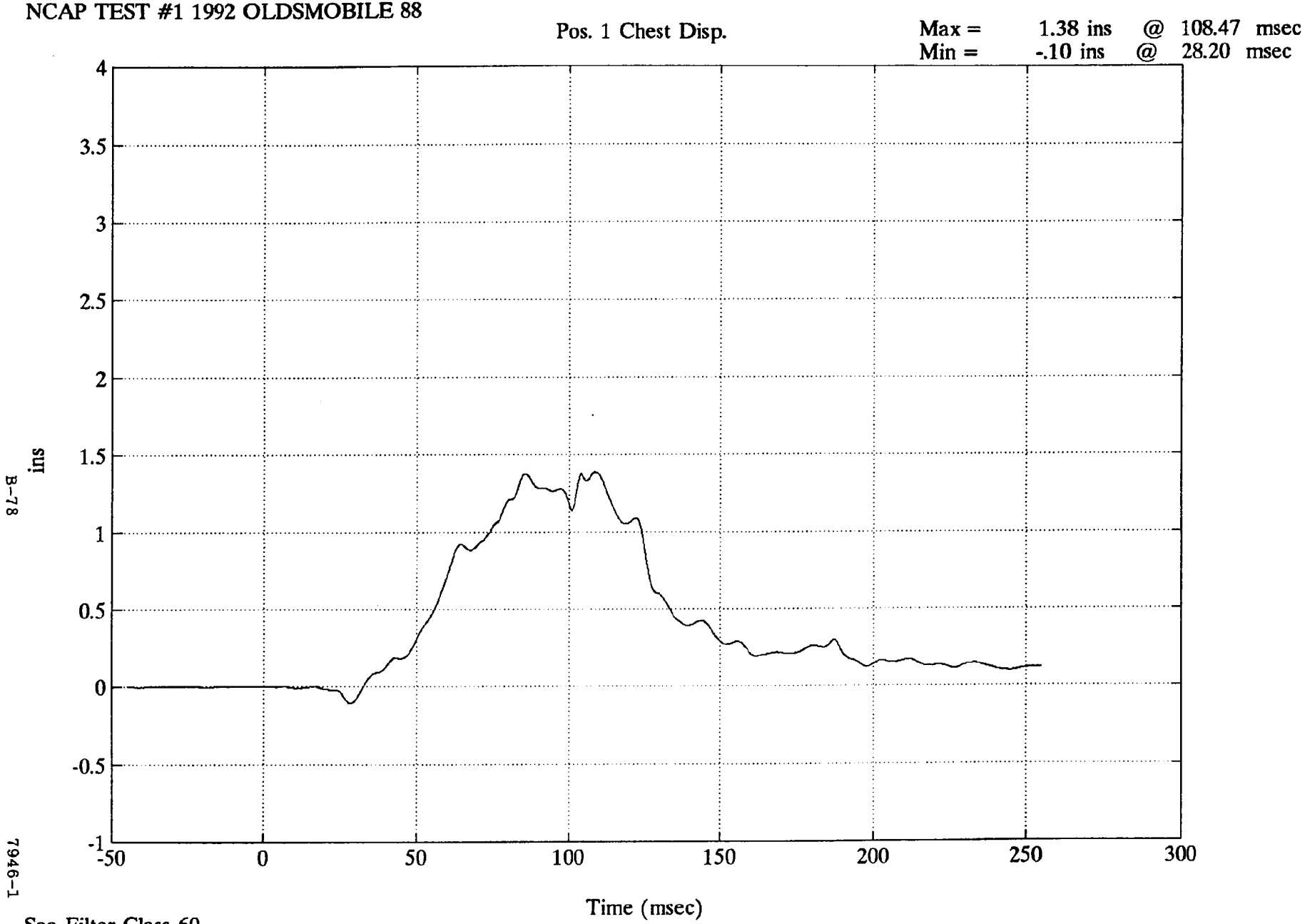


B-77

7946-1

Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88

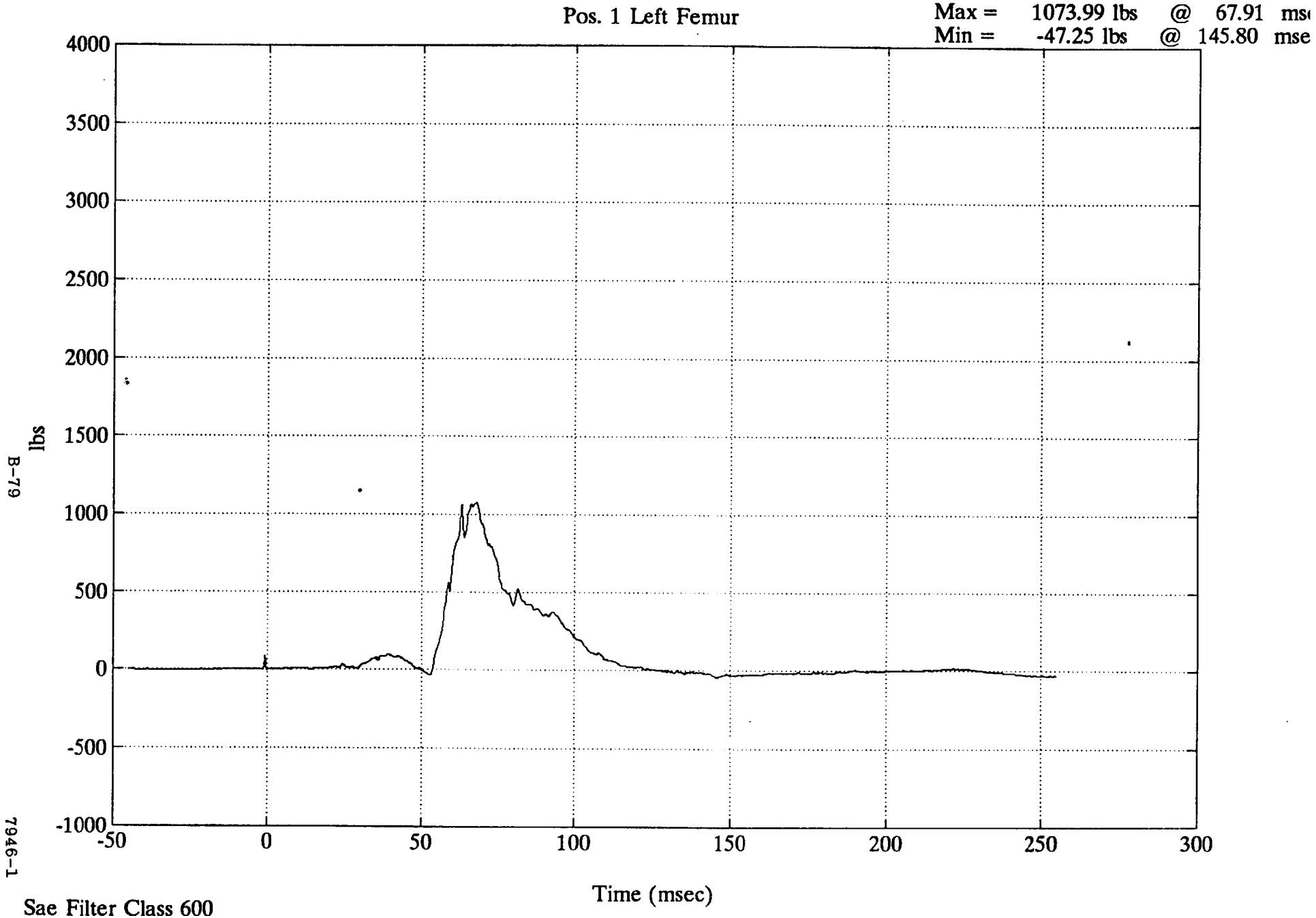


B-78

7946-1

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

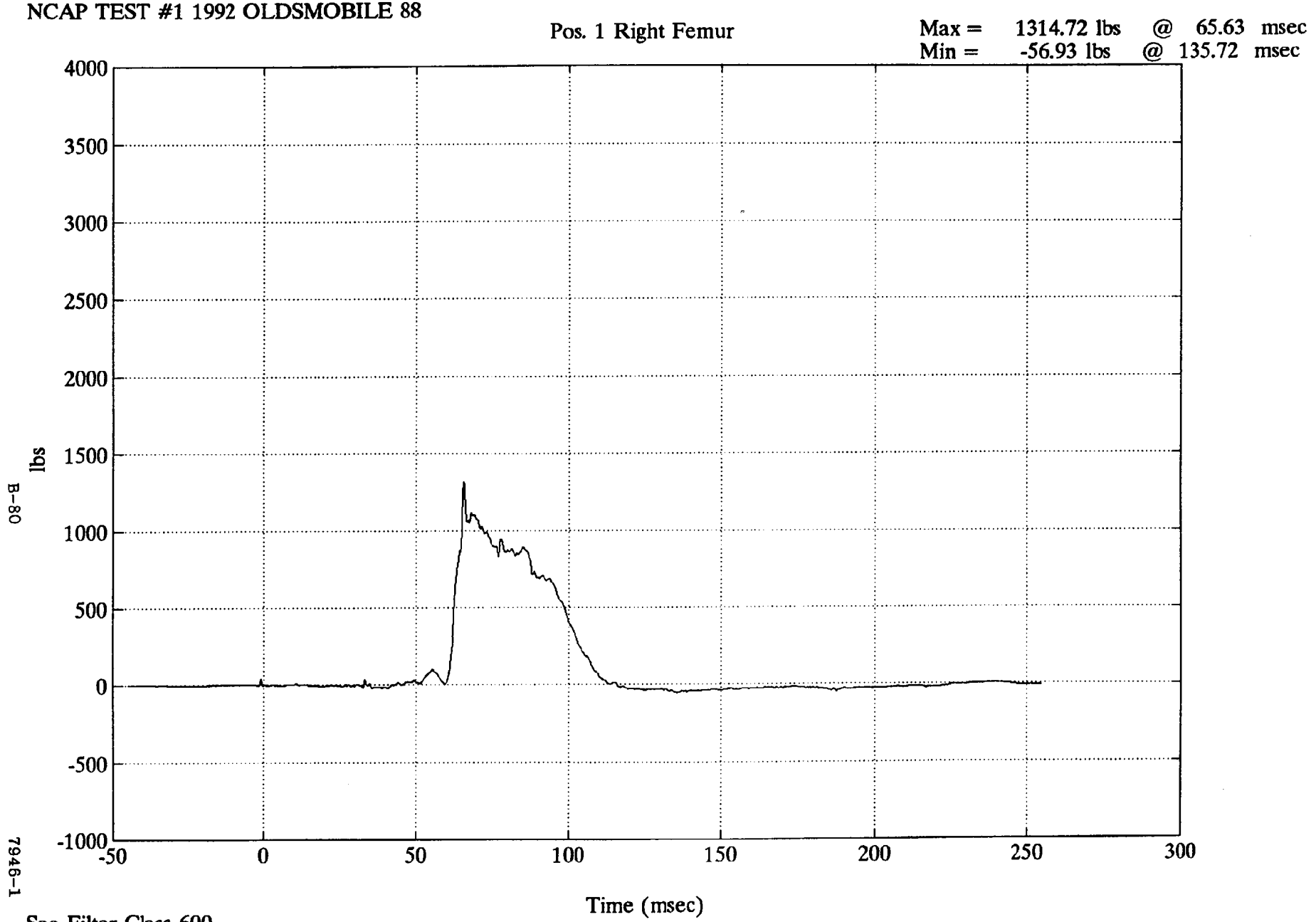


B-79

7946-1

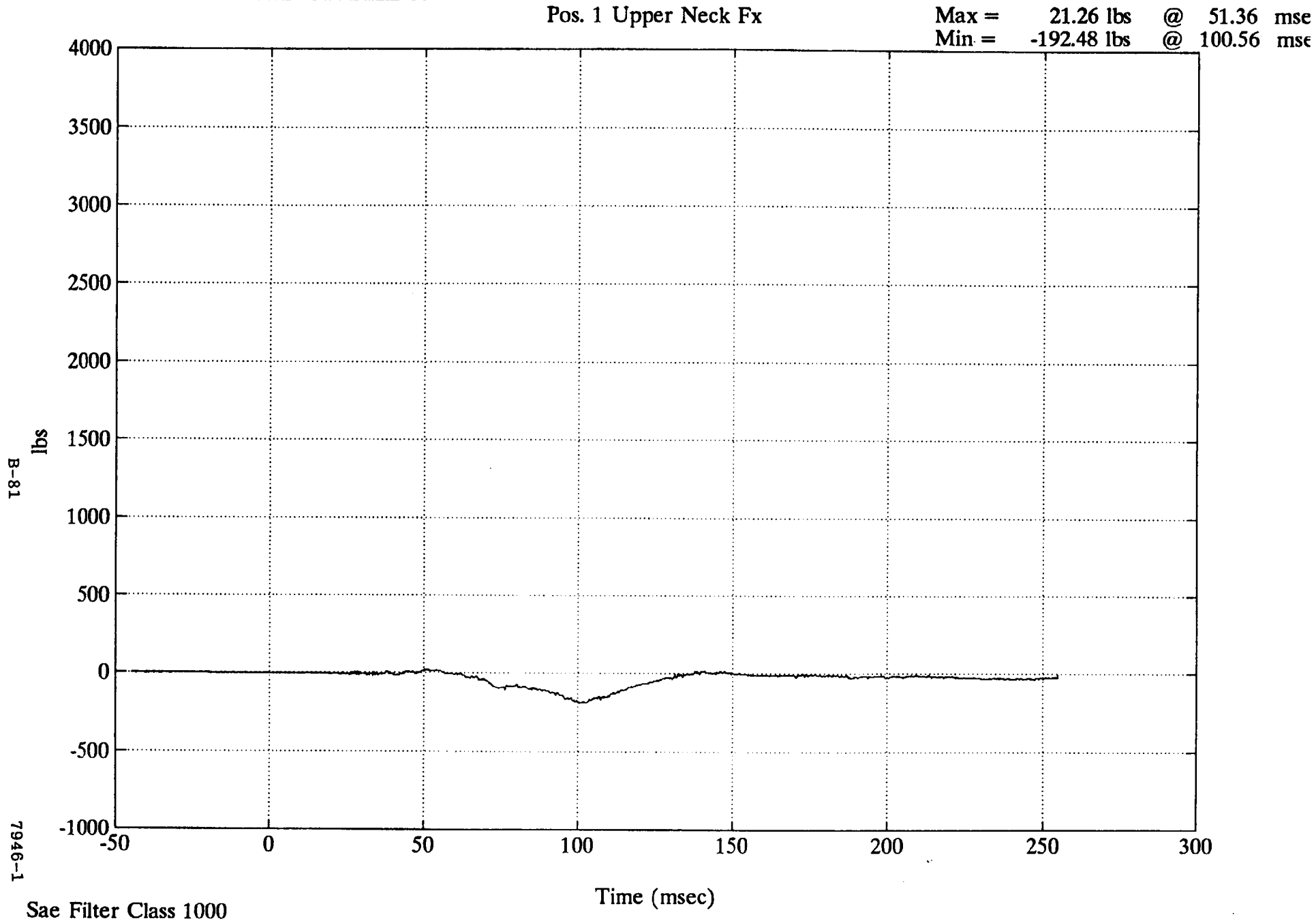
Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88



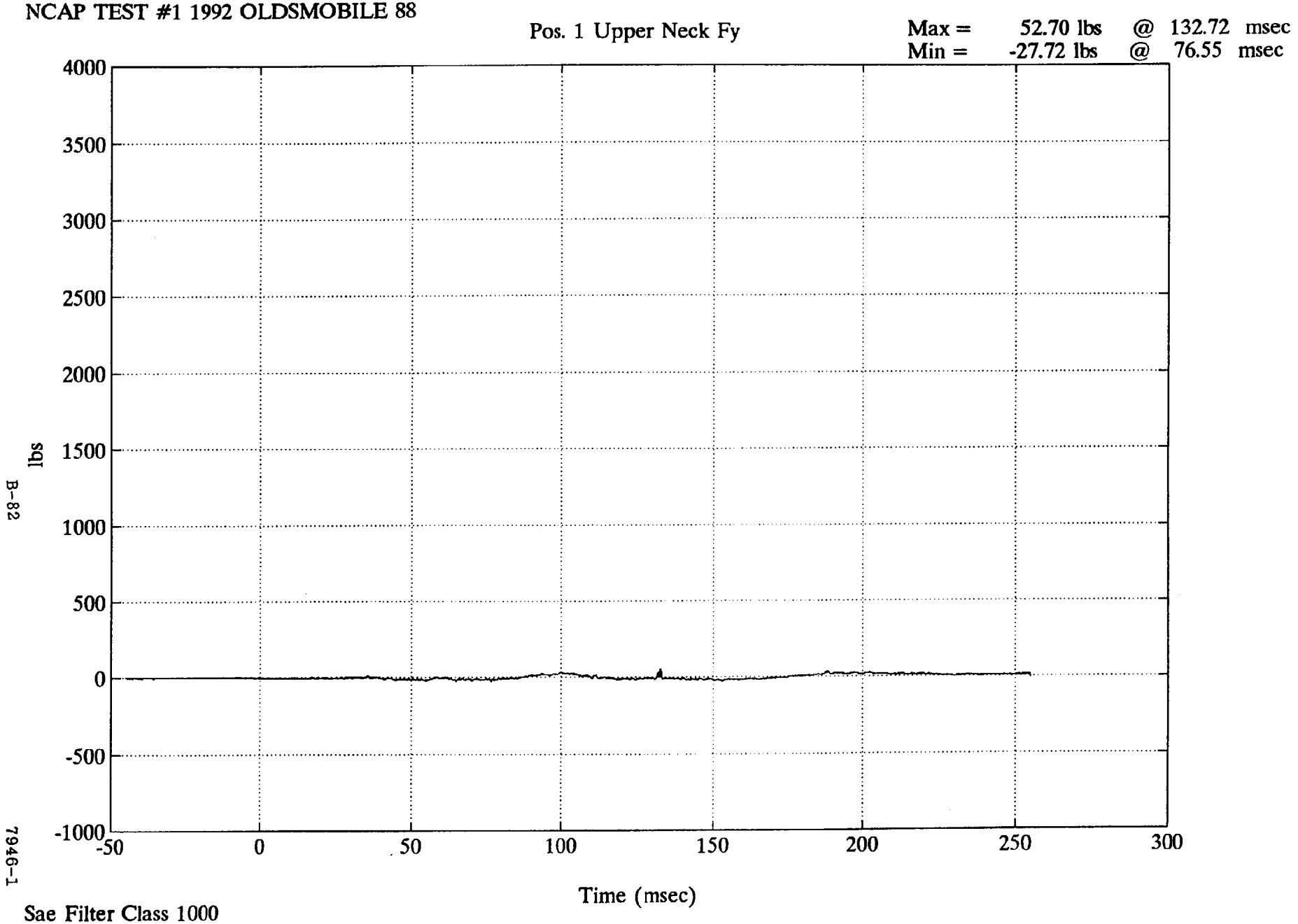
Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88



