V1885

REPORT NUMBER: CAL-93-N11

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

FUJI HEAVY INDUSTRIES LTD.
1993 SUBARU LEGACY
4-DOOR SEDAN

NHTSA NUMBER: MP5500

CALSPAN TEST NUMBER : 8058-7

March 9, 1993

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

FINAL REPORT

PREPARED FOR:

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

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

Prepared: Michael J. Kilgallon

Michael J. Kilgallon, Project Engineer

Approved: Walter E. Levan

Walter E. Levan, Program Manager
Transportation Research/
Physical Sciences Department

FINAL REPORT ACCEPTED BY:

Stuart Siegel

Manager, New Car Assessment Program (NCAP)

JUN 01 1993

Date of Report Acceptance

Hun Su Cha

Contracting Officer's Tech. Rep. (COTR)

JUN 01 1993

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. *Report No.* CAL-93-N11	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 1993 Subaru Legacy 4-Door Sedan		5. *Report Date* March 9, 1993 6. *Performing Organization Code* CAL
7. *Author(s)* Michael J. Kilgallon , Project Engineer Walter E. Levan , Program Manager		8. *Performing Organization Report No.* 8058-7
9. *Performing Organization Name and Address* Calspan Advanced Technology Center 4455 Genesee Street Buffalo, New York 14225		10. *Work Unit No.* 260-070-1264 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 March 1993 14. *Sponsoring Agency Code* DOT/NHTSA/RM/OMI
15. *Supplementary Notes*		

16. *Abstract*

A frontal load cell barrier test of a 1993 Subaru Legacy 4-door sedan was performed at Calspan Advanced Technology Center crash test facility in Buffalo , New York on March 9, 1993.

The impact velocity was 56.0. kph and the temperature at the barrier face was 3 deg. C. The maximum post-test vehicle crush was 540 mm. The test vehicle was equipped with an automatic torso belt and manual lap belt at each of the front seating positions. The test vehicle also contained 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.

17. *Key Words* Frontal Barrier Impact Test New Car Assessement Program (NCAP)		18. *Distribution Statement*	
19. *Security Classif. (of this report)* UNCLASSIFIED	20. *Security Classif. (of this page)* UNCLASSIFIED	21. *No. of Pages*	22. *Price*

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Section 1

PURPOSE AND TEST PROCEDURE

This 56.3 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 56.3 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 NUMBER MP5500

A load cell barrier consisting of 36 load cells was impacted by a 1993 Subaru Legacy 4-Door Sedan at a velocity of 56.0 kph. The test was performed at the Calspan Corporation Advanced Technology Center on March 9, 1993. 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 16 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572B, 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. 357) was used in one previous test (MP5300) . The injury criteria values were not exceeded in that previous test. The right-front passenger (Serial No. 320) was calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 67 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. Accelerometer #1(x), located on the left rear seat crossmember, contained questionable data between 13 and 21 milliseconds. Accelerometer #5(x), located on the right front disc brake caliper, contained questionable data between 46 and 52 milliseconds. The velocity and displacement data plots were removed from this report for both accelerometers.

The driver's head struck the airbag ; the HIC was 561.6 . The maximum chest deceleration over 3 milliseconds was 50.9 g's. Femur loads were -8316.7 newtons on the left femur and -6836.5 newtons on the right femur.

The right front passenger's HIC was 624.1 . Maximum chest deceleration over 3 milliseconds was 44.5 g's . Femur loads were -2026.7 newtons on the left and -4075.2 newtons on the right.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1993 Subaru Legacy 4-Door Sedan

NHTSA Test No.: MP5500 VIN.: 4S3BC6338P9643906

Body Color: Dark Green Date of Manufacture: 8/92

Date Received: 3/1/93

Odometer Reading: 32 Km

Engine:	4	Cylinders;	-	C.I.D.;	2.2	Liters;	-	CC
	X	Gas;	-	Diesel;	-	Turbocharged		
	X	Longitudinal;			-	Transverse		
Transmission:	4	Speed;	-	Manual;	X	Automatic;	-	Overdrive
Final Drive:	X	Front Wheel;	-	Rear Wheel;	-	Four Wheel		
Accessories:	X	A/C;	X	P/S;	X	P/B;	X	P/wdo
	X	Tilt Wheel;	-	P/seats;	X	Cruise Control	-	Other

Type of Occupant Restraint: Automatic Torso Belt and Manual Lap Belt; Driver side airbag

---

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 207 kPa, Rear 200 kPa

Recommended Tire Size: P185/70R14

Recommended Cold Tire Pressure: Front 207 kPa, Rear 200 kPa

Tires on Vehicle: P185/70R14 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) = 365 kgs.

No. of Occupants x 68 kgs. = 340 kgs.

Rated Cargo and Luggage Weight (RCLW) A-B = 25 kgs.

GVWR 1783 kgs. GAWR: Front 937 kgs. Rear 846 kgs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 363 kgs. Right Rear = 249 kgs.

Left Front = 386 kgs. Left Rear = 268 kgs.

TOTAL FRONT WEIGHT = 749 kgs. (59.2 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 517 kgs. (40.8 % of Total Vehicle Weight)

TOTAL DELIVERED WEIGHT = 1266 kgs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (1266 kgs.)

VCW = Vehicle Capacity Weight (365 kgs.)

DSC = Designated Seating Capacity (5 kgs.)

RCLW = VCW - (68 x (DSC)) = 25 kgs.

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

Target Test Weight = 1439 kgs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 24 KGS CARGO:

Right Front = 390 kgs. Right Rear = 308 kgs.

Left Front = 408 kgs. Left Rear = 327 kgs.

TOTAL FRONT WEIGHT = 798 kgs. (55.7 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 635 kgs. (44.3 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 1433 kgs.

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

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude:	RF	699	LF	688	RR	678	LR	671
Test Attitude:	RF	675	LF	680	RR	642	LR	639

Wheel Base: 2580 mm.; C.G. = 1143 mm. rearward of front wheel C/L

Remarks: 56.0 liters 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 deg.
Date of Test:	March 9, 1993	Time of Test:	12:10

Ambient Temperature: 3 ° C at impact area

Temperature in Occupant Compartment: 21 ° C

Windshield Molding Temperature: 21 ° C

Required Impact Velocity Range: 55.5 to 57.1 mph

Impact Velocity: primary = 56.0 mph, secondary = 56.6 mph

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	4475	C_L	4556	L	4464
	Post-test = R	3986	C_L	4016	L	4014
	Crush = R	489	C_L	540	L	450

Distance from front of test vehicle to point of impact:

R 466 C_L 451 L 481

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Airbag	Top of head with sunvisor, Chin with chest
Chest	Airbag	No Contact
Abdomen	No Contact	No Contact
Left Knee	Dashpanel	Lower Dashpanel
Right Knee	Dashpanel	Lower Dashpanel

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	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: No Comments

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 Performance Assessment Data
4. Camera Locations
5. 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.: MP5500 Vehicle: 1993 Subaru Legacy 4-Door Sedan

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-49.0	-15.6	38.1	59.8
Position #2 - Passenger	-27.6	21.7	66.3	71.1

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R*
Position #1 - Driver	-51.6	-12.9	17.5	50.9
Position #2 - Passenger	-50.6	22.9	-10.5	44.5

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

	MAXIMUM FORCE - FEMUR LOAD (kgs)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	-8316.7	-6836.5
Position #2 - Passenger	-2026.7	-4075.2

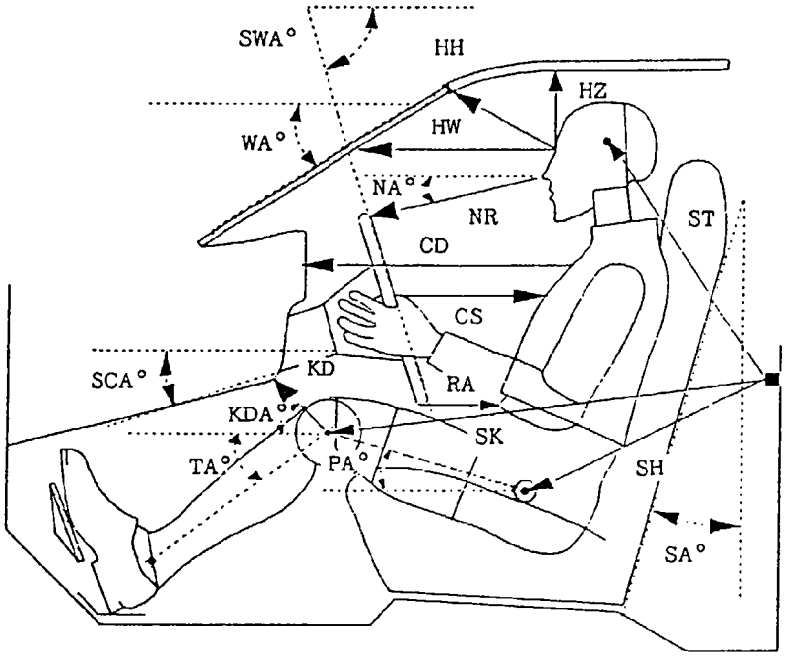
	MAXIMUM FORCE - SEAT BELT LOADS (kgs)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	7550.1	-	2004.9
Position #2 - Passenger	10065.3	6767.8	-

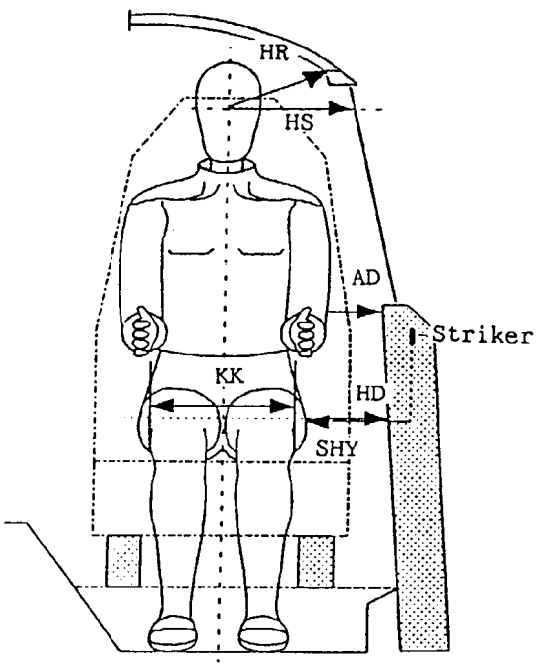
	HEAD INJURY CRITERIA (HIC)			
	HIC**	t_1 (mSec)	t_2 (mSec)	Average Acceleration t_1 to t_2
Position #1 - Driver	561.6	55.560	87.360	49.98
Position #2 - Passenger	624.1	60.840	96.720	49.68

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

Figure 1

DUMMY MEASUREMENTS FOR FRONT SEAT PASSENGERS



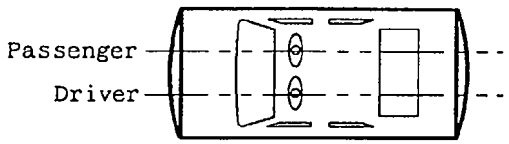


HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
NR - Nose to Rim
CS - Steering Wheel to Chest
CD - Chest to Dash
RA - Rime to Abdomen
KDL/KDR - Knee to Dash
KDA - Knee to Dash Angle
SH - Striker to H-Point

SK - Striker to Knee
ST - Striker to Head
NA - Nose to Rim Angle
TA - Tibial Angle
PA - Pelvic Angle
SA - Seat Back Angle
SCA - Steering Column Angle
SWA - Steering Wheel Angle
WA - Windshield Angle

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

Vertical Longitudinal Planes



Vertical Transverse Plane

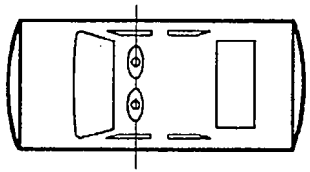


Table 3

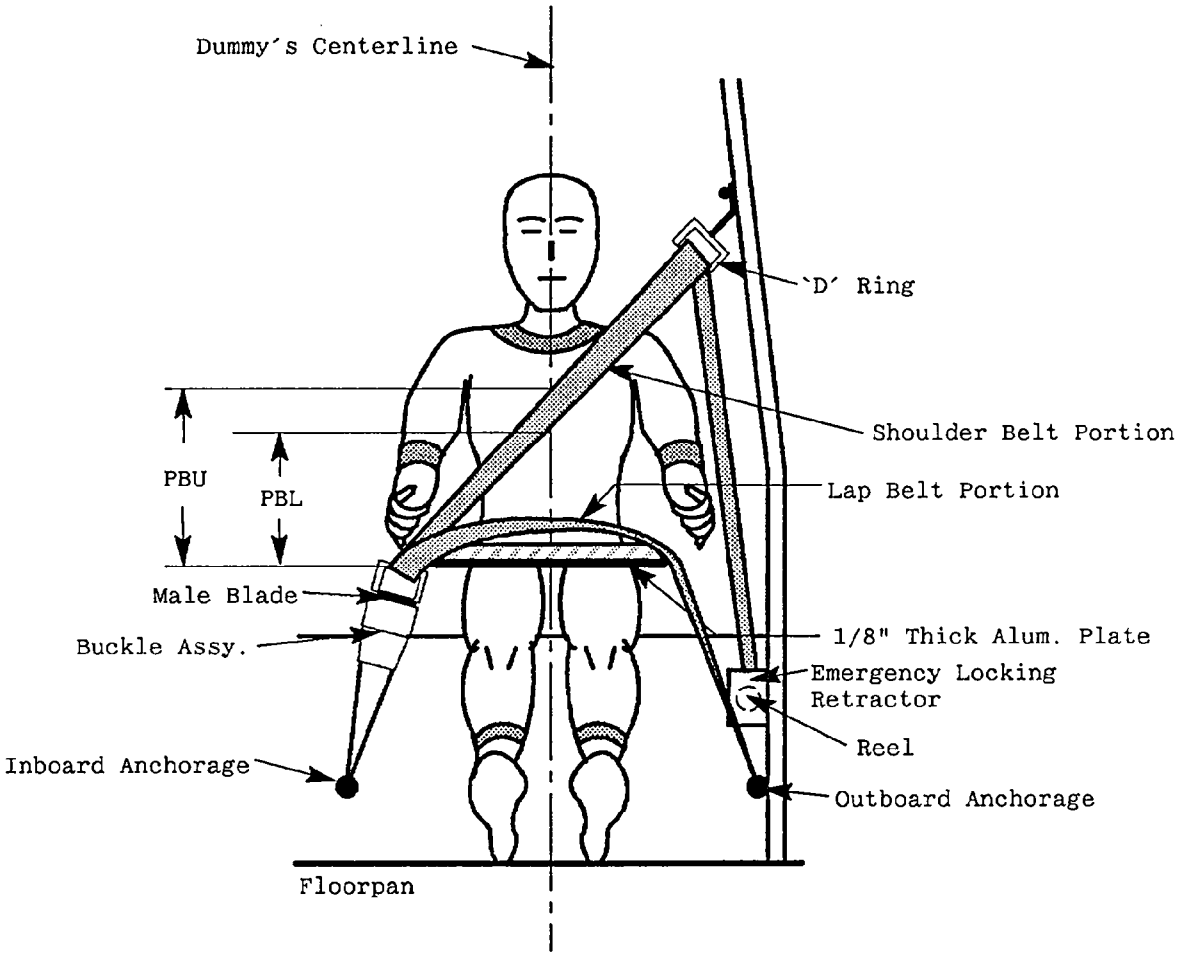
FRONT SEAT OCCUPANT MEASUREMENTS

	DRIVER (Serial # 357)		PASSENGER (Serial # 320)	
WA°	30 deg		30 deg	
SWA°	66 deg		N/A	
SCA°	24 deg		N/A	
SA°	See Note		See Note	
HZ	125 mm		128 mm	
HH	325 mm		328 mm	
HW	450 mm		455 mm	
HR	162 mm		168 mm	
NR	470 mm	Angle 26 deg	N/A	
CD	557 mm		585 mm	
CS	318 mm		N/A	
RA	83 mm		N/A	
KDL	115 mm	Angle (KDA) 35 deg	145 mm	
KDR	115 mm		140 mm	Angle (KDA) 37 deg
PA°	15 deg		15 deg	
TA°	35 deg		32 deg	
KK	345 mm		280 mm	
ST	559 mm	Angle 87 deg	566 mm	Angle 86 deg
SK	526 mm	Angle 4 deg	538 mm	Angle 3 deg
SH	163 mm	Angle 45 deg	168 mm	Angle 45 deg
SHY	225 mm		210 mm	
HS	202 mm		203 mm	
HD	178 mm		170 mm	
AD	85 mm		97 mm	

Note: Seat back was postioned according to manufacturer specifications

Figure 2

SEAT BELT POSITIONING DATA



Front View of Driver Dummy

	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	330 mm	330 mm
PBL -- Top surface of alum. plate to belt lower edge	260 mm	260 mm
LAP BELT TENSION	2 lbs	2 lbs
SHOULDER BELT TENSION	2 lbs	2 lbs

Table 4

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Shoulder belt length as measured on Part 572 Dummy.	910 mm	920 mm
Lap belt length as measured on Part 572 Dummy.	840 mm	840 mm
SHOULDER BELT SPOOL-OFF DATA:		
As determined mechanically	58 mm	70 mm
LAP BELT SPOOL-OFF DATA:		
As determined mechanically	55 mm	73 mm
As determined by film analysis	51 mm	64 mm
SHOULDER BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	55 mm/M	138.5 mm/M
Measured mechanically	0 mm/M	0 mm/M

Figure 3

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

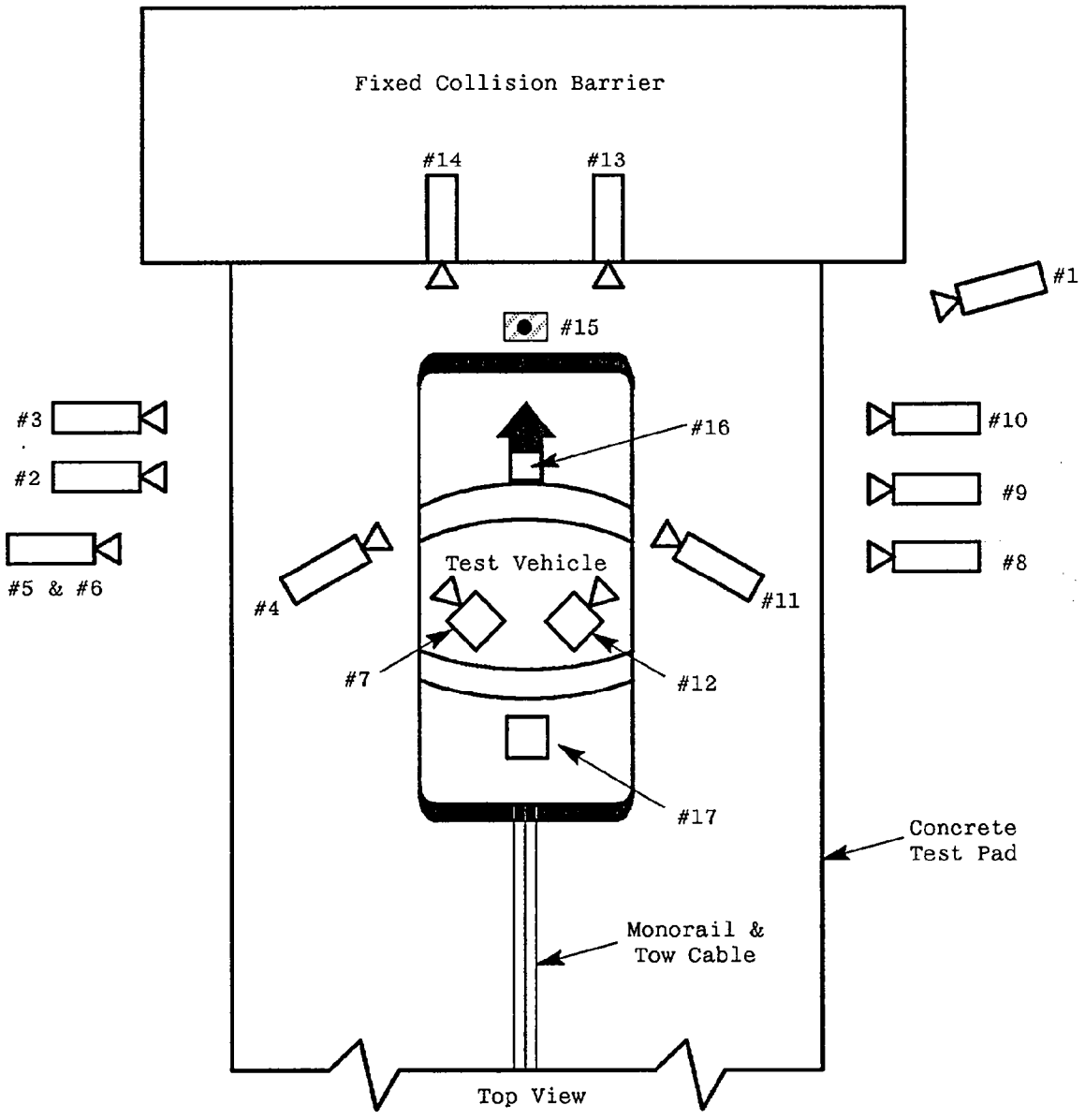


Table 5

HIGH-SPEED CAMERA LOCATIONS

Test No. MP5500 Vehicle: 1993 Subaru Legacy 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	5817	1422	1067	-3	5406	13	550
3	Left Side View	7772	864	1041	-3	7361	25	620
4	Driver and Interior View	2743	2616	1651	-17	2332	13	575
5	Steering Column (Bottom)	7010	1702	1168	-4	6599	25	825
6	Steering Column (Top)	7010	1702	1778	-10	6599	25	770
7	Left Belt	-	-	-	-	-	8	N.T.
8	Overall Right Side	5867	1753	1067	-5	5456	13	575
9	Right Side View	7696	1219	1016	-3	7285	25	555
10	Right Passenger View	7849	1930	1422	-5	7438	35	520
11	Passenger and Interior View	2743	2667	1600	-18	2332	13	580
12	Right Belt	-	-	-	-	-	8	N.T.
13	Passenger Front View	610	-127	1778	-38	-	13	640
14	Driver Front View	610	-127	1778	-35	-	13	N.T.
15	Windshield View	0	0	3048	-50	-	13	605
16	Pit View of Engine	0	1050	-3048	90	-	13	730
17	Pit View of Fuel Tank	0	3190	-3048	90	-	13	905

*X = film plane to monorail centerline

Y = film plane to impact location

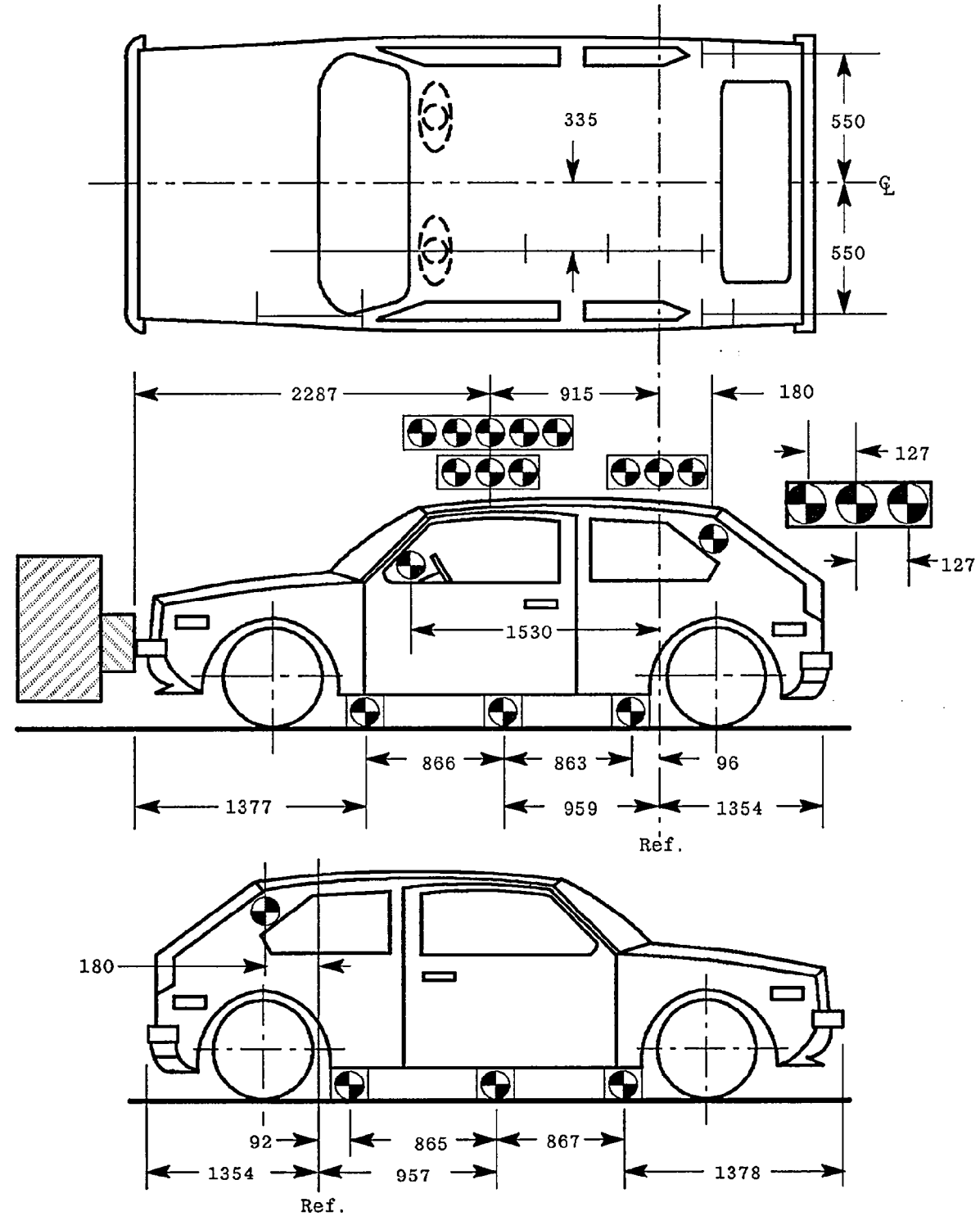
Z = film plane to ground

** = referenced to horizontal plane

N.T. indicates that timing did not recorded for this particular camera

Figure 4

VEHICLE TARGET LOCATIONS

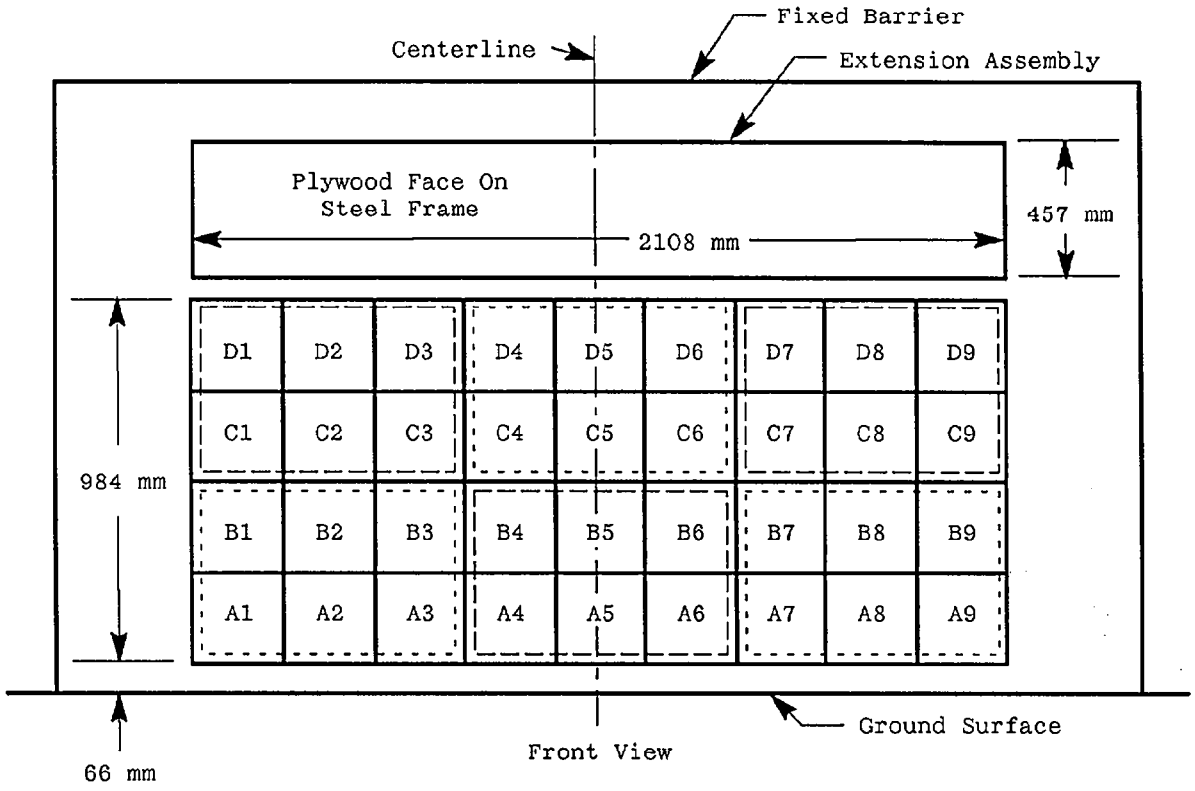


(Dimensions in millimeters)

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:

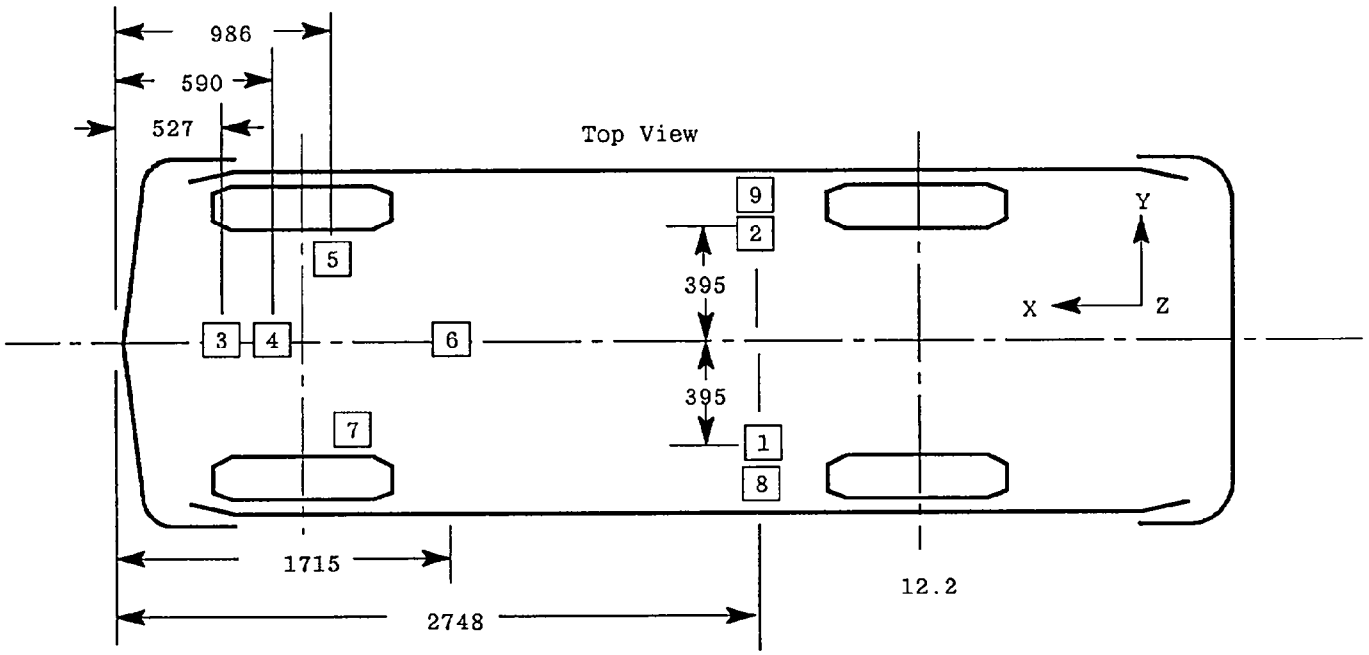
(1) Data from 36 individual load cells

(2) Total or Sum of 36 individual load cells

(3) Data from 6 Groupings shown above (6 cells/group)

Figure 6

VEHICLE ACCELEROMETER LOCATIONS



All dimensions are in millimeters

ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	LOCATION		
		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	Left Rear Seat Crossmember	X		
9	Right Rear Seat Crossmember	X		

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

Figure 7

TEST VEHICLE MEASUREMENTS

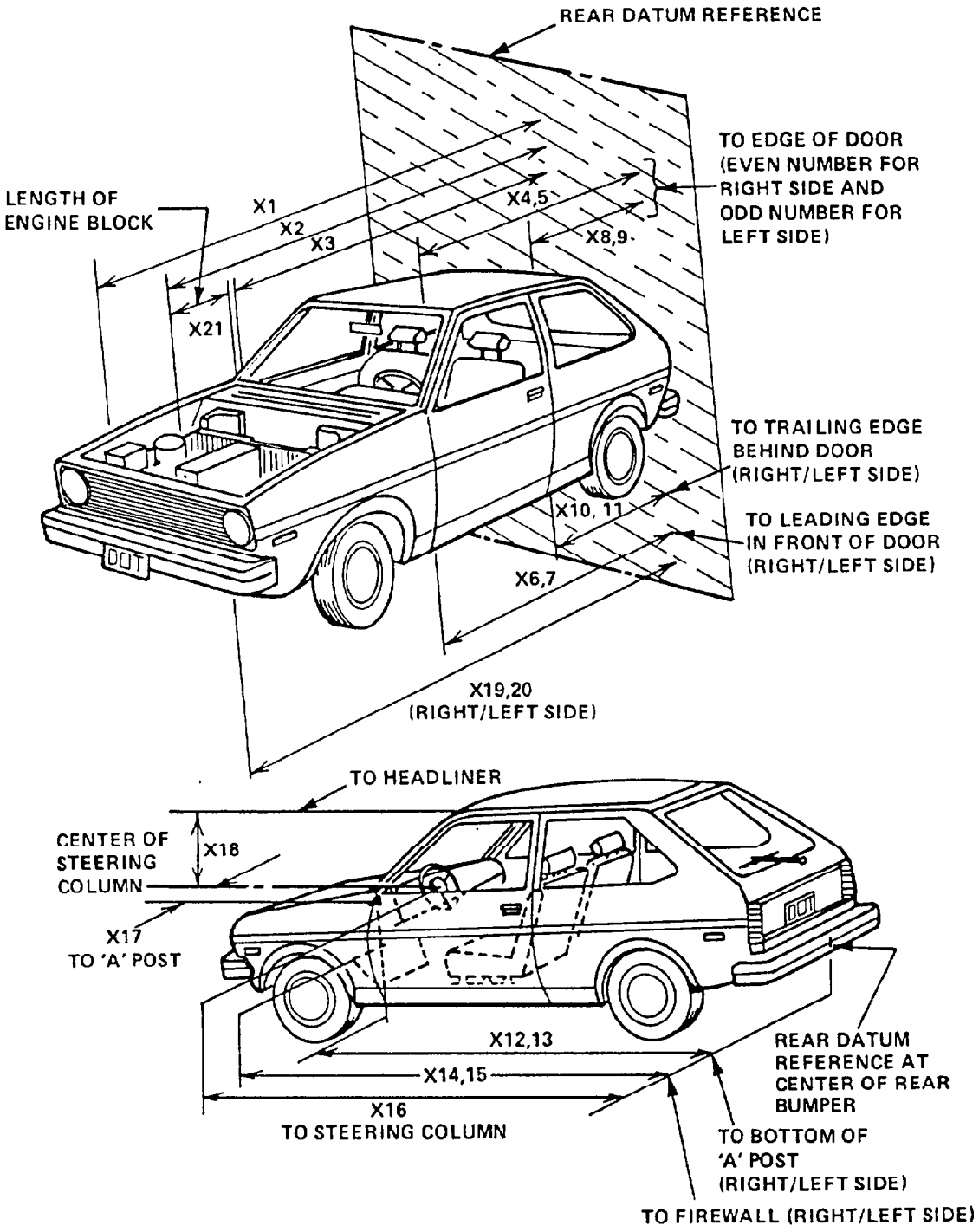


Table 6

VEHICLE MEASUREMENTS

		All Dimensions in mm		
No.		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	4556	4016	540
X2	Rear Surface of Vehicle to Front of Engine	4075	3740	335
X3	Rear Surface of Vehicle to Firewall	3448	3355	93
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3066	3063	3
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3060	3066	-6
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3114	3105	9
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3115	3100	15
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2102	2102	0
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2105	2096	9
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2102	2093	9
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2106	2092	14
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3116	3100	16
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3114	3112	2
X14	Rear Surface of Vehicle to Firewall, Right Side	3416	3344	72
X15	Rear Surface of Vehicle to Firewall, Left Side	3410	3315	95
X16	Rear Surface of Vehicle to Steering Column	2653	2650	3
X17	Center of Steering Column to "A" Post	394	382	12
X18	Center of Steering Column to Headliner	420	425	-5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4475	3986	489
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4464	4014	450
X21	Length of Engine Block	420	420	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2830	2810	20
CD	Rear Surface of Vehicle to Center of Dash Panel	2870	2820	50
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2826	2800	26

ACCIDENT INVESTIGATION DIVISION DATA

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: 1993 Subaru Legacy 4-Door Sedan

Vehicle NHTSA No.: MP5500 VIN: 4S3BC6338P9643906

Model Year: 1993 Build Date: 8/92 Test Date: March 9, 1993

Vehicle Size Category: Compact Test Weight: 1433 Kgs

Vehicle Wheelbase: 2580 mm; Front Overhang: 1377 mm; Overall Width: 1689 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions:

C1= 424 mm

C2= 492 mm

C3= 530 mm

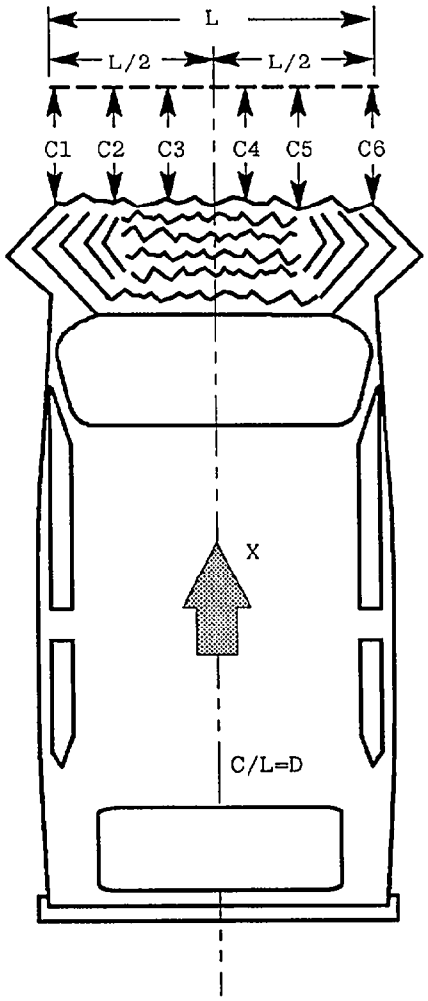
C4= 536 mm

C5= 516 mm

C6= 464 mm

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

Length of Damaged Region: L= 1450 mm



Section 4

SUMMARY OF RESULTS OF FMVSS NOS. 208, 212, 219 AND 301-75

- "Windshield Mounting," FMVSS No. 212 Data
- "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- "Fuel System Integrity," FMVSS No. 301-75

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 25 mm molding.

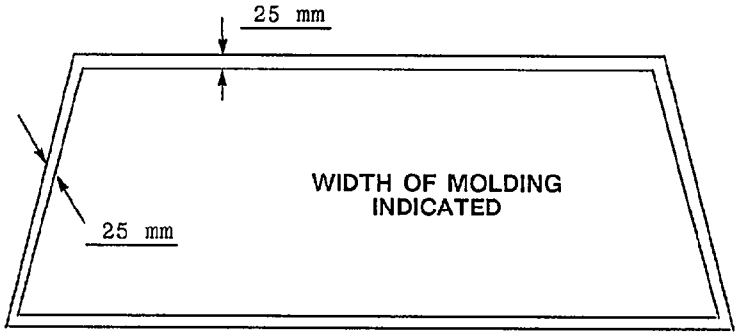
FMVSS 212 REQUIREMENTS:

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 windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	1872.5	1872.5	100%
LEFT SIDE	1872.5	1872.5	100%
TOTAL	3745.0	3745.0	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

None

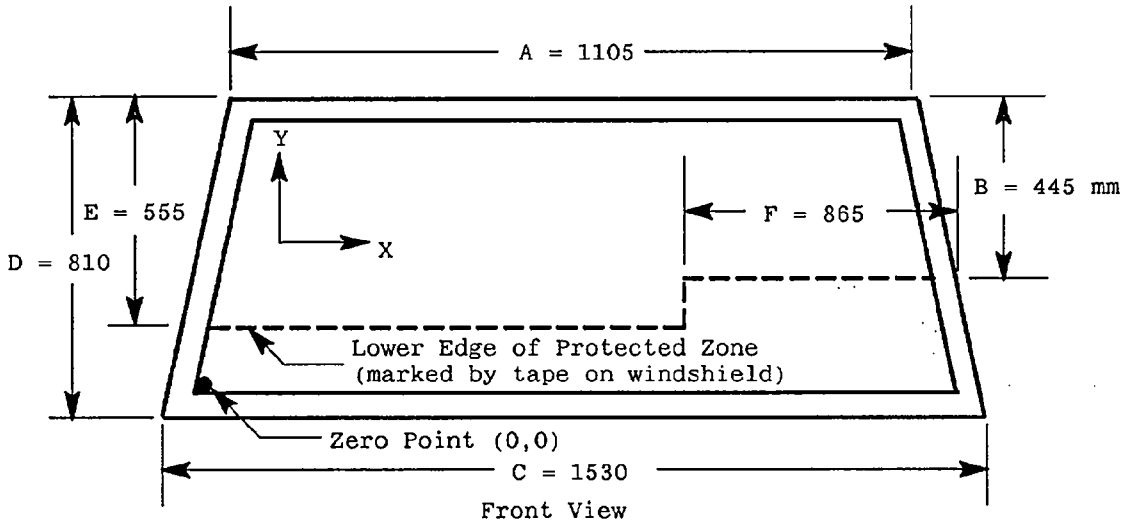
Figure 9

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

HONDA ACCORD PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. 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, and 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)



DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

(Show location of penetration on above sketch)

None

	COORDINATES	
	X	Y
1.		
2.		
3.		
4.		

Table 7

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: | M | P | 5 | 5 | 0 | 0 | TEST DATE: March 9, 1993

Vehicle Mfgr./Make/Model: 1993 Subaru Legacy 4-Door Sedan

Test vehicle fuel tank filled to 92% to 94% of manufacturer's "usable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE:

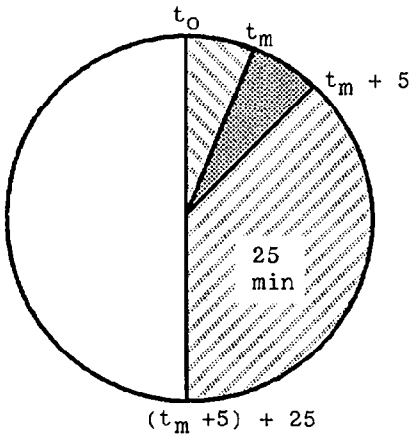
X Frontal (35 mph)

_____ Oblique (30 mph) with _____° 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./1 min.

SOLVENT SPILLAGE DETAILS:

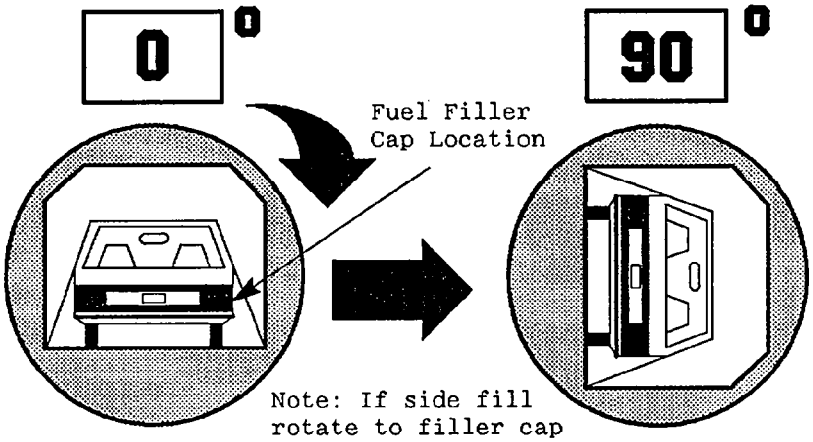
None

Table 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

Vehicle NHTSA ID No.: MP5500



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° 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	

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):

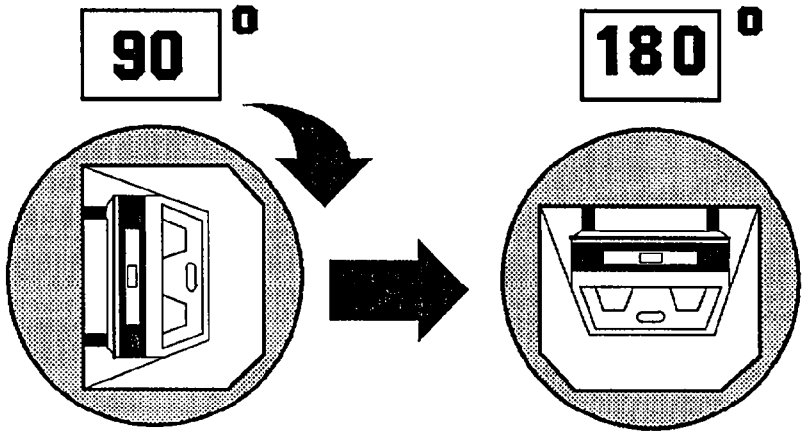
None

Table 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:

Vehicle NHTSA ID No.: MP5500



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° 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		

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):

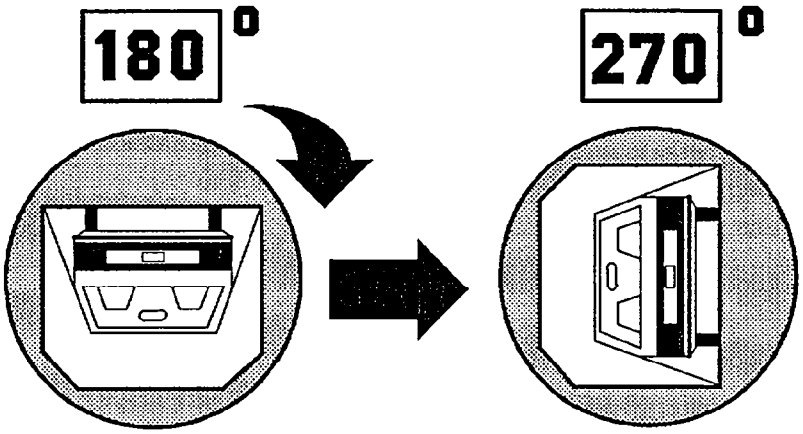
None

Table 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:

Vehicle NHTSA ID No.: MP5500



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° 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	

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

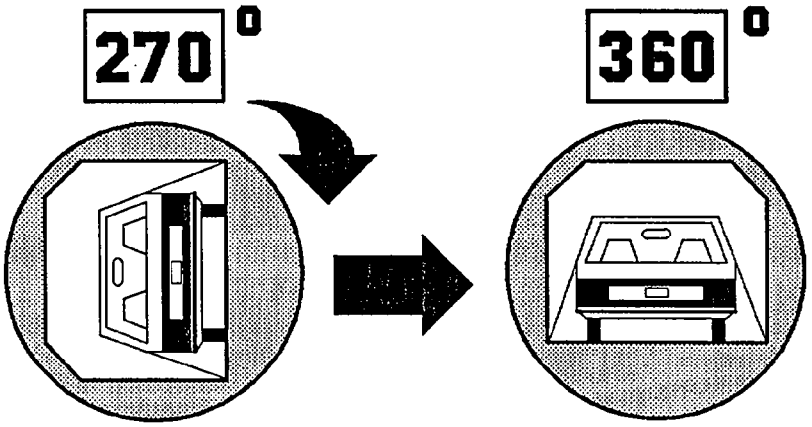
Table 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

[illegible]

TEST PHASE:

Vehicle NHTSA ID No.: MP5500



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° 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	

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

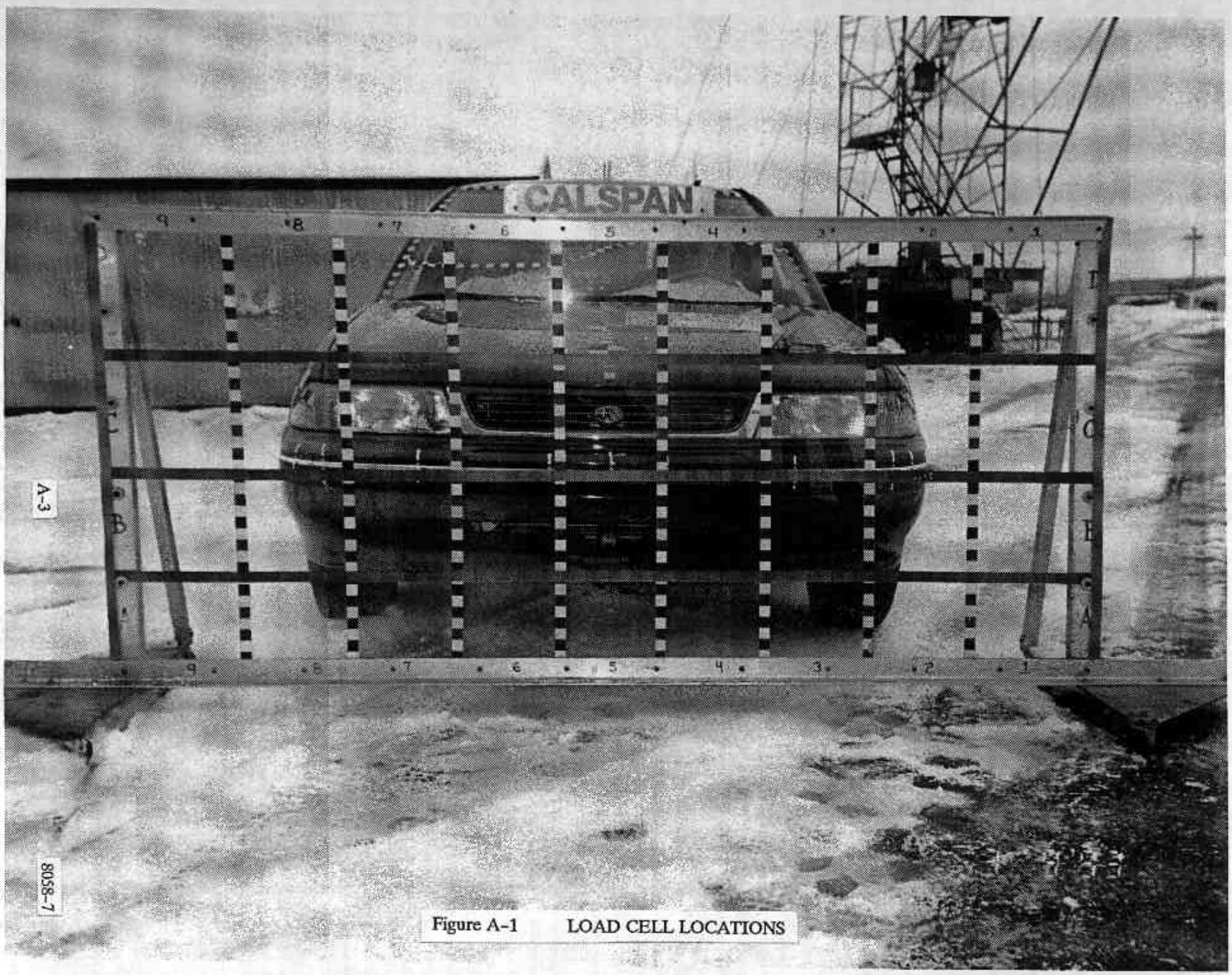


Figure A-1 LOAD CELL LOCATIONS

A-4

8058-7

Figure A-2 PRE-TEST FRONT VIEW

A-5

8058-7

Figure A-3 POST TEST FRONT VIEW

Figure A-4 PRE-TEST LEFT SIDE VIEW

Figure A-5 POST TEST LEFT SIDE VIEW

Figure A–6 PRE-TEST RIGHT SIDE VIEW

Figure A-7 POST-TEST RIGHT SIDE VIEW

A-10

8058-7

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

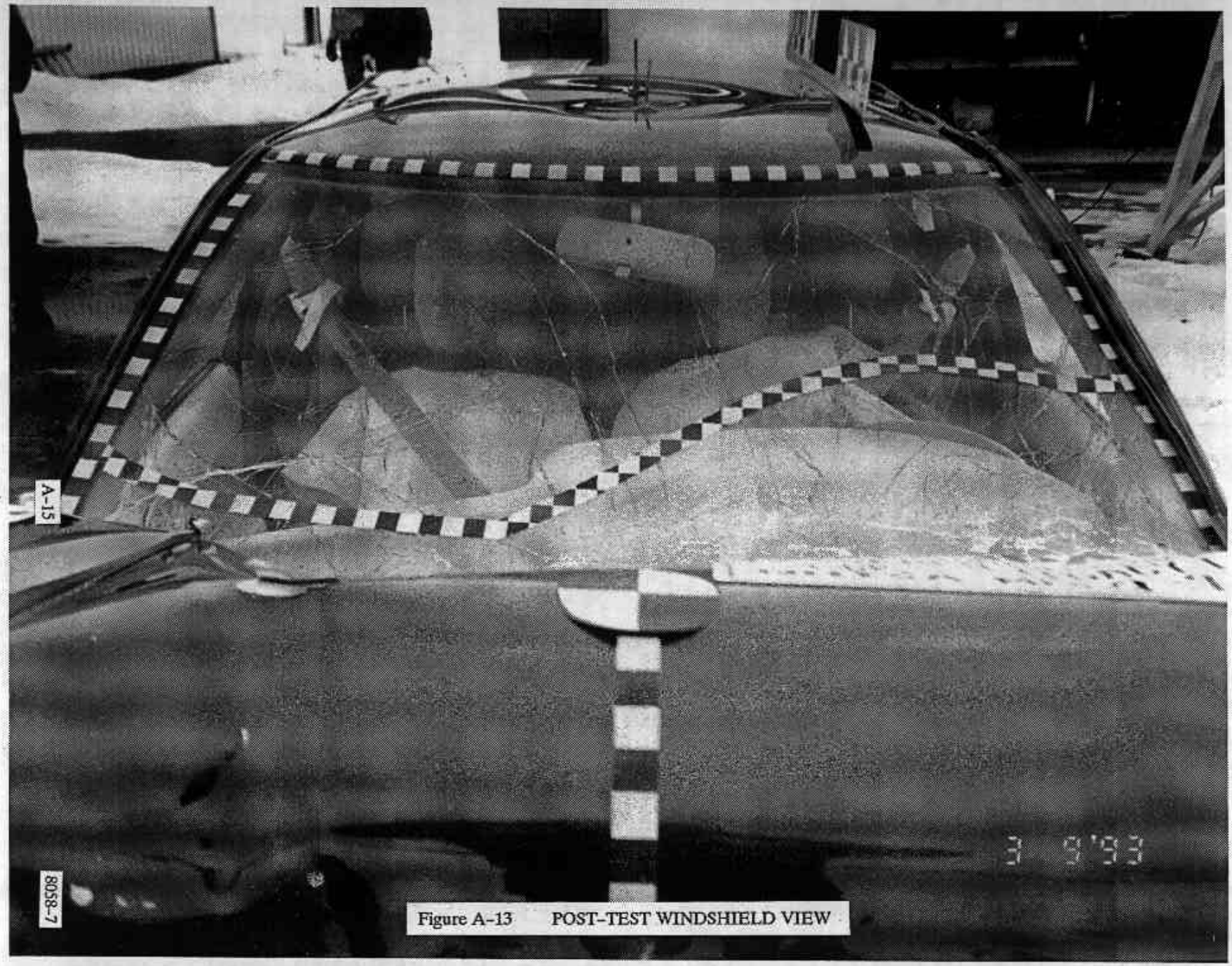


Figure A-13 POST-TEST WINDSHIELD VIEW

Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

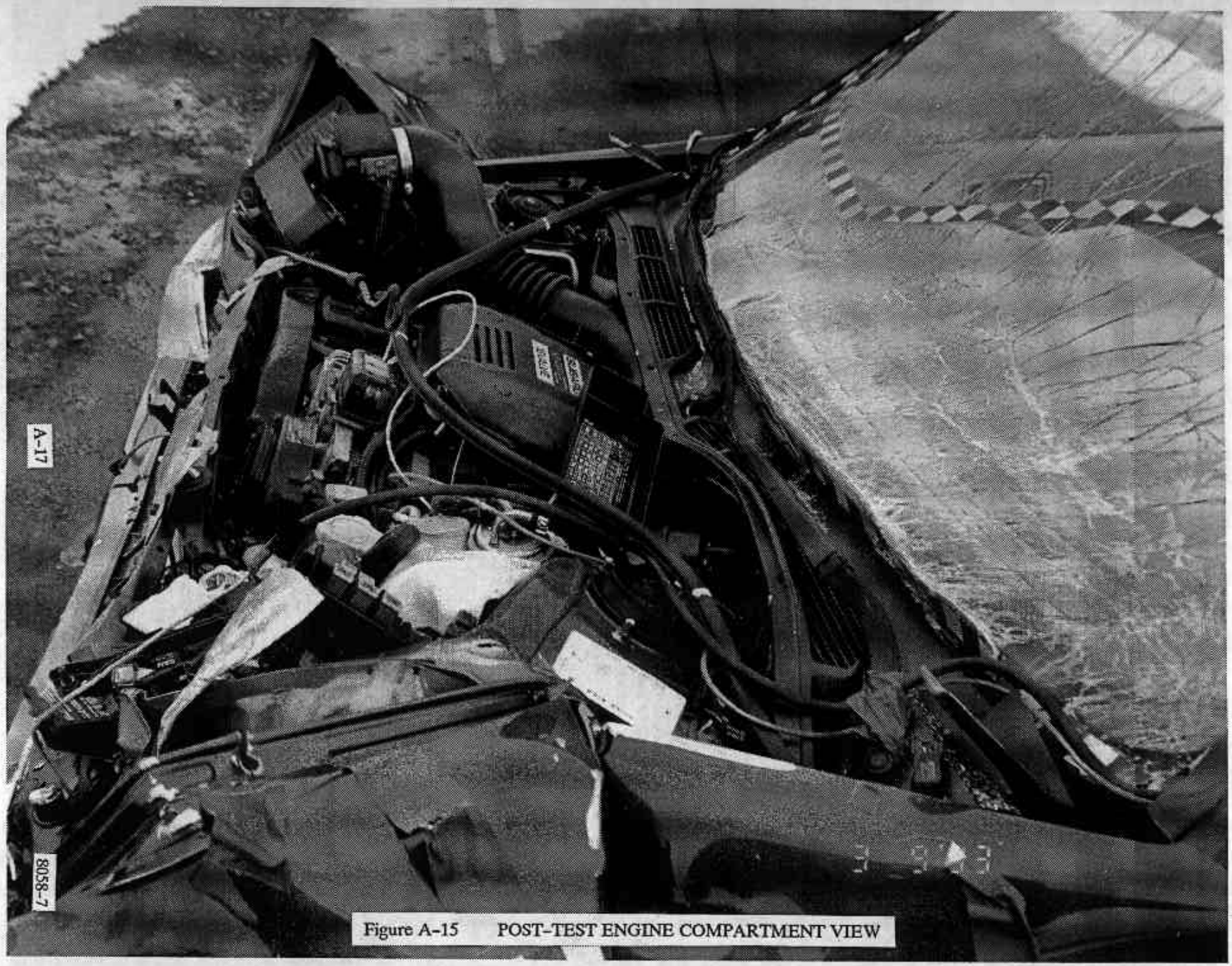


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

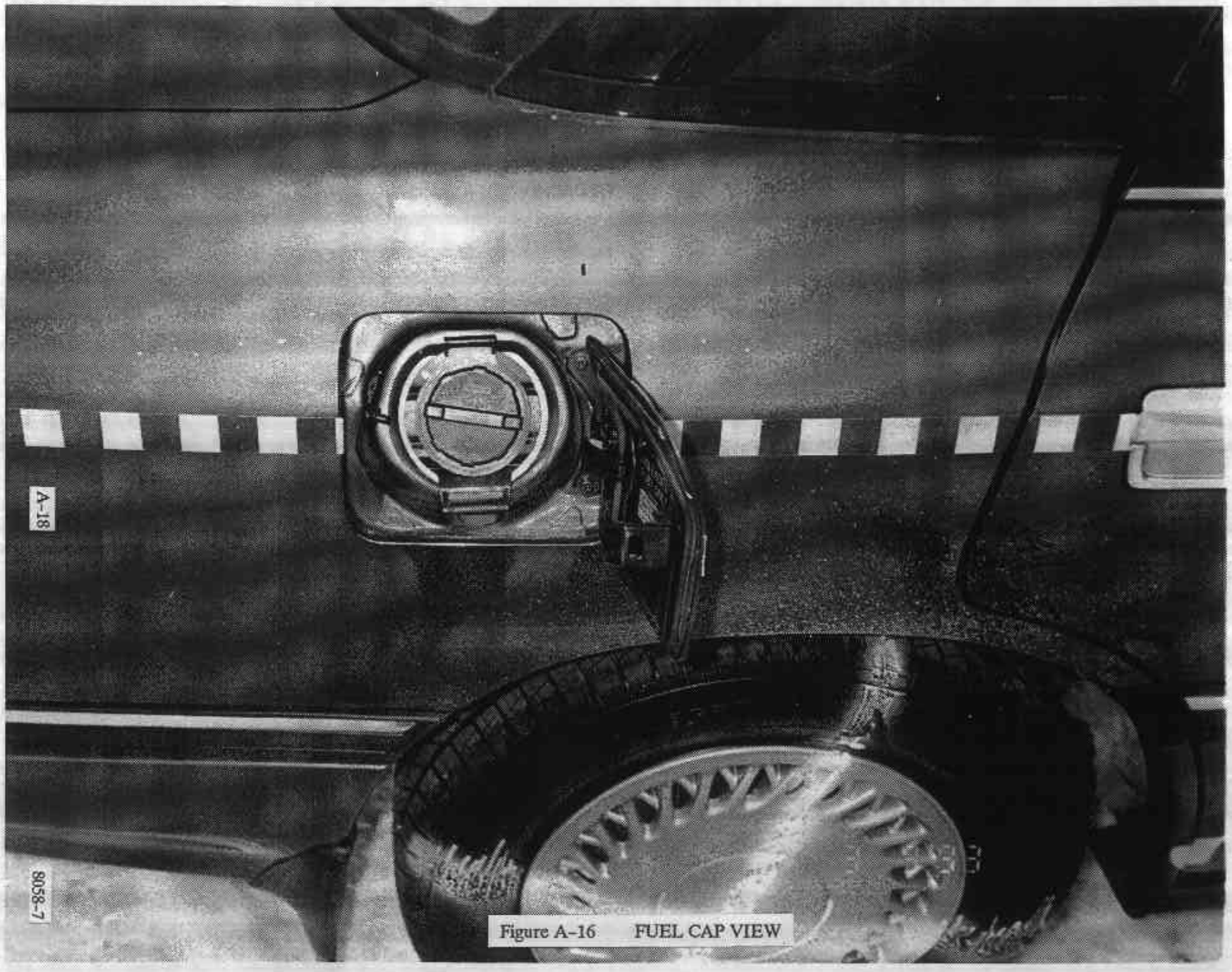
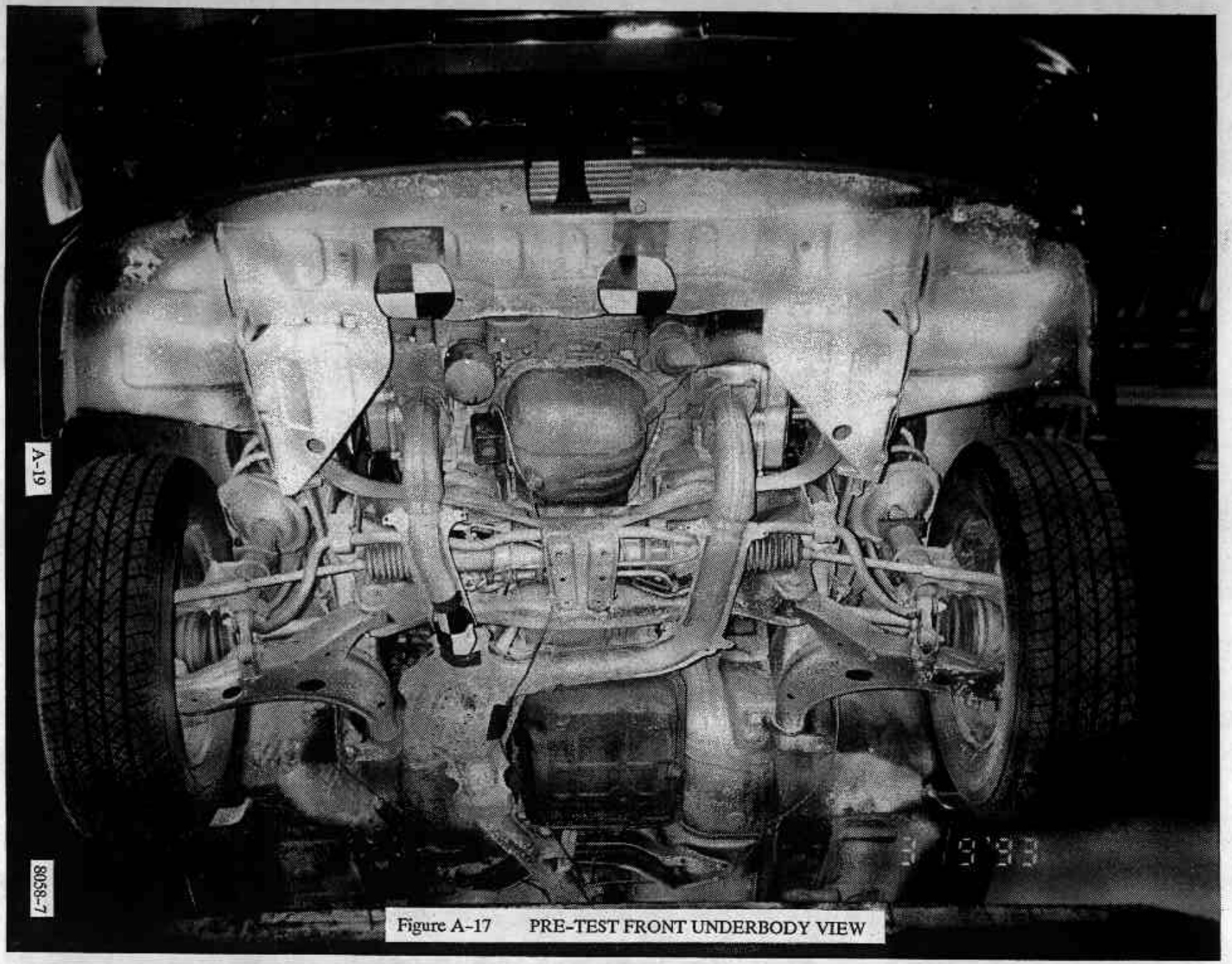


