V2413

REPORT NUMBER: CAL-96-N06

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

ISUZU MOTORS INC.
1996 ISUZU TROOPER
4-DOOR MPV

NHTSA NUMBER: MT5702

CALSPAN TEST NUMBER: 8313-6

February 29, 1996

CALSPAN SRL CORPORATION
TRANSPORTATION SCIENCE CENTER
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FINAL REPORT

PREPARED FOR:

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National Highway Traffic Safety Administration
Office of Market Incentives
400 Seventh Street, S. W.
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15. *Supplementary Notes*		

16. *Abstract*

A frontal load cell barrier test of a 1996 Isuzu Trooper 4-Door MPV was performed at Calspan SRL Corporation crash test facility in Buffalo, New York, on February 29, 1996.

The impact velocity was 56.7 kph and the temperature at the barrier face was 21°C. The maximum post-test vehicle crush was 500 mm. The test vehicle was equipped with a 3-point continuous belt system and a supplemental airbag at both front outboard seating positions.

With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" the driver complied with the head, chest and femur requirements. The passenger satisfied all requirements except for one — the maximum chest resultant acceleration criteria.

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Section 1

PURPOSE AND TEST PROCEDURE

This 56.7 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 56.7 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 MT5702

A load cell barrier consisting of 36 load cells was impacted by a 1996 Isuzu Trooper 4-Door MPV at a velocity of 56.7 kph. The test was performed at the Calspan SRL Corporation on February 29, 1996. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 150) and the right-front passenger (position 2) ATD (Serial No. 064) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 133 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Position 2 belt elongation data did not record accurately; the data trace was omitted from this report. Data for vehicle accelerometer number 4 (bottom of engine) did not record accurately after approximately 110 milliseconds of event time. This data trace is labeled accordingly. Two integrations are omitted from this report. Barrier load cells B6 and D1 did not record accurately; their time history plots are omitted from this report and were *not* used to generate load cell sums that appear in the report. Data for load cells B4 and B7 did not return to zero; both plots are marked accordingly.

The driver's HIC was 668.1. The maximum chest deceleration over 3 milliseconds was 56.4 g's and maximum chest deflection was -44.2 mm. Femur loads were -4659.6 newtons on the left and -6111.0 newtons on the right.

The right front passenger's HIC was 843.0. Maximum chest deceleration over 3 milliseconds was 61.4 g's and maximum chest deflection was -41.2 mm. Femur loads were -6235.0 newtons on the left and -6111.4 newtons on the right.

Table 1

GENERAL TEST AND VEHICLE DATA

Vehicle Year/Make/Model/Body Style: 1996 Isuzu Trooper 4-Door MPV

NHTSA Test No.: MT5702 VIN.: JACDJ58V3T7901580

Body Color: White Date of Manufacture: 10/95

Date Received: 2/23/96

Odometer Reading: 00123

Engine:	6	Cylinders;	-	C.I.D.;	3.2	Liters;	-	CC
	X	Gas;	-	Diesel;	-	Turbocharged		
	X	Longitudinal;			-	Transverse		
Transmission:	4	Speed;	-	Manual;	X	Automatic;	X	Overdrive
Final Drive:	-	Front Wheel;	-	Rear Wheel;	X	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: 3-point restraint system with supplemental driver and passenger airbags.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 240 kPa, Rear 240 kPa

Recommended Tire Size: P245/70R16

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

Tires on Vehicle: P245/70R16 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

Rated Cargo and Luggage Weight (RCLW) = 136 kgs.

GVWR 2500 kgs. GAWR: Front 1250 kgs. Rear 1400 kgs.

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

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

Right Front = 494 kgs. Right Rear = 483 kgs.

Left Front = 504 kgs. Left Rear = 472 kgs.

TOTAL FRONT WEIGHT = 998 kgs. (51.1 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 955 kgs. (48.9 % of Total Vehicle Weight)

TOTAL DELIVERED WEIGHT = 1953 kgs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1953 kgs.

RCLW = 136 kgs.

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

Target Test Weight = 2238 kgs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 125 KGS CARGO:

Right Front = 501 kgs. Right Rear = 599 kgs.

Left Front = 543 kgs. Left Rear = 584 kgs.

TOTAL FRONT WEIGHT = 1044 kgs. (46.9 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1183 kgs. (53.1 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 2227 kgs.

Weight of ballast secured in vehicle trunk area = 50 kgs.

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude:	RF	972	LF	975	RR	994	LR	991
Test Attitude:	RF	955	LF	960	RR	950	LR	955

Wheel Base: 2750 mm.; C.G. = 1461 mm. rearward of front wheel C/L

Remarks: 78 liters of Stoddard solution was placed in the fuel tank.

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

POST -IMPACT DATA:

Type of Test:	Frontal Barrier	Impact Angle:	0°
Date of Test:	February 29, 1996	Time of Test:	14:20

Ambient Temperature: 21 ° C at impact area

Temperature in Occupant Compartment: 21 ° C

Windshield Molding Temperature: 21 ° C

Required Impact Velocity Range: 55.5 to 57.1 kph

Impact Velocity: primary = 56.7 kph, secondary = 56.7 kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 1321 mm

Exiting Speed Trap: 305 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length:	Pre-test = R	4506	C_L	4535	L	4515
	Post-test = R	4045	C_L	4035	L	4045
	Crush = R	461	C_L	500	L	470

Distance from front of test vehicle to point of impact:

R	571	C_L	574	L	604

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Airbag	Airbag
Chest	Airbag	Airbag
Abdomen	Airbag	No contact
Left Knee	Knee bolster	Glove box door
Right Knee	Knee bolster	Glove box door

Table 1

GENERAL TEST AND VEHICLE DATA (cont'd)

	Front		Rear	
	Left	Right	Left	Right
Door Opening	Tools required	Tools required	Operable	Operable

	Front		Rear	
Seat Movement	Left	Right	Left	Right
Seat Back Failure	None	None	-	-
Seat Shift (mm.)	0.0	0.0	-	-

Glazing Damage

Backlight/Windshield: Windshield sustained stress cracks but remained intact.

Other Notable Impact Effects: None

Section 3

OCCUPANT AND VEHICLE INFORMATION

I. DATA

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

Table 2

DUMMY INJURY CRITERIA VALUES

NHTSA Test No.: MT5702 Vehicle: 1996 Isuzu Trooper 4-Door MPV

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-59.3	-7.9	33.7	66.6
Position #2 - Passenger	-70.8	-12.3	35.3	72.0

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R*
Position #1 - Driver	-59.1	8.1	22.5	56.4
Position #2 - Passenger	-60.3	-9.4	22.8	61.4

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

	MAXIMUM FORCE - FEMUR LOAD (nwt)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	-4659.6	-6111.0
Position #2 - Passenger	-6235.0	-6111.4

	MAXIMUM FORCE - SEAT BELT LOADS (nwt)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	7422.0	-	4215.6
Position #2 - Passenger	6925.0	4111.6	-

	HEAD INJURY CRITERIA (HIC)			
	HIC**	t_1 (mSec)	t_2 (mSec)	Average Acceleration t_1 to t_2
Position #1 - Driver	668.1	49.68	85.68	50.98
Position #2 - Passenger	843.0	54.36	90.36	55.95

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

Table 3

HYBRID III NECK AND CHEST DATA SHEET

Vehicle Year/Make/Model/Body Style: 1996 Isuzu Trooper 4-Door MPV

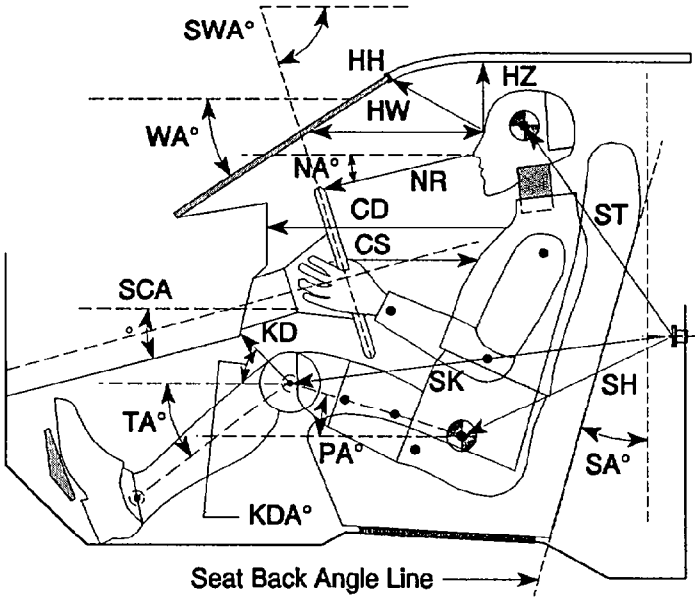
NHTSA Test No.: MT5702 Test Date: February 29, 1996

MAXIMUM VALUES	DRIVER DUMMY ID #150:	PASSENGER DUMMY ID #064:
Neck Load X (nwt)	684.8	660.3
Neck Load Y (nwt)	589.8	-504.2
Neck Load Z (nwt)	2724.0	2237.9
Neck Moment X (nwt-m)	-18.1	26.0
Neck Moment Y (nwt-m)	44.6	36.6
Neck Moment Z (nwt-m)	12.8	-16.3
Chest Deflection X (mm.)	-44.2	-41.2
Time of Max. Occurrence (msec)	63.5	65.8

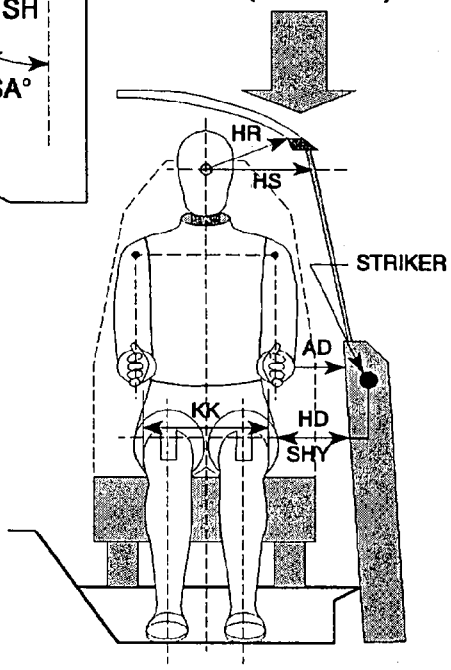
Note: All values listed occur during the primary impact event.

Figure 1

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



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



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

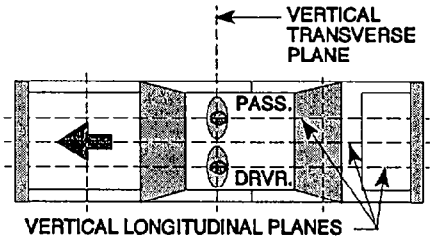


Table 4

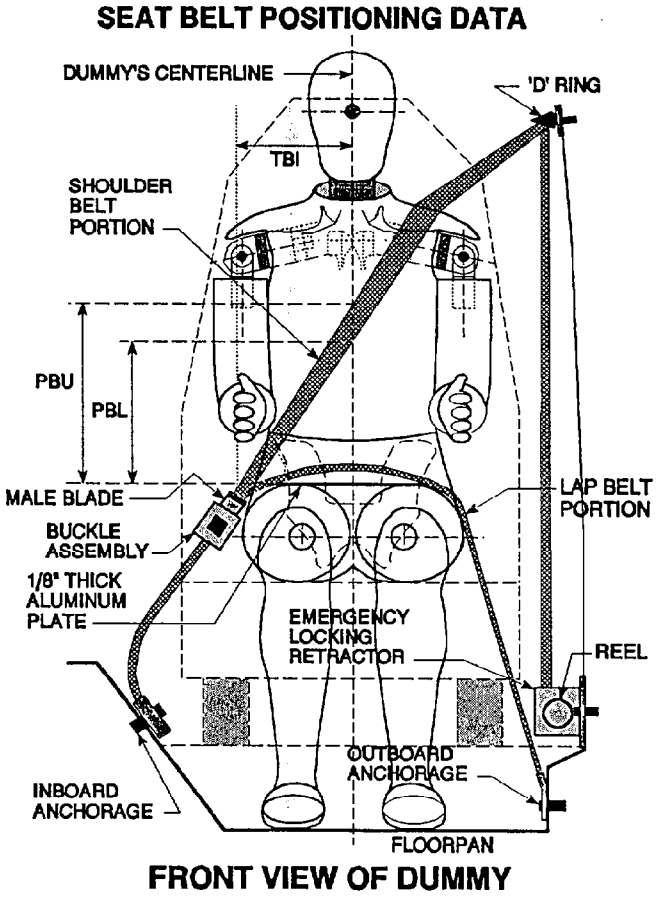
FRONT SEAT OCCUPANT MEASUREMENTS

	DRIVER (Serial #150)			PASS. (Serial # 064)		
WA°	40 deg.			N/A		
SWA°	65 deg.			N/A		
SCA°	25 deg.			N/A		
SA°	Reclined to 3rd notch			Reclined to 3rd notch		
HZ	215			210		
HH	389			394		
HW	526			539		
HR	257			263		
NR	346	Angle	20 deg.	N/A		
CD	507			532		
CS	274			N/A		
RA	151			N/A		
KDL	94	Angle (KDA)	28 deg.	151		
KDR	167			142	Angle (KDA)	23 deg.
PA°	22 deg.			21 deg.		
TA°	48 deg.			50 deg.		
KK	259			260		
ST	643	Angle	14 deg.	665	Angle	13 deg.
SK	630	Angle	90 deg.	643	Angle	90 deg.
SH	234	Angle	103 deg.	234	Angle	100 deg.
SHY	240			230		
HS	340			345		
HD	170			164		
AD	108			97		

Dimensions in millimeters

Figure 2

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	355	360
PBL-- Top surface of alum. plate to belt lower edge	275	278
LAP BELT TENSION	8 nwt	8 nwt
SHOULDER BELT TENSION	Retractor	Retractor

Table 5

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	Driver	Passenger
BELT LENGTH DATA:		
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	2270	2057
Shoulder belt length as measured on Part 572 Dummy.	870	864
Lap belt length as measured on Part 572 Dummy.	1120	914
SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis.	N/A*	N/A*
As determined mechanically.	63	85
As determined electronically.	87	127
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	≈ 60 mm/M	N/A**
Measured mechanically.	0 mm/M	0 mm/M

Dimensions in millimeters

* Belt markings not visible during entire spool-off action.
** Data did not record accurately.

Figure 3

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera information shown in Table 6.

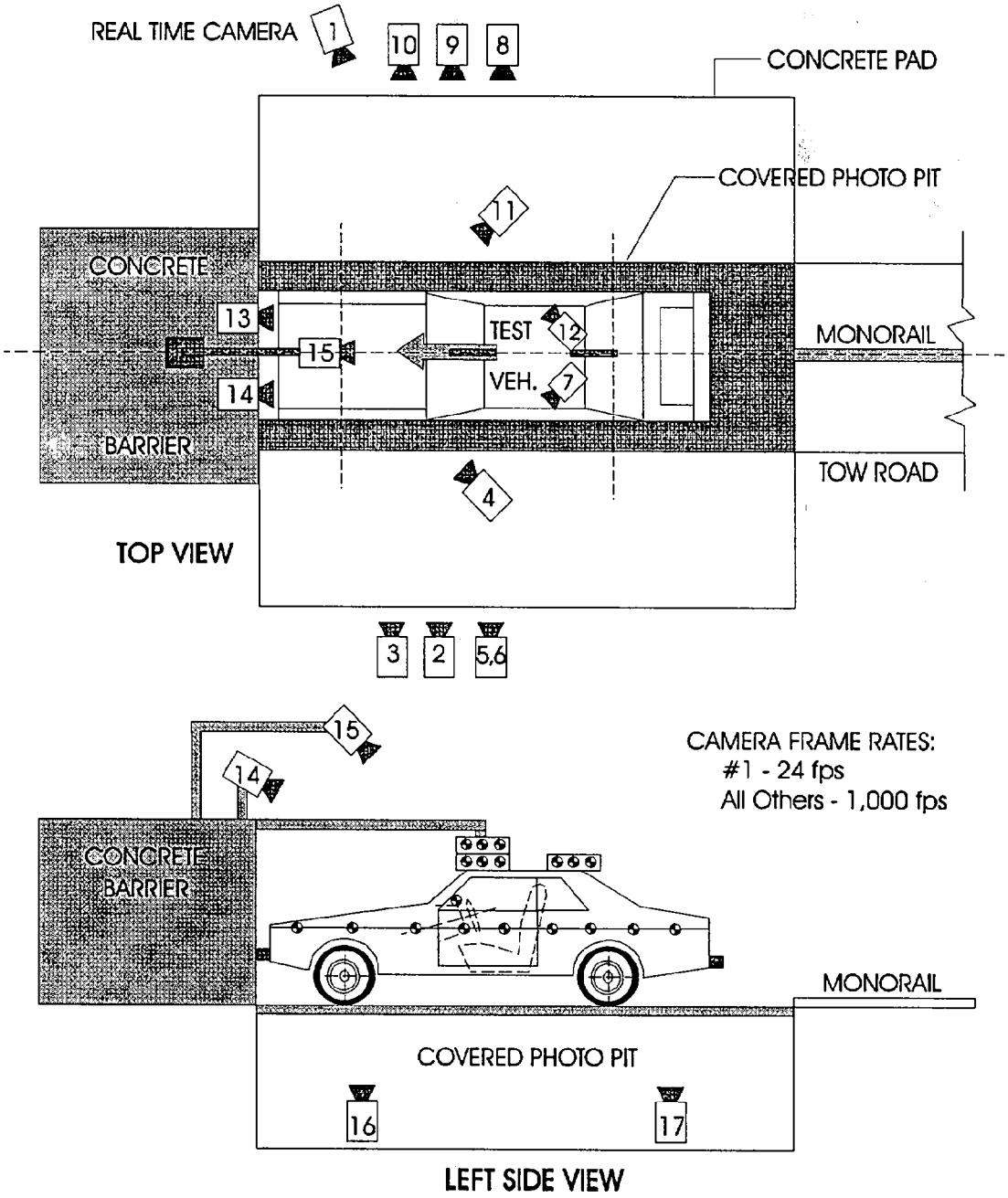


Table 6
HIGH-SPEED CAMERA LOCATIONS

NHTSA Test No.: MT5702 Vehicle: 1996 Isuzu Trooper 4-Door MPV

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	10394	1167	1179	-3	9948	25	1020
3	Left Side View	8814	700	1334	-4	8368	25	1020
4	Driver and Interior View	4710	2954	1988	-8	-	25	1020
5	Steering Column (Bottom)	9882	1529	1176	-2	9436	35	920
6	Steering Column (Top)	9882	1529	1772	-6	9436	35	1030
7	Left Belt	-	-	-	-	-	8	420
8	Overall Right Side	9899	1903	1277	-4	9453	25	1070
9	Right Side View	7798	1204	1207	-4	7352	25	970
10	Right Passenger View	8458	1562	1492	-3	8012	35	1020
11	Passenger and Interior View	4540	3152	1934	-8	-	25	1120
12	Right Belt	-	-	-	-	-	8	450
13	Passenger Front View	580	0	1985	-32	-	13	1010
14	Driver Front View	580	0	1985	-32	-	13	1010
15	Windshield View	0	-530	3048	-51	-	13	1000
16	Pit View of Engine	0	505	-3048	90	-	13	1030
17	Pit View of Fuel Tank	0	3432	-3048	90	-	13	940

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

N.T. indicates No Timing

Figure 4

VEHICLE TARGET LOCATIONS

(Dimensions in millimeters)

A	370
B	630
C	906
D	2251
E	222
F	1540
G	773
H	770
I	235
J	1379
K	1005
L	1378
M	222
N	235
O	776
P	772
Q	1378
R	1011
S	1374

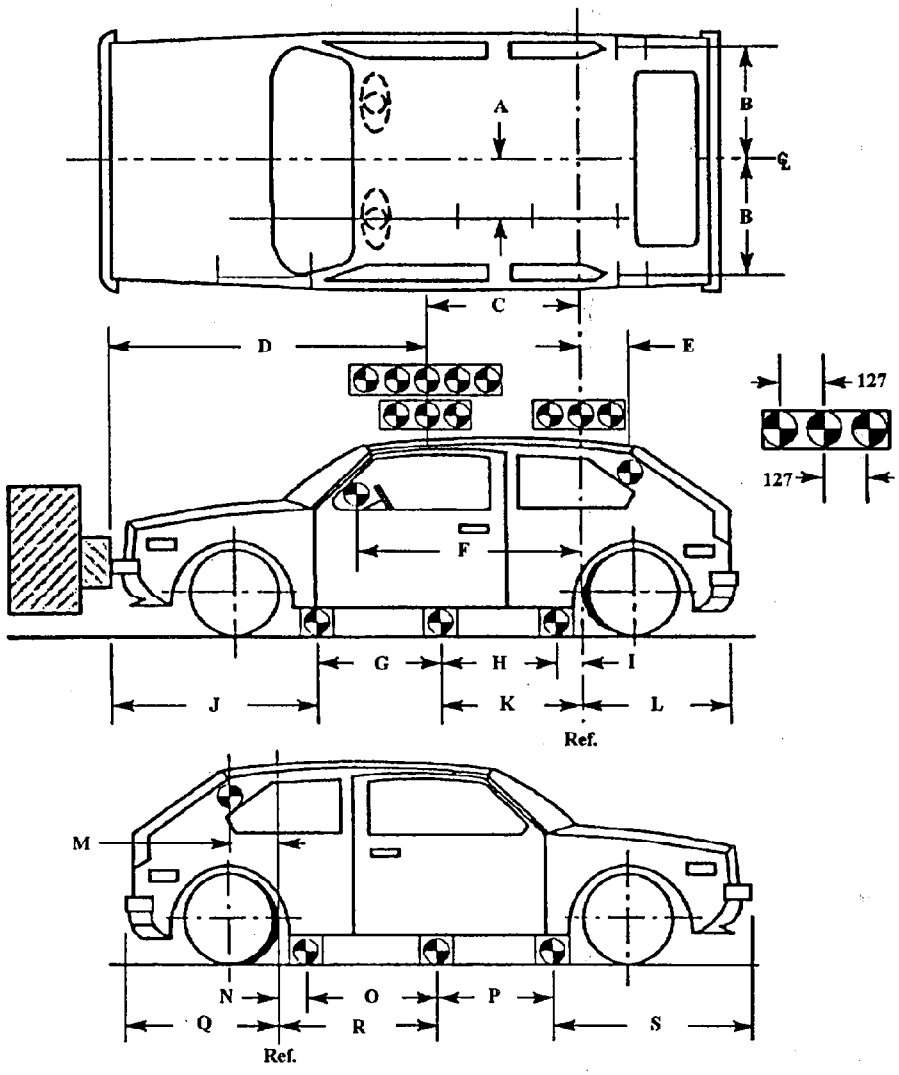
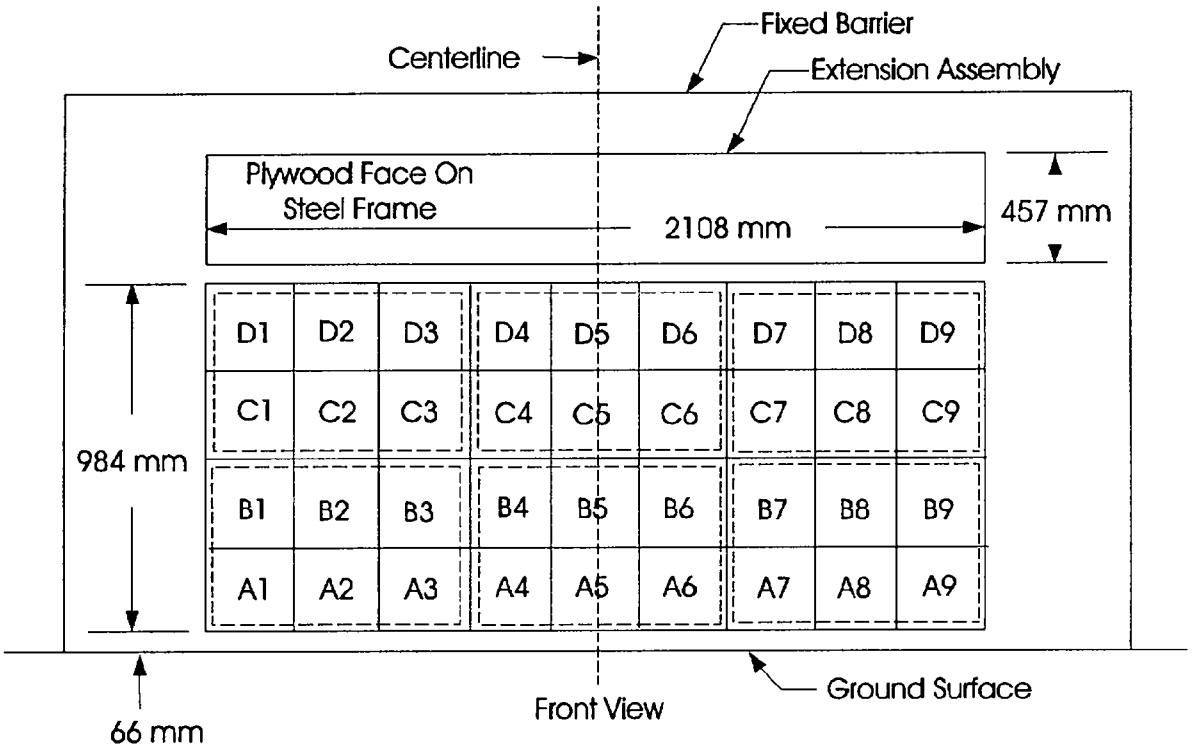


Figure 5

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

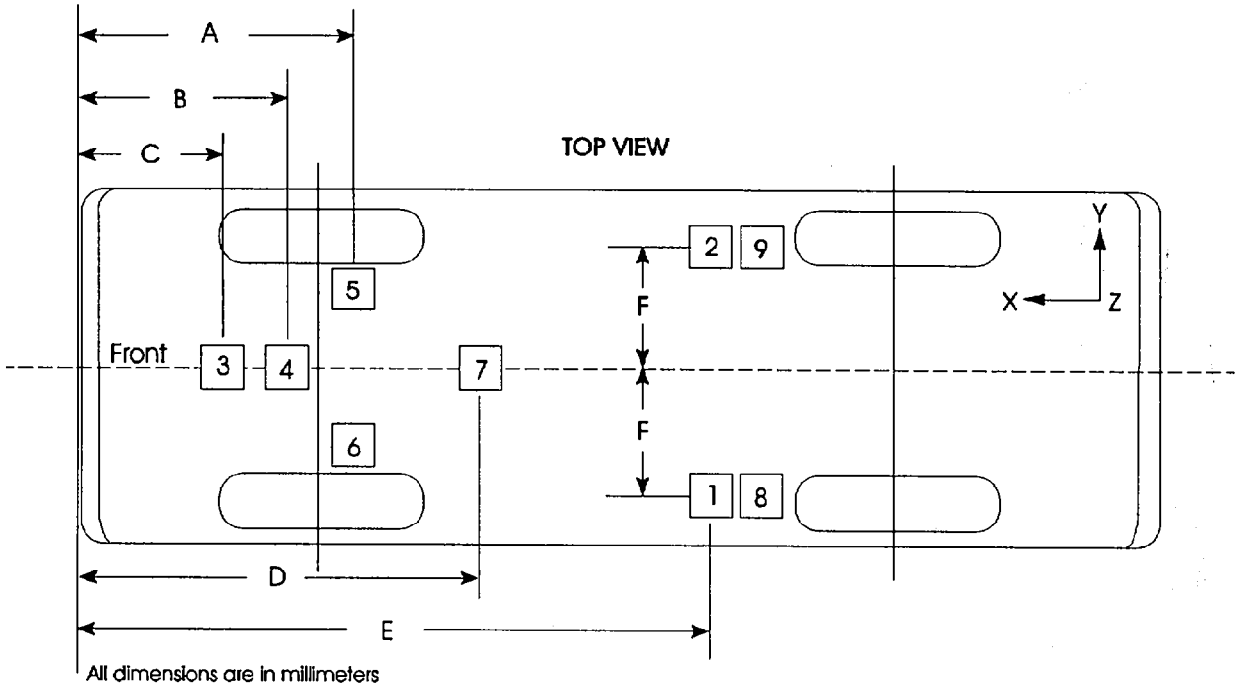
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

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

Figure 6

VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	Distances From Vehicle Front All dimensions in millimeters	
1	Left Rear Seat Crossmember [E/F]	X = 2881	Y = 655
2	Right Rear Seat Crossmember [E/F]	X = 2881	Y = 655
3	Top of engine [C]	733	
4	Bottom of engine [B]	987	
5	Right Disc Brake Caliper [A]	685	
6	Left Disc Brake Caliper [A]	685	
7	Instrument Panel [D]	1569	
8	Left Rear Seat Crossmember [E/F]	X = 2881	Y = 655
9	Right Rear Seat Crossmember [E/F]	X = 2881	Y = 655

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

Figure 7

TEST VEHICLE MEASUREMENTS

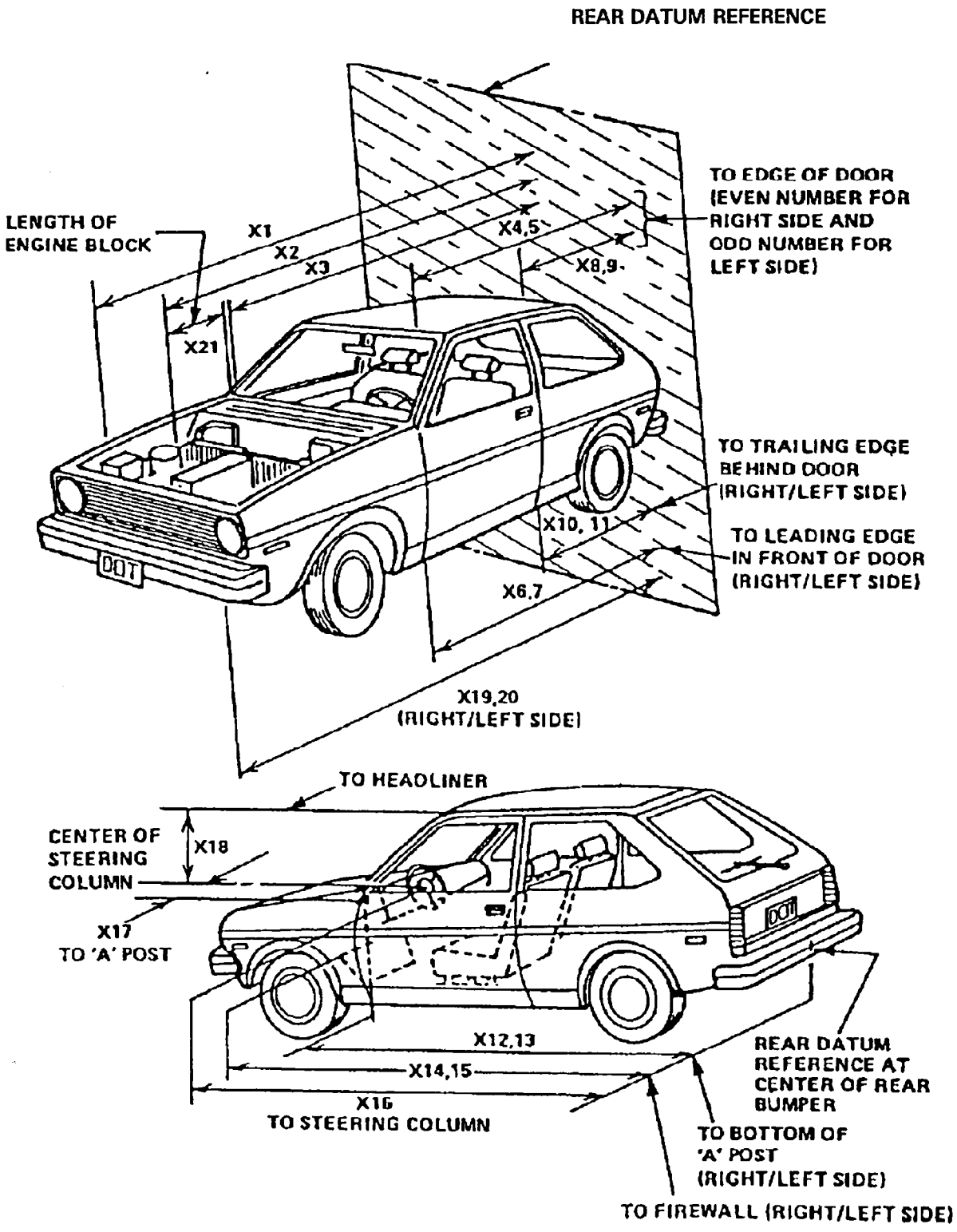


Table 7

VEHICLE MEASUREMENTS

No.		All Dimensions in mm		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	4535	4035	500
X2	Rear Surface of Vehicle to Front of Engine	3835	3640	195
X3	Rear Surface of Vehicle to Firewall	3460	3360	100
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3210	3179	31
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3213	3167	46
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3150	3127	23
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3155	3119	36
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2163	2140	23
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2172	2143	29
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2146	2137	9
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2161	2127	34
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3061	3039	22
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3064	3110	-46
X14	Rear Surface of Vehicle to Firewall, Right Side	3450	3365*	85
X15	Rear Surface of Vehicle to Firewall, Left Side	3460	3410	50
X16	Rear Surface of Vehicle to Steering Column	2725	2745	-20
X17	Center of Steering Column to "A" Post	420	365	55
X18	Center of Steering Column to Headliner	510	443	67
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4506	4045	461
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4515	4045	470
X21	Length of Engine Block	370	370	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2980	2950	30
CD	Rear Surface of Vehicle to Center of Dash Panel	2930	2890	40
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2920	2880	40

*Approximate measurement

Table 8

ACCIDENT INVESTIGATION DIVISION DATA

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Isuzu Trooper 4-Door MPV

NHTSA Test No.: MT5702 VIN: JACDJ58V3T7901580

Model Year: 1996 Build Date: 10/95 Test Date: February 29, 1996

Vehicle Size Category: MPV Test Weight: 2227 Kgs

Vehicle Wheelbase: 2750 mm; Front Overhang: 1377 mm; Overall Width: 1410 mm

Collision Deformation Classification (CDC) Code: 12FDEW2

Crush Depth Dimensions;

C1 = 465 mm

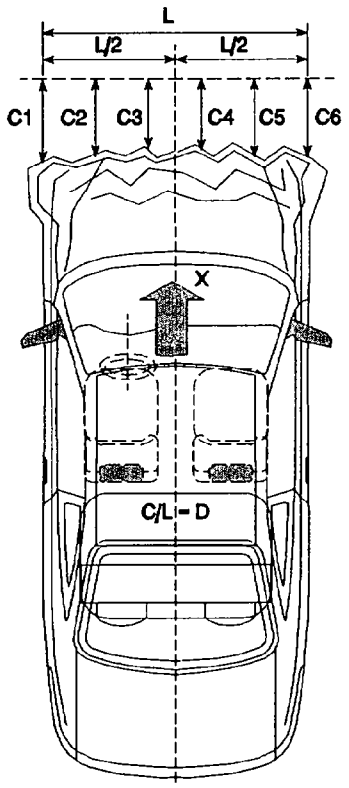
C2 = 485 mm

C3 = 500 mm

C4 = 500 mm

C5 = 470 mm

C6 = 450 mm



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

Longitude Length of Damaged Region: L= 1410 mm

Section 4

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

"Windshield Mounting" FMVSS No. 212 Data

"Windshield Zone Intrusion" FMVSS No. 219 Data

"Fuel System Integrity" FMVSS No. 301

Figure 8

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

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

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

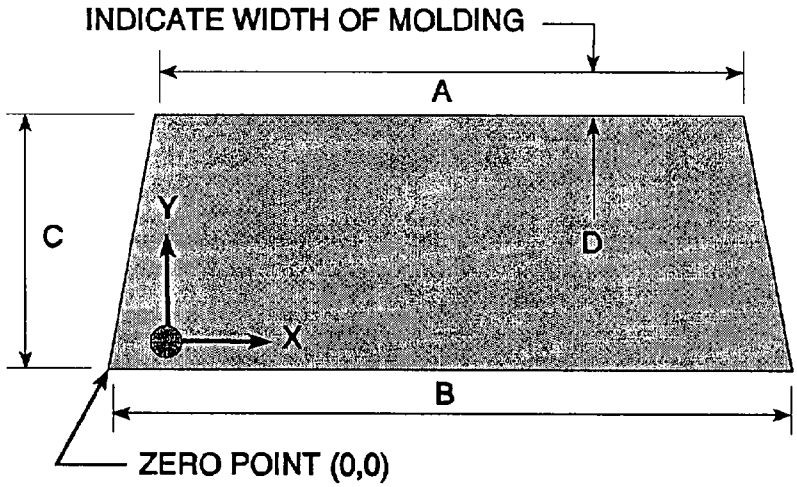
FMVSS 212 REQUIREMENTS:

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

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST(mm)	% OF RETENTION
RIGHT SIDE	2085.5	2085.5	100
LEFT SIDE	2085.5	2085.5	100
TOTAL	4171	4171	100

AREA OF RETENTION FAILURE:



FRONT VIEW OF WINDSHIELD

DIMENSIONS	
A	1296
B	1375
C	650
D	17

FAILURE DETAILS: None

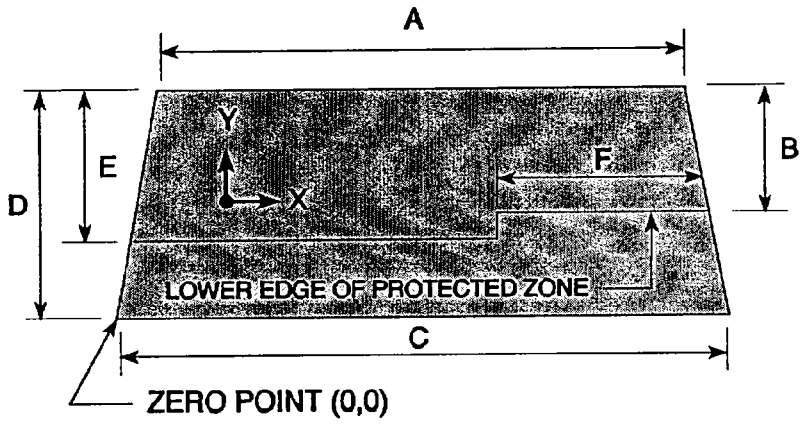
Figure 9

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA: (Dimensions in mm)



FRONT VIEW OF WINDSHIELD

DIMENSIONS	
A	1296
B	330
C	1575
D	650
E	470
F	960

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

(Show location of penetration on the above sketch)

	COORDINATES	
	X	Y
1.		
2.		
3.		
4.		

Table 9

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

NHTSA TEST No.:	MT5702	TEST DATE:	February 29, 1996
VEHICLE MAKE/MODEL:	1996 Isuzu Trooper 4-Door MPV		

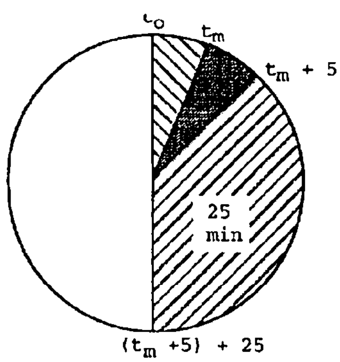
The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

= =

TEST VEHICLE IMPACT TYPE:

X	Frontal (35 mph)
-	Oblique (30 mph) with ________ deg. barrier face first contacting ______________________ (driver/passenger) side
-	Rear Moving Barrier (30 mph)
-	Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT:



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

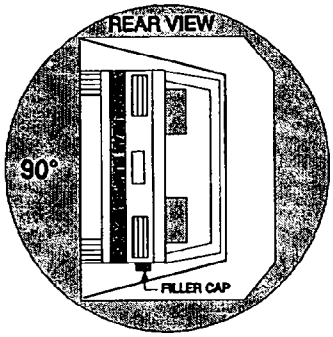
SOLVENT SPILLAGE DETAILS: None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5702



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 ounce	0 ounce	0 ounce	0 ounce

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

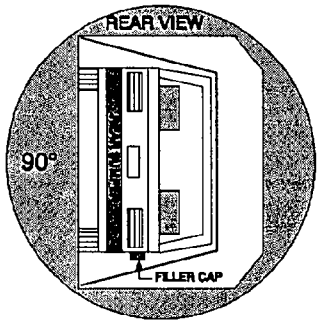
IV. SOLVENT SPILLAGE LOCATION(S): None

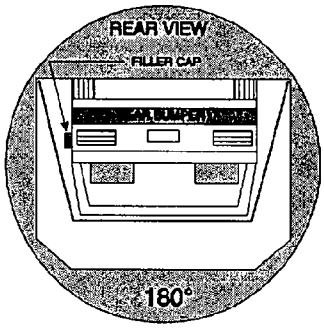
Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5702





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 ounce	0 ounce	0 ounce	0 ounce

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

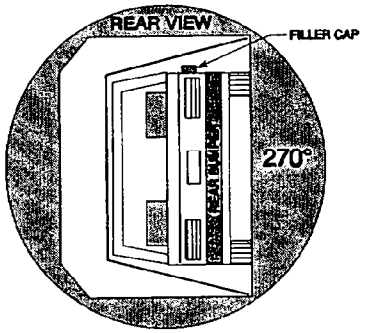
IV. SOLVENT SPILLAGE LOCATION(S): None

Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5702



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 ounce	0 ounce	0 ounce	0 ounce

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

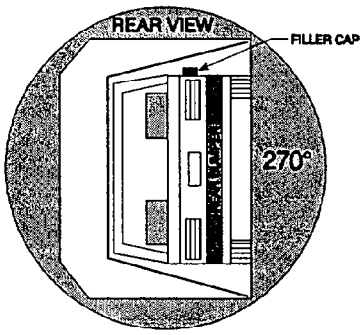
IV. SOLVENT SPILLAGE LOCATION(S): None

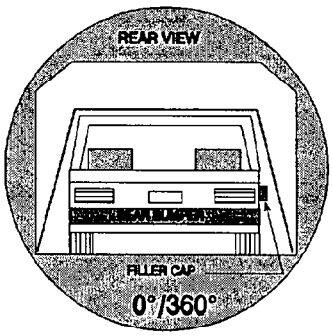
Table 10

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

NHTSA Test No.:
MT5702





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

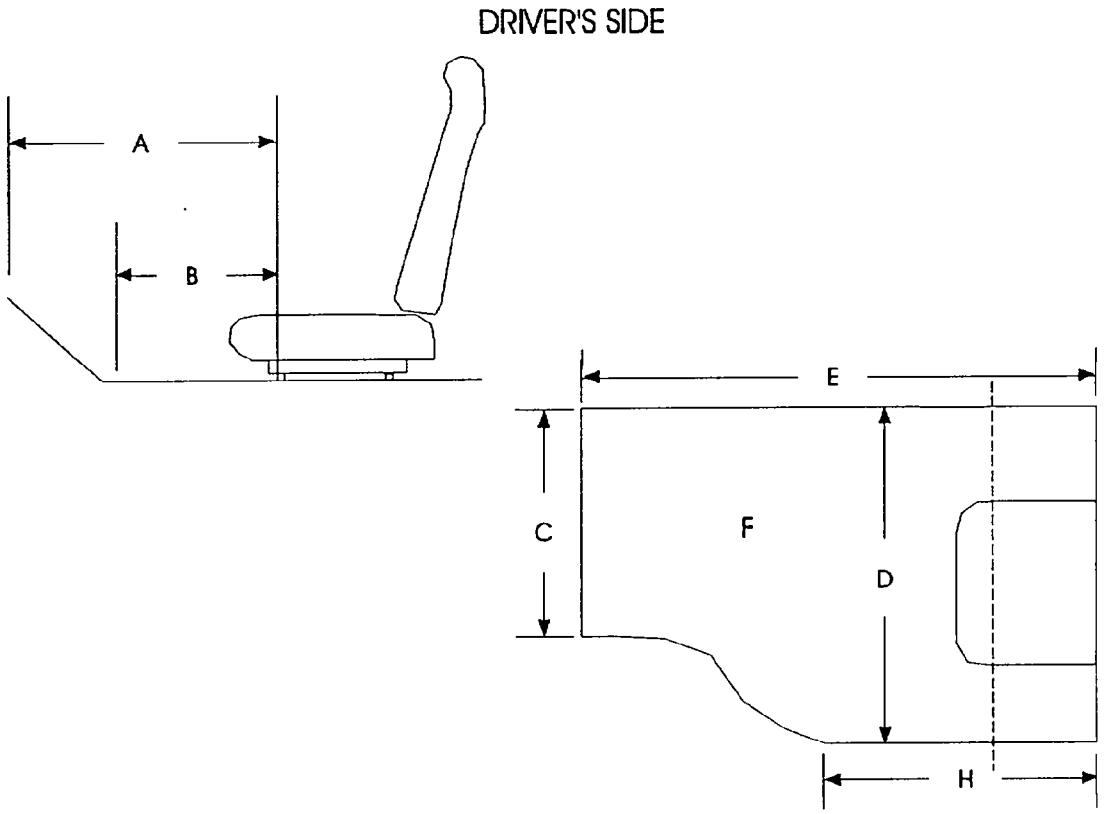
III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0 ounce	0 ounce	0 ounce	0 ounce

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

IV. SOLVENT SPILLAGE LOCATION(S): None

Figure 10
DRIVER SIDE FLOORBOARD DEFORMATION

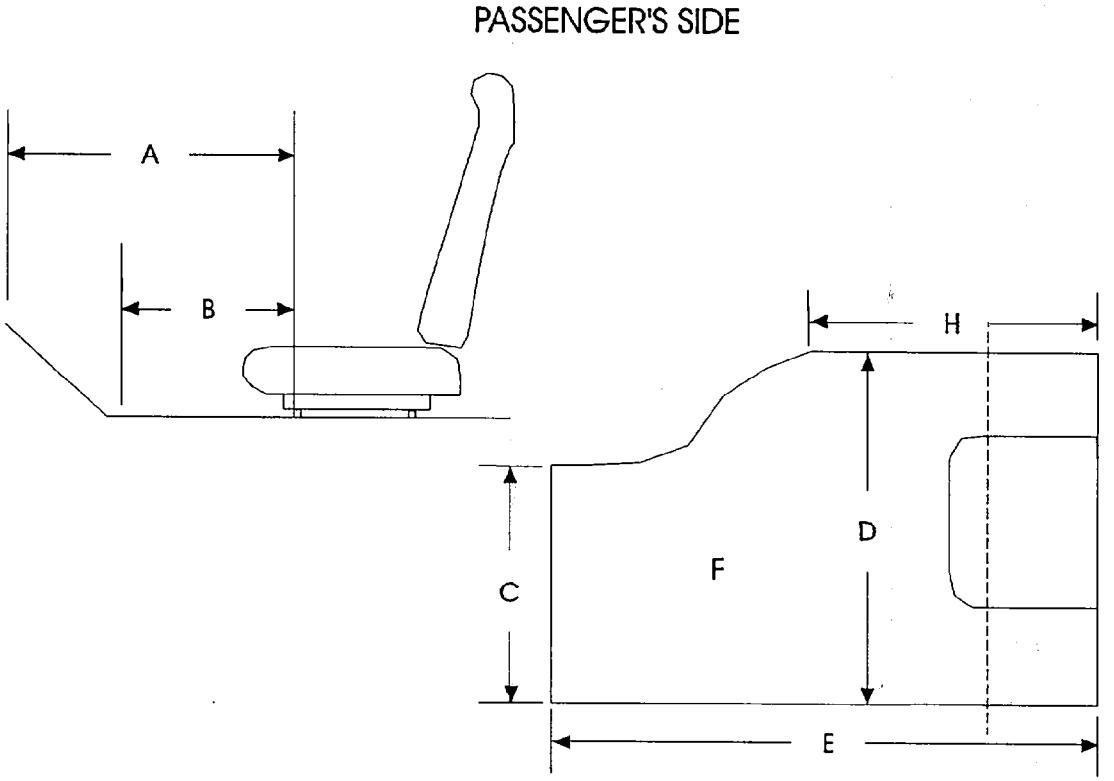


Measurement	Pre-Test	Post-Test	Difference
A	665	645	20
B	575	580	-5
C	410	380	30
D	440	430	10
E	580	580	0
H	320	305	15
F $(cm)^2$	2474	2357	117

Units = mm

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

Figure 11
PASSENGER SIDE FLOORBOARD DEFORMATION

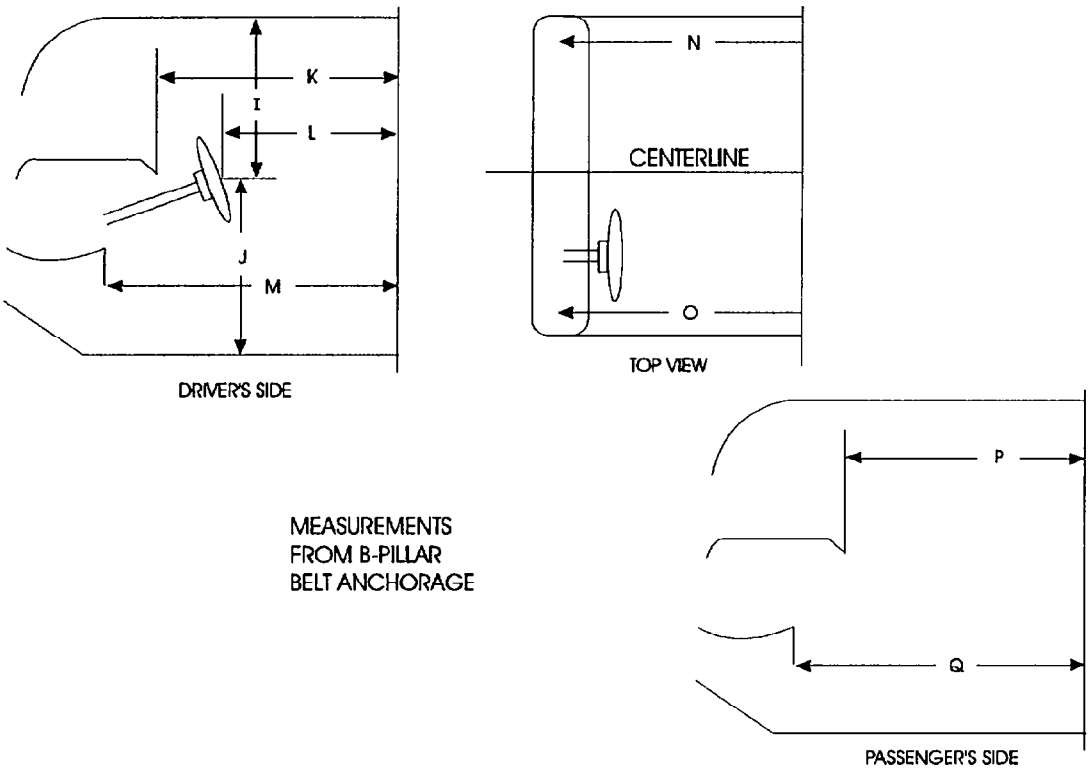


Measurement	Pre-Test	Post-Test	Difference
A	700	650	50
B	595	570	25
C	370	350	20
D	460	450	10
E	600	570	30
H	270	270	0
F $(cm)^2$	2463	2265	198

Units = mm

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

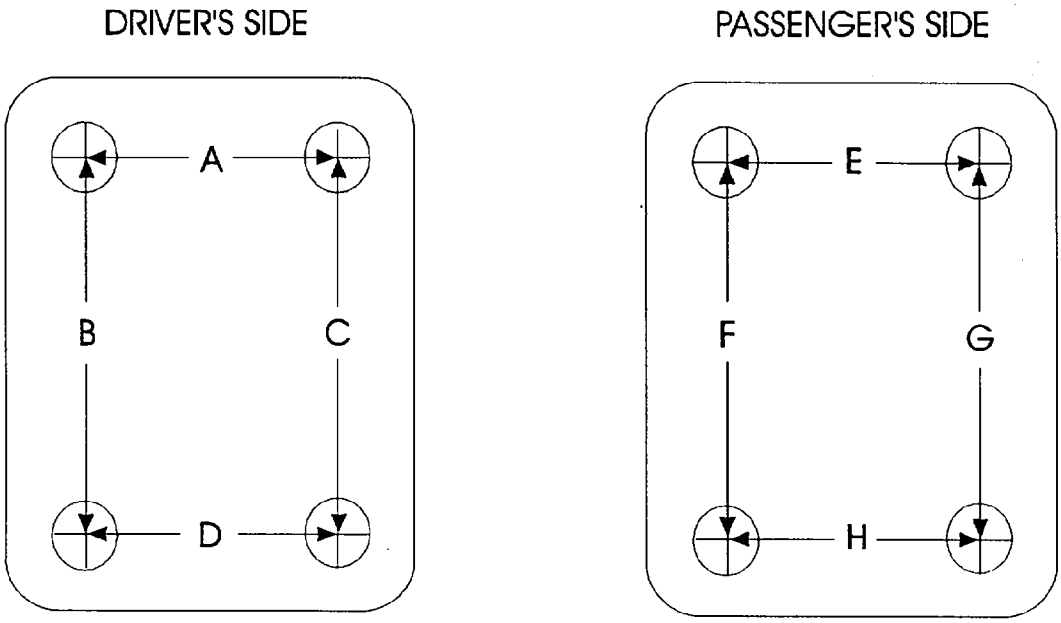
Figure 12
INTERIOR DEFORMATION



Measurement	Pre-Test	Post-Test	Difference
I	510	435	75
J	660	805	-145
K	1515	1550	-35
L	1300	1345	-45
M	1560	1575	-15
N	1555	1560	-5
O	1500	1500	0
P	1650	1655	-5
Q	1565	1558	7

Units = mm

Figure 13
FLOORBOARD DEFORMATION



Measurement	Pre-Test	Post-Test	Difference
A	310	332	-22
B	530	563	-33
C	530	548	-18
D	360	368	-8
E	310	292	18
F	500	532	-32
G	560	565	-5
H	440	443	-3

Units = mm

Appendix A

PHOTOGRAPHS

PHOTOGRAPHS

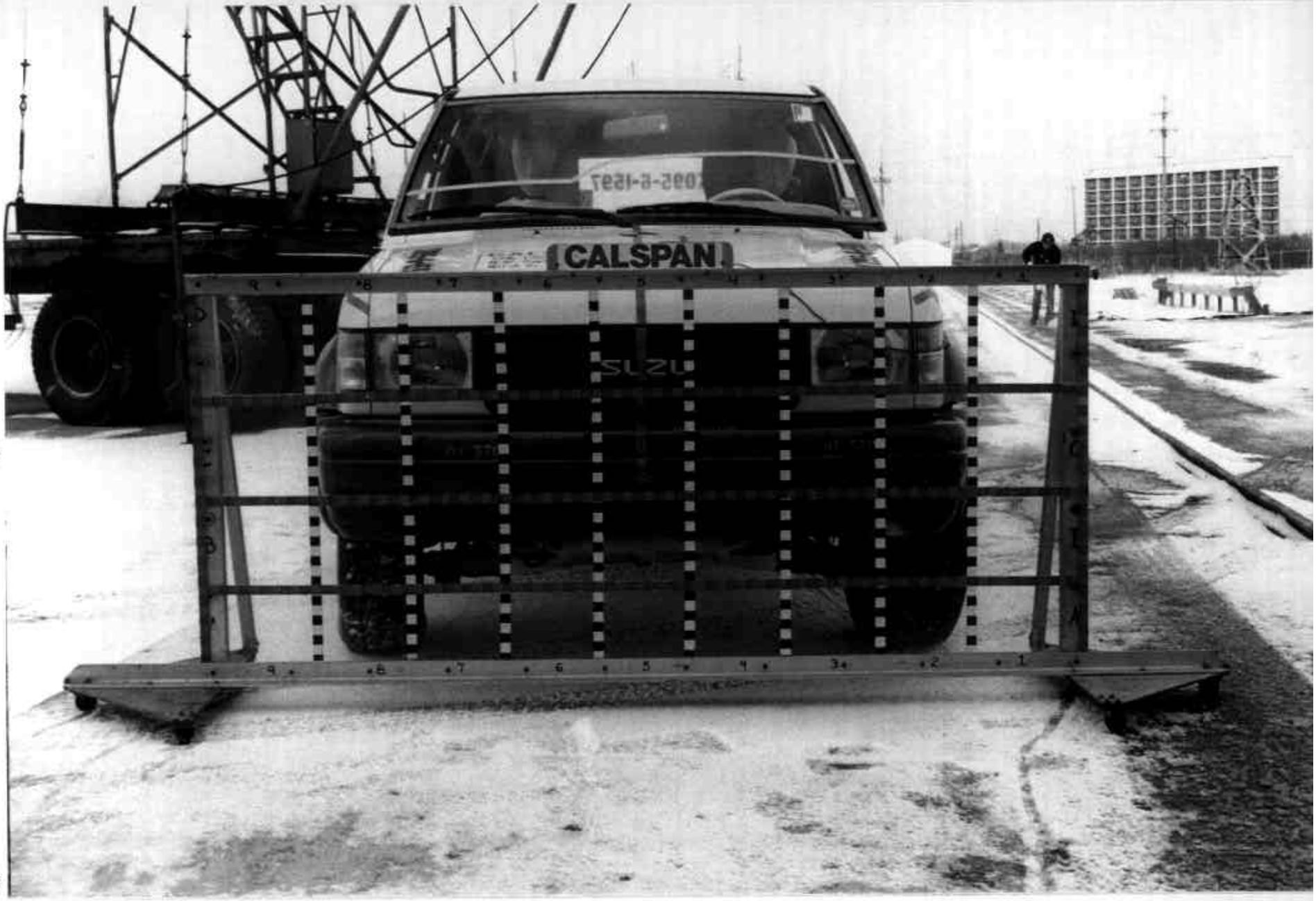


Figure A-1 LOAD CELL LOCATIONS

8313-6

Figure A-2 PRE-TEST FRONT VIEW

A-5

8313-6

Figure A-3 POST-TEST FRONT VIEW

Figure A-4 PRE-TEST LEFT SIDE VIEW

8313-6

Figure A-5 POST-TEST LEFT SIDE VIEW

8313-6

Figure A-6 PRE-TEST RIGHT SIDE VIEW

Figure A-7 POST-TEST RIGHT SIDE VIEW

8313-6

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

8313-6

PHOTOGRAPH NOT AVAILABLE

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

8313-6

Figure A-12 PRE-TEST WINDSHIELD VIEW

Figure A-13 POST-TEST WINDSHIELD VIEW

8313-6

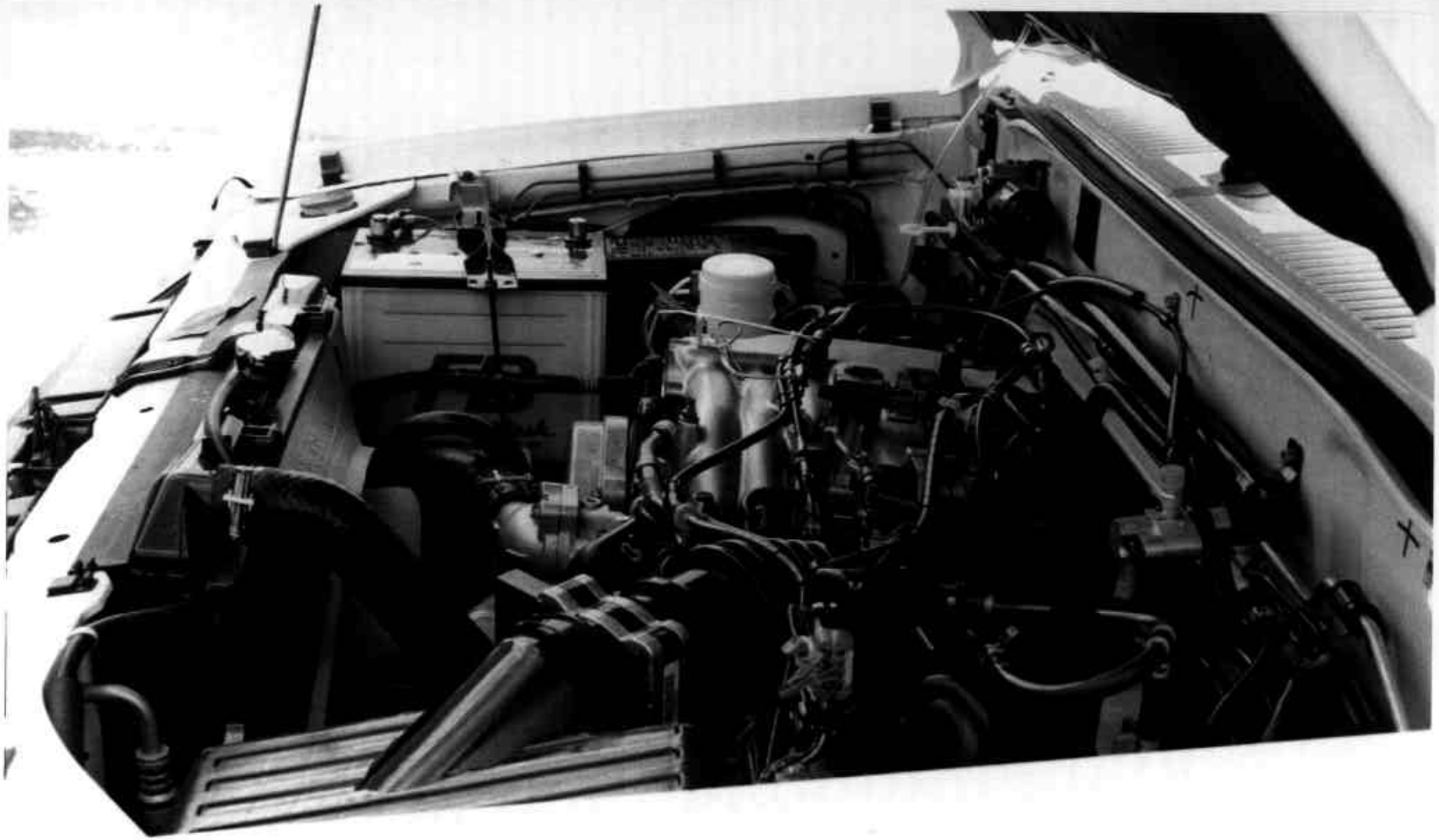


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

Figure A-15 FUEL CAP VIEW

8313-6

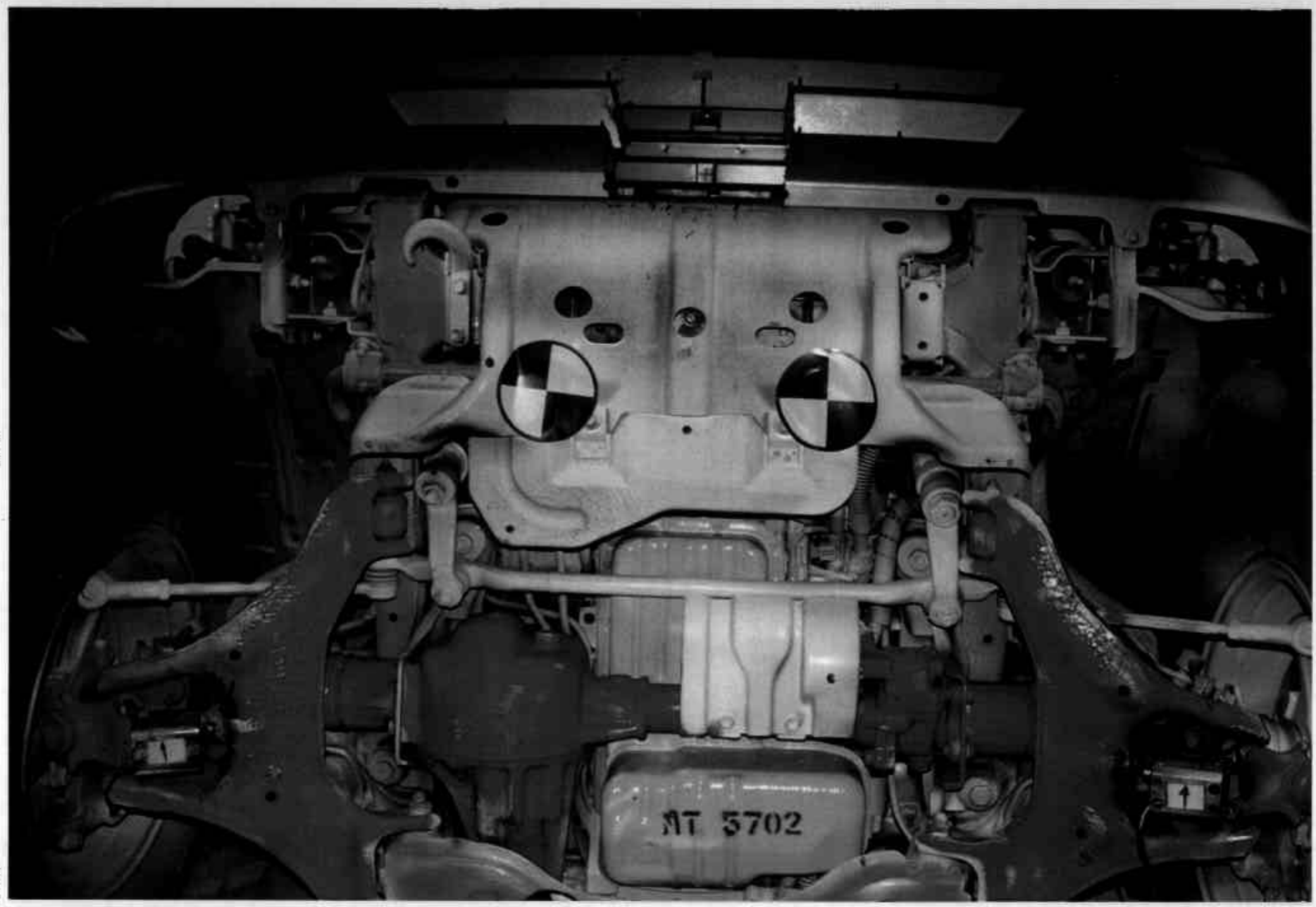


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

8313-6

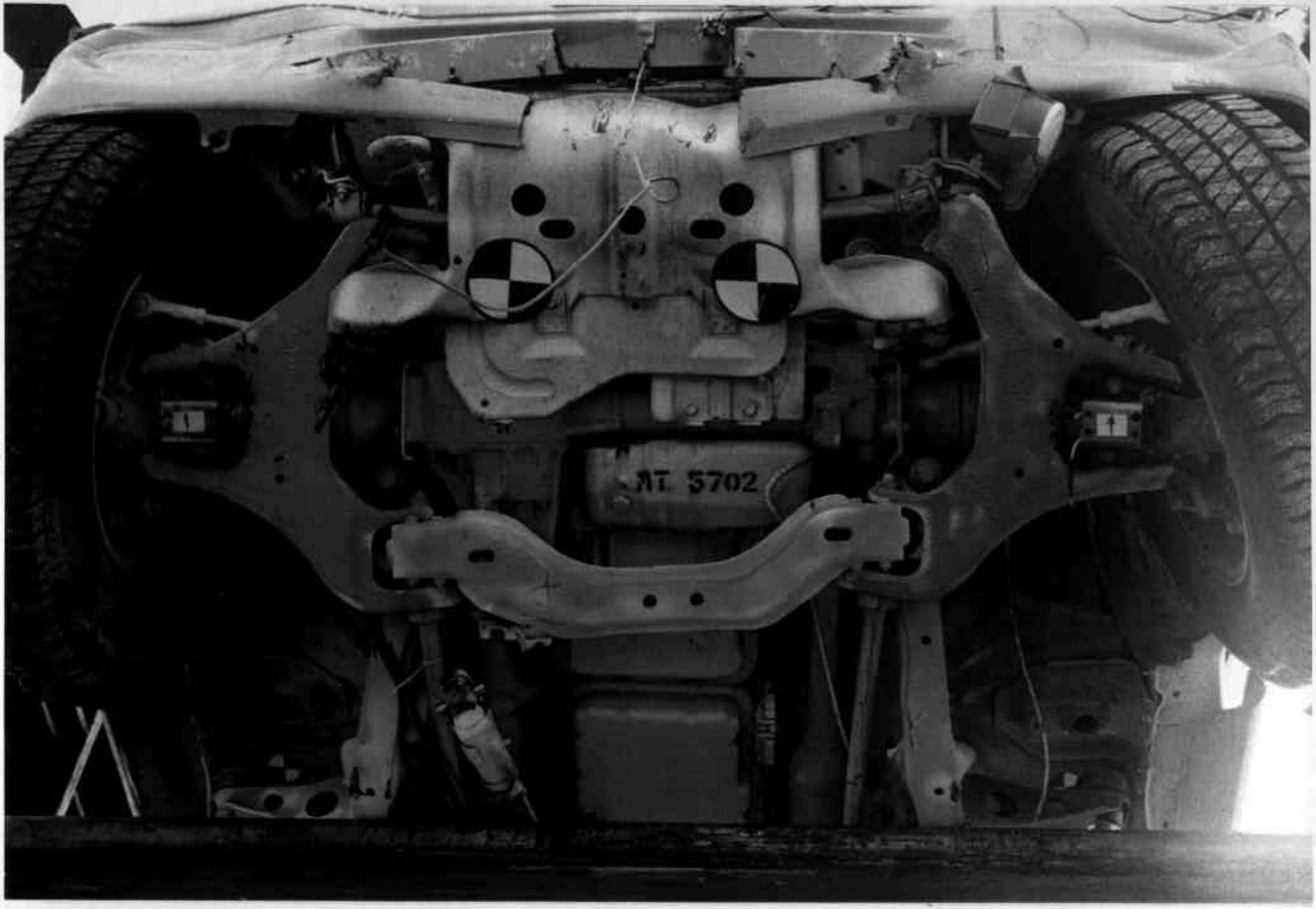


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

8313-6

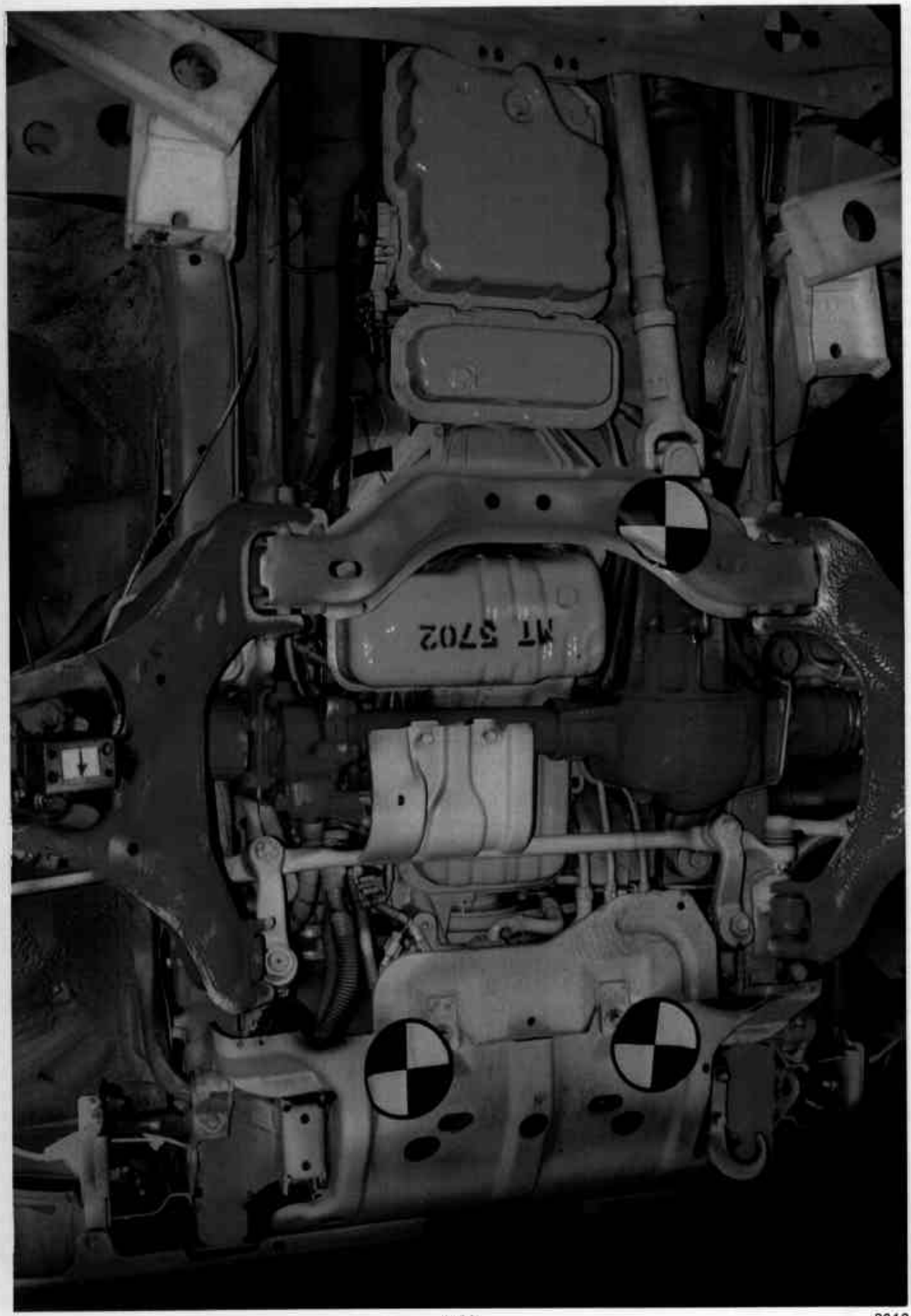


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW

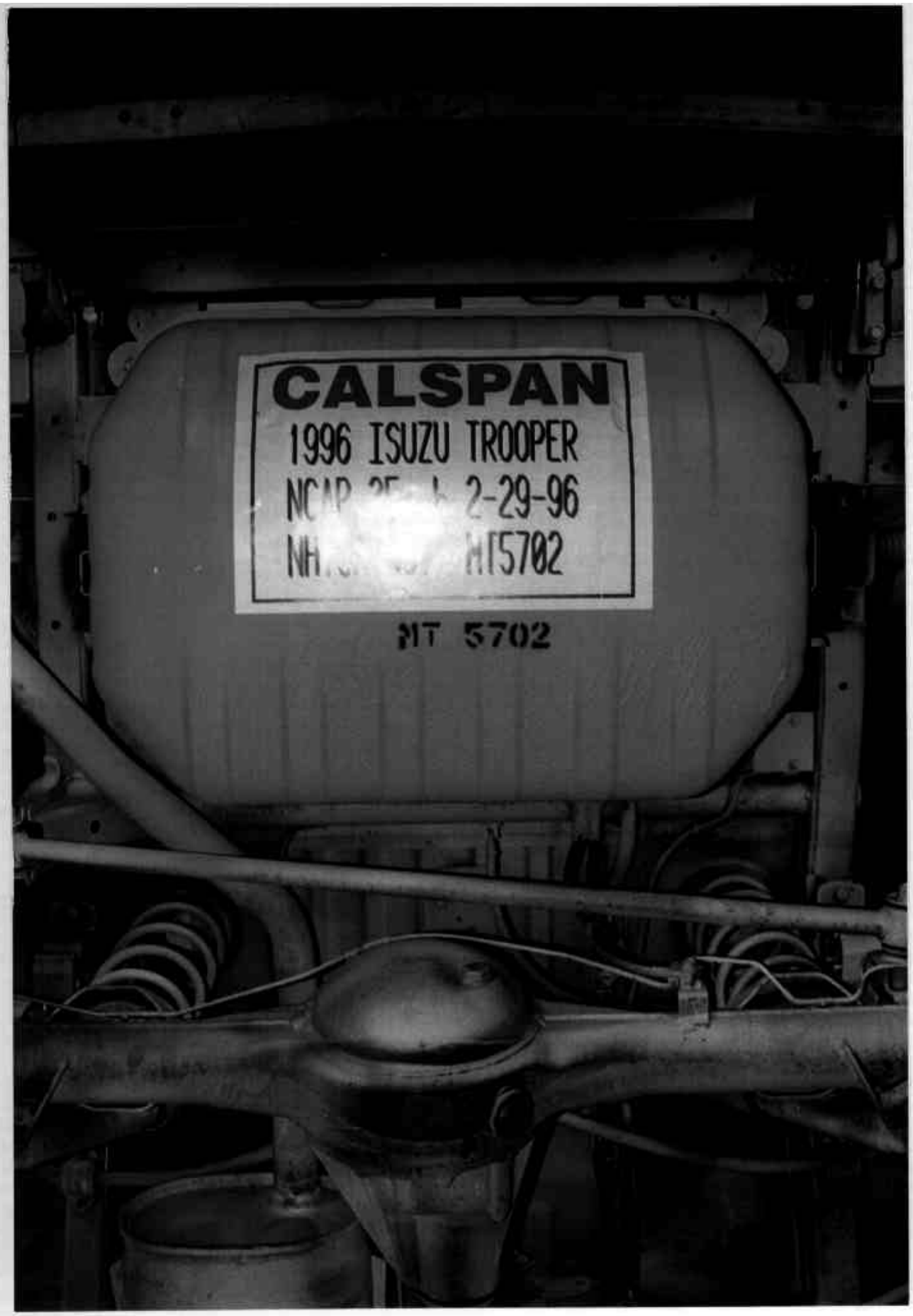


Figure A-20 PRE-TEST REAR UNDERBODY VIEW

Figure A-21 POST-TEST REAR UNDERBODY VIEW

8313-6

Figure A-22 PRE-TEST DRIVER POSITION VIEW

8313-6

Figure A-23 POST-TEST DRIVER POSITION VIEW

Figure A-24 PRE-TEST PASSENGER POSITION VIEW

8313-6

A-27

8313-6

Figure A-25 POST-TEST PASSENGER POSITION VIEW

Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW

8313-6

Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW

8313-6

Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

A-31

8313-6

Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

Figure A-30 PRE-TEST DRIVER HEAD LOCATION

A-33

8313-6

Figure A-31 POST-TEST DRIVER HEAD LOCATION

Figure A-32 PRE-TEST PASSENGER HEAD LOCATION

8313-6

A-35

8313-6

Figure A-33 POST-TEST PASSENGER HEAD LOCATION

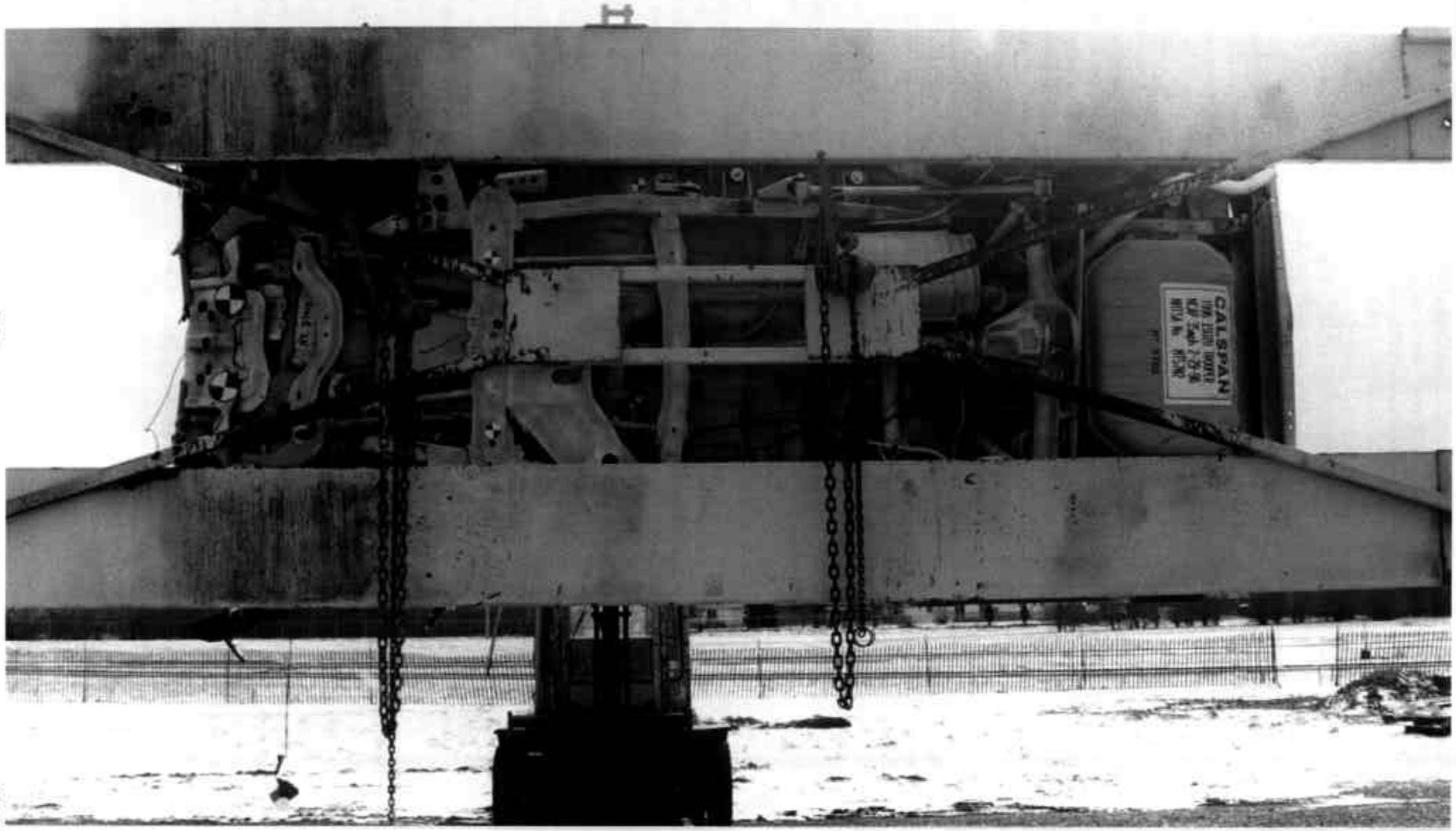


Figure A-34 ROLLOVER VIEW

8313-6

Figure A-35 IMPACT VIEW

8313-6

Appendix B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

NHTSA TEST NO. MT5702

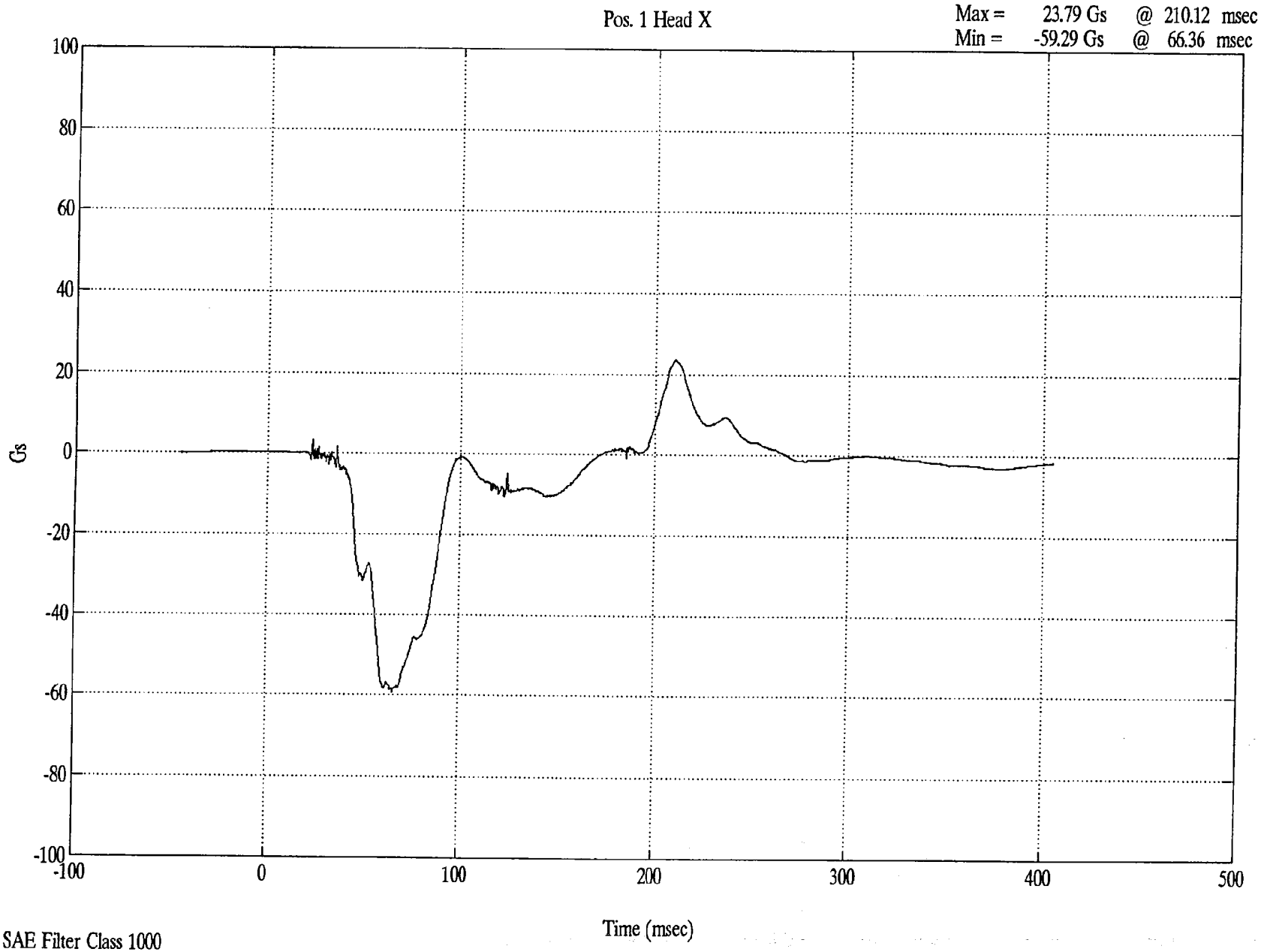
DUMMY DATA

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

Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers

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

NCAP TEST #6 - 1996 ISUZU TROOPER



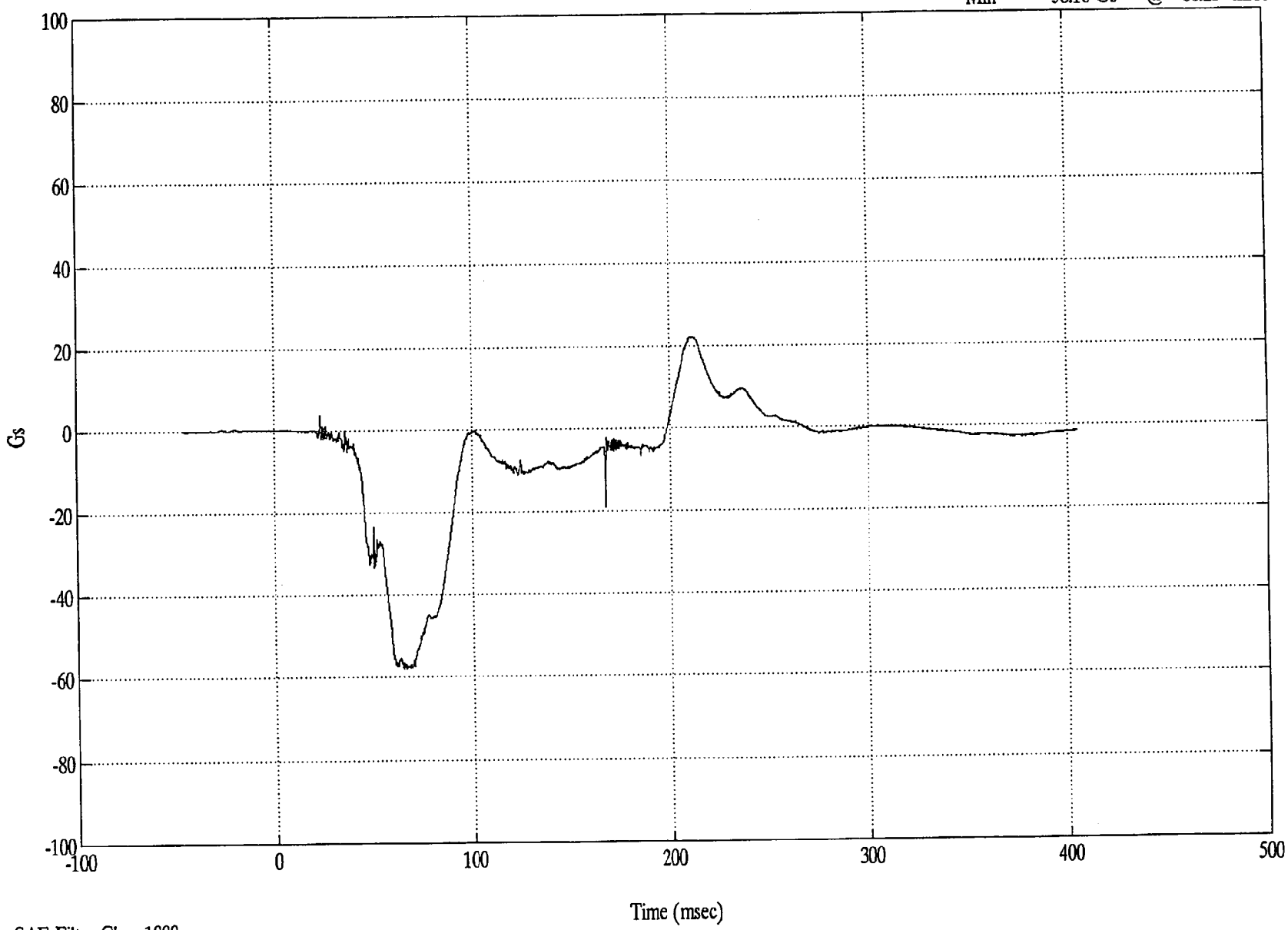
SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 1 Head X(R)