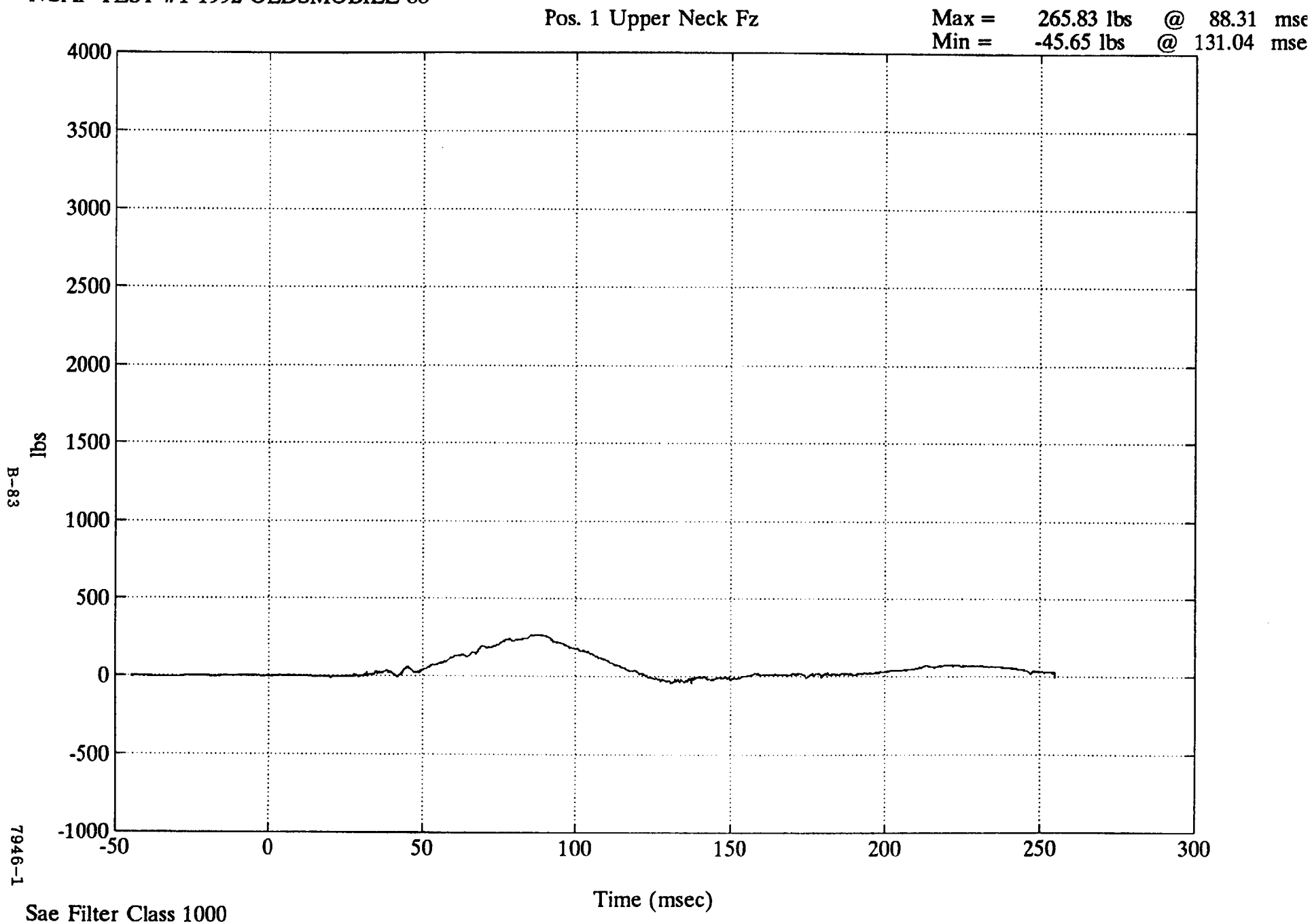
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



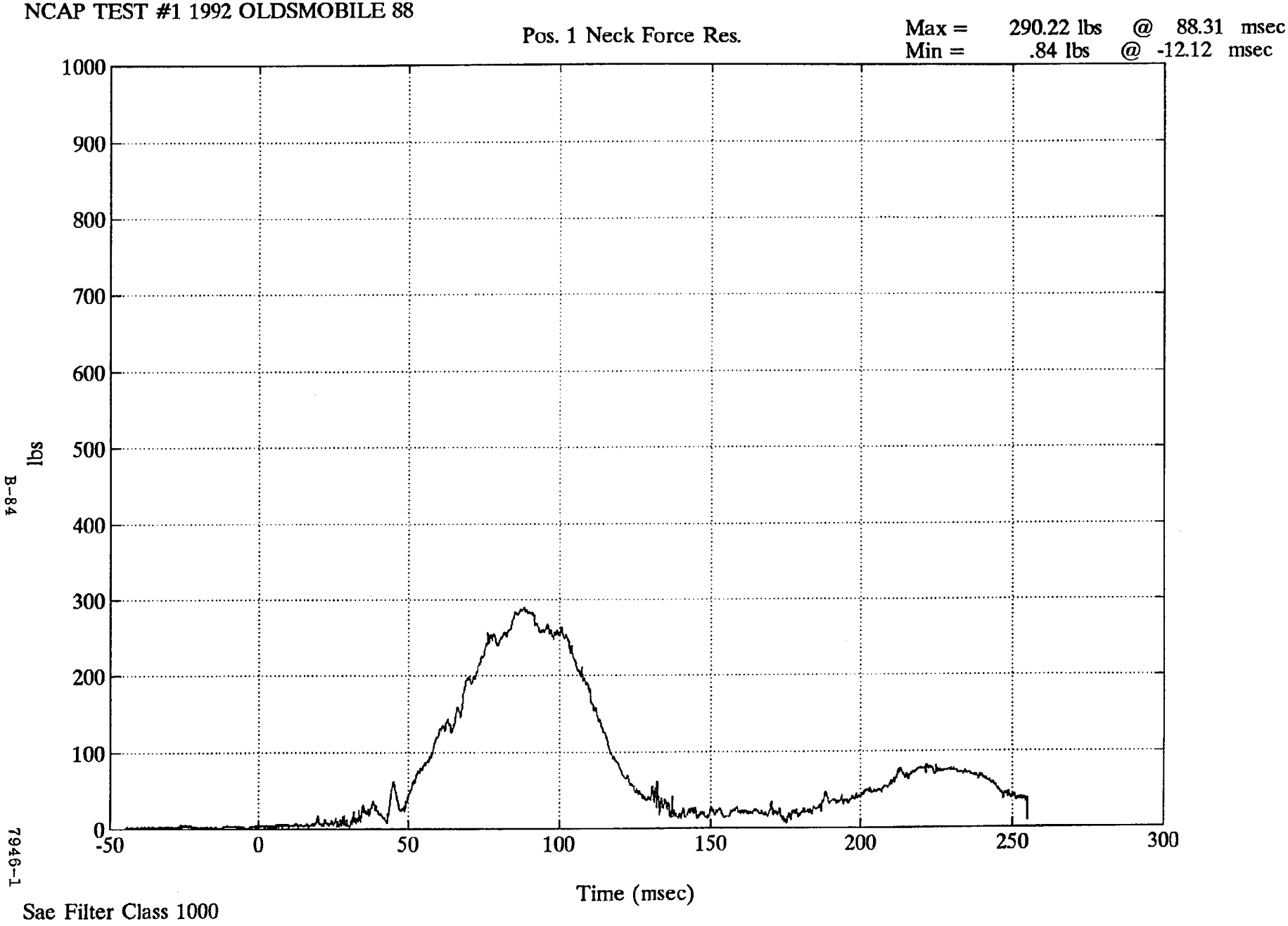
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



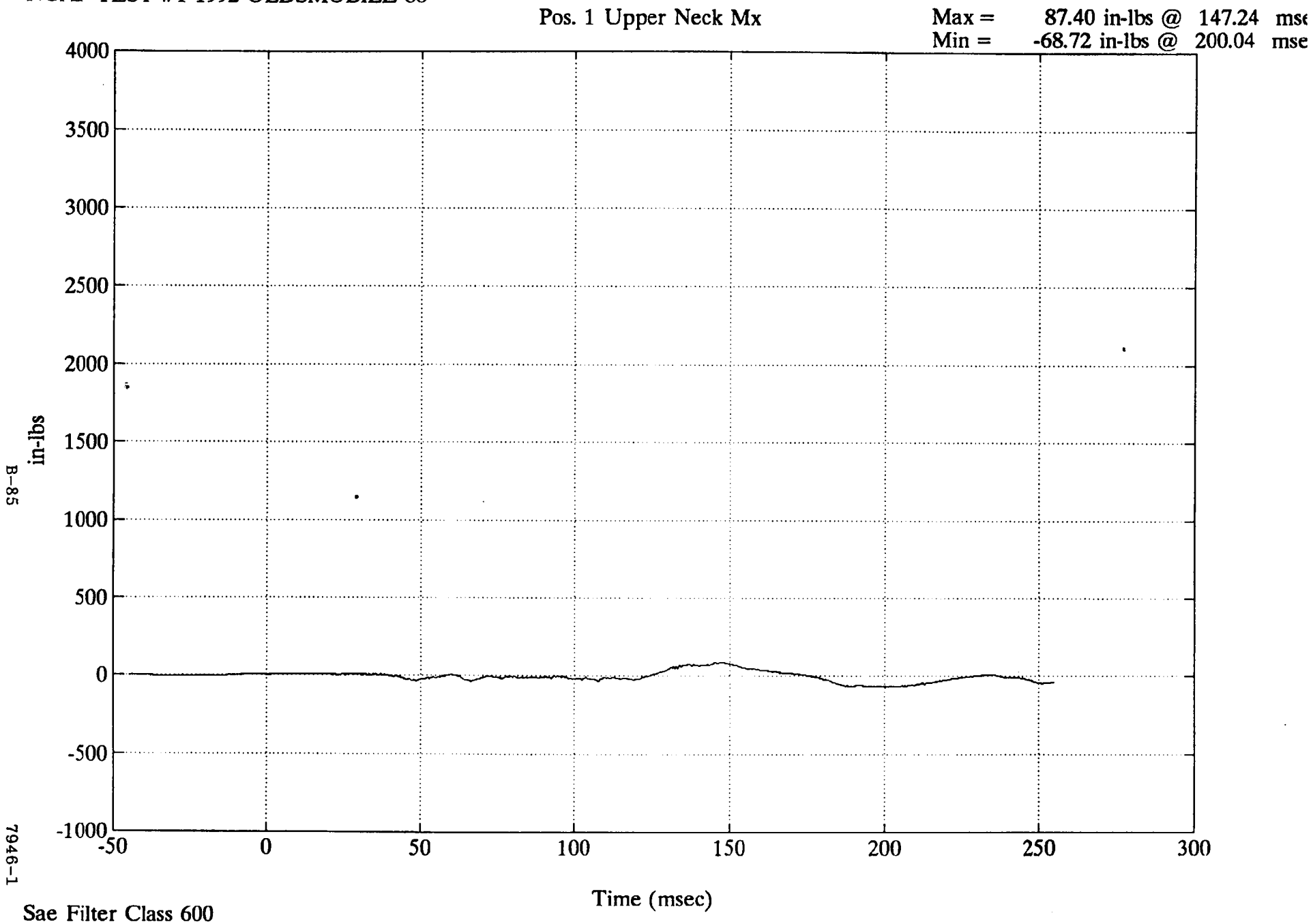
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