Figure A–16 FUEL CAP VIEW



A-19

8058-7

Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

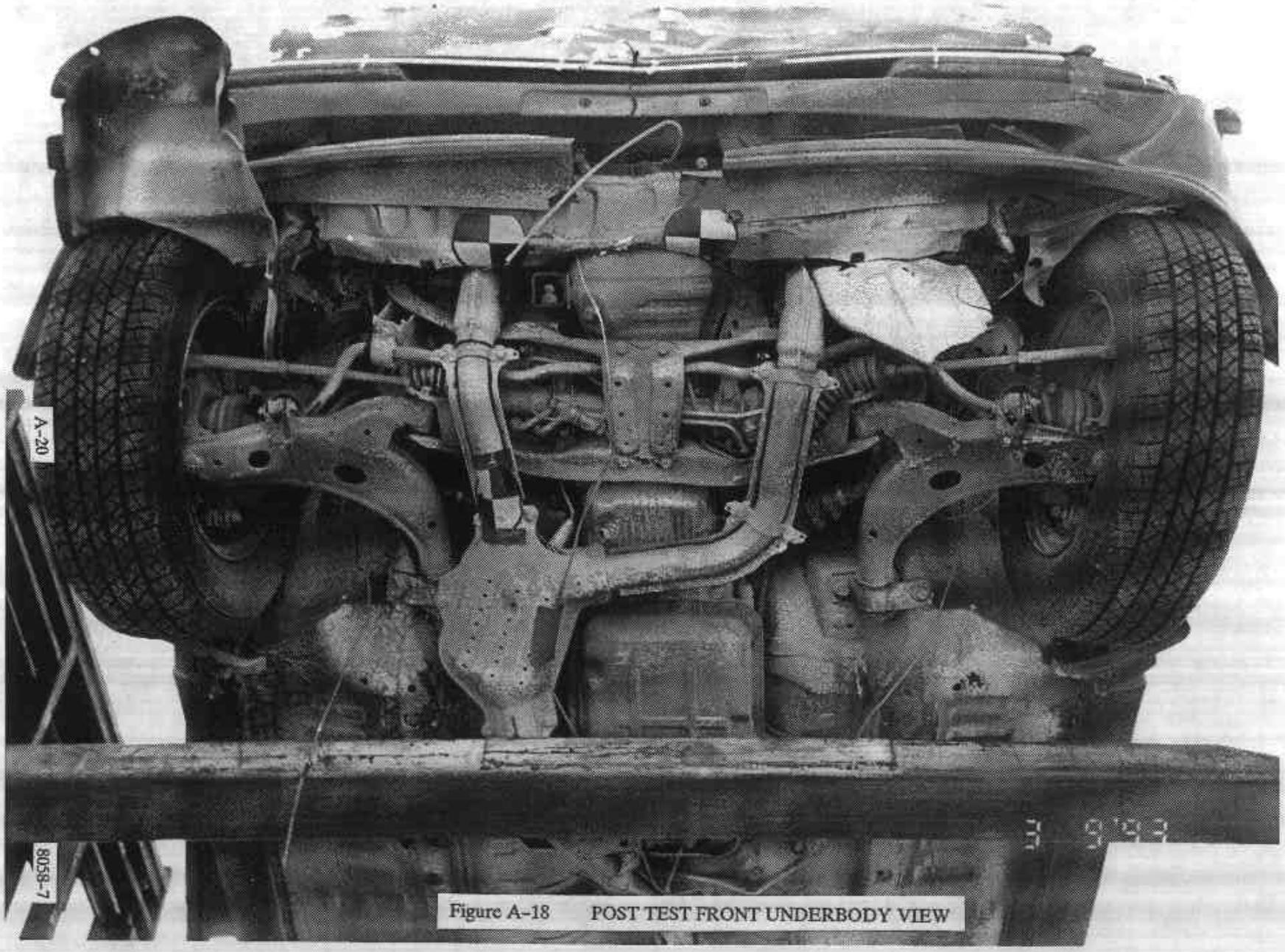


Figure A-18 POST TEST FRONT UNDERBODY VIEW

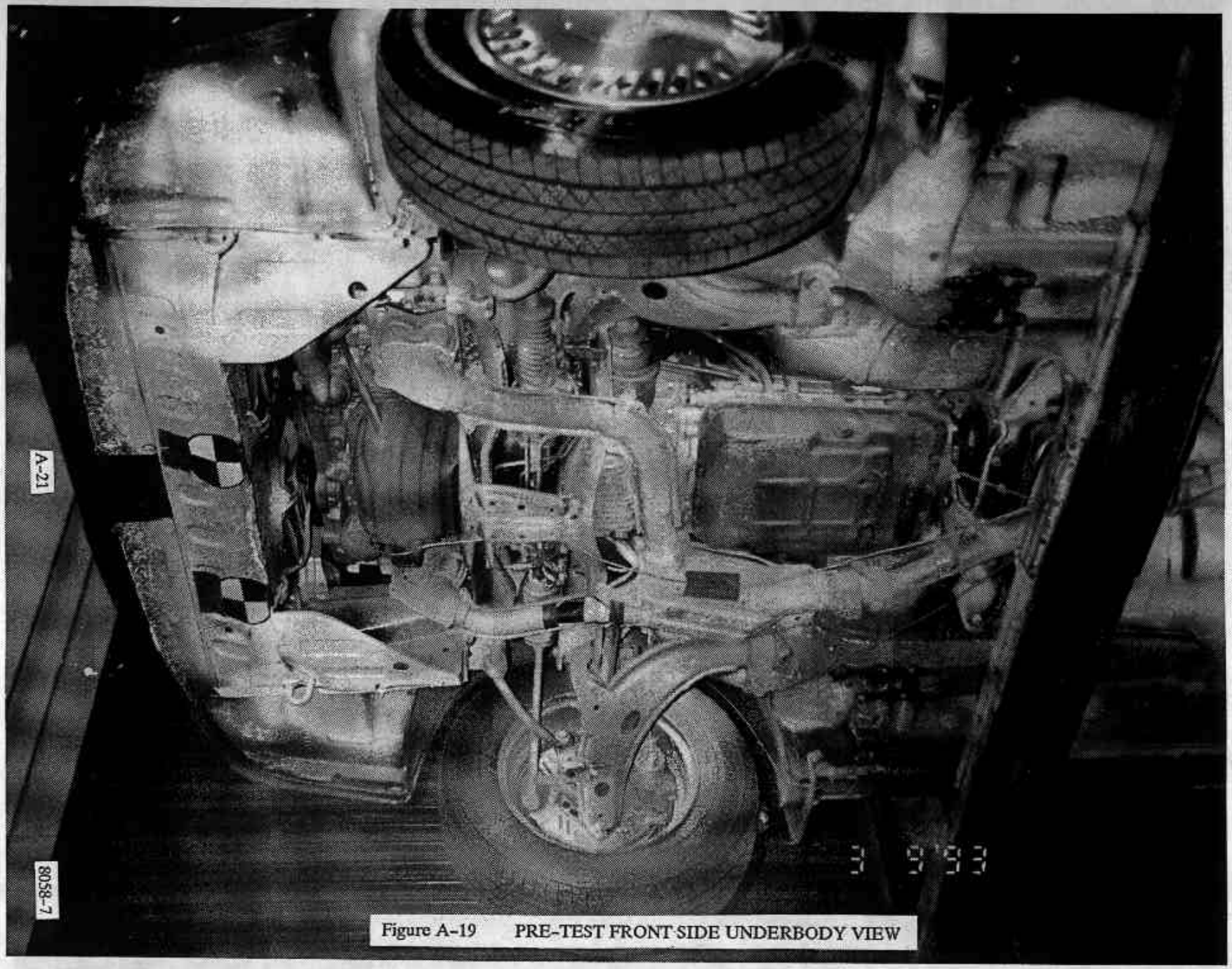


Figure A-19 PRE-TEST FRONT SIDE UNDERBODY VIEW

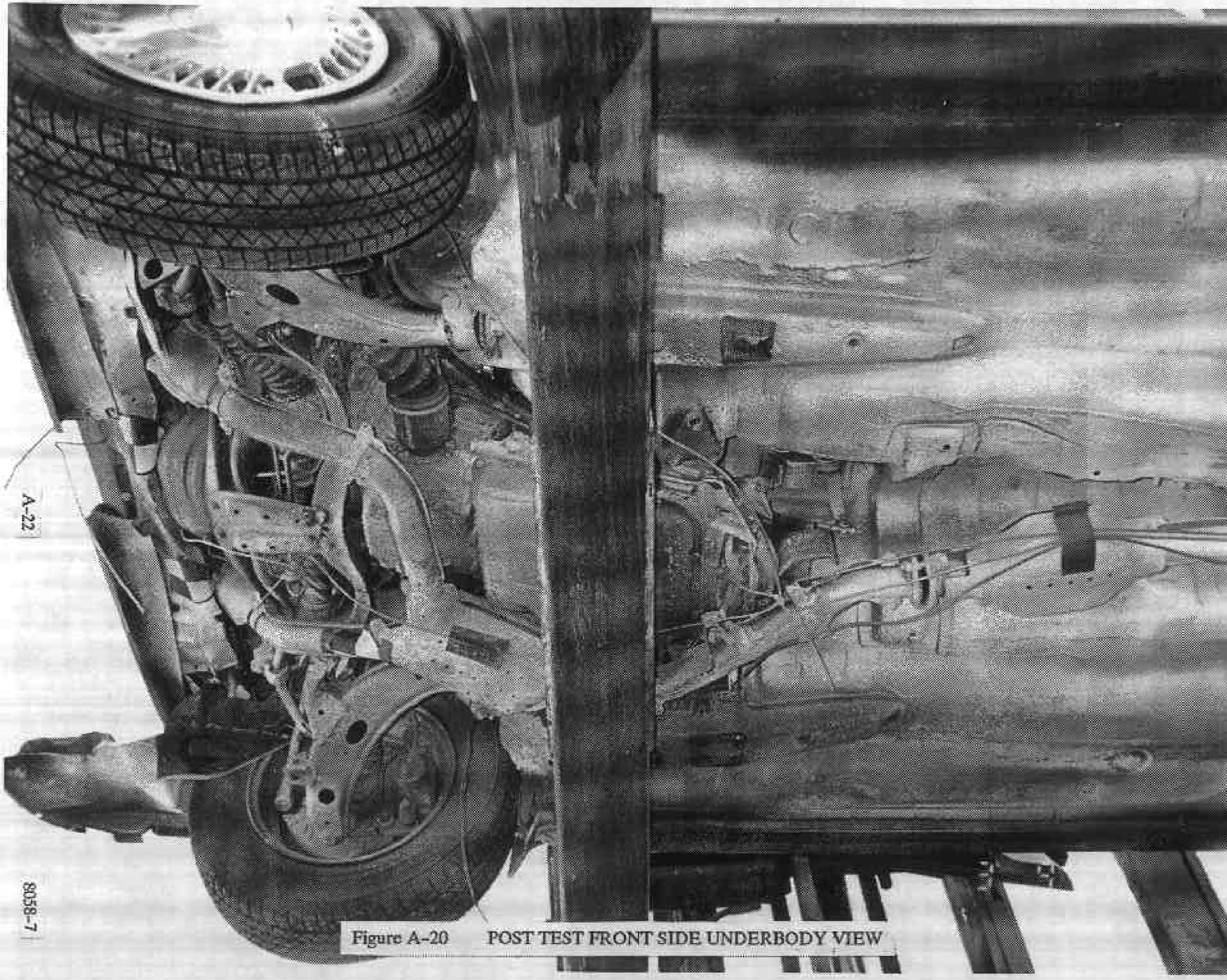


Figure A-20 POST TEST FRONT SIDE UNDERBODY VIEW

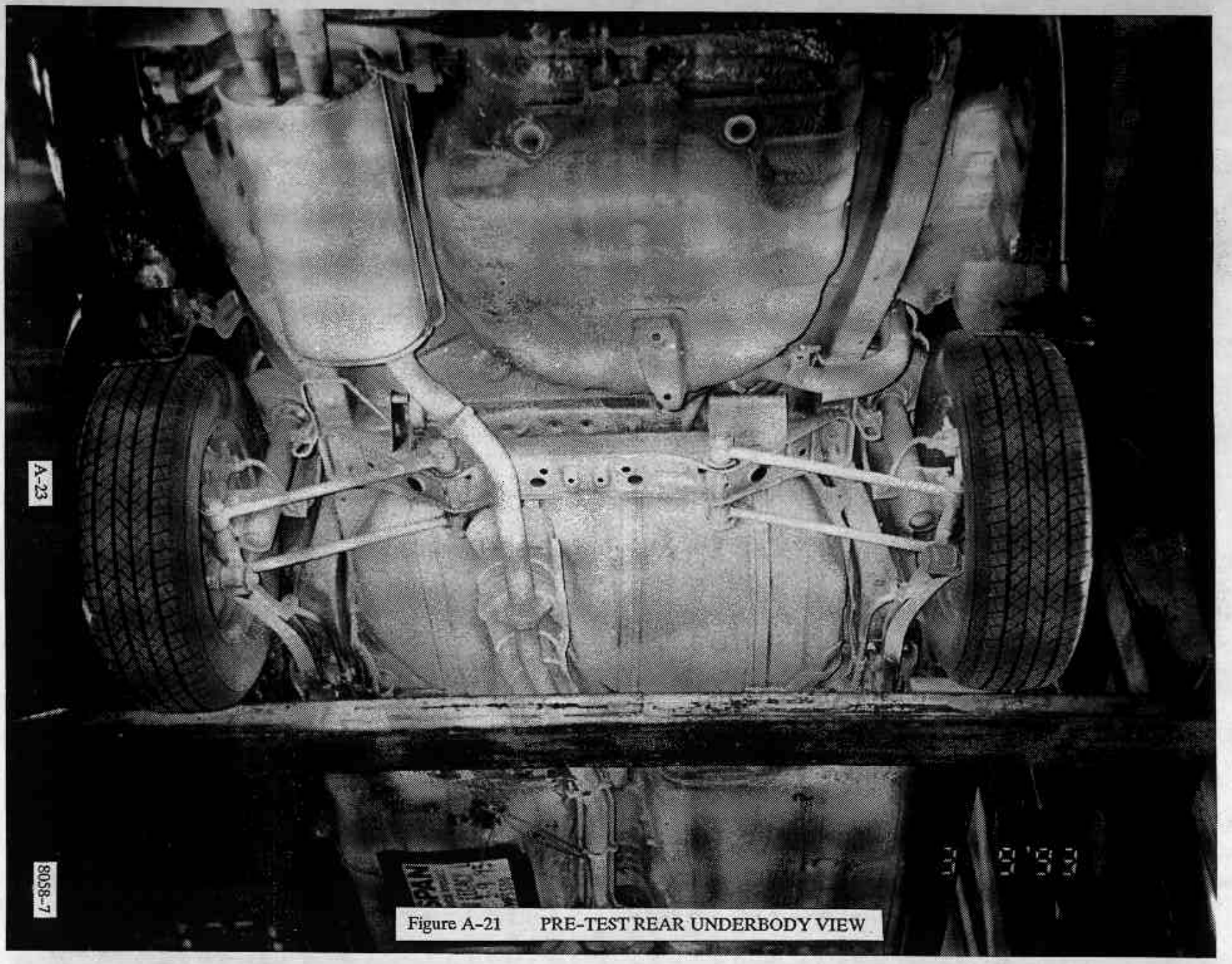


Figure A-21 PRE-TEST REAR UNDERBODY VIEW

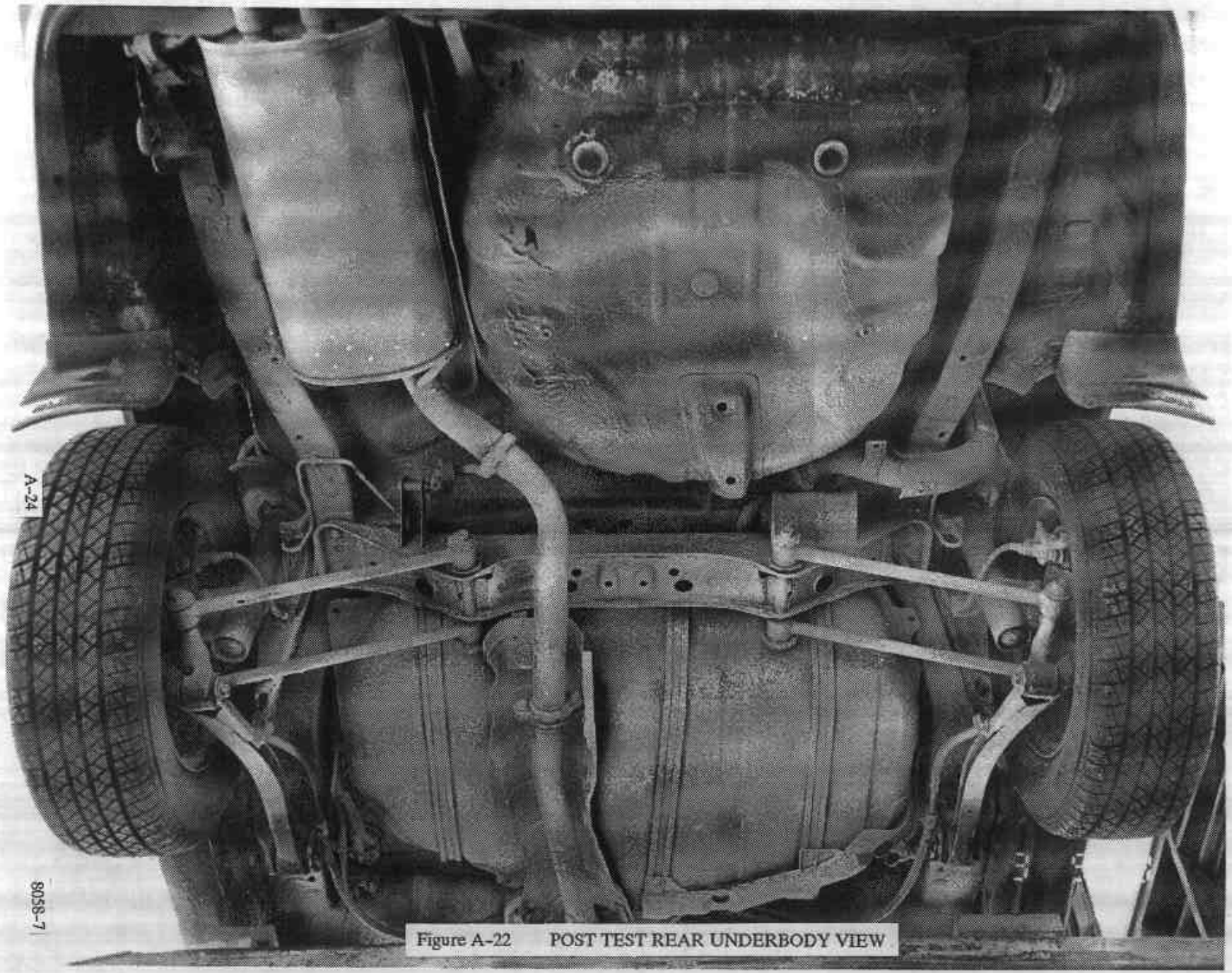


Figure A-22 POST TEST REAR UNDERBODY VIEW

Figure A-23 PRE-TEST DRIVER POSITION VIEW

Figure A-24 POST TEST DRIVER POSITION VIEW

Figure A-25 PRE-TEST PASSENGER POSITION VIEW

Figure A-26 POST TEST PASSENGER POSITION VIEW

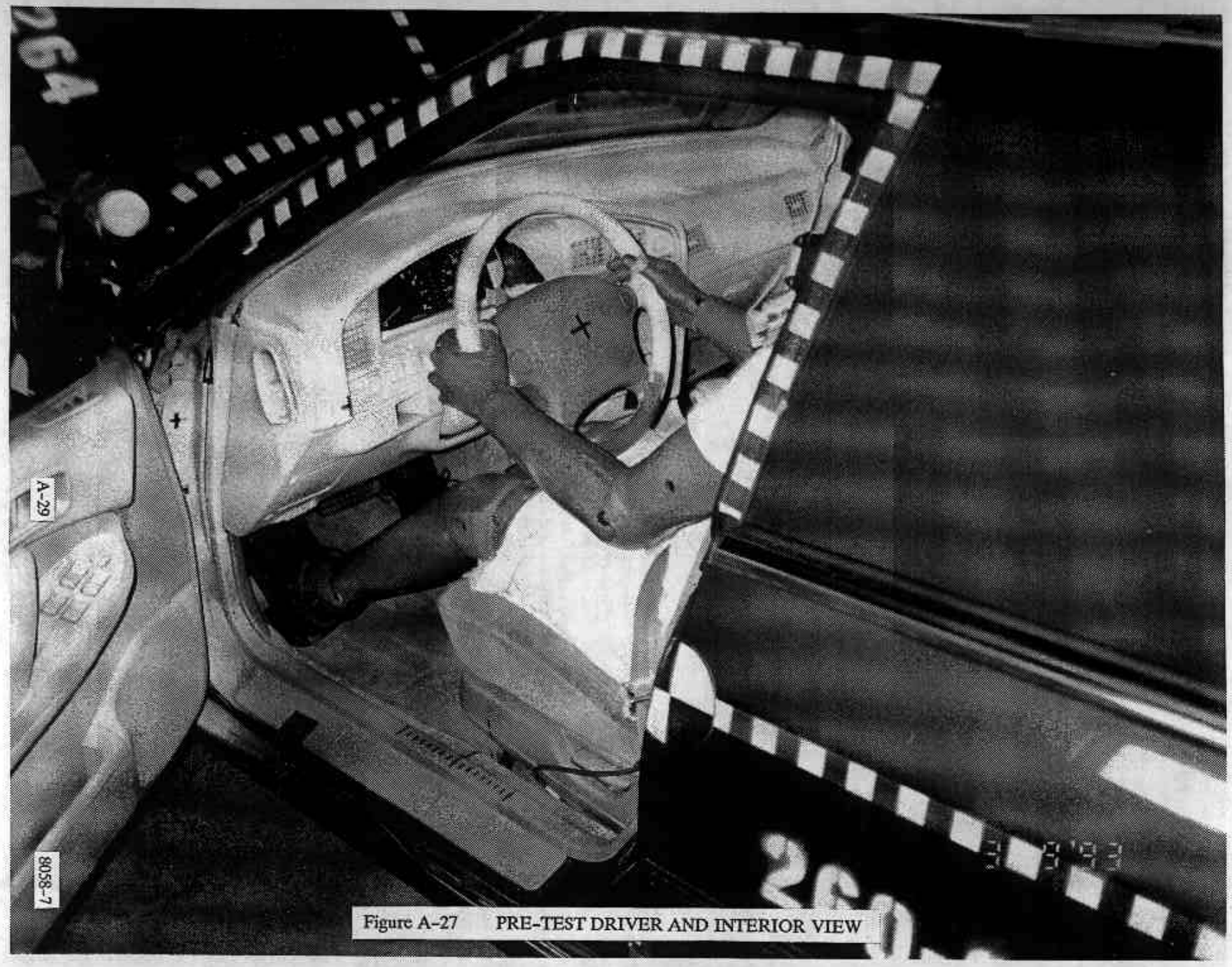


Figure A-27 PRE-TEST DRIVER AND INTERIOR VIEW

Figure A-28 POST TEST DRIVER AND INTERIOR VIEW

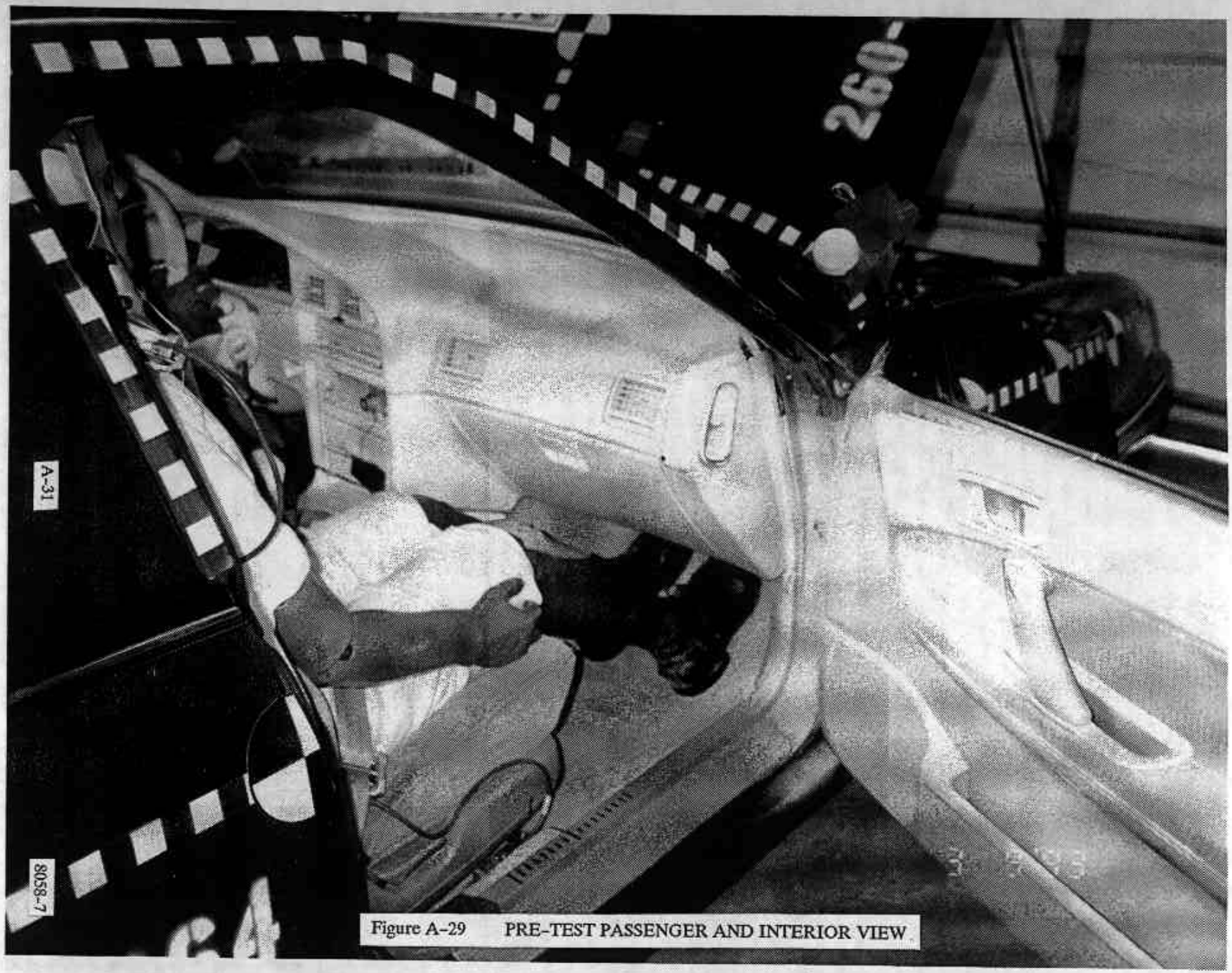


Figure A-29 PRE-TEST PASSENGER AND INTERIOR VIEW

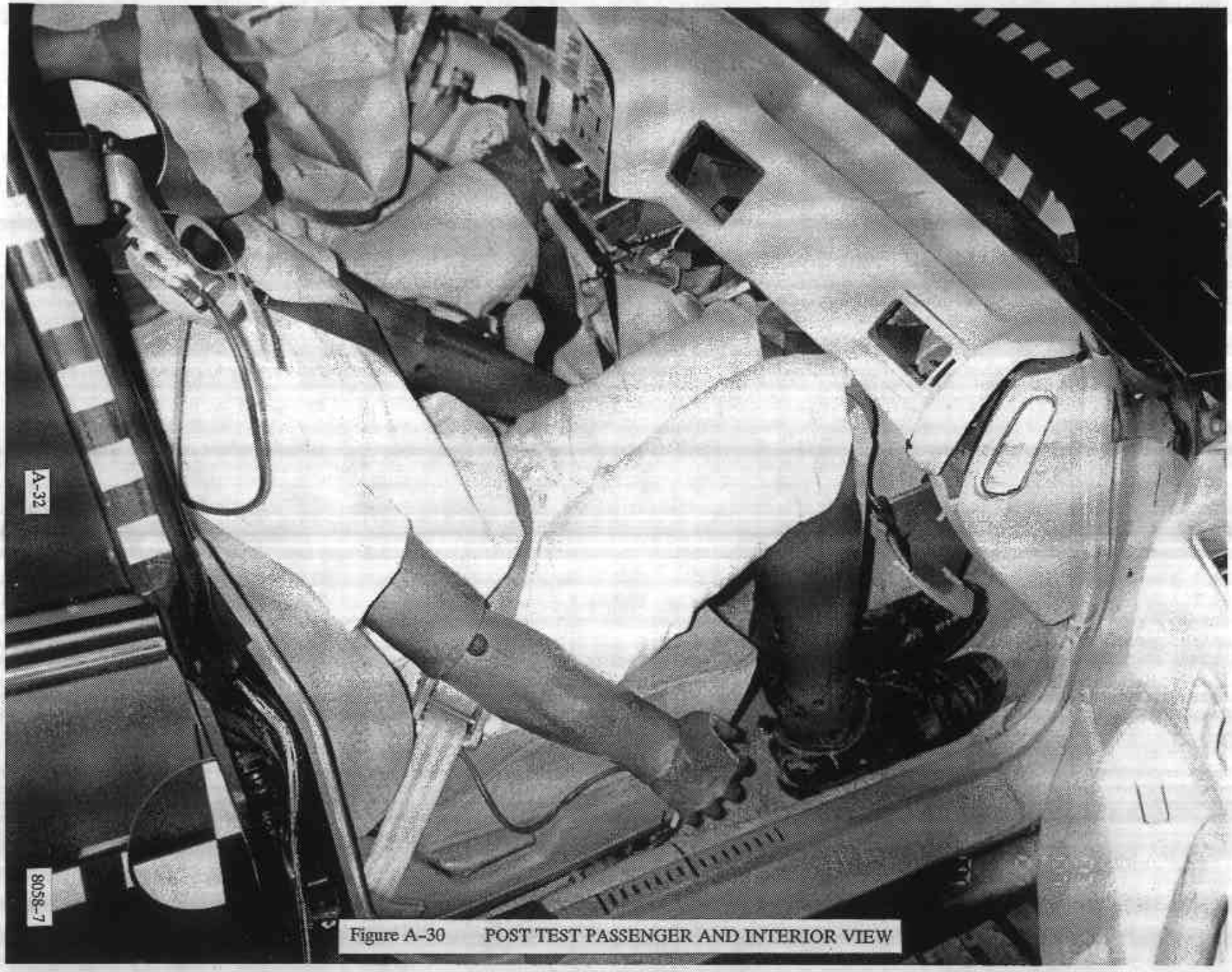


Figure A-30 POST TEST PASSENGER AND INTERIOR VIEW

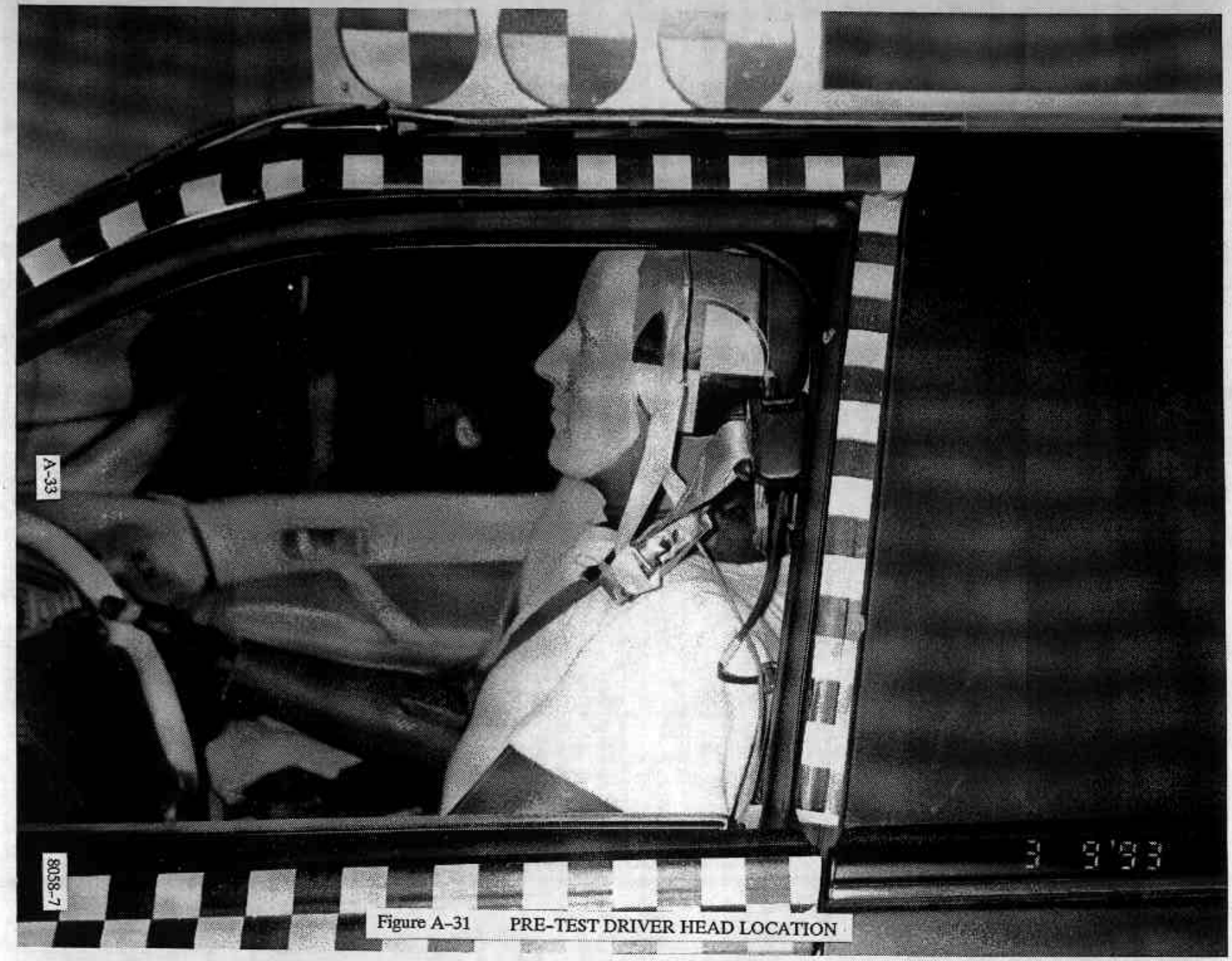


Figure A-31 PRE-TEST DRIVER HEAD LOCATION

Figure A-32 PRE-TEST PASSENGER HEAD LOCATION

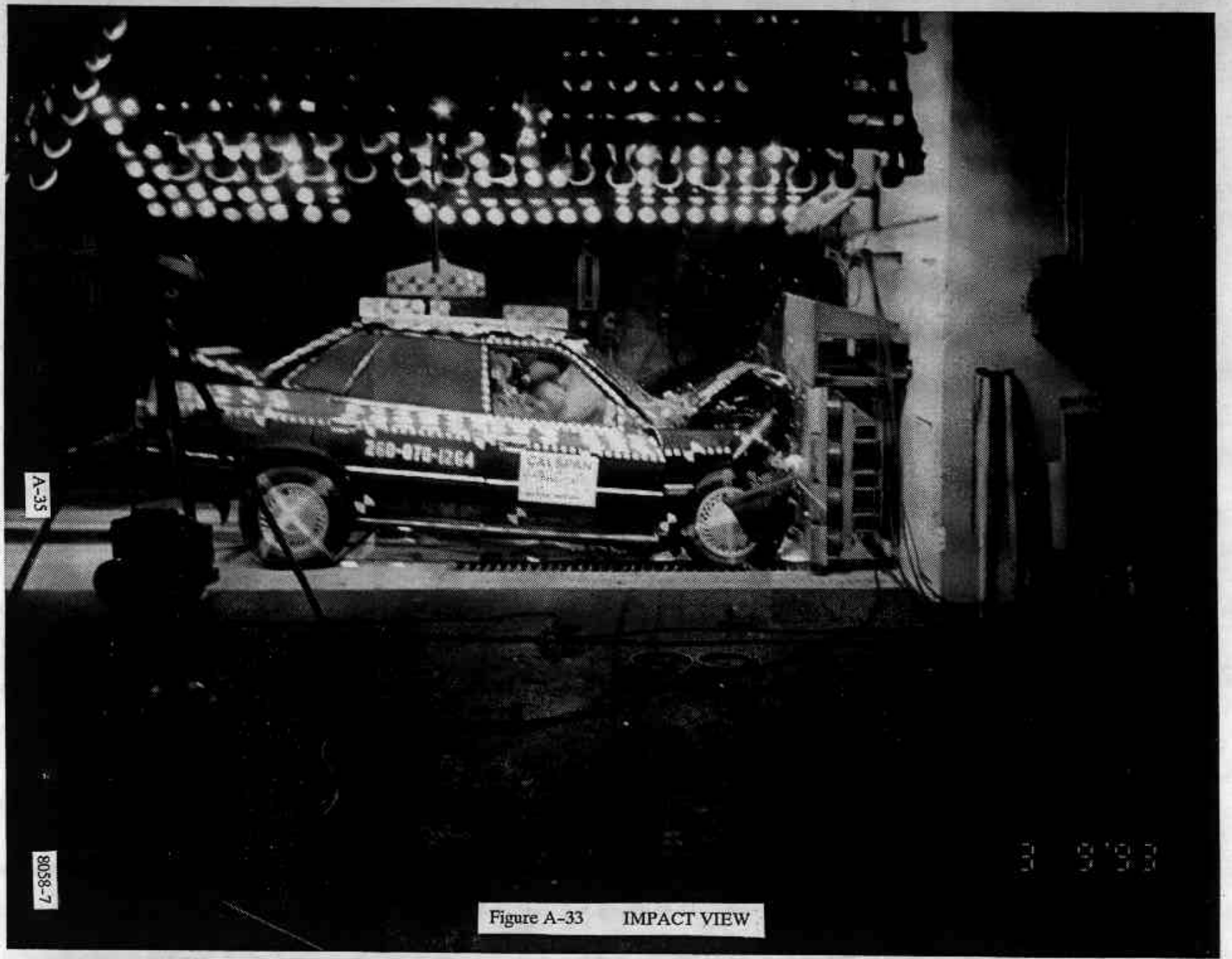


Figure A-33 IMPACT VIEW

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

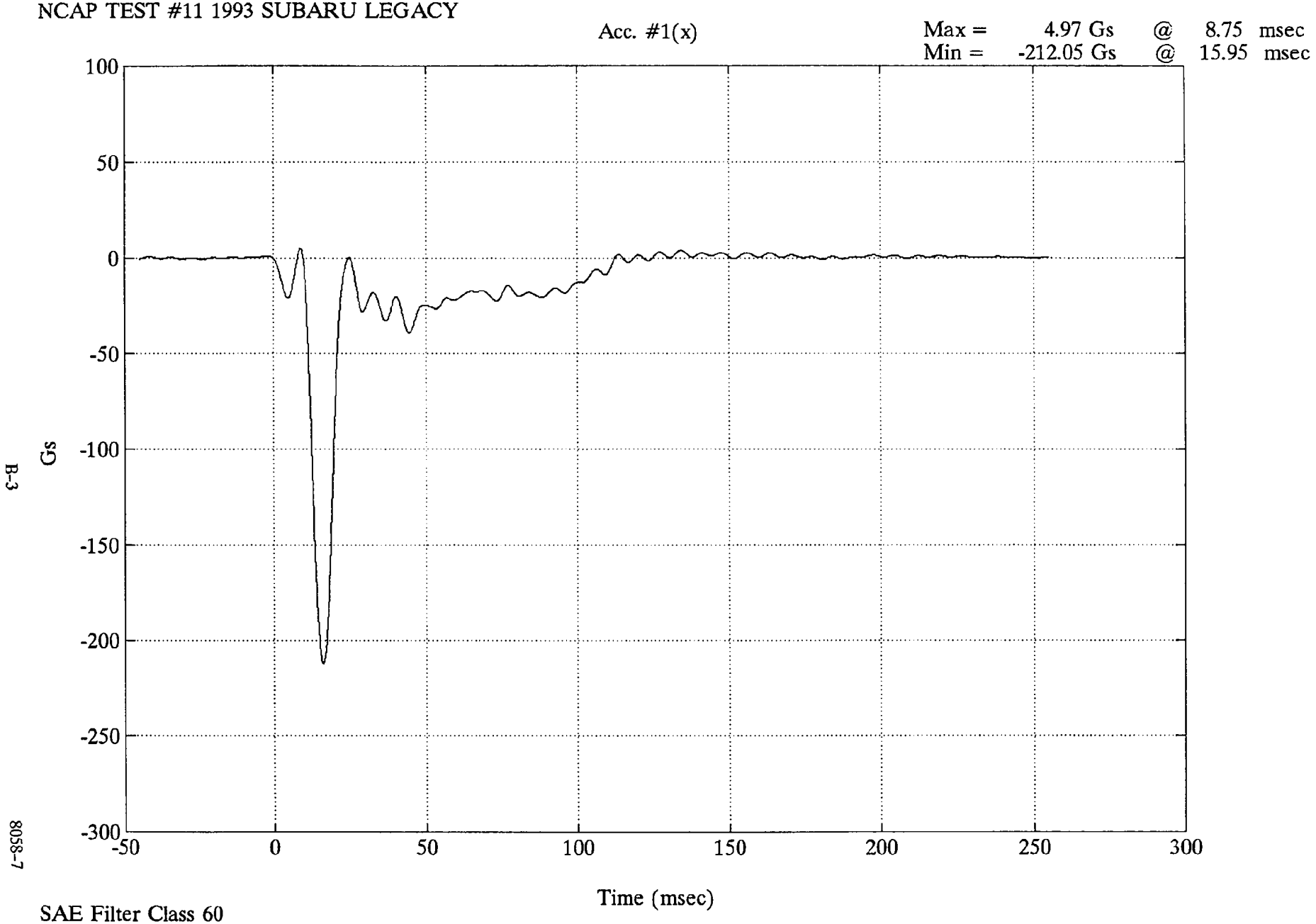
TEST NO. MP5500

VEHICLE DATA

FILTER CHANNEL CLASS

60

NCAP TEST #11 1993 SUBARU LEGACY

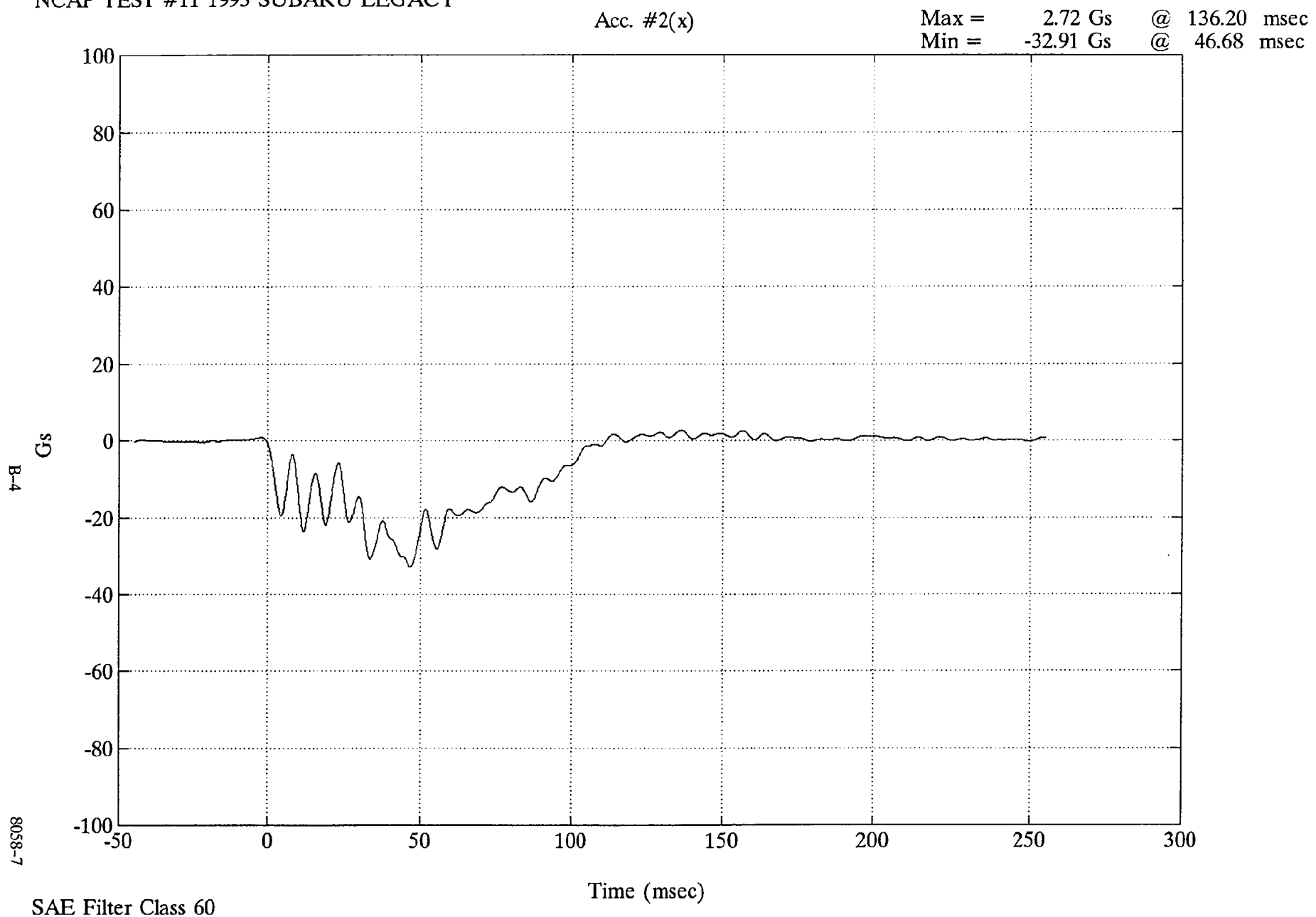


SAE Filter Class 60

B-3

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

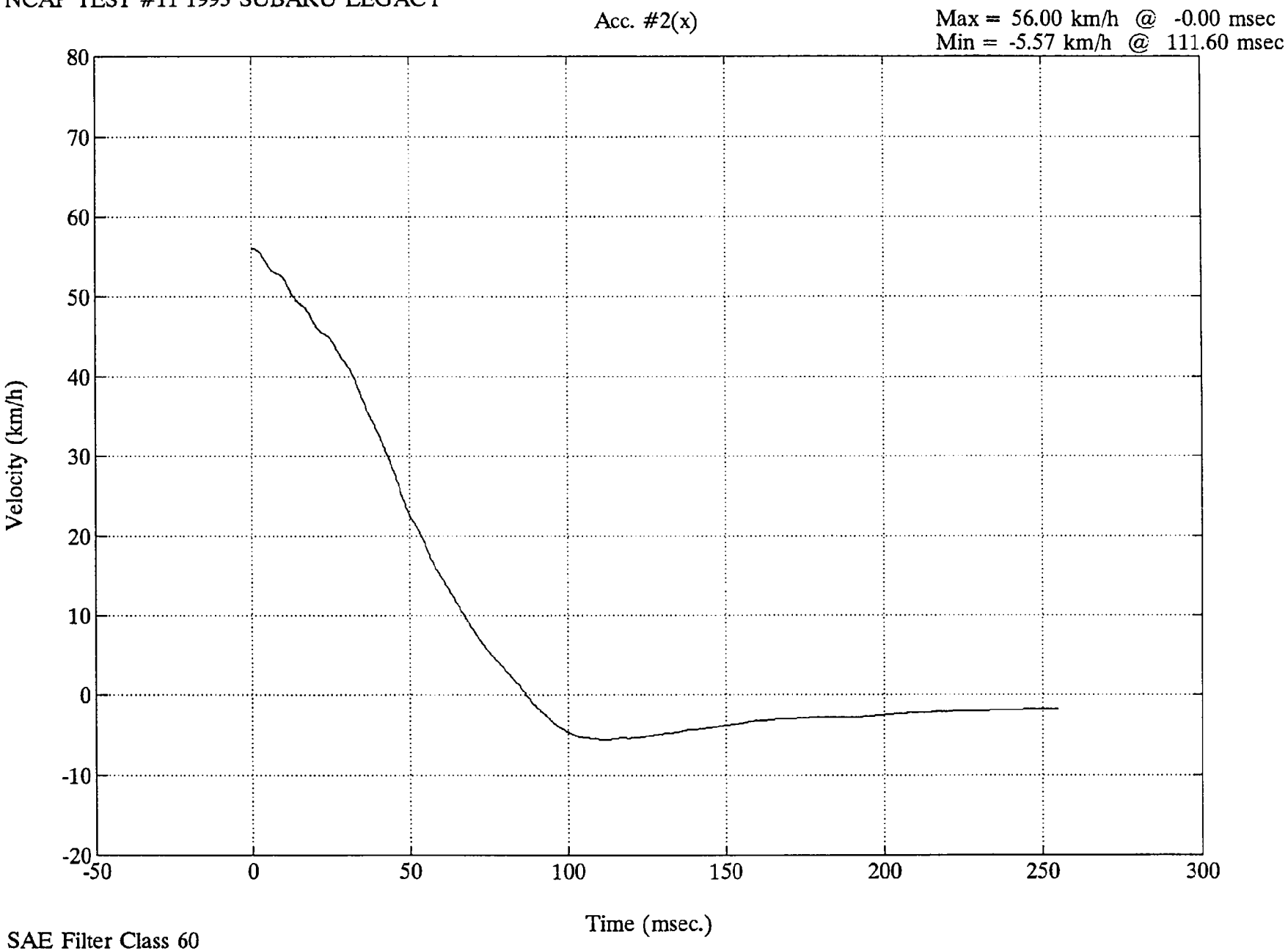


B-4

8058-7

SAE Filter Class 60

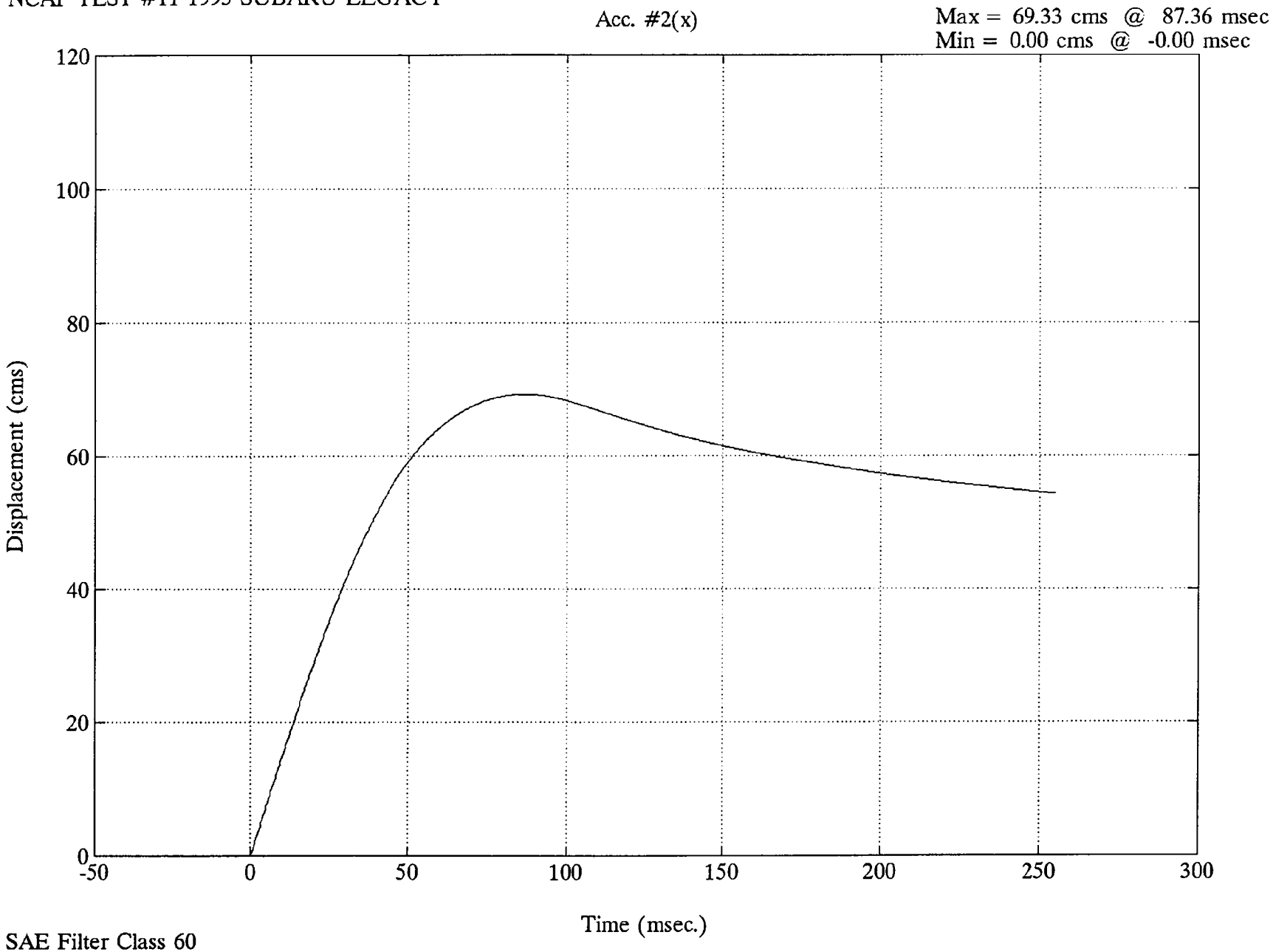
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