Max = 22.27 Gs @ 210.83 msec
Min = -58.16 Gs @ 66.23 msec

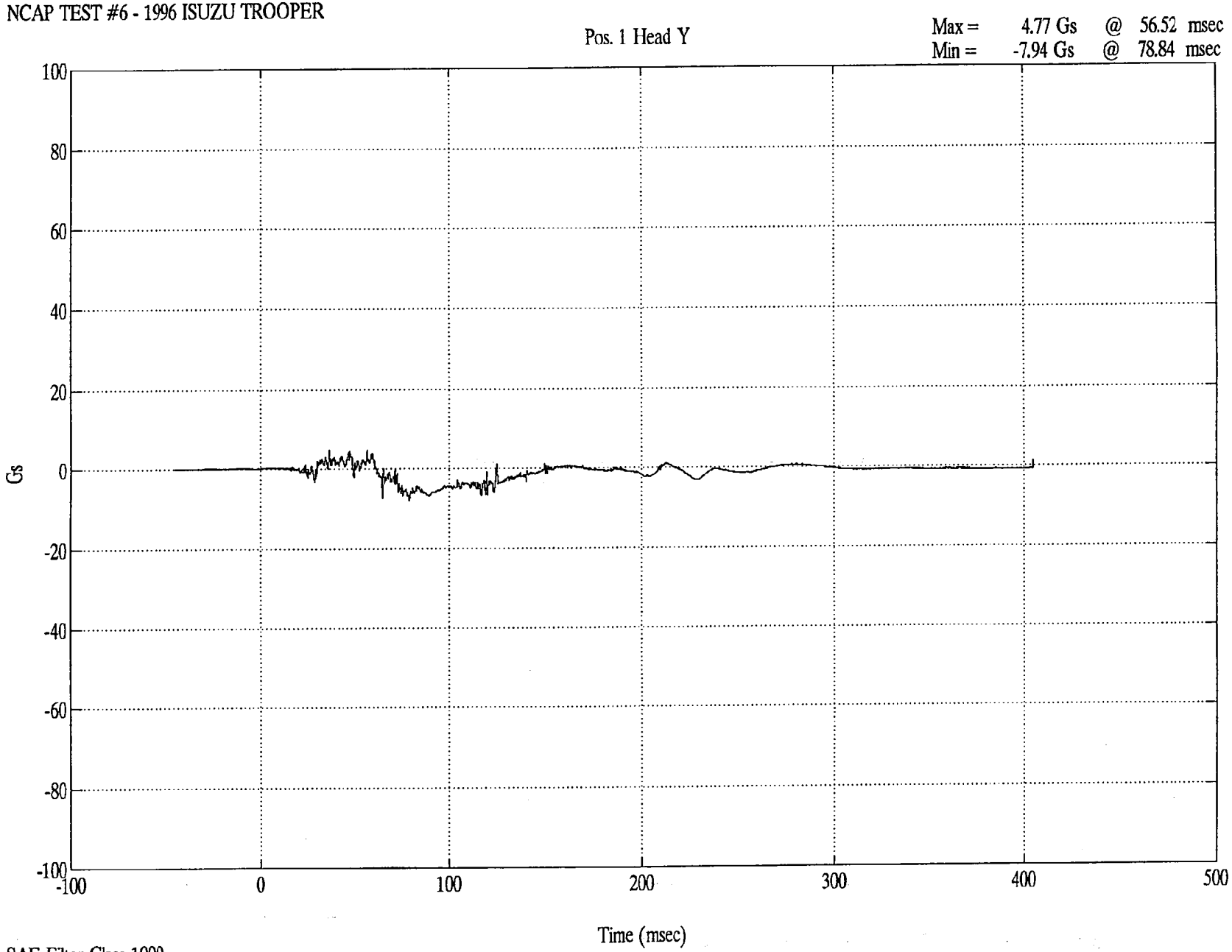


B-5

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

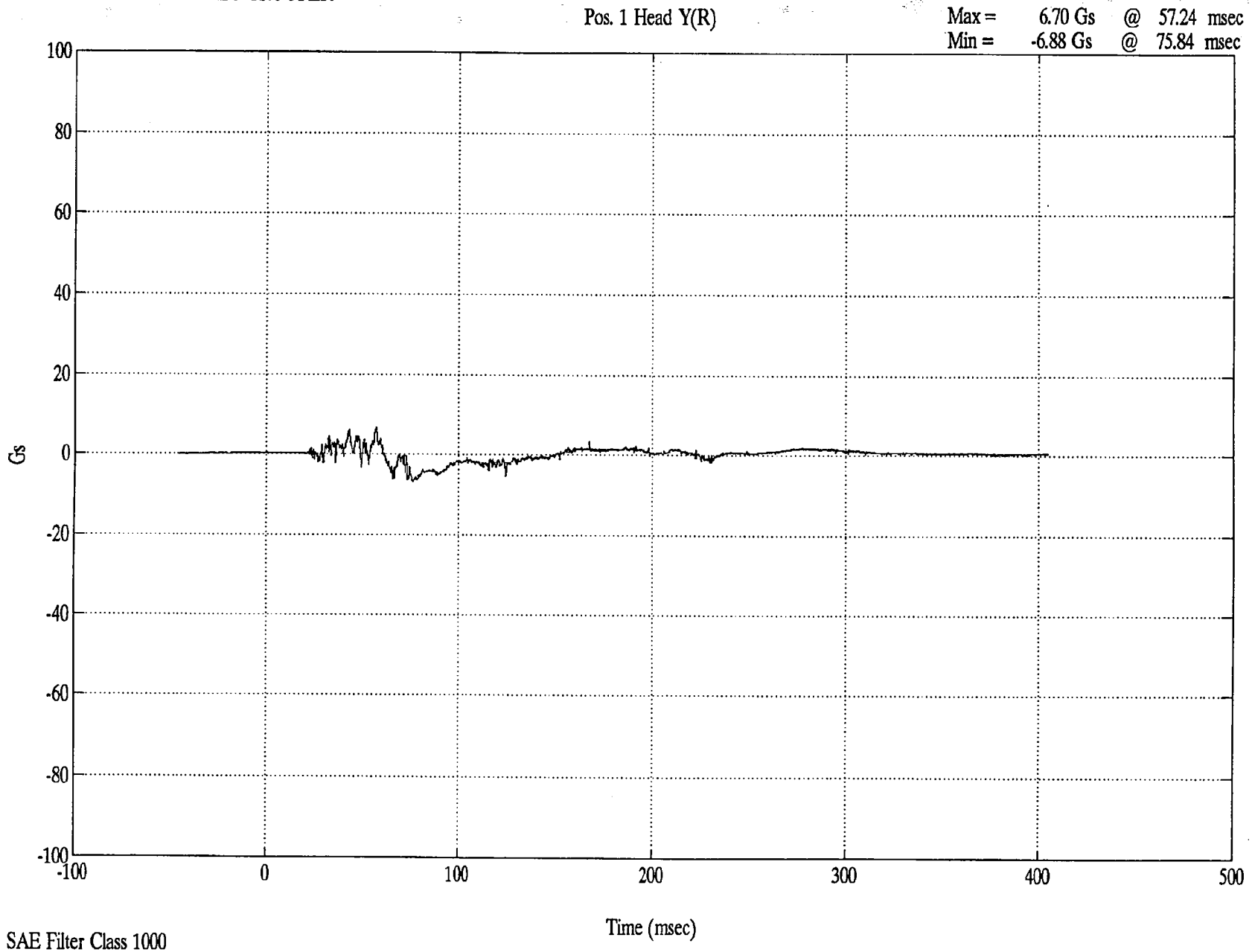


SAE Filter Class 1000

B-6

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

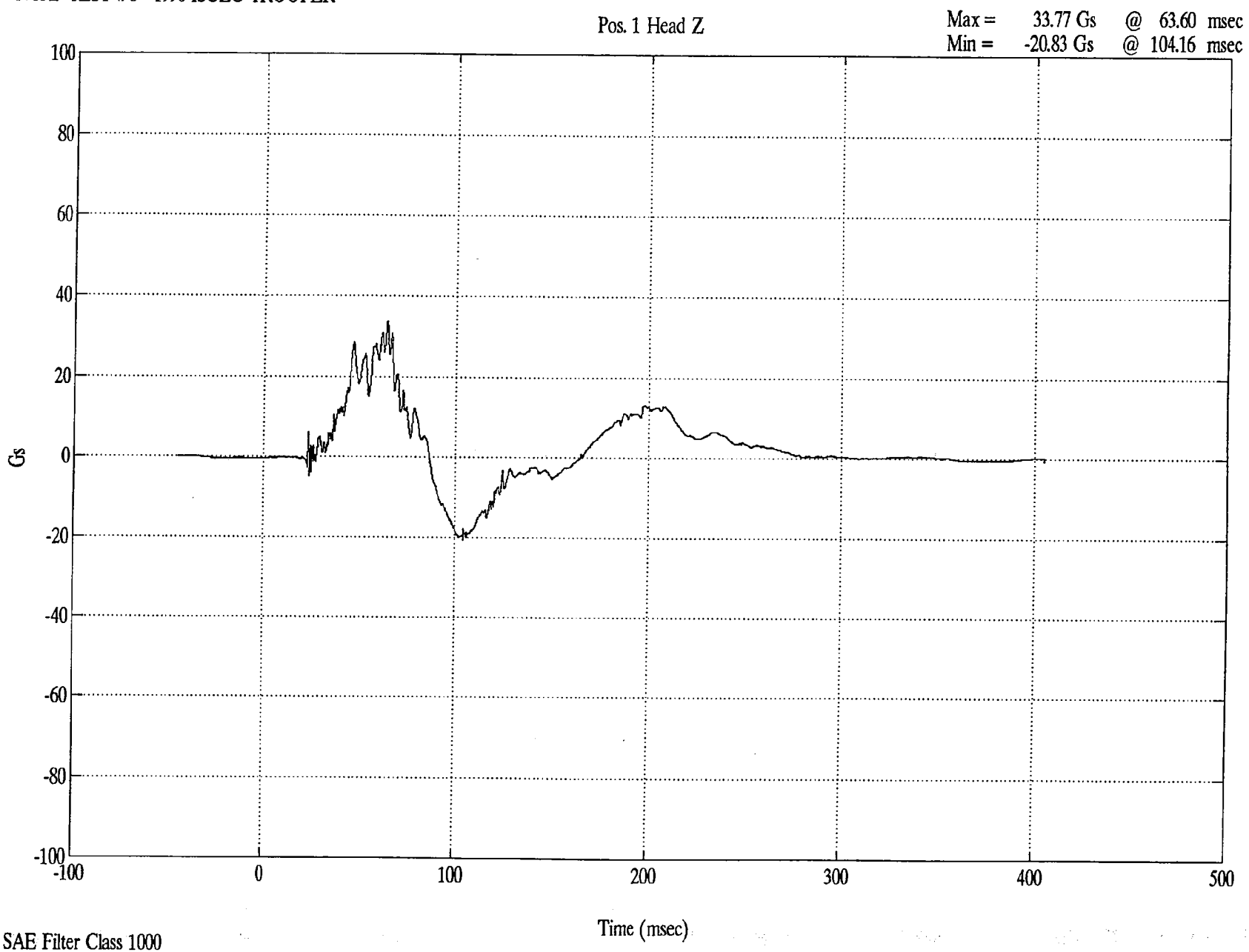


B-7

8313-6

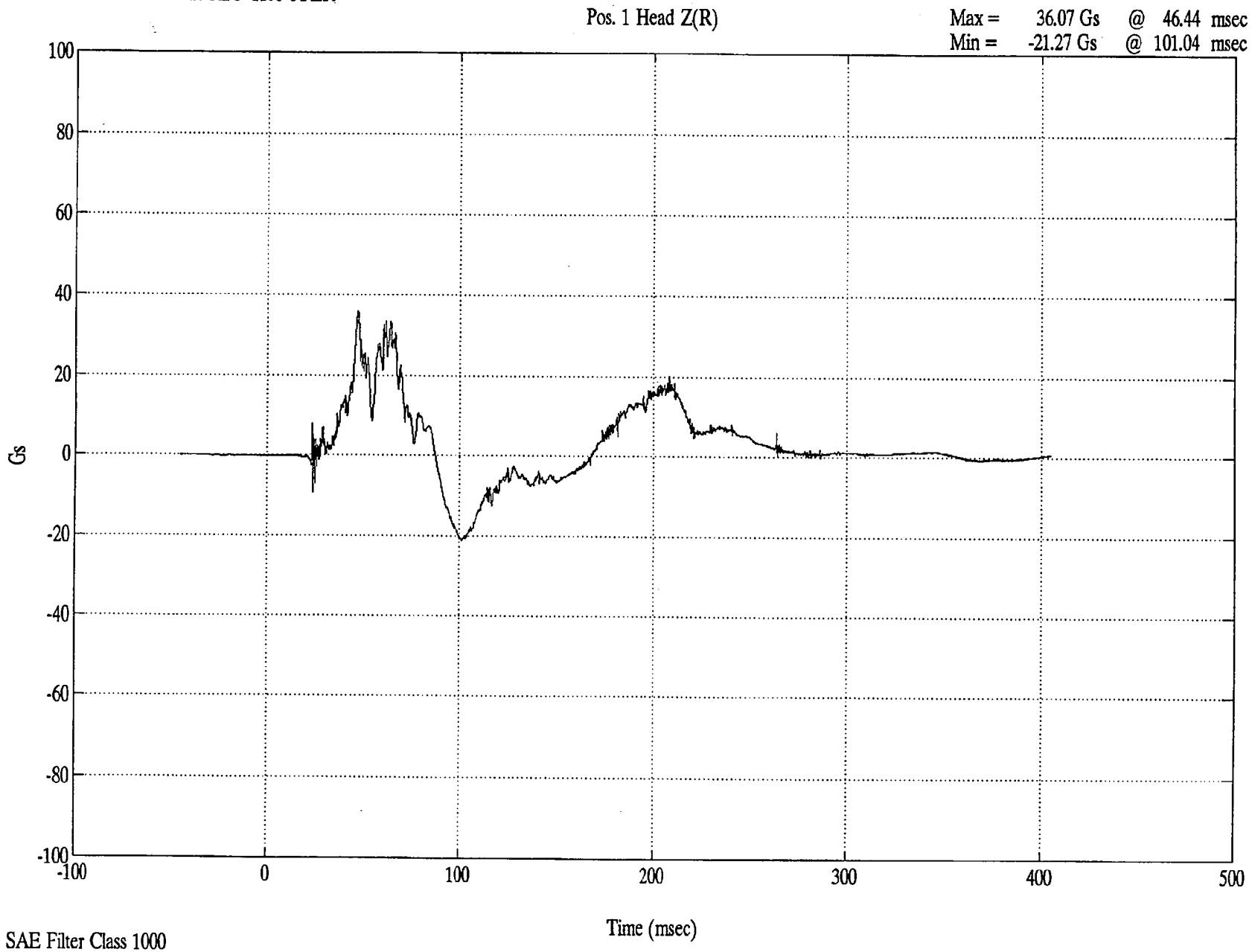
SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

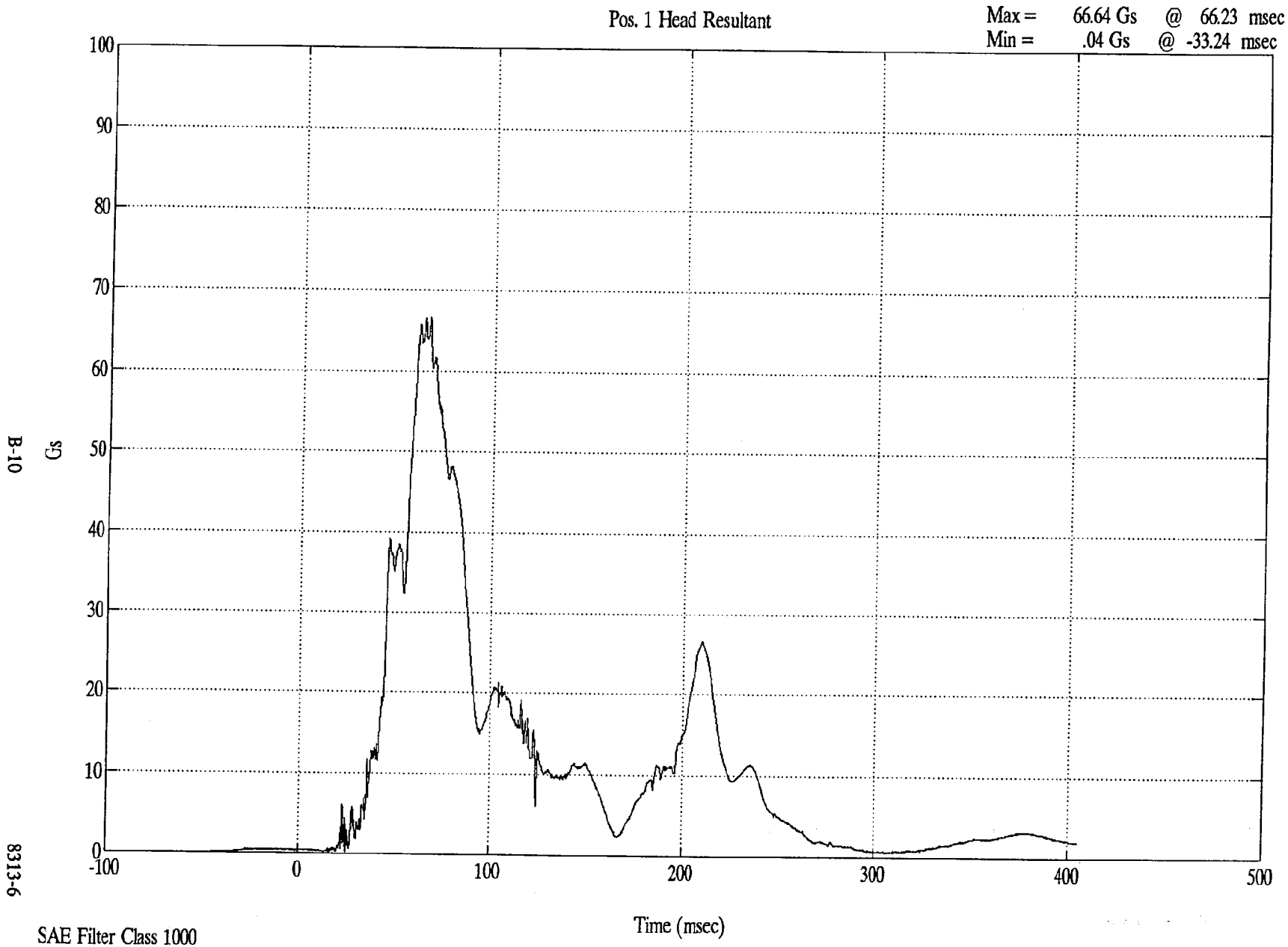


B-9

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

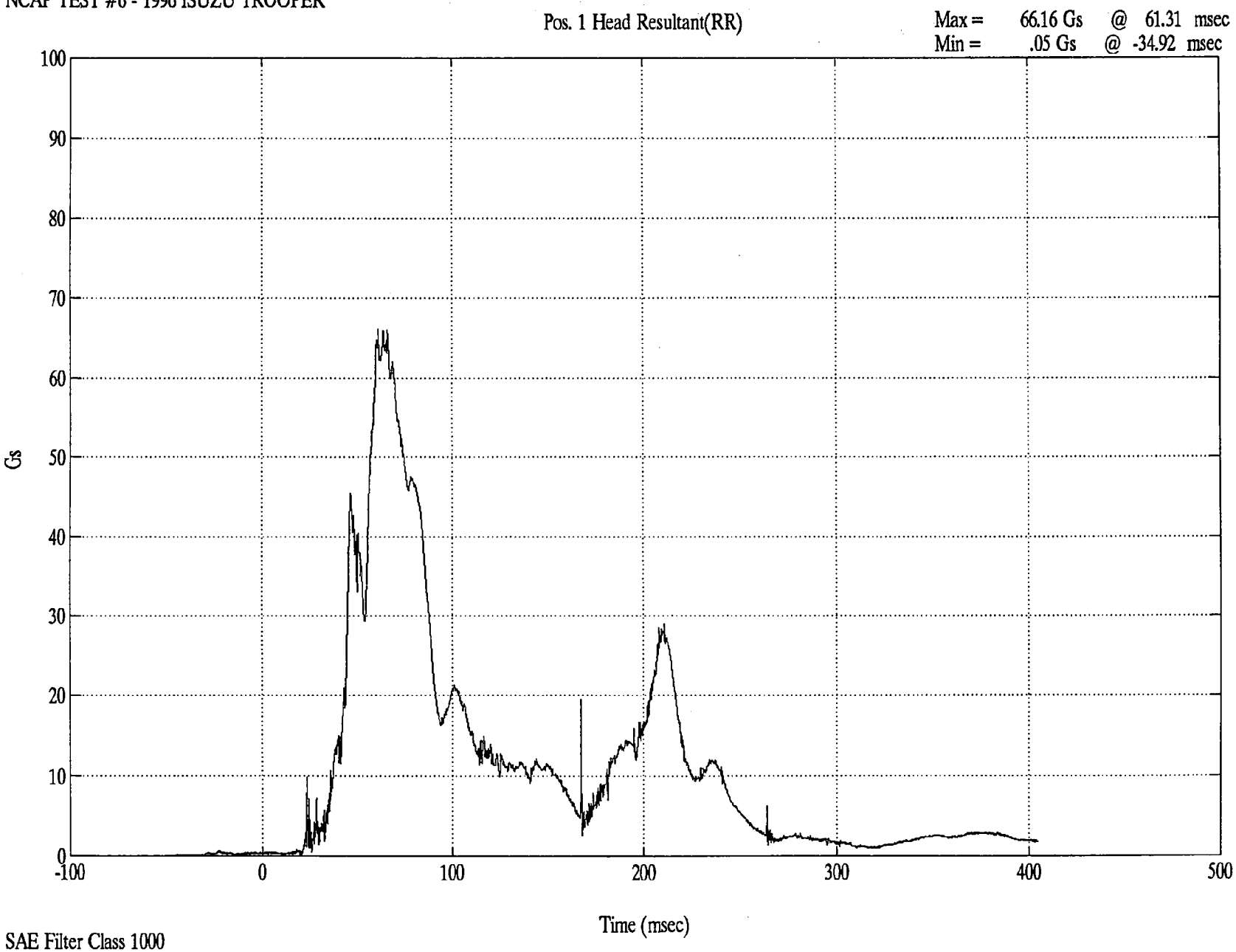


B-10

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

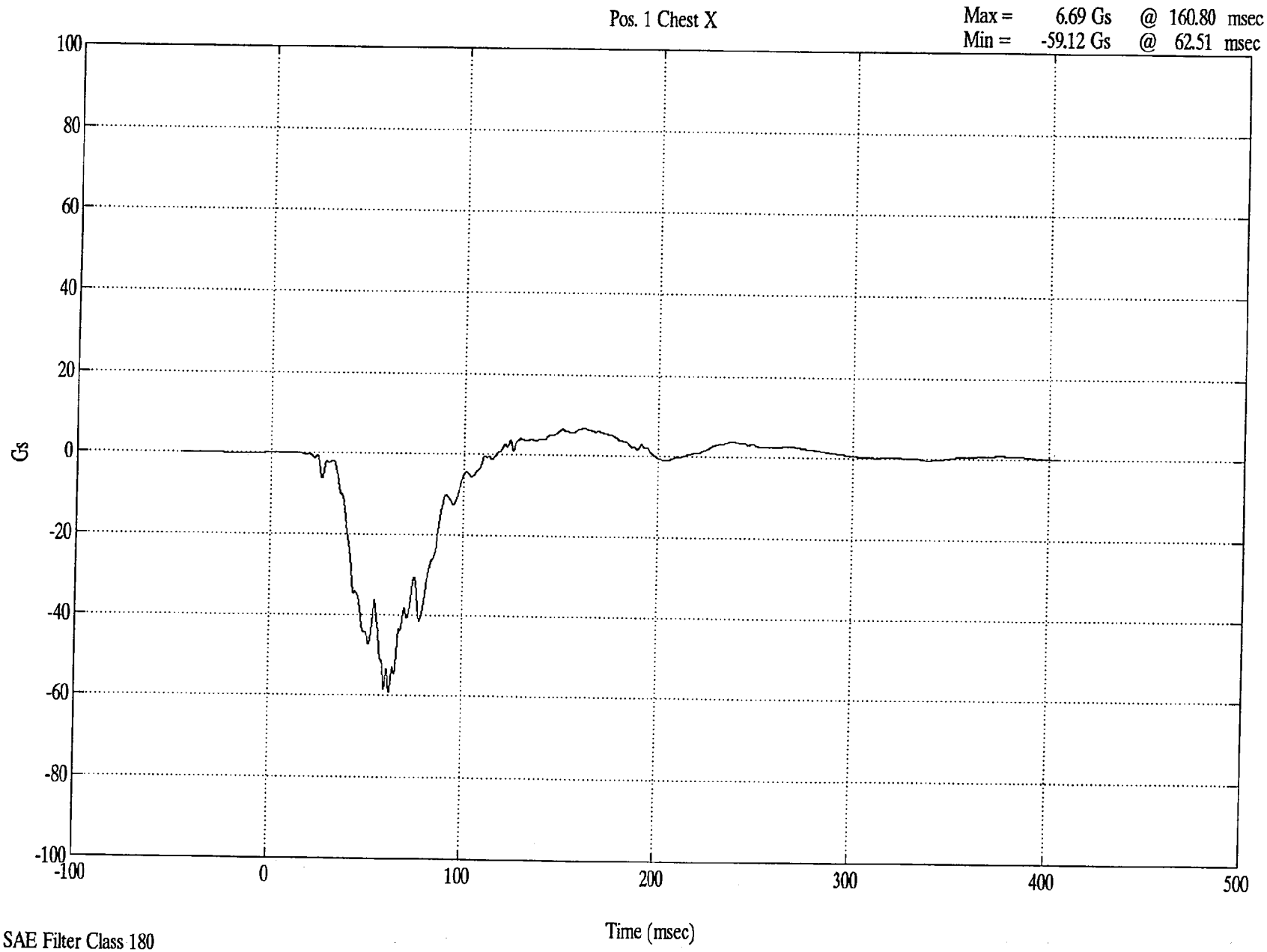


B-11

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER



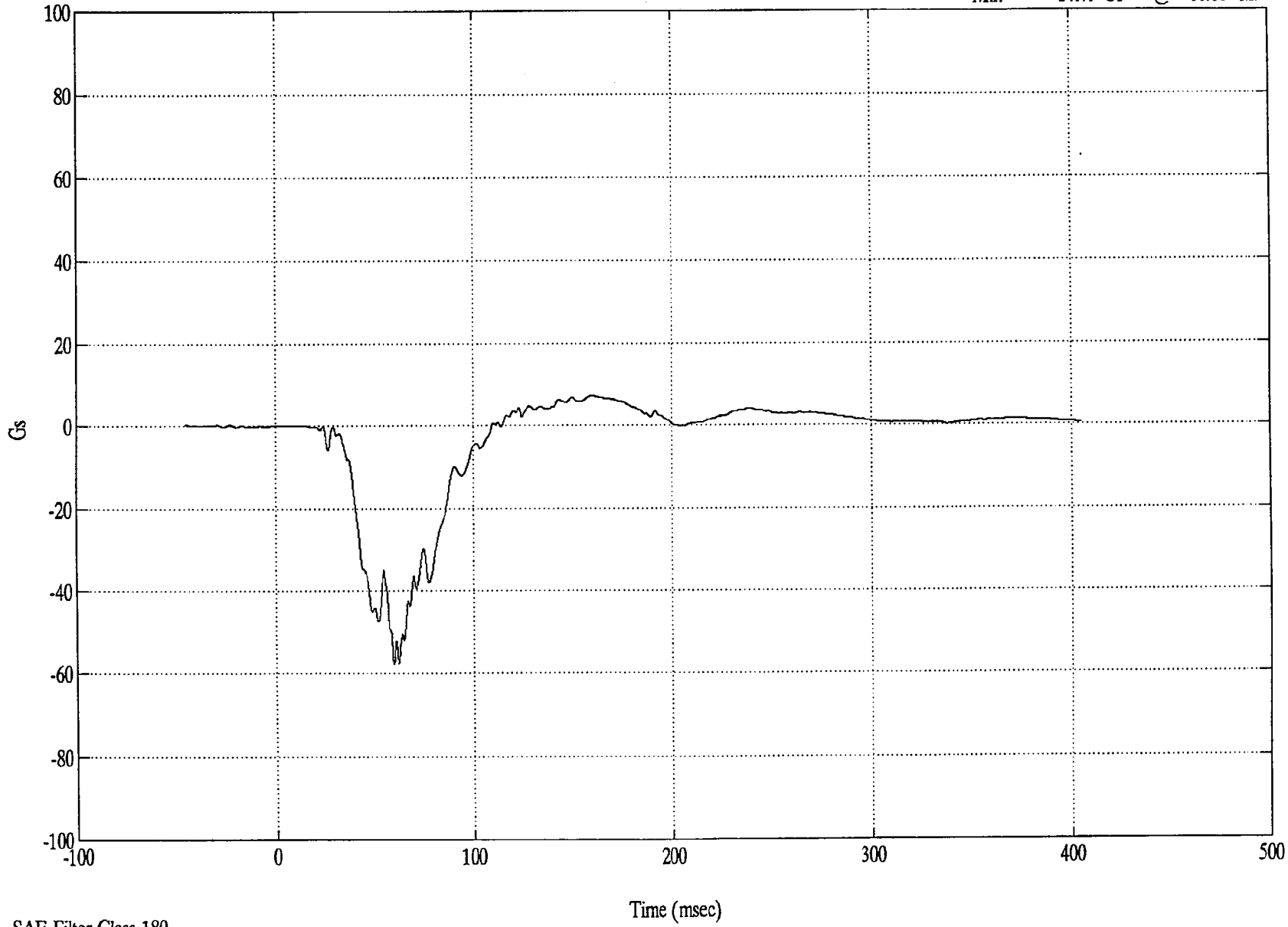
SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 1 Chest X(R)

Max = 7.26 Gs @ 159.72 msec
Min = -57.79 Gs @ 60.00 msec

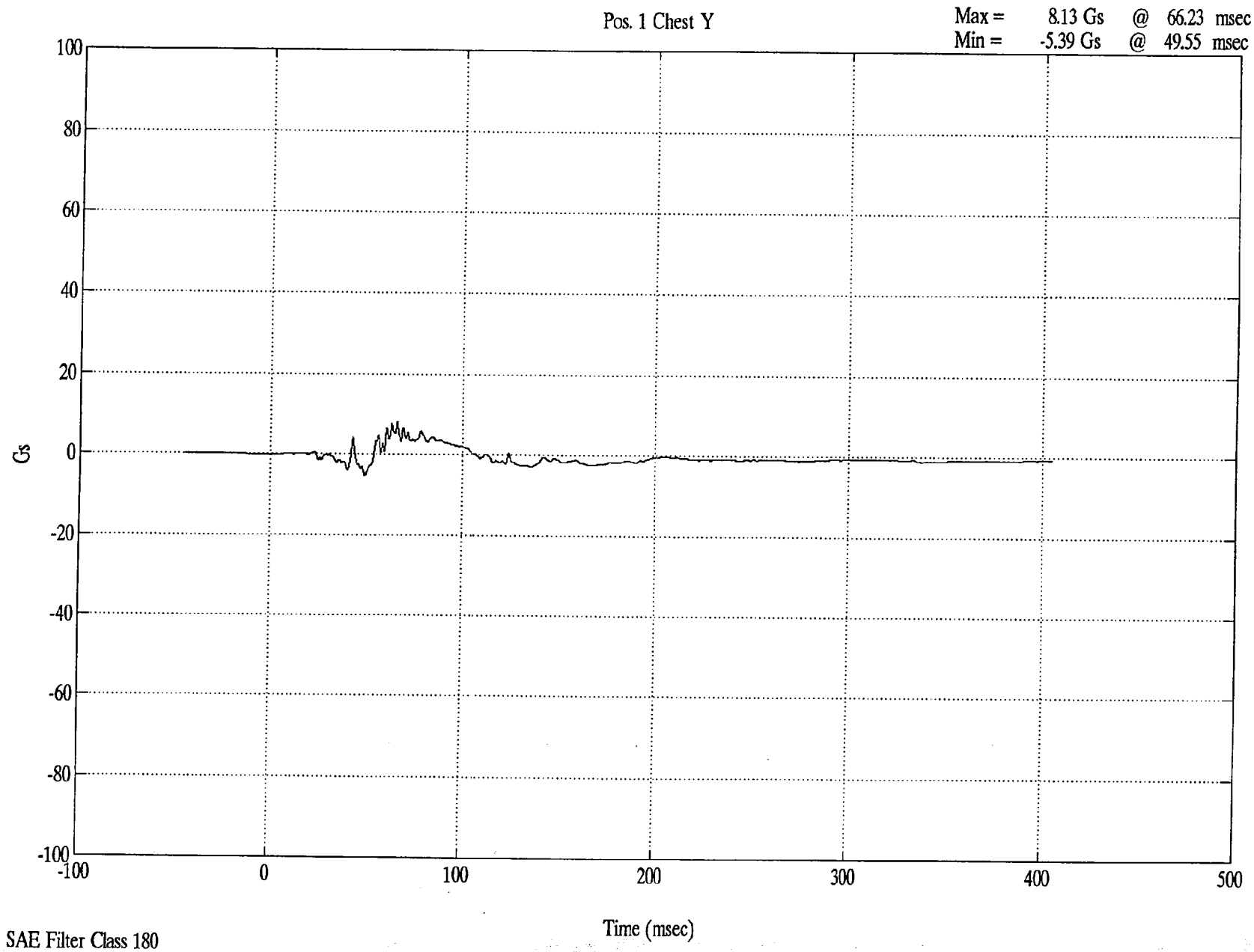


B-13

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

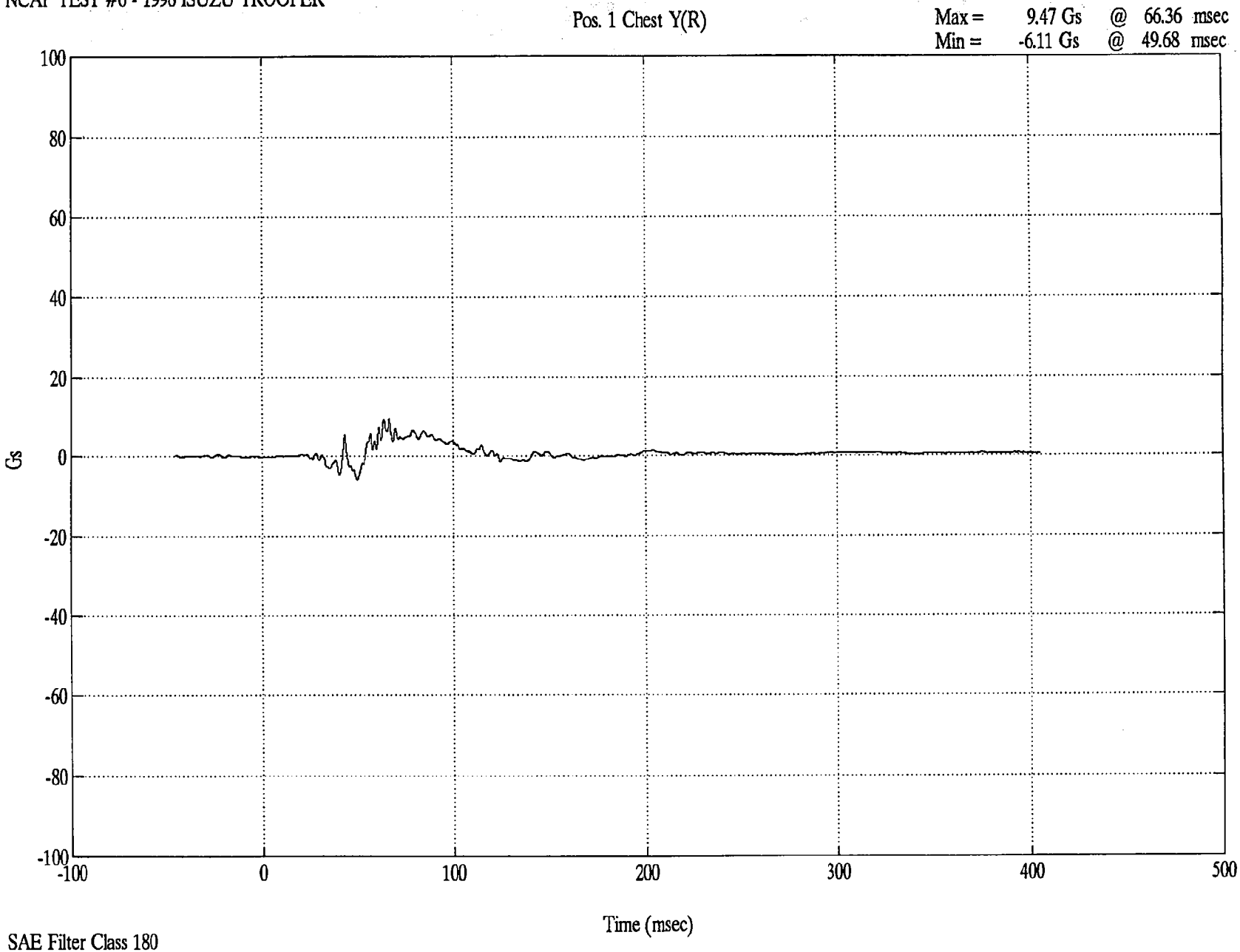


B-14

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER



B-15

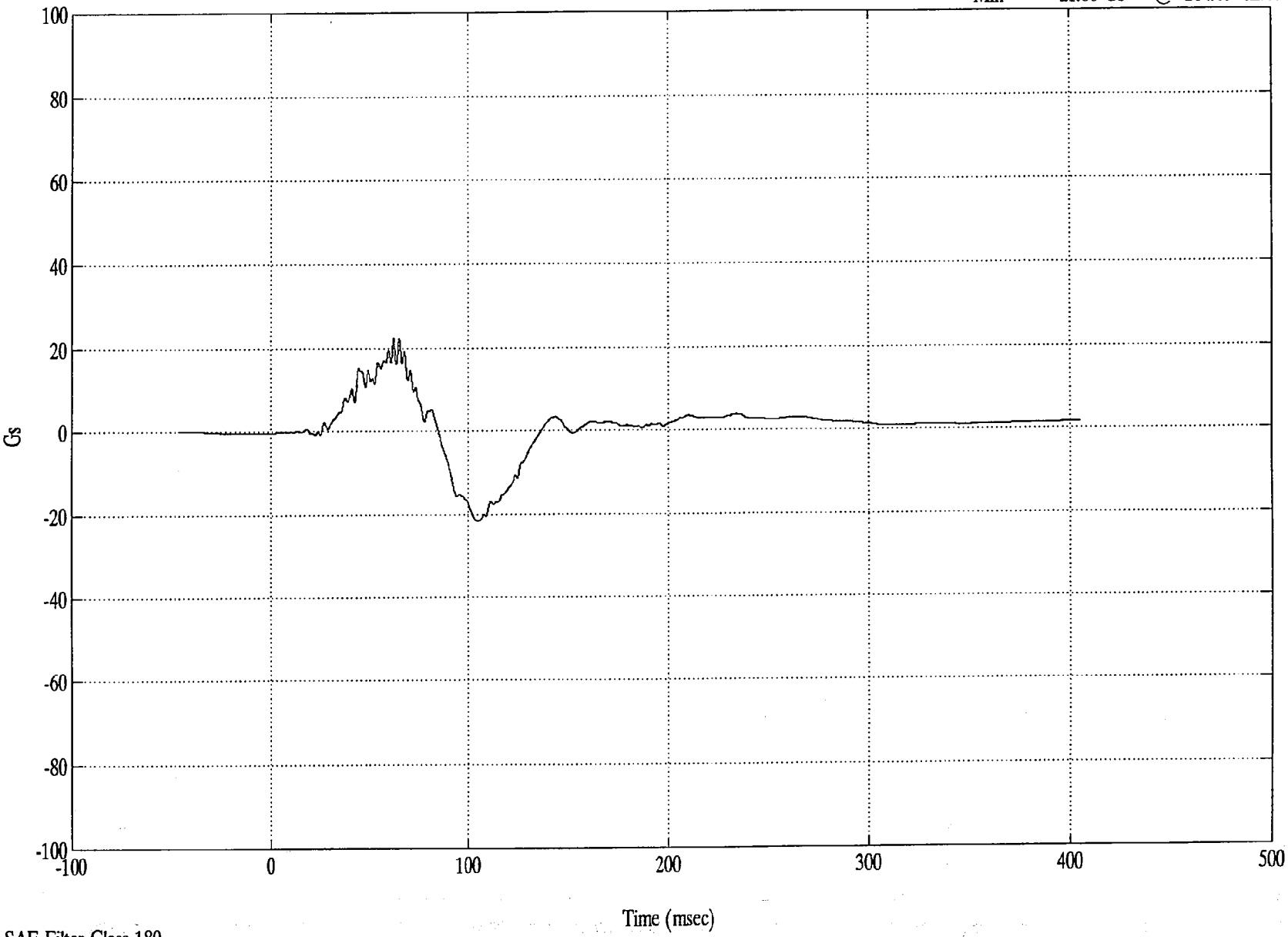
8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 1 Chest Z

Max = 22.45 Gs @ 65.15 msec
Min = -21.60 Gs @ 104.63 msec

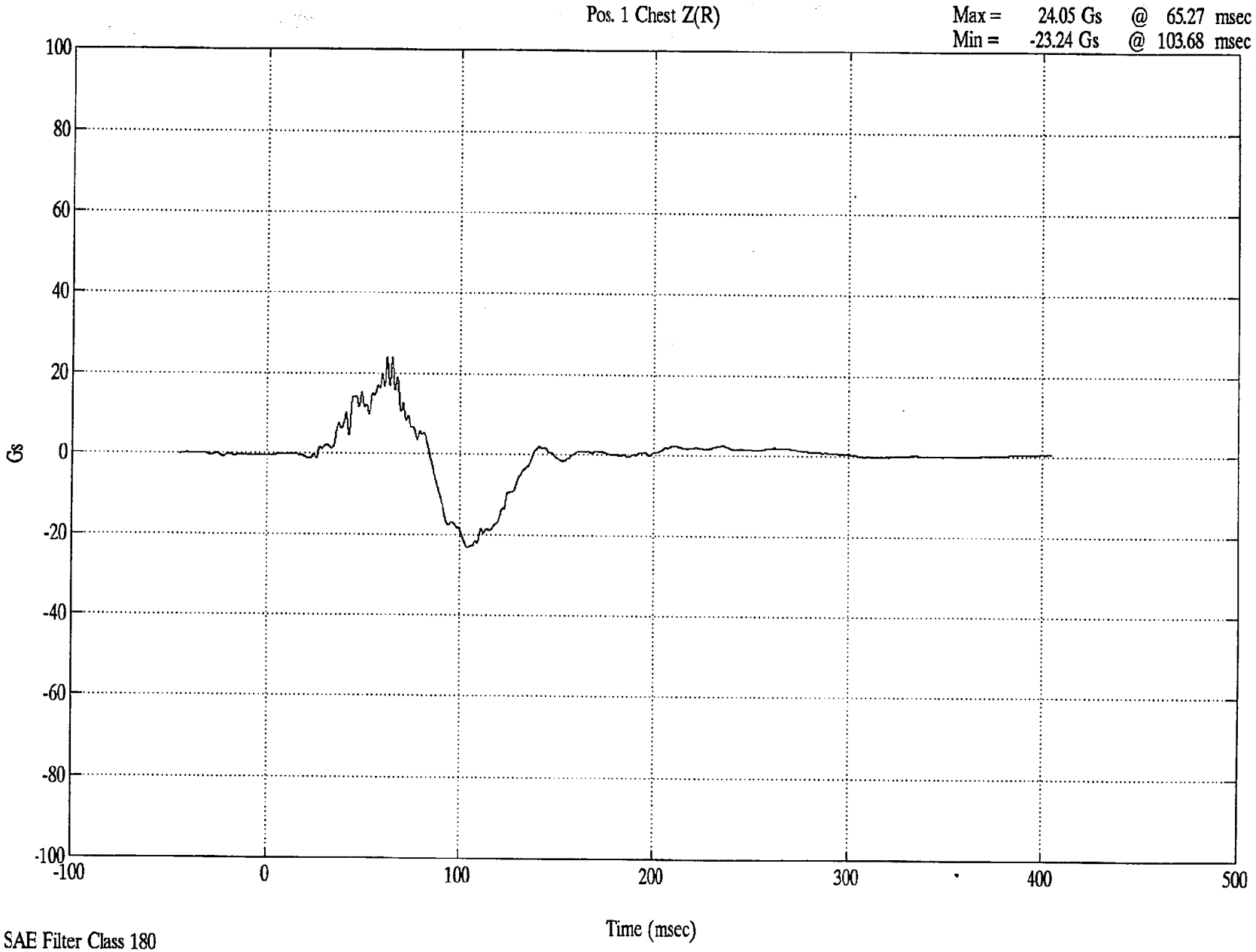


B-16

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

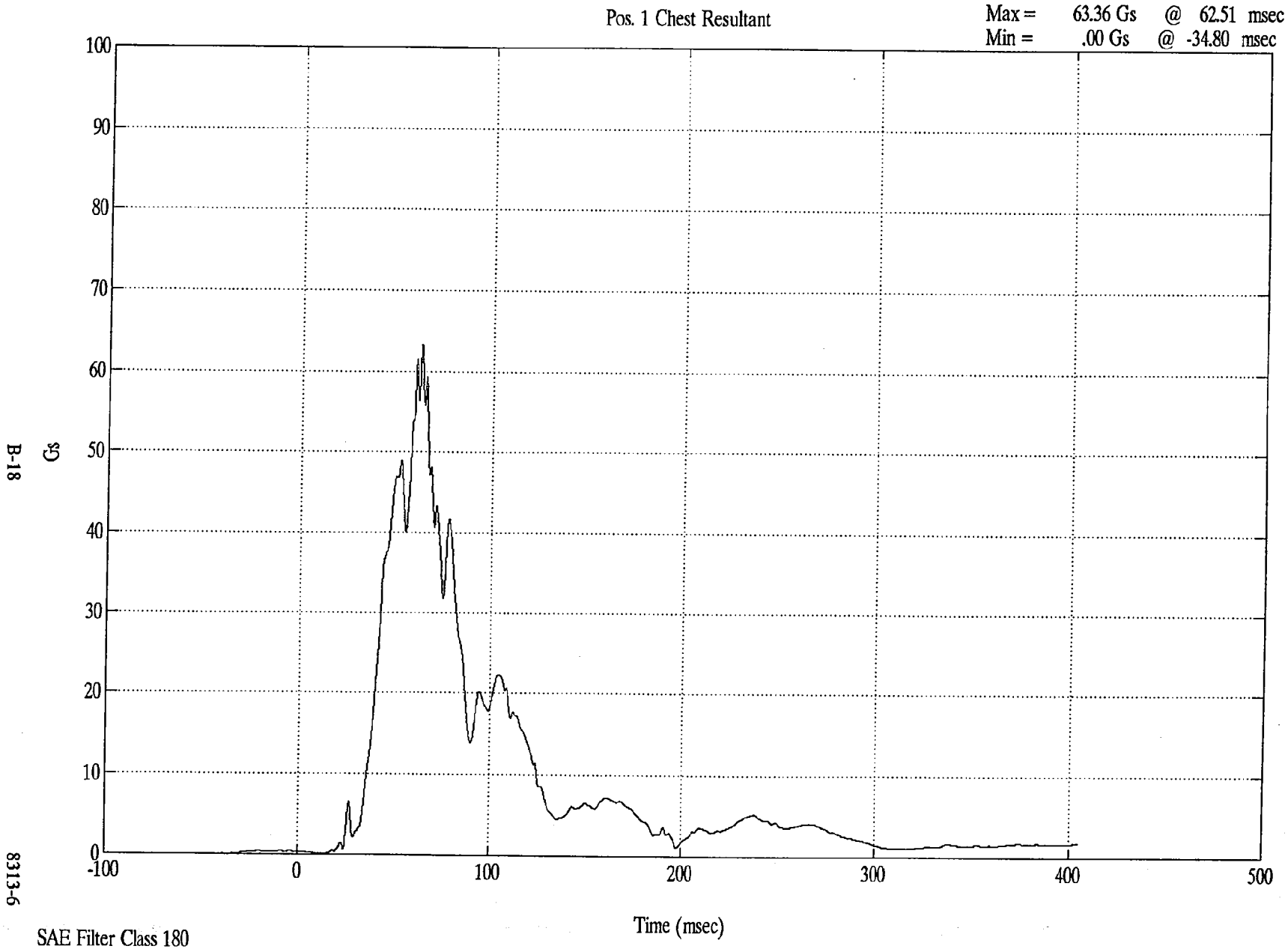


B-17

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

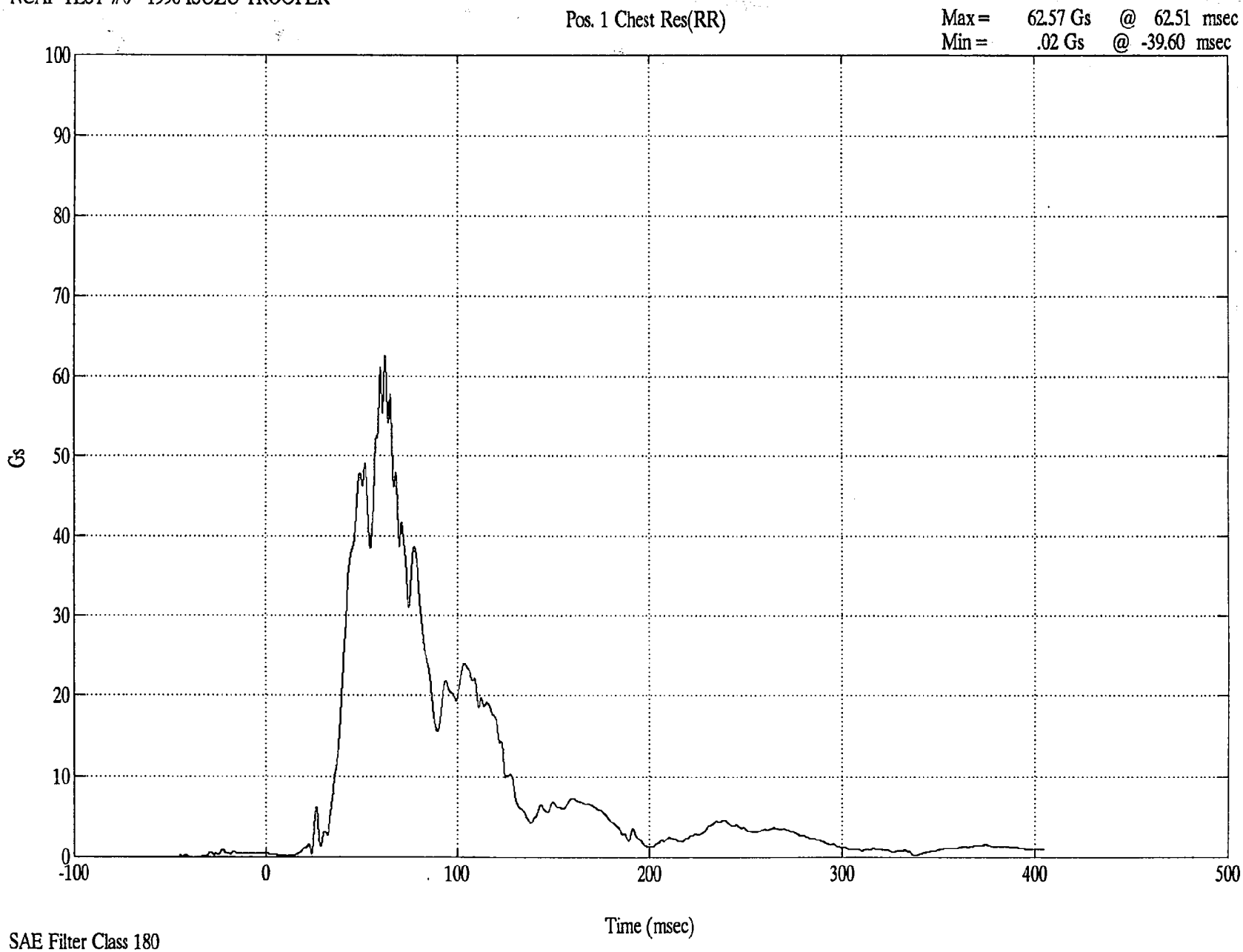


B-18

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

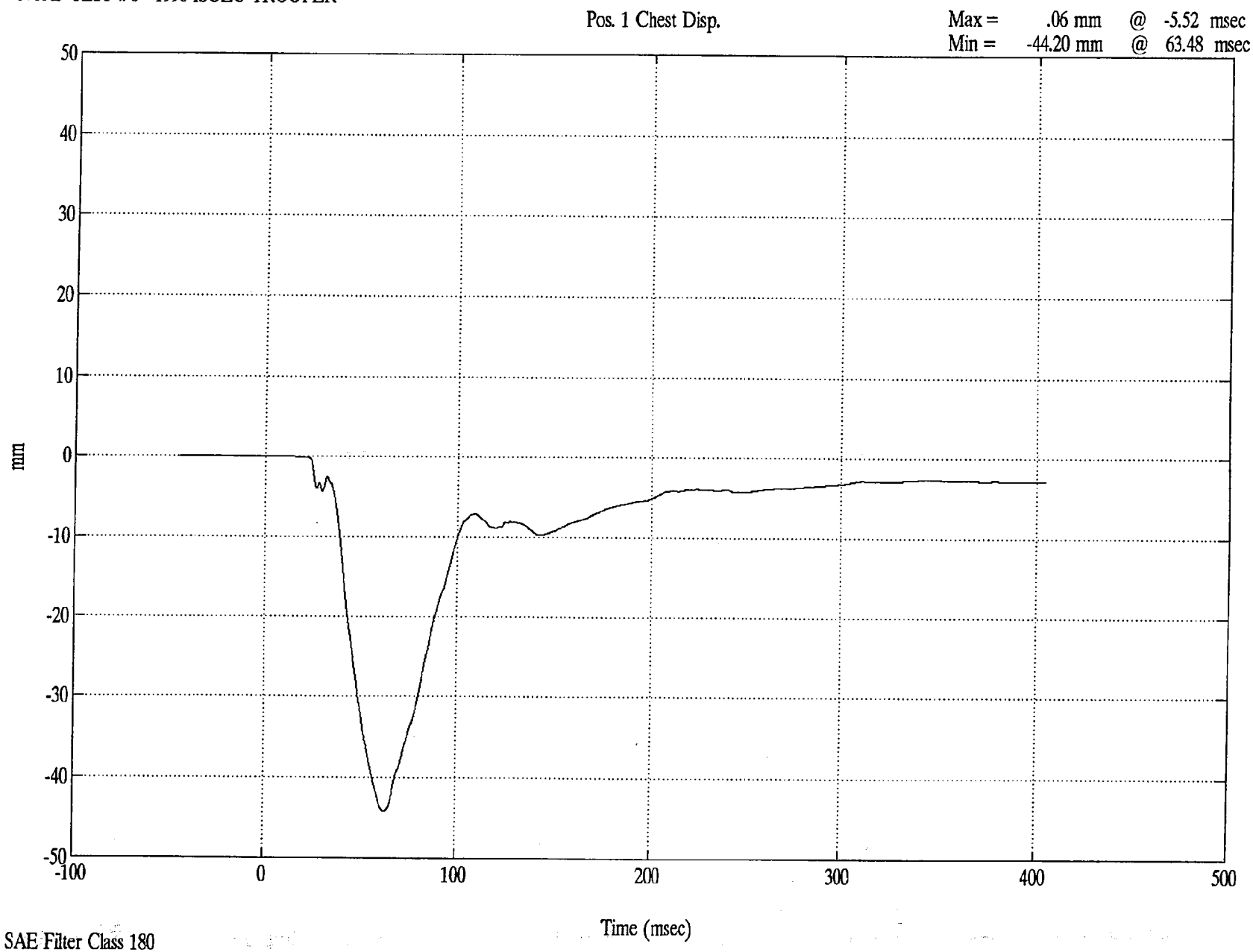


B-19

8313-6

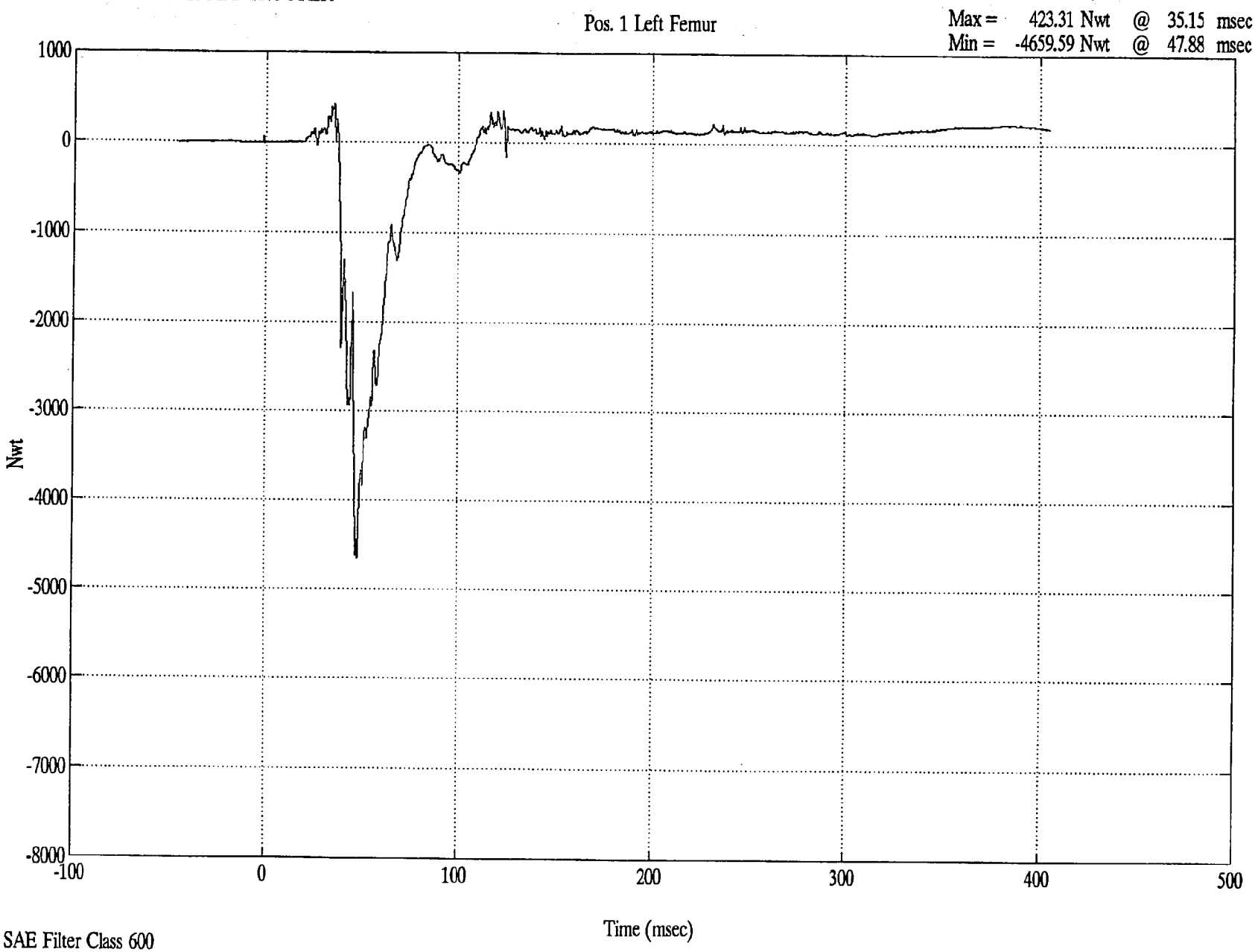
SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

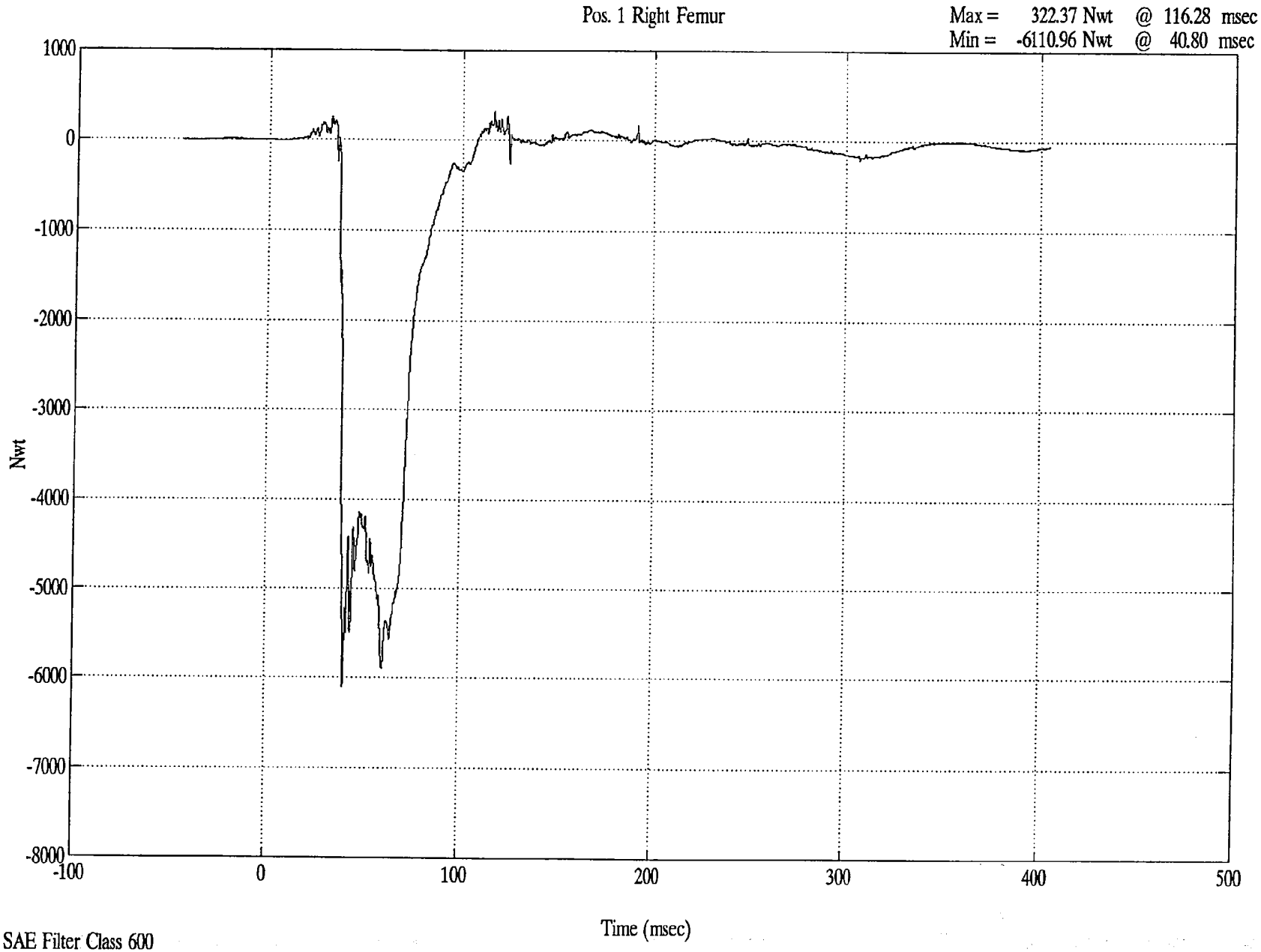


B-21

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

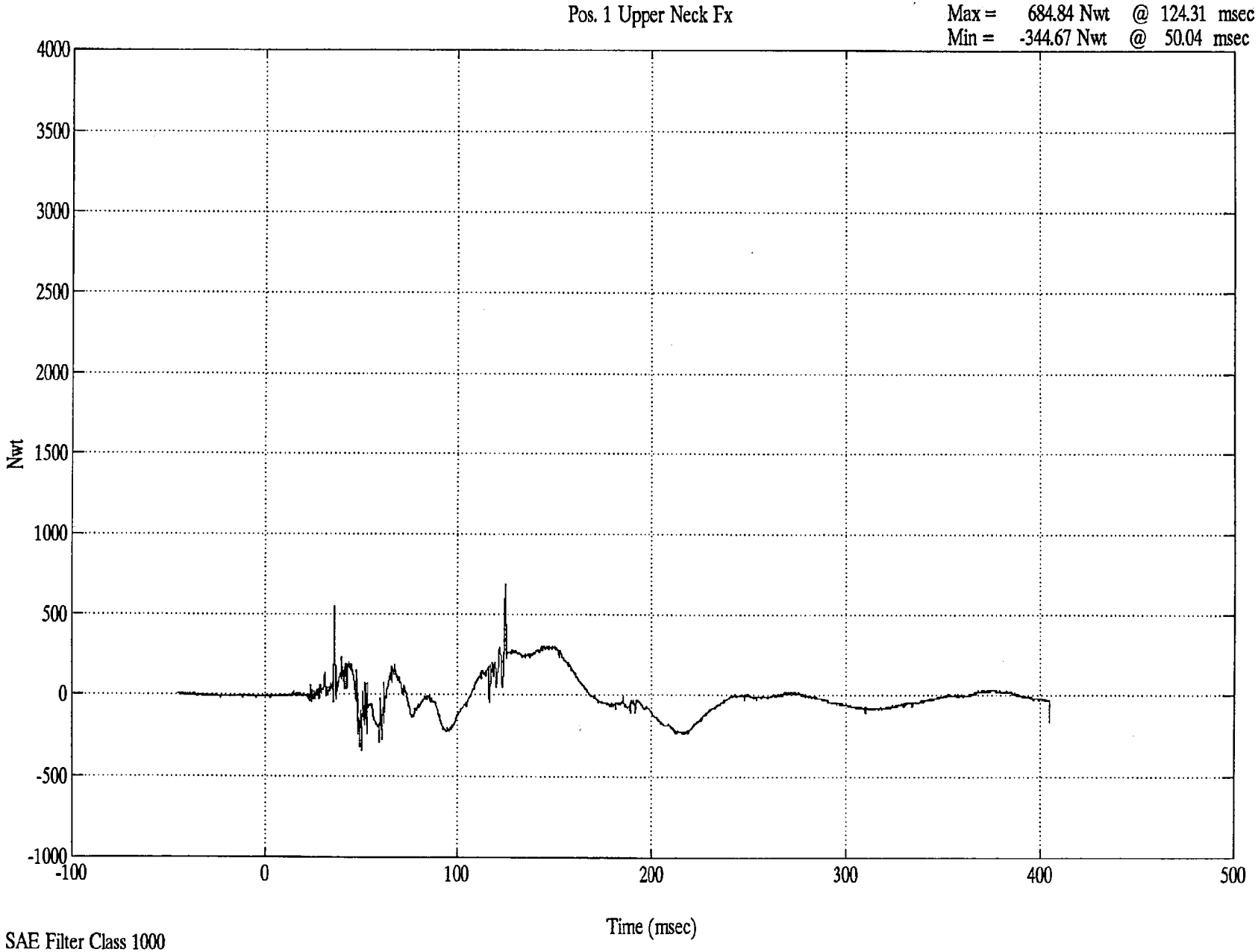


B-22

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

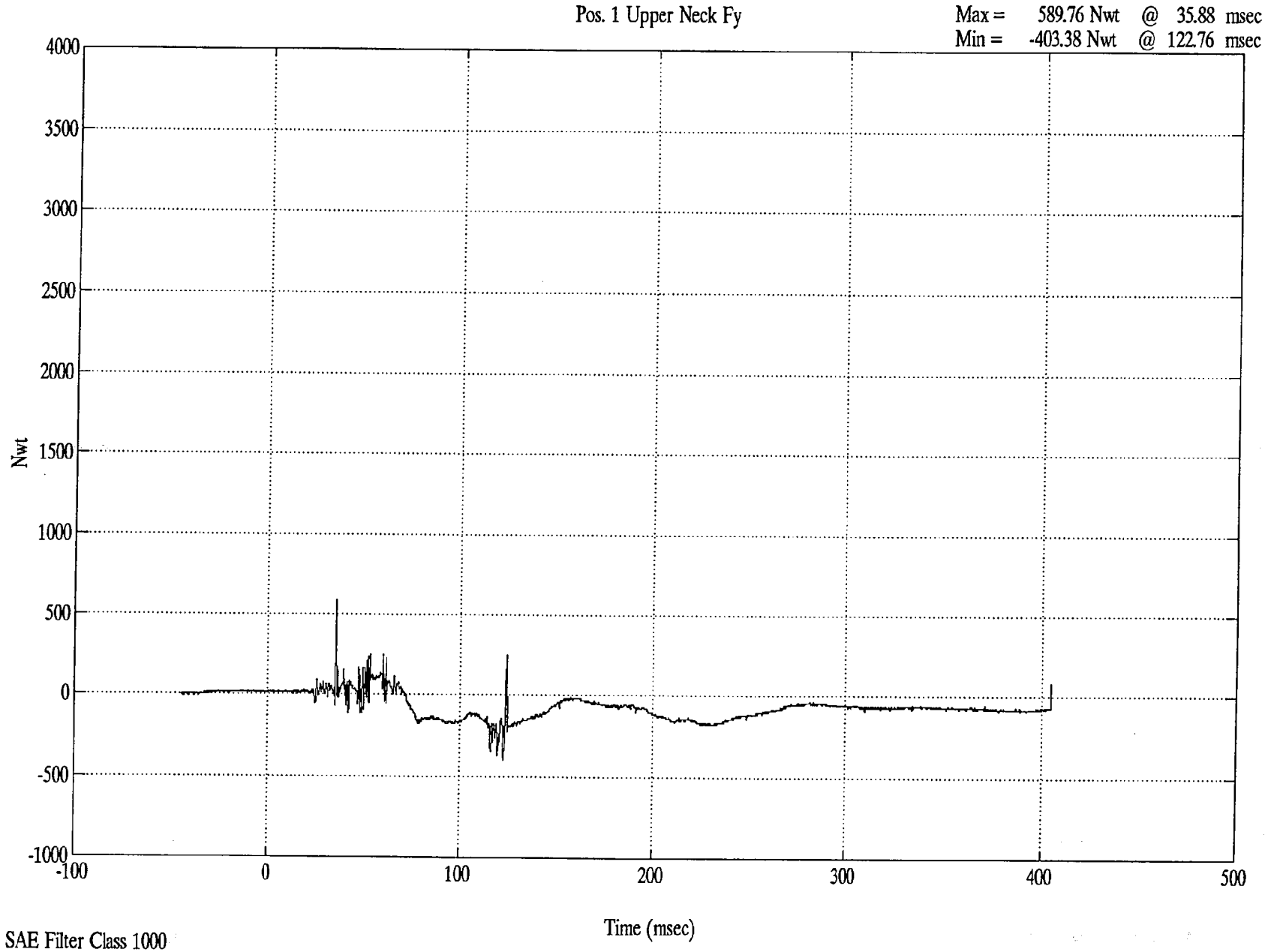


B-23

8313-6

SAE Filter Class 1000

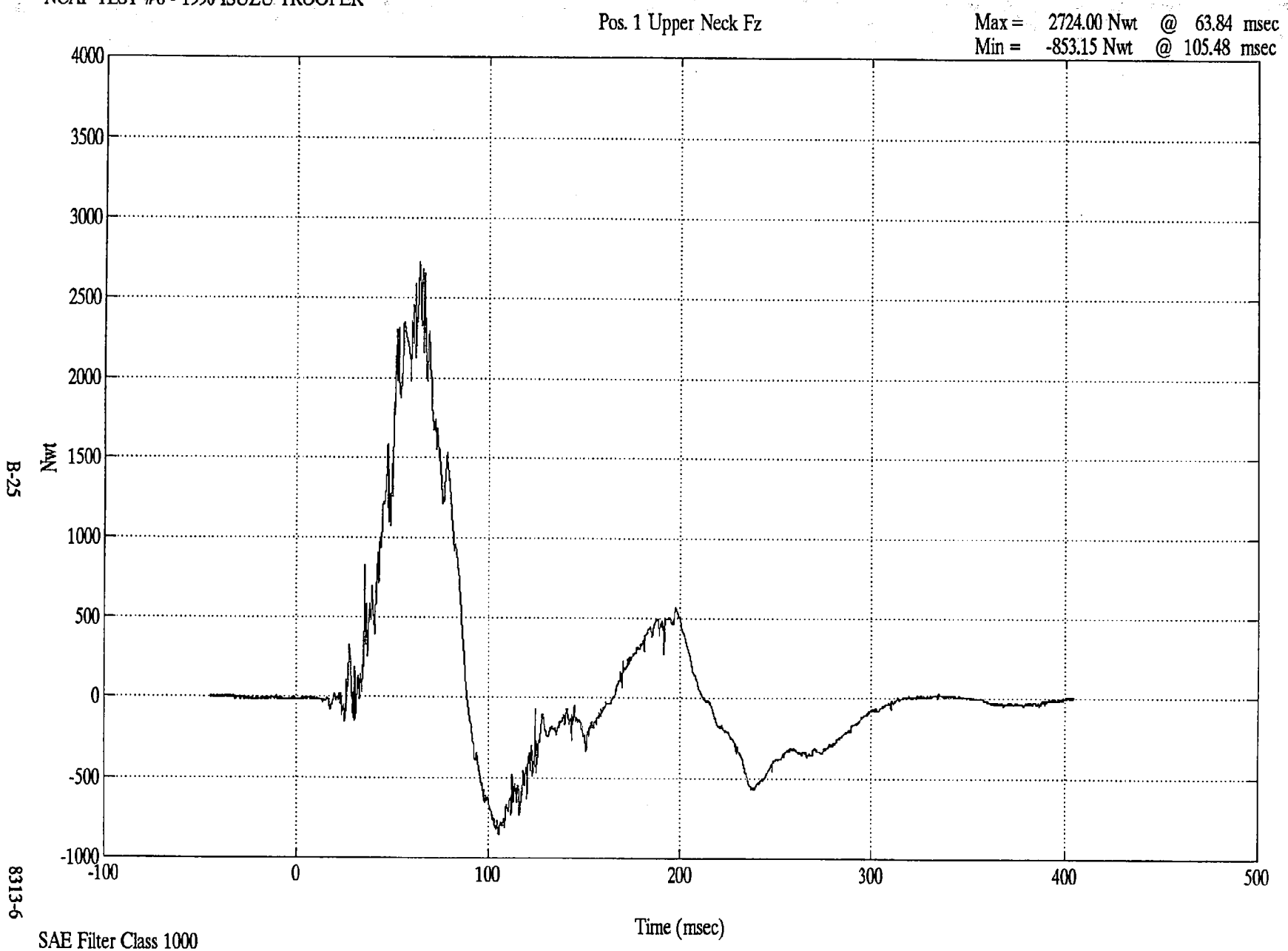
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

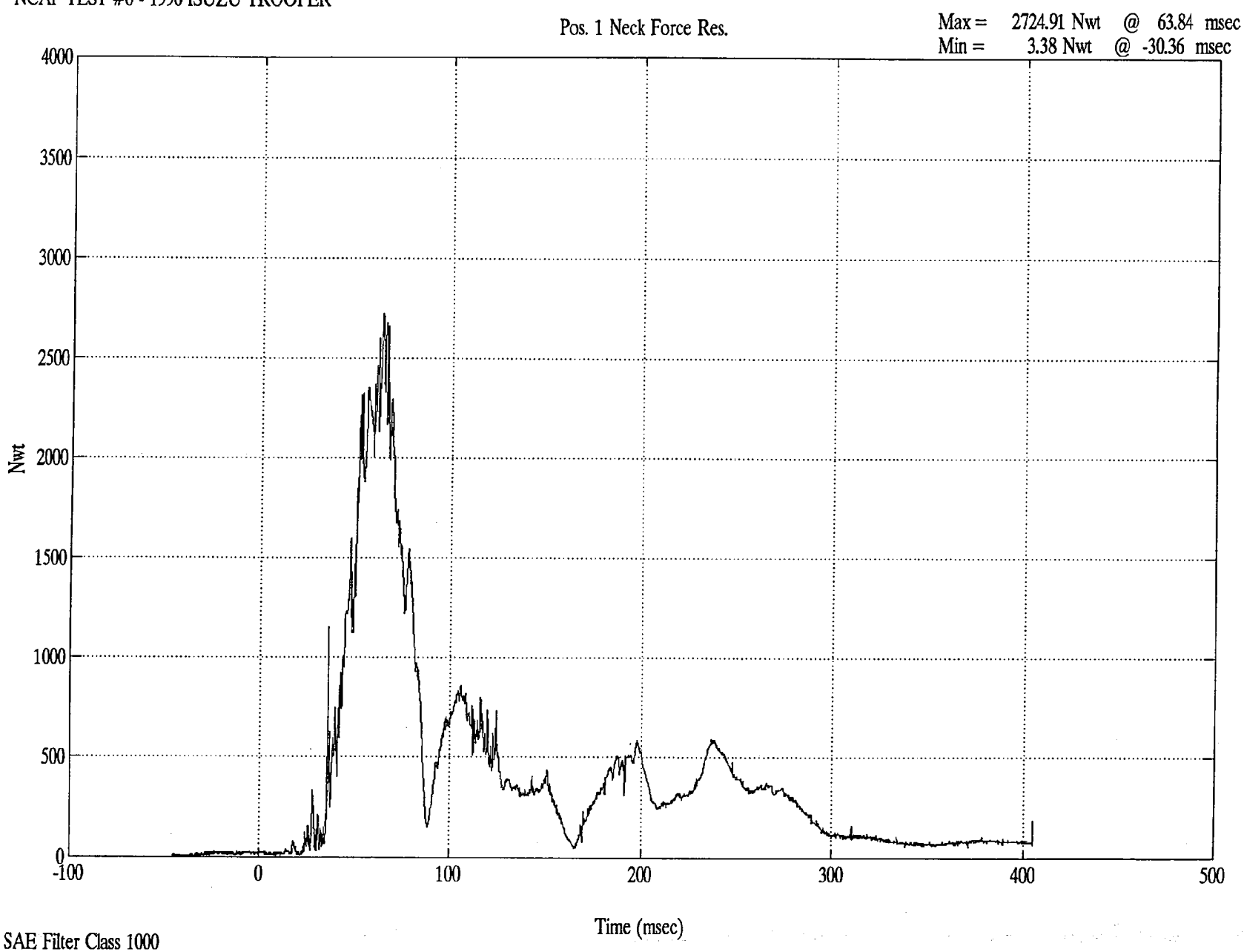


B-25

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER



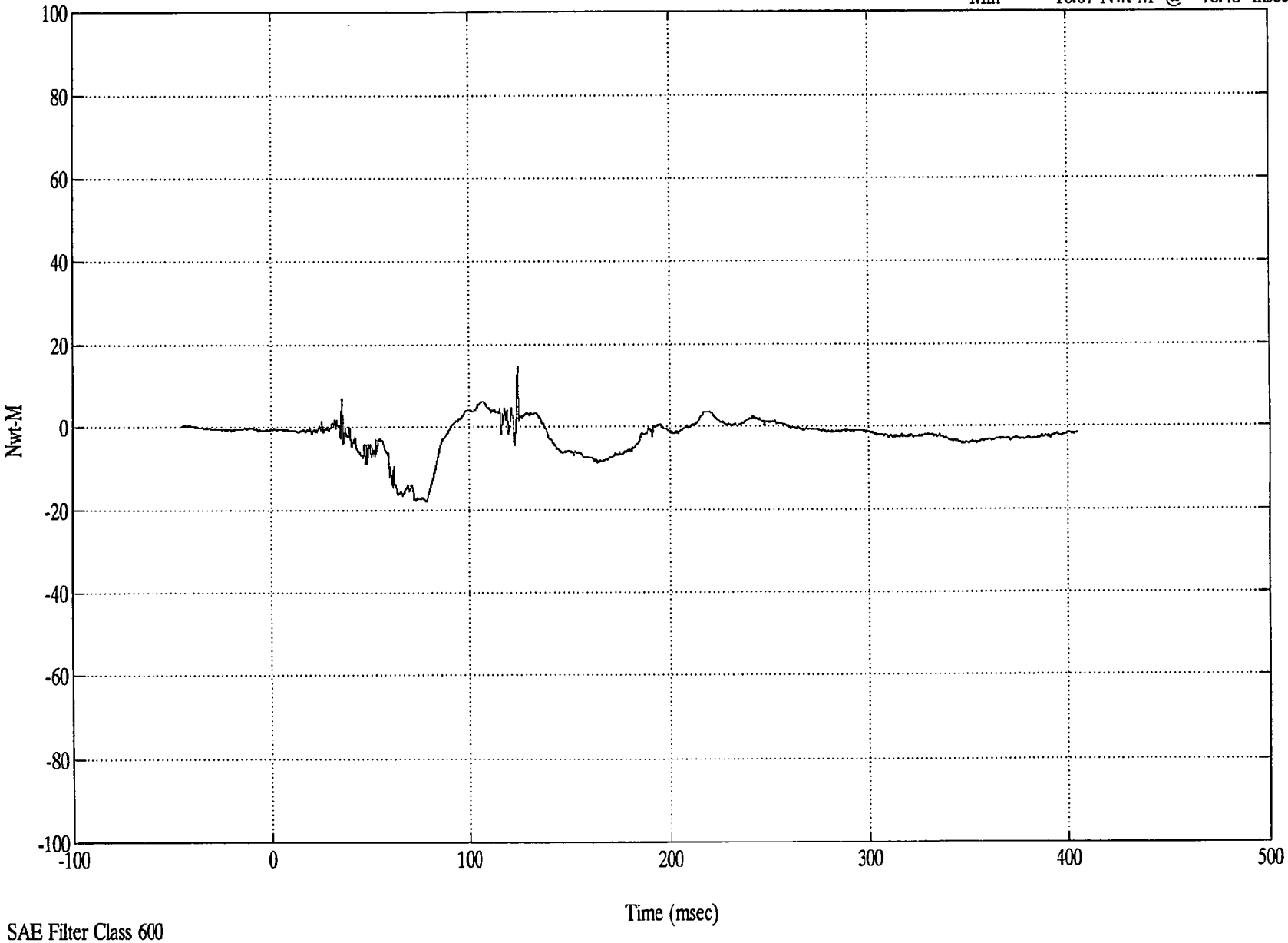
SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 1 Upper Neck Mx

Max = 14.50 Nwt-M @ 124.31 msec
Min = -18.07 Nwt-M @ 78.48 msec

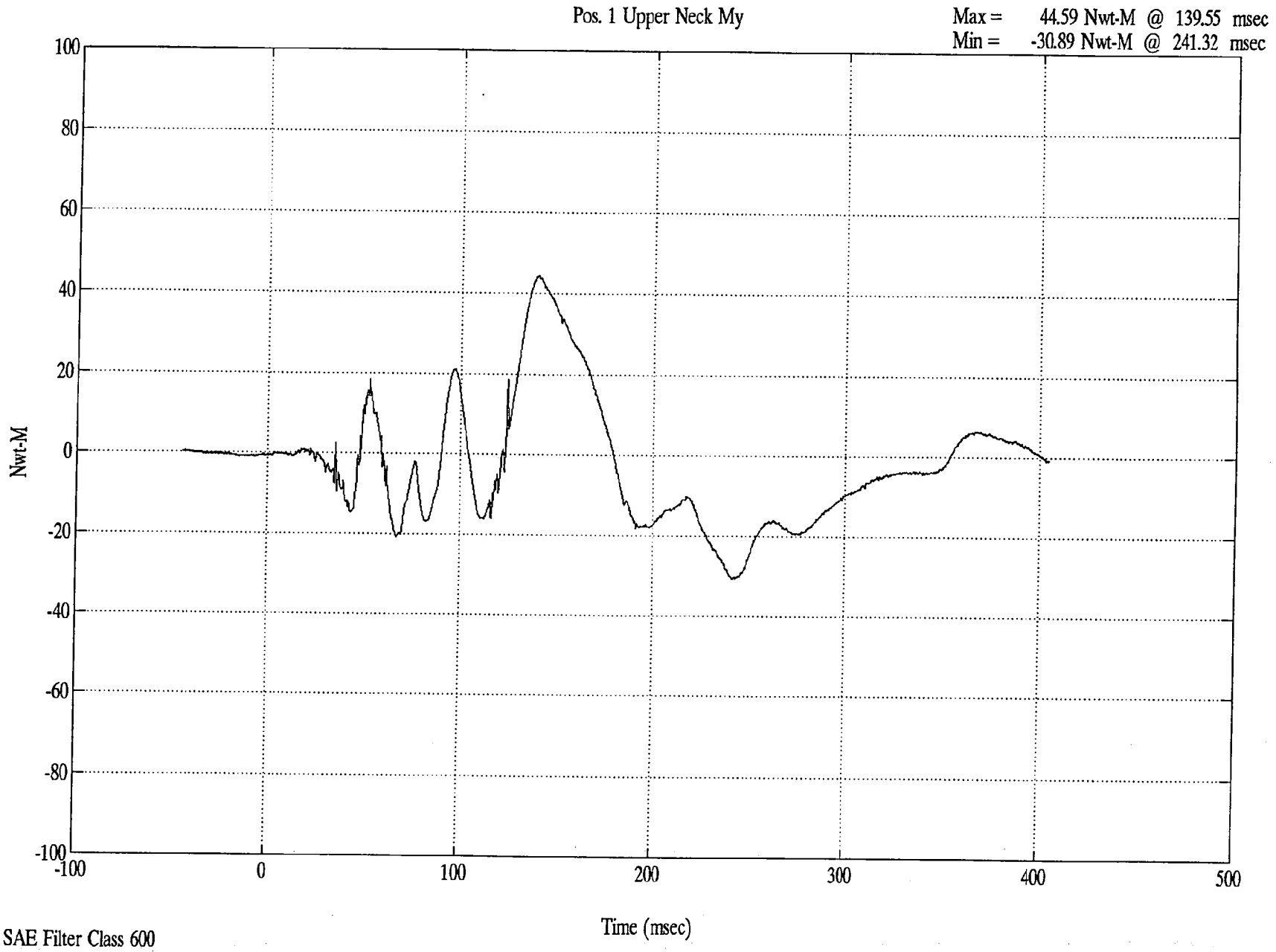


B-27

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

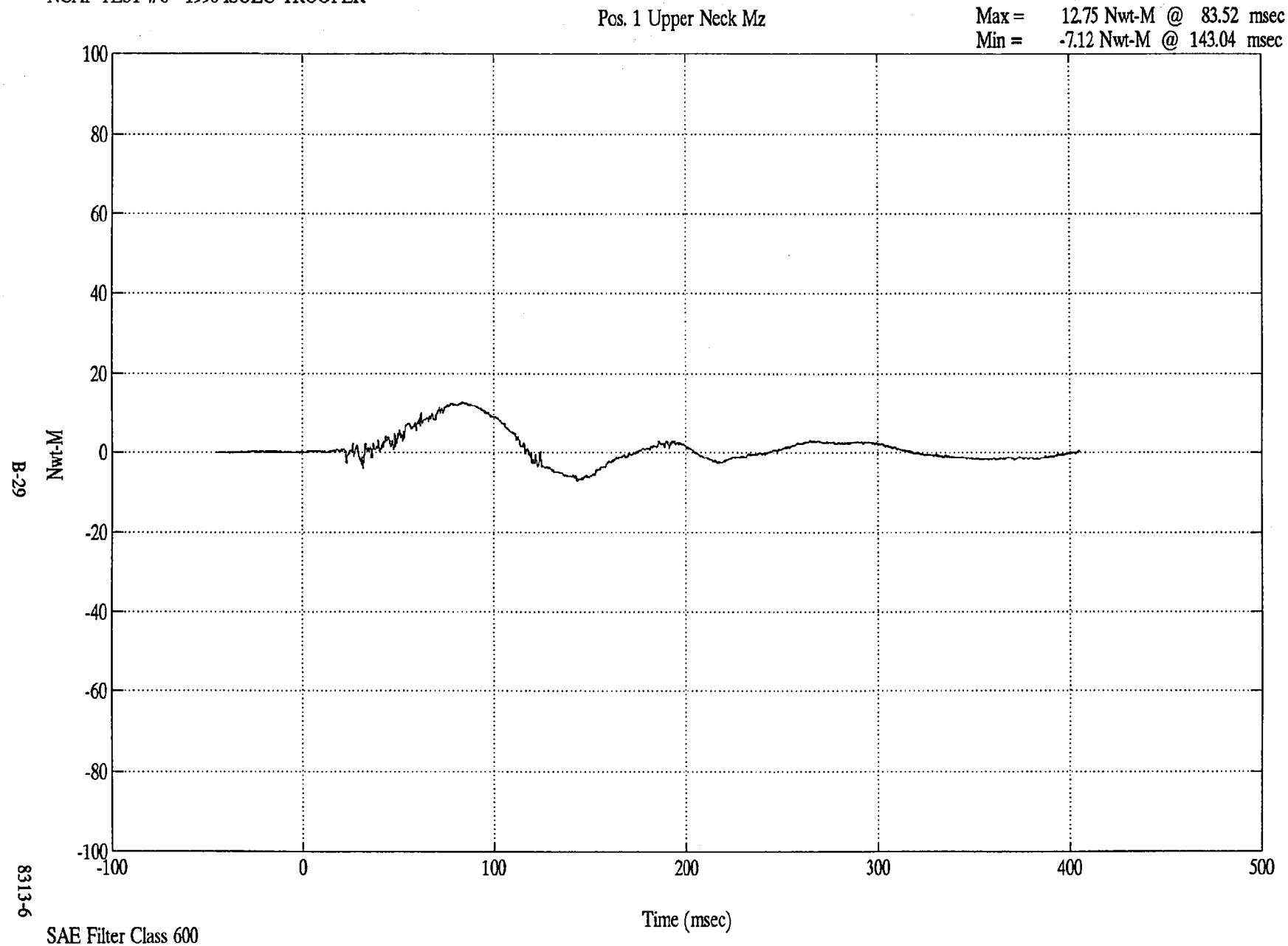


B-28

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

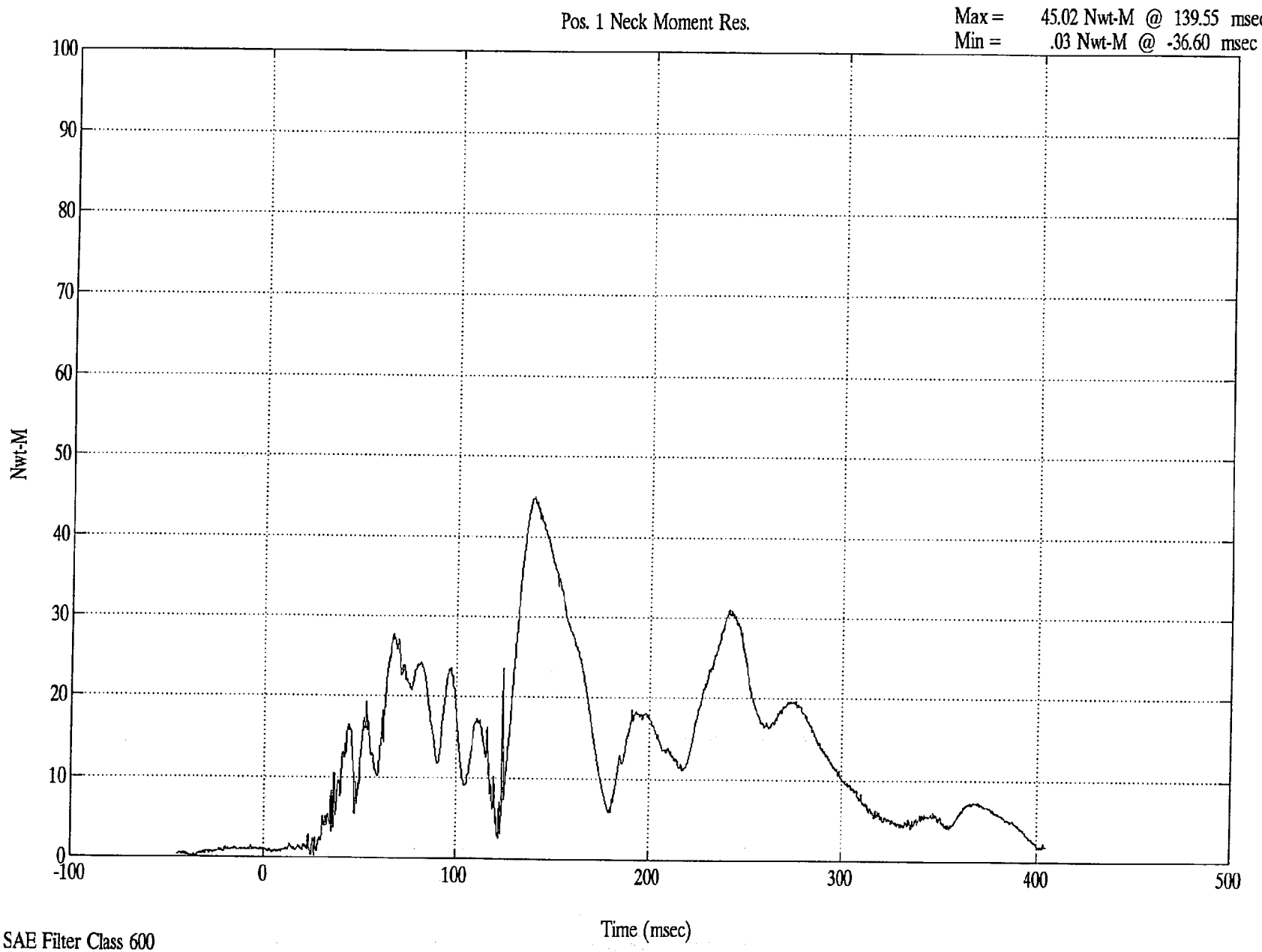


B-29

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

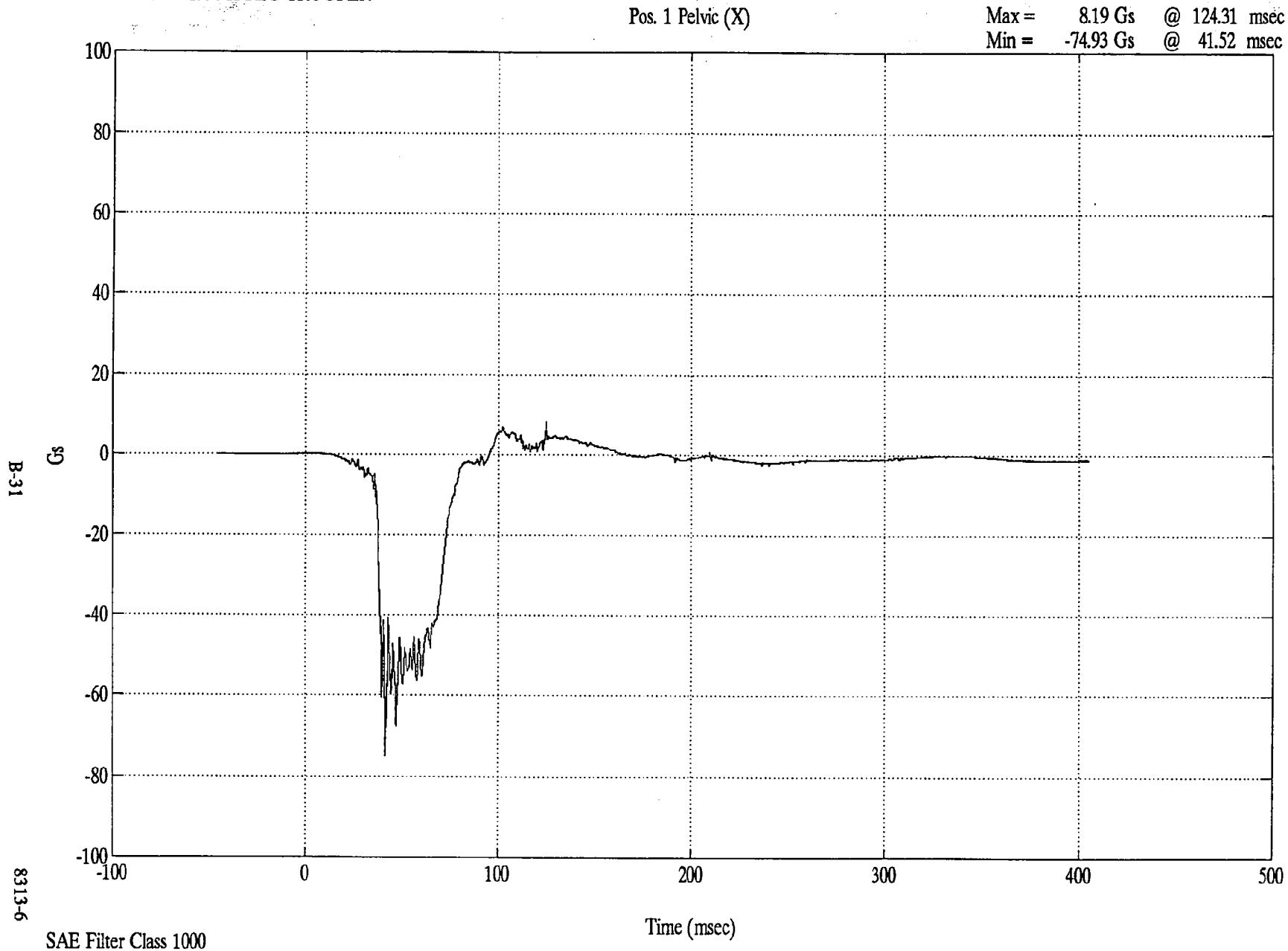


B-30

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

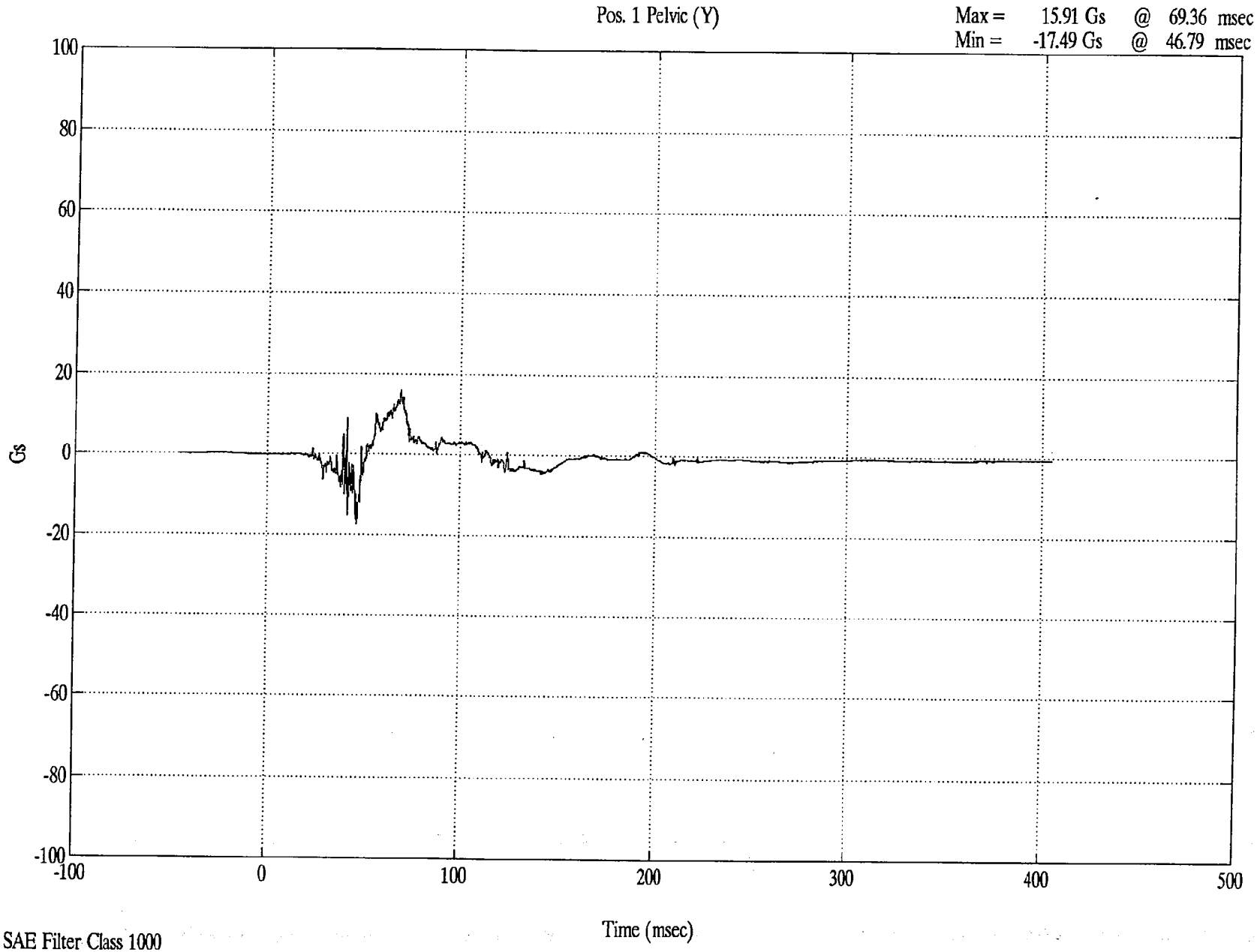


B-31

8313-6

SAE Filter Class 1000

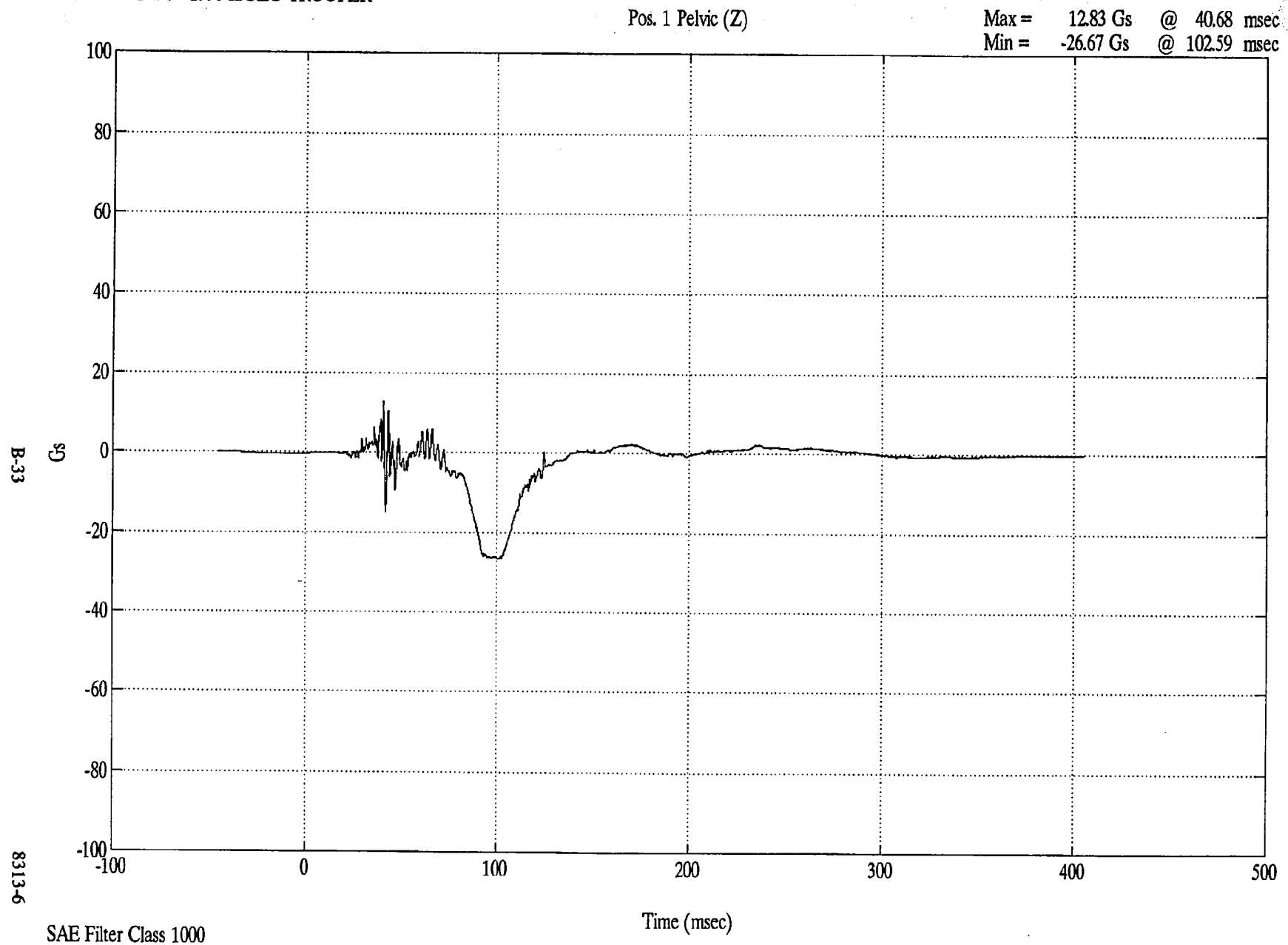
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

