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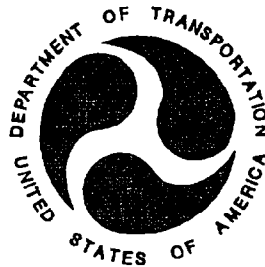
CALSPAN REPORT NUMBER: 8118-8

**VEHICLE-TO-VEHICLE FRONTAL 30° ANGLED
60 kph IMPACT OF A
1994 FORD TAURUS GL 4-DOOR SEDAN AND
A MOVING DEFORMABLE BARRIER**

CALSPAN TEST NUMBER: Y49-8-1417

June 8, 1994

CALSPAN CORPORATION
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FINAL REPORT

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Research and Special Programs Administration
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Cambridge, MA 02142

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16. Abstract A 60 kph vehicle to vehicle 30° angled impact test of a 1994 Ford Taurus GL 4-Door Sedan and a moving deformable barrier was performed at the Calspan Advanced Technology Center crash facility in Buffalo, New York on June 8, 1994. The measured impact velocities of both vehicles were 58.7 kph and the ambient temperature at the time of test was 26.1°C. The 1994 Ford Taurus (Vehicle 1) had a 50th percentile male Hybrid III dummy occupant in the driver and right front passenger seating positions. The dummies were restrained with a driver and right front passenger 3-point manual belt and individual supplemental airbags. The right front passenger dummy of Vehicle 1 had a 3 millisecond clipped chest resultant of 65.3 gs. The Head Injury Criteria (HIC) and the other femur load measurement for this dummy were below the injury criteria requirements of FMVSS 208 "Occupant Crash Protection". The driver dummy of Vehicle 1 had HIC, chest resultant and femur loads that were all below the injury requirements of FMVSS 208 "Occupant Crash Protection".			
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Section 1

PURPOSE AND TEST PROCEDURE

This 60 kph frontal vehicle-to-vehicle 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 2) 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 GL 4-Door Sedan and a Moving Deformable Honeycomb Barrier (MDB). The vehicle and the MDB each traveling at 58.7 kph were positioned at a 30° angle (measured counter clockwise from the centerline of Vehicle 1 looking down on the crash event). Vehicle 2 (the MDB) was positioned at the impact point with its left side tangent to a line at 15° angle (measured counter clockwise from Vehicle 1 centerline) passing through Vehicle 1 centerline at the forward most point (see Figure 1).

Vehicle number 1, a 1994 Ford Taurus GL 4-Door Sedan, contained two Part 572E, 50th percentile male Anthropomorphic Test Devices (ATDs), in the driver and right front passenger seating positions. Both ATDs were restrained using the vehicle's driver and right front passenger airbag restraint and 3-point manual belt systems.

Section 2

SUMMARY OF TEST

Two vehicles, both moving forward at 58.7 kph, were impacted at a 30° angle. Vehicle 1 was a 1994 Ford Taurus GL 4-Door Sedan and Vehicle 2 was a Moving Deformable Barrier (MDB). The test was performed at the Calspan Corporation Advanced Technology Center Crash Test Facility on June 8, 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 eight 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 points were determined as outlined in the previous section and shown in Figure 1. The actual impact points were offset approximately two inches to the right of the nominal impact points. This small offset caused the tangent angle for Vehicle 2 to be slightly smaller than 15° (see Figure 1).

Two Part 572E, 50th percentile male Anthropomorphic Test Devices (ATDs) were placed in the driver and right front passenger seating positions according to dummy placement instructions specified in the OVSC Laboratory Test Procedure. The driver and right front passenger in the 1994 Ford Taurus GL (Vehicle 1) were restrained with individual 3-point manual lap belts and supplemental airbags.

The 50th percentile male dummies in the driver and right front passenger positions of Vehicle 1 were instrumented with head and chest triaxial accelerometer packages; chest displacement potentiometer; upper neck force and moment transducers; pelvic triaxial accelerometers; femur axial force load cells and upper and lower tibia force and moment transducer packages. The driver dummy of 1994 Ford Taurus GL (Vehicle 1) also contained the chest compression displacement potentiometer array in addition to lower neck force and moment transducers.

The 110 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 1994 Ford Taurus GL (Vehicle 1) driver HIC was 461.0 and the only head contact was with the driver side airbag. The maximum chest acceleration over a three millisecond period was 54.8 gs. The left femur maximum axial compressive force was -6707.5 newtons and the right femur maximum axial compressive force was -6188.2 newtons.

The right-front passenger HIC value on Vehicle 1 was 418.4 with head contact on the right-front passenger airbag. The maximum chest acceleration over a 3 millisecond period was 65.3 gs. The left femur maximum axial compressive force was -8431.3 newtons and the right femur compressive force was -2067.2 newtons.

Structural damage to the 1994 Ford Taurus GL (Vehicle 1) occupant compartment consisted of deformation of the roof on the left front from the B-pillar forward, severe deformation of the driver side door such that it was inoperable, two large windshield cracks, crush of the left side of the vehicle with the dash panel and the left A-pillar moving rearward into the driver dummy, intrusion of the left side toepan approximately 29.8 cm. and severe intrusion of the left sill.

Problems occurred with the following data channels:

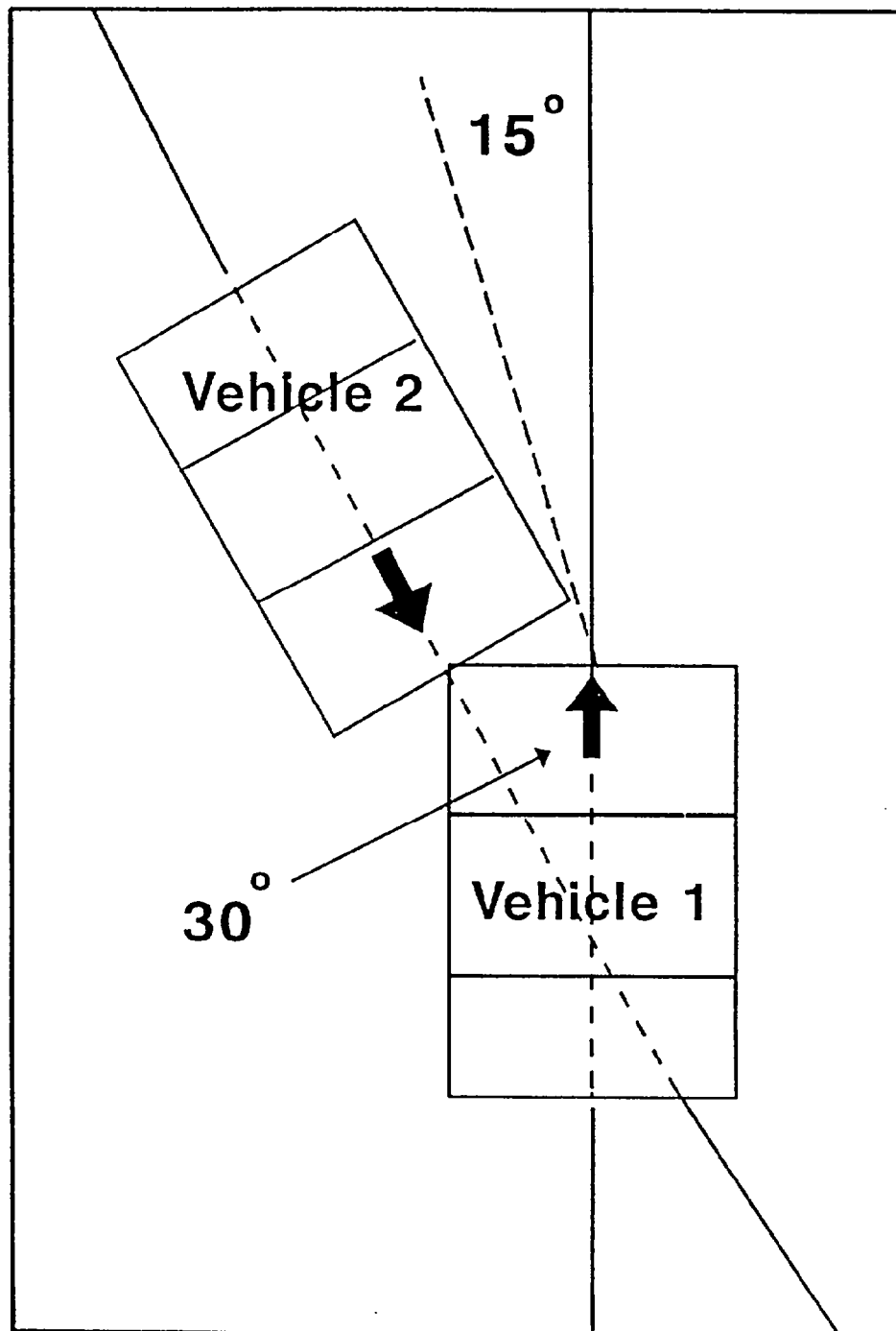
- Two of the chest displacement array potentiometers located in the chest of the driver dummy in Vehicle 1, numbers 130 and 131 contained questionable data during entire data trace.
- The vehicle acceleration from the accelerometer located on the right front frame rail (x) of Vehicle 1 contained questionable data after 210 milliseconds.
- The vehicle accelerations from the accelerometers located on the engine bottom (x and y axis) of Vehicle 1 contained questionable data. The data cables were damaged during impact.
- The position 2 upper neck moment (x) transducer sustained a damaged cable during impact. The data was questionable after 182 milliseconds.

Section 3

VEHICLE AND OCCUPANT INFORMATION

Figure 1

VEHICLE-TO-VEHICLE ANGLED FRONTAL IMPACT LAYOUT



VEHICLE ONE DATA

Table 1

GENERAL TEST AND VEHICLE 1 PARAMETER DATATEST VEHICLE INFORMATION:

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

NHTSA Test No.: - VIN.: 1FALP52U2RG132113

Body Color: White Date of Manufacture: 10/93

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 right front passenger airbag and 3-point manual belt systems

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

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

Recommended Tire Size: P205/65R15

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

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

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

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

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

Vehicle Capacity Weight (VCW) = 499 kgs. (A)

No. of Occupants x 68.03 kgs. = 408 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	=	<u>481</u>	kgs.	Right Rear	=	<u>245</u>	kgs.
Left Front	=	<u>467</u>	kgs.	Left Rear	=	<u>272</u>	kgs.
TOTAL FRONT WEIGHT	=	<u>948</u>	kgs.	(<u>64.7</u> % of Total Vehicle Weight)			
TOTAL REAR WEIGHT	=	<u>517</u>	kgs.	(<u>35.3</u> % of Total Vehicle Weight)			
TOTAL DELIVERED WEIGHT	=	<u>1465</u>	kgs.				

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES:

Right Front	=	<u>490</u>	kgs.	Right Rear	=	<u>327</u>	kgs.
Left Front	=	<u>481</u>	kgs.	Left Rear	=	<u>308</u>	kgs.
TOTAL FRONT WEIGHT	=	<u>971</u>	kgs.	(<u>60.5</u> % of Total Vehicle Weight)			
TOTAL REAR WEIGHT	=	<u>635</u>	kgs.	(<u>39.5</u> % of Total Vehicle Weight)			
TOTAL TEST WEIGHT	=	<u>1606</u>	kgs.				

Weight of Ballast Secured in Vehicle Trunk Area = 0.0 kgs.

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

Delivered Attitude:	RF	<u>728</u>	;	LF	<u>731</u>	;	RR	<u>696</u>	;	LR	<u>697</u>
Test Attitude:	RF	<u>711</u>	;	LF	<u>705</u>	;	RR	<u>657</u>	;	LR	<u>663</u>

Vehicle's Wheel Base = 2689 mm.

Location of Vehicle's C.G. = 1063 millimeters rearward of front wheel center.

Table 1

GENERAL TEST AND VEHICLE 1 PARAMETER DATA (continued)POST-IMPACT DATA:

Type of Test:	<u>Vehicle-to-MDB</u>	Impact Angle:	<u>30°</u>
Date of Test:	<u>June 8, 1994</u>	Time of Test:	<u>17:45</u>
Ambient Temperature:	<u>26.1</u>	°C at impact area	
Temperature in Occupant Compartment:	<u>21.1</u>	°C	
Windshield Molding Temperature:	<u>21.1</u>	°C	
Impact Velocity:	primary = <u>58.7</u> kph, secondary = <u>58.7</u> kph		
Distance From Front Bumper to Barrier Face When			
Entering Speed Trap:	<u>132.1</u>	cm.	
Exiting Speed Trap:	<u>30.5</u>	cm.	

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>		<u>Passenger</u>	
Head	<u>Face with airbag</u>		<u>Face with airbag</u>	
Chest	<u>Airbag</u>		<u>Airbag</u>	
Abdomen	<u>Airbag</u>		<u>Airbag</u>	
Left Knee	<u>Lower dash</u>		<u>Glove box Door</u>	
Right Knee	<u>Lower dash</u>		<u>Glove box Door</u>	

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>closed*</u>	<u>closed</u>	<u>closed</u>	<u>closed</u>

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

*tools required.

Table 2

VEHICLE 1 DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-59.5	41.0	23.7	63.2	-56.5	-22.5	17.0	54.784
DUMMY (2)	-59.2	-32.1	-29.9	66.3	-64.7	-24.4	-17.7	65.279
DUMMY (3)	-	-	-	-	-	-	-	-
DUMMY (4)	-	-	-	-	-	-	-	-

	MAXIMUM FORCE FEMUR LOAD (NEWTONS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	-6188.2	-6707.5
DUMMY (2)	-2067.2	-8431.3
DUMMY (3)	-	-
DUMMY (4)	-	-

	MAXIMUM LOAD (NEWTONS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	4932.3	-	-
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)	460.96	48.360	83.040	44.61
DUMMY (2)	418.36	53.400	83.400	45.48
DUMMY (3)	-	-	-	-
DUMMY (4)	-	-	-	-

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Figure 2

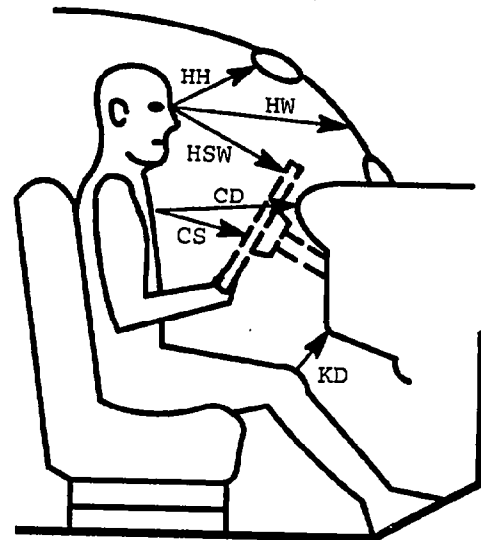
VEHICLE 1 OCCUPANT CLEARANCE DIMENSIONS (mm)

	DRIVER (mm)	PASSENGER
HH	296	298
NW	573	552
NSW	352	-
NIP	506	-
NH	366	-
CD	506	468
CS	287	-
KDL	60	105
KDR	65	104
1	603	-
2	51	-
SA	20°	20°
PA	24°	23°
ULA	108	108
LLA	227	227

DISTANCE OF H-POINT FROM TARGET POSITION (mm)		
	Driver	Passenger
Longitudinal	5.0 rearward	2.0 rearward
Vertical	5.0 above	4.0 above

	DRIVER (mm)	PASSENGER
HR	158	150
HS	258	250
AD	116	120
HD	145*	149*
KK	243	213
AA	310	232
DT	21°C	21°C

*to door pocket



HH = Head to Windshield Header
 NW = Nose 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 = Head Target to Steering Column Target
 2 = Distance between Steering Column Targets

Angles taken relative to vertical

SA = Seat Back Angle
 PA = Pelvic Angle
 ULA = Upper Leg Angle
 LLA = Lower Leg Angle
 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 °C

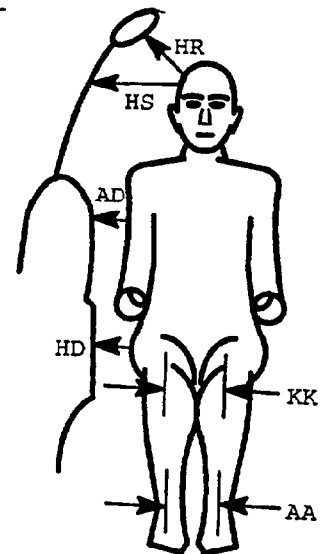
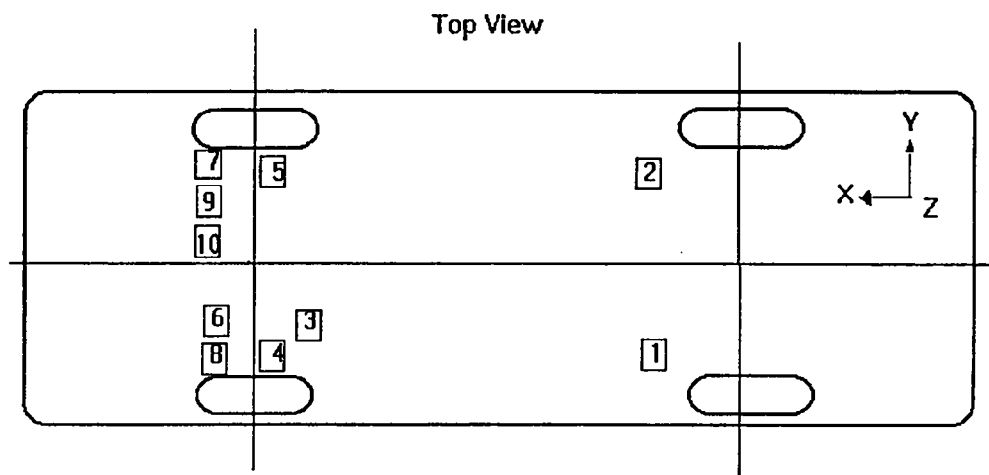


Figure 3

SUMMARY OF VEHICLE 1 ACCELEROMETER DATA



Vehicle: 1994 Ford Taurus GL 4-Door Sedan

ACCELEROMETER NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1 L.R. Comp (X)	Gs	4.6	126.0	-51.1	41.2	60.0
1	V1 L.R. Comp (Y)	Gs	4.1	287.0	-22.5	51.1	60.0
2	V1 R.R. Comp (X)	Gs	4.8	127.9	-54.0	51.4	60.0
2	V1 R.R. Comp (Y)	Gs	7.0	44.5	-24.0	49.7	60.0
3	V1 Brake Pedal (X)	Gs	69.2	42.7	-153.0	47.8	60.0
3	V1 Brake Pedal (Y)	Gs	36.6	117.8	-93.7	47.0	60.0
3	V1 Brake Pedal (Z)	Gs	161.7	43.8	-155.5	55.2	60.0
3	V1 Brake Pedal (res)	Gs	186.3	47.6	.1	-38.2	60.0
4	V1 Left Shock Tower (X)	Gs	34.2	74.5	-86.3	34.3	60.0
4	V1 Left Shock Tower (Y)	Gs	23.6	73.2	-92.6	28.9	60.0
5	V1 Right Shock Tower (X)	Gs	5.1	132.8	-75.9	48.4	60.0
5	V1 Right Shock Tower (Y)	Gs	14.7	62.0	-86.3	46.3	60.0
6	V1 Left Engine (X)	Gs	63.5	57.4	-180.2	38.6	60.0
7	V1 Right Engine (X)	Gs	64.9	56.3	-148.0	40.6	60.0
8	V1 L.F Frame Rail (X)	Gs	72.8	46.7	-173.4	32.4	60.0
8	V1 L.F Frame Rail (Y)	Gs	43.0	57.8	-97.7	32.4	60.0
8	V1 L.F Frame Rail (Z)	Gs	177.2	39.6	-137.1	33.2	60.0
8	V1 L.F Frame Rail Res.	Gs	237.7	32.6	.6	-34.0	60.0
* 9	V1 R.F Frame Rail (X)	Gs	56.0	263.5	-202.5	271.1	60.0
9	V1 R.F Frame Rail (Y)	Gs	64.1	268.7	-95.3	43.2	60.0
9	V1 R.F Frame Rail (Z)	Gs	41.8	34.0	-42.9	44.2	60.0
9	V1 R.F Frame Rail Res.	Gs	204.9	271.0	.1	-44.2	60.0
** 10	V1 Engine Bottom (X)	Gs	194.0	19.1	-169.4	60.2	60.0
*** 10	V1 Engine Bottom (Y)	Gs	144.5	-10.8	-60.4	-19.1	60.0

* - Data questionable after 210 msec.

** - Data questionable, cable damaged.

*** - No data, data cable cut.

Figure 4

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

ACCELEROMETER MOUNTING LOCATIONS

Test Description: 60 kph Angled Frontal Vehicle to Vehicle Impact
 Test Vehicle: 1994 Ford Taurus GL 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	3980	455	180	4038	387	199
2	LEFT FRONT FRAME RAIL	3965	405	193	3864	393	228
3	RIGHT ENGINE TOP	4015	222	892	3913	344	970
4	LEFT ENGINE TOP	3940	95	880	3758	65	1005
5	ENGINE BOTTOM	4052	140	225	3963	115	310
6	RIGHT SHOCK TOWER	3852	627	928	3840	592	995
7	LEFT SHOCK TOWER	3852	633	935	3527	550	1148
8	BRAKE PEDAL	3373	335	393	3289	275	463
9	LEFT REAR COMP.	1956	615	387	1956	615	378
10	RIGHT REAR COMP.	1956	615	382	1956	615	380
11	CENTER REAR COMP.	1891	0.0	472	1891	0.0	478
12	LOWER STEERING COL.	3343	378	632	3229	318	683
13	UPPER STEERING COL.	N/A*	N/A	N/A	N/A	N/A	N/A
14	LEFT DRIVER TOEPAN	3426	577	351	3324	540	436
15	RIGHT DRIVER TOEPAN	3493	332	293	3353	278	380

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

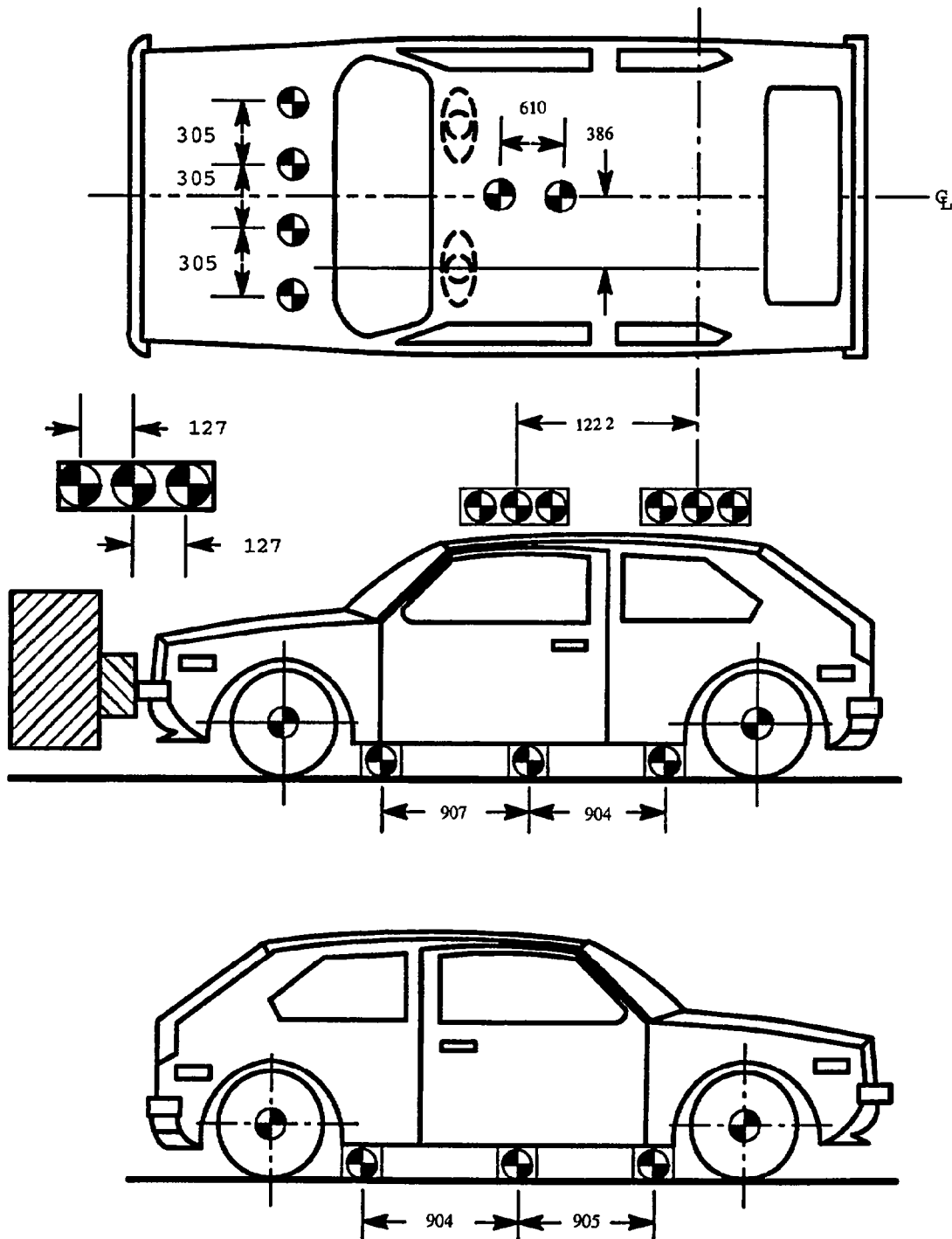
*Airbag was used for test.

TOEPAN MEASUREMENT POSITIONS						
Loc. No.	PRE-TEST AXIS (mm)			POST-TEST AXIS (mm)		
	X	Y	Z	X	Y	Z
1	3339	550	243	3286	527	287
2	3468	560	393	3314	507	485
3	3524	465	309	3364	405	395
4	3692	190	326	3394	150	413
5	3414	172	230	3329	155	285

Figure 5

VEHICLE 1 TARGET LOCATIONS

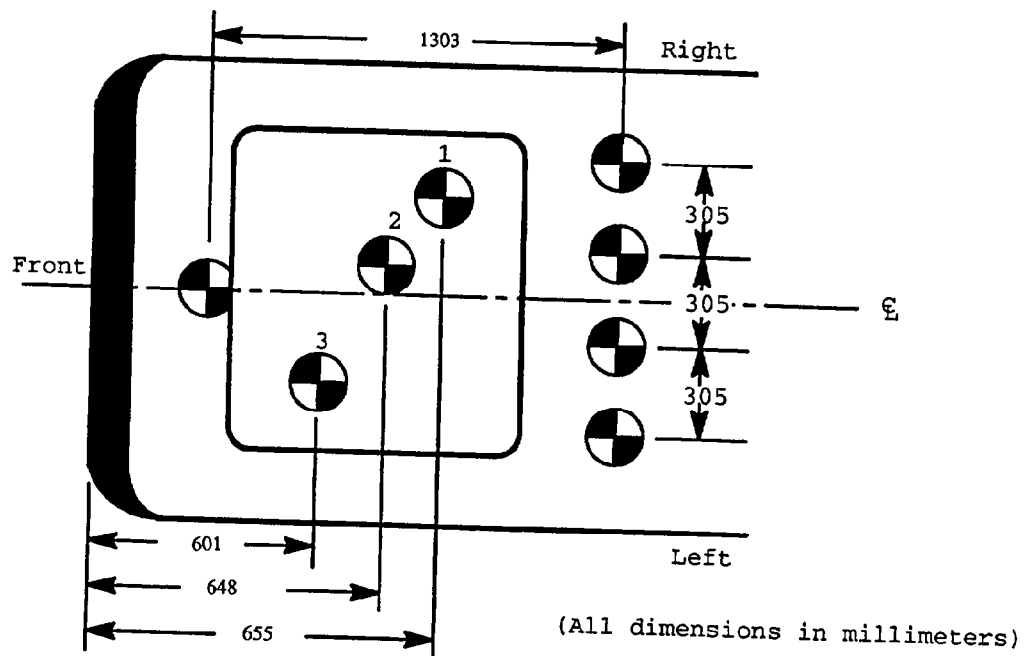
(All dimensions in millimeters)



(Dimensions in millimeters)

Figure 5

VEHICLE 1 TARGET LOCATIONS (continued)
(TOP VIEW OF HOOD AND ENGINE COMPARTMENT)



Note: Drawing not to scale

Target 1: Alternator
2: Air Cleaner Assembly
3: Valve Cover

Figure 6

VEHICLE 1 MEASUREMENT POINTS

(All dimensions in millimeters)

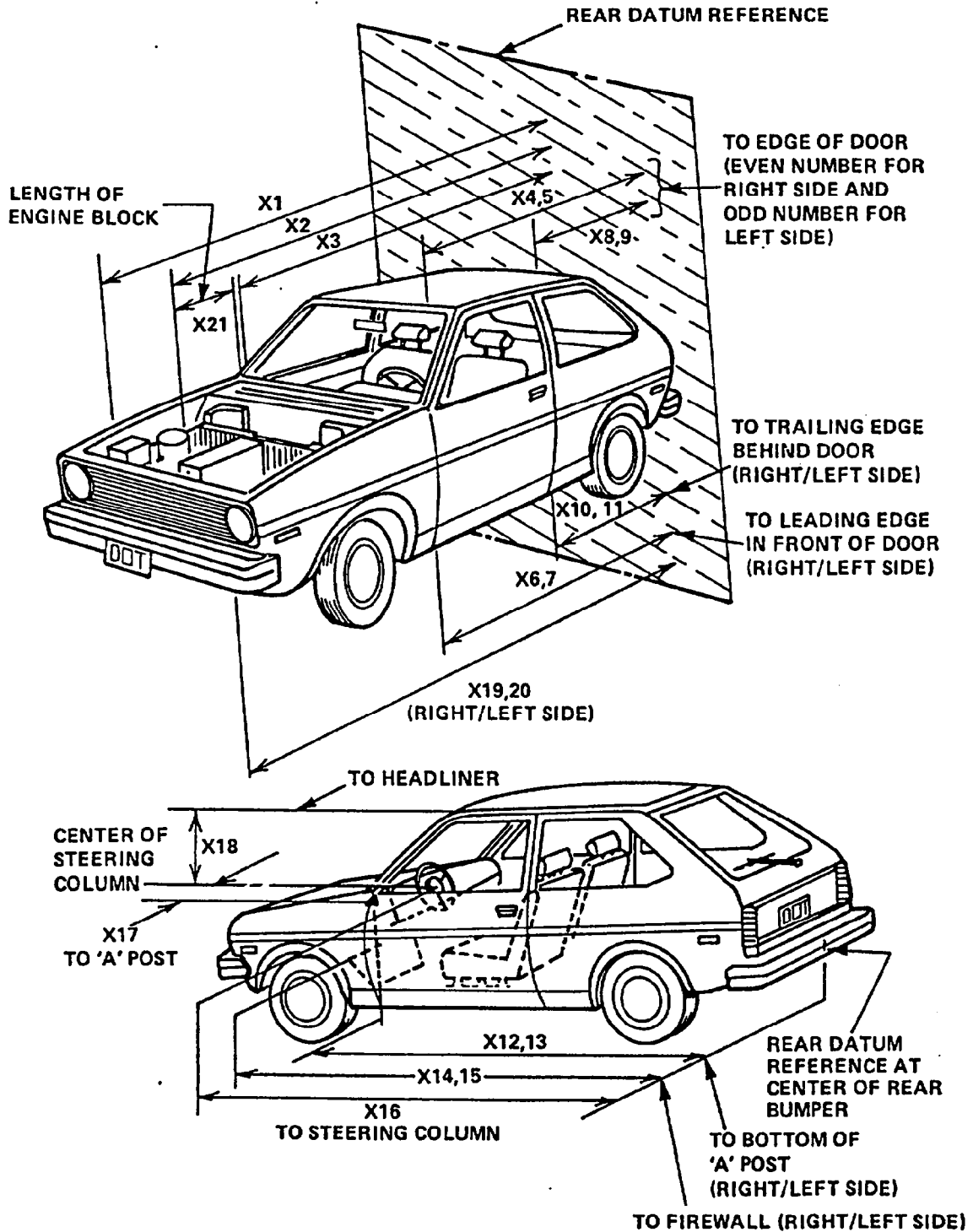


Figure 6

VEHICLE 1 MEASUREMENT POINTS (continued)

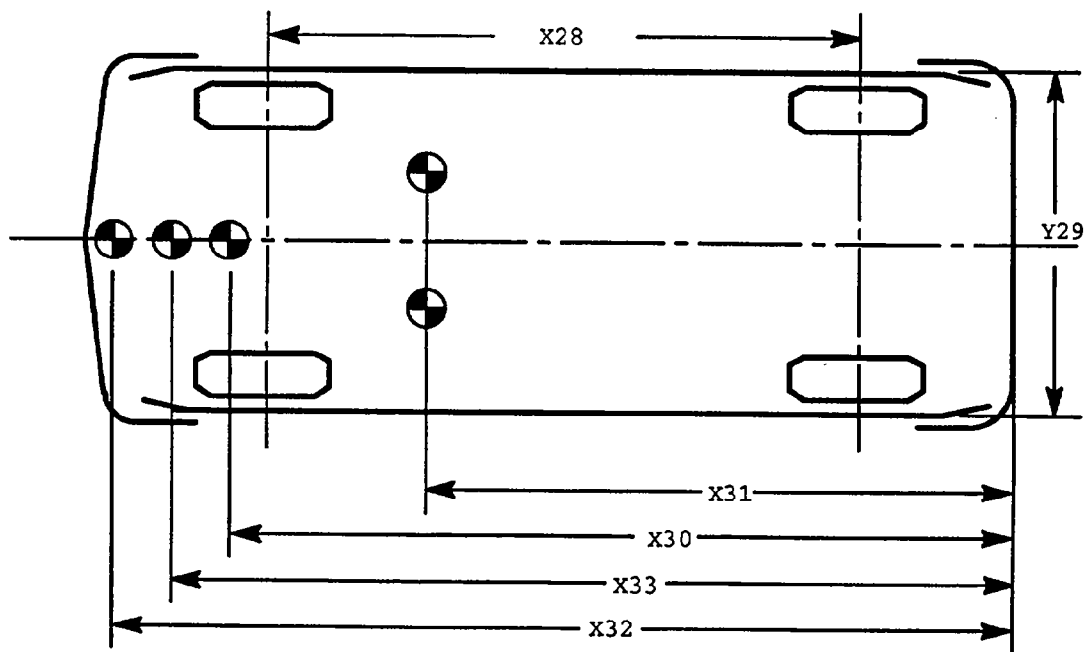
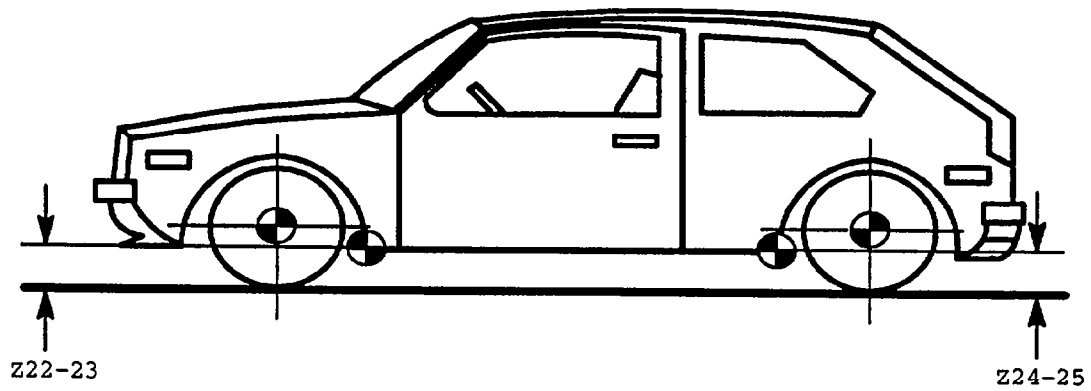


Table 3

VEHICLE 1 MEASUREMENTS

No.	TYPE OF MEASUREMENT	All Dimensions in millimeters	
		Pre-Test	Post-Test
X1	Total Length of Vehicle at Centerline	4880	4445
X2	Rear Surface of Vehicle to Engine at Centerline	4103	3935
X3	Rear Surface of Vehicle to Firewall	3662	3552
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3374	3338
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3372	3235
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3305	3288
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3300	3228
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2283	3259
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2284	2222
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2266	2250
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2274	2210
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3332	3322
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3385	3335
X14	Rear Surface of Vehicle to Firewall - Right Side	3645	3600
X15	Rear Surface of Vehicle to Firewall - Left Side	3625	3470
X16	Rear Surface of Vehicle to Steering Wheel Center	2865	2765
X17	Steering Column to "A" Post	410	395

Table 3

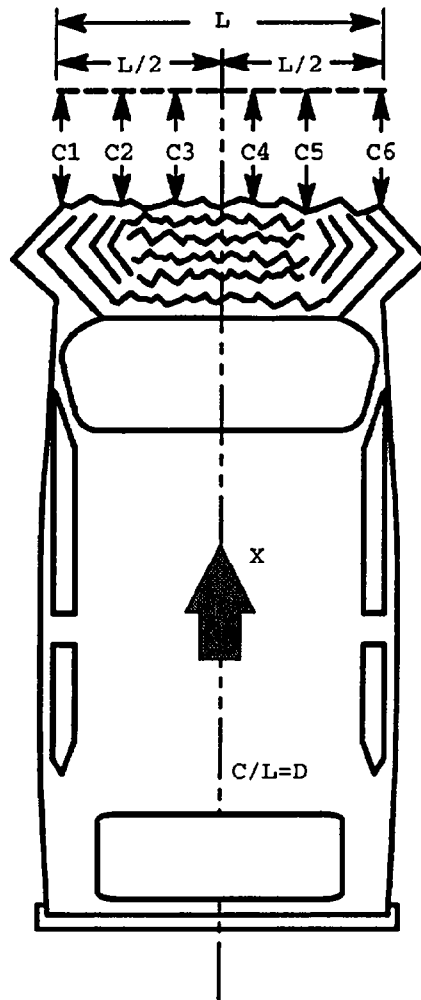
VEHICLE 1 MEASUREMENTS (continued)

No.	TYPE OF MEASUREMENT	All Dimensions in millimeters	
		Pre-Test	Post-Test
Z18	Rear of Windshield Header to Steering Wheel Column	405	460
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4770	4795
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4755	4125
X21	Width of Engine Block	400	400
Z22	Right Front Sill to Ground Plane	230	246
X23	Left Front Sill to Ground Plane	230	206
Z24	Right Rear Sill to Ground Plane	217	205
Z25	Left Rear Sill to Ground Plane	214	210
X26	Firewall to Engine or Transaxle	205	160
Z27	Vertical Dim. from Door Sill to Centerline of Steering Column	545	376
X28	Wheelbase of Vehicle	2689	R = 2705 L = 2510
Y29	Width of Vehicle at Maximum Width Point	1809	1821
X30	Rear Surface of Vehicle to Engine Target	4052	3963
X31	Rear Surface of Vehicle to Compartment Target	3345	R = 3361 L = 3321
X32	Rear Surface of Vehicle to Bumper Target	4805	4492
X33	Rear Surface of Vehicle to Frame Crossmember	4305	4213

Table 3

VEHICLE 1 MEASUREMENT (continued)

(all dimensions in millimeters)



Location	Pre-Test	Post-Test	Change
C1	4753	4044	709
C2	4842	4288	554
C3	4870	4491	379
C4	4870	4720	150
C5	4842	4748	94
C6	4753	4662	91

FMVSS NO. 301

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

FUEL SPILLAGE MEASUREMENT:

- | ACTUAL | MAX. ALLOWED |
|--------|--------------|
| 0 | 1 oz. |
| 0 | 5 oz. |
| 0 | 1 oz./1 min. |

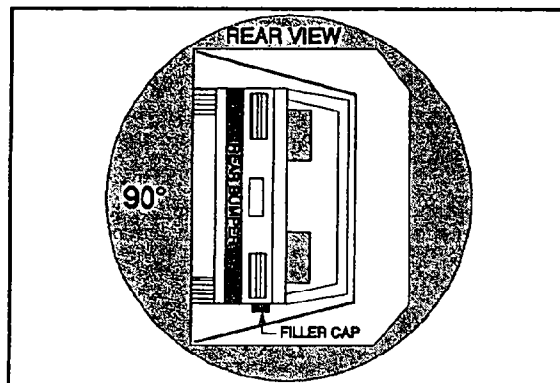
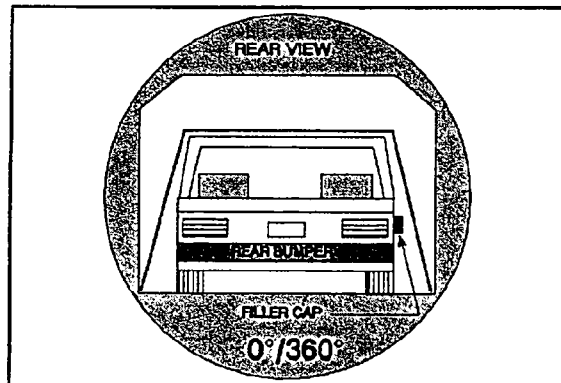
None

Table 5
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:

Vehicle NHTSA ID No.:

0-90 Deg.



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time
(Spec. Range = 1 to 3 minutes)

2 minutes 30 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

7 minutes 30 seconds

Next whole minute interval

8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 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.

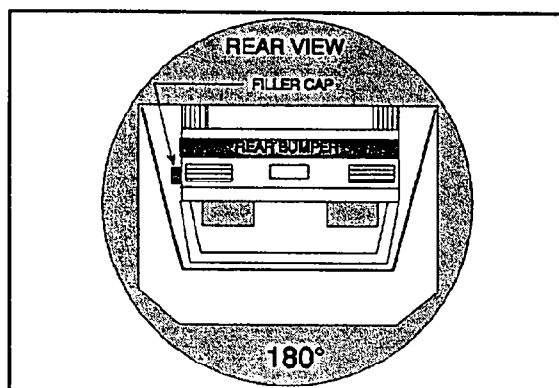
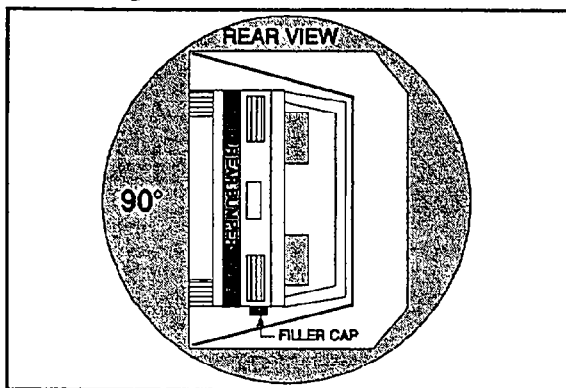
IV. SOLVENT SPILLAGE LOCATION(S):

None

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

TEST PHASE:
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)	<u>2</u> minutes <u>20</u> seconds
FMVSS 301 Position Hold Time +	<u>5</u> minutes <u>00</u> seconds
TOTAL	<u>7</u> minutes <u>20</u> seconds
Next whole minute interval	<u>8</u> 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.

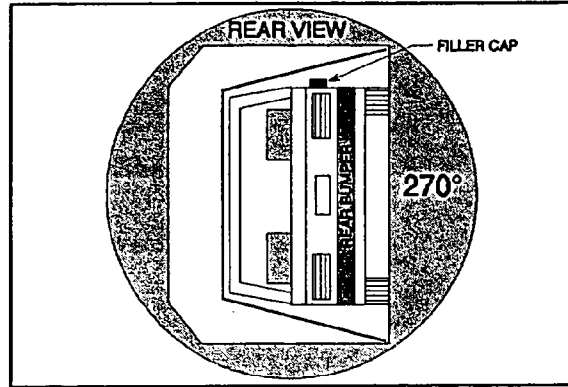
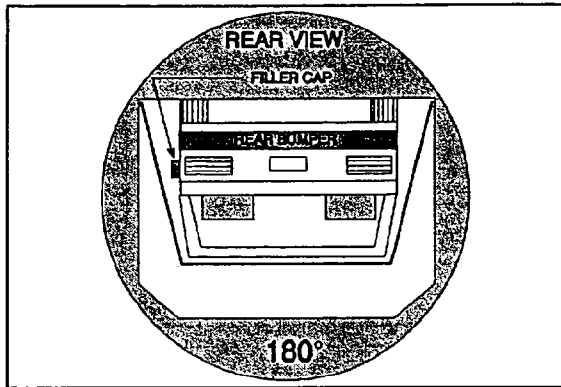
IV. SOLVENT SPILLAGE LOCATION(S):

None

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

TEST PHASE:
180-270 Deg.

Vehicle NHTSA ID No.:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>2</u>	minutes	<u>25</u>	seconds
(Spec. Range = 1 to 3 minutes)				
FMVSS 301 Position Hold Time +	<u>5</u>	minutes	<u>00</u>	seconds
TOTAL	<u>7</u>	minutes	<u>25</u>	seconds
Next whole minute interval	<u>8</u>	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.

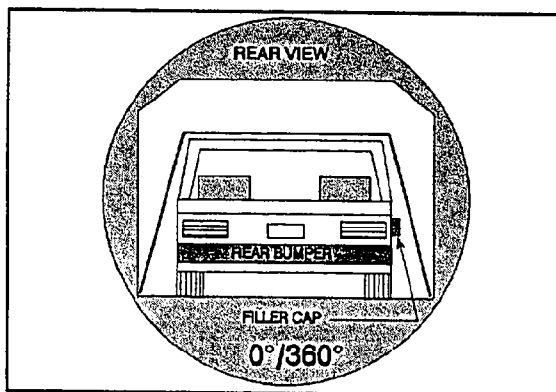
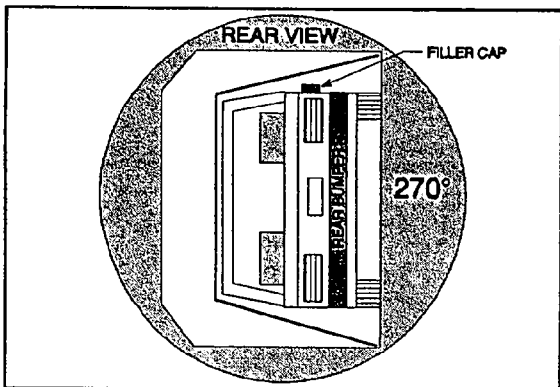
IV. SOLVENT SPILLAGE LOCATION(S):

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 2 minutes 35 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 00 seconds

TOTAL 7 minutes 35 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

VEHICLE TWO DATA

Table 6

CRASH TEST SUMMARY FOR SIDE IMPACTOR

POSITION OF IMPACT (MDB) MONORAIL:

30° to right

MDB DETAILS:

Overall Width of Framework Carriage	=	1251	millimeters
Overall Length of MDB (incl. honeycomb impact face)	=	4102	millimeters
Wheelbase of Framework Carriage	=	2598	millimeters
Tread of Framework Carriage (Front & Rear)	=	1880	millimeters
C.G. Location Rearward of Front Axle	=	-	millimeters

MDB WEIGHT:

Left Front	=	494	kg	Left Rear	=	299	kg
Right Front	=	485	kg	Right Rear	=	317	kg
SUBTOTAL	=	979	kg	SUBTOTAL	=	616	kg
TOTAL MDB WEIGHT		1595	kg				
Impact Angel (MDB C/L to Target Vehicle C/L)				=	30	degrees	
Impact Speed	=	1595	kg				

MAXIMUM STATIC CRUSH OR HONEYCOMB IMPACT FACE:

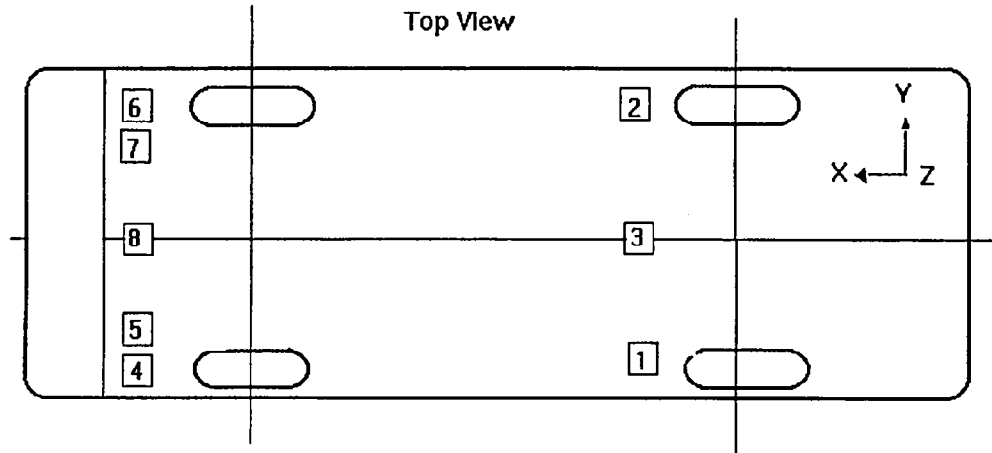
1. Row A at Bumper Level	=	363	millimeters
2. Row B at Mid-Stack Level	=	373	millimeters
3. Row C at Top of Stack Level	=	404	millimeters

INSTRUMENTATION:

Number of MDB Data Channels	=	12
-----------------------------	---	----

Figure 7

SUMMARY OF VEHICLE 2 ACCELEROMETER DATA



Vehicle: Moving Deformable Barrier

ACCELEROMETER NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V2 Left Rail X	Gs	2.0	139.0	-48.0	37.4	60.0
1	V2 Left Rail Y	Gs	19.3	54.4	-8.1	67.8	60.0
* 2	V2 Right Rail X	Gs	1.3	150.1	-42.6	43.0	60.0
2	V2 Right Rail Y	Gs	19.2	54.0	-8.8	46.1	60.0
3	V2 C.G. X	Gs	2.2	187.7	-51.8	37.6	60.0
3	V2 C.G. Y	Gs	20.7	55.9	-14.2	45.1	60.0
3	V2 C.G. Z	Gs	34.6	44.8	-22.1	19.3	60.0
3	V2 C.G.	Gs	54.1	37.4	.1	-10.9	60.0
4	V2 TL Load Cell	Nwt	13969.2	77.9	-211930.	34.8	60.0
5	V2 BL Load Cell	Nwt	10031.8	101.6	-157340.	41.4	60.0
6	V2 TR Load Cell	Nwt	21591.3	7.0	-52072.2	37.4	60.0
7	V2 BR Load Cell	Nwt	24753.7	34.2	-26179.4	89.3	60.0
8	V2 CL Load Cell	Nwt	2298.2	-4.8	-245275.5	36.1	60.0

* - Data questionable after 175 msec.

Table 7

MOVING DEFORMABLE HONEYCOMB BARRIER
(Grid as looking at MDB from front)

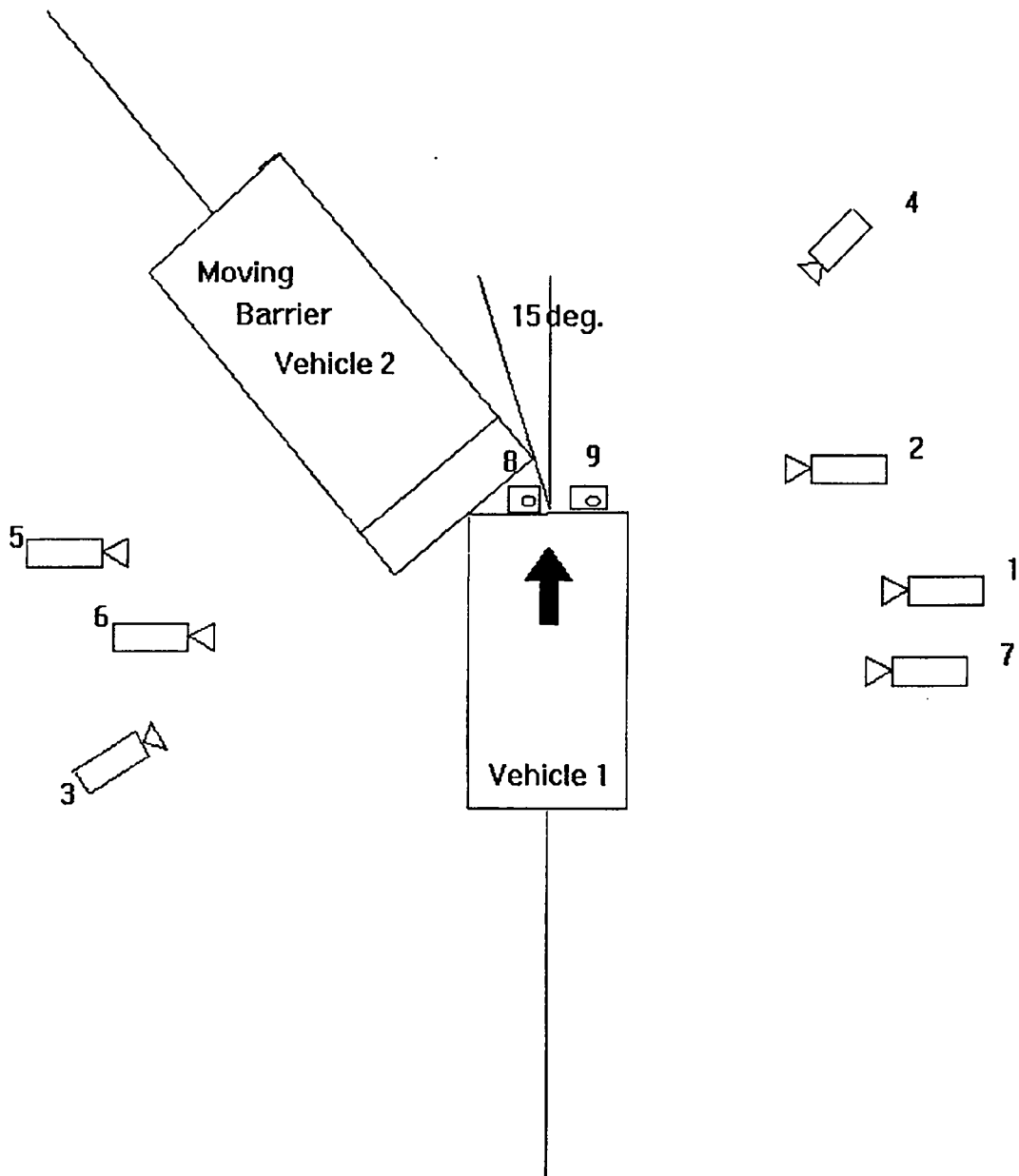
Test Date: June 8, 1994 Vehicle: Moving Deformable Barrier

Distances Left of Center																	
Location	813	711	610	508	406	305	203	102	0.0	102	203	305	406	508	610	711	813
Top of Stack Level	Pre	516	516	516	516	516	516	516	516	516	516	516	516	516	516	516	516
	Post	622	617	655	658	622	630	671	732	879	861	800	762	744	737	787	820
	Crush	106	101	139	142	106	114	155	216	363	345	284	246	228	221	271	304
Mid-Stack Level	Pre	516	516	516	516	516	516	516	516	516	516	516	516	516	516	516	516
	Post	592	615	N/A	N/A	N/A	711	724	749	800	864	871	843	813	798	813	889
	Crush	76	99	N/A	N/A	N/A	195	208	233	284	348	355	327	302	297	282	297
Bumper Level	Pre	N/A	409	409	409	409	409	409	409	409	409	409	409	409	409	409	N/A
	Post	N/A	709	726	737	762	709	668	671	775	800	787	770	762	775	813	N/A
	Crush	N/A	300	317	328	353	300	259	262	366	391	378	368	353	366	404	N/A

All dimensions in millimeters.

Figure 8

CAMERA POSITIONS FOR VEHICLE TO VEHICLE ANGLED FRONTAL IMPACT



HIGH-SPEED CAMERA LOCATIONS

Vehicle: 1994 Ford Taurus GL 4-Door Sedan, Moving Deformable Barrier

[illegible]
$$^*X = \text{film plane to monorail centerline}$$

Y = film plane to impact location

 $Z =$ film plane to ground

== referenced to horizontal plane

APPENDIX A
PHOTOGRAPHS

APPENDIX A

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OVERALL TEST SETUP



FIGURE A-1 PRE-TEST OVERHEAD VIEW

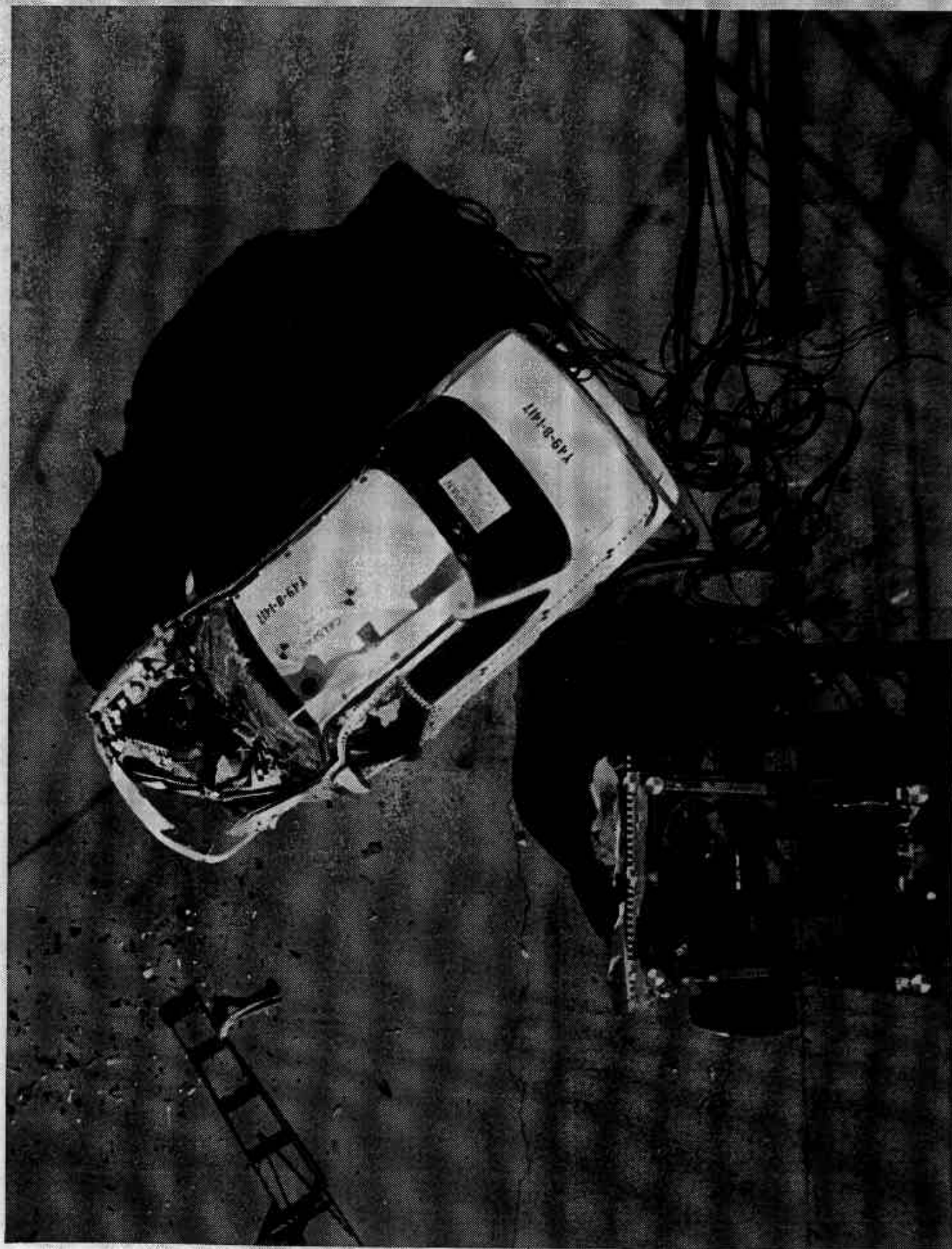


FIGURE A-2 POST-TEST OVERHEAD VIEW



FIGURE A-3 PRE-TEST OVERALL SIDE VIEW

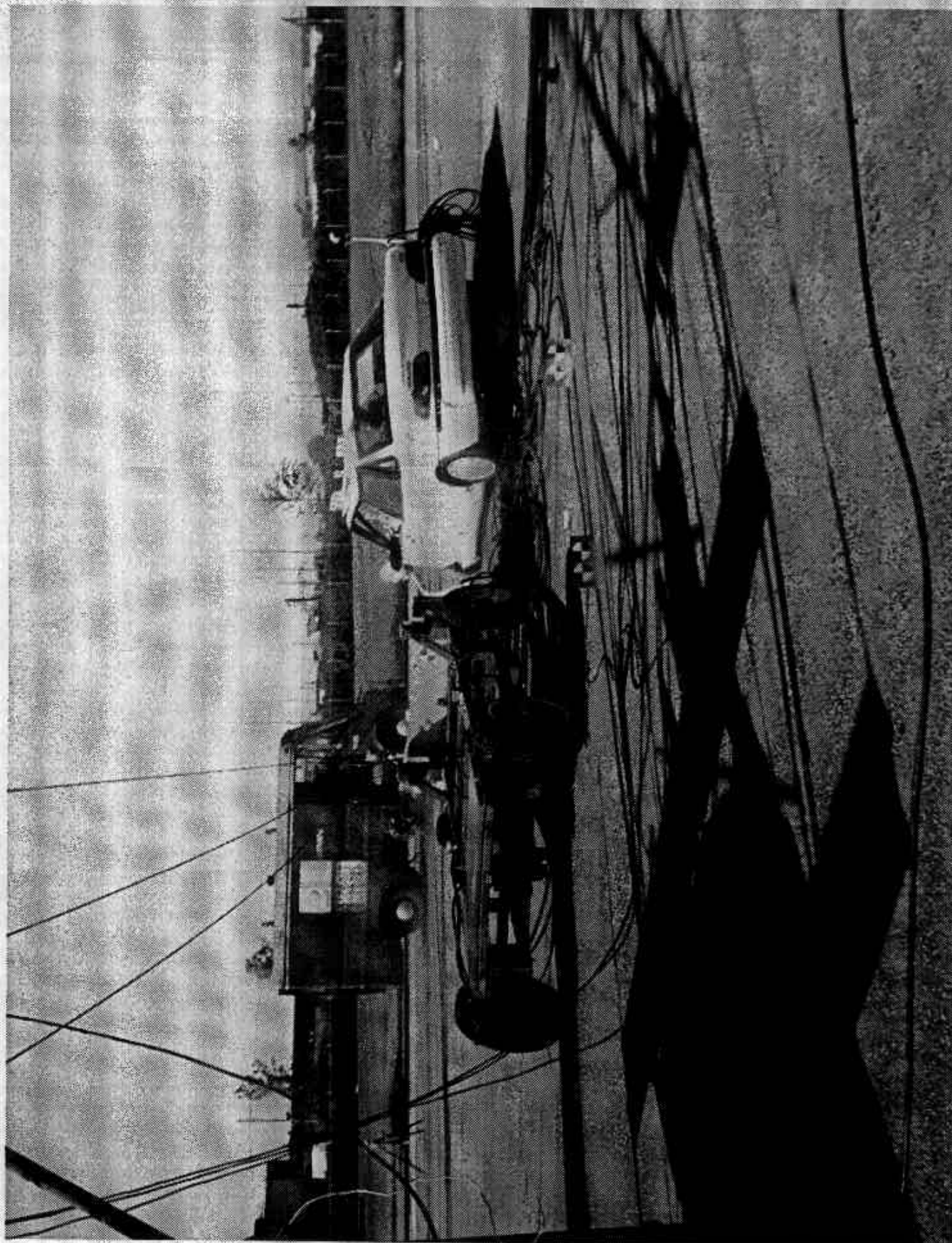


FIGURE A-4 POST-TEST OVERALL SIDE VIEW

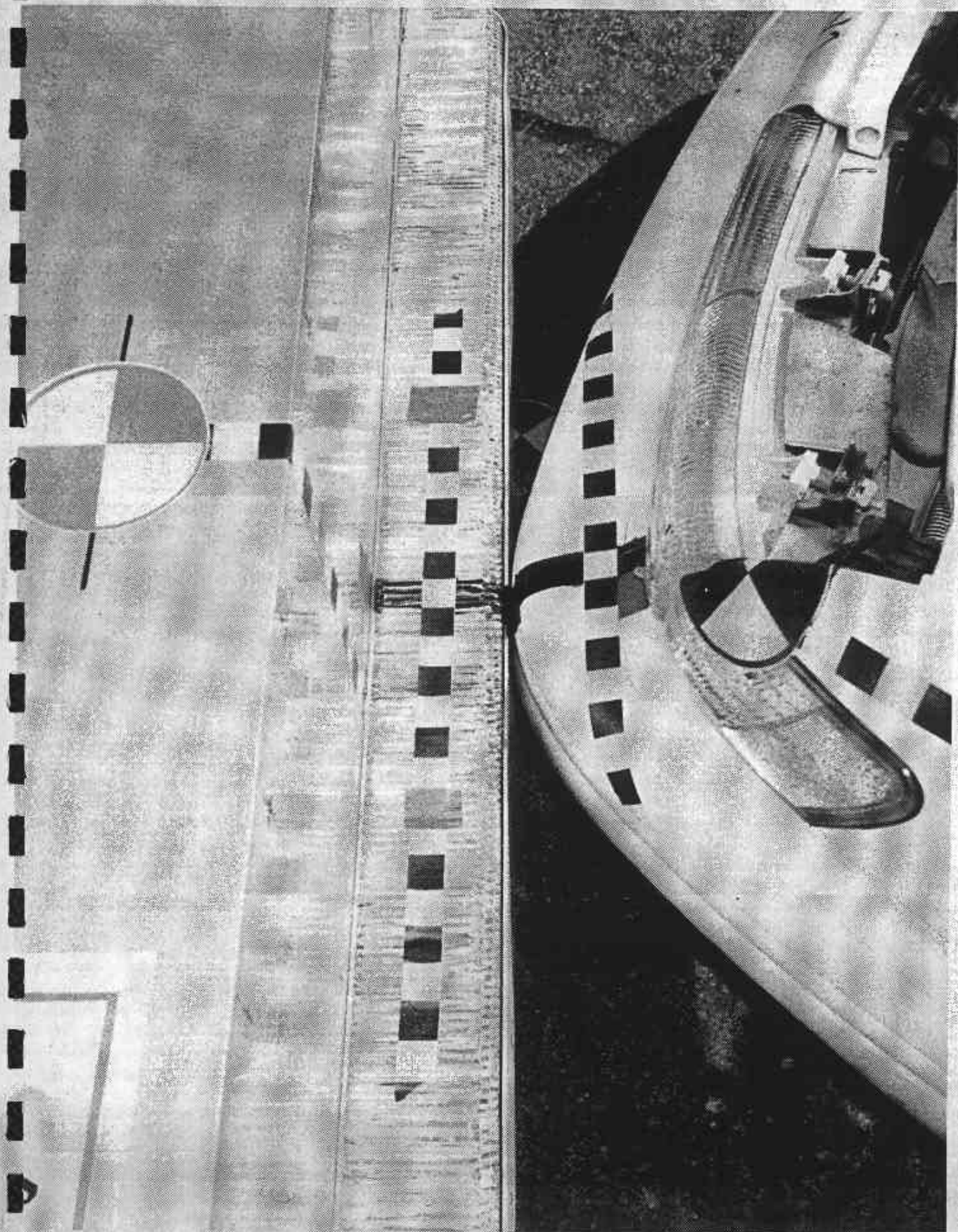


FIGURE A-5 PRE-TEST CLOSEUP VIEW OF IMPACT POINT



FIGURE A-6 PRE-TEST RIGHT SIDE CLOSEUP VIEW OF IMPACT POINT

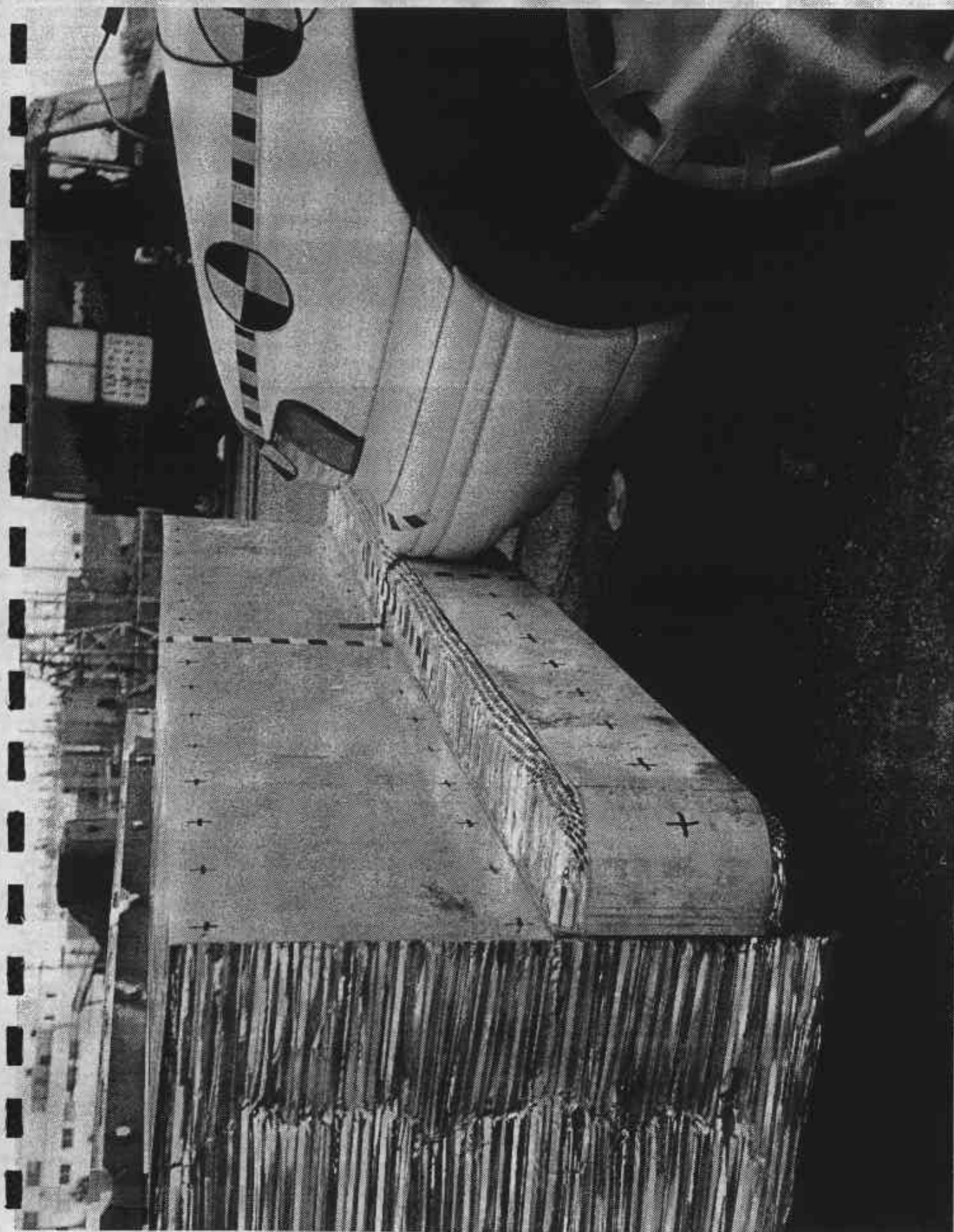


FIGURE A-7 PRE-TEST LEFT SIDE CLOSEUP VIEW OF IMPACT POINT

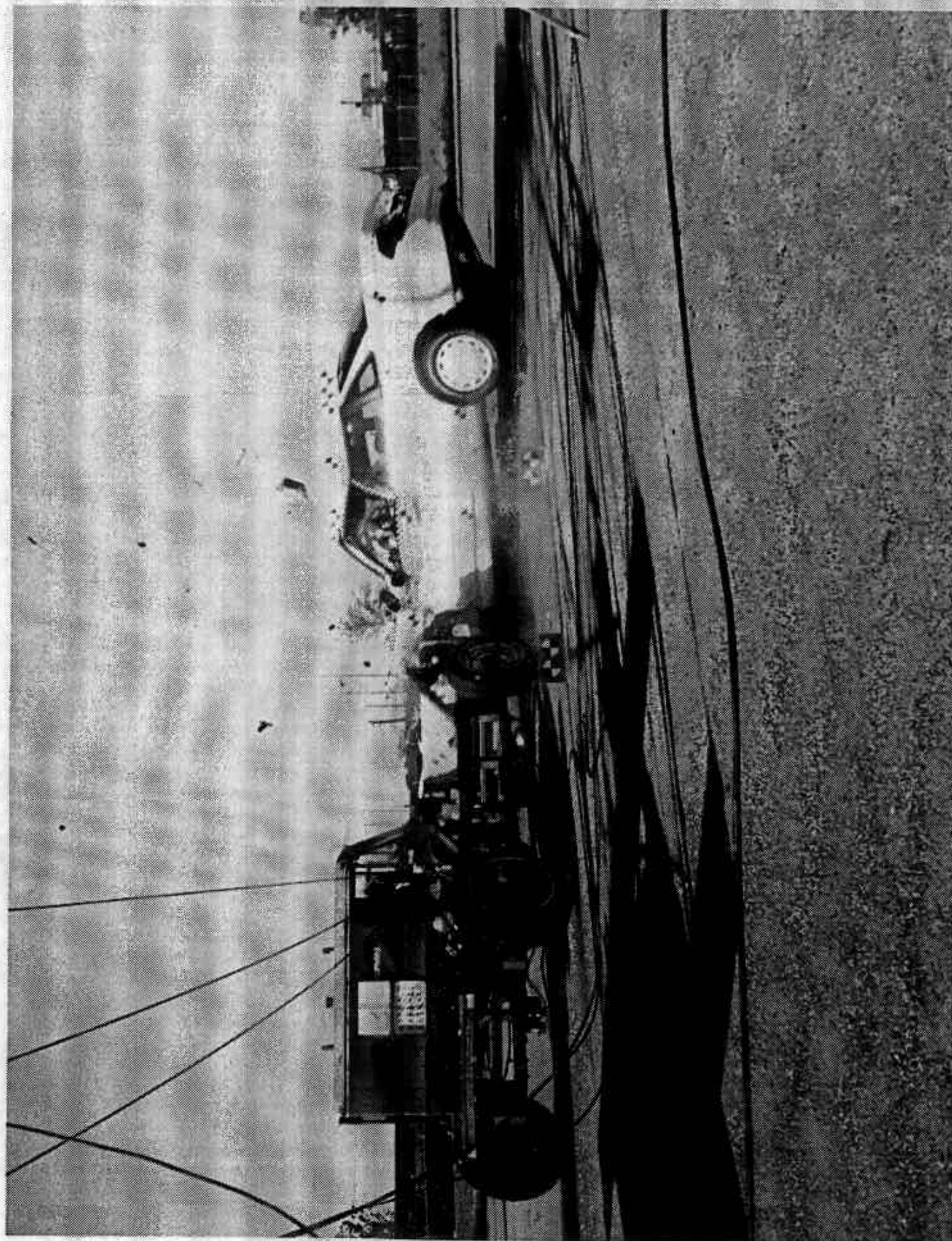


FIGURE A-8 IMPACT PHOTO

VEHICLE 1 PHOTOGRAPHS

8118-8



FIGURE A-9 PRE-TEST FRONT VIEW



FIGURE A-10 POST-TEST FRONT VIEW



FIGURE A-11 PRE-TEST FRONT RIGHT THREE QUARTER VIEW



FIGURE A-12 POST-TEST FRONT RIGHT THREE QUARTER VIEW

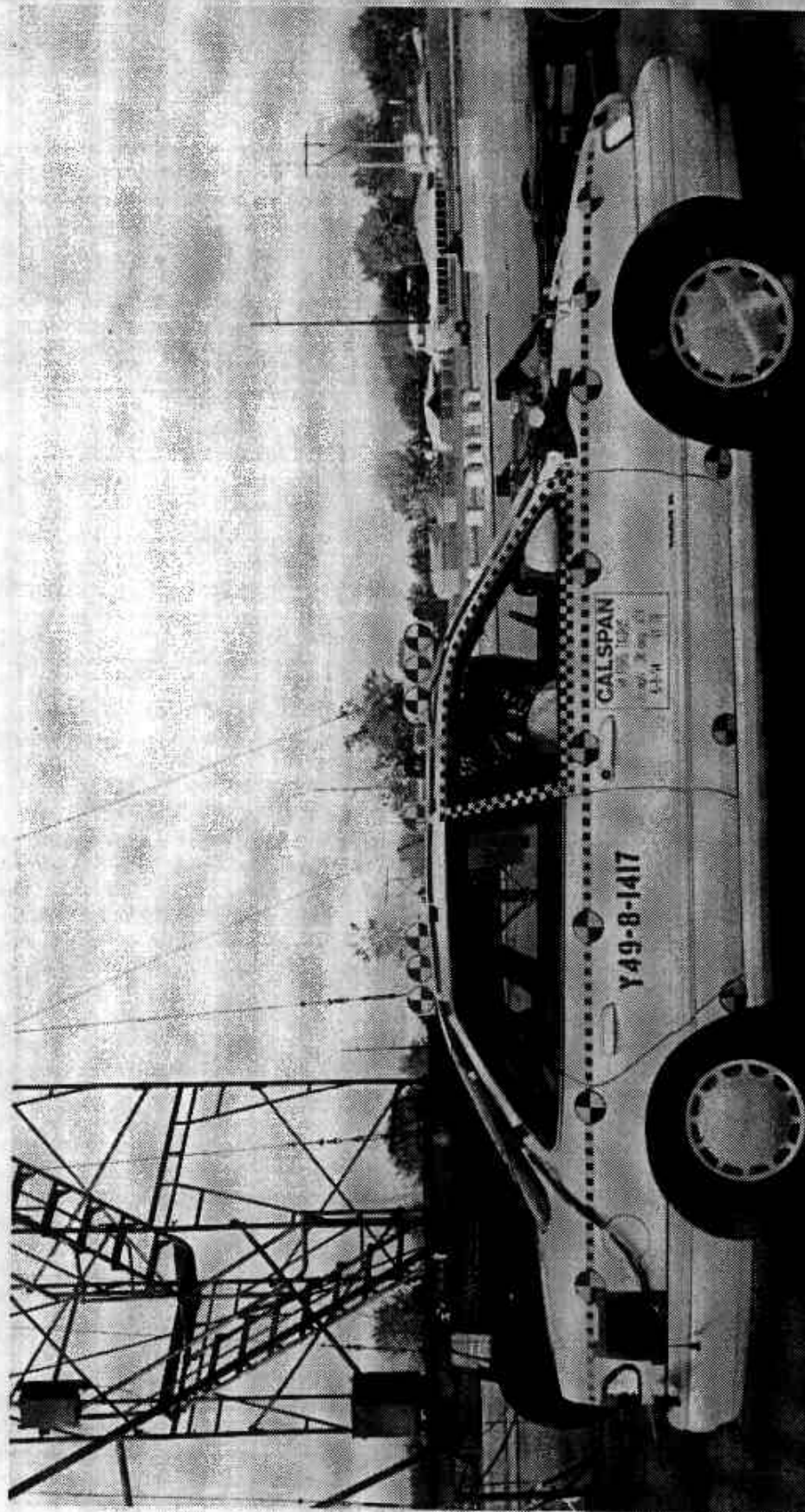


FIGURE A-13 PRE-TEST RIGHT SIDE VIEW

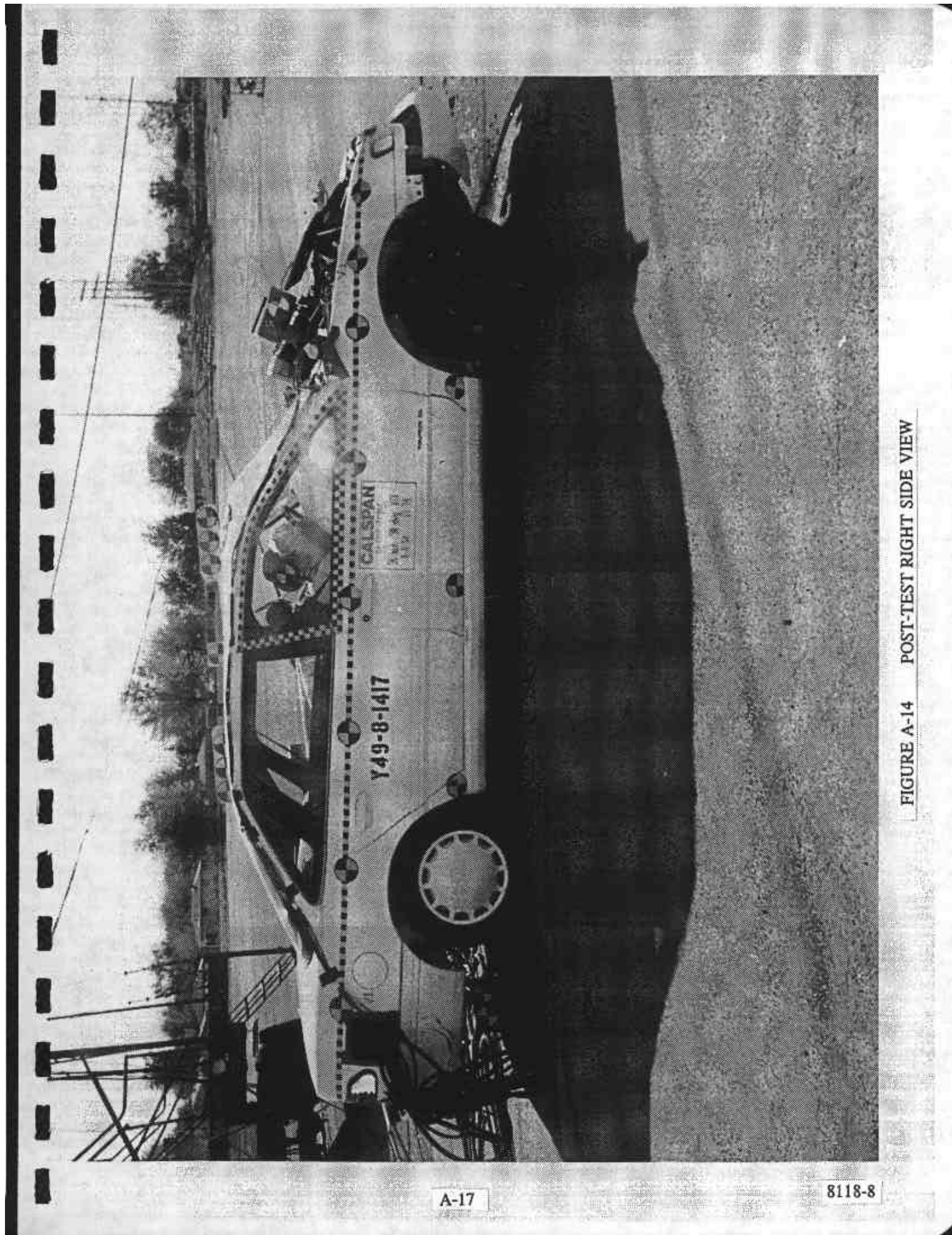


FIGURE A-14 POST-TEST RIGHT SIDE VIEW

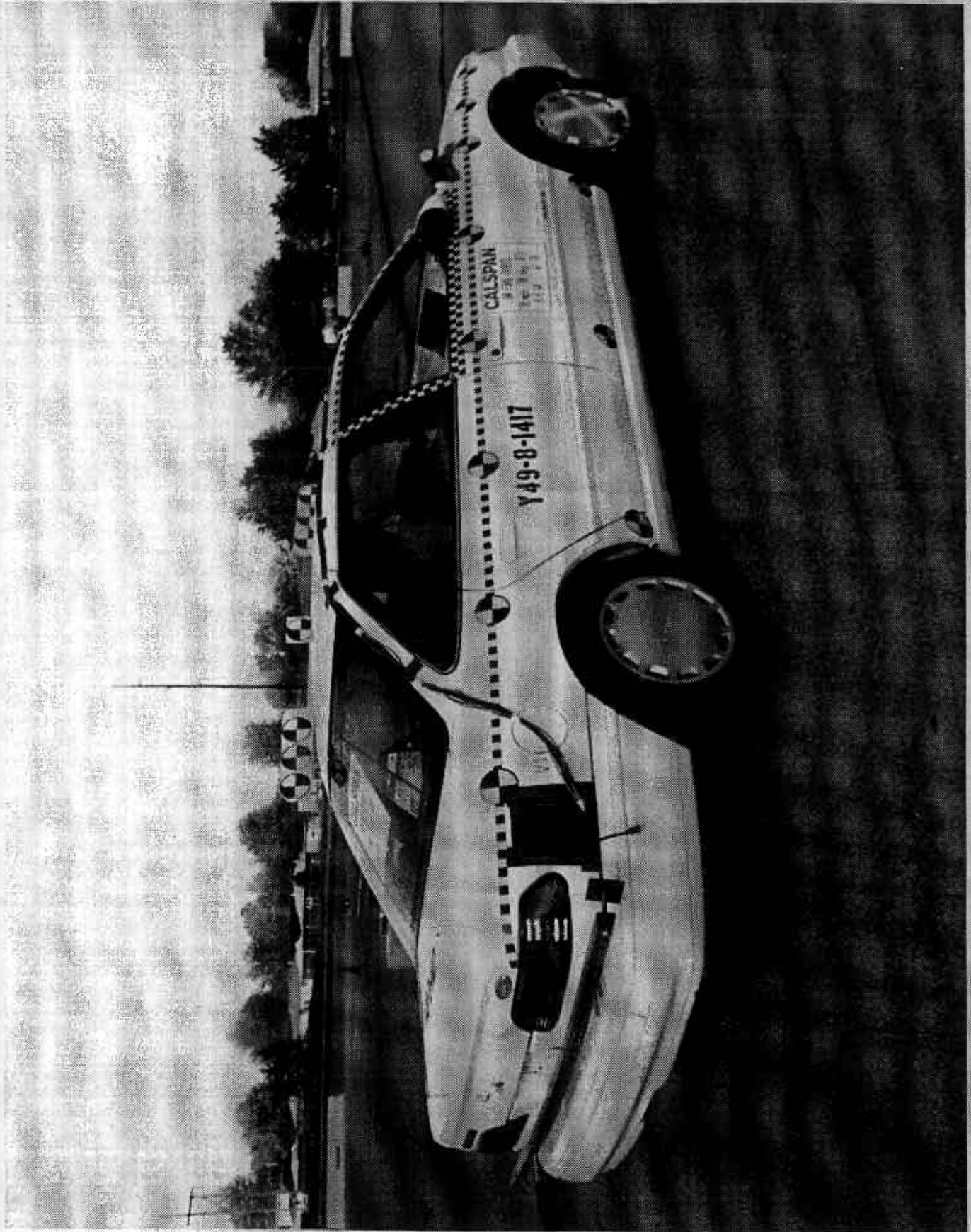


FIGURE A-15 PRE-TEST REAR RIGHT THREE QUARTER VIEW



FIGURE A-16 POST-TEST REAR RIGHT THREE QUARTER VIEW



FIGURE A-17 PRE-TEST REAR VIEW

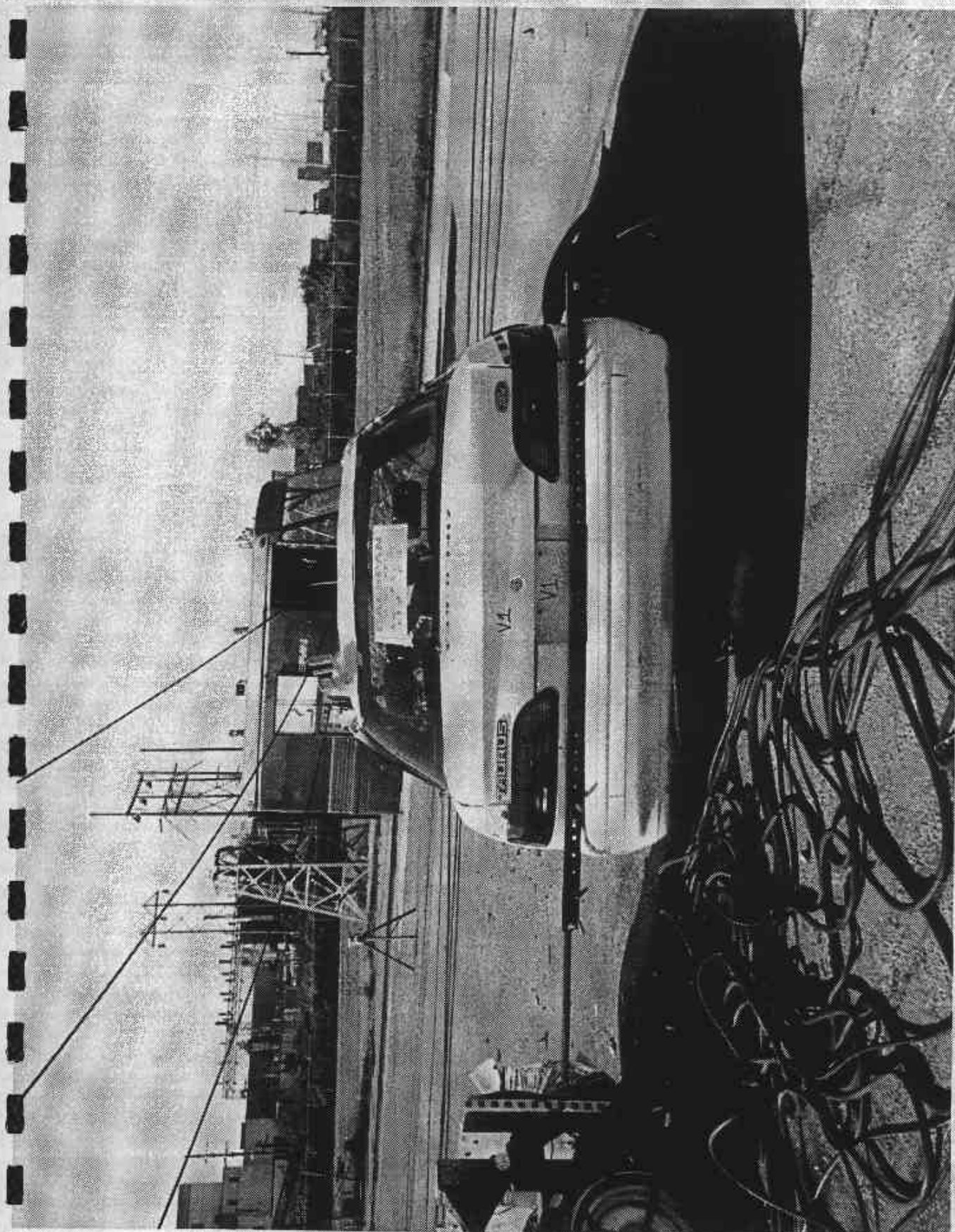


FIGURE A-18 POST-TEST REAR VIEW

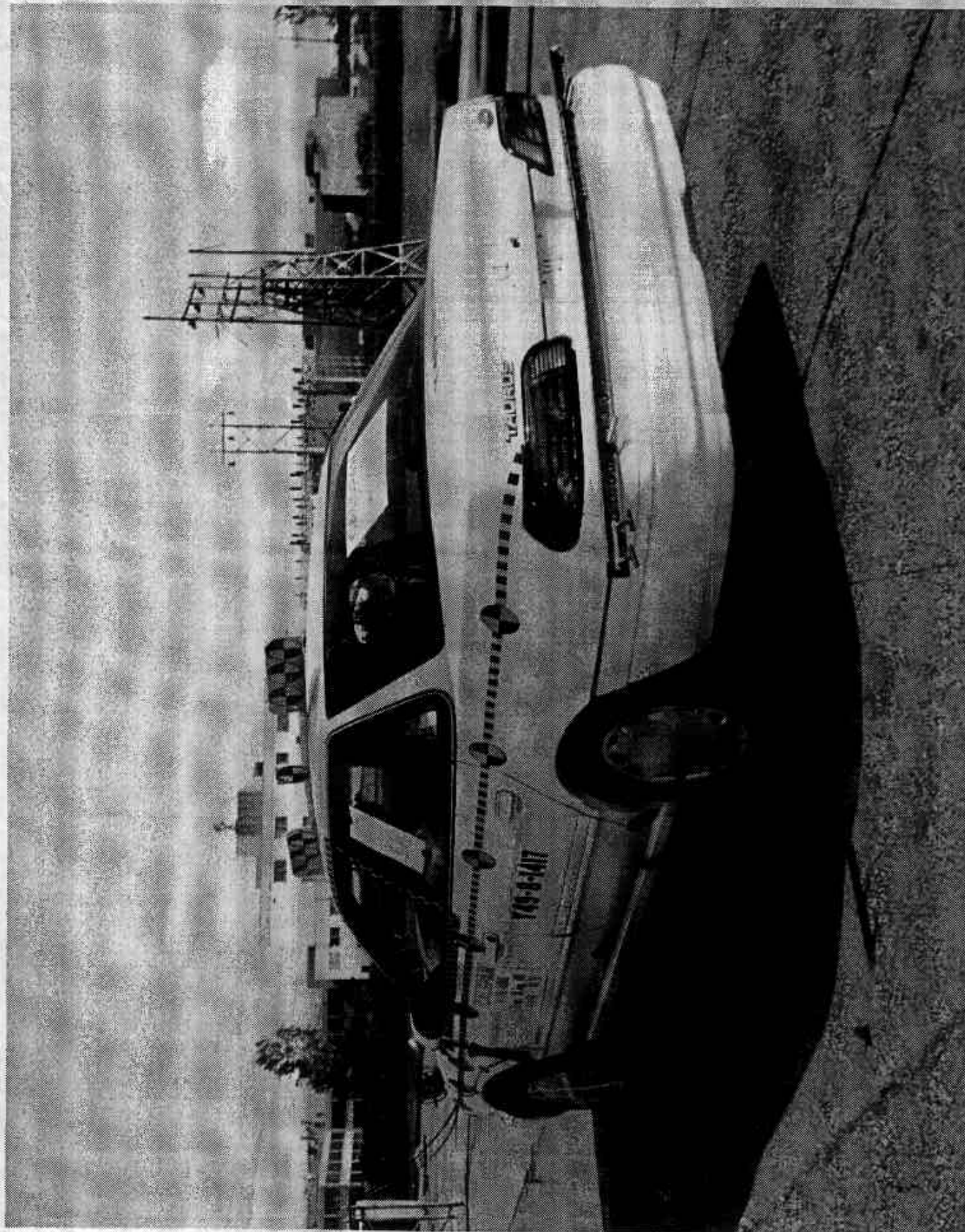


FIGURE A-19 PRE-TEST REAR LEFT THREE QUARTER VIEW

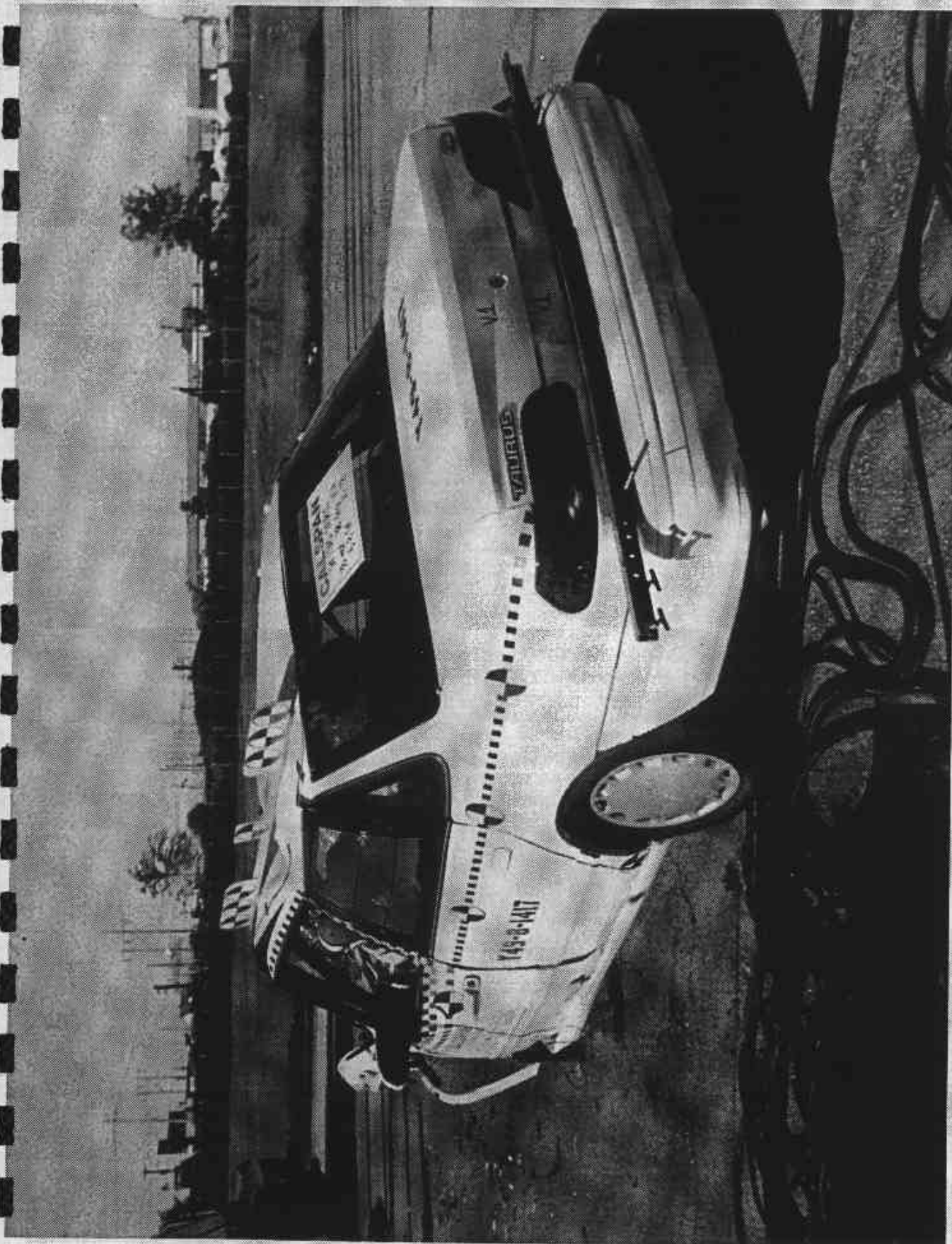


FIGURE A-20 POST-TEST REAR LEFT THREE QUARTER VIEW

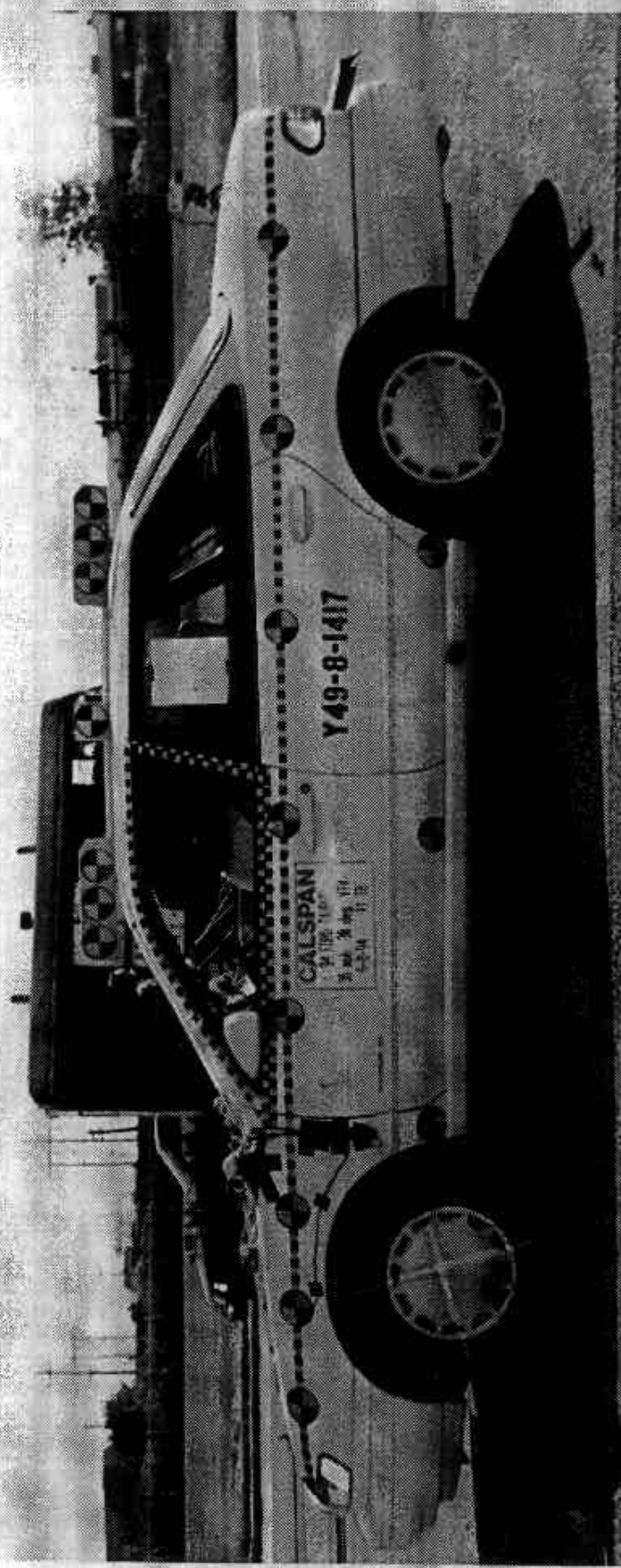


FIGURE A-21 PRE-TEST LEFT SIDE VIEW

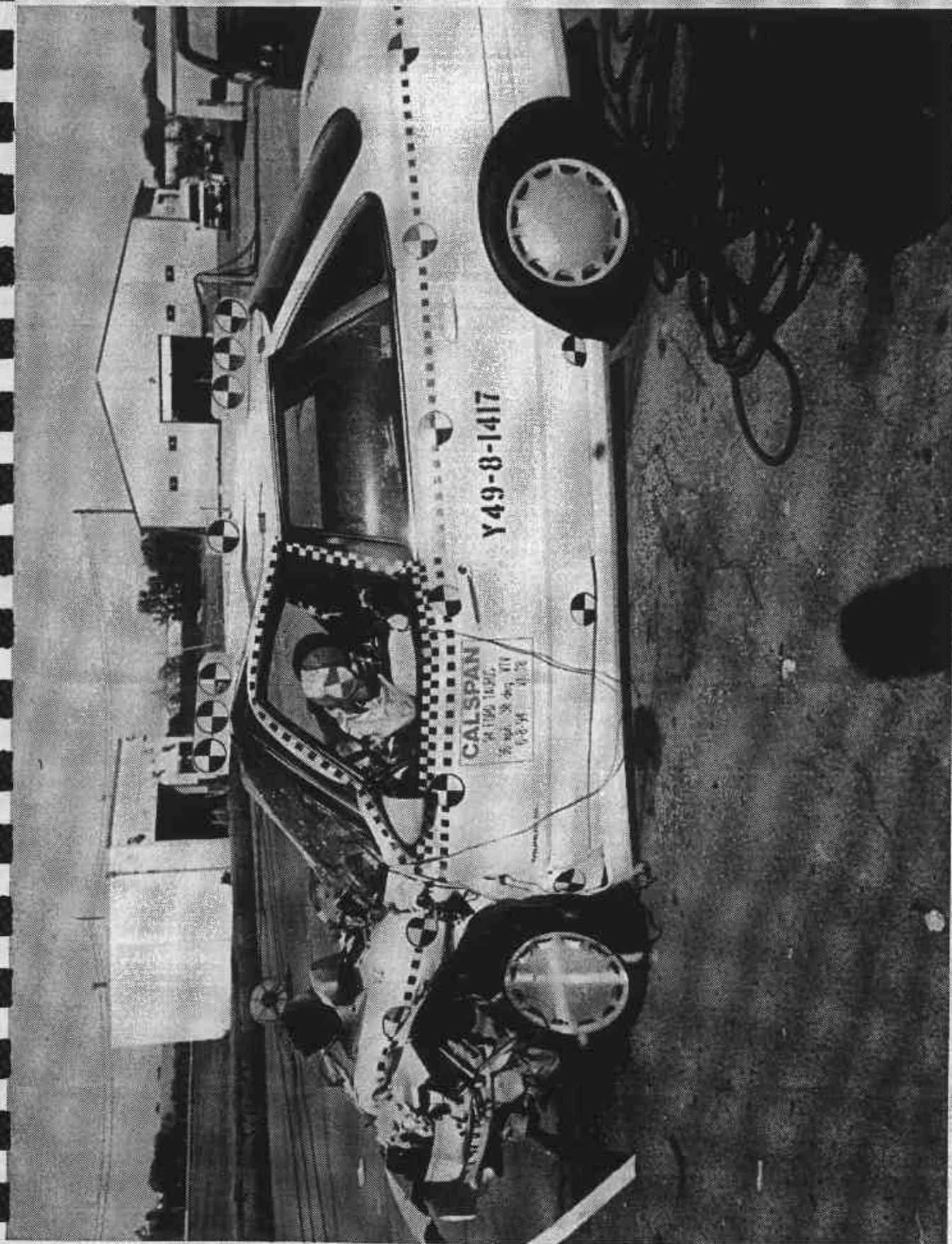


FIGURE A-22 POST-TEST LEFT SIDE VIEW

VEHICLE 1 PRE-TEST FRONT LEFT THREE QUARTER VIEW
(PHOTO NOT AVAILABLE)