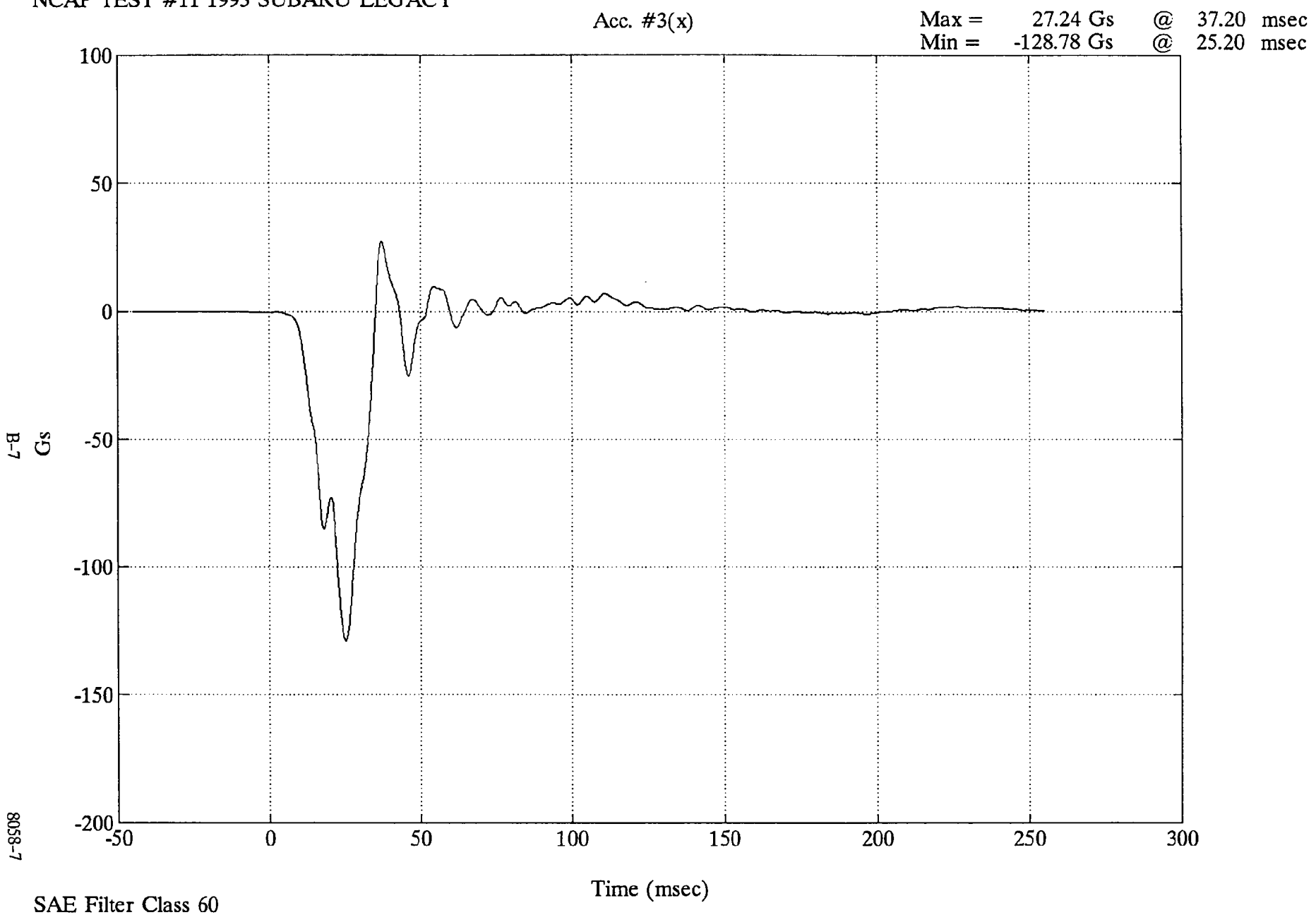
8058-7

NCAP TEST #11 1993 SUBARU LEGACY



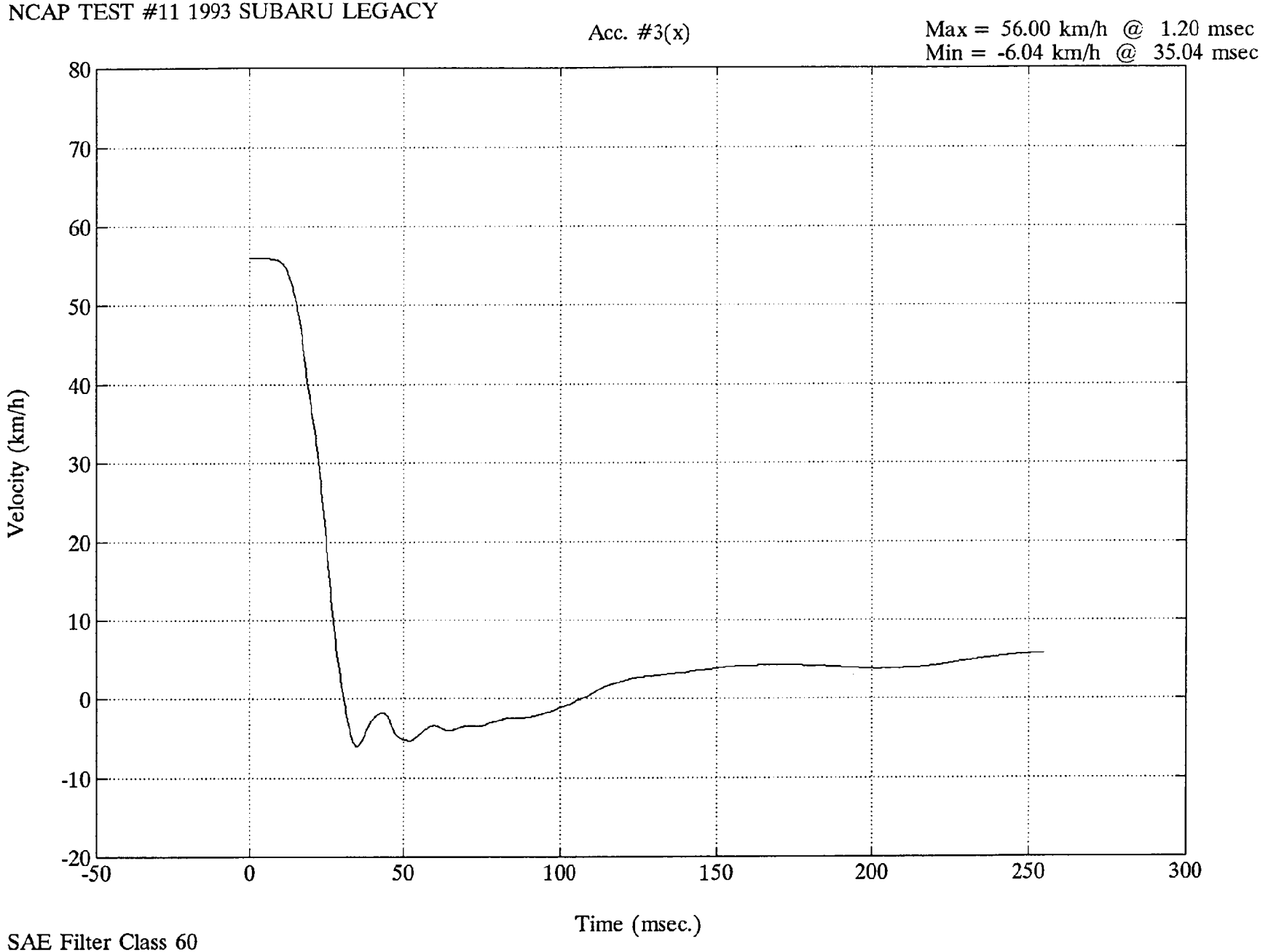
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

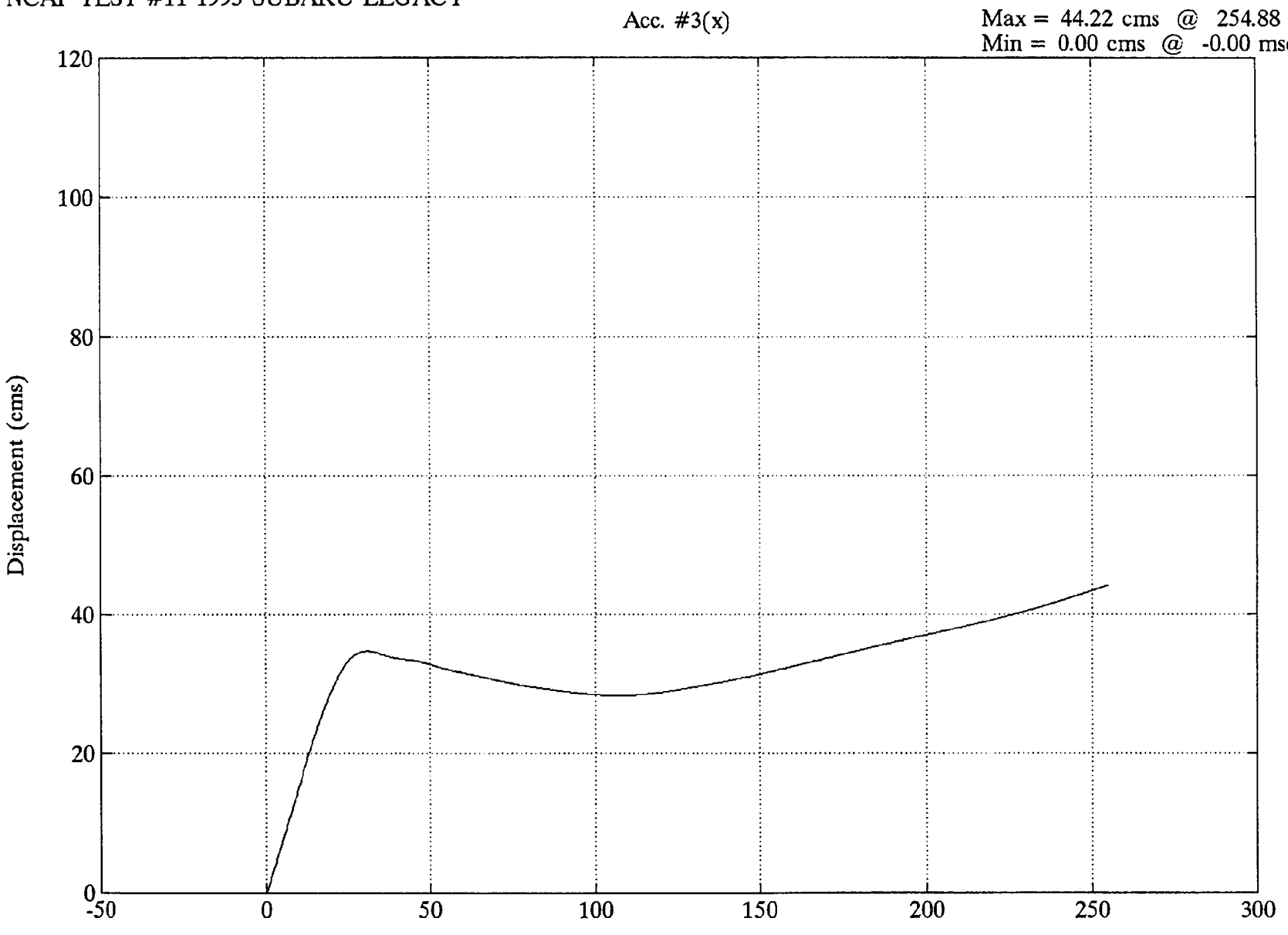
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

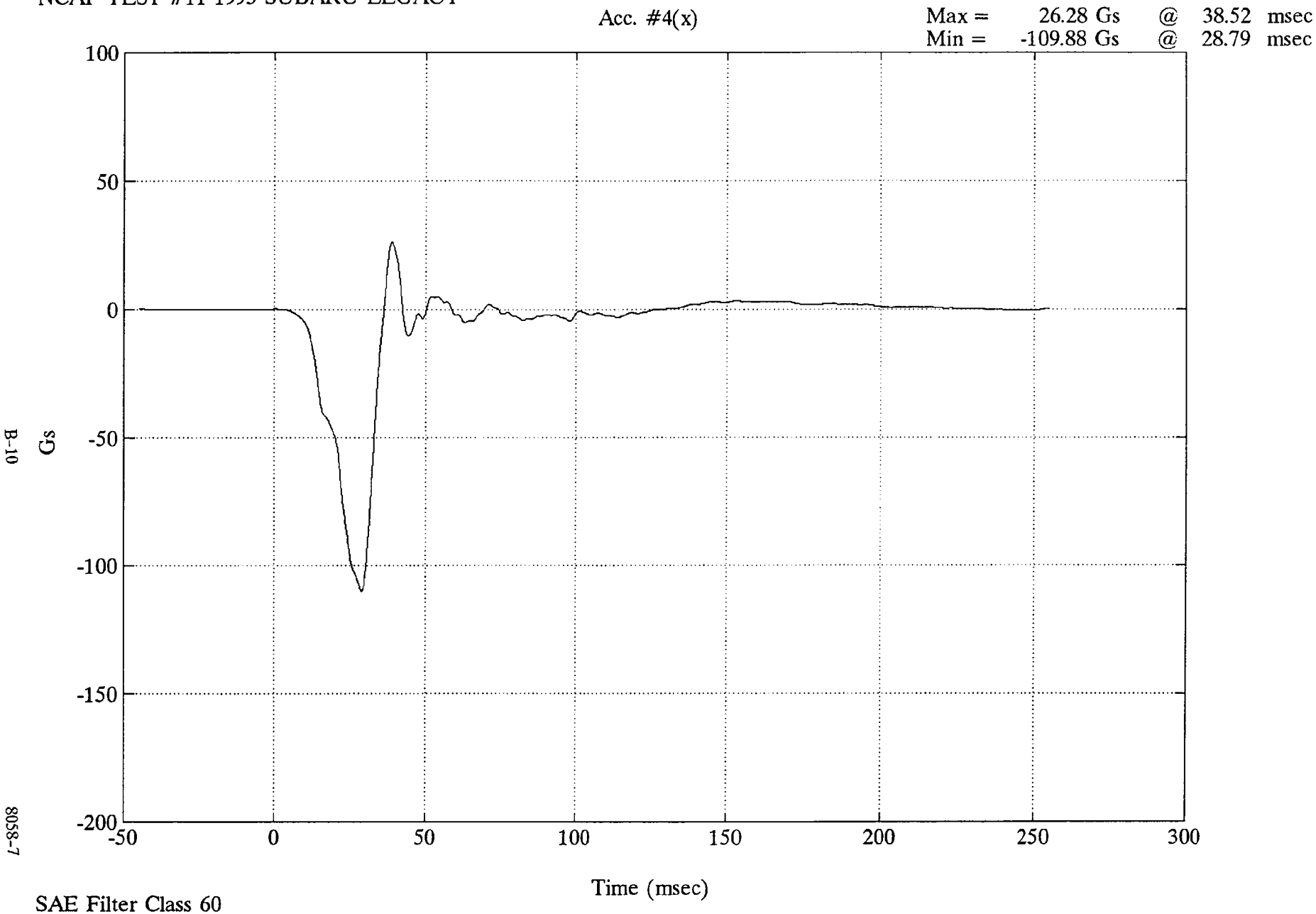
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8808-7

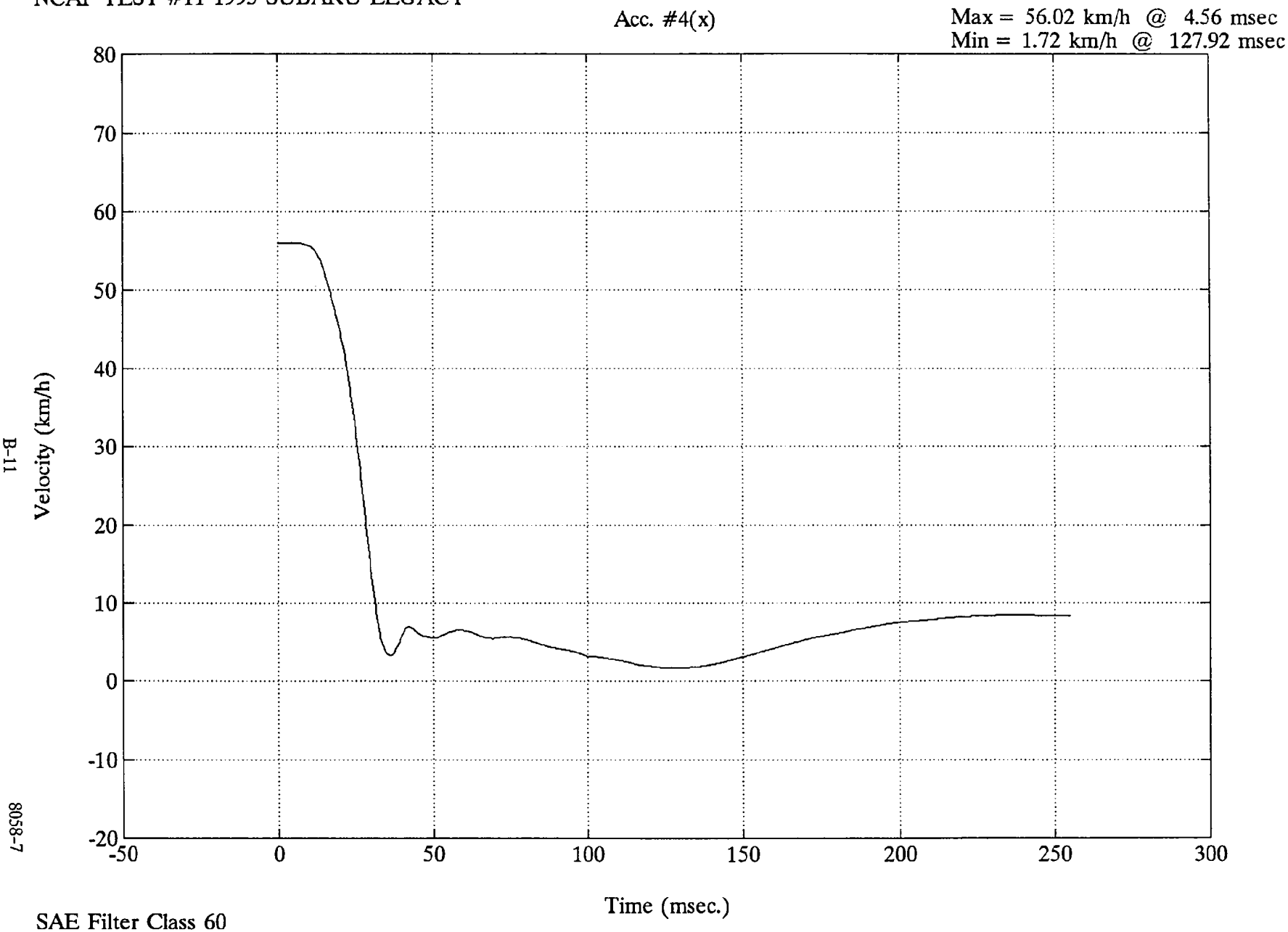
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

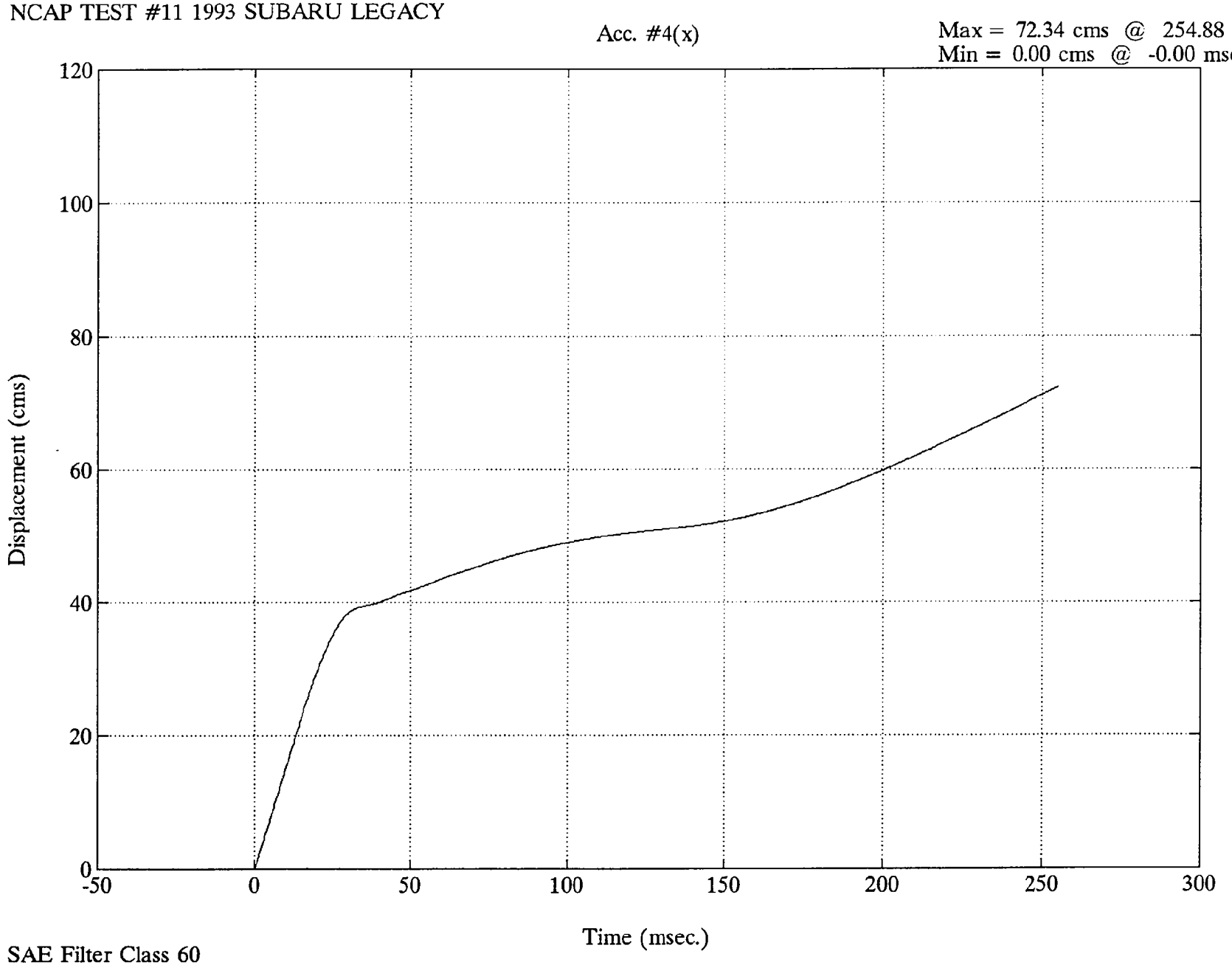
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

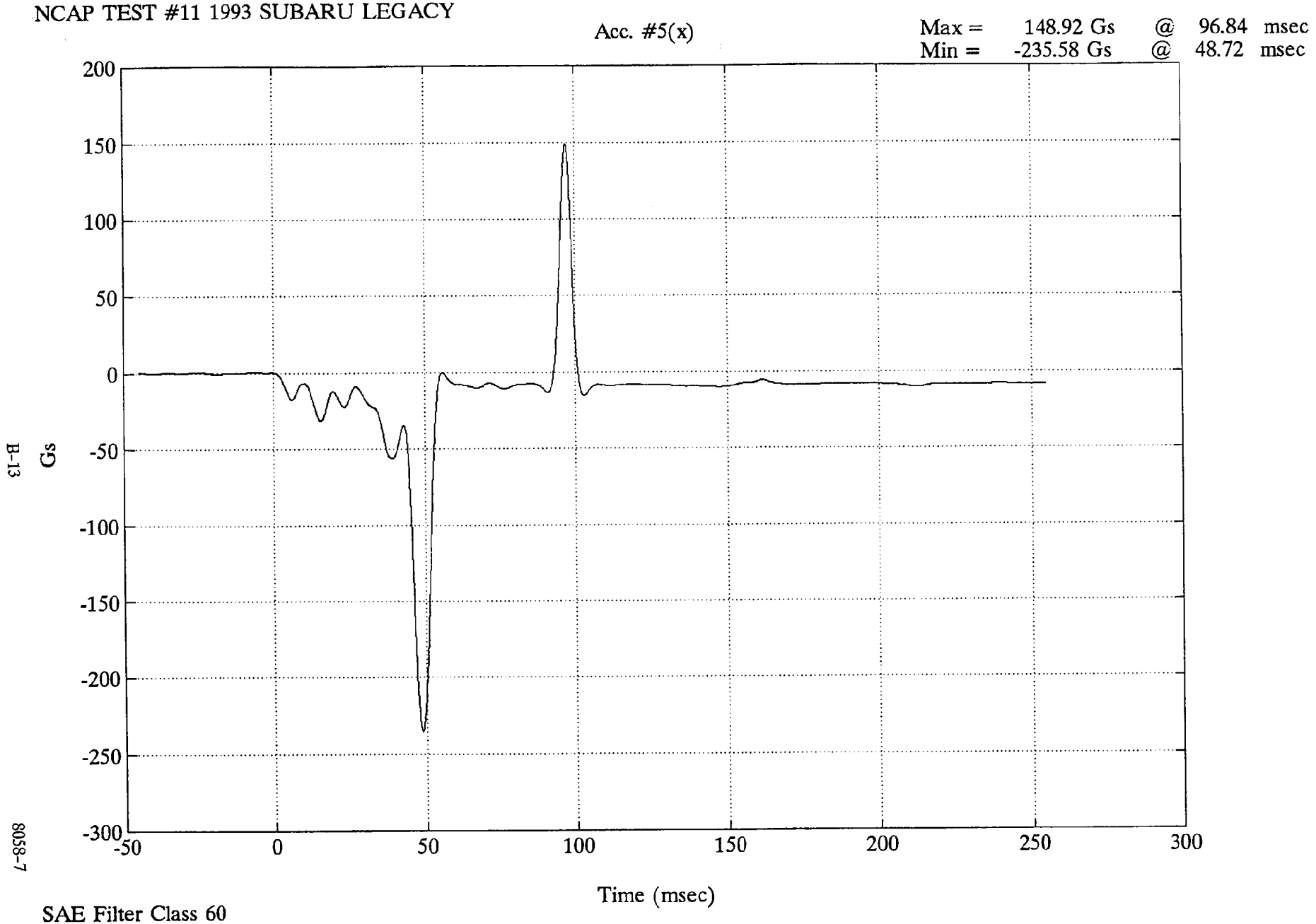
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

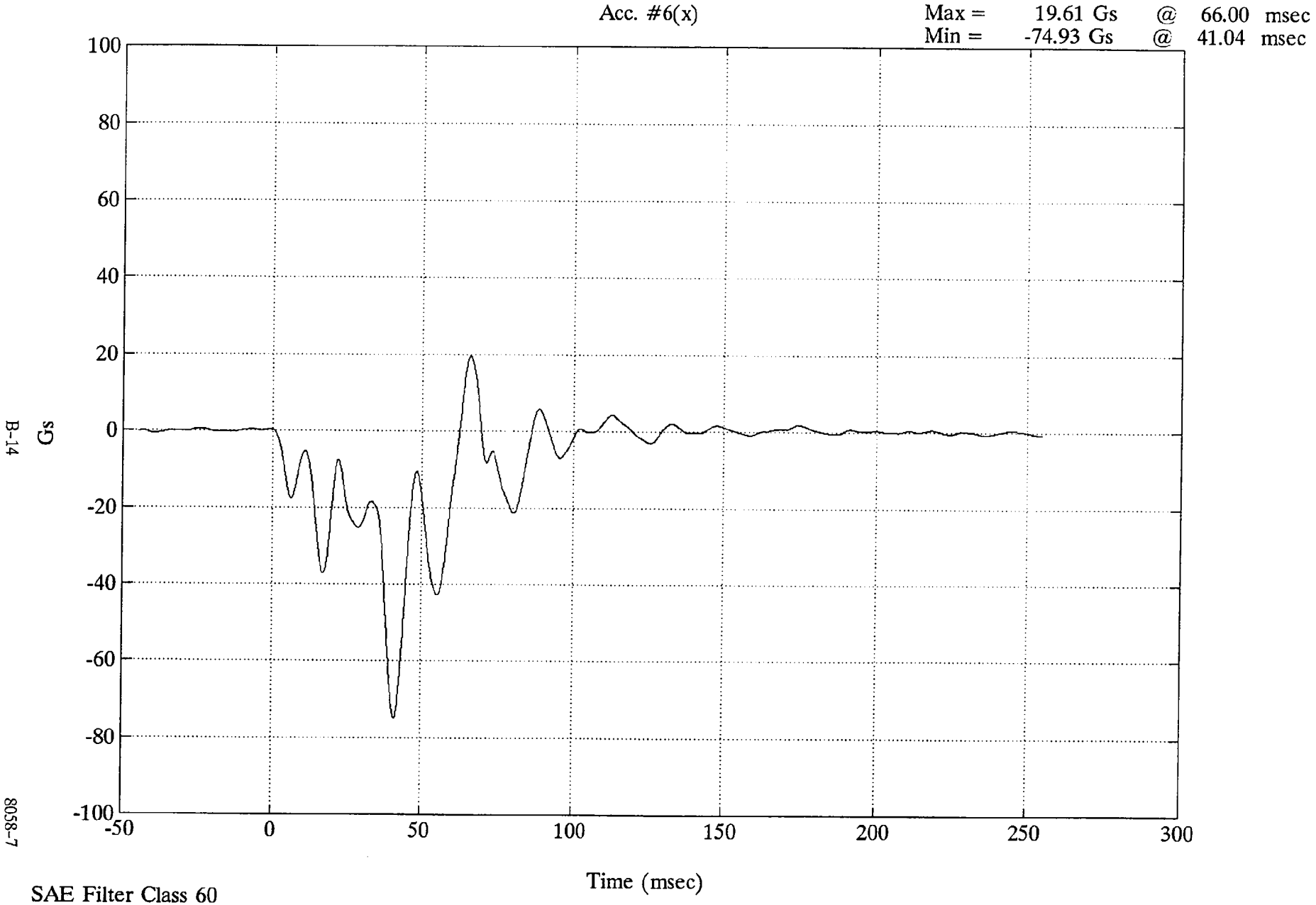


B-13

8058-7

SAE Filter Class 60

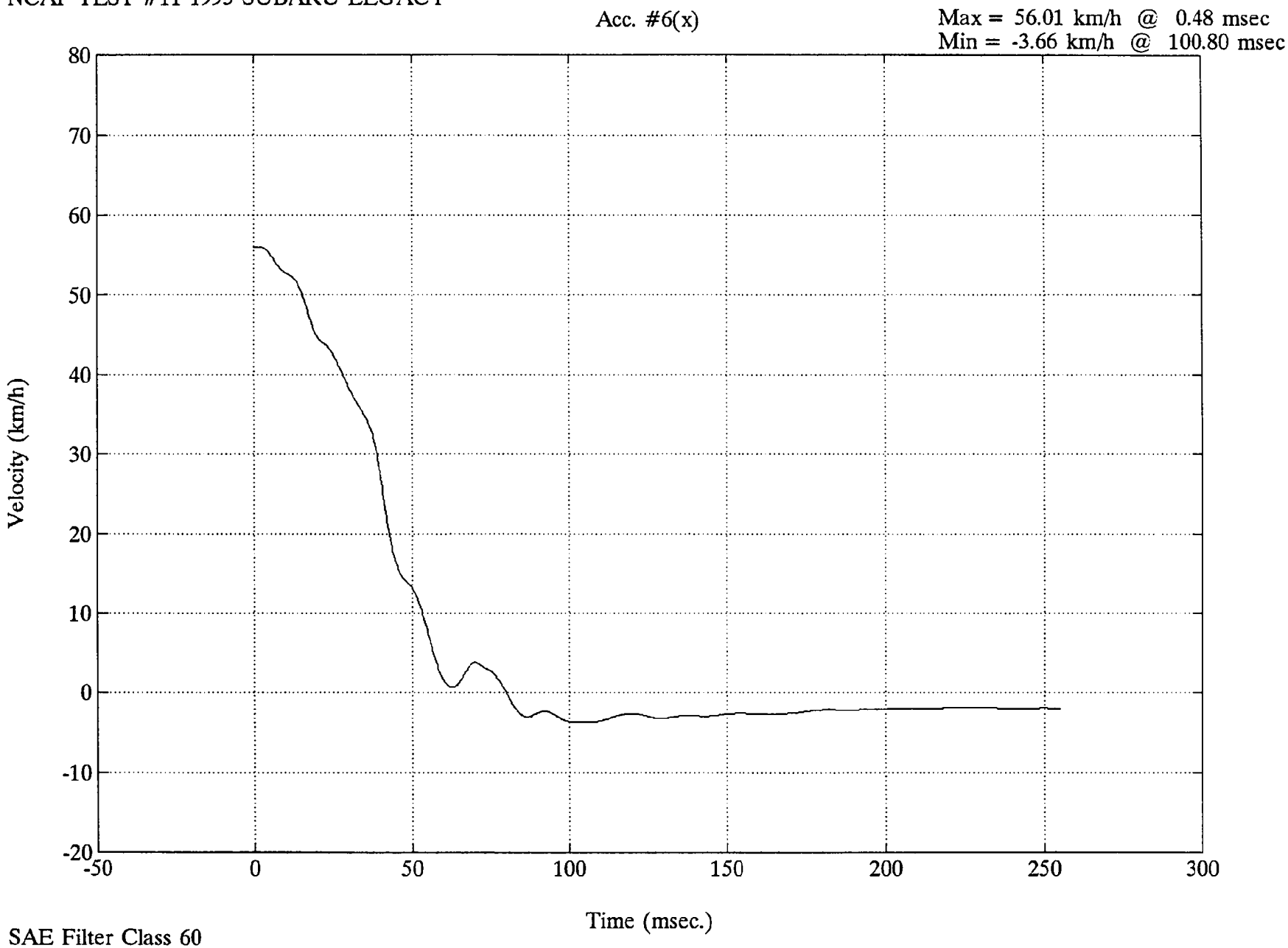
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

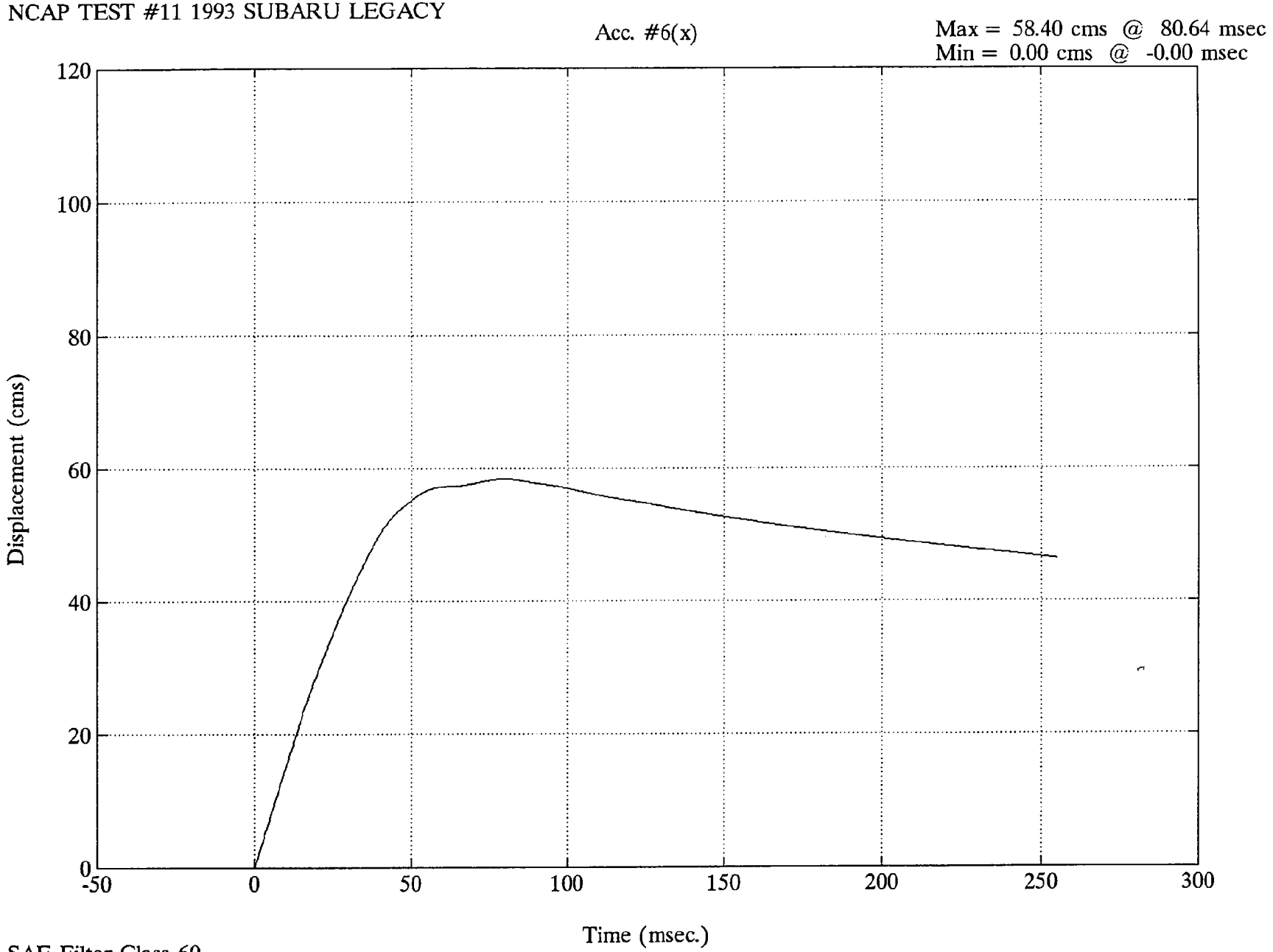
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

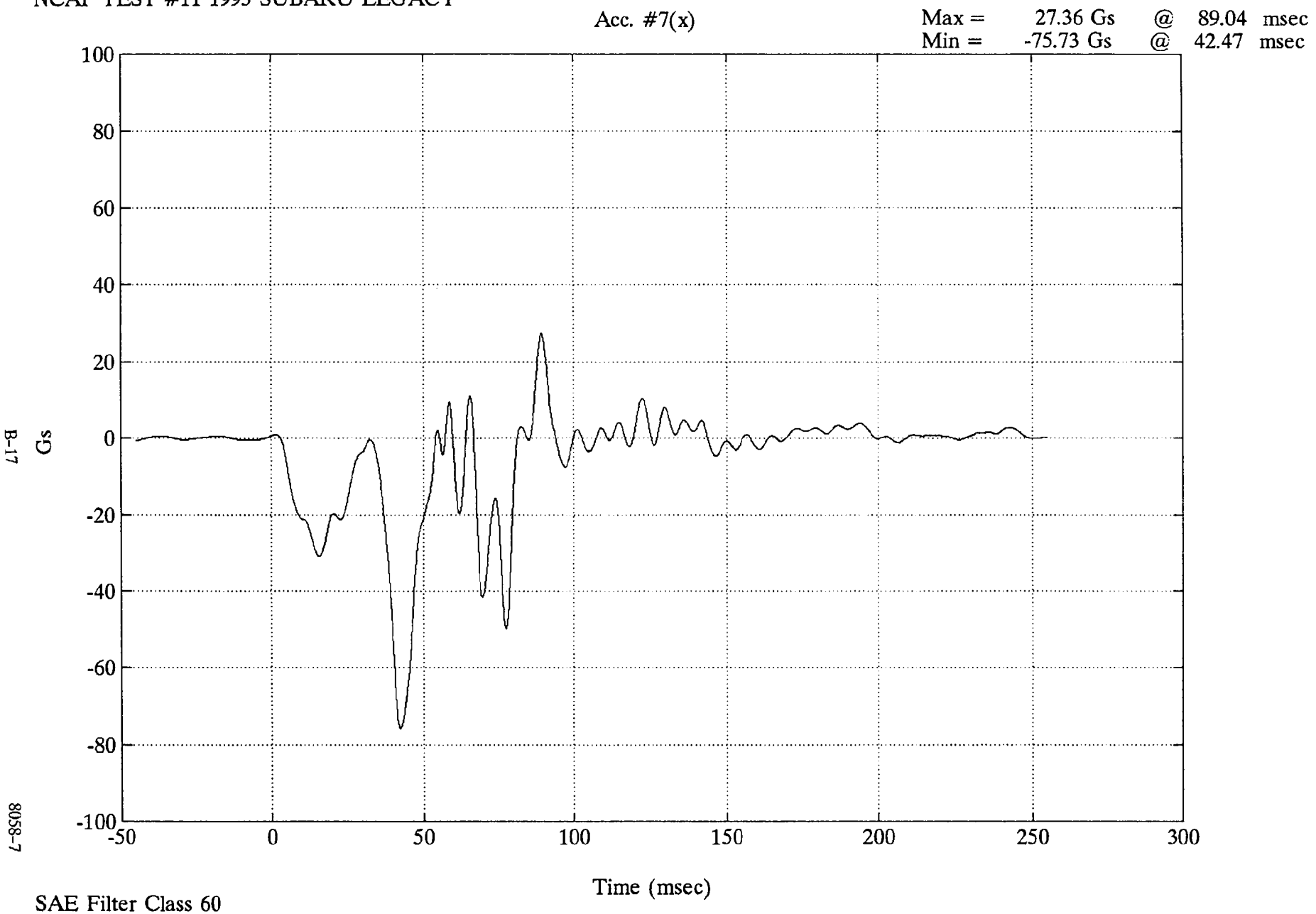
8058-7

NCAP TEST #11 1993 SUBARU LEGACY



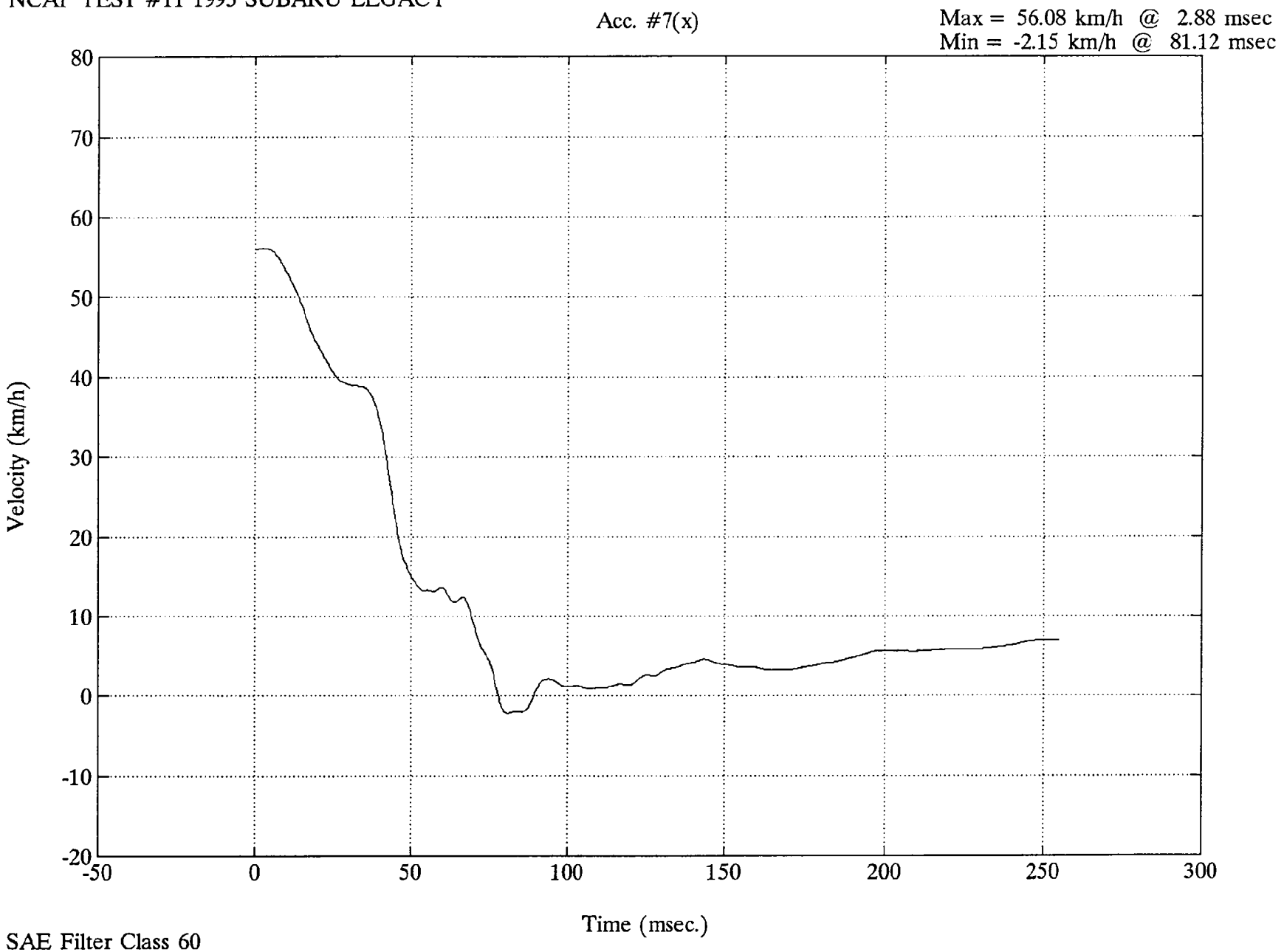
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

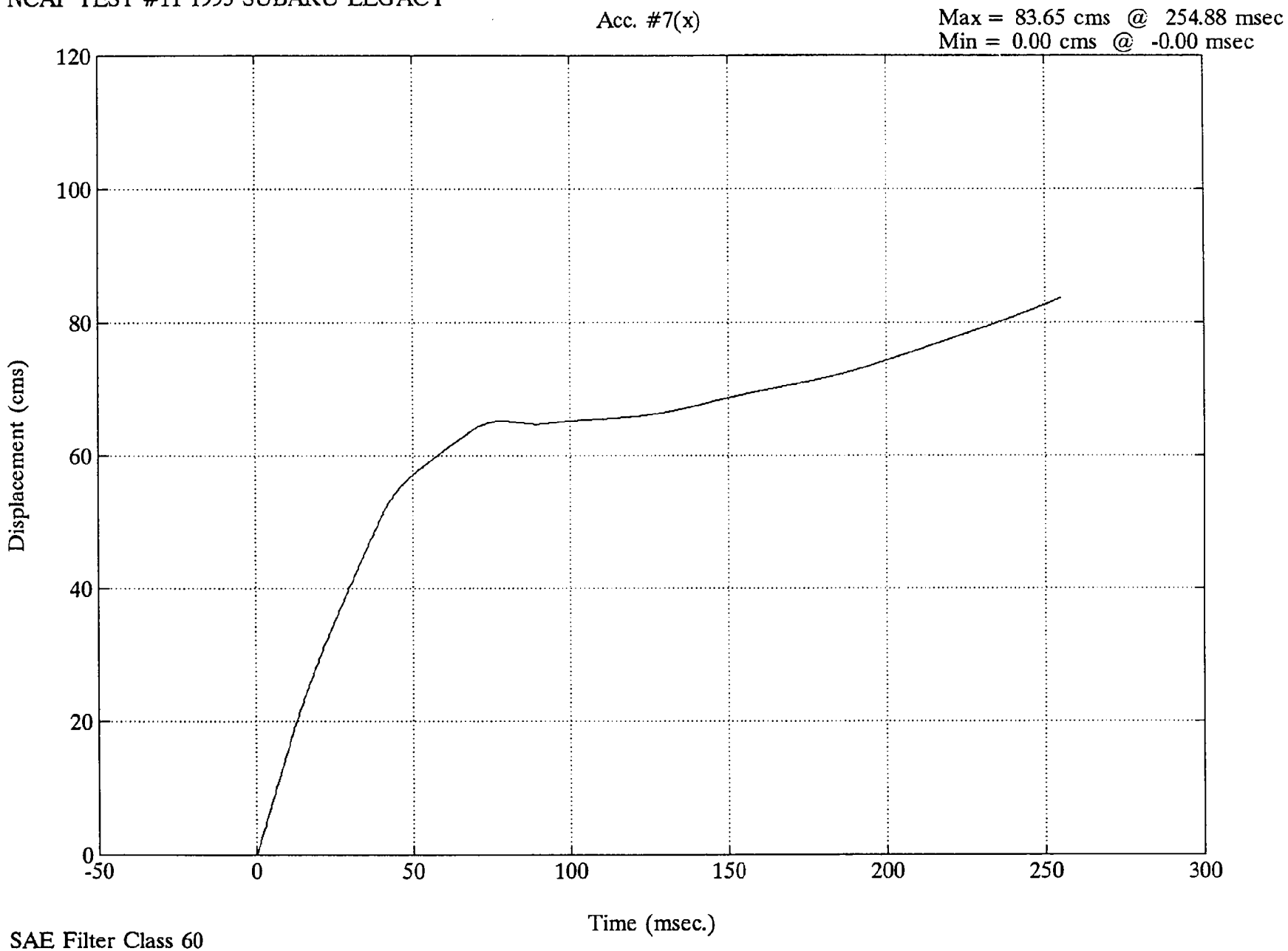
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

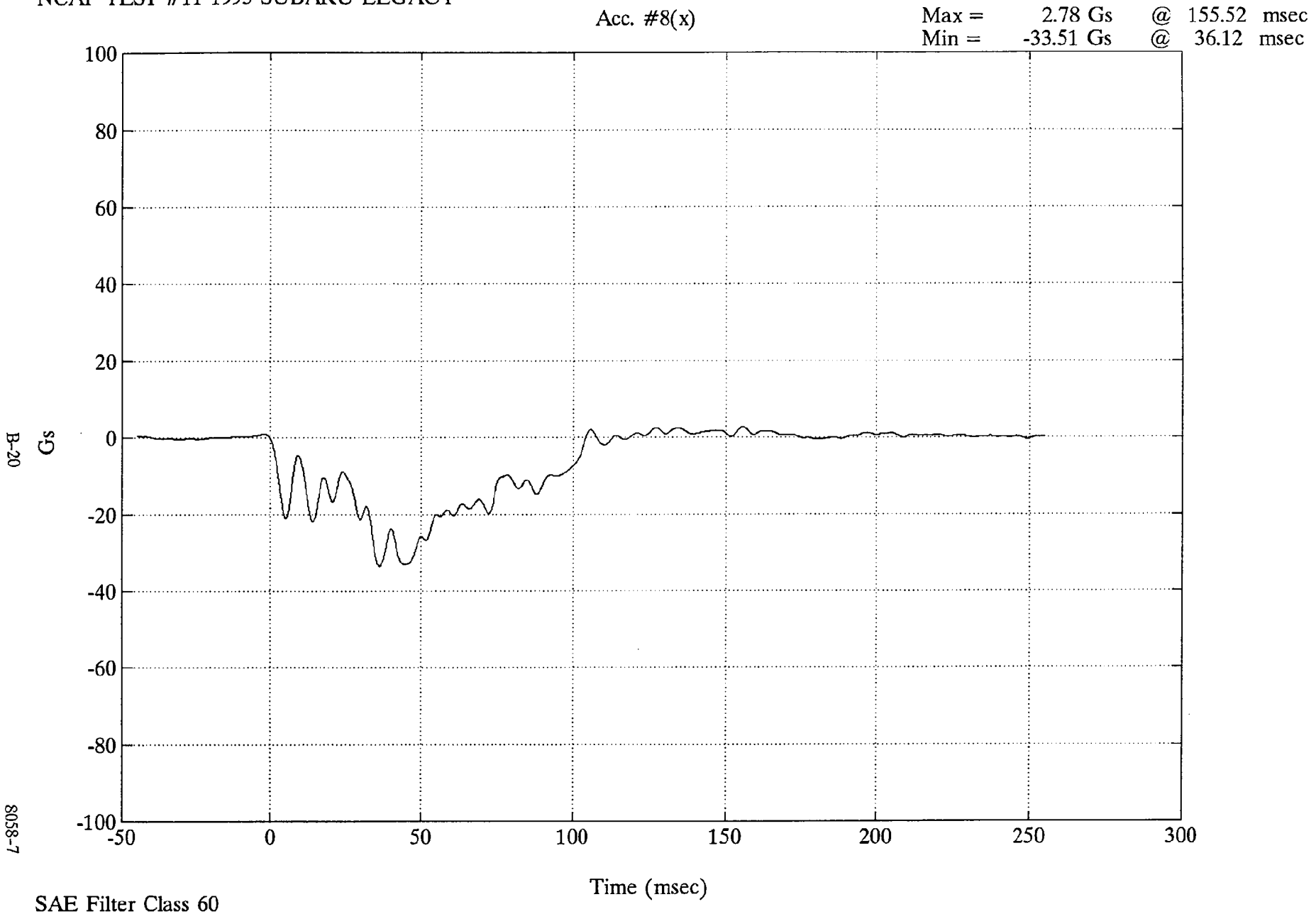
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

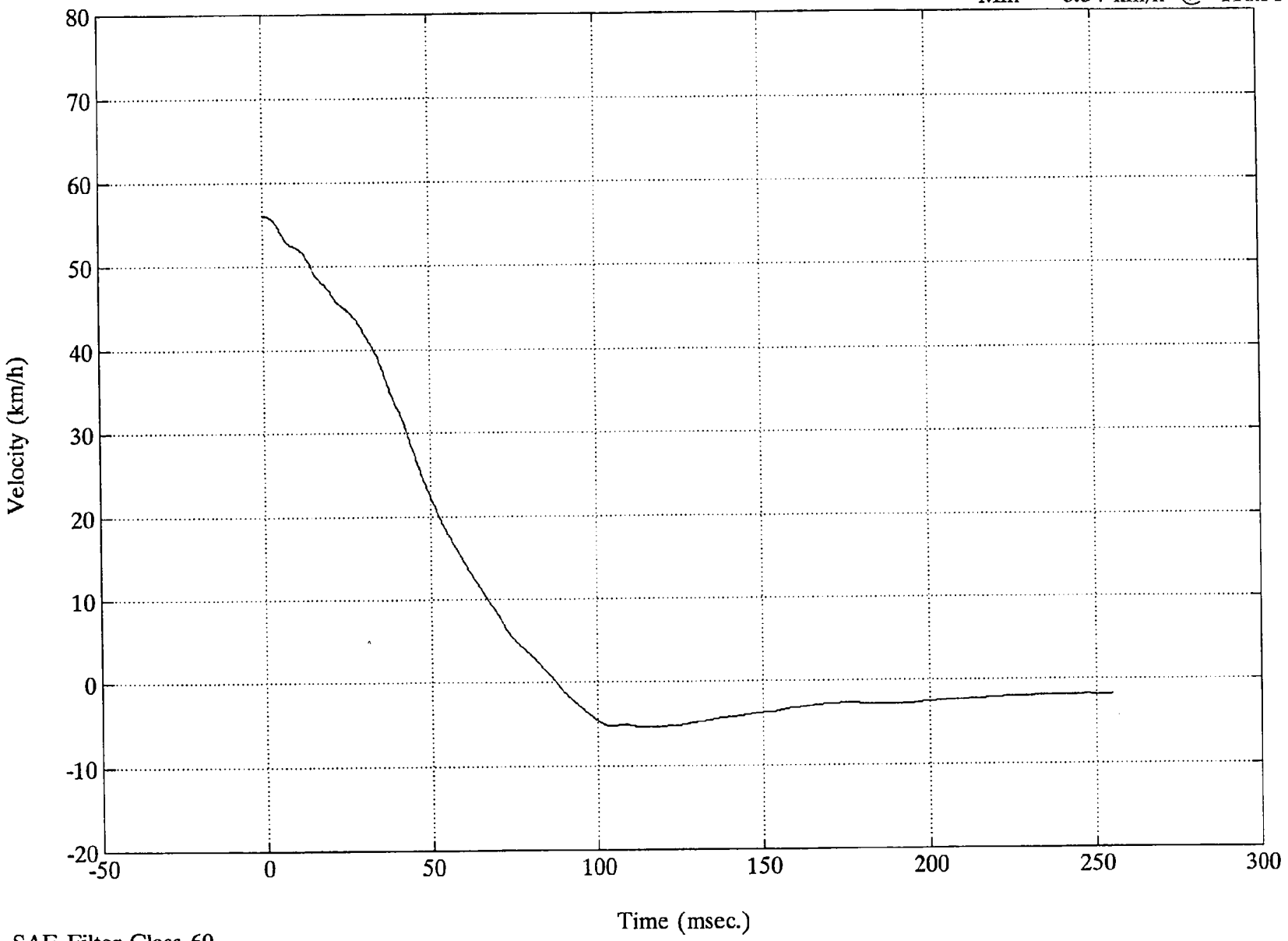


SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

Acc. #8(x)

Max = 56.00 km/h @ 0.24 msec
Min = -5.34 km/h @ 118.56 msec

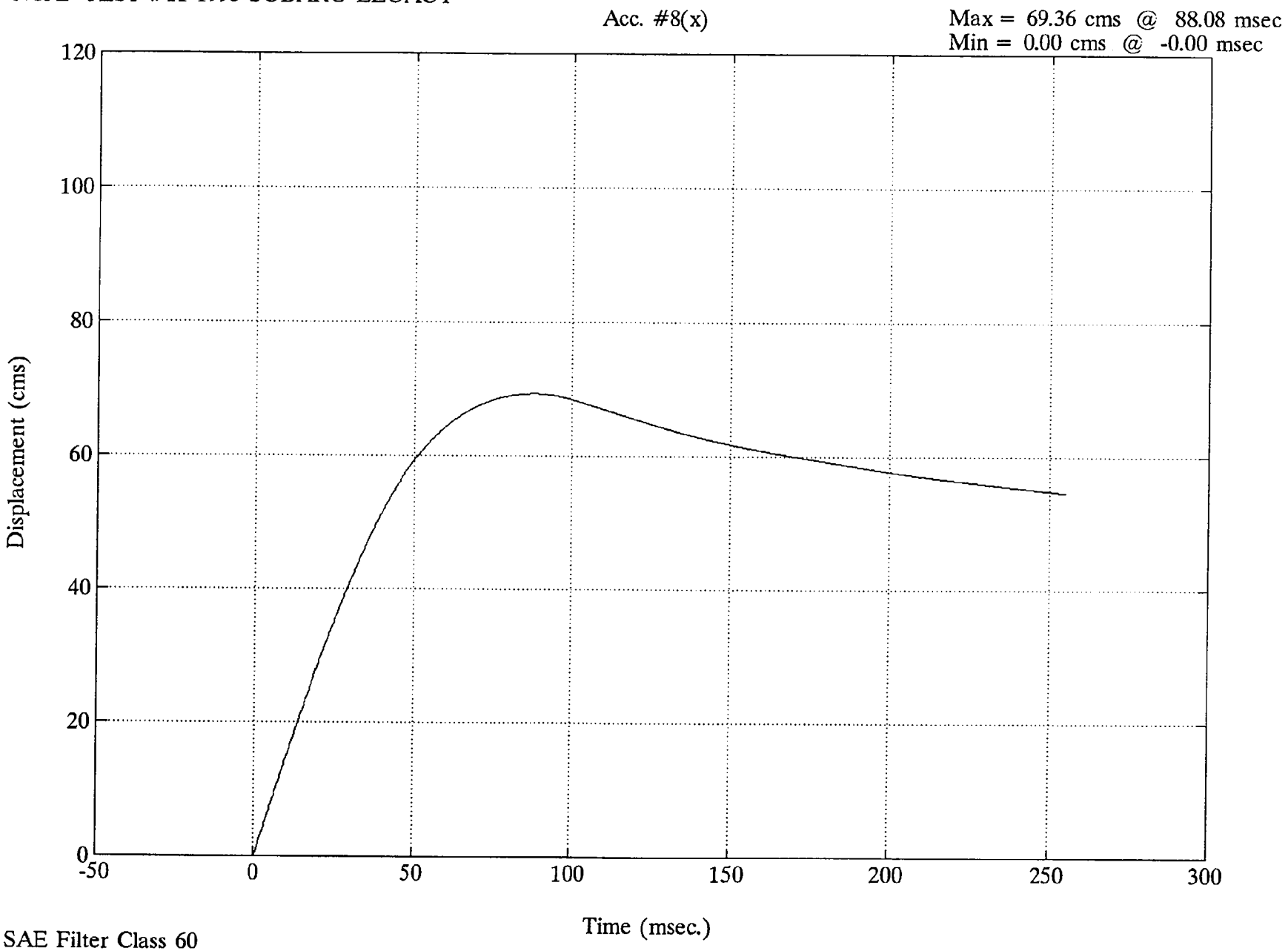


B-21

8058-7

SAE Filter Class 60

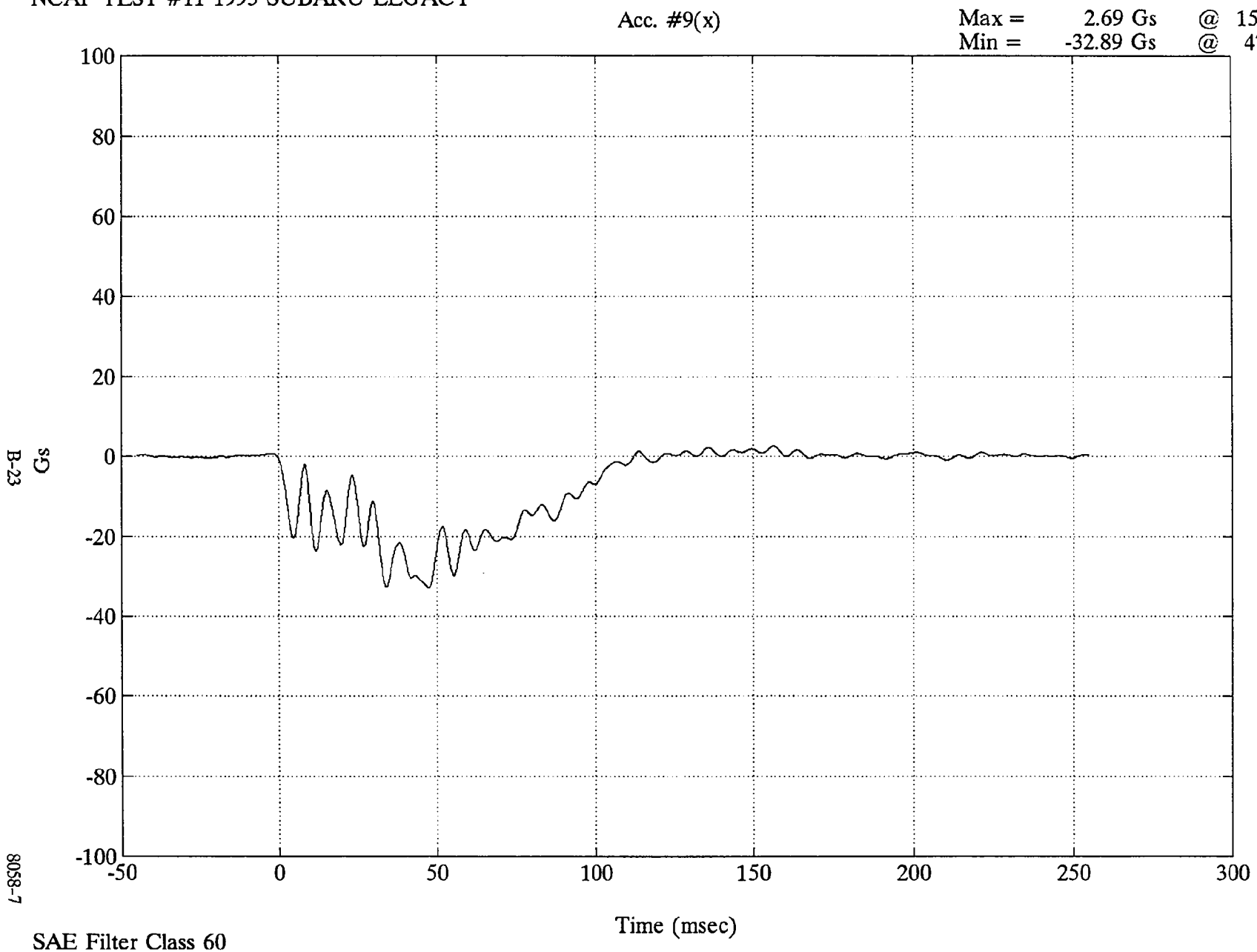
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

