

V2146

CALSPAN REPORT NUMBER: 8118-10

**VEHICLE-TO-VEHICLE FRONTAL 30° ANGLED  
60% OVERLAPPED 64.4 kph IMPACT OF A  
1991 ISUZU STYLUS 4-DOOR SEDAN AND  
A MOVING DEFORMABLE BARRIER**

CALSPAN TEST NUMBER: Y49-10-1455

September 21, 1994

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FINAL REPORT

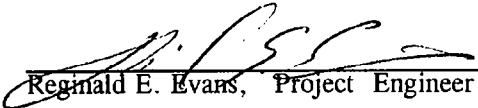
PREPARED FOR:

U. S. Department of Transportation  
Research and Special Programs Administration  
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Cambridge, MA 02142

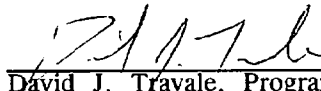
This Test Report was prepared for the U.S. Department of Transportation, Research and Special Programs Administration, under Contract No. DTRS-57-90-C-00104.

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## TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 8118-10	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle 64.4 kph Vehicle-to-Vehicle 30° Angled 60% Overlapped Frontal Impact of a 1991 Isuzu Stylus and a Moving Deformable Honeycomb Barrier.		5. Report Date September 21, 1994	
		6. Performing Organization Code CAL	
7. Author(s) Reginald E. Evans, Project Engineer David J. Travale, Program Manager		8. Performing Organization Report No. 8118-10	
		9. Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, New York 14225	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Research and Special Programs Administration Transportation Systems Center Kendall Square, Cambridge, MA 02142		10. Work Unit No.	
		11. Contract or Grant No. DTRS-57-90-C-00104	
15. Supplementary Notes		13. Type of Report and Period Covered Final	
		14. Sponsoring Agency Code DOT/NHTSA/NRD	
16. Abstract  A 64.4 kph vehicle to vehicle 30° angled 60% overlapped frontal impact test of a 1991 Isuzu Stylus 4-Door Sedan and a Moving Deformable Honeycomb Barrier (MDB) was performed at the Calspan Advanced Technology Center crash facility in Buffalo, New York on September 21, 1994.  The impact velocities of both vehicles were measured at 64.4 kph and the ambient temperature at time of test was 21°C. The 1991 Isuzu Stylus contained 50th percentile male Hybrid III Anthropomorphic Test Devices (ATD) occupant in the driver and right front passenger seating positions. The driver ATD was restrained using the vehicle airbag and 3 point belt system. The passenger ATD was restrained using a manual 3 point belt restraint system only. The driver and passenger HICs were 1,243.31 g's and 1,513.45 g's respectively, both exceeding the Head Injury Criteria (HIC) requirements of FMVSS 208 "Occupant Crash Protection". The driver's 3 millisecond clipped chest resultant was 100.062 g's and the right and left femur loads measured -23,373.9 newtons and -15,119.3 newtons respectively. These measurements exceeded the maximum requirement of FMVSS 208 "Occupant Crash Protection". The passenger chest clip and femur loads were below FMVSS 208 maximum requirements.			
17. Key Words Vehicle to vehicle crash Overlapped frontal Offset frontal		18. Distribution Statement <u>Copies of this report are available from:</u> NHTSA Technical Reference Division ; Mail Code: NAD-52 400 Seventh , S.W., Room 5108, Washington, D.C. 20590 Telephone No. (202) 366-4946 Attn: Robert Hornickle	
19. Security Classif. (of this report)  UNCLASSIFIED	20. Security Classif. (of this page)  UNCLASSIFIED	21. No. of Pages	22. Price

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## Section 1

### PURPOSE AND TEST PROCEDURE

This 64.4 kph 30° angled 60% overlapped 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 7) is to obtain responses from vehicles and restrained Hybrid III dummies during car-to-car overlapped frontal crashes.

This test was performed using a 1991 Isuzu Stylus 4-Door Sedan and a Moving Deformable Honeycomb Barrier (MDB). Both vehicles were traveling at 64.4 kph and impacted at a 30 degree angle measured counter clockwise from vehicle 1 center line. Vehicle 2 was positioned with its left side tangent to a line measured 15 degrees counter clockwise from the vehicle 1 60% overlapped line. The impact point was designated by an offset measurement to the right of vehicle 1 centerline which was 60% of vehicle 1 maximum width dimension.

Vehicle number 1, a 1991 Isuzu Stylus 4-Door Sedan, contained two Hybrid III 50th percentile male Anthropomorphic Test Devices (ATDs), in the driver and right front passenger seating positions. The driver ATD was restrained using the vehicle's driver side airbag and 3 point manual seatbelt restraint systems. The passenger ATD was restrained using the vehicle's 3 point manual belt system only. This vehicle was not equipped with a passenger airbag restraint system.

The honeycomb barrier used on vehicle 2 was the DSL-1285 barrier used for FMVSS 214D side impact testing. The rear of the barrier face was instrumented with load cells.

## Section 2

### SUMMARY OF TEST

Two vehicles, both moving forward at 64.4 kph, were impacted with a vehicle 1 60% overlap and a 30° approach angle. Vehicle 1 was a 1991 Isuzu Stylus 4-Door Sedan and Vehicle 2 was Moving Deformable Honeycomb Barrier (MDB). The test was performed at the Calspan Corporation Advanced Technology Center Crash Test Facility on September 21, 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 vehicles struck 0.75 inches off target so as to create slightly more overlap at impact.

Two Hybrid III 50th percentile Anthropomorphic Test Devices (ATDs) were placed in the driver and passenger seating positions in vehicle 1. The ATDs were positioned according to the ATD placement instructions from the FMVSS 208 "Occupant Crash Protection" Test Procedure. The driver ATD in the 1991 Isuzu Stylus (Vehicle 1) was restrained using the vehicle's driver side airbag and 3 point manual belt restraint system. The passenger ATD was restrained using the vehicle's 3 point manual belt system only. This vehicle was not equipped with a passenger airbag restraint system.

The 50th percentile male ATDs in the driver and passenger positions were both instrumented with head and chest three axis accelerometer packages; chest displacement potentiometers; upper neck force and moment transducers; femur axial force load cells and upper and lower tibia force and moment transducer packages. The driver ATD contained an additional chest compression displacement potentiometer arrays. Driver shoulder belt forces were also recorded.

The 110 channels of vehicle and ATD 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 ATD response data in plotted format.

Section 2

SUMMARY OF TEST (continued)

The 1991 Isuzu Stylus (Vehicle 1) driver HIC was 1243.31 and the head contacted the airbag, sunvisor, door frame, headrest and "B" pillar. The maximum chest acceleration over a three millisecond period was 100.062 gs. The left femur maximum axial compressive force was -15119.3 newtons and the right femur maximum axial compressive force was -23373.9 newtons.

The right front passenger HIC was 1513.45 with the head contacting the driver side instrument pod and the right roof rail. The maximum chest acceleration over a 3 millisecond period was 58.5989 gs. The left femur maximum axial compressive force was -8457.3 newtons and the right femur compressive force was -6237.7 newtons.

Structural damage to the 1991 Isuzu Stylus (Vehicle 1) consisted of severe deformation to instrument panel, roof rail and left door along with driver side floor pan intrusion and severe tearing in right and left side of windshield glazing.

The honeycomb barrier used on vehicle 2 was the DSL-1285 barrier used for FMVSS 214D side impact testing. The rear of the barrier face was instrumented with load cells.

## TEST ANOMALIES

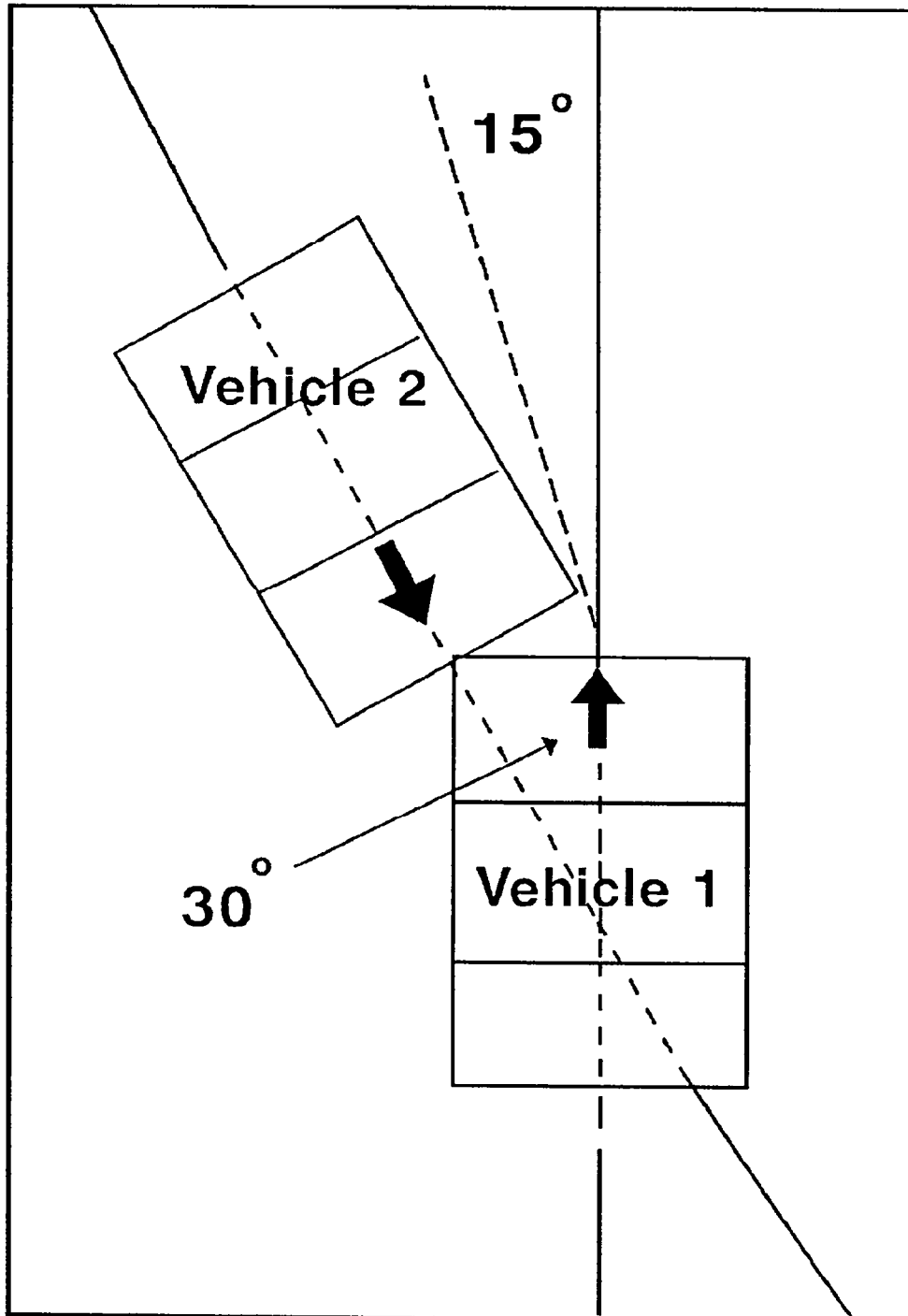
Appendix B contains lists of all data channels. Where an anomaly occurred, the channel is identified by an asterisk and commented below the list of data channels.

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 DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1991 Isuzu Stylus 4-Door Sedan  
 NHTSA Test No.: - VIN.: JABRT5351M7415931  
 Body Color: White Date of Manufacture: 8/94  
 Engine: - Cylinders; 97 C.I.D.; 1.6 Liters; 1600CC  
X Gas; - Diesel; - Turbocharged  
- Longitudinal; X Transverse  
 Transmission: 5 Speed; X Manual; - Automatic; - Overdrive  
 Final Drive: X Front Wheel; - Rear Wheel; - Four Wheel  
X A/C; X P/S; X P/B; - P/wdo  
- Tilt Wheel; - P/seats; - Cruise Control  
 Type of Occupant Restraint: Driver side airbag and 3 point belt. Passenger 3 point belt.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 241 kpa, Rear 241 kpa  
 Recommended Tire Size: P185/60 R14  
 Recommended Cold Tire Pressure: Front 220 kpa, Rear 220 kpa  
 Tires on Vehicle: P185/60 R14; Manufacturer: GOODYEAR  
 Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 TOTAL  
 Type of Front Seats: X Bucket; - Bench; - Split Bench;  
 Type of Front Seat Back: - Fixed; X Adj. With; X Lever - Rot. Knob  
 Vehicle Capacity Weight (VCW) = 375 kgs. (A)  
 No. of Occupants x 68.03 kgs. = 340 kgs. (B)  
 Rated Cargo and Luggage  
 Weight (RCLW) A - B = 35 kgs.  
 GVWR 1527 kgs. GAWR: Front 827 kgs. Rear 719 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>347</u>	kgs.	Right Rear	=	<u>200</u>	kgs.
Left Front	=	<u>344</u>	kgs.	Left Rear	=	<u>210</u>	kgs.
TOTAL FRONT WEIGHT	=	<u>691.0</u>	kgs.	( <u>62.8</u> % of Total Vehicle Weight)			
TOTAL REAR WEIGHT	=	<u>410.0</u>	kgs.	( <u>37.2</u> % of Total Vehicle Weight)			
TOTAL DELIVERED WEIGHT	=	<u>1,101.0</u>	kgs.				

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMY:

Right Front	=	<u>376</u>	kgs.	Right Rear	=	<u>277</u>	kgs.
Left Front	=	<u>375</u>	kgs.	Left Rear	=	<u>281</u>	kgs.
TOTAL FRONT WEIGHT	=	<u>751.0</u>	kgs.	( <u>57.4</u> % of Total Vehicle Weight)			
TOTAL REAR WEIGHT	=	<u>558.0</u>	kgs.	( <u>42.6</u> % of Total Vehicle Weight)			
TOTAL TEST WEIGHT	=	<u>1,309.0</u>	kgs.				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

Delivered Attitude:	RF	<u>650</u>	;	LF	<u>648</u>	;	RR	<u>668</u>	;	LR	<u>660</u>
Test Attitude:	RF	<u>645</u>	;	LF	<u>643</u>	;	RR	<u>635</u>	;	LR	<u>635</u>
Vehicle's Wheel Base =	<u>2440</u> mm.										
Location of Vehicle's C.G. =	<u>1045 millimeters rearward of front wheel center.</u>										

Driver seat fore and aft seat set at mid position. Rearward most and forward most positions were measured to 230 mm. Seat set at 115 mm rearward of front most position. Passenger seat set at 12 detents rearward of foremost 22 detents total. Seat angle set at 8 notchs rearward of verticle same for passenger.

Table 1

GENERAL TEST AND VEHICLE 1 PARAMETER DATA (continued)

POST-IMPACT DATA:

Type of Test:	<u>Frontal 30° Angled</u>	Impact Angle:	<u>30 deg.</u>
Date of Test:	<u>September 21, 1994</u>	Time of Test:	<u>14:50</u>
Ambient Temperature:	<u>21</u>	°C at impact area	
Temperature in Occupant Compartment:	<u>21</u>	°C	
Windshield Molding Temperature:	<u>-</u>	°C	
Required Impact Velocity Range:	<u>-</u>	to	<u>-</u> kph
Impact Velocity:	primary = <u>64.4</u>	kph, secondary =	<u>64.5</u> kph
Distance From Front Bumper to Barrier Face When			
Entering Speed Trap:	<u>132</u>	cm.	
Exiting Speed Trap:	<u>30.5</u>	cm.	

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>		<u>Passenger</u>	
Head	Face with airbag, face with door frame, top of head with sunvisor, rear of head with head rest and "B" pillar.		Face and top of head with driver instrument pod, top and rear of head with right roof rail.	
Chest	<u>Airbag</u>		<u>No contact</u>	
Abdomen	<u>No contact</u>		<u>No contact</u>	
Left Knee	<u>Lower dash panel and steering column</u>		<u>Instrument panel</u>	
Right Knee	<u>Lower dash panel and steering column</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>inoperable</u>	<u>inoperable</u>	<u>inoperable</u>	<u>inoperable</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>
Driver left seat floor pan intrusion.				

Post-test Comments:

Instrument panel severely deformed; windshield tear left and right side; roof rail severely deformed; left front door severely deformed; driver side floor pan intrusion.

Table 2

## VEHICLE 1 DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-72.6	66.1	-112.6	138.2	-107.9	81.5	53.2	100.062
DUMMY (2)	-98.5	195.9	51.0	215.7	-47.9	37.2	31.4	58.598
DUMMY (3)	-	-	-	-	-	-	-	-
DUMMY (4)	-	-	-	-	-	-	-	-

	MAXIMUM FORCE FEMUR LOAD (NEWTONS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	-23373.9	-15119.3
DUMMY (2)	-6237.7	-8457.3
DUMMY (3)	-	-
DUMMY (4)	-	-

	MAXIMUM LOAD (NEWTONS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	4274.7	-	-
DUMMY (2)	-	-	-
DUMMY (3)	-	-	-
DUMMY (4)	-	-	-

	MAXIMUM ACCELERATION ("G")			
	HIC	t <sub>1</sub> (SEC)	t <sub>2</sub> (SEC)	Average Acceleration t <sub>1</sub> TO t <sub>2</sub>
DUMMY (1)	1243.31	51.240	87.120	65.45
DUMMY (2)	1513.45	75.600	98.400	84.88
DUMMY (3)	-	-	-	-
DUMMY (4)	-	-	-	-

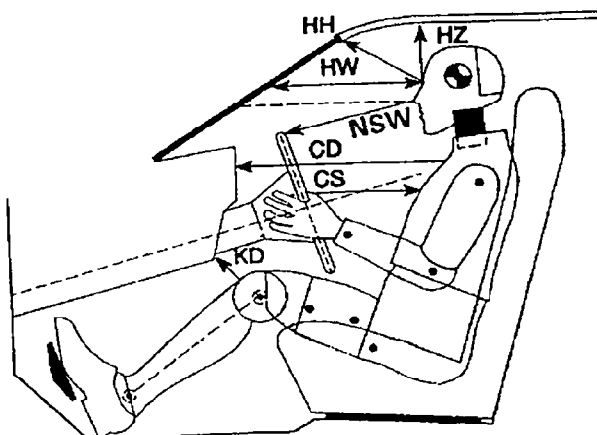
\*Defined as exceeding 0.003 sec. duration

\*\*As defined in FMVSS No. 208

Figure 2

VEHICLE 1 OCCUPANT CLEARANCE DIMENSIONS (mm)

	DRIVER (mm)	PASSENGER
HH	350	342
HW	536	565
NSW	391	-
NIP	541	-
NH	392	-
CD	529	566
CS	292	-
KDL	127	115
KDR	127	116
1	518	-
2	53	-
SA	8th notch	8th notch
PA	22°	24°
ULA	110°	109°
LLA	231	234



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

DISTANCE OF H-POINT FROM TARGET POSITION (mm)		
	Driver	Passenger
Longitudinal	4 behind	0
Vertical	8 above	2 below

Angles taken relative to vertical

SA = Seat Back Angle

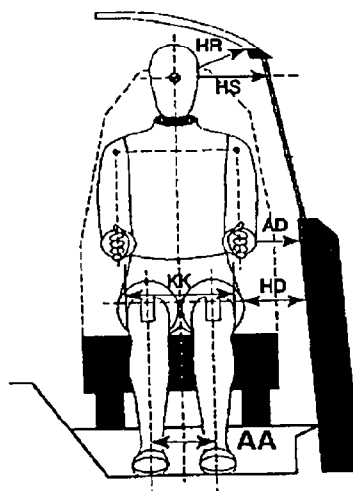
PA = Pelvic Angle

ULA= Upper Leg Angle

LLA= Lower Leg Angle

	DRIVER (mm)	PASSENGER
HR	180	147
HS	244	232
AD	119	109
HD	140	138
KK	310	266
AA	324*	223
DT	72°	72°

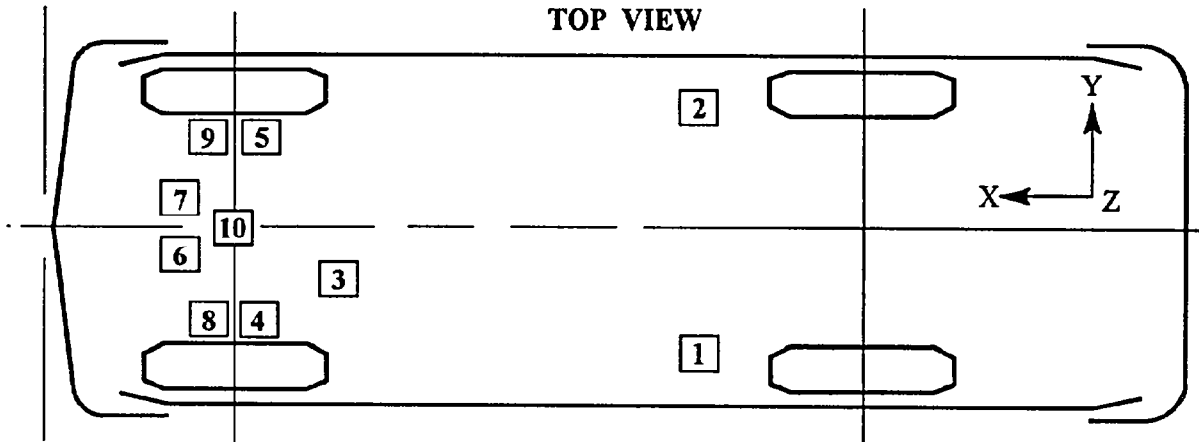
\*left foot on footrest



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

Figure 3

SUMMARY OF VEHICLE 1 ACCELEROMETER DATA



Vehicle: 1991 Isuzu Stylus 4-Door Sedan

ACCELEROMETER NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1 L.R. Comp (X)	Gs	3.6	274.4	-44.1	34.7	60.0
1	V1 L.R. Comp (Y)	Gs	30.2	31.7	-10.6	37.0	60.0
2	V1 R.R. Comp (X)	Gs	8.1	268.6	-59.1	44.6	60.0
2	V1 R.R. Comp (Y)	Gs	25.0	45.0	-9.8	254.9	60.0
3	V1 Brake Pedal (X)	Gs	200.4	47.8	-219.5	33.5	60.0
3	V1 Brake Pedal (Y)	Gs	133.4	43.8	-83.5	72.2	60.0
3	V1 Brake Pedal (Z)	Gs	84.9	71.6	-128.7	34.6	60.0
3	V1 Brake Pedal RES	Nwt-M	252.2	34.0	.1	-5.5	600.0
* 4	V1 Left Shock Tower (X)	Gs	279.7	91.2	-261.8	83.0	60.0
** 4	V1 Left Shock Tower (Z)	Gs	286.5	241.2	-267.7	234.0	60.0
5	V1 Right Shock Tower (X)	Gs	31.4	57.6	-148.7	43.8	60.0
5	V1 Right Shock Tower (Y)	Gs	256.8	43.7	-265.1	73.1	60.0
6	V1 Left Engine (X)	Gs	84.5	43.0	-178.3	24.5	60.0
7	V1 Right Engine (X)	Gs	33.9	57.0	-124.3	25.2	60.0
8	V1 L.F Frame Rail (X)	Gs	45.5	56.0	-93.9	30.1	60.0
8	V1 L.F Frame Rail (Y)	Gs	71.3	11.9	-24.3	53.4	60.0
8	V1 L.F Frame Rail (Z)	Gs	66.1	12.1	-59.1	42.7	60.0
8	V1 L.F Frame Rail Res.	Gs	108.9	29.9	.3	-20.0	60.0
9	V1 R.F Frame Rail (X)	Gs	17.6	51.0	-69.4	30.0	60.0
9	V1 R.F Frame Rail (Y)	Gs	18.4	50.0	-99.7	40.1	60.0
9	V1 R.F Frame Rail (Z)	Gs	38.6	37.1	-54.1	49.4	60.0
9	V1 R.F Frame Rail Res.	Gs	107.6	30.1	.4	-19.2	60.0
** 10	V1 Engine Bottom (X)	Gs	462.2	106.8	-445.9	131.8	60.0
** 10	V1 Engine Bottom (Y)	Gs	249.0	24.4	-6.3	6.7	60.0

\* Data questionable after 45msec, wire cut. \*\* Data inaccurate after 45msec, wire cut.  
 \*\* Data inaccurate after 42msec.

Figure 4

VEHICLE 1 PRE- AND POST-TEST POSITION OF TEST VEHICLE  
ACCELEROMETER MOUNTING LOCATIONS

Test Description: 64.4 kph Frontal Vehicle to Vehicle Impact  
 Test Vehicle: 1991 Isuzu Stylus 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	3141	211	135	2948	203	65
2	LEFT FRONT FRAME RAIL	3166	249	130	2783	203	95
3	RIGHT ENGINE TOP	3555	241	770	2931	401	815
4	LEFT ENGINE TOP	3496	33	770	2860	-127	765
5	ENGINE BOTTOM	3420	216	195	3228	368	143
6	RIGHT SHOCK TOWER	3260	610	836	2936	635	847
7	LEFT SHOCK TOWER	3260	597	831	2585	381	856
8	BRAKE PEDAL	2942	318	427	2479	127	399
9	LEFT REAR COMP.	1514	376	445	1514	376	439
10	RIGHT REAR COMP.	1514	376	452	1514	376	433
11	CENTER REAR COMP.	-	-	-	-	-	-
12	LOWER STEERING COL.	-	-	-	-	-	-
13	UPPER STEERING COL.	-	-	-	-	-	-
14	LEFT DRIVER TOEPAN	3013	559	457	2614	279	290
15	RIGHT DRIVER TOEPAN	3064	325	343	2779	114	457

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

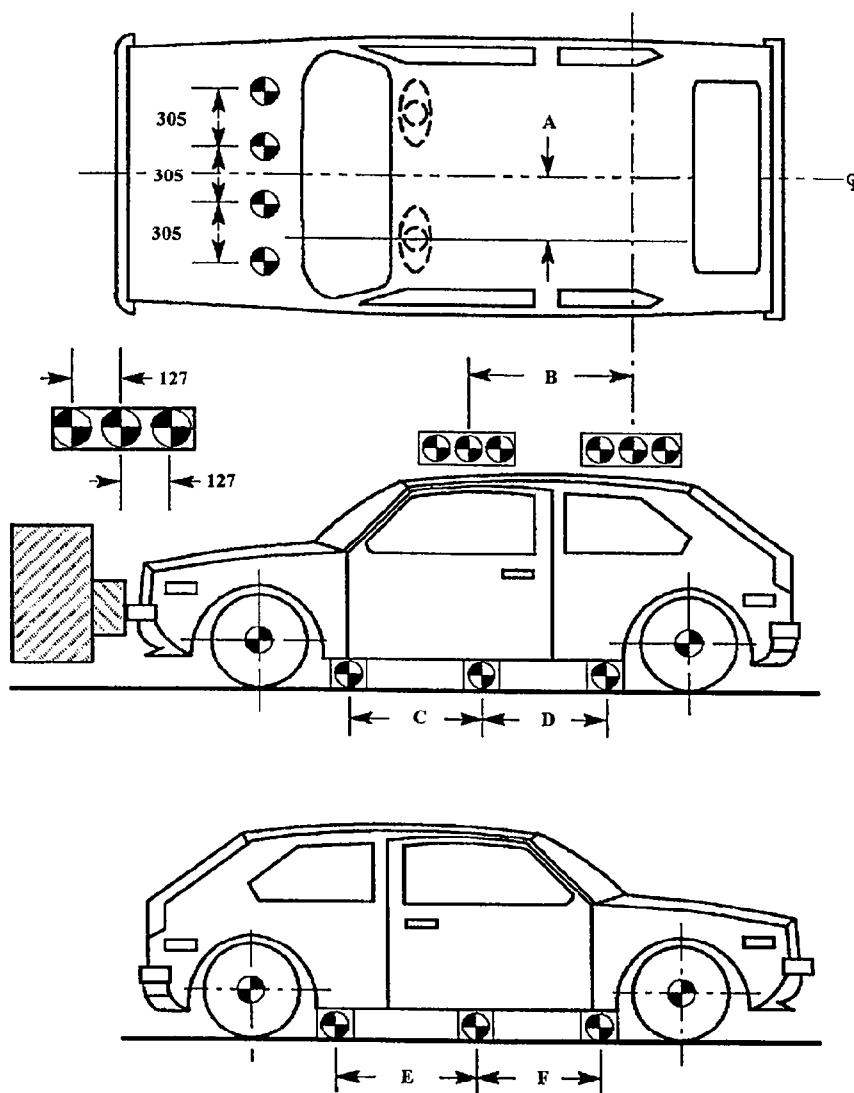
TOEPAN MEASUREMENT POSITIONS						
Loc. No.	PRE-TEST AXIS (mm)			POST-TEST AXIS (mm)		
	X	Y	Z	X	Y	Z
1	3036	567	505	*	*	*
2	2919	556	246	*	*	*
3	3048	440	340	2746	221	290
4	3048	211	335	*	*	*
5	2954	221	262	2682	-25	221

\* Information on post-test axis of toepan measurement positions are unavailable.

Figure 5

VEHICLE 1 TARGET LOCATIONS

(All dimensions in millimeters)

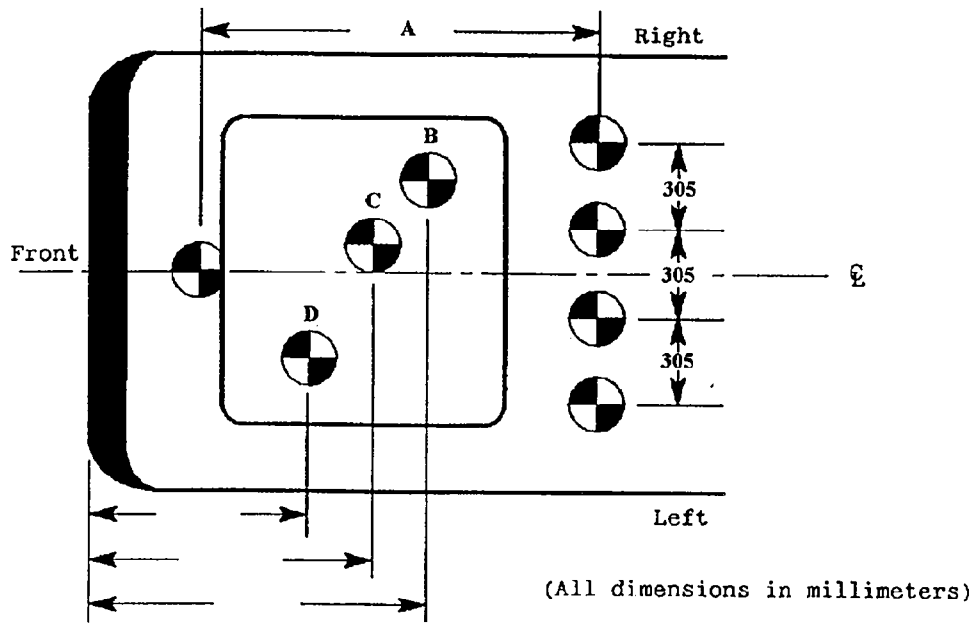


(Dimensions in millimeters)

Targets A: 287	D: 800
B: 1219	E: 800
C: 800	F: 800

Figure 5

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



Note: Drawing not to scale.

- Target A: 732  
B: Intake Manifold - 820  
C: Air Cleaner Assembly - 706  
D: Valve Cover - 569

Figure 6

VEHICLE 1 MEASUREMENT POINTS

(All dimensions in millimeters)

REAR DATUM REFERENCE

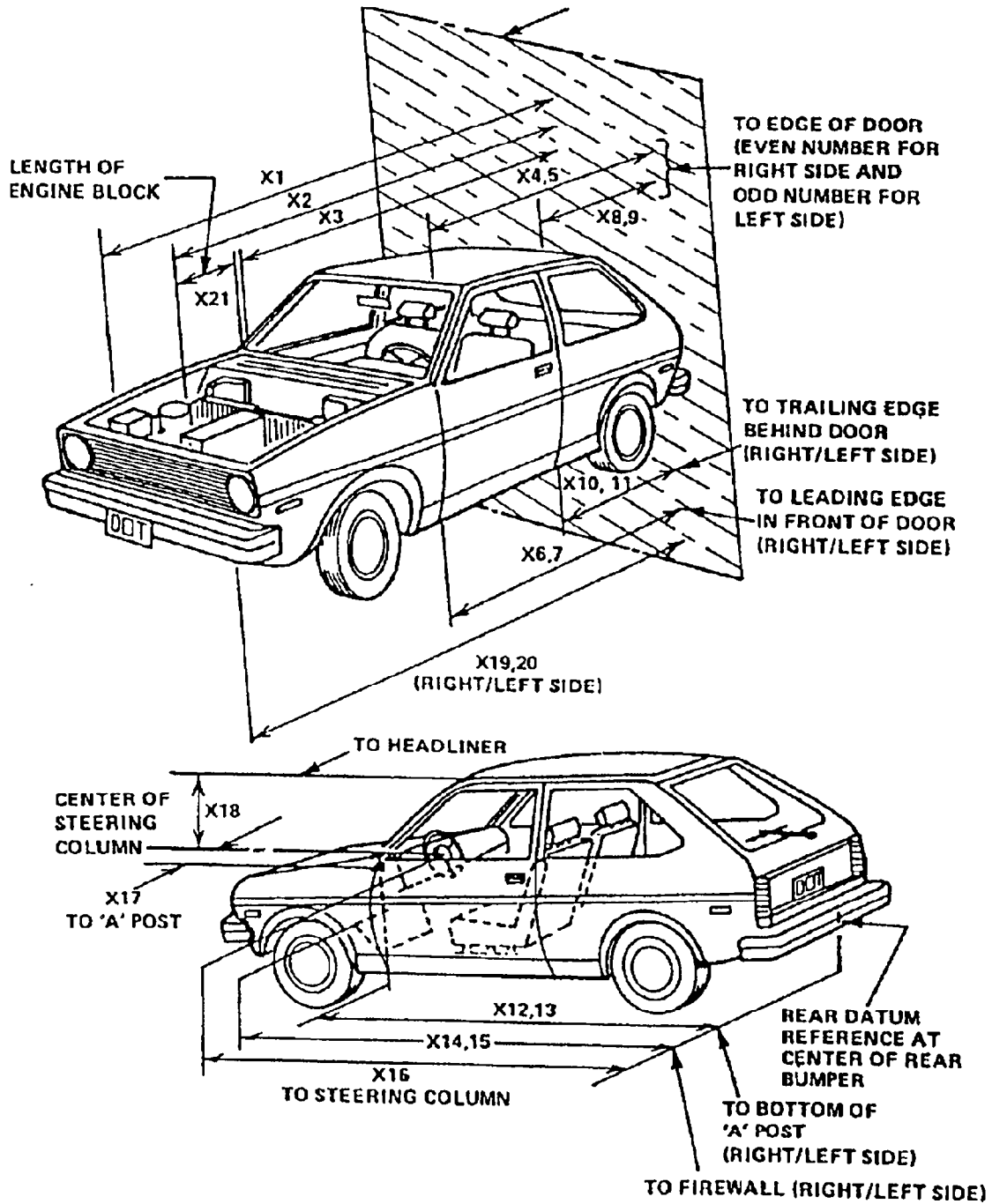


Figure 6

VEHICLE 1 MEASUREMENT POINTS (continued)

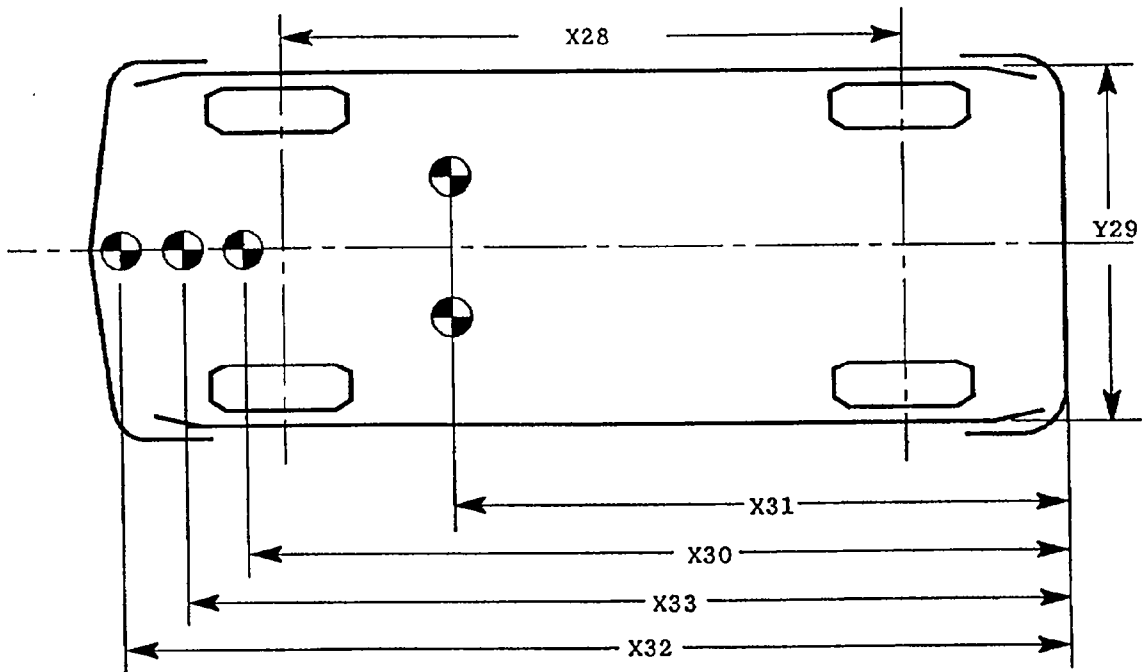
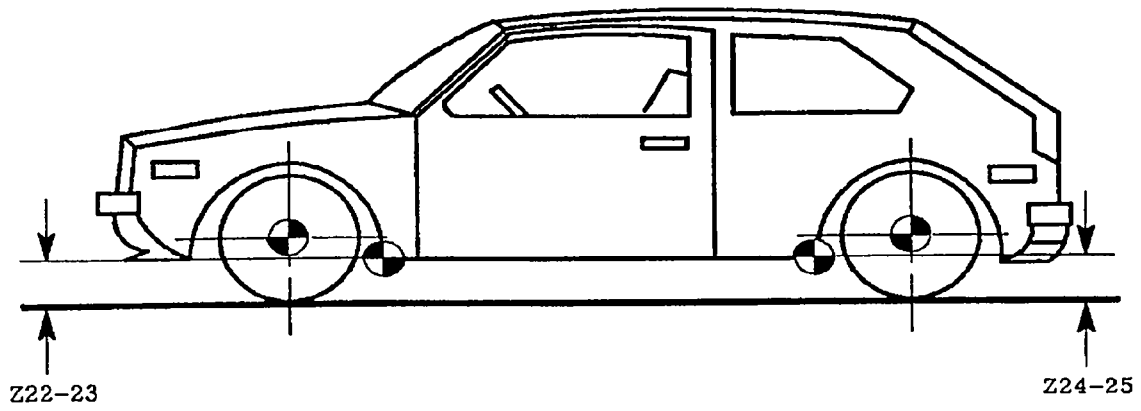


Table 3

## VEHICLE 1 MEASUREMENTS

No.	TYPE OF MEASUREMENT	All Dimensions in millimeters	
		Pre-Test	Post-Test
X1	Total Length of Vehicle at Centerline	4195	3520
X2	Rear Surface of Vehicle to Engine at Centerline	3700	3390
X3	Rear Surface of Vehicle to Firewall	3235	2945
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	2895	2872
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	2892	2520
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	2873	2840
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	2870	2452
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	1835	1832
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	1830	1659
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	1844	1809
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	1840	1802
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	2878	N/A
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	2865	2833
X14	Rear Surface of Vehicle to Firewall - Right Side	3205	3989
X15	Rear Surface of Vehicle to Firewall - Left Side	3180	2571
X16	Rear Surface of Vehicle to Steering Wheel Center	2388	2150
X17	Steering Column to "A" Post	443	N/A
X18	Steering Column to Headliner	408	280

Table 3

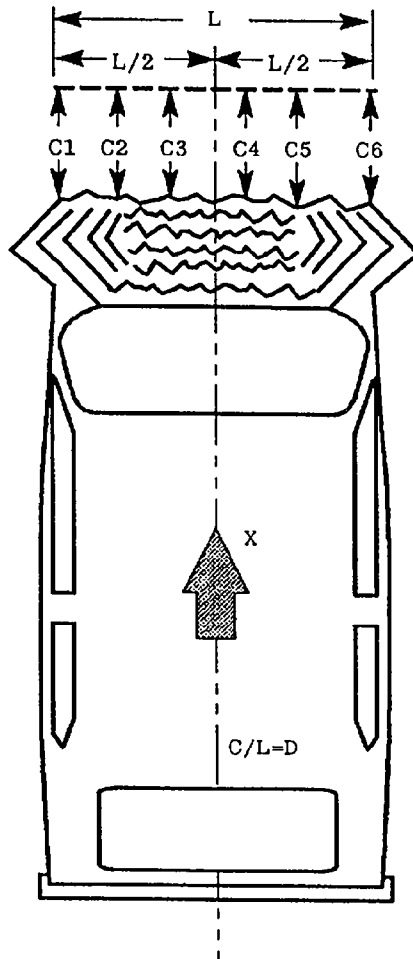
## VEHICLE I MEASUREMENTS (continued)

No.	TYPE OF MEASUREMENT	All Dimensions in millimeters	
		Pre-Test	Post-Test
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4092	4055
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4101	3055
X21	Width of Engine Block	420	420
Z22	Right Front Sill to Ground Plane	218	183
X23	Left Front Sill to Ground Plane	223	2.0
Z24	Right Rear Sill to Ground Plane	215	223
Z25	Left Rear Sill to Ground Plane	215	198
X26	Firewall to Engine or Transaxle	48	0
Z27	Vertical Dim. from Door Sill to Centerline of Steering Column	525	N/A
X28	Wheelbase of Vehicle	2440	R=2330 L=1920
Y29	Width of Vehicle at Maximum Width Point	1660	1655
X30	Rear Surface of Vehicle to Engine Target	3509	3012
X31	Rear Surface of Vehicle to Compartment Target	2870	R=2656 L=2555
X32	Rear Surface of Vehicle to Bumper Target	4119	3444
X33	Rear Surface of Vehicle to Frame Crossmember	3878	3469

Table 3

VEHICLE 1 MEASUREMENT (continued)

(all dimensions in millimeters)



Location	Pre-Test	Post-Test	Change
C1	4055	2960	1,095
C2	4160	3245	915
C3	4195	3430	765
C4	4190	3650	540
C5	4145	3870	275
C6	4042	4055	-13

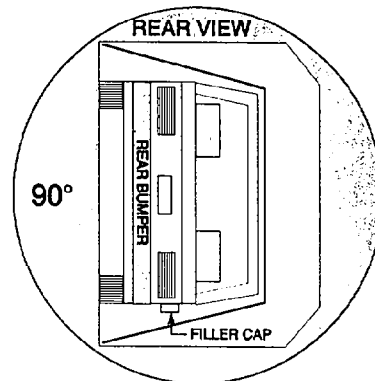
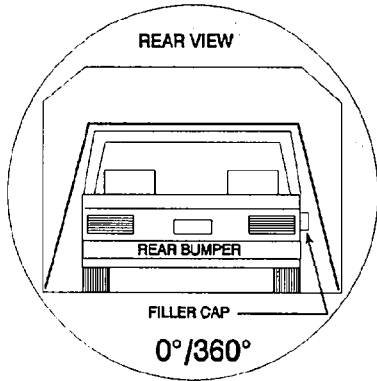
L = 1440



Table 5  
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:  
0-90 Deg.

Vehicle NHTSA ID No.:



**I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	37	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
<b>TOTAL</b>	6	minutes	37	seconds
Next whole minute interval	7	minutes		

**II. FMVSS 301 REQUIREMENTS:**

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

**III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:**

0	0	0	N/A
---	---	---	-----

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

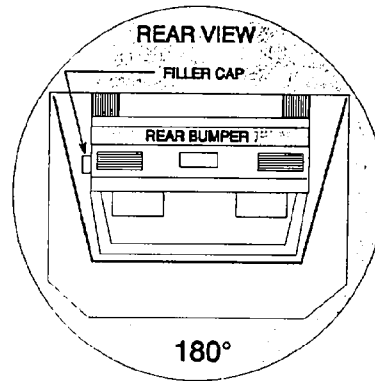
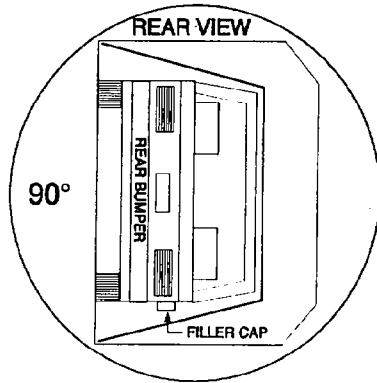
**IV. SOLVENT SPILLAGE LOCATION(S):**

None

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

TEST PHASE:  
90-180 Deg.

Vehicle NHTSA ID No.:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	<u>1</u>	minutes	<u>42</u>	seconds
FMVSS 301 Position Hold Time +	<u>5</u>	minutes	<u>00</u>	seconds
<b>TOTAL</b>	<u>6</u>	minutes	<u>42</u>	seconds
Next whole minute interval	<u>7</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	N/A
---	---	---	-----

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

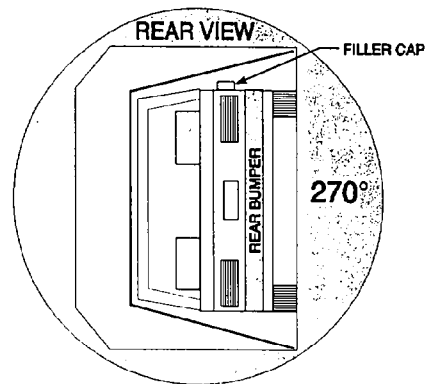
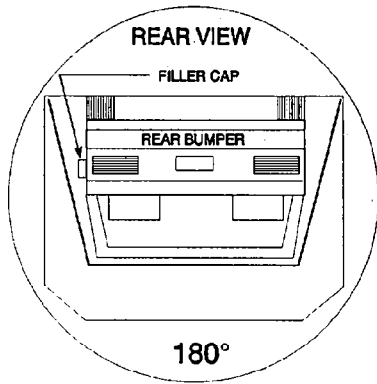
IV. SOLVENT SPILLAGE LOCATION(S):

None

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

TEST PHASE:  
180-270 Deg.

Vehicle NHTSA ID No.:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	<u>1</u>	minutes	<u>57</u>	seconds
FMVSS 301 Position Hold Time +	<u>5</u>	minutes	<u>00</u>	seconds
<b>TOTAL</b>	<u>6</u>	minutes	<u>57</u>	seconds
Next whole minute interval	<u>7</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	N/A
---	---	---	-----

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

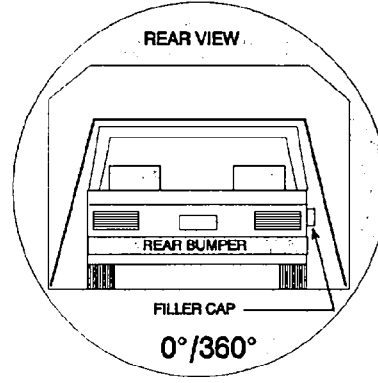
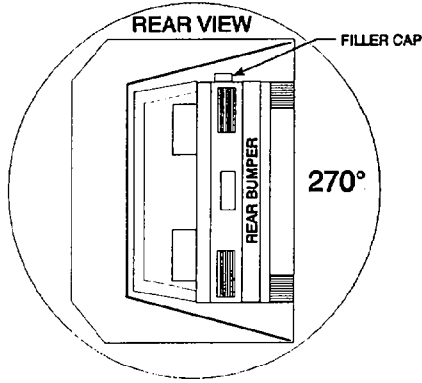
IV. SOLVENT SPILLAGE LOCATION(S):

None

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

TEST PHASE:  
270-360 Deg.

Vehicle NHTSA ID No.:



**I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	<u>  2  </u> minutes <u>  03  </u> seconds
FMVSS 301 Position Hold Time +	<u>  5  </u> minutes <u>  00  </u> seconds
<b>TOTAL</b>	<u>  7  </u> minutes <u>  03  </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

VEHICLE TWO DATA

Table 6

CRASH TEST SUMMARY FOR MOVING BARRIER

POSITION OF IMPACT (MDB) MONORAIL:

30° to right

MDB DETAILS:

Overall Width of Framework Carriage	=	<u>1251</u>	millimeters
Overall Length of MDB (incl. honeycomb impact face)	=	<u>4102</u>	millimeters
Wheelbase of Framework Carriage	=	<u>2598</u>	millimeters
Tread of Framework Carriage (Front & Rear)	=	<u>1880</u>	millimeters
C.G. Location Rearward of Front Axle	=	<u>1235</u>	millimeters

MDB WEIGHT:

Right Front	=	<u>266</u>	kgs.	Right Rear	=	<u>414</u>	kgs.
Left Front	=	<u>453</u>	kgs.	Left Rear	=	<u>237</u>	kgs.
TOTAL FRONT WEIGHT	=	<u>719</u>	kgs.	( <u>52.4</u> % of Total Vehicle Weight)			
TOTAL REAR WEIGHT	=	<u>651</u>	kgs.	( <u>47.5</u> % of Total Vehicle Weight)			
TOTAL TEST WEIGHT	=	<u>1370</u>	kgs.				