B-85

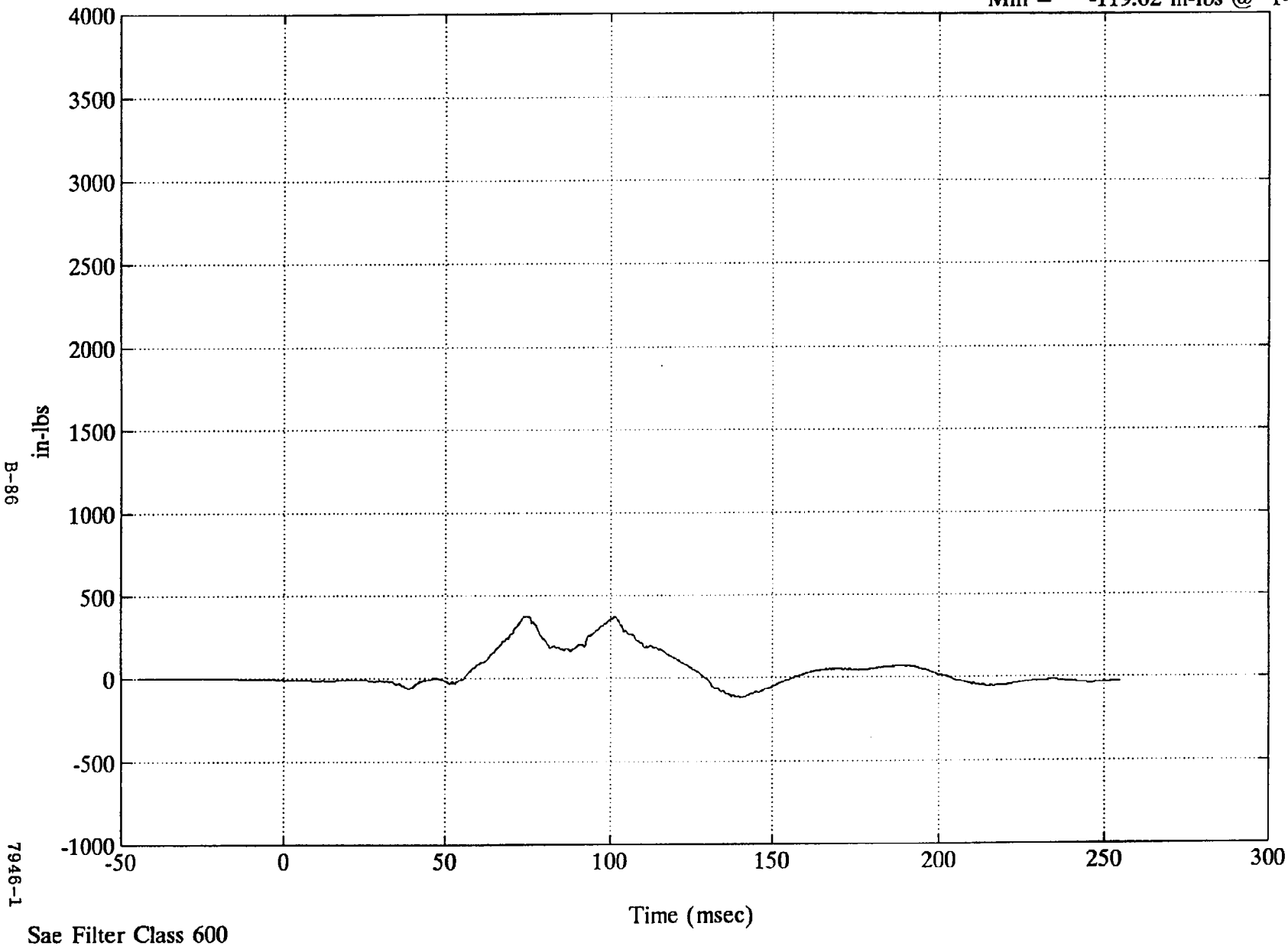
7946-1

Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88

Pos. 1 Upper Neck My

Max = 374.09 in-lbs @ 74.76 msec
Min = -119.62 in-lbs @ 140.40 msec

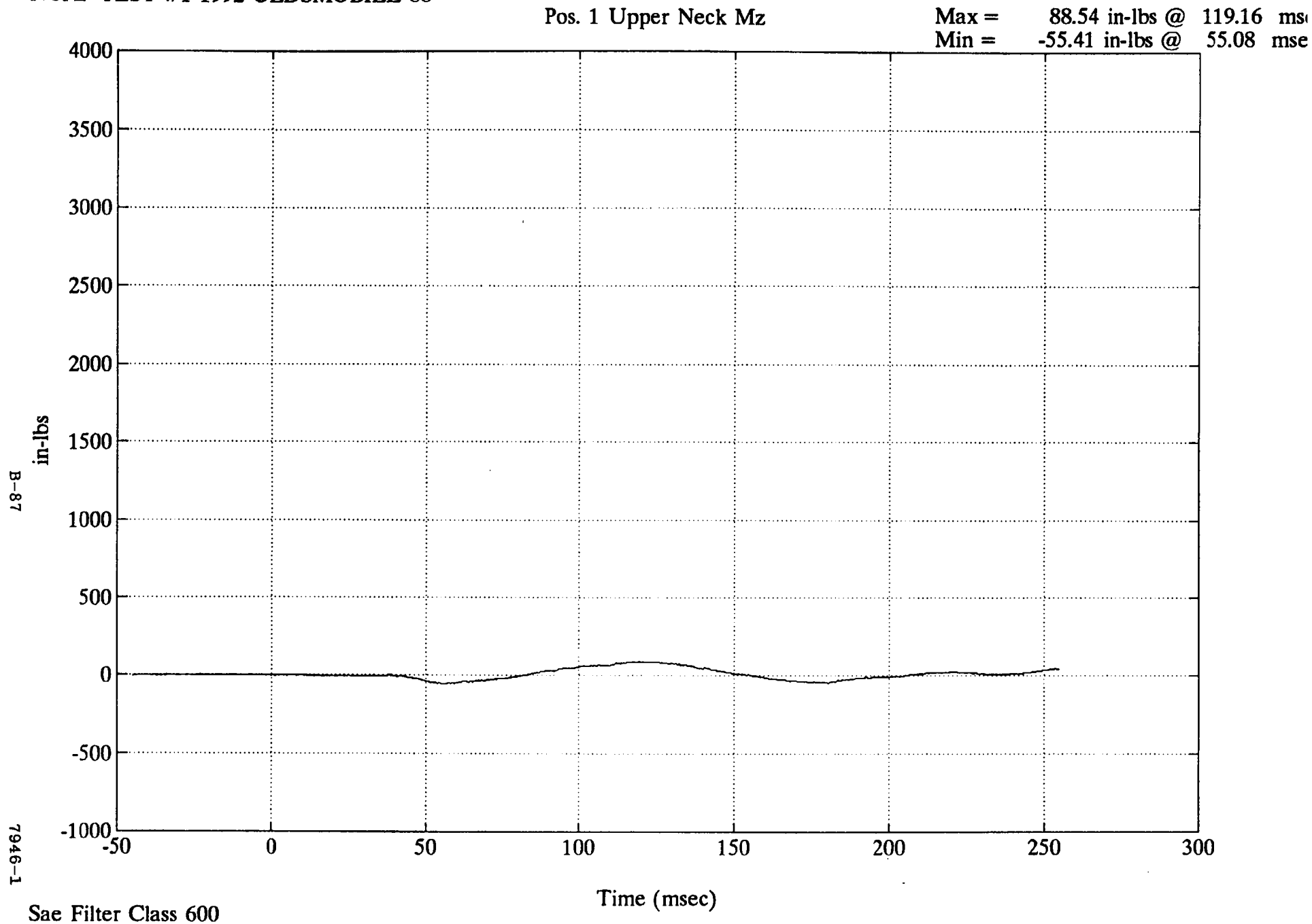


B-86

7946-1

Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88

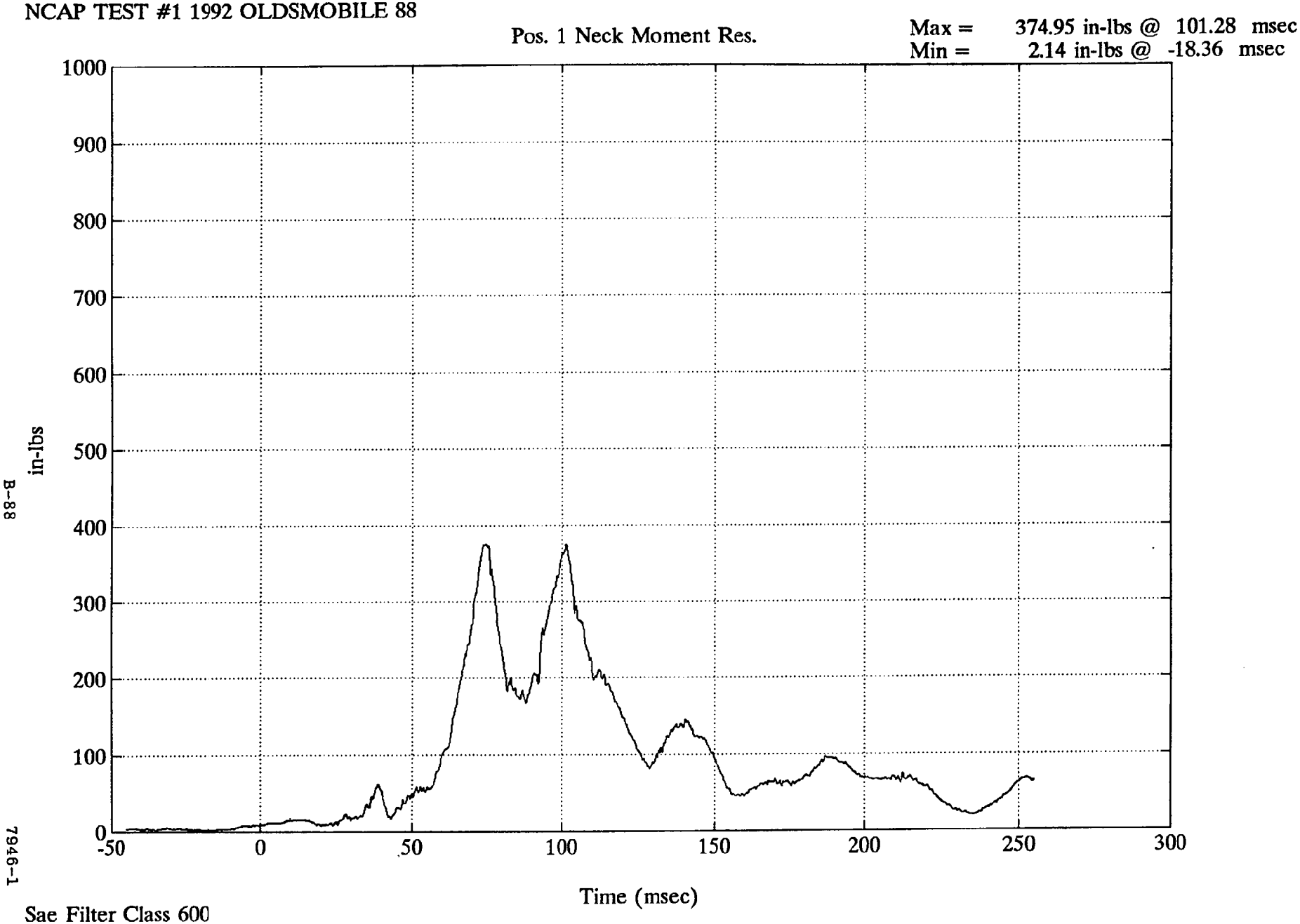


B-87

7946-1

Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88

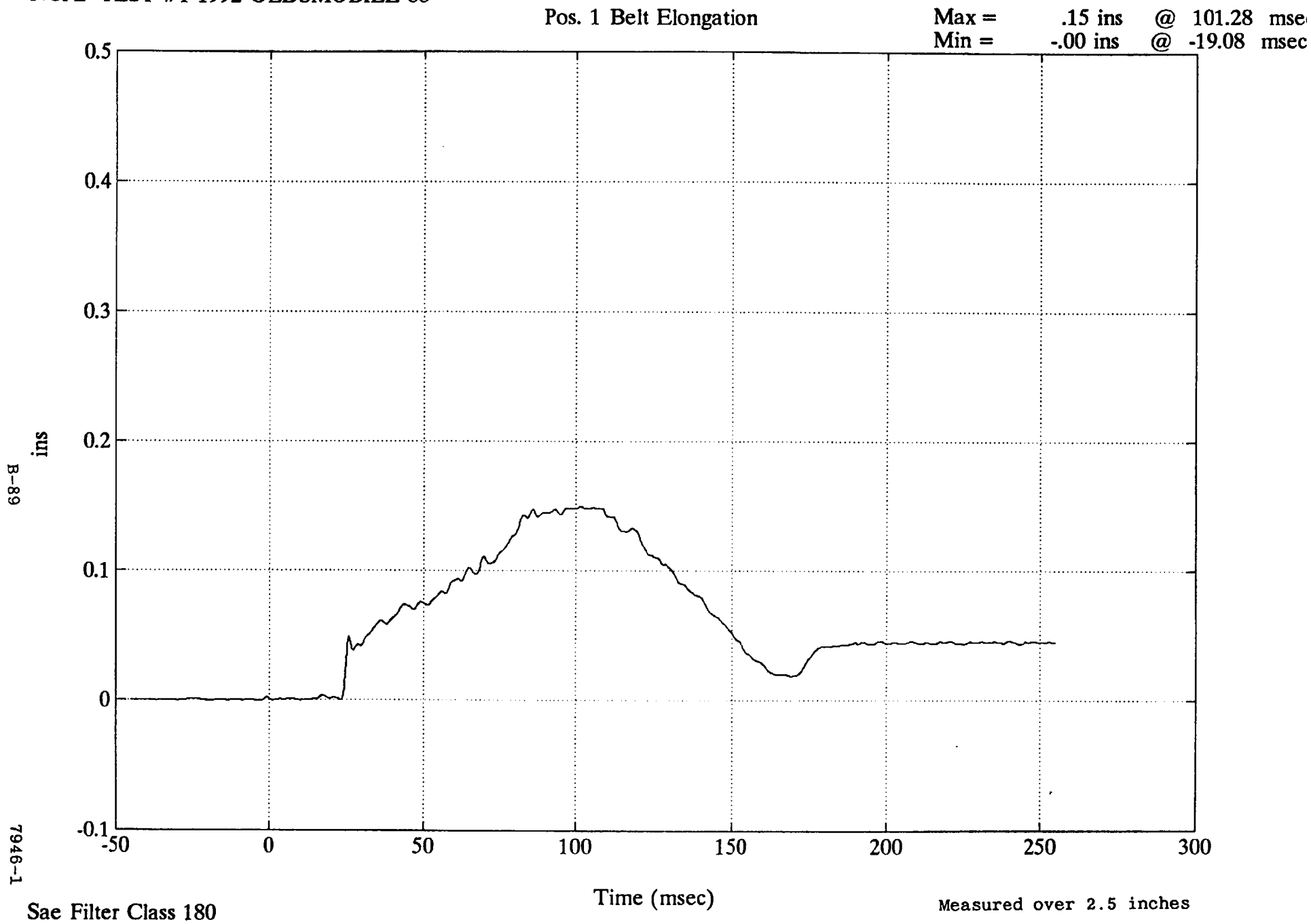


B-88

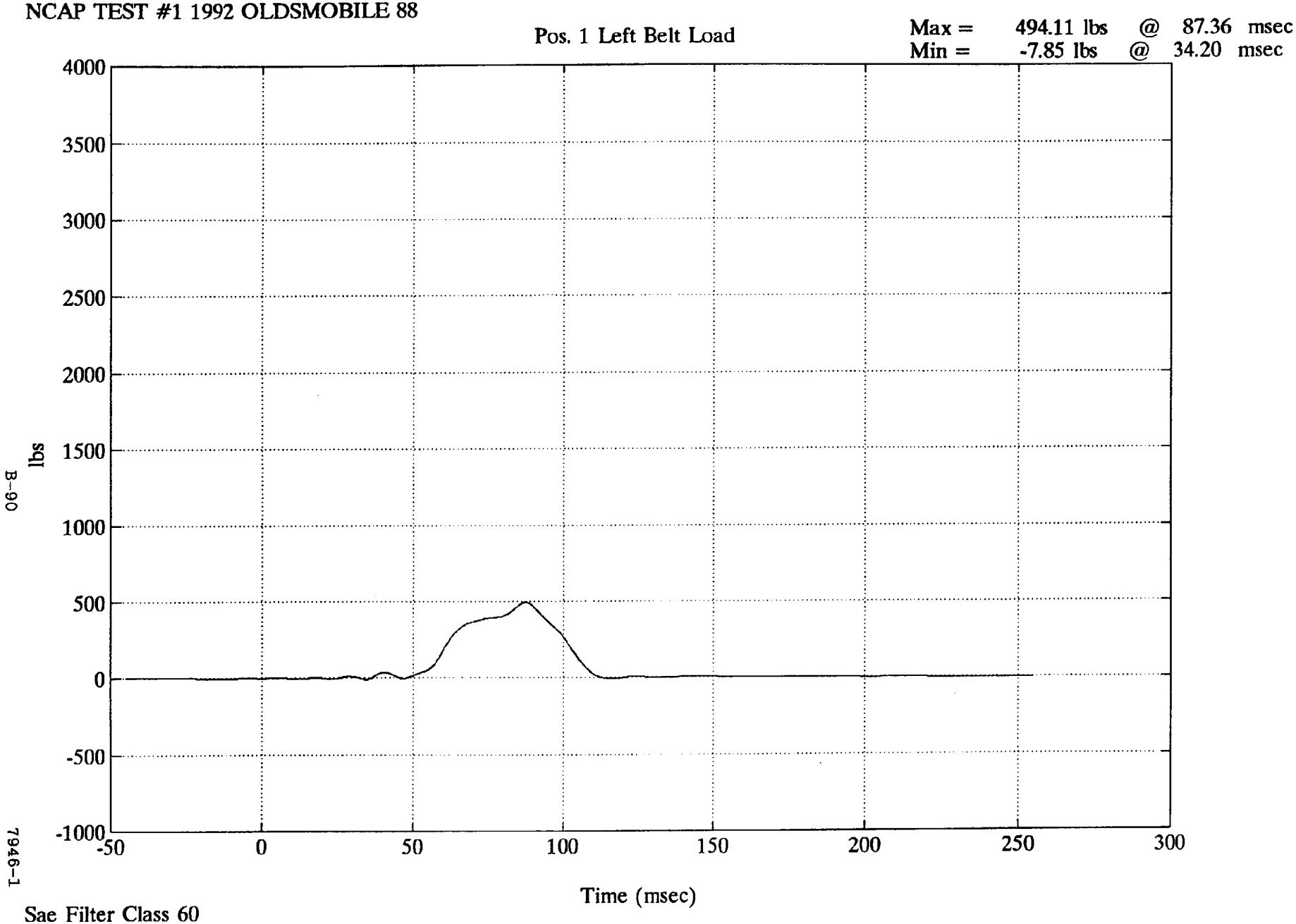
7946-1

Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88

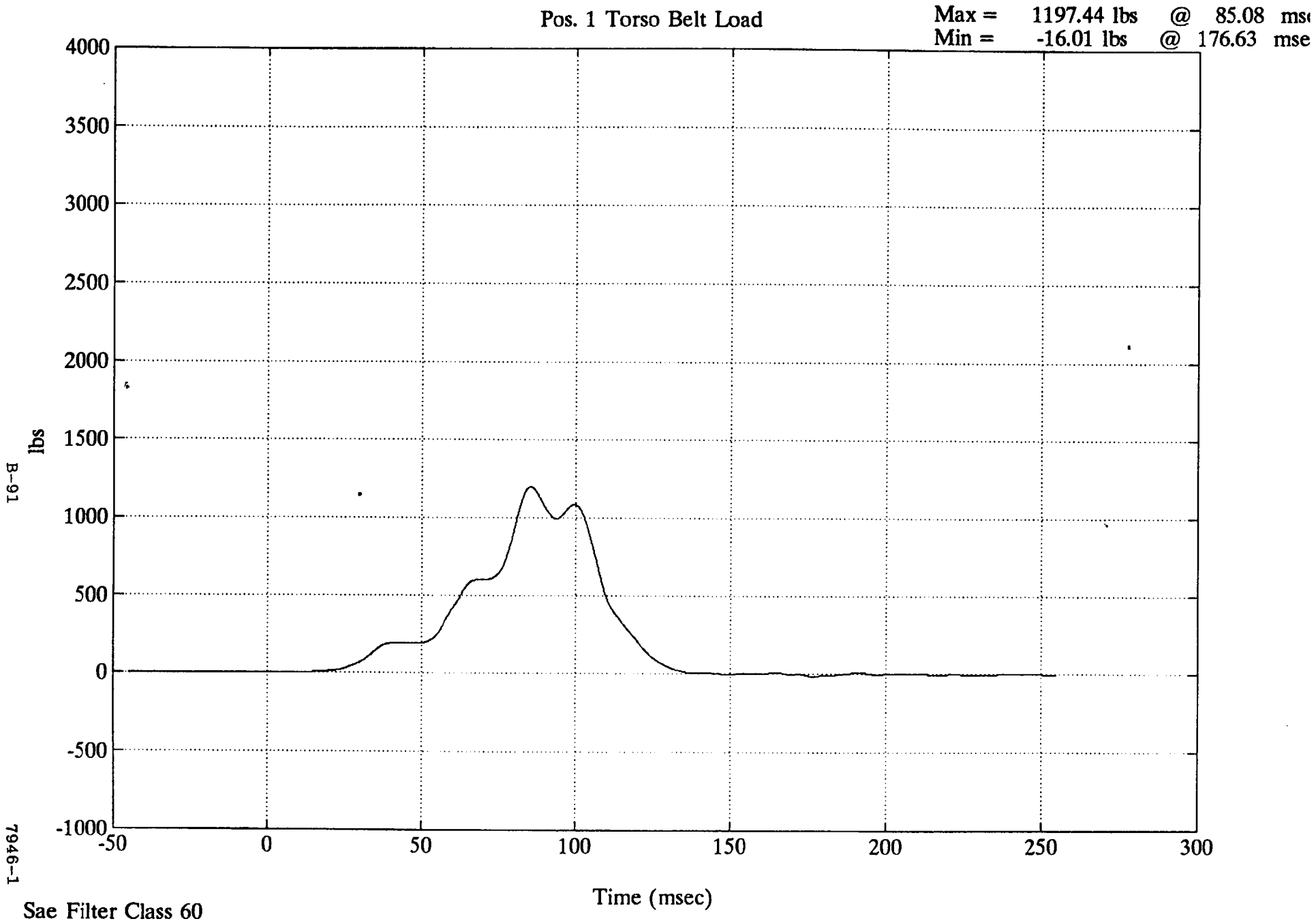


NCAP TEST #1 1992 OLDSMOBILE 88



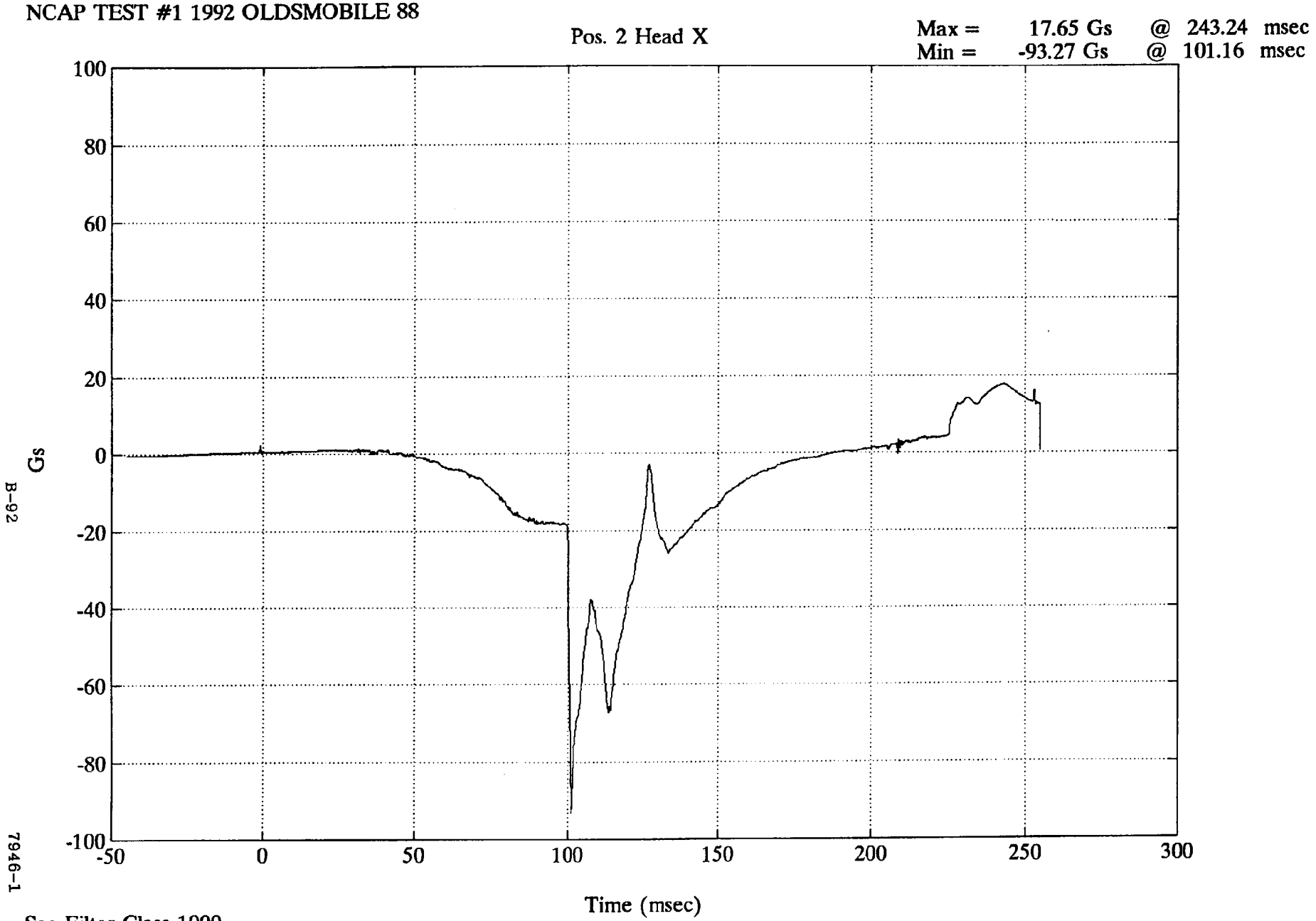
Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88



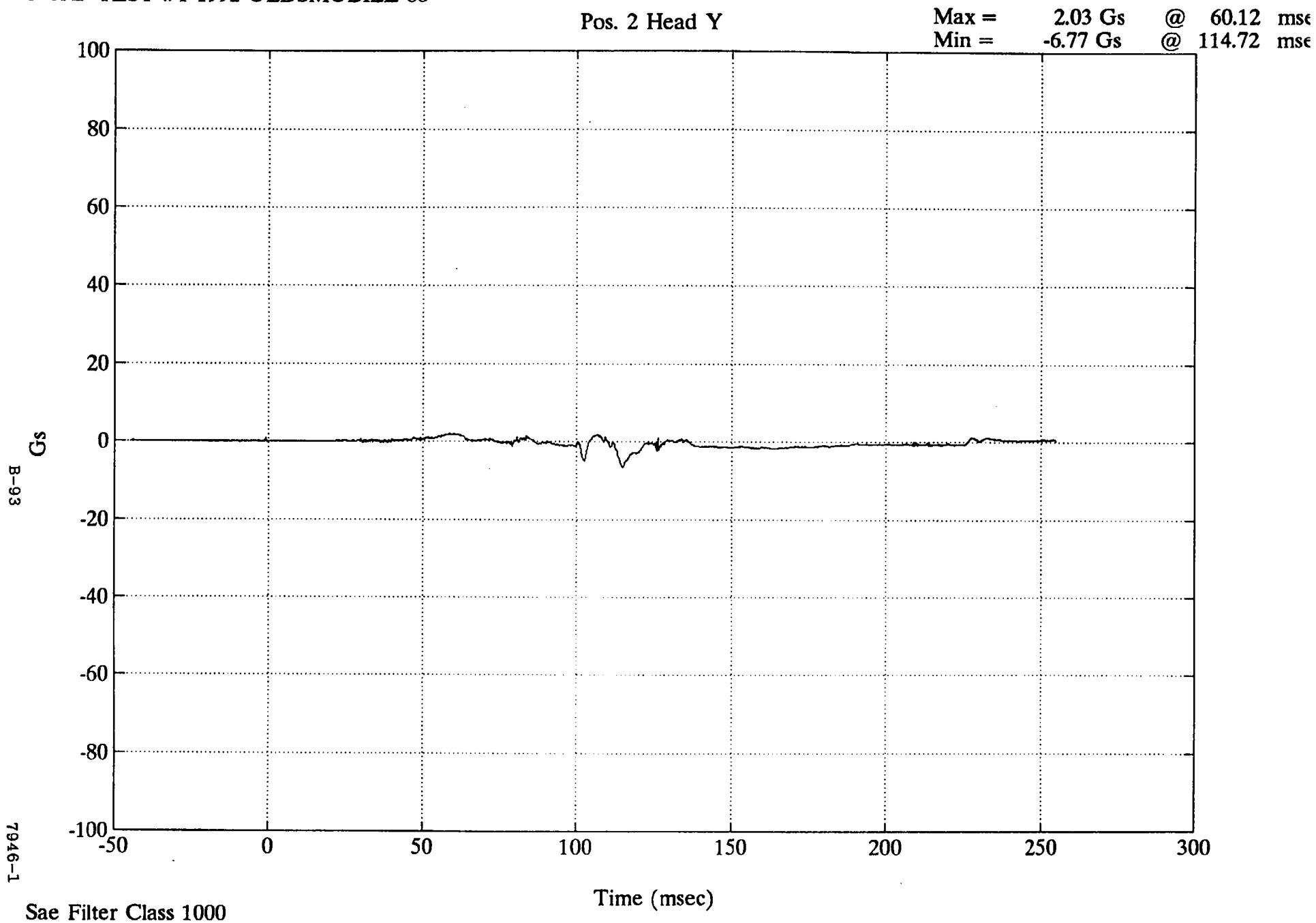
Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88