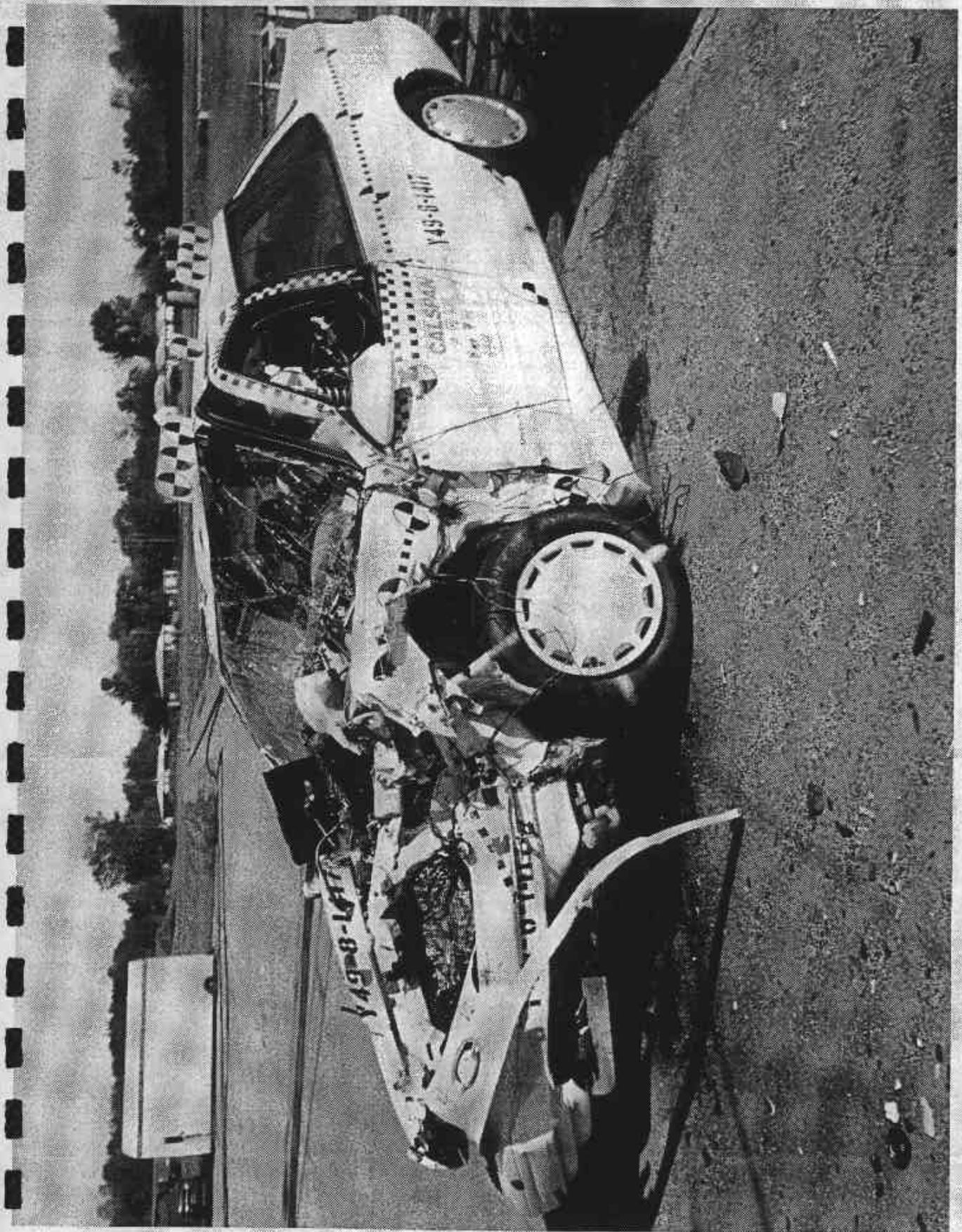


FIGURE A-24 POST-TEST FRONT LEFT THREE QUARTER VIEW

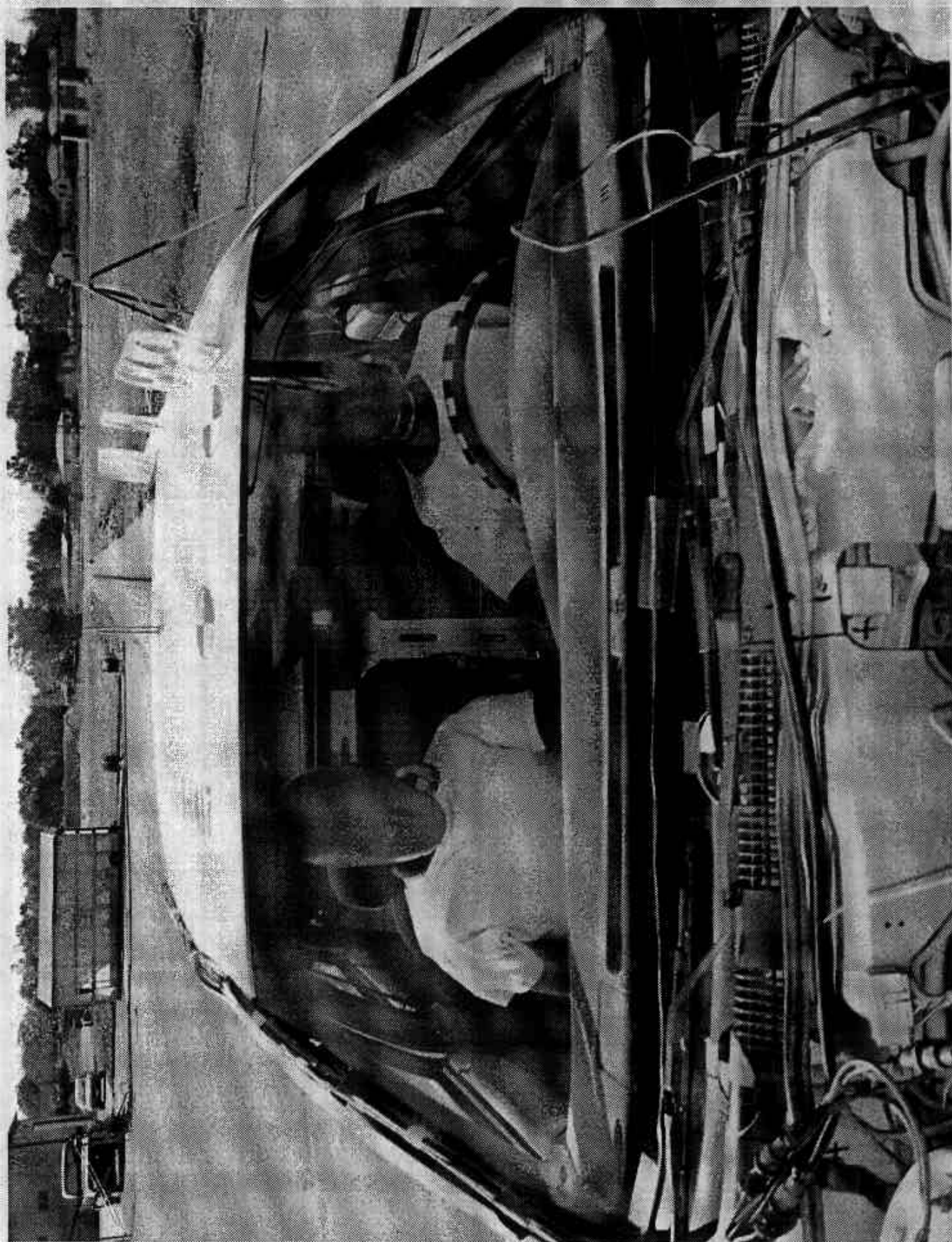


FIGURE A-25 PRE-TEST WINDSHIELD VIEW



FIGURE A-26 POST-TEST WINDSHIELD VIEW

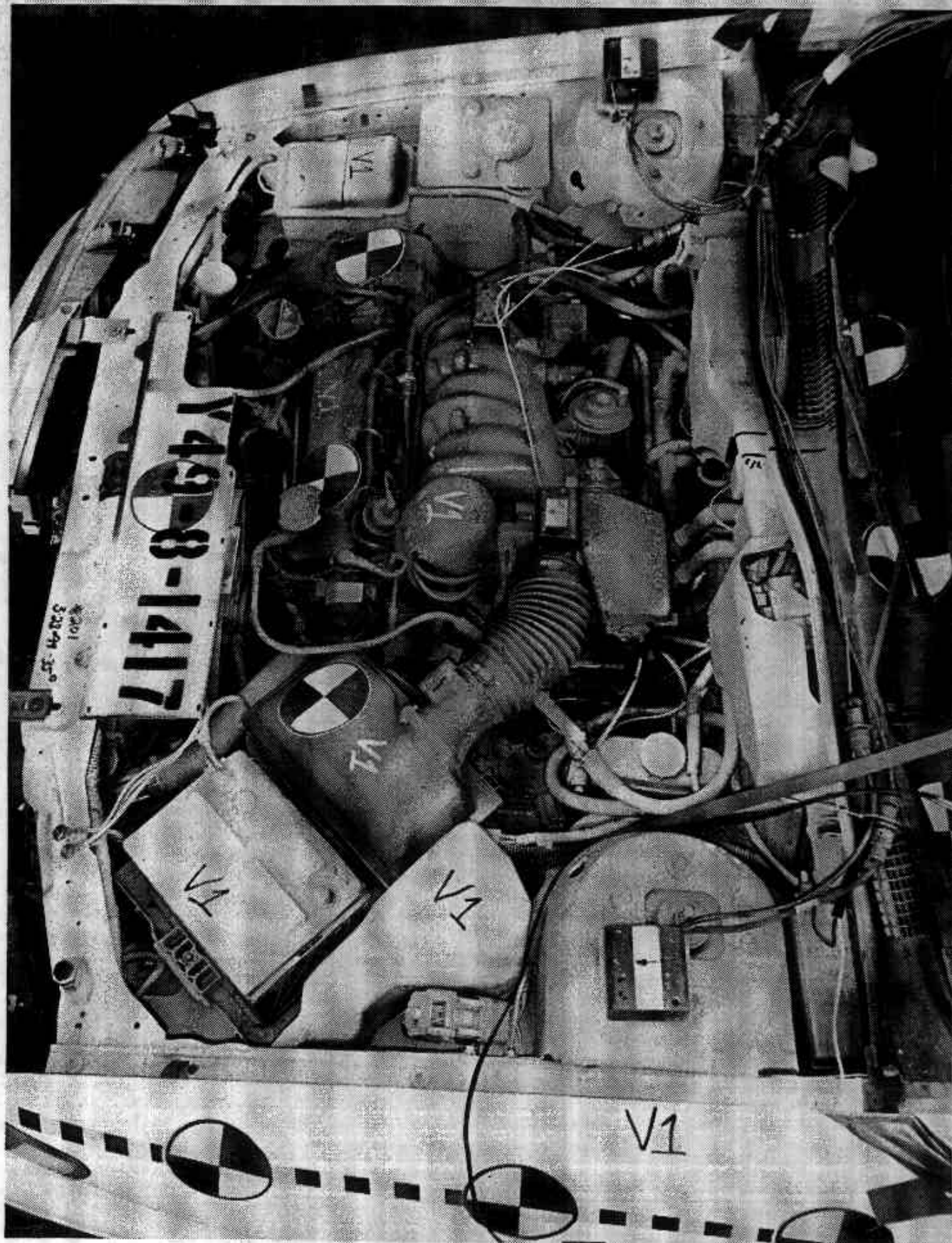


FIGURE A-27 PRE-TEST OVERHEAD ENGINE COMPARTMENT VIEW

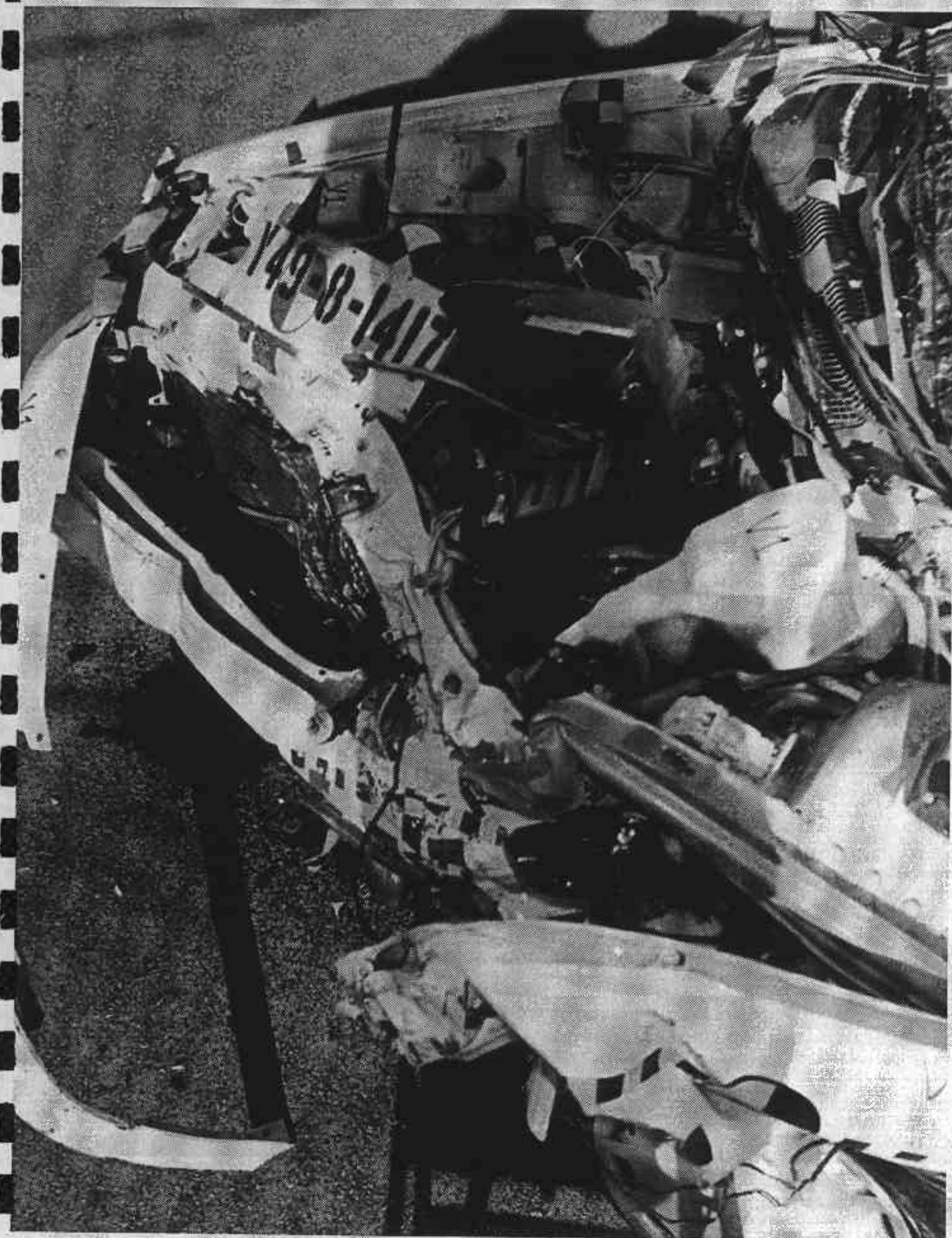


FIGURE A-28 POST-TEST OVERHEAD ENGINE COMPARTMENT VIEW

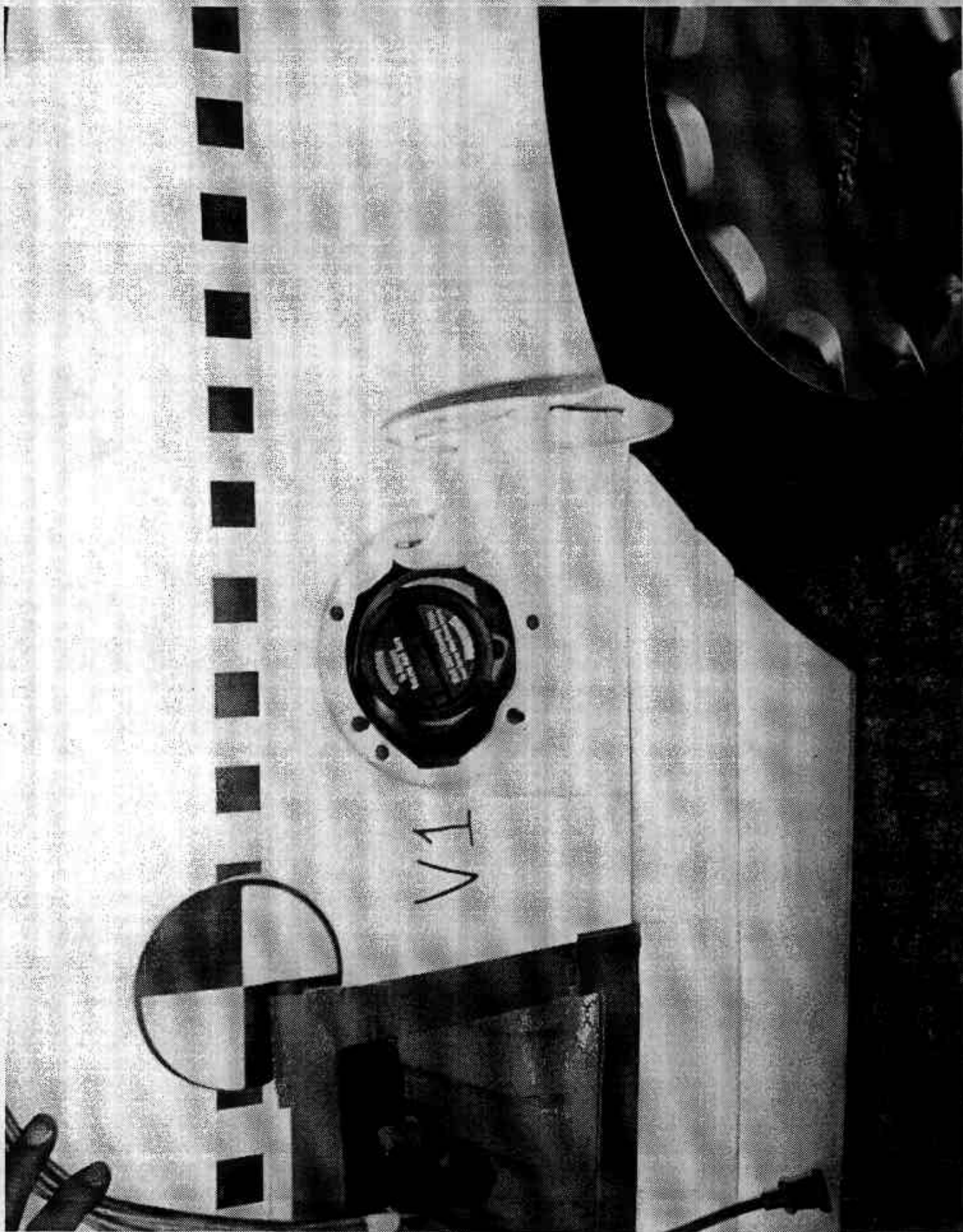


FIGURE A-29 PRE-TEST FUEL FILLER CAP VIEW

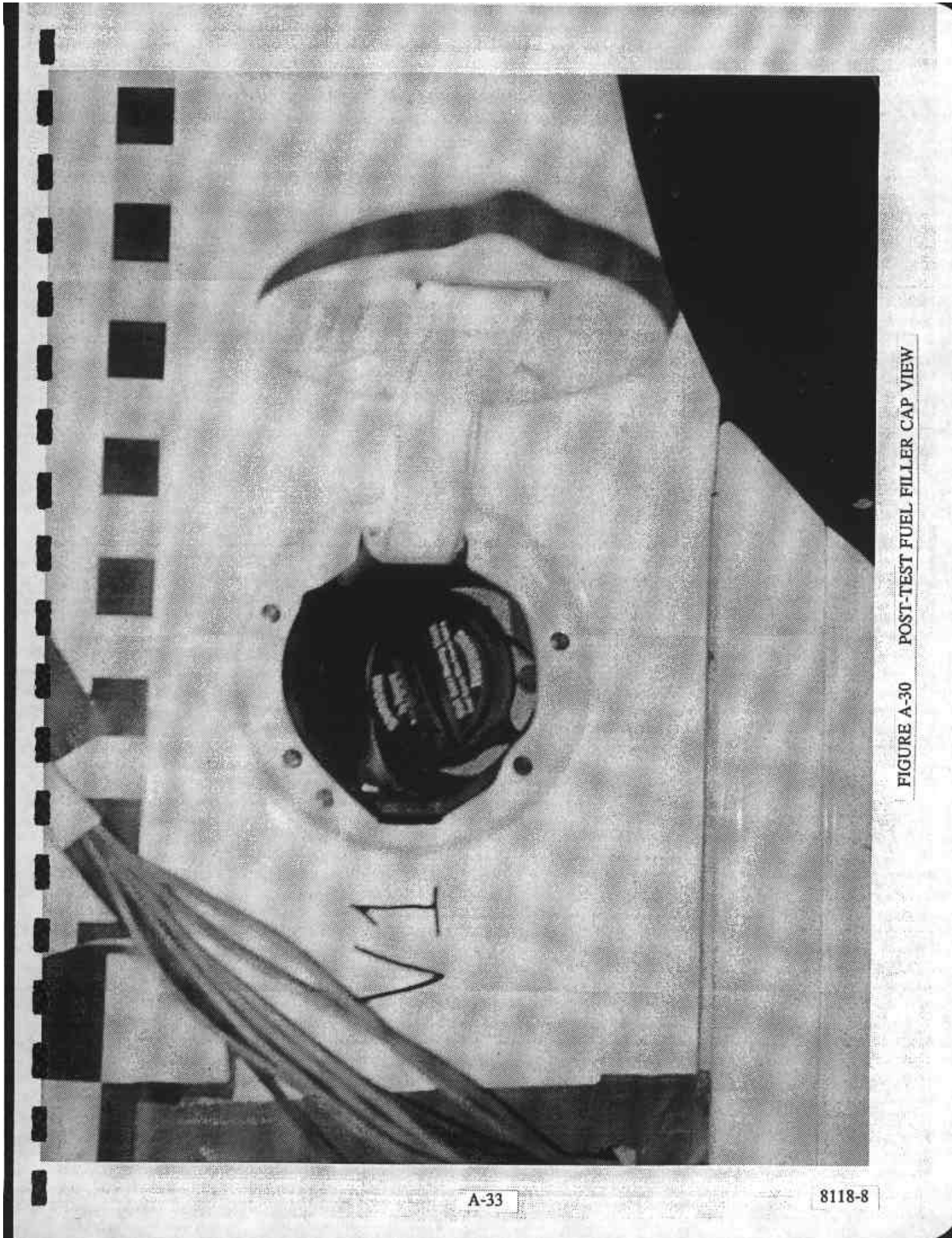


FIGURE A-30 POST-TEST FUEL FILLER CAP VIEW



FIGURE A-31 PRE-TEST UNDERBODY FRONT VIEW

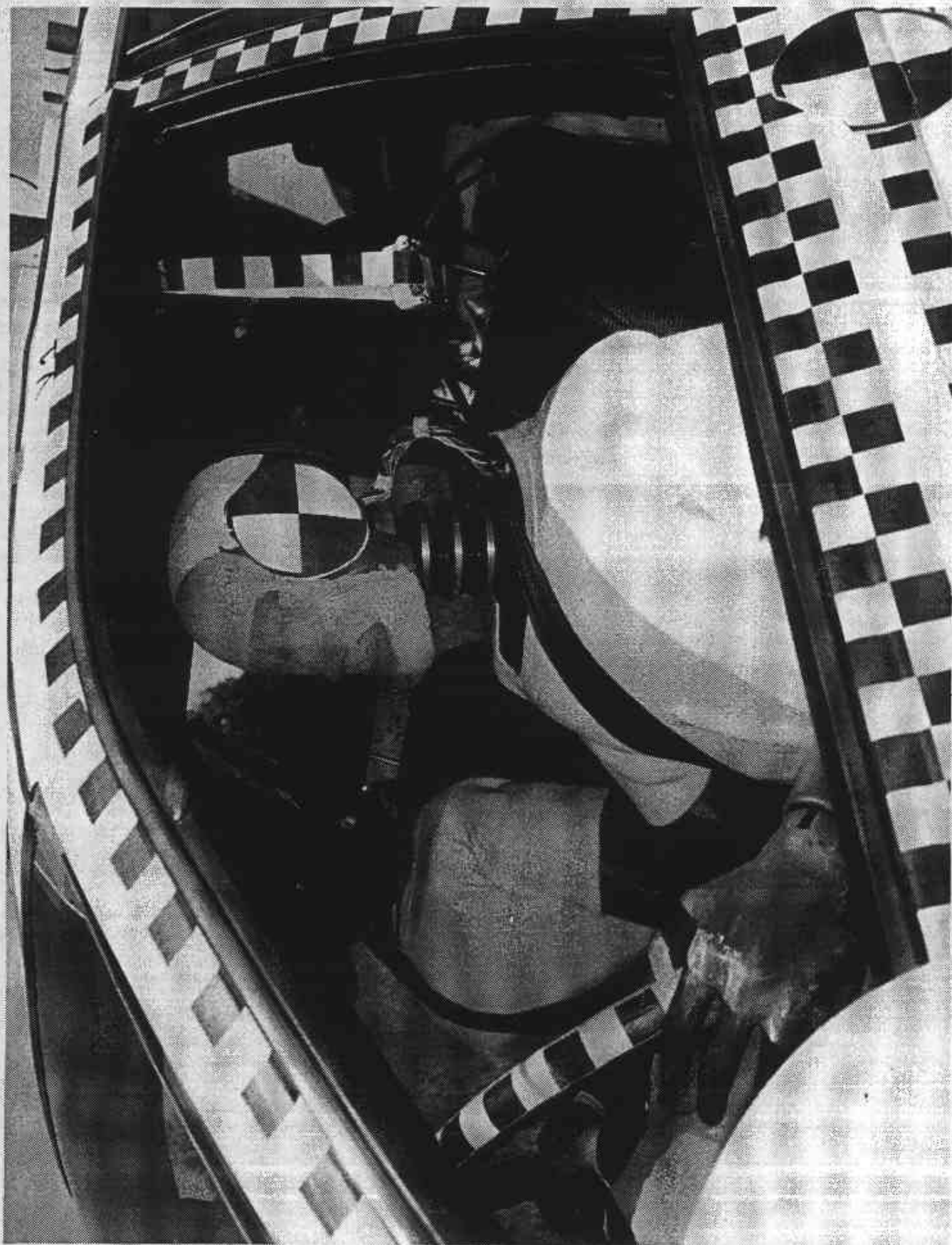


FIGURE A-37 PRE-TEST DRIVER POSITION VIEW

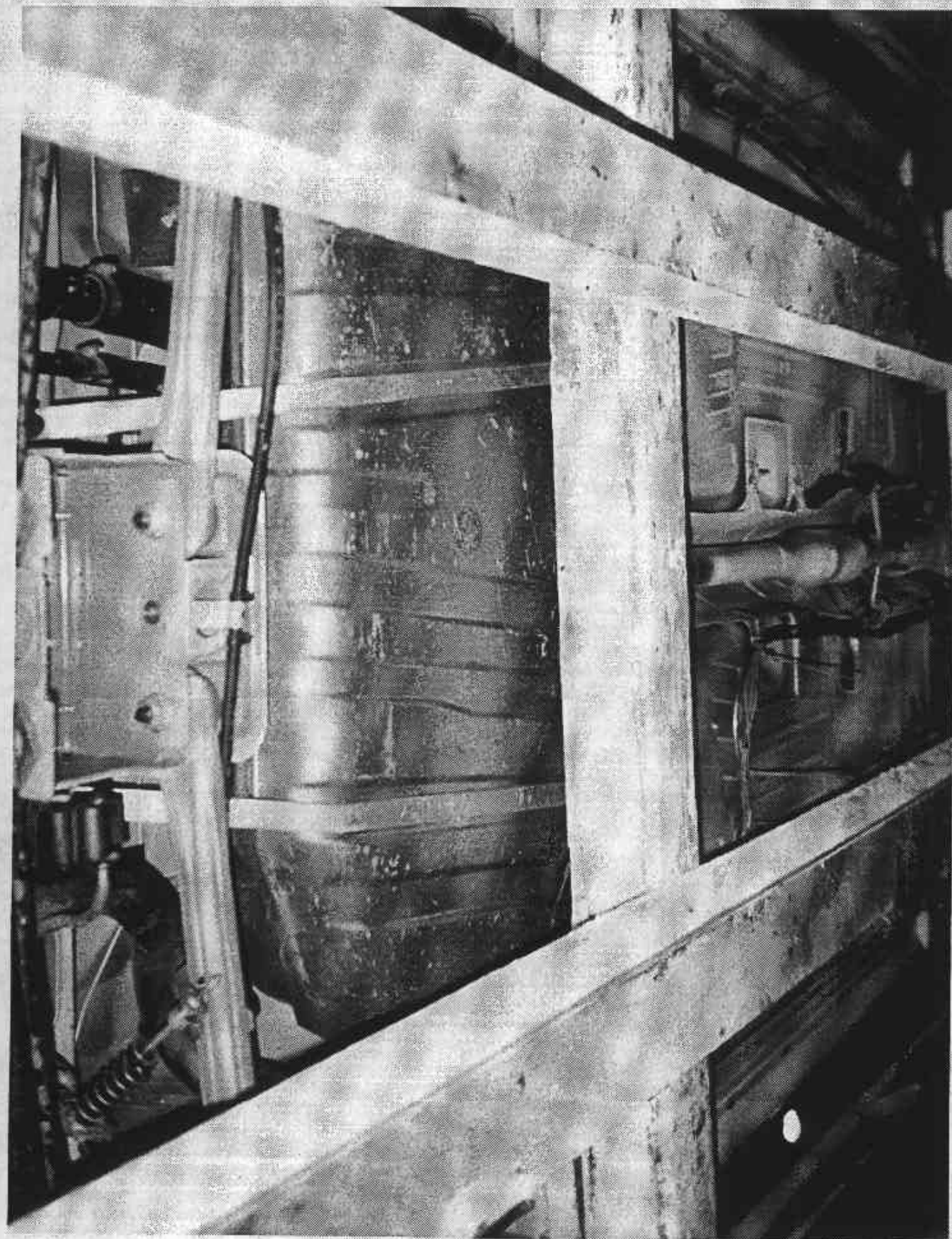


FIGURE A-35 PRE-TEST UNDERBODY REAR VIEW



FIGURE A-33 PRE-TEST UNDERBODY FRONT SIDE VIEW

VEHICLE 1 PRE-TEST UNDERBODY FRONT VIEW
(PHOTO NOT AVAILABLE)

VEHICLE 1 PRE-TEST UNDERBODY FRONT SIDE VIEW
(PHOTO NOT AVAILABLE)

VEHICLE 1 PRE-TEST UNDERBODY REAR VIEW
(PHOTO NOT AVAILABLE)

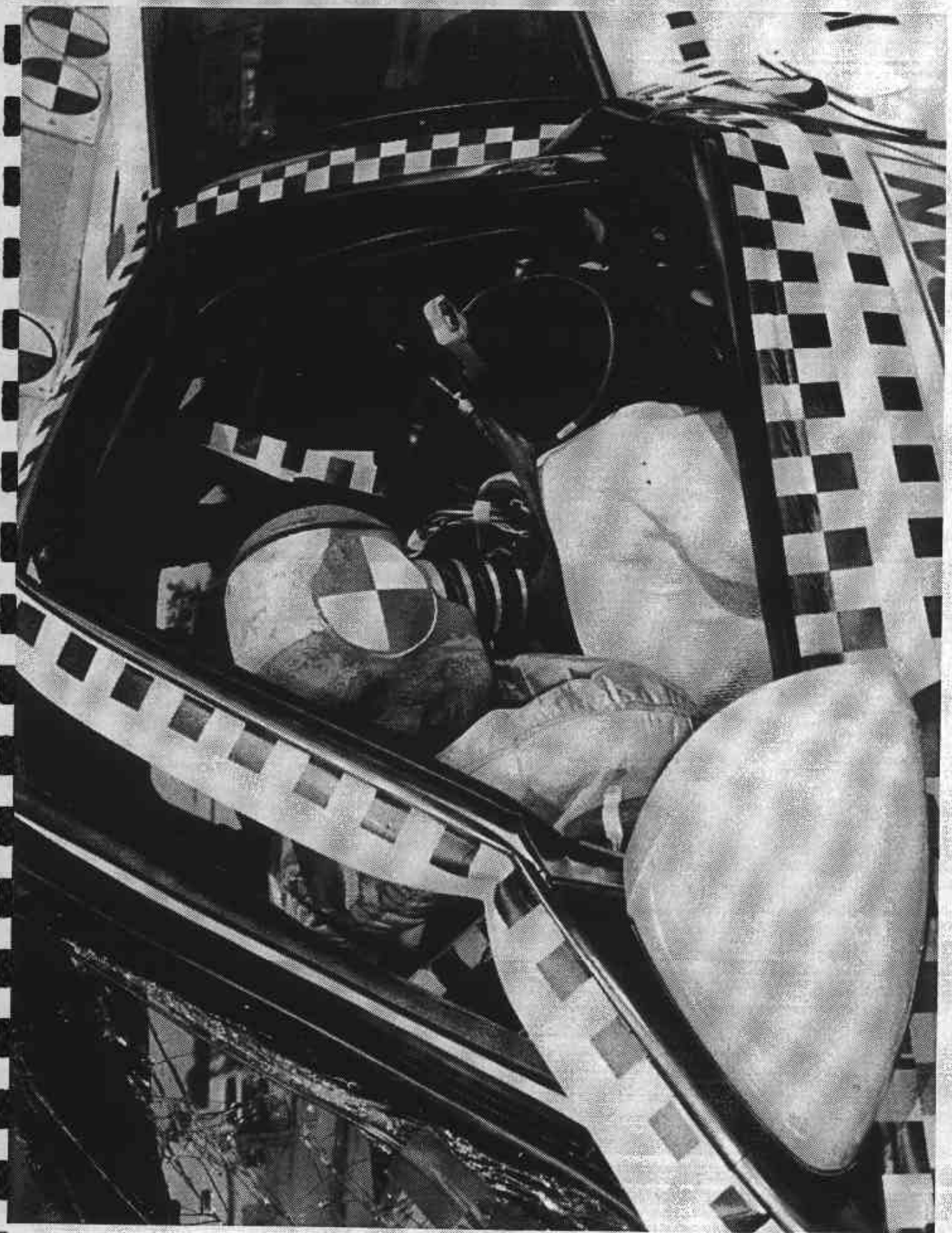


FIGURE A-38 POST-TEST DRIVER POSITION VIEW



FIGURE A-39 PRE-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW



FIGURE A-40 POST-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW

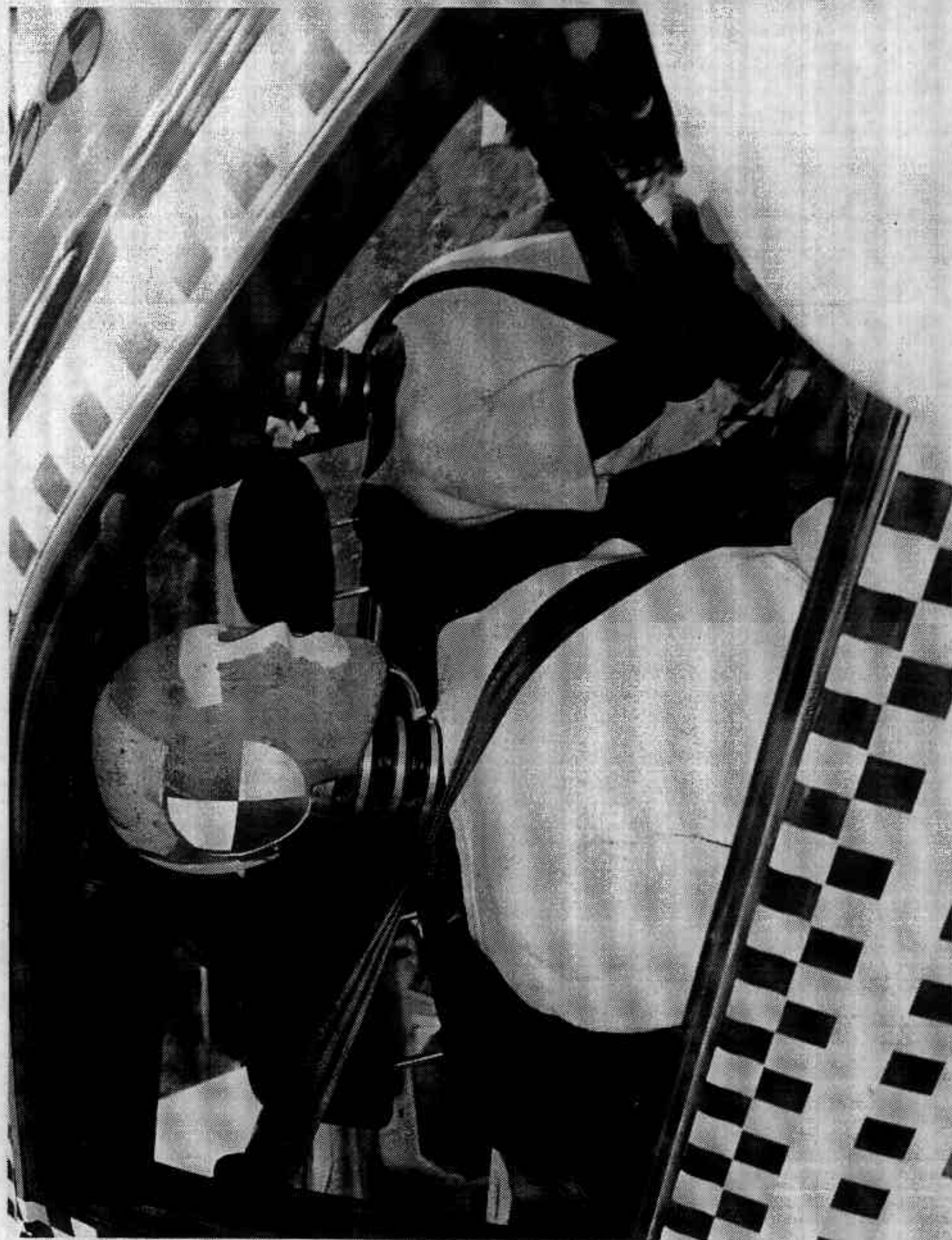


FIGURE A-41 PRE-TEST PASSENGER POSITION VIEW

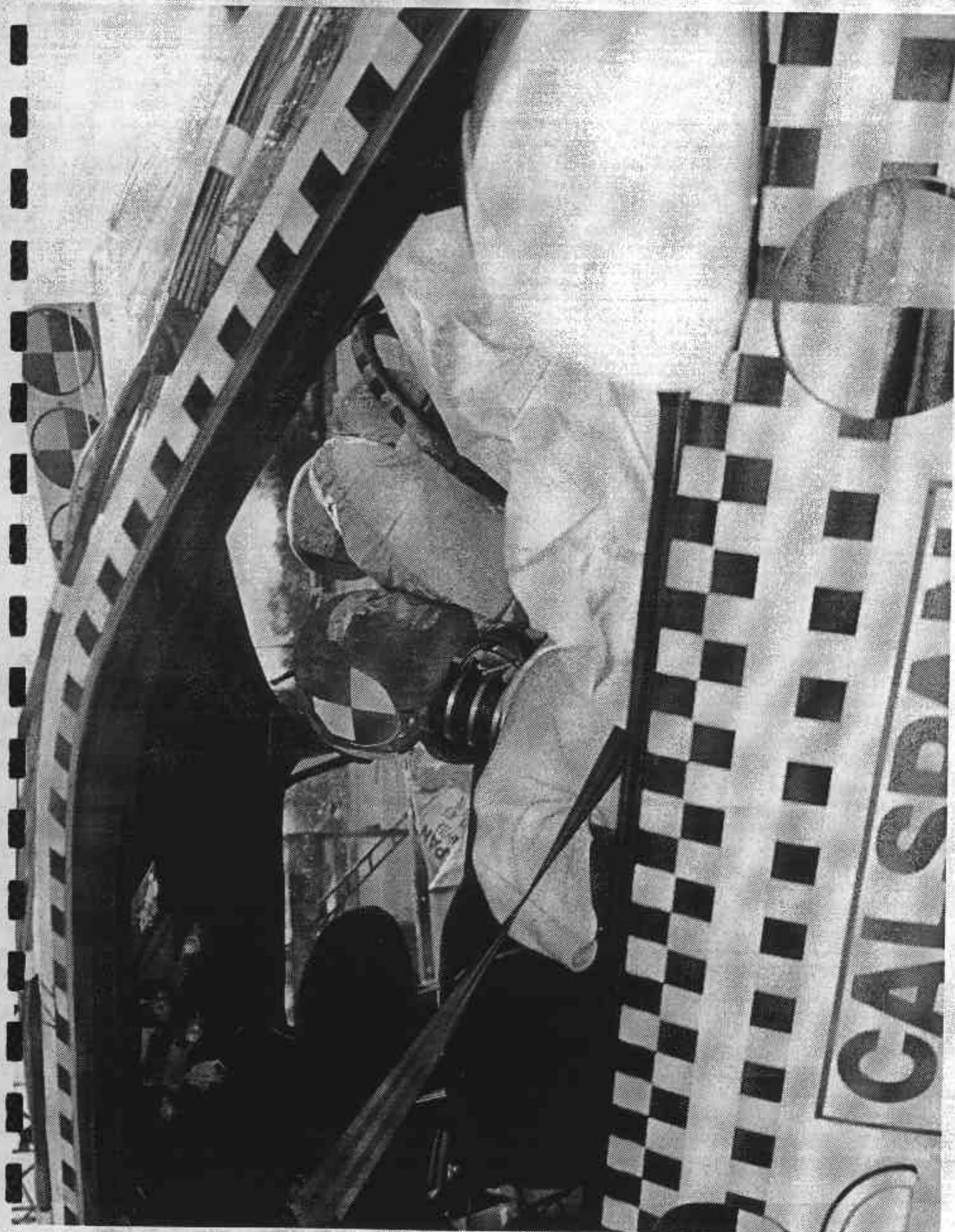


FIGURE A-42 POST-TEST PASSENGER POSITION VIEW



FIGURE A-43 PRE-TEST FRONT PASSENGER AND OCCUPANT COMPARTMENT VIEW



FIGURE A-44 POST-TEST FRONT PASSENGER AND OCCUPANT COMPARTMENT VIEW



FIGURE A-45 DRIVER AIRBAG VIEW



FIGURE A-46 RIGHT-PASSENGER AIRBAG VIEW

VEHICLE 2 PHOTOGRAPHS

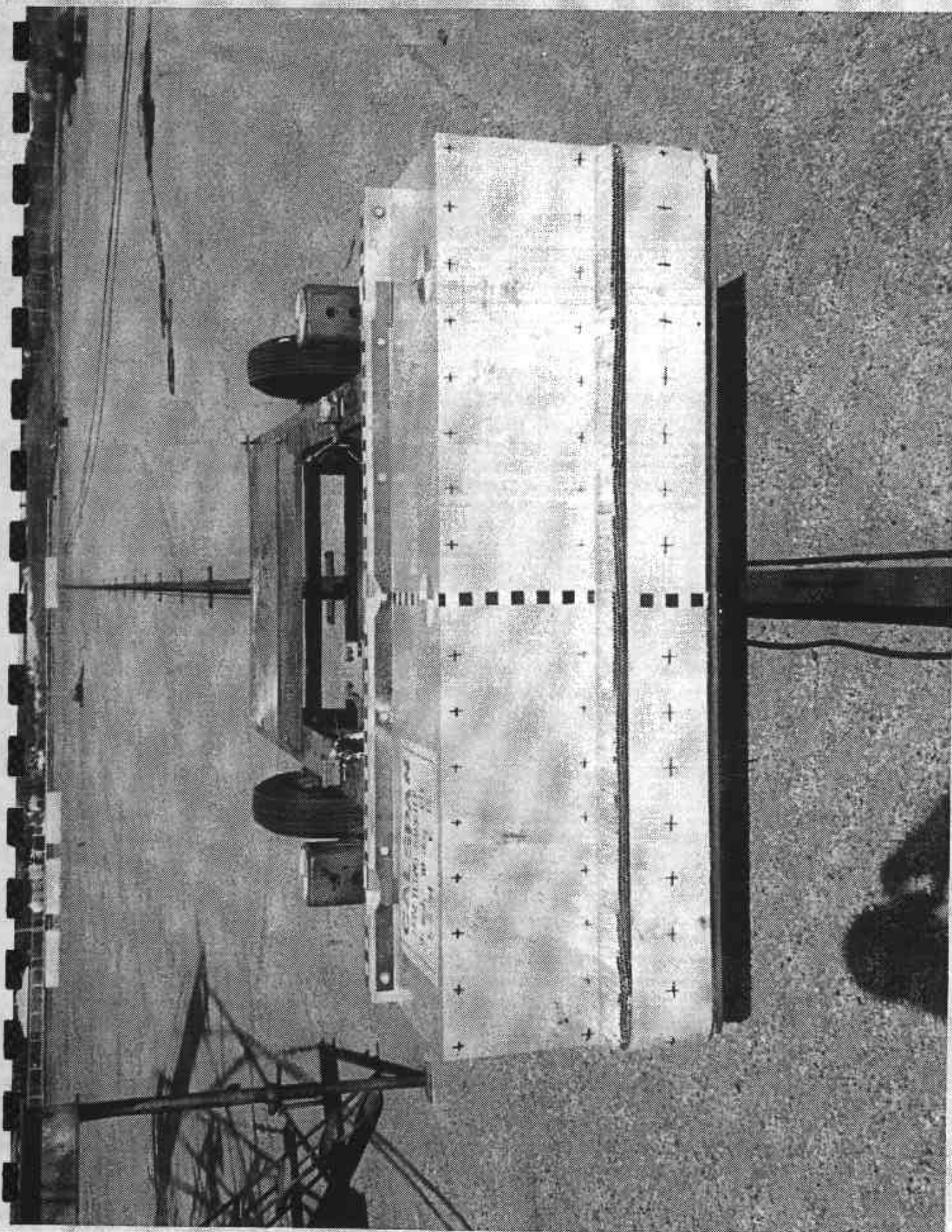


FIGURE A-47 PRE-TEST MDB FRONT VIEW



FIGURE A-48 POST-TEST MDB FRONT VIEW

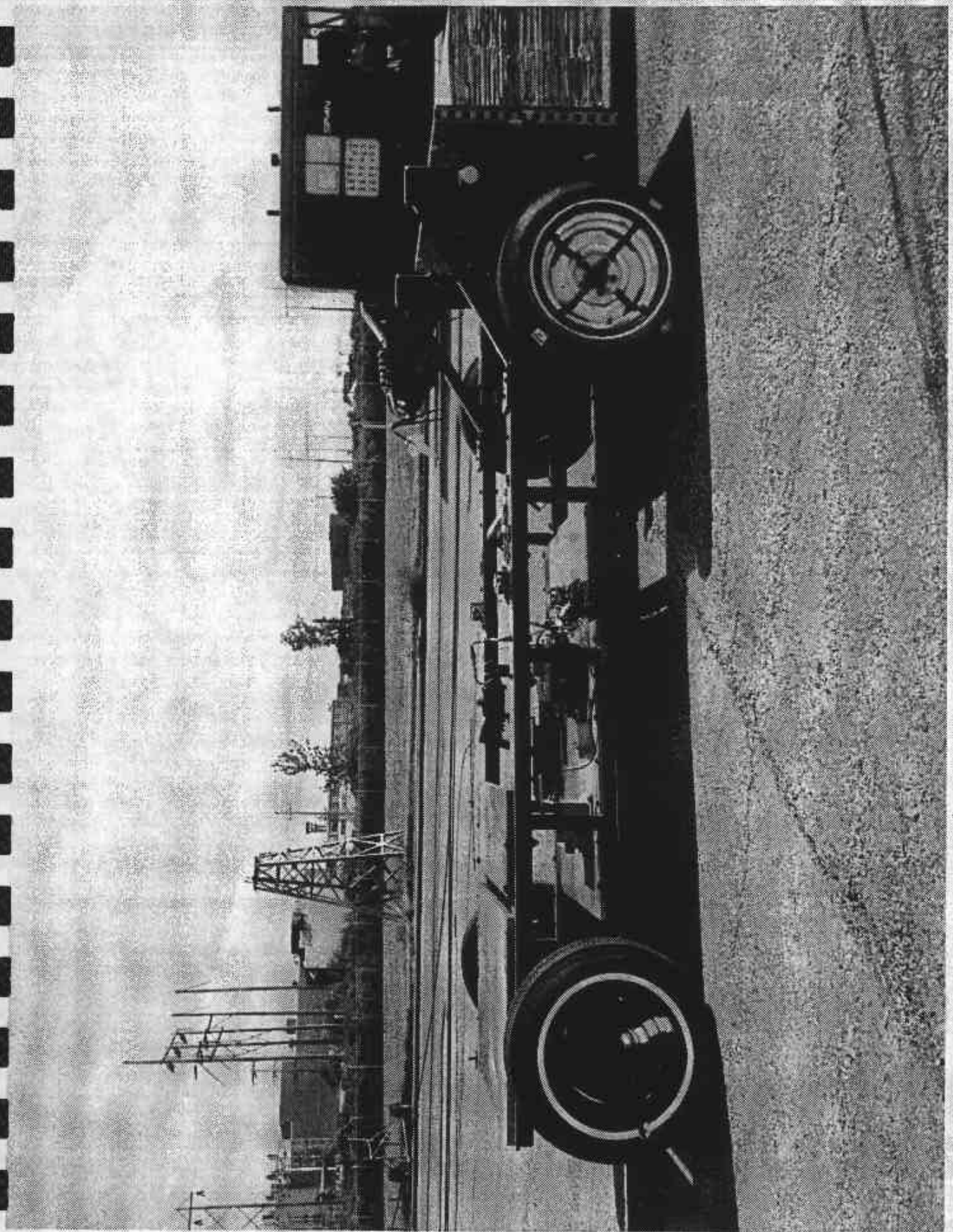


FIGURE A-49 PRE-TEST MDB RIGHT SIDE VIEW



FIGURE A-50 POST-TEST MDB RIGHT SIDE VIEW

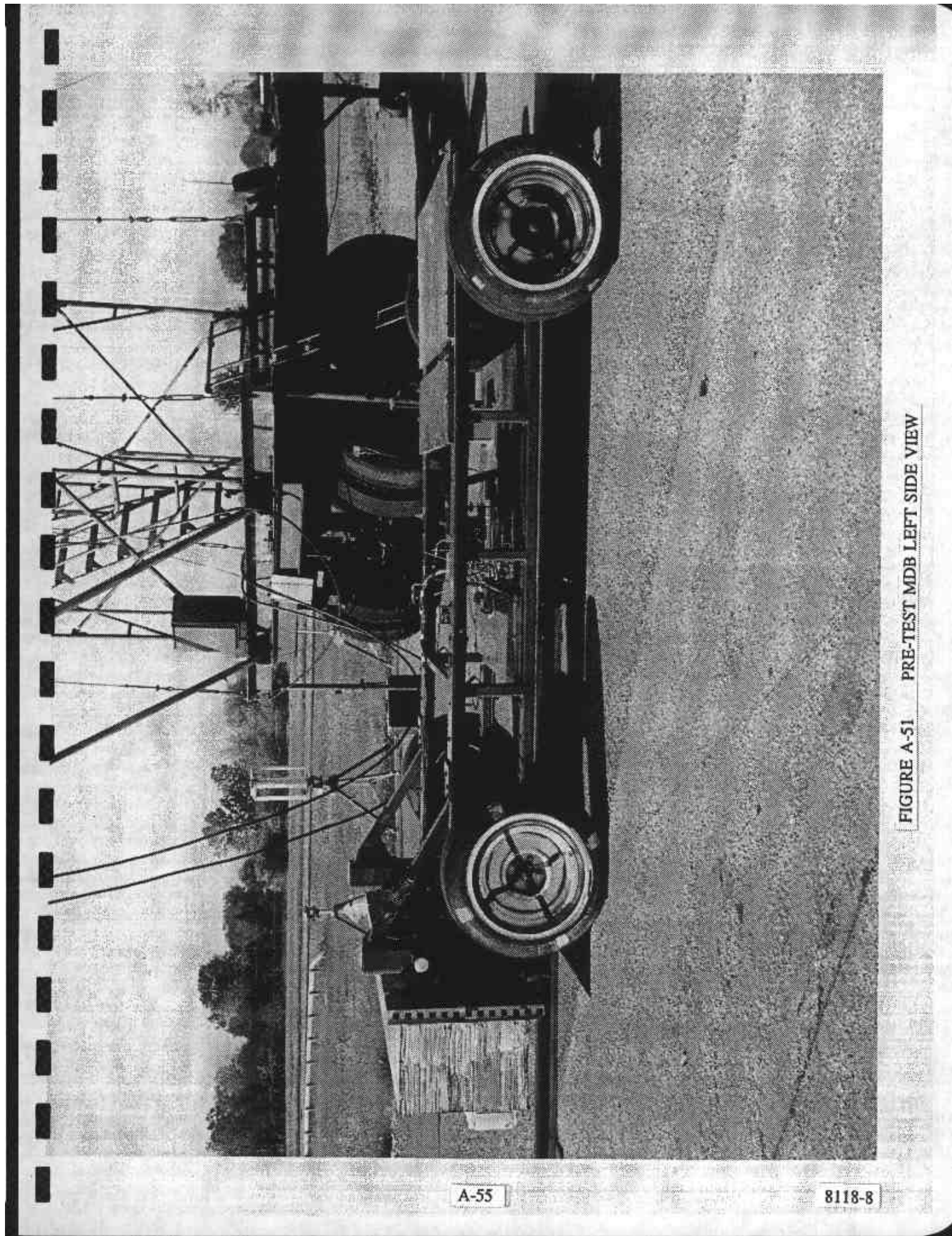


FIGURE A-51 PRE-TEST MDB LEFT SIDE VIEW

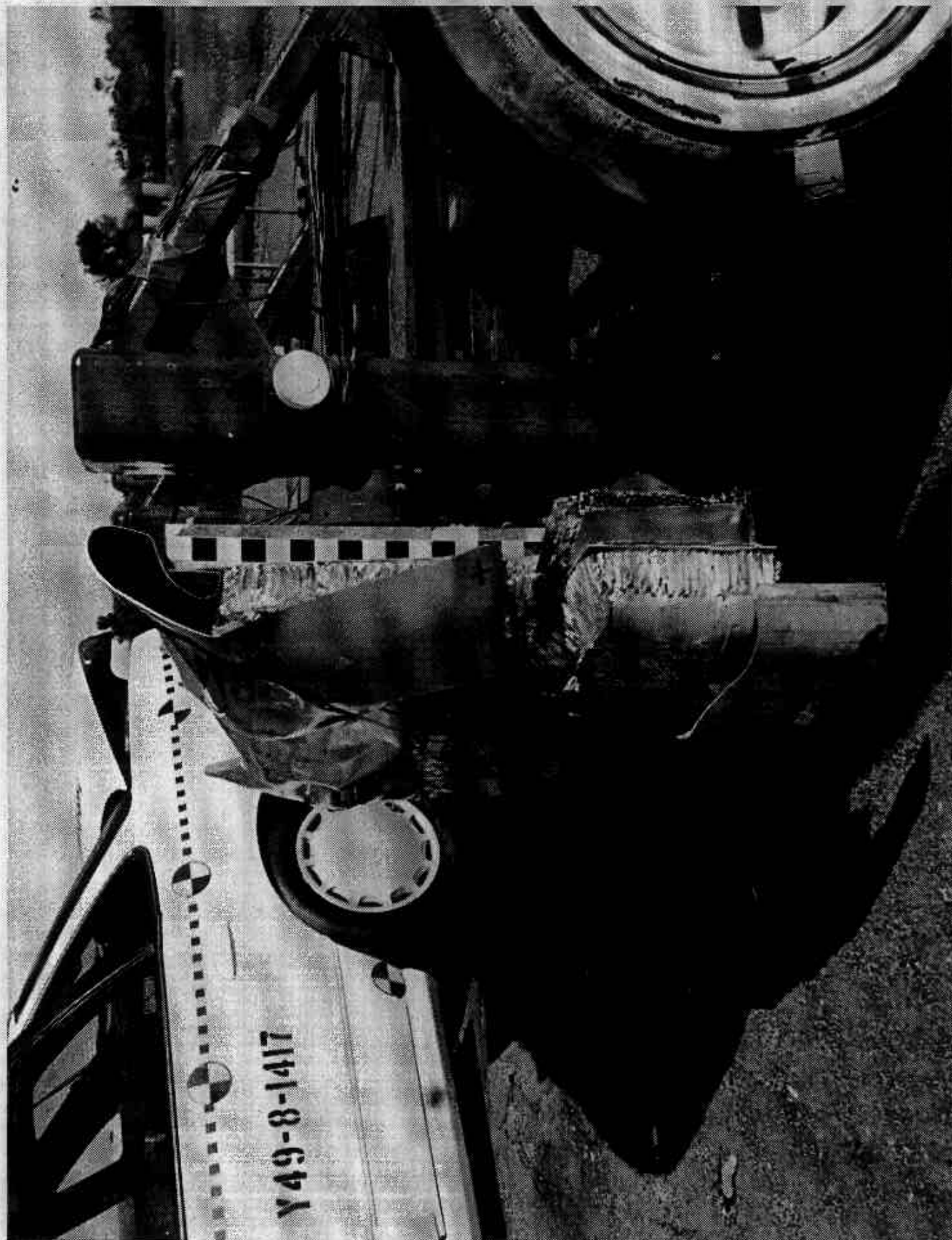


FIGURE A-52 POST-TEST MDB LEFT SIDE VIEW

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA

Key: V1 - Vehicle 1
V2 - Vehicle 2

RUN #: 1417
SERIES #: 1

FACILITY: TRACK
TEST TIME: 17:24:06
BOARD: a

TEST DATE: 08 Jun 1994

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P1 Head X	Gs	20.8	156.5	-59.5	67.2	1000.0
2	V1-P1 Head Y	Gs	41.0	159.5	-8.0	103.8	1000.0
3	V1-P1 Head Z	Gs	23.7	94.0	-21.9	161.2	1000.0
4	V1-P1 HD9Y (X)	Gs	19.0	159.4	-62.8	64.6	1000.0
5	V1-P1 Chest X	Gs	26.3	131.4	-56.5	76.0	180.0
6	V1-P1 Chest Y	Gs	10.5	141.2	-22.5	92.4	180.0
7	V1-P1 Chest Z	Gs	17.0	112.8	-16.6	70.9	180.0
8	V1-P1 HD9Y (Z)	Gs	22.1	94.7	-39.5	159.4	1000.0
9	V1-P1 Upper Neck Fx	Nwt	672.2	73.1	-465.2	111.5	1000.0
10	V1-P1 Upper Neck Fy	Nwt	470.4	63.7	-163.5	273.5	1000.0
11	V1-P1 Upper Neck Fz	Nwt	3265.4	66.7	-370.5	109.2	1000.0
12	V1-P1 HD9X (Y)	Gs	41.0	160.0	-10.9	85.4	1000.0
13	V1-P1 Upper Neck Mx	Nwt-M	24.3	60.7	-31.7	132.0	600.0
14	V1-P1 Upper Neck My	Nwt-M	23.7	52.6	-49.2	72.4	600.0
15	V1-P1 Upper Neck Mz	Nwt-M	25.9	77.4	-24.4	160.2	600.0
16	V1-P1 HD9X (Z)	Gs	24.3	93.8	-32.0	159.2	1000.0
17	Head Resultant	Gs	63.2	67.2	.1	-14.9	1000.0
18	Chest Resultant	Gs	60.1	76.1	.1	-14.5	180.0
19	Upper Neck Force Res.	Nwt	3306.4	66.7	7.3	-14.9	1000.0
20	Upper Neck Moment Res.	Nwt-M	54.5	72.4	.1	-15.0	600.0

36 ms Fixed Duration HIC SUMMARY: Head Resultant

hic: 460.96
t1 = 48.360 msec
t2 = 83.040 msec
Average G's Over Hic Duration = 44.61

CLIP SUMMARY: Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 54.784 G's
Tstart = 75.0000 ms
Tend = 78.1200 ms
CSI = 542.435

FACILITY: TRACK

TEST DATE: 08 Jun 1994

RUN #: 1417

TEST TIME: 17:24:06

SERIES #: 1

BOARD: b

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P2 Head X	Gs	14.4	102.6	-59.2	66.4	1000.0
2	V1-P2 Head Y	Gs	8.1	299.9	-32.1	79.2	1000.0
3	V1-P2 Head Z	Gs	3.9	15.0	-29.9	68.0	1000.0
4	V1-P1 Chest Disp.	mm	.3	13.2	-33.0	64.7	60.0
5	V1-P2 Chest X	Gs	9.0	163.6	-64.7	70.3	180.0
6	V1-P2 Chest Y	Gs	2.3	170.9	-24.4	73.0	180.0
7	V1-P2 Chest Z	Gs	8.5	96.6	-17.7	63.6	180.0
8	V1-P1 Torso Belt Load	Nwt	4932.3	80.4	-255.5	143.9	600.0
9	V1-P1 Lower Neck Fx	Nwt	236.7	116.9	-1406.4	72.5	1000.0
10	V1-P1 Lower Neck Fy	Nwt	546.7	69.8	-4347.1	92.6	1000.0
11	V1-P1 Lower Neck Fz	Nwt	3715.0	65.8	-946.3	115.6	1000.0
12	V1-P1 HD9Z (X)	Gs	37.1	159.6	-78.1	63.1	1000.0
13	V1-P1 Lower Neck Mx	Nwt-M	185.2	92.6	-58.7	137.3	600.0
14	V1-P1 Lower Neck My	Nwt-M	47.3	284.5	-233.9	76.4	600.0
15	V1-P1 Lower Neck Mz	Nwt-M	58.8	69.0	-191.5	92.8	600.0
16	V1-P1 HD9Z (Y)	Gs	73.1	159.4	-17.0	130.7	1000.0
17	V1-P2 Head Resultant	Gs	66.3	66.4	.1	-29.2	1000.0
18	V1-P2 Chest Resultant	Gs	68.7	70.6	.1	-29.0	180.0
19	V1-P1 Lower Neck F(res)	Nwt	4626.4	92.5	6.0	-15.2	1000.0
20	V1-P1 Lower Neck M(res)	Nwt-M	307.1	92.4	.7	-15.2	600.0

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

hic: 418.36

t1 = 53.400 msec

t2 = 83.400 msec

Average G's Over Hic Duration = 45.48

CLIP SUMMARY: V1-P2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 65.279 G's

Tstart = 68.6400 ms

Tend = 71.7600 ms

CSI = 587.265

FACILITY: TRACK
RUN #: 1417
SERIES #: 1

TEST DATE: 08 Jun 1994
TEST TIME: 17:24:06
BOARD: c

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P1 Lt Lower Tibia Fy	Nwt	866.2	46.6	-112.1	183.1	600.0
2	V1-P1 Lt Lower Tibia Fz	Nwt	592.7	61.9	-5471.7	45.6	600.0
3	V1-P1 Lt Lower Tibia Mx	Nwt-M	102.7	45.8	-20.8	57.7	600.0
4	V1-P1 Rt Lower Tibia Fy	Nwt	614.6	49.6	-2198.8	45.7	600.0
5	V1-P1 Rt Lower Tibia Fz	Nwt	401.0	131.6	-9234.1	46.7	600.0
6	V1-P1 Rt Lower Tibia Mx	Nwt-M	493.0	48.6	-41.3	45.2	600.0
7	V1-P1 Left Femur	Nwt	469.0	89.8	-6707.5	52.2	600.0
8	V1-P1 Right Femur	Nwt	2037.2	70.1	-6188.2	46.2	600.0
9	V1-P2 Left Femur	Nwt	431.8	49.2	-8431.3	57.6	600.0
10	V1-P2 Right Femur	Nwt	951.2	75.6	-2067.2	60.6	600.0
11	V1-P2 Lt Upper Tibia Mx	Nwt-M	181.6	59.4	-38.3	102.5	600.0
12	V1-P2 Lt Upper Tibia My	Nwt-M	17.2	101.6	-179.1	53.9	600.0
13	V1-P2 Lt Lower Tibia Fy	Nwt	945.3	50.2	-996.8	49.7	600.0
14	V1-P2 Lt Lower Tibia Fz	Nwt	858.0	61.3	-3229.9	49.7	600.0
15	V1 Right Shock Tower (Y)	Gs	14.7	62.0	-86.3	46.3	60.0
16	V1 Left Shock Tower (X)	Gs	23.6	73.2	-92.6	28.9	60.0

FACILITY: TRACK

TEST DATE: 08 Jun 1994

RUN #: 1417

TEST TIME: 17:24:06

SERIES #: 1

BOARD: d

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	msec	MINIMUM AMP	msec	FILTER CLASS
* 1	V1 R.F Frame Rail (X)	Gs	56.0	263.5	-202.5	271.1	60.0
2	V1 R.F Frame Rail (Y)	Gs	64.1	268.7	-95.3	43.2	60.0
3	V1 R.F Frame Rail (Z)	Gs	41.8	34.0	-42.9	44.2	60.0
** 4	V1 Engine Bottom (X)	Gs	194.0	19.1	-169.4	60.2	60.0
5	V1 L.F Frame Rail (X)	Gs	72.8	46.7	-173.4	32.4	60.0
6	V1 L.F Frame Rail (Y)	Gs	43.0	57.8	-97.7	32.4	60.0
7	V1 L.F Frame Rail (Z)	Gs	177.2	39.6	-137.1	33.2	60.0
8	V1-P2 Chest Disp.	mm	8.3	266.9	-48.9	62.4	60.0
9	V1-P1 Lt Upper Tibia Mx	Nwt-M	115.6	46.3	-21.7	128.8	600.0
10	V1-P1 Lt Upper Tibia My	Nwt-M	69.3	67.6	-266.6	43.7	600.0
11	V1-P1 Rt Upper Tibia Mx	Nwt-M	334.1	49.8	-91.9	46.1	600.0
12	V1-P1 Rt Upper Tibia My	Nwt-M	33.2	56.6	-318.1	47.4	600.0
13	V1 L.R. Comp (X)	Gs	4.6	126.0	-51.1	41.2	60.0
14	V1 L.R. Comp (Y)	Gs	4.1	287.0	-22.5	51.1	60.0
15	V1 R.R. Comp (X)	Gs	4.8	127.9	-54.0	51.4	60.0
16	V1 R.R. Comp (Y)	Gs	7.0	44.5	-24.0	49.7	60.0
17	V1 R.F Frame Rail Res.	Gs	204.9	271.0	.1	-44.2	60.0
18	V1 L.F Frame Rail Res.	Gs	237.7	32.6	.6	-34.0	60.0
19	NULL	Nwt-M	342.0	49.7	.5	-30.6	600.0
20	NULL	Gs	70.1	41.3	.1	-46.1	60.0

* - Data questionable after 210 msec.

** - Data questionable, cable damaged.

RUN #: 1417
SERIES #: 1

FACILITY: TRACK
TEST TIME: 17:24:06
BOARD: e

TEST DATE: 08 Jun 1994

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P1 Pelvic X	Gs	15.5	112.3	-77.1	45.7	1000.0
2	V1-P1 Pelvic Y	Gs	25.0	50.5	-21.9	81.4	1000.0
3	V1-P1 Pelvic Z	Gs	15.6	109.8	-9.5	70.3	1000.0
4	V1 Right Engine (X)	Gs	64.9	56.3	-148.0	40.6	60.0
5	V1-P2 Upper Neck Fx	Nwt	810.3	60.4	-345.6	102.7	1000.0
6	V1-P2 Upper Neck Fy	Nwt	616.1	121.3	-575.4	183.2	1000.0
7	V1-P2 Upper Neck Fz	Nwt	2740.1	66.7	-181.1	15.0	1000.0
* 8	V1 Engine Bottom (Y)	Gs	144.5	-10.8	-60.4	-19.1	60.0
** 9	V1-P2 Upper Neck Mx	Nwt-M	9.2	44.2	-47.7	183.6	600.0
10	V1-P2 Upper Neck My	Nwt-M	8.4	100.3	-55.2	58.4	600.0
11	V1-P2 Upper Neck Mz	Nwt-M	18.4	144.7	-52.3	91.8	600.0
12	V1 Left Engine (X)	Gs	63.5	57.4	-180.2	38.6	60.0
13	V1-P2 Pelvic X	Gs	11.9	183.2	-89.0	58.1	1000.0
14	V1-P2 Pelvic Y	Gs	15.3	52.9	-39.5	71.3	1000.0
15	V1-P2 Pelvic Z	Gs	24.5	69.0	-40.4	157.8	1000.0
16	V1 Right Shock Tower (X)	Gs	5.1	132.8	-75.9	48.4	60.0
17	V1-P1 Pelvic Res.	Gs	77.1	45.7	.2	-21.1	1000.0
18	V1-P2 Upper Neck F(res)	Nwt	2754.1	66.7	13.8	-15.1	1000.0
19	V1-P2 Upper Neck M(res)	Nwt-M	63.2	86.3	.2	-15.0	600.0
20	V1-P2 Pelvic Res.	Gs	89.8	58.1	.2	-29.4	1000.0

* - No data, data cable cut.

** - Data questionable after 182msec., cable damaged.

FACILITY: TRACK
RUN #: 1417
SERIES #: 1

TEST DATE: 08 Jun 1994
TEST TIME: 17:24:06
BOARD: F

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM	
			AMP	msec	AMP	msec
1	V1 Brake Pedal (X)	Gs	69.2	42.7	-153.0	47.8
2	V1 Brake Pedal (Y)	Gs	36.6	117.8	-93.7	47.0
3	V1 Brake Pedal (Z)	Gs	161.7	43.8	-155.5	55.2
4	V1-P2 Lt Lower Tibia Mx	Nwt-M	229.9	52.7	-22.1	282.7
5	V1-P2 Rt Upper Tibia Mx	Nwt-M	135.5	80.0	-38.4	105.1
6	V1-P2 Rt Upper Tibia My	Nwt-M	103.7	60.1	-70.6	51.2
7	V1-P2 Rt Lower Tibia Fy	Nwt	474.9	79.2	-1592.4	45.5
8	V1-P2 Rt Lower Tibia Fz	Nwt	588.1	132.6	-3180.4	62.8
9	V1-P2 Rt Lower Tibia Mx	Nwt-M	117.1	53.5	-25.7	225.6
10	V1 Left Shock Tower (Y)	Gs	34.2	74.5	-86.3	34.3
17	V1 Brake Pedal (res)	Gs	186.3	47.6	.1	-38.2

RUN #: 9417
SERIES #: 1

FACILITY: TAPE
TEST TIME: 14:21:09
BOARD: a

TEST DATE: 09 Jun 1994

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V2 C.G. X	Gs	2.2	187.7	-51.8	37.6	60.0
2	V2 C.G. Y	Gs	20.7	55.9	-14.2	45.1	60.0
3	V2 C.G. Z	Gs	34.6	44.8	-22.1	19.3	60.0
4	V2 Left Rail X	Gs	2.0	139.0	-48.0	37.4	60.0
5	V2 Left Rail Y	Gs	19.3	54.4	-8.1	67.8	60.0
* 6	V2 Right Rail X	Gs	1.3	150.1	-42.6	43.0	60.0
7	V2 Right Rail Y	Gs	19.2	54.0	-8.8	46.1	60.0
8	V2 TR Load Cell	Nwt	21591.3	7.0	-52072.2	37.4	60.0
9	V2 BR Load Cell	Nwt	24753.7	34.2	-26179.4	89.3	60.0
10	V2 TL Load Cell	Nwt	13969.2	77.9	-211930.	34.8	60.0
11	V2 BL Load Cell	Nwt	10031.8	101.6	-157340.	41.4	60.0
12	V2 CL Load Cell	Nwt	2298.2	-4.8	-245275.5	36.1	60.0
13	Chest Displacement #132	mm	.9	-37.8	-193.2	67.0	60.0
17	V2 C.G.	Gs	54.1	37.4	.1	-10.9	60.0

* - Data questionable after 175 msec.

FACILITY: TAPE
RUN #: 8417
SERIES #: 1

TEST DATE: 09 Jun 1994
TEST TIME: 14:09:40
BOARD: a

TITLE: VTV TEST #8

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	Chest Displacement #125	mm	50.1	223.9	-98.7	64.8	60.0
2	Chest Displacement #126	mm	17.7	159.1	-124.6	66.7	60.0
3	Chest Displacement #127	mm	29.4	106.0	-25.9	54.0	60.0
4	Chest Displacement #128	mm	28.6	123.5	-95.9	69.5	60.0
5	Chest Displacement #129	mm	38.6	298.6	-37.0	156.0	60.0
* 6	Chest Displacement #130	mm	91.8	85.1	-112.9	71.9	60.0
** 7	Chest Displacement #131	mm	238.9	173.2	-186.2	116.4	60.0

* - Data questionable after 70 msec.

** - Data questionable

TEST No. Y49-8-1417

VEHICLE DATA

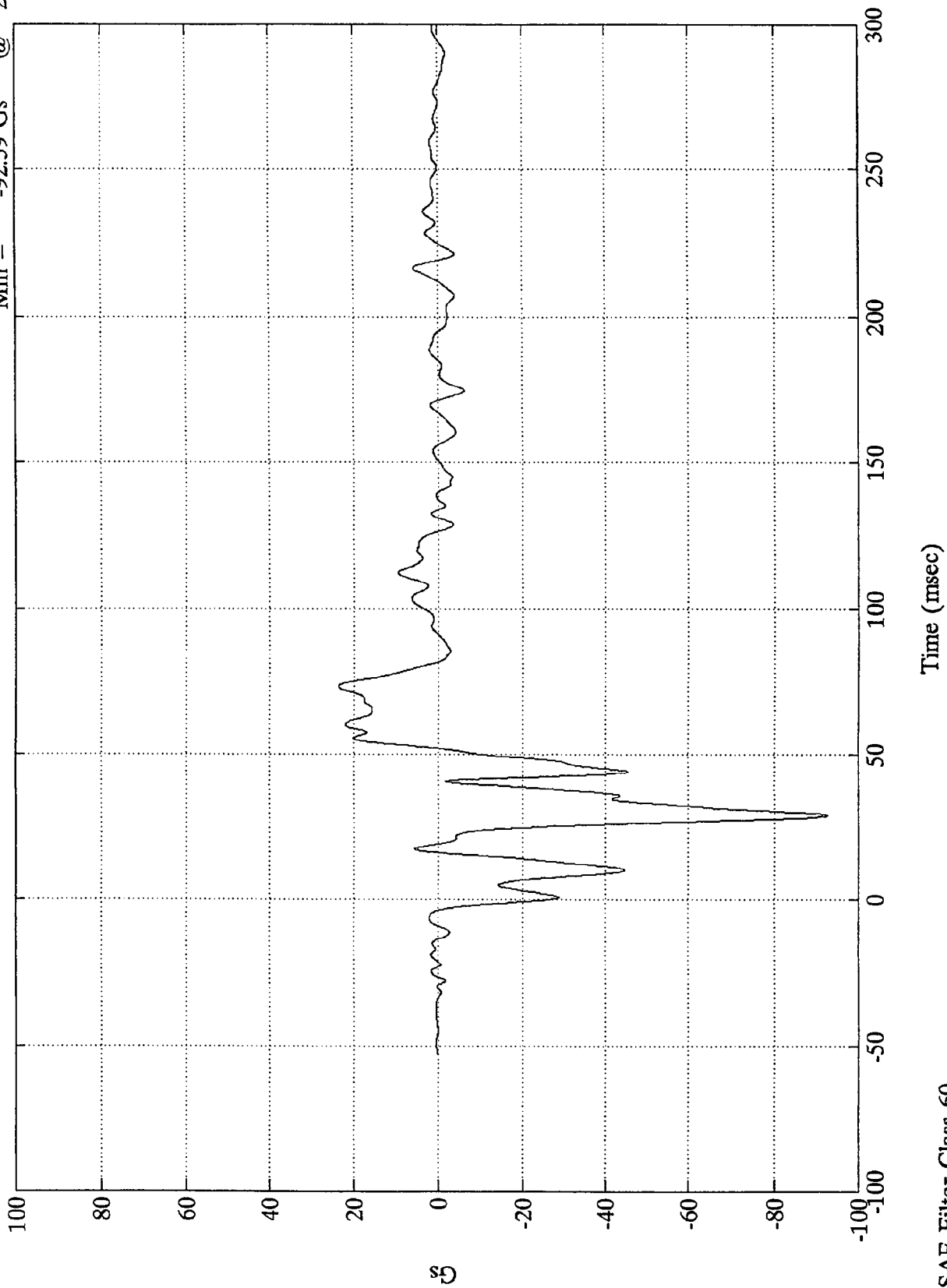
SAE FILTER CHANNEL CLASS
60

VEHICLE ONE DATA

VTV TEST #8

V1 Left Shock Tower (X)

Max =	23.58 Gs	@	73.20 msec
Min =	-92.59 Gs	@	28.92 msec



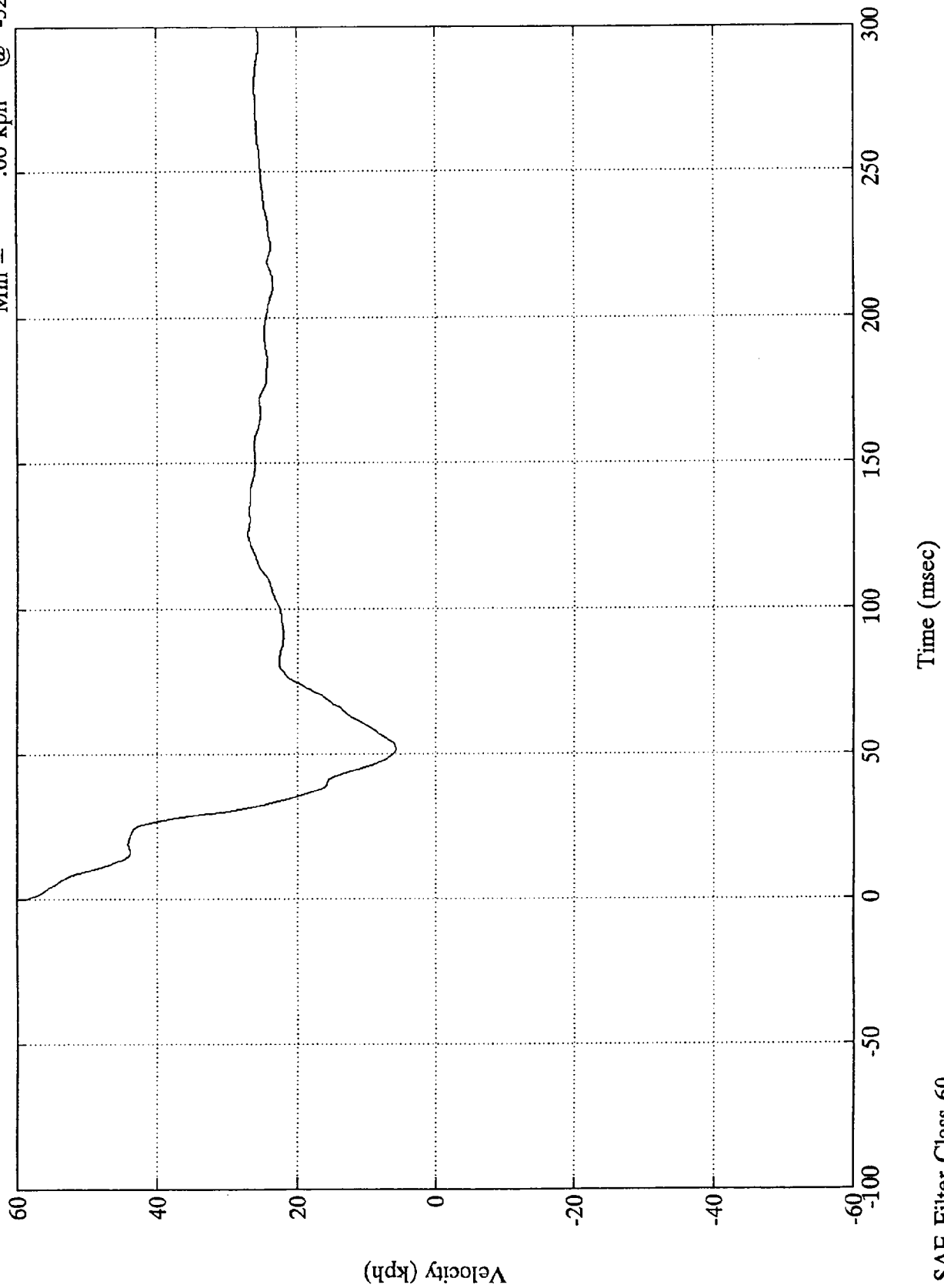
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 58.74 kph @ -0.00 msec
Min = .00 kph @ -52.92 msec

V1 Left Shock Tower (X)



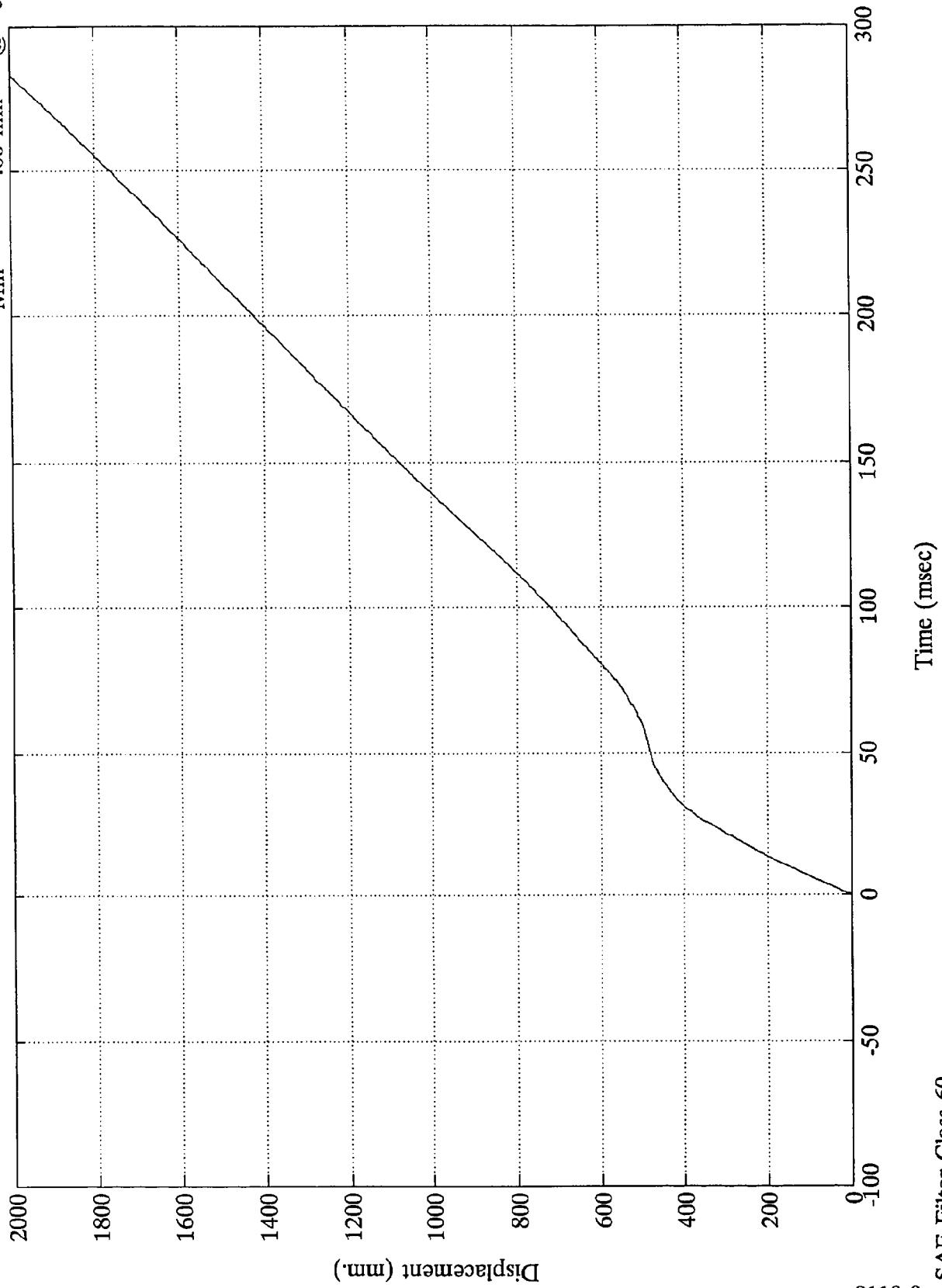
8118-8

SAE Filter Class 60

VTV TEST #8

V1 Left Shock Tower (X)

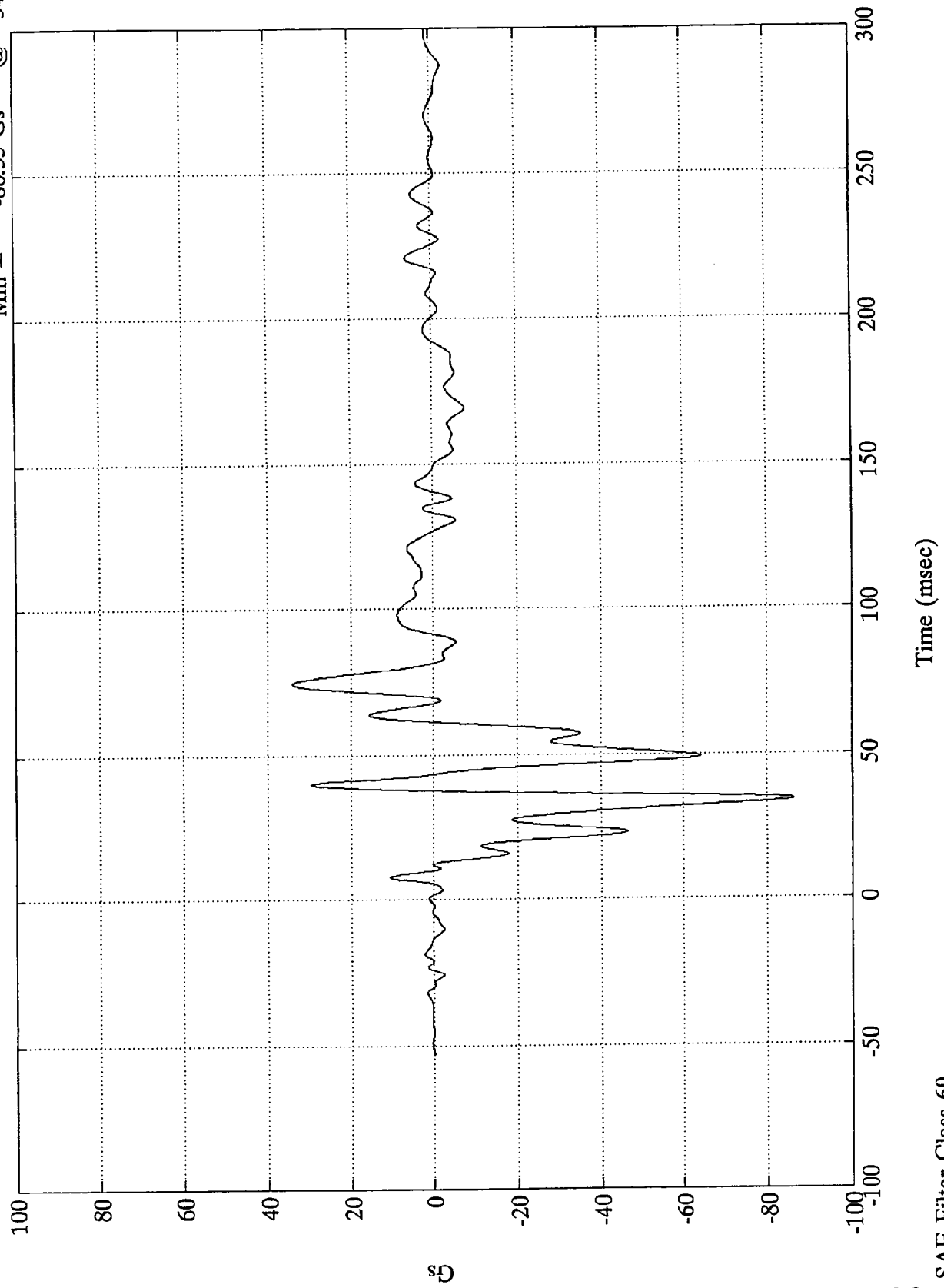
Max = 2118.06 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec



SAE Filter Class 60

VTV TEST #8

V1 Left Shock Tower(Y)
Max = 34.24 Gs @ 74.51 msec
Min = -86.35 Gs @ 34.31 msec

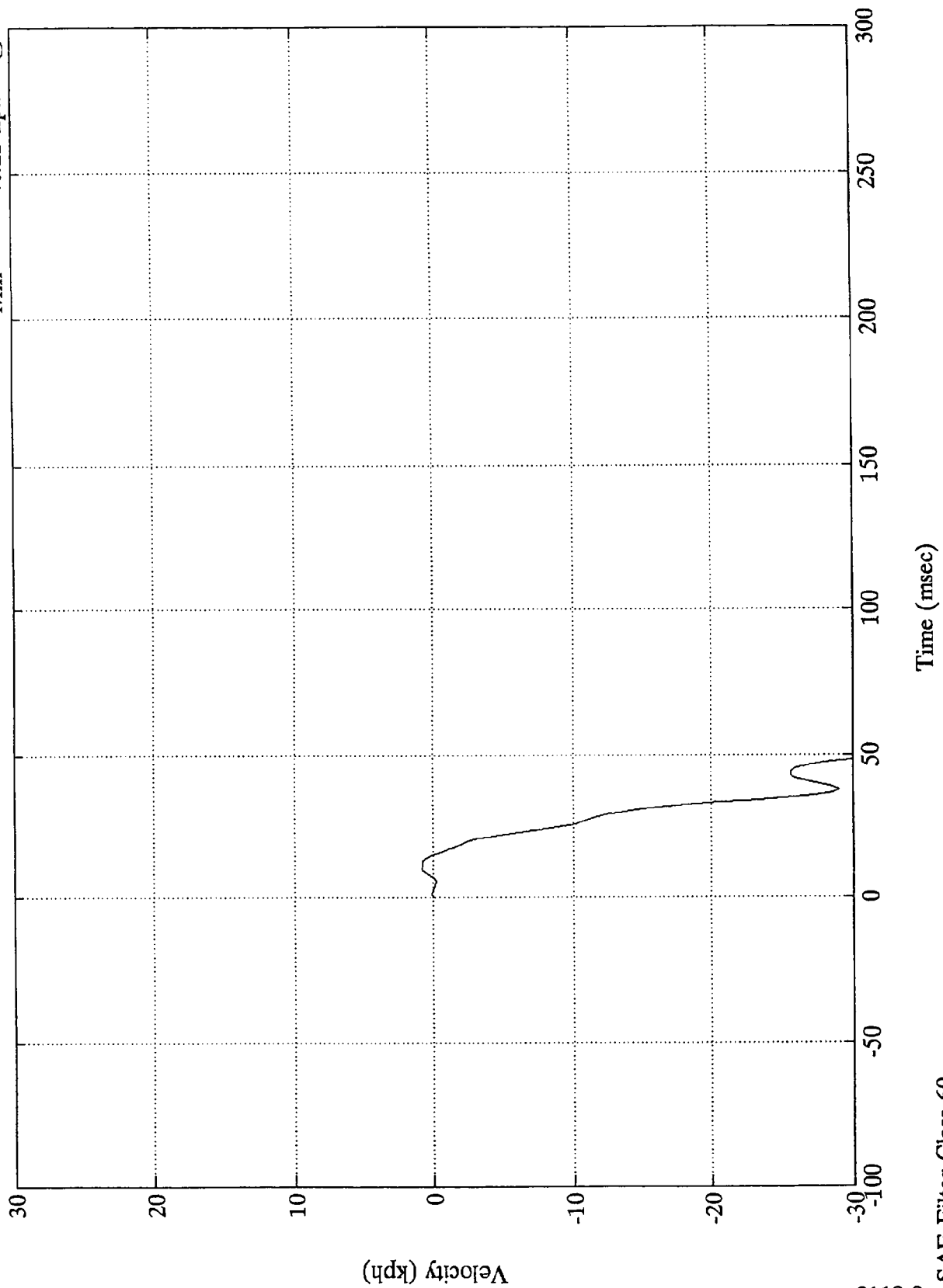


SAE Filter Class 60

8118-8

VTV TEST #8

V1 Left Shock Tower(Y)
Max = .79 kph @ 10.32 msec
Min = -46.21 kph @ 61.32 msec



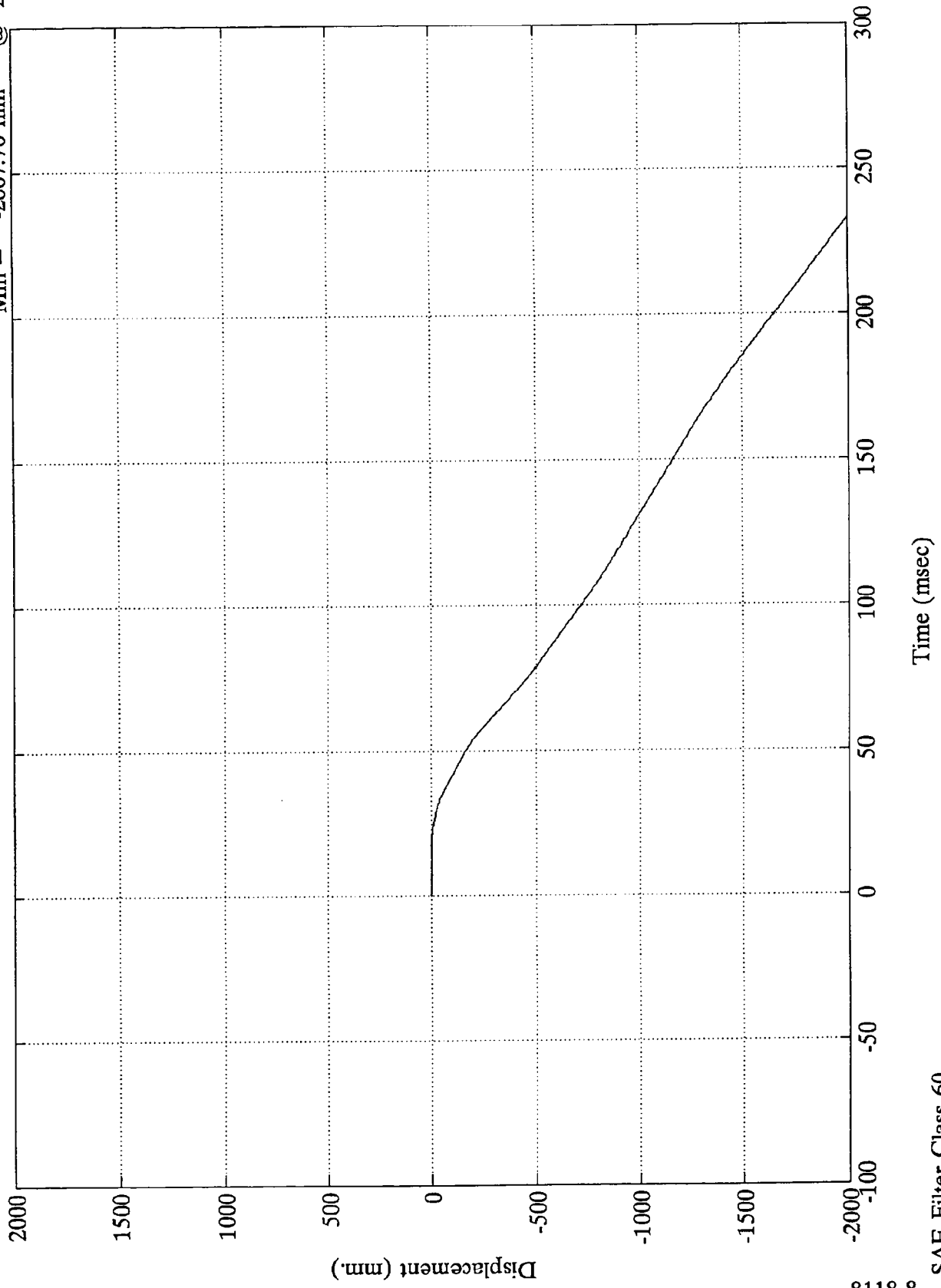
8-118

SAE Filter Class 60

VTV TEST #8

V1 Left Shock Tower(Y)

Max = 1.19 mm @ 15.36 msec
Min = -2667.76 mm @ 299.87 msec



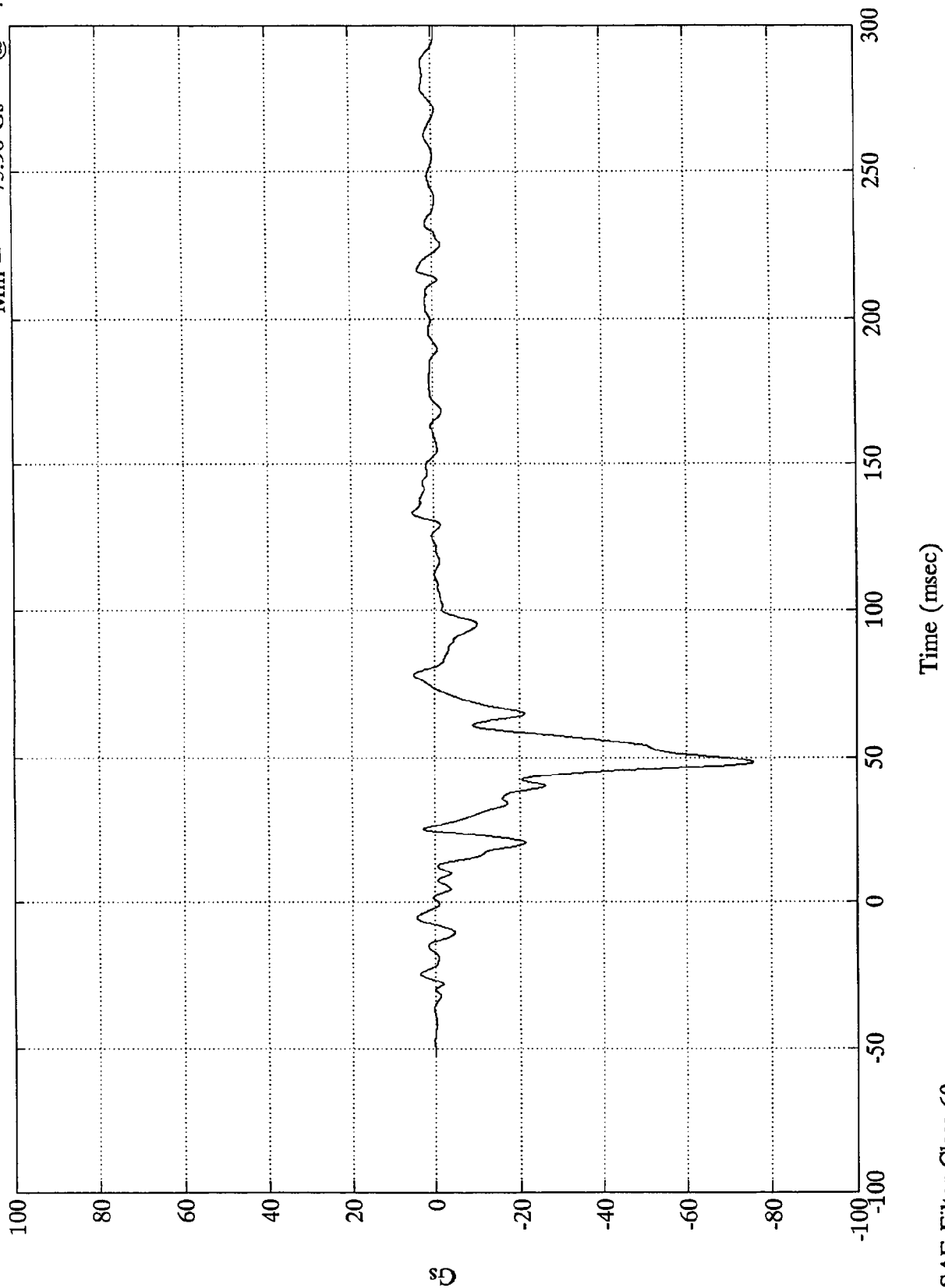
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 5.11 Gs @ 132.84 msec
Min = -75.90 Gs @ 48.36 msec

V1 Right Shock Tower (X)



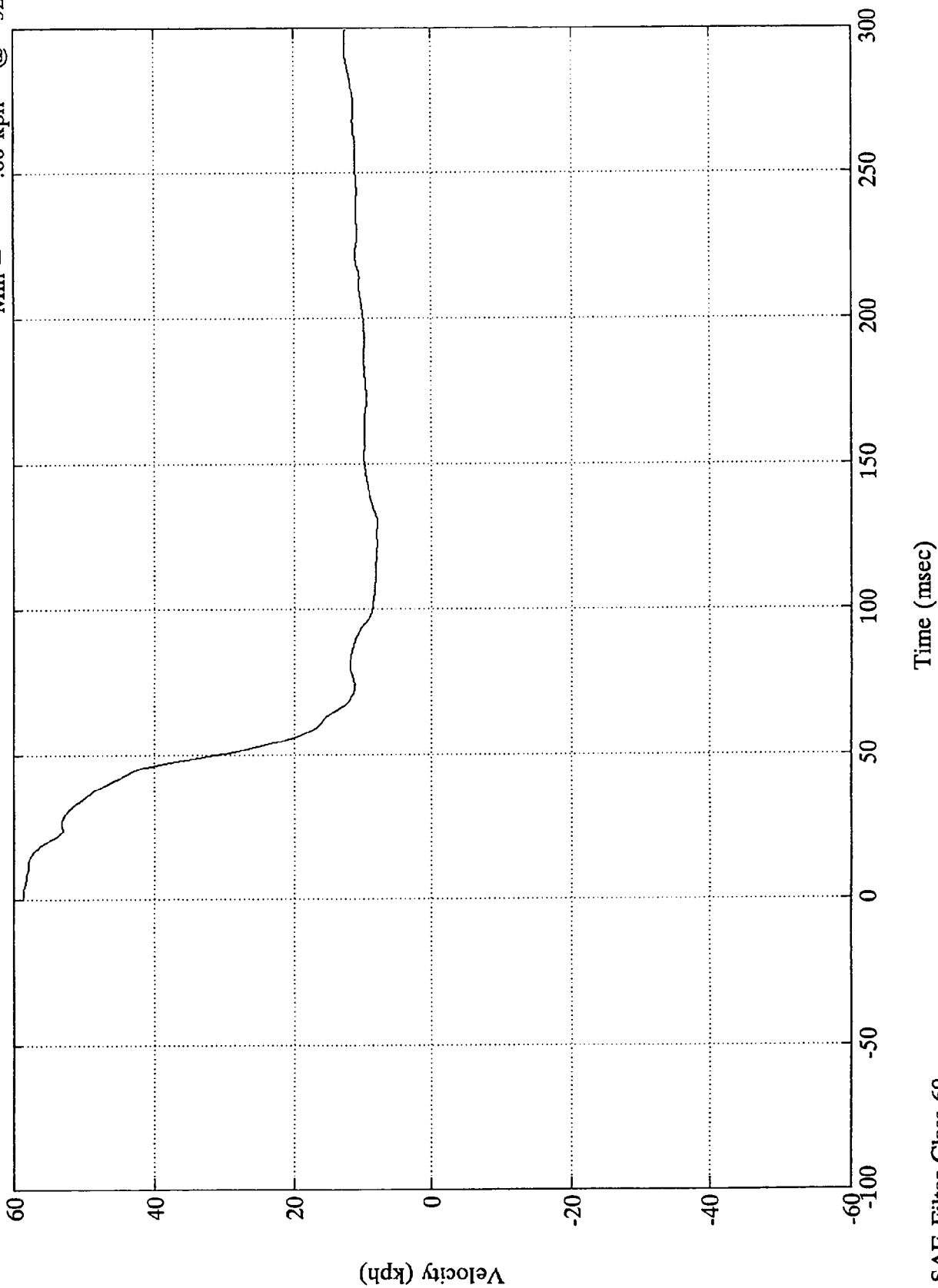
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 58.74 kph @ -0.00 msec
Min = .00 kph @ -52.92 msec

V1 Right Shock Tower (X)



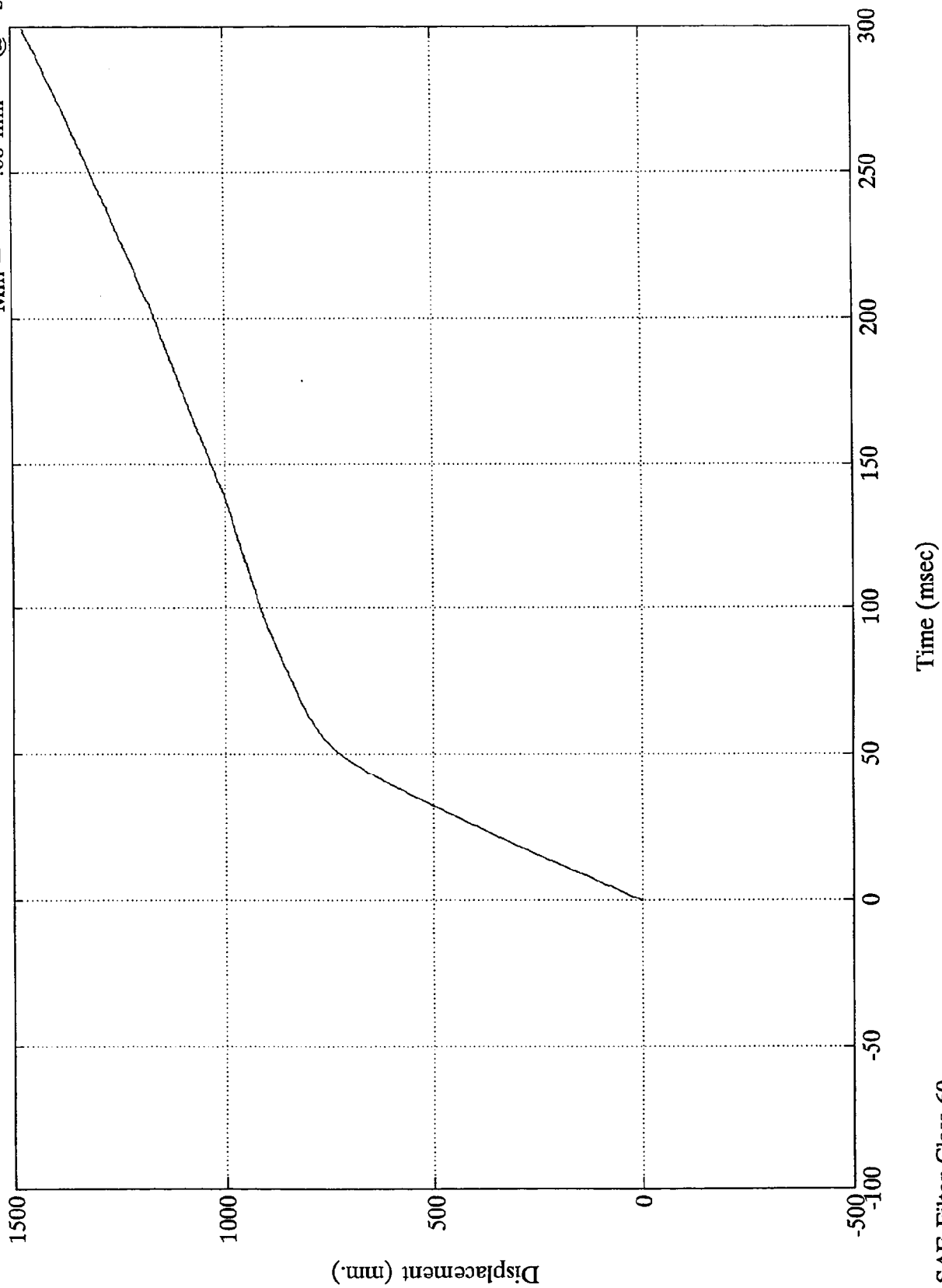
8118-8

SAE Filter Class 60

VTV TEST #8

V1 Right Shock Tower (X)

Max = 1474.10 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec



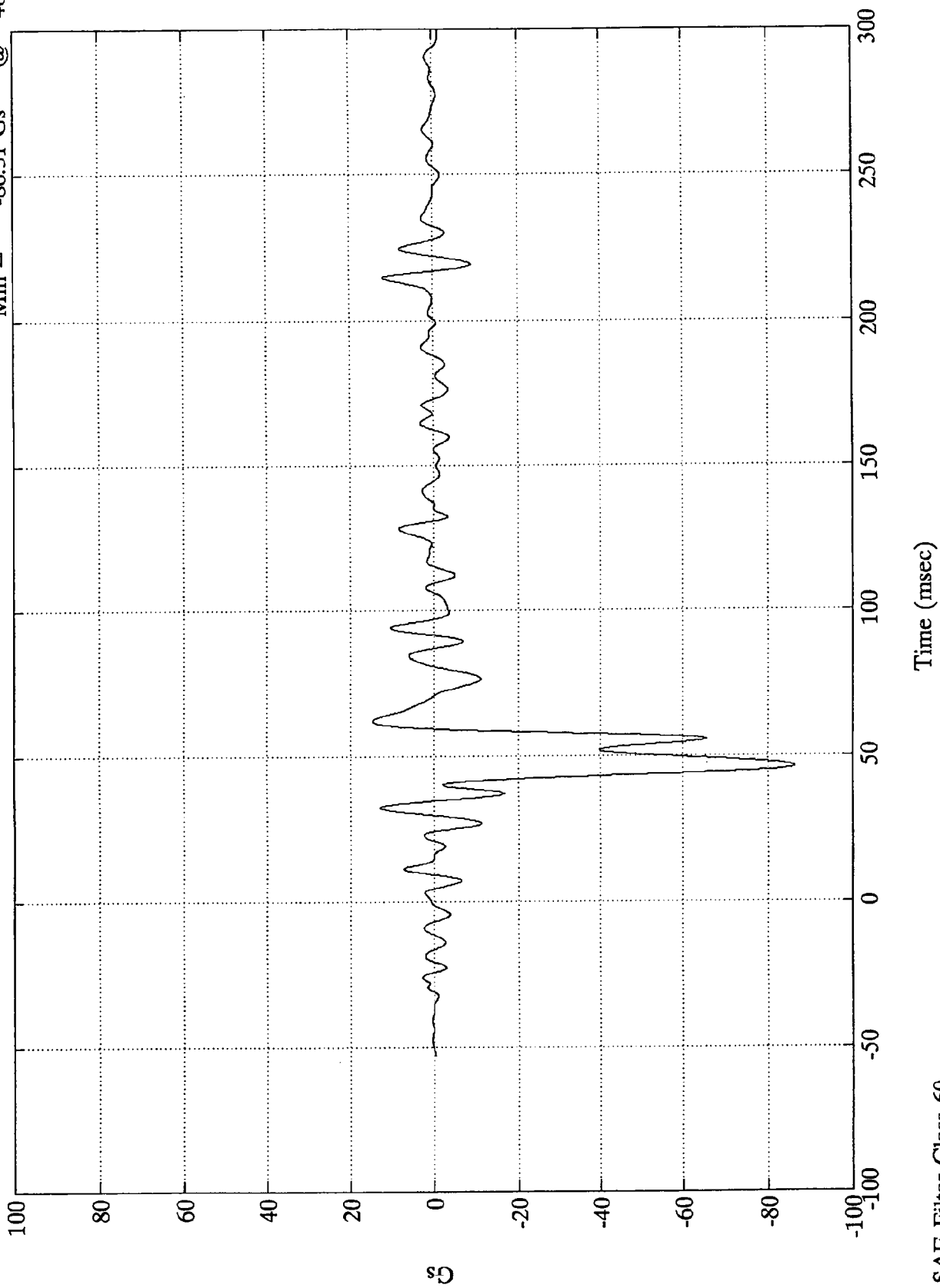
SAE Filter Class 60

8-8118

VTV TEST #8

Max = 14.65 Gs @ 62.04 msec
Min = -86.31 Gs @ 46.32 msec

V1 Right Shock Tower (Y)



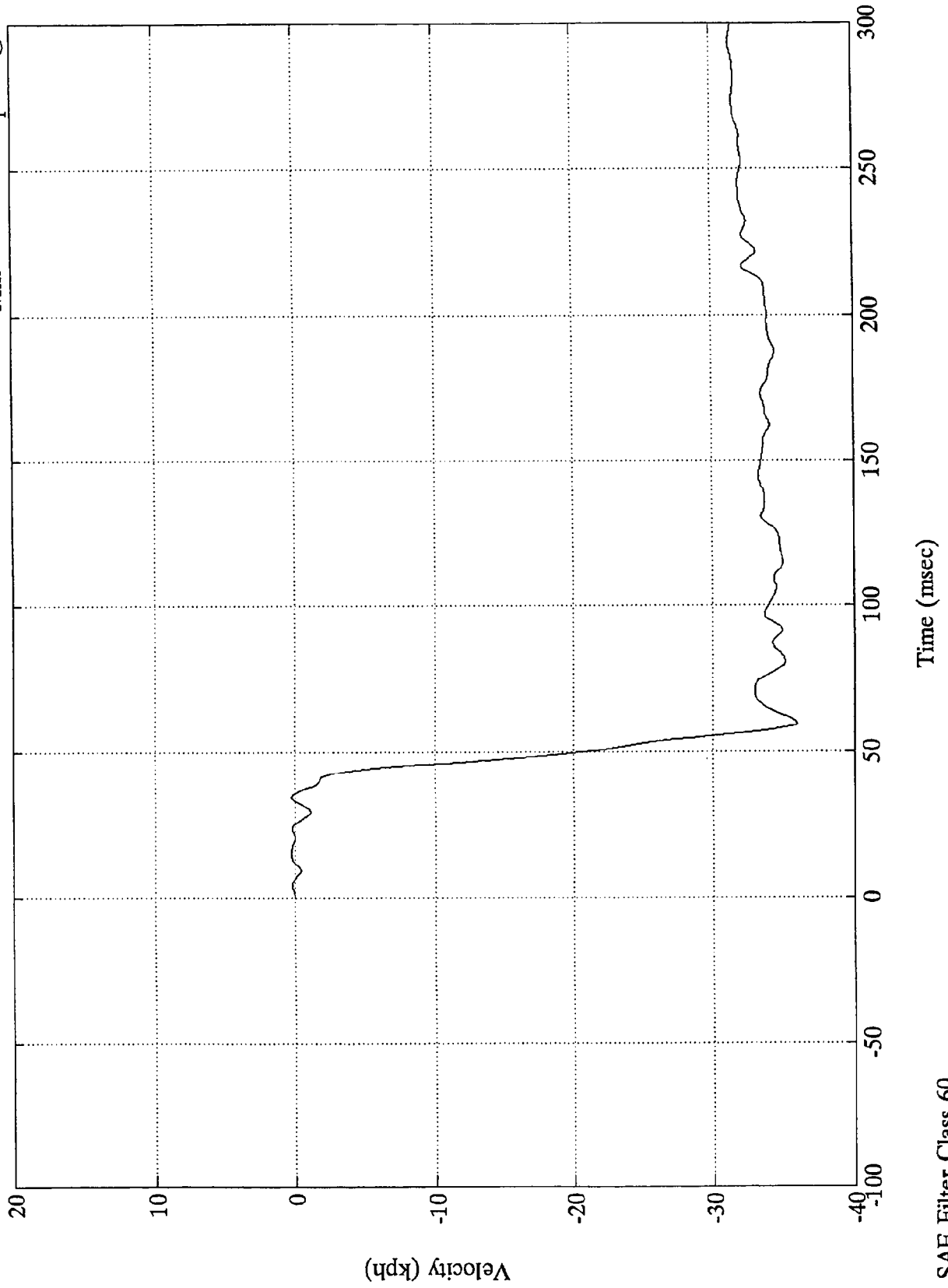
8118-8

SAE Filter Class 60

VTV TEST #8

Max = .30 kph @ 34.56 msec
Min = -35.93 kph @ 59.40 msec

V1 Right Shock Tower (Y)



