#2143

CALSPAN REPORT NUMBER: 8118-12

FRONTAL
50% OVERLAPPED 64.7 kph IMPACT OF A 1994 FORD TAURUS 4-DOOR SEDAN INTO AN EEVC DEFORMABLE BARRIER

CALSPAN TEST NUMBER: Y49-12-1457

September 27, 1994

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FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
Research and Special Programs Administration
Volpe National Transportation Systems Center
Kendall Square
Cambridge, MA 02142

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16. Abstract

A 64.7 kph frontal impact test of a 1994 Ford Taurus 4-Door Sedan into an EEVC Deformable Barrier was performed at the Calspan Advanced Technology Center crash facility in Buffalo, New York on September 27, 1994.

The test mode was perpendicular (0°) with a 50% offset such that the driver side of the vehicle contacted the barrier. The temperature at the time of the test was 21° C. The 1994 Ford Taurus contained 50th percentile Anthropomorphic Test Devices (ATD) in the driver and passenger seating positions. Both ATD's were restrained using the test vehicle's driver and passenger air bags and manual 3 point belt restraint systems. Both ATD Head Injury Criteria (HIC), 3 millisecond chest resultants and femur loads were below the injury criteria requirements of FMVSS 208 "Occupant Crash Protection".

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Section 1

PURPOSE AND TEST PROCEDURE

This 64.7 kph frontal vehicle to EEVC Barrier impact test is part of the Crashworthiness Testing and Analysis Program sponsored by the Research and Special Programs Administration under Contract No. DTRS-57-90-C-00104. The purpose of this Technical Task Directive (TTD 7) is to obtain responses from vehicles and restrained Hybrid III dummies during car-to-car overlapped frontal crashes.

This test was performed using a 1994 Ford Taurus 4-Door Sedan and an EEVC Deformable Barrier. The Ford Taurus was traveling at 64.7 kph and impacted the 50% offset fixed deformable barrier.

The 1994 Ford Taurus 4-Door sedan, contained two Hybrid III 50th percentile male Anthropomorphic Test Devices (ATDs), in the driver and right front passenger seating positions. The ATDs were restrained using the vehicle's driver and passenger air bags and 3 point manual seat belt restraint systems.

Section 2

SUMMARY OF TEST

A 1994 Ford Taurus 4-Door Sedan impact an EEVC deformable frontal barrier at a velocity of 64.7 kph. The barrier was offset such that 50% of the vehicle width was engaged during the impact. The test was set up to contact the left front half of the vehicle (driver side). The test was performed at the Calspan Corporation Advanced Technology Center Crash Test Facility on September 27, 1994.

Pre- and Post-test still photographs of the vehicles and dummies can be found in Appendix A. The impact event was documented with one real time movie camera and thirteen high speed movie cameras. Vehicle photographic target locations can be found in Figure 5 and movie camera locations can be found in Figure 8.

The nominal vehicle impact point was determined as outlined in the previous section and shown in Figure 1.

Two Hybrid III 50th percentile Anthropomorphic Test Devices (ATDs) were placed in the driver and right front passenger seating positions of the test vehicle. The ATDs were positioned according to the ATD placement instructions from the FMVSS 208 "Occupant Crash Protection" test procedure. The ATDs were restrained using the test vehicle's driver and passenger air bags and the 3 point manual seat belt restraint systems.

Each ATD was instrumented with head and chest three axis accelerometer packages; chest displacement potentiometers; upper neck force and moment transducers; femur axial force load cells and upper and lower tibia force and moment transducer packages. The driver ATD also contained chest compression displacement potentiometer arrays. Driver shoulder belt forces were also recorded.

The 98 channels of vehicle and dummy transducer data were recorded on a PC based data acquisition system. The data was reduced, filtered and processed as required by the appropriate test procedures using PC based software. Appendix B contains the vehicle and the dummy response data in plotted format.

The driver HIC was 177.61 and the head contacted the vehicle driver side air bag and the rear of the head contacted the headrest. The maximum chest acceleration over a three millisecond period was 38.533 gs. The left femur maximum axial compressive force was -6153.5 newtons and the right femur maximum axial compressive force was -1869.1 newtons.

The passenger HIC was 166.86 and the head contacted the vehicle air bag and headrest. The maximum chest acceleration over a three millisecond period was 35.606 gs. The left femur maximum axial compressive force was -4815.4 newtons and -2332.5 newtons on the right femur.

Structural damage to the 1994 Ford Taurus consisted of severe deformation to the vehicle front left side, minimal deformation to the left roof rail, cracking throughout windshield and the steering column stroked upward.

TEST ANOMALIES

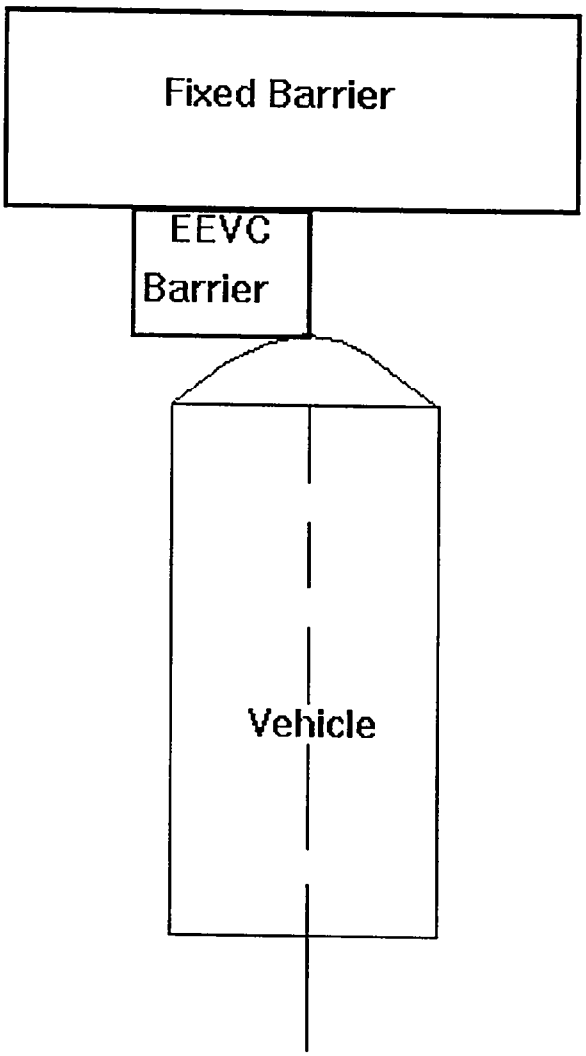
Appendix B contains lists of all data channels. Where an anomaly occurred, the channel is identified by an asterix and commented below.

Section 3

VEHICLE AND OCCUPANT INFORMATION

Figure 1

VEHICLE TO EEVC DEFORMABLE BARRIER LAYOUT



VEHICLE ONE DATA

Table 1

GENERAL TEST AND VEHICLE 1 PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1994 Ford Taurus 4-Door Sedan

NHTSA Test No.: - VIN.: 1FALP52U8RG101996

Body Color: Red Date of Manufacture: 4/94

Engine: 6 Cylinders; - C.I.D.; 3 Liters; - CC

X Gas; - Diesel; - Turbocharged

- Longitudinal; X Transverse

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

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

X A/C; X P/S; X P/B; - P/wdo

X Tilt Wheel; - P/seats; - Cruise Control

Type of Occupant Restraint: Driver and passenger air bags and 3 point belt system.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

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

Recommended Tire Size: P205/65 R15

Recommended Cold Tire Pressure: Front 240 kpa, Rear 240 kpa

Tires on Vehicle: P205/65 R15 ; Manufacturer: General

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

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

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

Vehicle Capacity Weight (VCW) = 431 kgs. (A)

No. of Occupants x 68.03 kgs. = 340 kgs. (B)

Rated Cargo and Luggage

Weight (RCLW) A - B = 91 kgs.

GVWR 2110 kgs. GAWR: Front 1138 kgs. Rear 985 kgs.

Table 1

GENERAL TEST AND VEHICLE 1 PARAMETER DATA (continued)

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

Right Front = 456 kgs. Right Rear = 262 kgs.

Left Front = 470 kgs. Left Rear = 259 kgs.

TOTAL FRONT WEIGHT = 926.0 kgs. (64.0 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 521.0 kgs. (36.0 % of Total Vehicle Weight)

TOTAL DELIVERED WEIGHT= 1,447.0 kgs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMY:

Right Front = 449 kgs. Right Rear = 319 kgs.

Left Front = 486.5 kgs. Left Rear = 305.5 kgs.

TOTAL FRONT WEIGHT = 935.5 kgs. (60.0 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 624.5 kgs. (40.0 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 1,560.0 kgs.

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

Delivered Attitude: RF 730 ; LF 729 ; RR 703 ; LR 710

Test Attitude: RF 724 ; LF 729 ; RR 671 ; LR 668

Vehicle's Wheel Base = 2675 mm.

Location of Vehicle's C.G. = 1071 millimeters rearward of front wheel center

Table 1

GENERAL TEST AND VEHICLE 1 PARAMETER DATA (continued)

POST-IMPACT DATA:

Type of Test: Frontal EEVC Barrier Impact Angle: 0°

Date of Test: September 27, 1994 Time of Test: 14:18

Ambient Temperature: 21 °C at impact area

Temperature in Occupant Compartment: 21 °C

Windshield Molding Temperature: - °C

Required Impact Velocity Range: 64.2 to 65.8 kph

Impact Velocity: primary = 64.7 kph, secondary = 65.0 kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 132 cm.

Exiting Speed Trap: 30.5 cm.

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Face with air bag, rear of head with head rest.	Face with air bag, rear of head with head rest.
Chest	Air bag	Air bag
Abdomen	No contact	No contact
Left Knee	Lower dash panel	Glove box door
Right Knee	Lower dash panel	Glove box door

	Front		Rear	
	Left	Right	Left	Right
Door Opening	operable	operable	operable	operable

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

Comments: windshield cracked throughout steering column stroked upward.

Table 2

VEHICLE 1 DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-33.3	10.9	10.8	33.4	-39.5	11.3	-11.8	38.533
DUMMY (2)	-42.0	***18.9	7.4	***42.4	-36.3	5.6	-12.3	35.606
DUMMY (3)	-	-	-	-	-	-	-	-
DUMMY (4)	-	-	-	-	-	-	-	-

	MAXIMUM FORCE FEMUR LOAD (NEWTONS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	-1869.1	-6153.5
DUMMY (2)	-2332.5	-4815.4
DUMMY (3)	-	-
DUMMY (4)	-	-

	MAXIMUM LOAD (NEWTONS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	5071.4	-	-
DUMMY (2)	-	-	-
DUMMY (3)	-	-	-
DUMMY (4)	-	-	-

	MAXIMUM ACCELERATION ("G")			
	HIC	t_1 (SEC)	t_2 (SEC)	Average Acceleration t_1 TO t_2
DUMMY (1)	177.61	84.120	120.000	30.05
DUMMY (2)	166.86	59.520	93.120	30.09
DUMMY (3)	-	-	-	-
DUMMY (4)	-	-	-	-

*Defined as exceeding 0.003 sec. duration
**As defined in FMVSS No. 208
***Data questionable, 75-90 ms, 205-220 ms

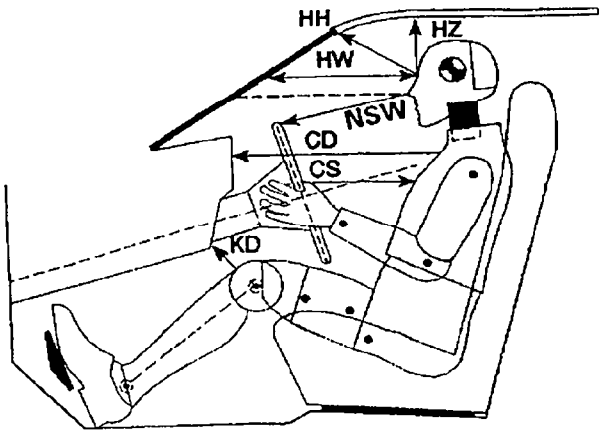
Figure 2

VEHICLE 1 OCCUPANT CLEARANCE DIMENSIONS (mm)

	DRIVER (mm)	PASSENGER
HH	282	308
HW	461	515
NSW	329	-
NIP	487	544
NH	342	-
CD	495	472
CS	274	-
KDL	50	86
KDR	56	93
1	467	-
2	52	-
SA	20°	20°
PA	25°	24°
ULA	110°	108°
LLA	230	225

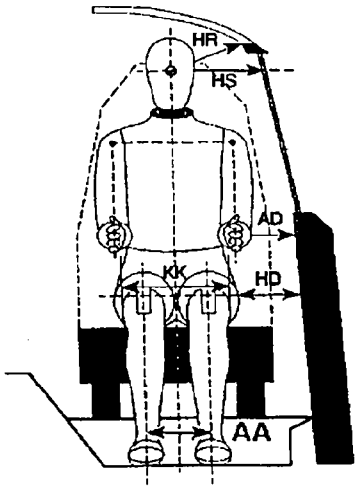
DISTANCE OF H-POINT FROM TARGET POSITION (mm)		
	Driver	Passenger
Longitudinal	0	0
Vertical	10 above	8 above

Angles taken relative to vertical
SA = Seat Back Angle
PA = Pelvic Angle
ULA= Upper Leg Angle
LLA= Lower Leg Angle



HH - Head to Windshield Header
HW - Head to Windshield
NSW - Nose to Steering Wheel
NIP - Nose to Instrument Panel
NH - Nose to Steering Wheel Hub
CD - Chest to Dash
CS - Chest to Steering Wheel Hub
KDL - Knee to Dash Left
KDR - Knee to Dash Right
1 - Nose to Steering Column Target
2 - Distance Between Steering Column Targets

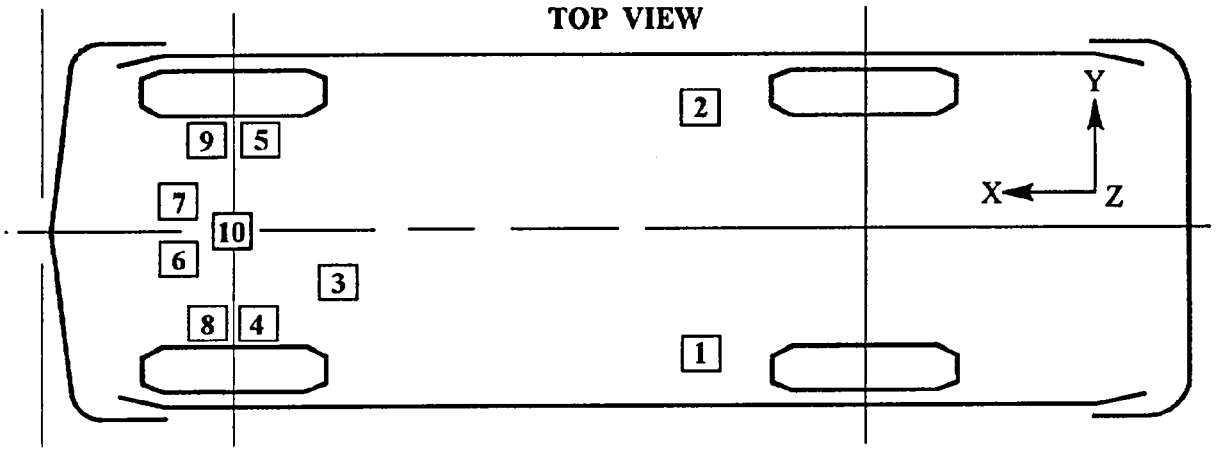
	DRIVER (mm)	PASSENGER
HR	185	164
HS	247	256
AD	105	118
HD	155	155
KK	271	270
AA	254	185
DT	21°	21°



HR - Head to Side Roof
HS - Head to Side Window
AD - Arm to Door
HD - Hip to Door
KK - Knee to Knee
AA - Ankle to Ankle
DT - Dummy Temperature °F

Figure 3

SUMMARY OF VEHICLE 1 ACCELEROMETER DATA



Vehicle: 1994 Ford Taurus 4-Door Sedan

ACCELEROMETER NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
** 1	V1 L.R. Comp (X)	Gs	152.8	239.6	-178.2	285.0	60.0
*+ 1	V1 L.R. Comp (Y)	Gs	480.8	182.6	-478.4	237.8	60.0
2	V1 R.R. Comp (X)	Gs	5.0	75.2	-6.6	70.1	60.0
2	V1 R.R. Comp (Y)	Gs	5.7	40.8	-4.0	136.7	60.0
3	V1 Brake Pedal (X)	Gs	30.6	118.0	-107.1	86.8	60.0
3	V1 Brake Pedal (Y)	Gs	58.8	93.6	-45.0	118.3	60.0
3	V1 Brake Pedal (Z)	Gs	48.5	99.0	-45.6	83.8	60.0
3	V1 Brake Pedal Res	Gs	107.8	86.8	.2	-8.9	60.0
4	V1 Left Shock Tower (X)	Gs	80.7	66.6	-40.0	71.3	60.0
4	V1 Left Shock Tower (Z)	Gs	31.2	71.6	-49.4	66.7	60.0
5	V1 Right Shock Tower (X)	Gs	3.5	9.4	-34.1	93.4	60.0
* 5	V1 Right Shock Tower (Y)	Gs	154.9	124.7	-20.5	27.5	60.0
6	V1 Left Engine (X)	Gs	17.1	89.9	-66.1	79.0	60.0
7	V1 Right Engine (X)	Gs	6.2	115.0	-44.8	74.2	60.0
8	V1 L.F Frame Rail (X)	Gs	23.1	40.6	-52.1	52.4	60.0
8	V1 L.F Frame Rail (Y)	Gs	23.6	35.2	-21.9	76.4	60.0
8	V1 L.F Frame Rail (Z)	Gs	40.4	44.8	-58.4	70.9	60.0
8	V1 L.F Frame Rail Res.	Gs	62.9	82.2	.0	287.4	60.0
9	V1 R.F Frame Rail (X)	Gs	14.8	17.5	-15.5	31.9	60.0
9	V1 R.F Frame Rail (Y)	Gs	12.7	20.5	-45.1	84.7	60.0
9	V1 R.F Frame Rail (Z)	Gs	17.6	28.6	-16.3	24.7	60.0
9	V1 R.F Frame Rail Res.	Gs	46.5	84.6	.1	-6.5	60.0
10	V1 Engine Bottom (X)	Gs	2.8	163.4	-43.3	79.8	60.0
10	V1 Engine Bottom (Y)	Gs	11.1	90.2	-6.4	49.6	60.0

* Data questionable after 120ms. ** Data questionable after 102ms, wire cut.
*+ Data questionable after 120ms, wire cut.

Figure 4

VEHICLE 1 PRE- AND POST-TEST POSITION OF TEST VEHICLE

ACCELEROMETER MOUNTING LOCATIONS

Test Description: 64.7 kph Frontal Vehicle to Vehicle Impact

Test Vehicle: 1994 Ford Taurus 4-Door Sedan

Reference Plane: Vehicle plane at rear bumper

VEHICLE No. 1		PRE-TEST AXIS (mm)			POST-TEST AXIS (mm)		
Loc. No.	DESCRIPTION	X	Y	Z	X	Y	Z
1	RIGHT FRONT FRAME RAIL	4013	440	183	3998	540	186
2	LEFT FRONT FRAME RAIL	4013	440	179	3839	352	50
3	RIGHT ENGINE TOP	4033	219	886	3806	267	872
4	LEFT ENGINE TOP	3972	74	888	3702	20	868
5	ENGINE BOTTOM	3962	110	197	3892	79	208
6	RIGHT SHOCK TOWER	3819	655	941	3791	625	927
7	LEFT SHOCK TOWER	3819	655	969	3712	565	934
8	BRAKE PEDAL	3301	359	508	3261	367	463
9	LEFT REAR COMP.	1940	618	375	1940	618	360
10	RIGHT REAR COMP.	1940	618	399	1940	618	415
11	CENTER REAR COMP.	-	-	-	-	-	-
12	LOWER STEERING COL.	-	-	-	-	-	-
13	UPPER STEERING COL.	-	-	-	-	-	-
14	LEFT DRIVER TOEPAN	3483	545	410	3417	535	365
15	RIGHT DRIVER TOEPAN	3547	308	353	3453	300	308

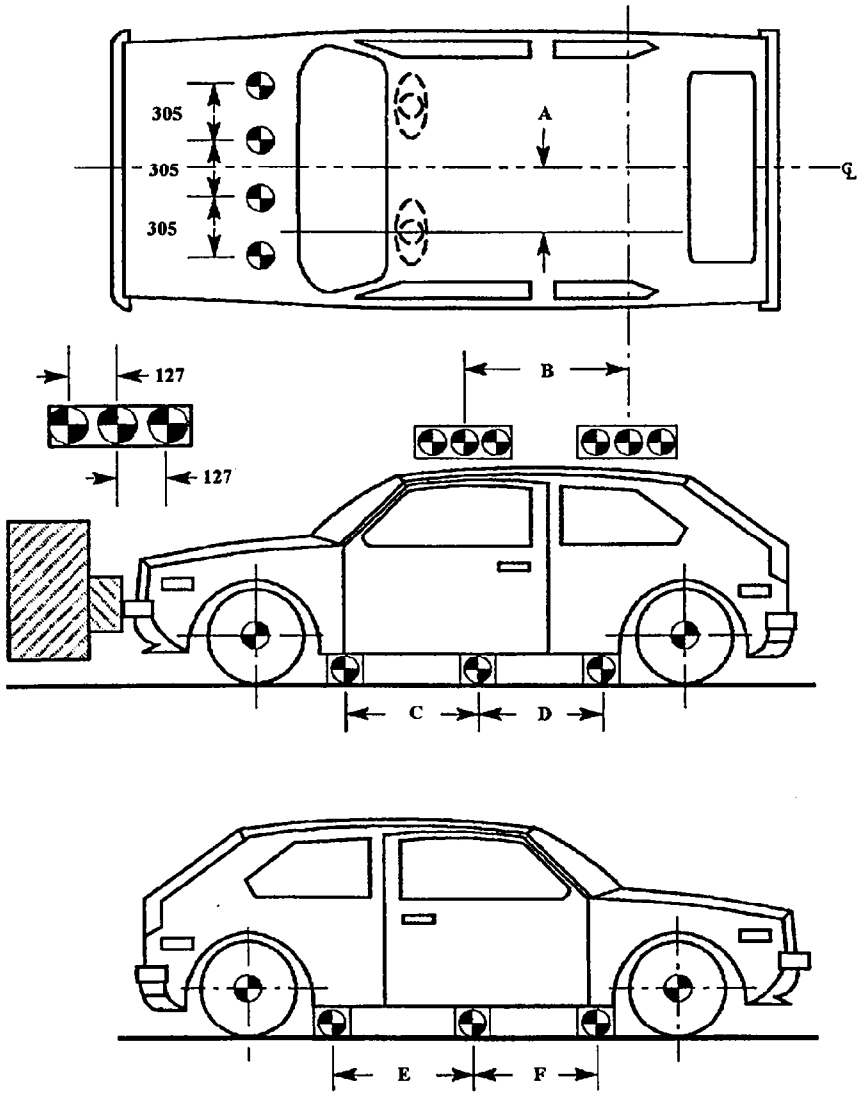
NOTE: Vehicle leveled to pre-test height for post-test measurements. Carpet removed from floor-pan.

TOEPAN MEASUREMENT POSITIONS						
	PRE-TEST AXIS (mm)			POST-TEST AXIS (mm)		
Loc. No.	X	Y	Z	X	Y	Z
1	3530	575	511	3438	555	466
2	3422	548	293	3363	530	248
3	3540	427	350	3462	420	305
4	3576	168	358	3454	160	313
5	3460	185	255	3353	179	210

Figure 5

VEHICLE 1 TARGET LOCATIONS

(All dimensions in millimeters)

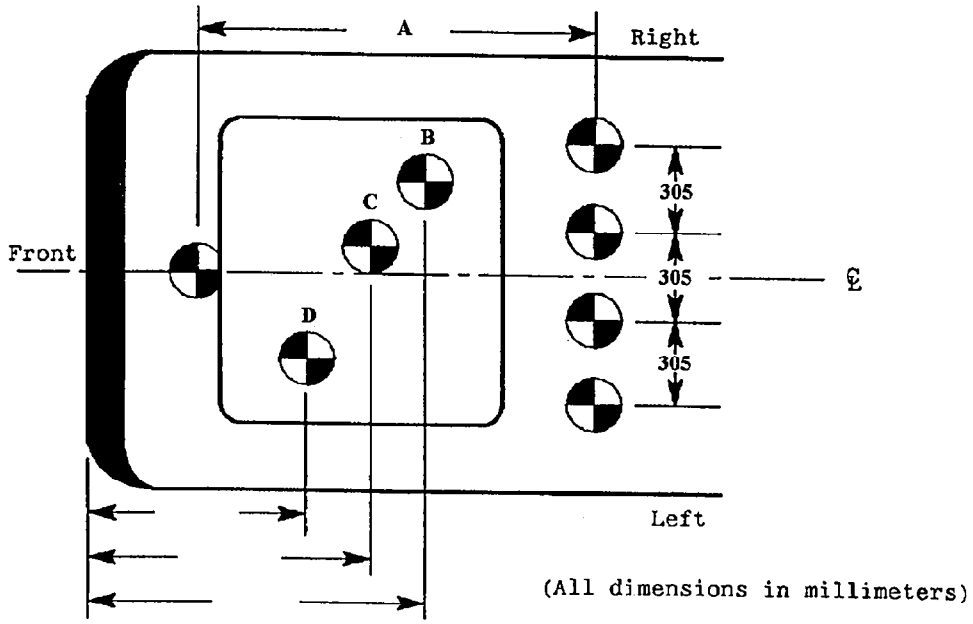


Targets A: 351 D: 894
B: 1219 E: 897
C: 899 F: 889

Figure 5

VEHICLE 1 TARGET LOCATIONS (continued)

(TOP VIEW OF HOOD AND ENGINE COMPARTMENT)



Note: Drawing not to scale.

Target A: 1049
B: Valve Cover - 678
C: Alternator - 678
D: Air Cleaner Assembly - 622

Figure 6

VEHICLE 1 MEASUREMENT POINTS

(All dimensions in millimeters)

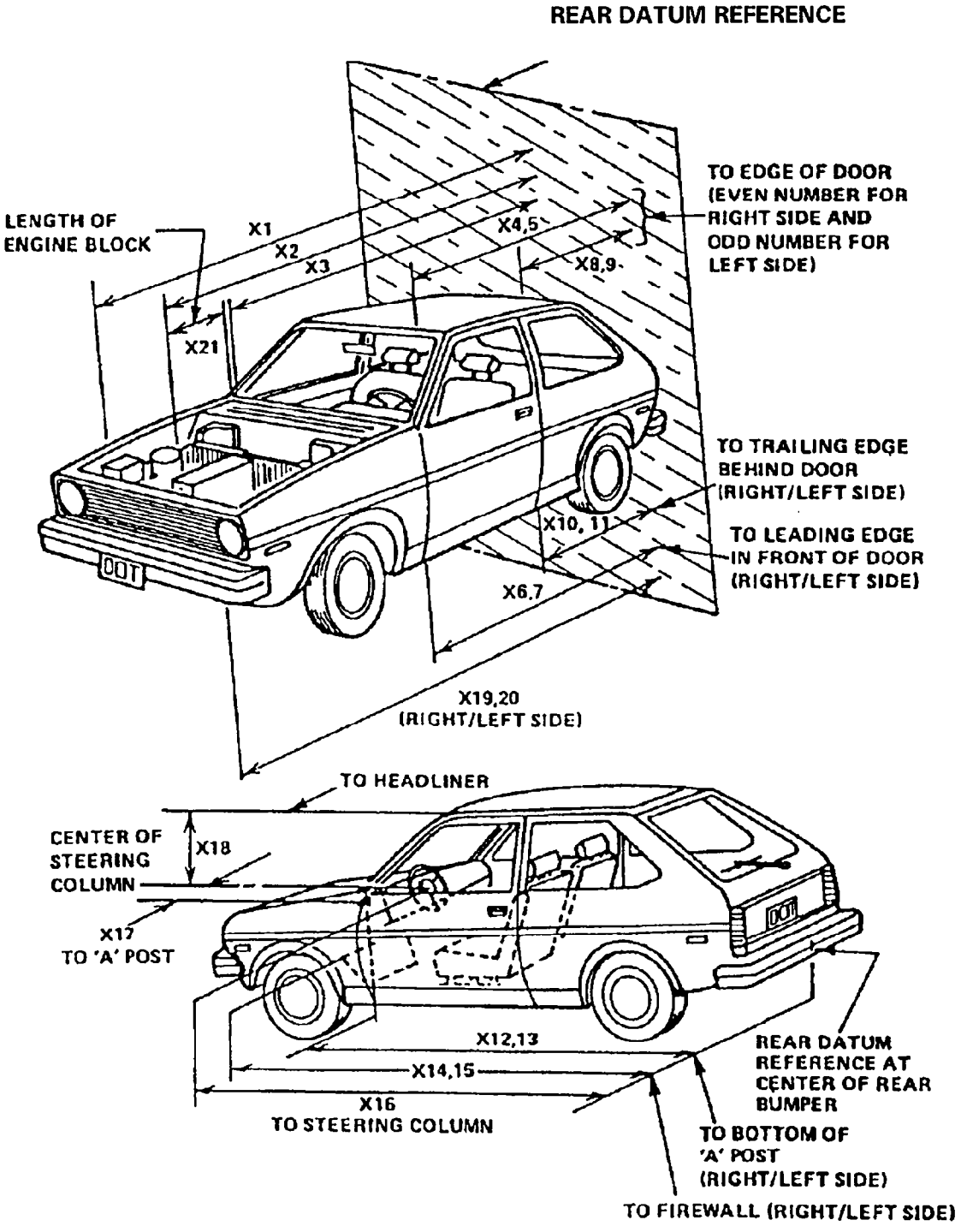
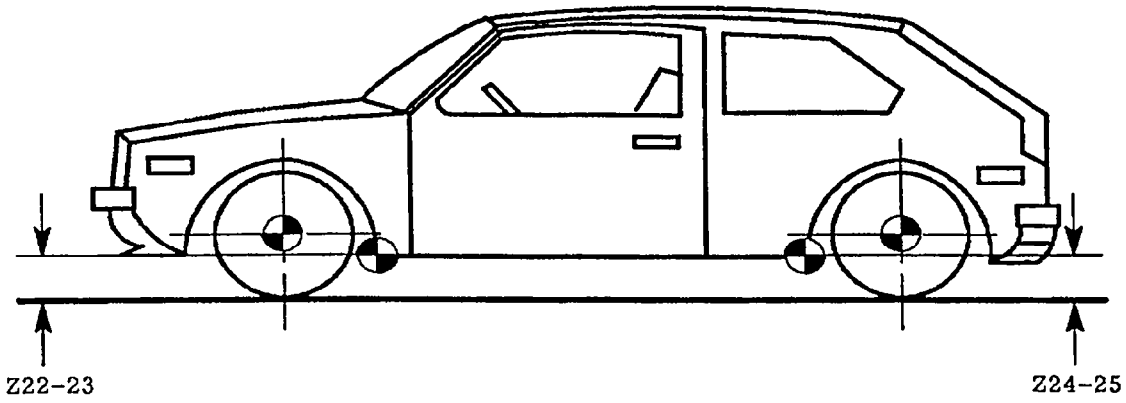


Figure 6

VEHICLE 1 MEASUREMENT POINTS (continued)



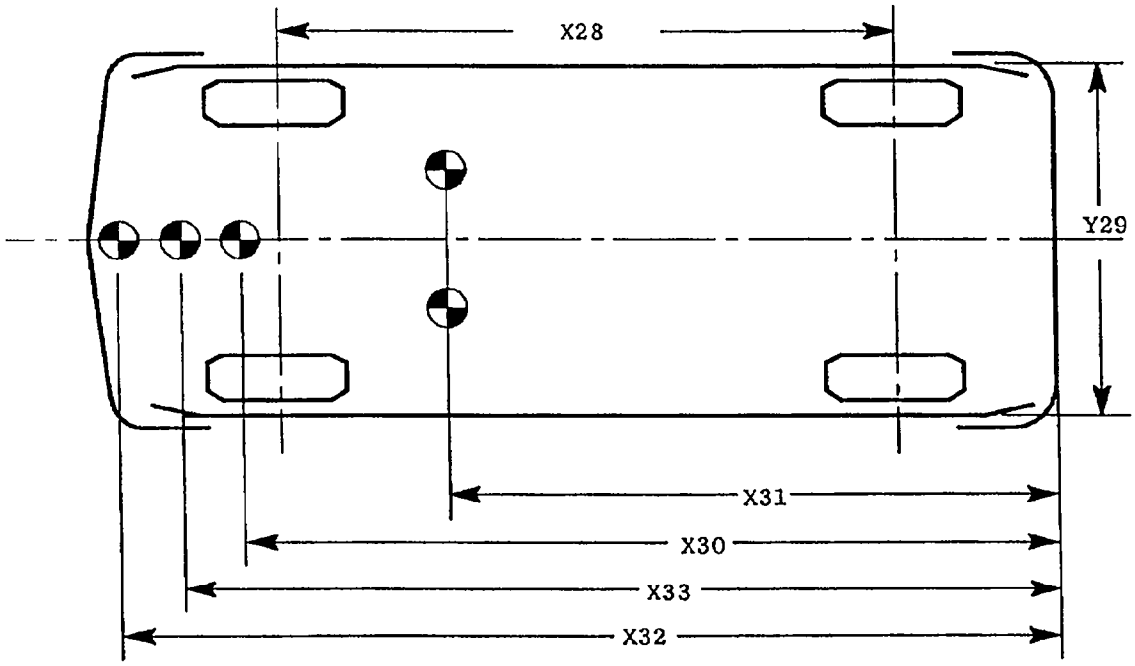


Table 3

VEHICLE 1 MEASUREMENTS

		All Dimensions in millimeters	
No.	TYPE OF MEASUREMENT	Pre-Test	Post-Test
X1	Total Length of Vehicle at Centerline	4895	4372
X2	Rear Surface of Vehicle to Engine at Centerline	4905	4120
X3	Rear Surface of Vehicle to Firewall	3675	3570
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3374	3374
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3374	3366
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3304	3304
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3302	3298
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2286	2290
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2292	2283
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2270	2269
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2265	2263
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3277	3260
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3290	3275
X14	Rear Surface of Vehicle to Firewall - Right Side	3645	3630
X15	Rear Surface of Vehicle to Firewall - Left Side	3640	3475
X16	Rear Surface of Vehicle to Steering Wheel Center	2870	2370
X17	Steering Column to "A" Post	425	405
X18	Steering Column to Headliner	375	320

Table 3

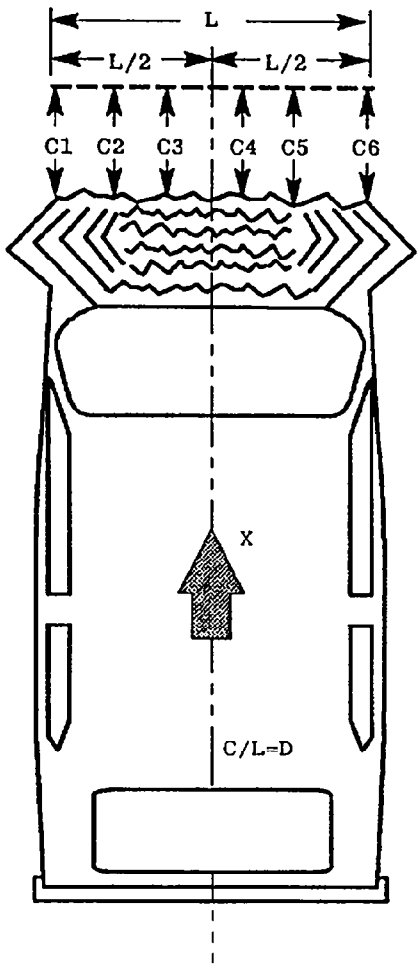
VEHICLE 1 MEASUREMENTS (continued)

		All Dimensions in millimeters	
No.	TYPE OF MEASUREMENT	Pre-Test	Post-Test
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4745	N/A
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4765	4210
X21	Width of Engine Block	430	430
Z22	Right Front Sill to Ground Plane	233	213
X23	Left Front Sill to Ground Plane	233	186
Z24	Right Rear Sill to Ground Plane	238	233
Z25	Left Rear Sill to Ground Plane	225	186
X26	Firewall to Engine or Transaxle	195	0
Z27	Vertical Dim. from Door Sill to Centerline of Steering Column	518	620
X28	Wheelbase of Vehicle	2675	R=2728 L=2540
Y29	Width of Vehicle at Maximum Width Point	1800	1805
X30	Rear Surface of Vehicle to Engine Target	3962	3892
X31	Rear Surface of Vehicle to Compartment Target	3304	R=3304 L=3298
X32	Rear Surface of Vehicle to Bumper Target	4809	unavailable
X33	Rear Surface of Vehicle to Frame Crossmember	4255	4105

Table 3

VEHICLE 1 MEASUREMENT (continued)

(all dimensions in millimeters)



Location	Pre-Test	Post-Test	Change
C1	2705	4170	-1,465
C2	2845	4305	-1,460
C3	2880	4360	-1,480
C4	2880	N/A	N/A
C5	2837	N/A	N/A
C6	2690	N/A	N/A

L = 1495

Table 4
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: - TEST DATE: September 27, 1994

Vehicle Mfg./Make/Model: 1994 Ford Taurus 4-Door Sedan

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

****

TEST VEHICLE IMPACT TYPE:

X Frontal (64.7 kph)

\- Oblique (30 mph) with - ° barrier face first contacting - (driver/passenger) side

\- Rear Moving Barrier (30 mph)

\- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT:

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

SOLVENT SPILLAGE DETAILS:

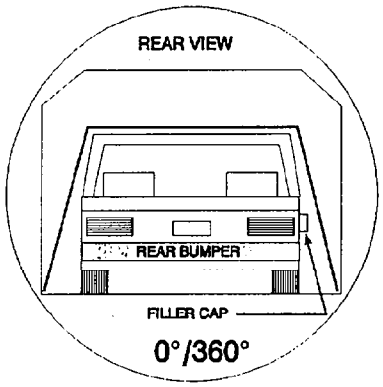
None

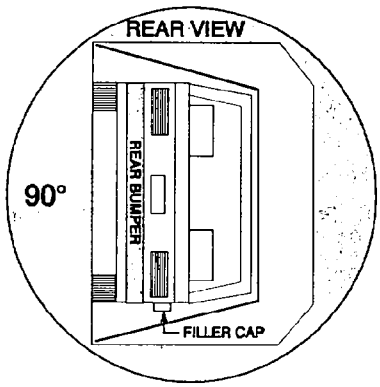
Table 5

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0-90 Deg.

Vehicle NHTSA ID No.:





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	46	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	46	seconds
Next whole minute interval	7	minutes		

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	N/A

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

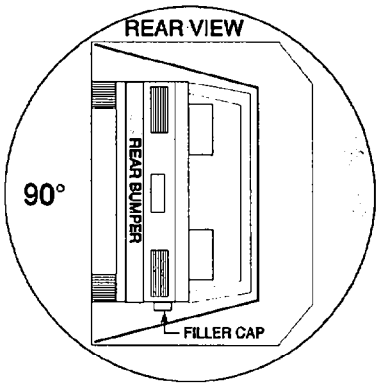
IV. SOLVENT SPILLAGE LOCATION(S):

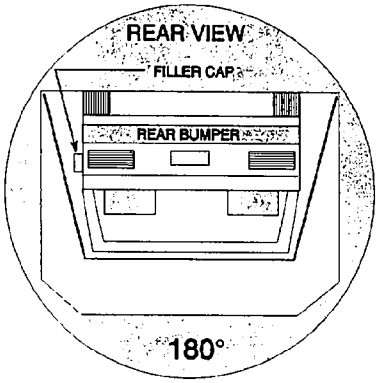
None

Table 5
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:
90-180 Deg.

Vehicle NHTSA ID No.:





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)		1	minutes	39	seconds
FMVSS 301 Position Hold Time +		5	minutes	00	seconds
	TOTAL	6	minutes	39	seconds
Next whole minute interval		7	minutes		

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	N/A

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

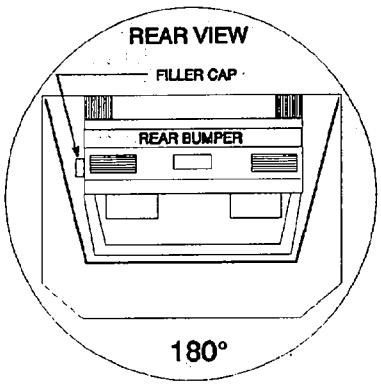
IV. SOLVENT SPILLAGE LOCATION(S):

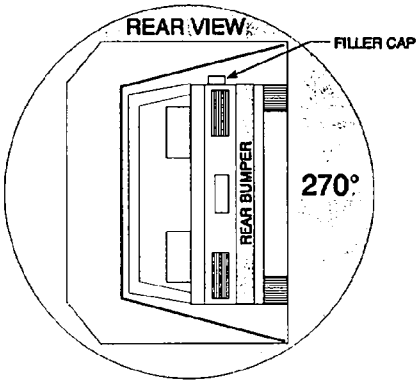
None

Table 5
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:
180-270 Deg.

Vehicle NHTSA ID No.:





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	2	minutes	01	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	7	minutes	01	seconds
Next whole minute interval	8	minutes		

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

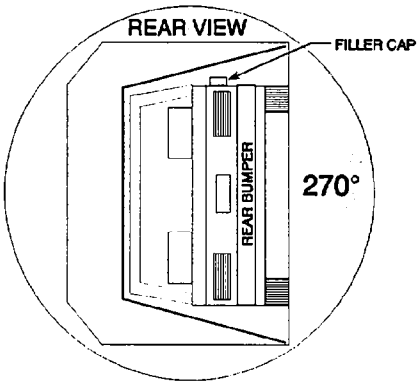
IV. SOLVENT SPILLAGE LOCATION(S):

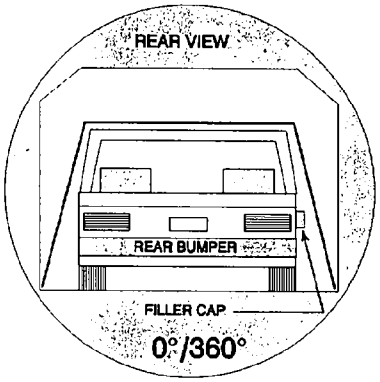
None

Table 5
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:
270-360 Deg.

Vehicle NHTSA ID No.:





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)		1	minutes	52	seconds
FMVSS 301 Position Hold Time +		5	minutes	00	seconds
	TOTAL	6	minutes	52	seconds
Next whole minute interval		7	minutes		

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Figure 7

CAMERA POSITIONS FOR VEHICLE TO VEHICLE ANGLED FRONTAL IMPACT

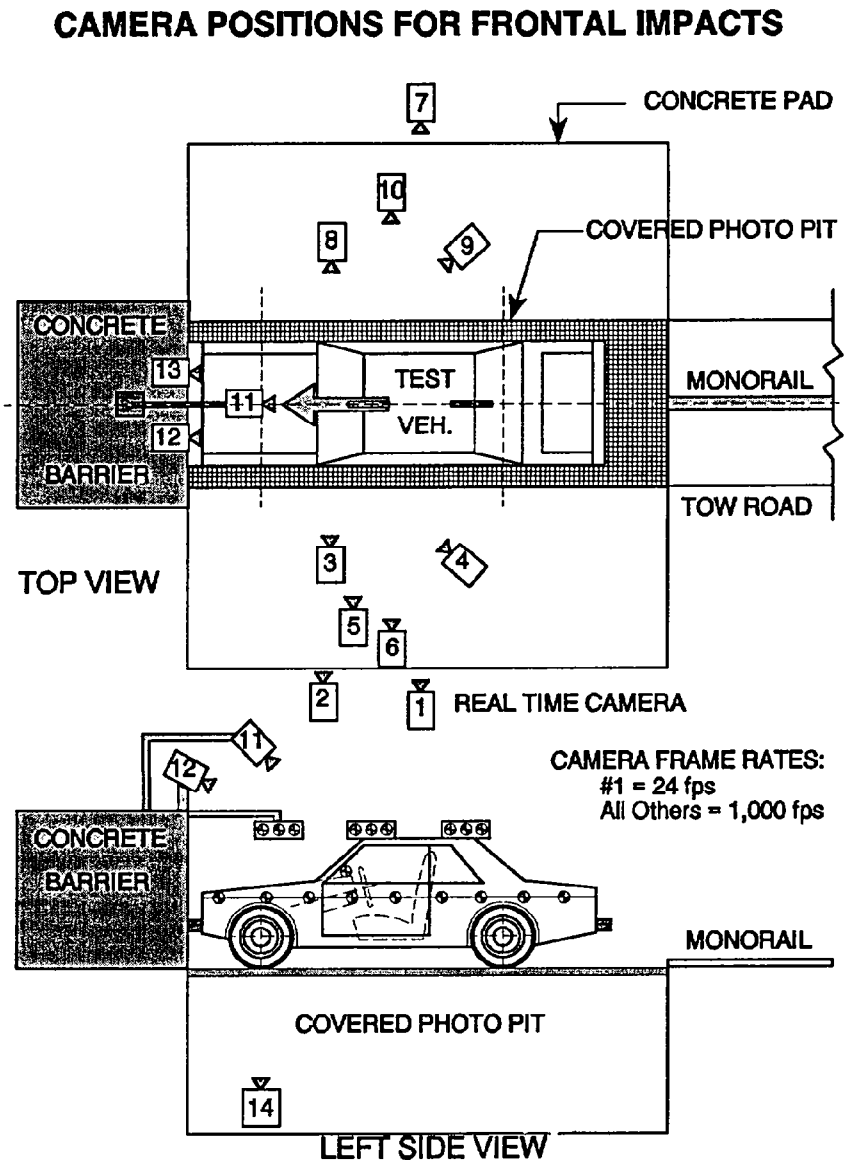


Table 6

HIGH-SPEED CAMERA LOCATIONS

Test No. Y49-12-1457 Vehicle: 1994 Ford Taurus 4-Door Sedan, EEVC Deformable Barrier

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	6731	1702	1041	-4	6304	13	1000
3	Left Side View	8103	762	1041	-3	7676	25	1000
4	Driver and Interior View	3023	2819	1829	-22	-	13	970
5	Steering Column (Bottom)	7874	2083	1168	-4	7447	25	N.T.
6	Steering Column (Top)	7874	2083	1778	-9	7447	25	1080
7	Overall Right Side	6299	2007	1041	-1	5872	25	1000
8	Right Side View	6680	1016	1041	-1	6253	13	1050
9	Right Passenger View	7722	1803	1372	-3	7295	35	960
10	Passenger and Interior View	5461	3099	1905	-11	-	25	1060
11	Passenger Front View	1016	559	1981	-26	-	13	1000
12	Driver Front View	1016	559	1981	-25	-	13	1000
13	Windshield View	0	0	3861	95	-	13	1000
14	Pit View of Engine	0	0	-2184	90	-	13	1000

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

APPENDIX A

PHOTOGRAPHS

APPENDIX A

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APPENDIX A

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VEHICLE PHOTOGRAPHS

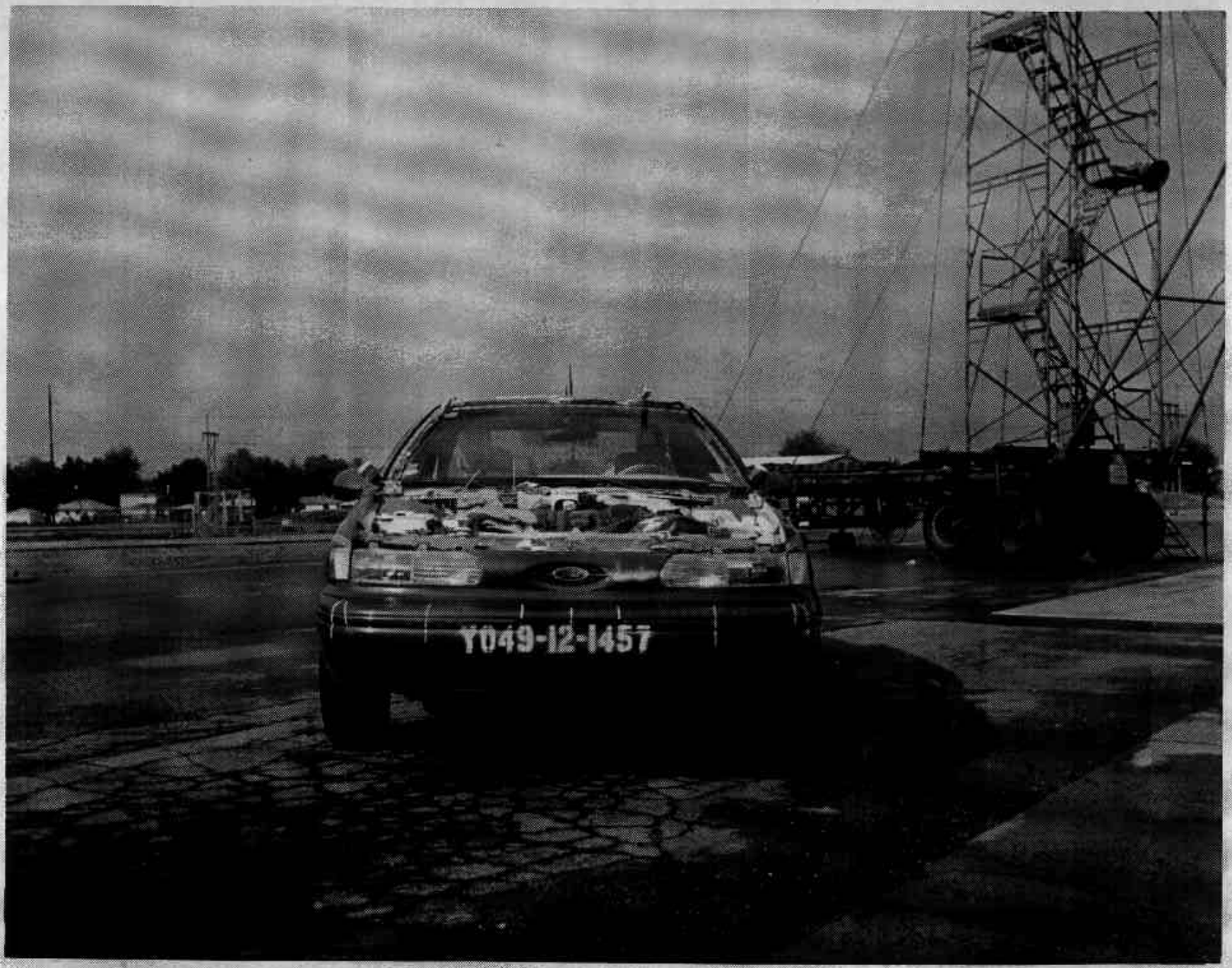

FIGURE A-1 PRE-TEST FRONT VIEW

FIGURE A-2 POST TEST FRONT VIEW

FIGURE A-3 PRE-TEST FRONT RIGHT THREE QUARTER VIEW

FIGURE A-4 POST-TEST FRONT RIGHT THREE QUARTER VIEW

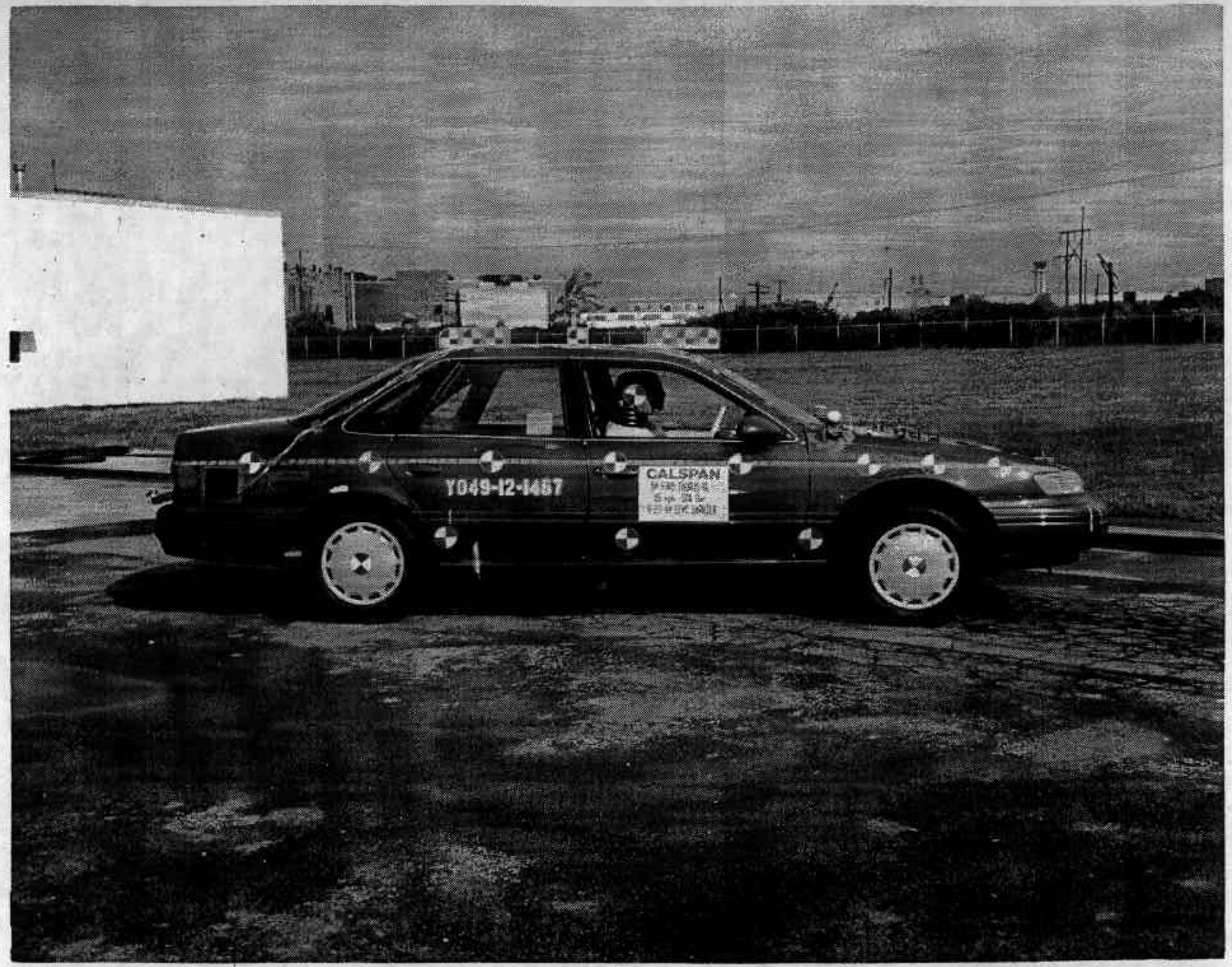

FIGURE A-5 PRE-TEST RIGHT SIDE VIEW

FIGURE A-6 POST-TEST RIGHT SIDE VIEW

FIGURE A-7 PRE-TEST REAR RIGHT THREE QUARTER VIEW

FIGURE A-8 POST-TEST REAR RIGHT THREE QUARTER VIEW

FIGURE A-9 PRE-TEST REAR VIEW

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FIGURE A-10 POST-TEST REAR VIEW

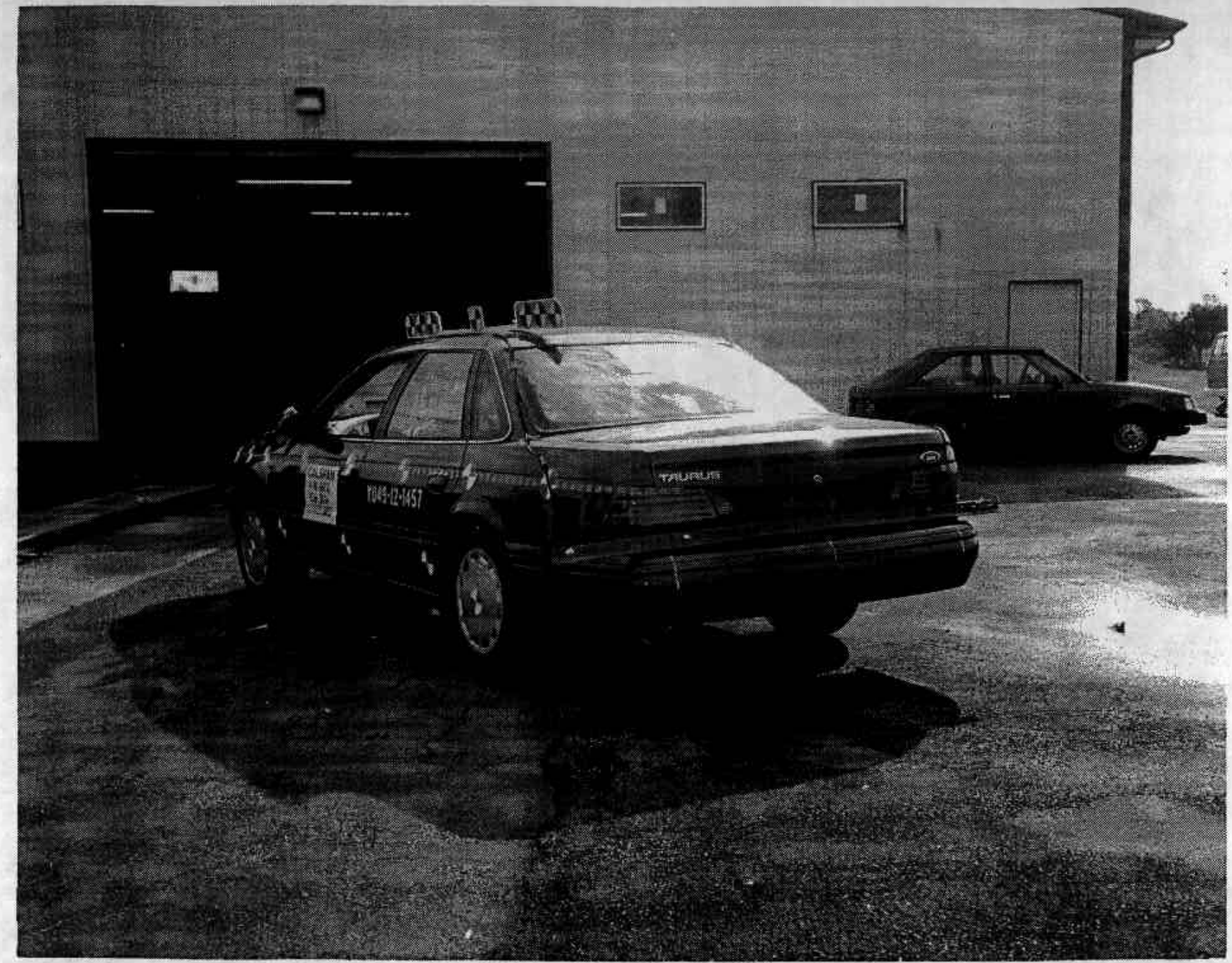

FIGURE A-11 PRE-TEST REAR LEFT THREE QUARTER VIEW

FIGURE A-12 POST-TEST REAR LEFT THREE QUARTER VIEW

FIGURE A-13 PRE-TEST LEFT SIDE VIEW

FIGURE A-14 POST-TEST LEFT SIDE VIEW

FIGURE A-15 PRE-TEST FRONT LEFT THREE QUARTER VIEW

FIGURE A-16. POST-TEST, FRONT LEFT THREE QUARTER VIEW

FIGURE A-17 PRE-TEST WINDSHIELD VIEW

FIGURE A-18 POST-TEST WINDSHIELD VIEW

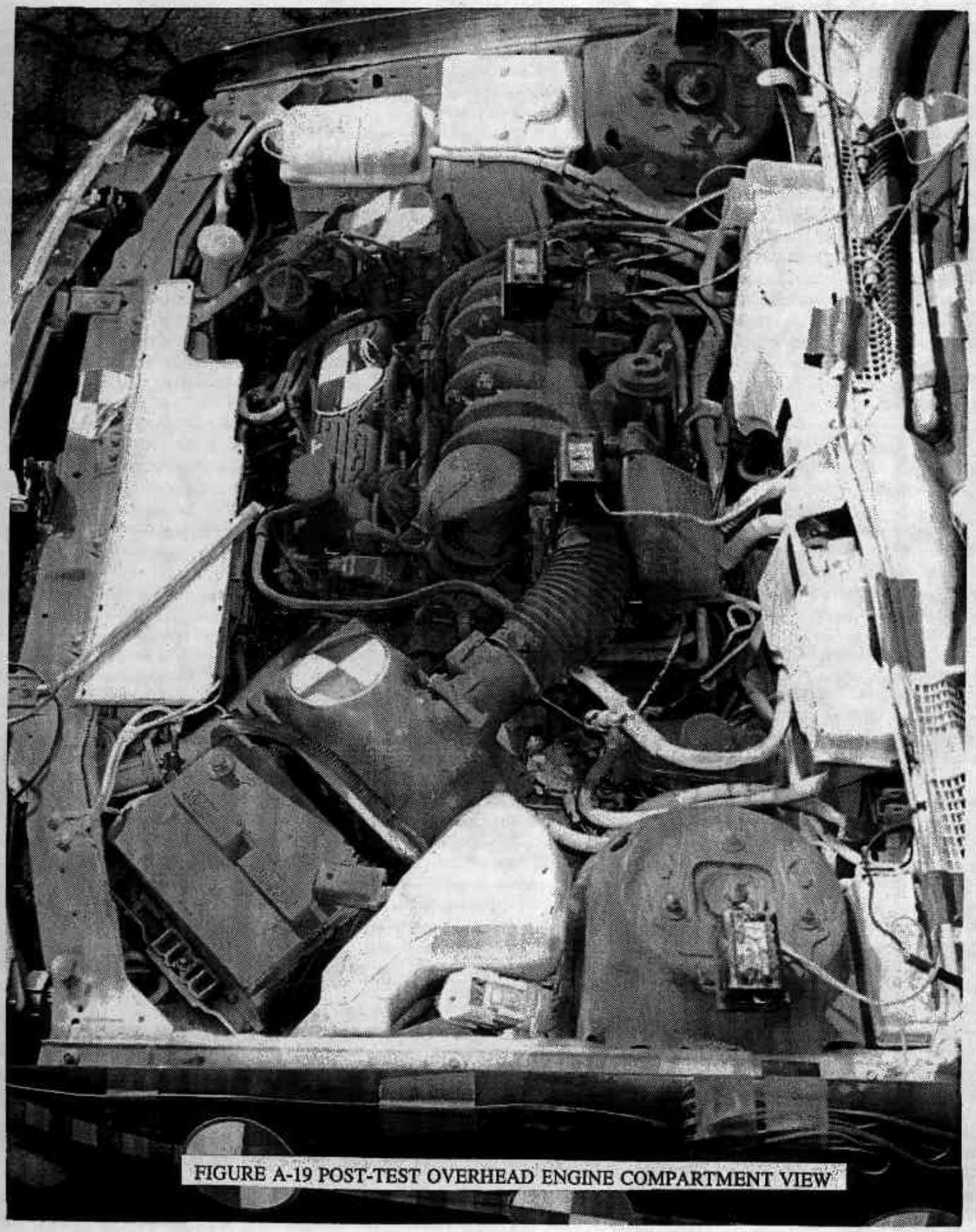

FIGURE A-19 POST-TEST OVERHEAD ENGINE COMPARTMENT VIEW

FIGURE A-20 POST-TEST OVERHEAD ENGINE COMPARTMENT VIEW

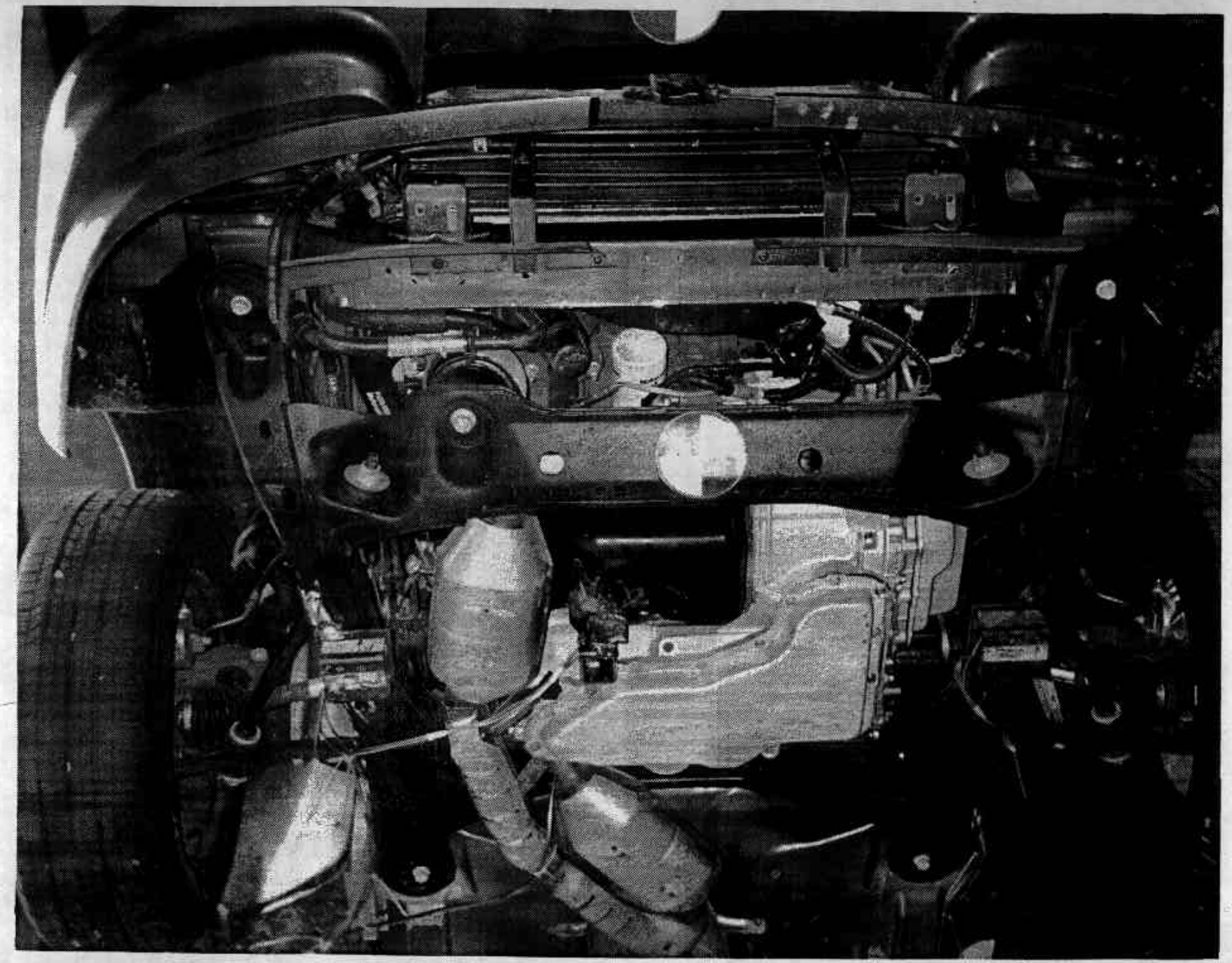

FIGURE A-21 PRE-TEST UNDERBODY FRONT VIEW

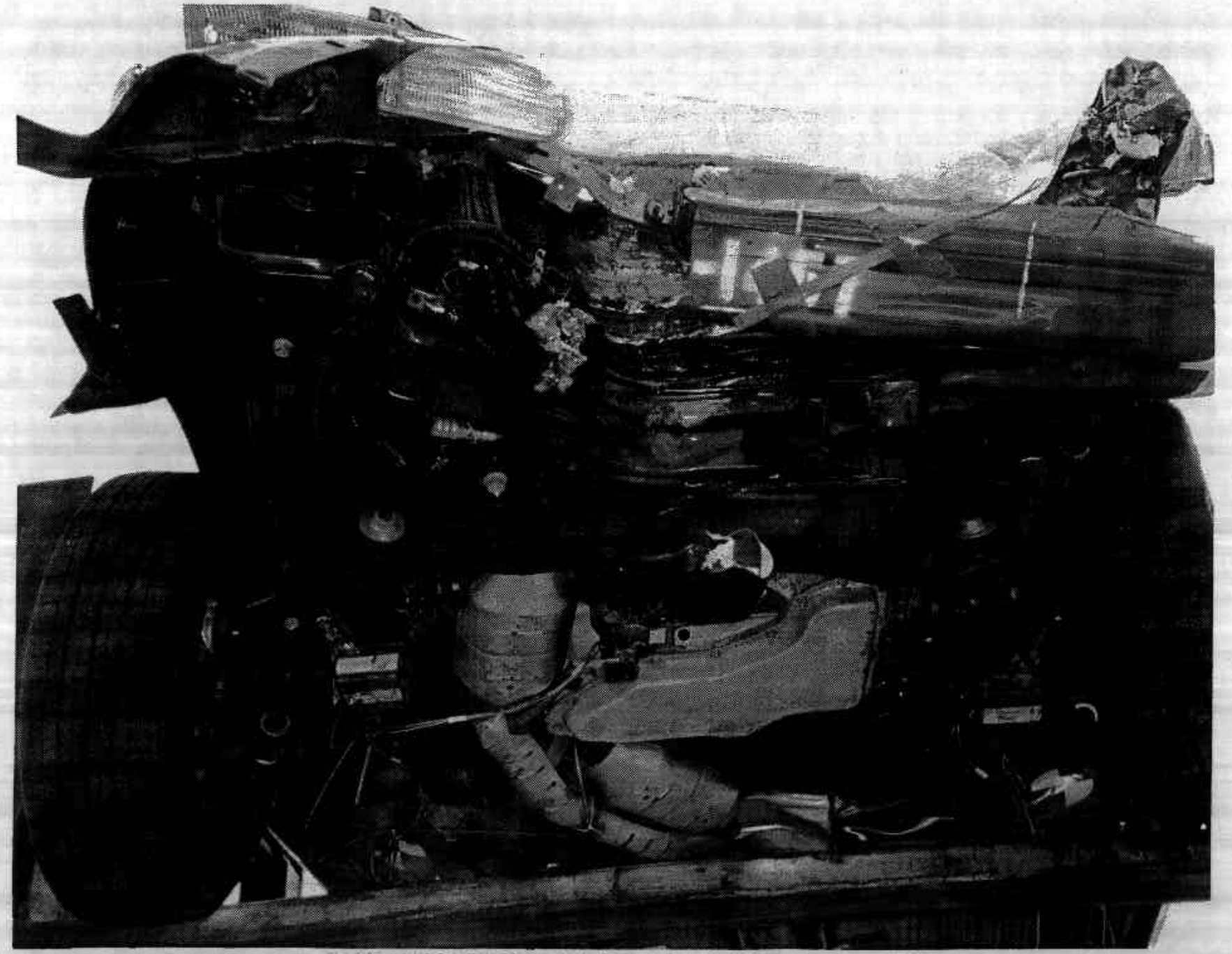

FIGURE A-22 POST-TEST UNDERBODY FRONT VIEW

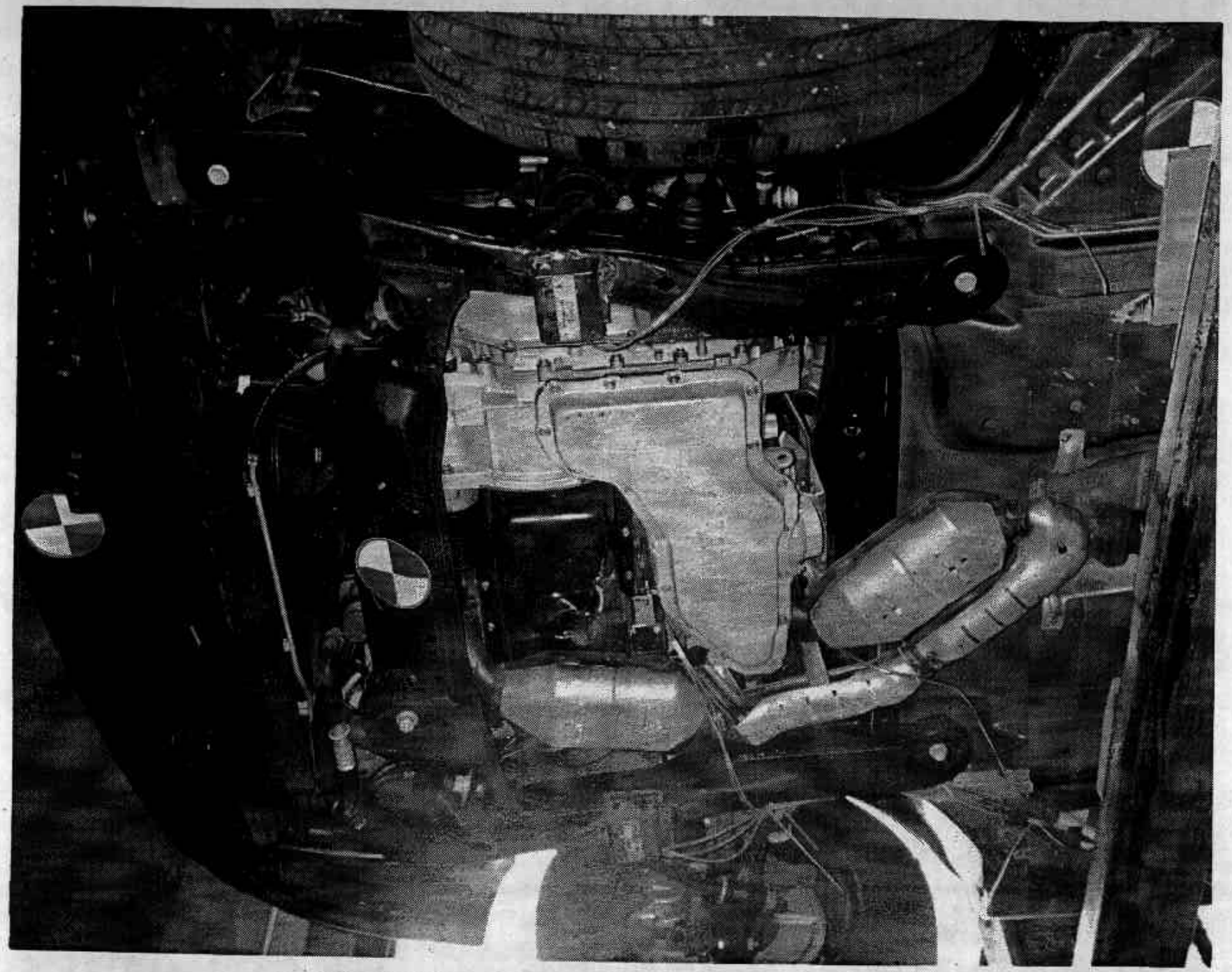

FIGURE A-23 PRE-TEST UNDERBODY FRONT SIDE VIEW

FIGURE A-24 POST-TEST UNDERBODY FRONT SIDE VIEW

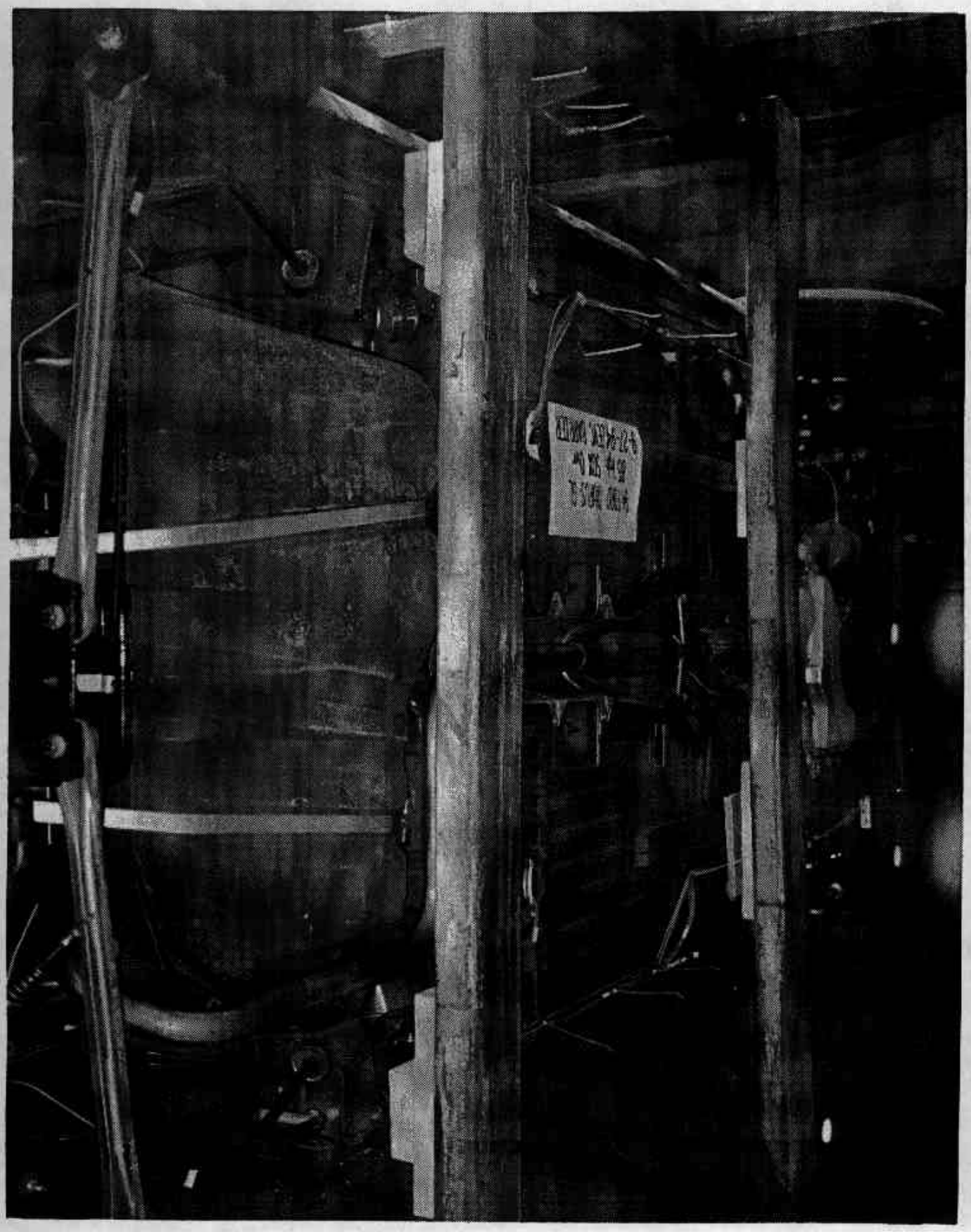

FIGURE A-25 PRE-TEST UNDERBODY REAR VIEW

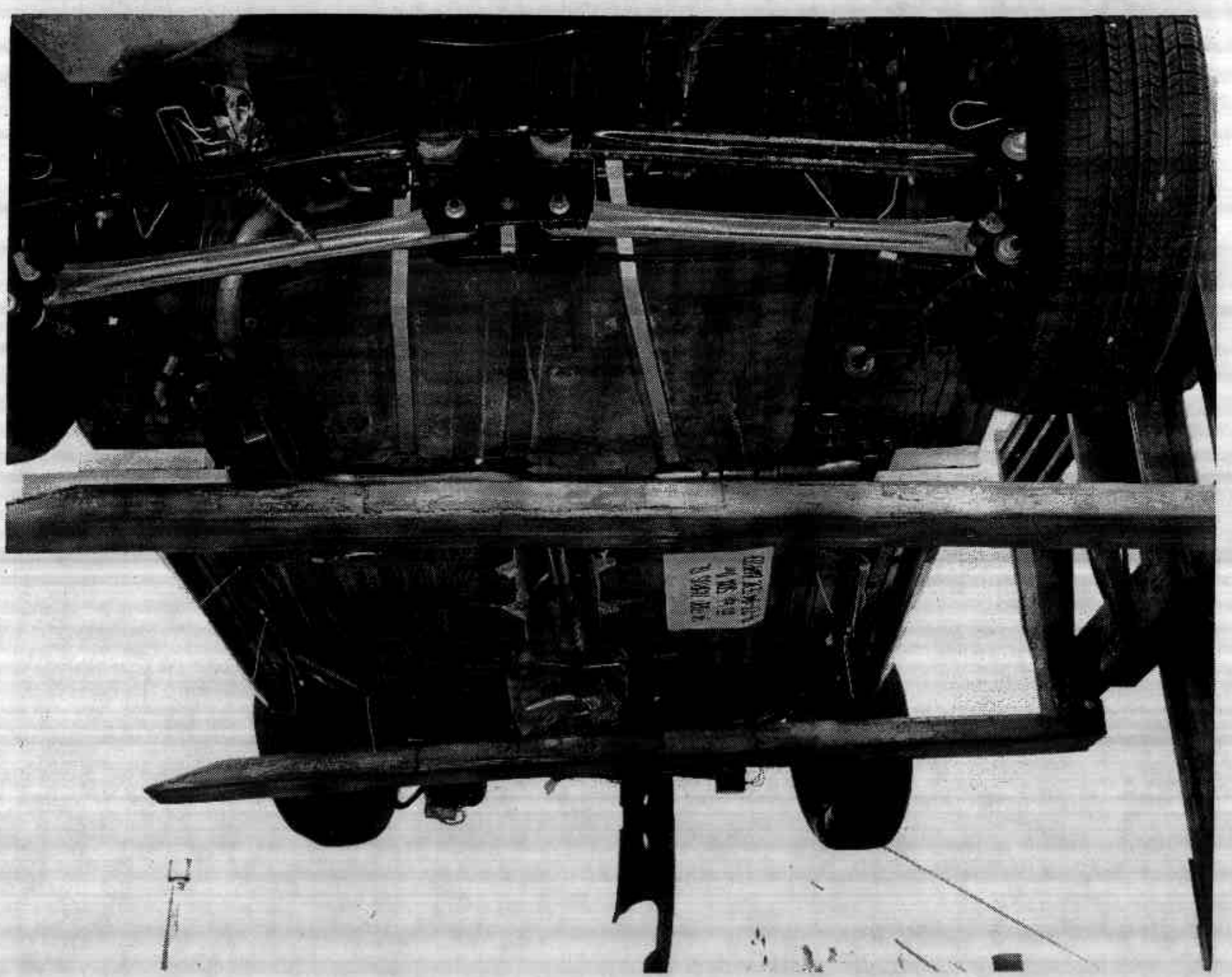

FIGURE A-26 POST-TEST UNDERBODY REAR VIEW

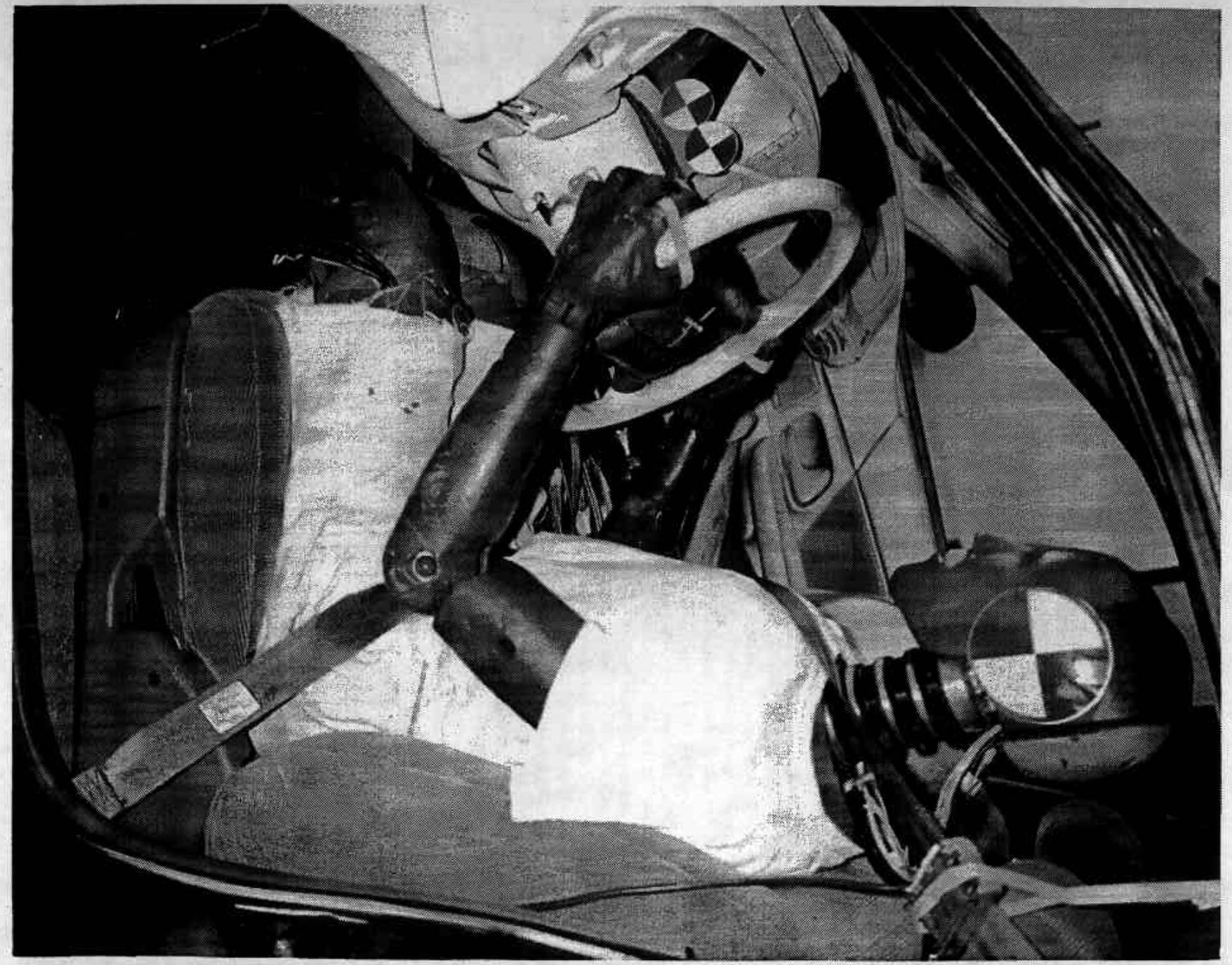

FIGURE A-27 PRE-TEST DRIVER POSITION VIEW

FIGURE A-28 POST-TEST DRIVER POSITION VIEW

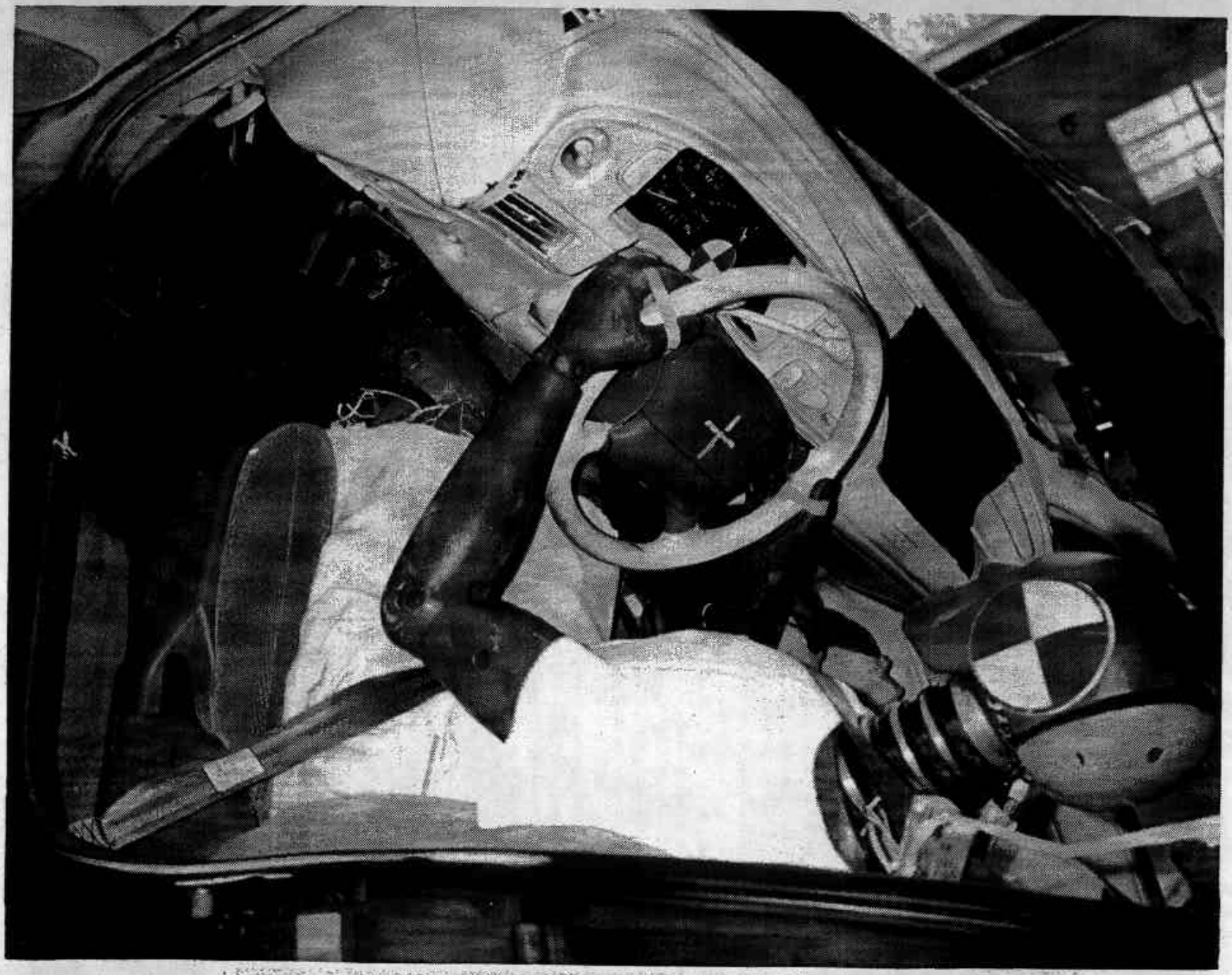

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FIGURE A-29 PRE-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW

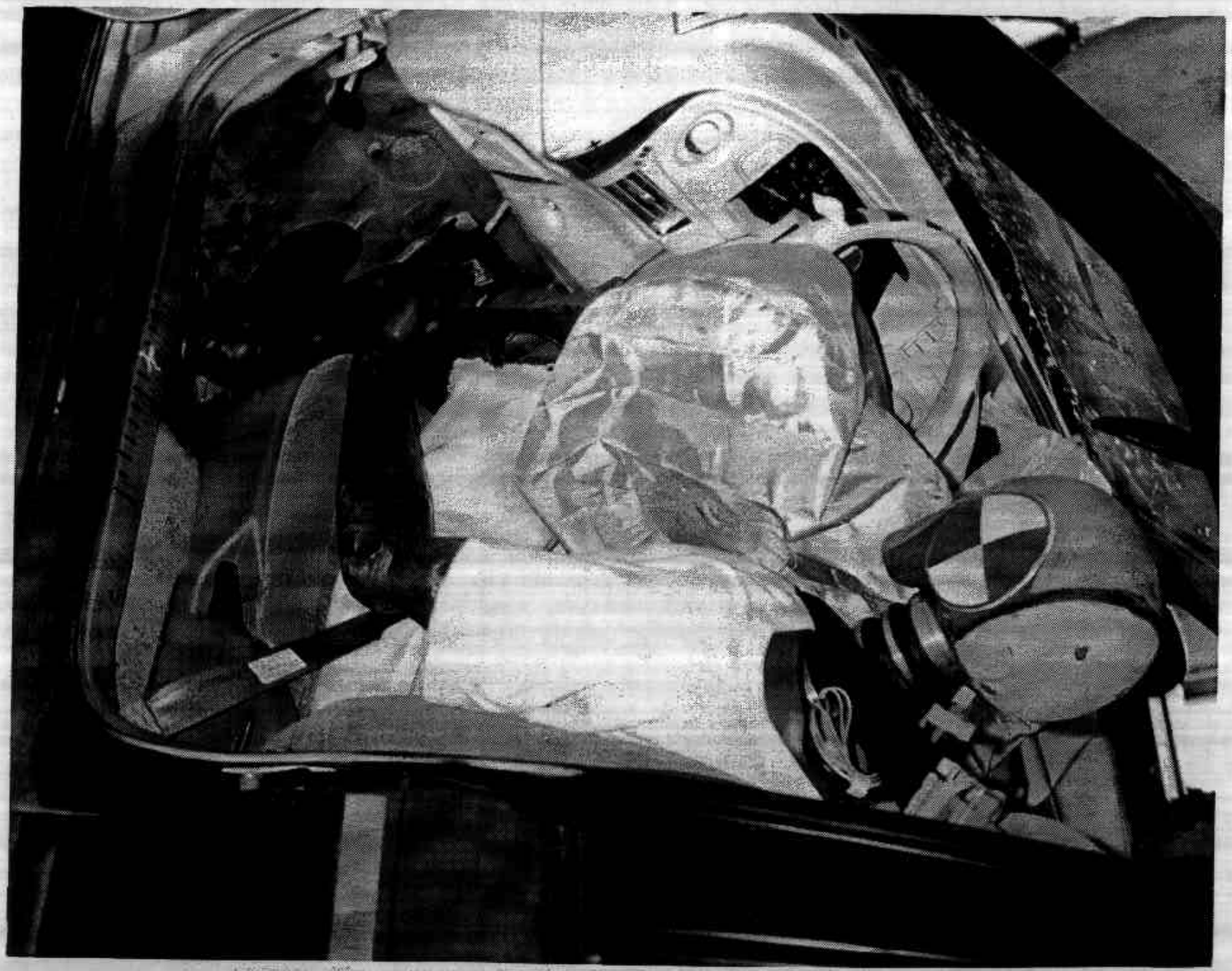

FIGURE A-30 POST-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW

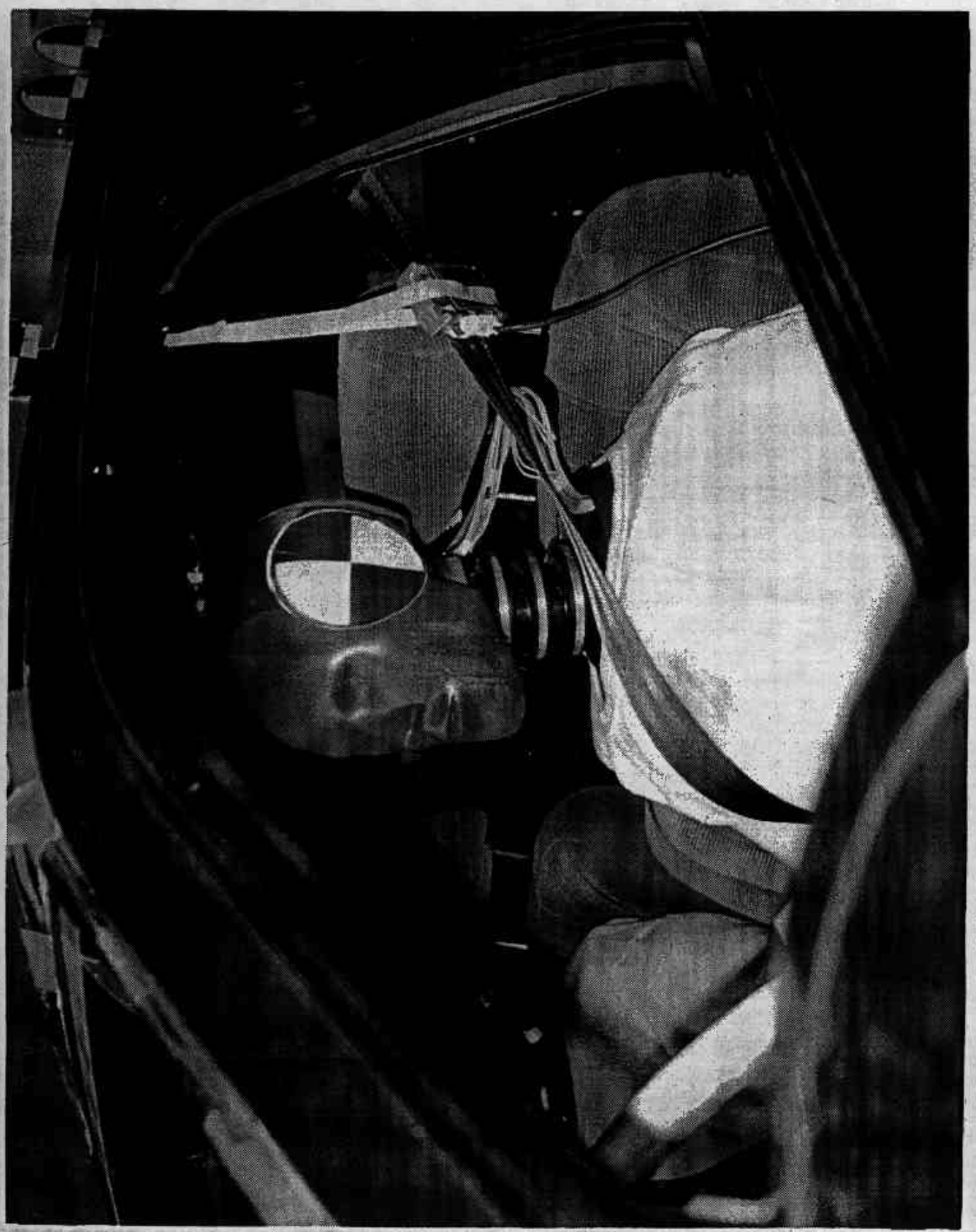

FIGURE A-31 PRE-TEST DRIVER FRONT SIDE VIEW

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FIGURE A-32 POST-TEST DRIVER FRONT SIDE VIEW

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FIGURE A-33 PRE-TEST DRIVER FRONT VIEW