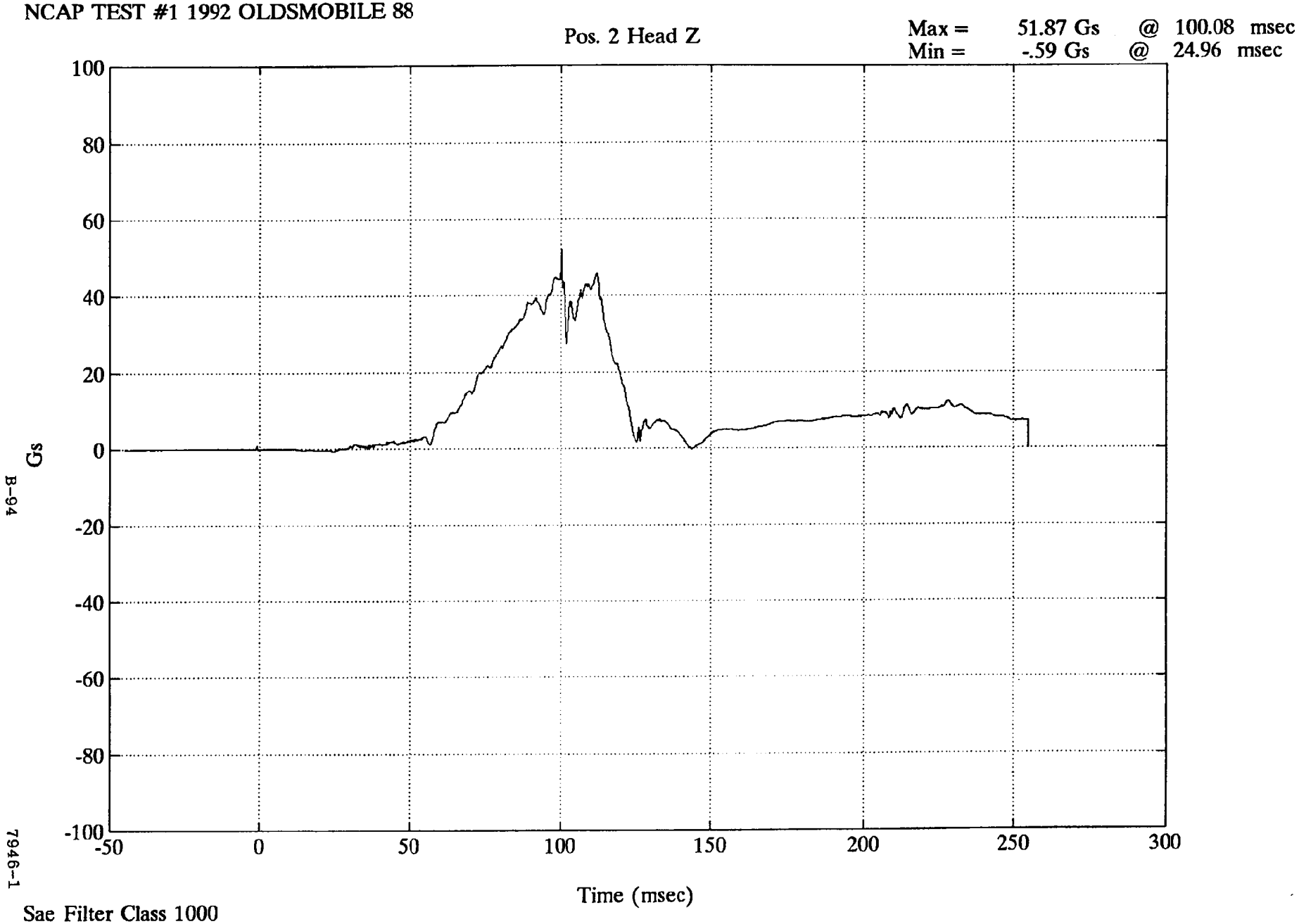


B-93

7946-1

Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88

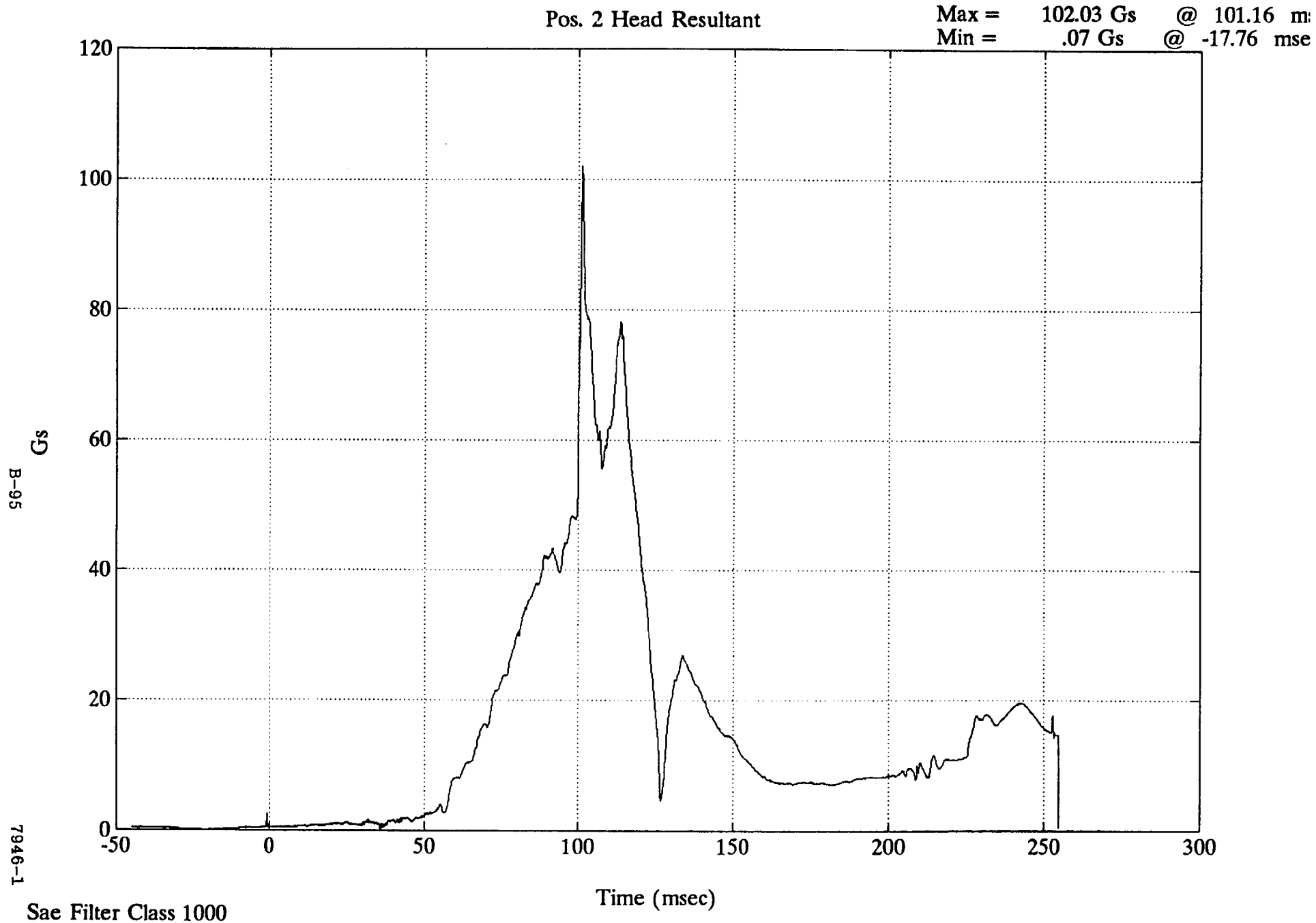


B-94

7946-1

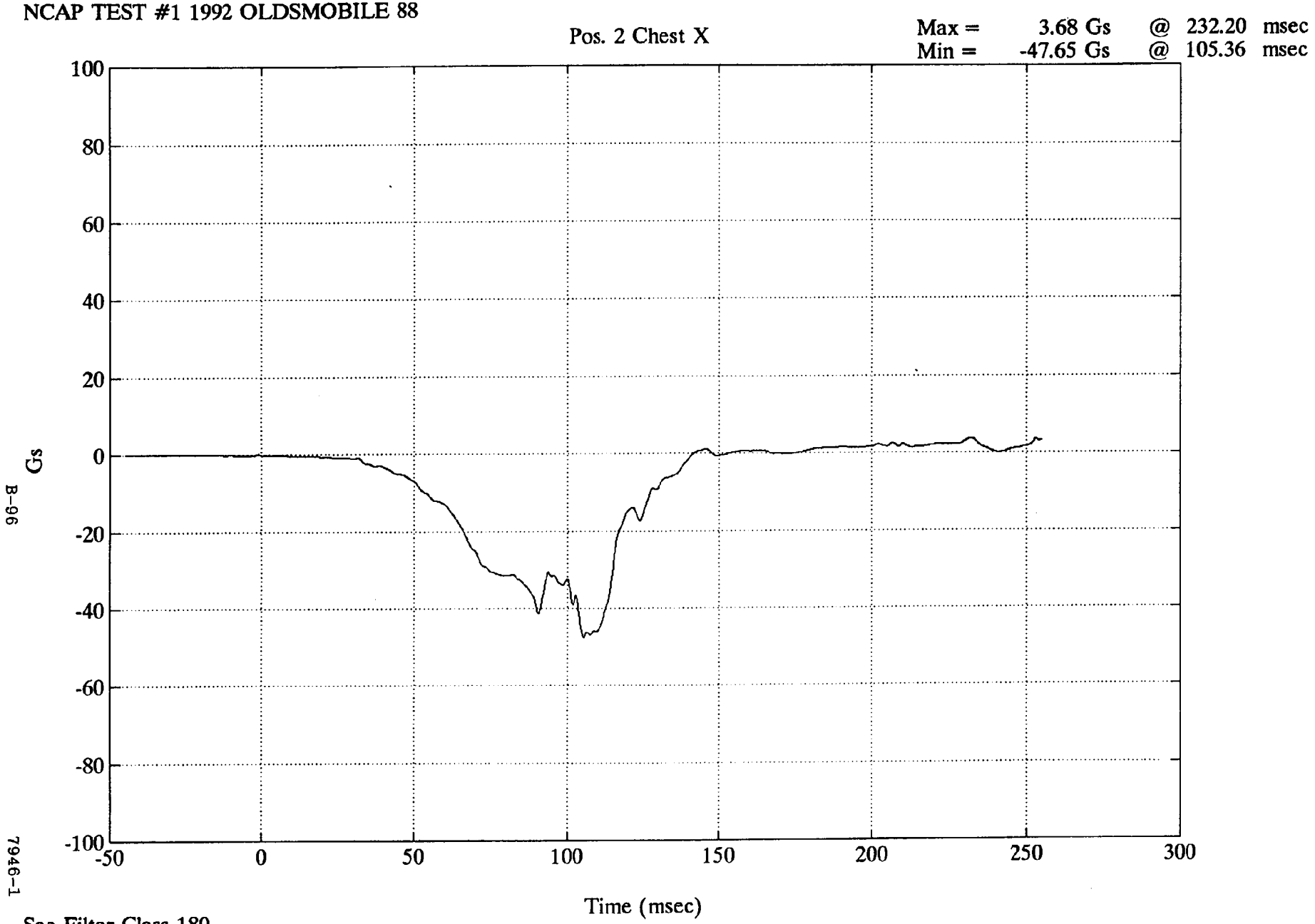
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



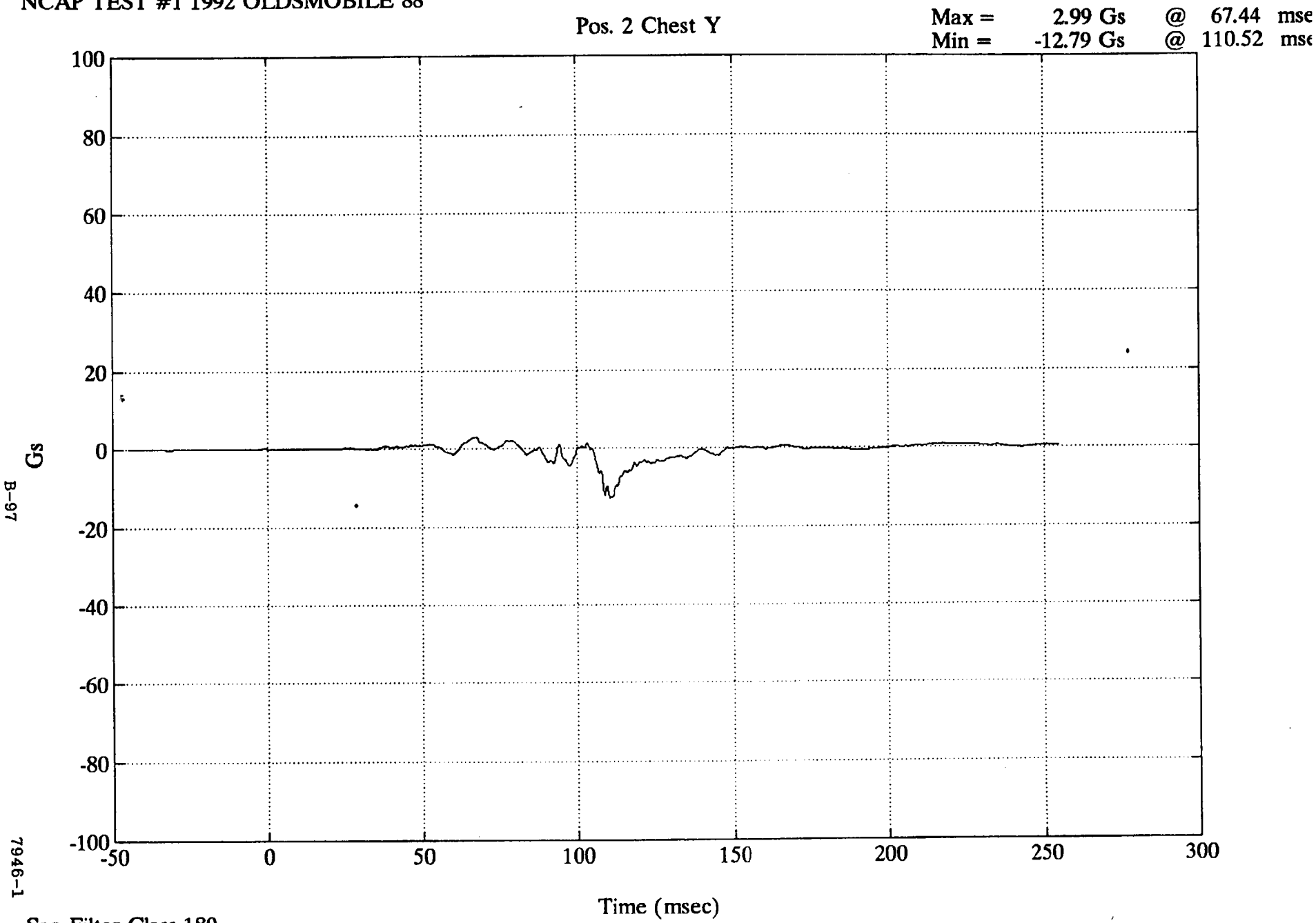
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88