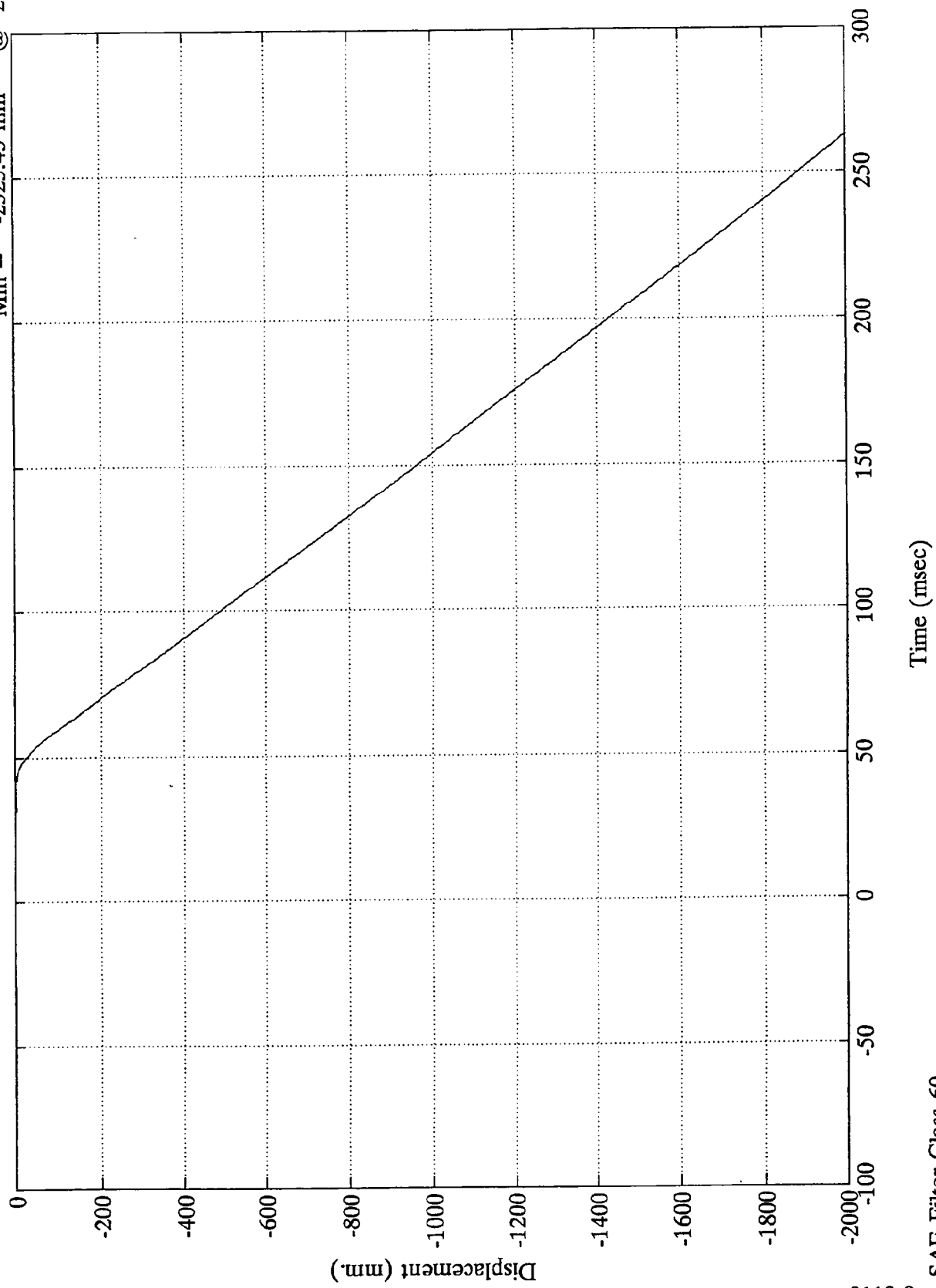
8118-8

SAE Filter Class 60

VTV TEST #8

V1 Right Shock Tower (Y)

Max = .43 mm @ 25.67 msec
Min = -2325.43 mm @ 299.87 msec

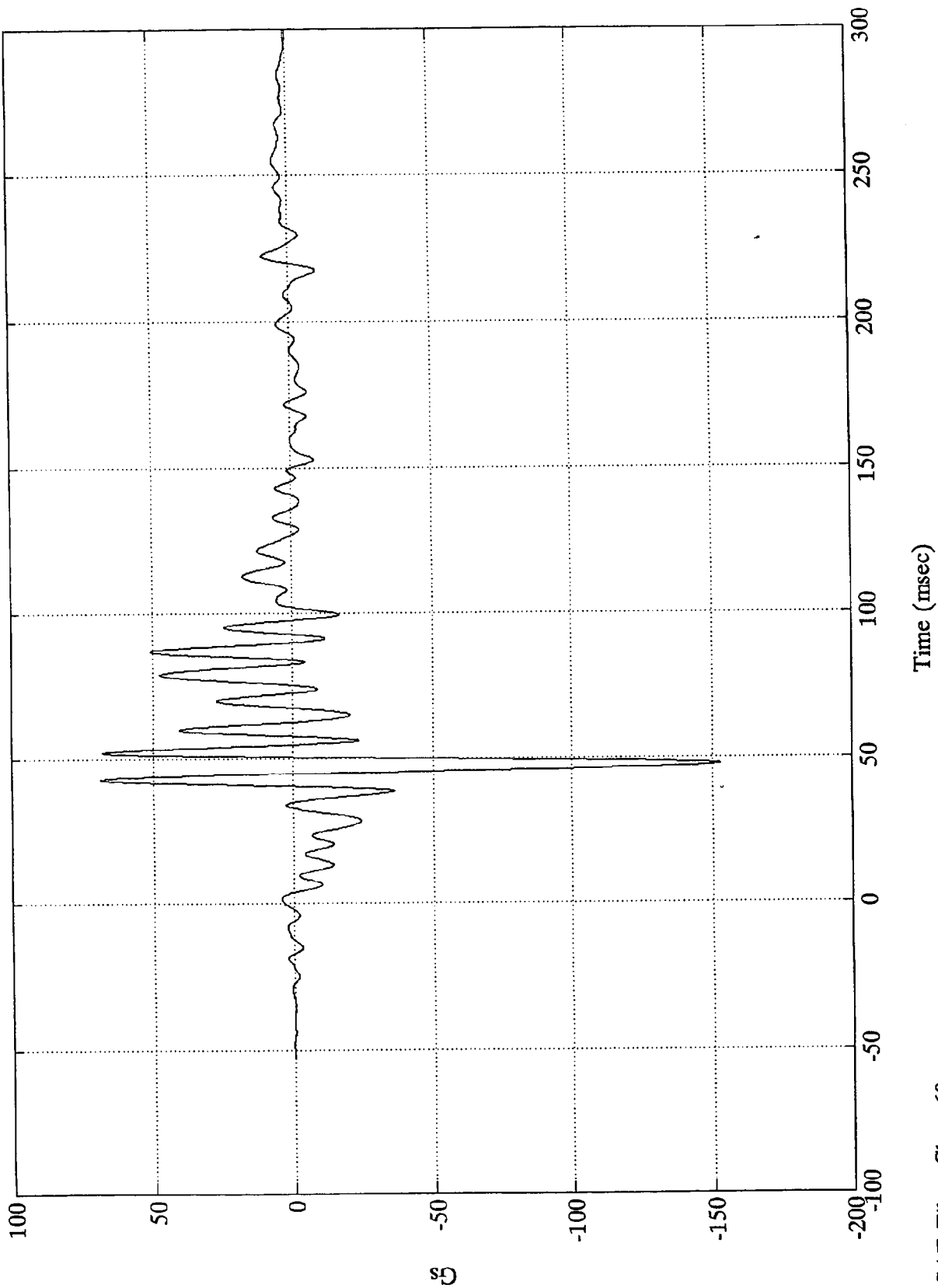


SAE Filter Class 60

8-8118

VTV TEST #8

V1 Brake Pedal (X) Max = 69.23 Gs @ 42.72 msec
Min = -153.01 Gs @ 47.76 msec



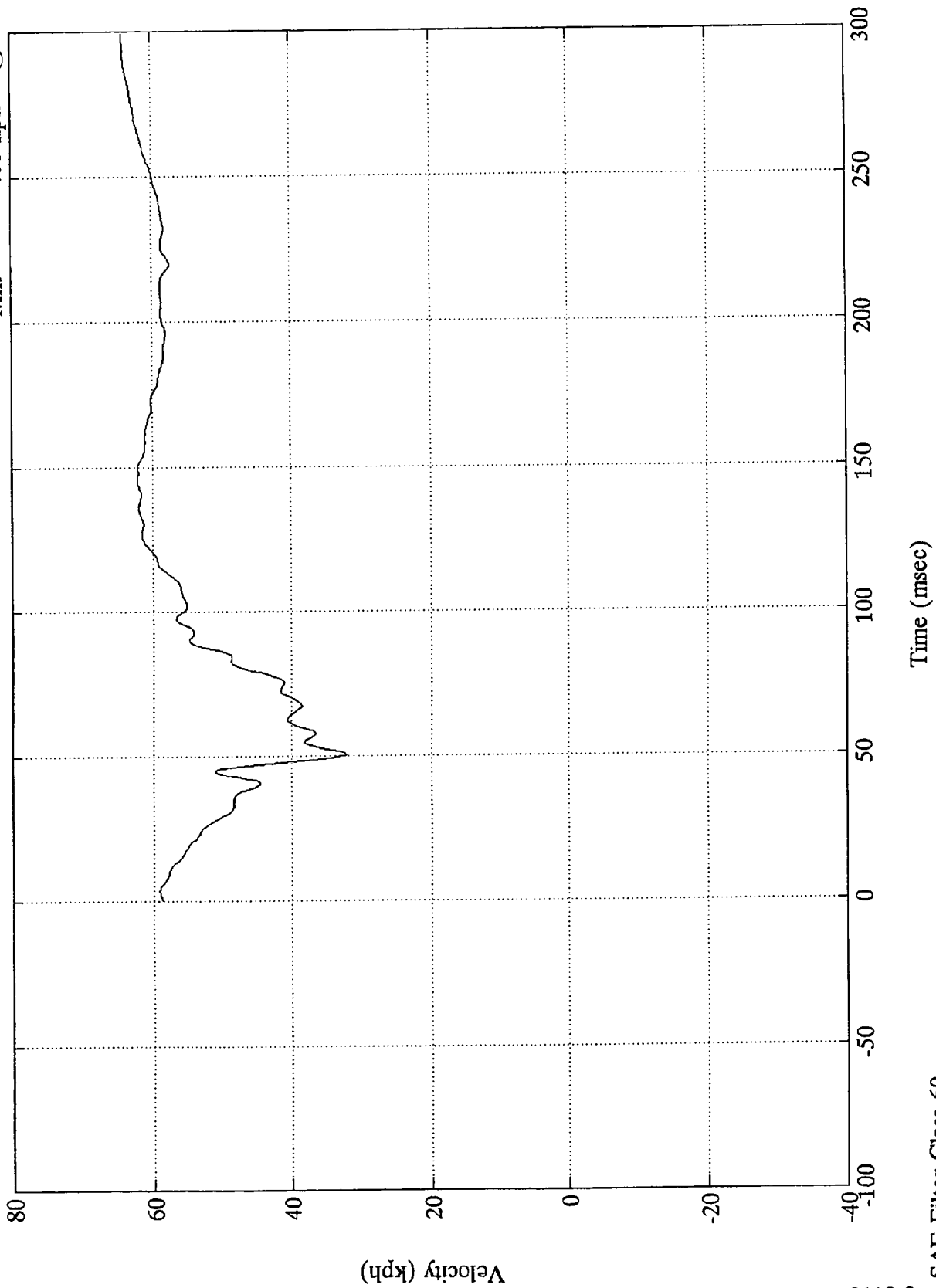
SAE Filter Class 60

8118-8

VTV TEST #8

V1 Brake Pedal (X)

Max = 64.22 kph @ 299.87 msec
Min = .00 kph @ -52.92 msec

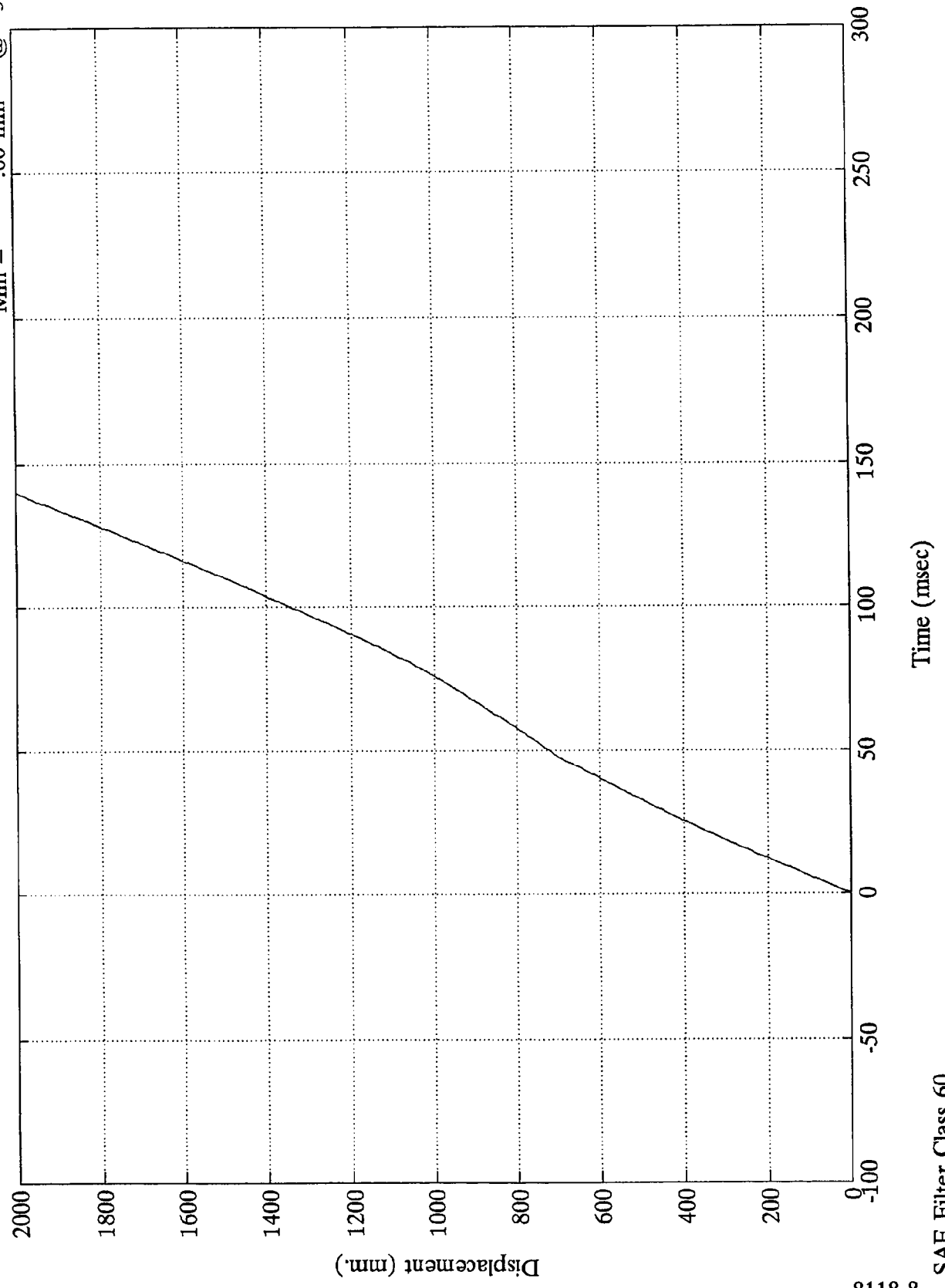


8118-8

SAE Filter Class 60

VTV TEST #8

V1 Brake Pedal (X)
Max = 4688.37 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec



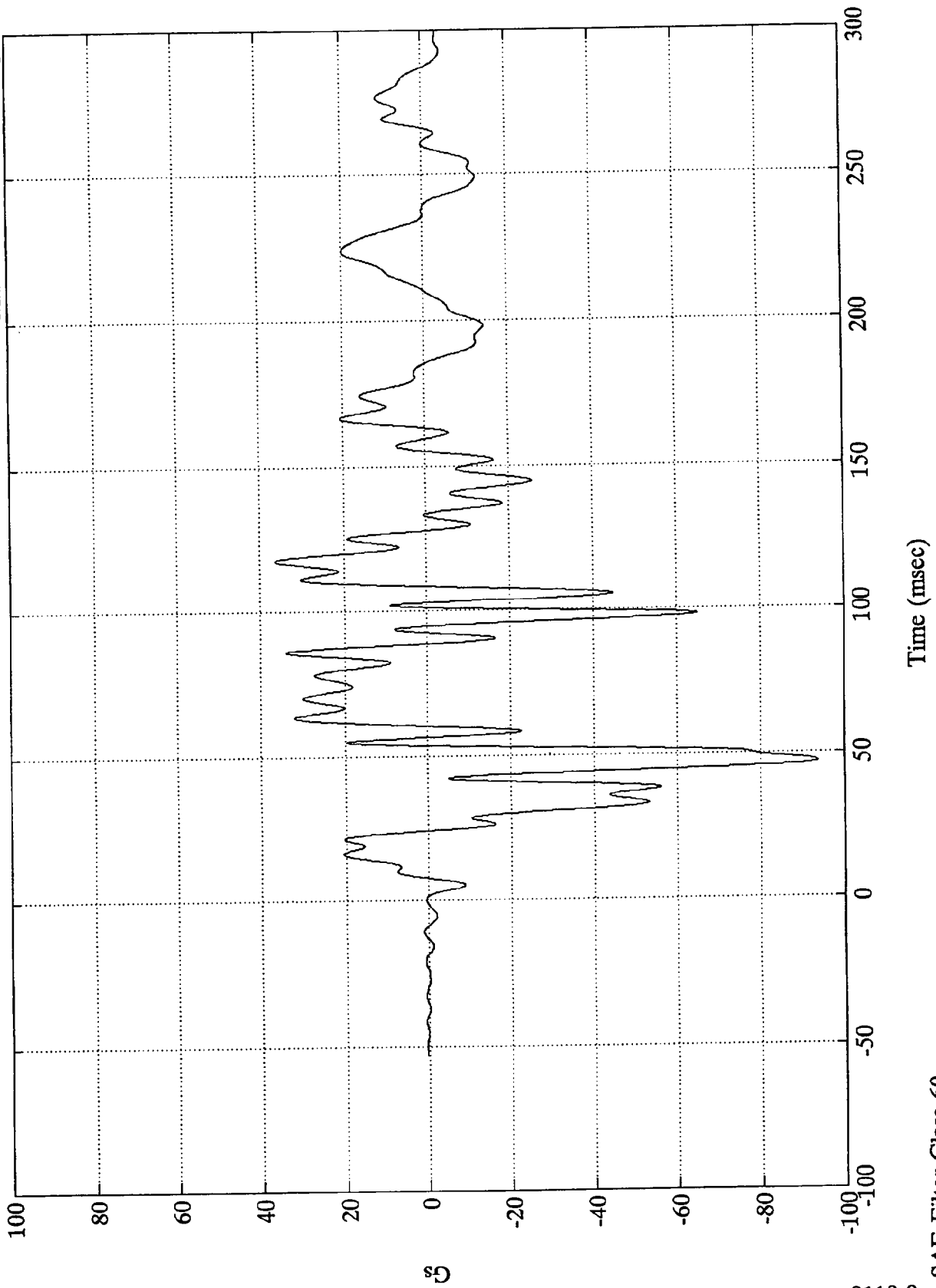
8-118

SAE Filter Class 60

VTV TEST #8

V1 Brake Pedal (Y)

Max = 36.59 Gs @ 117.84 msec
Min = -93.69 Gs @ 47.04 msec

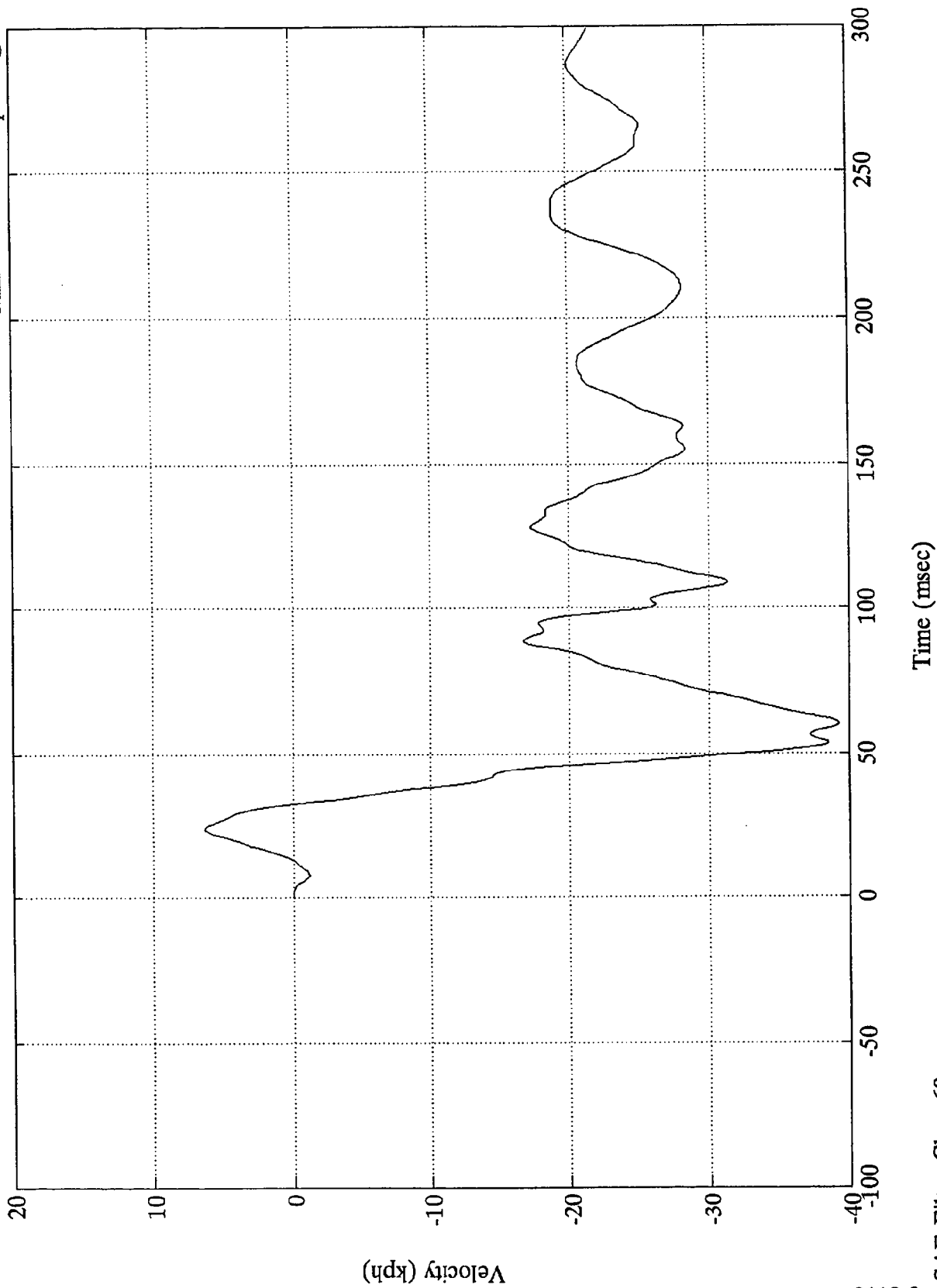


8118-8

SAE Filter Class 60

VTV TEST #8

V1 Brake Pedal (Y) Max = 6.33 kph @ 24.12 msec
Min = -39.26 kph @ 60.24 msec



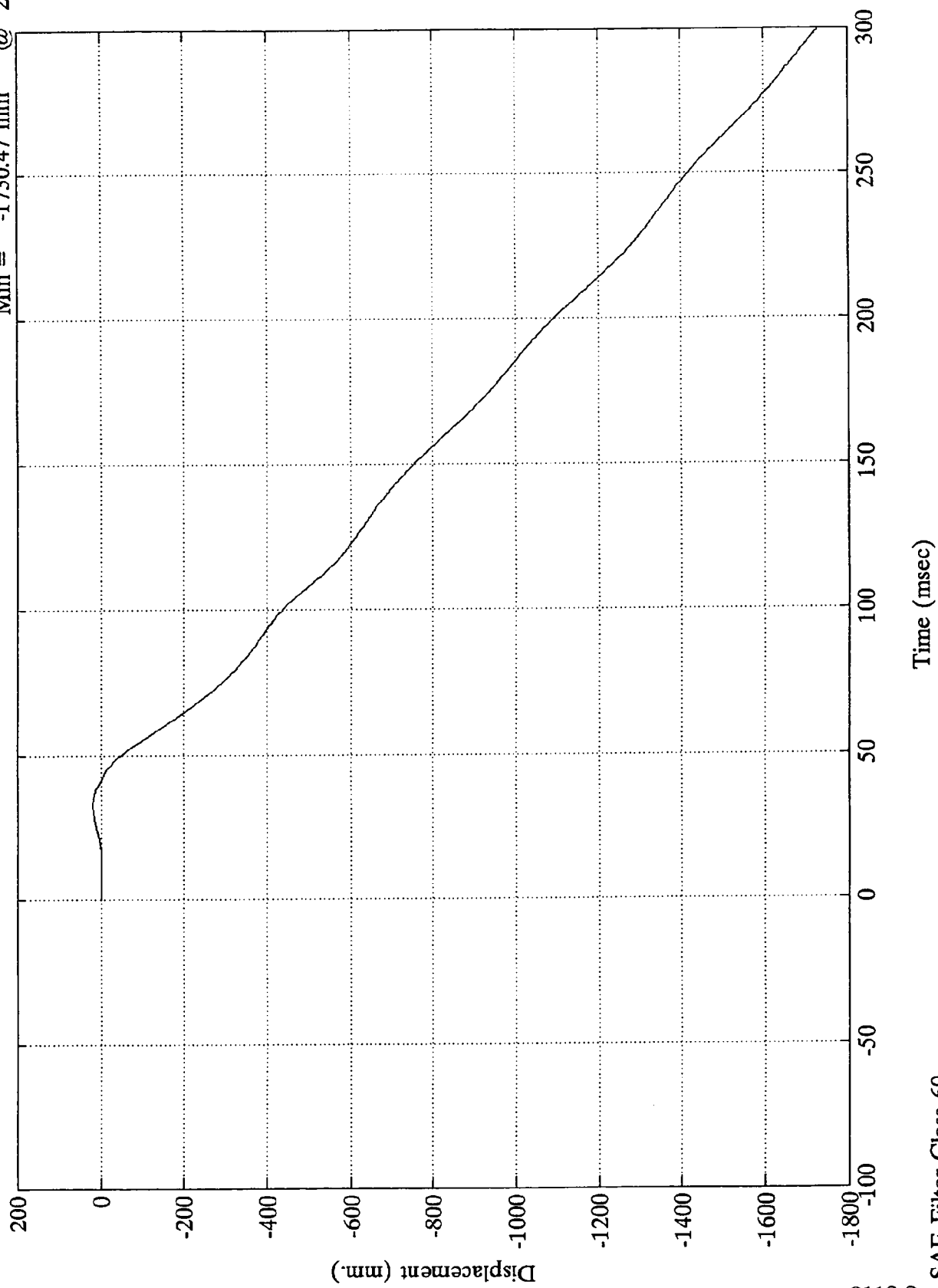
SAE Filter Class 60

8118-8

VTV TEST #8

V1 Brake Pedal (Y)

Max = 18.21 mm @ 32.64 msec
Min = -1730.47 mm @ 299.87 msec



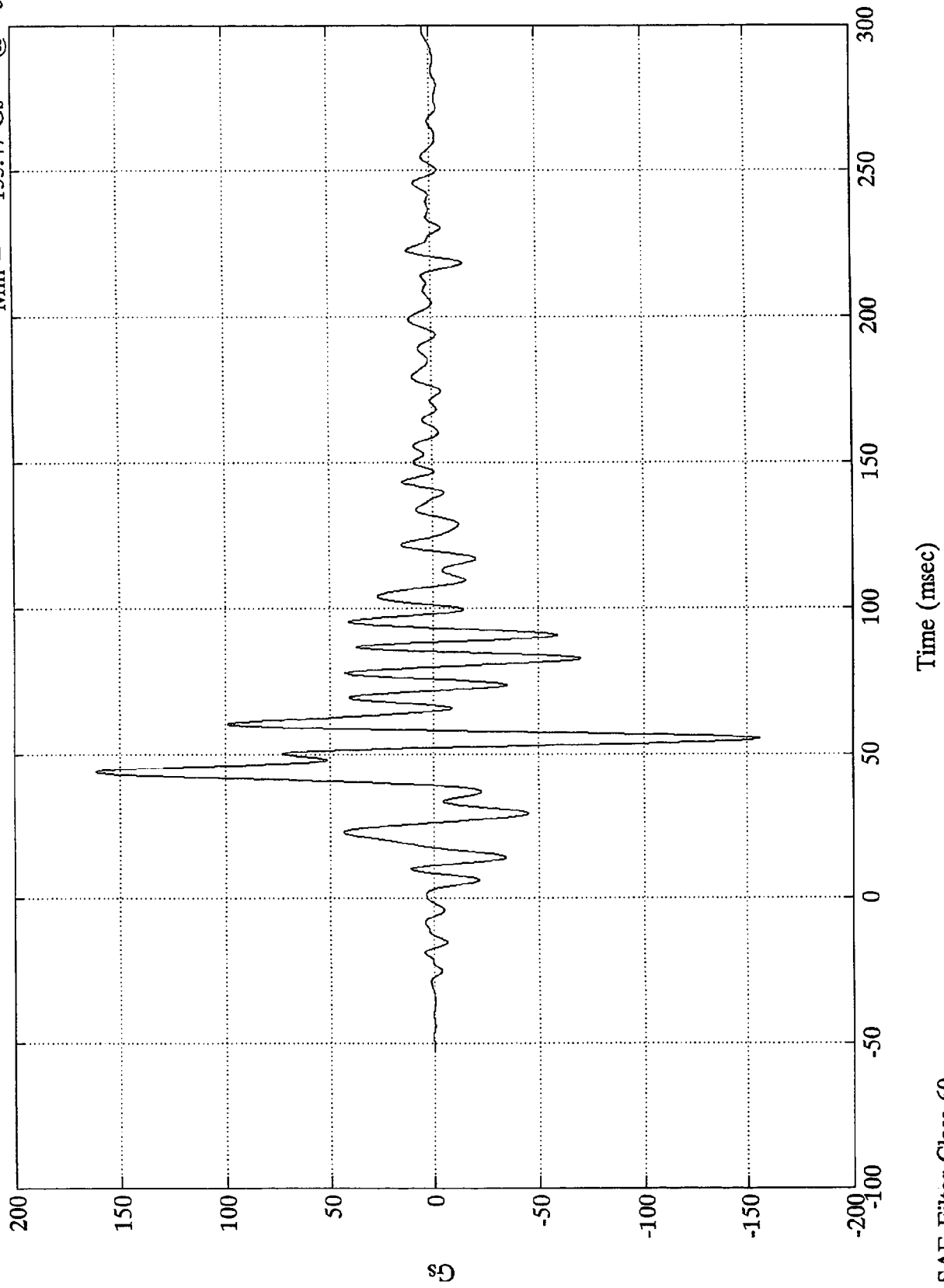
8-8118

SAE Filter Class 60

VTV TEST #8

V1 Brake Pedal (Z)

Max = 161.67 Gs @ 43.79 msec
Min = -155.47 Gs @ 55.20 msec

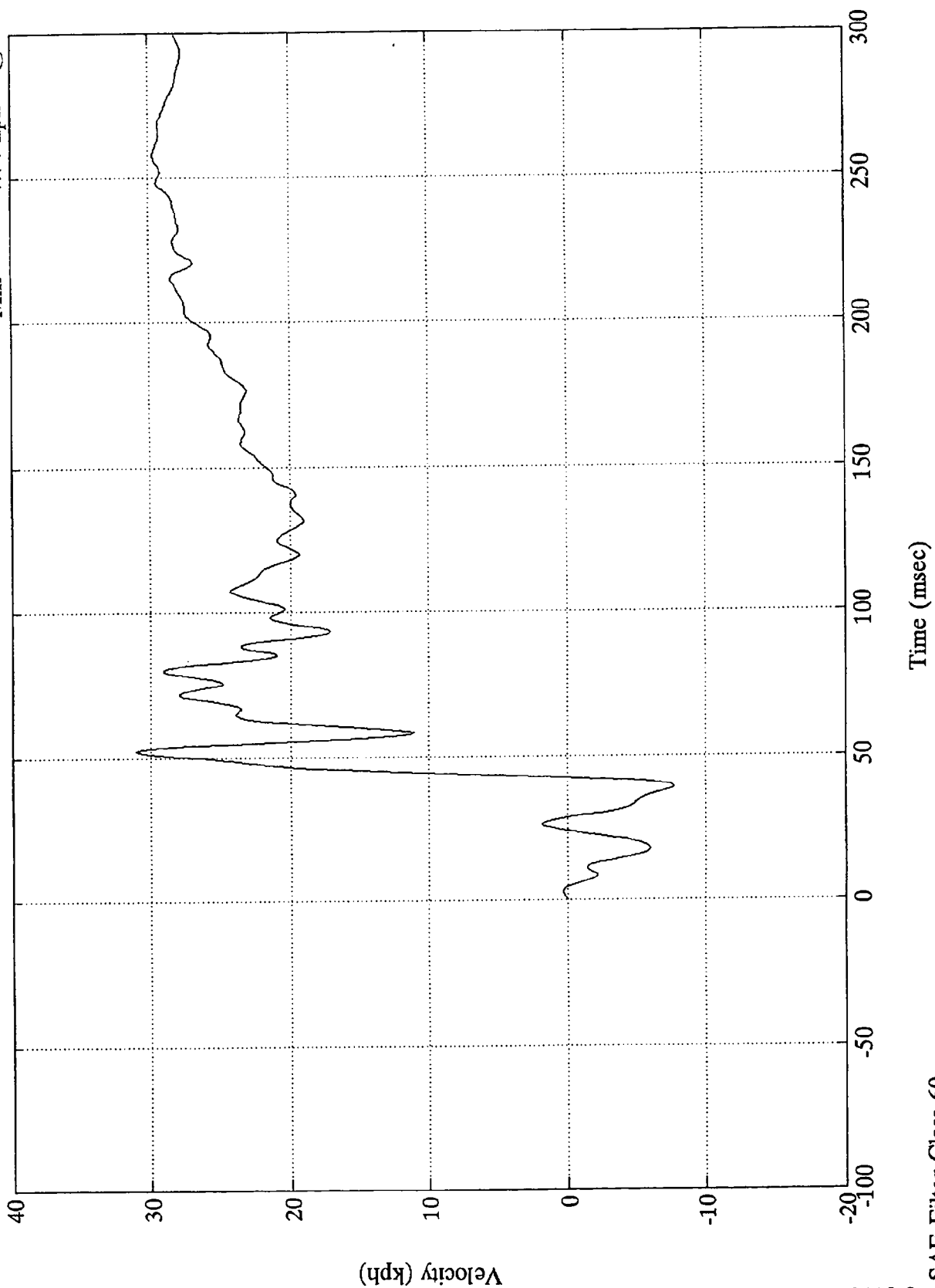


8118-8

SAE Filter Class 60

VTV TEST #8

V1 Brake Pedal (Z)
Max = 31.05 kph @ 52.20 msec
Min = -7.74 kph @ 39.00 msec



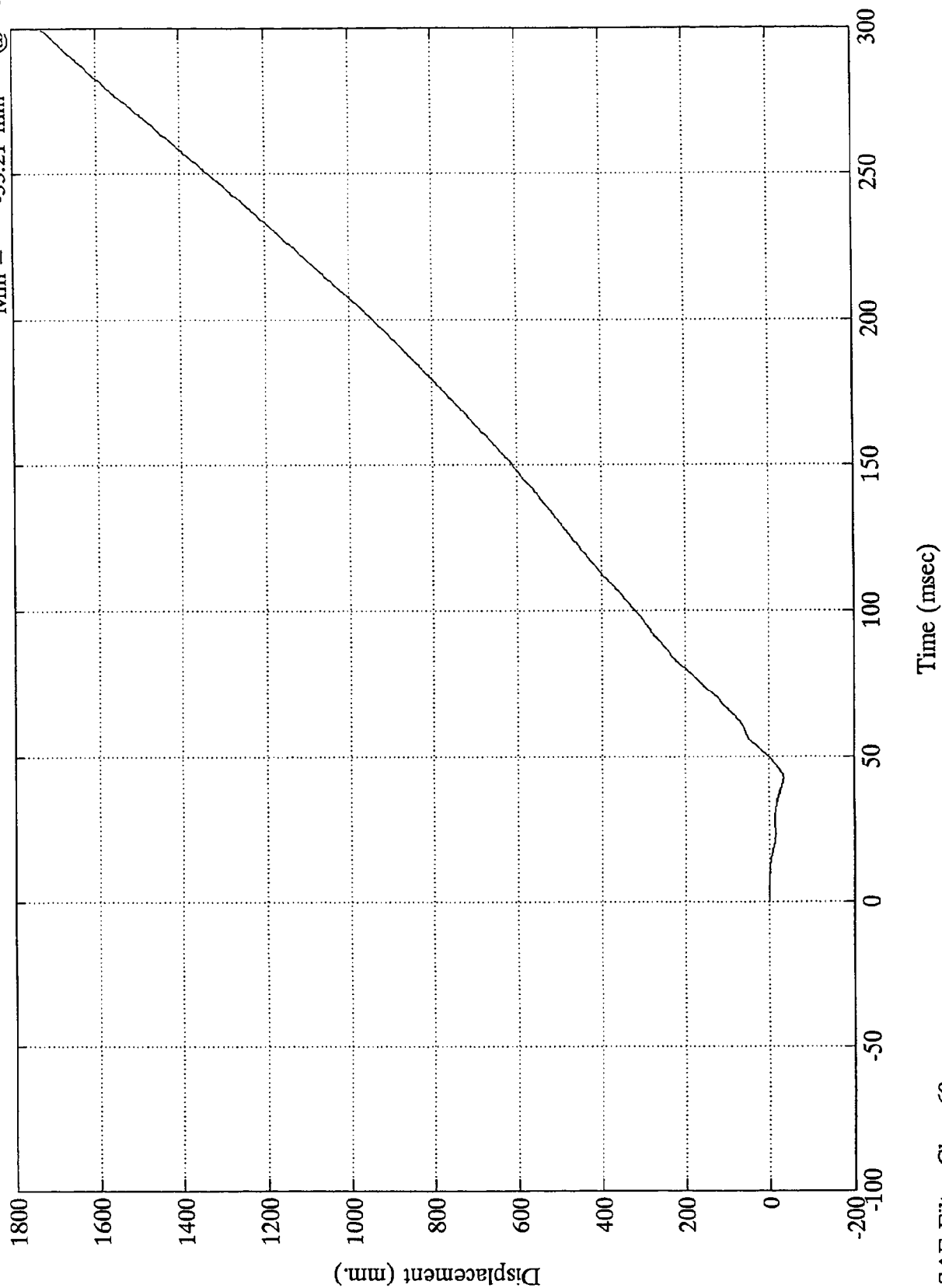
8118-8

SAE Filter Class 60

VTV TEST #8

V1 Brake Pedal (Z)

Max = 1731.60 mm @ 299.87 msec
Min = -33.21 mm @ 42.48 msec

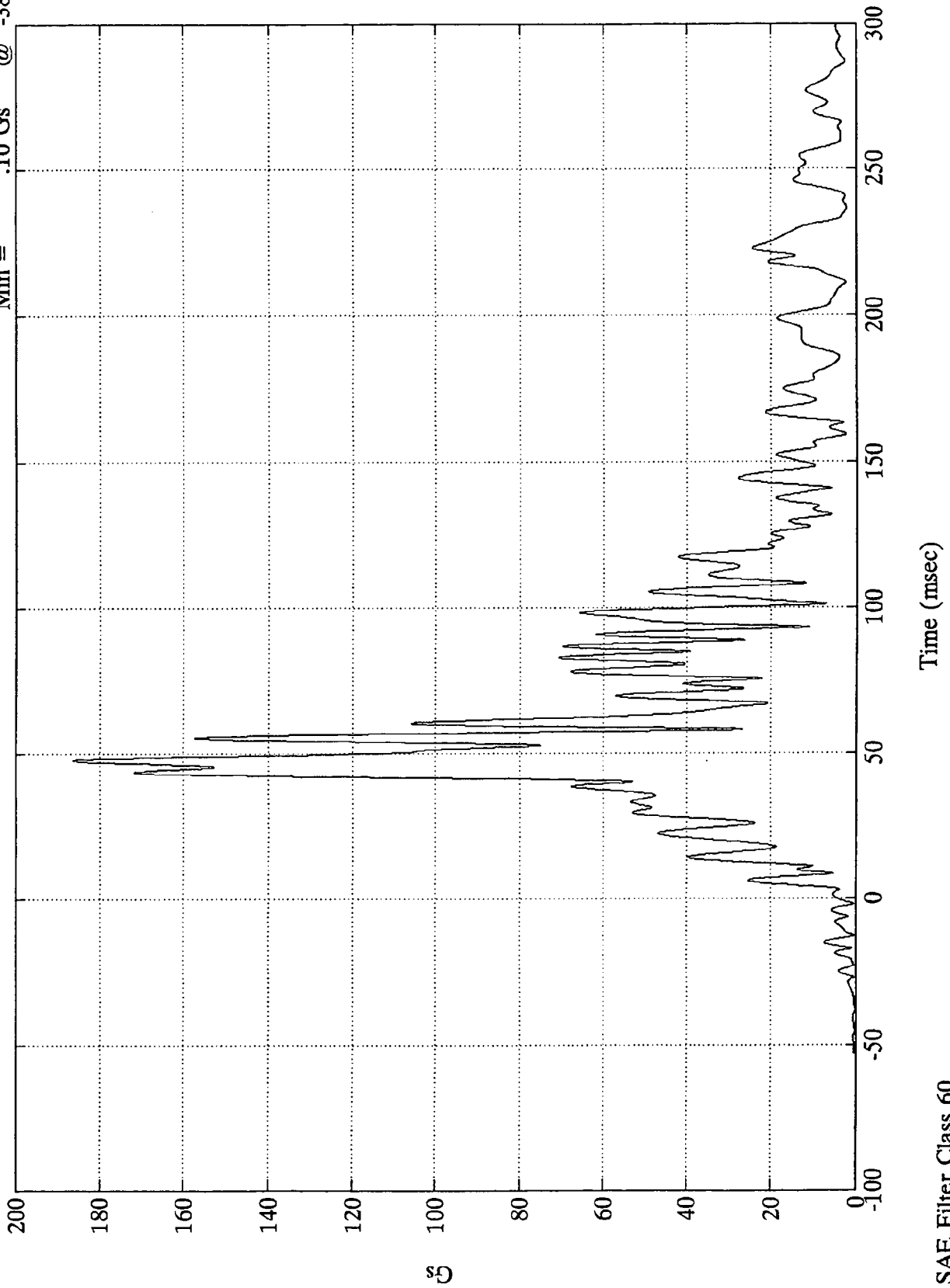


SAE Filter Class 60

8-8118

VTV TEST #8

V1 Brake Pedal (res) Max = 186.34 Gs @ 47.63 msec
Min = .10 Gs @ -38.16 msec

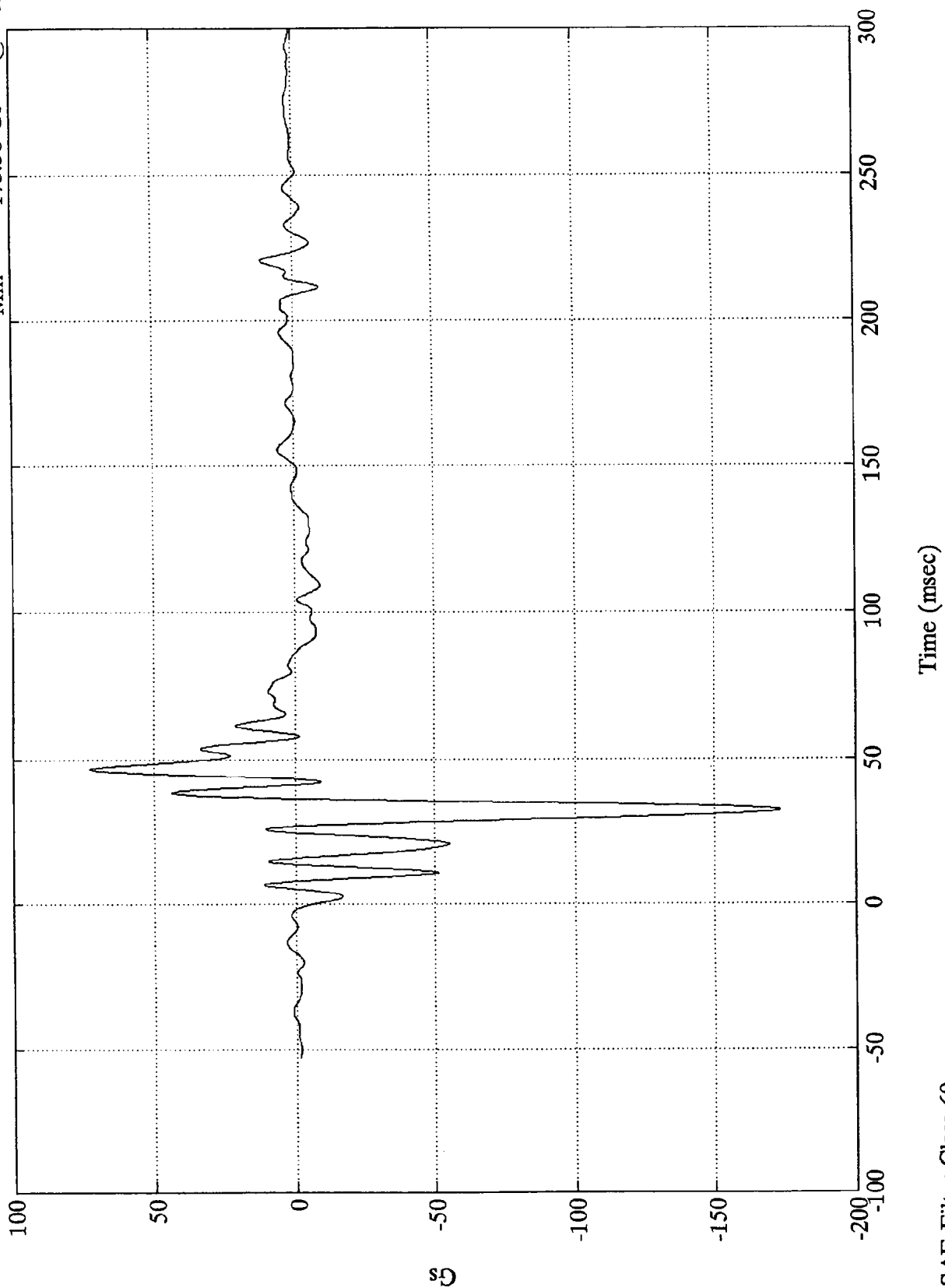


8118-8

VTV TEST #8

V1 LF Frame Rail (X)

Max = 72.78 Gs @ 46.68 msec
Min = -173.36 Gs @ 32.40 msec



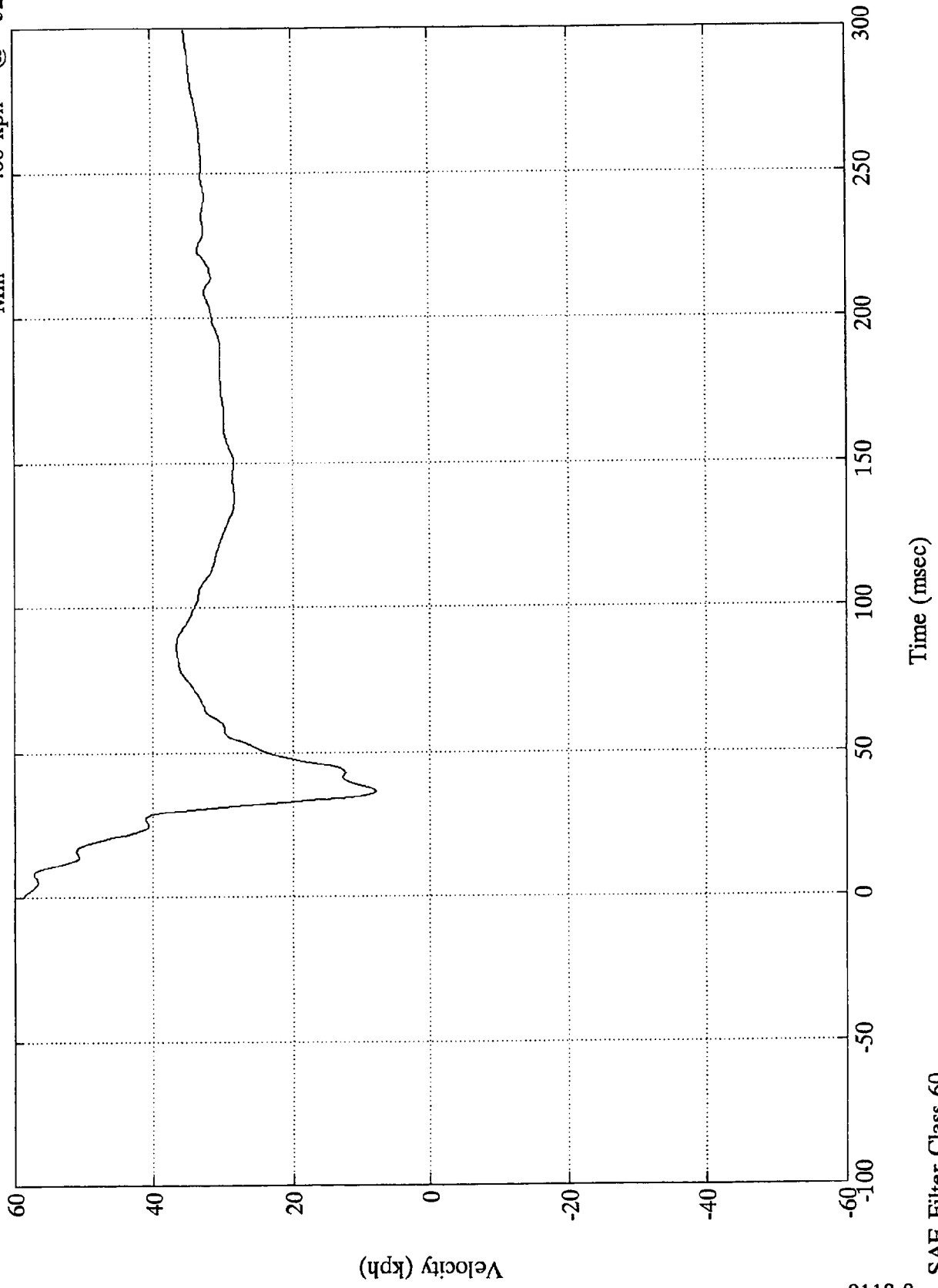
SAE Filter Class 60

8118-8

VTV TEST #8

V1 LF Frame Rail (X)

Max = 58.74 kph @ -0.00 msec
Min = .00 kph @ -52.92 msec



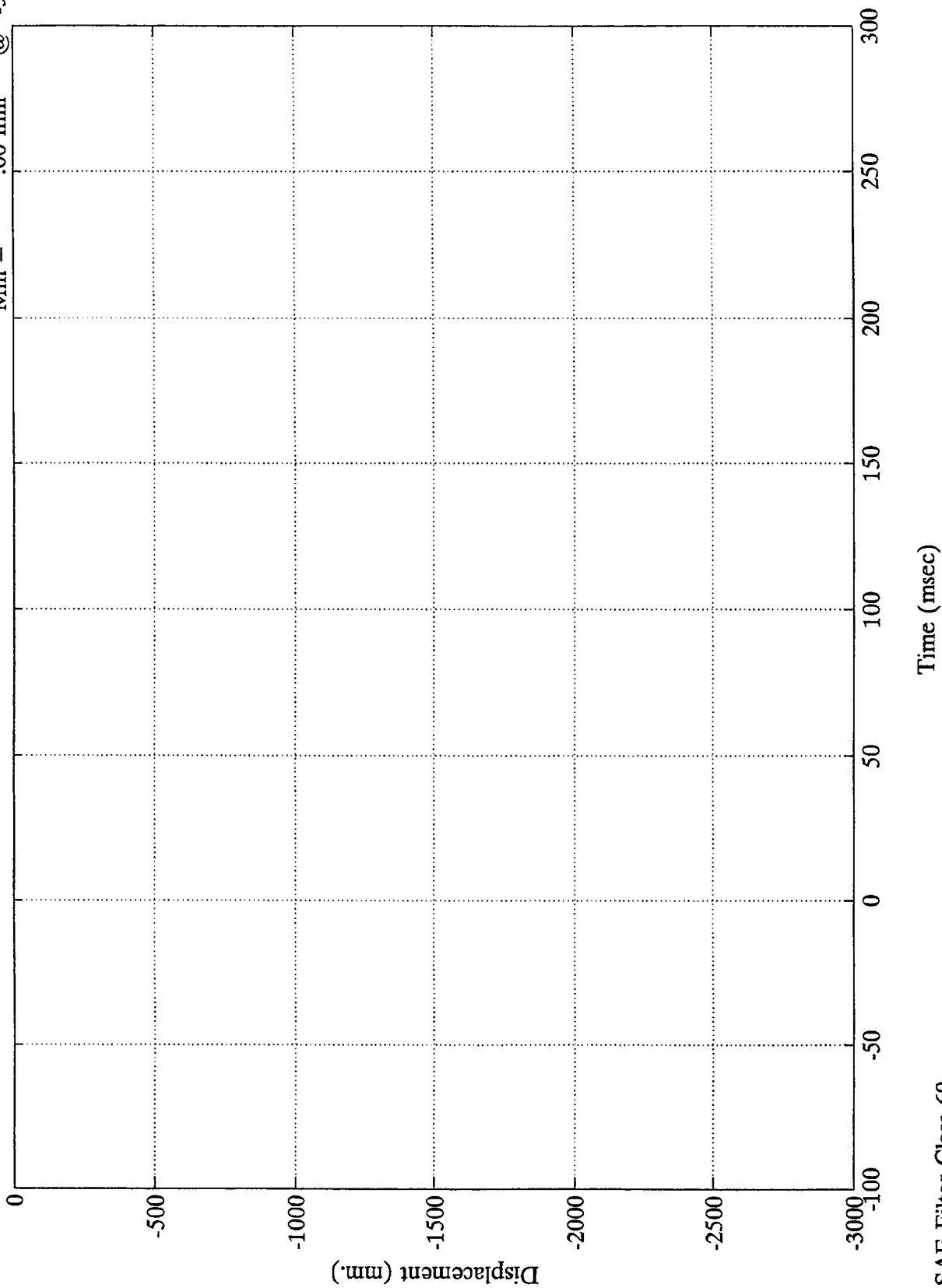
8118-8

SAE Filter Class 60

VTV TEST #8

V1 L.F Frame Rail (X)

Max = 2731.43 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec

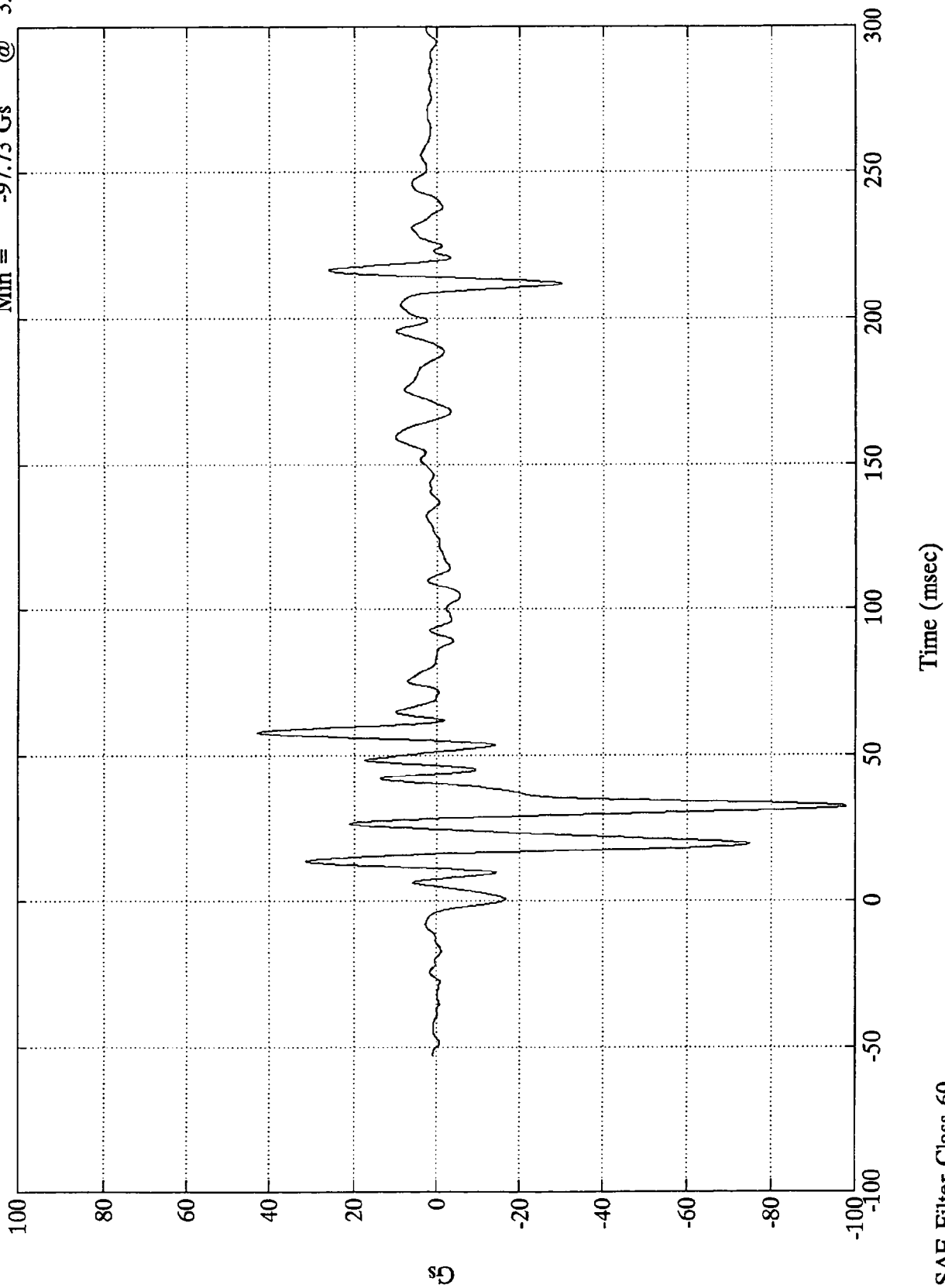


8118-8

VTV TEST #8

V1 LF Frame Rail (Y)

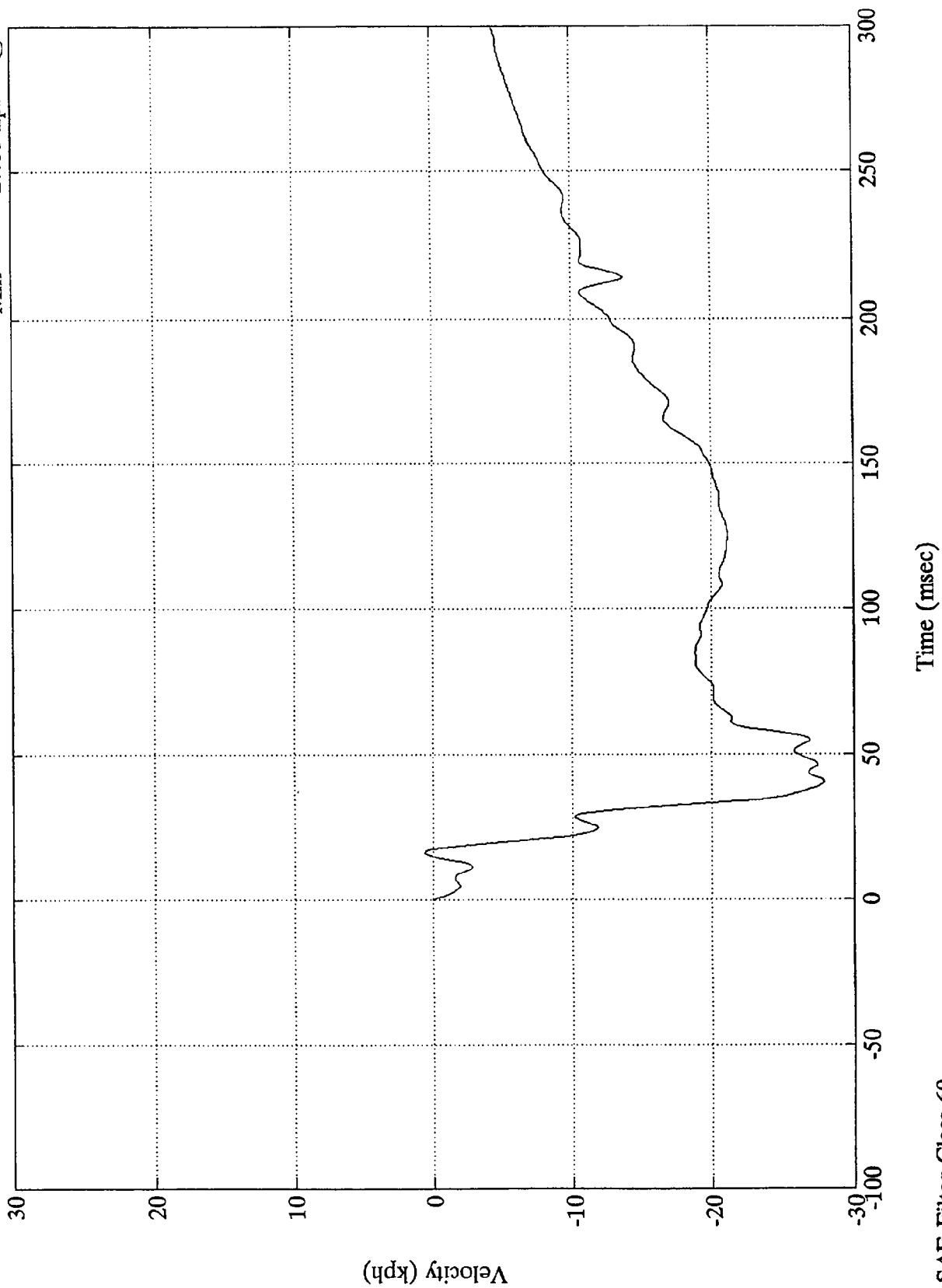
Max = 42.99 Gs @ 57.84 msec
Min = -97.73 Gs @ 32.40 msec



8118-8

VTV TEST #8

V1 L.F Frame Rail (Y) Max = .63 kph @ 16.44 msec
Min = -27.88 kph @ 40.20 msec



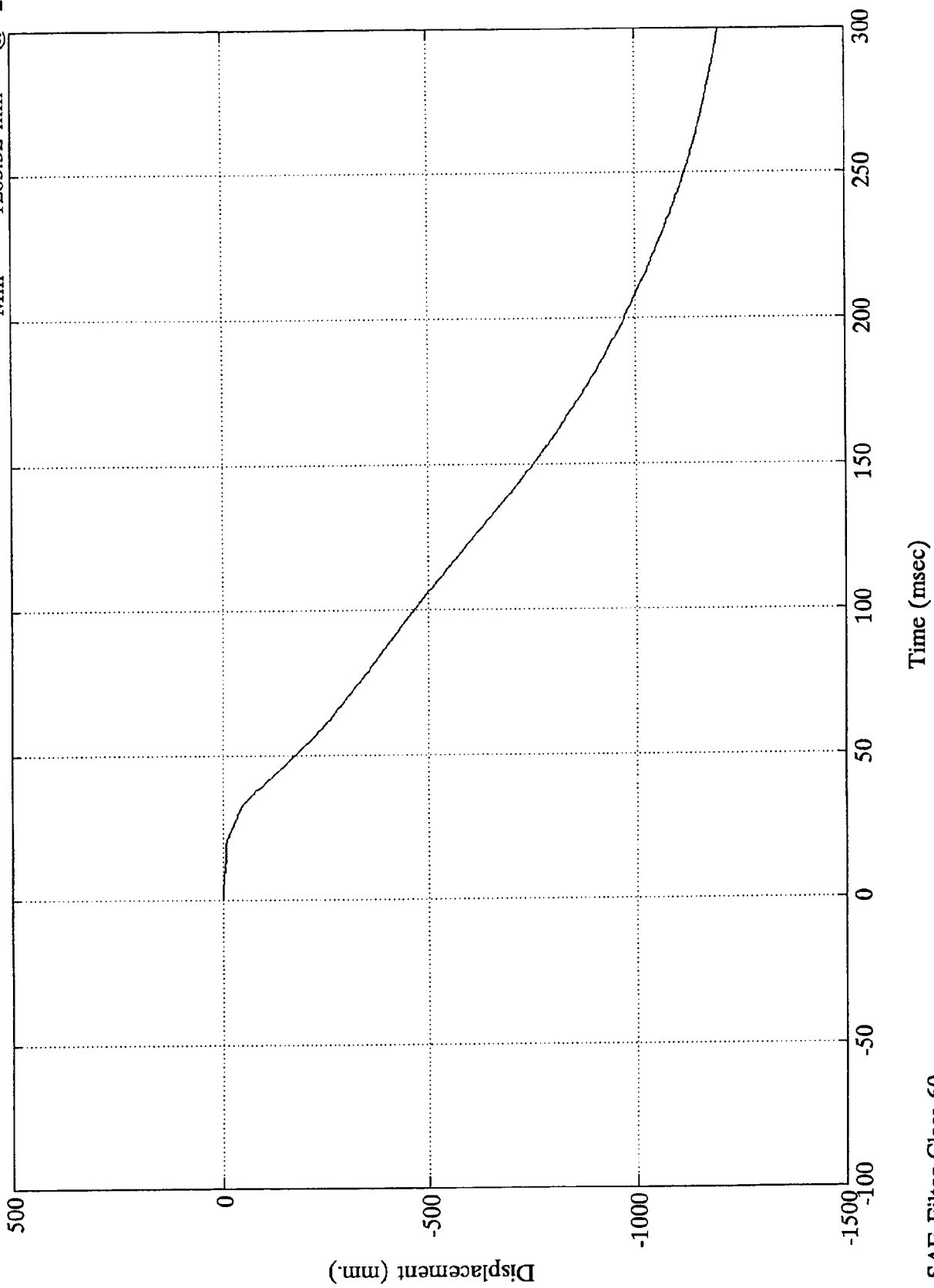
SAE Filter Class 60

8-1118

VTV TEST #8

V1 LF Frame Rail (Y)

Max = .00 mm @ -0.00 msec
Min = -1203.32 mm @ 299.87 msec

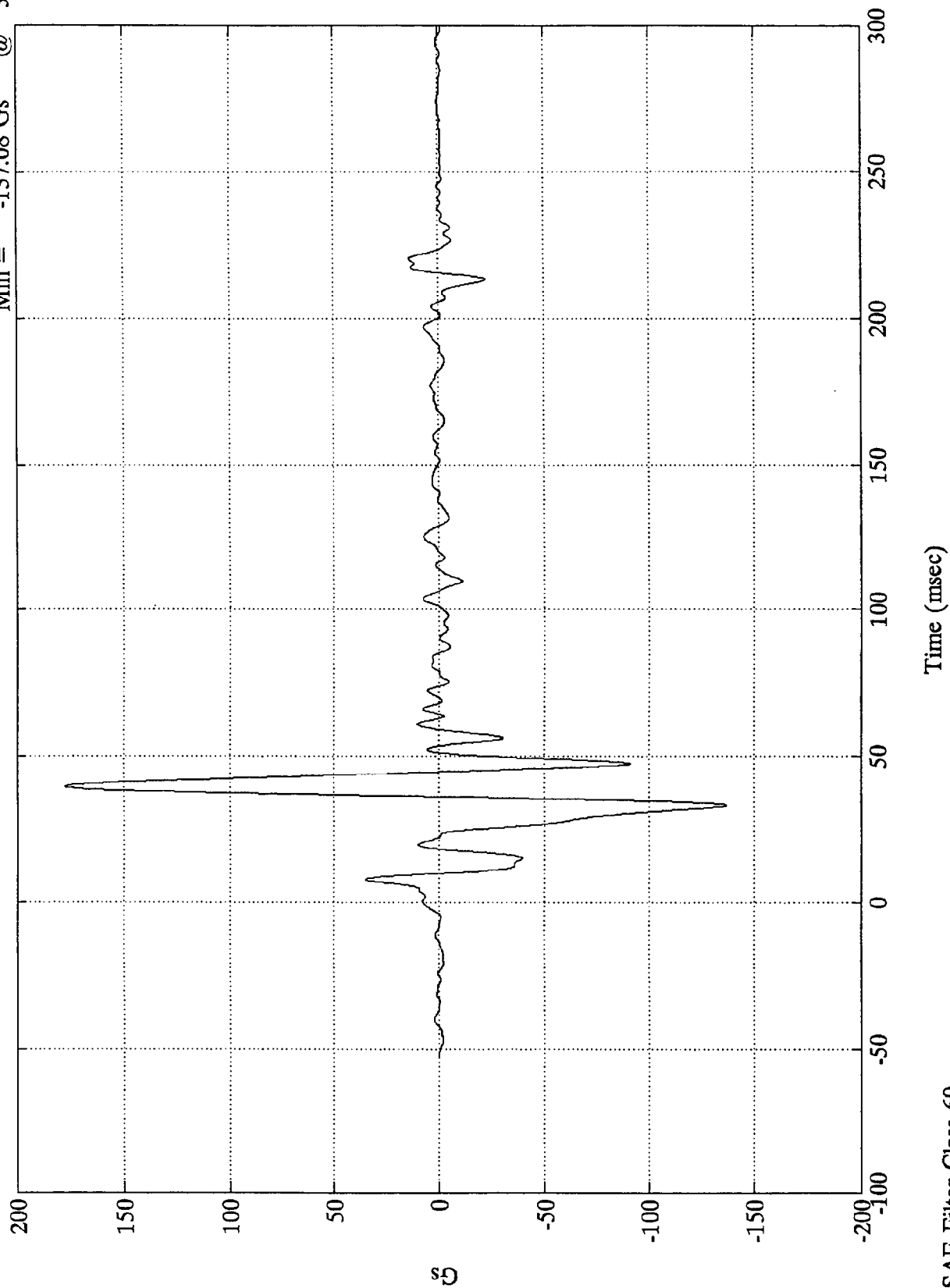


SAE Filter Class 60

VTV TEST #8

V1 L.F Frame Rail (Z)

Max =	177.23 Gs	@	39.59 msec
Min =	-137.08 Gs	@	33.24 msec



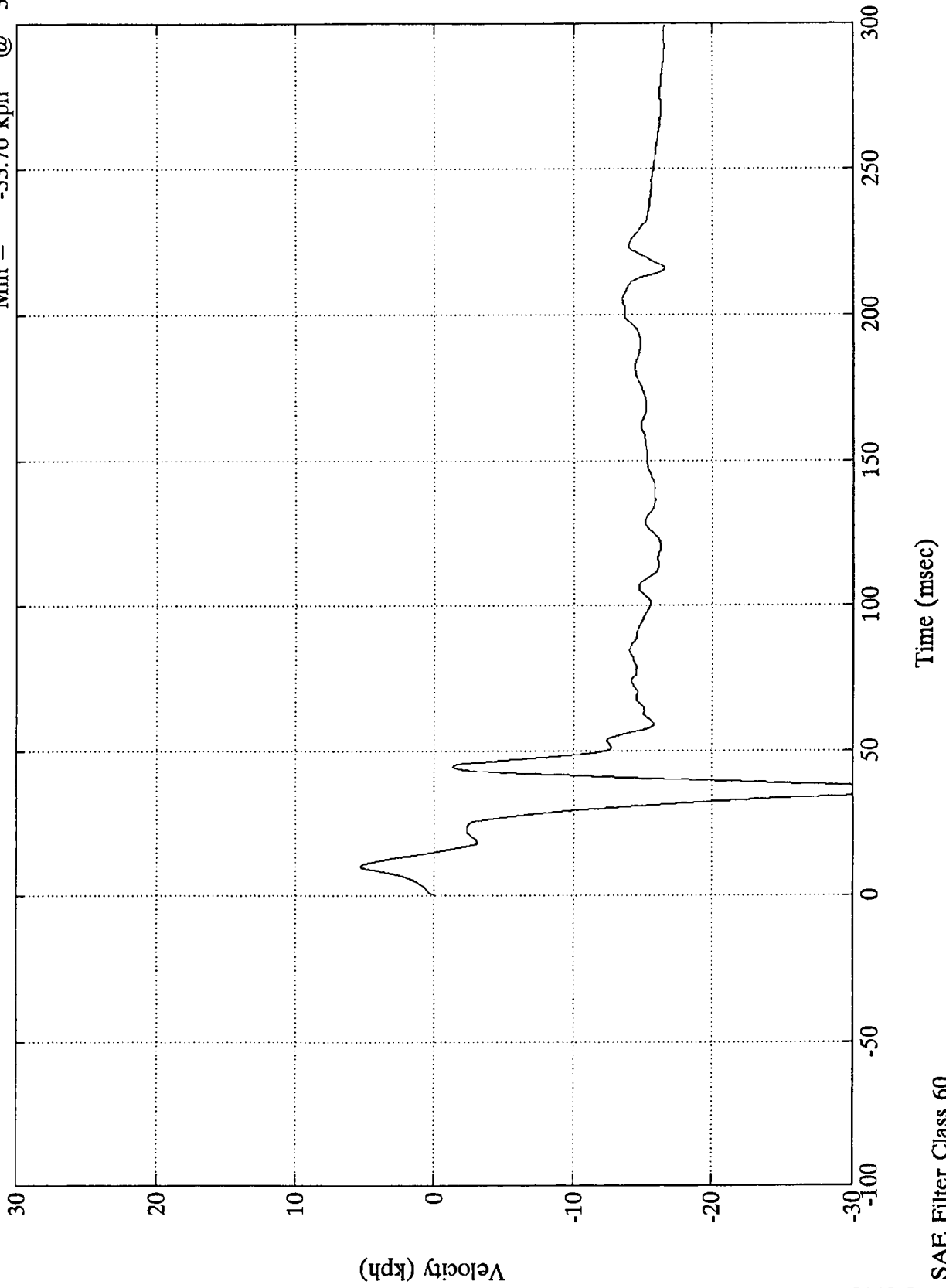
8118-8

SAE Filter Class 60

VTV TEST #8

V1 LF Frame Rail (Z)

Max = 5.34 kph @ 10.20 msec
Min = -33.76 kph @ 36.12 msec



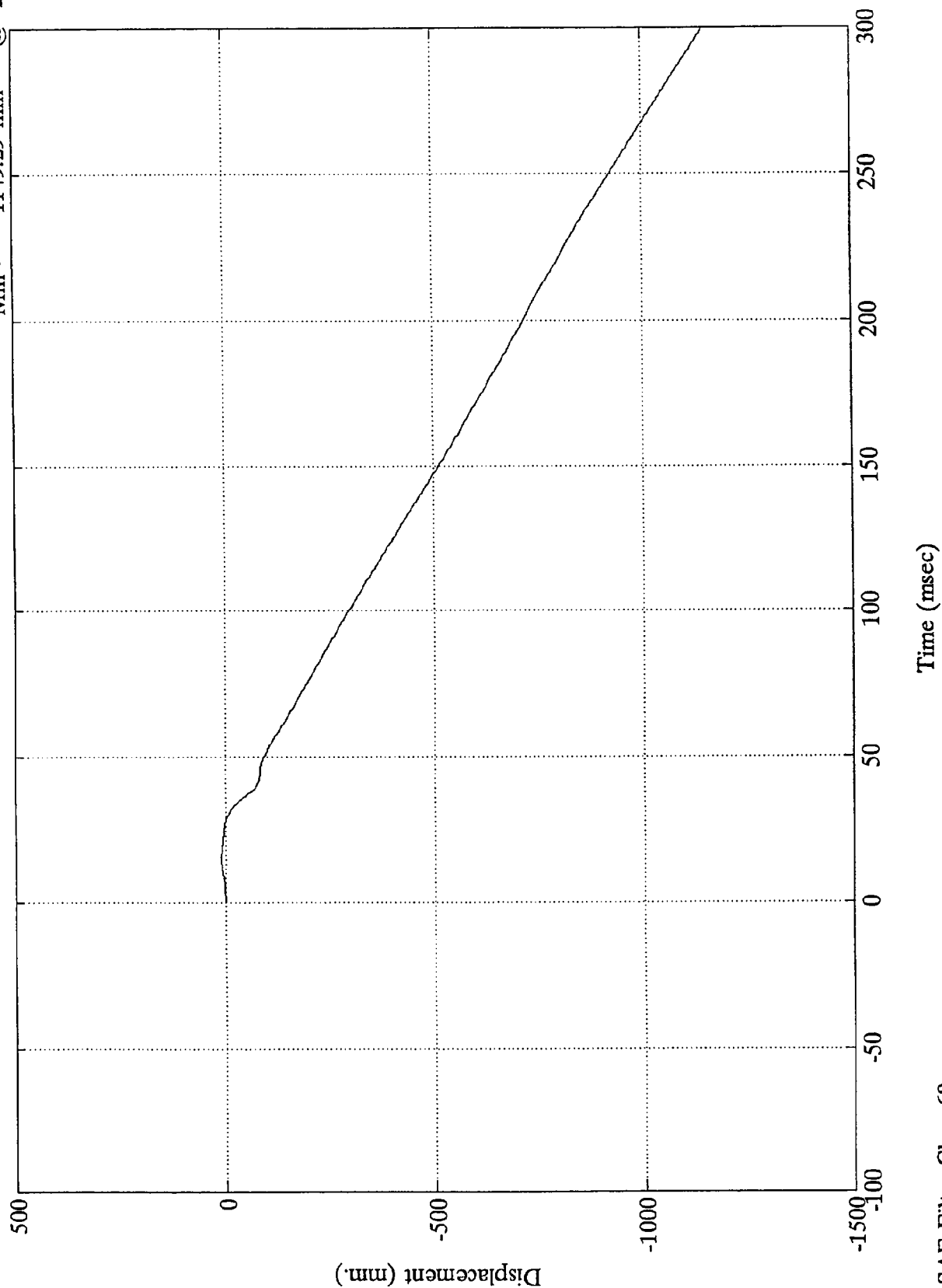
8118-8

SAE Filter Class 60

VTV TEST #8

V1 L.F. Frame Rail (Z)

Max =	9.99 mm	@	15.24 msec
Min =	-1149.29 mm	@	299.87 msec

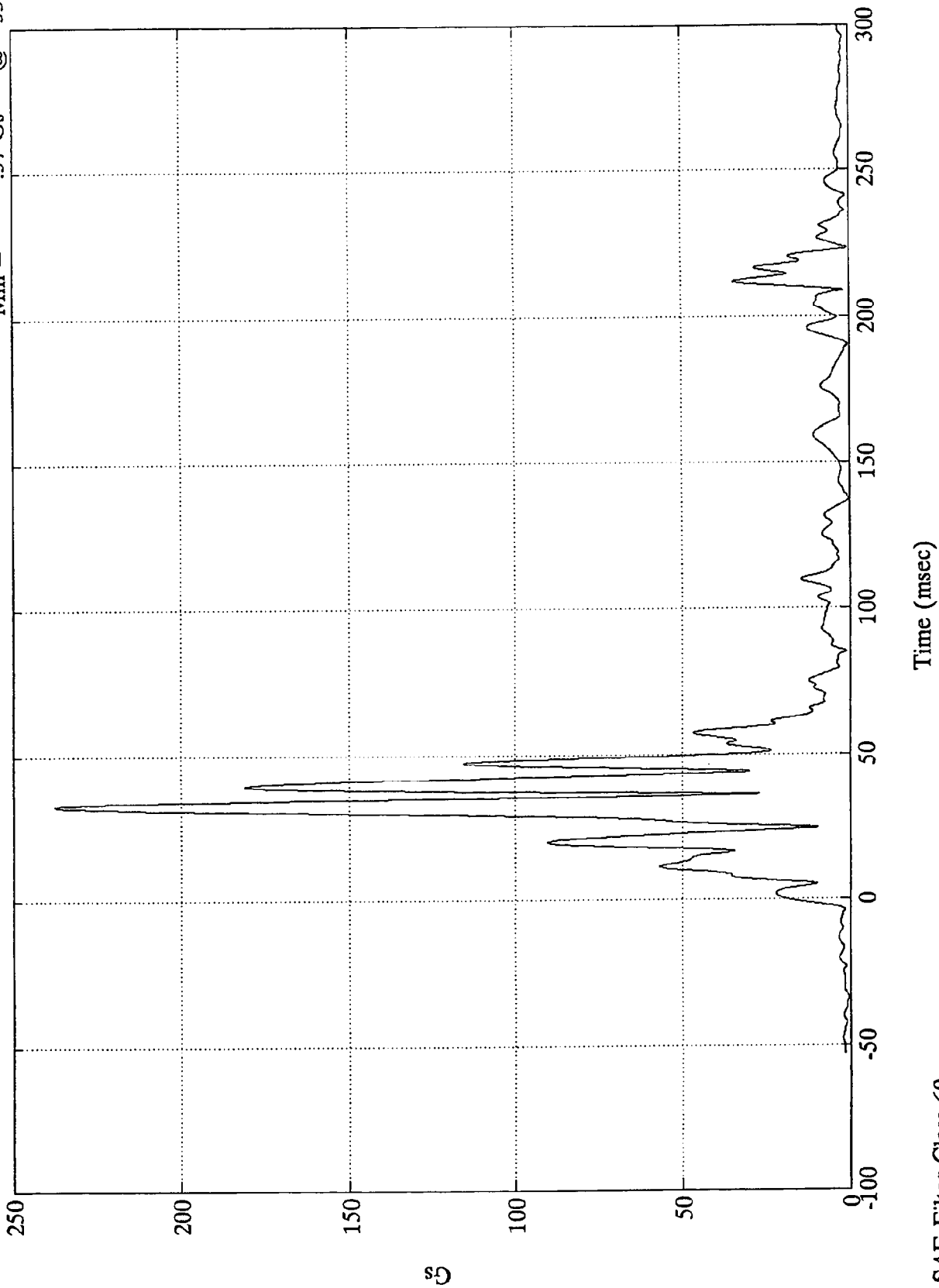


SAE Filter Class 60

VTV TEST #8

V1 LF Frame Rail Res.

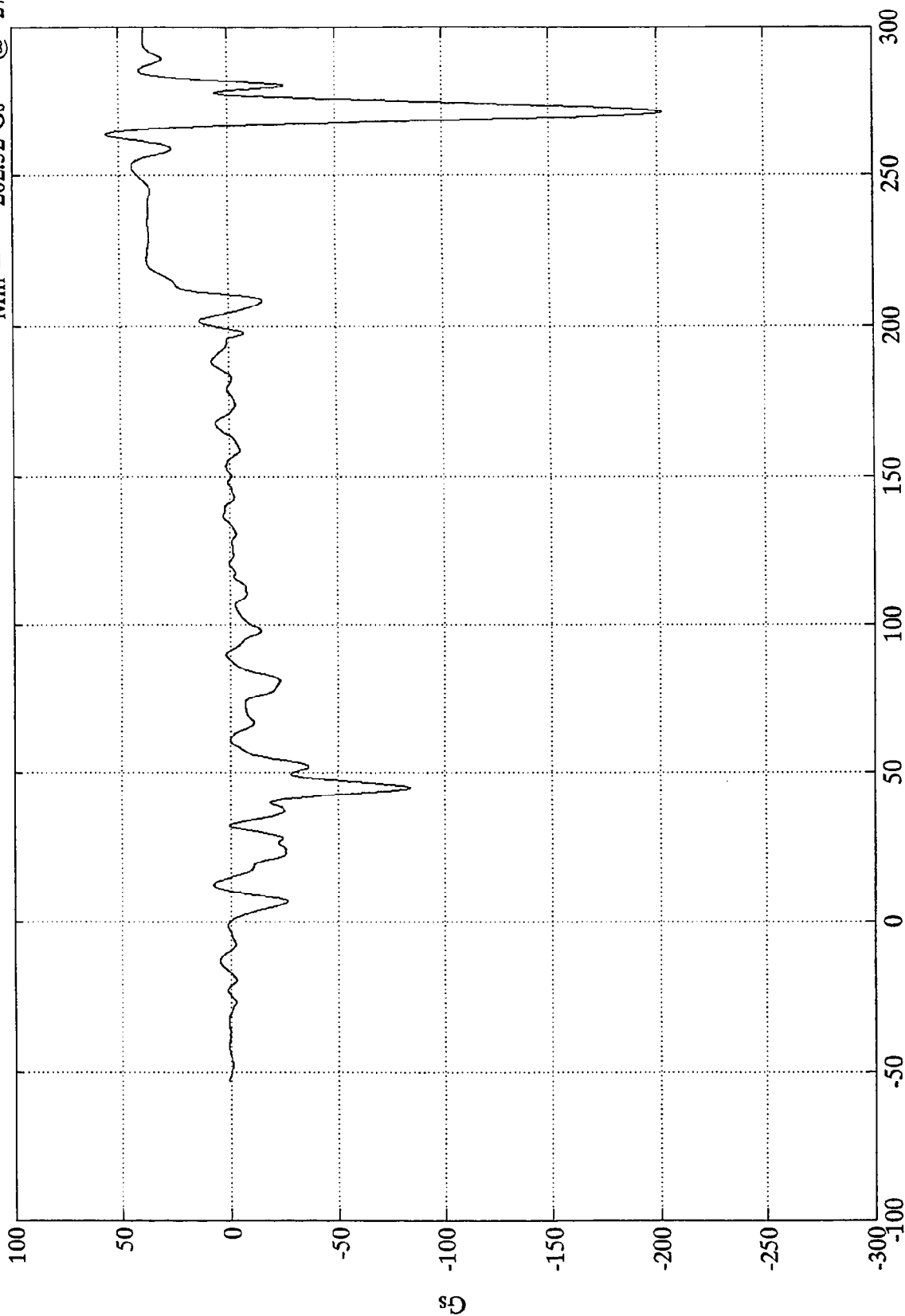
Max = 237.71 Gs @ 32.63 msec
Min = .57 Gs @ -33.96 msec



VTV TEST #8

Max = 56.02 Gs @ 263.51 msec
 Min = -202.52 Gs @ 271.08 msec

V1 R.F Frame Rail (X)



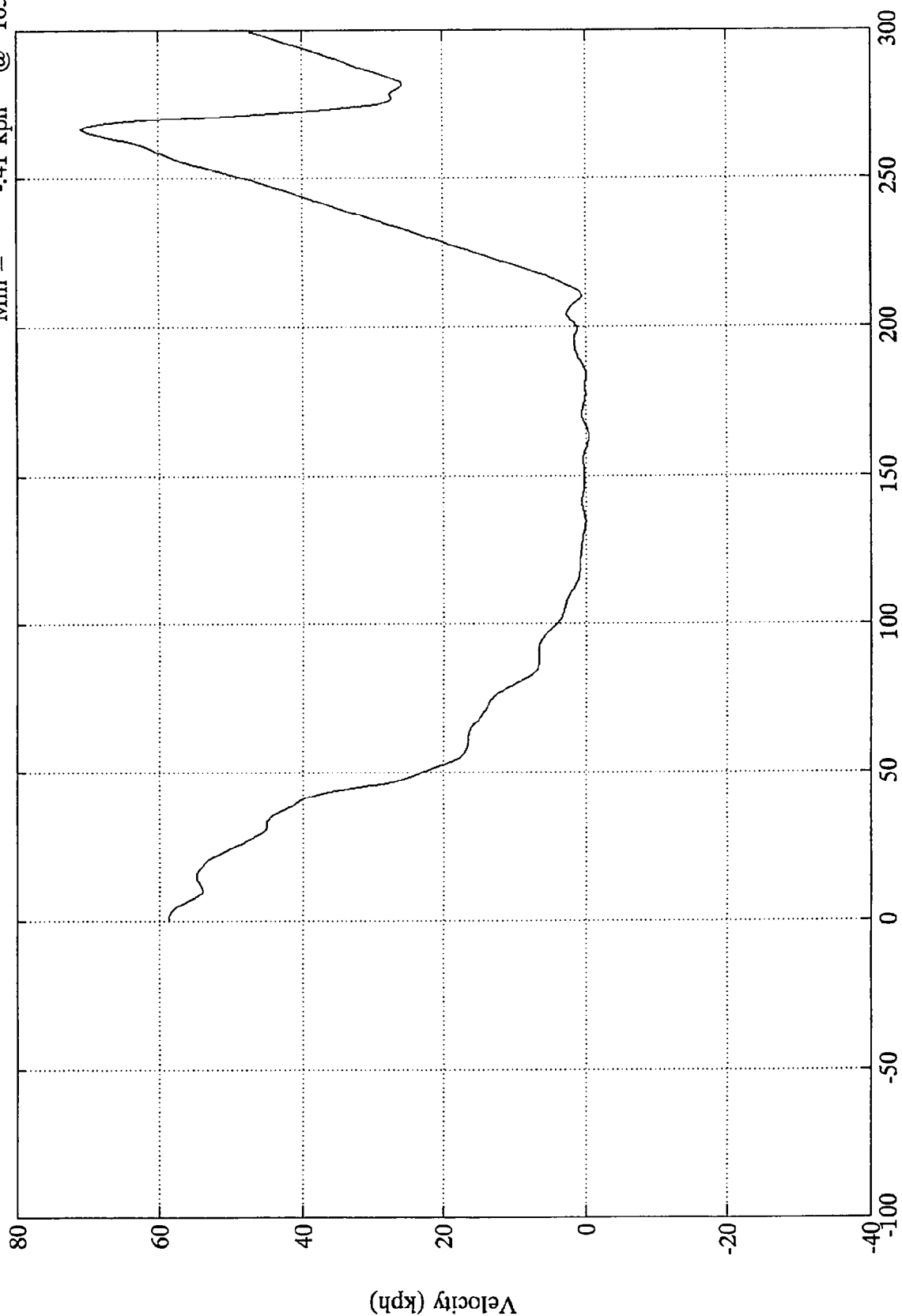
Time (msec) Data questionable after 210 msec.

SAE Filter Class 60

8118-8

VTV TEST #8

V1 R.F Frame Rail (X) Max = 70.86 kph @ 266.52 msec
Min = -41 kph @ 163.44 msec



Time (msec) Data questionable after 210 msec.

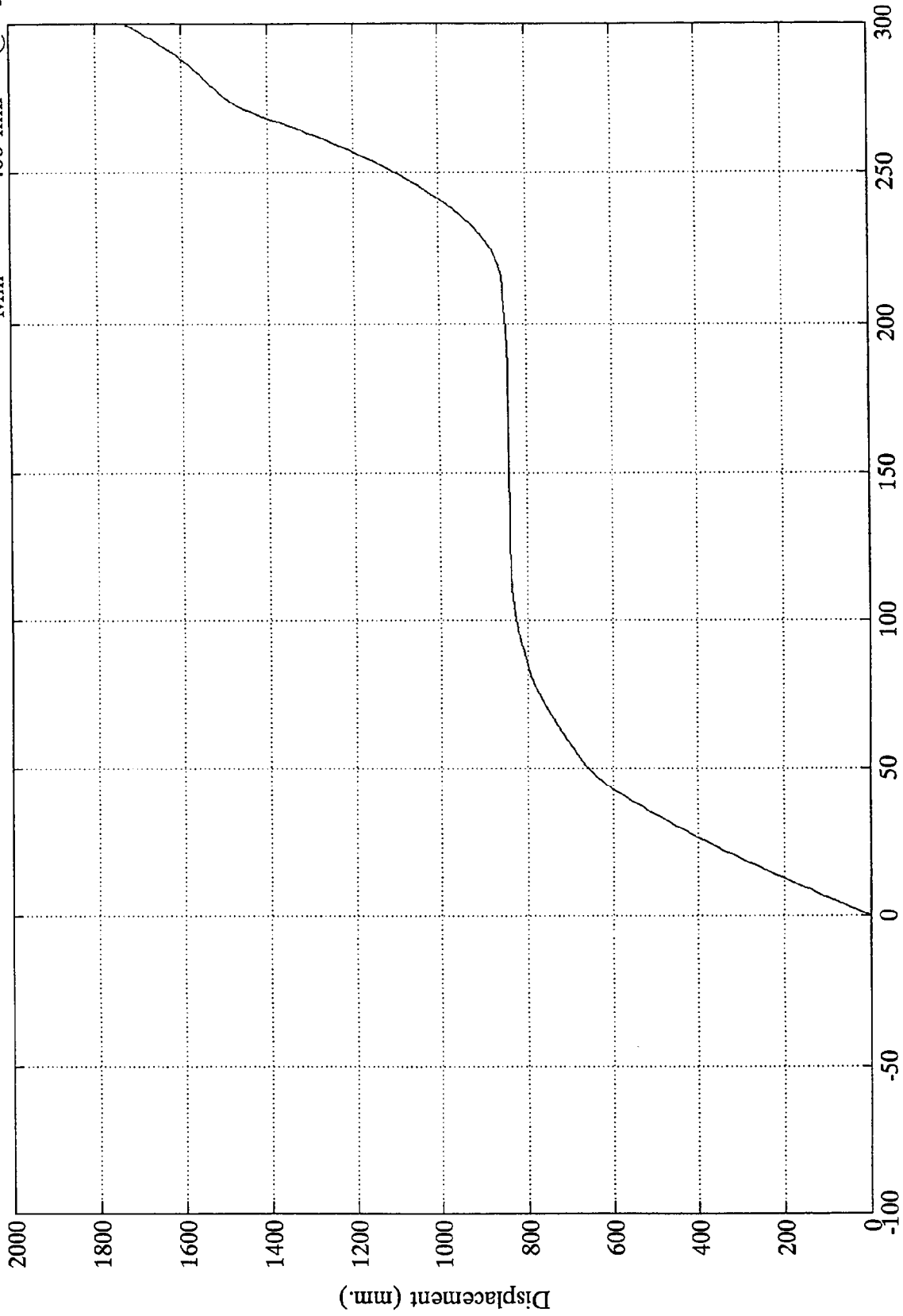
SAE Filter Class 60

8118-8

VTV TEST #8

V1 R.F Frame Rail (X)

Max = 1733.57 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec



Time (msec) Data questionable after 210 msec.

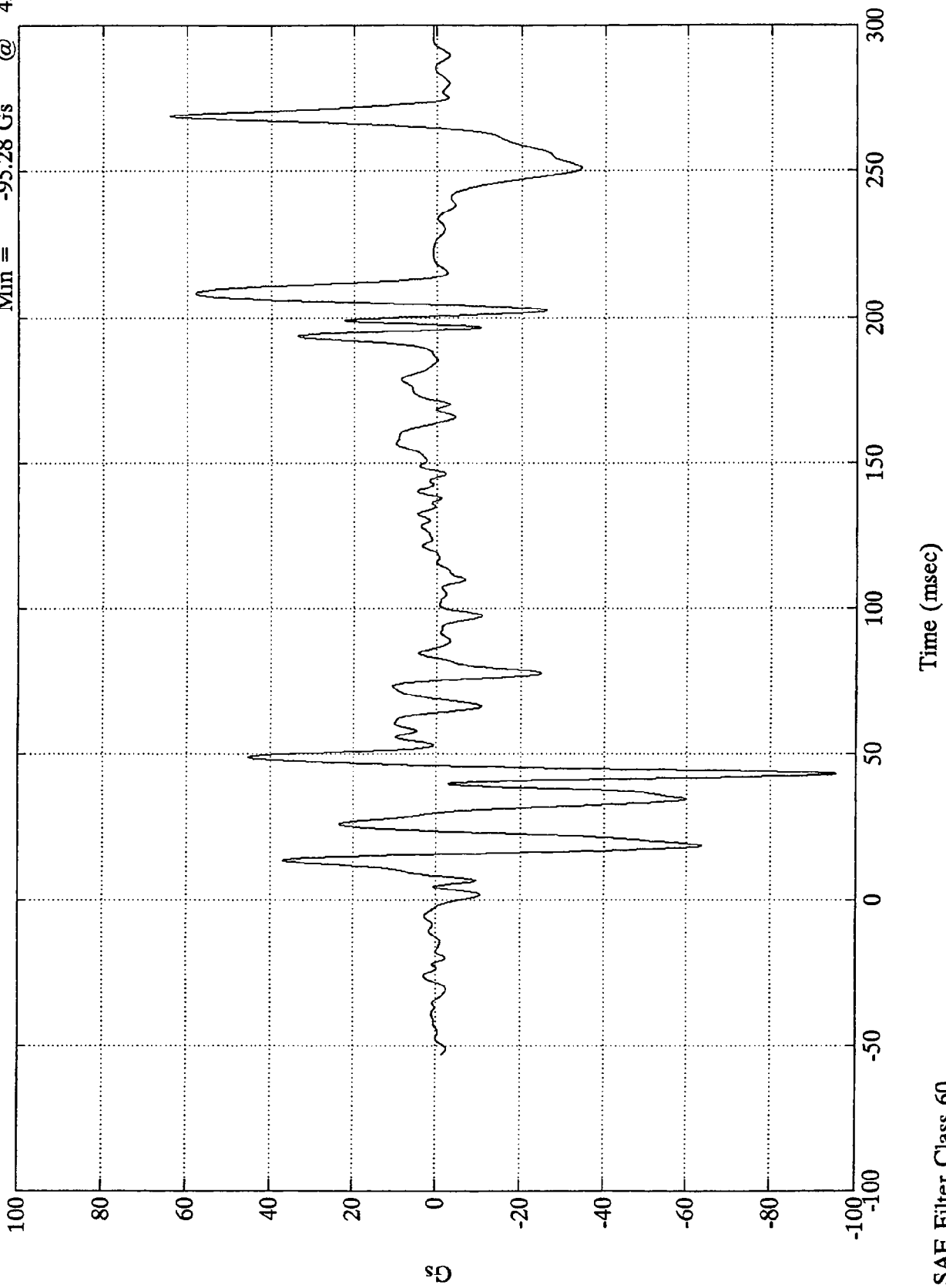
SAE Filter Class 60

8118-8

VTV TEST #8

V1 R.F Frame Rail (Y)

Max = 64.12 Gs @ 268.67 msec
Min = -95.28 Gs @ 43.20 msec

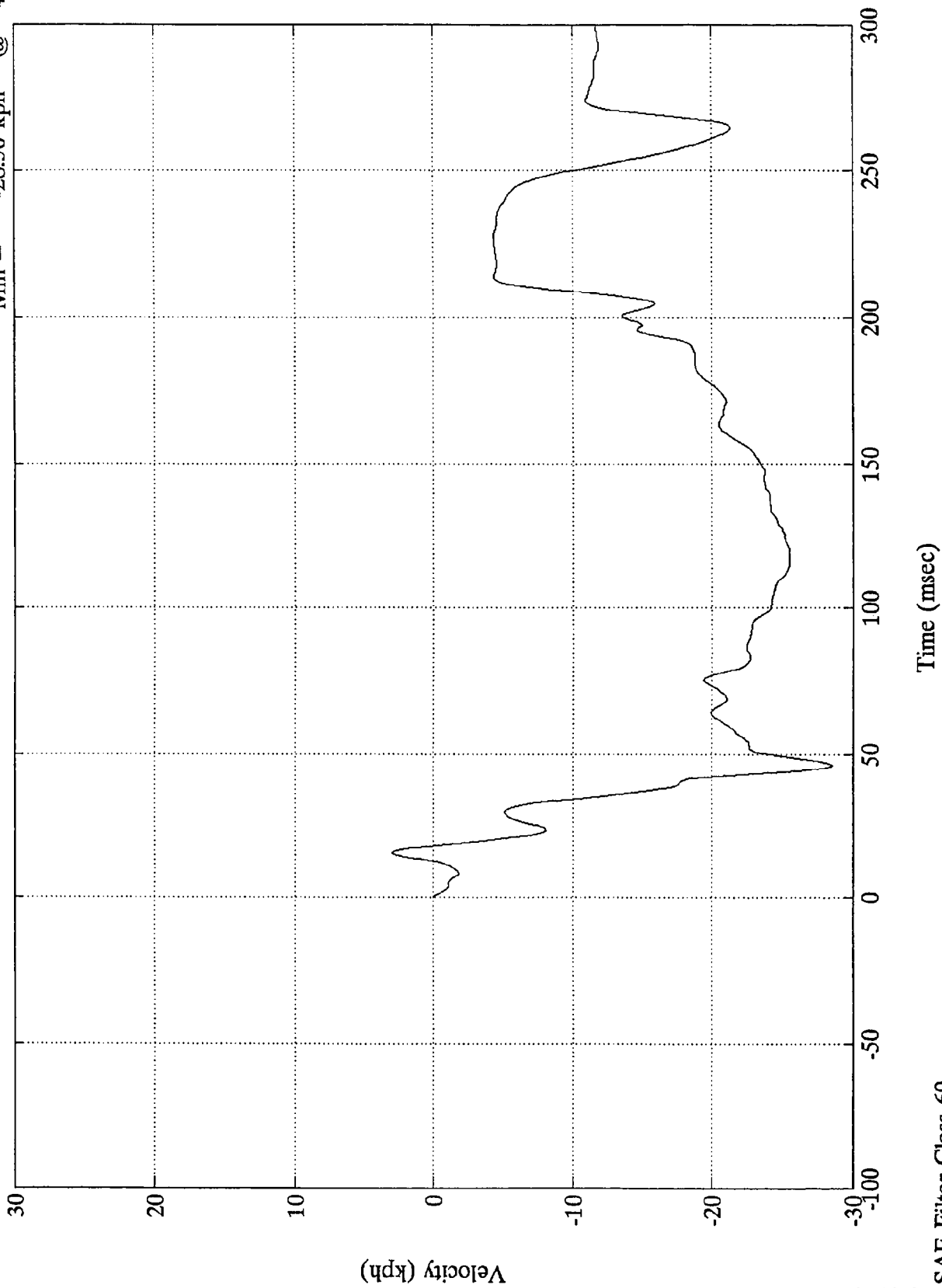


8118-8

SAE Filter Class 60

VTV TEST #8

V1 R.F Frame Rail (Y) Max = 3.02 kph @ 15.83 msec
Min = -28.50 kph @ 45.96 msec



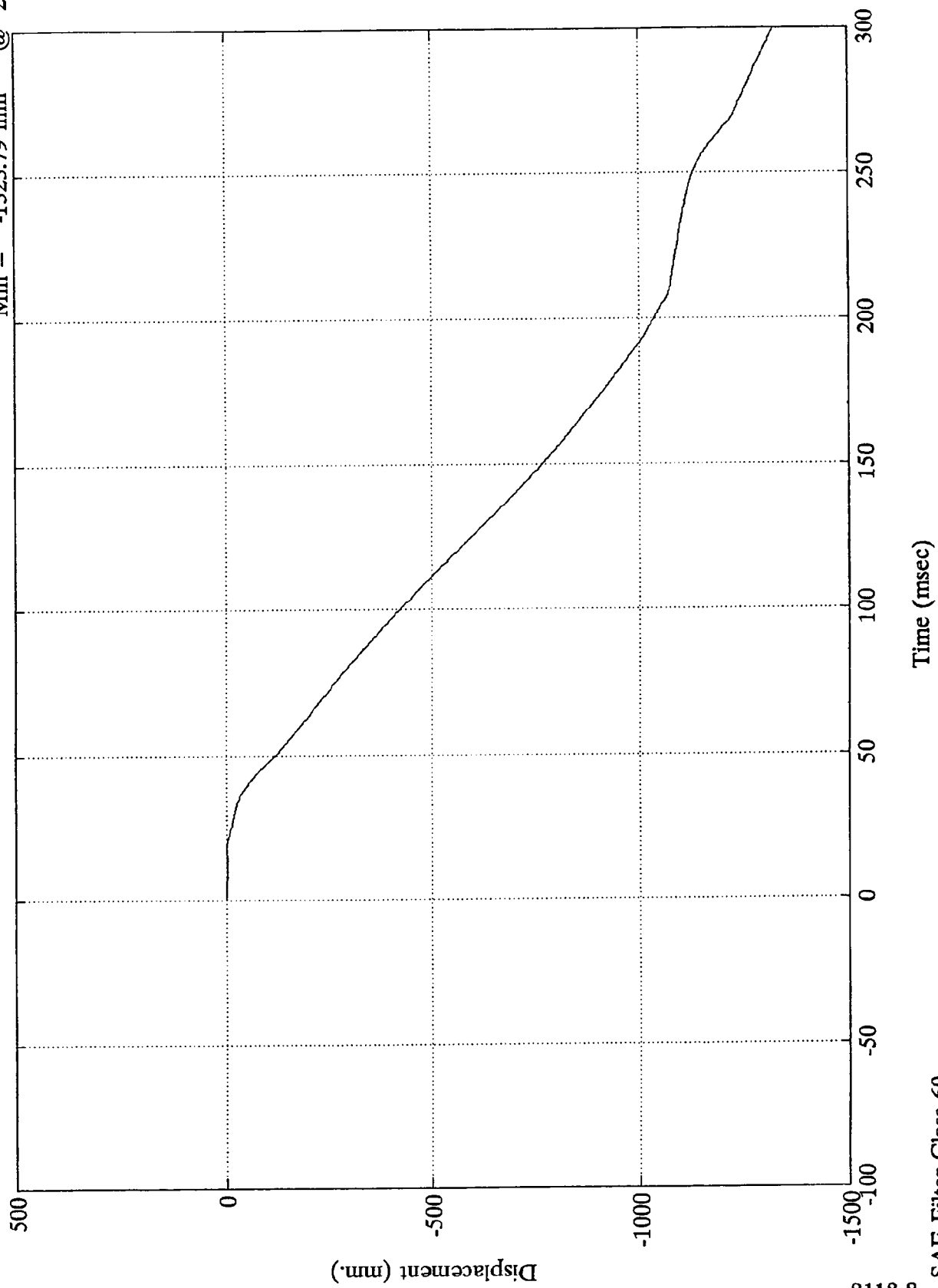
SAE Filter Class 60

8118-8

VTV TEST #8

V1 R.F Frame Rail (Y)

Max = .00 mm @ -0.00 msec
Min = -1323.79 mm @ 299.87 msec



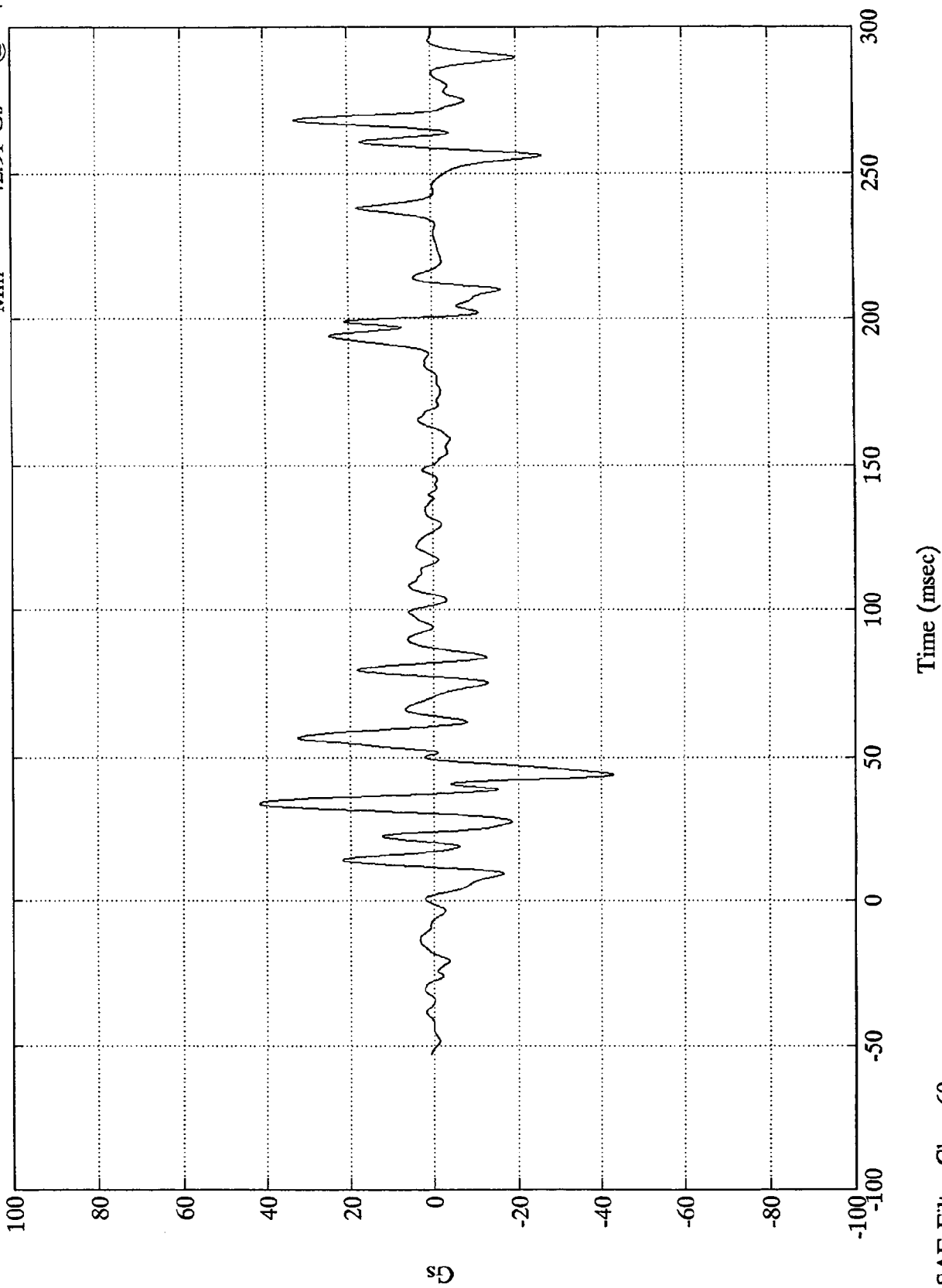
8-8118

SAE Filter Class 60

VTV TEST #8

V1 R.F. Frame Rail (Z)

Max = 41.84 Gs @ 33.95 msec
Min = -42.91 Gs @ 44.15 msec



8118-8

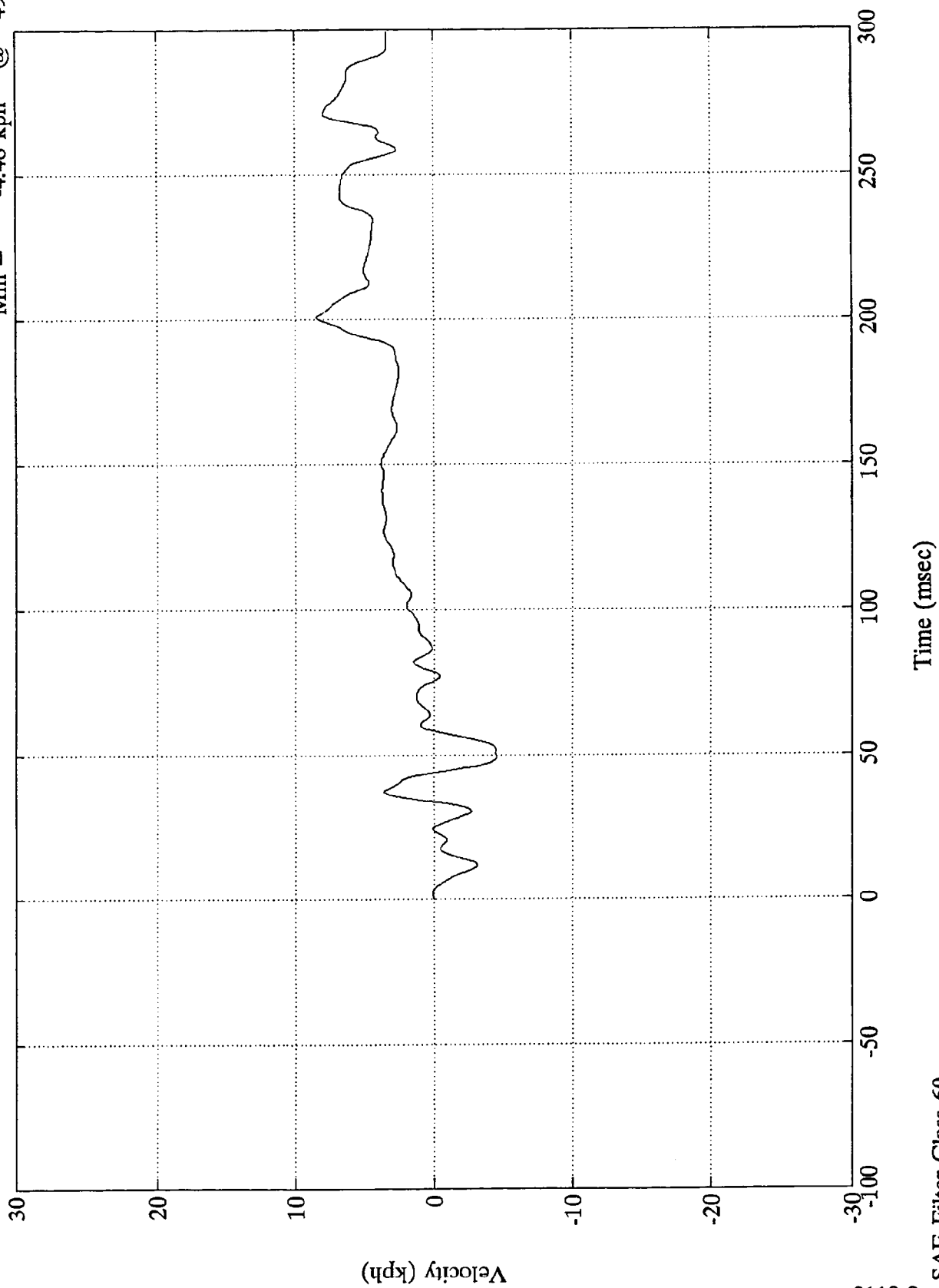
B-50

SAE Filter Class 60

VTV TEST #8

V1 R.F Frame Rail (Z)

Max = 8.49 kph @ 200.52 msec
Min = -4.48 kph @ 49.32 msec



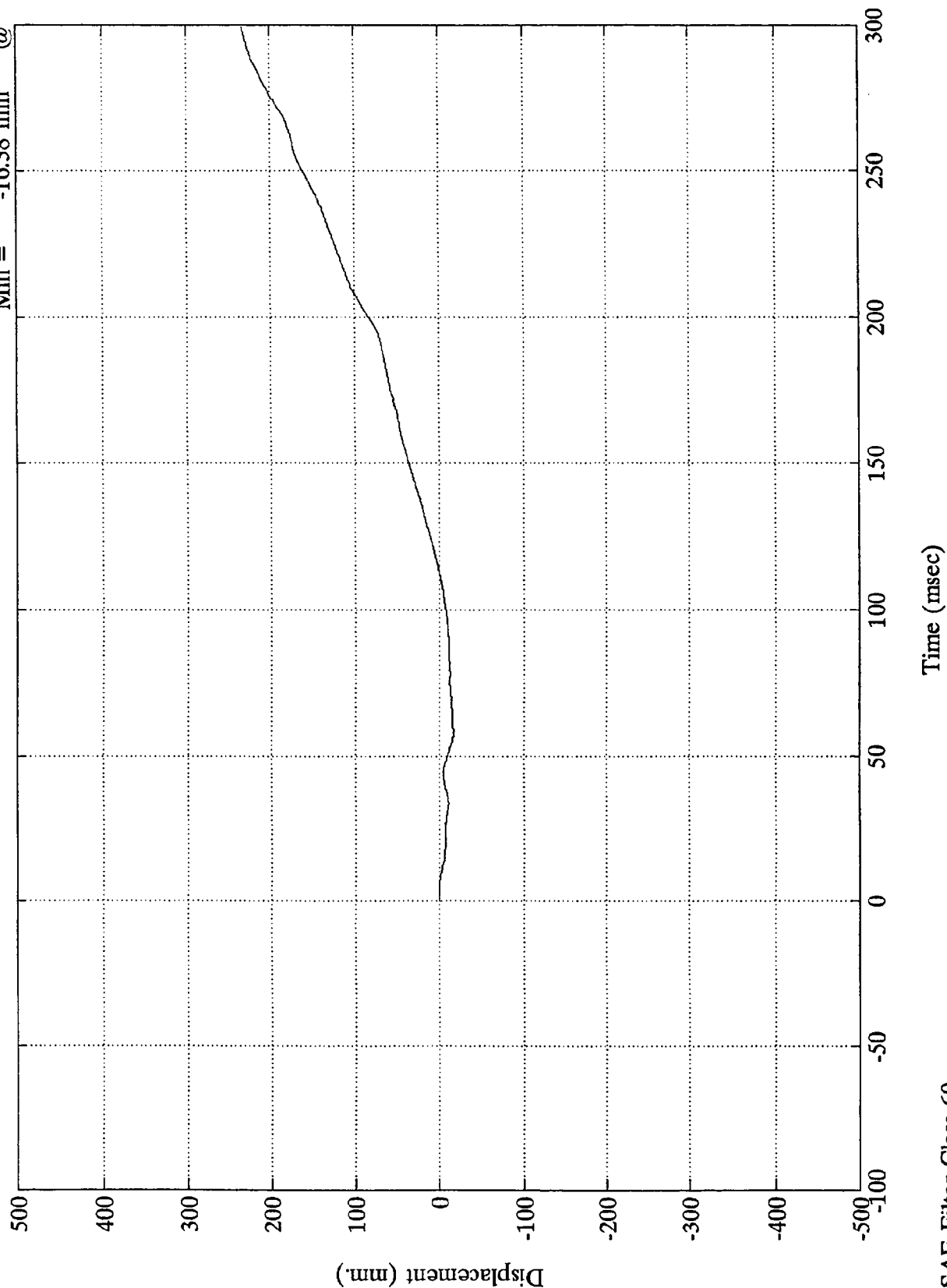
8118-8

SAE Filter Class 60

VTV TEST #8

V1 R.F Frame Rail (Z)

Max = 233.93 mm @ 299.87 msec
Min = -16.38 mm @ 58.08 msec

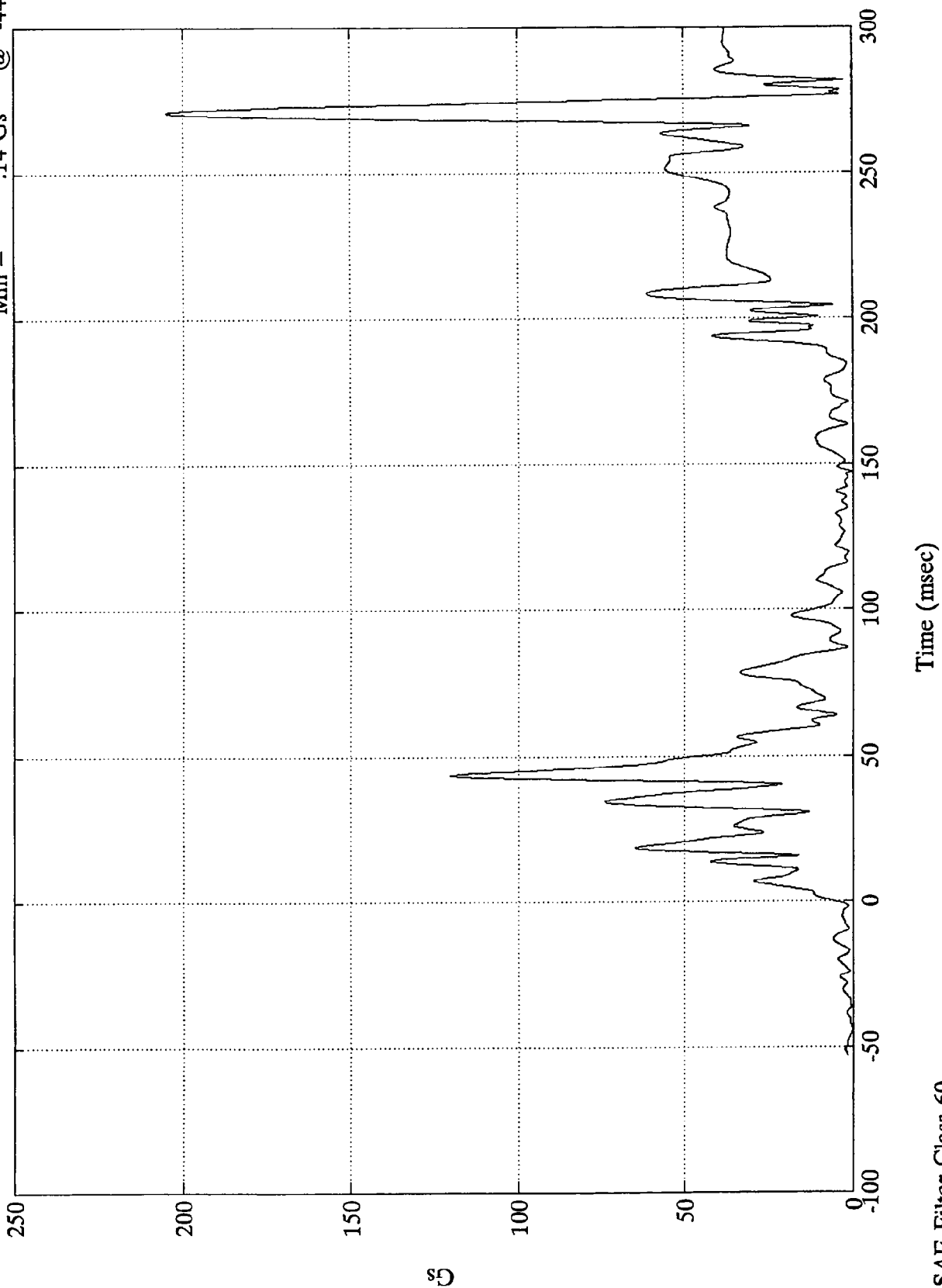


SAE Filter Class 60

VTV TEST #8

V1 R.F Frame Rail Res.