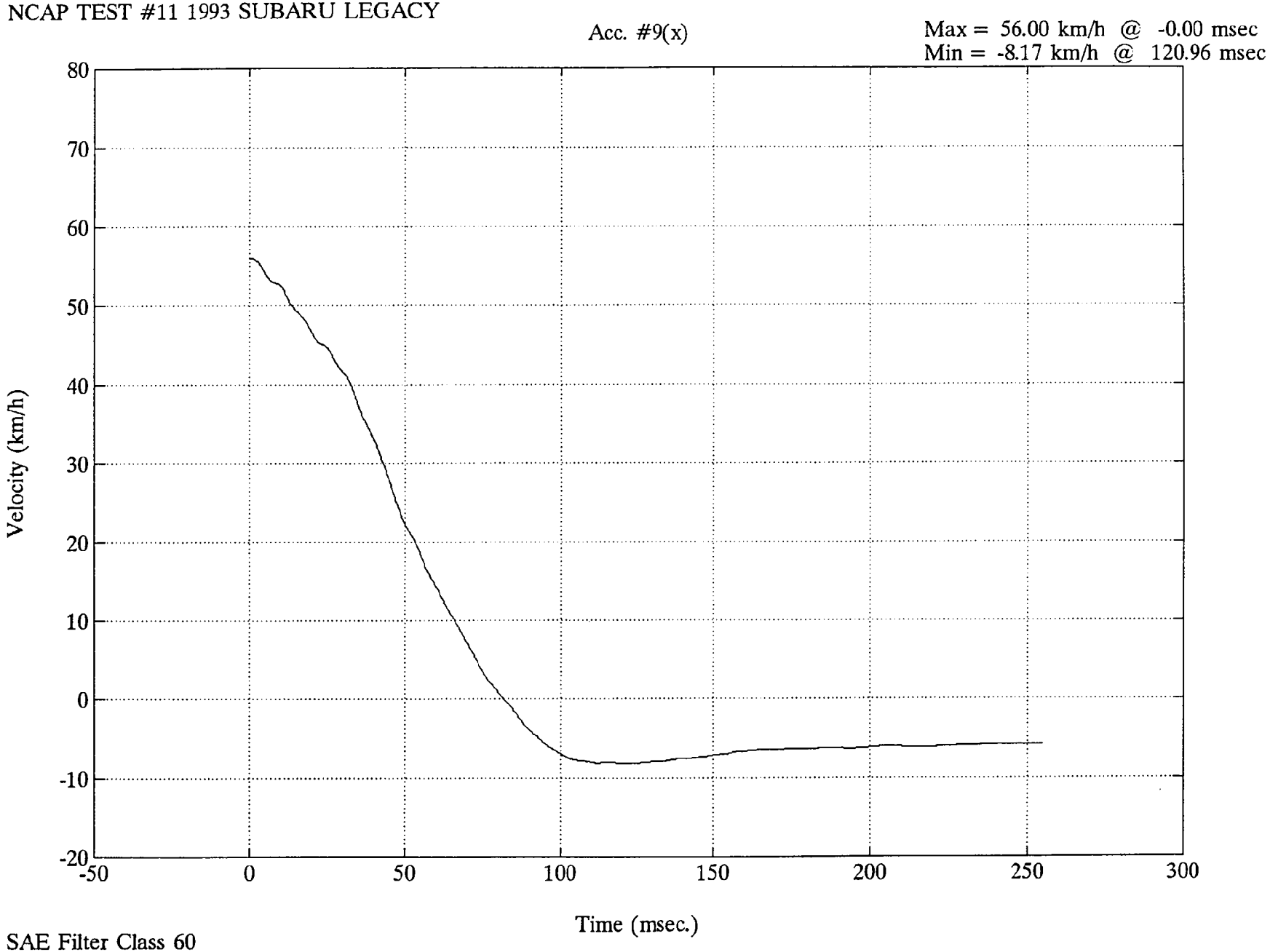
8058-7

NCAP TEST #11 1993 SUBARU LEGACY



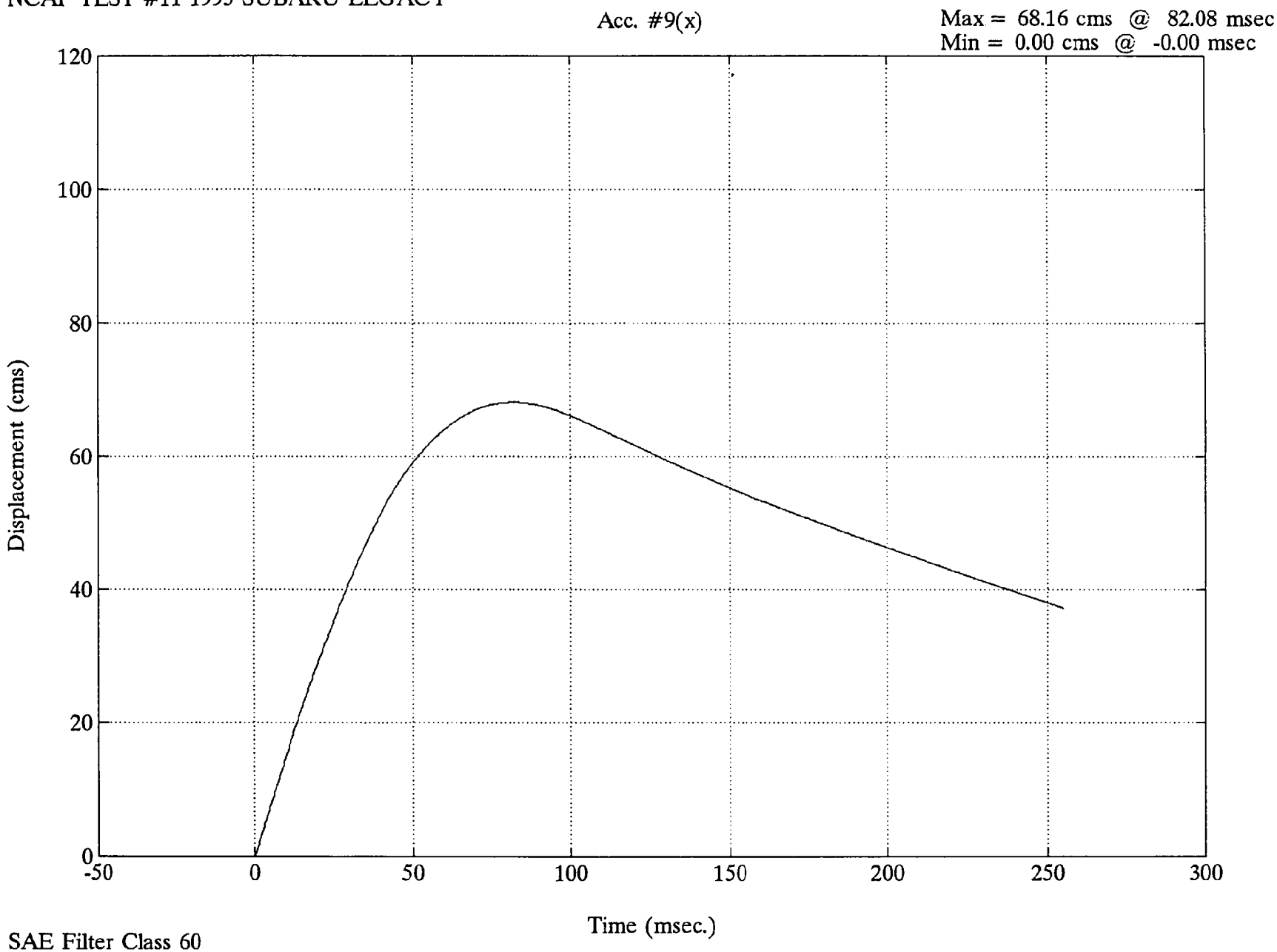
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

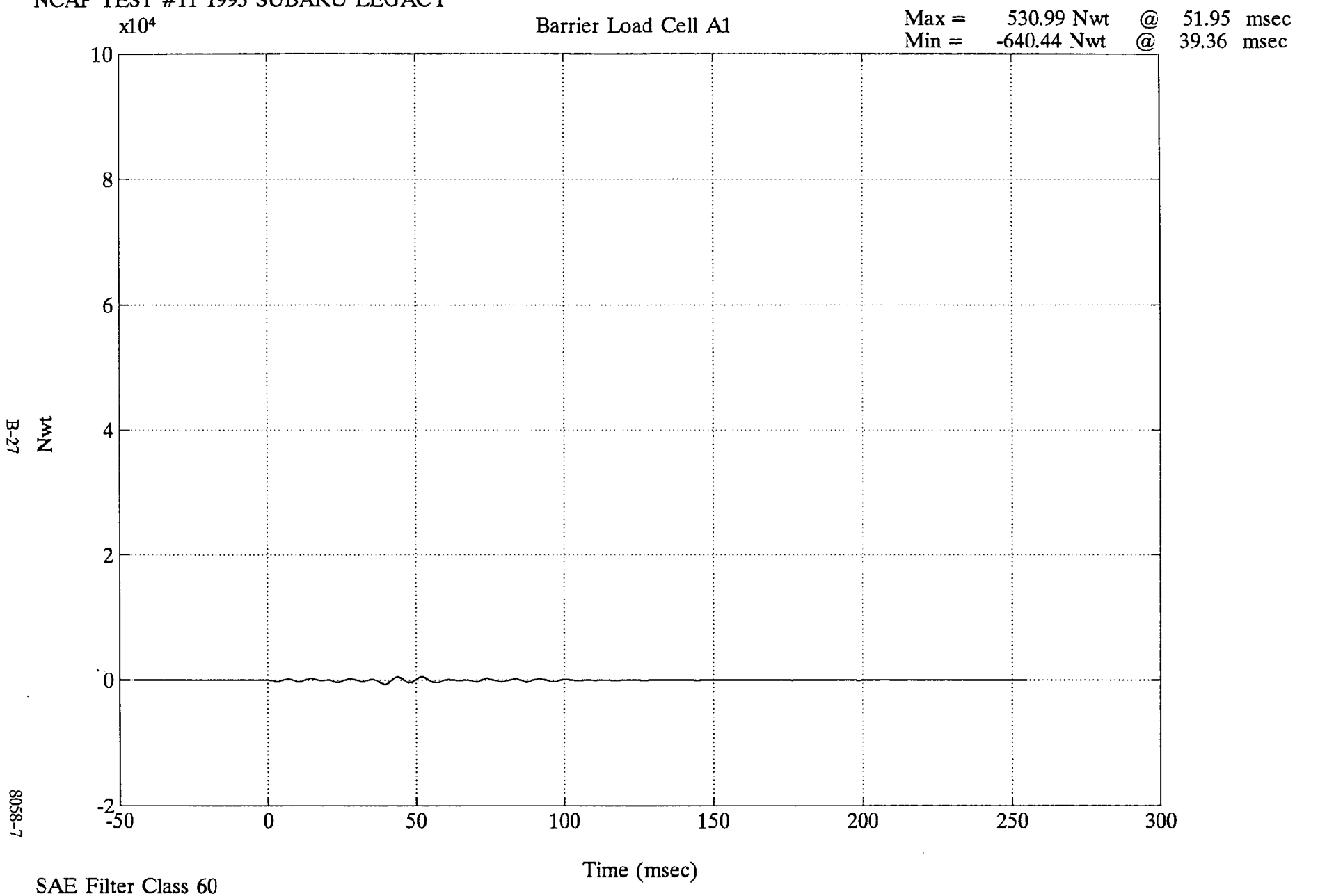
TEST NO. MP5500

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

60

NCAP TEST #11 1993 SUBARU LEGACY

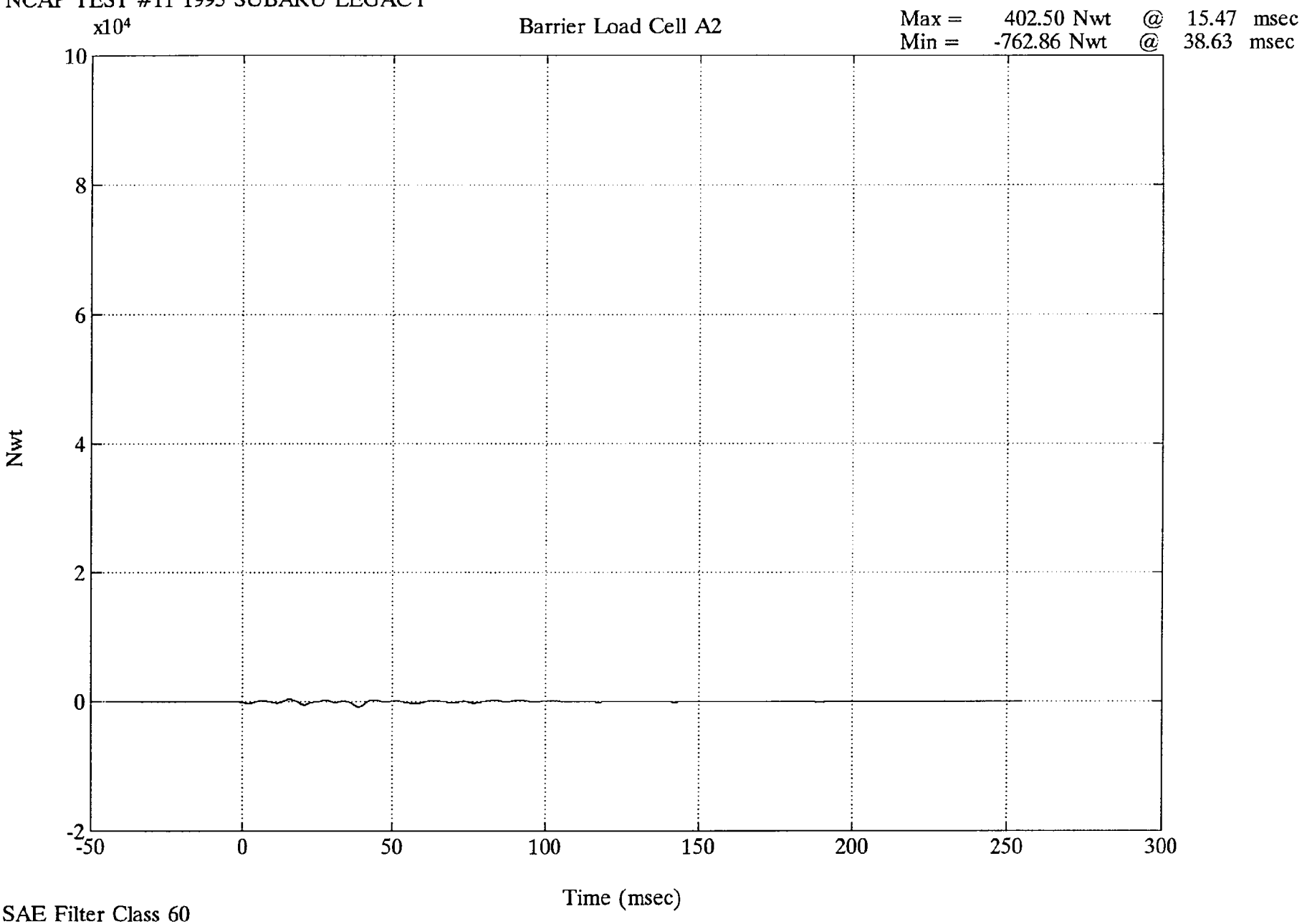


SAE Filter Class 60

B-27

8058-7

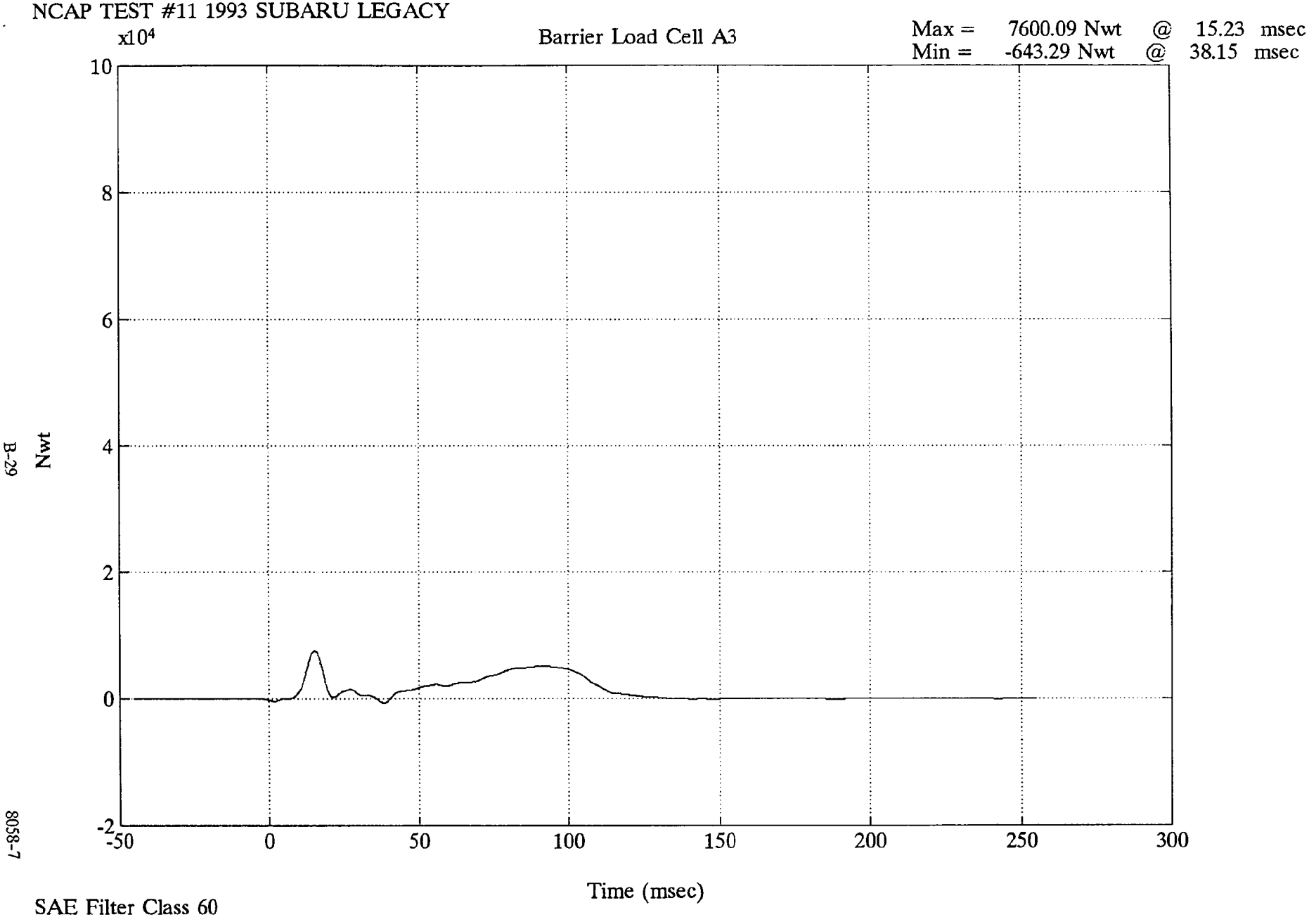
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

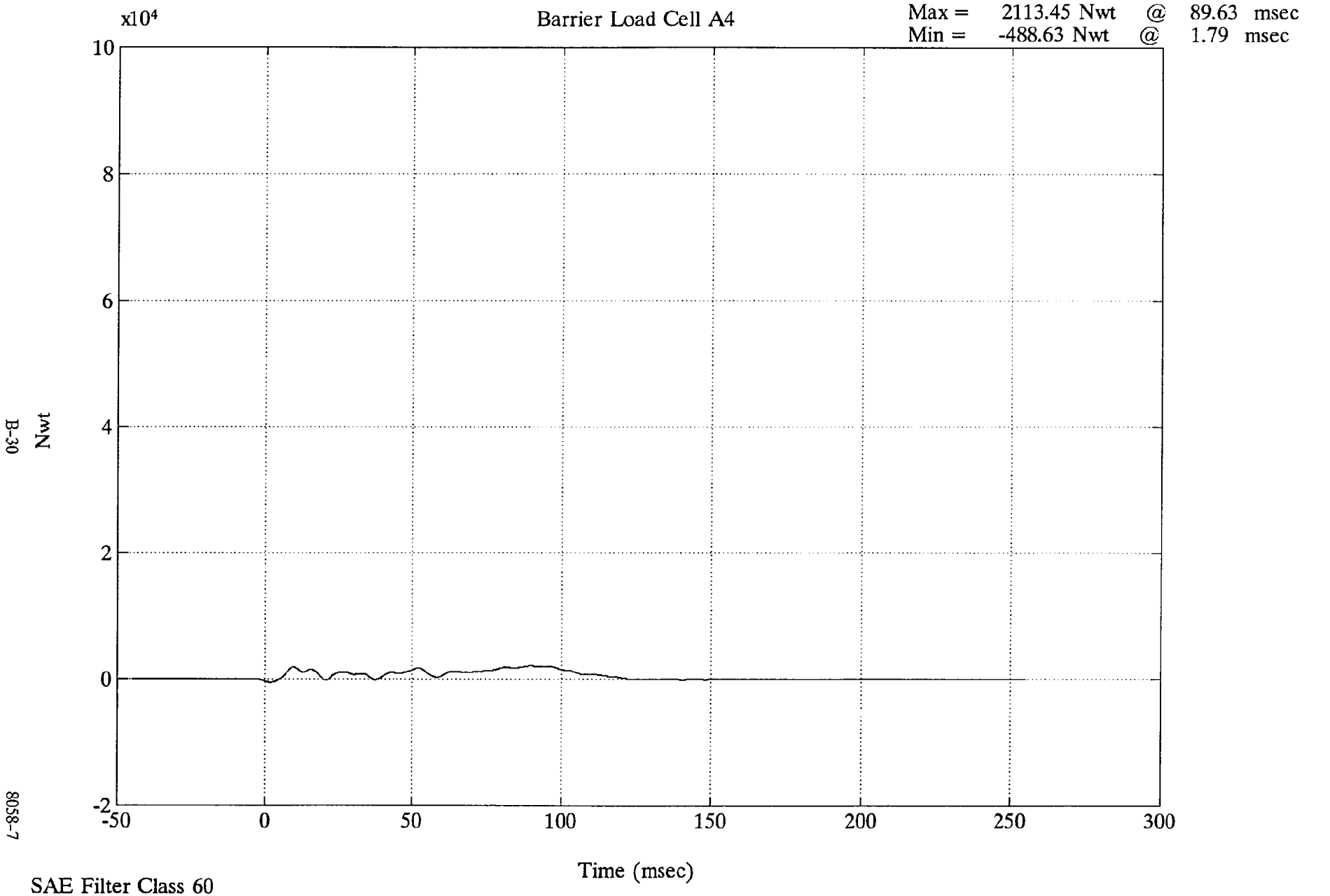


B-29

8058-7

SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

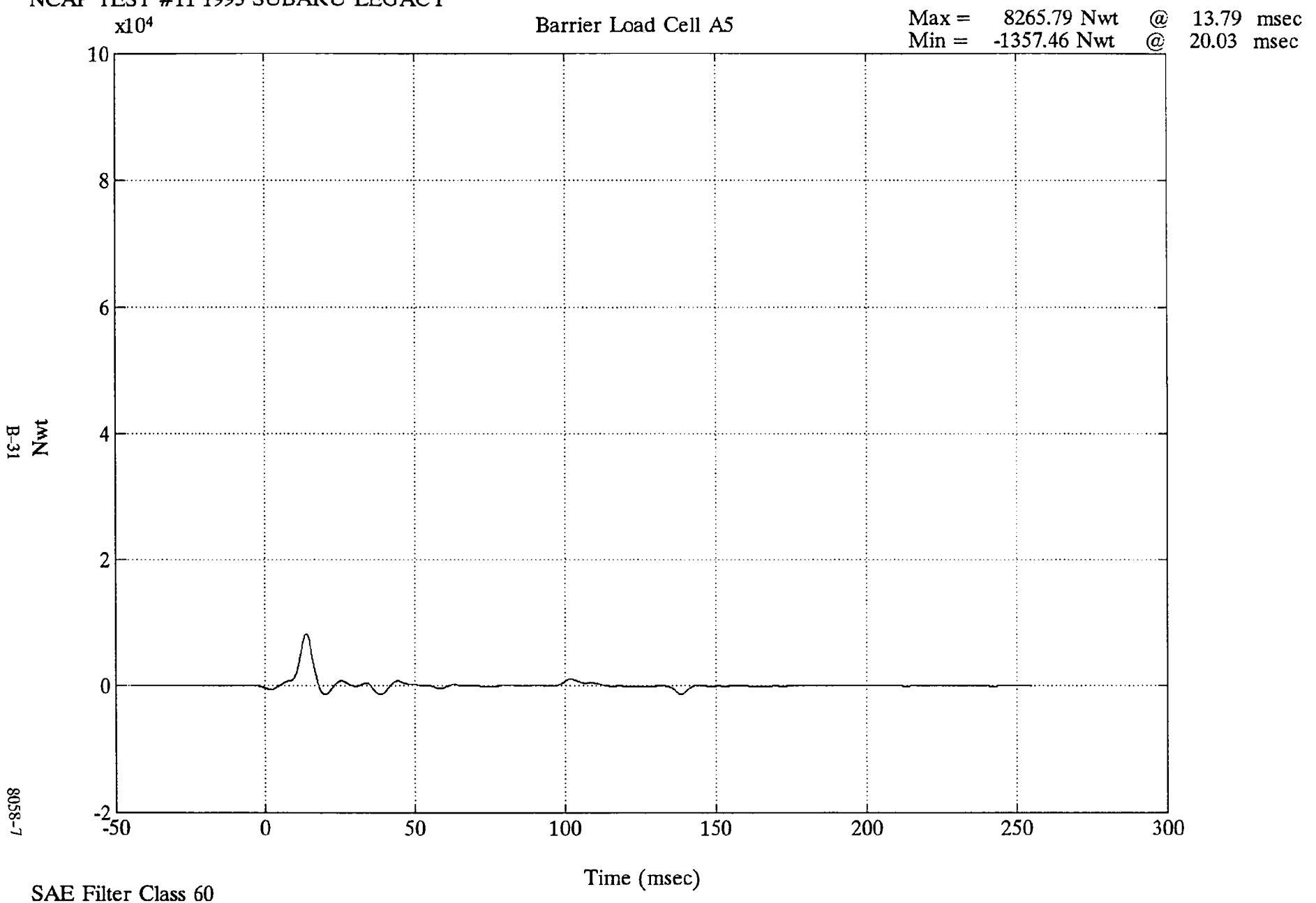


SAE Filter Class 60

B-30

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

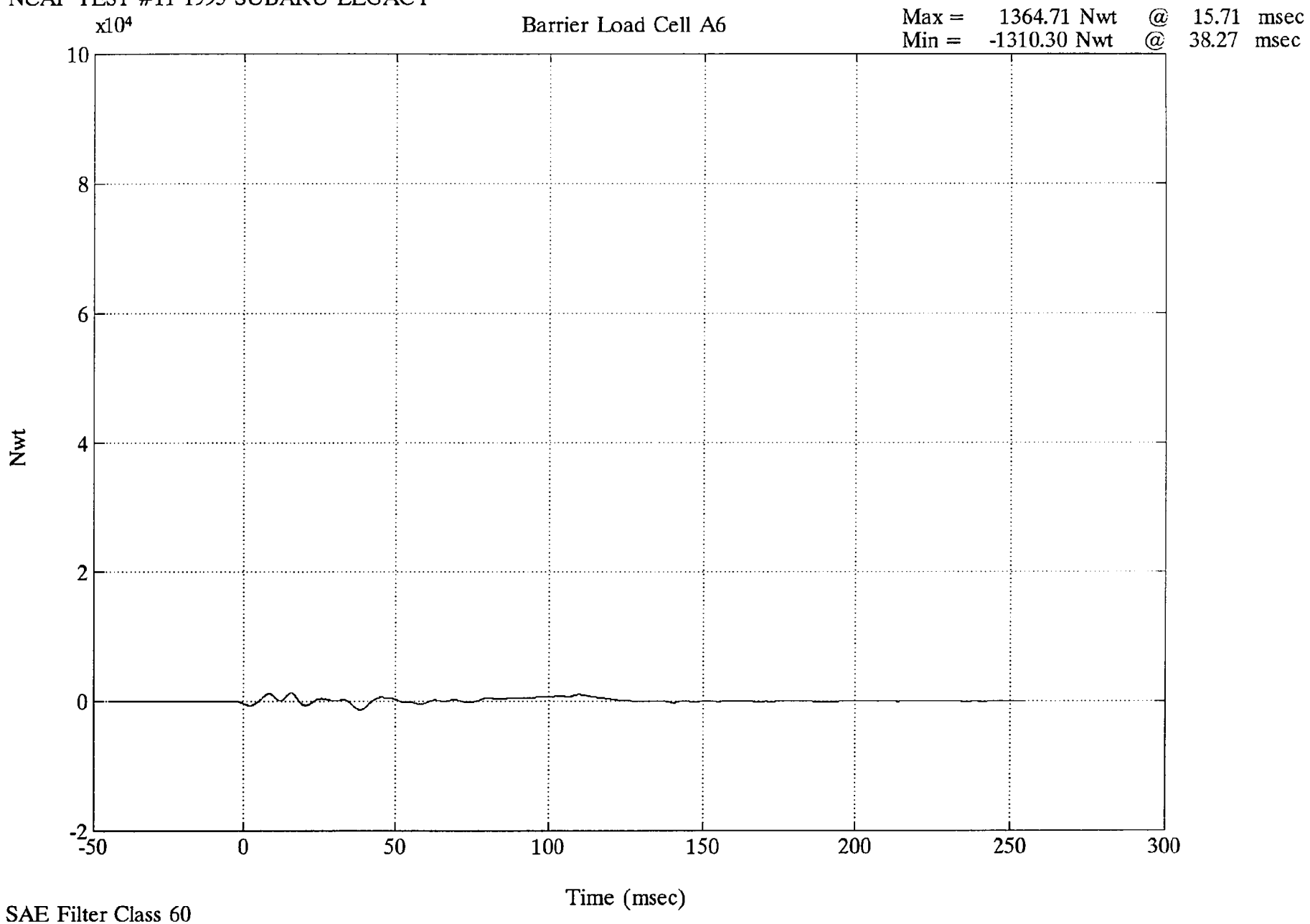


B-31

8058-7

SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

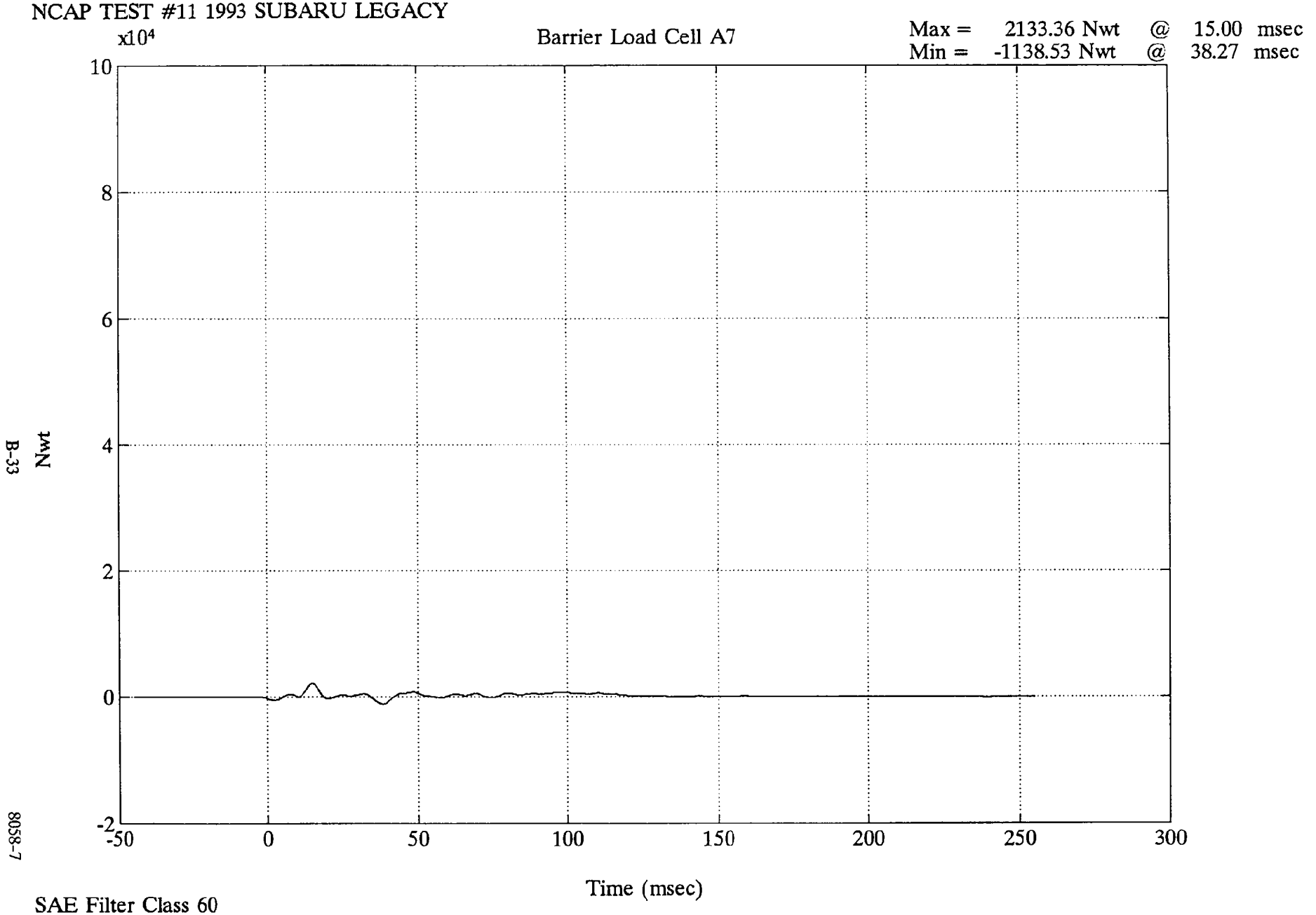


SAE Filter Class 60

B-32

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

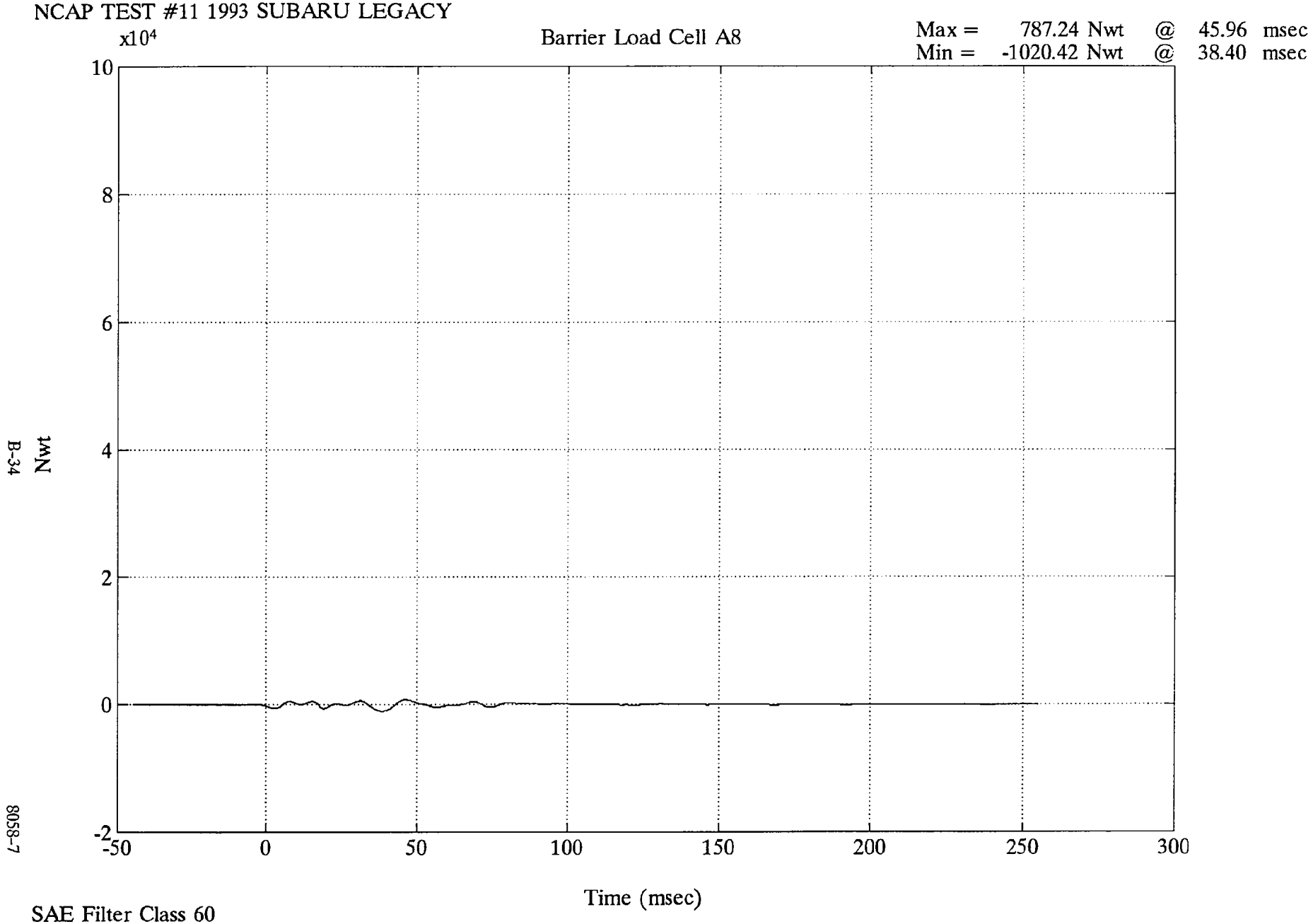


B-33

8058-7

SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

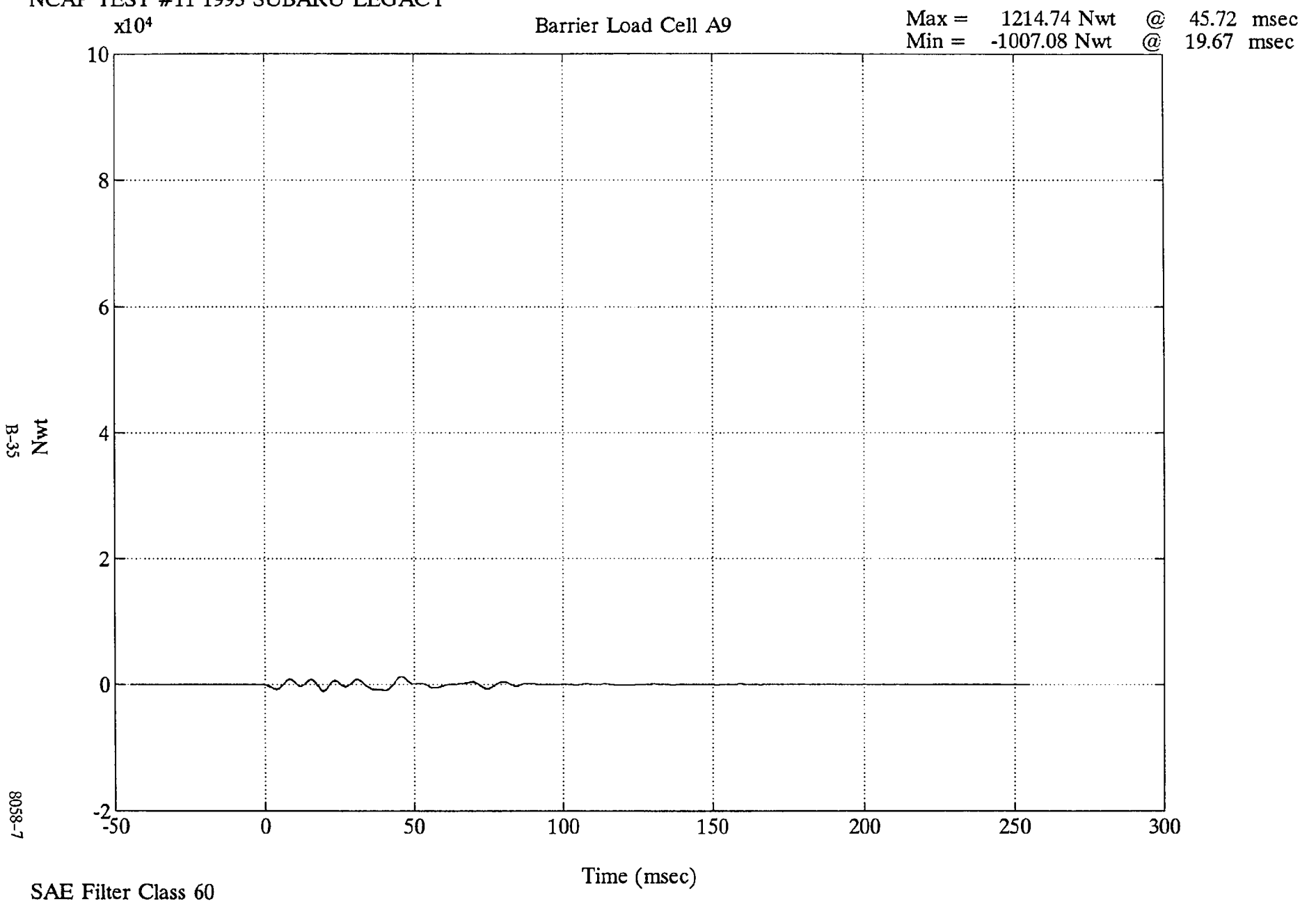


B-34

8058-7

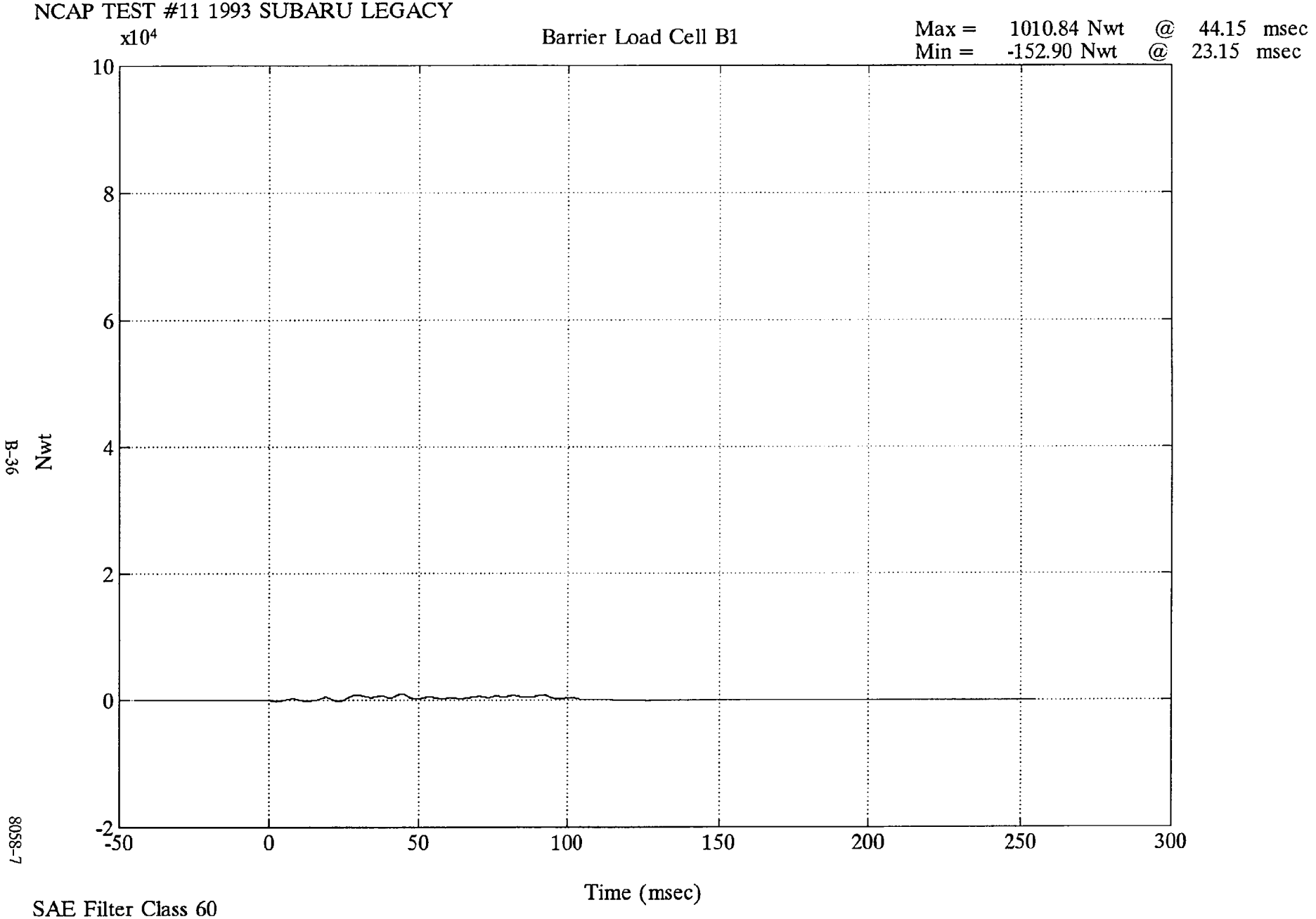
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



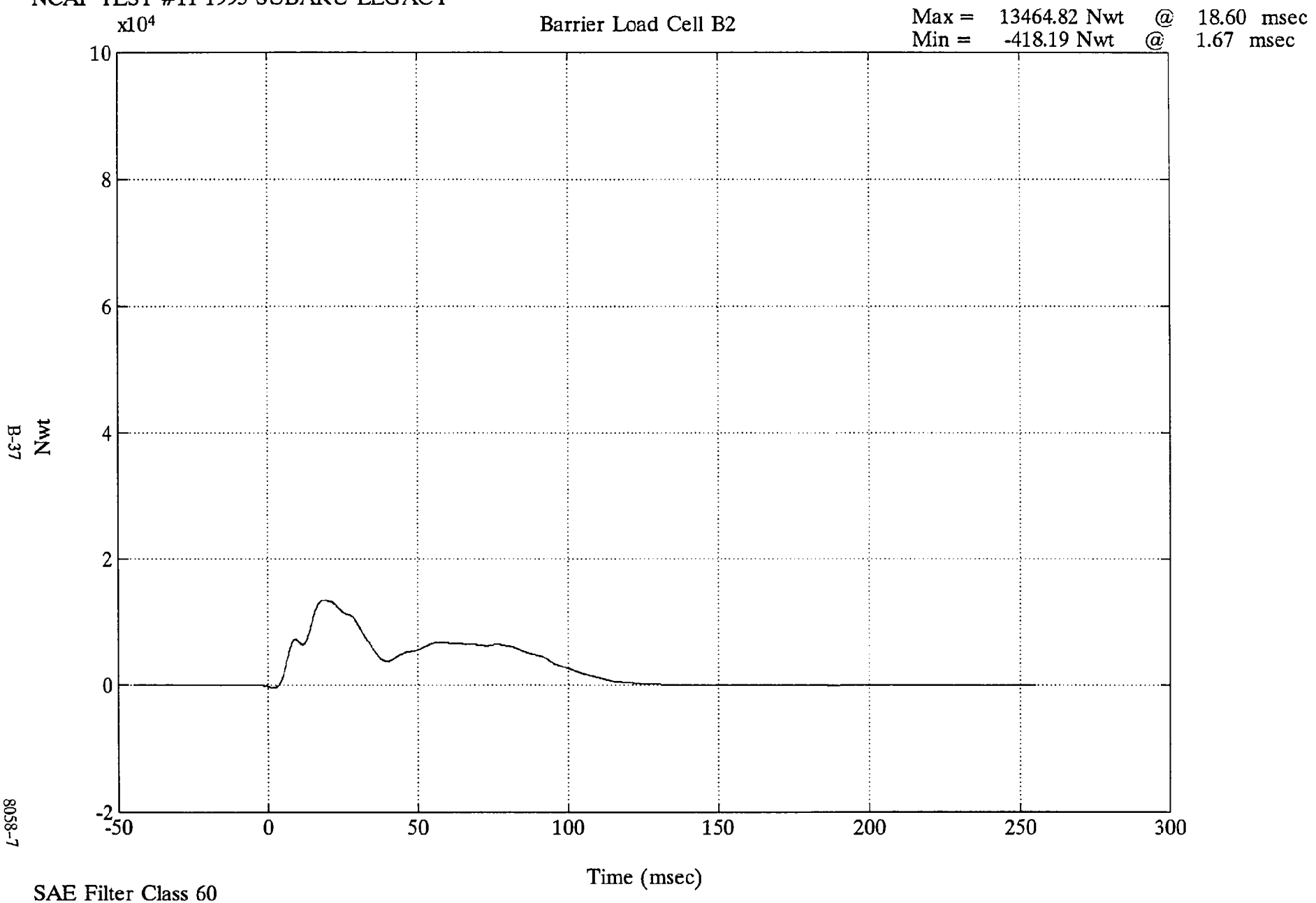
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

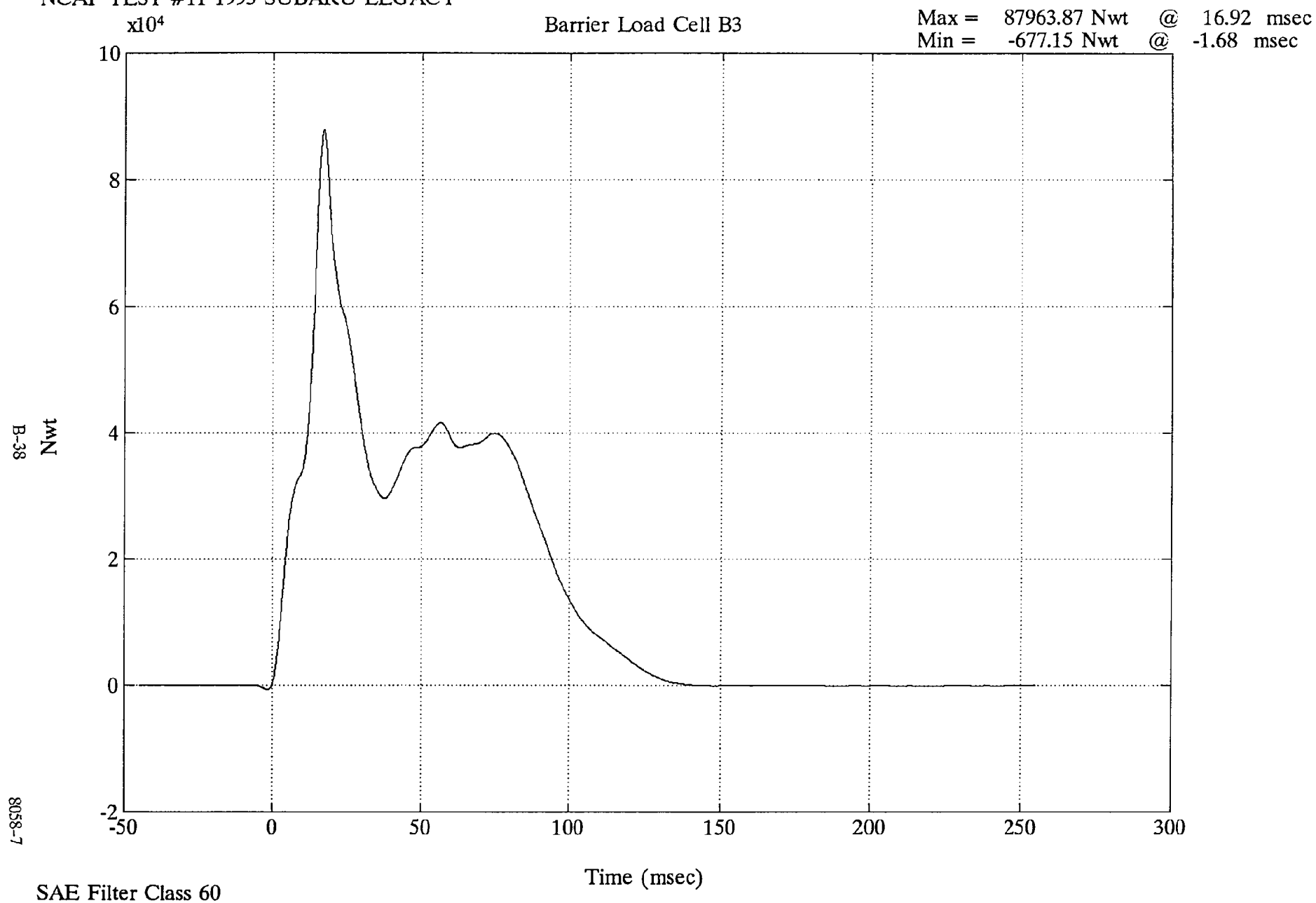


SAE Filter Class 60

B-37

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

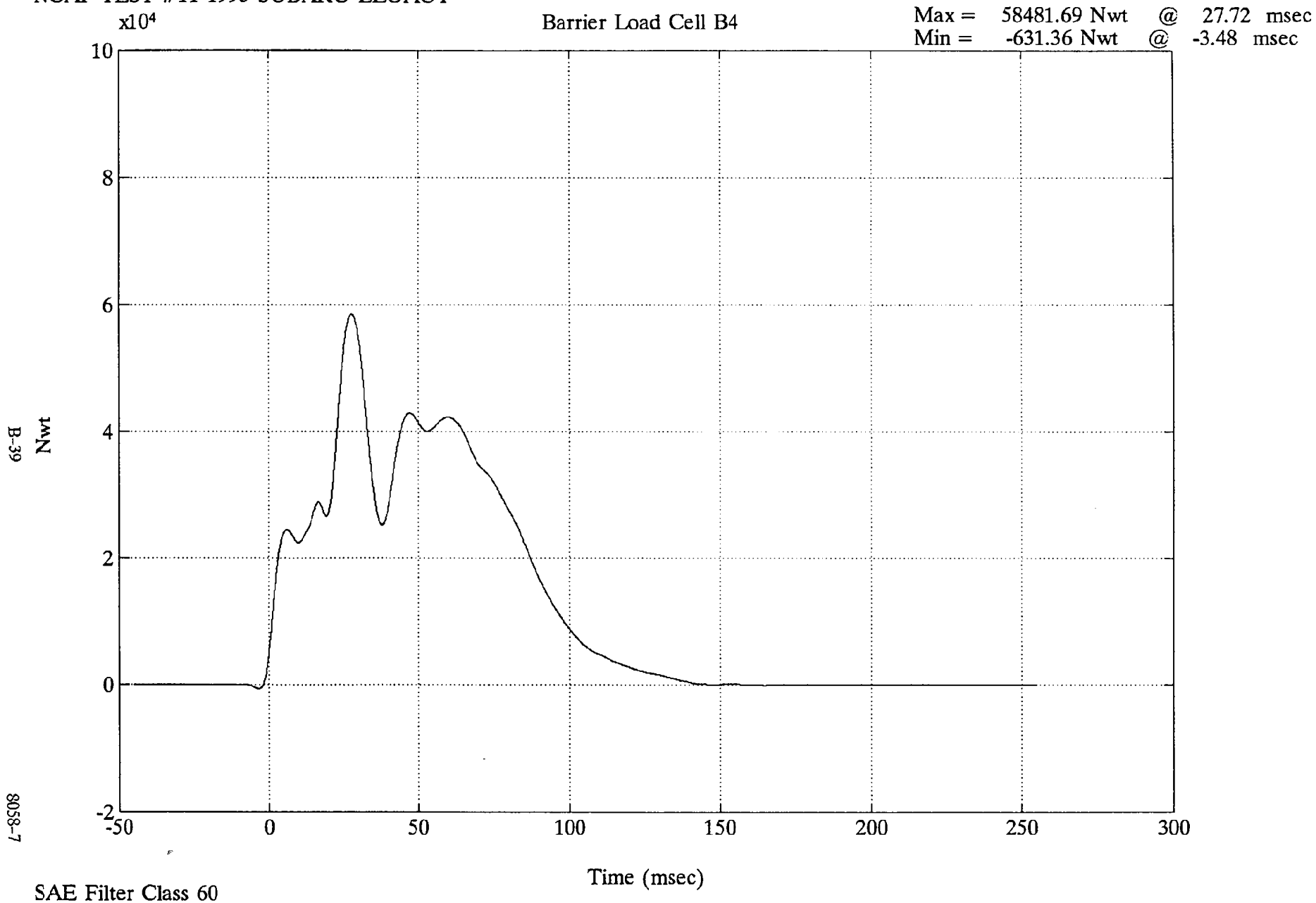


SAE Filter Class 60

B-38

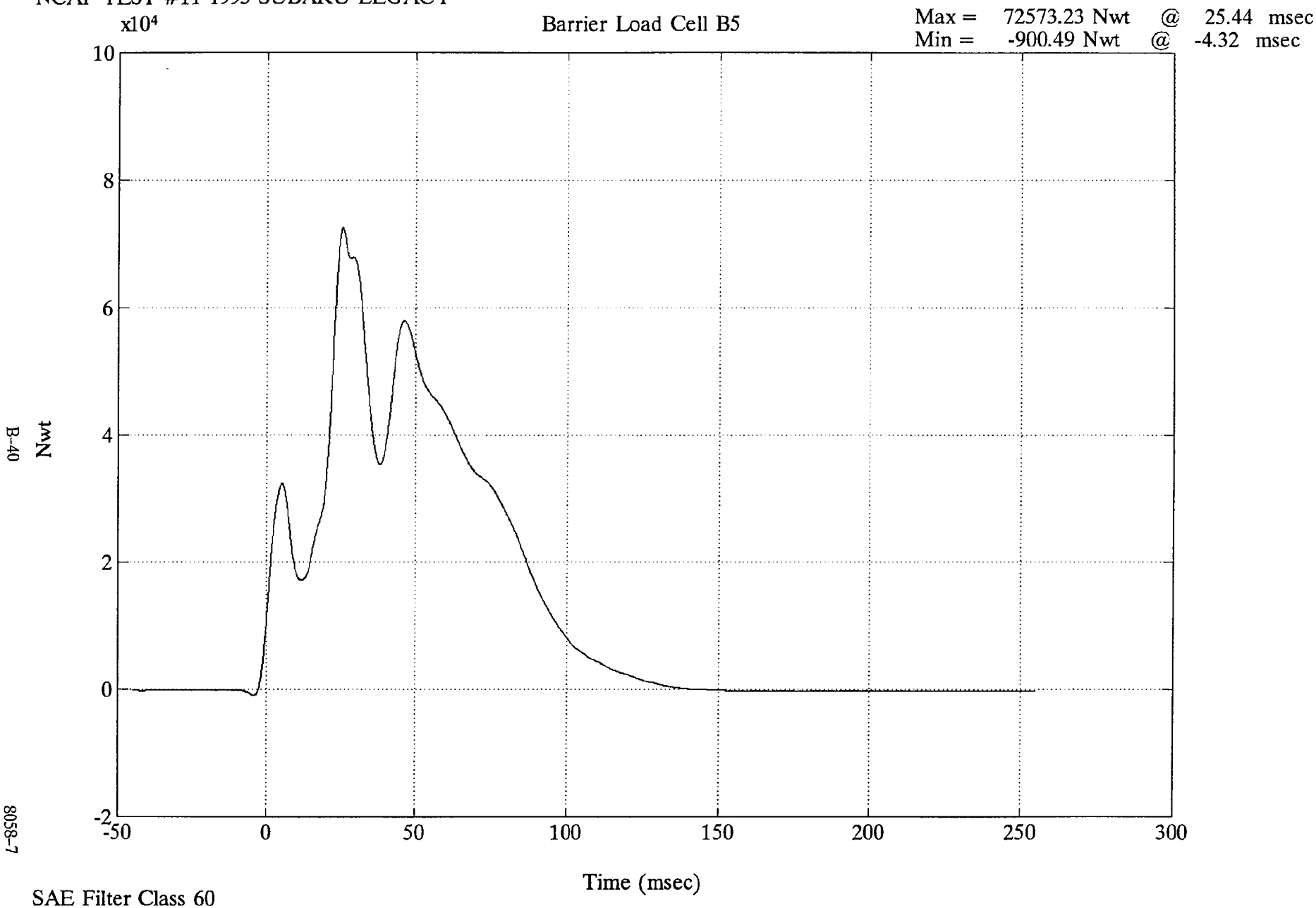
8058-7

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

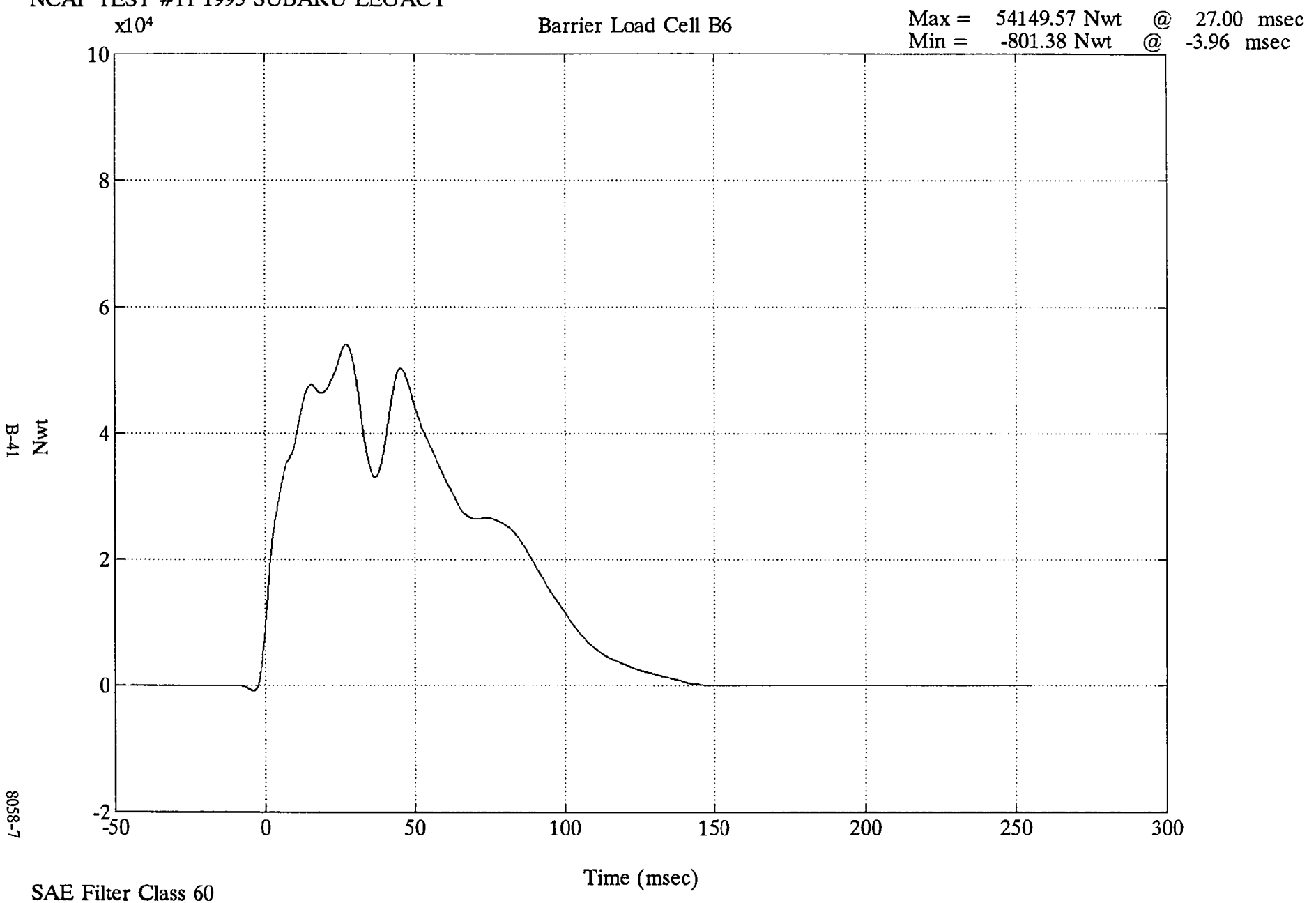
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