MAXIMUM STATIC CRUSH OR HONEYCOMB IMPACT FACE:

1. Row A at Bumper Level	=	<u>440</u>	millimeters
2. Row B at Mid-Stack Level	=	<u>327</u>	millimeters
3. Row C at Top of Stack Level	=	<u>157</u>	millimeters

INSTRUMENTATION:

Number of MDB Data Channels	=	<u>12</u>
-----------------------------	---	-----------



Table 7

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

Test Date: September 21, 1994

Vehicle: Moving Deformable Barrier

Location	Distance Right of Center										Distance Left of Center									
	813	711	610	508	406	305	203	102	0.0	102	203	305	406	508	610	711	813			
Pre	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382				
Post	376	335	272	240	212	255	255	242	242	262	265	260	250	238	225	225				
Crush Level	6	47	110	142	170	127	127	140	140	137	117	122	132	144	157	157				
Pre	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382				
Post	300	310	285	265	225	185	142	110	68	58	65	75	78	80	80	80				
Crush Level	82	72	97	117	157	197	240	272	314	324	317	307	304	302	302	302				
Pre	469	485	485	485	485	485	485	485	485	485	485	485	485	485	485	480				
Post	250	240	250	178	178	195	175	130	67	58	70	112	120	108	90	70				
Crush Level	219	245	235	307	307	290	310	355	418	440	415	373	365	377	395	410				

Figure 8

CAMERA POSITIONS FOR VEHICLE TO VEHICLE ANGLED FRONTAL IMPACT

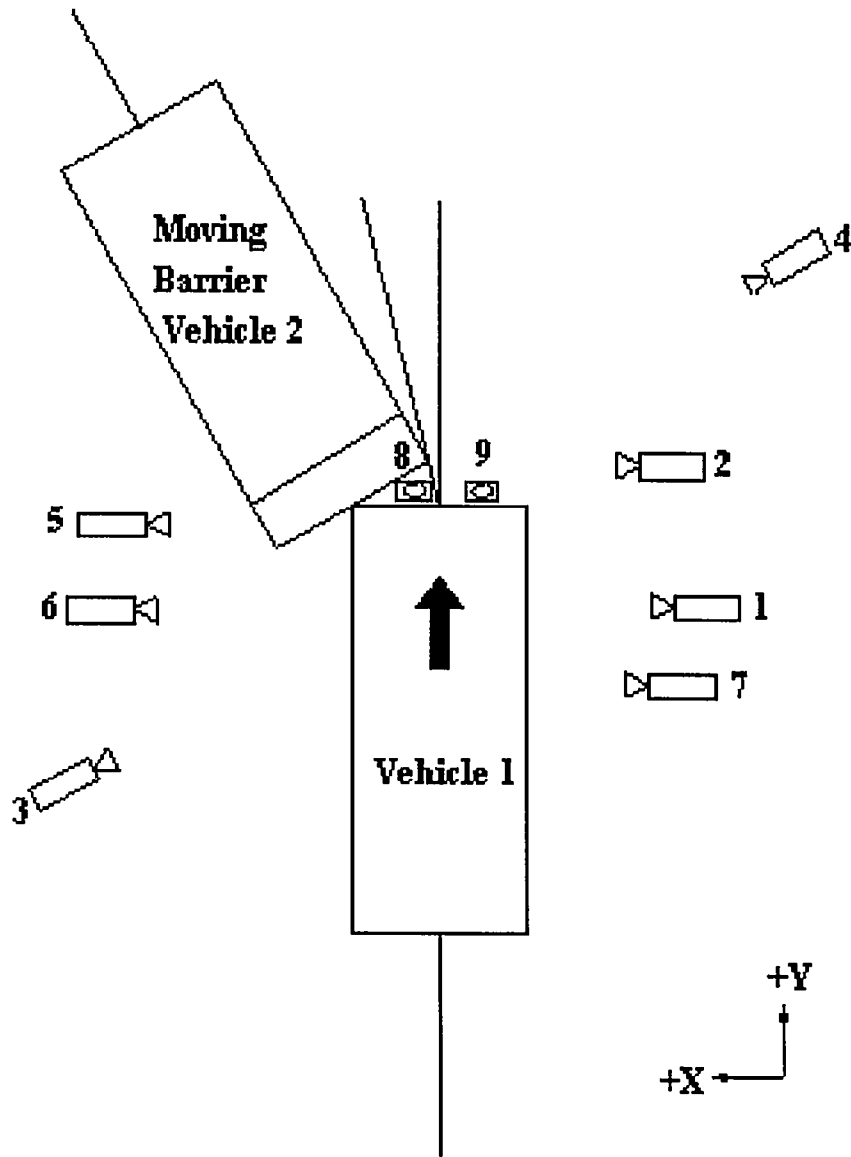


Table 8

HIGH-SPEED CAMERA LOCATIONS

Test No. Y49-10-1455 Vehicle: 1991 Isuzu Stylus 4-Door Sedan, Moving Deformable Barrier

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE** (deg)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Camera	-	-	-	-	8	24
2	South Overall Camera	7975.6	-2336.8	1066.8	-1	13	1000
3	South Impact Point	8458.2	2997.2	1041.4	-1	25	1040
4	North Impact Point	-8737.6	3454.4	1041.4	-2	25	1050
5	Vehicle 1 Driver Side View	9855.2	1066.8	1498.6	-3	35	880
6	Vehicle Driver and Interior View	3124.2	-2362.2	1879.6	-16	13	610
7	Vehicle 1 Passenger Side View	-10490.2	5410.2	1397.0	-3	25	1140
8	Overhead Overall View	0	176.0	9802.0	-90	13	1090
9	Overhead Impact Point	0	340.0	9802.0	-90	25	1000

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

APPENDIX A  
PHOTOGRAPHS

## APPENDIX A

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OVERALL TEST SETUP

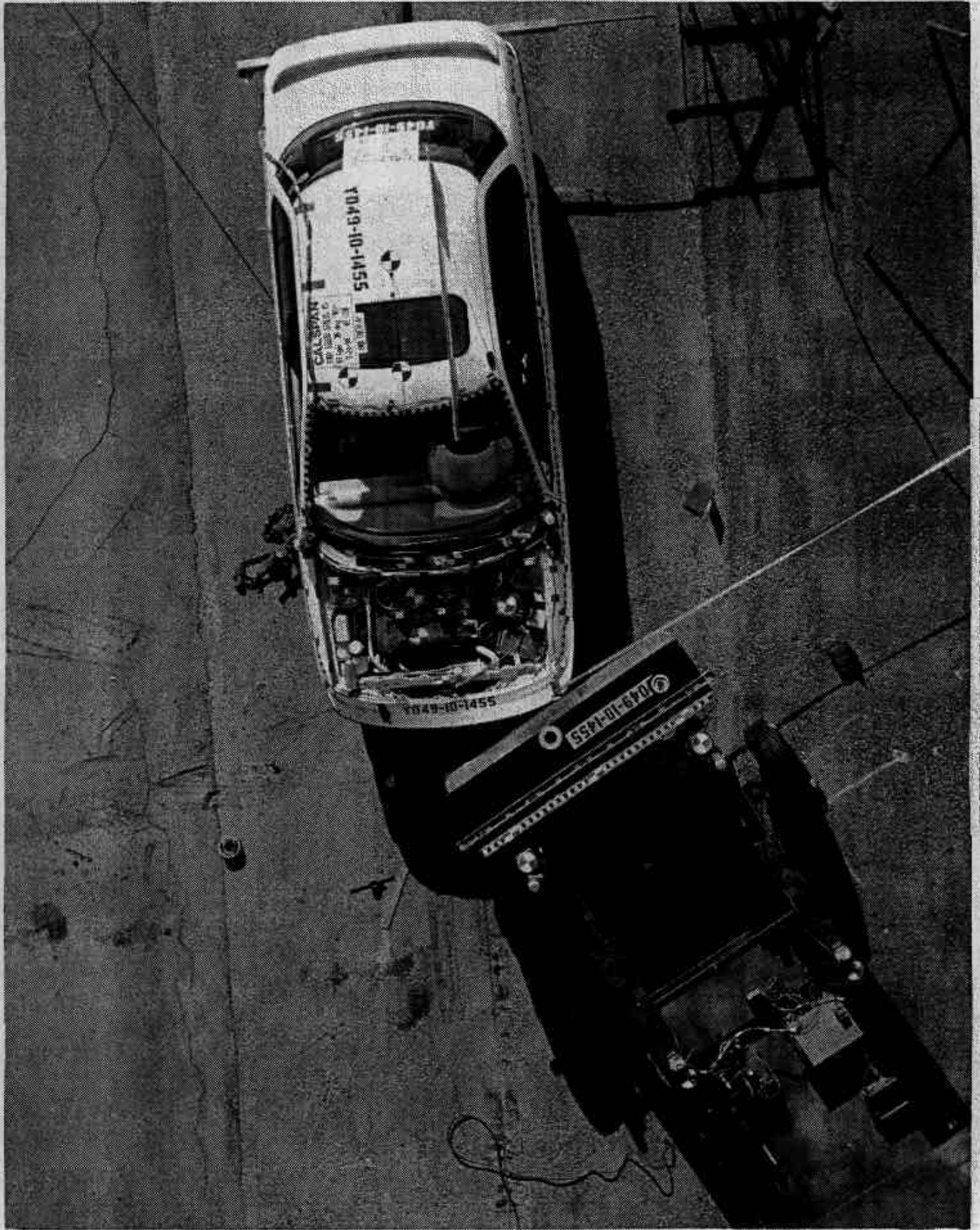


FIGURE A-1 PRE-TEST OVERHEAD VIEW

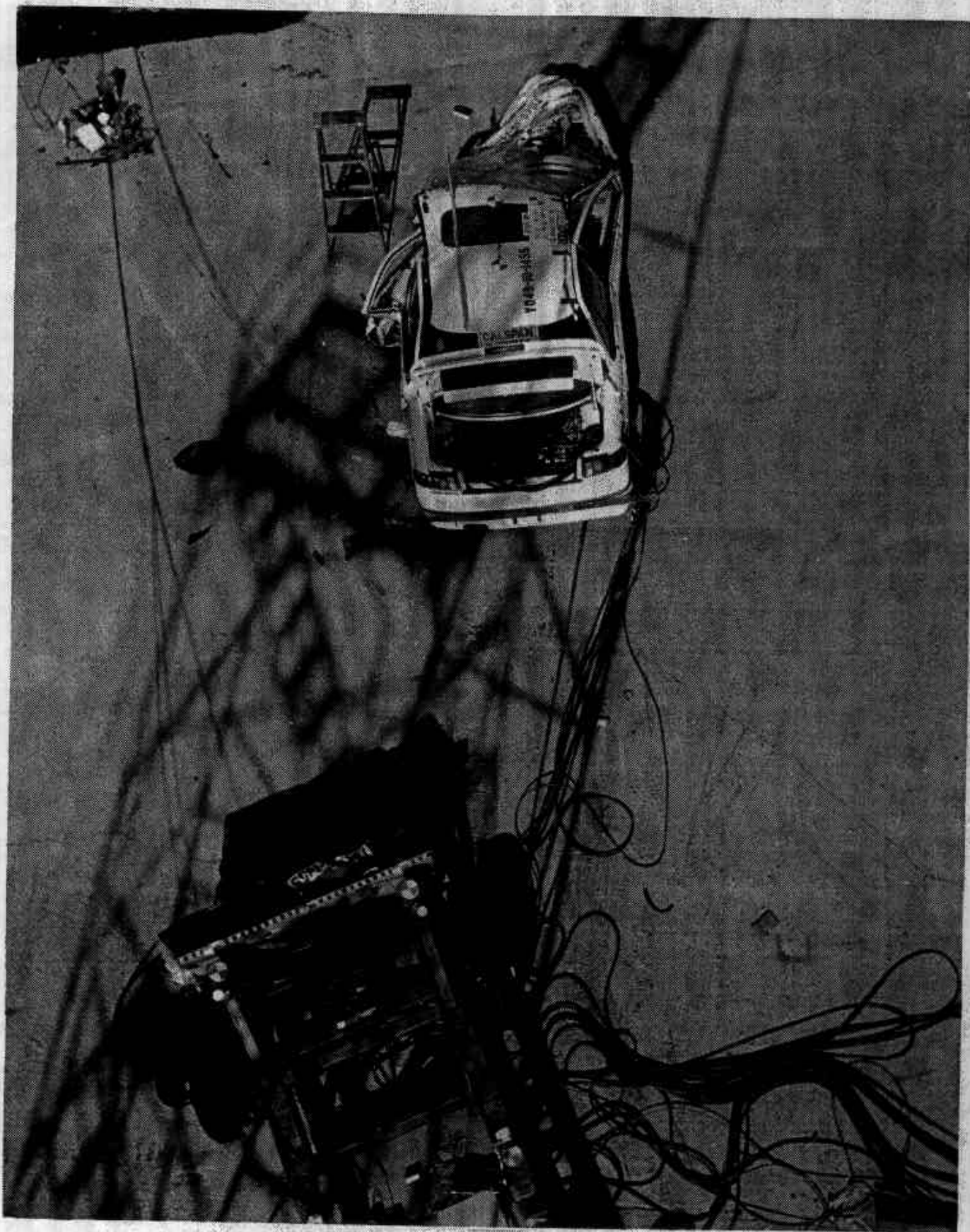


FIGURE A-2 POST-TEST OVERHEAD VIEW

A-4

8118-10

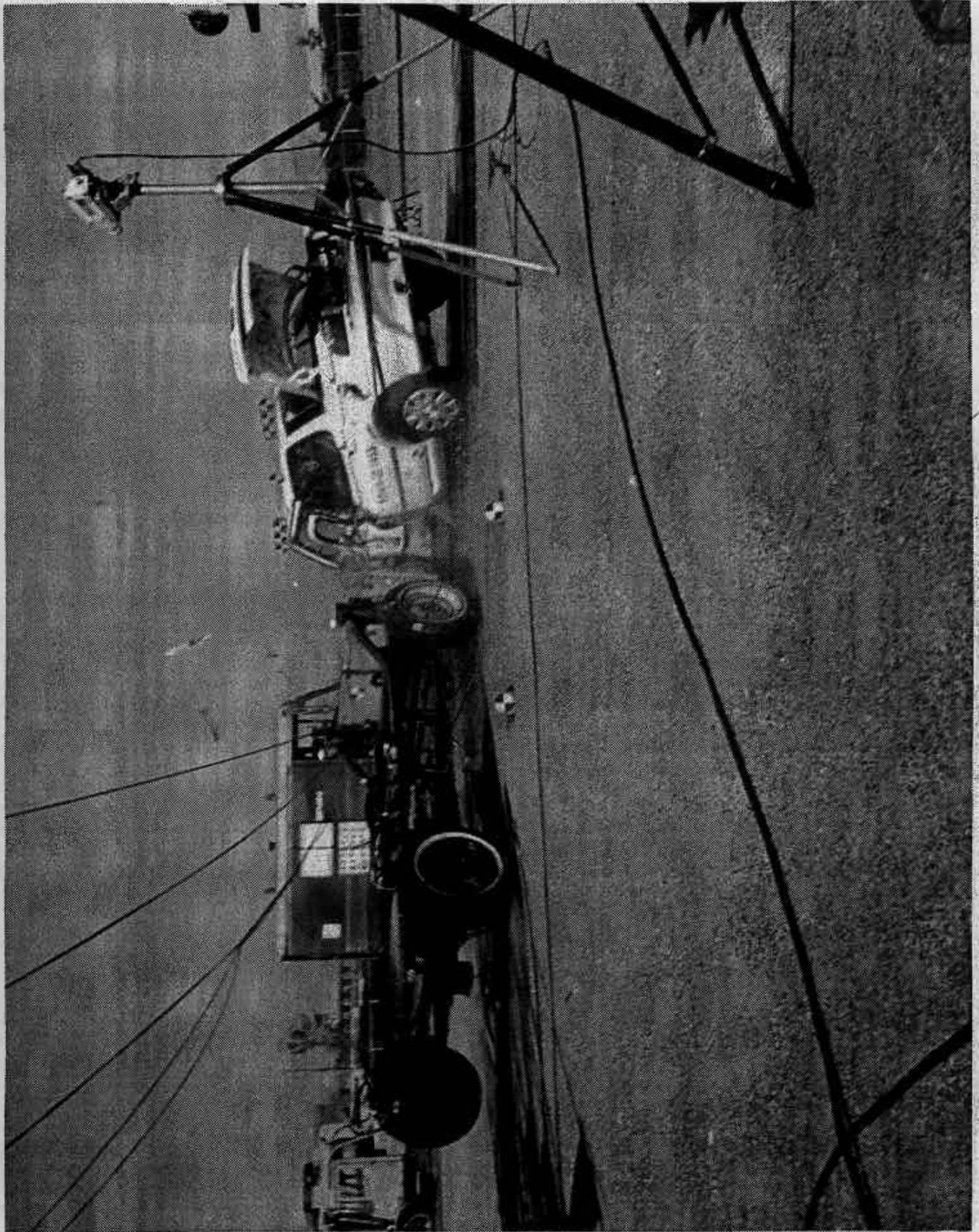


FIGURE A-3 IMPACT PHOTO

A-5

8118-10

VEHICLE 1 PHOTOGRAPHS



FIGURE A-4 PRE-TEST FRONT VIEW

A-7

8118-10

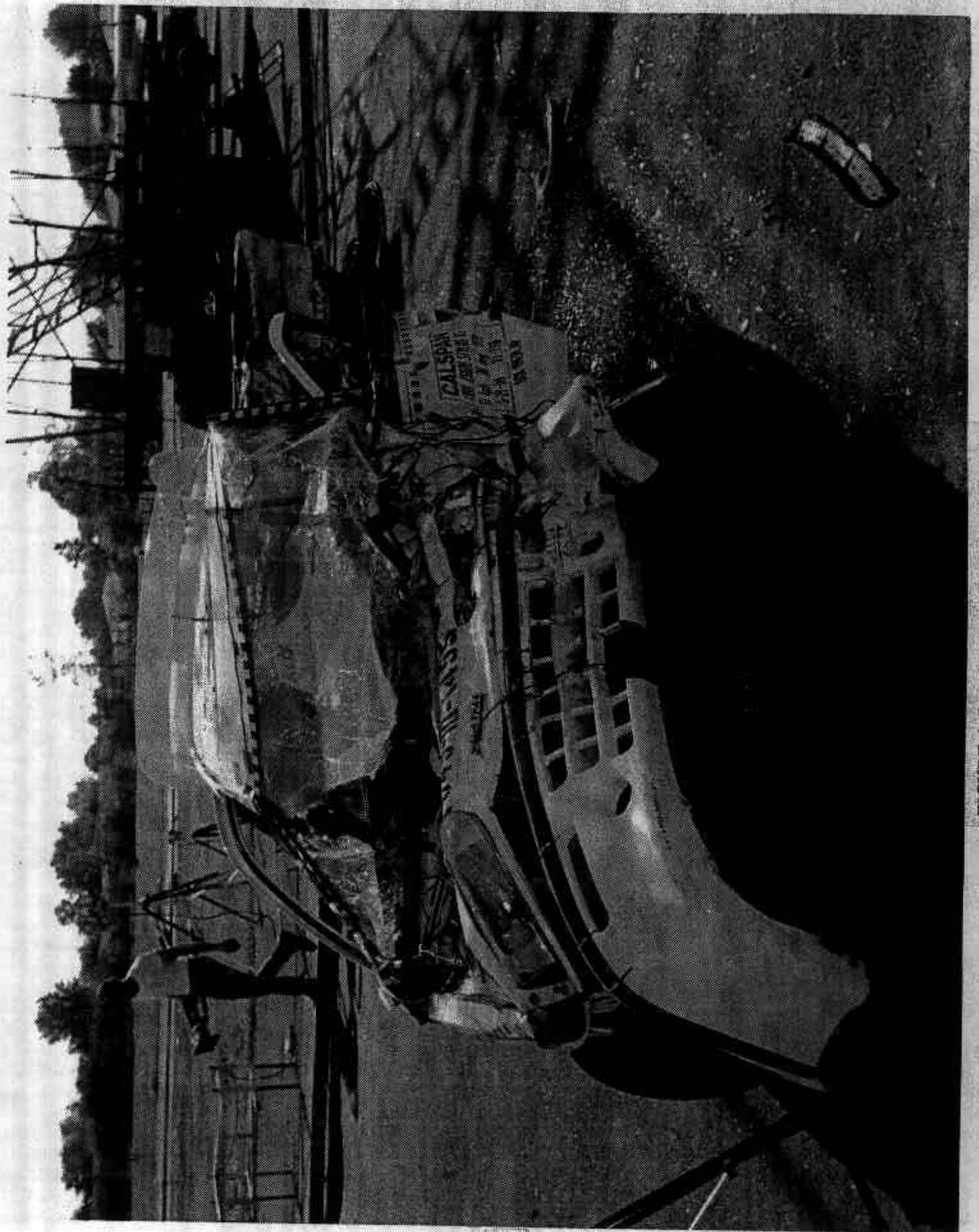


FIGURE A-5 POST-TEST FRONT VIEW

A-8

8118-10

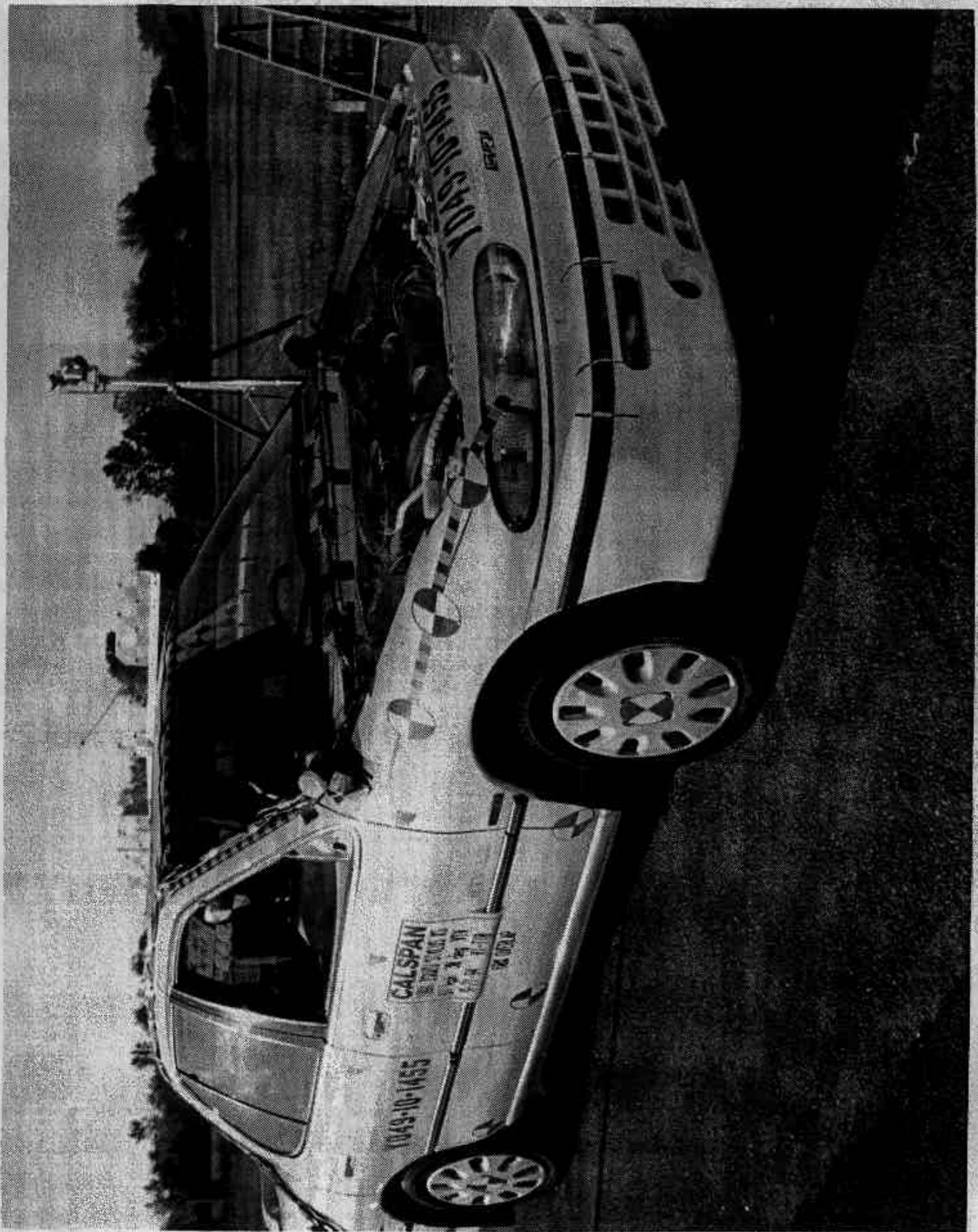


FIGURE A-6 PRE-TEST FRONT RIGHT THREE QUARTER VIEW

A-9

8118-10

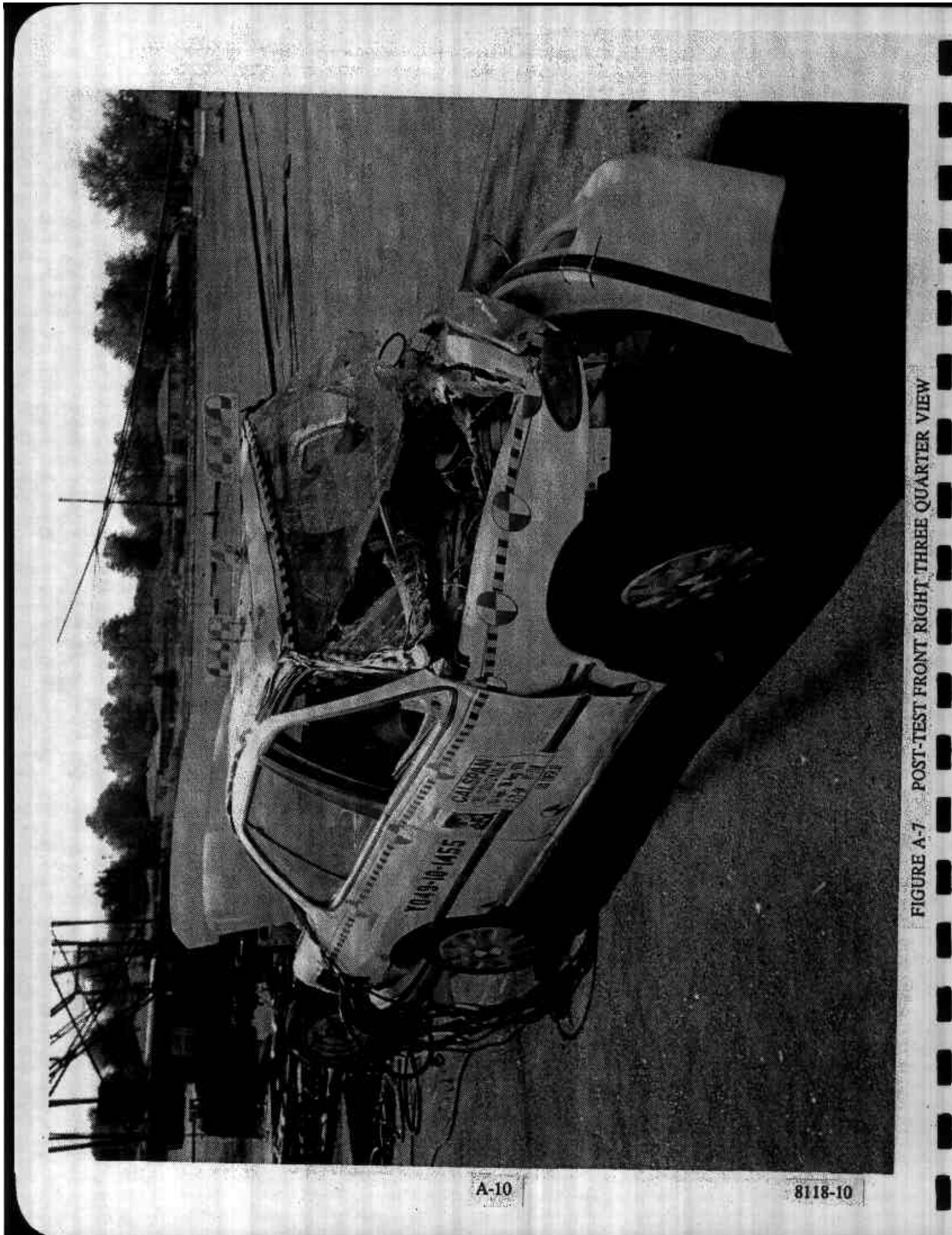
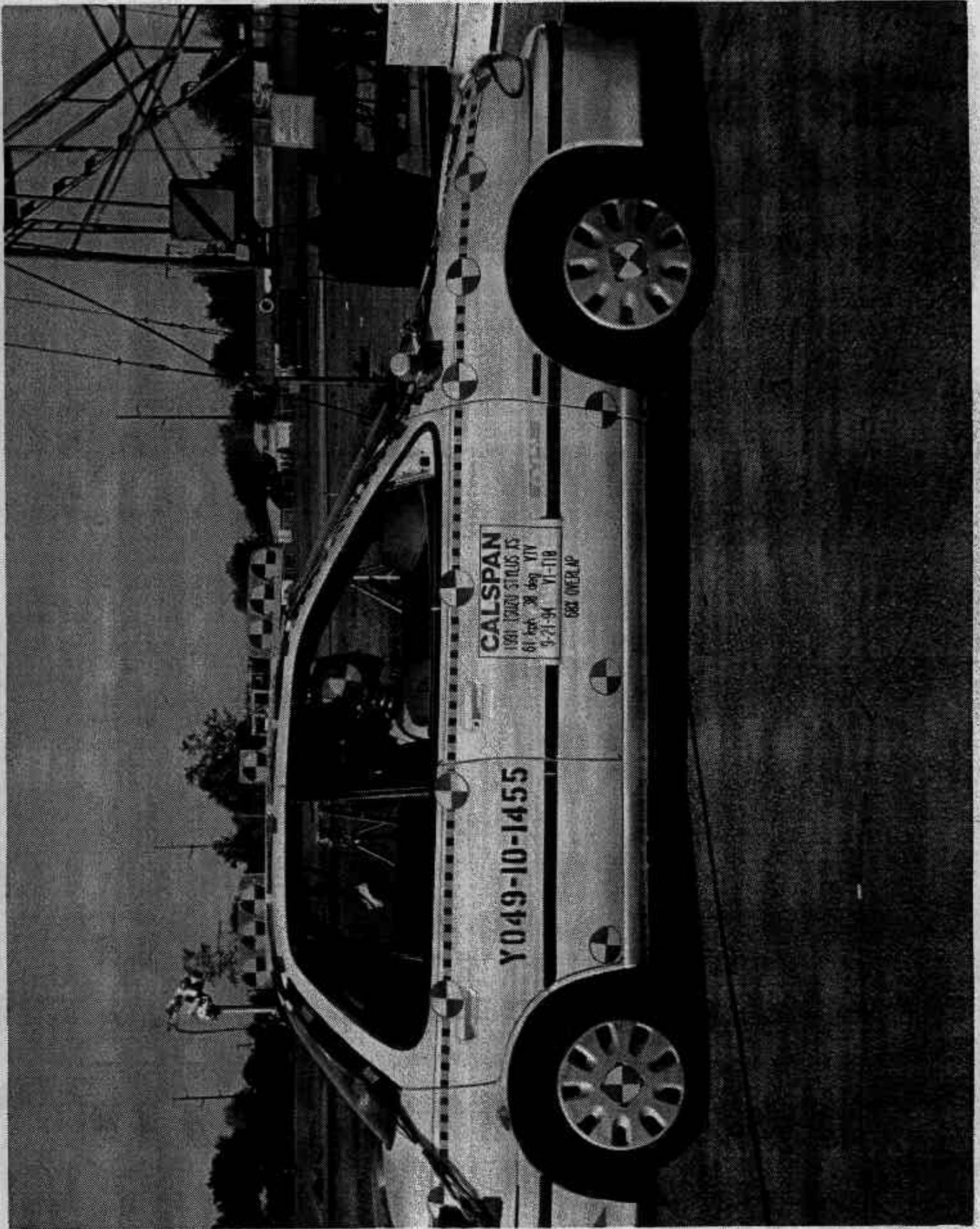