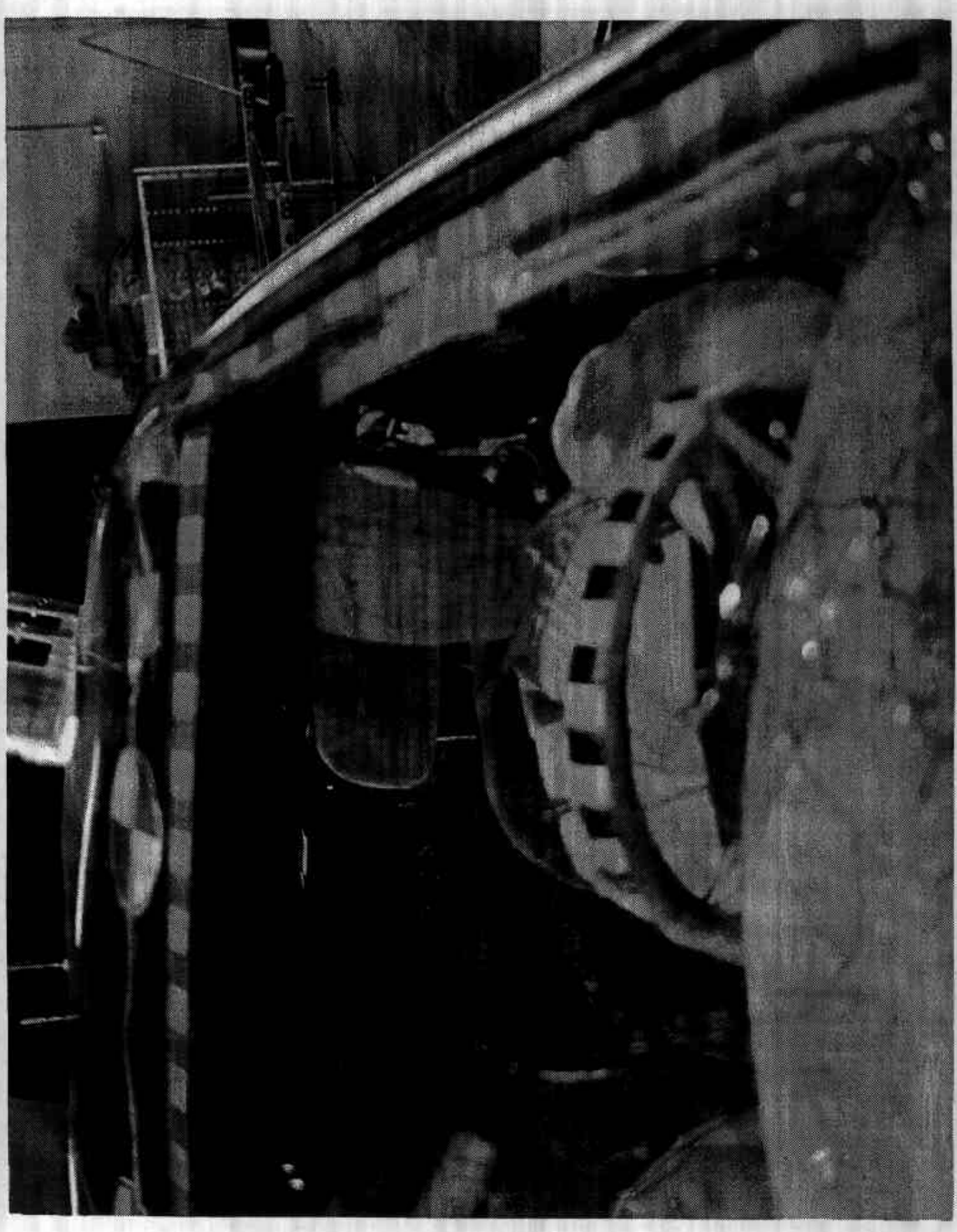

FIGURE A-34 POST-TEST DRIVER FRONT VIEW

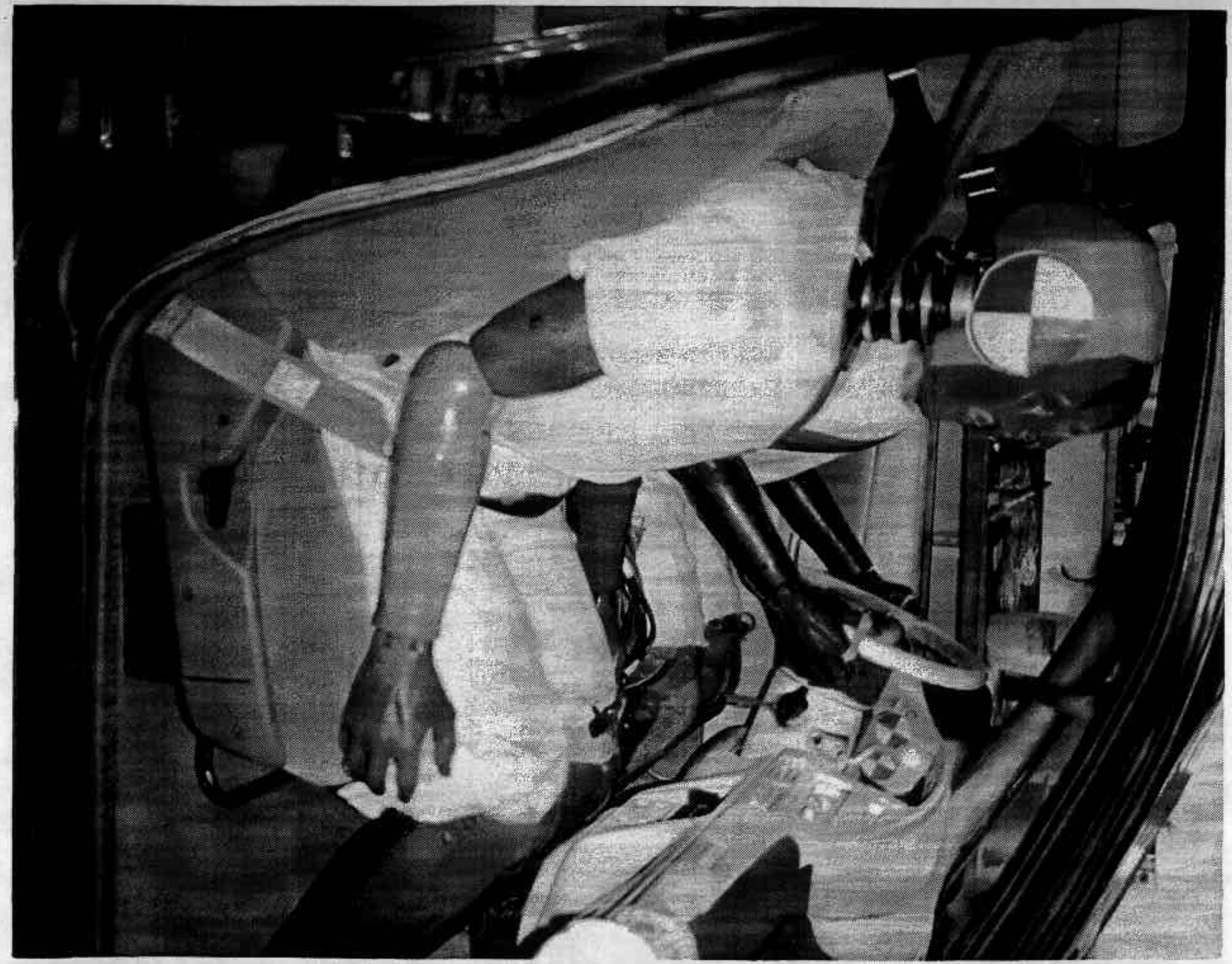

FIGURE A-35 PRE-TEST PASSENGER POSITION VIEW

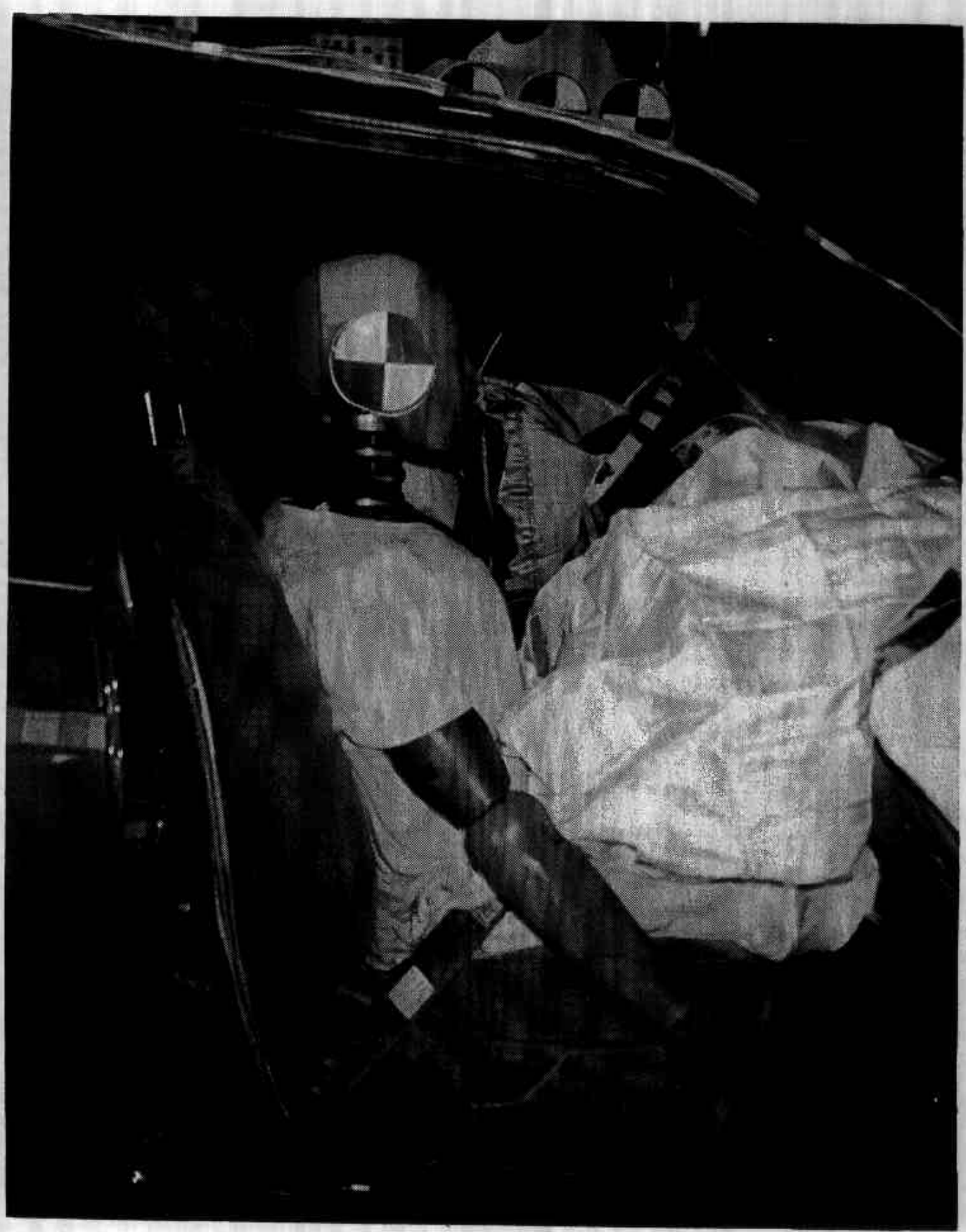

FIGURE A-36 POST-TEST PASSENGER POSITION VIEW

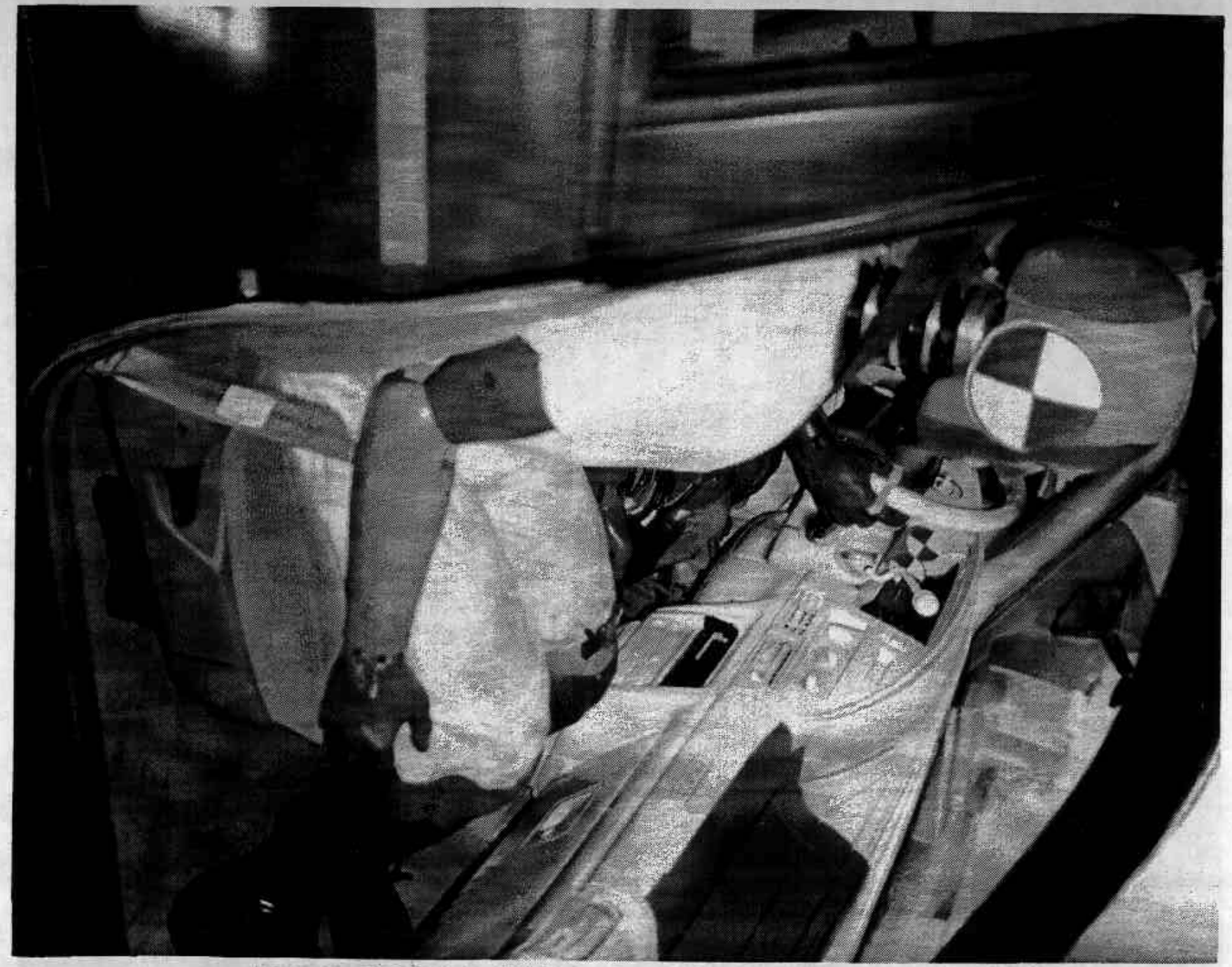

FIGURE A-37 PRE-TEST PASSENGER AND OCCUPANT COMPARTMENT VIEW

FIGURE A-38 POST-TEST PASSENGER AND OCCUPANT COMPARTMENT VIEW

FIGURE A-39 PRE-TEST PASSENGER FRONT SIDE VIEW

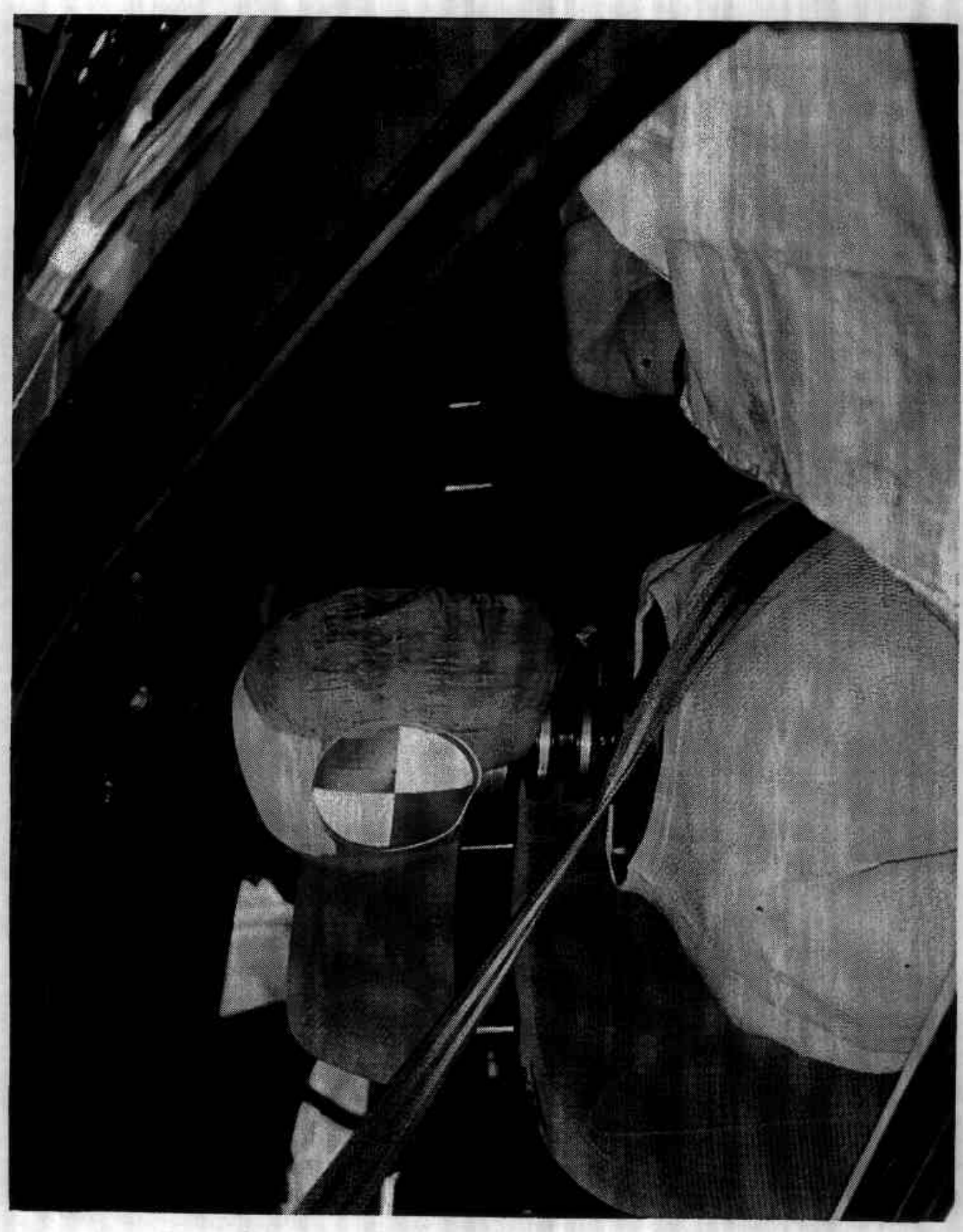

FIGURE A-40 POST-TEST PASSENGER FRONT SIDE VIEW

FIGURE A-41 PRE-TEST PASSENGER FRONT VIEW

FIGURE A-42 POST-TEST PASSENGER FRONT VIEW

FIGURE A-43 POST TEST, DRIVER AIRBAG, VIEW

FIGURE A-44 POST-TEST PASSENGER AIRBAG VIEW

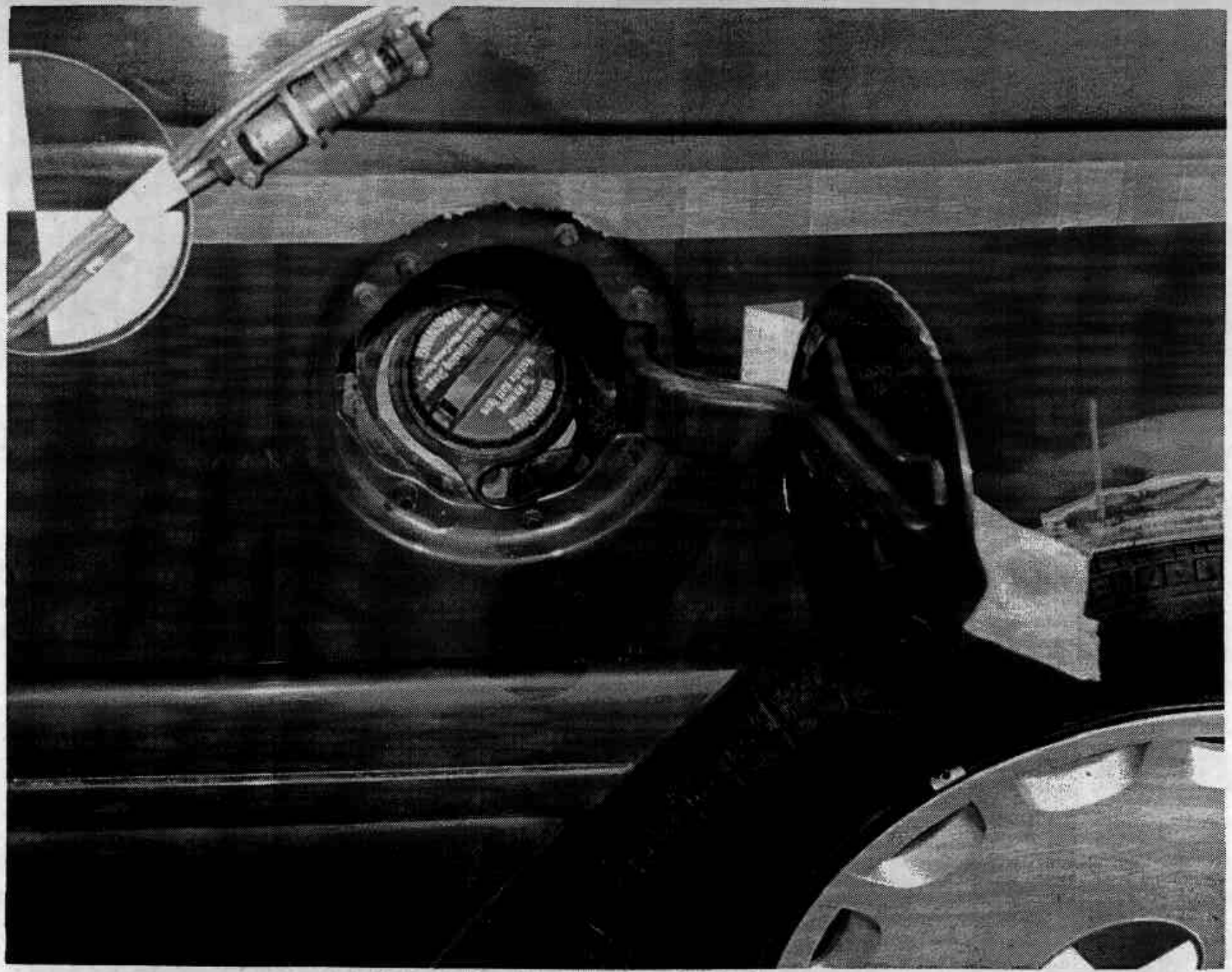

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FIGURE A-45 PRE-TEST FUEL FILLER CAP VIEW

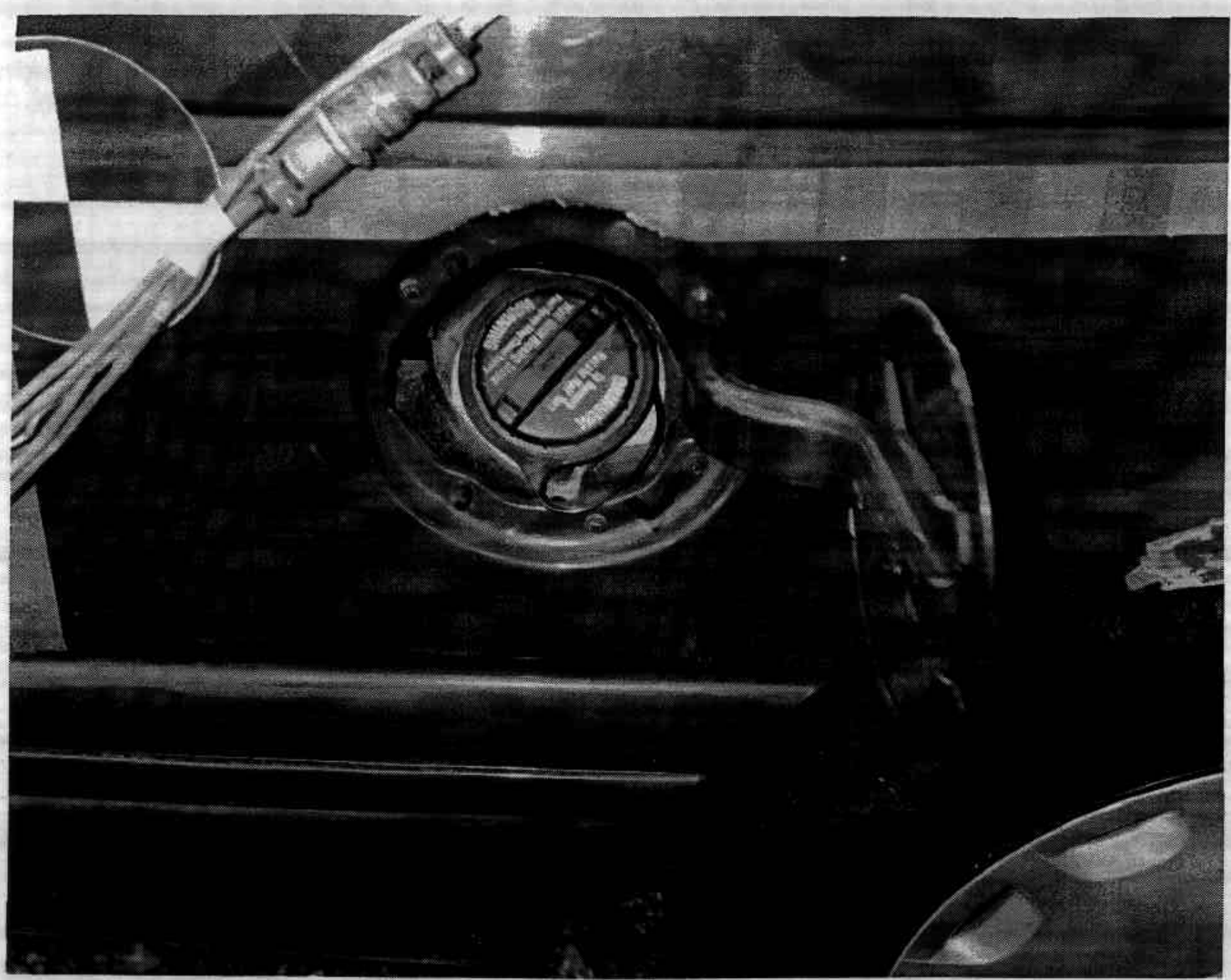

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FIGURE A-46 POST-TEST FUEL FILLER CAP VIEW

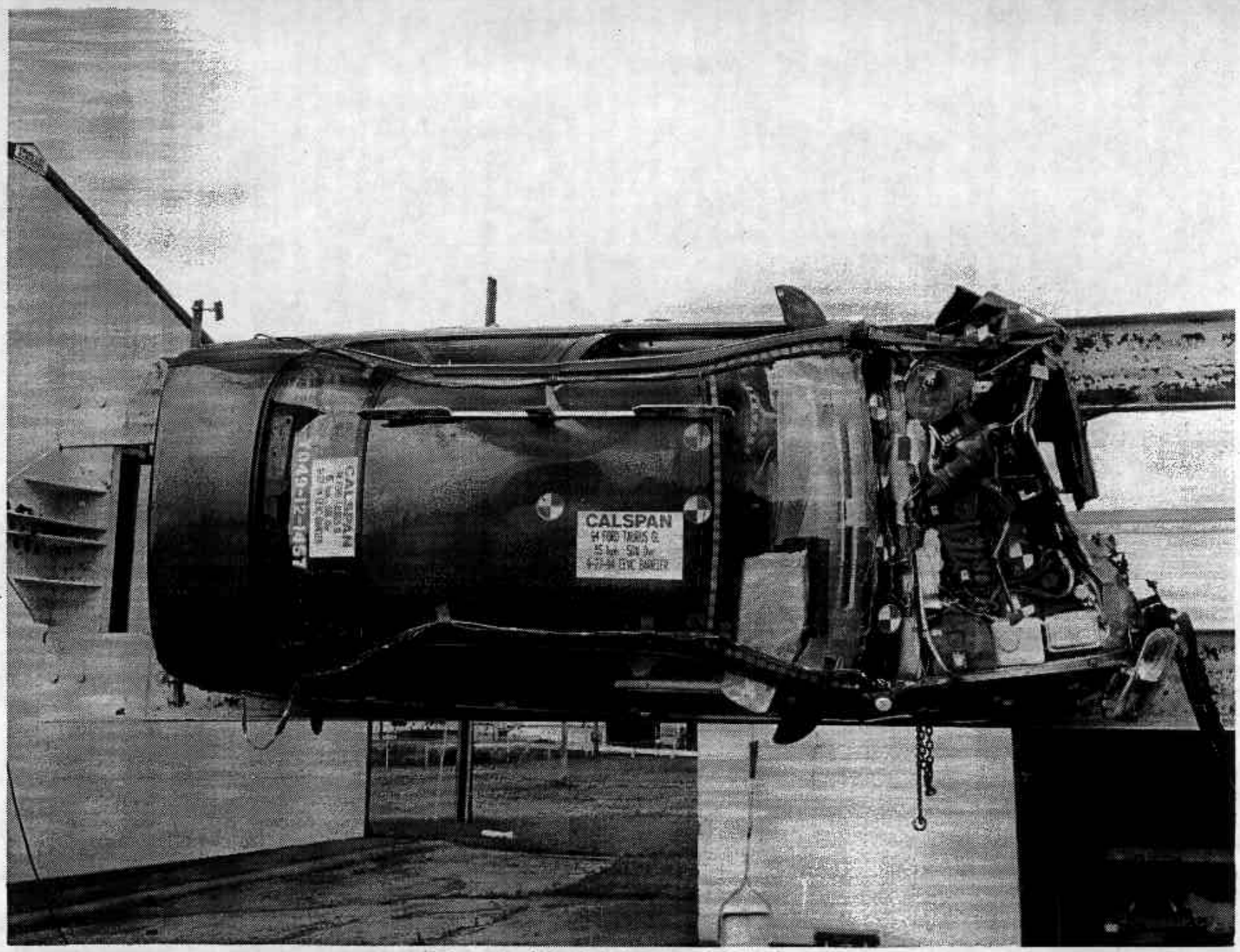

FIGURE A-47 POST-TEST TOP VIEW

EEVC HONEYCOMB BARRIER PHOTOGRAPHS

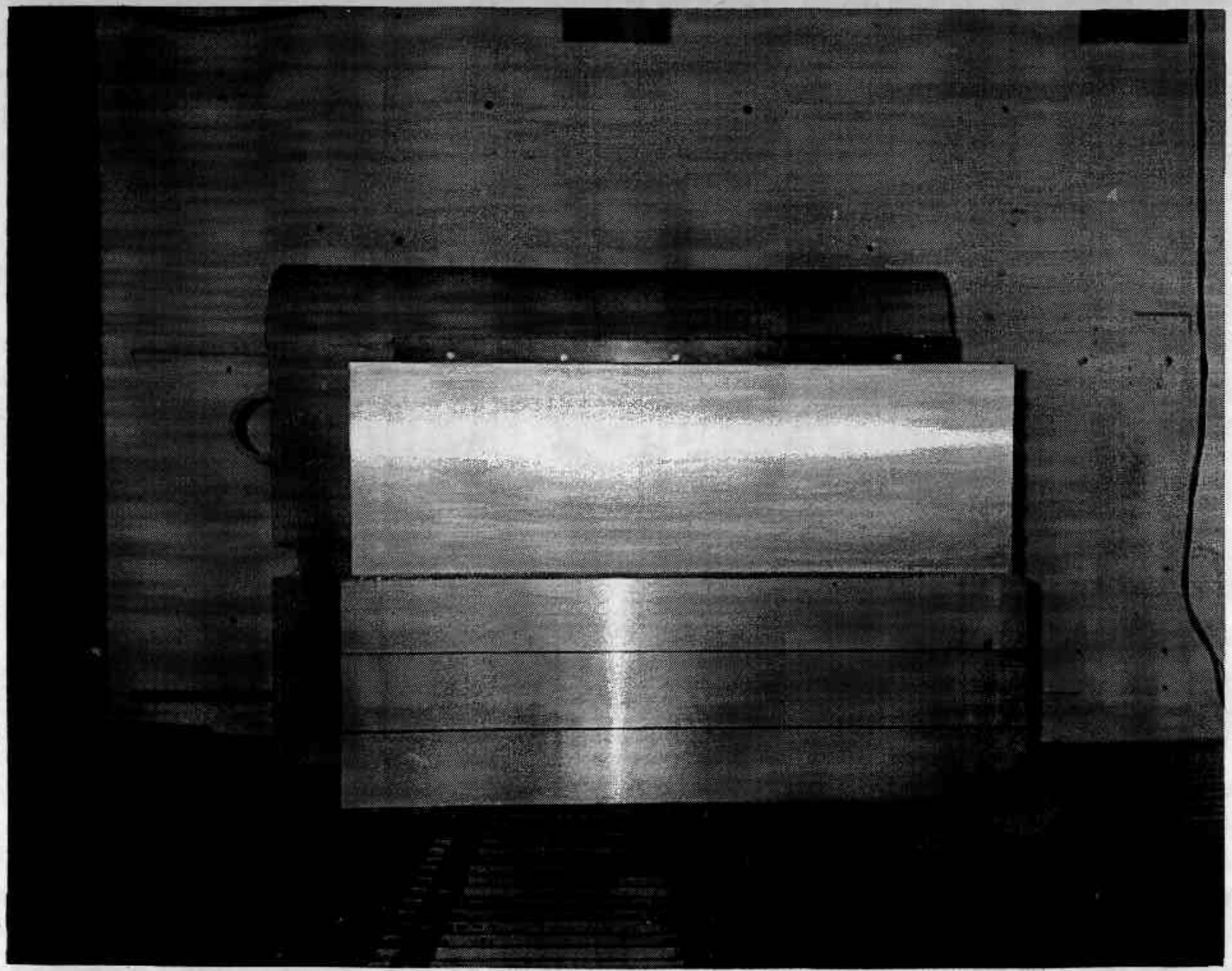

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FIGURE A-48 PRE-TEST BARRIER FRONT VIEW

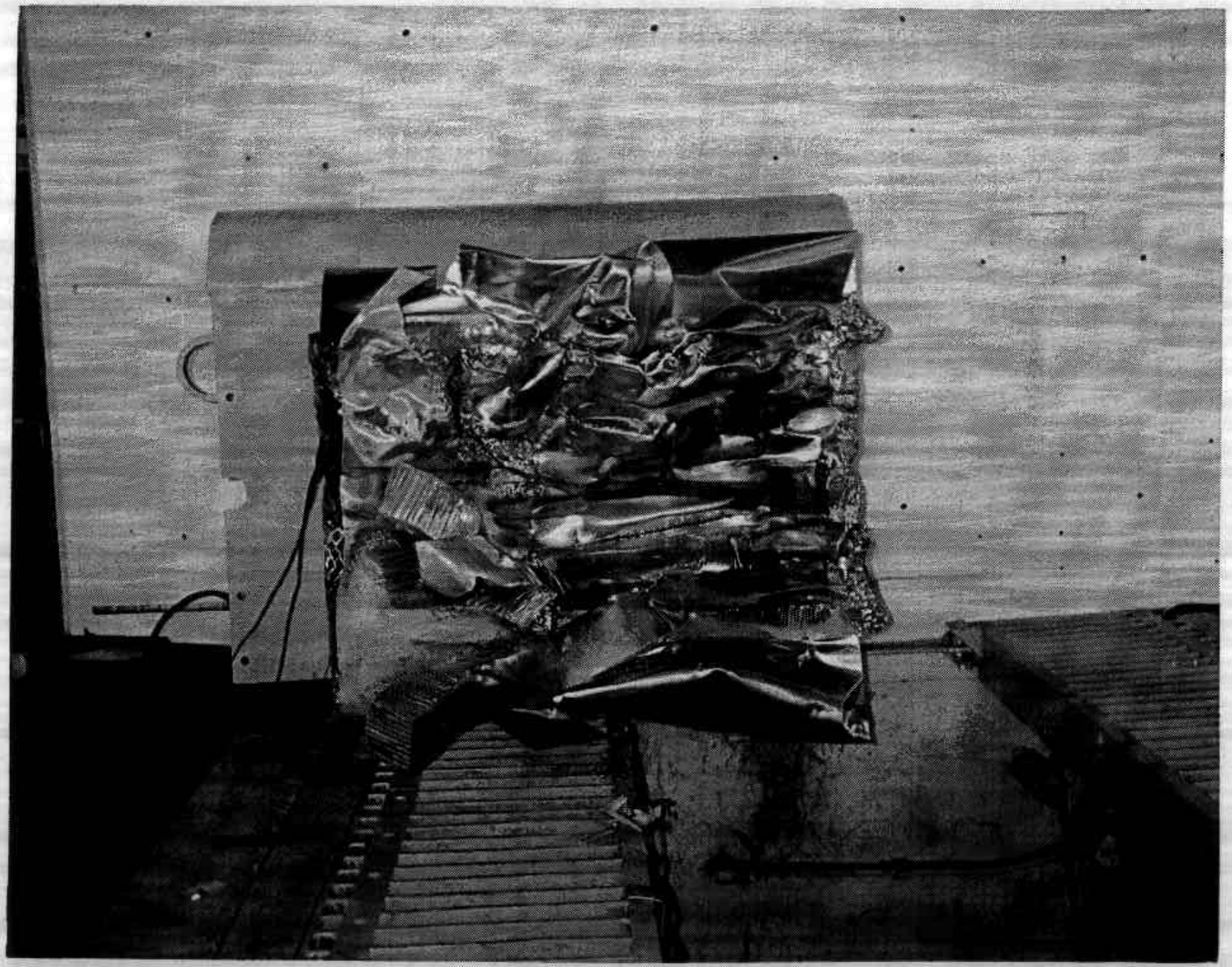

FIGURE A-49 POST-TEST BARRIER FRONT VIEW

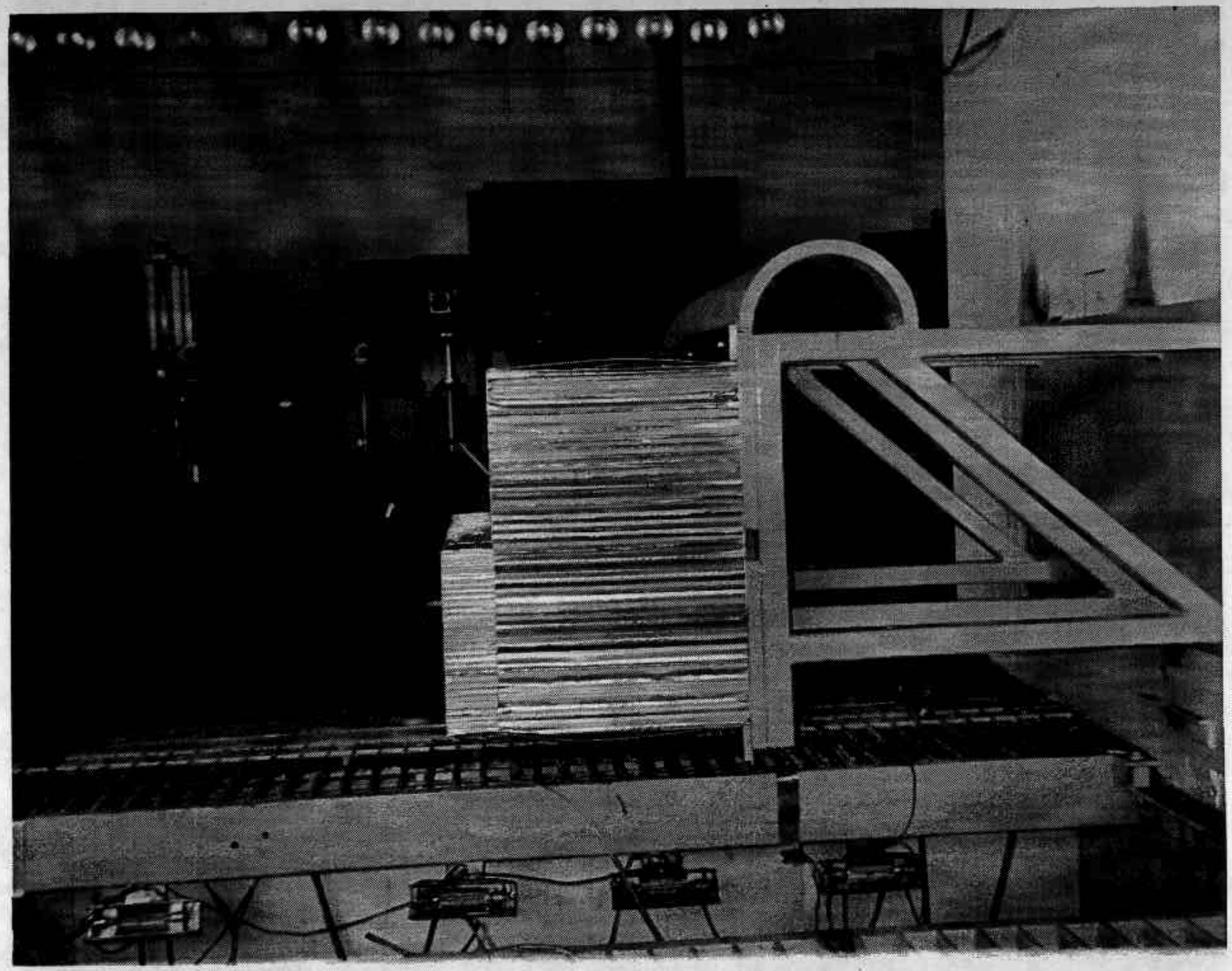

FIGURE A-50 PRE-TEST BARRIER LEFT SIDE VIEW

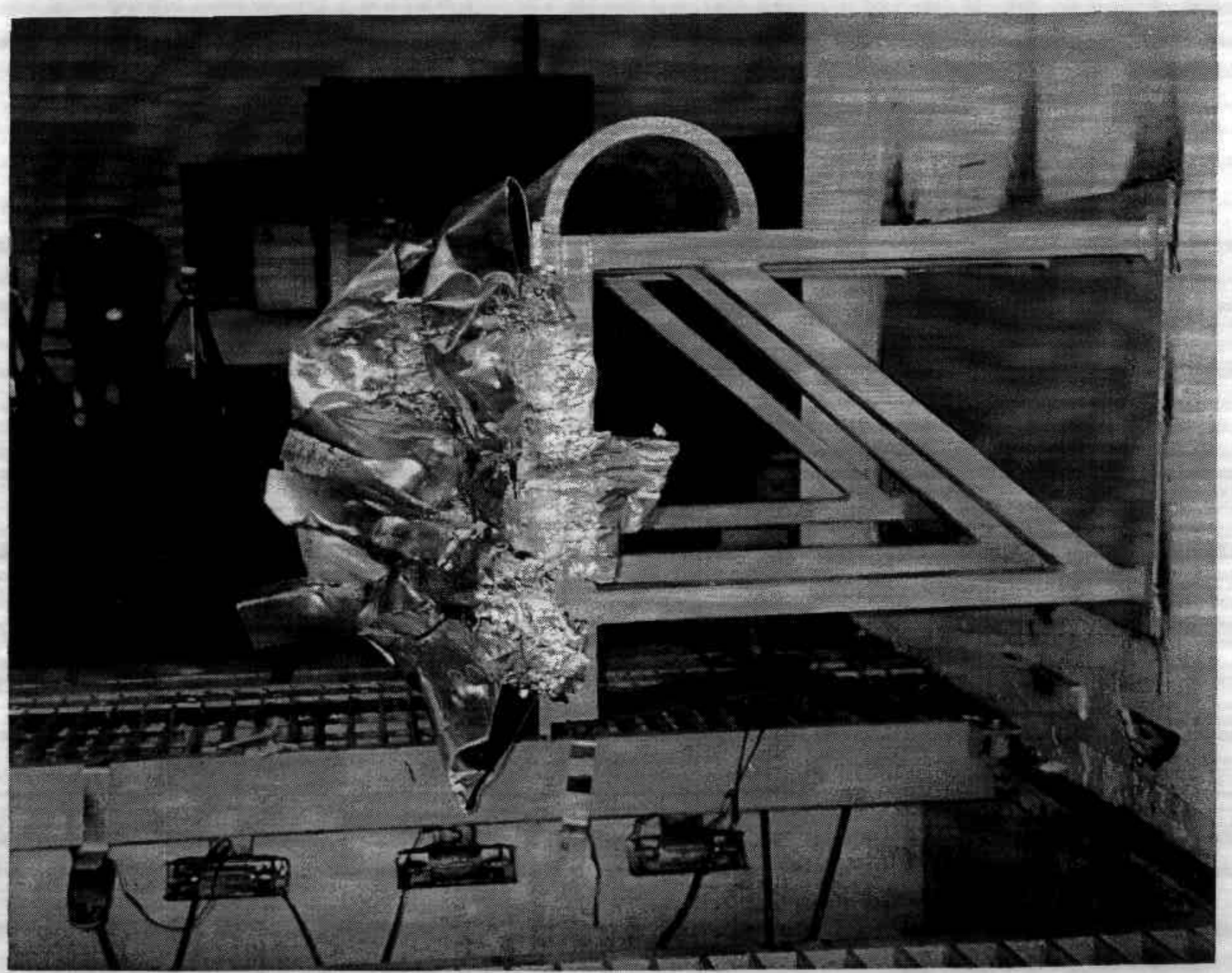

FIGURE A-51 POST-TEST BARRIER LEFT SIDE VIEW

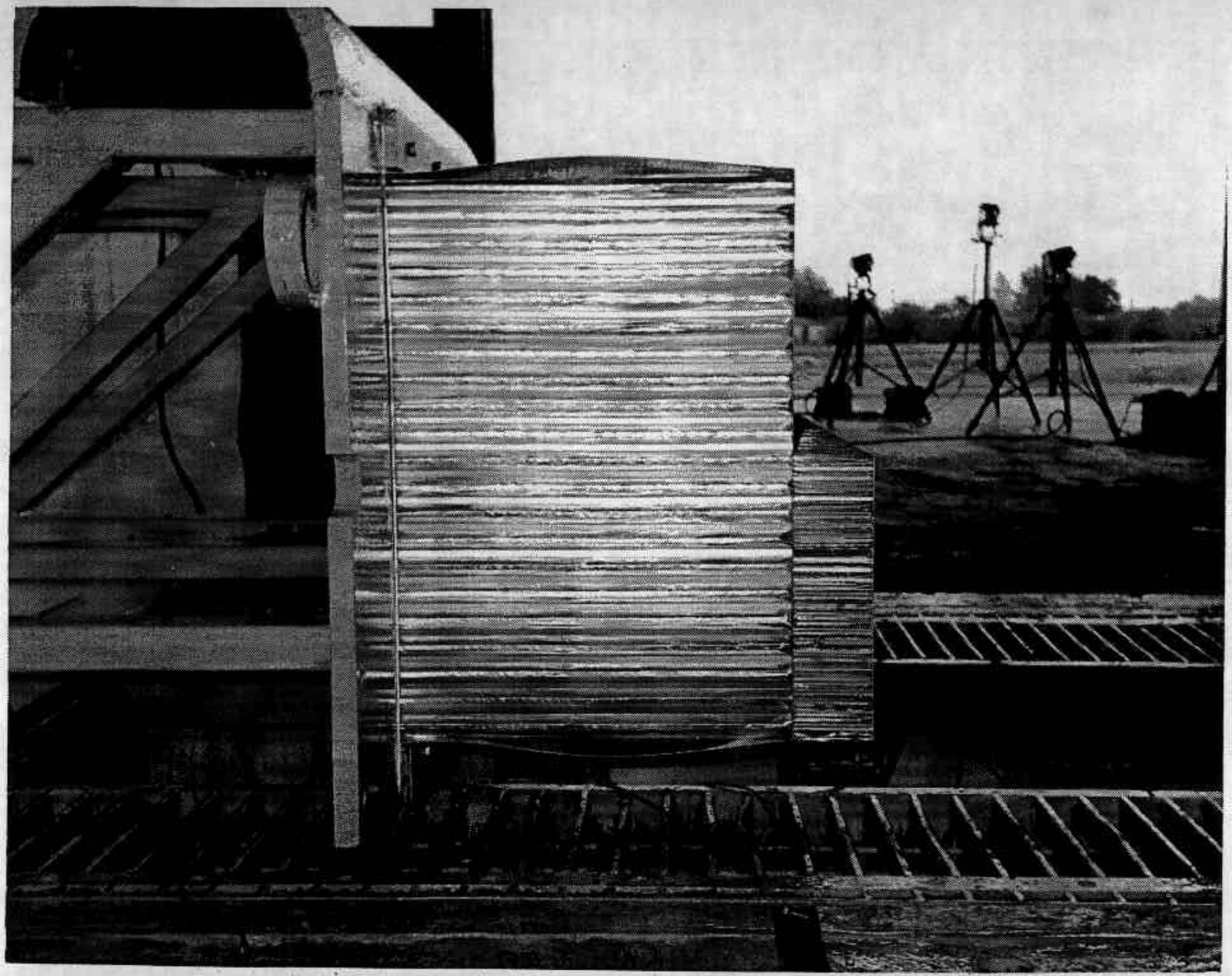

FIGURE A-52 PRE-TEST BARRIER RIGHT SIDE VIEW

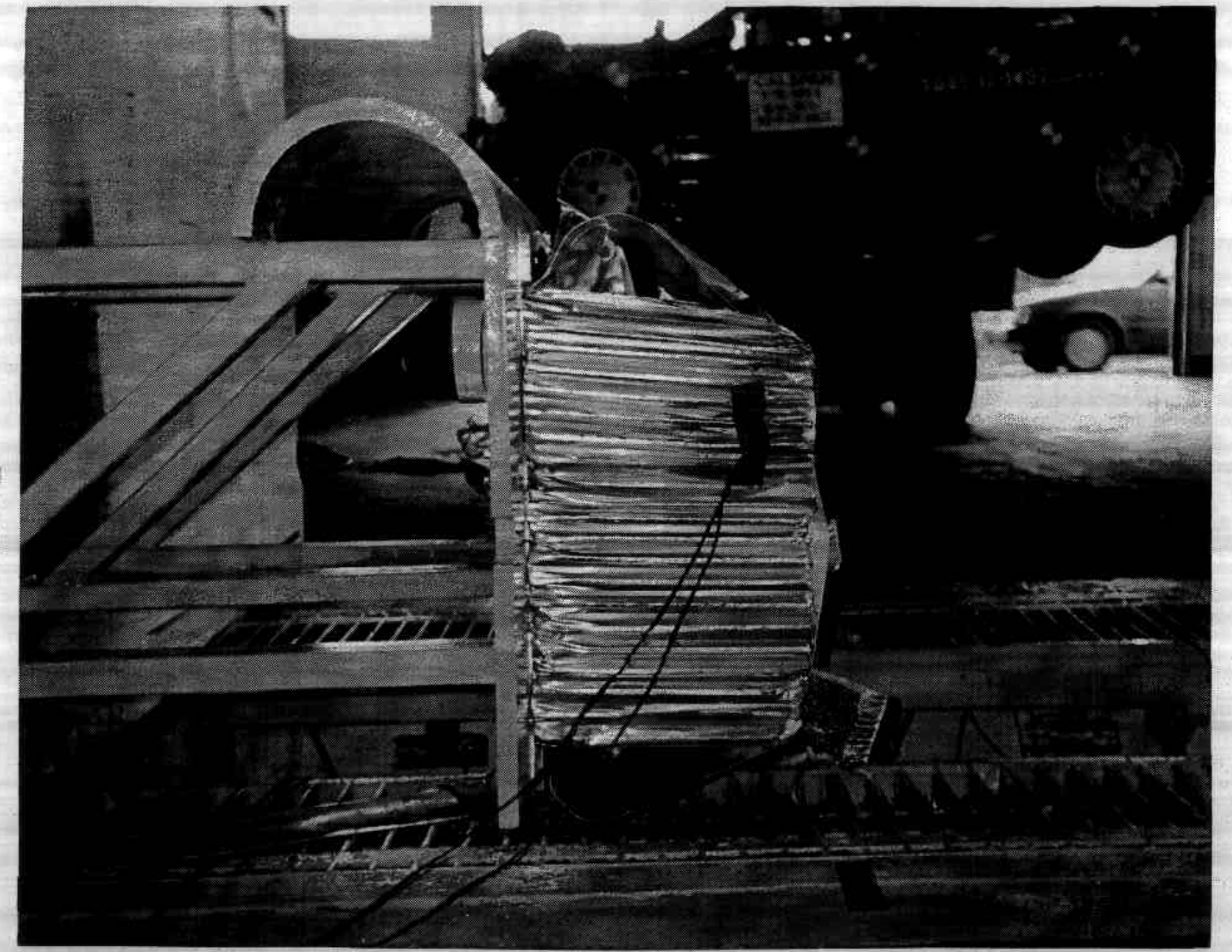

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FIGURE A-53 POST-TEST BARRIER RIGHT SIDE VIEW

FIGURE A-54 PRE-TEST BARRIER TOP VIEW

FIGURE A-55 POST-TEST BARRIER TOP VIEW

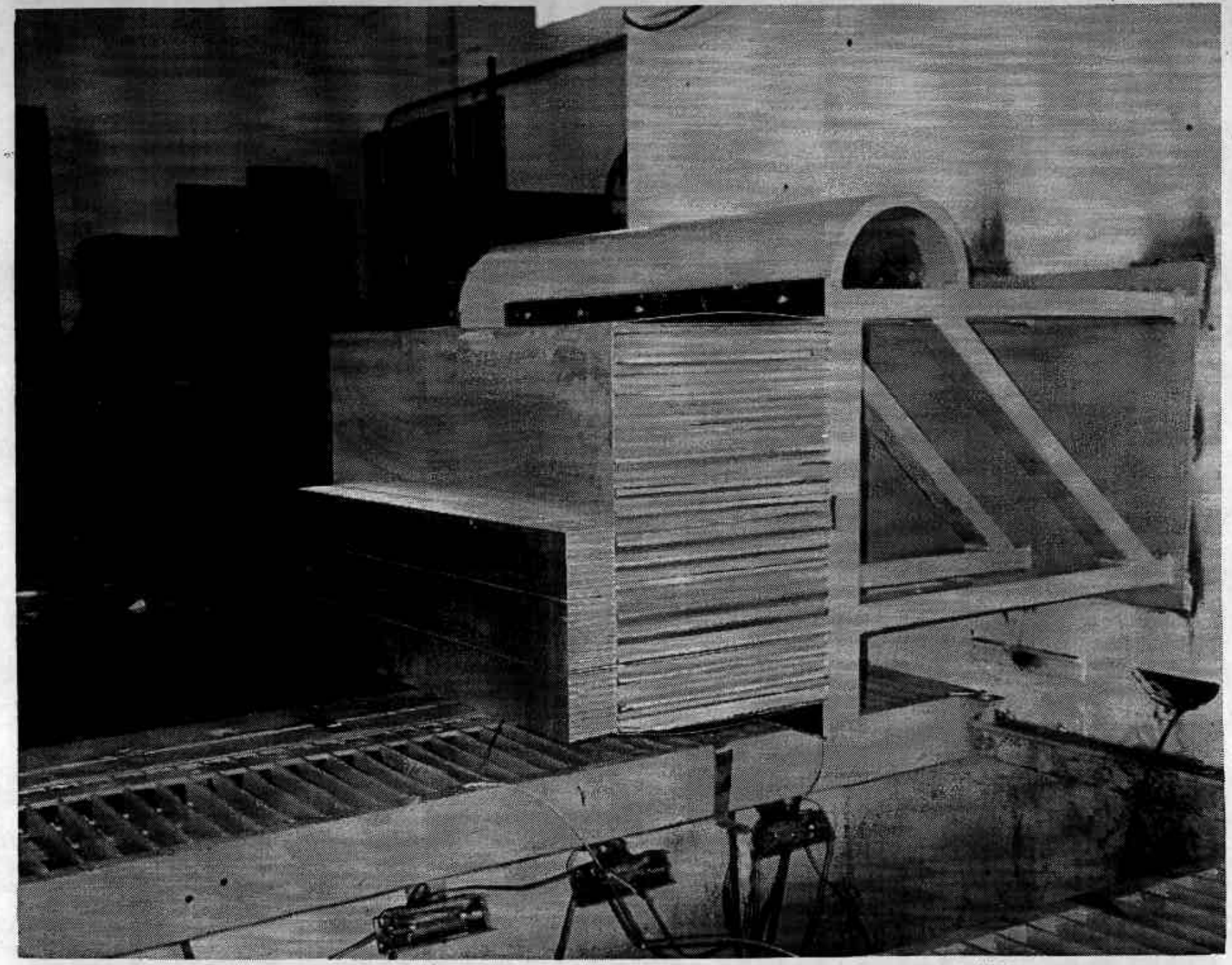


FIGURE A-56 PRE-TEST BARRIER LEFT FRONT THREE QUARTER VIEW

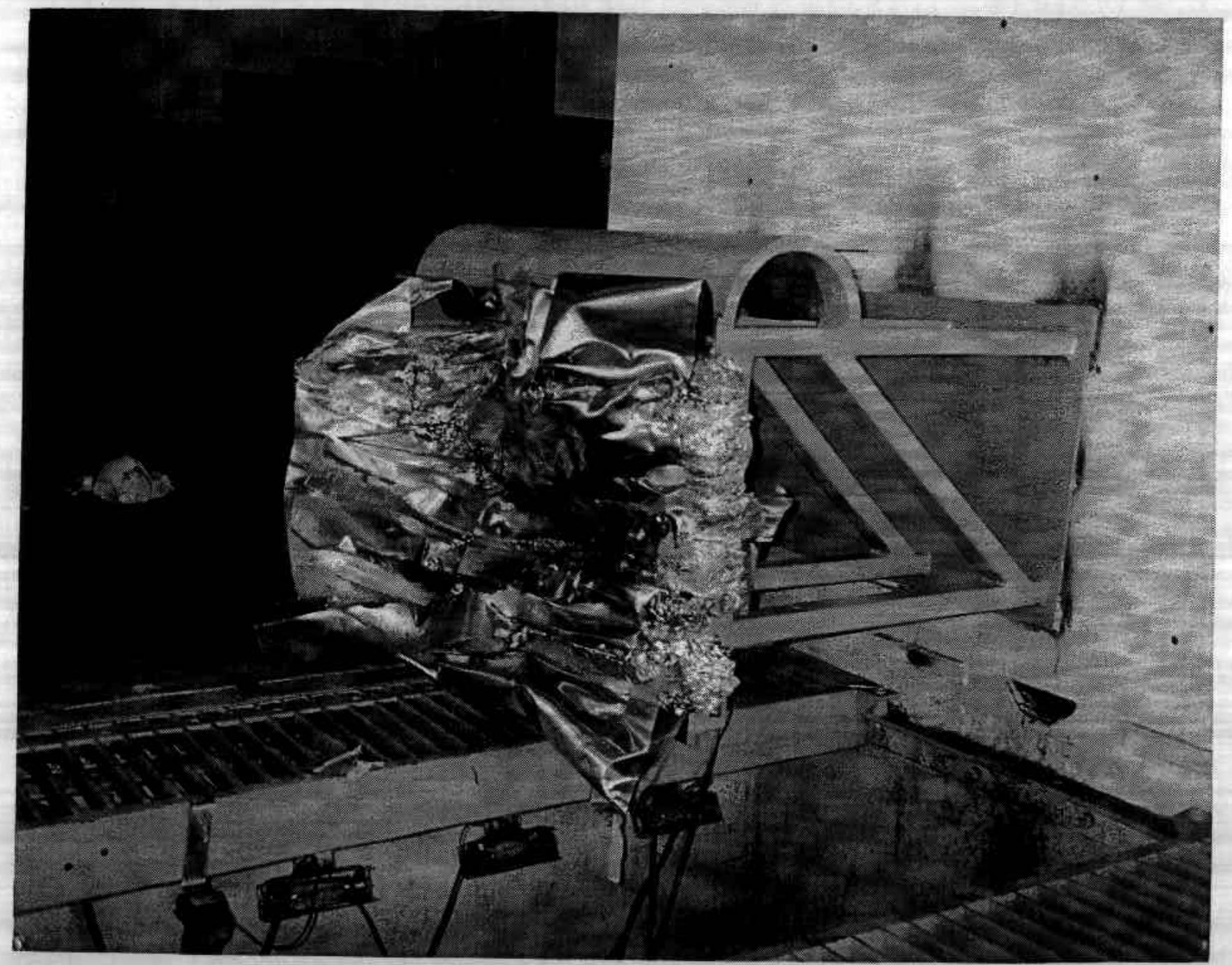


FIGURE A-57 POST-TEST BARRIER LEFT FRONT THREE QUARTER VIEW

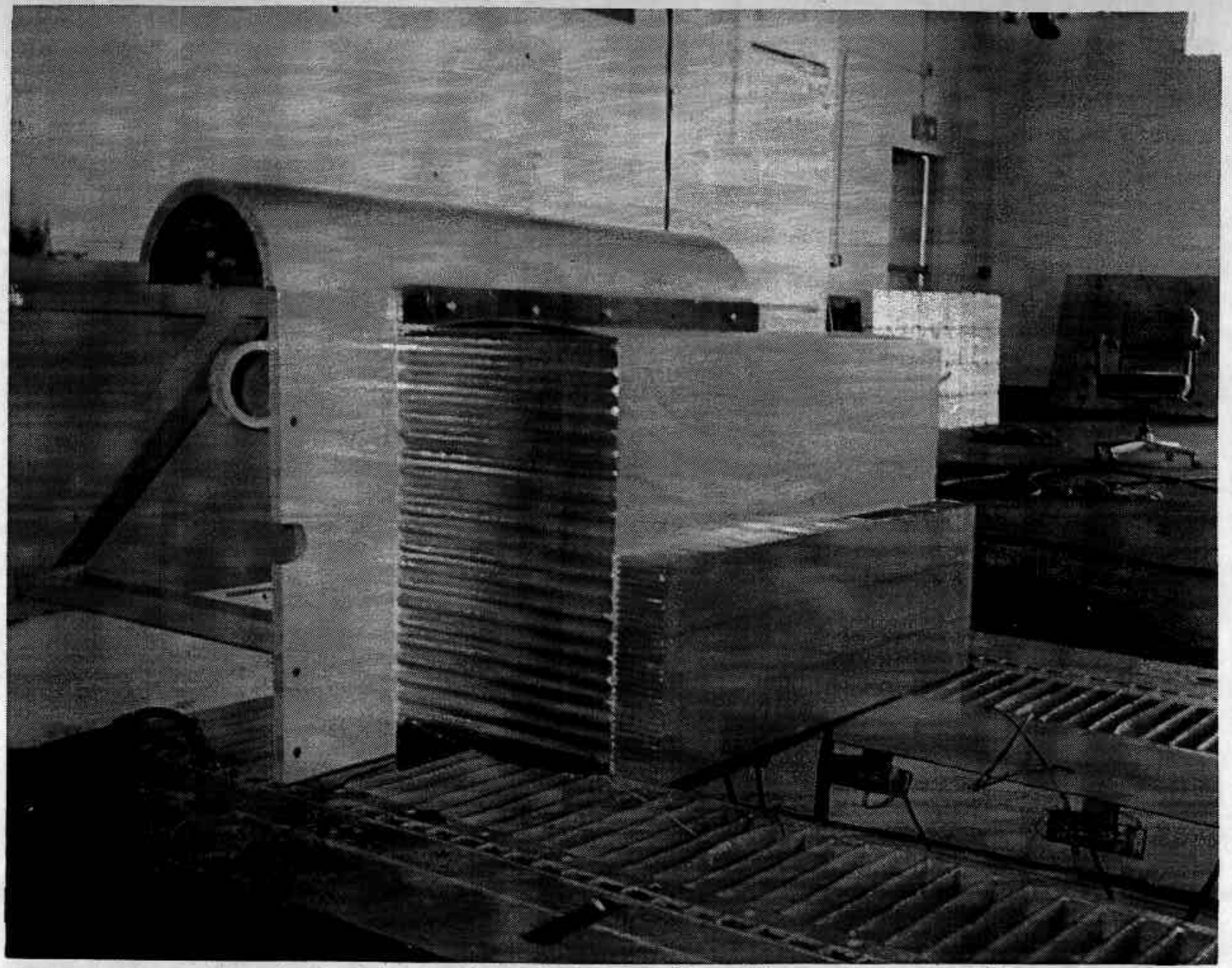


FIGURE A-58 PRE-TEST BARRIER RIGHT FRONT THREE QUARTER VIEW

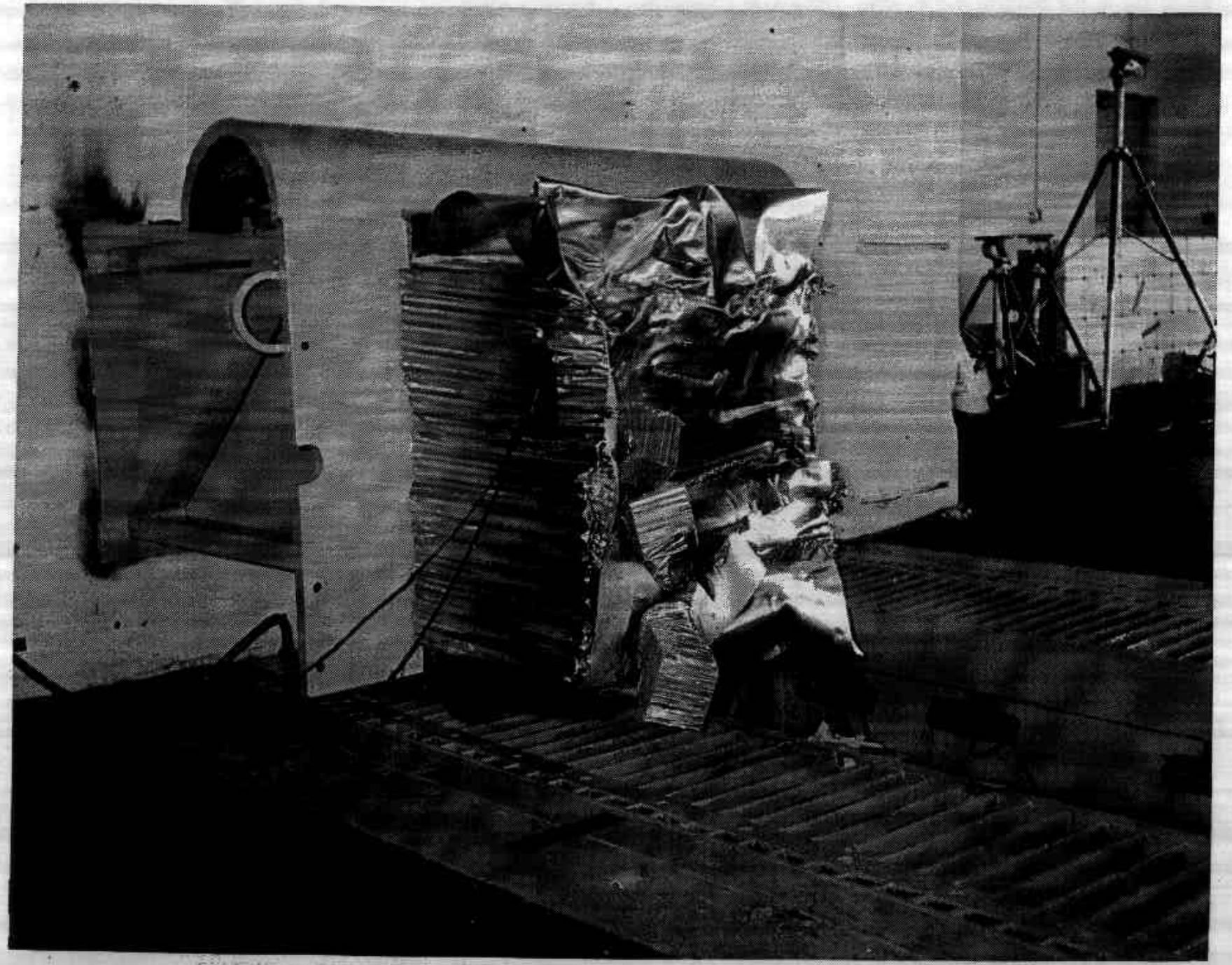


FIGURE A-59 POST-TEST BARRIER RIGHT FRONT THREE QUARTER VIEW

FIGURE A-60 VEHICLE IMPACT PHOTOGRAPH

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA

Key: V1 - Vehicle 1
V2 - Vehicle 2

FACILITY: TRACK
RUN #: 1457
SERIES #: 1

TEST DATE: 27 Sep 1994
TEST TIME: 14:18:15
BOARD: A

TITLE: VTV TEST #12

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
1	V1-P1 Head X	Gs	17.5	271.4	-33.3	115.4	1000.0
2	V1-P1 Head Y	Gs	10.9	178.2	-10.3	270.0	1000.0
3	V1-P1 Head Z	Gs	10.8	266.0	-7.1	137.2	1000.0
4	V1-P1 HD9Y (X)	Gs	19.2	270.1	-38.8	73.8	1000.0
5	V1-P1 Chest X	Gs	6.3	303.2	-39.5	115.9	180.0
6	V1-P1 Chest Y	Gs	11.3	122.5	-3.5	297.0	180.0
7	V1-P1 Chest Z	Gs	7.8	119.0	-11.8	150.2	180.0
8	V1-P1 HD9Y (Z)	Gs	11.7	124.1	-16.9	164.4	1000.0
9	V1-P1 Upper Neck Fx	Nwt	535.5	137.0	-219.4	183.7	1000.0
10	V1-P1 Upper Neck Fy	Nwt	452.4	176.9	-314.3	137.2	1000.0
11	V1-P1 Upper Neck Fz	Nwt	878.5	115.0	-175.1	162.6	1000.0
12	V1-P1 HD9X (Y)	Gs	11.4	48.2	-10.4	46.3	1000.0
13	V1-P1 Upper Neck Mx	Nwt-M	31.6	166.8	-13.0	270.6	600.0
14	V1-P1 Upper Neck My	Nwt-M	27.5	62.3	-18.6	99.7	600.0
15	V1-P1 Upper Neck Mz	Nwt-M	8.3	217.0	-20.9	152.9	600.0
16	V1-P1 HD9X (Z)	Gs	19.7	44.0	-16.6	50.5	1000.0
17	Head Resultant	Gs	33.4	99.6	.0	-10.8	1000.0
18	Chest Resultant	Gs	40.1	115.9	.0	-15.0	180.0
19	Upper Neck Force Res.	Nwt	892.0	115.0	6.6	7.0	1000.0
20	Upper Neck Moment Res.	Nwt-M	34.5	166.8	.1	-18.0	600.0

36 ms Fixed Duration HIC SUMMARY: Head Resultant

hic: 177.61
t1 = 84.120 msec
t2 = 120.000 msec
Average G's Over Hic Duration = 30.05

CLIP SUMMARY: Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 38.533 G's
Tstart = 117.4800 ms
Tend = 120.4800 ms
CSI = 378.972

FACILITY: TRACK TEST DATE: 27 Sep 1994
RUN #: 1457 TEST TIME: 14:18:15
SERIES #: 1 BOARD: B

TITLE: VTV TEST #12

	CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
	1	V1-P2 Head X	Gs	15.3	358.0	-42.0	67.1	1000.0
*	2	V1-P2 Head Y	Gs	18.9	76.2	-6.1	45.5	1000.0
	3	V1-P2 Head Z	Gs	7.4	123.0	-4.1	170.6	1000.0
	4	V1-P1 Chest Disp.	mm	.0	-13.6	-12.1	121.6	60.0
	5	V1-P2 Chest X	Gs	5.1	386.3	-36.3	85.7	180.0
	6	V1-P2 Chest Y	Gs	5.6	87.8	-5.1	137.0	180.0
	7	V1-P2 Chest Z	Gs	7.2	69.4	-12.3	150.0	180.0
	8	V1-P1 Torso Belt Load	Nwt	5071.4	119.4	-322.0	212.4	600.0
	9	V1-P1 Lower Neck Fx	Nwt	2192.5	99.6	-394.7	167.3	1000.0
	10	V1-P1 Lower Neck Fy	Nwt	1396.3	120.5	-458.1	215.5	1000.0
	11	V1-P1 Lower Neck Fz	Nwt	818.4	65.4	-733.1	136.9	1000.0
	12	V1-P1 HD9Z (X)	Gs	23.7	270.4	-35.7	50.3	1000.0
	13	V1-P1 Lower Neck Mx	Nwt-M	101.0	166.7	-34.7	279.5	600.0
	14	V1-P1 Lower Neck My	Nwt-M	69.1	186.1	-122.3	99.5	600.0
	15	V1-P1 Lower Neck Mz	Nwt-M	21.7	215.5	-46.3	120.2	600.0
	16	V1-P1 HD9Z (Y)	Gs	19.5	170.6	-16.7	269.8	1000.0
*	17	V1-P2 Head Resultant	Gs	42.4	67.1	.1	-2.8	1000.0
	18	V1-P2 Chest Resultant	Gs	36.5	85.6	.0	-8.4	180.0
	19	V1-P1 Lower Neck F(res)	Nwt	2553.5	99.5	1.8	-4.8	1000.0
	20	V1-P1 Lower Neck M(res)	Nwt-M	129.3	99.5	.1	-15.0	600.0

* Data questionable, 75-90ms,205-220ms

36 ms Fixed Duration HIC SUMMARY: V1-P2 Head Resultant

hic: 166.86
t1 = 59.520 msec
t2 = 93.120 msec
Average G's Over Hic Duration = 30.09

CLIP SUMMARY: V1-P2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 35.606 G's
Tstart = 82.6800 ms
Tend = 85.6800 ms
CSI = 287.133

FACILITY: TRACK
RUN #: 1457
SERIES #: 1

TEST DATE: 27 Sep 1994
TEST TIME: 14:18:15
BOARD: C

TITLE: VTV TEST #12

	CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
	1	V1-P1 Lt Lower Tibia Fy	Nwt	623.4	55.4	-405.0	212.3	600.0
	2	V1-P1 Lt Lower Tibia Fz	Nwt	488.3	163.2	-4526.9	78.7	600.0
	3	V1-P1 Lt Lower Tibia Mx	Nwt-M	77.6	56.5	-14.9	150.7	600.0
	4	V1-P1 Rt Lower Tibia Fy	Nwt	463.0	121.0	-366.8	212.3	600.0
	5	V1-P1 Rt Lower Tibia Fz	Nwt	612.3	175.3	-2594.5	85.7	600.0
	6	V1-P1 Rt Lower Tibia Mx	Nwt-M	126.0	92.5	-10.8	212.2	600.0
	7	V1-P1 Left Femur	Nwt	1016.6	212.2	-6153.5	112.7	600.0
	8	V1-P1 Right Femur	Nwt	1241.1	136.9	-1869.1	58.0	600.0
	9	V1-P2 Left Femur	Nwt	963.2	212.2	-4815.4	93.0	600.0
	10	V1-P2 Right Femur	Nwt	958.7	212.2	-2332.5	115.7	600.0
	11	V1-P2 Lt Upper Tibia Mx	Nwt-M	22.5	112.0	-25.6	166.6	600.0
	12	V1-P2 Lt Upper Tibia My	Nwt-M	35.2	109.2	-65.5	84.7	600.0
	13	V1-P2 Lt Lower Tibia Fy	Nwt	284.7	170.5	-565.1	99.4	600.0
	14	V1-P2 Lt Lower Tibia Fz	Nwt	628.9	173.0	-1465.2	56.3	600.0
*	15	V1 Right Shock Tower (Y)	Gs	154.9	124.7	-20.5	27.5	60.0
	16	V1 Left Shock Tower (X)	Gs	80.7	66.6	-40.0	71.3	60.0

* Data questionable after 120ms

FACILITY: TRACK
RUN #: 1457
SERIES #: 1

TEST DATE: 27 Sep 1994
TEST TIME: 14:18:15
BOARD: D

TITLE: VTV TEST #12

	CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
	1	V1 R.F Frame Rail (X)	Gs	14.8	17.5	-15.5	31.9	60.0
	2	V1 R.F Frame Rail (Y)	Gs	12.7	20.5	-45.1	84.7	60.0
	3	V1 R.F Frame Rail (Z)	Gs	17.6	28.6	-16.3	24.7	60.0
	4	V1 Engine Bottom (X)	Gs	2.8	163.4	-43.3	79.8	60.0
	5	V1 L.F Frame Rail (X)	Gs	23.1	40.6	-52.1	52.4	60.0
	6	V1 L.F Frame Rail (Y)	Gs	23.6	35.2	-21.9	76.4	60.0
	7	V1 L.F Frame Rail (Z)	Gs	40.4	44.8	-58.4	70.9	60.0
	8	V1-P2 Chest Disp.	mm	42.1	313.8	-5.4	411.1	60.0
	9	V1-P1 Lt Upper Tibia Mx	Nwt-M	11.0	237.6	-47.8	138.4	600.0
	10	V1-P1 Lt Upper Tibia My	Nwt-M	18.8	166.7	-142.2	88.7	600.0
	11	V1-P1 Rt Upper Tibia Mx	Nwt-M	31.6	74.0	-48.2	93.5	600.0
	12	V1-P1 Rt Upper Tibia My	Nwt-M	20.0	132.6	-67.0	78.6	600.0
*	13	V1 L.R. Comp (X)	Gs	152.8	239.6	-178.2	285.0	60.0
**	14	V1 L.R. Comp (Y)	Gs	480.8	182.6	-478.4	237.8	60.0
	15	V1 R.R. Comp (X)	Gs	5.0	75.2	-6.6	70.1	60.0
	16	V1 R.R. Comp (Y)	Gs	5.7	40.8	-4.0	136.7	60.0
	17	V1 R.F Frame Rail Res.	Gs	46.5	84.6	.1	-6.5	60.0
	18	V1 L.F Frame Rail Res.	Gs	62.9	82.2	.0	287.4	60.0

* Data questionable after 102ms, wire cut

** Data questionable after 120ms, wire cut

FACILITY: TRACK
RUN #: 1457
SERIES #: 1

TEST DATE: 27 Sep 1994
TEST TIME: 14:18:15
BOARD: E

TITLE: VTV TEST #12

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
1	V1-P1 Pelvic X	Gs	4.5	215.3	-35.7	53.0	1000.0
2	V1-P1 Pelvic Y	Gs	5.8	115.4	-8.4	58.9	1000.0
3	V1-P1 Pelvic Z	Gs	5.9	215.5	-17.2	136.9	1000.0
4	V1 Right Engine (X)	Gs	6.2	115.0	-44.8	74.2	60.0
5	V1-P2 Upper Neck Fx	Nwt	148.7	212.2	-761.3	175.3	1000.0
6	V1-P2 Upper Neck Fy	Nwt	281.9	283.7	-409.7	212.2	1000.0
7	V1-P2 Upper Neck Fz	Nwt	2779.4	67.4	-180.2	399.2	1000.0
8	V1 Engine Bottom (Y)	Gs	11.1	90.2	-6.4	49.6	60.0
9	V1-P2 Upper Neck Mx	Nwt-M	18.4	138.2	-14.3	48.8	600.0
10	V1-P2 Upper Neck My	Nwt-M	53.6	175.6	-48.1	67.2	600.0
11	V1-P2 Upper Neck Mz	Nwt-M	8.8	61.6	-13.9	99.6	600.0
12	V1 Left Engine (X)	Gs	17.1	89.9	-66.1	79.0	60.0
13	V1-P2 Pelvic X	Gs	6.9	140.9	-47.0	92.9	1000.0
14	V1-P2 Pelvic Y	Gs	7.2	87.4	-10.1	136.8	1000.0
15	V1-P2 Pelvic Z	Gs	4.7	181.8	-21.2	99.5	1000.0
16	V1 Right Shock Tower (X)	Gs	3.5	9.4	-34.1	93.4	60.0
17	V1-P1 Pelvic Res.	Gs	37.0	53.0	.1	-2.4	1000.0
18	V1-P2 Upper Neck F(res)	Nwt	2840.1	67.0	5.7	-1.6	1000.0
19	V1-P2 Upper Neck M(res)	Nwt-M	54.1	175.6	.1	-6.7	600.0
20	V1-P2 Pelvic Res.	Gs	50.0	92.9	.0	-4.0	1000.0

FACILITY: TRACK
RUN #: 1457
SERIES #: 1

TEST DATE: 27 Sep 1994
TEST TIME: 14:18:15
BOARD: F

TITLE: VTV TEST #12

	CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
	1	V1 Brake Pedal (X)	Gs	30.6	118.0	-107.1	86.8	60.0
	2	V1 Brake Pedal (Y)	Gs	58.8	93.6	-45.0	118.3	60.0
	3	V1 Brake Pedal (Z)	Gs	48.5	99.0	-45.6	83.8	60.0
	4	V1-P2 Lt Lower Tibia Mx	Nwt-M	19.7	175.1	-28.8	99.5	600.0
*	5	V1-P2 Rt Upper Tibia Mx	Nwt-M	13244.5	99.5	-14496.1	215.4	600.0
	6	V1-P2 Rt Upper Tibia My	Nwt-M	59.9	115.3	-84.3	85.9	600.0
	7	V1-P2 Rt Lower Tibia Fy	Nwt	461.1	99.5	-412.7	54.8	1000.0
	8	V1-P2 Rt Lower Tibia Fz	Nwt	1797.0	99.5	-2356.6	87.0	1000.0
	9	V1-P2 Rt Lower Tibia Mx	Nwt-M	19.8	136.8	-61.2	87.1	600.0
	10	V1 Left Shock Tower (Z)	Gs	31.2	71.6	-49.4	66.7	60.0
	11	NULL	in	.0	427.3	.0	427.3	1000.0
	12	NULL	in	.0	427.3	.0	427.3	1000.0
	17	V1 Brake Pedal (res)	Gs	107.8	86.8	.2	-8.9	60.0

* Data not accurate, channel not calibrated

FACILITY: TAPE TEST DATE: 27 Sep 1994
RUN #: 7457 TEST TIME: 15:44:28
SERIES #: 1 BOARD: G

TITLE: VTV TEST #12

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
1	Chest Displacement #132	mm	26.3	119.6	-.1	-22.4	60.0
2	NULL	Gs	.0	427.3	.0	427.3	1000.0
3	NULL	Gs	.0	427.3	.0	427.3	1000.0
4	NULL	Gs	.0	427.3	.0	427.3	1000.0

FACILITY: TAPE TEST DATE: 27 Sep 1994
RUN #: 8457 TEST TIME: 15:48:58
SERIES #: 1 BOARD: H

TITLE: VTV TEST #12

	CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
	1	Chest Displacement #125	mm	3.6	61.8	-.1	212.0	60.0
	2	Chest Displacement #126	mm	17.1	124.7	.0	15.6	60.0
	3	Chest Displacement #127	mm	5.8	133.3	-2.0	273.0	60.0
	4	Chest Displacement #128	mm	14.5	126.4	-6.4	272.9	60.0
*	5	Chest Displacement #129	mm	28.5	136.7	-6.3	190.9	60.0
**	6	Chest Displacement #130	mm	5.3	123.4	-6.8	90.5	60.0
	7	Chest Displacement #131	mm	8.3	133.9	-7.4	124.7	60.0
	8	NULL		.0	427.3	.0	427.3	1000.0

* Data questionable

** Data questionable between 20 and 95ms

TEST NO. Y49-12-1457

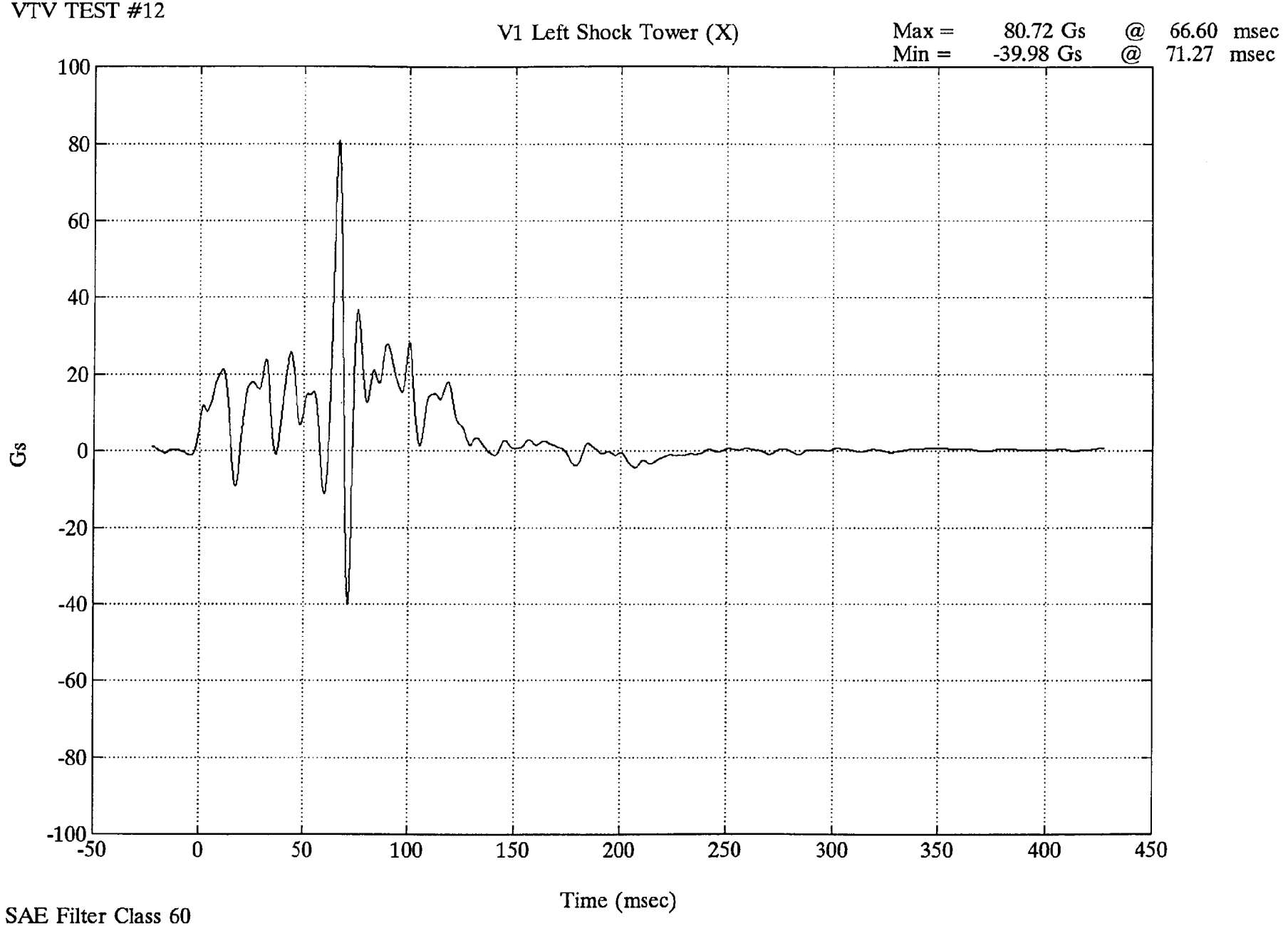
VEHICLE DATA

SAE FILTER CHANNEL CLASS

60

VEHICLE DATA

VTV TEST #12

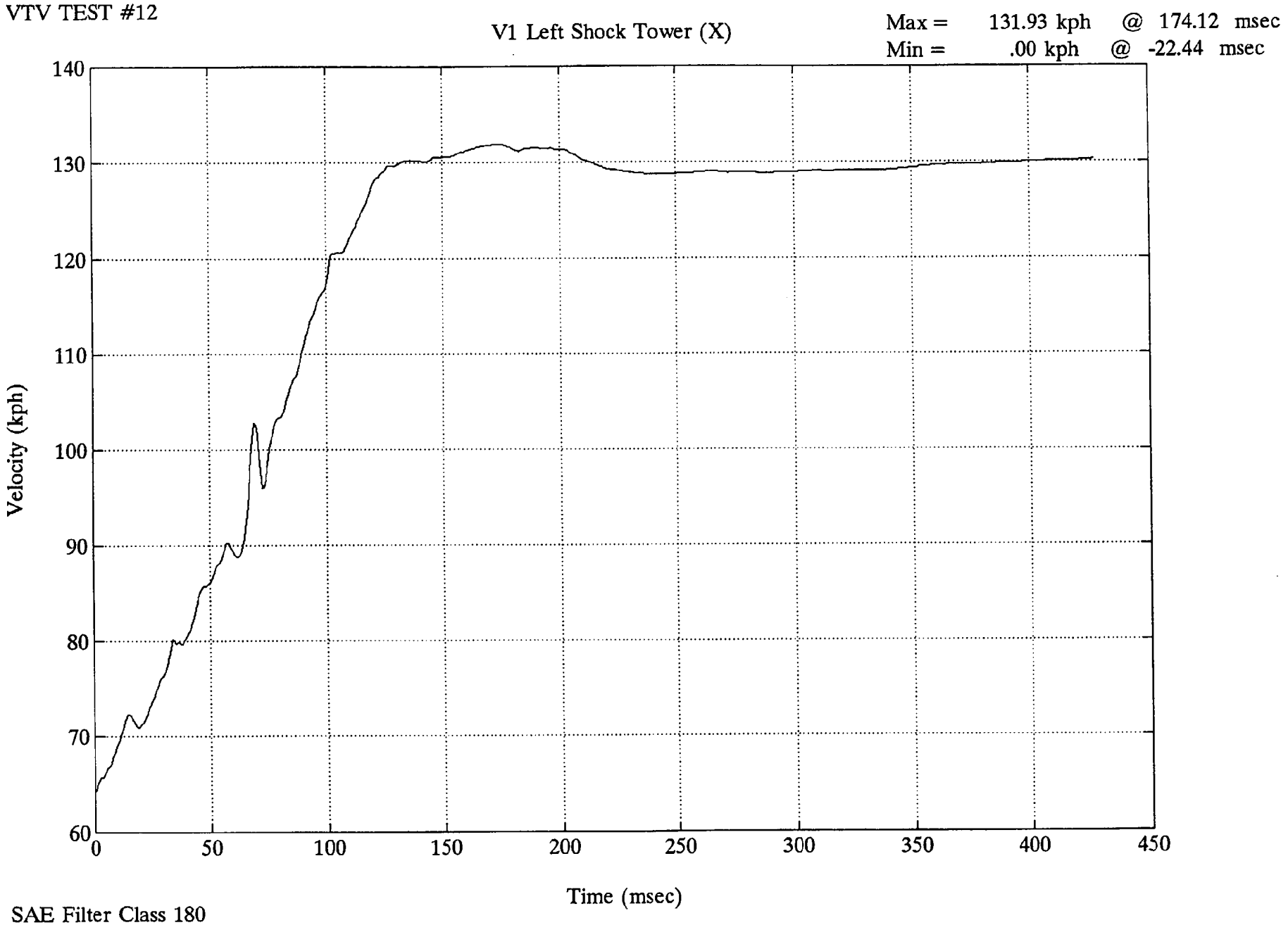


B-12

8118-12

SAE Filter Class 60

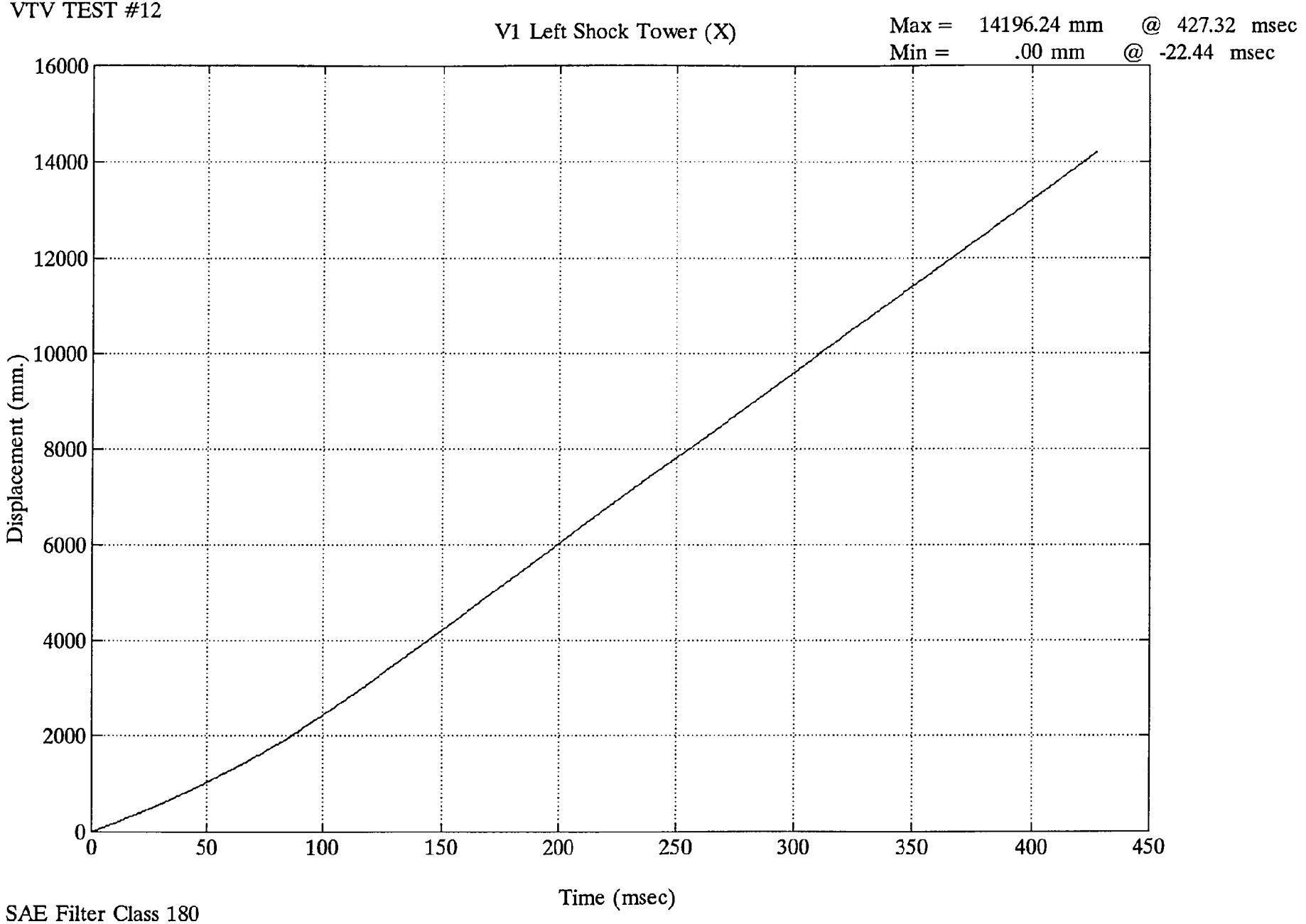
VTV TEST #12



SAE Filter Class 180

8118-12

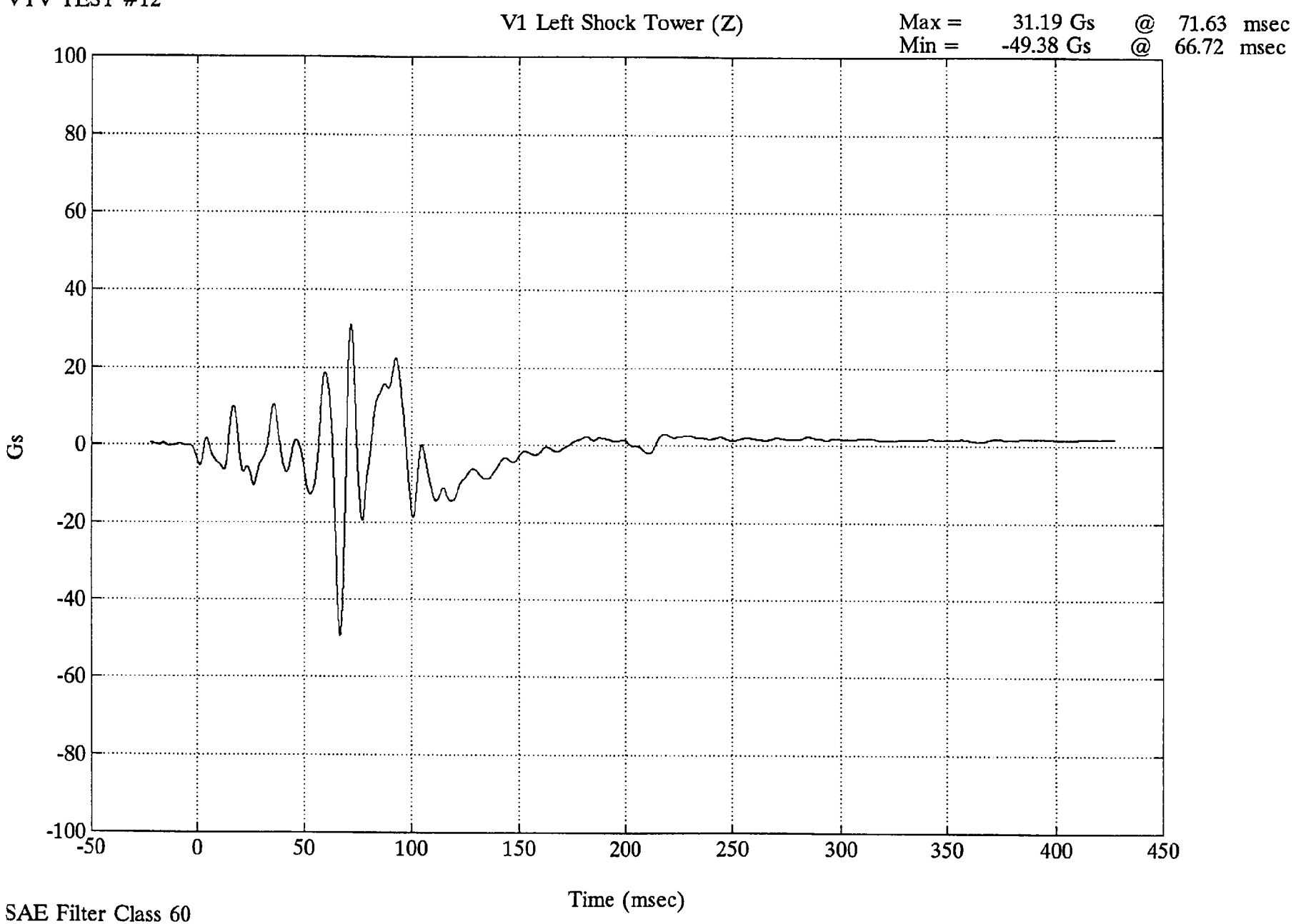
VTV TEST #12



SAE Filter Class 180

8118-12

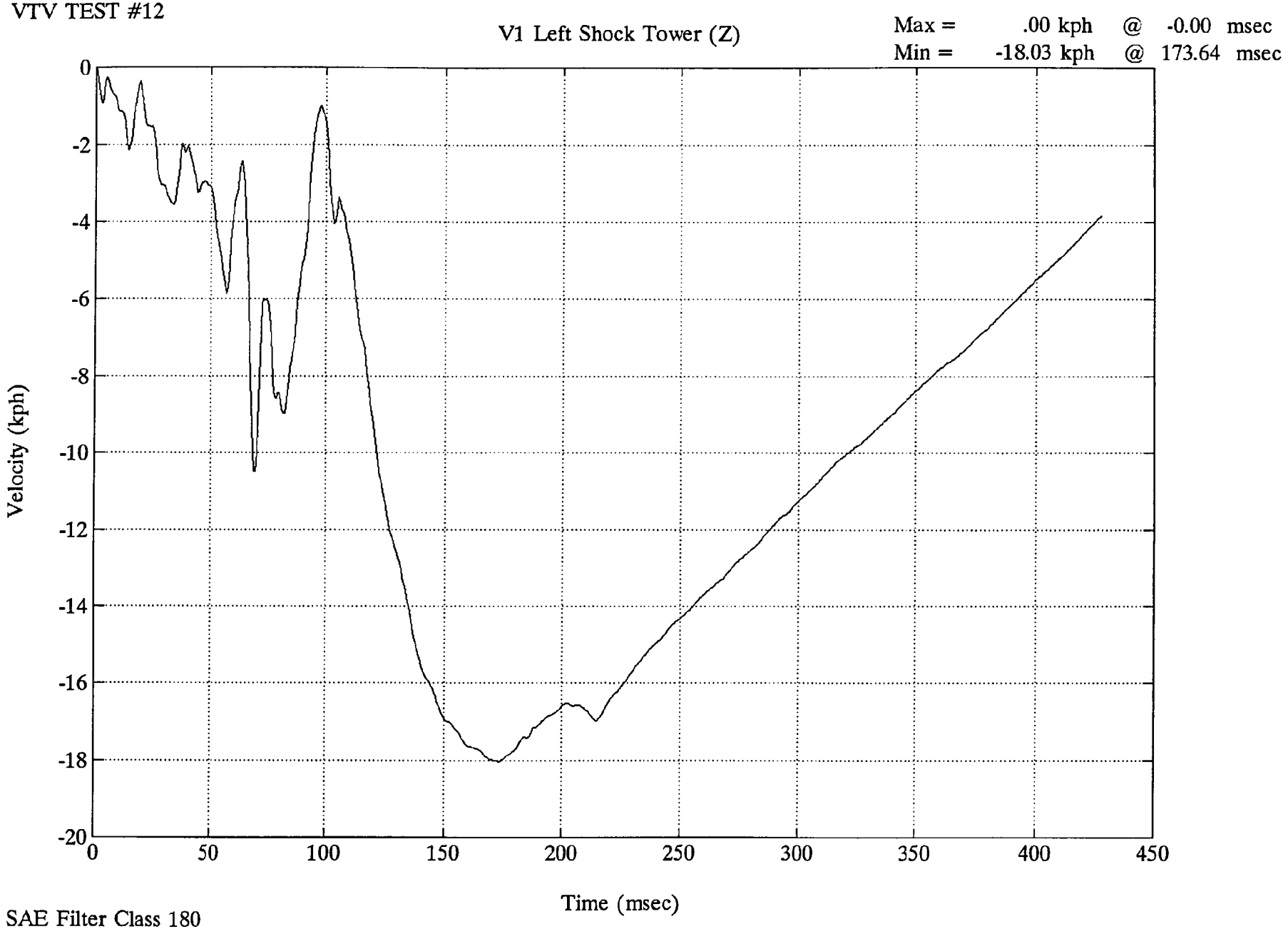
VTV TEST #12



SAE Filter Class 60

8118-12

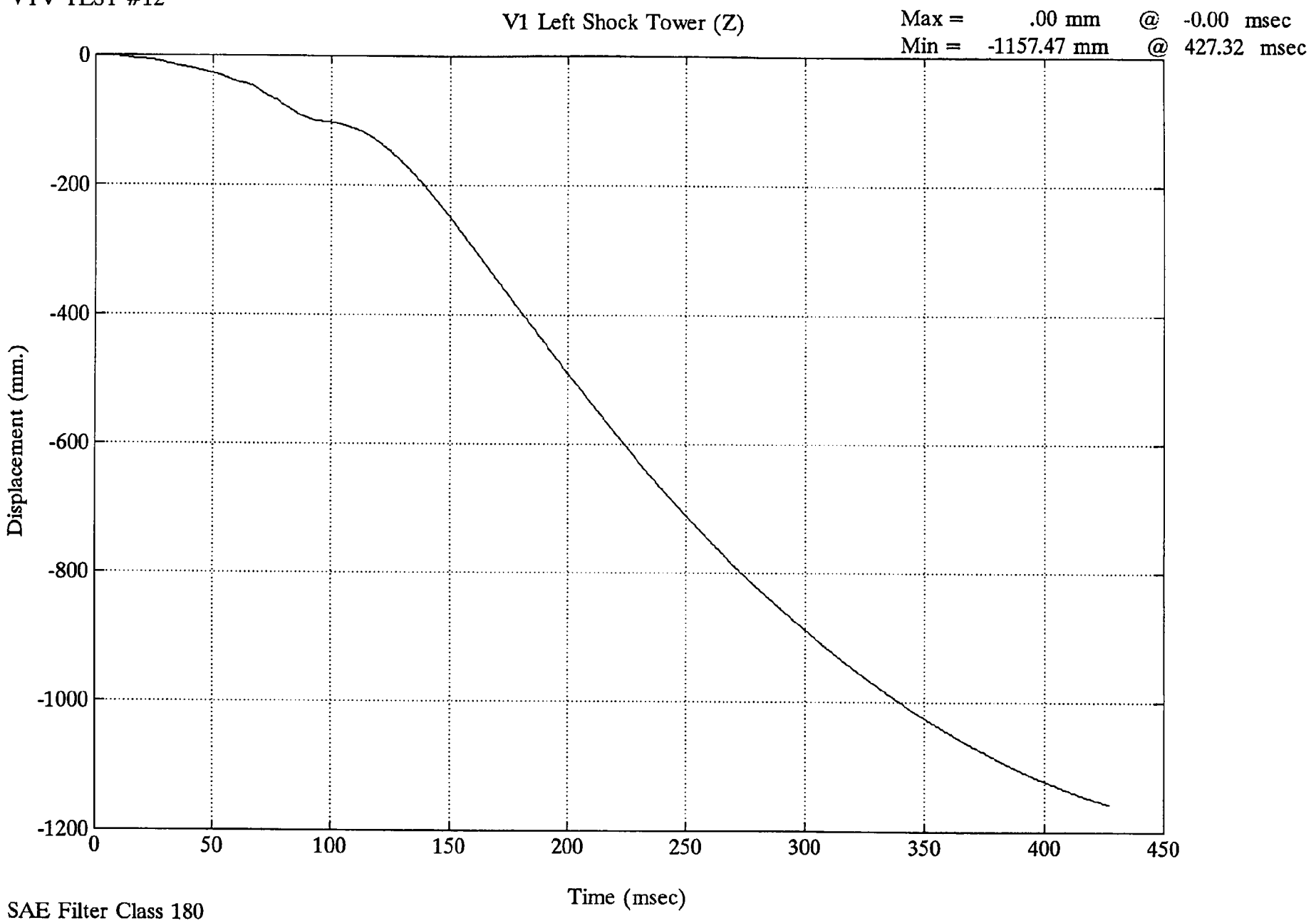
VTV TEST #12



SAE Filter Class 180

8118-12

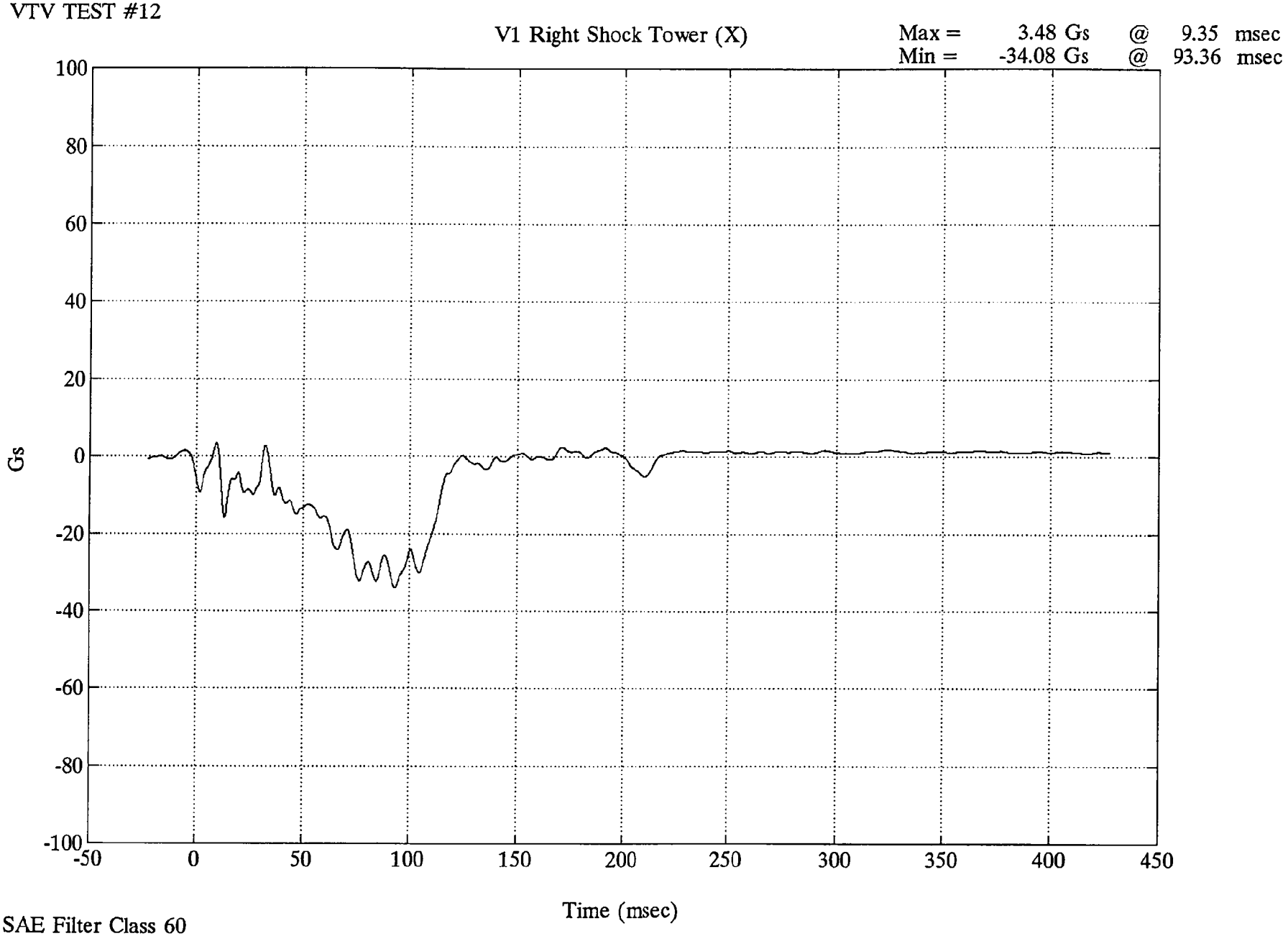
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12