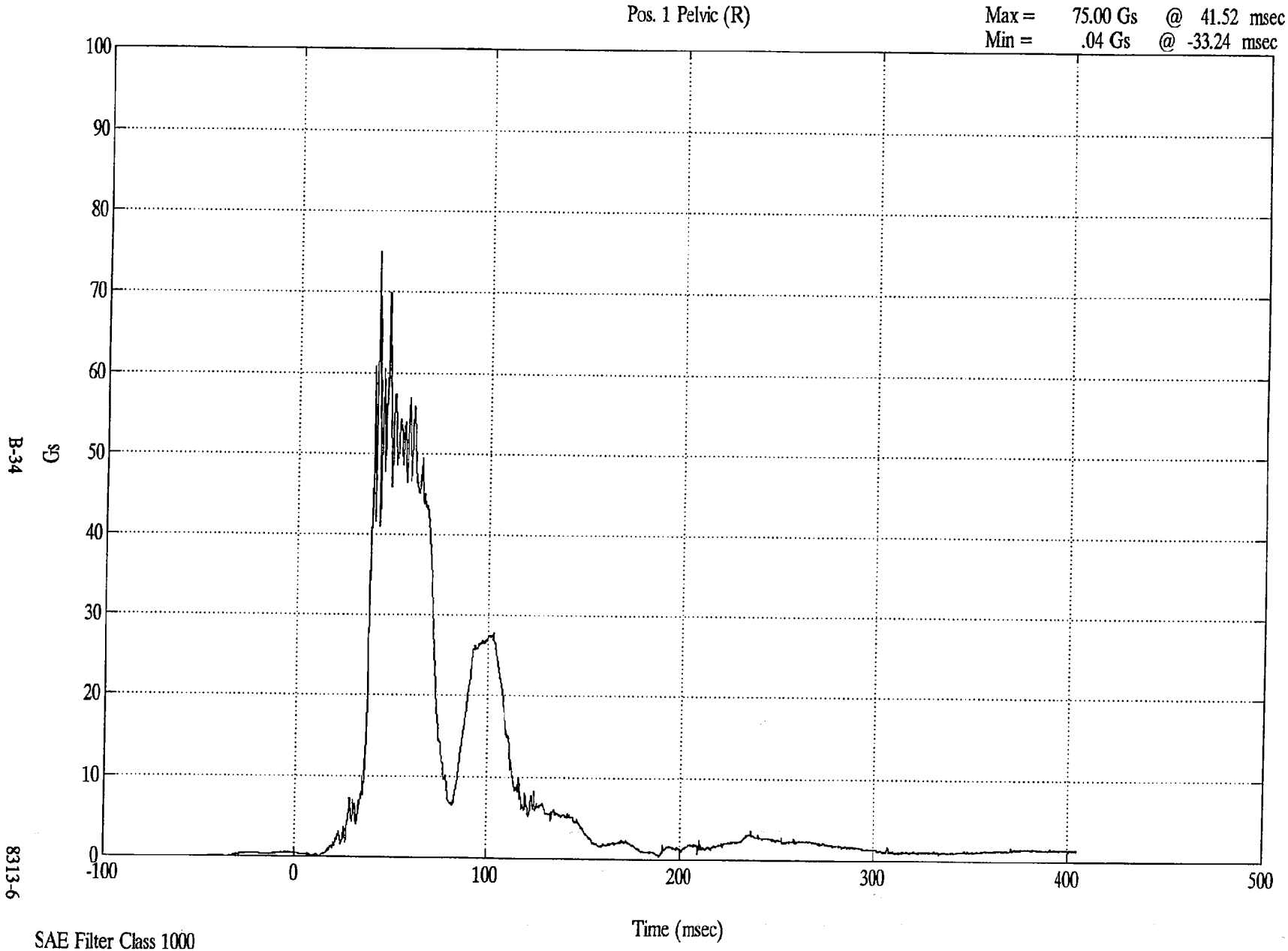


B-33

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

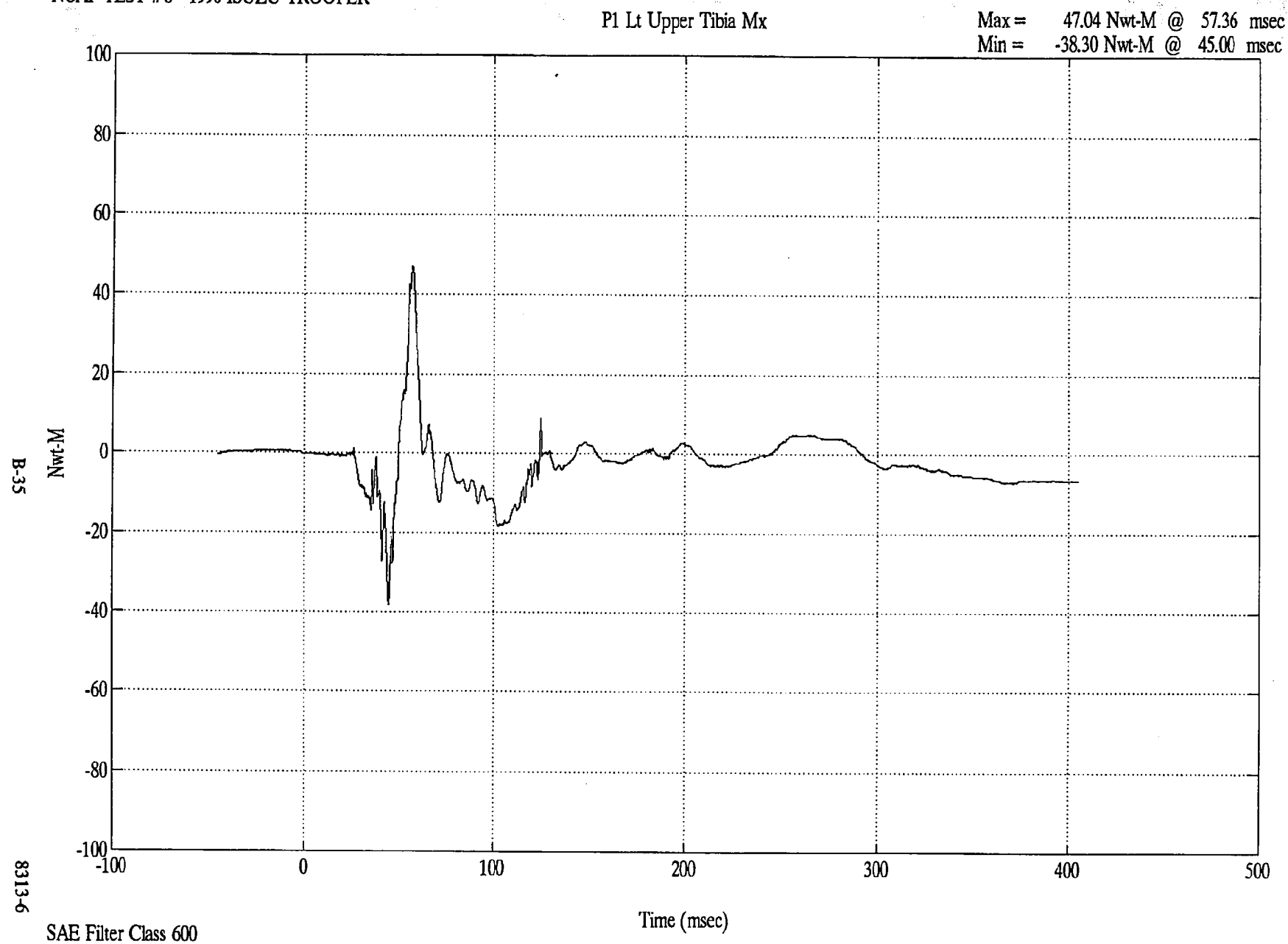


B-34

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER



B-35

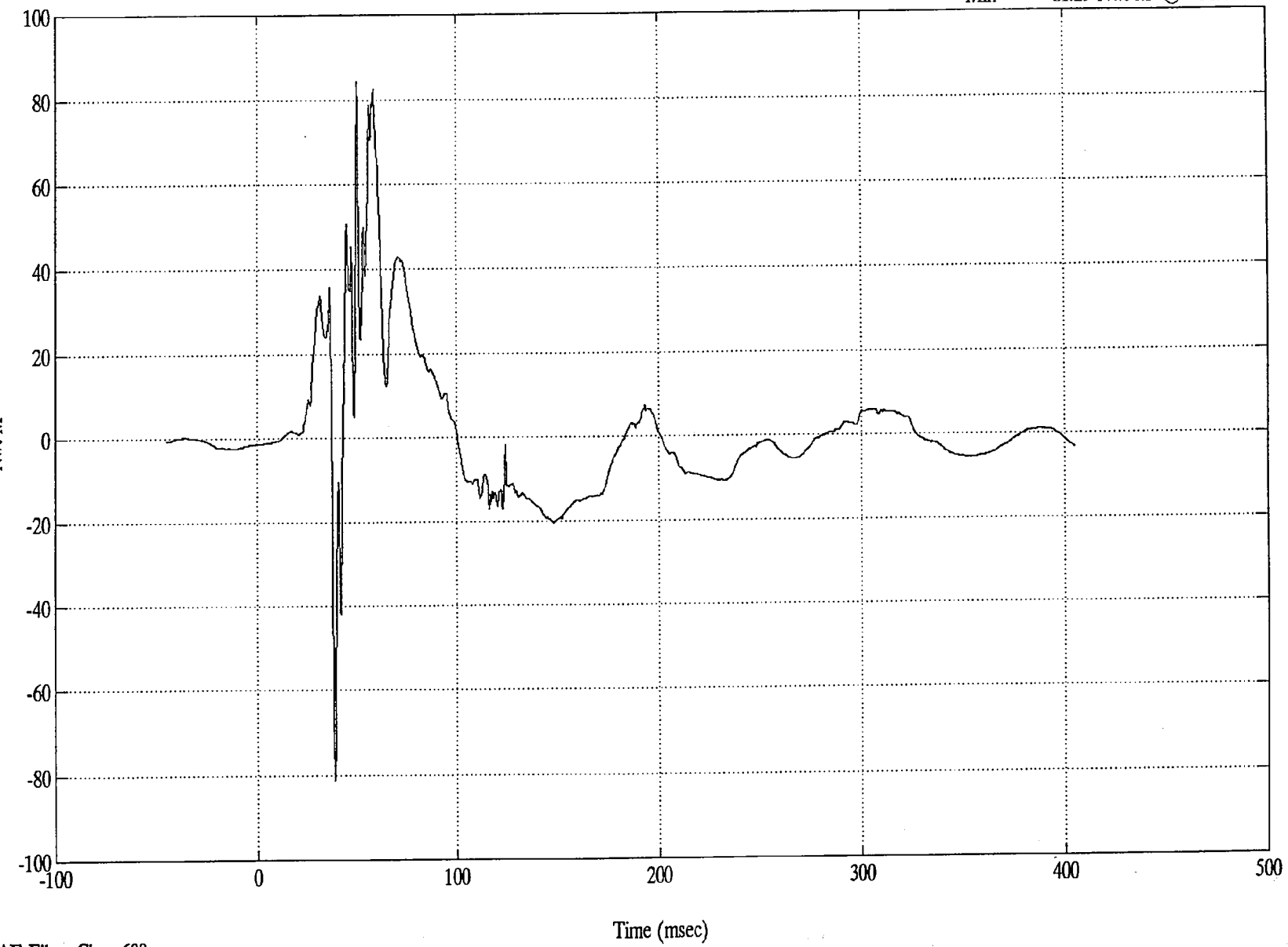
8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

P1 Lt Upper Tibia My

Max = 84.30 Nwt-M @ 49.68 msec
Min = -81.29 Nwt-M @ 38.40 msec

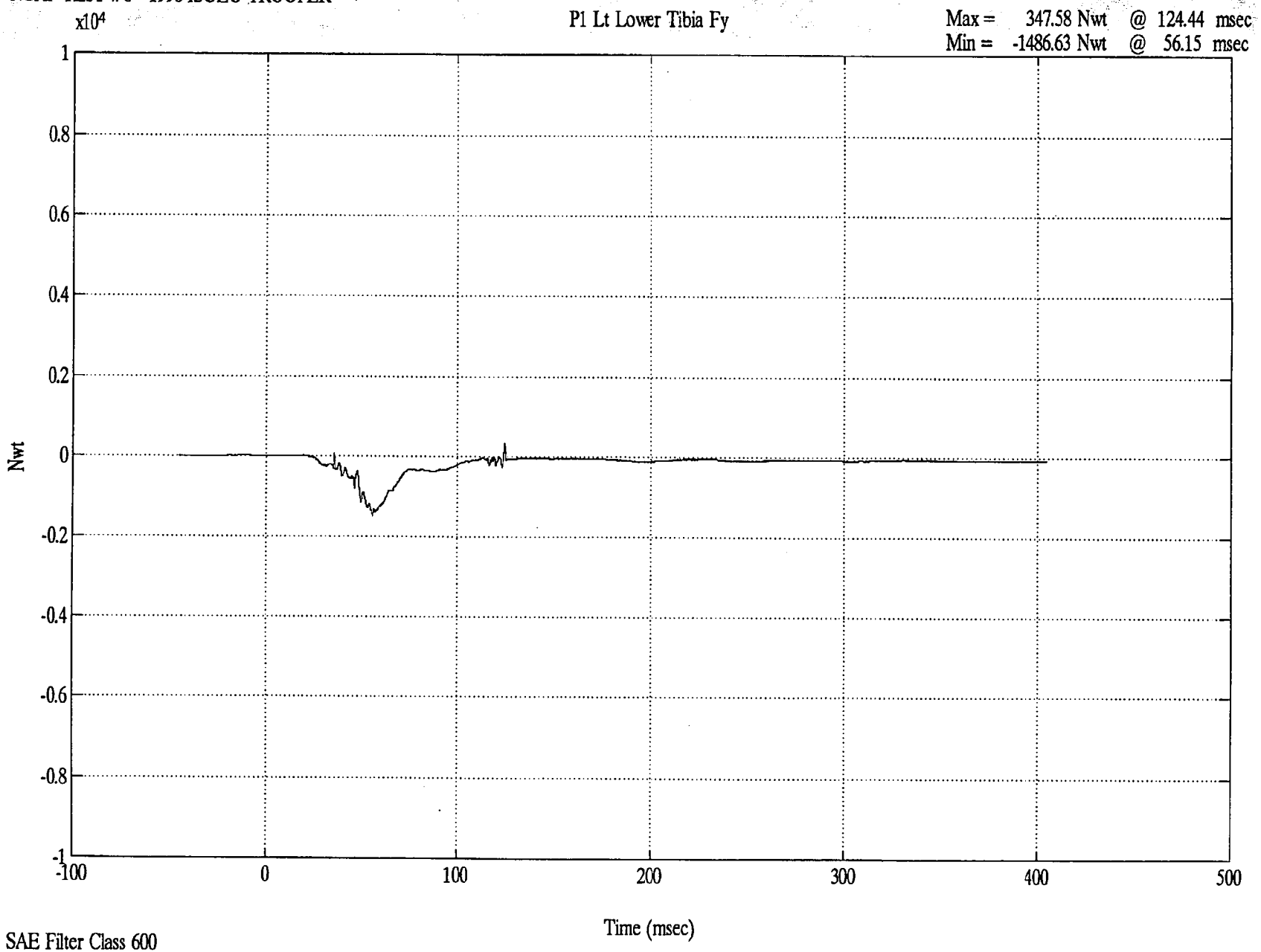


B-36

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

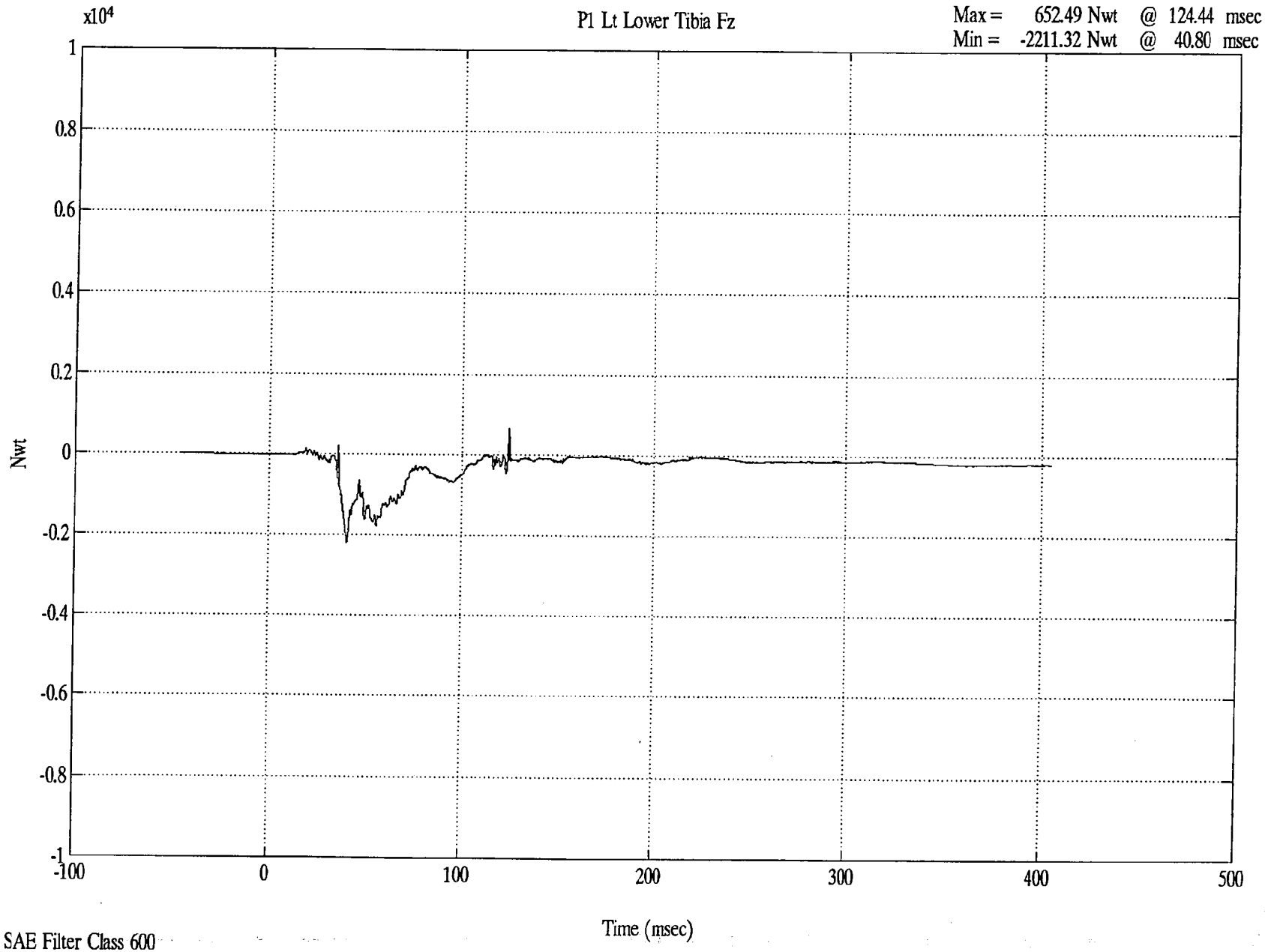


B-37

8313-6

SAE Filter Class 600

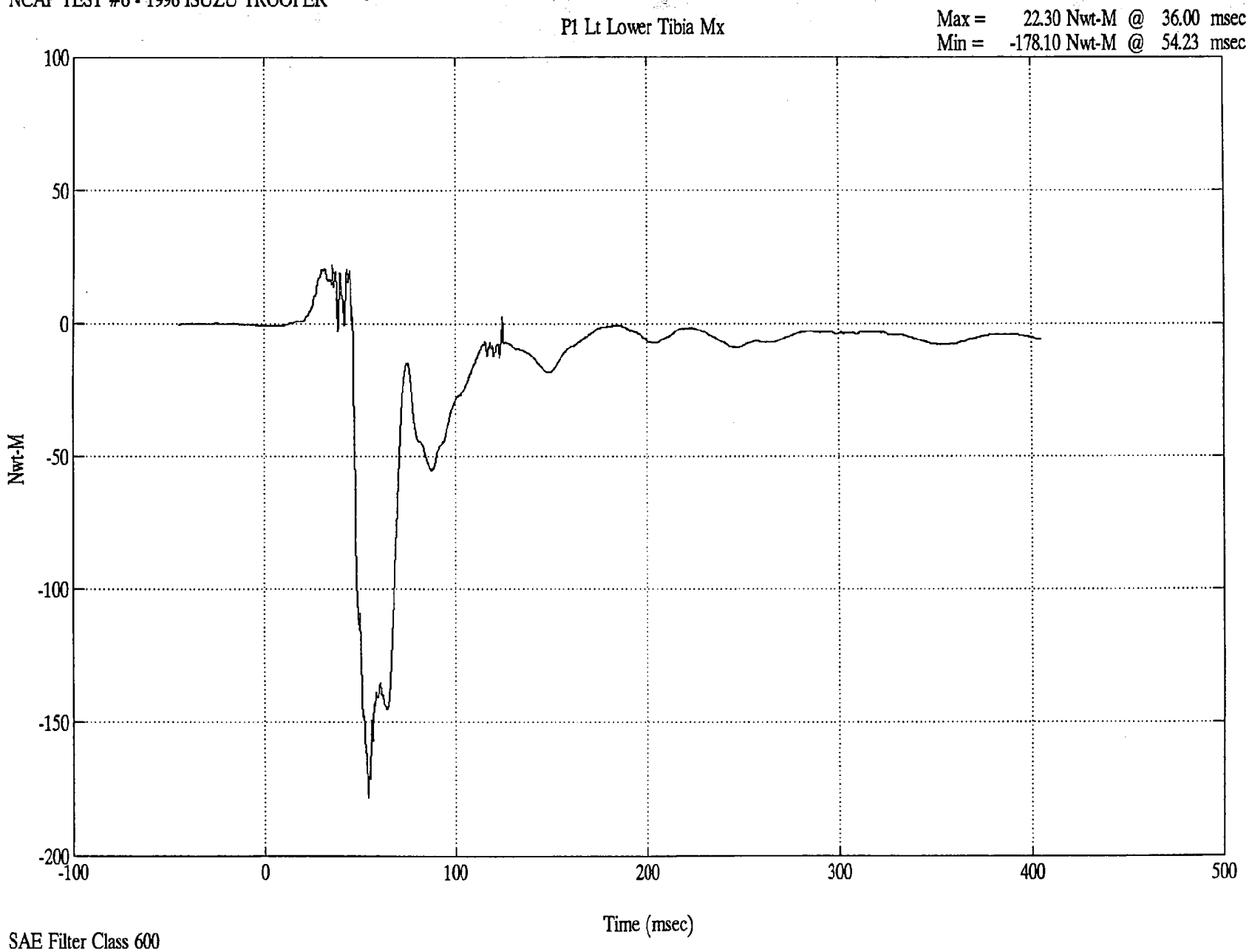
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 600

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



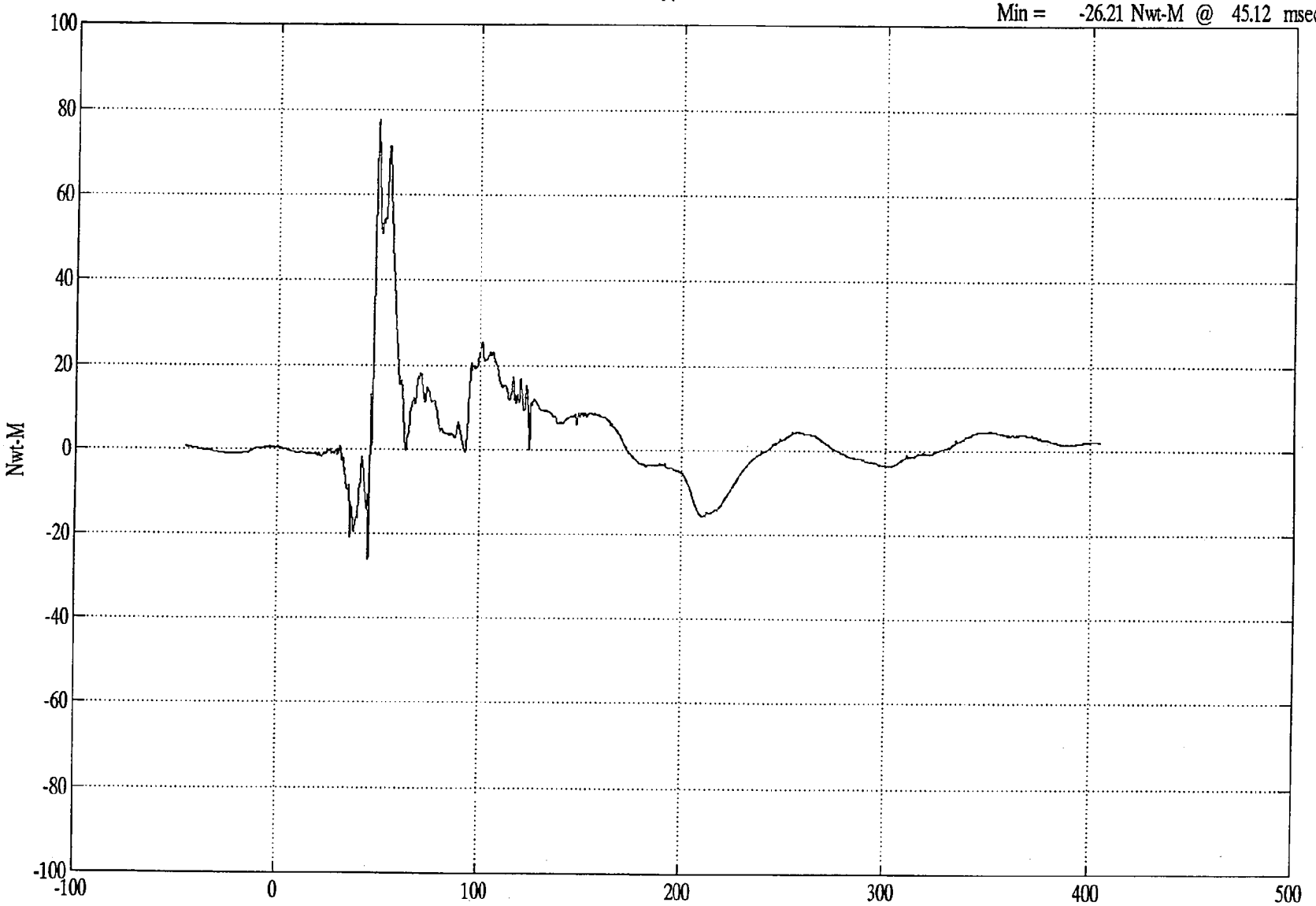
SAE Filter Class 600

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

P1 Rt Upper Tibia Mx

Max = 77.75 Nwt-M @ 48.95 msec
Min = -26.21 Nwt-M @ 45.12 msec



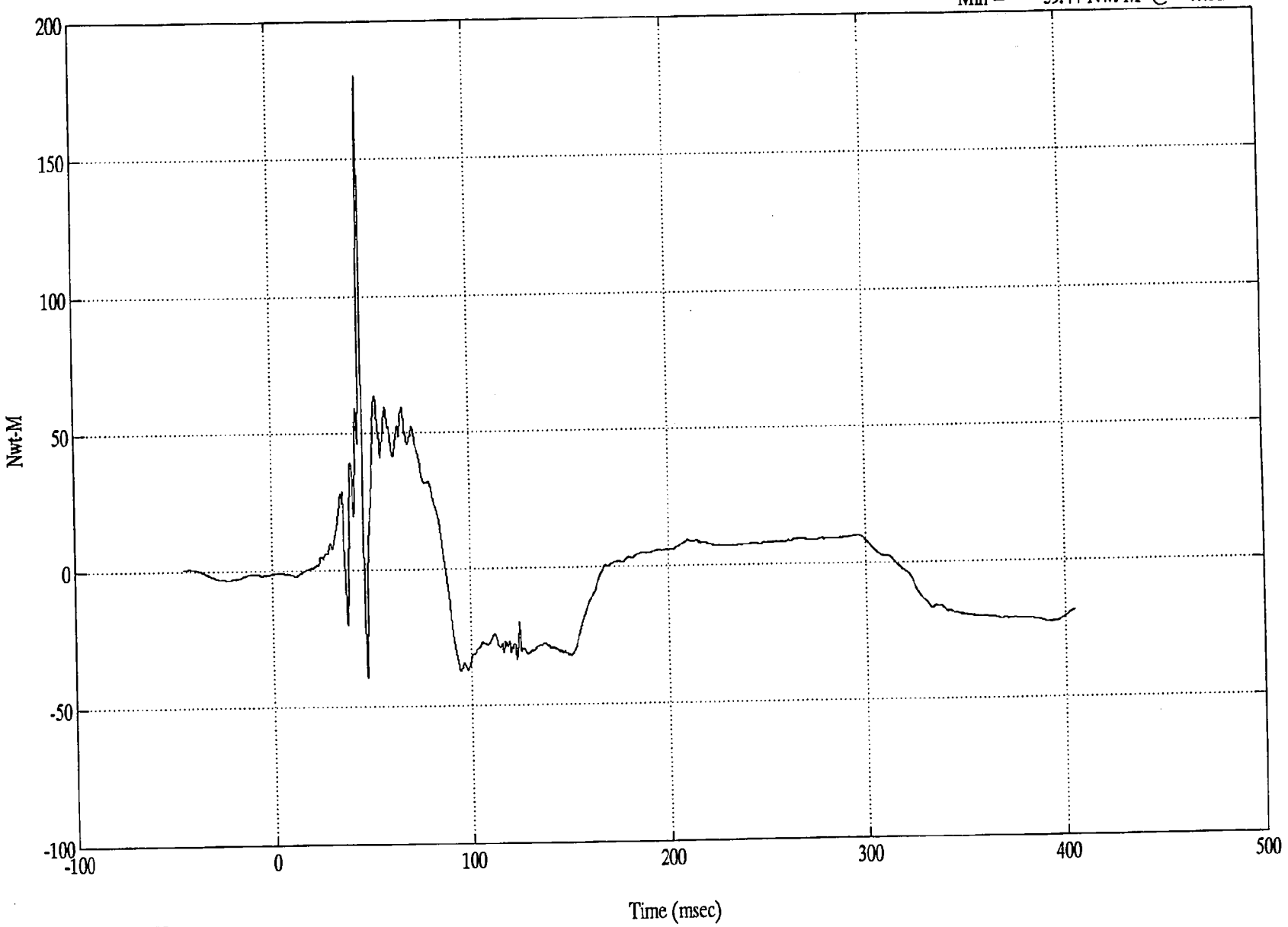
SAE Filter Class 600

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

P1 Rt Upper Tibia My

Max = 180.32 Nwt-M @ 45.36 msec
Min = -39.44 Nwt-M @ 47.52 msec

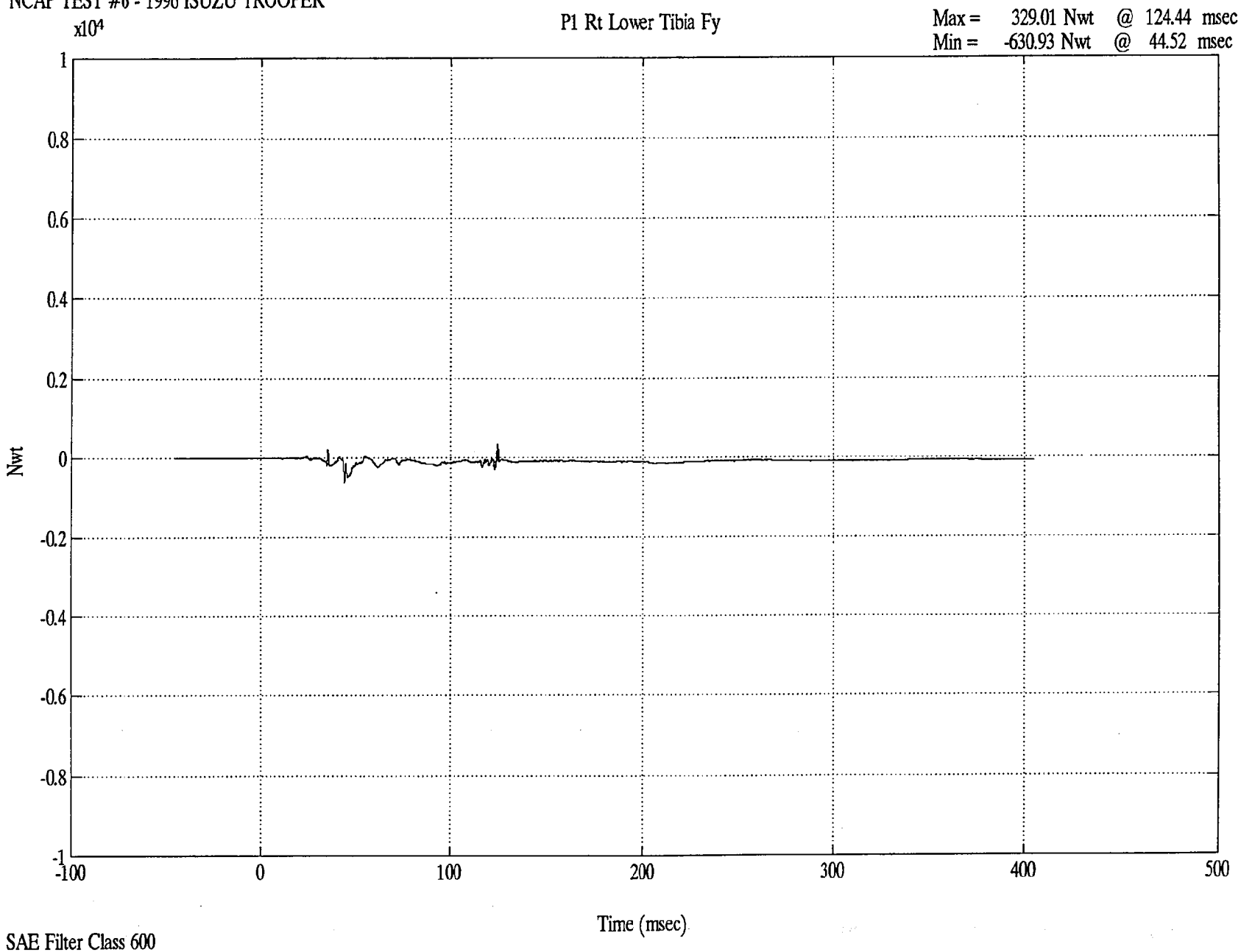


B-41

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

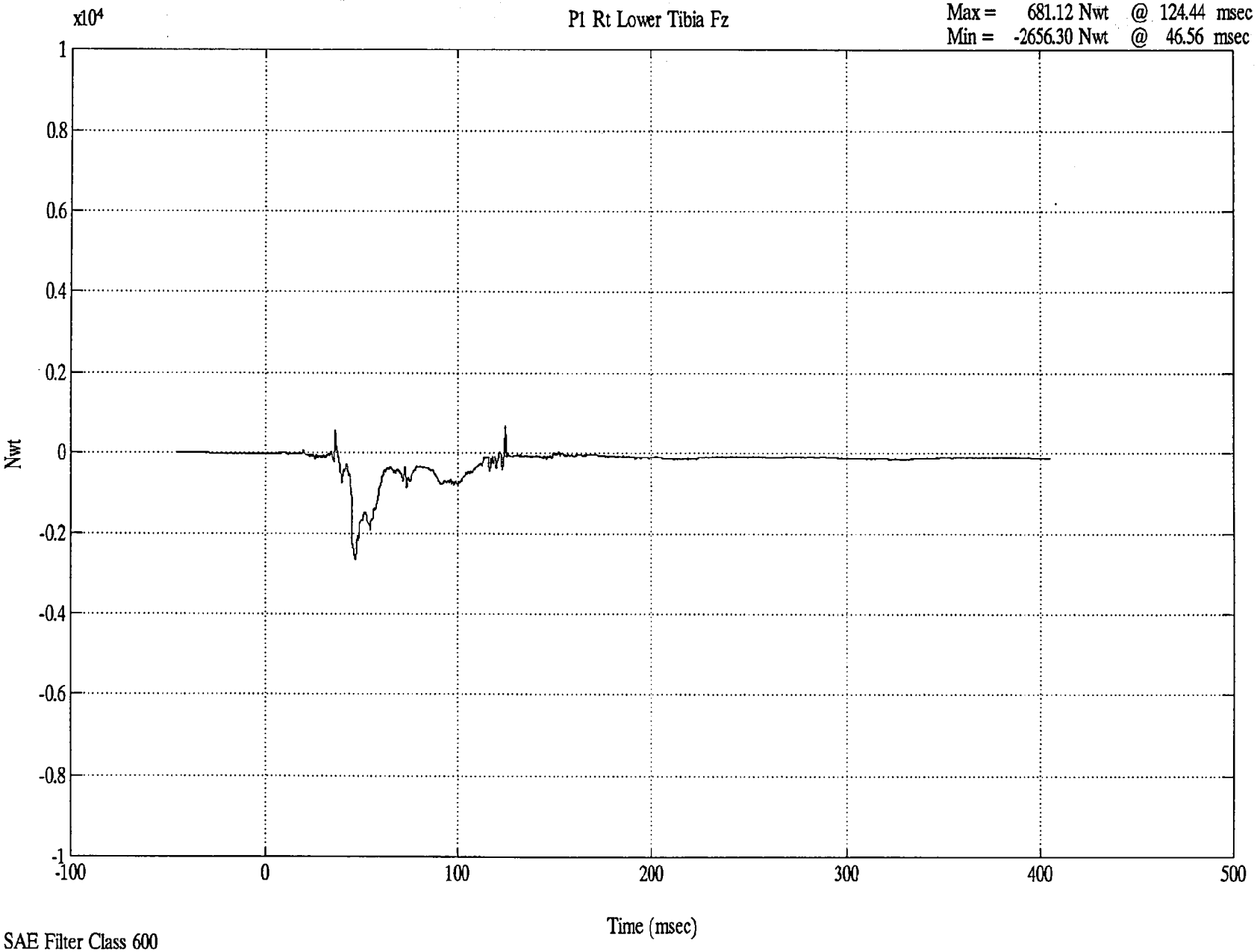


B-42

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

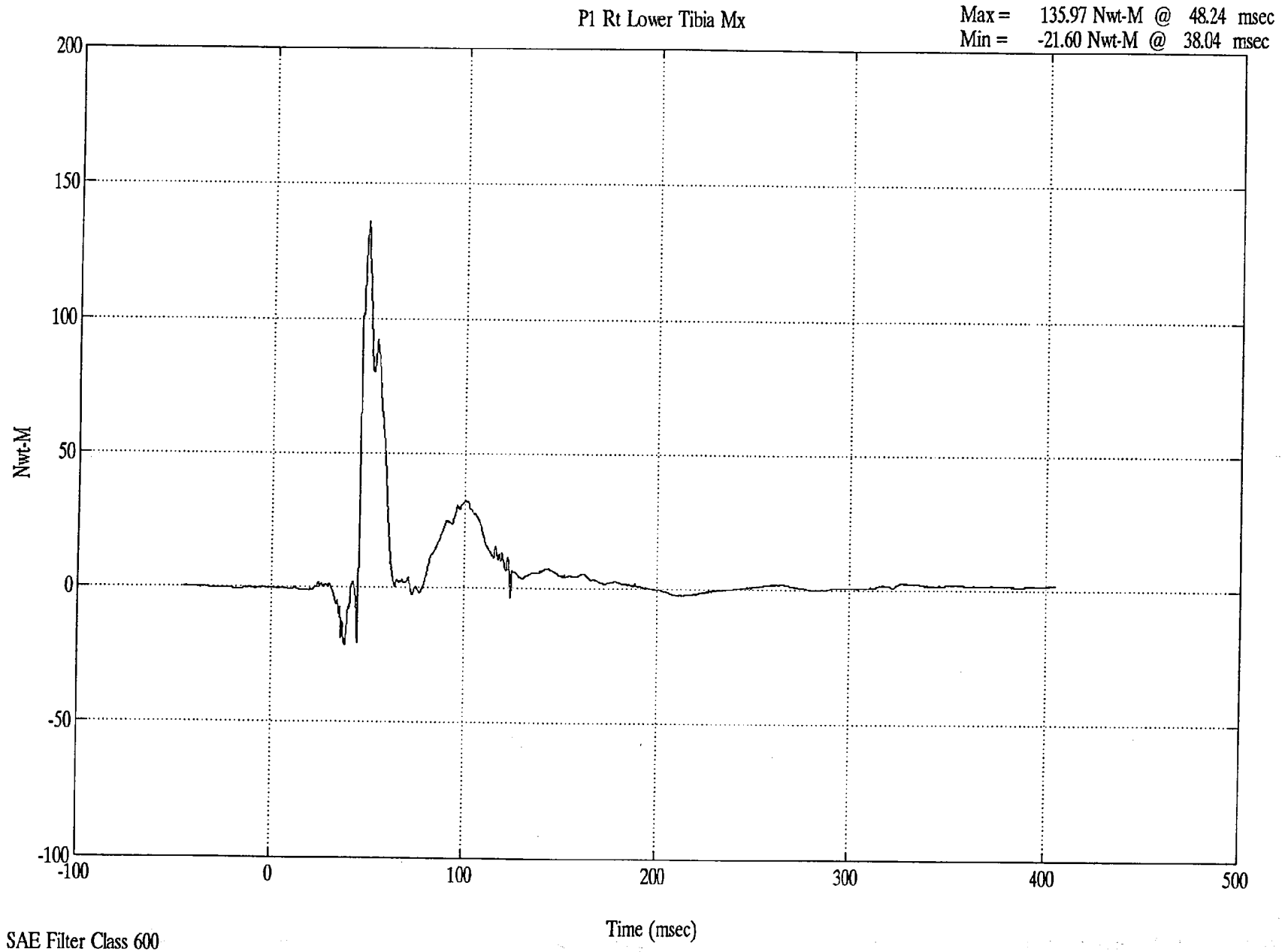


B-43

8313-6

SAE Filter Class 600

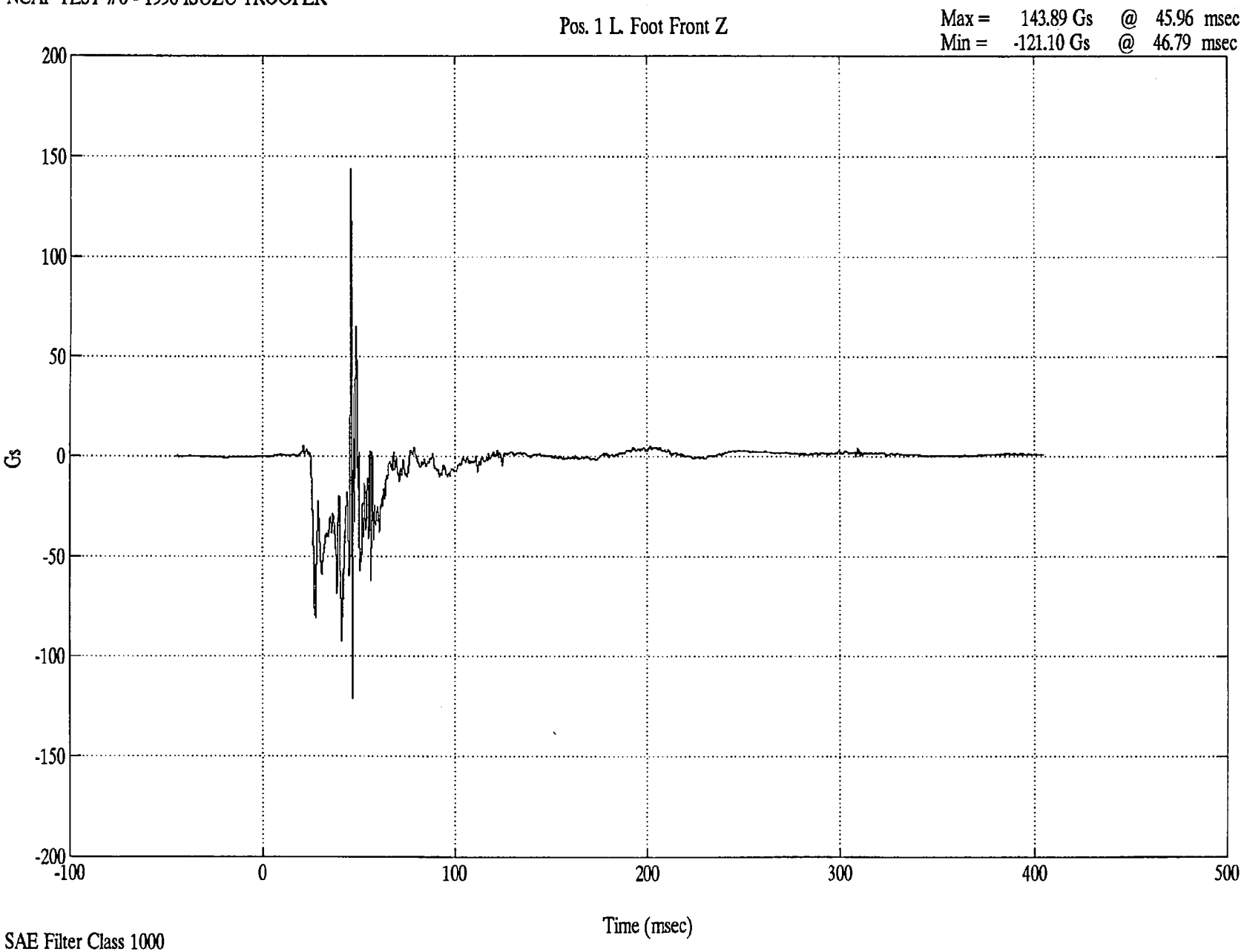
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 600

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



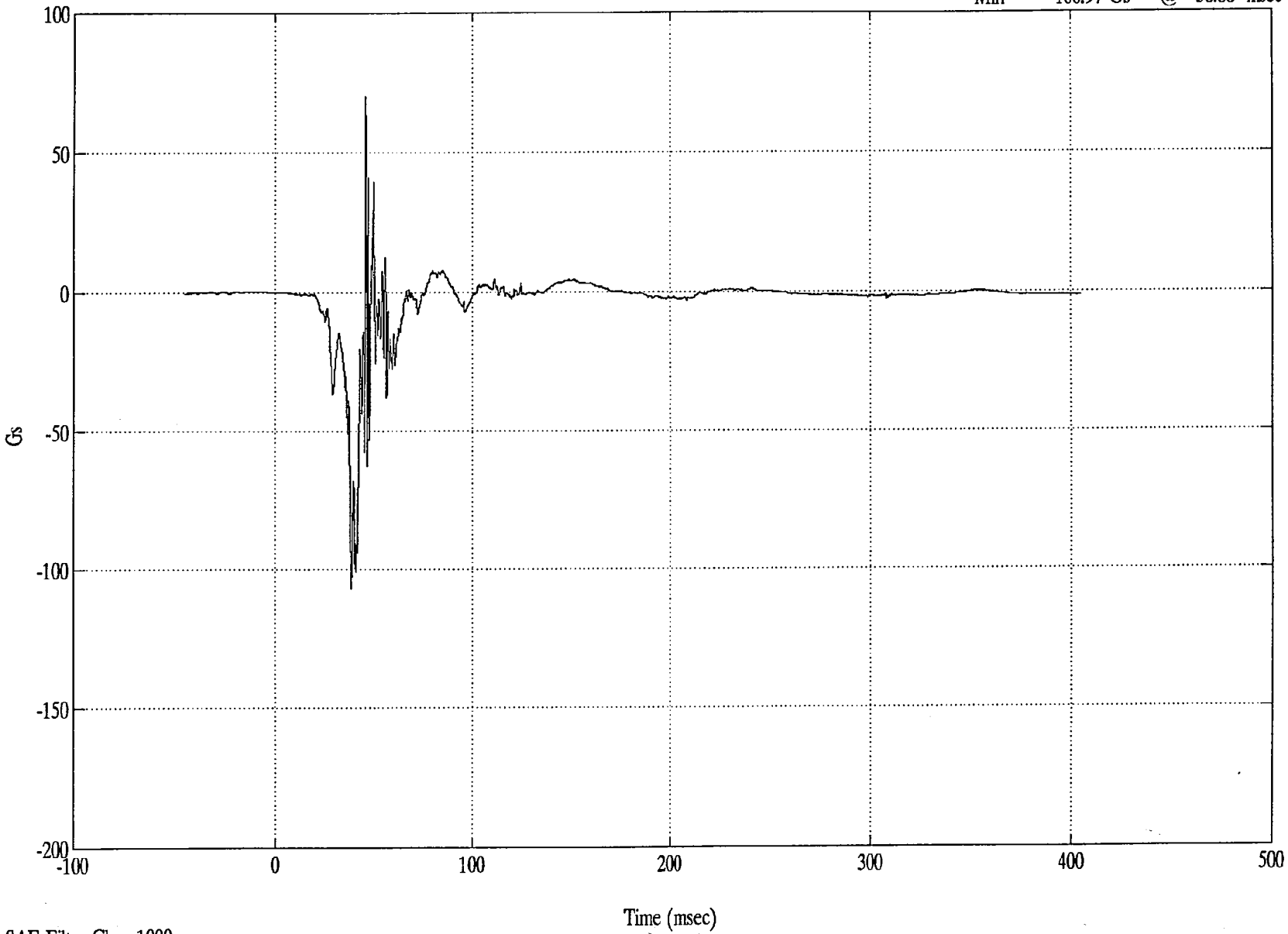
SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 1 L. Foot Rear X

Max = 70.04 Gs @ 45.96 msec
Min = -106.97 Gs @ 38.88 msec

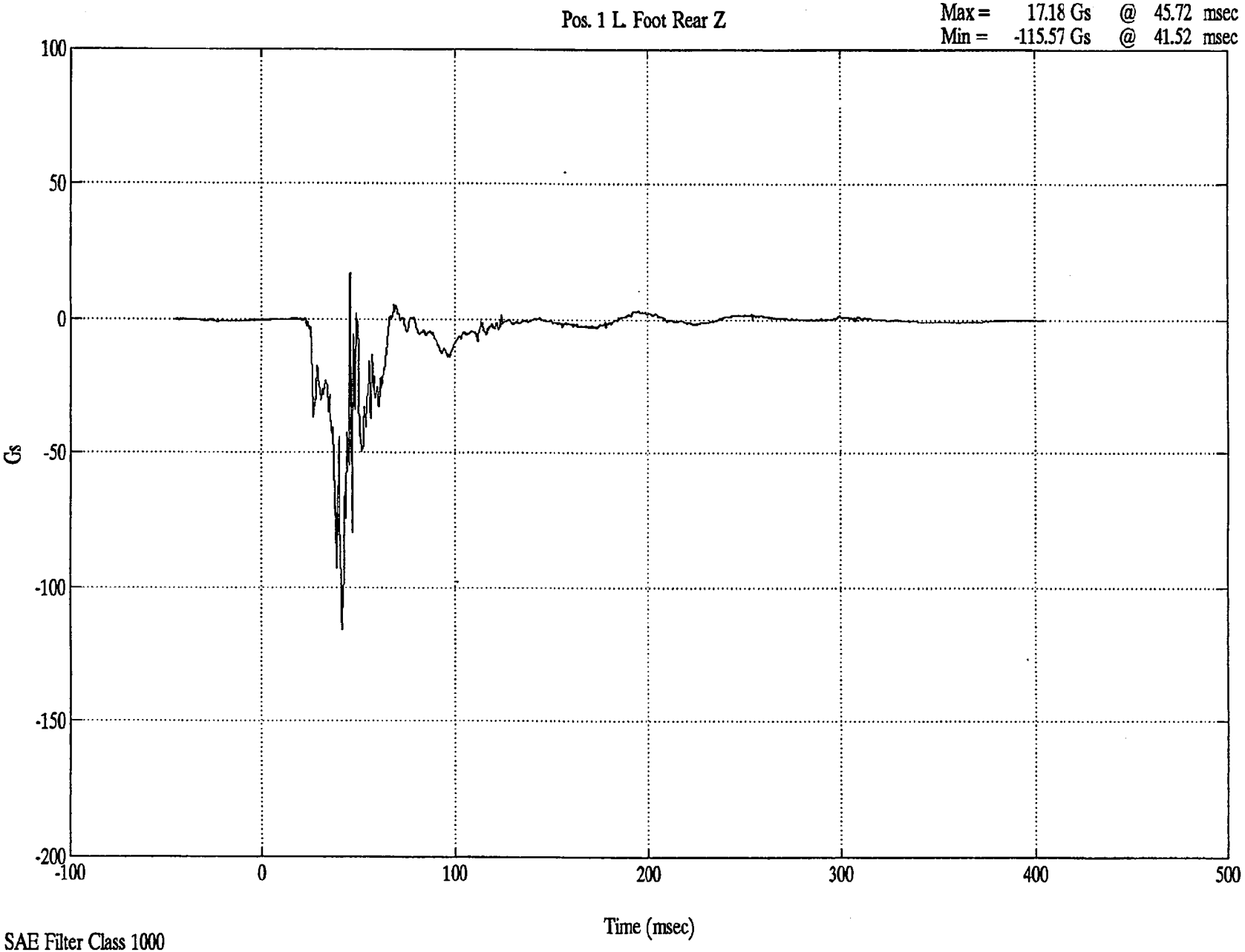


B-46

8313-6

SAE Filter Class 1000

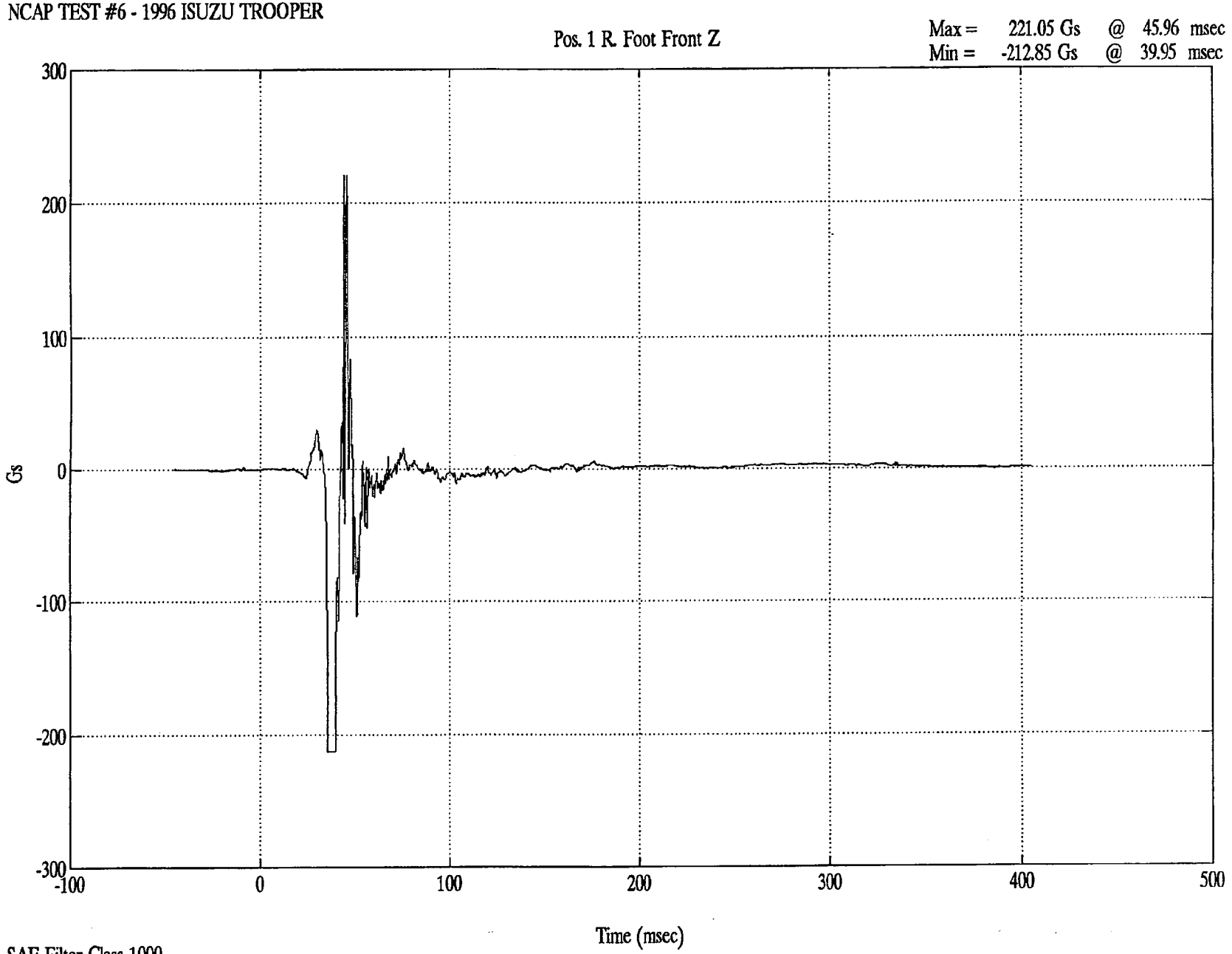
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

8313-6

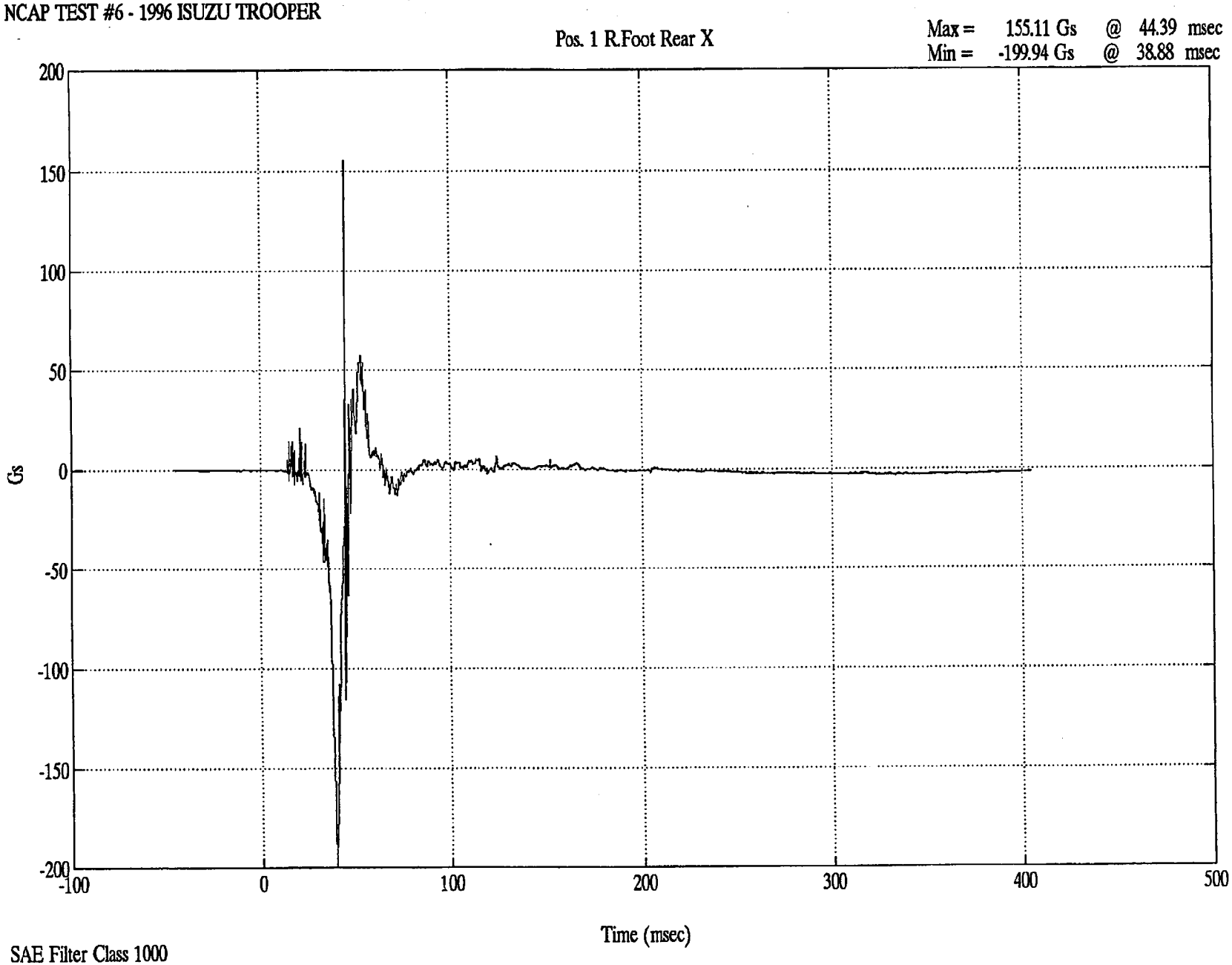
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

8313-6

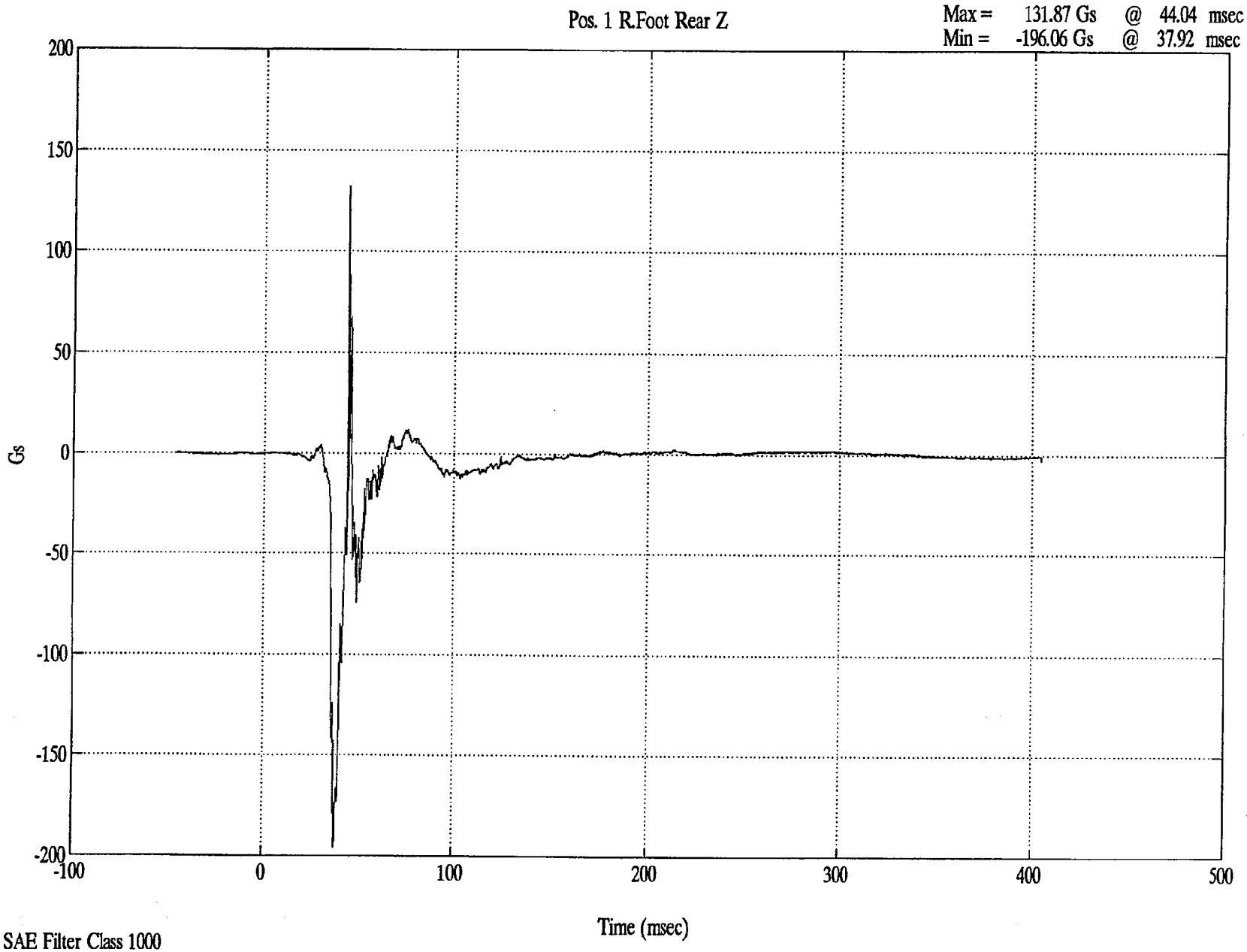
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

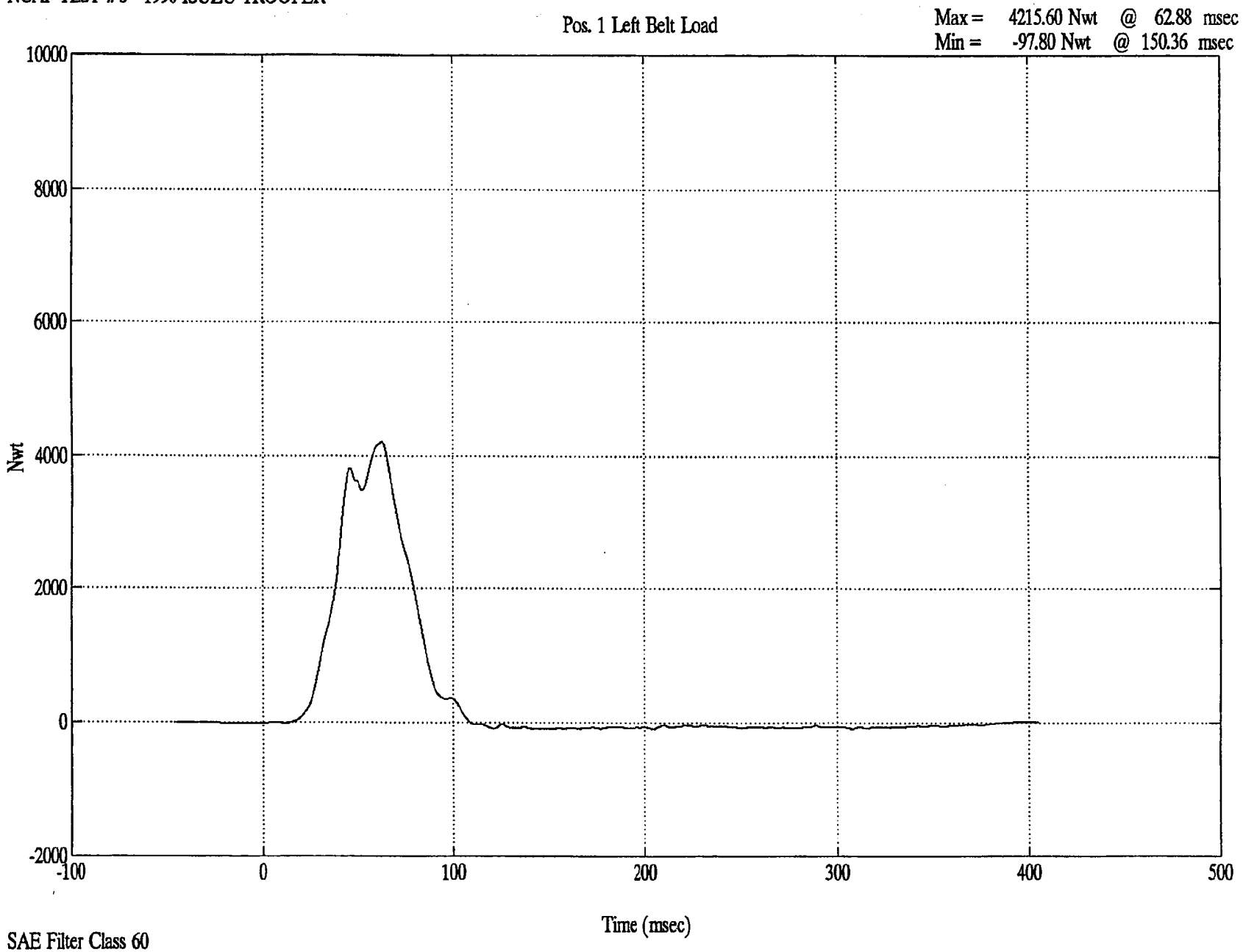


B-50

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

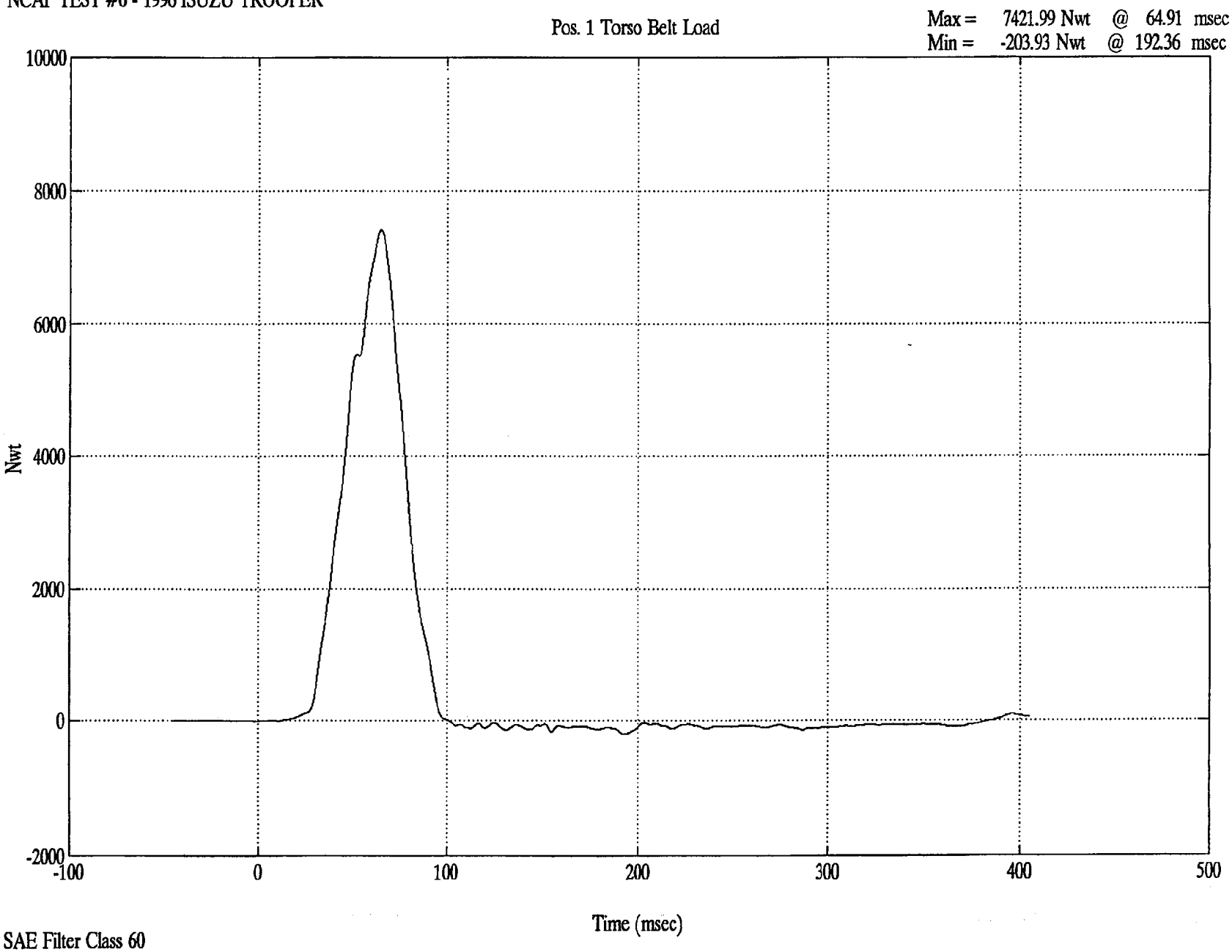


SAE Filter Class 60

B-51

8313-6

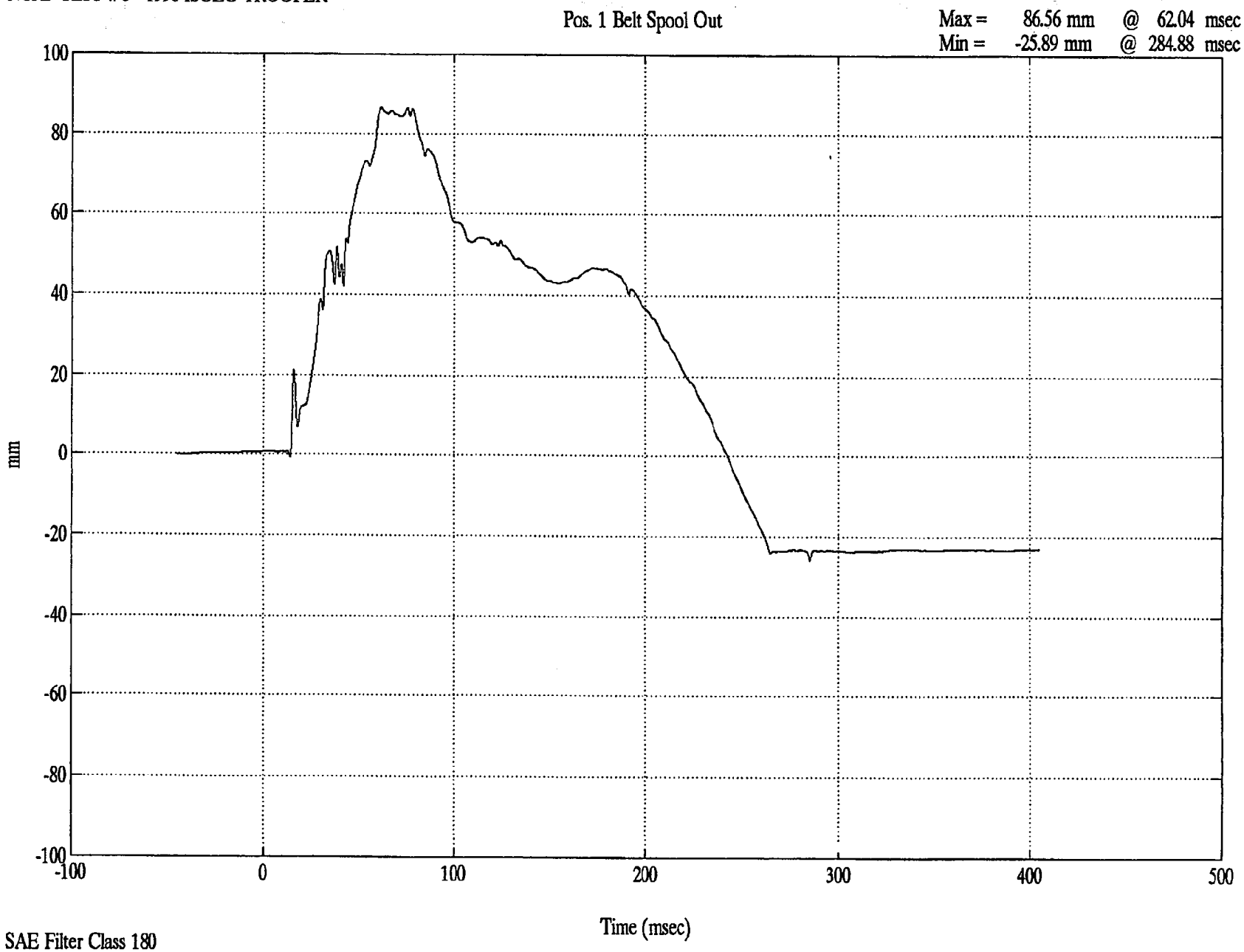
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

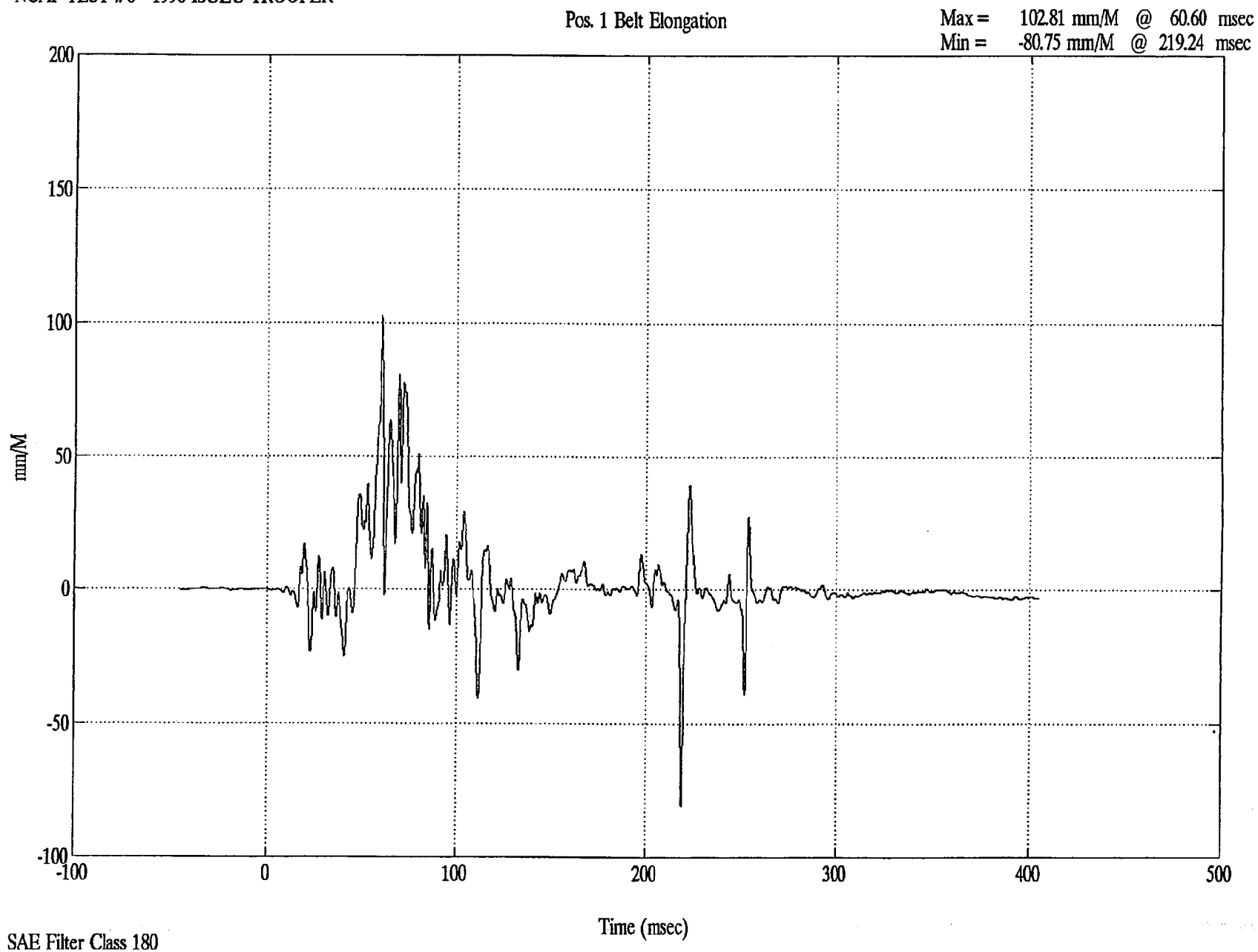


B-53

8313-6

SAE Filter Class 180

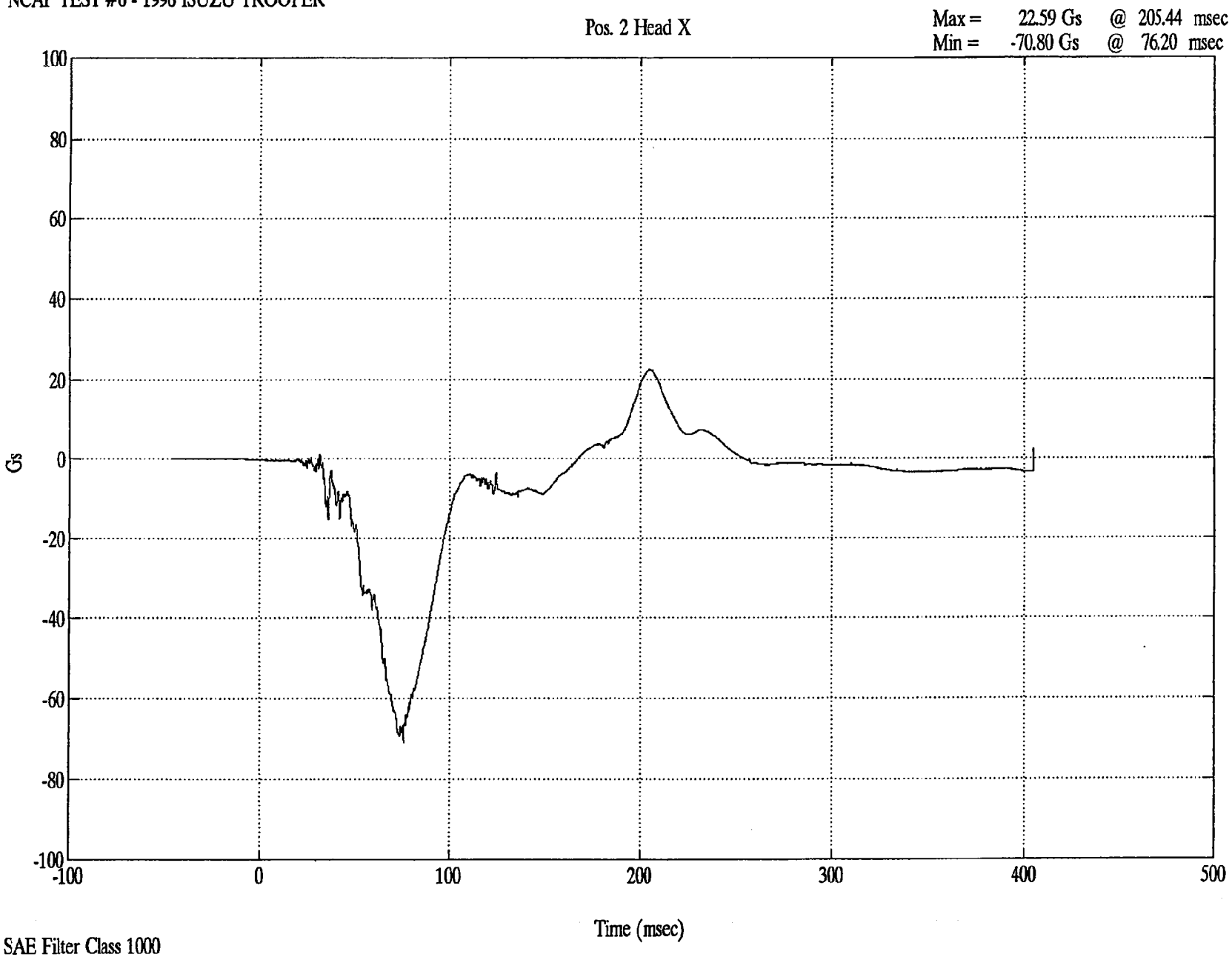
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