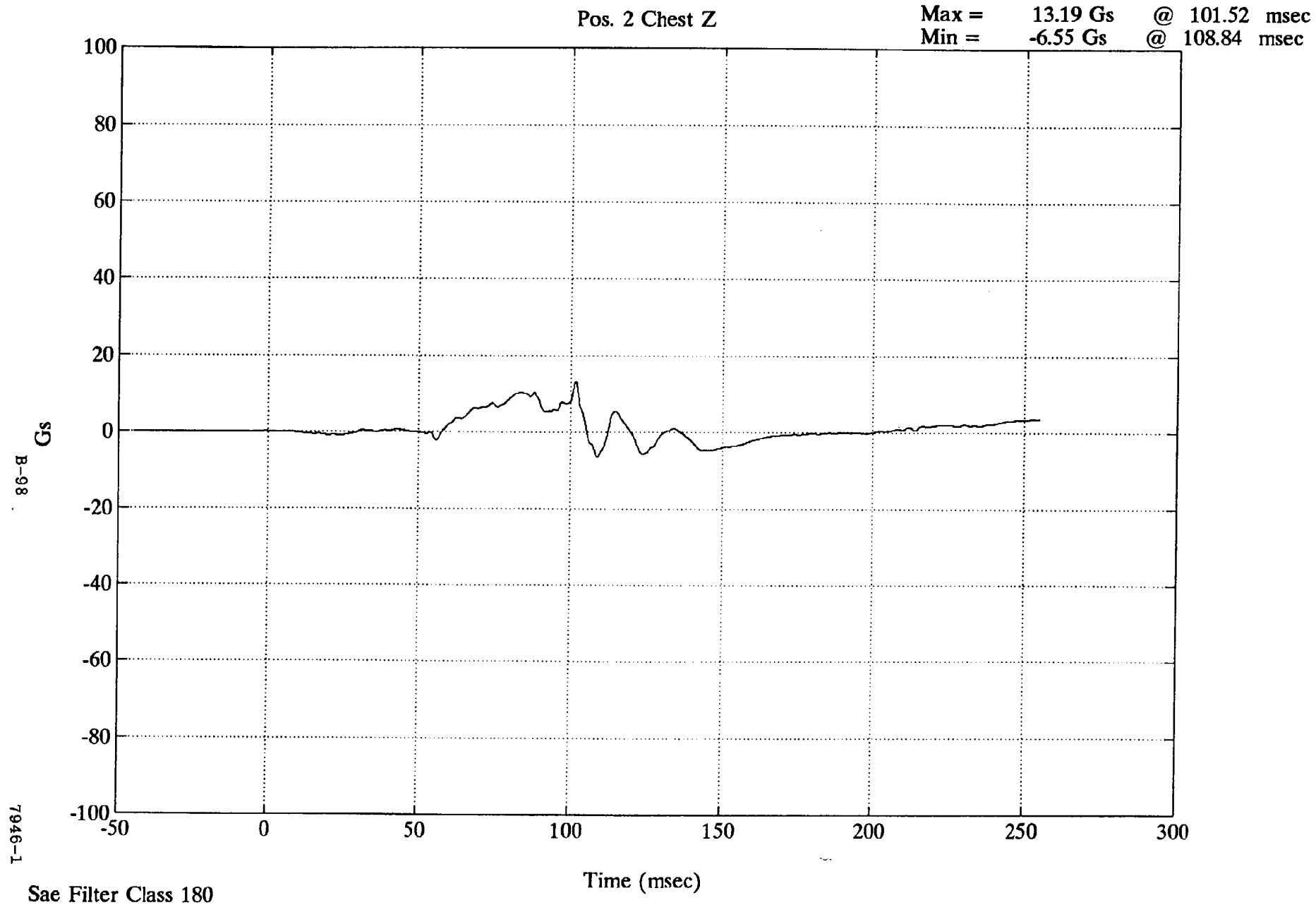


B-97

7946-1

Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88

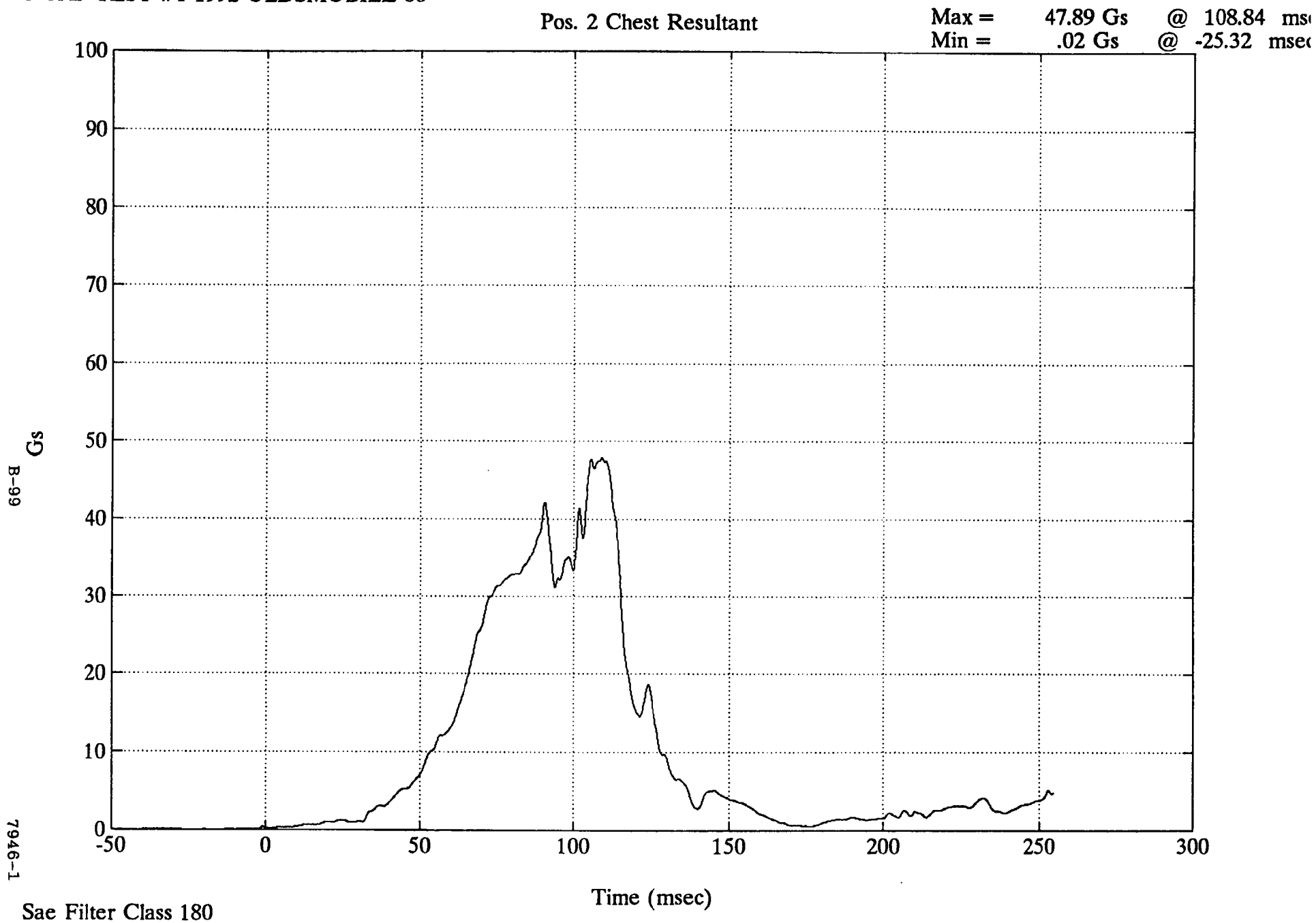


B-98

7946-1

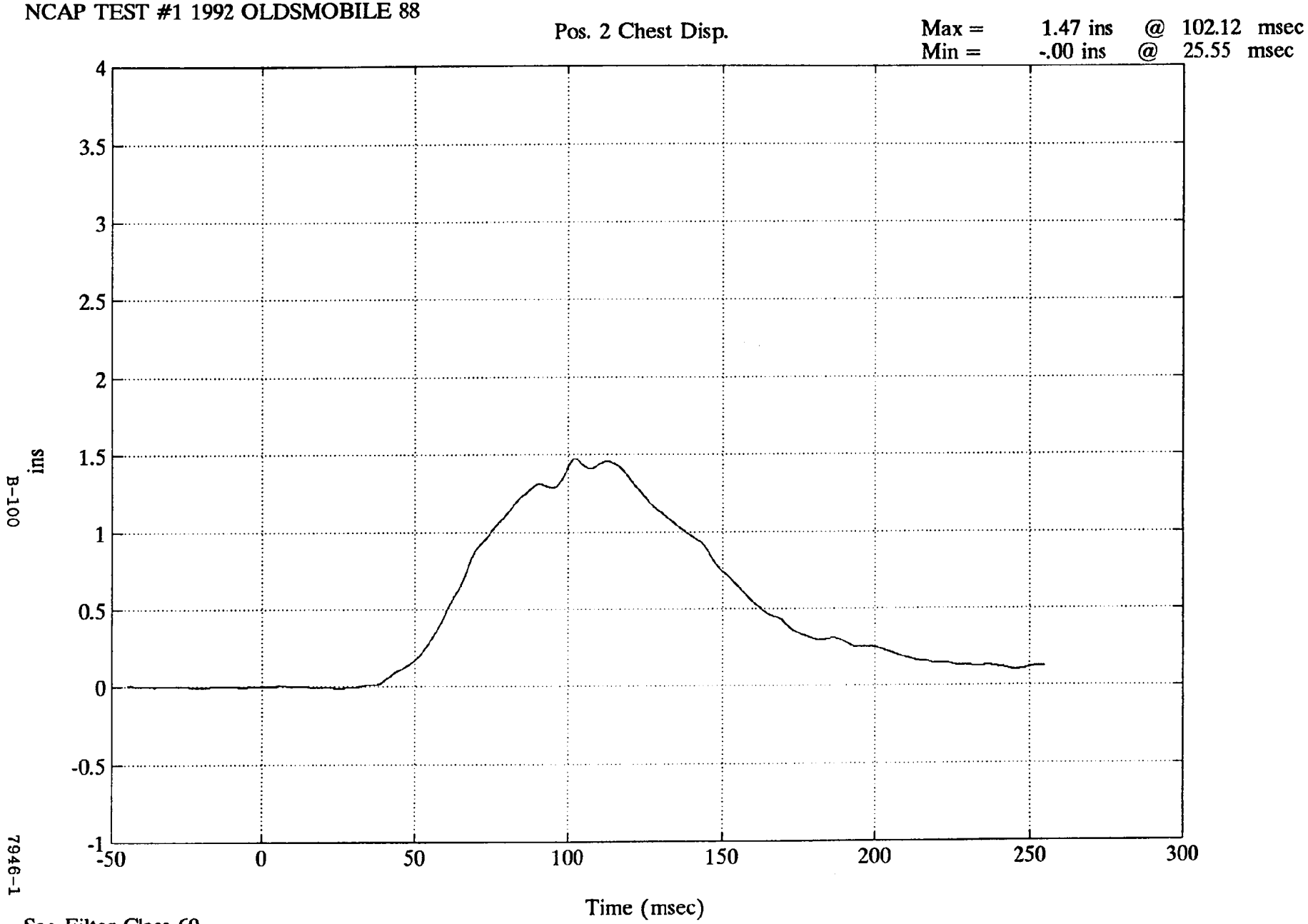
Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88



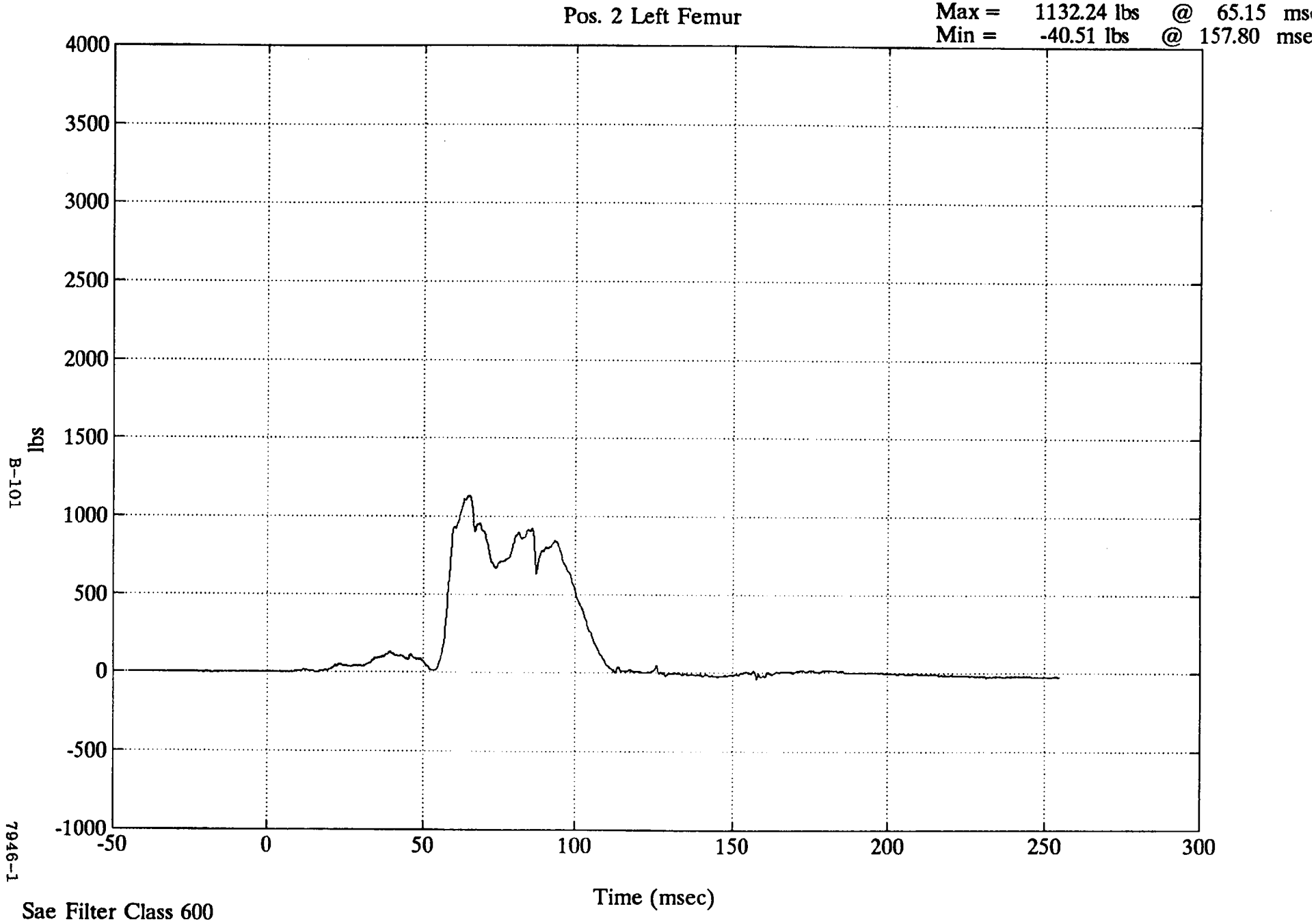
Sae Filter Class 180

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88

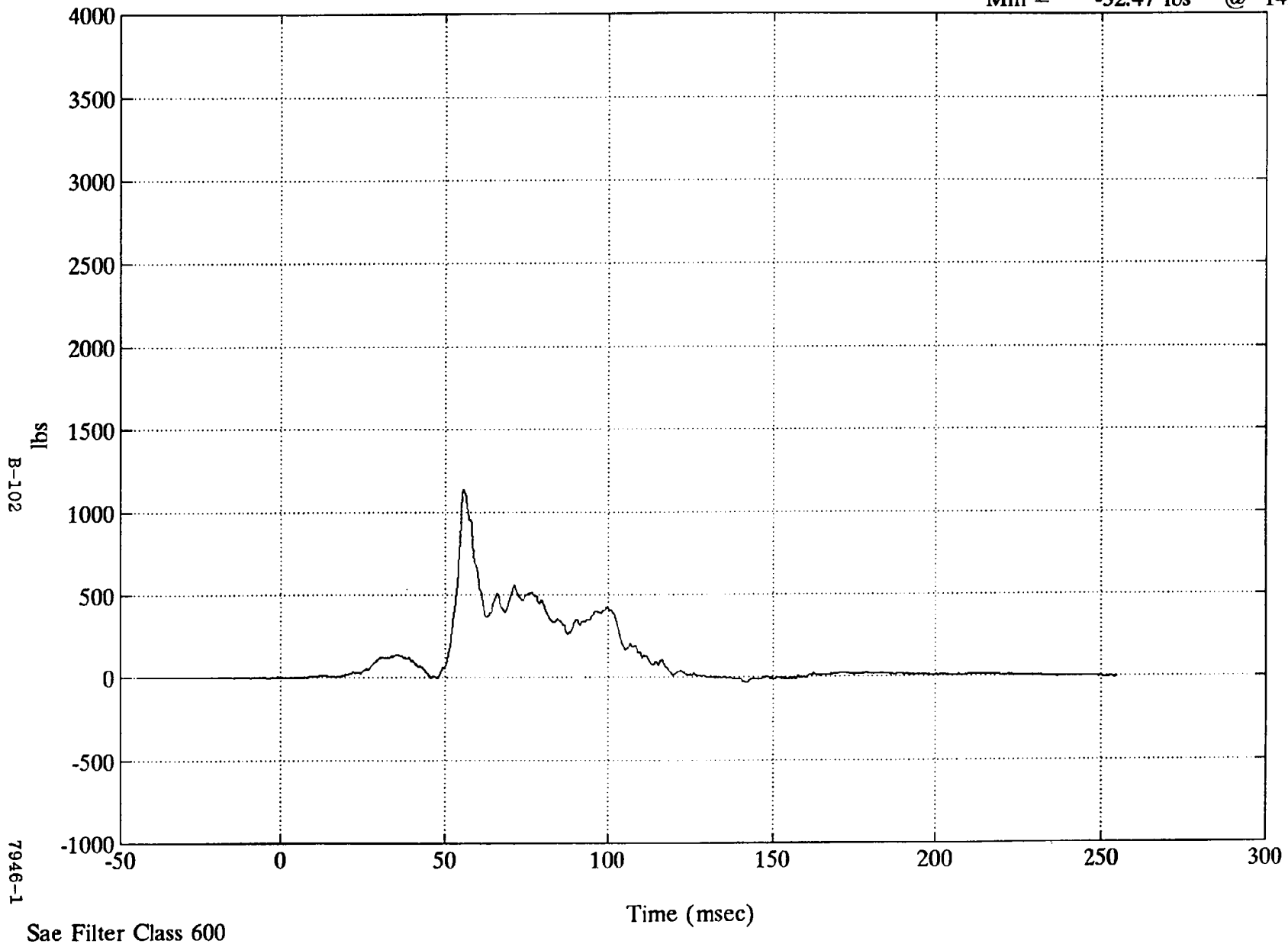


Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88

Pos. 2 Right Femur

Max = 1137.10 lbs @ 55.44 msec
Min = -32.47 lbs @ 142.08 msec

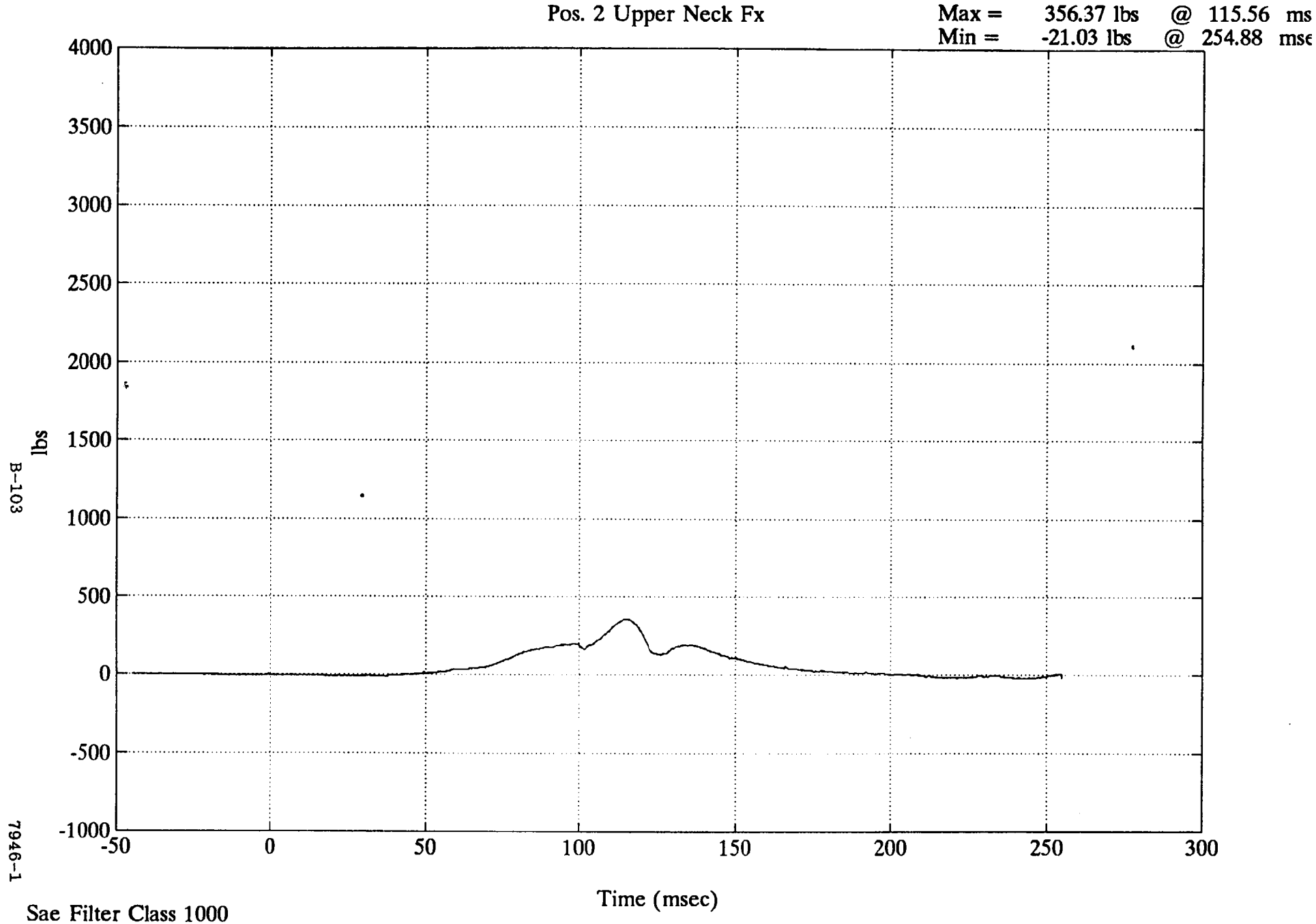


B-102

7946-1

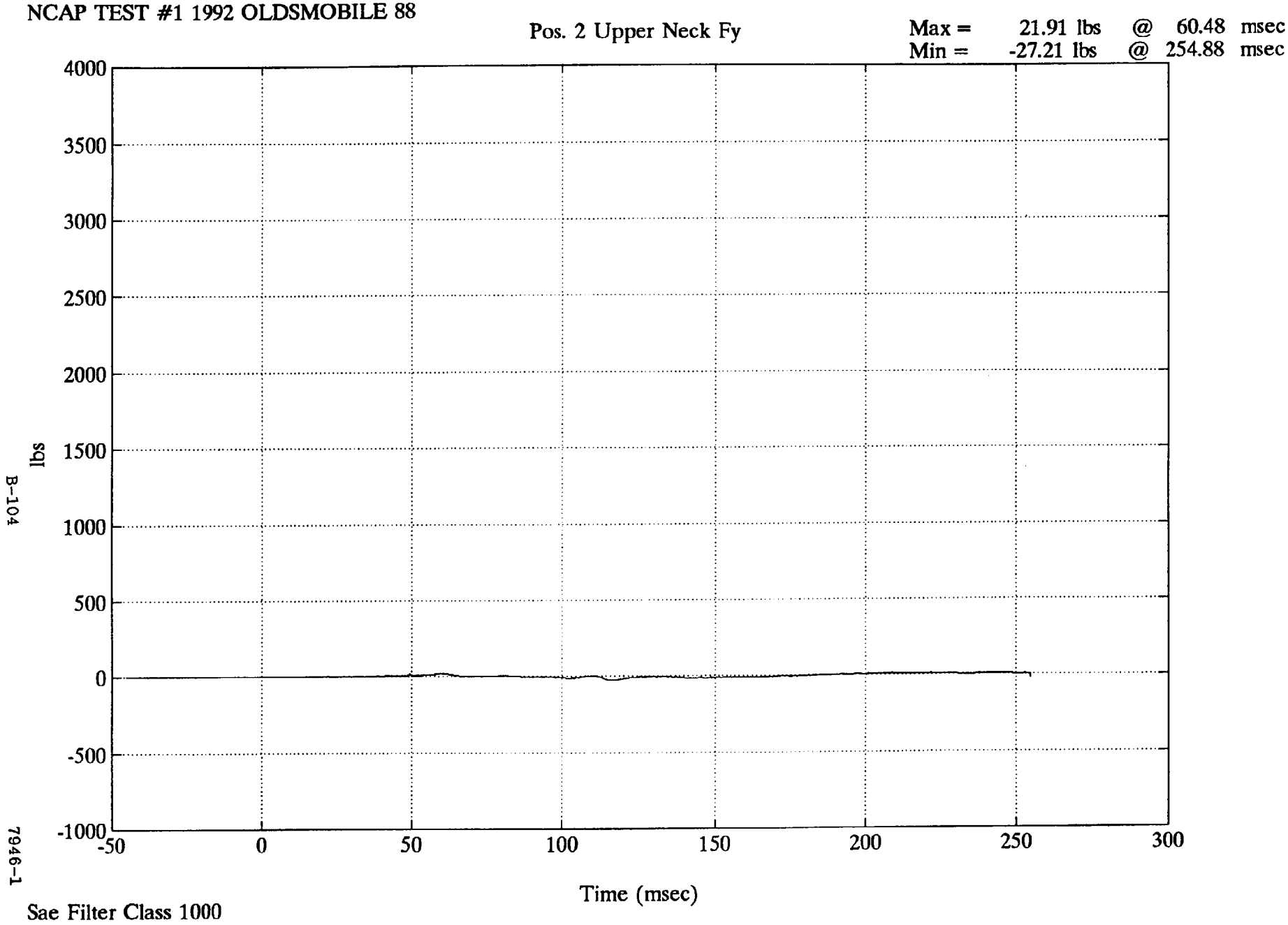
Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88