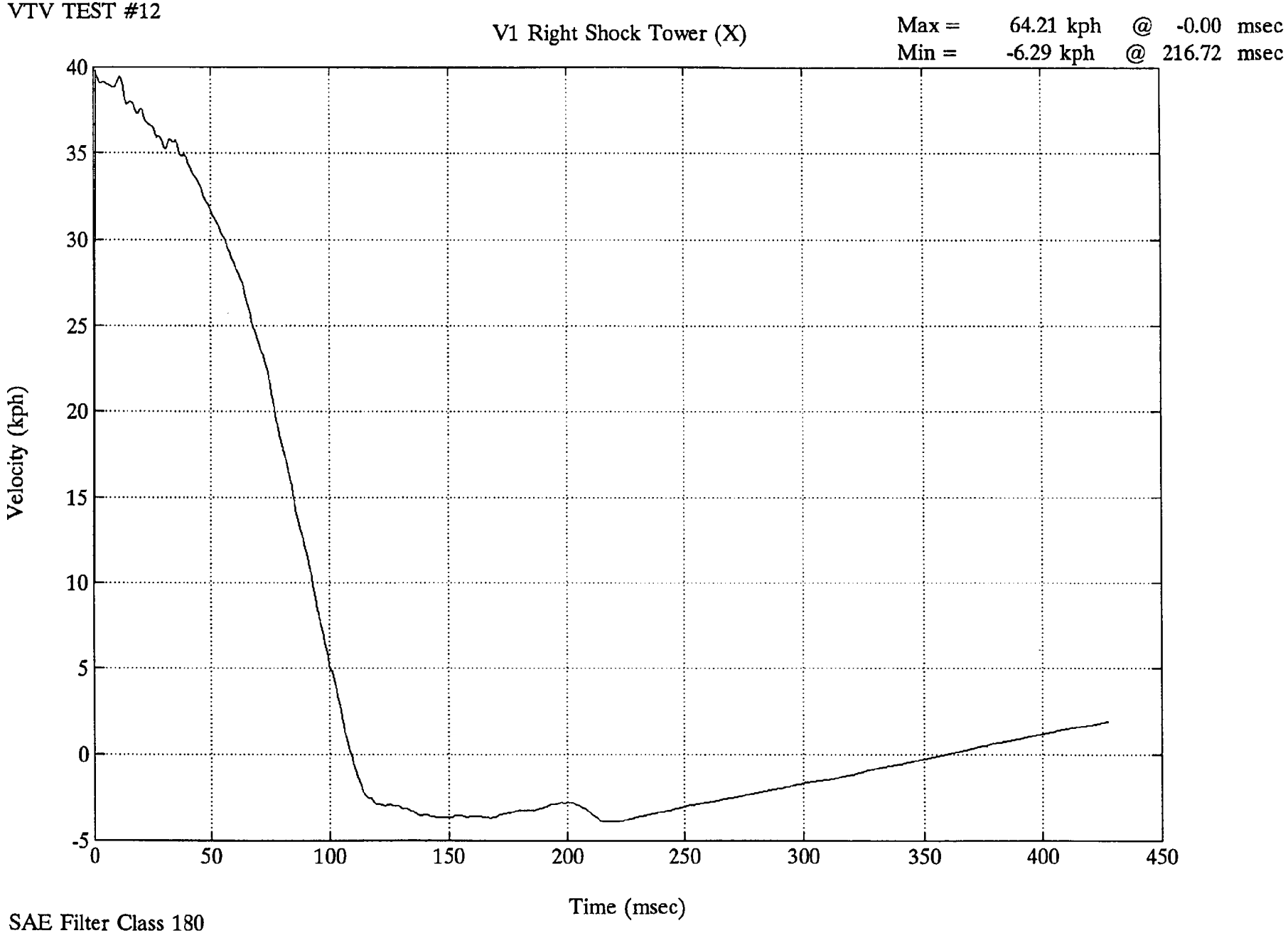


SAE Filter Class 60

B-18

8118-12

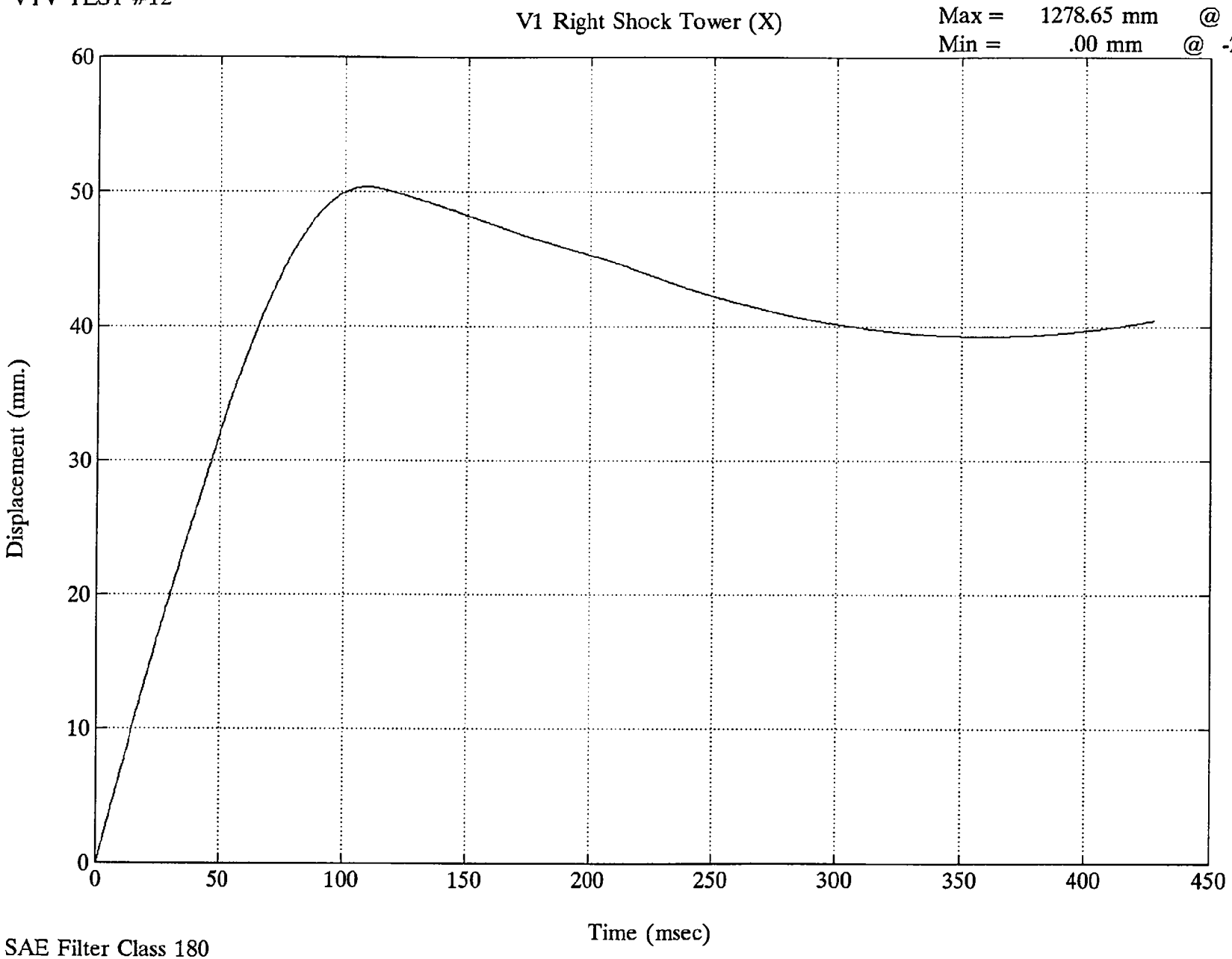
VTV TEST #12



SAE Filter Class 180

8118-12

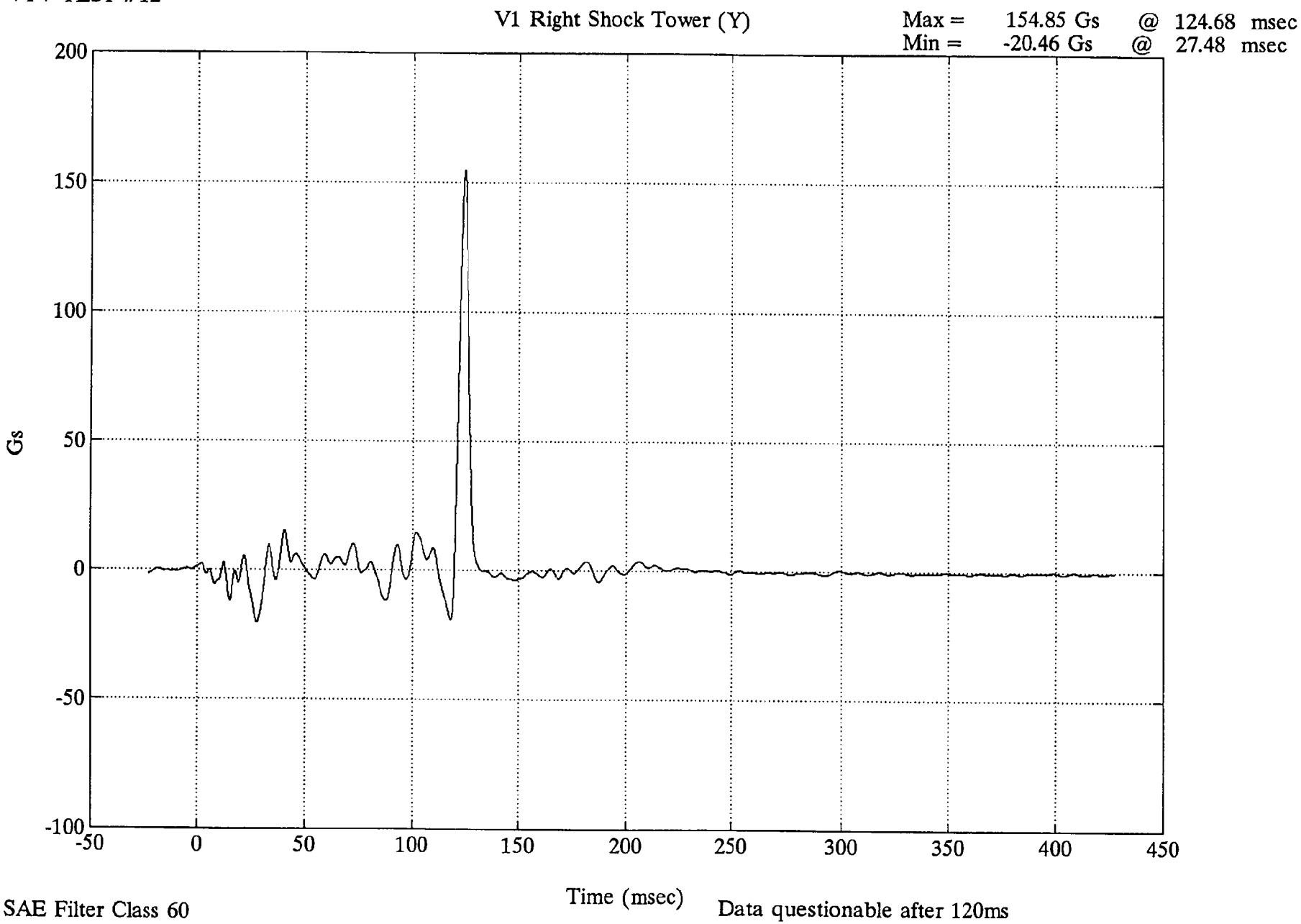
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12



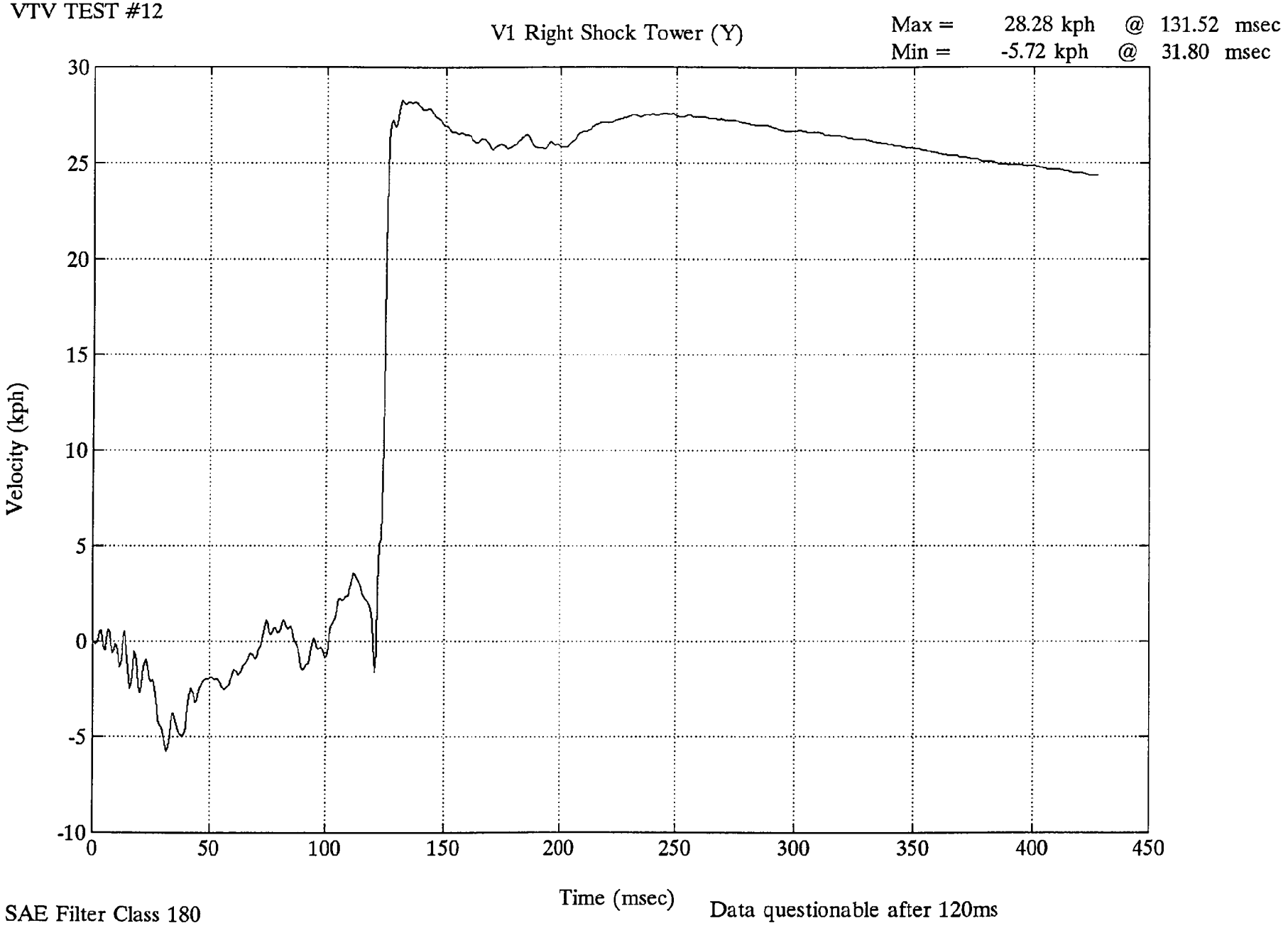
B-21

8118-12

SAE Filter Class 60

Data questionable after 120ms

VTV TEST #12

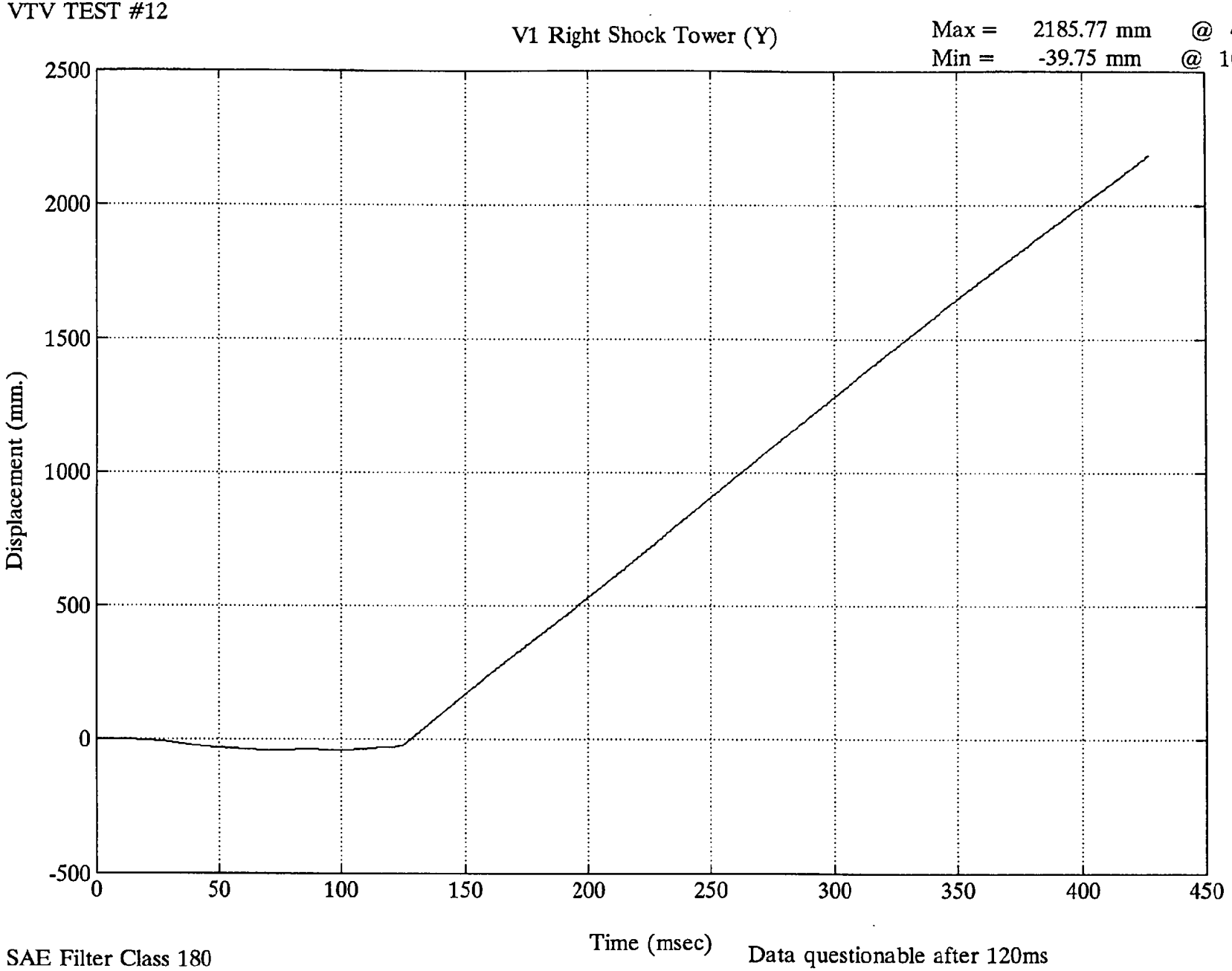


SAE Filter Class 180

Data questionable after 120ms

8118-12

VTV TEST #12

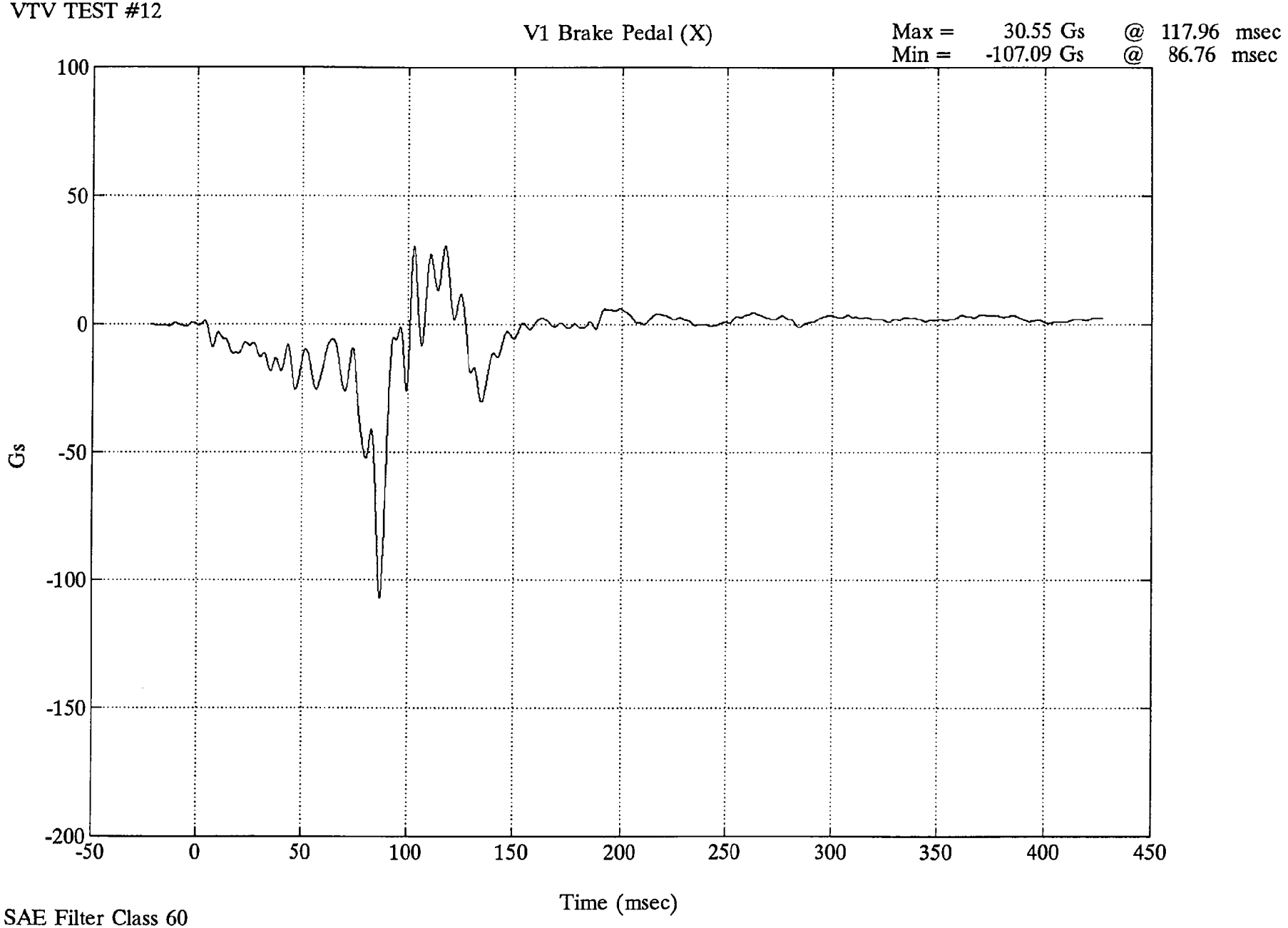


SAE Filter Class 180

Data questionable after 120ms

8118-12

VTV TEST #12

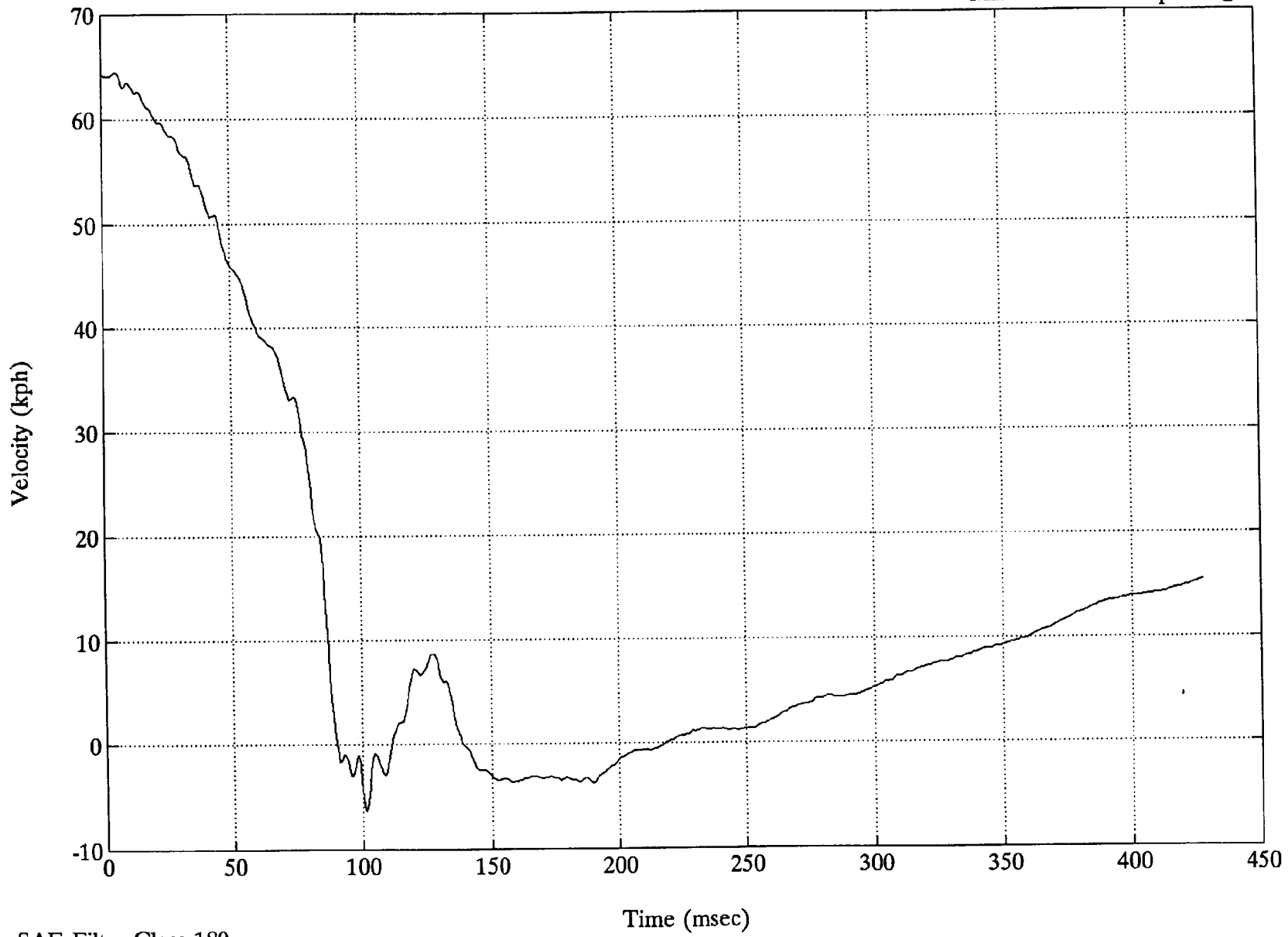


SAE Filter Class 60

VTV TEST #12

V1 Brake Pedal (X)

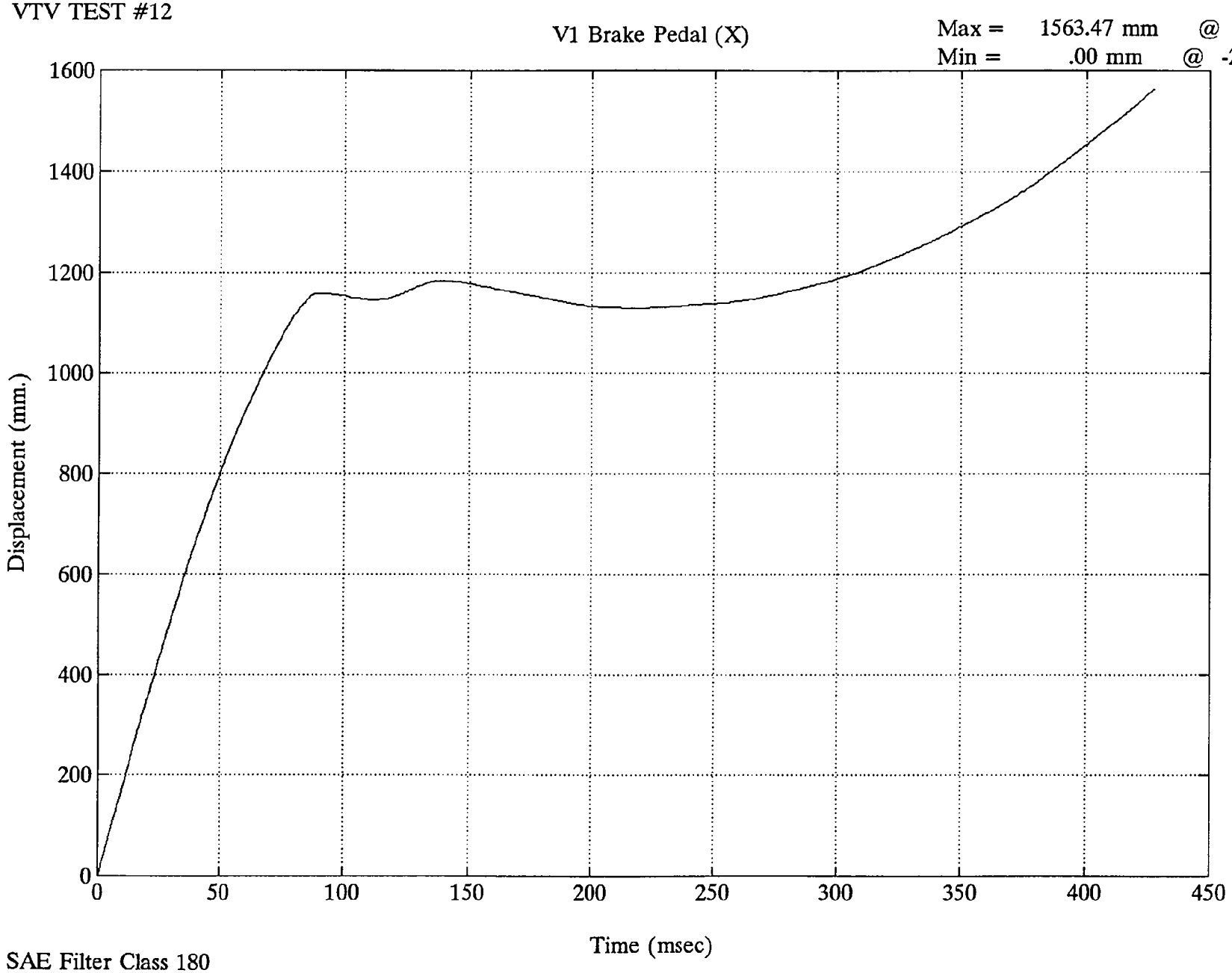
Max = 64.51 kph @ 5.87 msec
Min = -6.37 kph @ 101.16 msec



SAE Filter Class 180

8118-12

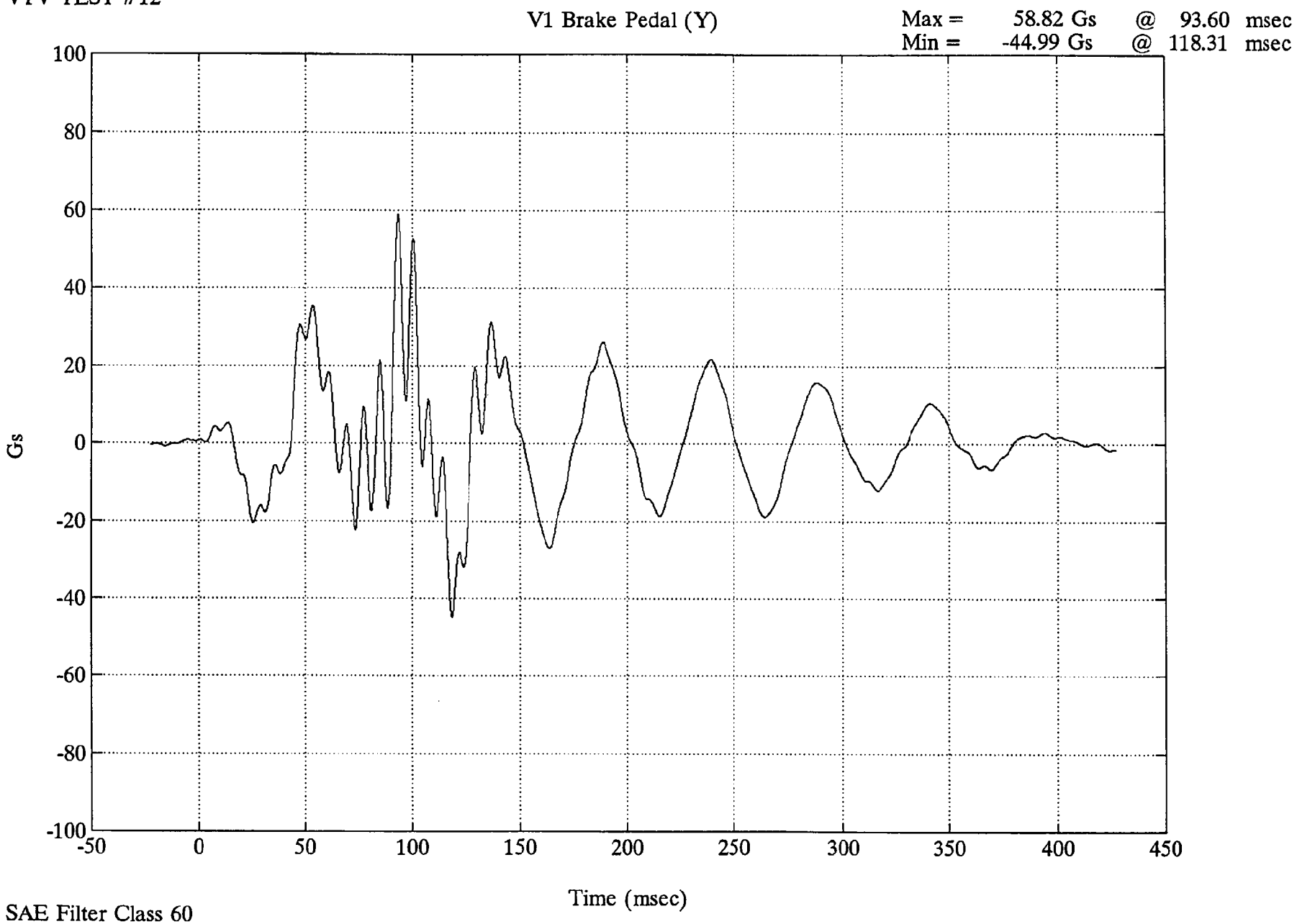
VTV TEST #12



SAE Filter Class 180

8118-12

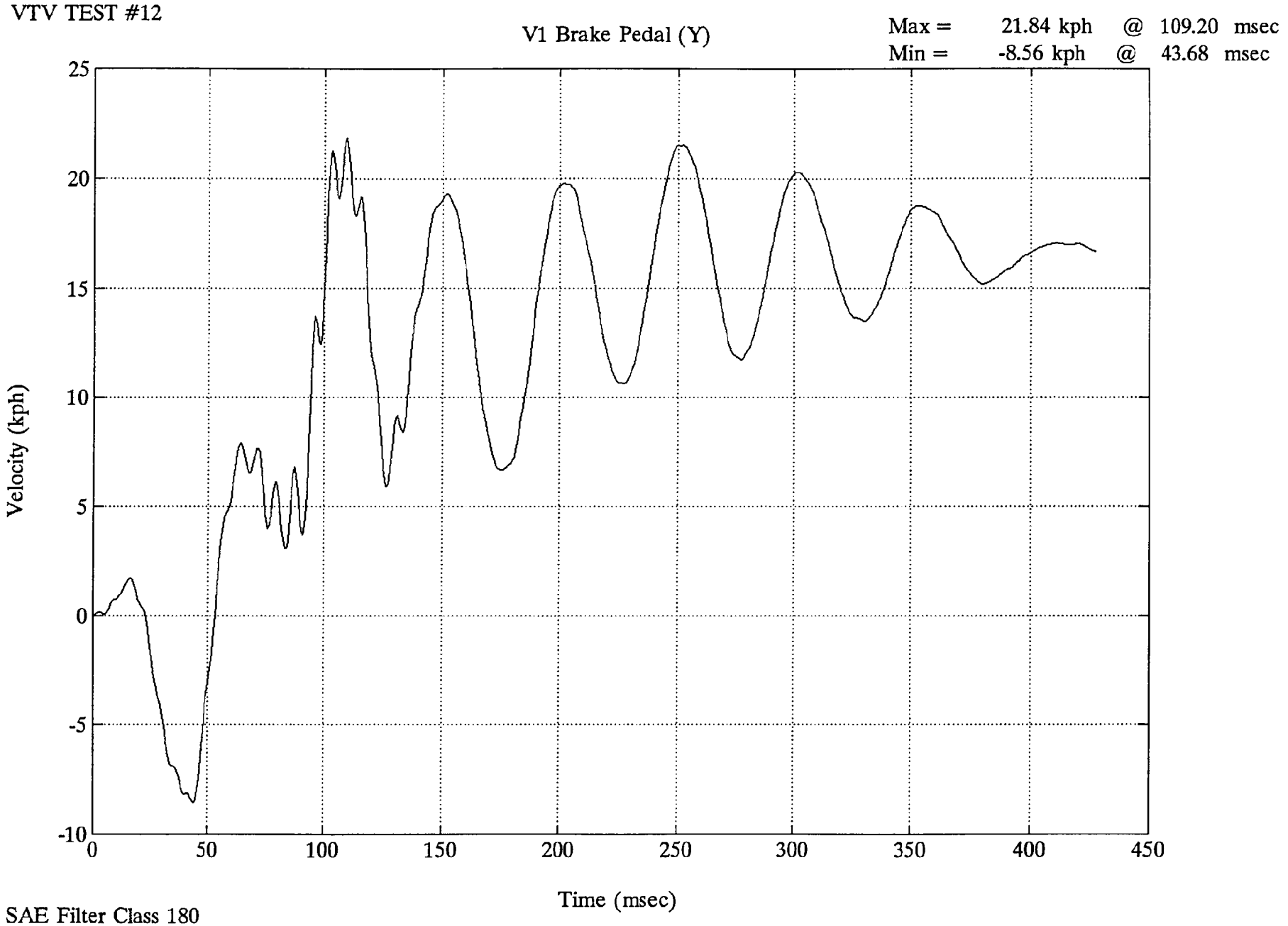
VTV TEST #12



SAE Filter Class 60

8118-12

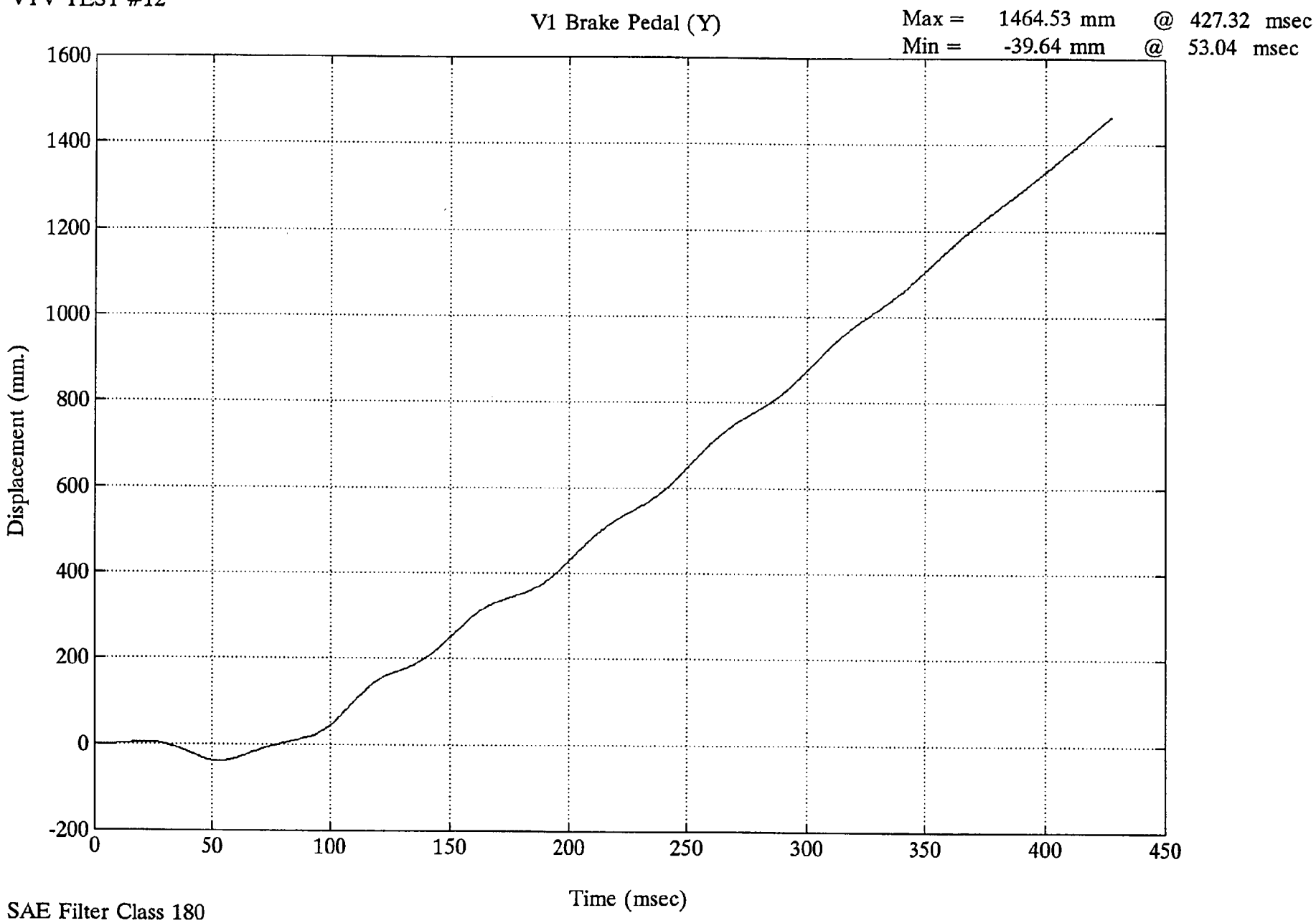
VTV TEST #12



SAE Filter Class 180

8118-12

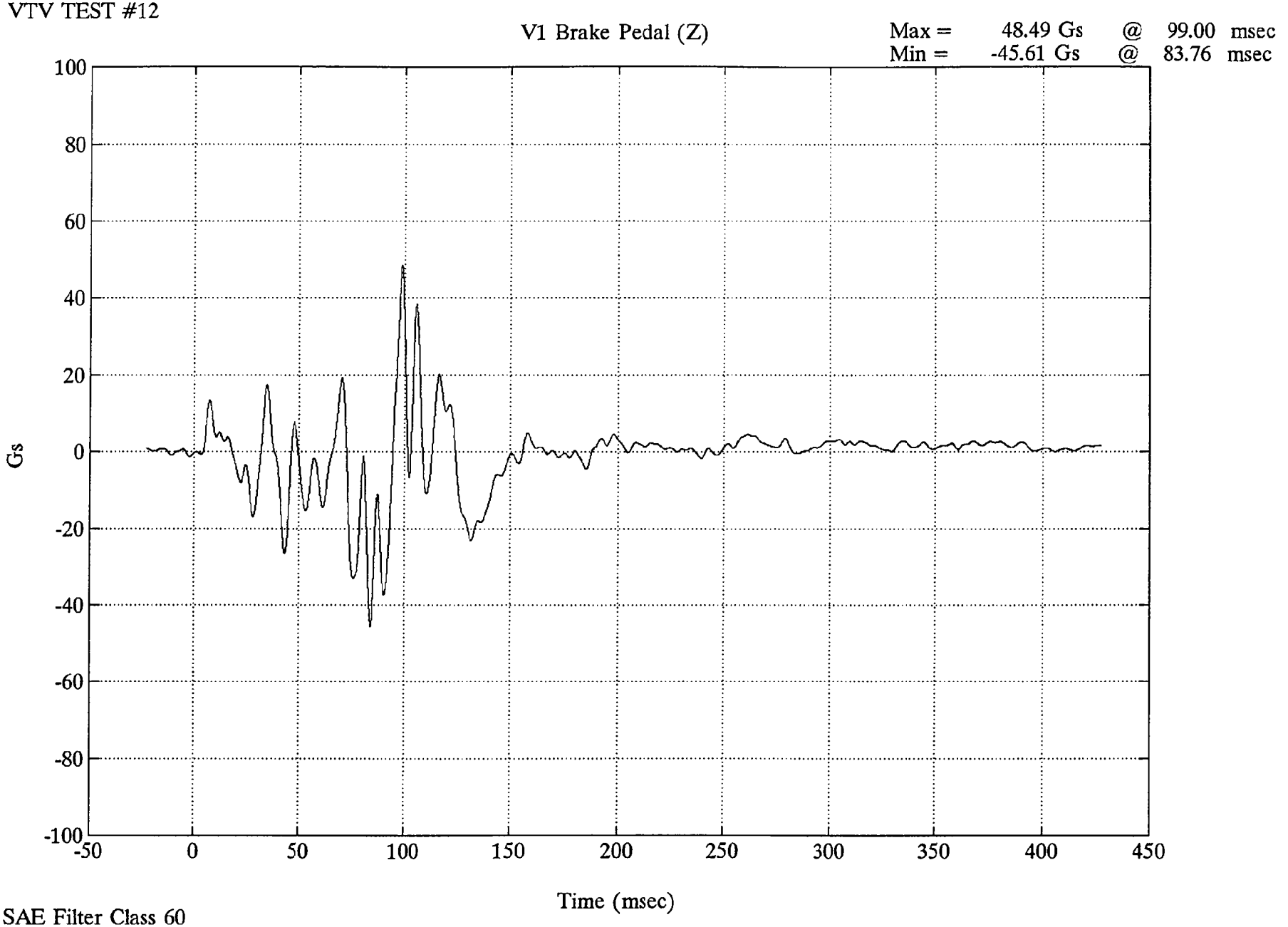
VTV TEST #12



SAE Filter Class 180

8118-12

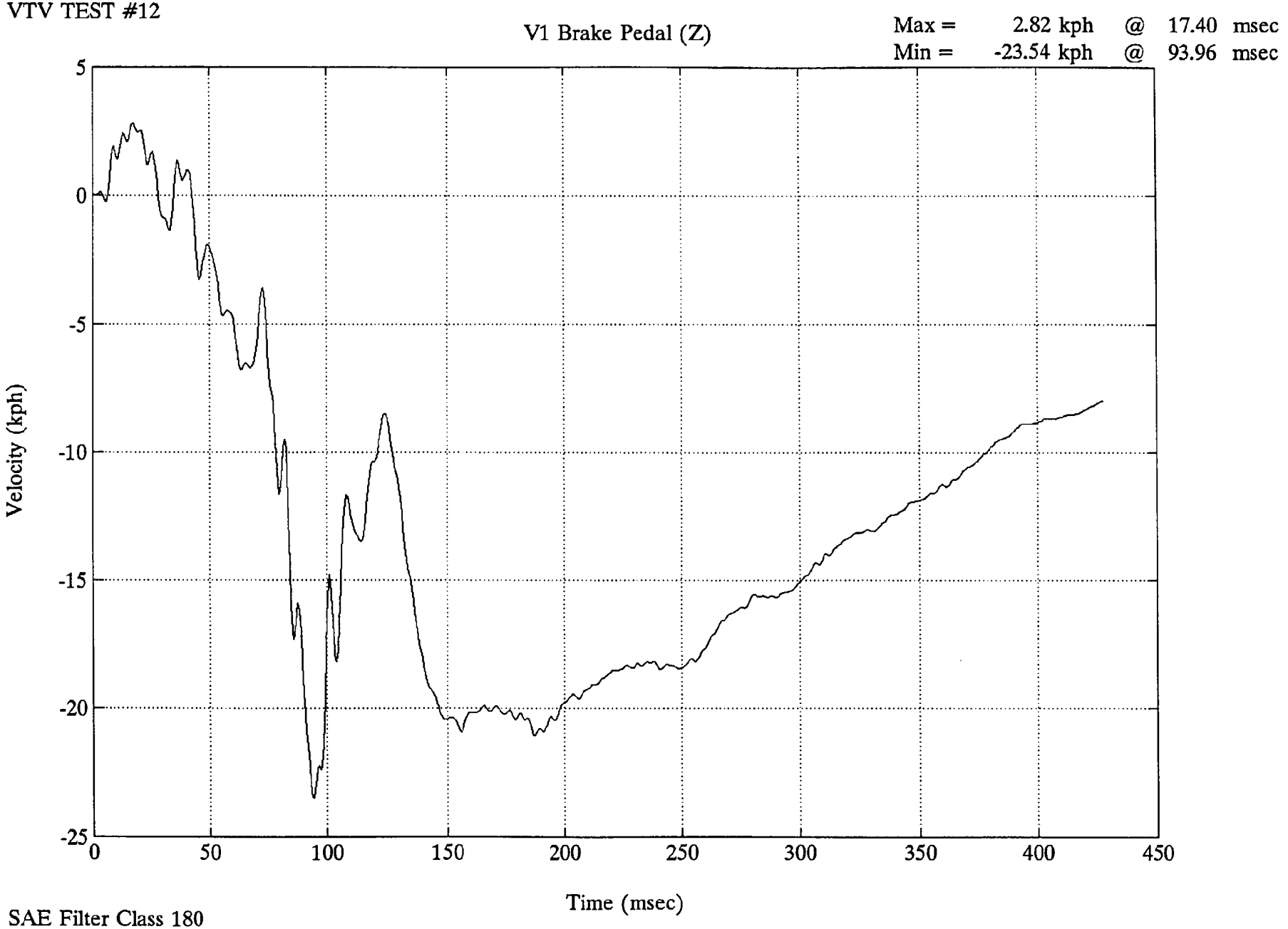
VTV TEST #12



SAE Filter Class 60

8118-12

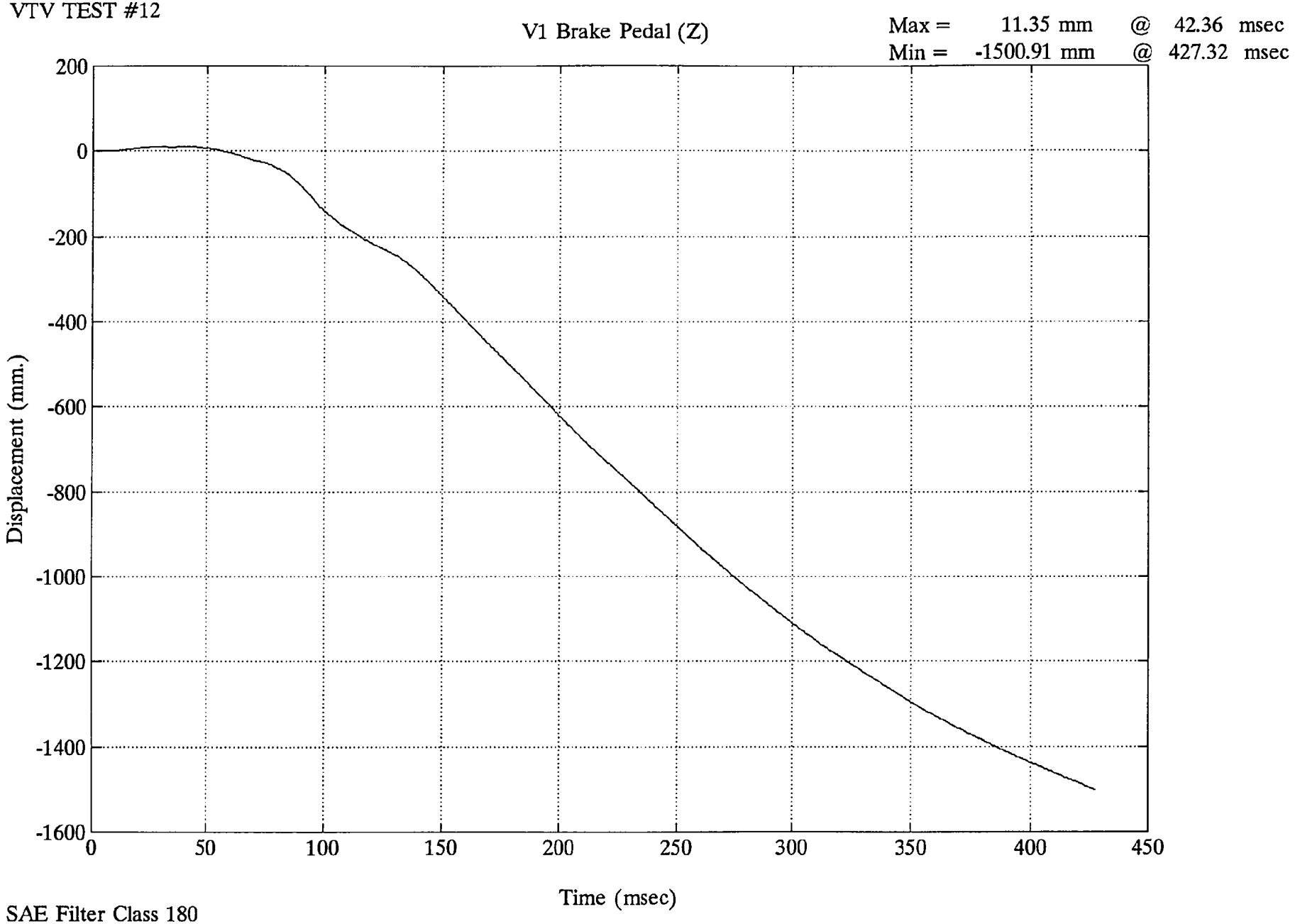
VTV TEST #12



SAE Filter Class 180

8118-12

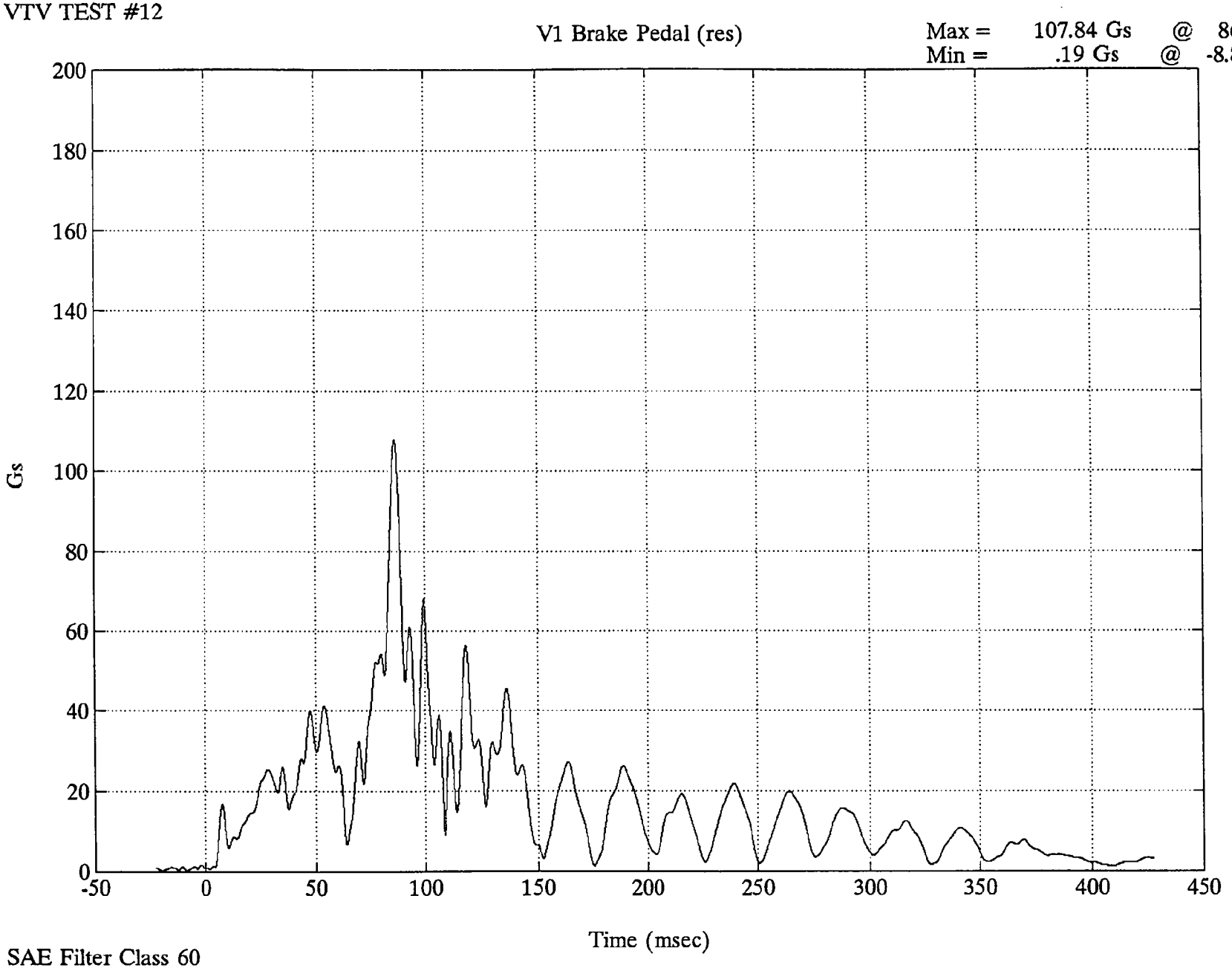
VTV TEST #12



SAE Filter Class 180

8118-12

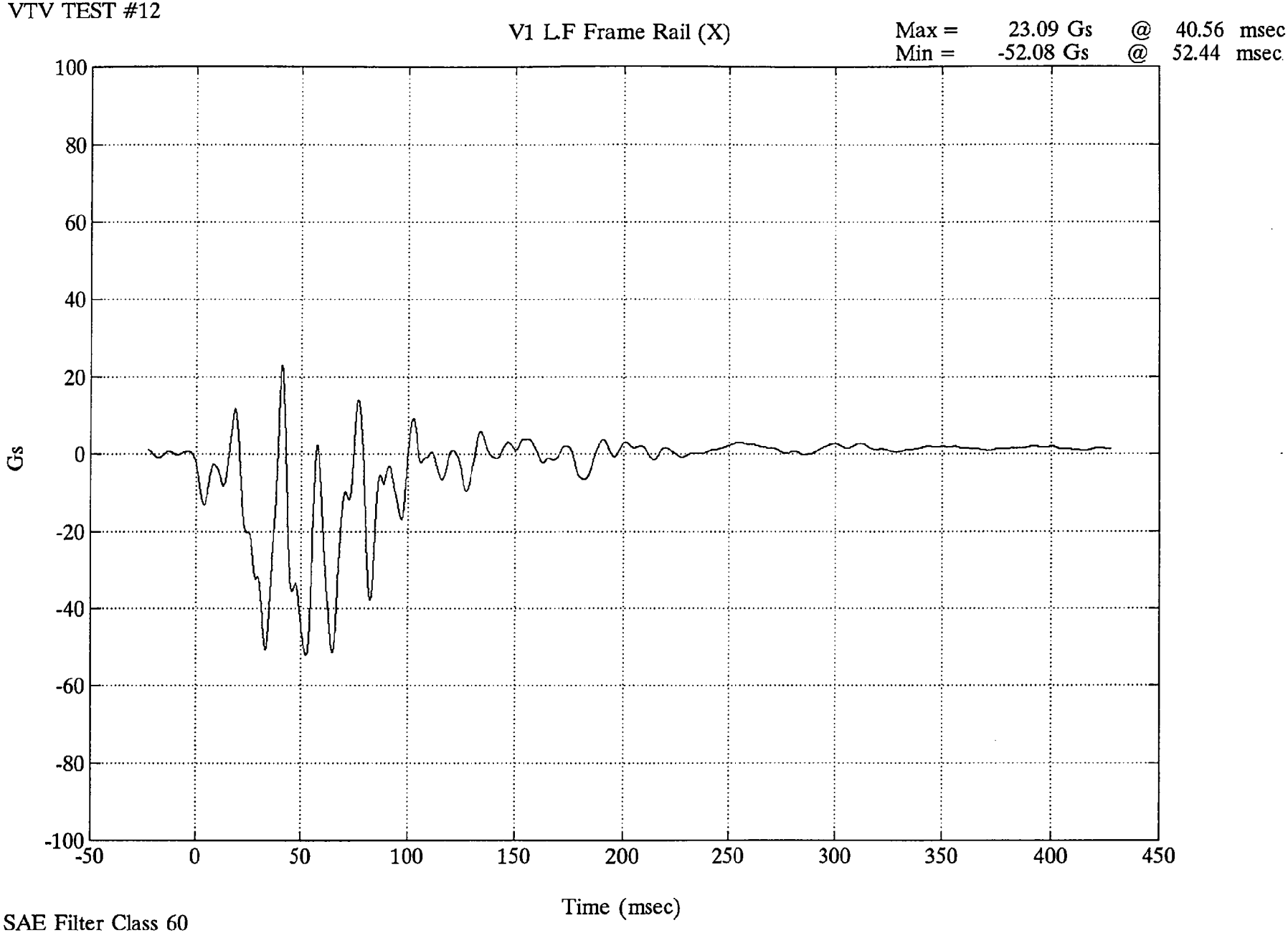
VTV TEST #12



SAE Filter Class 60

8118-12

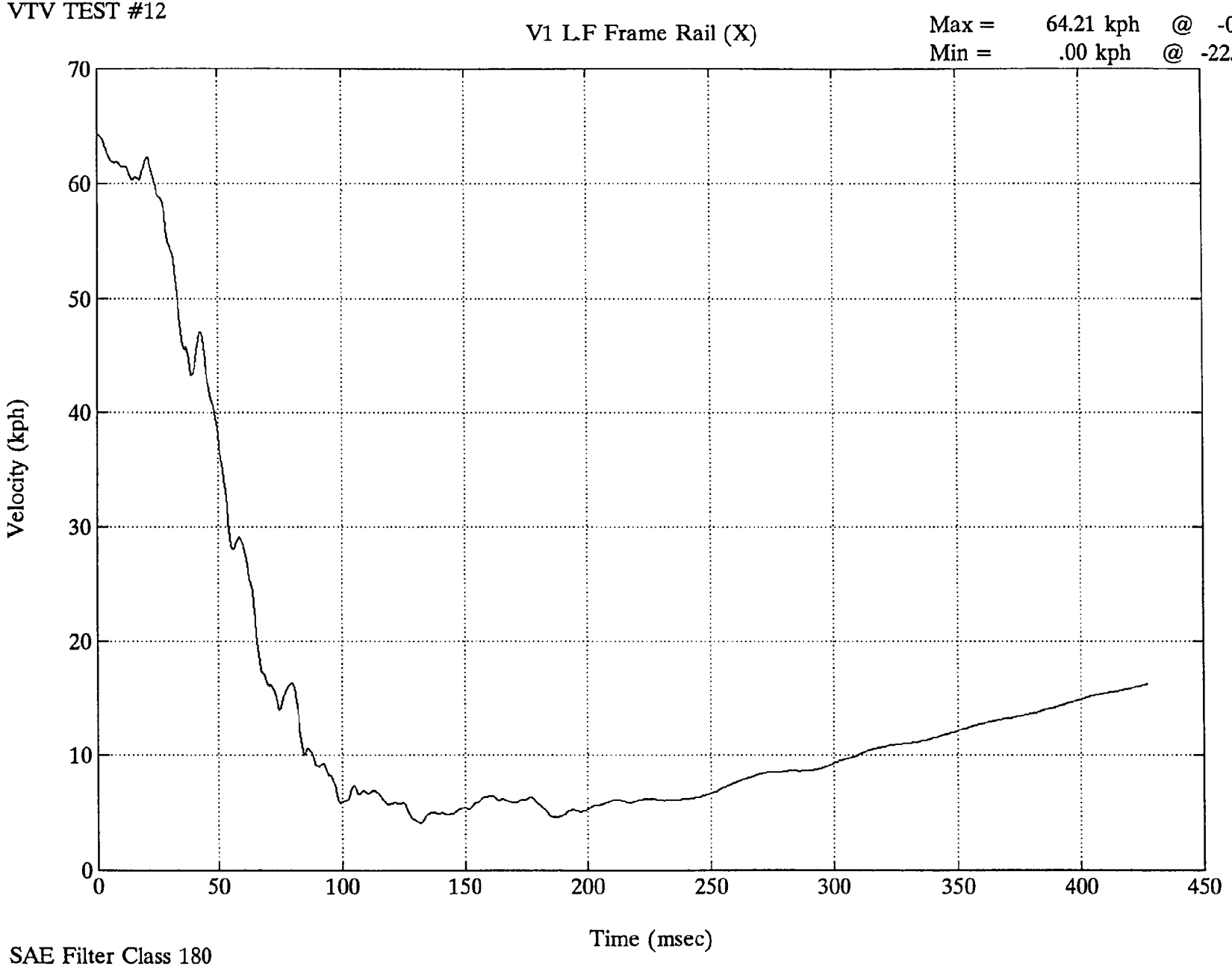
VTV TEST #12



SAE Filter Class 60

8118-12

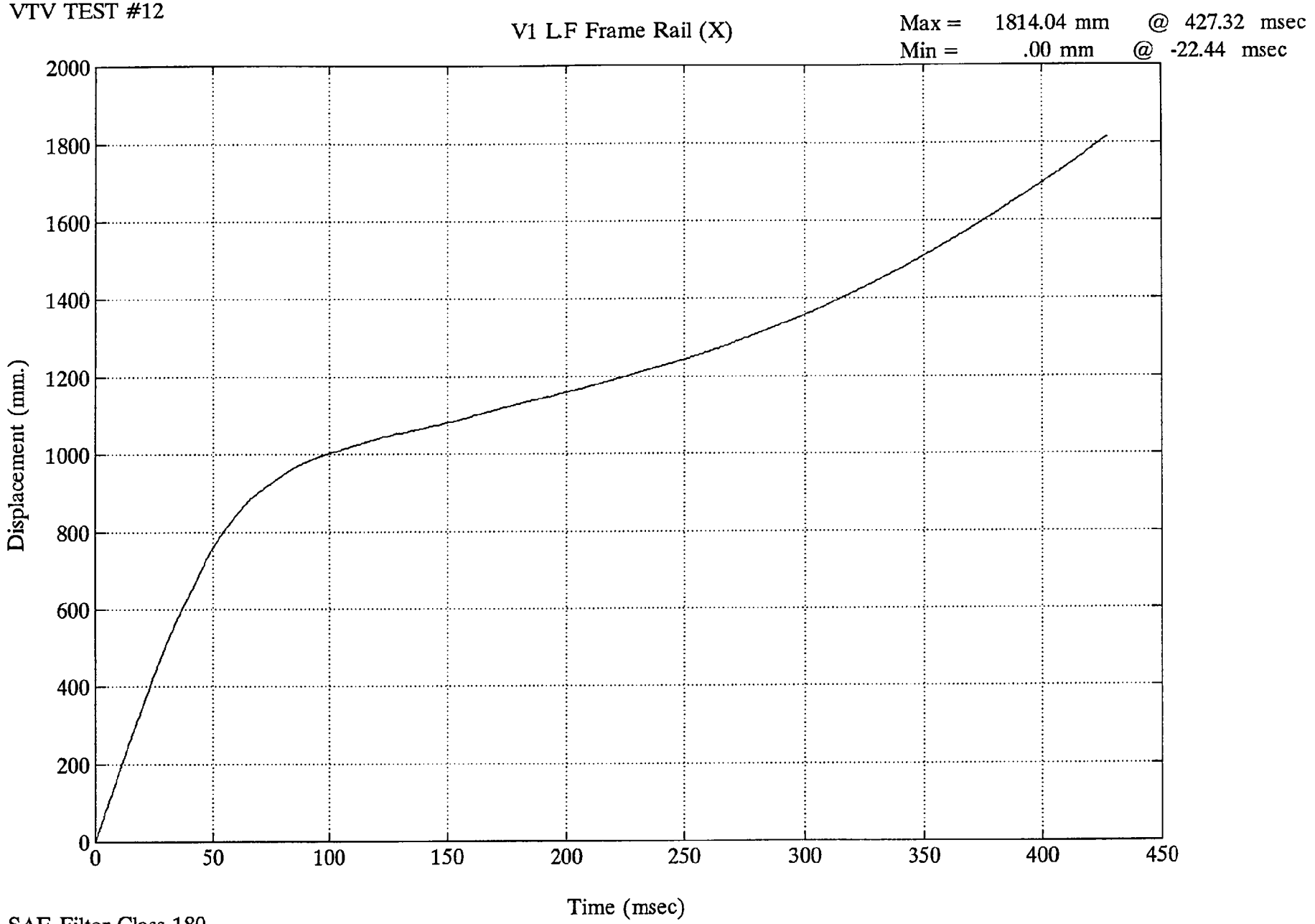
VTV TEST #12



SAE Filter Class 180

8118-12

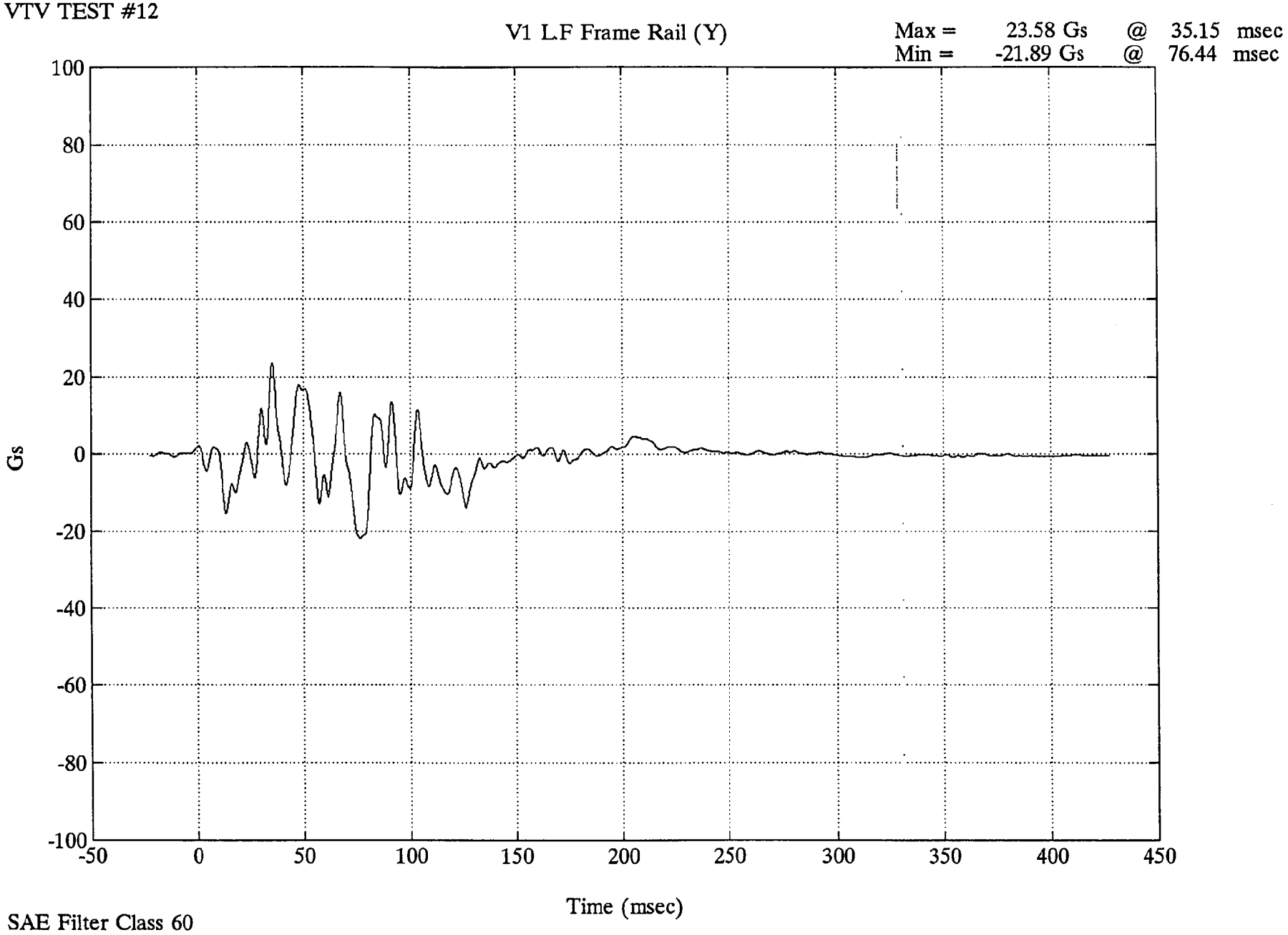
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12