Max = 204.95 Gs @ 270.95 msec
Min = .14 Gs @ -44.15 msec



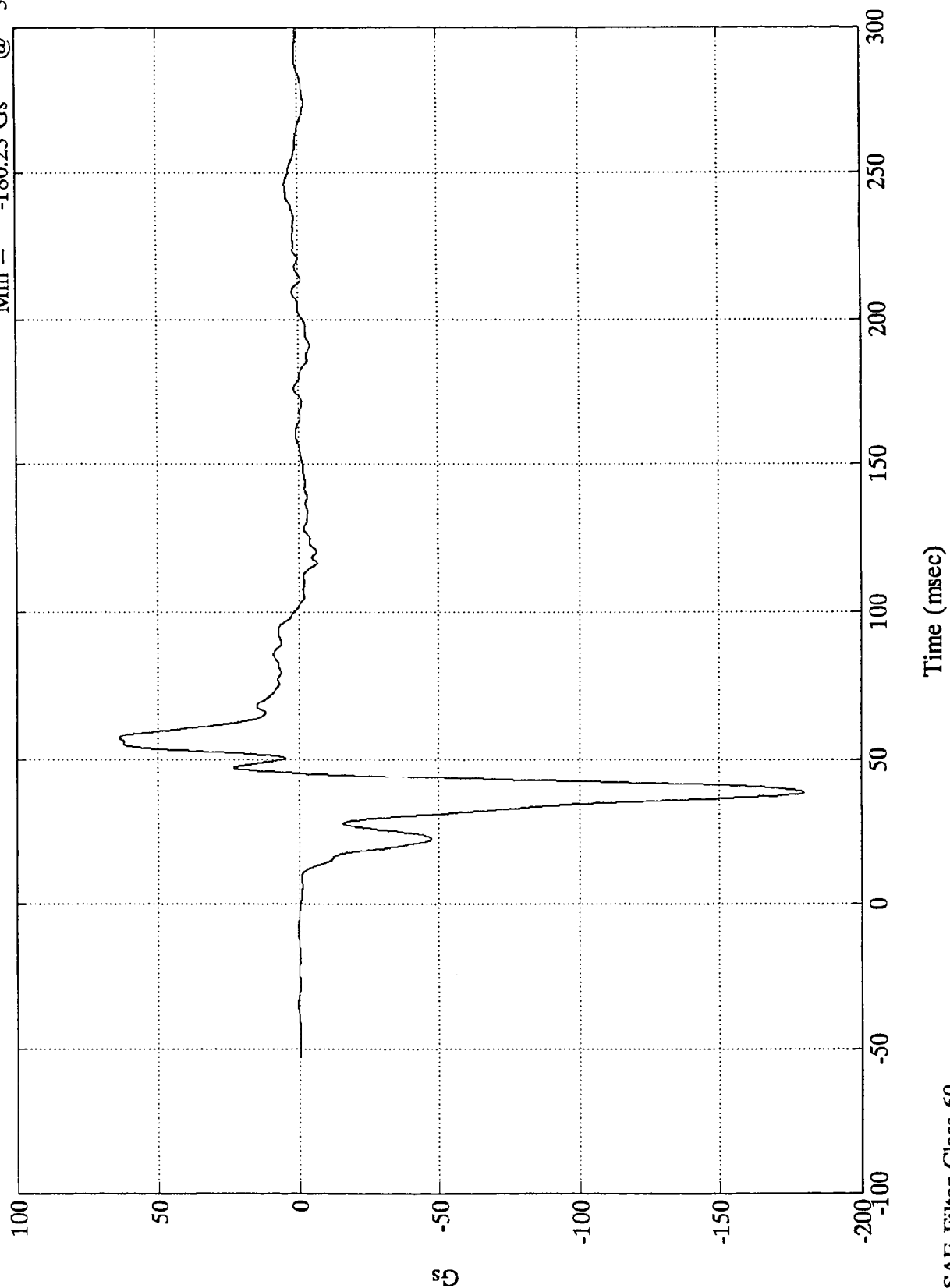
SAE Filter Class 60

8118-8

VTV TEST #8

V1 Left Engine (X)

Max = 63.45 Gs @ 57.36 msec
Min = -180.23 Gs @ 38.63 msec



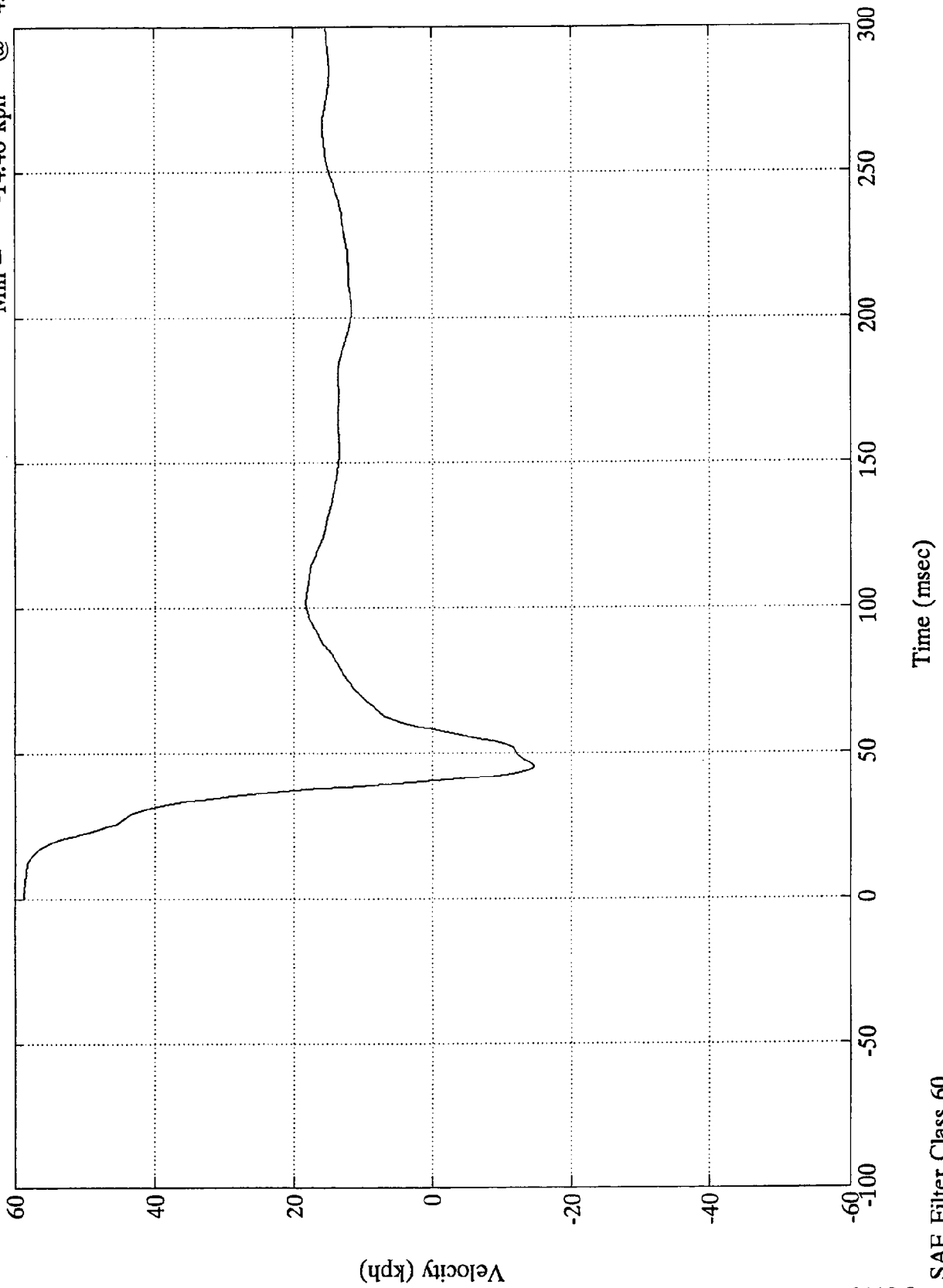
SAE Filter Class 60

8118-8

VTV TEST #8

V1 Left Engine (X)

Max = 58.74 kph @ -0.00 msec
Min = -14.48 kph @ 45.36 msec



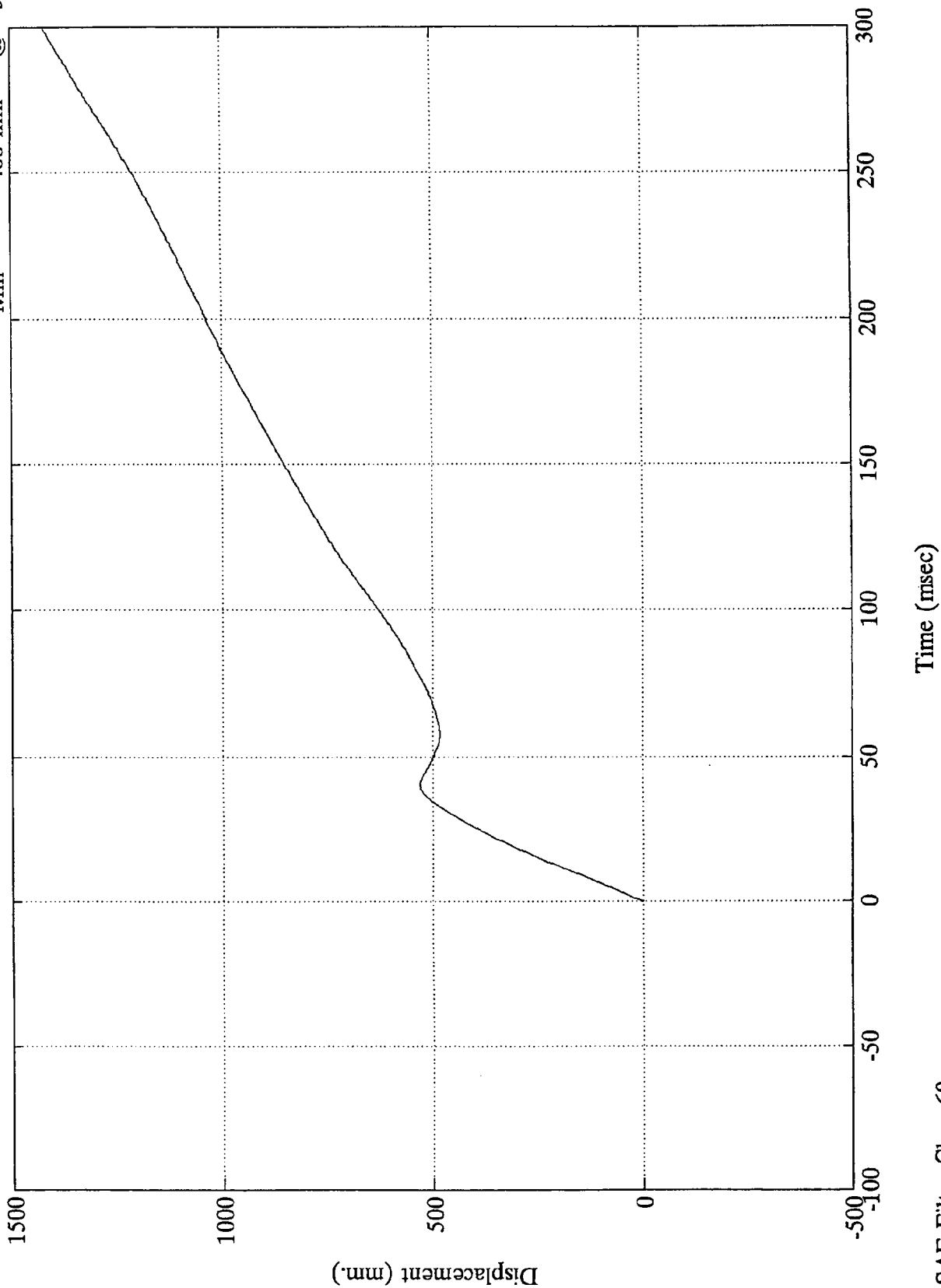
8118-8

SAE Filter Class 60

VTV TEST #8

V1 Left Engine (X)

Max = 1423.66 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec

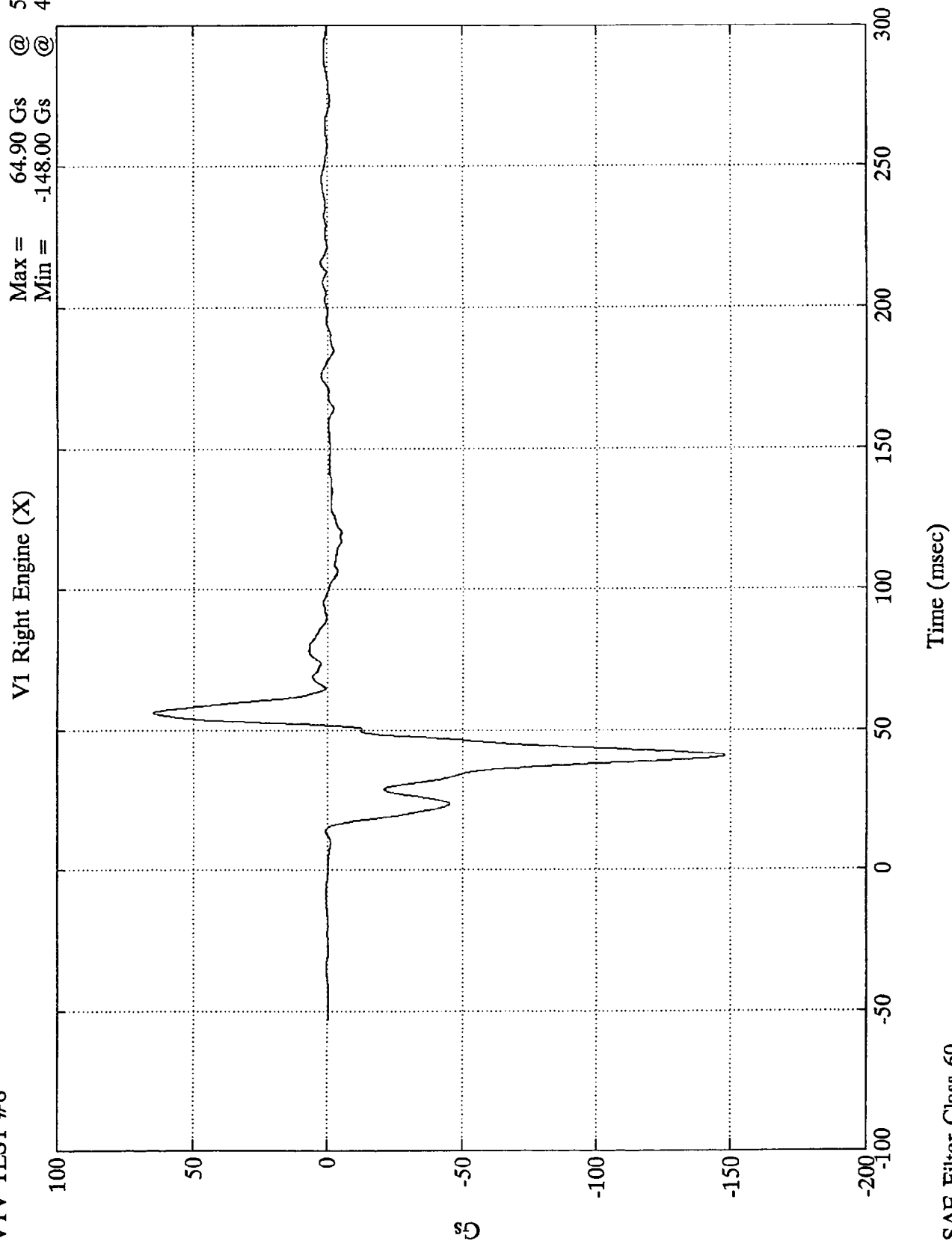


SAE Filter Class 60

8-8118

VTV TEST #8

Max = 64.90 Gs @ 56.28 msec
Min = -148.00 Gs @ 40.56 msec

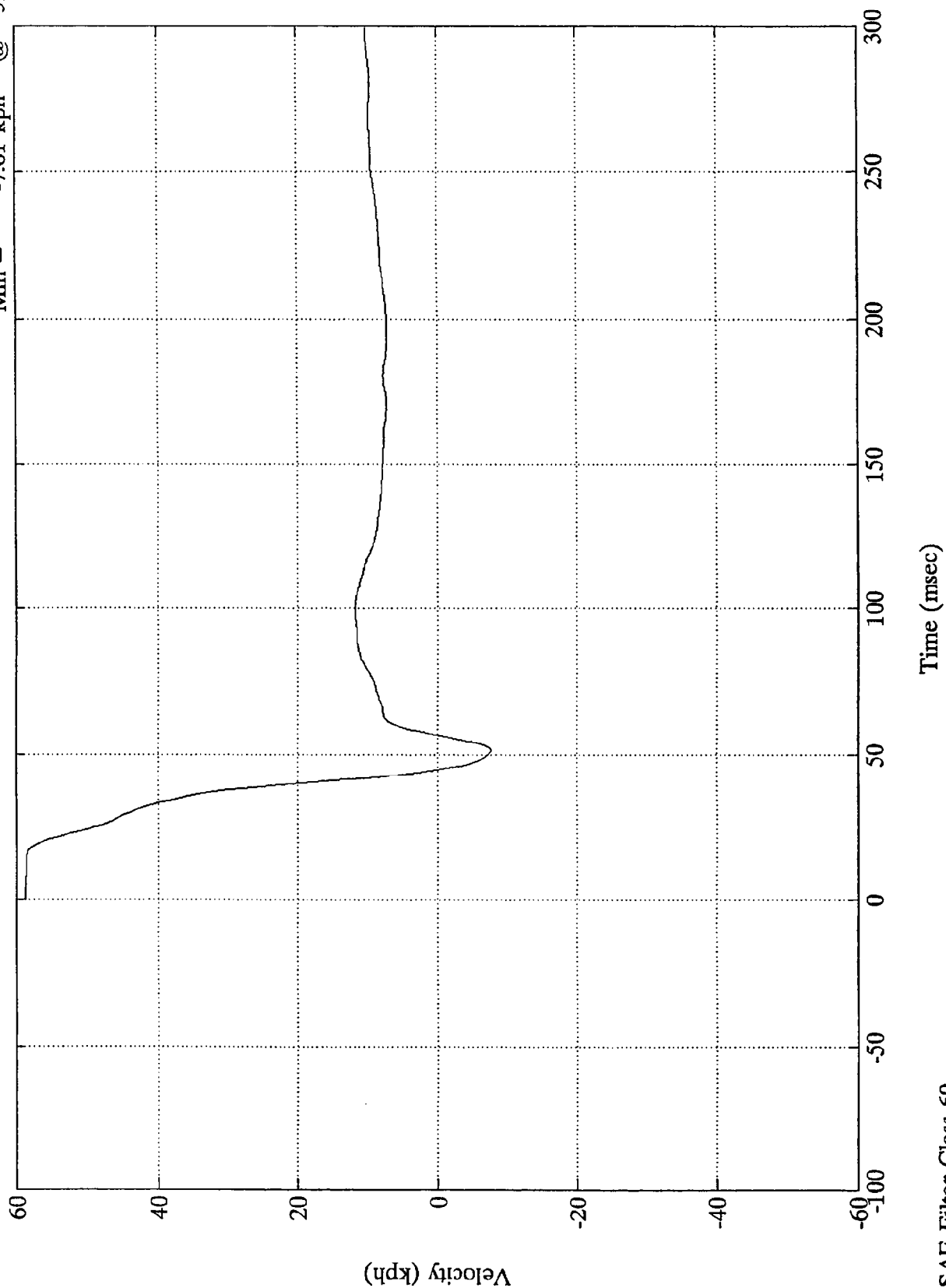


8118-8

VTV TEST #8

Max = 58.74 kph @ -0.00 msec
Min = -7.61 kph @ 51.72 msec

V1 Right Engine (X)

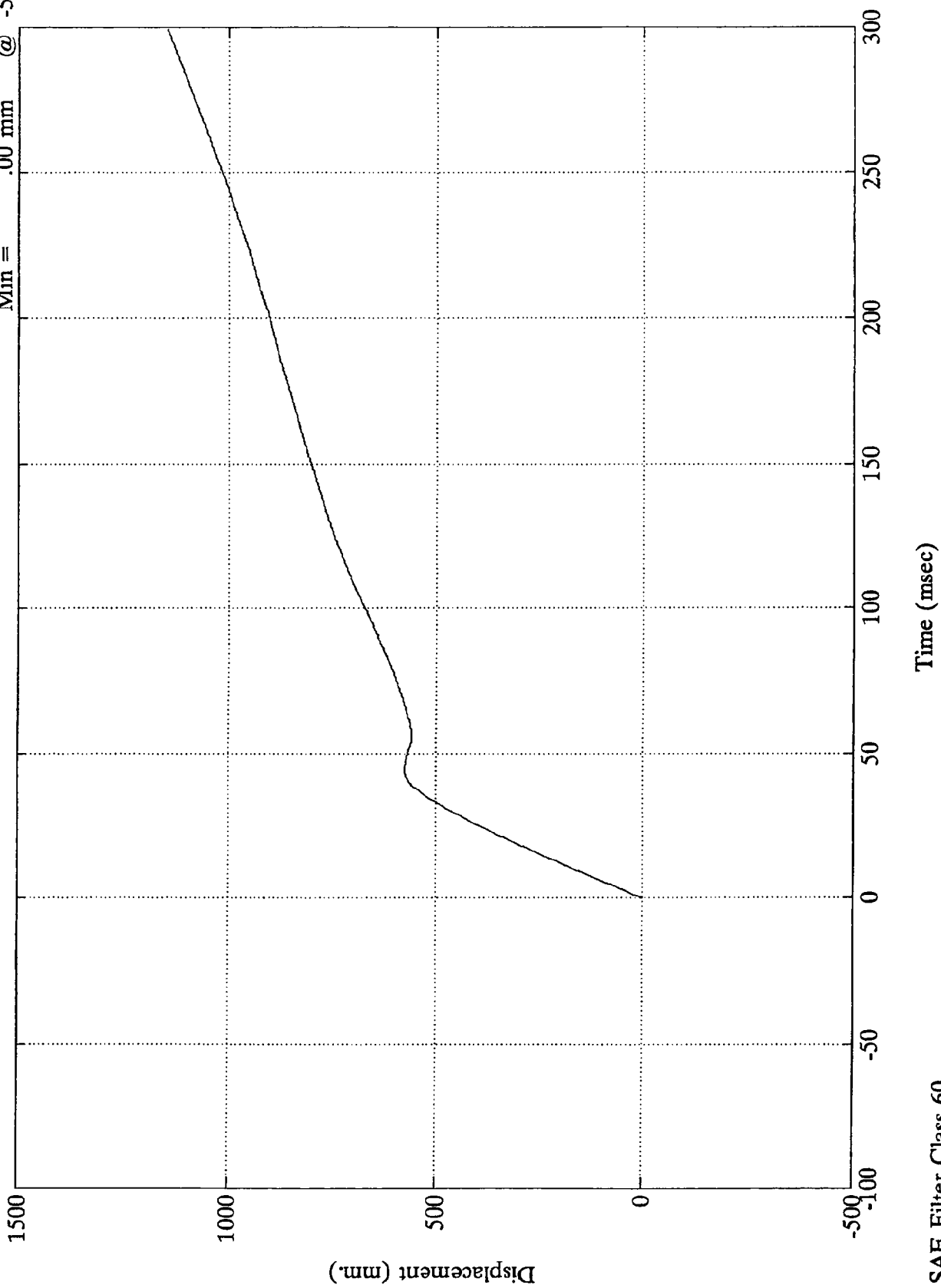


SAE Filter Class 60

8118-8

VTV TEST #8

V1 Right Engine (X)
Max = 1148.69 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec

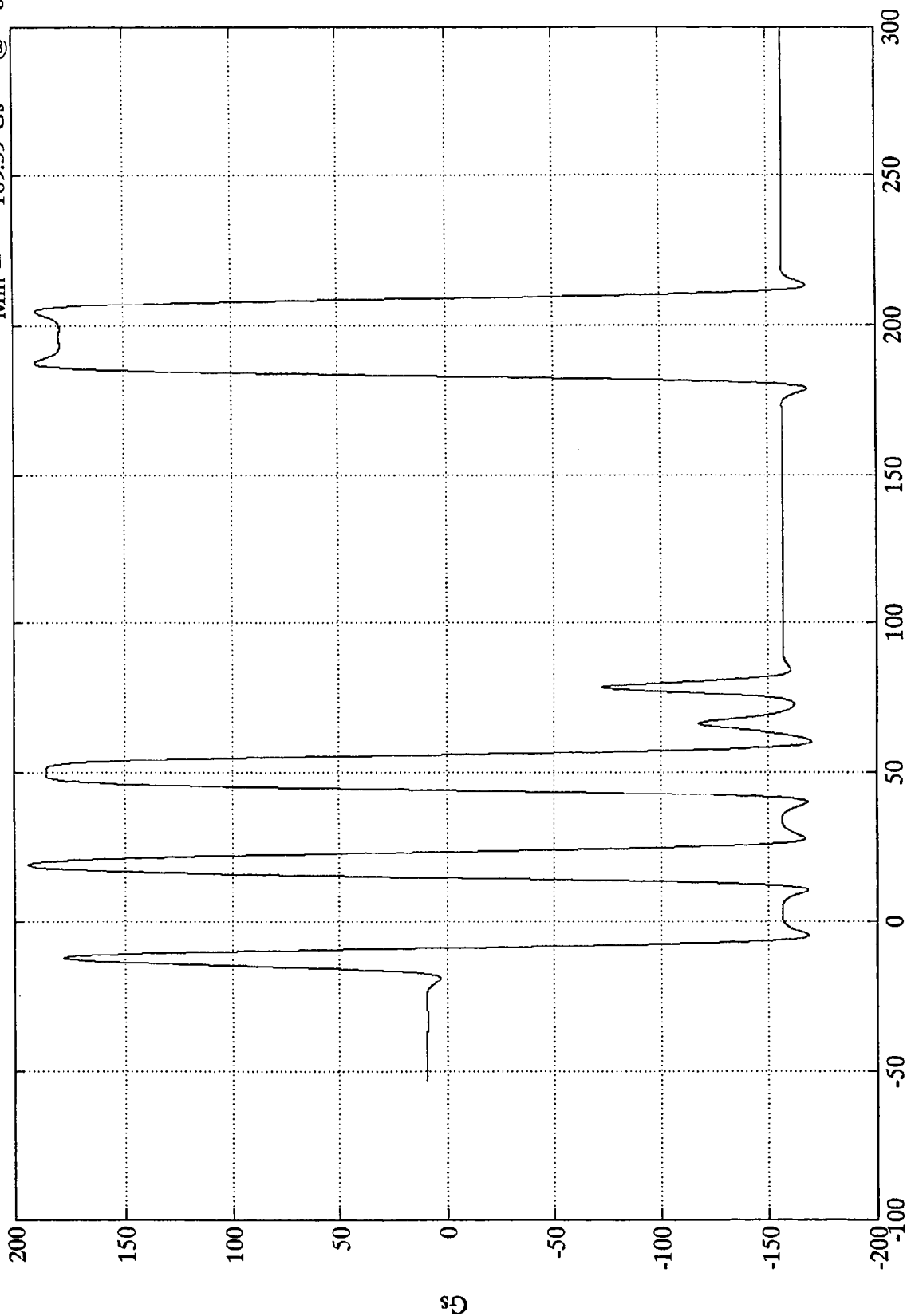


8-8118

SAE Filter Class 60

VTV TEST #8

V1 Engine Bottom (X) Max = 194.05 Gs @ 19.07 msec
Min = -169.39 Gs @ 60.24 msec



Time (msec) Data questionable, cable damaged

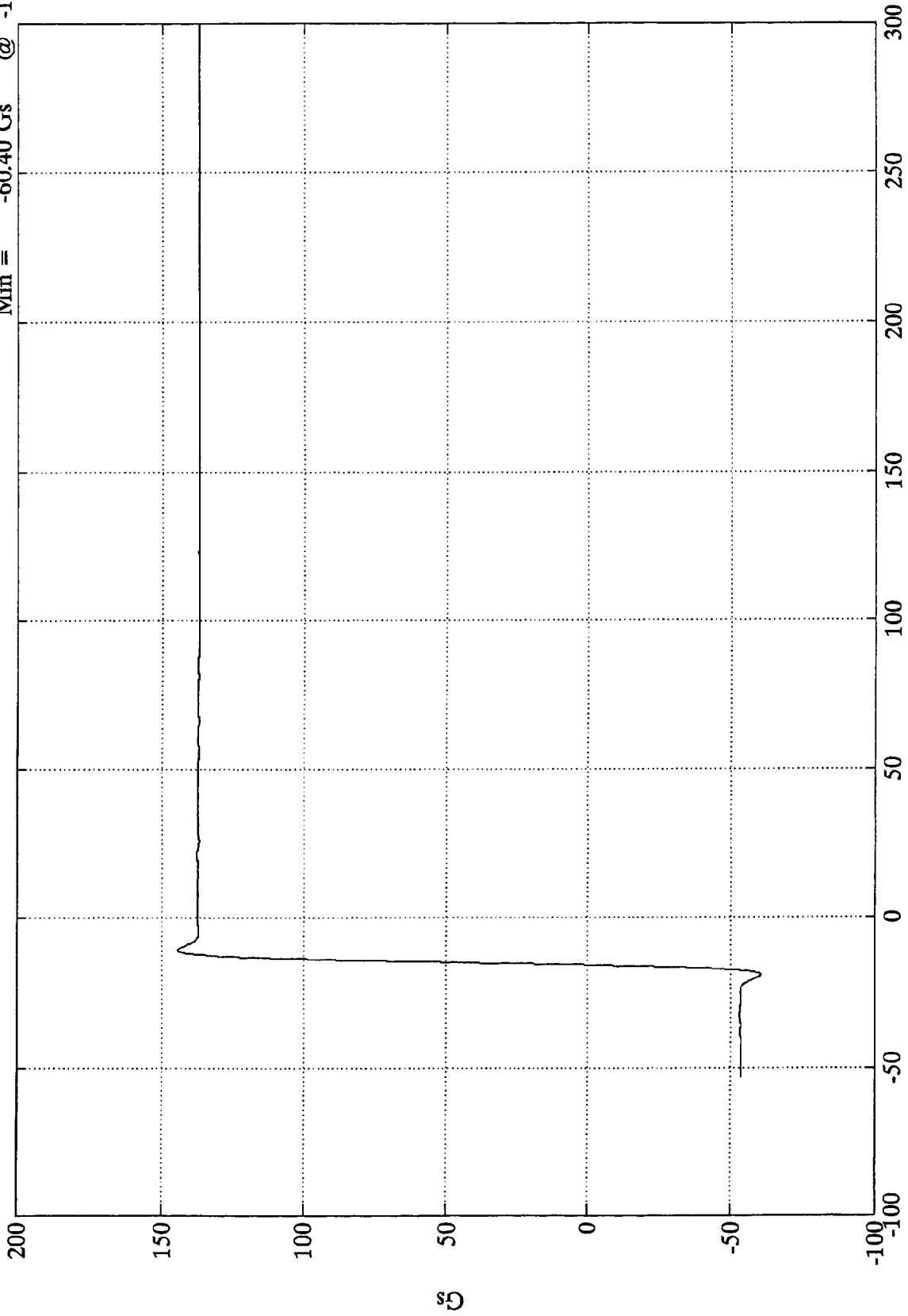
SAE Filter Class 60

8118-8

VTV TEST #8

V1 Engine Bottom (Y)

Max = 144.54 Gs @ -10.80 msec
Min = -60.40 Gs @ -19.08 msec



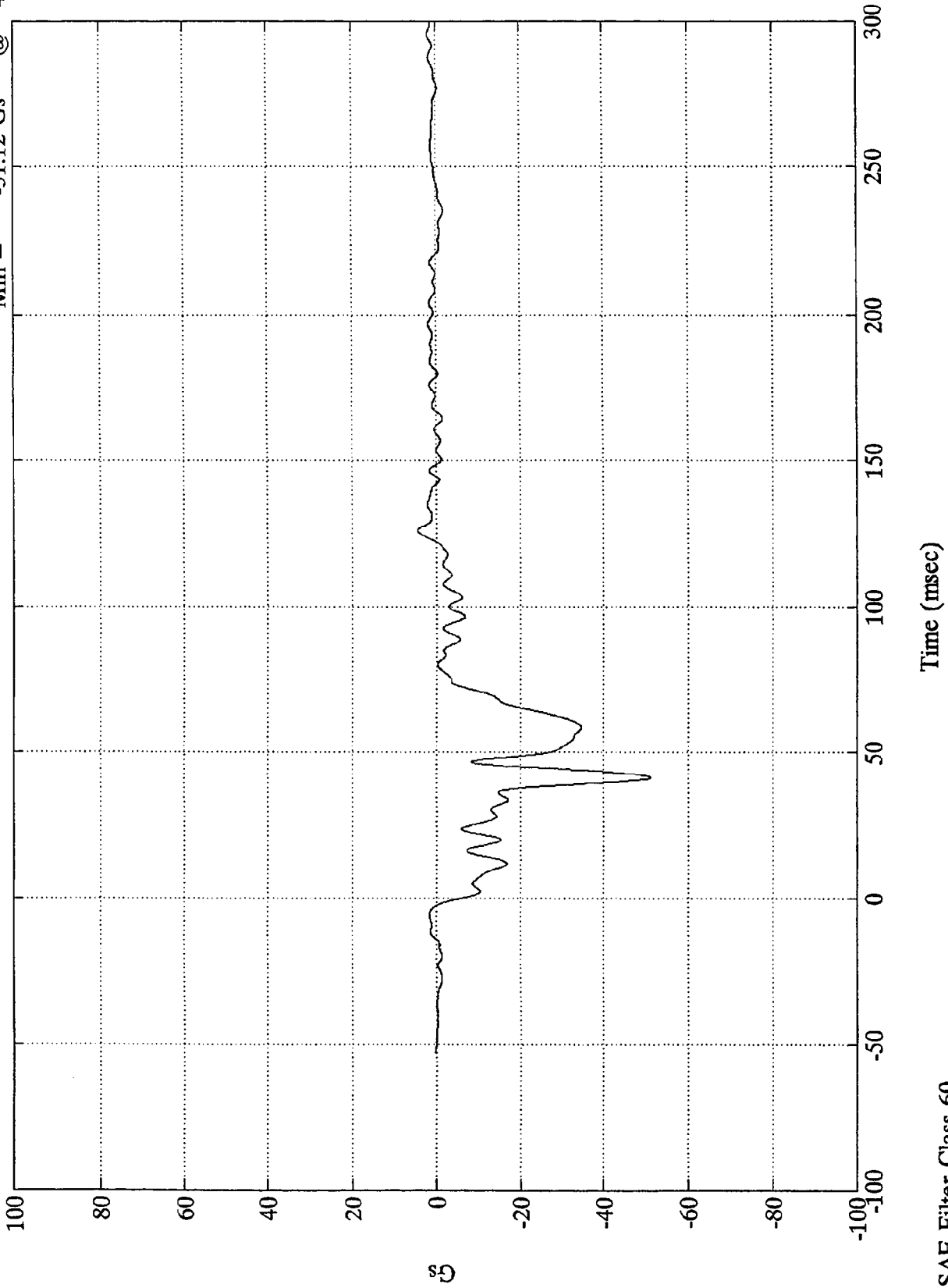
No data, cable cut

SAE Filter Class 60

8118-8

VTV TEST #8

V1 L.R. Comp (X) Max = 4.61 Gs @ 126.00 msec
 Min = -51.12 Gs @ 41.16 msec



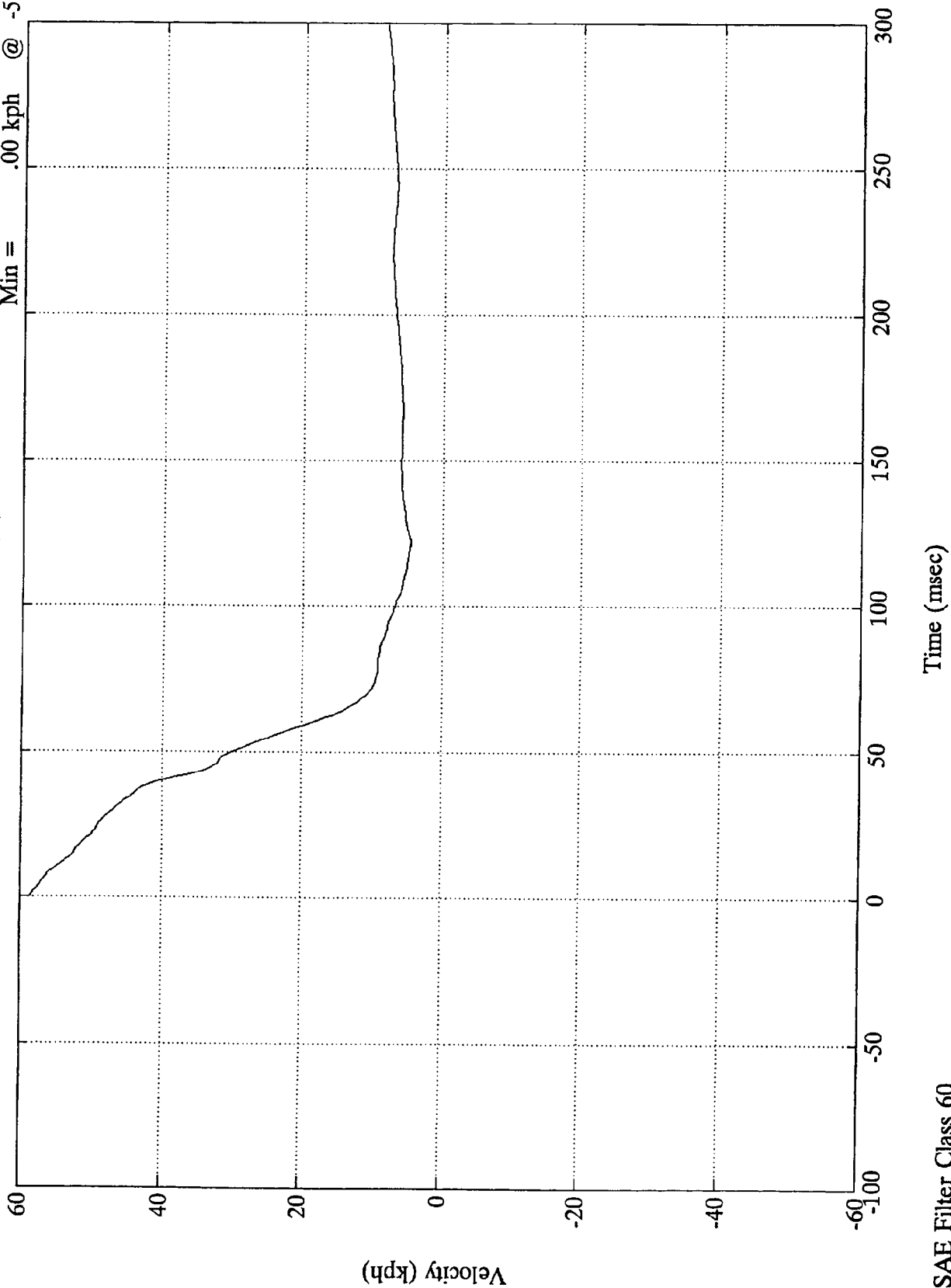
SAE Filter Class 60

8118-8

VTV TEST #8

V1 L.R. Comp (X)

Max = 58.74 kph @ -0.00 msec
Min = .00 kph @ -52.92 msec

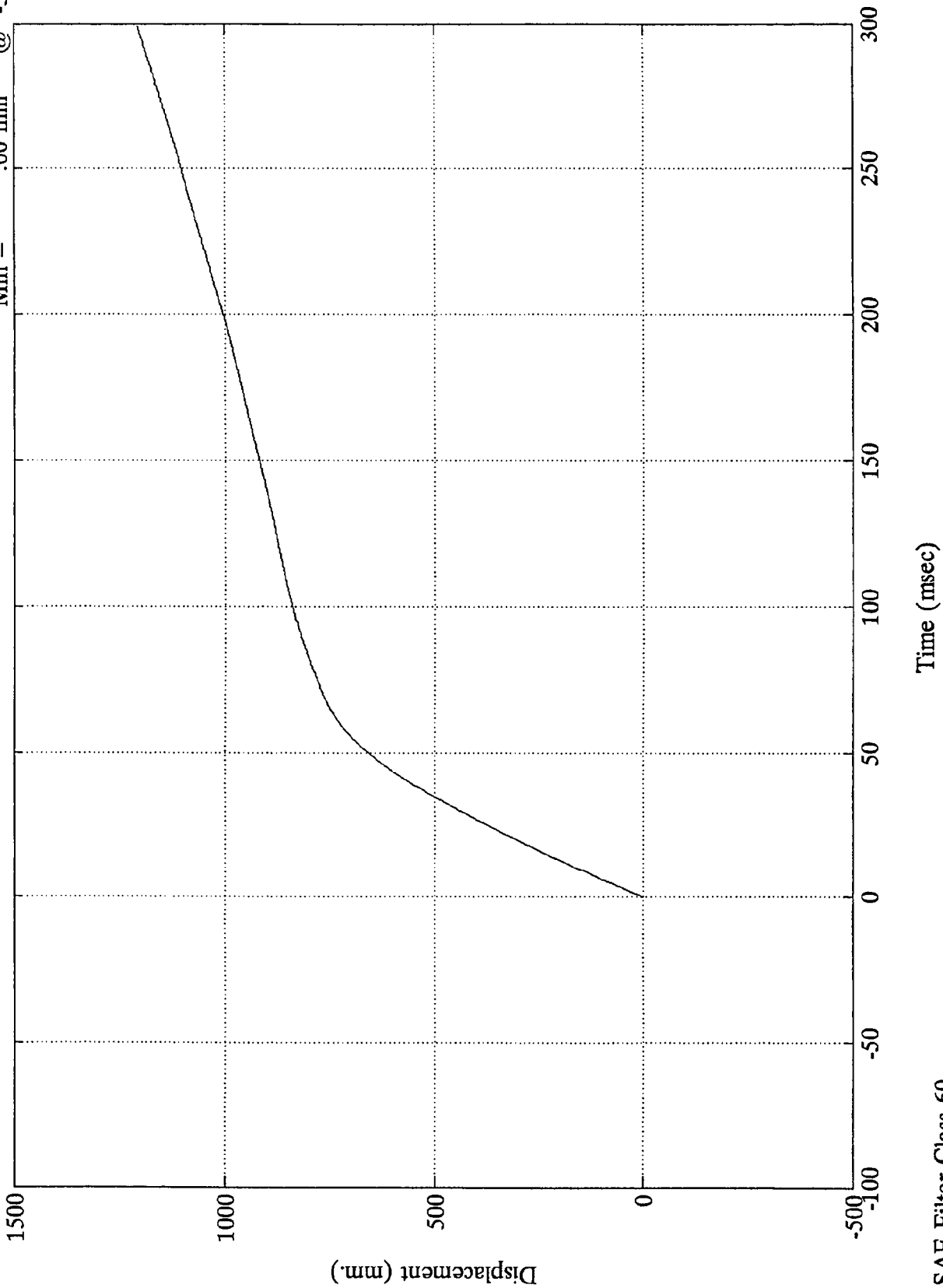


SAE Filter Class 60

VTV TEST #8

V1 L.R. Comp (X)

Max = 1211.01 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec



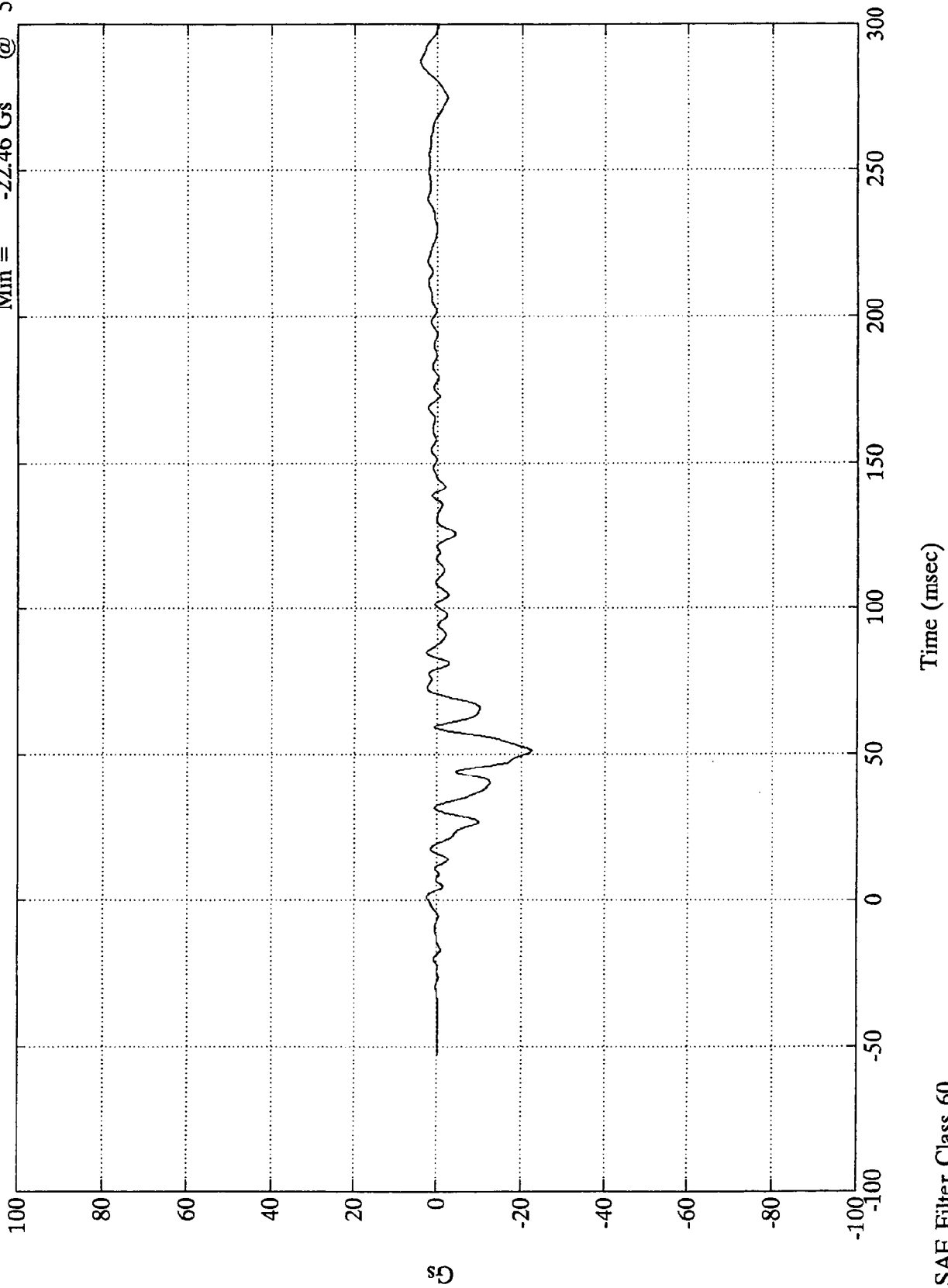
SAE Filter Class 60

8-8118-8

VTV TEST #8

V1 L.R. Comp (Y)

Max = 4.06 Gs @ 287.04 msec
Min = -22.46 Gs @ 51.12 msec



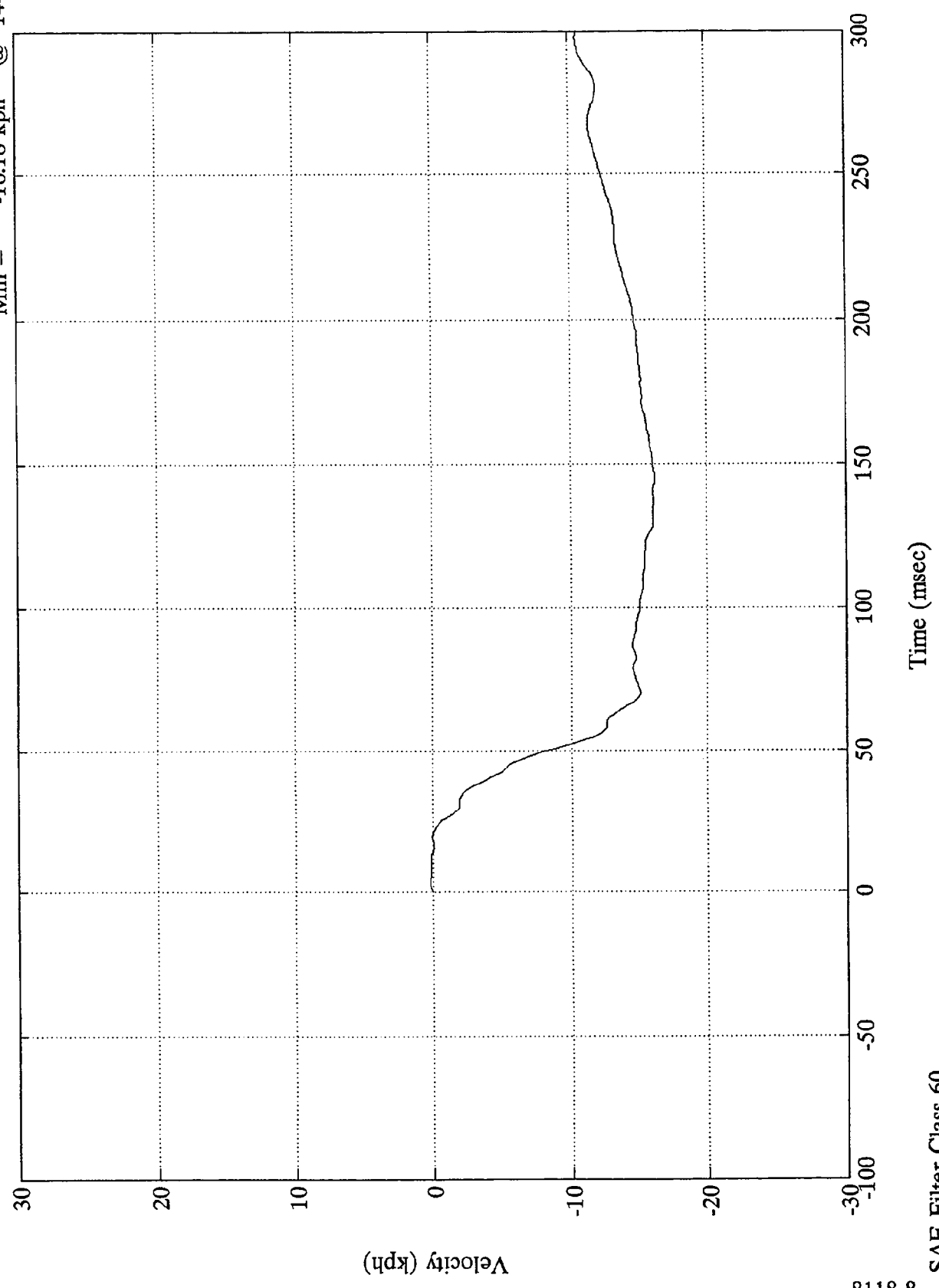
8118-8

SAE Filter Class 60

B-65

VTV TEST #8

V1 L.R. Comp (Y) Max = .24 kph @ 3.59 msec
Min = -16.18 kph @ 144.84 msec

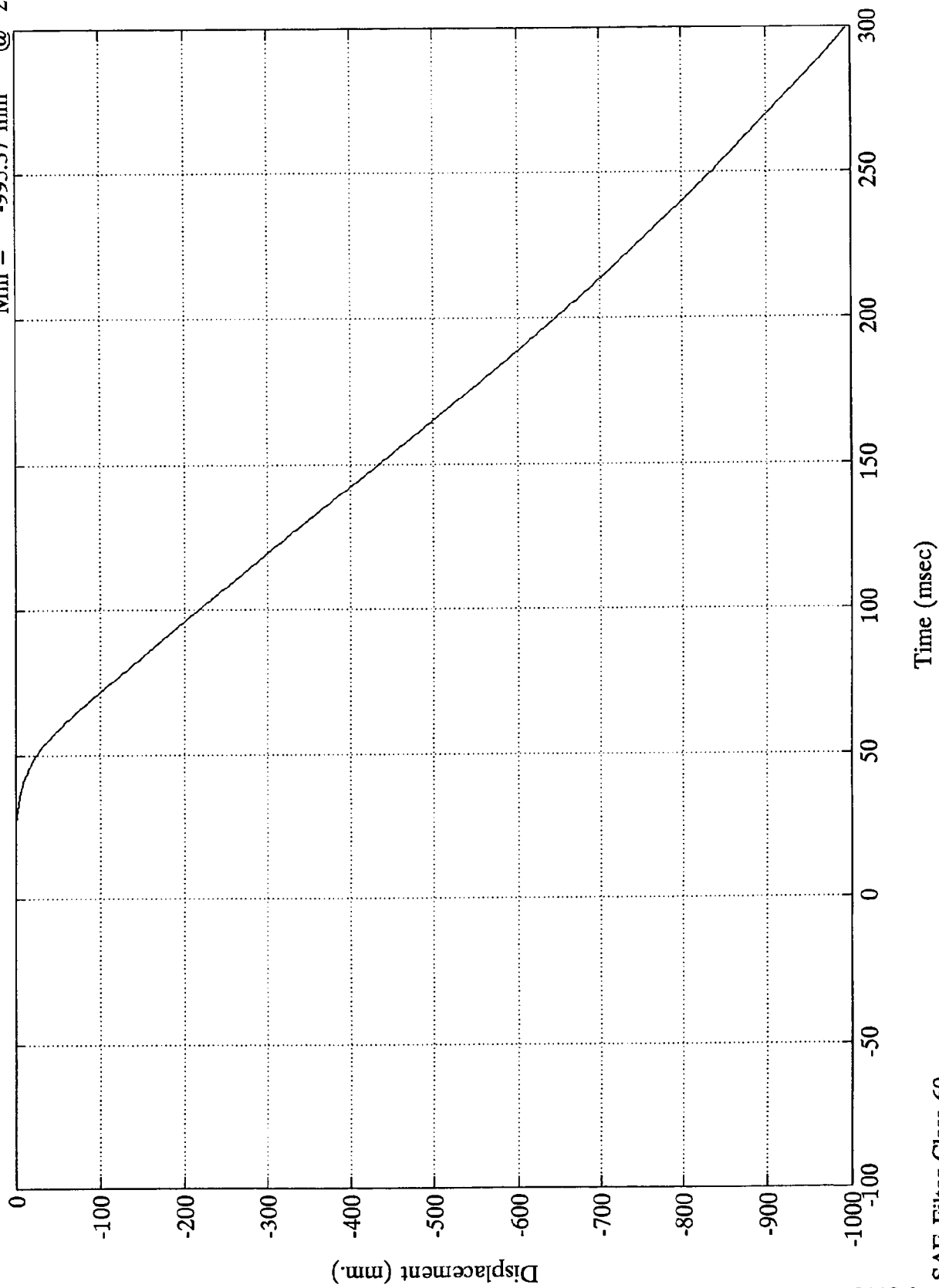


8118-8

VTV TEST #8

Max = .59 mm @ 14.75 msec
Min = -995.37 mm @ 299.87 msec

V1 L.R. Comp (Y)

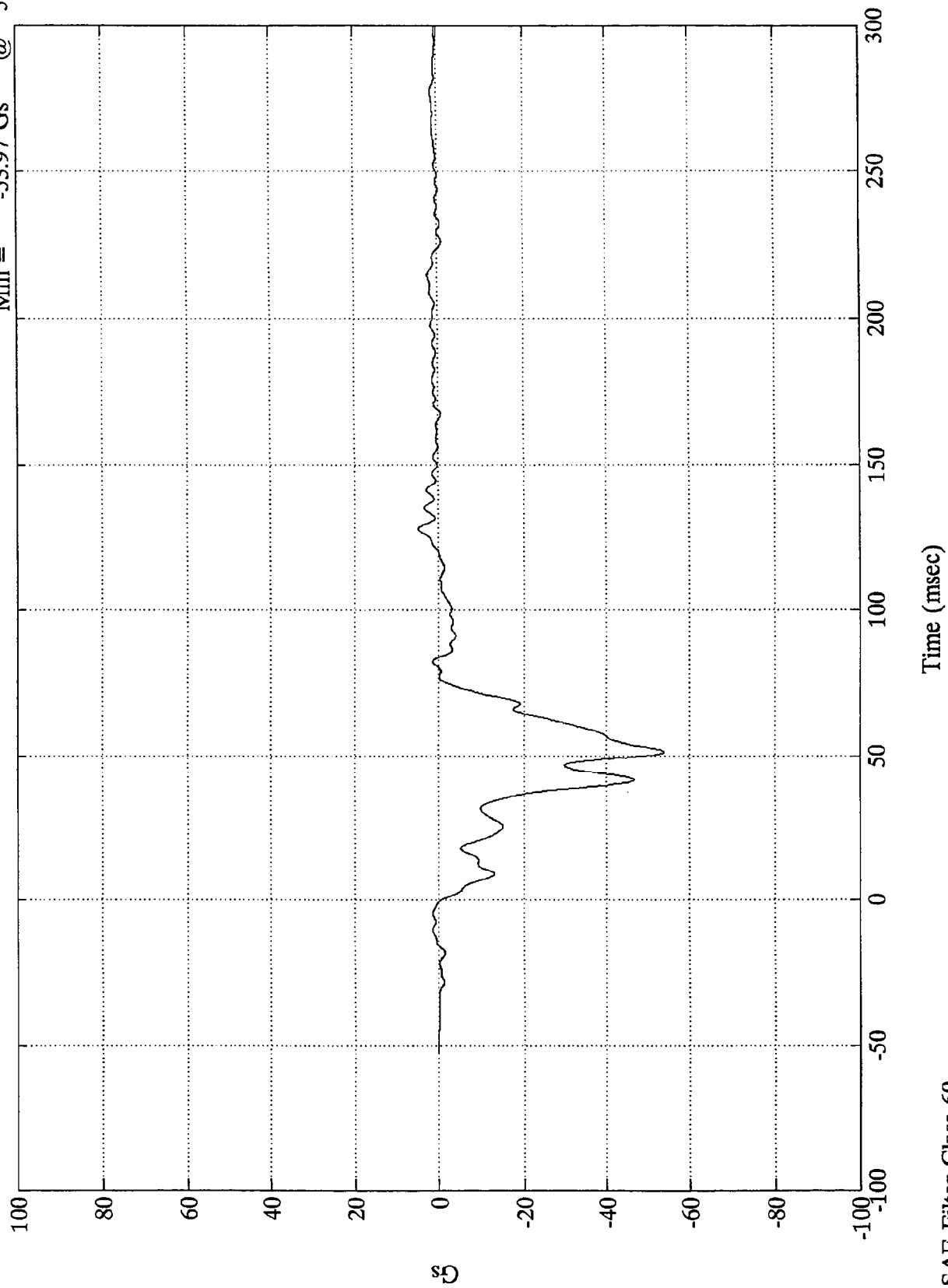


SAE Filter Class 60

8-8118

VTV TEST #8

V1 R.R. Comp (X) Max = 4.75 Gs @ 127.91 msec
Min = -53.97 Gs @ 51.36 msec

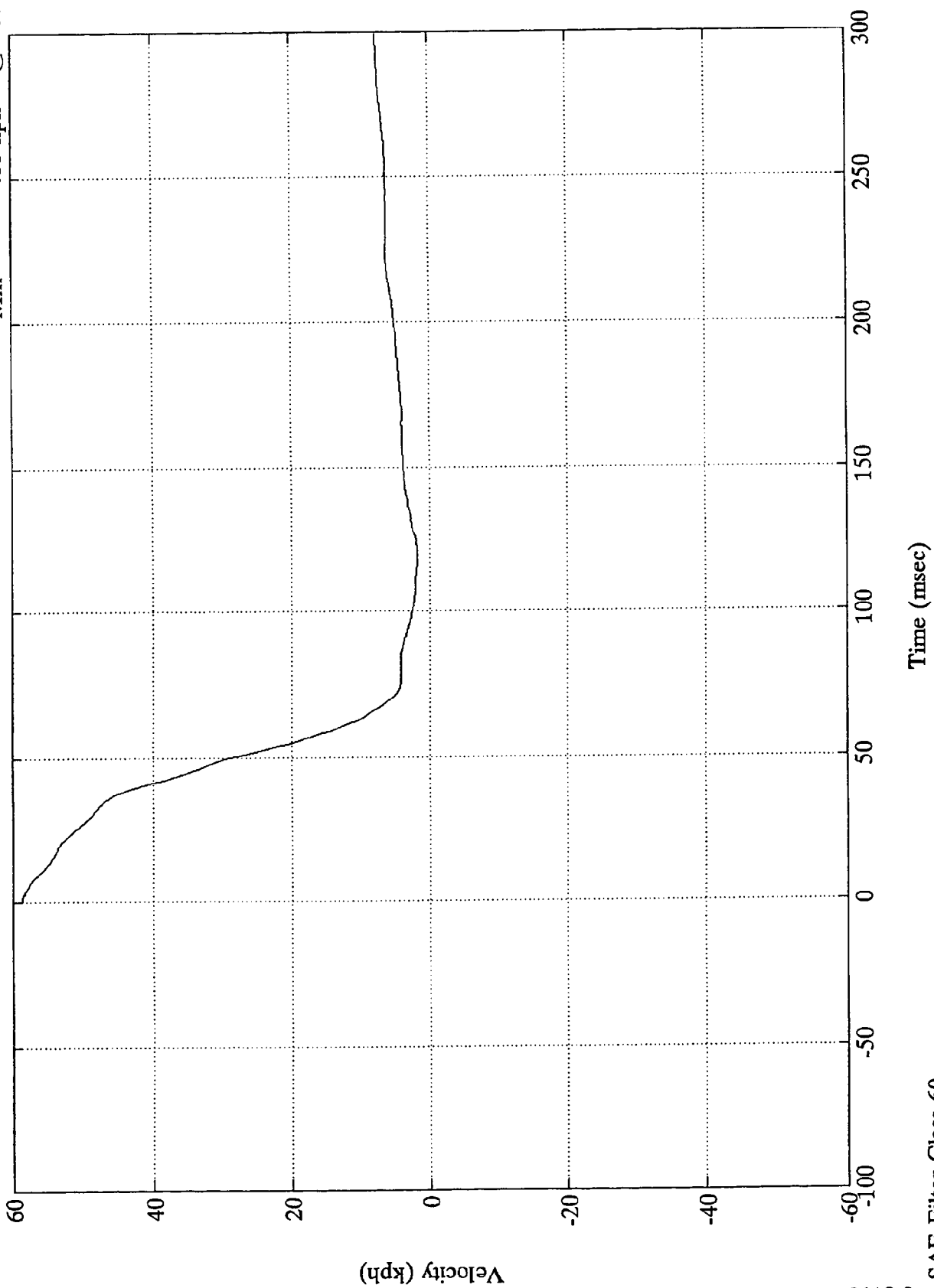


8118-8

SAE Filter Class 60

VTV TEST #8

V1 R.R. Comp (X) Max = 58.74 kph @ -0.00 msec
Min = .00 kph @ -52.92 msec



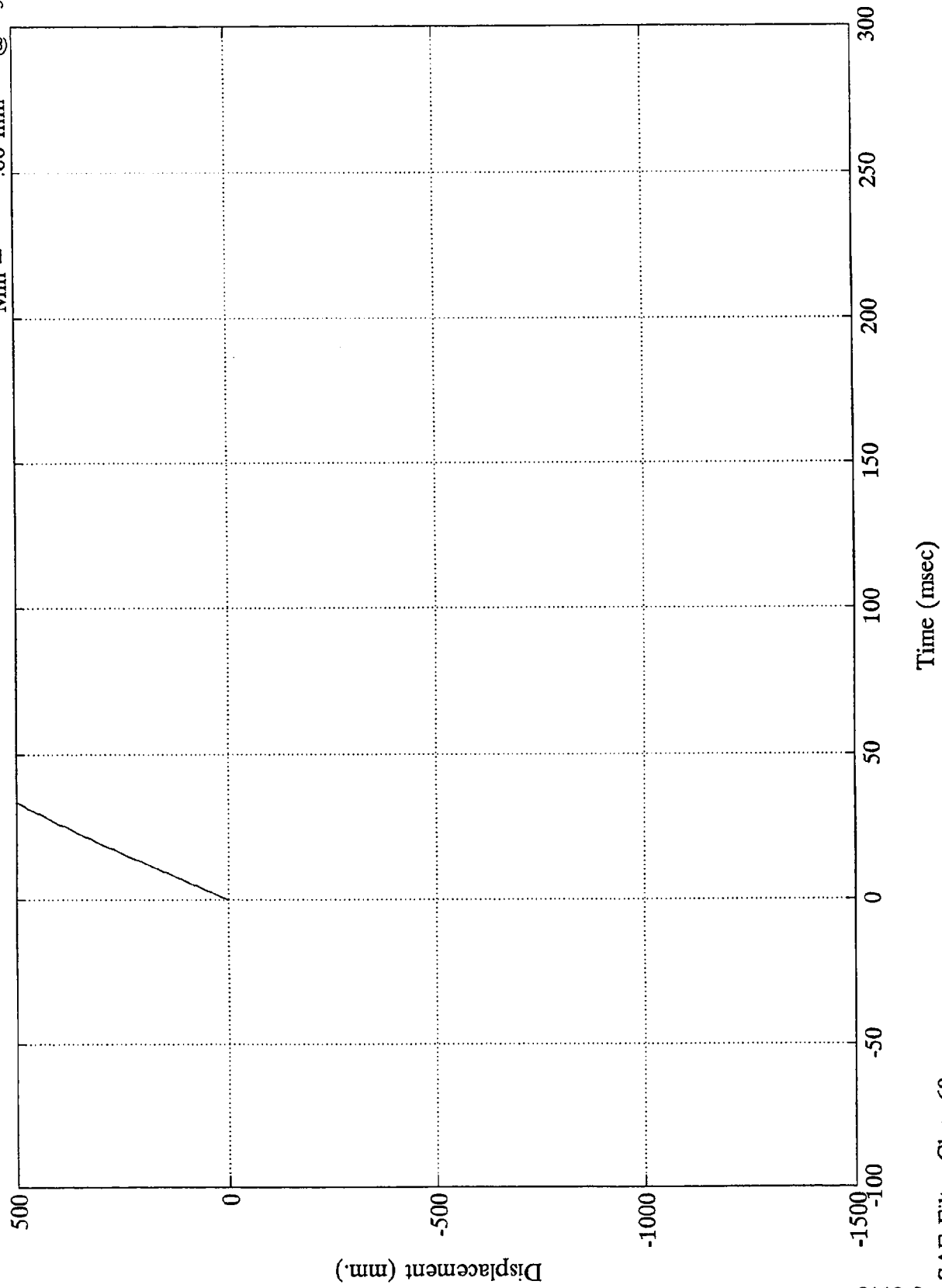
8118-8

SAE Filter Class 60

VTV TEST #8

V1 R.R. Comp (X)

Max = 1064.56 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec

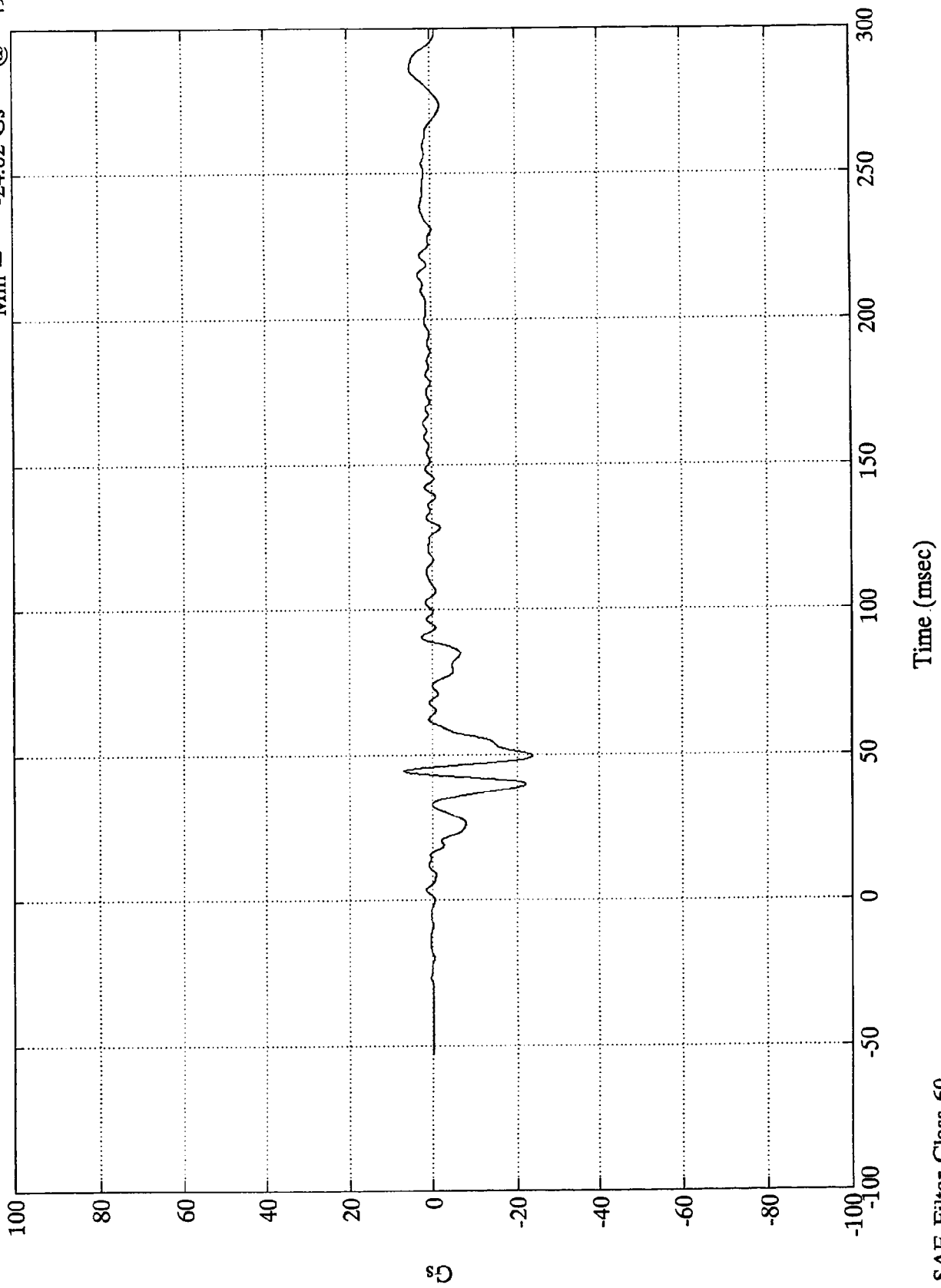


8-8118

VTV TEST #8

V1 R.R. Comp (Y)

Max = 6.98 Gs @ 44.52 msec
Min = -24.02 Gs @ 49.68 msec

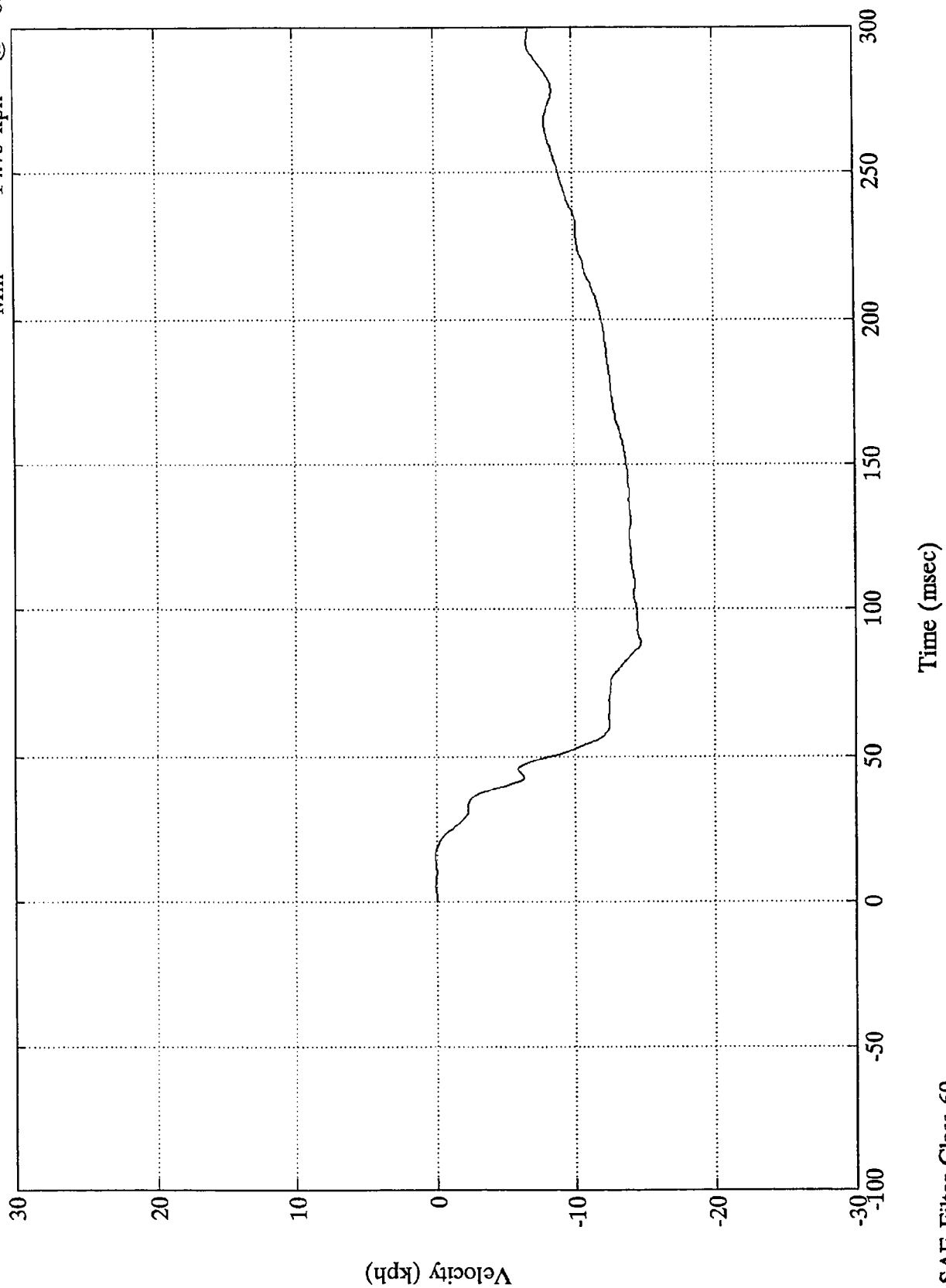


SAE Filter Class 60

8118-8

VTV TEST #8

V1 R.R. Comp (Y) Max = .14 kph @ 16.68 msec
Min = -14.75 kph @ 88.80 msec

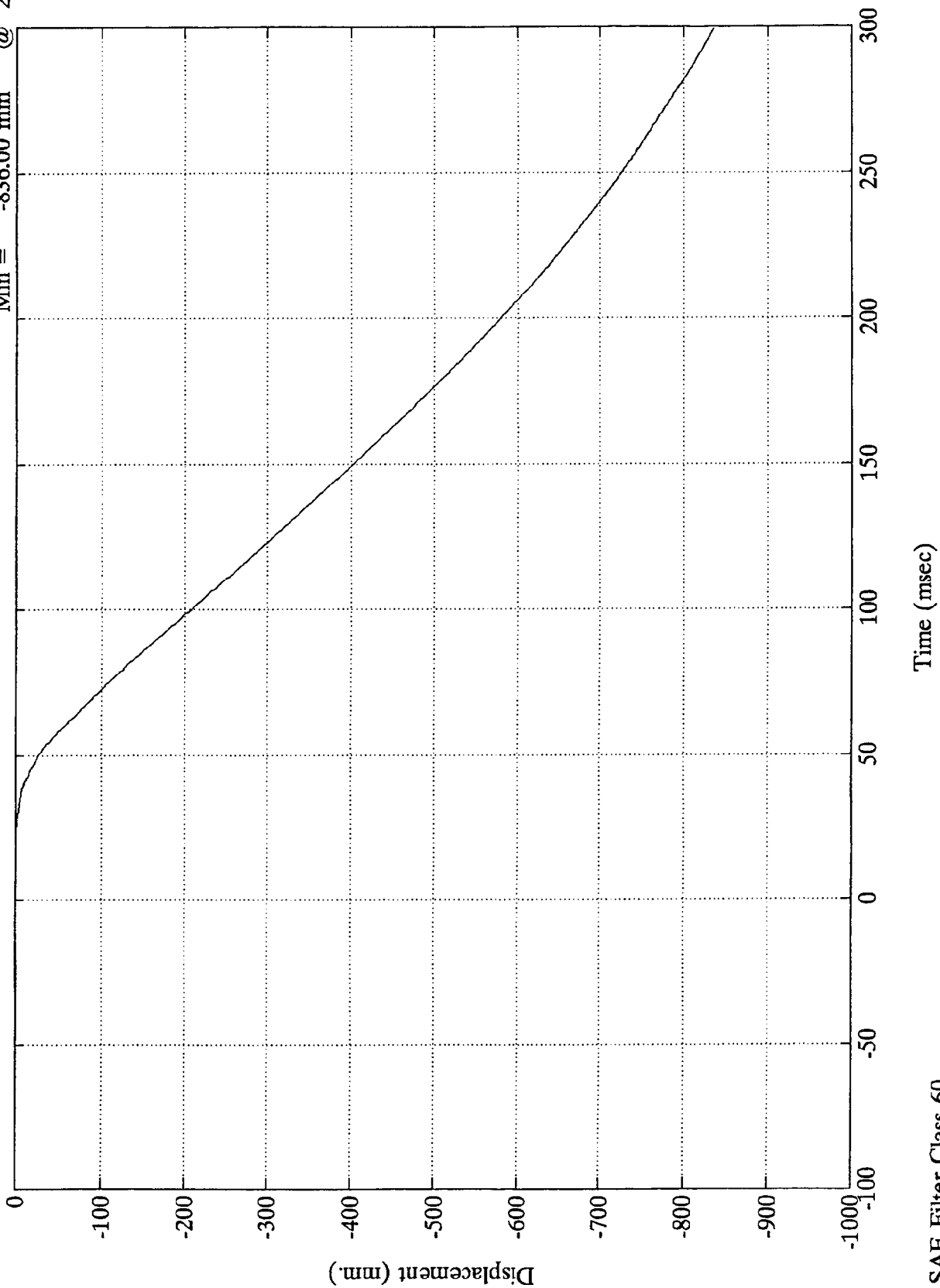


8118-8

SAE Filter Class 60

VTV TEST #8

V1 R.R. Comp (Y) Max = .35 mm @ 19.07 msec
Min = -836.00 mm @ 299.87 msec



8118-8

SAE Filter Class 60

TEST No. Y49-8-1417

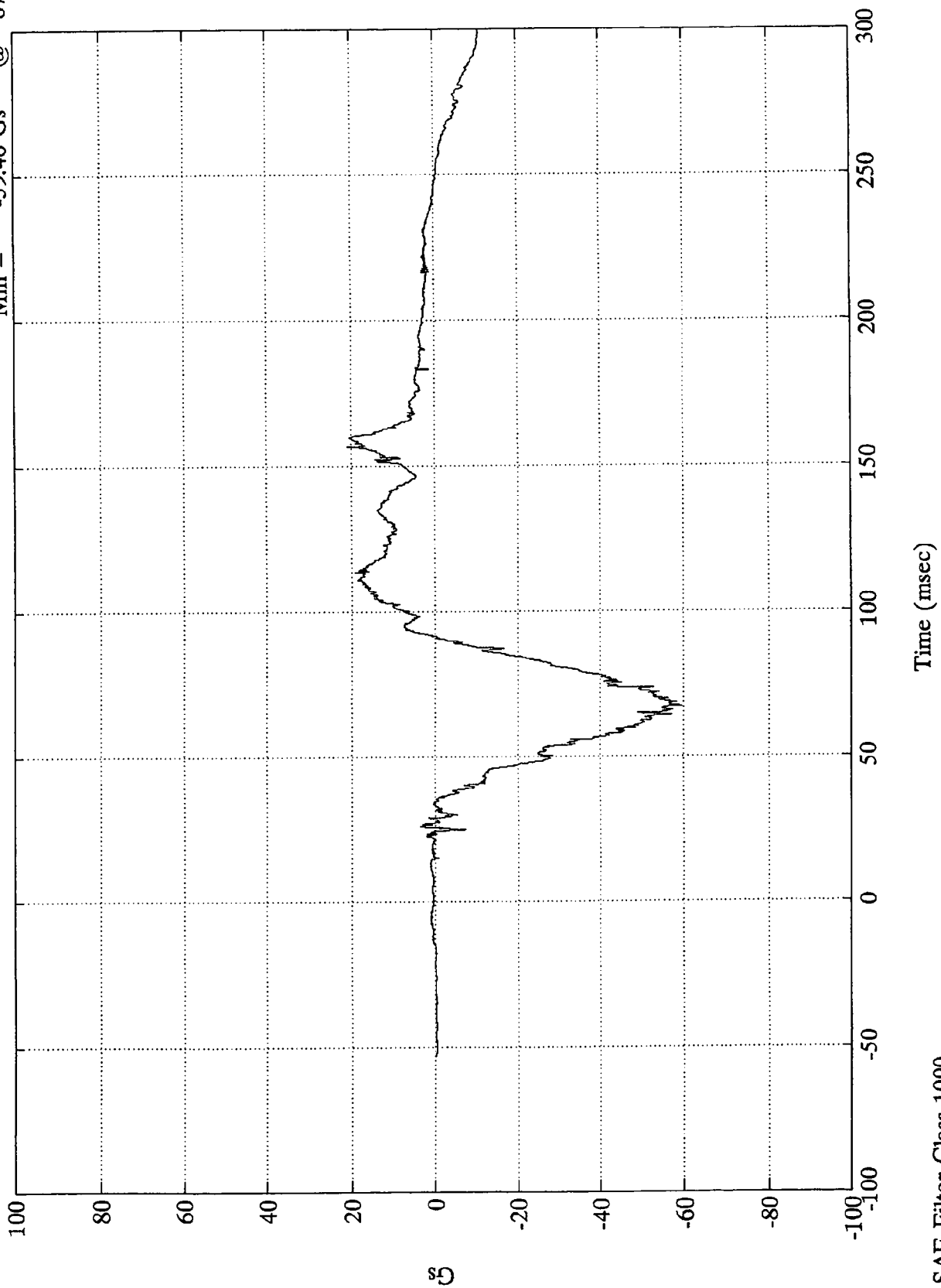
DUMMY DATA

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

VTV TEST #8

Max = 20.76 Gs @ 156.47 msec
Min = -59.46 Gs @ 67.20 msec

V1-P1 Head X



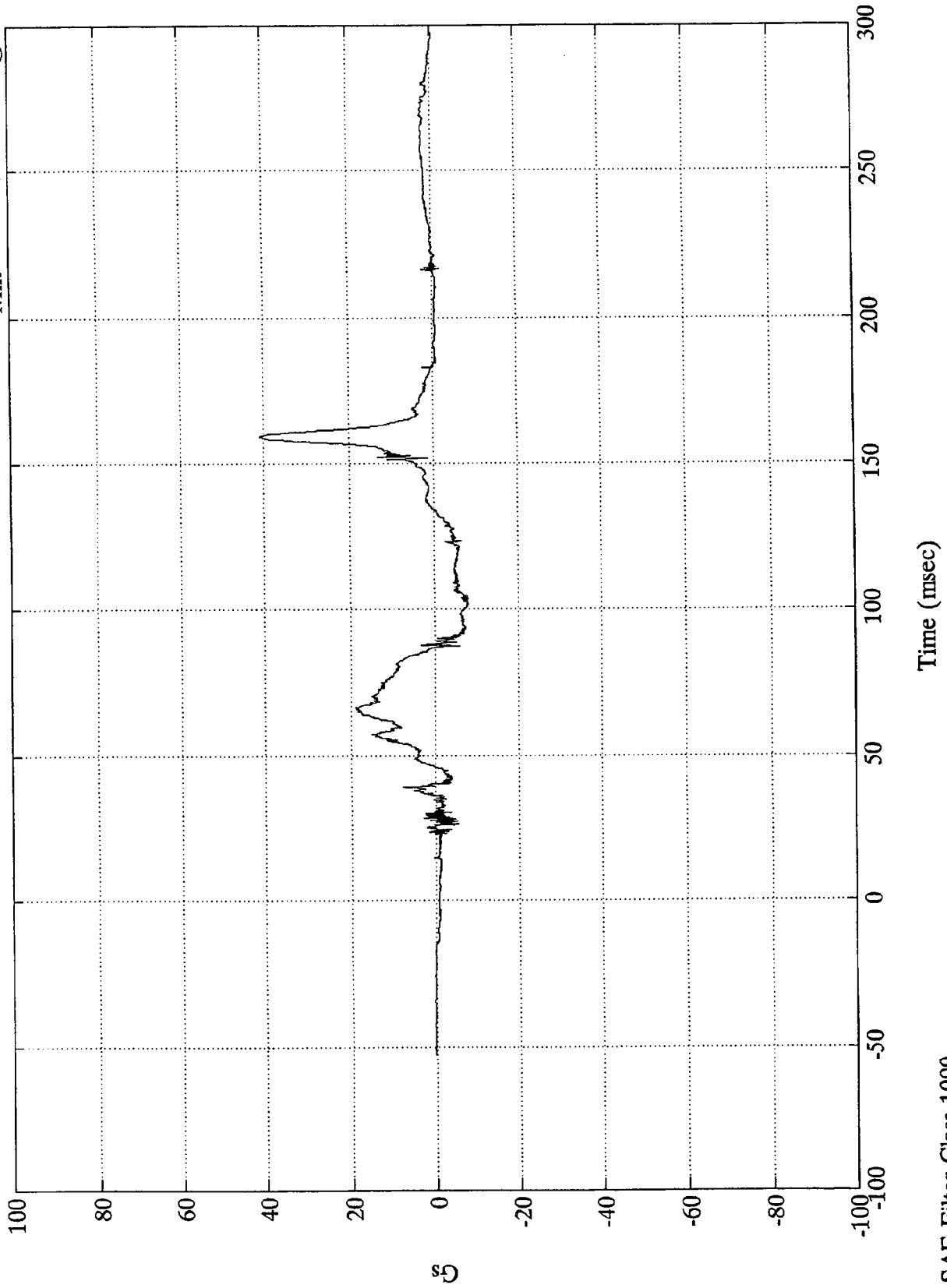
8118-8

SAE Filter Class 1000

VTV TEST #8

V1-P1 Head Y

Max = 41.02 Gs @ 159.48 msec
Min = -7.95 Gs @ 103.80 msec



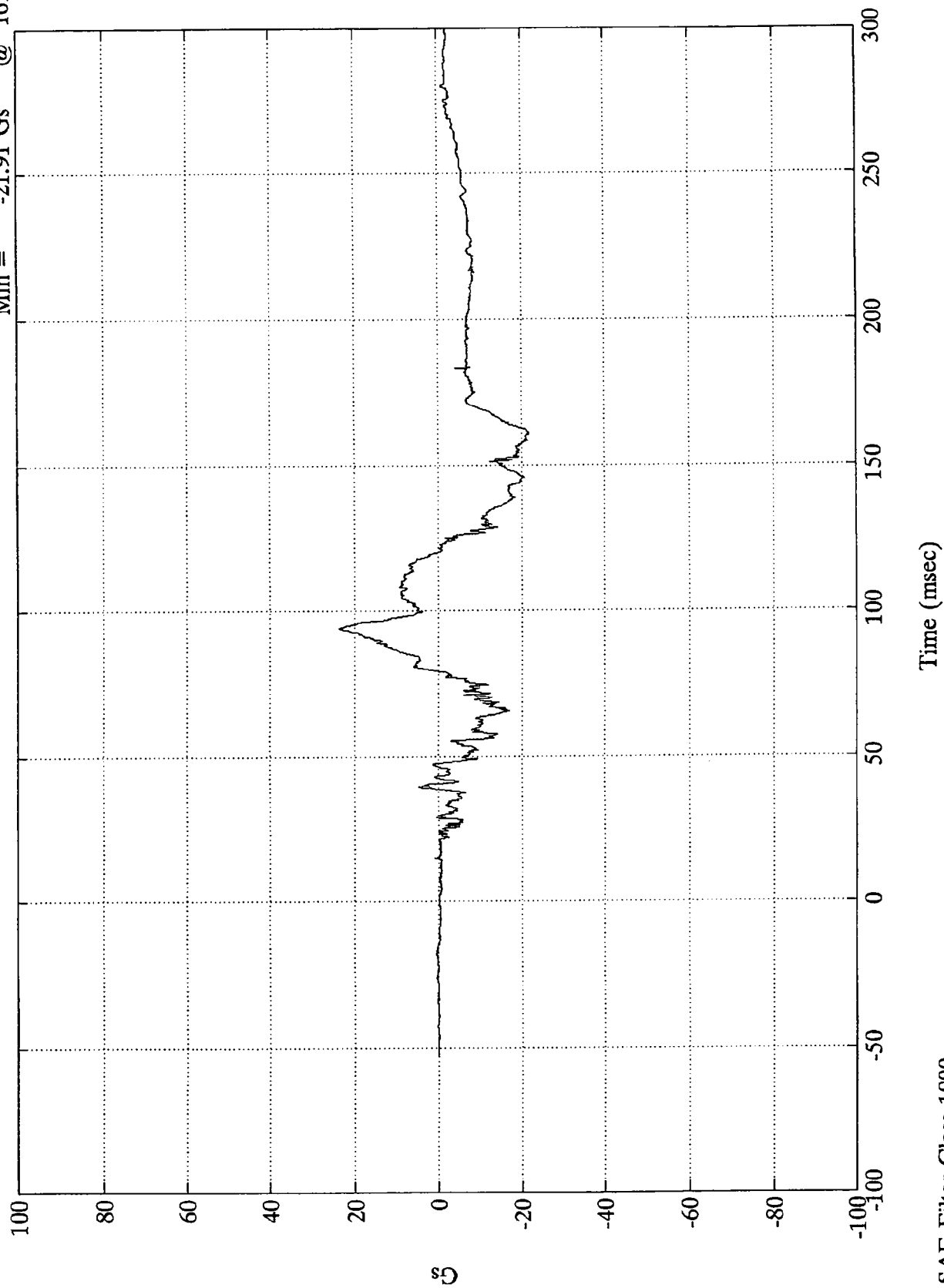
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P1 Head Z

Max = 23.70 Gs @ 93.95 msec
Min = -21.91 Gs @ 161.16 msec

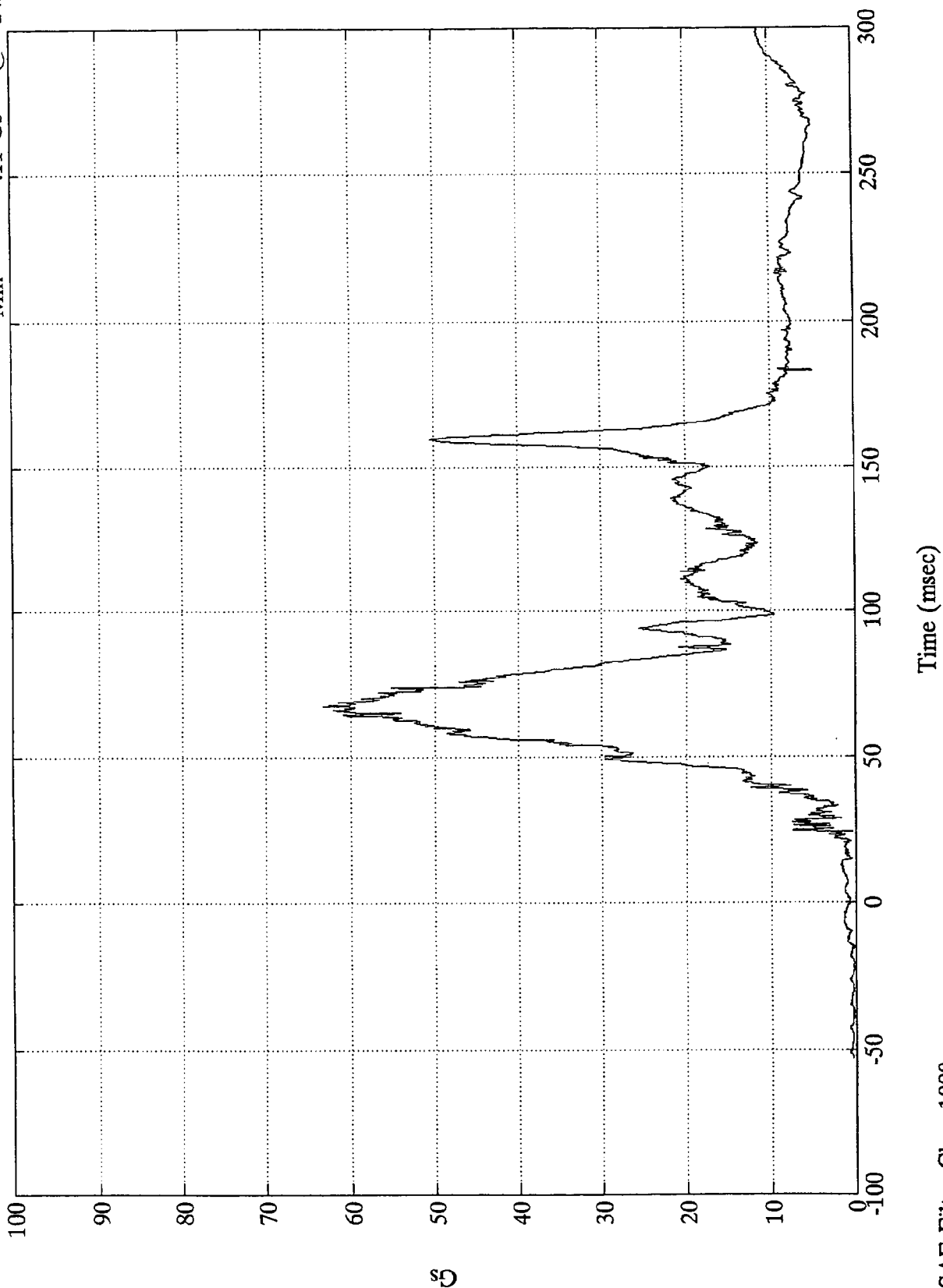


8118-8

VTV TEST #8

Max = 63.24 Gs @ 67.20 msec
 Min = .11 Gs @ -14.88 msec

Head Resultant



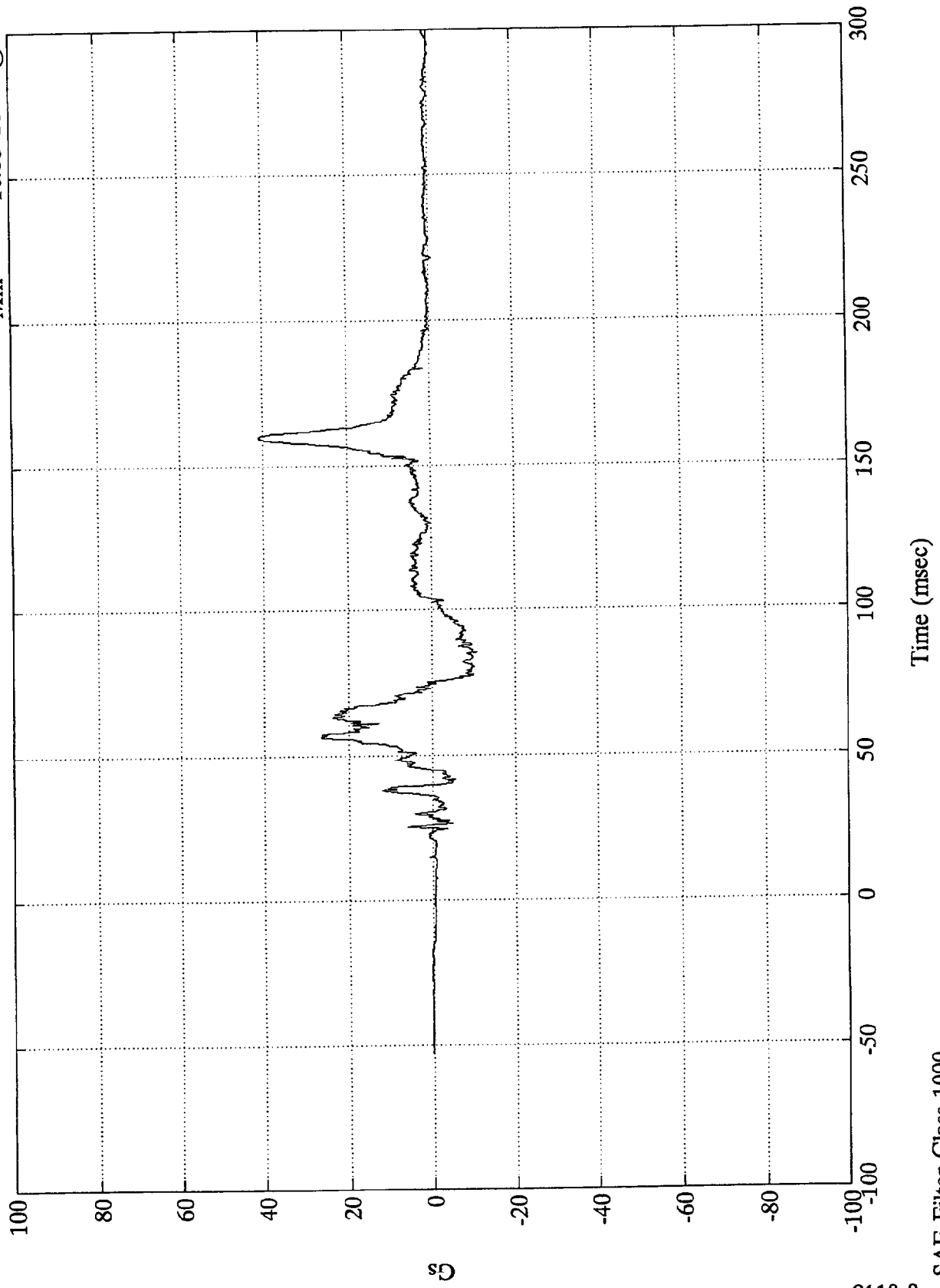
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P1 HD9X (Y)

Max = 41.03 Gs @ 159.96 msec
Min = -10.88 Gs @ 85.44 msec



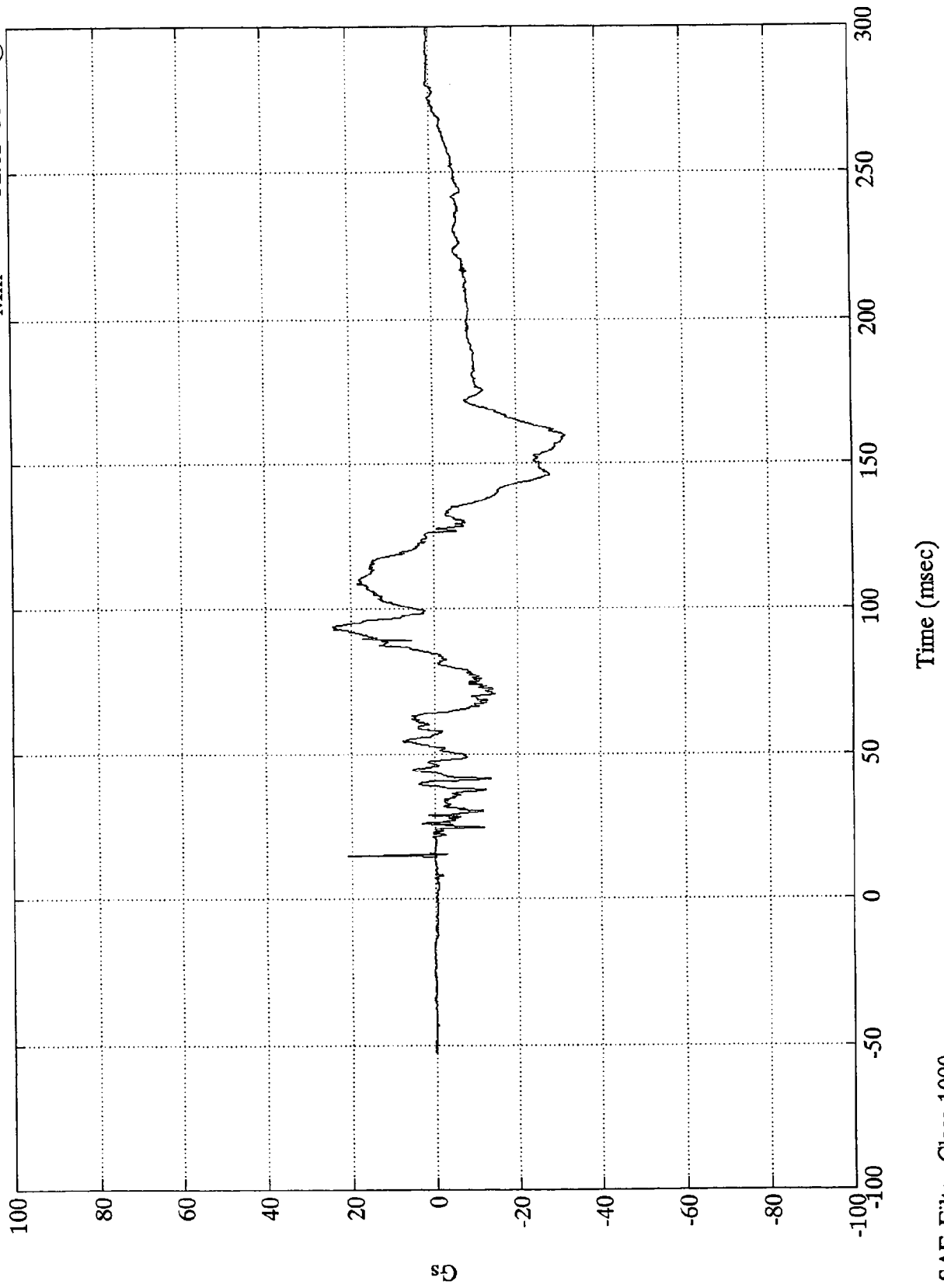
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P1 HD9X (Z)