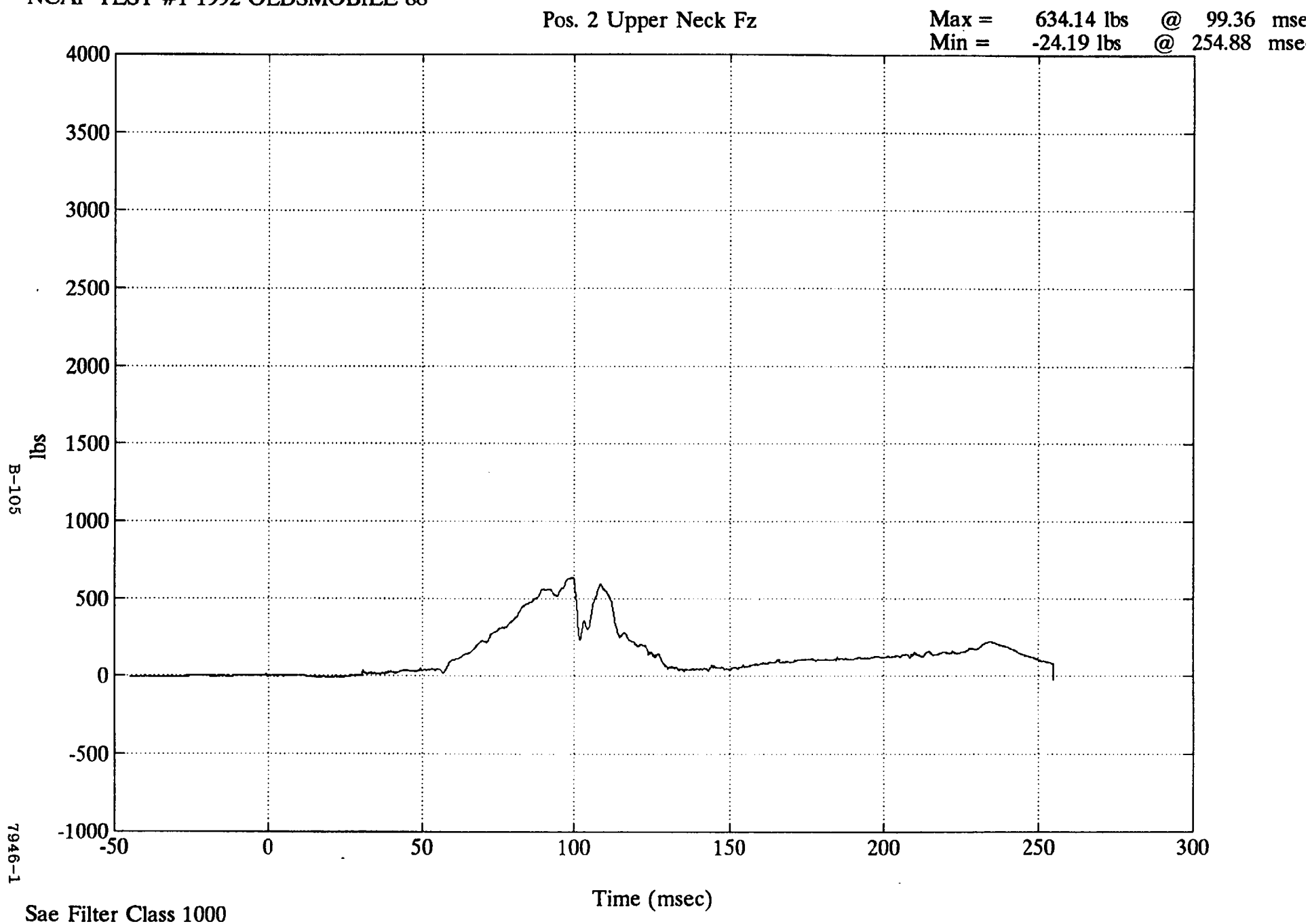
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



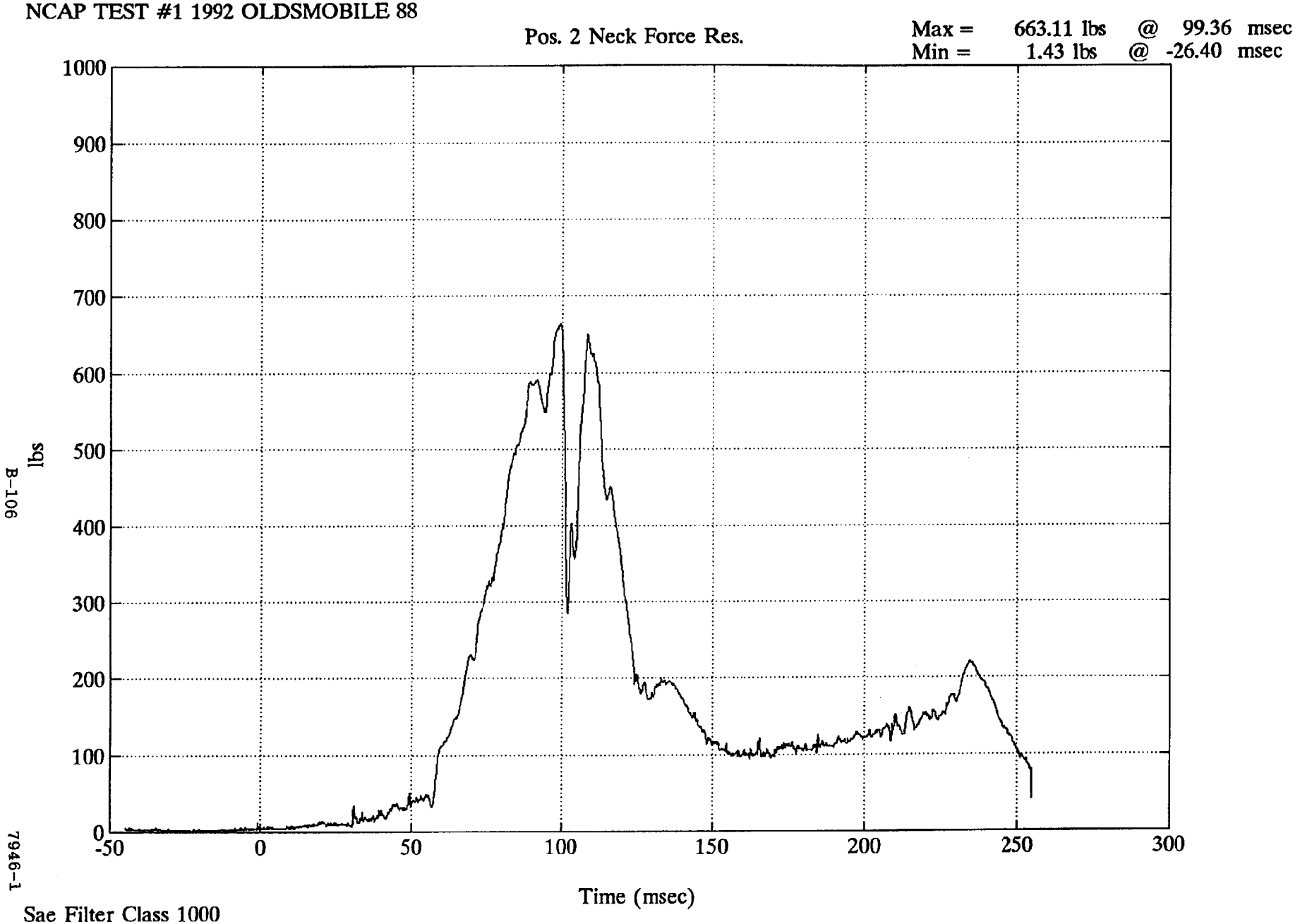
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



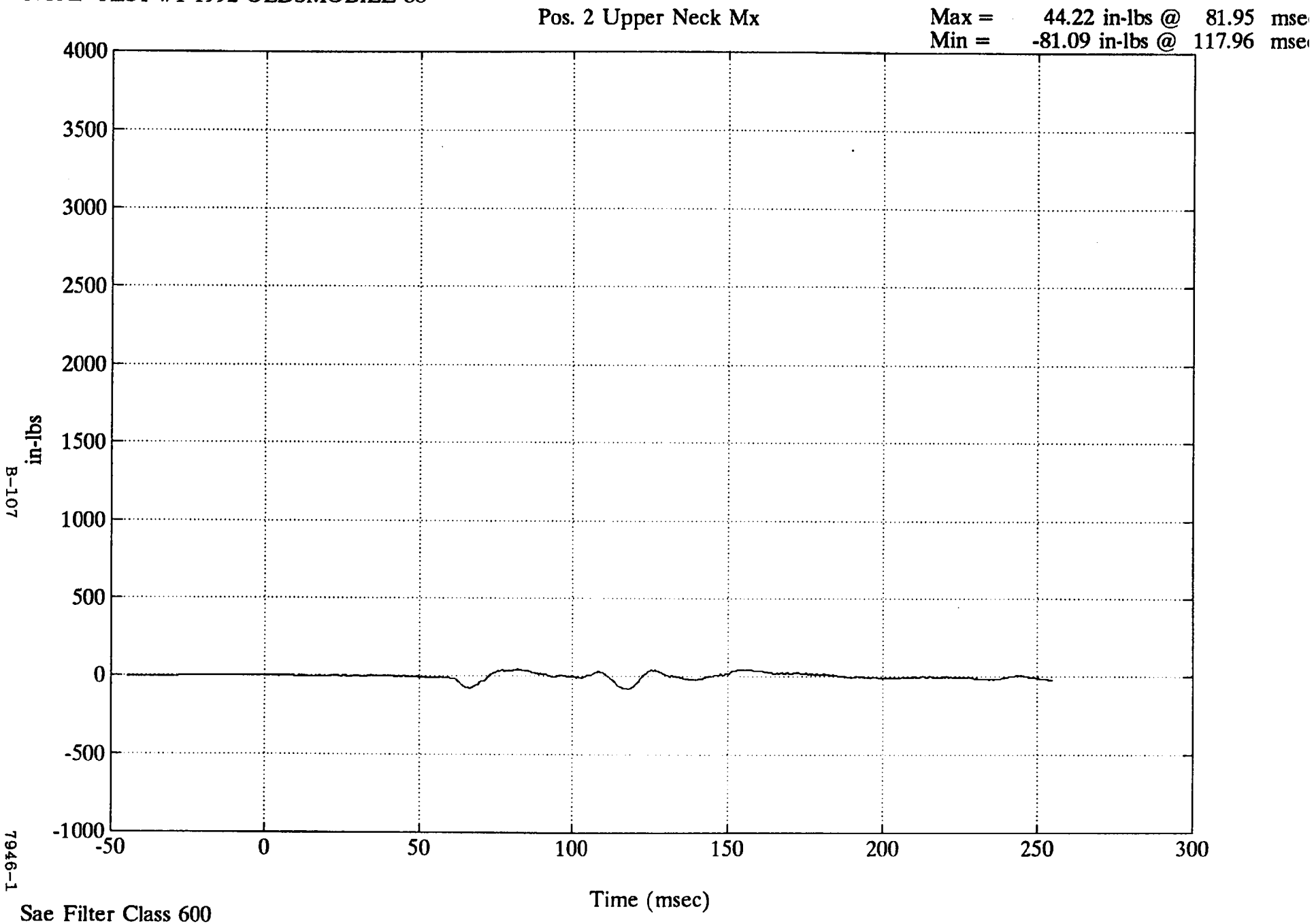
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