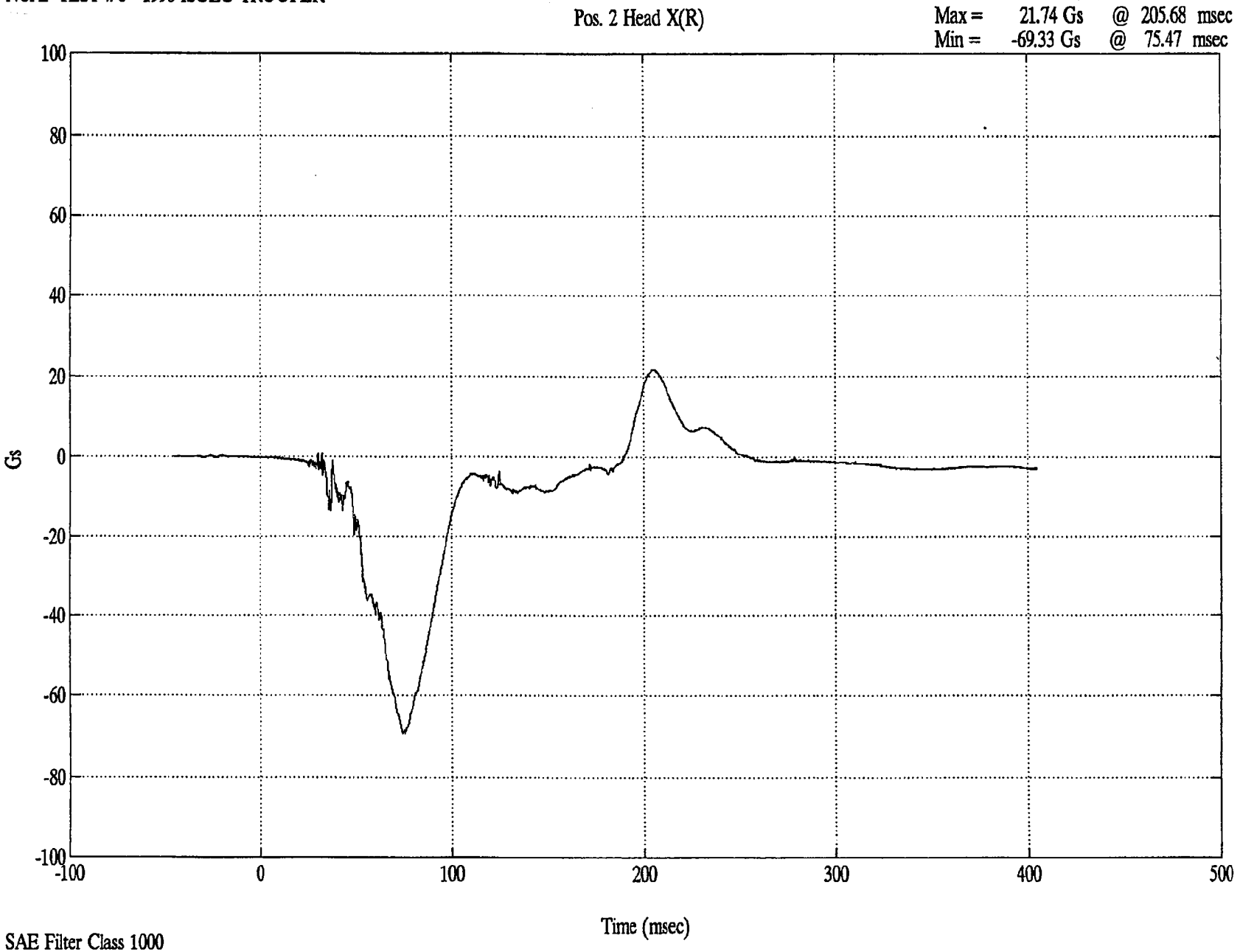


B-56

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

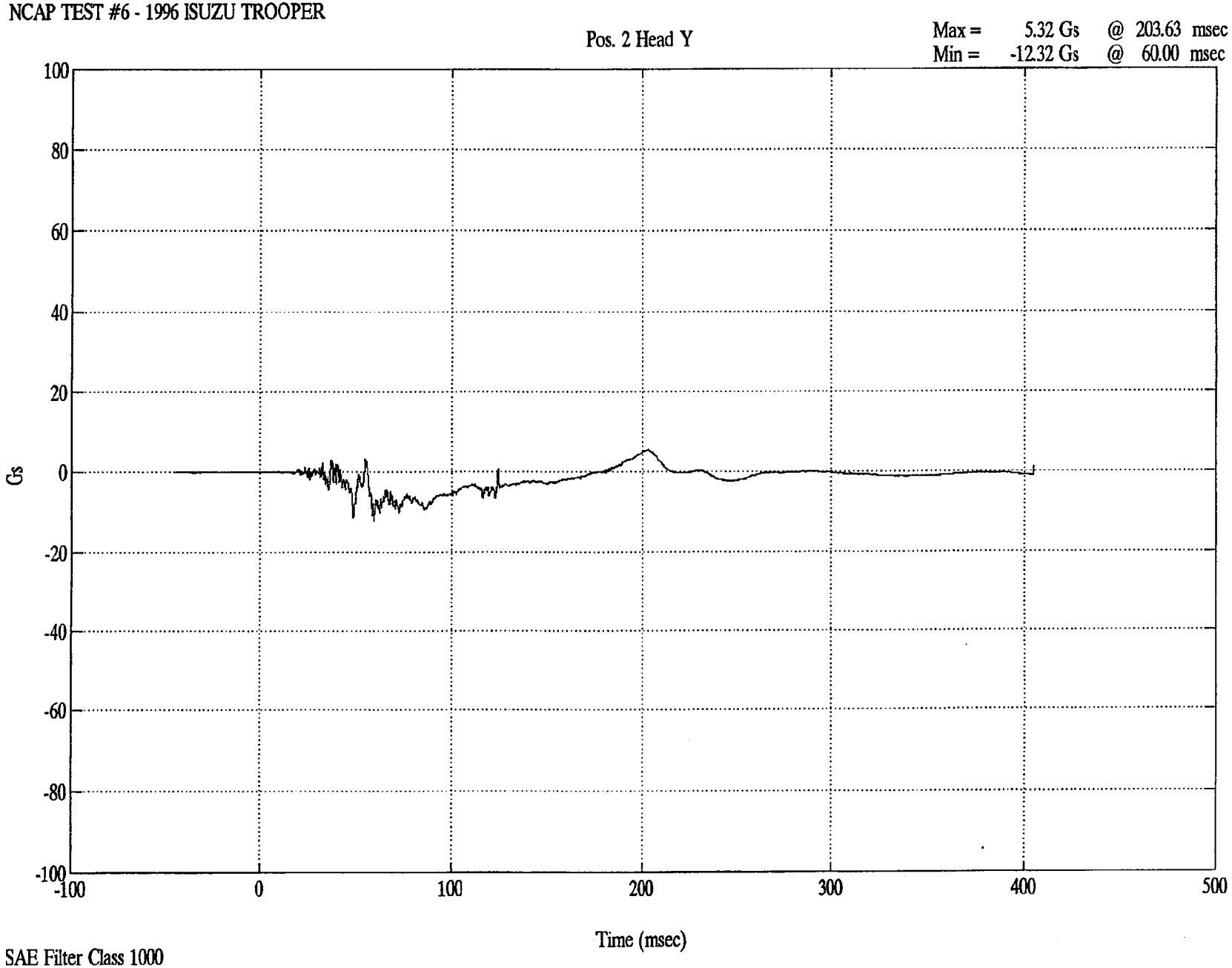


B-57

8313-6

SAE Filter Class 1000

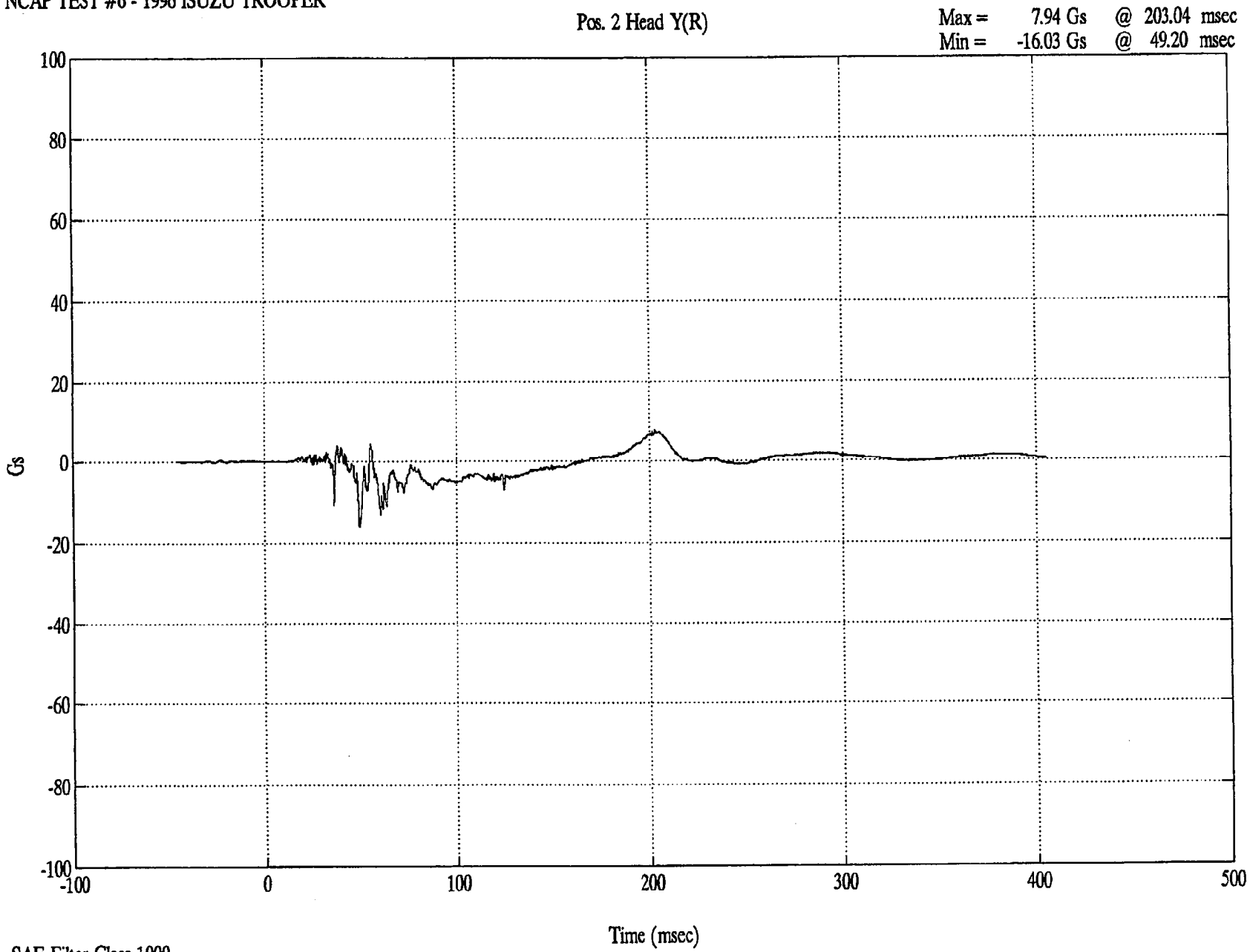
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

8313-6

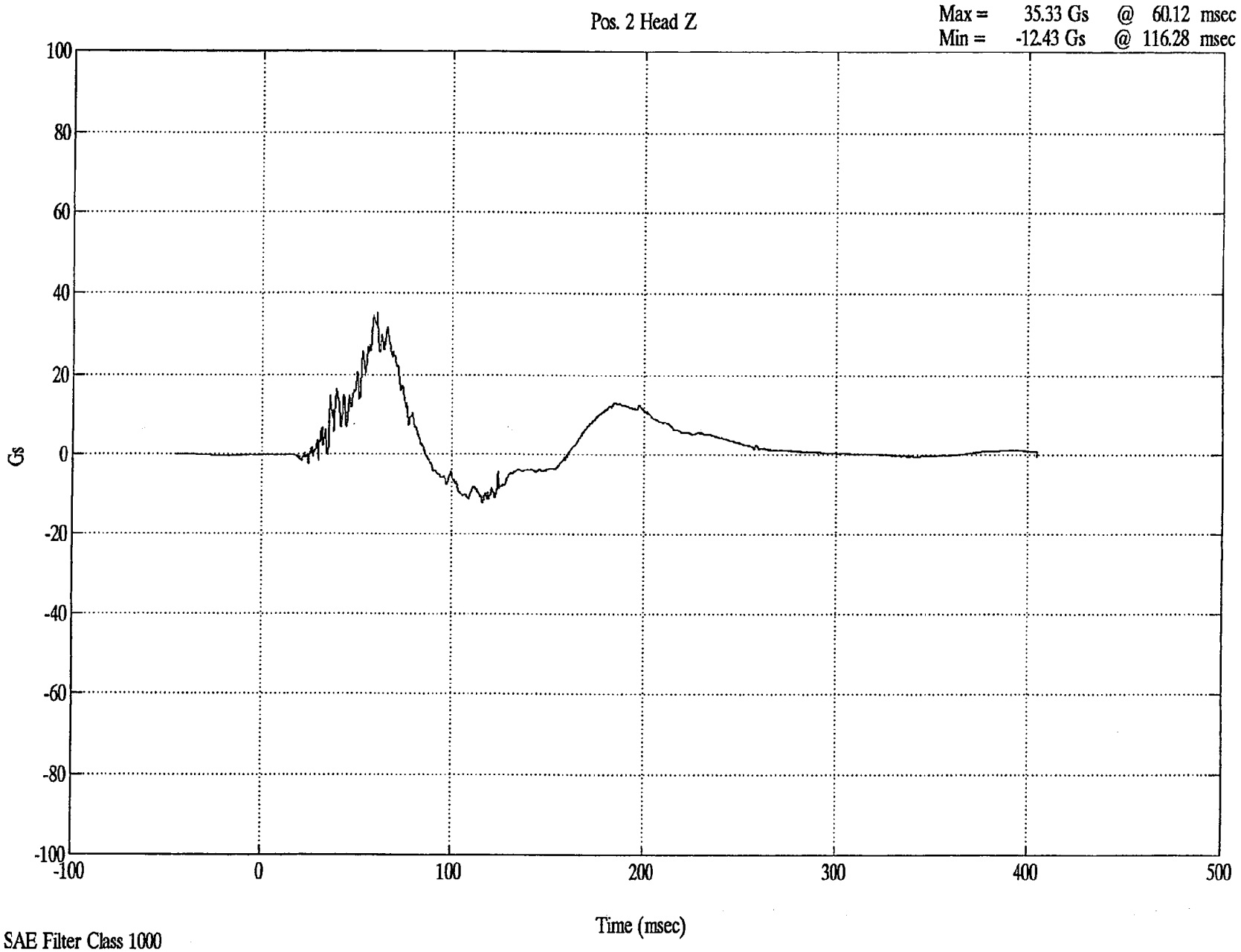
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



B-60

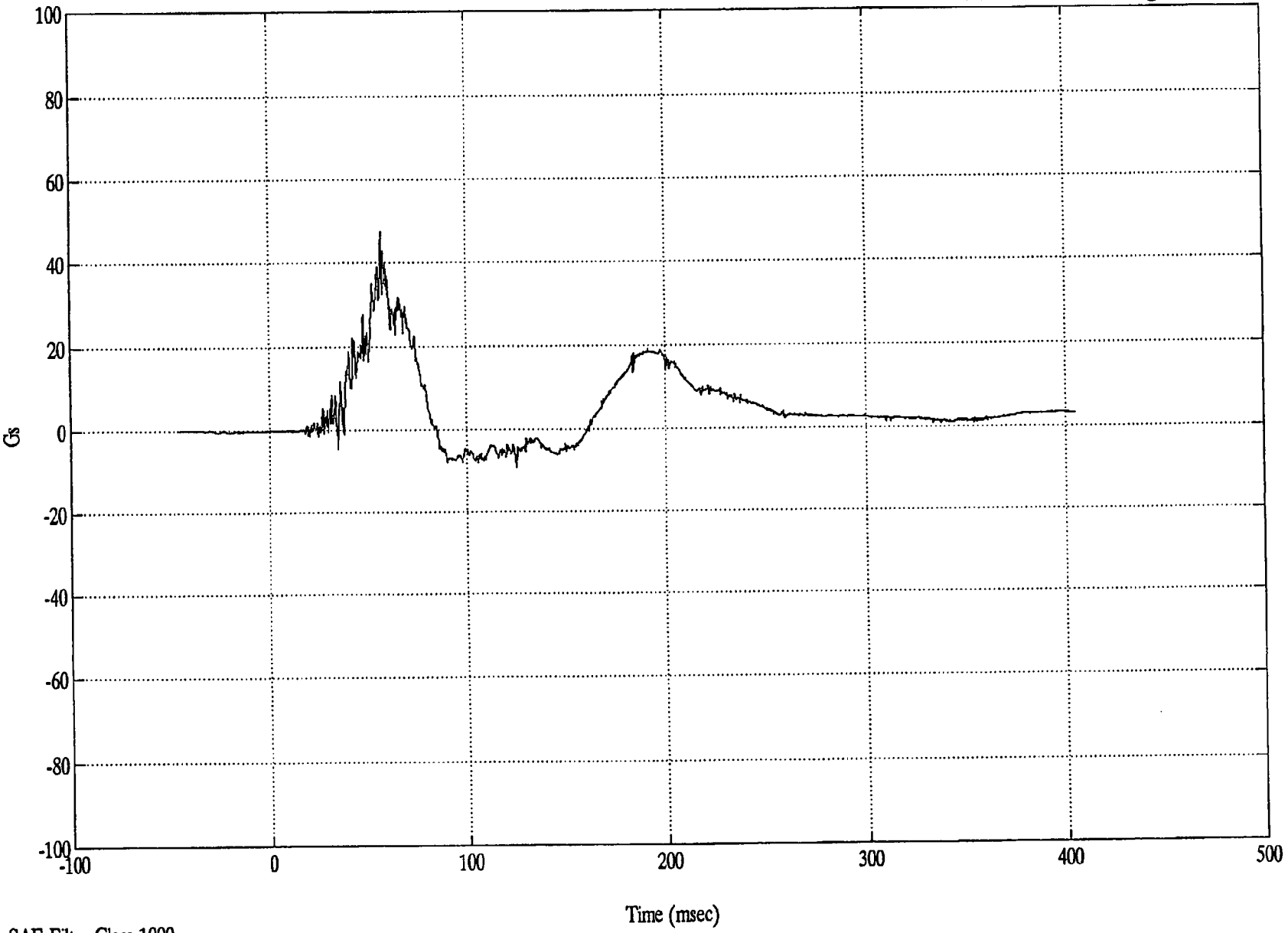
8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 2 Head Z(R)

Max = 47.47 Gs @ 57.47 msec
Min = -9.24 Gs @ 124.31 msec

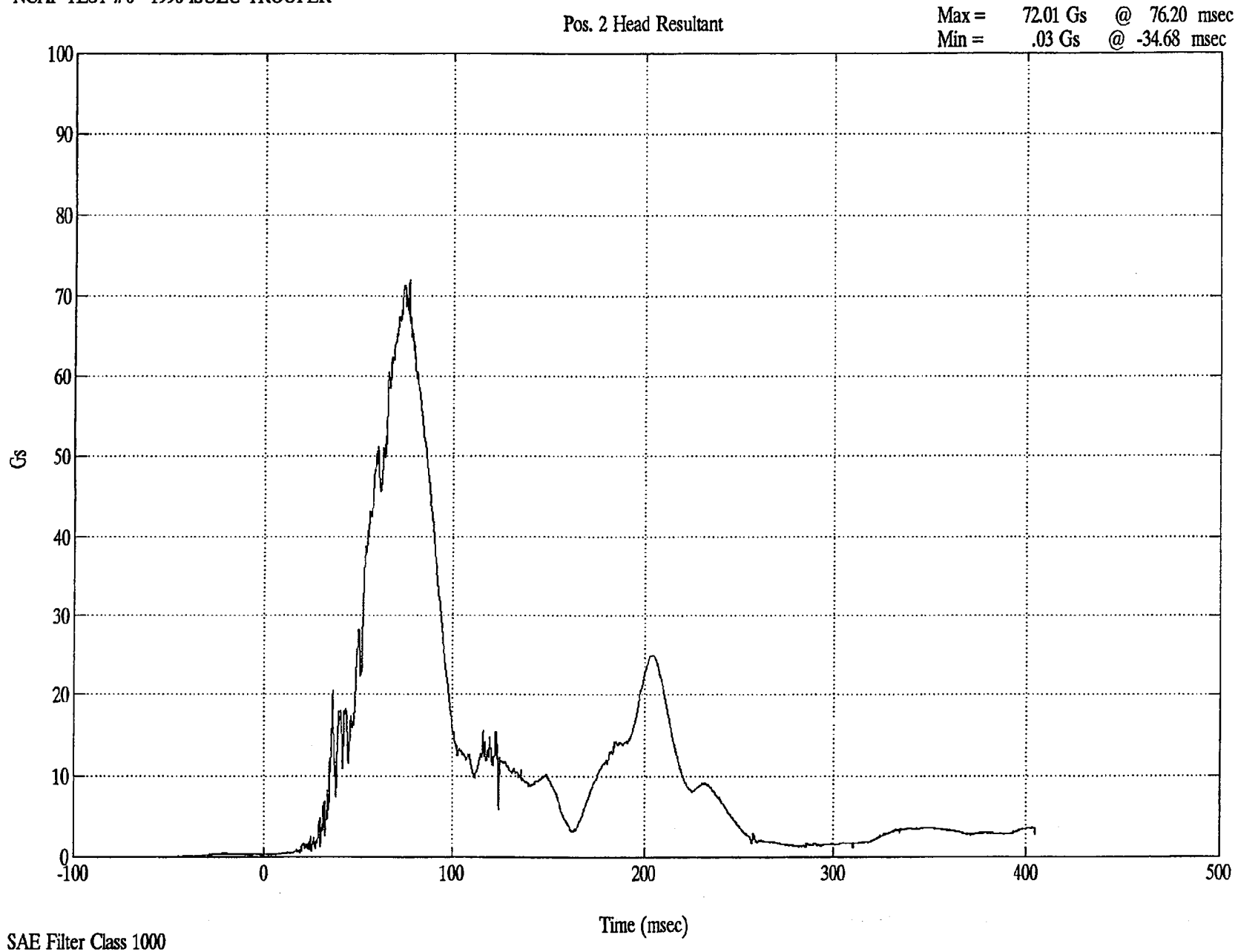


B-61

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

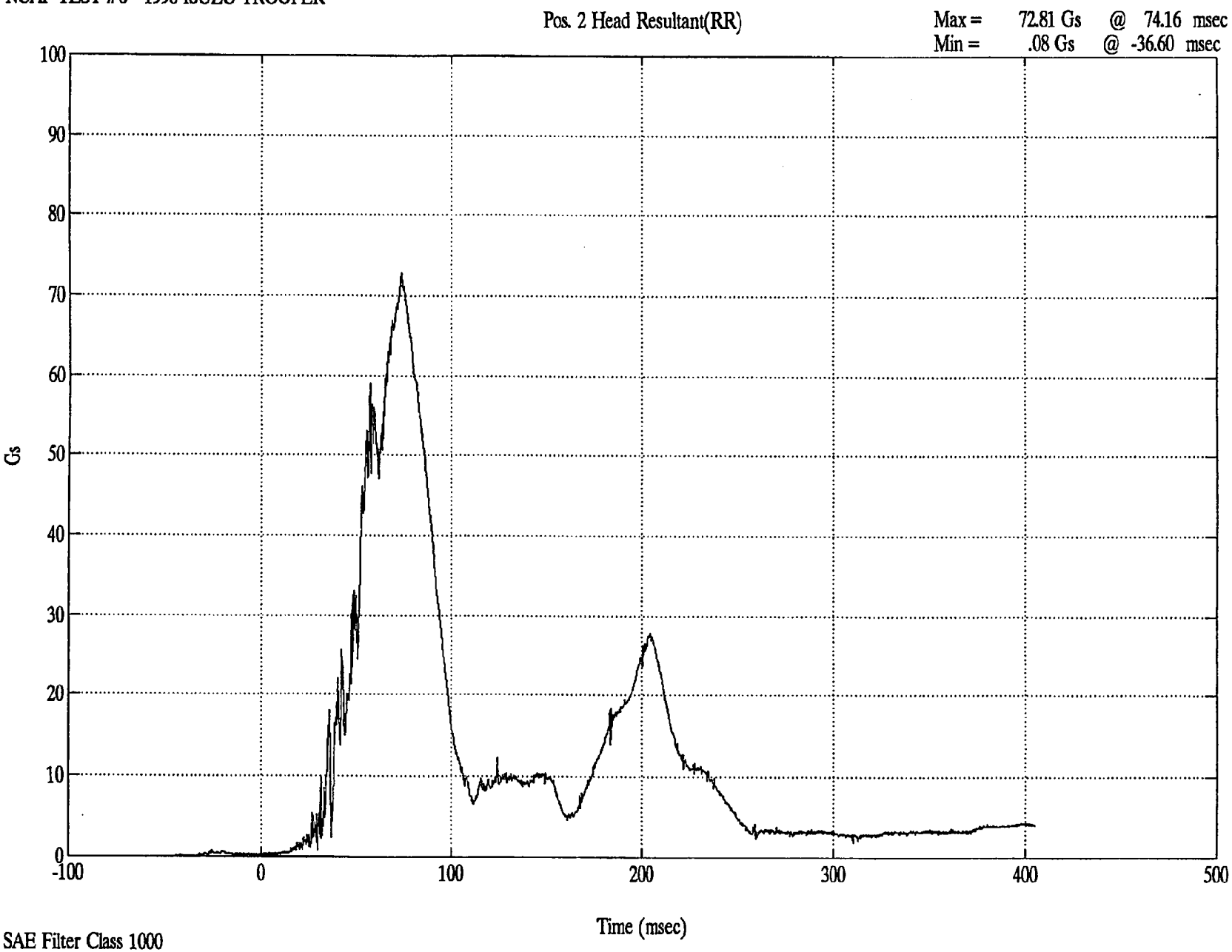


B-62

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

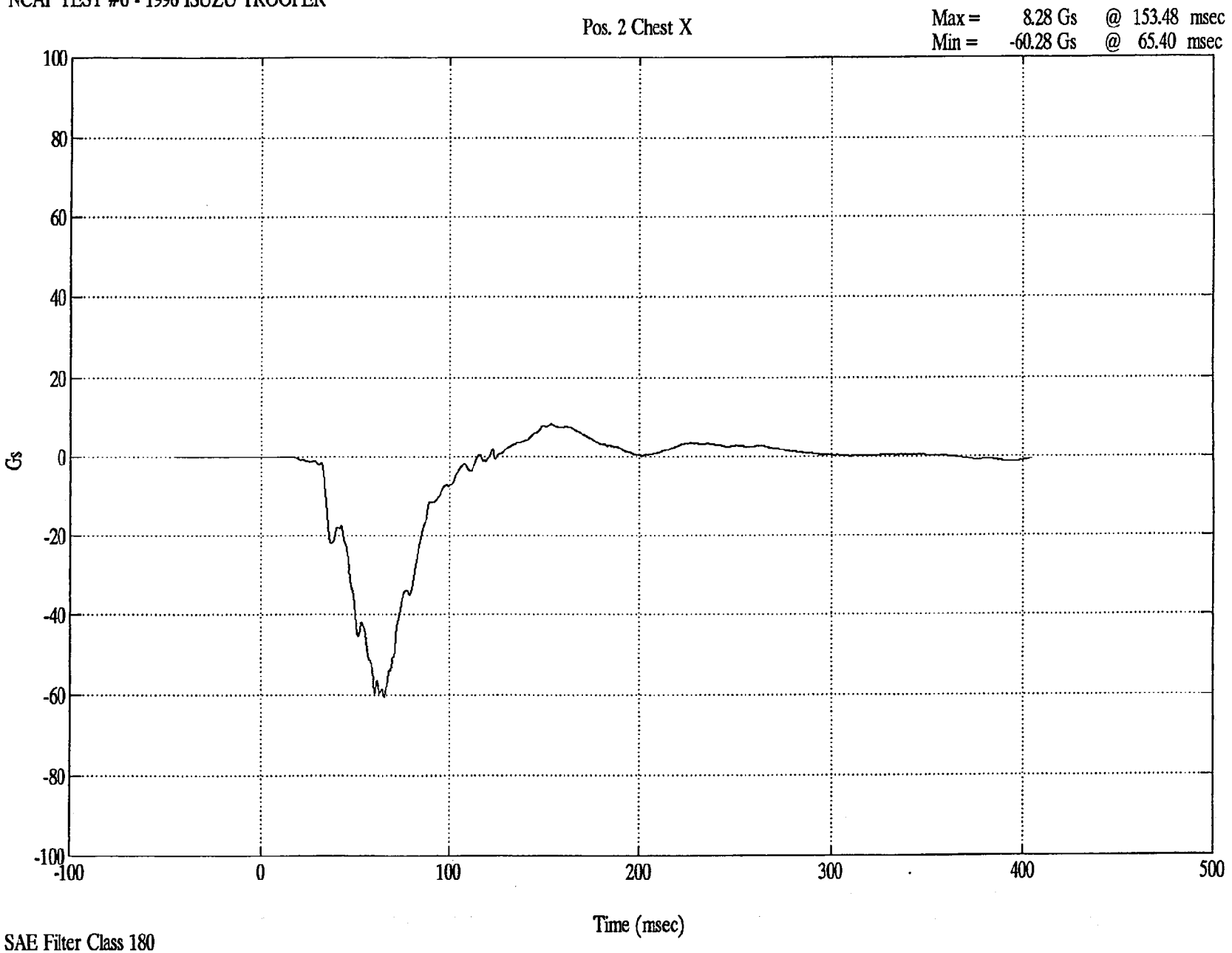


B-63

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

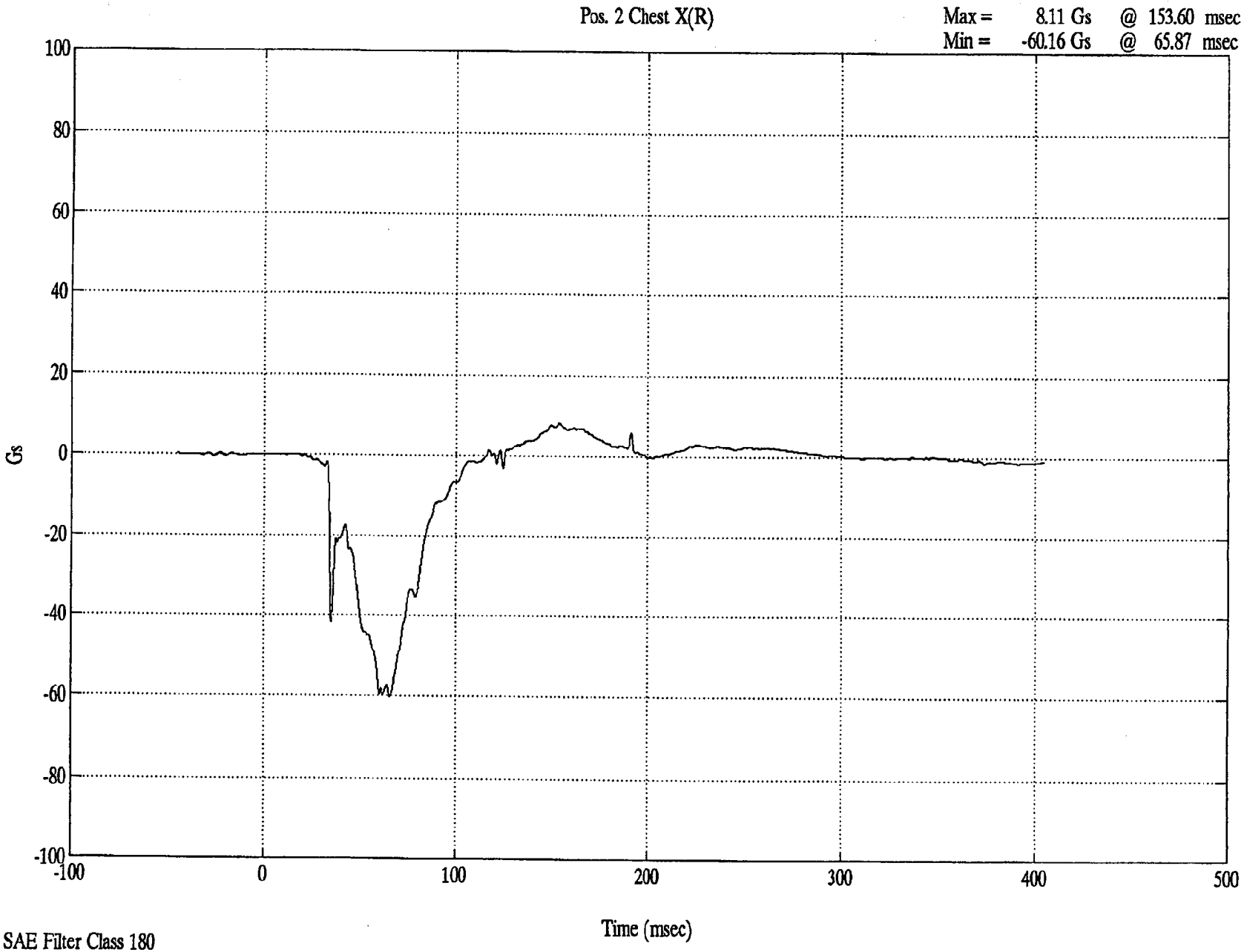


B-64

8313-6

SAE Filter Class 180

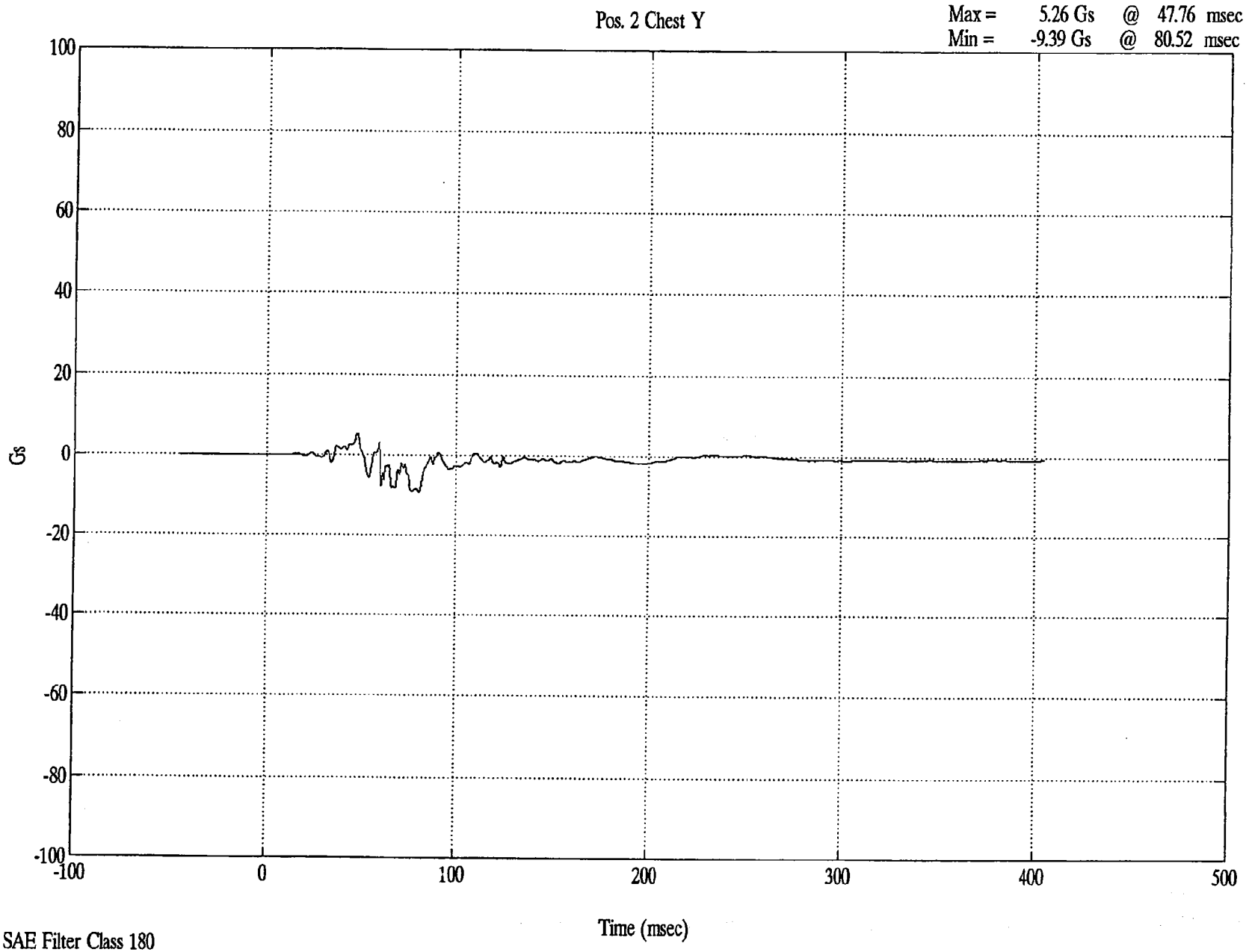
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

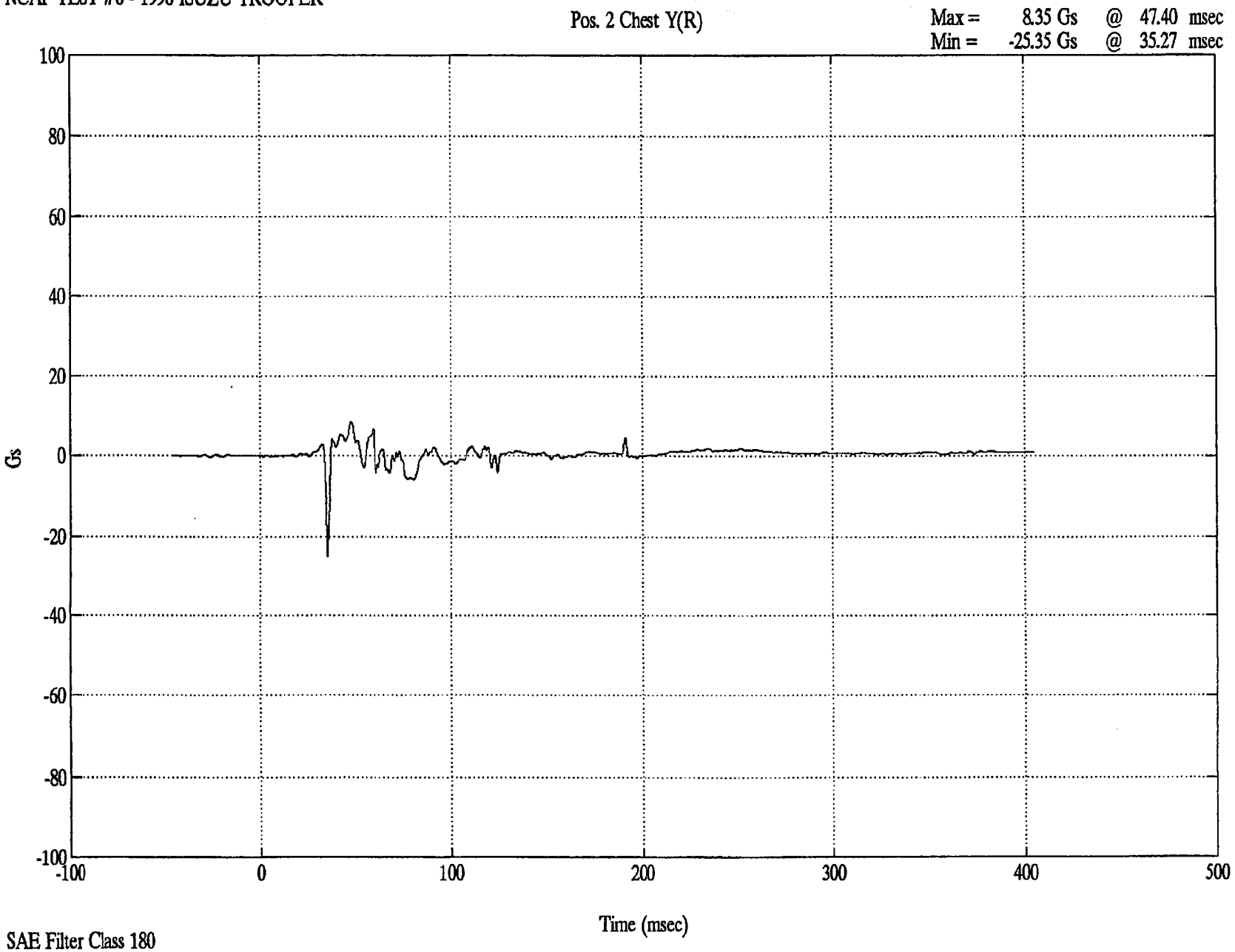


B-66

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

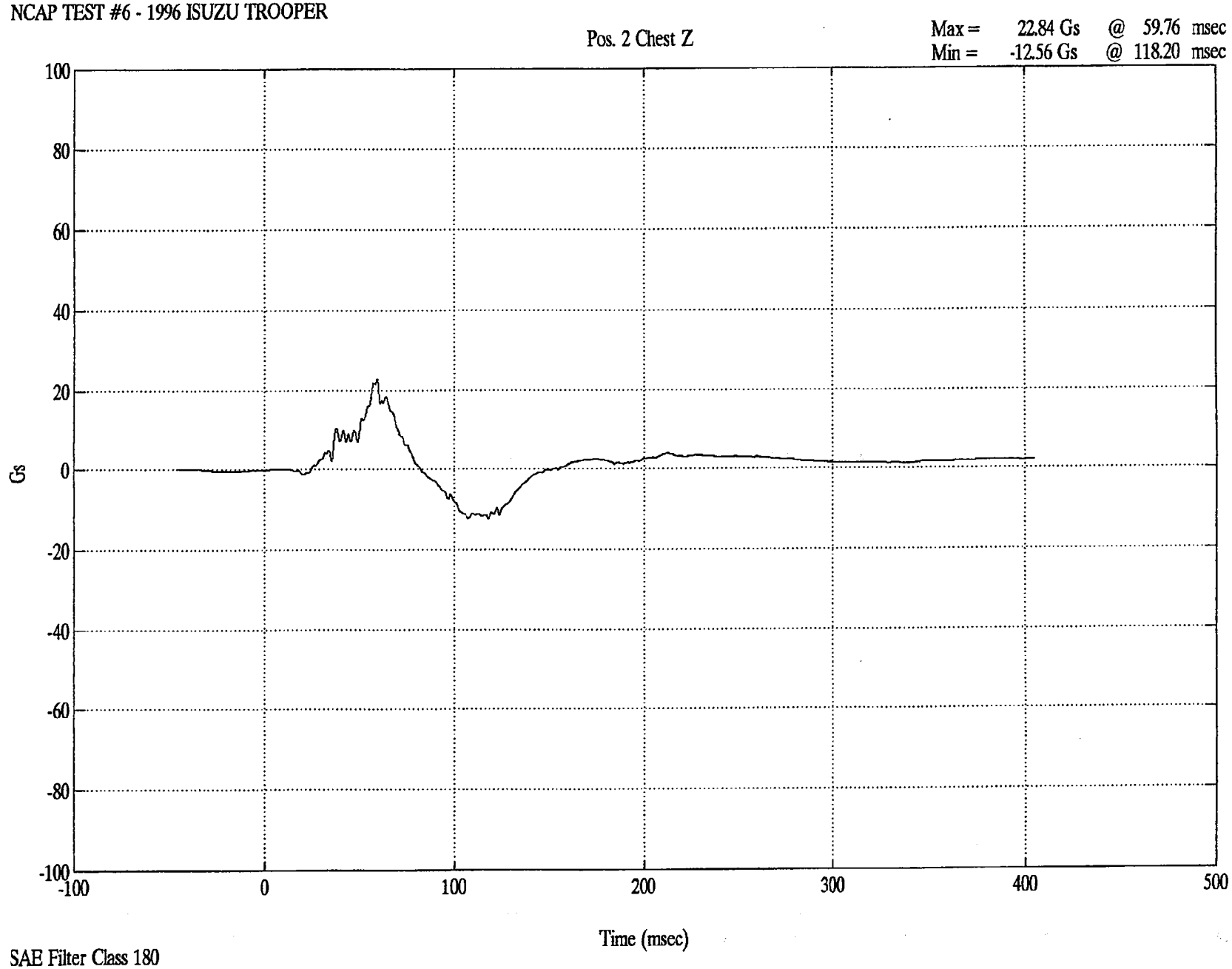


SAE Filter Class 180

B-67

8313-6

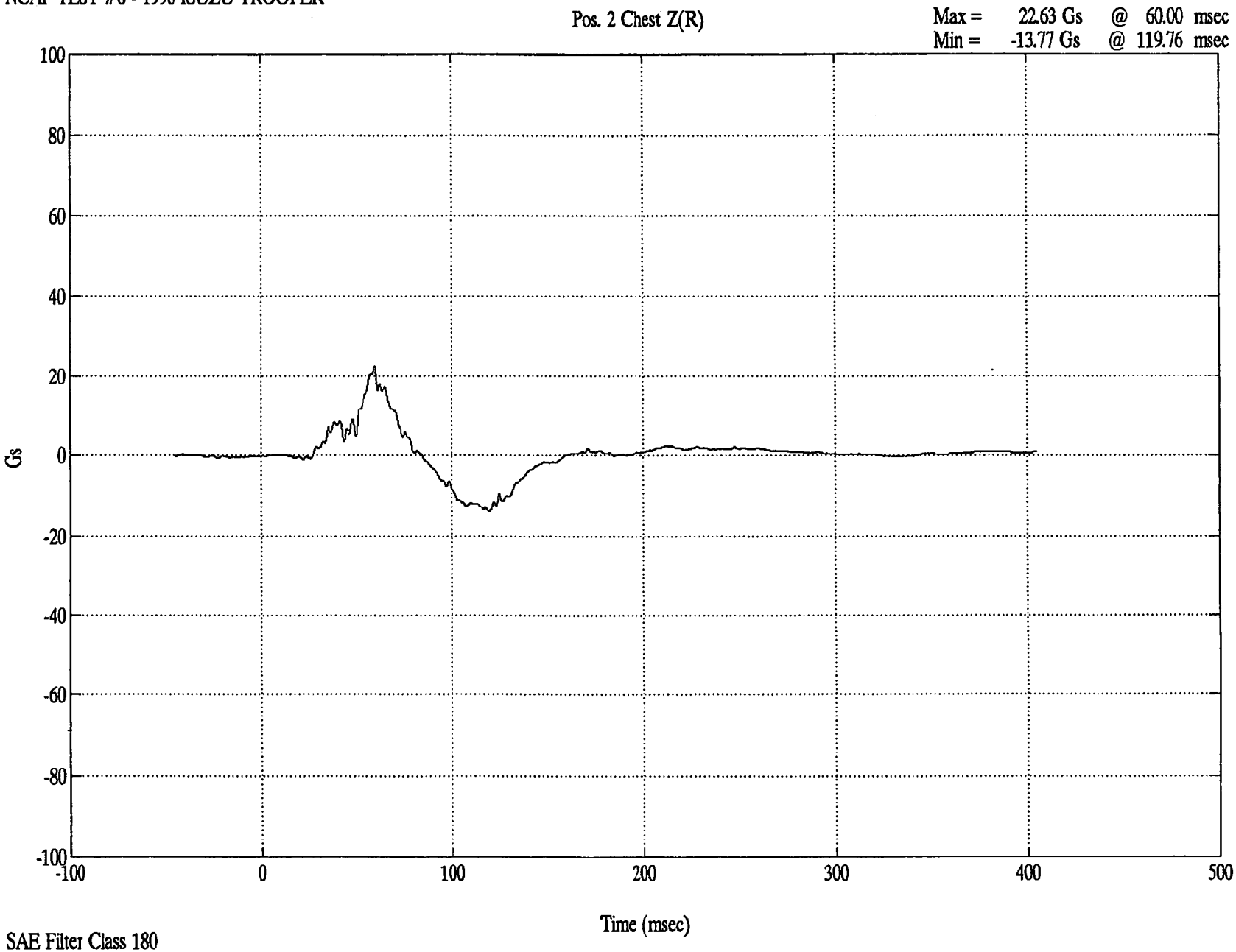
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

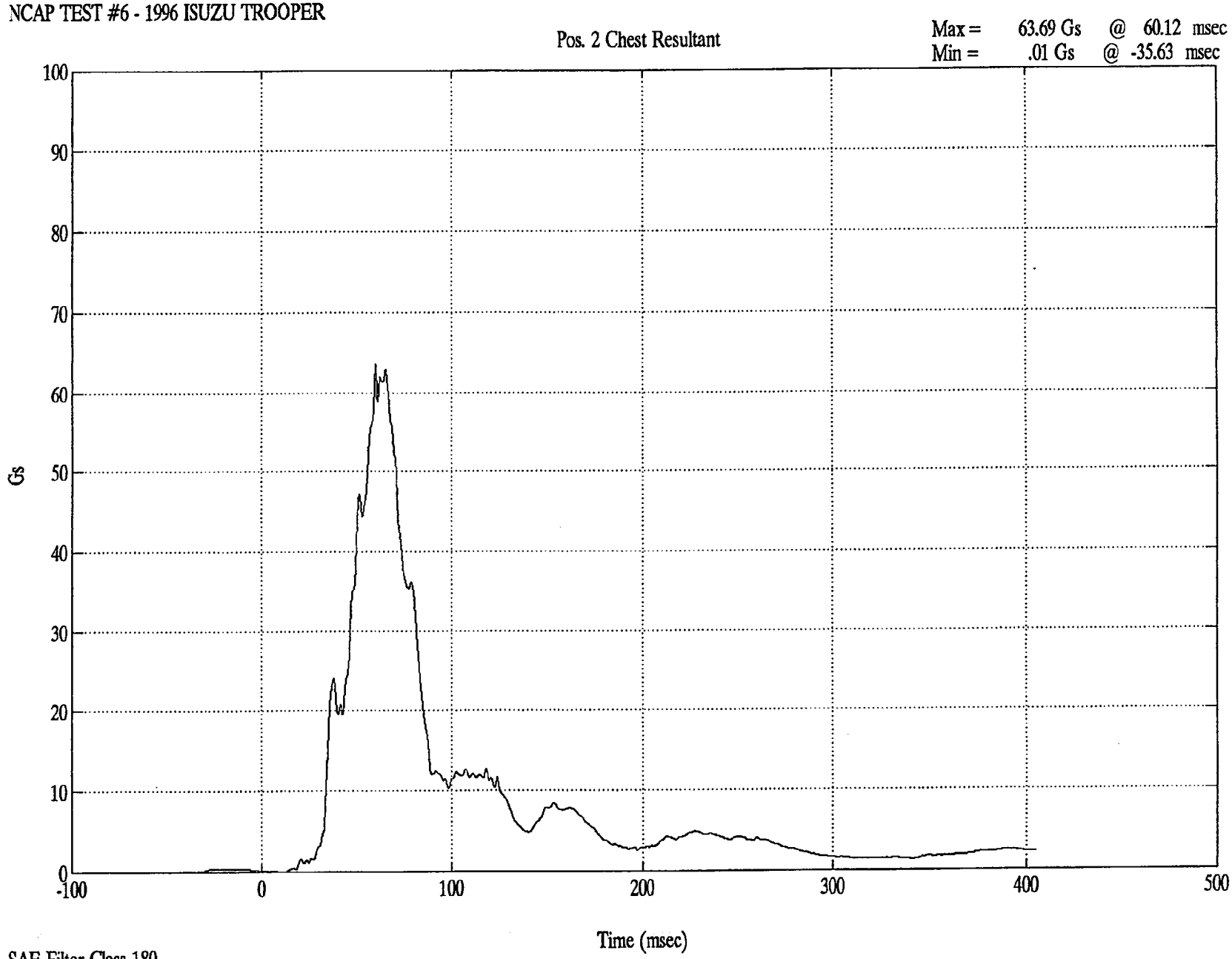


B-69

8313-6

SAE Filter Class 180

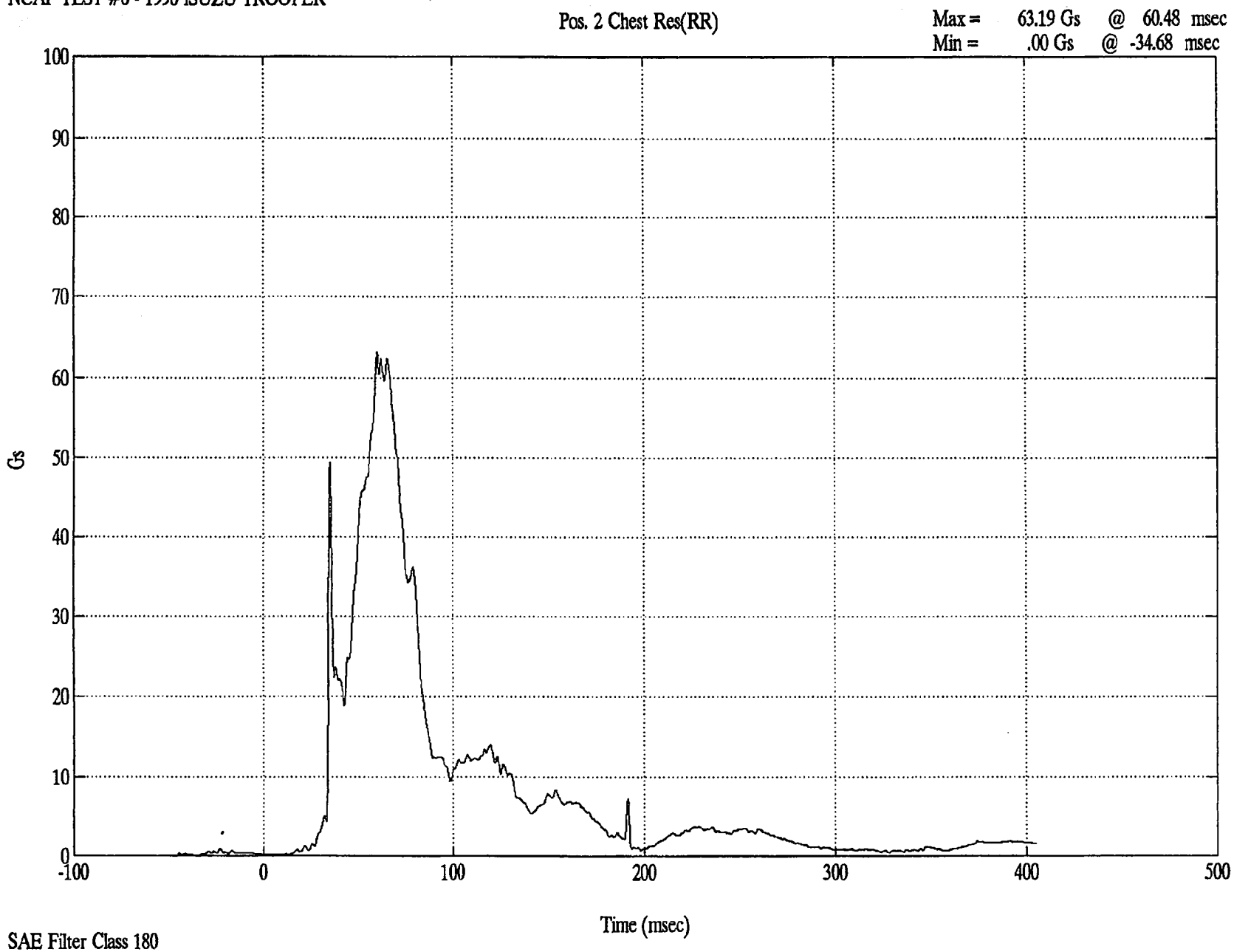
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

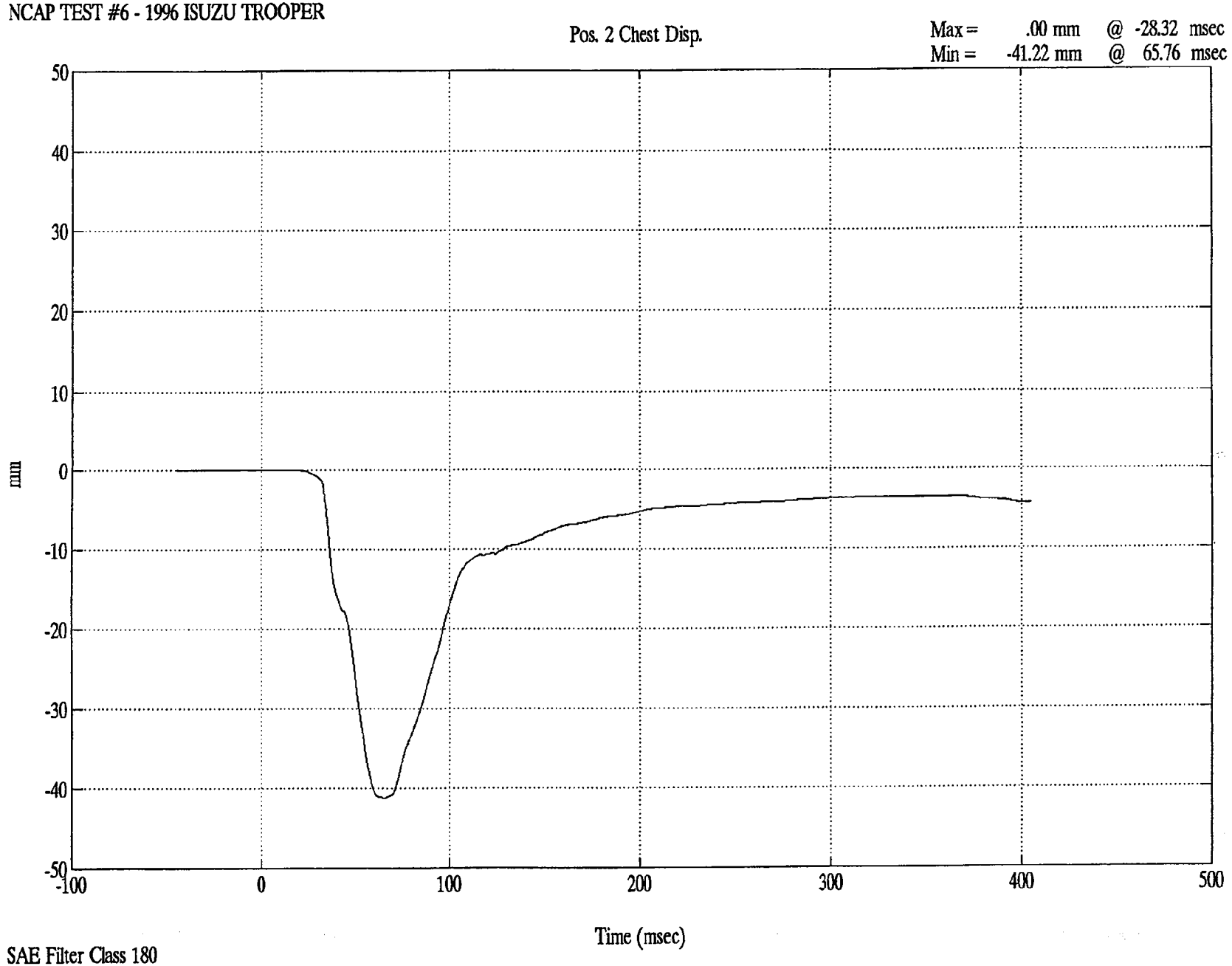
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

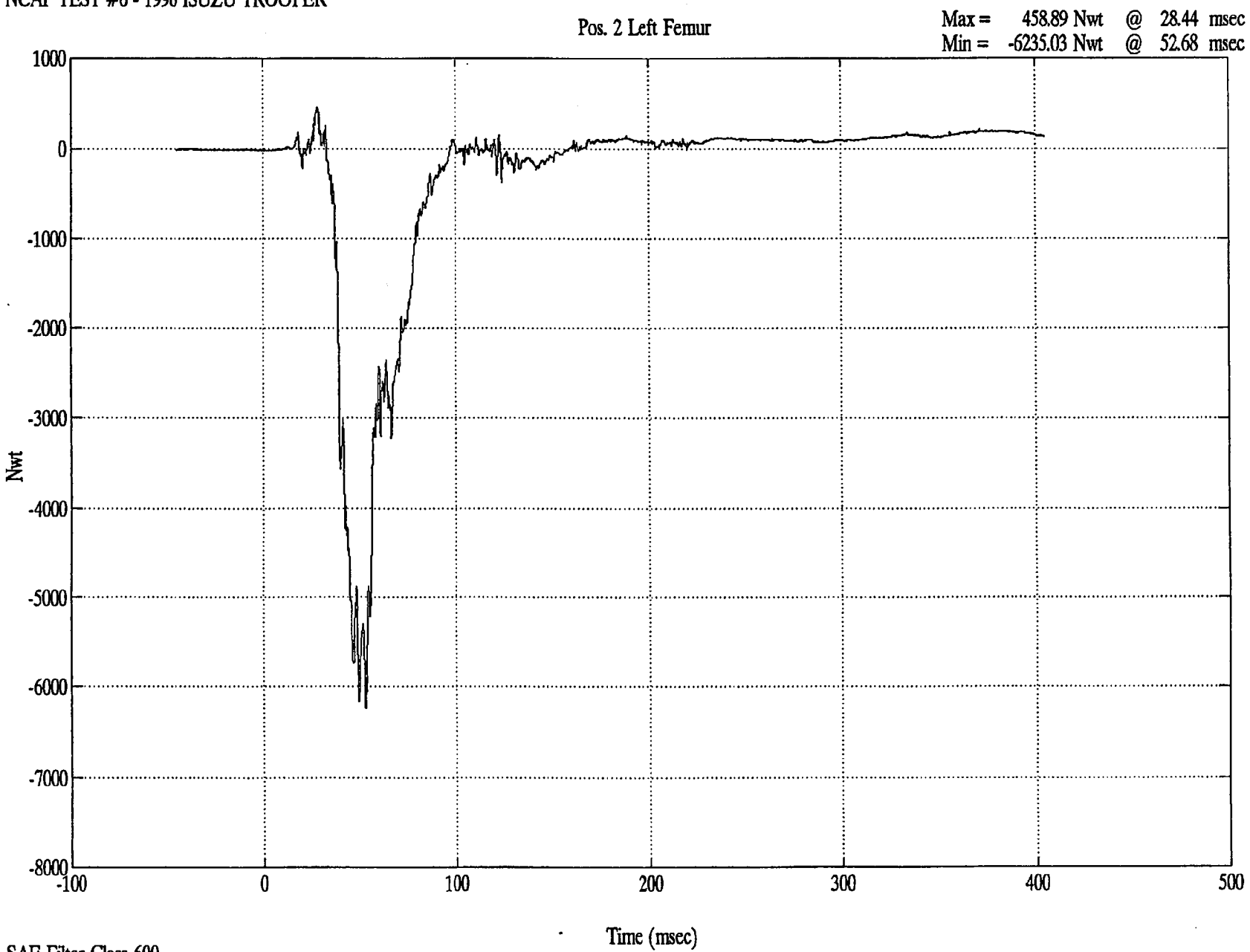
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 600

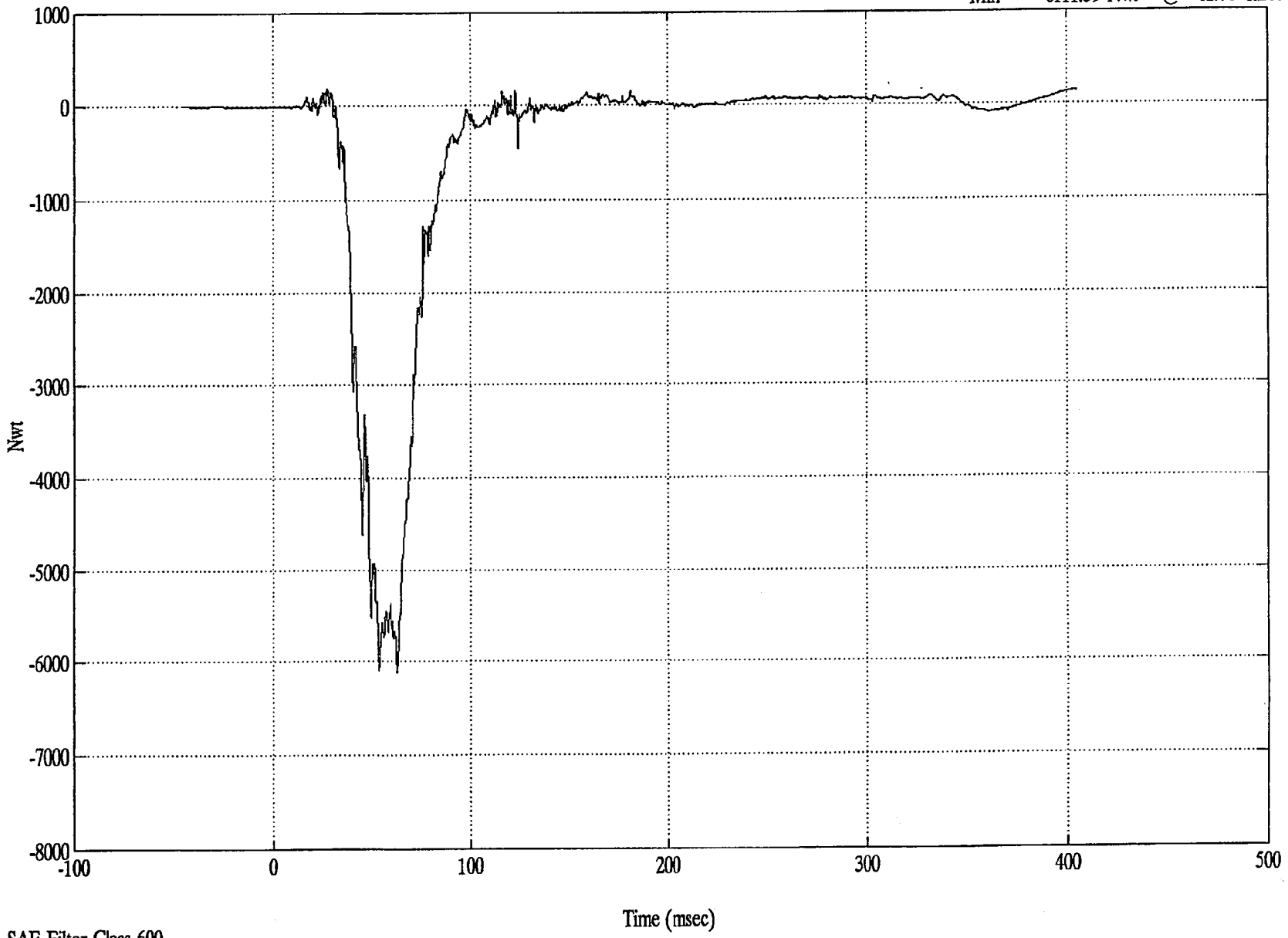
B-73

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

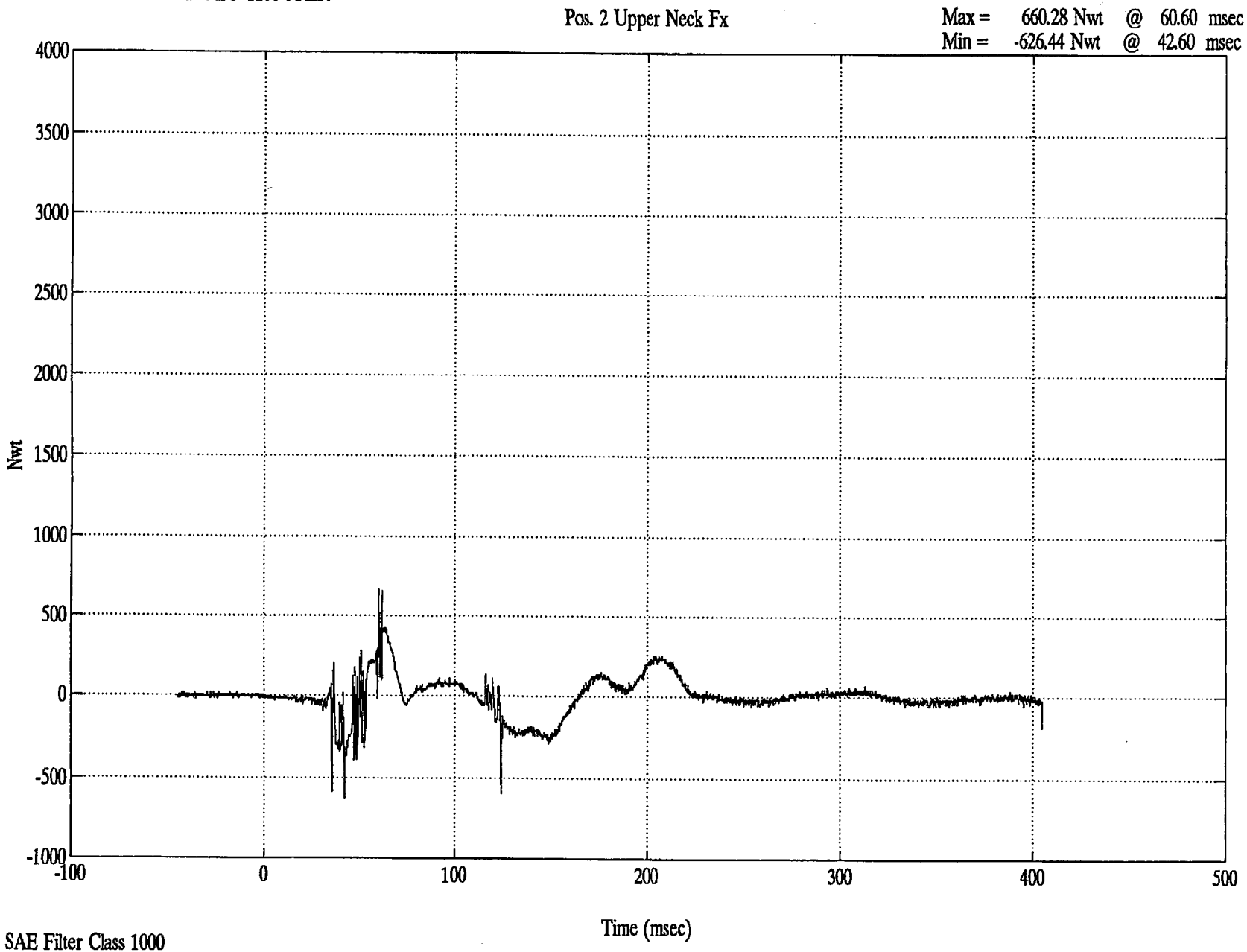
Pos. 2 Right Femur

Max = 182.39 Nwt @ 27.48 msec
Min = -6111.39 Nwt @ 62.76 msec



SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER



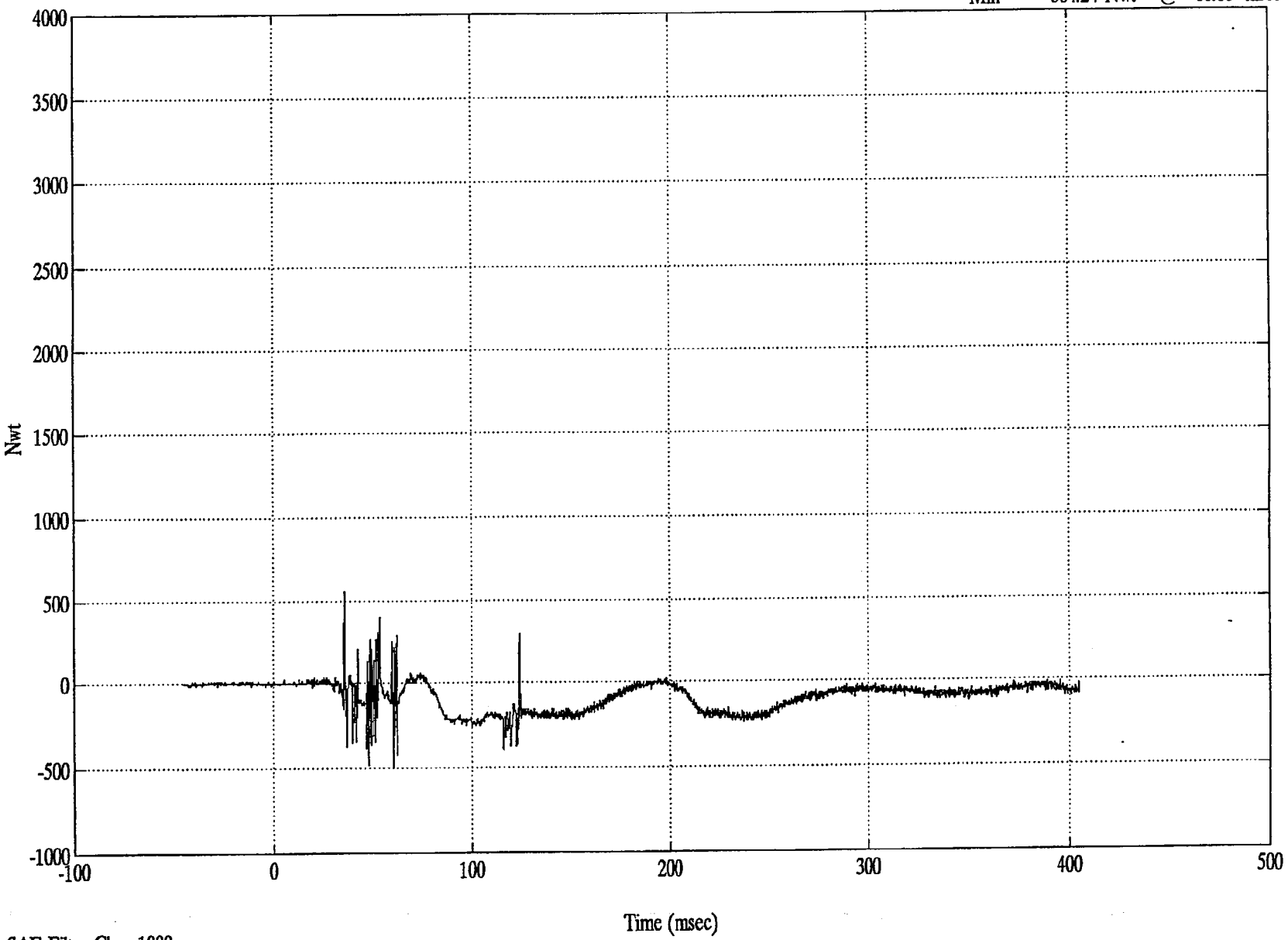
SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