Max = 24.27 Gs @ 93.84 msec
Min = -32.01 Gs @ 159.24 msec



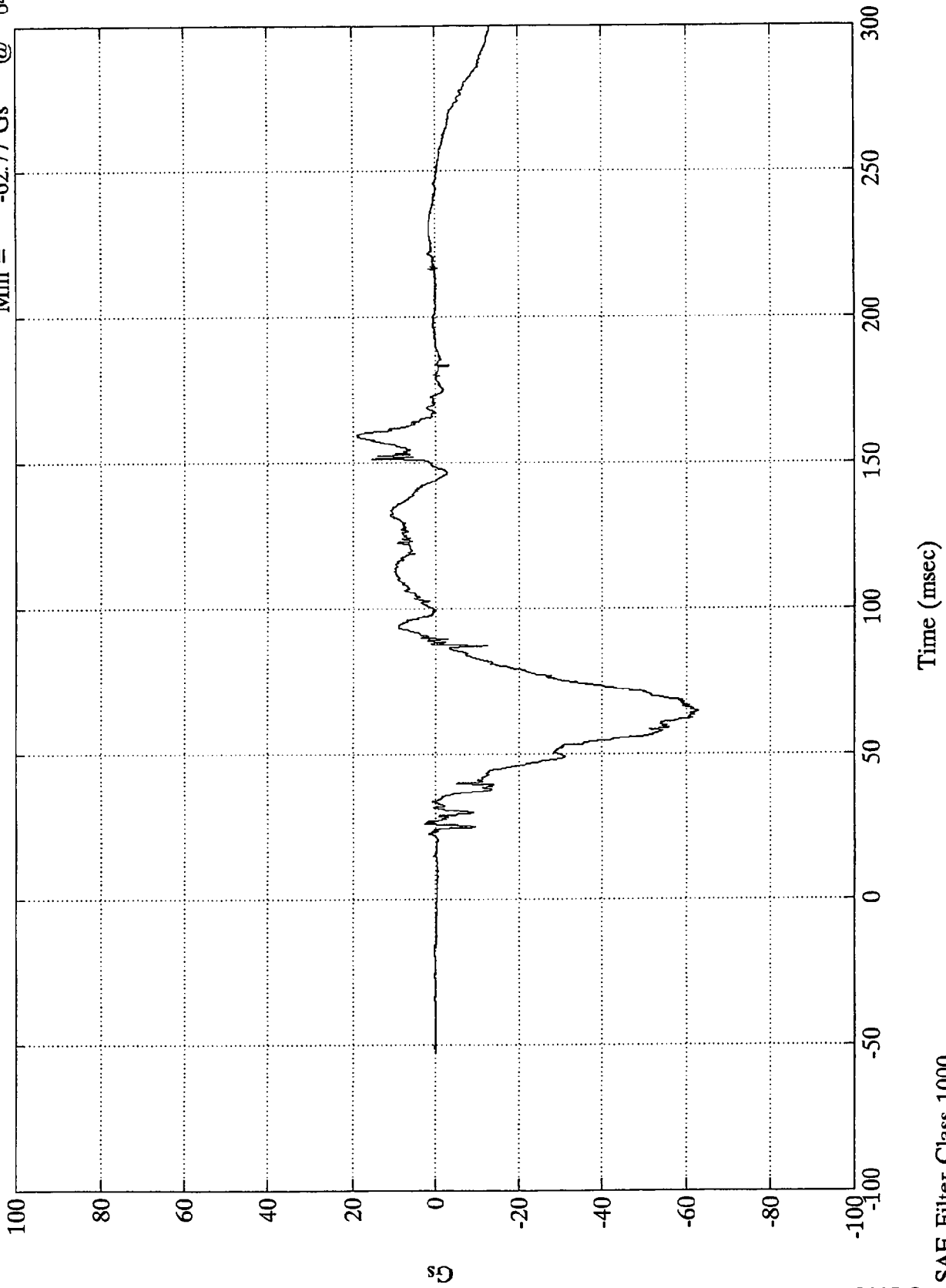
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P1 HD9Y (X)

Max = 19.04 Gs @ 159.36 msec
Min = -62.77 Gs @ 64.56 msec



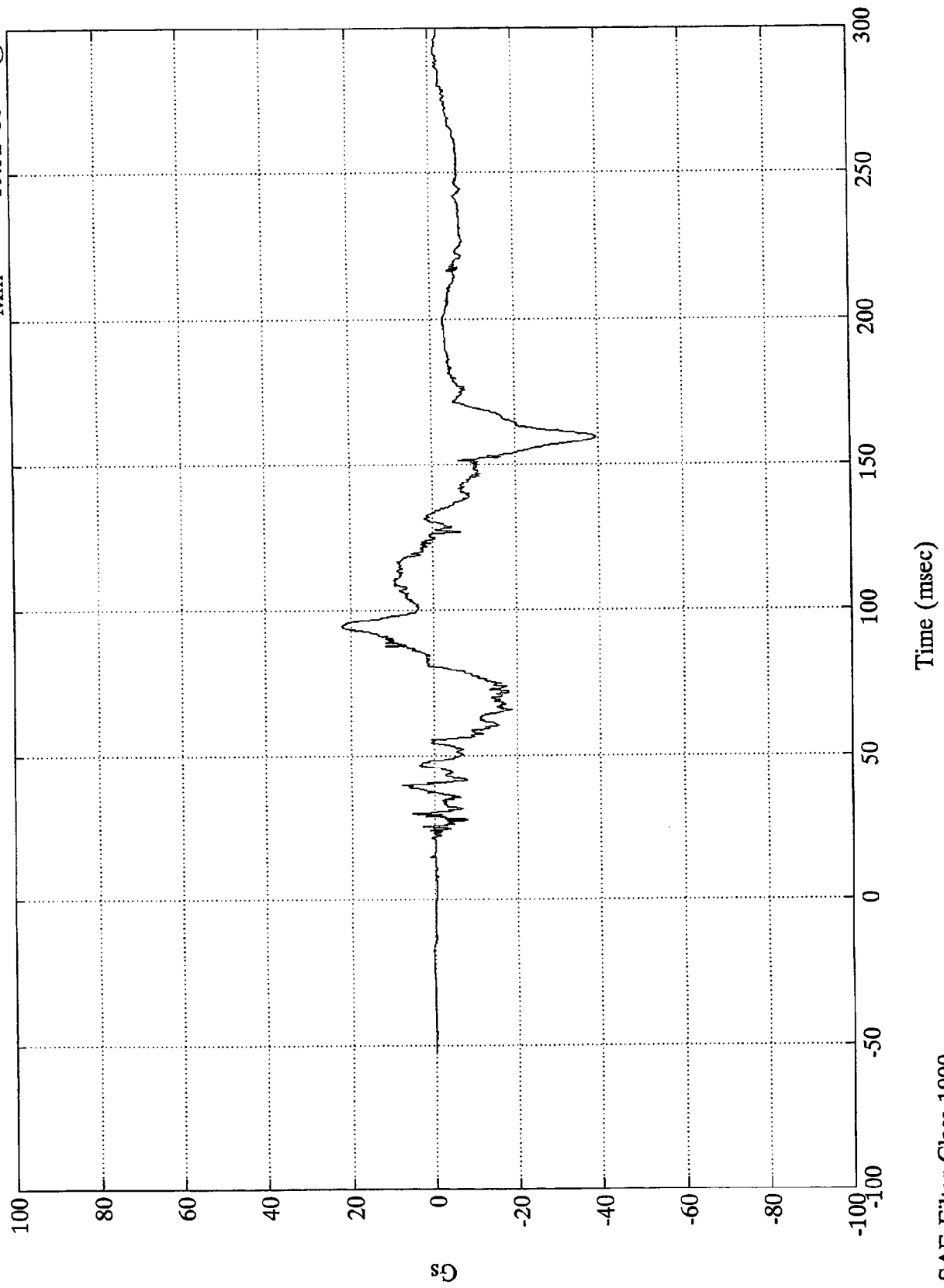
8118-8

SAE Filter Class 1000

VTV TEST #8

V1-P1 HD9Y (Z)

Max = 22.15 Gs @ 94.68 msec
Min = -39.52 Gs @ 159.36 msec

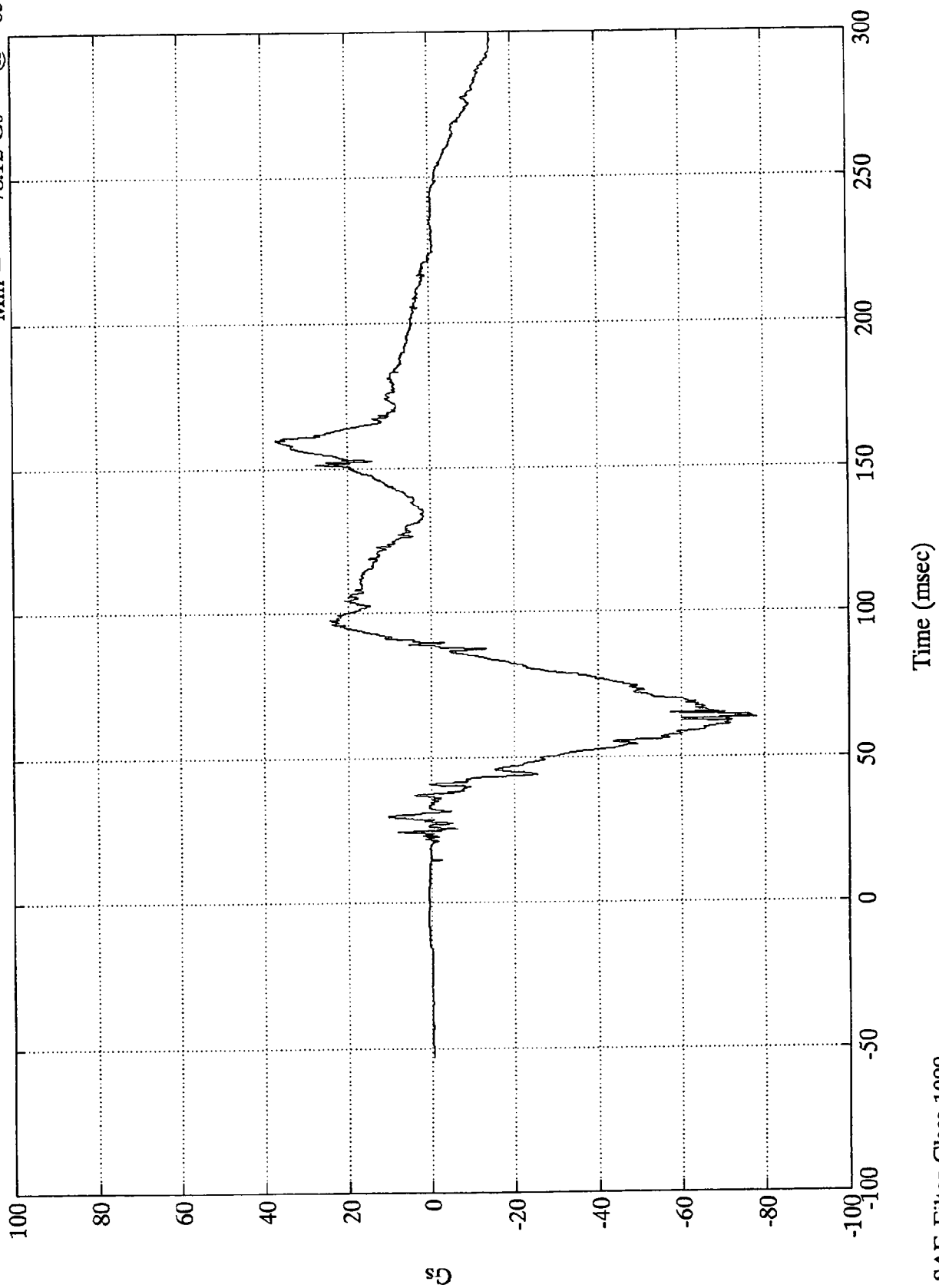


8118-8

VTV TEST #8

V1-P1 HD9Z (X)

Max = 37.07 Gs @ 159.60 msec
Min = -78.12 Gs @ 63.11 msec



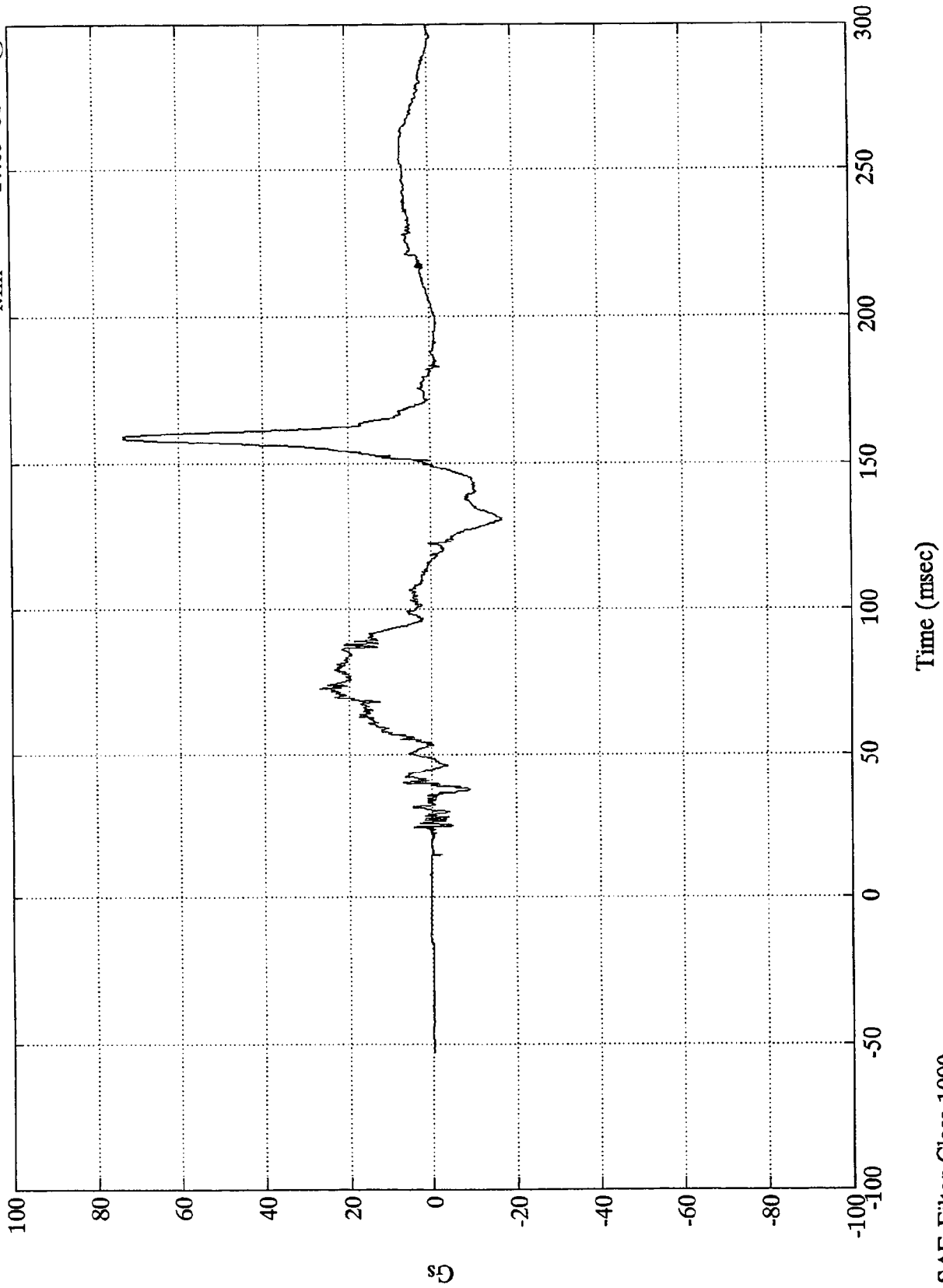
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P1 HD9Z (Y)

Max = 73.09 Gs @ 159.36 msec
Min = -17.05 Gs @ 130.68 msec

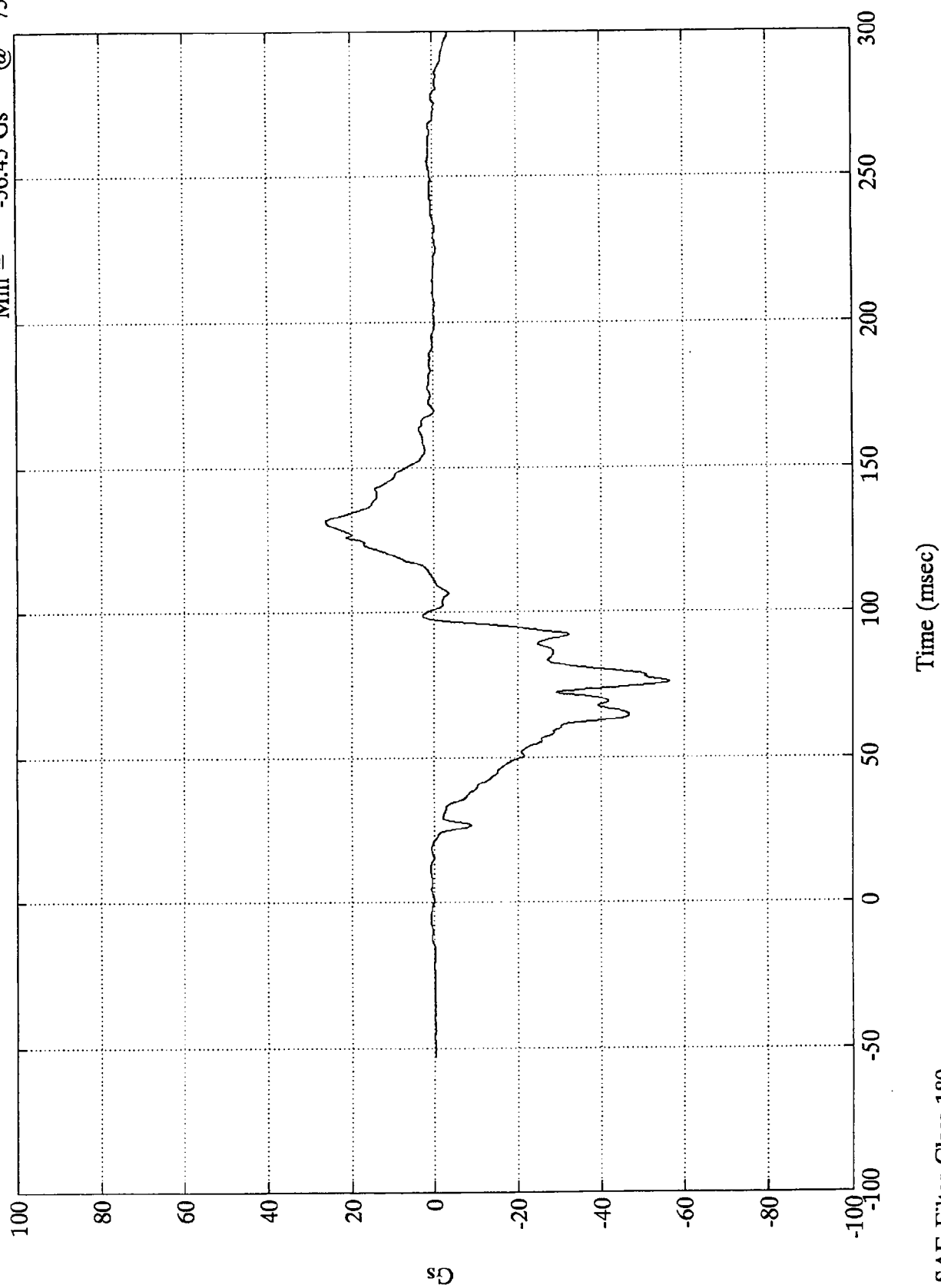


SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P1 Chest X
Max = 26.29 Gs @ 131.40 msec
Min = -56.45 Gs @ 75.95 msec



8118-8

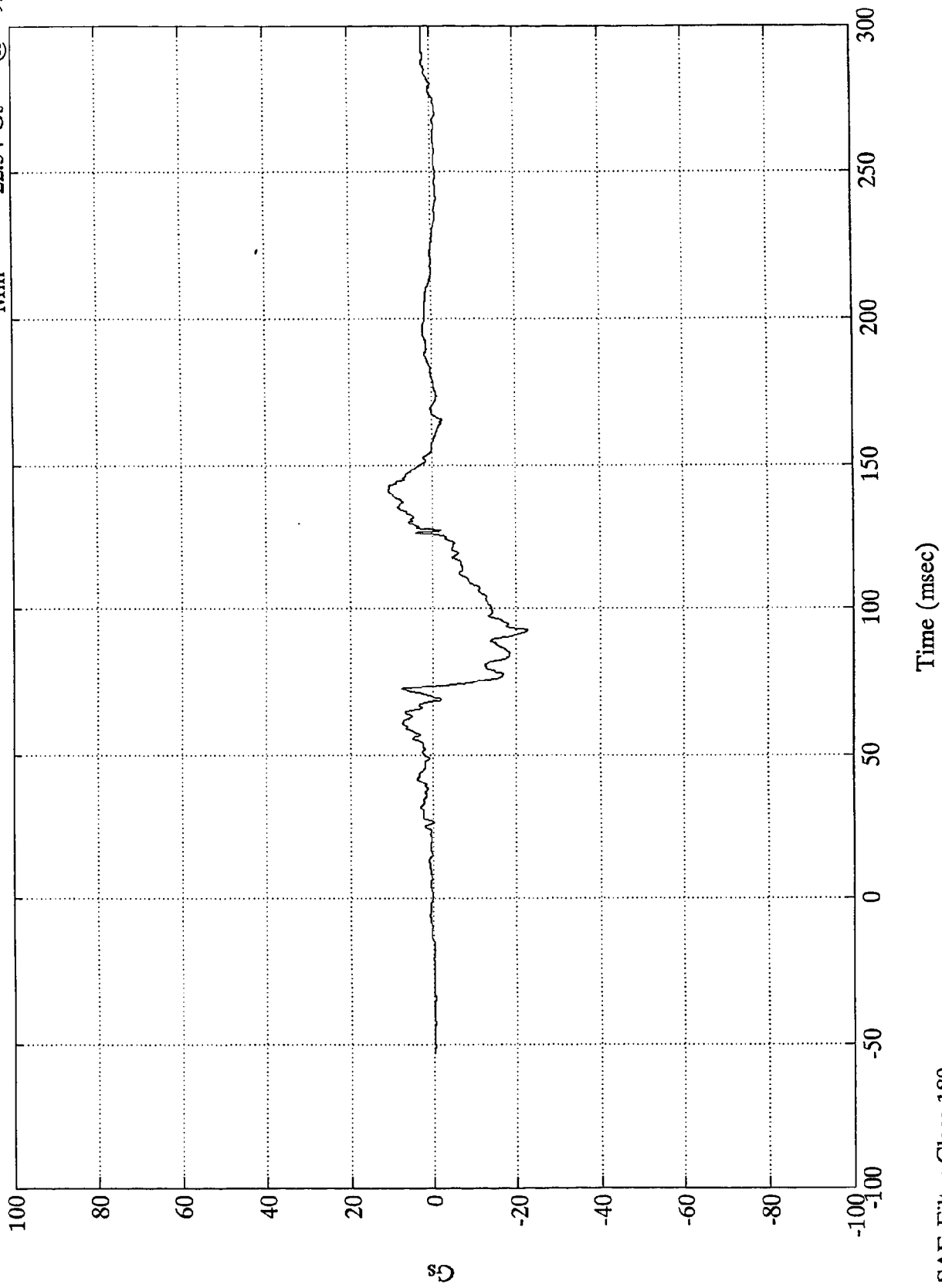
B-85

SAE Filter Class 180

VTV TEST #8

Max = 10.52 Gs @ 141.24 msec
Min = -22.54 Gs @ 92.40 msec

V1-P1 Chest Y



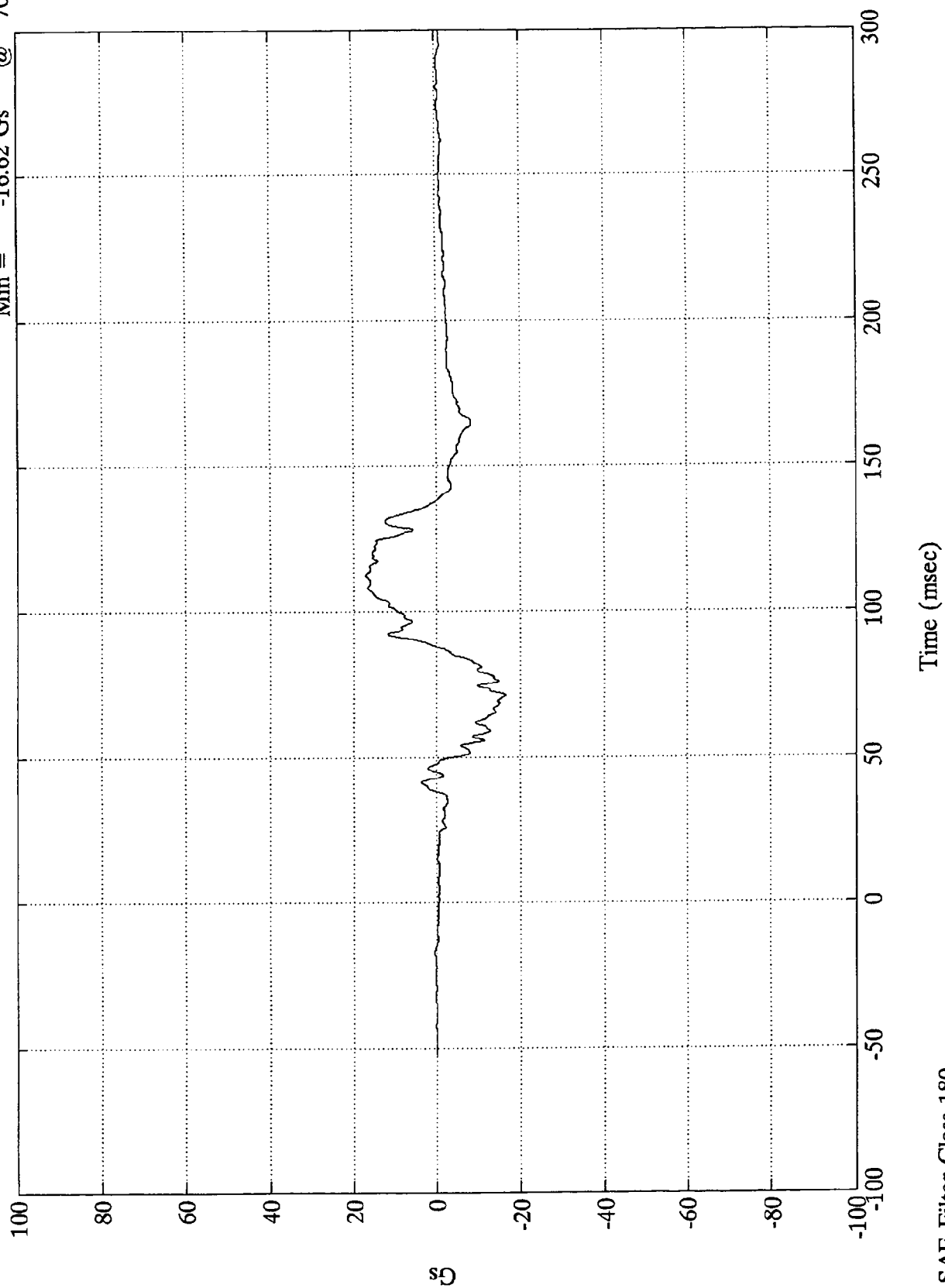
SAE Filter Class 180

8118-8

VTV TEST #8

Max = 16.99 Gs @ 112.80 msec
Min = -16.62 Gs @ 70.92 msec

V1-P1 Chest Z



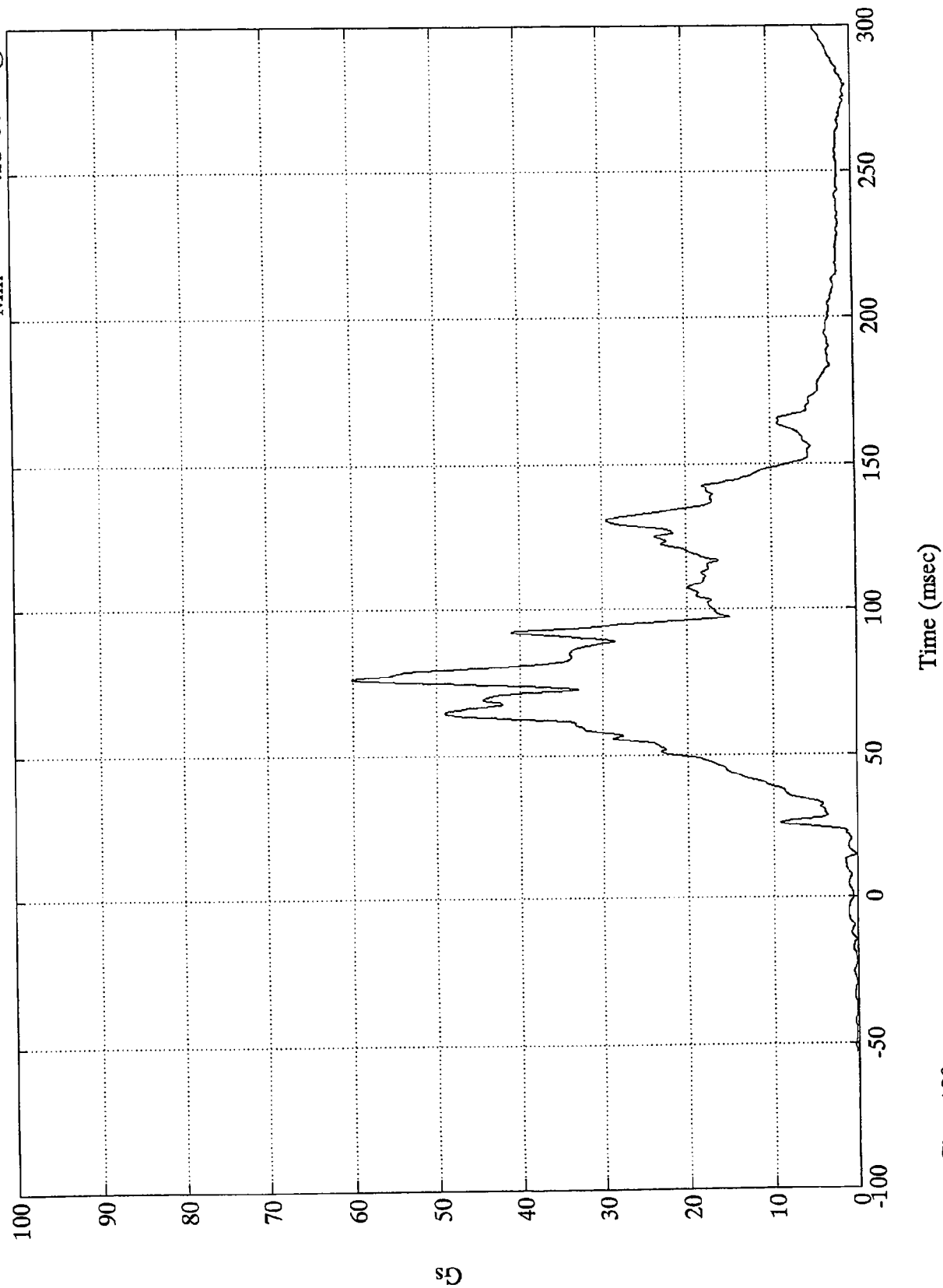
8118-8

SAE Filter Class 180

VTV TEST #8

Max = 60.11 Gs @ 76.08 msec
Min = .11 Gs @ -14.52 msec

Chest Resultant



SAE Filter Class 180

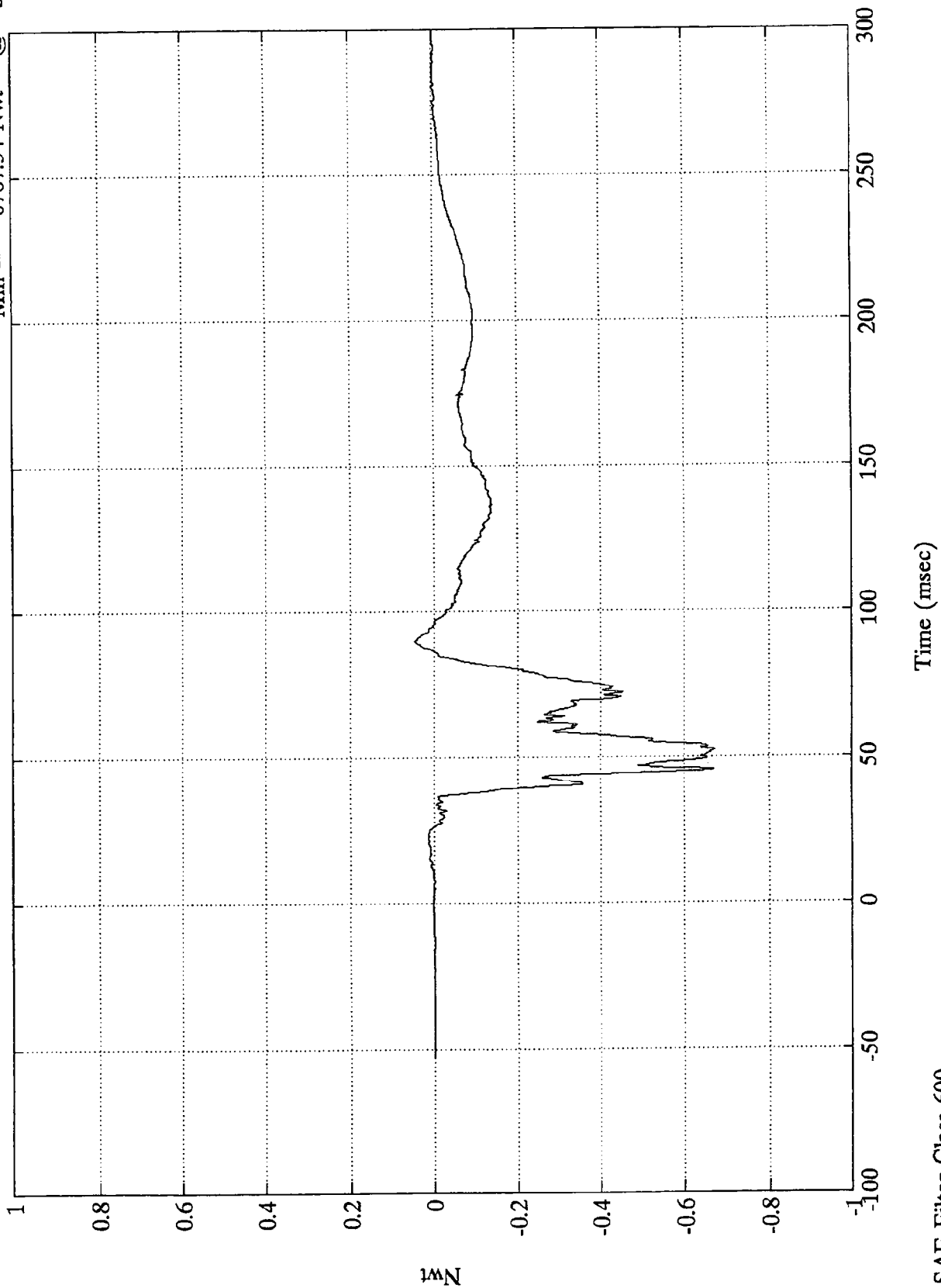
8118-8

VTV TEST #8

$\times 10^4$

V1-P1 Left Femur

Max = 469.03 Nwt @ 89.76 msec
Min = -6707.54 Nwt @ 52.20 msec



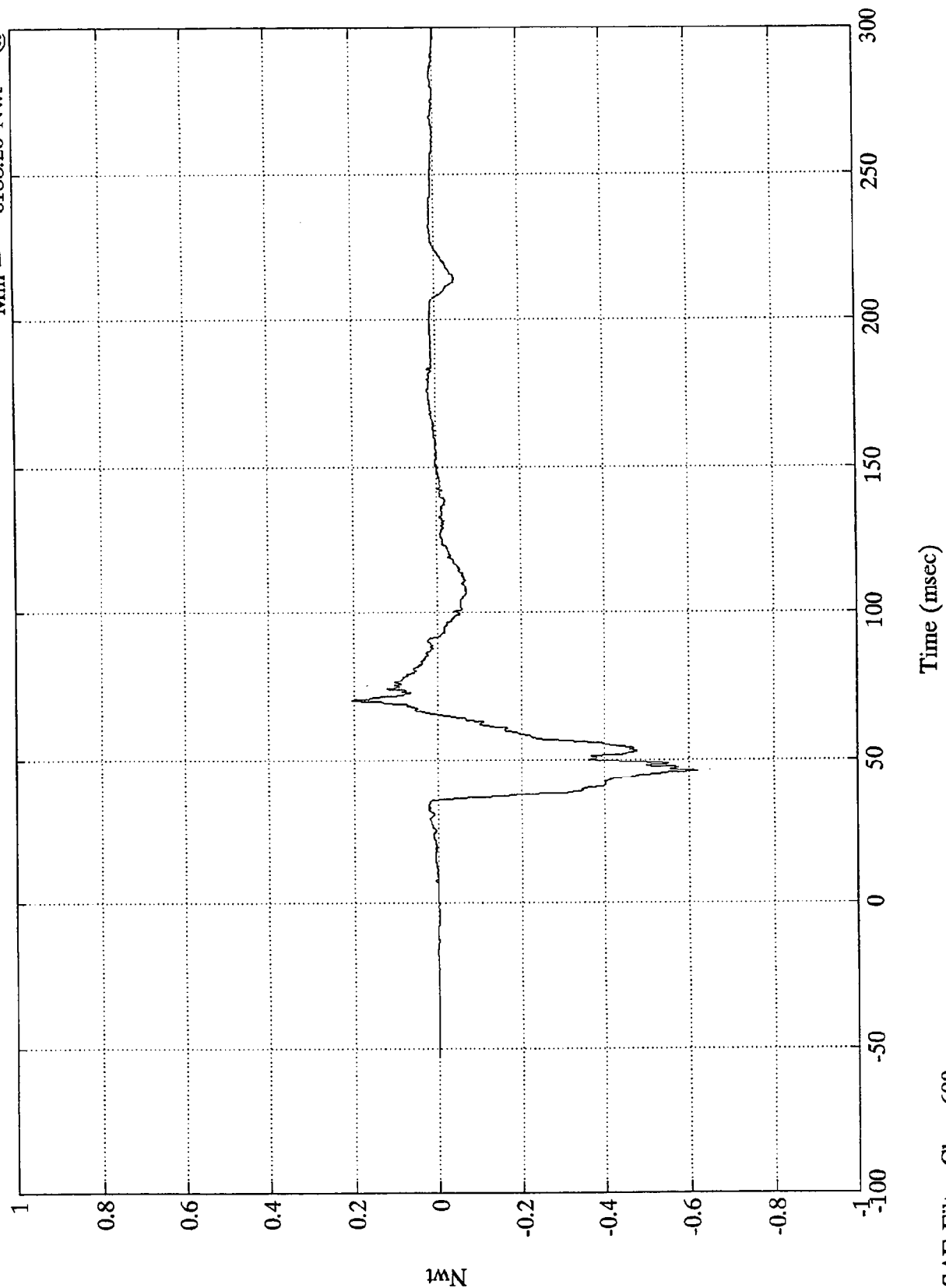
SAE Filter Class 600

8118-8

VTV TEST #8

$\times 10^4$

V1-P1 Right Femur
Max = 2037.19 Nwt @ 70.08 msec
Min = -6188.20 Nwt @ 46.20 msec



SAE Filter Class 600

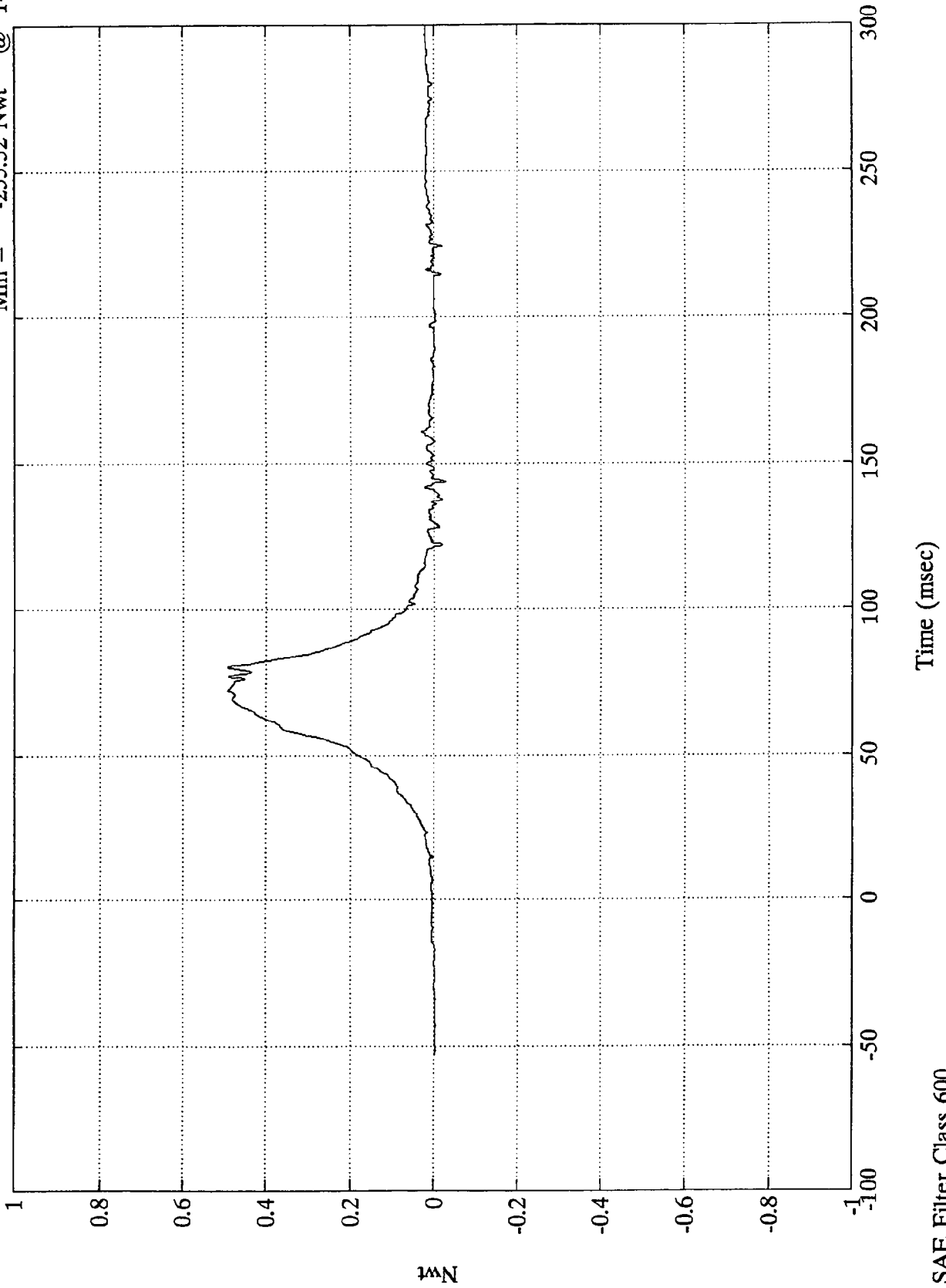
8118-8

VTV TEST #8

$\times 10^4$

V1-P1 Torso Belt Load

Max = 4932.27 Nwt @ 80.40 msec
Min = -255.52 Nwt @ 143.88 msec



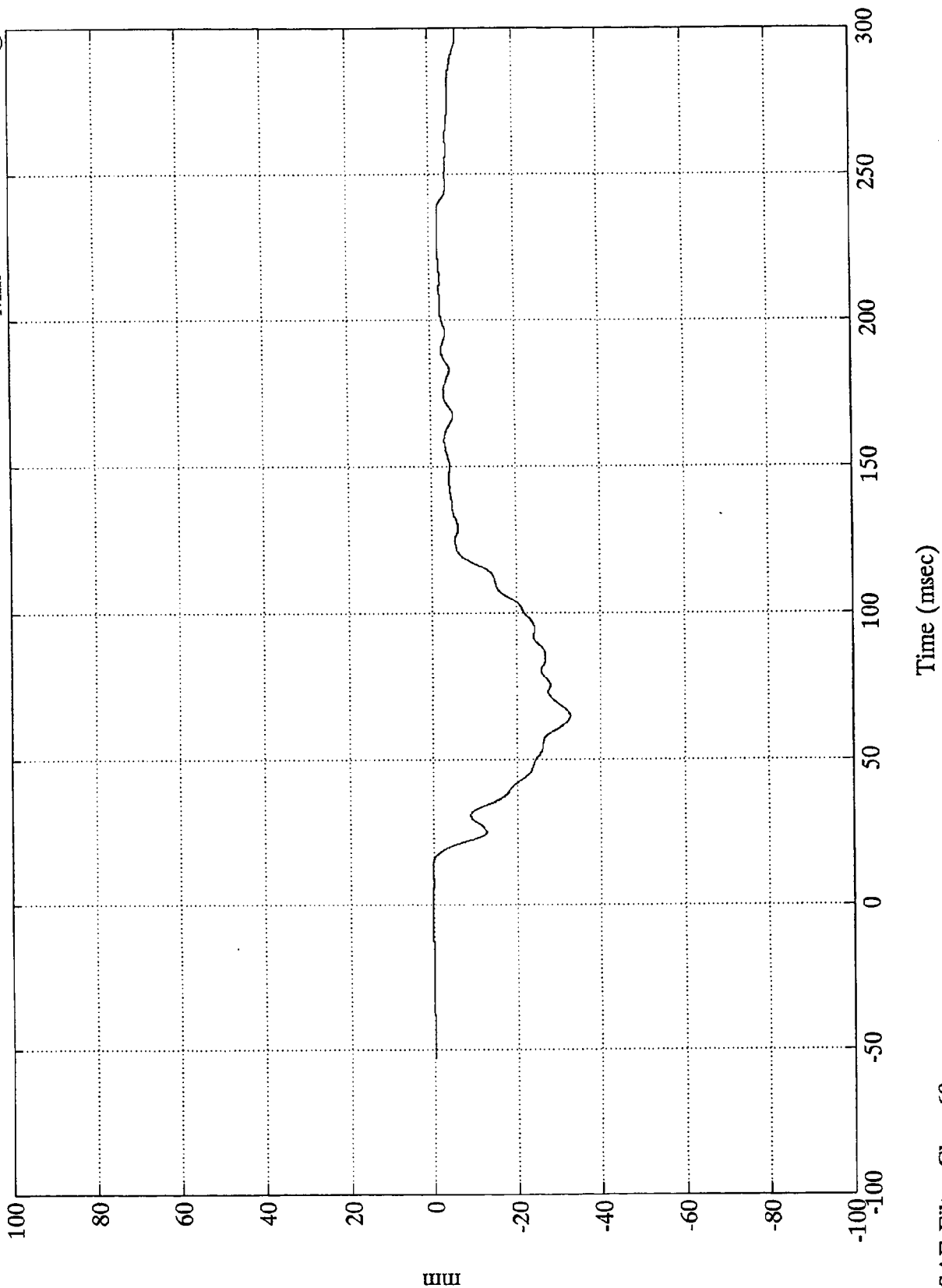
8118-8

SAE Filter Class 600

VTV TEST #8

V1-P1 Chest Disp.

Max = .27 mm @ 13.19 msec
Min = -32.99 mm @ 64.68 msec



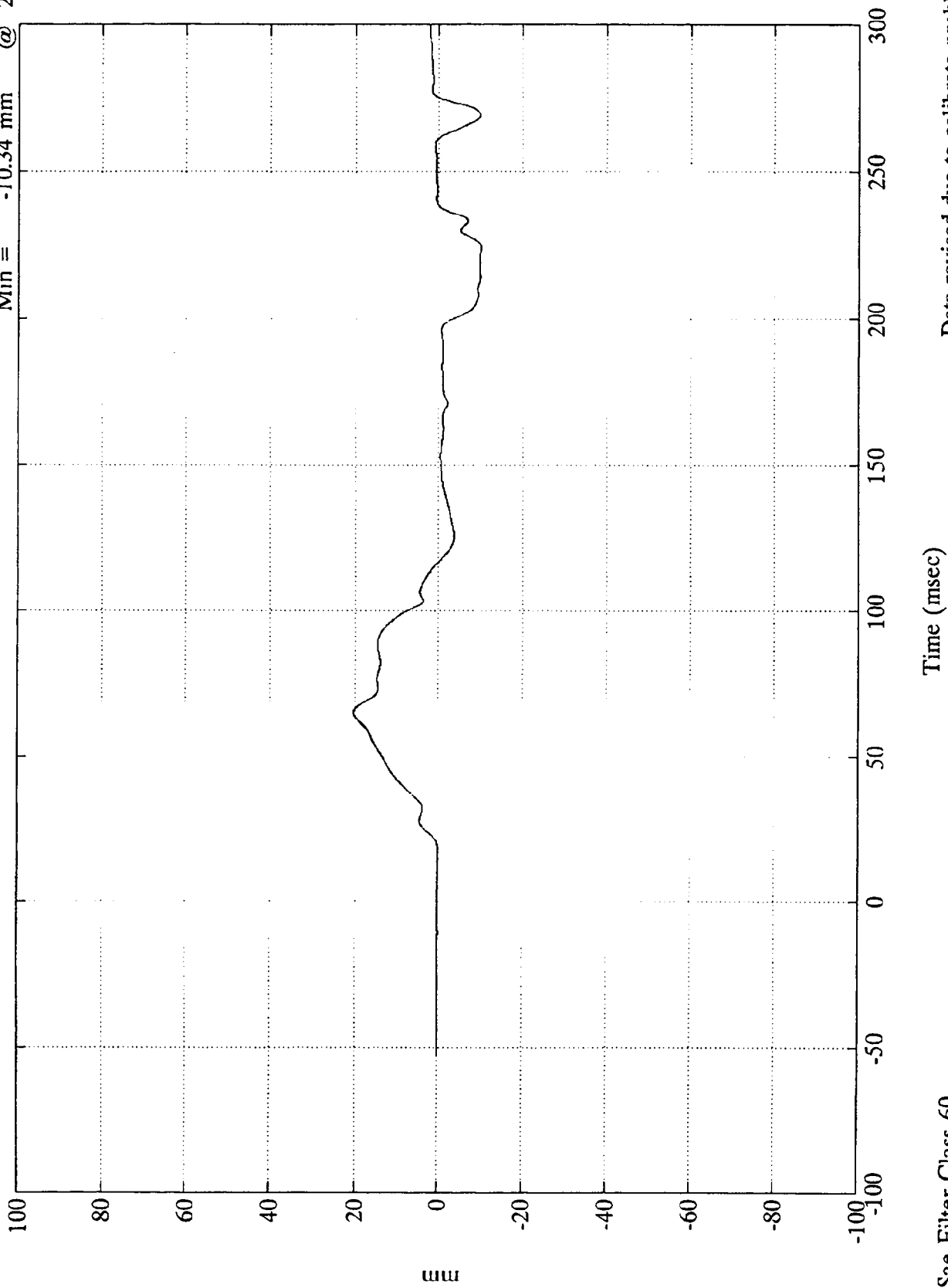
SAE Filter Class 60

8118-8

VTV TEST #8

Chest Displacement #125

Max = 20.39 mm @ 64.80 msec
Min = -10.34 mm @ 223.91 msec



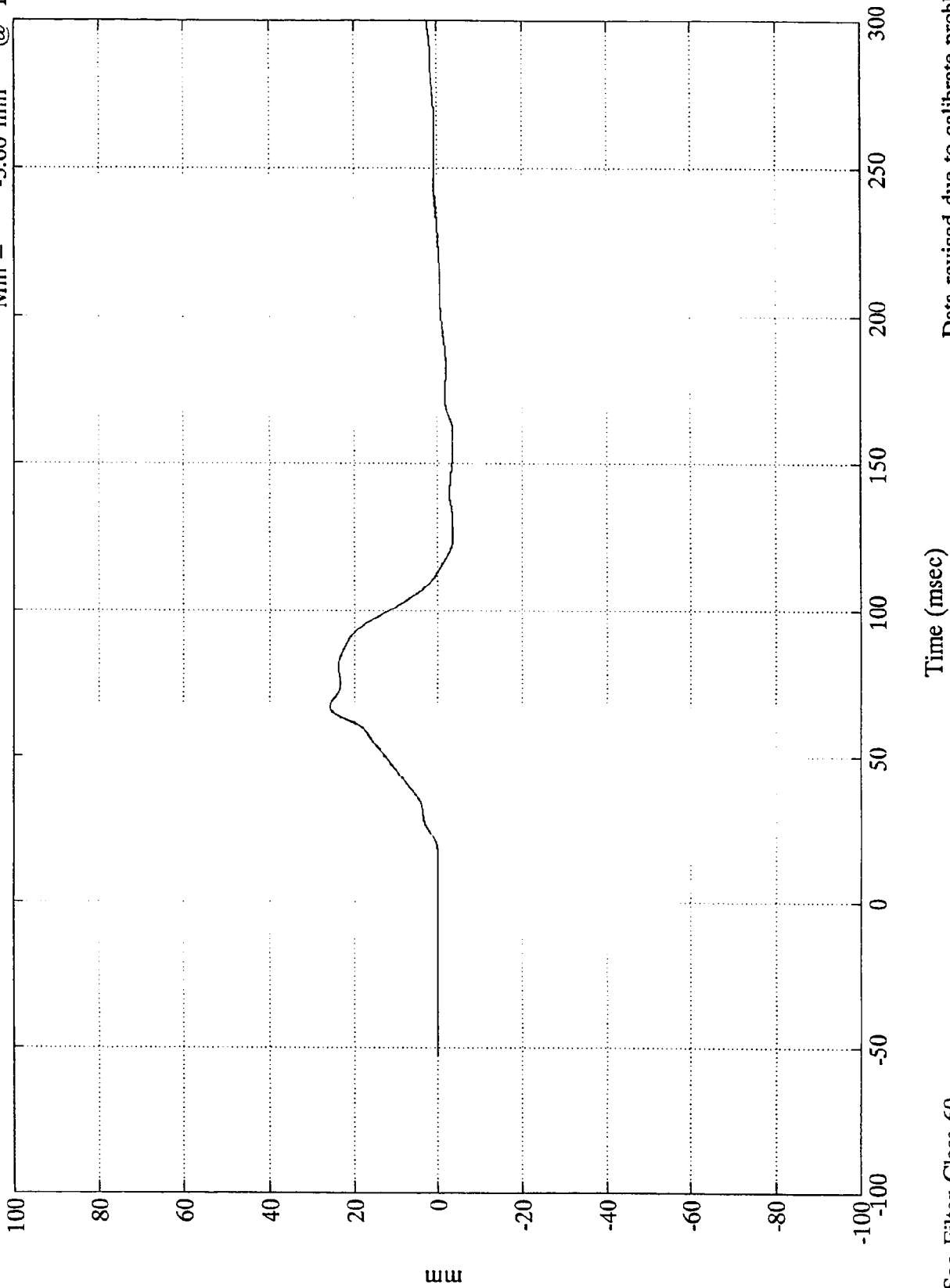
Sae Filter Class 60

Data revised due to calibrate problem

8118-8

VTV TEST #8

Chest Displacement #126
Max = 25.74 mm @ 66.72 msec
Min = -3.66 mm @ 159.12 msec



Data revised due to calibrate problem

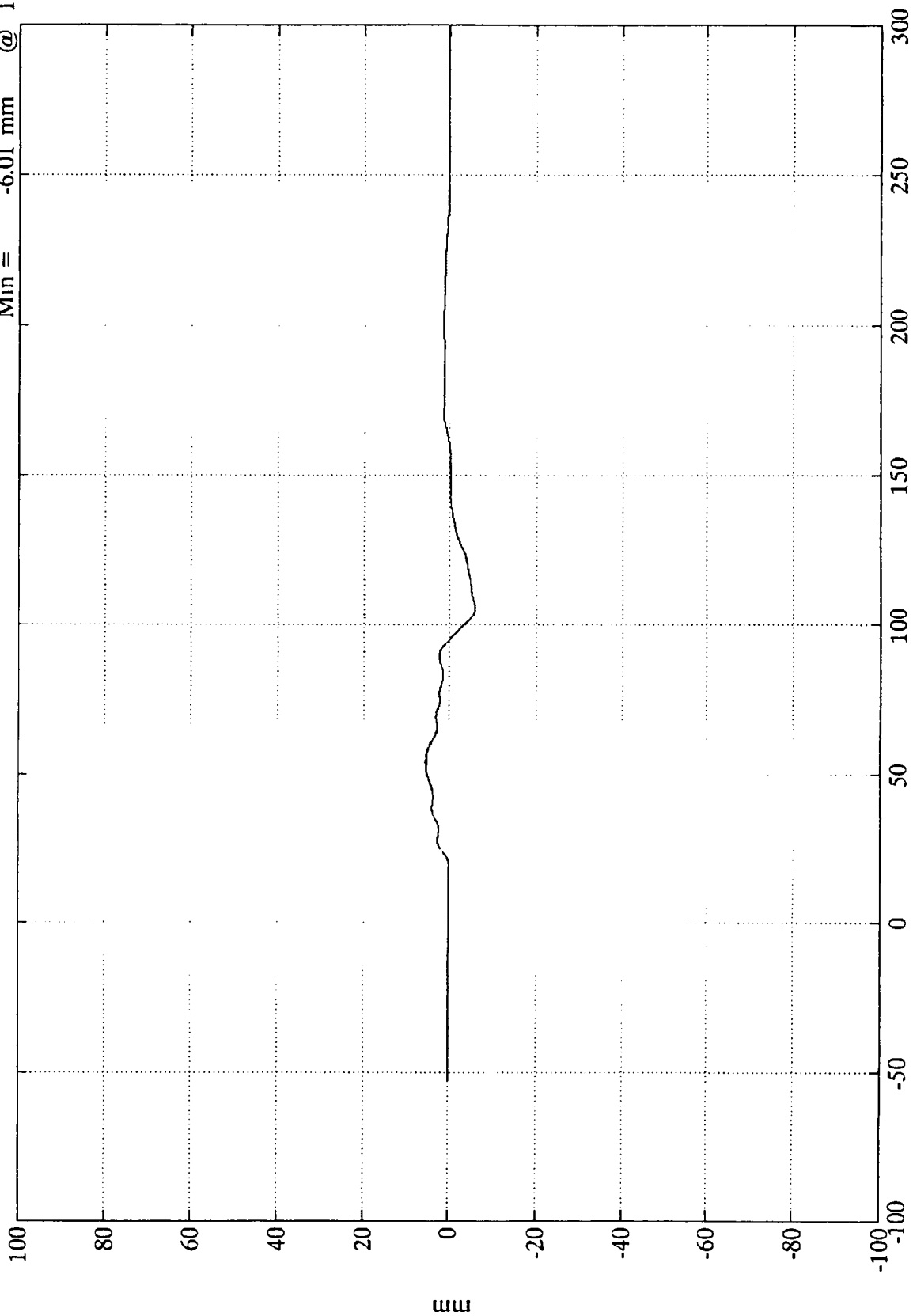
Sae Filter Class 60

8118-8

VTV TEST #8

Chest Displacement #127

Max = 5.28 mm @ 54.00 msec
Min = -6.01 mm @ 105.96 msec



Time (msec)

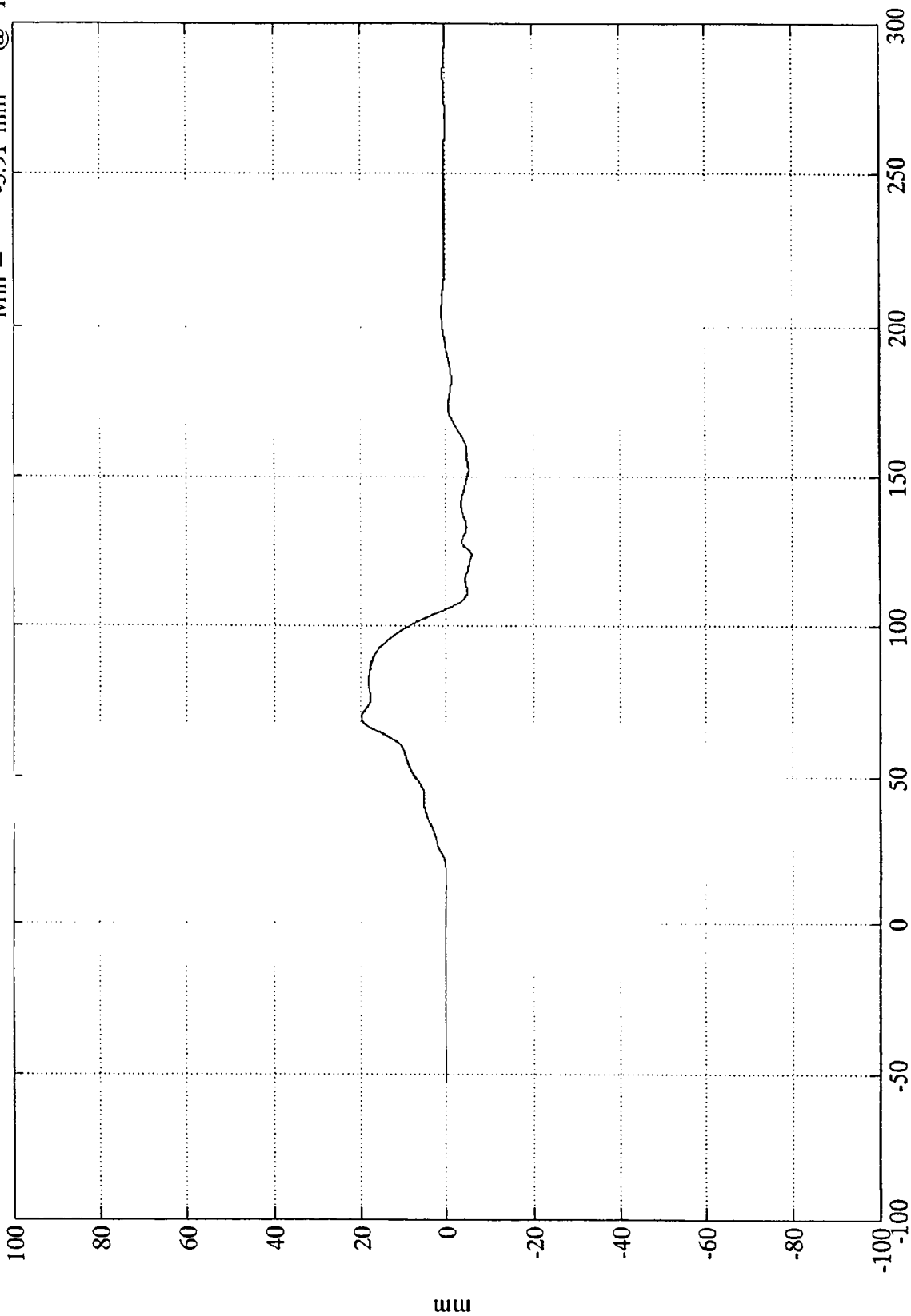
Sae Filter Class 60

Data revised due to calibrate problem

8118-8

VTV TEST #8

Chest Displacement #128
 Max = 19.80 mm @ 69.48 msec
 Min = -5.91 mm @ 123.48 msec



Time (msec)

Data revised due to calibrate problem

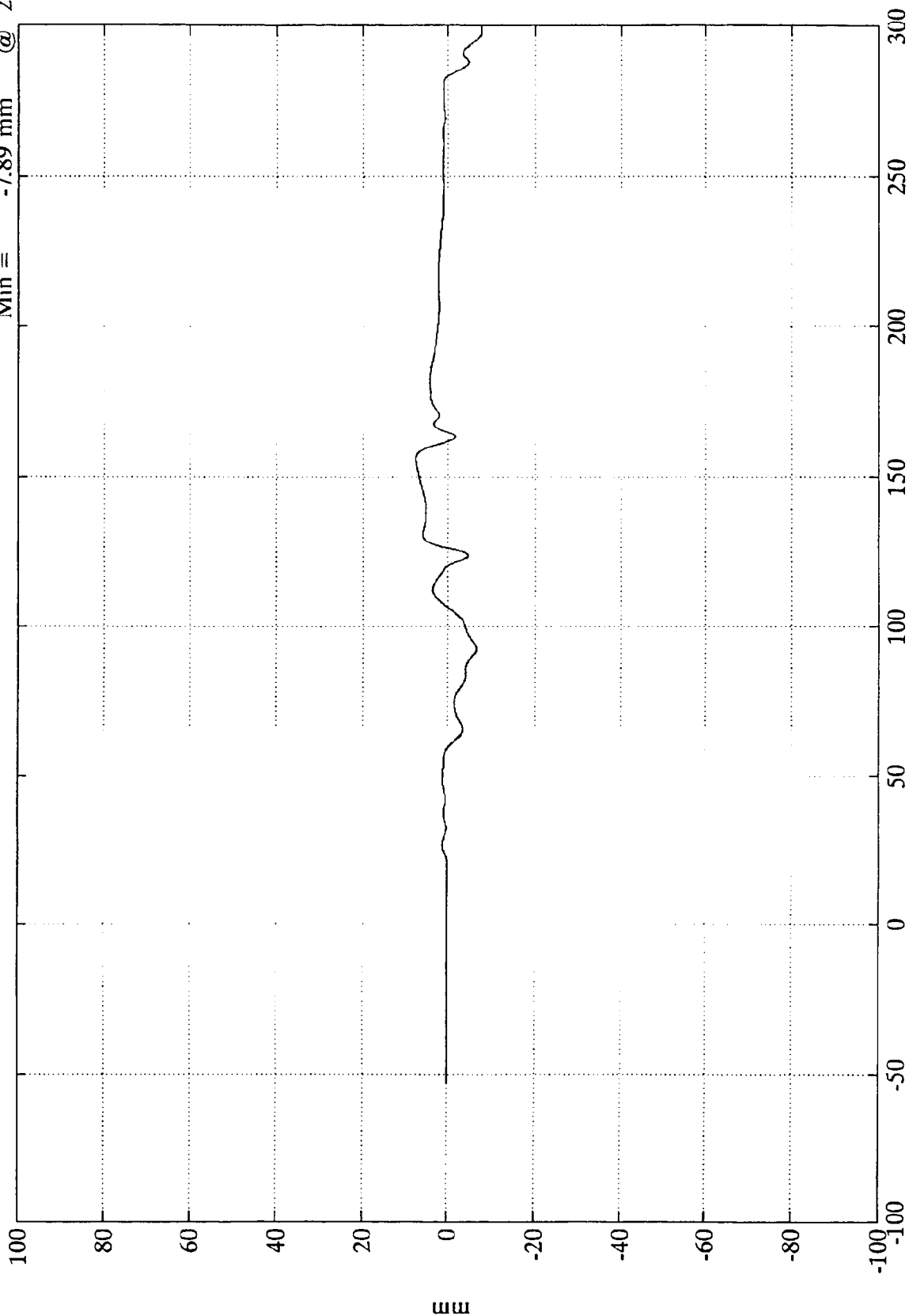
Sae Filter Class 60

8118-8

VTV TEST #8

Chest Displacement #129

Max = 7.56 mm @ 156.00 msec
Min = -7.89 mm @ 298.56 msec



Time (msec)

Sae Filter Class 60

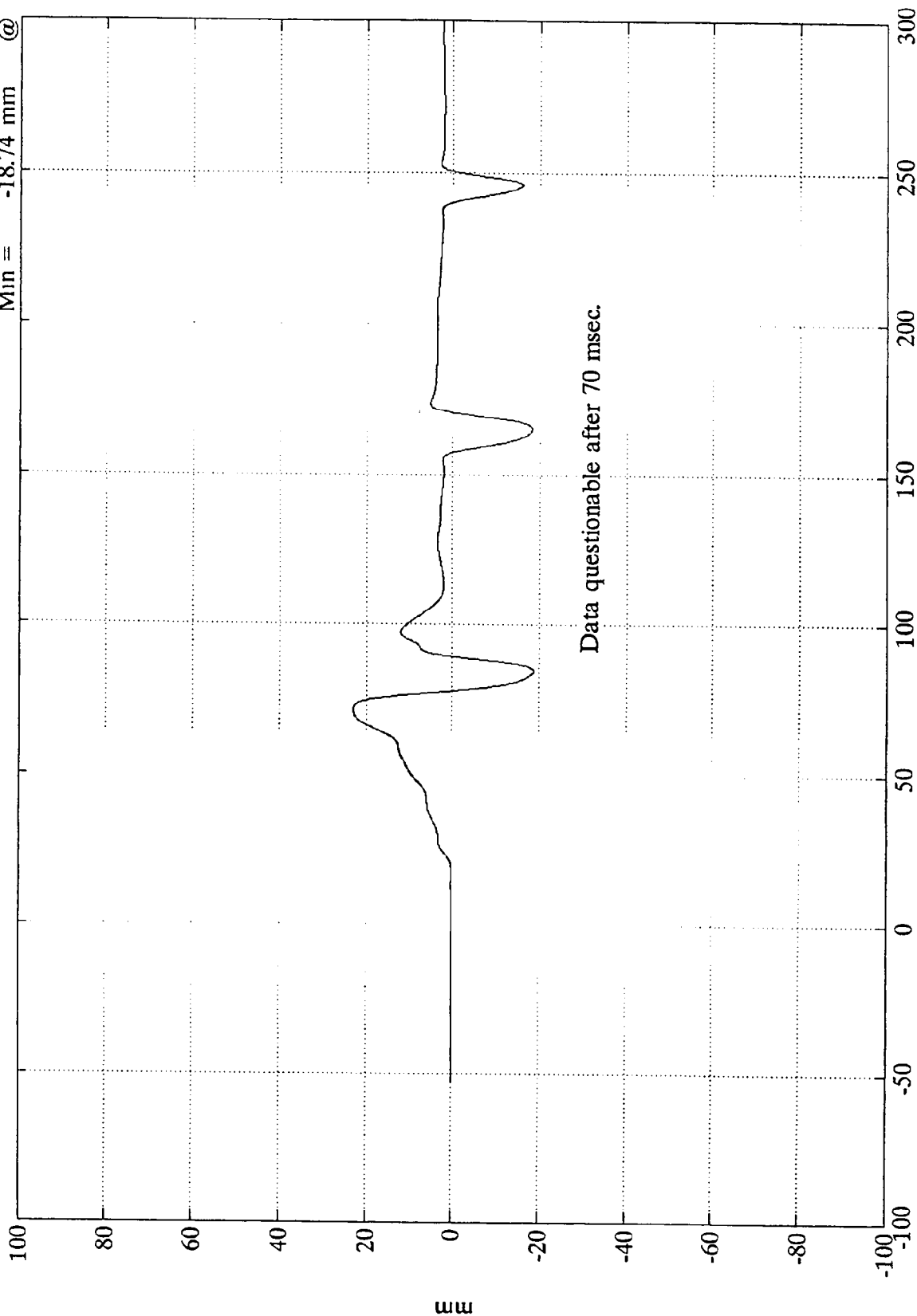
Data revised due to calibrate problem

8118-8

VTV TEST #8

Chest Displacement #130

Max = 23.05 mm @ 71.88 msec
 Min = -18.74 mm @ 85.08 msec



Time (msec)

Data revised due to calibrate problem

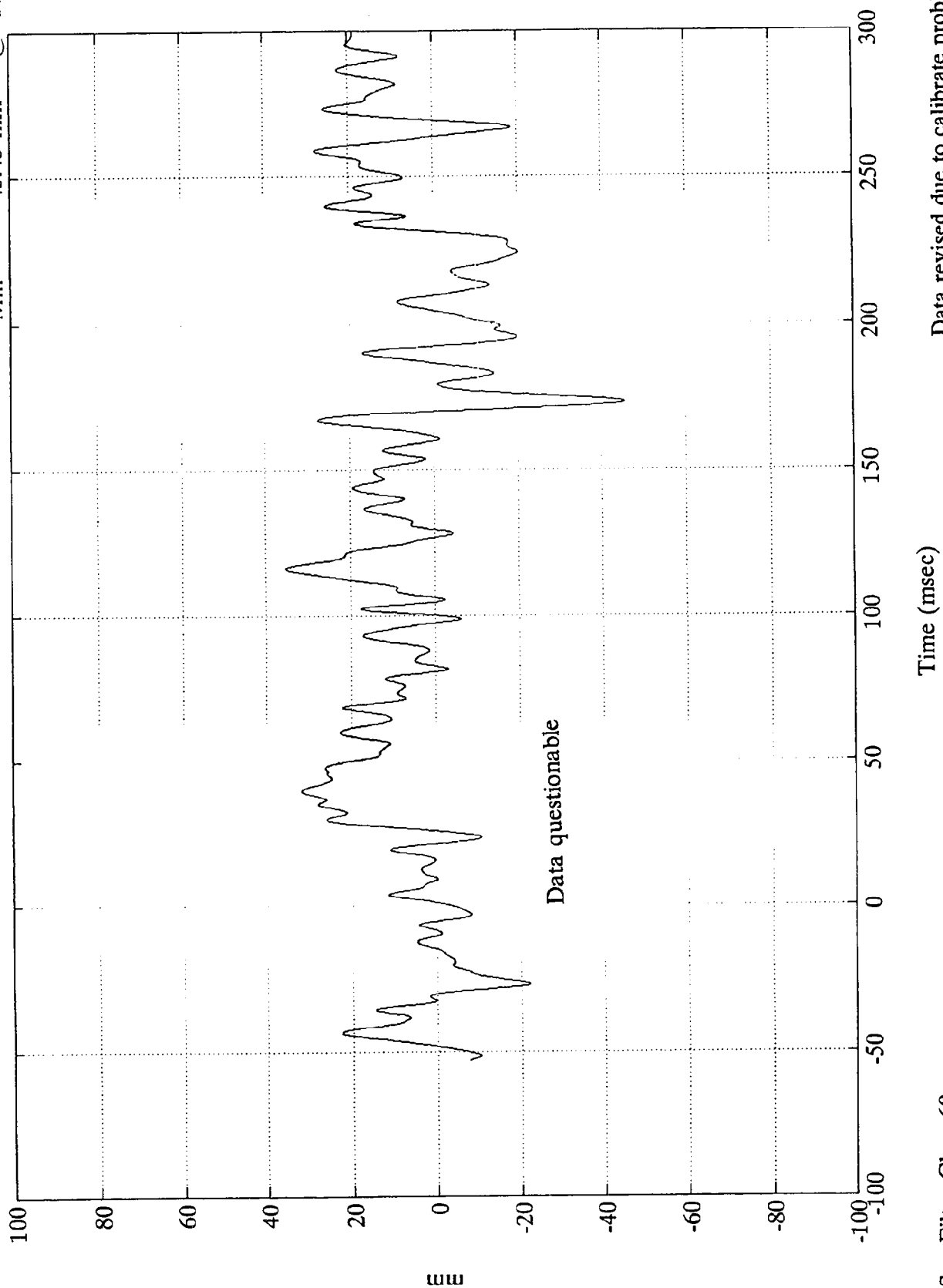
Sae Filter Class 60

8118-8

VTV TEST #8

Chest Displacement #131

Max = 35.40 mm @ 116.40 msec
Min = -45.43 mm @ 173.16 msec



Data revised due to calibrate problem

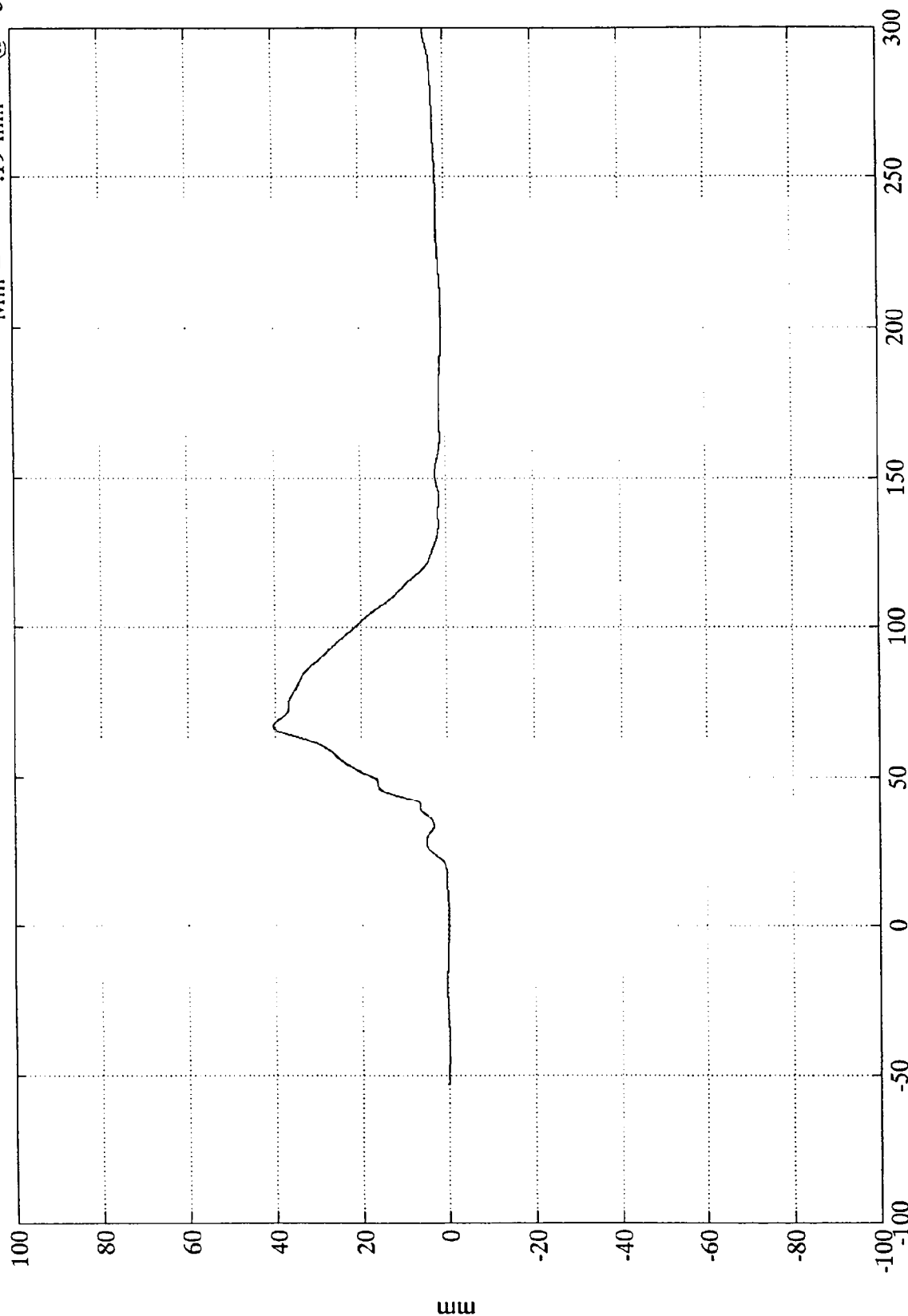
Sae Filter Class 60

8118-8

VTV TEST #8

Max = 40.53 mm @ 66.95 msec
Min = -19 mm @ -37.80 msec

Chest Displacement #132



Time (msec)

Data revised due to calibrate problem

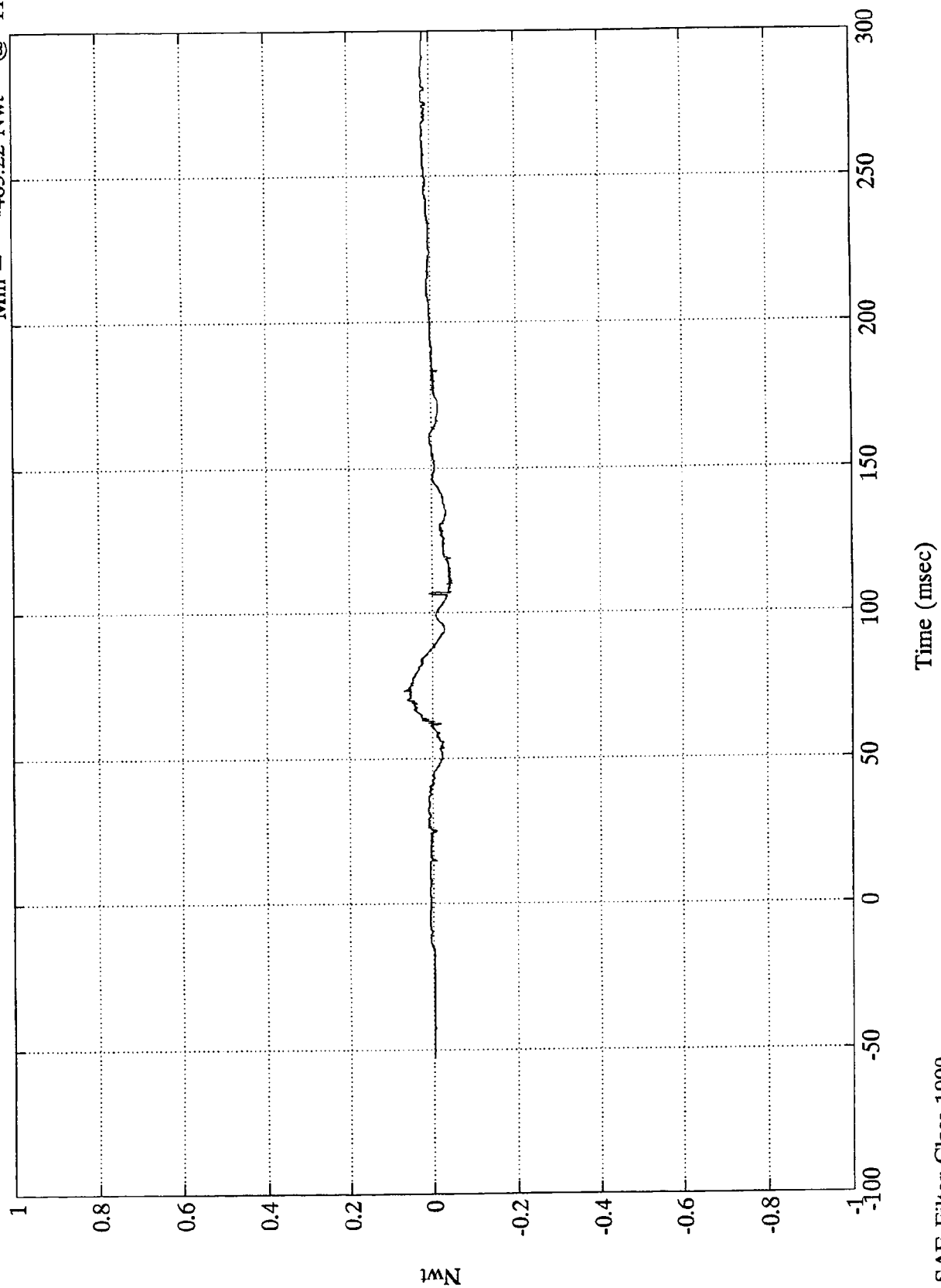
Sae Filter Class 60

8118-8

VTV TEST #8
x10⁴

V1-P1 Upper Neck Fx

Max = 672.19 Nwt @ 73.08 msec
Min = -465.22 Nwt @ 111.48 msec



8118-8

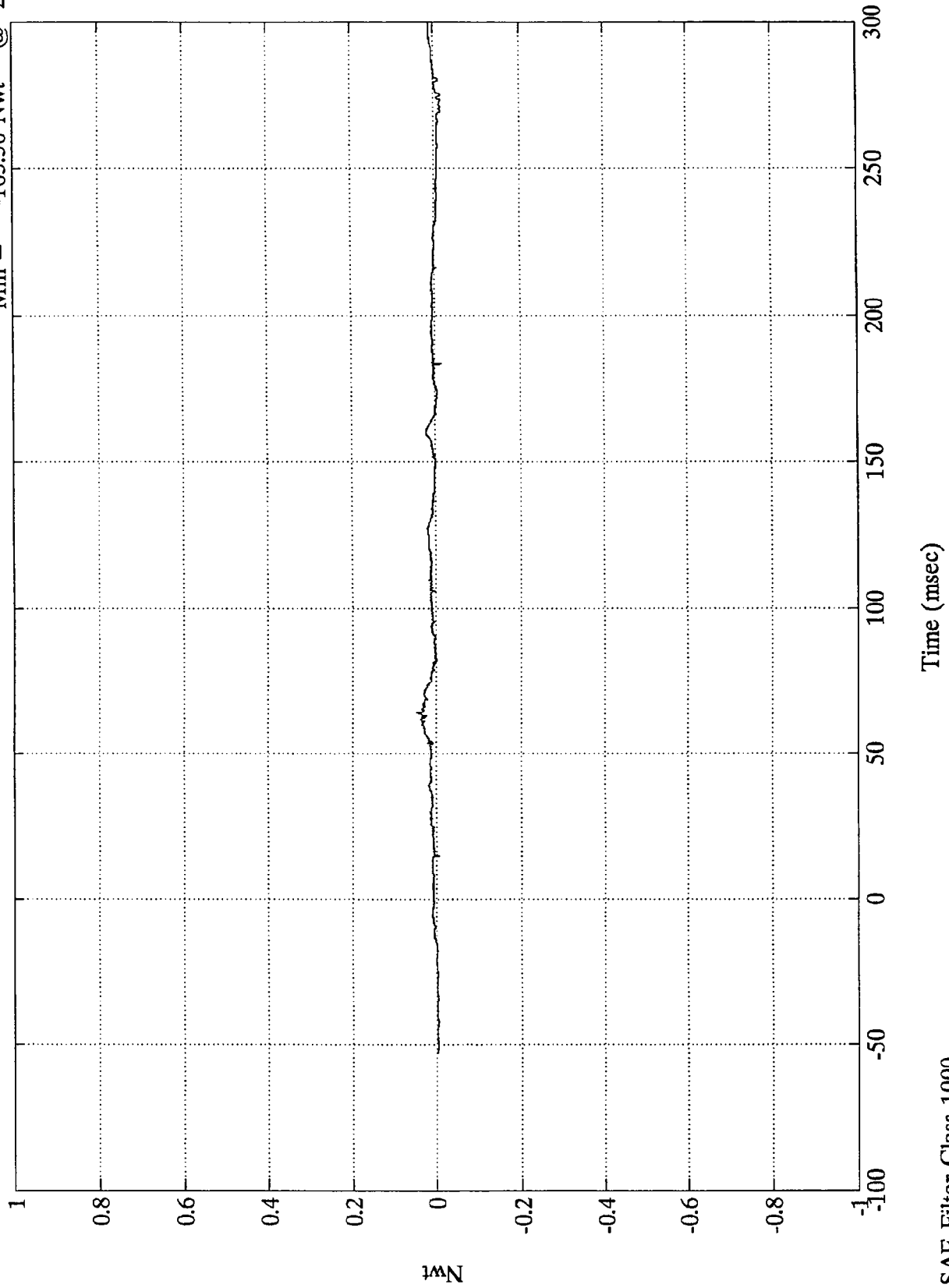
SAE Filter Class 1000

VTV TEST #8

$\times 10^4$

V1-P1 Upper Neck Fy

Max = 470.38 Nwt @ 63.72 msec
Min = -163.50 Nwt @ 273.48 msec



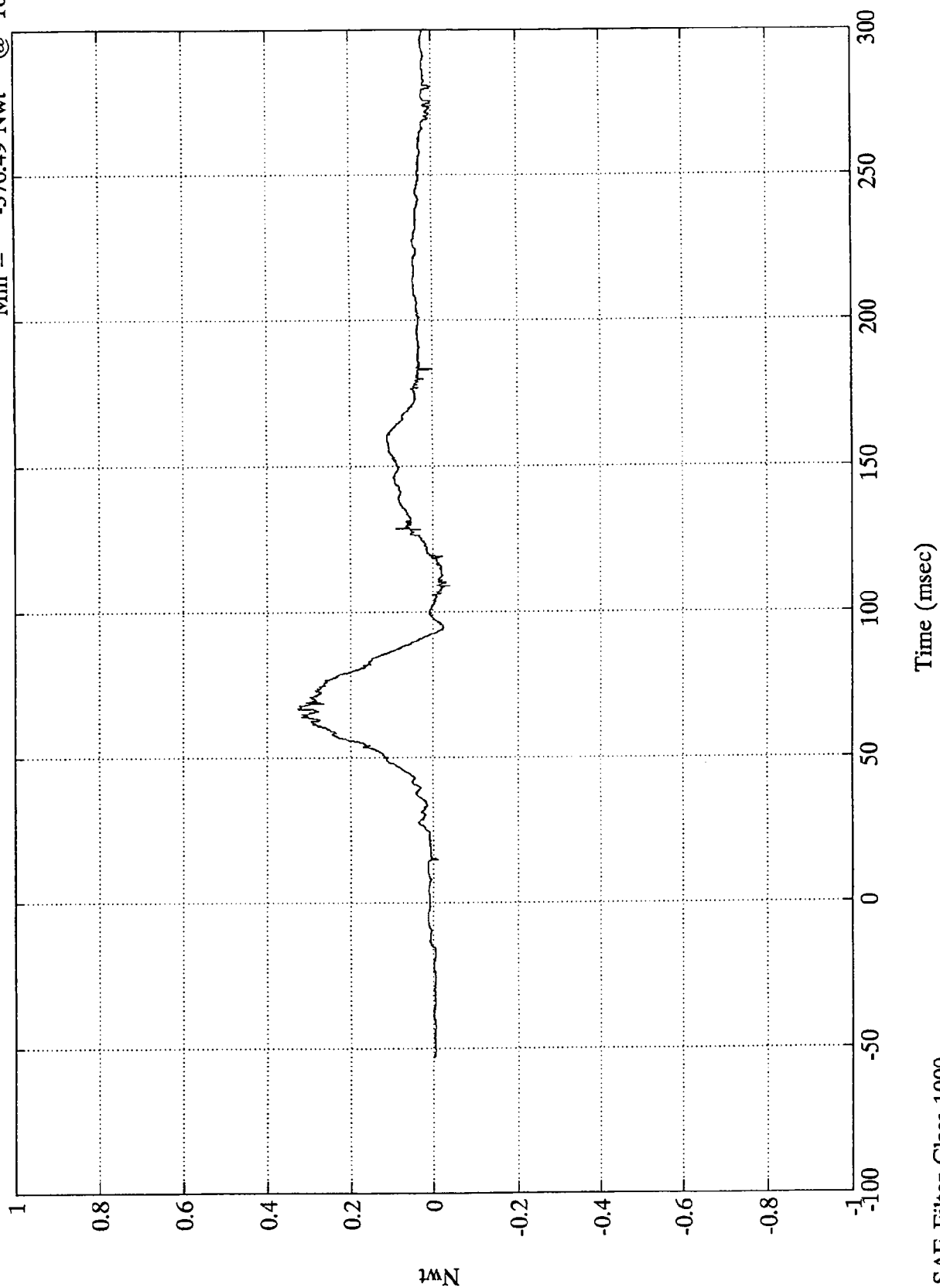
8118-8

SAE Filter Class 1000

VTV TEST #8
x10⁴

V1-P1 Upper Neck Fz

Max = 3265.41 Nwt @ 66.72 msec
Min = -370.49 Nwt @ 109.19 msec



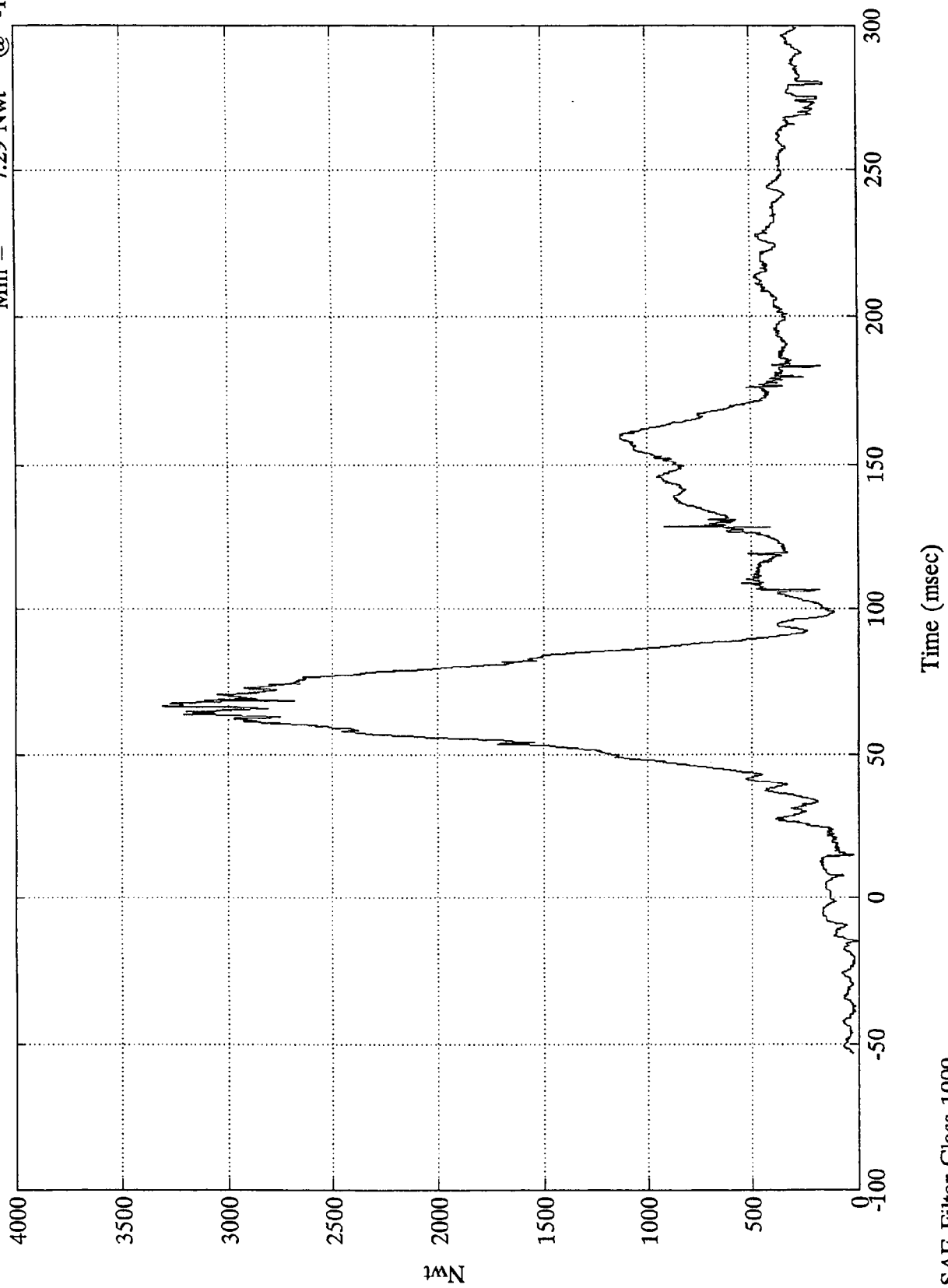
8118-8

SAE Filter Class 1000

VTV TEST #8

Upper Neck Force Res.

Max = 3306.36 Nwt @ 66.72 msec
Min = 7.29 Nwt @ -14.88 msec



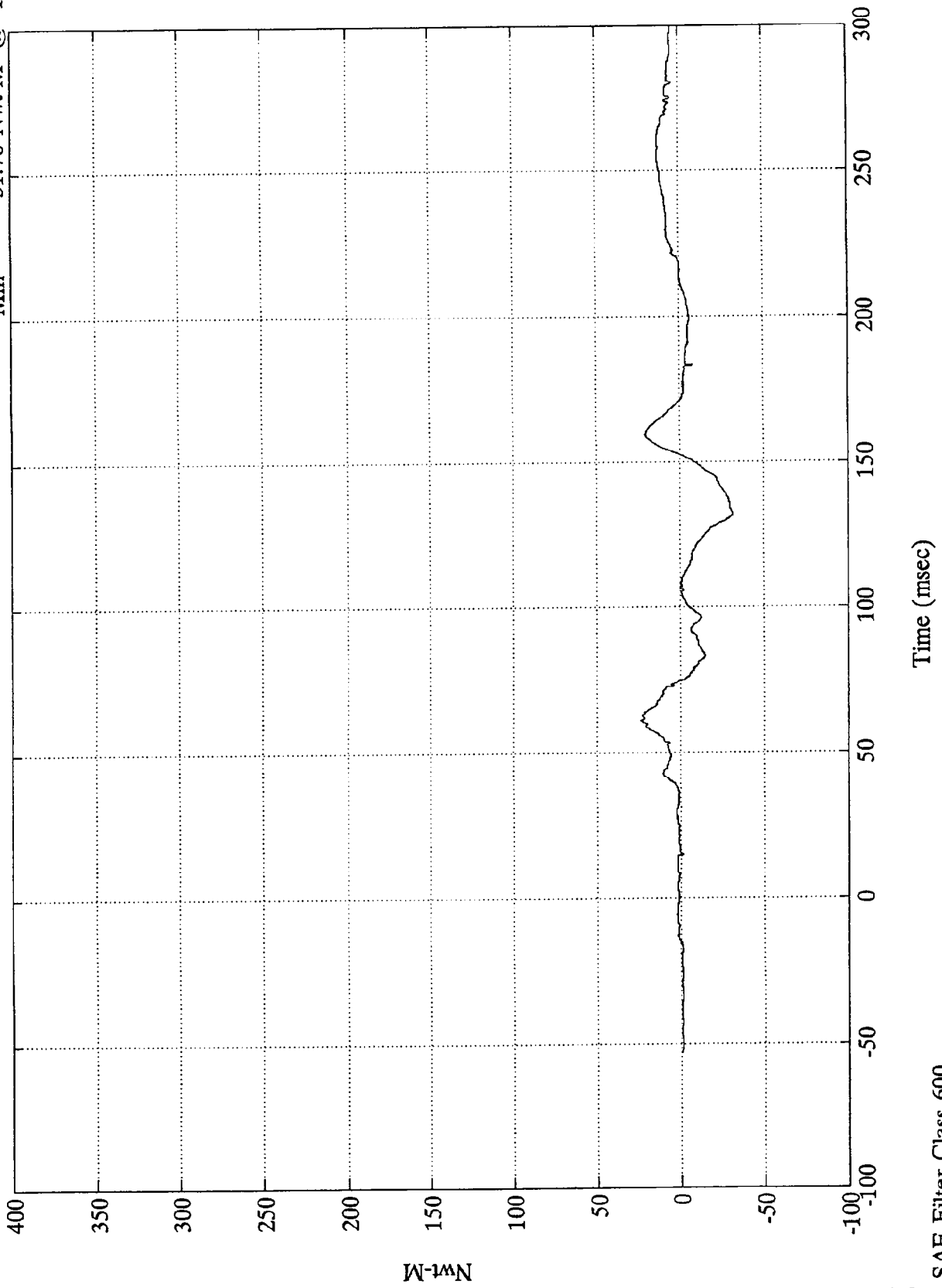
8118-8

SAE Filter Class 1000

VTV TEST #8

V1-P1 Upper Neck Mx

Max = 24.26 Nwt-M @ 60.72 msec
Min = -31.70 Nwt-M @ 132.00 msec

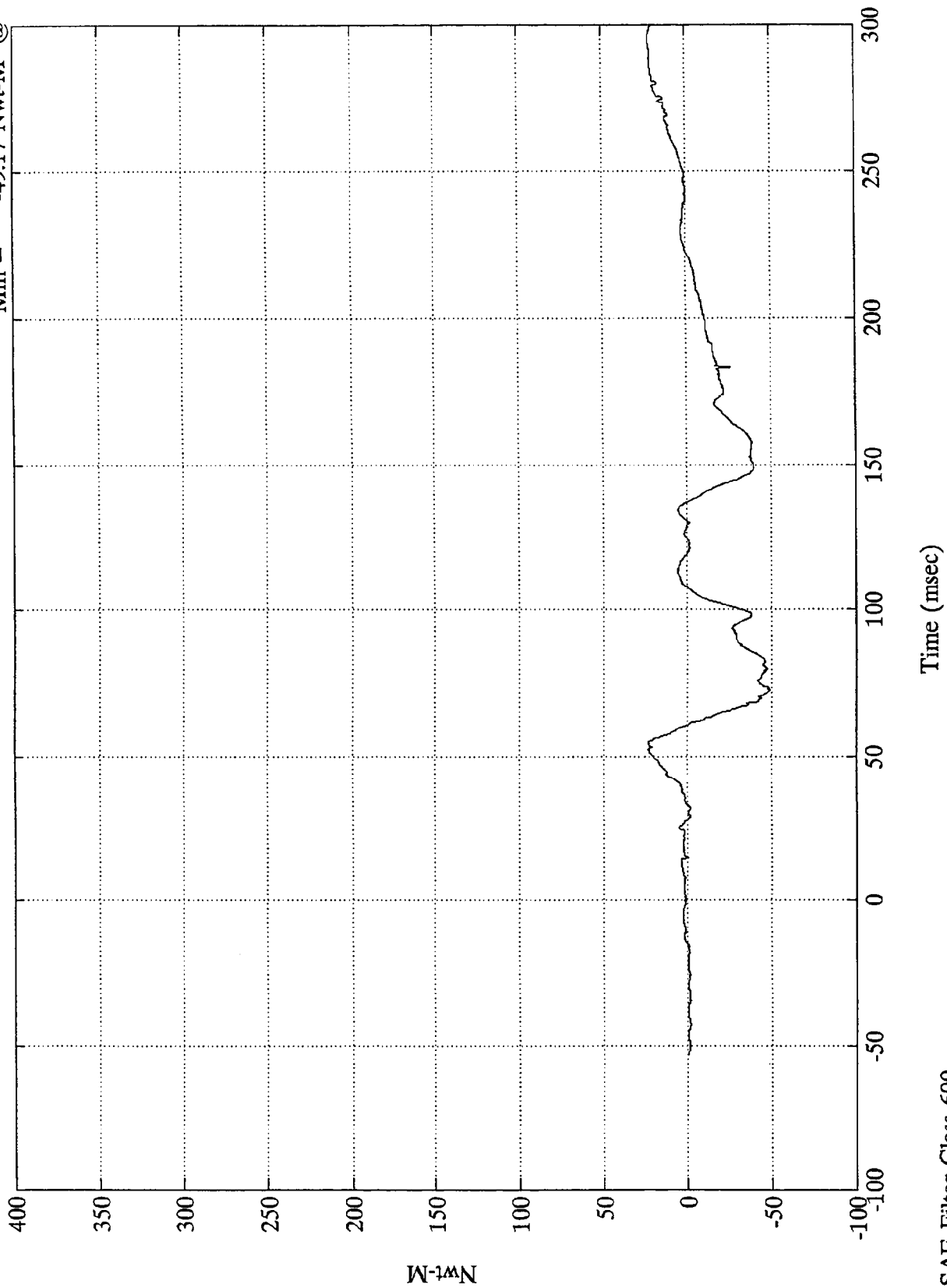


8118-8

VTV TEST #8

V1-P1 Upper Neck My

Max = 23.66 Nwt-M @ 52.56 msec
 Min = -49.17 Nwt-M @ 72.36 msec



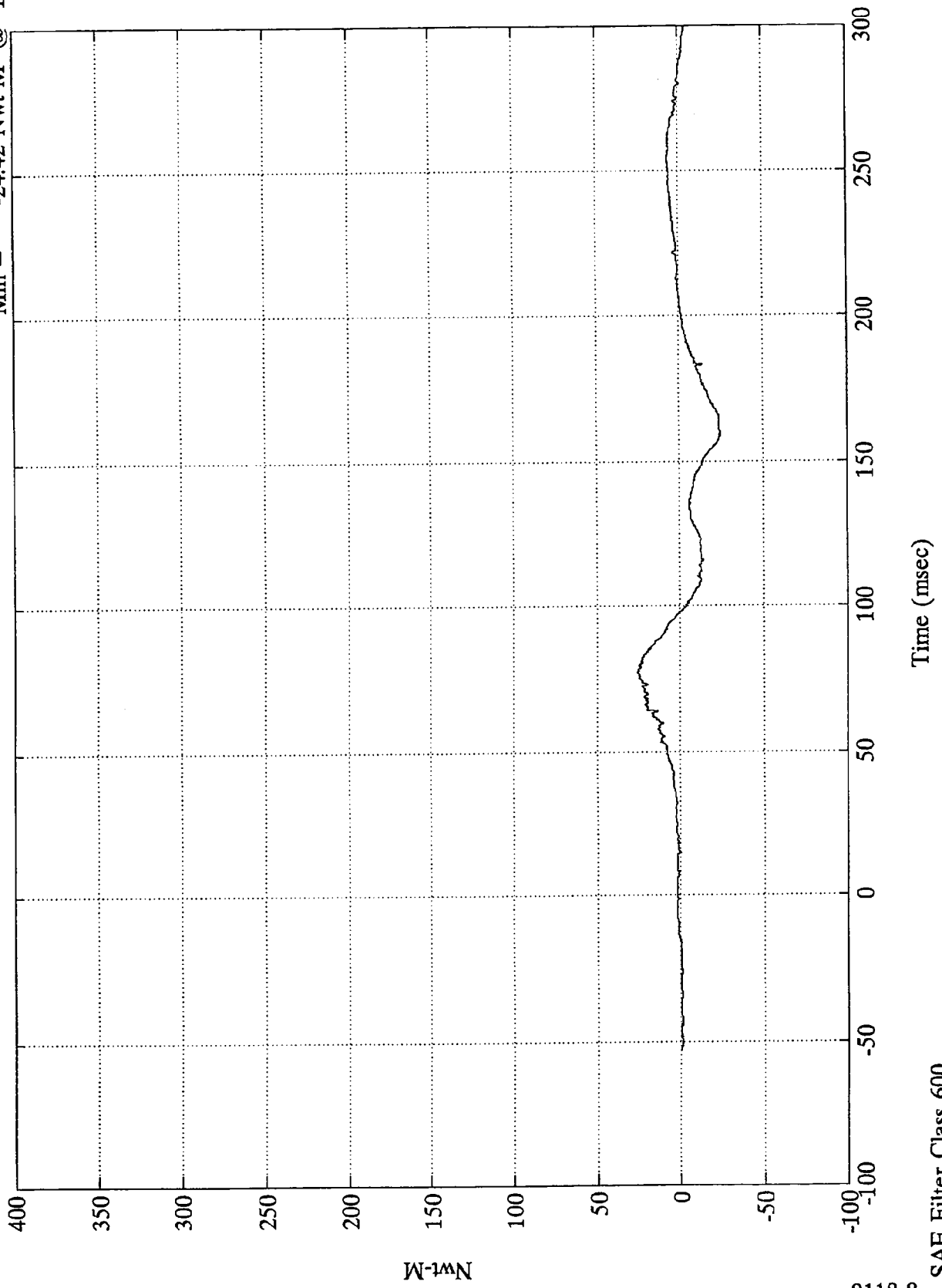
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P1 Upper Neck Mz

Max = 25.89 Nwt-M @ 77.40 msec
Min = -24.42 Nwt-M @ 160.19 msec



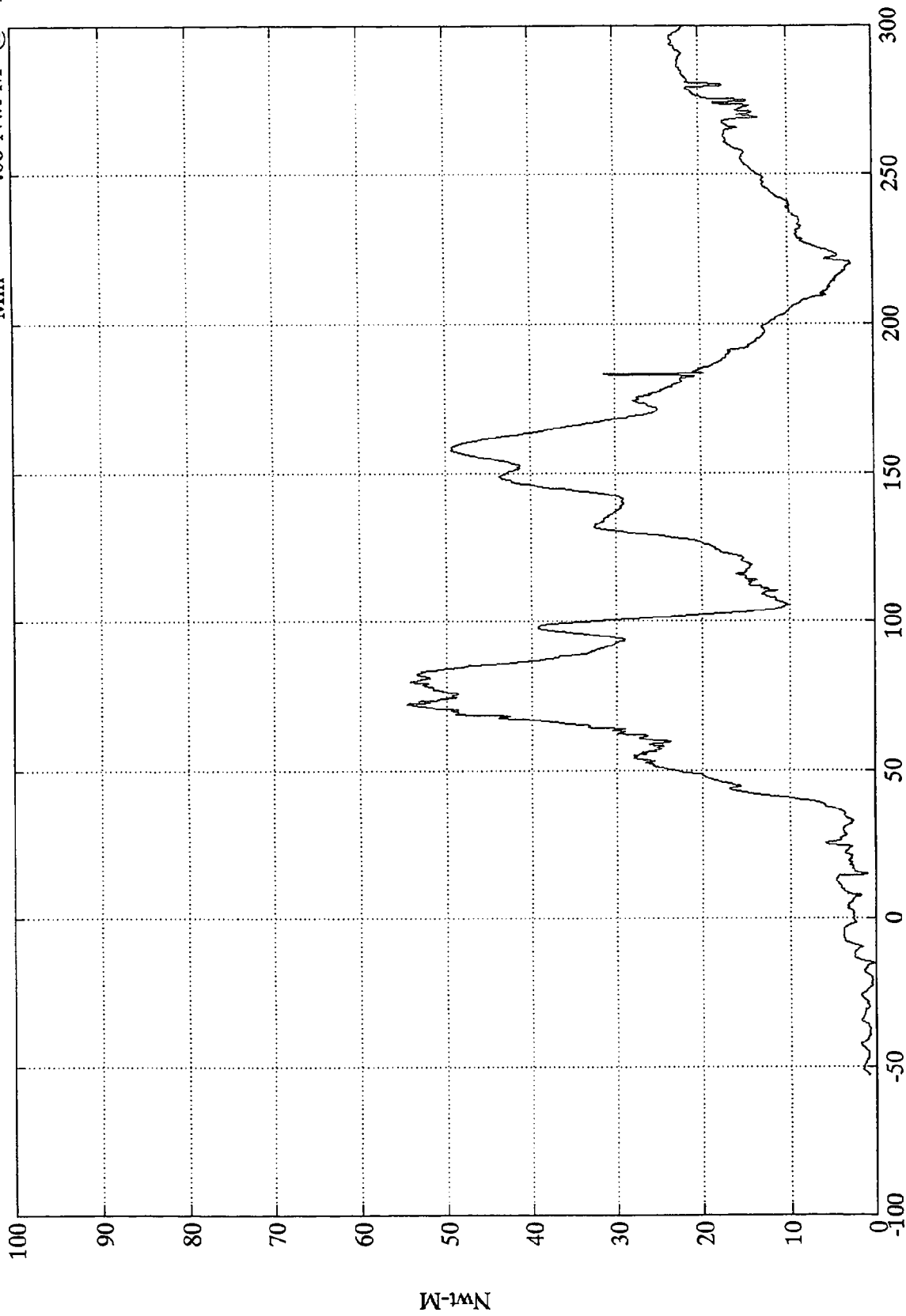
8118-8

SAE Filter Class 600

VTV TEST #8

Max = 54.55 Nwt-M @ 72.36 msec
Min = .08 Nwt-M @ -15.00 msec

Upper Neck Moment Res.