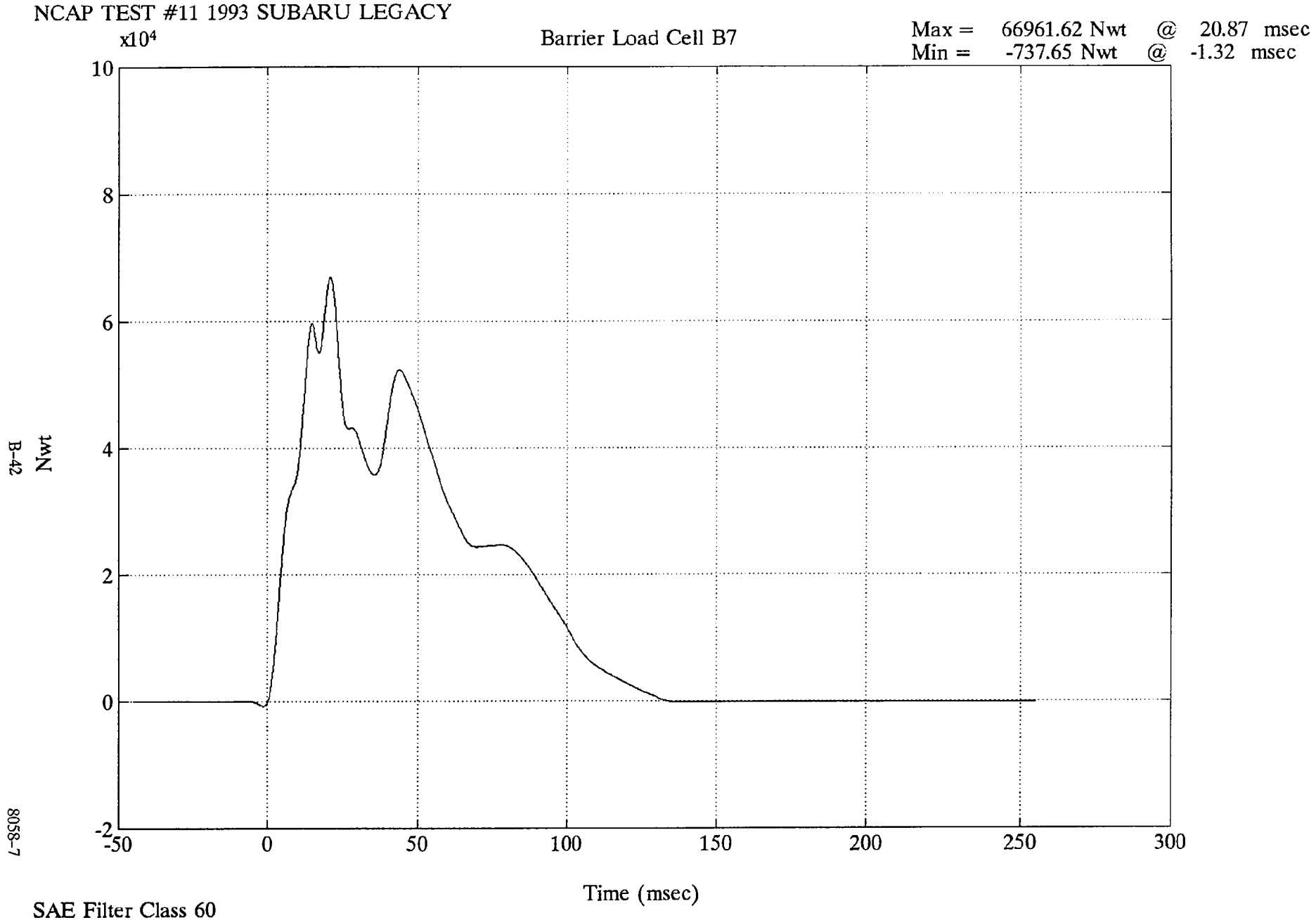
8058-7

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

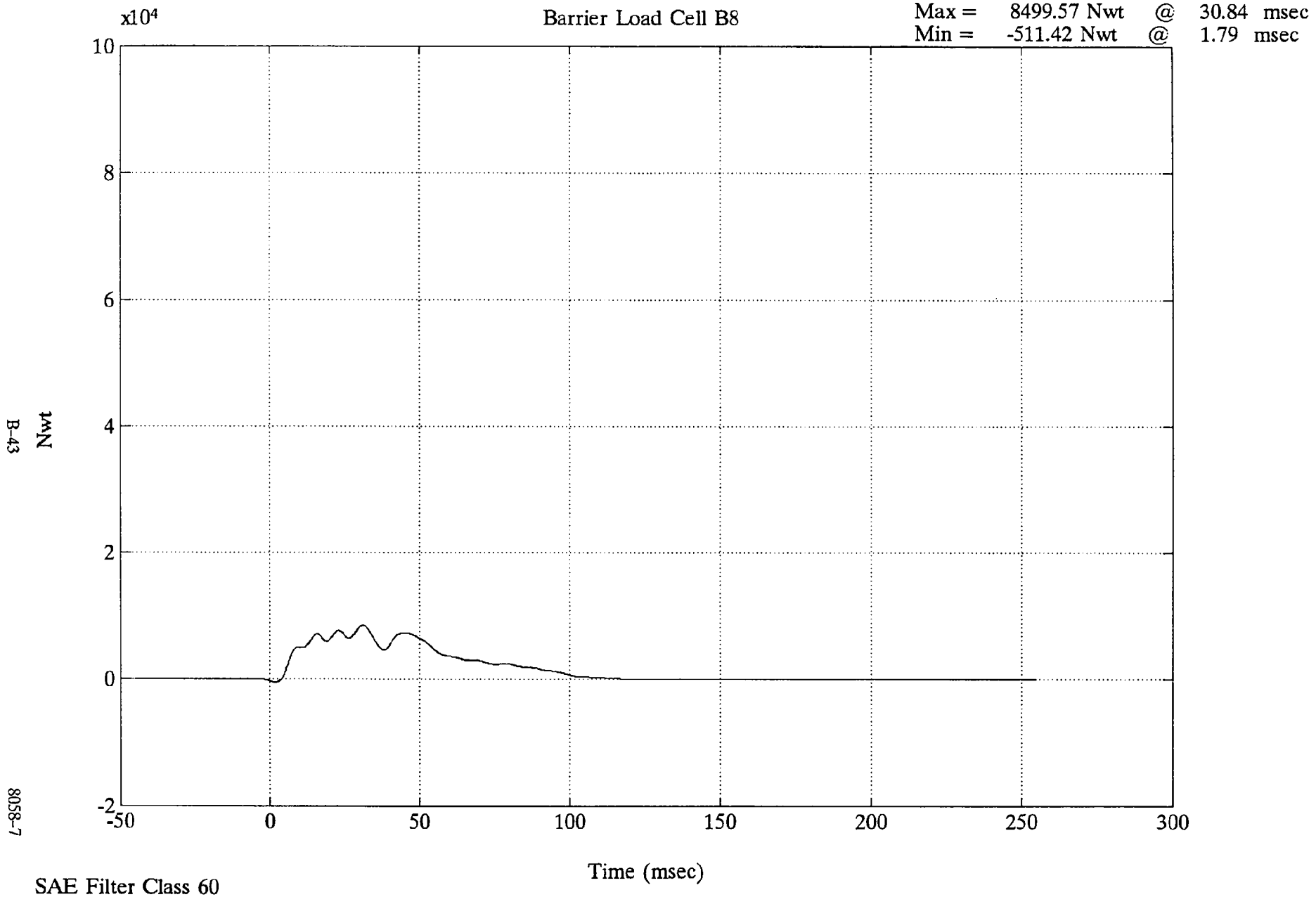
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

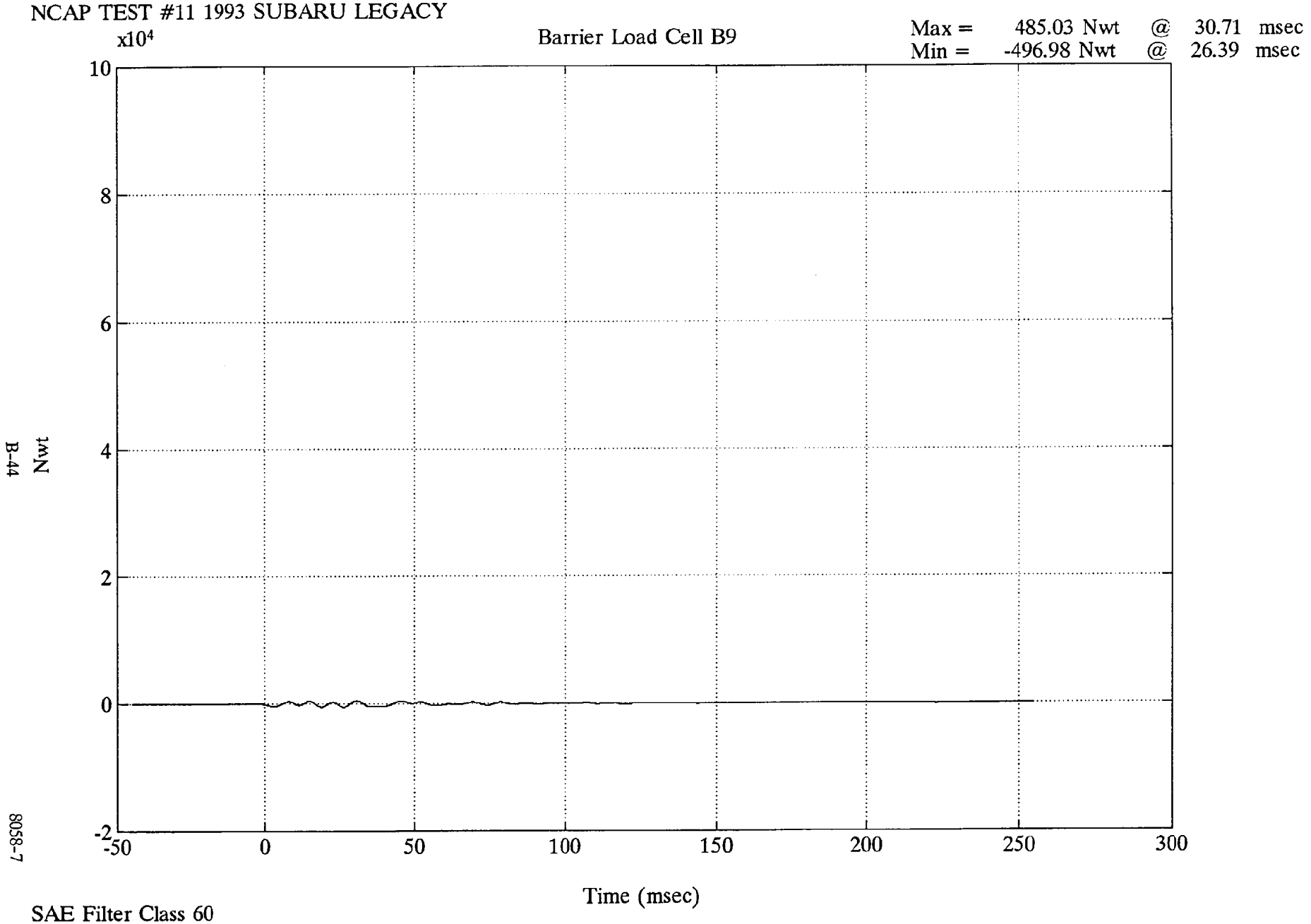


B-43

8058-7

SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

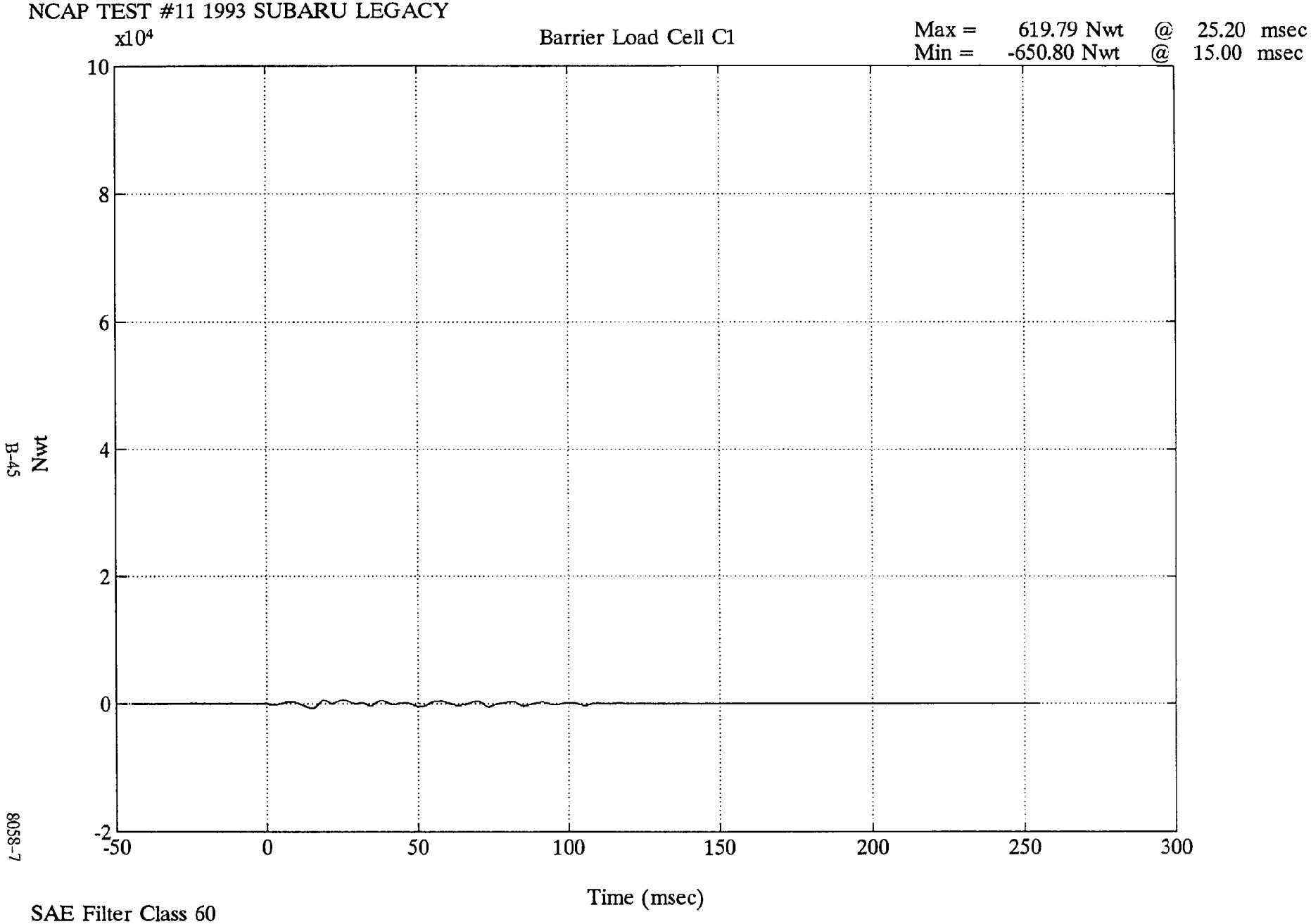


B-44

8058-7

SAE Filter Class 60

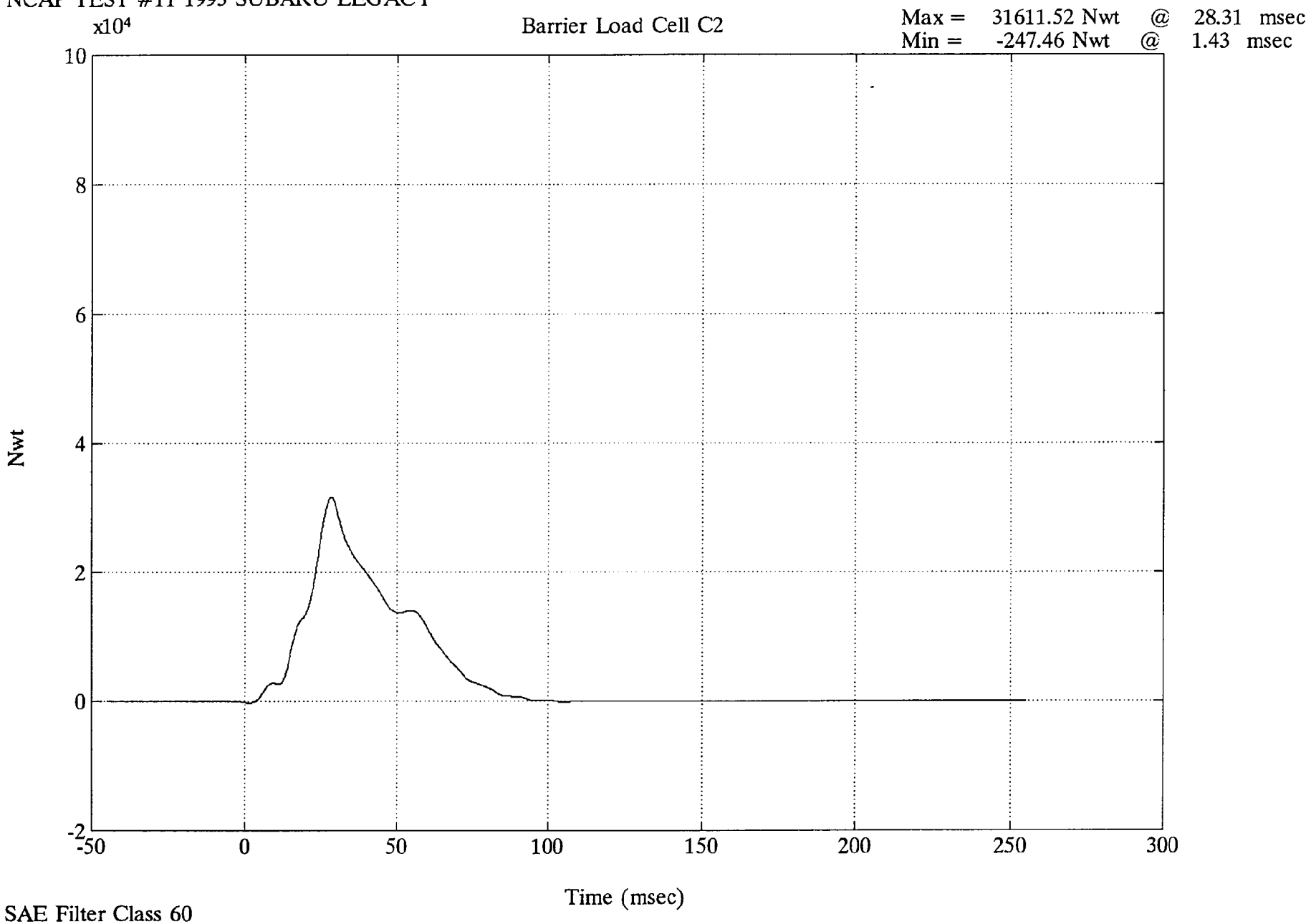
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

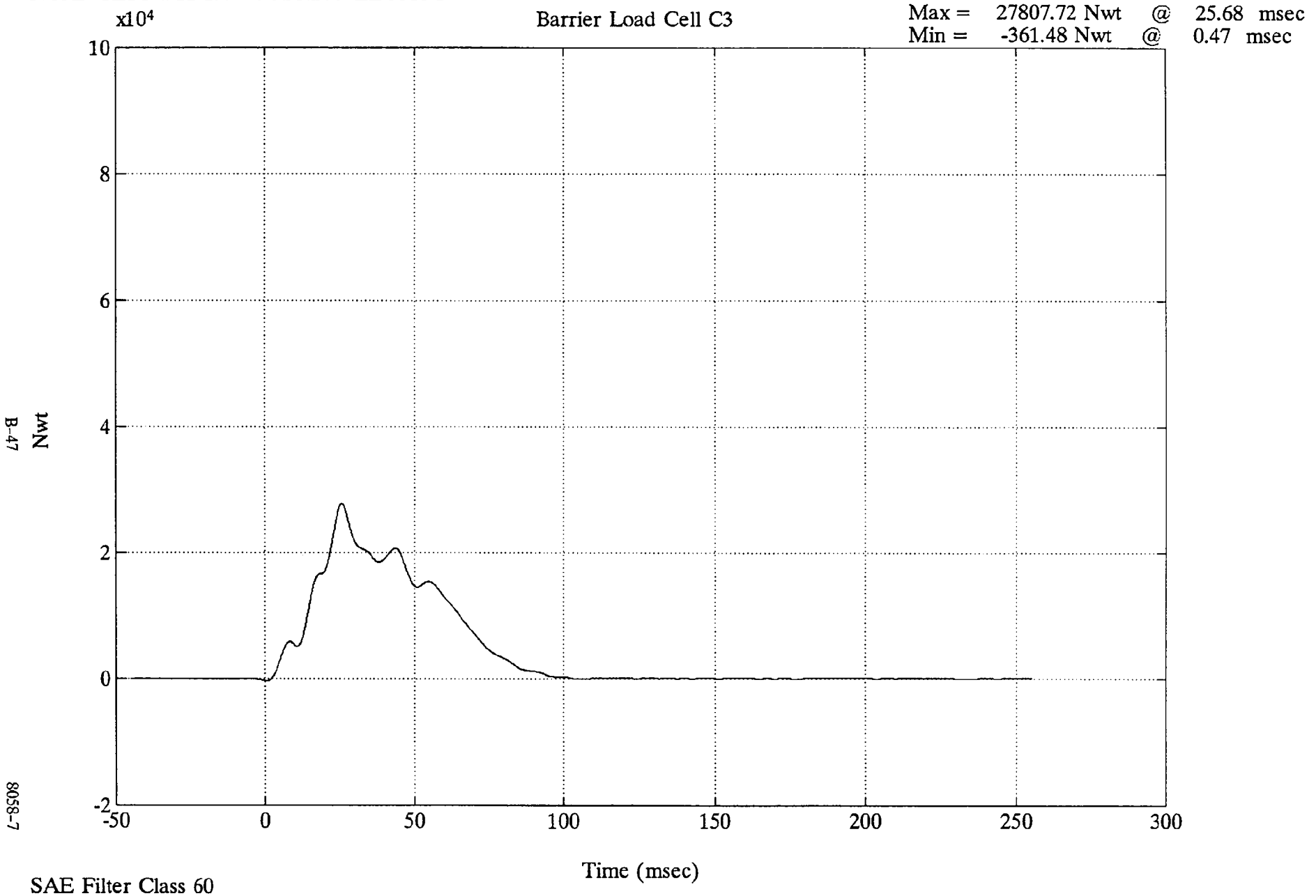
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

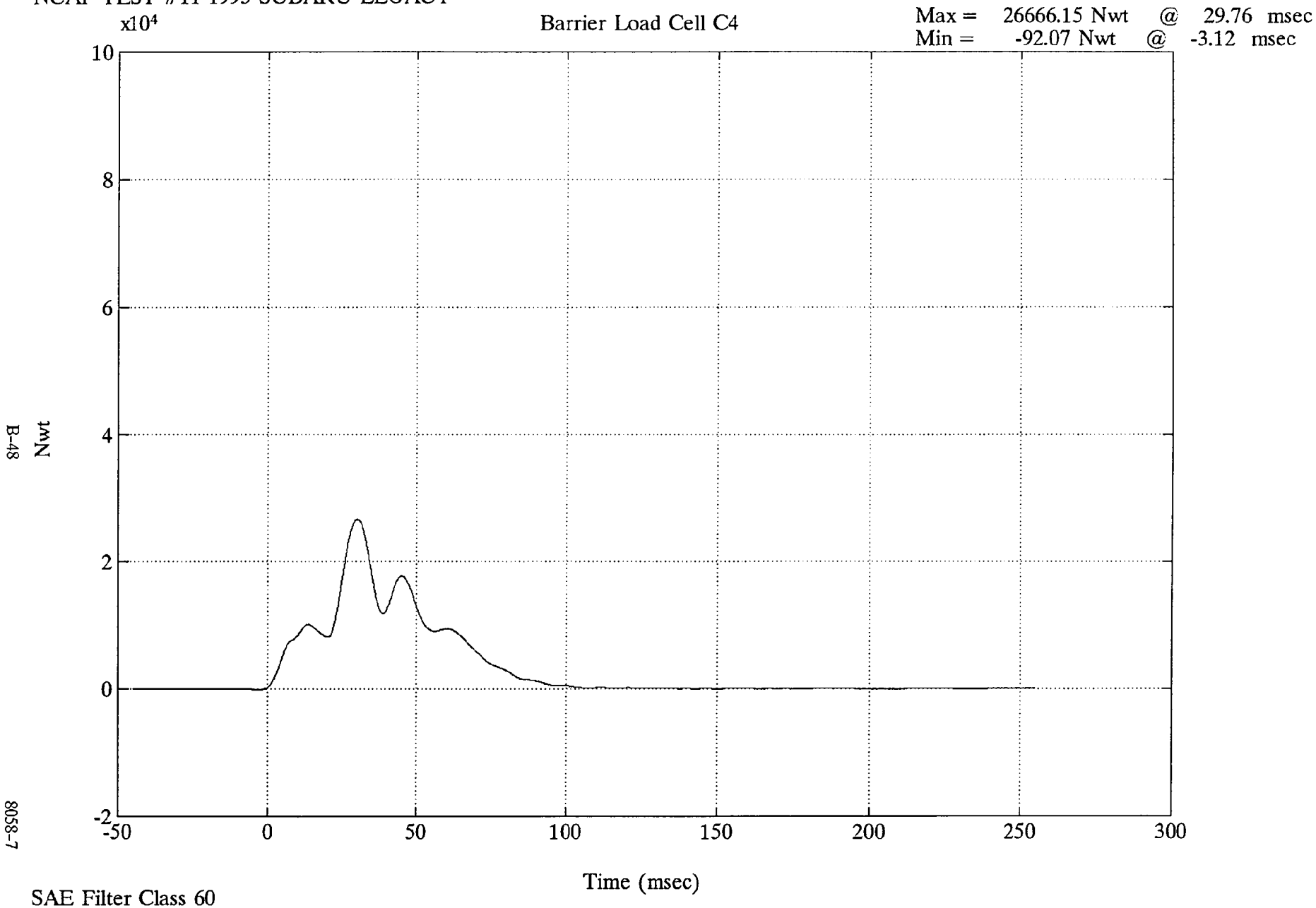
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

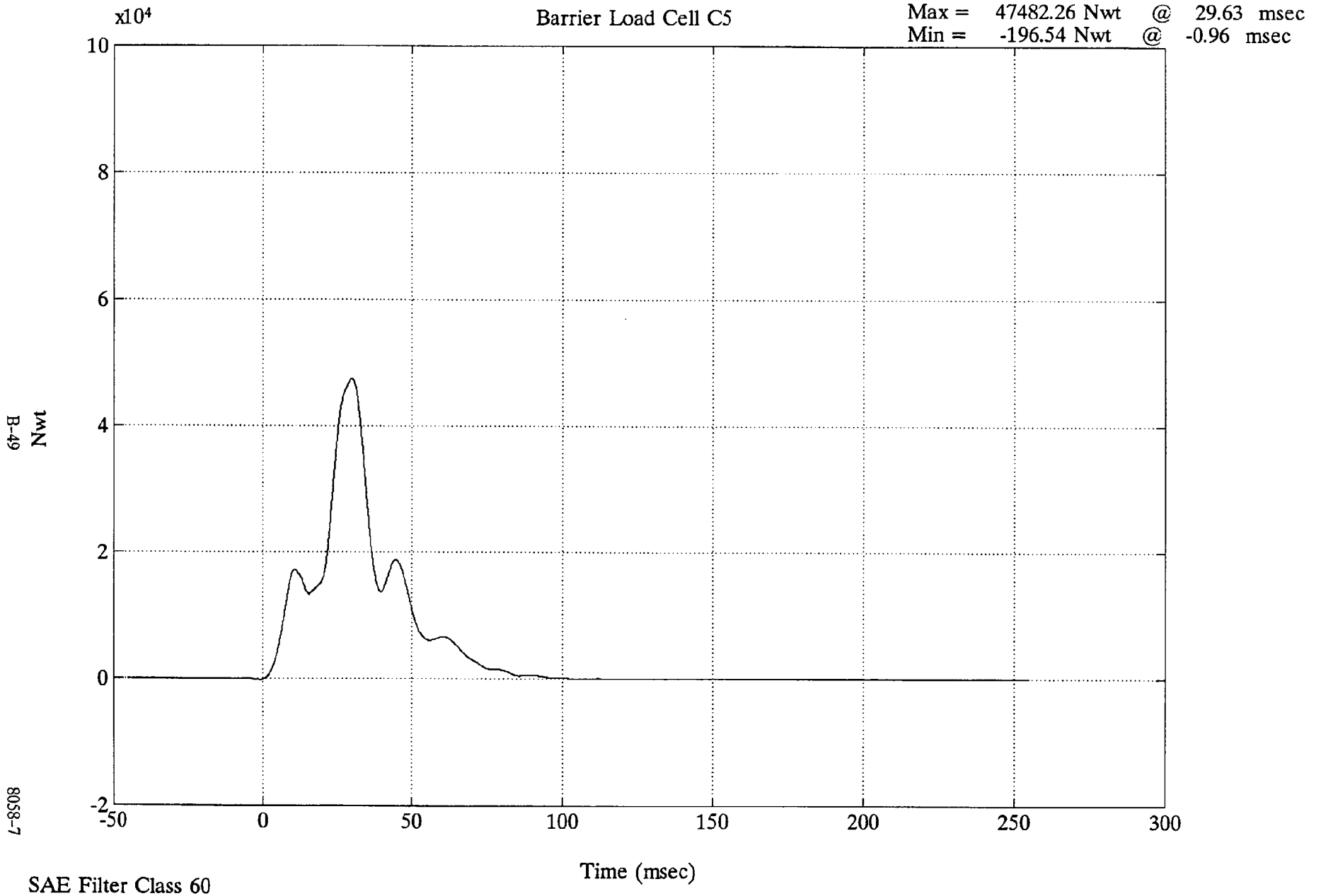
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

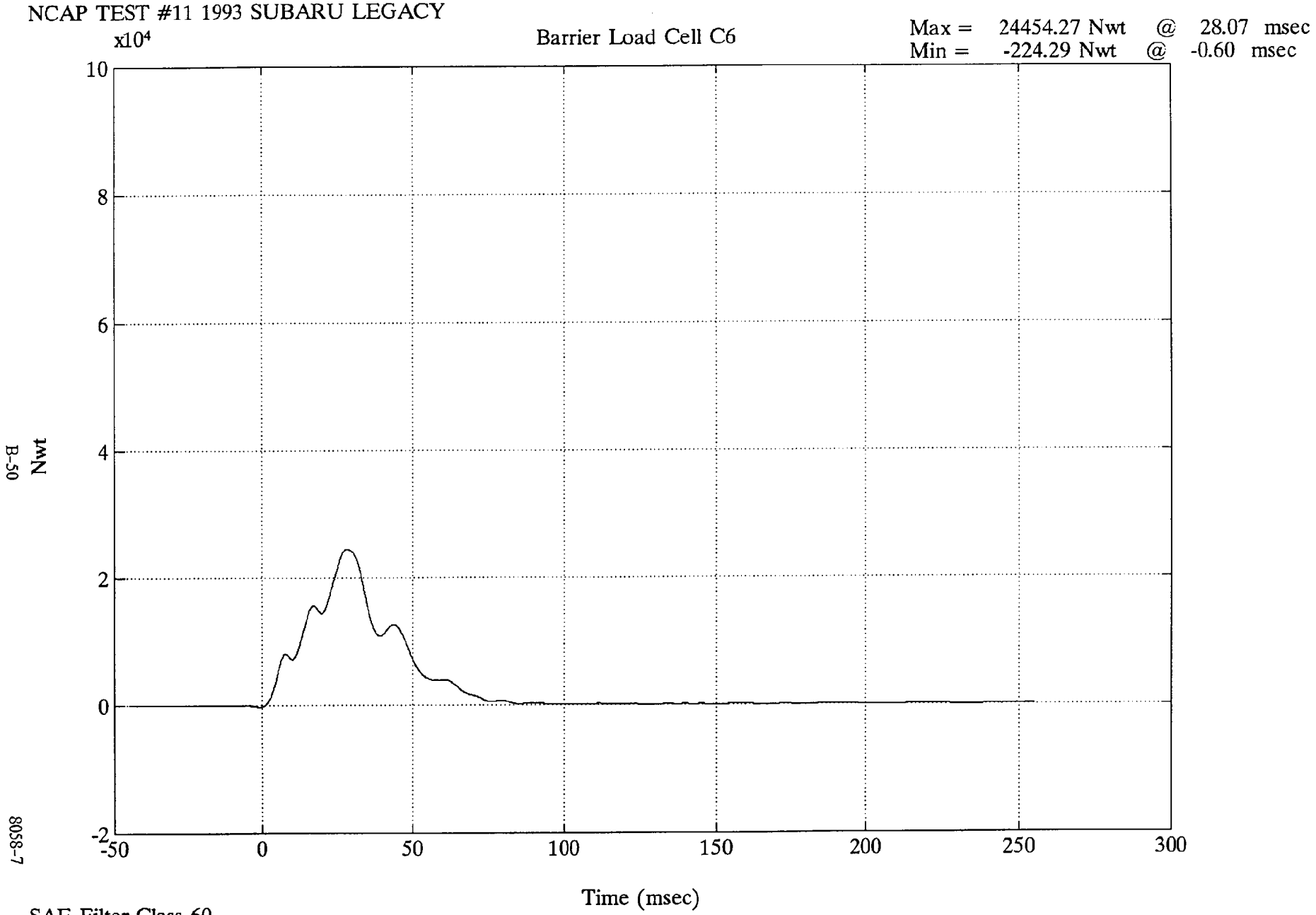


B-49

8058-7

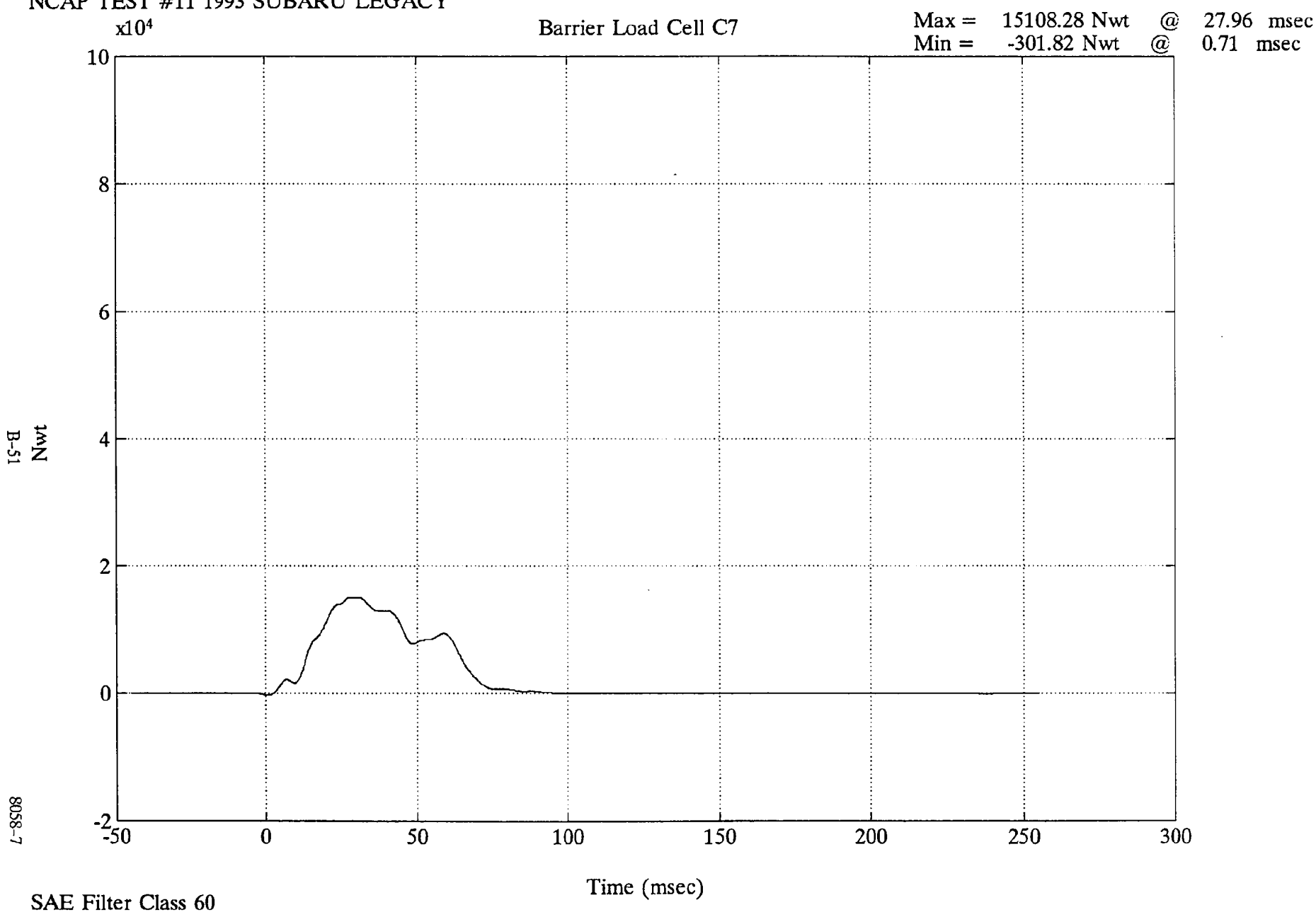
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



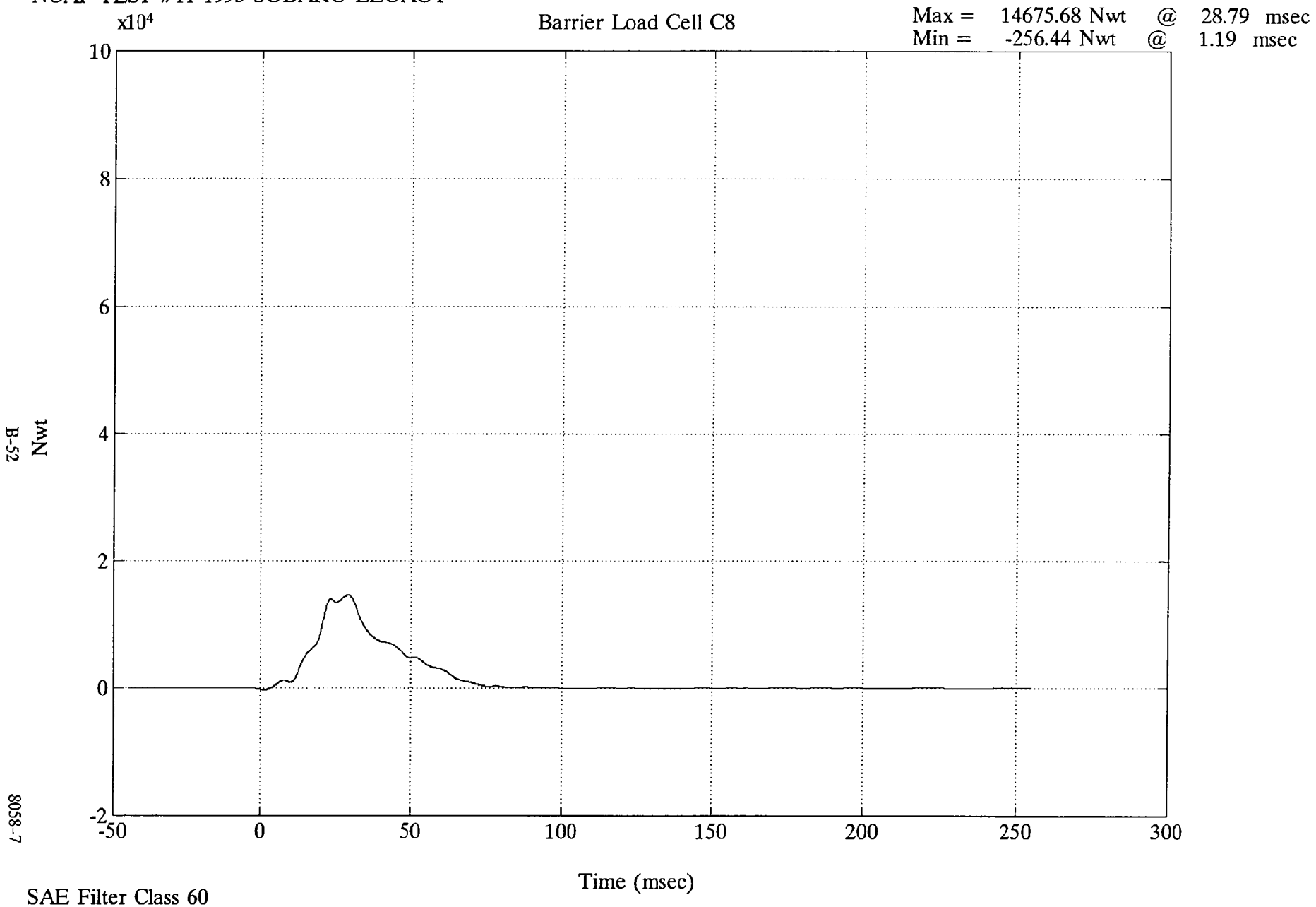
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

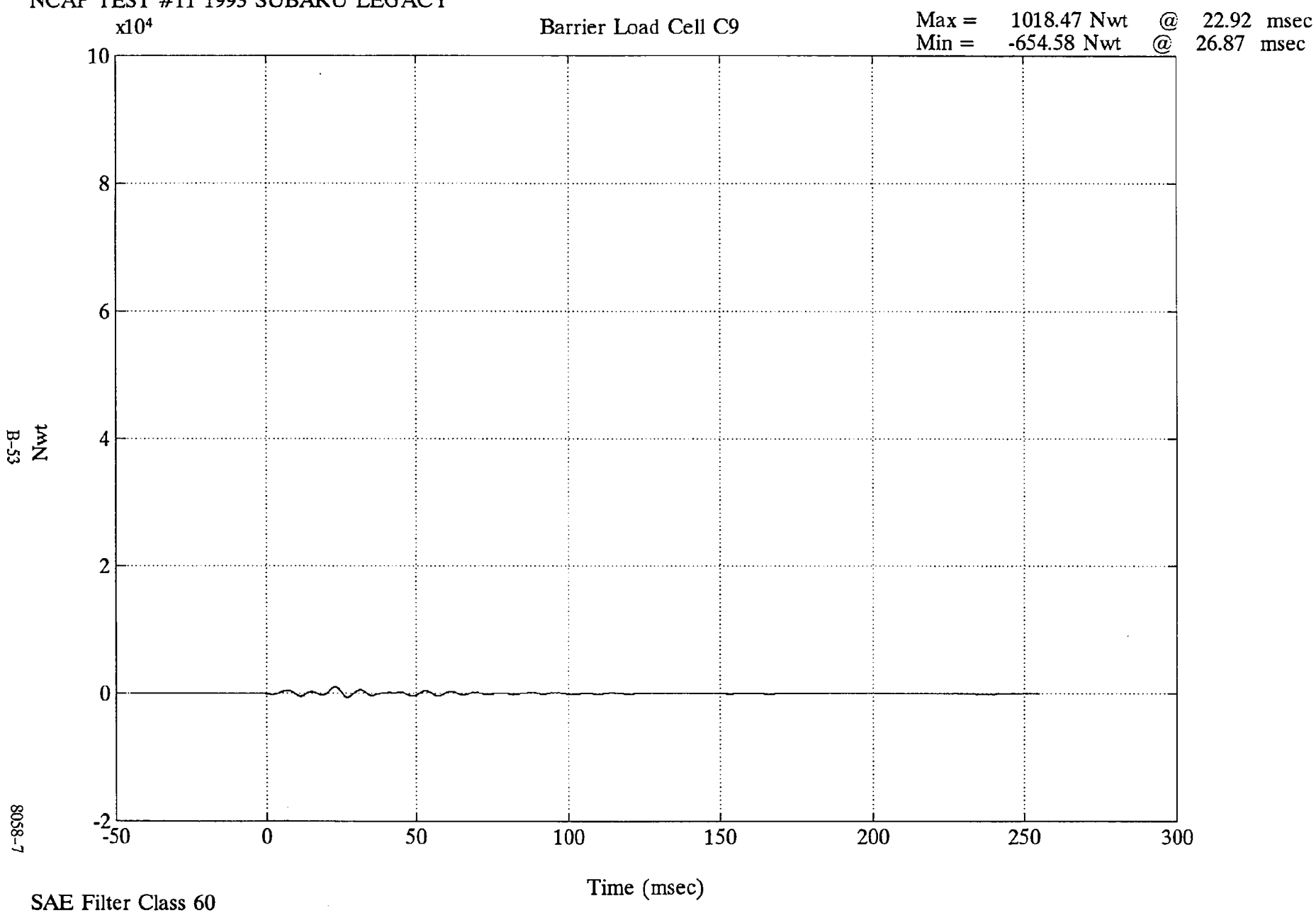


B-52

8058-7

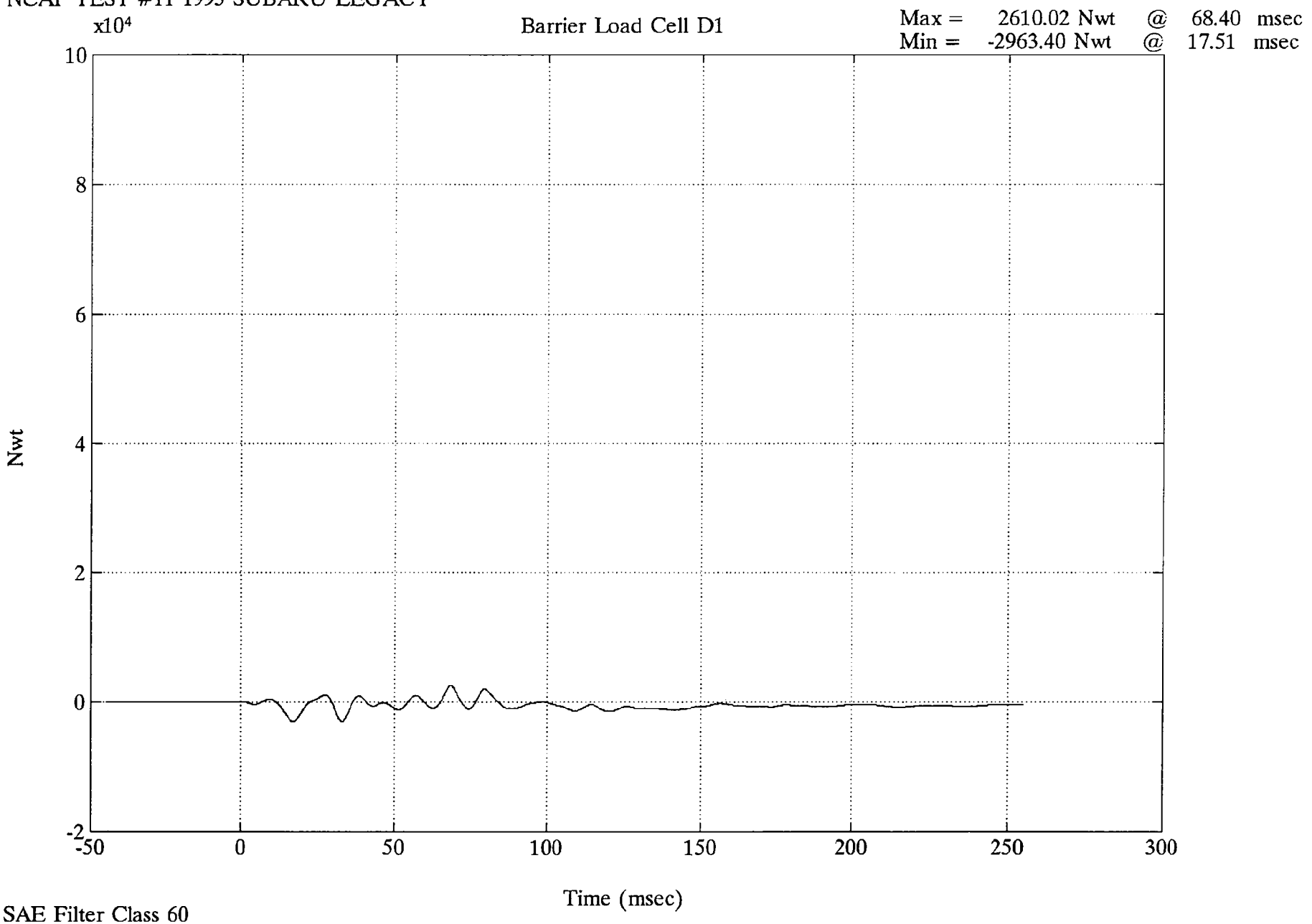
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

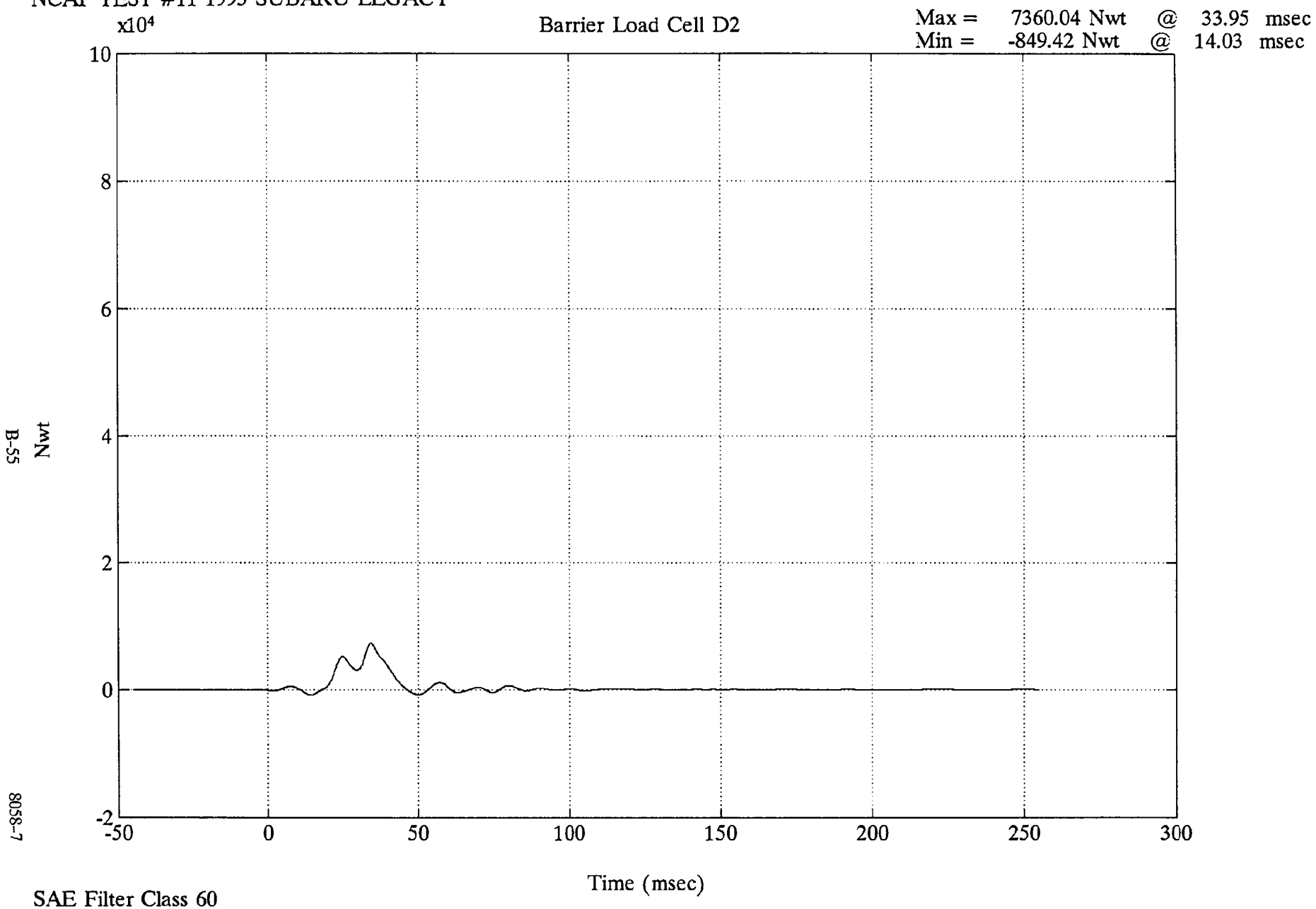
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