FIGURE A-7 POST-TEST FRONT RIGHT THREE QUARTER VIEW

A-10

8118-10



A-11

8118-10

FIGURE A-8 PRE-TEST RIGHT SIDE VIEW

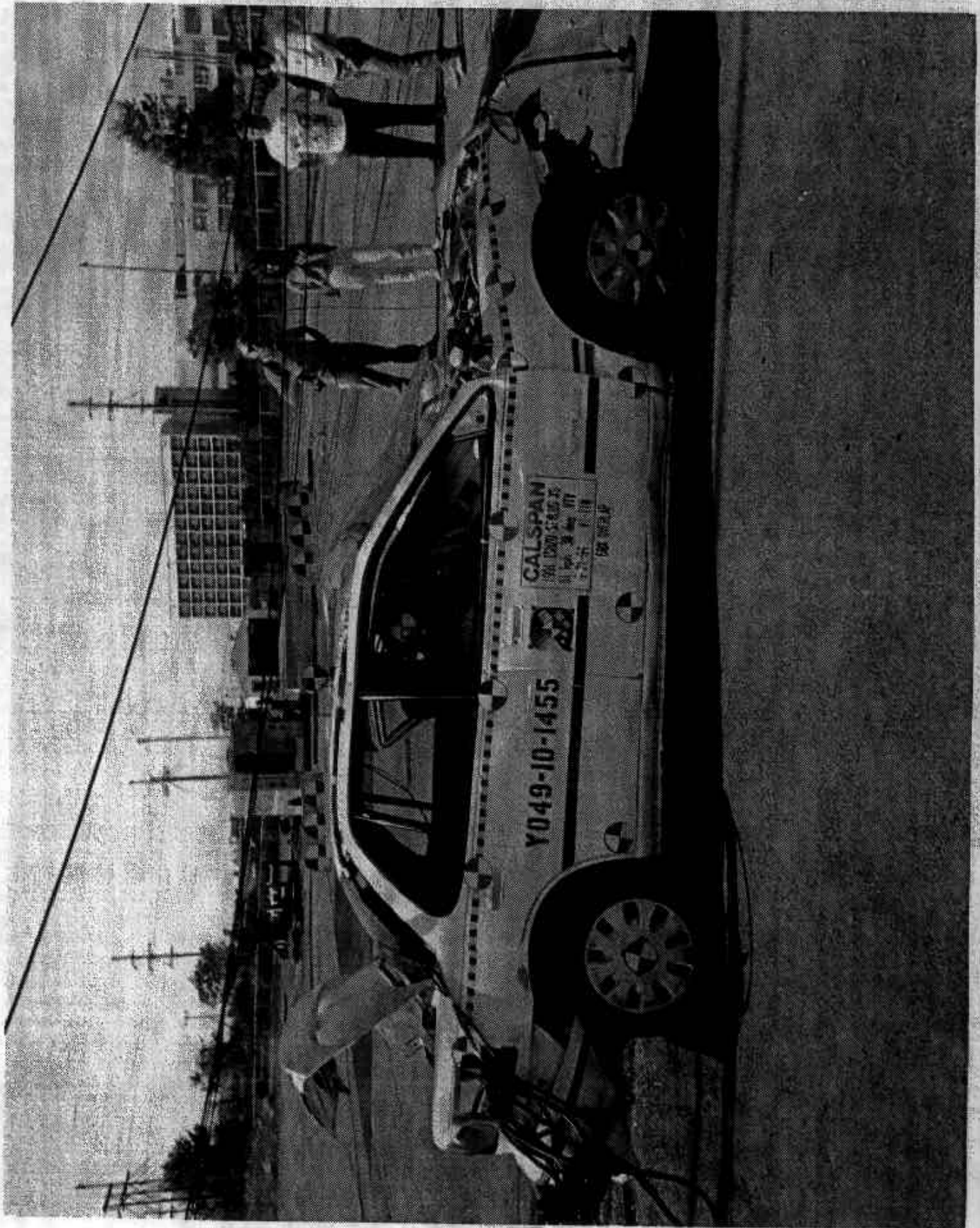


FIGURE A-9 POST-TEST RIGHT SIDE VIEW

A-12

8118-10

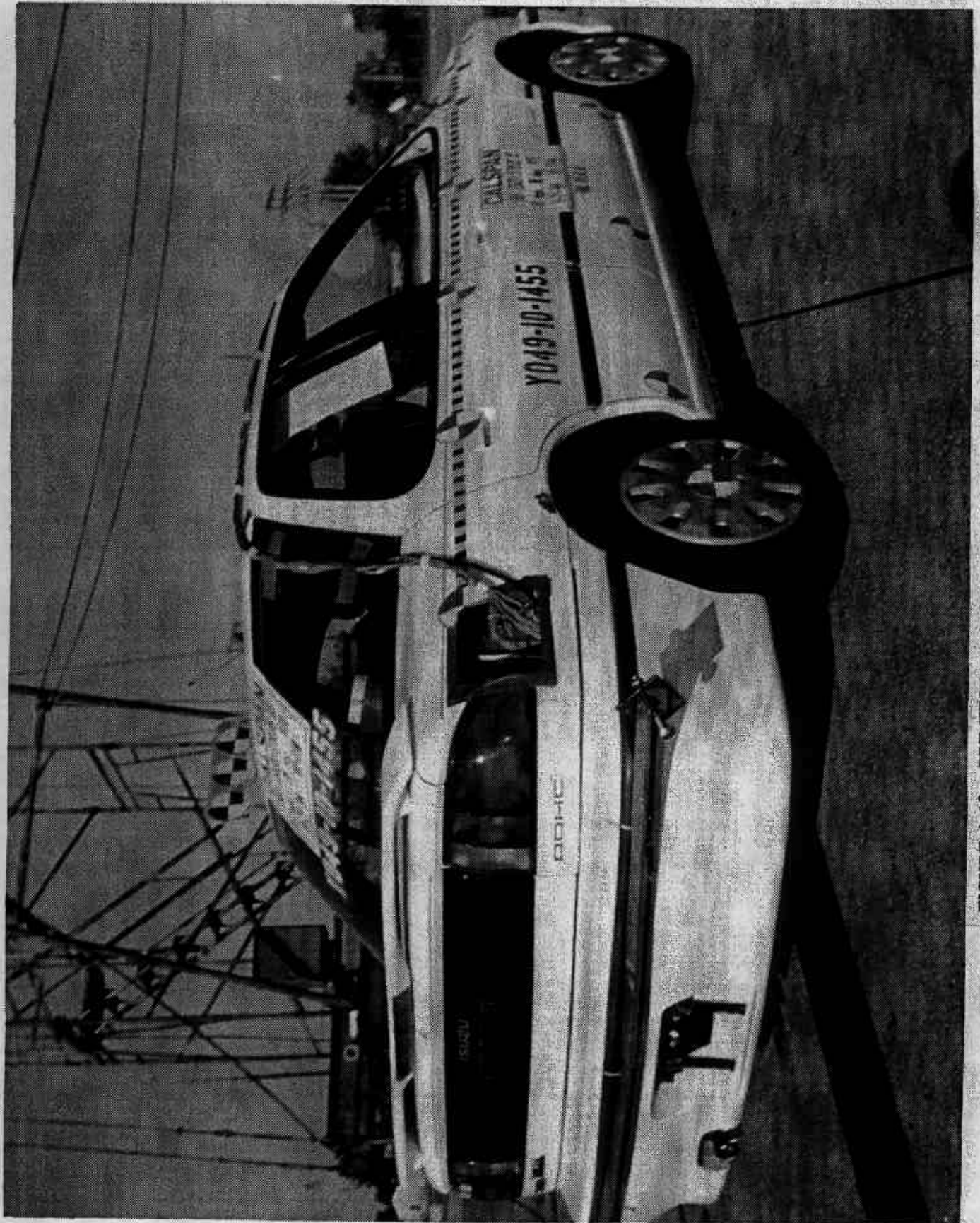


FIGURE A-10 PRE-TEST REAR RIGHT THREE QUARTER VIEW

A-13

8118-10

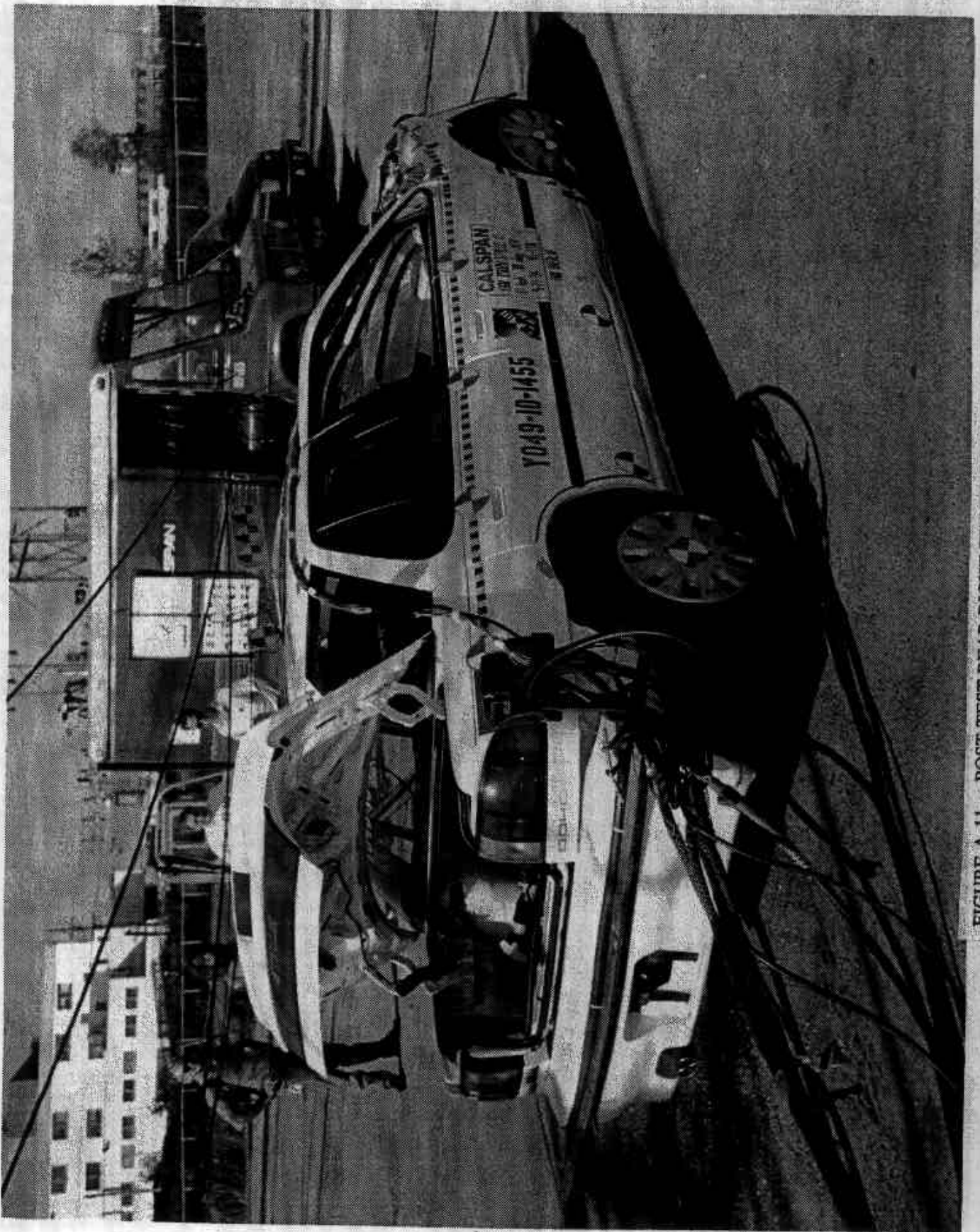


FIGURE A-11 POST-TEST REAR RIGHT THREE QUARTER VIEW

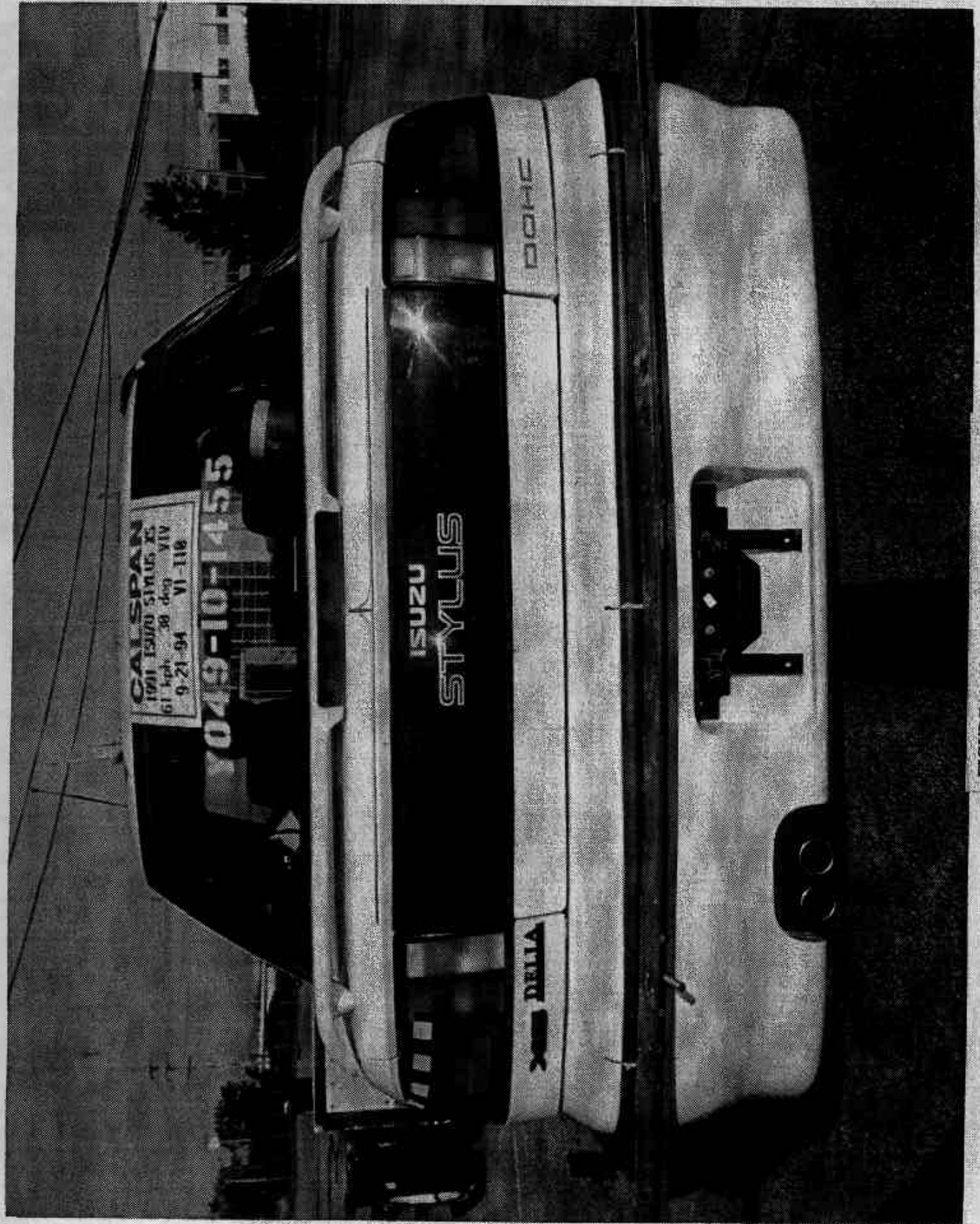


FIGURE A-12 PRE-TEST REAR VIEW

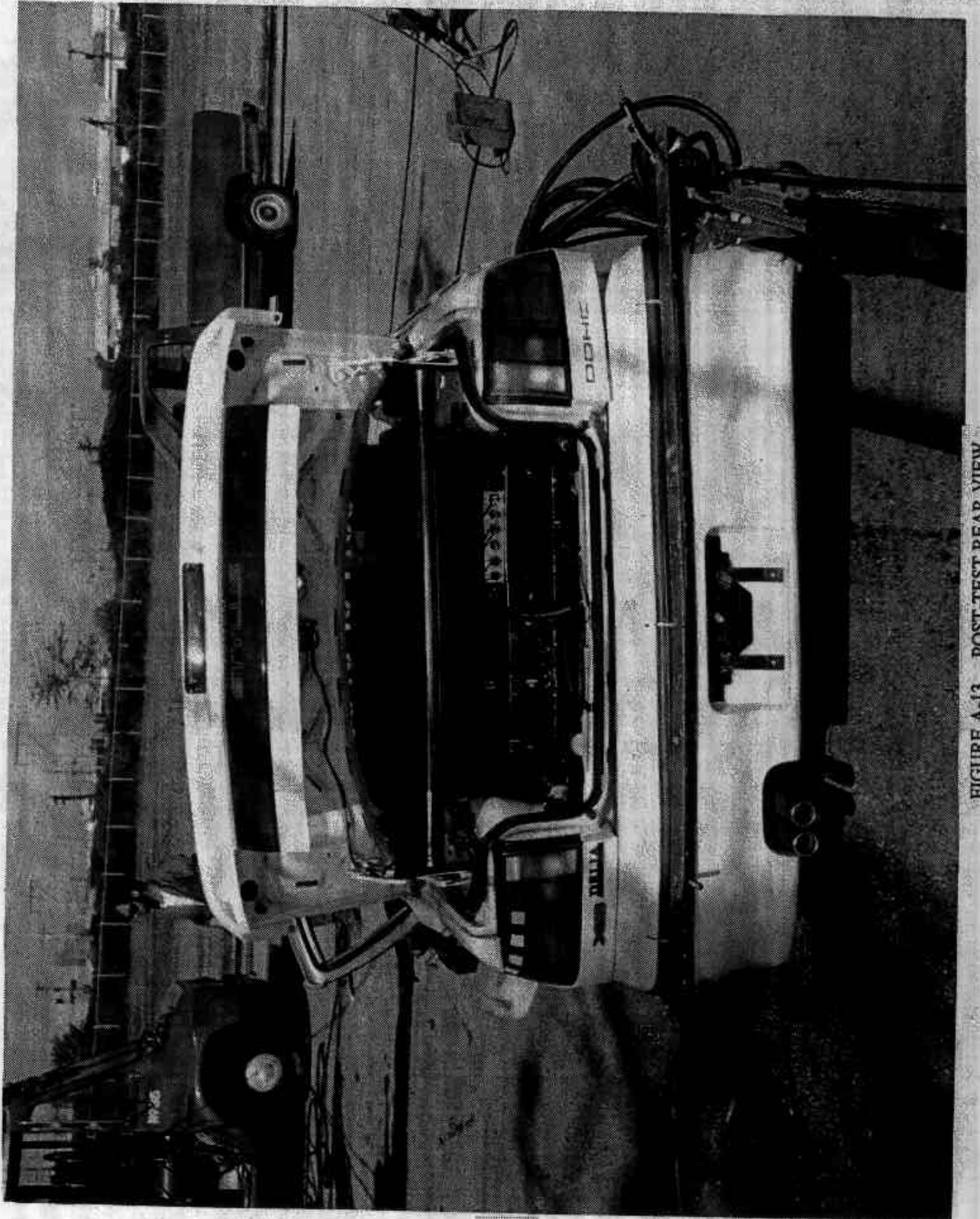


FIGURE A-13 POST-TEST REAR VIEW

A-16

8118-10

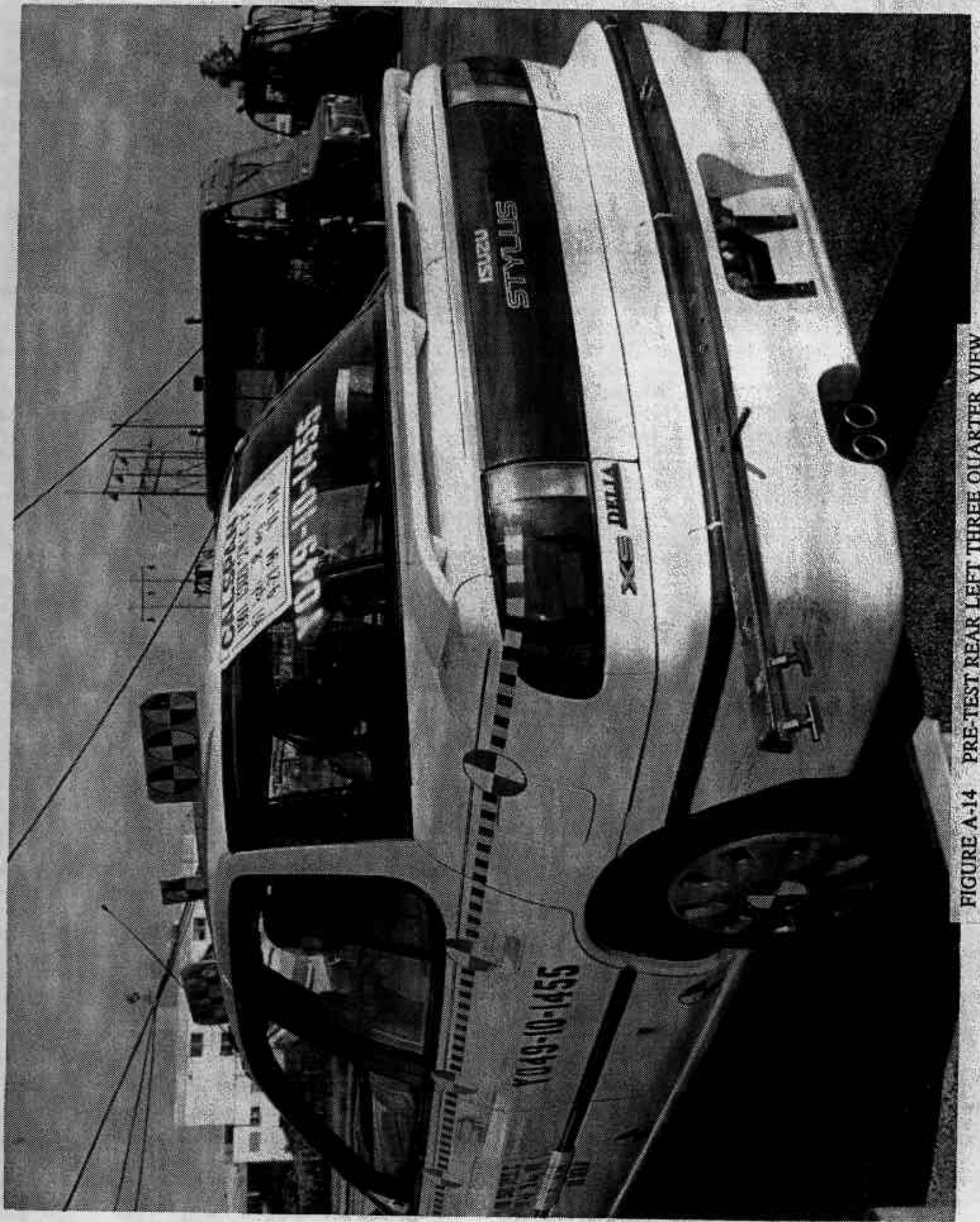


FIGURE A-14 PRE-TEST REAR LEFT THREE QUARTER VIEW

A-17

8118-10

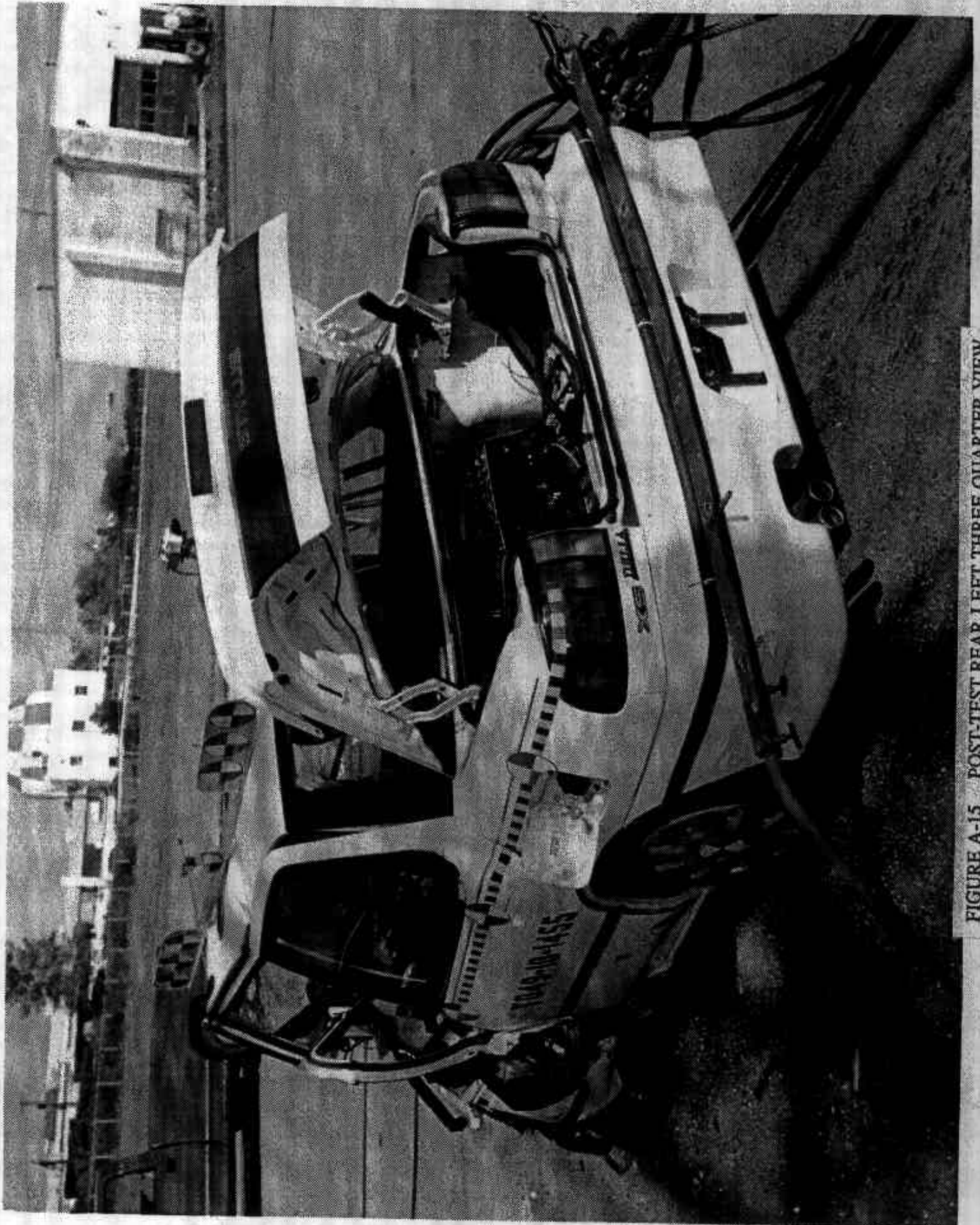


FIGURE A-15 POST-TEST REAR LEFT THREE QUARTER VIEW

A-18

8118-10

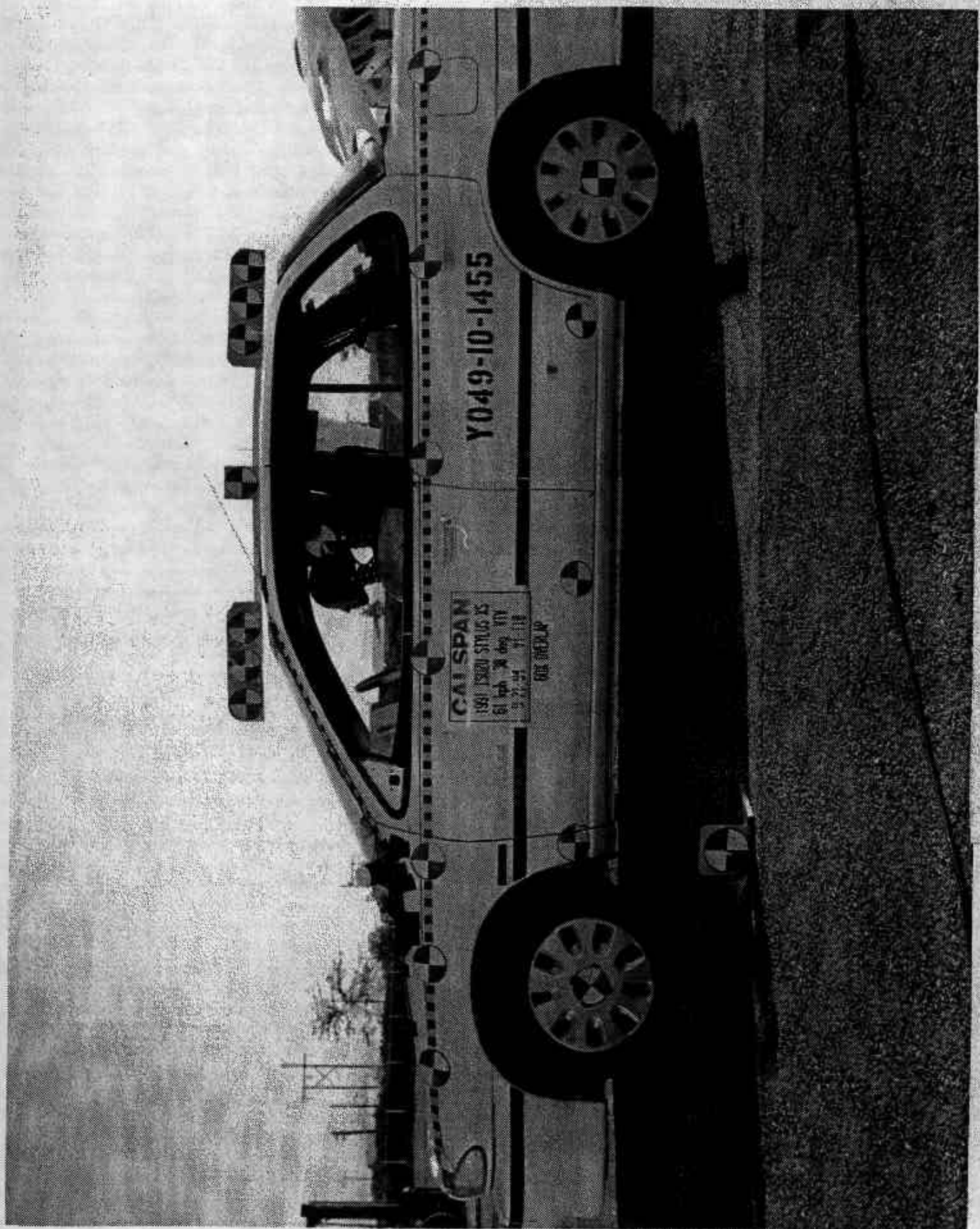


FIGURE A-16 PRE-TEST LEFT SIDE VIEW

A-19

8118-10

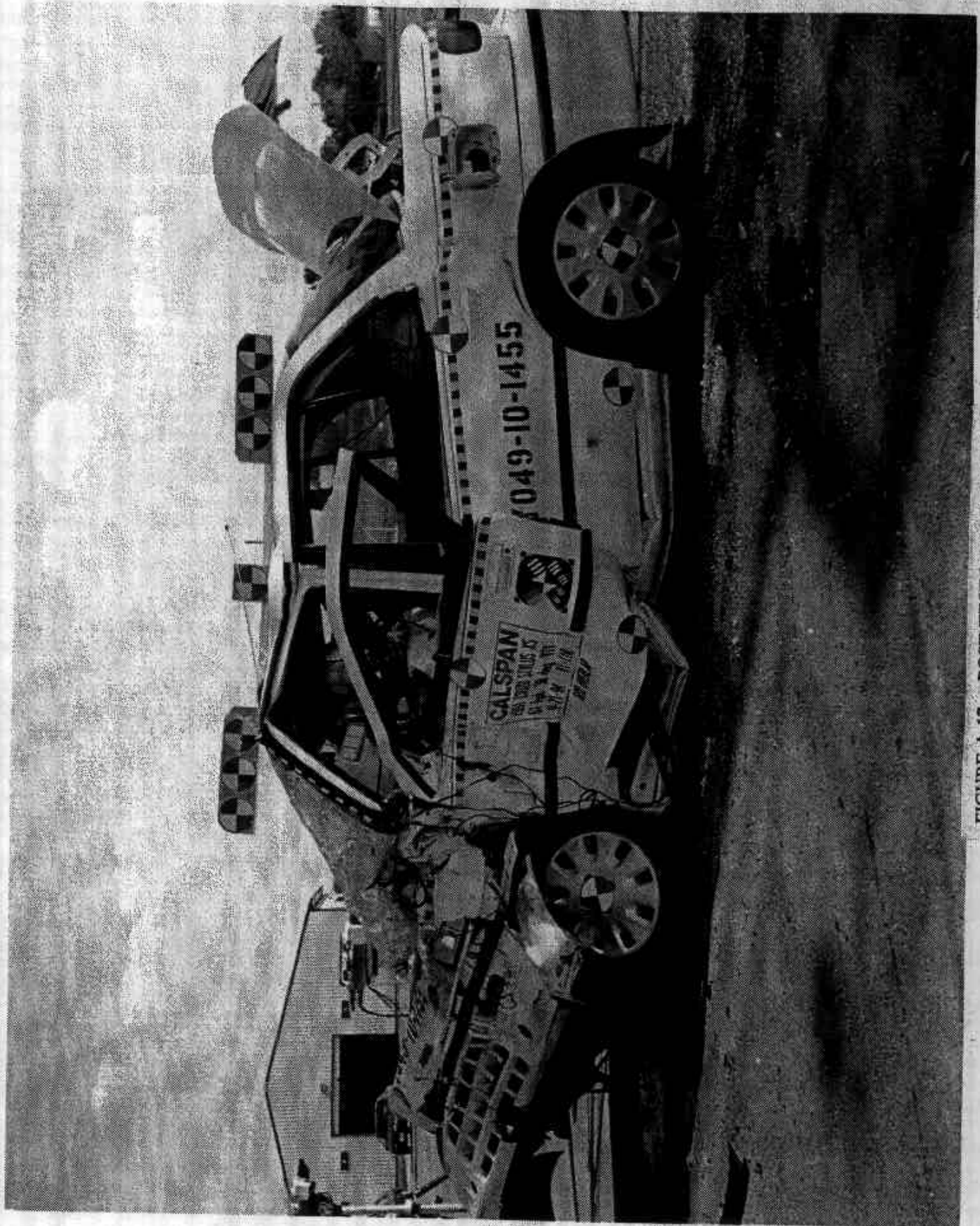


FIGURE A-17 POST-TEST LEFT SIDE VIEW

A-20

8118-10

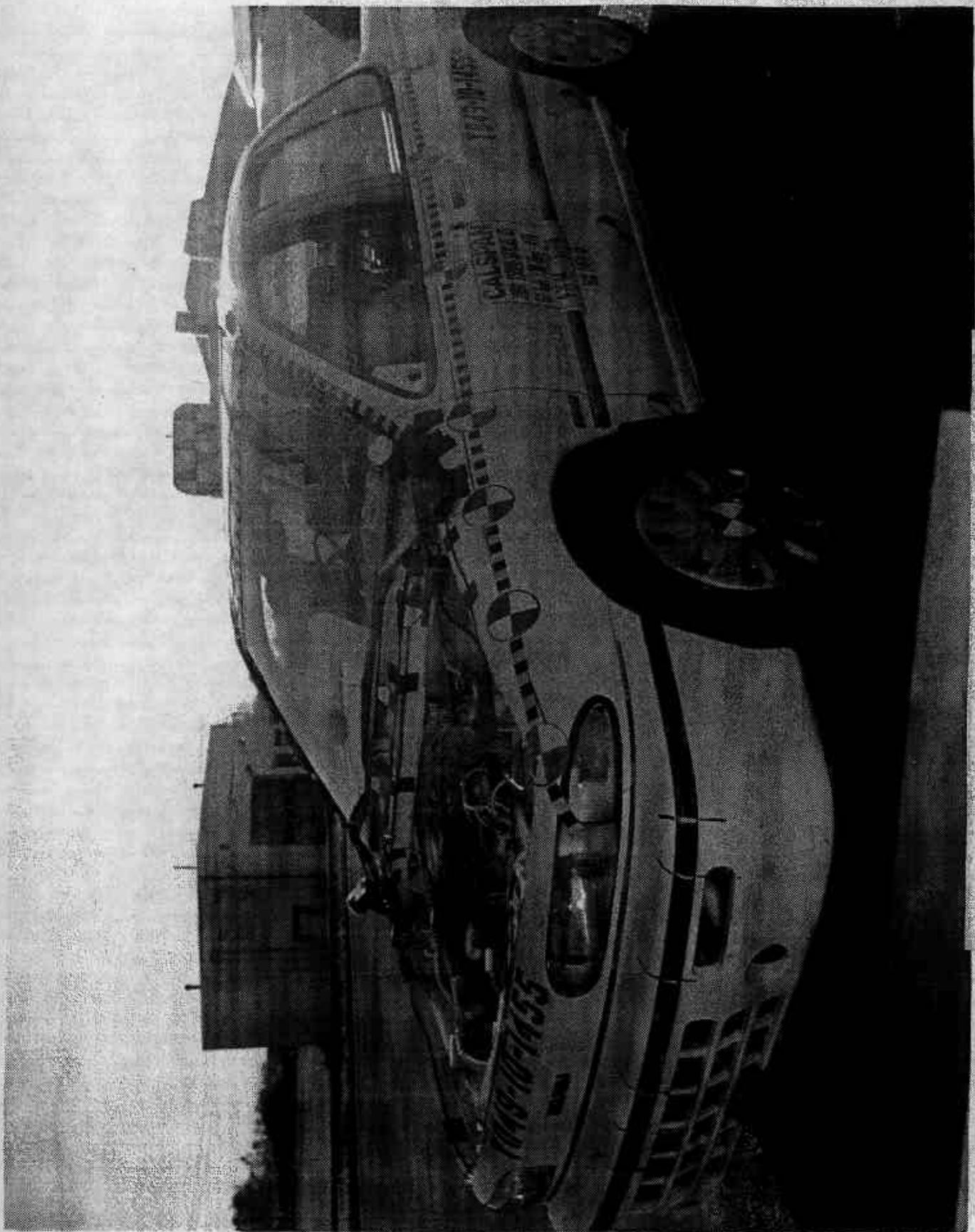


FIGURE A-18 PRE-TEST FRONT LEFT THREE QUARTER VIEW

A-21

8118-10

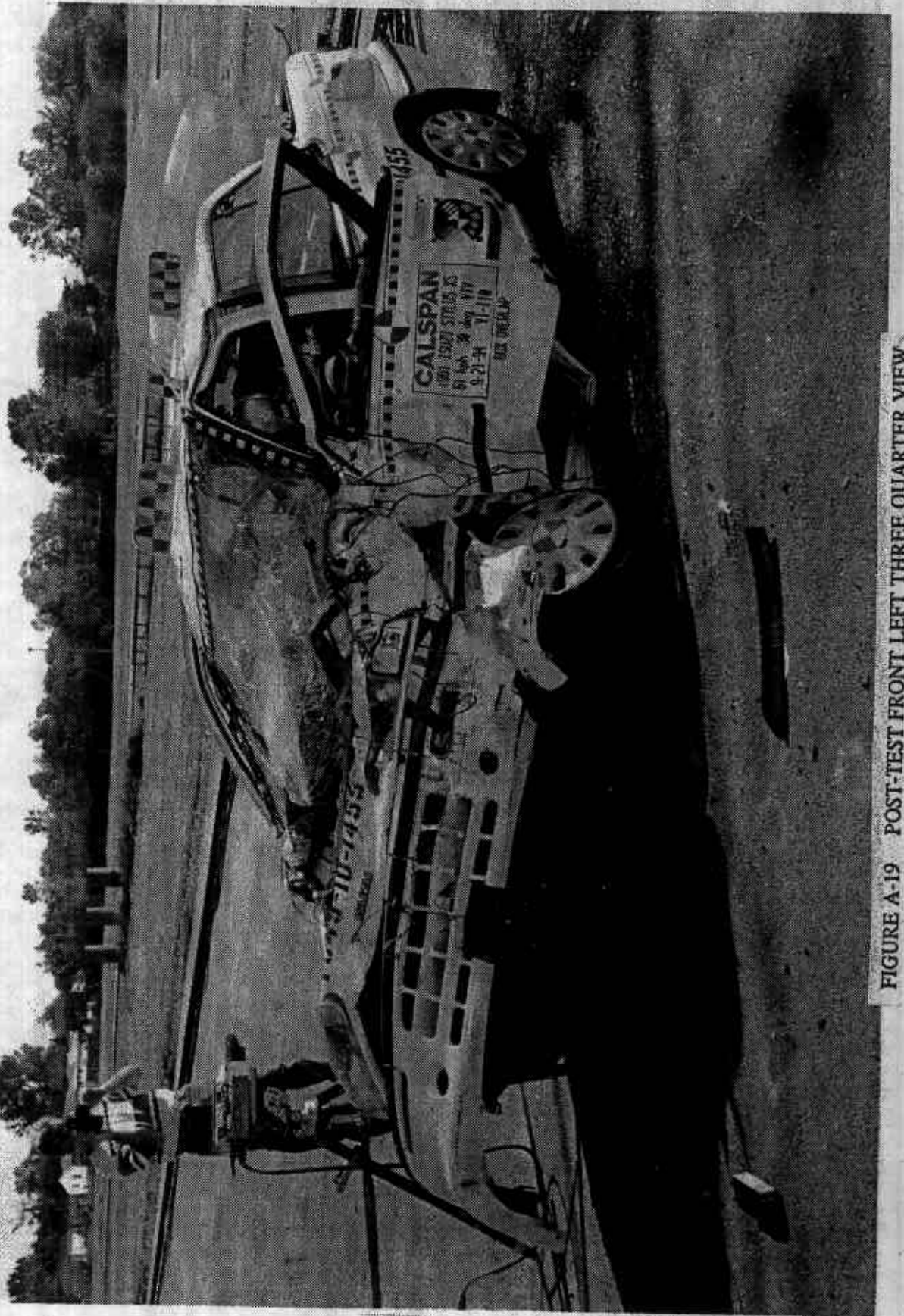


FIGURE A-19 POST-TEST FRONT LEFT THREE QUARTER VIEW

A-22

8118-10

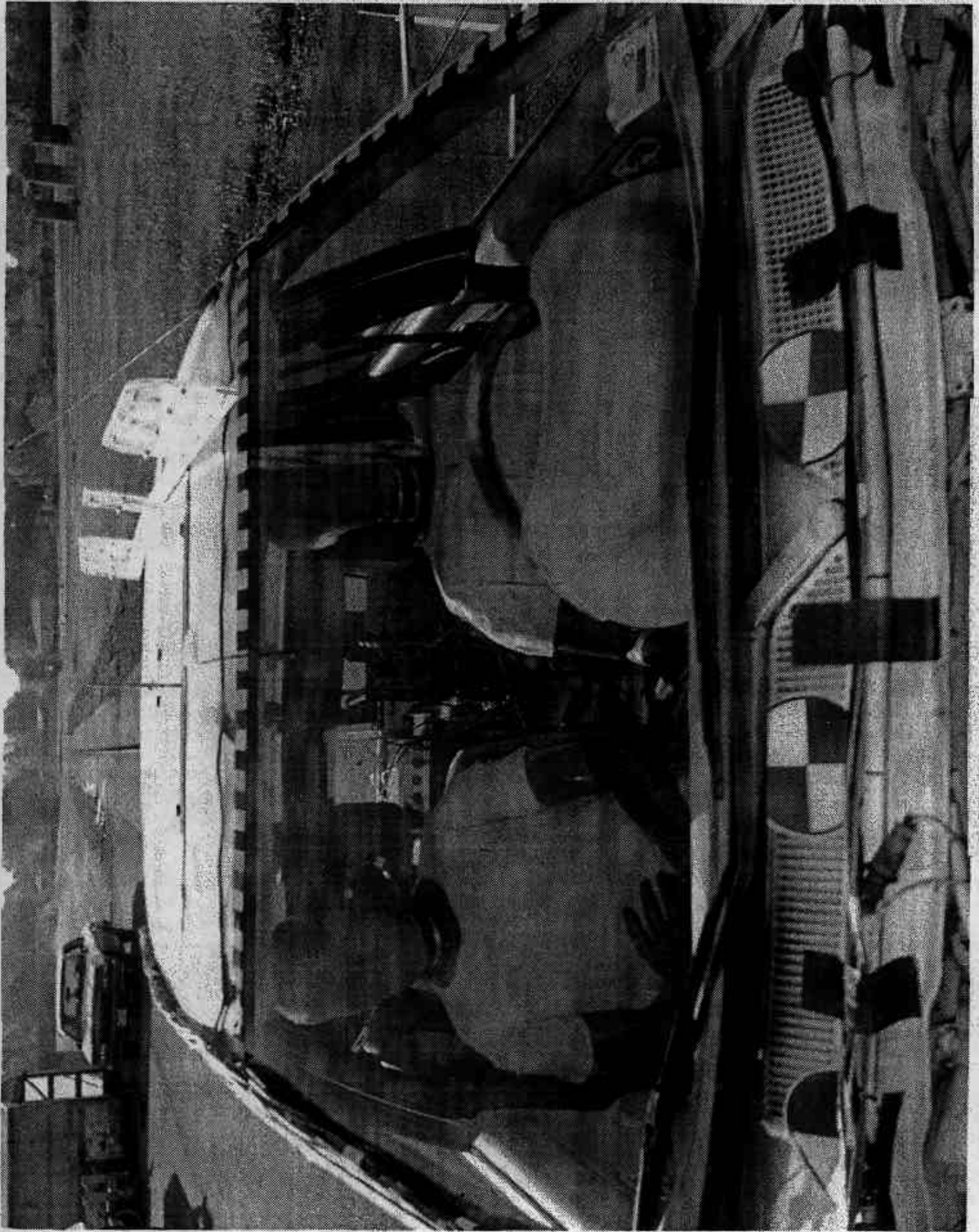


FIGURE A-20 PRE-TEST WINDSHIELD VIEW

A-23

8118-10



FIGURE A-21 POST-TEST WINDSHIELD VIEW

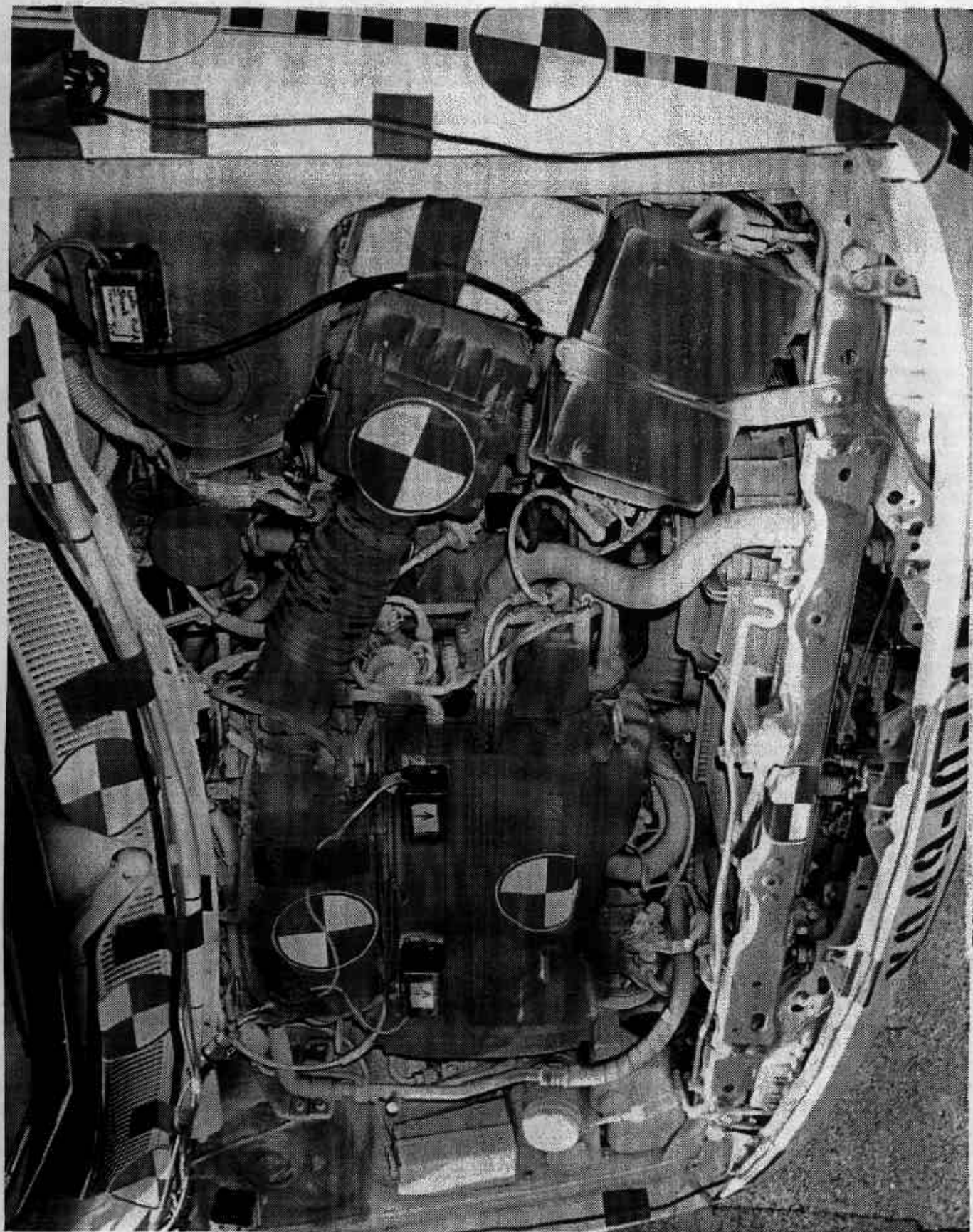


FIGURE A-22 PRE-TEST OVERHEAD ENGINE COMPARTMENT VIEW

A-25

8118-10

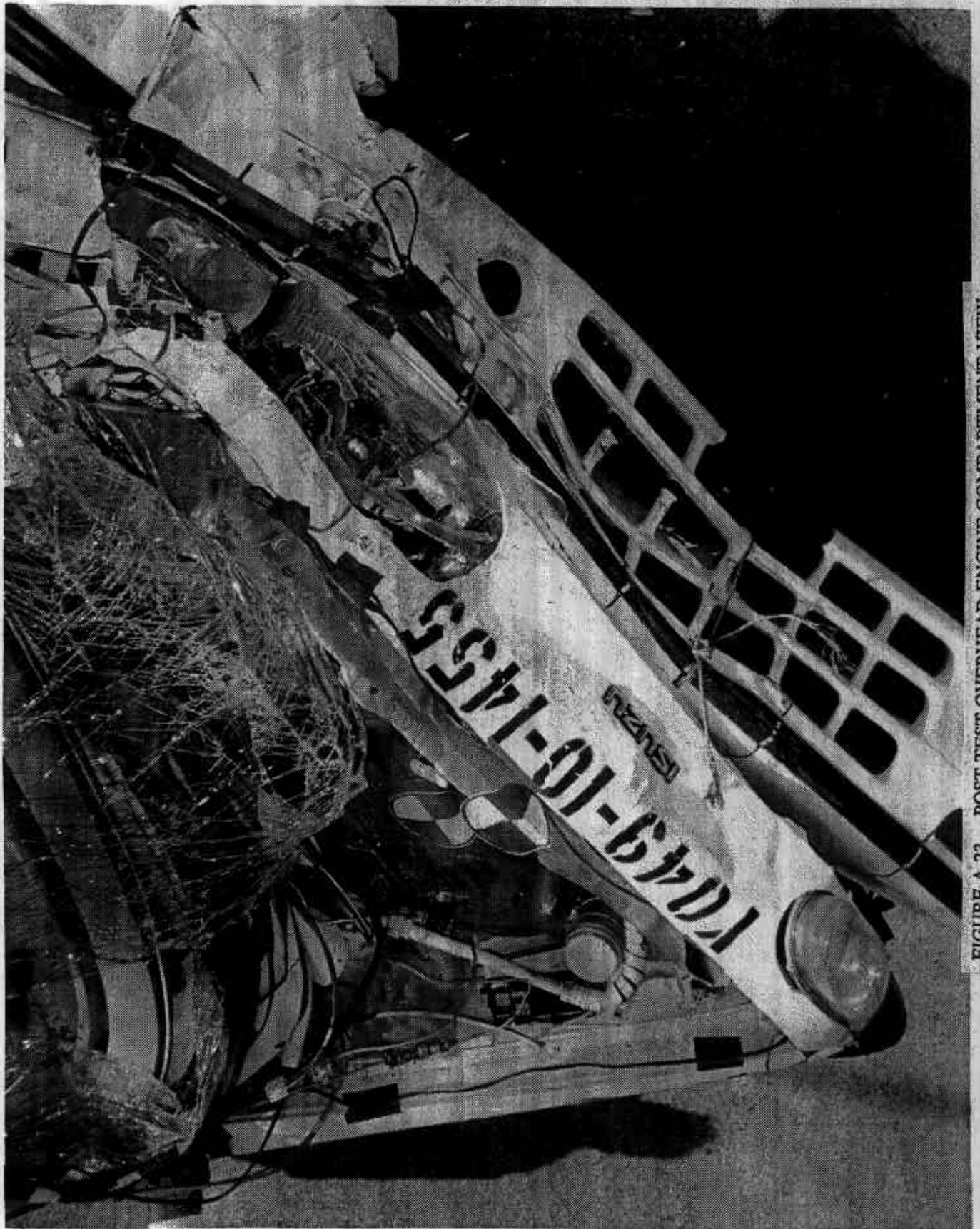


FIGURE A-23 POST-TEST OVERHEAD ENGINE COMPARTMENT VIEW

VEHICLE 1 PRE-TEST UNDERBODY FRONT VIEW

(PHOTO UNAVAILABLE)

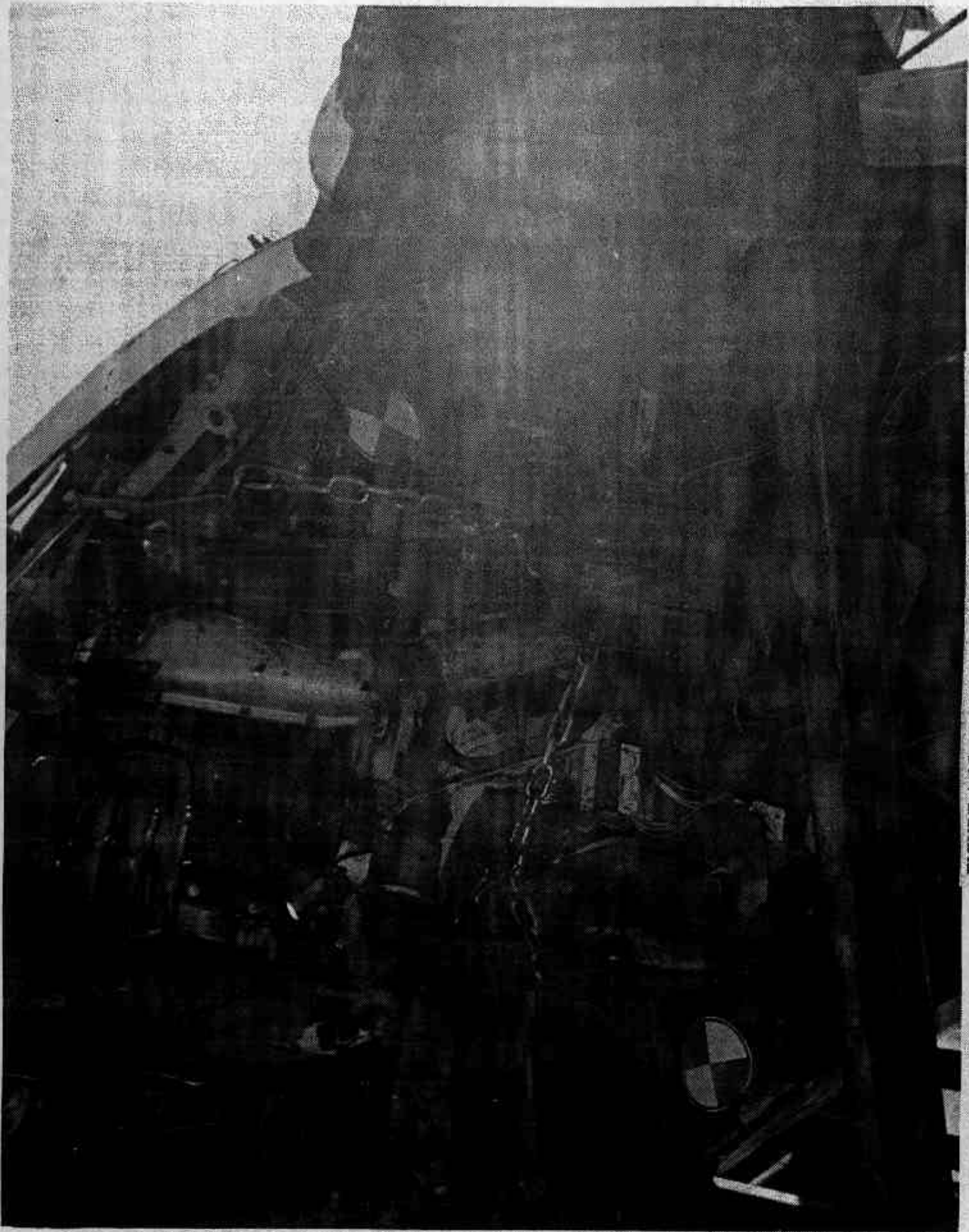


FIGURE A-25 POST-TEST UNDERBODY FRONT VIEW

A-28

8118-10



FIGURE A-26 PRE-TEST UNDERBODY FRONT SIDE VIEW

A-29

8118-10



FIGURE A-27 POST-TEST UNDERBODY FRONT SIDE VIEW

A-30

8118-10

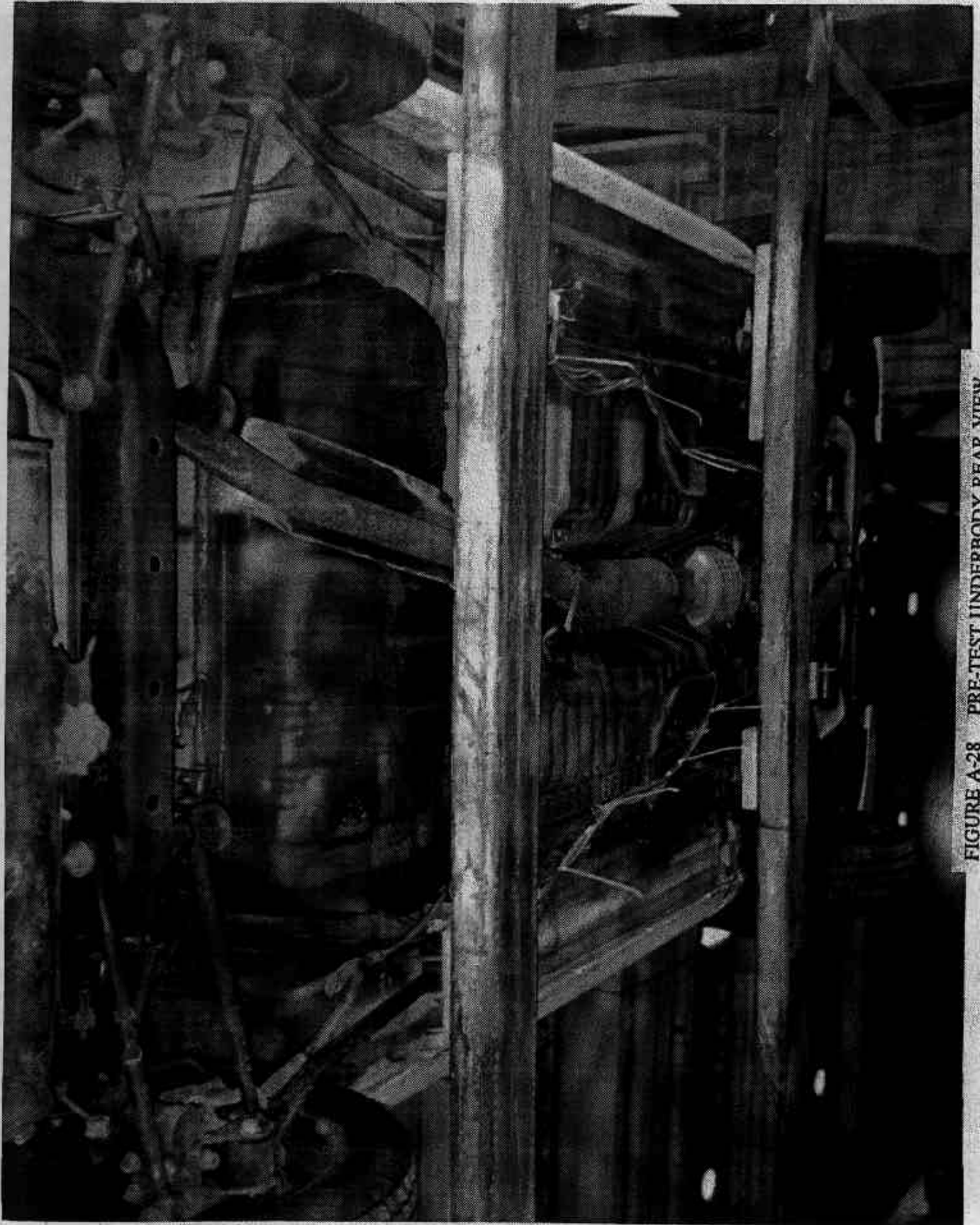


FIGURE A-28 PRE-TEST UNDERBODY REAR VIEW

A-31

8118-10

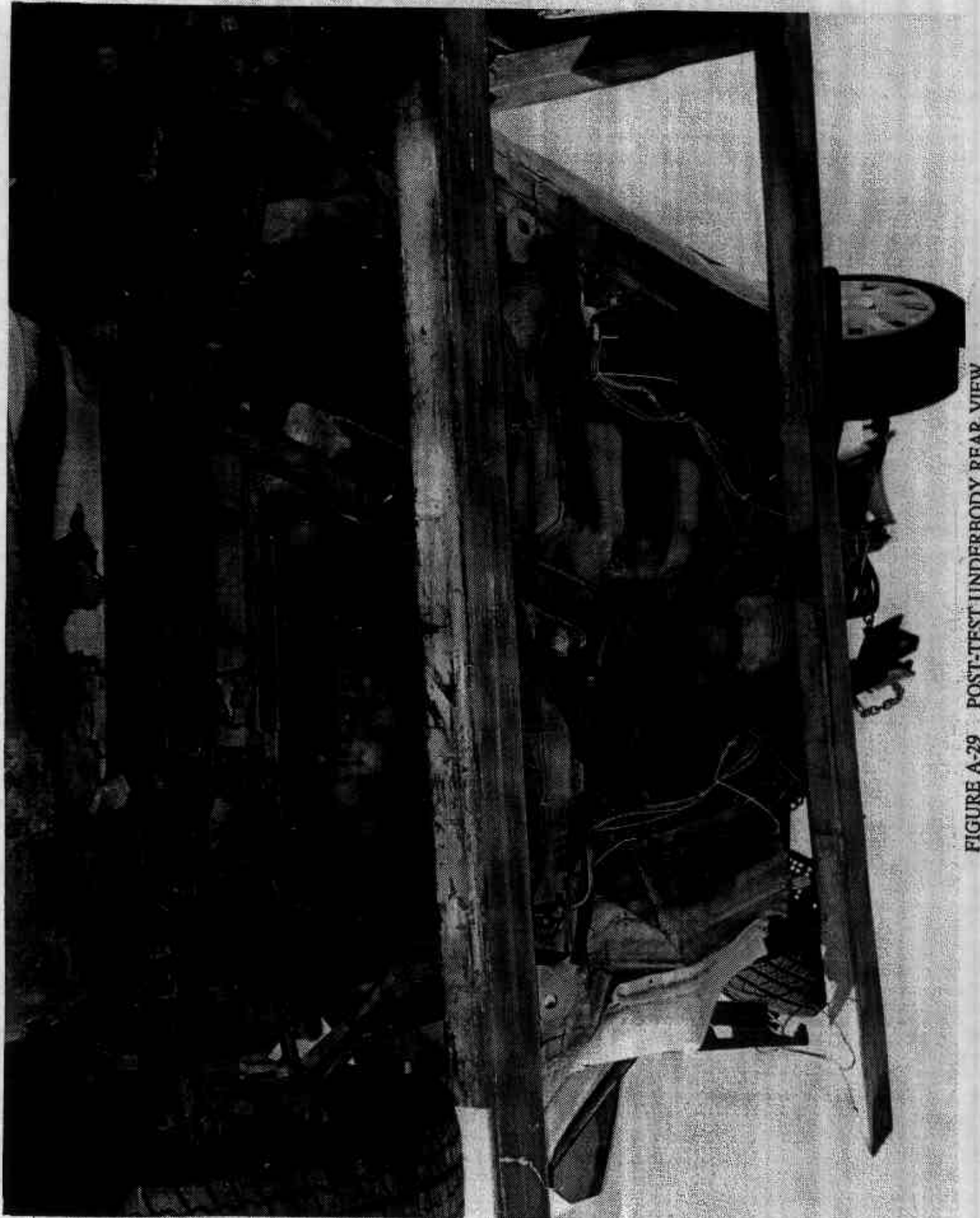


FIGURE A-29 POST-TEST UNDERBODY REAR VIEW

A-32

8118-10

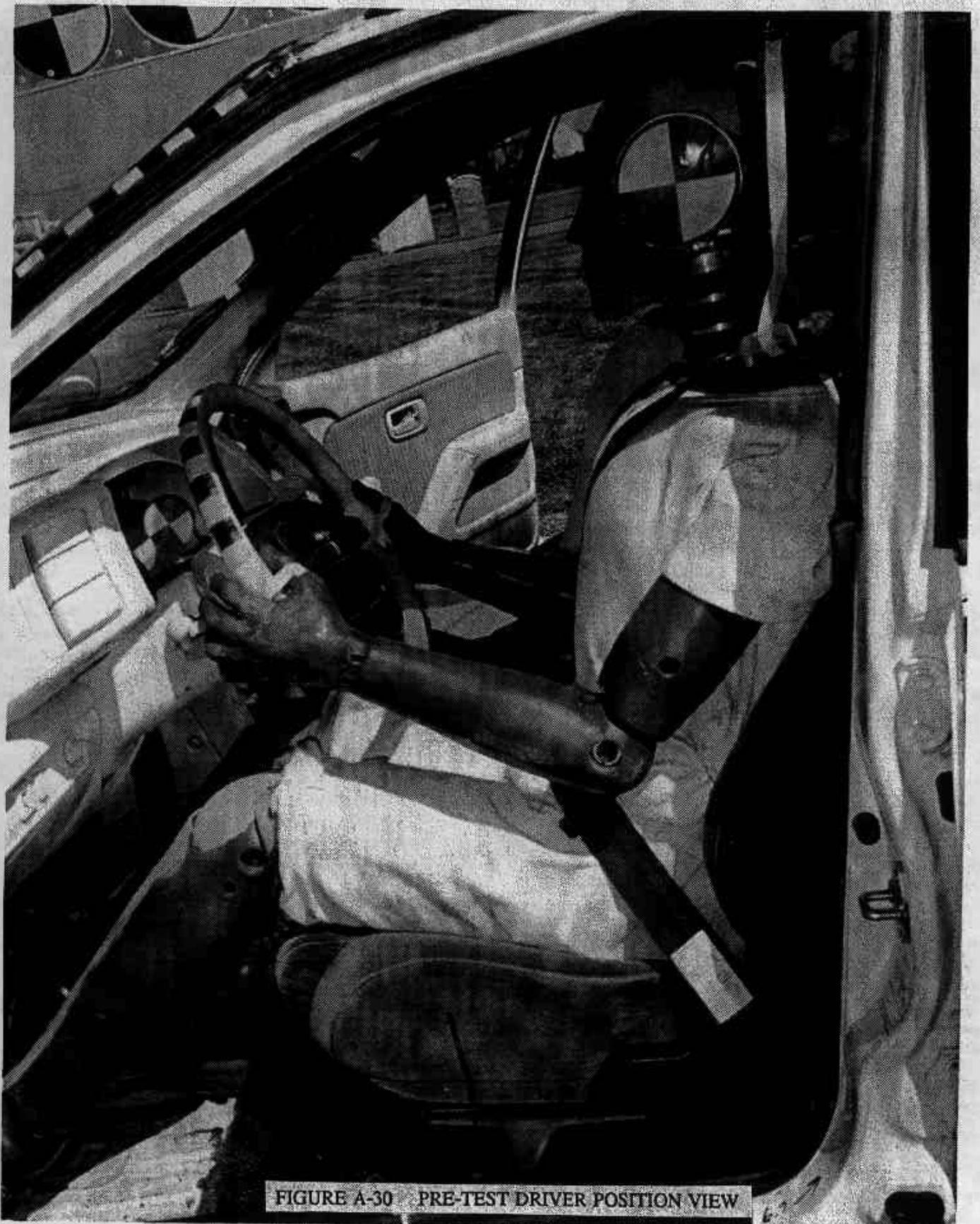


FIGURE A-30 PRE-TEST DRIVER POSITION VIEW



FIGURE A-31 POST-TEST DRIVER POSITION VIEW



FIGURE A-32 PRE-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW



FIGURE A-33 POST-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW



FIGURE A-34 PRE-TEST DRIVER FRONT SIDE VIEW

A-37

8118-10



FIGURE A-35 POST-TEST DRIVER FRONT SIDE VIEW



FIGURE A-36 PRE-TEST DRIVER FRONT VIEW

VEHICLE 1 POST-TEST DRIVER FRONT VIEW  
(PHOTO UNAVAILABLE)



FIGURE A-38 PRE-TEST PASSENGER POSITION VIEW

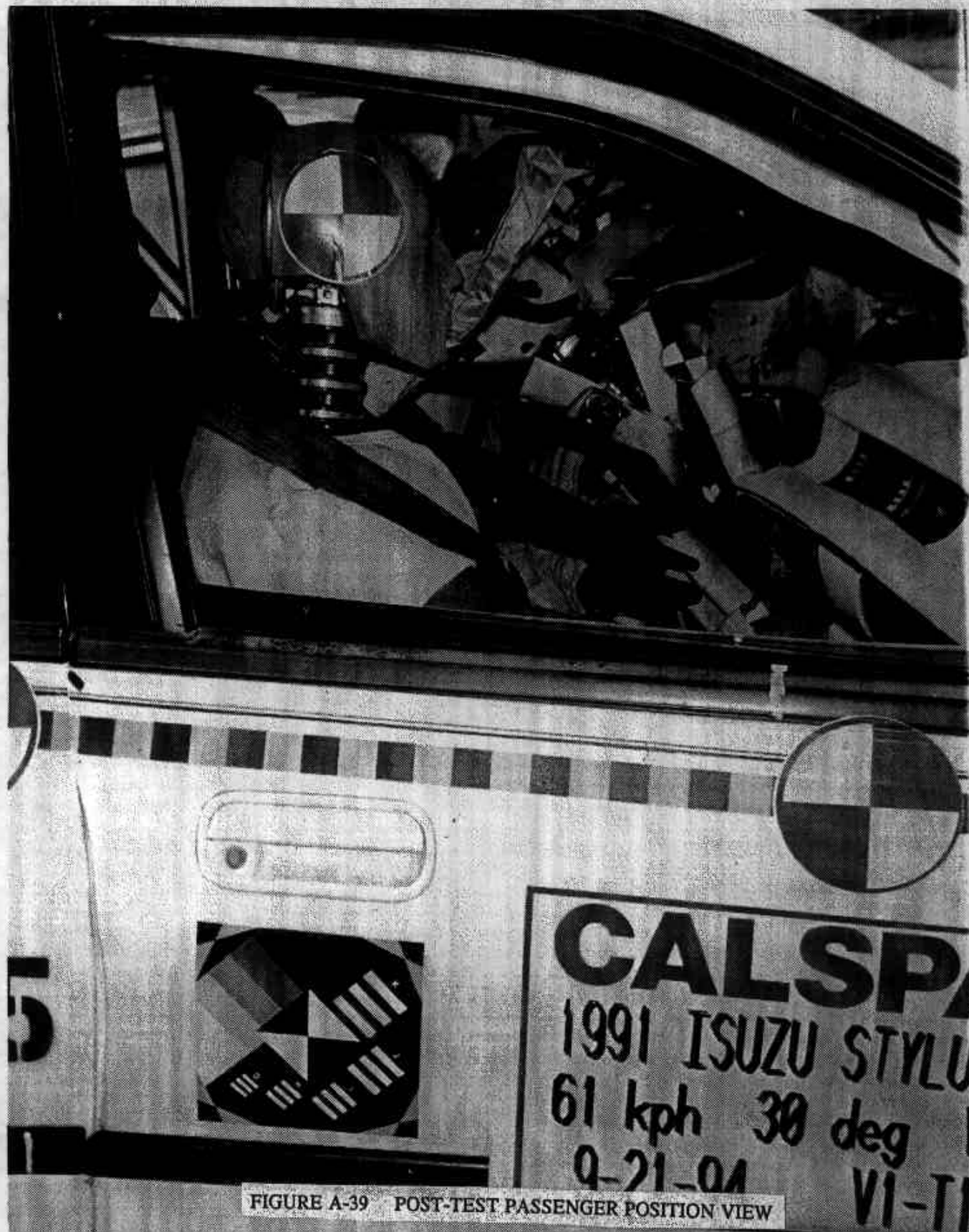


FIGURE A-39 POST-TEST PASSENGER POSITION VIEW



FIGURE A-40 PRE-TEST PASSENGER AND OCCUPANT COMPARTMENT VIEW



FIGURE A-41 POST-TEST PASSENGER AND OCCUPANT COMPARTMENT VIEW



FIGURE A-42 PRE-TEST PASSENGER FRONT SIDE VIEW

A-45

8118-10

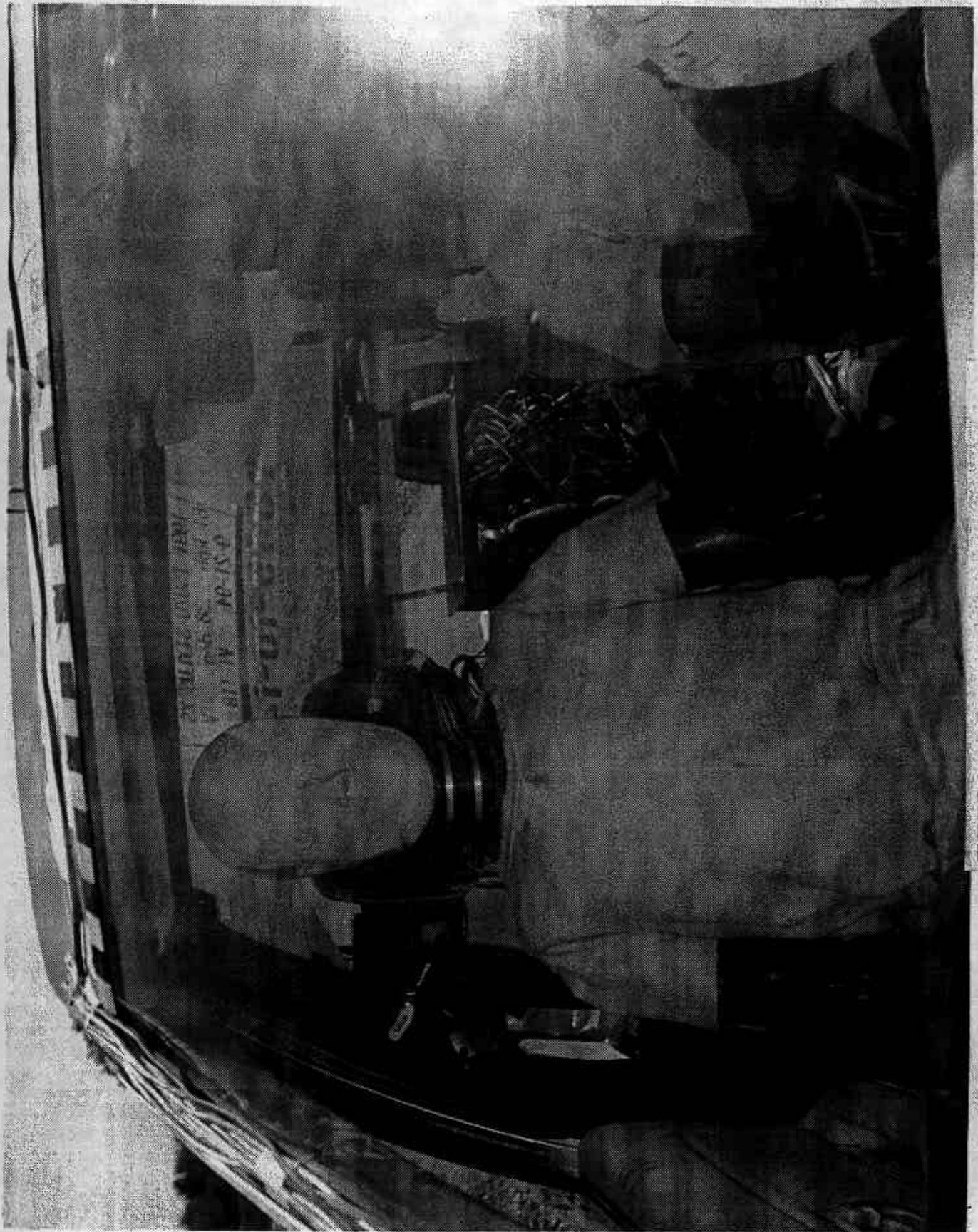


FIGURE A-44 PRE-TEST PASSENGER FRONT VIEW

A-47

8118-10

VEHICLE 1 POST-TEST PASSENGER FRONT VIEW

(PHOTO UNAVAILABLE)



FIGURE A-46 POST-TEST DRIVER AIRBAG VIEW

A-49

8118-10



FIGURE A-47 POST-TEST DRIVER FLOOR PAN INTRUSION VIEW.