Time (msec)

SAE Filter Class 600

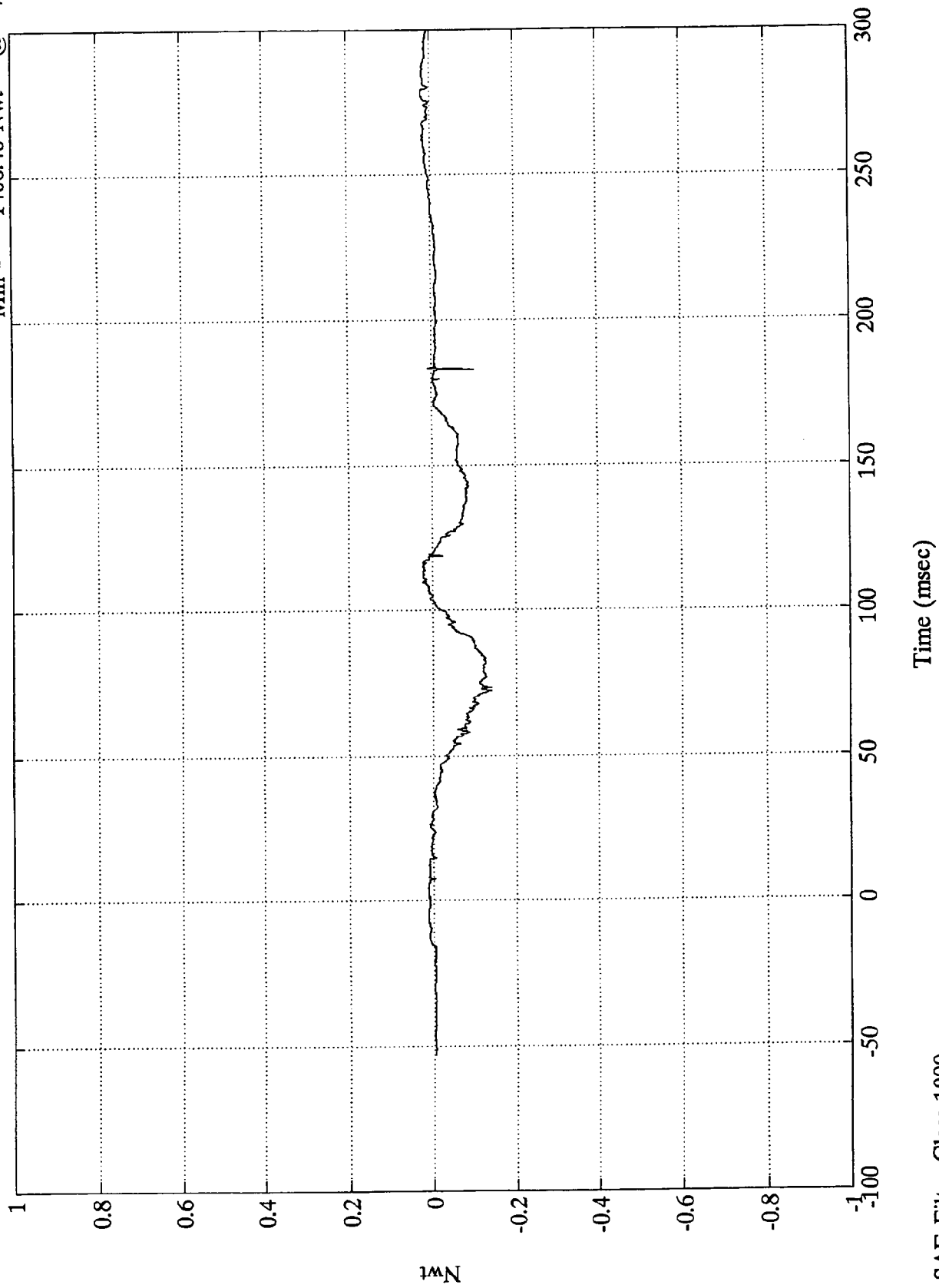
8118-8

VTV TEST #8

$\times 10^4$

V1-P1 Lower Neck Fx

Max = 236.72 Nwt @ 116.88 msec
Min = -1406.40 Nwt @ 72.48 msec



SAE Filter Class 1000

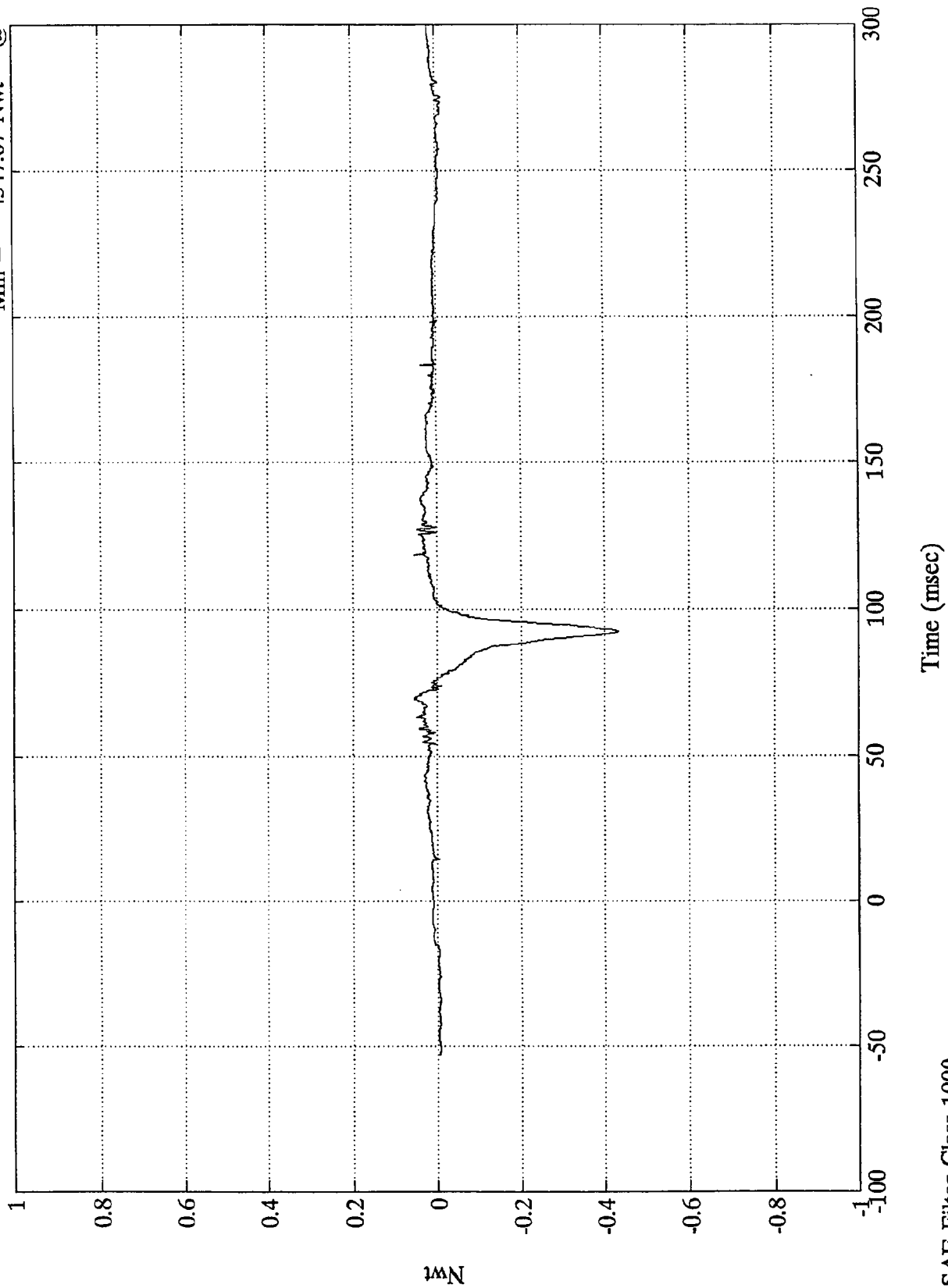
8118-8

VTV TEST #8

$\times 10^4$

V1-P1 Lower Neck Fy

Max = 546.71 Nwt @ 69.83 msec
Min = -4347.07 Nwt @ 92.64 msec



SAE Filter Class 1000

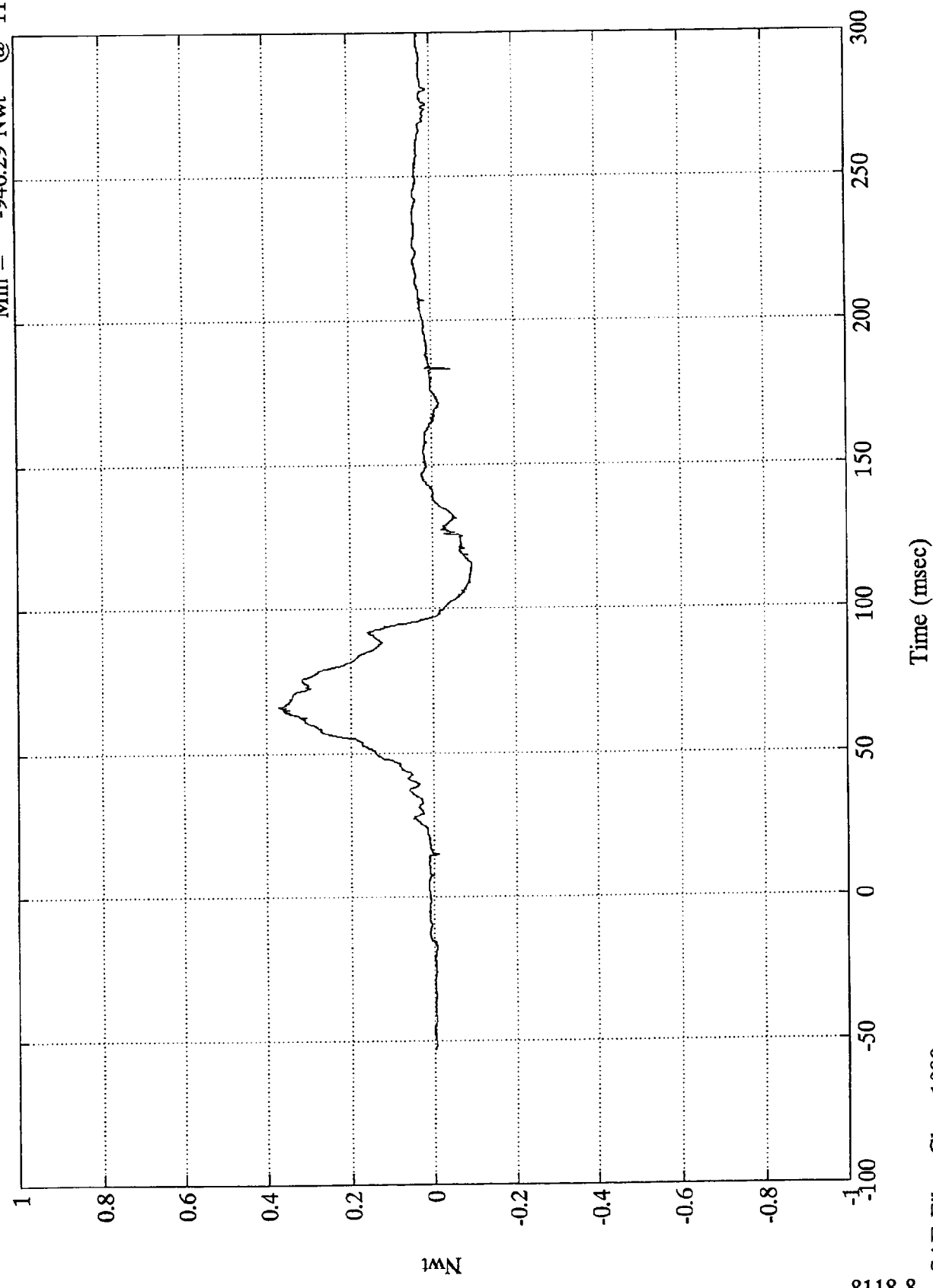
8118-8

VTV TEST #8

$\times 10^4$

V1-P1 Lower Neck Fz

Max = 3715.01 Nwt @ 65.76 msec
Min = -946.29 Nwt @ 115.56 msec



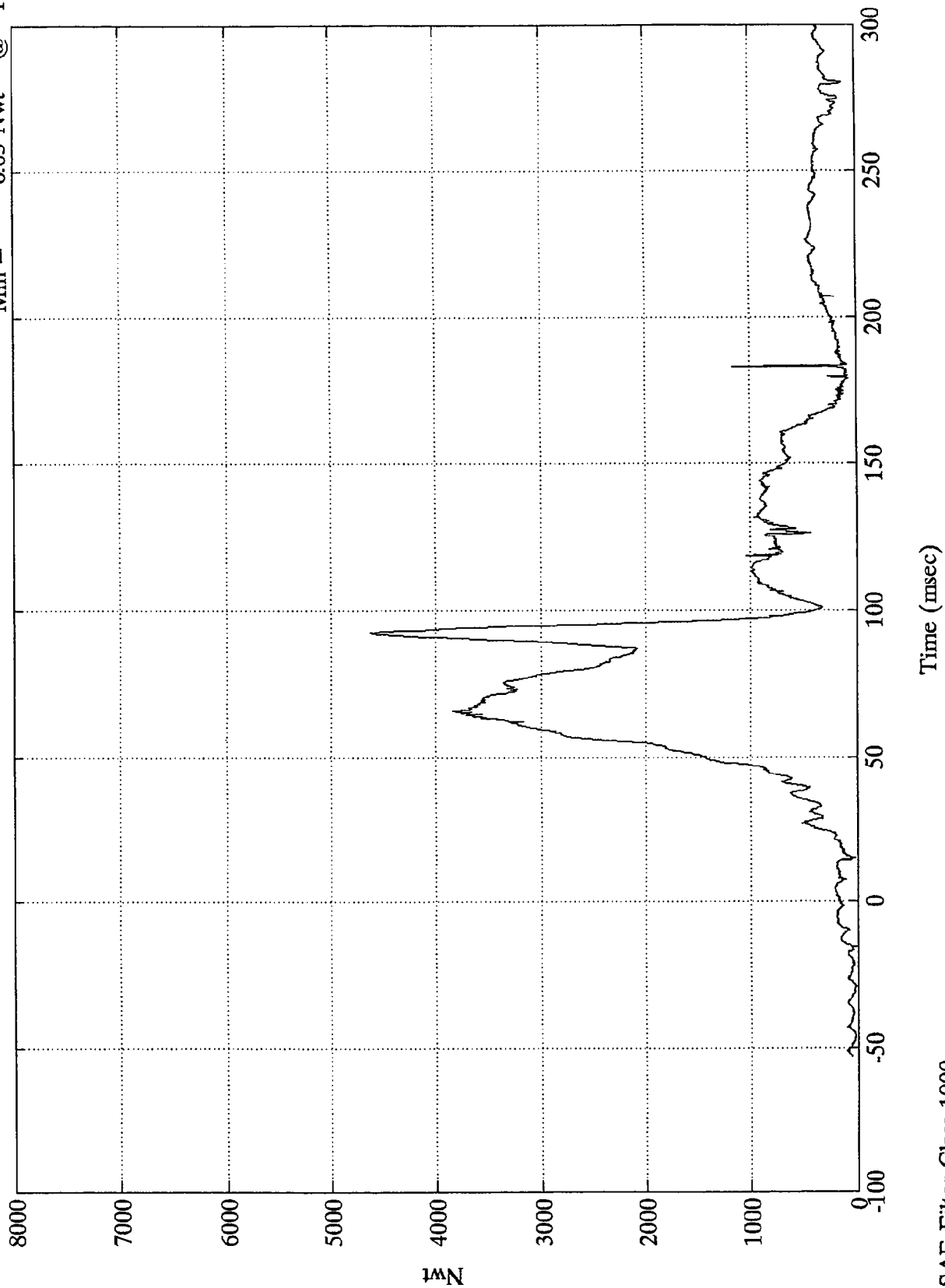
SAE Filter Class 1000

8118-8

VTV TEST #8

Max = 4626.40 Nwt @ 92.52 msec
Min = 6.03 Nwt @ -15.24 msec

V1-P1 Lower Neck F(res)

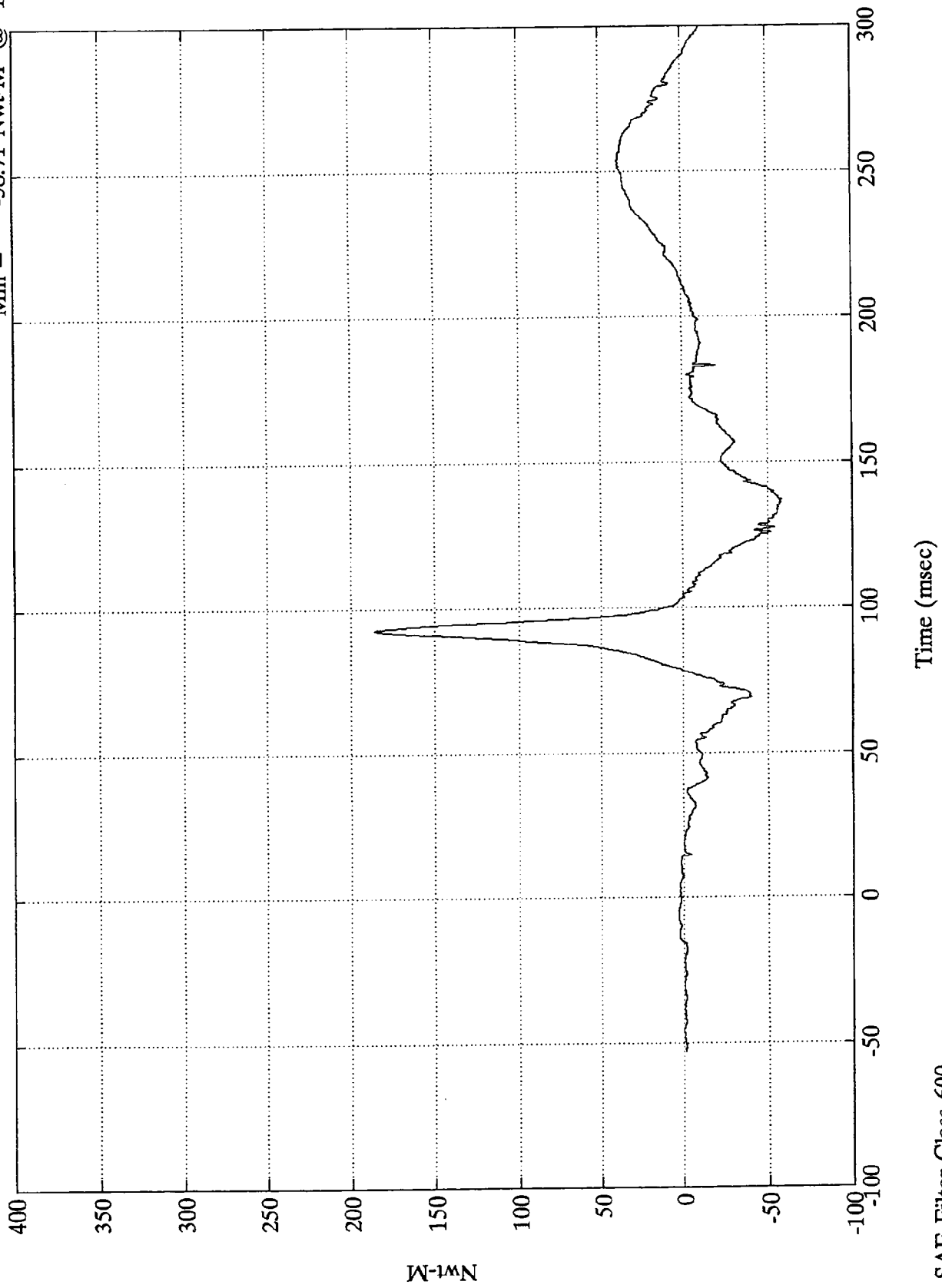


SAE Filter Class 1000

8118-8

VTV TEST #8

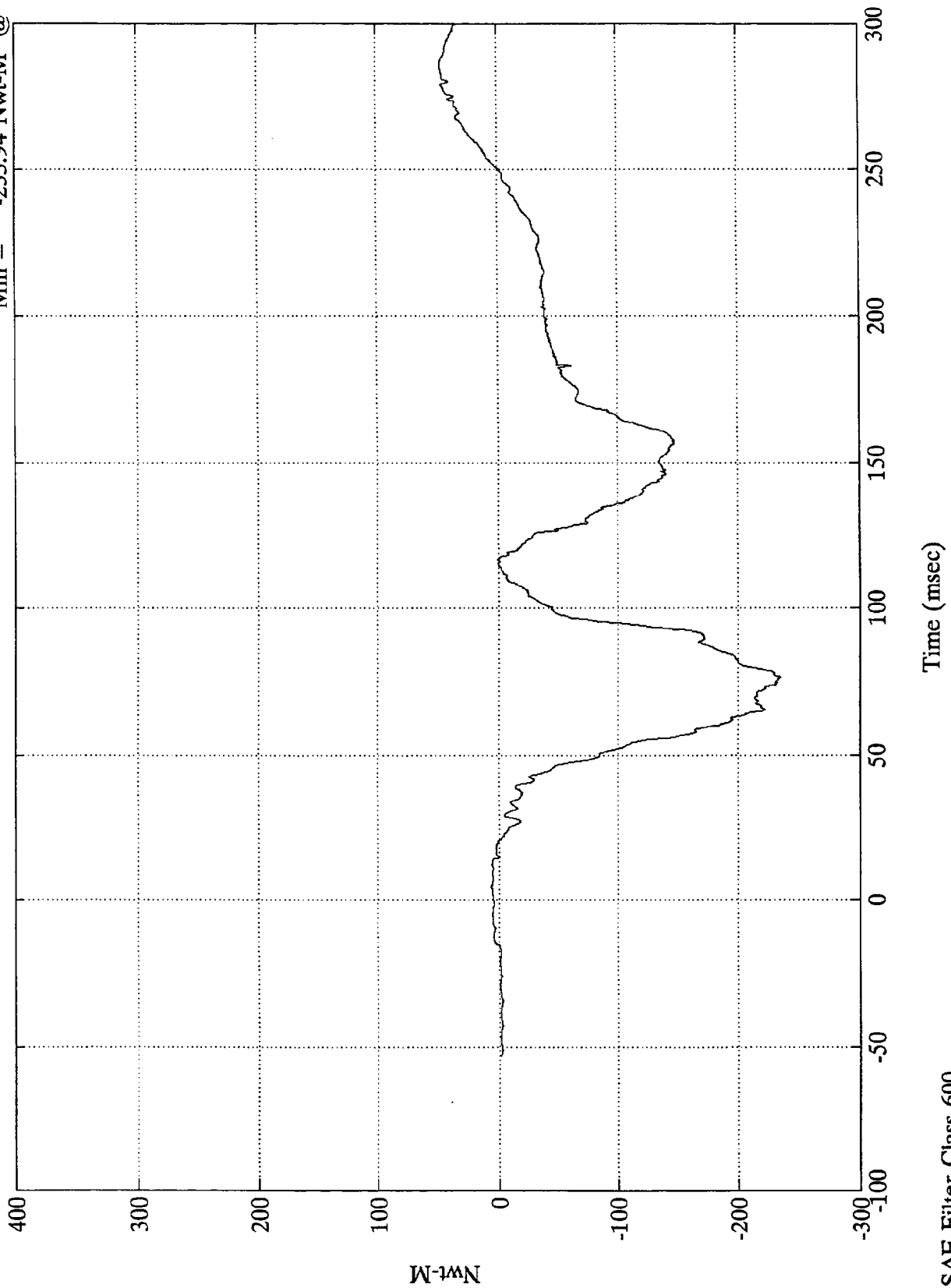
V1-P1 Lower Neck Mx
Max = 185.19 Nwt-M @ 92.64 msec
Min = -58.71 Nwt-M @ 137.27 msec



VTV TEST #8

V1-P1 Lower Neck My

Max = 47.27 Nwt-M @ 284.51 msec
Min = -233.94 Nwt-M @ 76.44 msec



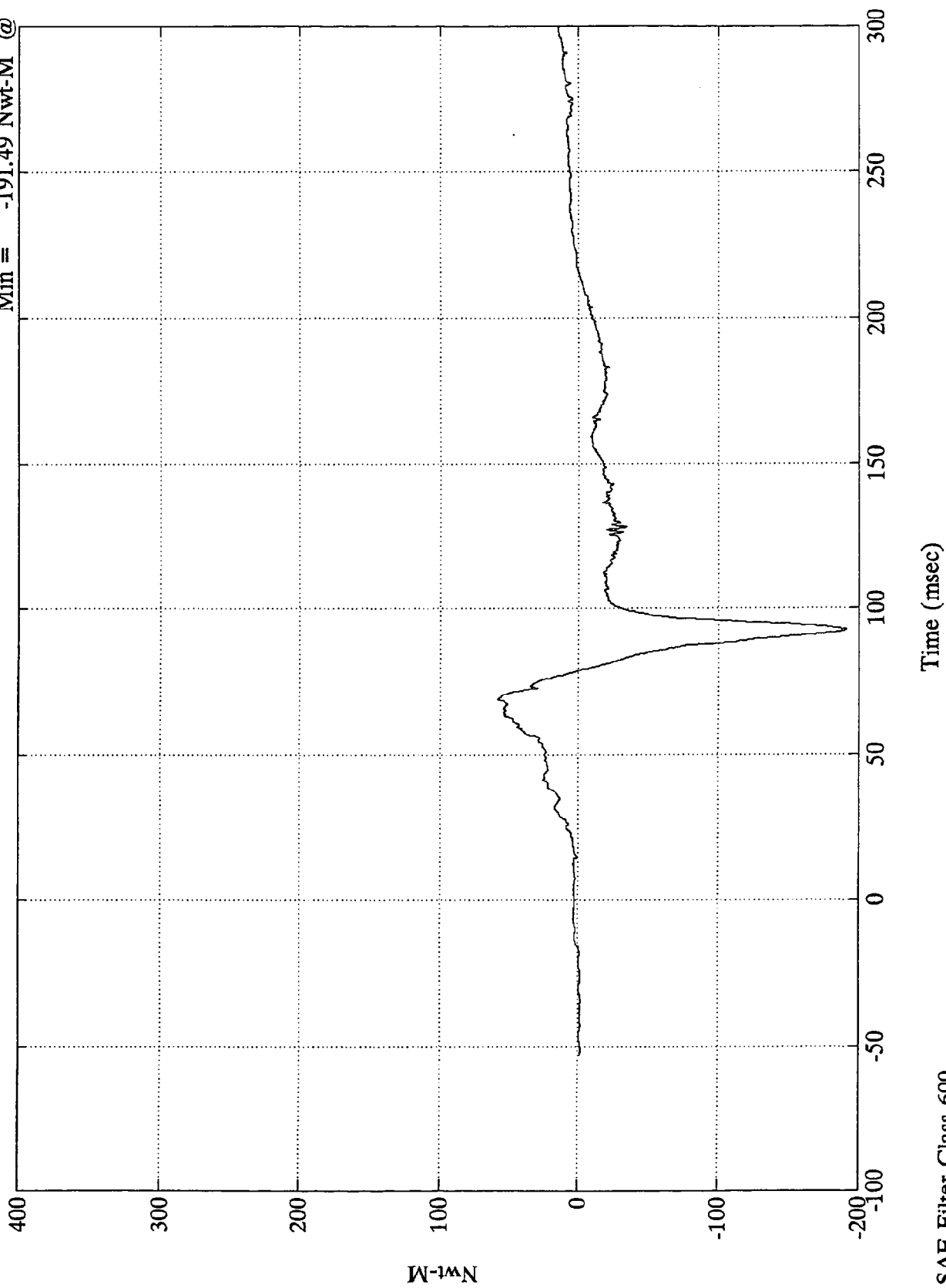
8118-8

SAE Filter Class 600

VTV TEST #8

Max = 58.80 Nwt-M @ 69.00 msec
Min = -191.49 Nwt-M @ 92.76 msec

V1-P1 Lower Neck Mz

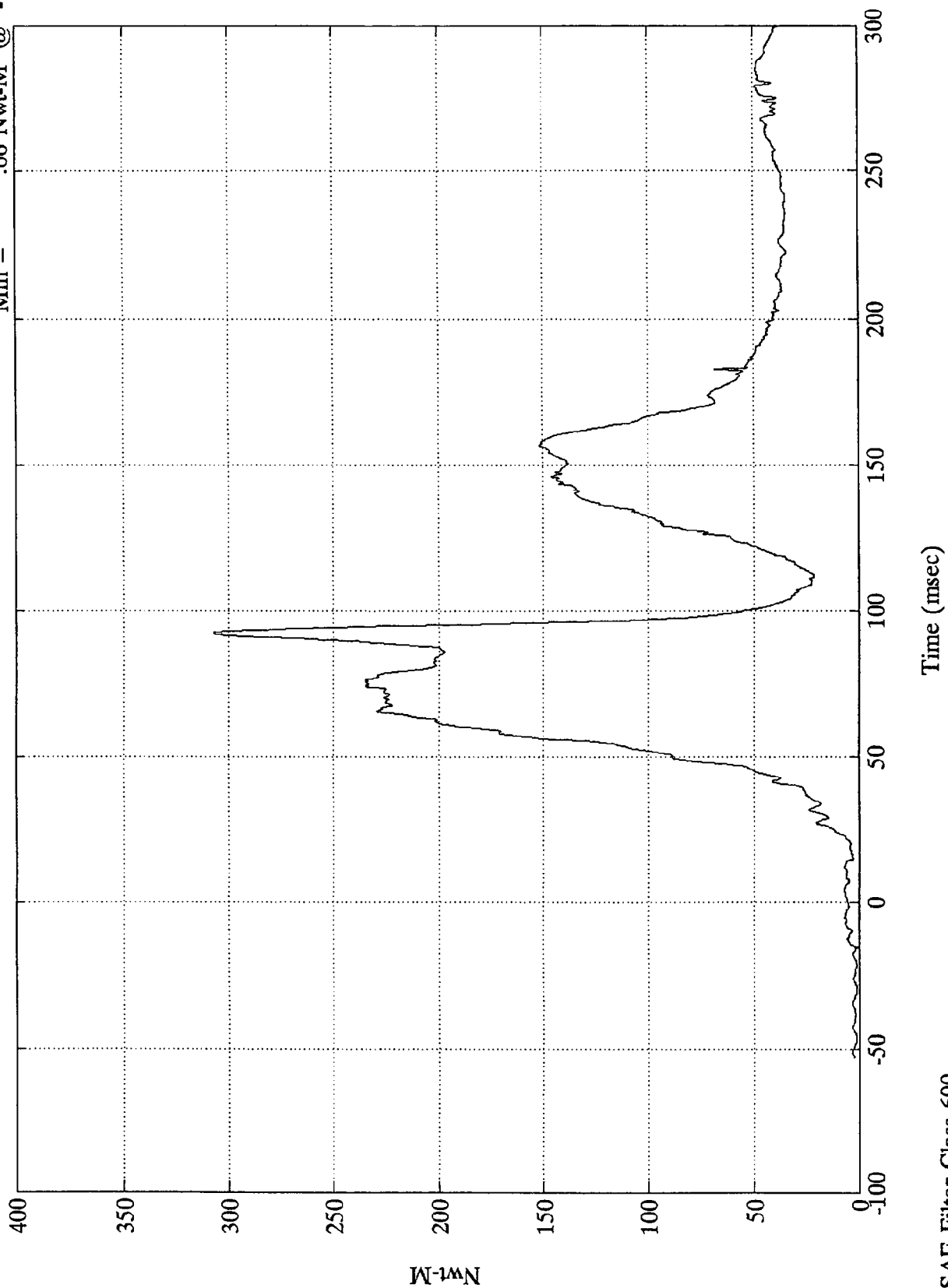


8118-8

VTV TEST #8

V1-P1 Lower Neck M(res)

Max = 307.06 Nwt-M @ 92.40 msec
Min = .66 Nwt-M @ -15.24 msec



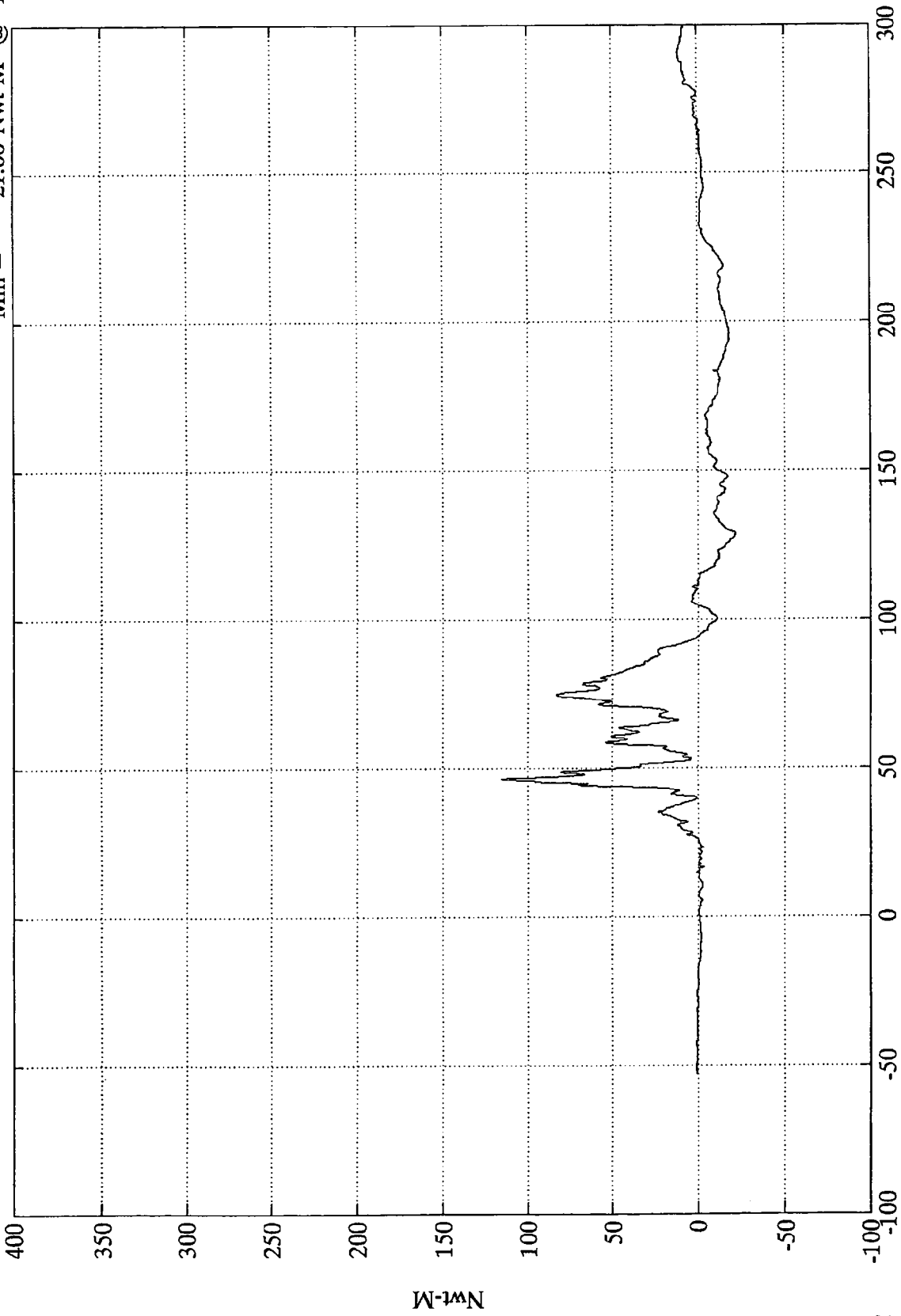
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P1 Lt Upper Tibia Mx

Max = 115.62 Nwt-M @ 46.32 msec
Min = -21.66 Nwt-M @ 128.76 msec



Time (msec)

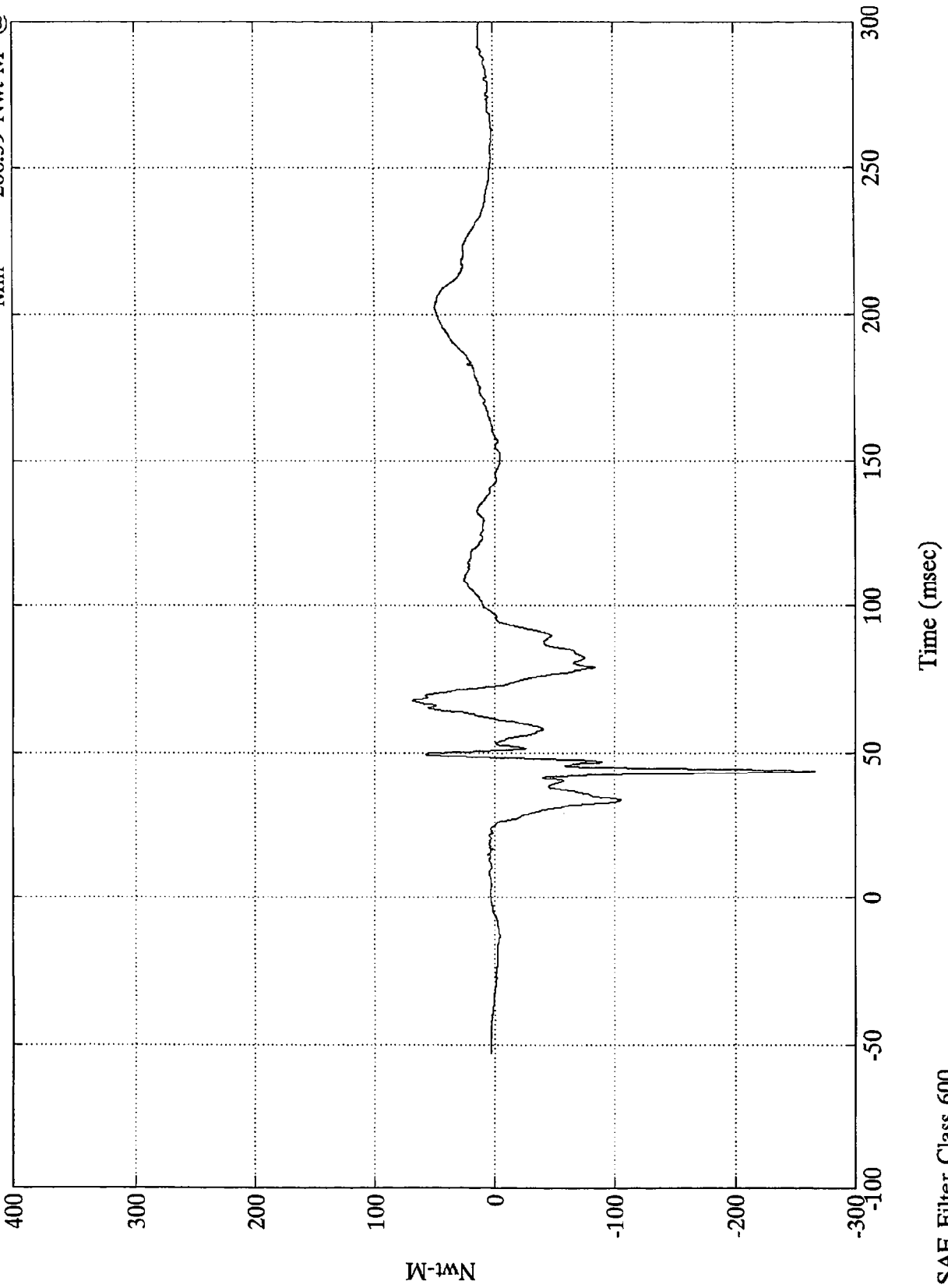
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P1 Lt Upper Tibia My

Max = 69.29 Nwt-M @ 67.56 msec
Min = -266.59 Nwt-M @ 43.68 msec



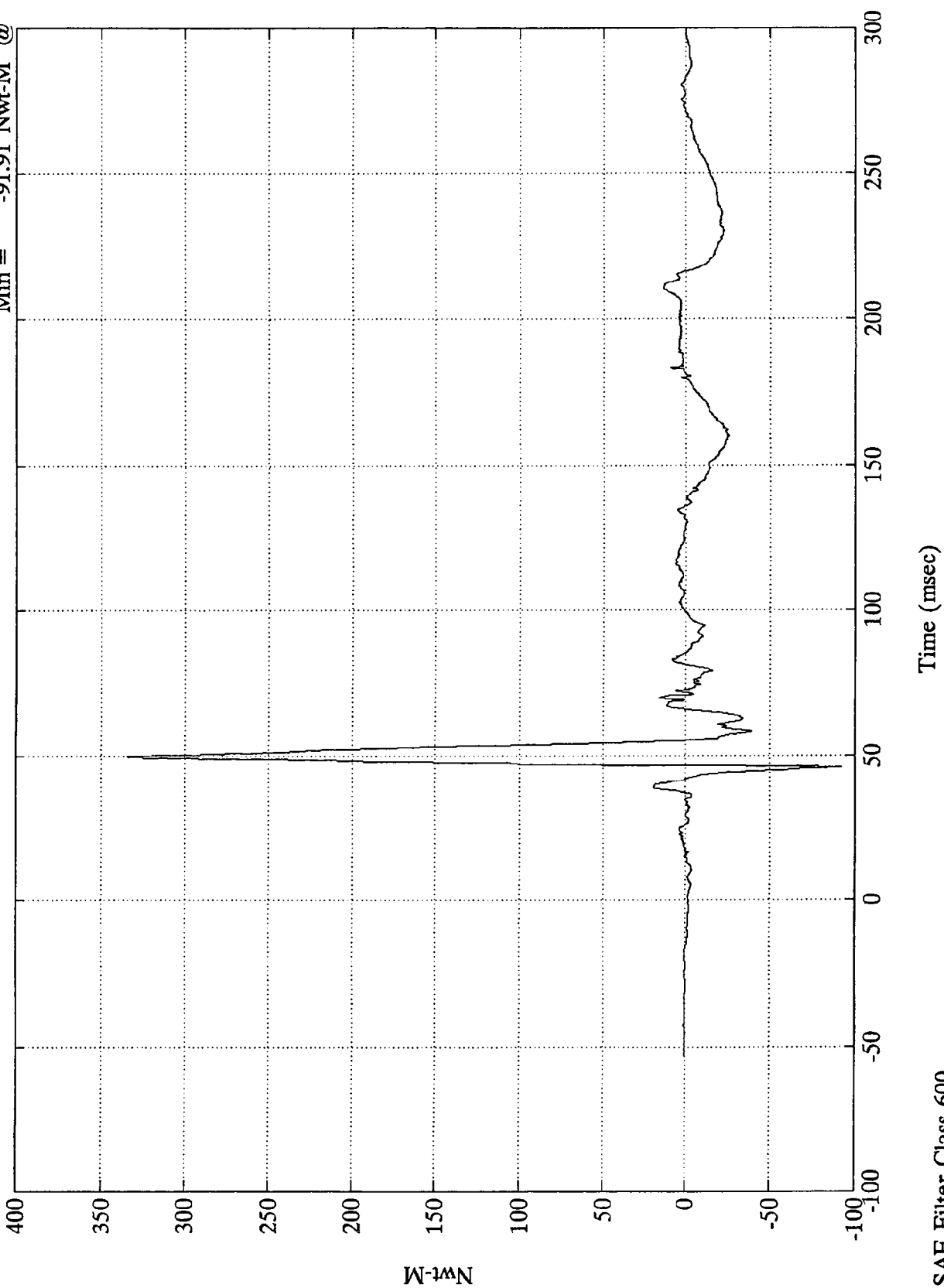
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P1 Rt Upper Tibia Mx

Max = 334.12 Nwt-M @ 49.79 msec
Min = -91.91 Nwt-M @ 46.08 msec

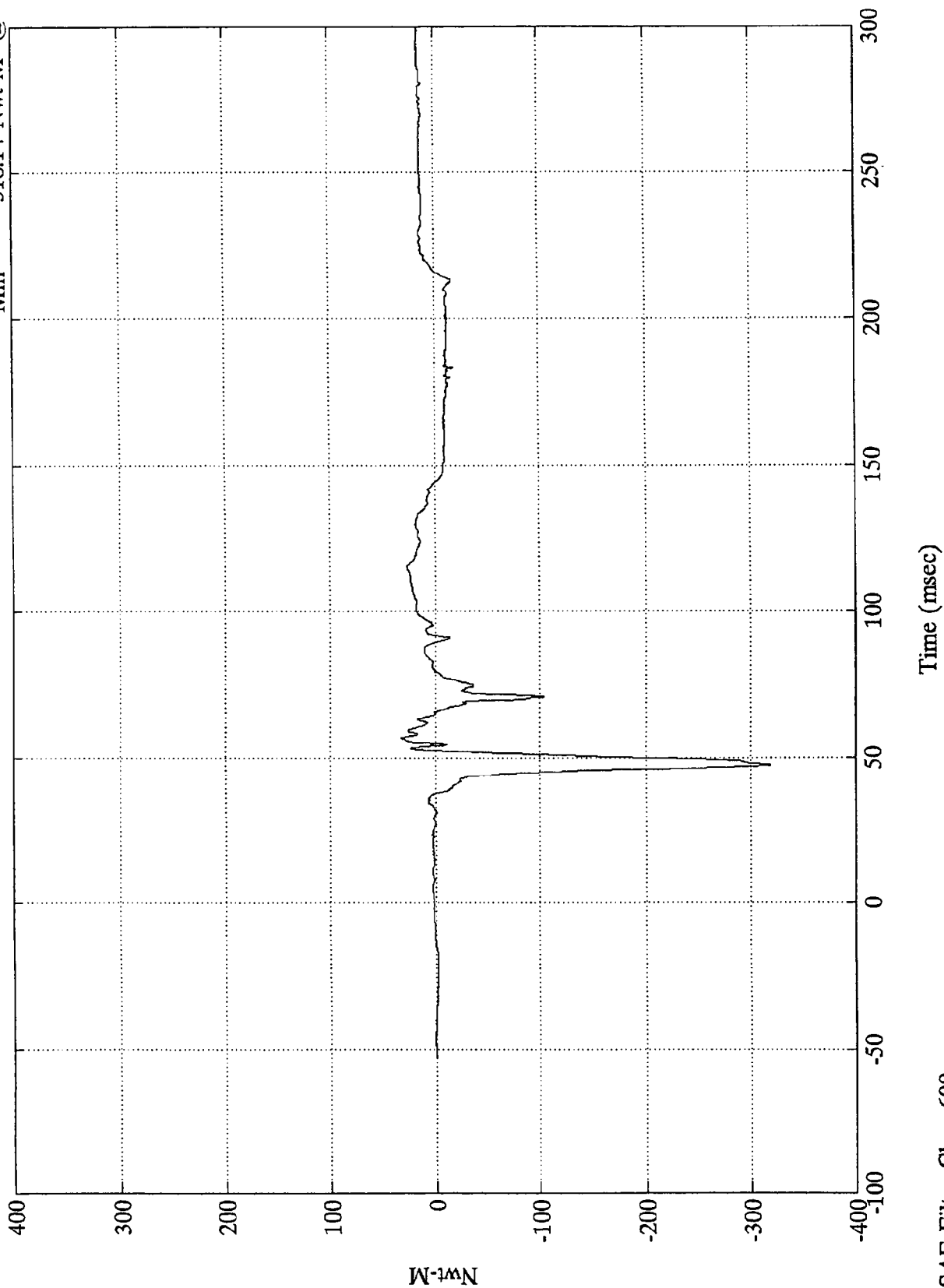


8118-8

VTV TEST #8

Max = 33.23 Nwt-M @ 56.64 msec
Min = -318.14 Nwt-M @ 47.40 msec

V1-P1 Rt Upper Tibia My



8118-8

VTV TEST #8

$\times 10^4$

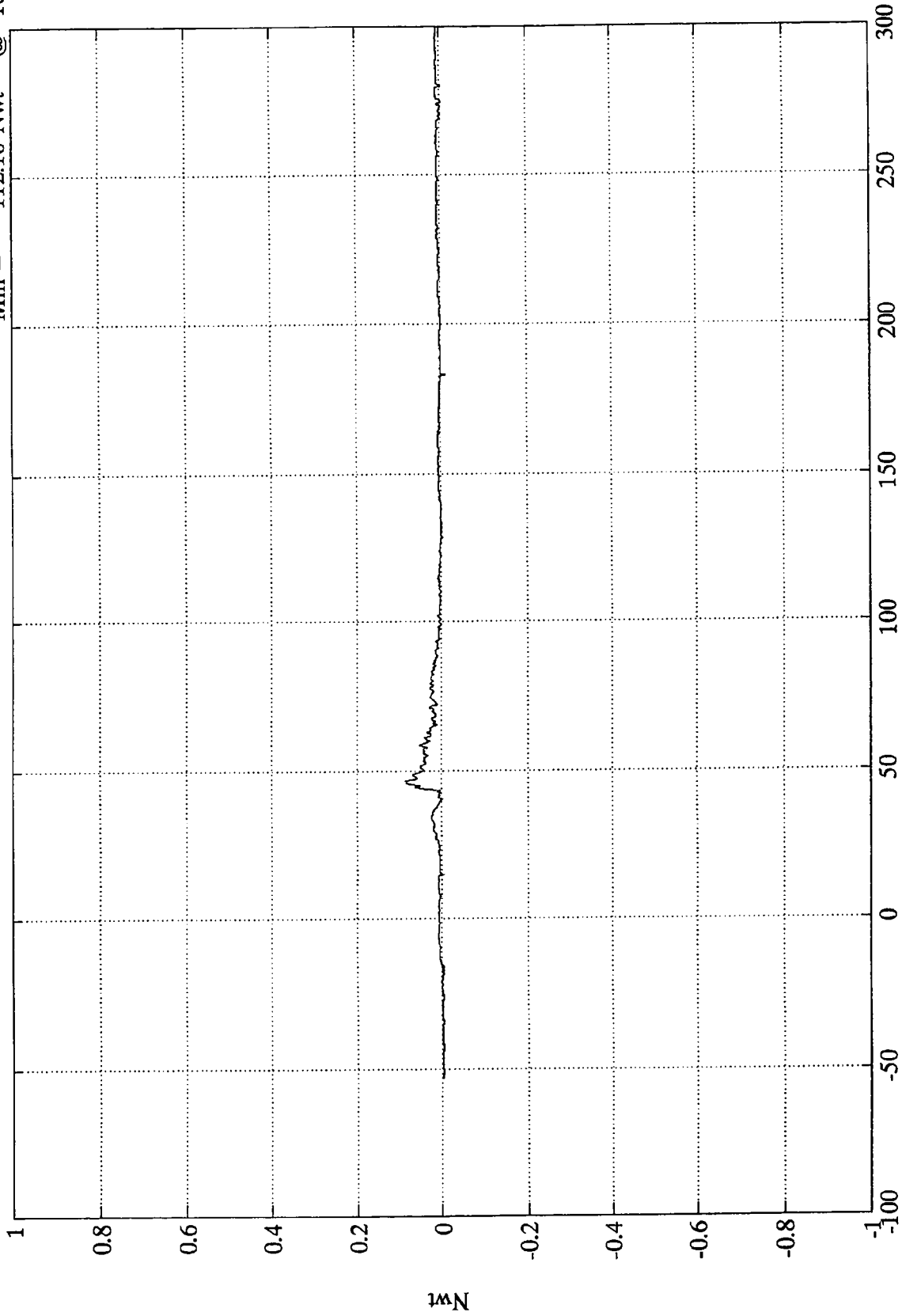
V1-P1 Lt Lower Tibia Fy

Max = 866.16 Nwt

@ 46.56 msec

Min = -112.10 Nwt

@ 183.12 msec



Time (msec)

SAE Filter Class 600

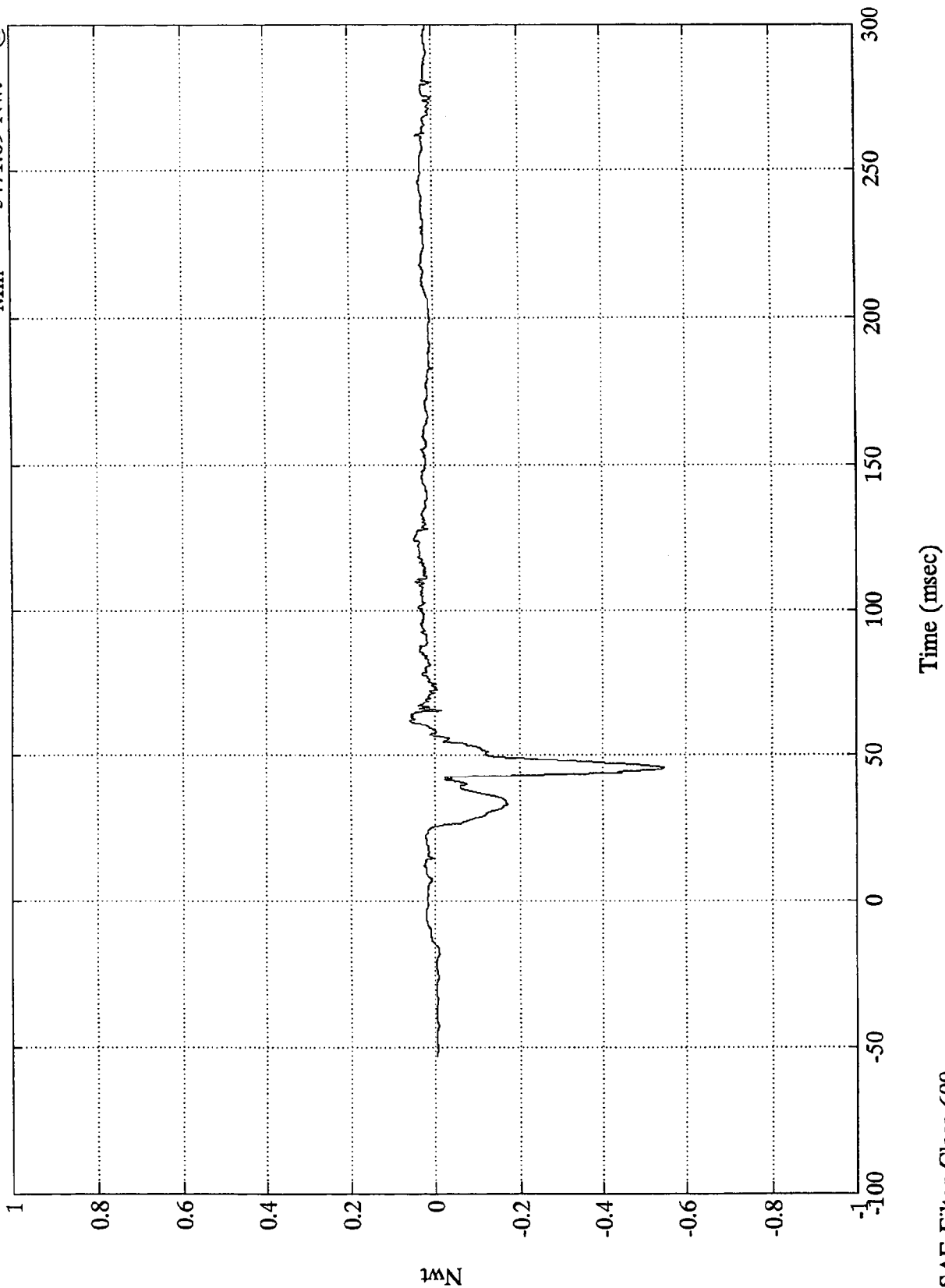
8118-8

VTV TEST #8

$\times 10^4$

Max = 592.71 Nwt @ 61.92 msec
Min = -5471.69 Nwt @ 45.60 msec

V1-P1 Lt Lower Tibia Fz



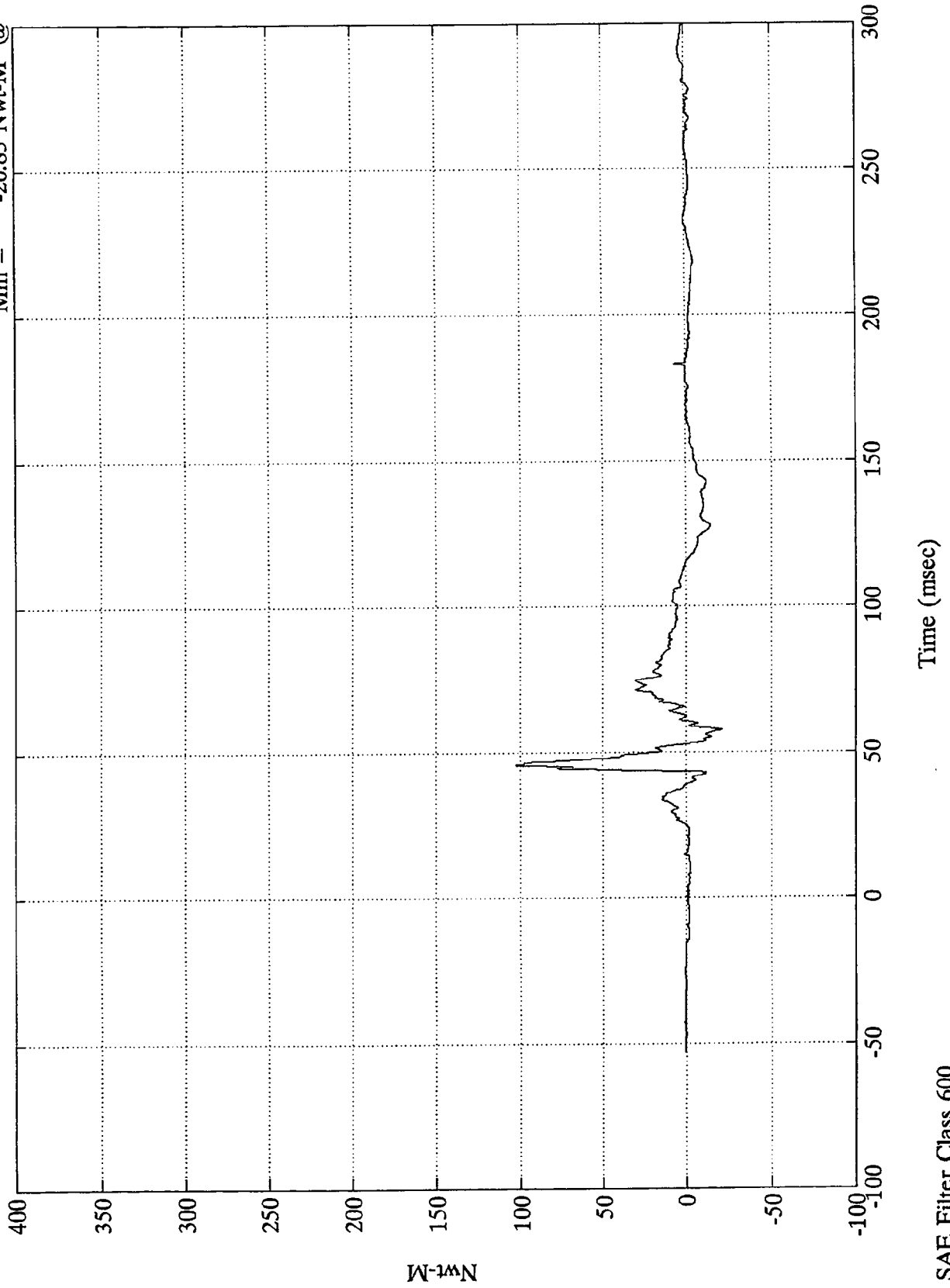
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P1 Lt Lower Tibia Mx

Max = 102.72 Nwt-M @ 45.84 msec
Min = -20.83 Nwt-M @ 57.72 msec



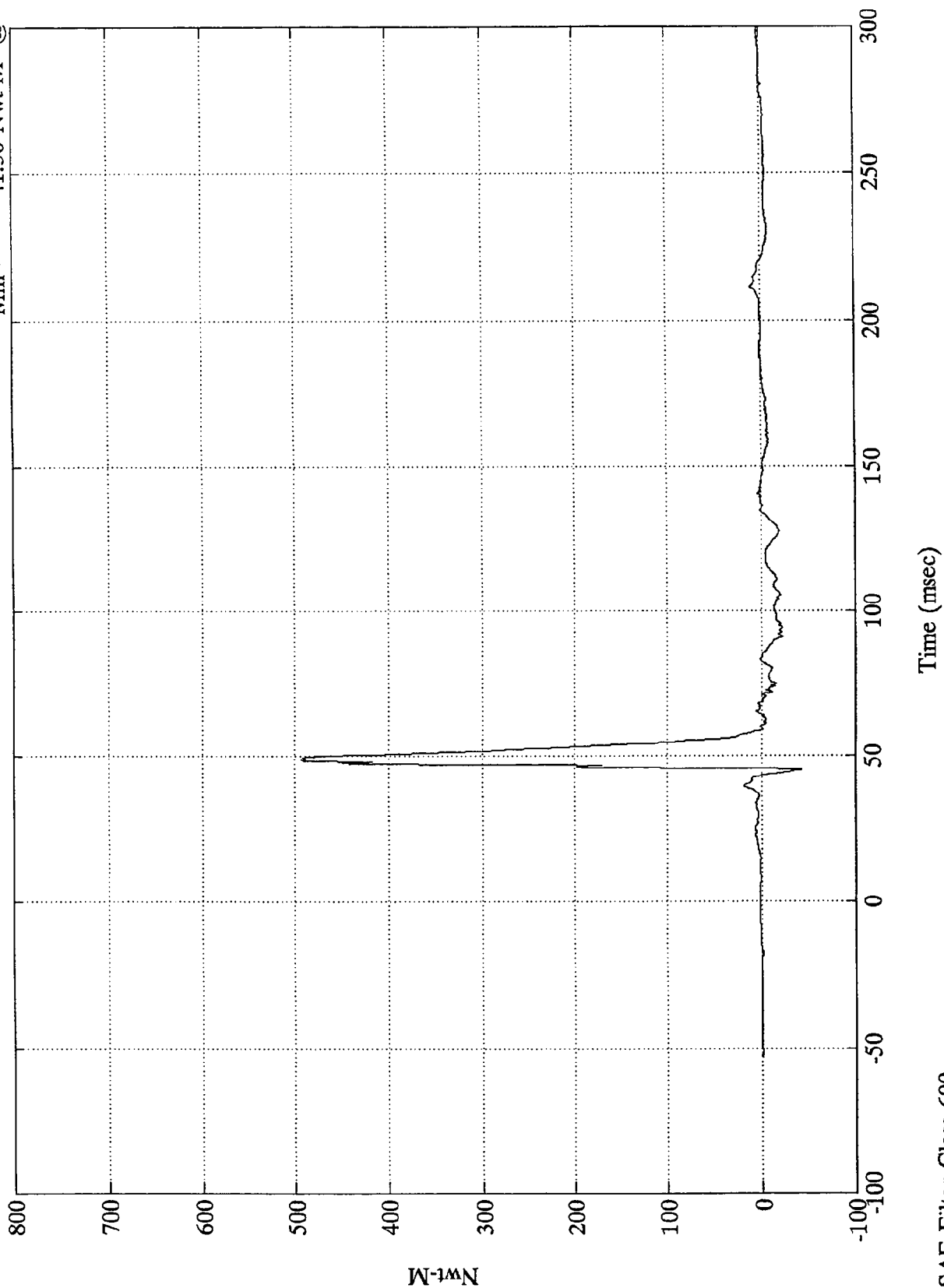
8118-8

SAE Filter Class 600

VTV TEST #8

V1-P1 Rt Lower Tibia Mx

Max = 492.98 Nwt-M @ 48.59 msec
Min = -41.30 Nwt-M @ 45.24 msec



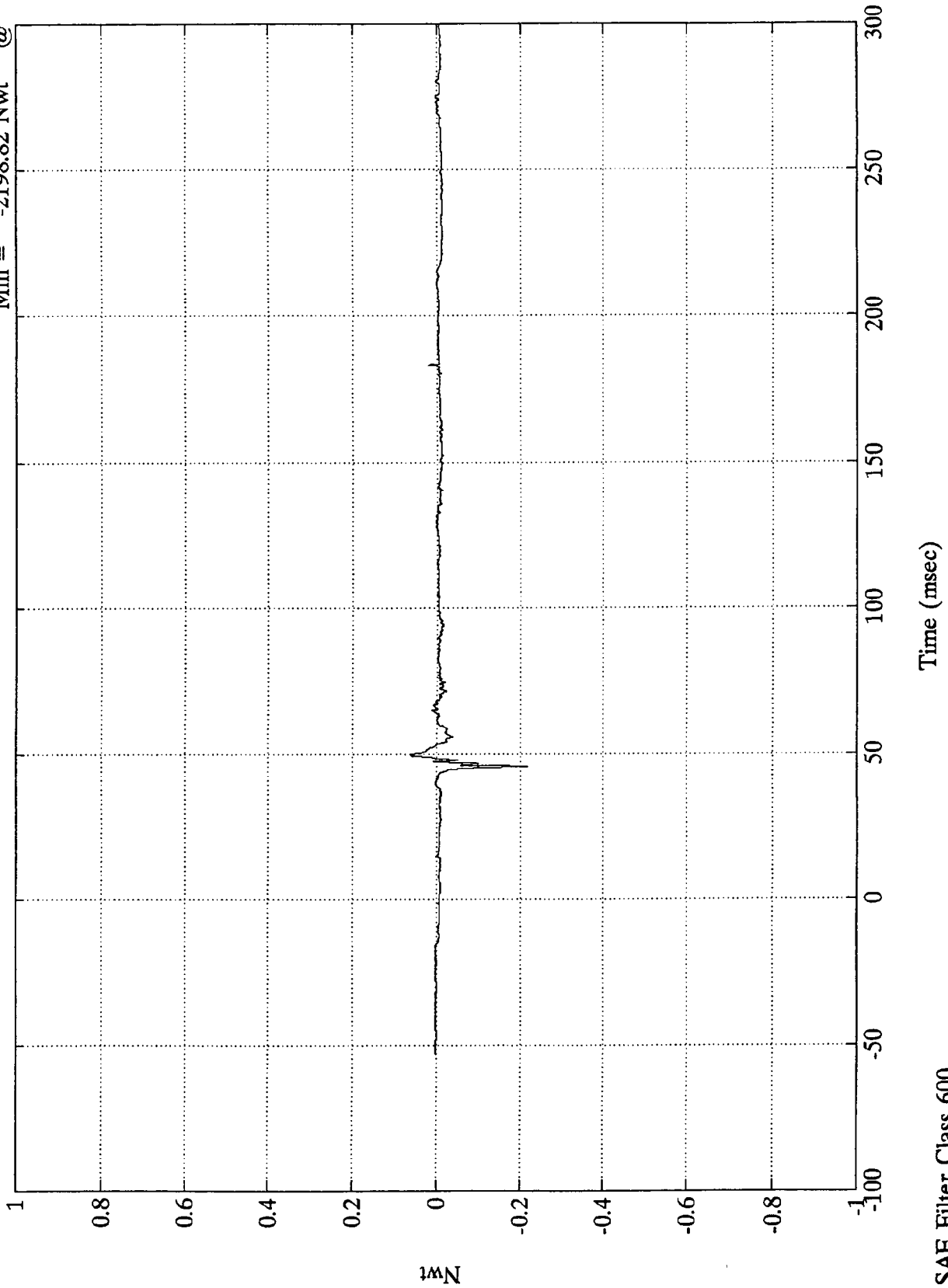
SAE Filter Class 600

8118-8

VTV TEST #8

Max = 614.58 Nwt @ 49.56 msec
Min = -2198.82 Nwt @ 45.72 msec

V1-P1 Rt Lower Tibia Fy



SAE Filter Class 600

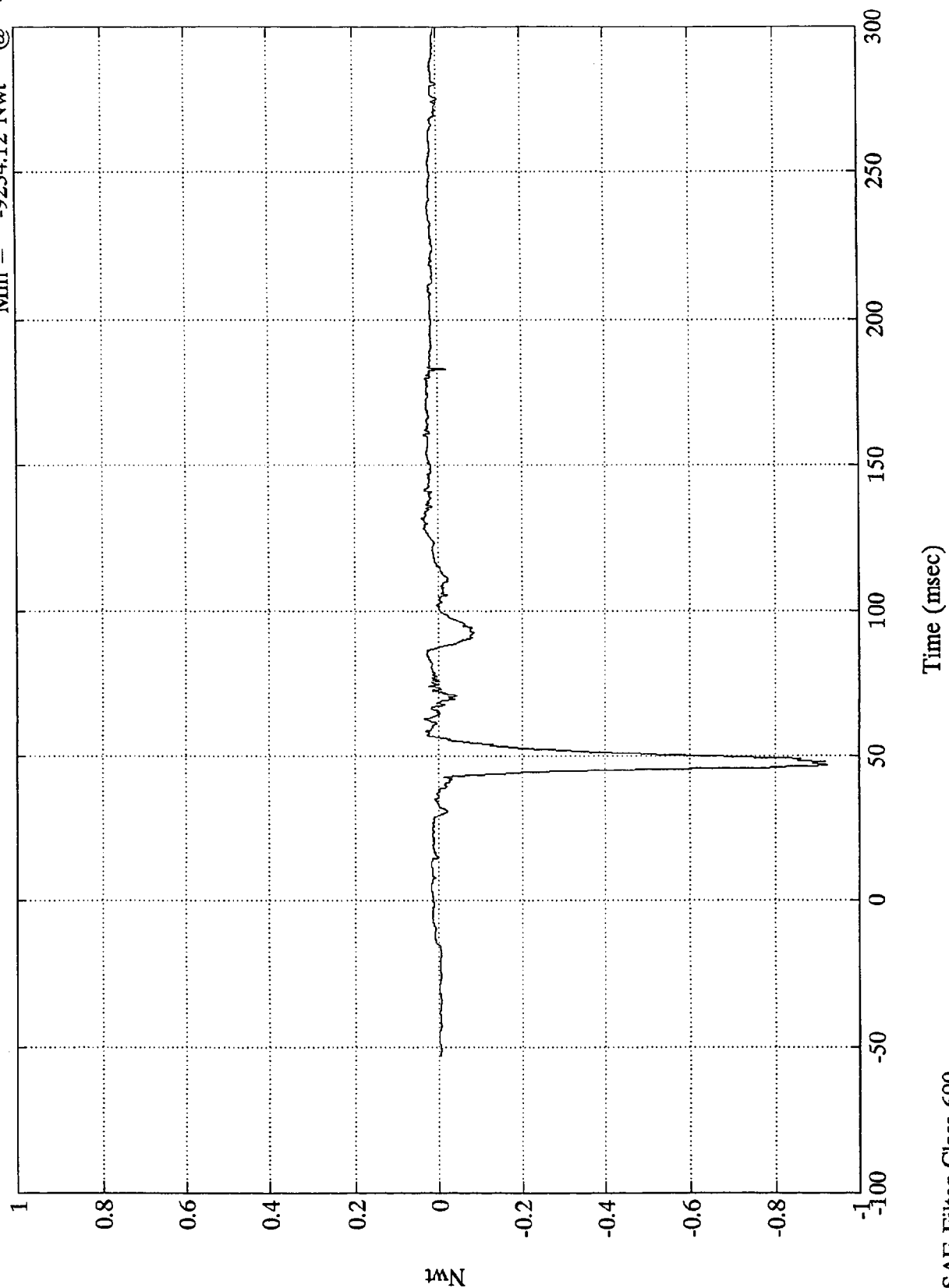
8118-8

VTV TEST #8

$\times 10^4$

V1-P1 Rt Lower Tibia Fz

Max = 401.03 Nwt @ 131.63 msec
Min = -9234.12 Nwt @ 46.68 msec



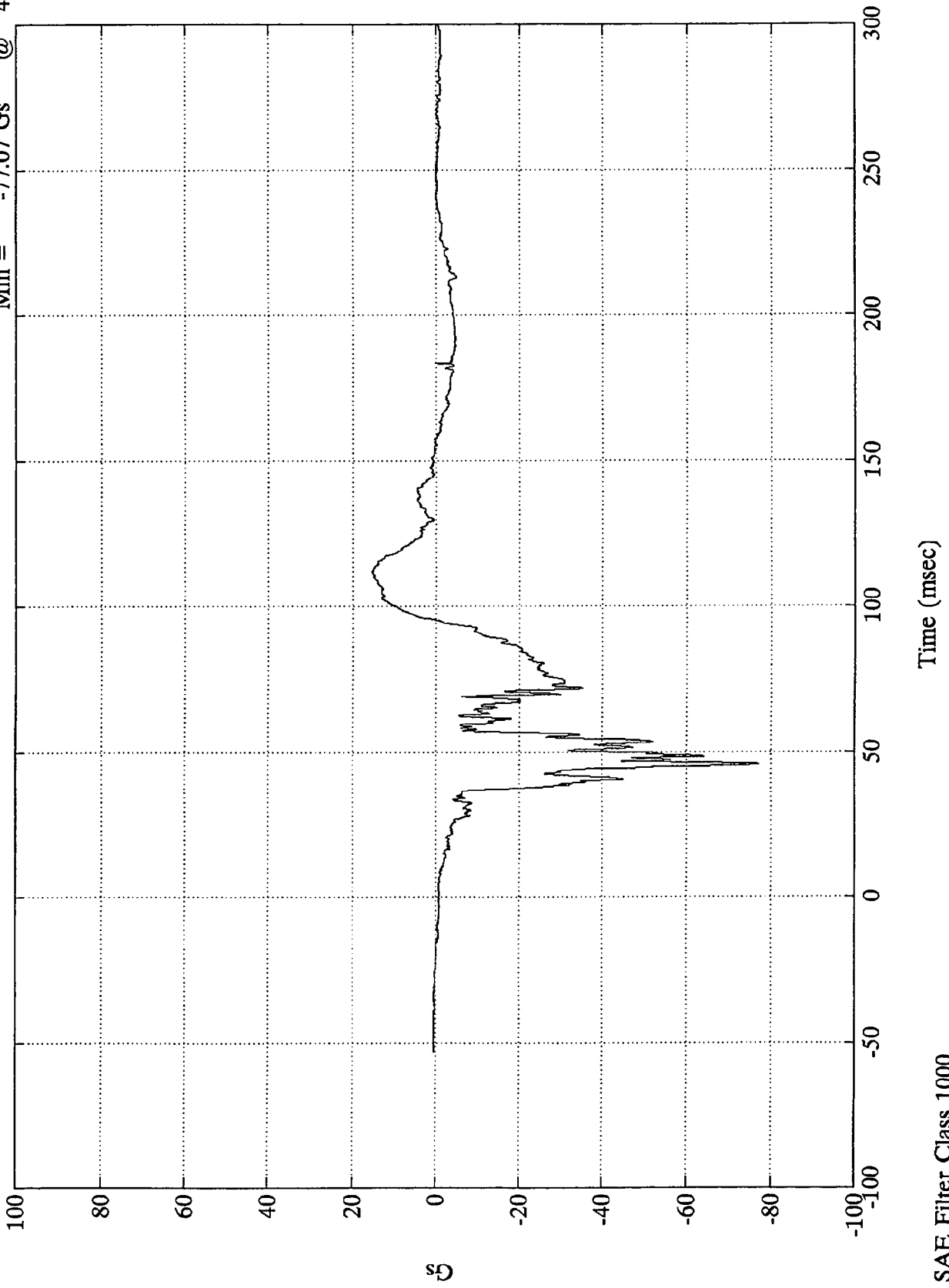
8118-8

SAE Filter Class 600

VTV TEST #8

V1-P1 Pelvic X

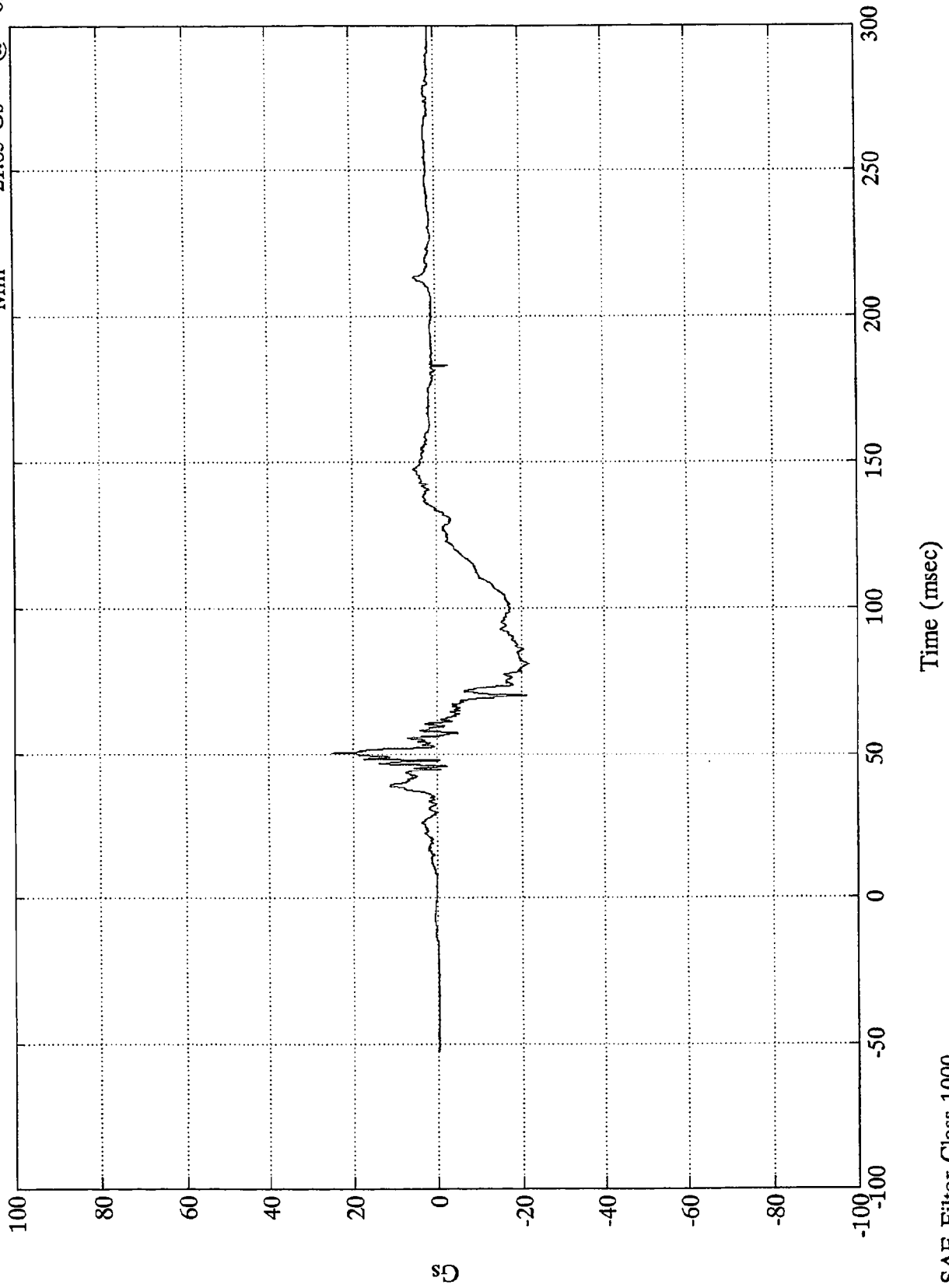
Max = 15.47 Gs @ 112.32 msec
Min = -77.07 Gs @ 45.72 msec



8118-8

VTV TEST #8

V1-P1 Pelvic Y
Max = 25.00 Gs @ 50.52 msec
Min = -21.85 Gs @ 81.36 msec



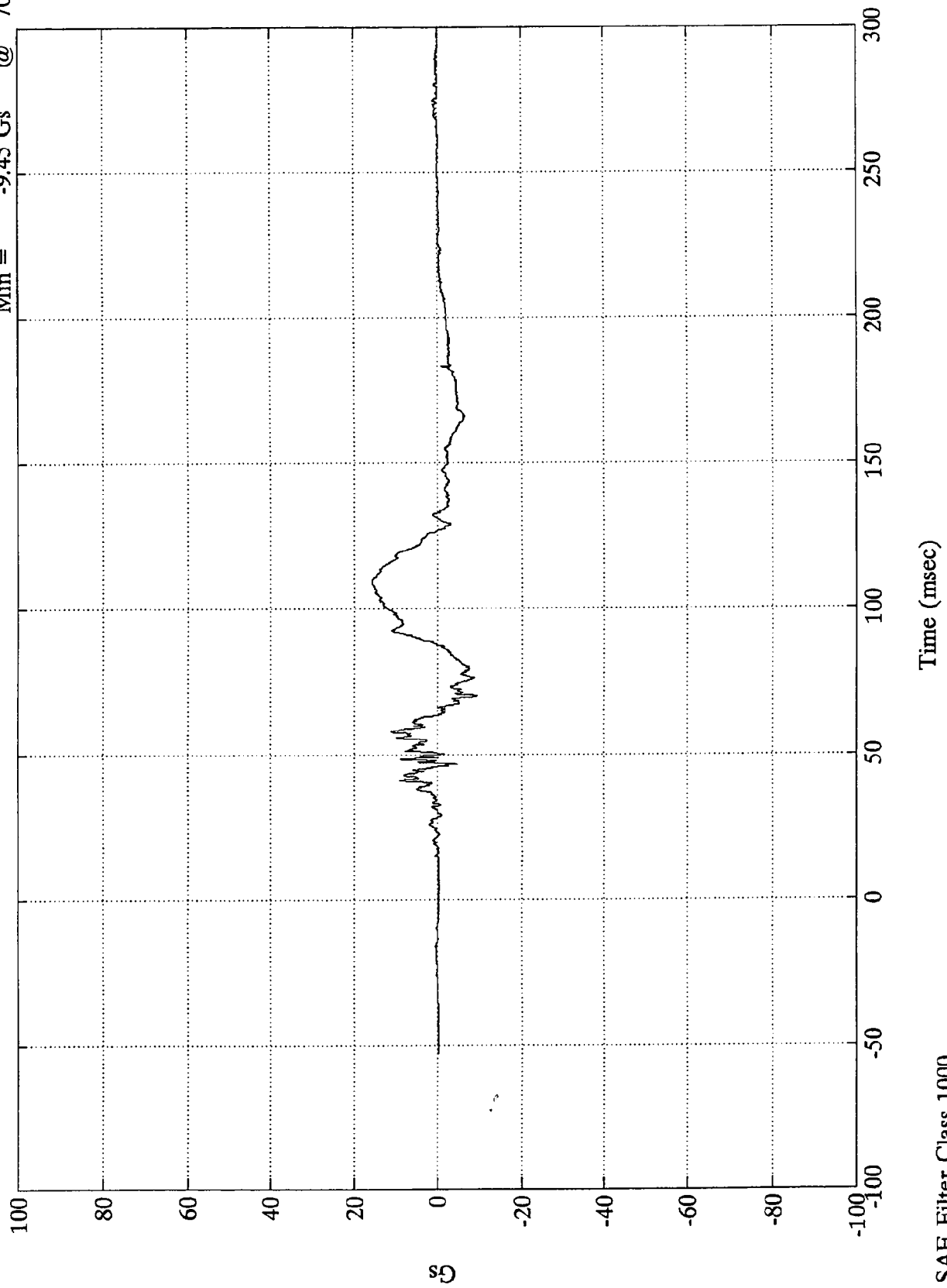
SAE Filter Class 1000

8118-8

VTV TEST #8

Max = 15.60 Gs @ 109.80 msec
Min = -9.45 Gs @ 70.31 msec

V1-P1 Pelvic Z



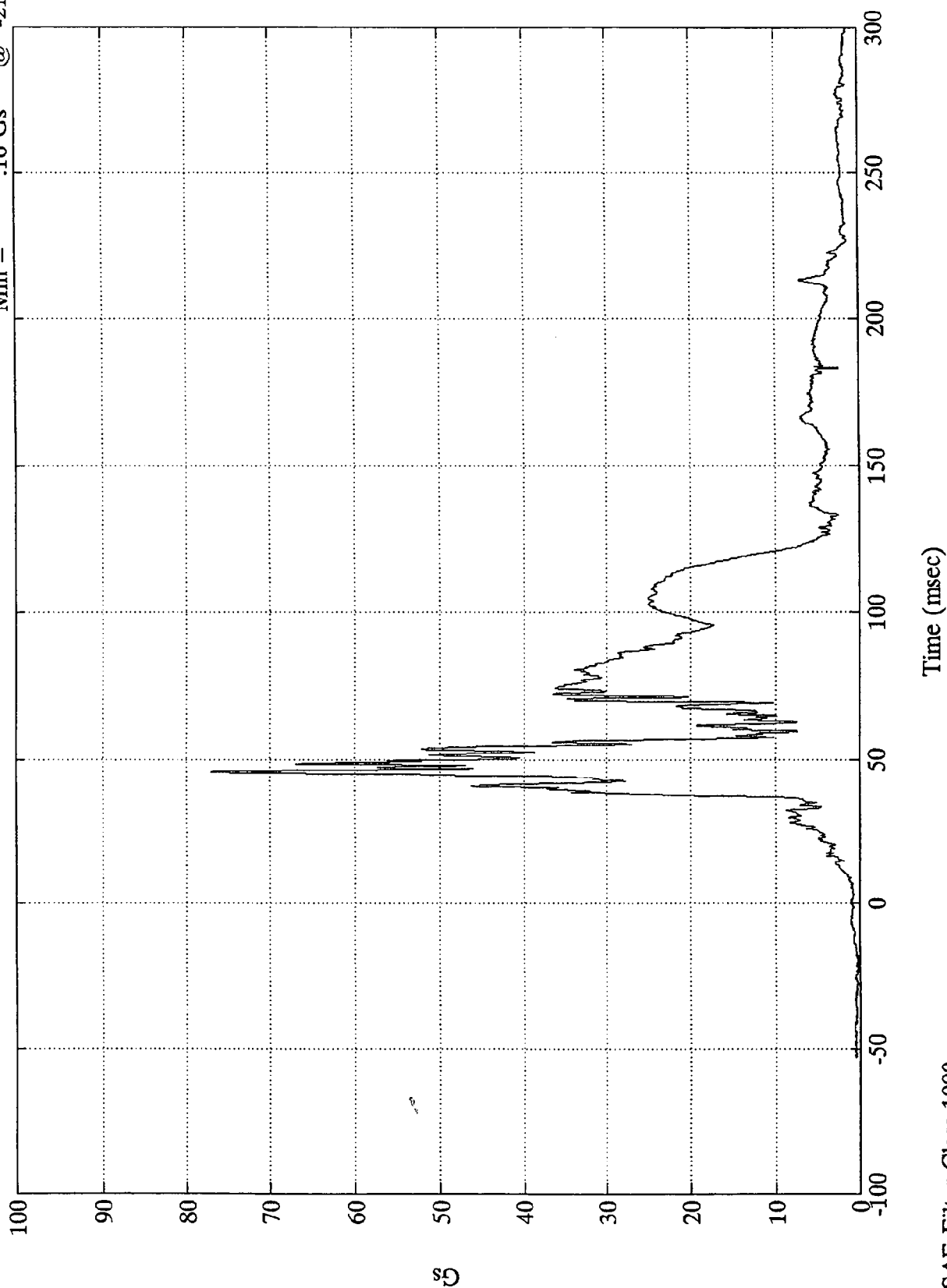
8118-8

SAE Filter Class 1000

VTV TEST #8

V1-P1 Pelvic Res.

Max = 77.11 Gs @ 45.72 msec
Min = .16 Gs @ -21.12 msec



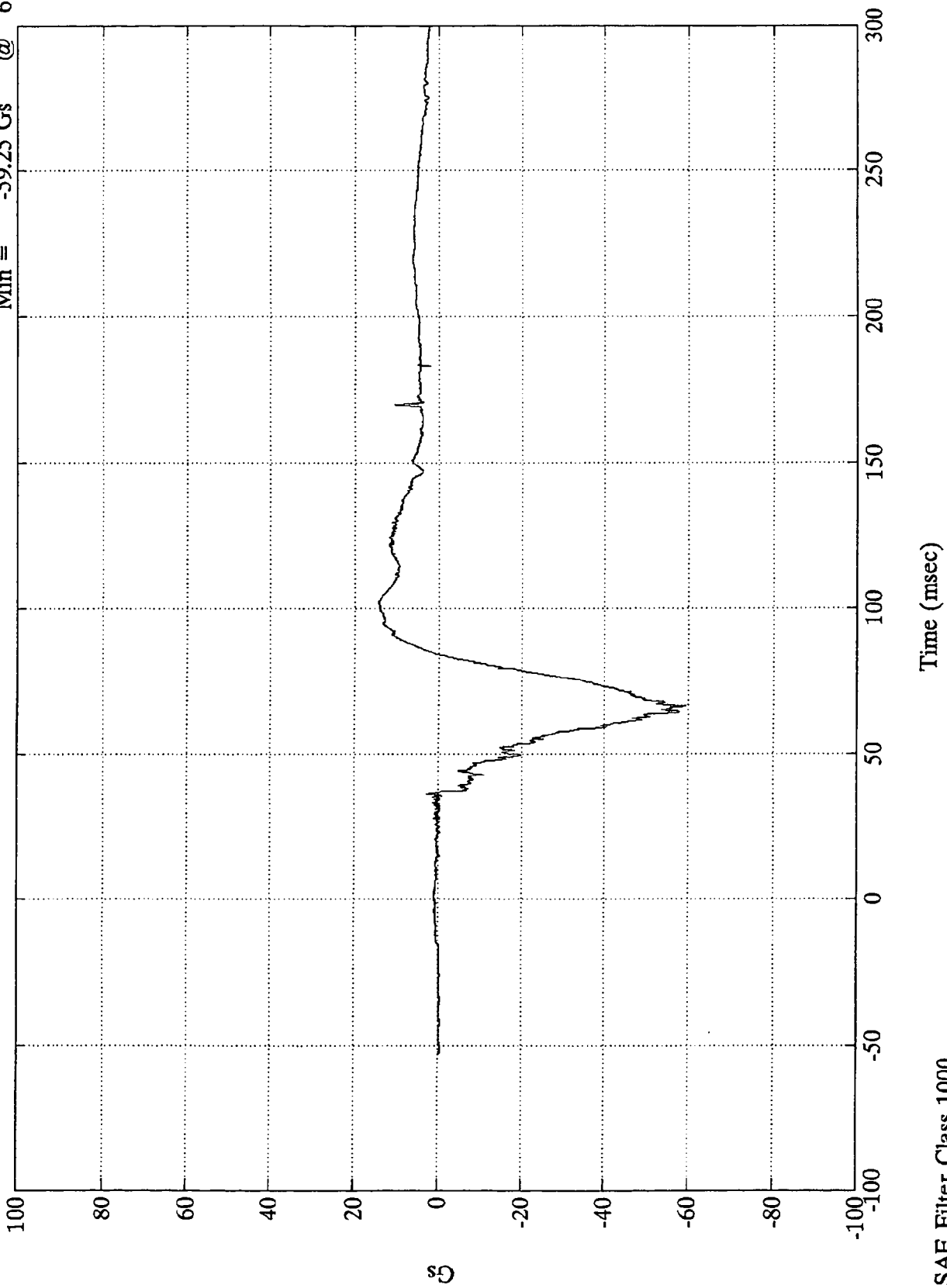
SAE Filter Class 1000

8118-8

VTV TEST #8

Max = 14.37 Gs @ 102.59 msec
Min = -59.25 Gs @ 66.36 msec

V1-P2 Head X



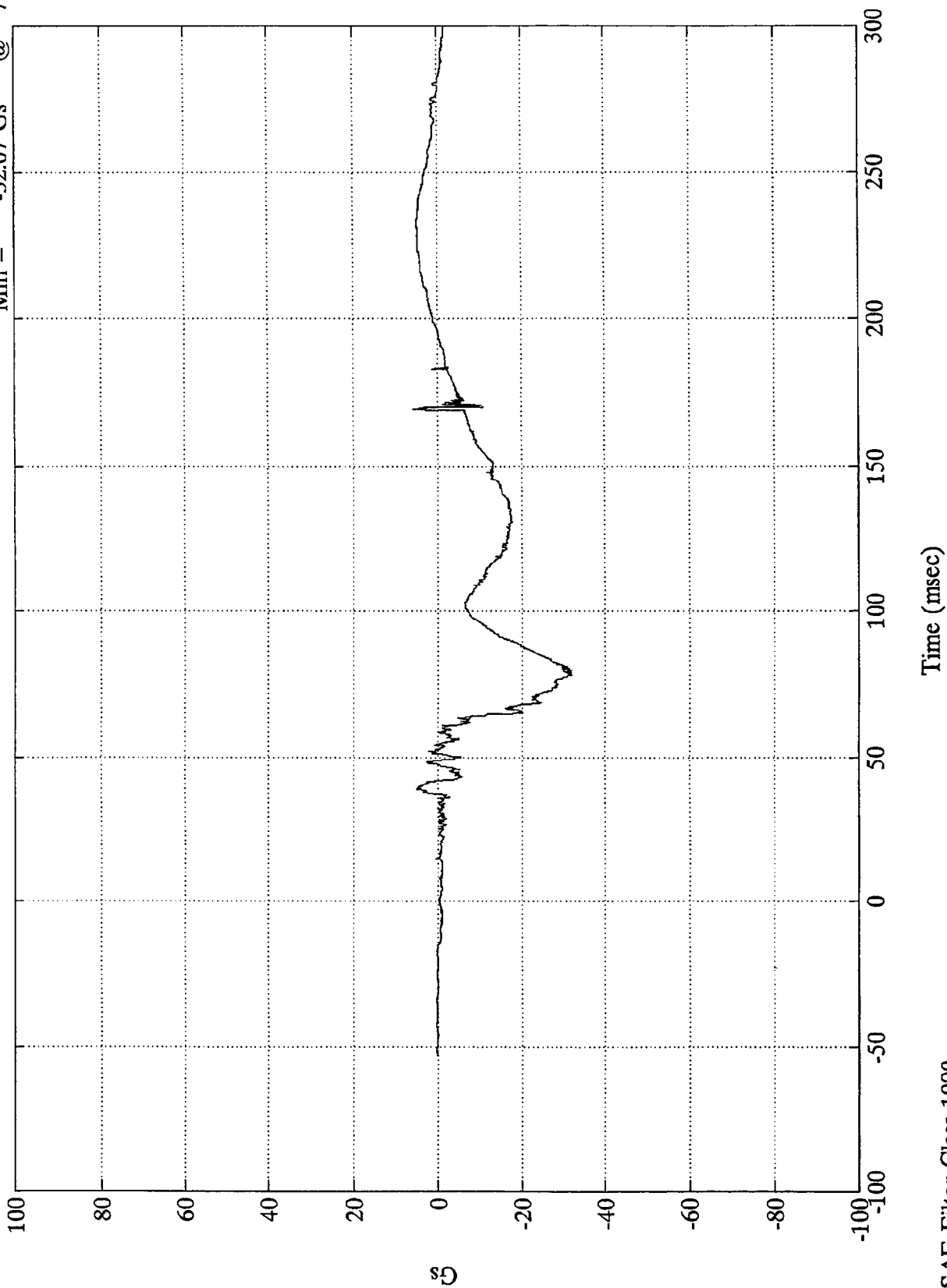
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P2 Head Y

Max = 8.09 Gs @ 299.88 msec
Min = -32.07 Gs @ 79.19 msec



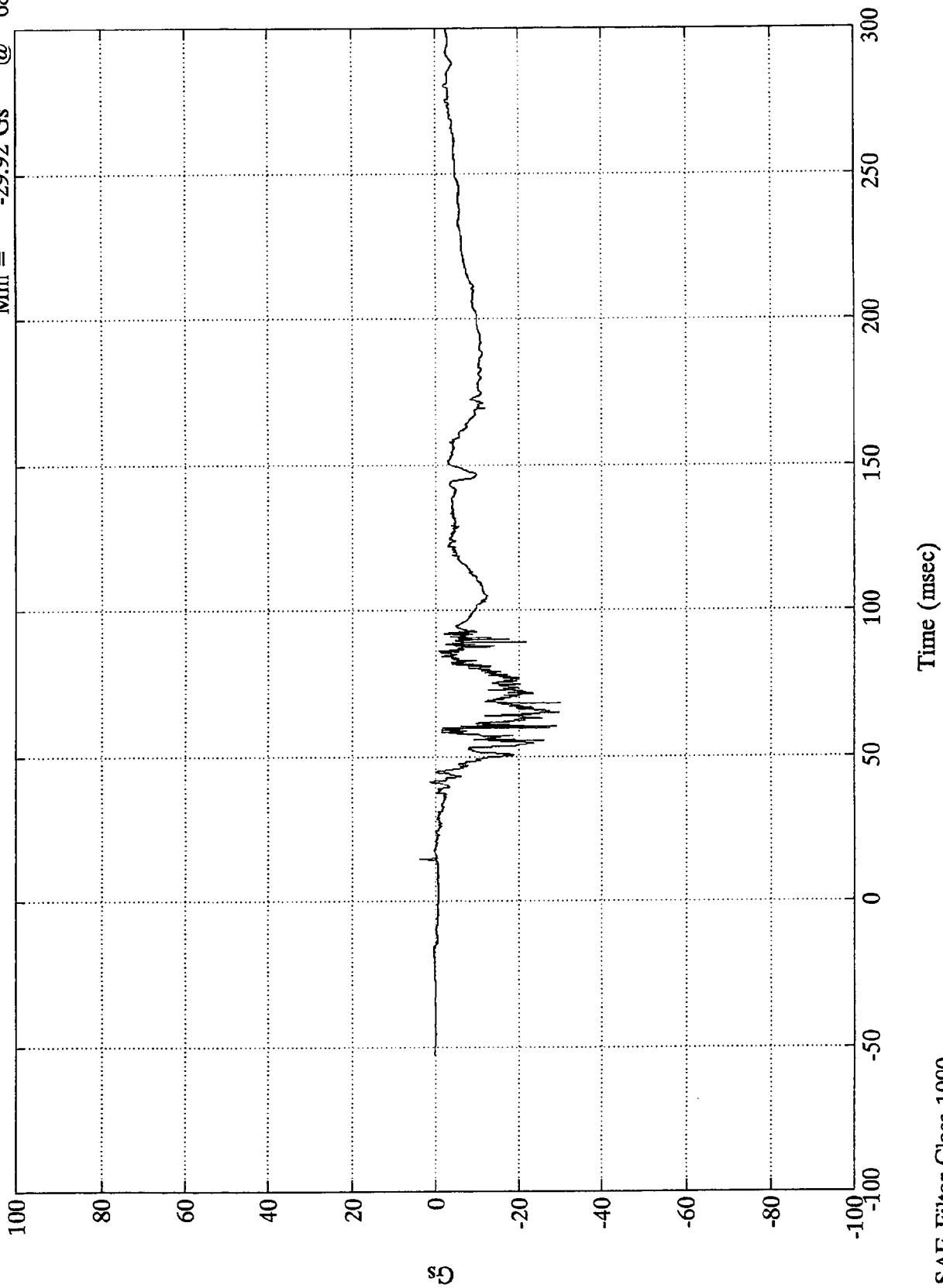
SAE Filter Class 1000

8118-8

VTV TEST #8

Max = 3.89 Gs @ 15.00 msec
Min = -29.92 Gs @ 68.04 msec

V1-P2 Head Z



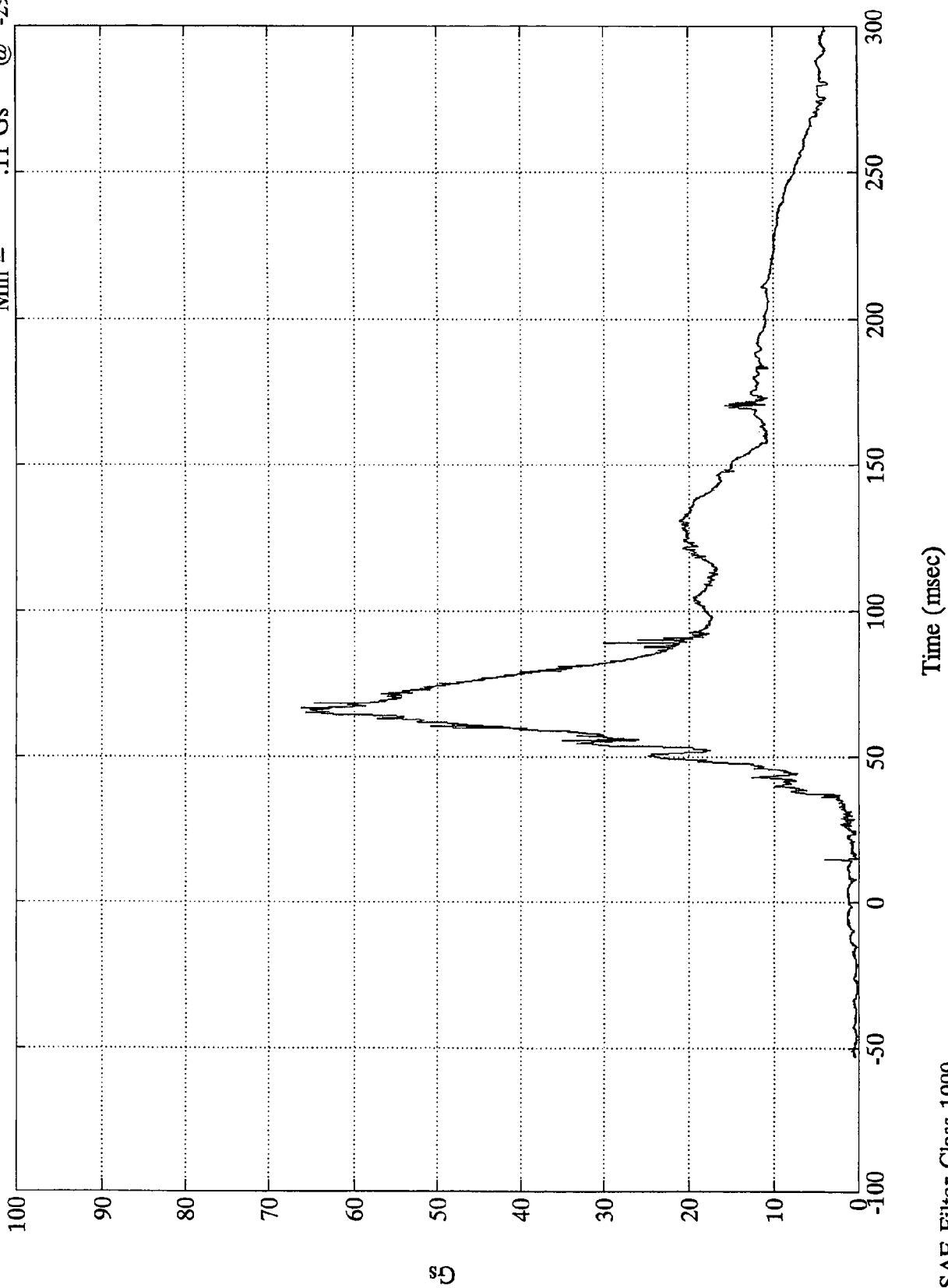
SAE Filter Class 1000

8118-8

VTW TEST #8

Max = 66.25 Gs @ 66.36 msec
Min = .11 Gs @ -29.16 msec

V1-P2 Head Resultant

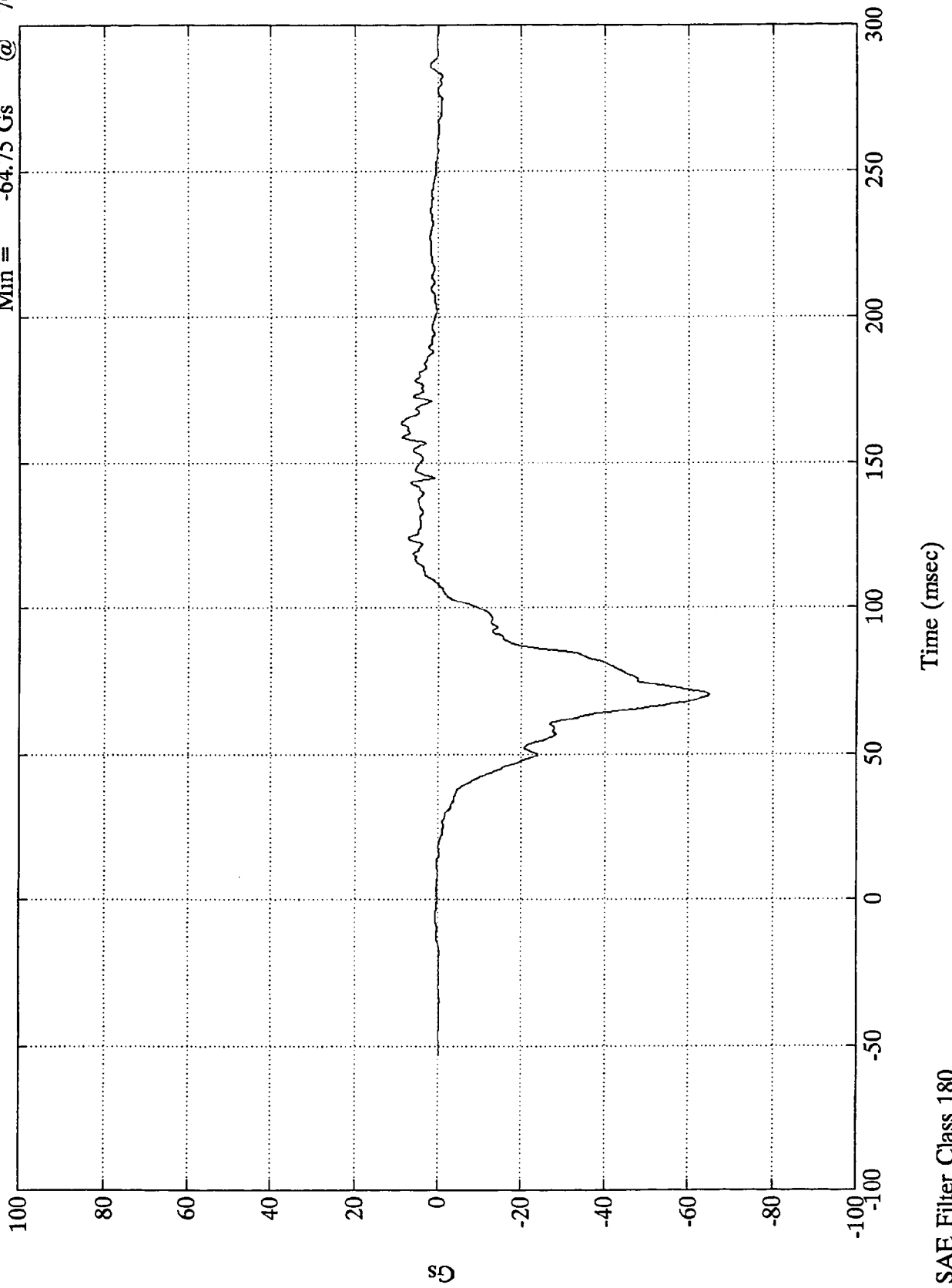


SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P2 Chest X
Max = 9.05 Gs @ 163.55 msec
Min = -64.75 Gs @ 70.31 msec

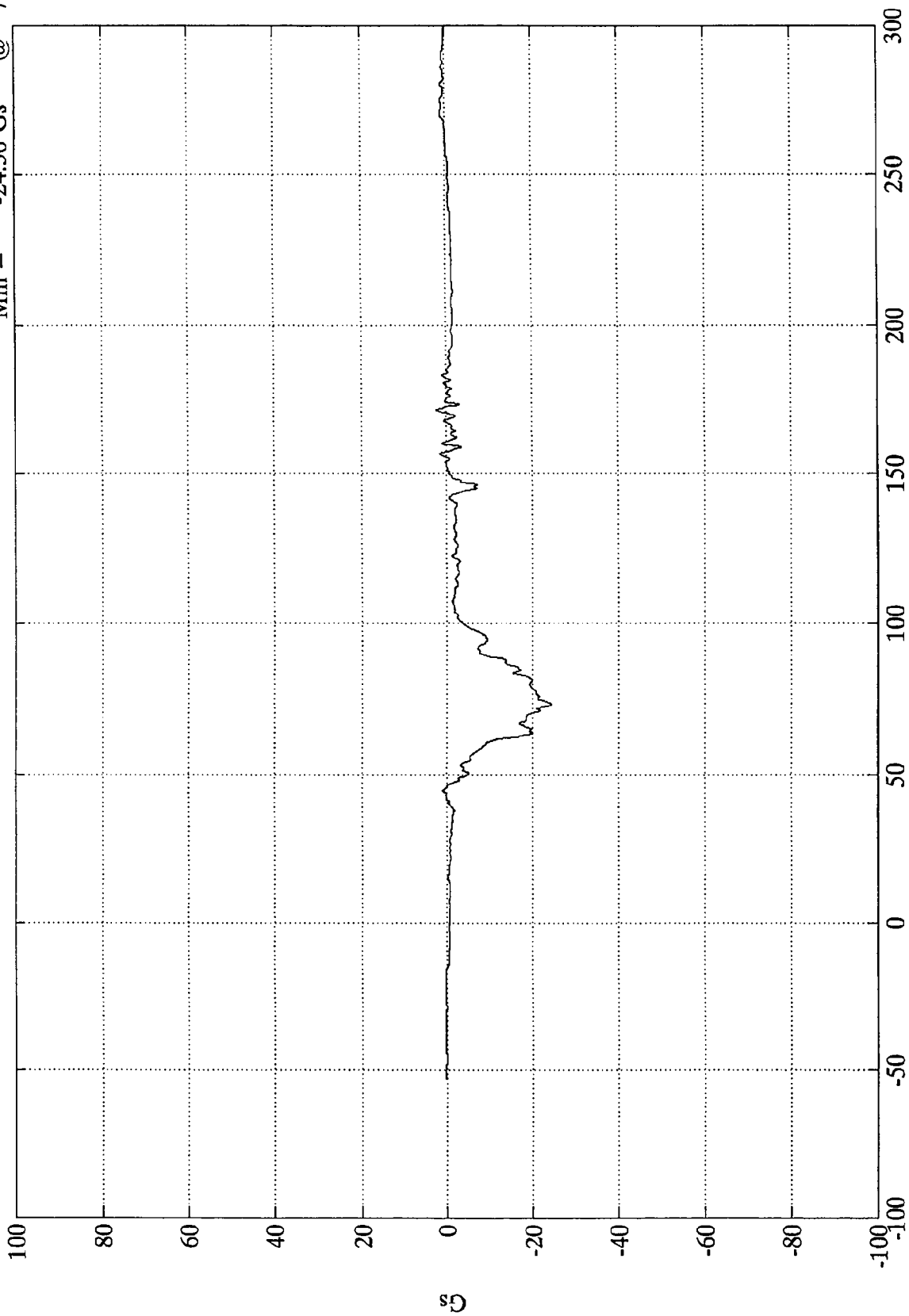


8118-8

VTV TEST #8

Max = 2.27 Gs @ 170.88 msec
 Min = -24.36 Gs @ 72.96 msec

V1-P2 Chest Y



Time (msec)