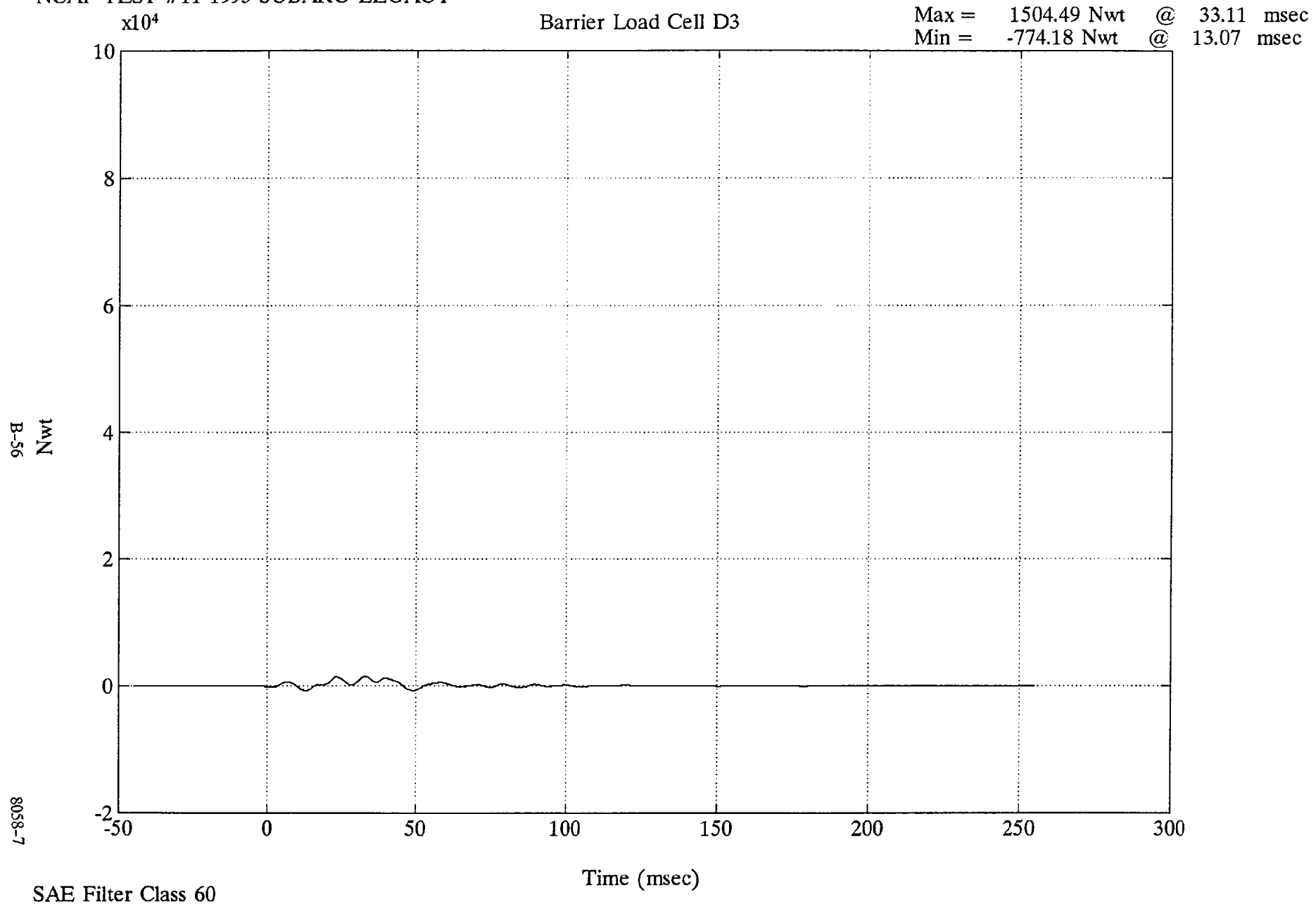


SAE Filter Class 60

B-55

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

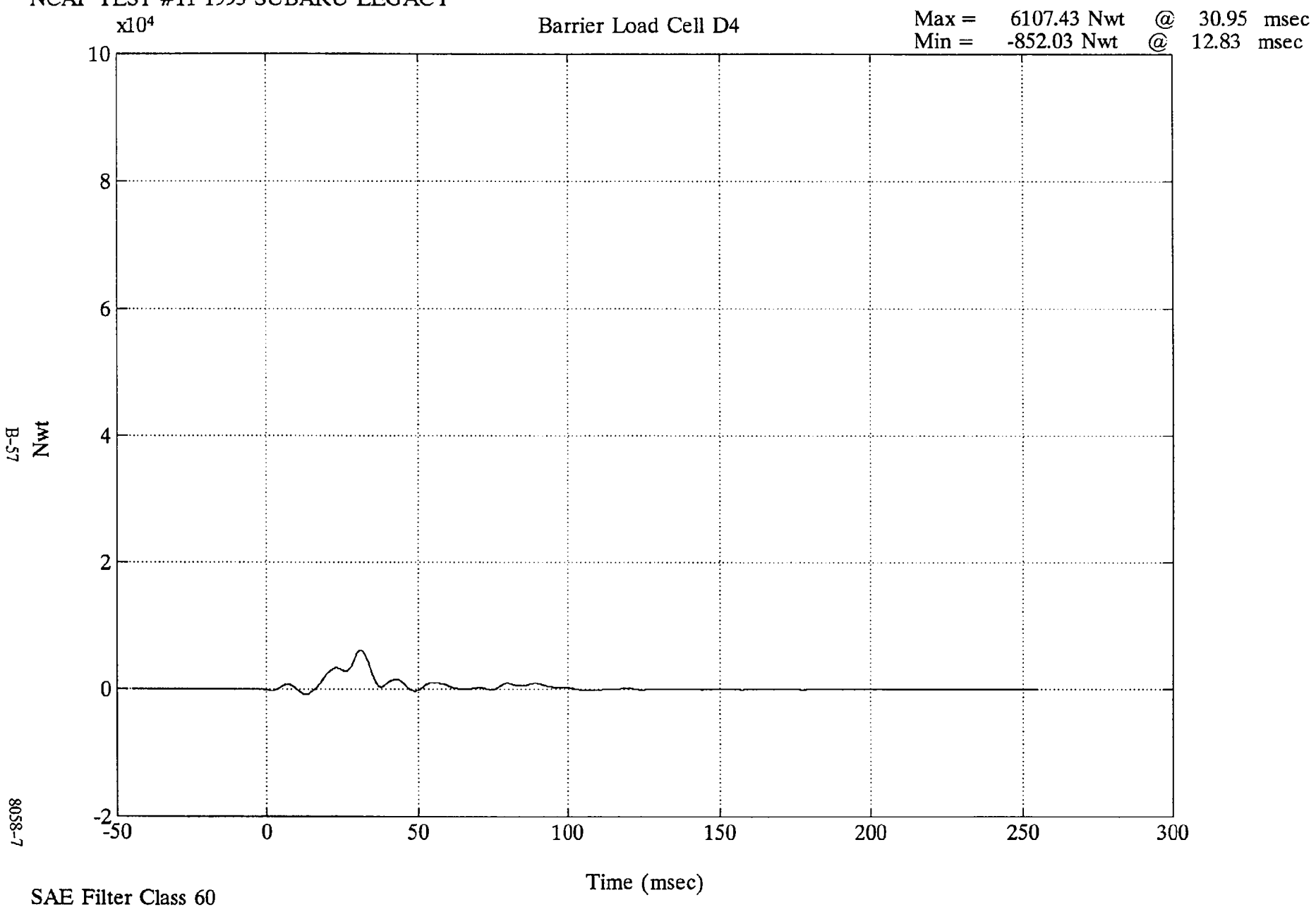


B-56

8058-7

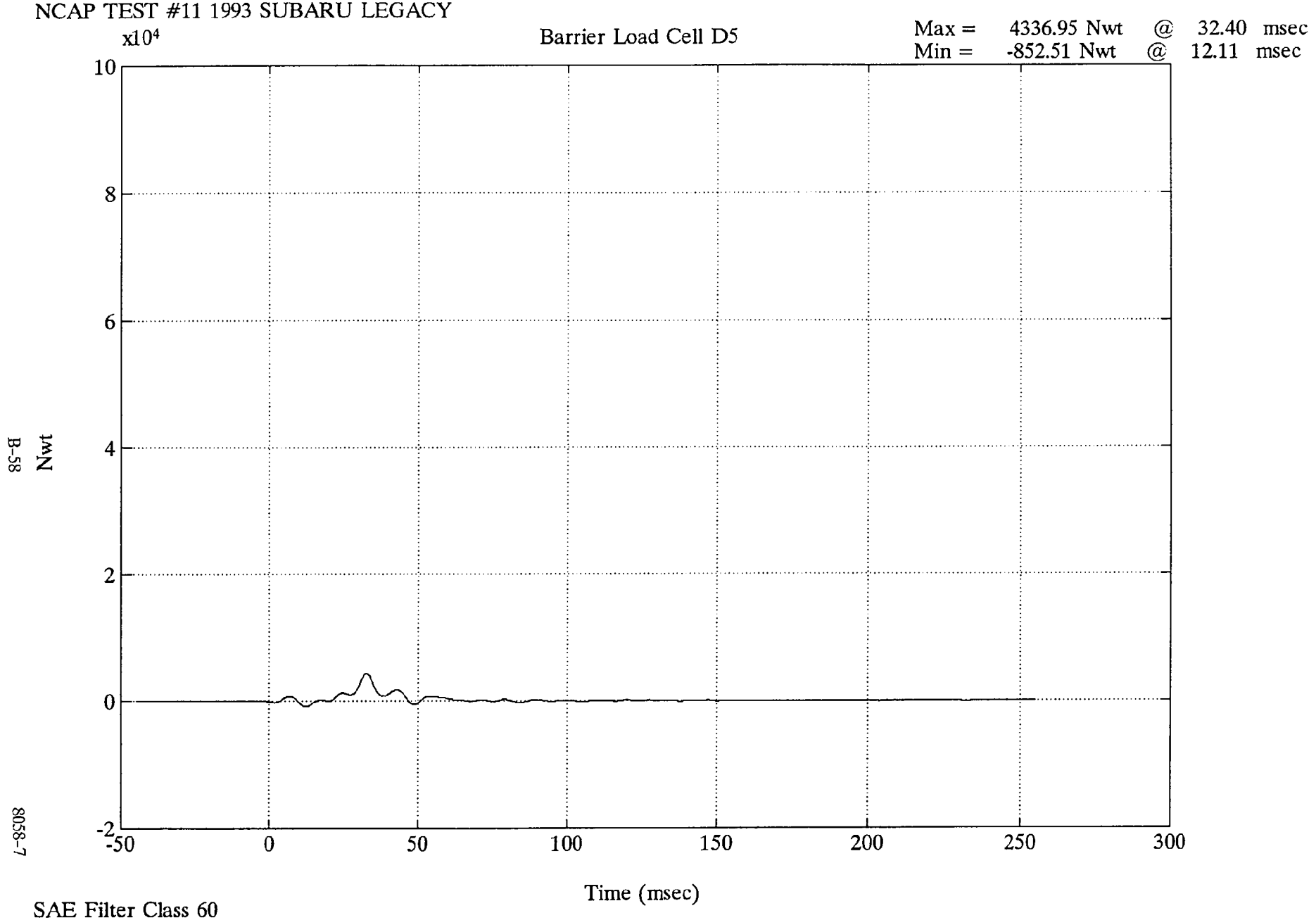
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

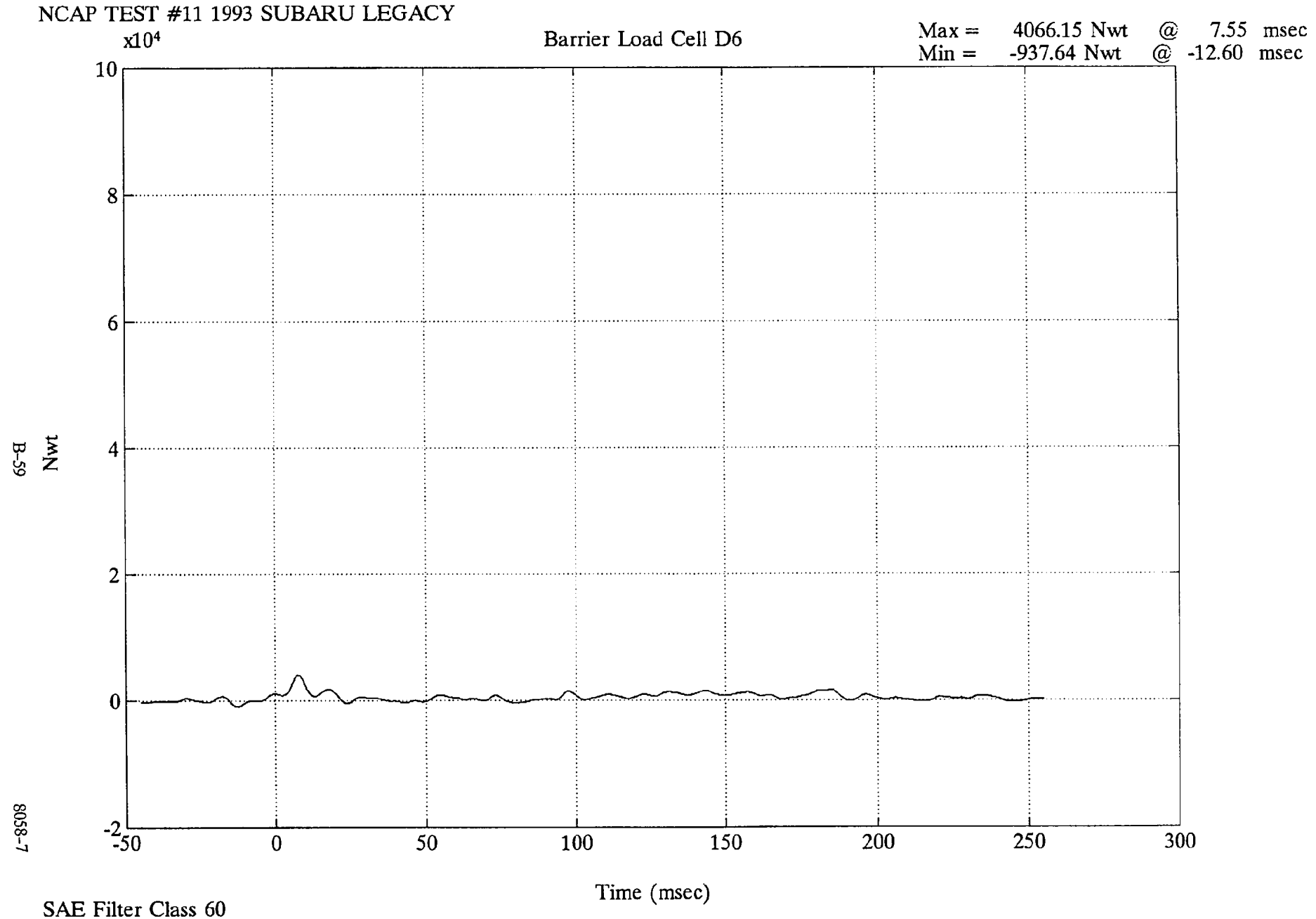


SAE Filter Class 60

B-58

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

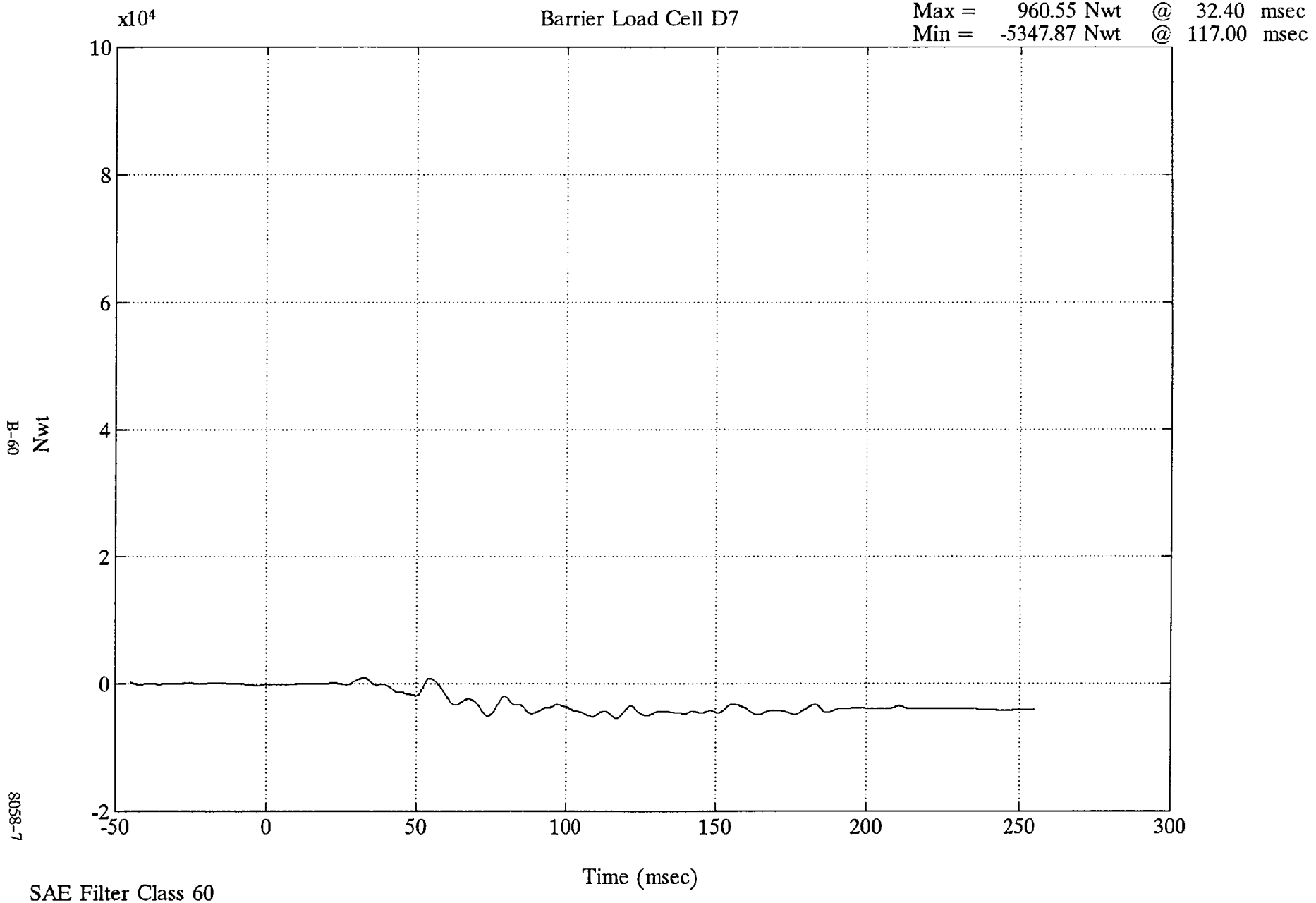


B-59

8058-7

SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

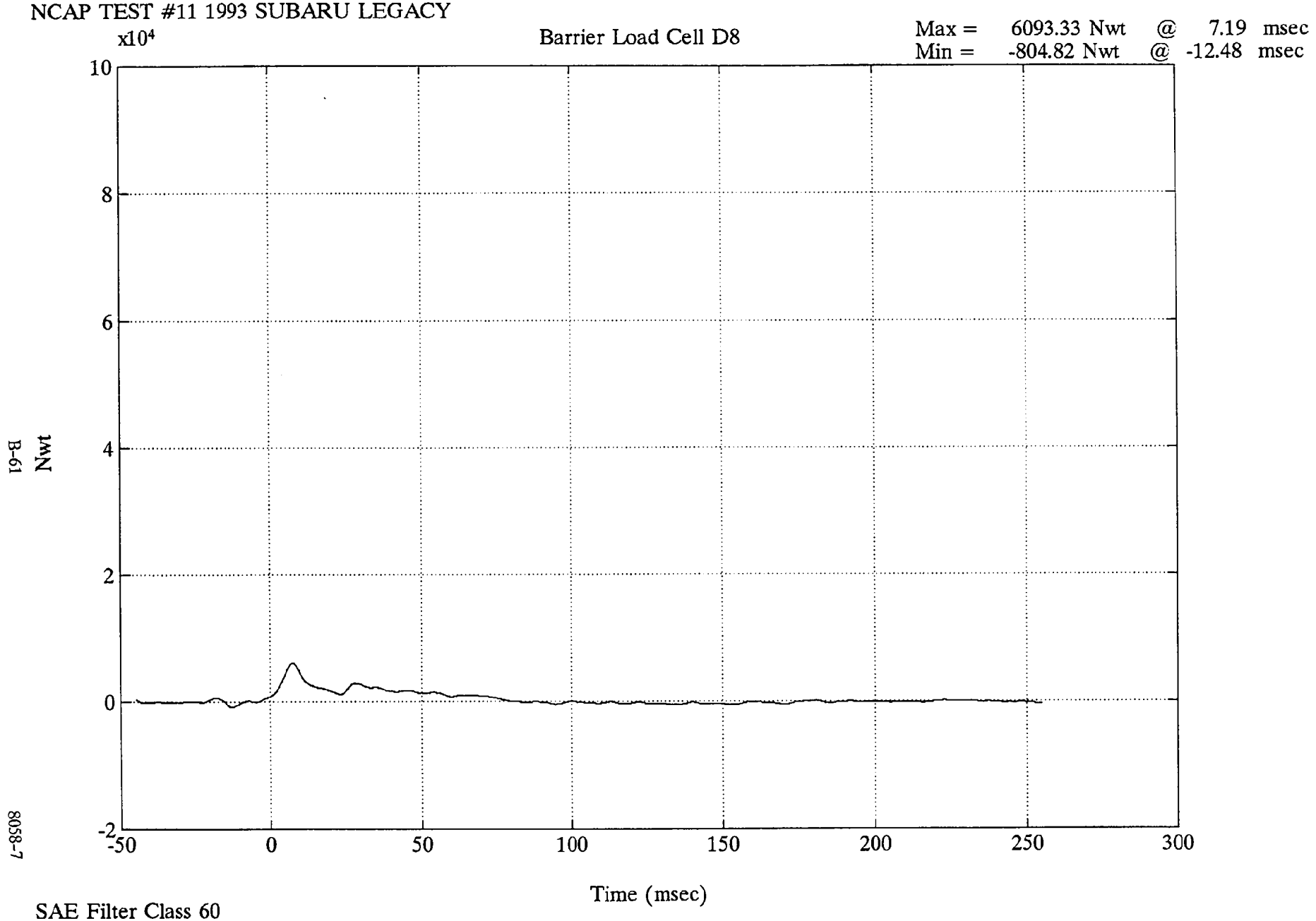


SAE Filter Class 60

B-60

8058-7

NCAP TEST #11 1993 SUBARU LEGACY

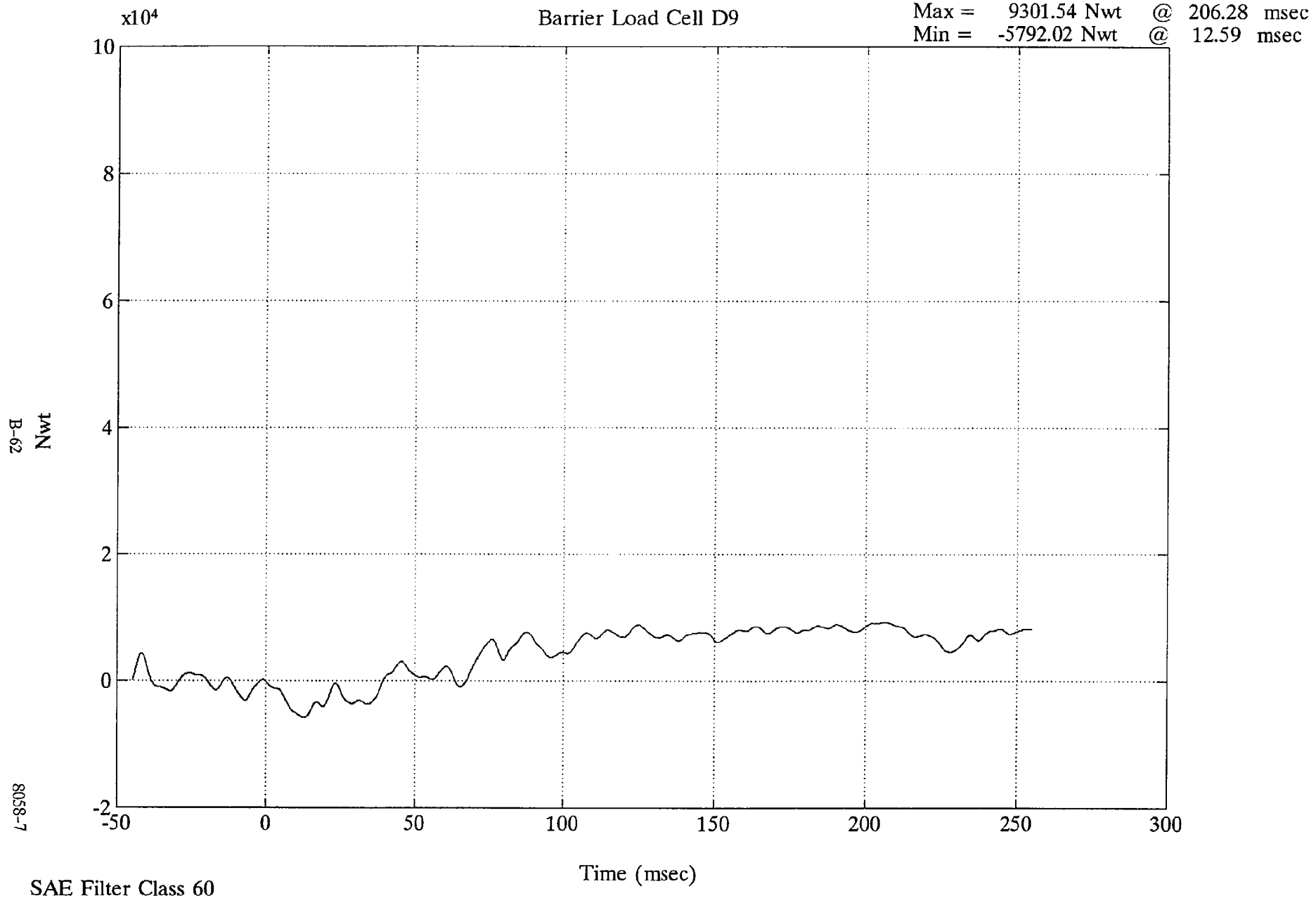


B-61

8058-7

SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

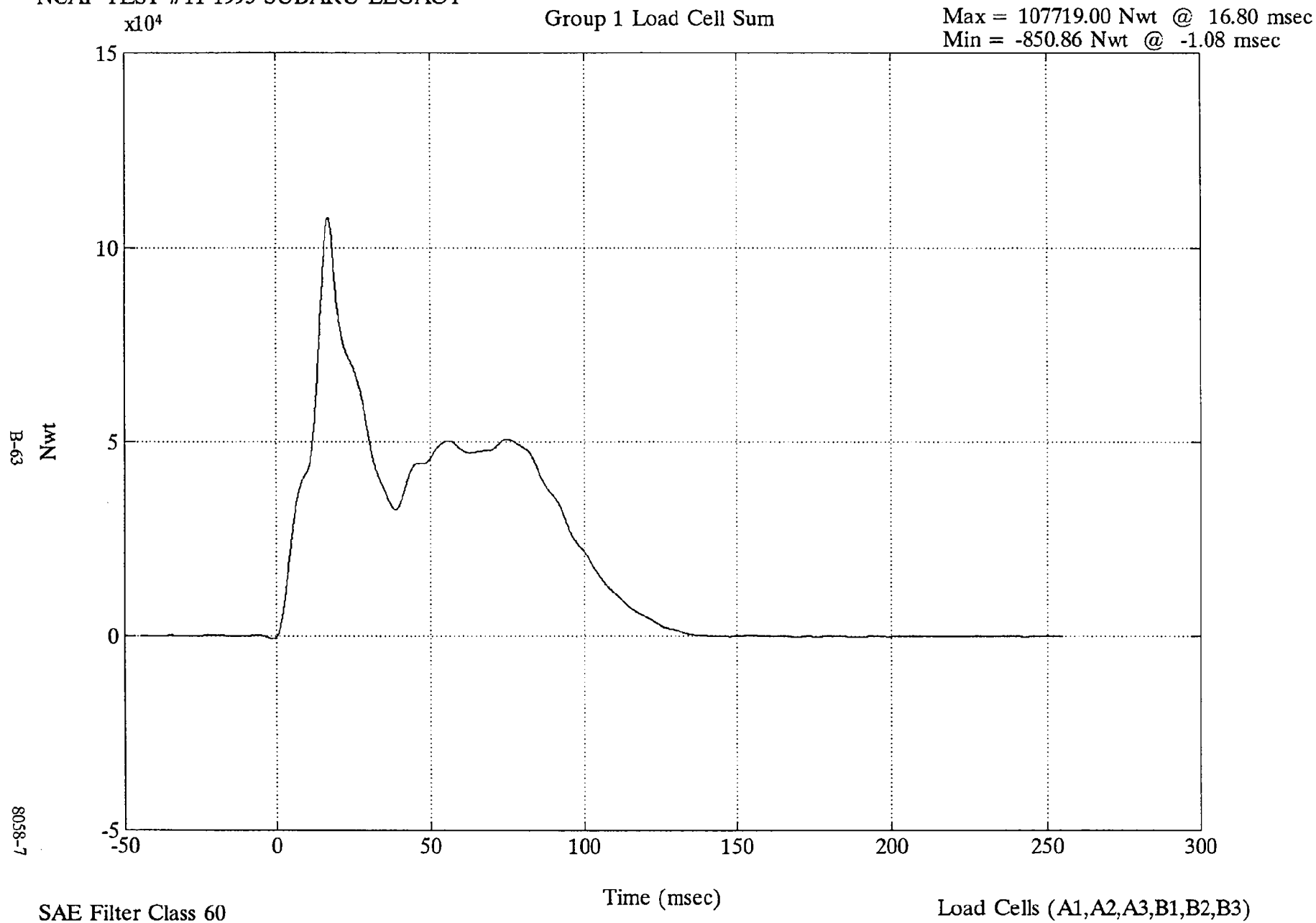


B-62

8058-7

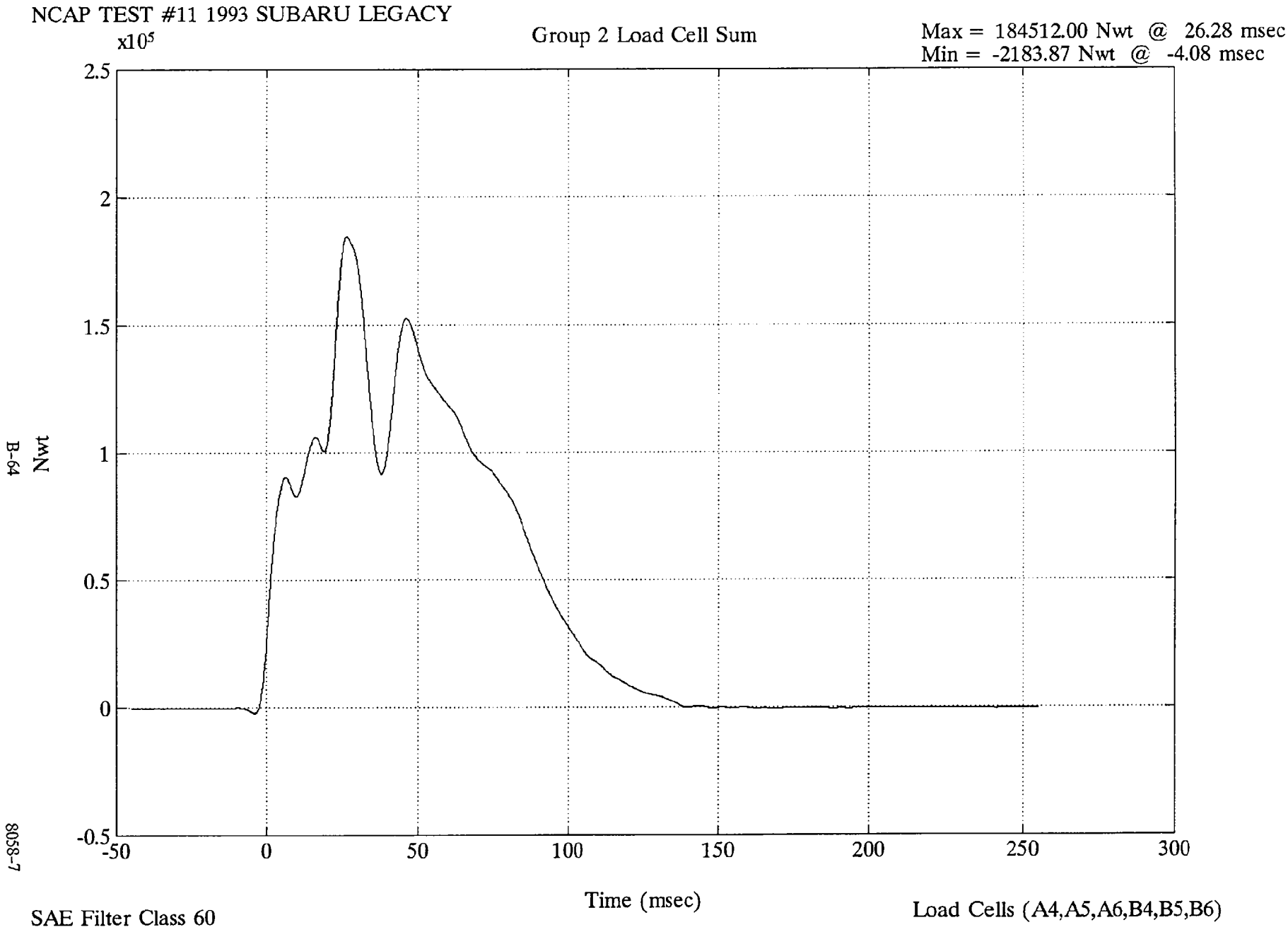
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY

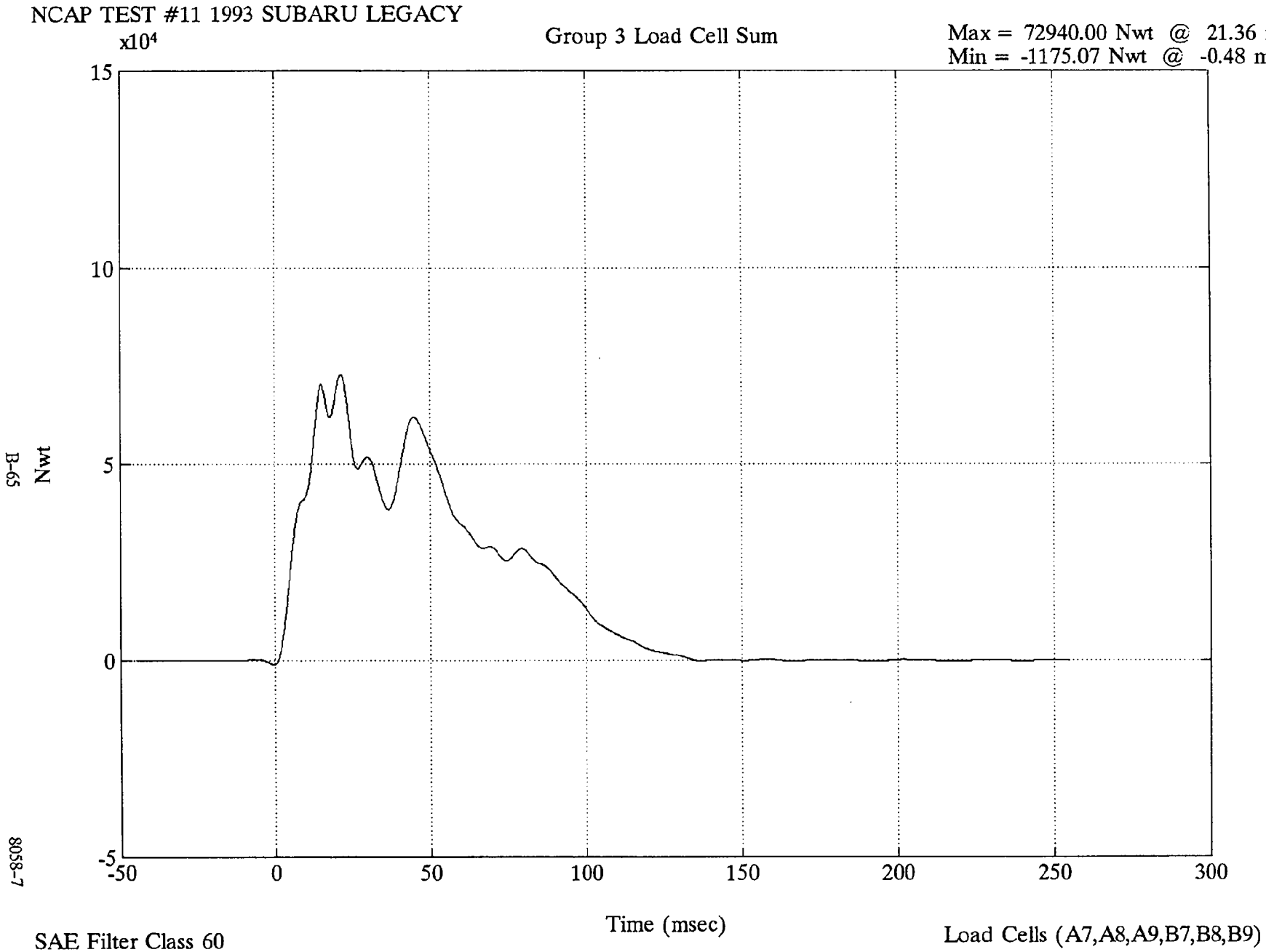


SAE Filter Class 60

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


NCAP TEST #11 1993 SUBARU LEGACY
x10^5
Group 2 Load Cell Sum
Max = 184512.00 Nwt @ 26.28 msec
Min = -2183.87 Nwt @ -4.08 msec
2.5
2
1.5
1
0.5
0
-0.5
Nwt
-50
0
50
100
150
200
250
300
Time (msec)
B-64
8058-7
SAE Filter Class 60
Load Cells (A4,A5,A6,B4,B5,B6)

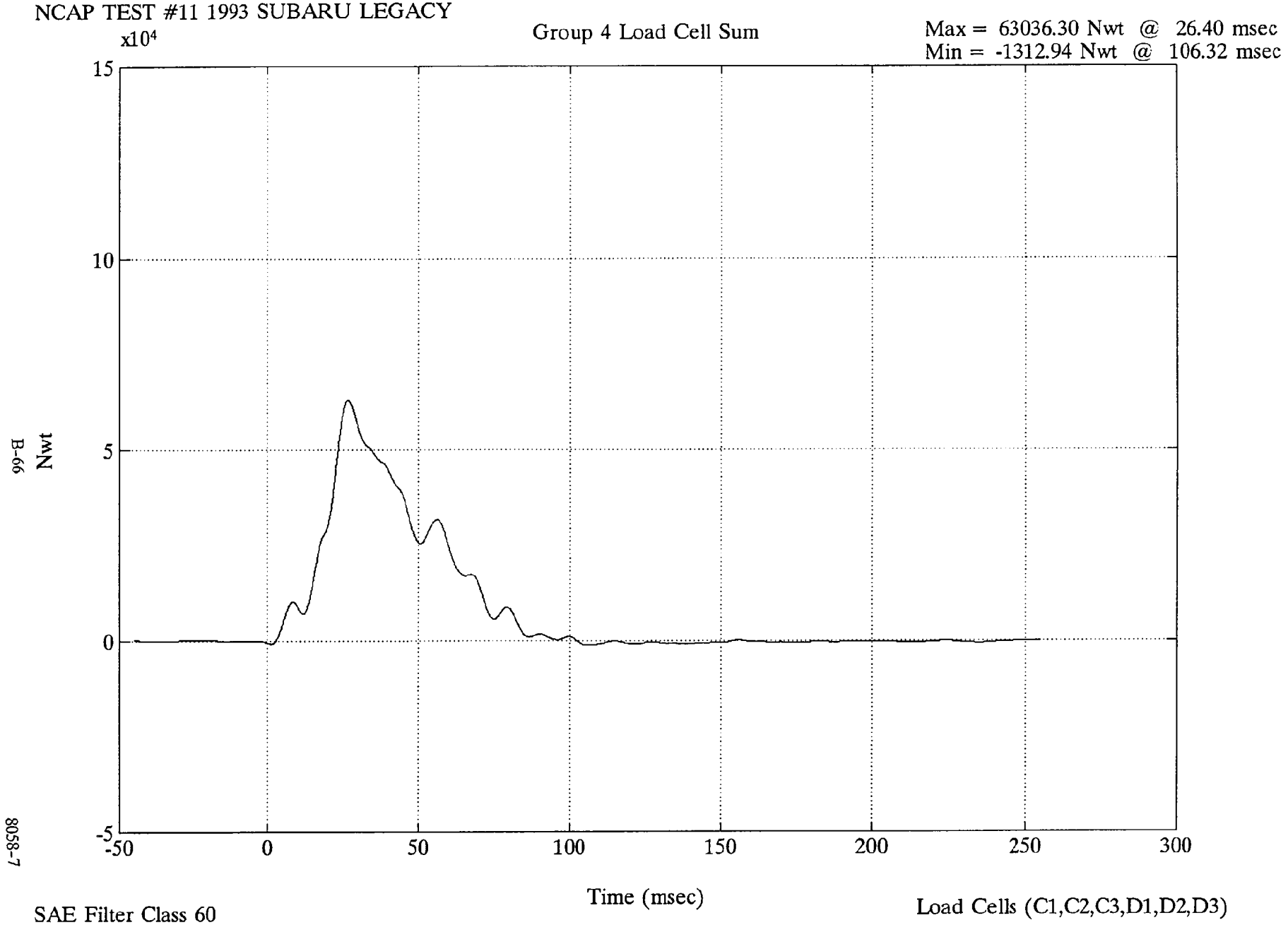
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

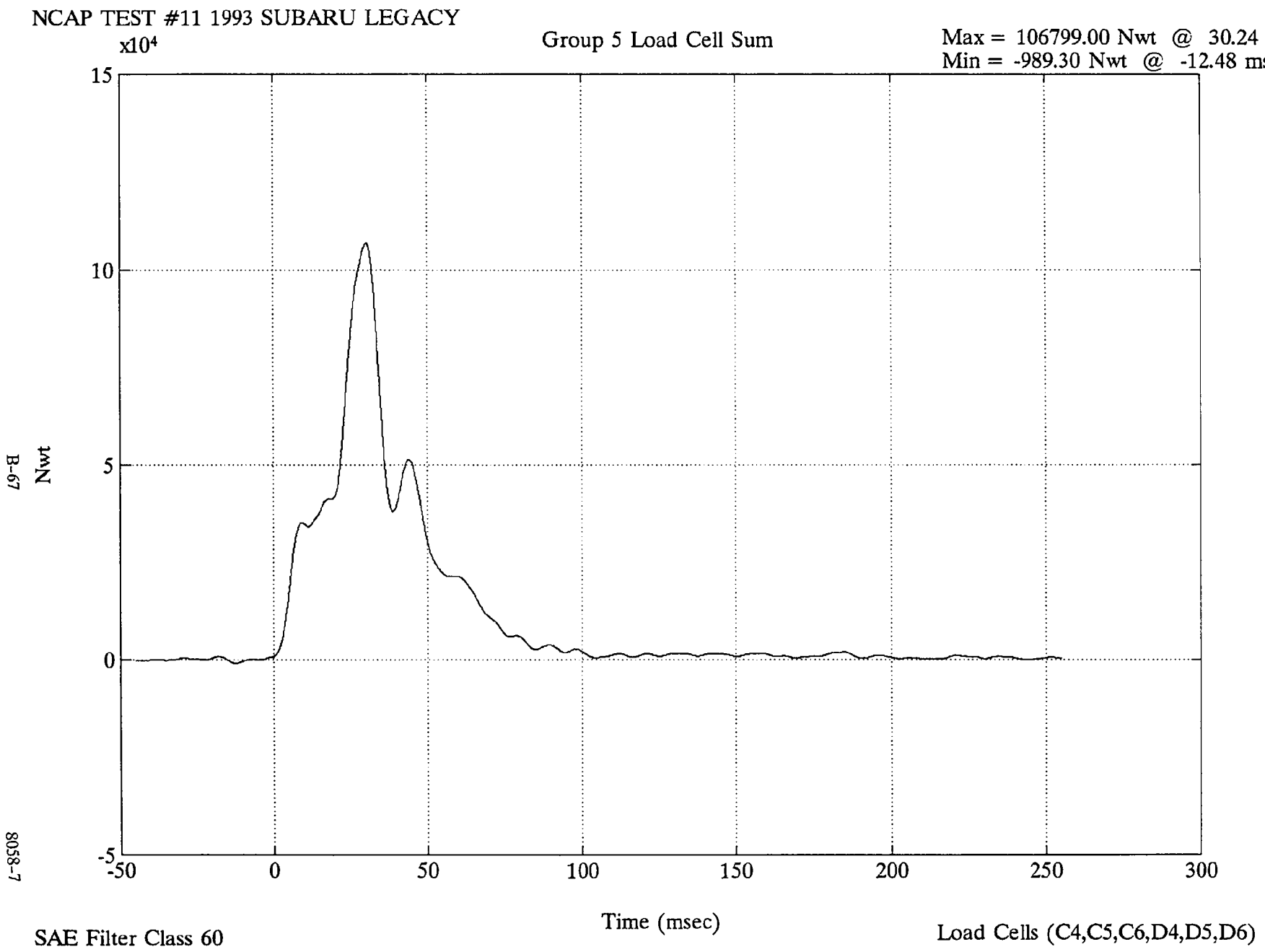
Load Cells (A7,A8,A9,B7,B8,B9)

NCAP TEST #11 1993 SUBARU LEGACY

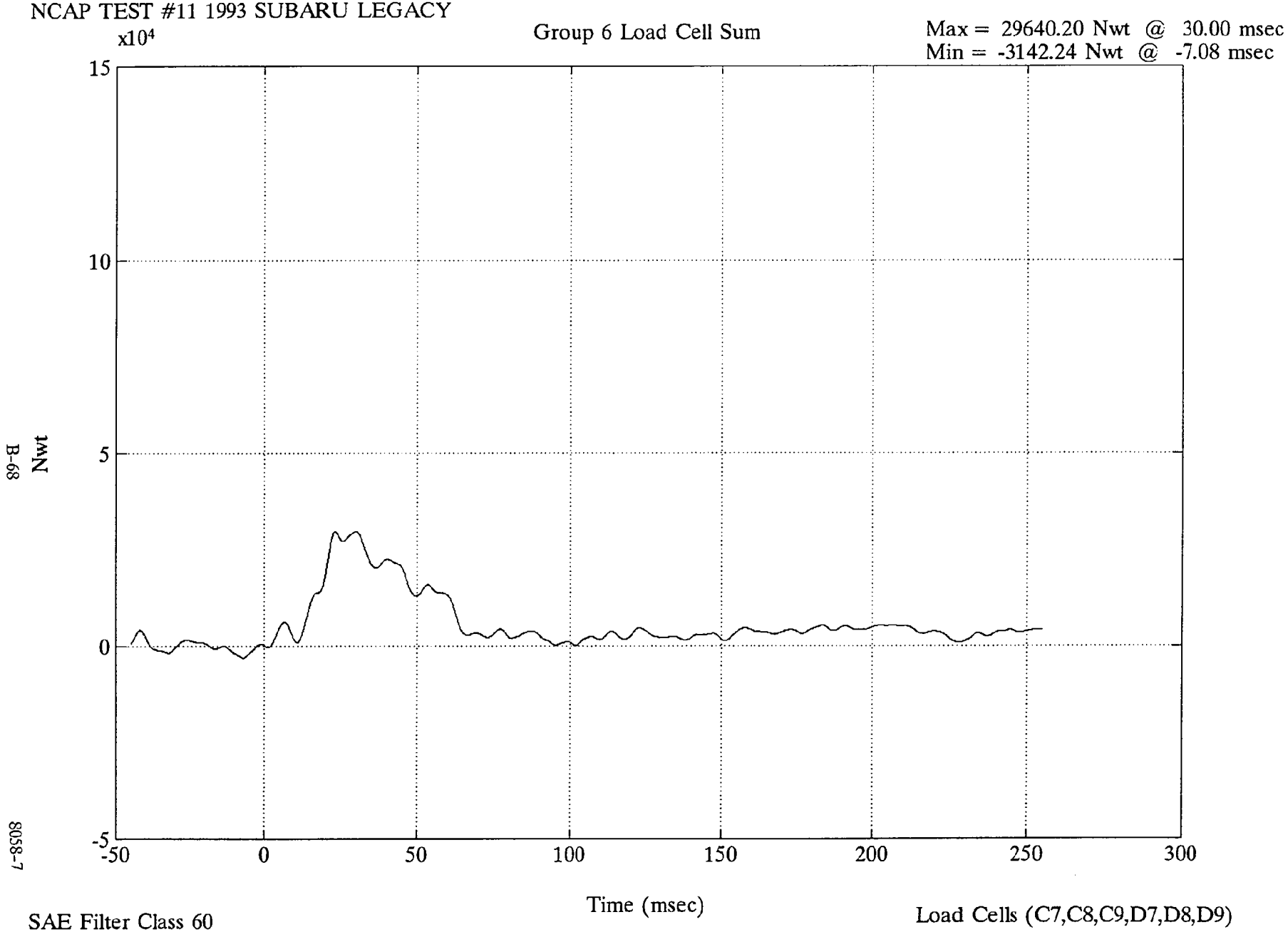


SAE Filter Class 60

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


NCAP TEST #11 1993 SUBARU LEGACY
x10⁴
Group 5 Load Cell Sum
Max = 106799.00 Nwt @ 30.24 msec
Min = -989.30 Nwt @ -12.48 msec
15
10
5
0
-5
Nwt
-50
0
50
100
150
200
250
300
Time (msec)
B-67
8058-7
SAE Filter Class 60
Load Cells (C4,C5,C6,D4,D5,D6)

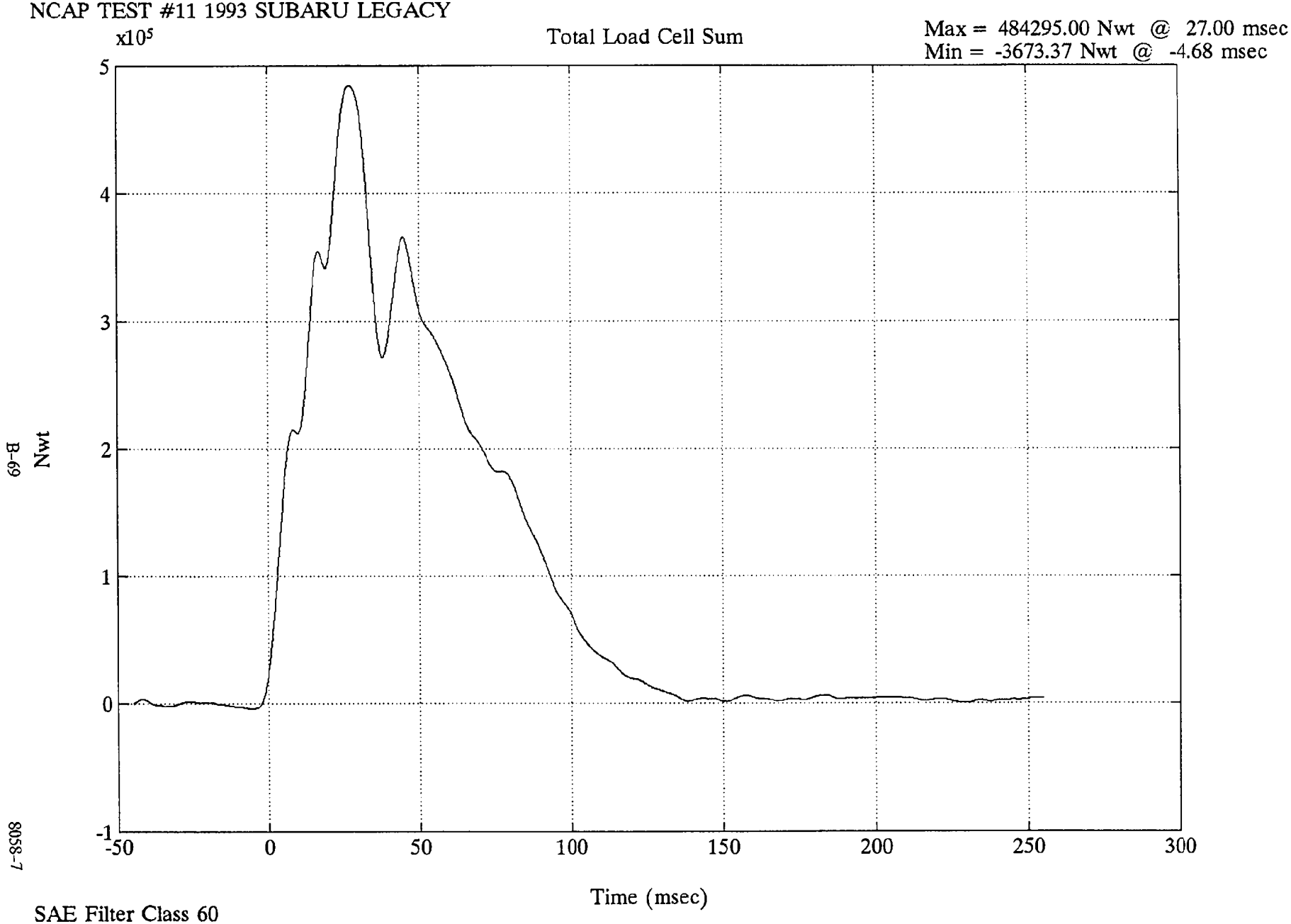
NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

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

NCAP TEST #11 1993 SUBARU LEGACY



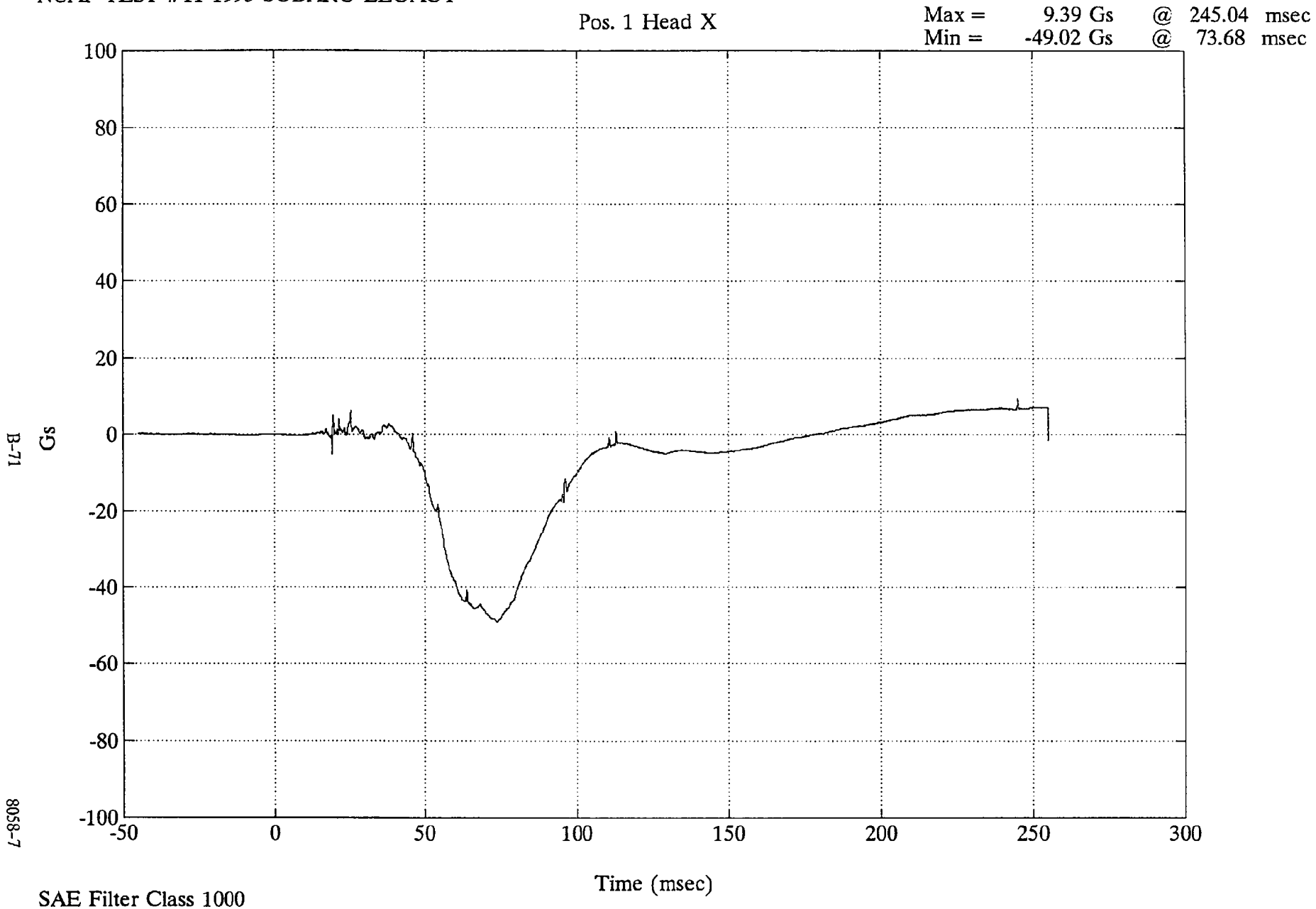
SAE Filter Class 60

TEST NO. MP5500

DUMMY DATA

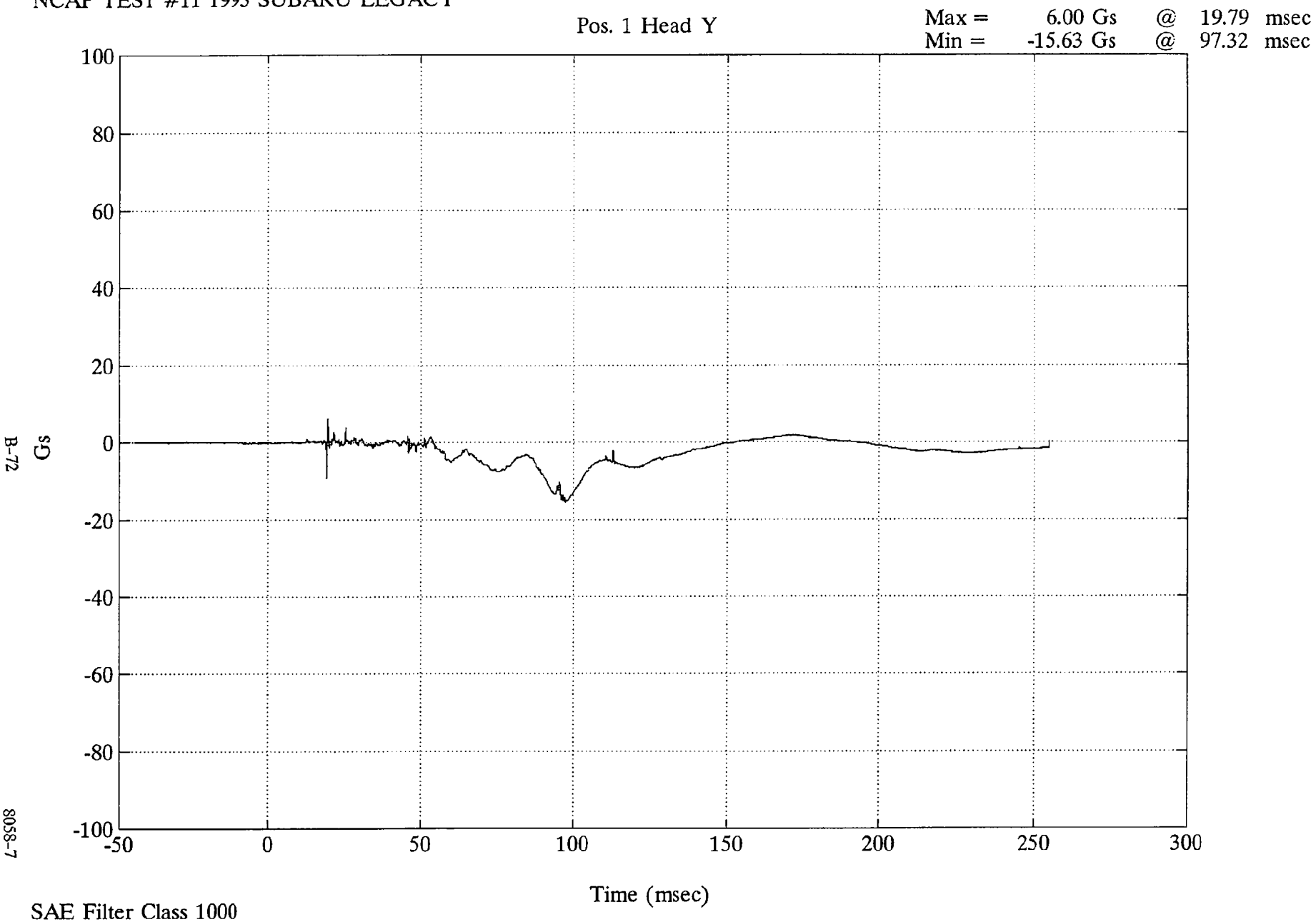
CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600
Belt Loads	60
Belt Displacements	180