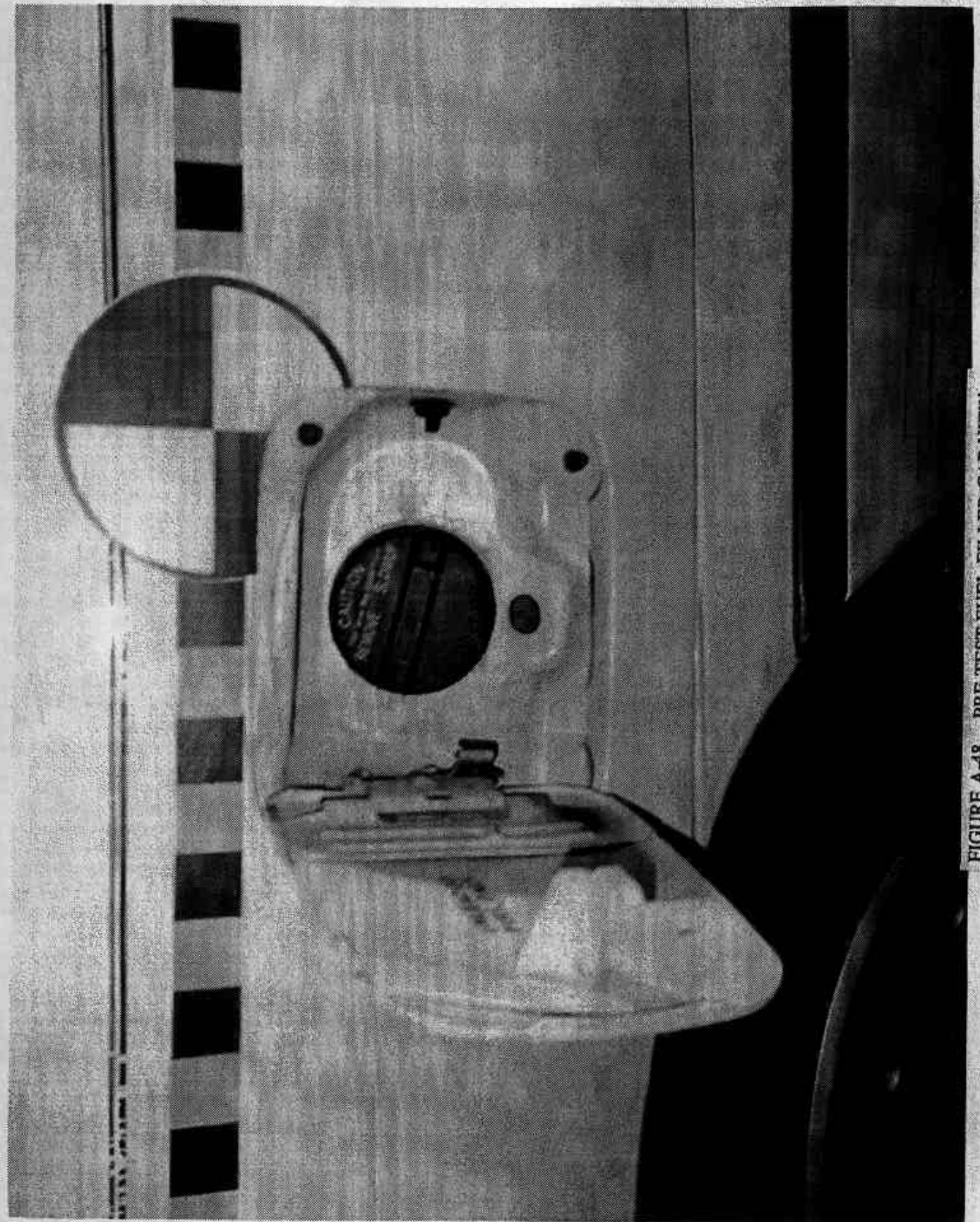


FIGURE A-48 PRE-TEST FUEL FILLER CAP VIEW

A-51

8118-10

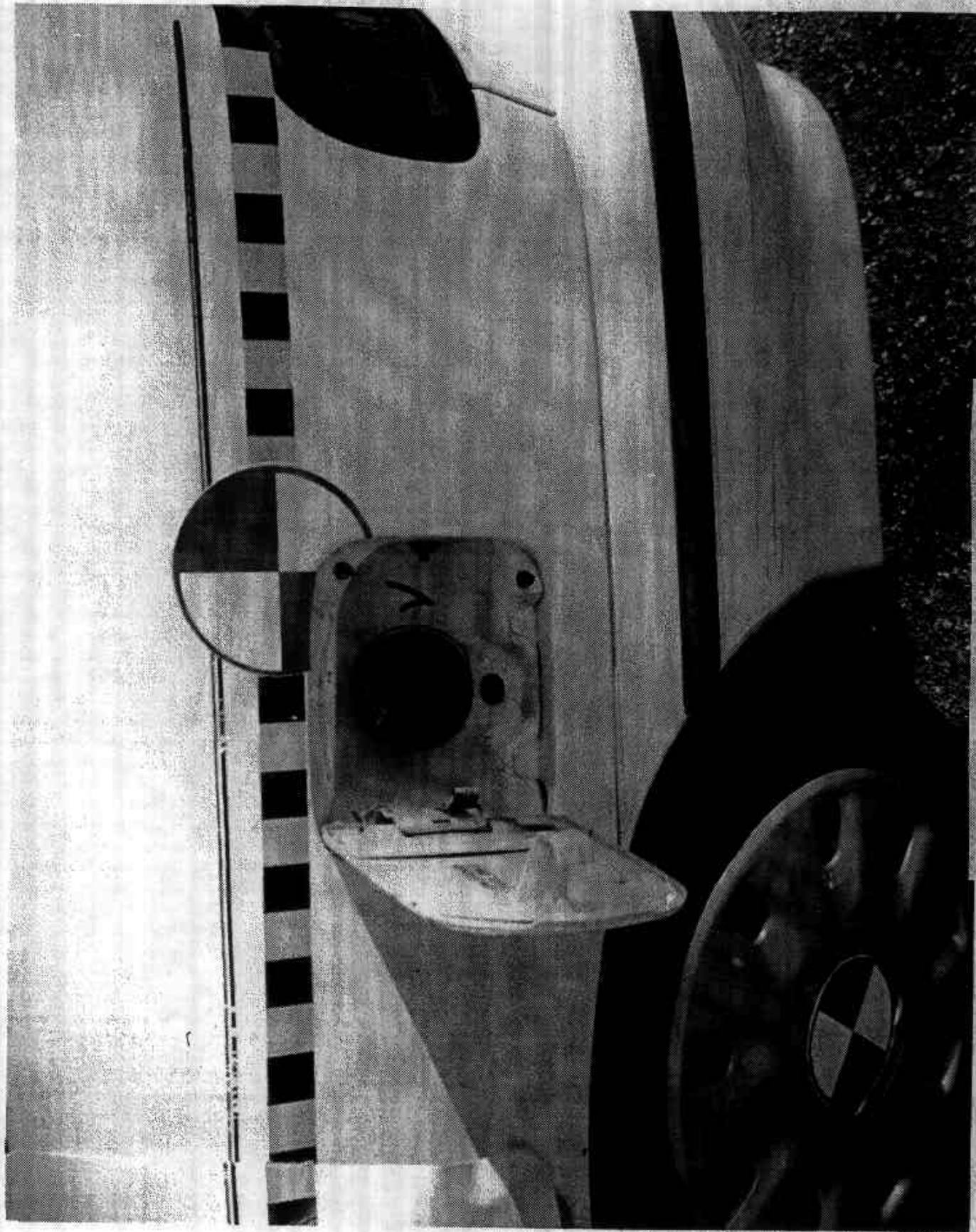


FIGURE A-49 POST-TEST FUEL FILLER CAP VIEW

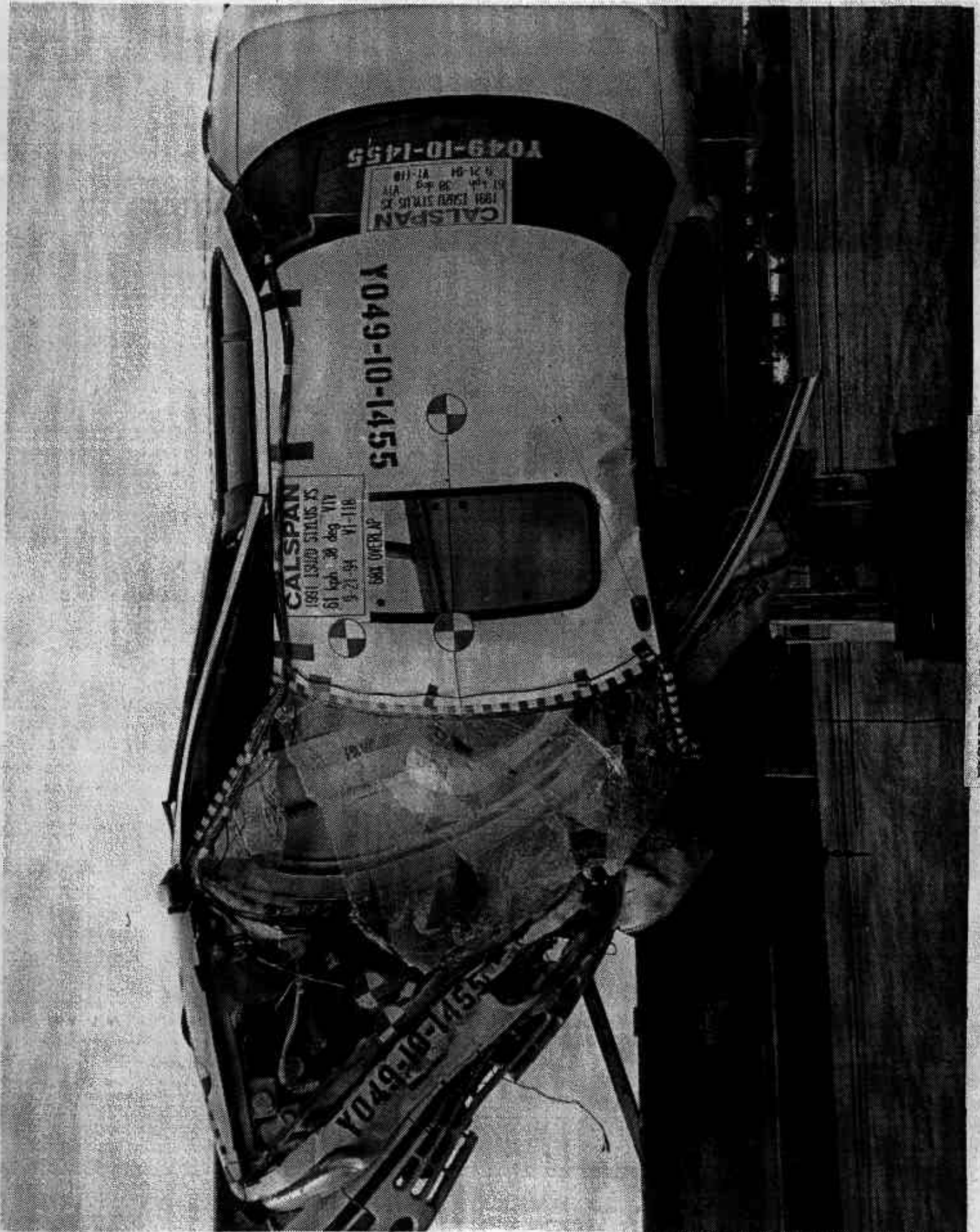


FIGURE A-50 POST-TEST TOP VIEW

VEHICLE 2 PHOTOGRAPHS

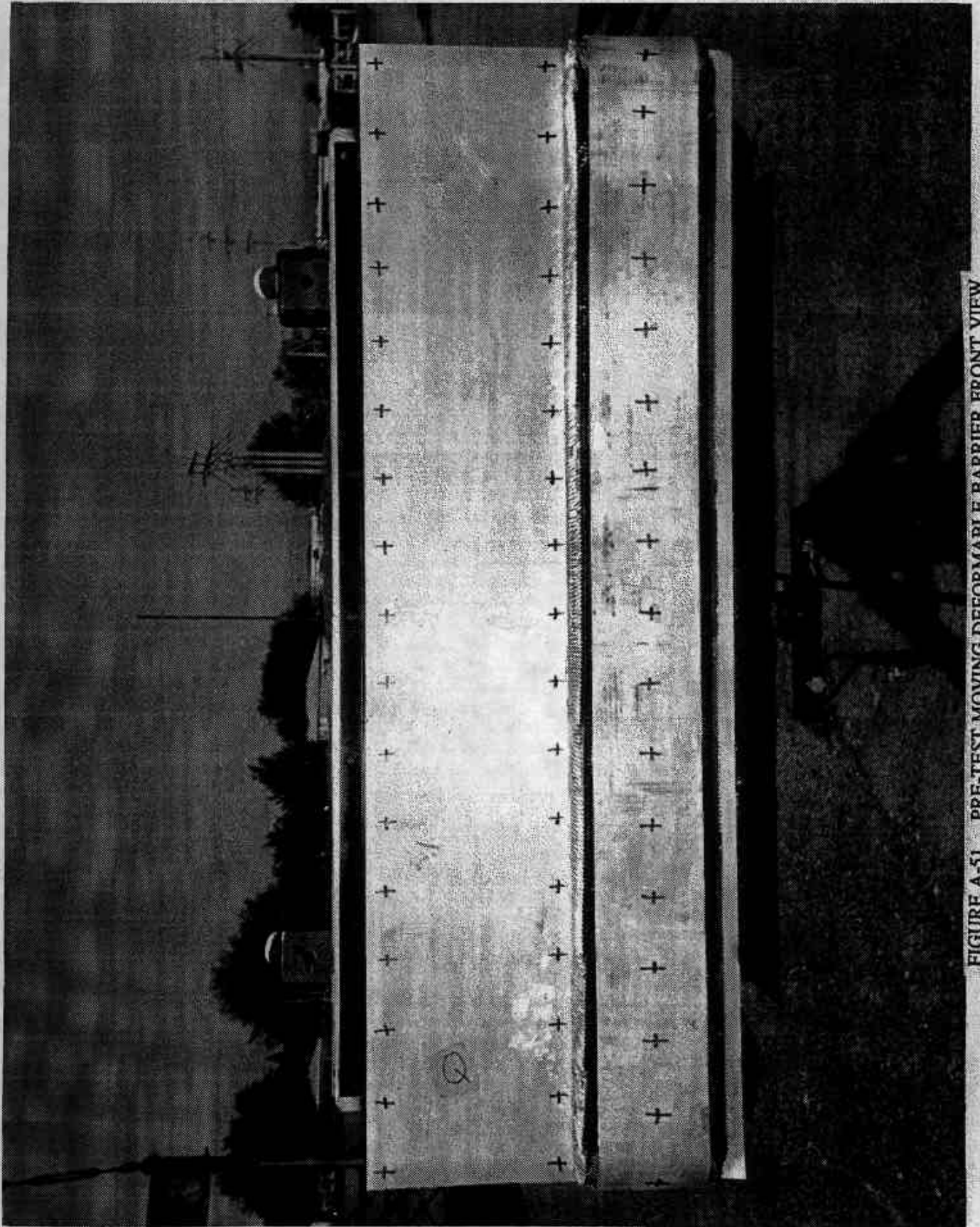


FIGURE A-51 PRE-TEST MOVING DEFORMABLE BARRIER FRONT VIEW

A-55

8118-10



FIGURE A-52 POST-TEST MOVING DEFORMABLE BARRIER FRONT VIEW

A-56

8118-10

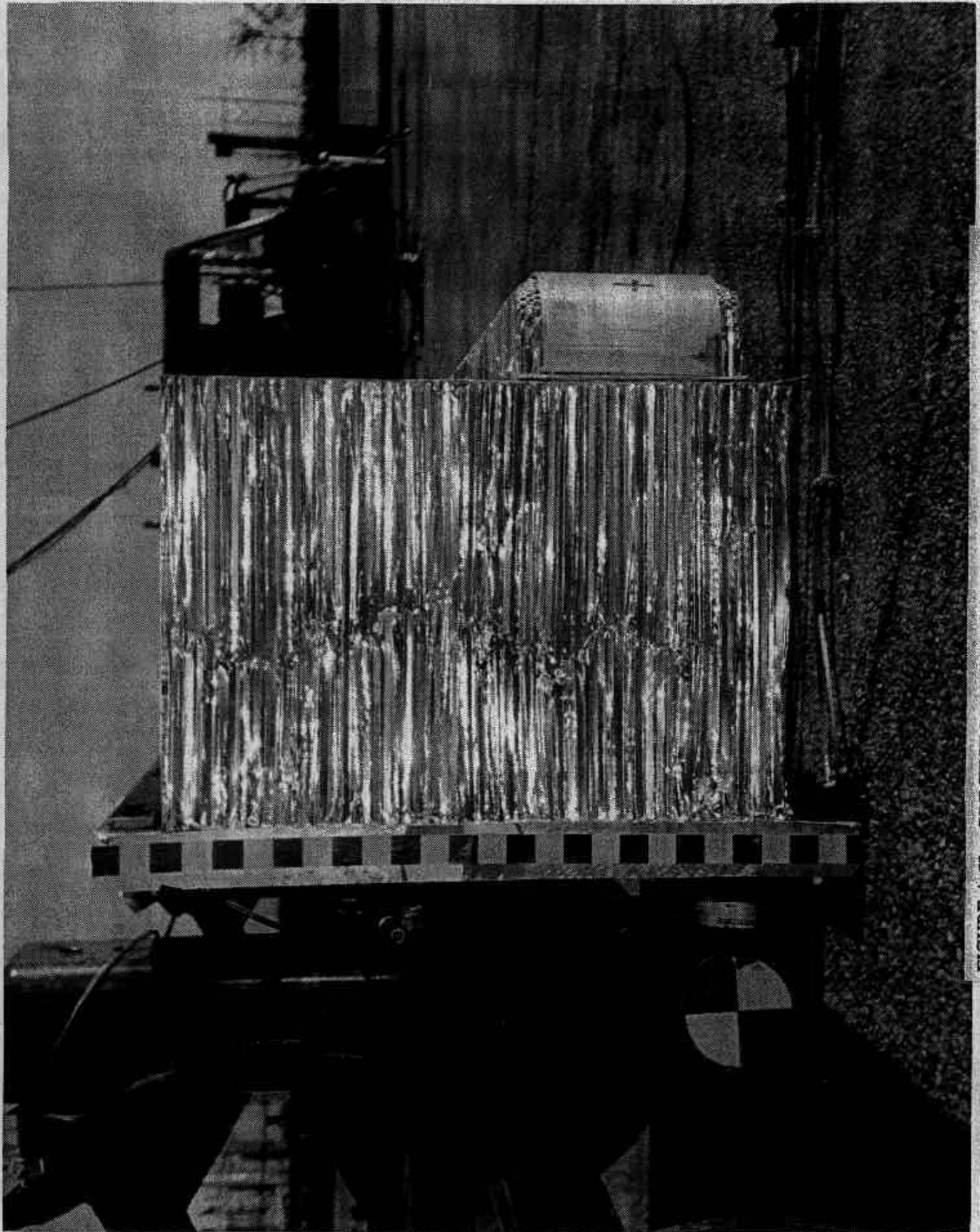


FIGURE A-53 PRE-TEST MOVING DEFORMABLE BARRIER RIGHT SIDE VIEW

A-57

8118-10

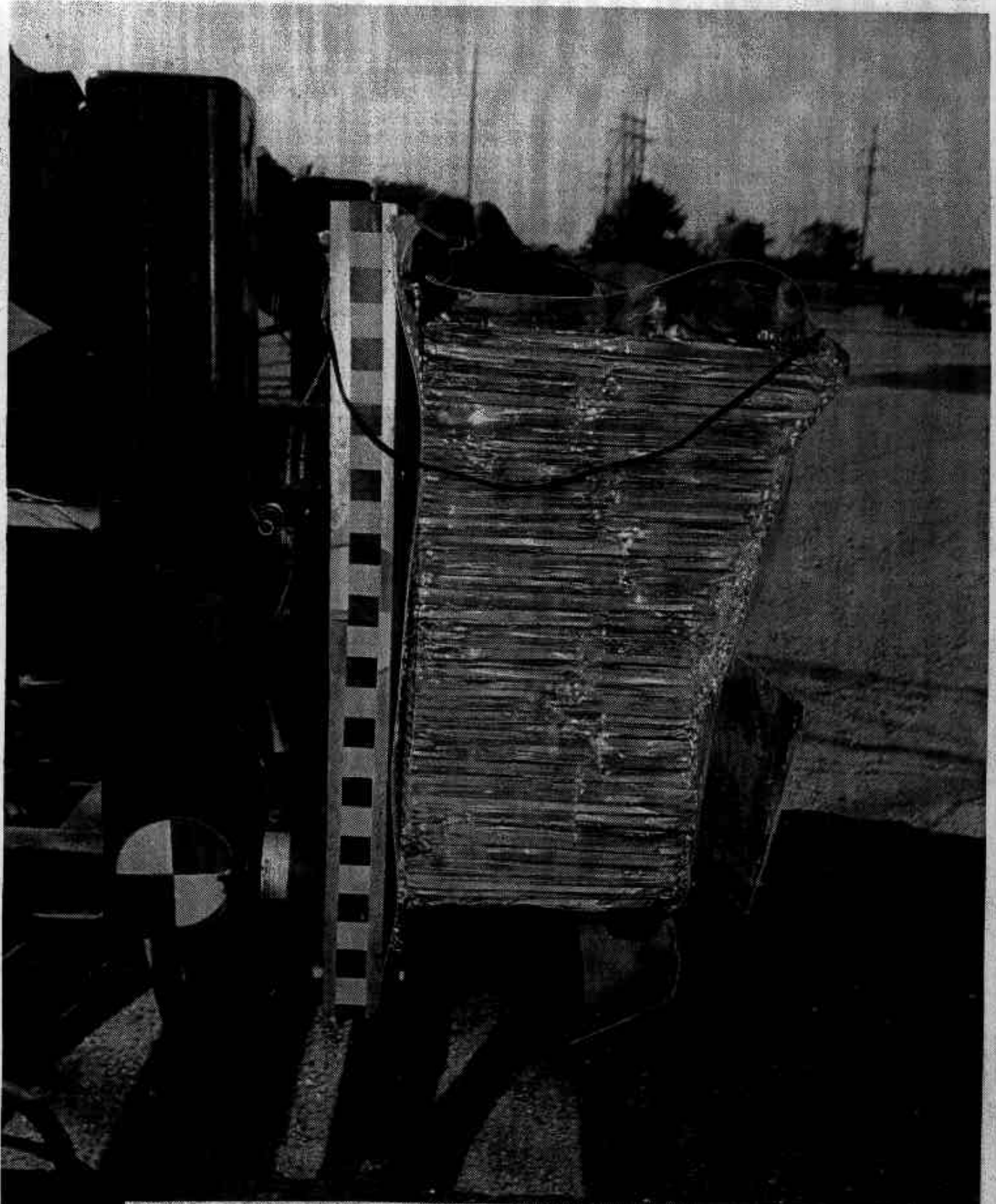


FIGURE A-54 POST-TEST MOVING DEFORMABLE BARRIER RIGHT SIDE VIEW

A-58

8118-10

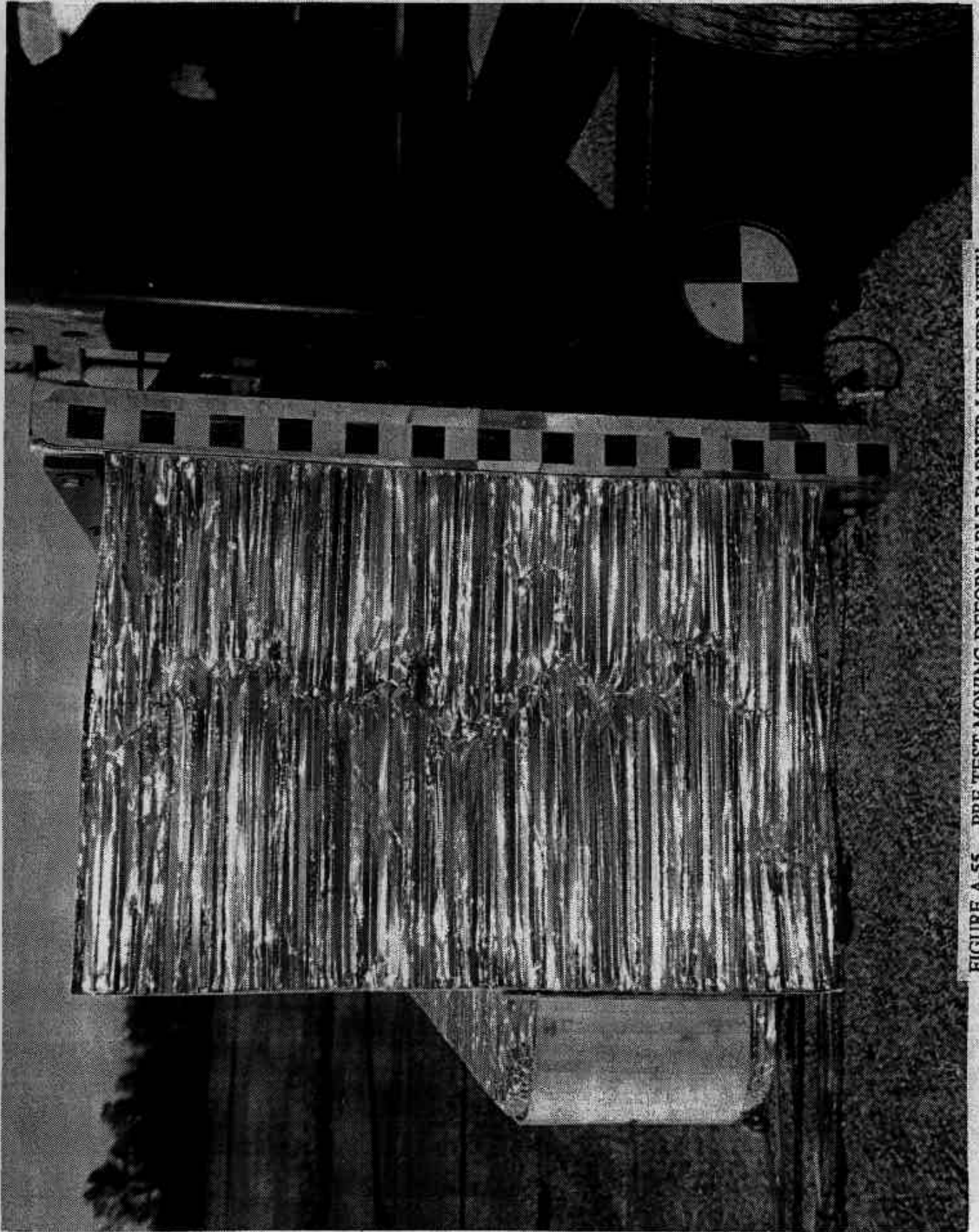


FIGURE A-55 PRE-TEST MOVING DEFORMABLE BARRIER LEFT SIDE VIEW

A-59

8118-10

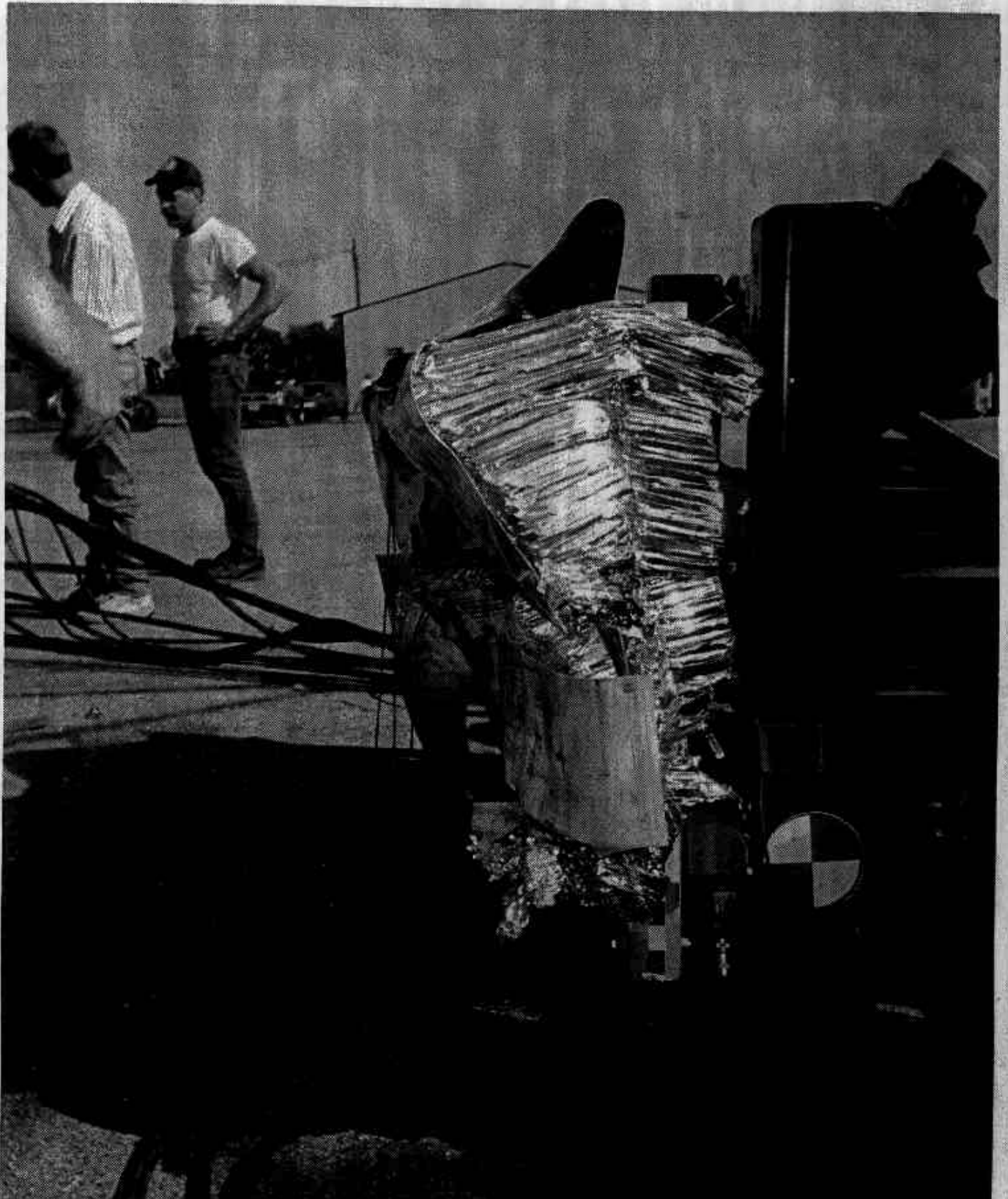


FIGURE A-56 POST-TEST MOVING DEFORMABLE BARRIER LEFT SIDE VIEW

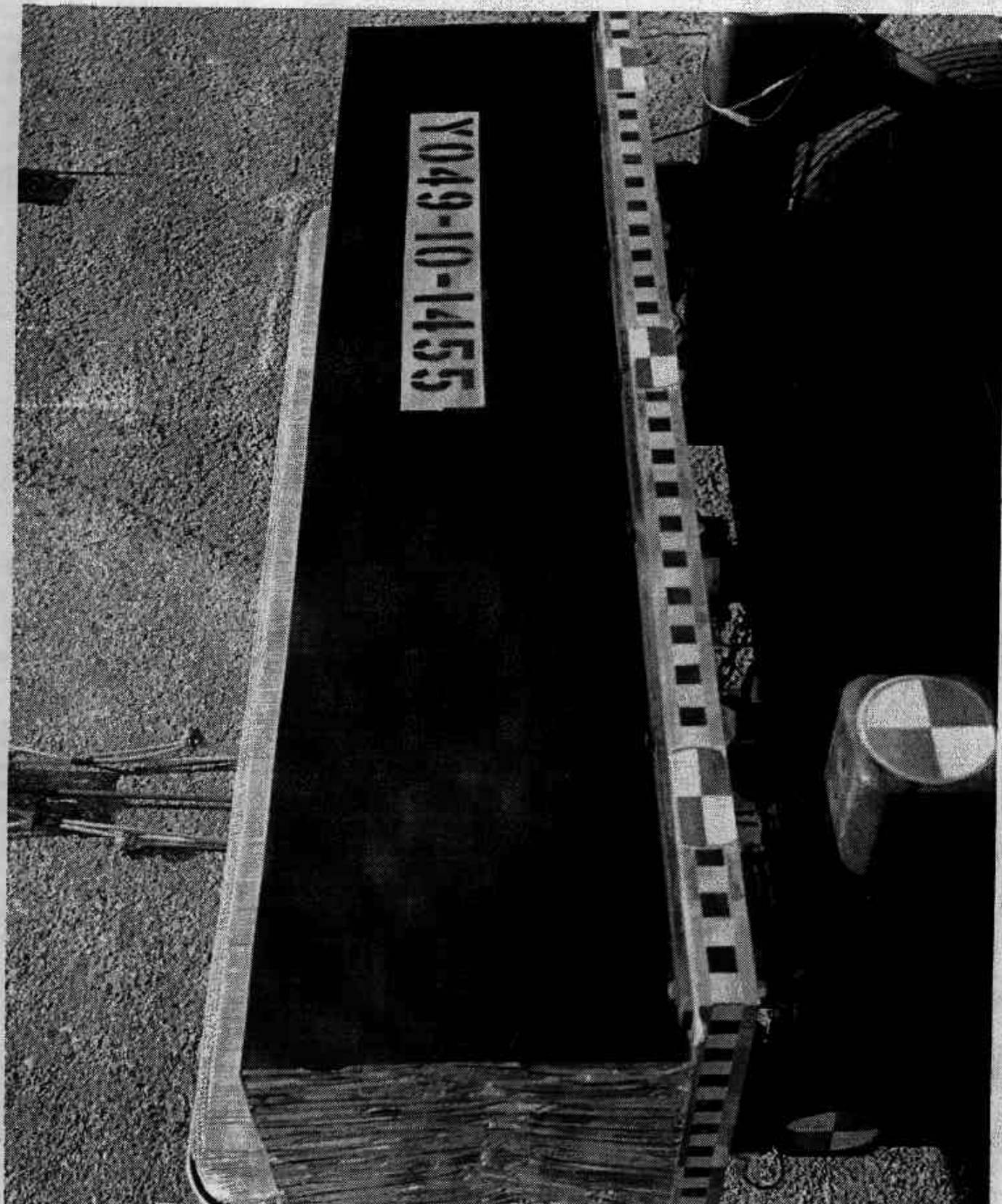


FIGURE A-57 PRE-TEST MOVING DEFORMABLE BARRIER TOP VIEW

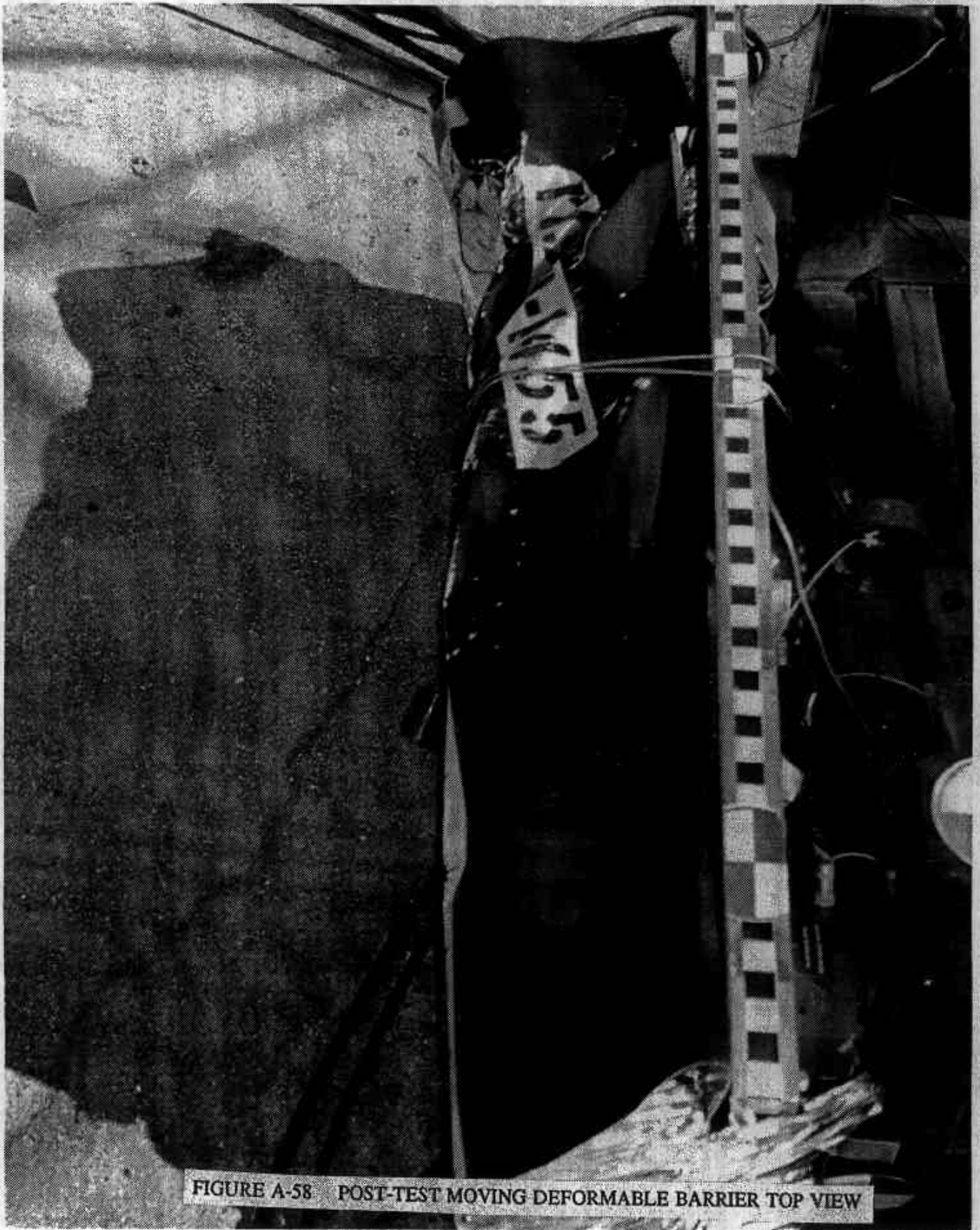


FIGURE A-58 POST-TEST MOVING DEFORMABLE BARRIER TOP VIEW

**APPENDIX B**  
**VEHICLE AND DUMMY RESPONSE DATA**

Key: V1 - Vehicle 1  
V2 - Vehicle 2

FACILITY: TRACK  
RUN #: 1455  
SERIES #: 1

TEST DATE: 21 Sep 1994  
TEST TIME: 14:50:54  
BOARD: A

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P1 Head X	Gs	42.3	72.1	-72.6	76.9	1000.0
2	V1-P1 Head Y	Gs	66.1	76.8	-21.2	44.3	1000.0
3	V1-P1 Head Z	Gs	70.3	60.6	-112.6	75.8	1000.0
4	V1-P1 HD9Y (X)	Gs	39.2	72.0	-69.4	55.0	1000.0
5	V1-P1 Chest X	Gs	11.3	111.8	-107.9	72.4	180.0
6	V1-P1 Chest Y	Gs	81.5	71.9	-16.2	65.2	180.0
7	V1-P1 Chest Z	Gs	53.2	59.2	-44.1	71.9	180.0
8	V1-P1 HD9Y (Z)	Gs	84.2	60.5	-107.9	76.2	1000.0
9	V1-P1 Upper Neck Fx	Nwt	894.5	74.2	-2503.6	85.1	1000.0
10	V1-P1 Upper Neck Fy	Nwt	587.4	59.3	-390.6	189.8	1000.0
11	V1-P1 Upper Neck Fz	Nwt	2630.2	60.5	-1104.5	73.1	1000.0
12	V1-P1 HD9X (Y)	Gs	101.6	76.0	-44.7	44.3	1000.0
13	V1-P1 Upper Neck Mx	Nwt-M	74.7	78.0	-43.7	53.9	600.0
14	V1-P1 Upper Neck My	Nwt-M	24.4	118.1	-175.3	79.0	600.0
15	V1-P1 Upper Neck Mz	Nwt-M	43.7	78.7	-17.7	198.2	600.0
16	V1-P1 HD9X (Z)	Gs	49.9	60.8	-54.3	81.1	1000.0
17	Head Resultant	Gs	138.2	76.0	.1	10.8	1000.0
18	Chest Resultant	Gs	141.3	71.9	.2	-18.1	180.0
19	Upper Neck Force Res.	Nwt	3150.4	84.7	5.3	13.4	1000.0
20	Upper Neck Moment Res.	Nwt-M	192.3	78.8	.1	-6.7	600.0

36 ms Fixed Duration HIC SUMMARY: Head Resultant

hic: 1243.31  
t1 = 51.240 msec  
t2 = 87.120 msec  
Average G's Over Hic Duration = 65.45

CLIP SUMMARY: Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 100.062 G's  
Tstart = 70.8000 ms  
Tend = 73.9200 ms  
CSI = 1705.593

FACILITY: TRACK  
RUN #: 1455  
SERIES #: 1

TEST DATE: 21 Sep 1994  
TEST TIME: 14:50:54  
BOARD: B

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P2 Head X	Gs	22.2	235.7	-98.5	83.6	1000.0
2	V1-P2 Head Y	Gs	195.9	77.3	-13.9	235.1	1000.0
3	V1-P2 Head Z	Gs	51.0	73.6	-7.1	83.5	1000.0
4	V1-P1 Chest Disp.	mm	.0	-4.2	-33.4	74.8	180.0
5	V1-P2 Chest X	Gs	3.7	157.7	-47.9	66.6	180.0
6	V1-P2 Chest Y	Gs	37.2	73.2	-5.5	296.8	180.0
7	V1-P2 Chest Z	Gs	31.4	67.8	-10.0	56.3	180.0
8	V1-P1 Torso Belt Load	Nwt	4274.7	65.8	-200.3	128.8	600.0
9	V1-P1 Lower Neck Fx	Nwt	3107.5	61.2	-2469.2	76.4	1000.0
10	V1-P1 Lower Neck Fy	Nwt	2609.9	71.9	-2295.1	102.4	1000.0
11	V1-P1 Lower Neck Fz	Nwt	5143.3	60.5	-356.0	75.1	1000.0
12	V1-P1 HD9Z (X)	Gs	70.3	75.1	-106.2	86.3	1000.0
13	V1-P1 Lower Neck Mx	Nwt-M	169.4	102.5	-108.0	72.0	600.0
14	V1-P1 Lower Neck My	Nwt-M	108.6	75.5	-435.5	61.1	600.0
15	V1-P1 Lower Neck Mz	Nwt-M	90.3	102.1	-153.3	71.6	600.0
16	V1-P1 HD9Z (Y)	Gs	182.2	56.0	-182.5	58.1	1000.0
17	V1-P2 Head Resultant	Gs	215.7	77.3	.1	-.6	1000.0
18	V1-P2 Chest Resultant	Gs	59.9	70.3	.0	-17.0	180.0
19	V1-P1 Lower Neck F(res)	Nwt	5975.8	60.2	6.6	-9.5	1000.0
20	V1-P1 Lower Neck M(res)	Nwt-M	441.3	61.1	.5	-10.3	600.0

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

hic: 1513.45  
t1 = 75.600 msec  
t2 = 98.400 msec  
Average G's Over Hic Duration = 84.88

CLIP SUMMARY: V1-P2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 58.598 G's  
Tstart = 68.4000 ms  
Tend = 71.5200 ms  
CSI = 579.932

FACILITY: TRACK  
RUN #: 1455  
SERIES #: 1

TEST DATE: 21 Sep 1994  
TEST TIME: 14:50:54  
BOARD: C

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P1 Lt Lower Tibia Fy	Nwt	1159.2	64.9	-971.8	66.2	600.0
2	V1-P1 Lt Lower Tibia Fz	Nwt	2406.3	50.8	-2829.6	39.4	600.0
* 3	V1-P1 Lt Lower Tibia Mx	Nwt-M	131.0	66.4	-337.9	43.6	600.0
* 4	V1-P1 Rt Lower Tibia Fy	Nwt	1976.8	38.3	-854.2	64.4	600.0
5	V1-P1 Rt Lower Tibia Fz	Nwt	1727.9	52.4	-6675.2	43.7	600.0
6	V1-P1 Rt Lower Tibia Mx	Nwt-M	492.1	44.9	-58.4	50.0	600.0
7	V1-P1 Left Femur	Nwt	2157.7	65.2	-15119.3	49.4	600.0
8	V1-P1 Right Femur	Nwt	5440.7	65.9	-23373.9	46.6	600.0
9	V1-P2 Left Femur	Nwt	206.7	40.3	-8457.3	45.7	600.0
10	V1-P2 Right Femur	Nwt	456.1	42.2	-6237.7	58.6	600.0
11	V1-P2 Lt Upper Tibia Mx	Nwt-M	53.8	99.2	-232.2	65.0	600.0
12	V1-P2 Lt Upper Tibia My	Nwt-M	91.4	53.6	-89.4	45.1	600.0
13	V1-P2 Lt Lower Tibia Fy	Nwt	1029.3	49.3	-1104.1	40.6	600.0
14	V1-P2 Lt Lower Tibia Fz	Nwt	1250.2	56.6	-4636.7	45.6	600.0
15	V1 Right Shock Tower (Y)	Gs	256.8	43.7	-265.1	73.1	60.0
** 16	V1 Left Shock Tower (X)	Gs	279.7	91.2	-261.8	83.0	60.0

\* Noise in data after 45msec

\*\* Data questionable after 45msec, wire cut

FACILITY: TRACK  
RUN #: 1455  
SERIES #: 1

TEST DATE: 21 Sep 1994  
TEST TIME: 14:50:54  
BOARD: D

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1 R.F Frame Rail (X)	Gs	17.6	51.0	-69.4	30.0	60.0
2	V1 R.F Frame Rail (Y)	Gs	18.4	50.0	-99.7	40.1	60.0
3	V1 R.F Frame Rail (Z)	Gs	38.6	37.1	-54.1	49.4	60.0
* 4	V1 Engine Bottom (X)	Gs	462.2	106.8	-445.9	131.8	60.0
5	V1 L.F Frame Rail (X)	Gs	45.5	56.0	-93.9	30.1	60.0
6	V1 L.F Frame Rail (Y)	Gs	71.3	11.9	-24.3	53.4	60.0
7	V1 L.F Frame Rail (Z)	Gs	66.1	12.1	-59.1	42.7	60.0
8	V1-P2 Chest Disp.	mm	38.3	155.8	-1.2	385.6	180.0
9	V1-P1 Lt Upper Tibia Mx	Nwt-M	94.8	98.4	-392.9	64.3	600.0
10	V1-P1 Lt Upper Tibia My	Nwt-M	125.8	67.1	-139.5	39.4	600.0
11	V1-P1 Rt Upper Tibia Mx	Nwt-M	183.5	50.5	-178.3	41.9	600.0
12	V1-P1 Rt Upper Tibia My	Nwt-M	257.3	50.2	-165.9	40.8	600.0
13	V1 L.R. Comp (X)	Gs	3.6	274.4	-44.1	34.7	60.0
14	V1 L.R. Comp (Y)	Gs	30.2	31.7	-10.6	37.0	60.0
15	V1 R.R. Comp (X)	Gs	8.1	268.6	-59.1	44.6	60.0
16	V1 R.R. Comp (Y)	Gs	25.0	45.0	-9.8	254.9	60.0
17	V1 R.F Frame Rail Res.	Gs	107.6	30.1	.4	-19.2	60.0
18	V1 L.F Frame Rail Res.	Gs	108.9	29.9	.3	-20.0	60.0

\* Data inaccurate after 45msec, wire cut

FACILITY: TRACK  
RUN #: 1455  
SERIES #: 1

TEST DATE: 21 Sep 1994  
TEST TIME: 14:50:54  
BOARD: E

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1-P1 Pelvic X	Gs	60.6	65.8	-186.3	47.2	1000.0
2	V1-P1 Pelvic Y	Gs	64.1	65.4	-88.9	46.4	1000.0
3	V1-P1 Pelvic Z	Gs	26.6	50.3	-61.5	46.8	1000.0
4	V1 Right Engine (X)	Gs	33.9	57.0	-124.3	25.2	60.0
5	V1-P2 Upper Neck Fx	Nwt	219.1	228.5	-828.5	69.4	1000.0
6	V1-P2 Upper Neck Fy	Nwt	473.8	78.0	-559.3	95.5	1000.0
7	V1-P2 Upper Neck Fz	Nwt	5028.0	69.5	-2819.4	242.5	1000.0
* 8	V1 Engine Bottom (Y)	Gs	249.0	24.4	-6.3	6.7	60.0
9	V1-P2 Upper Neck Mx	Nwt-M	67.8	97.3	-46.4	78.1	600.0
10	V1-P2 Upper Neck My	Nwt-M	43.2	91.7	-38.0	68.9	600.0
11	V1-P2 Upper Neck Mz	Nwt-M	20.6	108.8	-12.4	170.8	600.0
12	V1 Left Engine (X)	Gs	84.5	43.0	-178.3	24.5	60.0
13	V1-P2 Pelvic X	Gs	3.7	135.1	-103.2	45.5	1000.0
14	V1-P2 Pelvic Y	Gs	35.1	43.3	-11.0	58.2	1000.0
15	V1-P2 Pelvic Z	Gs	5.9	42.5	-29.0	54.8	1000.0
16	V1 Right Shock Tower (X)	Gs	31.4	57.6	-148.7	43.8	60.0
17	V1-P1 Pelvic Res.	Gs	207.5	46.4	.1	-15.8	1000.0
18	V1-P2 Upper Neck F(res)	Nwt	5094.5	69.5	6.6	26.4	1000.0
19	V1-P2 Upper Neck M(res)	Nwt-M	73.4	96.1	.0	-5.9	600.0
20	V1-P2 Pelvic Res.	Gs	105.6	45.5	.1	-17.3	1000.0

\* Data inaccurate after 45msec, wire cut

FACILITY: TRACK  
RUN #: 1455  
SERIES #: 1

TEST DATE: 21 Sep 1994  
TEST TIME: 14:50:54  
BOARD: F

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V1 Brake Pedal (X)	Gs	200.4	47.8	-219.5	33.5	60.0
2	V1 Brake Pedal (Y)	Gs	133.4	43.8	-83.5	72.2	60.0
3	V1 Brake Pedal (Z)	Gs	84.9	71.6	-128.7	34.6	60.0
4	V1-P2 Lt Lower Tibia Mx	Nwt-M	16.2	99.7	-423.6	45.4	600.0
5	V1-P2 Rt Upper Tibia Mx	Nwt-M	109.9	46.1	-54.1	41.0	60.0
6	V1-P2 Rt Upper Tibia My	Nwt-M	207.8	45.6	-60.8	40.1	60.0
7	V1-P2 Rt Lower Tibia Fy	Nwt	424.0	188.0	-2215.2	45.6	60.0
8	V1-P2 Rt Lower Tibia Fz	Nwt	1265.6	188.0	-2989.6	70.9	600.0
9	V1-P2 Rt Lower Tibia Mx	Nwt-M	86.8	46.6	-97.8	41.3	60.0
* 10	V1 Left Shock Tower (Z)	Gs	286.5	241.2	-267.7	234.0	60.0
11	NULL	in	.0	427.3	.0	427.3	60.0
12	NULL	in	.0	427.3	.0	427.3	600.0
17	V1 Brake Pedal (res)	Nwt-M	252.2	34.0	.1	-5.5	600.0

\* Data inaccurate after 42msec

FACILITY: TAPE  
RUN #: 7455  
SERIES #: 1

TEST DATE: 22 Sep 1994  
TEST TIME: 09:03:48  
BOARD: G

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	Chest Displacement #132	mm	29.2	72.0	-.1	-1.1	60.0
2	NULL	Gs	.0	427.3	.0	427.3	1000.0
3	NULL	Gs	.0	427.3	.0	427.3	1000.0
4	NULL	Gs	.0	427.3	.0	427.3	1000.0

FACILITY: TAPE  
RUN #: 8455  
SERIES #: 1

TEST DATE: 22 Sep 1994  
TEST TIME: 09:00:59  
BOARD: H

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	Chest Displacement #125	mm	12.3	76.2	.0	-22.4	60.0
* 2	Chest Displacement #126	mm	31.0	78.6	-1.4	324.0	60.0
3	Chest Displacement #127	mm	5.0	72.1	-.3	297.5	60.0
** 4	Chest Displacement #128	mm	32.9	75.2	-5.4	214.1	60.0
** 5	Chest Displacement #129	mm	22.0	96.2	-4.5	183.0	60.0
6	Chest Displacement #130	mm	8.9	61.3	-5.1	283.9	60.0
7	Chest Displacement #131	mm	23.0	77.0	-.1	-1.3	60.0
8	NULL		.0	427.3	.0	427.3	1000.0

\* Data inaccurate 70 - 125msec

\*\* Data questionable

FACILITY: TAPE  
RUN #: 9455  
SERIES #: 1

TEST DATE: 22 Sep 1994  
TEST TIME: 09:11:17  
BOARD: I

TITLE: VTV TEST #10

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V2 C.G. X	Gs	5.7	71.0	-55.8	36.6	60.0
2	V2 C.G. Y	Gs	5.1	76.2	-10.0	52.9	60.0
3	V2 C.G. Z	Gs	60.6	81.7	-62.9	43.8	60.0
4	V2 Left Rail X	Gs	5.6	65.6	-63.0	34.8	60.0
5	V2 Left Rail Y	Gs	29.1	54.1	-39.6	48.8	60.0
6	V2 Right Rail X	Gs	1.4	179.6	-49.1	35.5	60.0
7	V2 Right Rail Y	Gs	11.3	42.5	-26.2	47.6	60.0
8	V2 TR Load Cell	Nwt	44356.2	35.3	-10492.5	5.0	60.0
9	V2 BR Load Cell	Nwt	7373.5	197.3	-42730.6	83.6	60.0
10	V2 TL Load Cell	Nwt	203892.0	35.0	-26190.4	53.4	60.0
11	V2 BL Load Cell	Nwt	5049.2	399.6	-2.40E+5	40.0	60.0
12	V2 CL Load Cell	Nwt	952.3	-12.7	-2.17E+5	34.7	60.0
17	V2 C.G. Resultant	Nwt	70.1	43.6	.3	269.8	60.0

TEST NO. Y49-10-1455

VEHICLE DATA

SAE FILTER CHANNEL CLASS

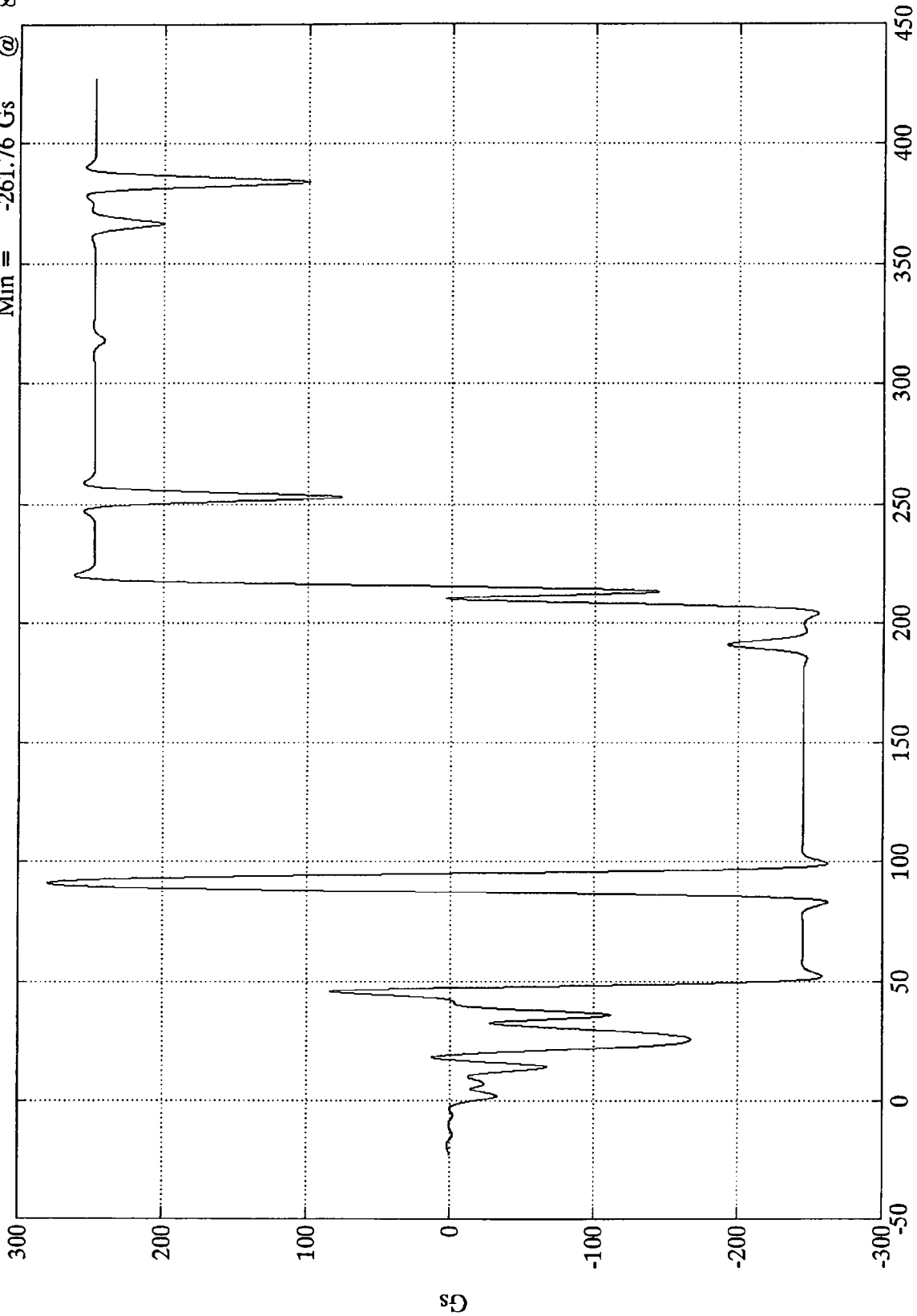
60

VEHICLE ONE DATA

VTV TEST #10

V1 Left Shock Tower (X)

Max = 279.68 Gs @ 91.20 msec  
Min = -261.76 Gs @ 83.04 msec



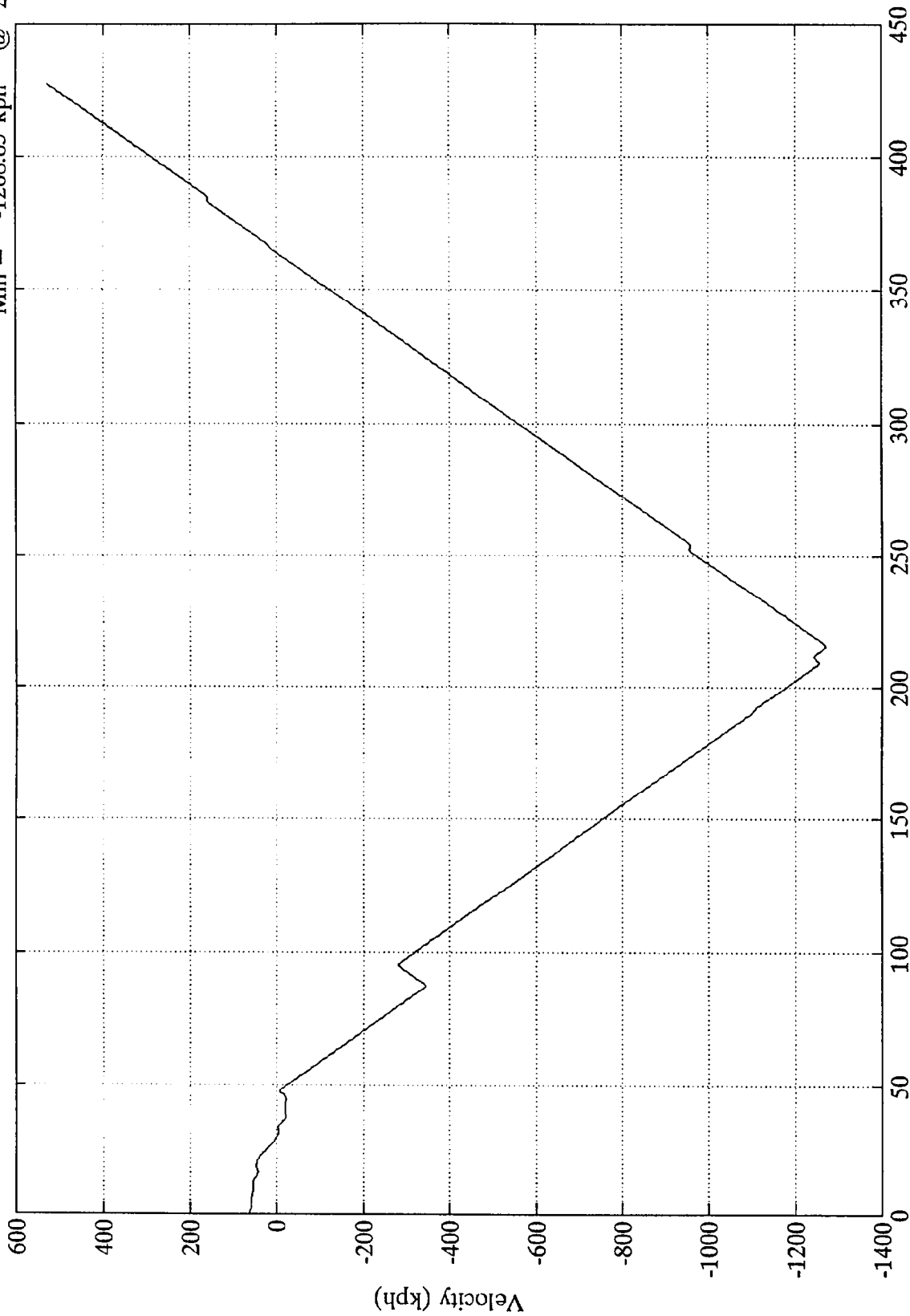
SAE Filter Class 60

Data questionable after 45msec, wire cut

VTV TEST #10

V1 Left Shock Tower (X)

Max = 527.40 kph @ 427.32 msec  
Min = -1268.65 kph @ 215.52 msec

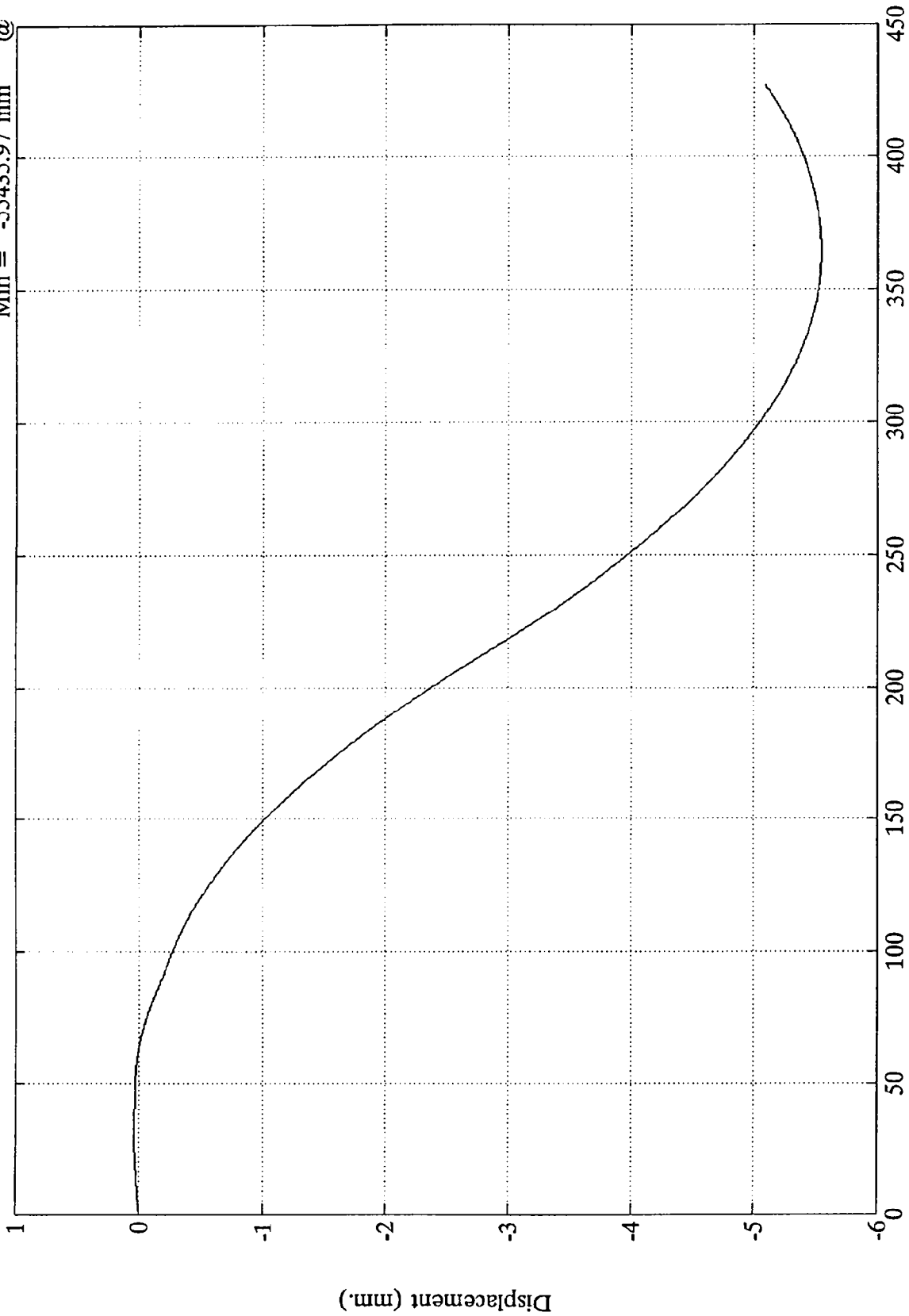


SAE Filter Class 180 Data questionable after 45msec, wire cut

VTV TEST #10  
x10<sup>4</sup>

V1 Left Shock Tower (X)

Max = 371.22 mm @ 30.00 msec  
Min = -55435.97 mm @ 363.96 msec



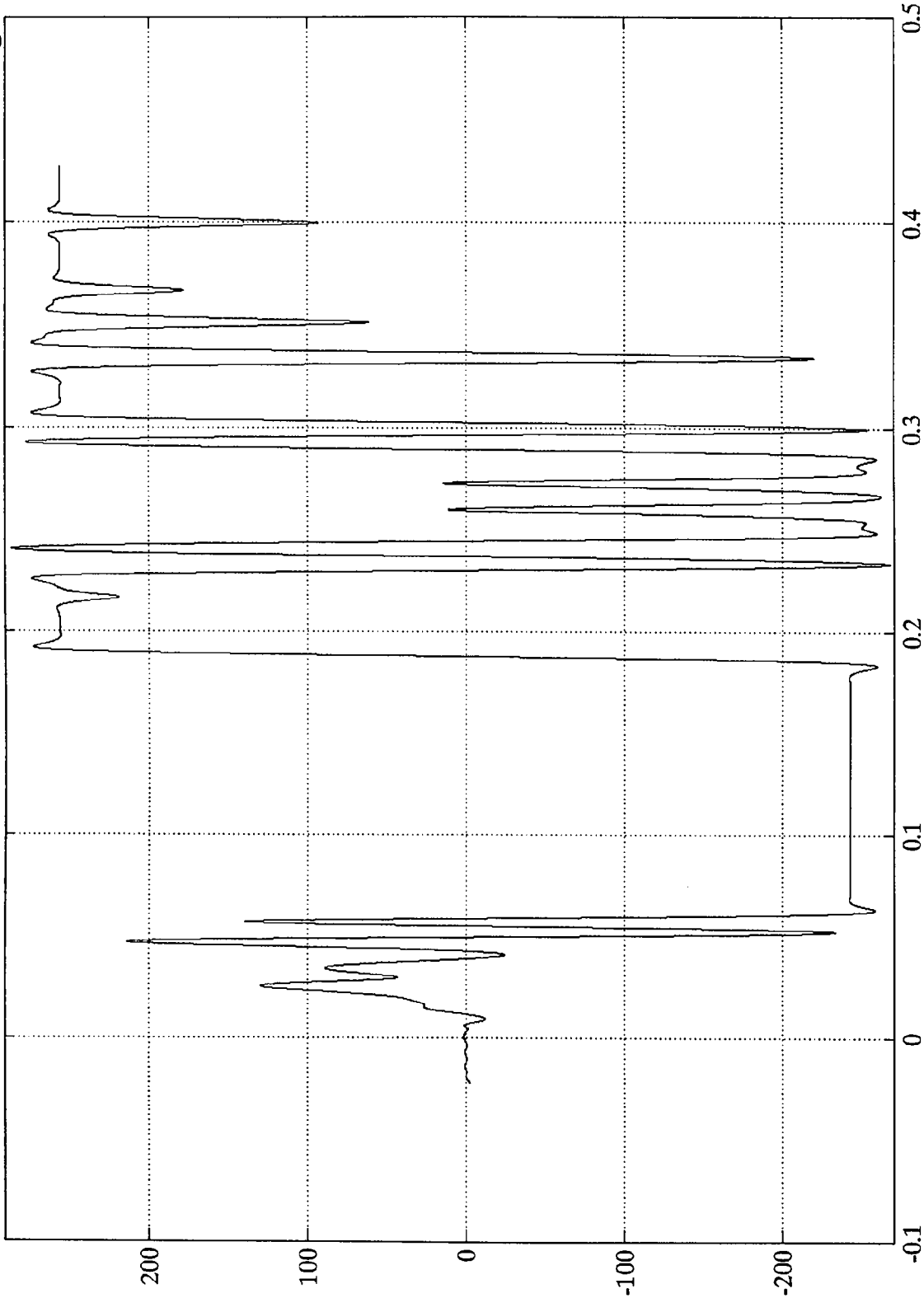
Time (msec) Data questionable after 45msec, wire cut