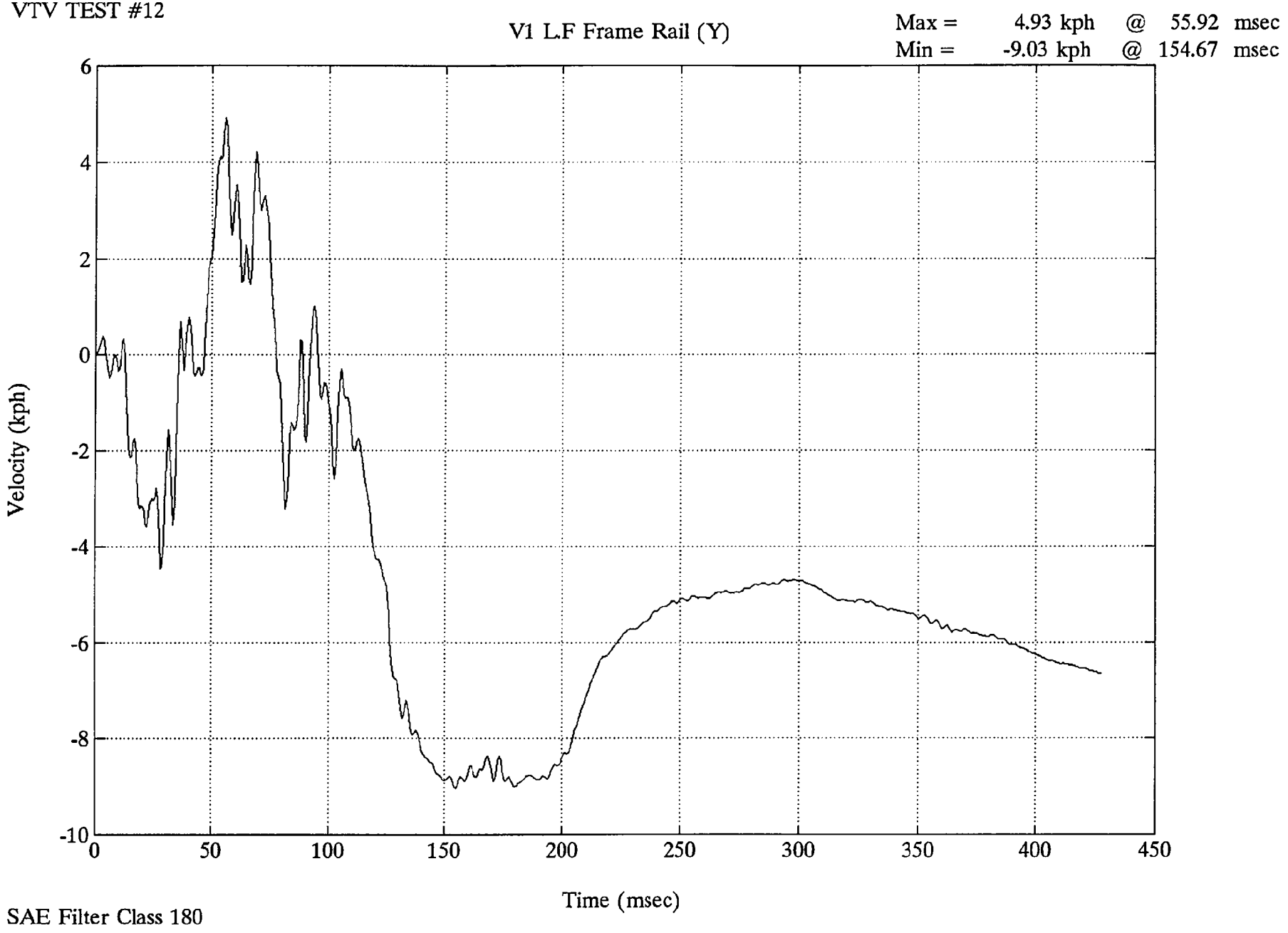


B-37

8118-12

SAE Filter Class 60

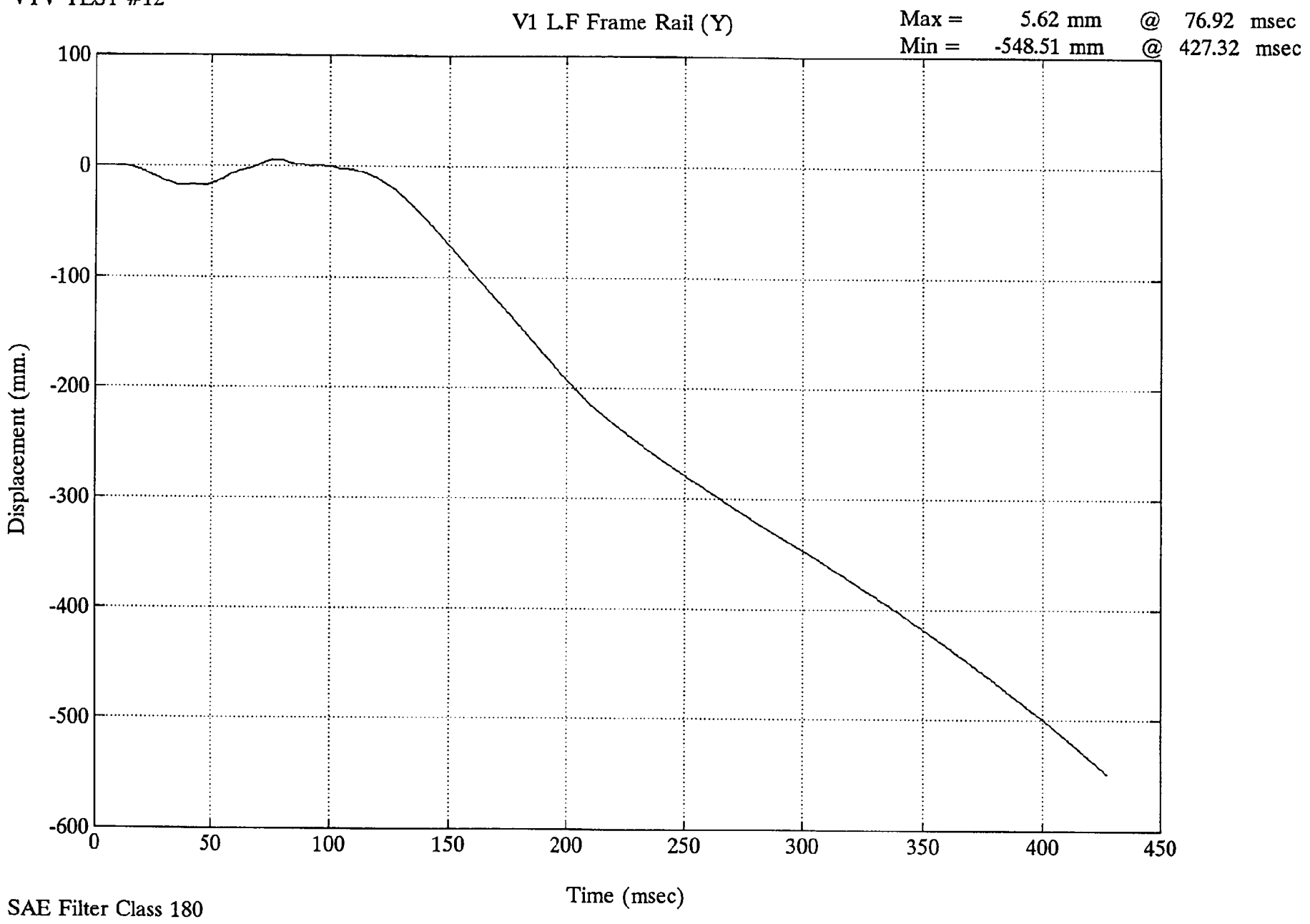
VTV TEST #12



SAE Filter Class 180

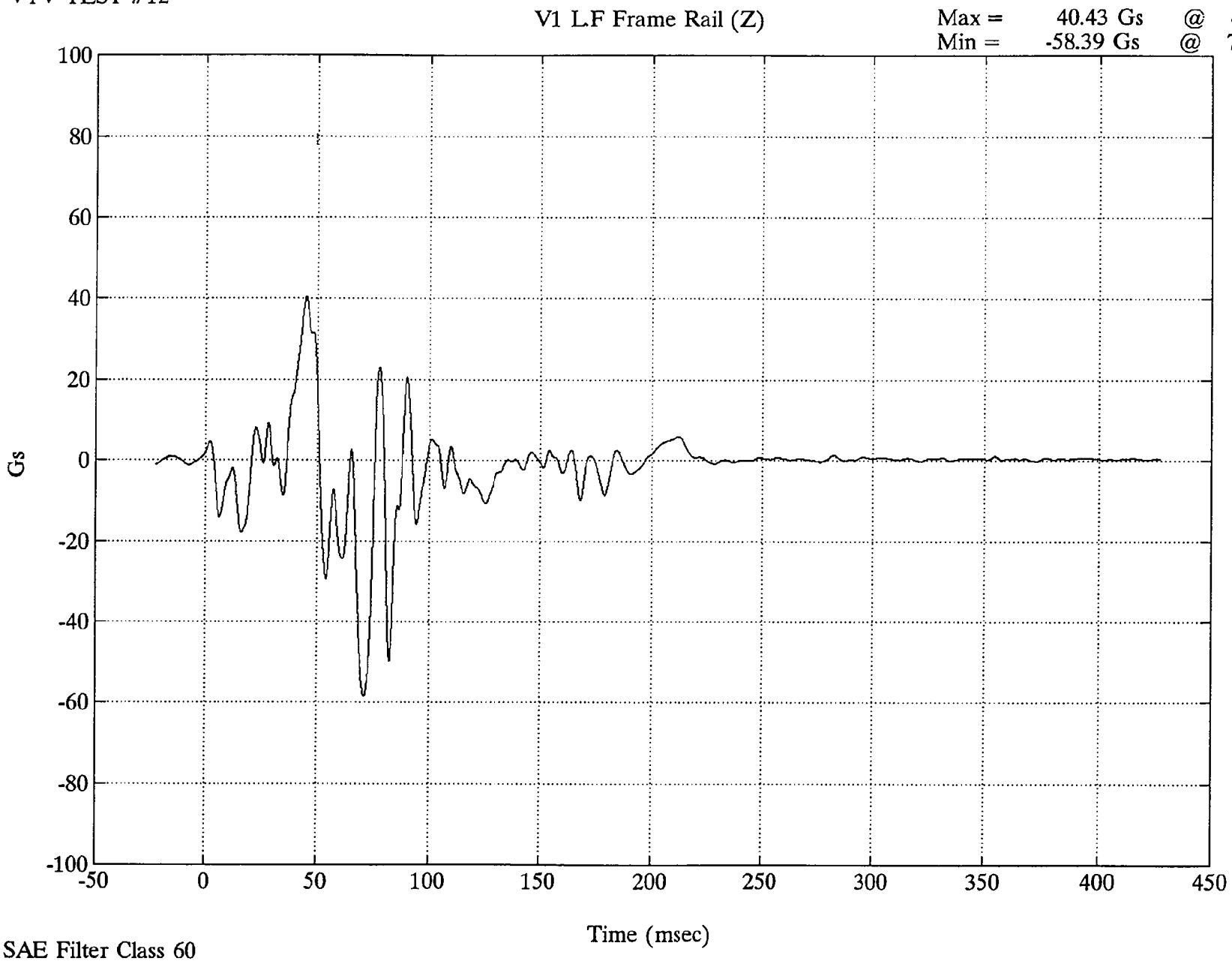
8118-12

VTV TEST #12



SAE Filter Class 180

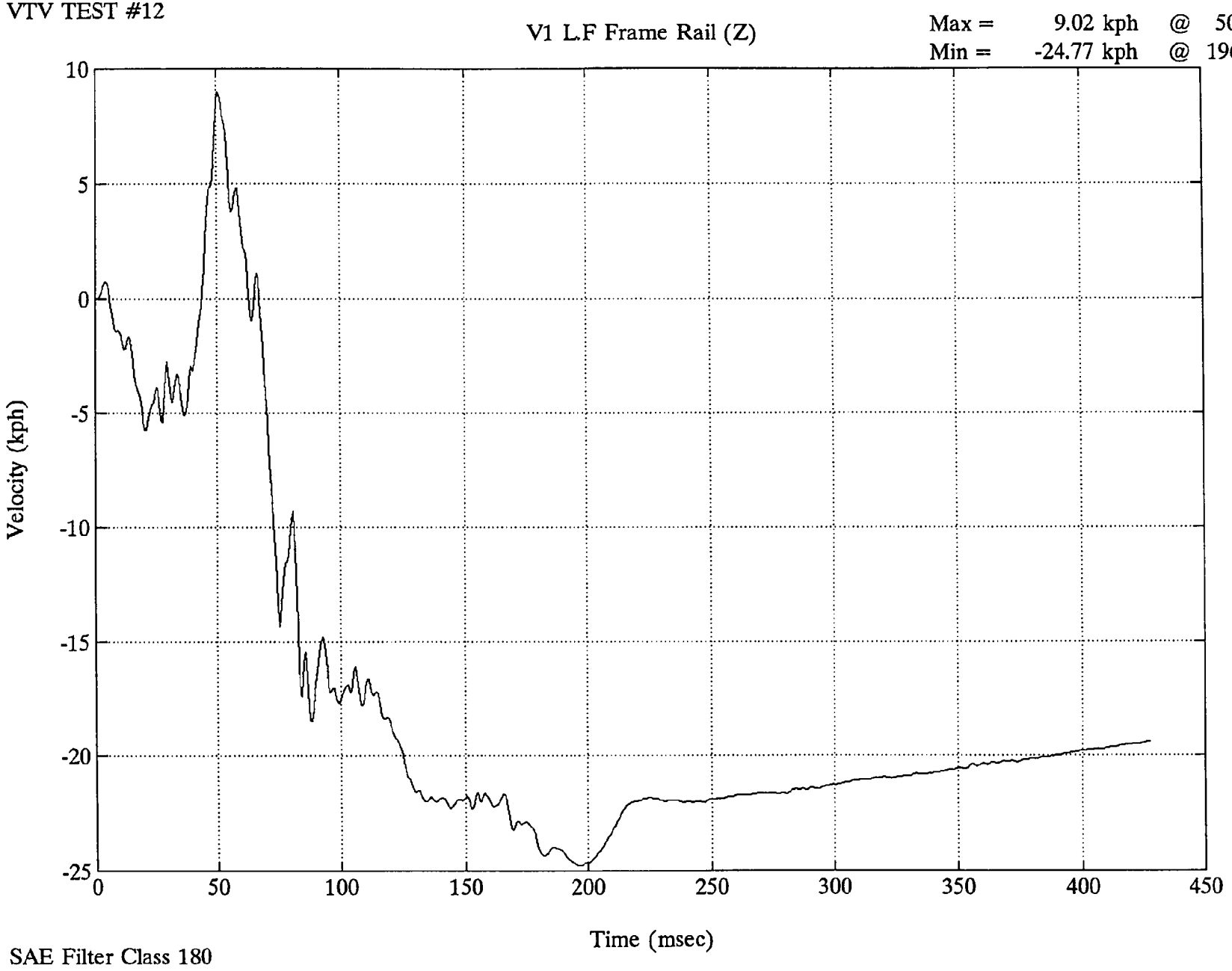
VTV TEST #12



SAE Filter Class 60

8118-12

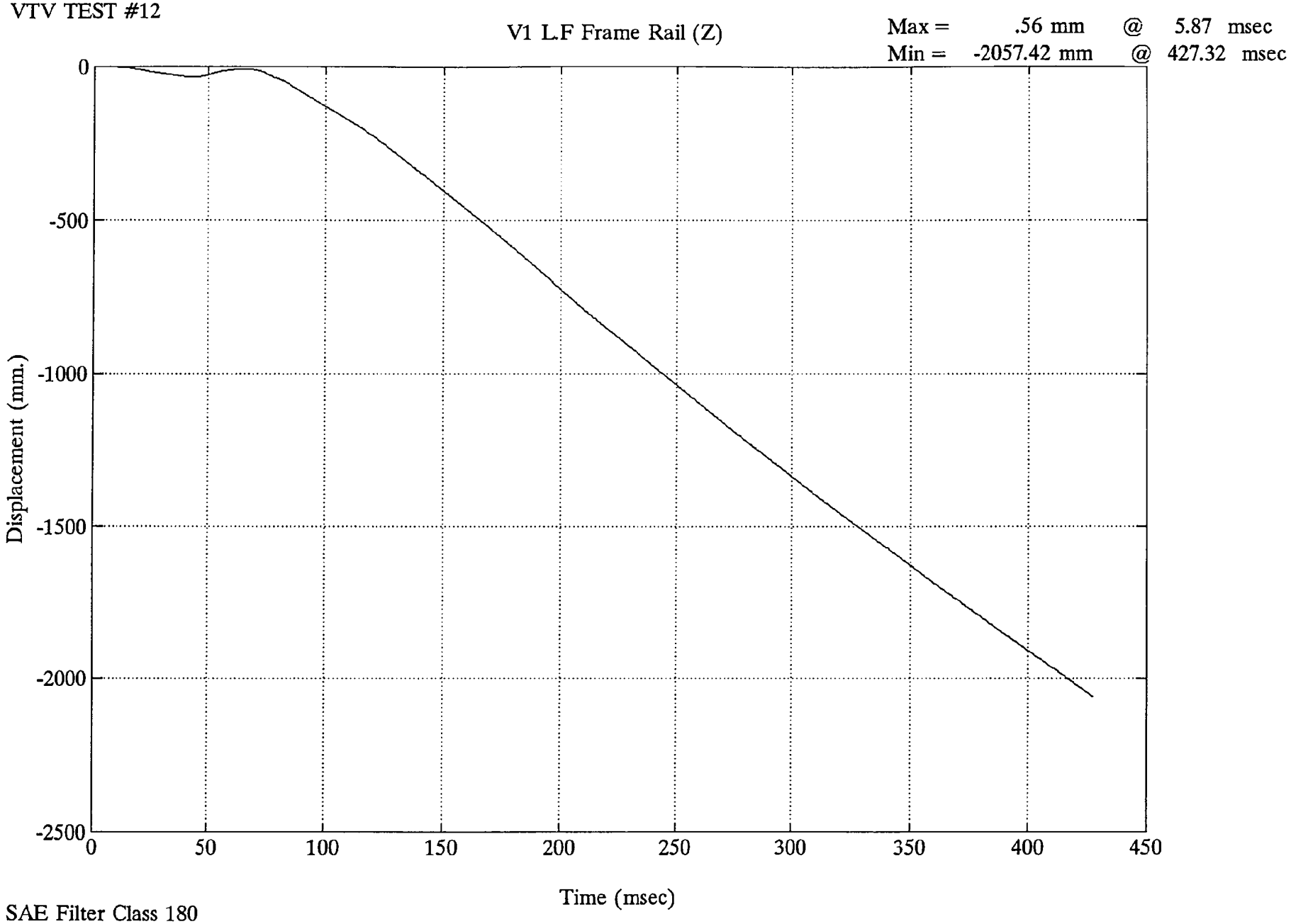
VTV TEST #12



SAE Filter Class 180

8118-12

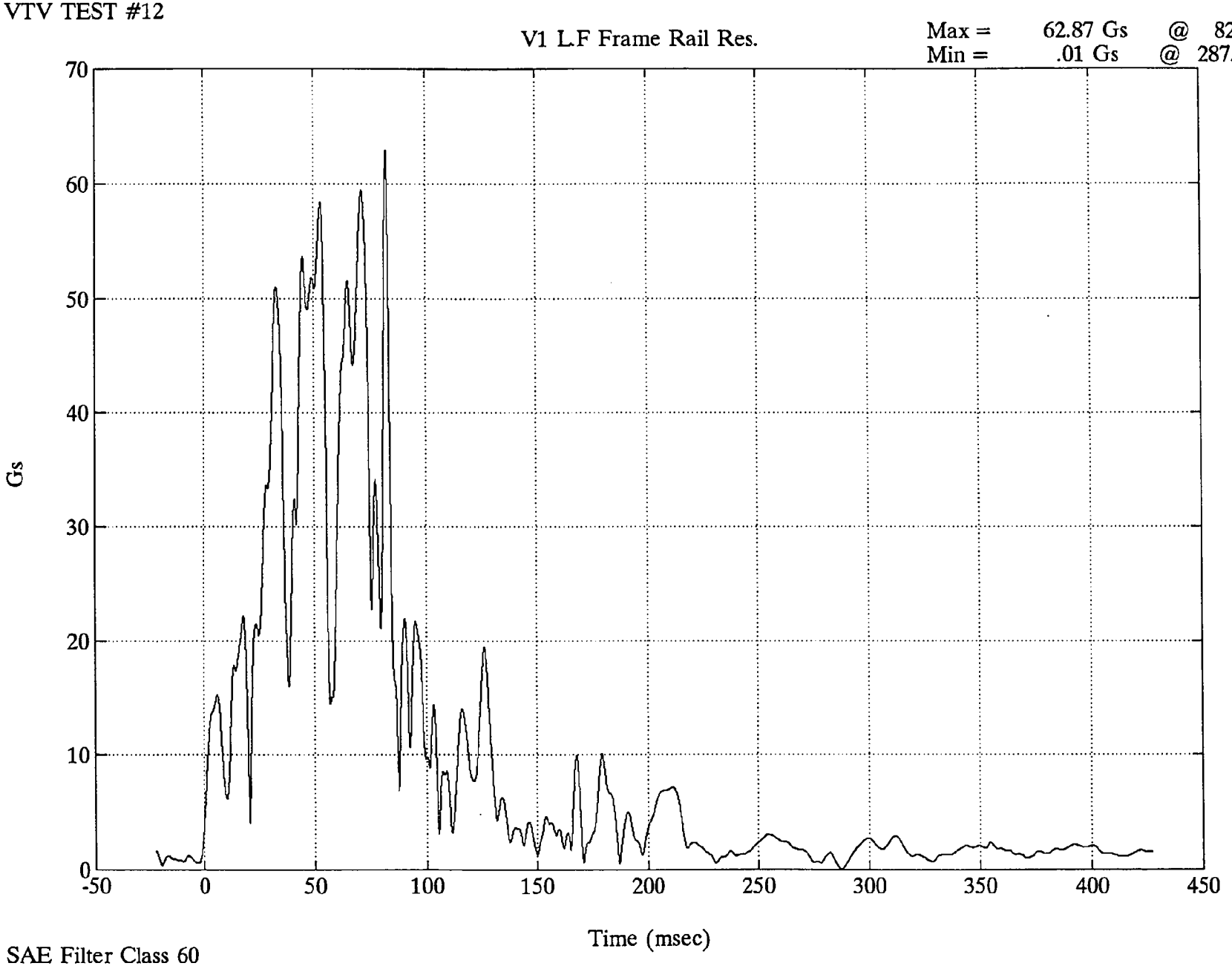
VTV TEST #12



SAE Filter Class 180

8118-12

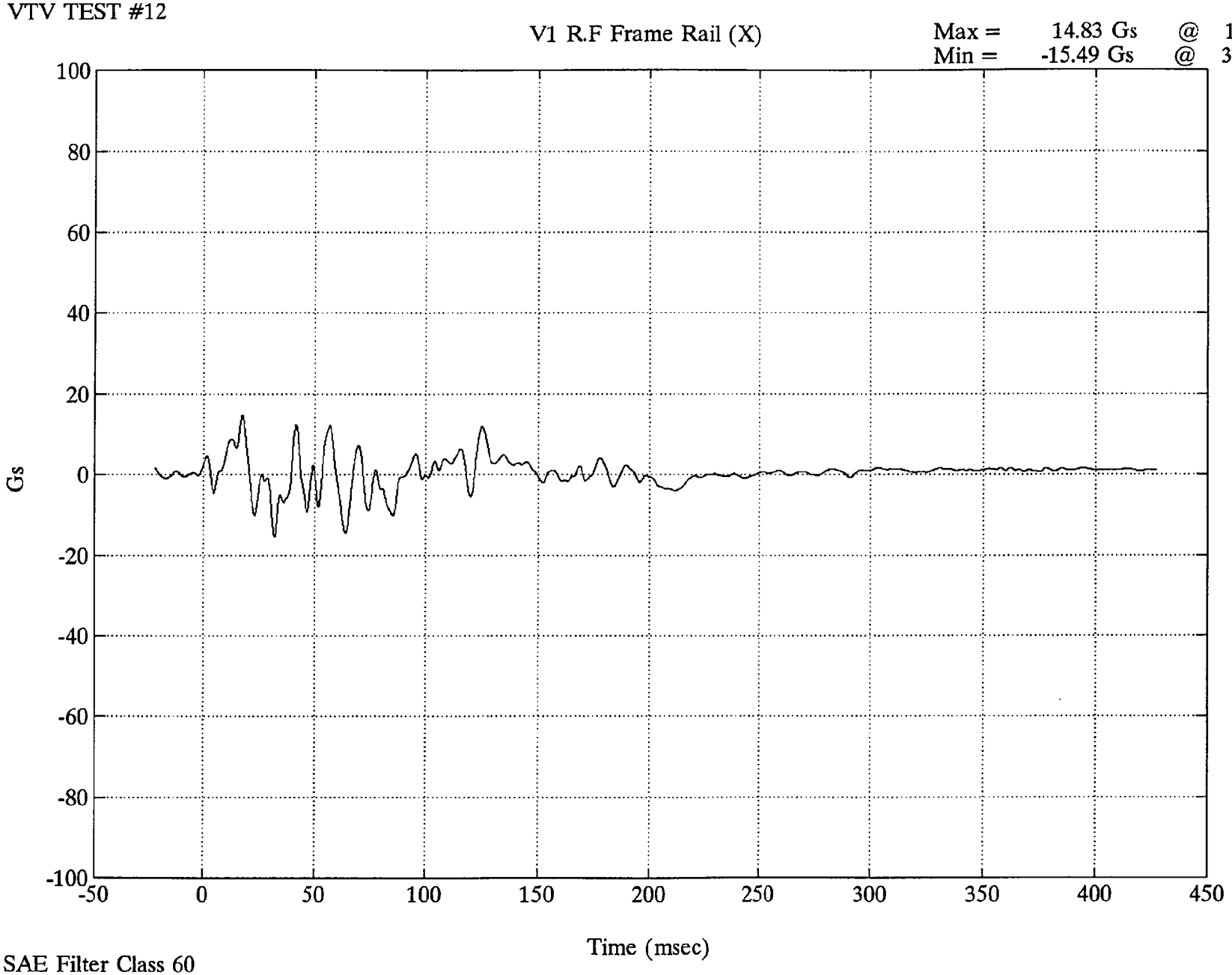
VTV TEST #12



SAE Filter Class 60

8118-12

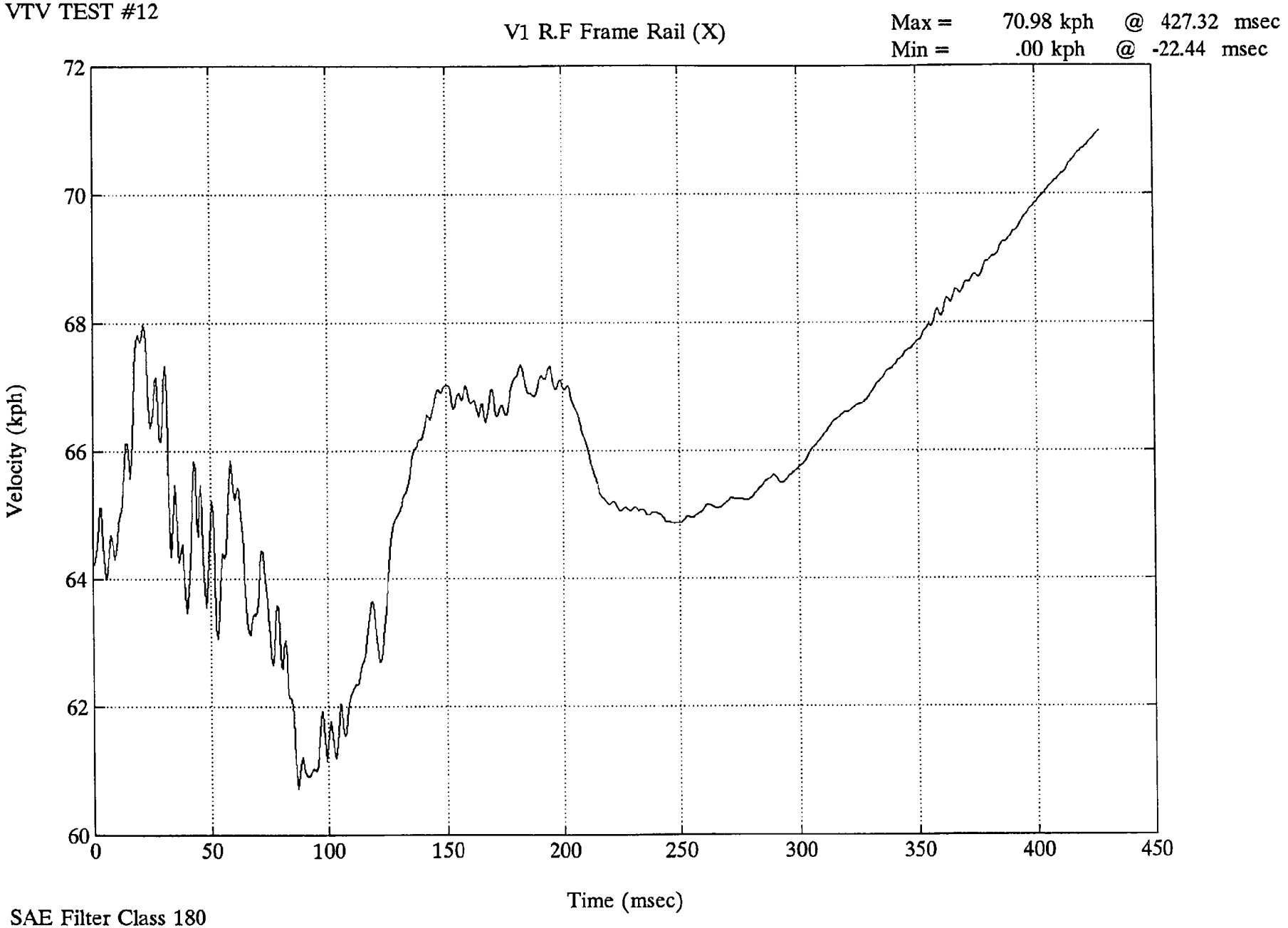
VTV TEST #12



SAE Filter Class 60

8118-12

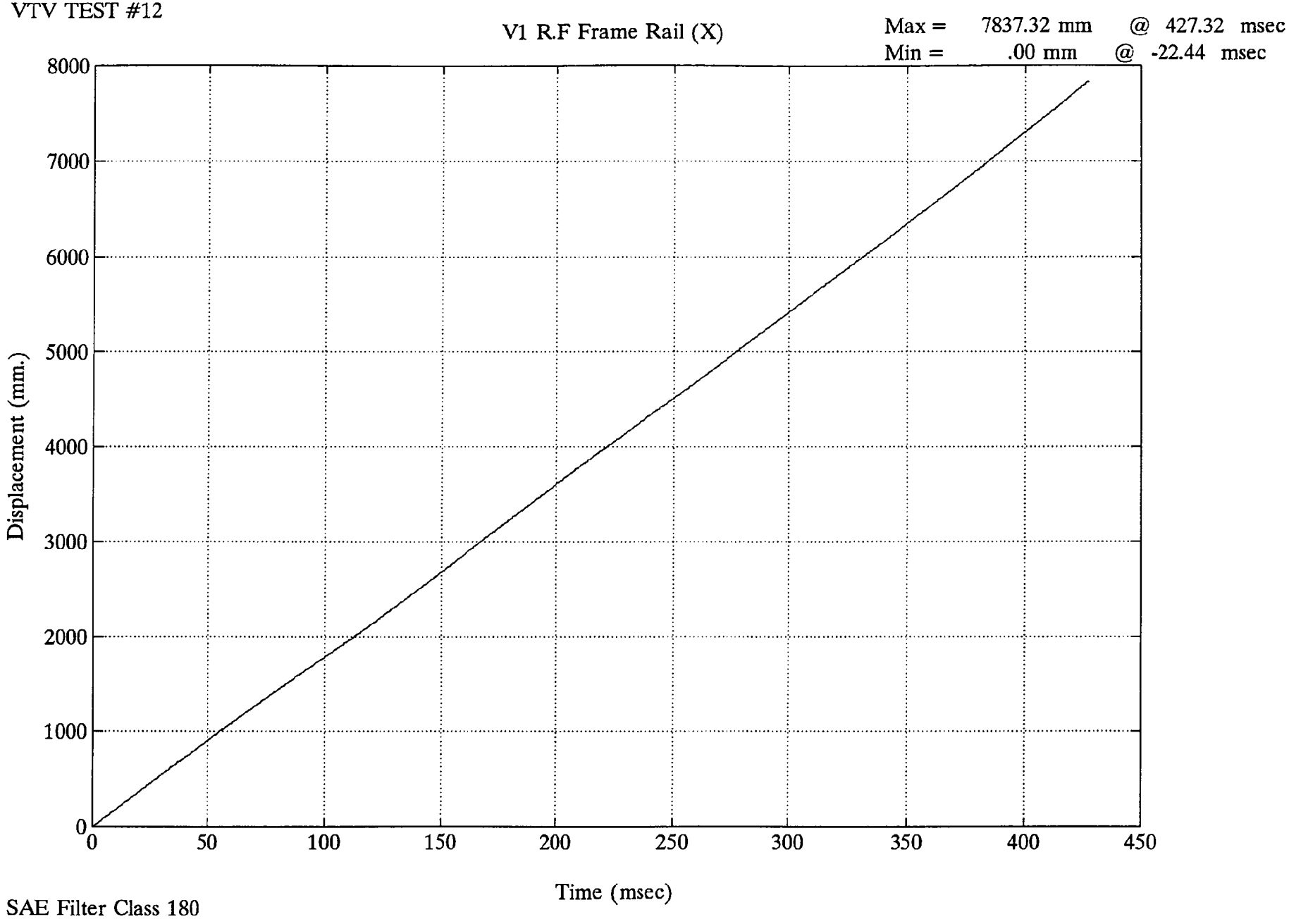
VTV TEST #12



SAE Filter Class 180

8118-12

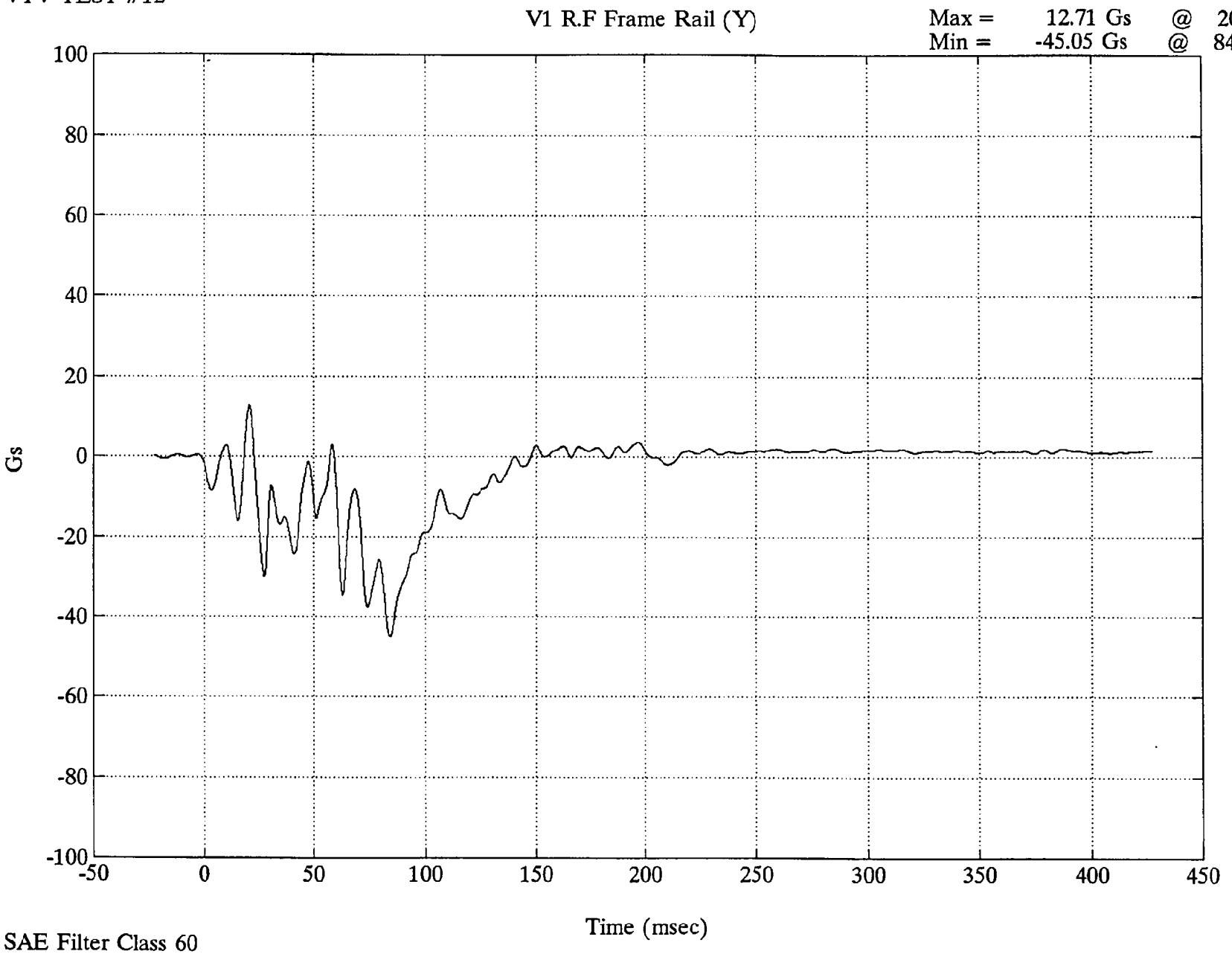
VTV TEST #12



SAE Filter Class 180

8118-12

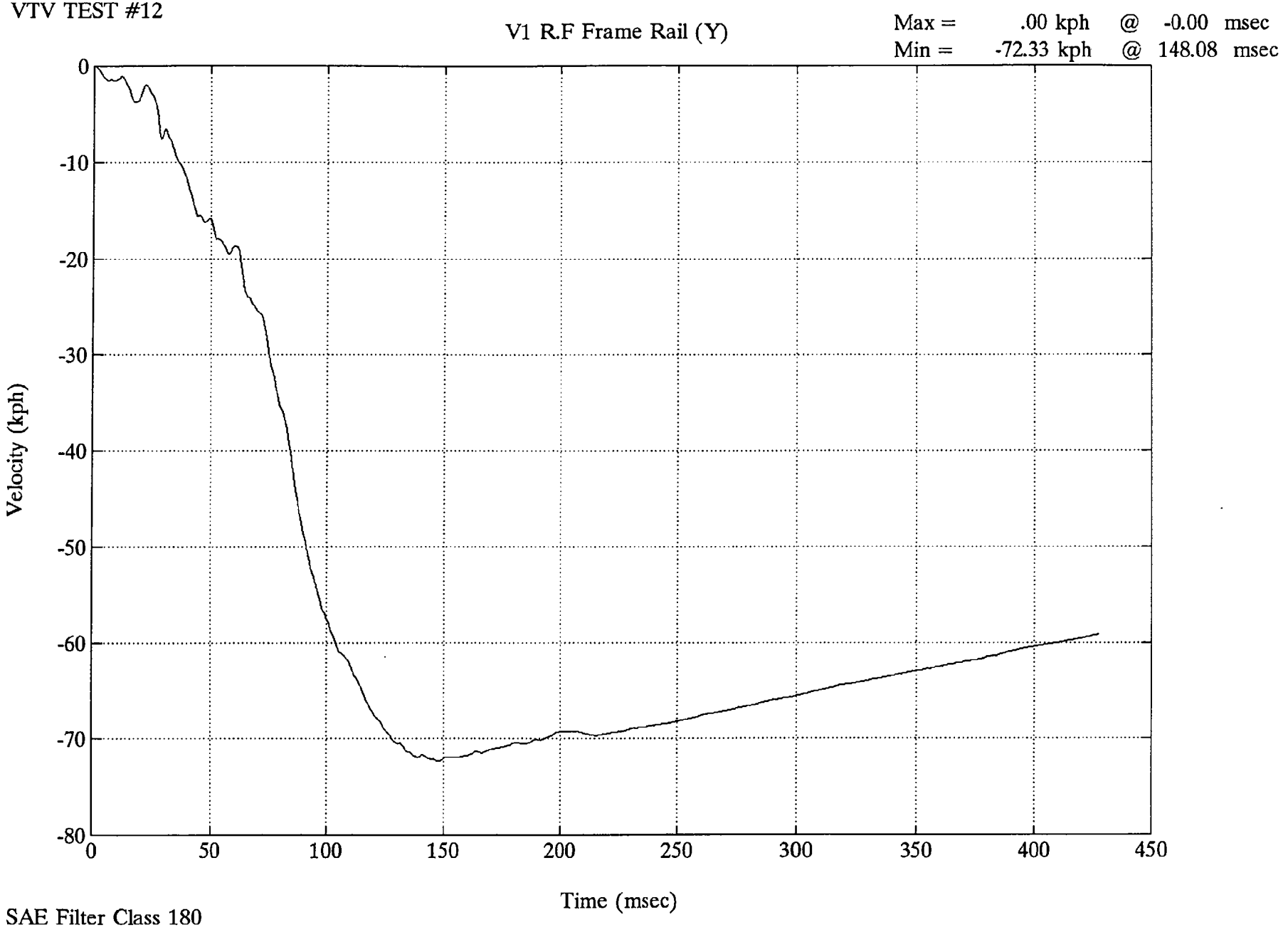
VTV TEST #12



SAE Filter Class 60

8118-12

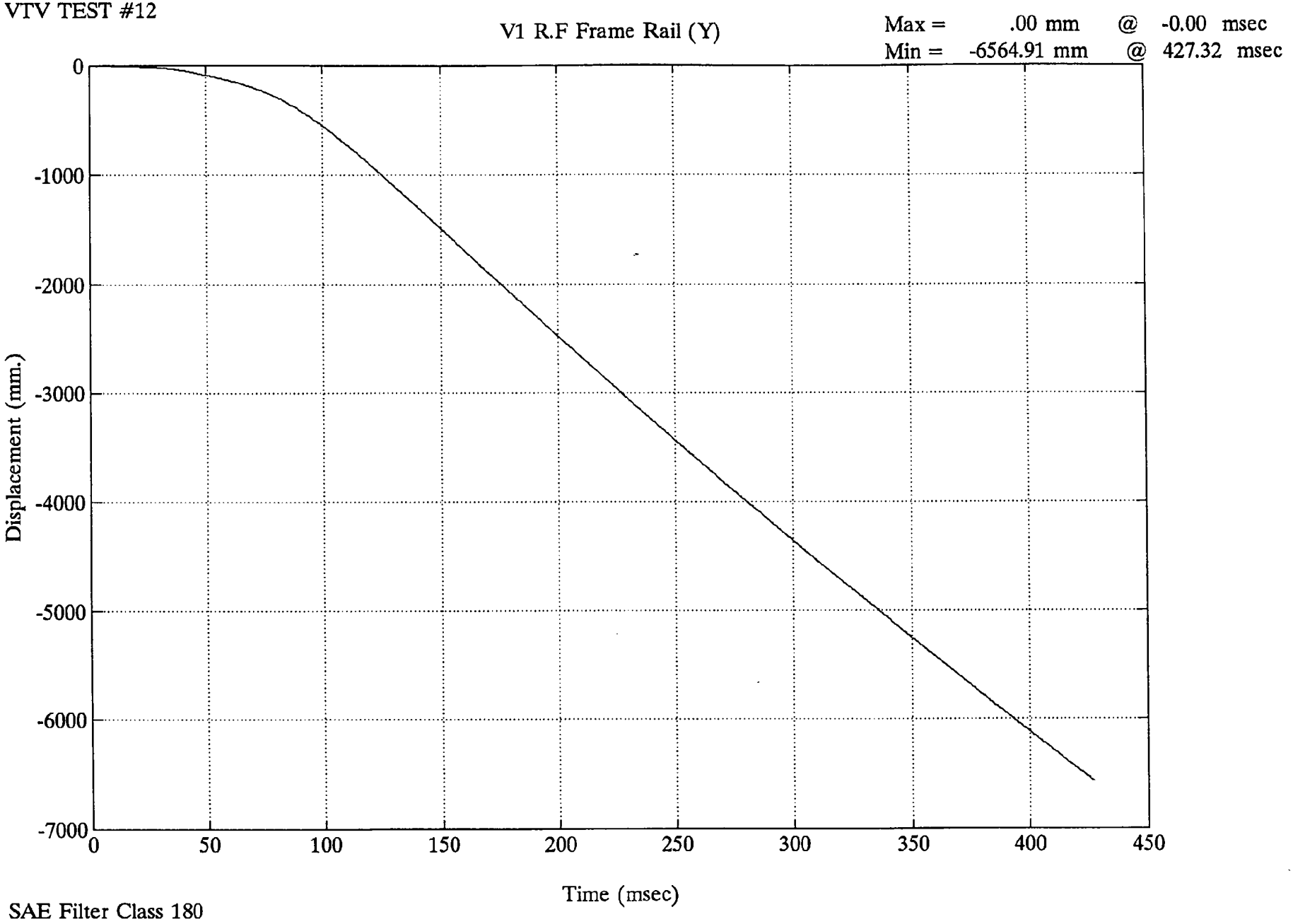
VTV TEST #12



SAE Filter Class 180

8118-12

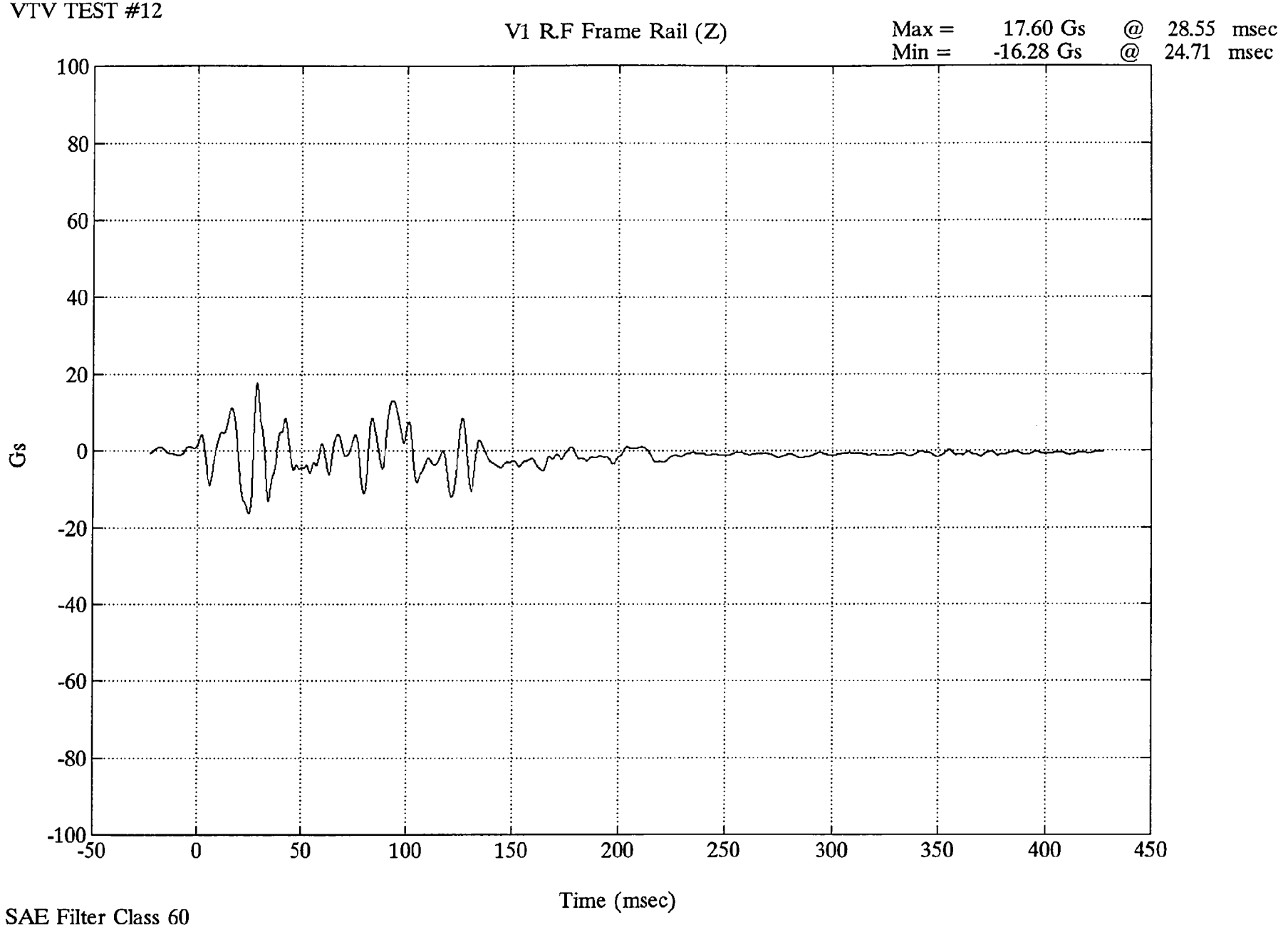
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12

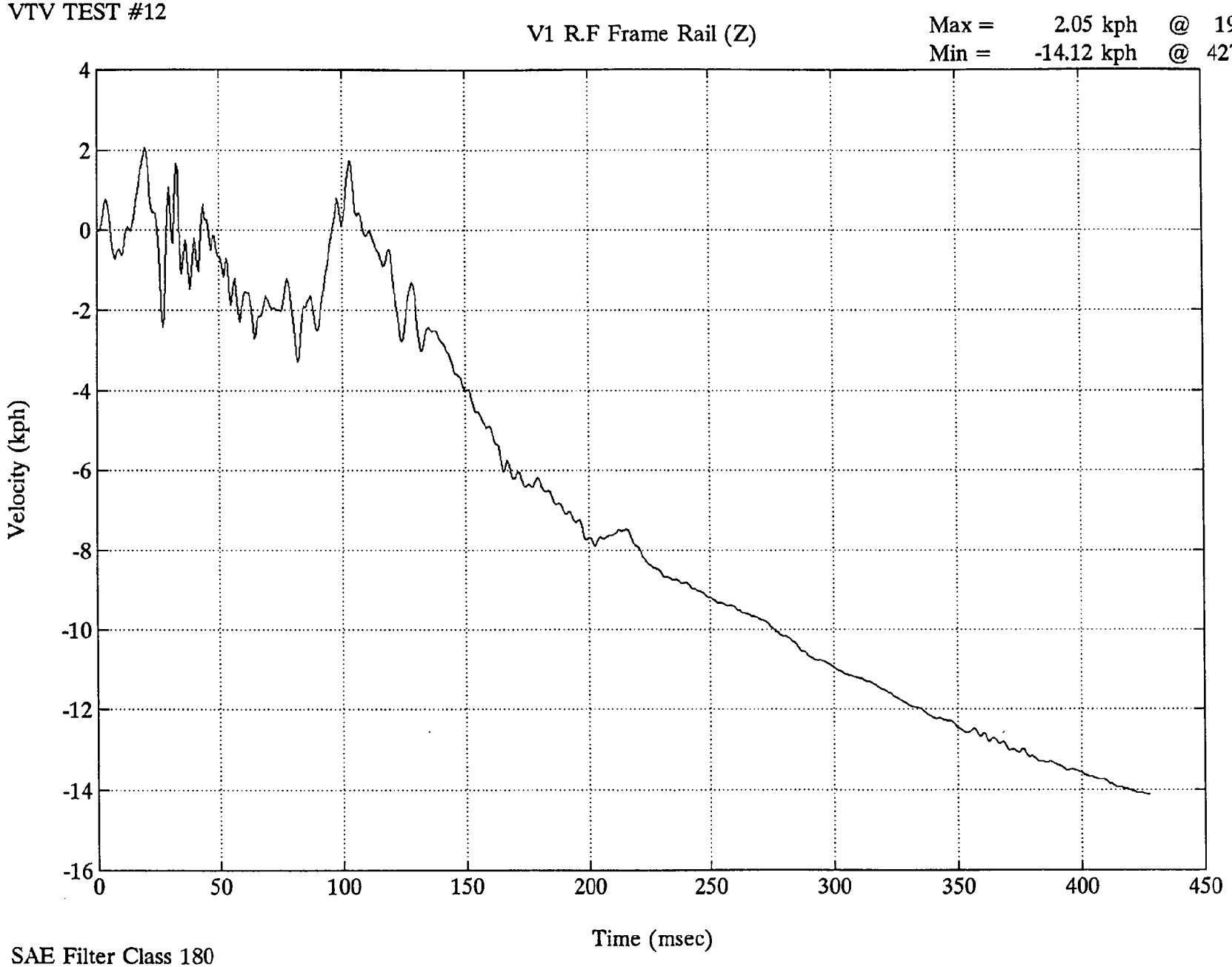


B-50

8118-12

SAE Filter Class 60

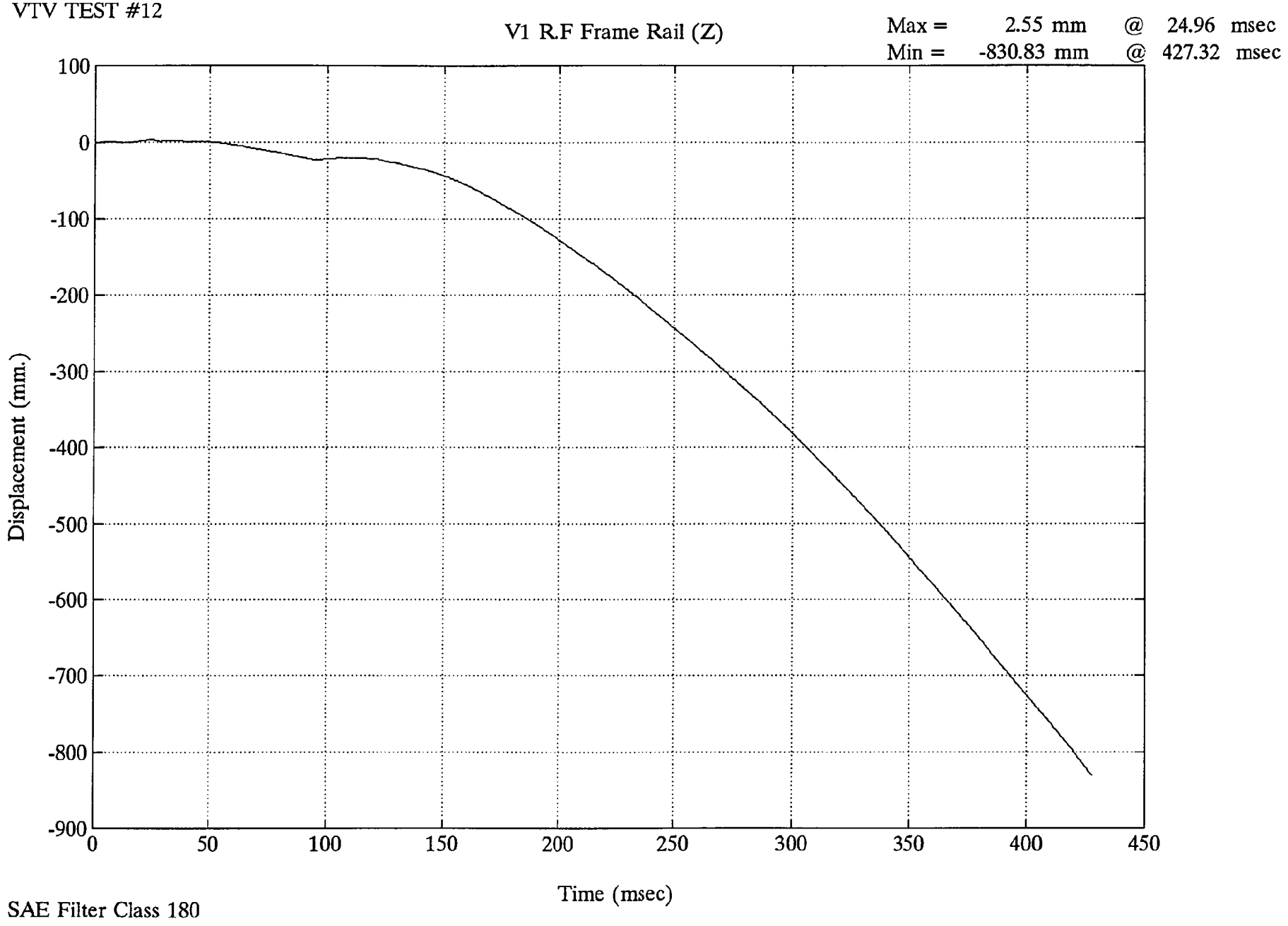
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12

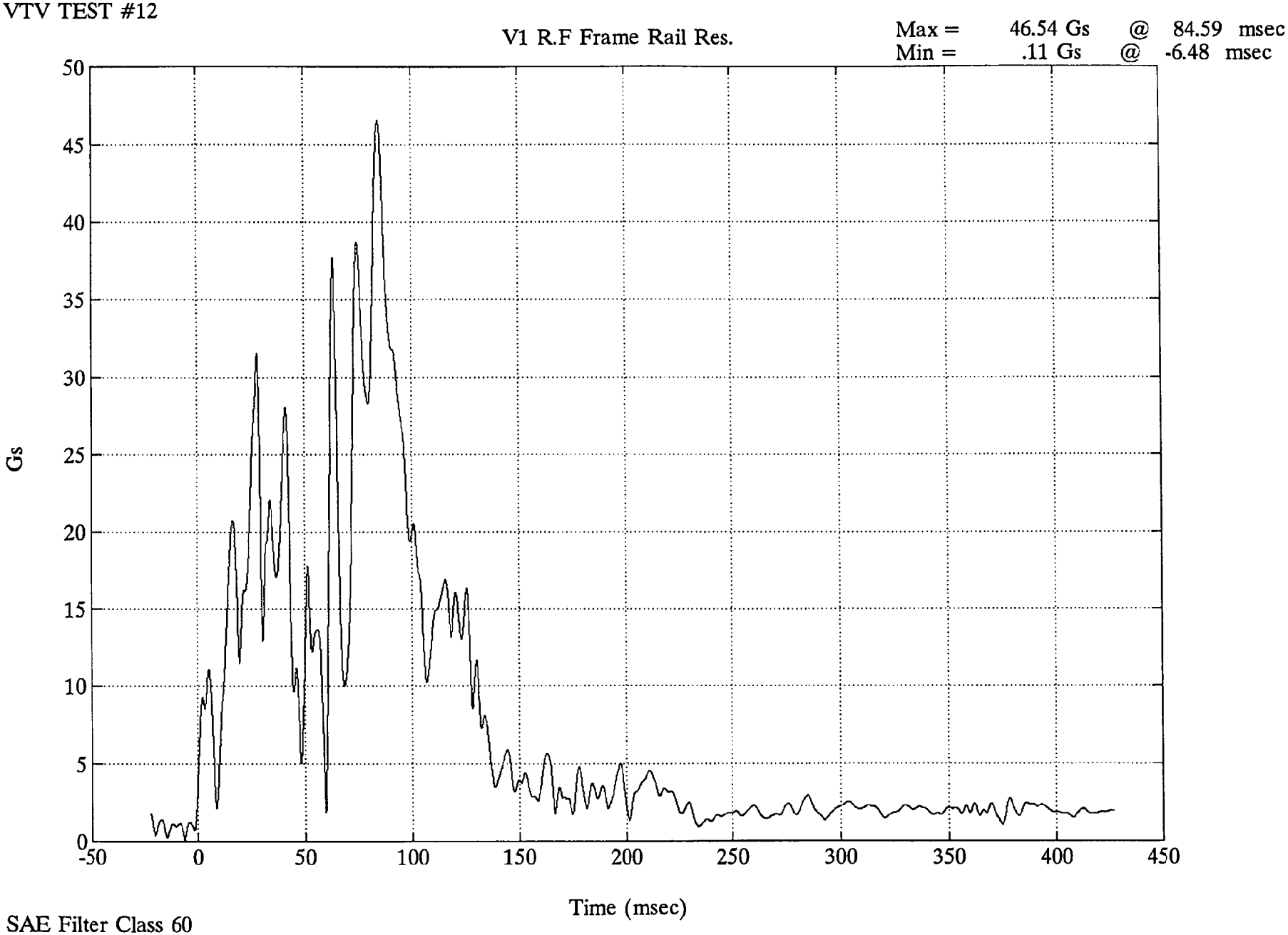


B-52

8118-12

SAE Filter Class 180

VTV TEST #12

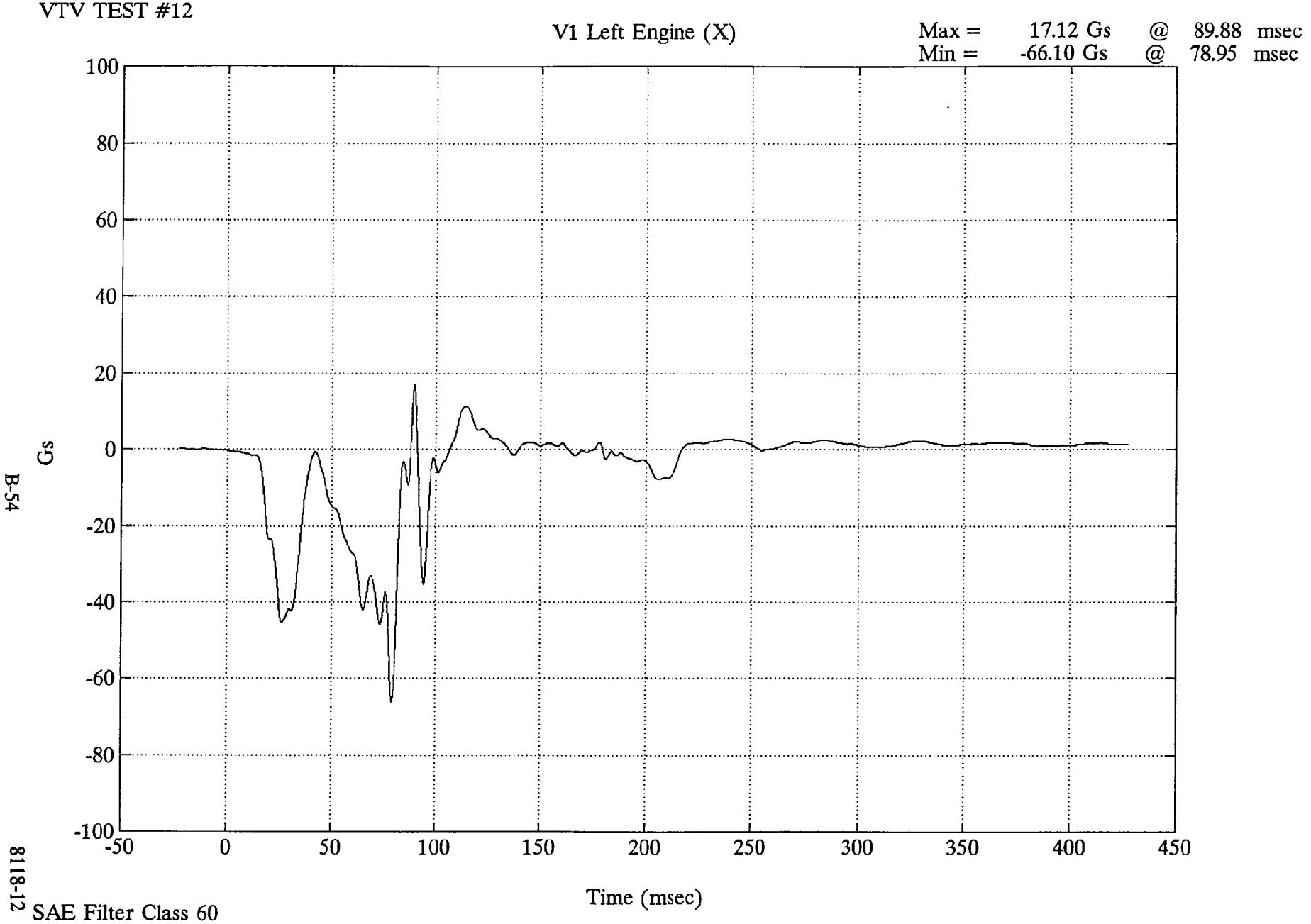


B-53

8118-12

SAE Filter Class 60

VTV TEST #12

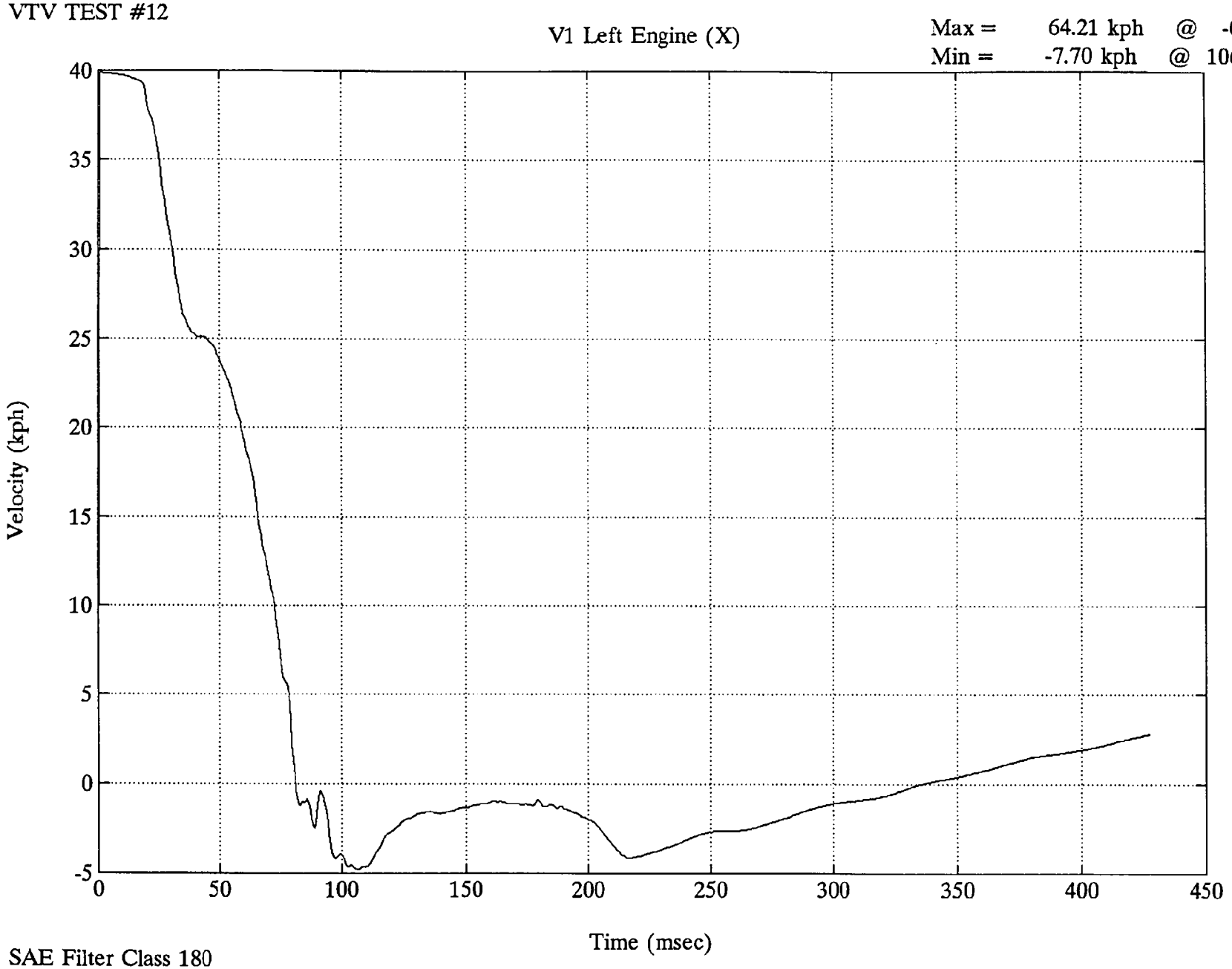


B-54

8118-12

SAE Filter Class 60

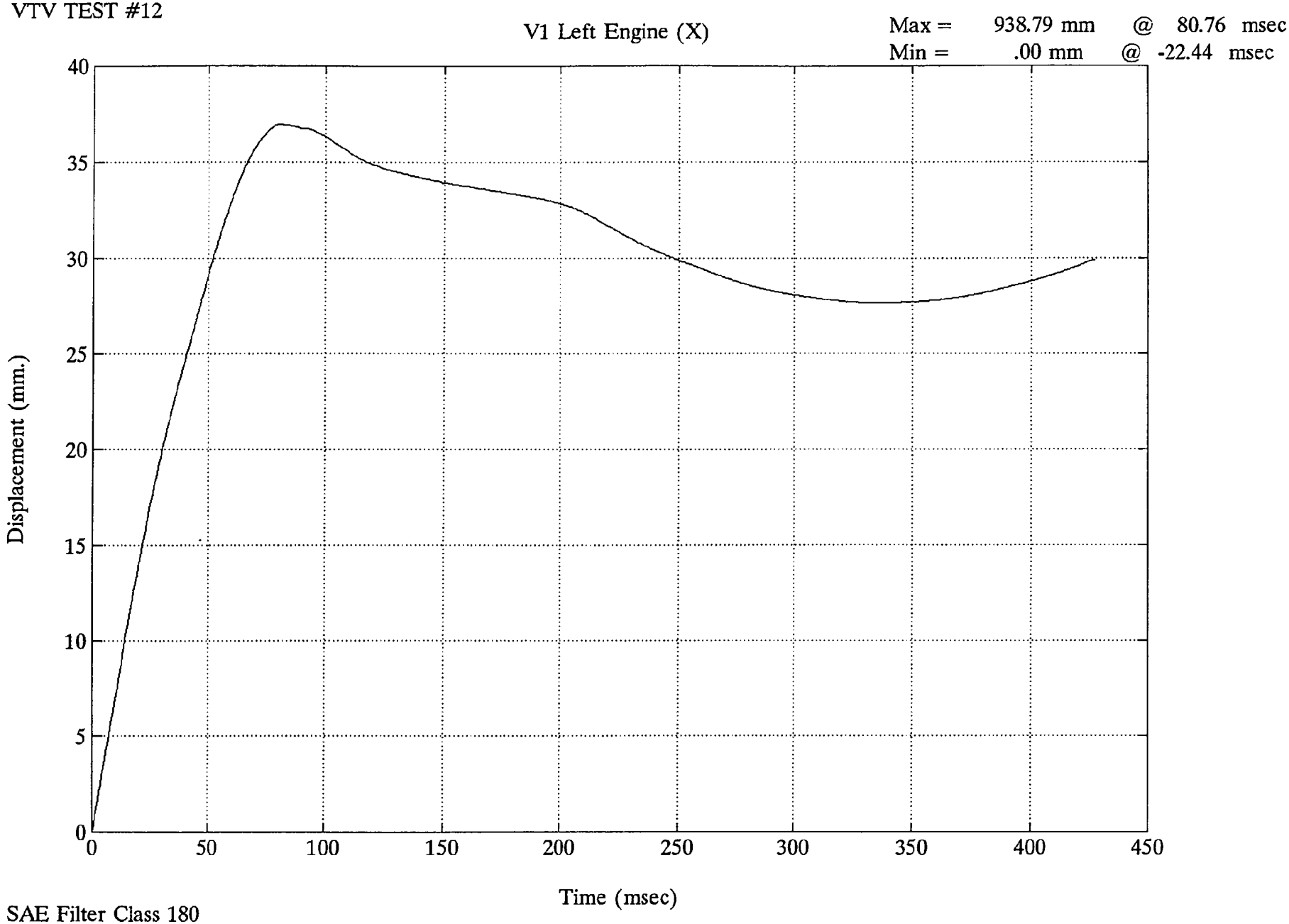
VTV TEST #12



SAE Filter Class 180

8118-12

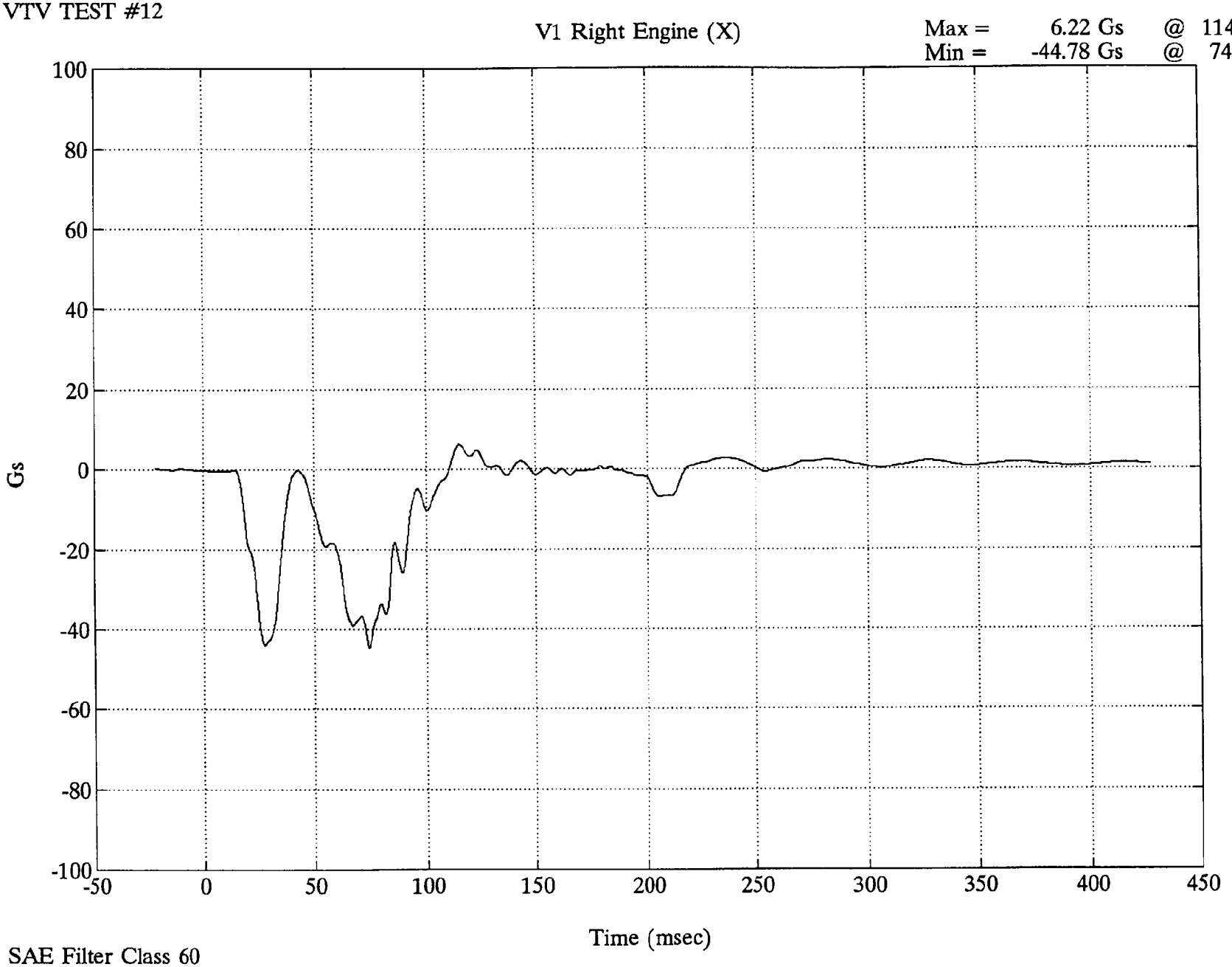
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12

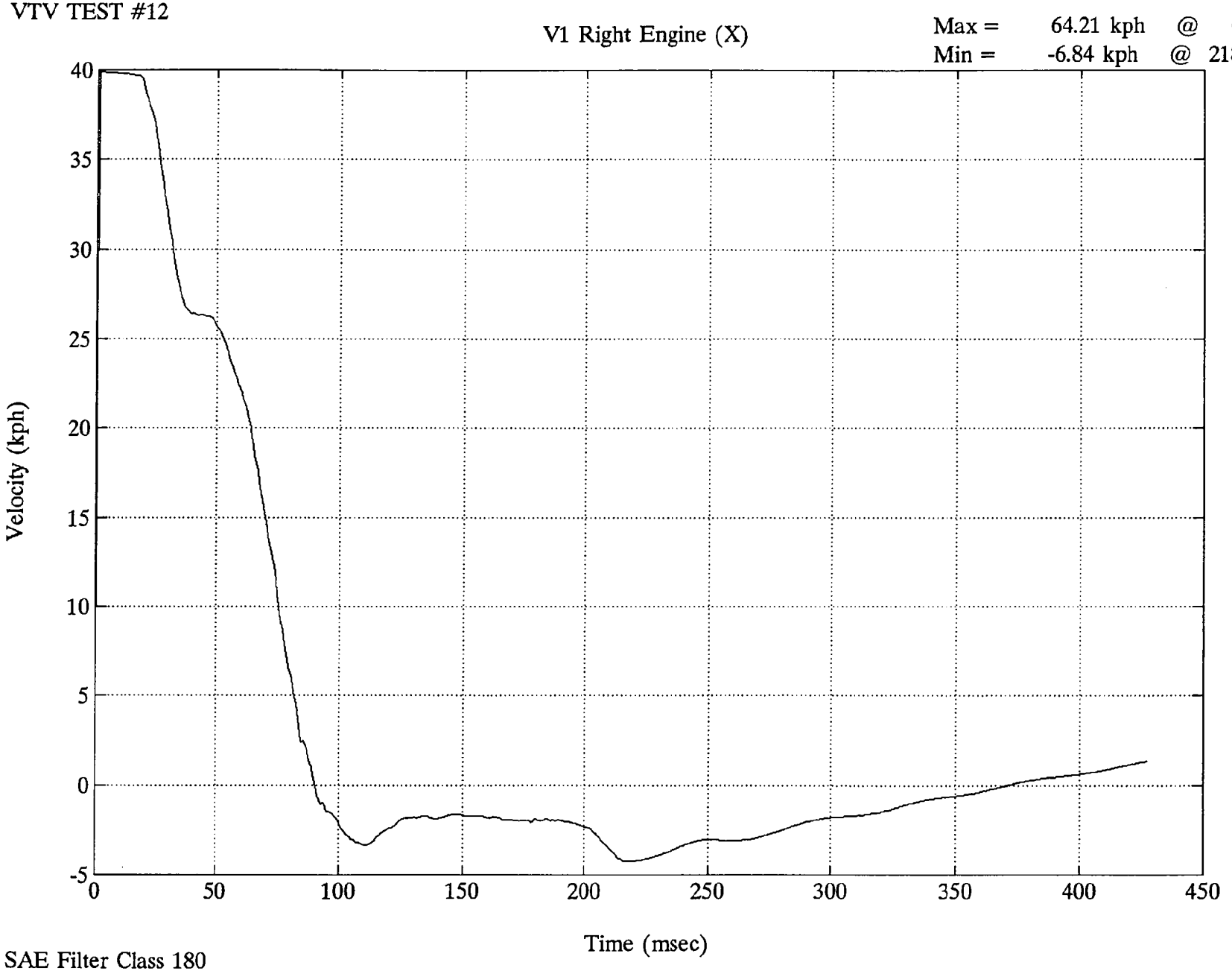


B-57

8118-12

SAE Filter Class 60

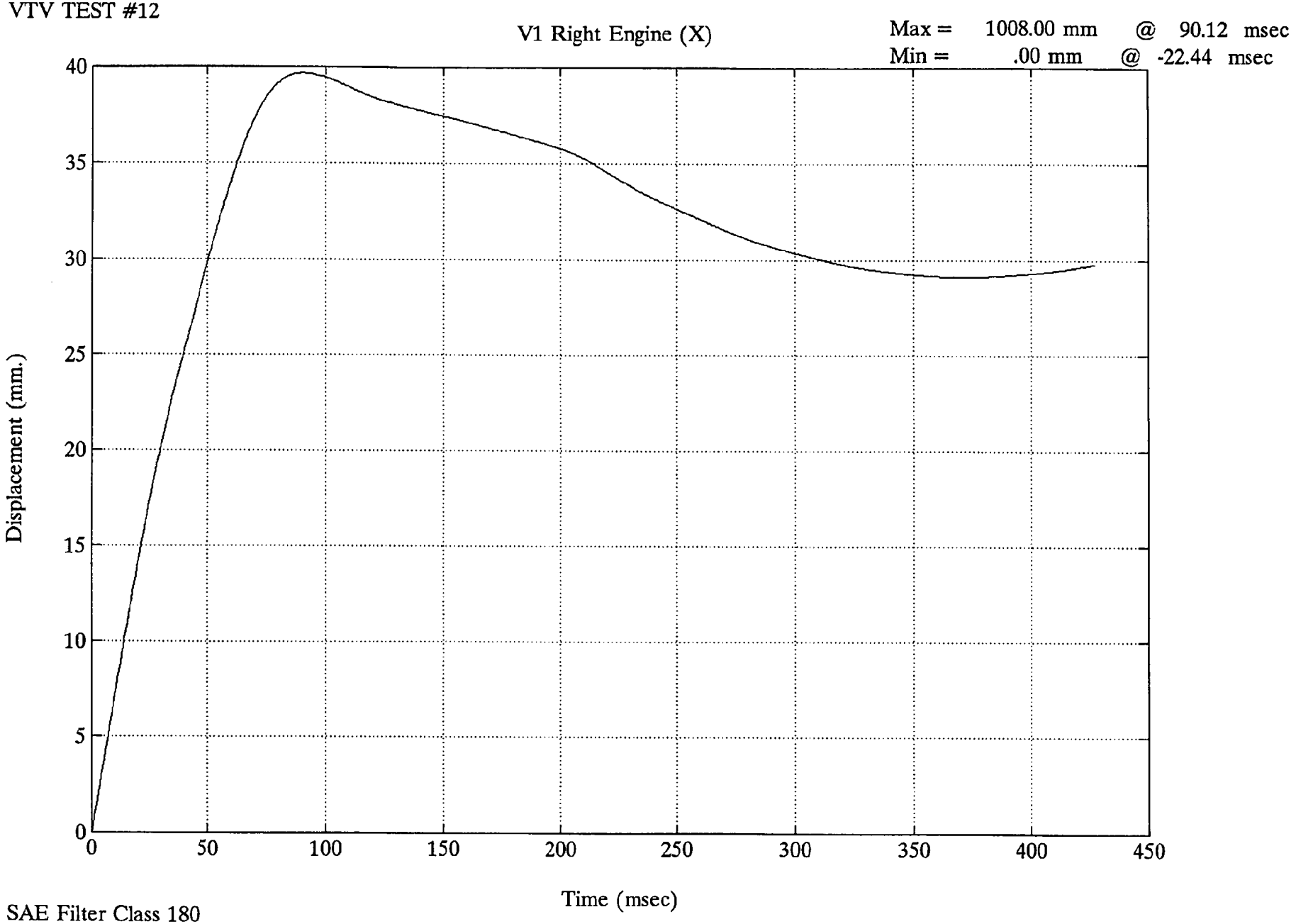
VTV TEST #12



SAE Filter Class 180

8118-12

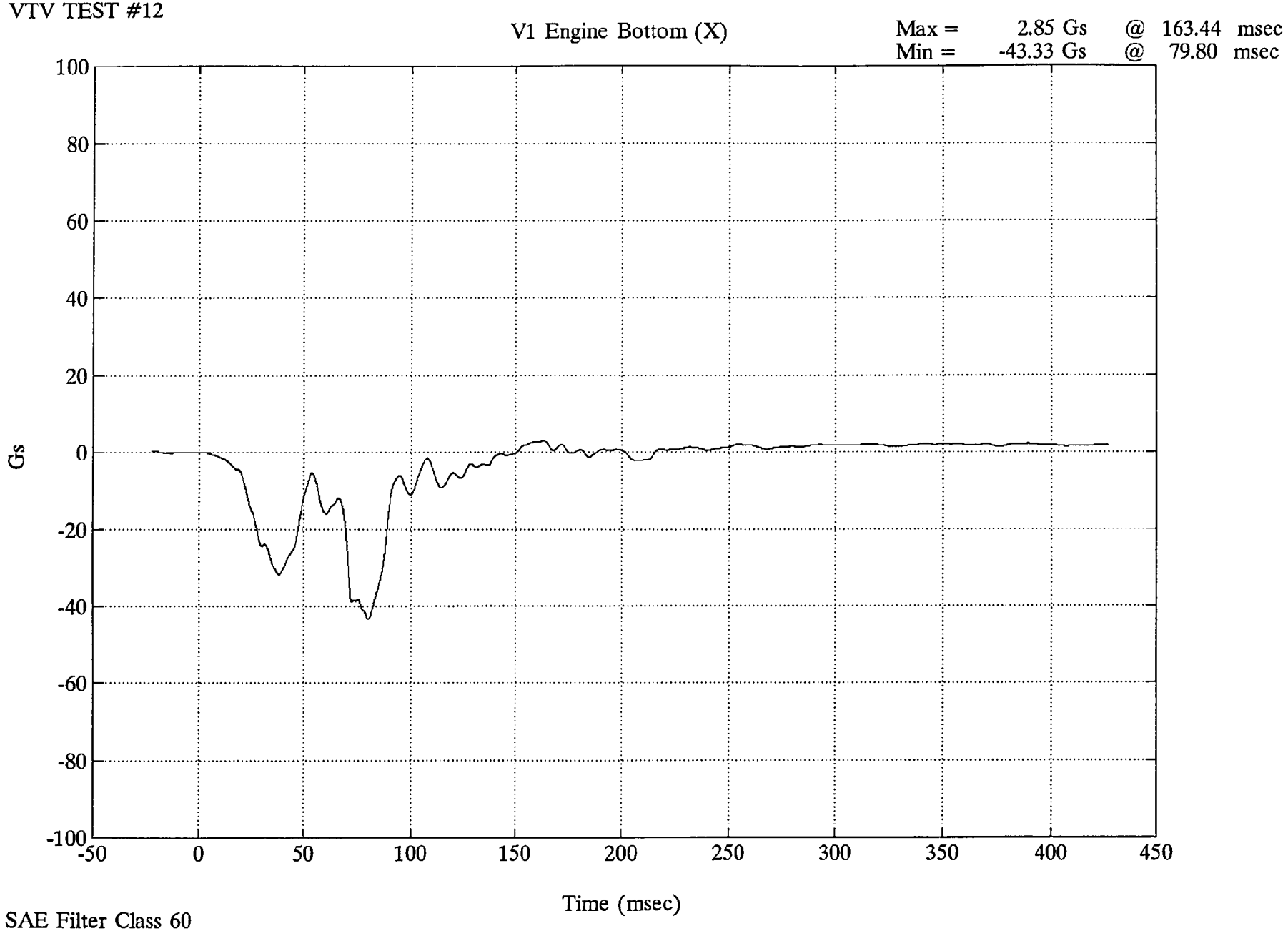
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12

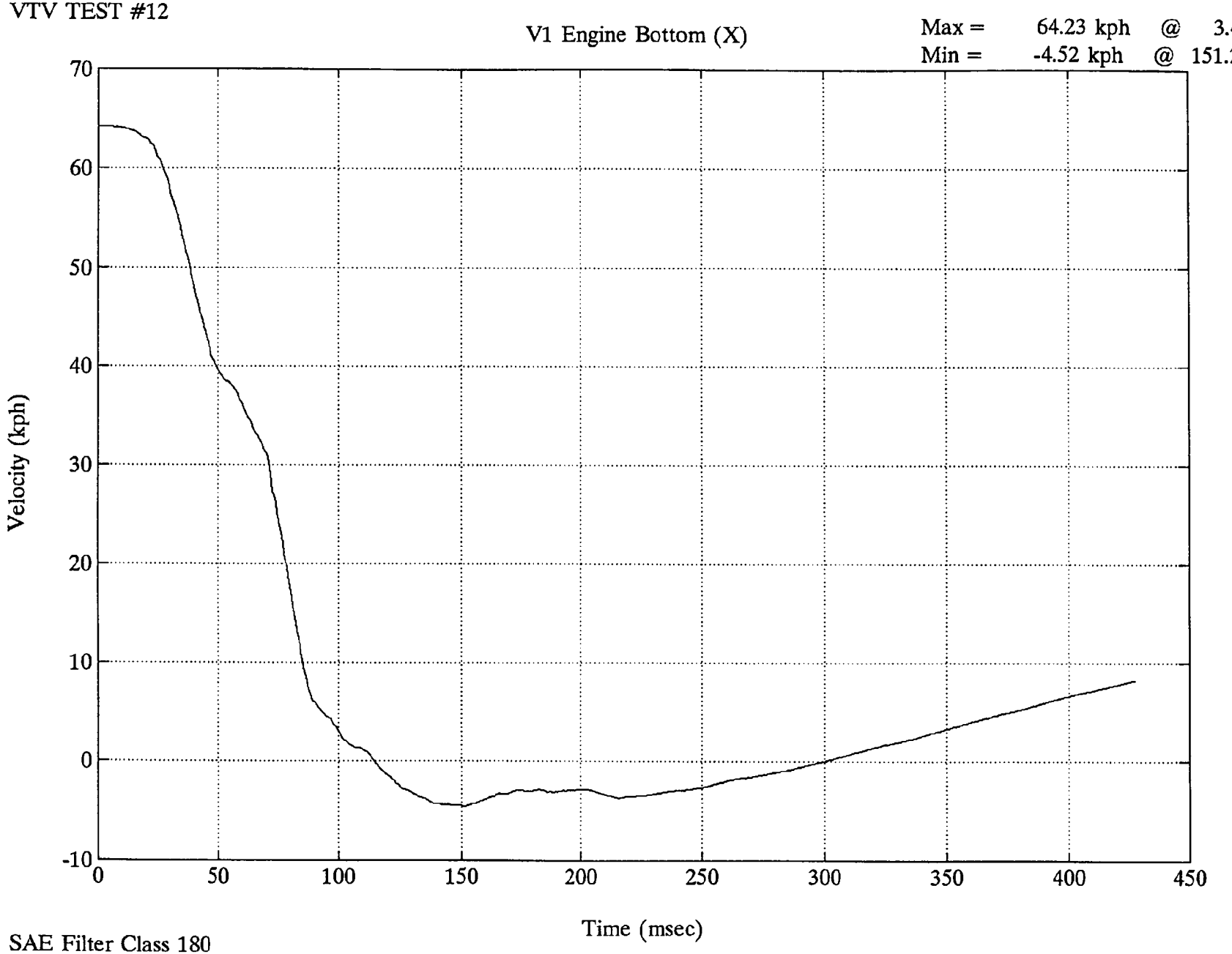


B-60

8118-12

SAE Filter Class 60

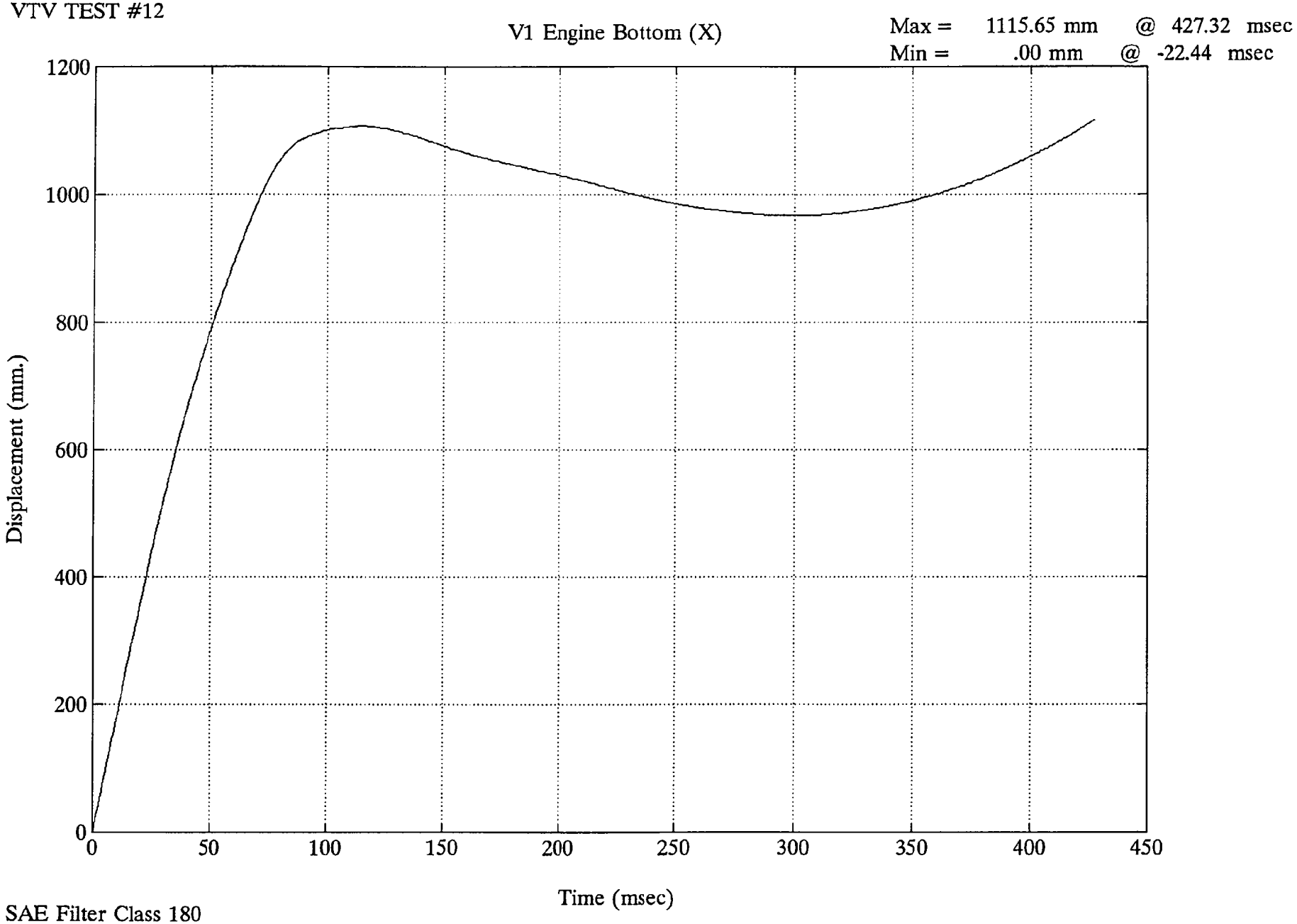
VTV TEST #12



SAE Filter Class 180

8118-12

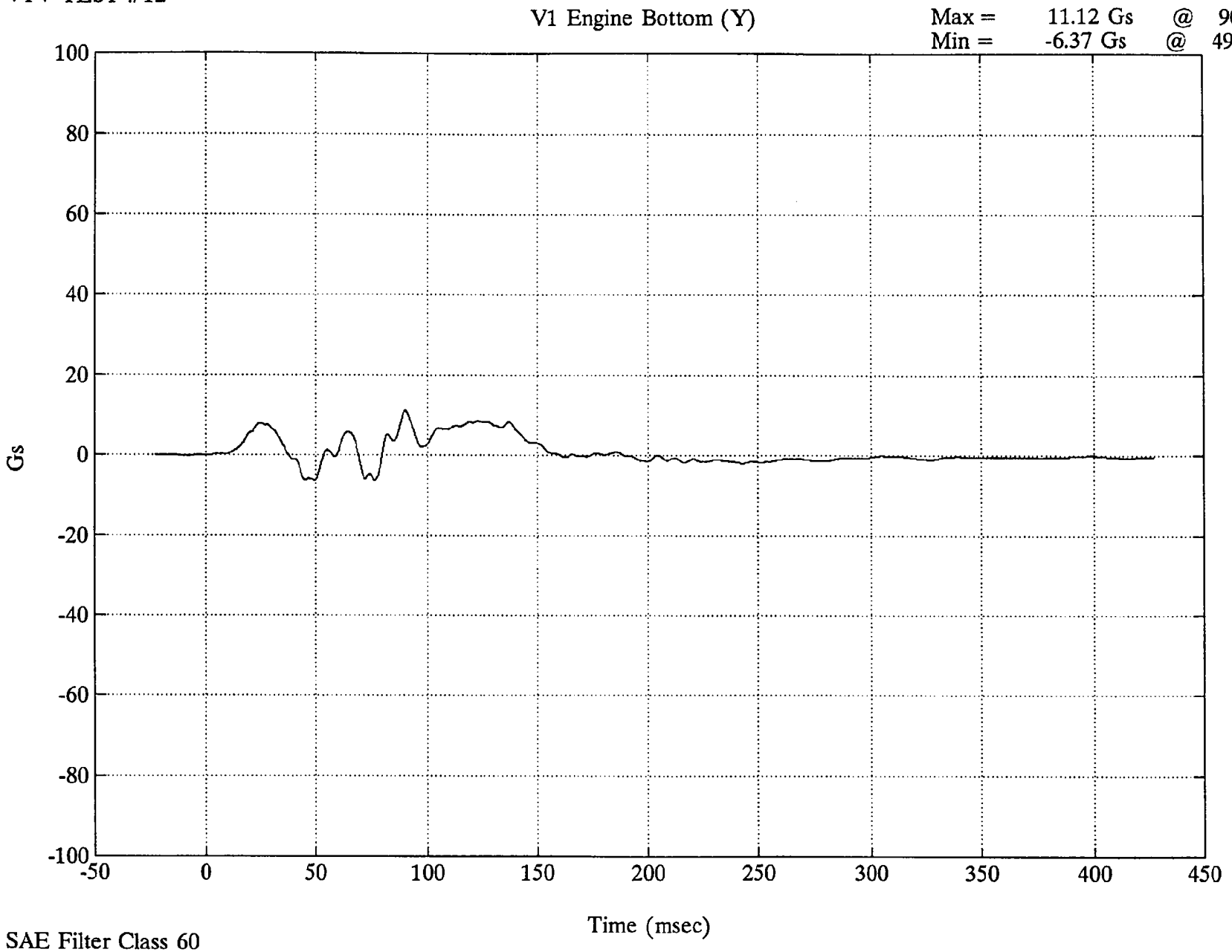
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12

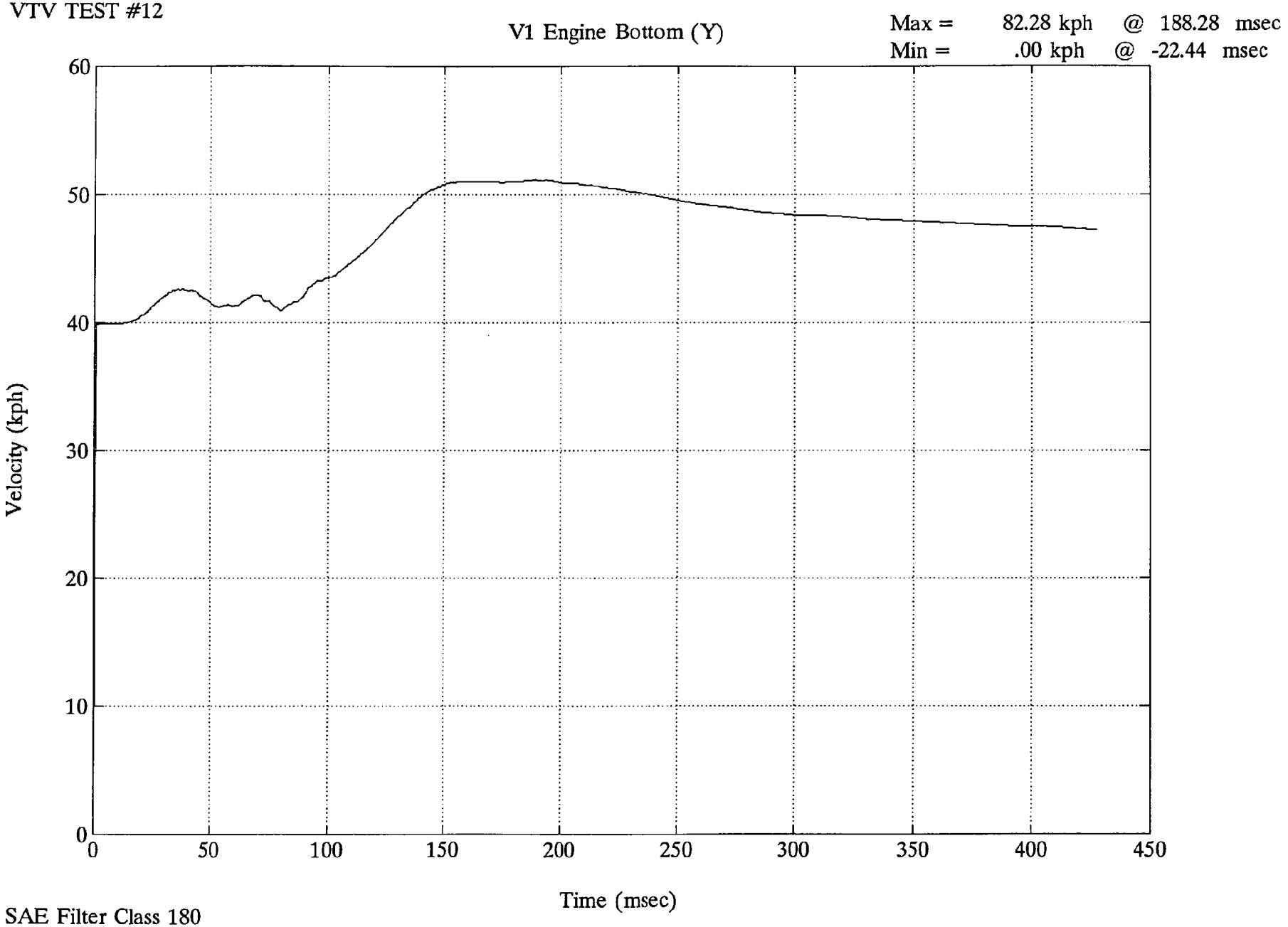


B-63

8118-12

SAE Filter Class 60

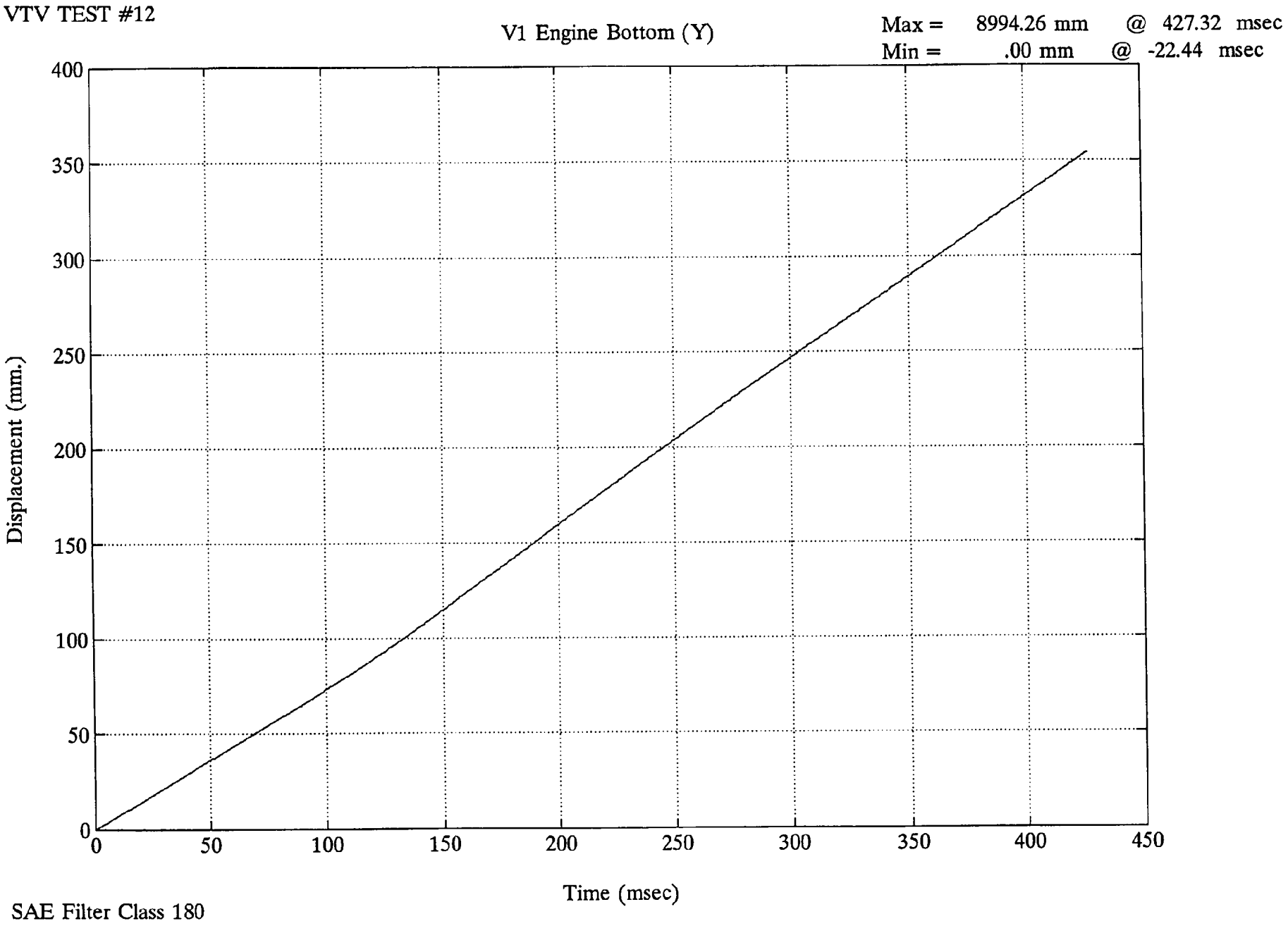
VTV TEST #12



SAE Filter Class 180

8118-12

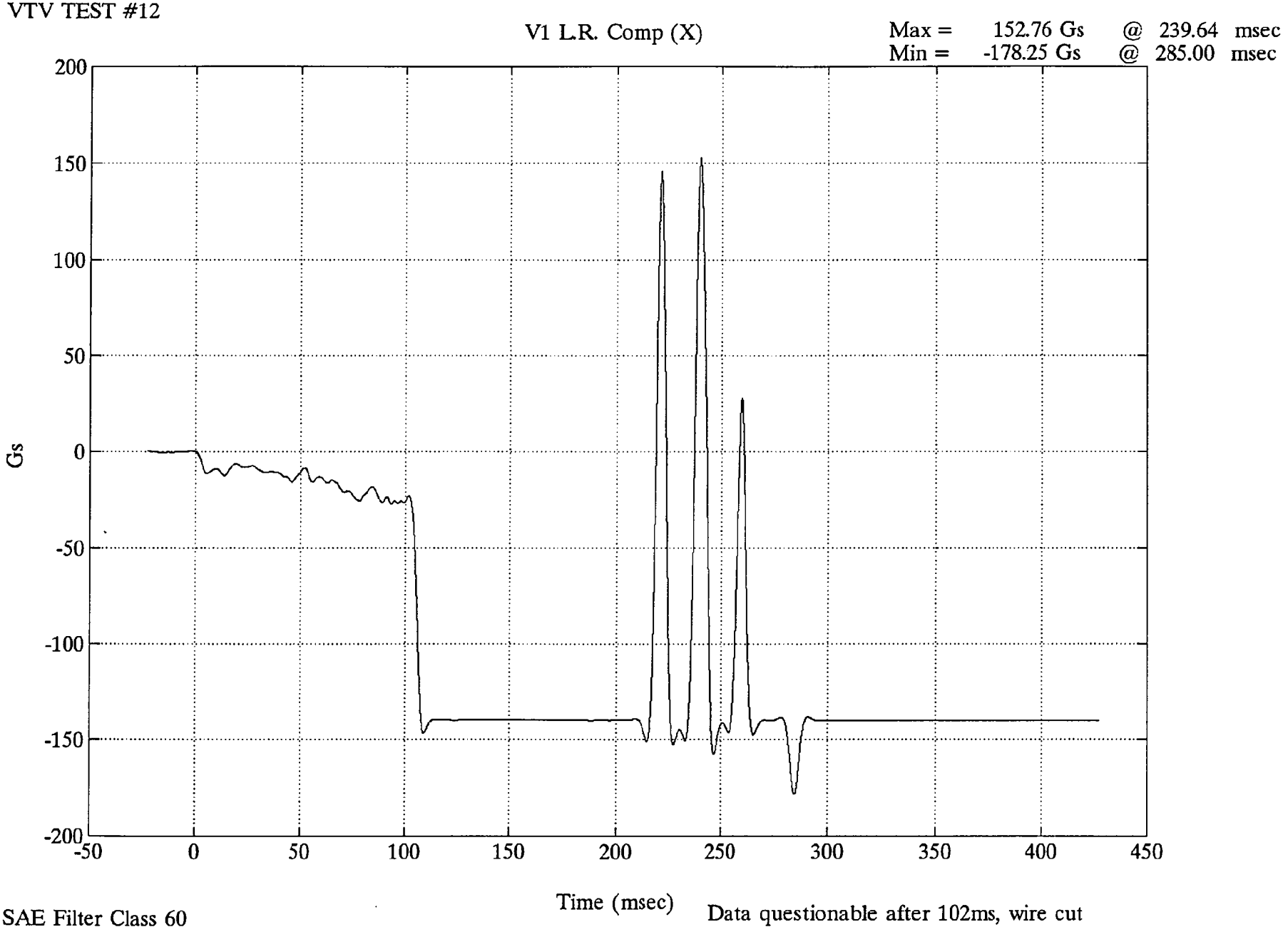
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12