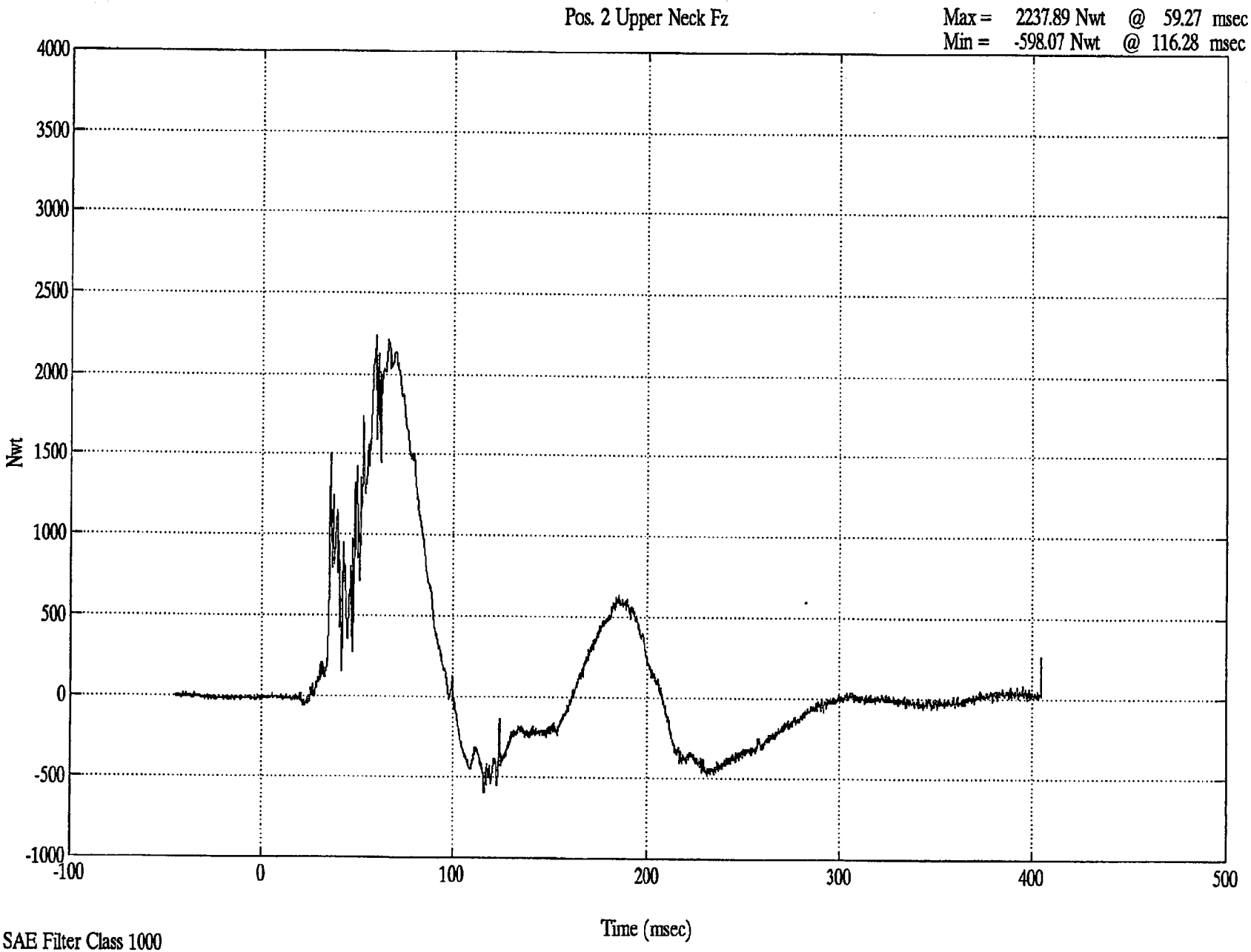
Pos. 2 Upper Neck Fy

Max = 553.94 Nwt @ 35.76 msec
Min = -504.24 Nwt @ 60.60 msec



SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

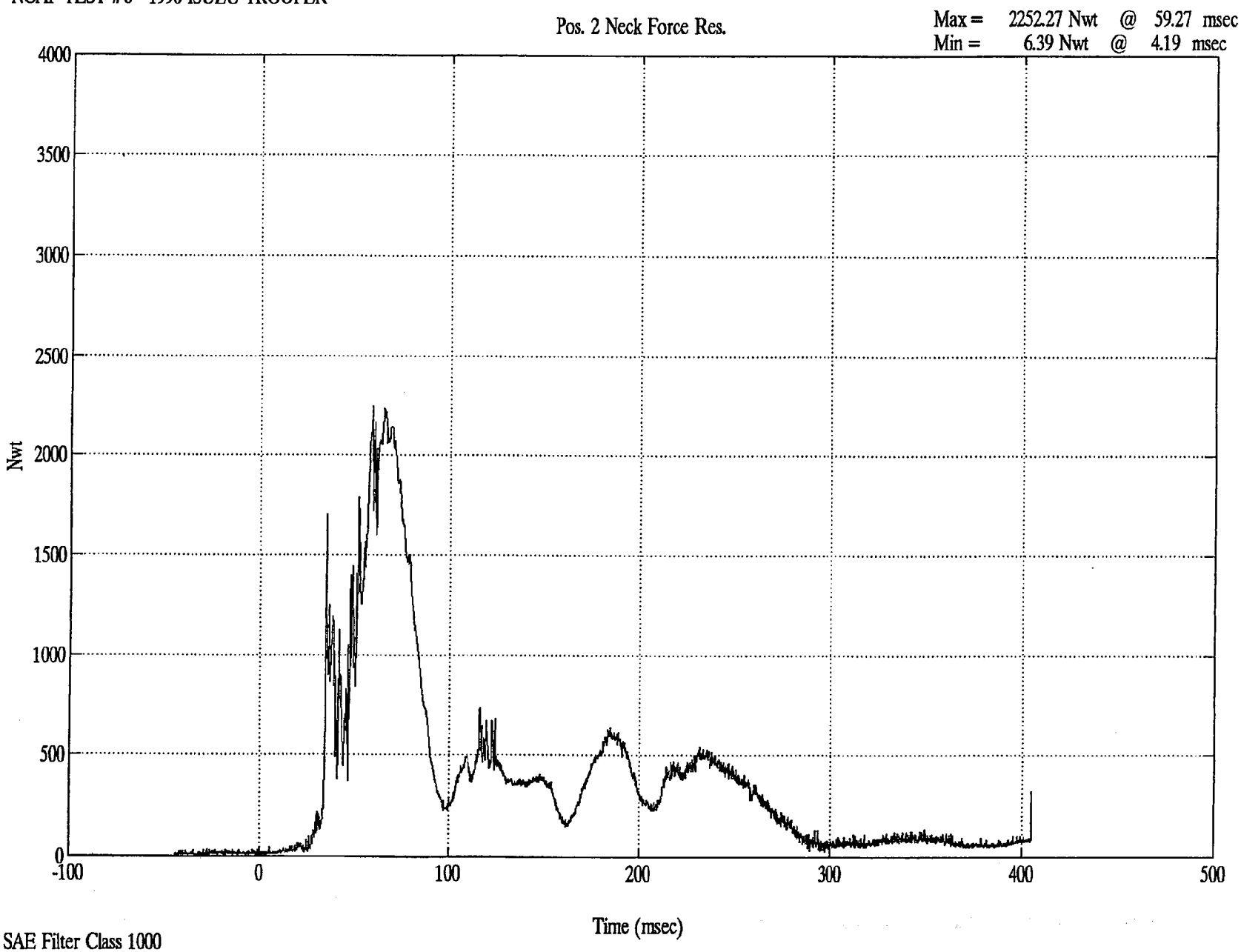


B-77

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER



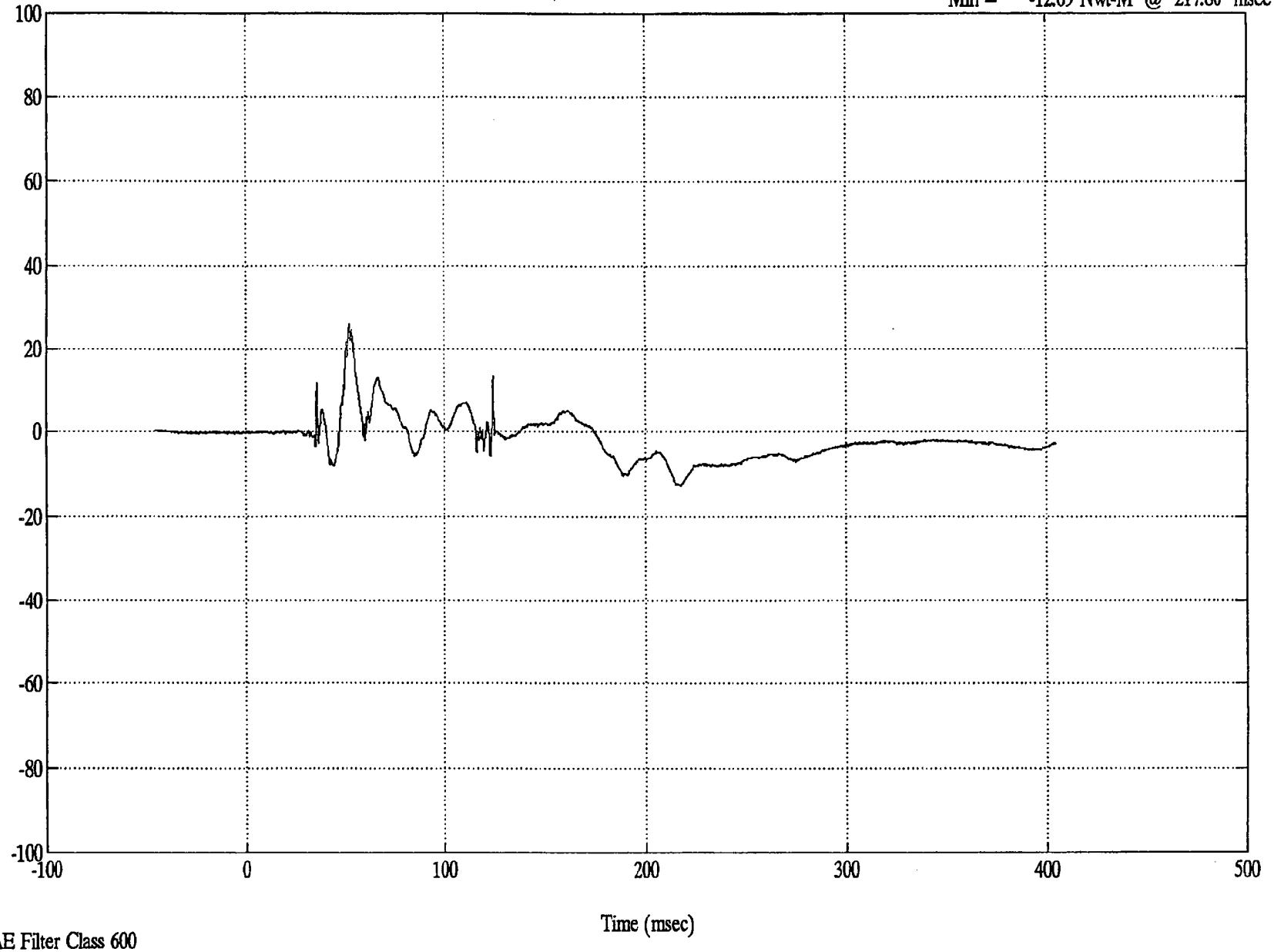
SAE Filter Class 1000

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 2 Upper Neck Mx

Max = 25.97 Nwt-M @ 52.31 msec
Min = -12.69 Nwt-M @ 217.80 msec



SAE Filter Class 600

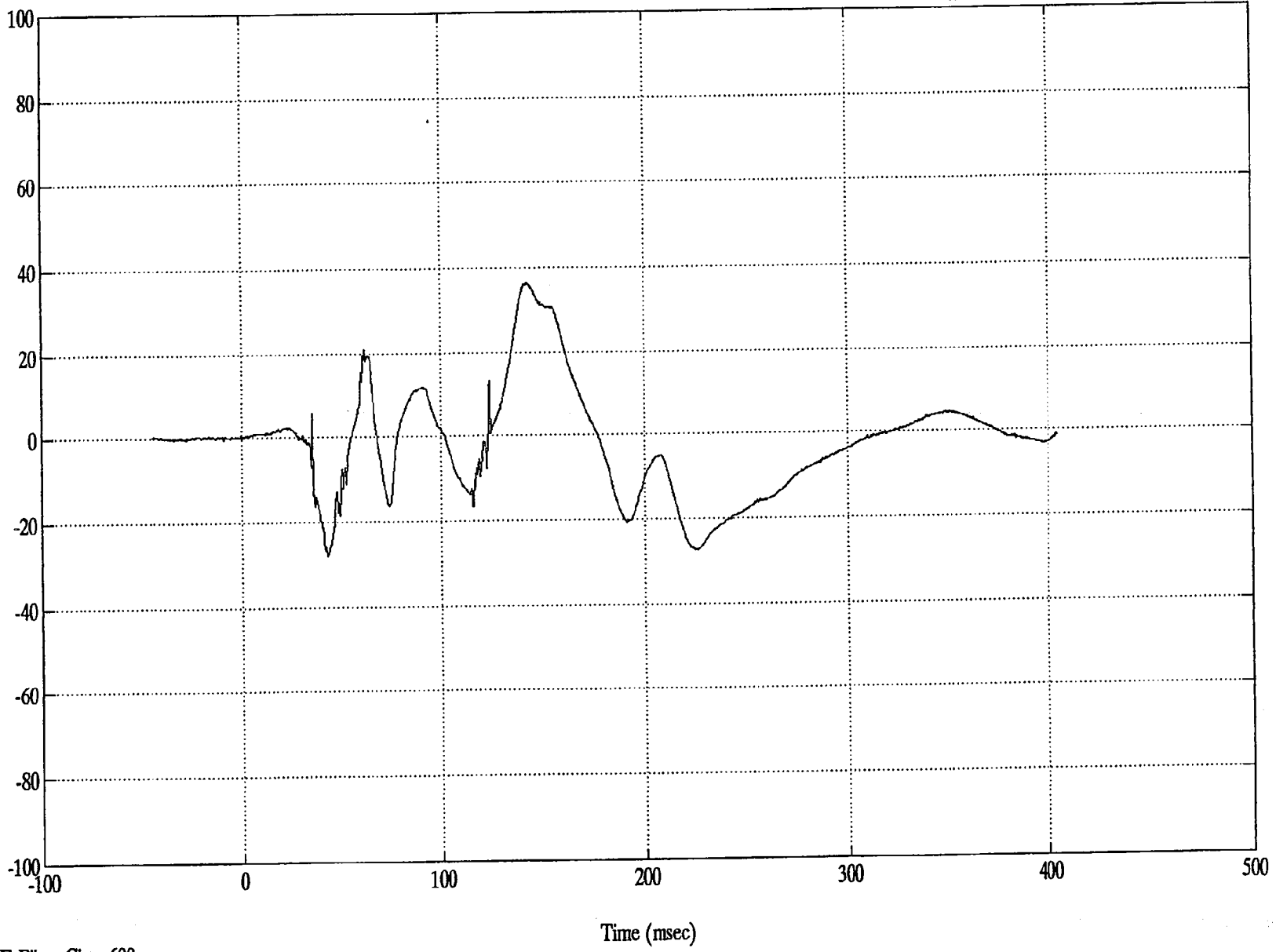
B-79

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 2 Upper Neck My

Max = 36.56 Nwt-M @ 142.68 msec
Min = -28.08 Nwt-M @ 43.20 msec

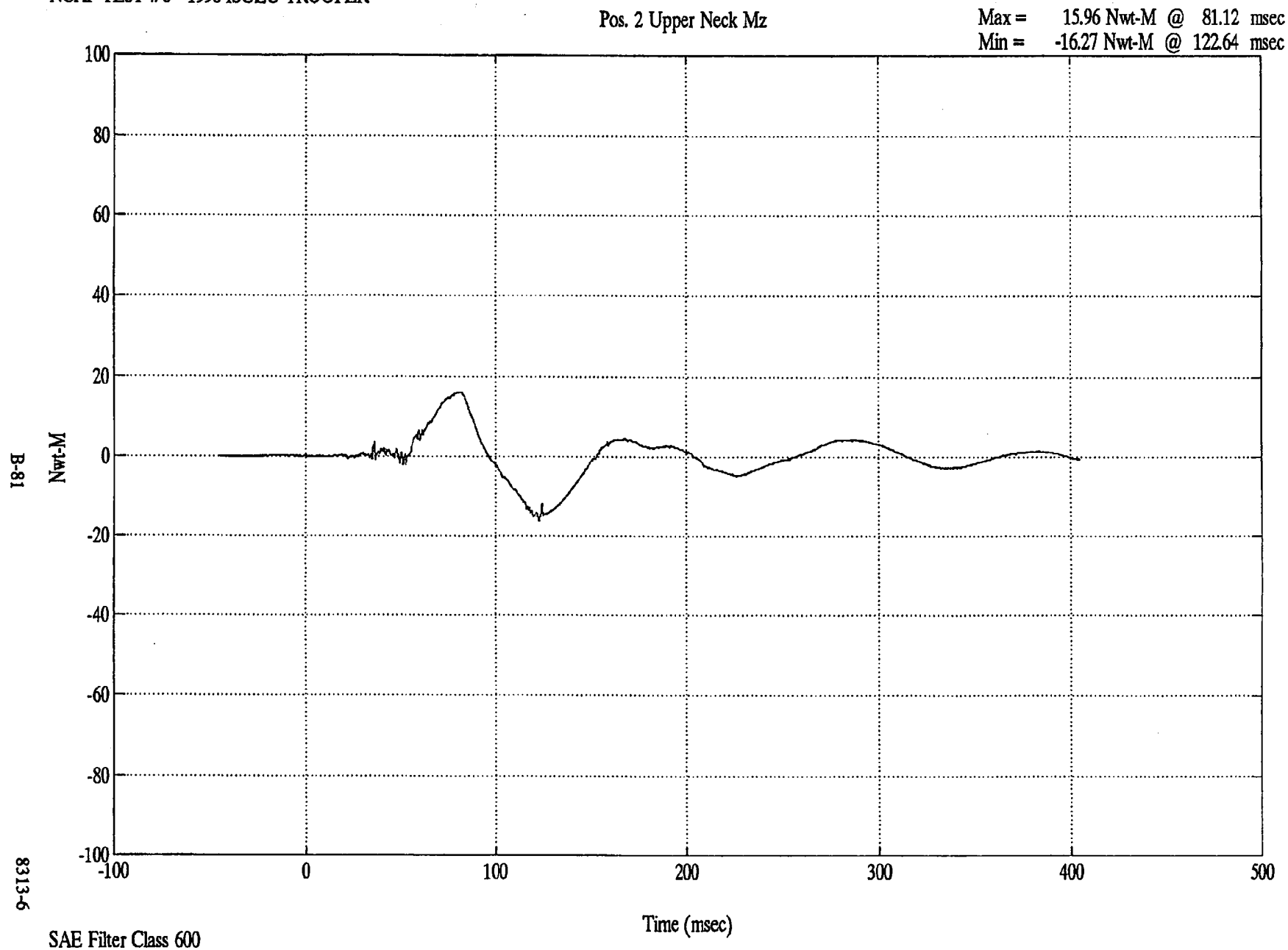


B-80

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

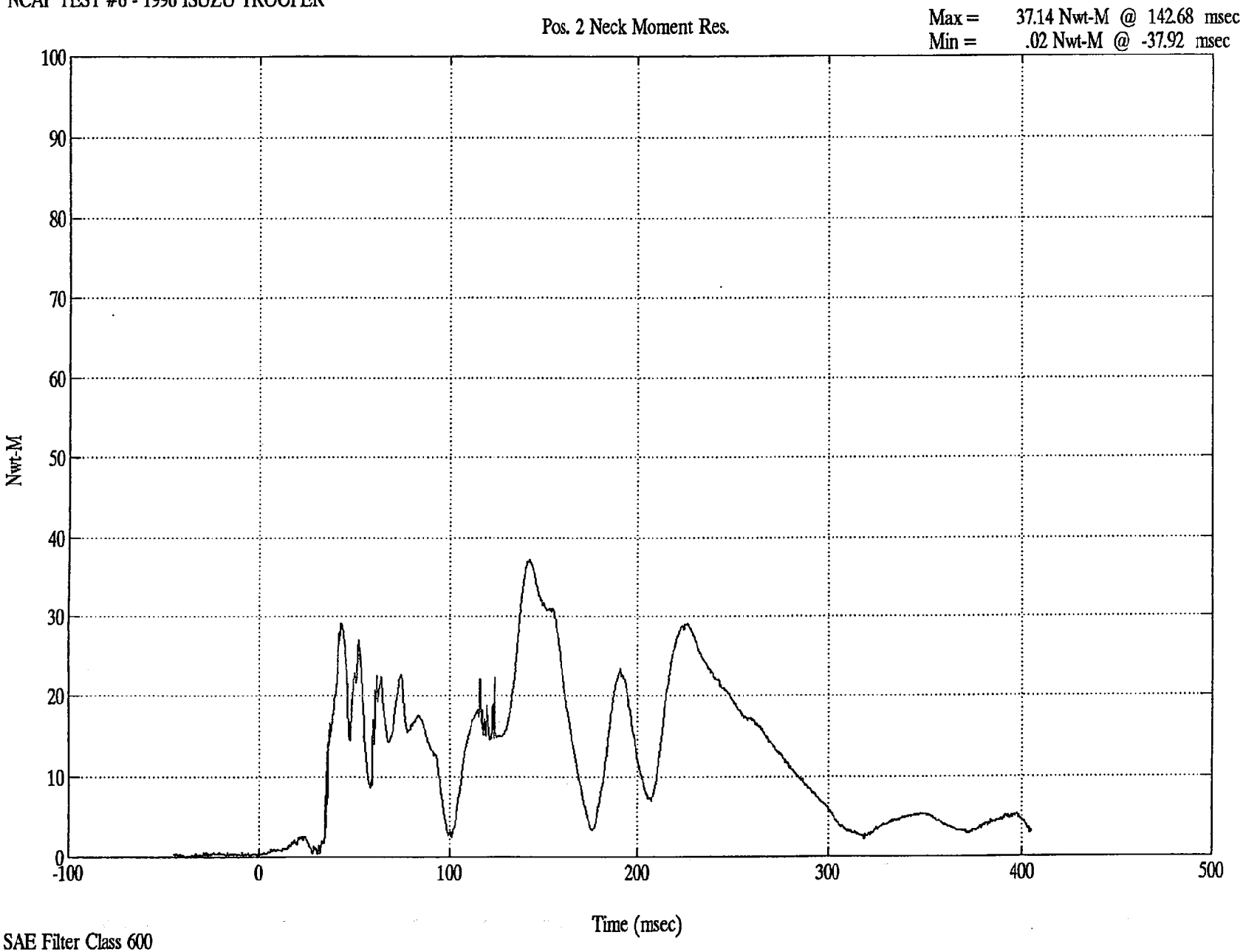


B-81

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

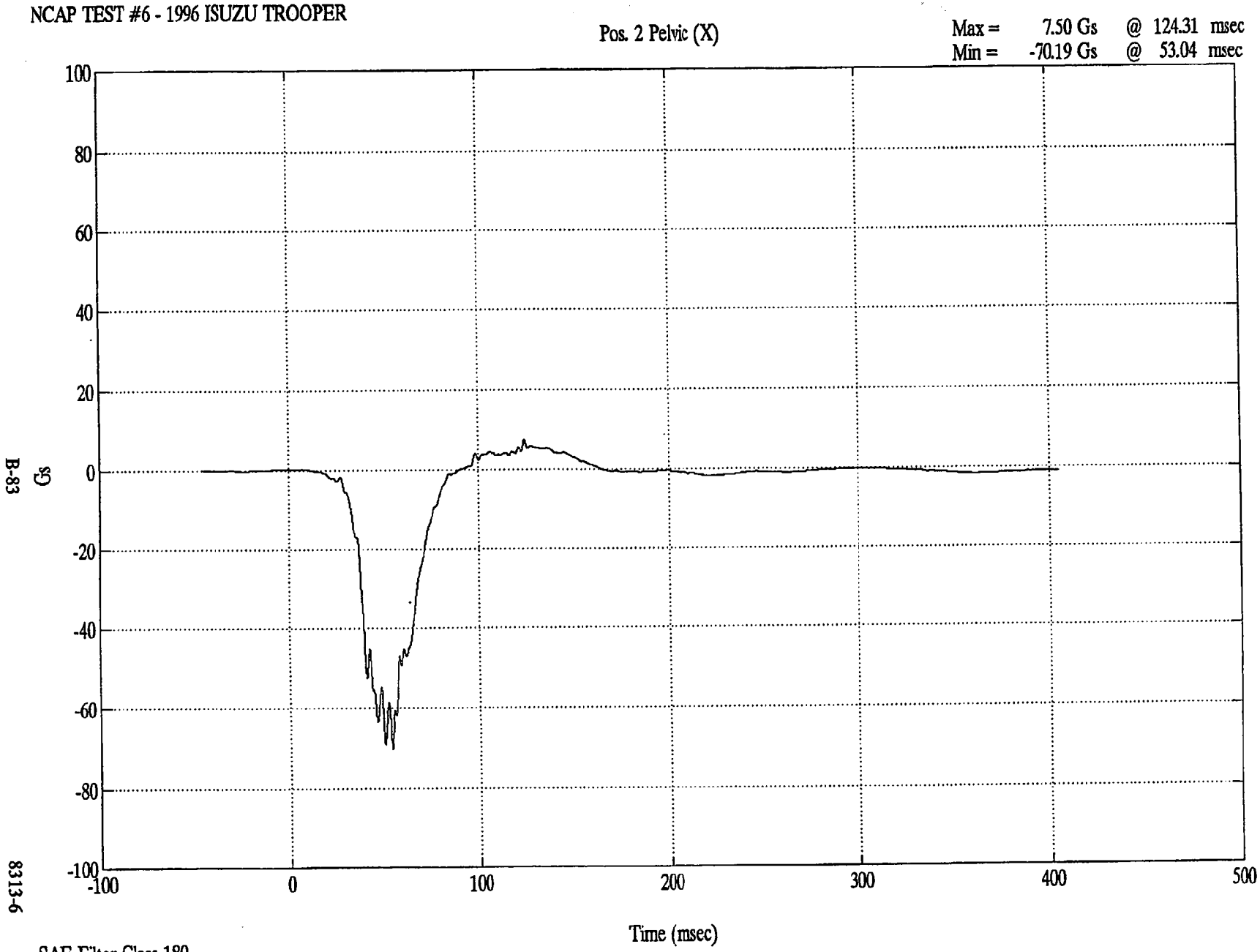


B-82

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

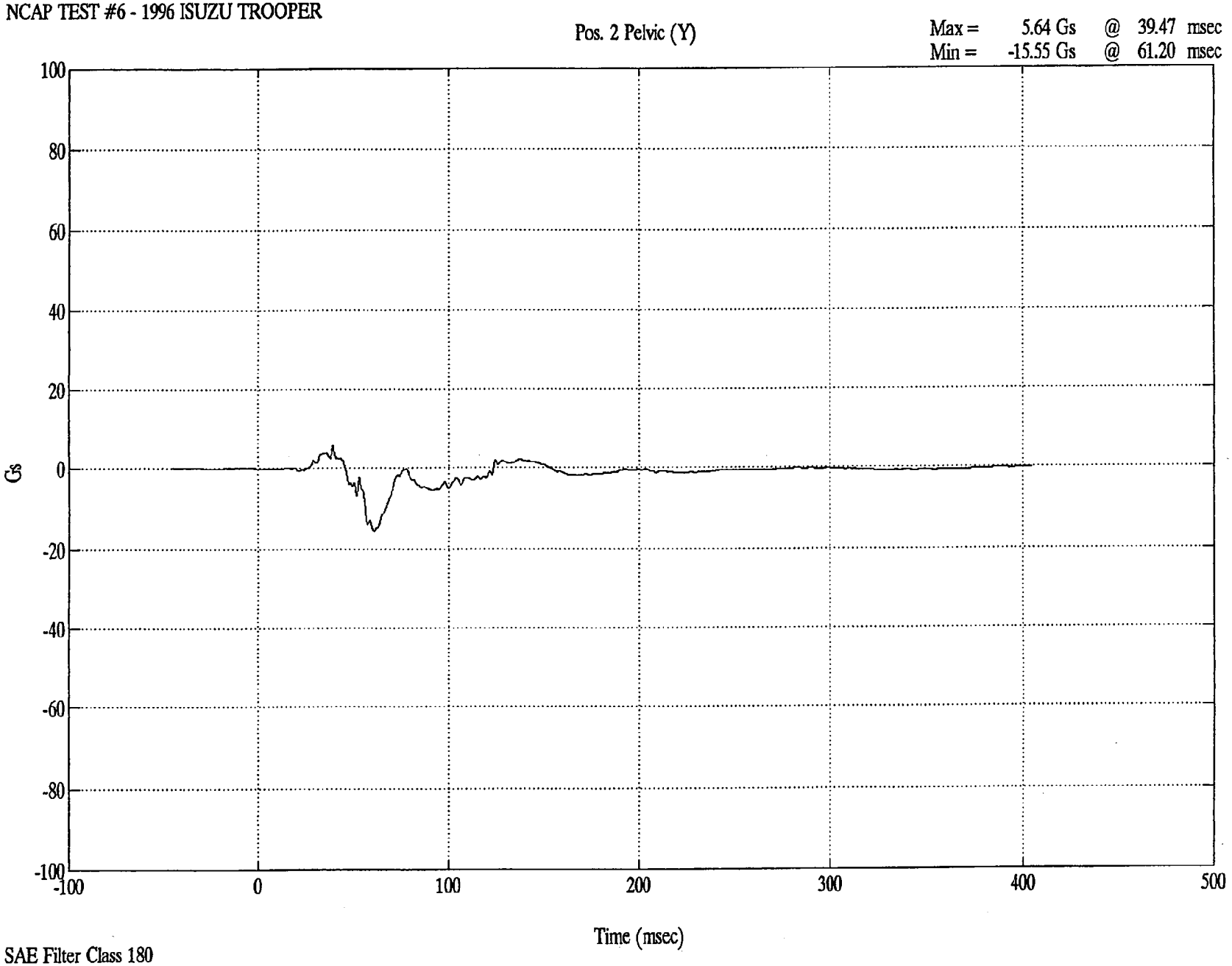


B-83

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

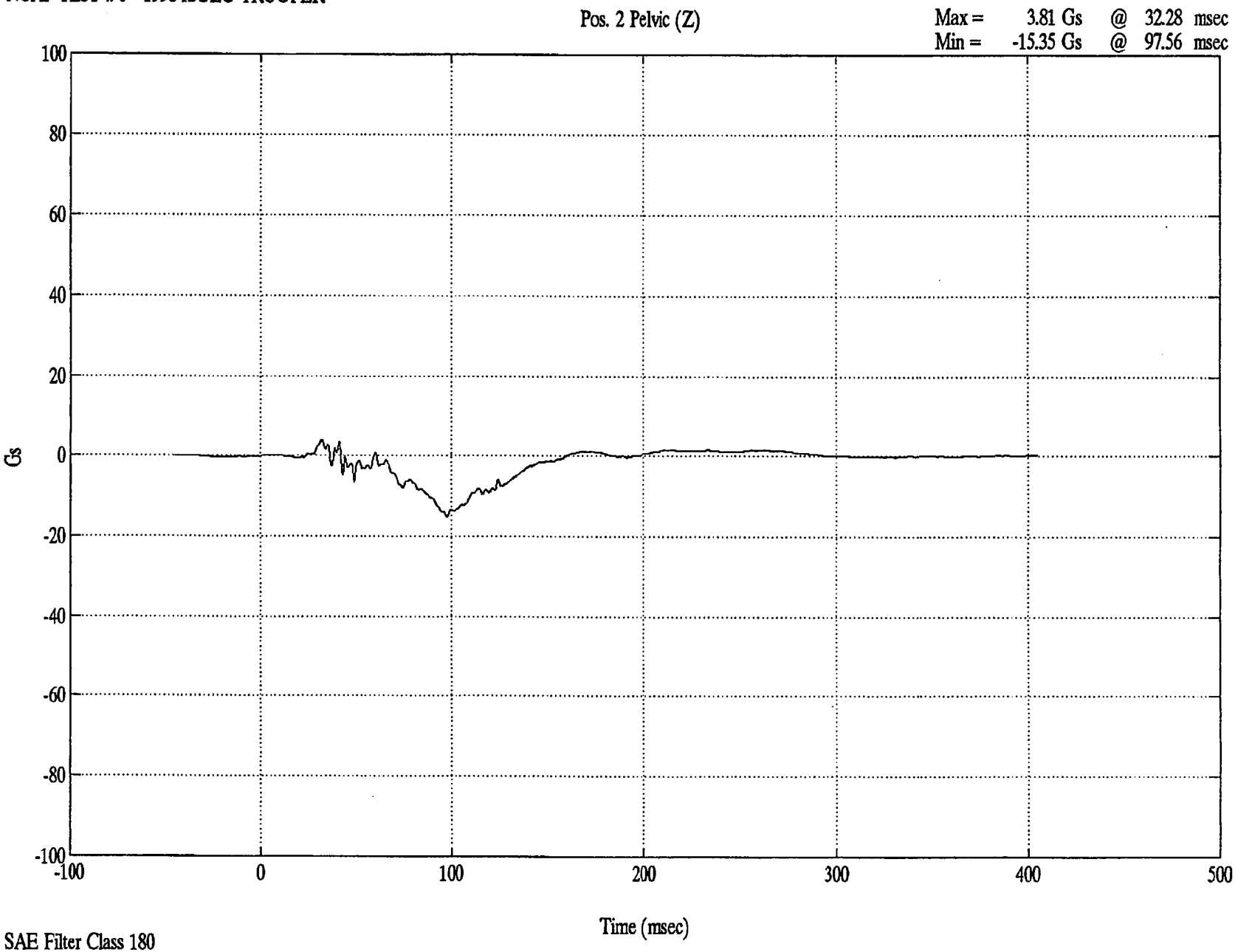


B-84

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

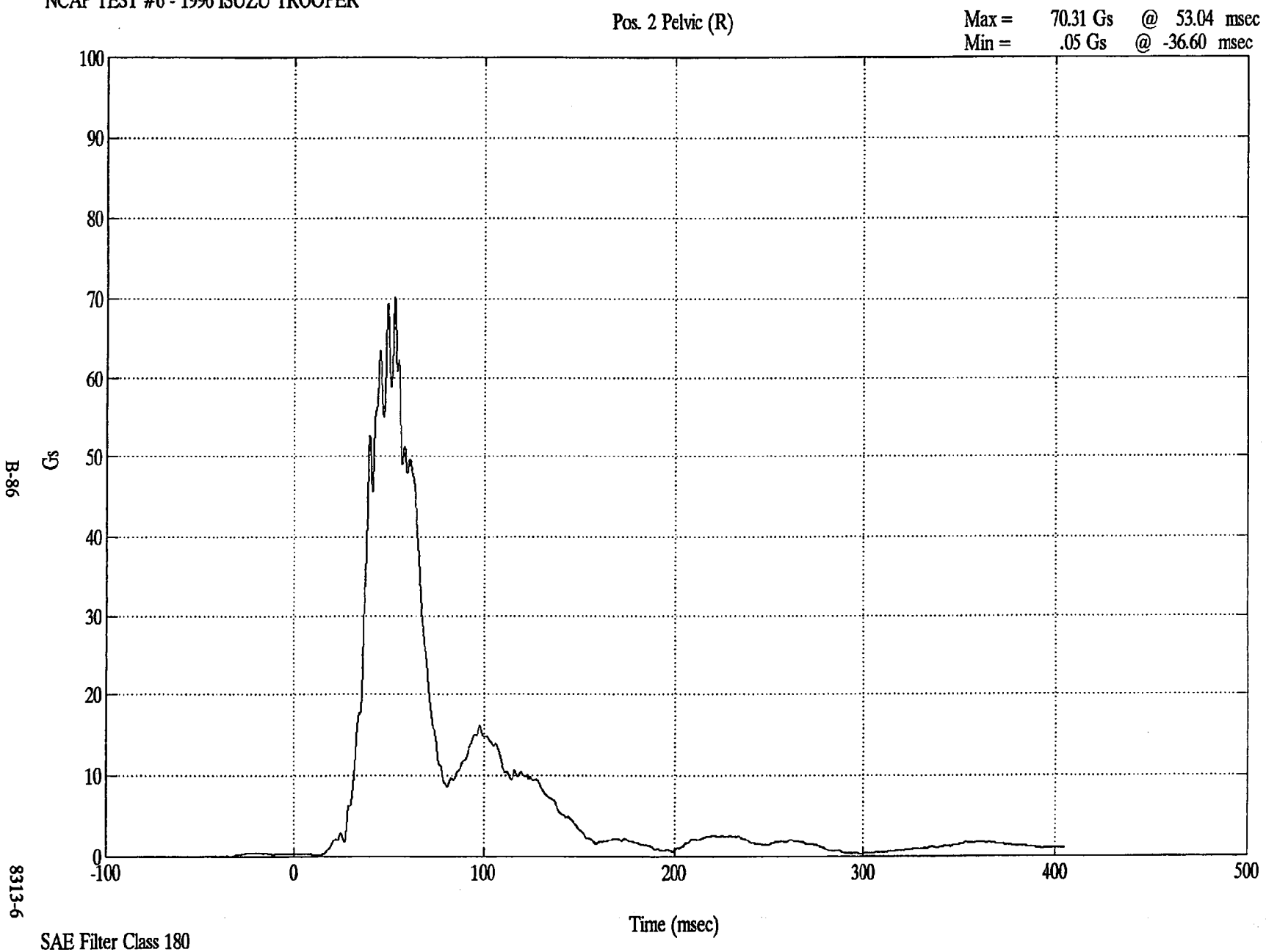


B-85

8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER



B-86

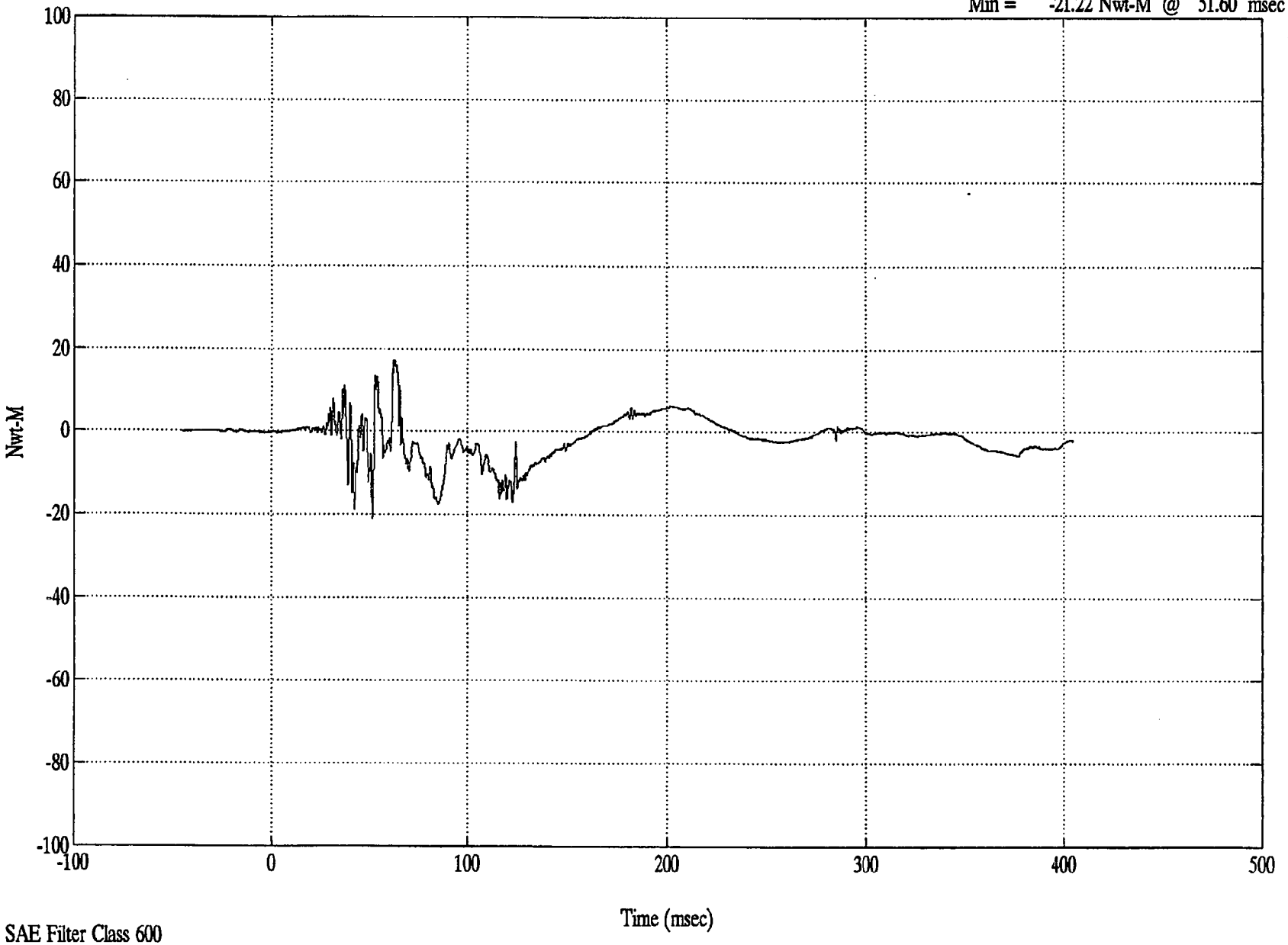
8313-6

SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 2 Lt Upper Tibia Mx

Max = 17.34 Nwt-M @ 63.11 msec
Min = -21.22 Nwt-M @ 51.60 msec



SAE Filter Class 600

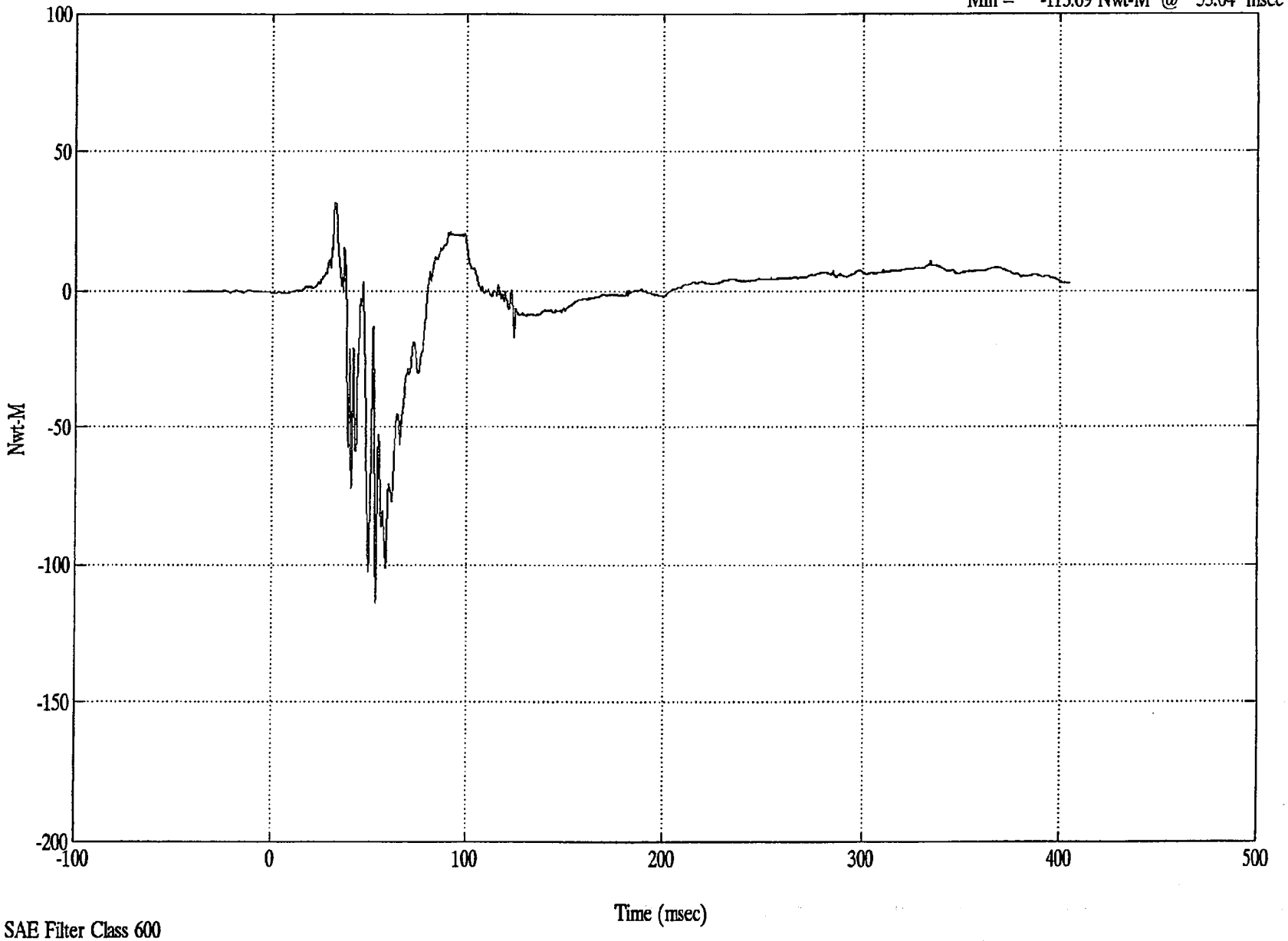
B-87

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 2 Lt Upper Tibia My

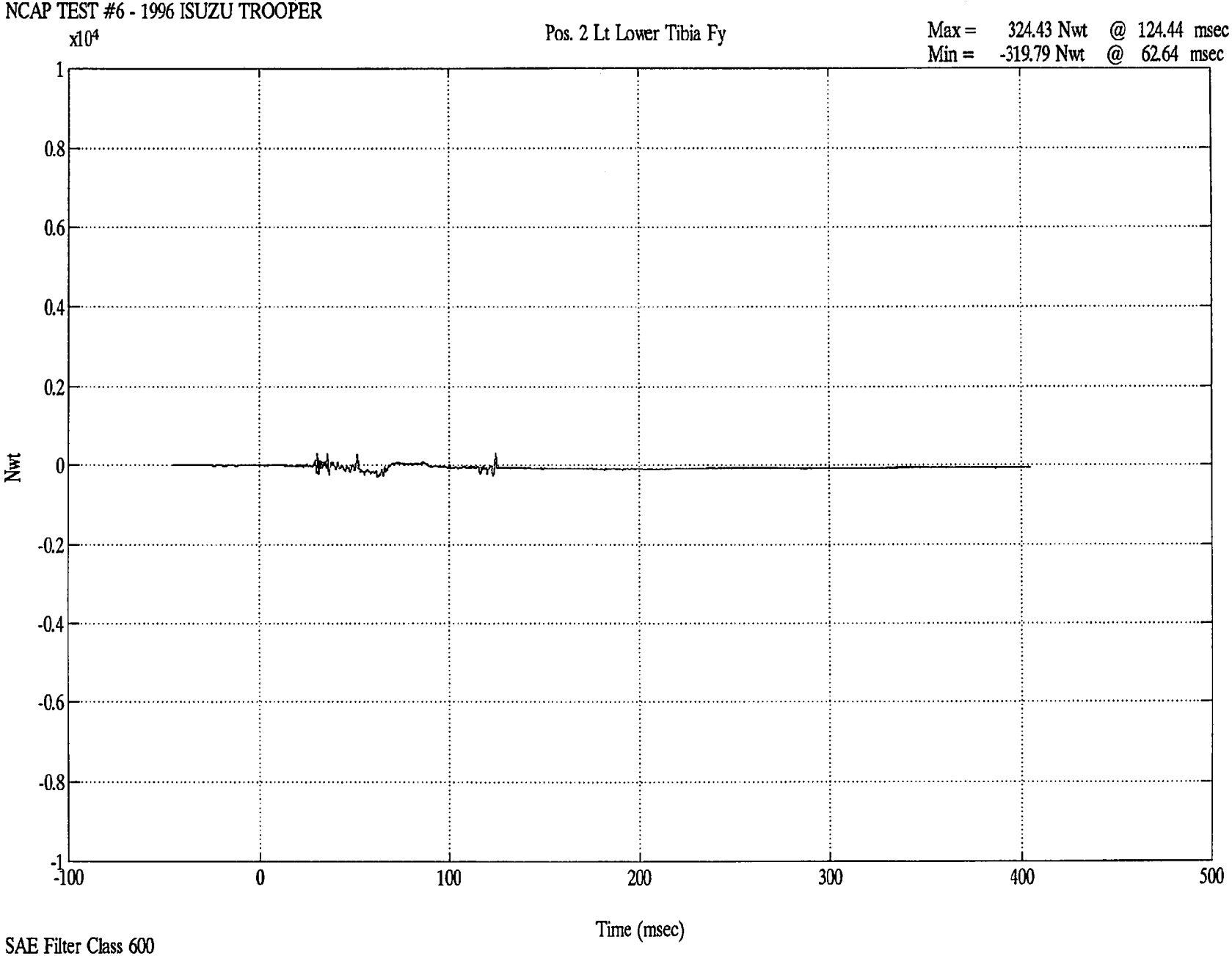
Max = 31.48 Nwt-M @ 31.92 msec
Min = -113.69 Nwt-M @ 53.04 msec



SAE Filter Class 600

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

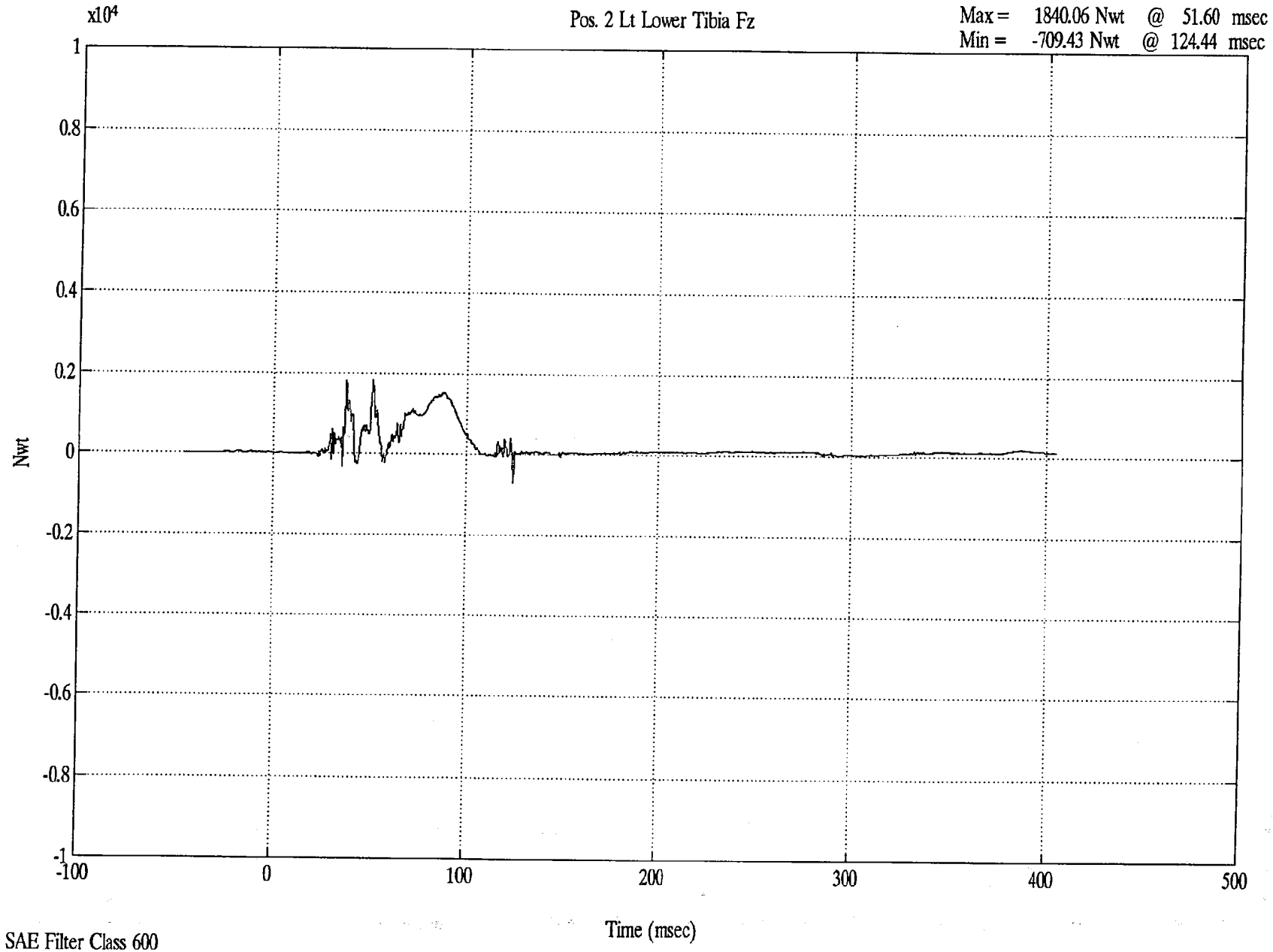


B-89

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

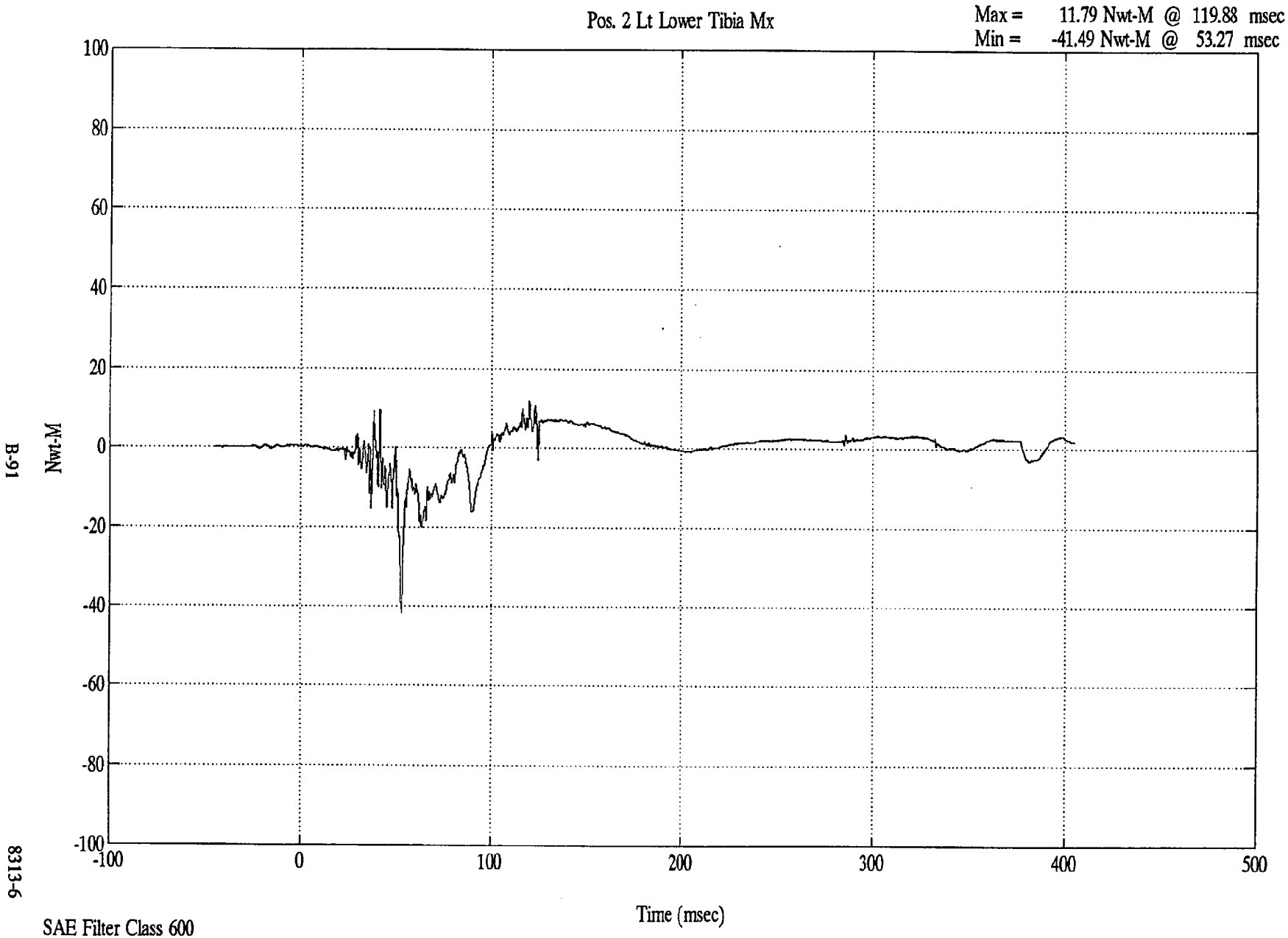


B-90

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER



B-91

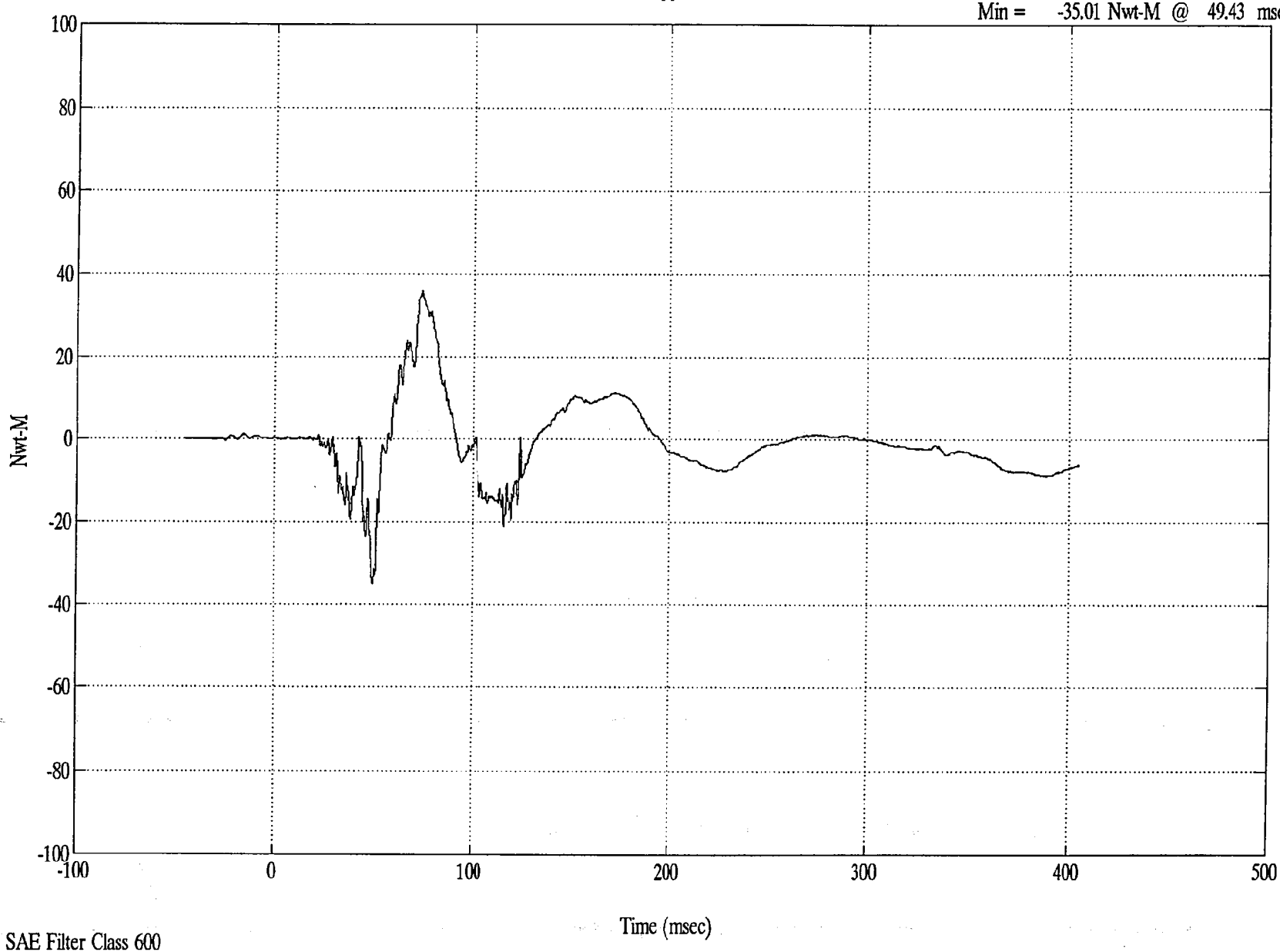
8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 2 Rt Upper Tibia Mx

Max = 36.09 Nwt-M @ 74.04 msec
Min = -35.01 Nwt-M @ 49.43 msec



B-92

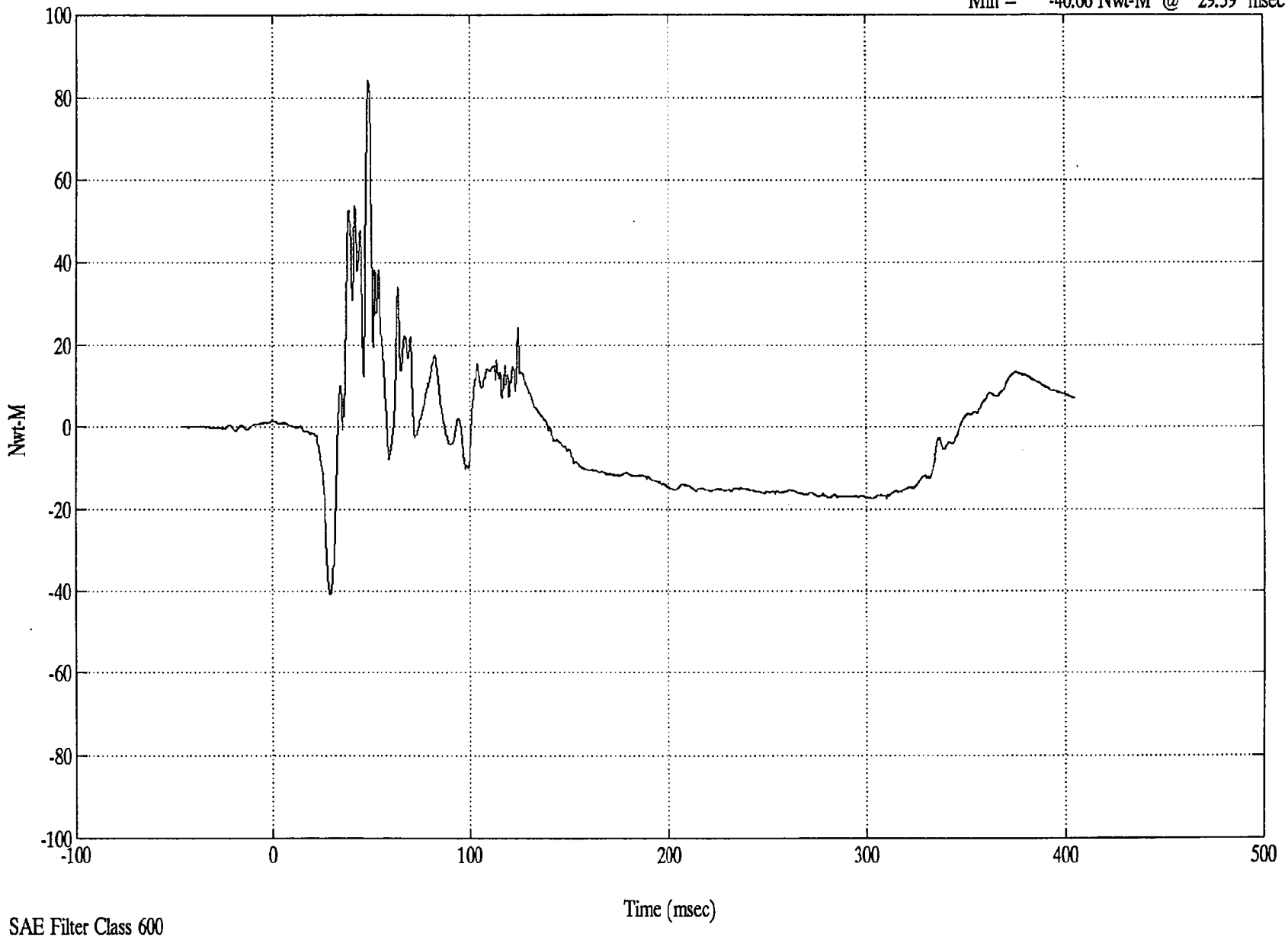
8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

Pos. 2 Rt Upper Tibia My

Max = 84.09 Nwt-M @ 48.24 msec
Min = -40.66 Nwt-M @ 29.39 msec

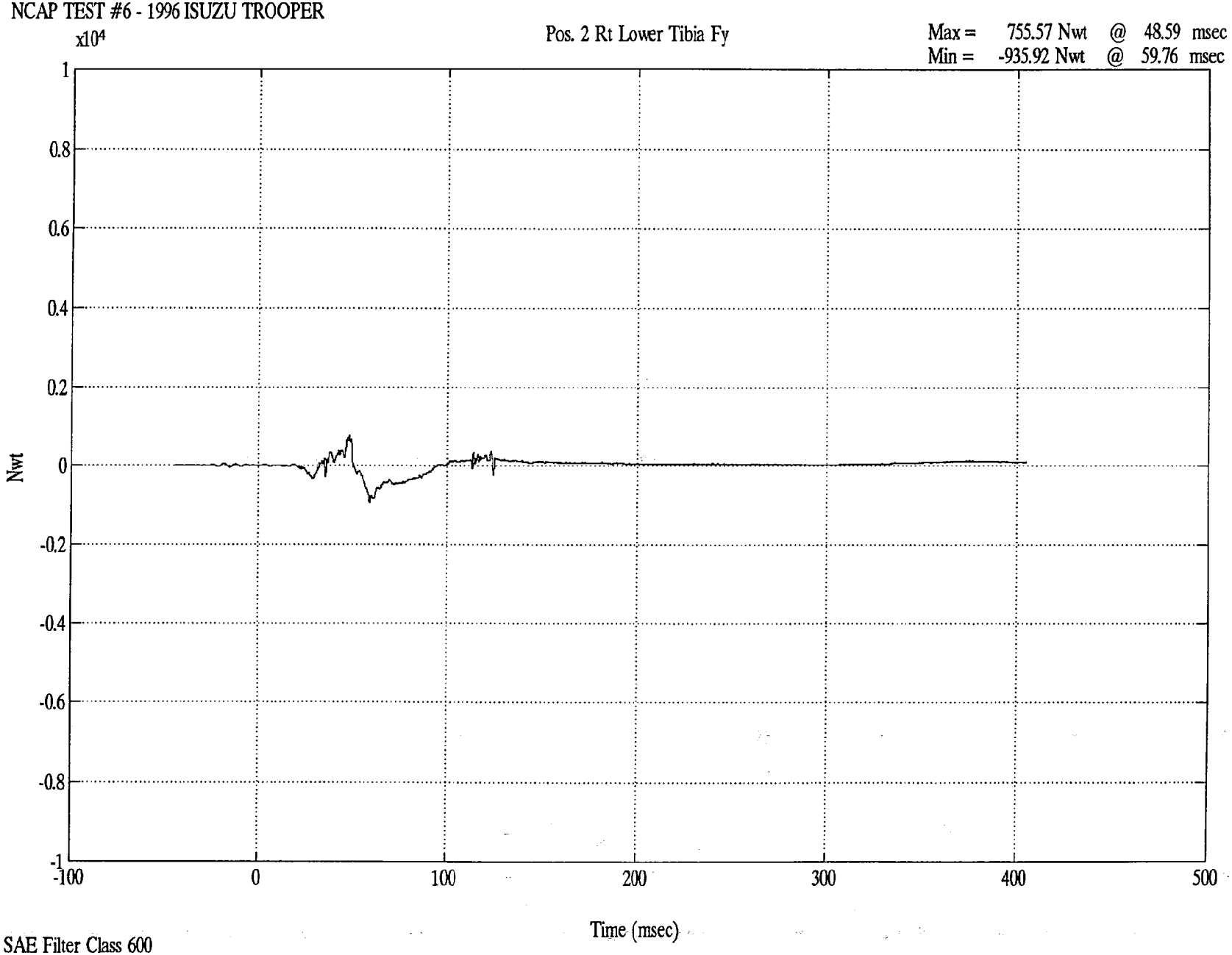


B-93

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

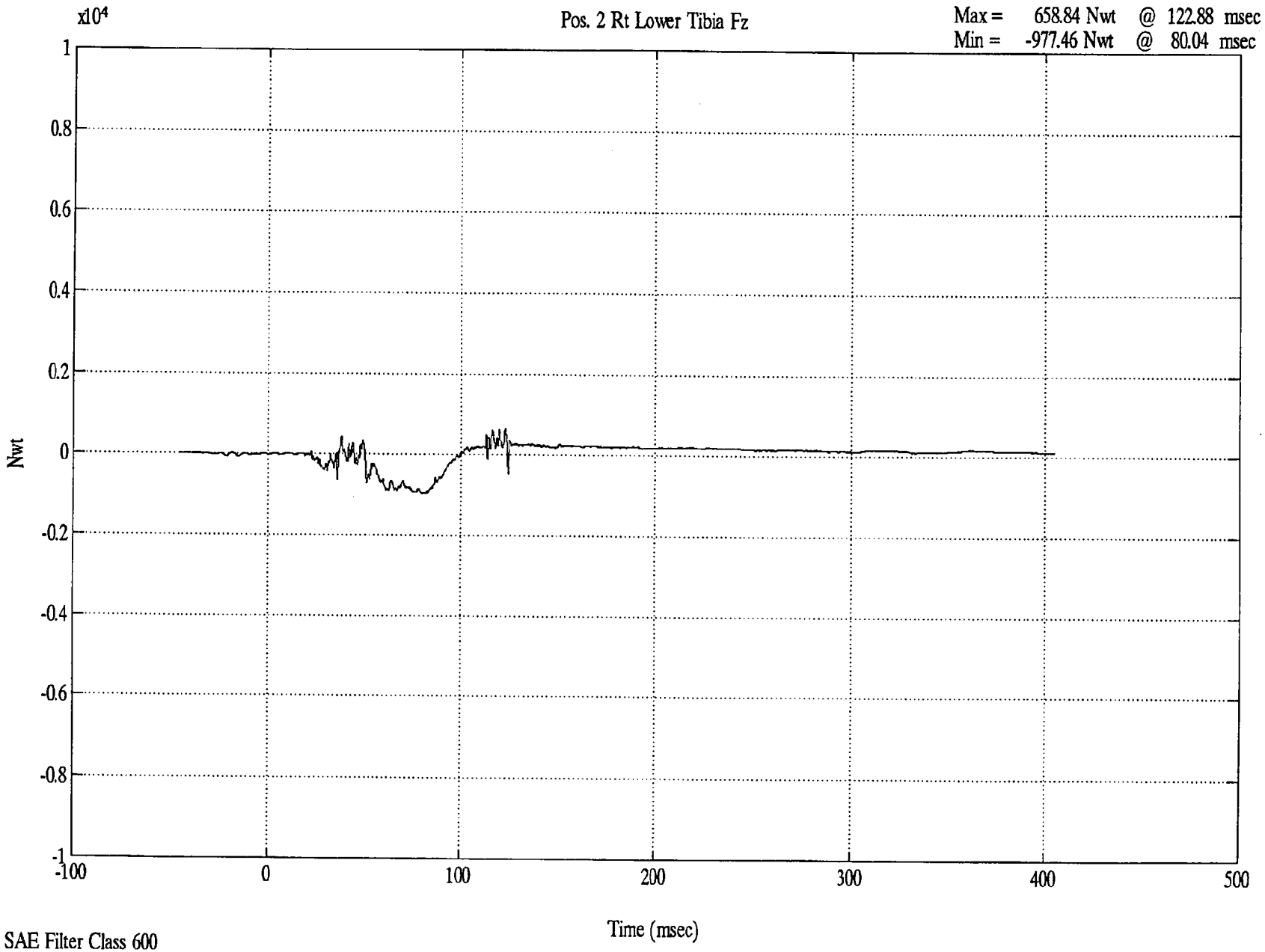


B-94

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

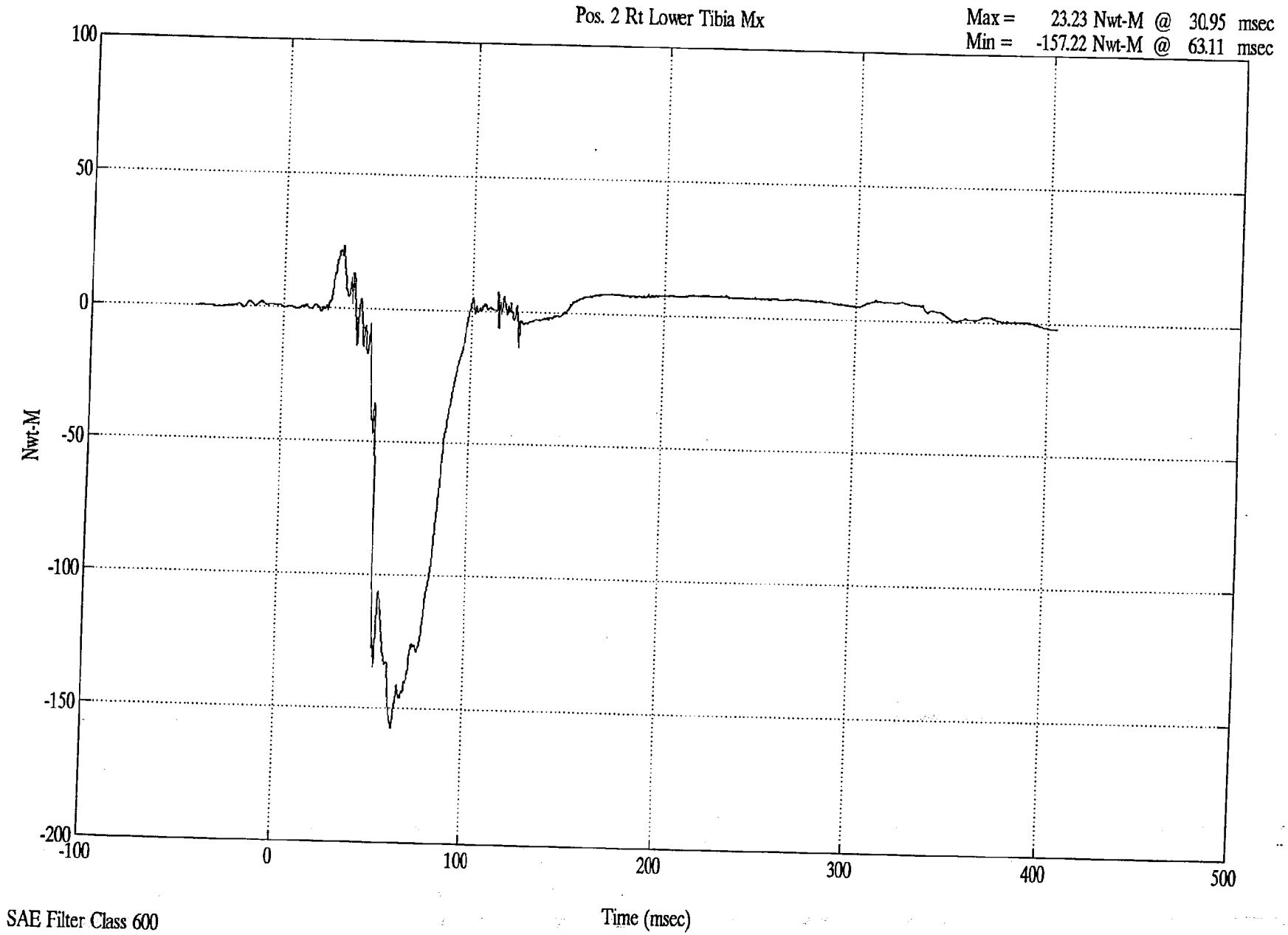


B-95

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

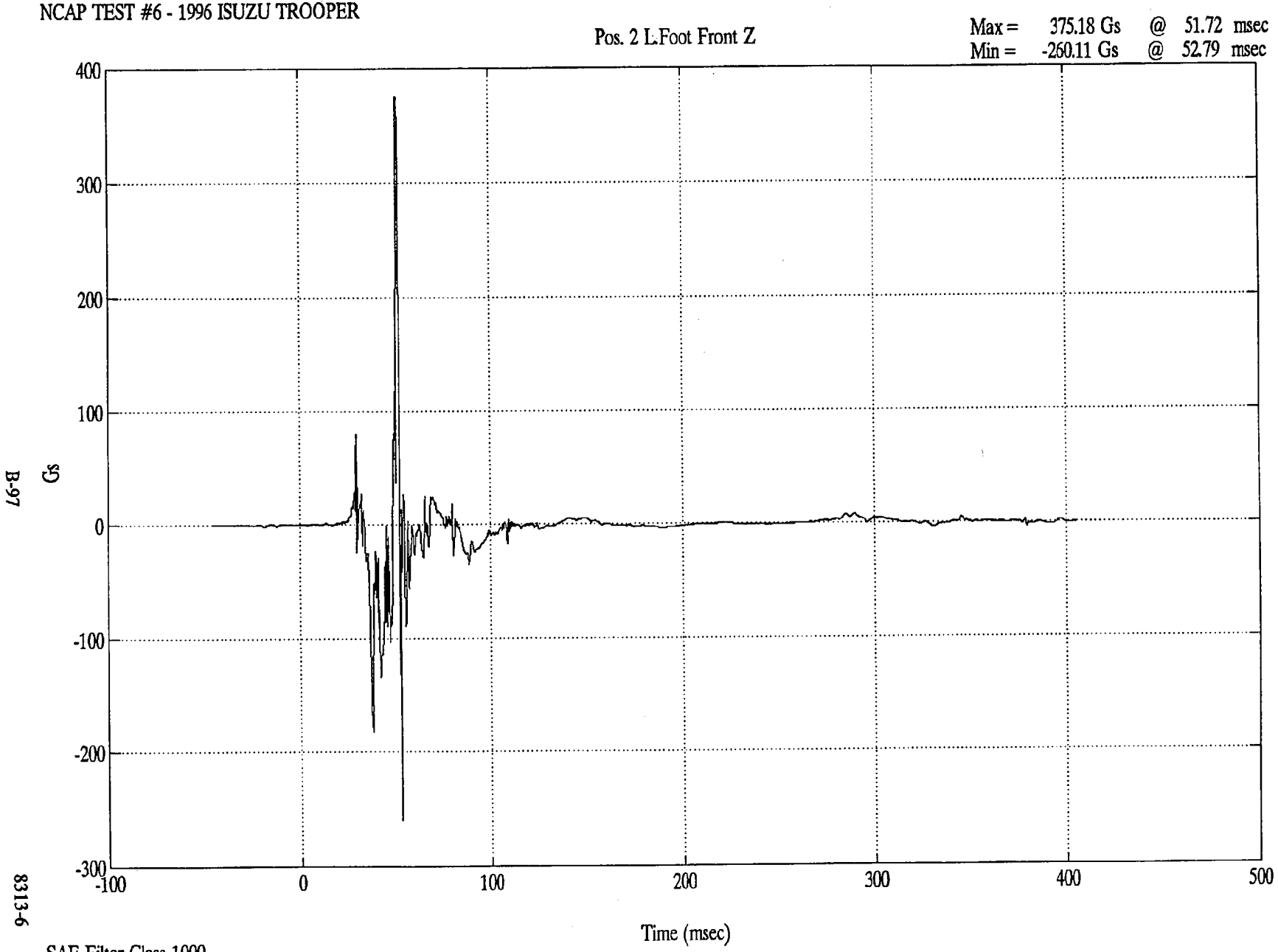


B-96

8313-6

SAE Filter Class 600

NCAP TEST #6 - 1996 ISUZU TROOPER

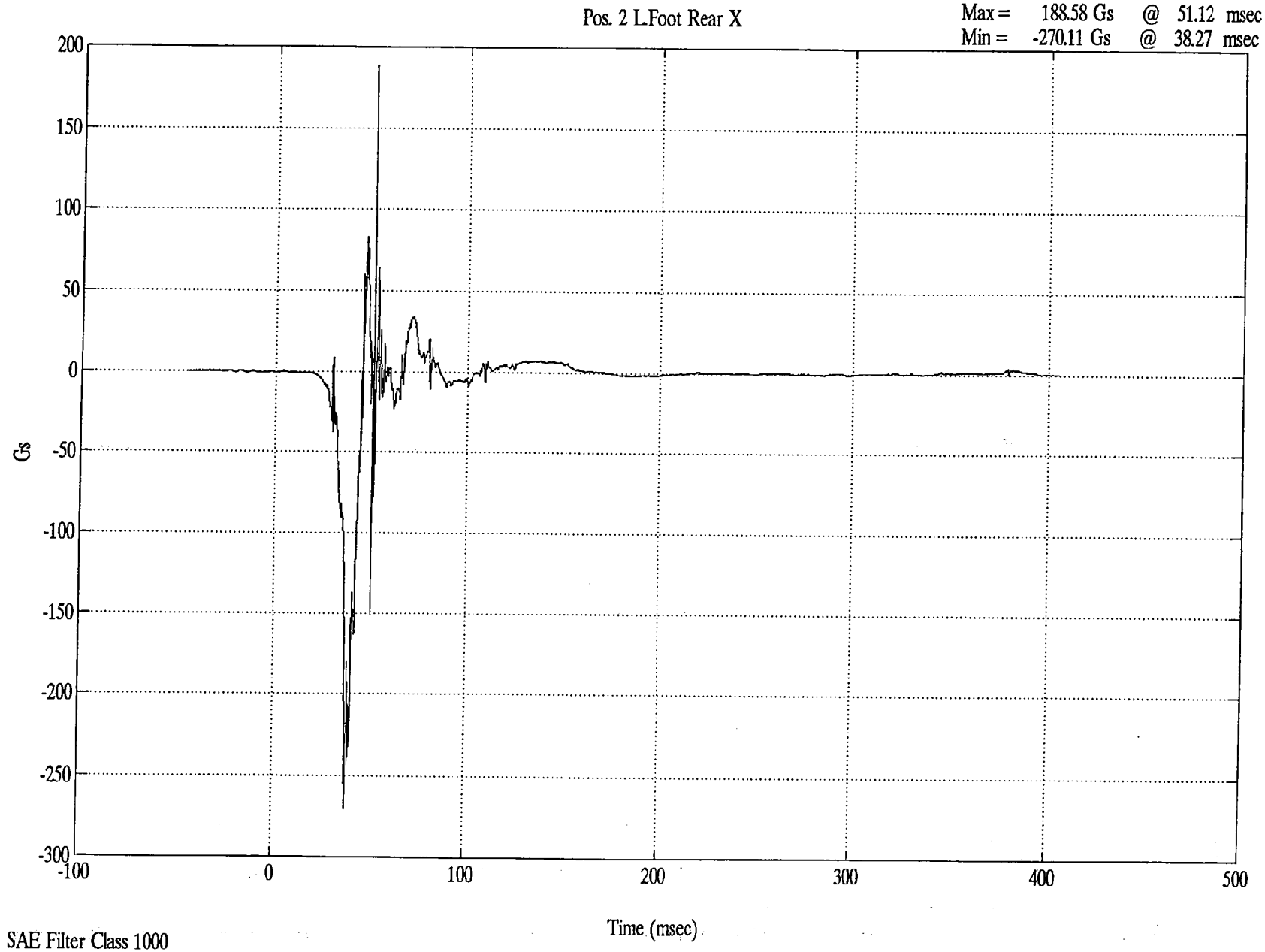


B-97

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

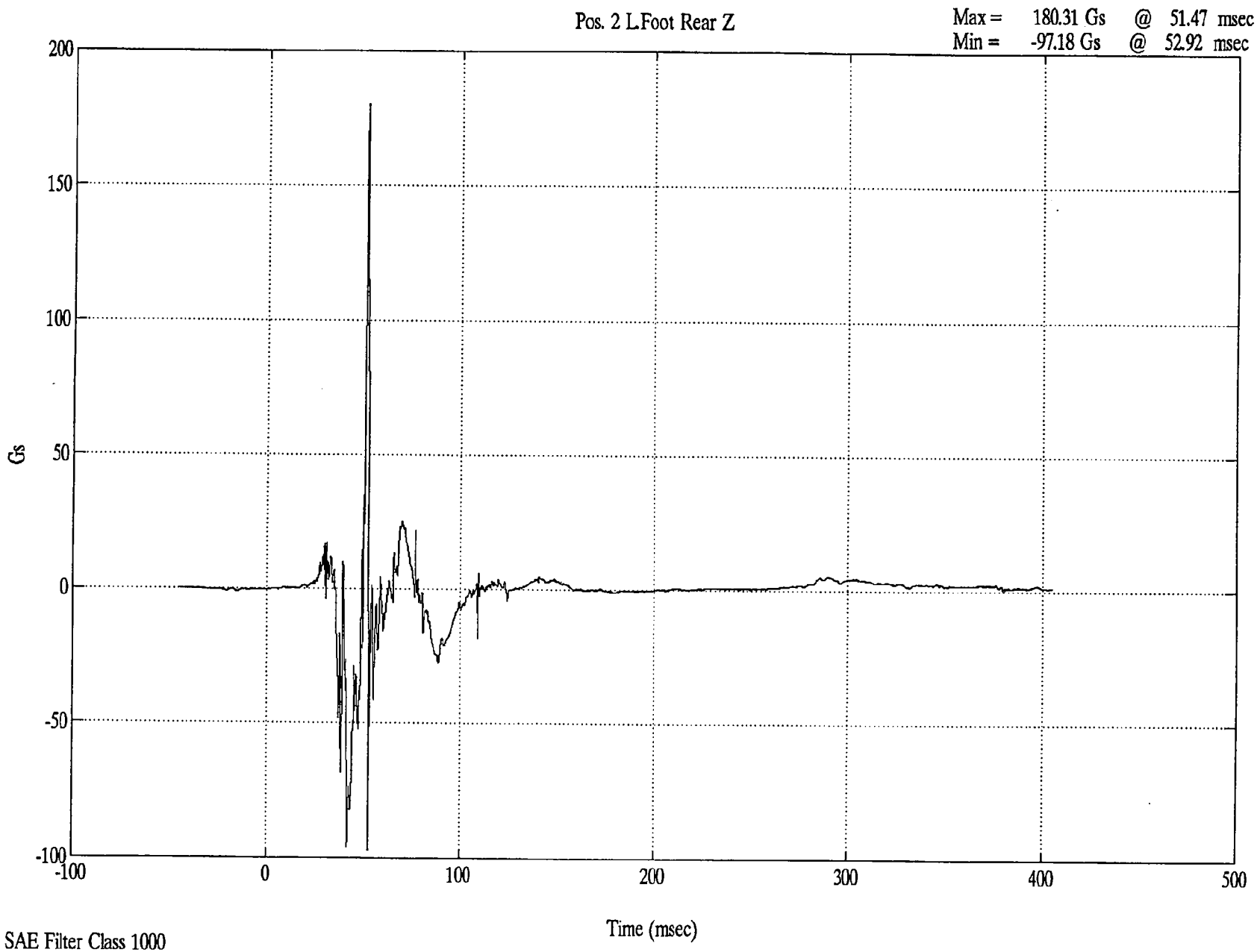


B-98

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

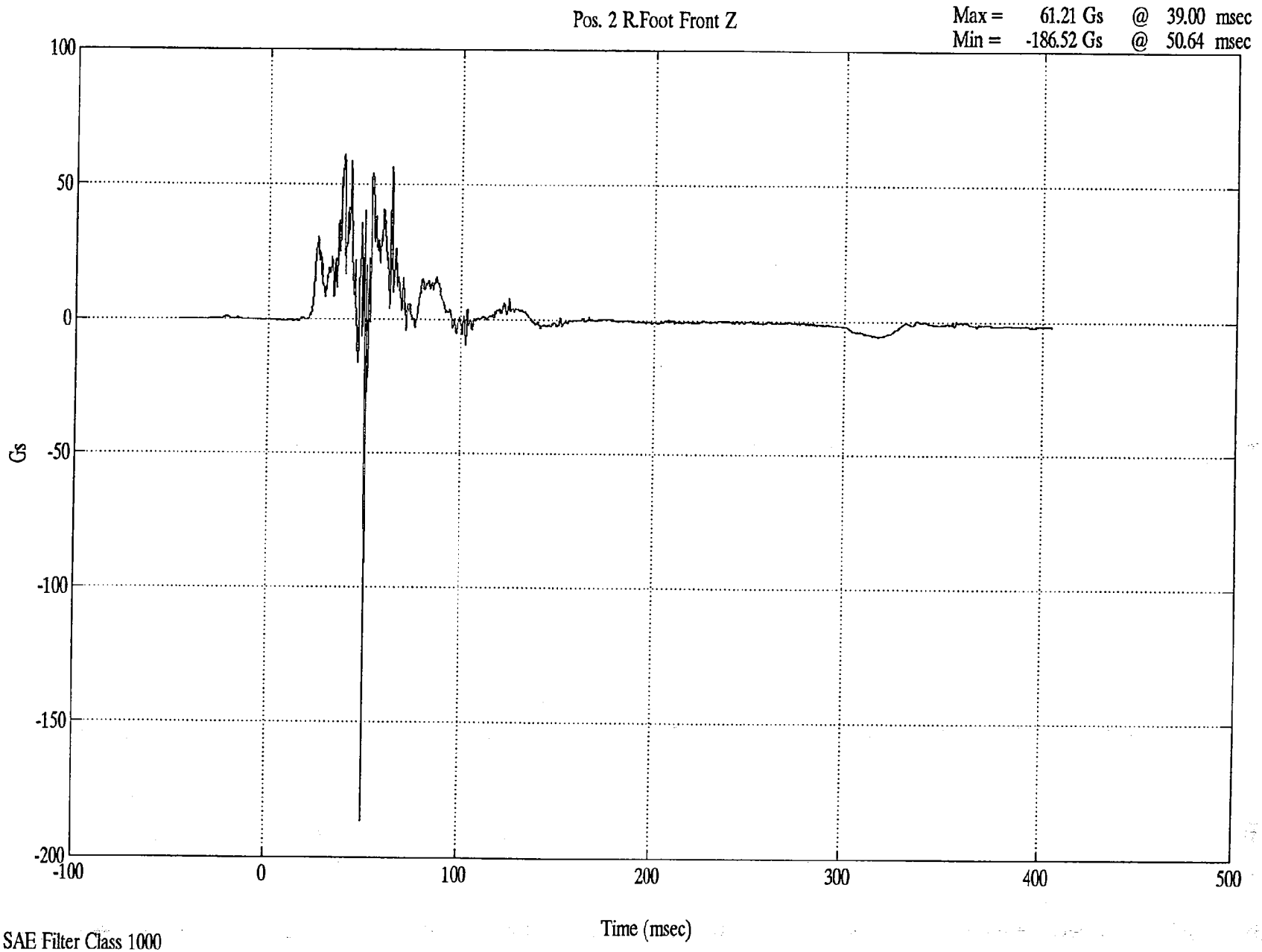


B-99

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

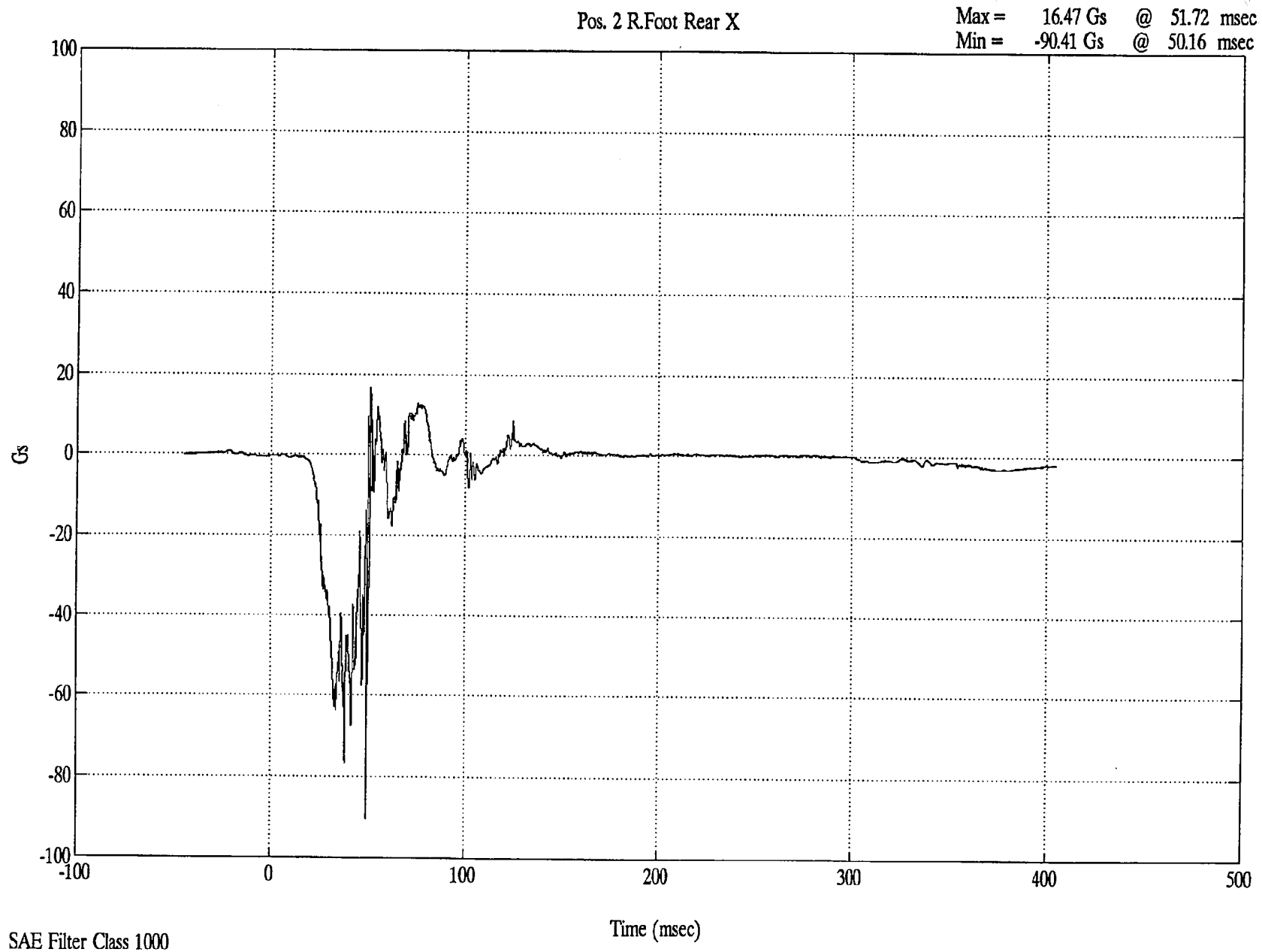


B-100

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

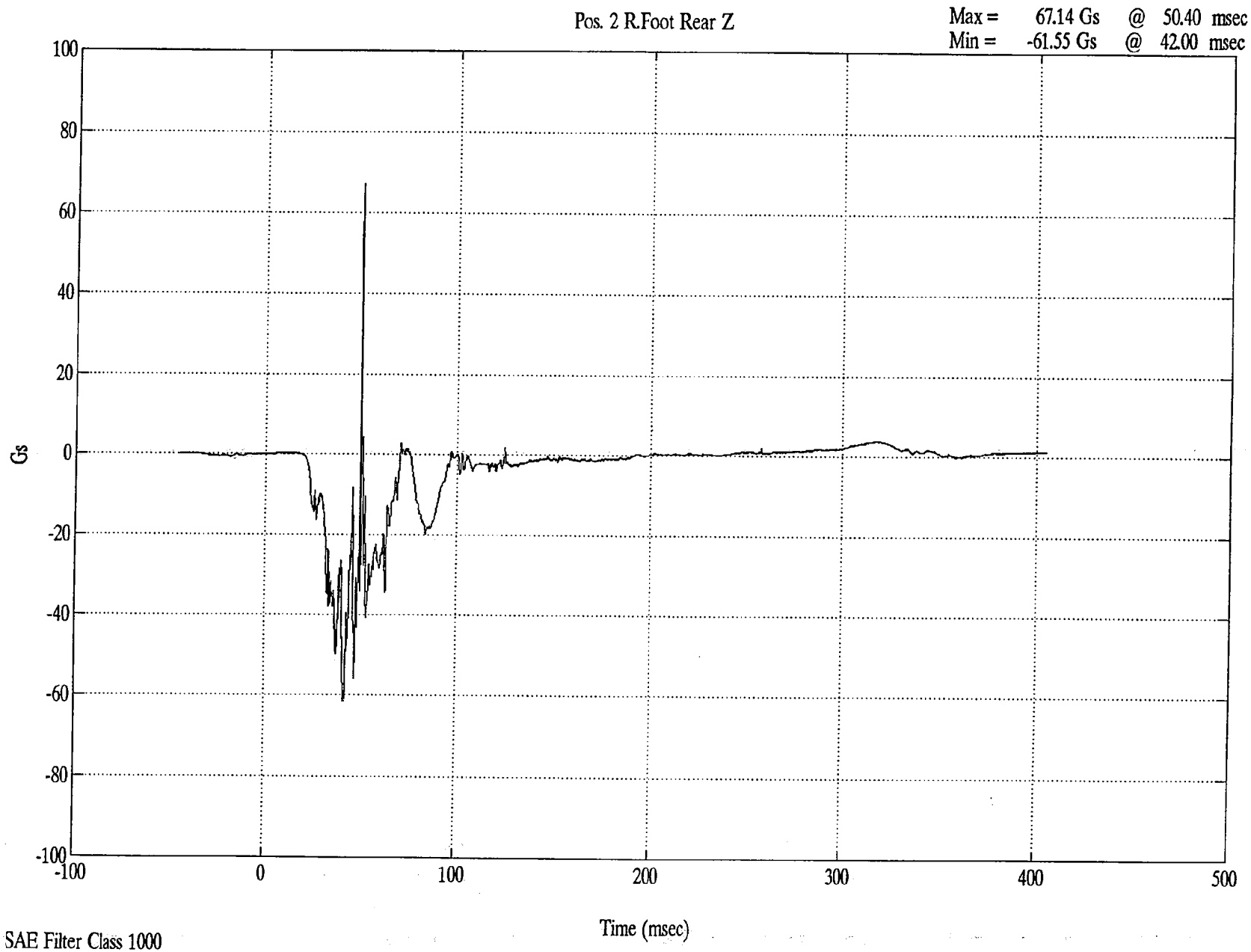


B-101

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

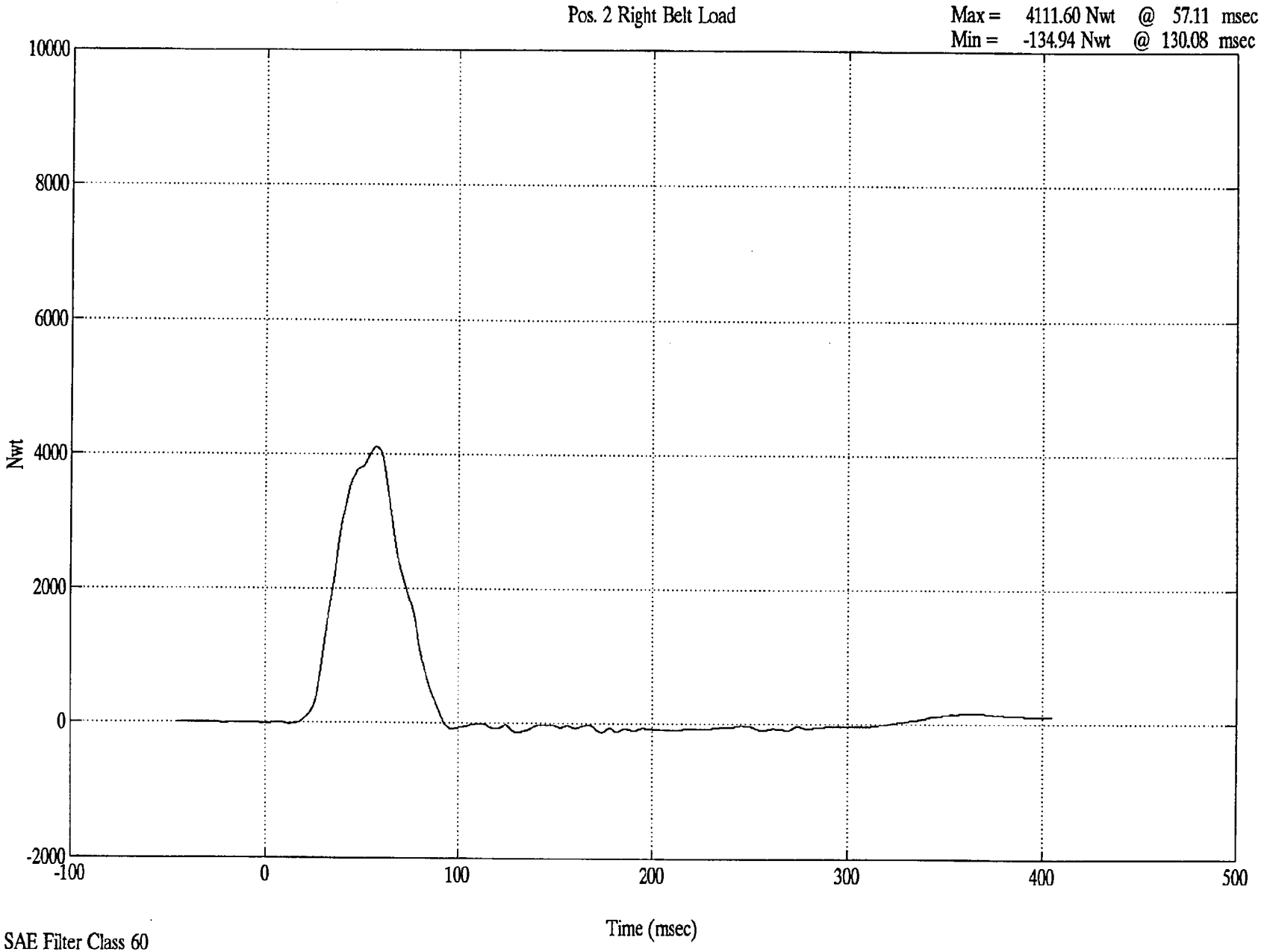


B-102

8313-6

SAE Filter Class 1000

NCAP TEST #6 - 1996 ISUZU TROOPER

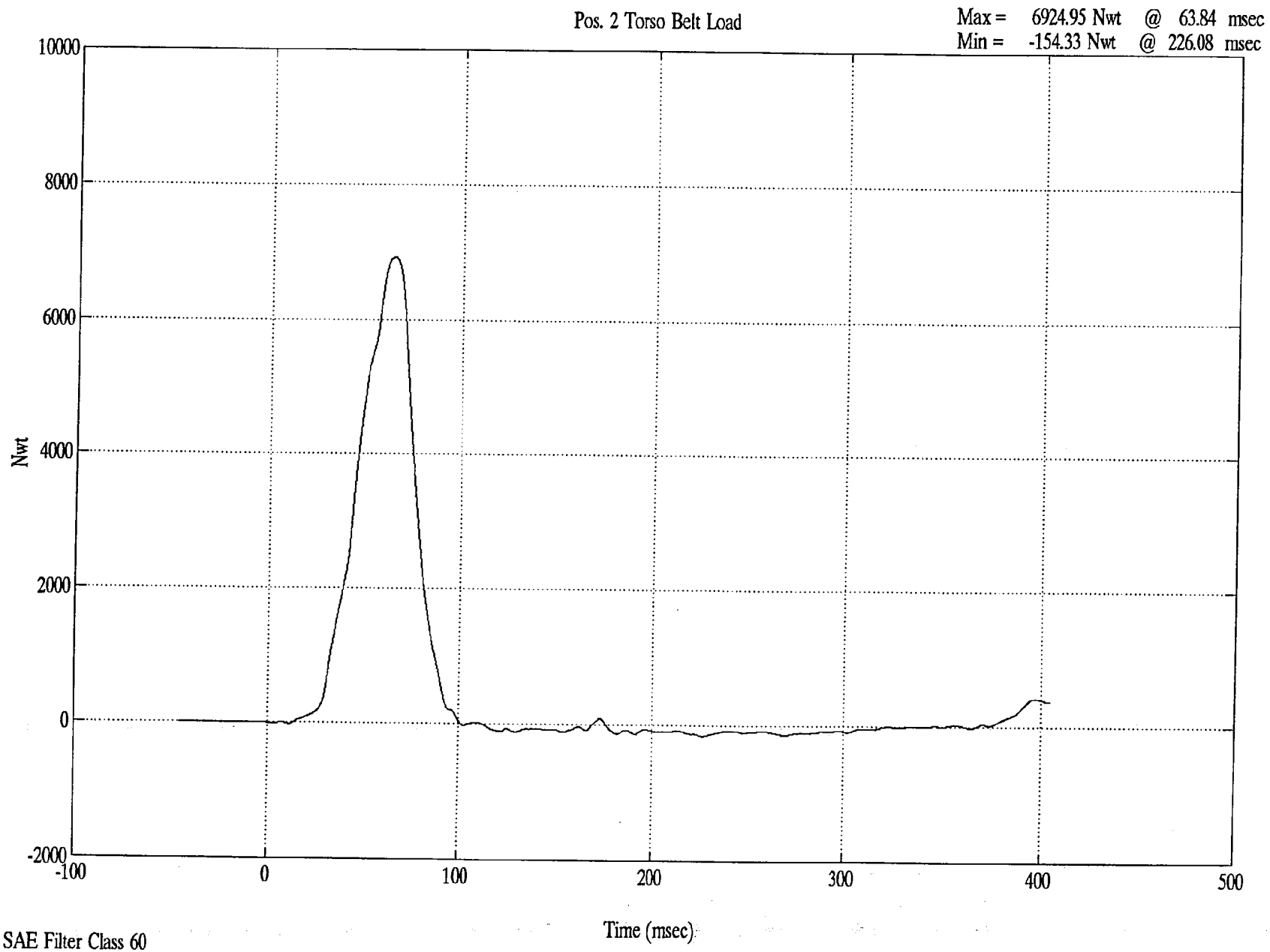


B-103

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

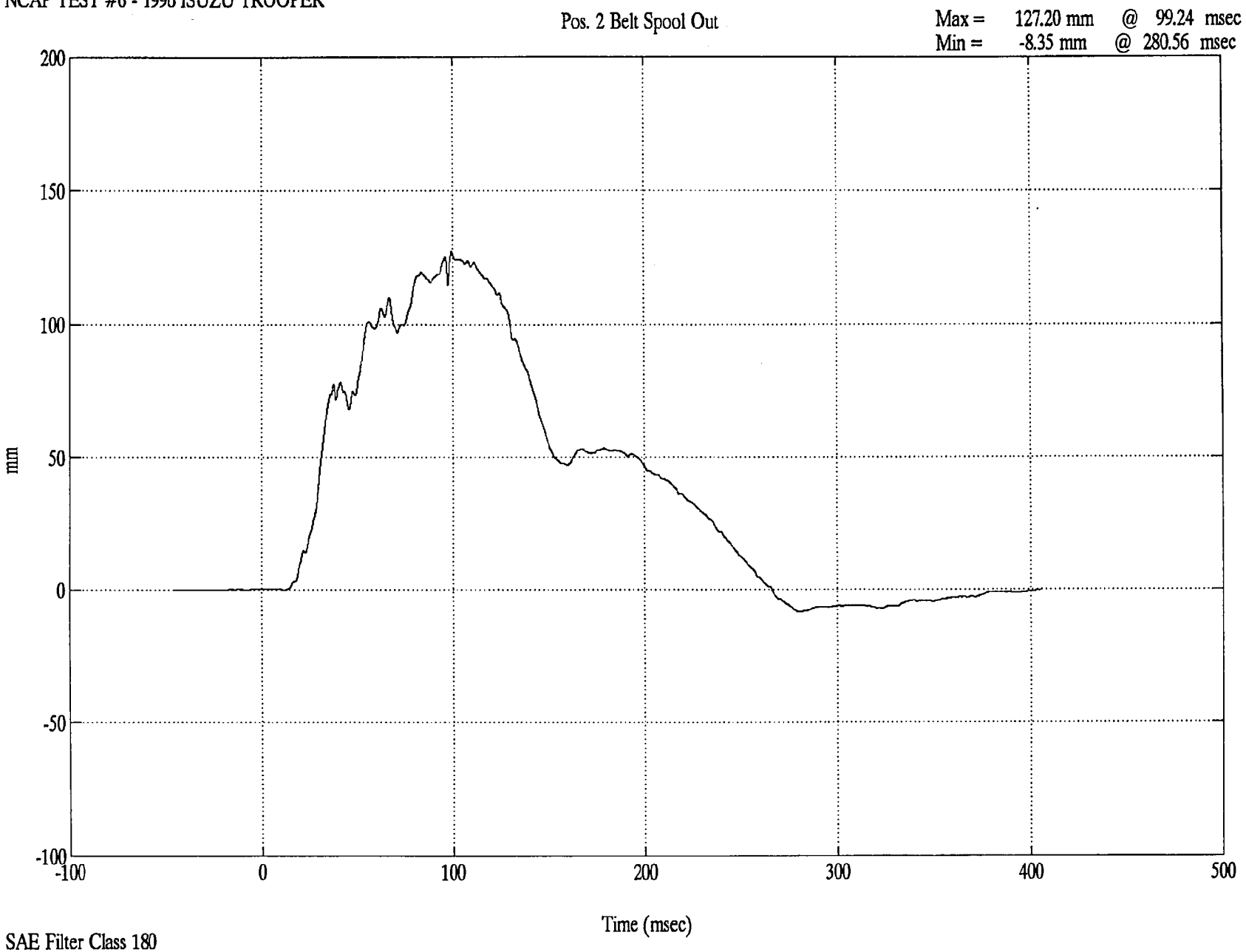


B-104

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER



B-105

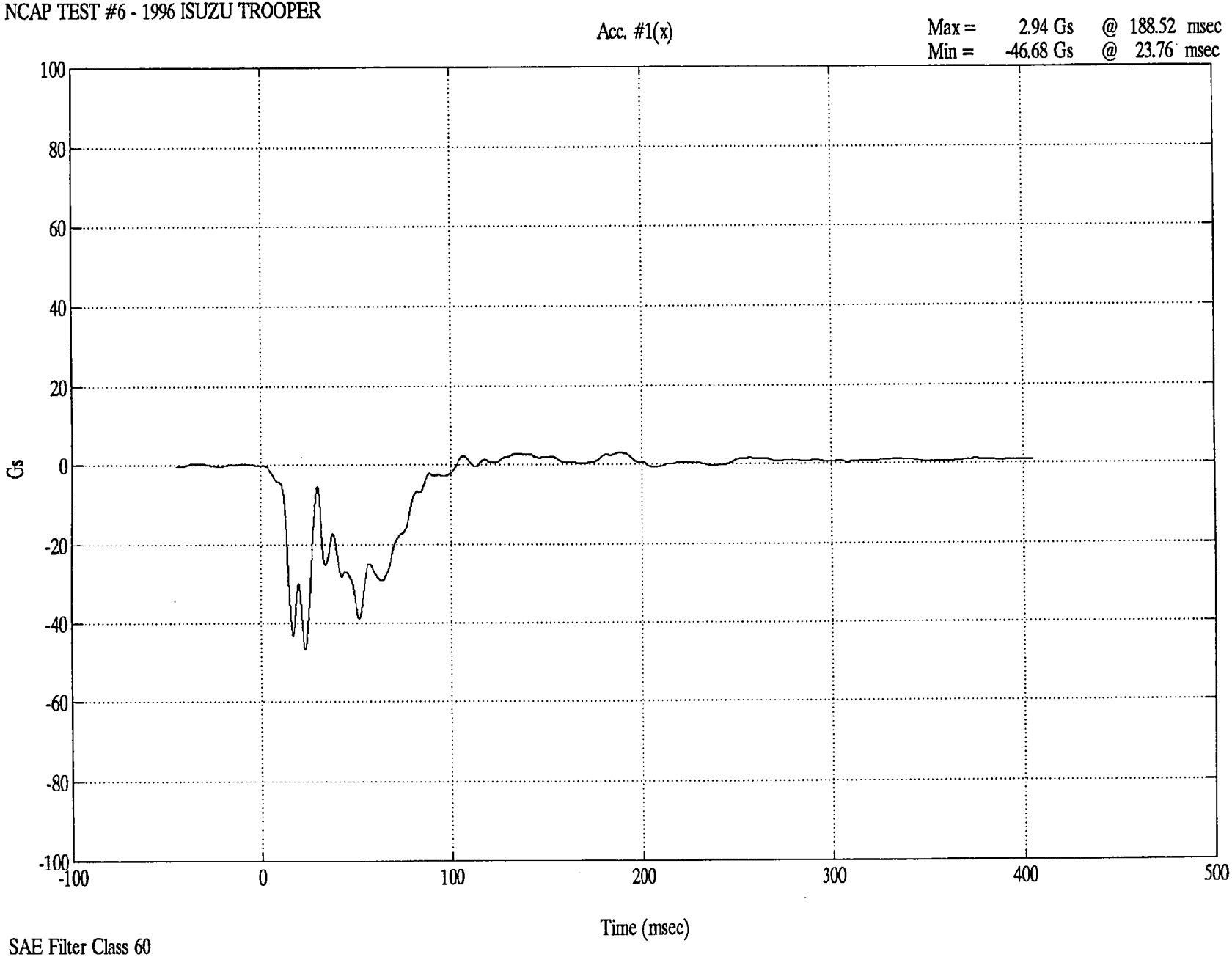
8313-6

SAE Filter Class 180

NHTSA TEST NO. MT5702

VEHICLE DATA	FILTER CHANNEL CLASS
Acceleration	60
Velocity	180
Displacement	180

NCAP TEST #6 - 1996 ISUZU TROOPER

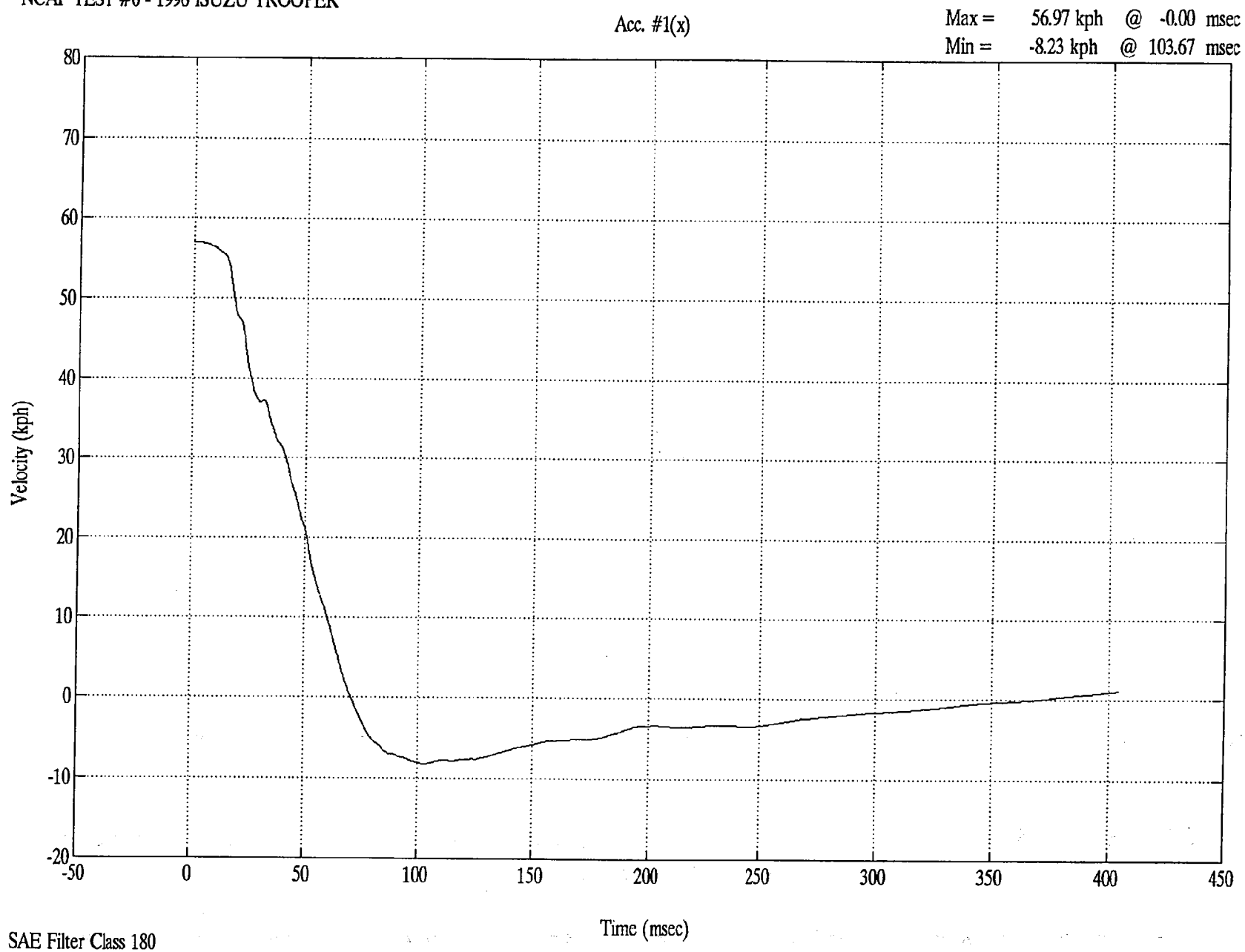


B-107

8313-6

SAE Filter Class 60

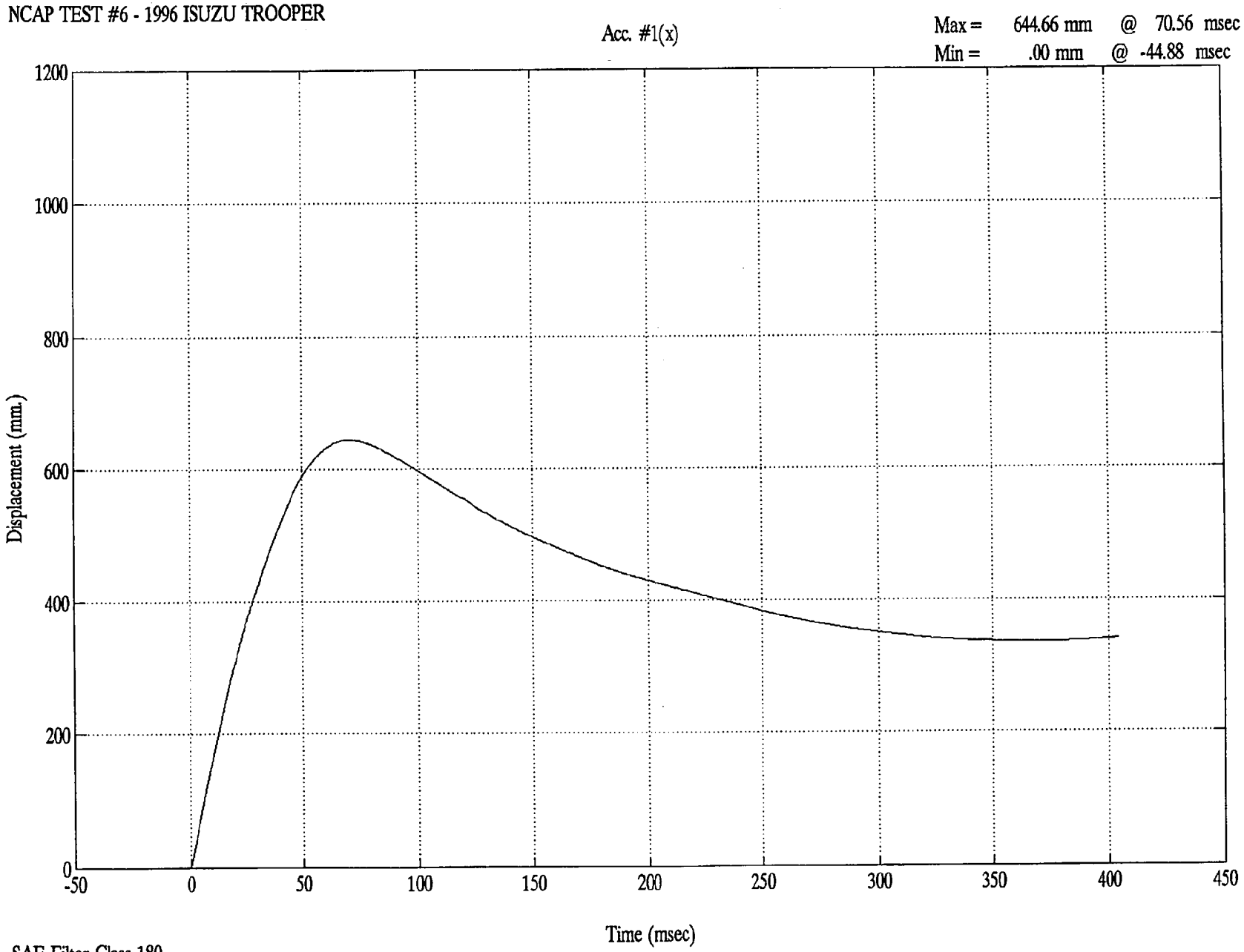
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