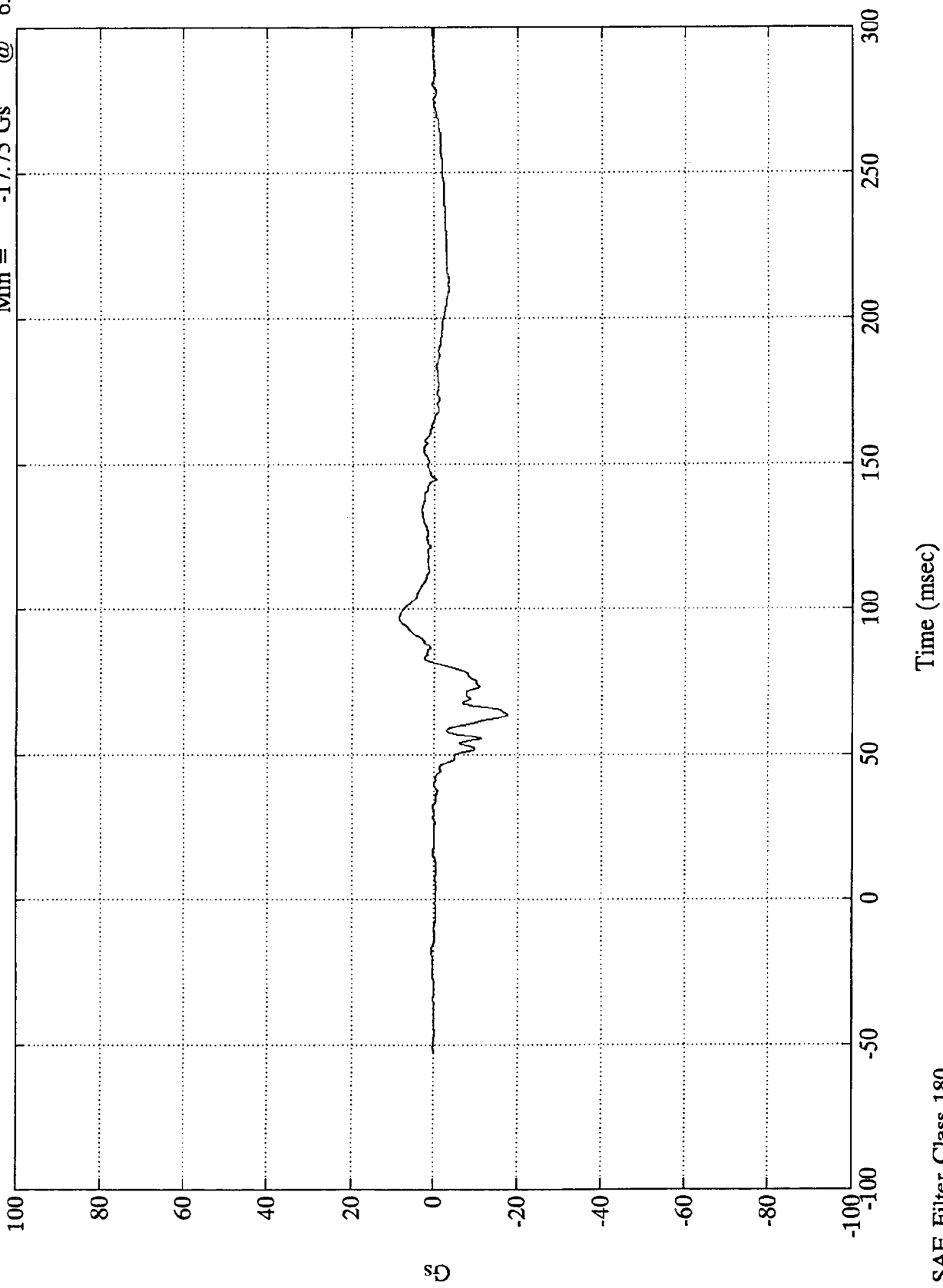
SAE Filter Class 180

8118-8

VTV TEST #8

V1-P2 Chest Z

Max = 8.53 Gs @ 96.60 msec
Min = -17.75 Gs @ 63.60 msec

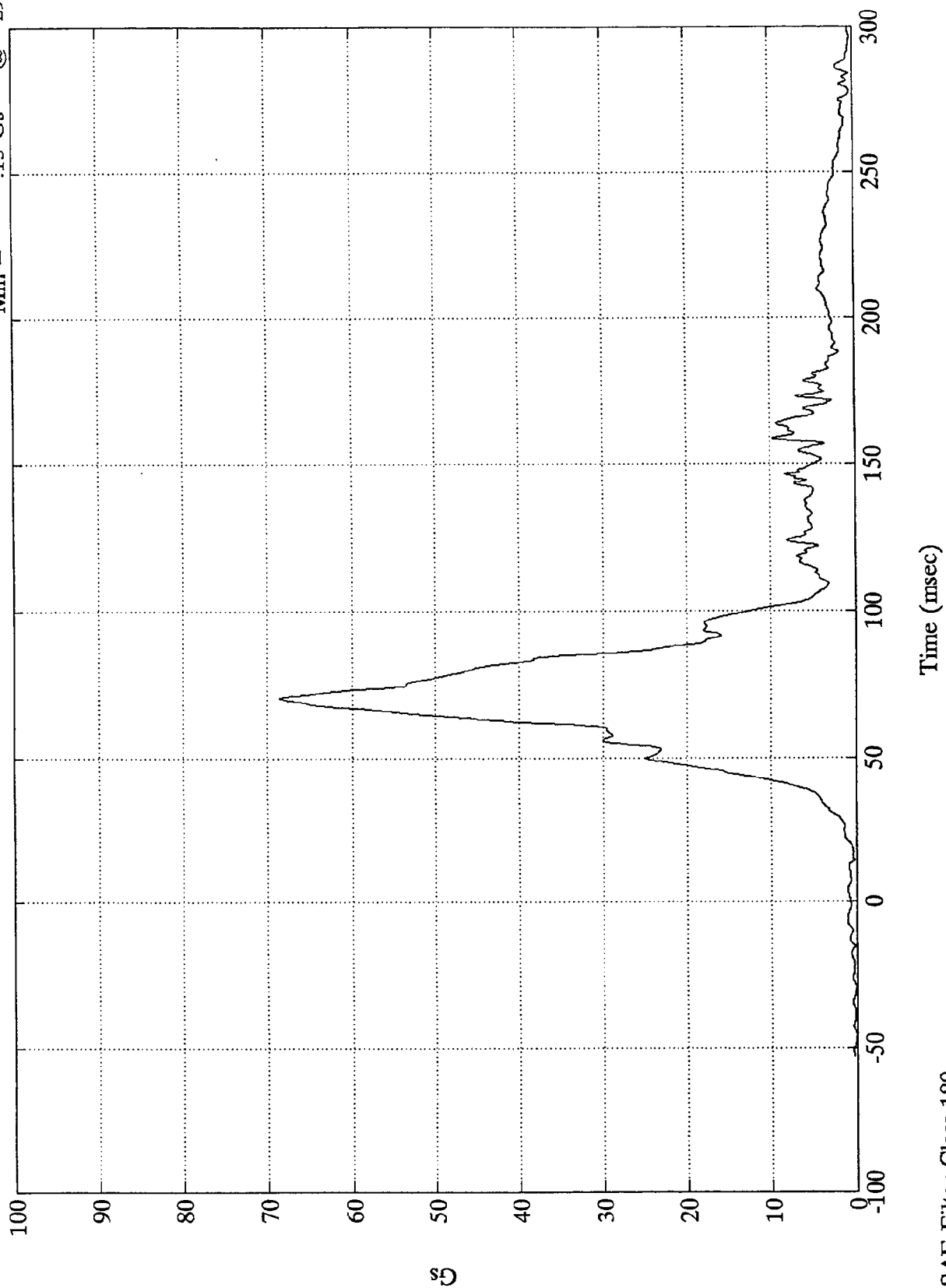


8118-8

VTV TEST #8

Max = 68.67 Gs @ 70.55 msec
Min = .15 Gs @ -29.04 msec

V1-P2 Chest Resultant



SAE Filter Class 180

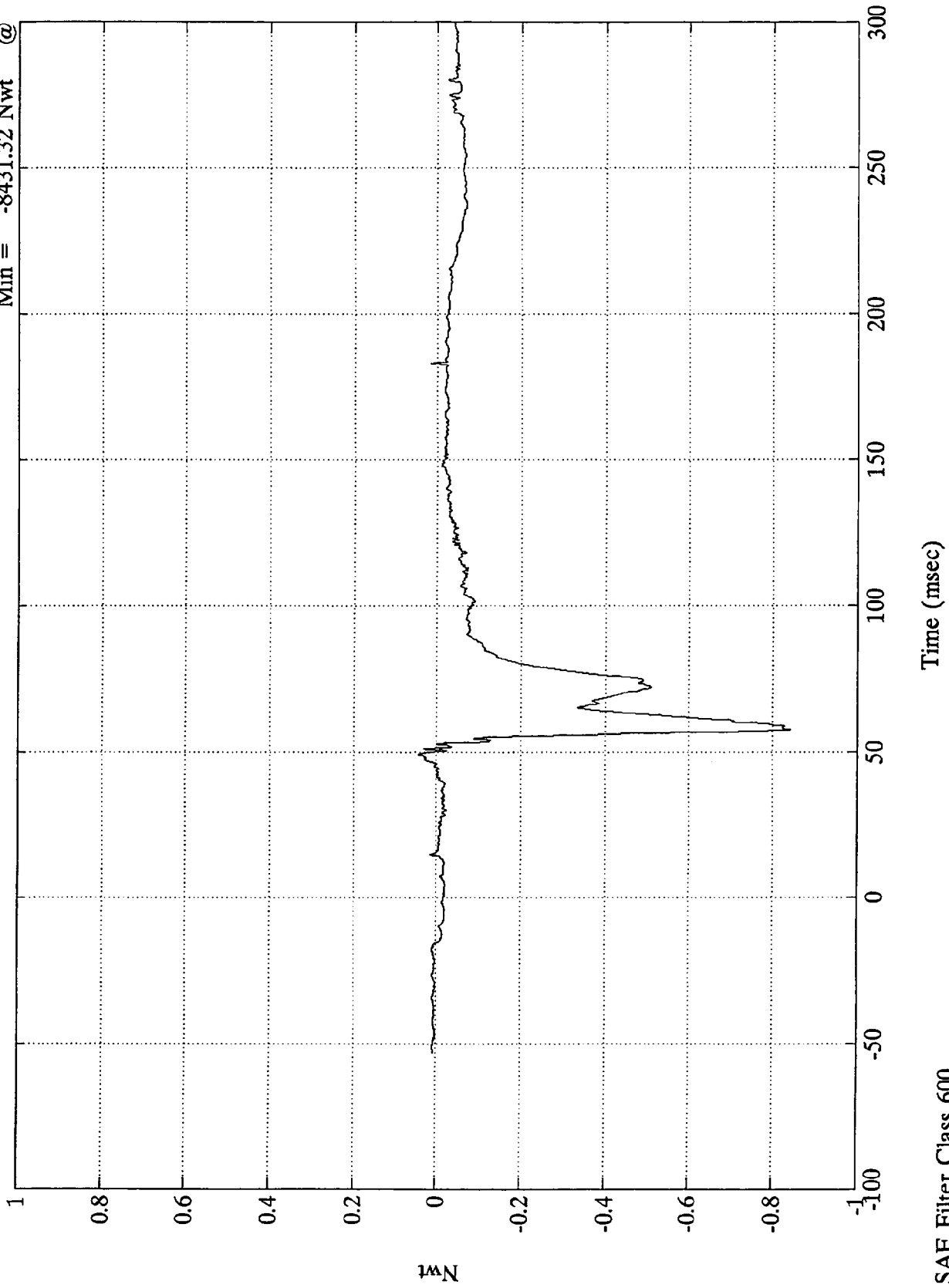
8118-8

VTV TEST #8

$\times 10^4$

V1-P2 Left Femur

Max = 431.85 Nwt @ 49.20 msec
Min = -8431.32 Nwt @ 57.60 msec



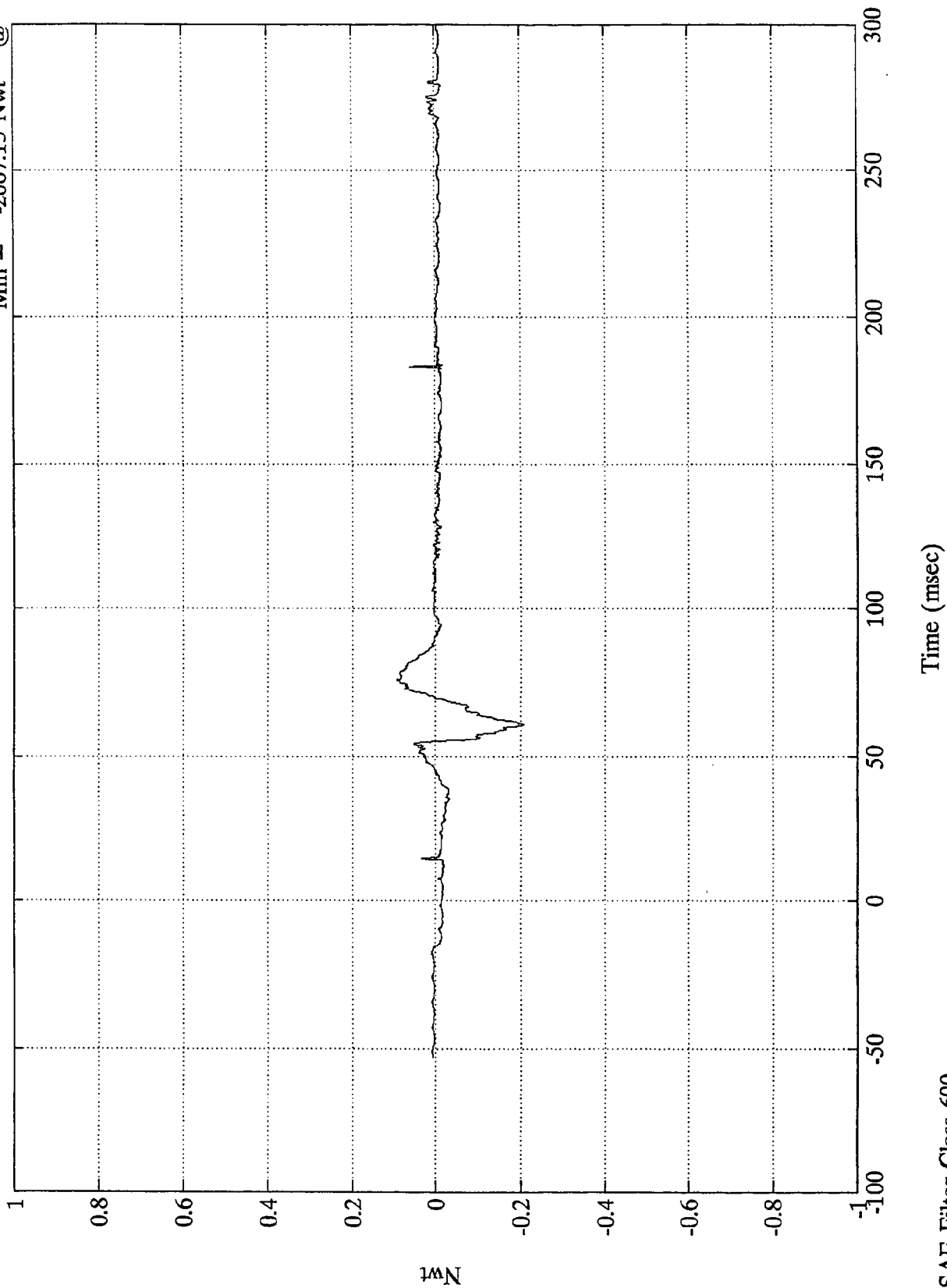
8118-8

VTV TEST #8

$\times 10^4$

V1-P2 Right Femur

Max = 951.17 Nwt @ 75.60 msec
Min = -2067.15 Nwt @ 60.60 msec

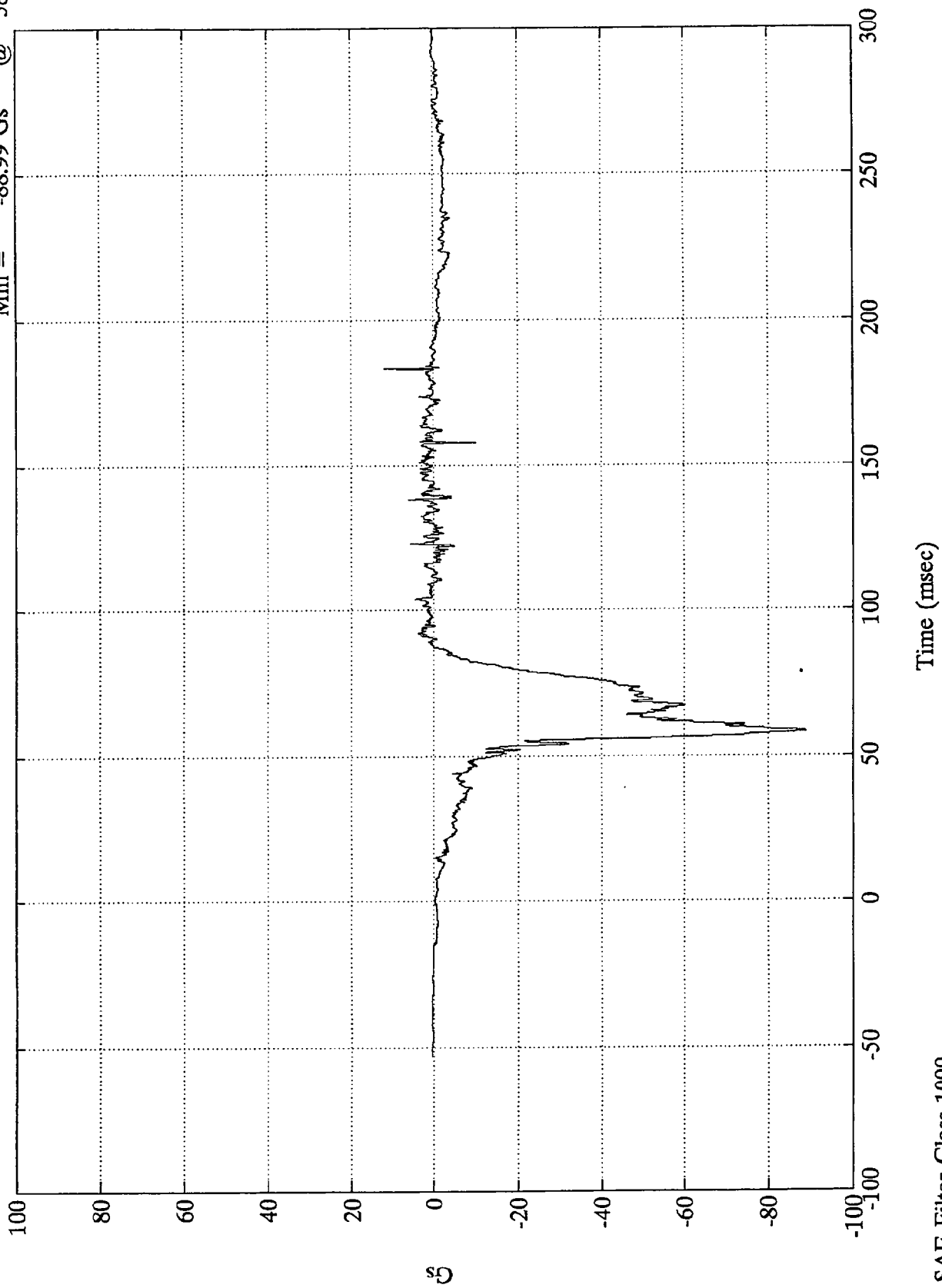


8118-8

VTV TEST #8

Max = 11.91 Gs @ 183.24 msec
Min = -88.99 Gs @ 58.08 msec

V1-P2 Pelvic X



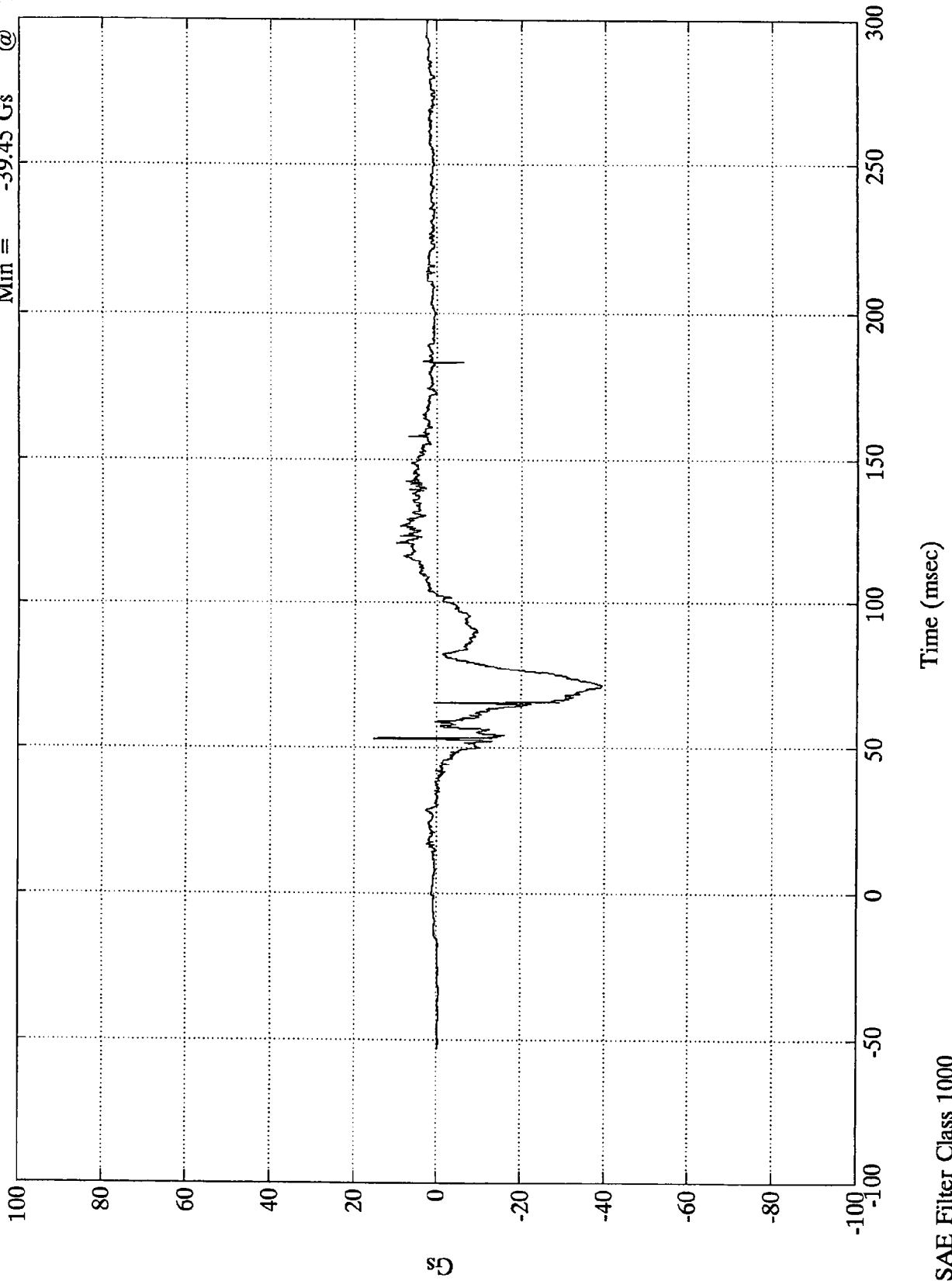
SAE Filter Class 1000

8118-8

VTV TEST #8

Max = 15.30 Gs @ 52.92 msec
Min = -39.45 Gs @ 71.27 msec

V1-P2 Pelvic Y



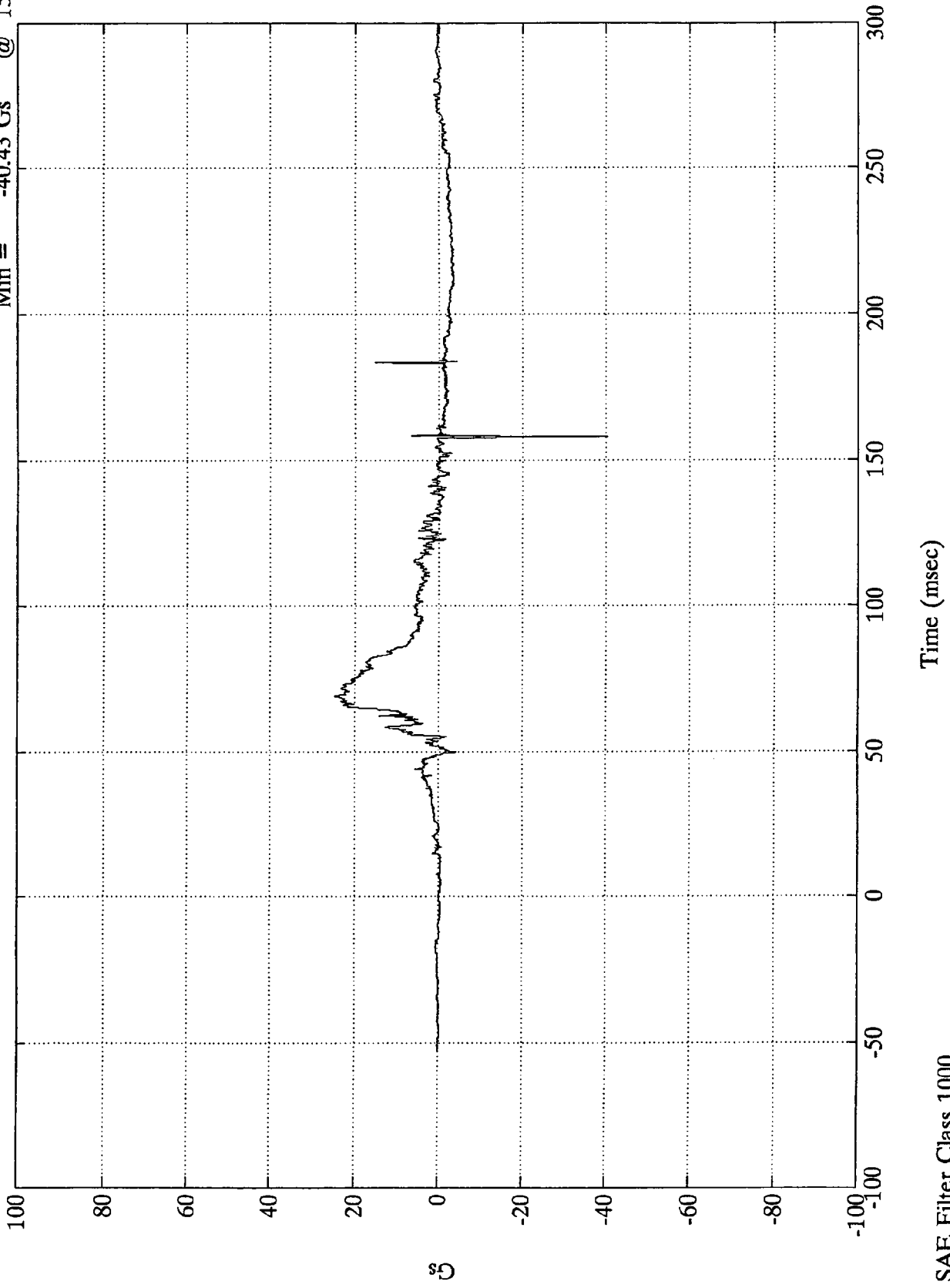
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P2 Pelvic Z

Max = 24.54 Gs @ 69.00 msec
Min = -40.43 Gs @ 157.80 msec

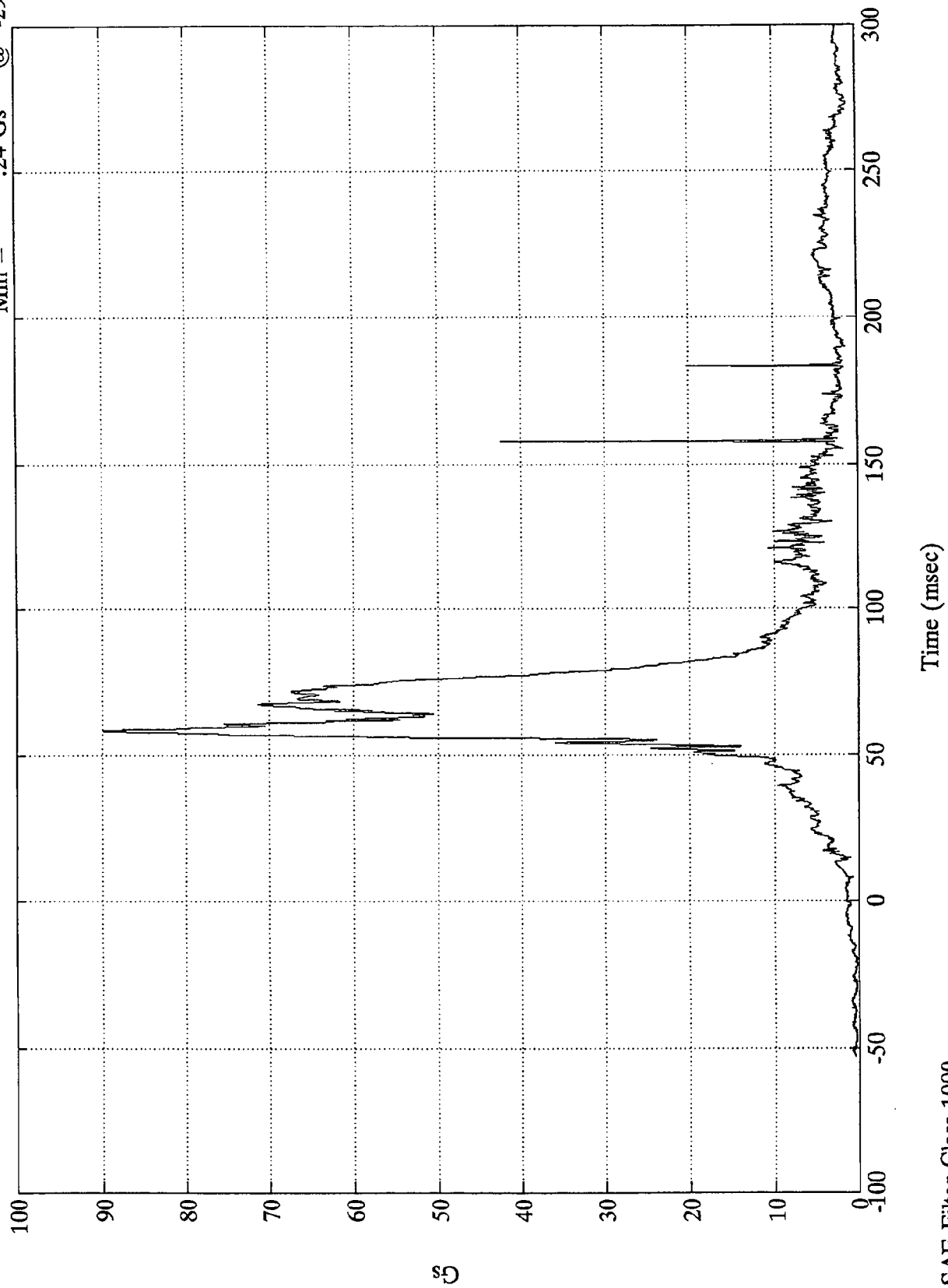


8118-8

VTV TEST #8

V1-P2 Pelvic Res.

Max =	89.84 Gs	@	58.08 msec
Min =	.24 Gs	@	-29.40 msec



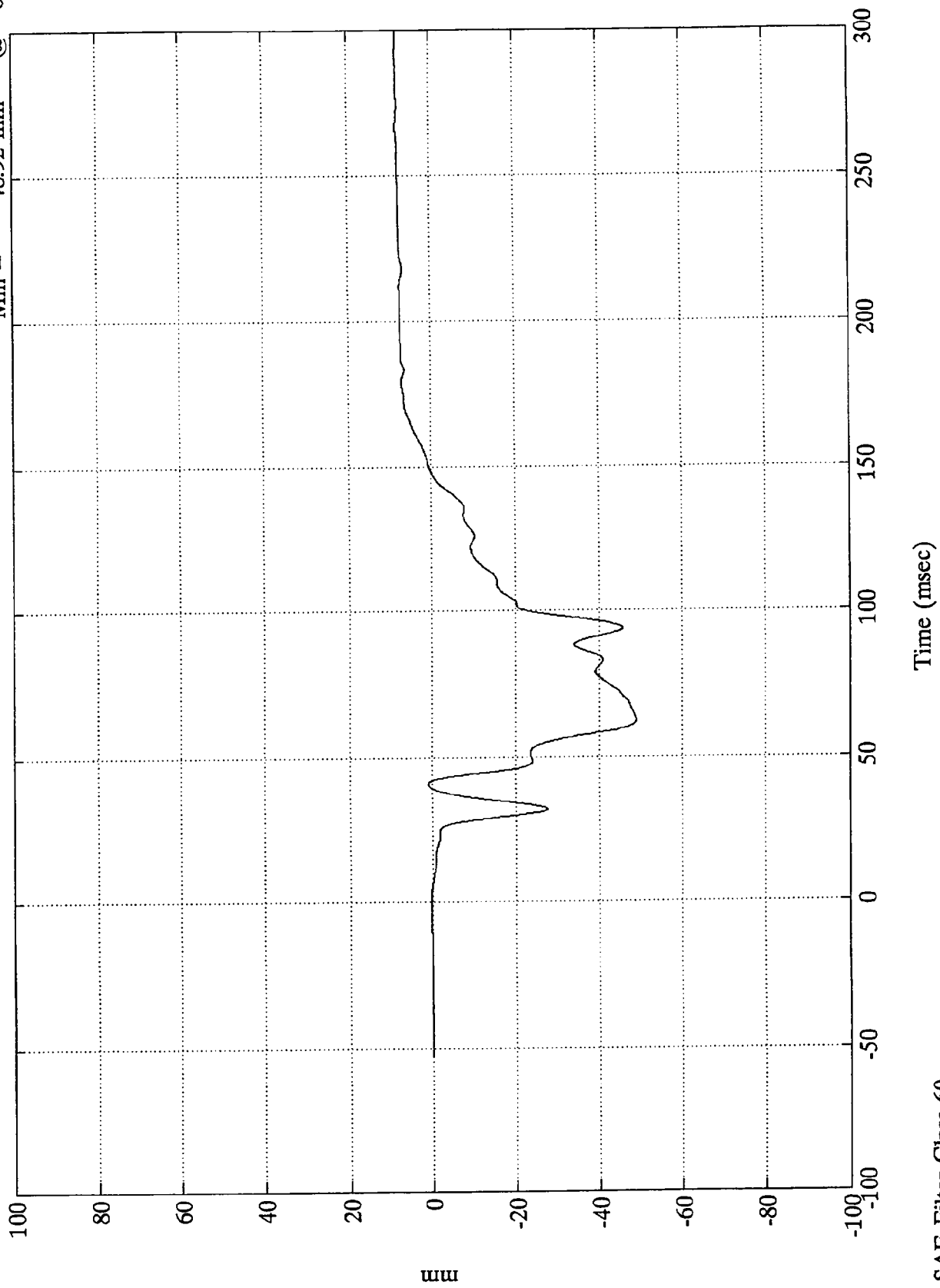
8118-8

SAE Filter Class 1000

VTV TEST #8

V1-P2 Chest Disp.

Max = 8.26 mm @ 266.88 msec
Min = -48.92 mm @ 62.40 msec



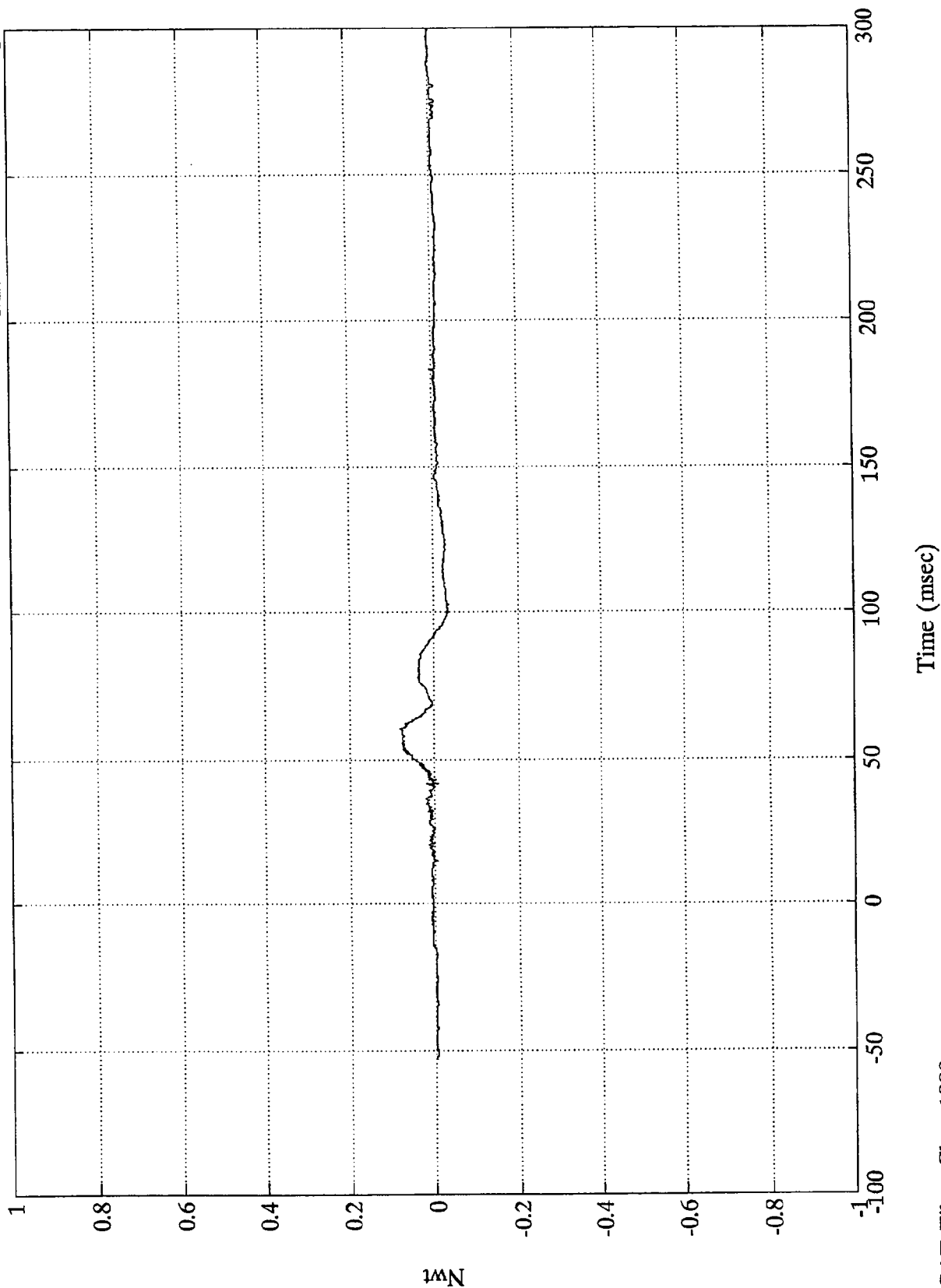
8118-8

SAE Filter Class 60

VTV TEST #8
x10⁴

V1-P2 Upper Neck Fx

Max = 810.28 Nwt @ 60.36 msec
Min = -345.63 Nwt @ 102.72 msec



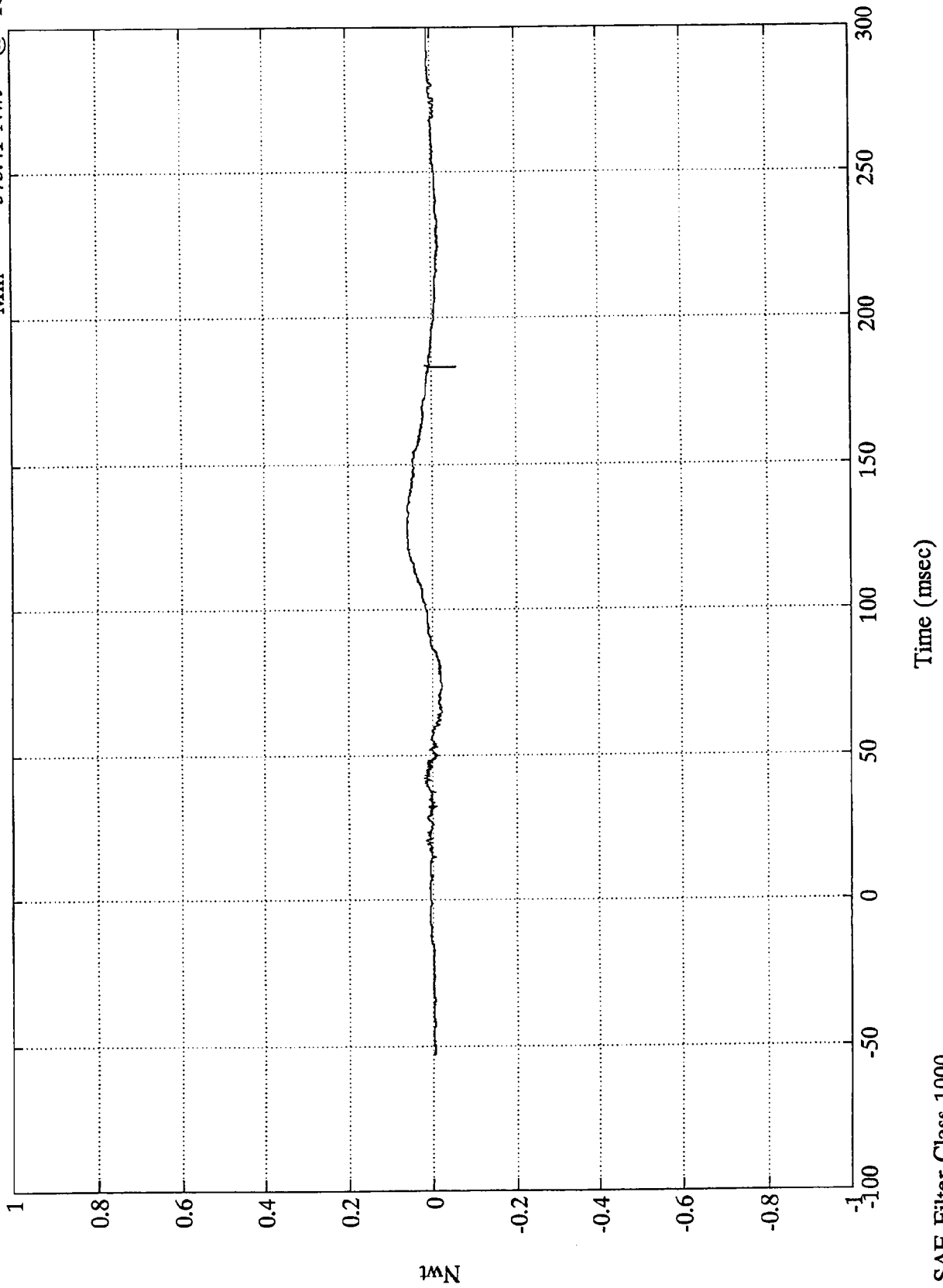
8118-8

VTV TEST #8

$\times 10^4$

V1-P2 Upper Neck Fy

Max = 616.08 Nwt @ 121.31 msec
Min = -575.41 Nwt @ 183.24 msec



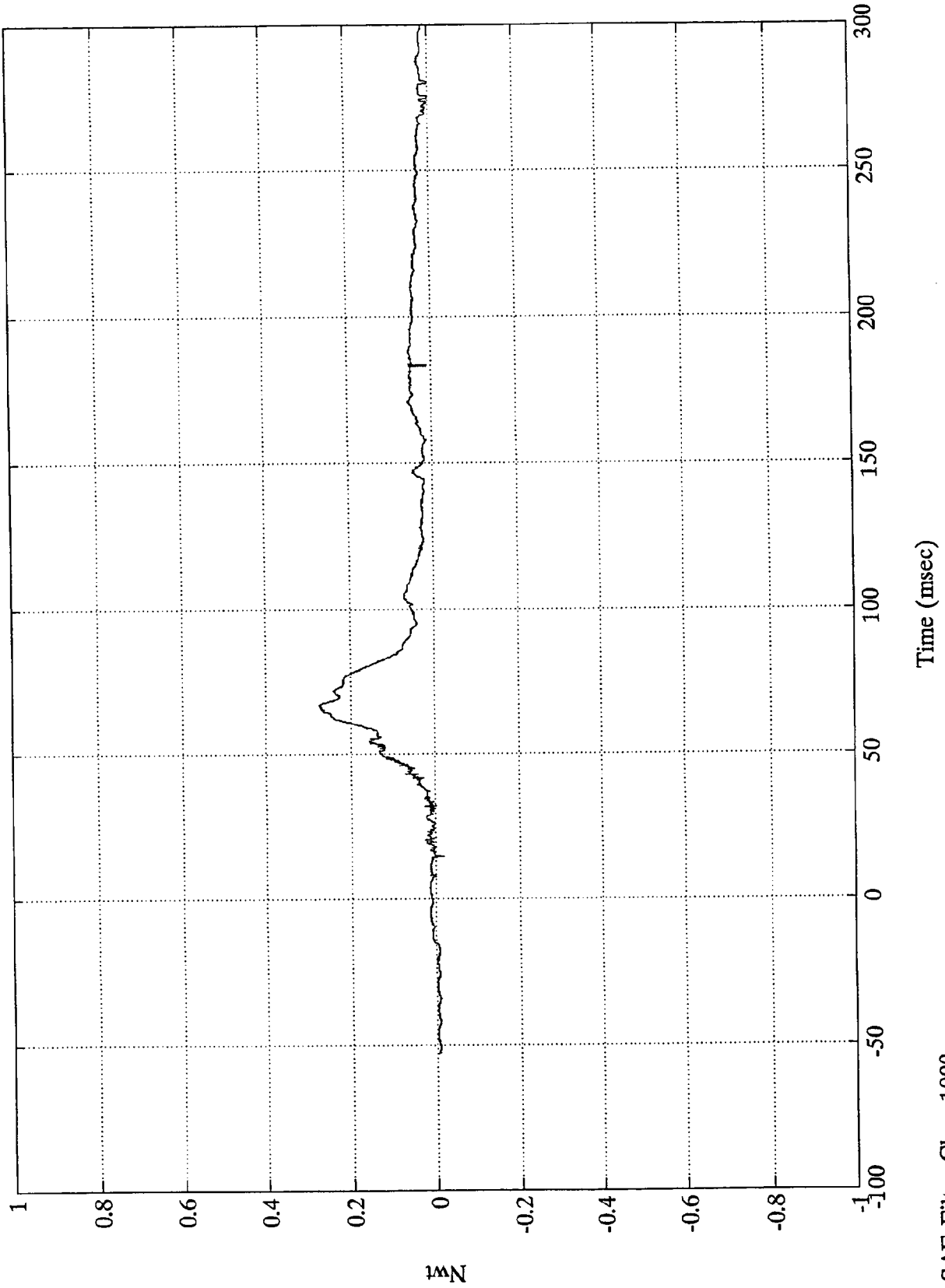
8118-8

SAE Filter Class 1000

VTV TEST #8
x10⁴

V1-P2 Upper Neck Fz

Max = 2740.12 Nwt @ 66.72 msec
Min = -181.11 Nwt @ 15.00 msec



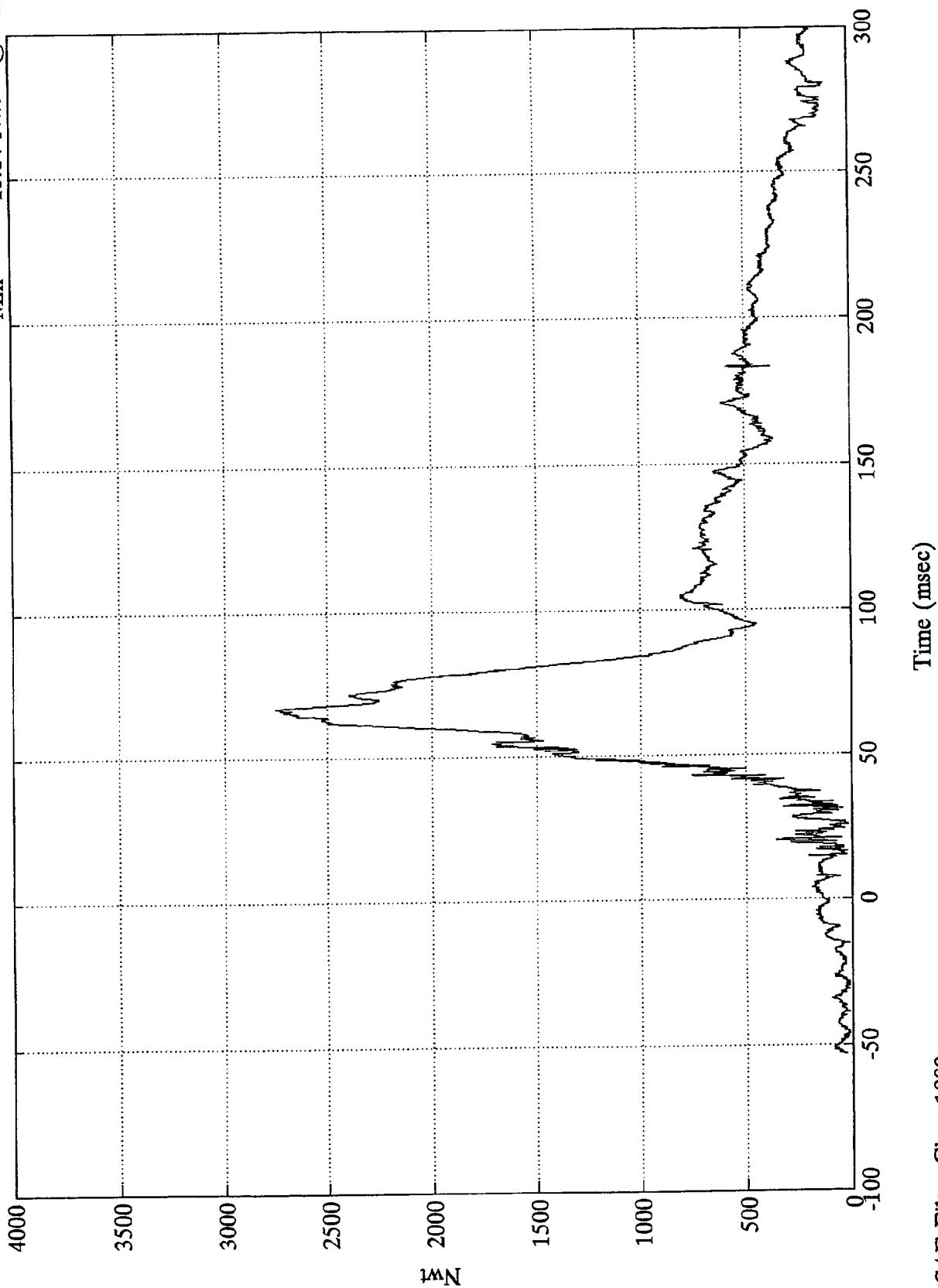
SAE Filter Class 1000

8118-8

VTV TEST #8

Max = 2754.14 Nwt @ 66.72 msec
Min = 13.84 Nwt @ -15.12 msec

V1-P2 Upper Neck F(res)



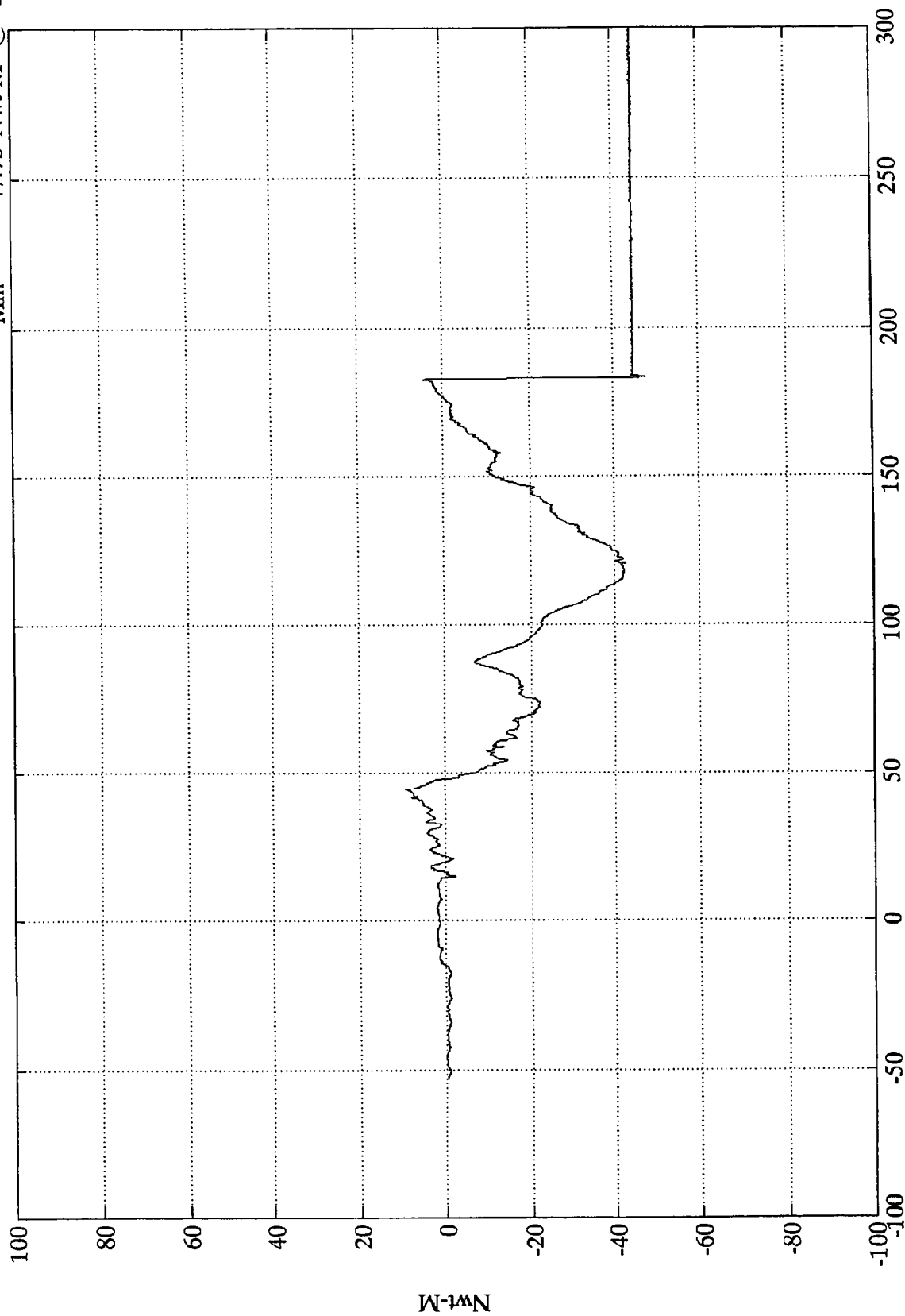
SAE Filter Class 1000

8118-8

VTV TEST #8

V1-P2 Upper Neck Mx

Max = 9.18 Nwt-M @ 44.15 msec
Min = -47.73 Nwt-M @ 183.60 msec



Time (msec) Data questionable after 182 msec, cable damaged

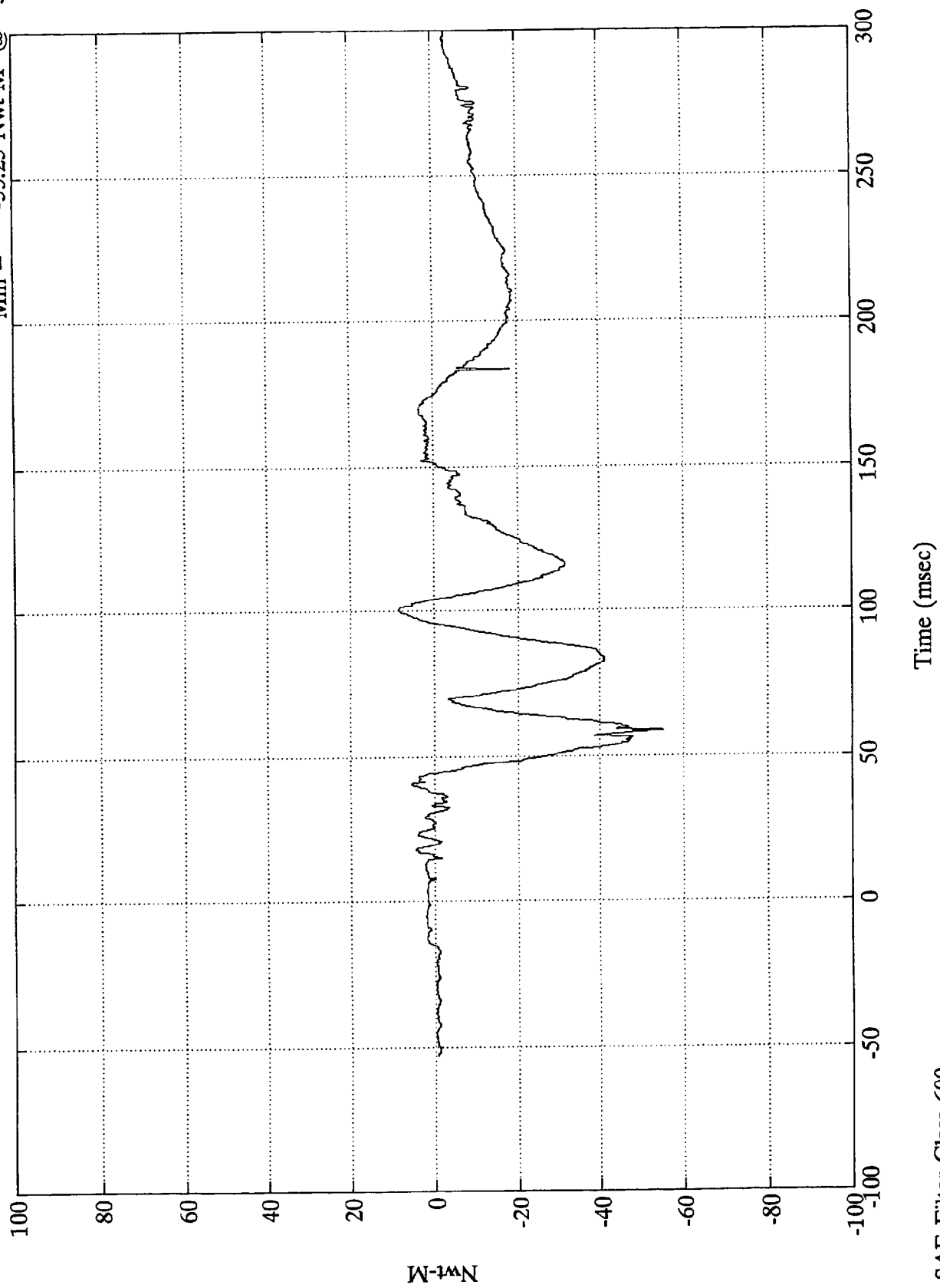
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P2 Upper Neck My

Max = 8.43 Nwt-M @ 100.32 msec
Min = -55.25 Nwt-M @ 58.43 msec



Nwt-M

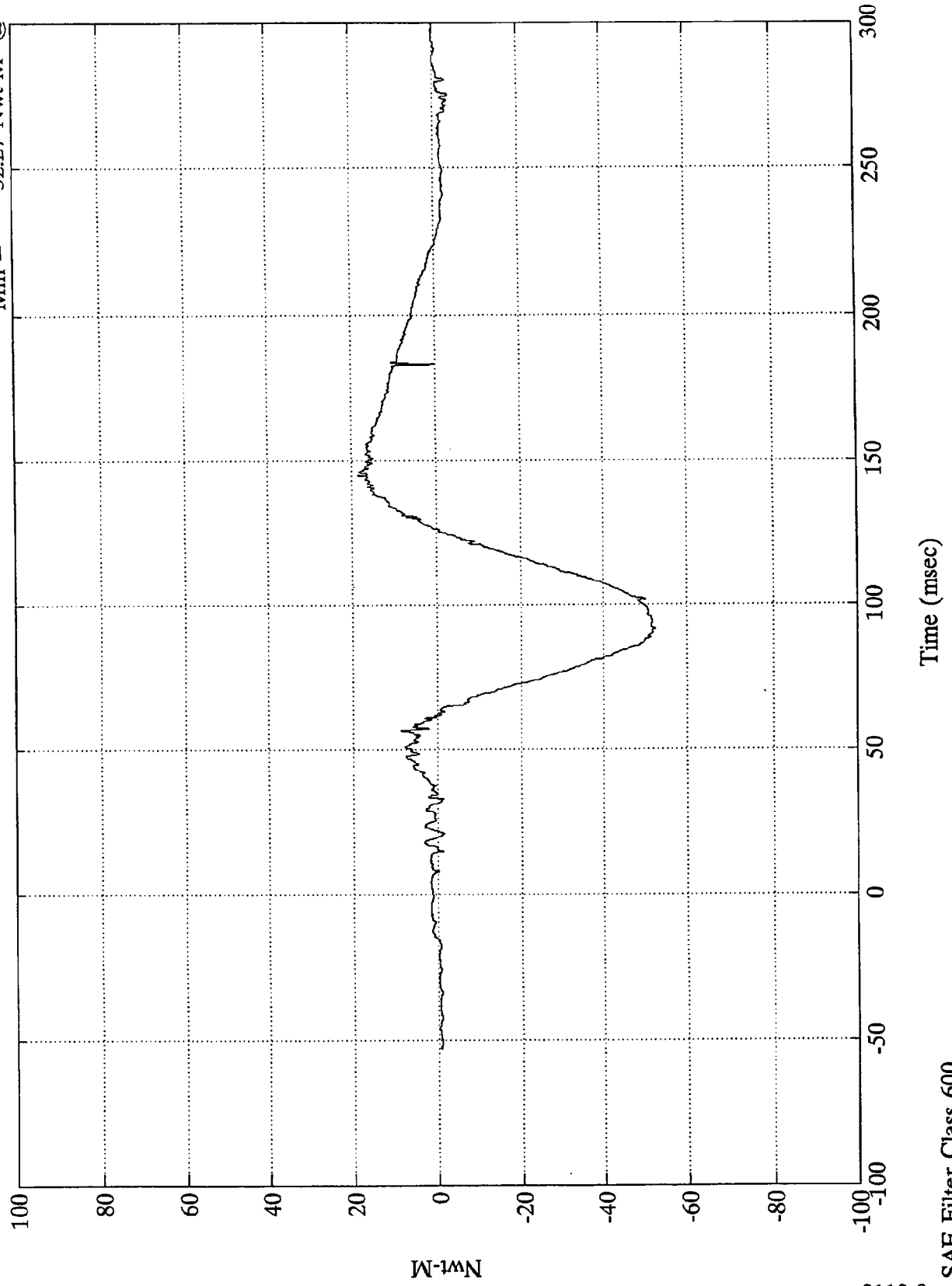
8118-8

SAE Filter Class 600

VTV TEST #8

V1-P2 Upper Neck Mz

Max = 18.38 Nwt-M @ 144.72 msec
Min = -52.27 Nwt-M @ 91.80 msec



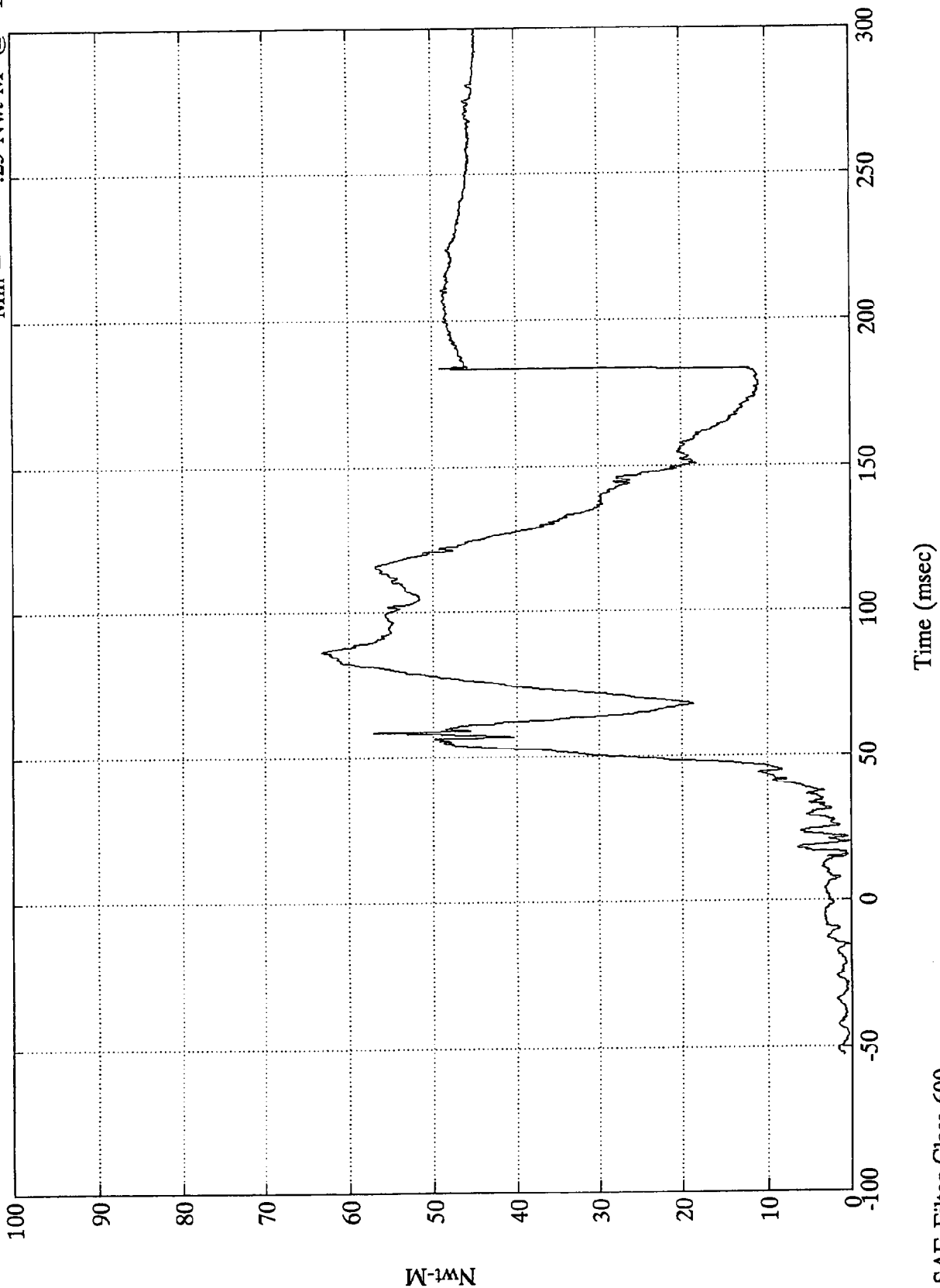
8118-8

SAE Filter Class 600

VTV TEST #8

V1-P2 Upper Neck M(res)

Max = 63.17 Nwt-M @ 86.28 msec
Min = .23 Nwt-M @ -15.00 msec



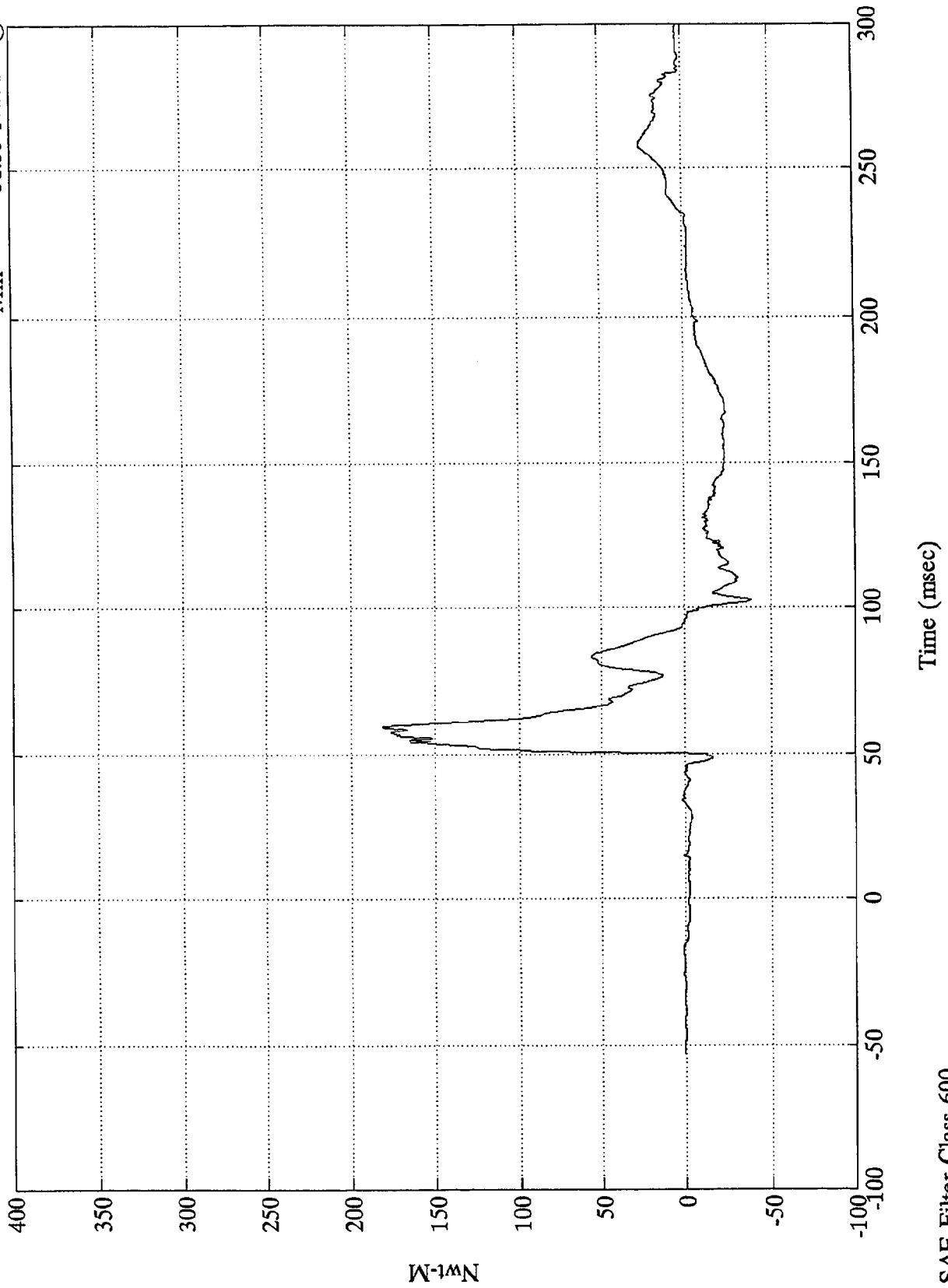
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P2 Lt Upper Tibia Mx

Max = 181.63 Nwt-M @ 59.40 msec
Min = -38.35 Nwt-M @ 102.48 msec



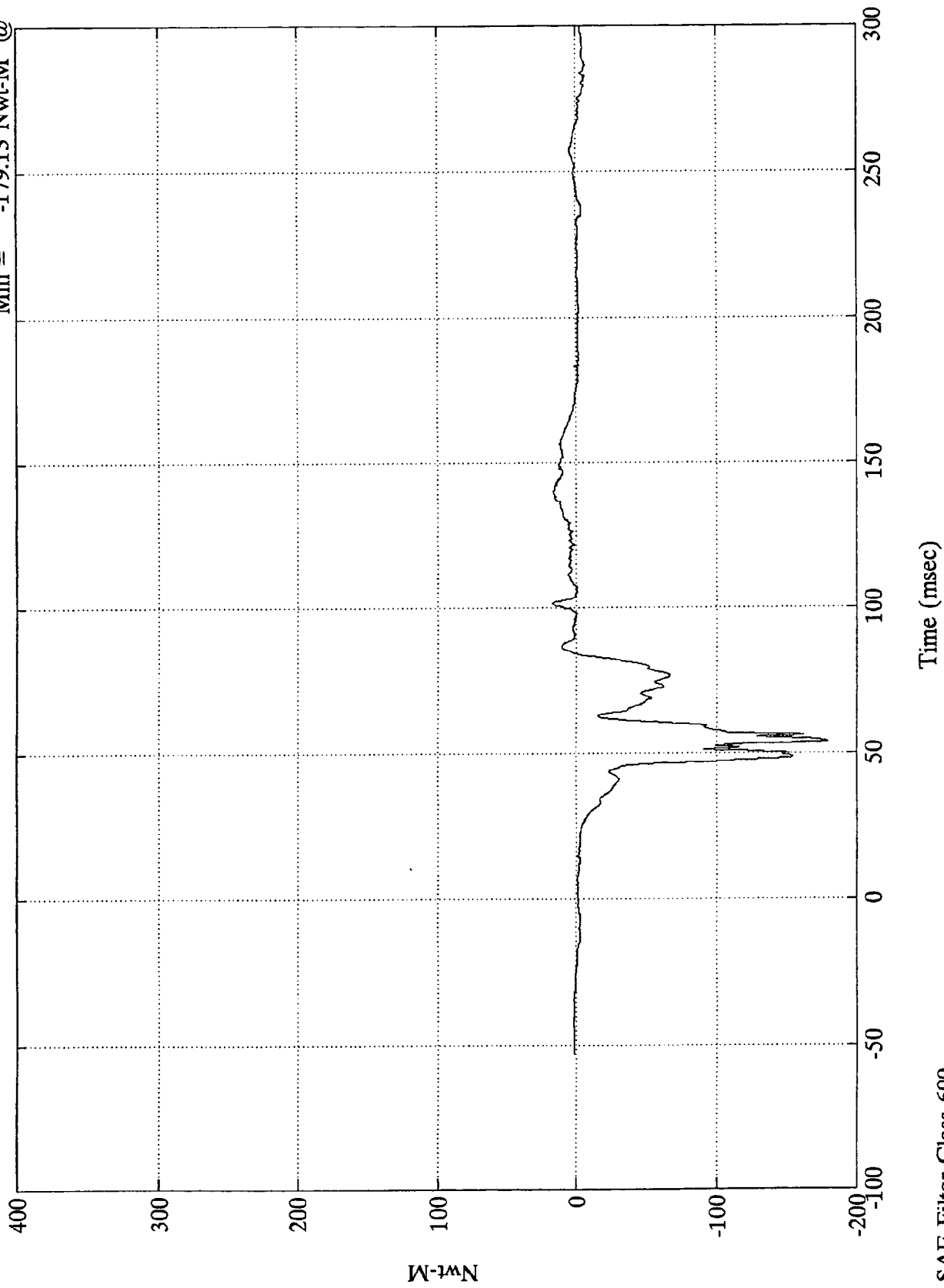
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P2 Lt Upper Tibia My

Max = 17.21 Nwt-M @ 101.63 msec
Min = -179.13 Nwt-M @ 53.88 msec



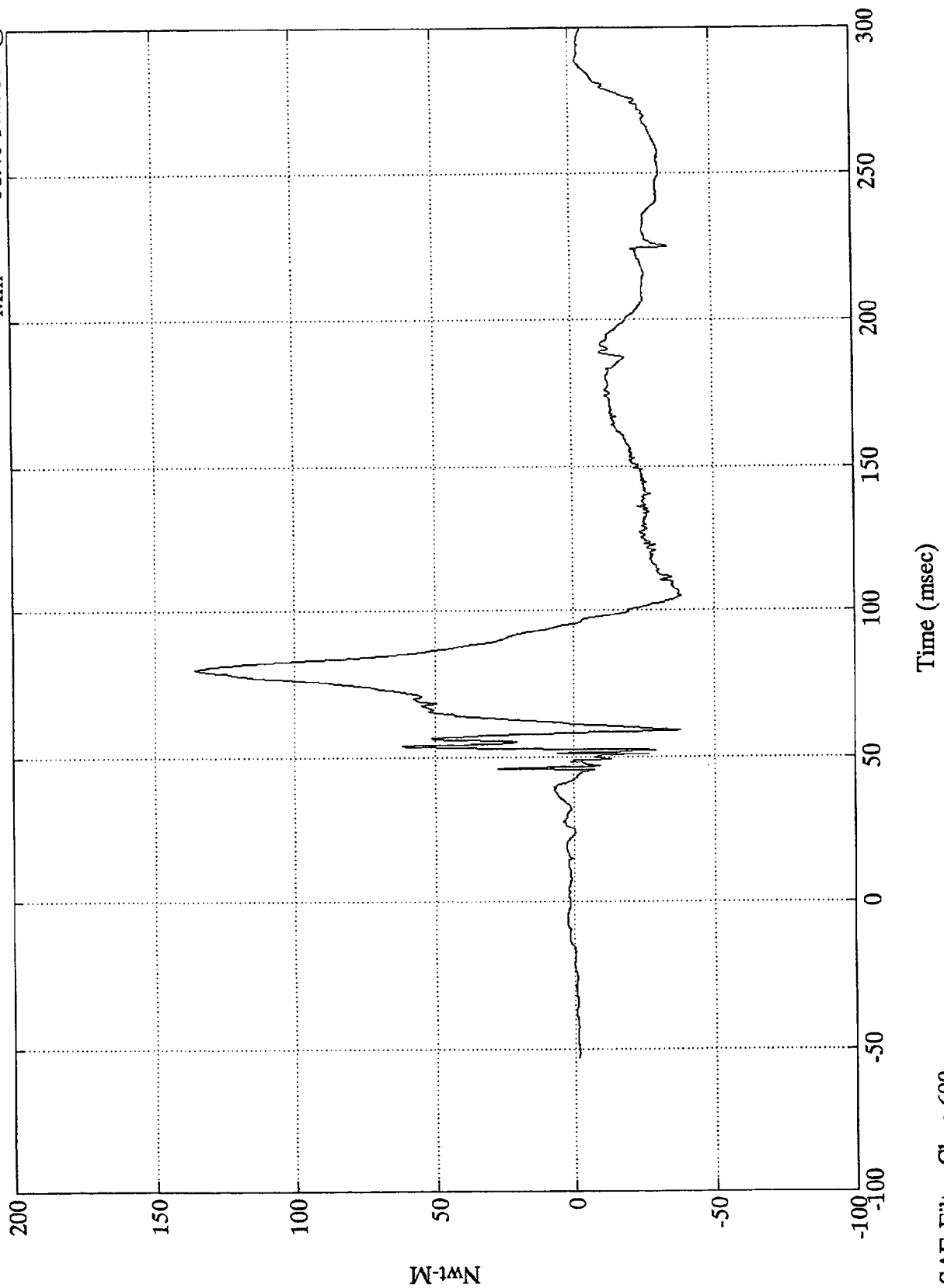
SAE Filter Class 600

8118-8

VTV TEST #8

V1-P2 Rt Upper Tibia Mx

Max = 135.51 Nwt-M @ 80.04 msec
Min = -38.40 Nwt-M @ 105.12 msec



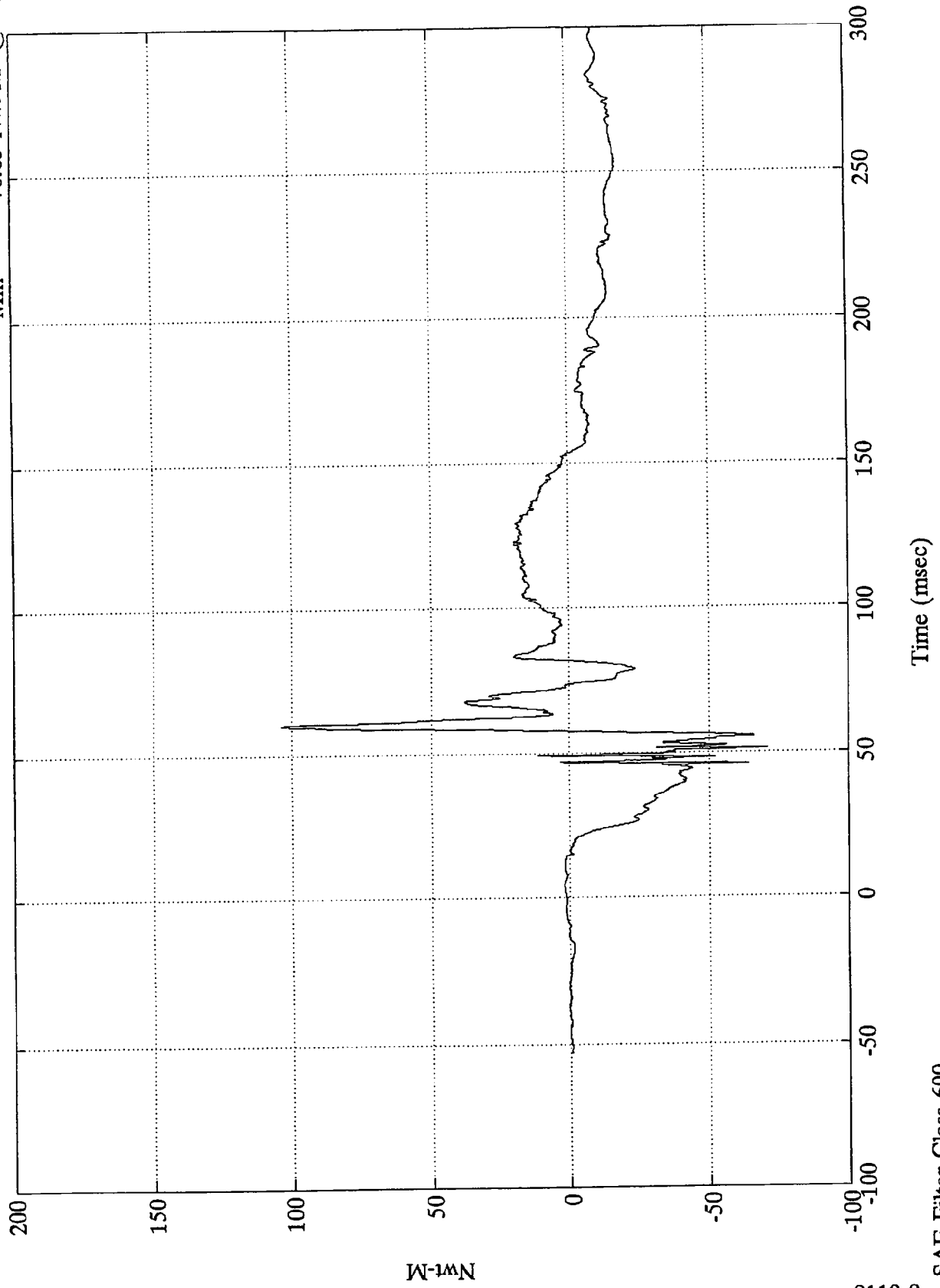
8118-8

SAE Filter Class 600

VTV TEST #8

V1-P2 Rt Upper Tibia My

Max = 103.67 Nwt-M @ 60.12 msec
Min = -70.63 Nwt-M @ 51.24 msec



8118-8

SAE Filter Class 600

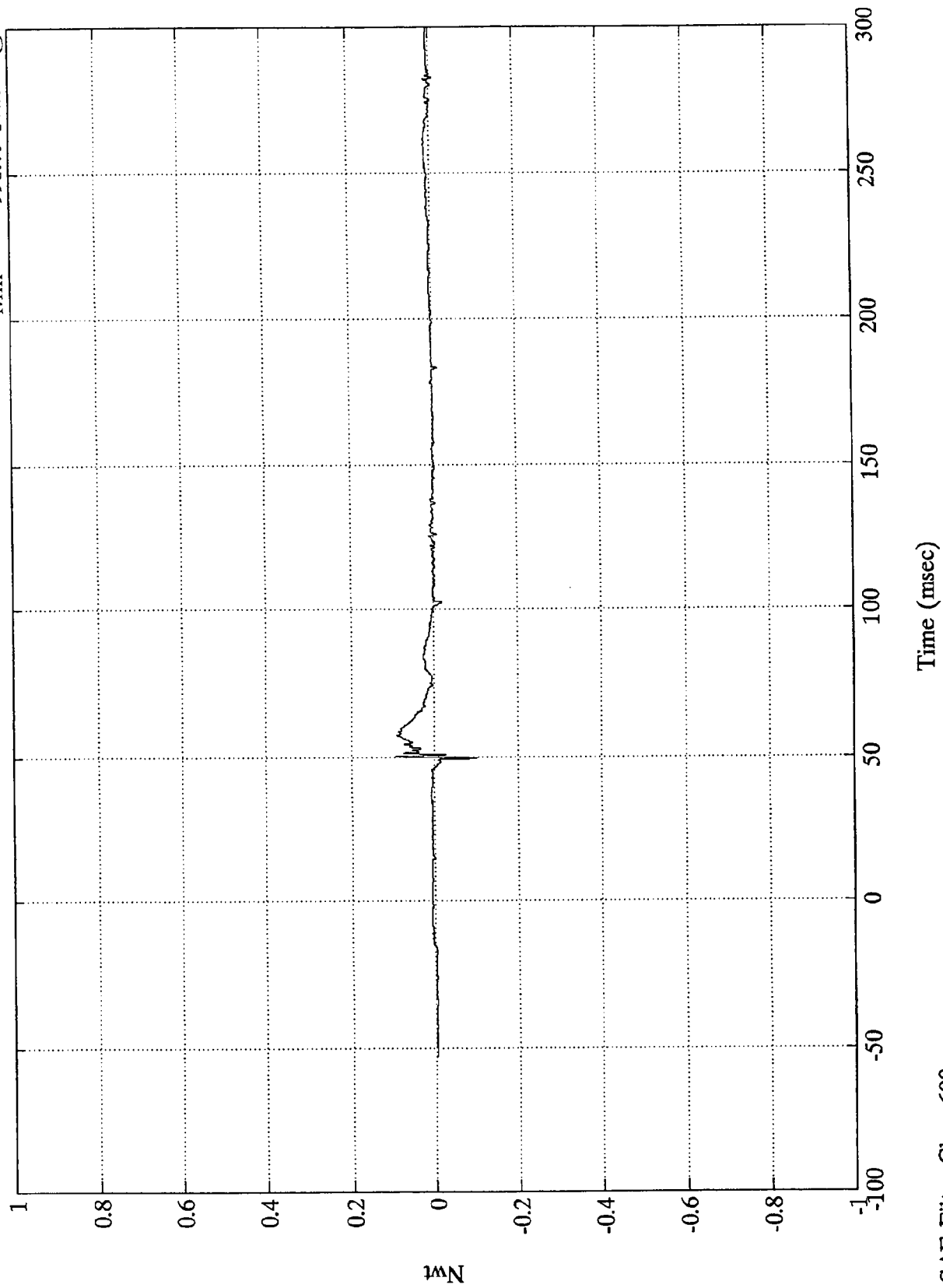
Nwt-M

B-157

VTV TEST #8
x10⁴

V1-P2 Lt Lower Tibia Fy

Max = 945.25 Nwt @ 50.16 msec
Min = -996.79 Nwt @ 49.68 msec



SAE Filter Class 600

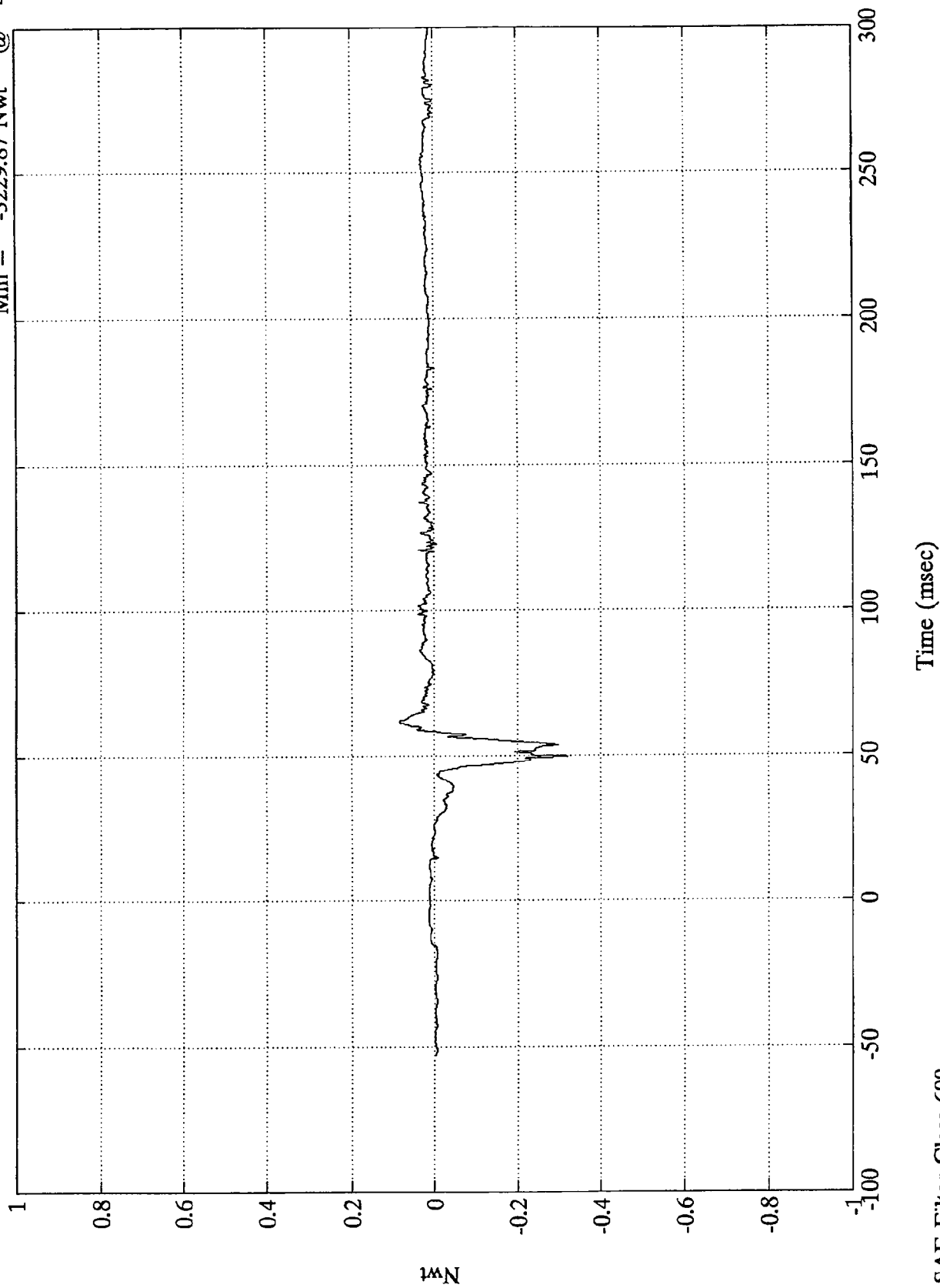
8118-8

VTV TEST #8

$\times 10^4$

V1-P2 Lt Lower Tibia Fz

Max = 857.98 Nwt @ 61.32 msec
Min = -3229.87 Nwt @ 49.68 msec



SAE Filter Class 600

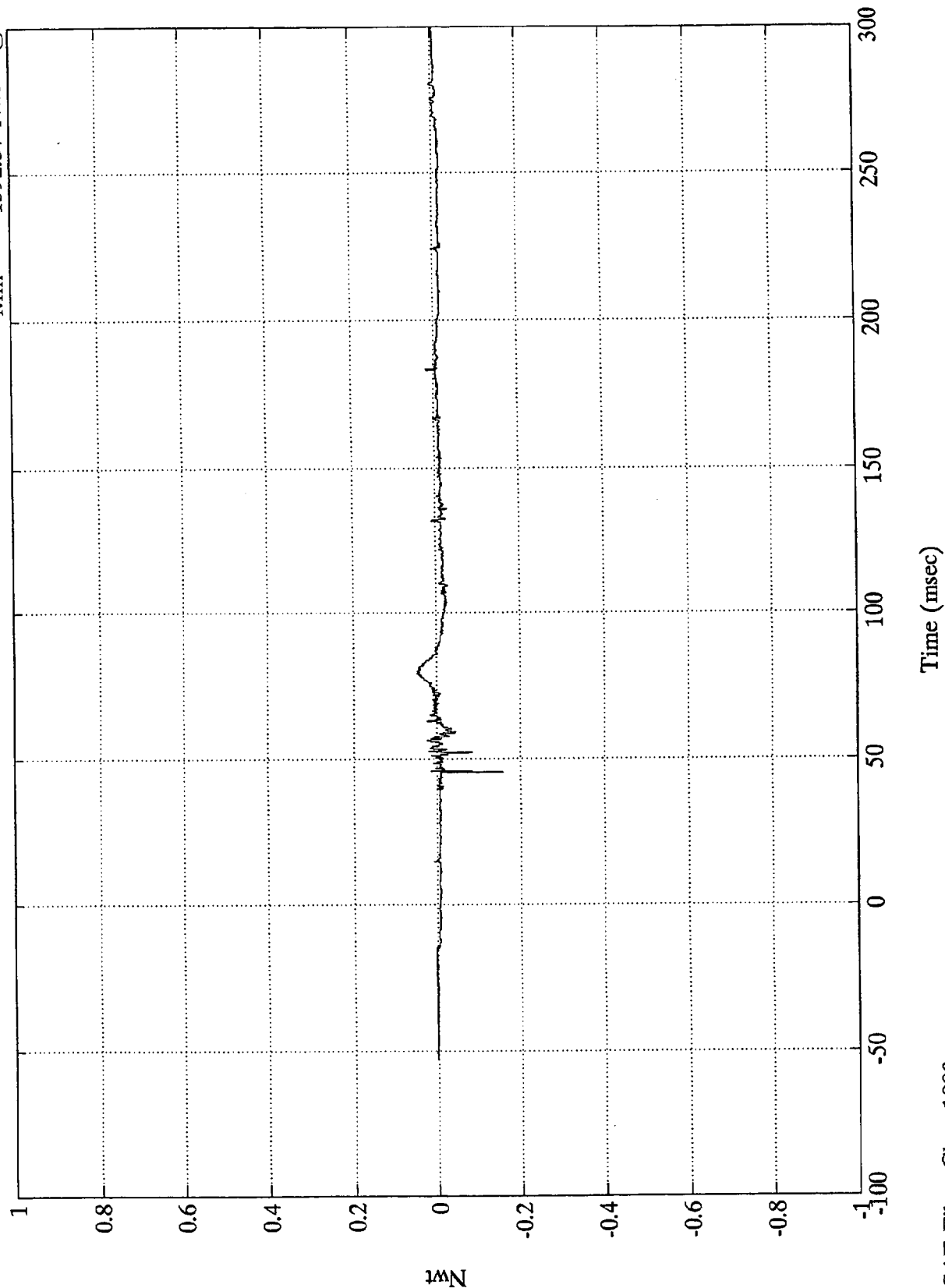
8118-8

VTV TEST #8
x10⁴

Max = 79.19 msec
Min = 45.48 msec

Max = 474.88 Nwt @
Min = -1592.37 Nwt @

V1-P2 Rt Lower Tibia Fy



8118-8

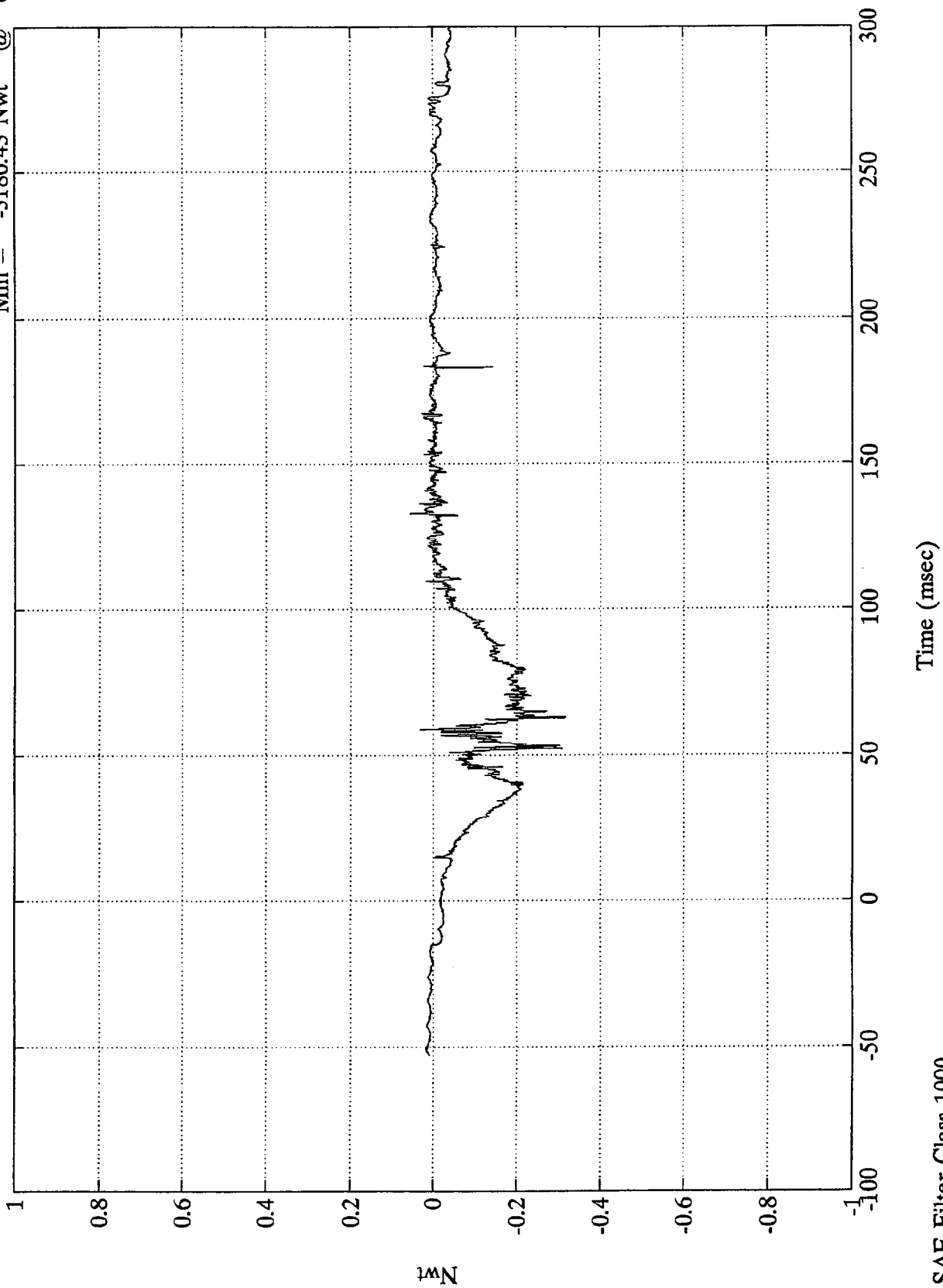
SAE Filter Class 1000

VTV TEST #8

$\times 10^4$

V1-P2 Rt Lower Tibia Fz

Max = 588.09 Nwt @ 132.60 msec
Min = -3180.43 Nwt @ 62.76 msec

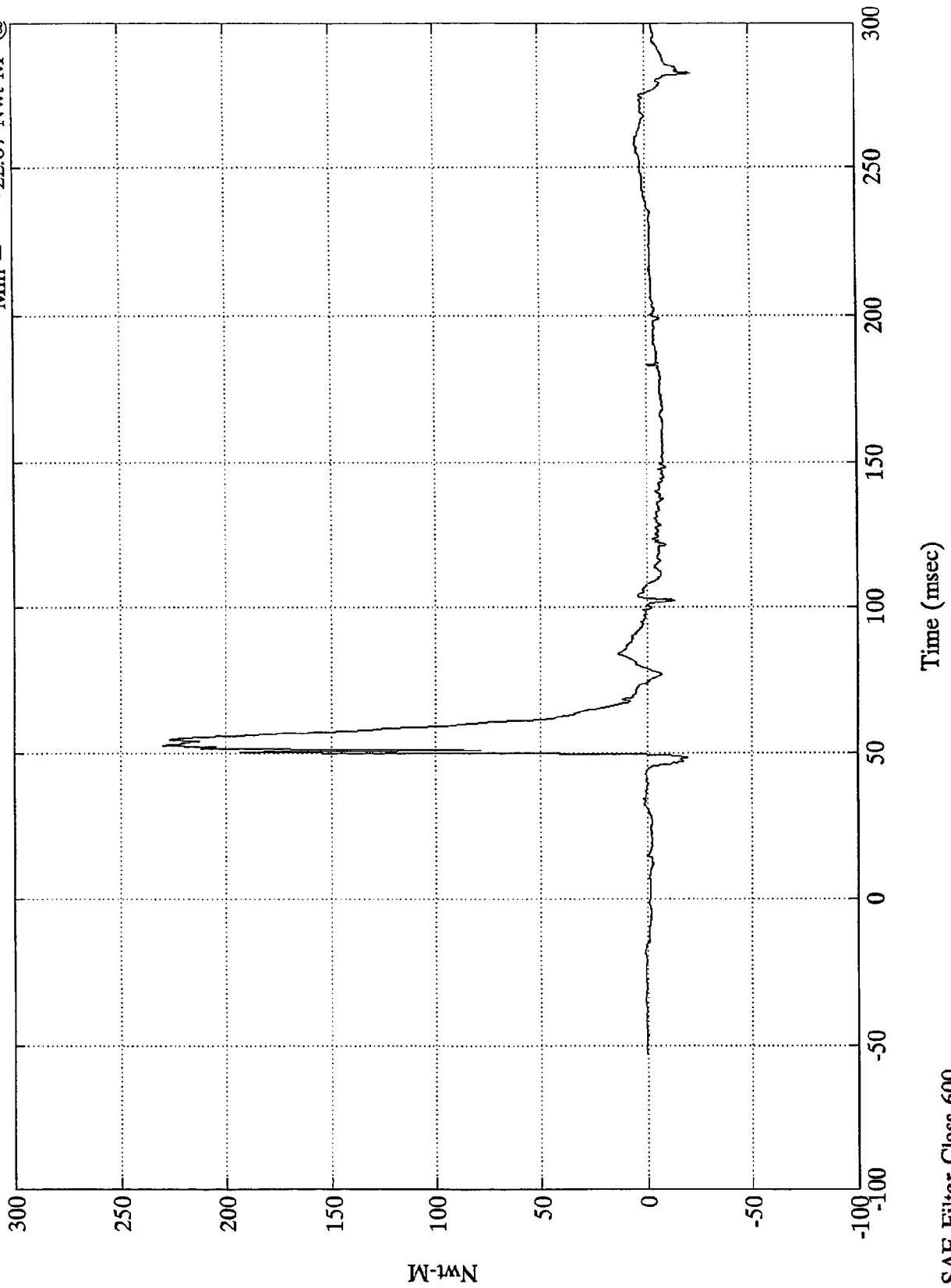


8118-8

VTV TEST #8

Max = 229.86 Nwt-M @ 52.68 msec
Min = -22.07 Nwt-M @ 282.72 msec

V1-P2 Lt Lower Tibia Mx

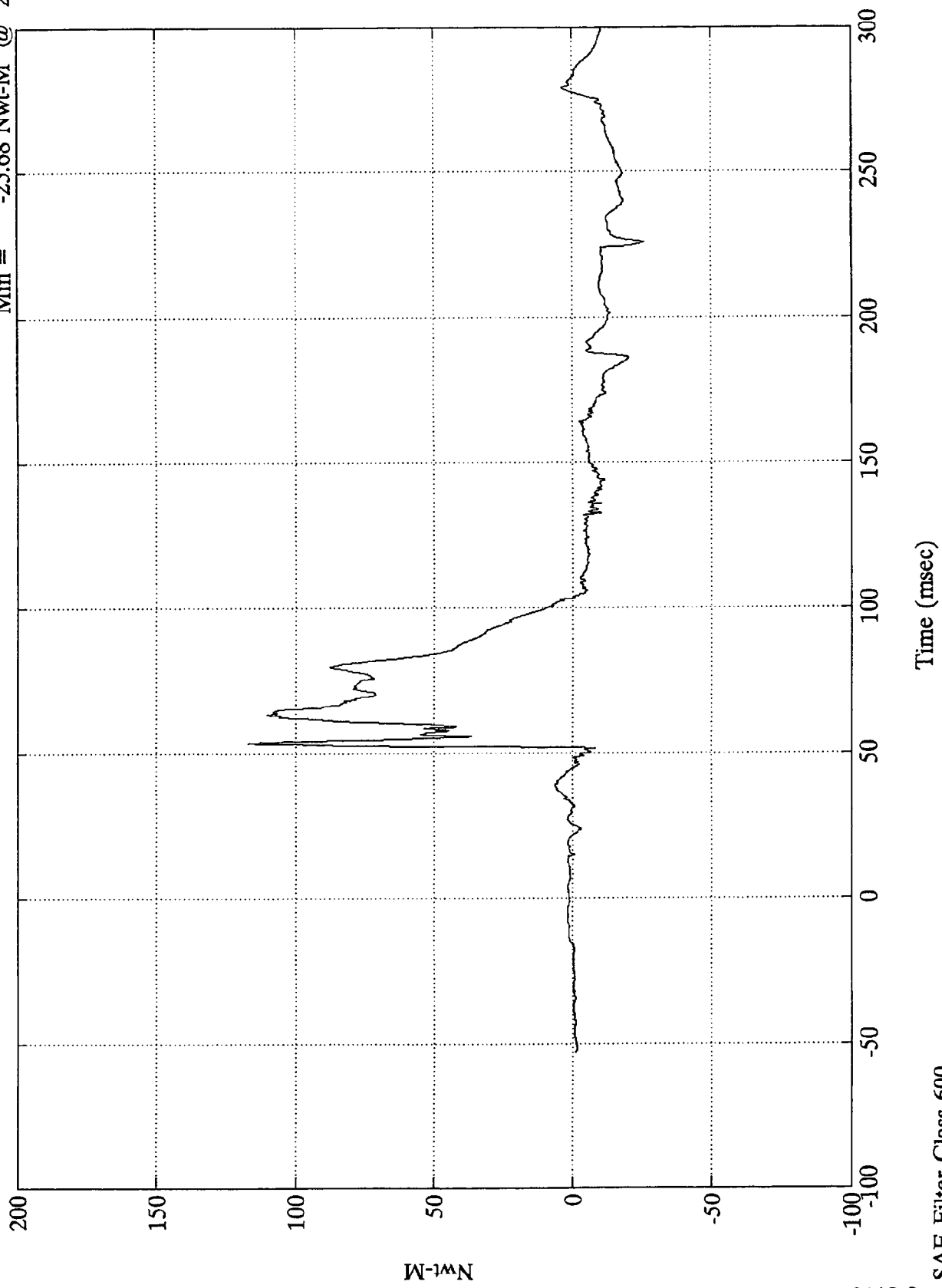


8118-8

VTV TEST #8

V1-P2 Rt Lower Tibia Mx

Max = 117.08 Nwt-M @ 53.52 msec
Min = -25.68 Nwt-M @ 225.60 msec



8118-8

SAE Filter Class 600

VEHICLE TWO DATA

TEST No. Y49-8-1417

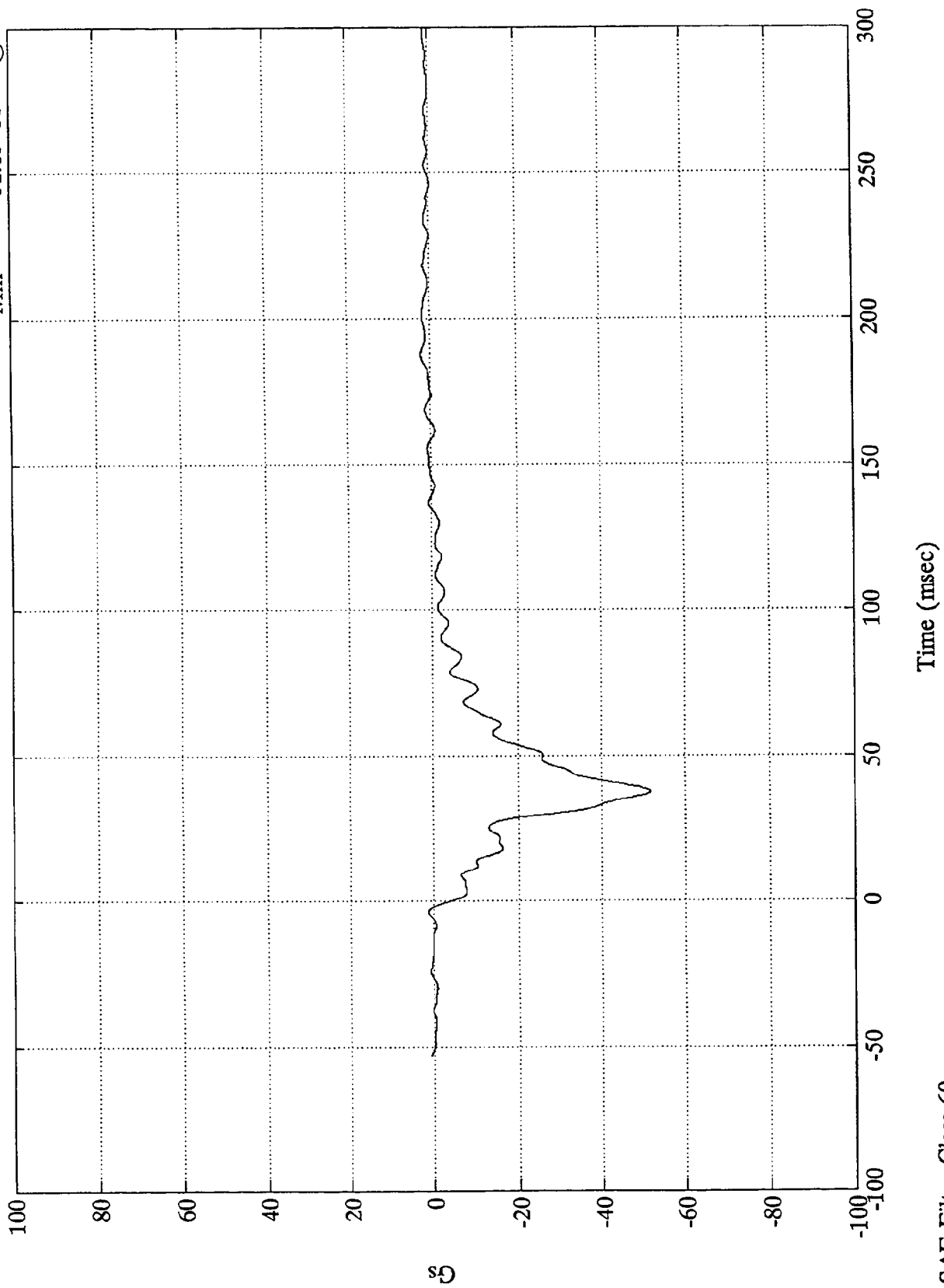
VEHICLE DATA

SAE FILTER CHANNEL CLASS
60

VTV TEST #8

V2 C.G. X

Max = 2.22 Gs @ 187.68 msec
Min = -51.83 Gs @ 37.56 msec



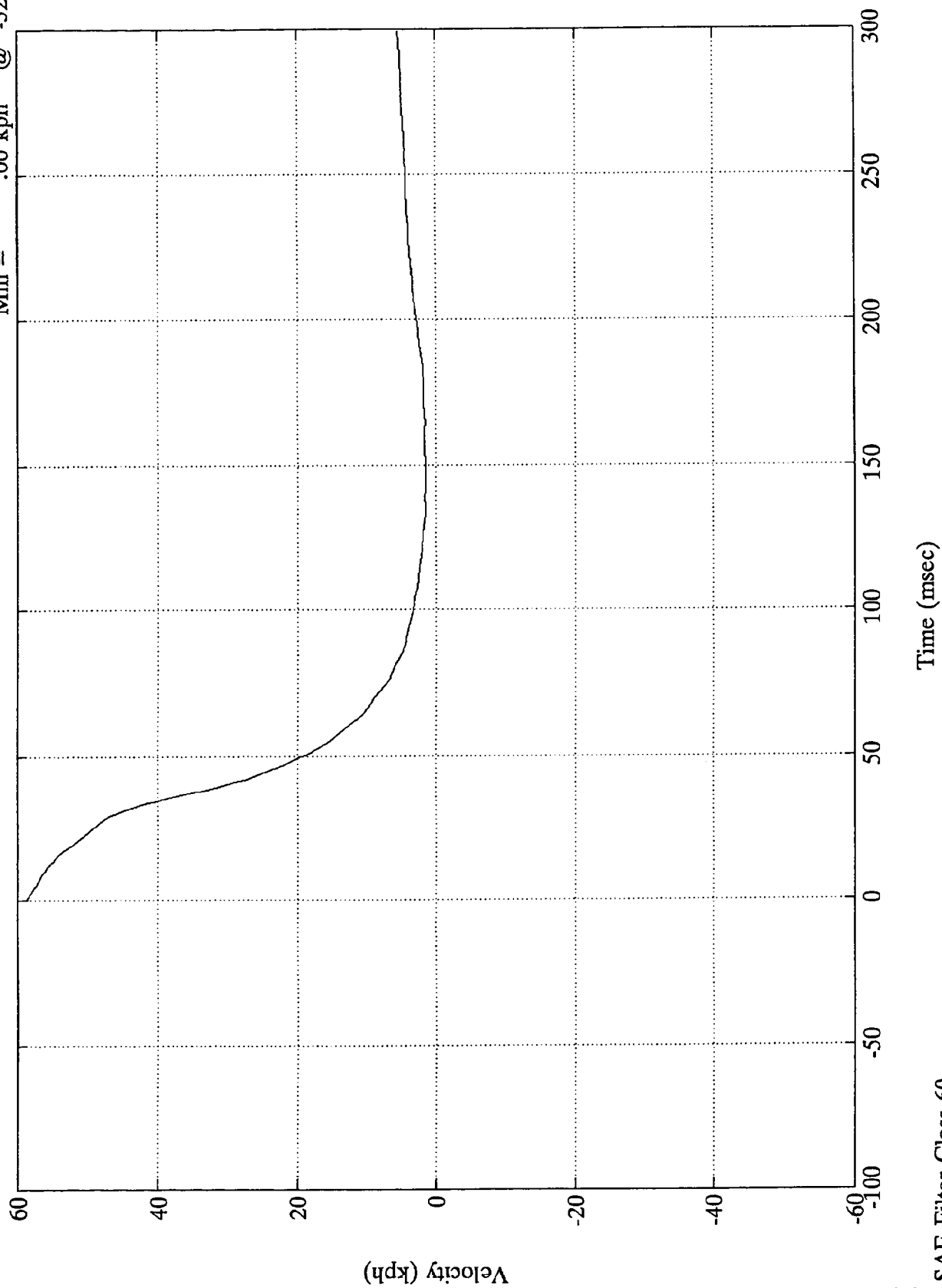
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 58.74 kph @ -0.00 msec
Min = .00 kph @ -52.92 msec