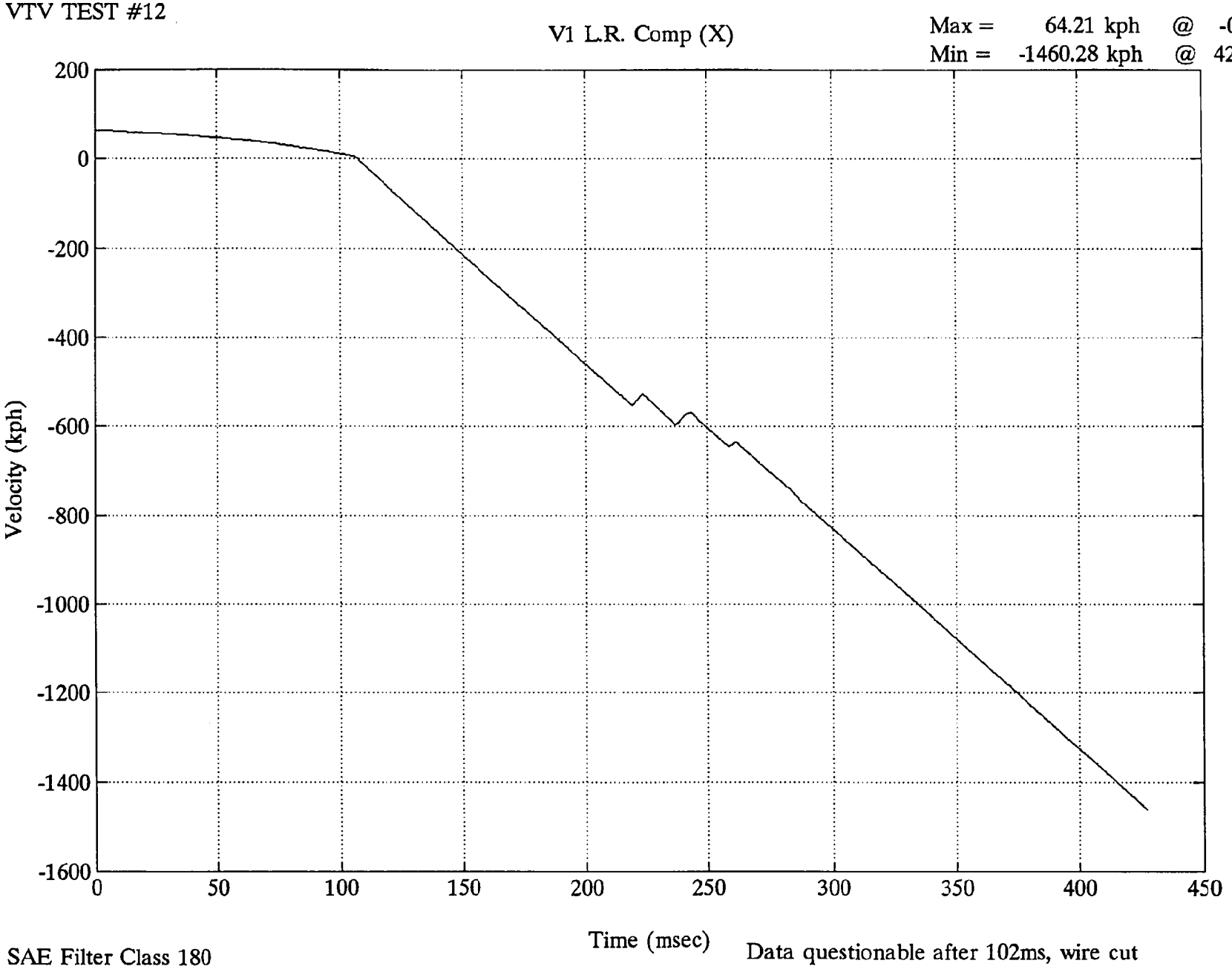
SAE Filter Class 60

Data questionable after 102ms, wire cut

B-66

8118-12

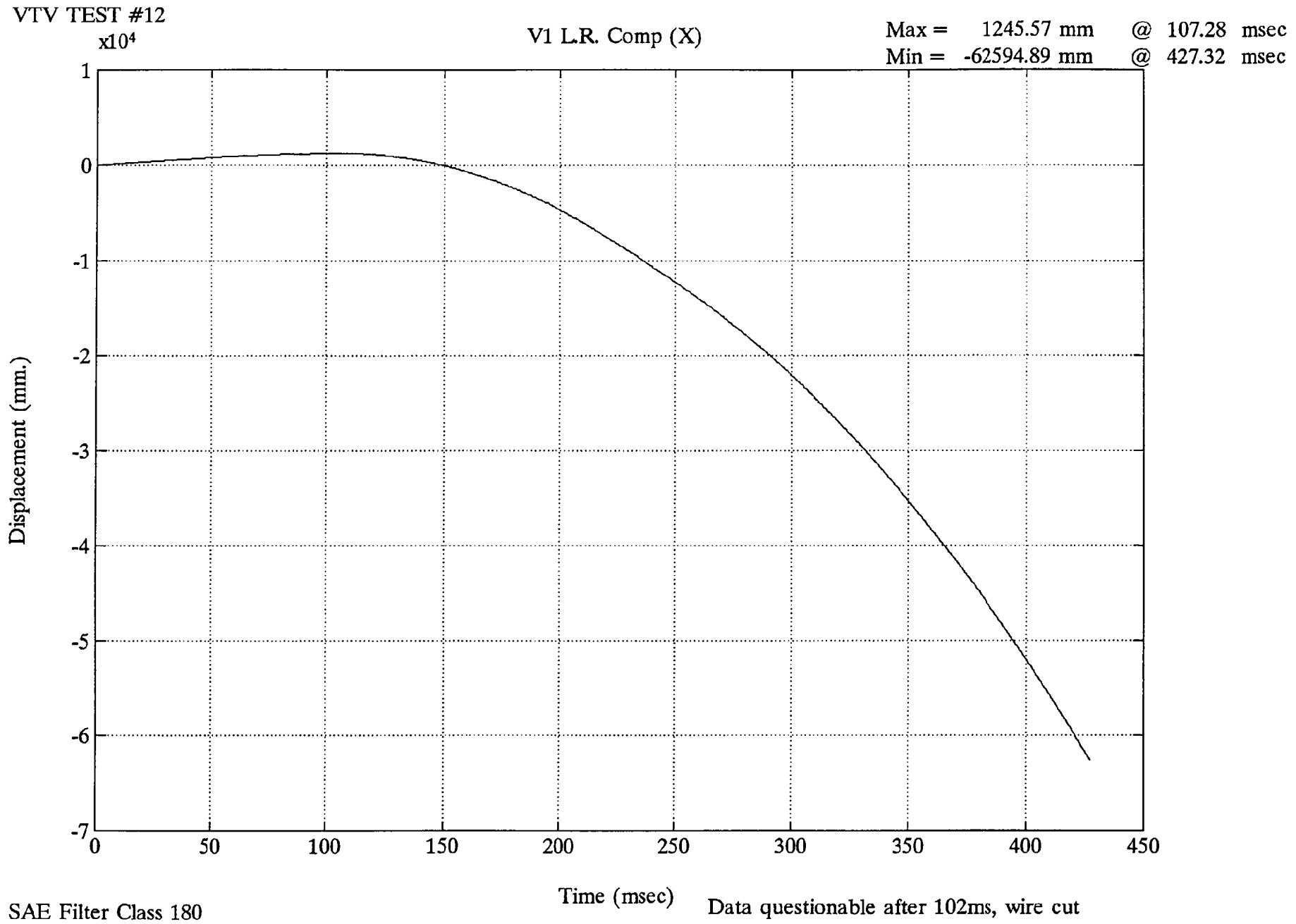
VTV TEST #12



SAE Filter Class 180

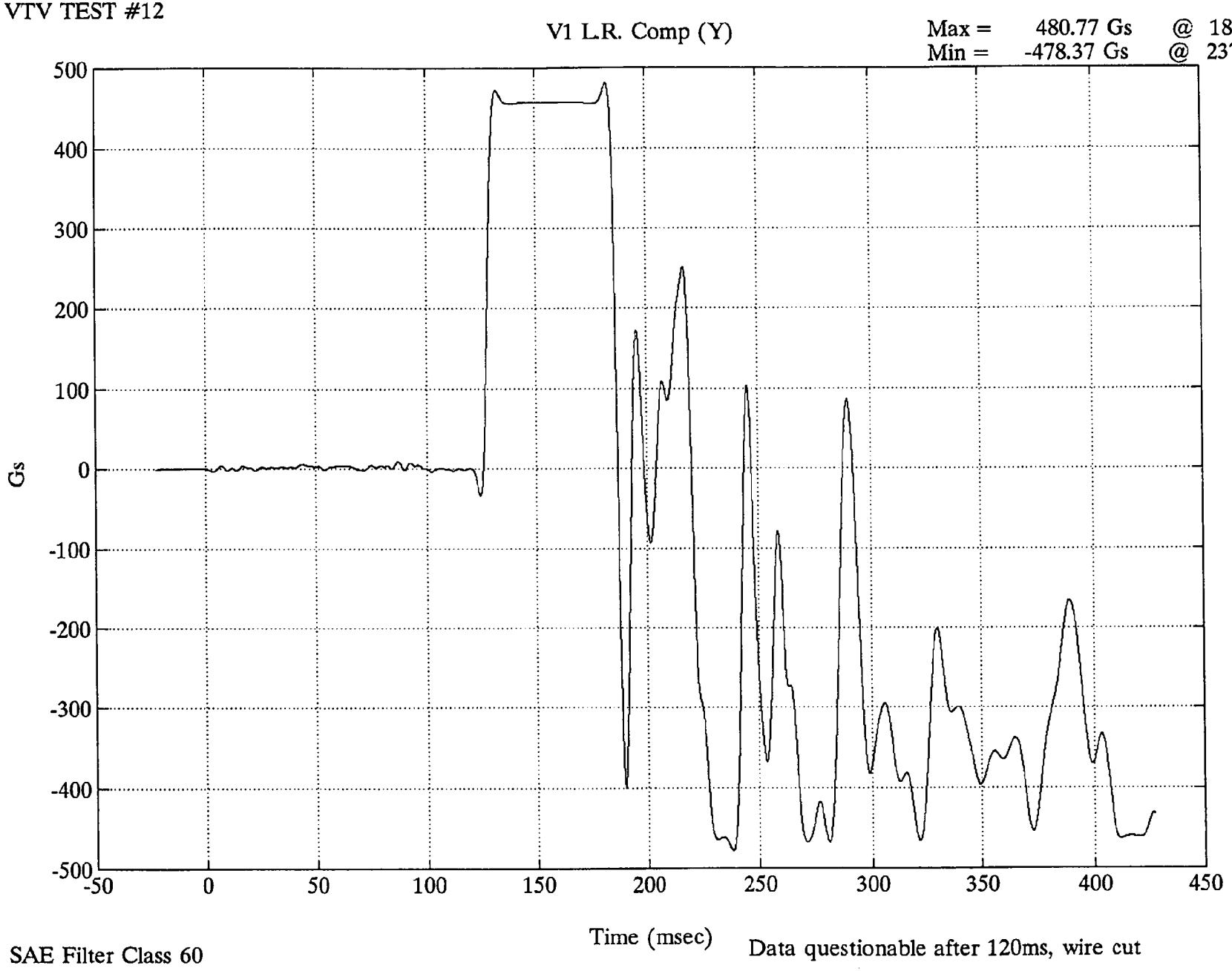
Data questionable after 102ms, wire cut

8118-12


VTV TEST #12
x10⁴
V1 L.R. Comp (X)
Max = 1245.57 mm @ 107.28 msec
Min = -62594.89 mm @ 427.32 msec
Displacement (mm.)
1
0
-1
-2
-3
-4
-5
-6
-7
0
50
100
150
200
250
300
350
400
450
Time (msec)
Data questionable after 102ms, wire cut
SAE Filter Class 180

8118-12

VTV TEST #12



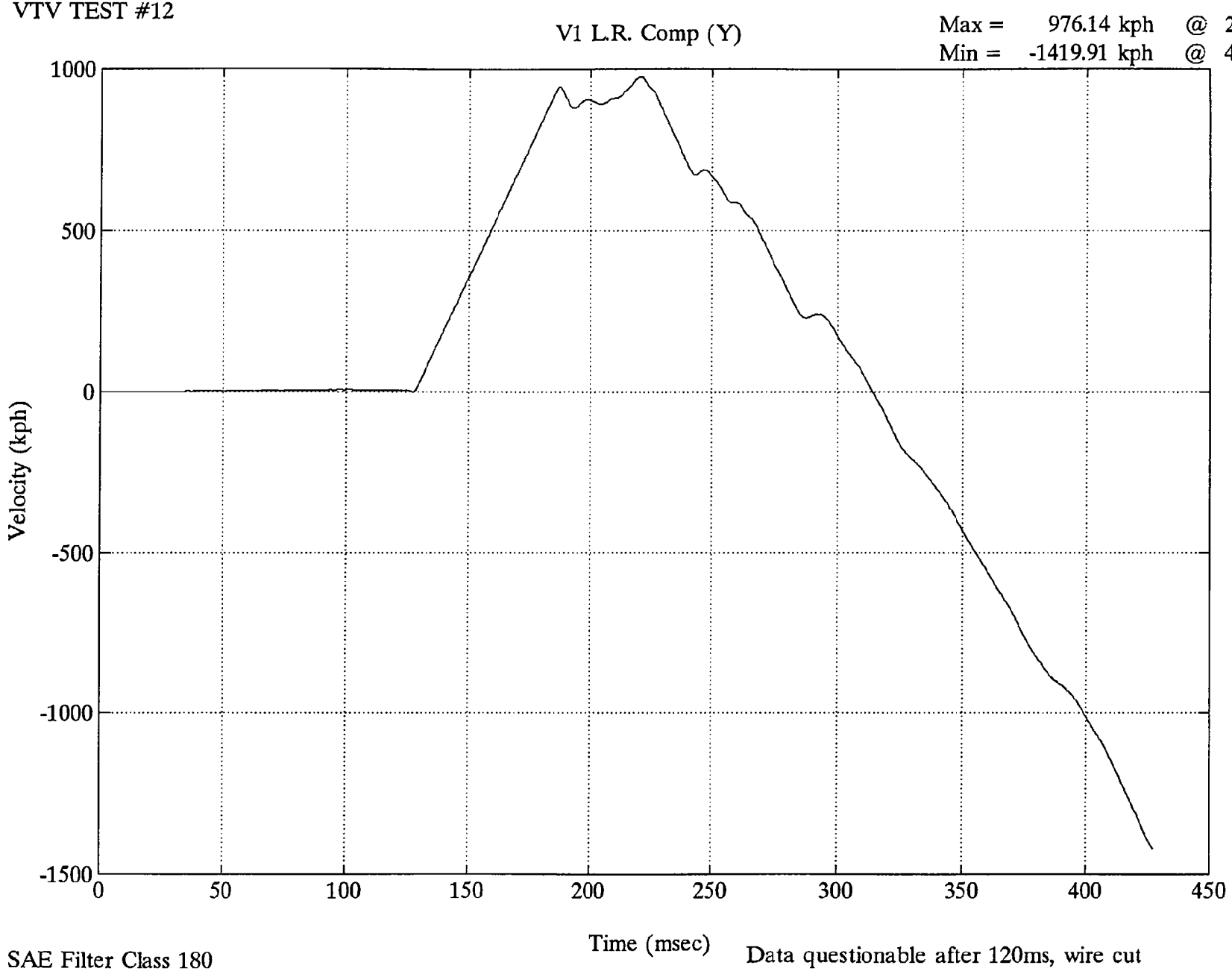
SAE Filter Class 60

Data questionable after 120ms, wire cut

B-69

8118-12

VTV TEST #12

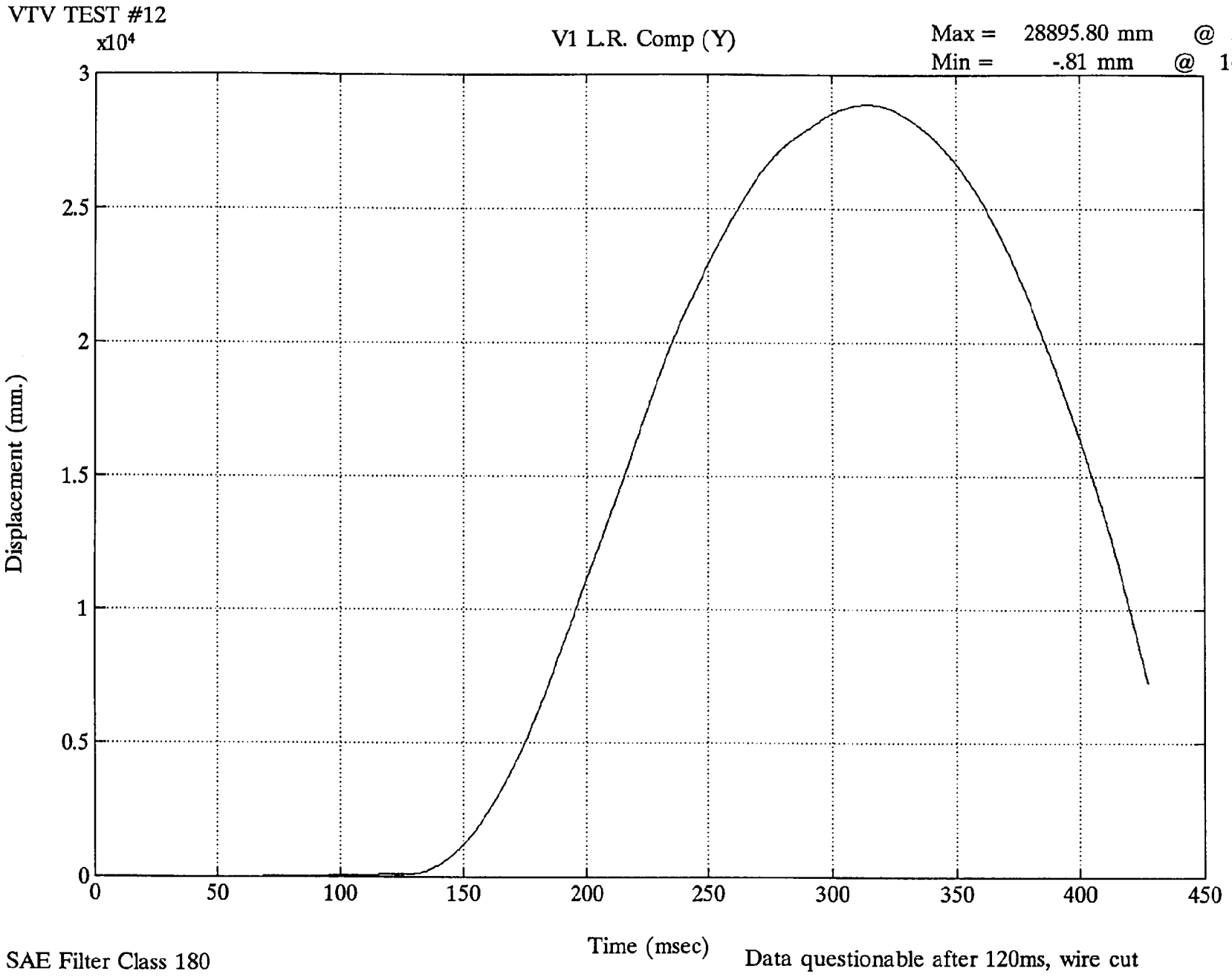


B-70

8118-12

SAE Filter Class 180

Data questionable after 120ms, wire cut

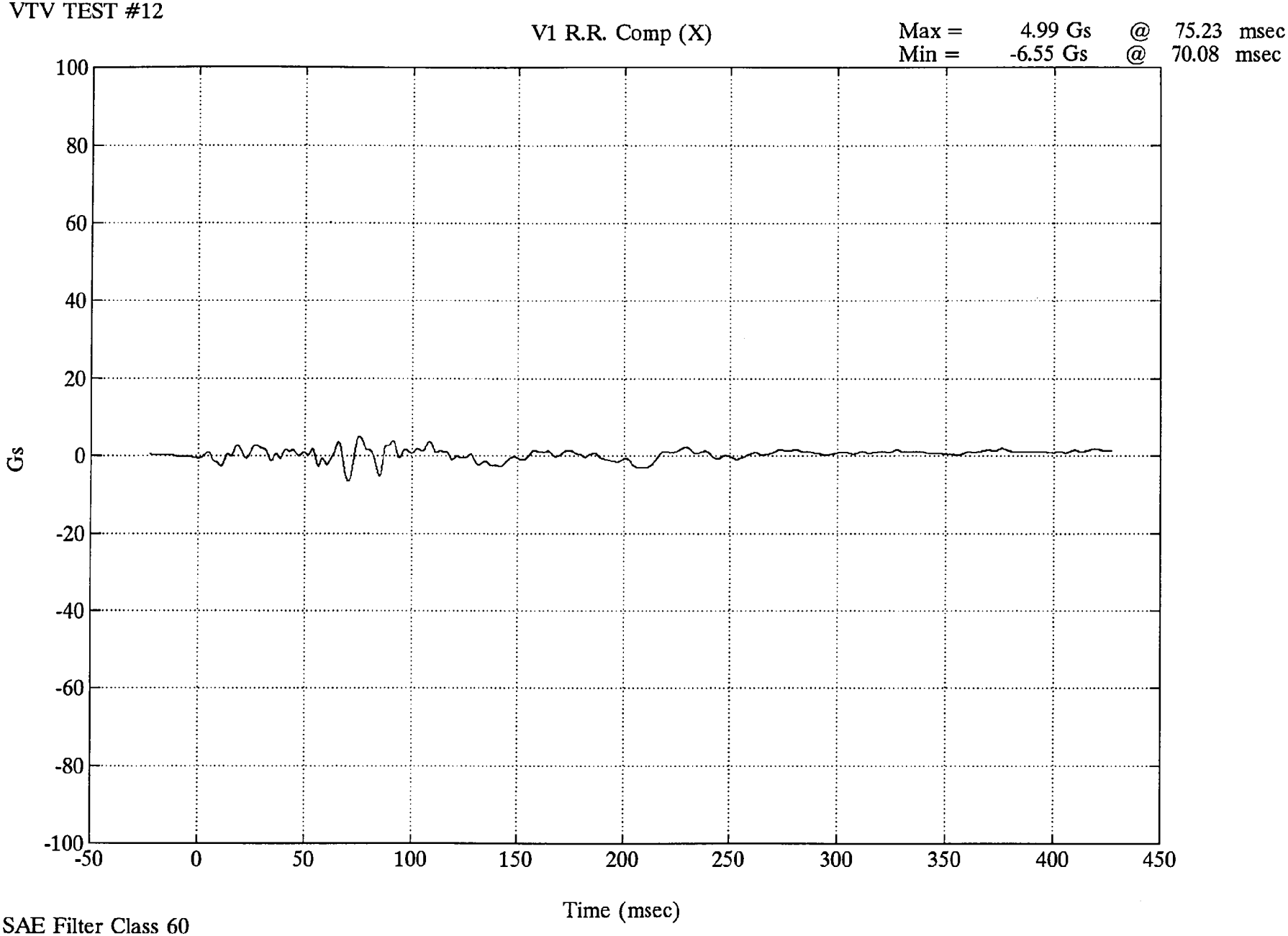


SAE Filter Class 180

Data questionable after 120ms, wire cut

8118-12

VTV TEST #12

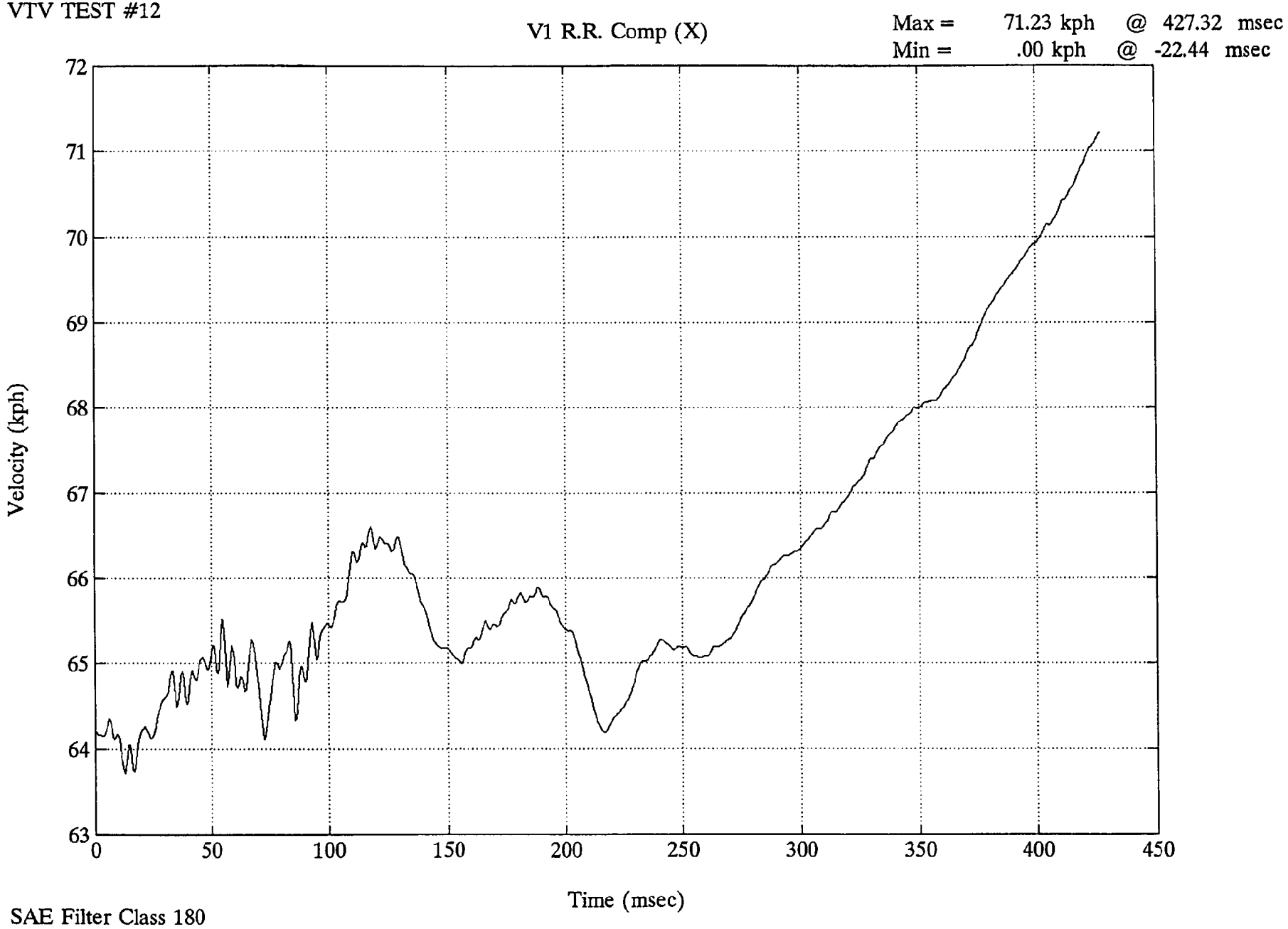


B-72

8118-12

SAE Filter Class 60

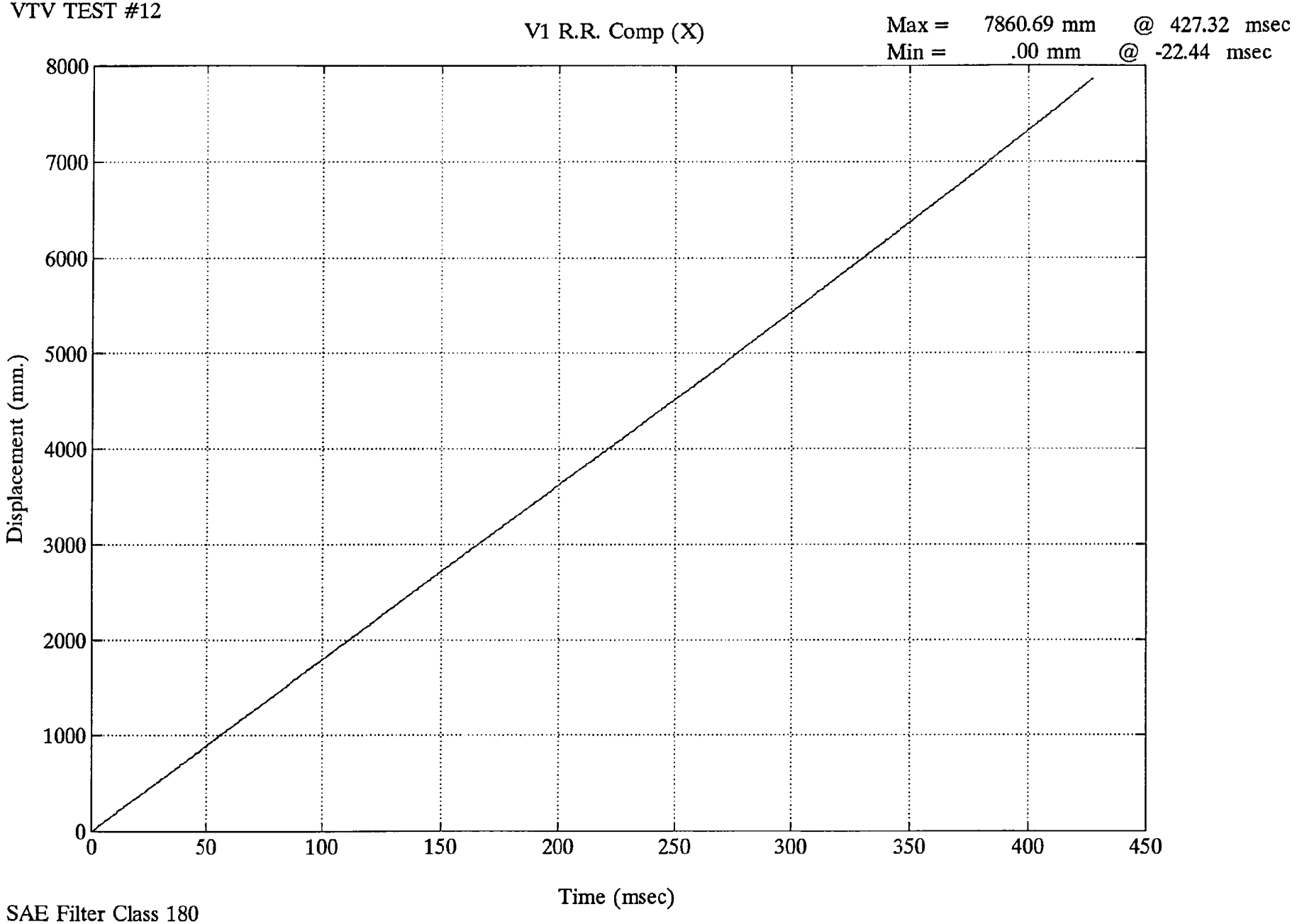
VTV TEST #12



SAE Filter Class 180

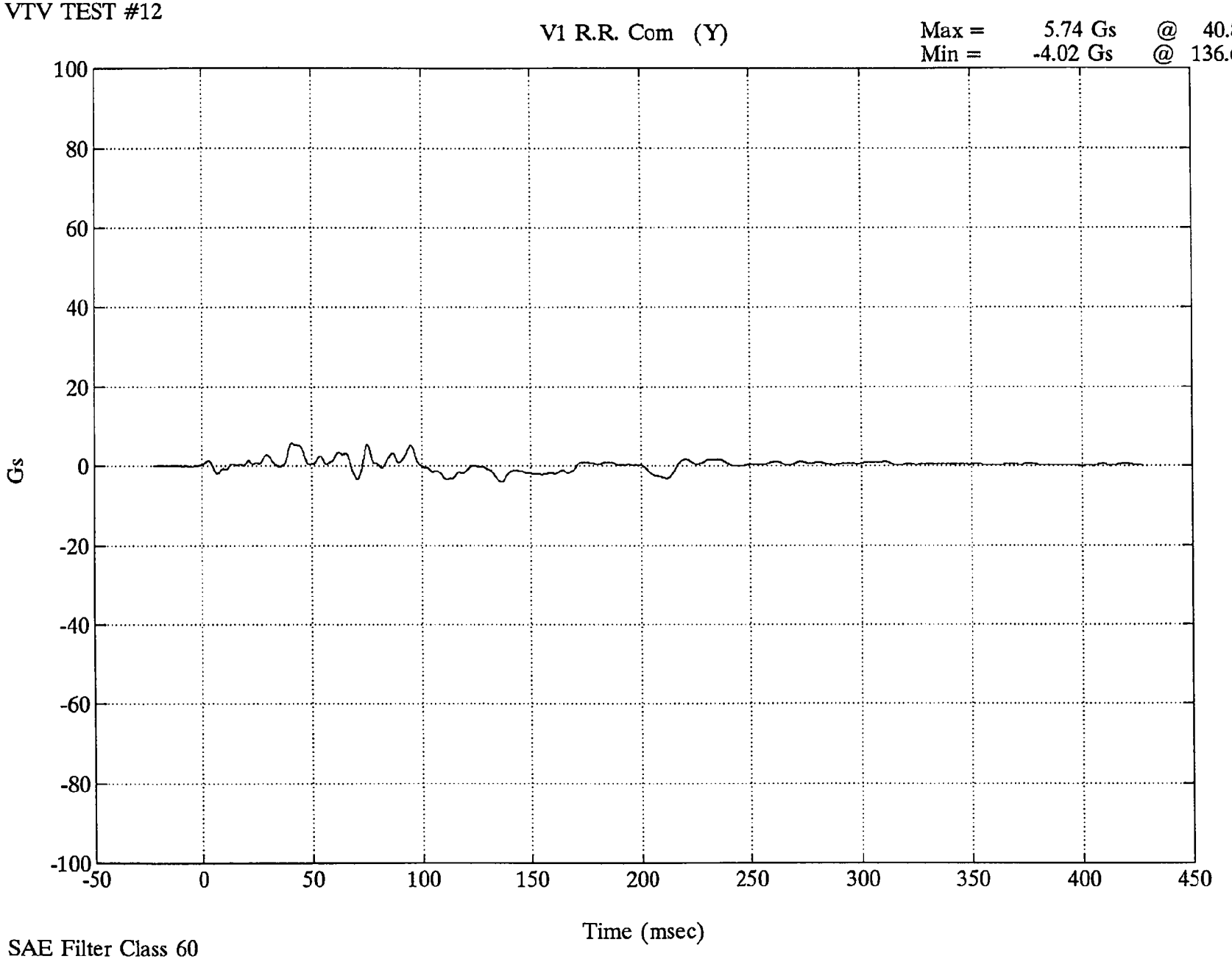
8118-12

VTV TEST #12



SAE Filter Class 180

VTV TEST #12

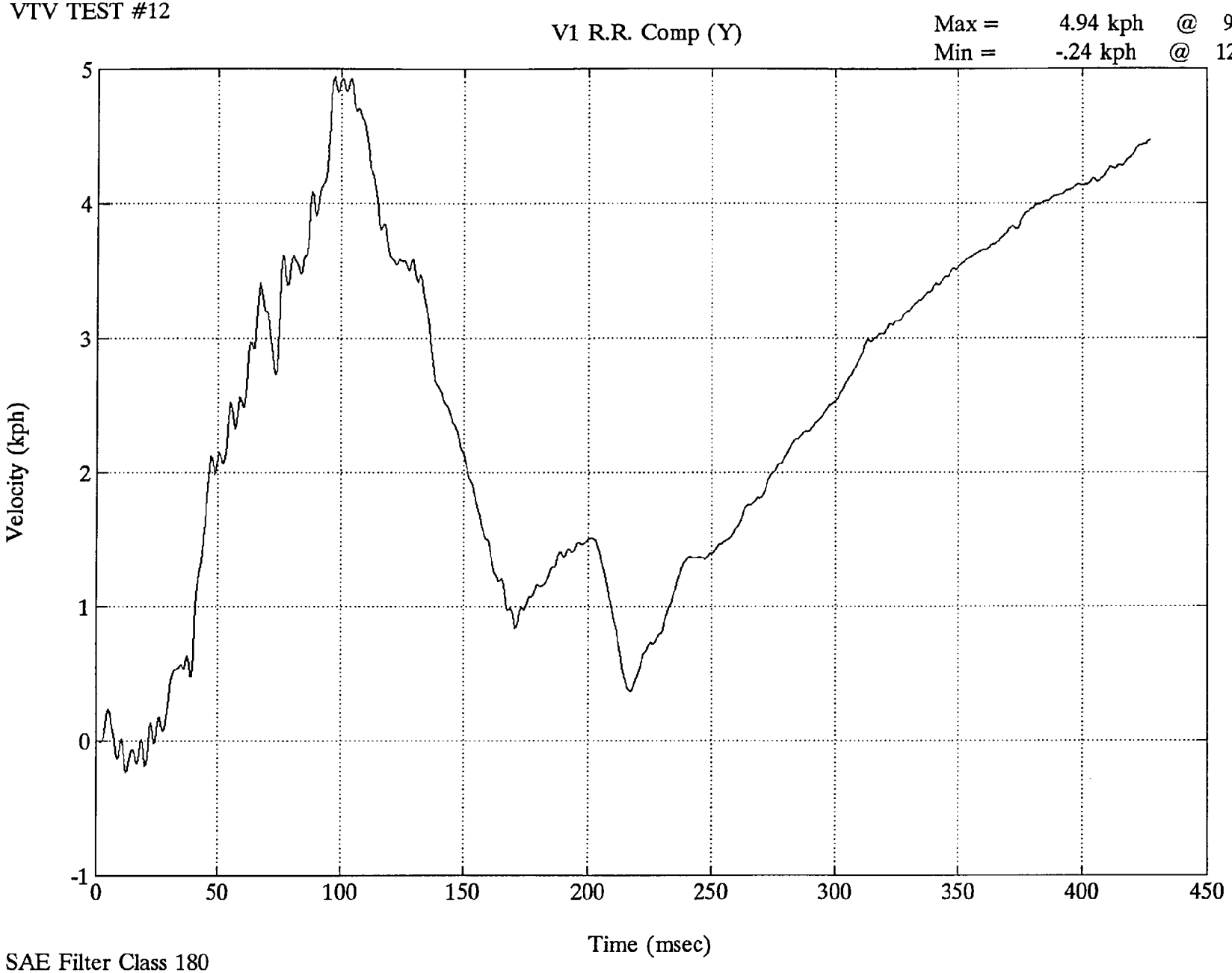


B-75

8118-12

SAE Filter Class 60

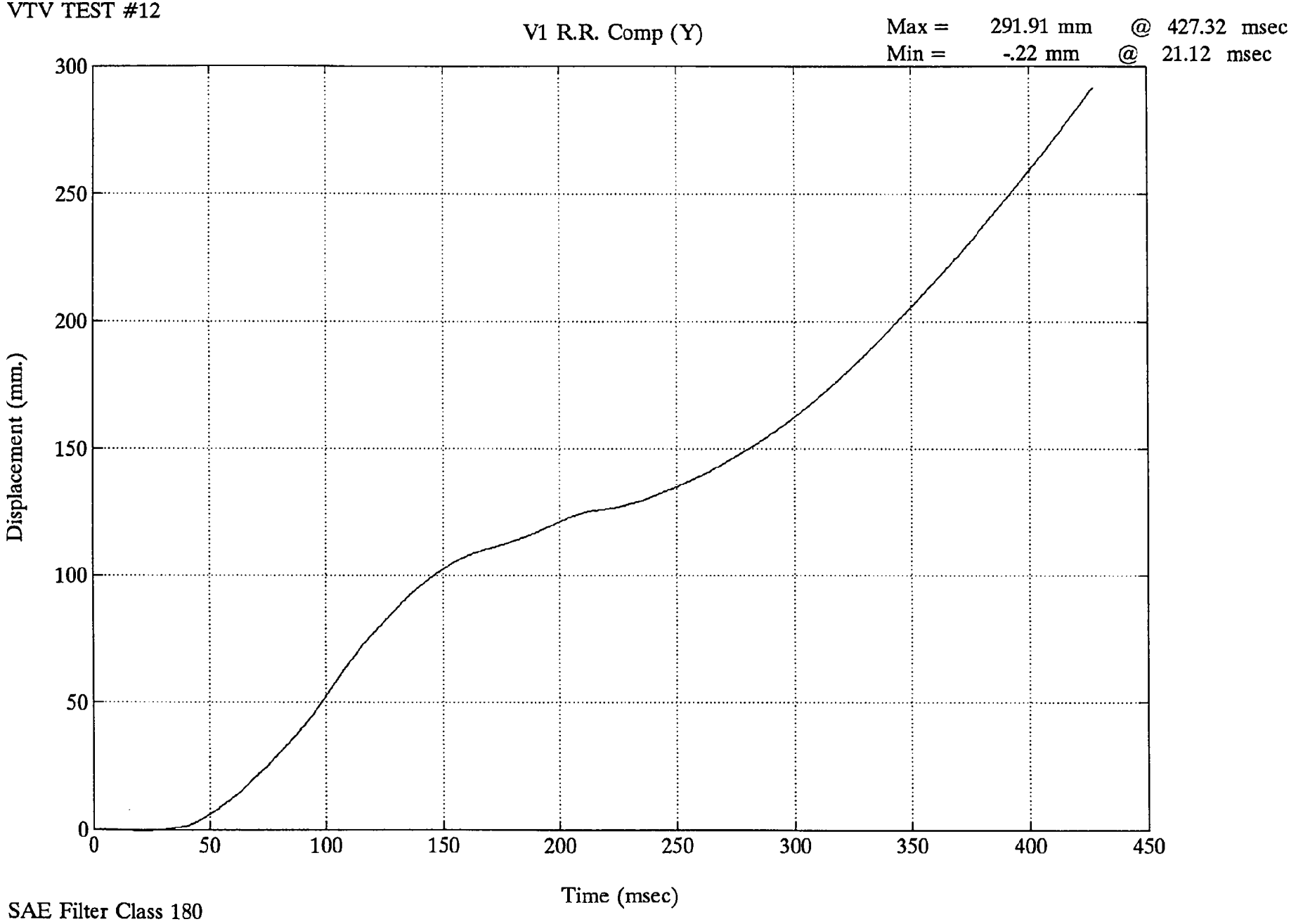
VTV TEST #12



SAE Filter Class 180

8118-12

VTV TEST #12



SAE Filter Class 180

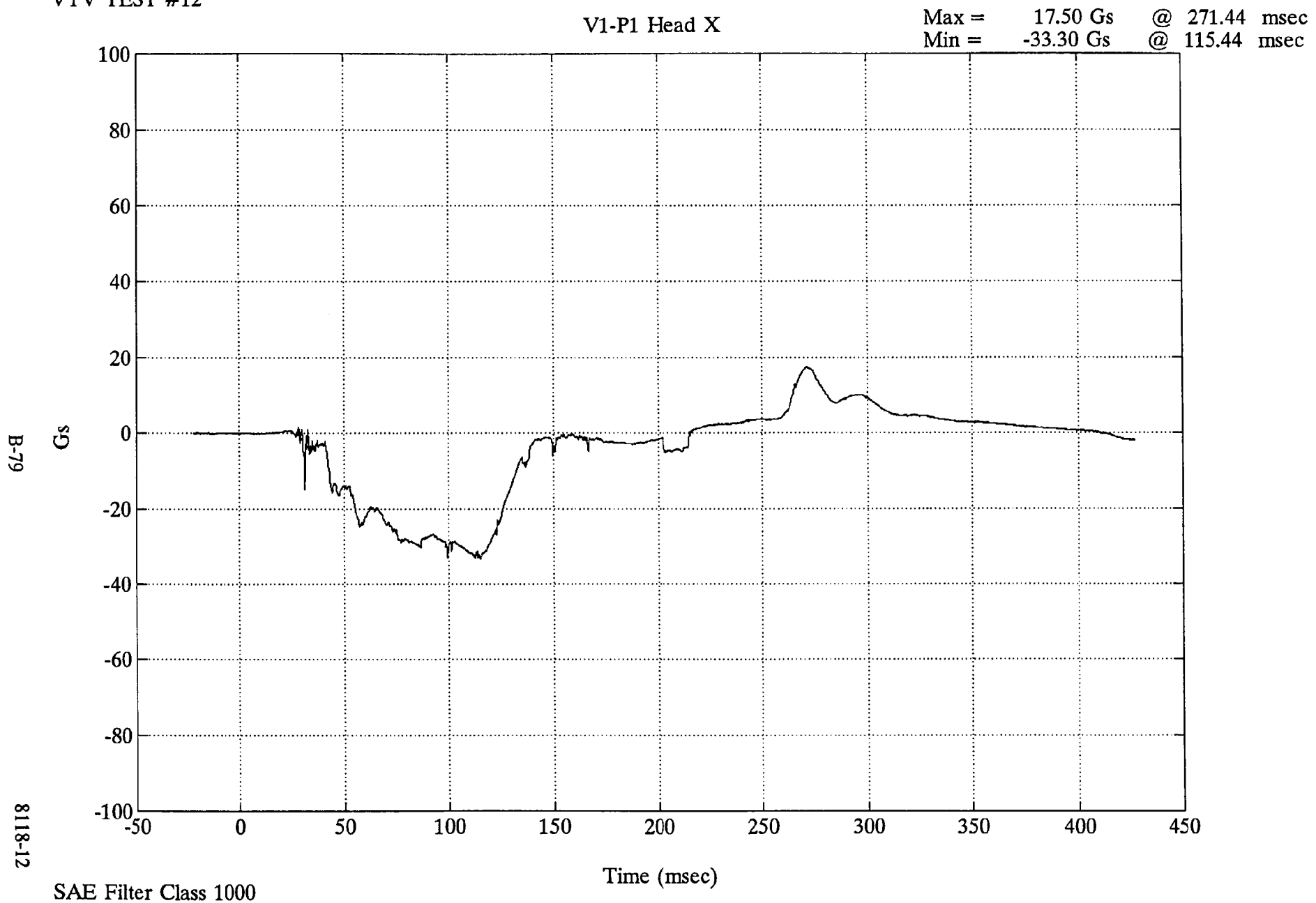
8118-12

TEST NO. Y49-12-1457

DUMMY DATA

CHANNEL	SAE FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600
Torso Belt	60
Chest Displacement	180
Neck Forces	1000
Neck Moments	600
Tibia Forces, Moments	600