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 1000

NCAP TEST #11 1993 SUBARU LEGACY

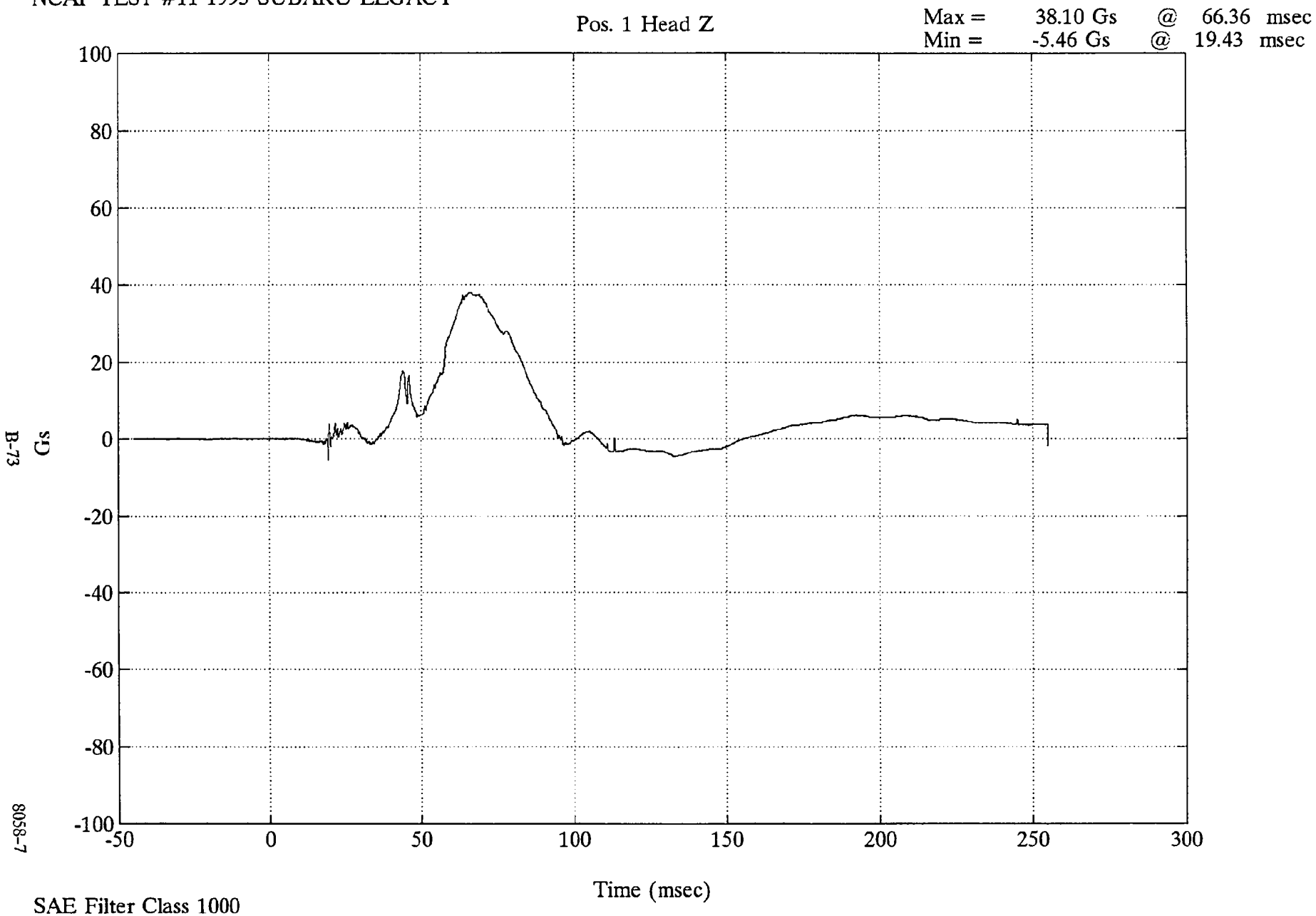


B-72

8058-7

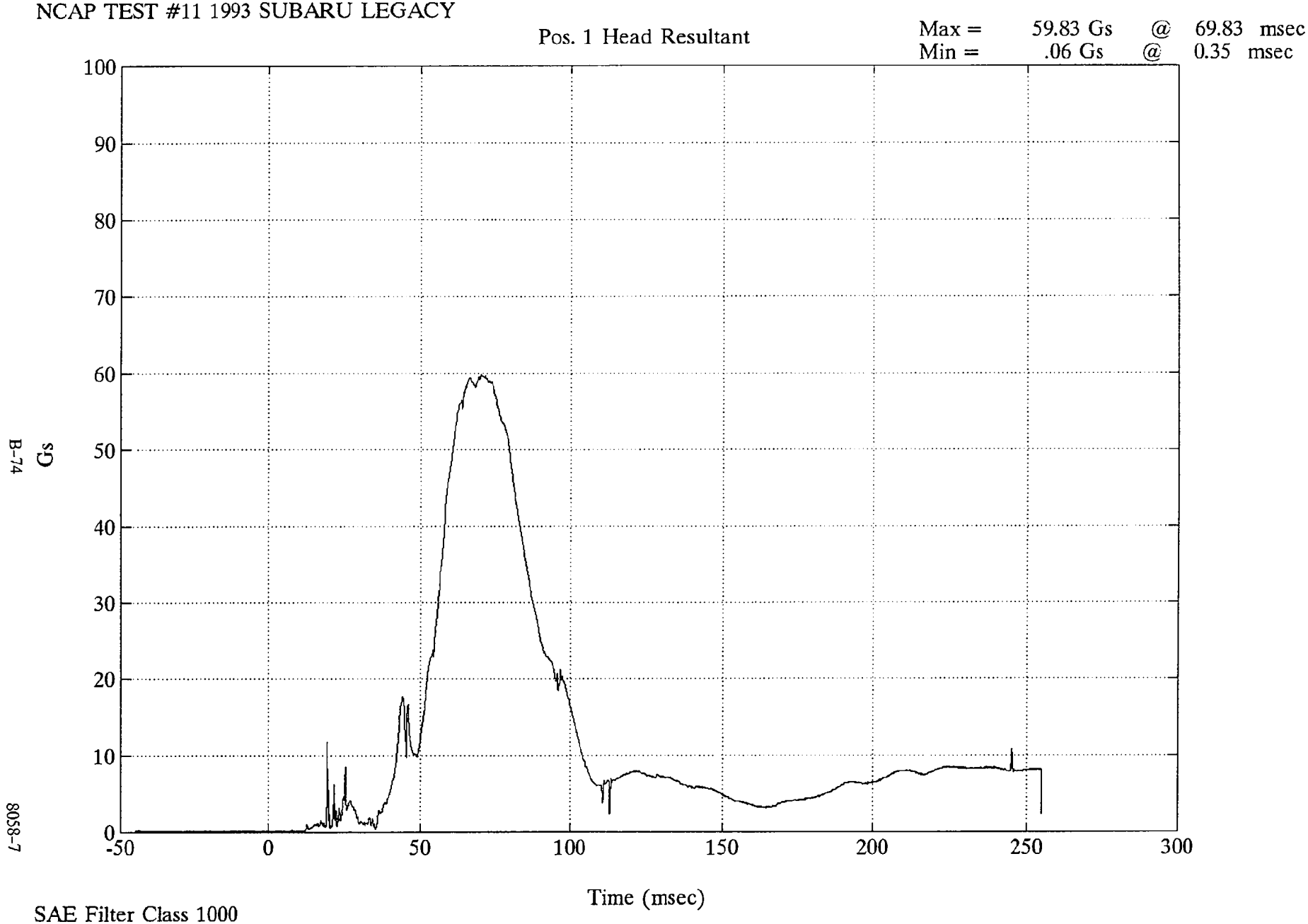
SAE Filter Class 1000

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 1000

NCAP TEST #11 1993 SUBARU LEGACY

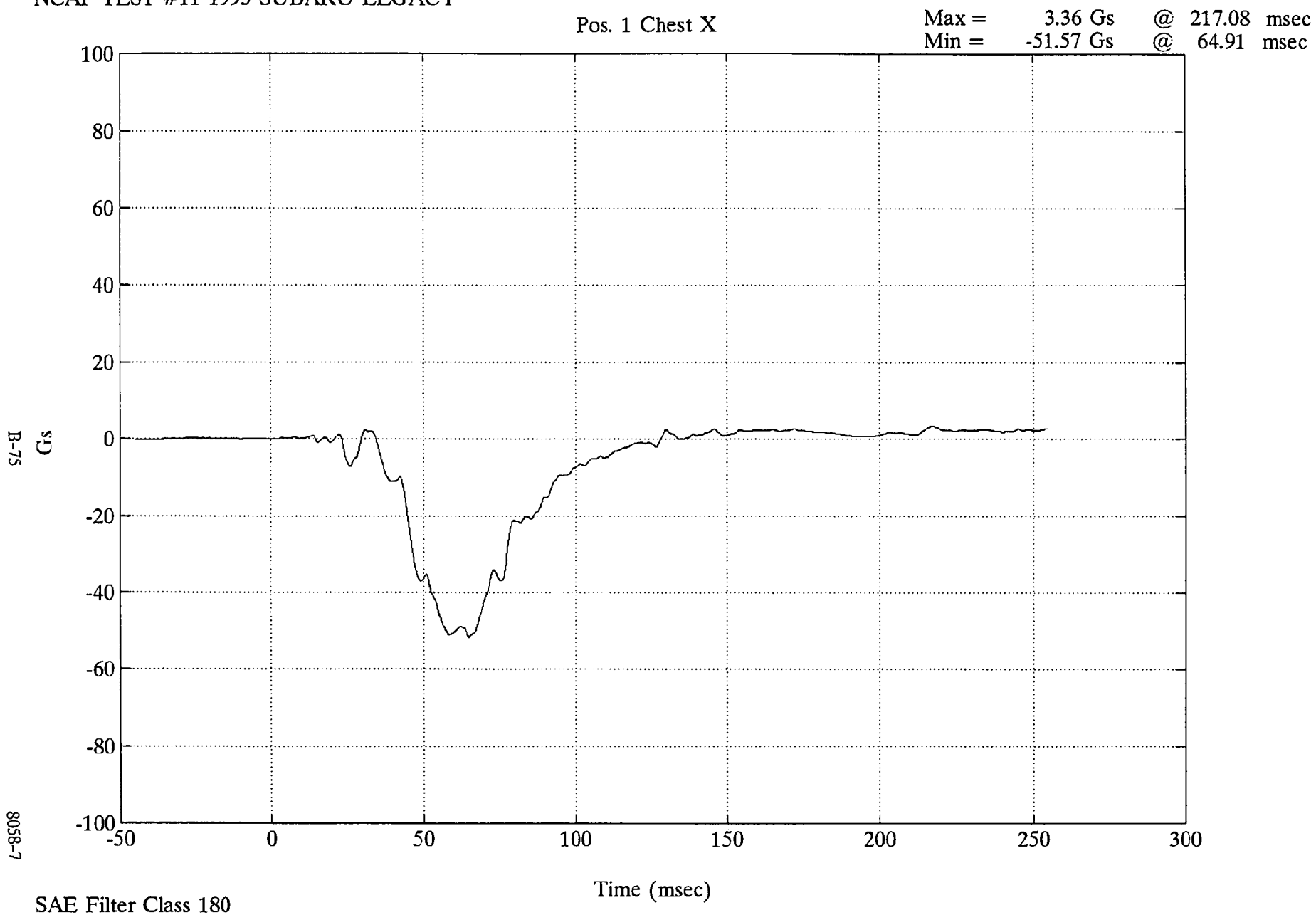


SAE Filter Class 1000

B-74

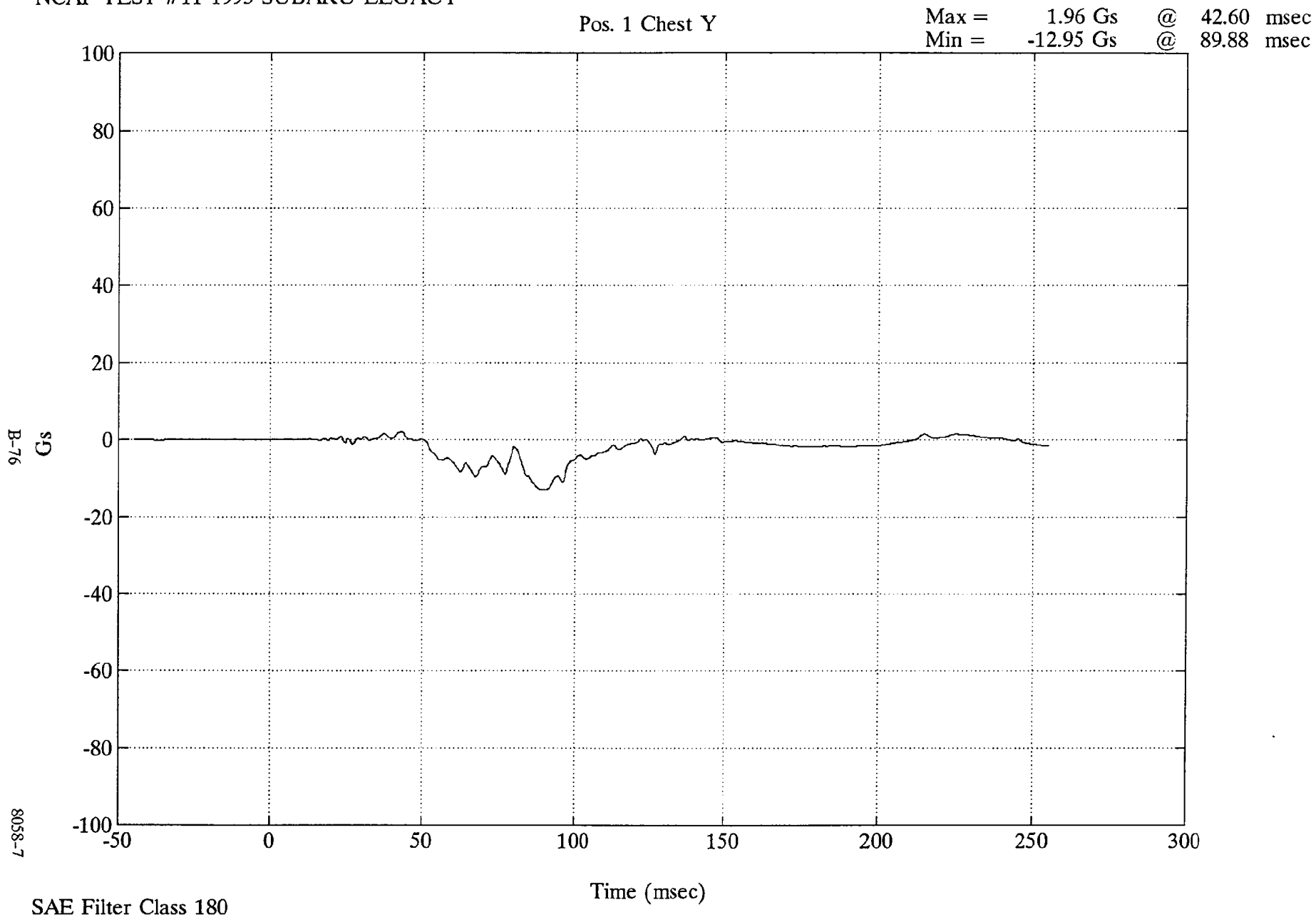
8058-7

NCAP TEST #11 1993 SUBARU LEGACY



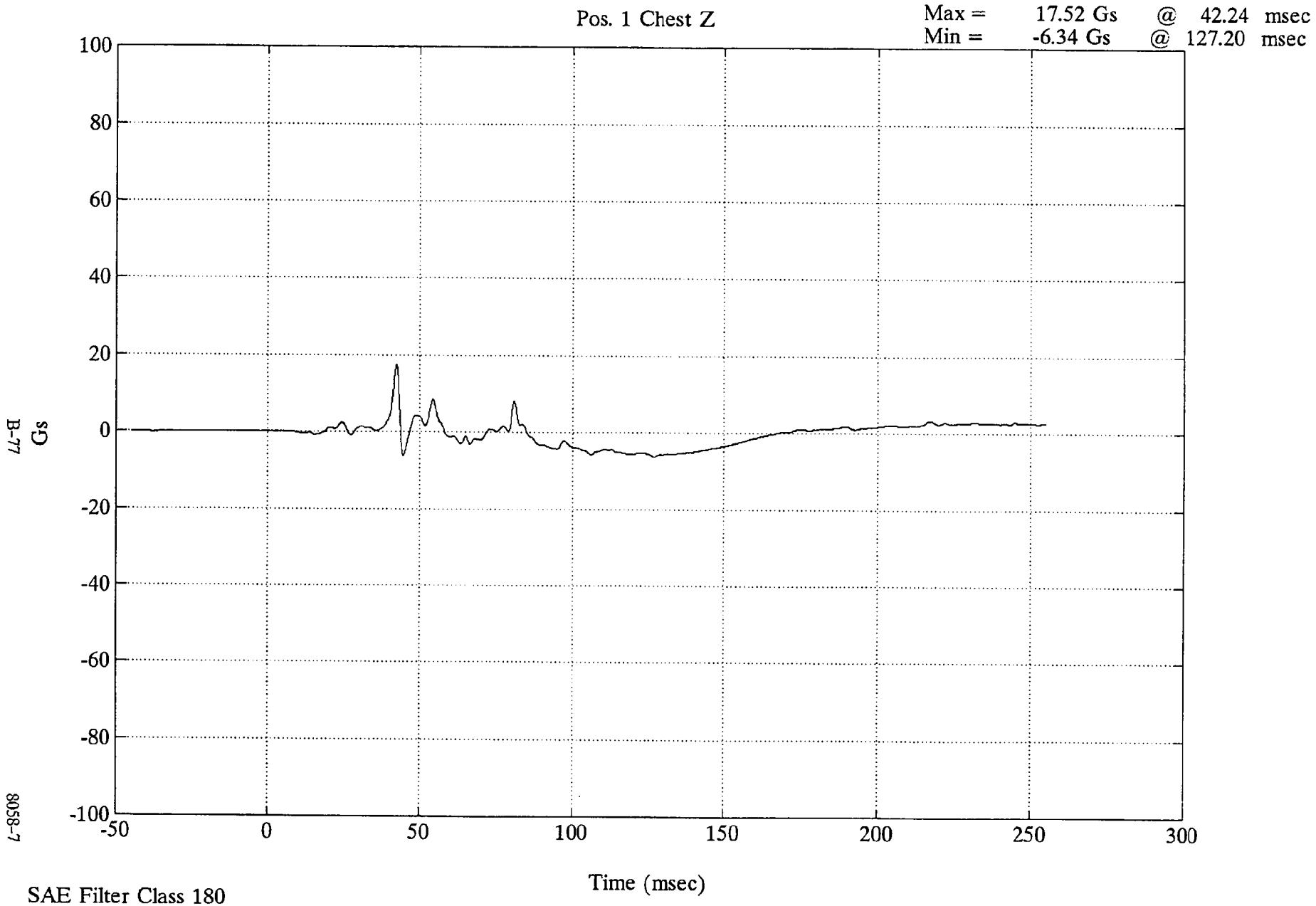
SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY



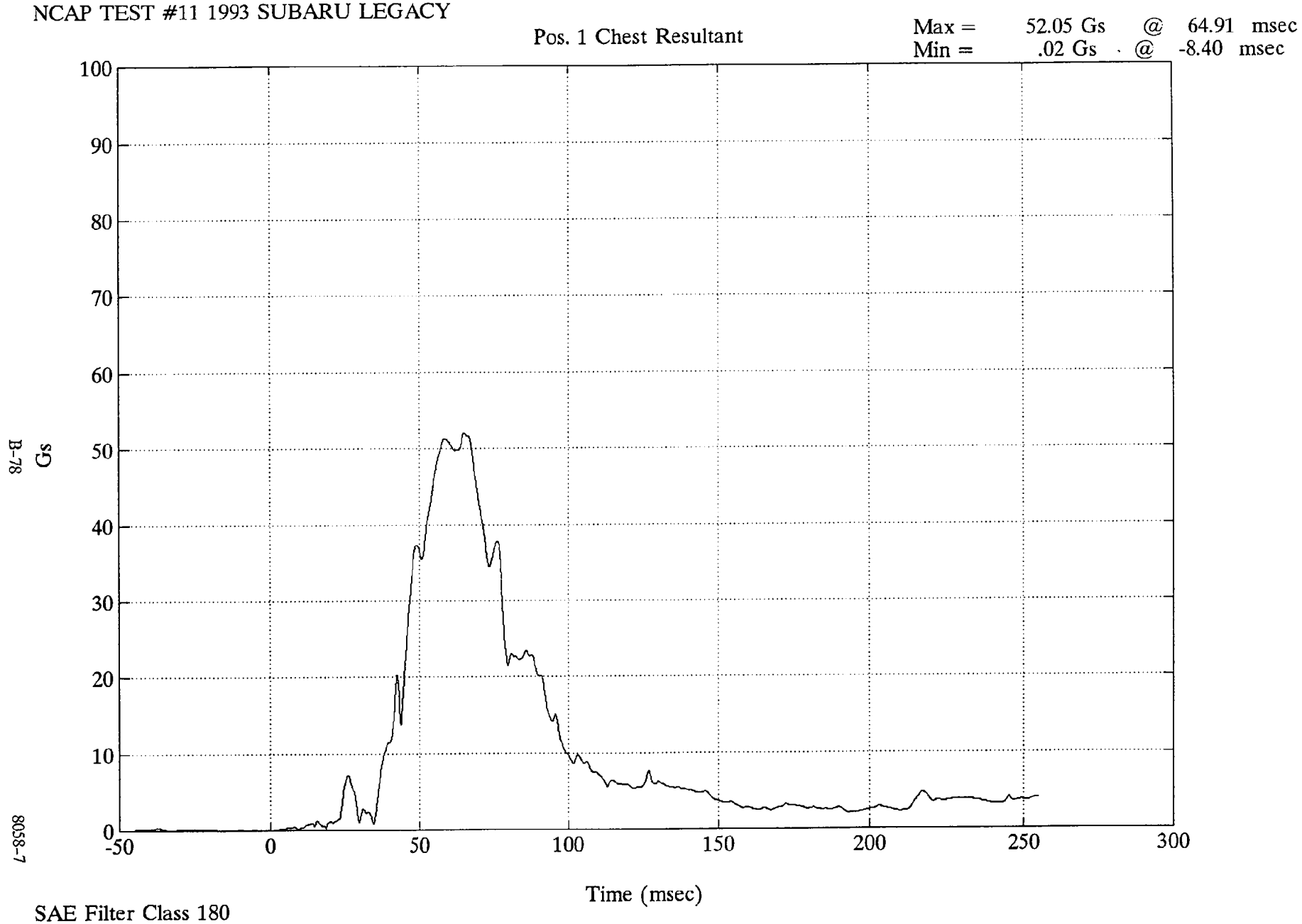
SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY



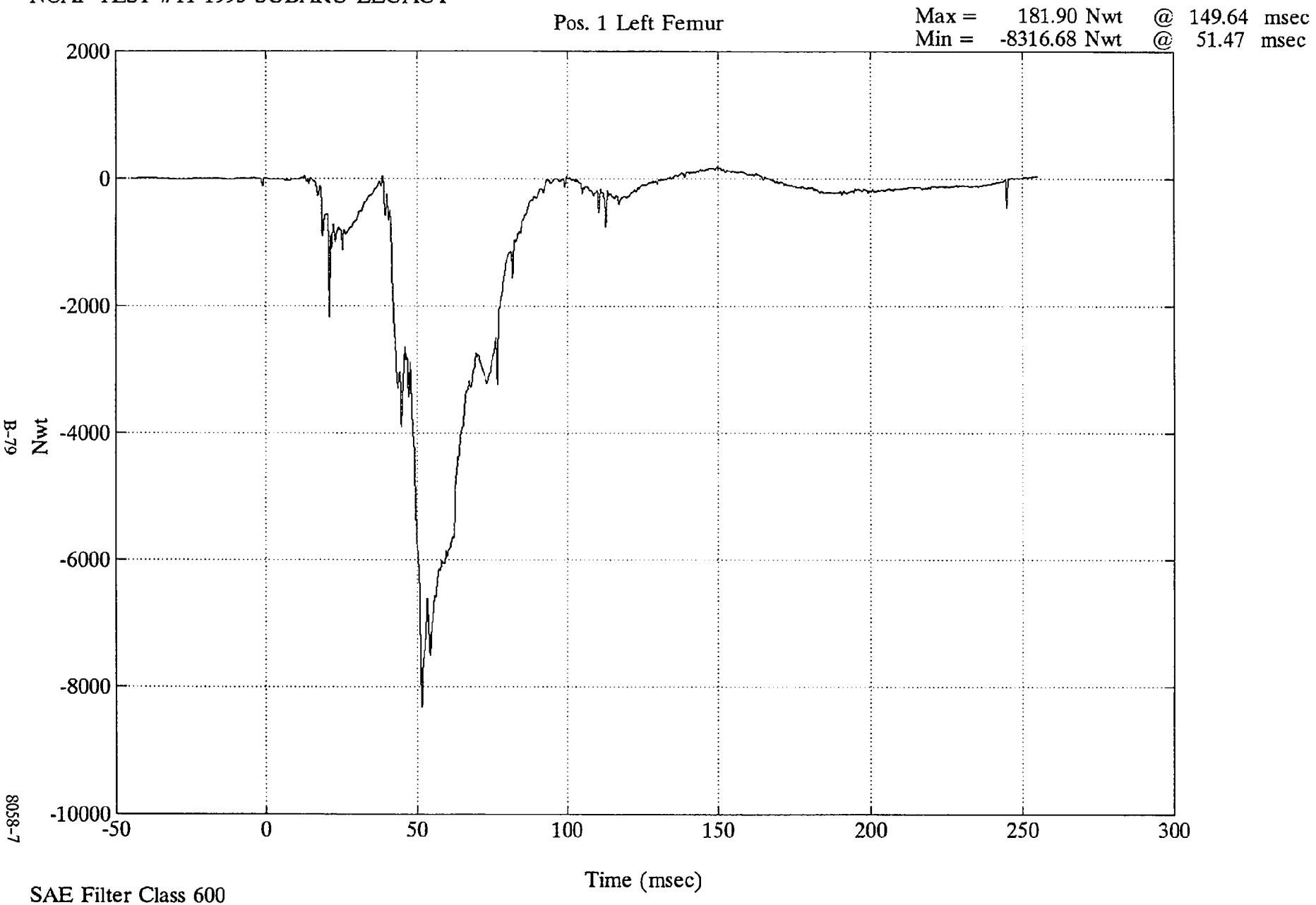
SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY

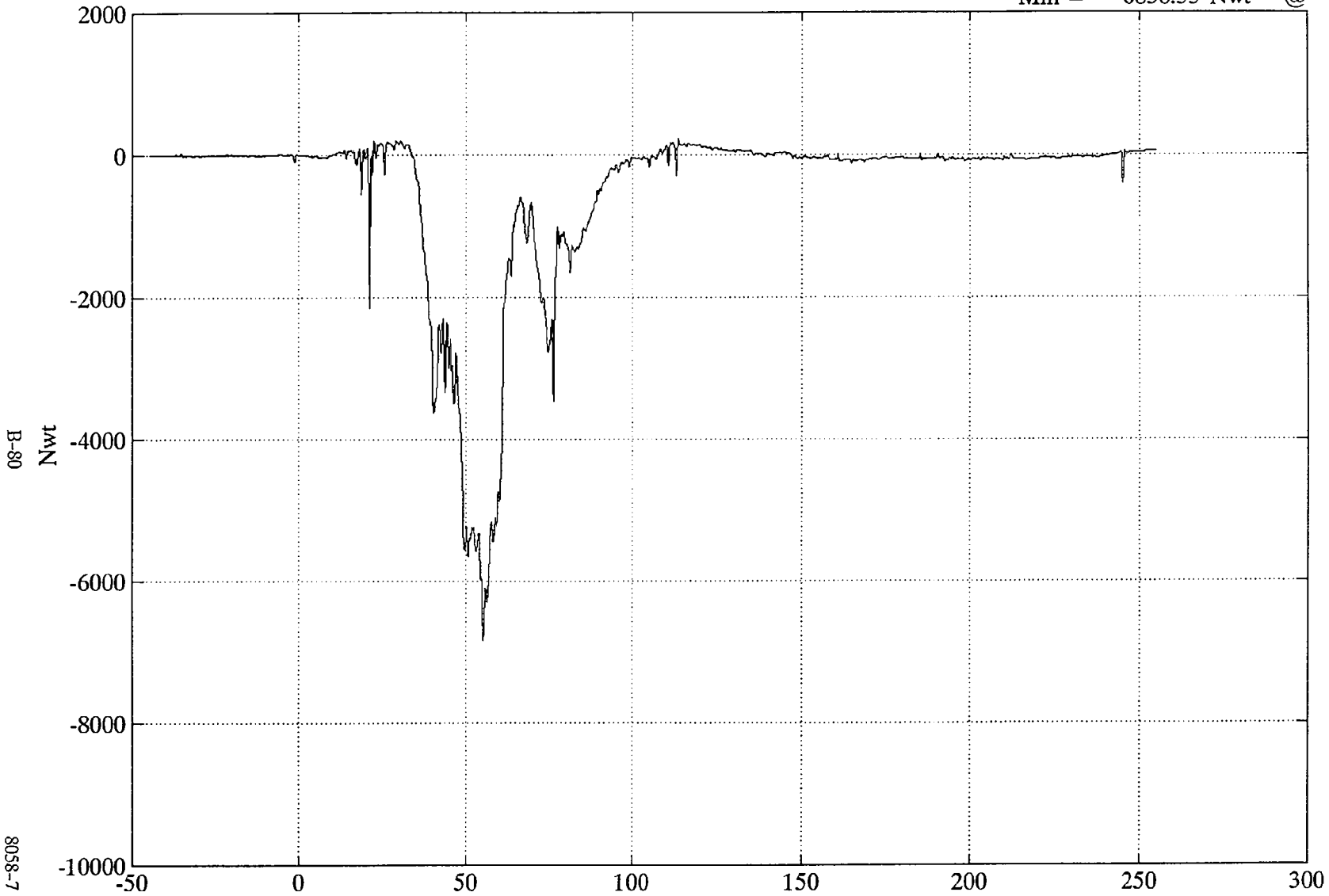


SAE Filter Class 600

NCAP TEST #11 1993 SUBARU LEGACY

Pos. 1 Right Femur

Max = 228.29 Nwt @ 113.52 msec
Min = -6836.55 Nwt @ 55.20 msec

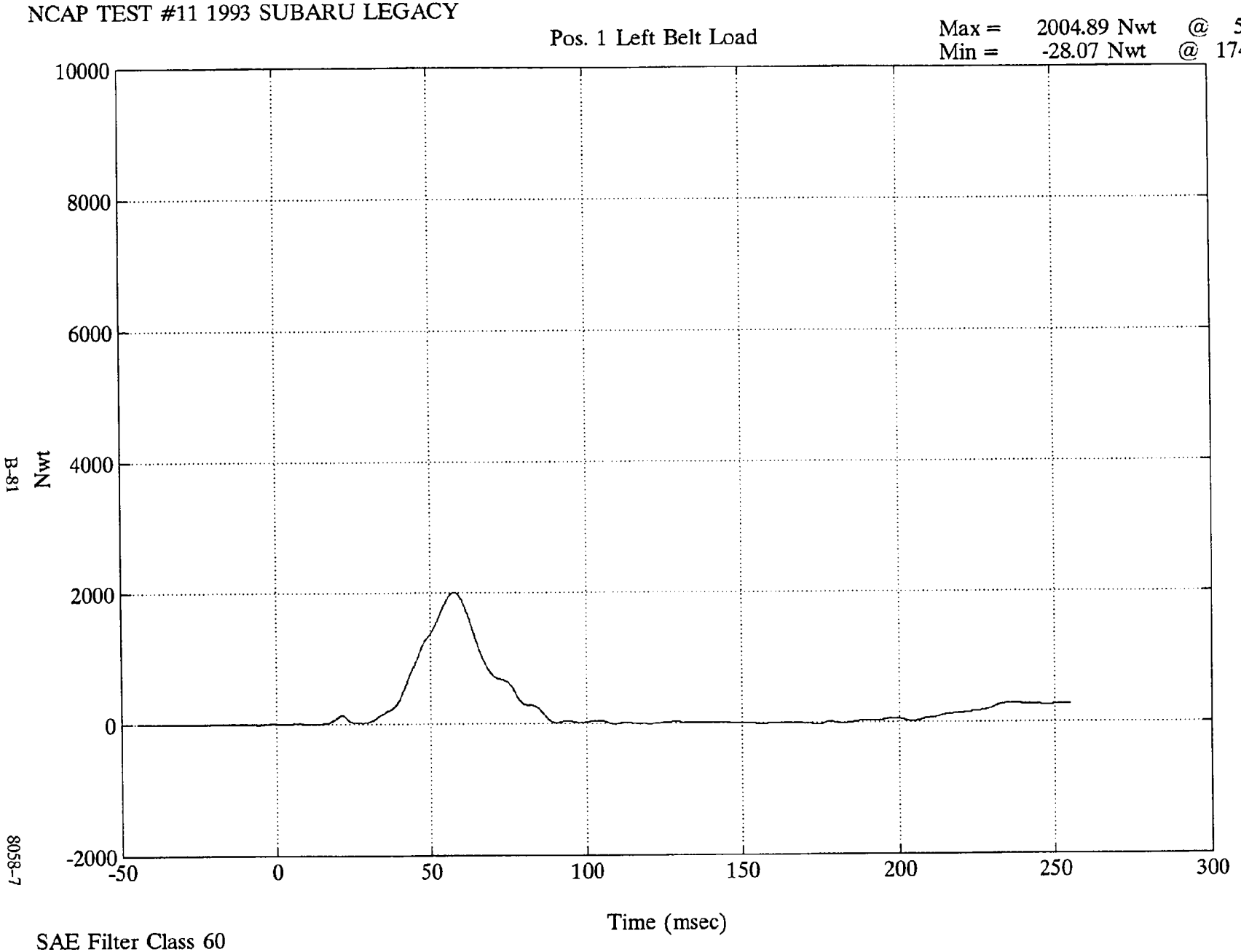


B-80

8058-7

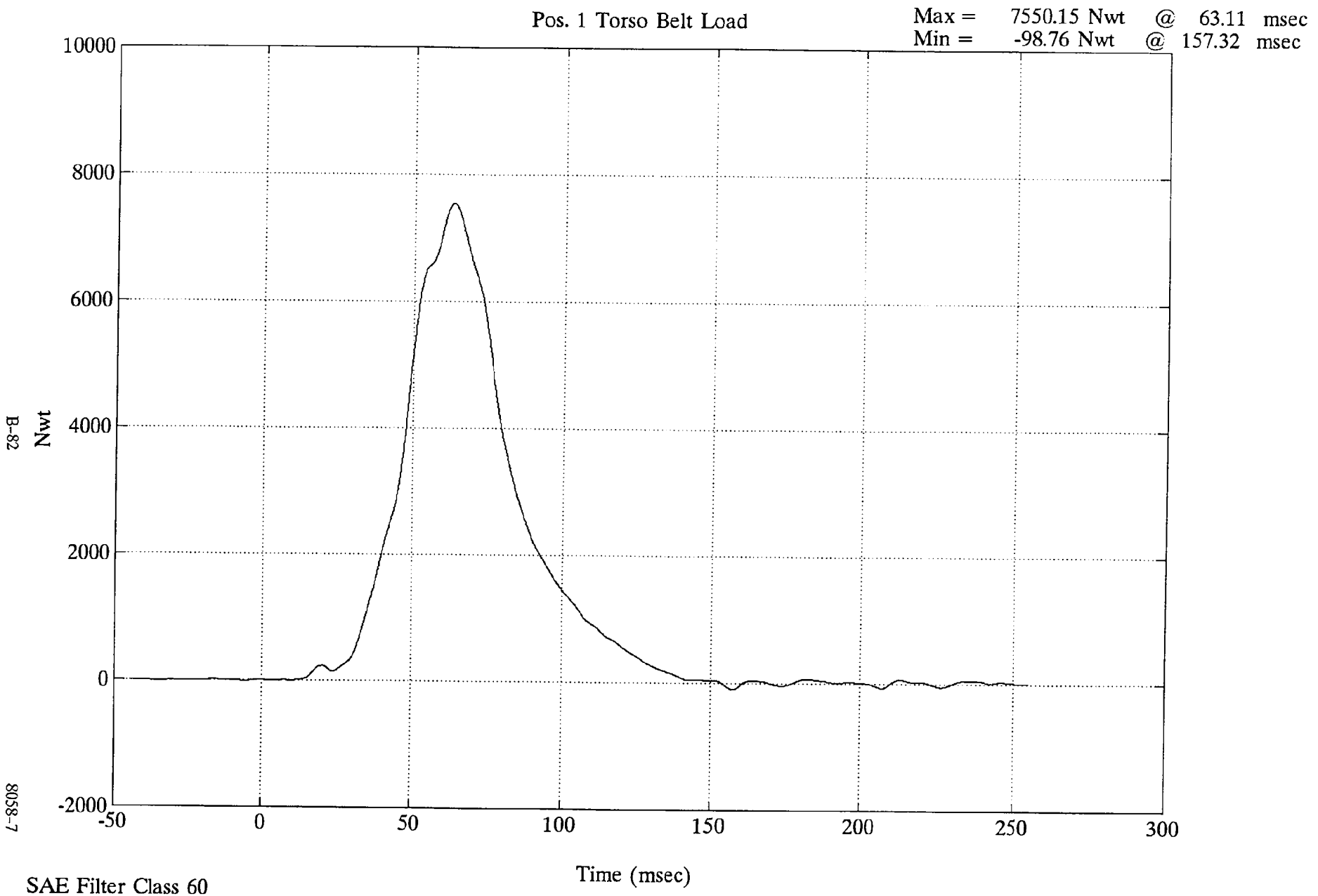
SAE Filter Class 600

NCAP TEST #11 1993 SUBARU LEGACY



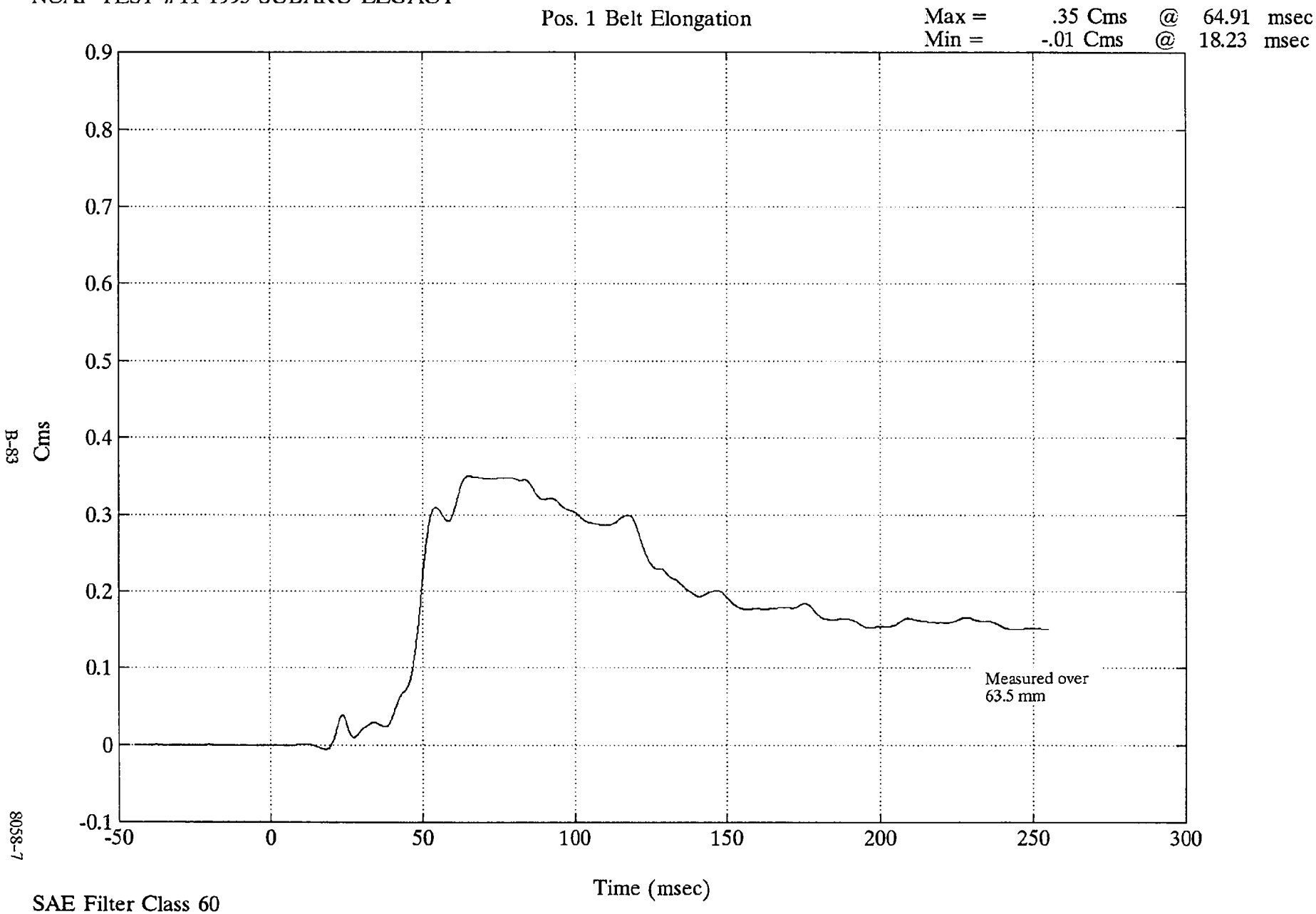
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



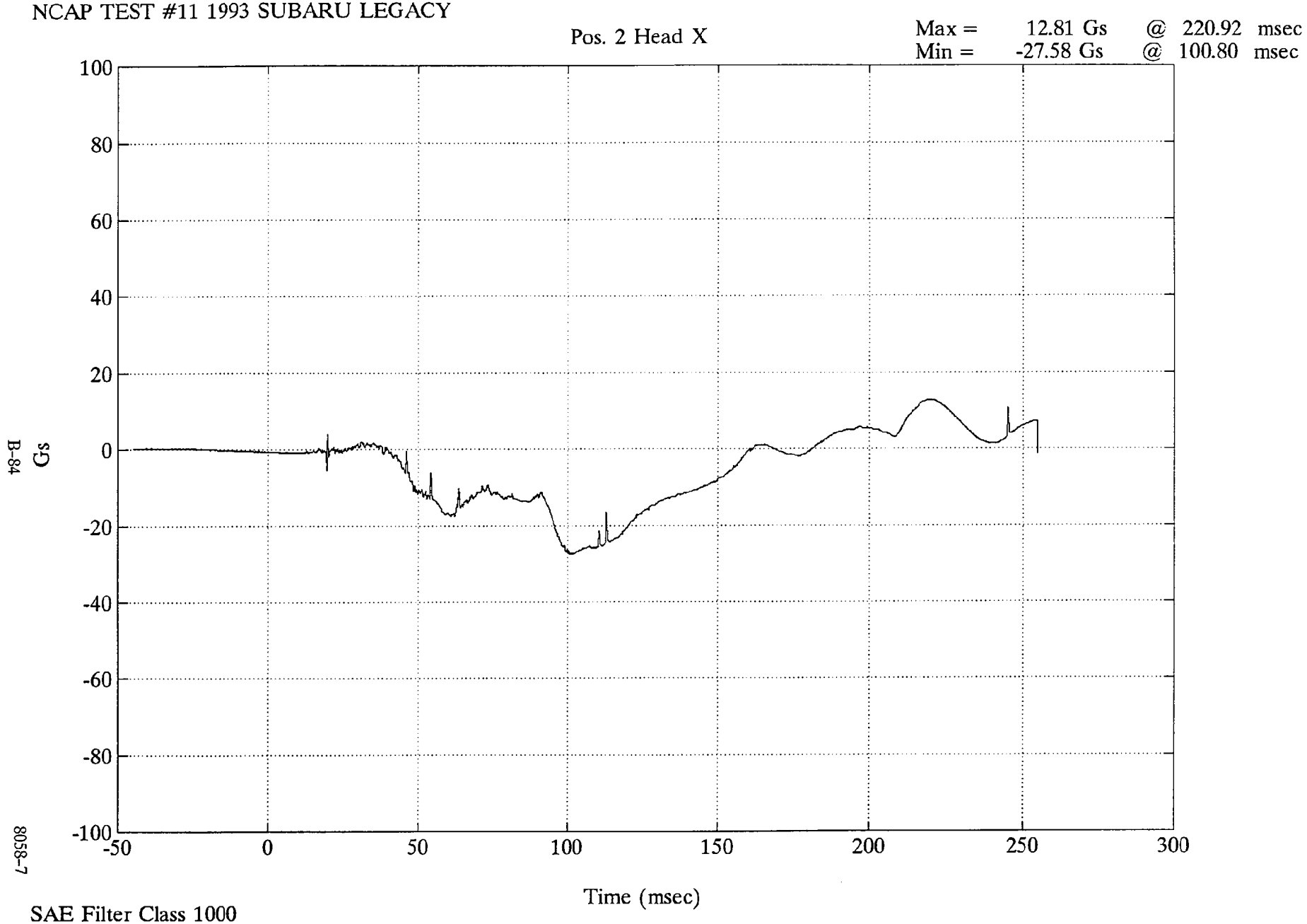
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



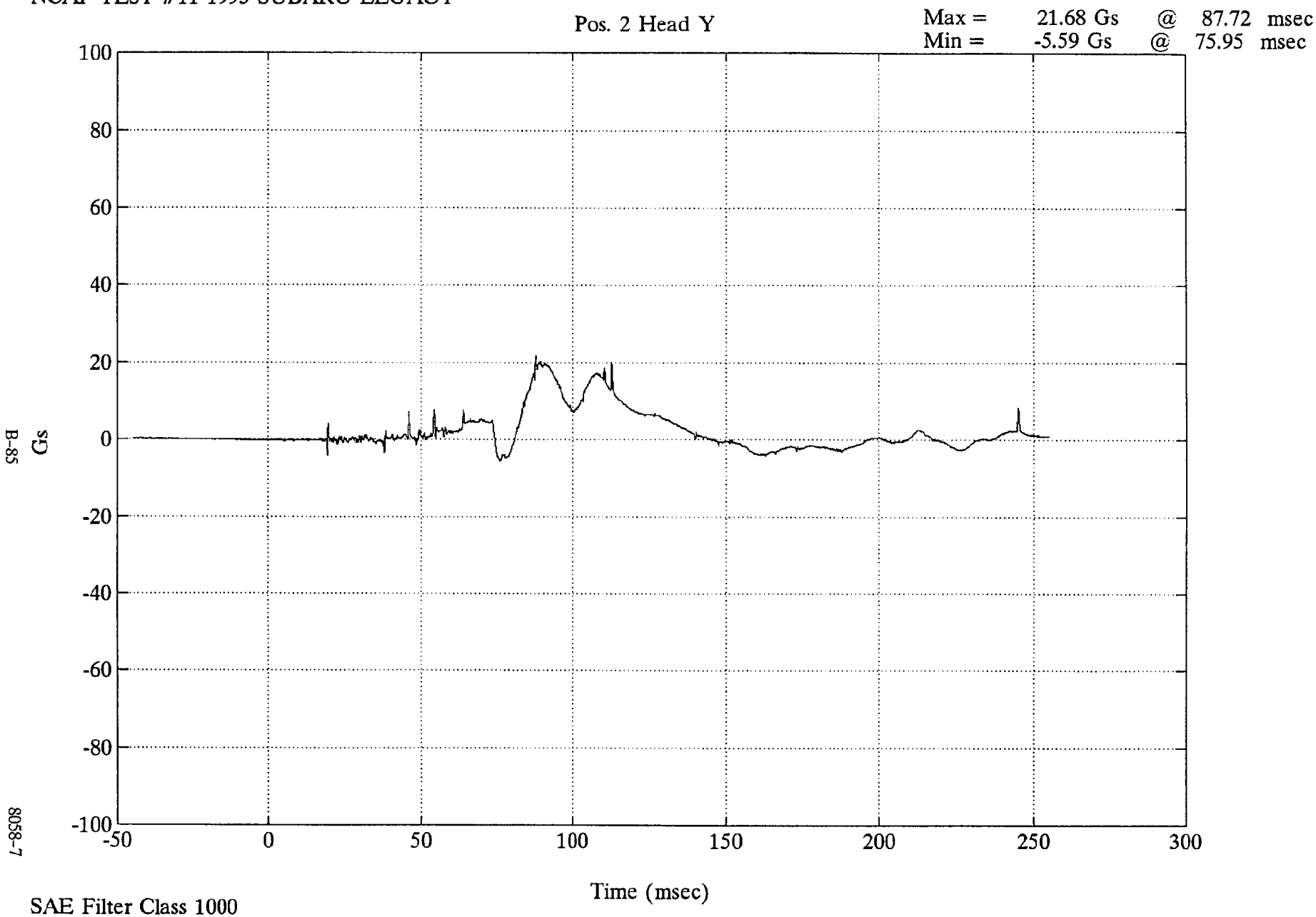
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



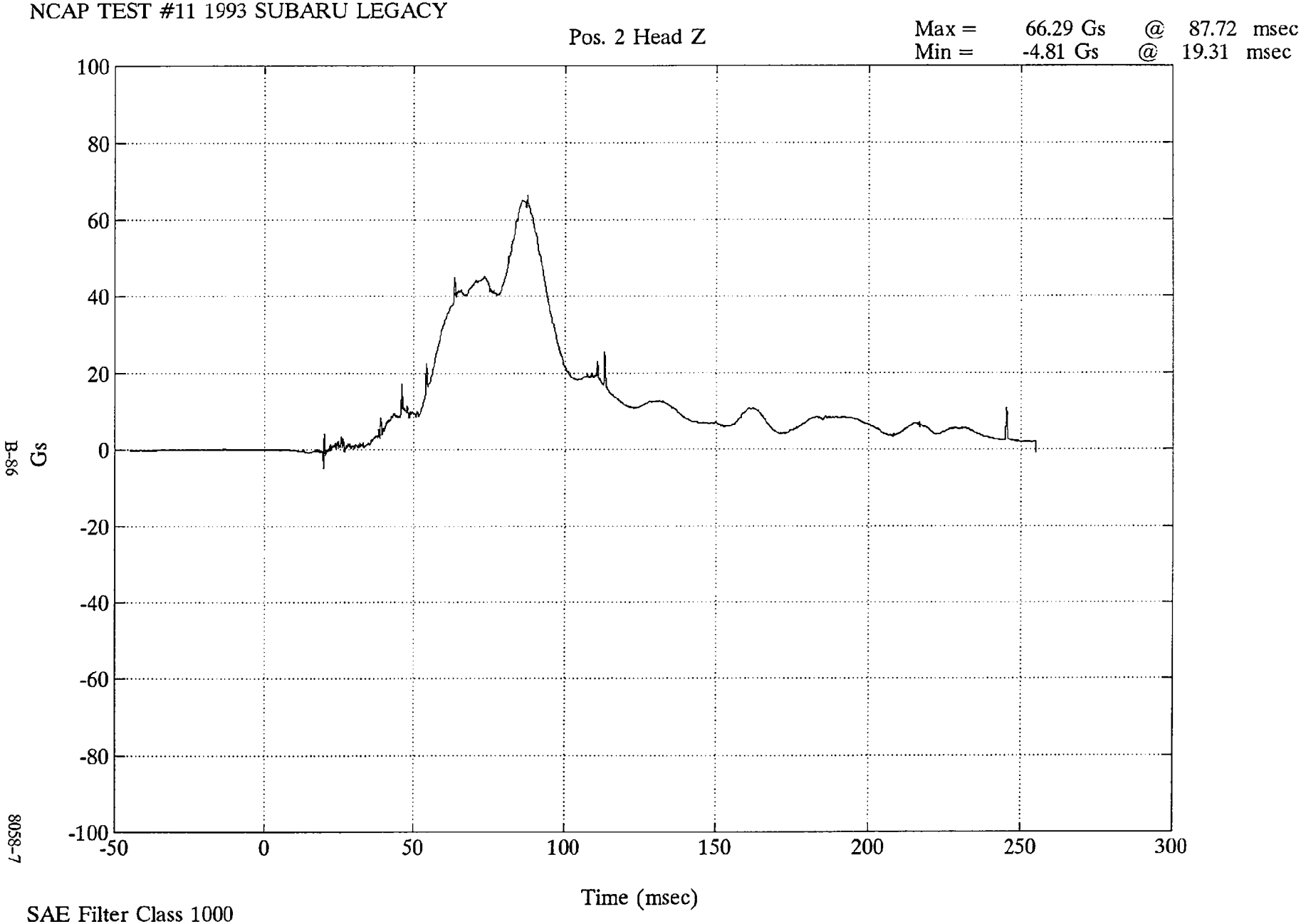
SAE Filter Class 1000

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 1000

NCAP TEST #11 1993 SUBARU LEGACY

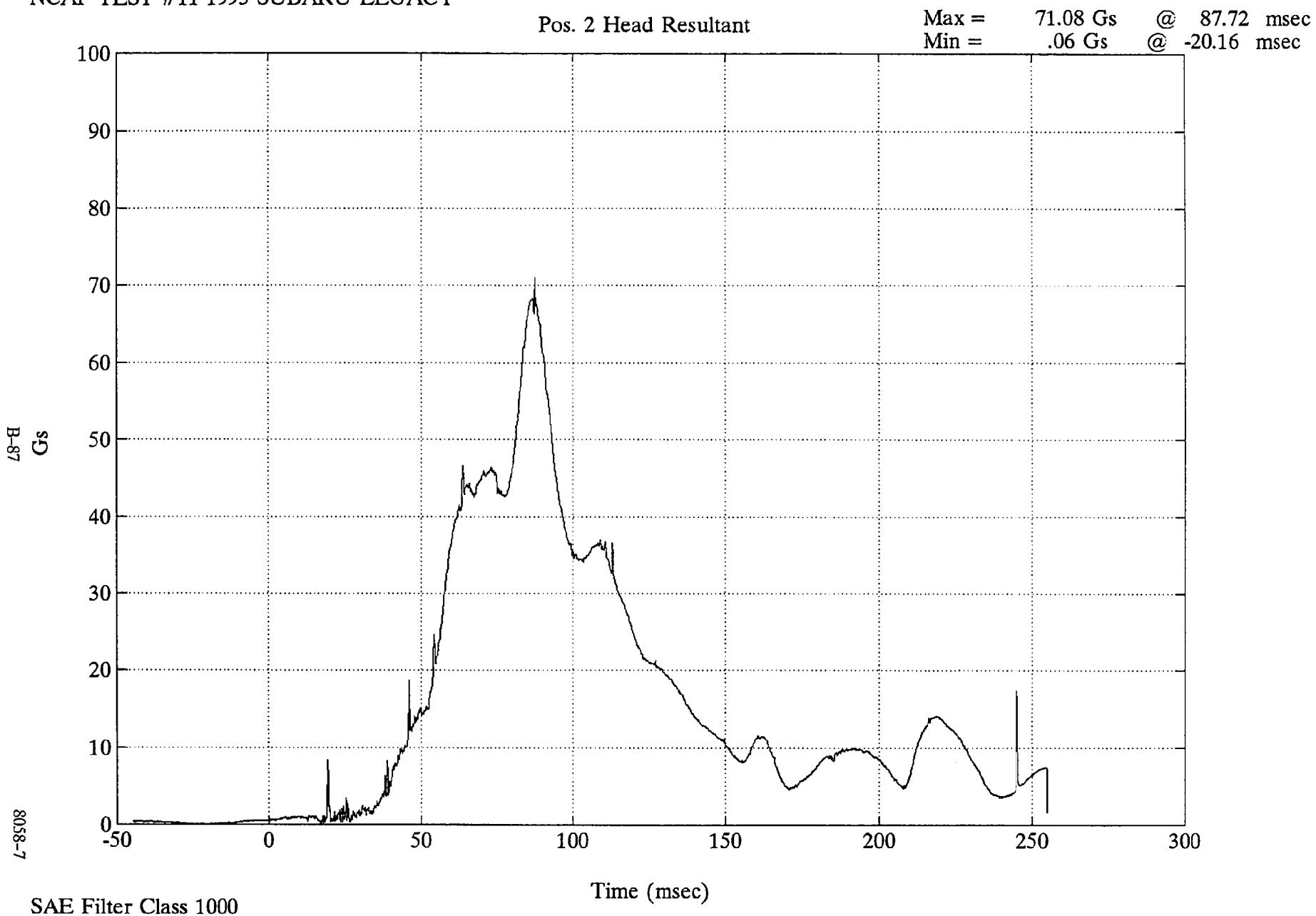


B-86

8058-7

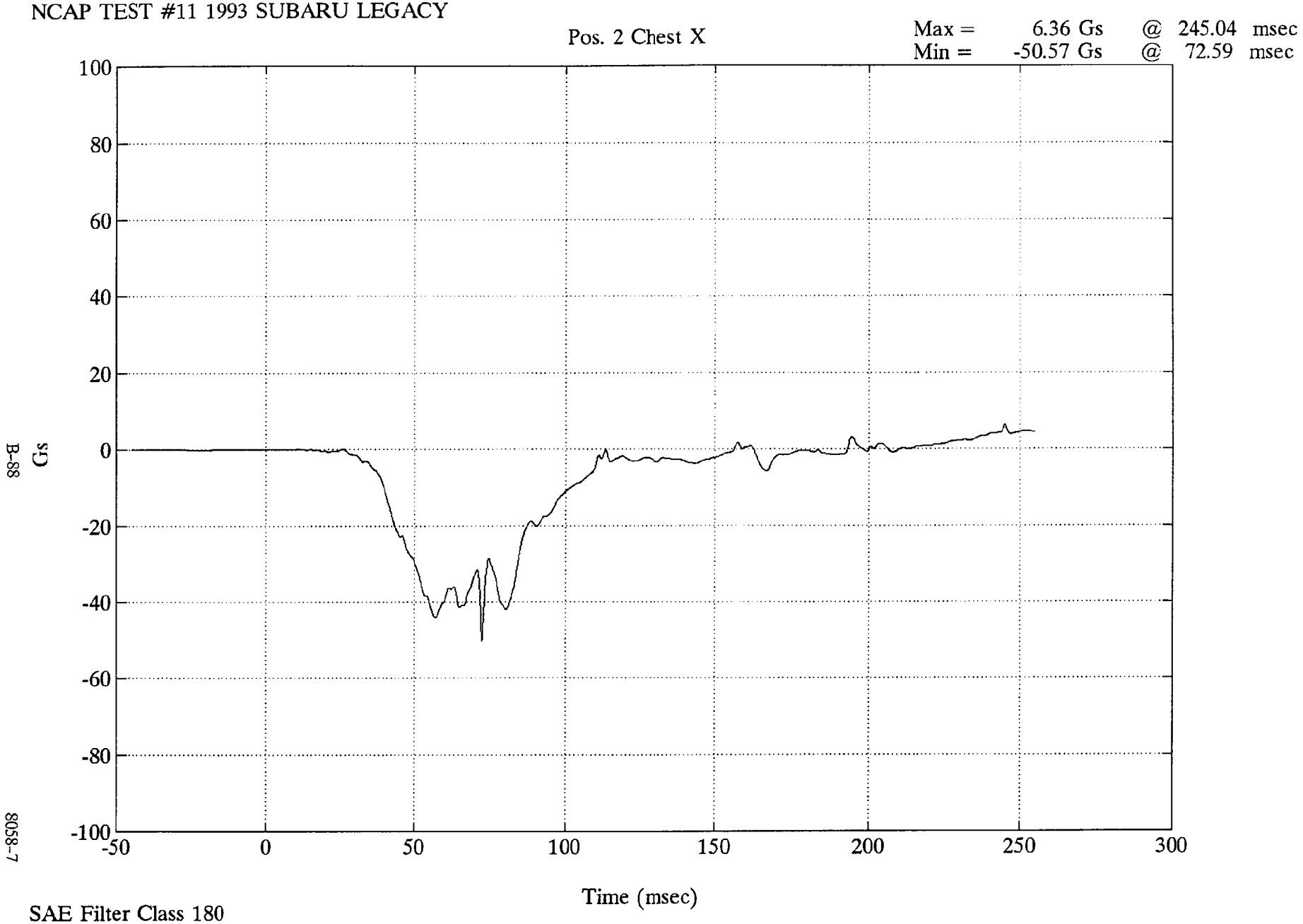
SAE Filter Class 1000

NCAP TEST #11 1993 SUBARU LEGACY



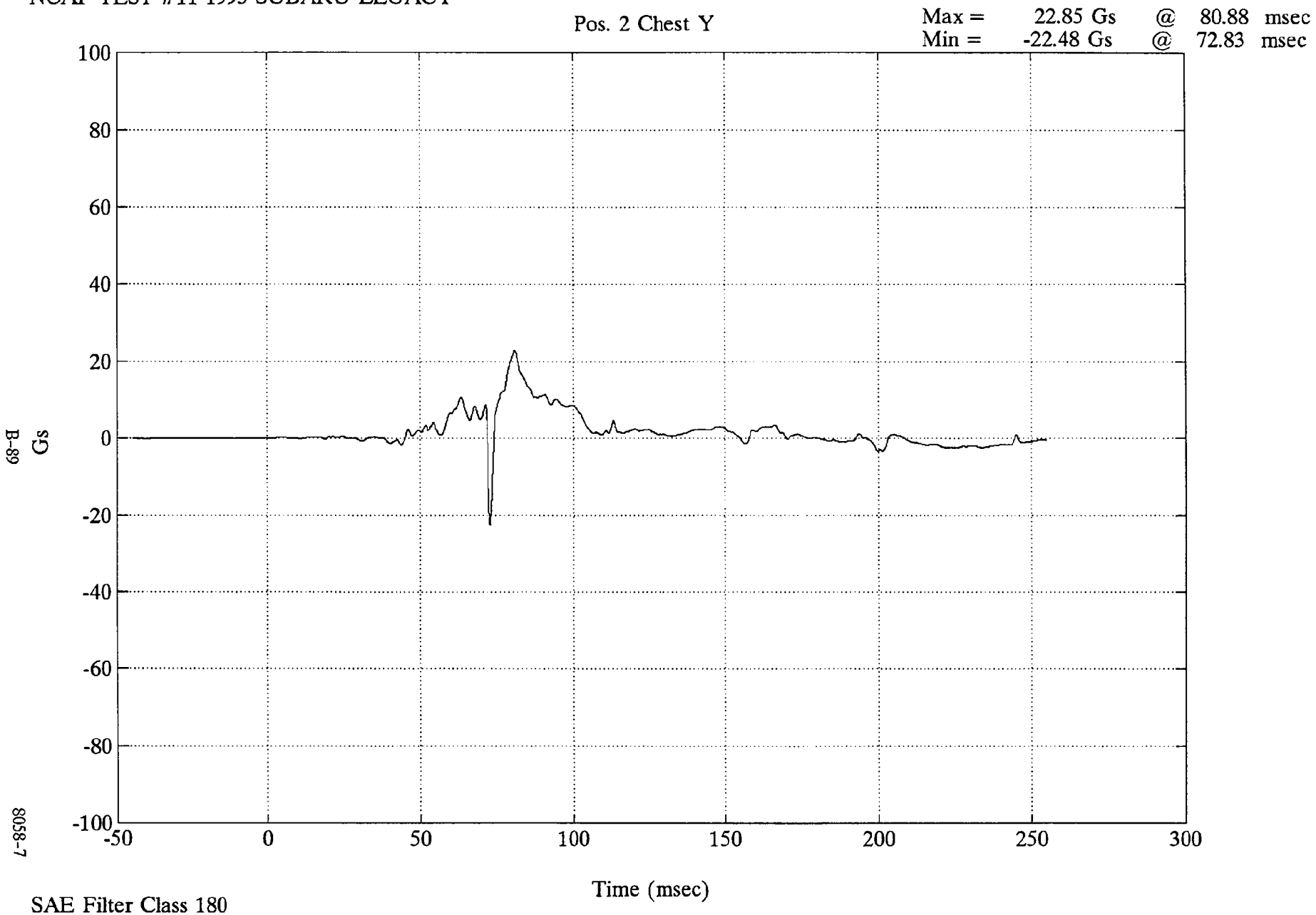
SAE Filter Class 1000

NCAP TEST #11 1993 SUBARU LEGACY



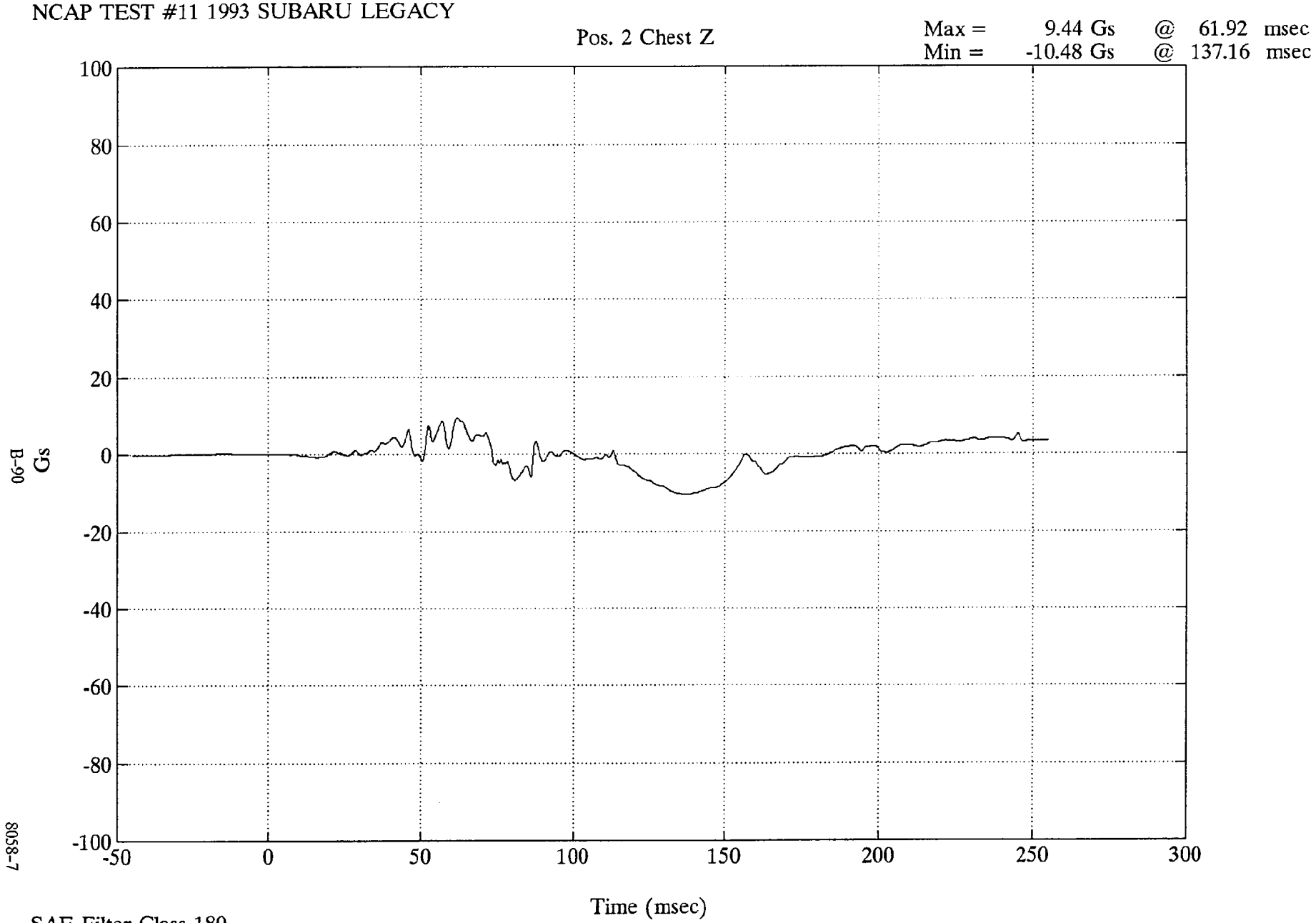
SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY