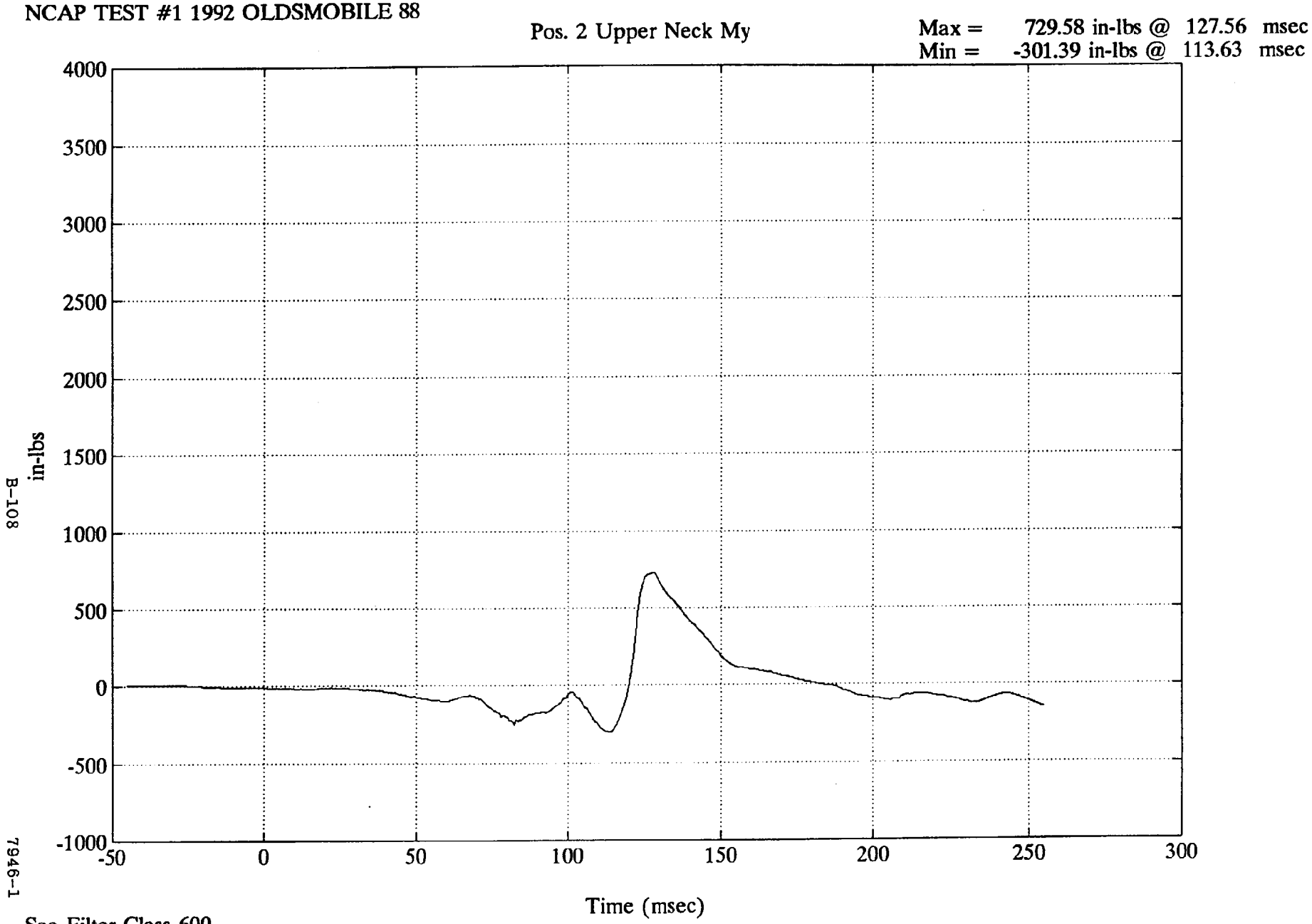
Sae Filter Class 1000

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88

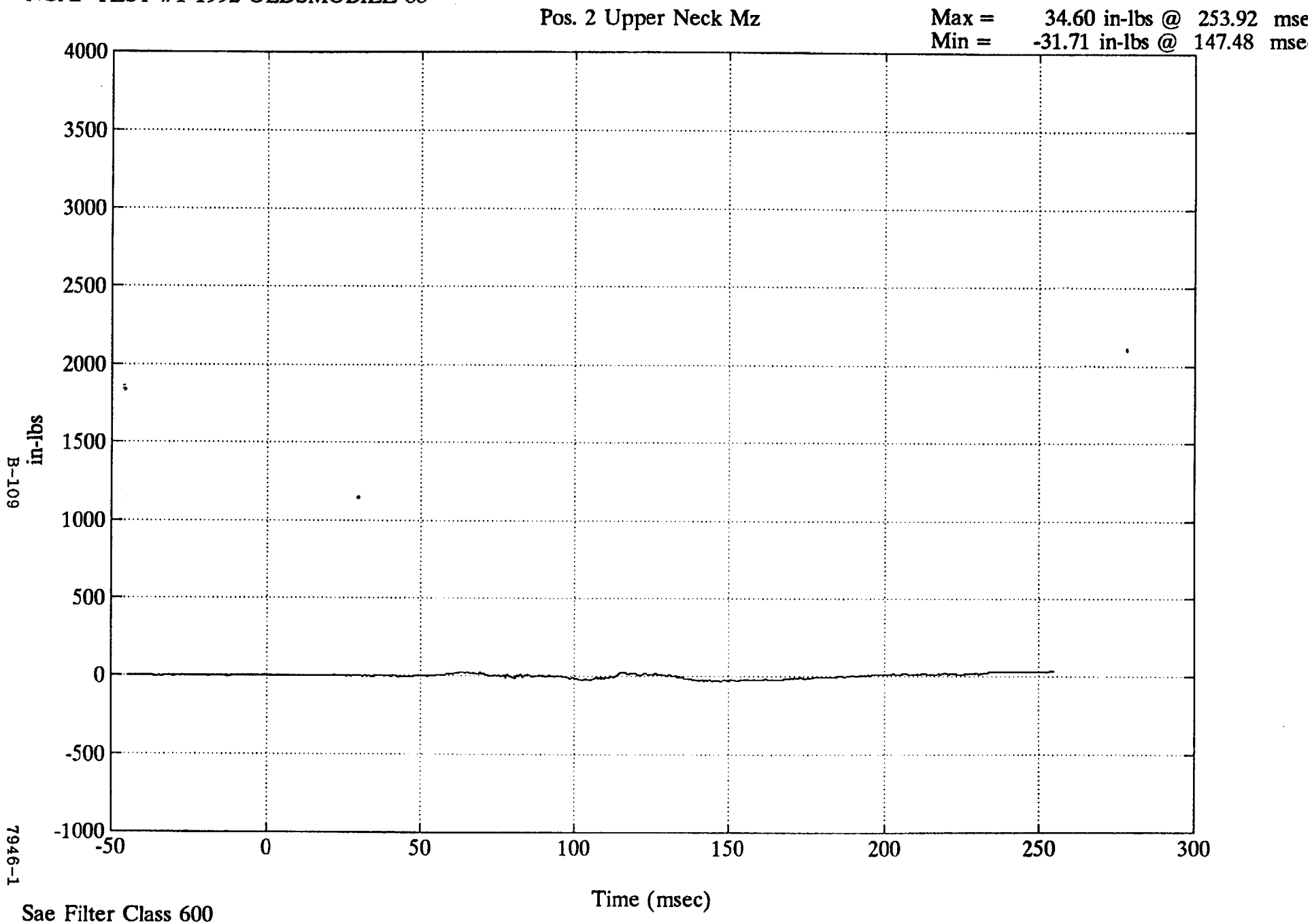


B-108

7946-1

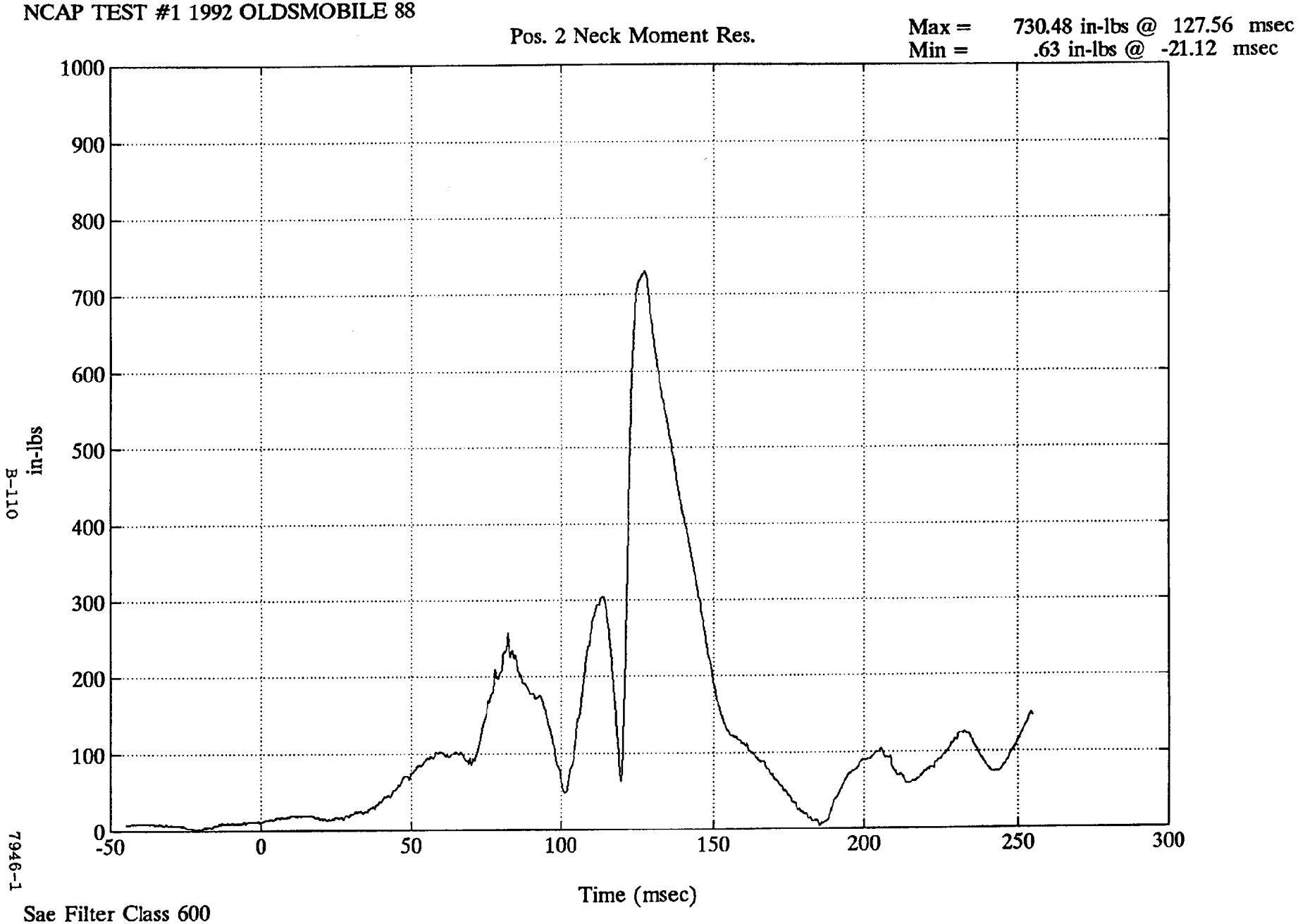
Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88



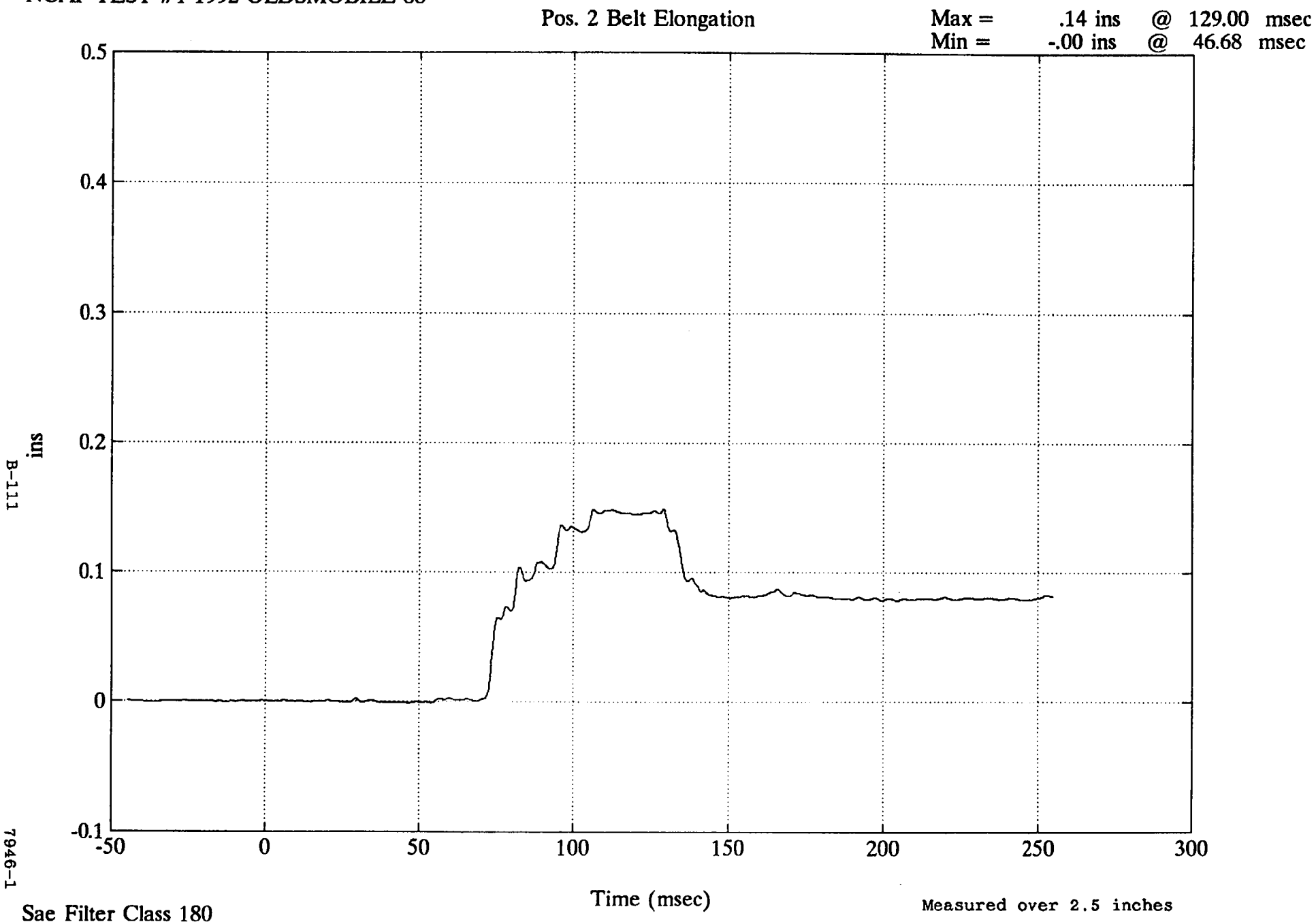
Sae Filter Class 600

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 600

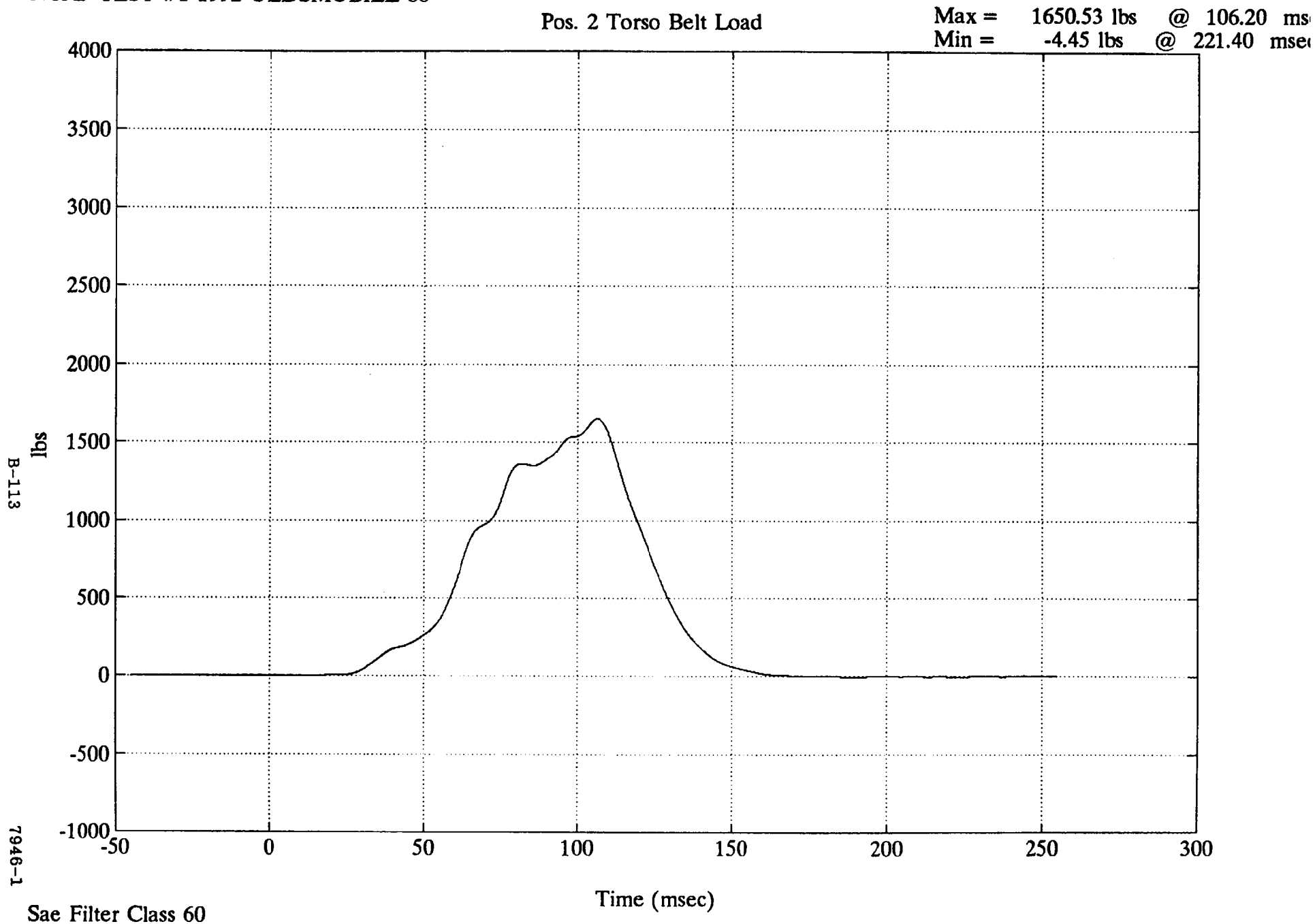
NCAP TEST #1 1992 OLDSMOBILE 88



NCAP TEST #1 1992 OLDSMOBILE 88

Sae Filter Class 60

NCAP TEST #1 1992 OLDSMOBILE 88



Sae Filter Class 60

Appendix C

PART 572 E DUMMY CONFIGURATION

AND PERFORMANCE VERIFICATION DATA SHEETS

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

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

Dummy serial numbers and certification dates are:

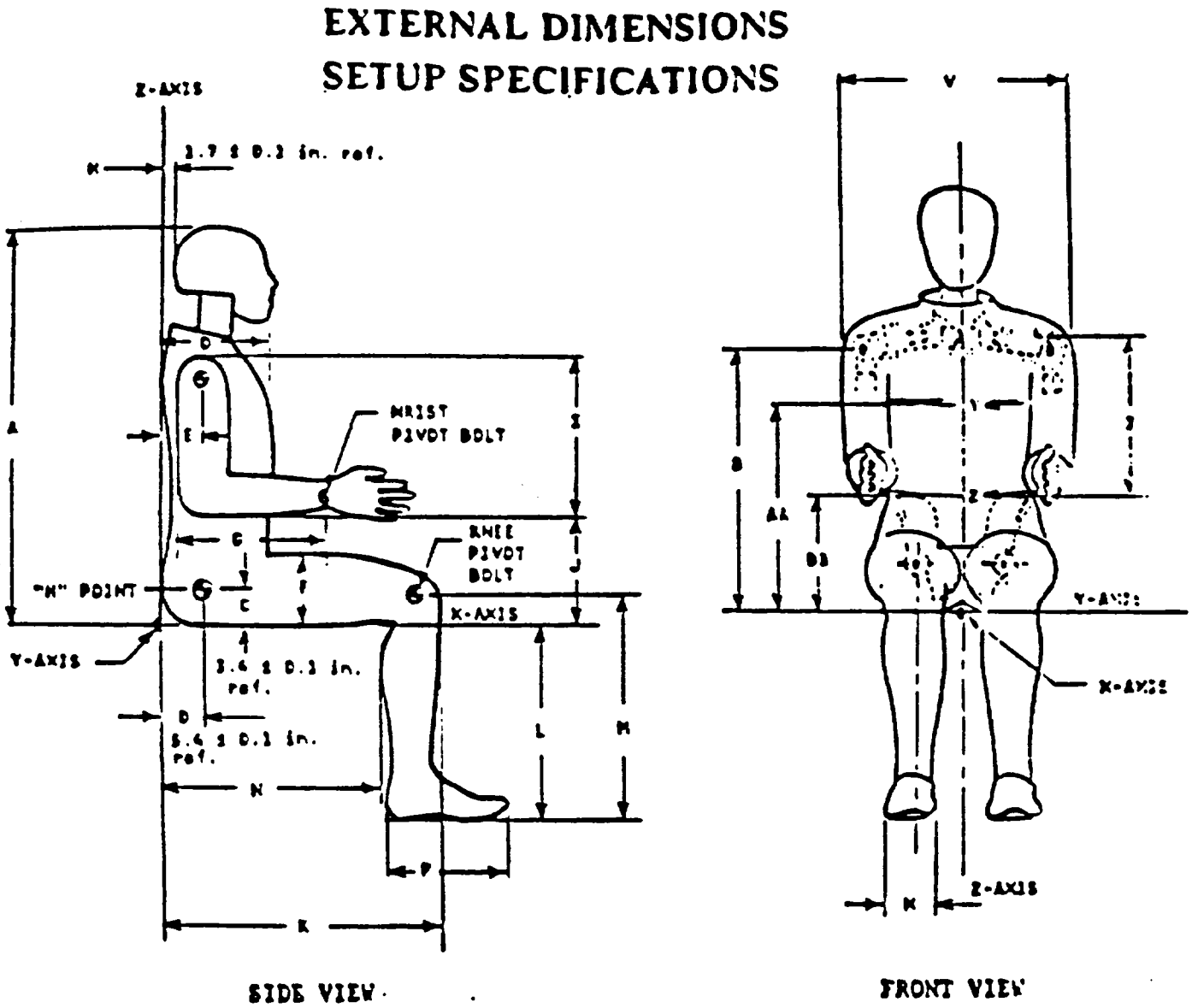
Serial No.	Completion Date
150	9-5-91
245	9-5-91

Electronic Test Equipment

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

Figure 10

DUMMY CONFIGURATION DIMENSIONS



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

HYBRID III EXTERNAL DIMENSIONS

S/N HUMANOID

DUMMY SERIAL NO. 150 DATE: 9-3-91

TEMPERATURE			70 DEG. F
RELATIVE HUMIDITY			50 %
LOCATION FOR CHEST CIRCUMFERENCE	(AA)	16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE	(BB)	8.9-9.1 IN	9.0 IN
CHEST CIRCUMFERENCE	(Y)	38.2-39.4 IN	38.8 IN
WAIST CIRCUMFERENCE	(Z)	32.1-34.1 IN	33.2 IN
CHEST DEPTH	(O)	8.4-9.0 IN	8.7 IN
H-POINT HEIGHT	(C)	3.3-3.5 IN	3.4 IN
H-POINT FROM SEAT BACK	(D)	5.3-5.5 IN	5.5 IN
SKULL CAP TO BACKLINE	(H)	1.6-1.8 IN	1.6 IN
TOTAL SITTING HEIGHT	(A)	34.6-35.0 IN	34.8 IN
THIGH CLEARANCE	(F)	5.5-6.1 IN	5.9 IN
BUTTOCK KNEE LENGTH	(K)	22.8-23.8 IN	23.2 IN
BUTTOCK POPLITAL LENGTH	(N)	17.8-18.8 IN	18.3 IN
POPLITEAL LENGTH	(L)	16.9-17.9 IN	17.6 IN
KNEE PIVOT HEIGHT	(M)	19.1-19.7 IN	19.4 IN
FOOT LENGTH	(P)	9.9-10.5 IN	10.0 IN
FOOT BREADTH	(W)	3.6-4.2 IN	4.1 IN
SHOULDER PIVOT FROM BACKLINE	(E)	3.3-3.7 IN	3.5 IN
SHOULDER BREADTH	(V)	16.6-17.2 IN	16.7 IN
SHOULDER PIVOT HEIGTH	(B)	19.9-20.5 IN	20.0 IN
ELBOW REST HEIGHT	(J)	7.5-8.3 IN	8.2 IN
SHOULDER-ELBOW LENGTH	(I)	13.0-13.6 IN	13.4 IN
BACK OF ELBOW TO WRIST PIVOT	(G)	11.4-12.0 IN	11.7 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 9-3-91

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 150 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	72 DEG. F
RELATIVE HUMIDITY	10% - 70%	44 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	248.6 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	10.8 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 : 9-4-91 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN:150 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71 DEG. F
RELATIVE HUMIDITY		10% - 70%	47 %
IMPACT VELOCITY		22.60 - 23.40 FPS	23.1 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	23.86 G'S
	20 MS	17.60 - 22.60 G'S	22.34 G'S
	30 MS	12.50 - 18.50 G'S	18.49 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	18.49 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	40.5 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	77.86 DEG.
	TIME	57 - 64 MS	59.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	78.16 FT.-LBS.
	TIME	47 - 58 MS	54.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.5 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.88 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 9-4-91 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN:150 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71 DEG. F
RELATIVE HUMIDITY		10% - 70%	45 %
IMPACT VELOCITY		19.50 - 20.30 FPS	20.2 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	18.65 G'S
	20 MS	14.00 - 19.00 G'S	18.29 G'S
	30 MS	11.00 - 16.00 G'S	14.81 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	14.81 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	45.63 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	101.66 DEG.
	TIME	72 - 82 MS	75.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-59.0/-39.0 FT.-LBS.	-54.15 FT.-LBS.
	TIME	65 - 79 MS	70.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	153.25 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	131.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 9-5-91