VTV TEST #12

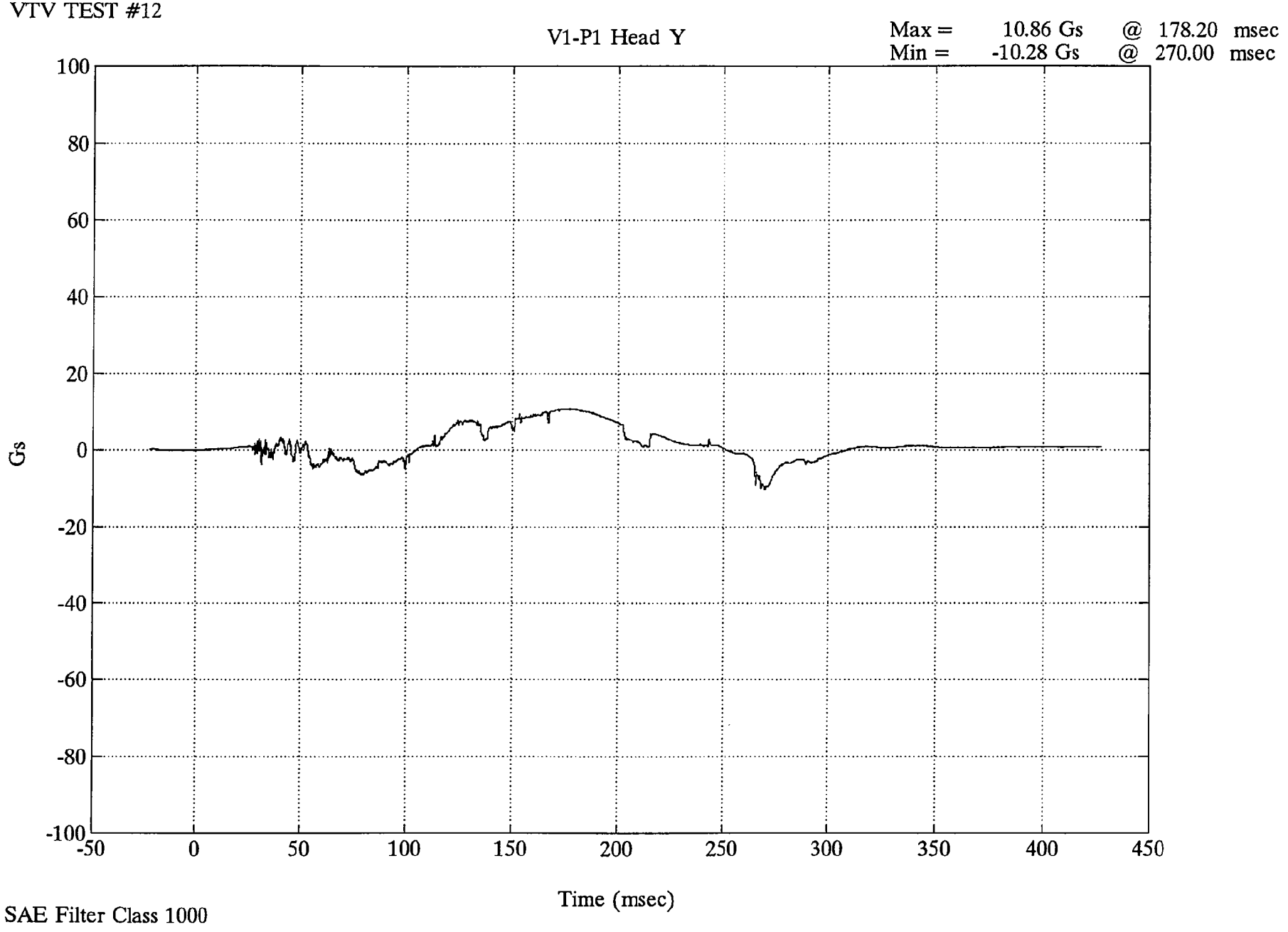


B-79

8118-12

SAE Filter Class 1000

VTV TEST #12

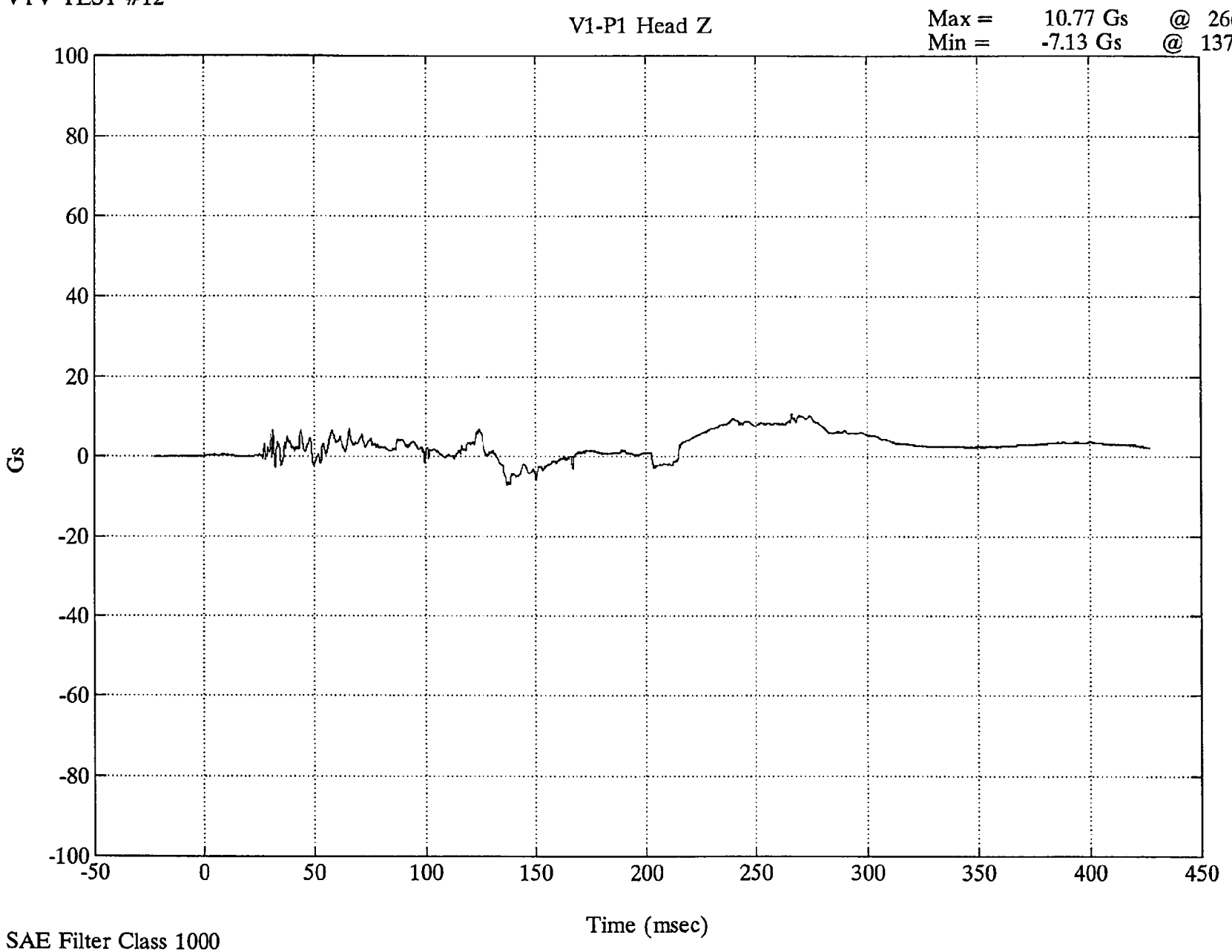


B-80

8118-12

SAE Filter Class 1000

VTV TEST #12



B-81

8118-12

SAE Filter Class 1000

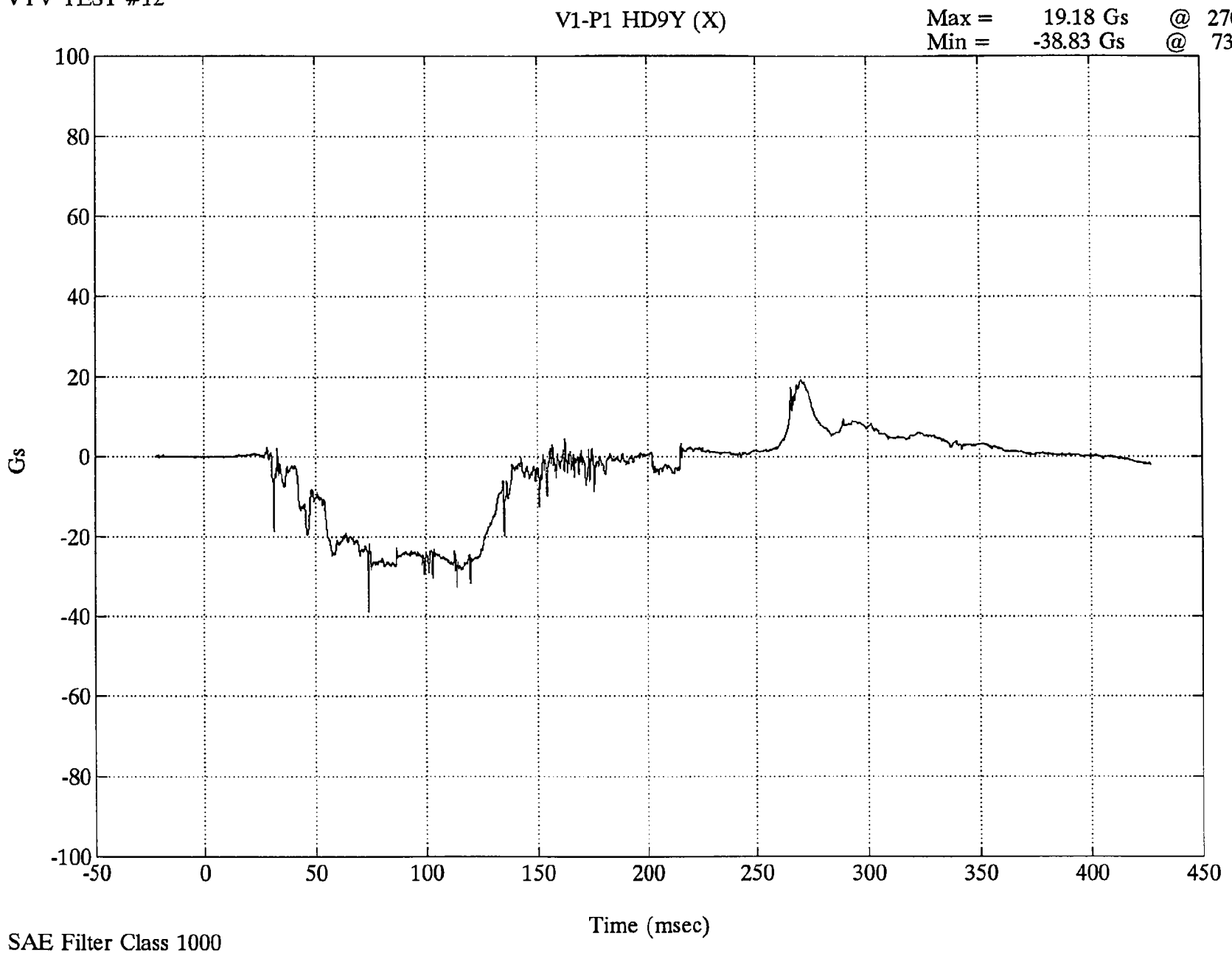
VTV TEST #12

SAE Filter Class 1000

B-82

8118-12

VTV TEST #12

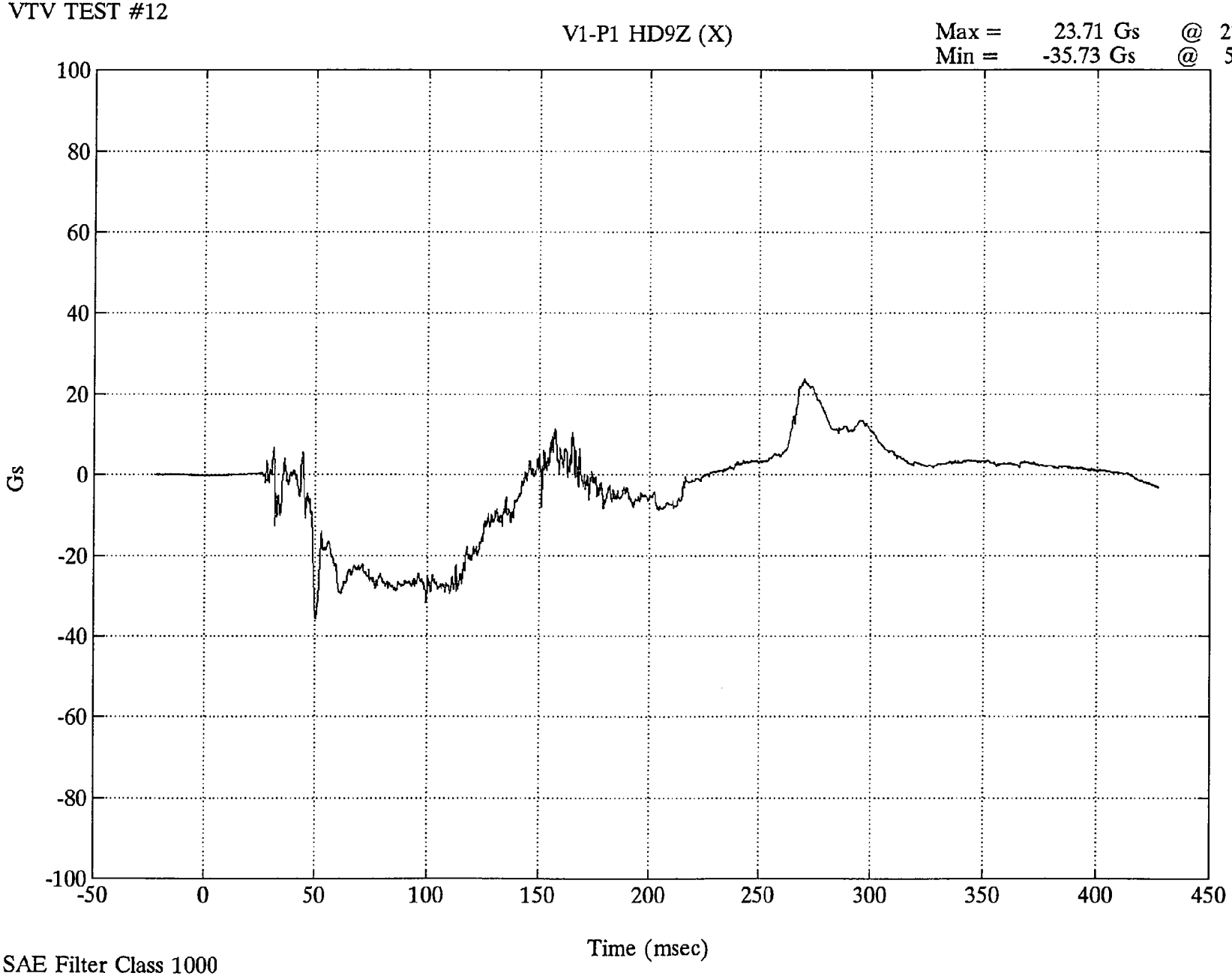


B-83

8118-12

SAE Filter Class 1000

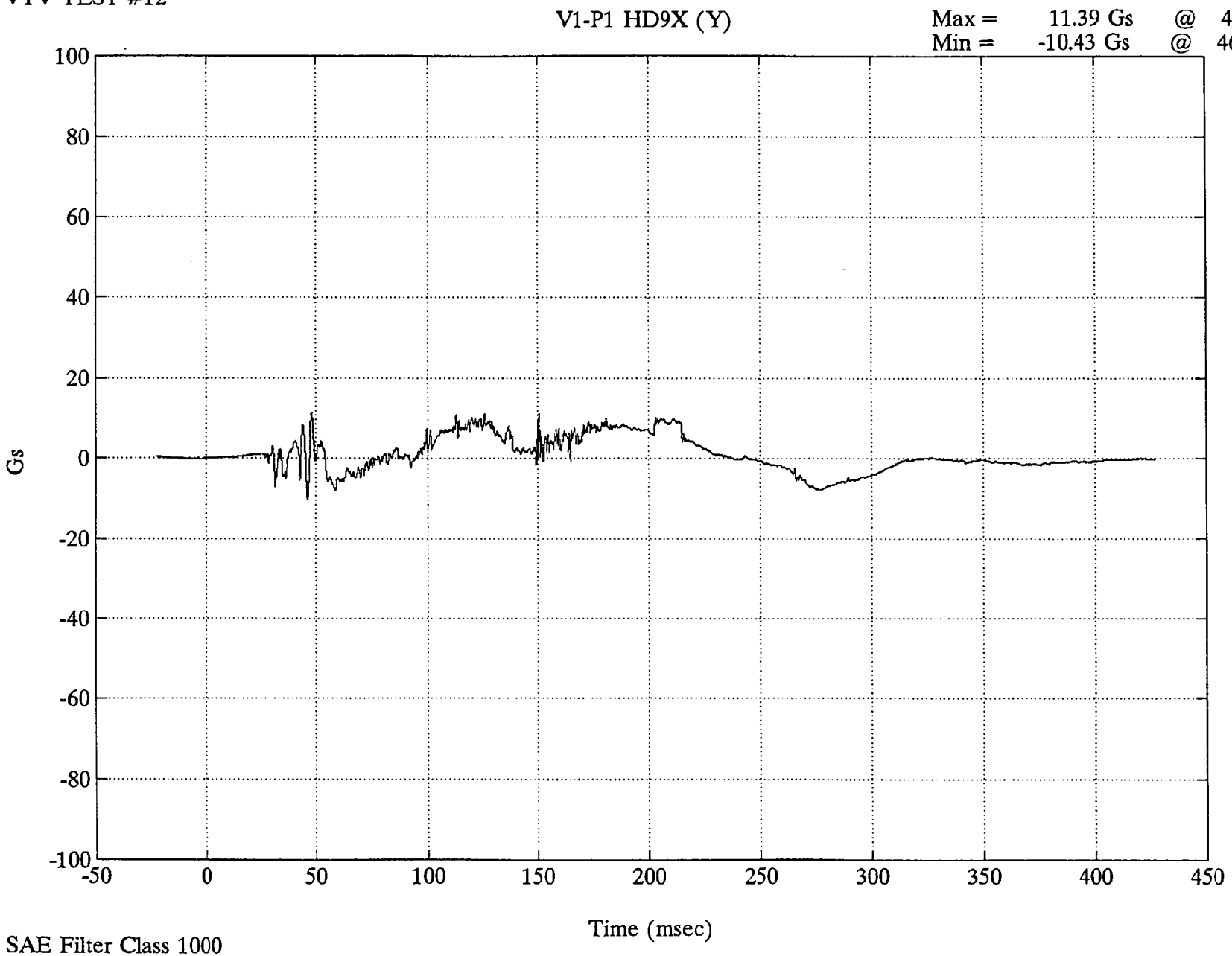
VTV TEST #12



SAE Filter Class 1000

8118-12

VTV TEST #12

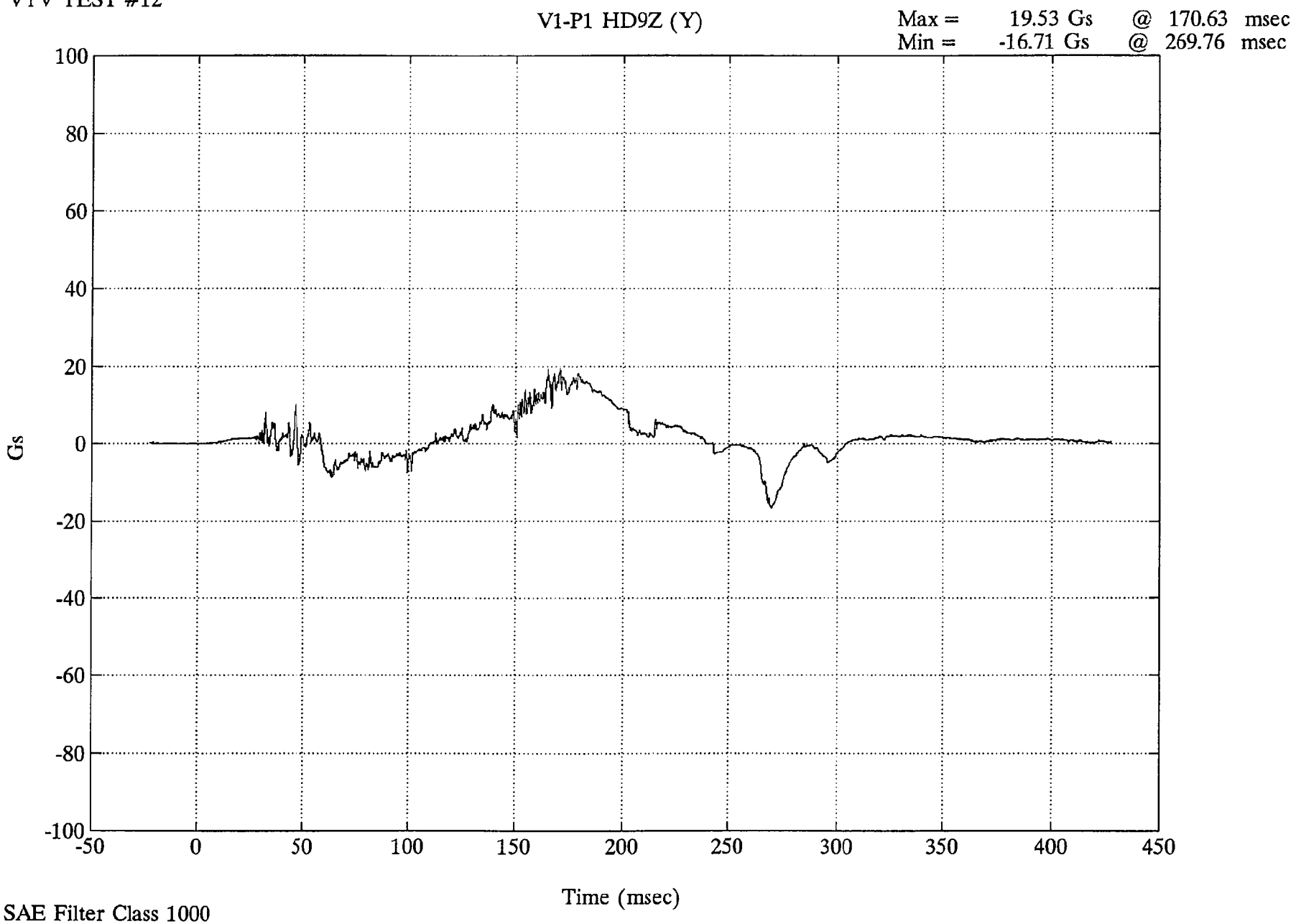


B-85

8118-12

SAE Filter Class 1000

VTV TEST #12

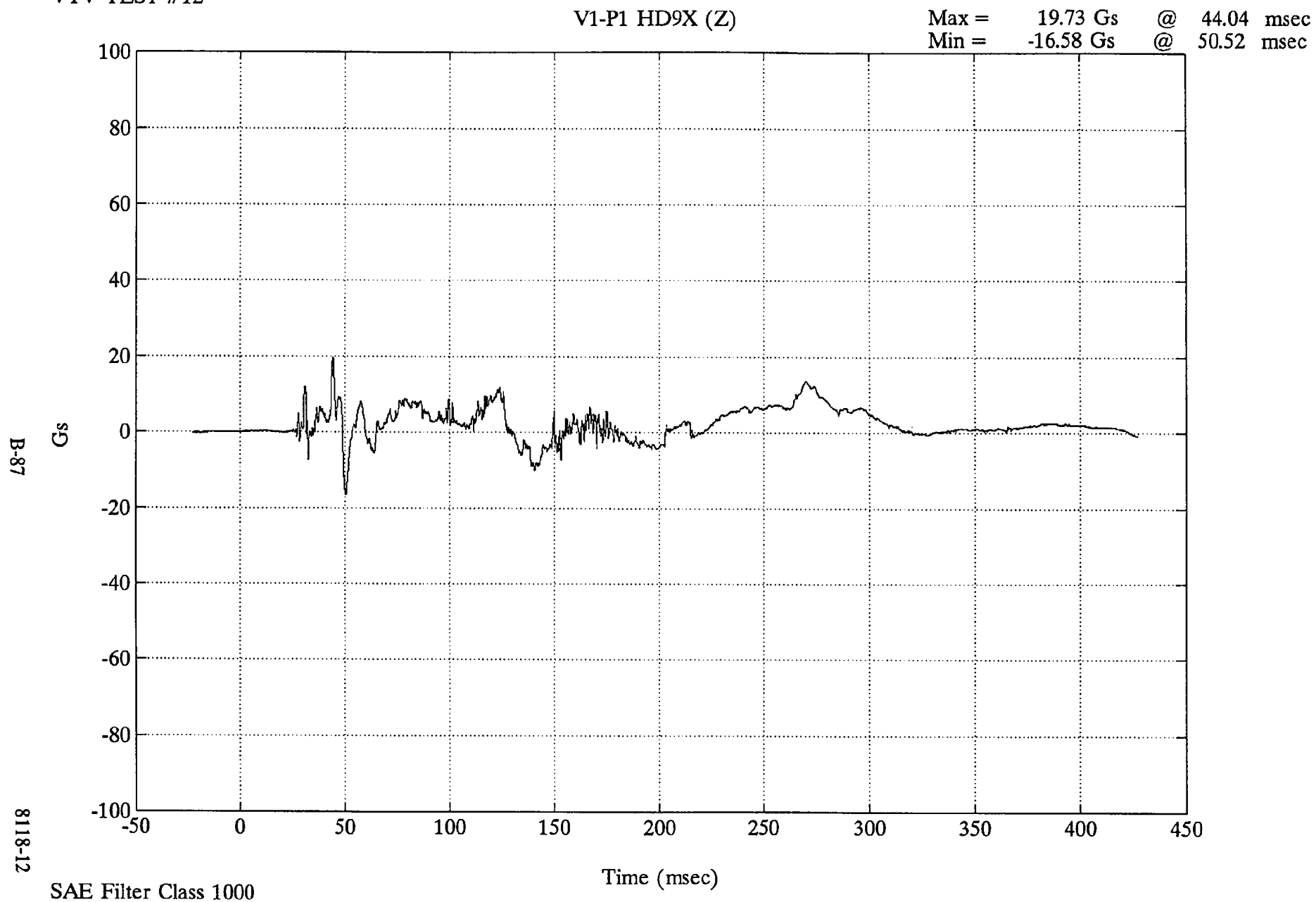


B-86

8118-12

SAE Filter Class 1000

VTV TEST #12

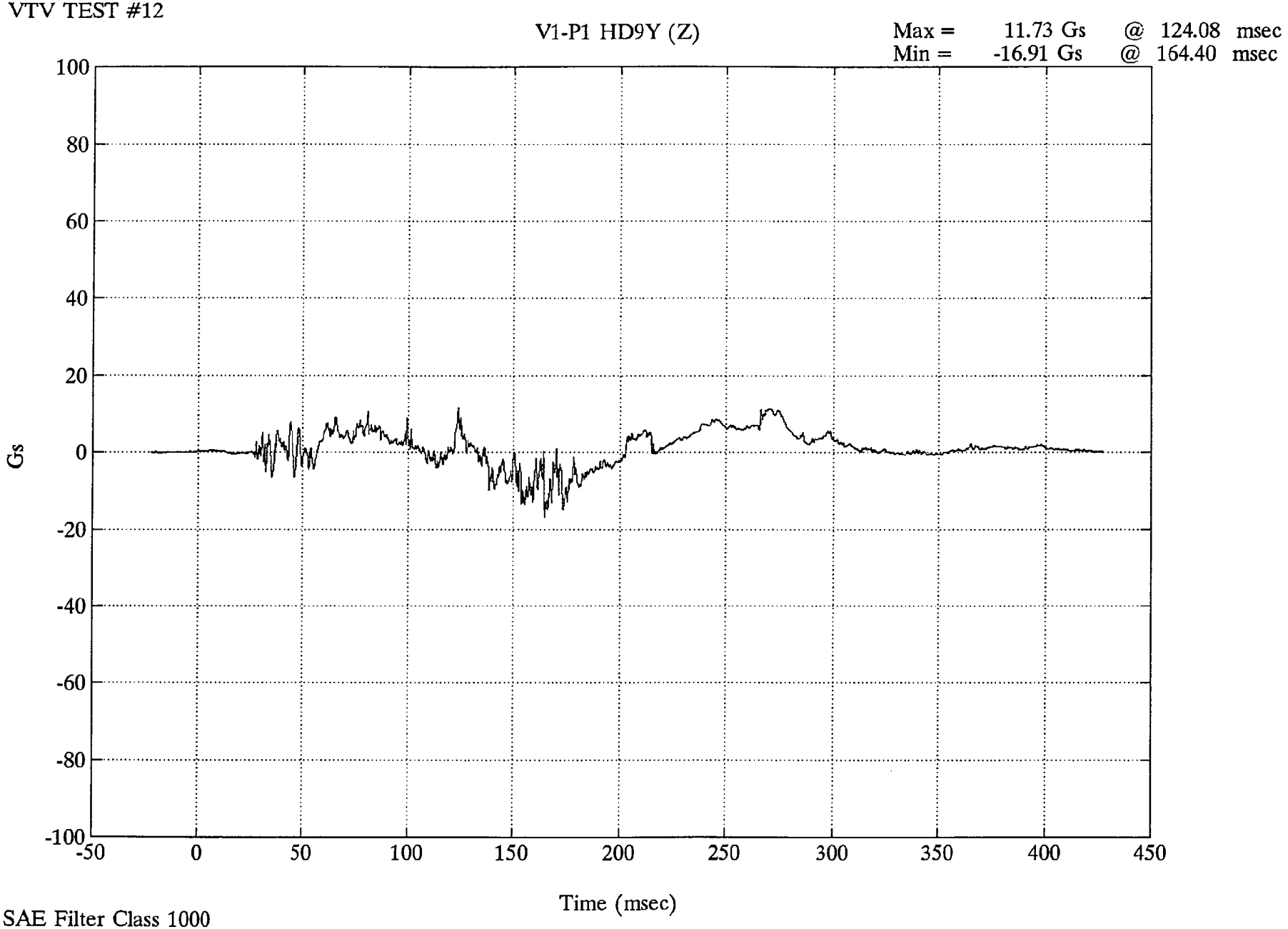


B-87

8118-12

SAE Filter Class 1000

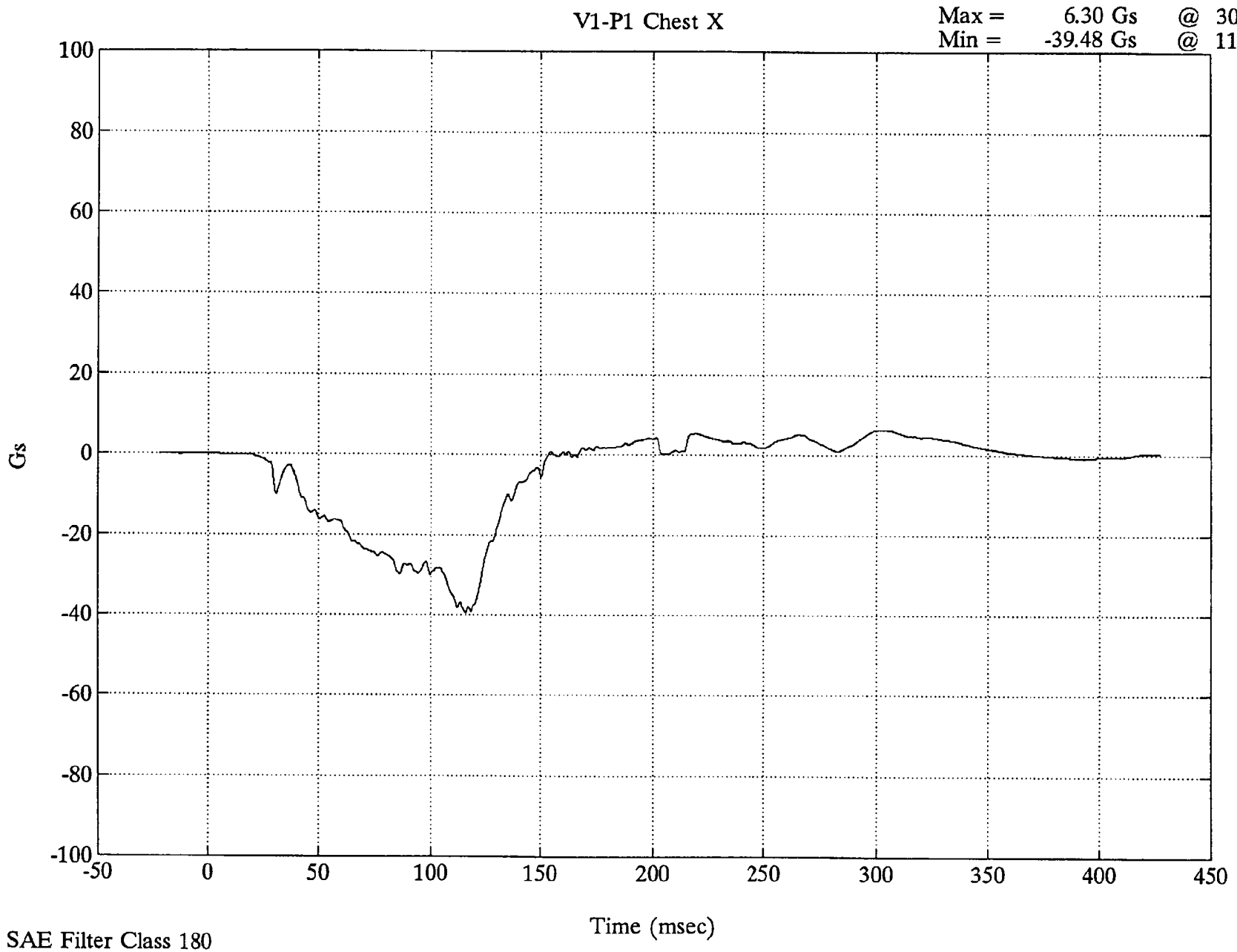
VTV TEST #12



SAE Filter Class 1000

8118-12

VTV TEST #12

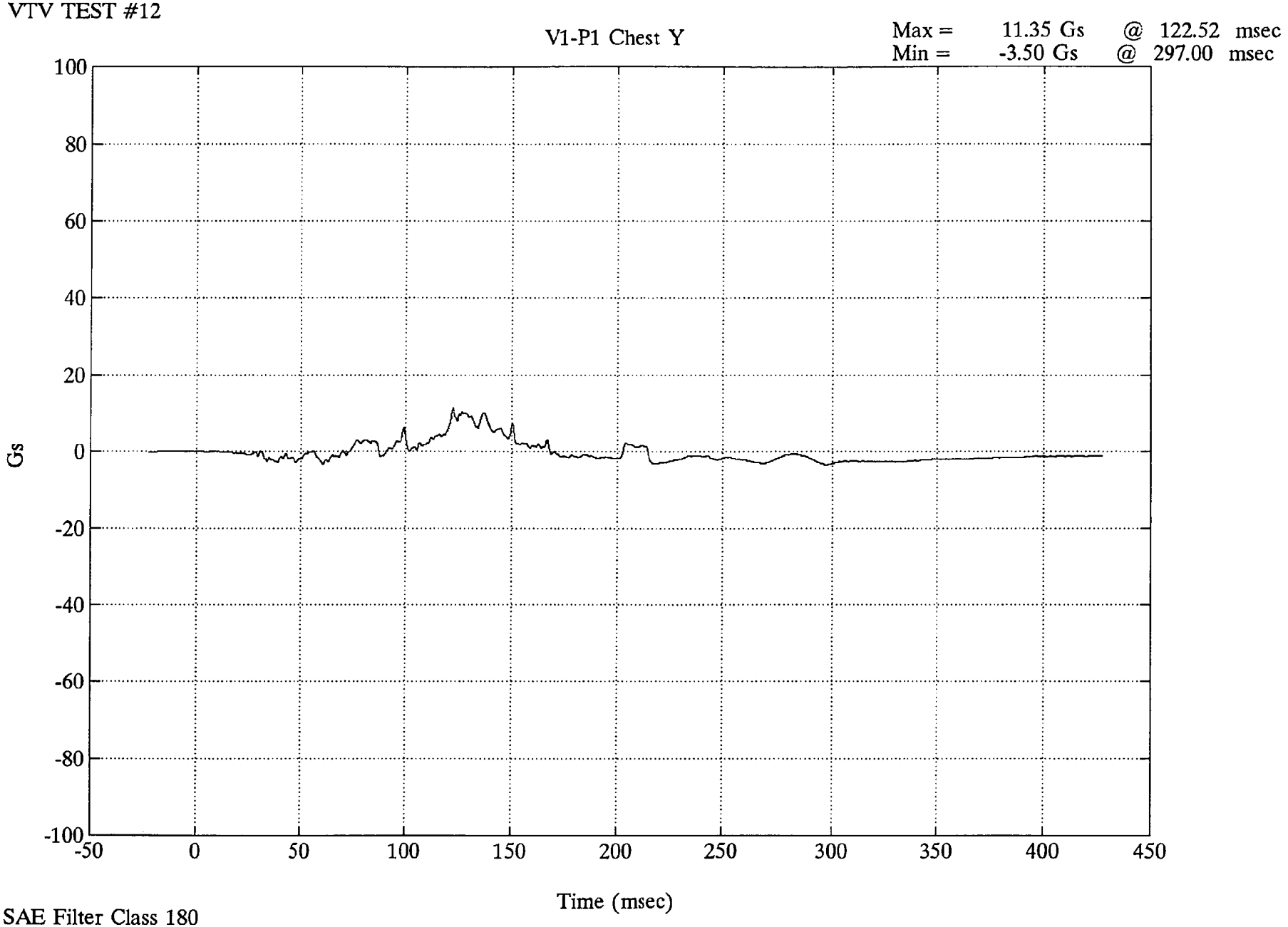


B-89

8118-12

SAE Filter Class 180

VTV TEST #12

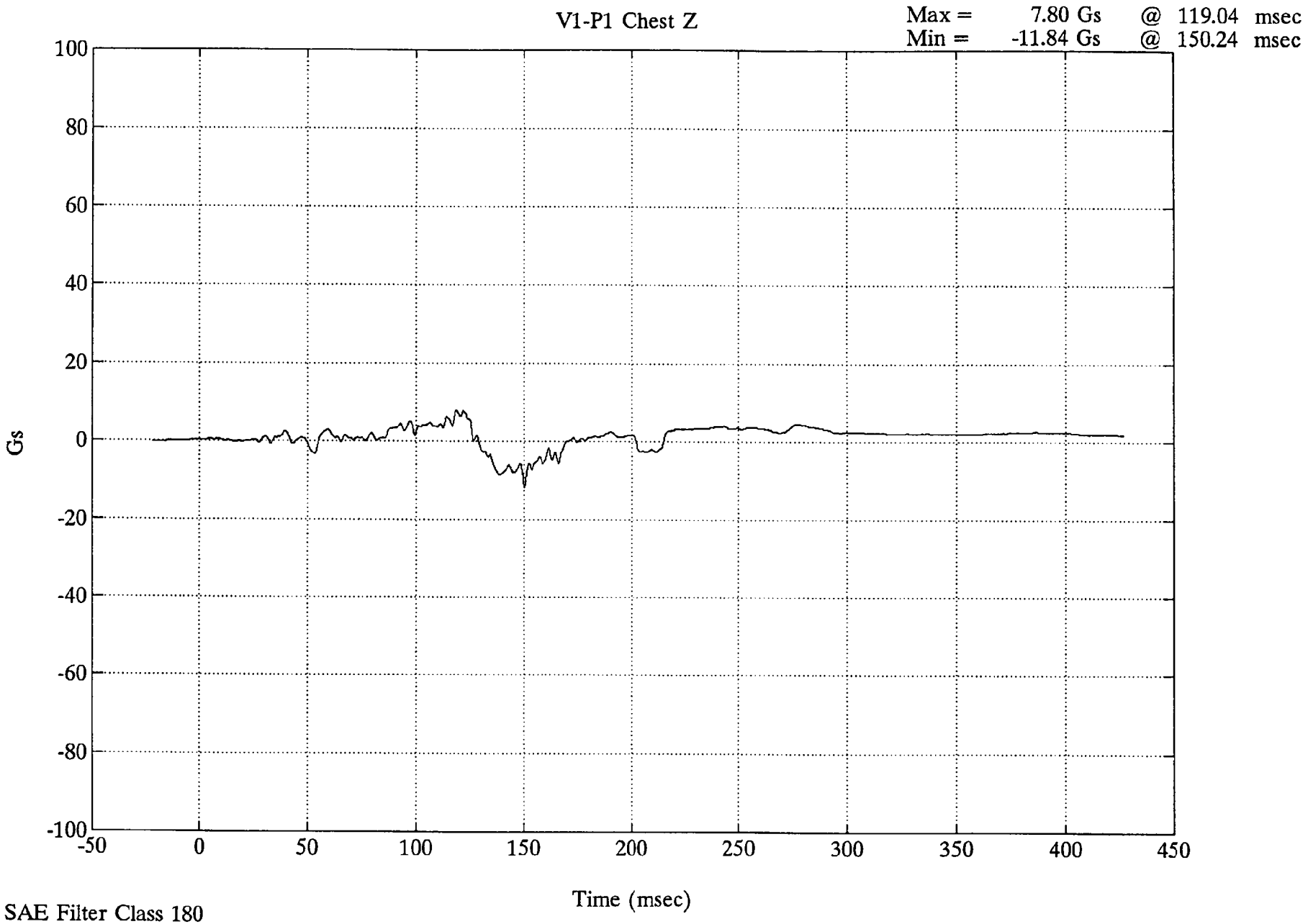


B-90

8118-12

SAE Filter Class 180

VTV TEST #12

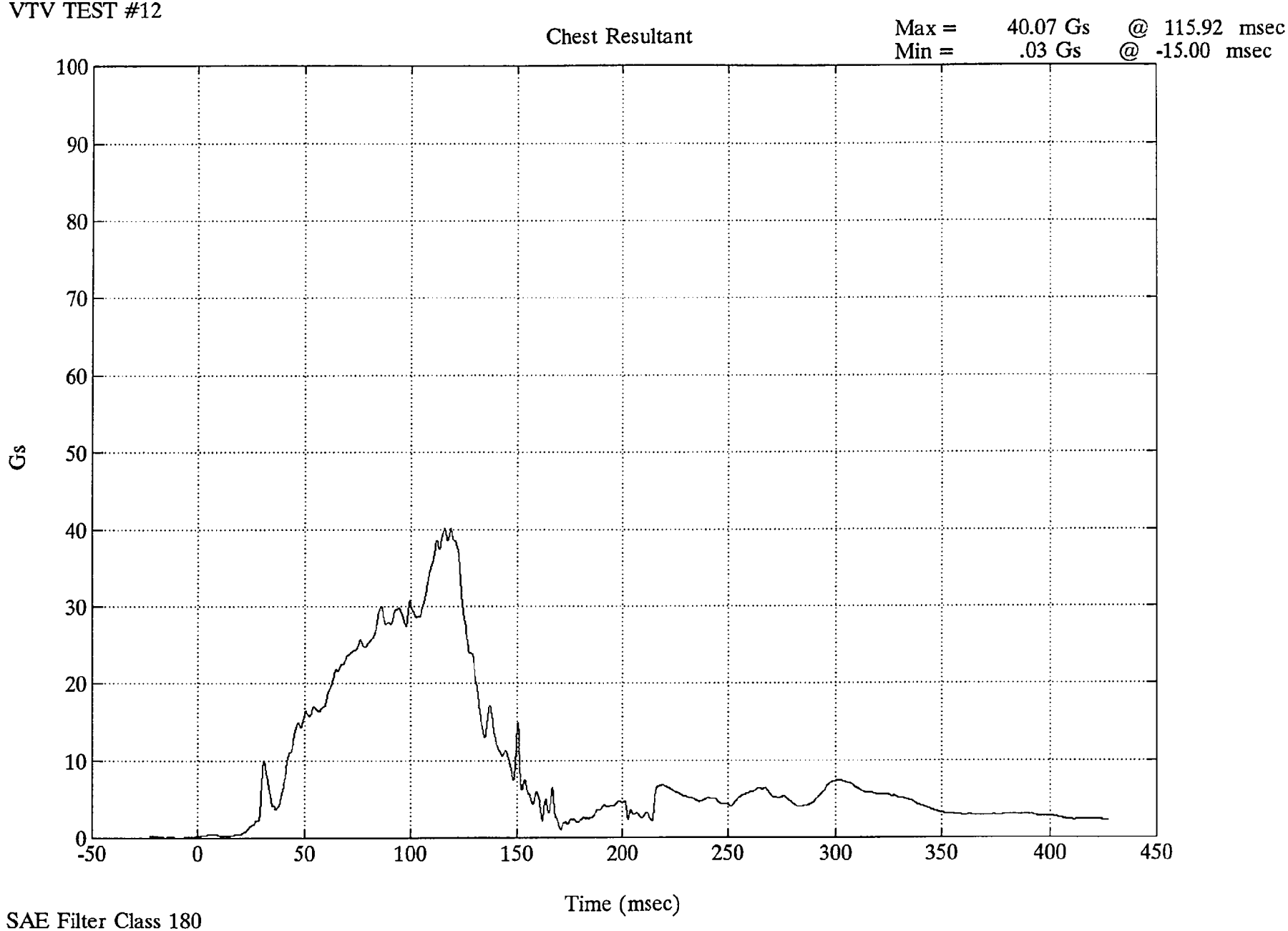


SAE Filter Class 180

B-91

8118-12

VTV TEST #12

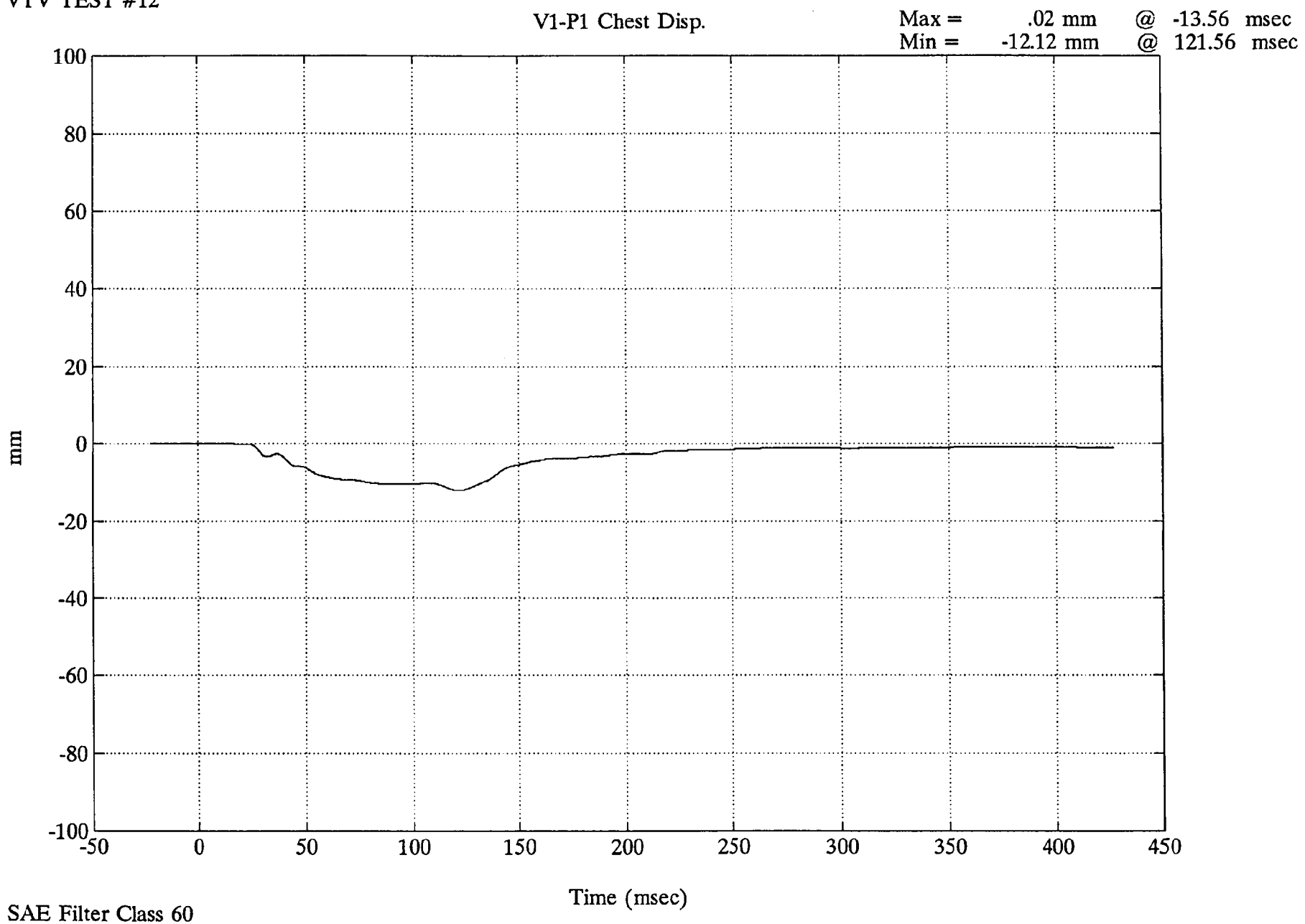


B-92

8118-12

SAE Filter Class 180

VTV TEST #12

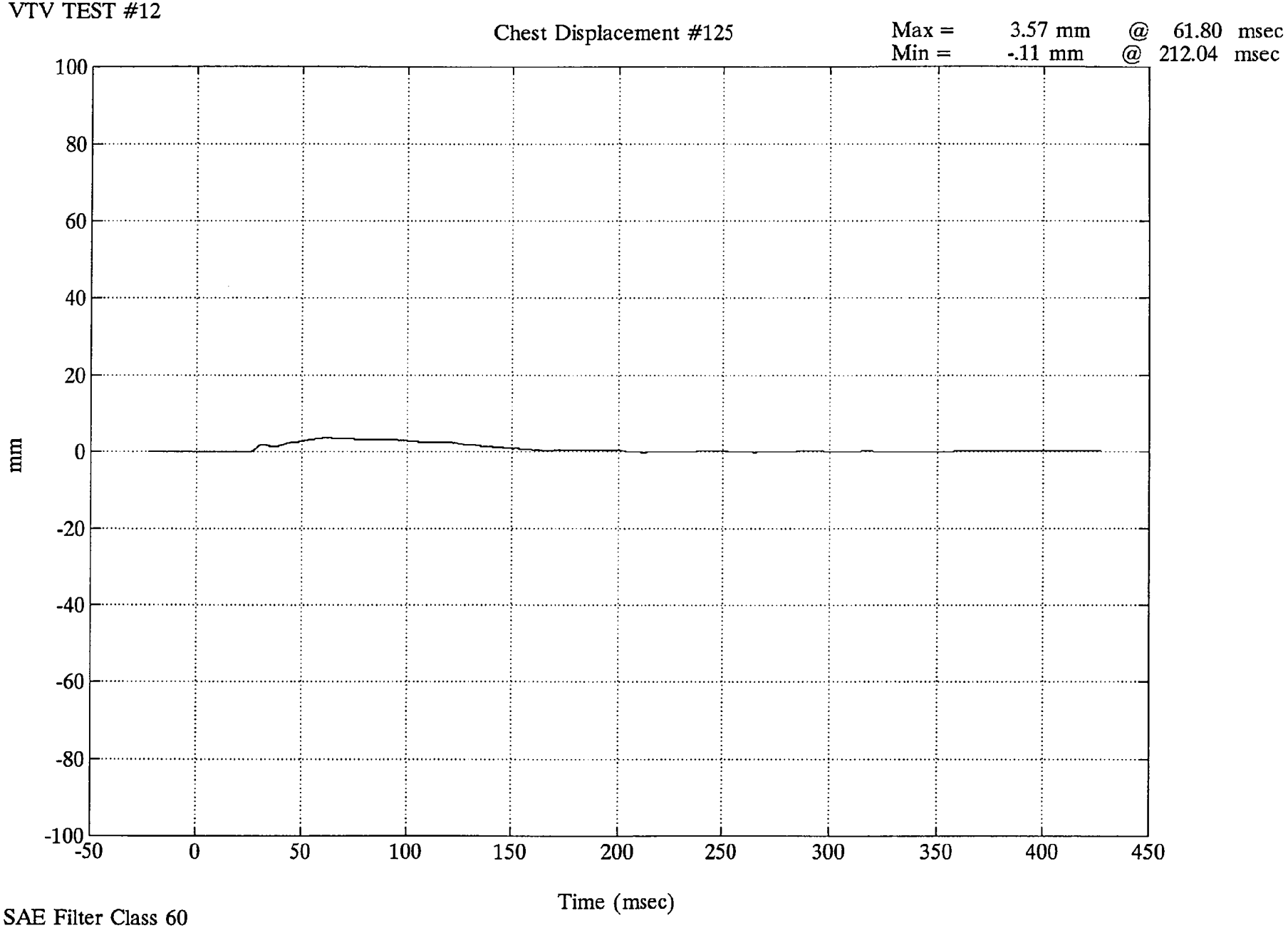


B-93

8118-12

SAE Filter Class 60

VTV TEST #12

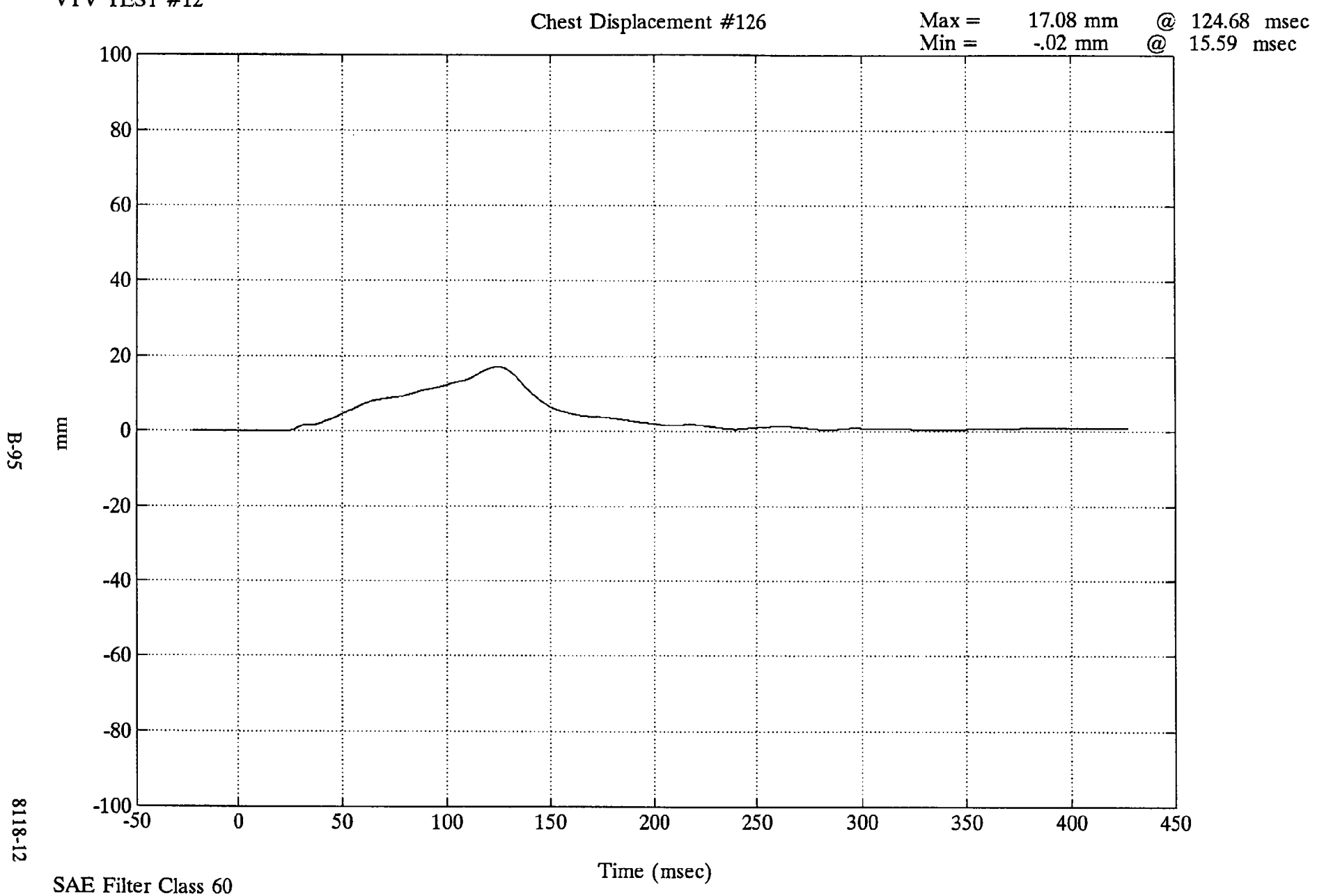


SAE Filter Class 60

B-94

8118-12

VTV TEST #12

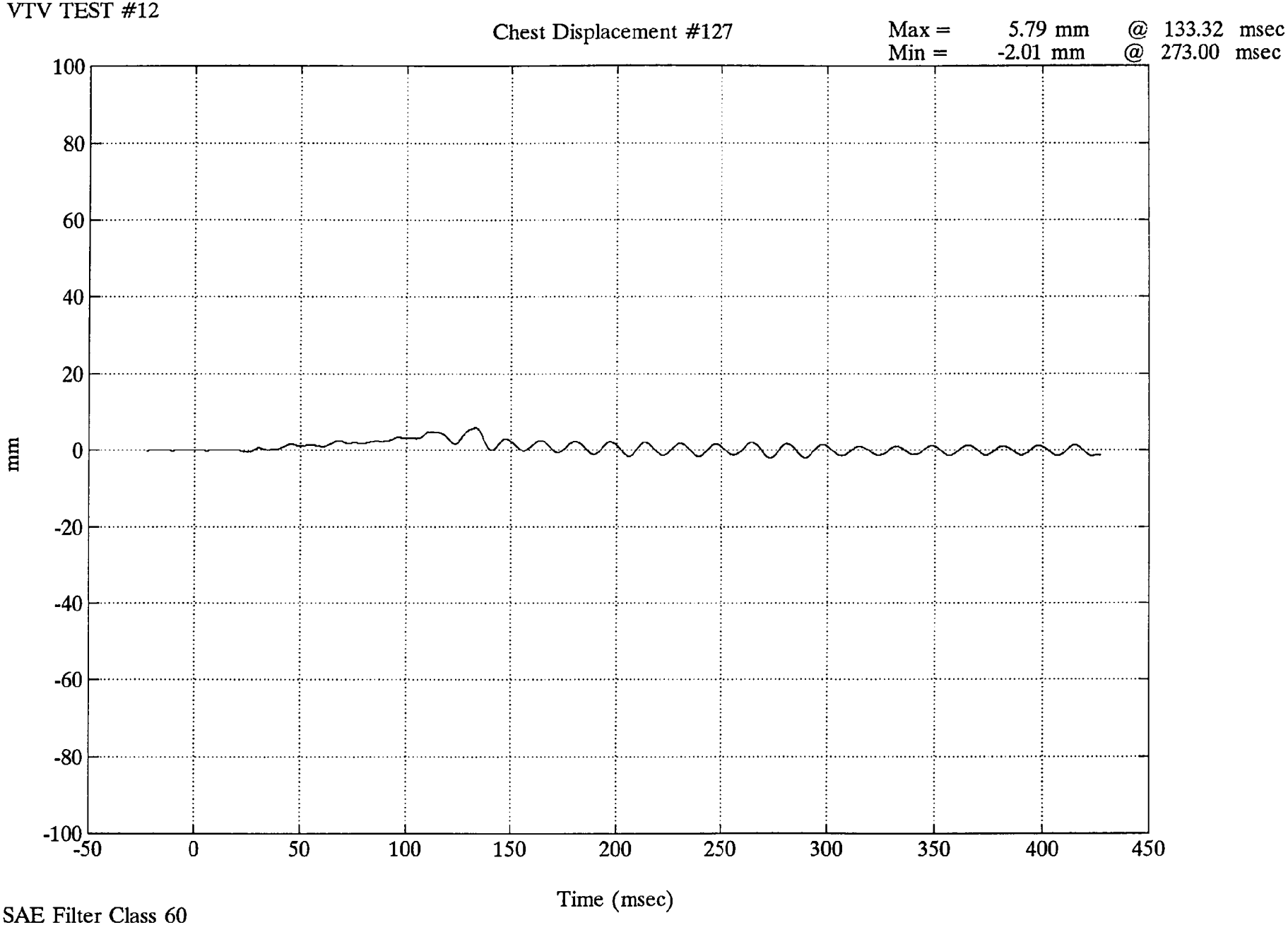


B-95

8118-12

SAE Filter Class 60

VTV TEST #12

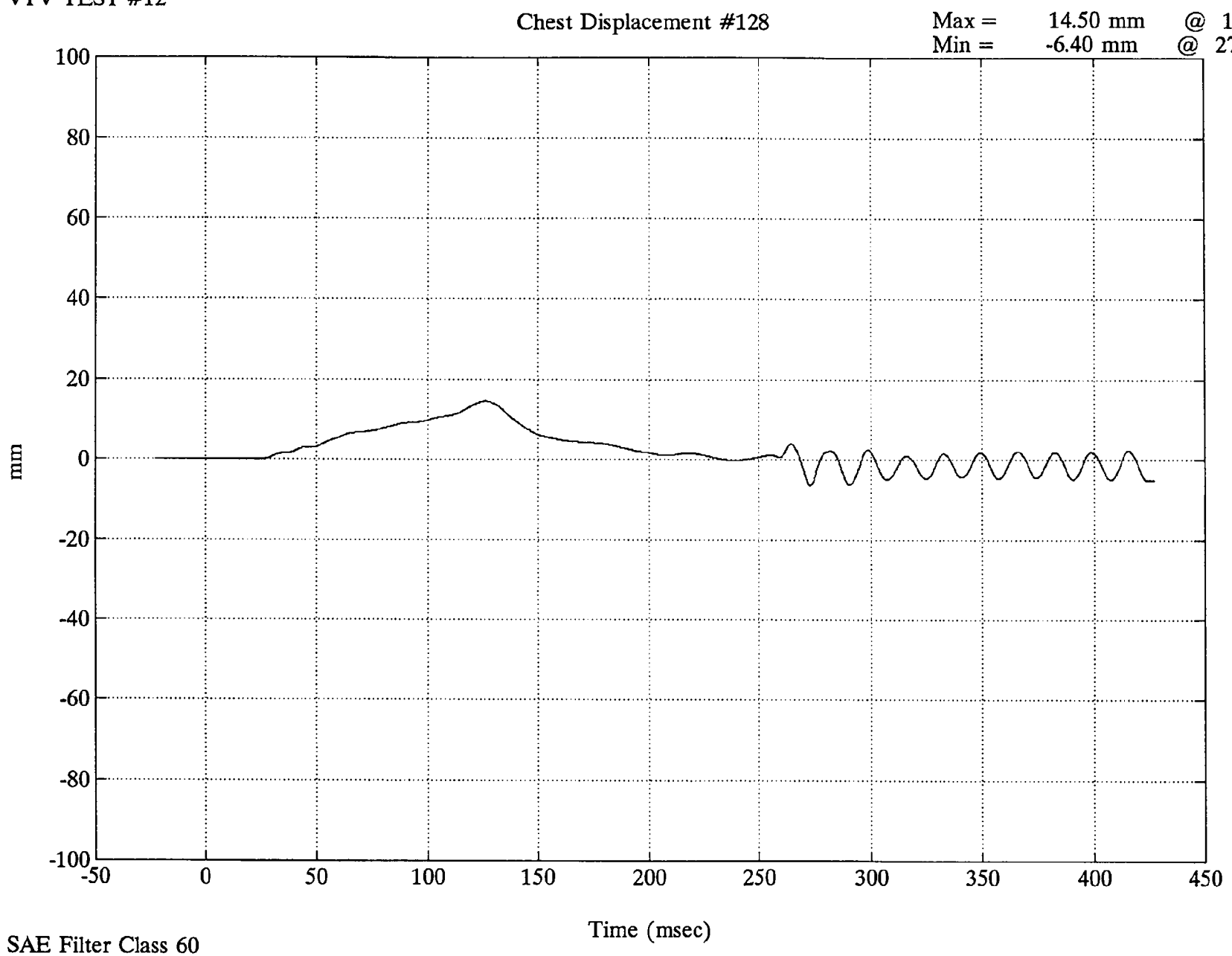


B-96

8118-12

SAE Filter Class 60

VTV TEST #12

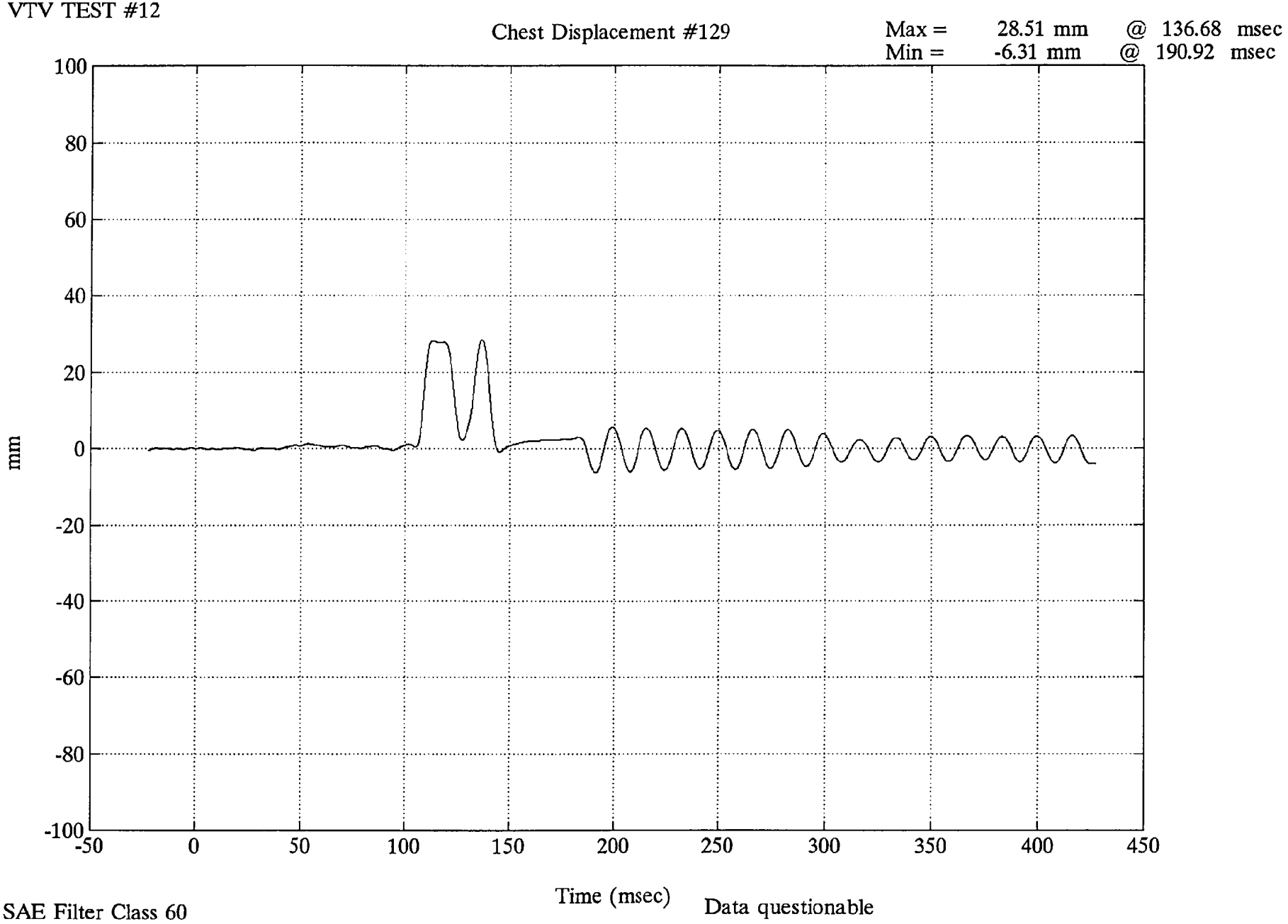


B-97

8118-12

SAE Filter Class 60

VTV TEST #12



SAE Filter Class 60

Data questionable

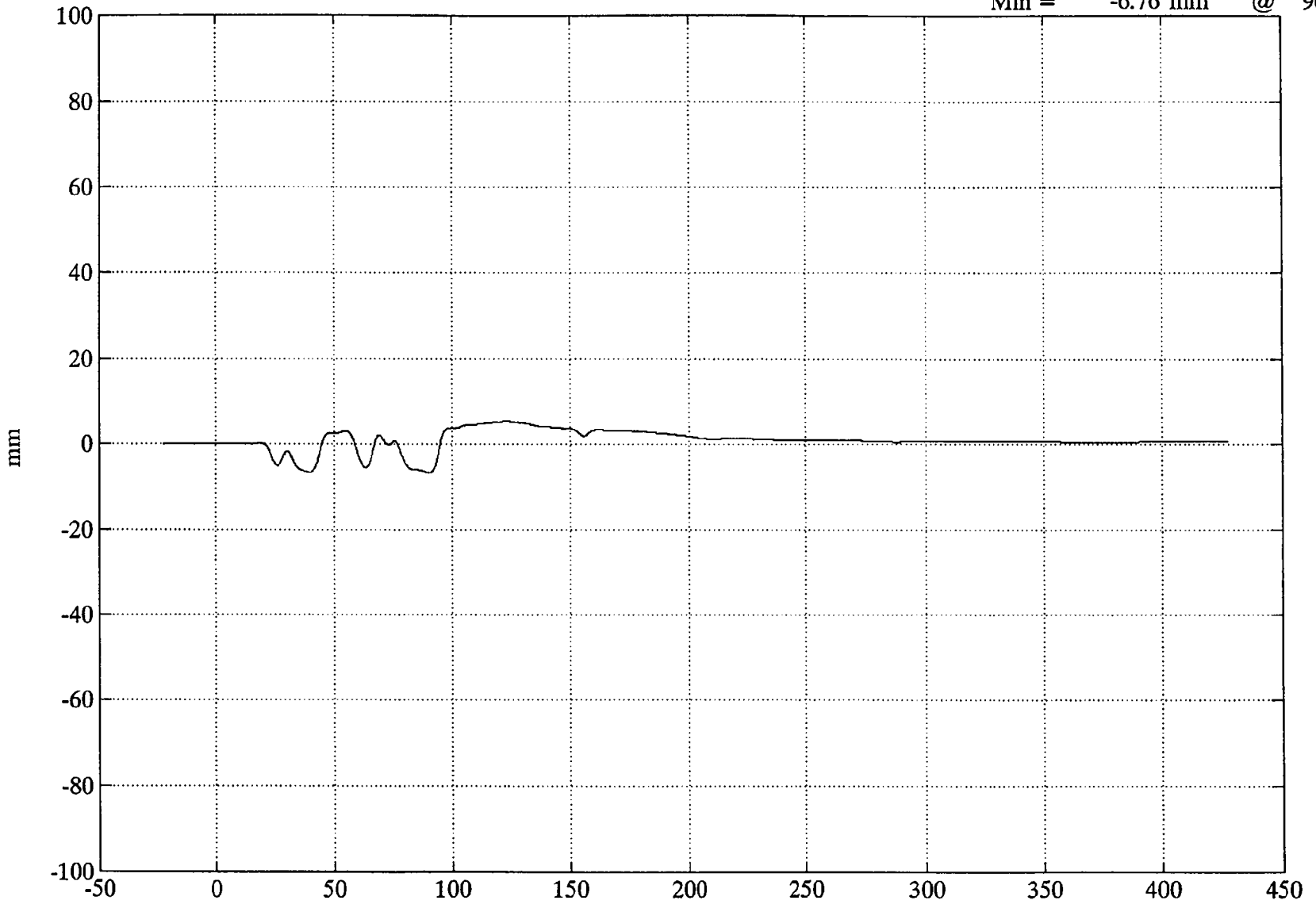
B-98

8118-12

VTV TEST #12

Chest Displacement #130

Max = 5.31 mm @ 123.36 msec
Min = -6.76 mm @ 90.48 msec



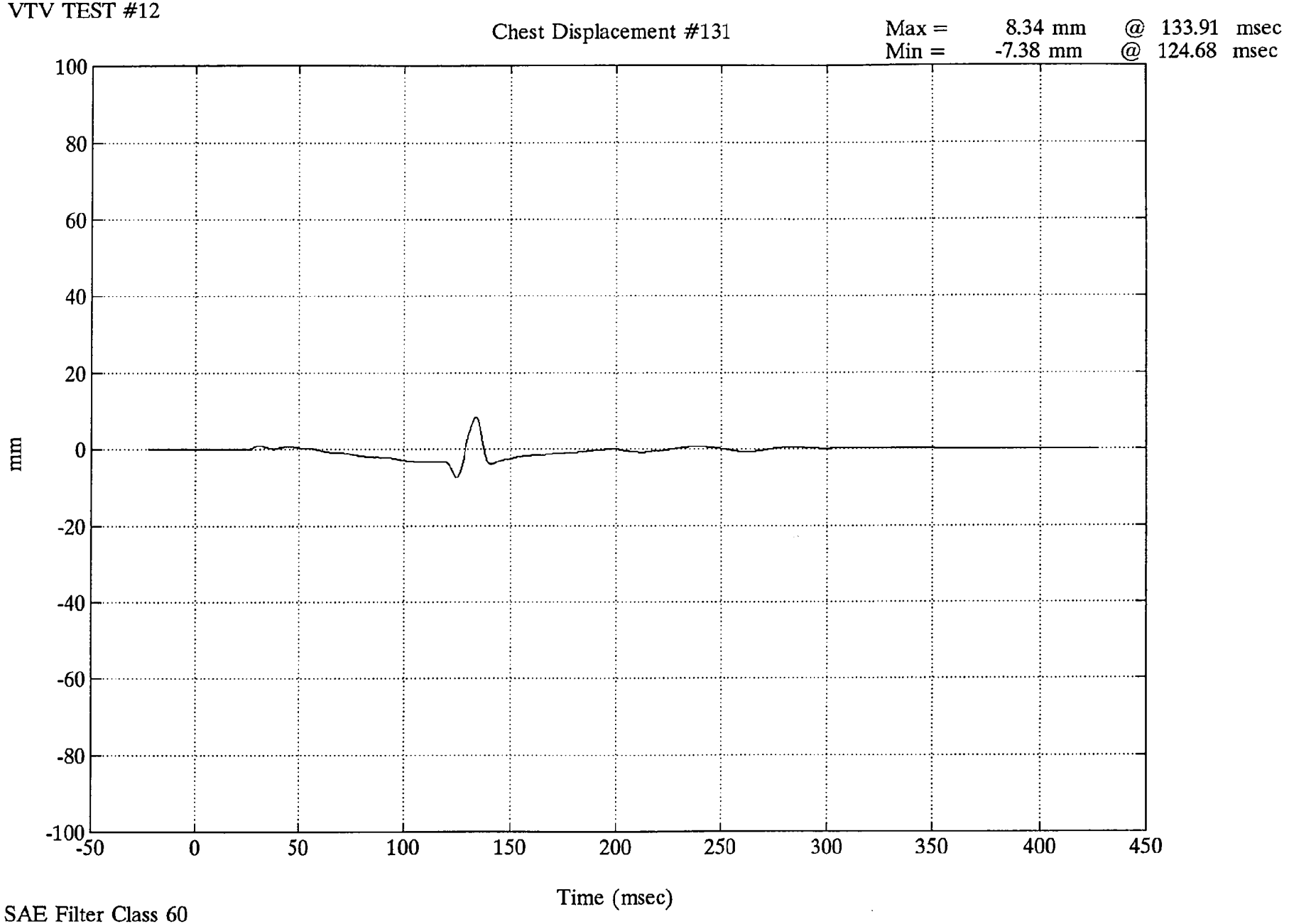
SAE Filter Class 60

Data questionable between 20 and 95ms

B-99

8118-12

VTV TEST #12

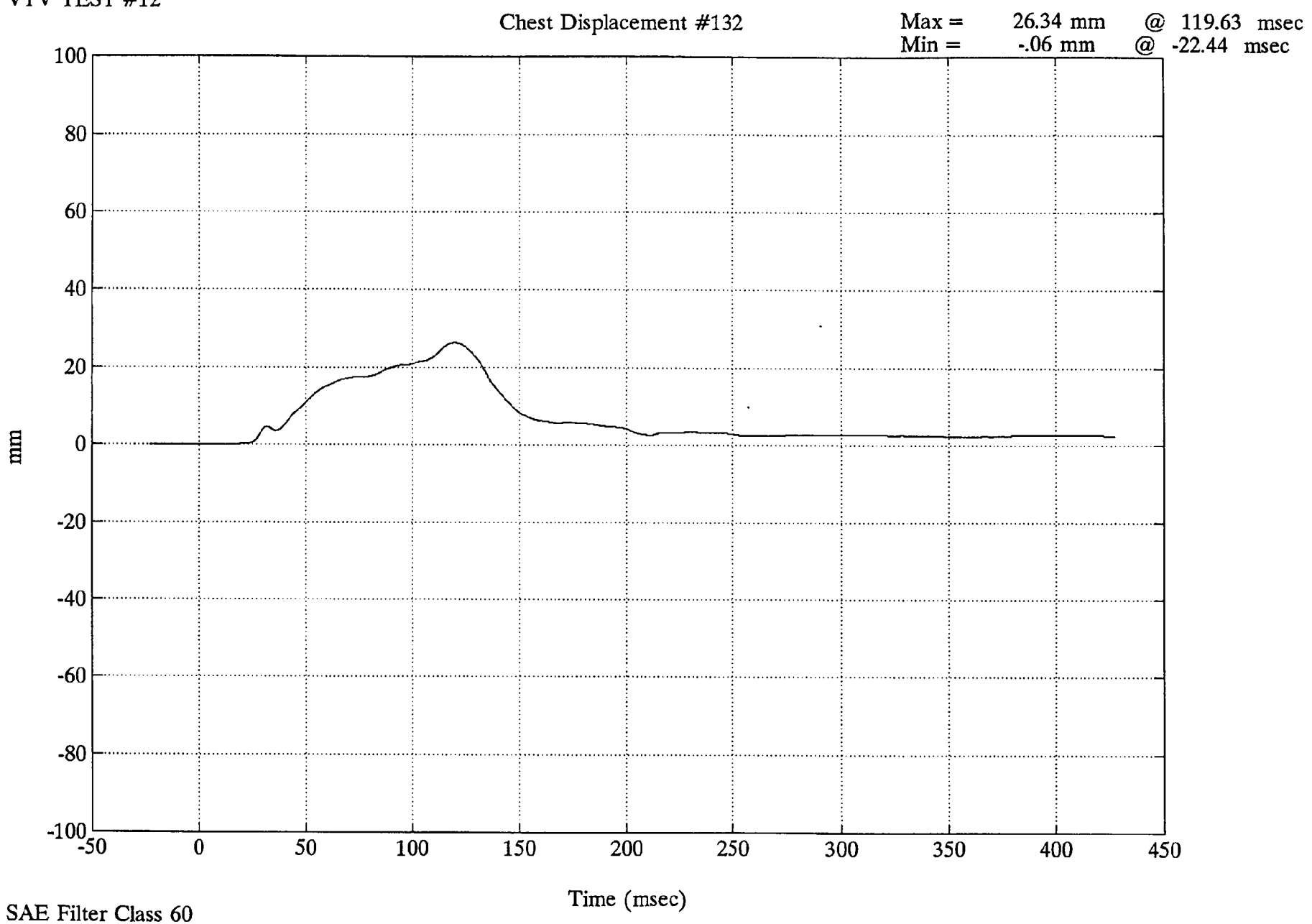


B-100

8118-12

SAE Filter Class 60

VTV TEST #12

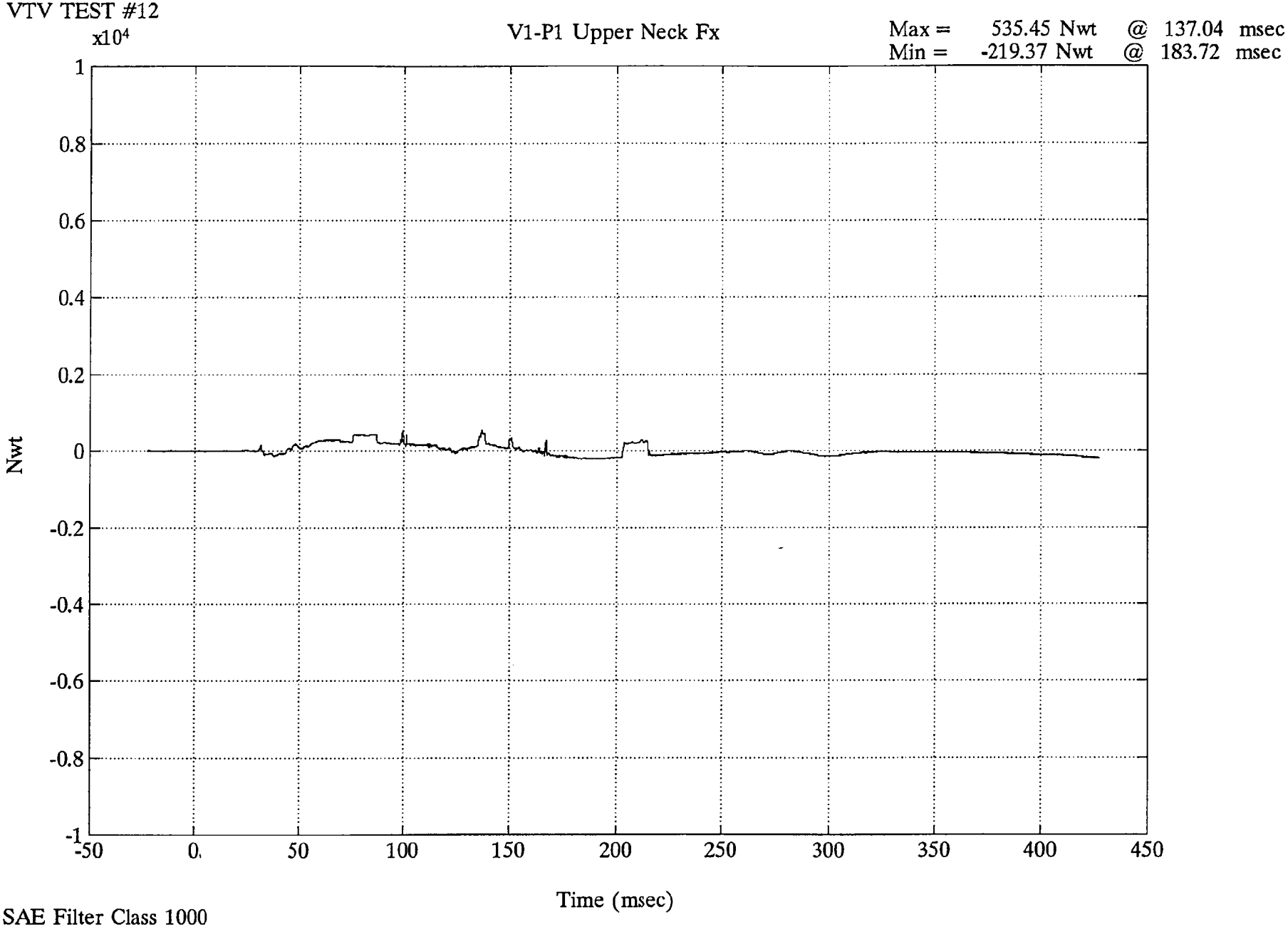


B-101

8118-12

SAE Filter Class 60

VTV TEST #12

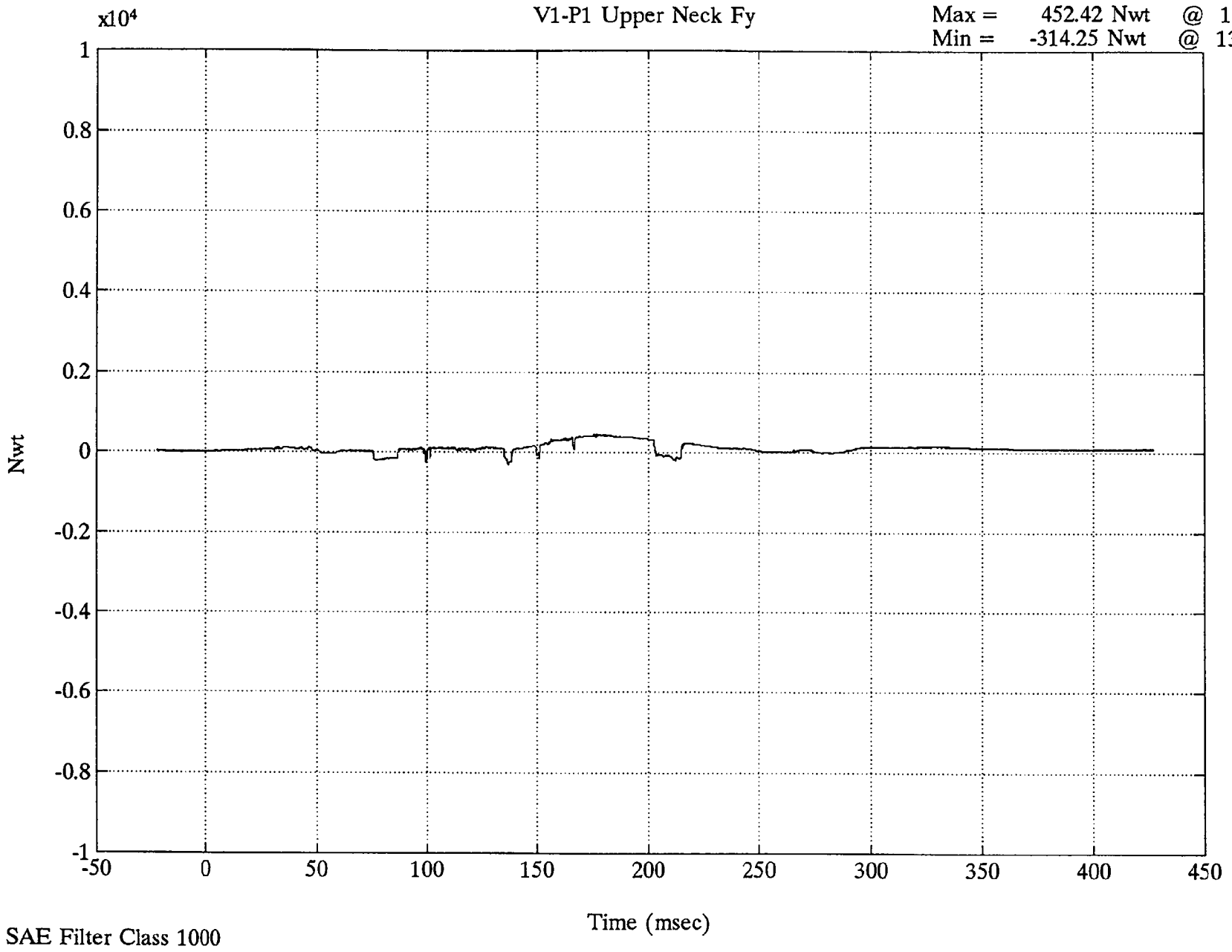


SAE Filter Class 1000

B-102

8118-12

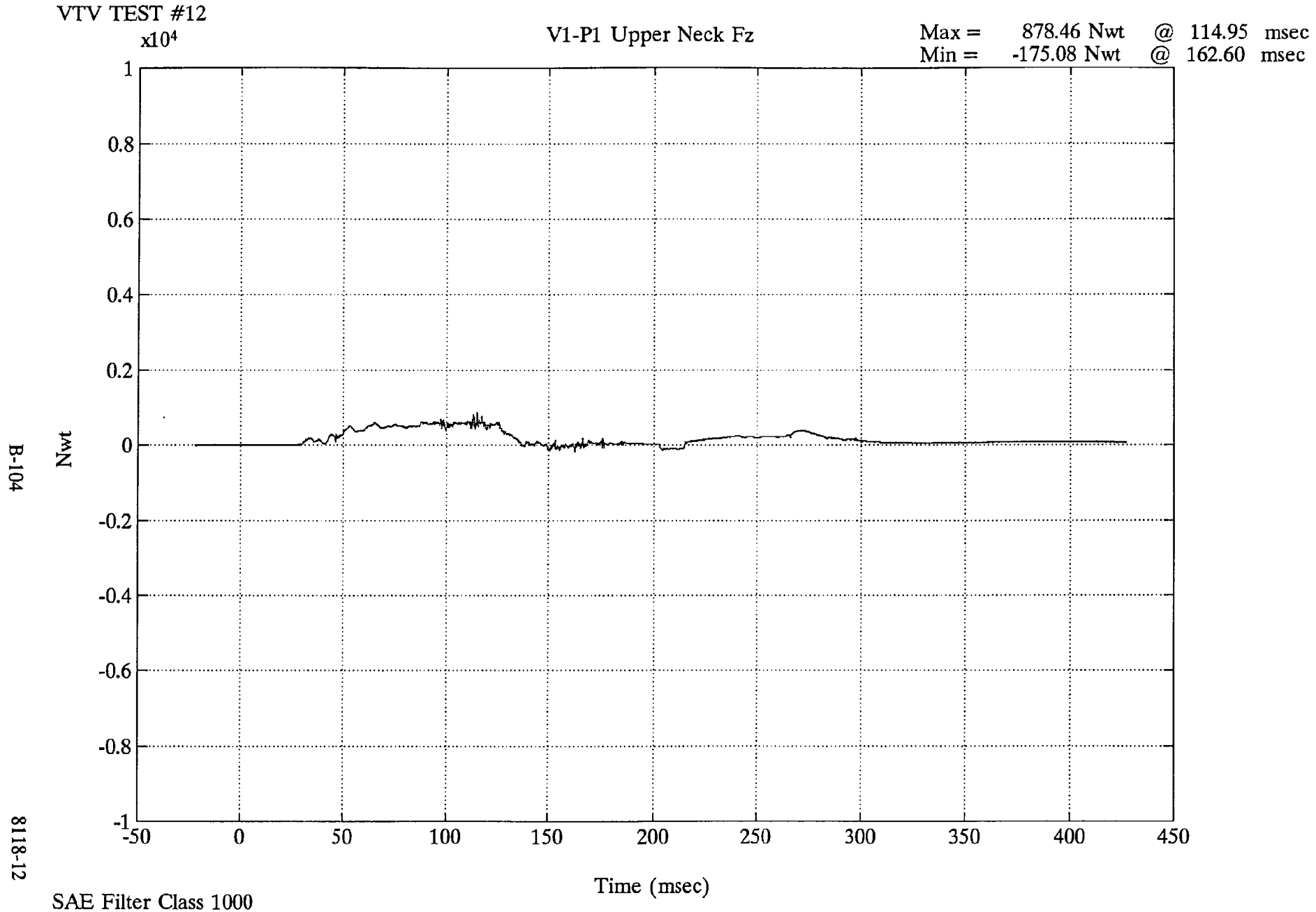
VTV TEST #12



B-103

8118-12

SAE Filter Class 1000

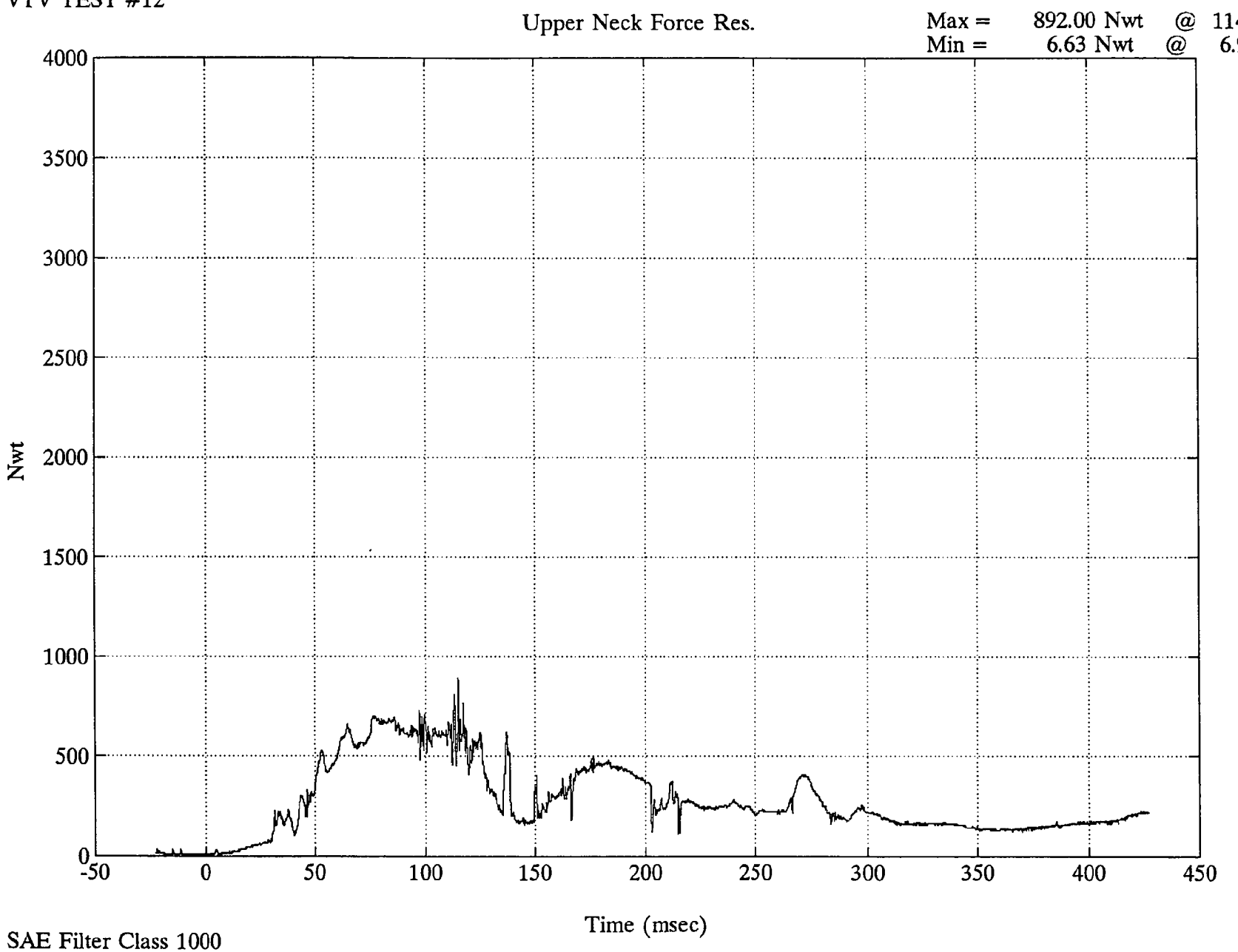


B-104

8118-12

SAE Filter Class 1000

VTV TEST #12

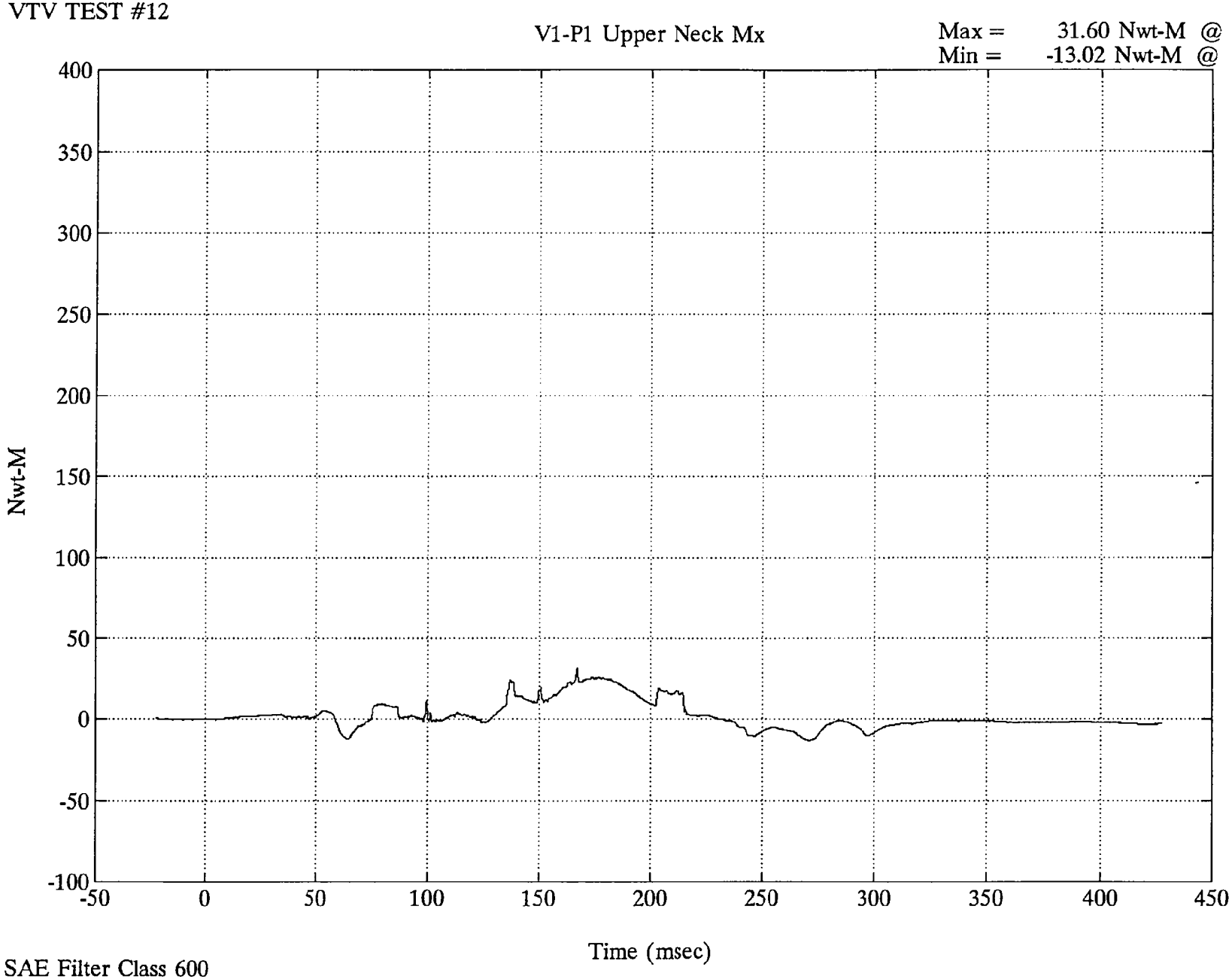


SAE Filter Class 1000

B-105

8118-12

VTV TEST #12

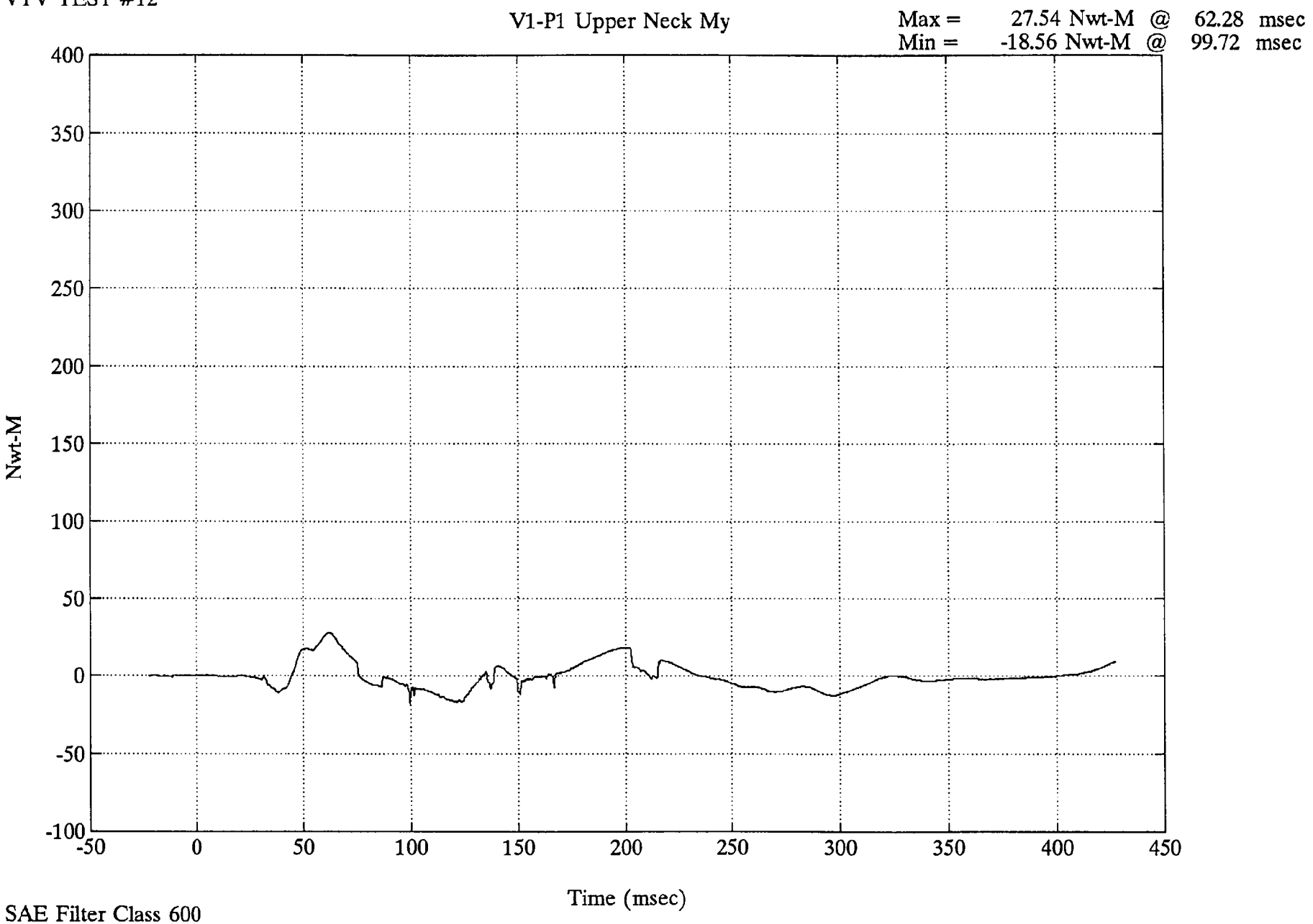


B-106

8118-12

SAE Filter Class 600

VTV TEST #12

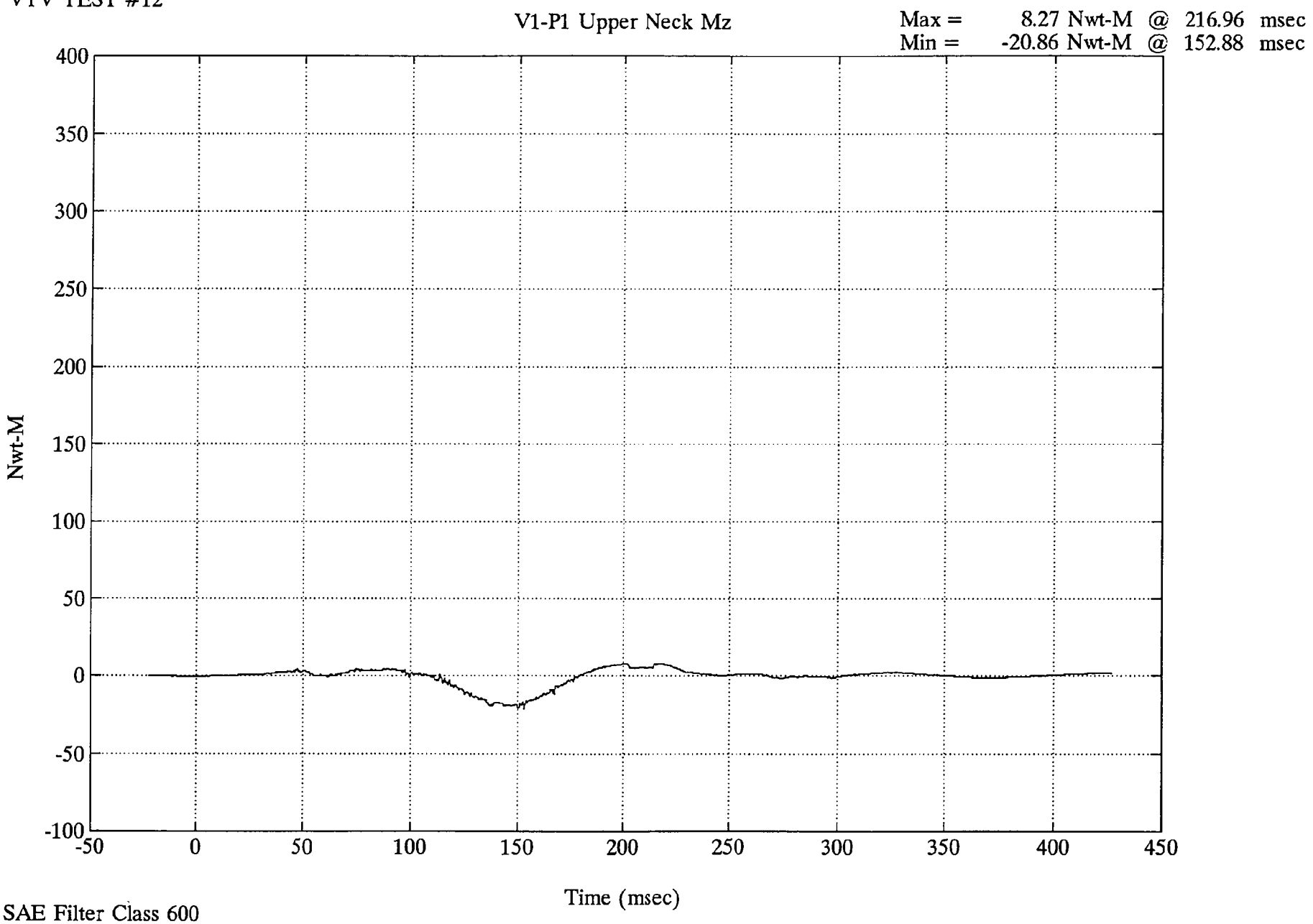


B-107

8118-12

SAE Filter Class 600

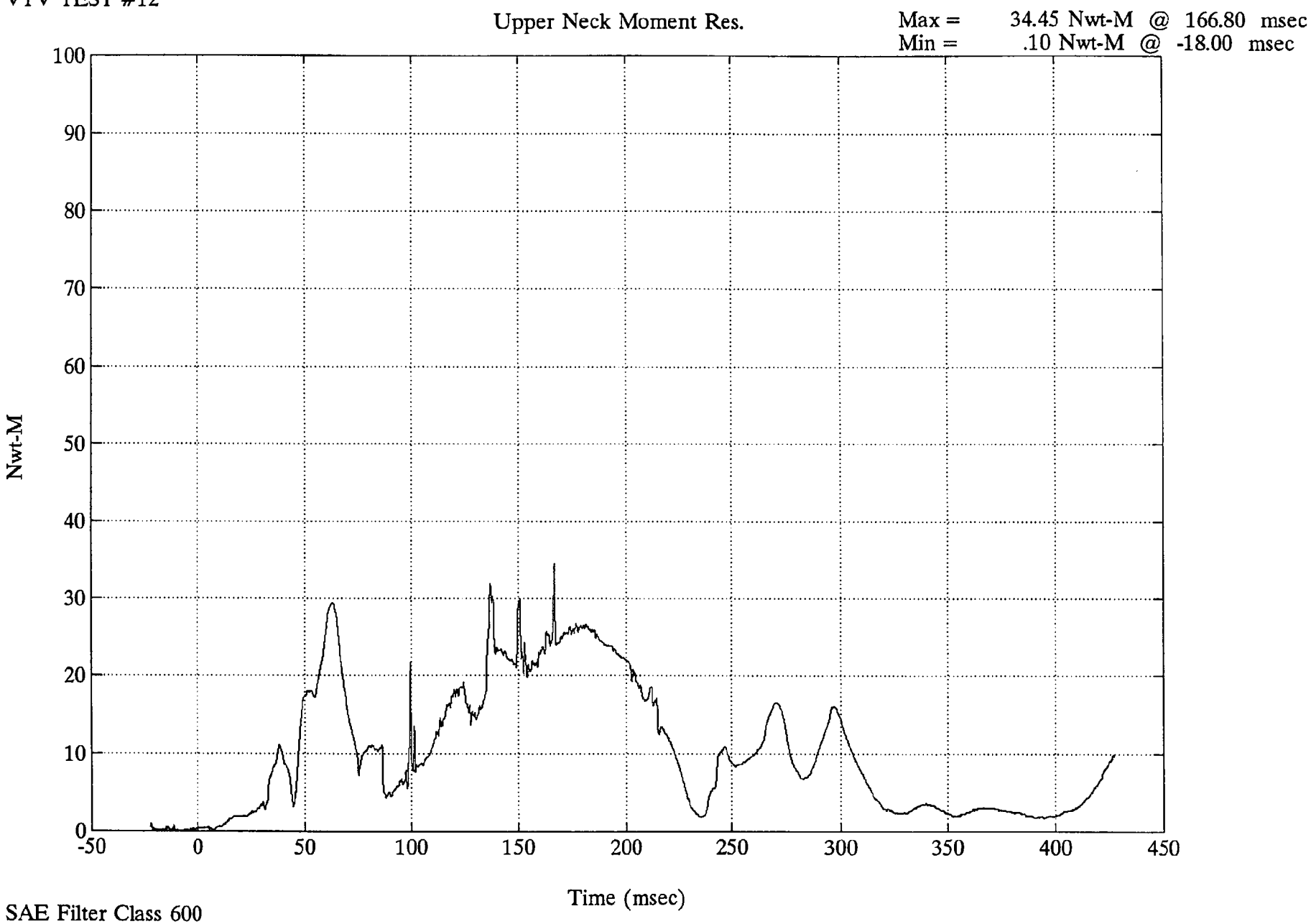
VTV TEST #12



SAE Filter Class 600

8118-12

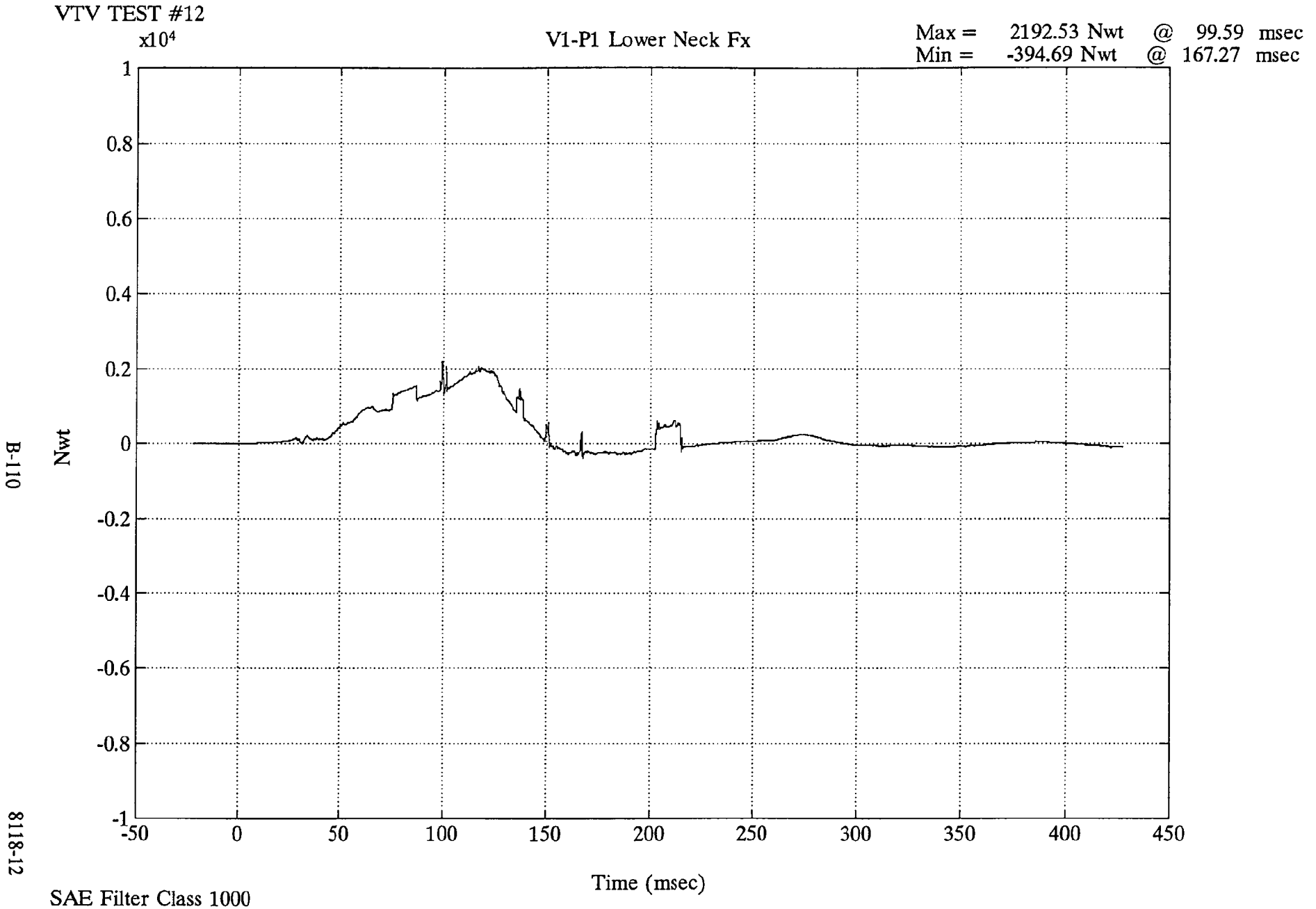
VTV TEST #12



B-109

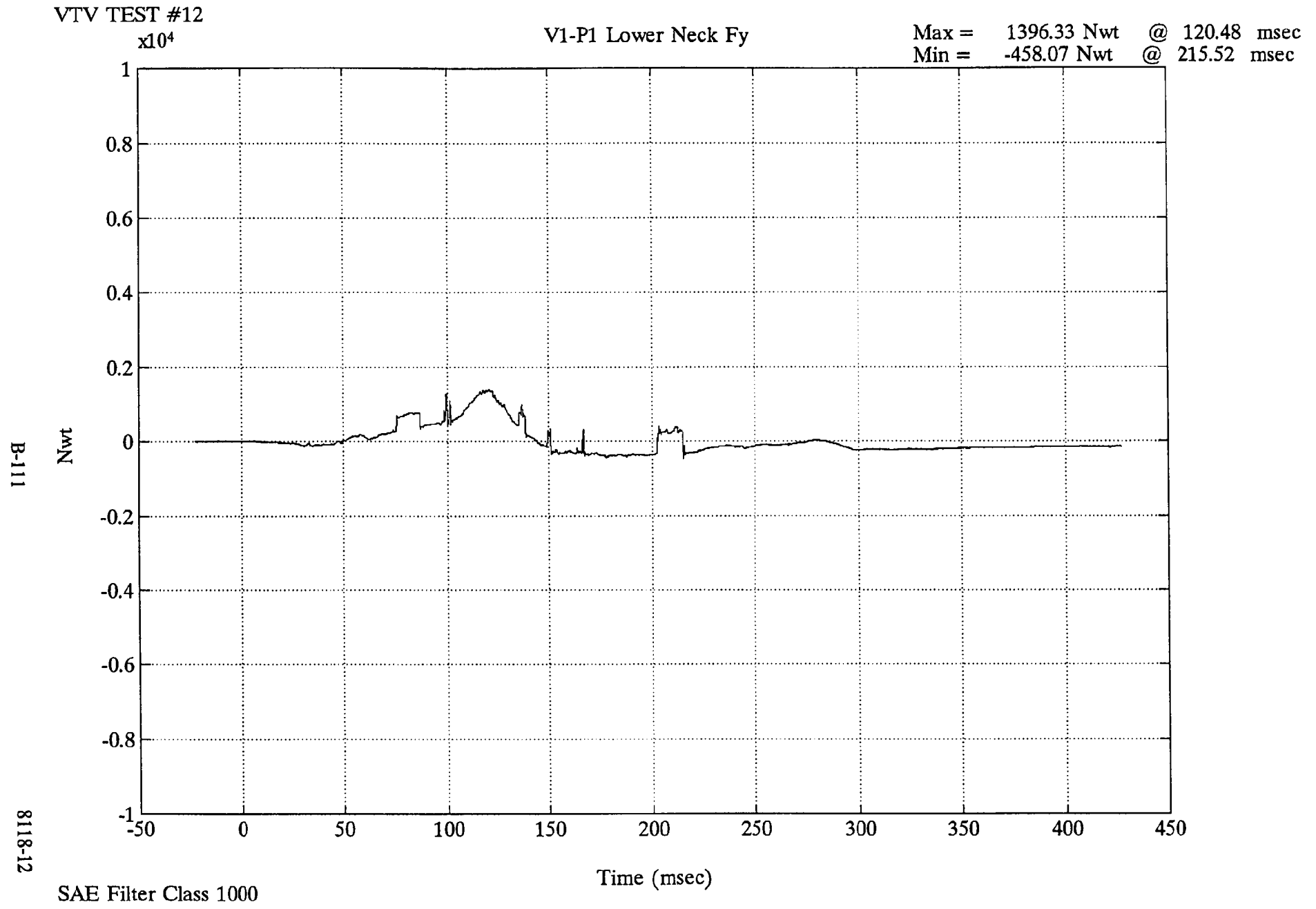
8118-12

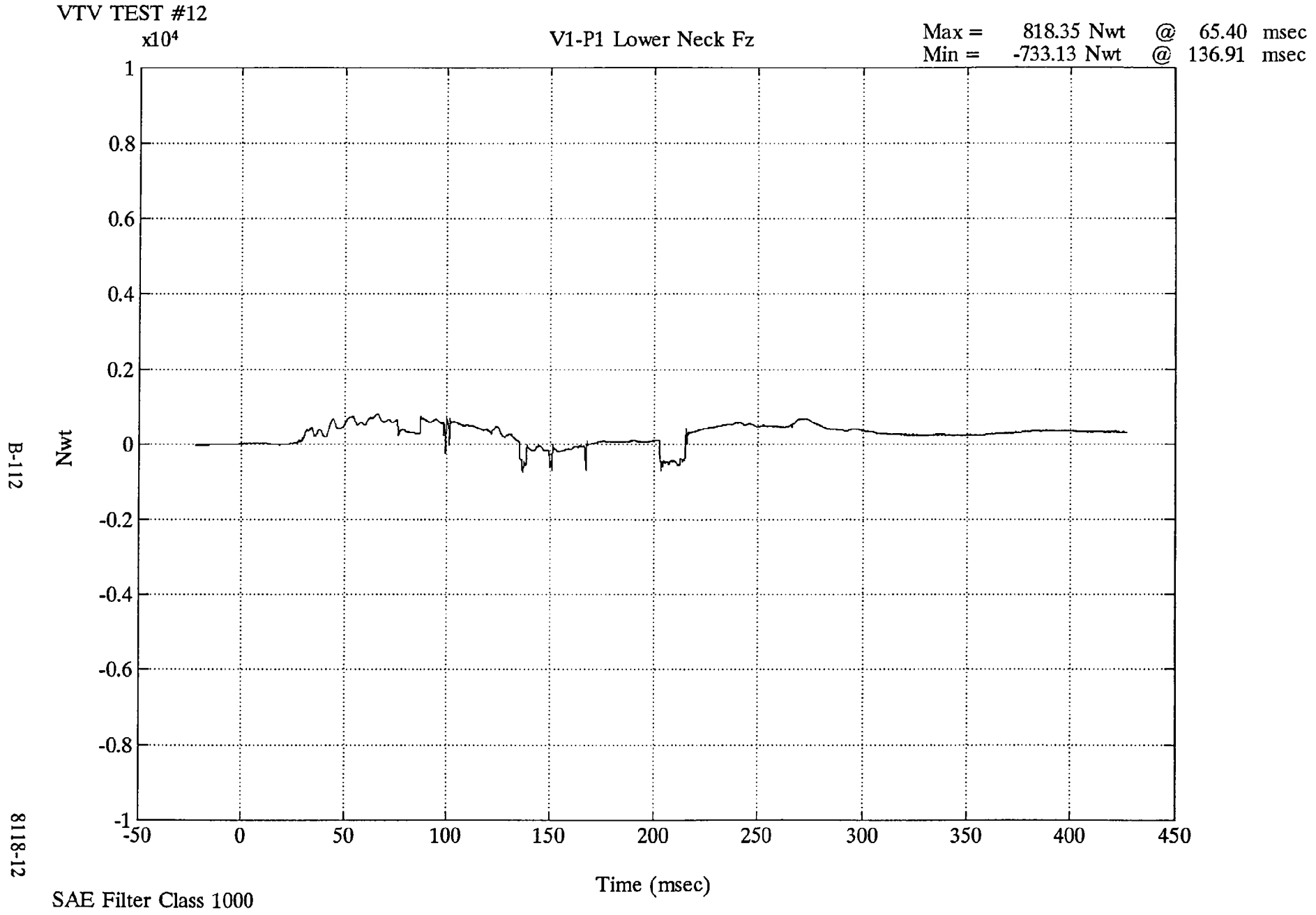
SAE Filter Class 600


VTV TEST #12
x10^4
V1-P1 Lower Neck Fx
Max = 2192.53 Nwt @ 99.59 msec
Min = -394.69 Nwt @ 167.27 msec
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 1000

B-110

8118-12


VTV TEST #12
x10⁴
V1-P1 Lower Neck Fy
Max = 1396.33 Nwt @ 120.48 msec
Min = -458.07 Nwt @ 215.52 msec
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
B-111
8118-12
SAE Filter Class 1000

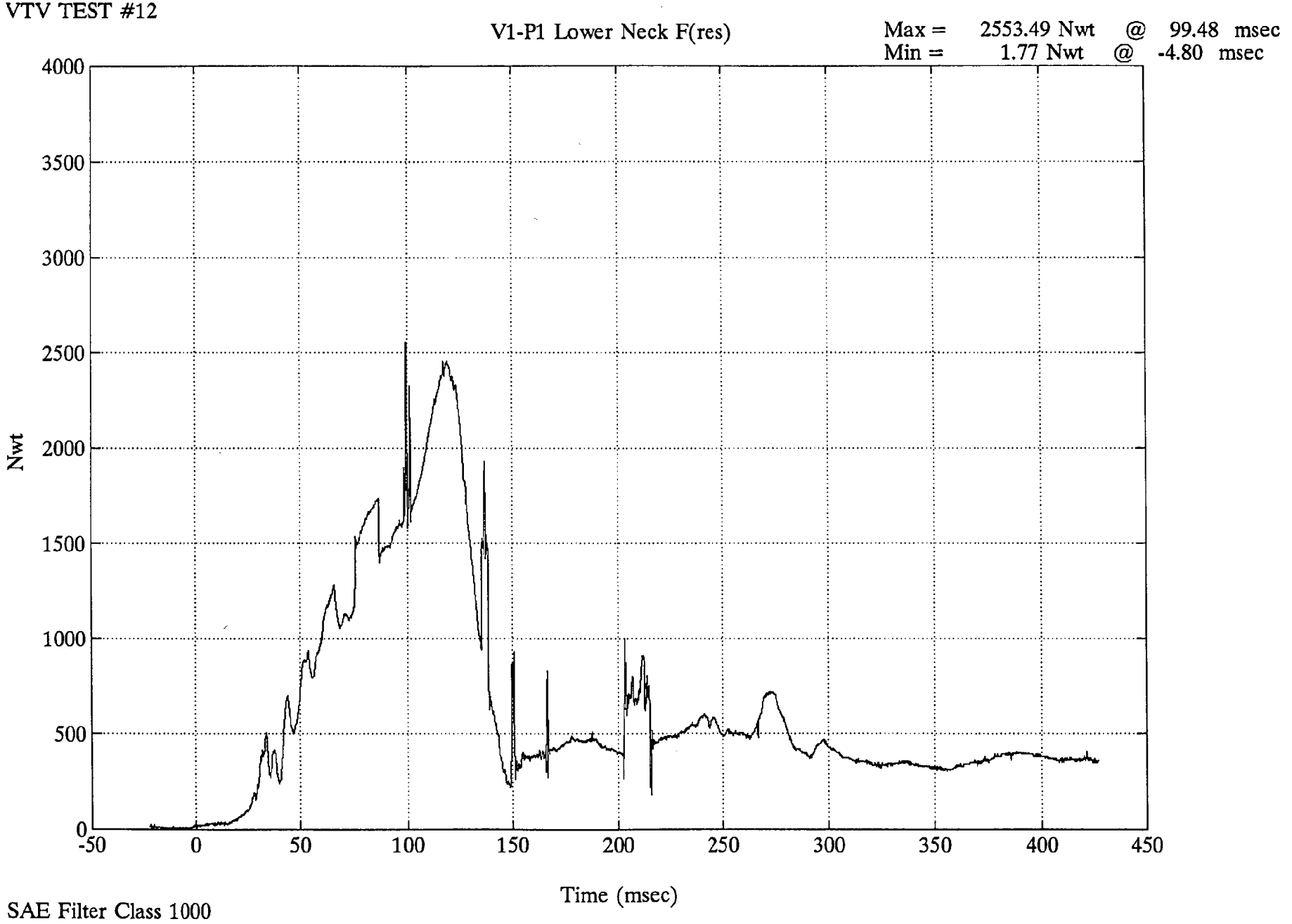


B-112

8118-12

SAE Filter Class 1000

VTV TEST #12

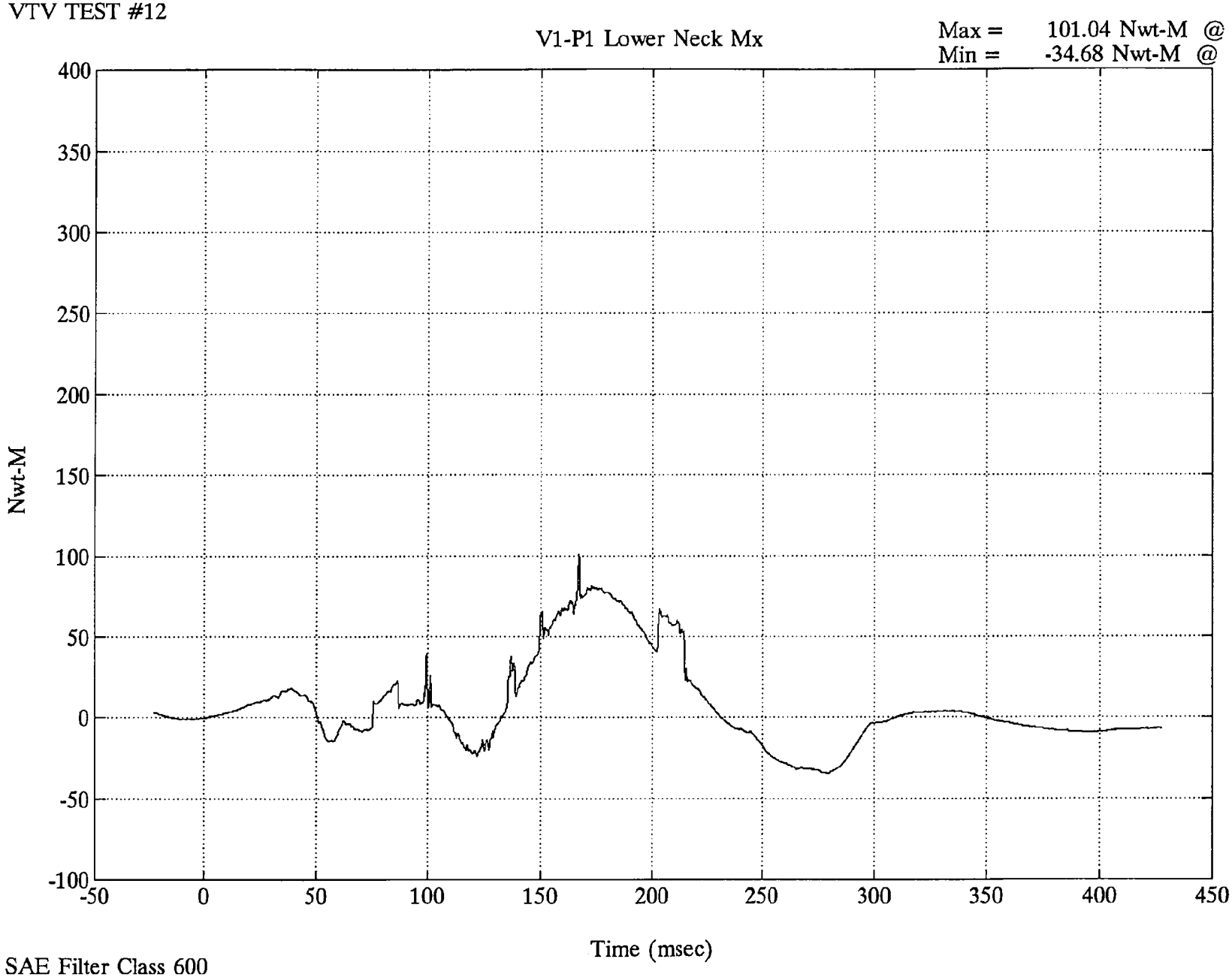


B-113

8118-12

SAE Filter Class 1000

VTV TEST #12

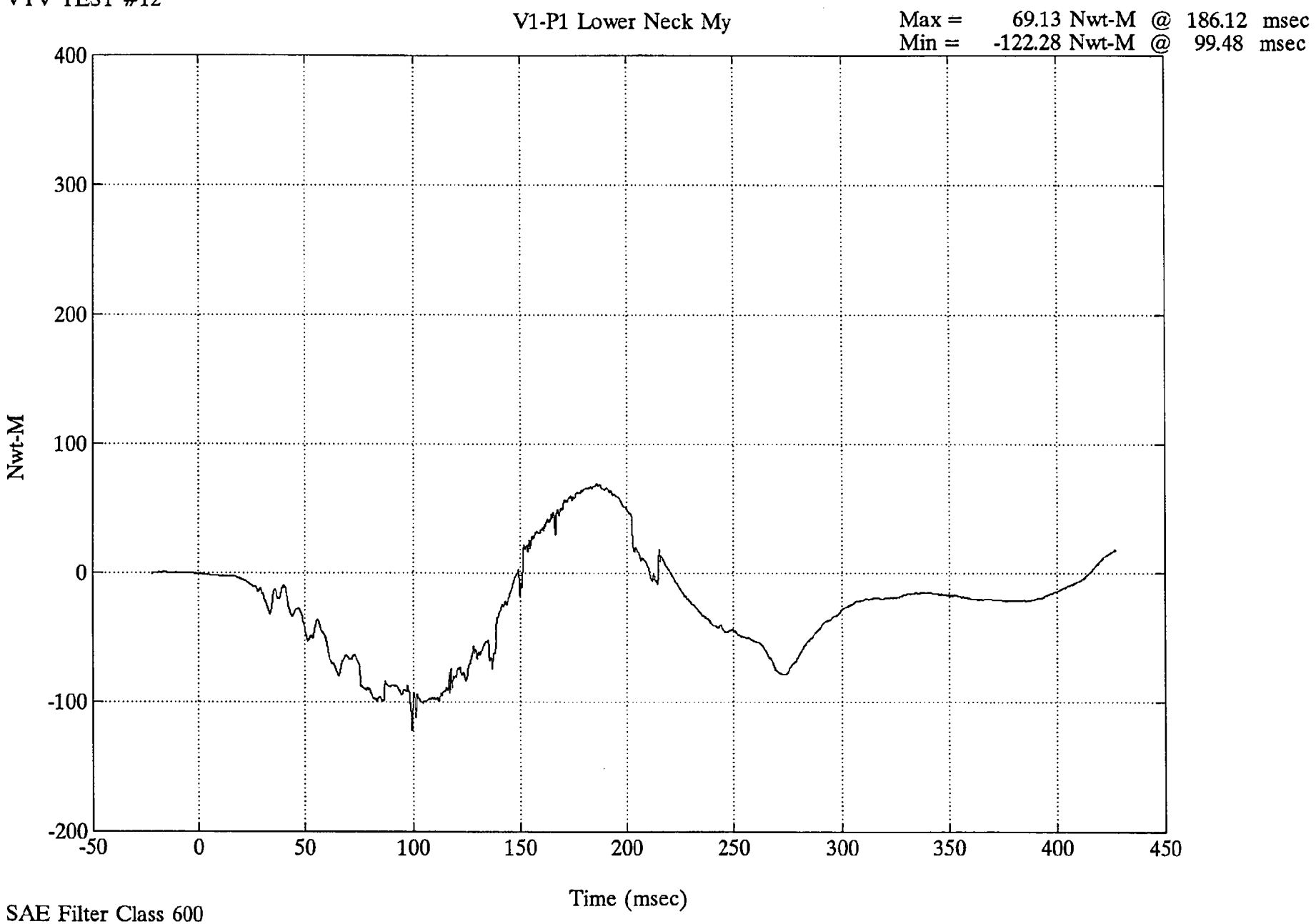


B-114

8118-12

SAE Filter Class 600

VTV TEST #12

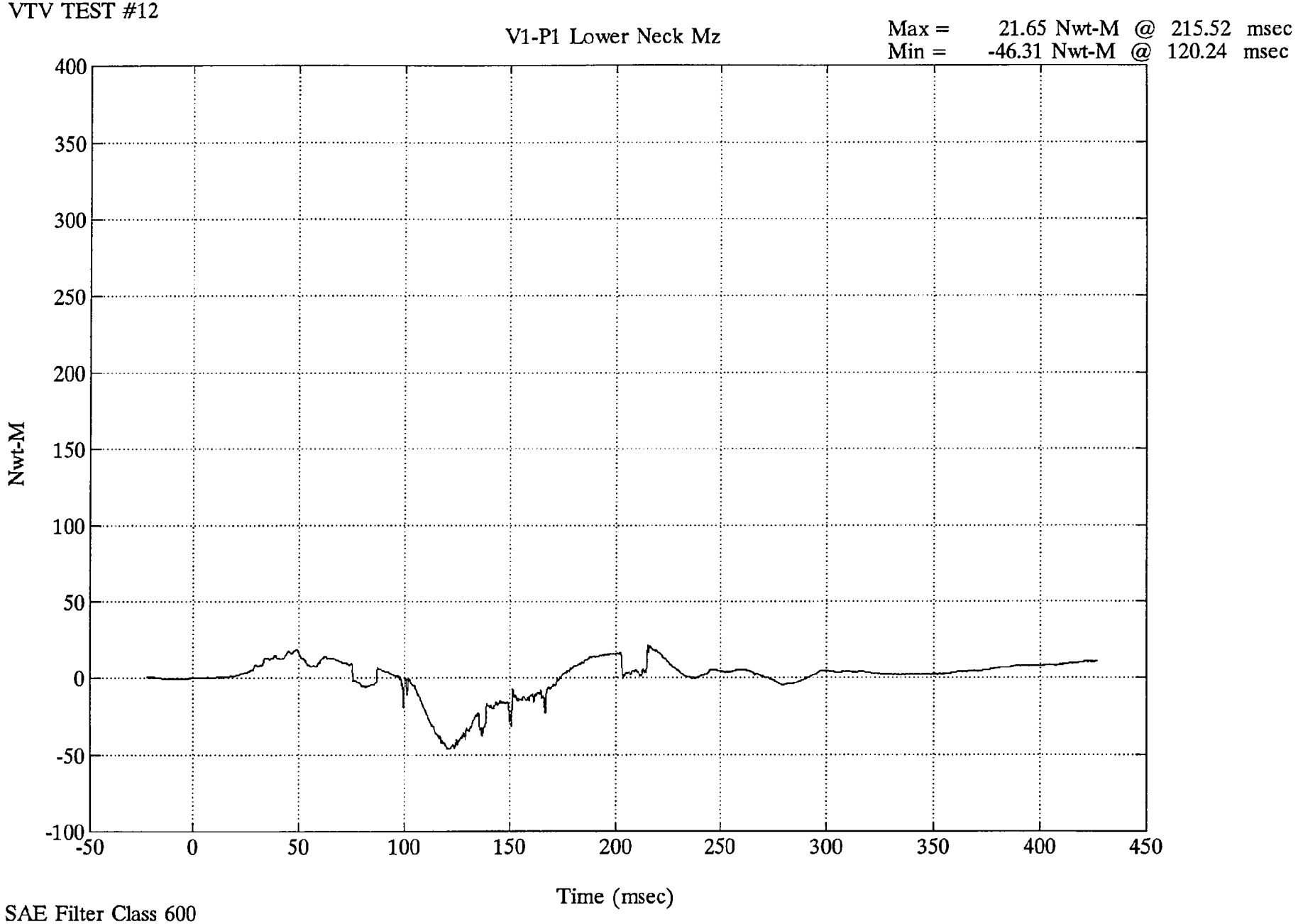


B-115

8118-12

SAE Filter Class 600

VTV TEST #12

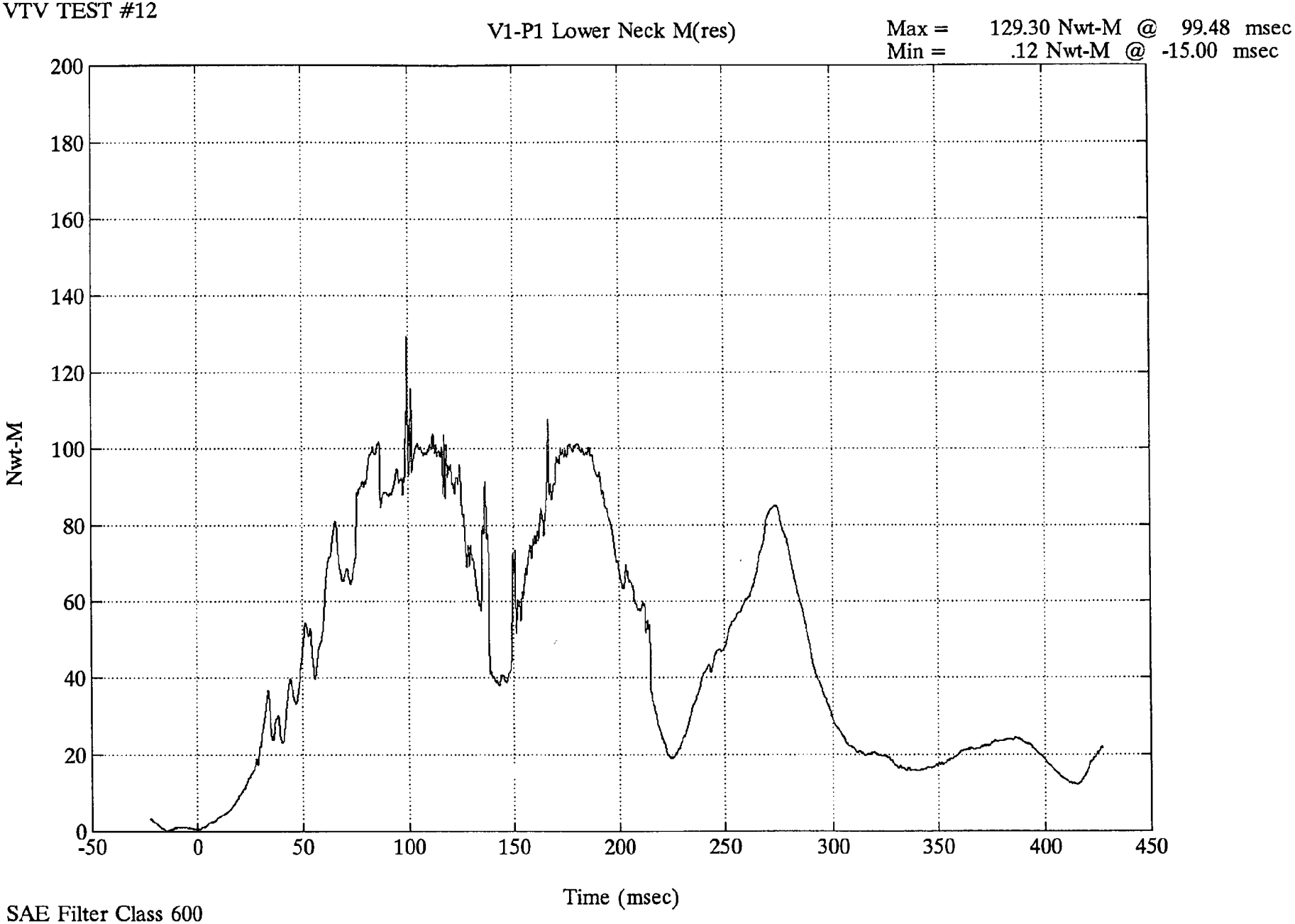


B-116

8118-12

SAE Filter Class 600

VTV TEST #12

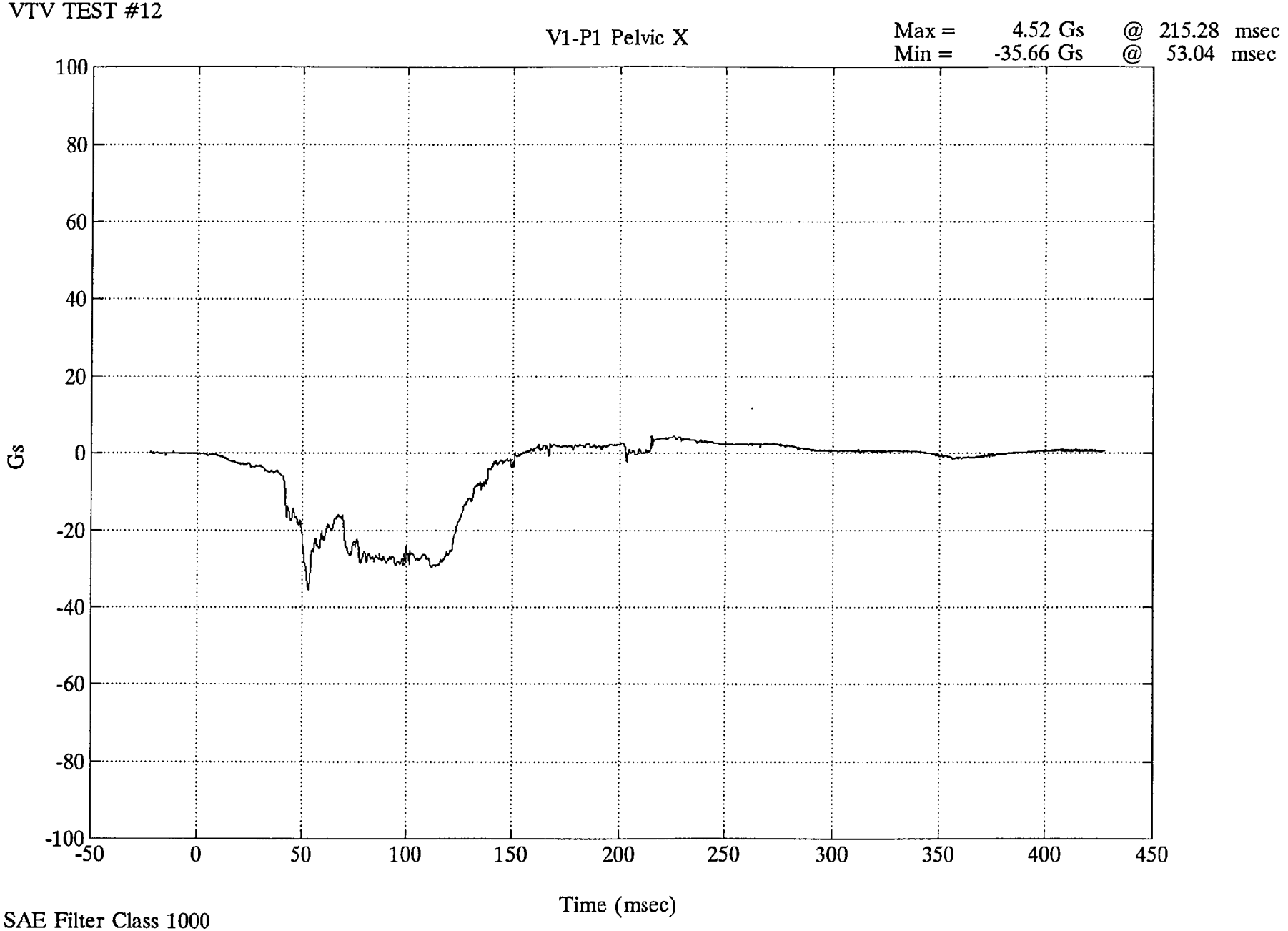


B-117

8118-12

SAE Filter Class 600

VTV TEST #12

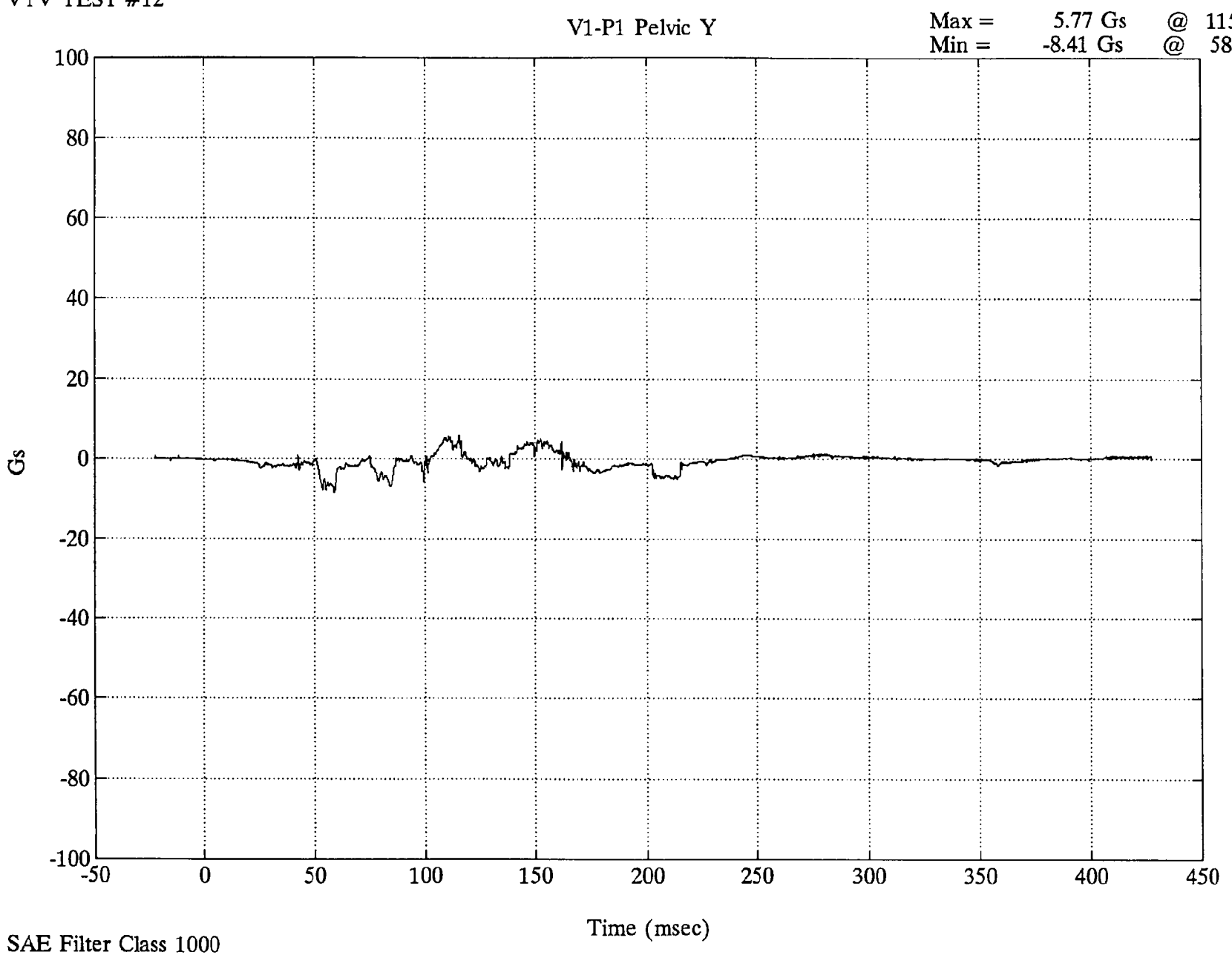


B-118

8118-12

SAE Filter Class 1000

VTV TEST #12

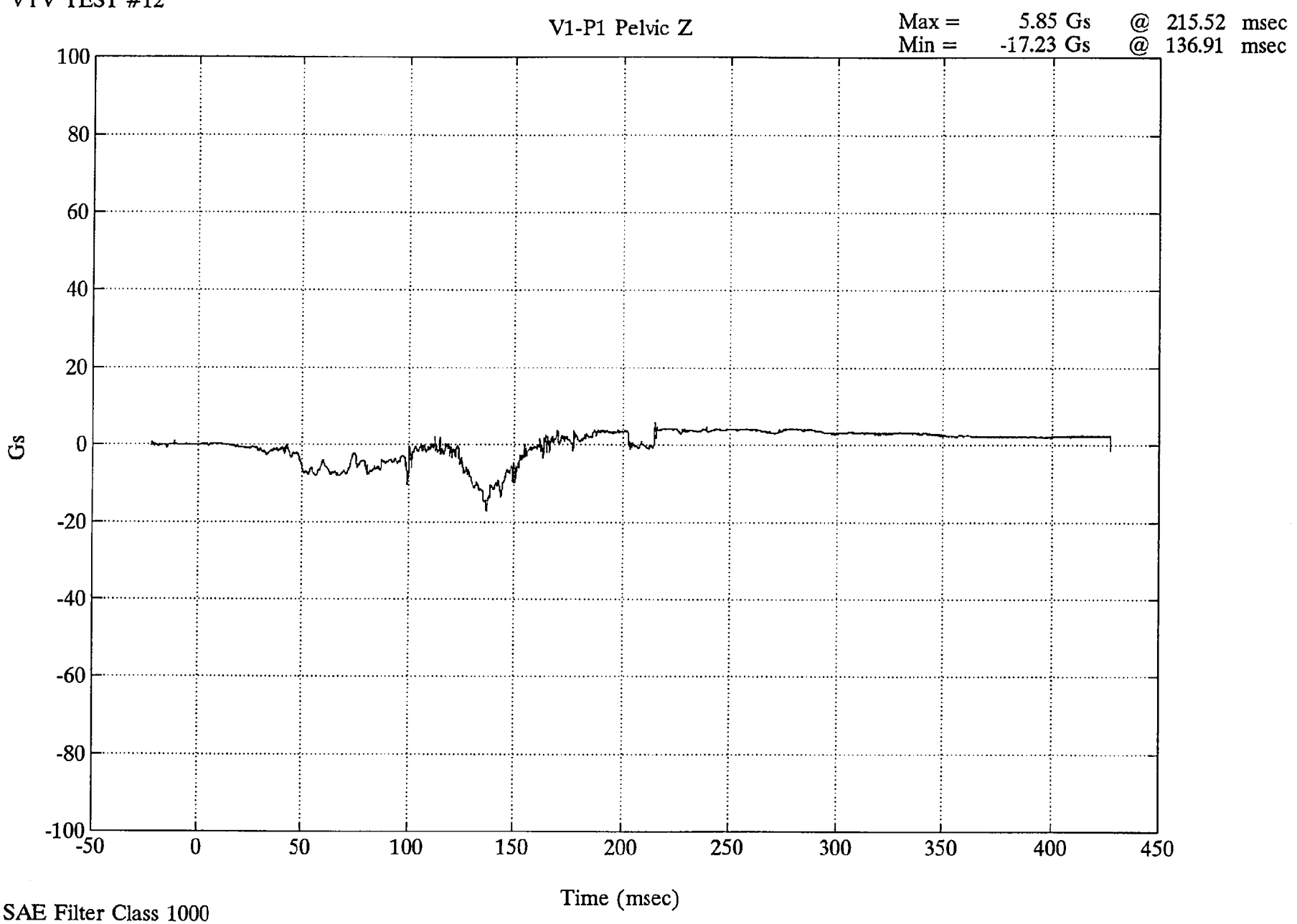


B-119

8118-12

SAE Filter Class 1000

VTV TEST #12

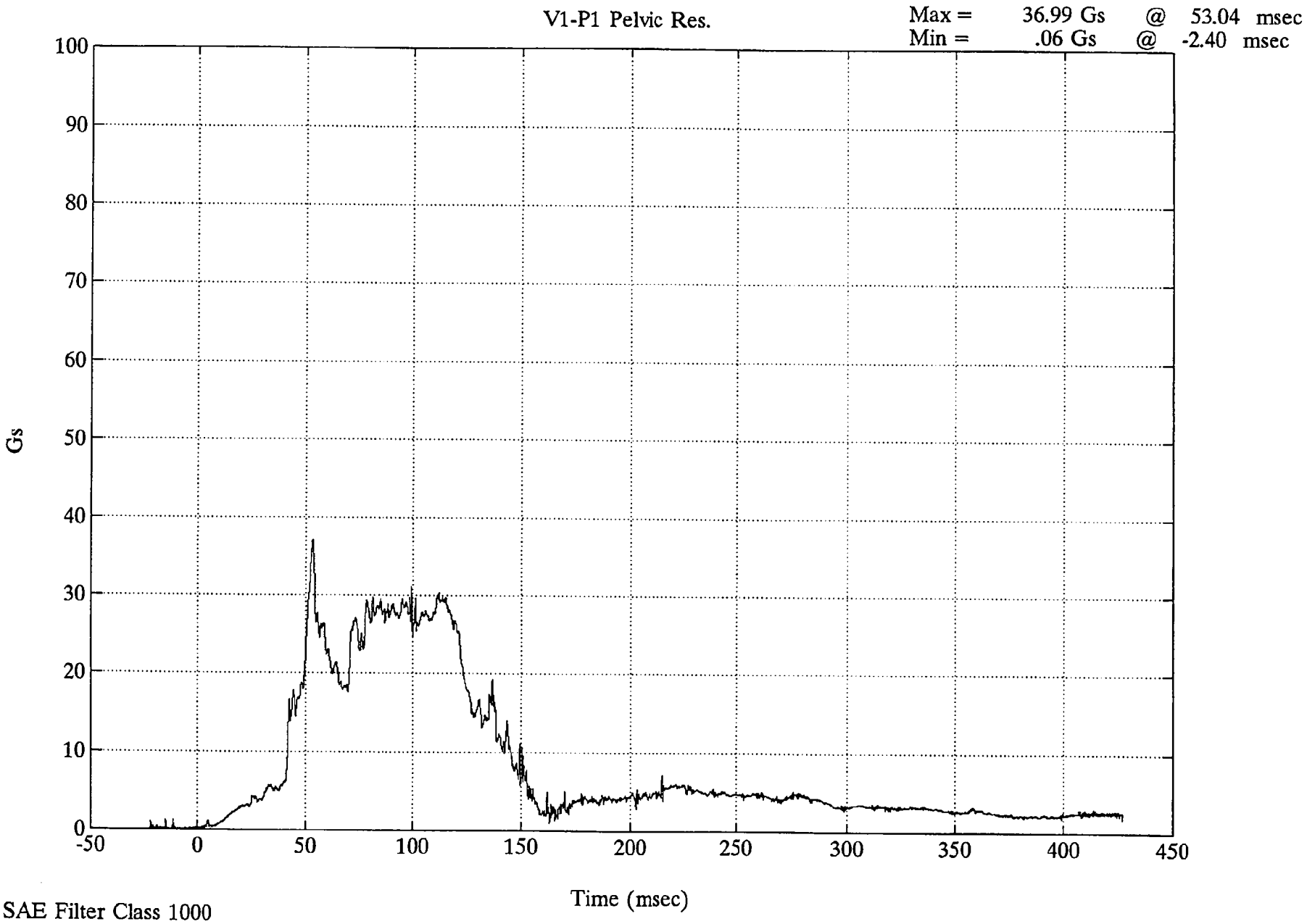


B-120

8118-12

SAE Filter Class 1000

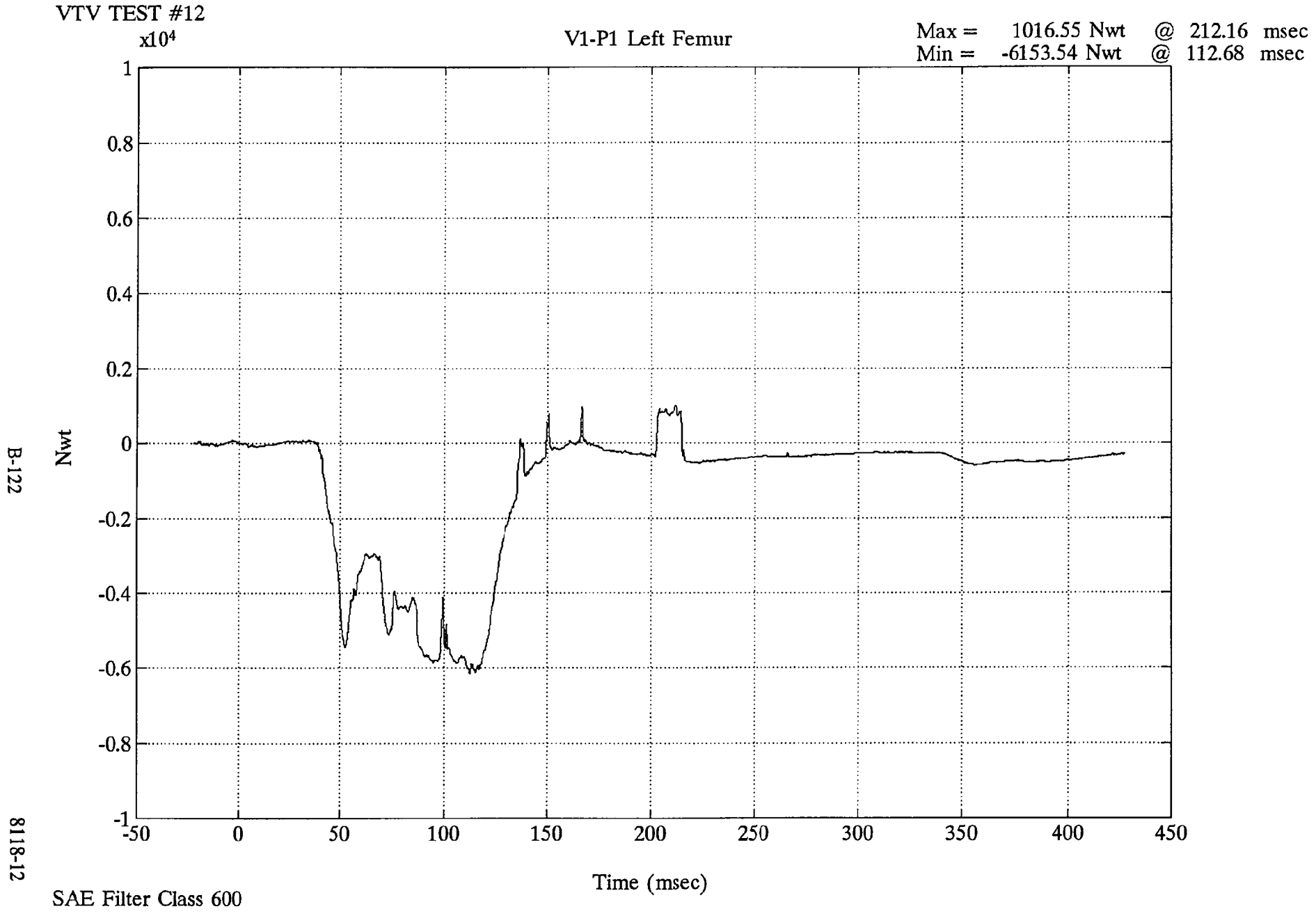
VTV TEST #12



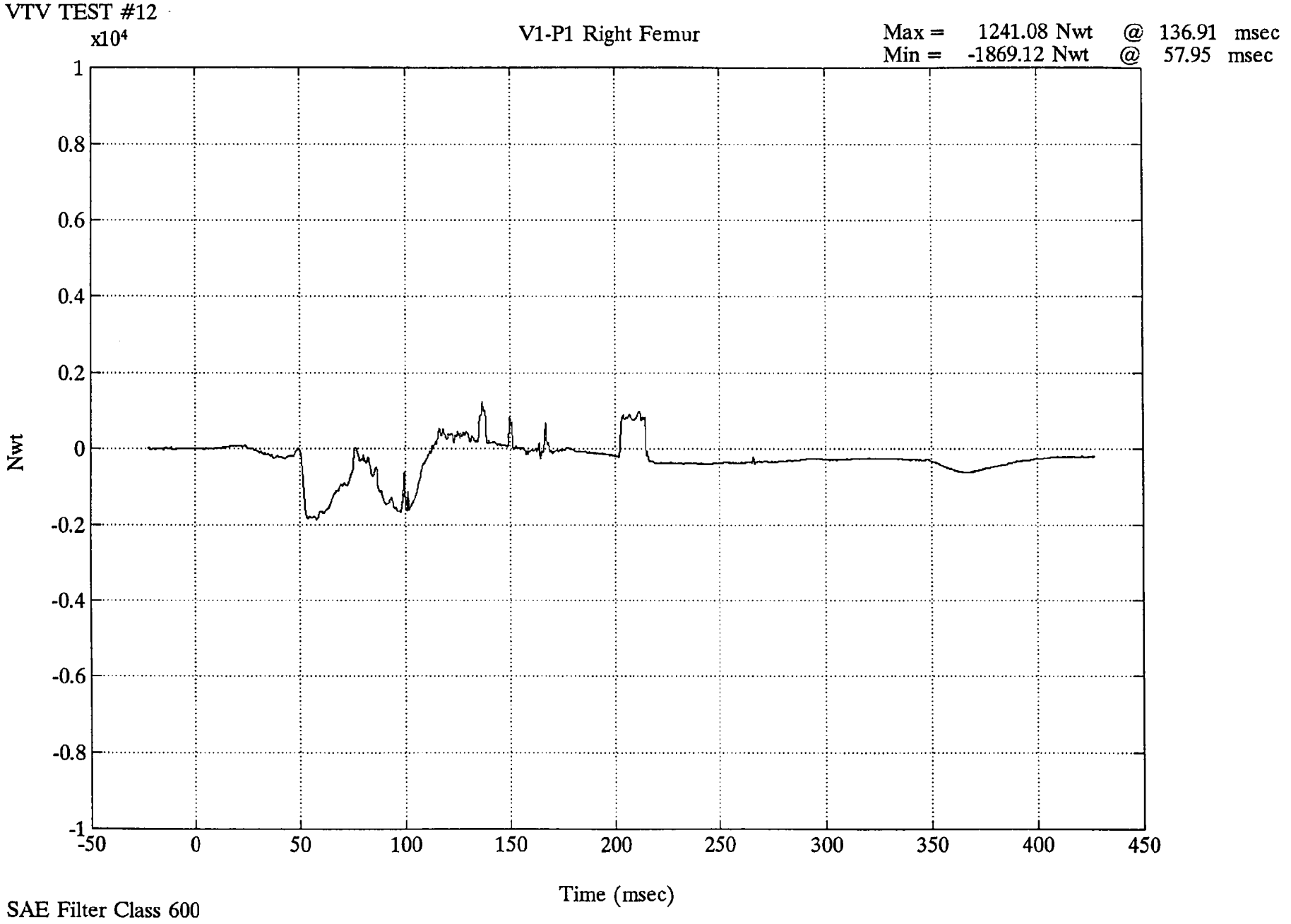
B-121

8118-12

SAE Filter Class 1000


VTV TEST #12
x10^4
V1-P1 Left Femur
Max = 1016.55 Nwt @ 212.16 msec
Min = -6153.54 Nwt @ 112.68 msec
Nwt
Time (msec)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-50
0
50
100
150
200
250
300
350
400
450
B-122
8118-12
SAE Filter Class 600