V2 C.G. X



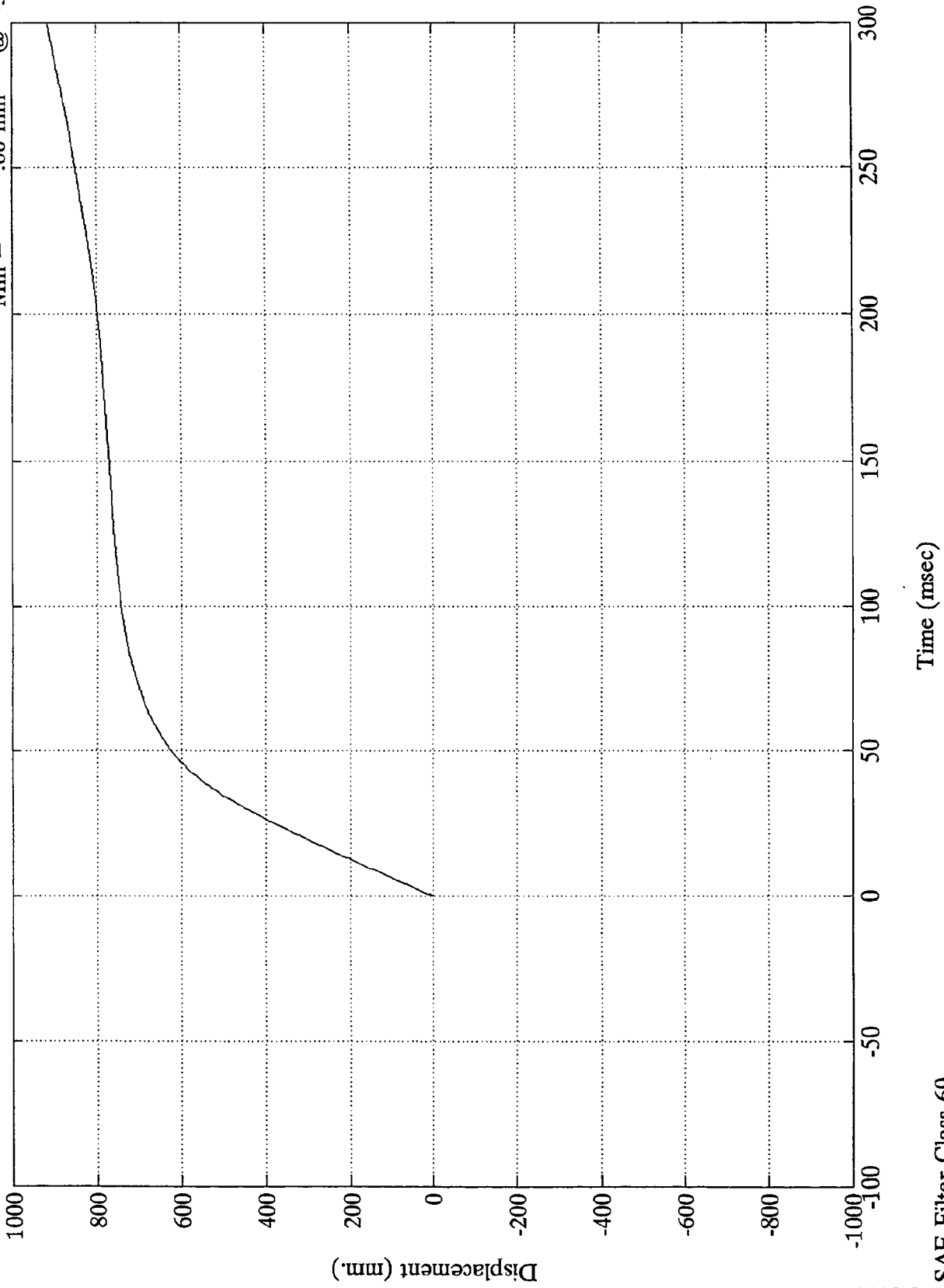
8118-8

SAE Filter Class 60

VTV TEST #8

V2 C.G. X

Max = 916.38 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec

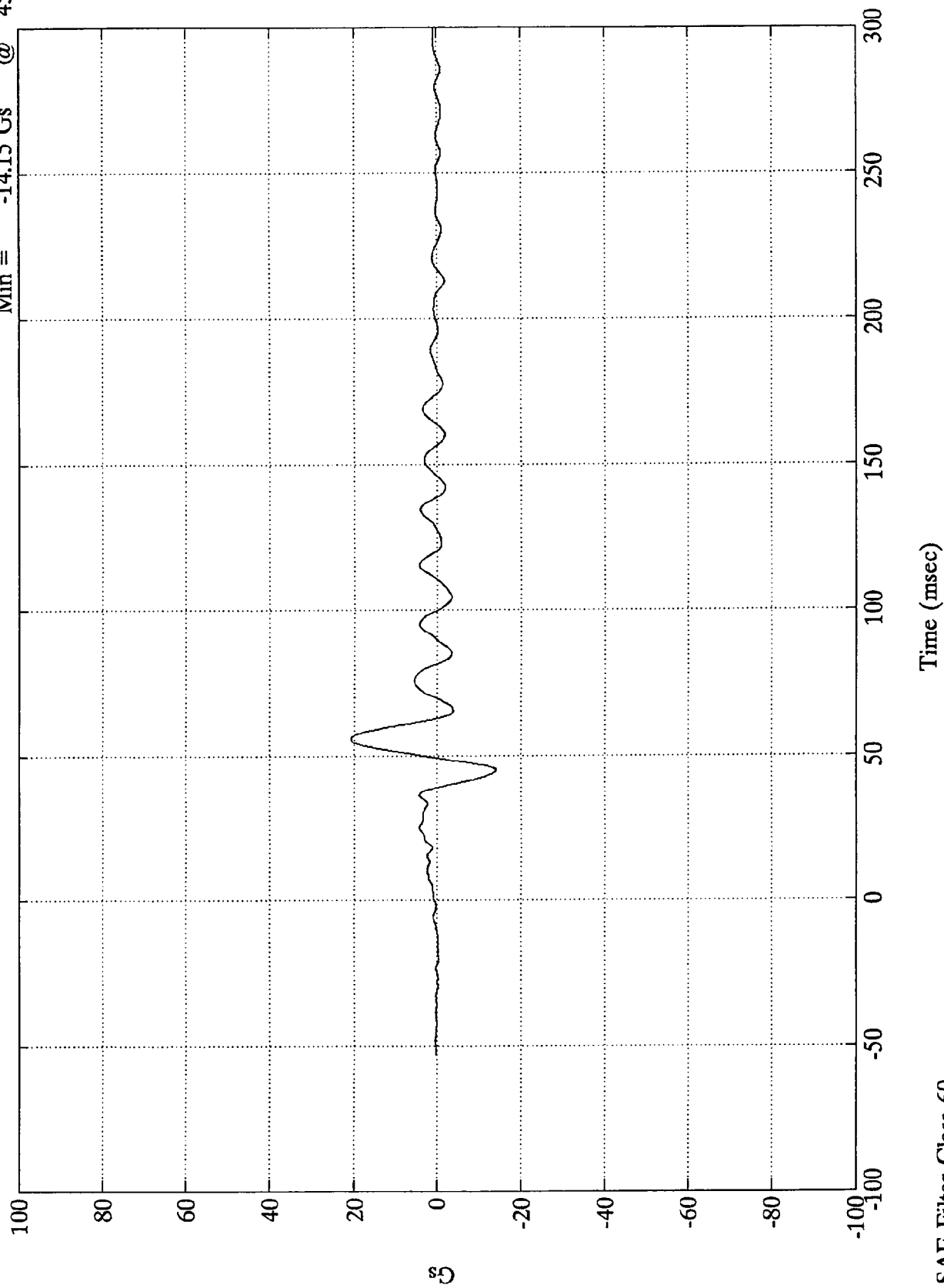


8118-8

SAE Filter Class 60

VTV TEST #8

V2 C.G. Y
Max = 20.67 Gs @ 55.92 msec
Min = -14.15 Gs @ 45.12 msec



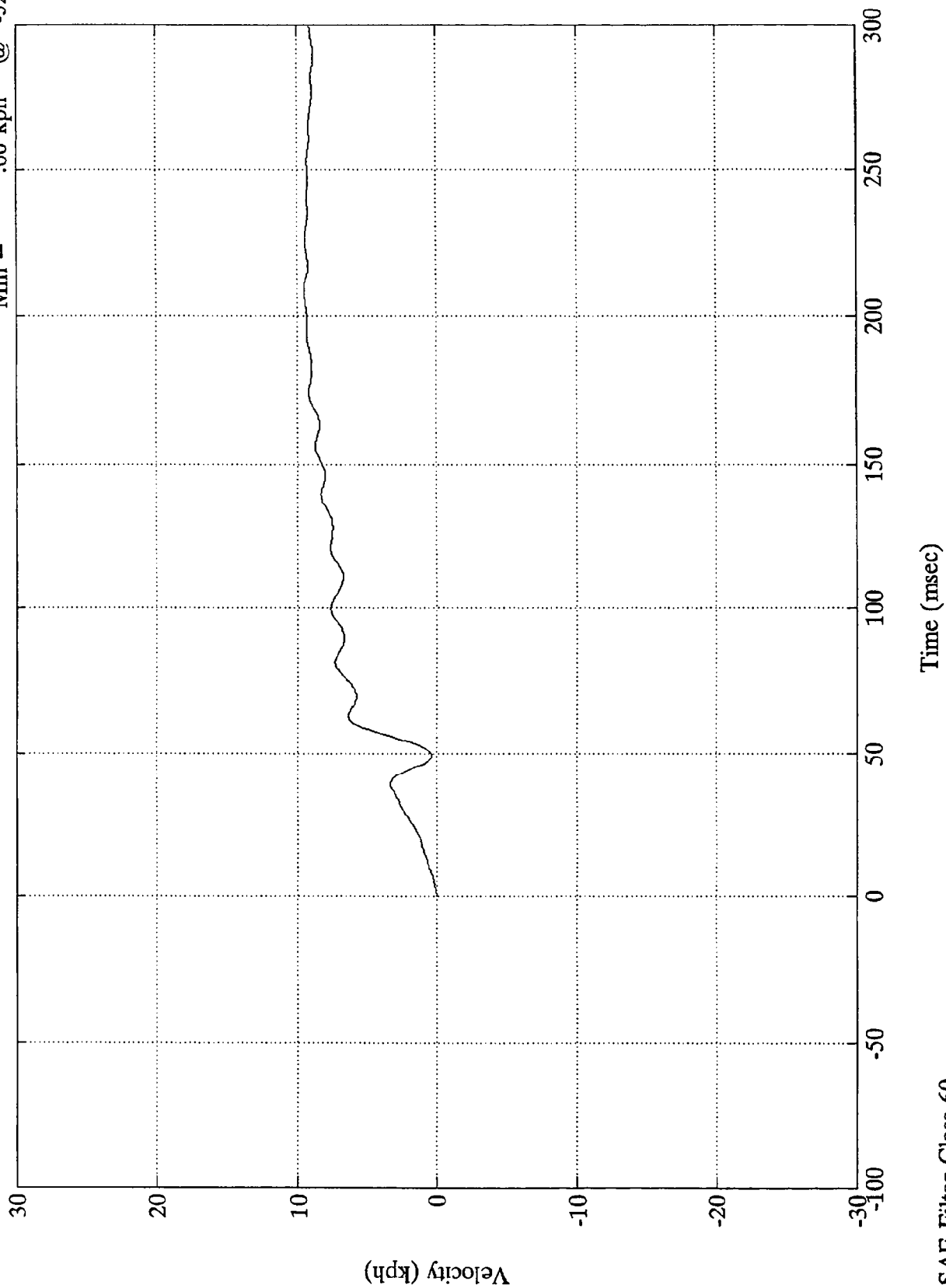
SAE Filter Class 60

8118-8

VTV TEST #8

V2 C.G. Y

Max = 9.56 kph @ 209.16 msec
Min = .00 kph @ -52.92 msec



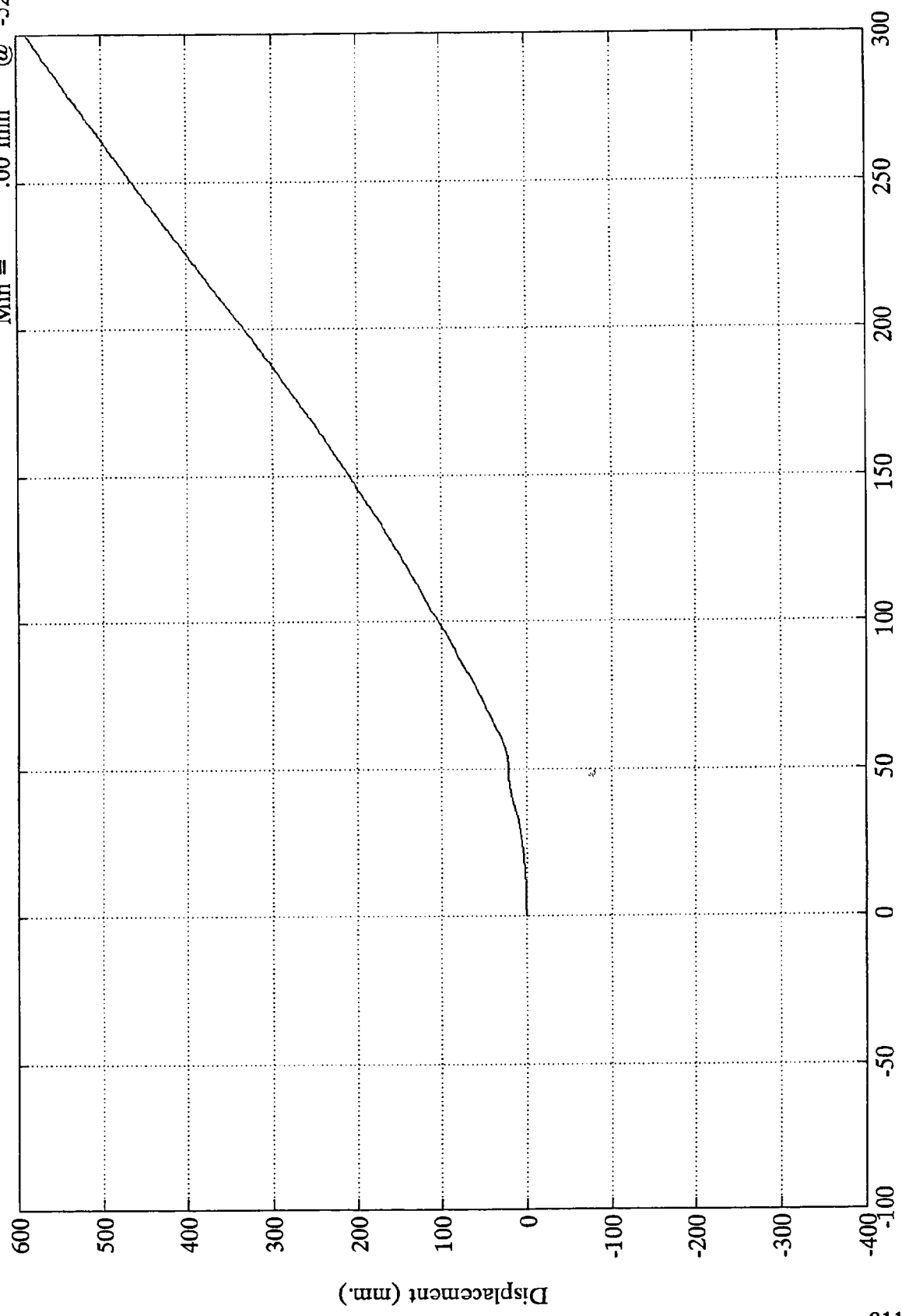
8118-8

SAE Filter Class 60

VTV TEST #8

V2 C.G. Y

Max = 588.97 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec



Time (msec)

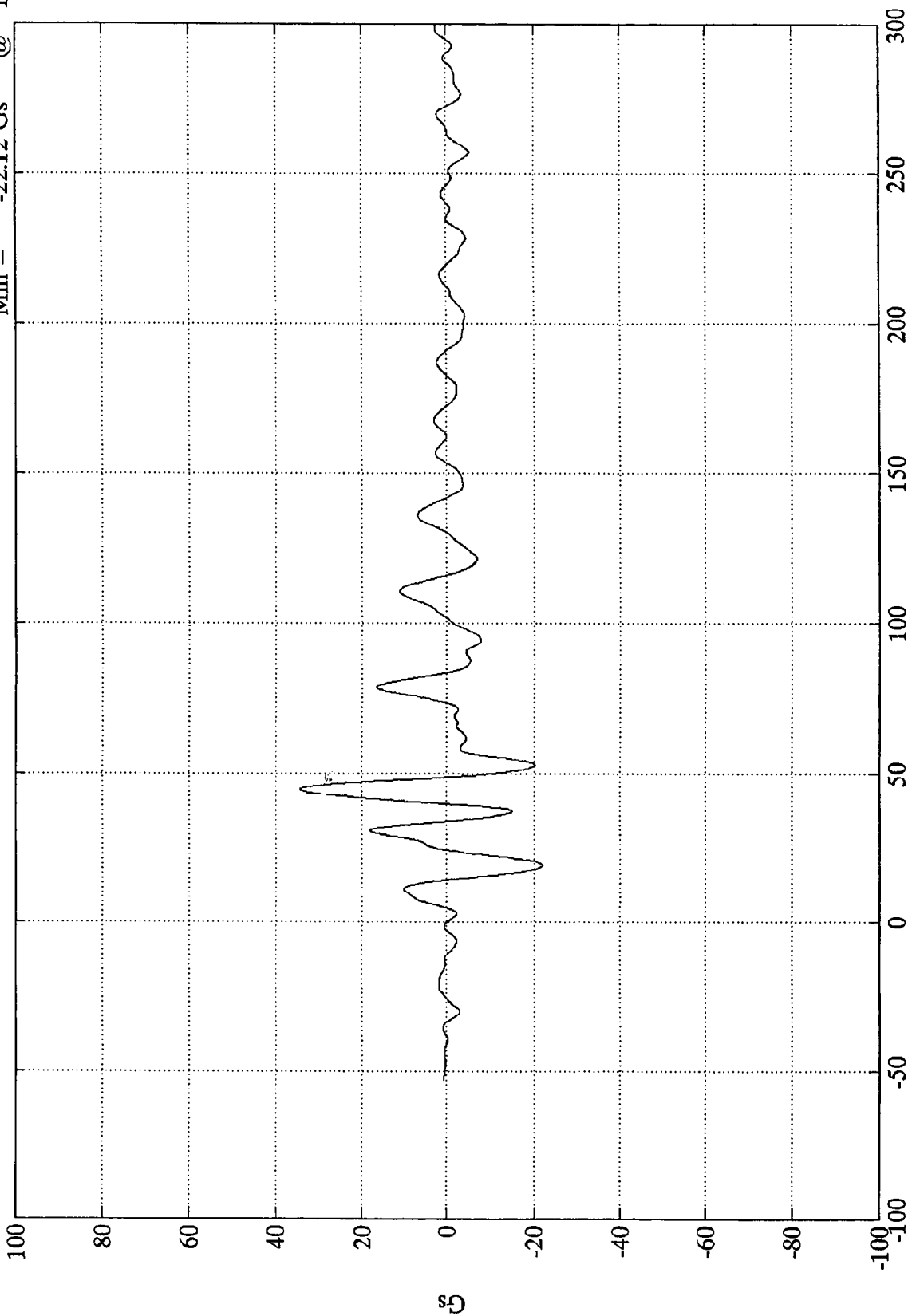
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 34.57 Gs @ 44.75 msec
Min = -22.12 Gs @ 19.31 msec

V2 C.G. Z



Time (msec)

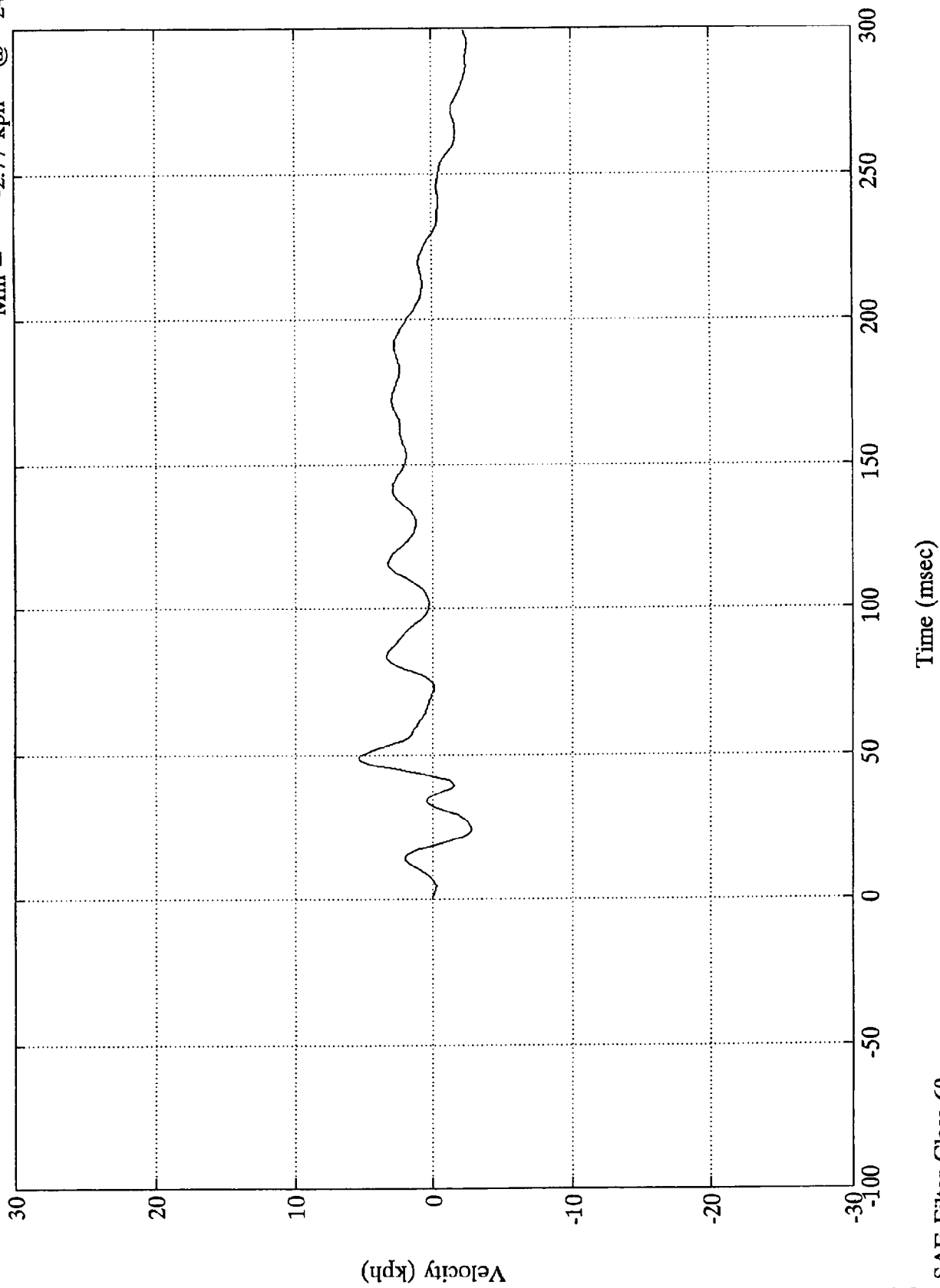
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 5.38 kph @ 48.84 msec
Min = -2.77 kph @ 24.24 msec

V2 C.G. Z



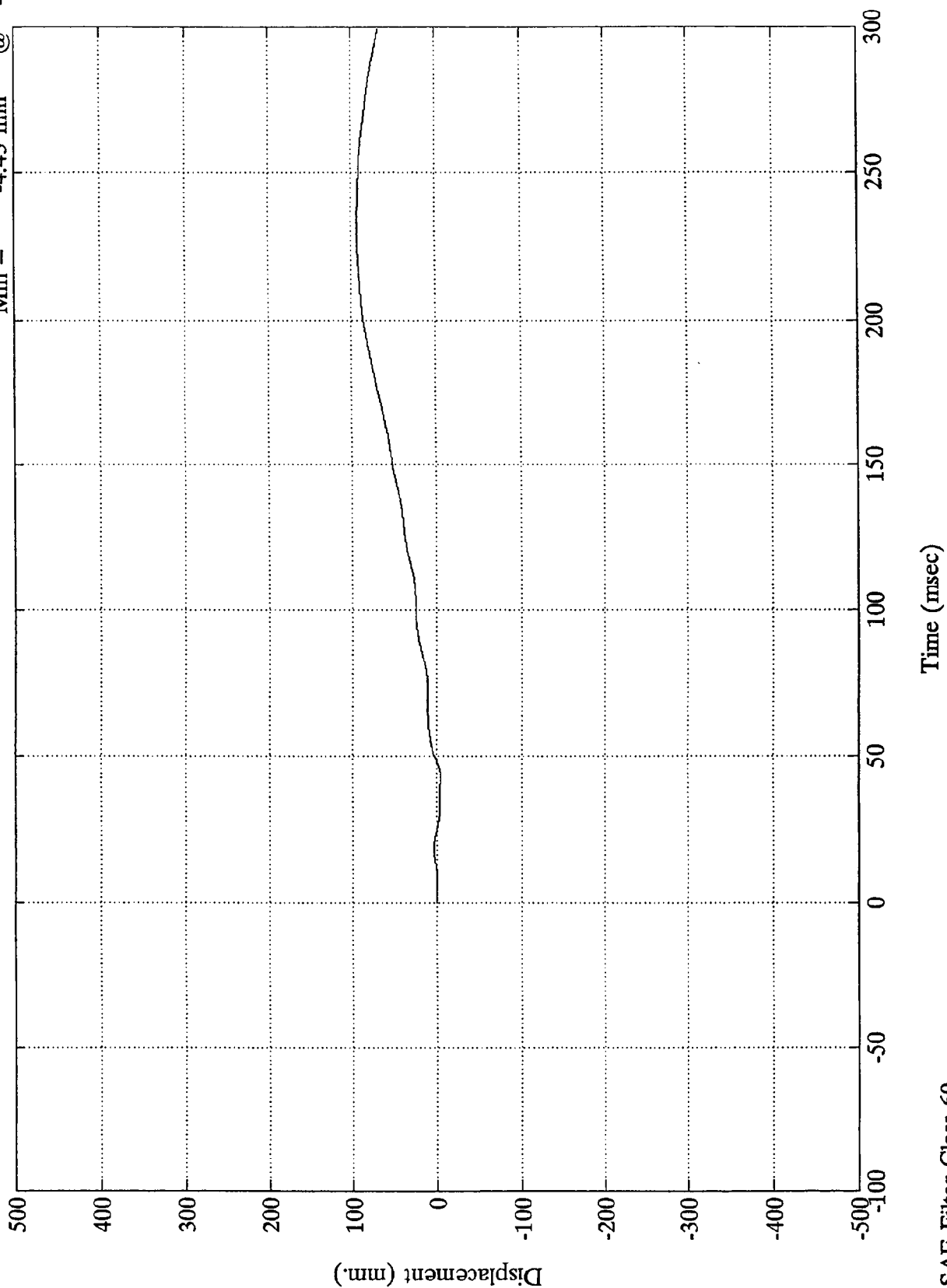
8118-8

SAE Filter Class 60

VTV TEST #8

Max = 93.27 mm @ 229.44 msec
Min = -4.43 mm @ 42.72 msec

V2 C.G. Z



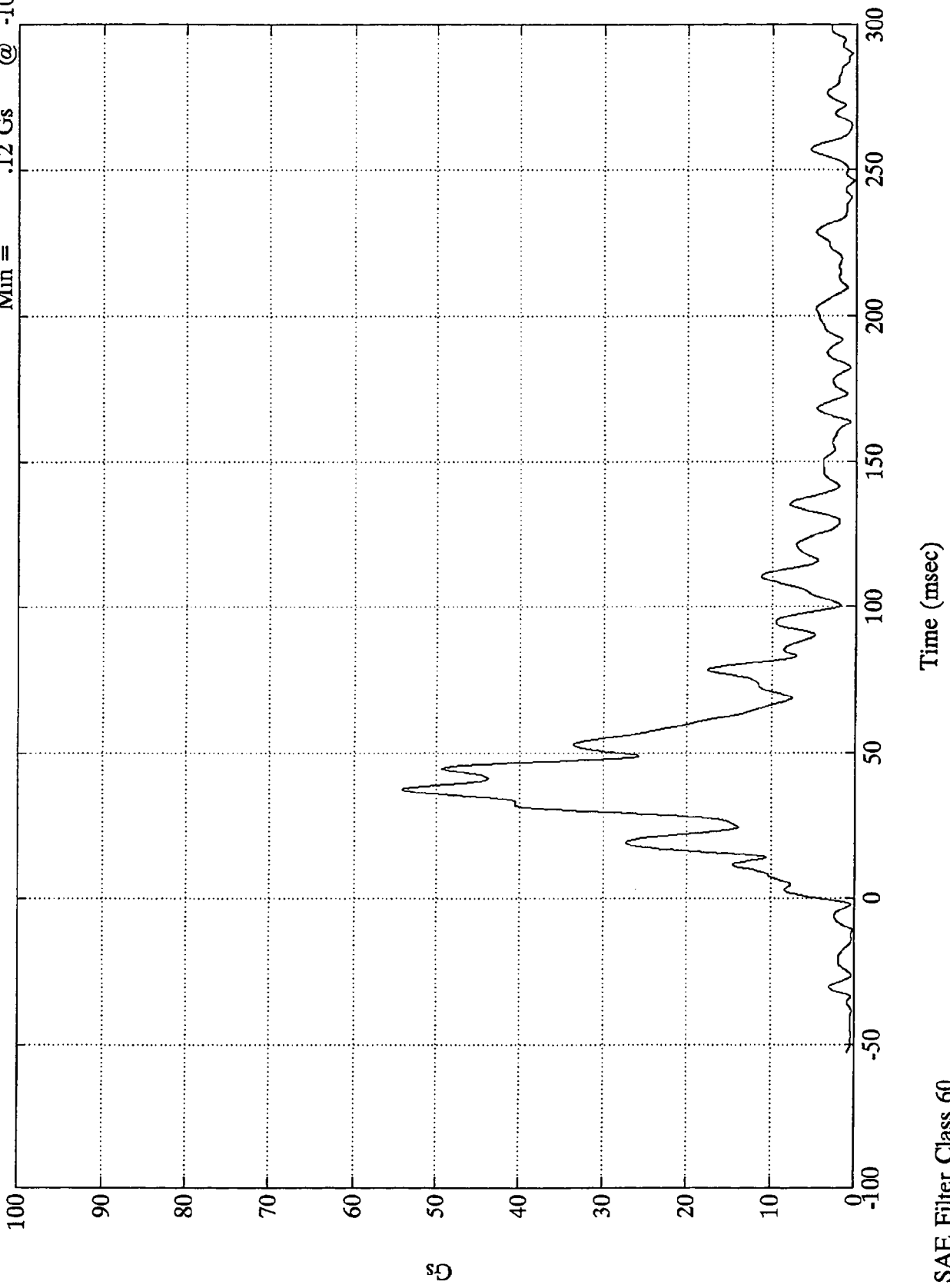
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 54.14 Gs @ 37.44 msec
Min = .12 Gs @ -10.92 msec

V2 C.G. Resultant



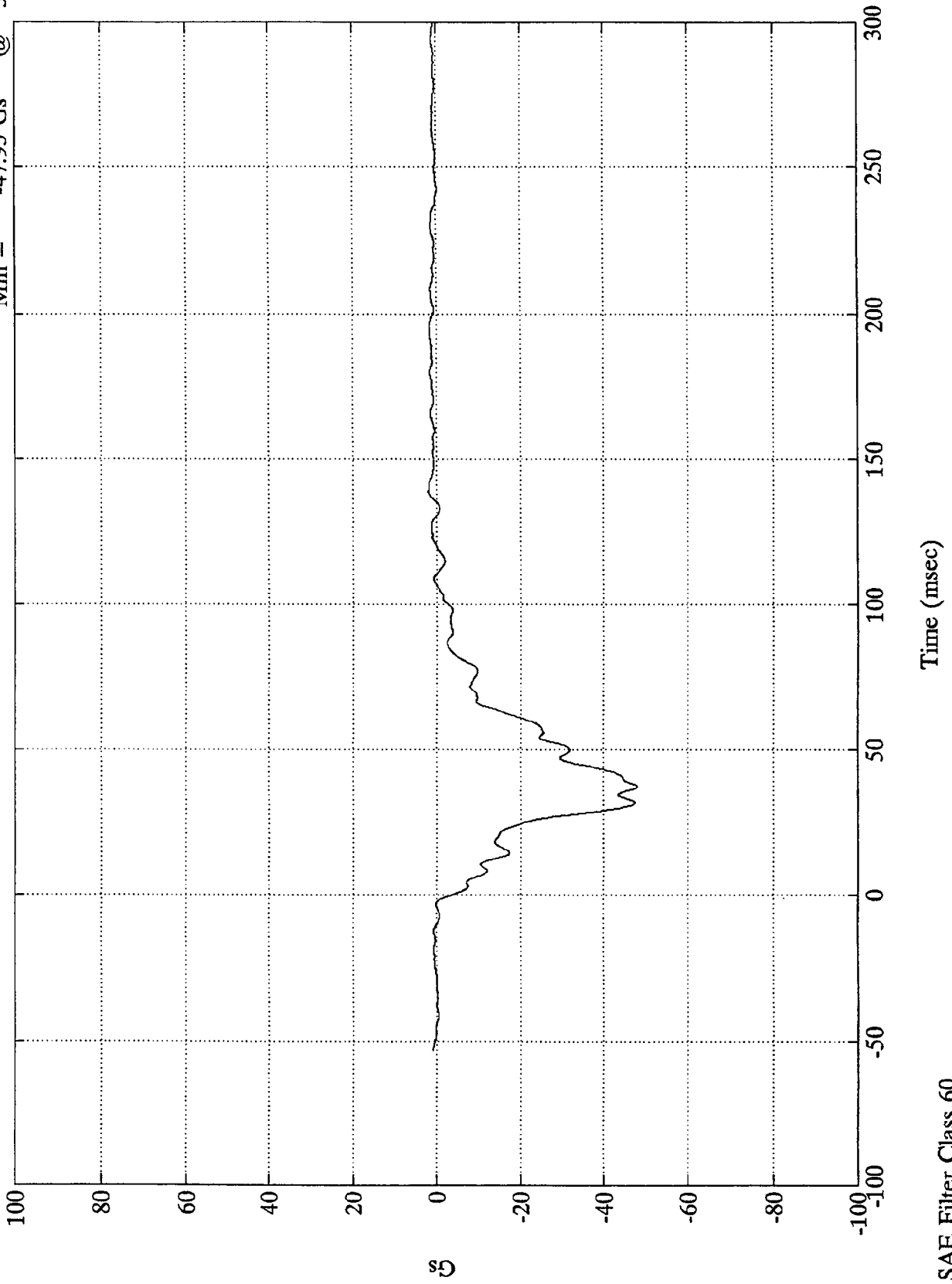
8118-8

SAE Filter Class 60

VTV TEST #8

V2 Left Rail X

Max = 1.95 Gs @ 138.96 msec
Min = -47.95 Gs @ 37.44 msec



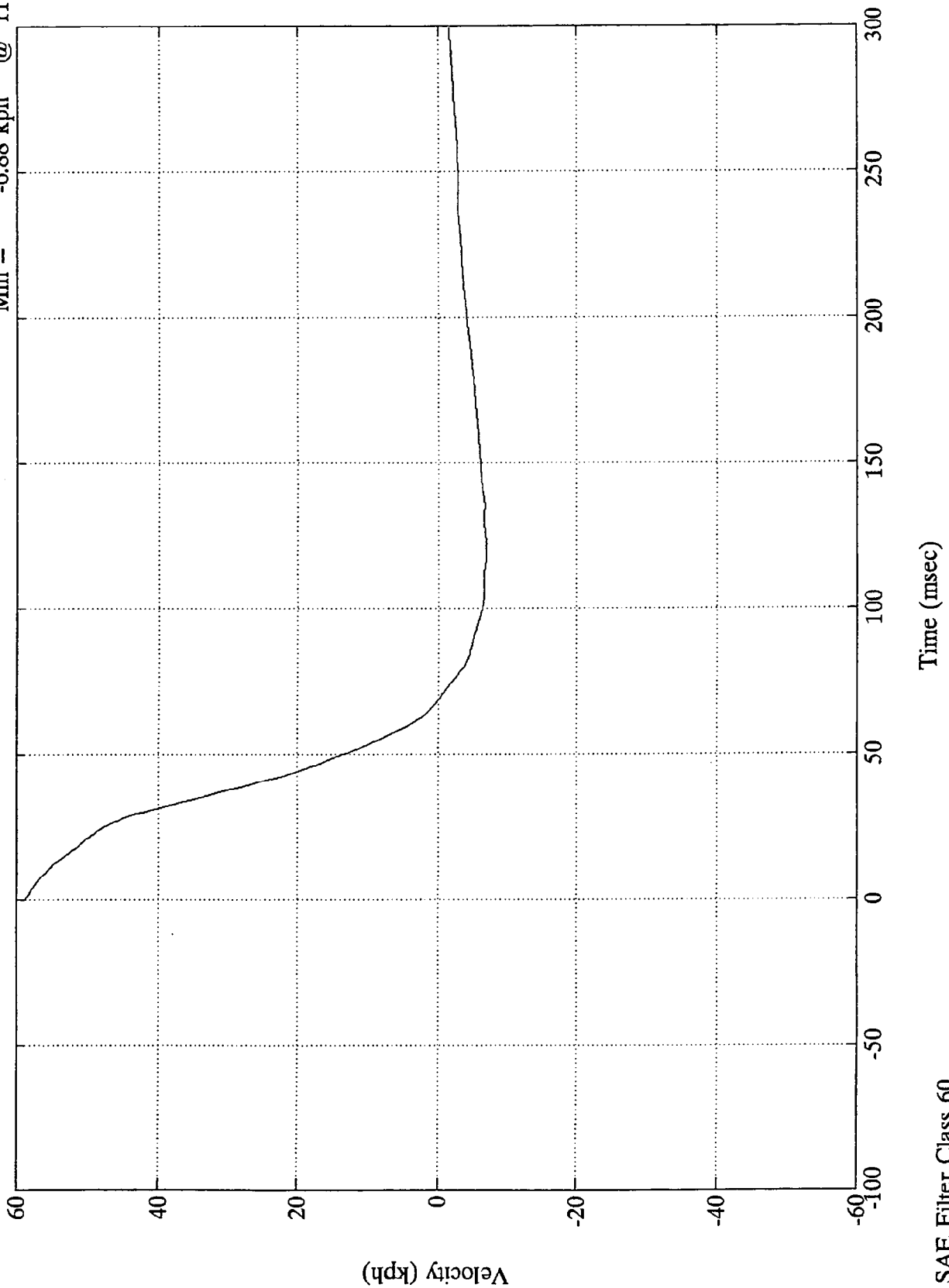
8118-8

SAE Filter Class 60

VTV TEST #8

Max = 58.74 kph @ -0.00 msec
Min = -6.88 kph @ 119.64 msec

V2 Left Rail X



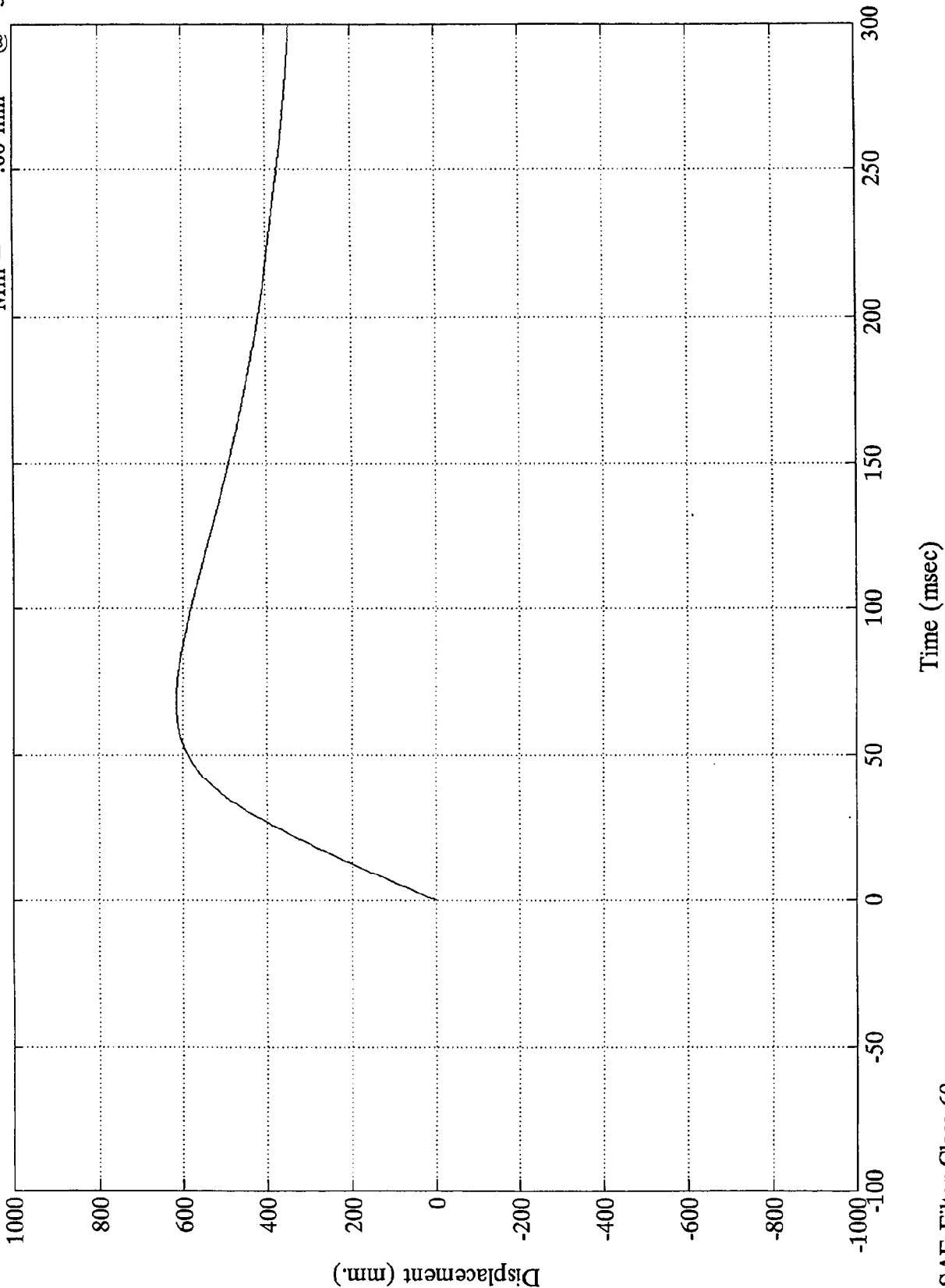
8118-8

SAE Filter Class 60

VTV TEST #8

V2 Left Rail X

Max = 615.33 mm @ 68.40 msec
Min = .00 mm @ -52.92 msec



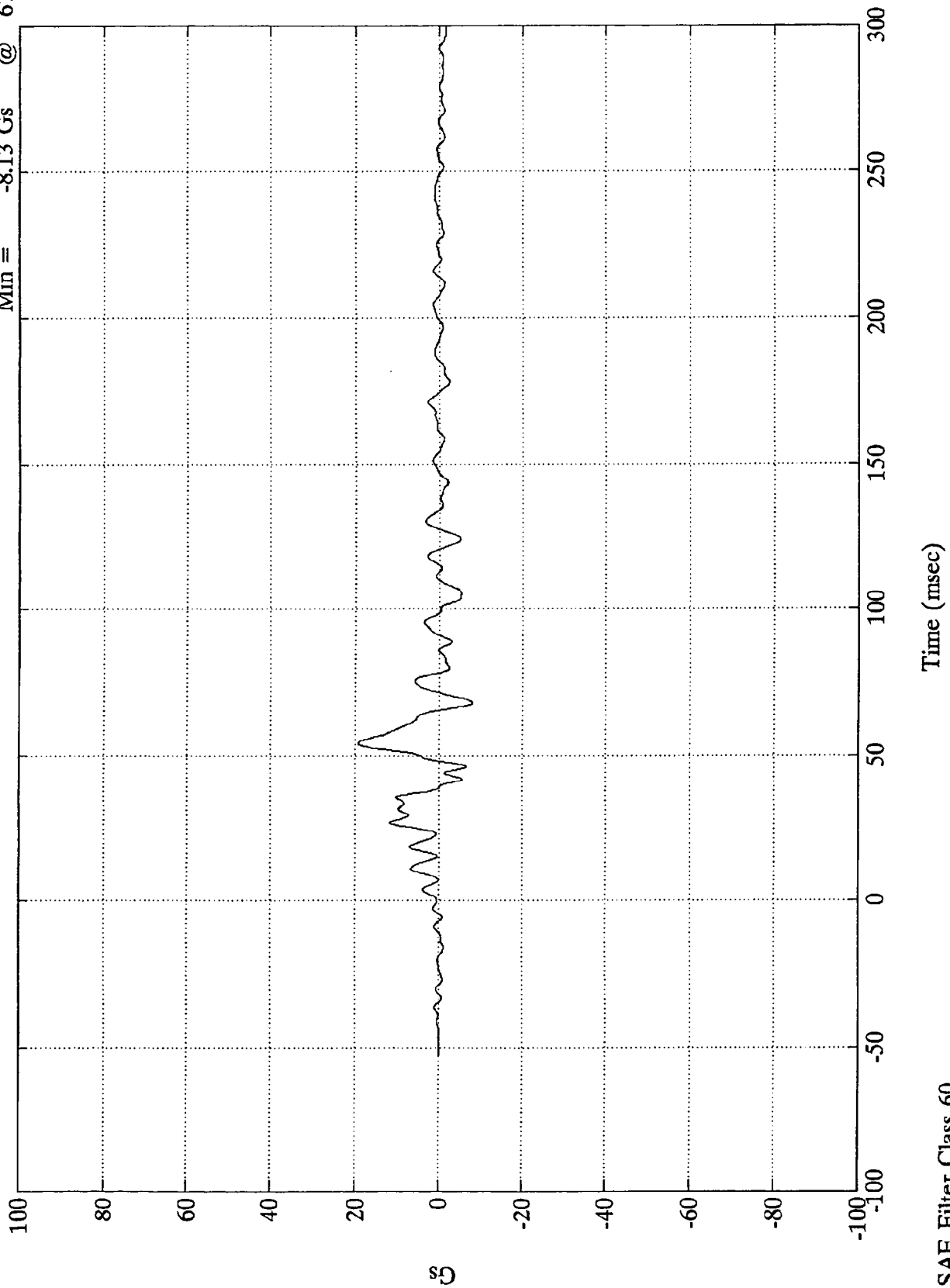
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 19.34 Gs @ 54.36 msec
Min = -8.13 Gs @ 67.80 msec

V2 Left Rail Y

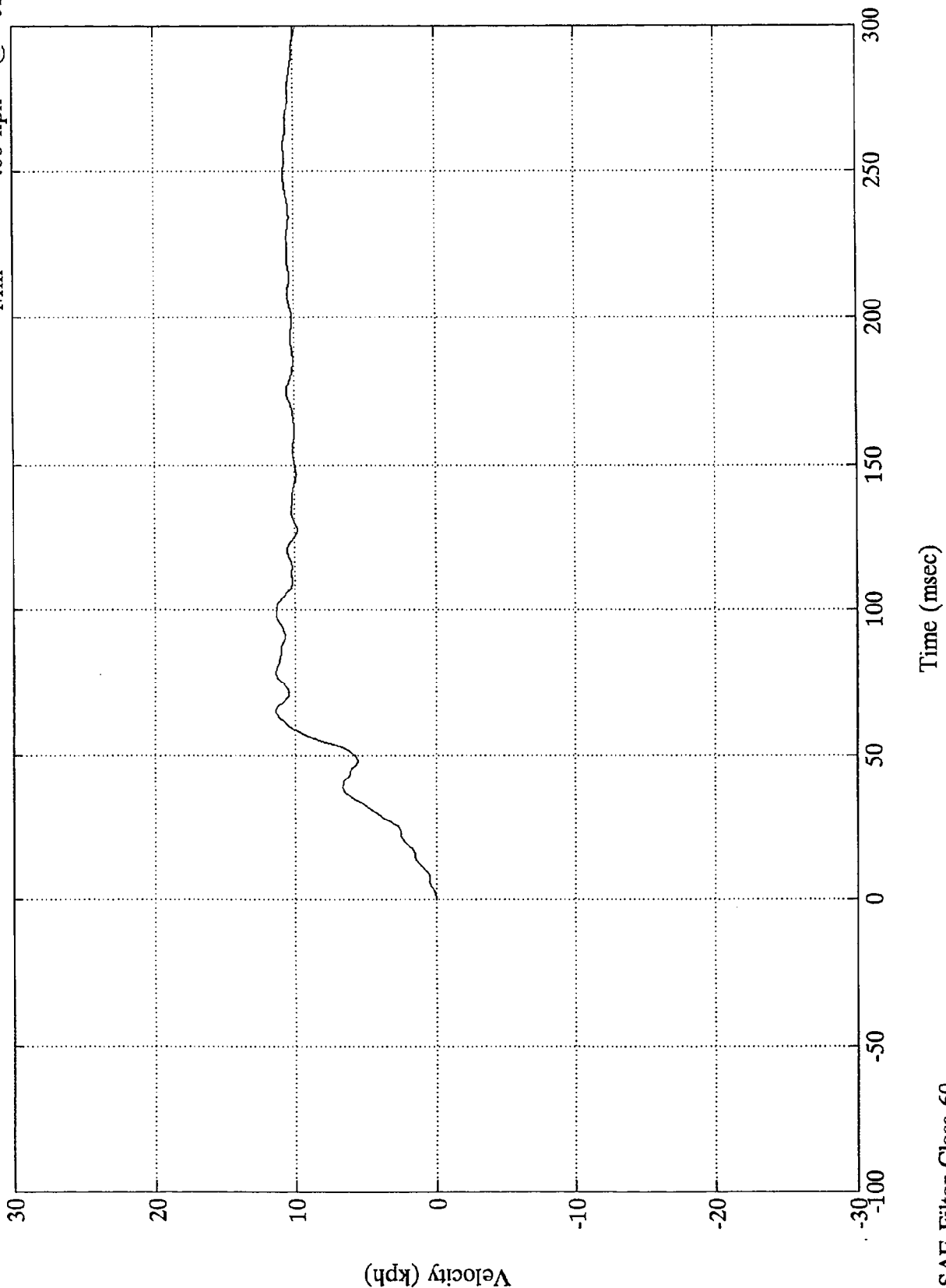


8118-8

VTV TEST #8

Max = 11.42 kph @ 65.28 msec
Min = .00 kph @ -52.92 msec

V2 Left Rail Y



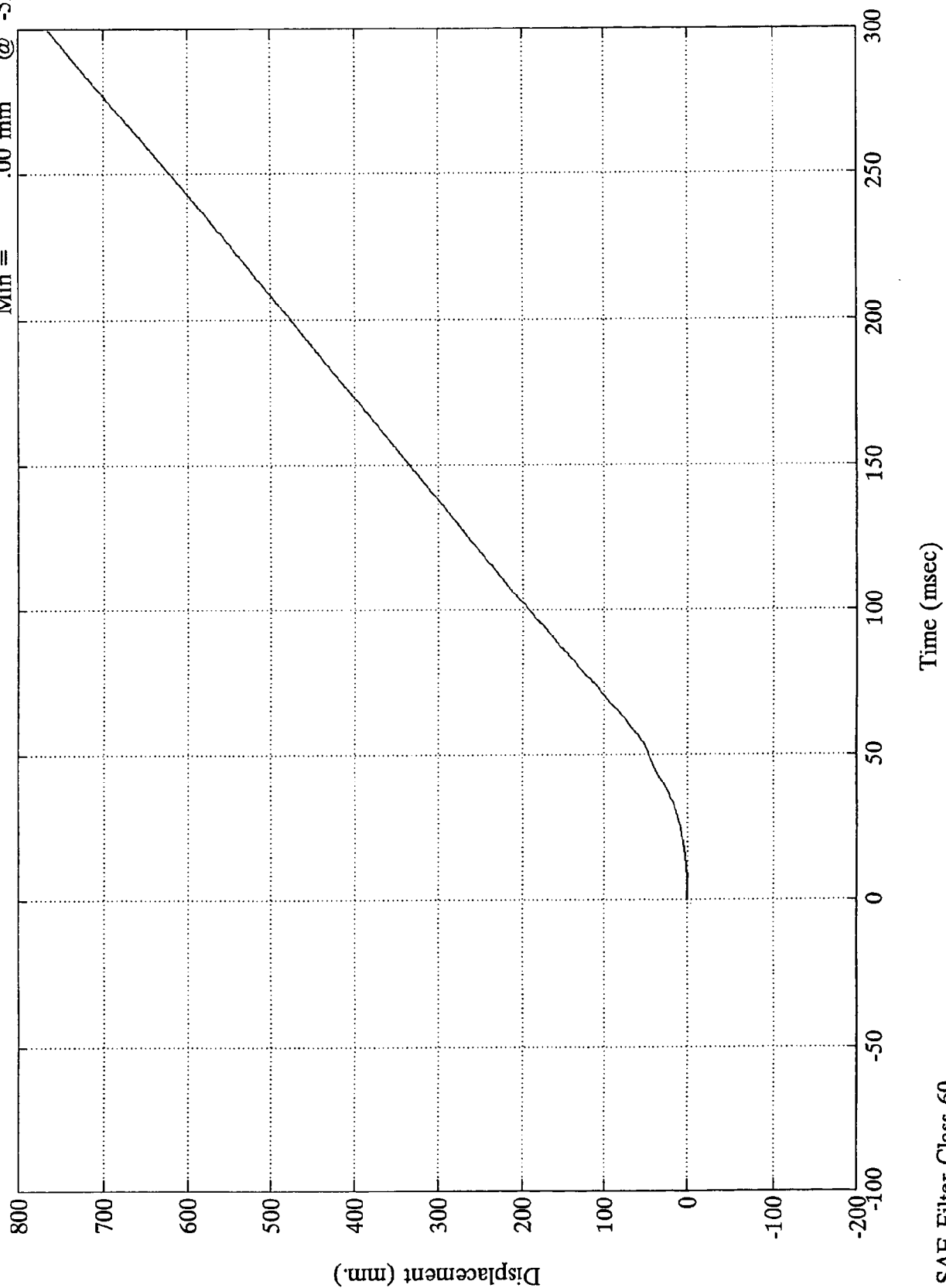
8118-8

SAE Filter Class 60

VTV TEST #8

Max = 765.26 mm @ 299.87 msec
Min = .00 mm @ -52.92 msec

V2 Left Rail Y



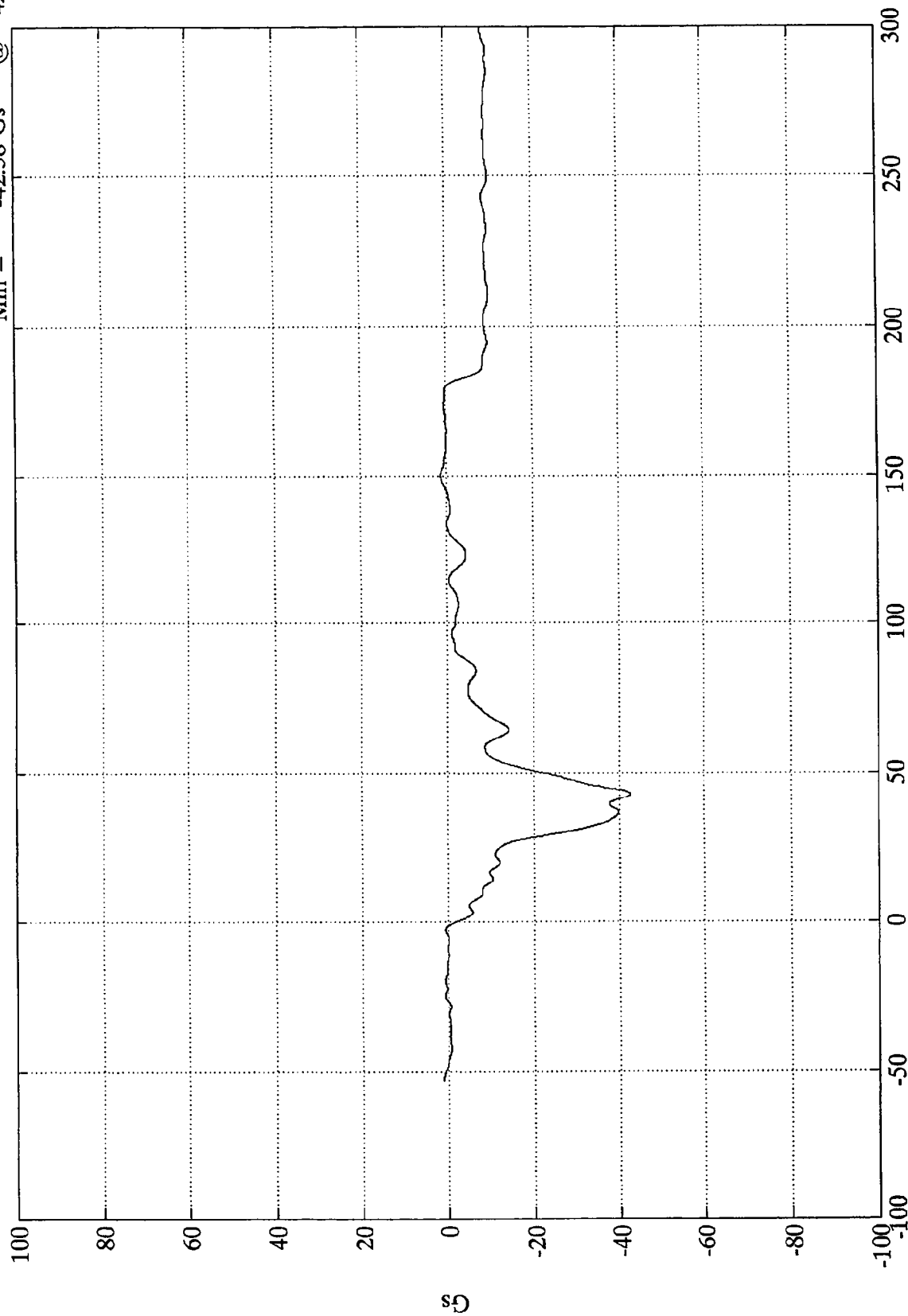
8118-8

SAE Filter Class 60

VTV TEST #8

V2 Right Rail X

Max = 1.28 Gs @ 150.12 msec
Min = -42.58 Gs @ 42.95 msec



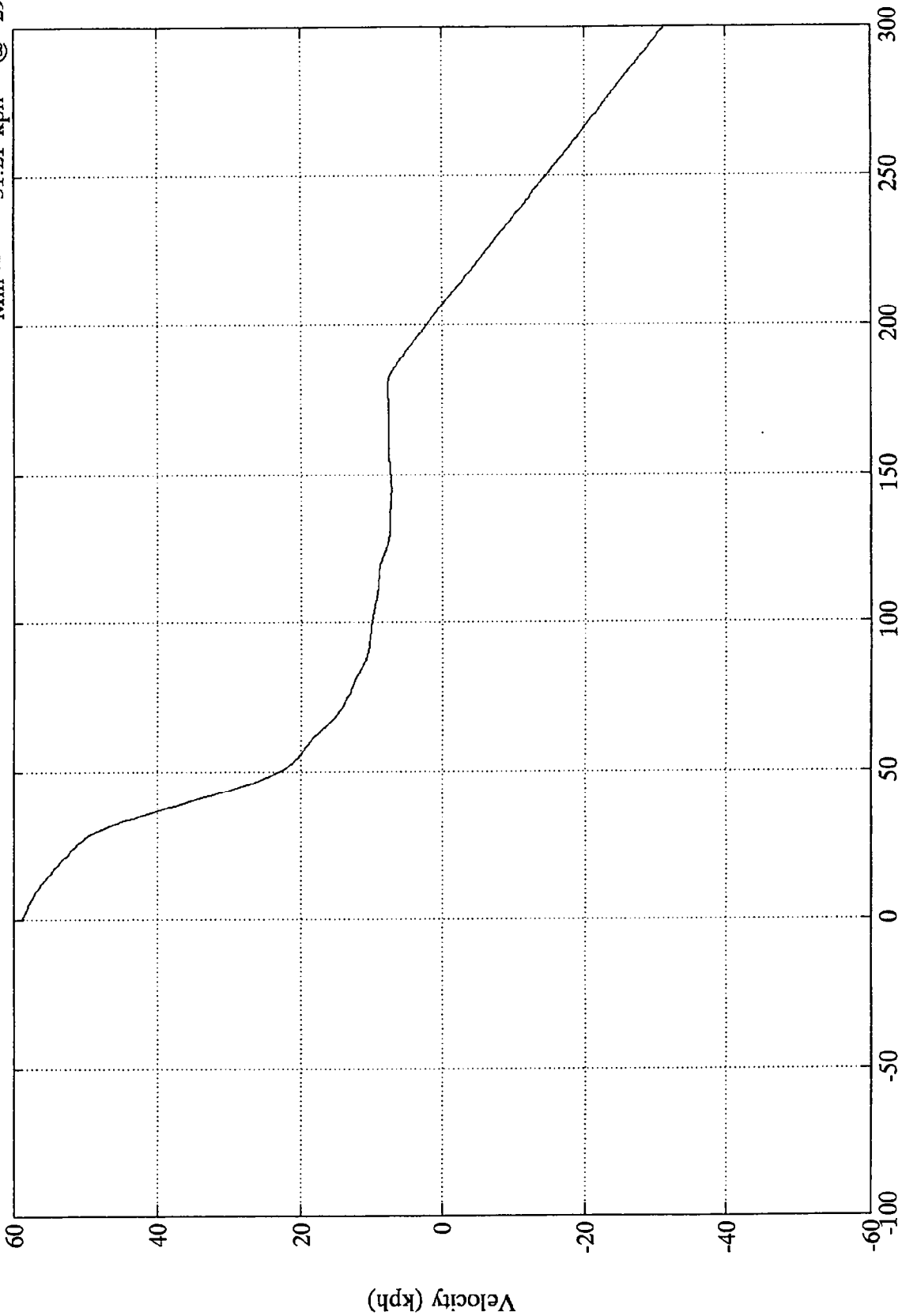
Time (msec) Data questionable after 175 msec.

SAE Filter Class 60

8118-8

VTV TEST #8

V2 Right Rail X
Max = 58.74 kph @ -0.00 msec
Min = -31.21 kph @ 299.87 msec



Time (msec) Data questionable after 175 msec.

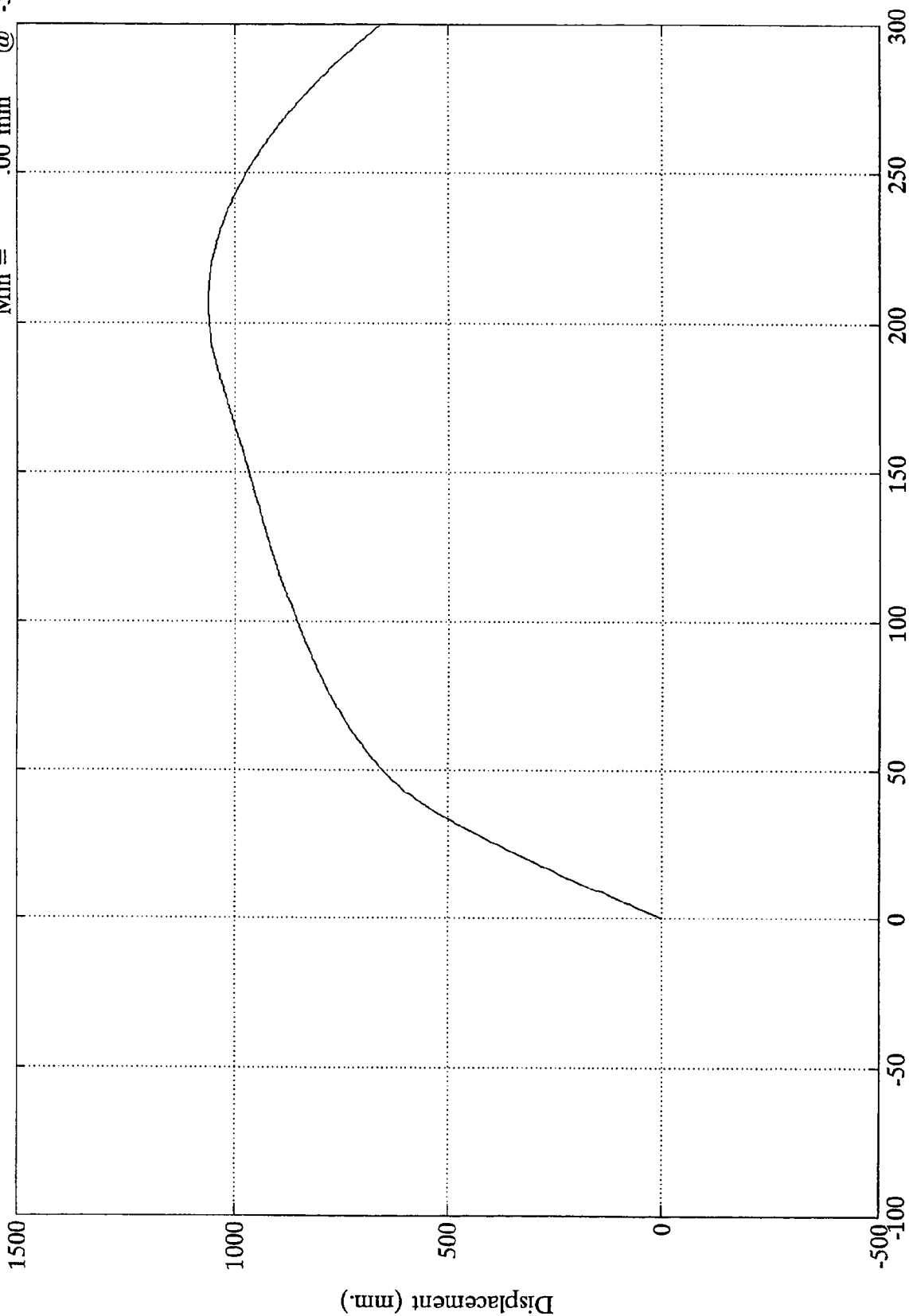
SAE Filter Class 60

8118-8

VTV TEST #8

V2 Right Rail X

Max = 1061.35 mm @ 206.64 msec
Min = .00 mm @ -52.92 msec



Time (msec) Data questionable after 175 msec.

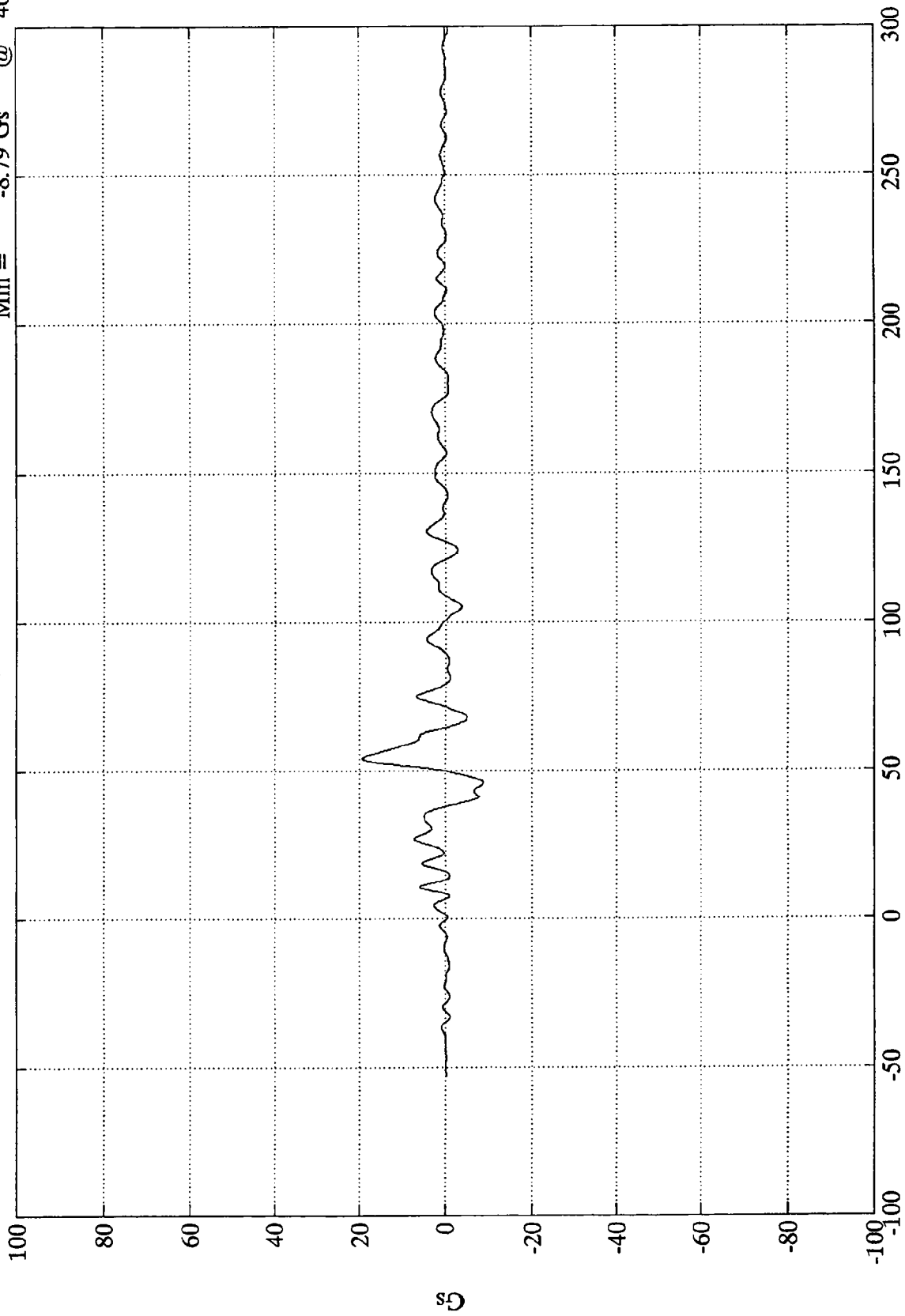
SAE Filter Class 60

8118-8

VTV TEST #8

Max = 19.19 Gs @ 54.00 msec
Min = -8.79 Gs @ 46.08 msec

V2 Right Rail Y



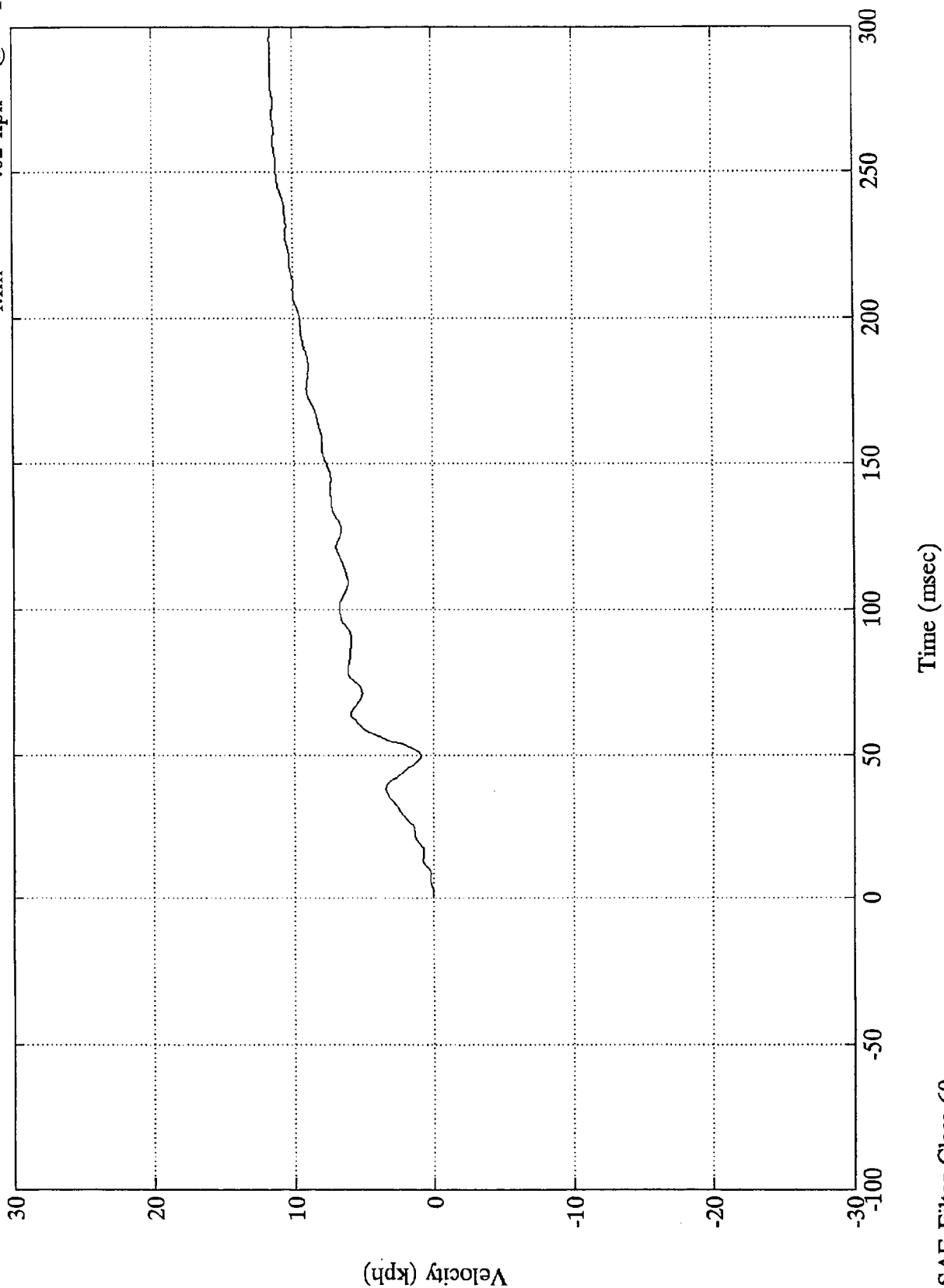
Time (msec)

SAE Filter Class 60

8118-8

VTV TEST #8

V2 Right Rail Y
Max = 11.59 kph @ 295.92 msec
Min = -0.02 kph @ 1.31 msec



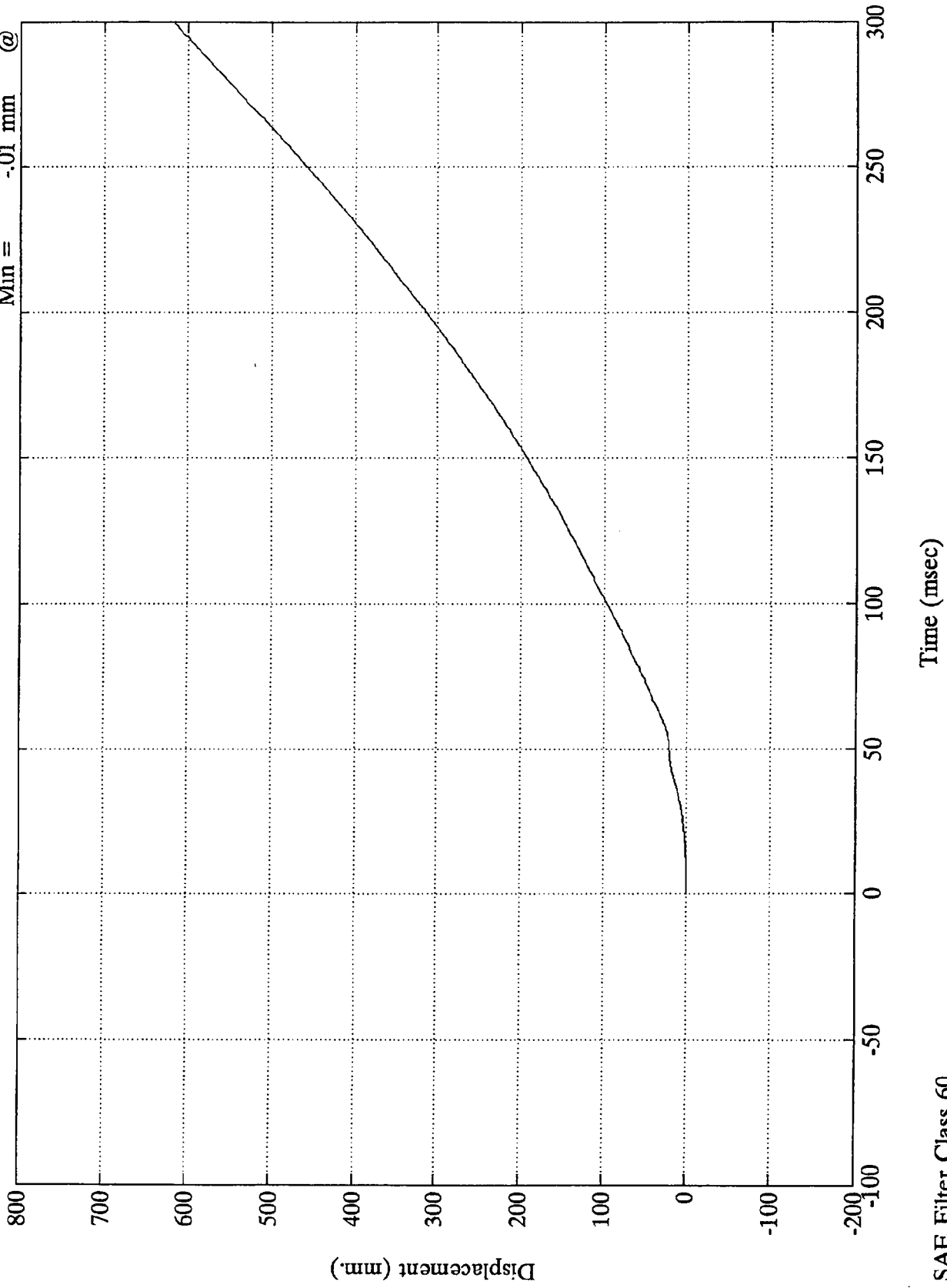
SAE Filter Class 60

8118-8

VTV TEST #8

V2 Right Rail Y

Max = 616.98 mm @ 299.87 msec
Min = -0.01 mm @ 2.27 msec



8-8118

SAE Filter Class 60

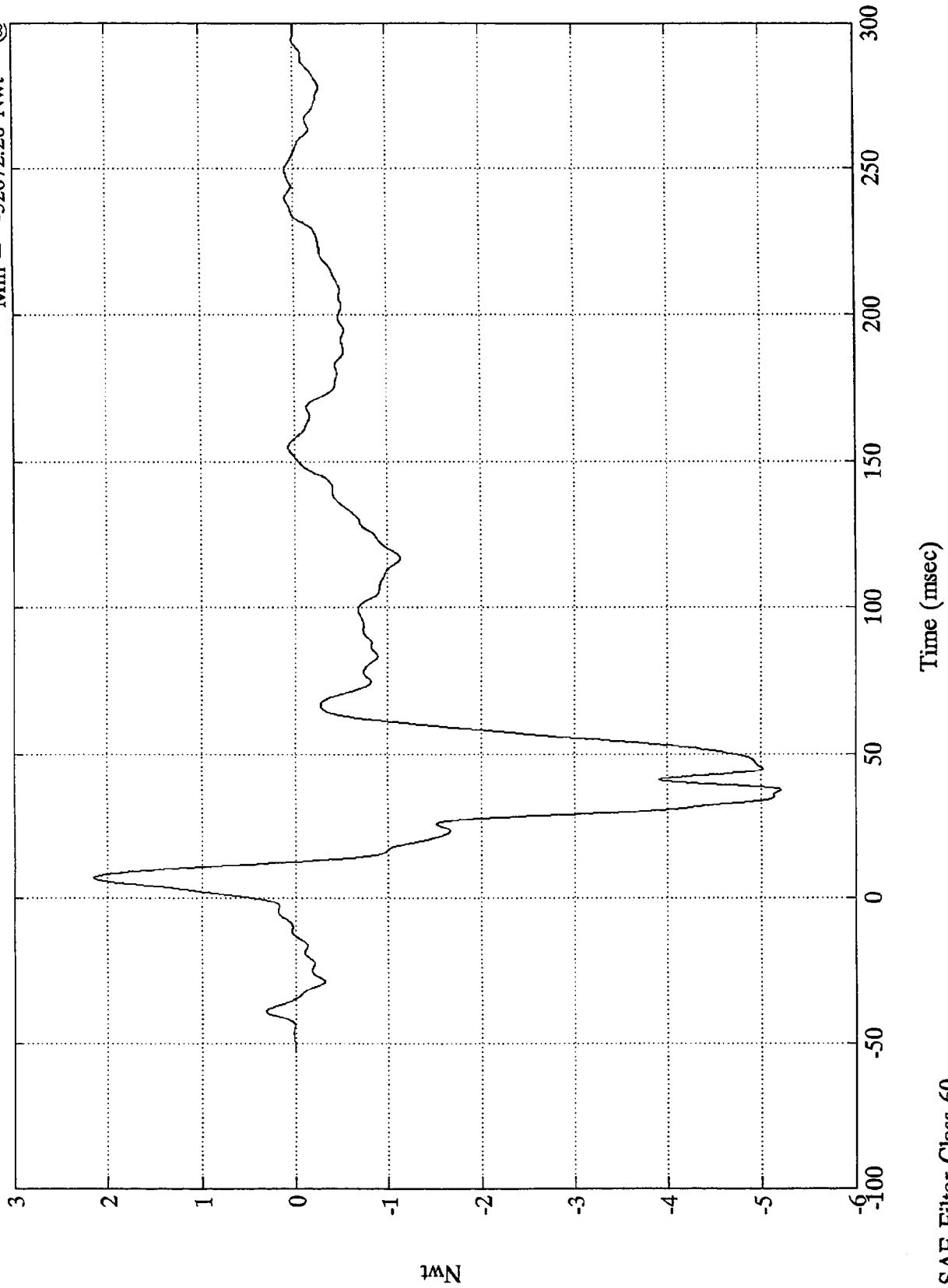
VTV TEST #8

$\times 10^4$

V2 Top Right Load Cell

Max = 21591.29 Nwt @
Min = -52072.20 Nwt @

6.95 msec
37.44 msec



SAE Filter Class 60

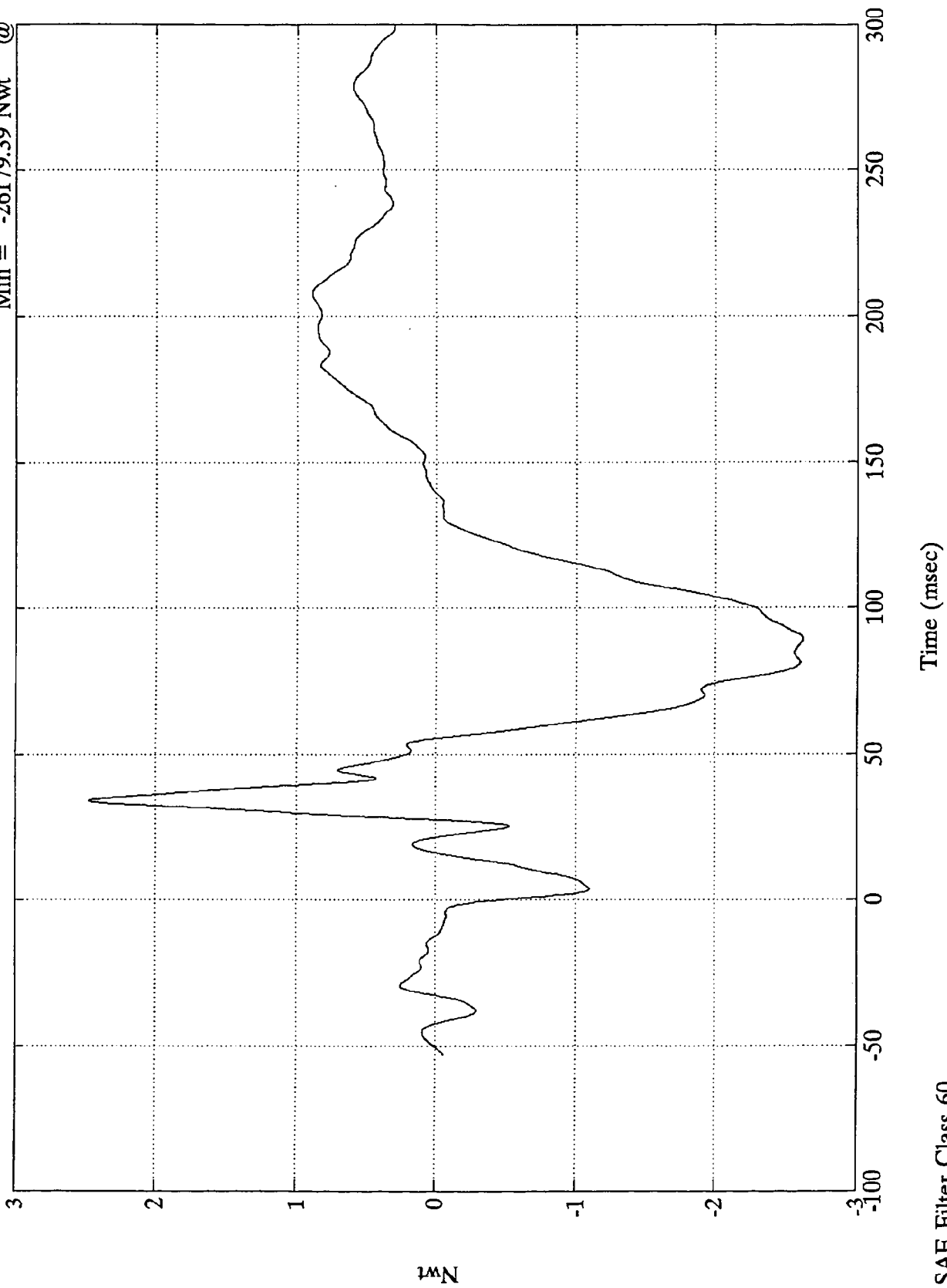
8118-8

VTV TEST #8

$\times 10^4$

V2 Bottom Right Load Cell

Max = 24753.66 Nwt @ 34.20 msec
Min = -26179.39 Nwt @ 89.27 msec



8118-8

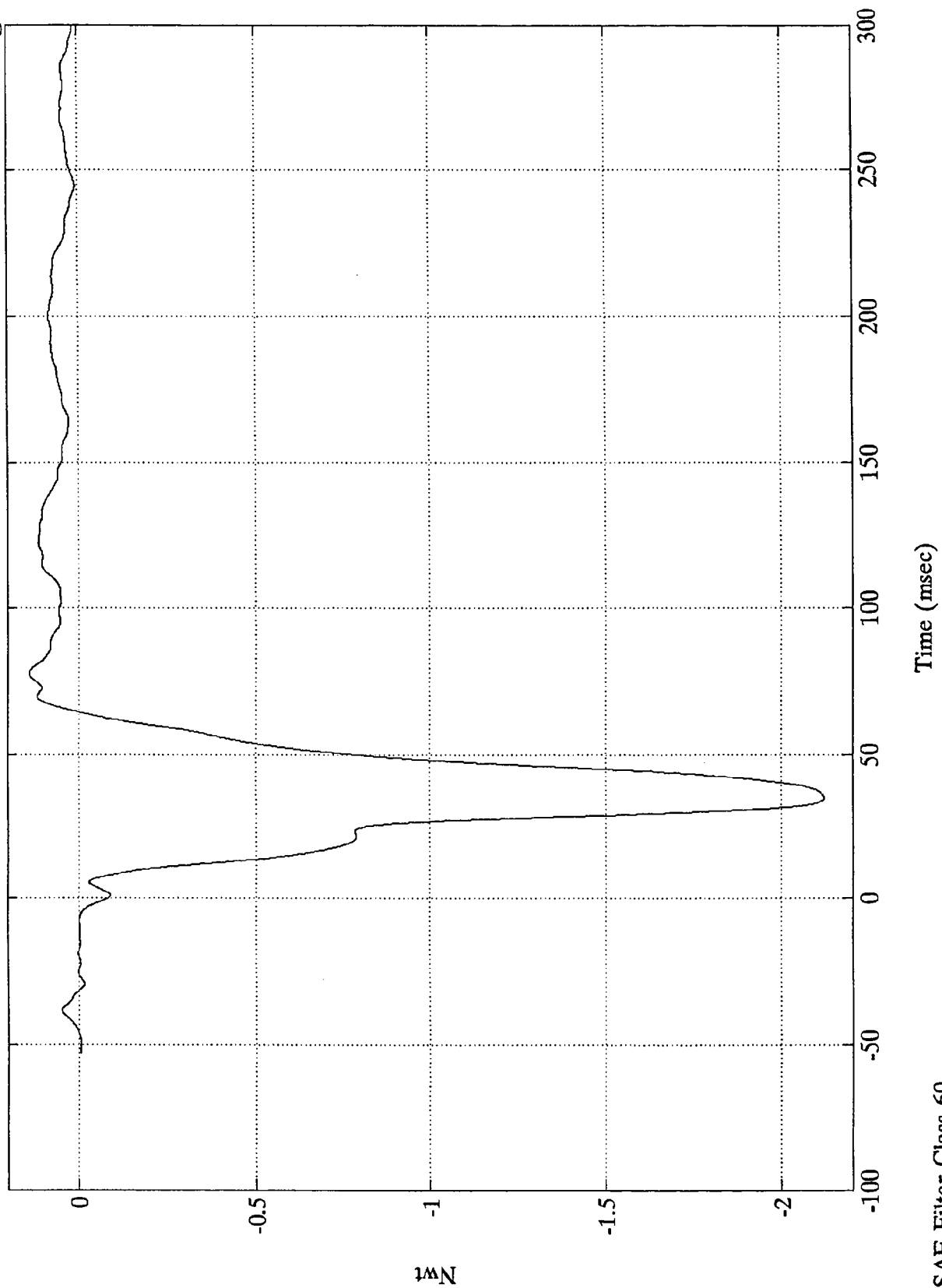
SAE Filter Class 60

VTV TEST #8

$\times 10^5$

V2 Top Left Load Cell

Max = 13969.22 Nwt @ 77.88 msec
Min = -211928.97 Nwt @ 34.79 msec



8118-8

Nwt

B-190

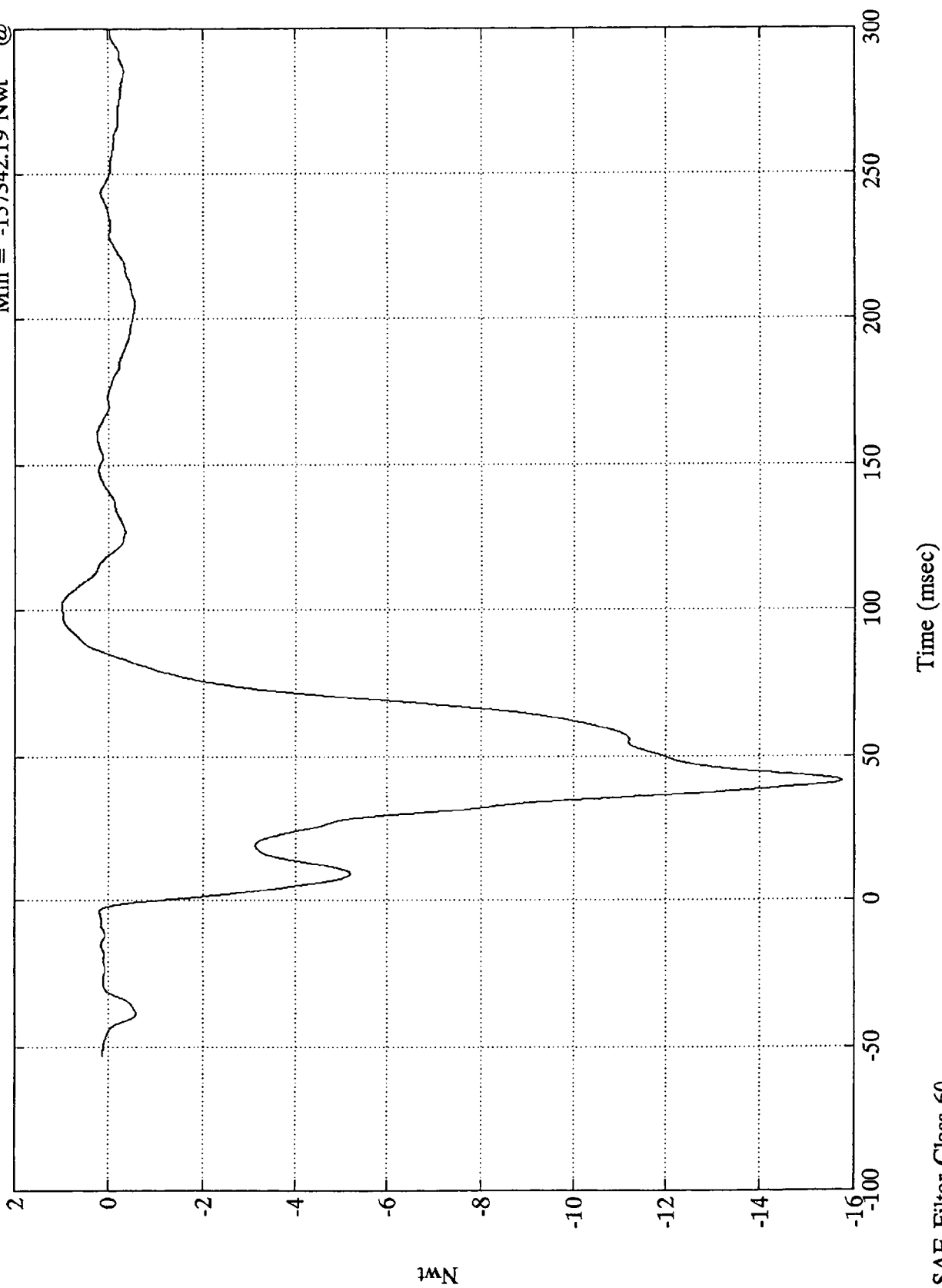
SAE Filter Class 60

VTV TEST #8

$\times 10^4$

V2 Bottom Left Load Cell

Max = 10031.79 Nwt @ 101.63 msec
Min = -157342.19 Nwt @ 41.40 msec



8118-8

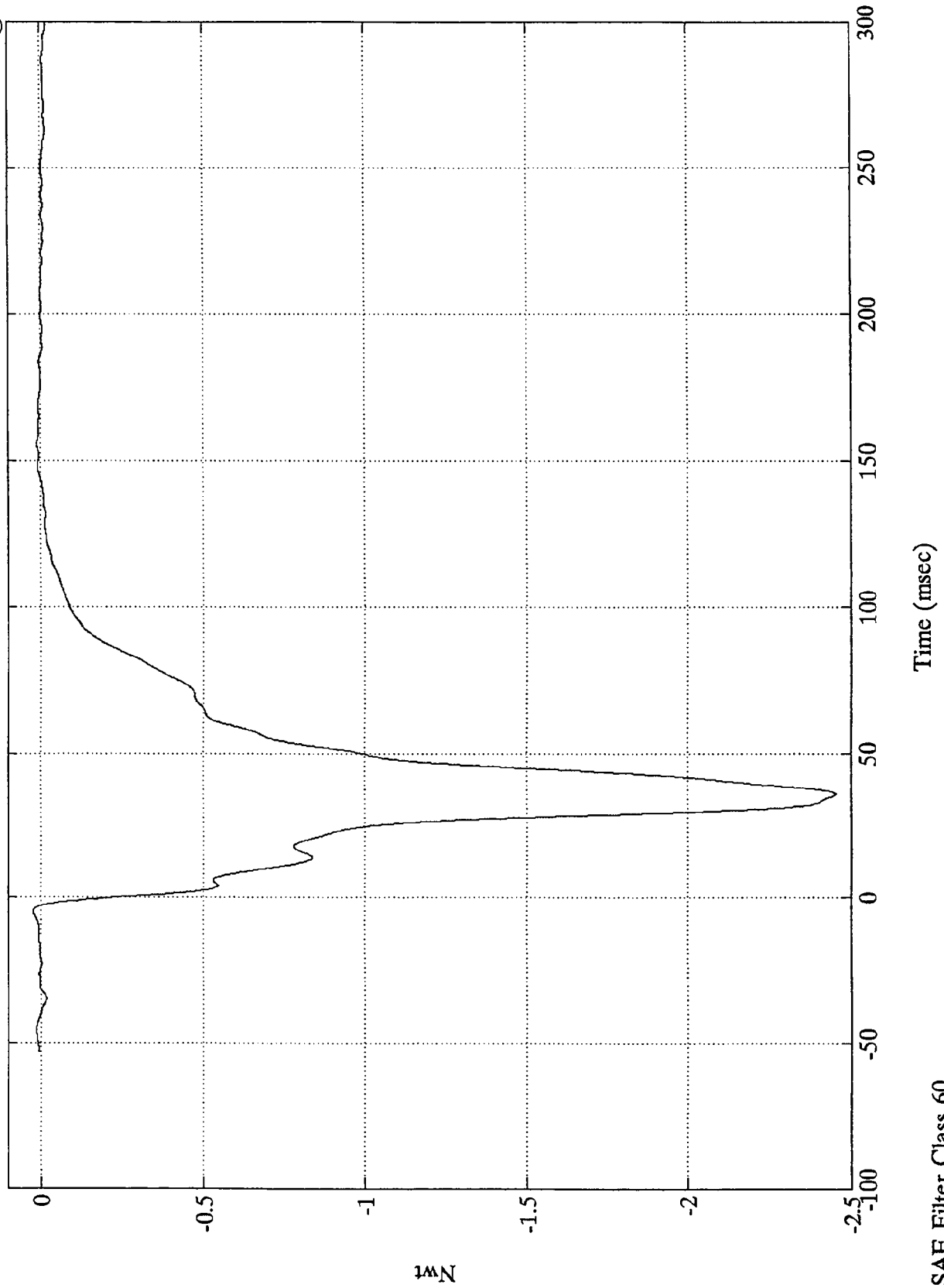
SAE Filter Class 60

VTV TEST #8

$\times 10^5$

V2 Center Load Cell

Max = 2298.23 Nwt @ -4.80 msec
Min = -245275.55 Nwt @ 36.12 msec



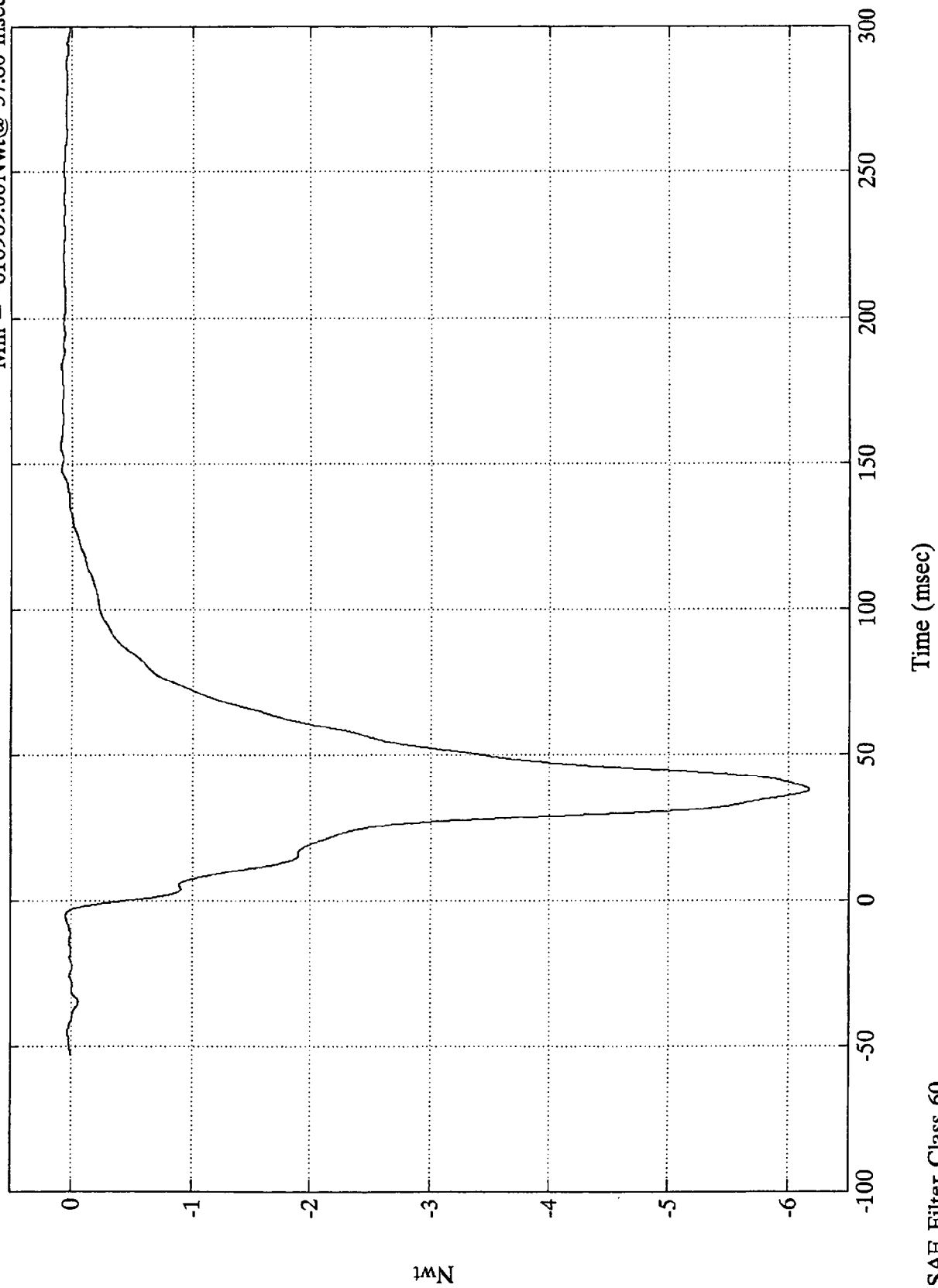
8118-8

SAE Filter Class 60

VTV TEST #8
x10⁵

Max = 9486.51Nwt@ 155.88 msec
Min = -616969.00Nwt@ 37.80 msec

V2 Load Cell Sum



SAE Filter Class 60

8118-8

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.

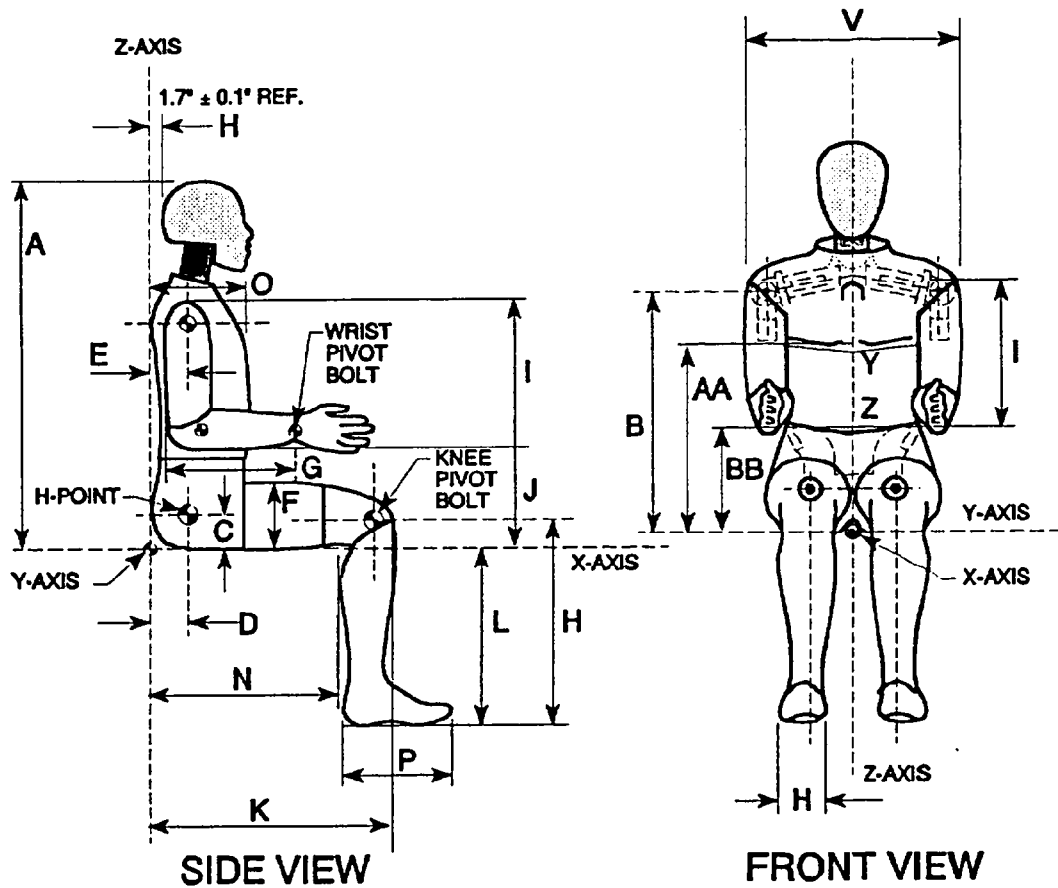
The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation, Advanced Technology Center. A summary of the test results, and Part 572 specifications are included in the Appendix.

Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
150	3-22-94
245	3-22-94

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))

VEHICLE 1, 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 HEIGHT (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 MINKIEWICZ

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 EXTENSION

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	TEST RESULTS
	SPECIFICATION	
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

1. HEAD ACCELEROMETER

HX LONGITUDINAL

HY LATERAL

HZ VERTICAL

2. CHEST ACCELEROMETER

CX LONGITUDINAL

CY LATERAL

CZ VERTICAL

3. FEMUR LOAD CELLS

LEFT SIDE

RIGHT SIDE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	A39J	4/94	10/94
ENDEVCO	AC2R5	4/94	10/94
ENDEVCO	A27F	4/94	10/94
ENDEVCO	A12C	4/94	10/94
ENDEVCO	A60C	4/94	10/94
ENDEVCO	A84G	4/94	10/94
GSE	951	11/93	5/94
GSE	952	11/93	5/94

B. CALIBRATION LABORATORY
INSTRUMENTS

1. PENDULUM ACC.

2. TEST PROBE
ACCELEROMETER

3. LUMBAR FLEXION TEST
PUSH FORCE GAUGE

4. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

5. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
CEC	A160	1/94	7/94
CEC	A161	1/94	7/94
TRANS- DUCER INC	20051	11/93	5/94
BLH	72952	11/93	5/94
CIC	567-11	11/93	5/94

VEHICLE 1, POSITION 2 - FRONT PASSENGER DUMMY

Manufacturer: Humanoid

Serial No.: 245

HYBRID III EXTERNAL DIMENSIONS

S/N 245 HUMANOID

DUMMY SERIAL NO. 245

DATE: 3/22/94

TEMPERATURE		69 DEG. F
RELATIVE HUMIDITY		35 %
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	33.6 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	35.0 IN
THIGH CLEARANCE (F)	5.5-6.1 IN	6.1 IN
BUTTOCK KNEE LENGTH (K)	22.8-23.8 IN	23.6 IN
BUTTOCK POPLITAL LENGTH (N)	17.8-18.8 IN	18.5 IN
POPLITEAL LENGTH (L)	16.9-17.9 IN	17.1 IN
KNEE PIVOT HEIGHT (M)	19.1-19.7 IN	19.3 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	16.8 IN
SHOULDER PIVOT HEIGHT (B)	19.9-20.5 IN	20.4 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 : 9/23/93

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%	54 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	237.3 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	3.1 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:245 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY		10% - 70%	34 %
IMPACT VELOCITY		22.60 - 23.40 FPS	23.1 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	24.87 G'S
	20 MS	17.60 - 22.60 G'S	21.57 G'S
	30 MS	12.50 - 18.50 G'S	18.29 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	18.29 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	41.25 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	67.61 DEG.
	TIME	57 - 64 MS	58.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	74.4 FT.-LBS.
	TIME	47 - 58 MS	54 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	98.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
NECK EXTENSION TEST
HYBRID III

DATE : 3/22/94

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN:245 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	70 DEG. F
RELATIVE HUMIDITY		10% - 70%	33 %
IMPACT VELOCITY		19.50 - 20.30 FPS	20.1 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	17.91 G'S
	20 MS	14.00 - 19.00 G'S	18.12 G'S
	30 MS	11.00 - 16.00 G'S	15.98 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	15.98 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	44.75 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	89.81 DEG.
	TIME	72 - 82 MS	73 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-59.0/-39.0 FT.-LBS.	-57.2 FT.-LBS.
	TIME	65 - 79 MS	68.75 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	124.5 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
THORAX IMPACT TEST
HYBRID III

DATE : 9/22/94

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	54 %
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	1215 POUNDS
INTERNAL HYSTERESIS	69% - 85%	77.7 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
KNEE IMPACT TEST
HYBRID III

DATE : 10/25/94

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 245 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	40 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS.	1167 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 10/25/93

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 245 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	40 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS.	1097 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 245

A. DUMMY INSTRUMENTS

1. HEAD ACCELEROMETER

HX LONGITUDINAL

HY LATERAL

HZ VERTICAL

2. CHEST ACCELEROMETER

CX LONGITUDINAL

CY LATERAL

CZ VERTICAL

3. FEMUR LOAD CELLS

LEFT SIDE

RIGHT SIDE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	ADMB8	4/94	10/94
ENDEVCO	ADL44	4/94	10/94
ENDEVCO	AC2J3	4/94	10/94
ENDEVCO	ADMB6	4/94	10/94
ENDEVCO	AC209	4/94	10/94
ENDEVCO	ADL98	4/94	10/94
GSE	954	11/93	5/94
GSE	955	11/93	5/94

B. CALIBRATION LABORATORY
INSTRUMENTS

1. PENDULUM ACC.

2. TEST PROBE
ACCELEROMETER

3. LUMBAR FLEXION TEST
PUSH FORCE GAUGE

4. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

5. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
CEC	A160	1/94	7/94
CEC	A161	1/94	7/94
TRANS- DUCER INC	20051	11/93	5/94
BLH	72952	11/93	5/94
CIC	567-11	11/93	5/94