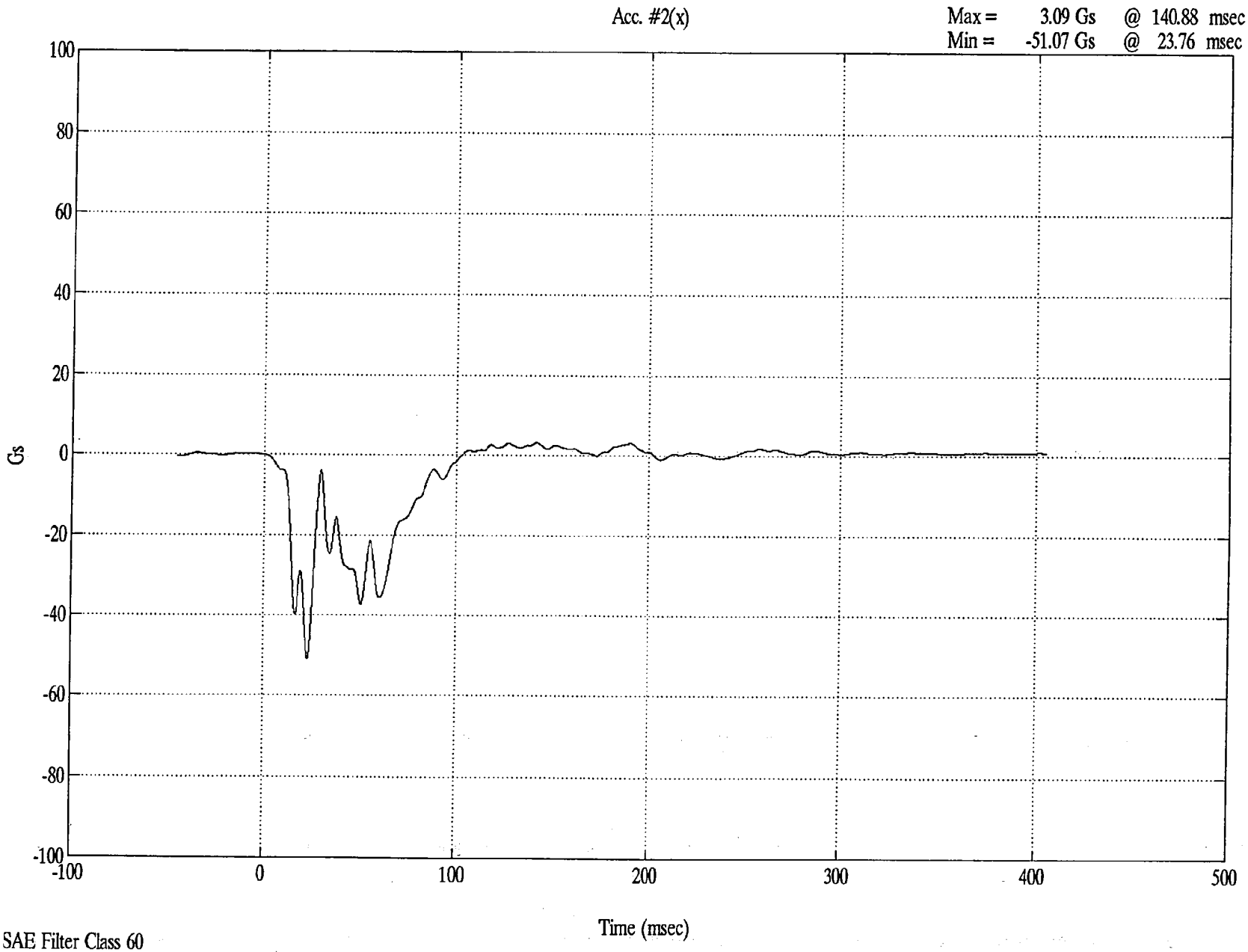
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

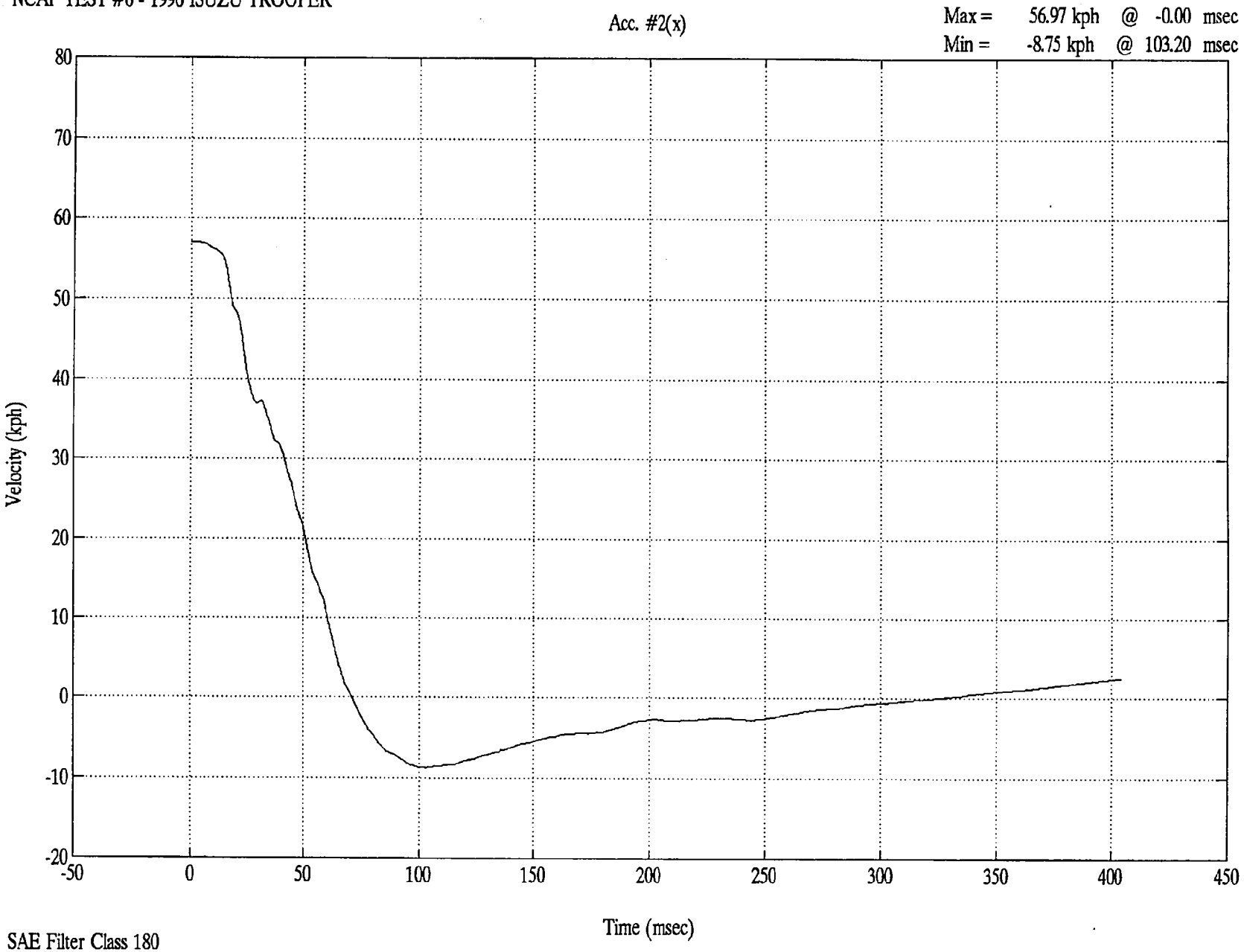


B-110

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

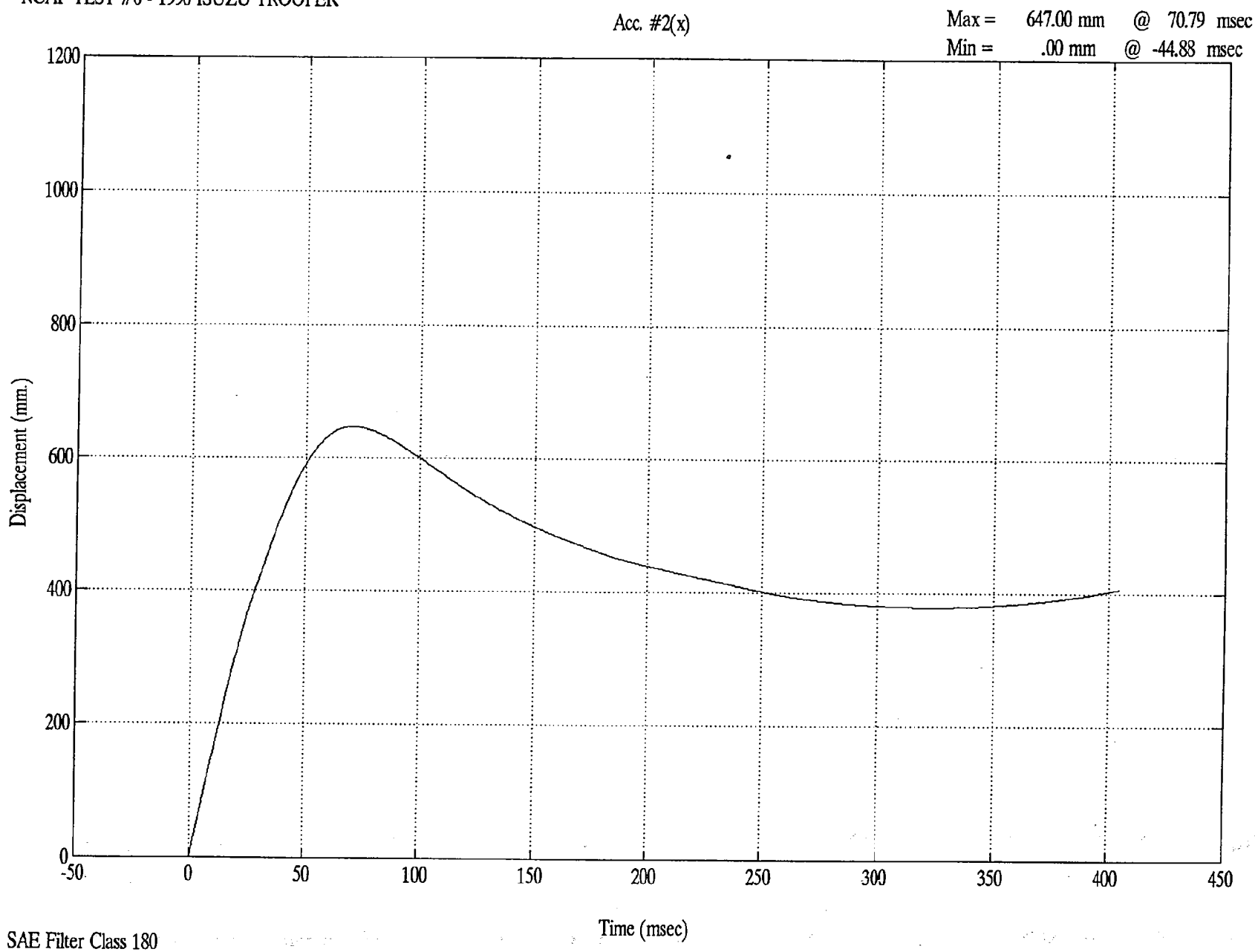


B-111

8313-6

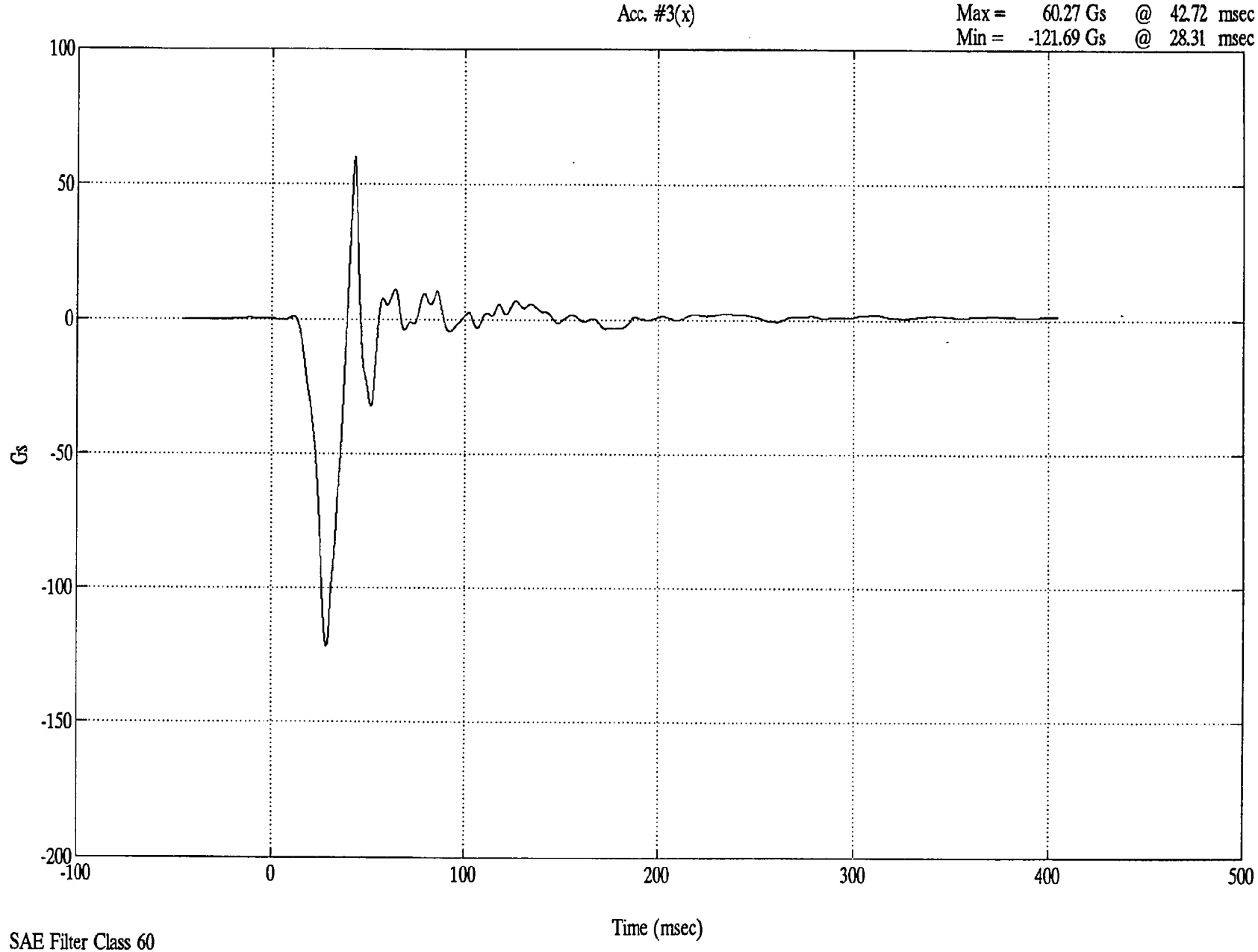
SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

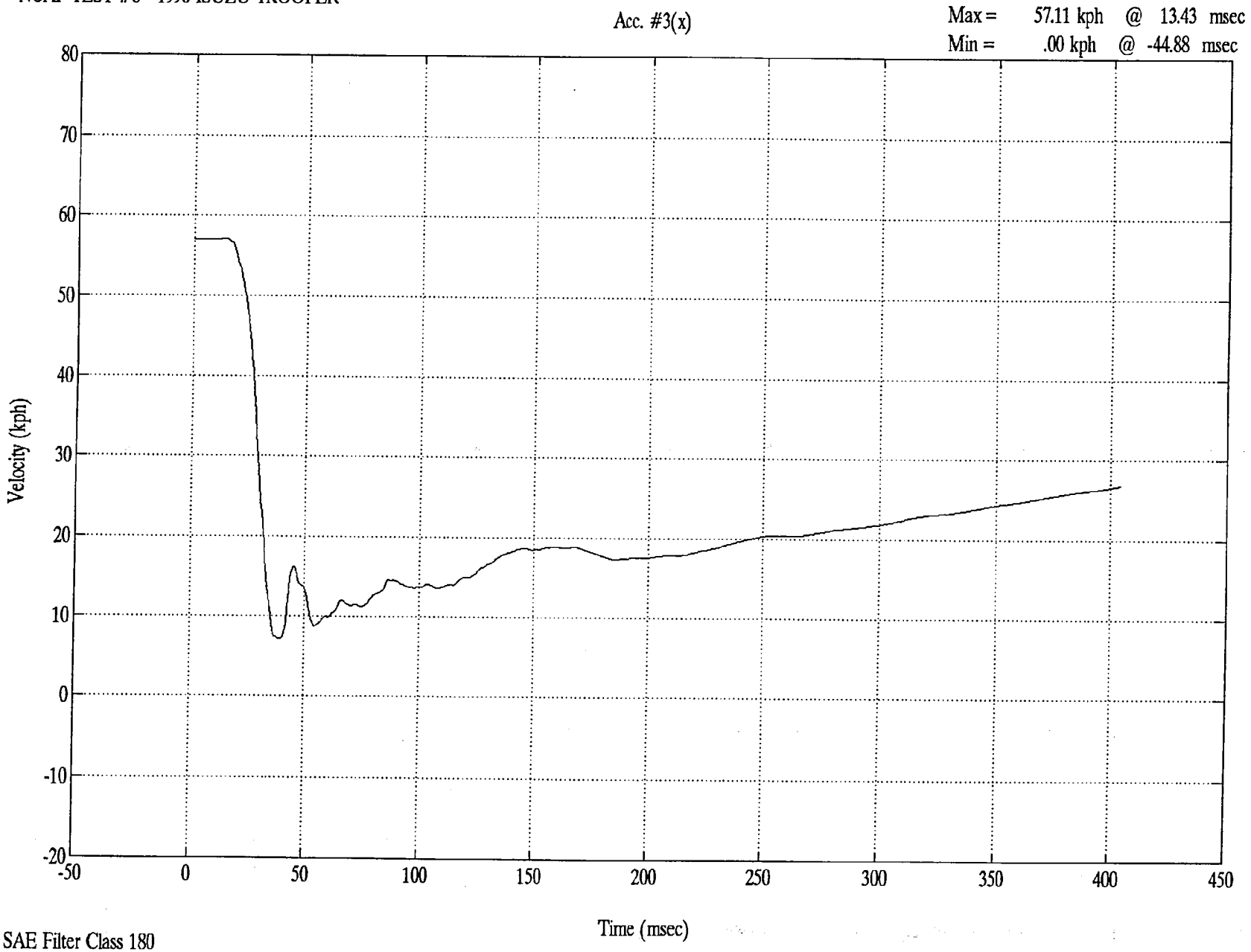
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

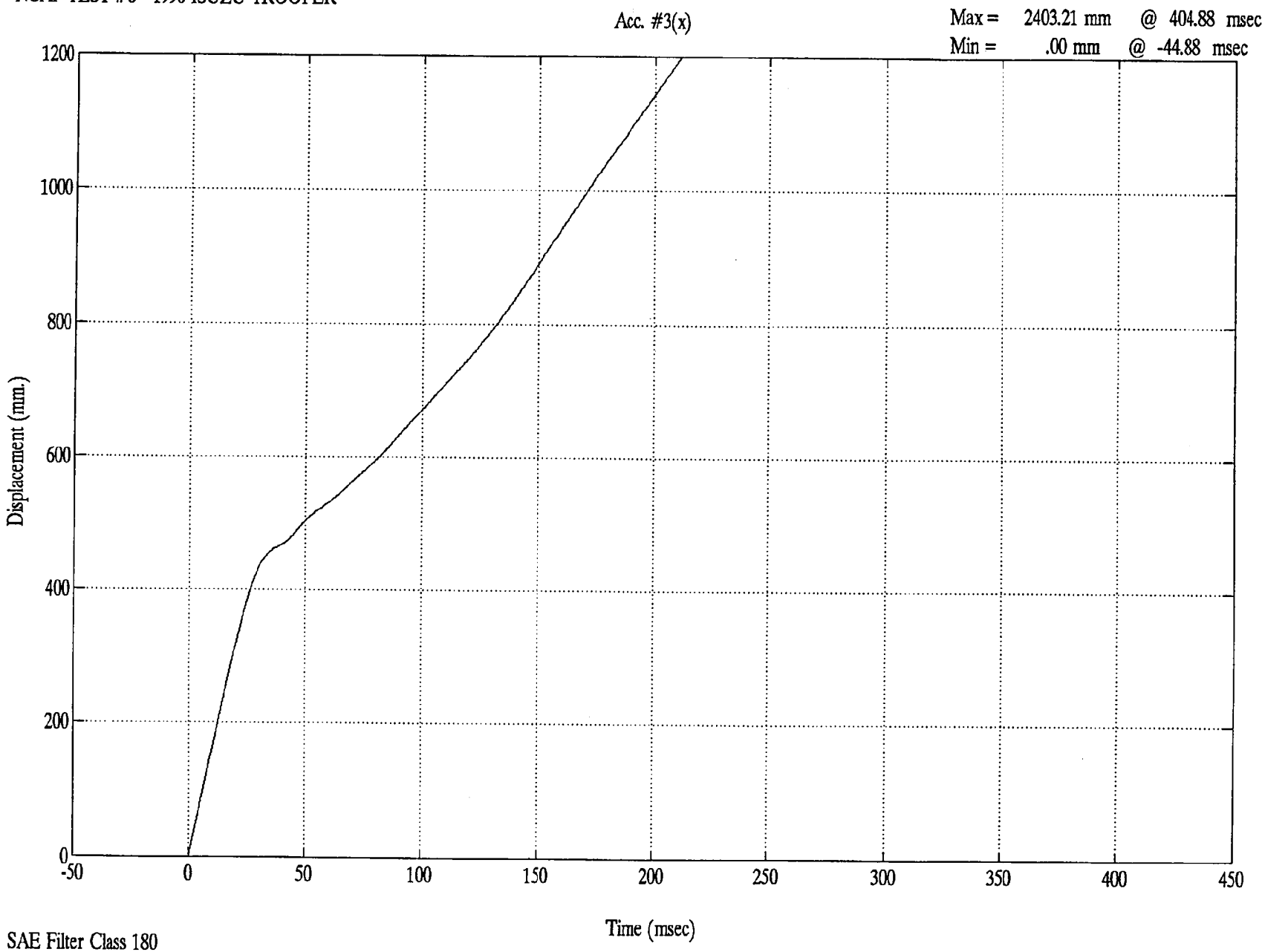
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

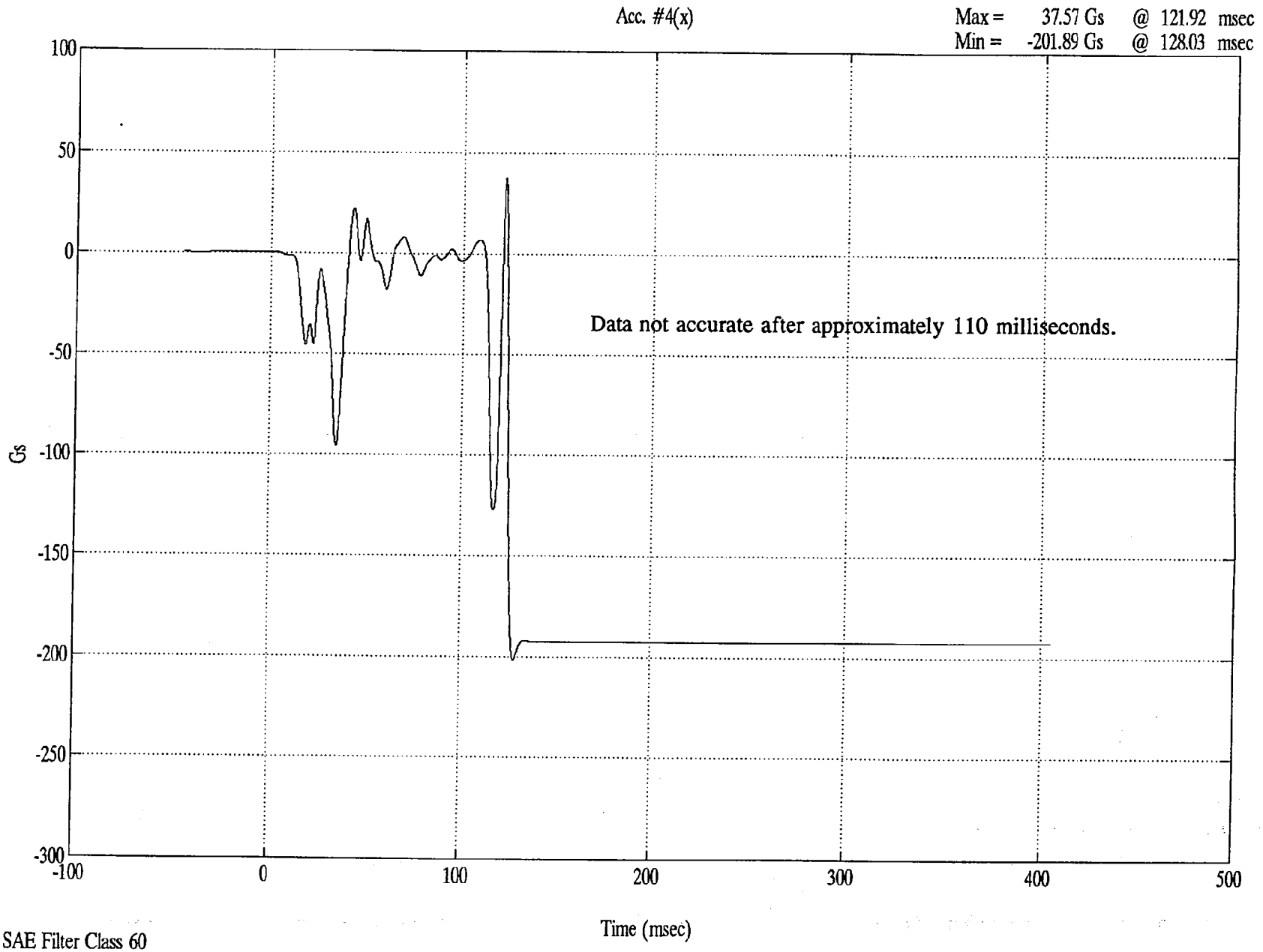
8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

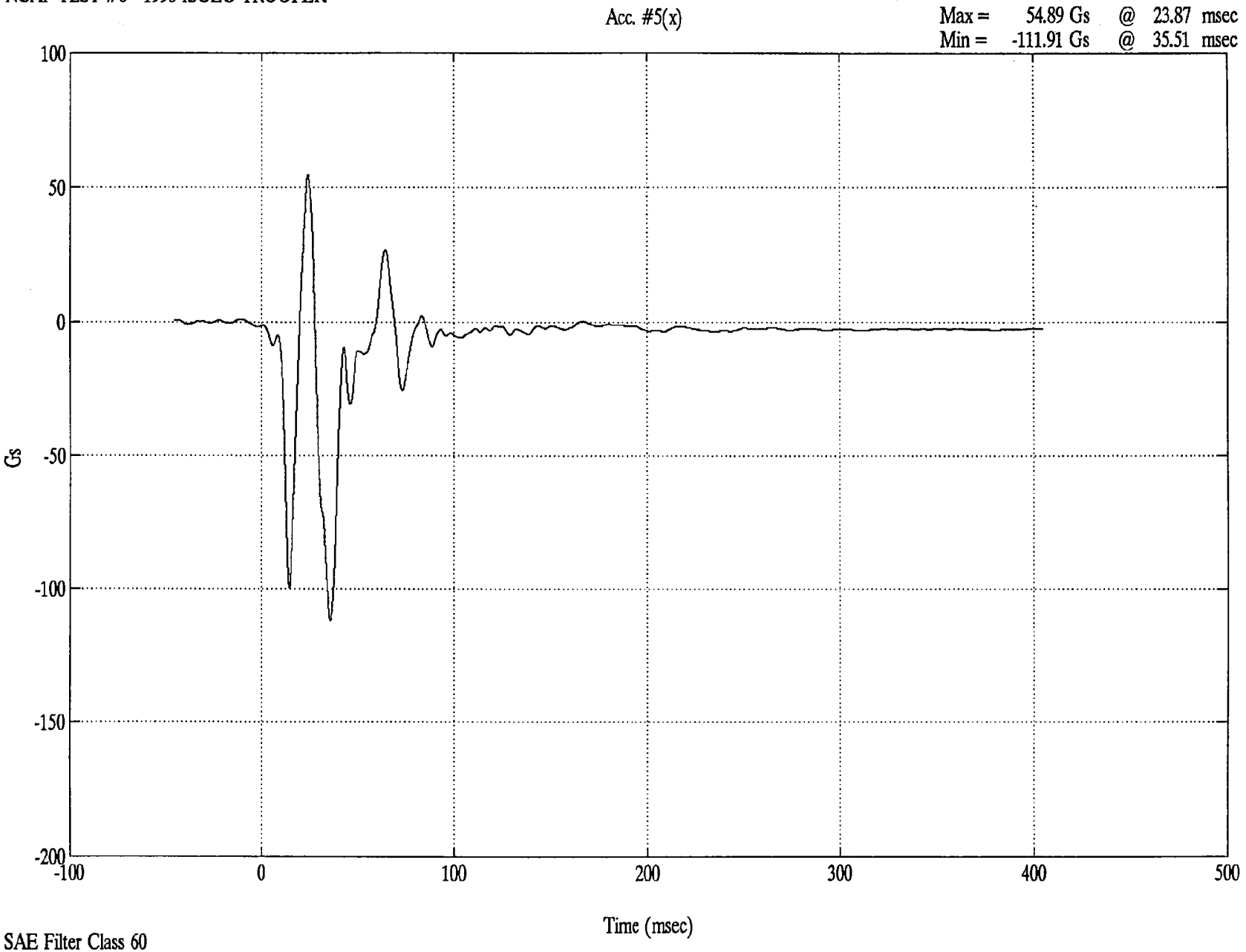
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

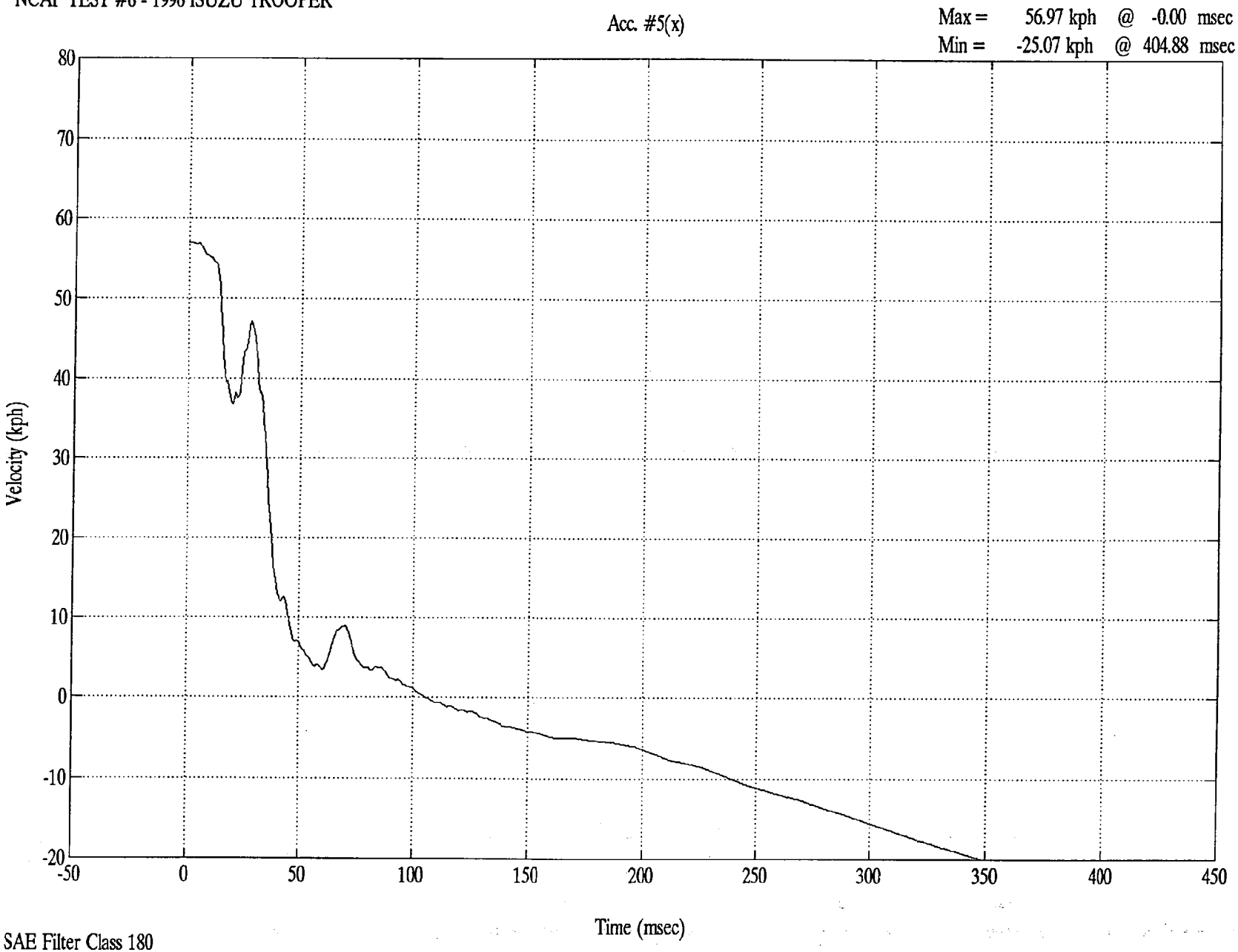
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

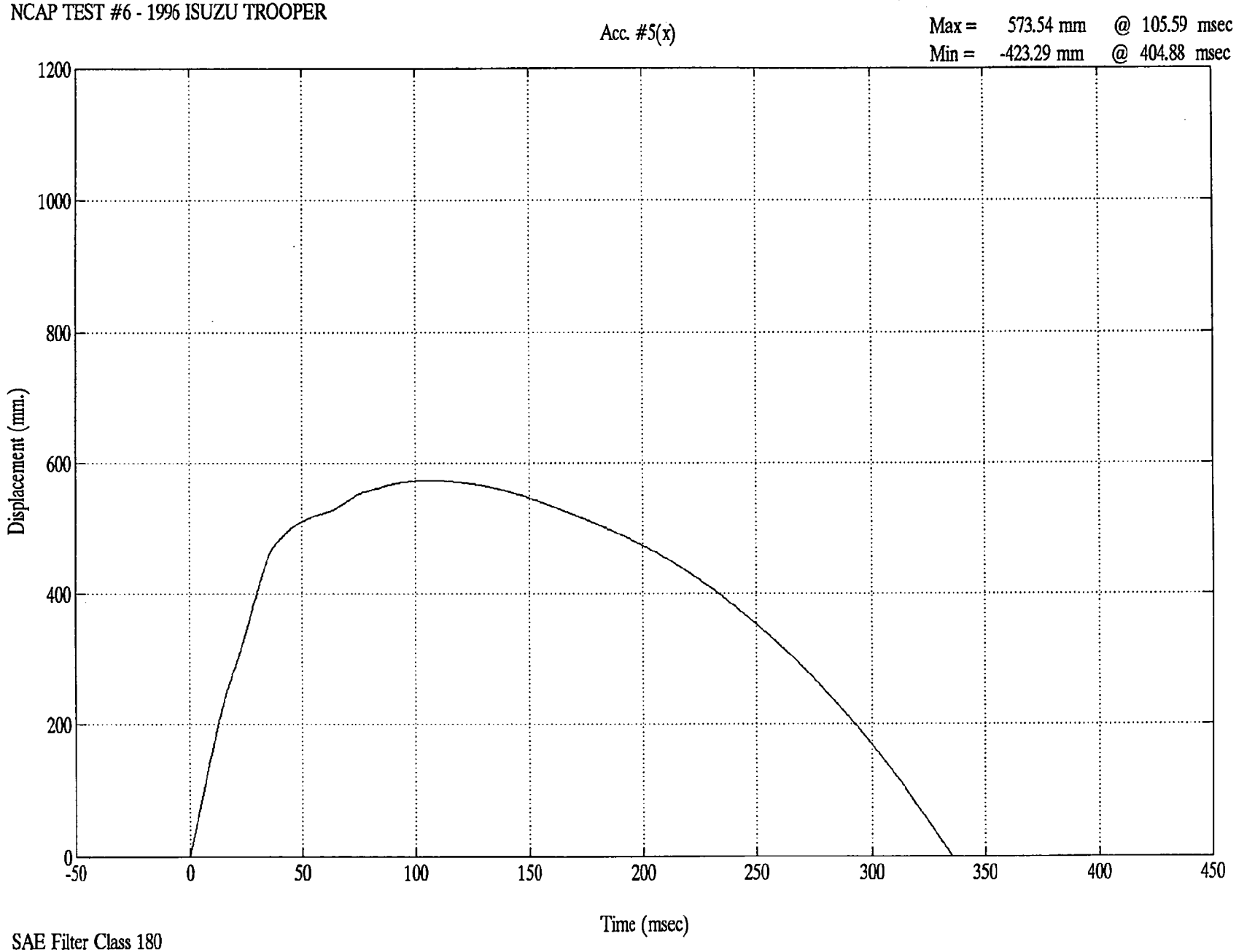
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

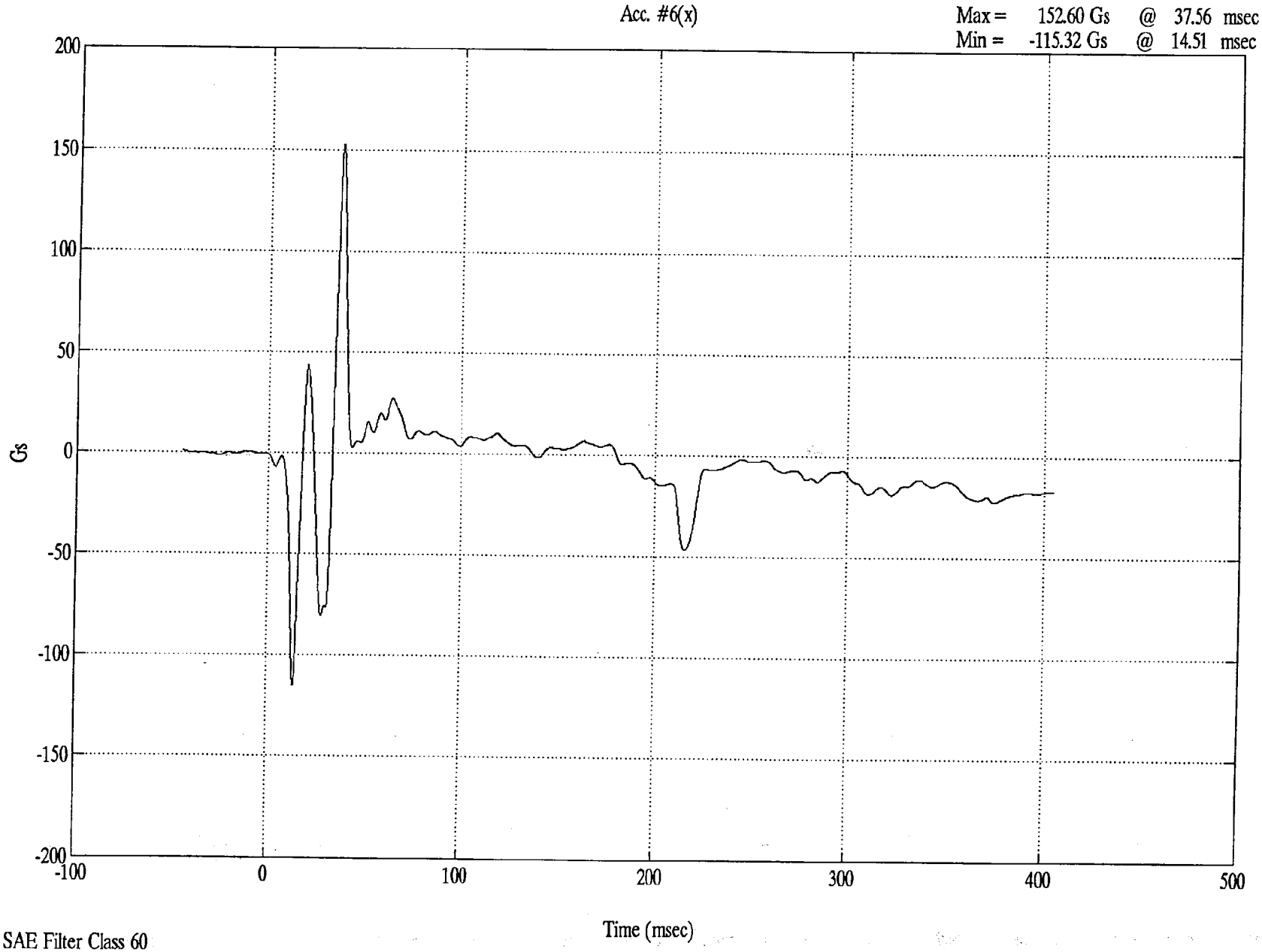
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

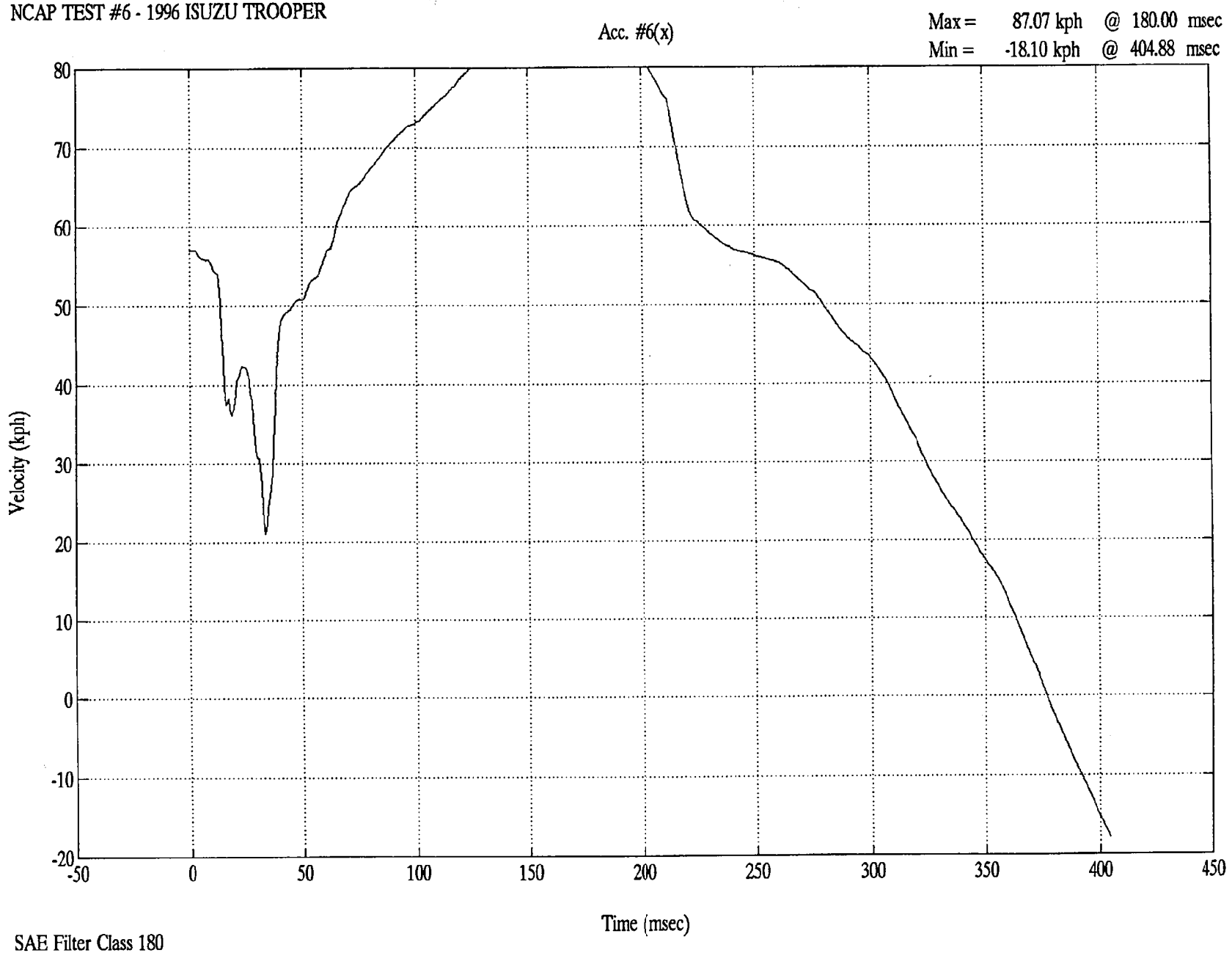


B-120

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

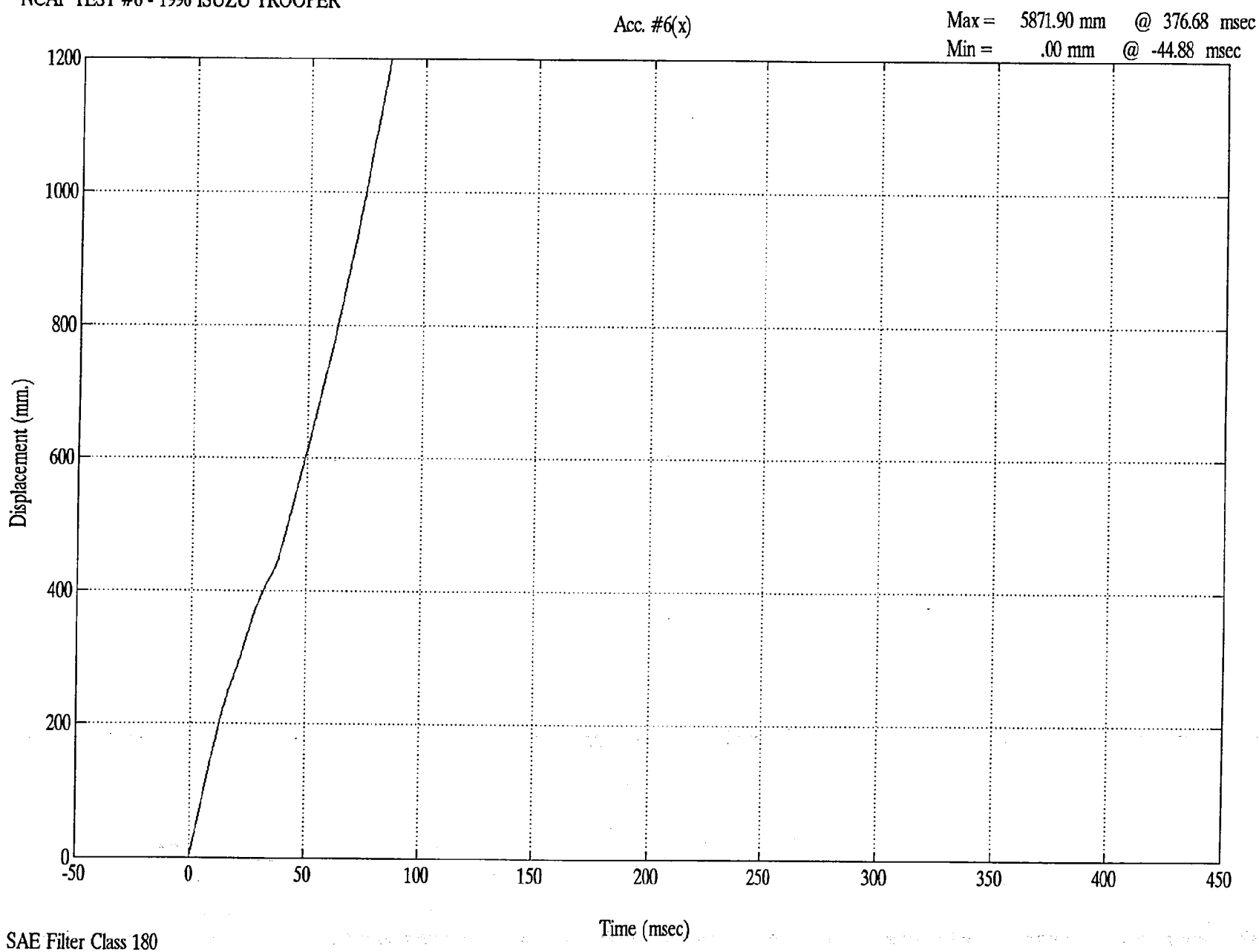


SAE Filter Class 180

B-121

8313-6

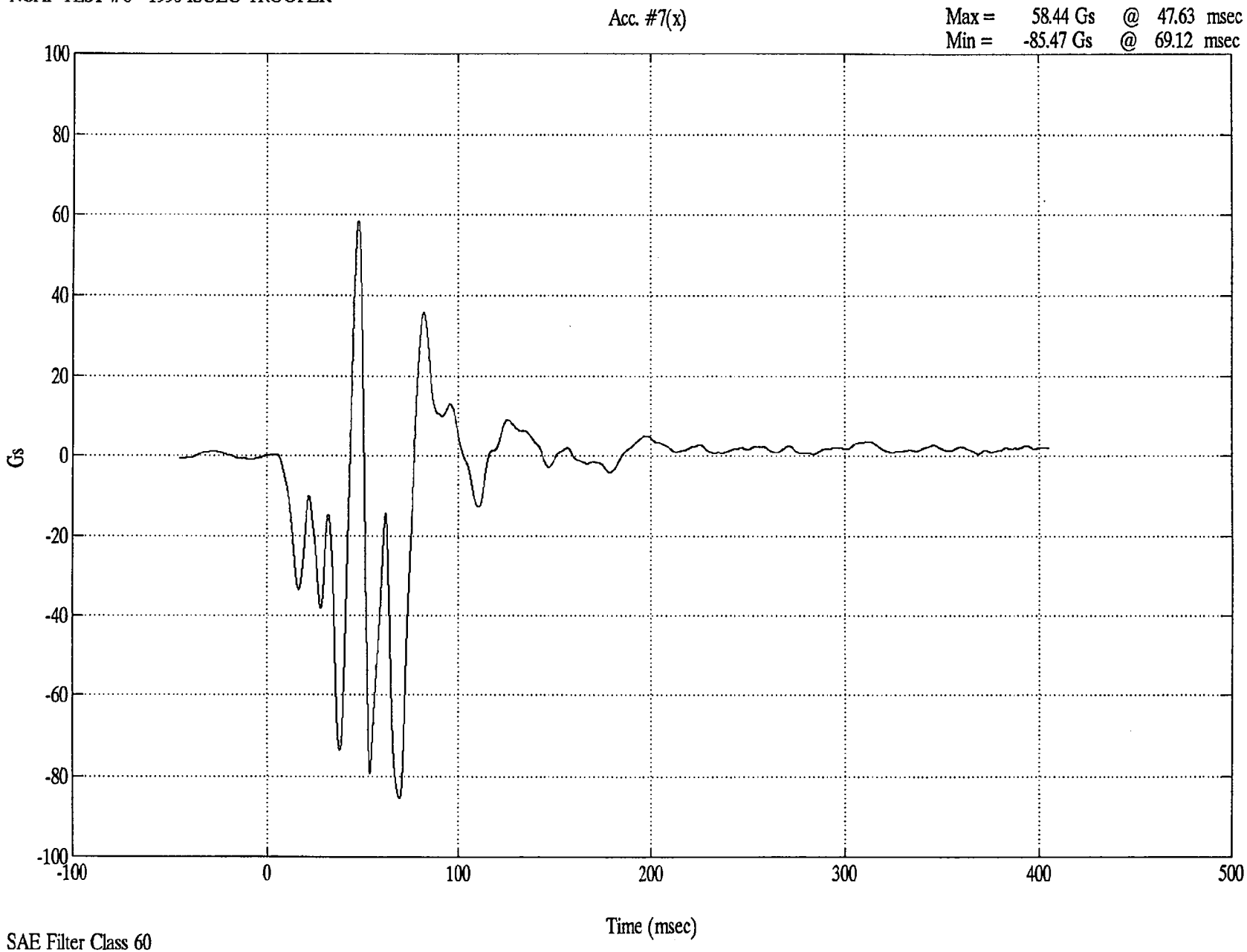
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

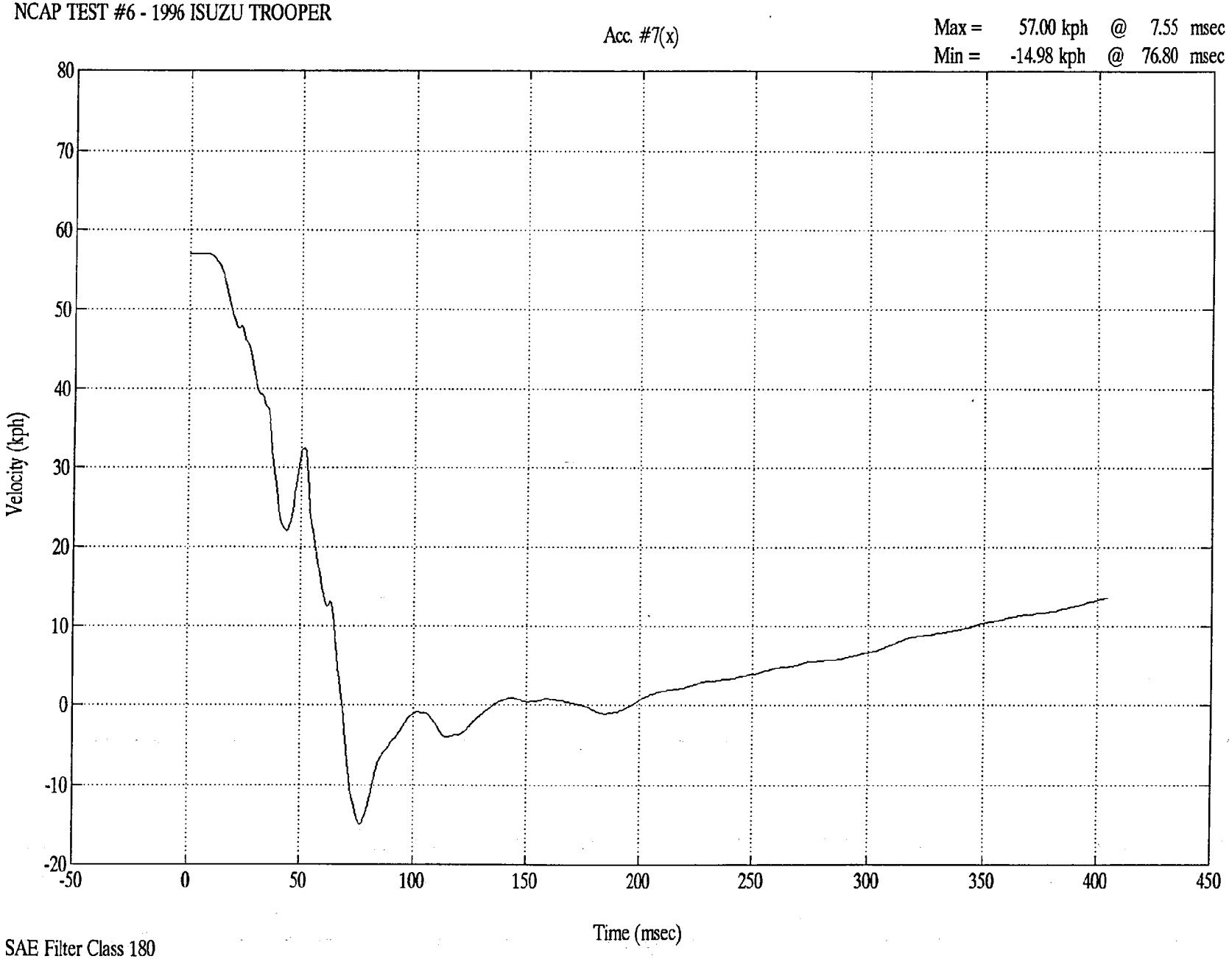


B-123

8313-6

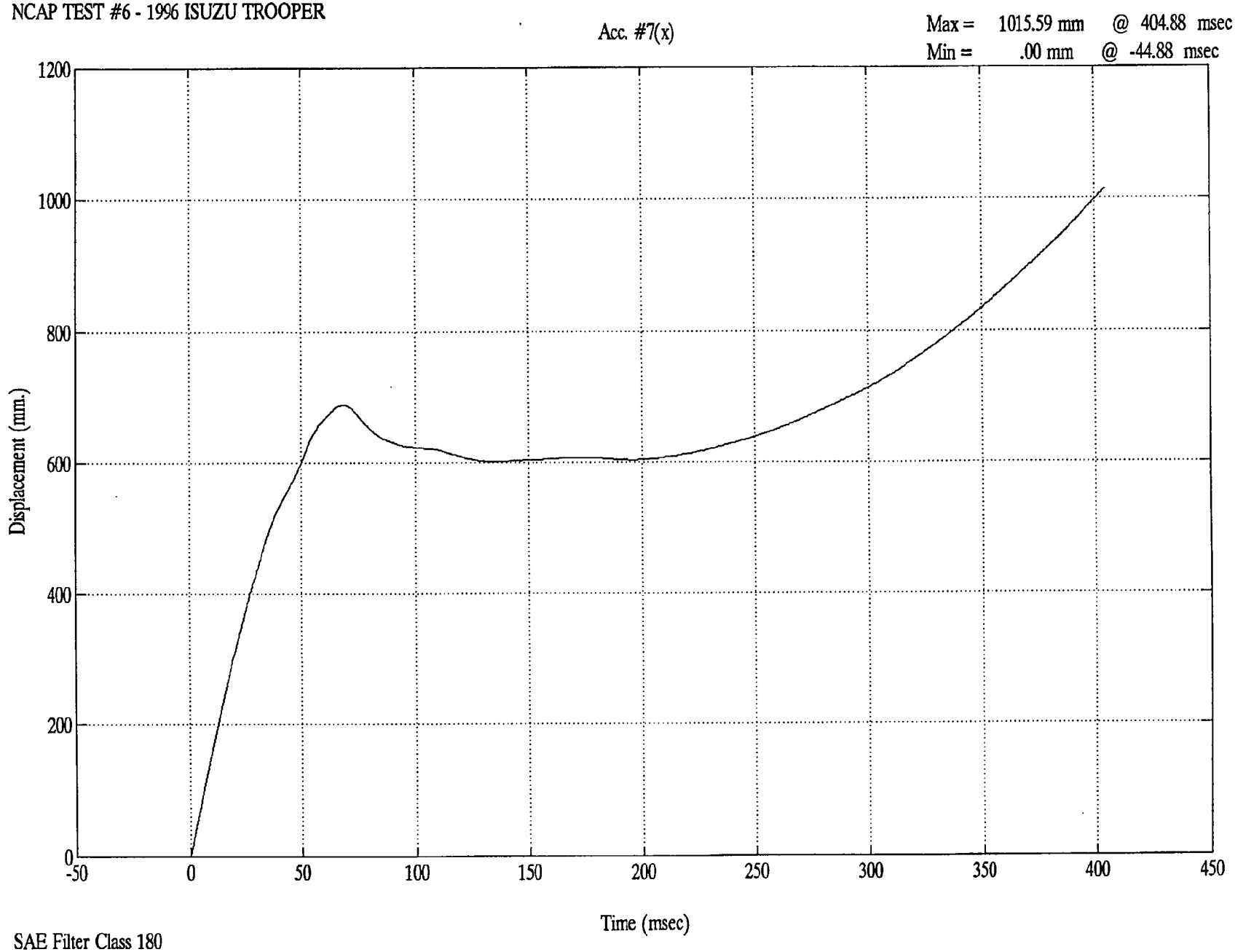
SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER



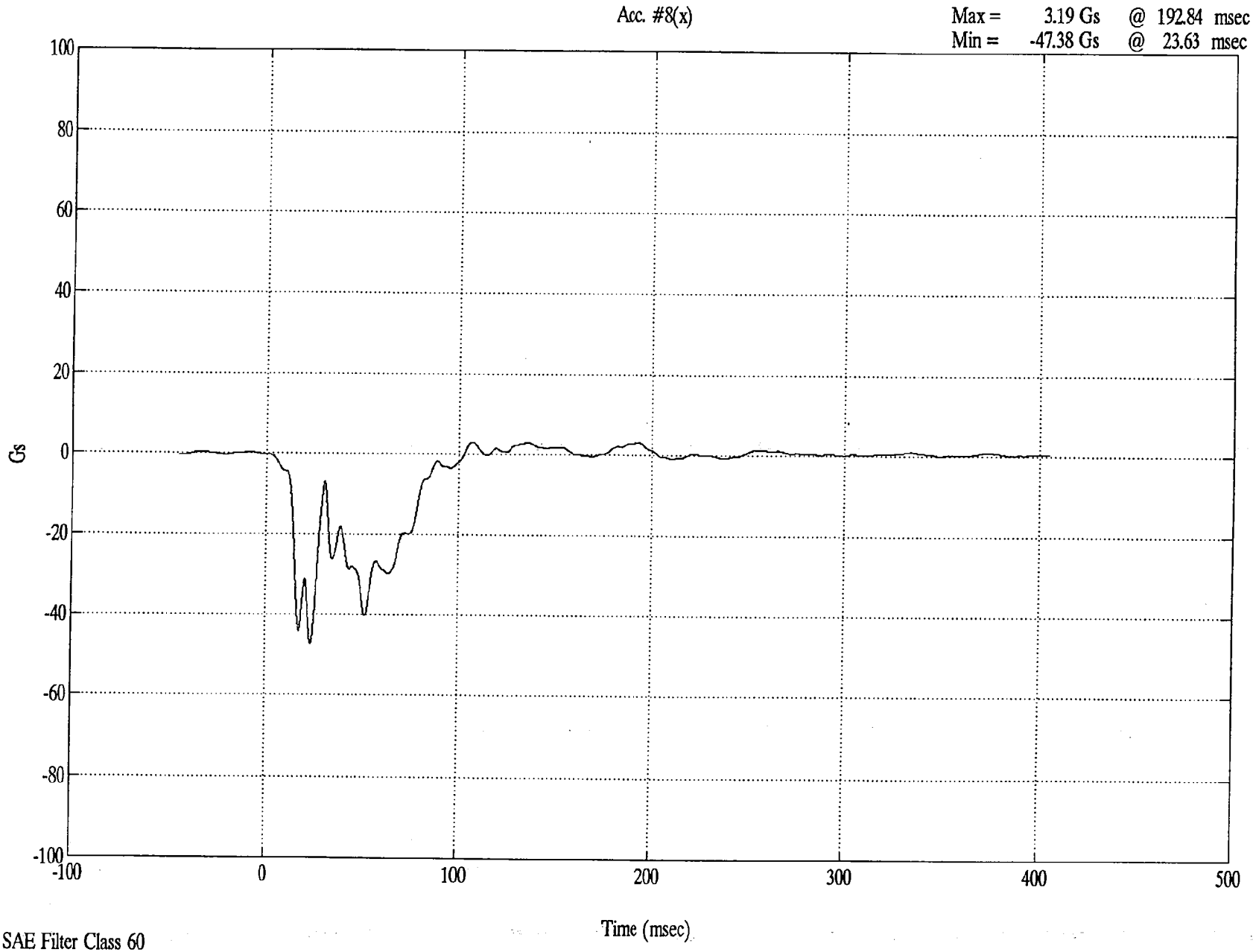
SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER

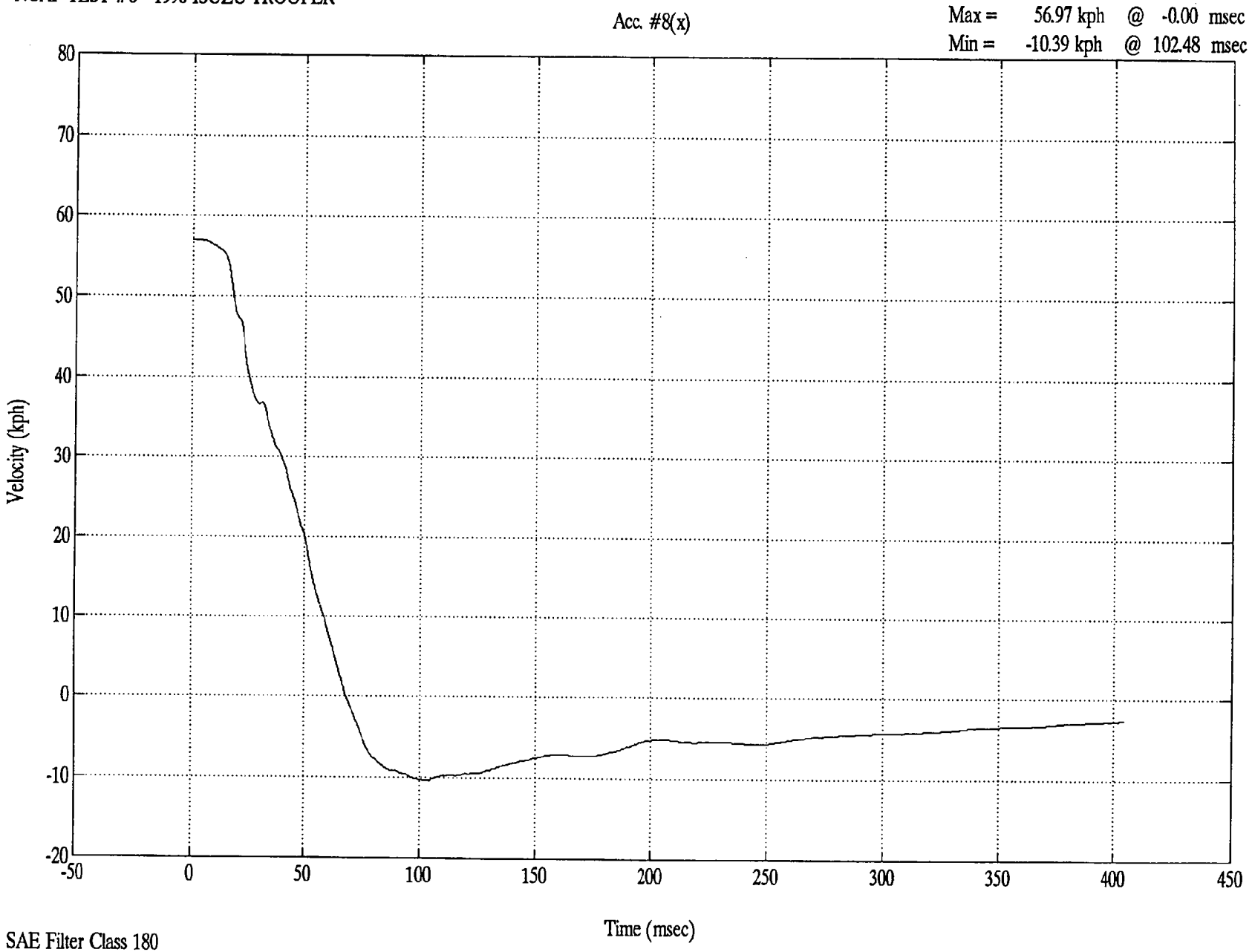


SAE Filter Class 60

B-126

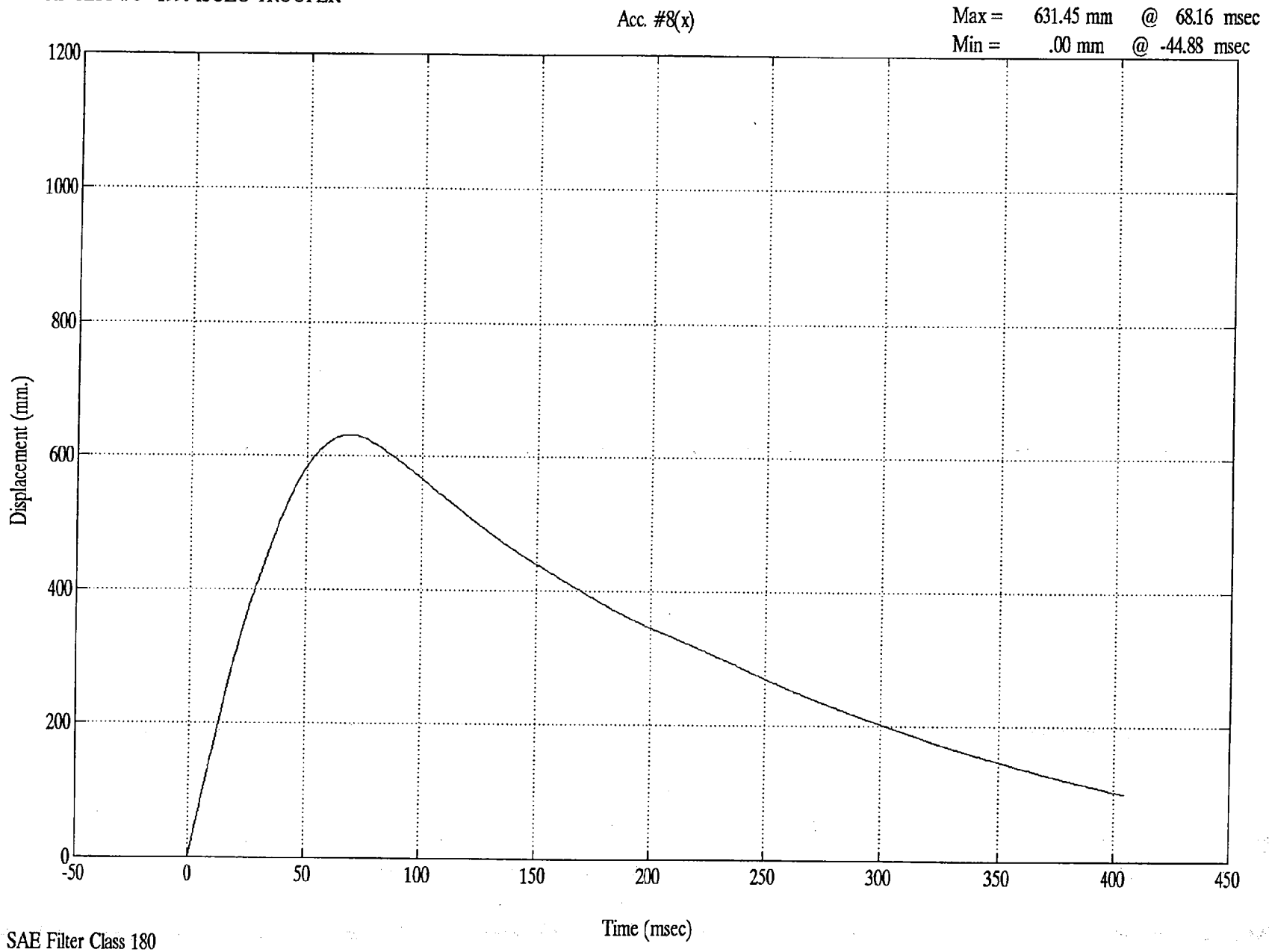
8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

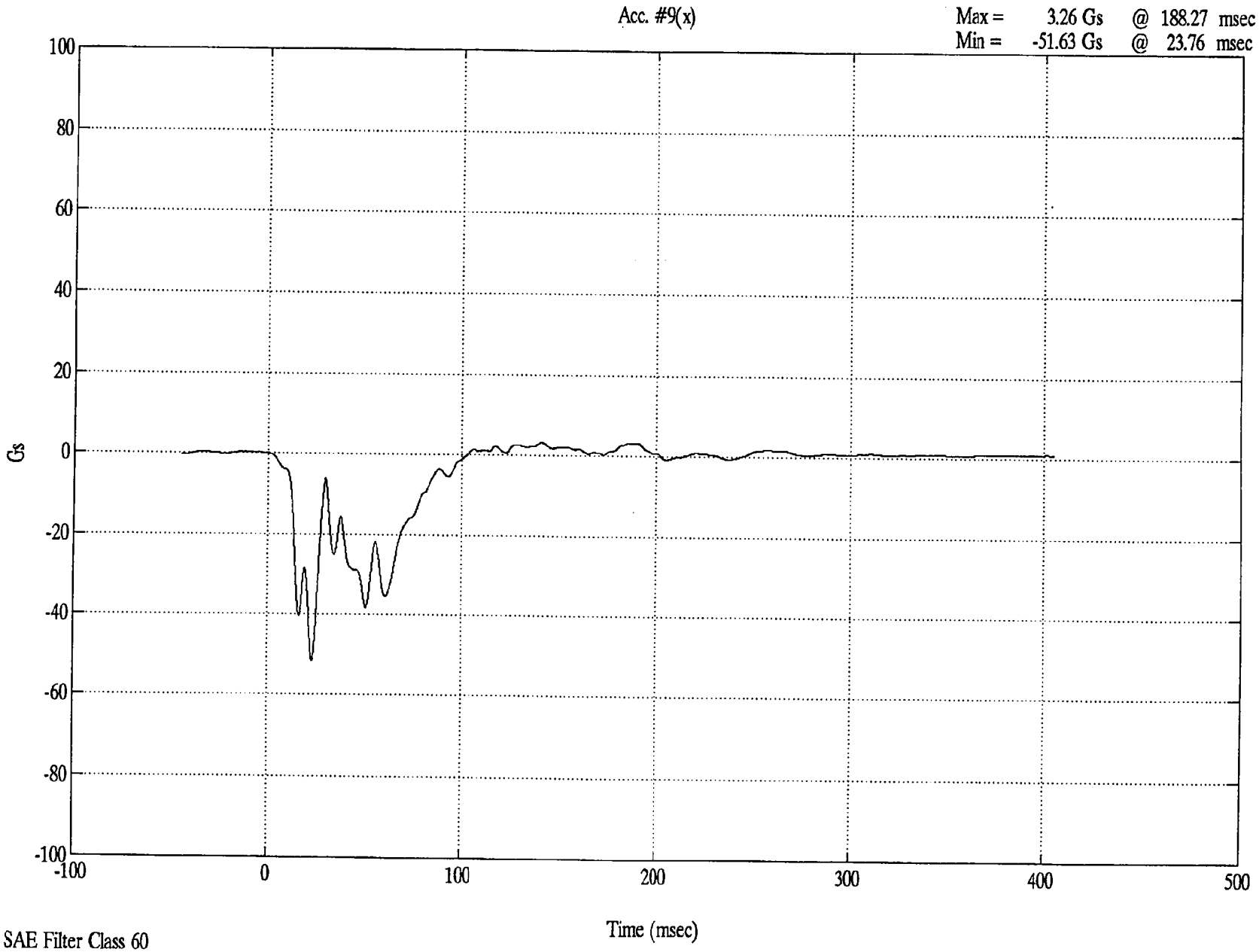
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

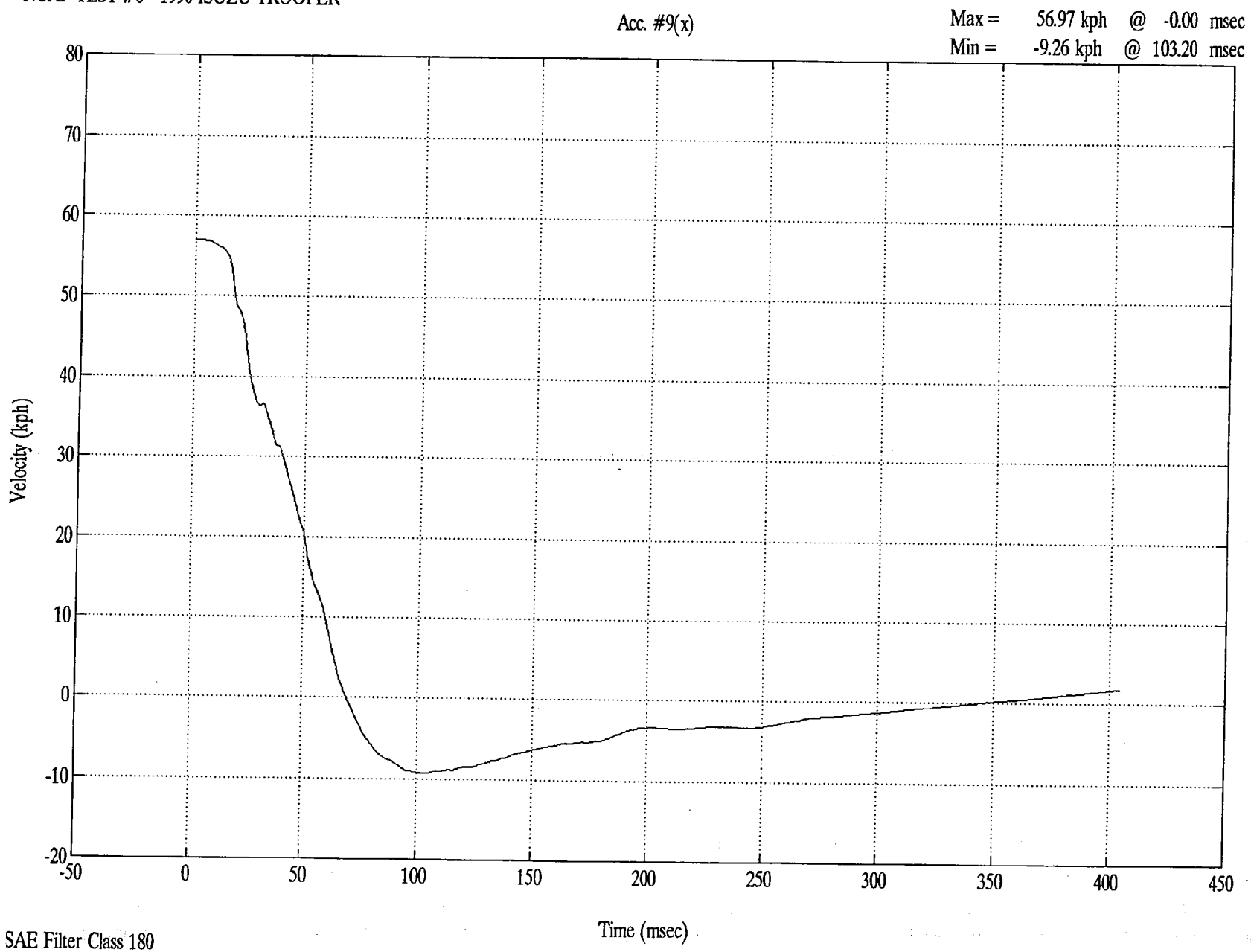


B-129

8313-6

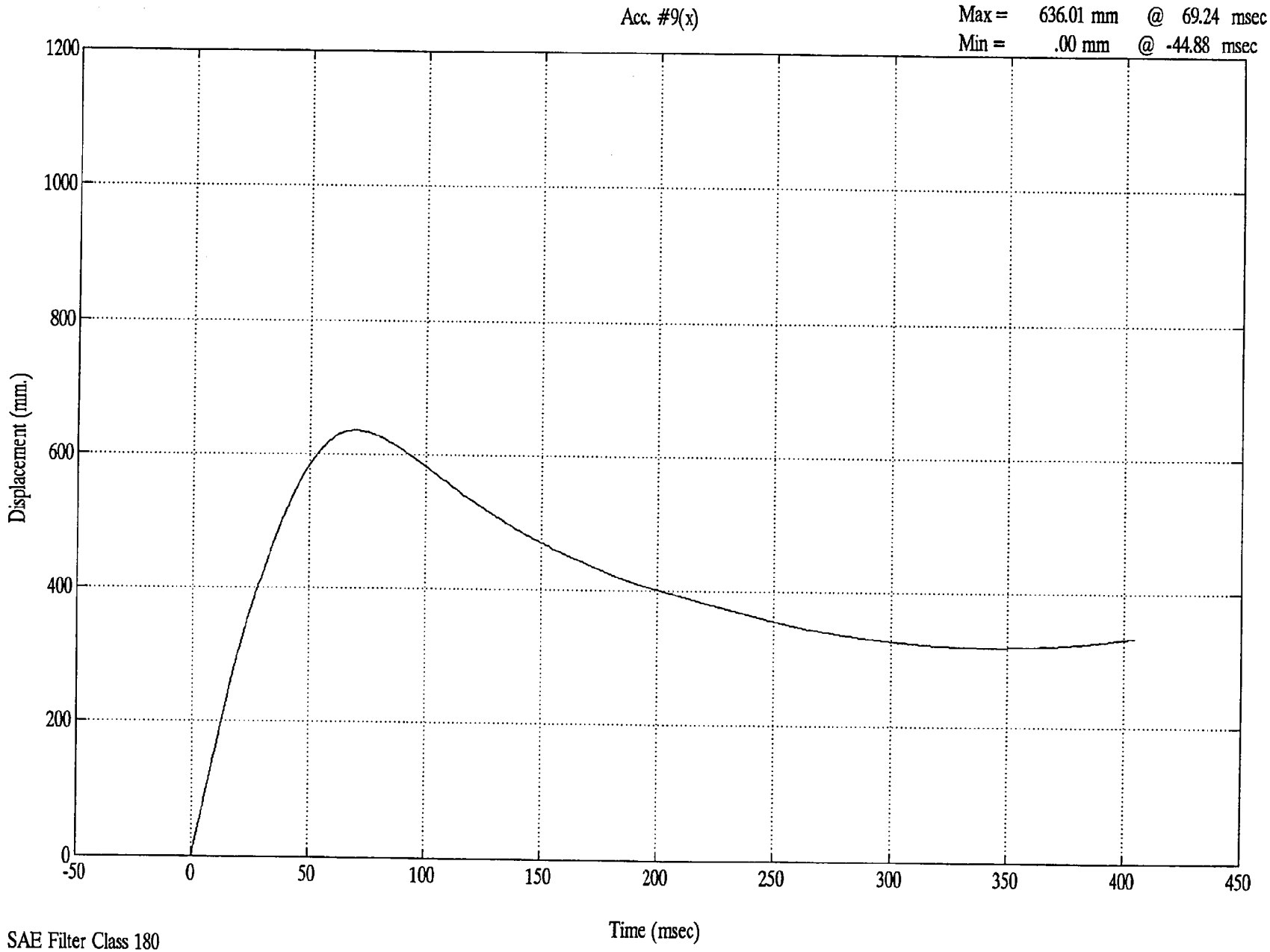
SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 180