VTV TEST #12

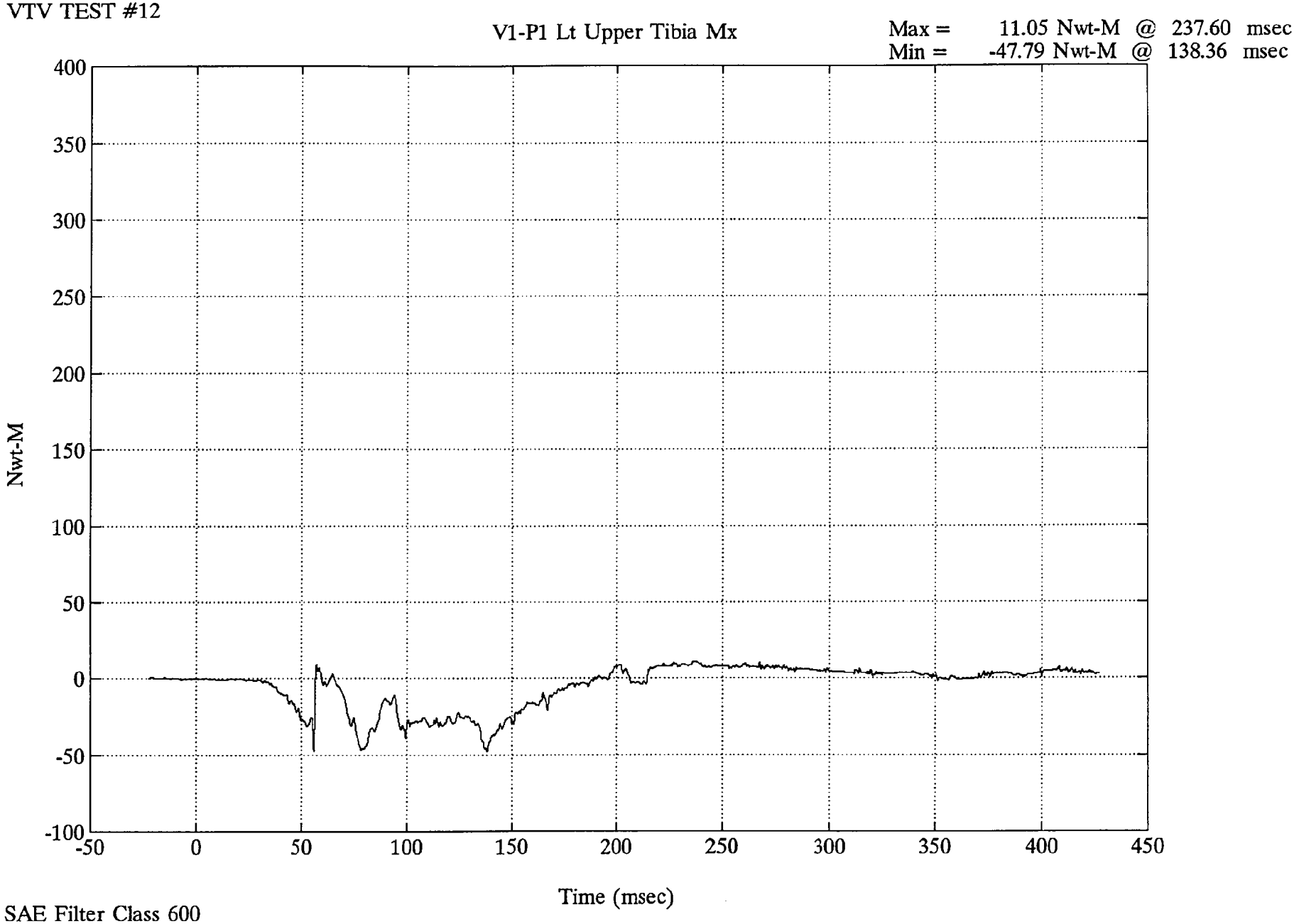


B-123

8118-12

SAE Filter Class 600

VTV TEST #12

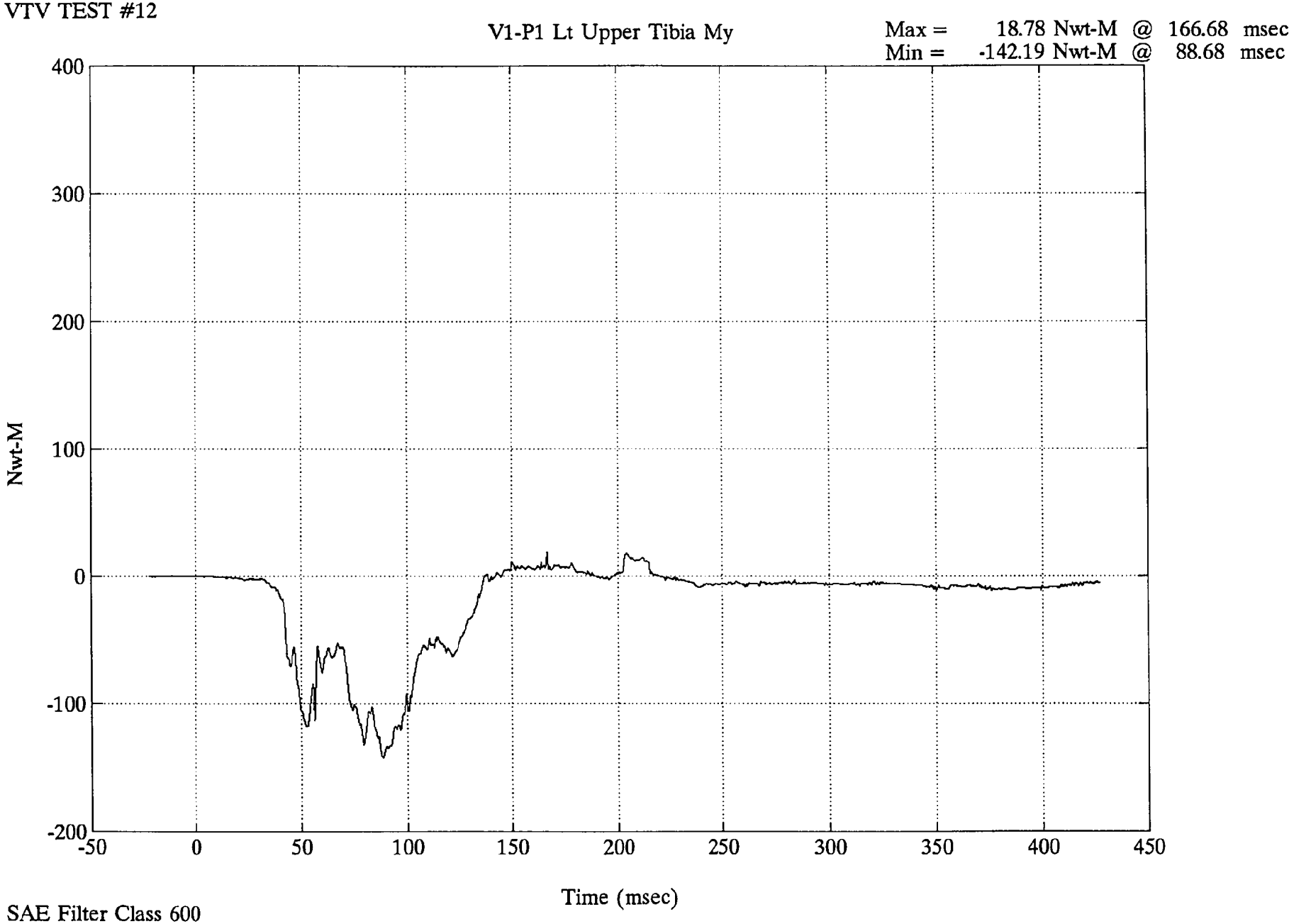


B-124

8118-12

SAE Filter Class 600

VTV TEST #12

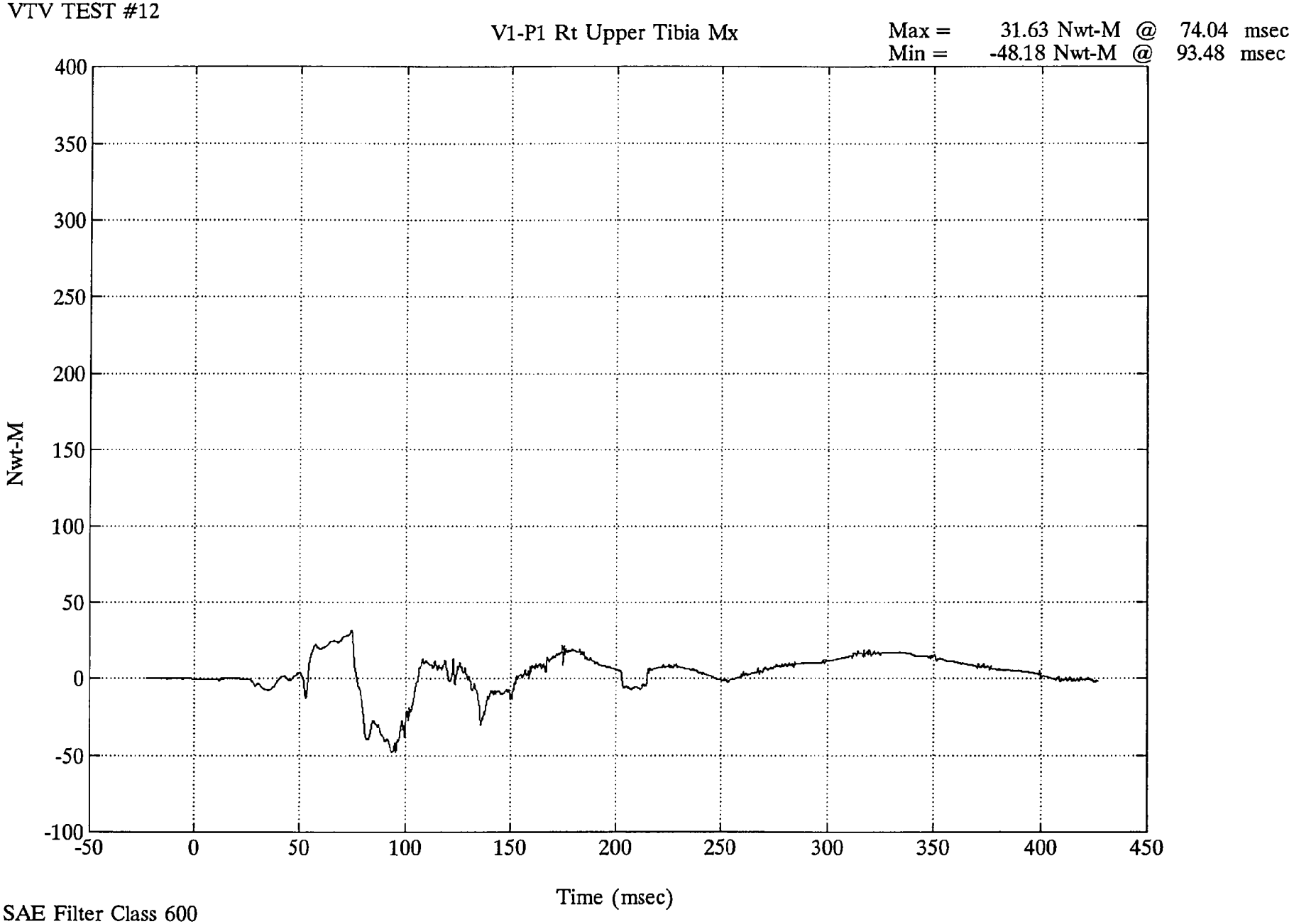


B-125

8118-12

SAE Filter Class 600

VTV TEST #12

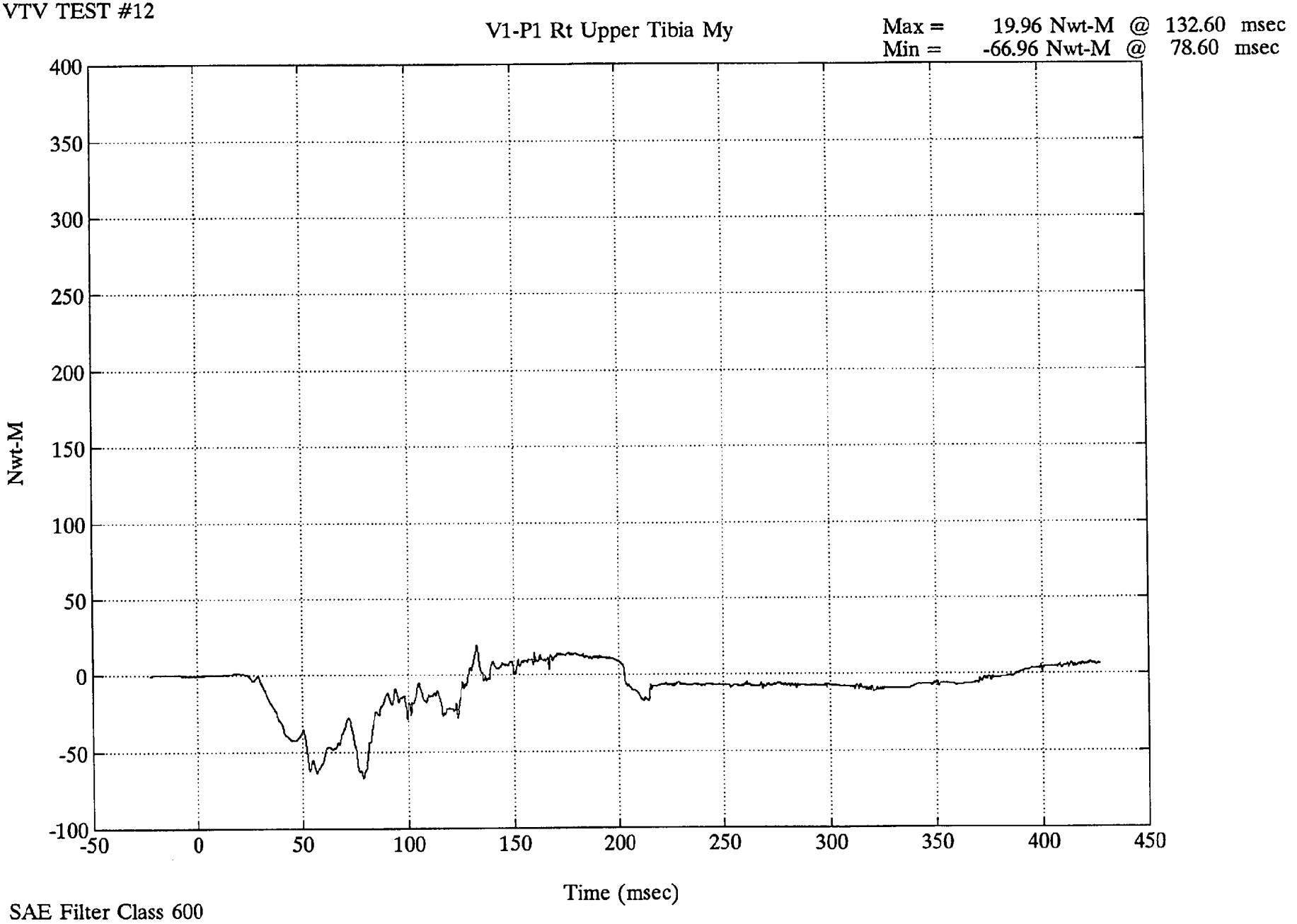


B-126

8118-12

SAE Filter Class 600

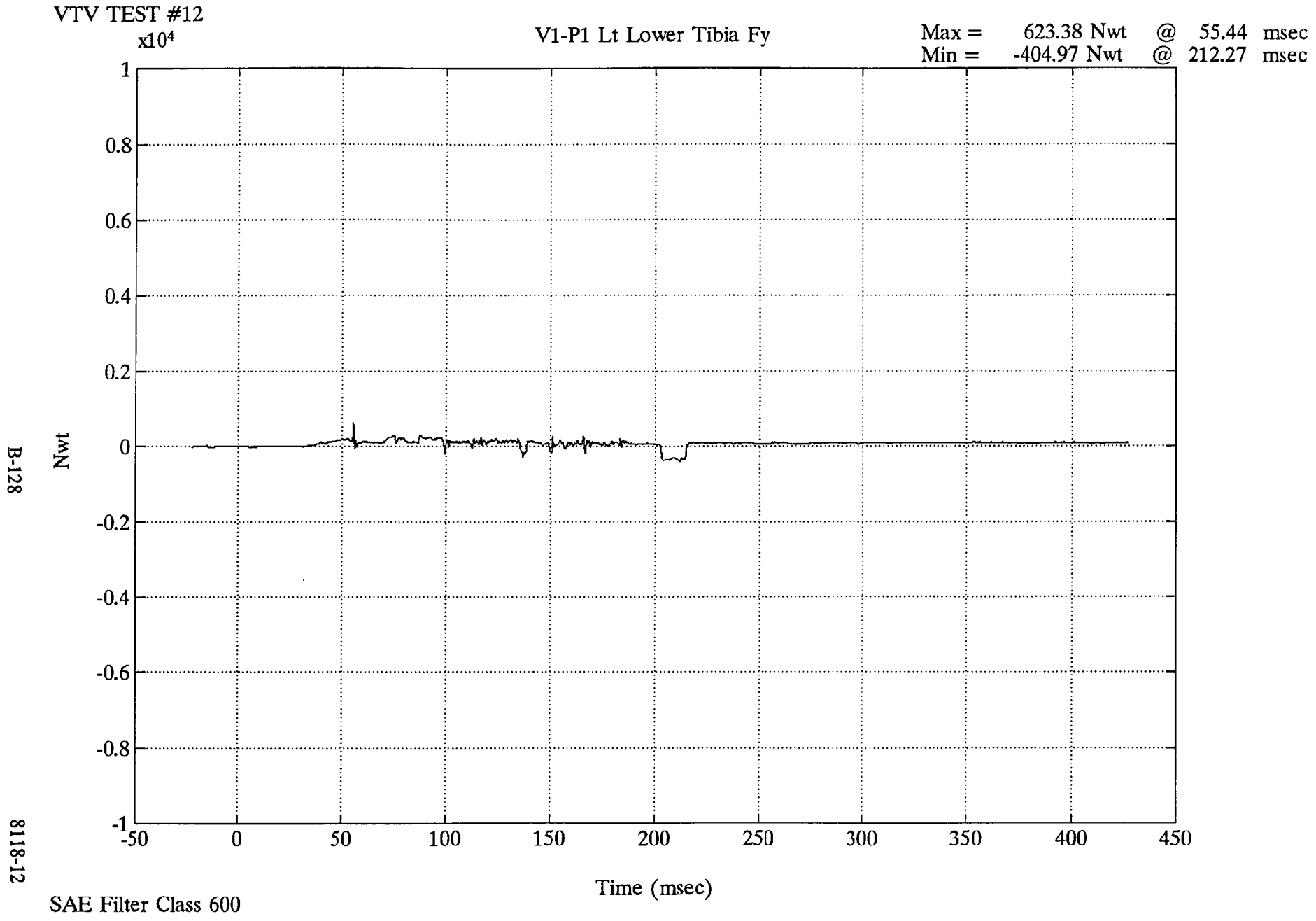
VTV TEST #12



B-127

8118-12

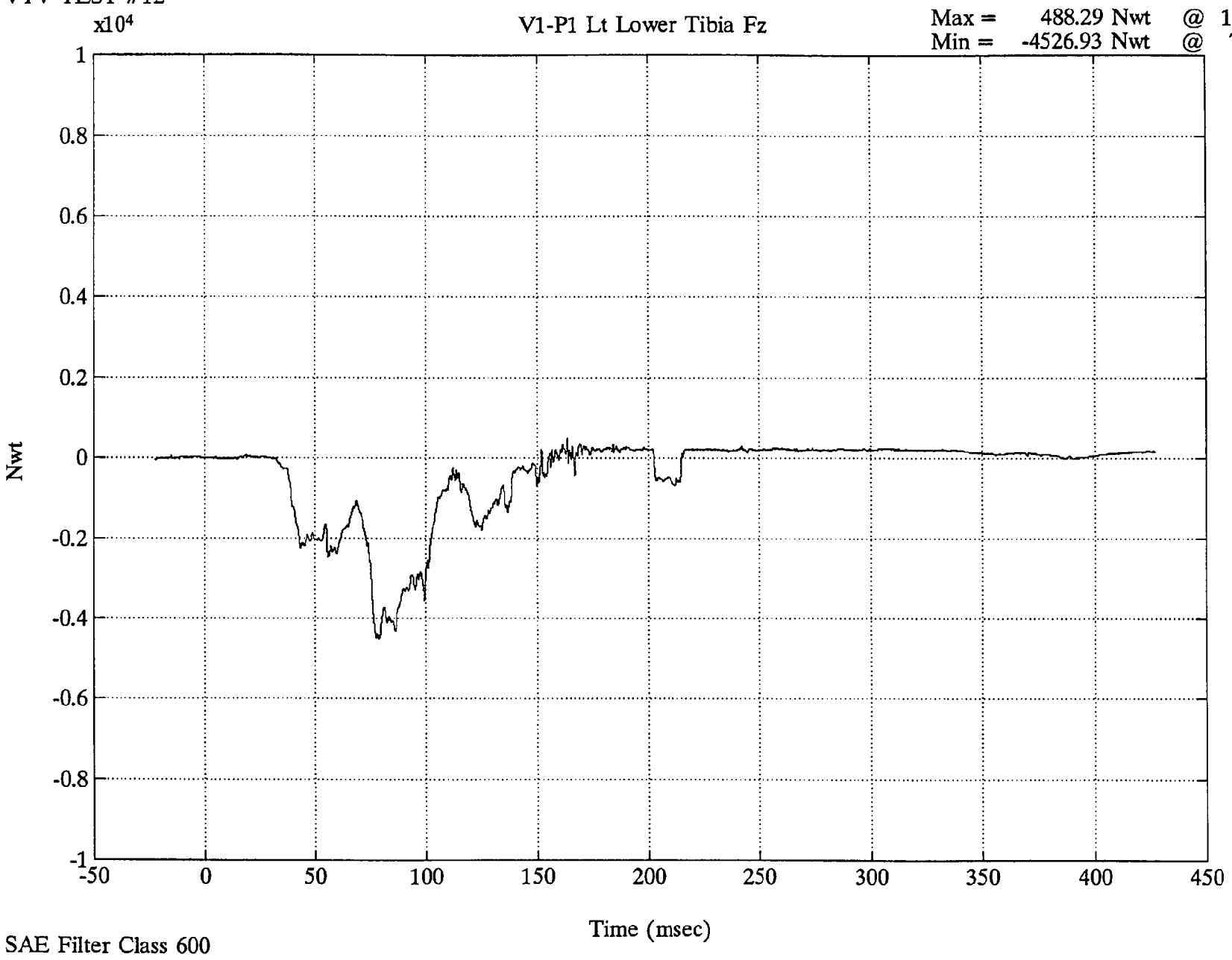
SAE Filter Class 600


VTV TEST #12
x10⁴
V1-P1 Lt Lower Tibia Fy
Max = 623.38 Nwt @ 55.44 msec
Min = -404.97 Nwt @ 212.27 msec
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 600

B-128

8118-12

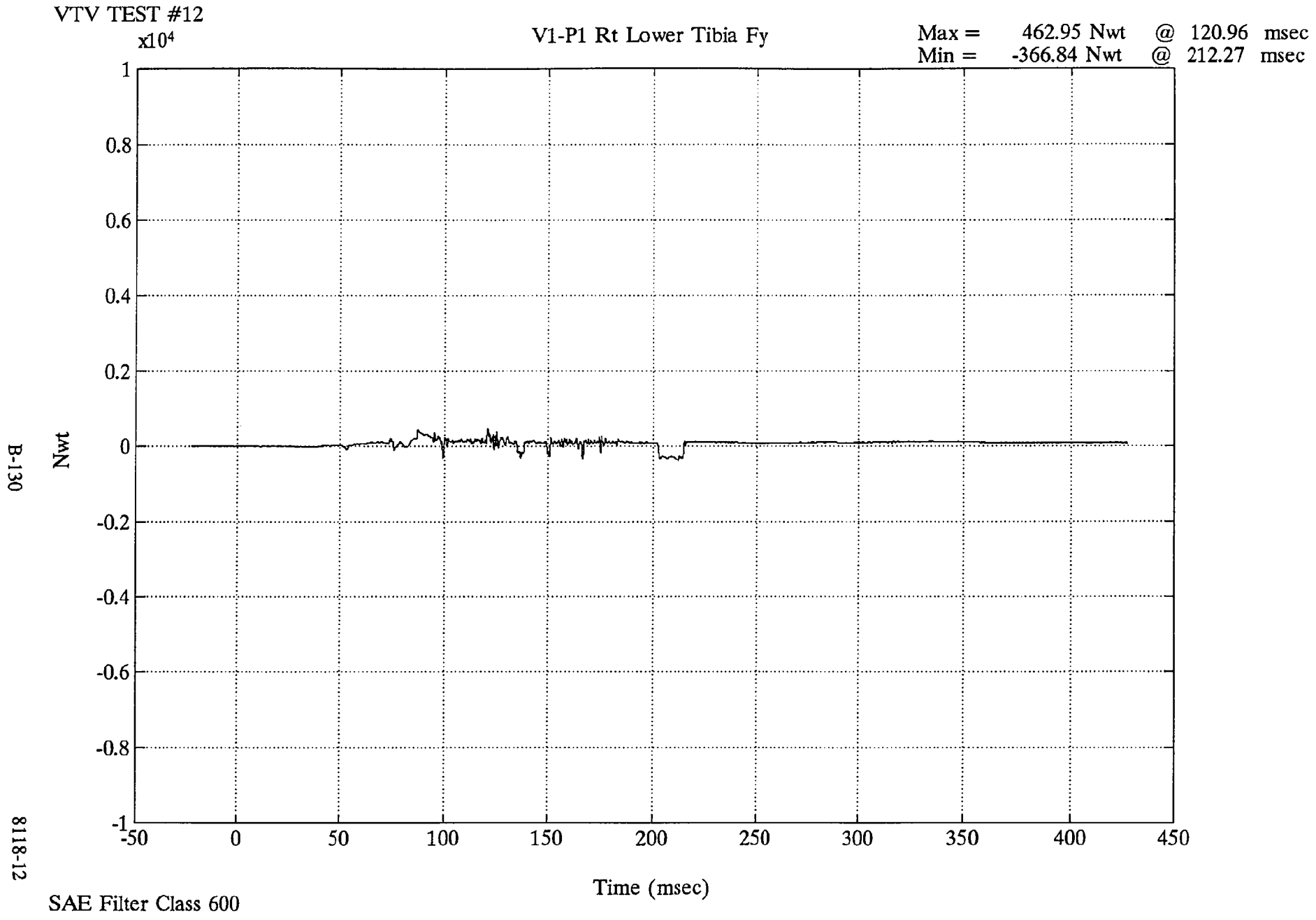
VTV TEST #12

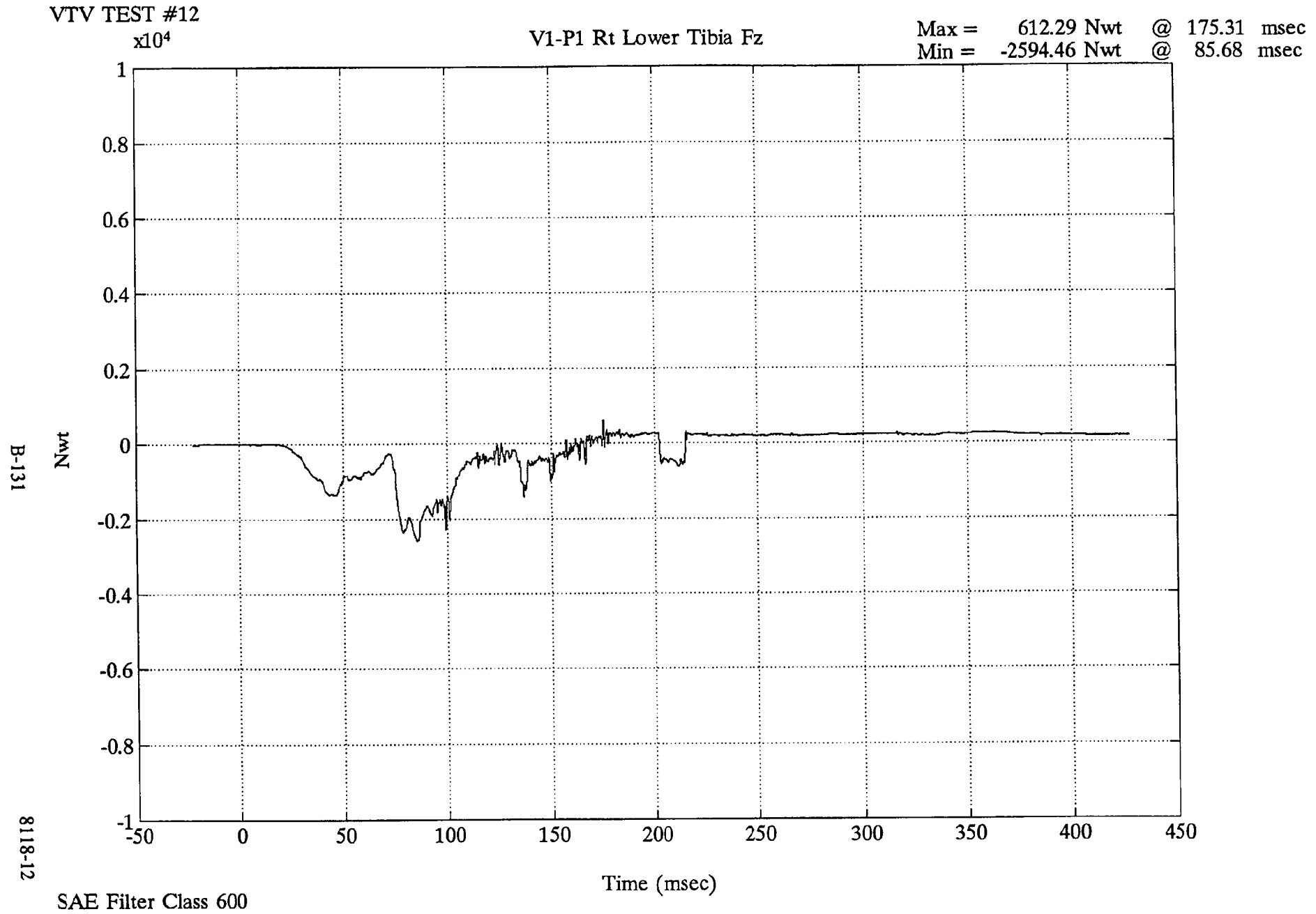


B-129

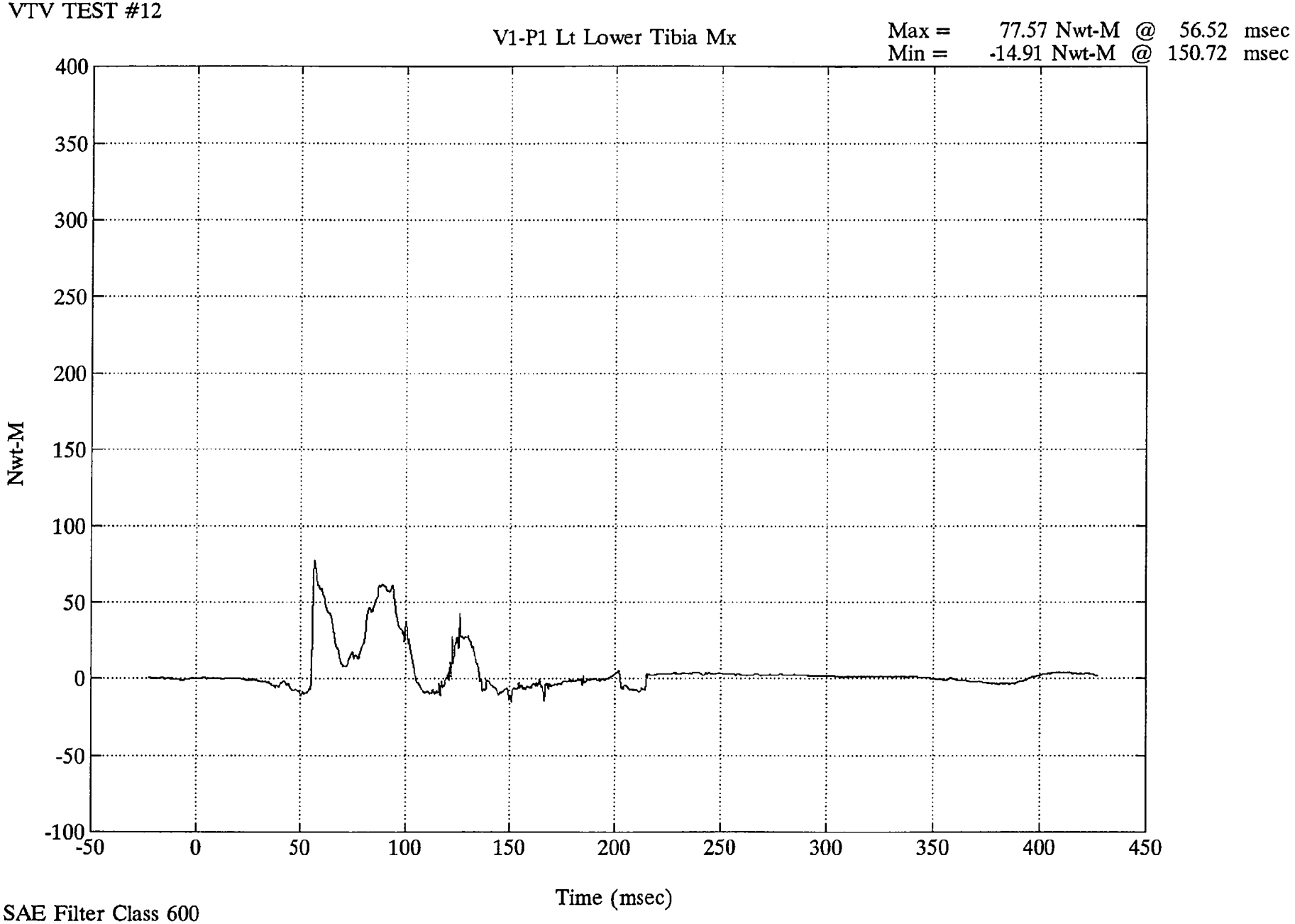
8118-12

SAE Filter Class 600


VTV TEST #12
x10^4
V1-P1 Rt Lower Tibia Fy
Max = 462.95 Nwt @ 120.96 msec
Min = -366.84 Nwt @ 212.27 msec
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 600
B-130
8118-12


VTV TEST #12
x10^4
V1-P1 Rt Lower Tibia Fz
Max = 612.29 Nwt @ 175.31 msec
Min = -2594.46 Nwt @ 85.68 msec
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
B-131
8118-12
SAE Filter Class 600

VTV TEST #12

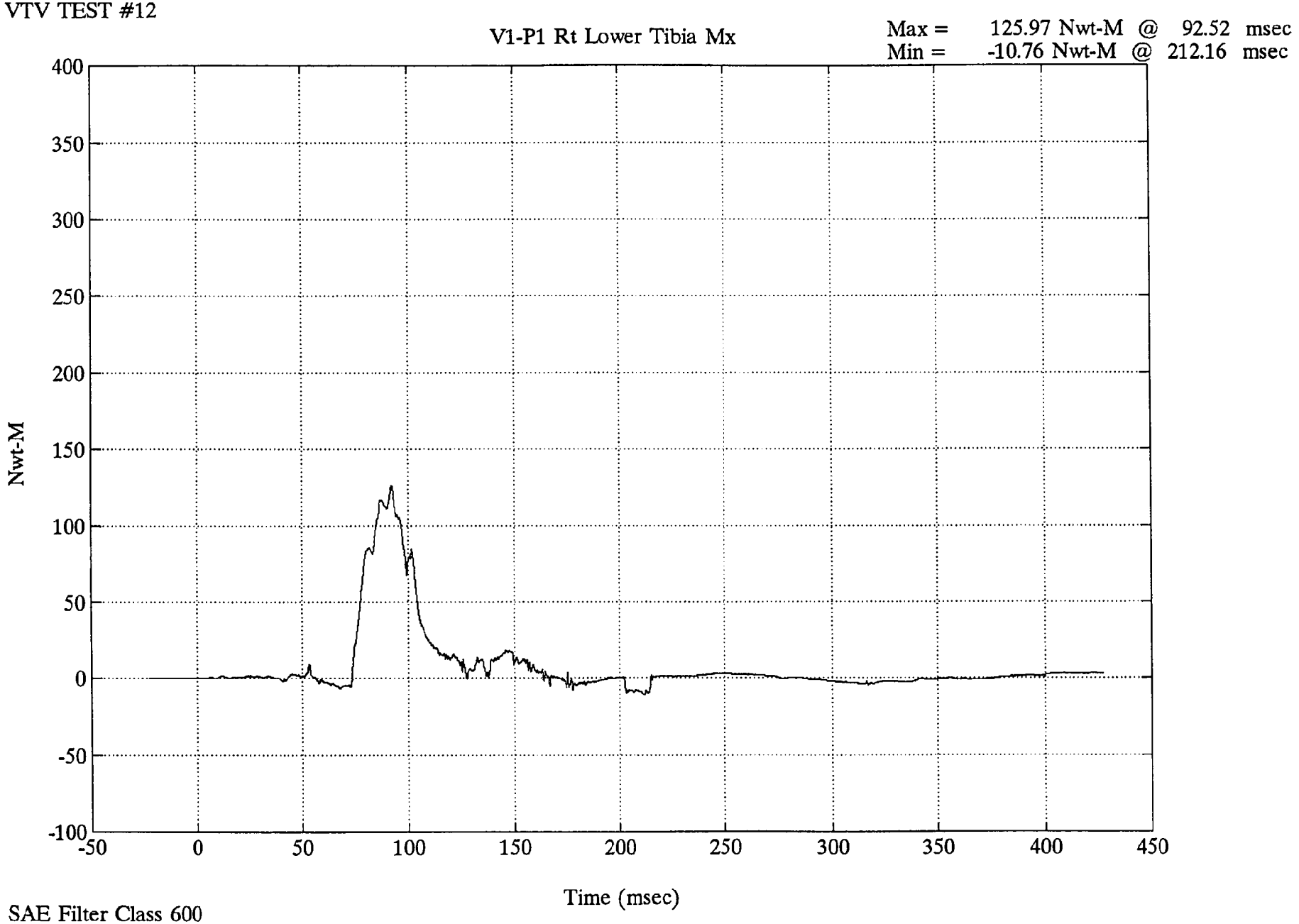


SAE Filter Class 600

B-132

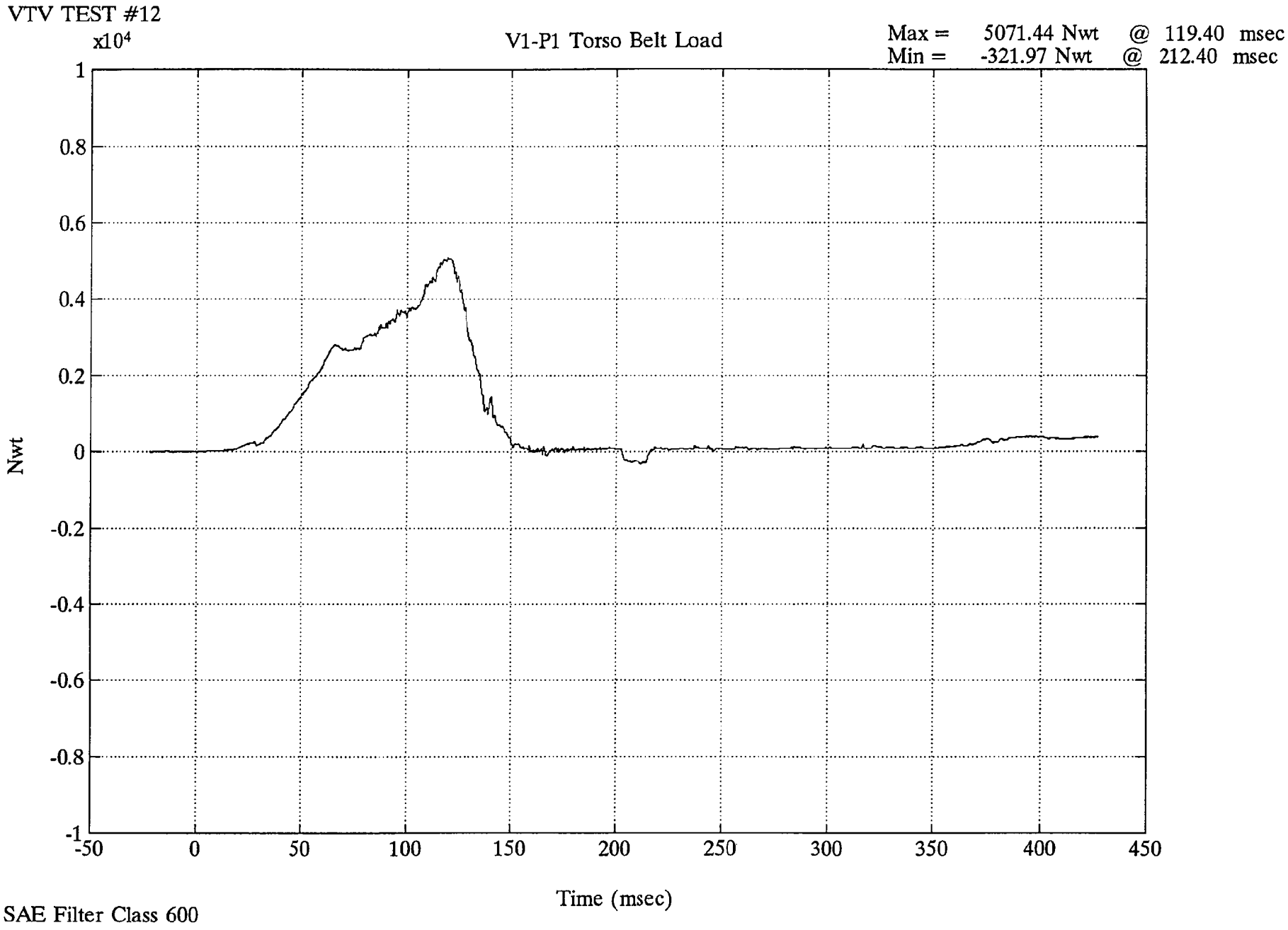
8118-12

VTV TEST #12

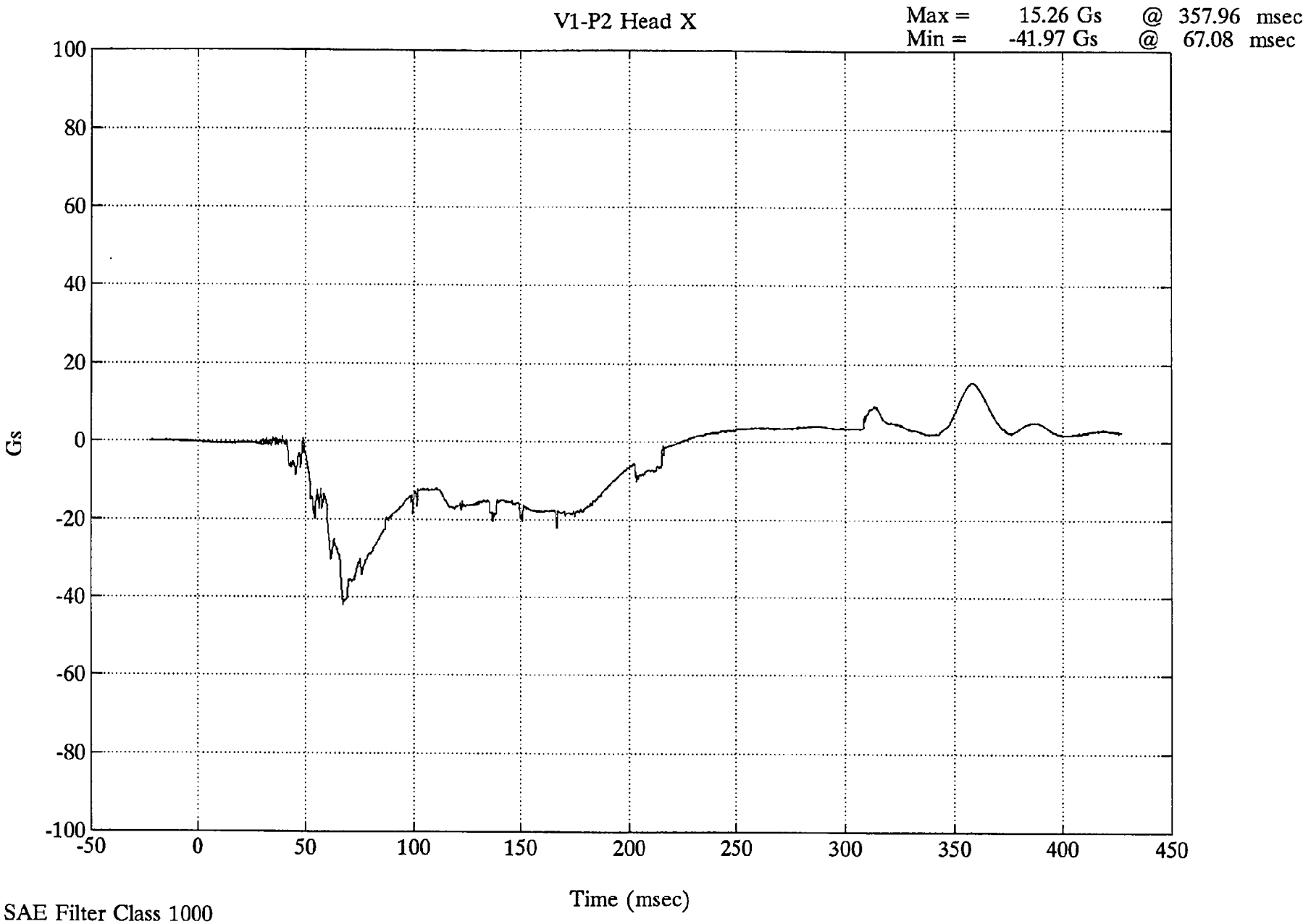


SAE Filter Class 600

8118-12


VTV TEST #12
x10^4
V1-P1 Torso Belt Load
Max = 5071.44 Nwt @ 119.40 msec
Min = -321.97 Nwt @ 212.40 msec
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 600

VTV TEST #12

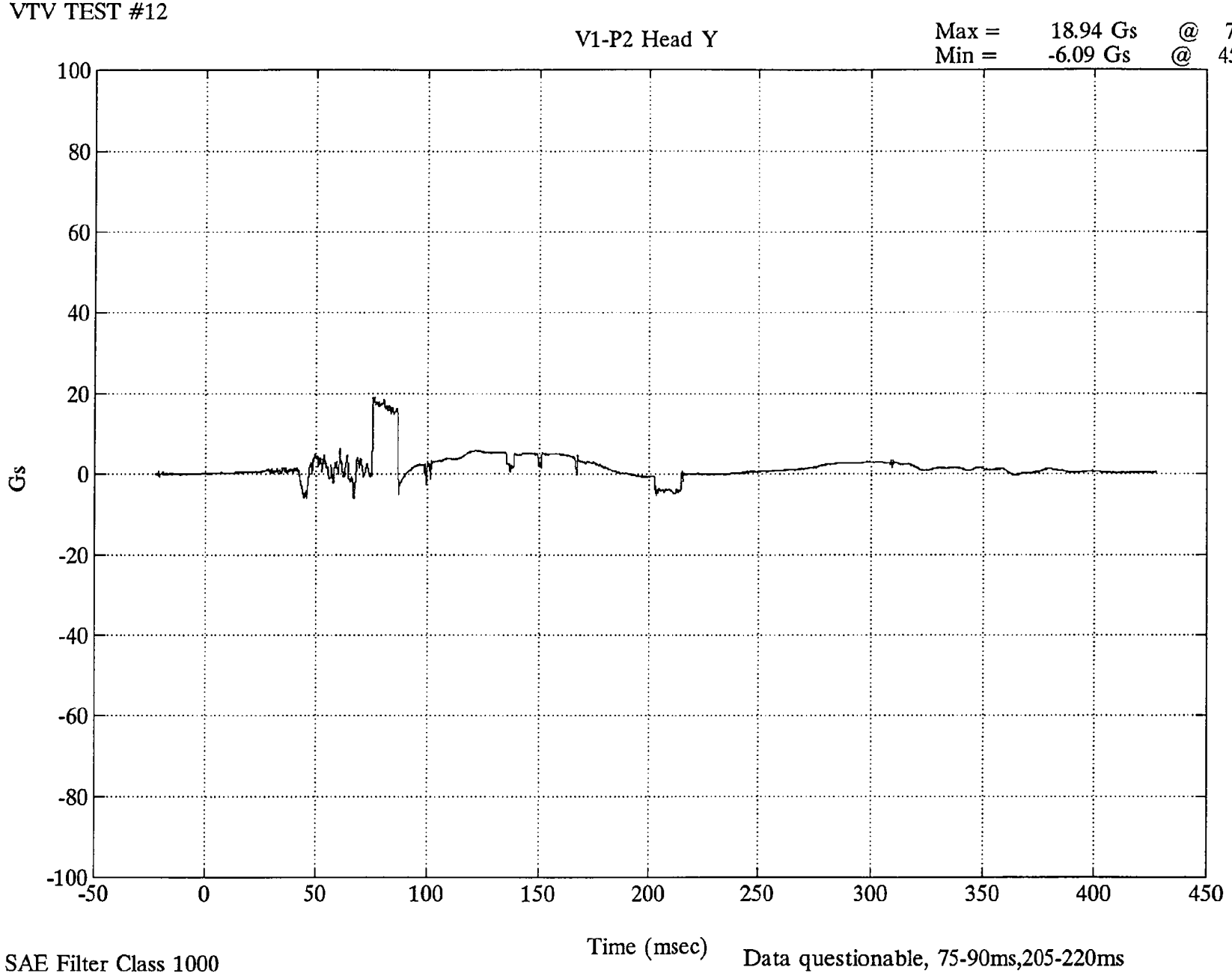


B-135

8118-12

SAE Filter Class 1000

VTV TEST #12



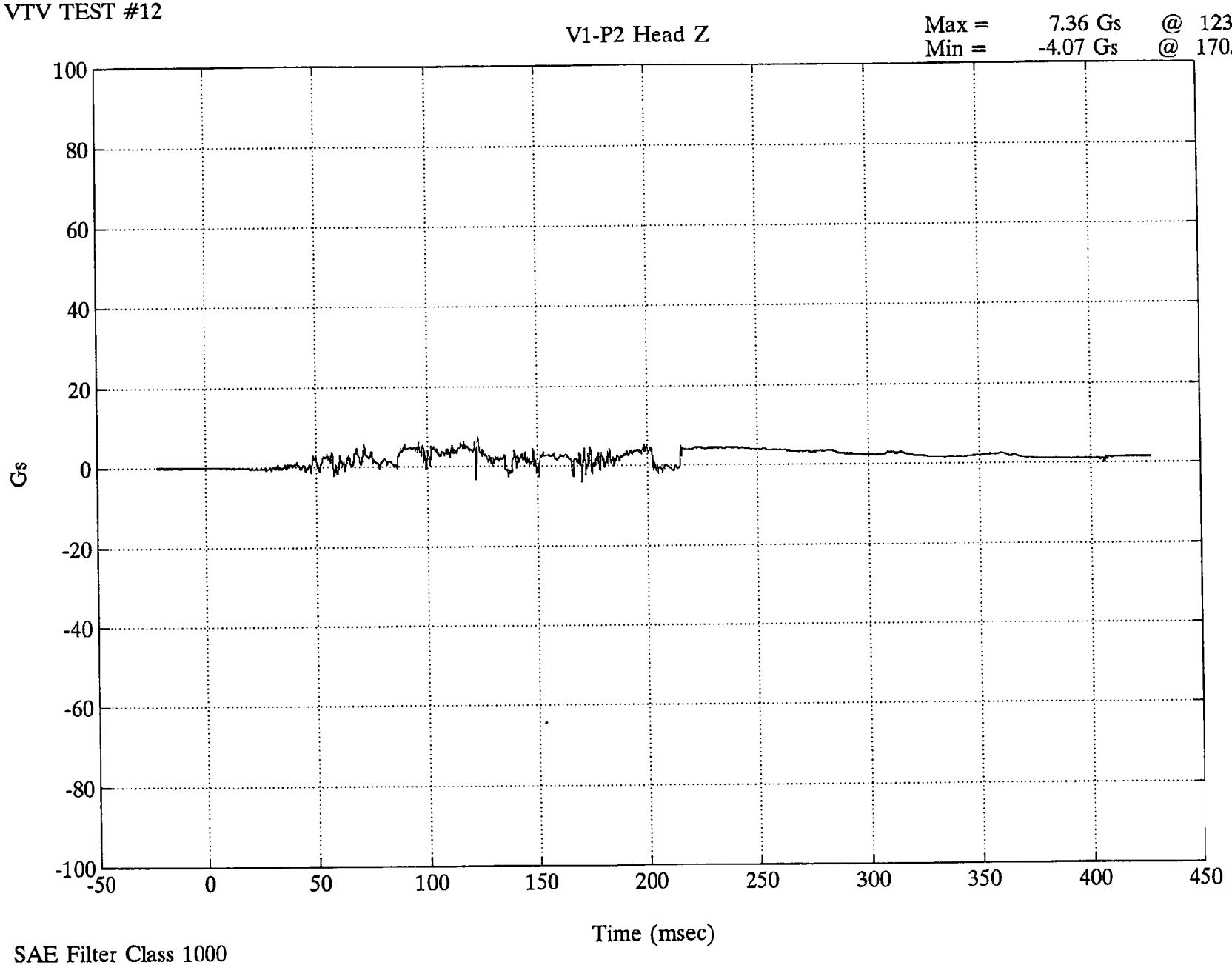
SAE Filter Class 1000

Data questionable, 75-90ms,205-220ms

B-136

8118-12

VTV TEST #12

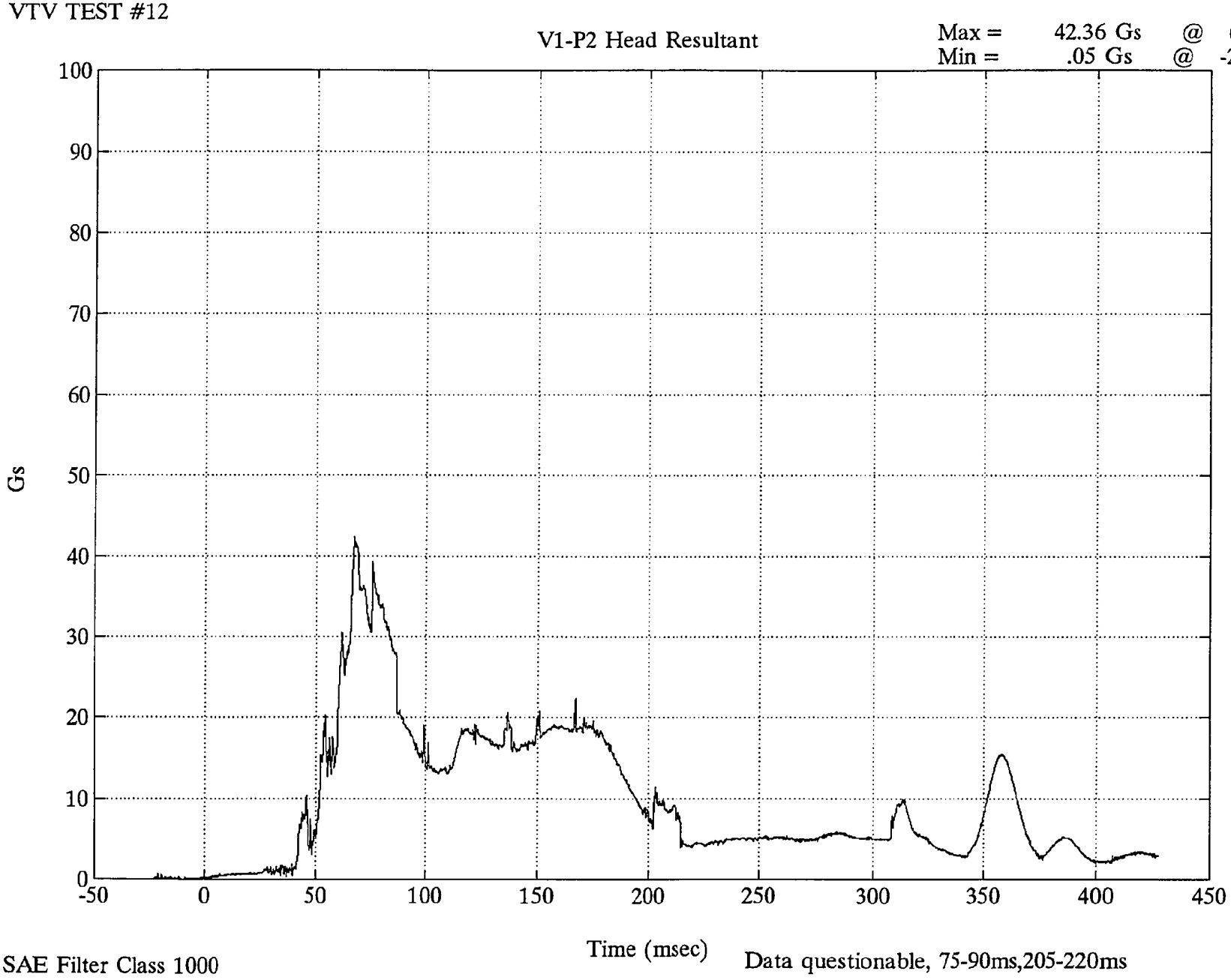


SAE Filter Class 1000

B-137

8118-12

VTV TEST #12



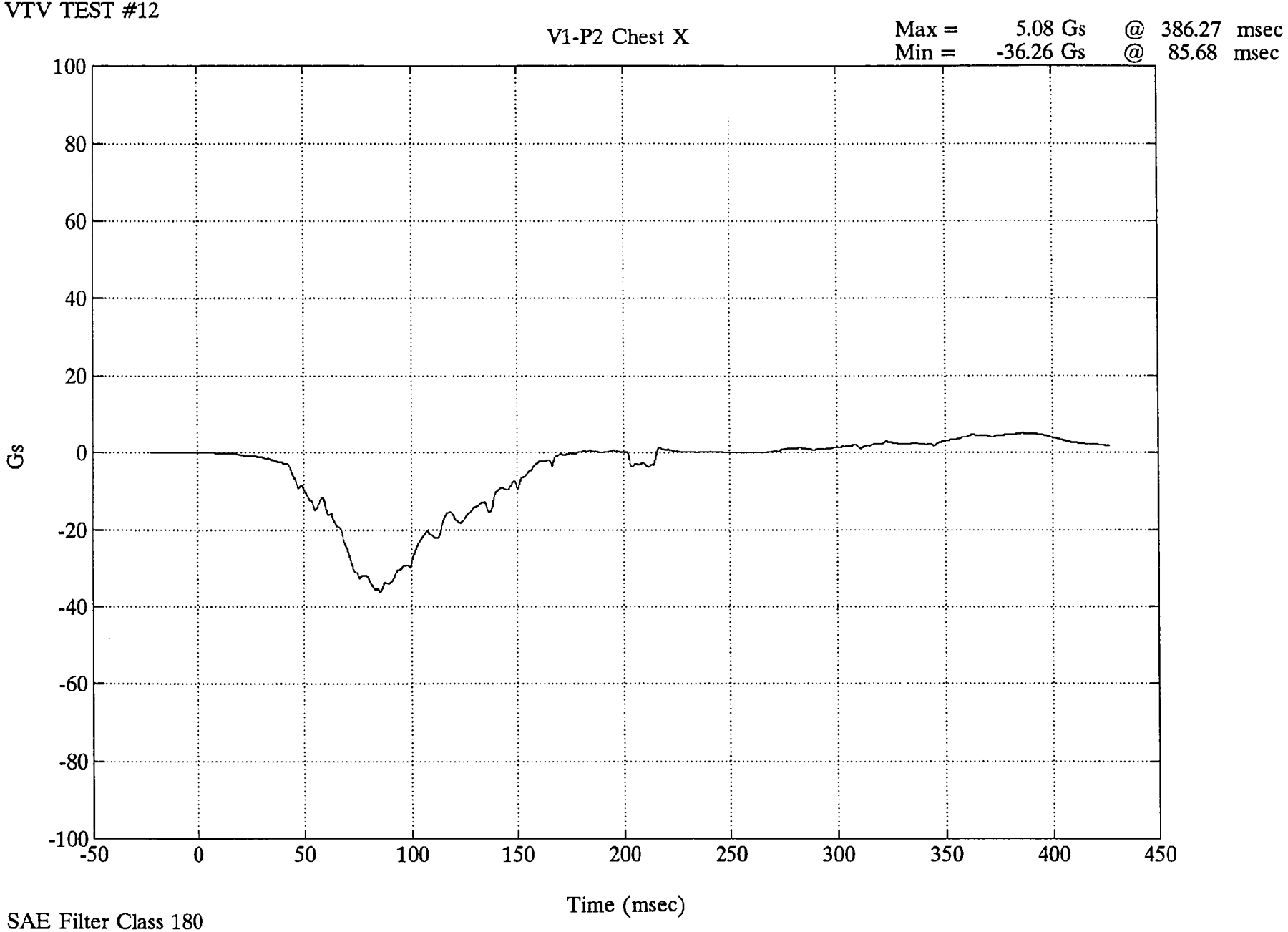
SAE Filter Class 1000

Data questionable, 75-90ms,205-220ms

B-138

8118-12

VTV TEST #12

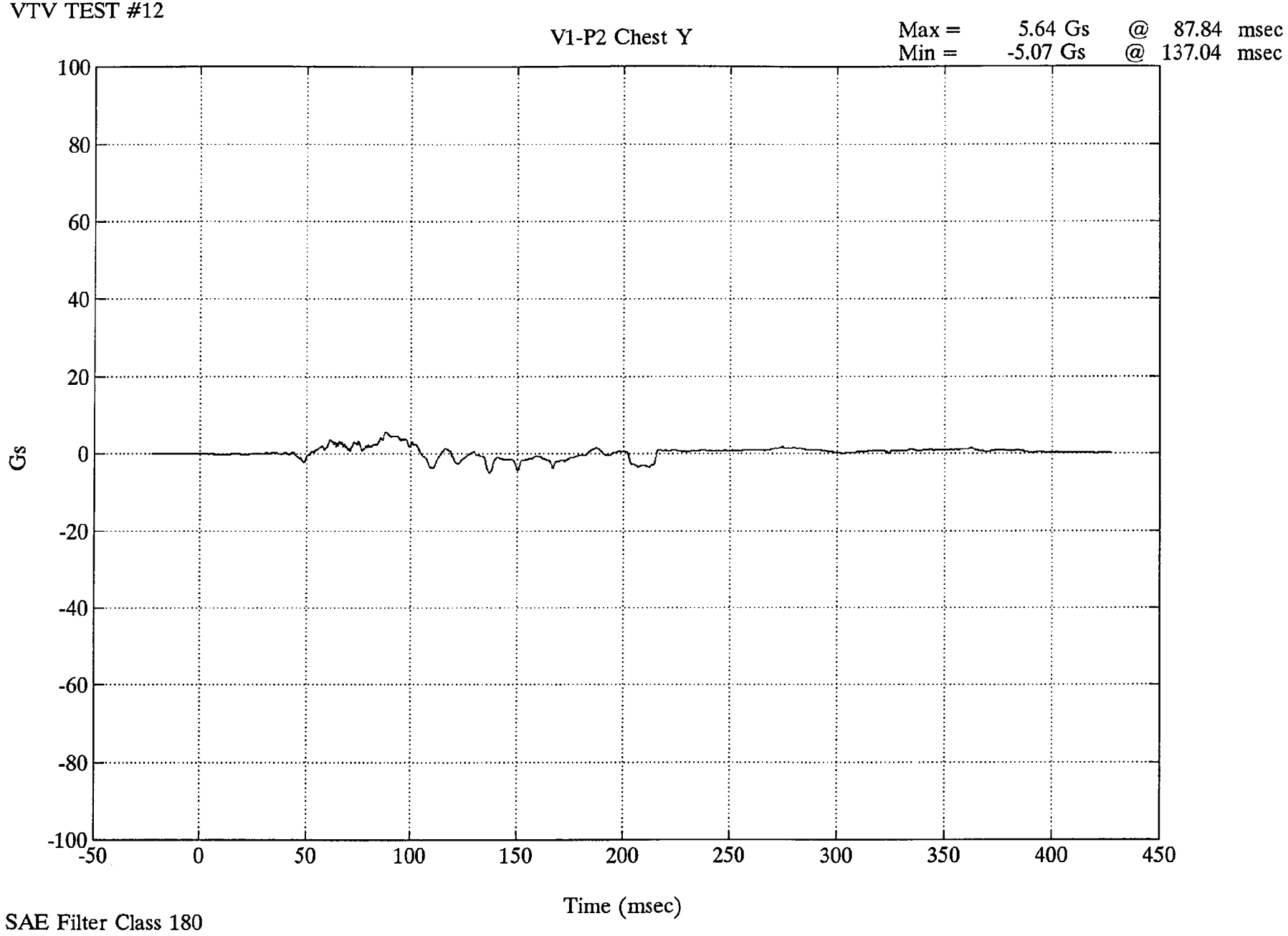


SAE Filter Class 180

B-139

8118-12

VTV TEST #12

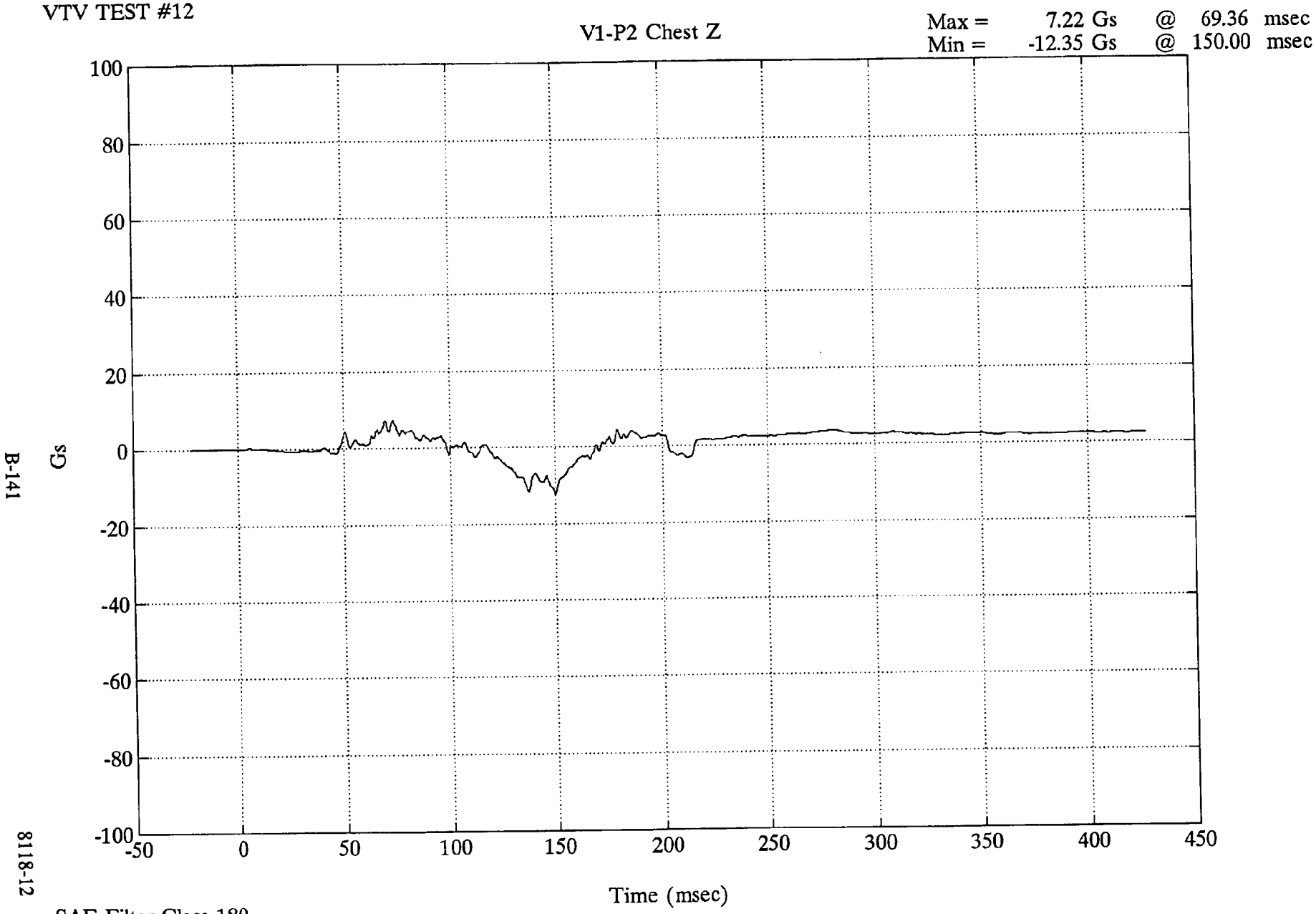


B-140

8118-12

SAE Filter Class 180

VTV TEST #12

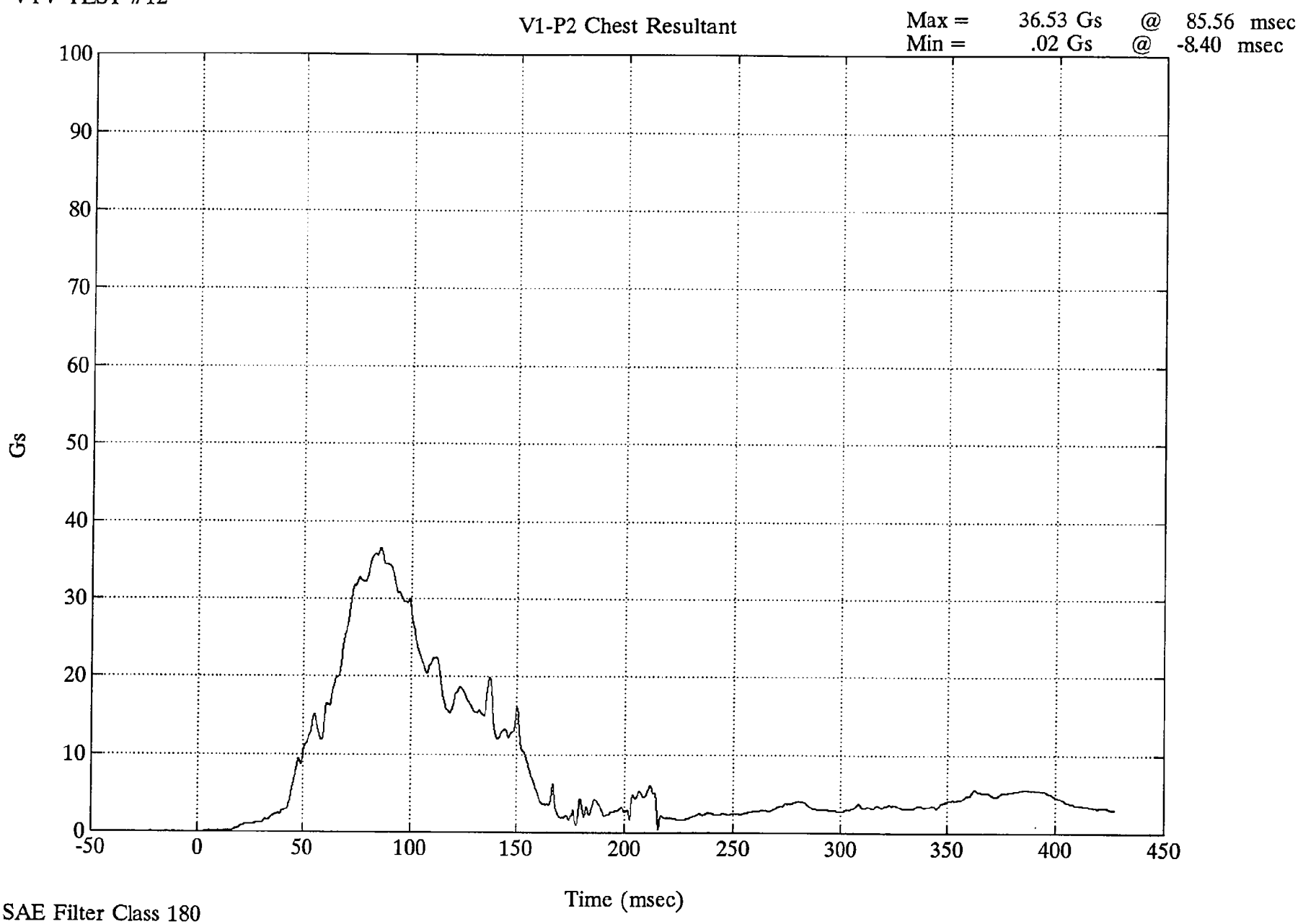


B-141

8118-12

SAE Filter Class 180

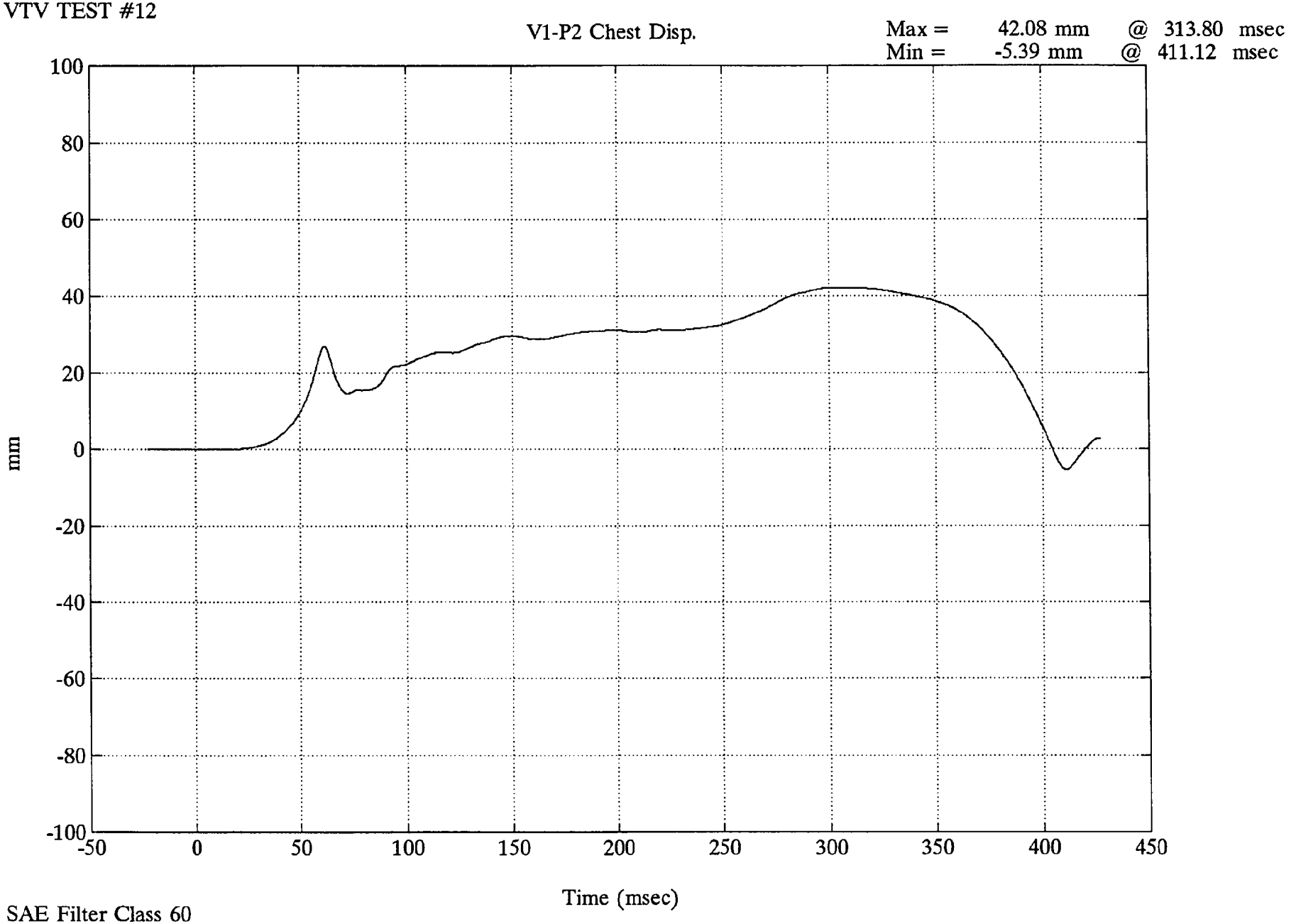
VTV TEST #12



SAE Filter Class 180

8118-12

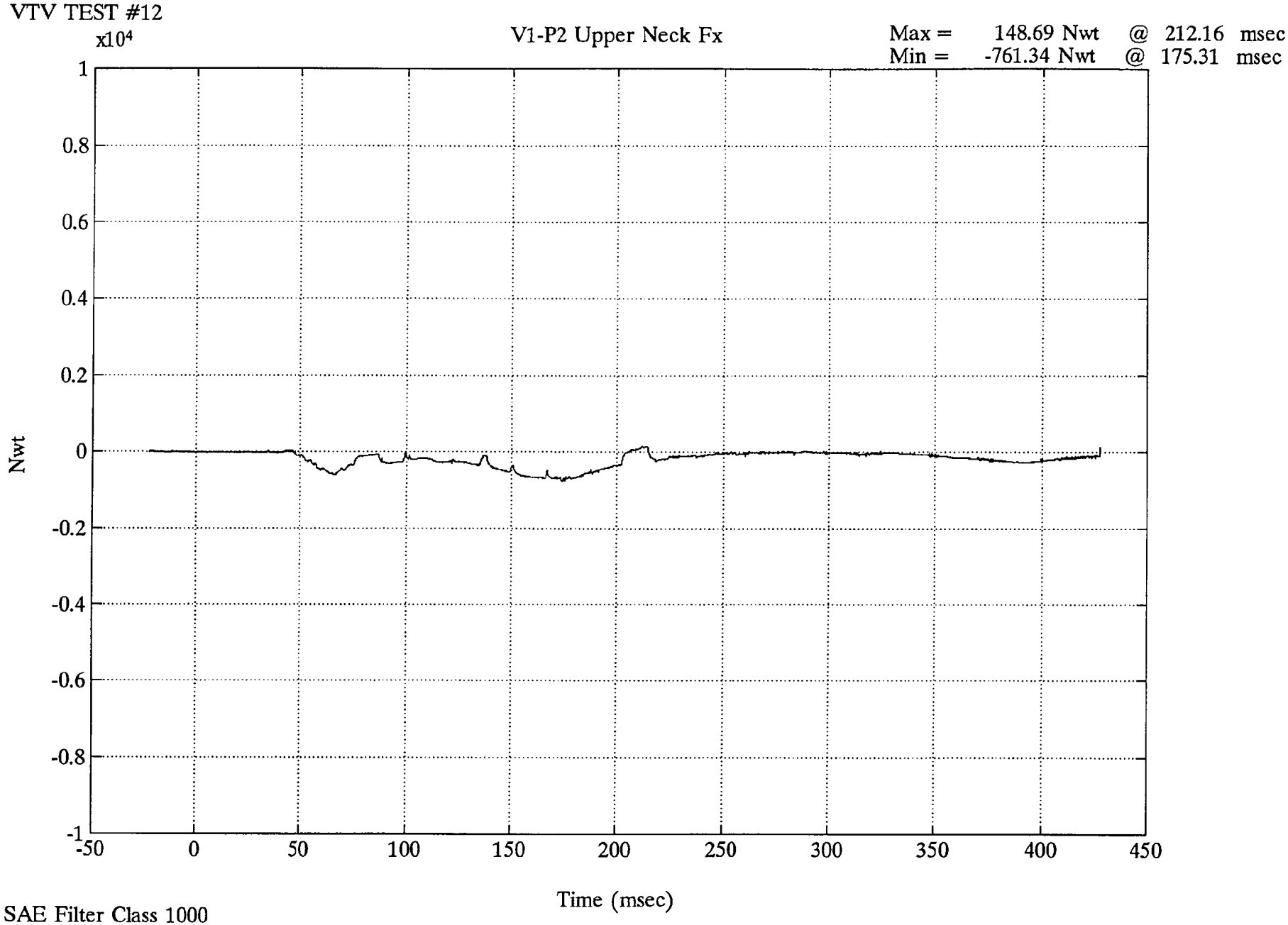
VTV TEST #12



SAE Filter Class 60

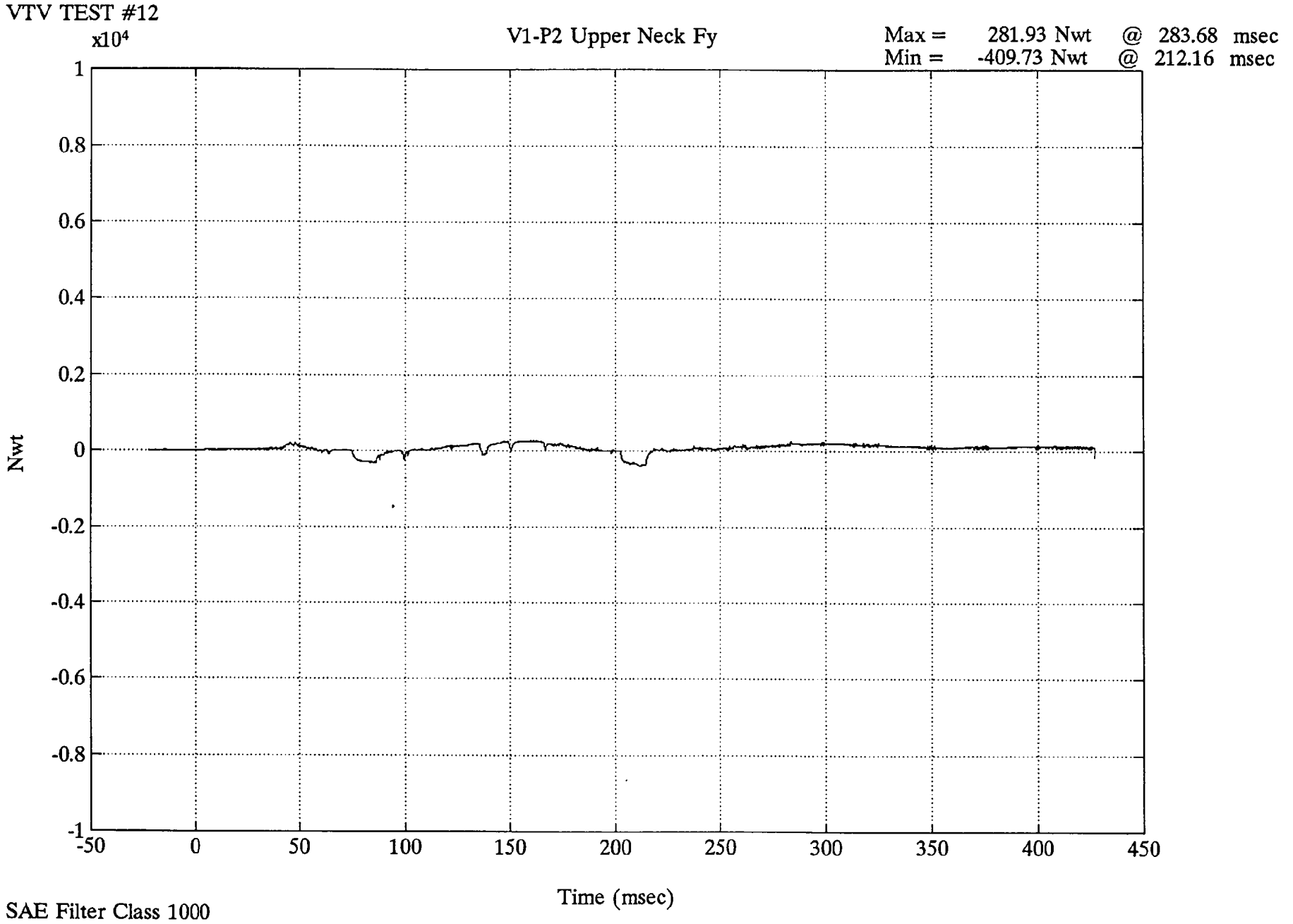
B-143

8118-12


VTV TEST #12
x10⁴
V1-P2 Upper Neck Fx
Max = 148.69 Nwt @ 212.16 msec
Min = -761.34 Nwt @ 175.31 msec
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Nwt
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 1000