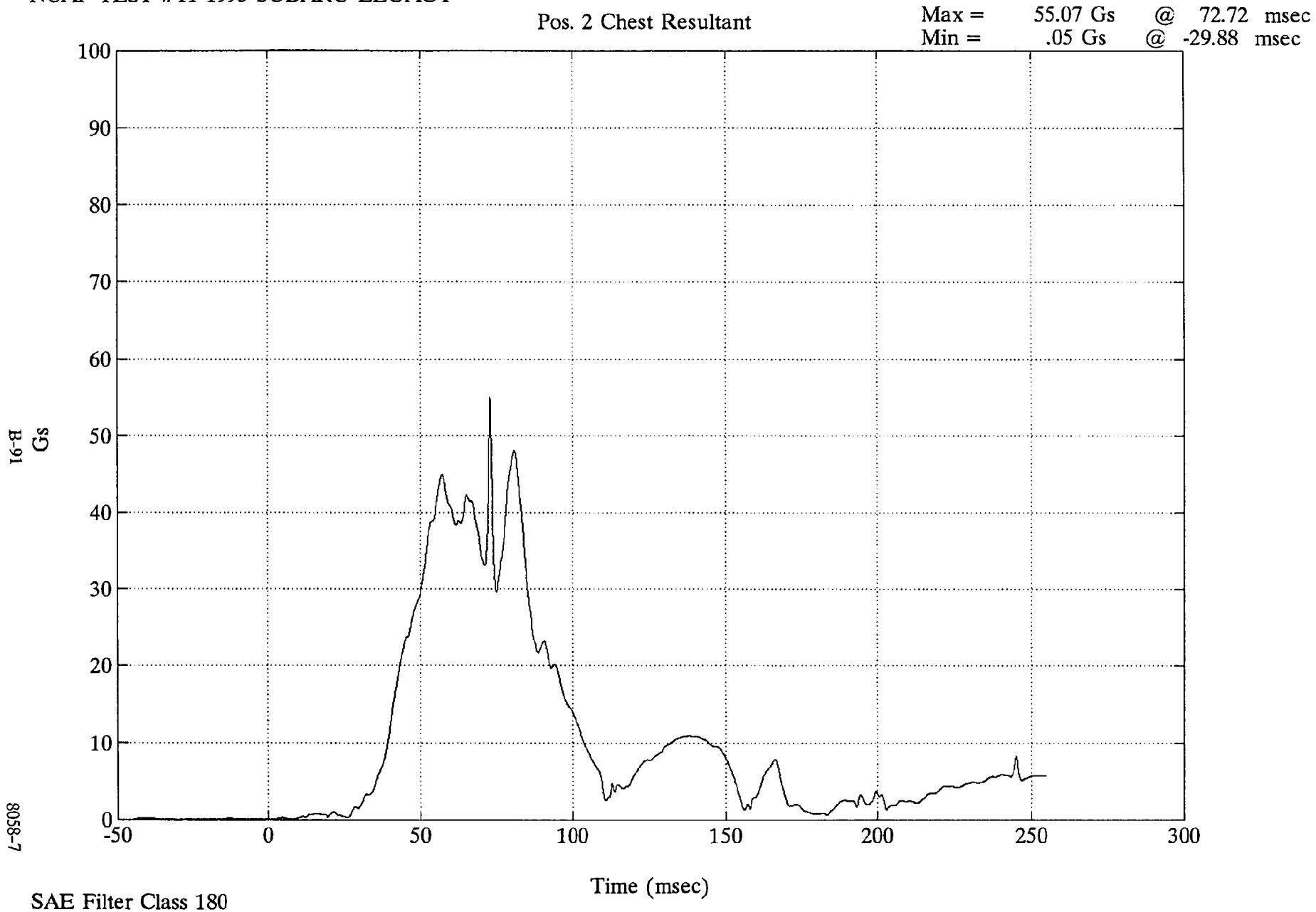
SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY



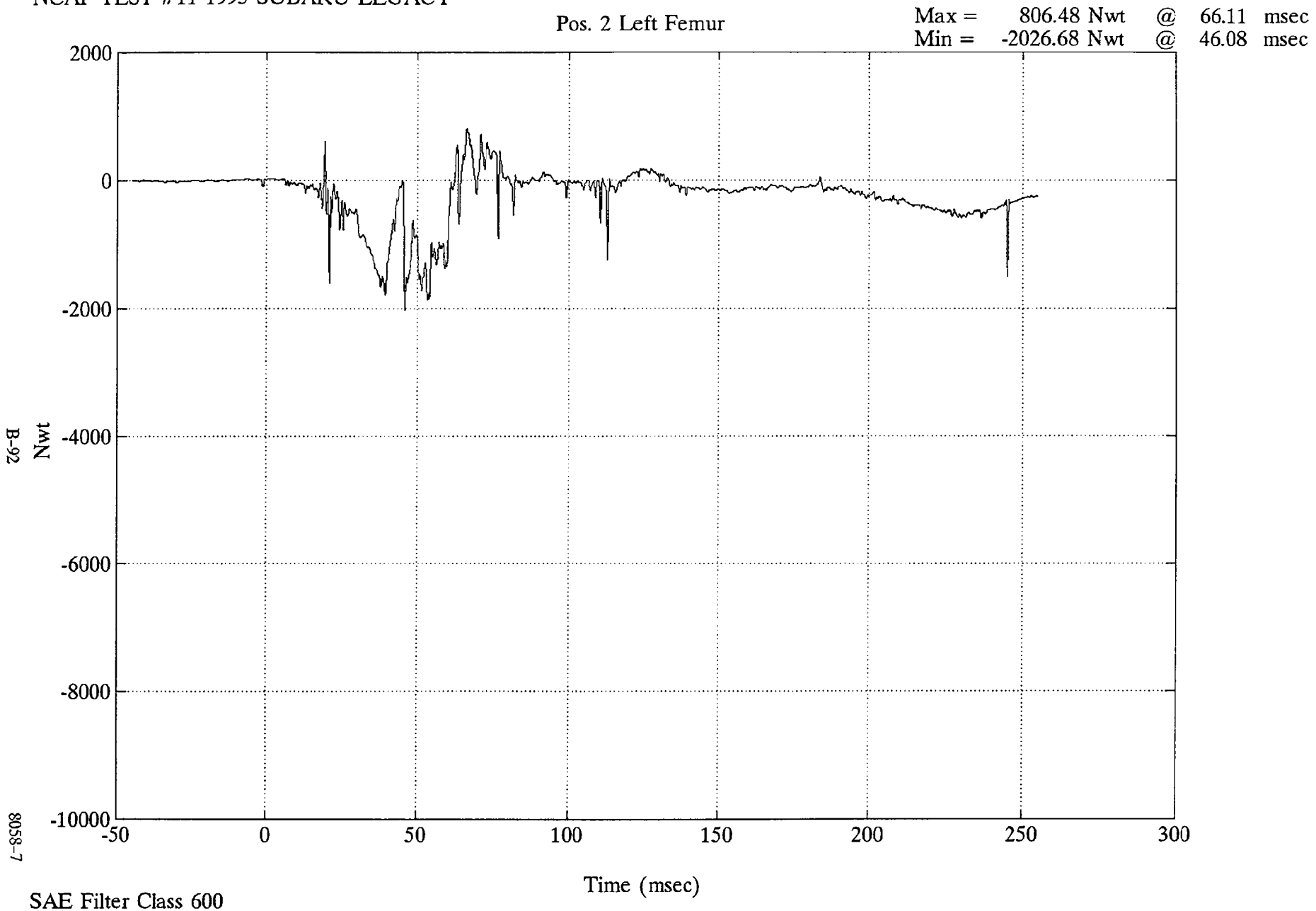
SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 180

NCAP TEST #11 1993 SUBARU LEGACY



B-92

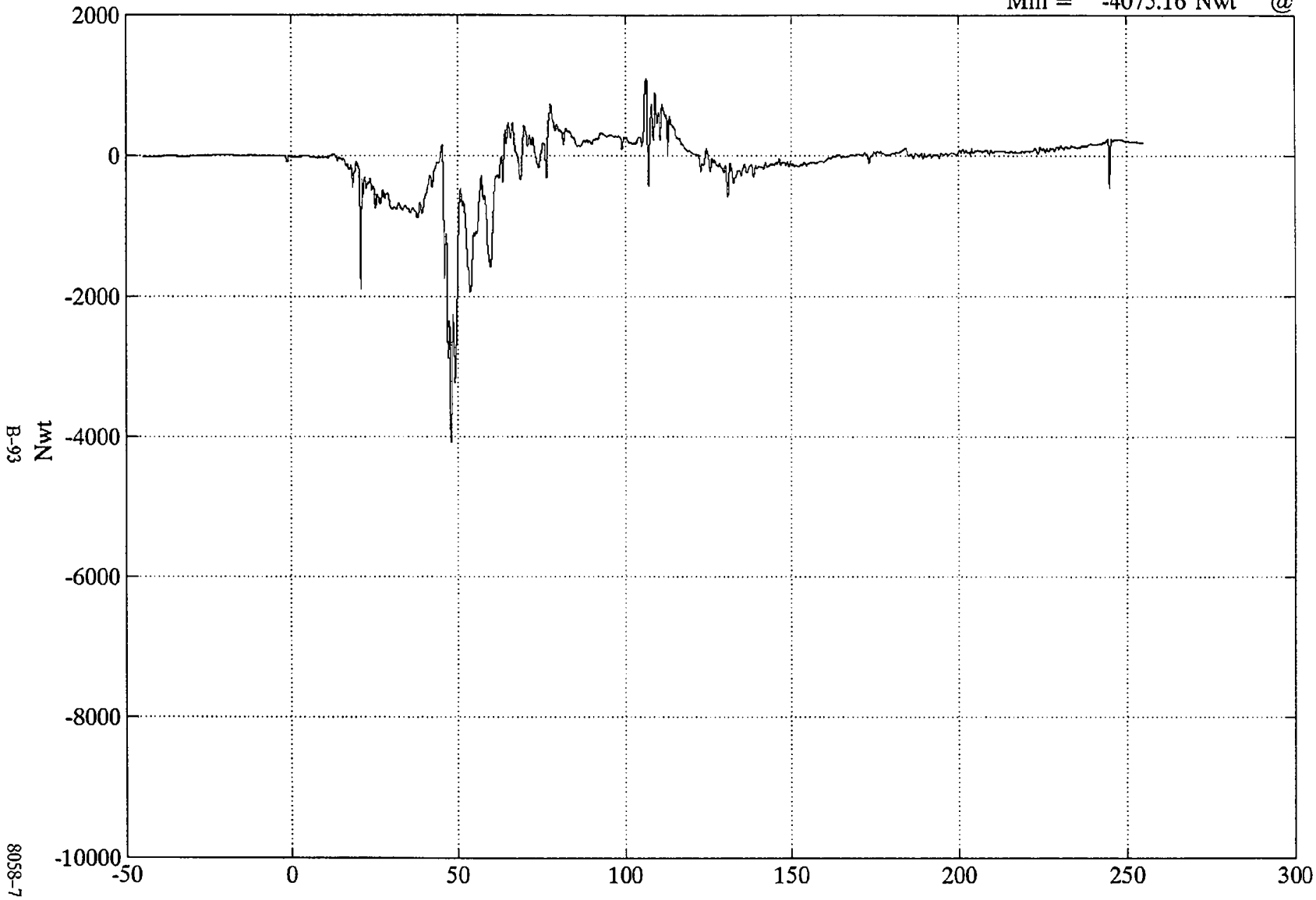
8058-7

SAE Filter Class 600

NCAP TEST #11 1993 SUBARU LEGACY

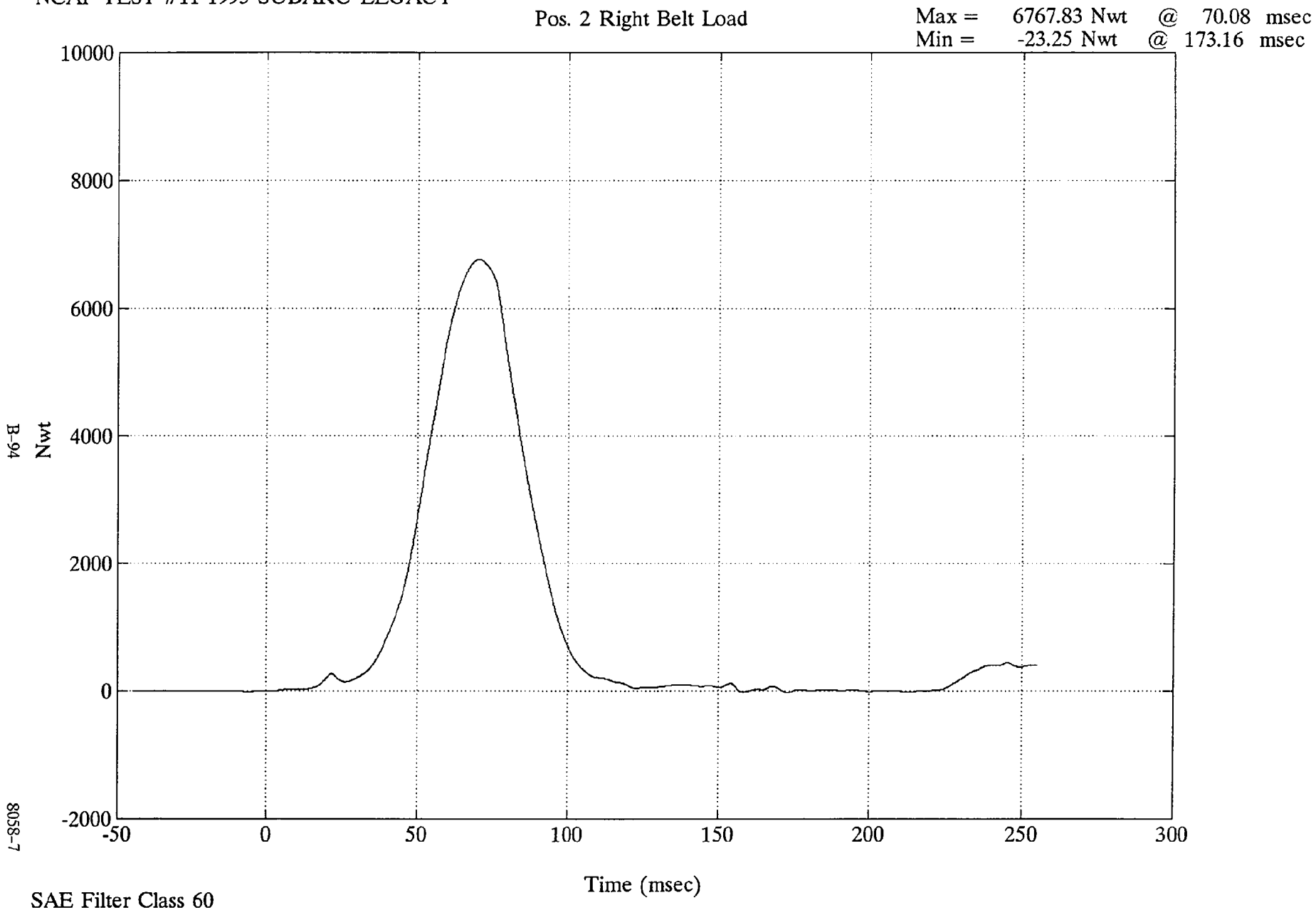
Pos. 2 Right Femur

Max = 1104.03 Nwt @ 106.44 msec
Min = -4075.16 Nwt @ 48.00 msec



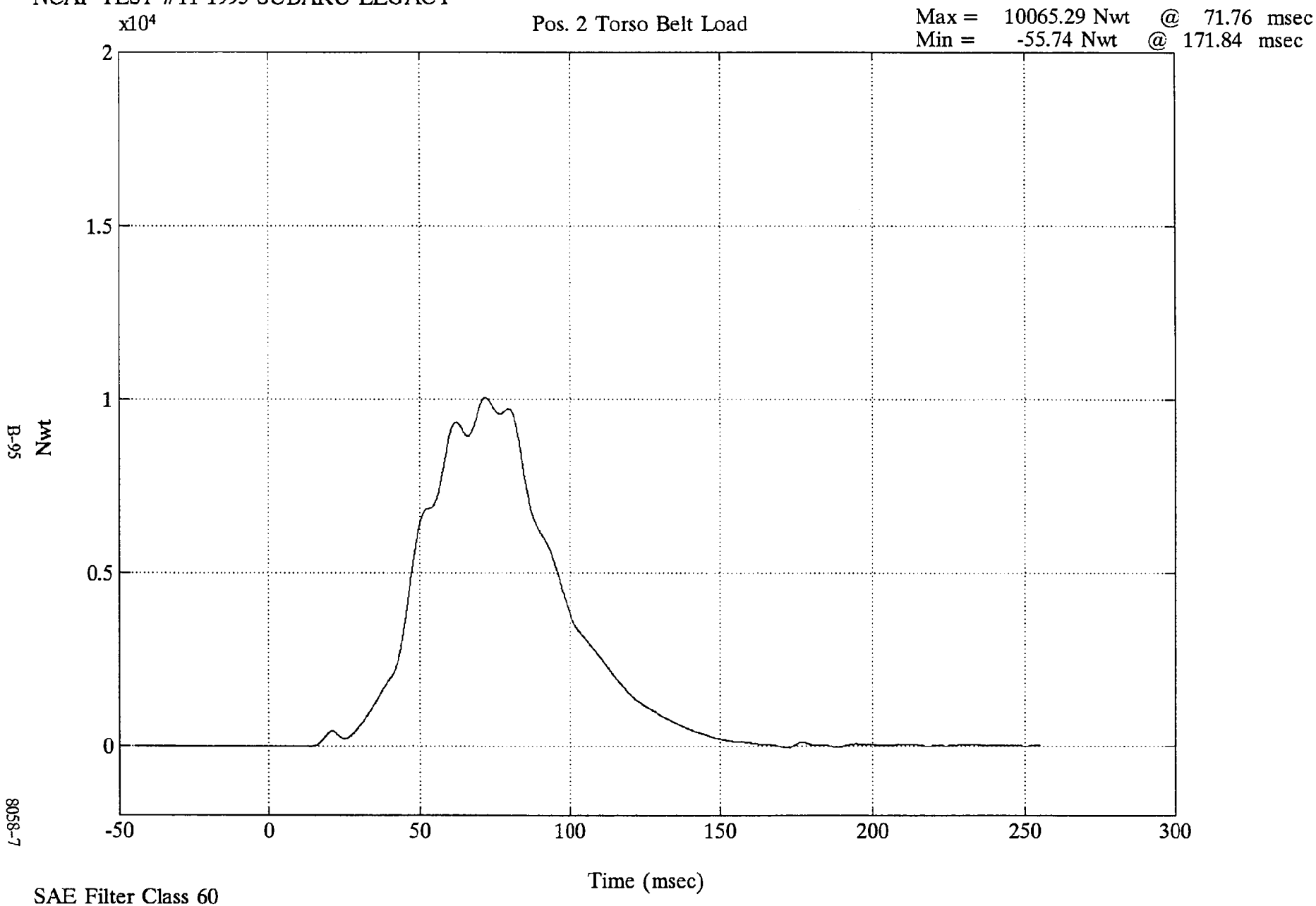
SAE Filter Class 600

NCAP TEST #11 1993 SUBARU LEGACY



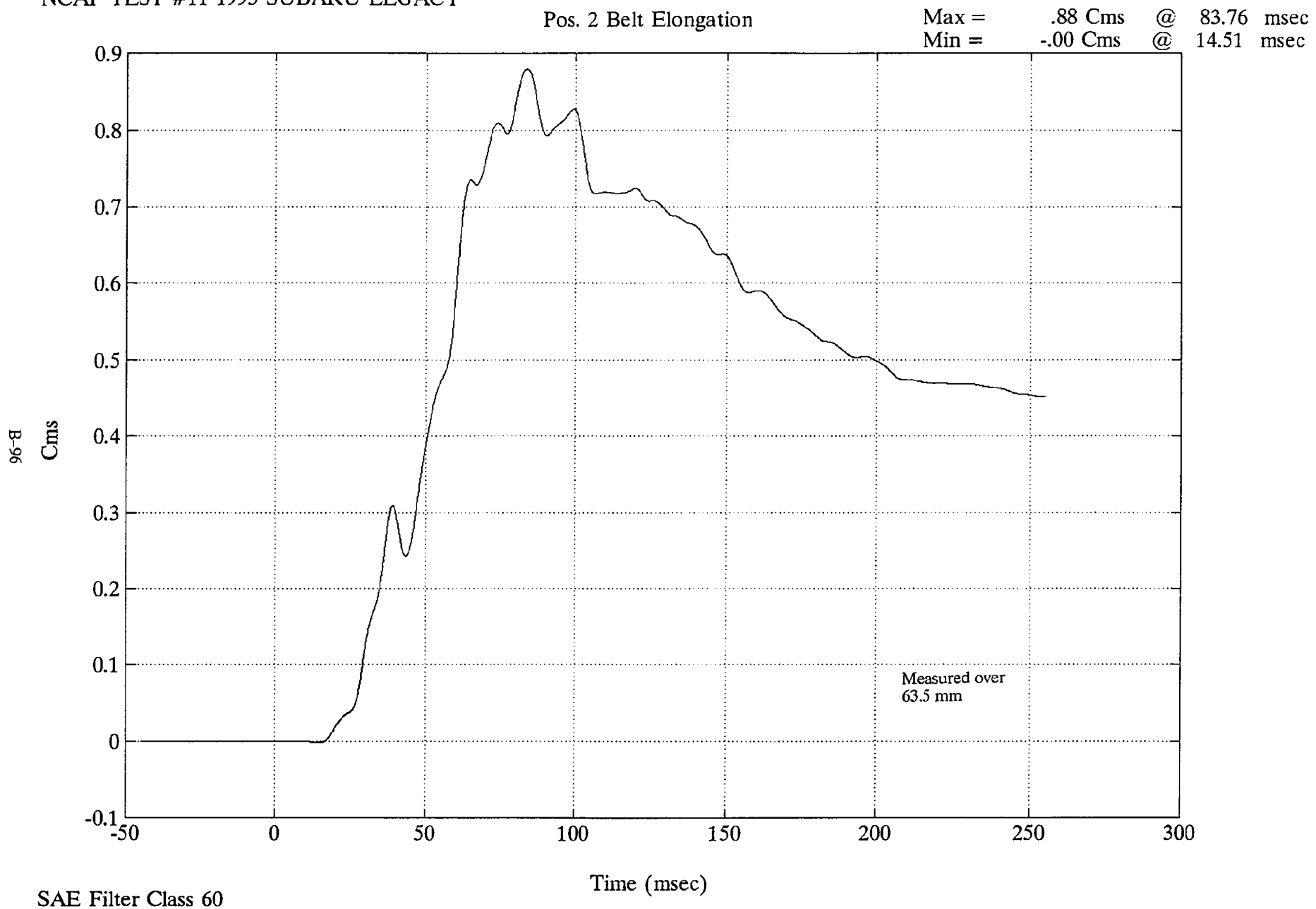
SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

NCAP TEST #11 1993 SUBARU LEGACY



SAE Filter Class 60

Appendix C

PART 572B 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:

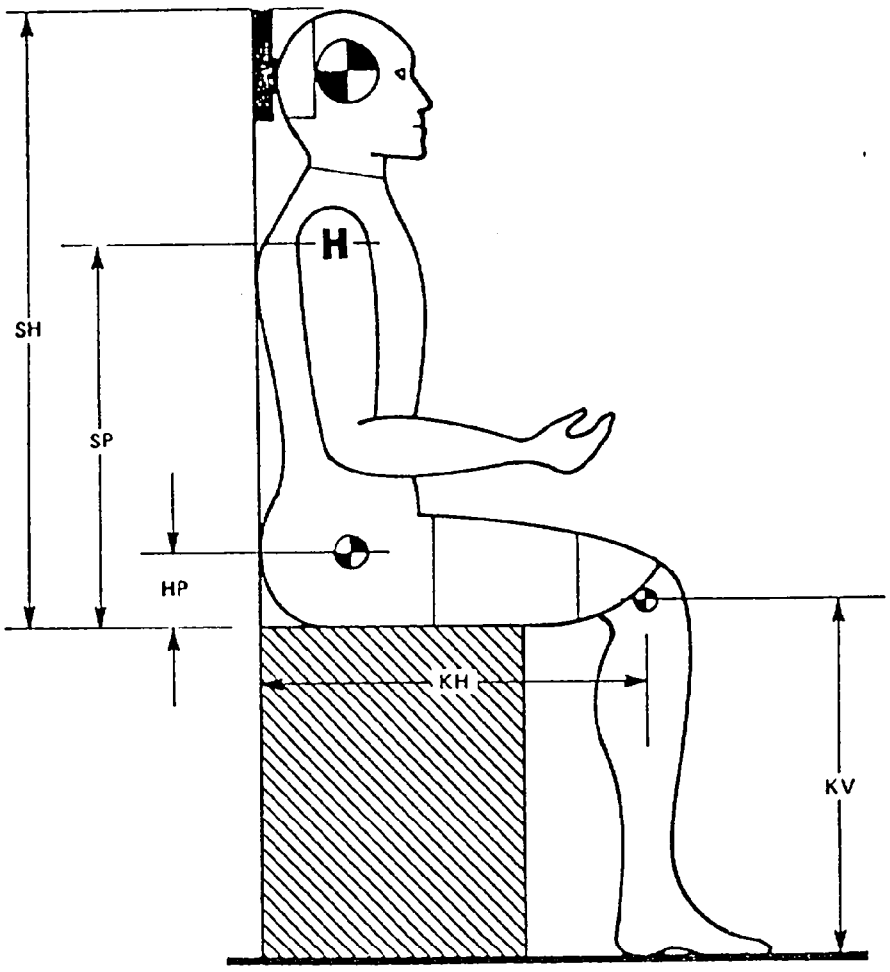
Serial No.	Completion Date
357	1/15/93
320	1/15/93

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



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER: 357

I. CONFIGURATION VERIFICATION DATA:

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXX	1/15/93	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	1	
SH - Seated Height	904 to 909 mm	904 mm	mm
SP - Shoulder Pivot Height	554 to 569 mm	556 mm	mm
HP - Hip Pivot Height	99 mm ref.	99 mm	mm
KH - Knee Pivot from Back Line	510 to 526 mm	518 mm	mm
KV - Knee Pivot from floor	490 to 505 mm	495 mm	mm
SW - Shoulder Width	452 to 467 mm	457 mm	mm
HW - Hip Width	356 to 391 mm	363 mm	mm

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		1/15/93	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (19 to 25 C)		20.5-21 C	C
VERIFICATION LAB HUMIDITY (10 TO 70 %)		29-35 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	217.8 G's	G's
b. peak lateral accel.	<= 10 G's	7.2 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.38 ms	ms

* Sequential number beginning with "1" at the start of each fiscal year crash test program.

TECHNICIAN'S NAME: Ivan Minkewicz

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA...continued

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 357

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		23.6 to 28.0 kph	24.9 kph	kph
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	22.9 G's	G's
c. Peak Resultant Head Acceleration		26 G's max.	25.8 G's	G's
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.73 ms	ms
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.17 ms	ms
f. Pendulum Decel. (t4-t3)		<= 10 ms.	7.69 ms	ms
g. Max. Head Rotation		63 to 73 deg.	66.87 deg	deg
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	ms
	Displ.	-13 to 13 mm	0.0 mm	mm
30 deg.	Time	25.6 to 34.4 ms.	30.38 ms	ms
	Displ.	53 to 79 mm	65 mm	mm
60 deg.	Time	40.3 to 51.7 ms.	46.5 ms	ms
	Displ.	109 to 135 mm	126 mm	mm
Maximum	Time	53.2 to 66.8 ms.	56.55 ms	ms
	Displ.	127 to 152 mm	134 mm	mm
60 deg.	Time	67.0 to 83.0 ms.	67.58 ms	ms
	Displ.	109 to 135 mm	128 mm	mm
30 deg.	Time	85.4 to 104.6 ms.	87.55 ms	ms
	Displ.	53 to 79 mm	58.4 mm	mm
0 deg.	Time	101.0 - 123.0 ms.	101.69 ms	ms
	Displ.	-13 to 13 mm	0.0 mm	mm

TECHNICIANS NAME: Ivan Minkewicz

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 357

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION TEST: (preload = 222 N)			
a. Force @ 1.3 mm	102 to 160 N	124.5 N	N
b. Force @ 1.9 mm	160 to 222 N	186.8 N	N
c. Force @ 2.5 mm	222 to 280 N	262.4 N	N
d. Force @ 3.3 mm	325 to 391 N	371.4 N	N
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	98 to 151 N	129 N	N
b. Force @ 30 deg.	151 to 205 N	180 N	N
c. Force @ 40 deg.	205 to 257 N	226.8 N	N
d. Return Angle	12 deg. maximum	9 deg	deg
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	23.9 to 24.4 kph	24 kph	kph
(2) Peak Deflection	43 mm maximum	41.1 mm	mm
(3) Peak Resistive Force	10008 N maximum	9305 N	N
(4) Internal Hysteresis	50 to 70%	58.9 %	%
B. Low Speed			
(1) Probe Speed	15.0 to 15.5 kph	15.36 kph	kph
(2) Peak Deflection	28 mm maximum	27.7 mm	mm
(3) Peak Resistive Force	6449 N maximum	5795 N	N
(4) Internal Hysteresis	50 to 70%	52.7 %	%

TECHNICIAN'S NAME: Ivan Minkewicz

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 357

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	7.4 to 7.7 kph	7.68 kph	kph
(2) Maximum Force	8229 to 11120 N	8642 N	N
(3) Time above 1000 lbs.	1.7 ms. minimum	1.875 ms	ms
B. Right Knee			
(1) Probe Speed	7.4 to 7.7 kph	7.68 kph	kph
(2) Maximum Force	8229 to 11120 N	9185 N	N
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	ms

REMARKS:

TECHNICIAN'S NAME: Ivan Minkewicz

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 357

A. DUMMY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER				
HX LONGITUDINAL	ENDEVCO	AC2K4	12/92	6/93
HY LATERAL	ENDEVCO	AC2K3	12/92	6/93
HZ VERTICAL	ENDEVCO	AC2M6	12/92	6/93
2. CHEST ACCELEROMETER				
CX LONGITUDINAL	ENDEVCO	ACT12	3/93	9/93
CY LATERAL	ENDEVCO	ACT24	3/93	9/93
CZ VERTICAL	ENDEVCO	AC2R5	3/93	9/93
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	954	11/92	5/93
RIGHT SIDE	GSE	955	11/92	5/93

B. CALIBRATION LABORATORY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. PENDULUM ACC.	CEC	A160	11/92	5/93
2. TEST PROBE ACCELEROMETER	CEC	A161	11/92	5/93
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE	TRANS-DUCER INC	20051	11/92	5/93
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE	BLH	72952	11/92	5/93
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE	CIC	567-11	11/92	5/93

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER: 320

I. CONFIGURATION VERIFICATION DATA:

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXX	1/15/93	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	2	
SH - Seated Height	904 to 909 mm	906 mm	mm
SP - Shoulder Pivot Height	554 to 569 mm	559 mm	mm
HP - Hip Pivot Height	99 mm ref.	99 mm	mm
KH - Knee Pivot from Back Line	510 to 526 mm	518 mm	mm
KV - Knee Pivot from floor	490 to 505 mm	498 mm	mm
SW - Shoulder Width	452 to 467 mm	460 mm	mm
HW - Hip Width	356 to 391 mm	376 mm	mm

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		1/15/93	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		2	
VERIFICATION LAB TEMPERATURE (19 to 25 C)		20.5-21 C	C
VERIFICATION LAB HUMIDITY (10 TO 70 %)		29-32 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	234 G's	G's
b. peak lateral accel.	<= 10 G's	9.6 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.13 ms	ms

* Sequential number beginning with "1" at the start of each fiscal year crash test program.

TECHNICIAN'S NAME: Ivan Minkewicz

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA...continued

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		23.6 to 28.0 kph	24.24 kph	kph
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.8 G's	G's
c. Peak Resultant Head Acceleration		26 G's max.	25.75 G's	G's
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.48 ms	ms
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.54 ms	ms
f. Pendulum Decel. (t4-t3)		<= 10 ms.	3.47 ms	ms
g. Max. Head Rotation		63 to 73 deg.	70.11 deg	deg
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	ms
	Displ.	-13 to 13 mm	0.0 mm	mm
30 deg.	Time	25.6 to 34.4 ms.	28.15 ms	ms
	Displ.	53 to 79 mm	64.5 mm	mm
60 deg.	Time	40.3 to 51.7 ms.	42.16 ms	ms
	Displ.	109 to 135 mm	120.1 mm	mm
Maximum	Time	53.2 to 66.8 ms.	55.68 ms	ms
	Displ.	127 to 152 mm	135.1 mm	mm
60 deg.	Time	67.0 to 83.0 ms.	68.58 ms	ms
	Displ.	109 to 135 mm	123.4 mm	mm
30 deg.	Time	85.4 to 104.6 ms.	86.93 ms	ms
	Displ.	53 to 79 mm	55.9 mm	mm
0 deg.	Time	101.0 - 123.0 ms.	101.93 ms	ms
	Displ.	-13 to 13 mm	0.0 mm	mm

TECHNICIANS NAME: Ivan Minkewicz

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION TEST: (preload = 222 N)			
a. Force @ 1.3 mm	102 to 160 N	111.2 N	N
b. Force @ 1.9 mm	160 to 222 N	175.7 N	N
c. Force @ 2.5 mm	222 to 280 N	246.4 N	N
d. Force @ 3.3 mm	325 to 391 N	340.7 N	N
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	98 to 151 N	117.9 N	N
b. Force @ 30 deg.	151 to 205 N	177.9 N	N
c. Force @ 40 deg.	205 to 257 N	217.9 N	N
d. Return Angle	12 deg. maximum	10 deg	deg
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	23.9 to 24.4 kph	23.9 kph	kph
(2) Peak Deflection	43 mm maximum	40.9 mm	mm
(3) Peak Resistive Force	10008 N maximum	9768 N	N
(4) Internal Hysteresis	50 to 70%	60.2 %	%
B. Low Speed			
(1) Probe Speed	15.0 to 15.5 kph	15.25 kph	kph
(2) Peak Deflection	28 mm maximum	27.4 mm	mm
(3) Peak Resistive Force	6449 N maximum	5938 N	N
(4) Internal Hysteresis	50 to 70%	57.7 %	%

TECHNICIAN'S NAME: Ivan Minkewicz

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	7.4 to 7.7 kph	7.68 kph	kph
(2) Maximum Force	8229 to 11120 N	8936 N	N
(3) Time above 1000 lbs.	1.7 ms. minimum	1.875 ms	ms
B. Right Knee			
(1) Probe Speed	7.4 to 7.7 kph	7.68 kph	kph
(2) Maximum Force	8229 to 11120 N	9834 N	N
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	ms

REMARKS:

TECHNICIAN'S NAME: Ivan Minkewicz

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 320

A. DUMMY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER				
HX LONGITUDINAL	ENDEVCO	ER74	3/93	9/93
HY LATERAL	ENDEVCO	A57G	3/93	9/93
HZ VERTICAL	ENDEVCO	A84J	3/93	9/93
2. CHEST ACCELEROMETER				
CX LONGITUDINAL	ENDEVCO	A12C	3/93	9/93
CY LATERAL	ENDEVCO	A60C	3/93	9/93
CZ VERTICAL	ENDEVCO	A84G	3/93	9/93
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	551	11/92	5/93
RIGHT SIDE	GSE	552	11/92	5/93

B. CALIBRATION LABORATORY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. PENDULUM ACC.	CEC	A160	11/92	5/93
2. TEST PROBE ACCELEROMETER	CEC	A161	11/92	5/93
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE	TRANS-DUCER INC	20051	11/92	5/93
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE	BLH	72952	11/92	5/93
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE	CIC	567-11	11/92	5/93

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	AC2K4	ENDEVCO	12/92	6/93
Y	AC2K3	ENDEVCO	12/92	6/93
Z	AC2M6	ENDEVCO	12/92	6/93
Chest X	ACT12	ENDEVCO	3/93	9/93
Y	ACT24	ENDEVCO	3/93	9/93
Z	AC2R5	ENDEVCO	3/93	9/93
Right Femur Load Cell	955	GSE	11/92	5/93
Left Femur Load Cell	954	GSE	11/92	5/93
Neck Load Cell X	---	DENTON	------	-----
Y	---	DENTON	-----	-----
Z	---	DENTON	-----	-----
Neck Moment X	---	DENTON	-----	-----
Y	---	DENTON	-----	-----
Z	---	DENTON	-----	-----
Chest Deflection Gauge	---	HUMANOID	-----	-----
Hybrid III Use Only				
Lap Belt Load Cells	706	LEBOW	2/93	8/93
Shoulder Belt Load Cells	707	LEBOW	2/93	8/93
Spool-Out Potentiometer	---	SERVONIC INST.	-----	-----
Belt Stretch Transducer	E1	CALSPAN	11/92	5/93

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X	ER74	ENDEVCO	3/93	9/93
	Y	A57G	ENDEVCO	3/93	9/93
	Z	A84J	ENDEVCO	3/93	9/93
Chest	X	A12C	ENDEVCO	3/93	9/93
	Y	A60C	ENDEVCO	3/93	9/93
	Z	A84G	ENDEVCO	3/93	9/93
Right Femur Load Cell		552	GSE	11/92	5/93
Left Femur Load Cell		551	GSE	11/92	5/93
Neck Load Cell	X	---	DENTON	-----	-----
	Y	---	DENTON	-----	-----
	Z	---	DENTON	-----	-----
Neck Moment	X	---	DENTON	-----	-----
	Y	---	DENTON	-----	-----
	Z	---	DENTON	-----	-----
Chest Deflection Gauge		---	HUMANOID	-----	----
Hybrid III Use Only					
Lap Belt Load Cells		710	LEBOW	2/93	8/93
Shoulder Belt Load Cells		711	LEBOW	2/93	8/93
Spool-Out Potentiometer		---	SERVONIC INST.	-----	-----
Belt Stretch Transducer		E2	CALSPAN	11/92	5/93

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

(6 Month Calibration Minimum)

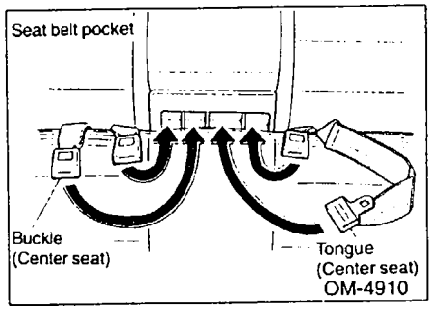
	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	A69	CEC	1/93	7/93
Right Rear Seat Crossmember	A70	CEC	2/93	8/93
Top of Engine	A44	CEC	1/93	7/93
Bottom of Engine	A152	CEC	10/92	4/93
Left Disc Brake Caliper	A163	CEC	10/92	4/93
Right Disc Brake Caliper	A147	CEC	11/92	5/93
Instrument Panel	A183	CEC	10/92	4/93
Center Rear Crossmember	A101	CEC	11/92	5/93
Vehicle Rear Z	A142	CEC	1/93	7/93

Appendix E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

WARNING!
- **Never stack luggage or other cargo higher than the top of the seatback because it could tumble forward and injure passengers in the event of a sudden stop or an accident.**
- **Firmly secure skis and other long items in position to prevent them from shooting forward during a sudden stop and causing injury.**
- **Never permit anyone to ride in the cargo area of the wagon because this area is designed only for carrying luggage and other miscellaneous items.**

CAUTION:
- ***Do not place luggage or other articles on the floor under the seat cushion.***
- ***When folding down the back seat in a wagon, put the seat belts in the seat belt pocket to prevent them from falling beneath the seat cushion.***



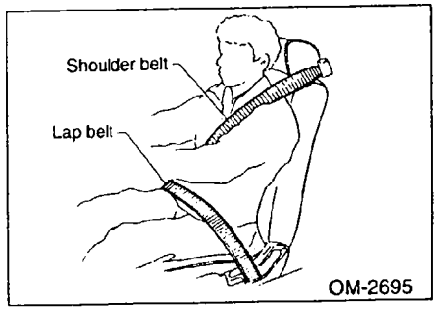
To return the rear seat to its original position, raise the seatback and push it till it locks. Then pull the rear cushion down to its normal position. Move the seat back and forth to confirm that it is securely locked in position. Place the head restraints (if so equipped) back in their normal position.

WARNING!
- **After returning the rear seatback to its upright position, make sure the seat belts and seat conversion strap are properly located on top of the rear seat cushion.**
- **Also make certain that the shoulder belts are in front of rather than behind the rear seatback.**

D13KE

Front Seat Belts (Automatic Belts)

Your vehicle (except Canada model) has an automatic shoulder belt and a manual lap belt for both front seat.
The automatic shoulder belt restrains the upper torso.
When the ignition switch is turned "ON", the shoulder belt responds automatically to the opening and closing of the door to allow easy entry into and egress from the vehicle.
A knee panel is also located below the instrument panel to restrain the lower torso.



WARNING!

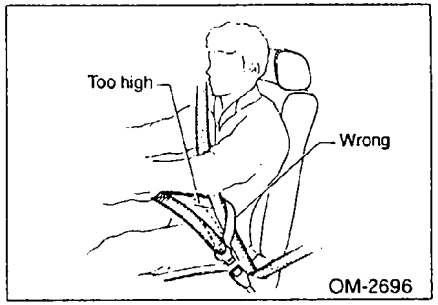
- **All passengers must wear the manual lap belts for full restraint. Shoulder belts alone are not sufficient.**
- **Never open the door while the vehicle is moving as this will cause the automatic shoulder belt to move forward and away from you.**

To use your automatic shoulder belt, first close the door and adjust the seat. When the ignition switch is turned "ON", the shoulder belt automatically moves to restrain the upper half of your body.
The shoulder belt moves freely to allow normal body movement but automatically locks during a sudden stop or impact.
When the door is opened, the shoulder belt moves forward, allowing you to get out easily.
If the ignition switch is turned "OFF", the seat belt will move forward only when the door is opened for the first time. If the door is closed again, the seat belt will remain in its current position and will not move until the ignition is again turned "ON".
If the ignition is turned "ON" while the seat belt is moving backward, turning the ignition "OFF" will cause the seat belt to stop.
If the seat belt is moving forward while the ignition is turned "OFF", closing the door will cause the seat belt to stop at its current position.
A seat belt which stops under any of these conditions moves normally again when the ignition switch is turned "ON" or when the door is opened.

E-3

8058-7

If the shoulder belt slide anchor becomes stuck or cannot be moved, see the section entitled "In Case of Emergency".



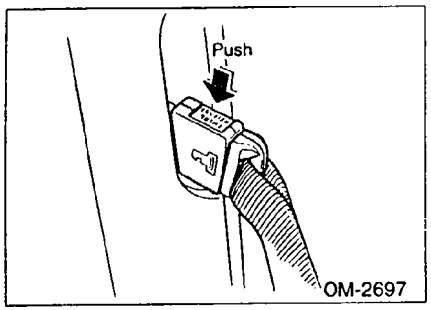
WARNING!

- **To avoid personal injury and damage to property that may result from normal movement of the shoulder belt slide anchor in its track, keep all parts of your body (especially fingers and hands) and all objects away from the shoulder belt slide anchor when it is moving.**
- **For correct placement of the shoulder belt, keep your body still and your arms down while the system is operating.**
- **Never use a belt that is twisted or reversed. In an accident, this can increase the risk or severity of injury.**
- **Never position the shoulder belt under your arm. In an accident, this can increase the risk or severity of injury.**
- **Let the shoulder belt position itself around you first before fastening the manual lap belt. Fastening the lap belt first may cause the shoulder belt to get caught beneath the lap belt.**
- **To eliminate the risk of sliding under the seat belt in a collision, the front seats should not be reclined more than needed for comfort. Seat belts restrain the body most effectively when the occupant sits well back and upright in the seat.**

☐ **How to release the shoulder belt in an emergency**

The shoulder belt may be unfastened manually in an emergency by simply pushing the release button on the shoulder belt slide anchor buckle. The shoulder belt will drop free and allow you to quickly leave the vehicle.

If the emergency release is disconnected accidentally or is not fastened securely, a warning light will go on and a chime will sound.

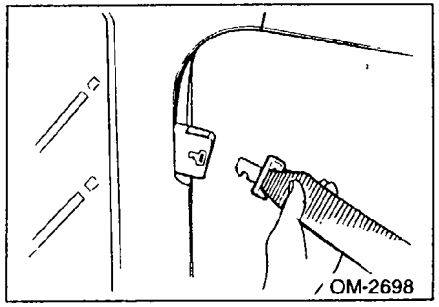


☐ **How to reset the emergency release buckle**

1. Close the front door and turn the ignition switch to "ON" to allow the shoulder belt slide anchor to move to the rearmost position.

2. Draw the shoulder belt across your body, making sure that the caution label attached to the webbing faces you and the belt is not twisted.

3. Insert the tongue of the shoulder belt into the slide anchor until it snaps.



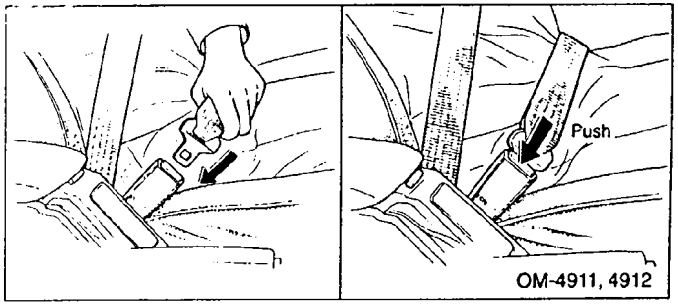
☐ **Manual lap belt (front seats)**

Your lap belt has an emergency locking retractor. To fasten the manual lap belt, pull it from the retractor and insert the tongue into the buckle until it snaps.

The manual lap belt moves freely to allow normal body movement but locks automatically during a sudden stop or impact.

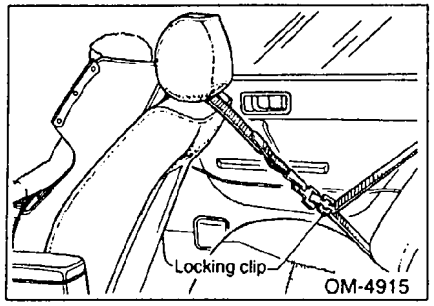
This system can not be made to lock by jerking on the belt.

To unfasten the belt, push the button on the buckle.



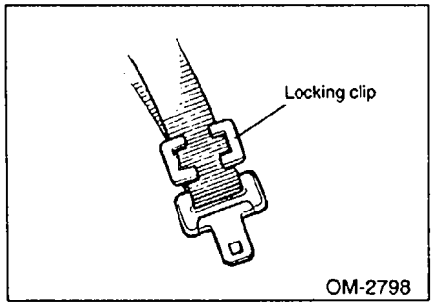
Be sure to fasten the lap belt after the automatic shoulder belt is in place. Fastening the lap belt first may cause the shoulder belt to get caught beneath the lap belt.

If the child restraint system has a top strap, first install a locking clip on the outside lap and shoulder belts of the rear seat as shown in the illustration. Then latch the hook of the top strap onto the tongue of the rear seat belt, and tighten the top strap.



☐ **Locking clip information**

The locking clip mentioned in this manual should be a SUBARU locking clip (Part No. 64956 GA730) or an equivalent. If a locking clip is not included in your child restraint system, you can purchase one from your SUBARU dealer.



CAUTION:

———***Be sure to remove the locking clip when the child restraint system is not in use.***

D17CE

Seat Belt Maintenance

CAUTION:

———***Keep sharp edged or damaging objects away from belts and other parts of the passenger restraint system.***

———***Keep the belts free of polishes, oils, chemicals, and particularly battery acid.***

———***Never attempt to make modifications or changes that will prevent the seat belt from operating properly.***

Important Notes:

- To clean the belts, use a mild soap and lukewarm water. Never bleach or attempt to dye the belts because this could seriously affect their strength.
- Inspect the seat belts and attachments (including the webbing and all hardware) periodically for cracks, cuts, gashes, teares, damage, loose bolts or worn areas. Replace the seat belts even if only minor damage is found.
- Replace all seat belt assemblies, including retractors and attaching hardware, worn by occupants of a vehicle that has been in a serious accident. If in doubt about the severity of the accident, it is better to play it safe and replace the seat belt assemblies.

D18FE

Seat-Belt Warning Light and Chime

☐ **Manual belts**

Your vehicle is equipped with a seat-belt warning device at the driver's seat, as required by current safety standards. This device causes the seat-belt warning light on the instrument panel to light up for about six seconds when the ignition switch is turned to "ON". If the driver's seat belt is not fastened, a warning chime sounds at the same time.

☐ **Automatic belts**

A seat belt warning device required by current safety standards has been provided for the front shoulder belts and the driver's lap belt.

This device causes the seat belt warning light on the instrument panel to flash for about six seconds when the ignition switch is turned "ON".

1. Driver's lap belt warning chime

When the ignition is turned on, a warning chime sounds if the driver's lap belt has not been fastened.

2. Front shoulder belt warning chime

A warning chime sounds for about six seconds and a warning light illuminates and stays on when the emergency release buckle for either the driver's or passenger's shoulder belt has been unlatched. The warning light also illuminates and stays on when either the driver's or passenger's automatic shoulder belt is incompletely fastened.

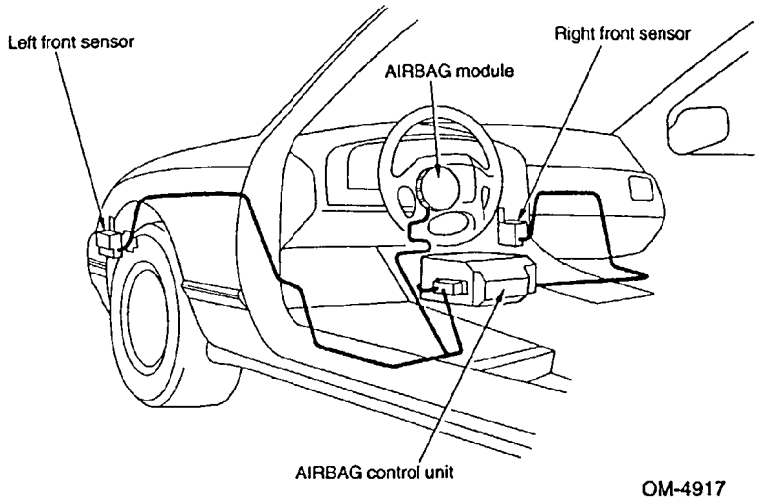
WARNING!
If the warning light does not go off when all shoulder belts have been properly and securely fastened, park the vehicle in a safe place. Refer to the section entitled "In Case of Emergency".

D26DE

SRS AIRBAG (if equipped)

The SRS (Supplemental Restraint System) AIRBAG in your vehicle affords the driver additional protection in a frontal collision. This system is available for the driver only and is designed to supplement the protection provided by the seat belt.

NOTE:
SRS AIRBAG can function only when the ignition switch is in the "ON" position.



OM-4917

WARNING!
To obtain maximum protection in an accident, the driver and all passengers in the vehicle should always wear seat belts when the vehicle is moving. The SRS AIRBAG does not do away with the need to fasten seat belts. In combination with the seat belts, it offers the best combined protection in a serious accident.
For instructions and precautions concerning the seat belt system, see front seat belts on page 2-21 and rear seat belts on page 2-28.

E-6

8058-7

The SRS AIRBAG is designed to deploy in an accident involving a moderate to severe frontal collision. It is not designed to assist the driver in lesser frontal impacts, in side or rear impacts or in roll-over accidents. The SRS AIRBAG is designed to function on a one-time-only basis. In the event that the SRS AIRBAG is deployed, replacement of the system must be performed only by an authorized SUBARU dealer. When the components of SRS AIRBAG are replaced, use only genuine SUBARU parts.

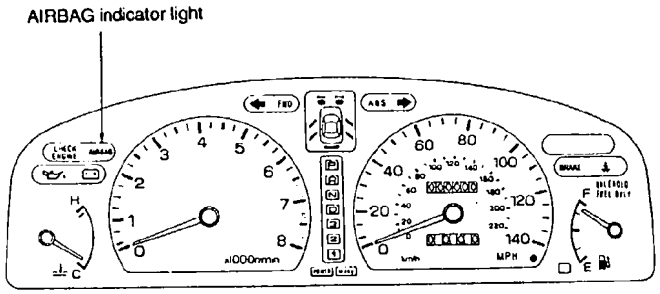
WARNING!
To avoid accidental firing of the system or rendering the system inoperative, which may result in serious injury, no modifications should be made to any components or wiring of the SRS AIRBAG. This includes the installation of "custom" steering wheels or additional trim material, or badges over the steering wheel hub. Installation of additional electrical/electronic equipment on or near SRS AIRBAG components and/or wiring is not advisable.

☐ System Monitors

A diagnostic system continually monitors the readiness of the SRS AIRBAG while the vehicle is being driven. The AIRBAG indicator light will show normal system operation by lighting for about 8 seconds when the ignition key is first turned to the "ON" position then turning off.

The following components are monitored by the indicator:

- Right front sensor
- Left front sensor
- AIRBAG control unit
- AIRBAG module
- All related wiring



OM-5169

In the event of a malfunction indicated by any of following, the vehicle should be taken promptly to your nearest SUBARU dealer to have the system checked. Unless checked and rapaired, the SRS AIRBAG will not function reliably:

- Flashing or flickering of the indicator light.
- Failure of the indicator light to illuminate when the ignition switch is first turned to the "ON" position.
- Continuous illumination of the indicator light.
- Illumination of the indicator light while driving.

☐ Safety Guidelines for the SRS AIRBAG

During a severe frontal impact, a sudden, fairly loud inflation noise will be heard and some smoke will be released. These occurrences are normal and not harmful. The smoke does not indicate a fire in the vehicle.

Although it is highly unlikely that the SRS AIRBAG would activate in a non-accident situation, should it occur, the bag will deflate quickly, not obscuring vision and will not interfere with the driver's ability to maintain control of the vehicle.

Note:
When you sell your vehicle, we urge you to explain to the buyer that it is equipped with an SRS AIRBAG by alerting him to the applicable section in this owner's manual.

☐ **System Servicing**
To ensure its long-term reliability, the SRS AIRBAG must be inspected by a SUBARU dealer ten years after the date of manufacture, which is shown on the certification label attached to the driver's door jamb.

CAUTION:
The impact sensors are located in both front fenders and under the center console. If you need service or repair in those areas or near the steering wheel and column, we recommended that you have an authorized SUBARU dealer perform the work.

WARNING!
- **When scrapping the airbag unit or the entire car damaged by a collision, consult your SUBARU dealer.**
- **The SRS AIRBAG has no user-serviceable parts. Tampering with or disconnecting the system's wiring could result in accidental inflation of the airbag or could make the system inoperative, which may result in serious injury. For required servicing of the SRS AIRBAG, see your nearest SUBARU dealer.**

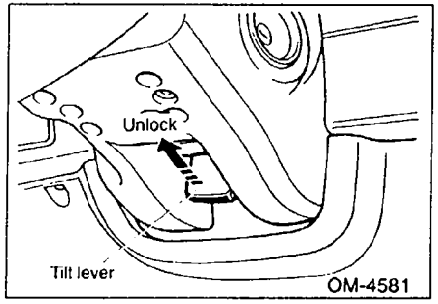
E-8

8058-7

D20EE

Tilt Steering Wheel

To adjust the steering wheel, grasp the steering wheel and pull the tilt lever. The steering wheel may then be adjusted to the position most suitable to you.



After adjusting the steering wheel, move it up and down to make sure that it is securely locked.
For easier entry and egress from the driver's seat, pull the "LIFT UP" lever located on the steering column upward. The steering wheel will automatically spring up. To return it to its original position, move the wheel downward until it locks securely at the preselected position. Keep a continuous hold on the steering wheel when operating the "LIFT UP" lever.