SAE Filter Class 180

VTV TEST #10

V1 Left Shock Tower (Z)

Max = 286.5 Gs @ 241.20 msec  
Min = -267.7 Gs @ 234.00 msec



Time (sec)

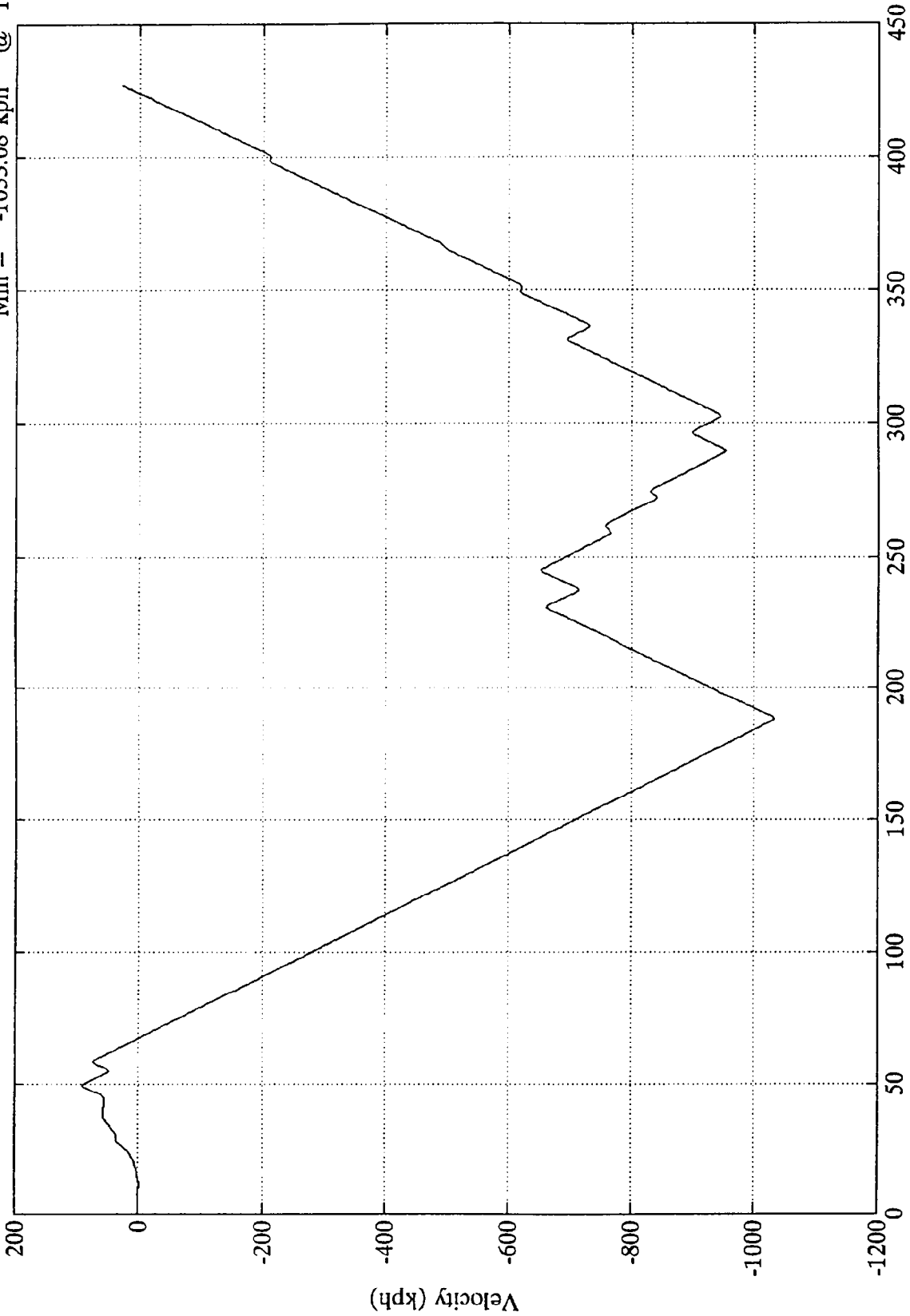
Data inaccurate after 42msec

Sae Filter Class 60

VTV TEST #10

V1 Left Shock Tower (Z)

Max = 90.36 kph @ 49.32 msec  
Min = -1033.08 kph @ 188.16 msec



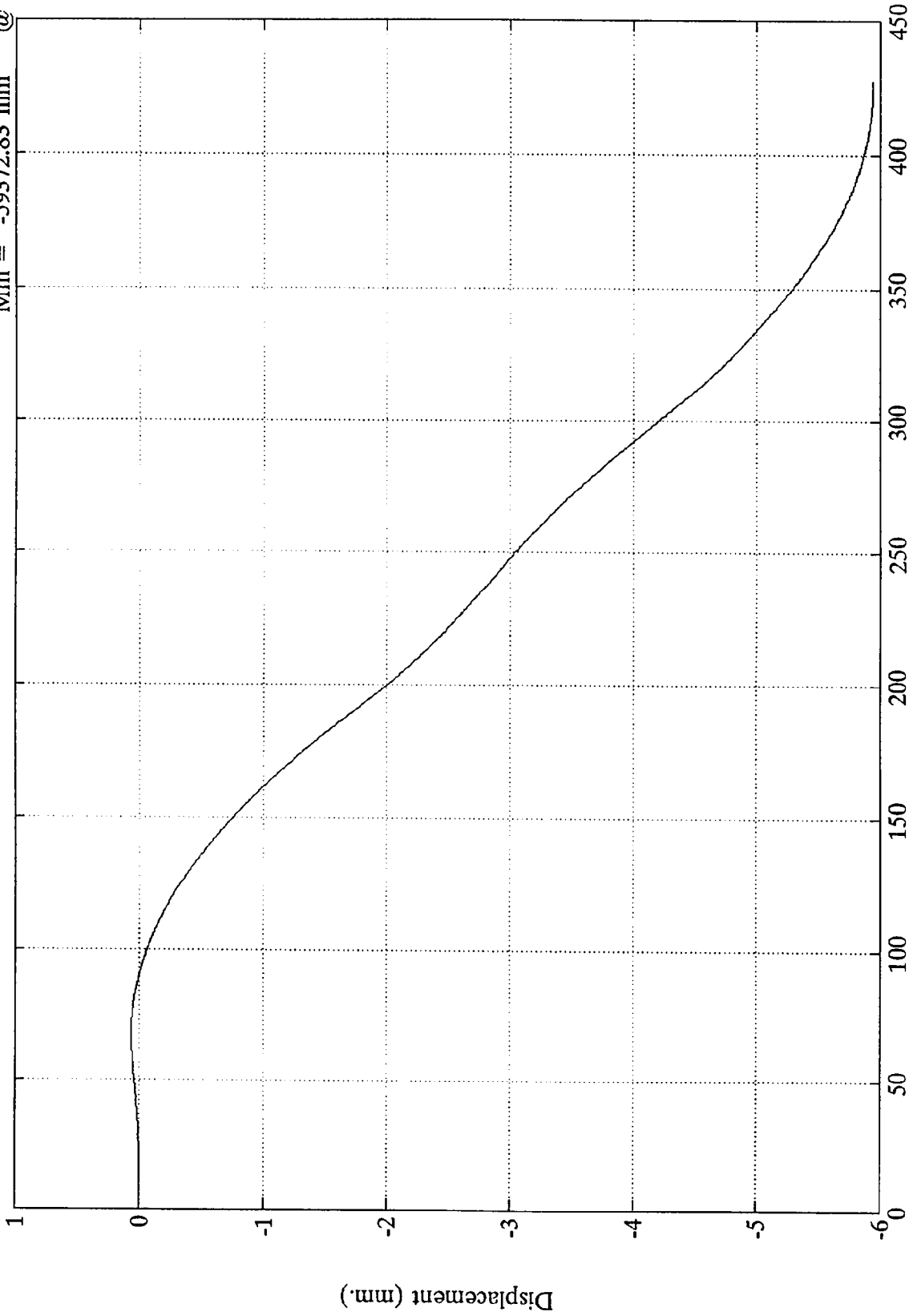
Time (msec) Data inaccurate after 42msec

SAE Filter Class 180

VTV TEST #10  
x10<sup>4</sup>

V1 Left Shock Tower (Z)

Max = 620.42 mm @ 67.20 msec  
Min = -59372.83 mm @ 424.20 msec



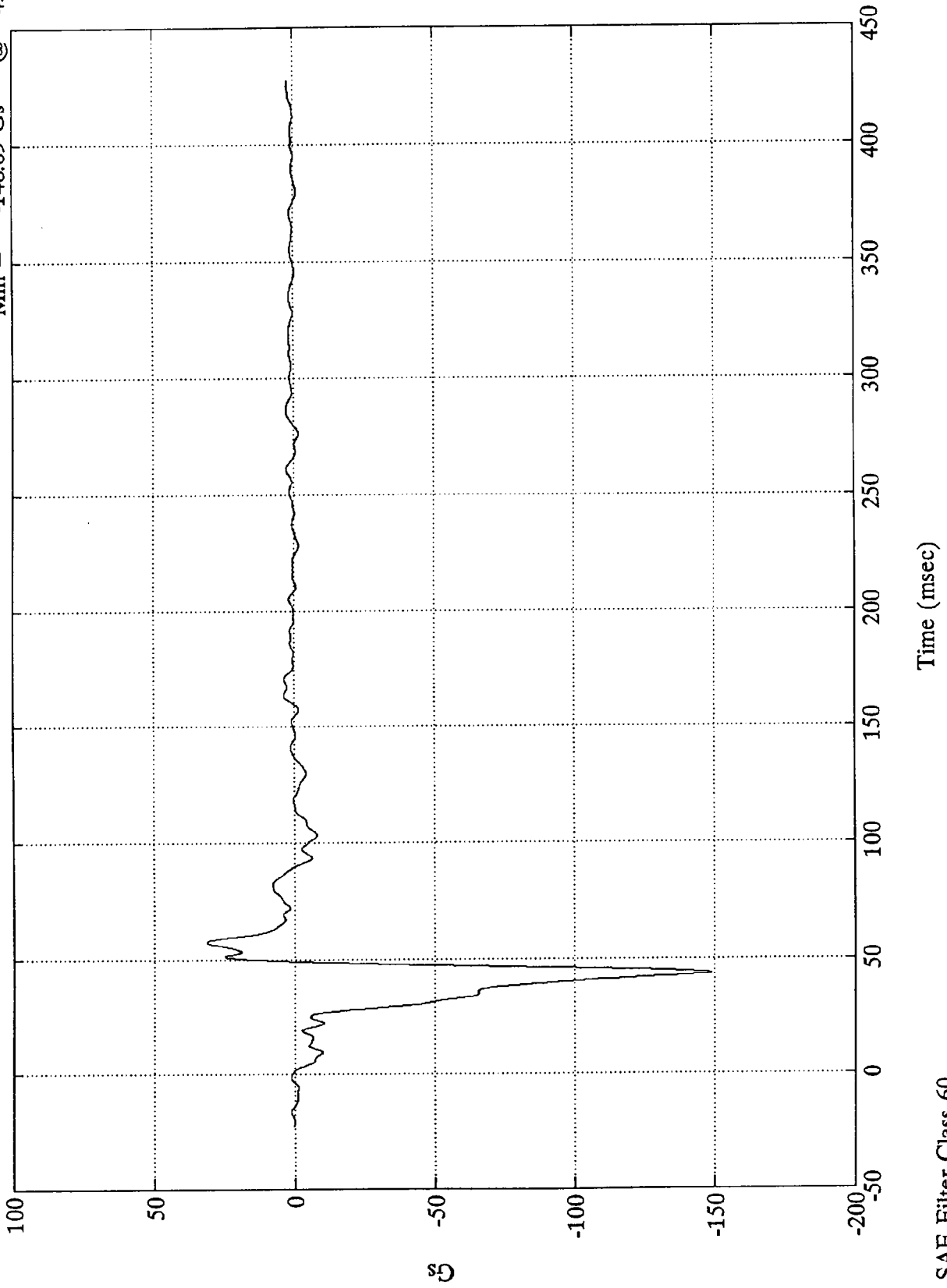
Data inaccurate after 42msec

SAE Filter Class 180

VTV TEST #10

V1 Right Shock Tower (X)

Max = 31.36 Gs @ 57.60 msec  
Min = -148.69 Gs @ 43.79 msec

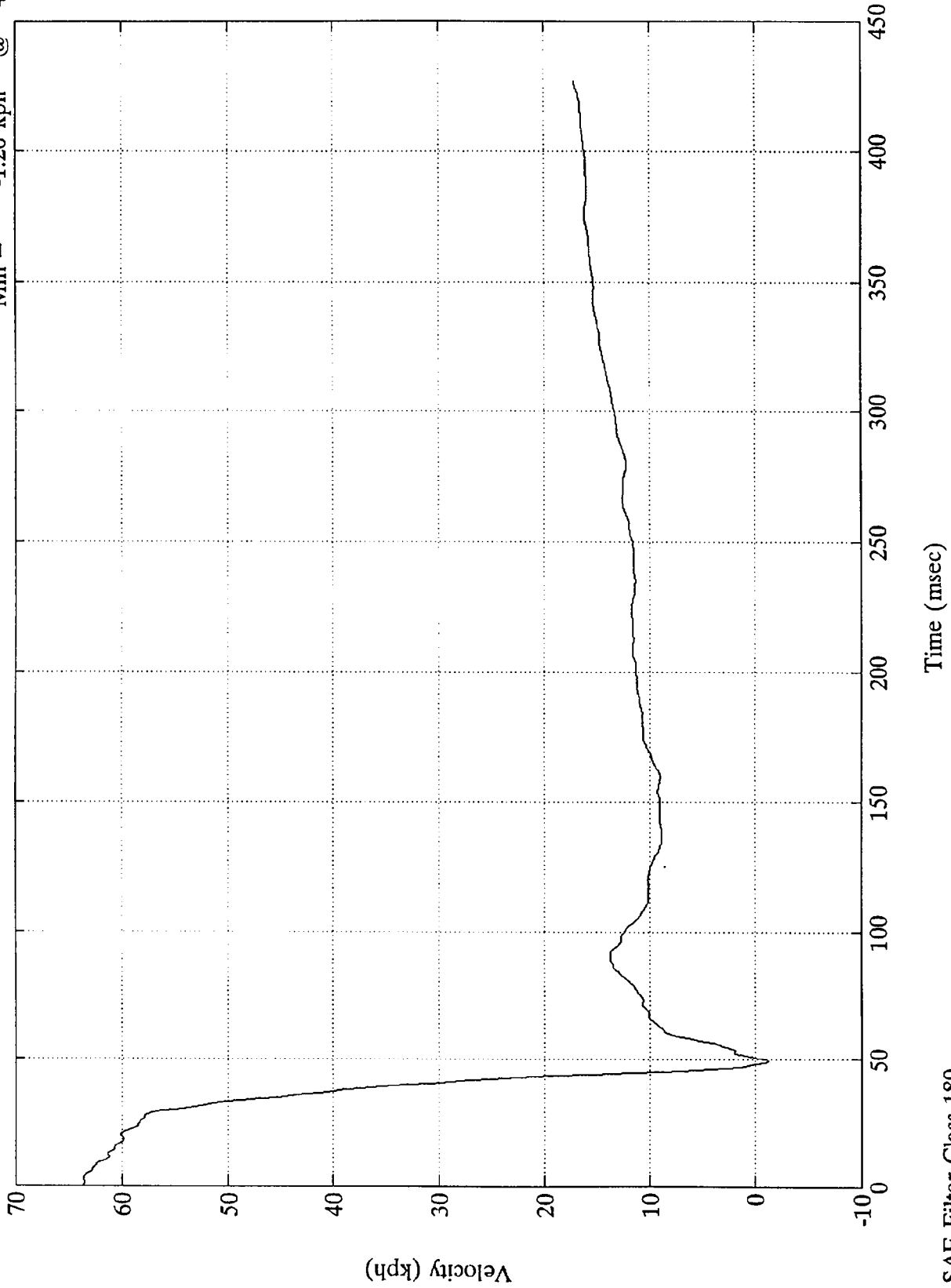


SAE Filter Class 60

VTV TEST #10

V1 Right Shock Tower (X)

Max = 63.58 kph @ 3.23 msec  
Min = -1.26 kph @ 49.20 msec

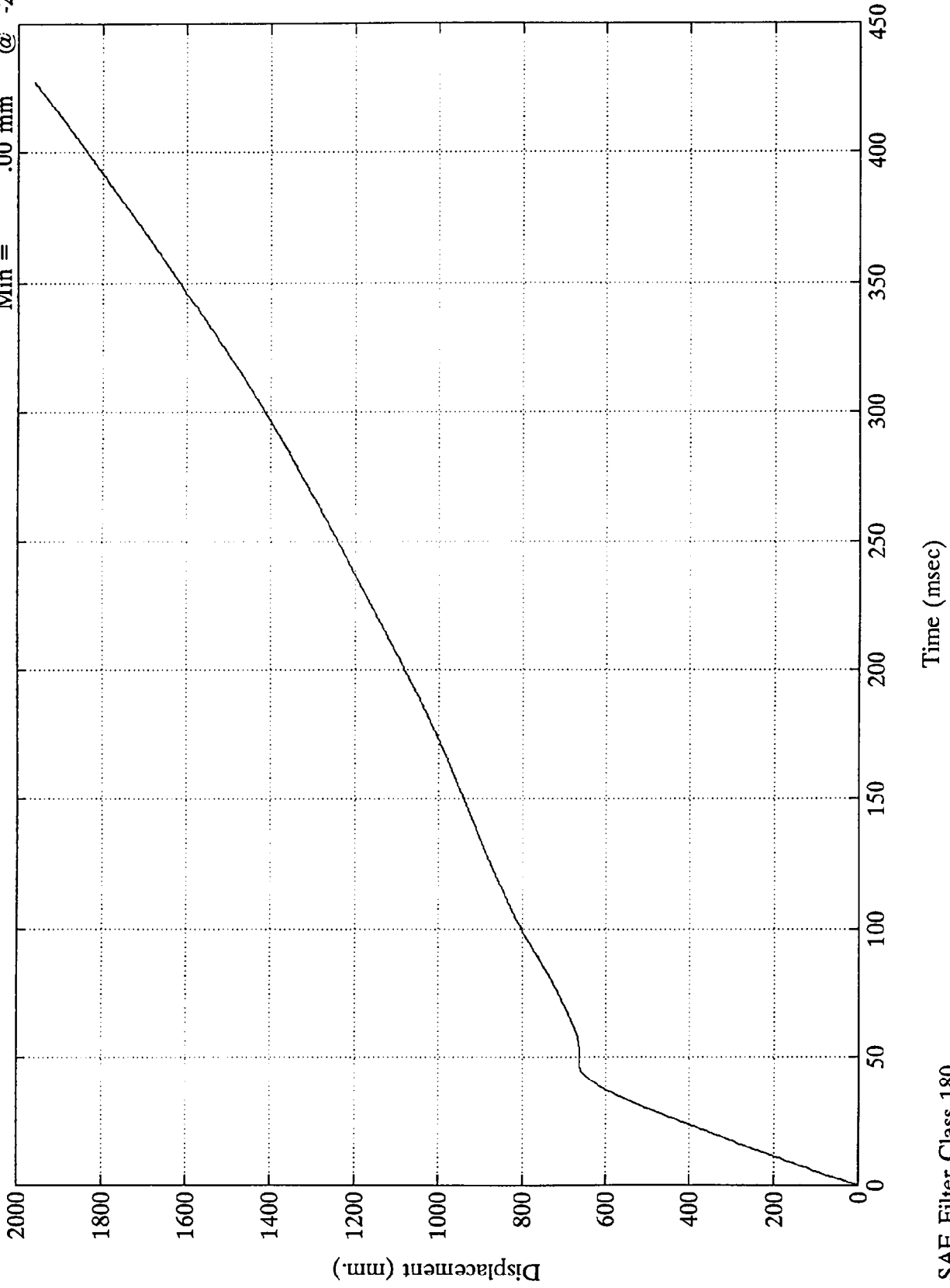


SAE Filter Class 180

VTV TEST #10

V1 Right Shock Tower (X)

Max = 1961.26 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

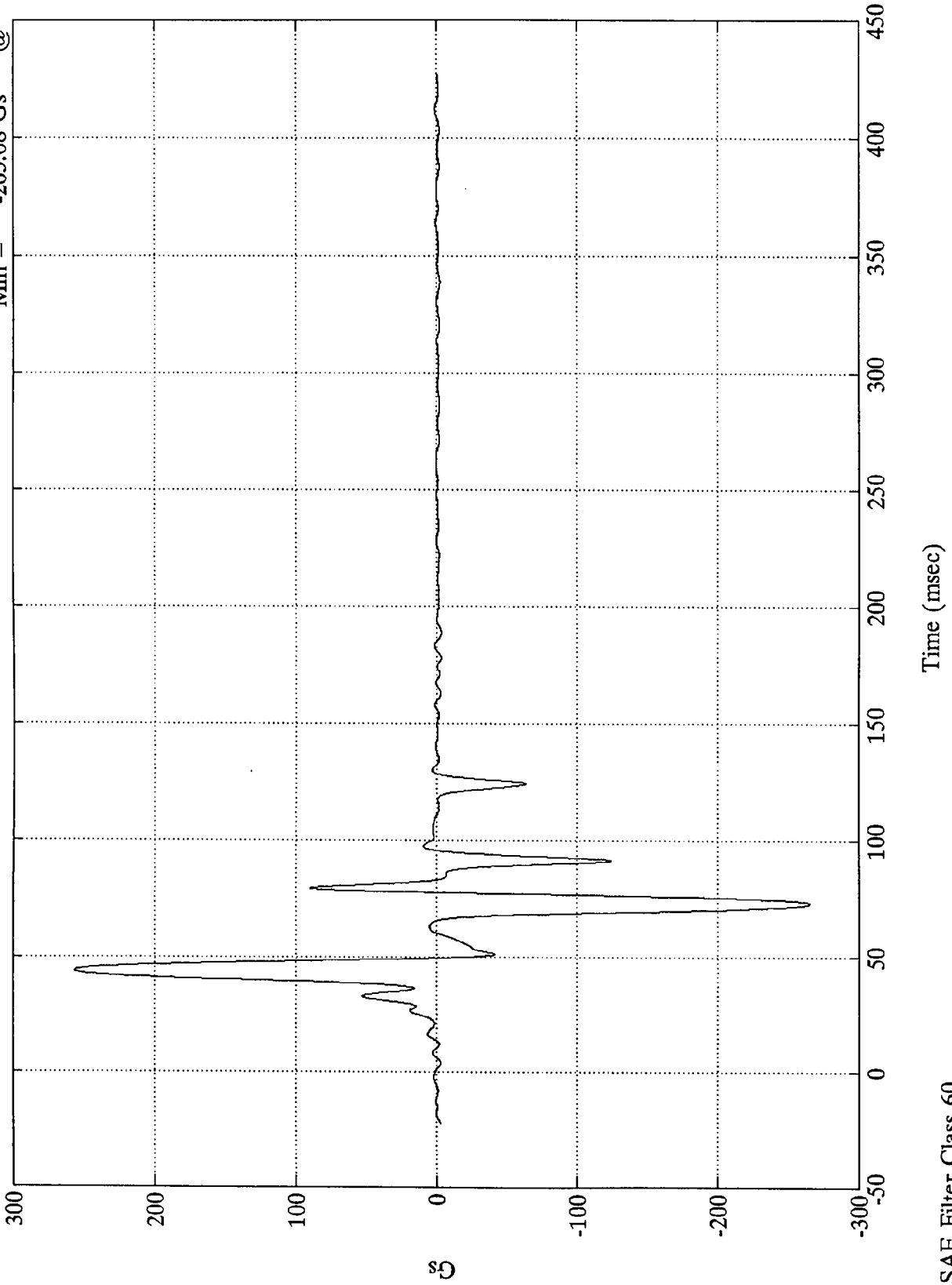


SAE Filter Class 180

VTV TEST #10

V1 Right Shock Tower (Y)

Max = 256.85 Gs @ 43.68 msec  
Min = -265.08 Gs @ 73.08 msec

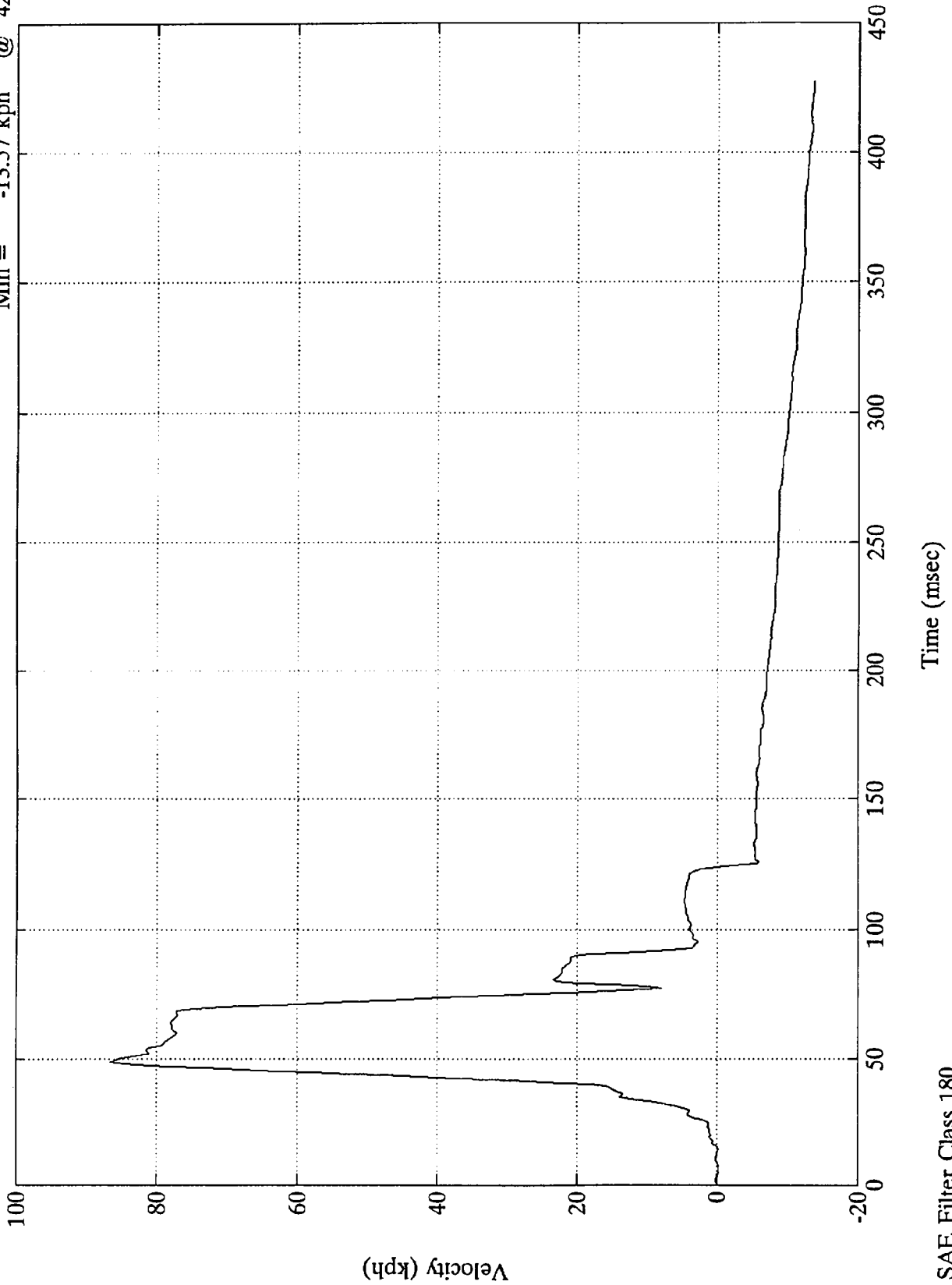


SAE Filter Class 60

VTV TEST #10

V1 Right Shock Tower (Y)

Max = 86.54 kph @ 48.60 msec  
Min = -13.57 kph @ 425.04 msec

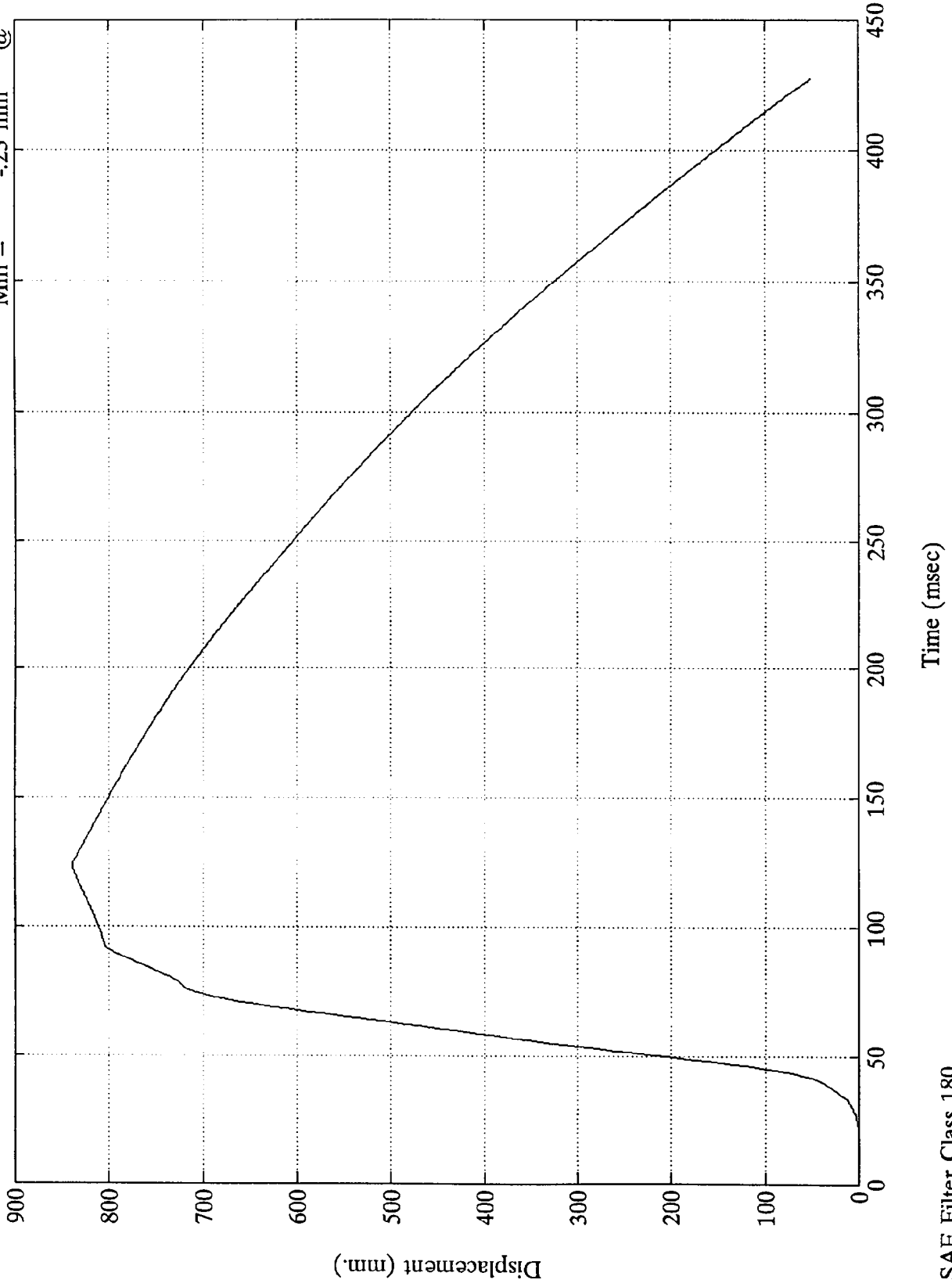


SAE Filter Class 180

VTV TEST #10

Max = 839.04 mm @ 123.96 msec  
Min = -23 mm @ 8.63 msec

V1 Right Shock Tower (Y)

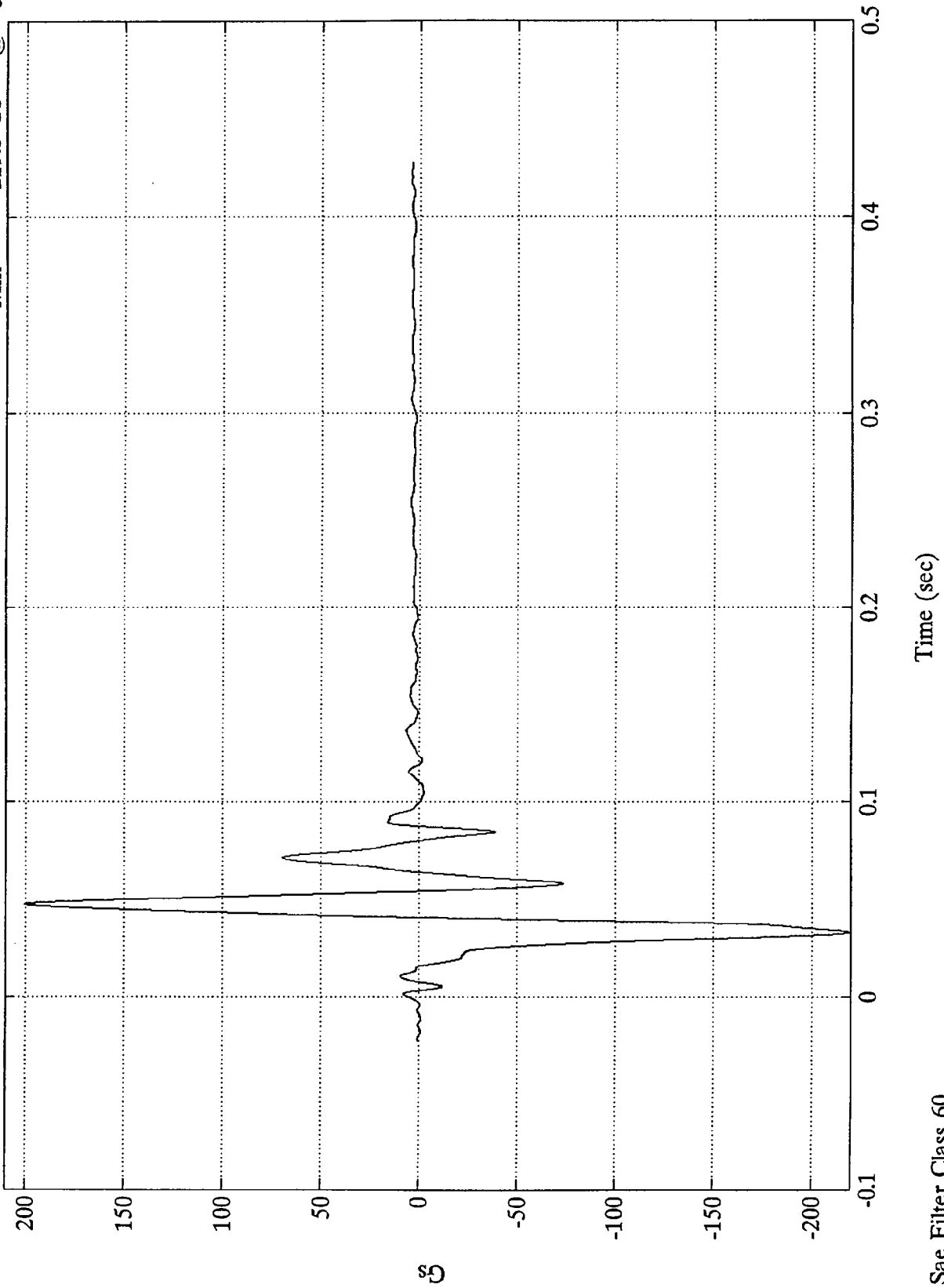


SAE Filter Class 180

VTV TEST #10

V1 Brake Pedal (X)

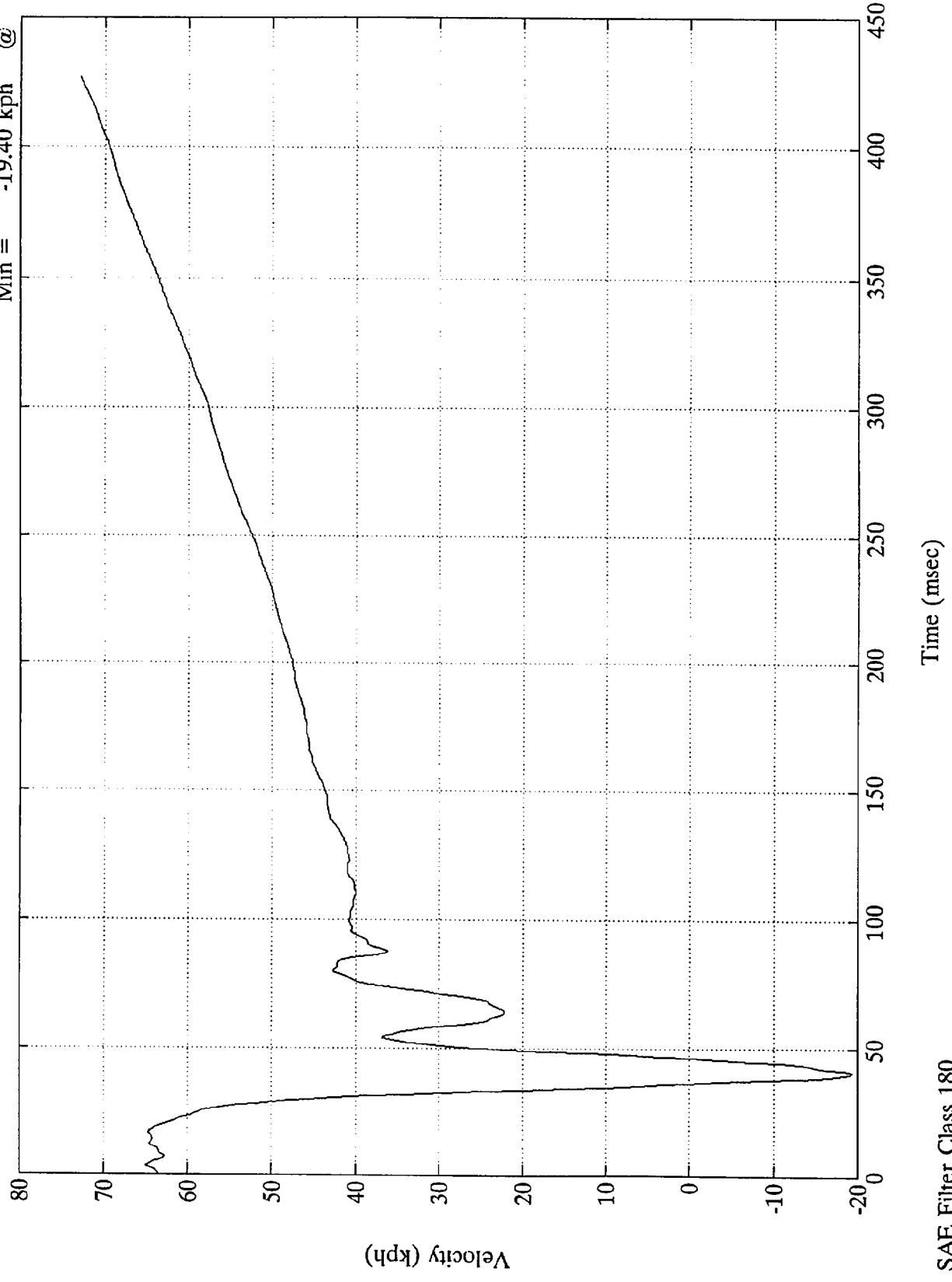
Max = 200.3 Gs @ 47.76 msec  
Min = -219.5 Gs @ 33.47 msec



VTV TEST #10

V1 Brake Pedal (X)

Max = 72.85 kph @ 427.32 msec  
Min = -19.40 kph @ 40.68 msec

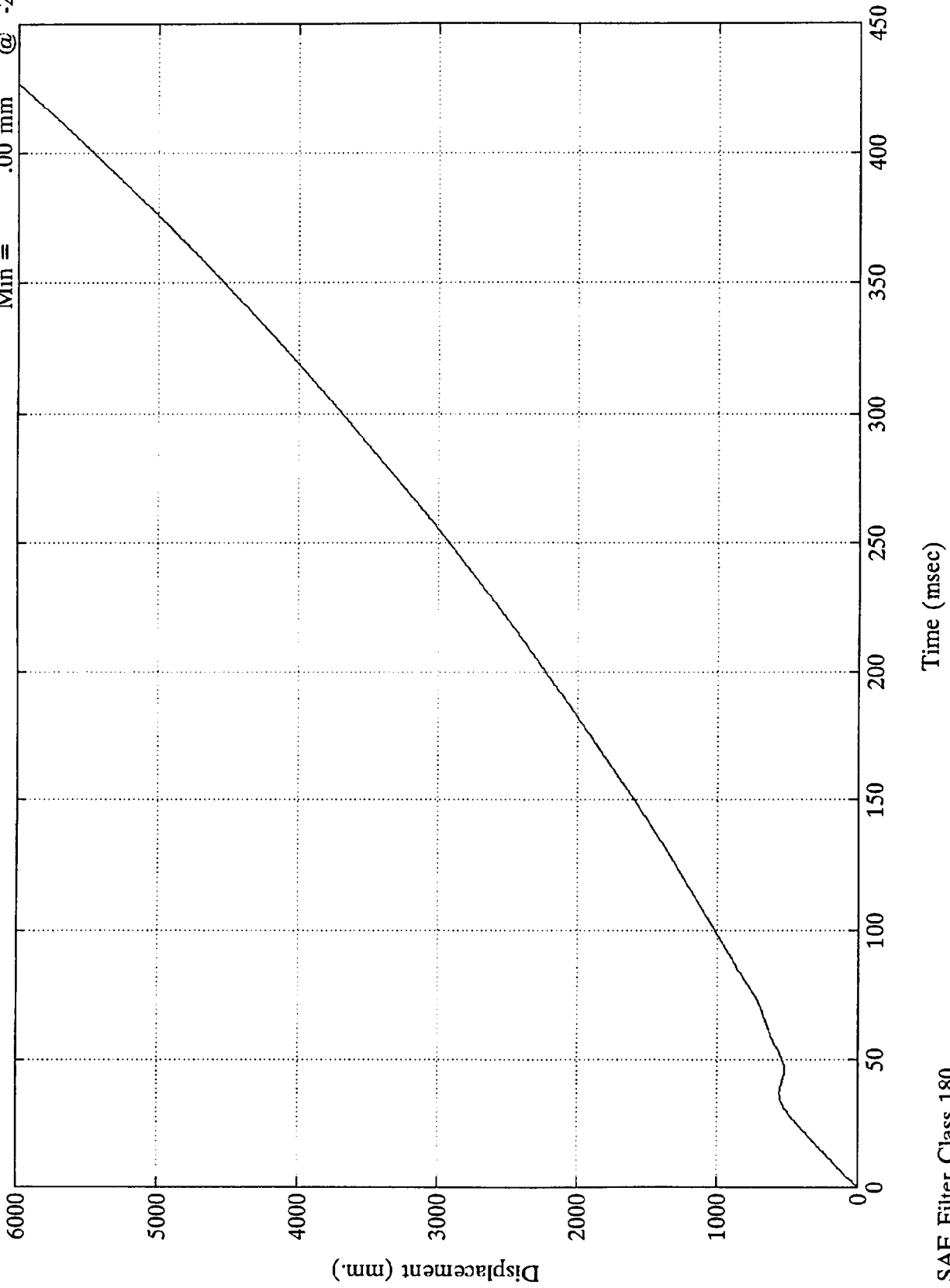


SAE Filter Class 180

VTV TEST #10

V1 Brake Pedal (X)

Max = 6000.08 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

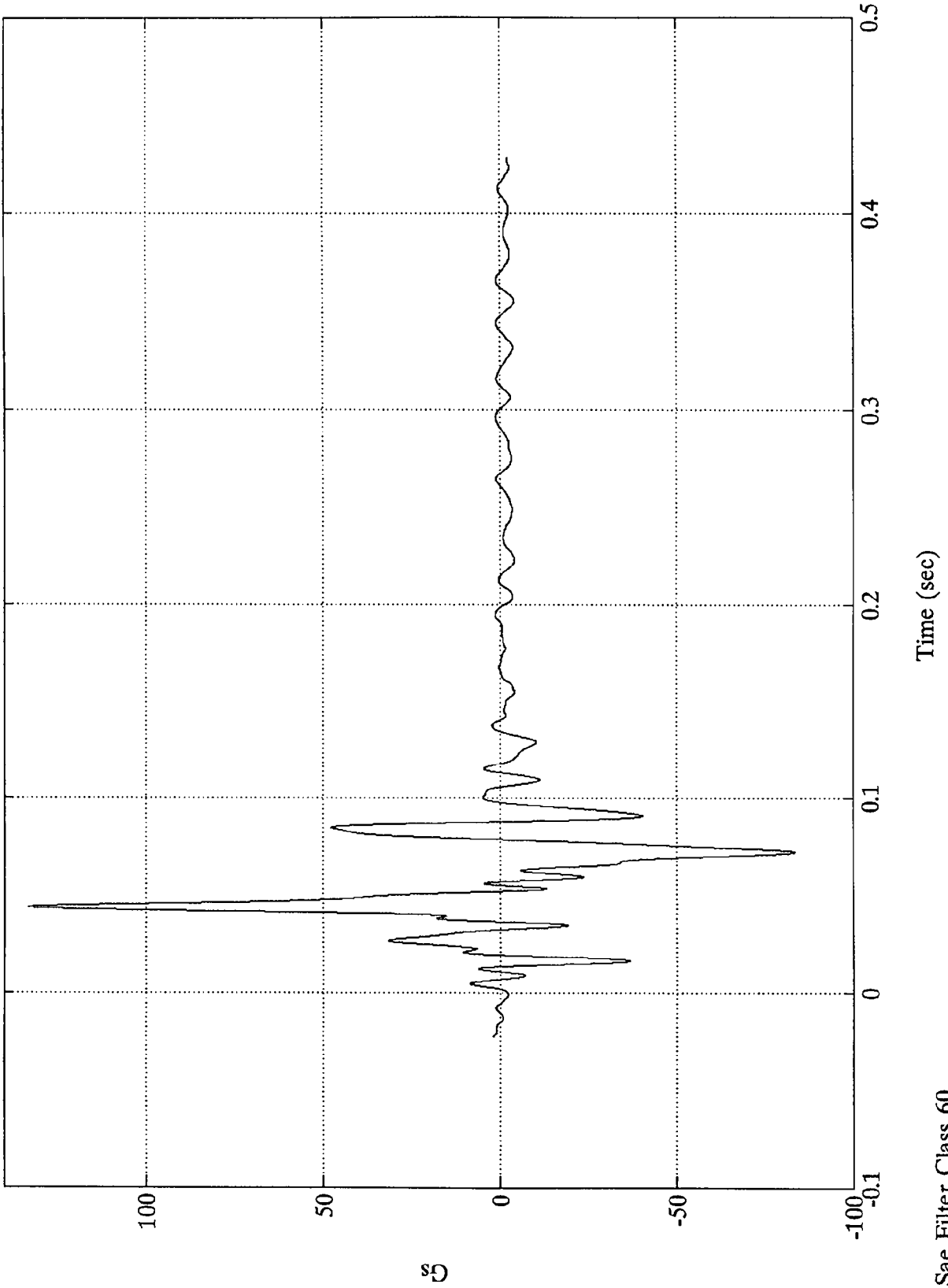


SAE Filter Class 180

VTV TEST #10

V1 Brake Pedal (Y)

Max = 133.4 Gs @ 43.79 msec  
Min = -83.5 Gs @ 72.24 msec



Sae Filter Class 60

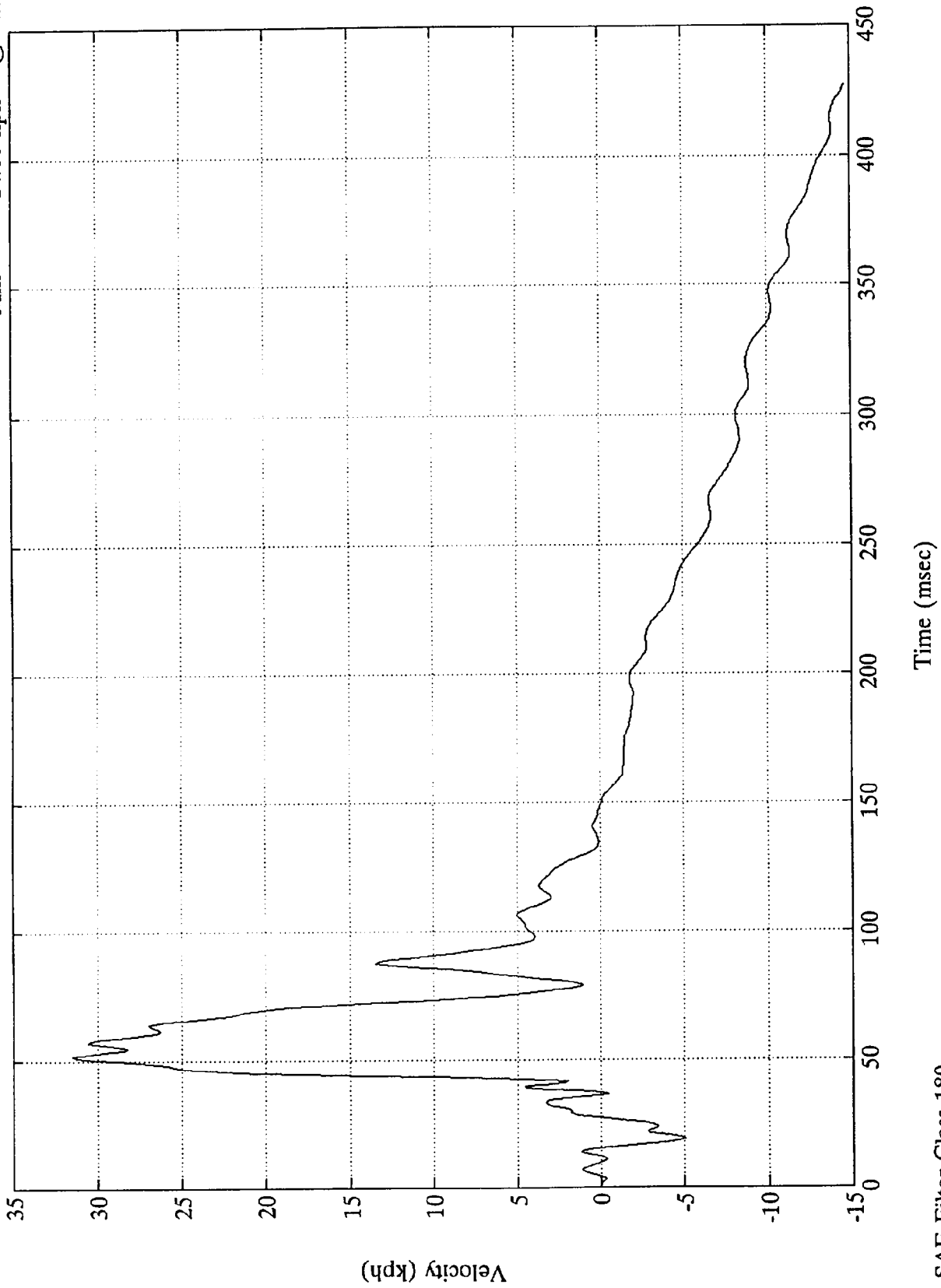
Gs

Time (sec)

VTV TEST #10

V1 Brake Pedal (Y)

Max = 31.49 kph @ 51.48 msec  
Min = -14.66 kph @ 427.32 msec

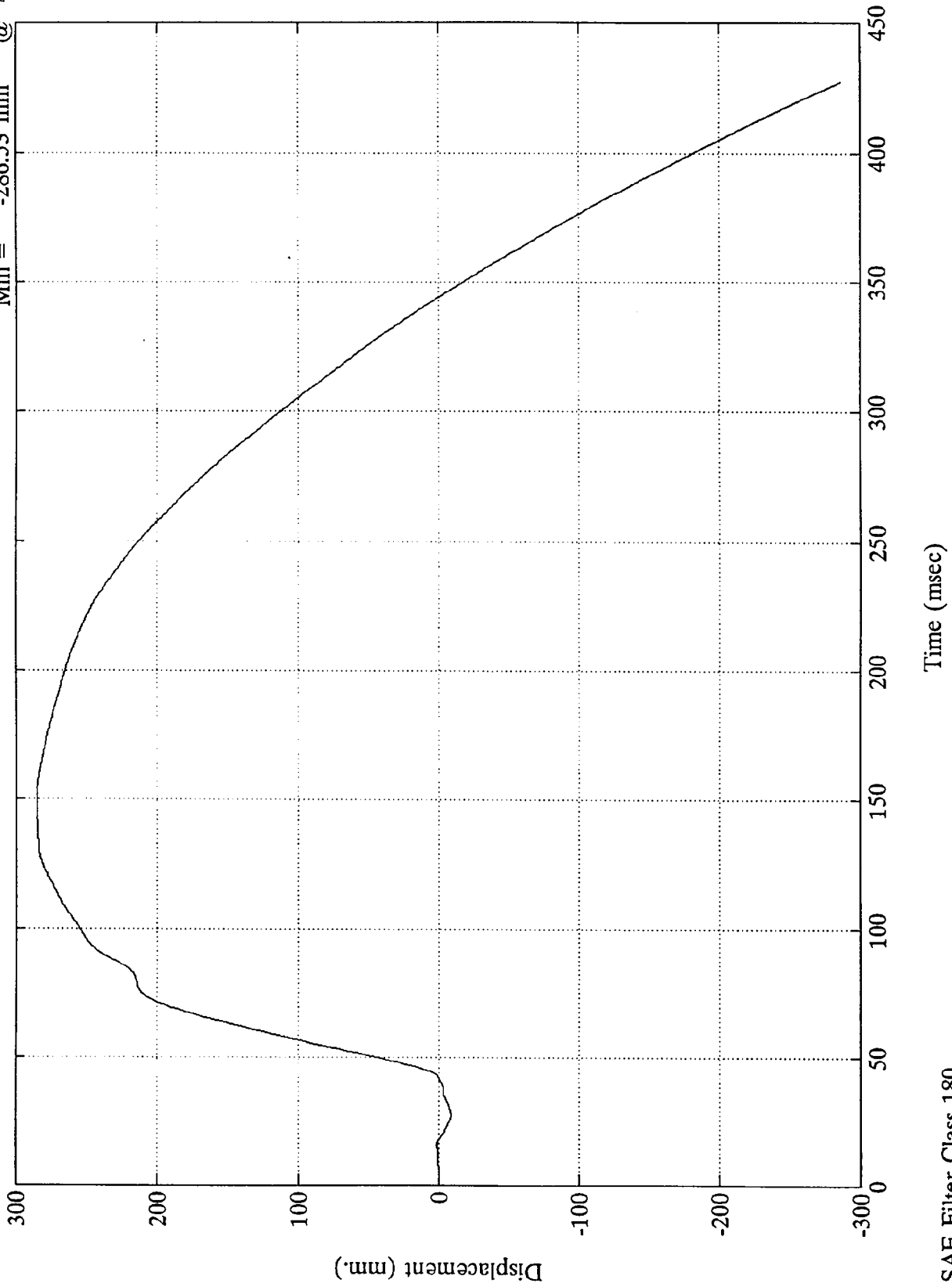


SAE Filter Class 180

VTV TEST #10

V1 Brake Pedal (Y)