8118-12

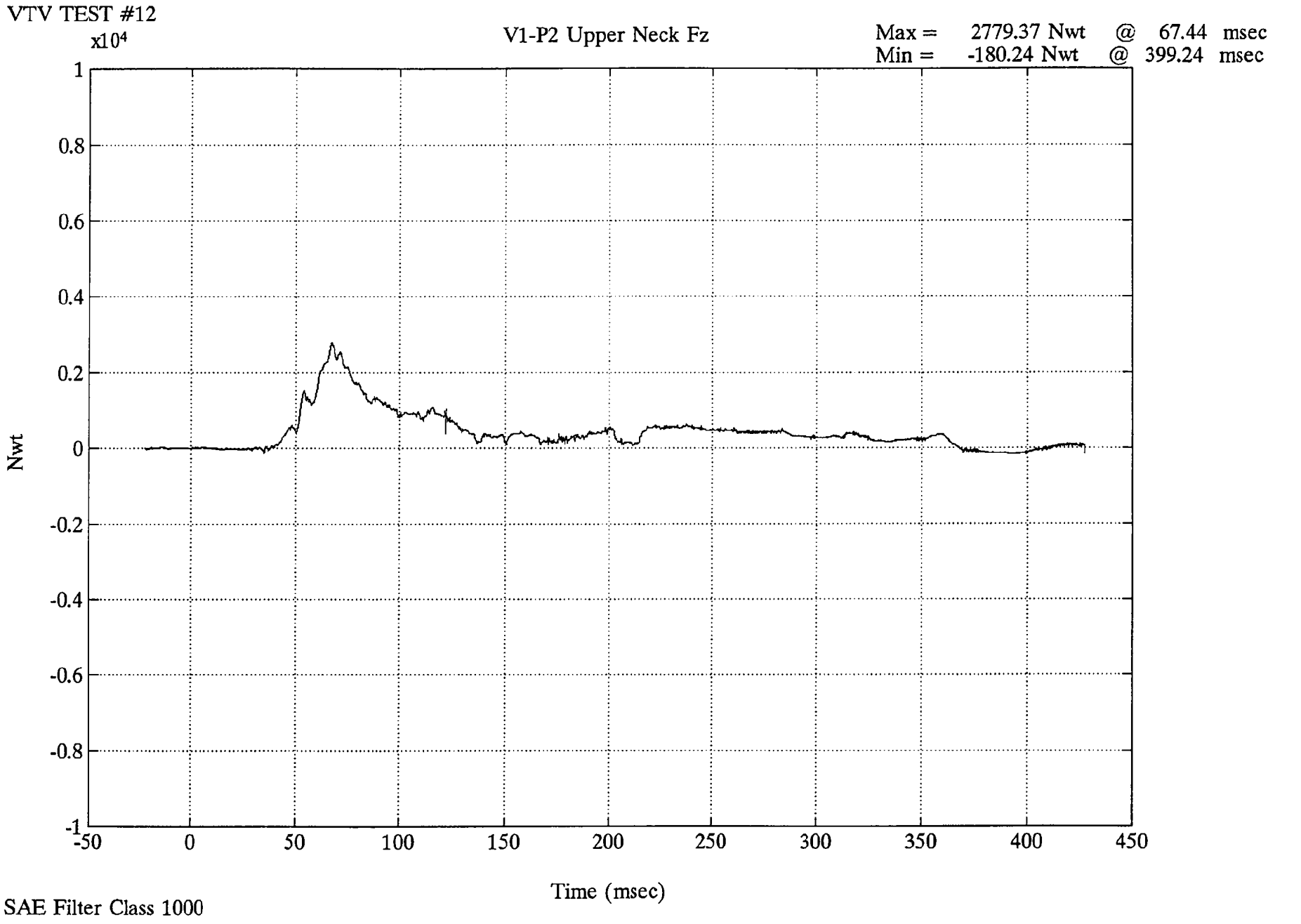
VTV TEST #12



SAE Filter Class 1000

B-145

8118-12

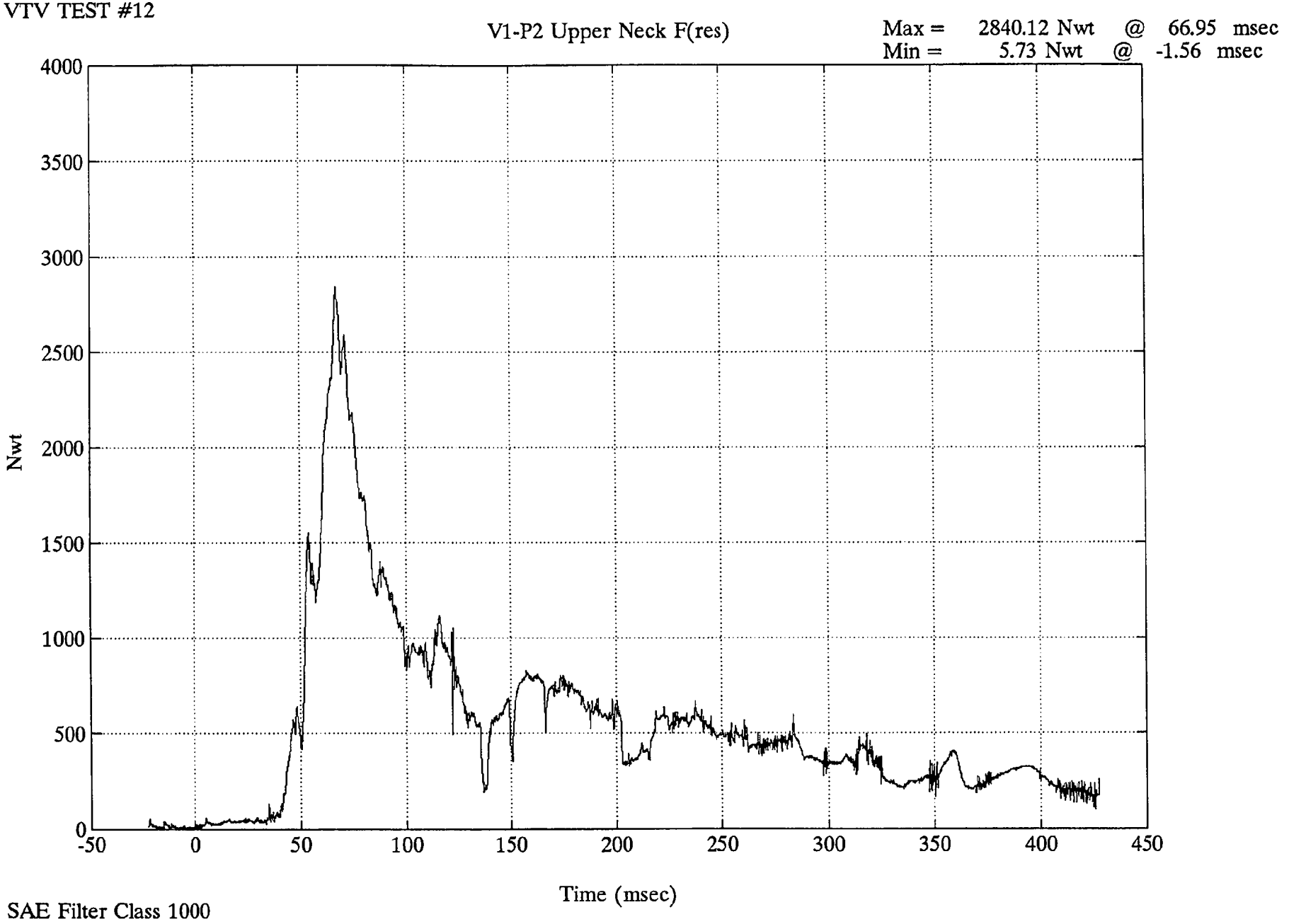


B-146

8118-12

SAE Filter Class 1000

VTV TEST #12

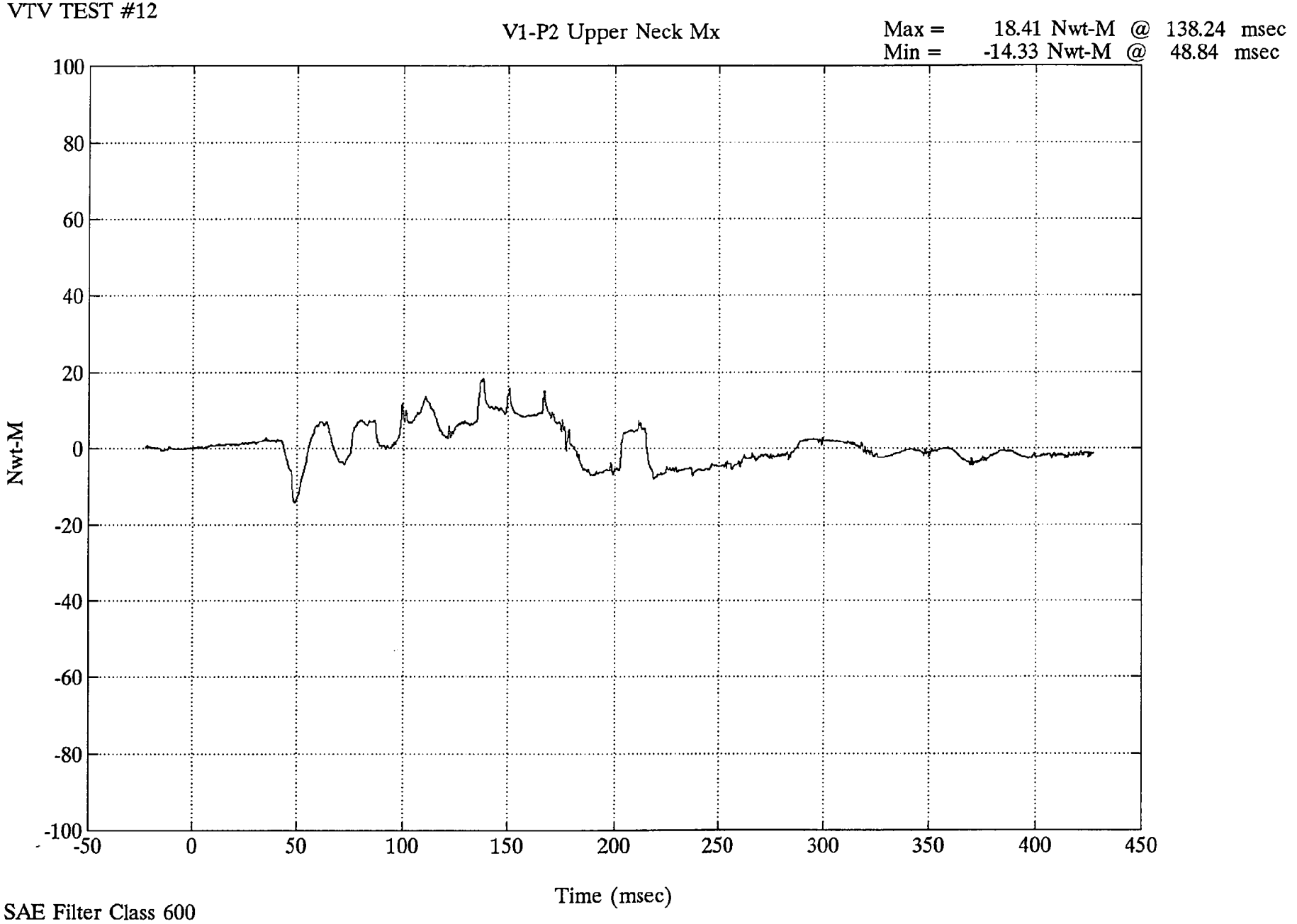


B-147

8118-12

SAE Filter Class 1000

VTV TEST #12

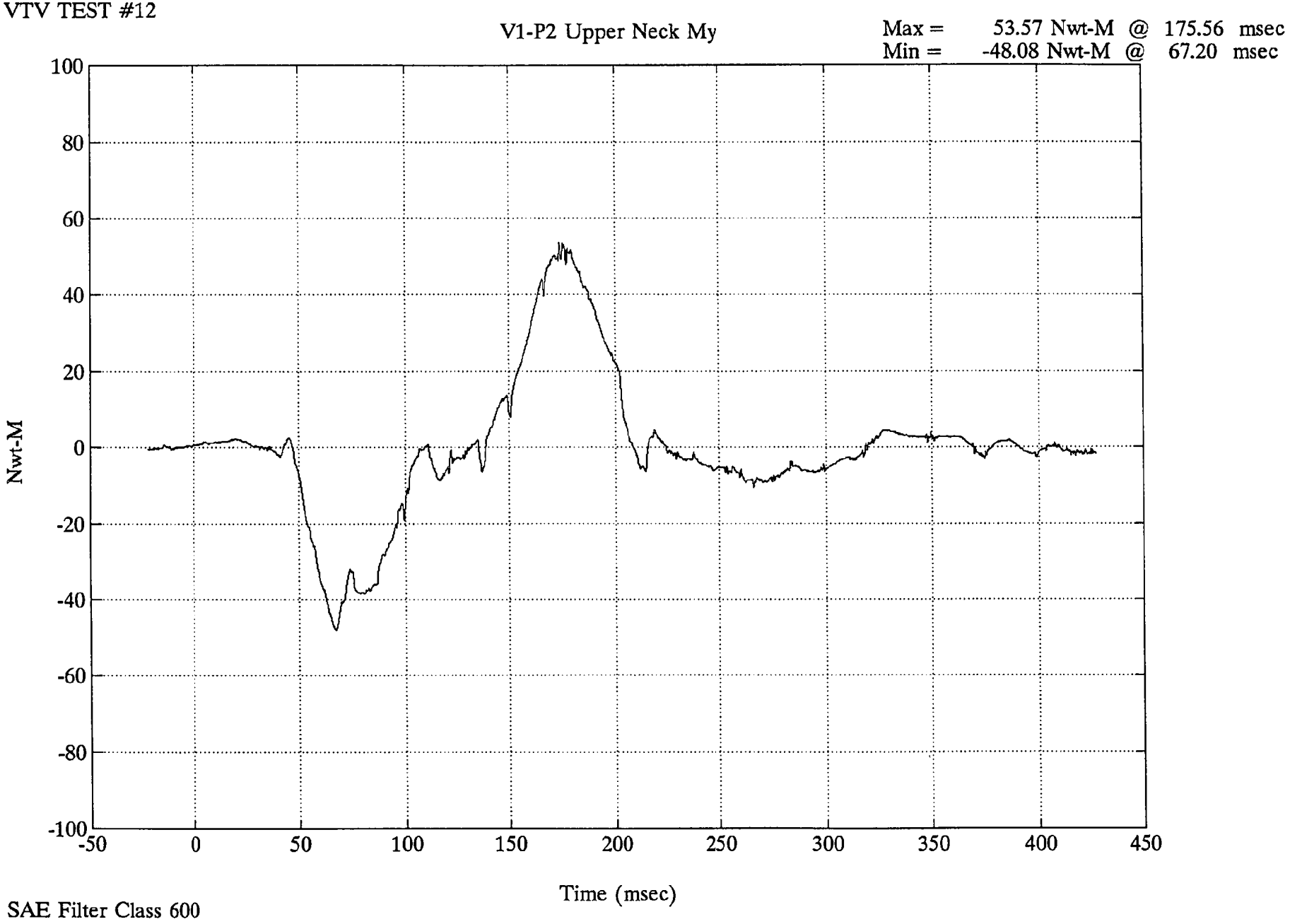


B-148

8118-12

SAE Filter Class 600

VTV TEST #12

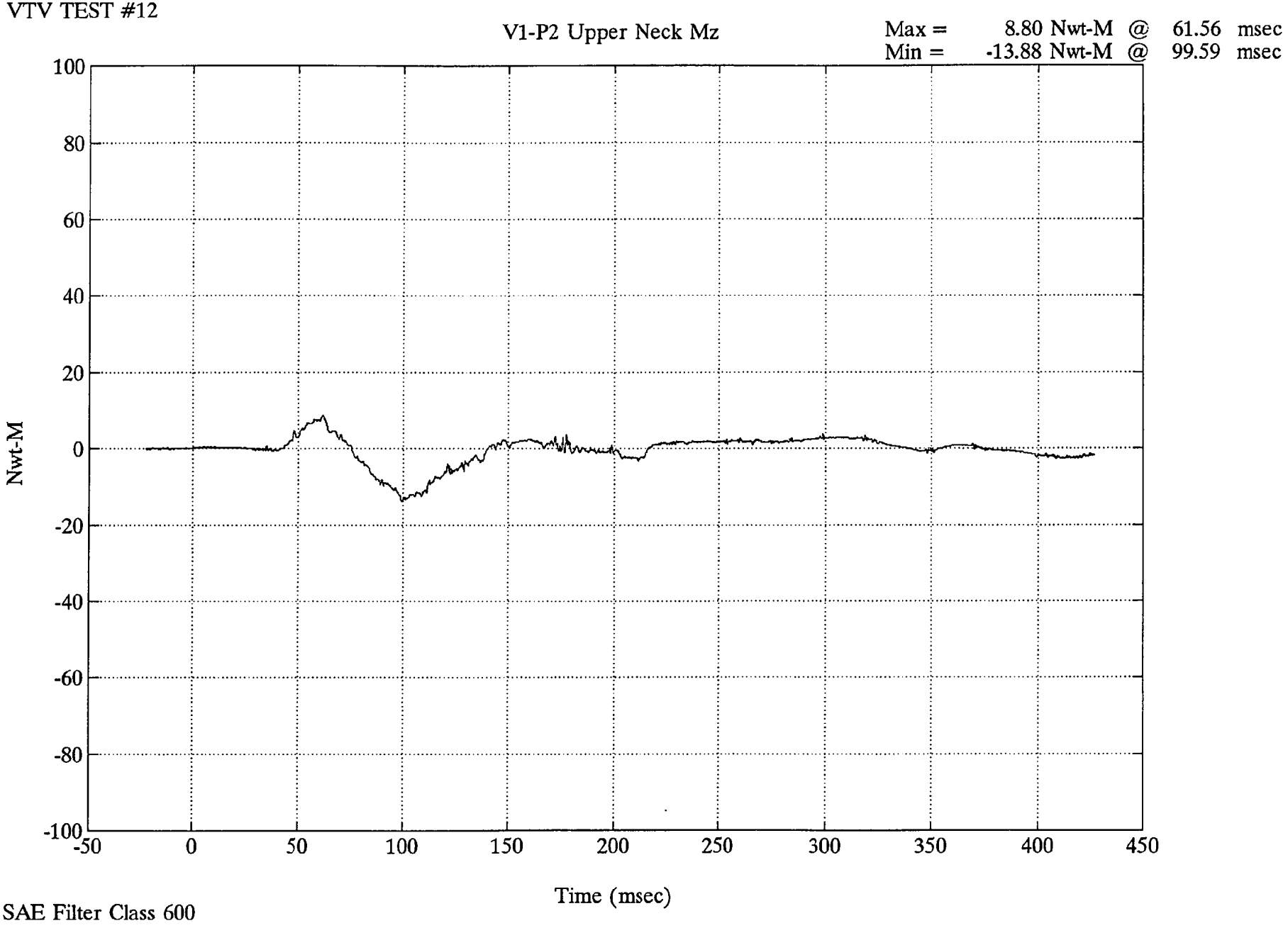


SAE Filter Class 600

B-149

8118-12

VTV TEST #12

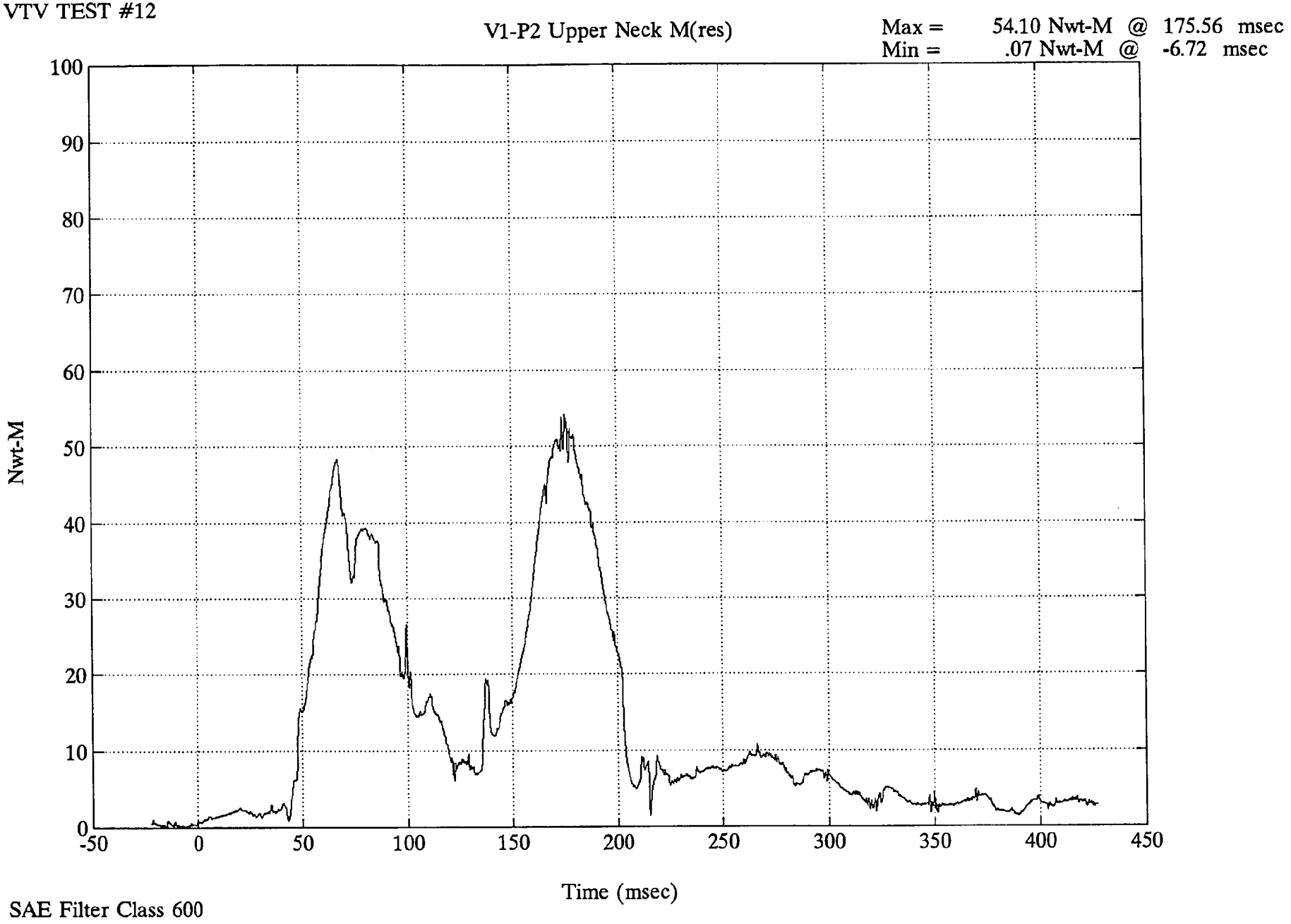


B-150

8118-12

SAE Filter Class 600

VTV TEST #12

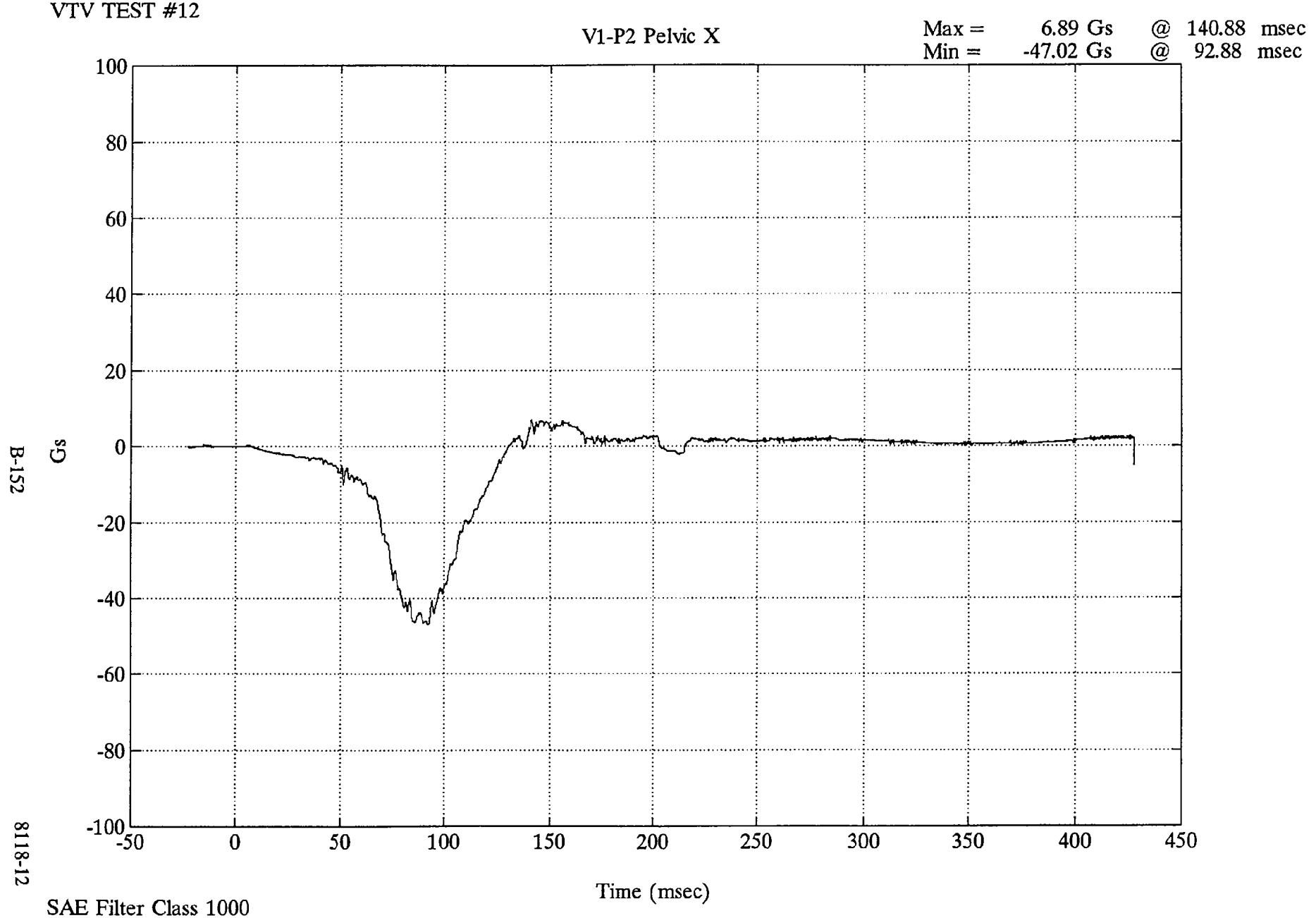


B-151

8118-12

SAE Filter Class 600

VTV TEST #12

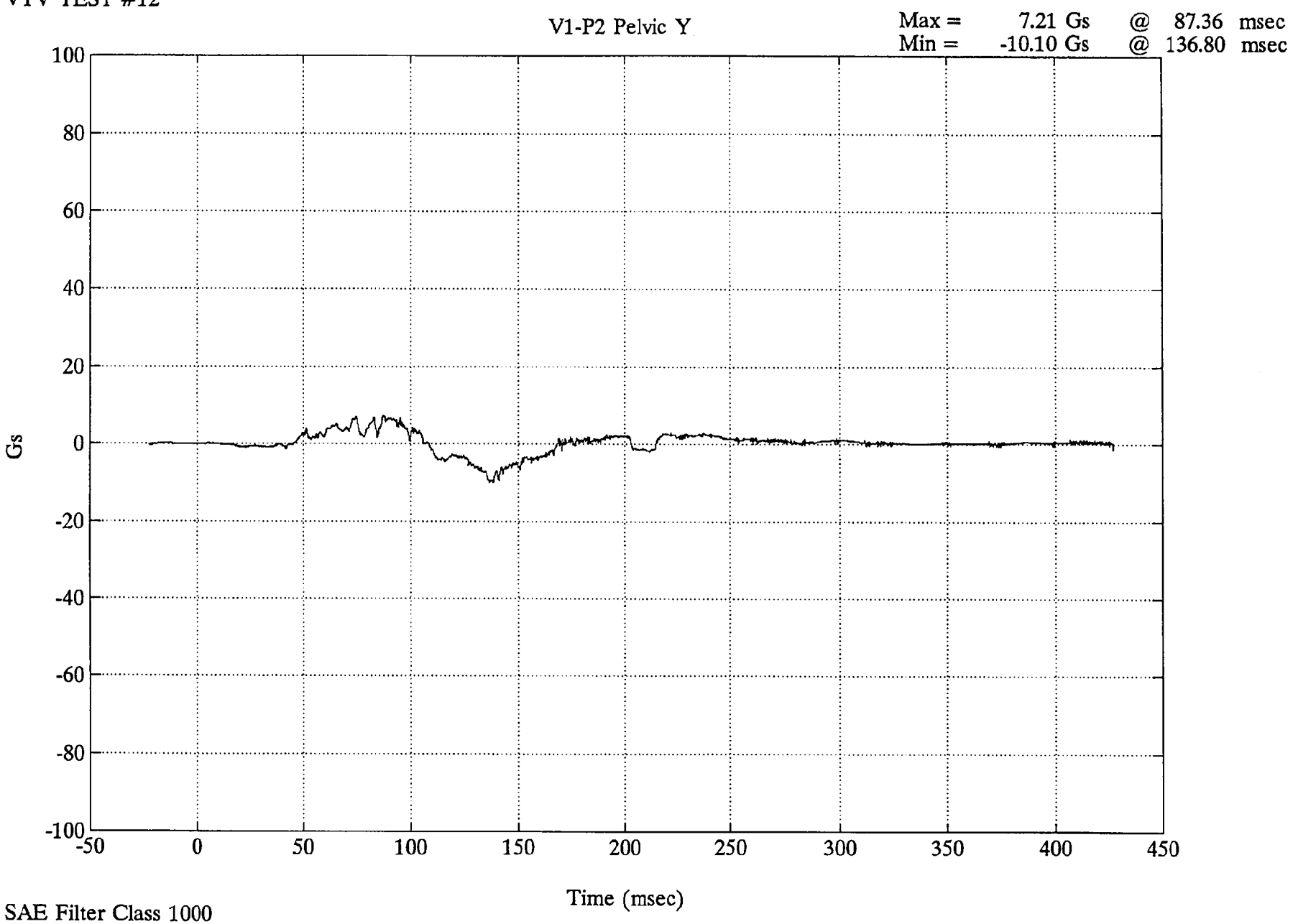


B-152

8118-12

SAE Filter Class 1000

VTV TEST #12

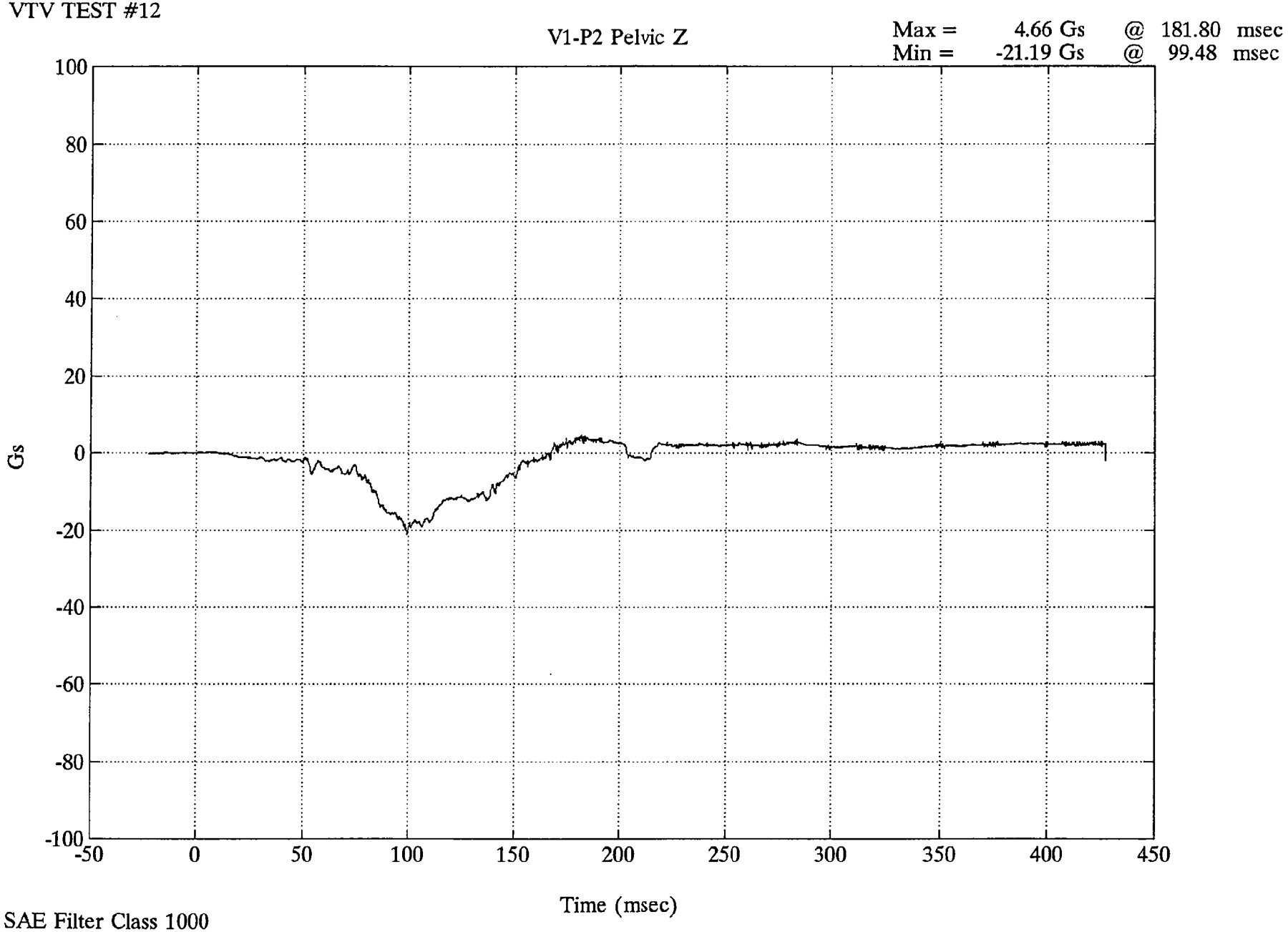


B-153

8118-12

SAE Filter Class 1000

VTV TEST #12

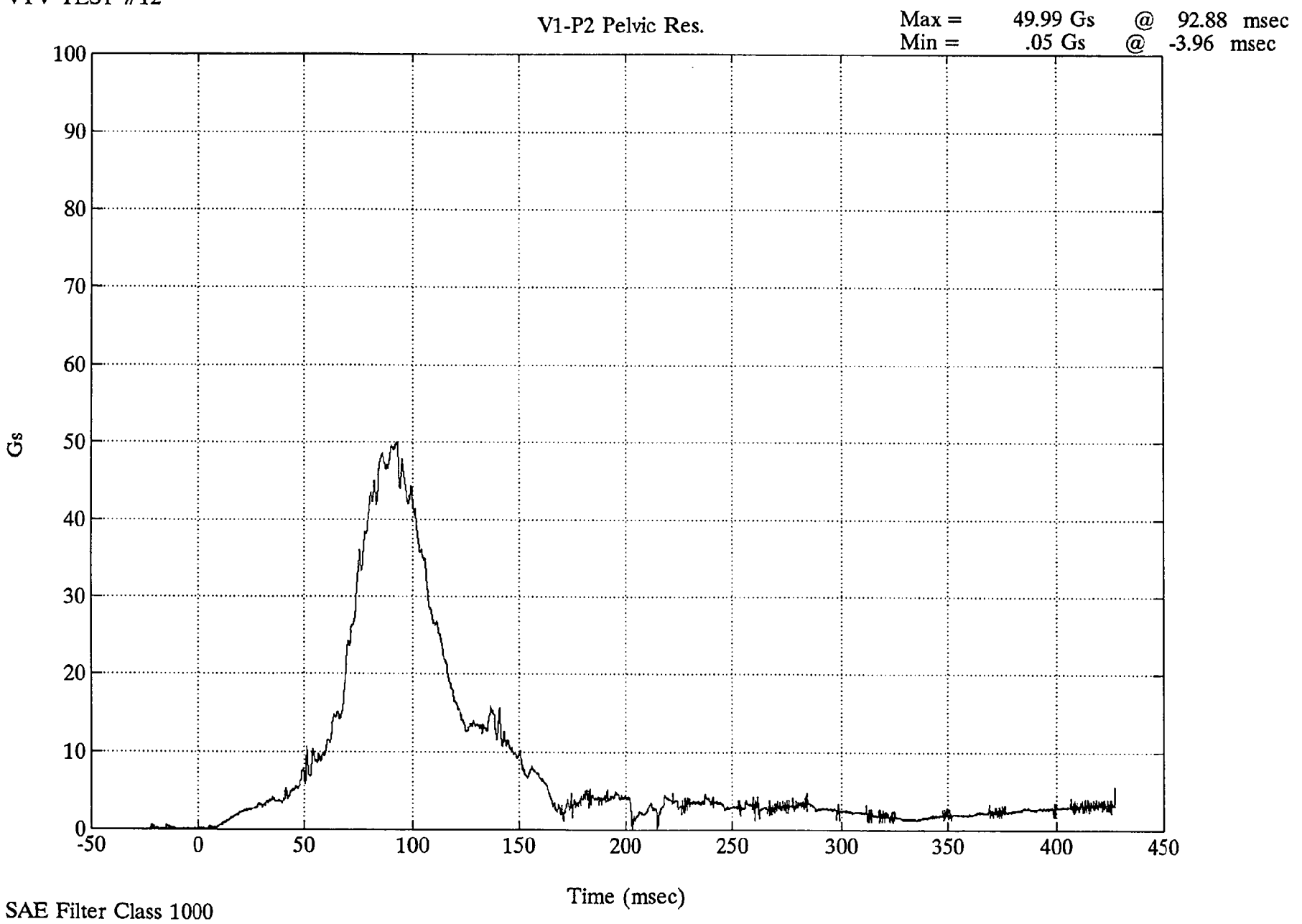


B-154

8118-12

SAE Filter Class 1000

VTV TEST #12

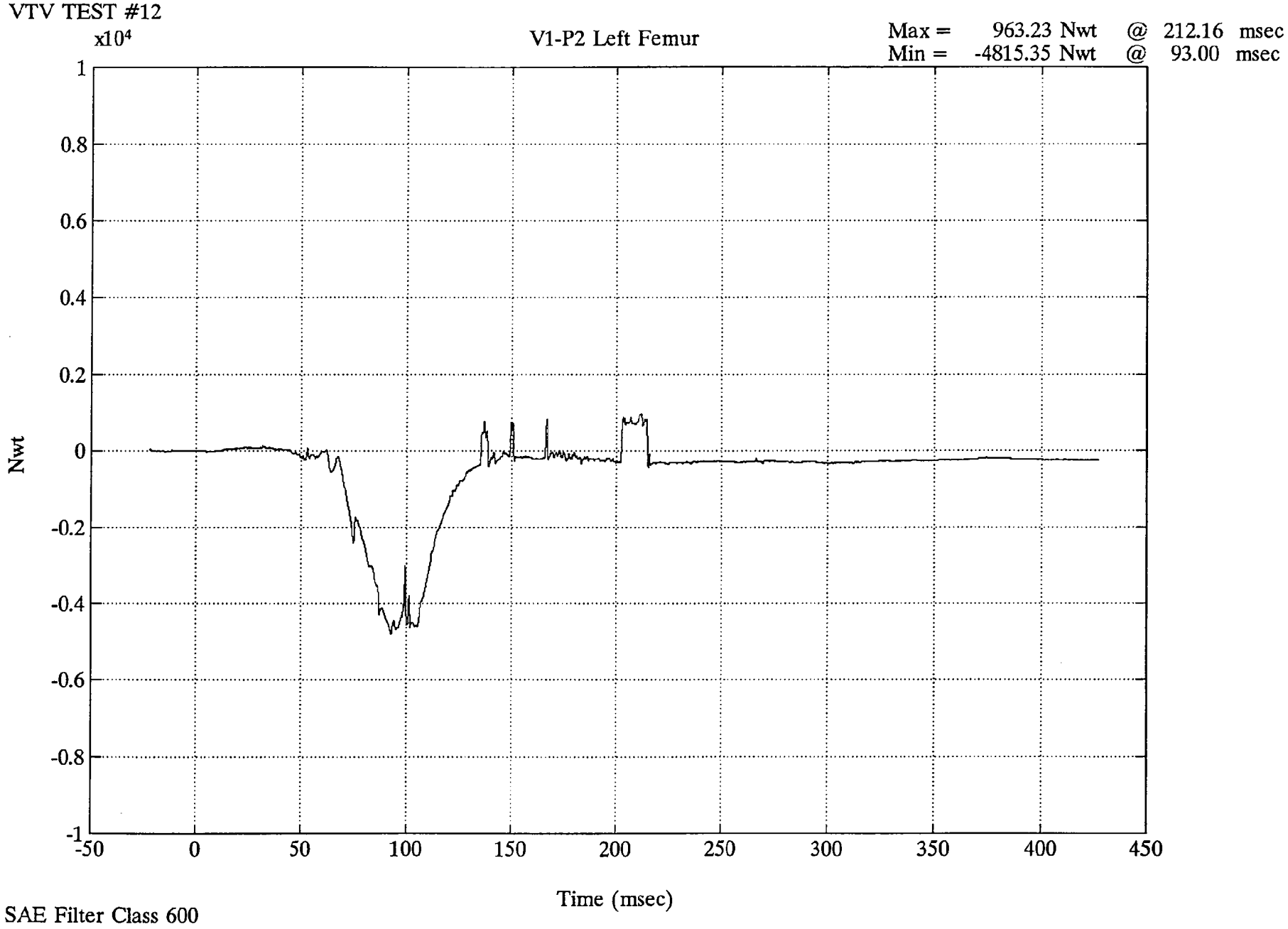


SAE Filter Class 1000

B-155

8118-12

VTV TEST #12

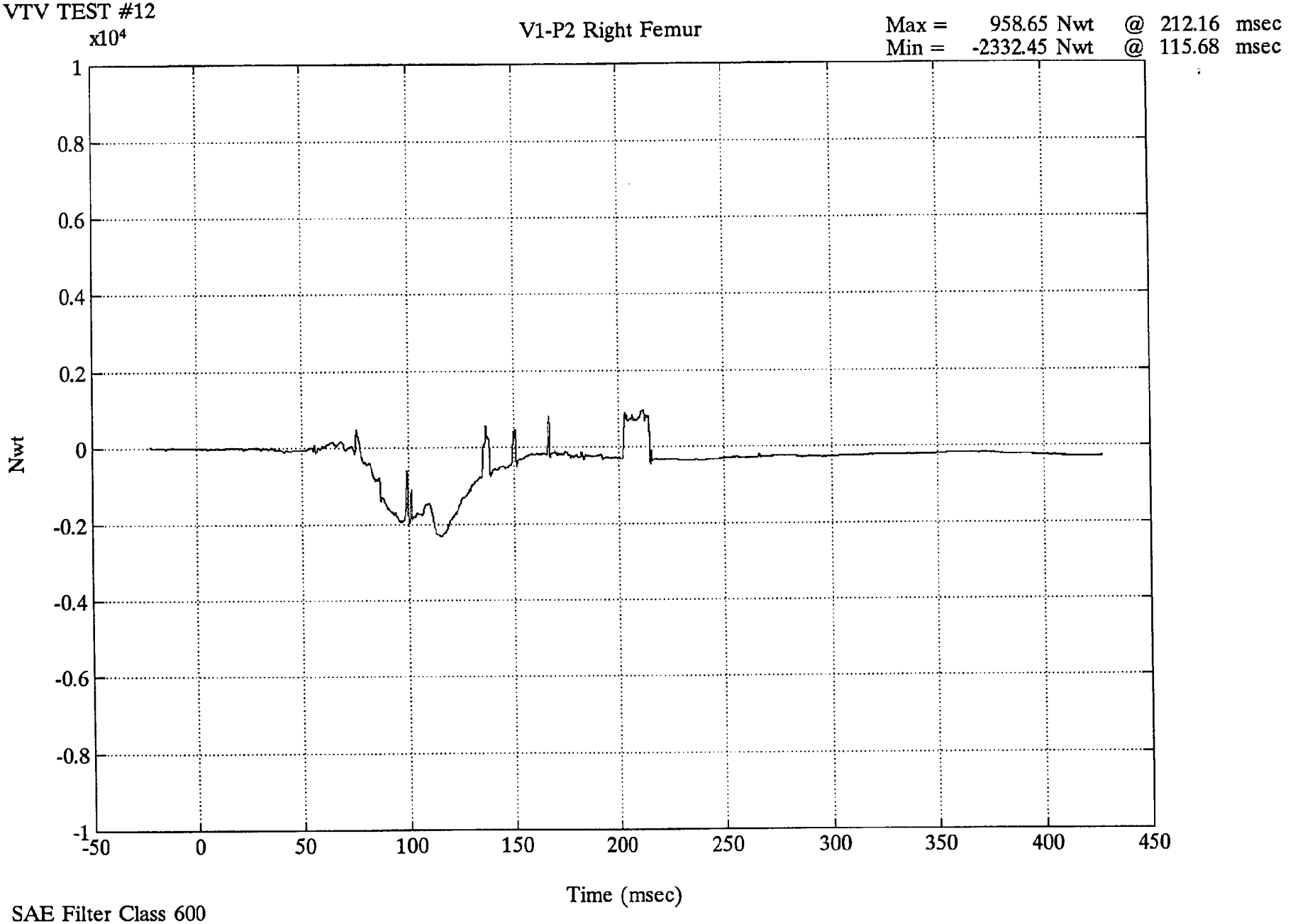


B-156

8118-12

SAE Filter Class 600

VTV TEST #12

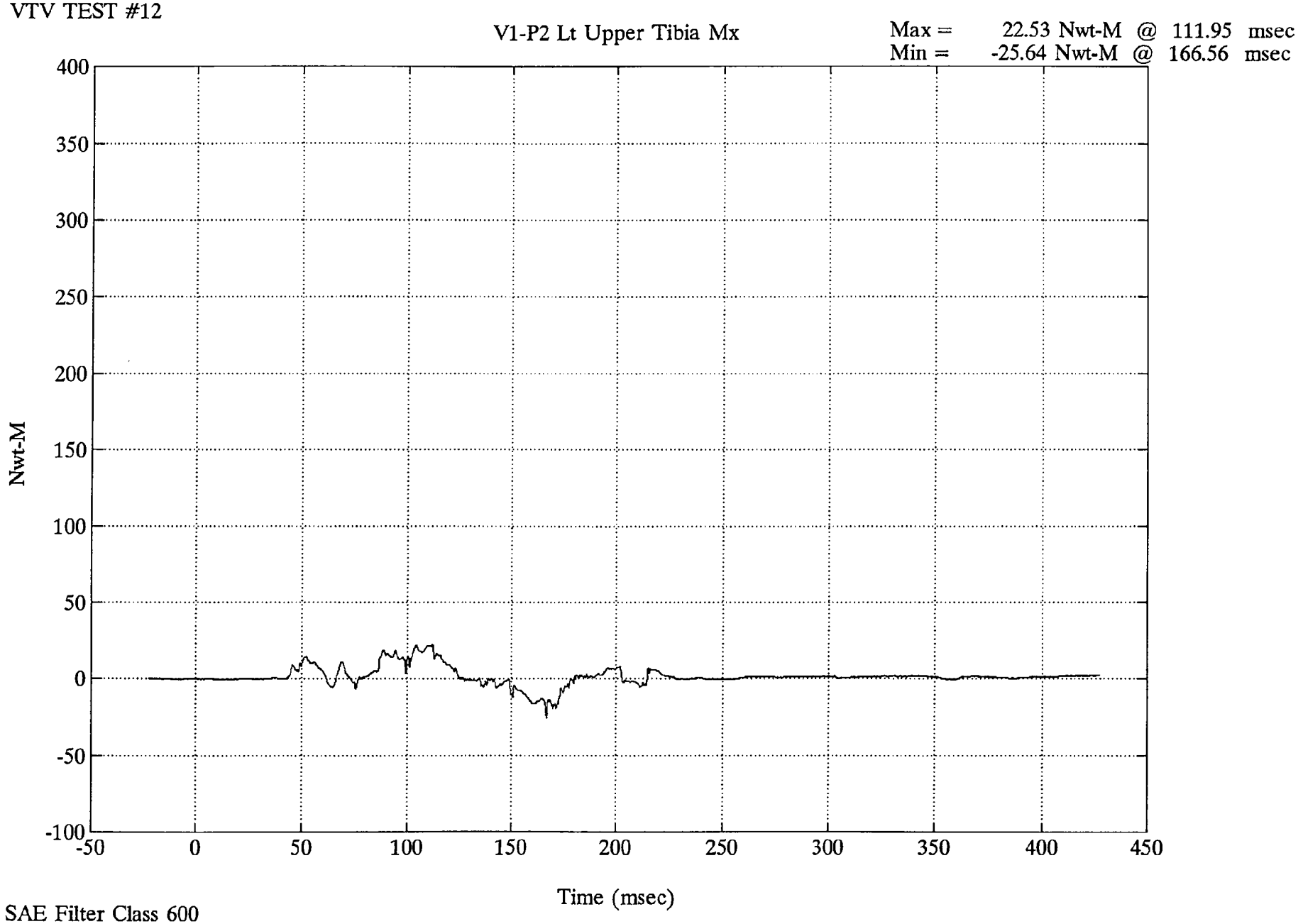


B-157

8118-12

SAE Filter Class 600

VTV TEST #12

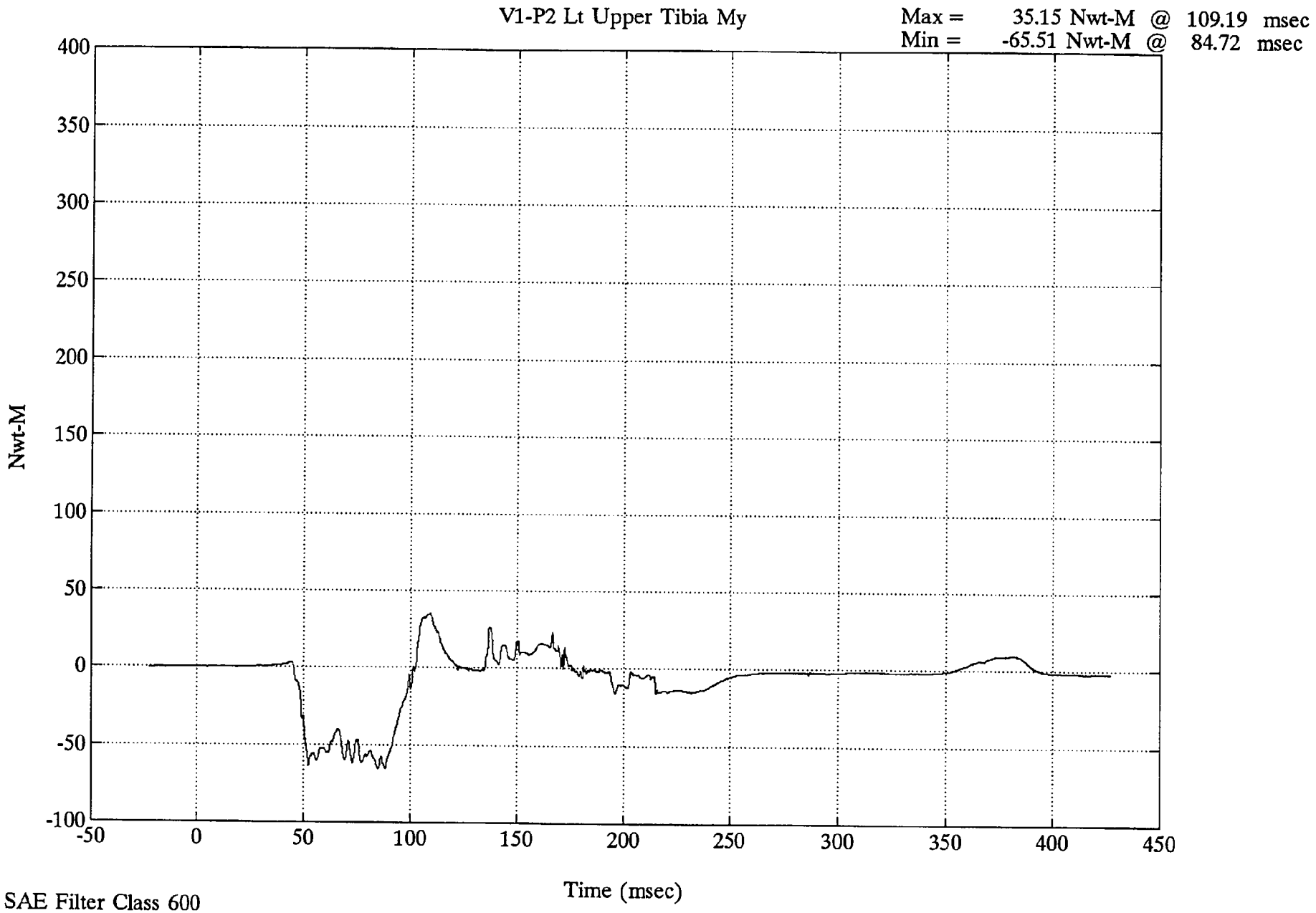


B-158

8118-12

SAE Filter Class 600

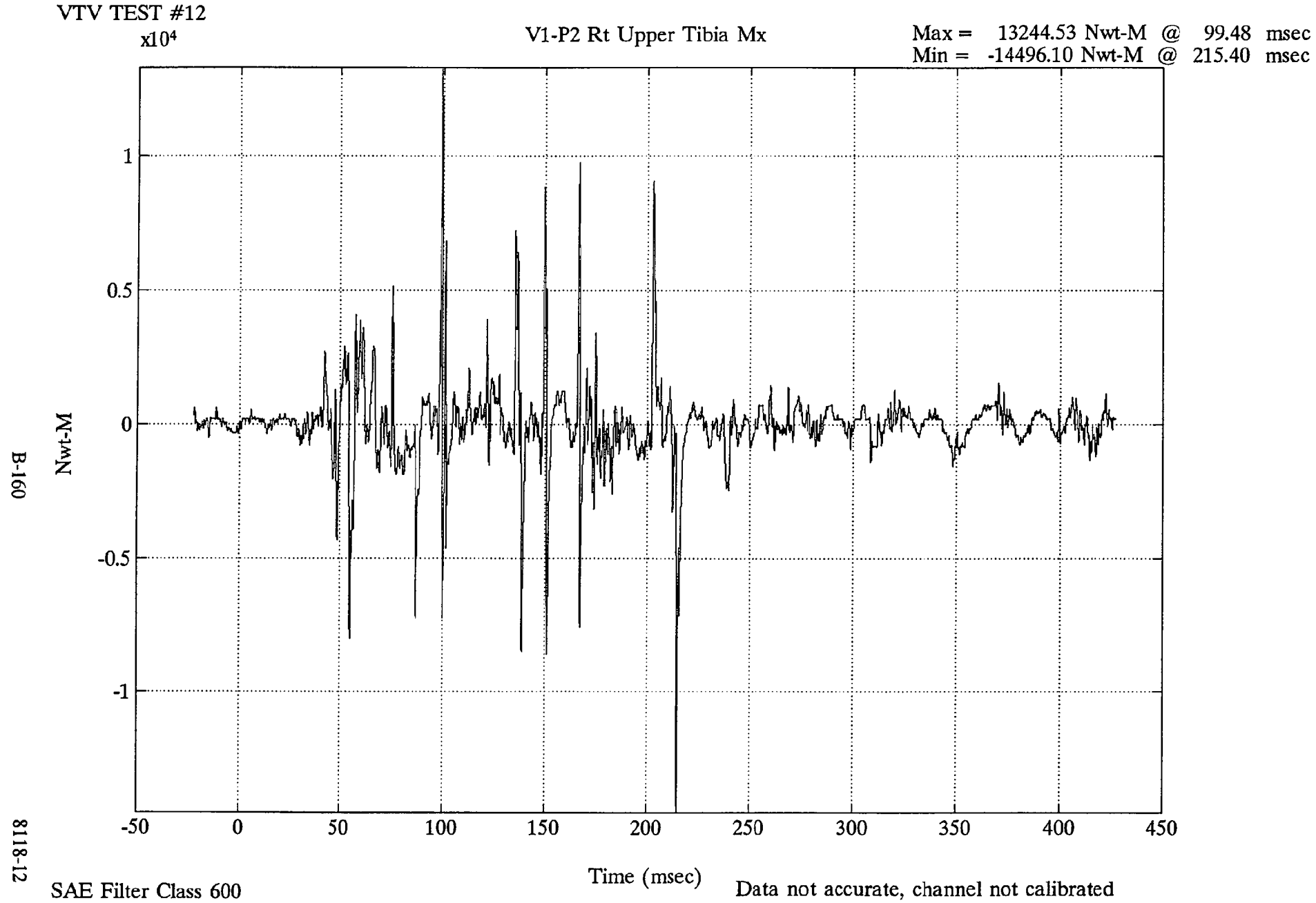
VTV TEST #12



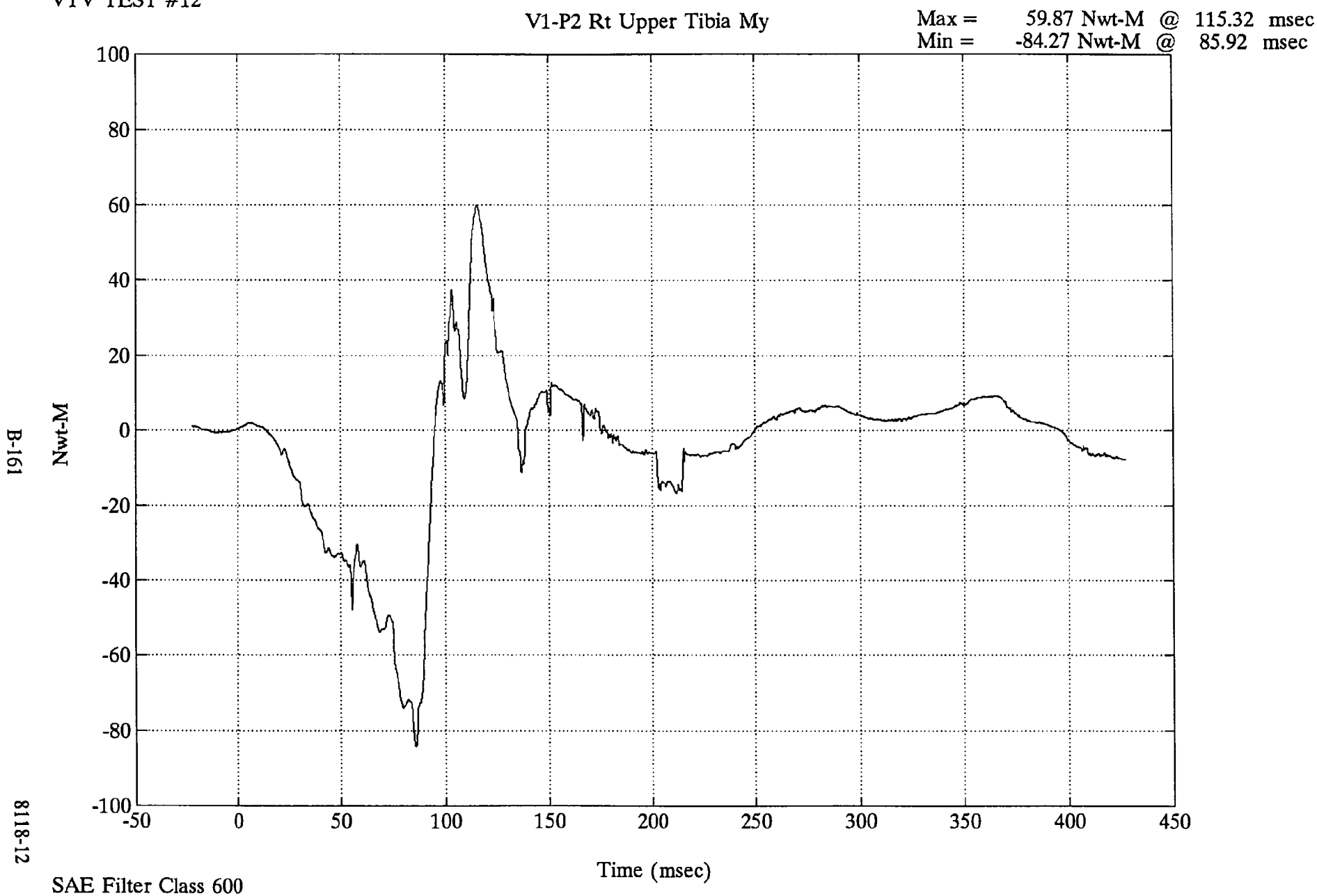
SAE Filter Class 600

B-159

8118-12


VTV TEST #12
x10⁴
V1-P2 Rt Upper Tibia Mx
Max = 13244.53 Nwt-M @ 99.48 msec
Min = -14496.10 Nwt-M @ 215.40 msec
Nwt-M
1
0.5
0
-0.5
-1
-50
0
50
100
150
200
250
300
350
400
450
Time (msec)
SAE Filter Class 600
Data not accurate, channel not calibrated
B-160
8118-12

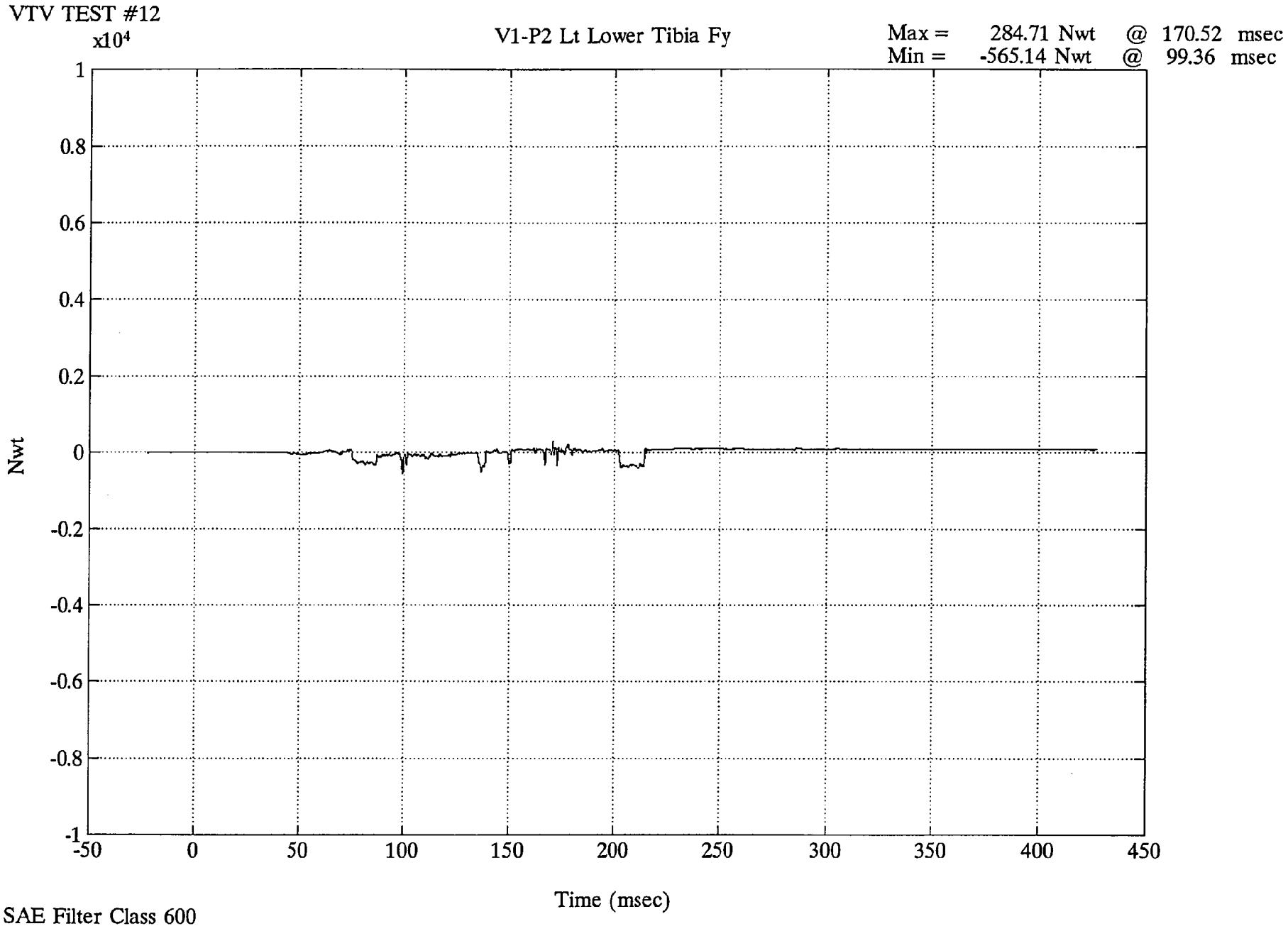
VTV TEST #12



B-161

8118-12

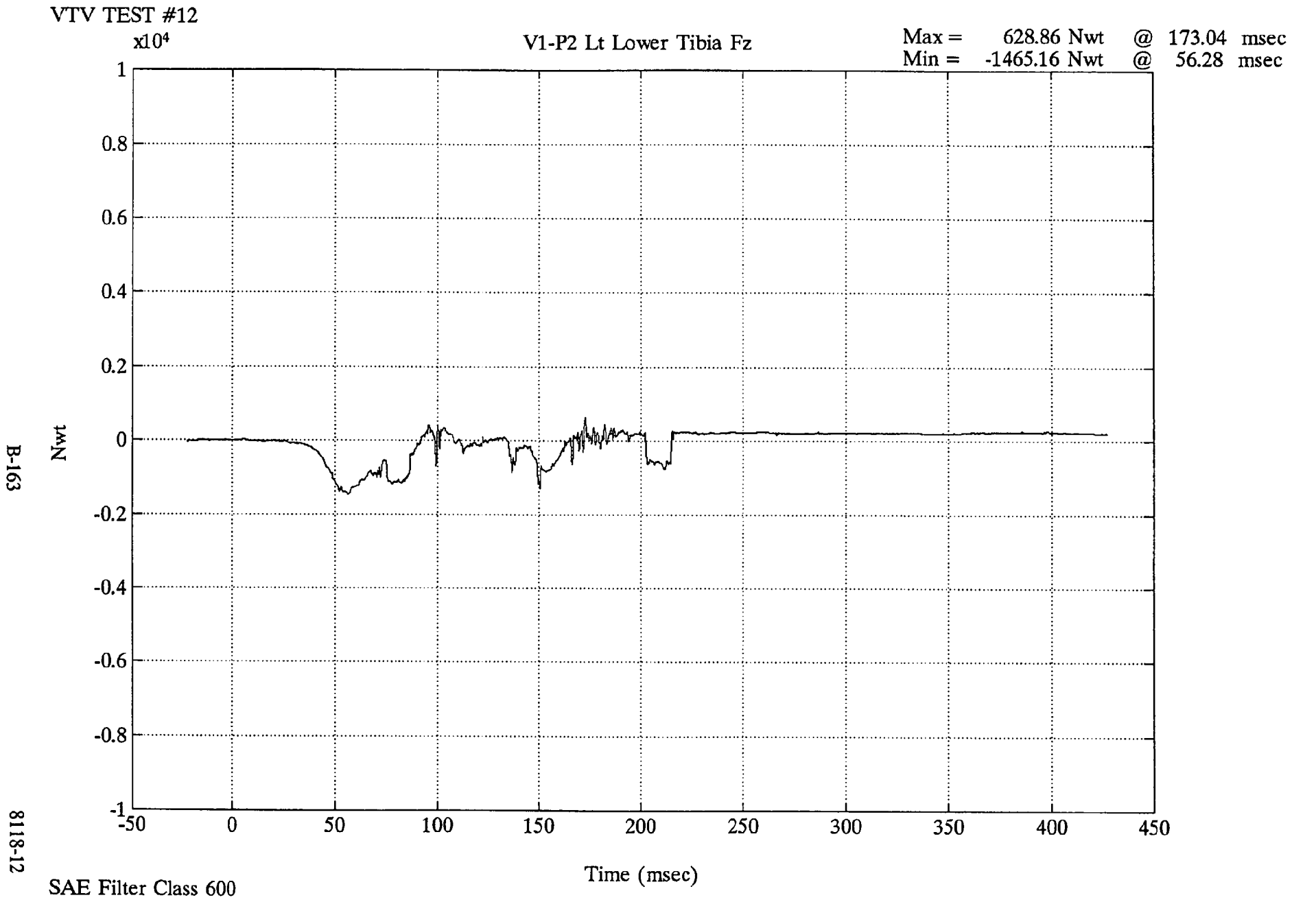
SAE Filter Class 600

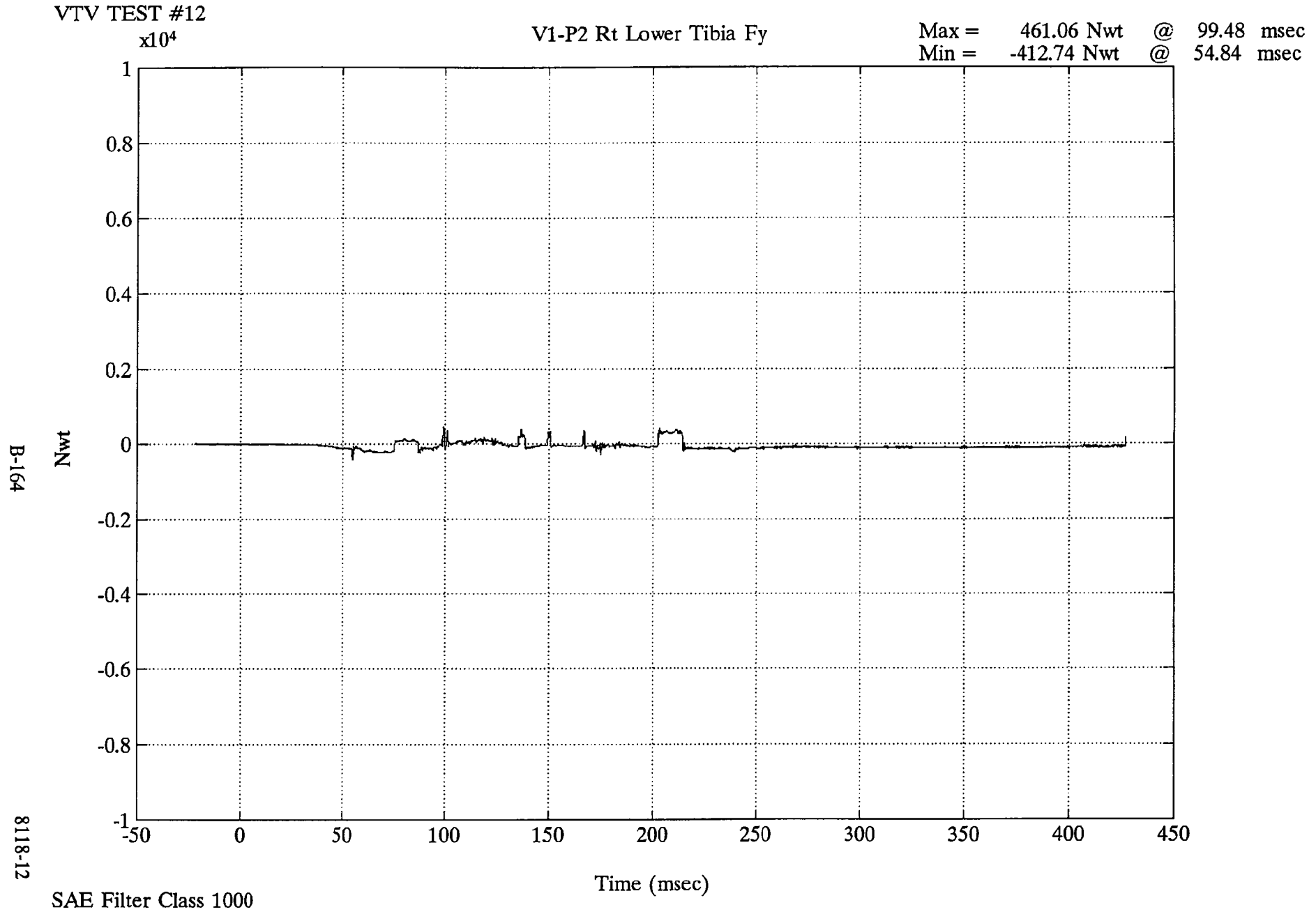


B-162

8118-12

SAE Filter Class 600

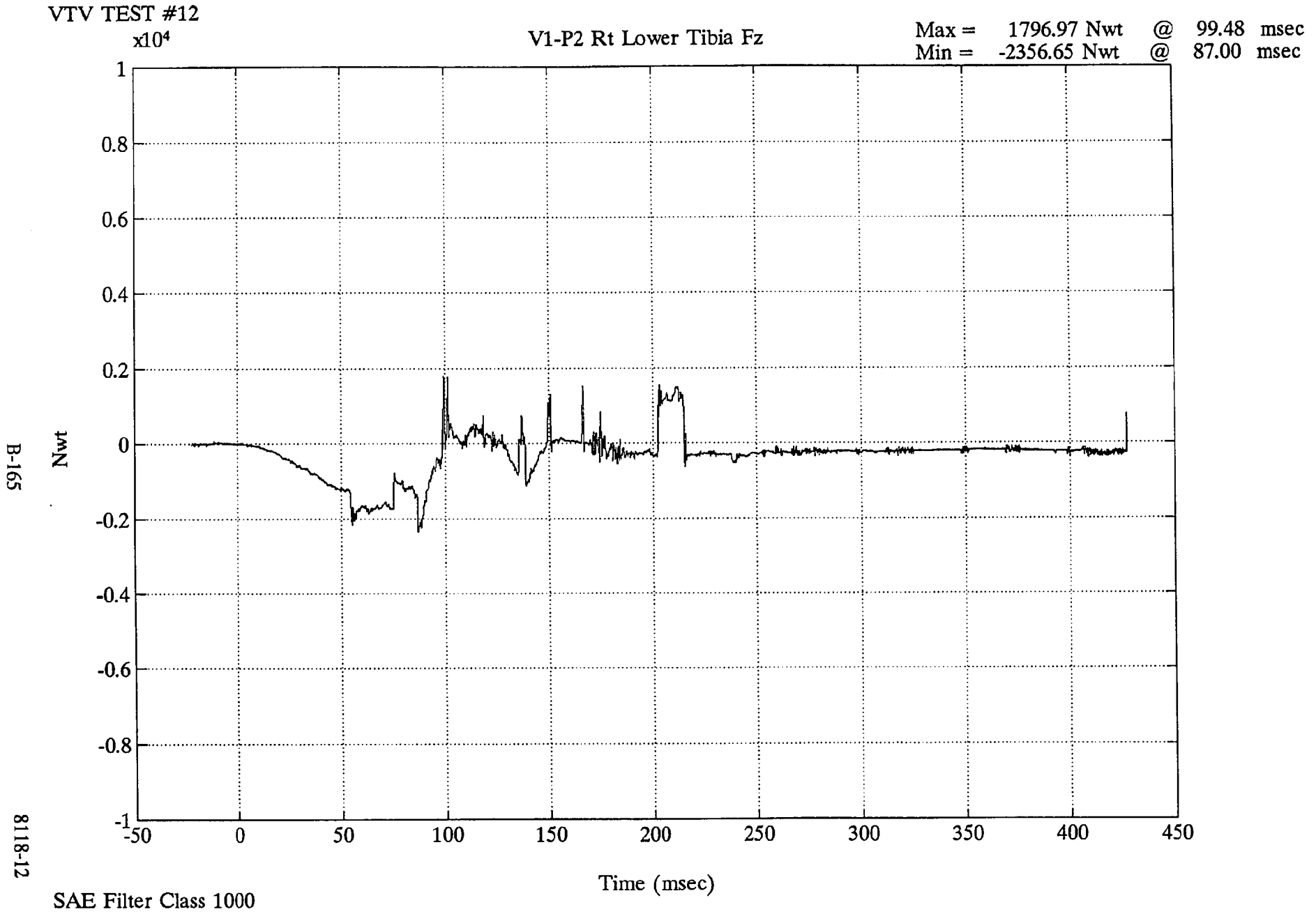

VTV TEST #12
x10⁴
V1-P2 Lt Lower Tibia Fz
Max = 628.86 Nwt @ 173.04 msec
Min = -1465.16 Nwt @ 56.28 msec
Nwt
Time (msec)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-50
0
50
100
150
200
250
300
350
400
450
B-163
8118-12
SAE Filter Class 600



B-164

8118-12

SAE Filter Class 1000

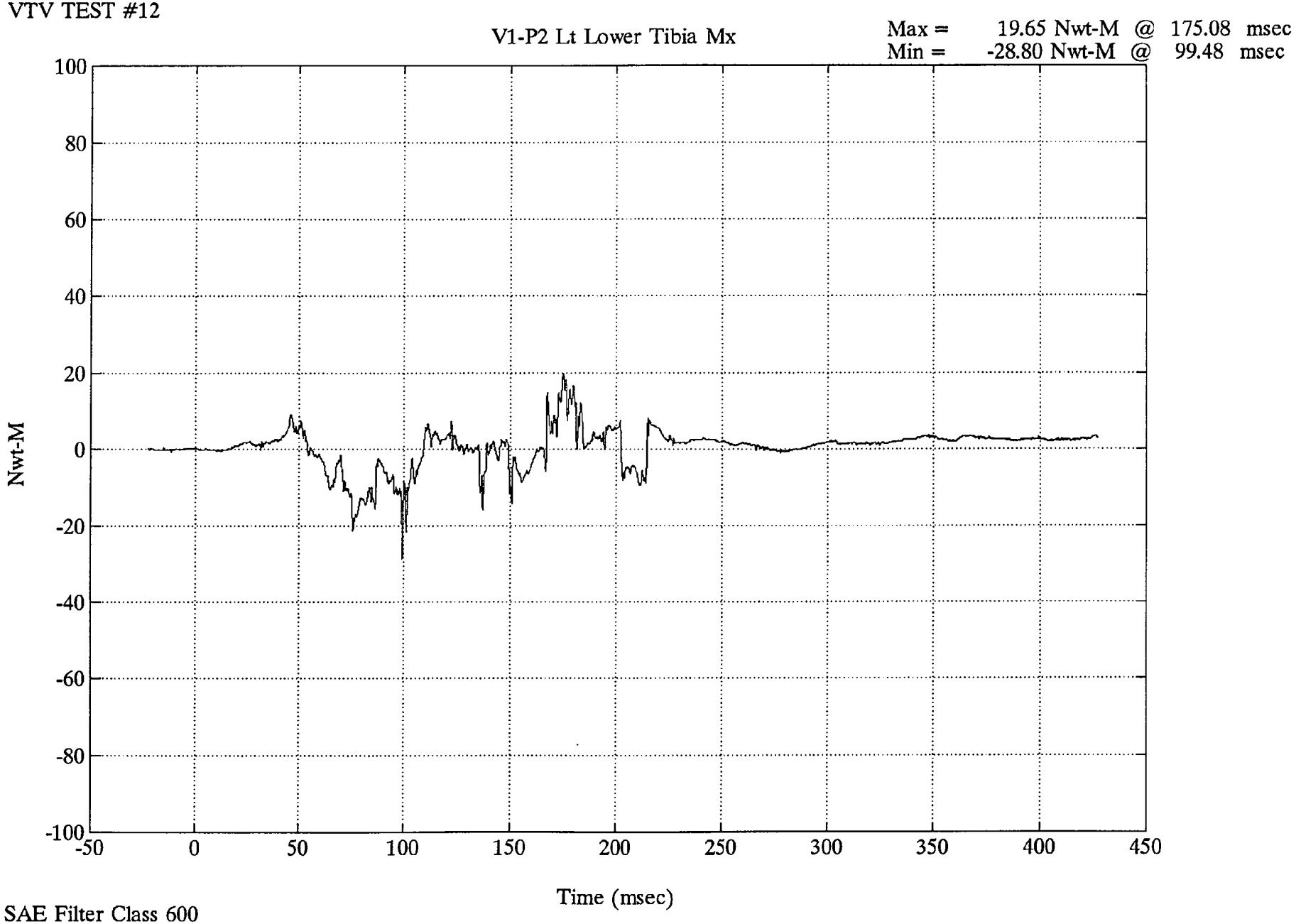


B-165

8118-12

SAE Filter Class 1000

VTV TEST #12

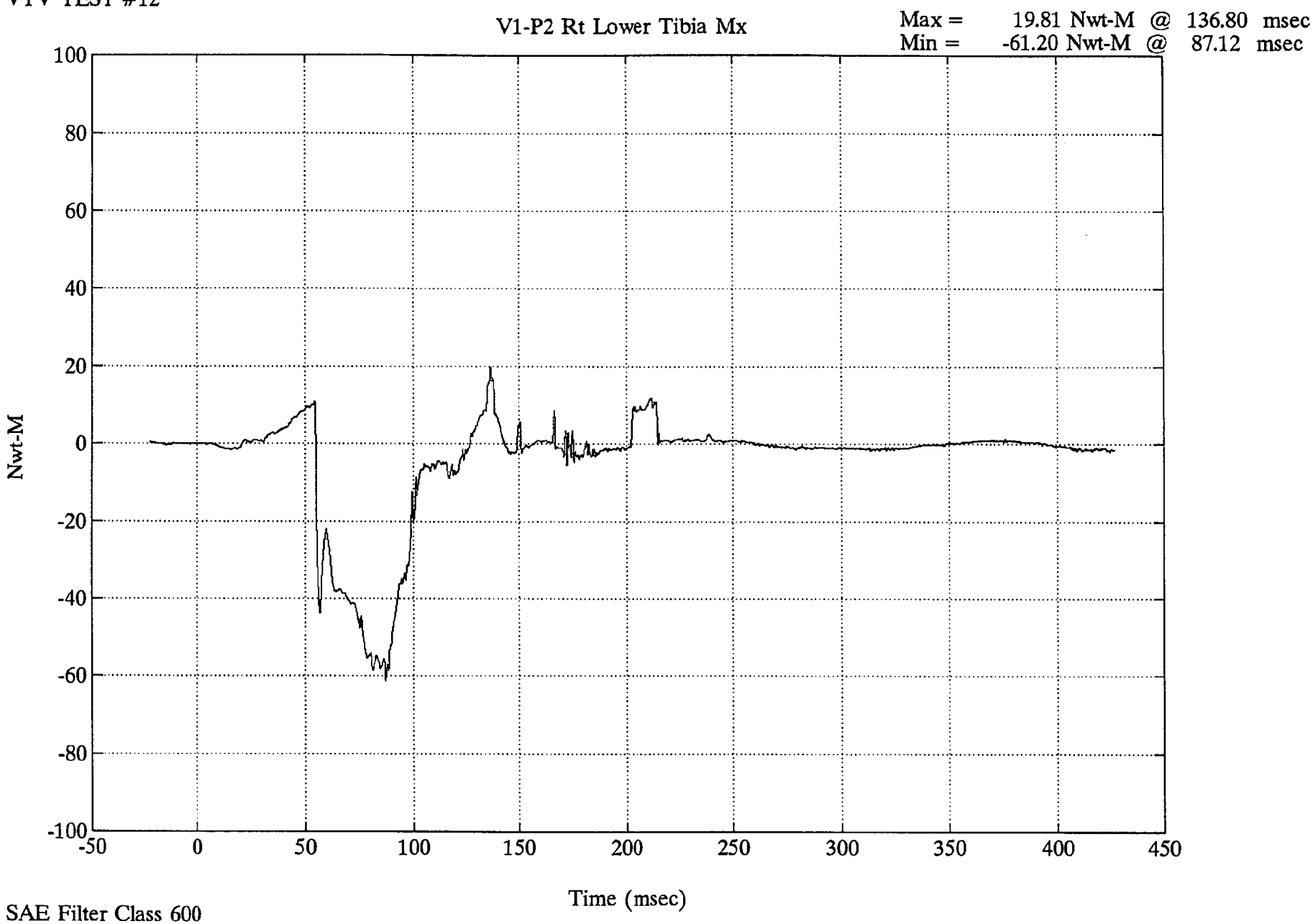


SAE Filter Class 600

B-166

8118-12

VTV TEST #12



B-167

8118-12

SAE Filter Class 600

APPENDIX C

PART 572E DUMMY CONFIGURATION AND
PERFORMANCE VERIFICATION DATA SHEETS

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

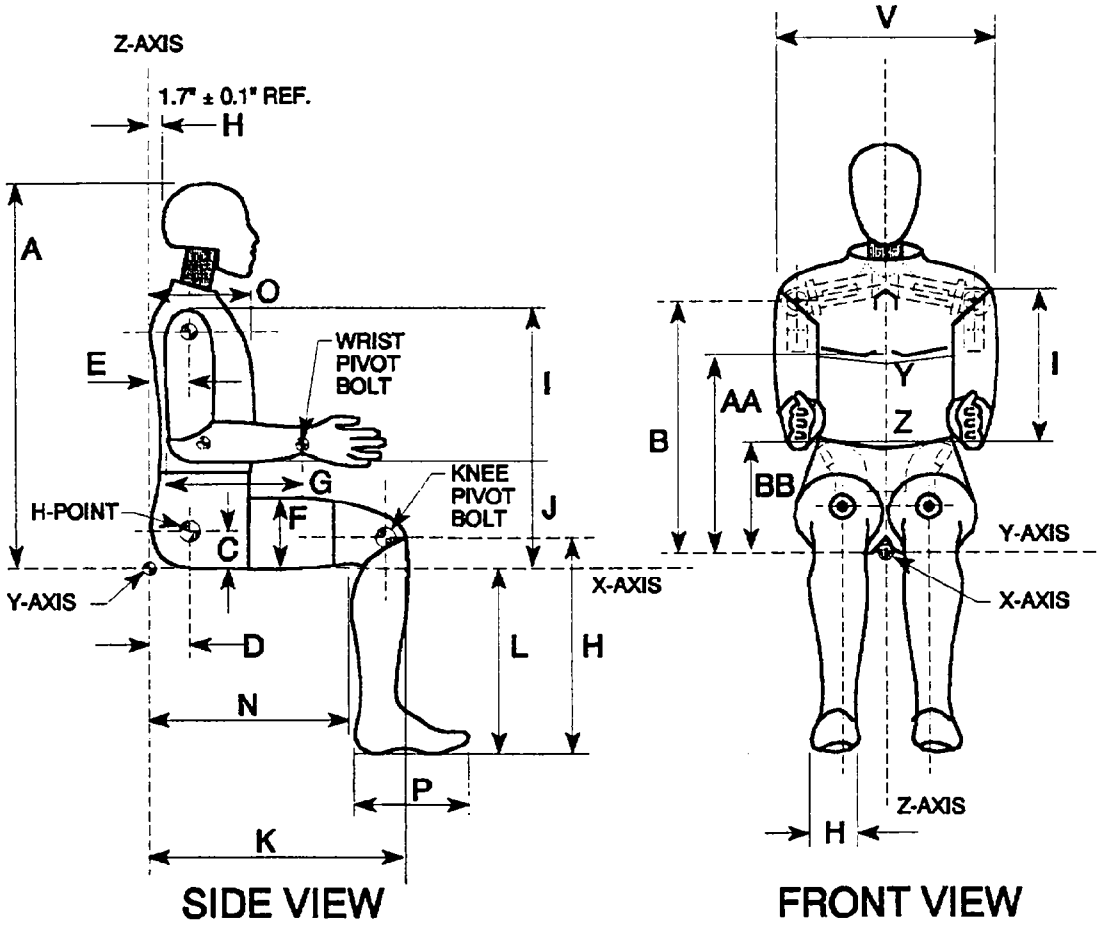
The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation, Advanced Technology Center. A summary of the test results, and Part 572 specifications are included in the Appendix.

Dummy serial numbers and certification dates are:

Serial No.	Completion Date
150	3-22-94
245	9-10-94

FIGURE 9

EXTERNAL DIMENSIONS SETUP 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))

POSITION 1 - DRIVER DUMMY

Manufacturer: Humanoid

Serial No.: 150

HYBRID III EXTERNAL DIMENSIONS

S/N 150 HUMANOID

DUMMY SERIAL NO. 150 DATE: 3/22/94

TEMPERATURE		69 DEG. F
RELATIVE HUMIDITY		31 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)	8.9-9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)	38.2-39.4 IN	39.3 IN
WAIST CIRCUMFERENCE (Z)	32.1-34.1 IN	34.0 IN
CHEST DEPTH (O)	8.4-9.0 IN	8.4 IN
H-POINT HEIGHT (C)	3.3-3.5 IN	3.5 IN
H-POINT FROM SEAT BACK (D)	5.3-5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)	1.6-1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)	34.6-35.0 IN	34.7 IN
THIGH CLEARANCE (F)	5.5-6.1 IN	5.6 IN
BUTTOCK KNEE LENGTH (K)	22.8-23.8 IN	23.3 IN
BUTTOCK POPLITAL LENGTH (N)	17.8-18.8 IN	18.5 IN
POPLITEAL LENGTH (L)	16.9-17.9 IN	17.8 IN
KNEE PIVOT HEIGHT (M)	19.1-19.7 IN	19.7 IN
FOOT LENGTH (P)	9.9-10.5 IN	10.2 IN
FOOT BREADTH (W)	3.6-4.2 IN	3.8 IN
SHOULDER PIVOT FROM BACKLINE (E)	3.3-3.7 IN	3.7 IN
SHOULDER BREADTH (V)	16.6-17.2 IN	16.9 IN
SHOULDER PIVOT HEIGTH (B)	19.9-20.5 IN	20.2 IN
ELBOW REST HEIGHT (J)	7.5-8.3 IN	8.2 IN
SHOULDER-ELBOW LENGTH (I)	13.0-13.6 IN	13.3 IN
BACK OF ELBOW TO WRIST PIVOT (G)	11.4-12.0 IN	11.5 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 3/3/94

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 150 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	29 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	239.5 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	4.9 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 3/22/94 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN:150 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	70 DEG. F
RELATIVE HUMIDITY		10% - 70%	33 %
IMPACT VELOCITY		22.60 - 23.40 FPS	23.1 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	23.98 G'S
	20 MS	17.60 - 22.60 G'S	22.24 G'S
	30 MS	12.50 - 18.50 G'S	18.43 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	18.43 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	40.38 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	73.87 DEG.
	TIME	57 - 64 MS	59.5 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	77.92 FT.-LBS.
	TIME	47 - 58 MS	54.38 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.25 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97.13 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 3/22/94 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN:150 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	70 DEG. F
RELATIVE HUMIDITY		10% - 70%	33 %
IMPACT VELOCITY		22.60 - 23.40 FPS	20.2 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	17.6 G'S
	20 MS	17.60 - 22.60 G'S	16.79 G'S
	30 MS	12.50 - 18.50 G'S	15.51 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	15.51 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	43.75 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	88.19 DEG.
	TIME	57 - 64 MS	76.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	-51.43 FT.-LBS.
	TIME	47 - 58 MS	71.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	152.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	131.25 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 3/1/94

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

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	26 %
PENDULUM VELOCITY	21.6 - 22.4 FT/SEC	21.6 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.53 INCHES
MAXIMUM RESISTIVE FORCE	1160 - 1325 POUNDS	1311 POUNDS
INTERNAL HYSTERESIS	69% - 85%	72.1 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 3/3/94 KNEE: LEFT

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

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	29 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS.	1178 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 3/3/94 KNEE: RIGHT

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

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	29 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS.	1144 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 150

A. DUMMY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER				
HX LONGITUDINAL	ENDEVCO	AF5B3	8/94	2/95
HY LATERAL	ENDEVCO	AF5F7	8/94	2/95
HZ VERTICAL	ENDEVCO	AF5E1	8/94	2/95
2. CHEST ACCELEROMETER				
CX LONGITUDINAL	ENDEVCO	A12C	4/94	10/94
CY LATERAL	ENDEVCO	A60C	4/94	10/94
CZ VERTICAL	ENDEVCO	A84G	4/94	10/94
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	951	7/94	1/95
RIGHT SIDE	GSE	952	7/94	1/95

B. CALIBRATION LABORATORY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. PENDULUM ACC.	CEC	A160	6/94	12/94
2. TEST PROBE ACCELEROMETER	CEC	A161	7/94	1/95
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE	TRANS-DUCER INC	20051	6/94	12/94
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE	BLH	72952	6/94	12/94
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE	CIC	567-11	6/94	12/94

POSITION 2 - FRONT PASSENGER DUMMY

Manufacturer: Humanoid

Serial No.: 245

HYBRID III EXTERNAL DIMENSIONS

S/N 245 HUMANOID

DUMMY SERIAL NO. 245 DATE: 9/10/94

TEMPERATURE		20.5 DEG. C
RELATIVE HUMIDITY		51 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	429-434 mm	431 mm
LOCATION FOR WAIST CIRCUMFERENCE (BB)	226-231 mm	228 mm
CHEST CIRCUMFERENCE (Y)	970-1001 mm	998 mm
WAIST CIRCUMFERENCE (Z)	815-866 mm	863 mm
CHEST DEPTH (O)	213-229 mm	213 mm
H-POINT HEIGHT (C)	84-89 mm	89 mm
H-POINT FROM SEAT BACK (D)	135-140 mm	137 mm
SKULL CAP TO BACKLINE (H)	41-46 mm	43 mm
TOTAL SITTING HEIGHT (A)	879-889 mm	889 mm
THIGH CLEARANCE (F)	140-155 mm	152 mm
BUTTOCK KNEE LENGTH (K)	580-605 mm	596 mm
BUTTOCK POPLITAL LENGTH (N)	452-477 mm	464 mm
POPLITEAL LENGTH (L)	430-455 mm	447 mm
KNEE PIVOT HEIGHT (M)	485-501 mm	487 mm
FOOT LENGTH (P)	252-267 mm	256 mm
FOOT BREADTH (W)	91-107 mm	96 mm
SHOULDER PIVOT FROM BACKLINE (E)	84-94 mm	89 mm
SHOULDER BREADTH (V)	422-437 mm	426 mm
SHOULDER PIVOT HEIGTH (B)	505-521 mm	518 mm
ELBOW REST HEIGHT (J)	190-211 mm	205 mm
SHOULDER-ELBOW LENGTH (I)	330-345 mm	335 mm
BACK OF ELBOW TO WRIST PIVOT (G)	290-305 mm	294 mm

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 8/30/94

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN: 245 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	49 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	249.7 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	6.9 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 9/2/94 6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1 HY3 SN:245 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY		10% - 70%	52 %
IMPACT VELOCITY		19.50 - 20.30 FPS	20.1 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	19.36 G'S
	20 MS	14.00 - 19.00 G'S	18.55 G'S
	30 MS	11.00 - 16.00 G'S	15.82 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	15.82 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	45.25 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	88.82 DEG.
	TIME	72 - 82 MS	73.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-59.0/-39.0 FT.-LBS.	-57.71 FT.-LBS.
	TIME	65 - 79 MS	68 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	147 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	123.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 8/31/94

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN:245 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	70 DEG. F
RELATIVE HUMIDITY		10% - 70%	53 %
IMPACT VELOCITY		22.60 - 23.40 FPS	23 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	26.61 G'S
	20 MS	17.60 - 22.60 G'S	22.43 G'S
	30 MS	12.50 - 18.50 G'S	16.78 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	16.78 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	41.25 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	72.41 DEG.
	TIME	57 - 64 MS	59.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	76.18 FT.-LBS.
	TIME	47 - 58 MS	54.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	118.63 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

THORAX IMPACT TEST

HYBRID III

DATE : 8/29/94

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

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	50 %
PENDULUM VELOCITY	21.6 - 22.4 FT/SEC	21.6 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.55 INCHES
MAXIMUM RESISTIVE FORCE	1160 - 1325 POUNDS	1307 POUNDS
INTERNAL HYSTERESIS	69% - 85%	73.2 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9/9/94 KNEE: LEFT

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

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70 DEG. F
RELATIVE HUMIDITY	10% - 70%	56 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS.	1166 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION

TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9/9/94 KNEE: RIGHT

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

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70 DEG. F
RELATIVE HUMIDITY	10% - 70%	56 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS.	1086 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 045

A. DUMMY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER				
HX LONGITUDINAL	ENDEVCO	ADL50	8/94	2/95
HY LATERAL	ENDEVCO	A59J	8/94	2/95
HZ VERTICAL	ENDEVCO	A73A	8/94	2/95
2. CHEST ACCELEROMETER				
CX LONGITUDINAL	ENDEVCO	ADL98	8/94	2/95
CY LATERAL	ENDEVCO	AC209	8/94	2/95
CZ VERTICAL	ENDEVCO	ADMB6	8/94	2/95
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	954	7/94	1/95
RIGHT SIDE	GSE	955	7/94	1/95

B. CALIBRATION LABORATORY INSTRUMENTS

	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. PENDULUM ACC.	CEC	A160	6/94	12/94
2. TEST PROBE ACCELEROMETER	CEC	A161	7/94	1/95
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE	TRANS-DUCER INC	20051	6/94	12/94
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE	BLH	72952	6/94	12/94
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE	CIC	567-11	6/94	12/94