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN 150 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	46 %
PENDULUM VELOCITY	21.6 - 22.4 FT/SEC	21.6 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.53 INCHES
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1240 POUNDS
INTERNAL HYSTERESIS	69% - 85%	75.8 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9-5-91 KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 150 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	71 DEG. F
RELATIVE HUMIDITY	10% - 70%	42 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1105 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9-5-91 KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 150 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	71 DEG. F
RELATIVE HUMIDITY	10% - 70%	42 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1110 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 150

A. DUMMY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER				
HX LONGITUDINAL	ENDEVCO	CP30	4/91	10/91
HY LATERAL	ENDEVCO	CX05	4/91	10/91
HZ VERTICAL	ENDEVCO	DB47	4/91	10/91
2. CHEST ACCELEROMETER				
CX LONGITUDINAL	CEC	A74	4/91	10/91
CY LATERAL	ENDEVCO	GK28	4/91	10/91
CZ VERTICAL	CEC	A128	4/91	10/91
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	077	3/91	9/91
RIGHT SIDE	GSE	1927	3/91	9/91

B. CALIBRATION LABORATORY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. PENDULUM ACC.	CEC	A160	5/91	11/91
2. TEST PROBE ACCELEROMETER	CEC	A161	5/91	11/91
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE	TRANS-DUCER INC	20051	7/91	1-92
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE	BLH	72952	7/91	1-92
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE	CIC	567-11	7/91	1-92

HYBRID III EXTERNAL DIMENSIONS

S/N HUMANOID

DUMMY SERIAL NO. 245 DATE: 9-3-91

TEMPERATURE		70 DEG. F
RELATIVE HUMIDITY		50 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)	8.9-9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)	38.2-39.4 IN	39.2 IN
WAIST CIRCUMFERENCE (Z)	32.1-34.1 IN	33.5 IN
CHEST DEPTH (O)	8.4-9.0 IN	8.5 IN
H-POINT HEIGHT (C)	3.3-3.5 IN	3.5 IN
H-POINT FROM SEAT BACK (D)	5.3-5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)	1.6-1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)	34.6-35.0 IN	34.9 IN
THIGH CLEARANCE (F)	5.5-6.1 IN	6.1 IN
BUTTOCK KNEE LENGTH (K)	22.8-23.8 IN	23.5 IN
BUTTOCK POPLITAL LENGTH (N)	17.8-18.8 IN	18.4 IN
POPLITEAL LENGTH (L)	16.9-17.9 IN	17.0 IN
KNEE PIVOT HEIGHT (M)	19.1-19.7 IN	19.4 IN
FOOT LENGTH (P)	9.9-10.5 IN	10.3 IN
FOOT BREADTH (W)	3.6-4.2 IN	3.8 IN
SHOULDER PIVOT FROM BACKLINE (E)	3.3-3.7 IN	3.7 IN
SHOULDER BREADTH (V)	16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGTH (B)	19.9-20.5 IN	20.3 IN
ELBOW REST HEIGHT (J)	7.5-8.3 IN	8.2 IN
SHOULDER-ELBOW LENGTH (I)	13.0-13.6 IN	18.3 IN
BACK OF ELBOW TO WRIST PIVOT (G)	11.4-12.0 IN	11.6 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 9-3-91

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 245 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	72 DEG. F
RELATIVE HUMIDITY	10% - 70%	44 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	270.4 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	1.3G'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 : 9-4-91 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN:245 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71 DEG. F
RELATIVE HUMIDITY		10% - 70%	44 %
IMPACT VELOCITY		22.60 - 23.40 FPS	22.9 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	23.83 G'S
	20 MS	17.60 - 22.60 G'S	22.58 G'S
	30 MS	12.50 - 18.50 G'S	18.27 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	18.27 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	40.75 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	73.76 DEG.
	TIME	57 - 64 MS	58.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	75.35 FT.-LBS.
	TIME	47 - 58 MS	54.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	113.63 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	101.88 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 9-4-91 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN:245 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71 DEG. F
RELATIVE HUMIDITY		10% - 70%	44 %
IMPACT VELOCITY		19.50 - 20.30 FPS	19.5 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	19.1 G'S
	20 MS	14.00 - 19.00 G'S	17.41 G'S
	30 MS	11.00 - 16.00 G'S	15.31 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	15.31 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	41 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	91.23 DEG.
	TIME	72 - 82 MS	75.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-59.0/-39.0 FT.-LBS.	-43.34 FT.-LBS.
	TIME	65 - 79 MS	71.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	150.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	131.88 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 9-5-91

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN 245 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	46 %
PENDULUM VELOCITY	21.6 - 22.4 FT/SEC	21.6 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.52 INCHES
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1243 POUNDS
INTERNAL HYSTERESIS	69% - 85%	76.1 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9-5-91 KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 245 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	71 DEG. F
RELATIVE HUMIDITY	10% - 70%	42 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1127 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9-5-91 KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 245 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	71 DEG. F
RELATIVE HUMIDITY	10% - 70%	42 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1108 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 245

A. DUMMY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER				
HX LONGITUDINAL	ENDEVCO	FY05	3/91	9/91
HY LATERAL	ENDEVCO	GD98	3/91	9/91
HZ VERTICAL	ENDEVCO	CD75	3/91	9/91
2. CHEST ACCELEROMETER				
CX LONGITUDINAL	CEC	A73	3/91	9/91
CY LATERAL	ENDEVCO	GL77	3/91	9/91
CZ VERTICAL	CEC	A44	3/91	9/91
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	954	3/91	9/91
RIGHT SIDE	GSE	955	3/91	9/91

B. CALIBRATION LABORATORY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. PENDULUM ACC.	CEC	A160	5/91	11/91
2. TEST PROBE ACCELEROMETER	CEC	A161	5/91	11/91
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE	TRANS-DUCER INC	20051	7/91	1/92
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE	BLH	72952	7/91	1/92
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE	CIC	567-11	7/91	1/92

Appendix D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(6 Month Calibration Minimum)

DRIVER DUMMY SN150	Serial #	Manufacturer	Calibration Last	Calibration Next
Head X	CP30	ENDEVCO	4/91	10/91
Y	CX05	ENDEVCO	4/91	10/91
Z	DB47	ENDEVCO	4/91	10/91
Chest X	A74	CEC	4/91	10/91
Y	GK28	ENDEVCO	4/91	10/91
Z	A128	CEC	4/91	10/91
Right Femur Load Cell	1927	GSE	3/91	9/91
Left Femur Load Cell	77	GSE	3/91	9/91
Neck Load Cell X	269	DENTON	7/91	1/92
Y	269	DENTON	7/91	1/92
Z	269	DENTON	7/91	1/92
Neck Moment X	269	DENTON	7/91	1/92
Y	269	DENTON	7/91	1/92
Z	269	DENTON	7/91	1/92
Chest Deflection Gauge Hybrid III Use Only	150	HUMANOID	8/91	2/92
Lap Belt Load Cells	123	LEBOW	4/91	10/91
Shoulder Belt Load Cells	127	LEBOW	4/91	10/91
Belt Stretch Transducer	E1	CALSPAN	9/91	3/92

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(6 Month Calibration Minimum)

PASSENGER DUMMY SN245	Serial #	Manufacturer	Calibration Last	Calibration Next
Head X	FY05	ENDEVCO	3/91	9/91
Y	GD98	ENDEVCO	3/91	9/91
Z	GD75	ENDEVCO	3/91	9/91
Chest X	A73	CEC	3/91	9/91
Y	GL77	ENDEVCO	3/91	9/91
Z	A44	CEC	3/91	9/91
Right Femur Load Cell	955	GSE	3/91	9/91
Left Femur Load Cell	954	GSE	3/91	9/91
Neck Load Cell X	076	DENTON	7/91	1/92
Y	076	DENTON	7/91	1/92
Z	076	DENTON	7/91	1/92
Neck Moment X	076	DENTON	7/91	1/92
Y	076	DENTON	7/91	1/92
Z	076	DENTON	7/91	1/92
Chest Deflection Gauge Hybrid III Use Only	245	HUMANOID	8/91	1/92
Lap Belt Load Cells	133	LEBOW	4/91	10/92
Shoulder Belt Load Cells	135	LEBOW	4/91	10/92
Belt Stretch Transducer	E3	CALSPAN	9/91	3/92

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration Last	Calibration Next
Left Seat Rear Crossmember	A181	CEC	4/91	10/91
Right Rear Seat Crossmember	A188	CEC	3/91	10/91
Top of Engine	A52	CEC	7/91	1/92
Bottom of Engine	A184	CEC	3/91	10/91
Left Disc Brake Caliper	A144	CEC	4/91	10/91
Right Disc Brake Caliper	A115	CEC	4/91	10/91
Instrument Panel	A164	CEC	4/91	10/91
Center Rear Crossmember Z	A69	CEC	7/91	1/92
Vehicle Rear Z	A152	CEC	4/91	10/91

INSTRUMENT CALIBRATION FOR LABORATORY INSTRUMENTS
(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Neck Bending Pendulum Accel.	A160	CEC	5/91	11/91
Neck Bending Rotary Potentiometer	None	BOURNS	7/91	1/92
Femur Probe Accelerometer	A161	CEC	5/91	11/91
Chest/Thorax Probe Accel.	A161	CEC	5/91	11/91
Lumbar Flexion Force Gauge	20051	TRANSDUCER INC.	7/91	1/92

Appendix E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Seats & Safety Belts

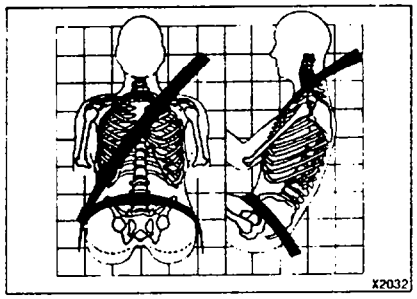
Lap-Shoulder Belt

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

1. Close and lock the door.
2. Adjust the seat (to see how, see the *Index* under *Seat Controls*) so you can sit up straight.
3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.
4. Push the latch plate into the buckle until it clicks.

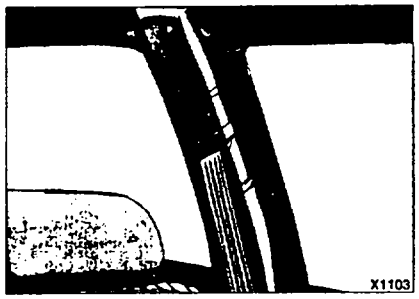
If the belt isn't long enough, see the *Index* under *Safety Belt Extender.*

Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.



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

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



Shoulder Belt Height Adjuster

You can move the shoulder belt adjuster to the height that is right for you.

To move it up or down, squeeze the release handle. When you release the handle, try to move it down a little to make sure it has locked into position.

You can move the adjuster up from a lower position by pushing the bottom of the release handle.

Adjust the height so that the shoulder portion of the belt is properly positioned on your shoulder, away from your face and neck.

Seats & Safety Belts

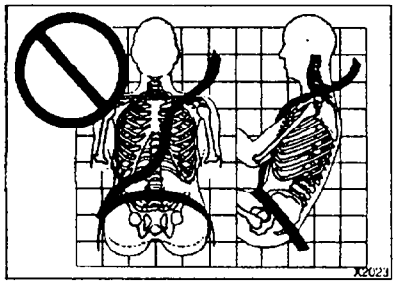
Shoulder Belt Height Adjuster (CONT.)

To help you find a height that is right for you, follow these guidelines:

For a Tall Person: Use the upper or upper-middle position.

For a Person of Average Height: Use a position somewhere in the middle.

For a Short Person: Use the lower or lower-middle position.

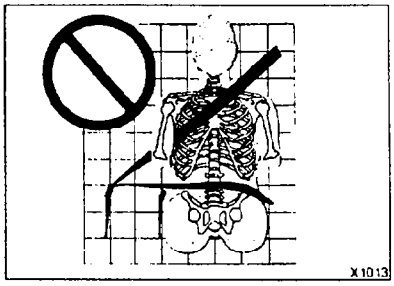


Q: What's wrong with this?

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

CAUTION

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

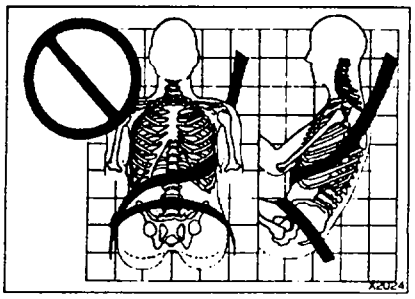


Q: What's wrong with this?

A: The belt is buckled in the wrong place.

CAUTION

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

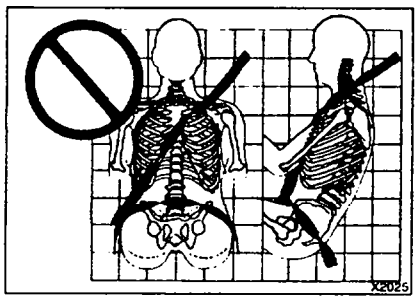


Q: What's wrong with this?

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

CAUTION

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



Q: What's wrong with this?

A: The belt is twisted across the body.

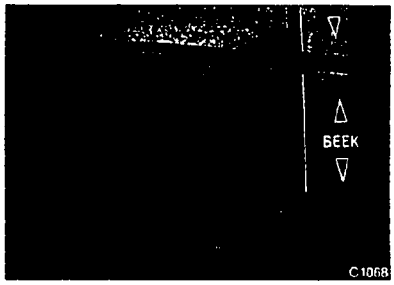
CAUTION

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

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

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

Seats & Safety Belts



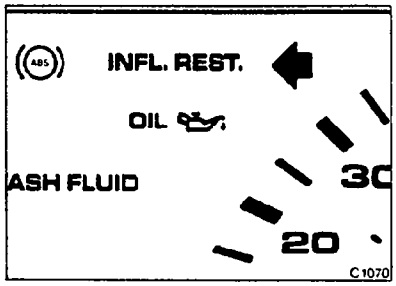
■ *Supplemental Inflatable Restraint System*

This section explains the driver's "air bag," or Supplemental Inflatable Restraint (SIR) system.

Here's the Most Important Thing to Know:

CAUTION

If you are ever in a crash and you're not wearing a safety belt, your injuries may be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you're buckled up. That's true even when you have the SIR system. And, a driver whose body is against or very close to the steering wheel when the "air bag" inflates can be injured. For protection in frontal and all other collisions, everyone in the vehicle, including children, should be properly restrained.



Supplemental Inflatable Restraint Light

There is an inflatable restraint light on the instrument panel. The system checks itself and the light tells you if there is a problem.

You will see this light flash for a few seconds when you turn your ignition to **Run** or **Start**. Then the light should go out, which means the system is ready.

CAUTION

If the inflatable restraint light doesn't come on, or stays on, or comes on when you are driving, your inflatable restraint system may not work properly. Have your vehicle serviced right away.

How the SIR System Works

The "air bag" part of the SIR system is in the middle of the steering wheel.

The SIR system is only for crashes where the front area of your vehicle hits something. If the collision is hard enough, the "air bag" inflates in a fraction of a second. It helps restrain the driver, and then it quickly deflates. Some gray "smoke" is normal when this happens, and some people have reported mild coughing and watery eyes from it. But all of these have been temporary. The "air bag" can give extra protection for the driver's upper body.

CAUTION

- Don't attach anything to the steering wheel pad. It might injure the driver if the SIR inflates.
- The SIR is designed to inflate only once. After it inflates, if you don't get a new system, the SIR system won't be there to help protect you in another crash. A new system will include an inflator module, crash sensors, and possibly other parts, such as a new steering wheel and steering column.
- Let only qualified technicians work on your SIR system. Improper service can mean that your SIR system won't work properly. See your dealer for service.

Seats & Safety Belts

Servicing Your Oldsmobile with the SIR System

Please tell or remind anyone who works on your Oldsmobile that it has the SIR system. There are parts of the SIR system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. The SIR system does not need regular maintenance. Your Oldsmobile dealer and the 1992 Oldsmobile Service Manual have information about the SIR system, including repair or disposal.

CAUTION

⚠ For up to 10 minutes after the ignition key is turned off and the battery disconnected, an "air bag" can still inflate during improper service. You can be injured if you are close to an "air bag" when it inflates. Be sure to follow the proper service procedures.

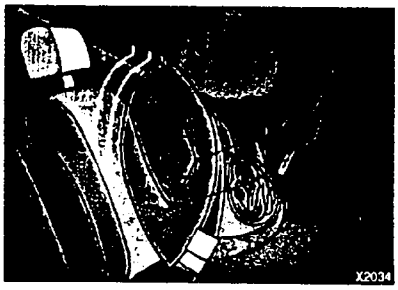
When electrical work is done under the hood or inside the vehicle, the ignition should be in LOCK, if possible.

Avoid wires wrapped with yellow tape, or yellow connectors. They are probably part of the SIR system.

But if the ignition has to be on for electrical work, or if the steering column is to be disassembled, the SIR system must be disconnected. To do this:

- Remove the SIR fuse (see the *Index* under *Fuses and Circuit Breakers*).
- Disconnect the yellow connector at the base of the steering column.

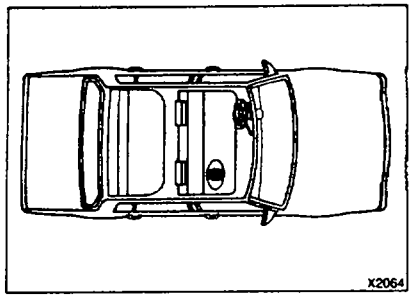
When the work is complete, if the SIR system was disconnected, be sure to reattach everything and replace the fuse before turning the ignition on. When you turn the ignition key on, be sure you see the inflatable restraint light on the instrument panel. If you don't see this light flash and then go out as usual, have your SIR system repaired.



Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts. A pregnant woman should wear a lap-shoulder belt if at all possible. The lap portion should be worn as low as possible throughout the pregnancy.

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

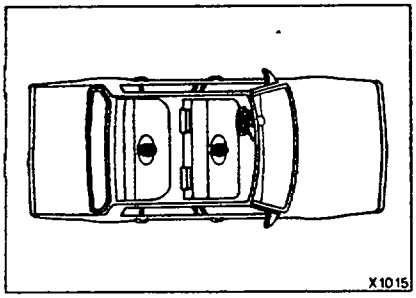


Right Front Passenger Position

The right front passenger's safety belt works the same way as the driver's safety belt. See the *Index* under *Driver Position*.

When the lap belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.

Be sure to use the correct buckle when buckling your lap-shoulder belt. If you find that the latch plate will not go fully into the buckle, see if you are using the buckle for the center passenger position.



Center Passenger Position

If your vehicle has front and rear bench seats, someone can sit in the center positions.

Lap Belt

When you sit in a center seating position, you have a lap safety belt, which has no retractor.

To make the belt longer, tilt the latch plate and pull it along the belt.

Seats & Safety Belts

Lap Belt (CONT.)

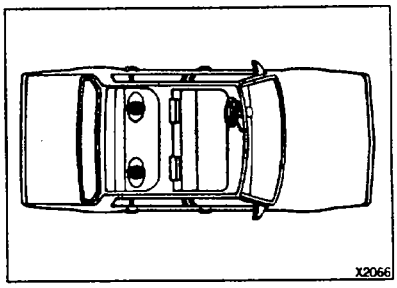
To make the belt shorter, pull its free end as shown until the belt is snug.

Buckle, position and release it the same way as a lap-shoulder belt. If the belt isn't long enough, see the *Index* under *Safety Belt Extender*. Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.

Rear Seat Passengers

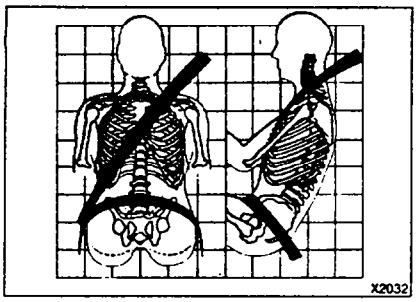
It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

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



Rear Seat—Outside Positions

The positions next to the windows have lap-shoulder belts.



Here's How to Wear One Properly:

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

When the lap belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.

If the belt is not long enough, see the *Index* under *Safety Belt Extender.* Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.

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

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

CAUTION

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