Max = 285.32 mm @ 149.16 msec  
Min = -286.53 mm @ 427.32 msec

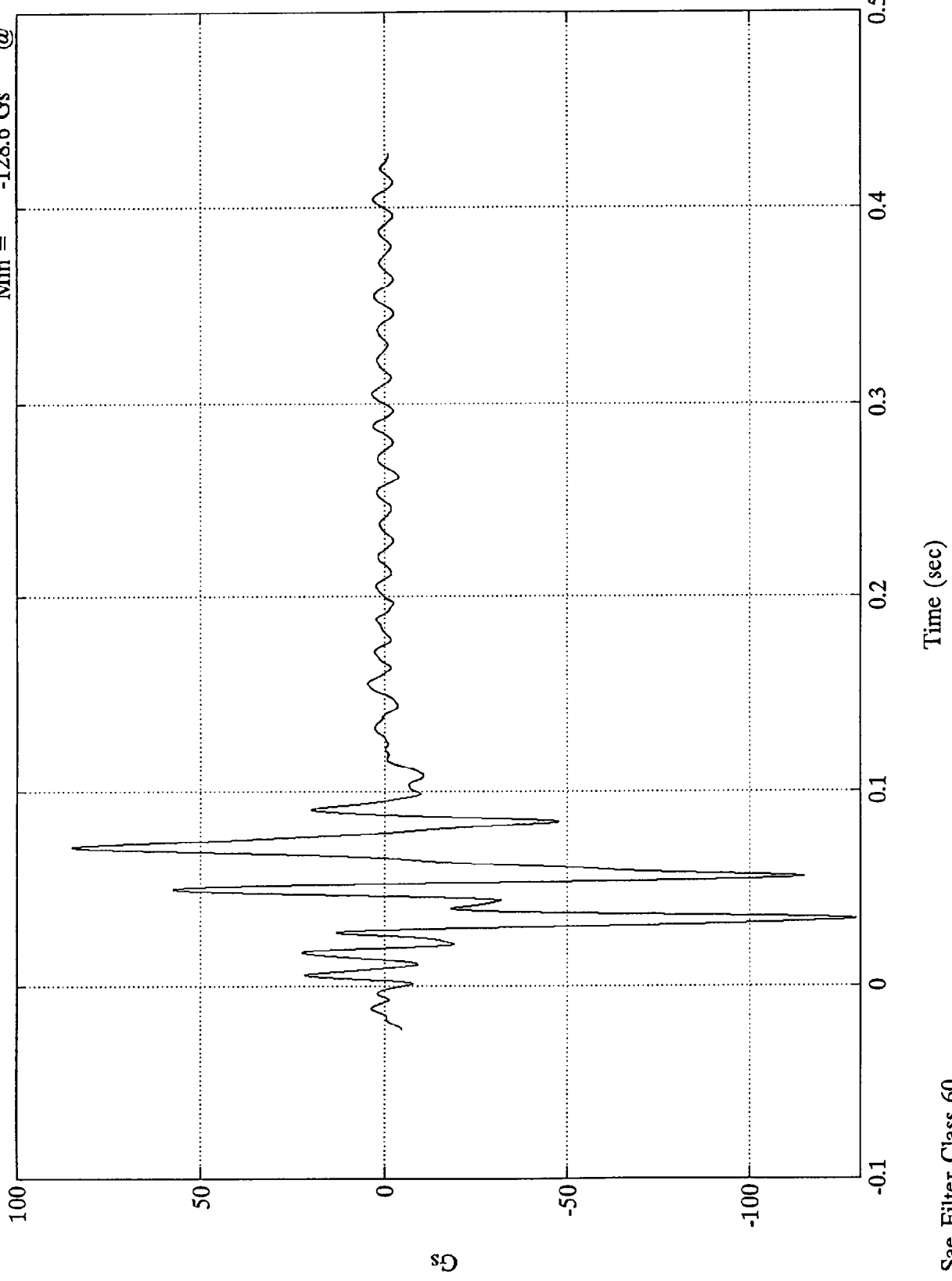


SAE Filter Class 180

VTV TEST #10

V1 Brake Pedal (Z)

Max = 84.9 Gs @ 71.63 msec  
Min = -128.6 Gs @ 34.56 msec

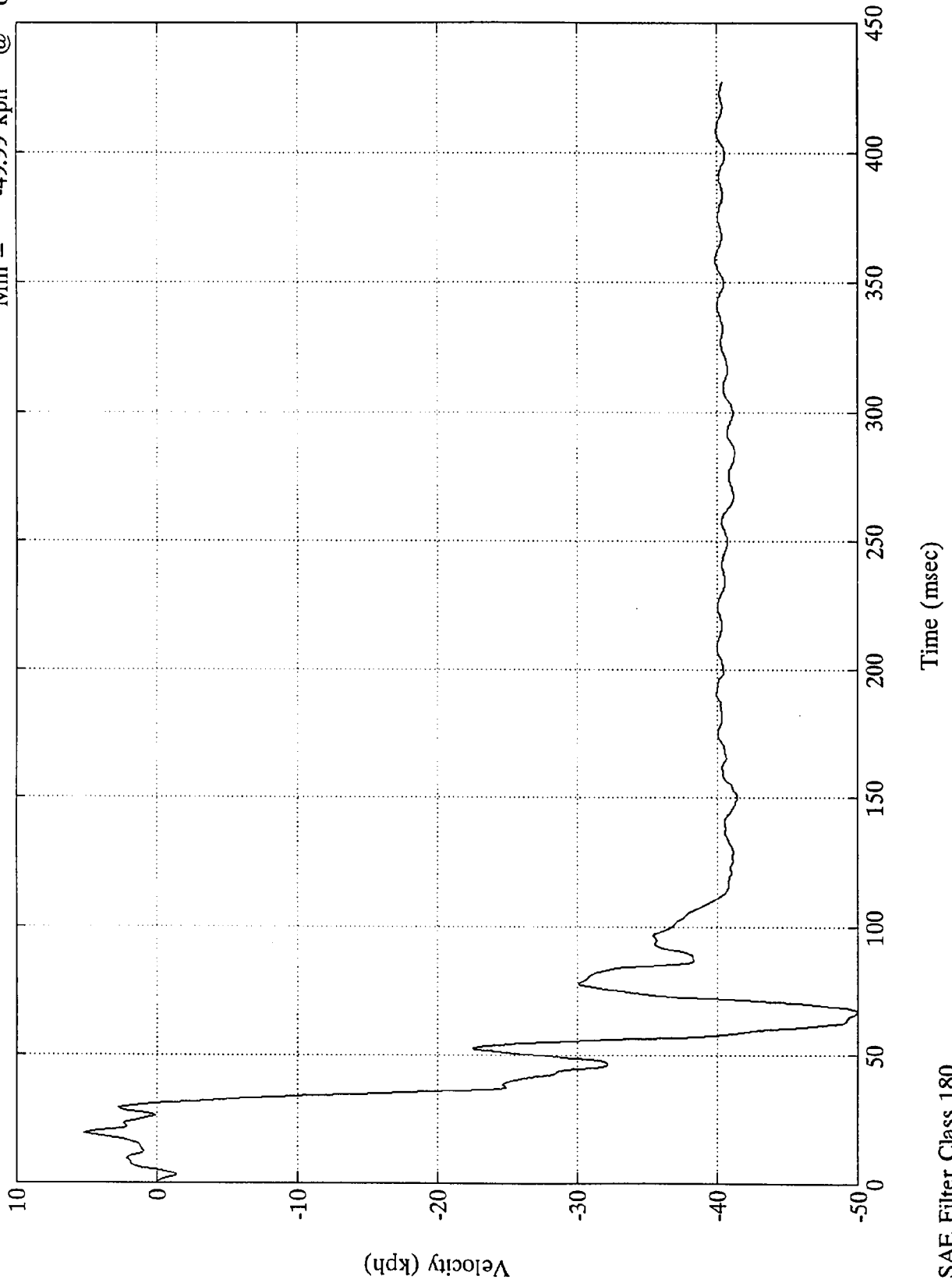


Sae Filter Class 60

VTV TEST #10

V1 Brake Pedal (Z)

Max = 5.28 kph @ 19.79 msec  
Min = -49.99 kph @ 66.95 msec

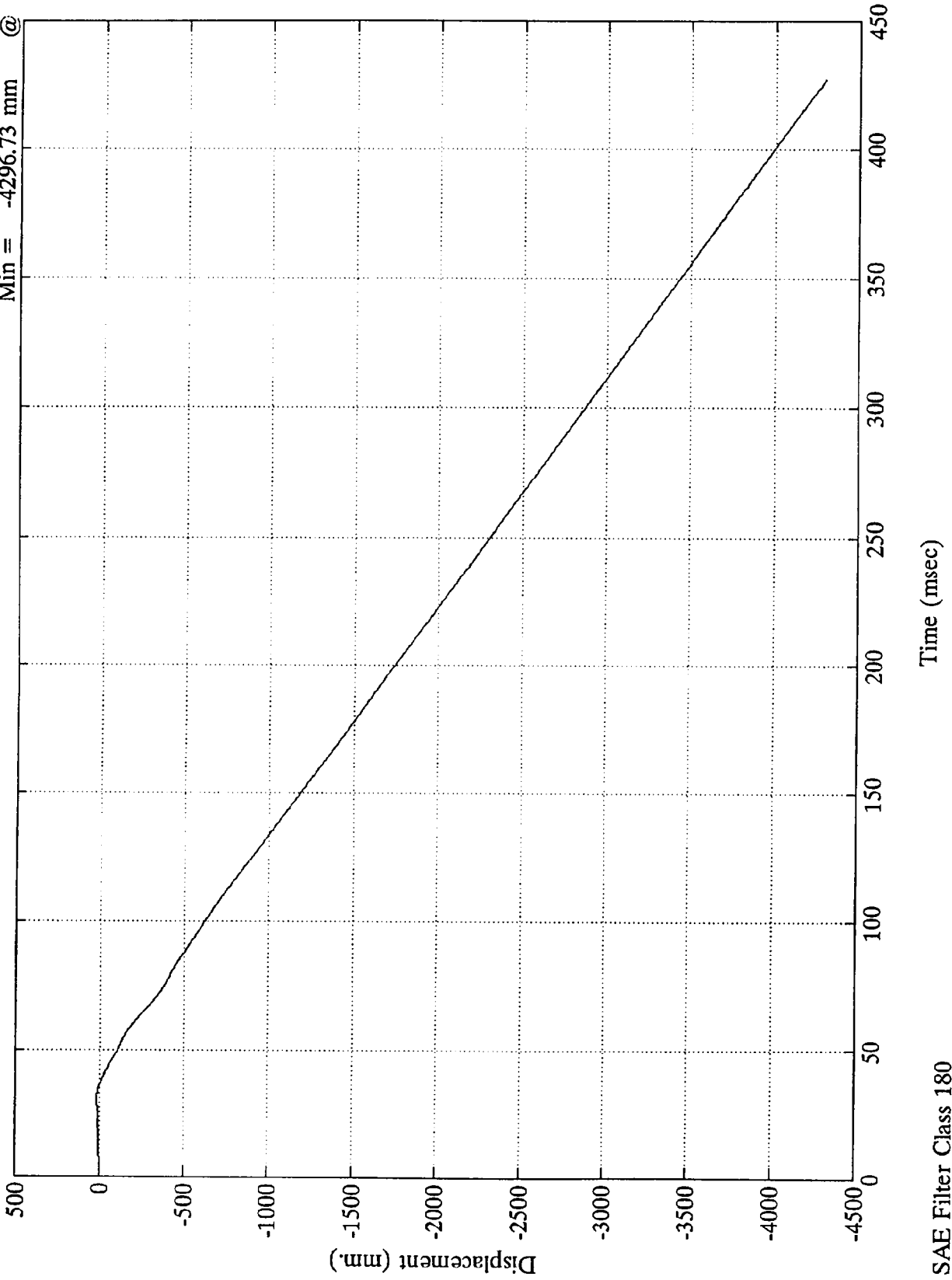


SAE Filter Class 180

VTV TEST #10

V1 Brake Pedal (Z)

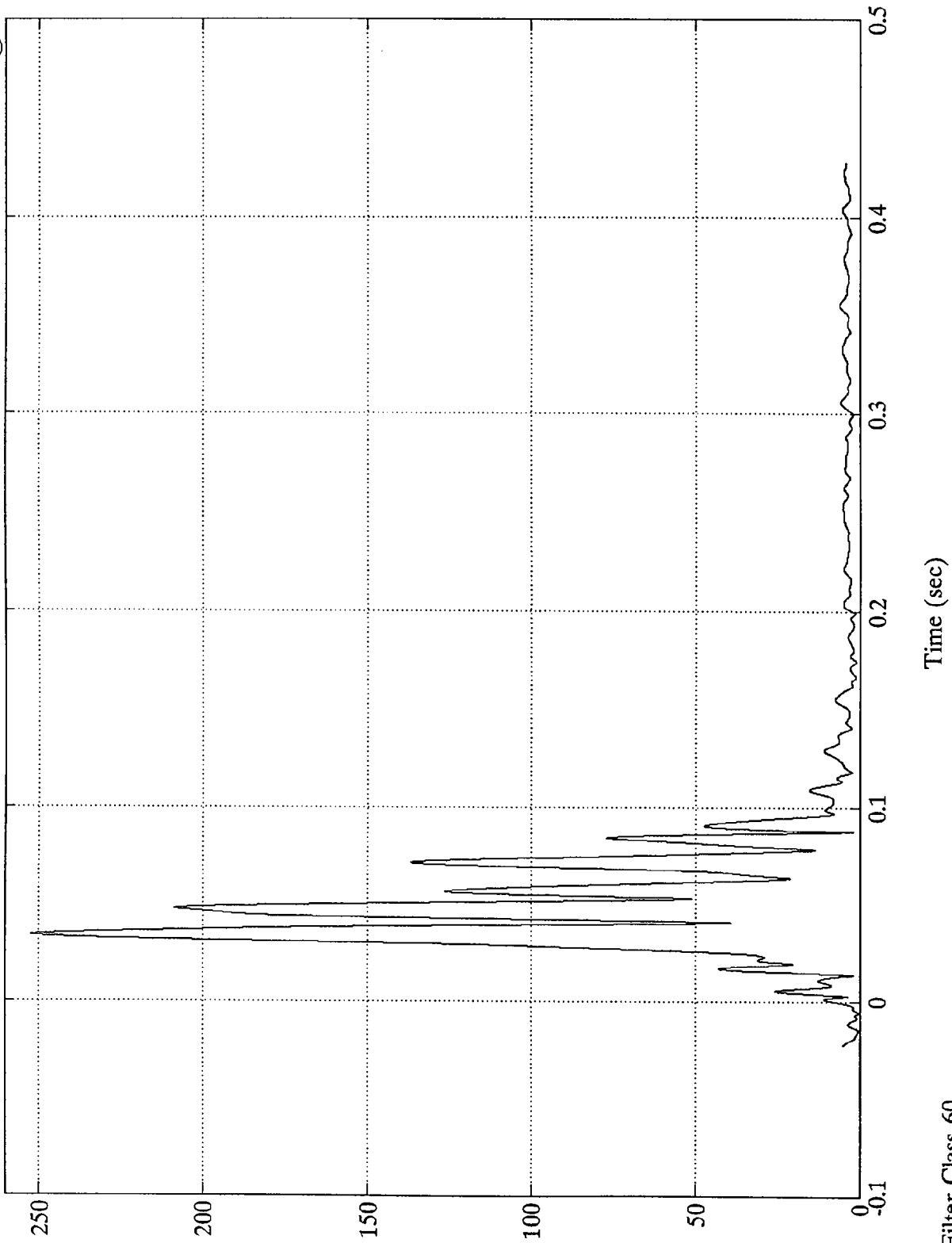
Max = 13.09 mm @ 30.96 msec  
Min = -4296.73 mm @ 427.32 msec



VTV TEST #10

V1 Brake Pedal (res)

Max = 252.2 Gs @ 33.95 msec  
Min = 0.1 Gs @ -5.52 msec



Gs

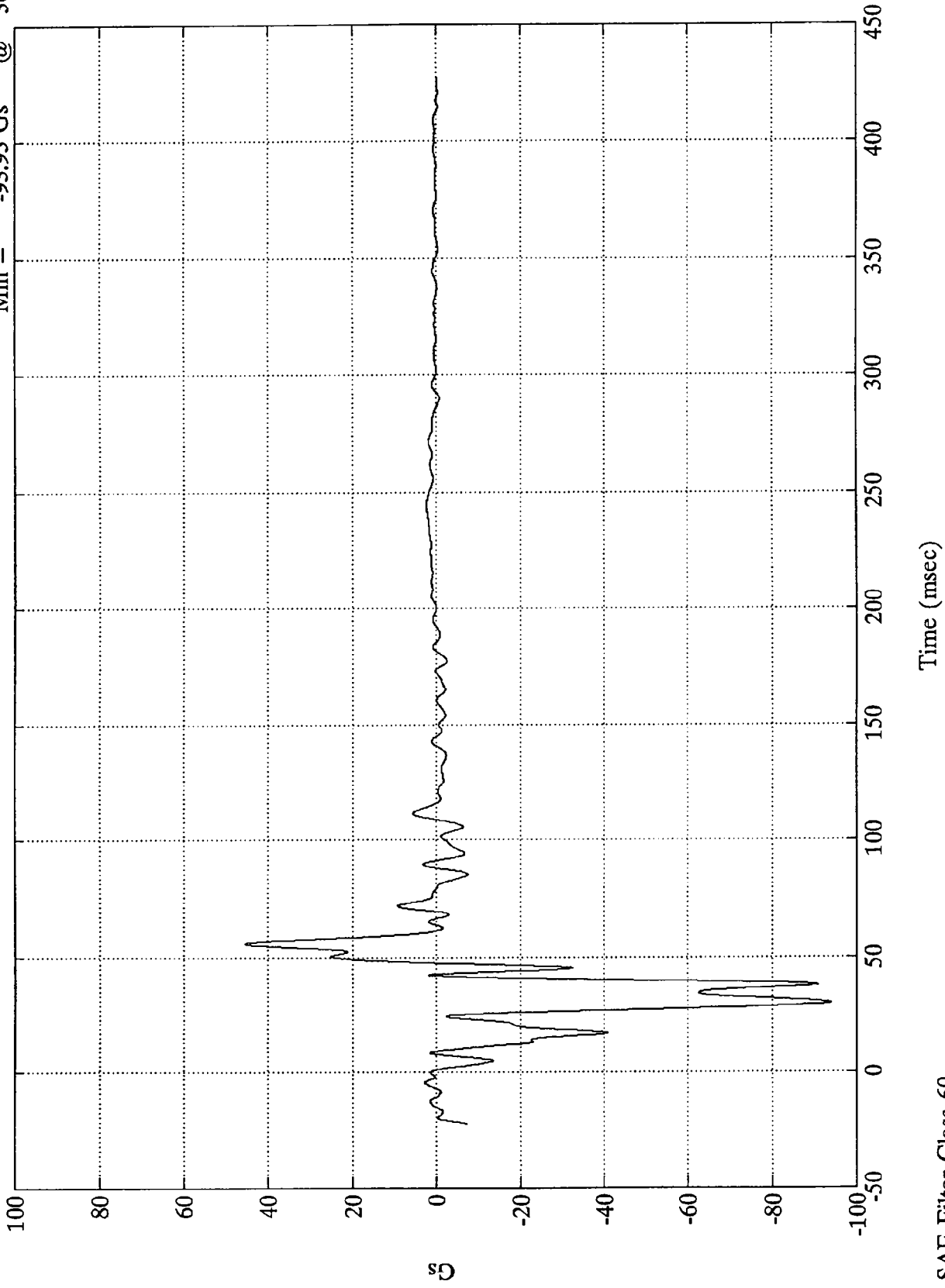
Time (sec)

Sae Filter Class 60

VTV TEST #10

V1 LF Frame Rail (X)

Max = 45.51 Gs @ 56.04 msec  
Min = -93.93 Gs @ 30.12 msec

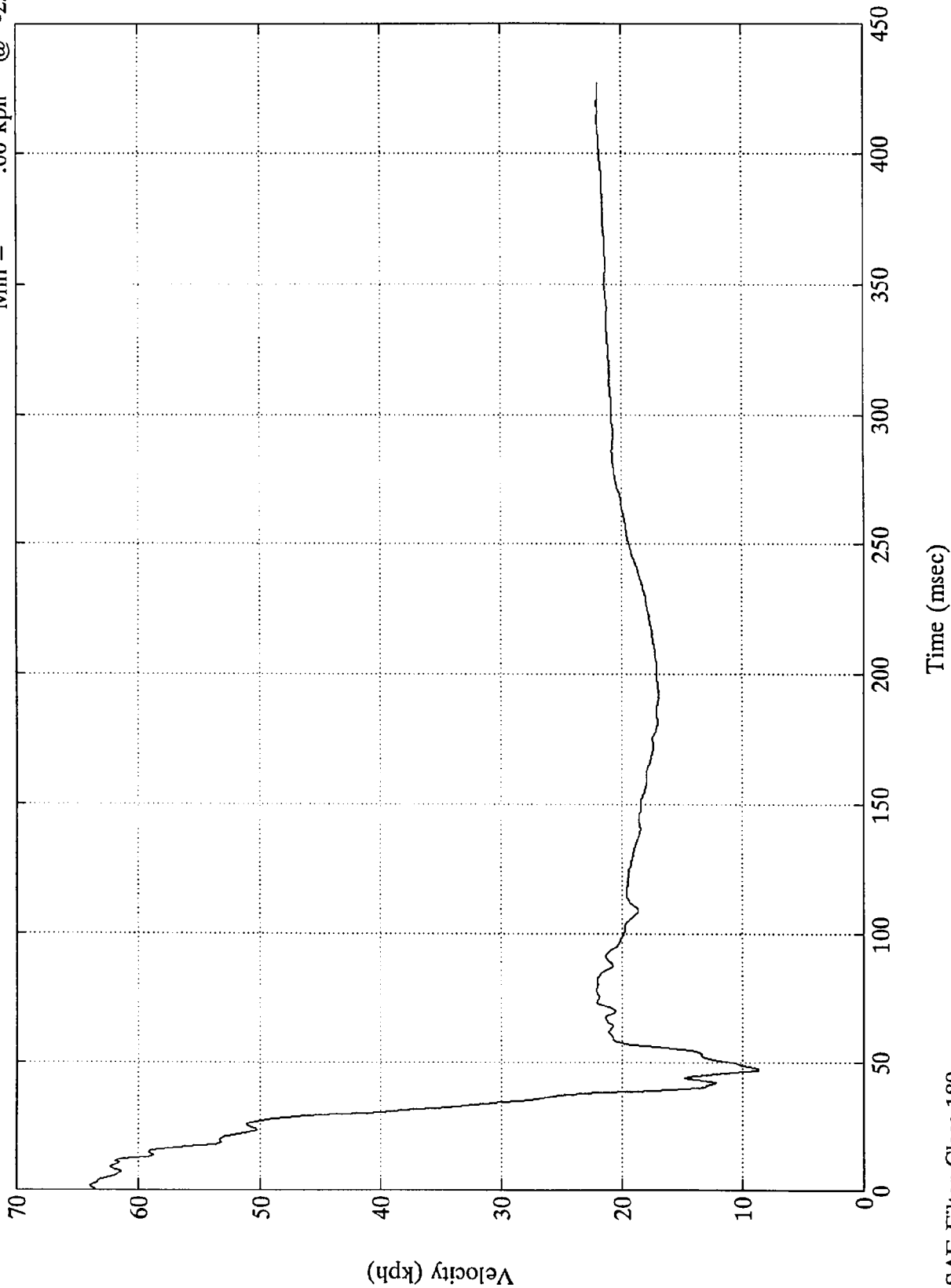


SAE Filter Class 60

VTV TEST #10

V1 L-F Frame Rail (X)

Max = 63.98 kph @ 1.67 msec  
Min = .00 kph @ -22.44 msec

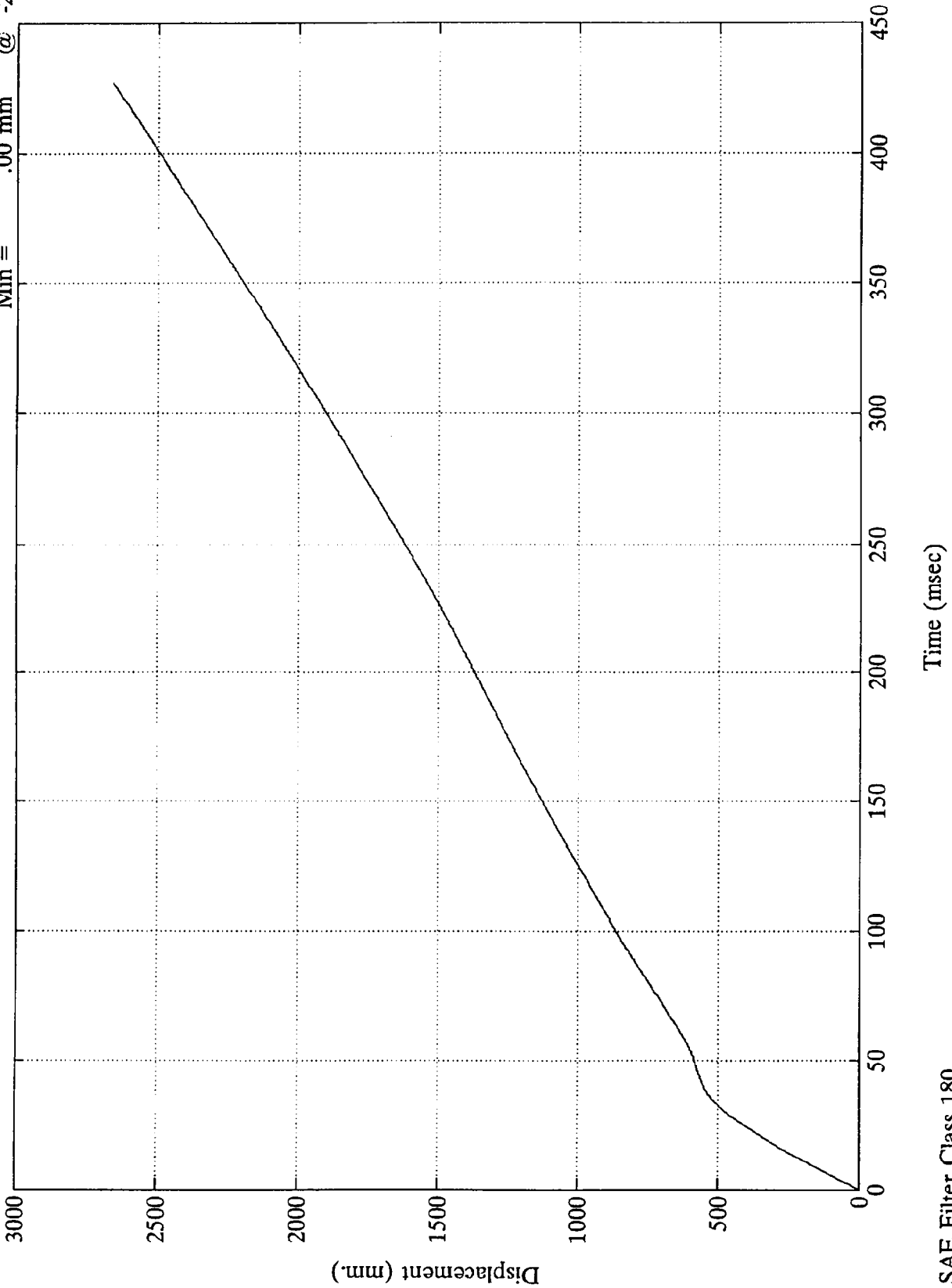


SAE Filter Class 180

VTV TEST #10

V1 L F Frame Rail (X)

Max = 2660.89 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

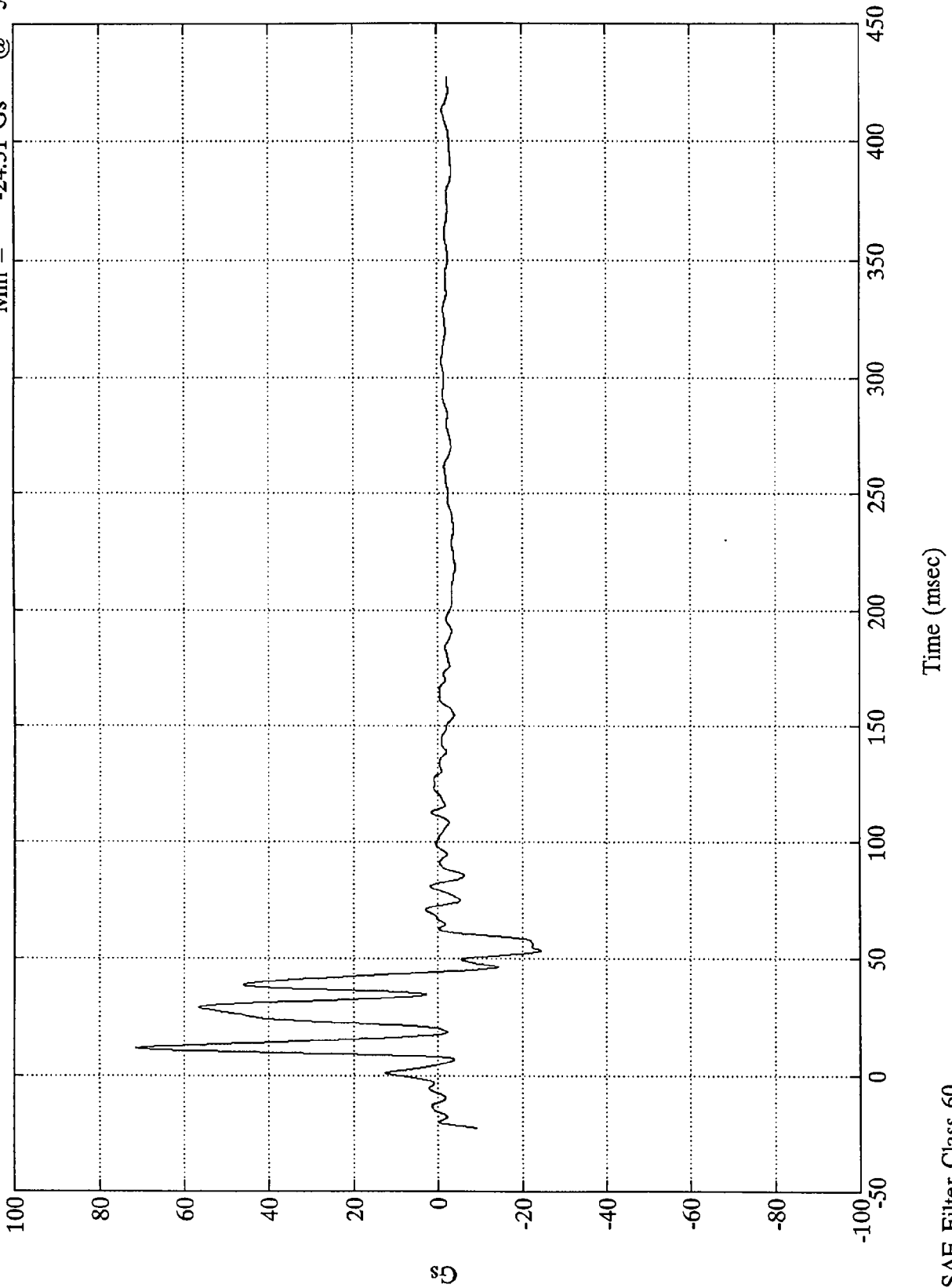


SAE Filter Class 180

VTV TEST #10

V1 LF Frame Rail (Y)

Max = 71.31 Gs @ 11.88 msec  
Min = -24.31 Gs @ 53.40 msec

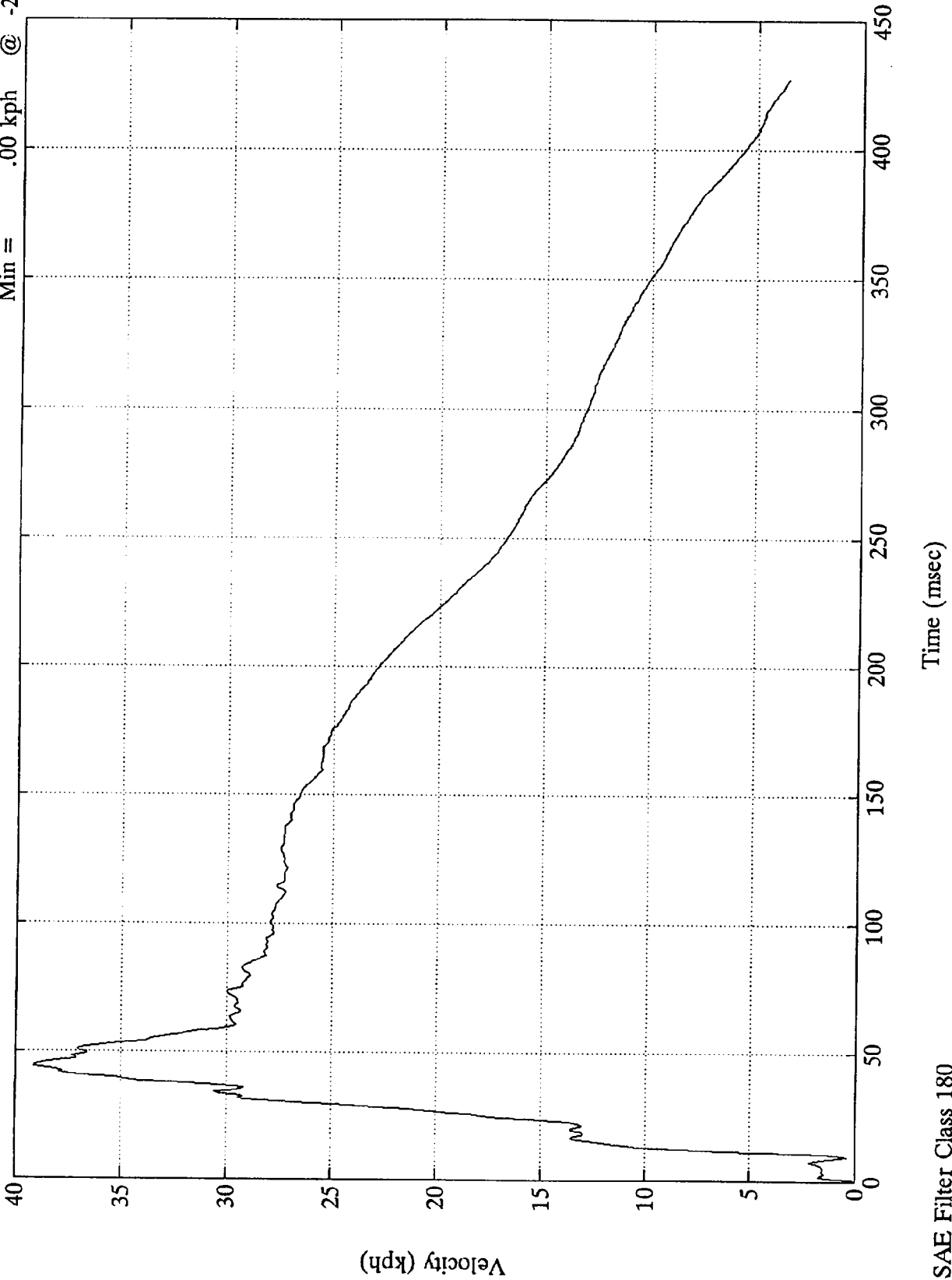


SAE Filter Class 60

VTV TEST #10

V1 L.F. Frame Rail (Y)

Max = 39.18 kph @ 44.04 msec  
Min = .00 kph @ -22.44 msec

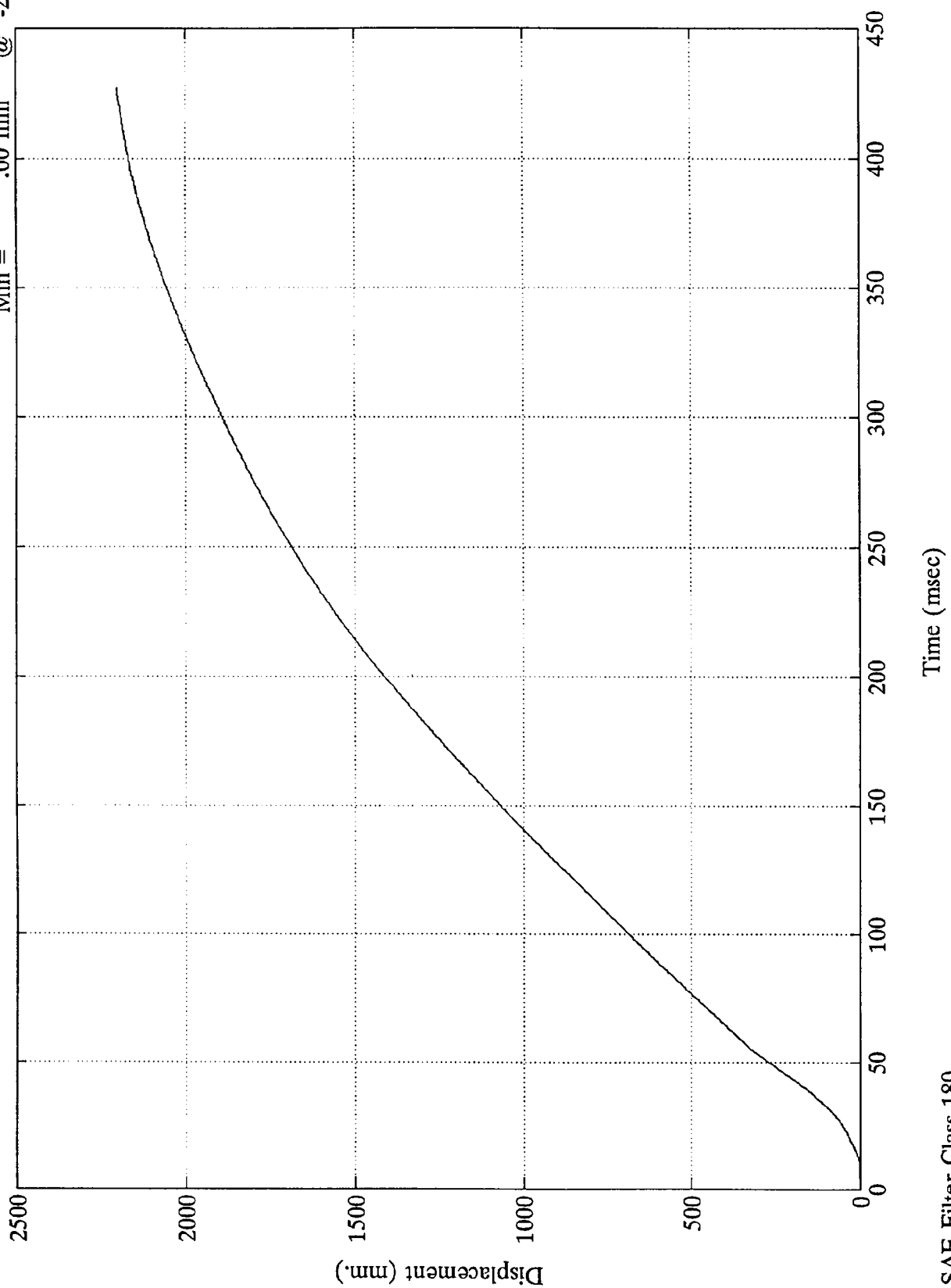


SAE Filter Class 180

VTV TEST #10

V1 L-F Frame Rail (Y)

Max = 2202.08 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

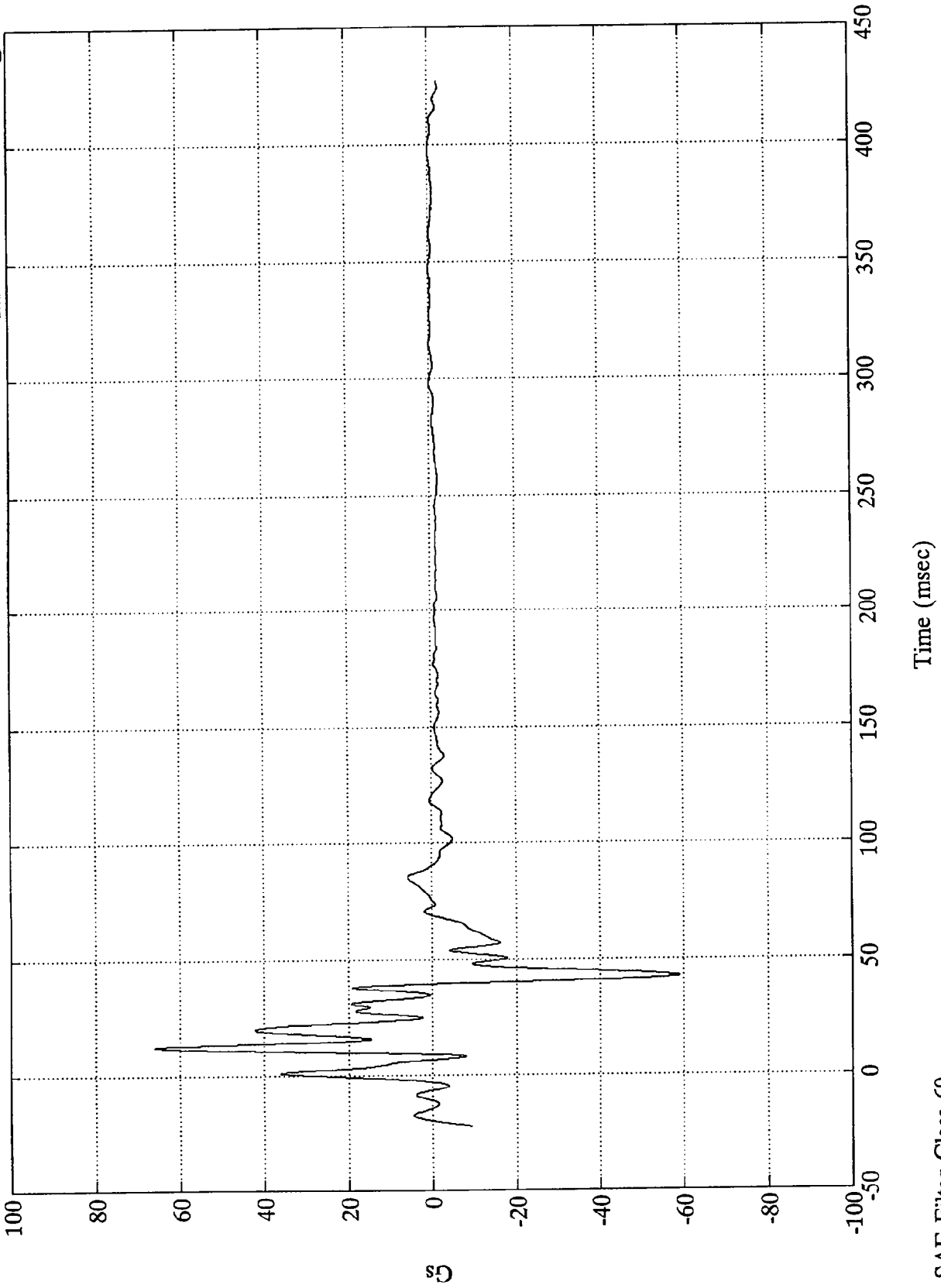


SAE Filter Class 180

VTV TEST #10

V1 L.F. Frame Rail (Z)

Max = 66.07 Gs @ 12.11 msec  
Min = -59.11 Gs @ 42.72 msec

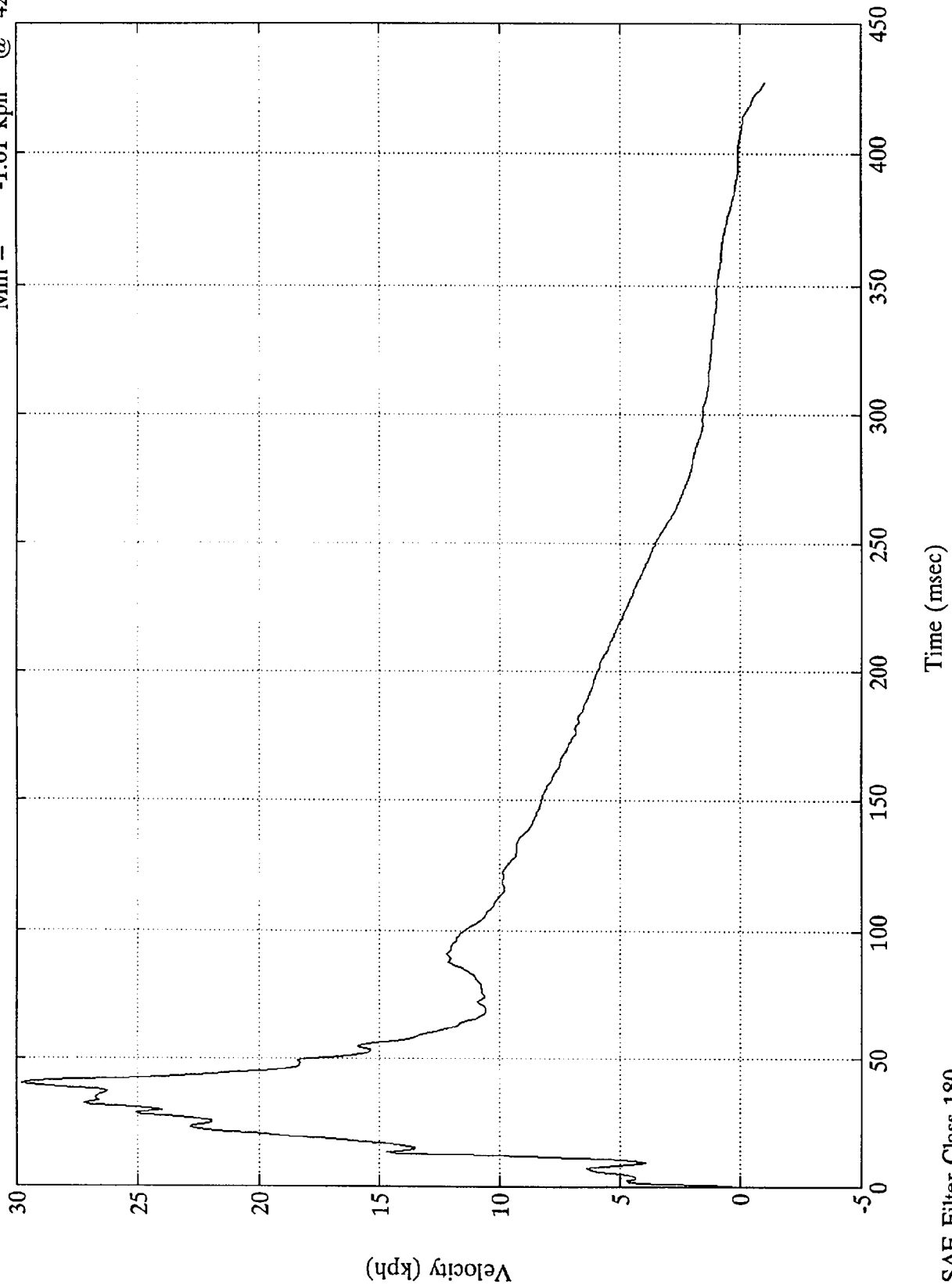


SAE Filter Class 60

VTV TEST #10

V1 LF Frame Rail (Z)

Max = 29.80 kph @ 40.20 msec  
Min = -1.01 kph @ 427.32 msec

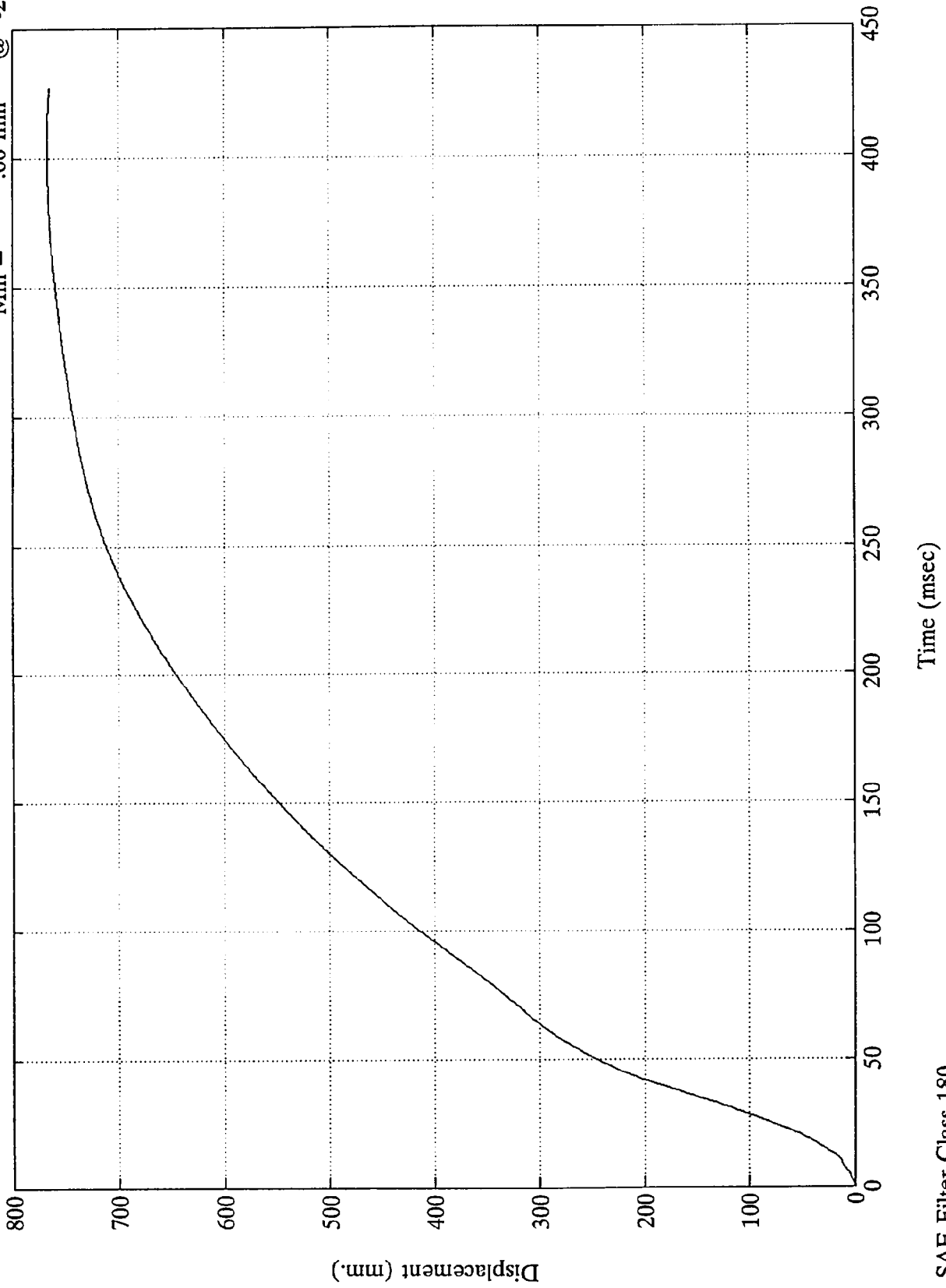


SAE Filter Class 180

VTV TEST #10

V1 LF Frame Rail (Z)

Max = 766.95 mm @ 406.80 msec  
Min = .00 mm @ -22.44 msec

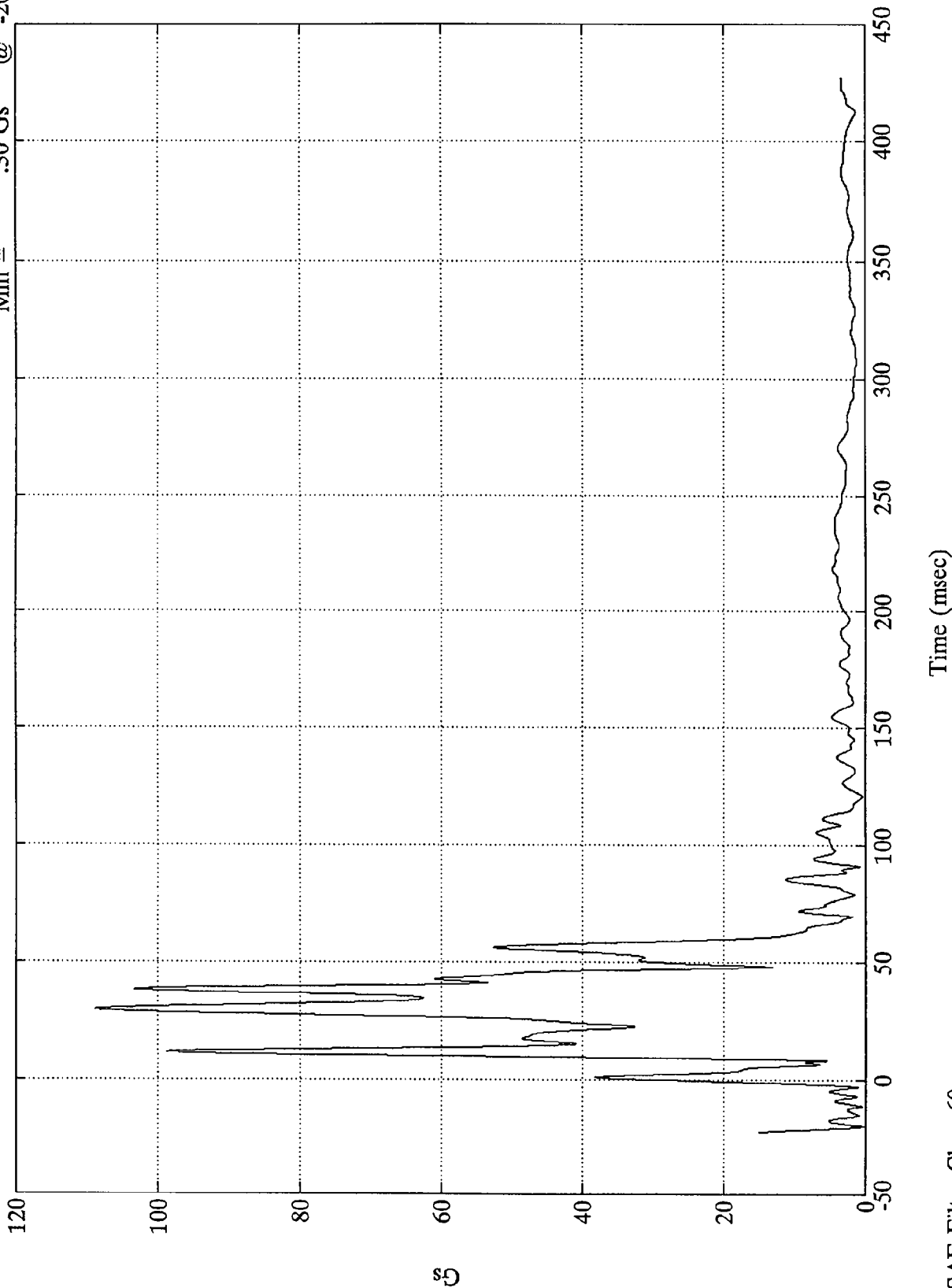


SAE Filter Class 180

VTV TEST #10

V1 L.F Frame Rail Res.