8313-6

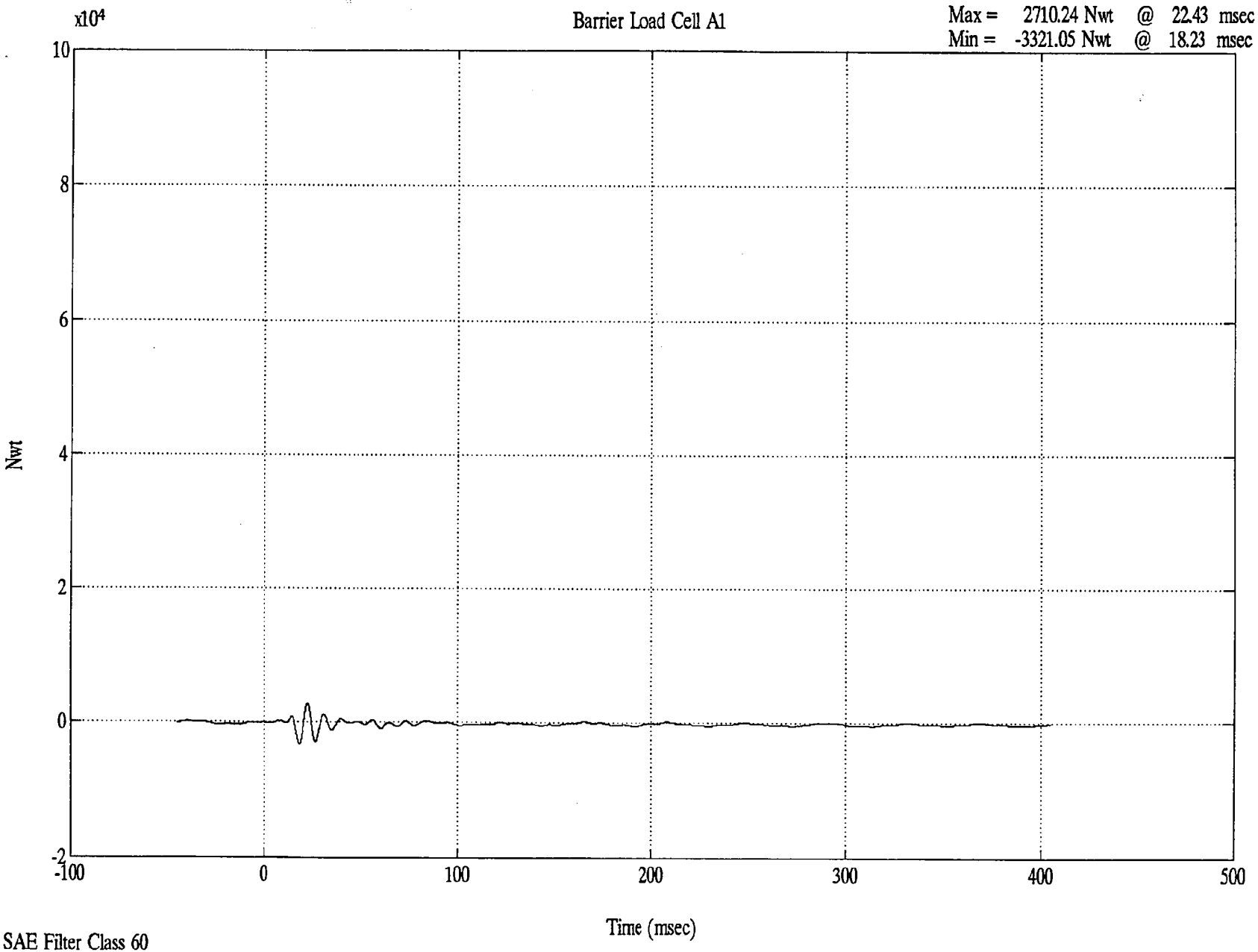
NHTSA TEST NO. MT5702

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

60

NCAP TEST #6 - 1996 ISUZU TROOPER

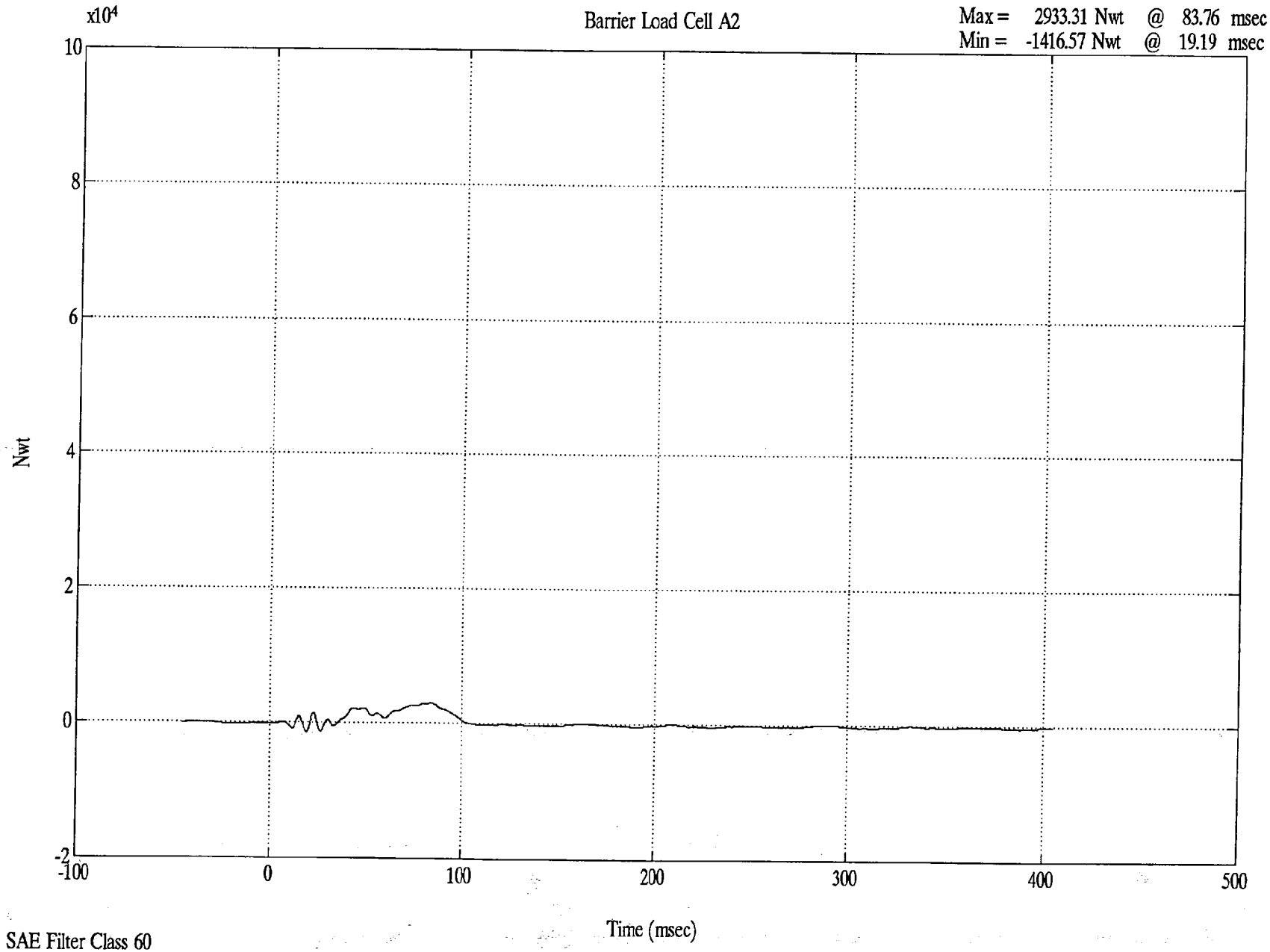


B-133

8313-6

SAE Filter Class 60

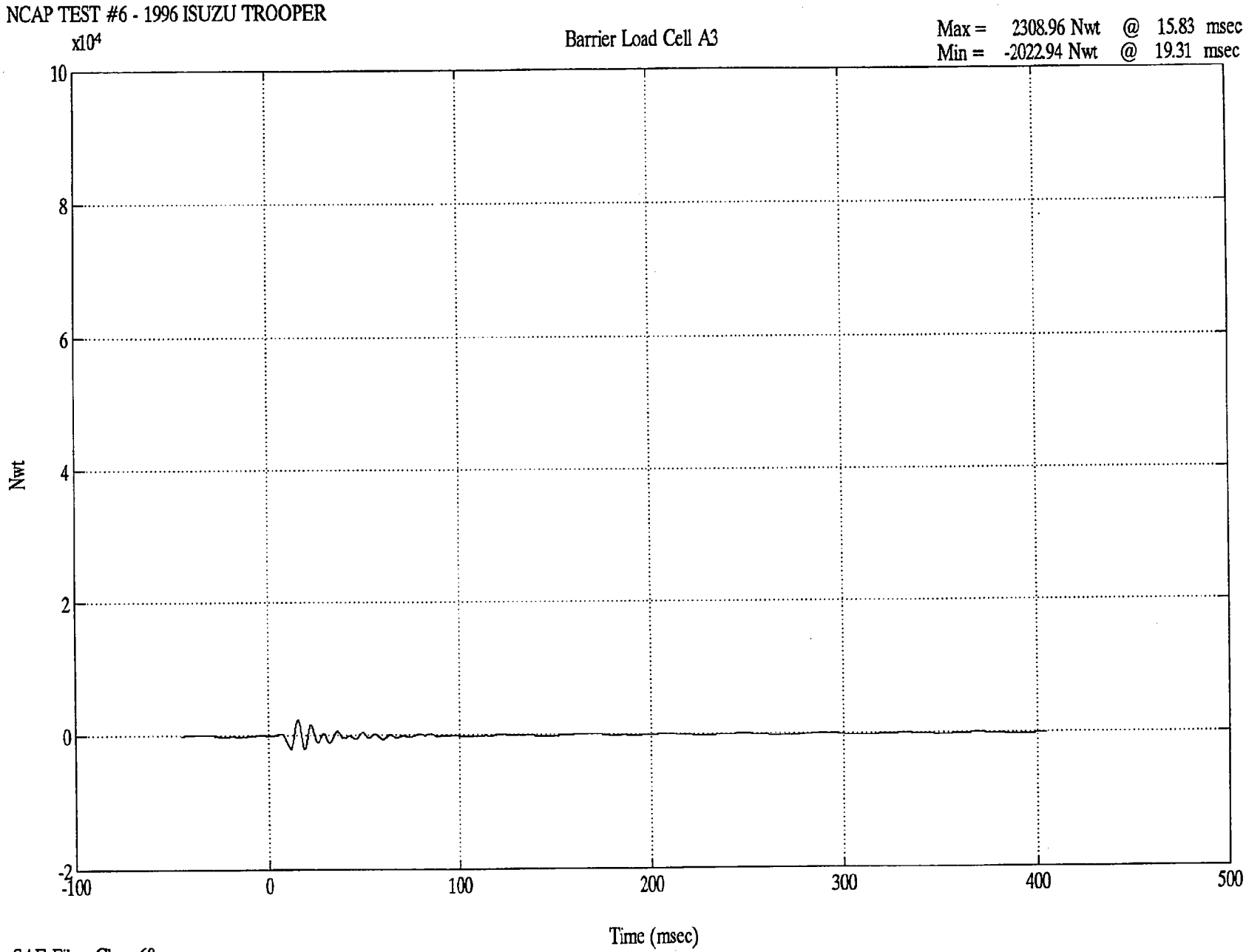
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

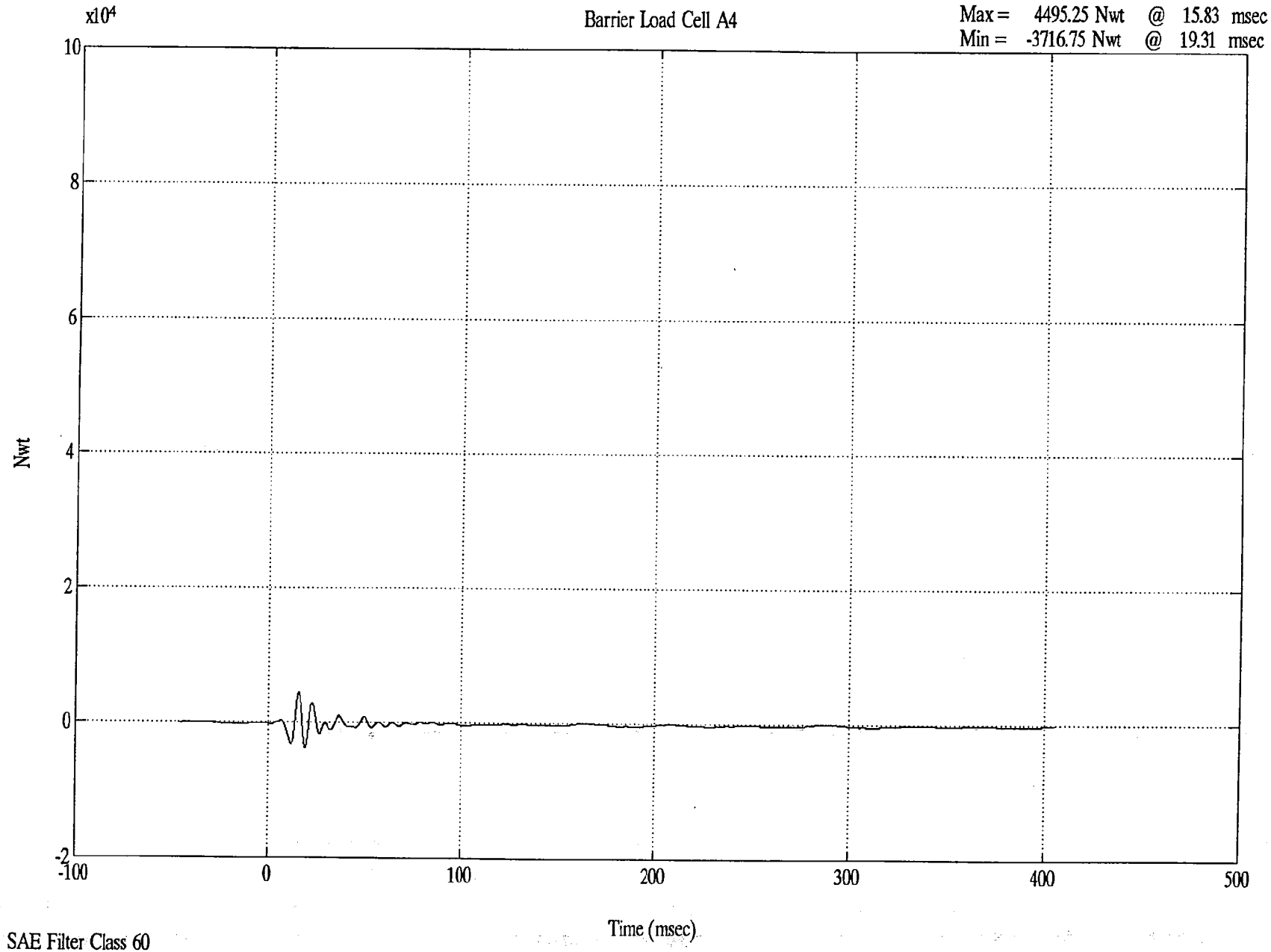
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

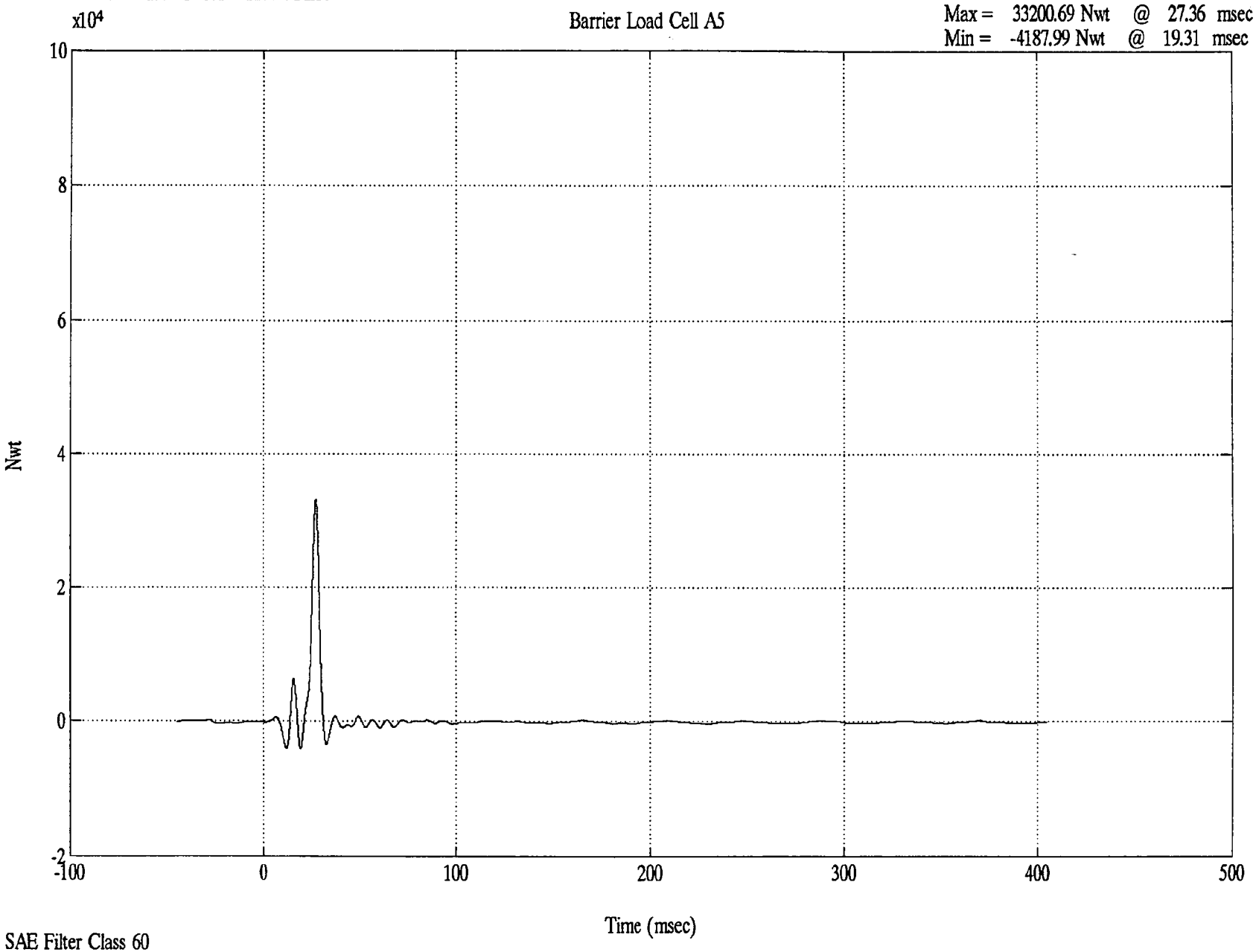
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

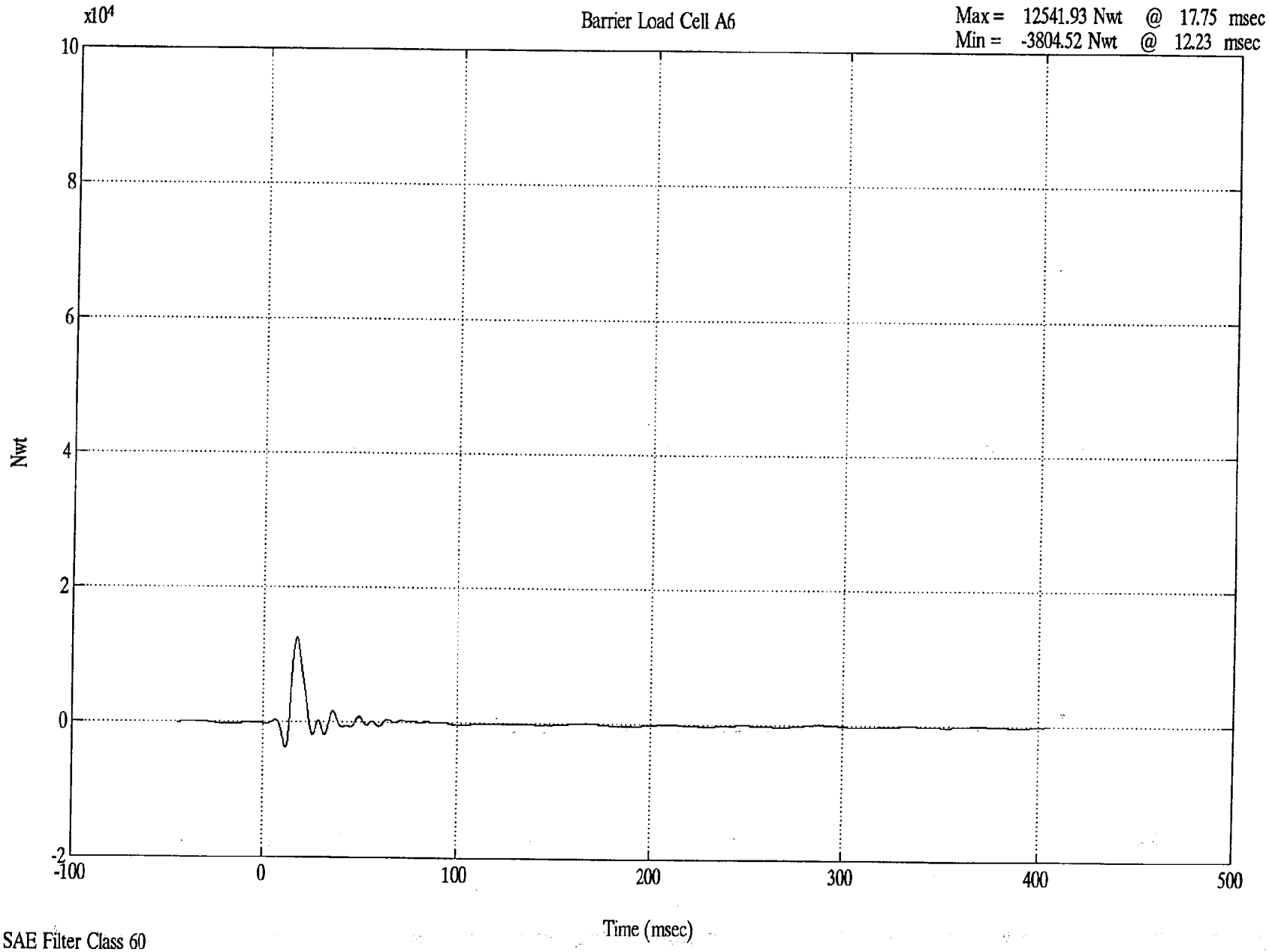


B-137

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

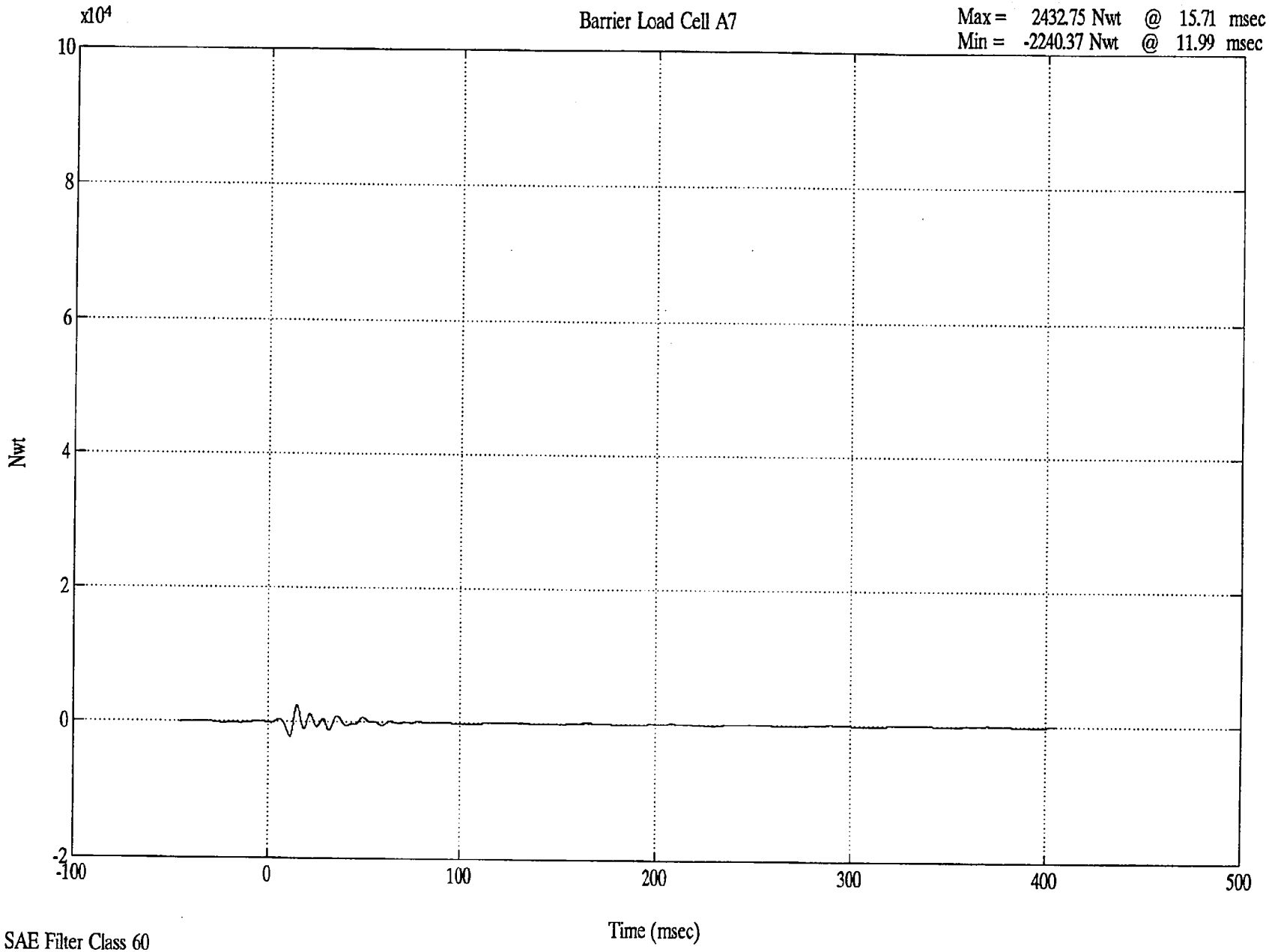


SAE Filter Class 60

B-138

8313-6

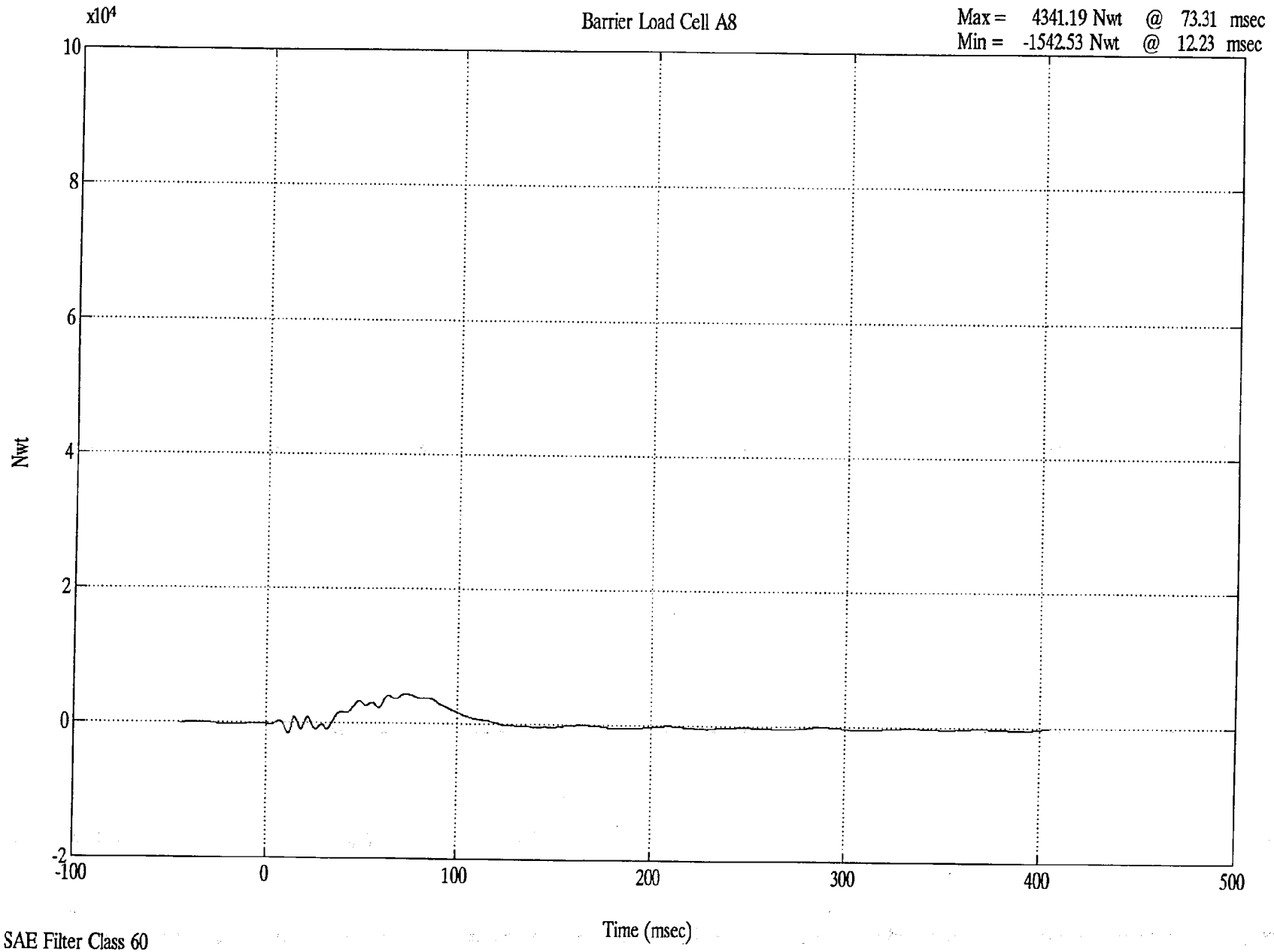
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

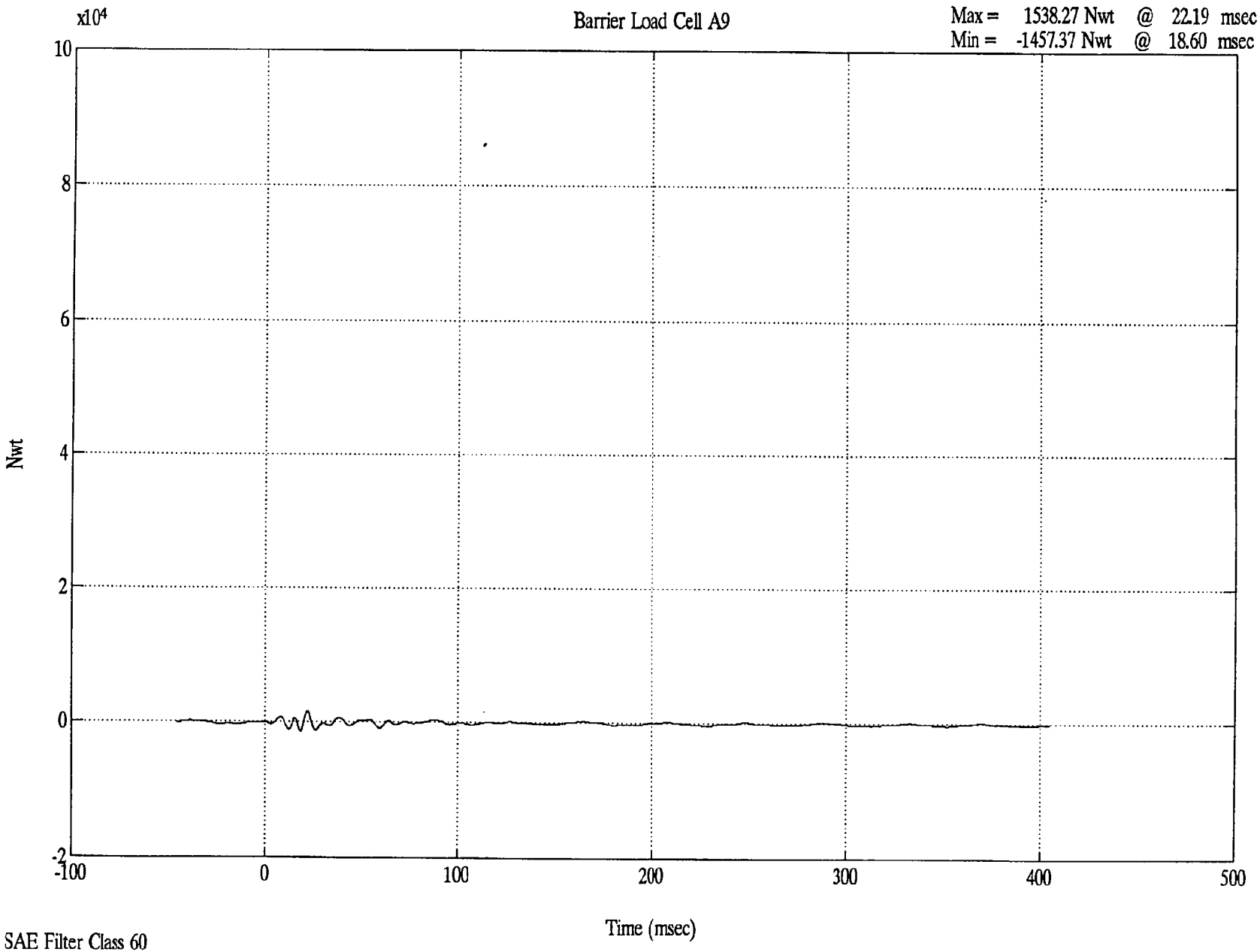


B-140

8313-6

SAE Filter Class 60

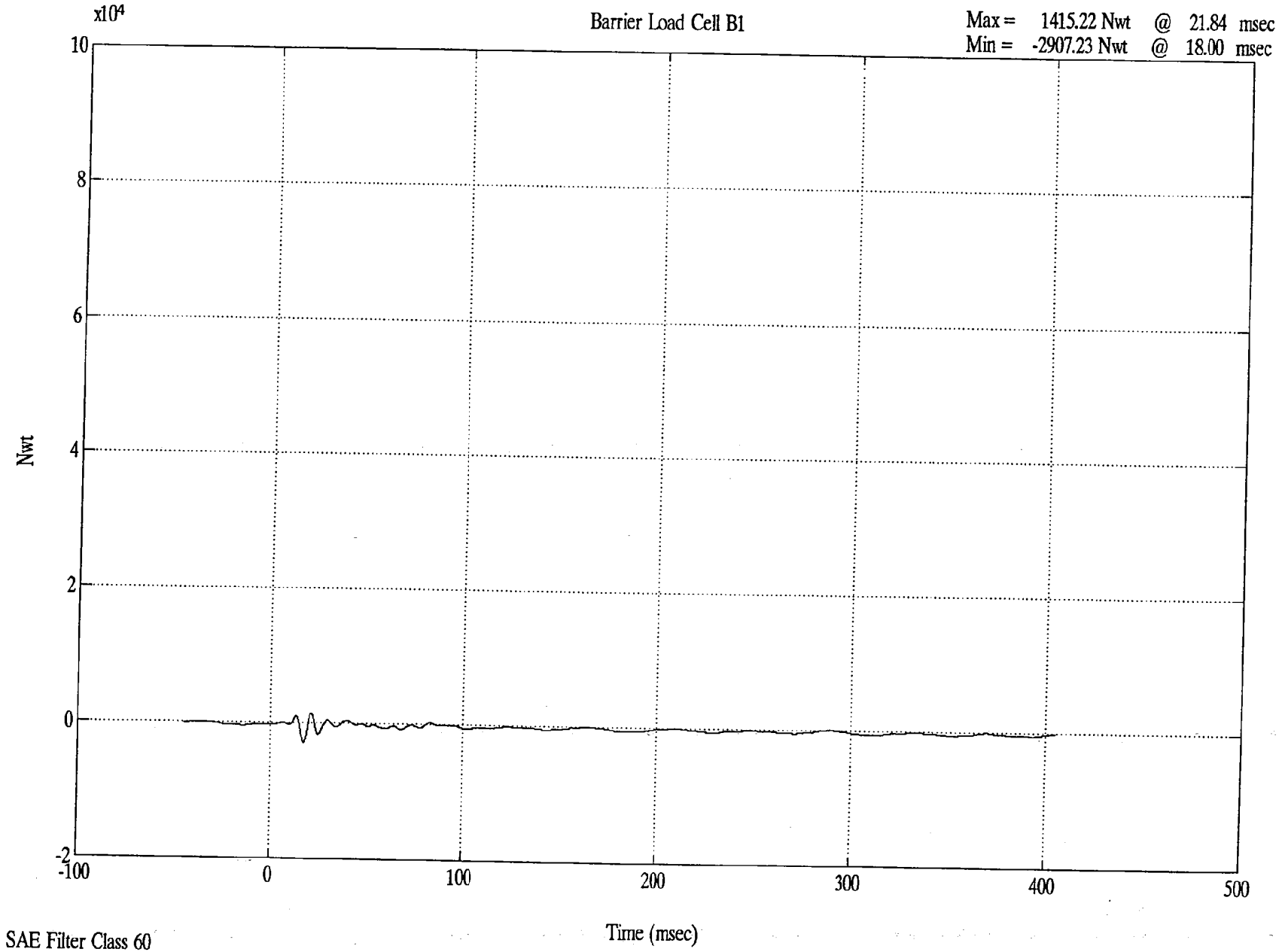
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

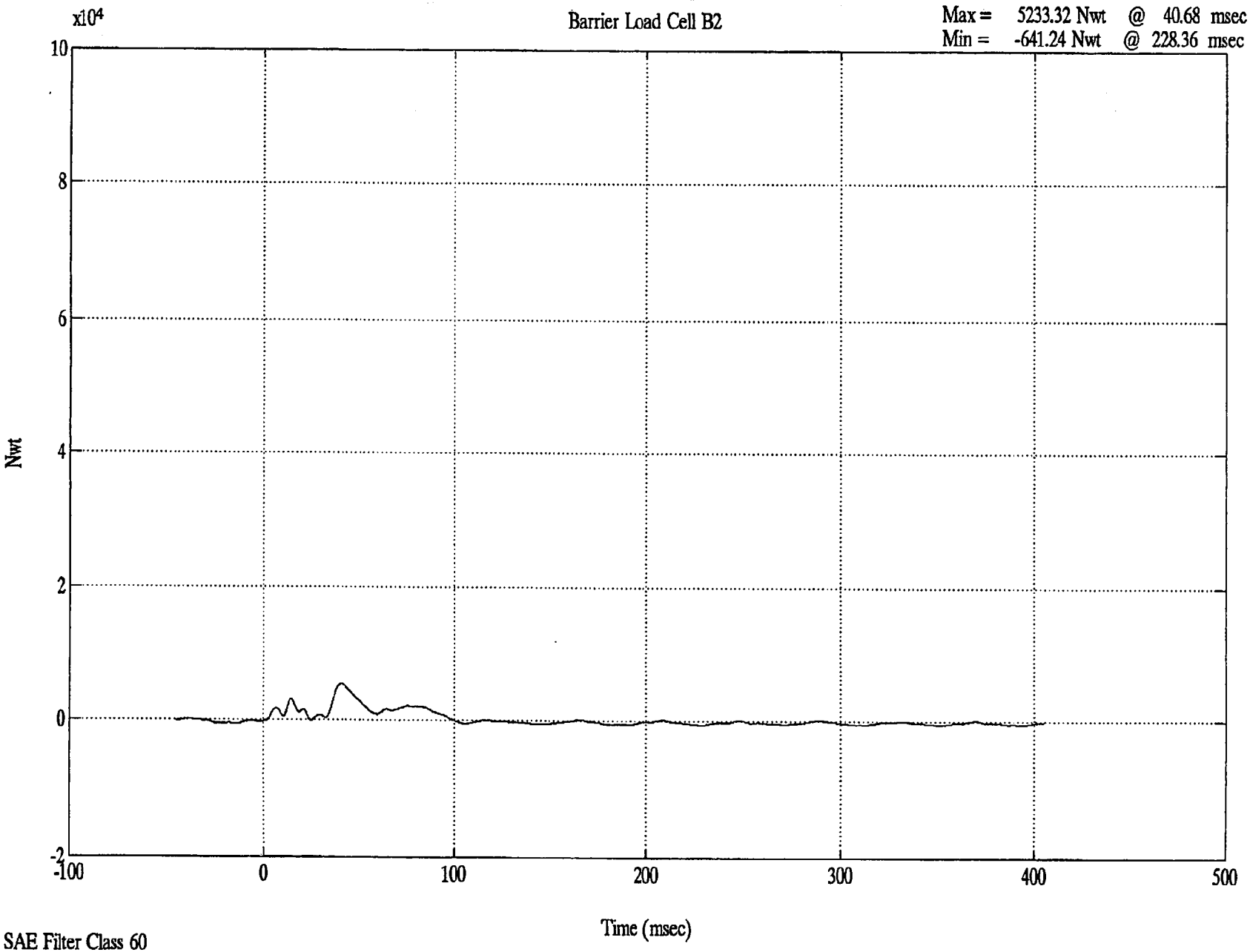


SAE Filter Class 60

B-142

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

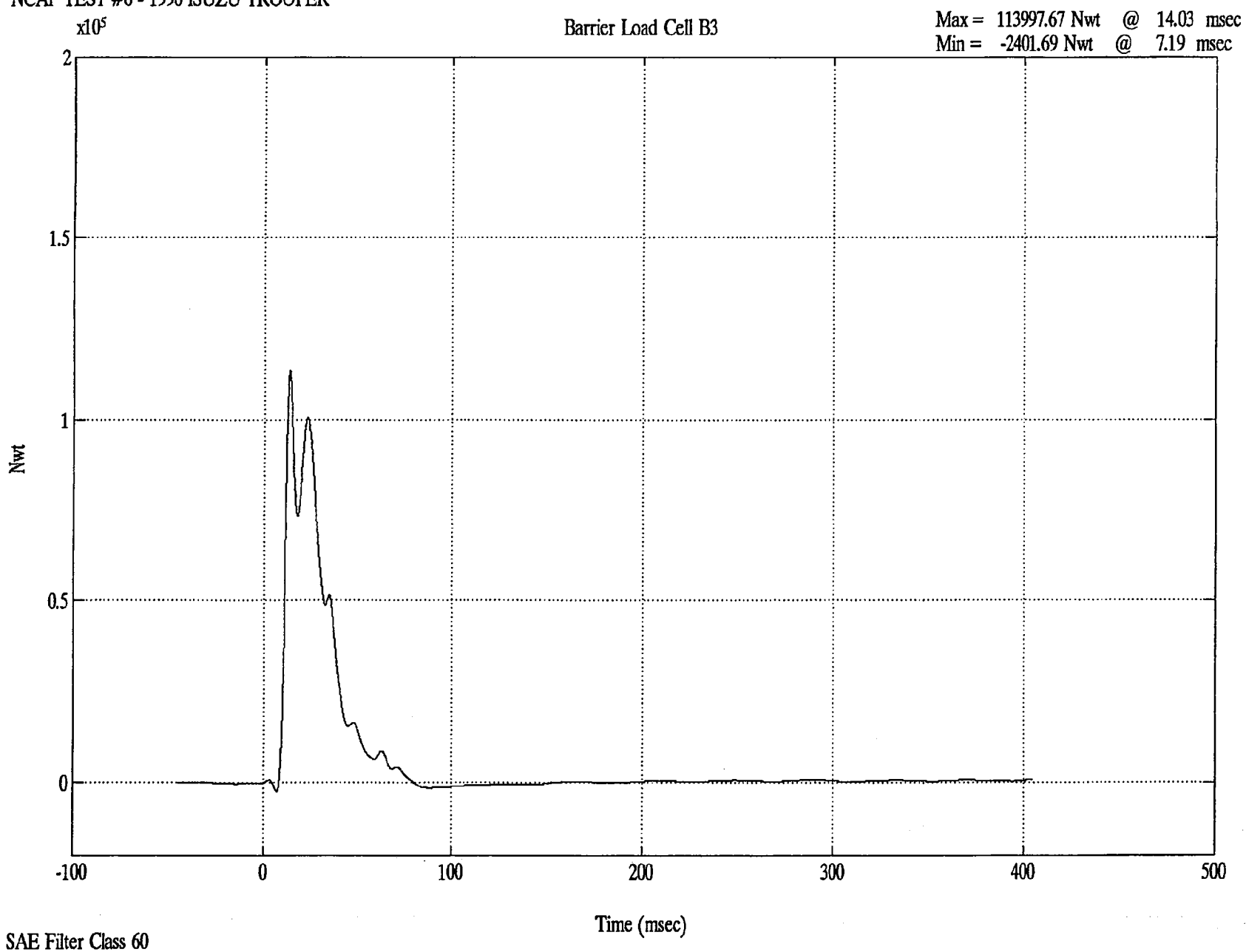


B-143

8313-6

SAE Filter Class 60

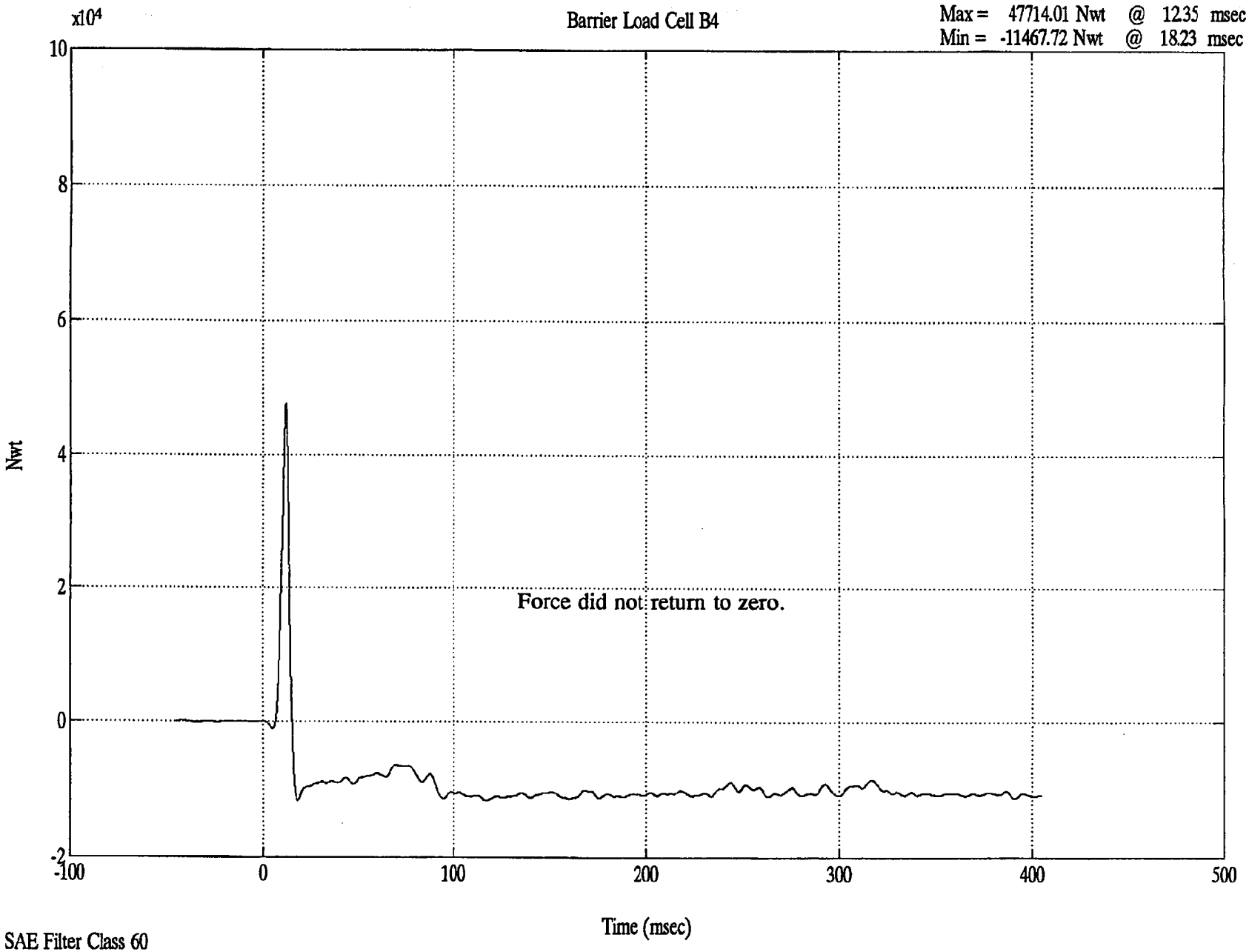
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

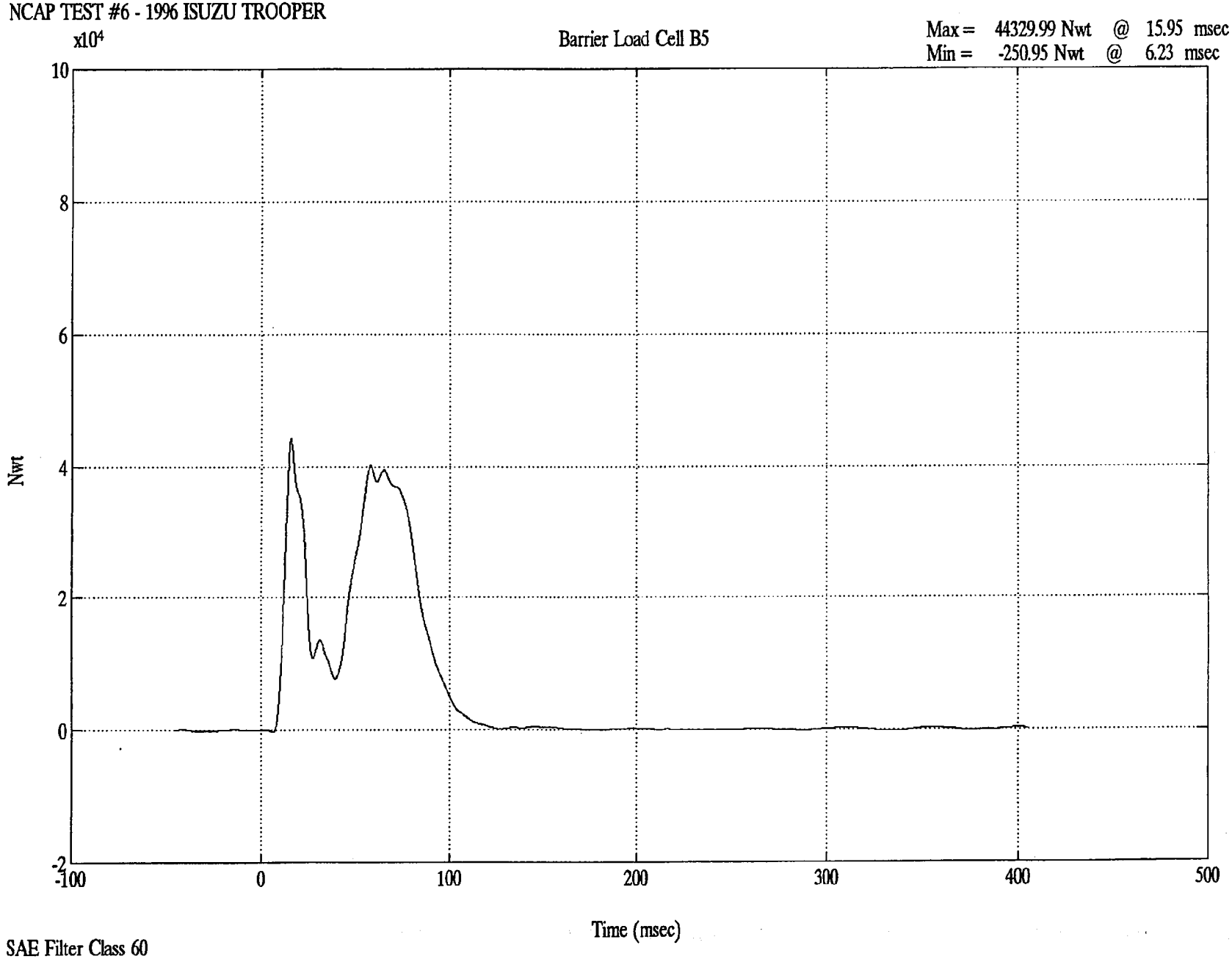


B-145

8313-6

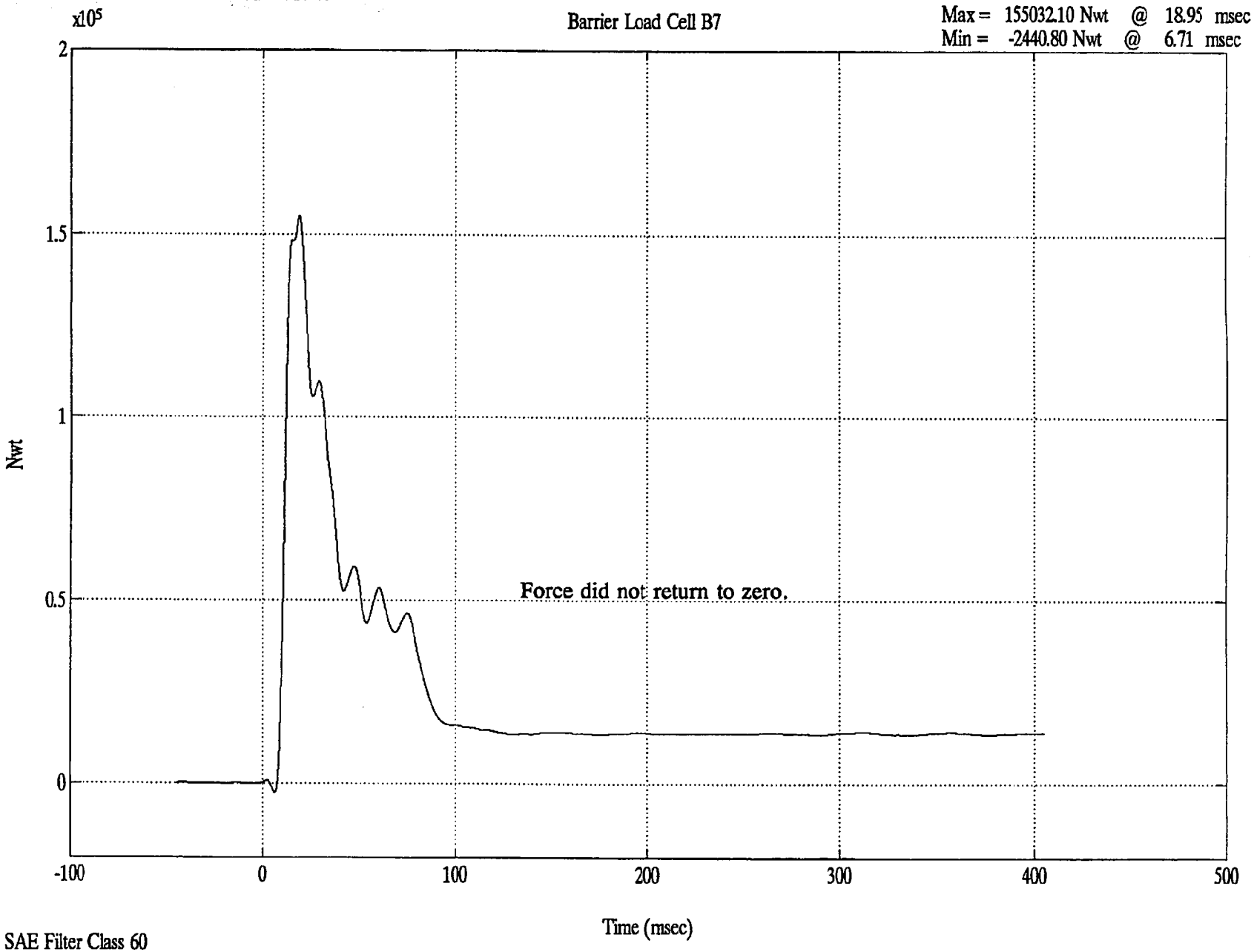
SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

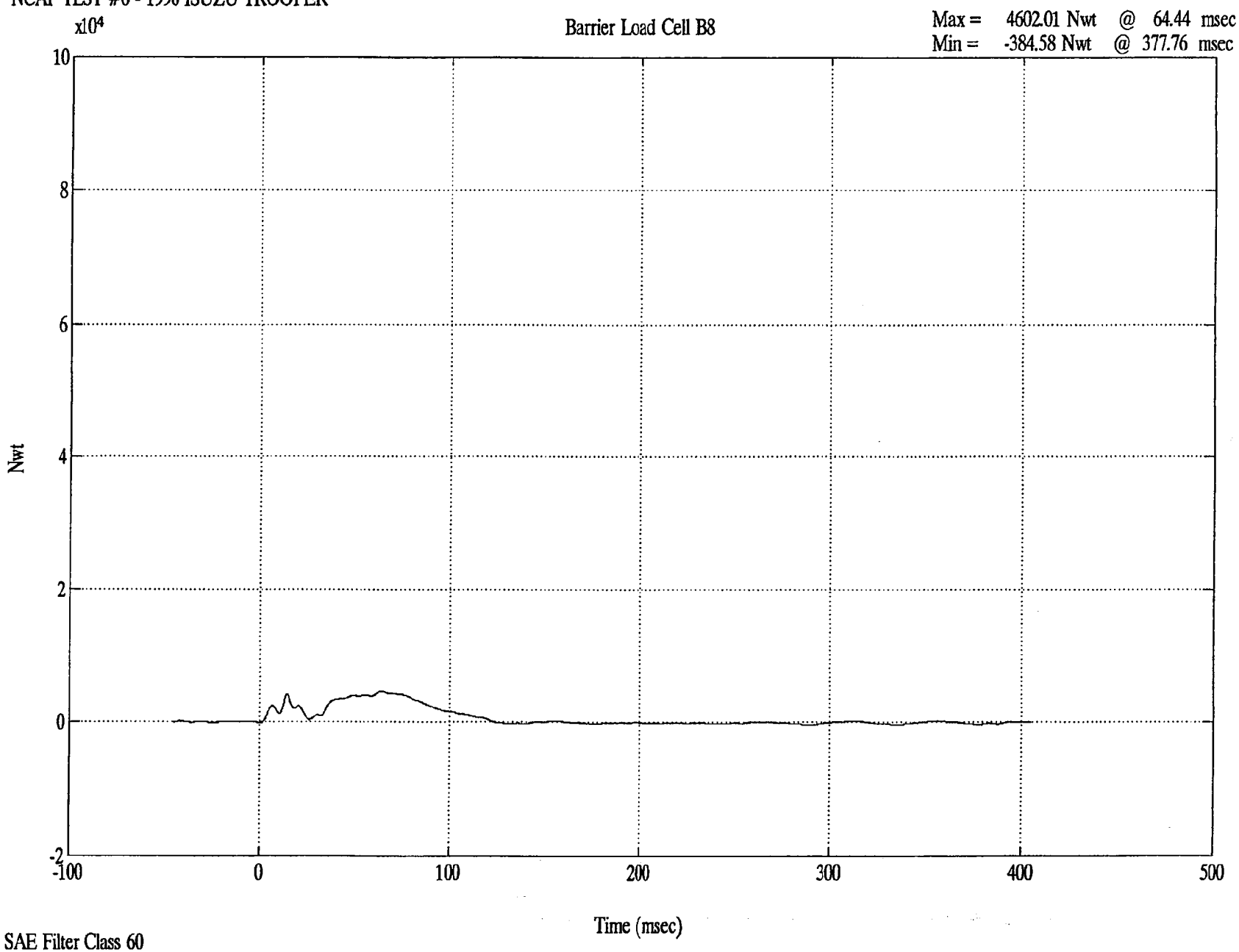
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

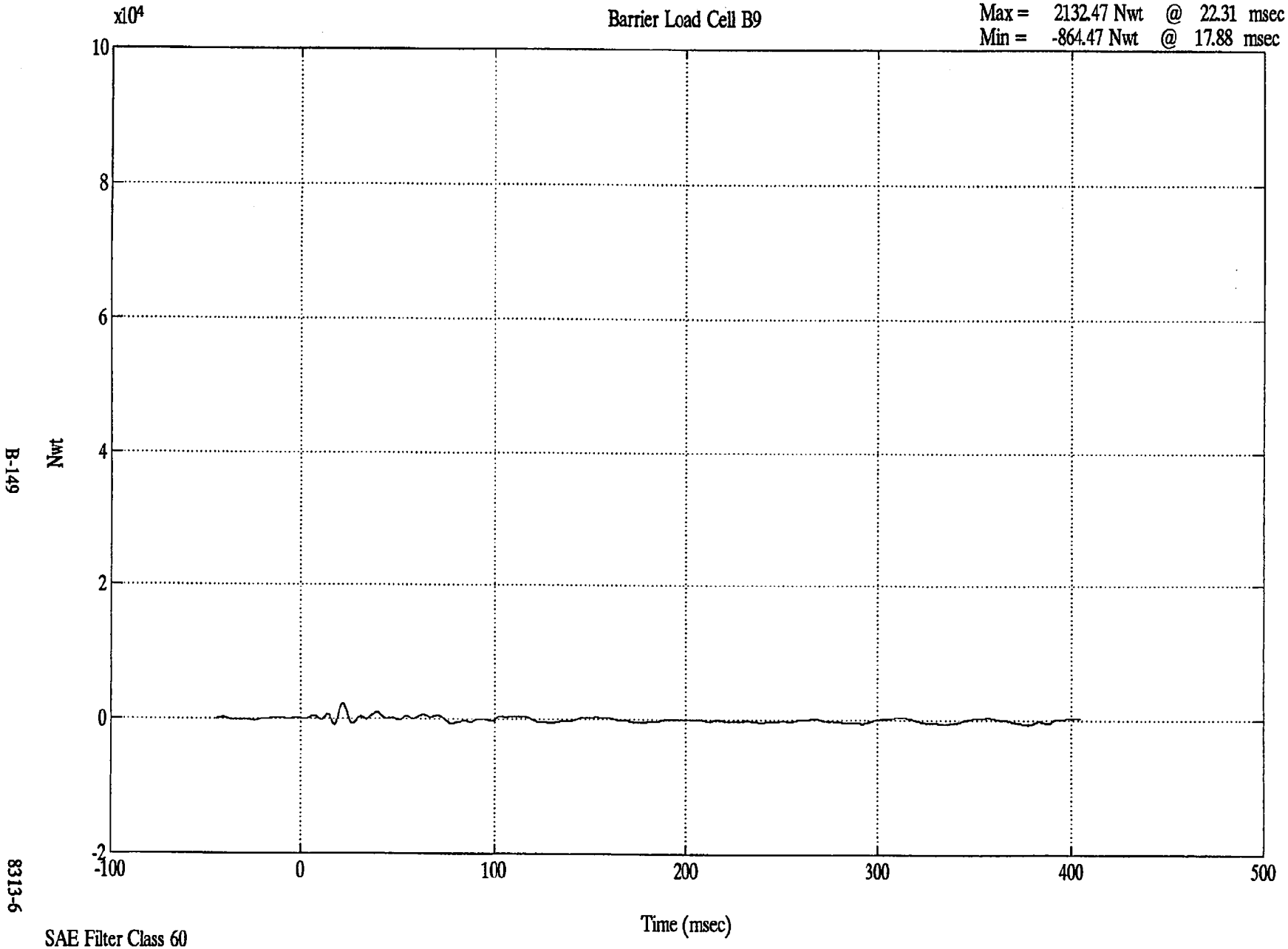
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

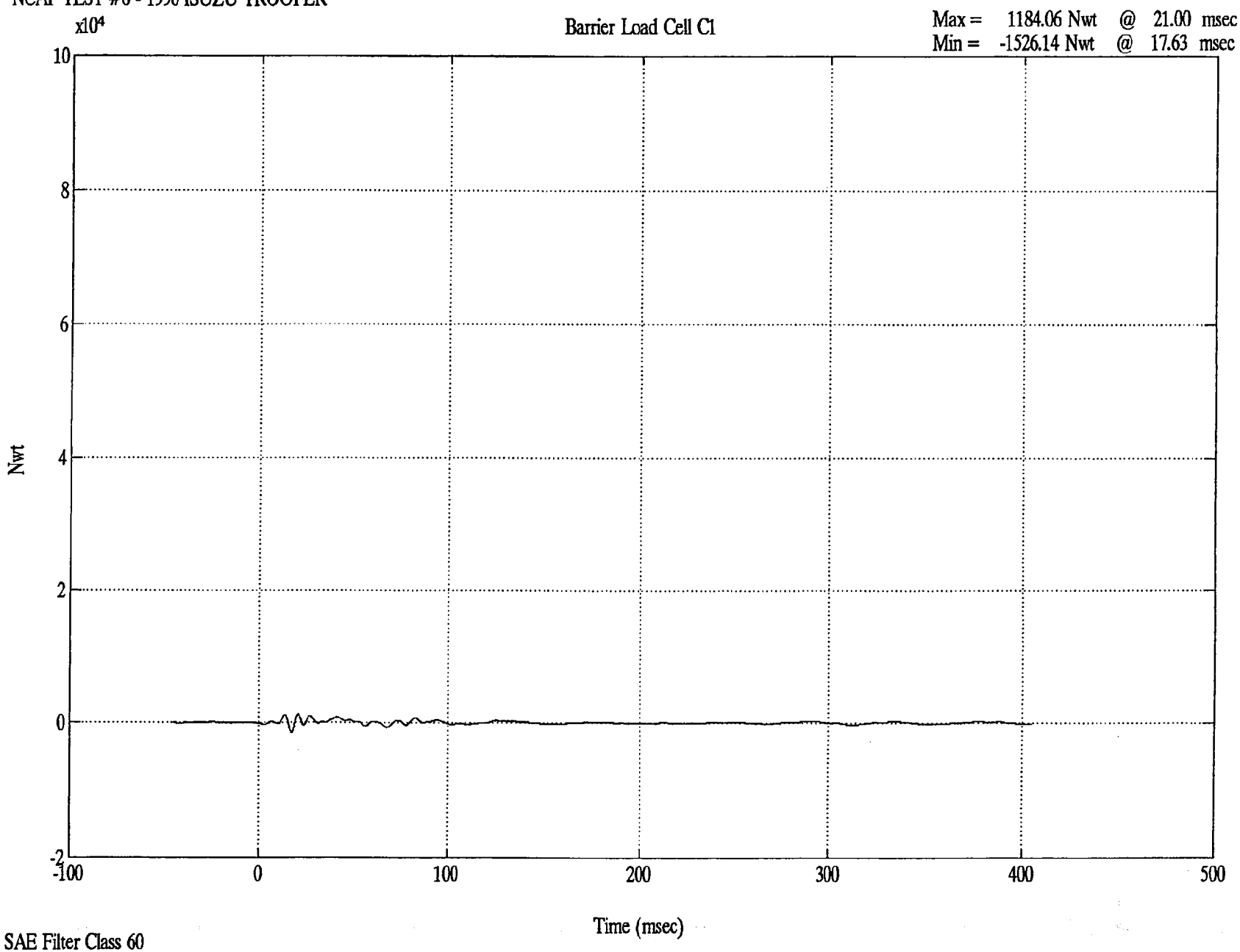


B-149

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

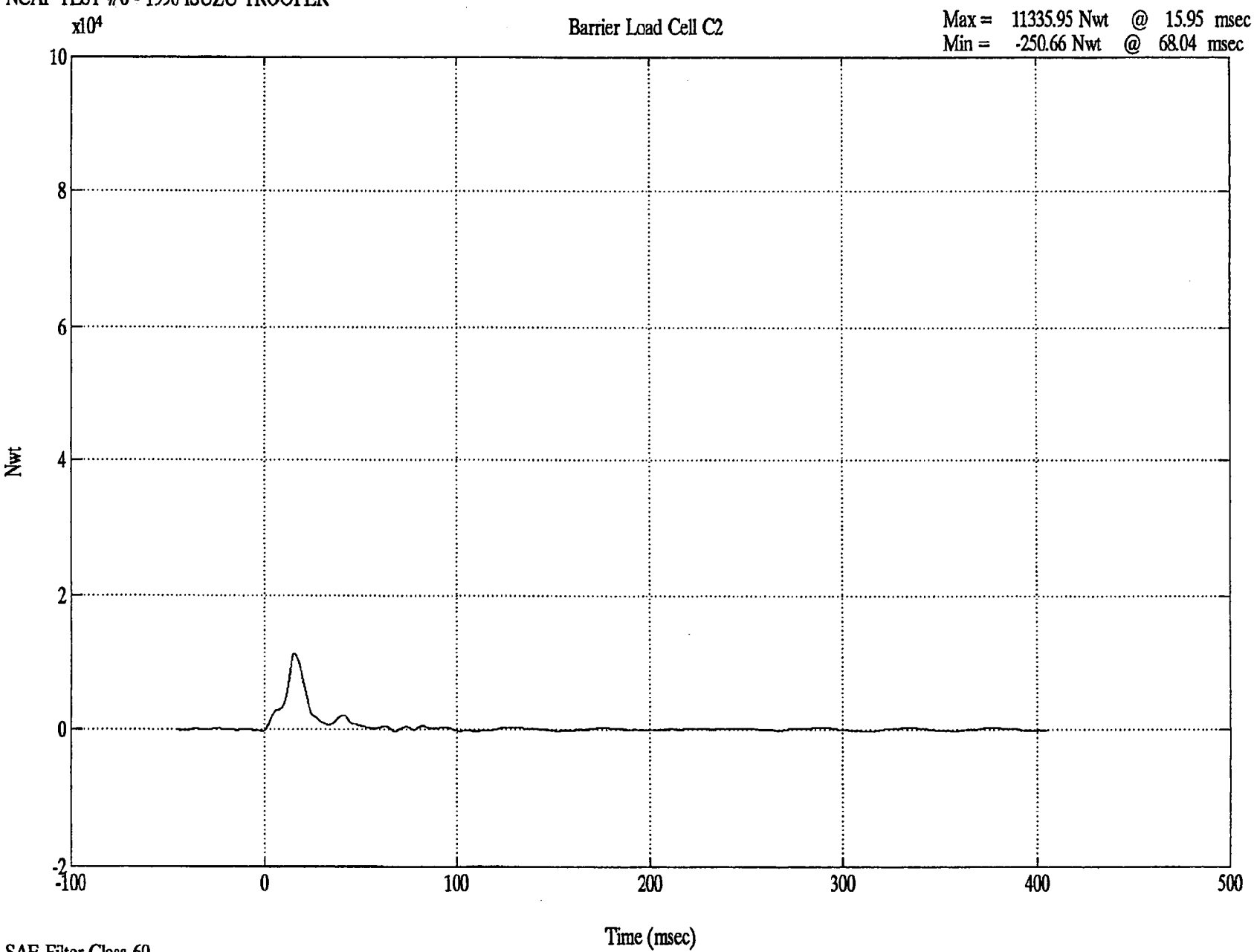


B-150

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

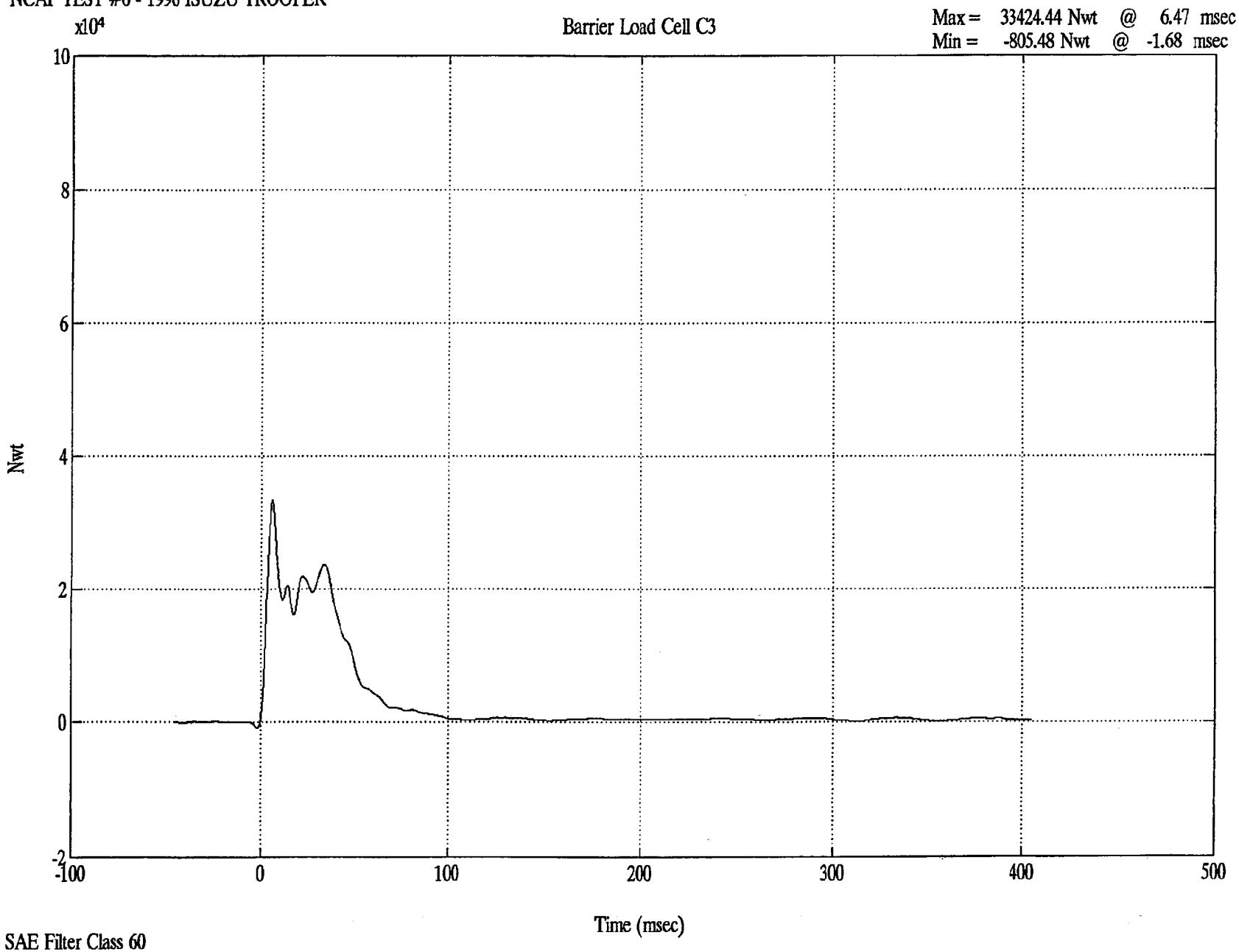


B-151

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

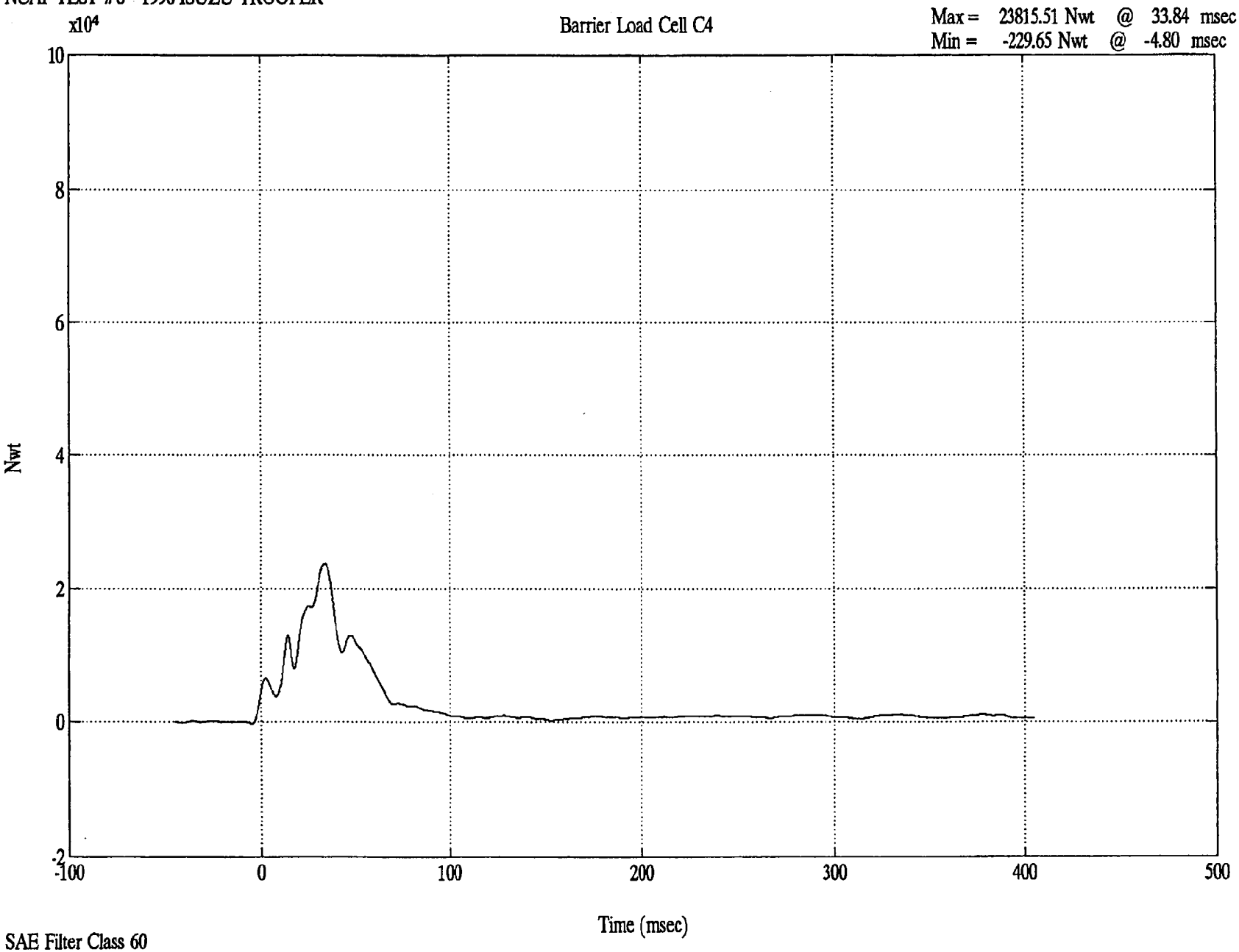


B-152

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

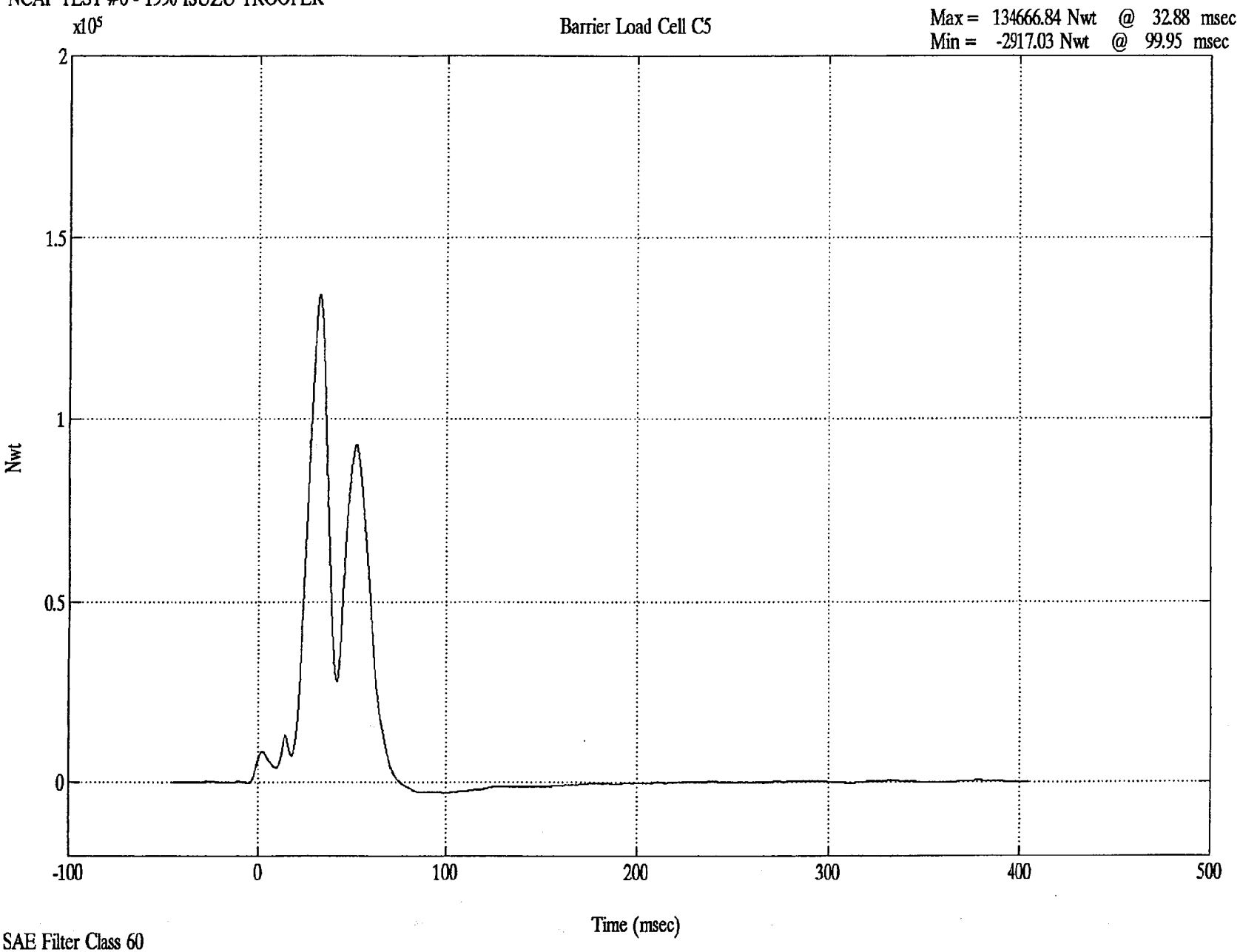


B-153

8313-6

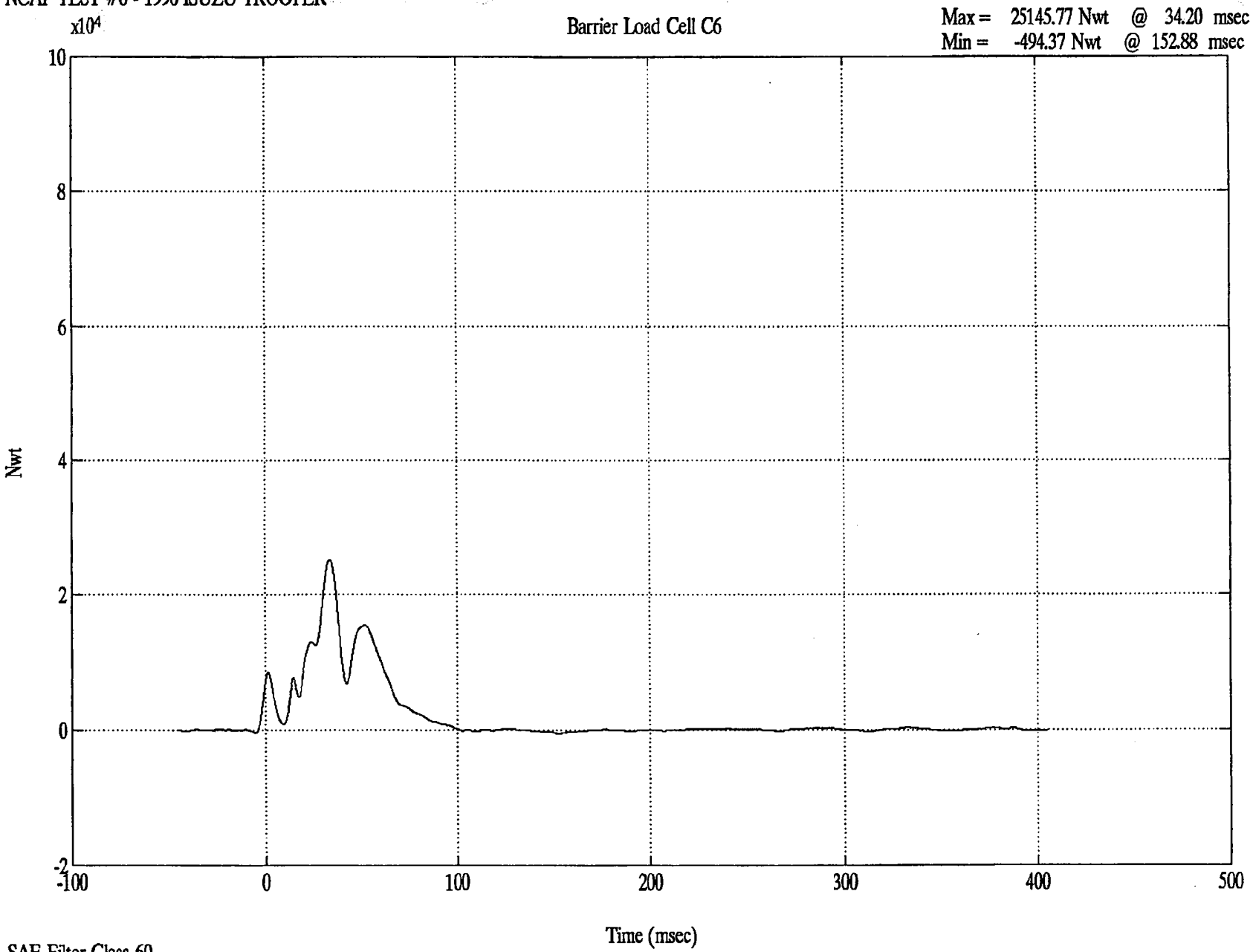
SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