Max = 108.88 Gs @ 29.88 msec  
Min = .30 Gs @ -20.04 msec

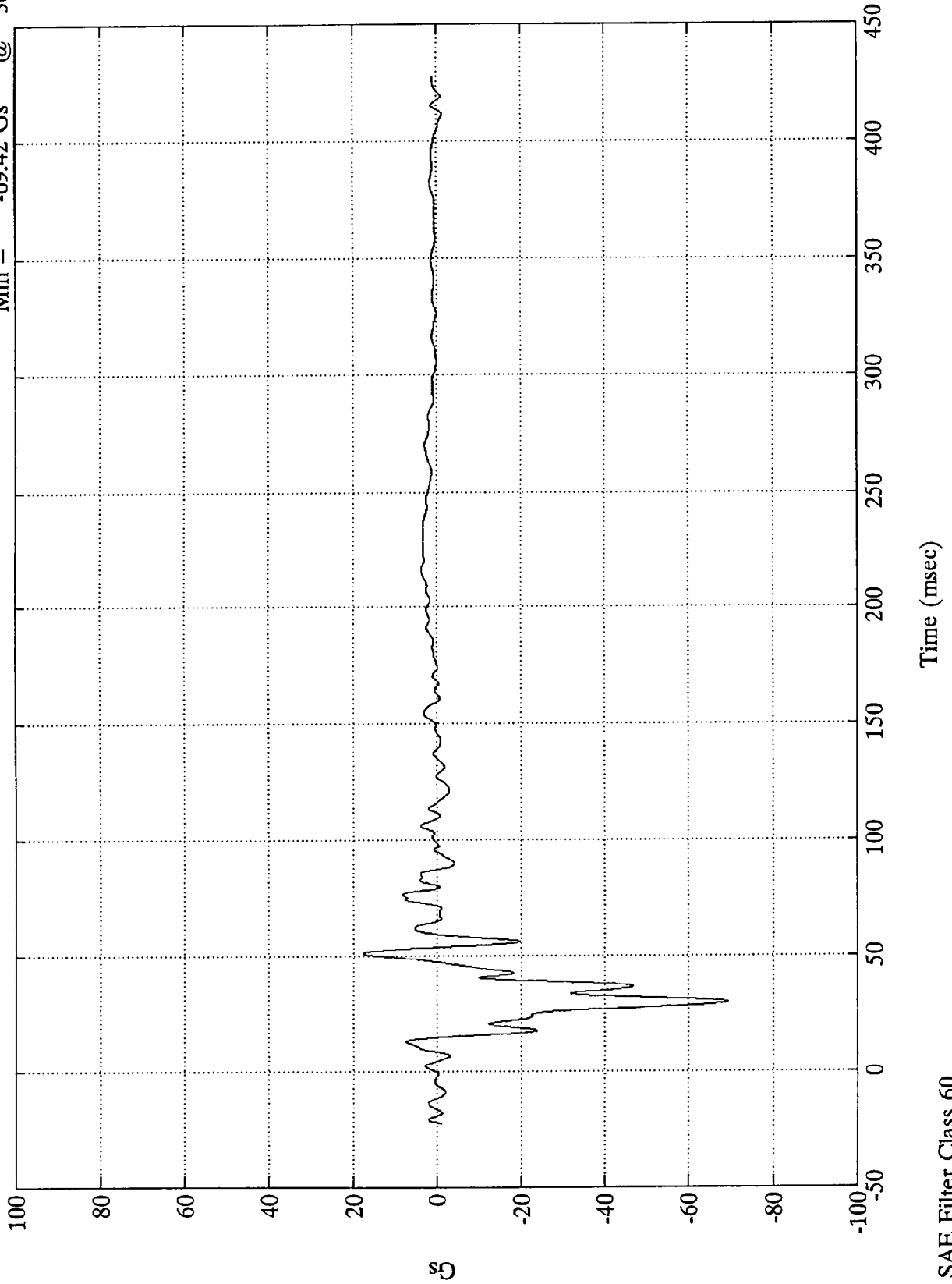


SAE Filter Class 60

VTV TEST #10

V1 R.F Frame Rail (X)

Max = 17.58 Gs @ 51.00 msec  
Min = -69.42 Gs @ 30.00 msec



B-45

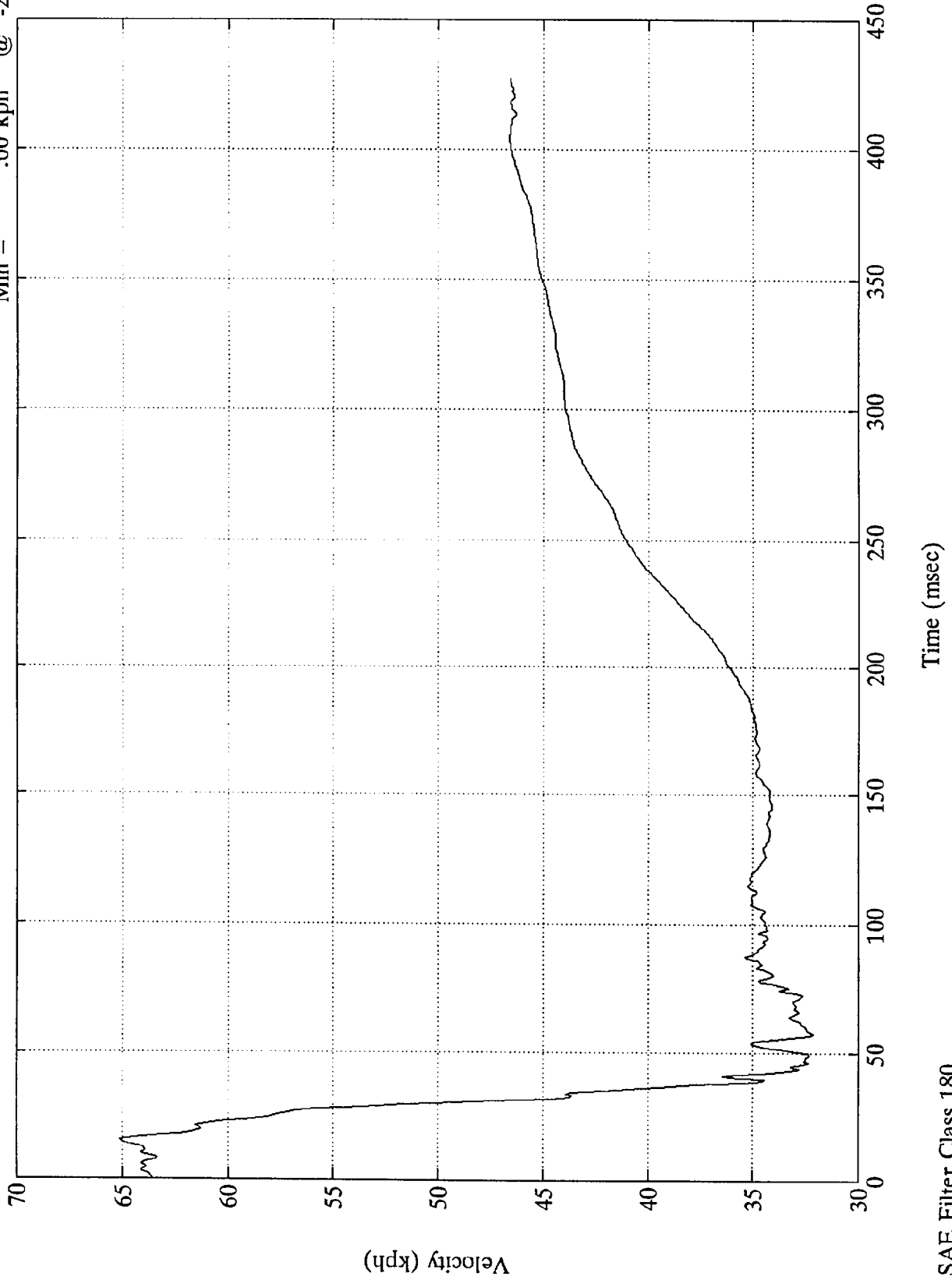
8118-10

SAE Filter Class 60

VTV TEST #10

V1 R.F Frame Rail (X)

Max = 65.15 kph @ 15.48 msec  
Min = .00 kph @ -22.44 msec

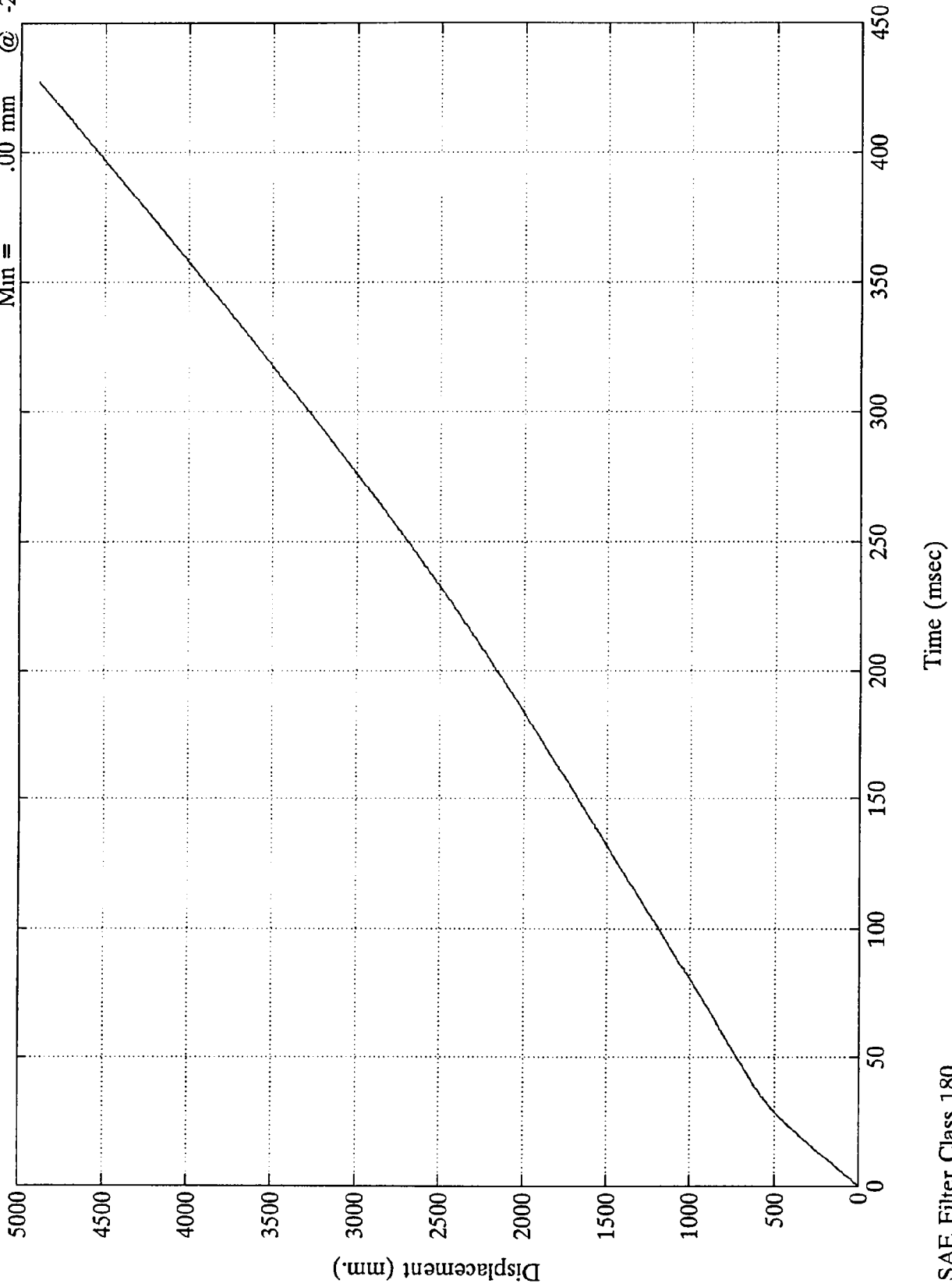


SAE Filter Class 180

VTV TEST #10

V1 R.F Frame Rail (X)

Max = 4890.50 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

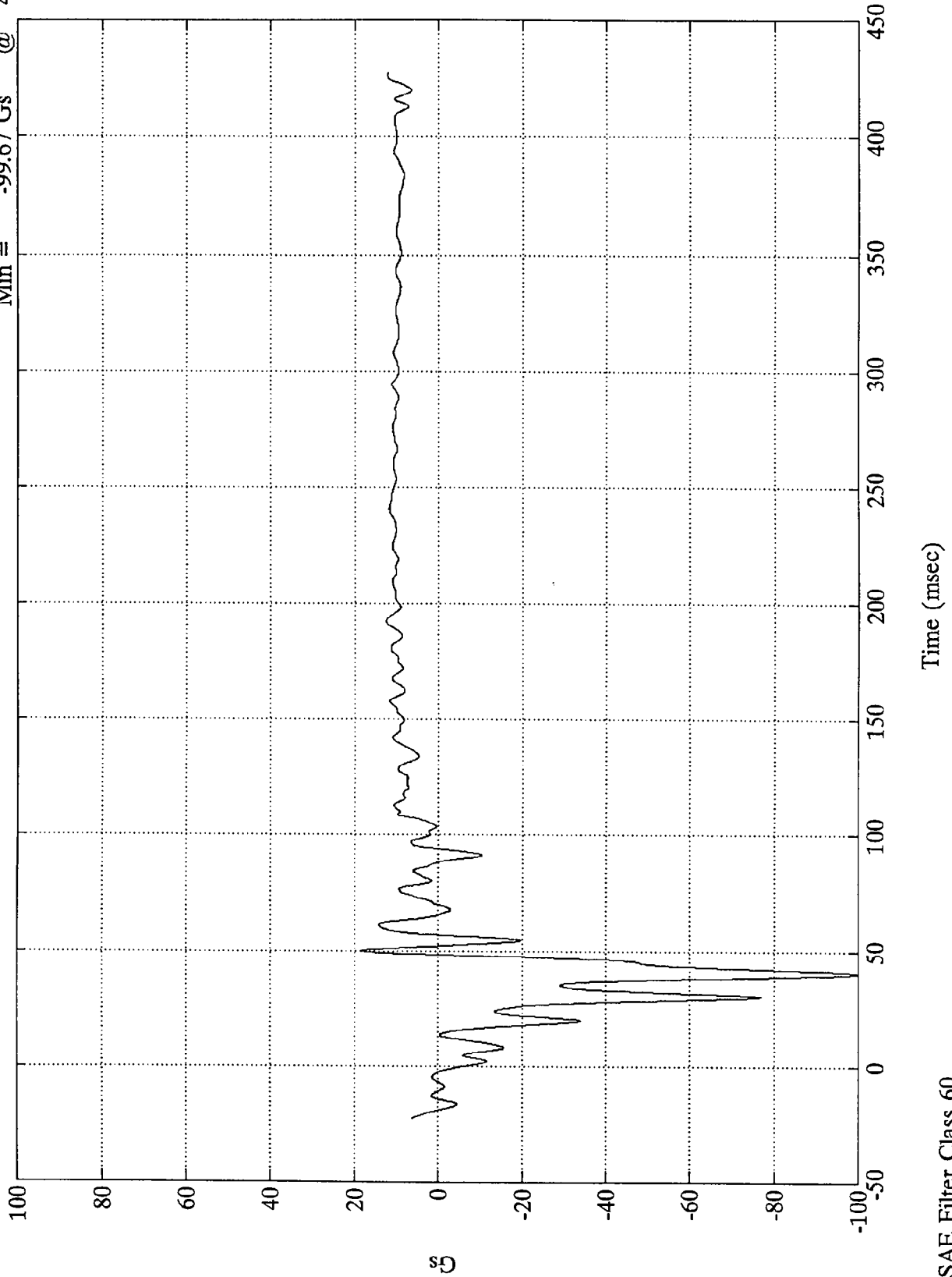


SAE Filter Class 180

VTV TEST #10

V1 R.F. Frame Rail (Y)

Max = 18.39 Gs @ 50.04 msec  
Min = -99.67 Gs @ 40.07 msec

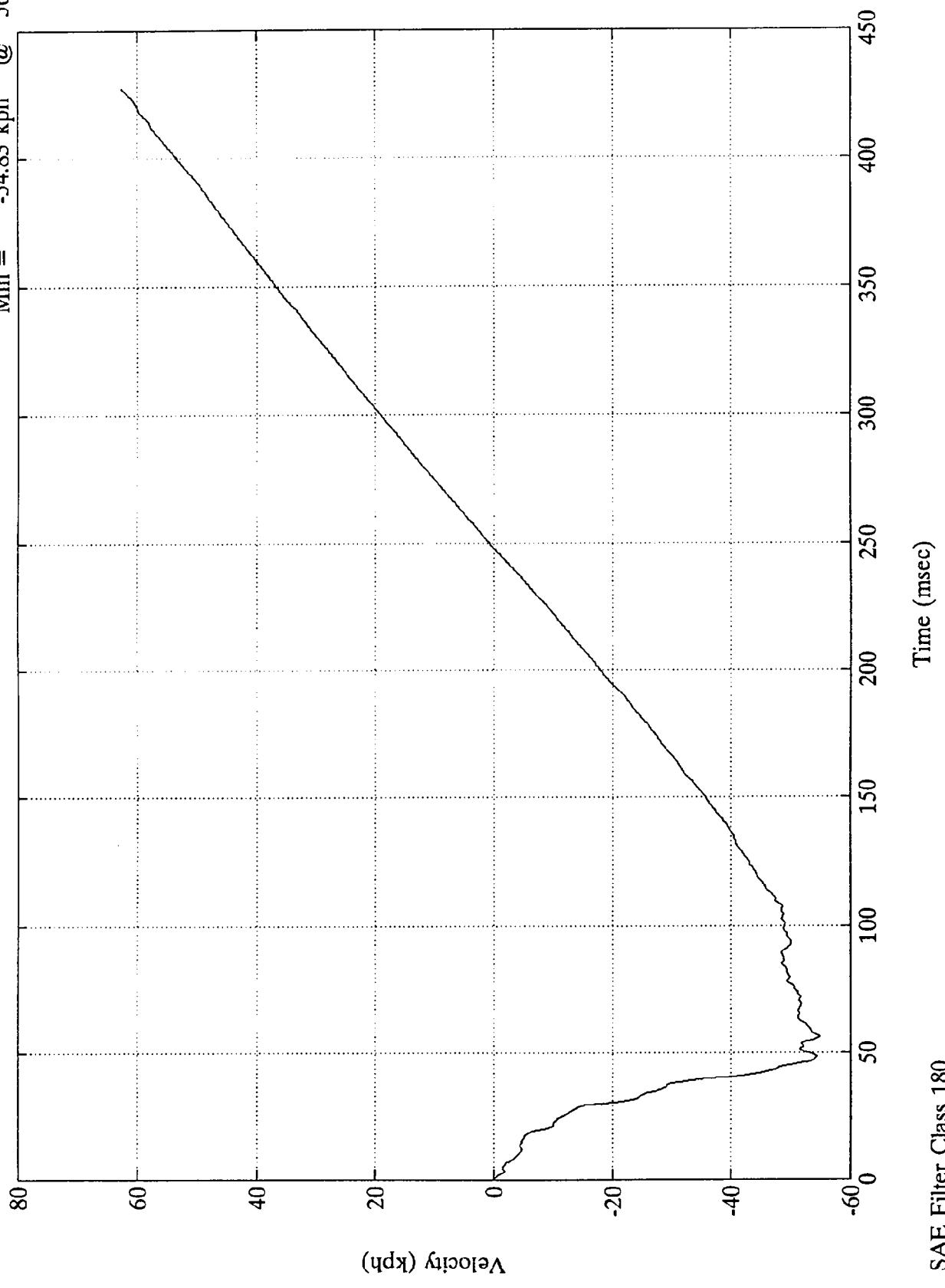


SAE Filter Class 60

VTV TEST #10

V1 R.F Frame Rail (Y)

Max = 62.63 kph @ 427.32 msec  
Min = -54.83 kph @ 56.52 msec

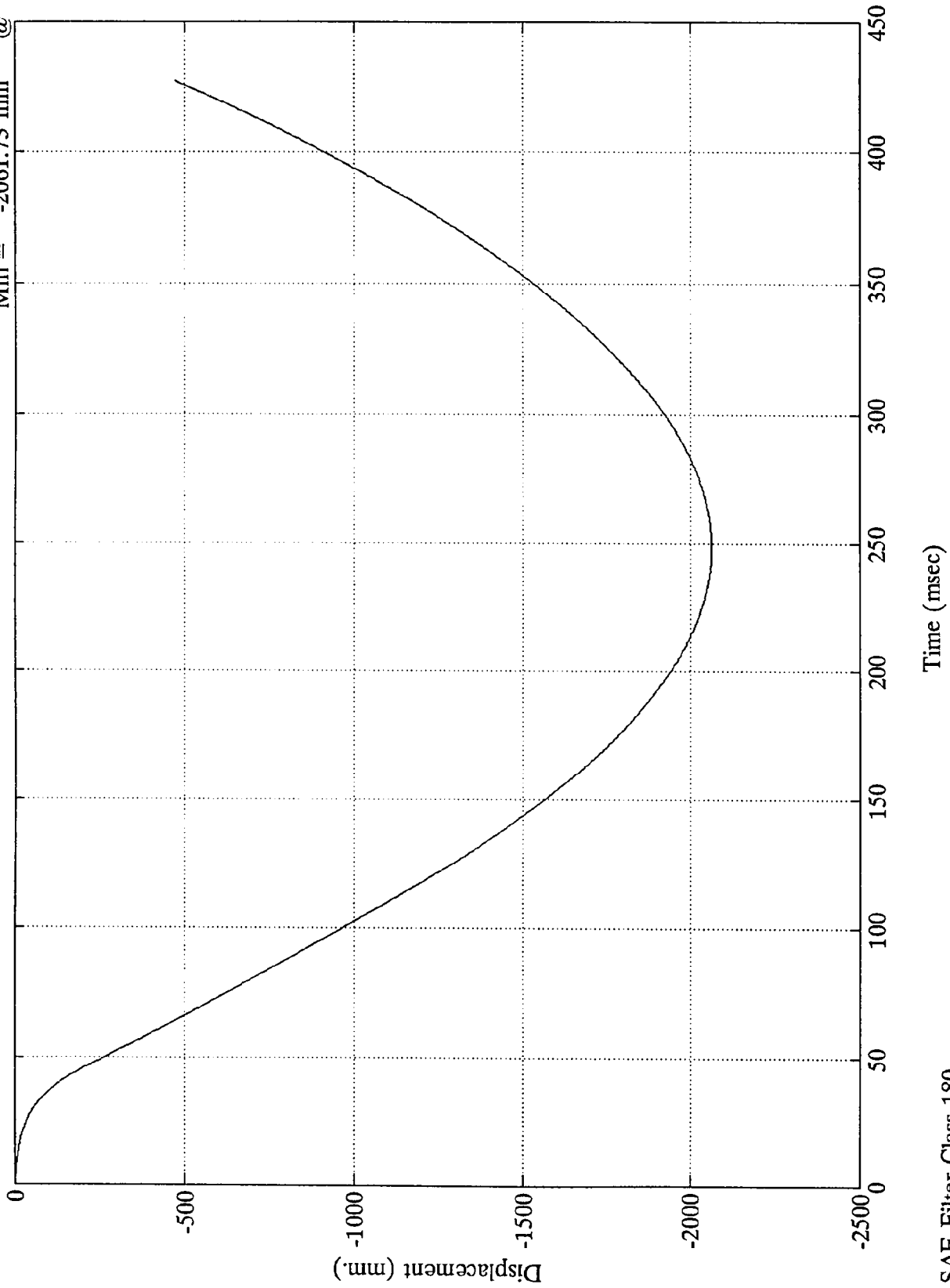


SAE Filter Class 180

VTV TEST #10

V1 R.F Frame Rail (Y)

Max = .00 mm @ -0.00 msec  
Min = -2061.73 mm @ 248.04 msec

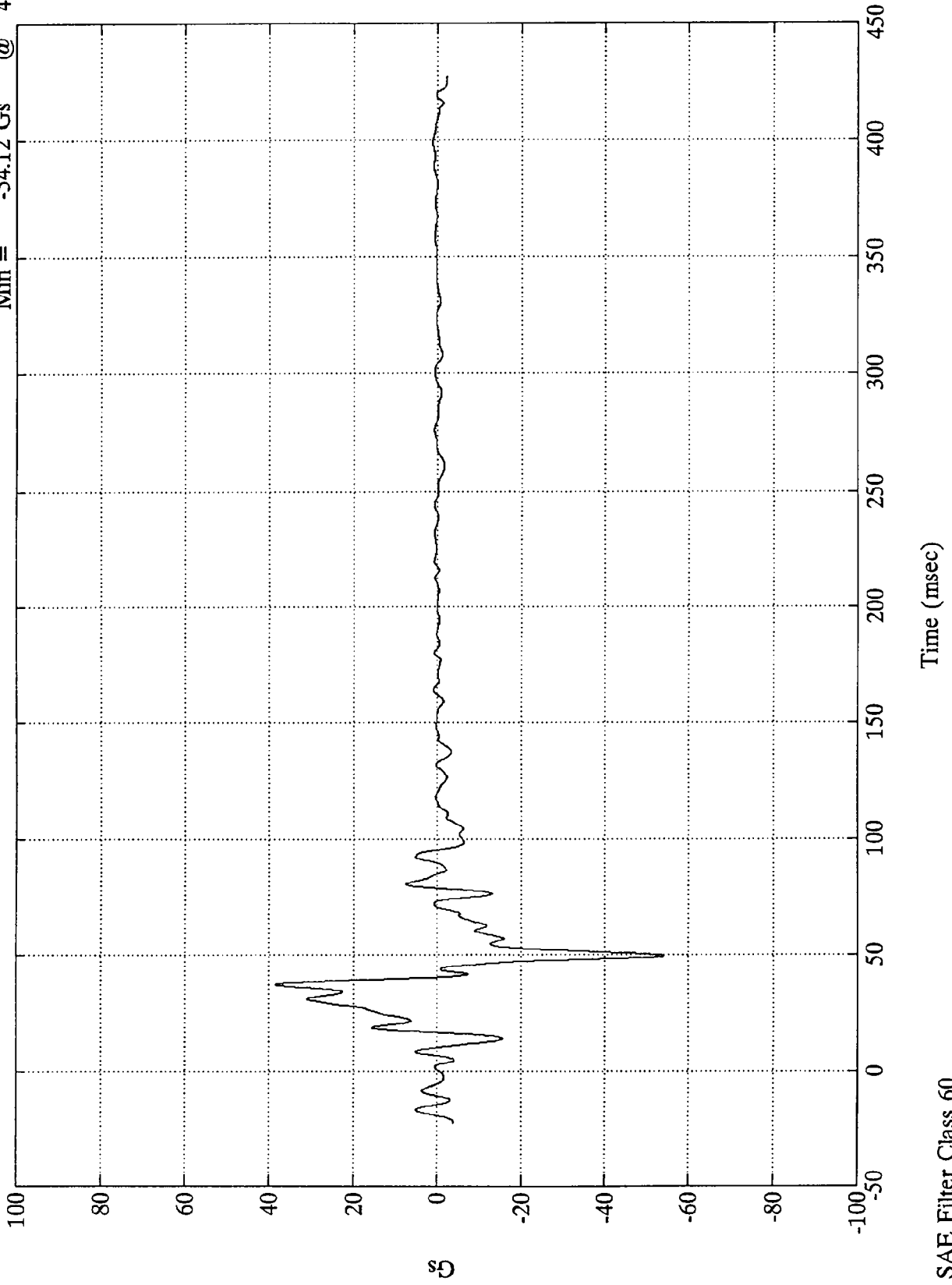


SAE Filter Class 180

VTV TEST #10

V1 R.F Frame Rail (Z)

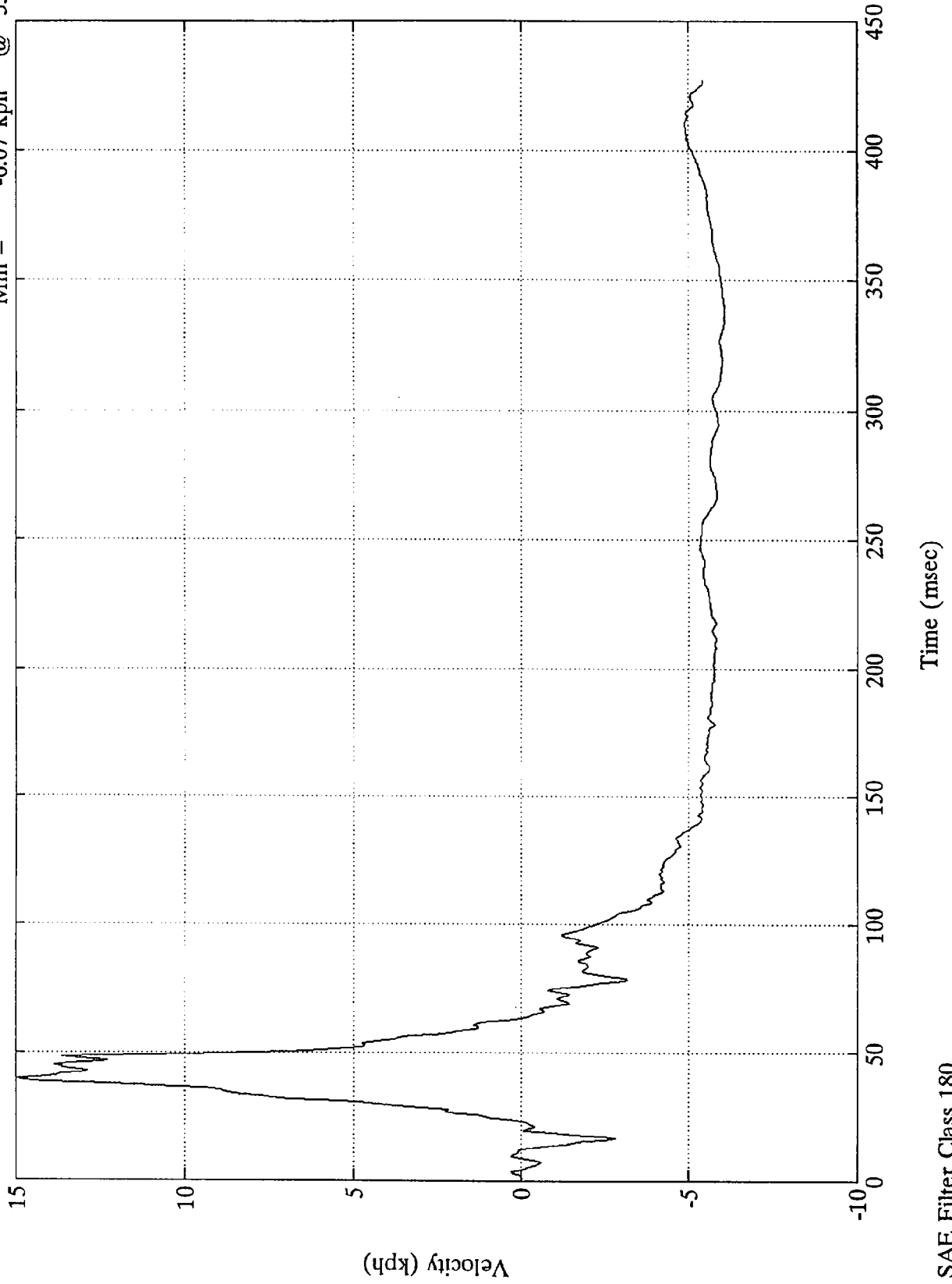
Max = 38.61 Gs @ 37.08 msec  
Min = -54.12 Gs @ 49.43 msec



VTV TEST #10

V1 R.F Frame Rail (Z)

Max = 14.97 kph @ 39.48 msec  
Min = -6.07 kph @ 336.60 msec

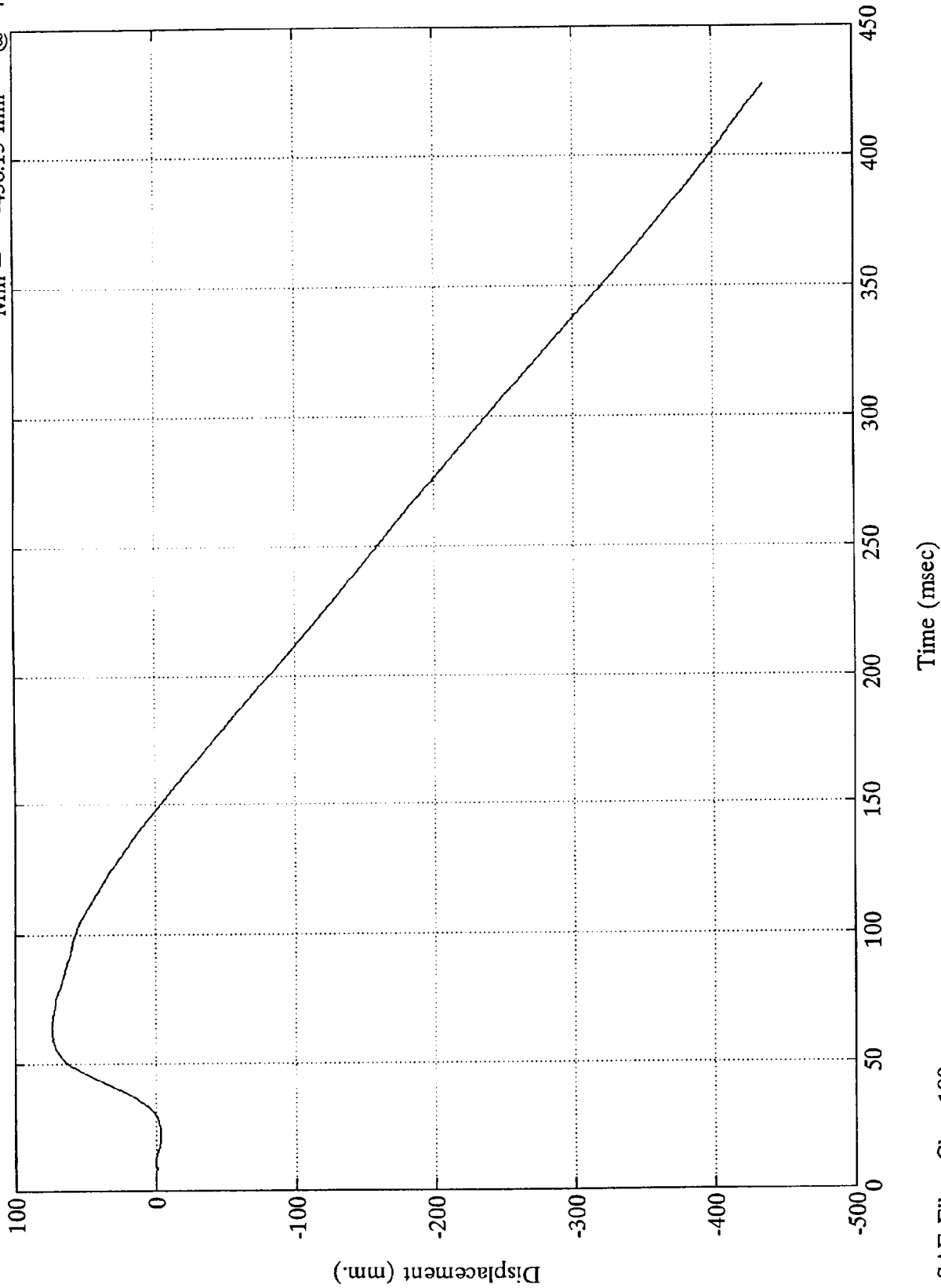


SAE Filter Class 180

VTV TEST #10

V1 R.F Frame Rail (Z)

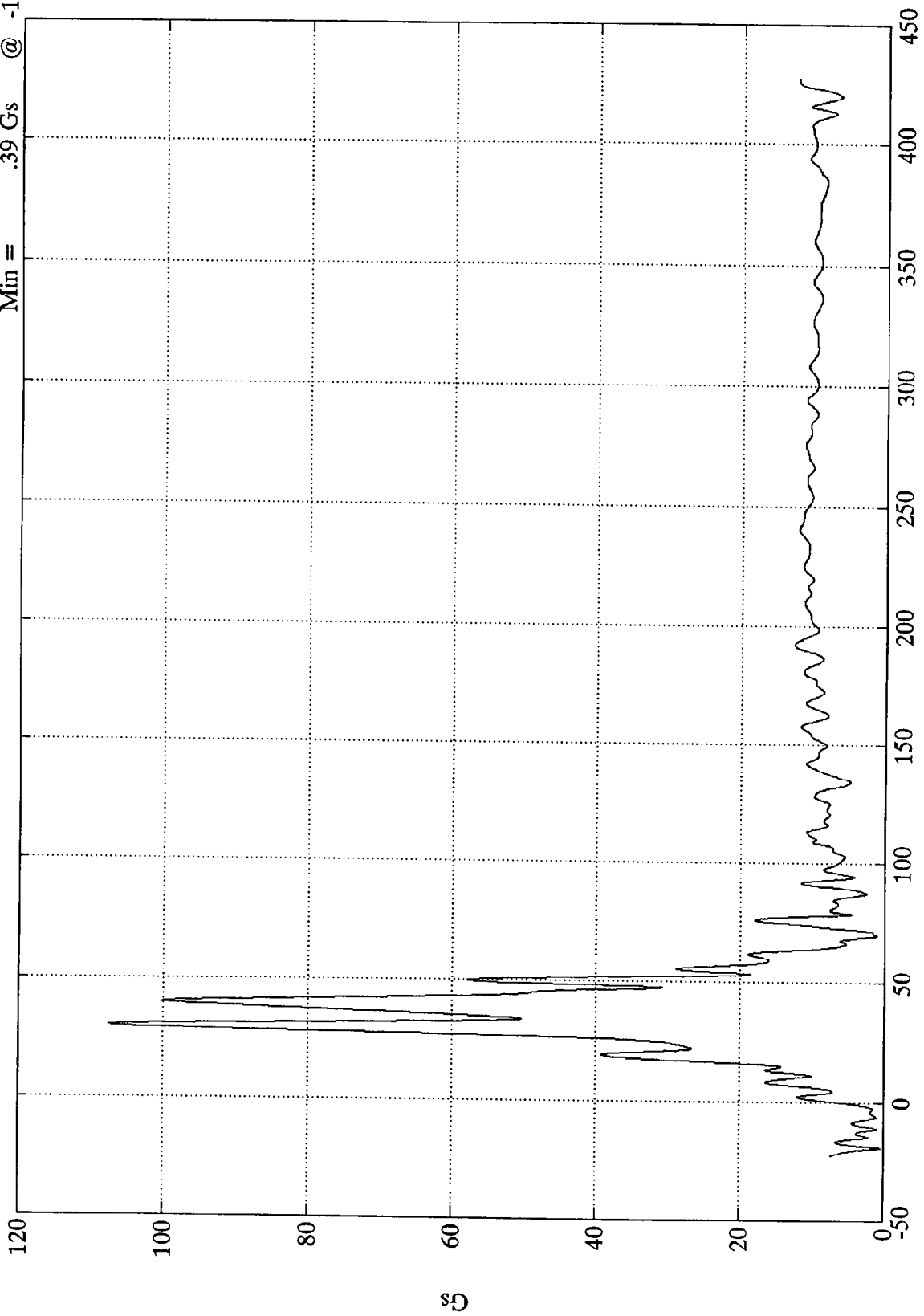
Max = 74.03 mm @ 63.00 msec  
Min = -436.15 mm @ 427.32 msec



VTV TEST #10

V1 R.F Frame Rail Res.

Max = 107.59 Gs @ 30.12 msec  
Min = .39 Gs @ -19.20 msec



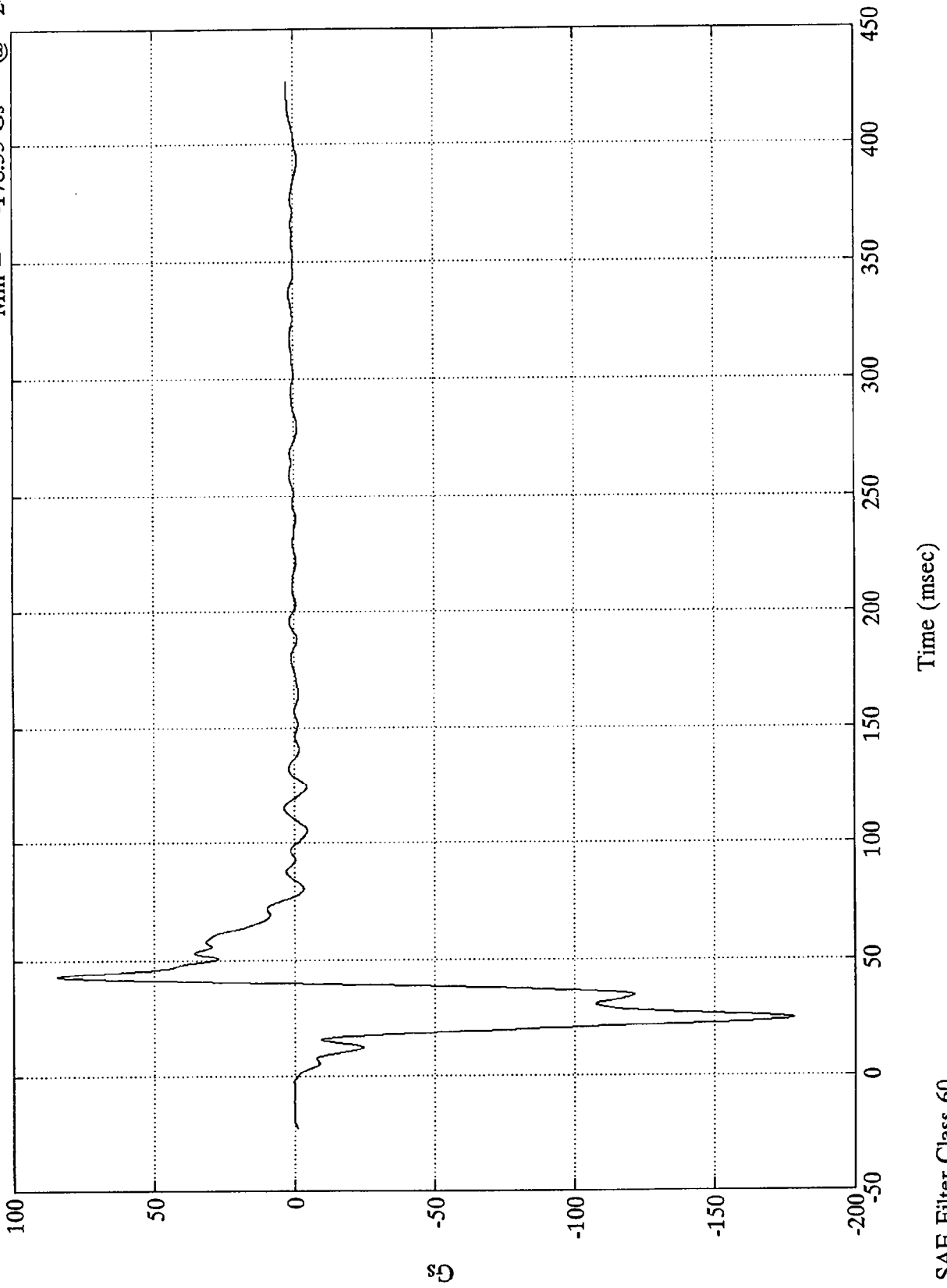
Time (msec)

SAE Filter Class 60

VTV TEST #10

V1 Left Engine (X)

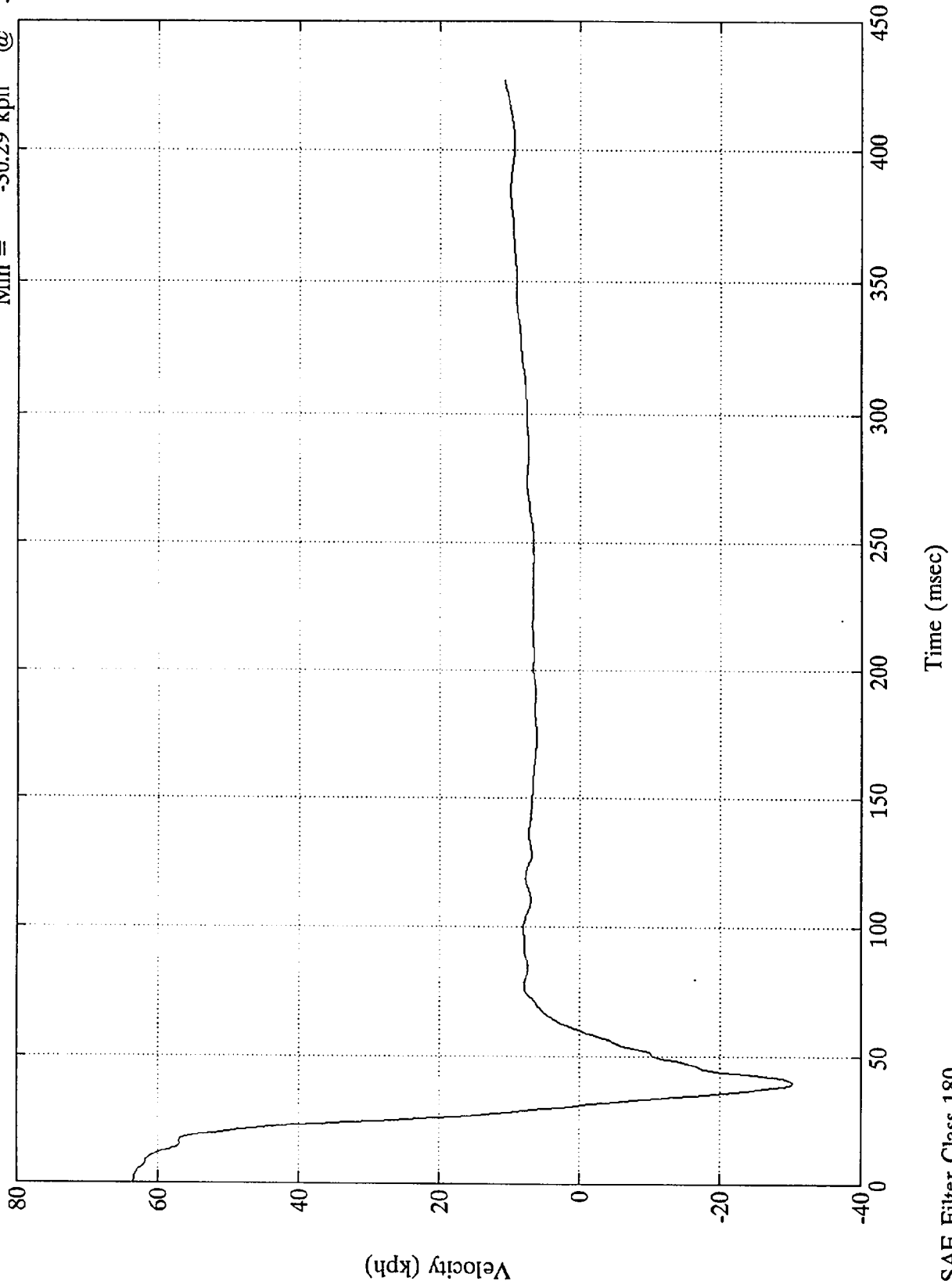
Max = 84.54 Gs @ 42.95 msec  
Min = -178.33 Gs @ 24.47 msec



VTV TEST #10

V1 Left Engine (X)

Max = 63.57 kph @ -0.00 msec  
Min = -30.29 kph @ 39.59 msec

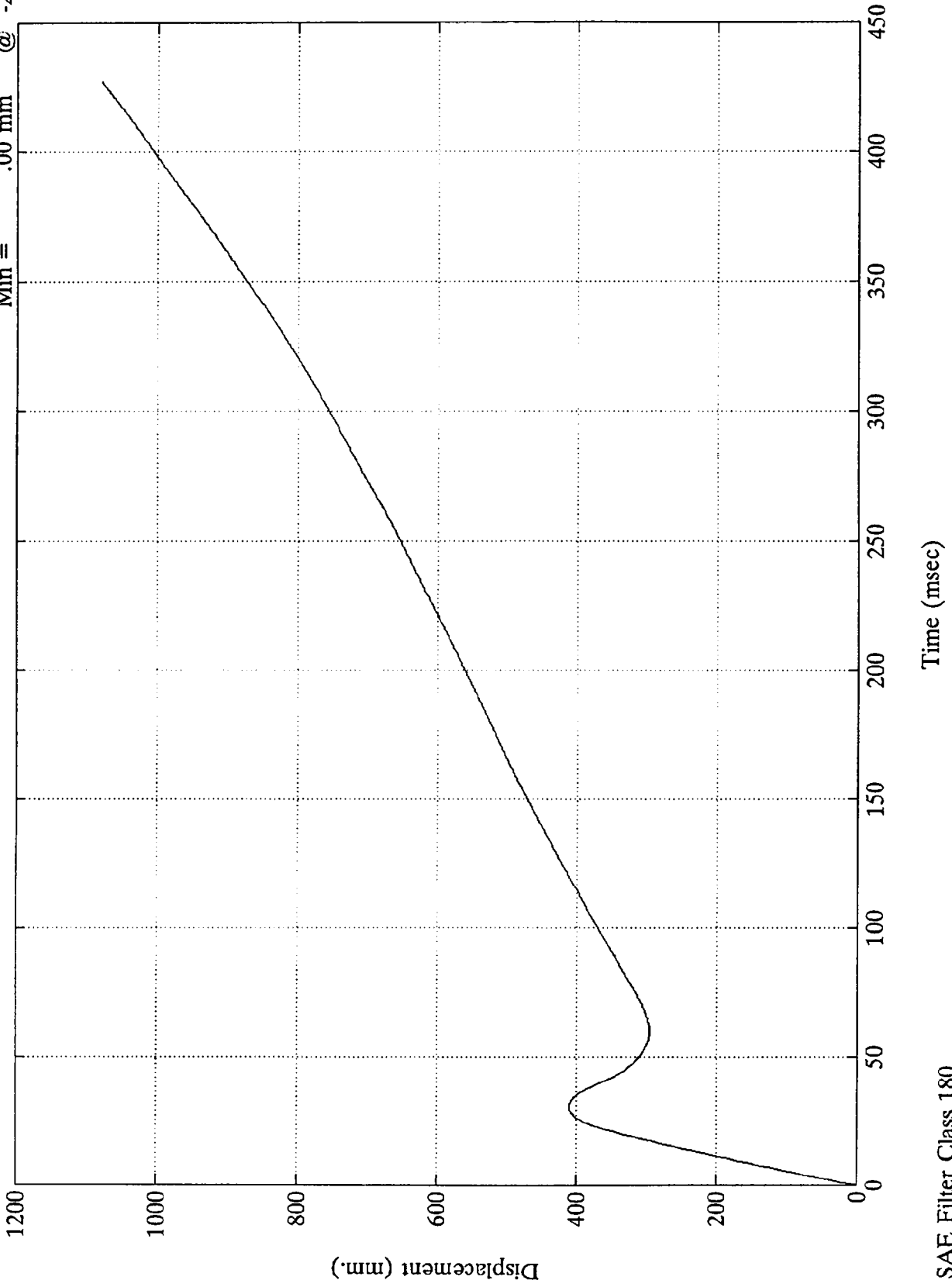


SAE Filter Class 180

VTV TEST #10

V1 Left Engine (X)

Max = 1080.47 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

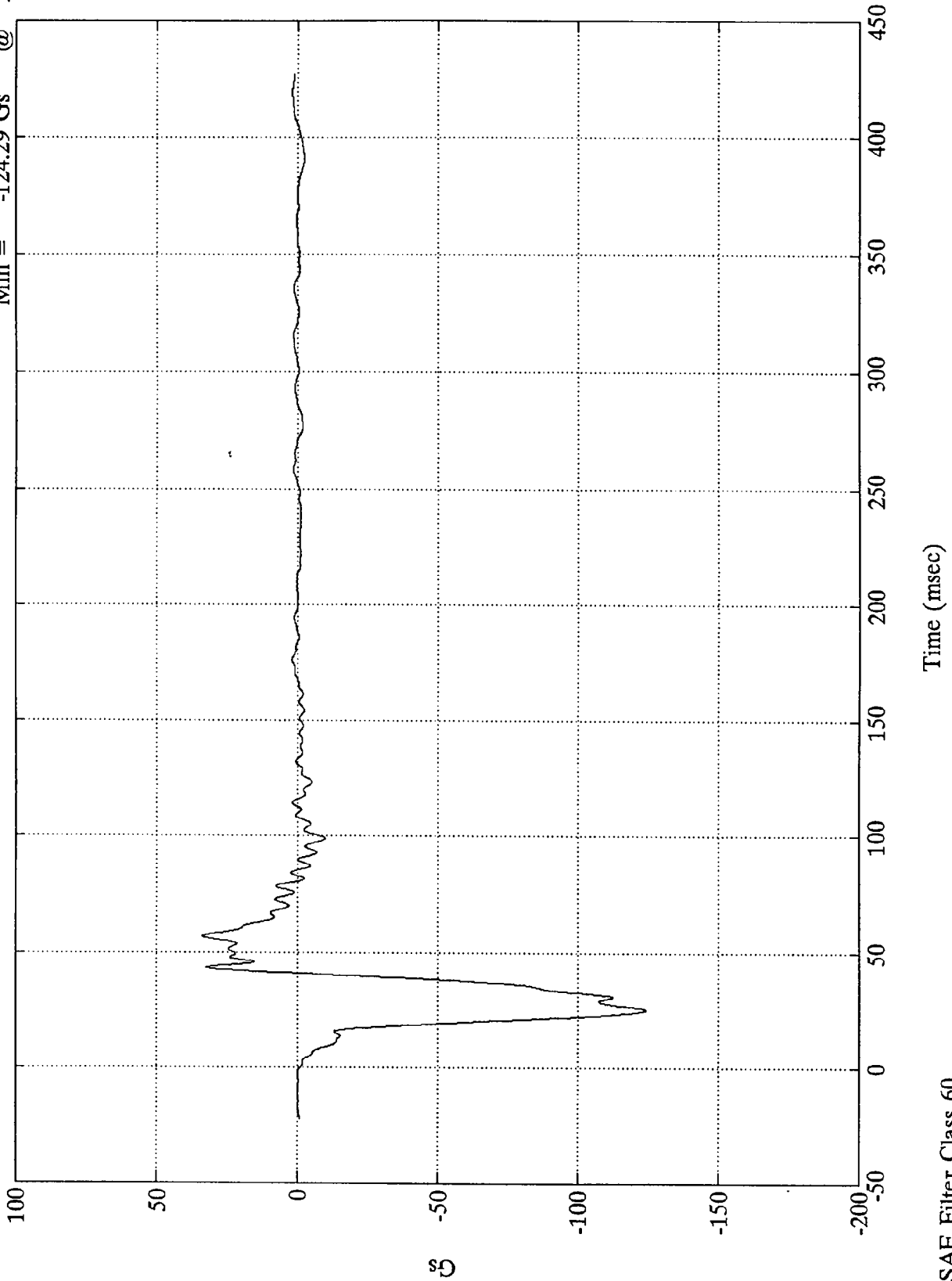


SAE Filter Class 180

VTV TEST #10

V1 Right Engine (X)

Max = 33.87 Gs @ 57.00 msec  
Min = -124.29 Gs @ 25.20 msec

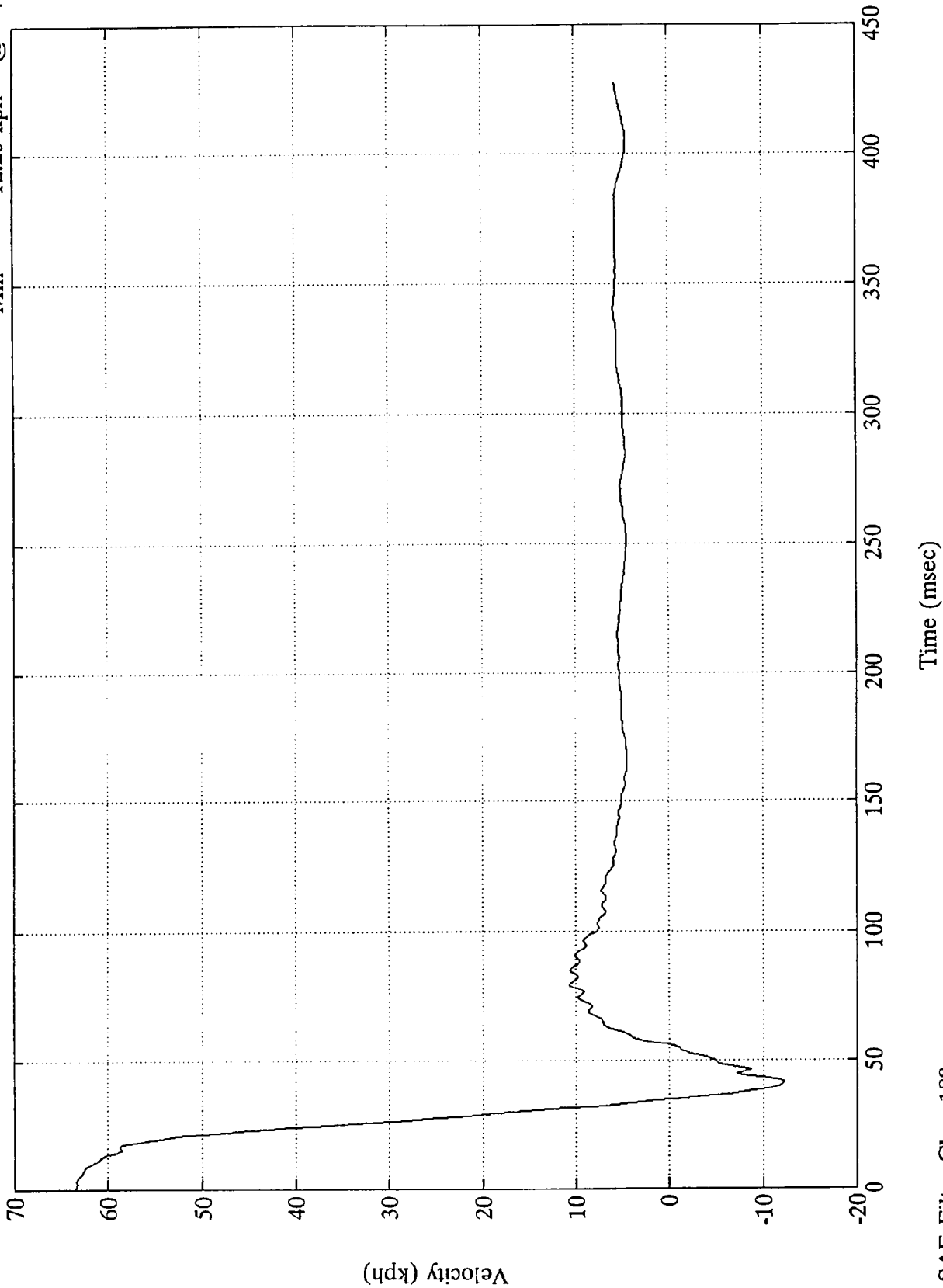


SAE Filter Class 60

VTV TEST #10

Max = 63.57 kph @ -0.00 msec  
Min = -12.26 kph @ 41.40 msec

V1 Right Engine (X)