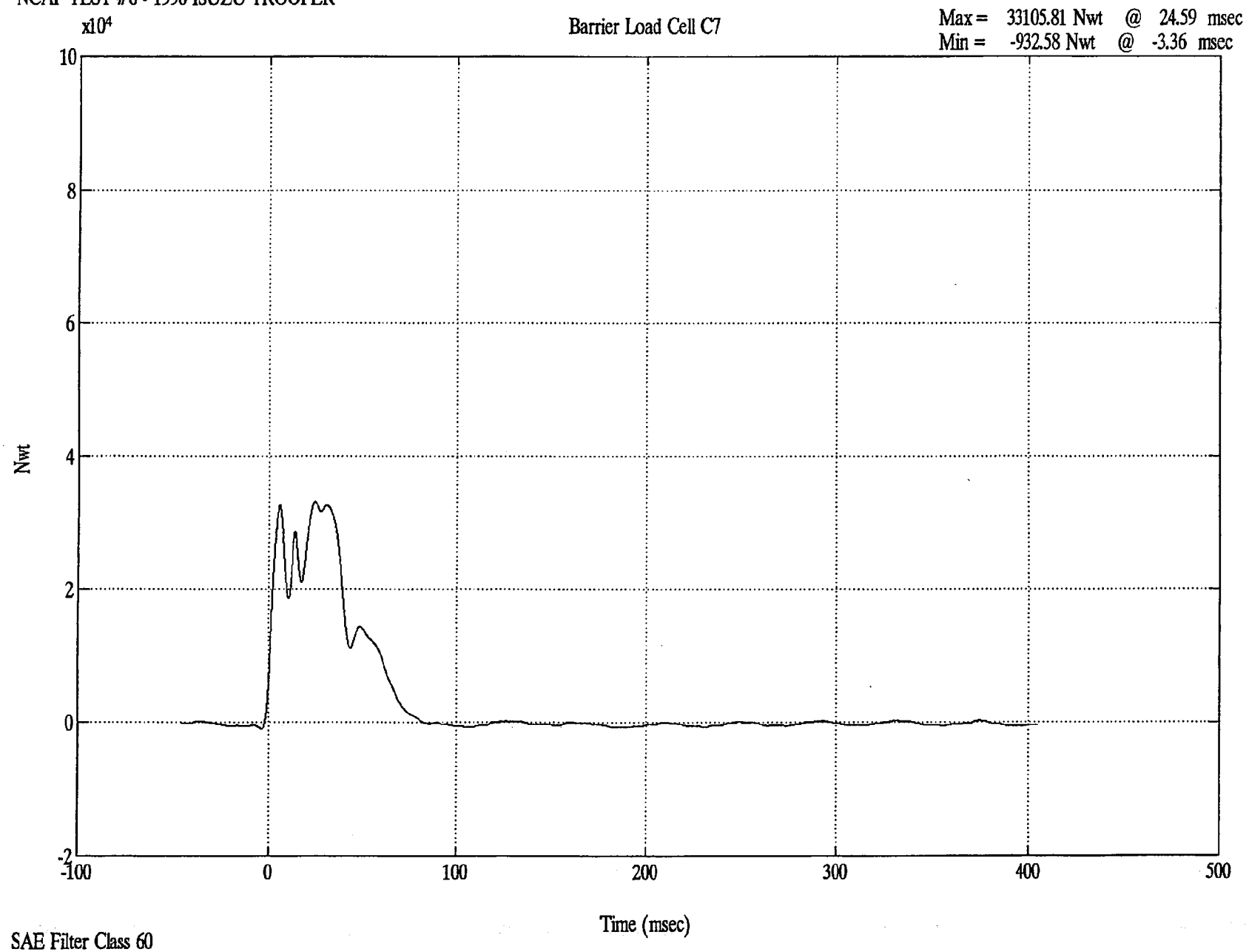


SAE Filter Class 60

B-155

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

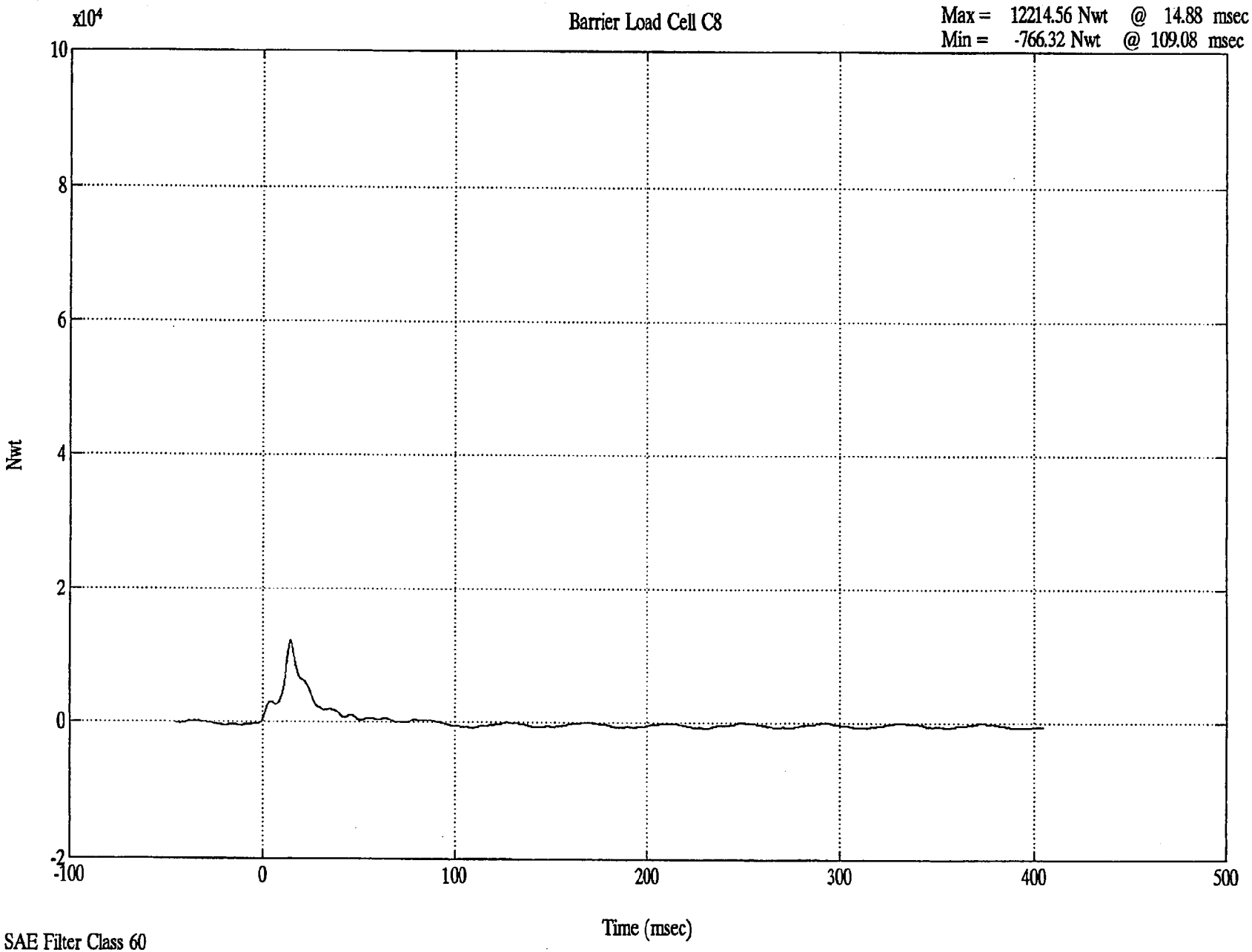


SAE Filter Class 60

B-156

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

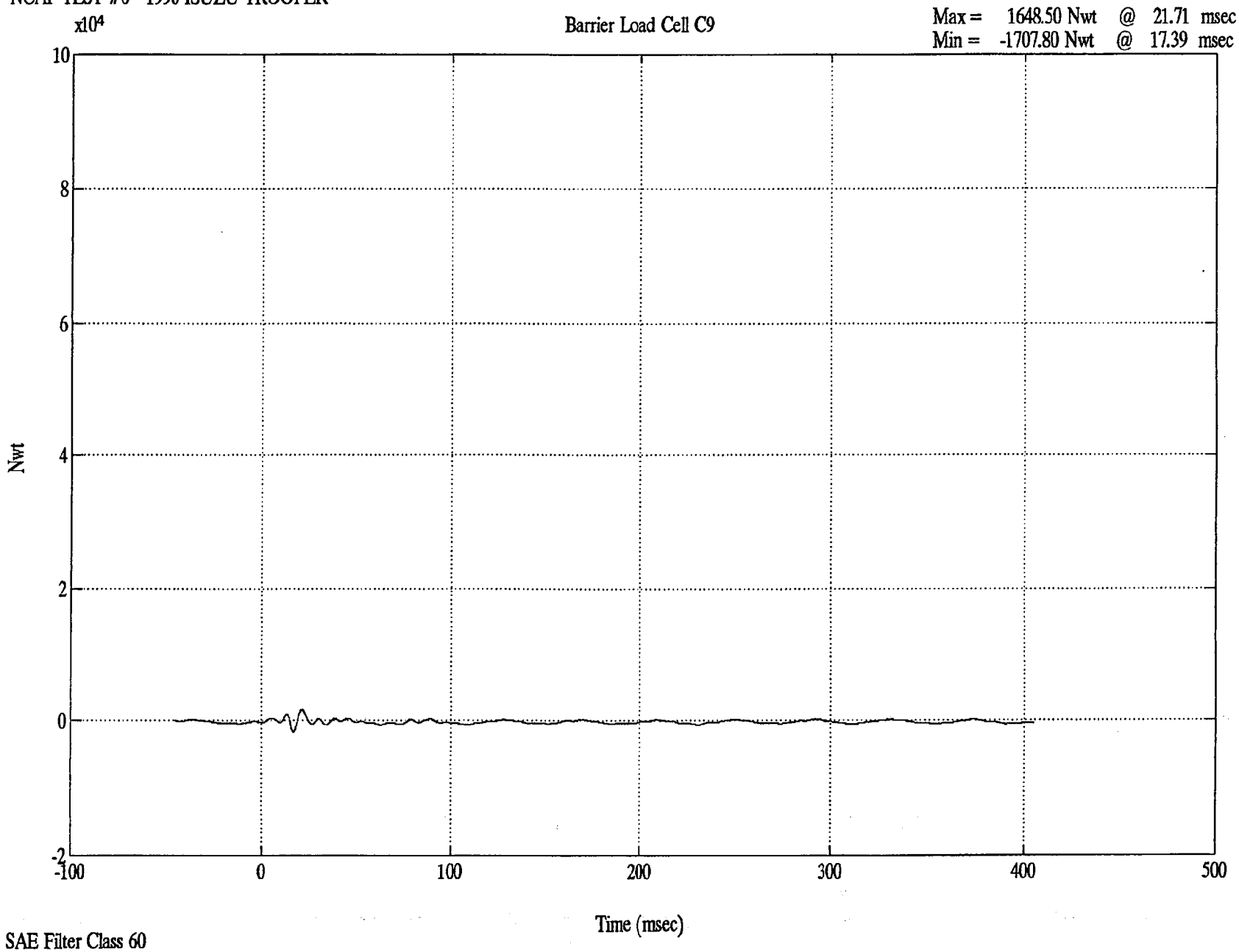


B-157

8313-6

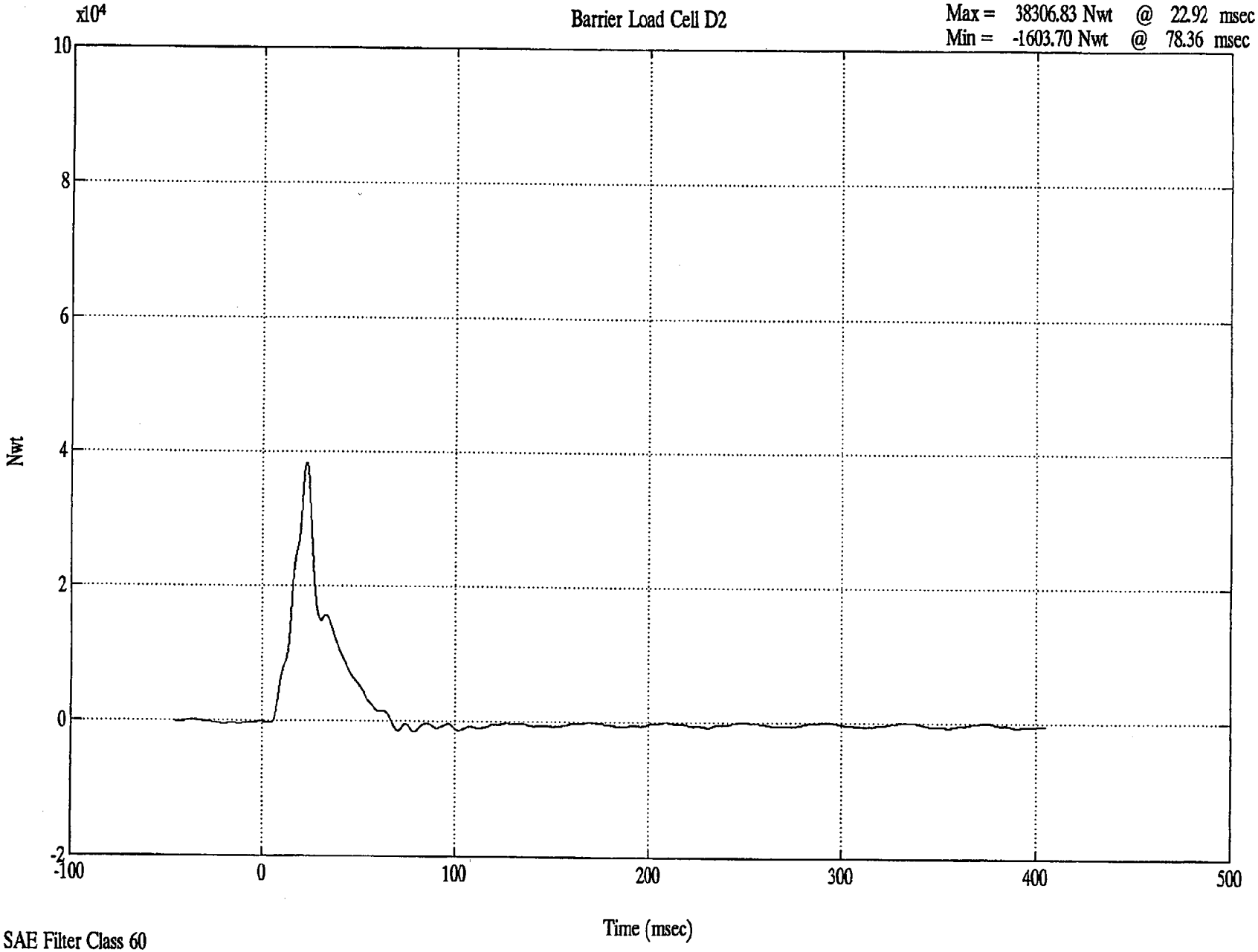
SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

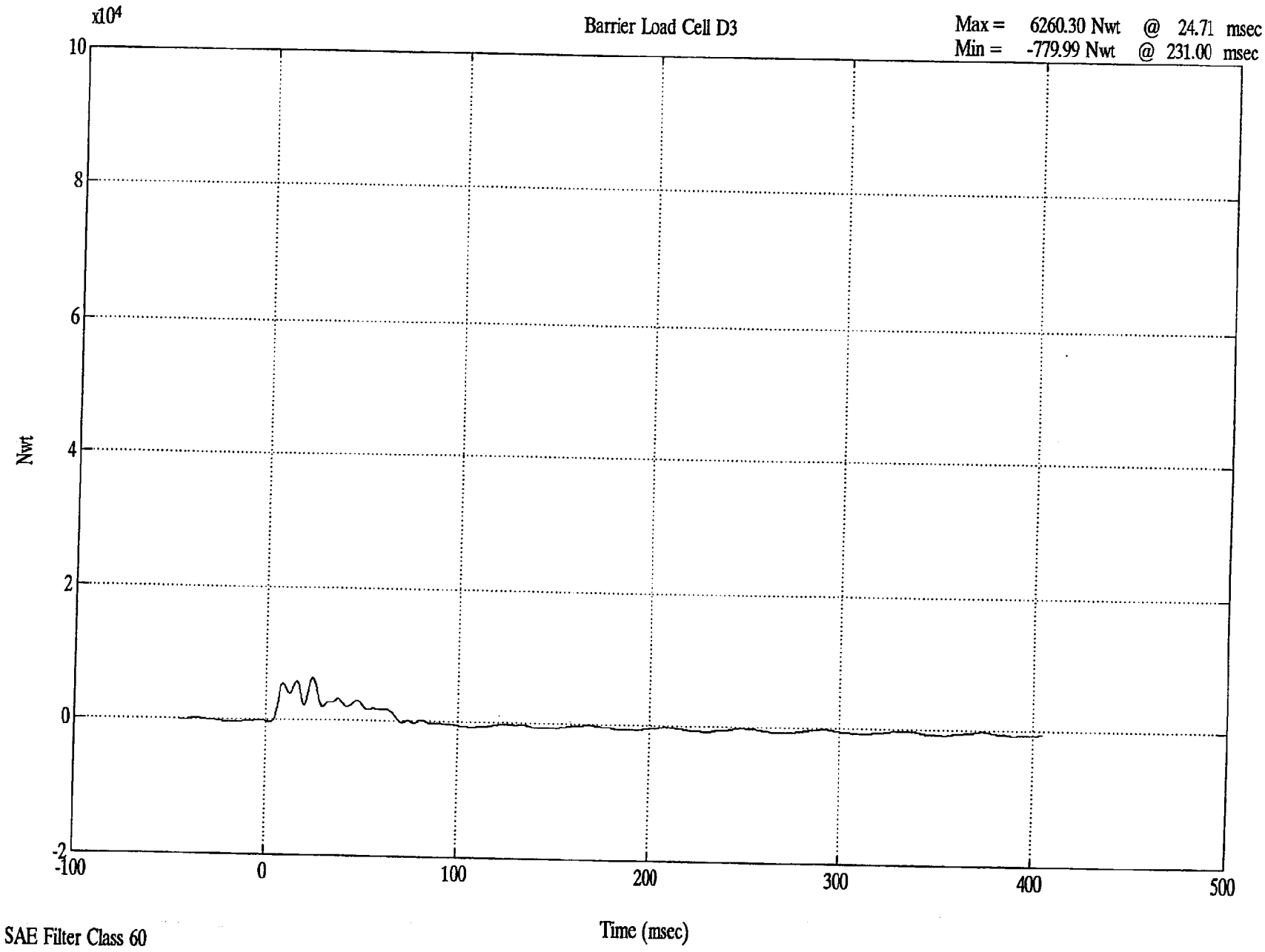


SAE Filter Class 60

B-159

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

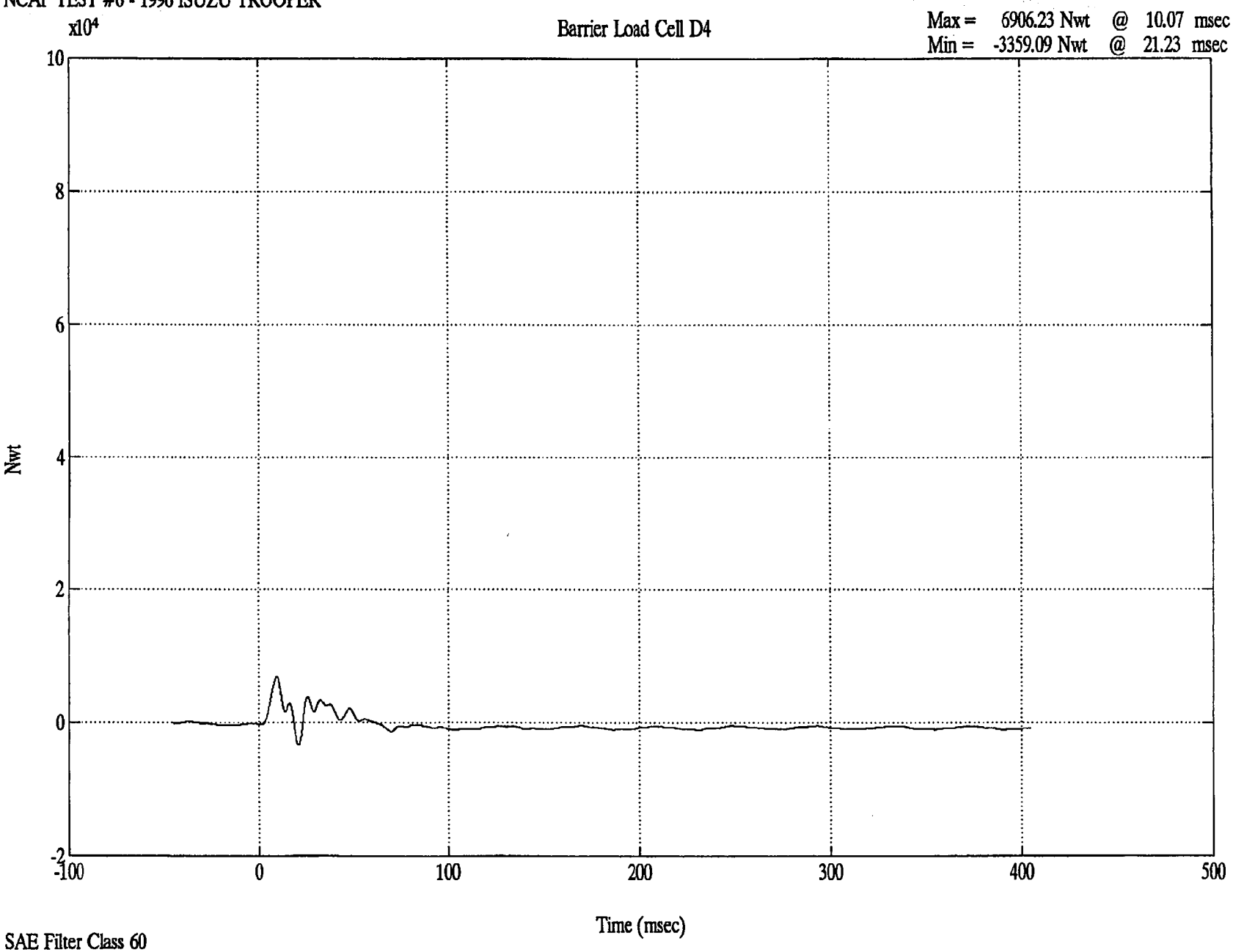


B-160

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

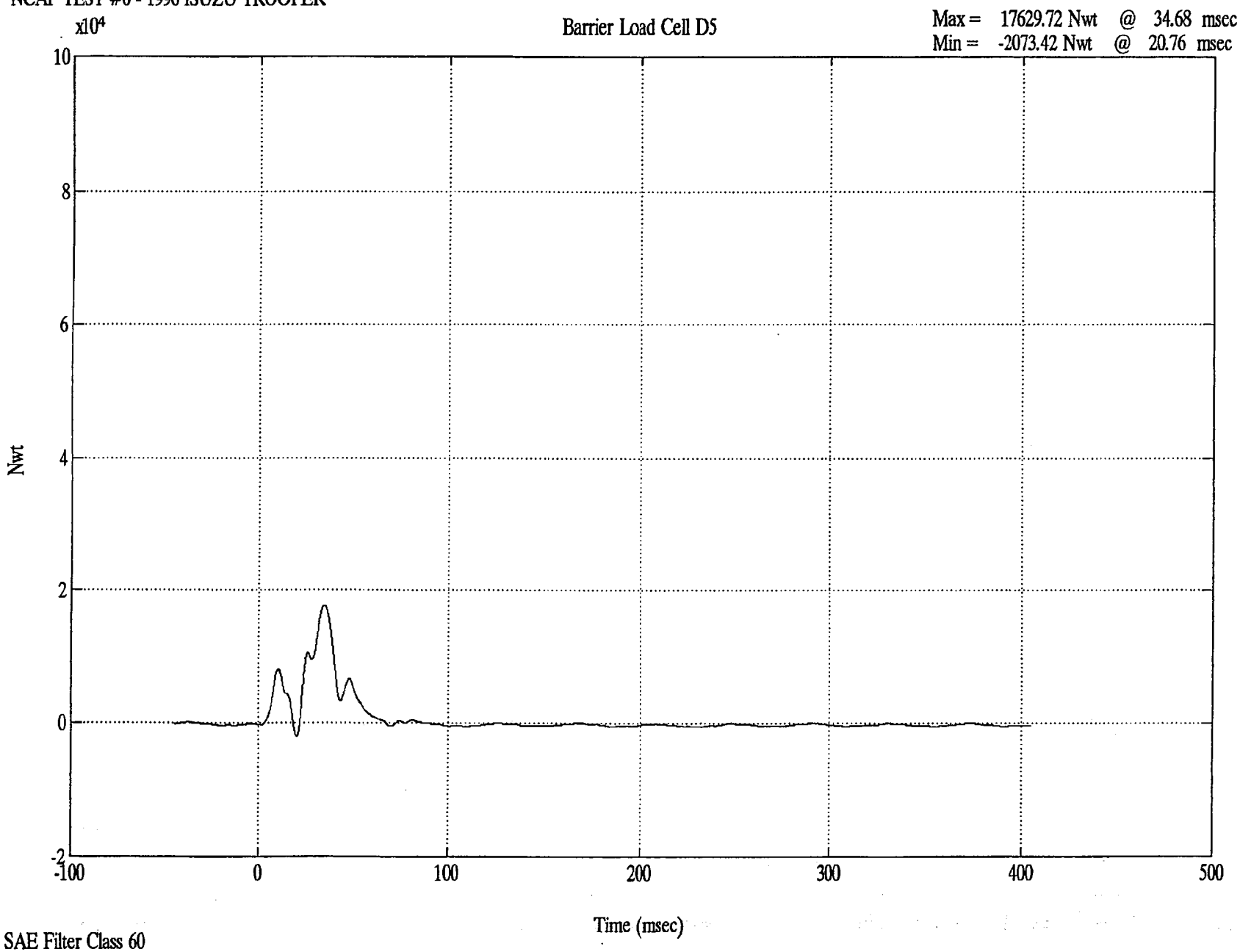


B-161

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

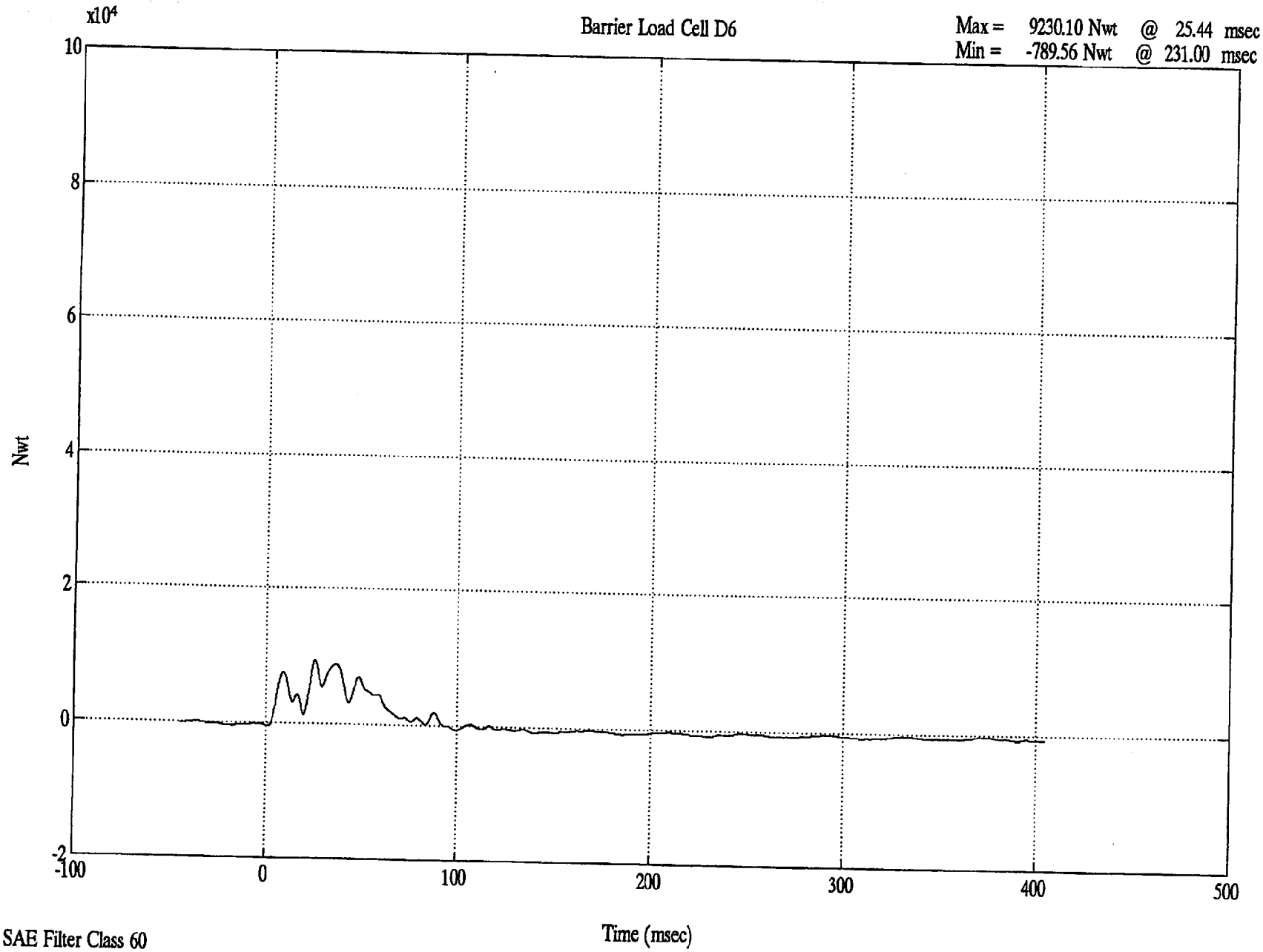


SAE Filter Class 60

B-162

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

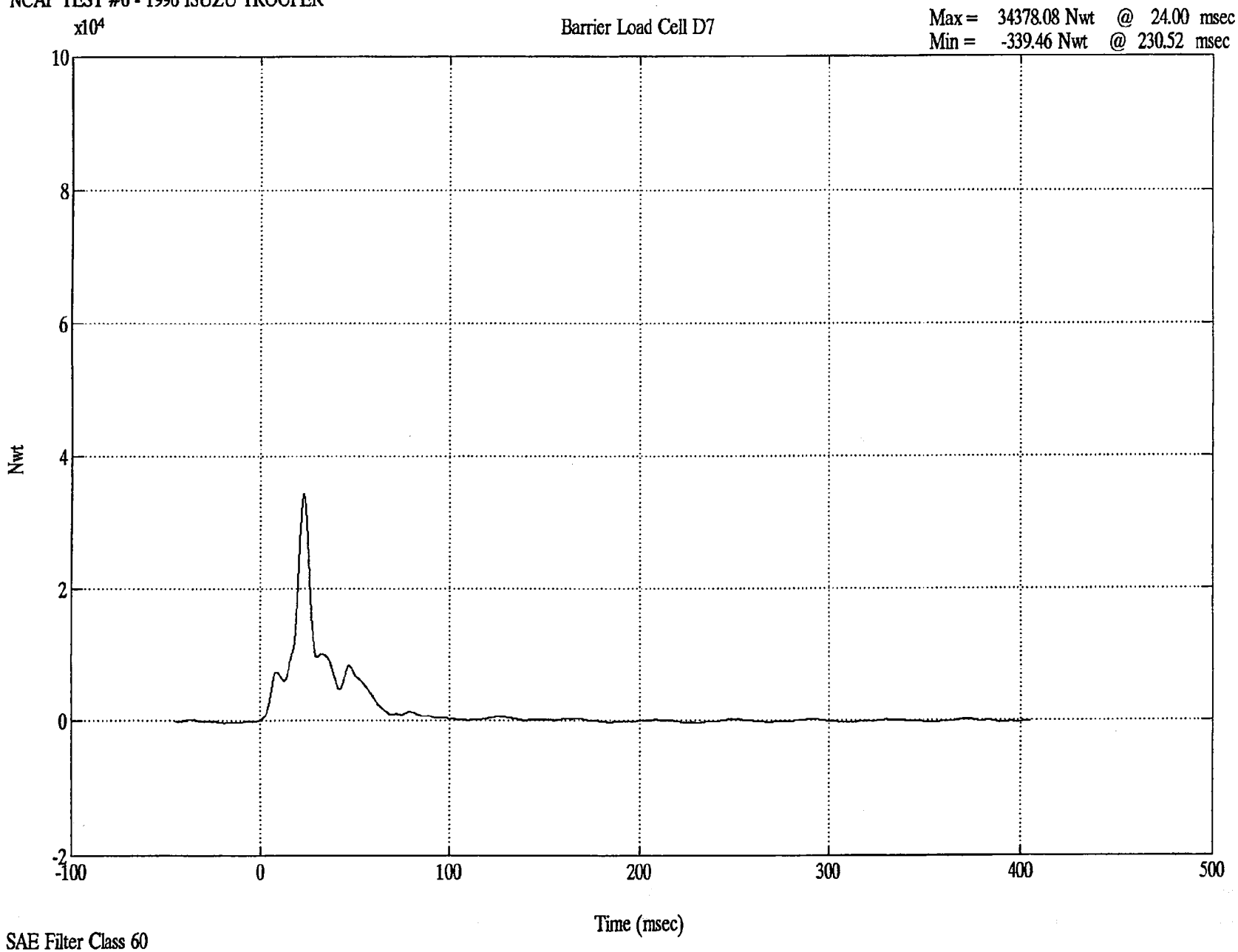


B-163

8313-6

SAE Filter Class 60

NCAP TEST #6 - 1996 ISUZU TROOPER

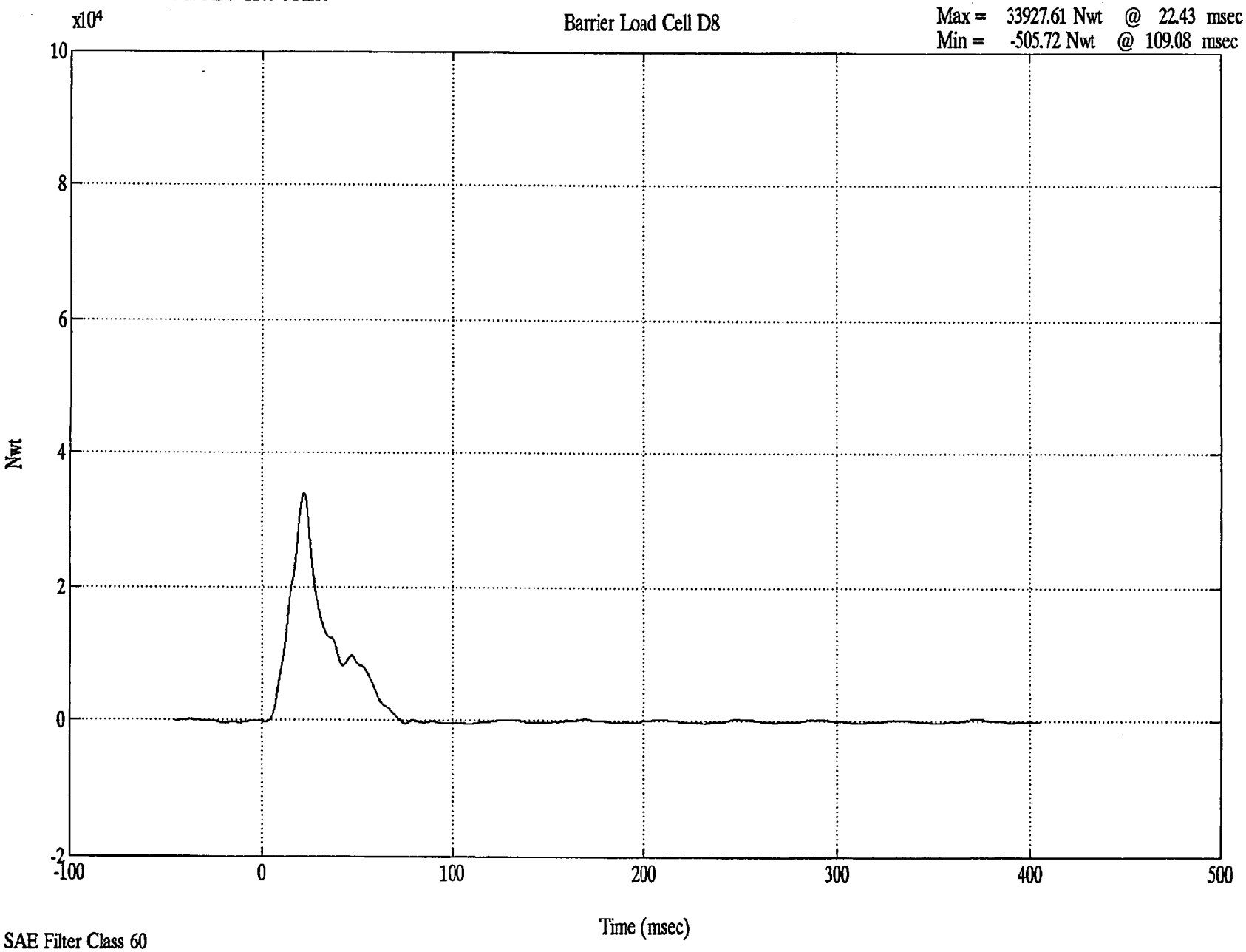


SAE Filter Class 60

B-164

8313-6

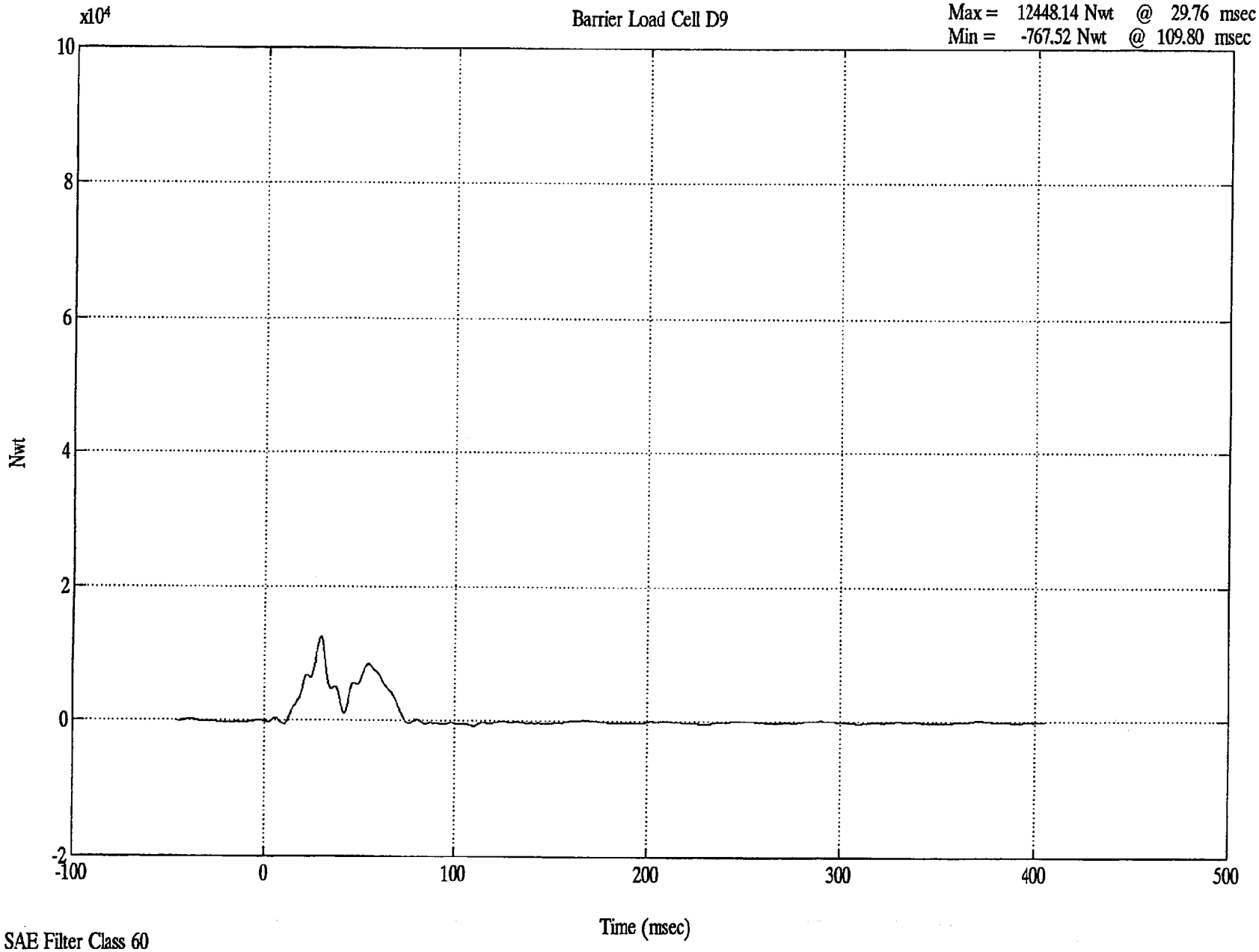
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

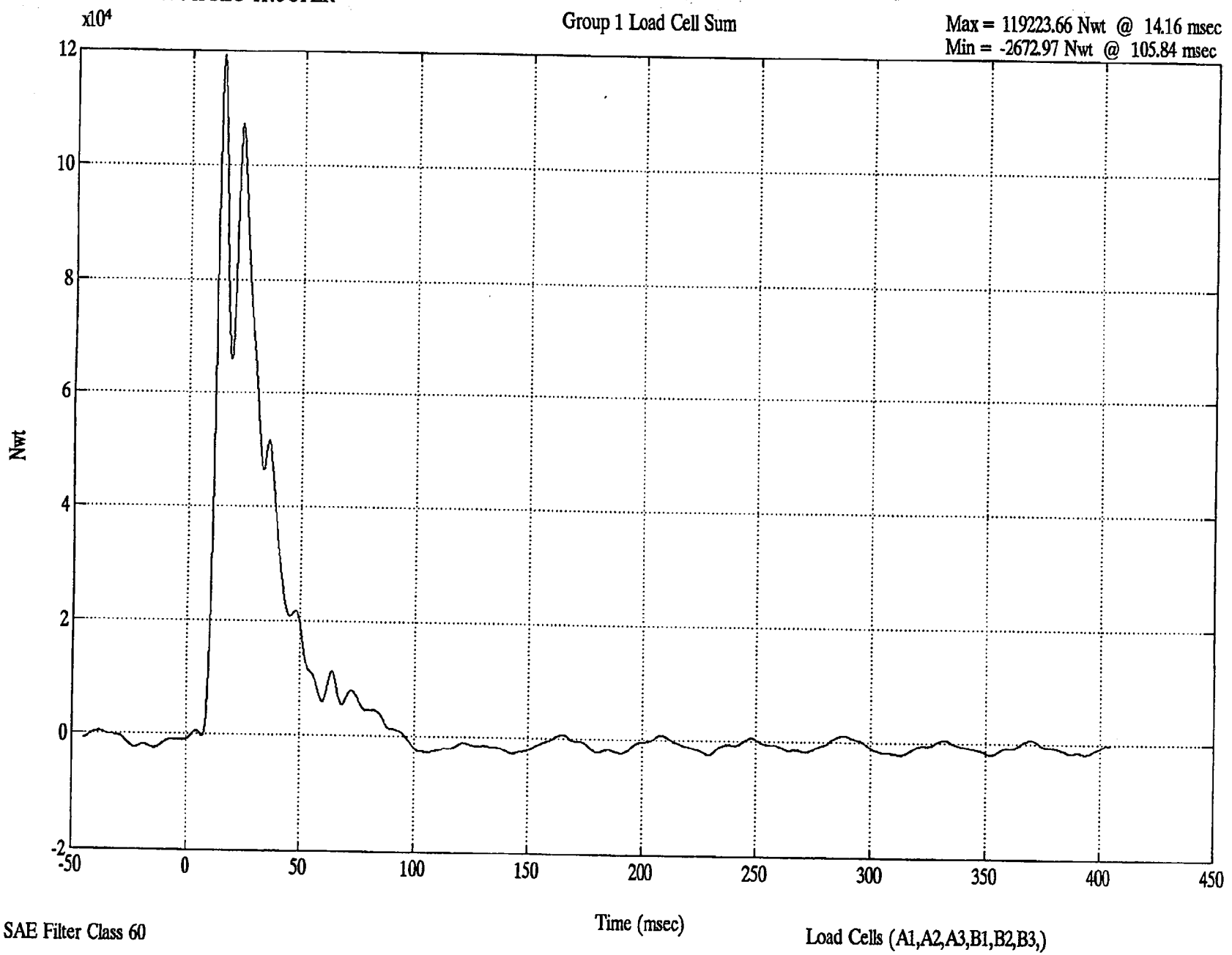
NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



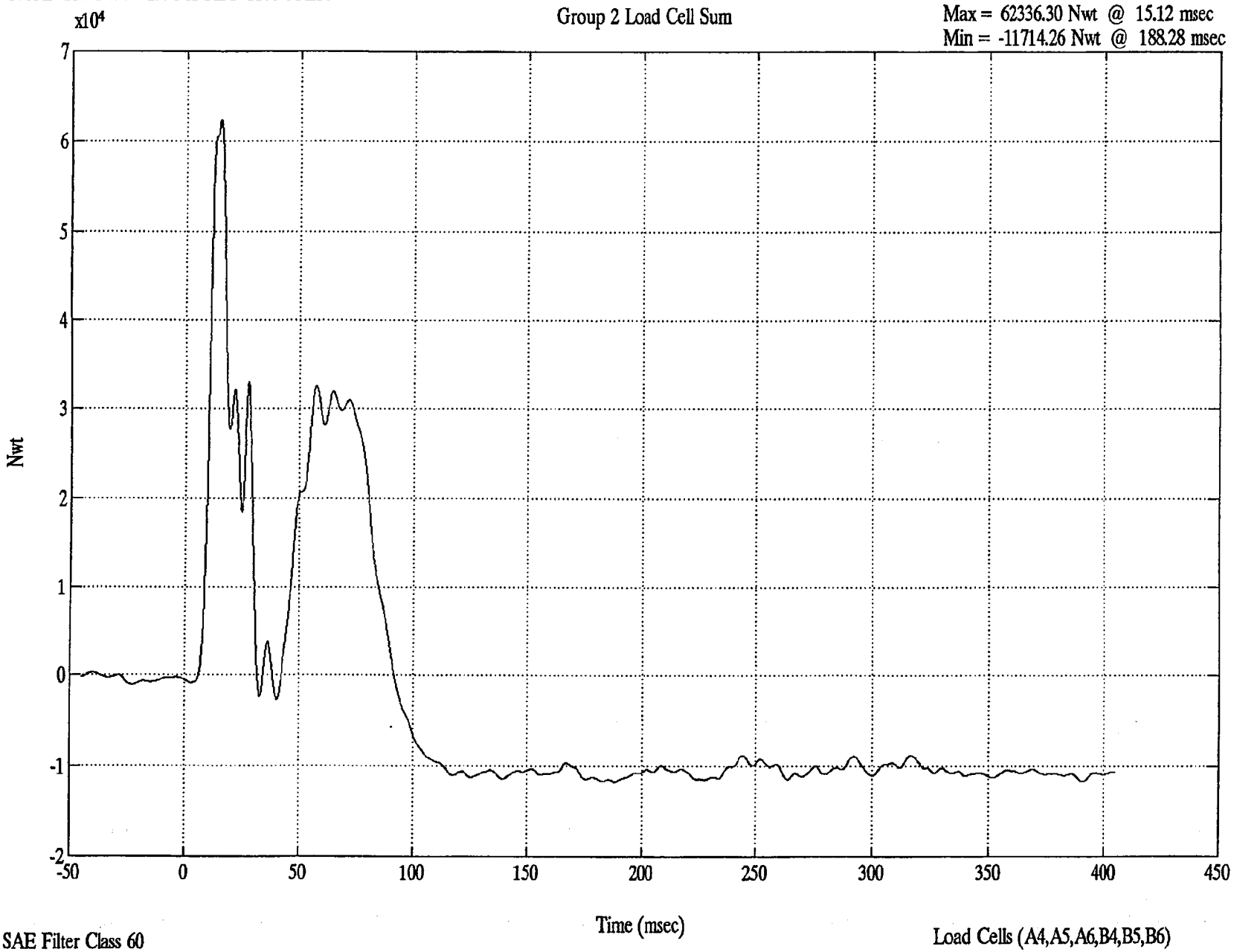
SAE Filter Class 60

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

B-167

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

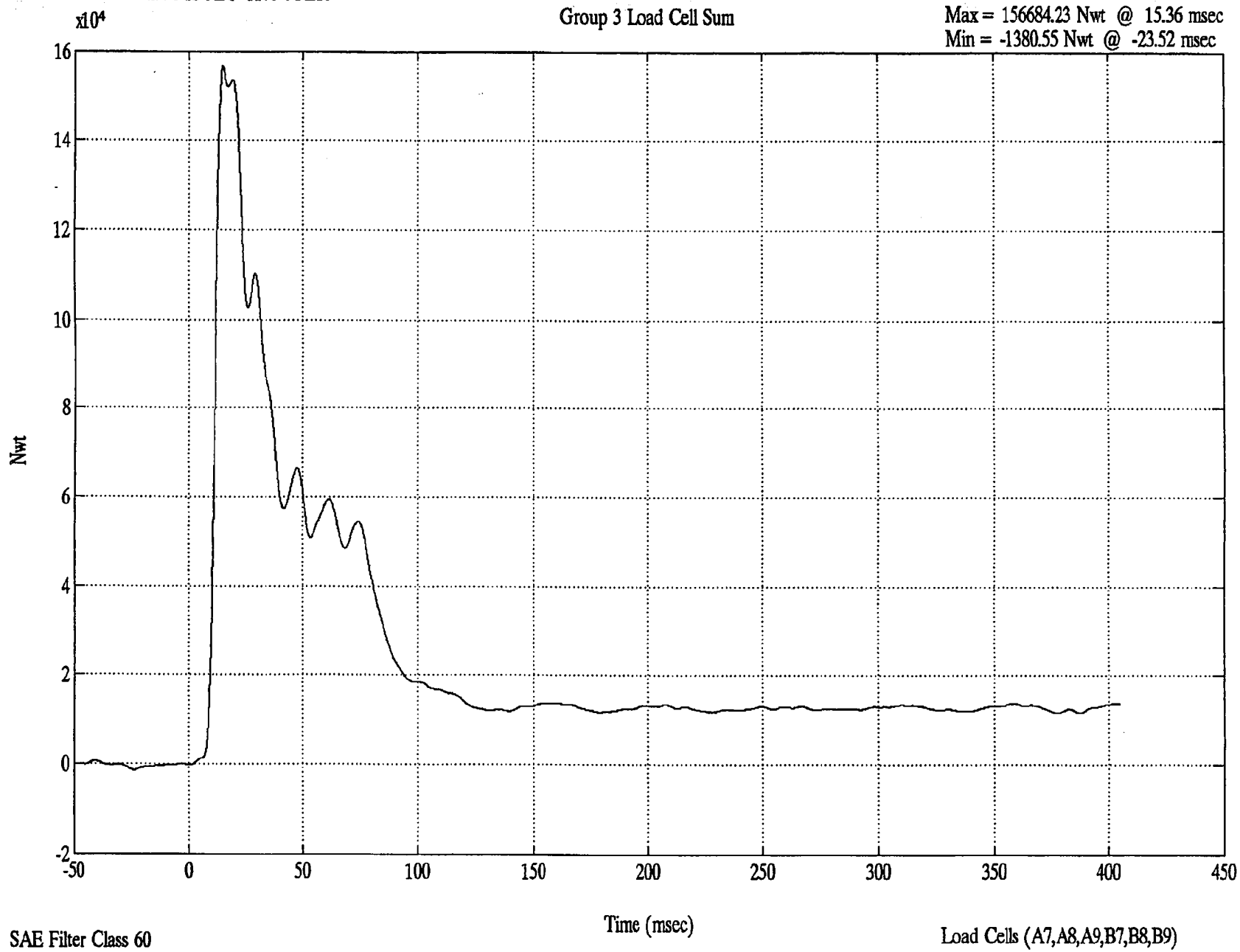


SAE Filter Class 60

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

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

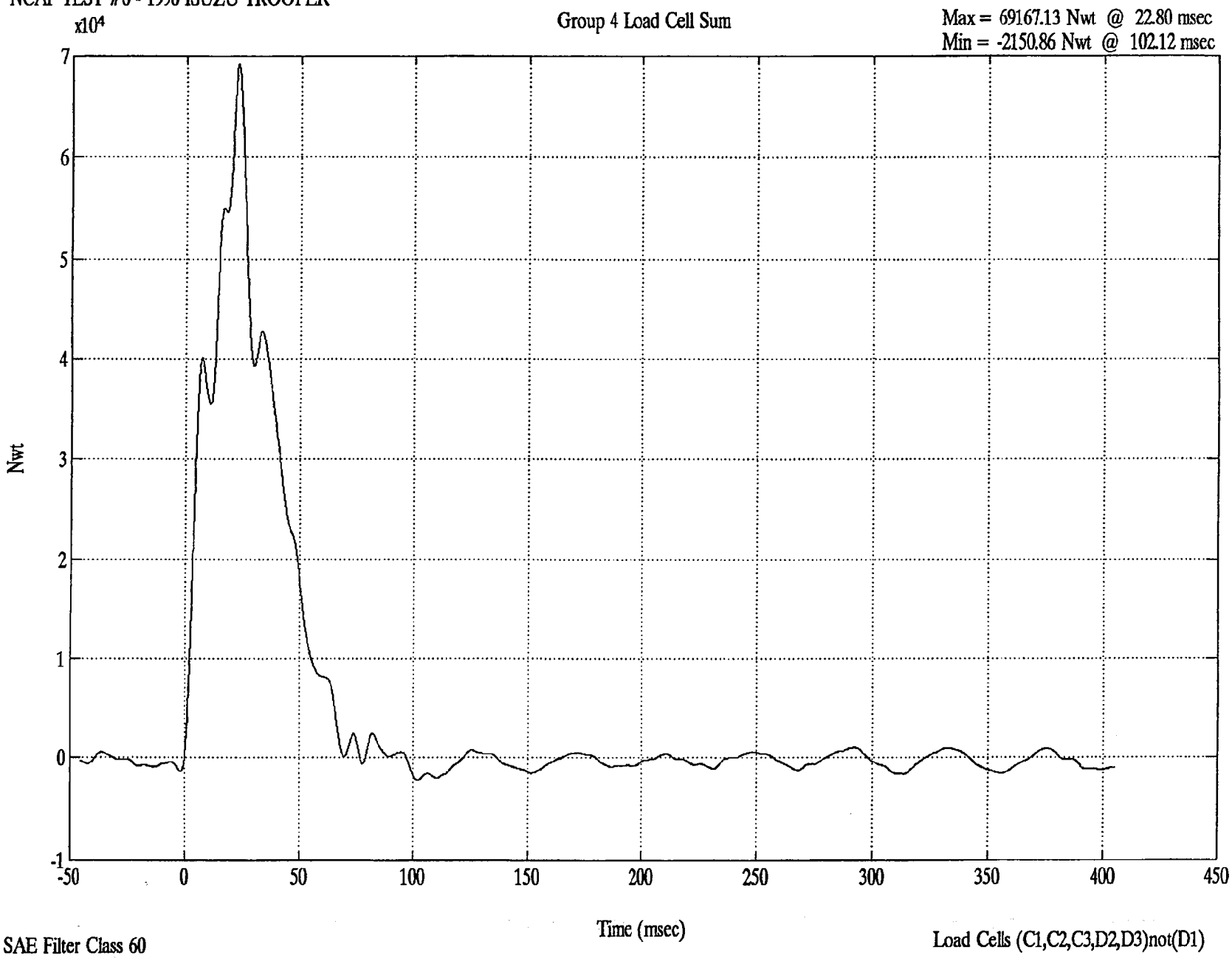


SAE Filter Class 60

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

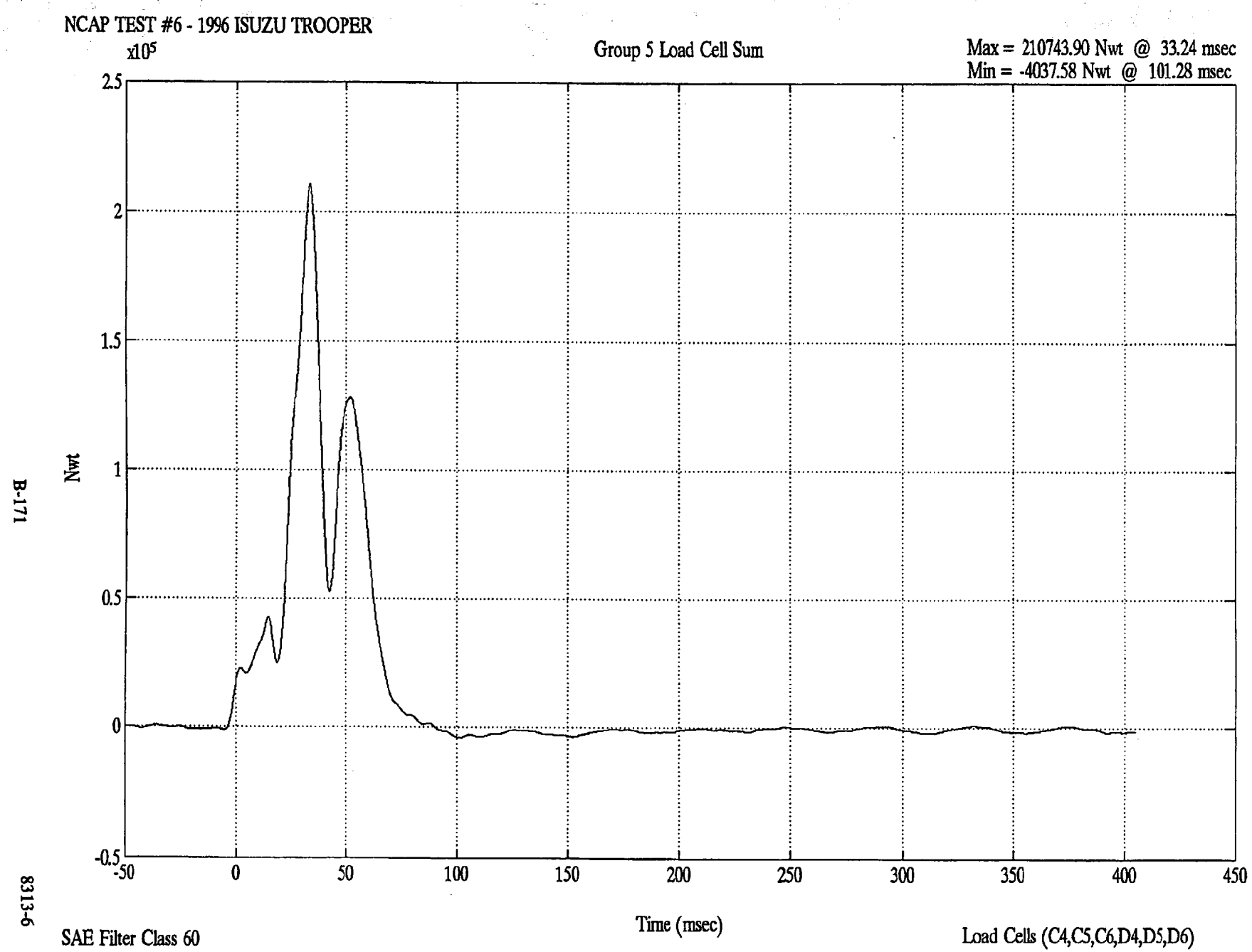
8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER

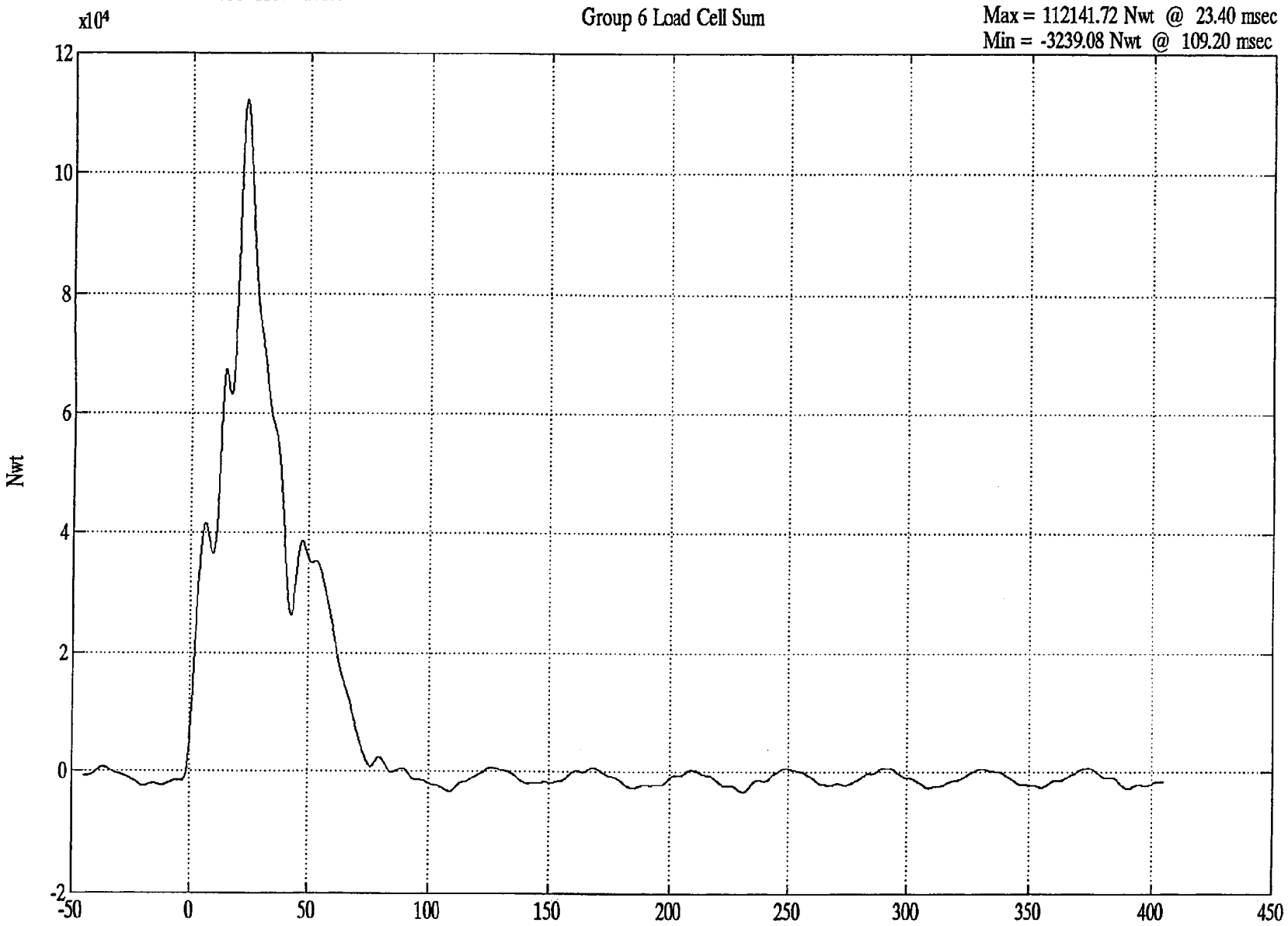


SAE Filter Class 60

Load Cells (C1,C2,C3,D2,D3)not(D1)


NCAP TEST #6 - 1996 ISUZU TROOPER
x10^5
Group 5 Load Cell Sum
Max = 210743.90 Nwt @ 33.24 msec
Min = -4037.58 Nwt @ 101.28 msec
Nwt
2.5
2
1.5
1
0.5
0
-0.5
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 60
Load Cells (C4,C5,C6,D4,D5,D6)

NCAP TEST #6 - 1996 ISUZU TROOPER



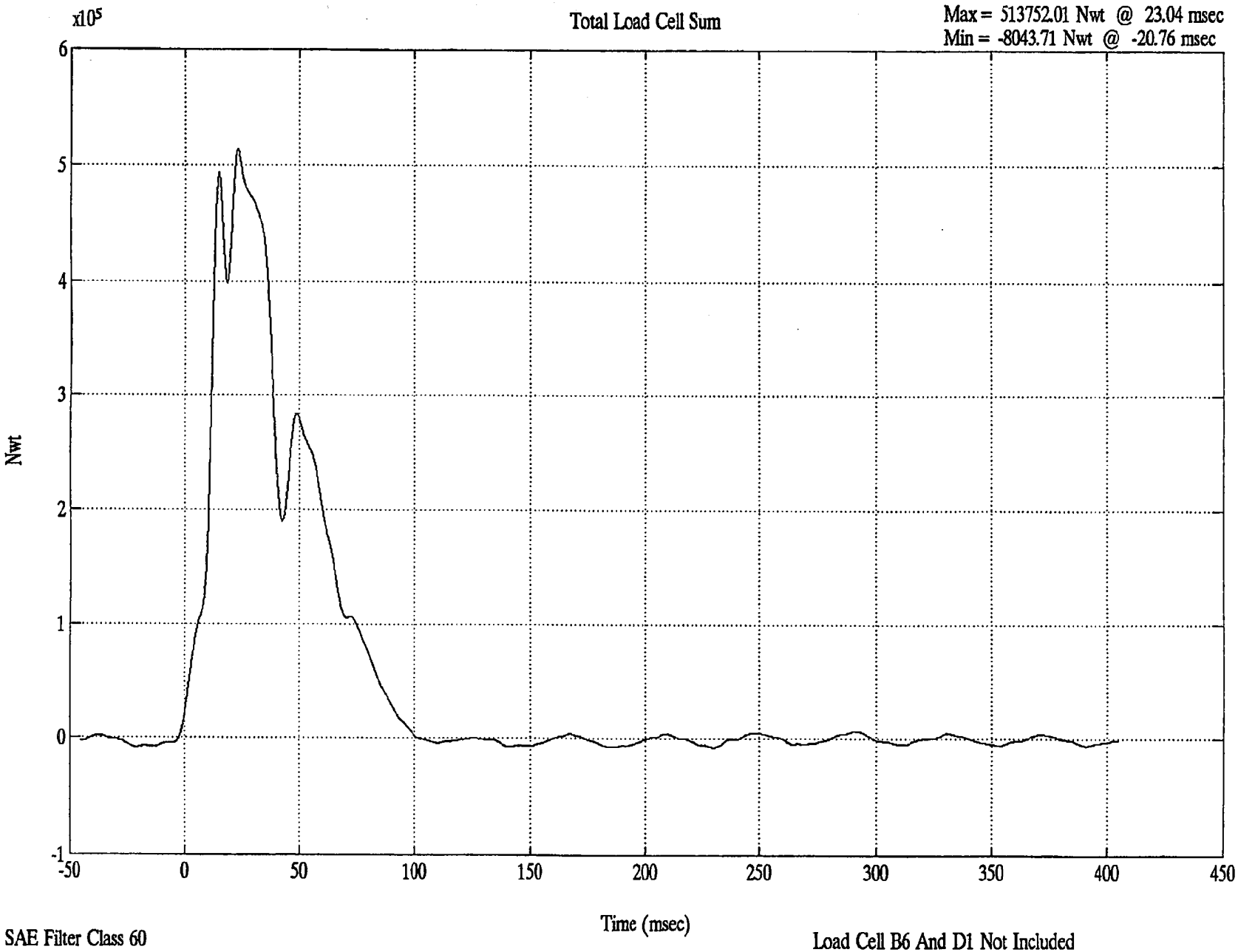
SAE Filter Class 60

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

B-172

8313-6

NCAP TEST #6 - 1996 ISUZU TROOPER



SAE Filter Class 60

Load Cell B6 And D1 Not Included

B-173

8313-6

Appendix C

PART 572B/E DUMMY CONFIGURATION

AND PERFORMANCE VERIFICATION DATA SHEETS

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

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

Dummy serial numbers and certification dates are:

Position No./Location	Serial No.	Completion Date
#1/Driver	150	2/28/96
#2/Right Front Passenger	064	2/28/96

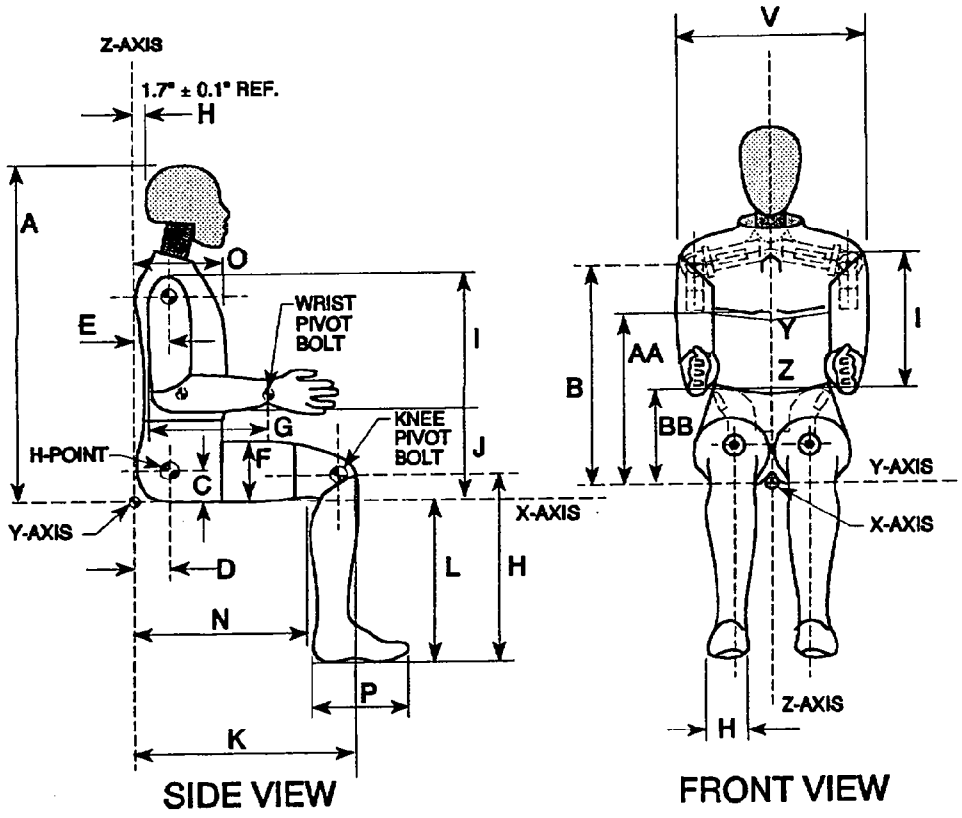
Electronic Test Equipment

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 14

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



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

HYBRID III EXTERNAL DIMENSIONS

S/N 150 HUMANOID

DUMMY SERIAL NO. 150 DATE: 2/28/96

TEMPERATURE		21 DEG. C
RELATIVE HUMIDITY		30 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	429-434 mm	432 mm
LOCATION FOR WAIST CIRCUMFERENCE (BB)	226-231 mm	228 mm
CHEST CIRCUMFERENCE (Y)	970-1001 mm	993 mm
WAIST CIRCUMFERENCE (Z)	836-866 mm	864 mm
CHEST DEPTH (O)	213-229 mm	213 mm
H-POINT HEIGHT (C)	84-89 mm	86 mm
H-POINT FROM SEAT BACK (D)	135-140 mm	137 mm
SKULL CAP TO BACKLINE (H)	41-46 mm	43 mm
TOTAL SITTING HEIGHT (A)	879-889 mm	886 mm
THIGH CLEARANCE (F)	140-155 mm	145 mm
BUTTOCK KNEE LENGTH (K)	580-605 mm	594 mm
BUTTOCK POPLITAL LENGTH (N)	452-477 mm	470 mm
POPLITEAL LENGTH (L)	430-455 mm	452 mm
KNEE PIVOT HEIGHT (M)	485-501 mm	498 mm
FOOT LENGTH (P)	252-267 mm	257 mm
FOOT BREADTH (W)	91-107 mm	96 mm
SHOULDER PIVOT FROM BACKLINE (E)	84-94 mm	94 mm
SHOULDER BREADTH (V)	422-437 mm	427 mm
SHOULDER PIVOT HEIGTH (B)	505-521 mm	513 mm
ELBOW REST HEIGHT (J)	190-211 mm	206 mm
SHOULDER-ELBOW LENGTH (I)	330-345 mm	335 mm
BACK OF ELBOW TO WRIST PIVOT (G)	290-305 mm	292 mm

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 2/27/96

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 150 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	235.3 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	12.8 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 2/27/96 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 150 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5-22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	30 %
IMPACT VELOCITY		24.8 - 25.7 KPH	25.45 KPH
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	23.97 G'S
	20 MS	17.60 - 22.60 G'S	21.7 G'S
	30 MS	12.50 - 18.50 G'S	15.91 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	15.91 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	34.88 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	70.03 DEG.
	TIME	57 - 64 MS	59.5 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88 - 108 N-M	102.6 N-M
	TIME	47 - 58 MS	49.5 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116.5 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 2/27/96 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 150 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	30 %
IMPACT VELOCITY		21.4 - 22.3 KPH	21.6 KPH
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	17.3 G'S
	20 MS	14.00 - 19.00 G'S	15.34 G'S
	30 MS	11.00 - 16.00 G'S	12.91 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	12.91 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	41.38 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	94.9 DEG.
	TIME	72 - 82 MS	78.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-80.0/-52.9 N-M	-66.3 N-M
	TIME	65 - 79 MS	72.5 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.5 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	147.5 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 2/26/96

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN 150 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PENDULUM VELOCITY	23.7 - 24.6 KPH	24.0 KPH
MAXIMUM DEFLECTION	64 - 73 mm	64.3 mm
MAXIMUM RESISTIVE FORCE	5160 - 5894 NEWTONS	5742 NEWTONS
INTERNAL HYSTERESIS	69% - 85%	75.7 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 2/28/96 KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 150 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5680 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 2/28/96 KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 150 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5573 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

HYBRID III EXTERNAL DIMENSIONS

S/N 064 HUMANOID

DUMMY SERIAL NO. 064 DATE: 2/28/96

TEMPERATURE			21 DEG. C
RELATIVE HUMIDITY			30 %
LOCATION FOR CHEST CIRCUMFERENCE	(AA)	429-434 mm	432 mm
LOCATION FOR WAIST CIRCUMFERENCE	(BB)	226-231 mm	229 mm
CHEST CIRCUMFERENCE	(Y)	970-1001 mm	986 mm
WAIST CIRCUMFERENCE	(Z)	836-866 mm	848 mm
CHEST DEPTH	(O)	213-229 mm	218 mm
H-POINT HEIGHT	(C)	84-89 mm	86 mm
H-POINT FROM SEAT BACK	(D)	135-140 mm	137 mm
SKULL CAP TO BACKLINE	(H)	41-46 mm	43.2 mm
TOTAL SITTING HEIGHT	(A)	879-889 mm	884 mm
THIGH CLEARANCE	(F)	140-155 mm	152 mm
BUTTOCK KNEE LENGTH	(K)	580-605 mm	602 mm
BUTTOCK POPLITAL LENGTH	(N)	452-477 mm	467 mm
POPLITEAL LENGTH	(L)	430-455 mm	442 mm
KNEE PIVOT HEIGHT	(M)	485-501 mm	493 mm
FOOT LENGTH	(P)	252-267 mm	257 mm
FOOT BREADTH	(W)	91-107 mm	96.5 mm
SHOULDER PIVOT FROM BACKLINE	(E)	84-94 mm	91.4 mm
SHOULDER BREADTH	(V)	422-437 mm	427 mm
SHOULDER PIVOT HEIGTH	(B)	505-521 mm	518 mm
ELBOW REST HEIGHT	(J)	190-211 mm	203 mm
SHOULDER-ELBOW LENGTH	(I)	330-345 mm	338 mm
BACK OF ELBOW TO WRIST PIVOT	(G)	290-305 mm	292 mm

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 2/27/96

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 064 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	231.7 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	4.8 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 2/27/96 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 064 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5-22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	30 %
IMPACT VELOCITY		24.8 - 25.7 KPH	25.6 KPH
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	24.31 G'S
	20 MS	17.60 - 22.60 G'S	19.71 G'S
	30 MS	12.50 - 18.50 G'S	16.04 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	16.04 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	35.13 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	71.27 DEG.
	TIME	57 - 64 MS	59.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88 - 108 N-M	106 N-M
	TIME	47 - 58 MS	50.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116.75 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 2/27/96 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 064 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY		10% - 70%	30 %
IMPACT VELOCITY		21.4 - 22.3 KPH	21.6 KPH
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	17.85 G'S
	20 MS	14.00 - 19.00 G'S	15.63 G'S
	30 MS	11.00 - 16.00 G'S	14.27 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	14.27 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	38.38 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	95.27 DEG.
	TIME	72 - 82 MS	74.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-80.0/-52.9 N-M	-69.4 N-M
	TIME	65 - 79 MS	73 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	154.25 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	146.13 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 2/26/96

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN 064 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.5 - 22.2 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PENDULUM VELOCITY	23.7 - 24.6 KPH	24.1 KPH
MAXIMUM DEFLECTION	64 - 73 mm	64.3 mm
MAXIMUM RESISTIVE FORCE	5160 - 5894 NEWTONS	5755 NEWTONS
INTERNAL HYSTERESIS	69% - 85%	74.5 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 2/28/96 KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 064 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5653 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 2/28/96 KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 3 HY3 SN: 064 KNEE 4.9 KGS CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19 - 25 DEG. C	21 DEG. C
RELATIVE HUMIDITY	10% - 70%	30 %
PROBE VELOCITY	7.5 - 7.7 KPH	7.68 KPH
PEAK KNEE IMPACT FORCE	4715 - 5782 N	5591 N
PROBE WEIGHT	4.9 KGS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN BRIAN SWIECICKI

Appendix D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY (S/N 150)		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X	ADL98	ENDEVCO	10/95	4/96
	Y	AE8K0	ENDEVCO	10/95	4/96
	Z	ADMB6	ENDEVCO	10/95	4/96
Chest	X	A26A	ENDEVCO	10/95	4/96
	Y	A27A	ENDEVCO	10/95	4/96
	Z	A51A	ENDEVCO	10/95	4/96
Right Femur Load Cell		952	GSE	1/96	7/96
Left Femur Load Cell		951	GSE	1/96	7/96
Neck Load Cell	X	269	DENTON	11/95	5/96
	Y	269	DENTON	11/95	5/96
	Z	269	DENTON	11/95	5/96
Neck Moment	X	269	DENTON	11/95	5/96
	Y	269	DENTON	11/95	5/96
	Z	269	DENTON	11/95	5/96
Chest Deflection Gauge		150	HUMANOID	1/96	7/96
Hybrid III Use Only					
Lap Belt Load Cells		706	LEBOW	1/96	7/96
Shoulder Belt Load Cells		707	LEBOW	1/96	7/96
Spool-Out Potentiometer		M7	MAGNETEK	11/95	5/96
Belt Stretch Transducer		E6	CALSPAN	11/95	5/96

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X (R)	AC827	ENDEVCO	9/95	3/96
	Y (R)	AC8F6	ENDEVCO	10/95	4/96
	Z (R)	ACCW0	ENDEVCO	9/95	3/96
Chest	X (R)	AHRC9	ENDEVCO	10/95	4/96
	Y (R)	AC7W8	ENDEVCO	2/96	8/96
	Z (R)	ACC06	ENDEVCO	10/95	4/96
Pelvic	X	AL6N5	ENDEVCO	1/96	7/96
	Y	AL6R7	ENDEVCO	1/96	7/96
	Z	A12C	ENDEVCO	1/96	7/96
Left Upper Tibia	Mx	38	DENTON	10/95	4/96
Left Upper Tibia	My	38	DENTON	10/95	4/96
Left Lower Tibia	Fy	32	DENTON	10/95	4/96
Left Lower Tibia	Fz	32	DENTON	10/95	4/96
Left Lower Tibia	Mx	32	DENTON	10/95	4/96
Right Upper Tibia	Mx	45	DENTON	10/95	4/96
Right Upper Tibia	My	45	DENTON	10/95	4/96
Right Lower Tibia	Fy	41	DENTON	10/95	4/96
Right Lower Tibia	Fz	41	DENTON	10/95	4/96
Right Lower Tibia	Mx	41	DENTON	10/95	4/96

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

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

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

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

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X (R)	AC7Y3	ENDEVCO	10/95	4/96
	Y (R)	AC824	ENDEVCO	10/95	4/96
	Z (R)	AC814	ENDEVCO	10/95	4/96
Chest	X (R)	AP1E0	ENDEVCO	2/96	8/96
	Y (R)	AJ9F8	ENDEVCO	2/96	8/96
	Z (R)	AP1A2	ENDEVCO	2/96	8/96
Pelvic	X	AH5F3	ENDEVCO	1/96	7/96
	Y	AL6H7	ENDEVCO	1/96	7/96
	Z	AL6C8	ENDEVCO	1/96	7/96
Left Upper Tibia	Mx	015	DENTON	10/95	4/96
Left Upper Tibia	My	015	DENTON	10/95	4/96
Left Lower Tibia	Fy	011	DENTON	10/95	4/96
Left Lower Tibia	Fz	011	DENTON	10/95	4/96
Left Lower Tibia	Mx	011	DENTON	10/95	4/96
Right Upper Tibia	Mx	016	DENTON	10/95	4/96
Right Upper Tibia	My	016	DENTON	10/95	4/96
Right Lower Tibia	Fy	012	DENTON	10/95	4/96
Right Lower Tibia	Fz	012	DENTON	10/95	4/96
Right Lower Tibia	Mx	012	DENTON	10/95	4/96

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY		Serial #	Manufacture	Calibration	
				Last	Next
Left Foot Front	Z	AKEB3	ENDEVCO	2/96	8/96
Left Foot Rear	X	AEYW0	ENDEVCO	9/95	3/96
Left Foot Rear	Z	AEW71	ENDEVCO	2/96	8/96
Right Foot Front	Z	AEWE3	ENDEVCO	1/96	7/96
Right Foot Rear	X	AEWJ5	ENDEVCO	1/96	7/96
Right Foot Rear	Z	AEWK1	ENDEVCO	1/96	7/96

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

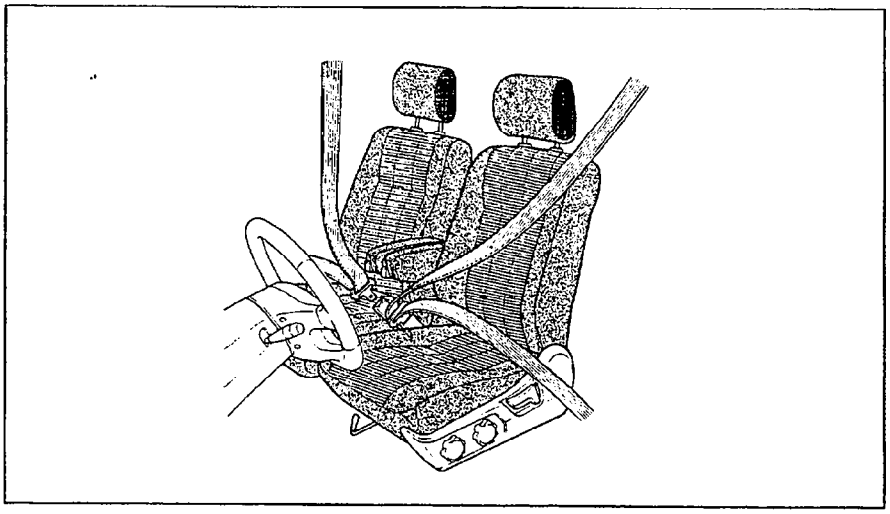
(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	Y25	ICS	1/96	7/96
Right Rear Seat Crossmember	X87	ICS	12/95	6/96
Top of Engine	Y15	ICS	1/96	7/96
Bottom of Engine	Y05	ICS	2/96	8/96
Left Disc Brake Caliper	A178	CEC	12/95	6/96
Right Disc Brake Caliper	A44	CEC	9/95	3/96
Instrument Panel	A89	CEC	9/95	3/96
Left Seat Rear Crossmember (R)	Y11	ICS	1/96	7/96
Right Seat Rear Crossmember (R)	X81	ICS	11/95	5/96

Appendix E

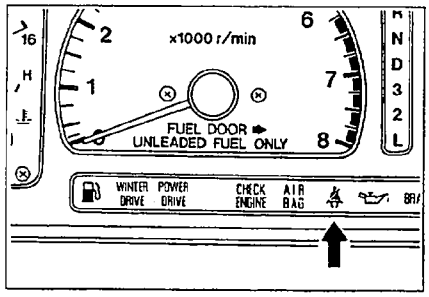
VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

3. *Seats, Seat belts and Air Bags* / D SEAT BELTS



❶ SEAT BELT REMINDER

When the key is turned to the "ON" position, a light will be illuminated until the driver's seat belt is buckled. Unless the driver's seat belt is buckled, a buzzer will sound for four to eight seconds.



❷ FRONT AND REAR SEAT LAP/ SHOULDER BELTS

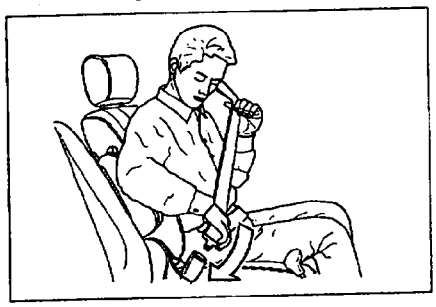
Safety Belt/Air Bag Relationship
The Air Bag is formally called a Supplemental Restraint System (SRS). Both the driver and the right front passenger must always use the seat belts even though the vehicle is equipped with front seat air bags. That's true not only in frontal collisions, but especially in side and other collisions.

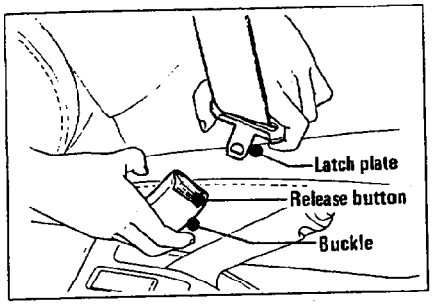
WARNING

⚠ **To help lessen the chance of injury in accidents or sudden stops, we urge that people riding in the vehicle must be properly restrained at all times, using the seat belts provided. This includes children and pregnant women. See the following pages for use of restraints by children and pregnant women.**

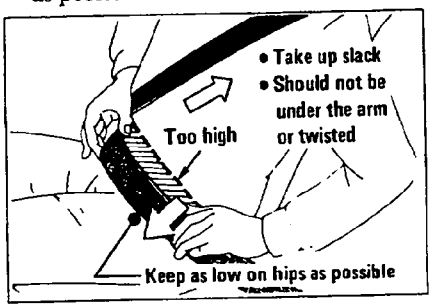
To Fasten the Seat Lap/Shoulder Belt

1. Adjust the front seat as needed. Sit up straight and well back in the seat.
2. Grasp the latch plate and:
- Pull the lap-shoulder belt webbing across the body.
- At the same time, slide the latch along the belt until it reaches the buckle.
- Push the latch plate into the buckle until it clicks.
- Pull the shoulder belt webbing to confirm that the latch plate latchs to the buckle completely.

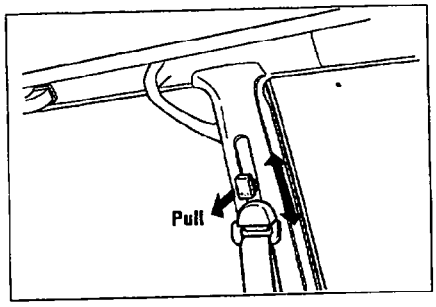


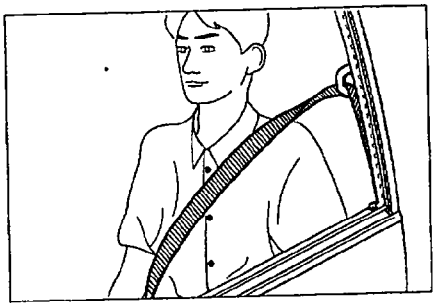


3. Position the "lap" portion of the belt across the lap as LOW ON THE HIPS as possible.



4. With the shoulder anchor pulled, move it up and down to adjust the position of the shoulder belt so that it comes right onto the shoulder. The adjustment position is available in 5 steps.





Then, adjust to a SNUG FIT by holding the "shoulder" portion of the front seat belt and pulling it UPWARD through the latch plate until the lap portion is snug across the lap. This reduces the risk of sliding under the belt during an accident.

5. To unfasten the belt, push in the button on the buckle. The belt should retract when the buckle is unlatched but hold the latch plate as it does so, to keep it from hitting people or nearby objects. To help prevent damage to the safety belt and interior trim, before closing the door be sure the belt is fully retracted and the latch plate is out of the way.

WARNING

⚠ **•A snug fit with the lap belt positioned low on the hips is necessary to lessen the chance of injury and/or the degree of injury in an accident. This spreads the force of the lap belt over the hip bone instead of across the abdomen.**
• Never use the same seat belt for more than one person at a time. A seat belt worn by more than one person will not provide adequate protection in the event of a collision.
• Never wear twisted seat belts.
• Be very careful not to damage seat belts or seat belt buckles by pinching them in the seat or the door.
• Too much slack could increase the amount of injury because the belt would not be able to properly restrain you in an accident. DO NOT wear the shoulder belt under the arm or out of position. Such use could increase the chance of injury and/or the degree of injury in an accident.
• According to Federal accident statistics, children are safer when properly restrained in rear seating positions than in the front seating positions. It is advisable to have children seated in the rear center seat and restrained with the vehicle's safety belt. Children who have outgrown child restraint systems should use the vehicle's safety belts and sit in the rear seat. If the child's seating position has a shoulder belt which is on or very close to the face or neck, position the child so that the belt is properly positioned.

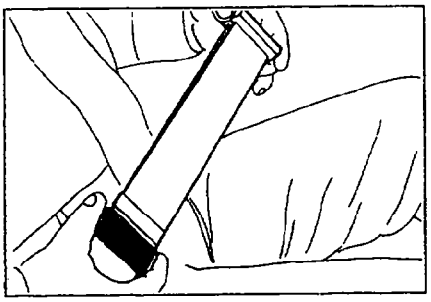
NOTE

• The retractor will lock the belt only during a sudden stop or on impact.
• At other times you can move around freely.
• The seat belts for the outside passenger seats have an additional locking mechanism designed for securing child restraint seats. When the belt is pulled all the way out, the locking mechanism will only permit the belt to retract. Do not pull the belt all the way out except when using it to secure a child restraint seat. If the belt is inadvertently pulled all the way out, let the belt fully retract before using it for an adult passenger.

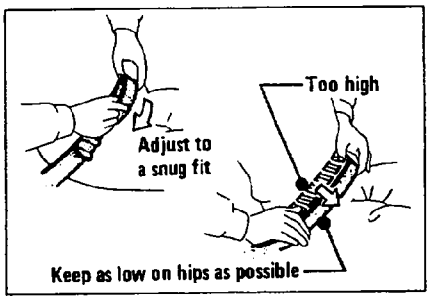
❸ REAR CENTER SEAT LAP BELTS (Non-retractor type)

1. Sit up straight and well back in the seat.
2. Take hold of the latch plate at an angle to the webbing and slide it toward the front of vehicle.
   Then pull it slowly across your lap and

push the latch plate into the buckle until it clicks.

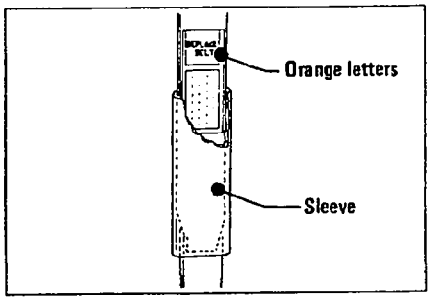


3. Position the belt across the lap as LOW ON THE HIPS as possible. Then, adjust to SNUG FIT by holding the free end of the webbing and pulling it through the latch plate until the belt is snug across the lap. This reduces the risk of sliding under the belt during an accident.
4. To unfasten the belt, push in the button on the buckle.



❹ SEAT BELT REPLACEMENT LABEL

The front seat safety belts have a loop of webbing under the sleeve for effectiveness of the entire restraint system.



WARNING

⚠ •Torn, frayed or damaged seat belts may not protect you in the event of an accident or a sudden stop. If a belt is torn, frayed or damaged, have it replaced immediately. Also, replace the front seat safety belt when the loop has been pulled out and the orange letter words "REPLACE BELT" are visible at the top edge of the sleeve.

❺ SAFETY BELT EXTENDER

If the vehicle's safety belt will fasten around you, you should use it.
But if a safety belt isn't long enough to fasten around you, your dealer will order you an extender. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Don't let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.

⑥ SEAT BELT INSPECTION

- Occasionally check that the belts, buckles, latch plates, retractors, reminder systems, guide loops, and anchors work properly. Also check for damage that could keep the restraint system from doing its job.
- Keep sharp edges and damaging objects away from the belts and other parts of the restraint system.
- Replace belts if cut, weakened, or frayed. Also, have belts replaced if they have been worn in a collision.
- If there is any doubt, have all related parts including belts replaced.
- Keep belts clean and dry.

WARNING

⚠ **•Do not bleach or dye the seat belts, since it may severely weaken them. In the event of an accident or a sudden stop, the belts may not adequately restrain the occupants. Clean the safety belts only with mild soap and luke warm water.**

⑦ CHILD RESTRAINT

Children in vehicles should be restrained to help lessen the chance and/or severity of injuries in the event of an accident or a sudden stop. Never let a child of any age stand or kneel on any seat. Use of infant or child restraint systems which conform to Federal motor vehicle safety standards and which are installed according to their manufacturer's instructions is the surest way of minimizing the risk of injury to young passengers. Older children should be placed on a seat and restrained with the seat belts provided with your vehicle. Both lap and shoulder belts should be used.

The use of infant or child restraint systems may be required by the laws of your state. You should check with the appropriate state authorities to ensure that you are in compliance with these laws.

- Secure the child in the restraint in accordance with the manufacturer's instructions.
- Push and pull the child restraint in all directions to be sure it is secure.
- If the child restraint is not secure, use a different seating position in the vehicle.
- Secure the child restraint with the lap belt or the portion of lap-shoulder belt in accordance with restraint manufacturer's instructions.

WARNING

⚠ **•For effective protection in automobile accidents and sudden stops, children should not be transported unrestrained. The preferred restraint for small children is a child restraint system. If this is not available, children should be placed in the rear seat and restrained with the lap belt if they are old enough to sit alone.**

- **Holding a child in your arms is dangerous. In an accident, a child held in a person's arms can be struck or crushed by any unrestrained occupant. An unrestrained child can also be injured by striking the interior, or by being ejected from the vehicle during a sudden maneuver or impact.**
- **All child restraint systems are designed to be secured in vehicle seats by lap belts or the lap portion of a lap-shoulder belt.**