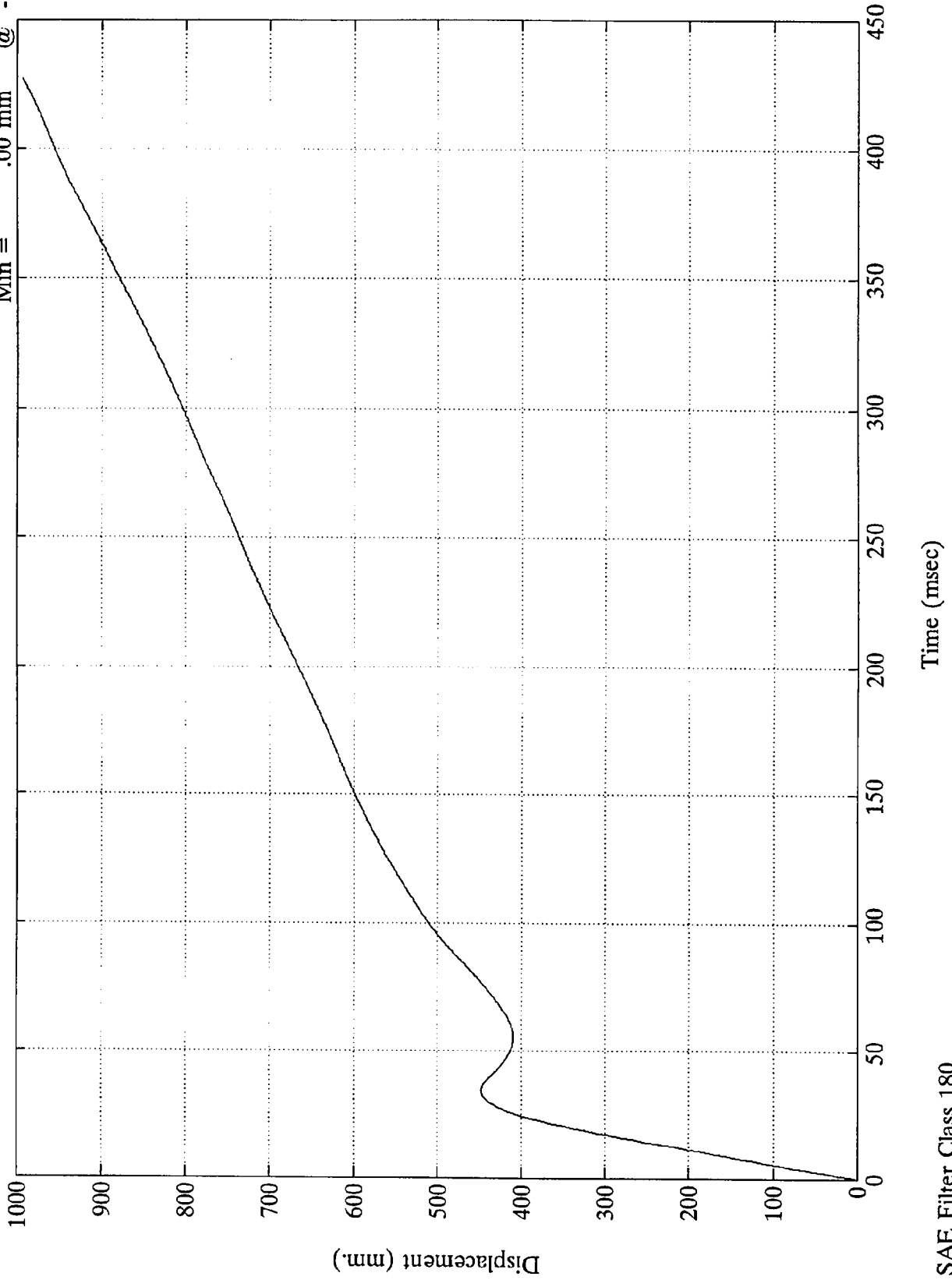


SAE Filter Class 180

VTV TEST #10

V1 Right Engine (X)

Max = 993.12 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

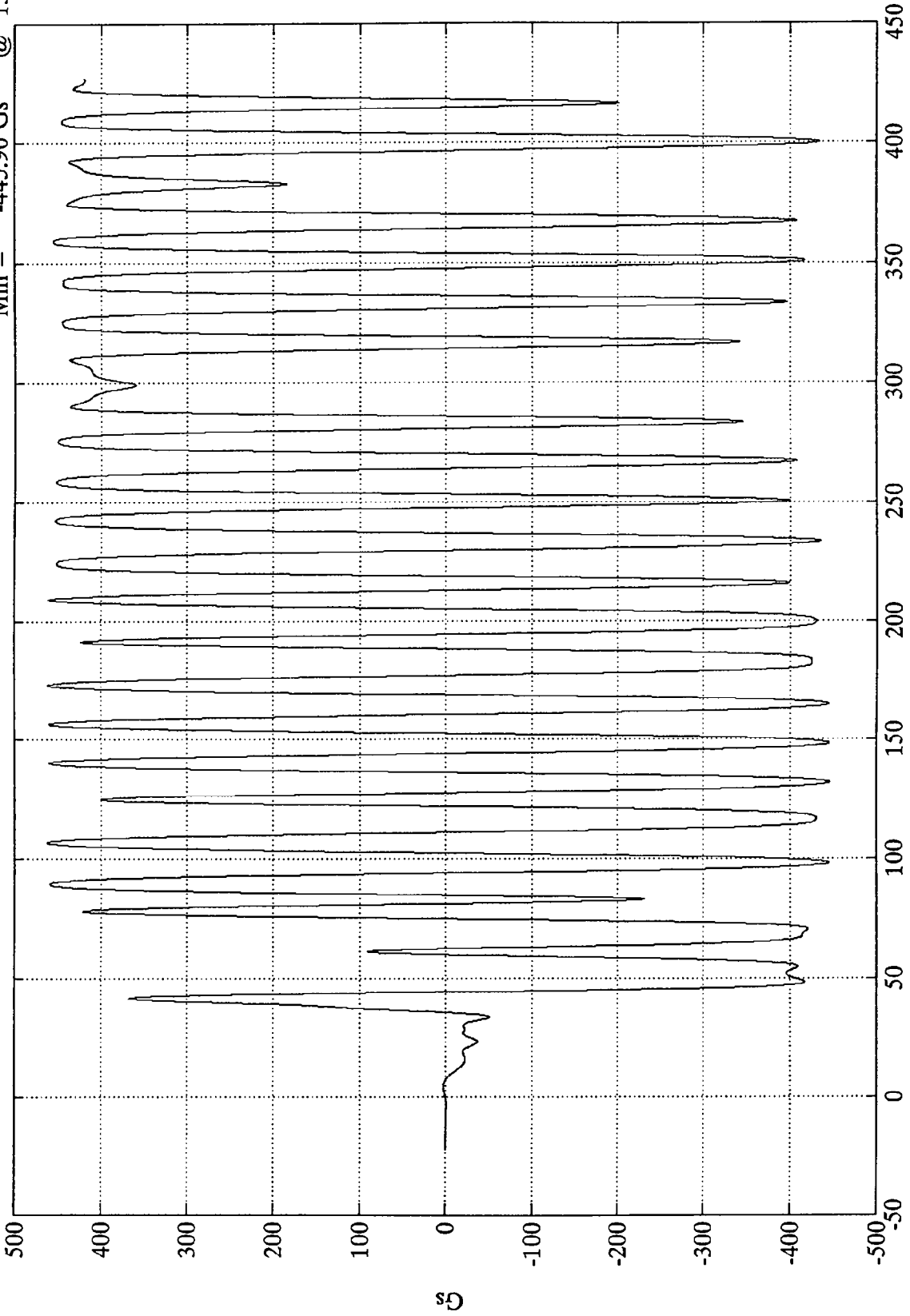


SAE Filter Class 180

VTV TEST #10

V1 Engine Bottom (X)

Max = 462.20 Gs @ 106.80 msec  
Min = -445.90 Gs @ 131.75 msec



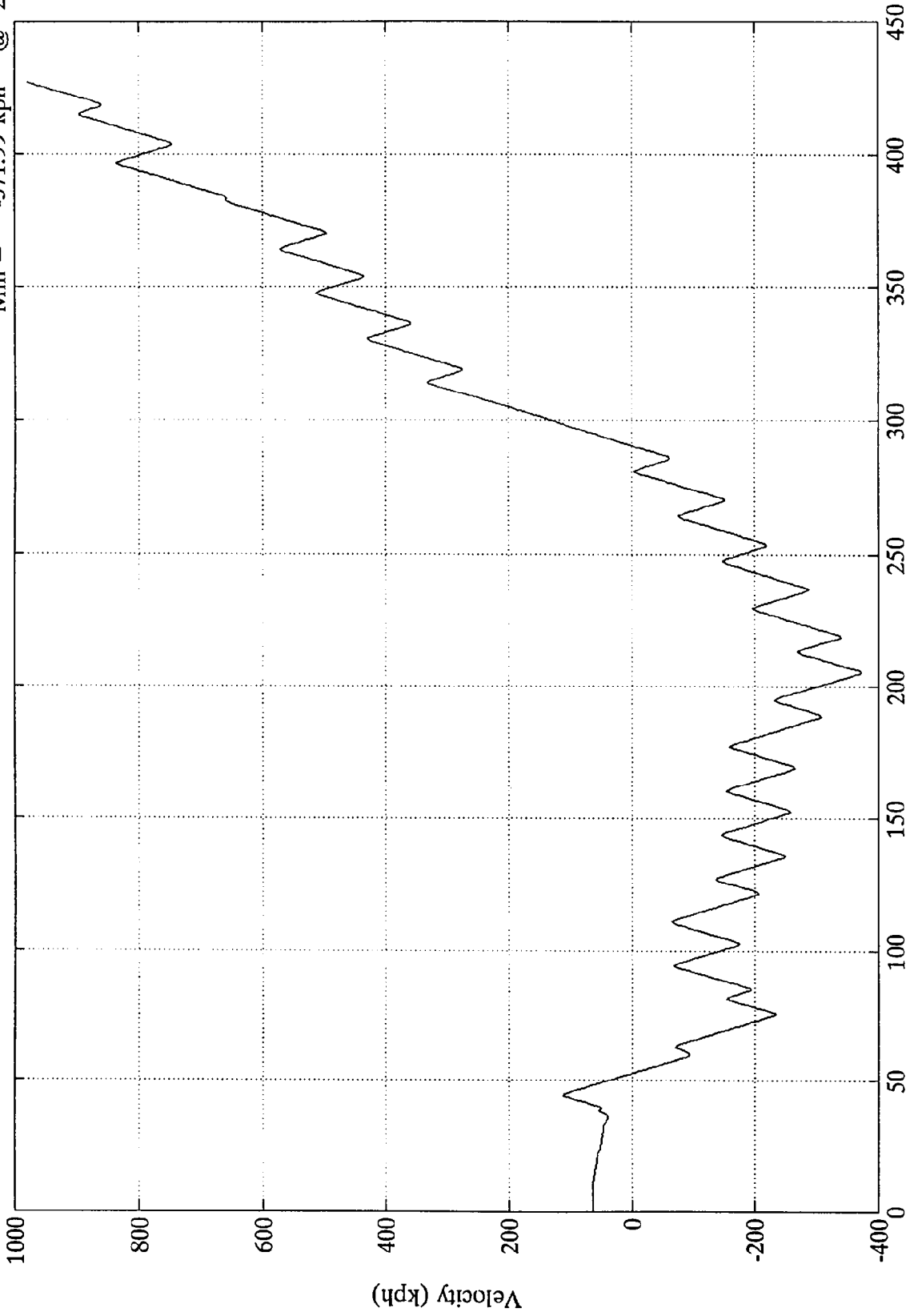
Time (msec) Data inaccurate after 45msec, wire cut

SAE Filter Class 60

VTV TEST #10

V1 Engine Bottom (X)

Max = 981.43 kph @ 427.32 msec  
Min = -371.99 kph @ 205.56 msec



Data inaccurate after 45msec, wire cut

SAE Filter Class 180

VTV TEST #10  
x10<sup>4</sup>

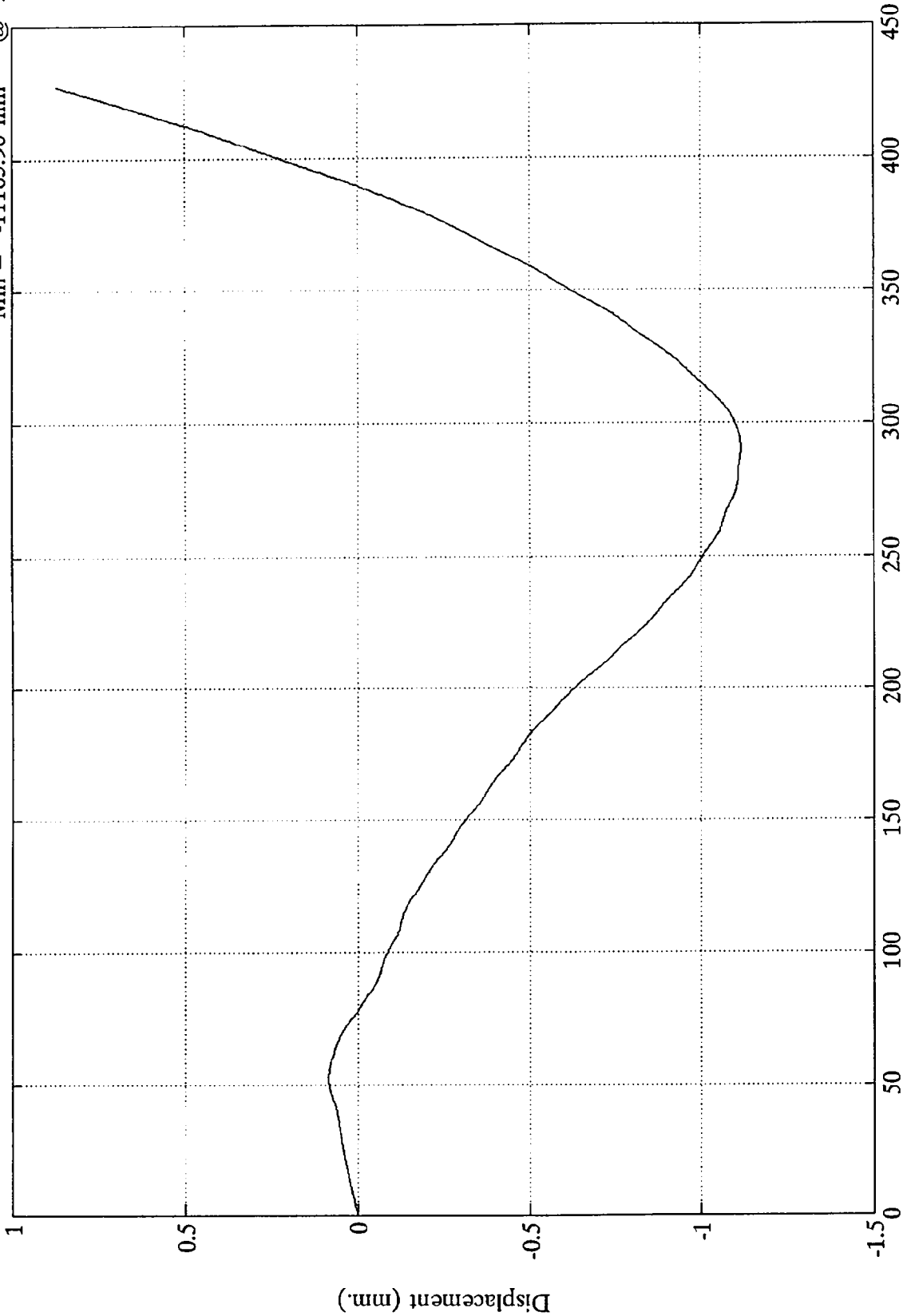
V1 Engine Bottom (X)

Max = 8742.74 mm

@ 427.32 msec

Min = -11165.90 mm

@ 290.39 msec



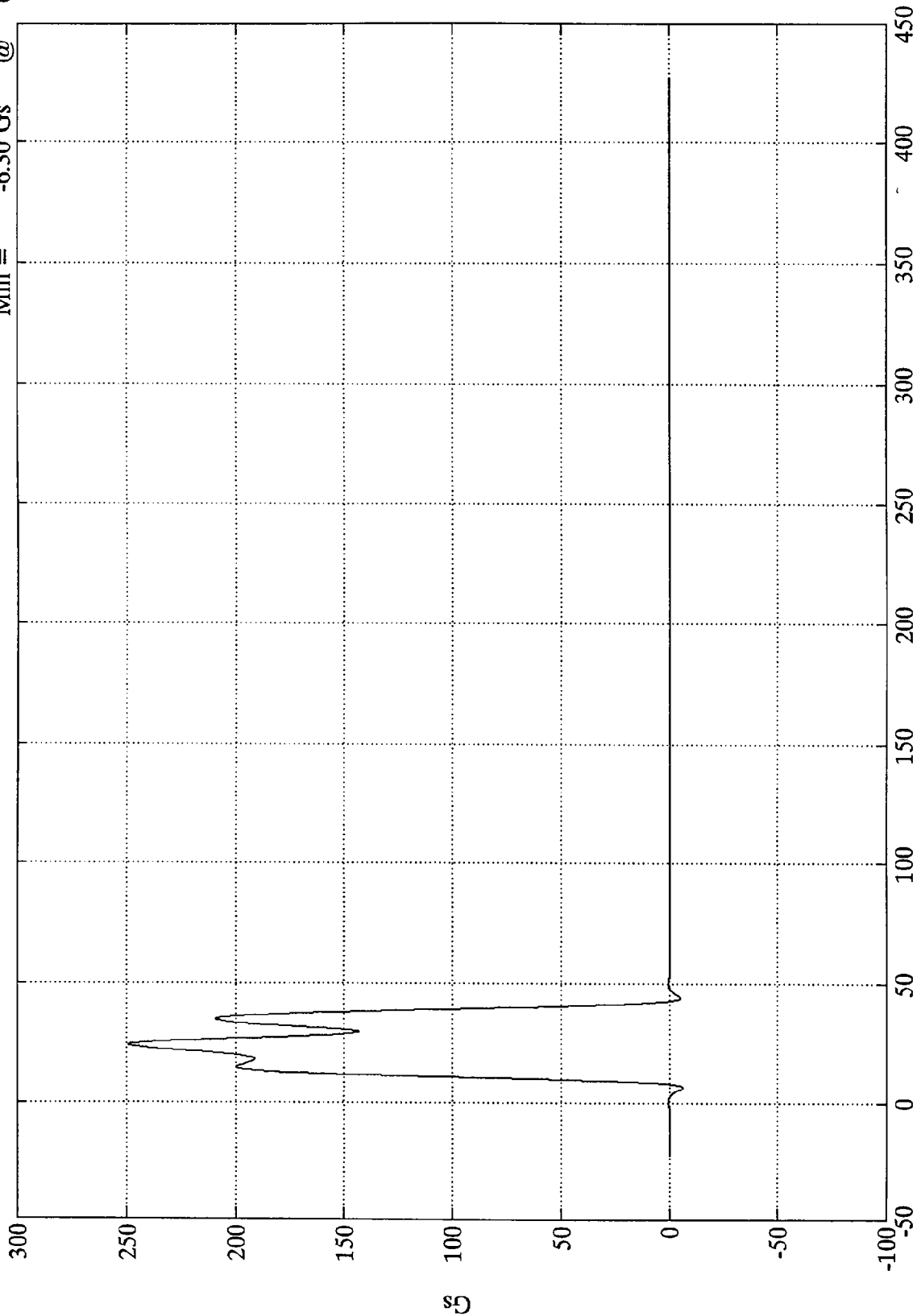
Time (msec) Data inaccurate after 45msec, wire cut

SAE Filter Class 180

VTV TEST #10

V1 Engine Bottom (Y)

Max = 249.04 Gs @ 24.36 msec  
Min = -6.30 Gs @ 6.71 msec

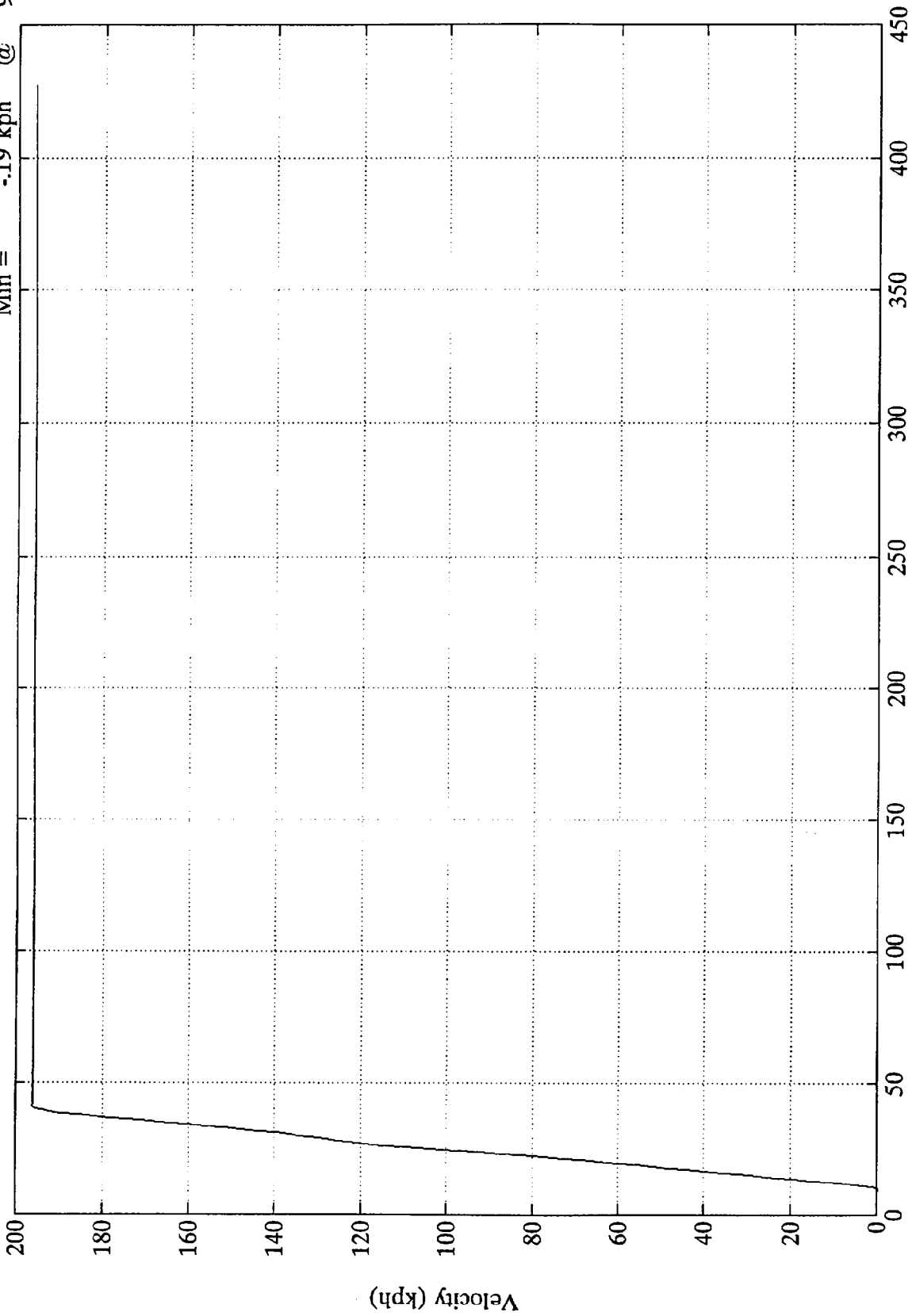


SAE Filter Class 60 Data inaccurate after 45msec, wire cut

VTV TEST #10

V1 Engine Bottom (Y)

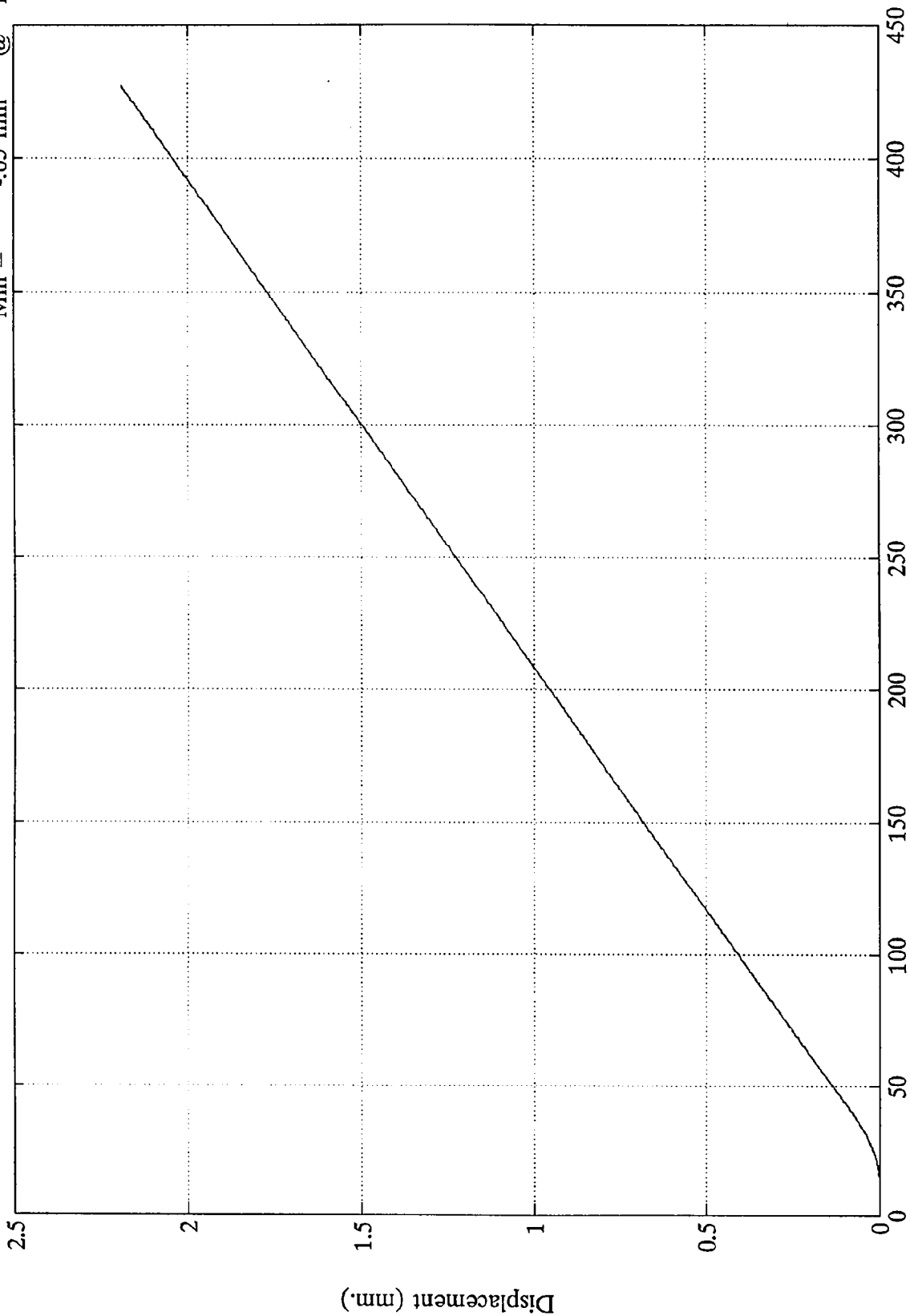
Max = 196.17 kph @ 41.28 msec  
Min = -19 kph @ 9.83 msec



VTV TEST #10  
x10<sup>4</sup>

V1 Engine Bottom (Y)

Max = 21912.54 mm @ 427.32 msec  
Min = -0.05 mm @ 10.32 msec



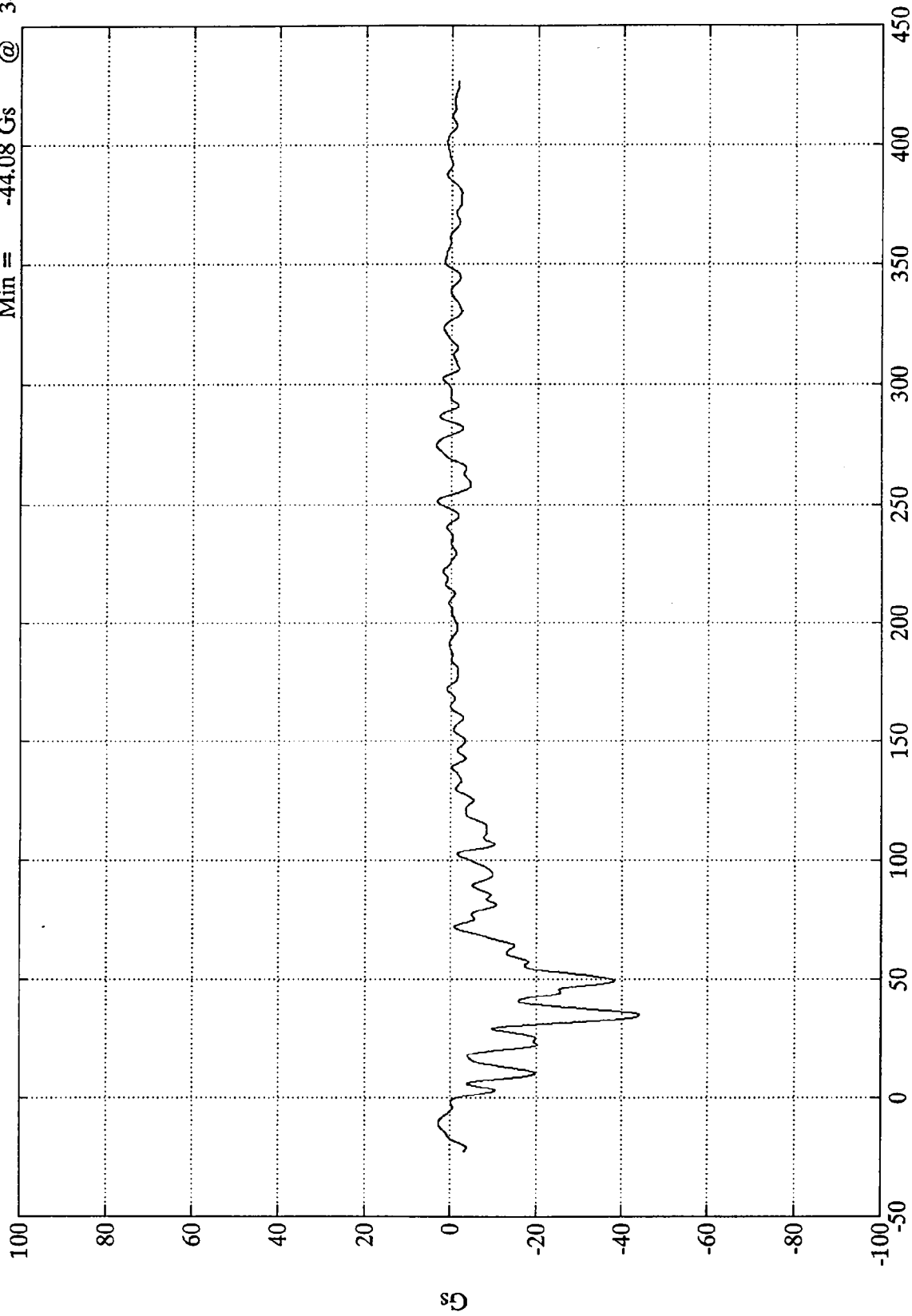
Time (msec) Data inaccurate after 45msec, wire cut

SAE Filter Class 180

VTV TEST #10

V1 L.R. Comp (X)

Max = 3.59 Gs @ 274.44 msec  
Min = -44.08 Gs @ 34.68 msec



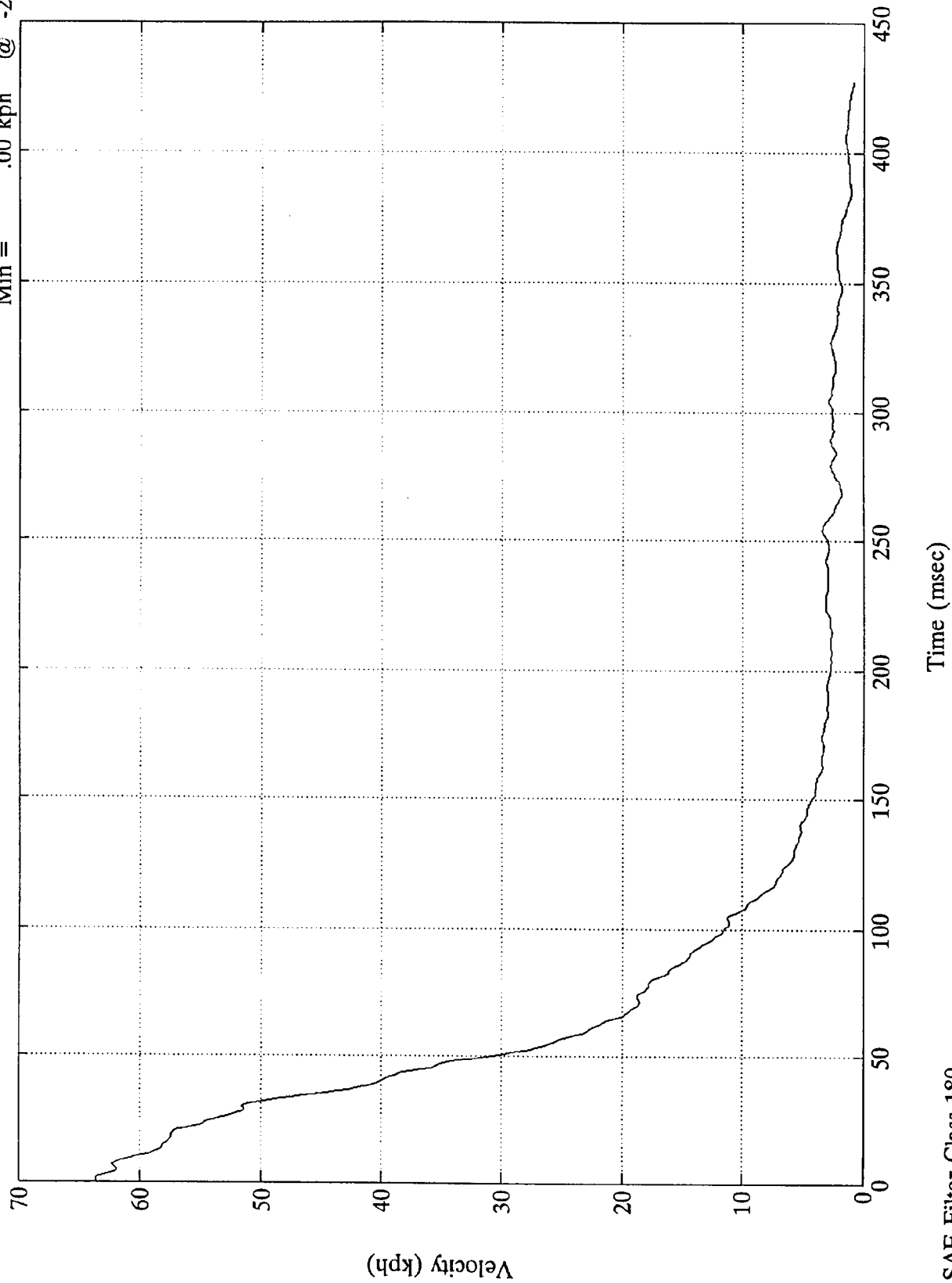
Time (msec)

SAE Filter Class 60

VTV TEST #10

V1 L.R. Comp (X)

Max = 63.59 kph @ 1.43 msec  
Min = .00 kph @ -22.44 msec

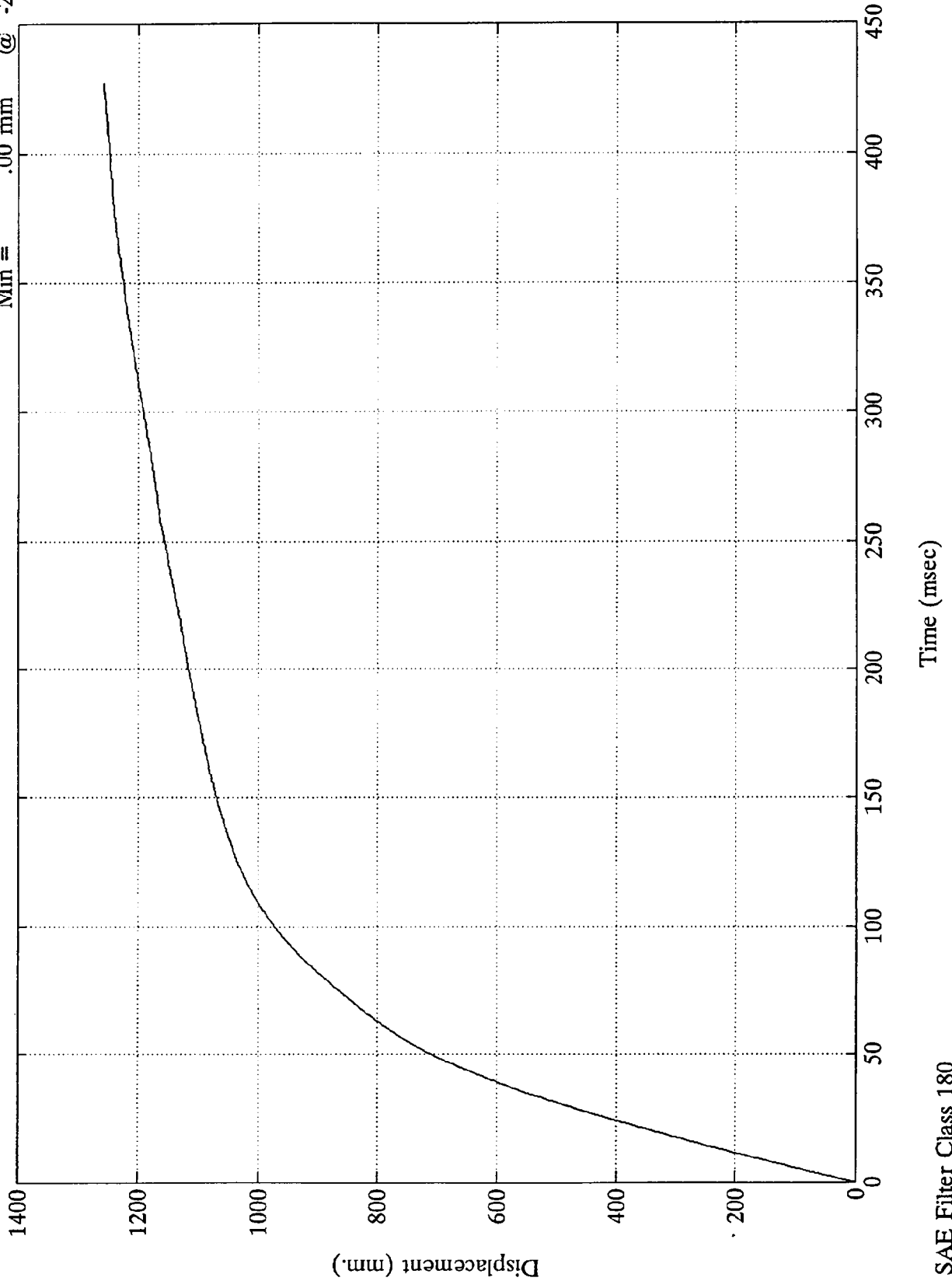


SAE Filter Class 180

VTV TEST #10

V1 L.R. Comp (X)

Max = 1257.16 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

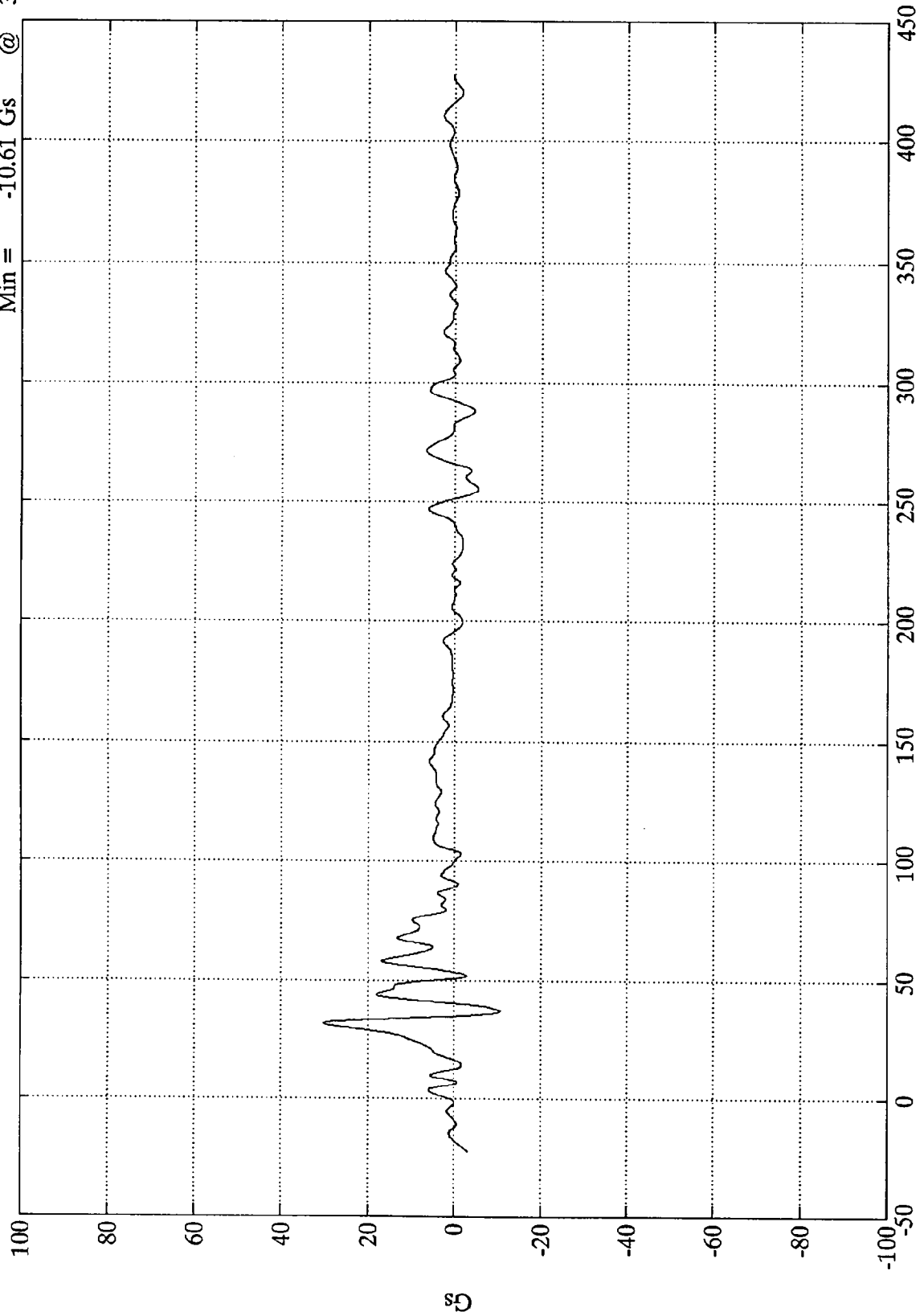


SAE Filter Class 180

VTV TEST #10

V1 L.R. Comp (Y)

Max = 30.15 Gs @ 31.67 msec  
Min = -10.61 Gs @ 36.96 msec



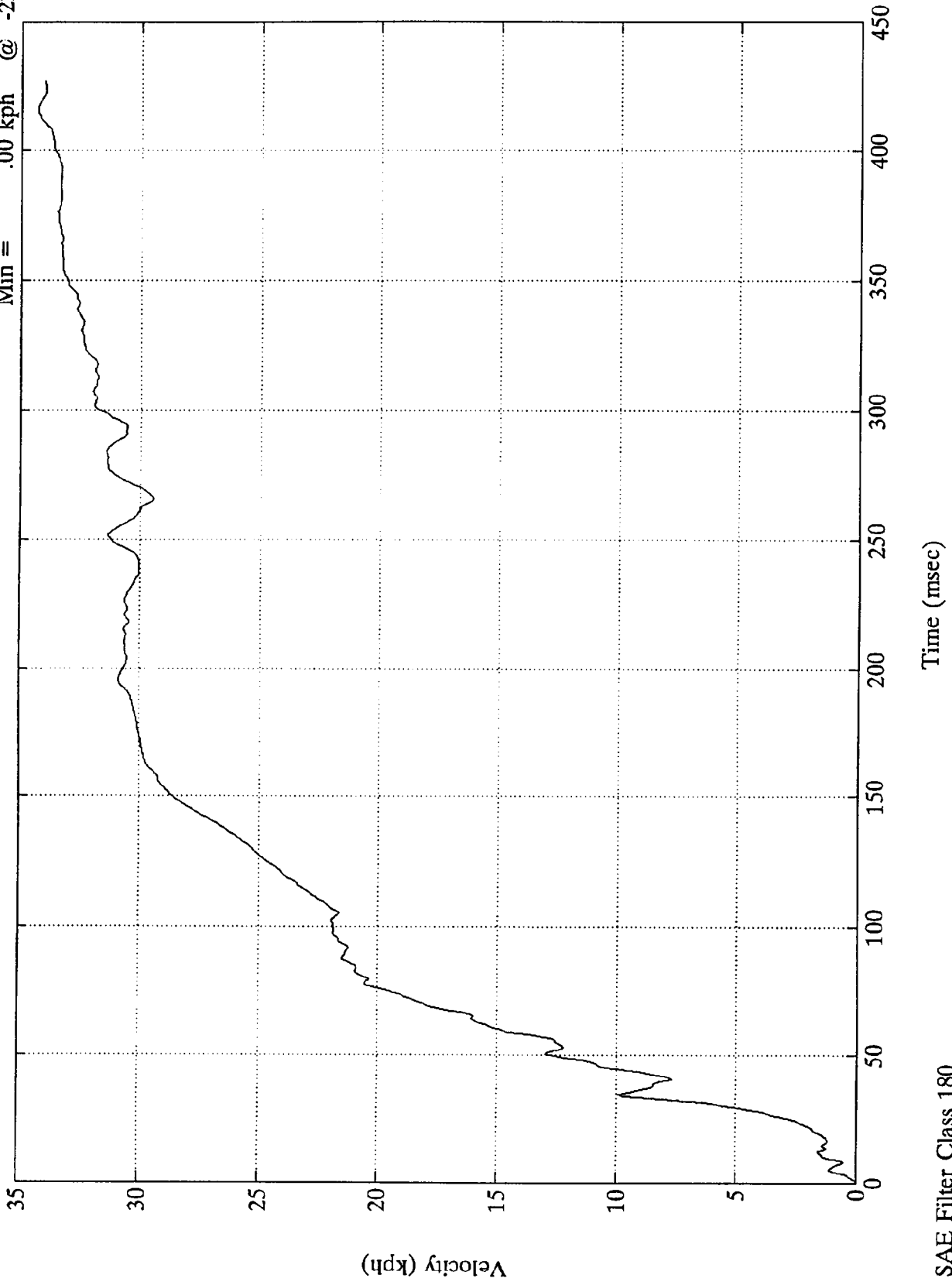
Time (msec)

SAE Filter Class 60

VTV TEST #10

V1 L.R. Comp (Y)

Max = 34.31 kph @ 416.04 msec  
Min = .00 kph @ -22.44 msec

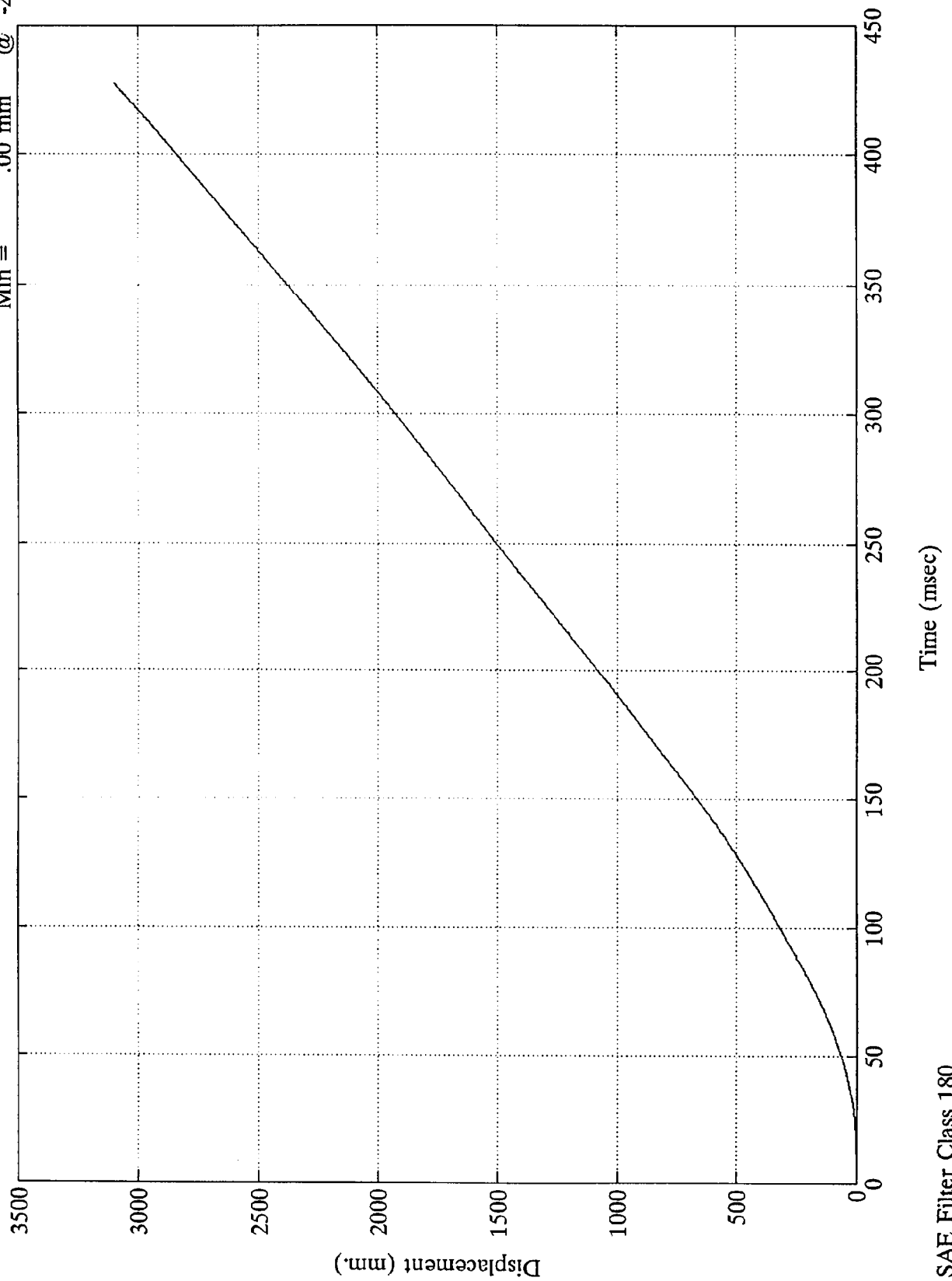


SAE Filter Class 180

VTV TEST #10

V1 L.R. Comp (Y)

Max = 3097.80 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

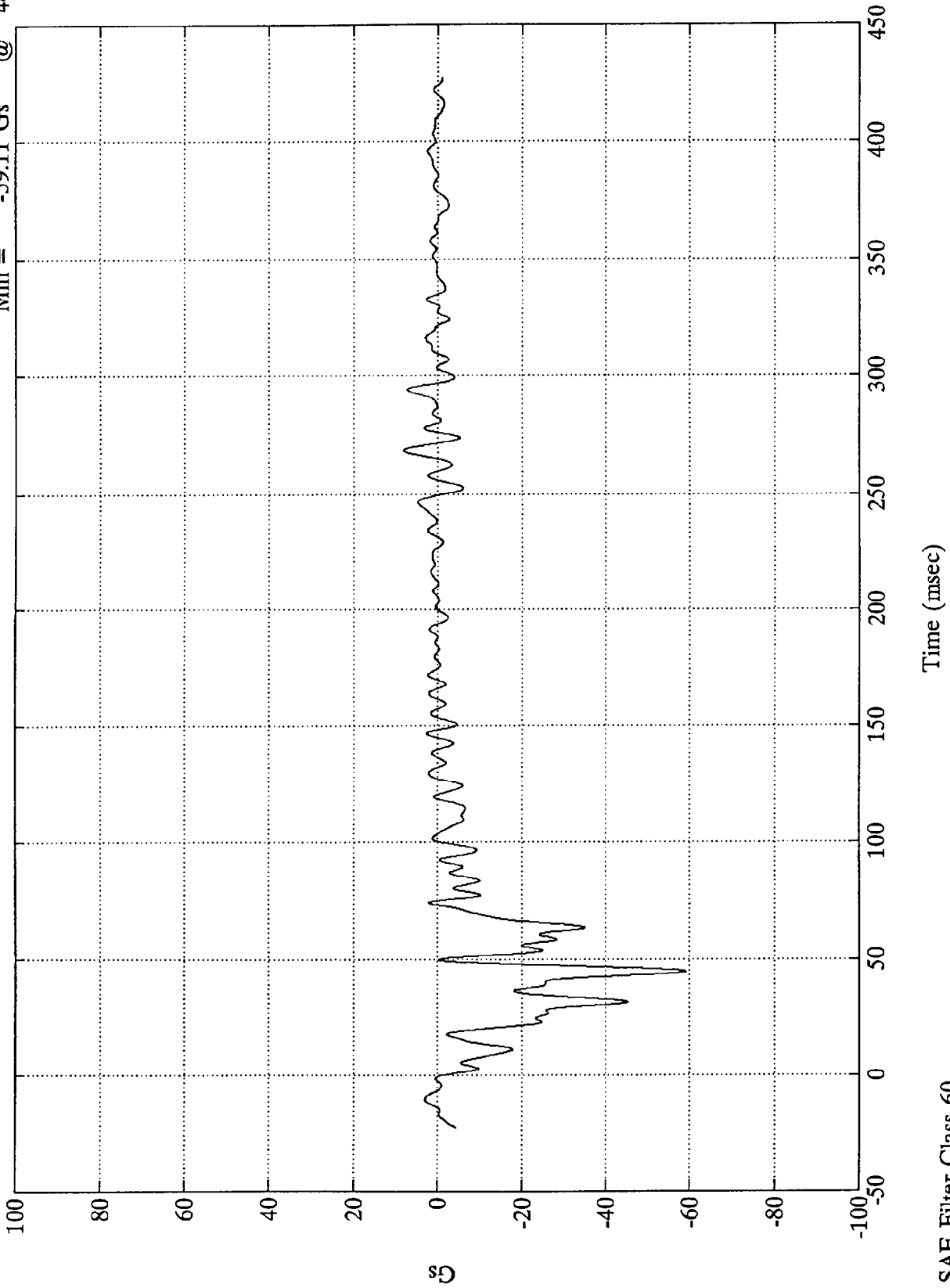


SAE Filter Class 180

VTV TEST #10

V1 R.R. Comp (X)

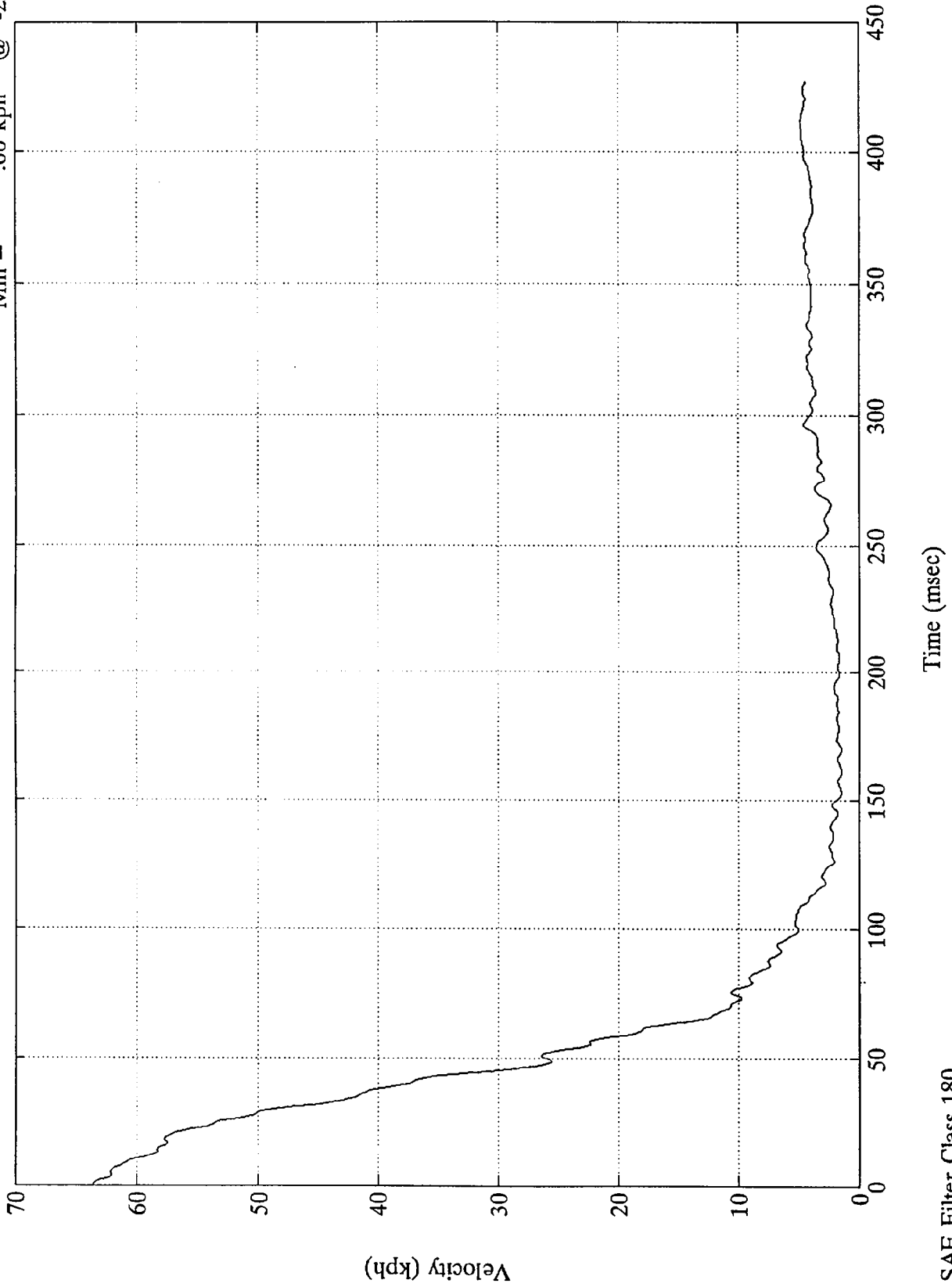
Max = 8.14 Gs @ 268.56 msec  
Min = -59.11 Gs @ 44.63 msec



VTV TEST #10

V1 R.R. Comp (X)

Max = 63.60 kph @ 0.59 msec  
Min = .00 kph @ -22.44 msec

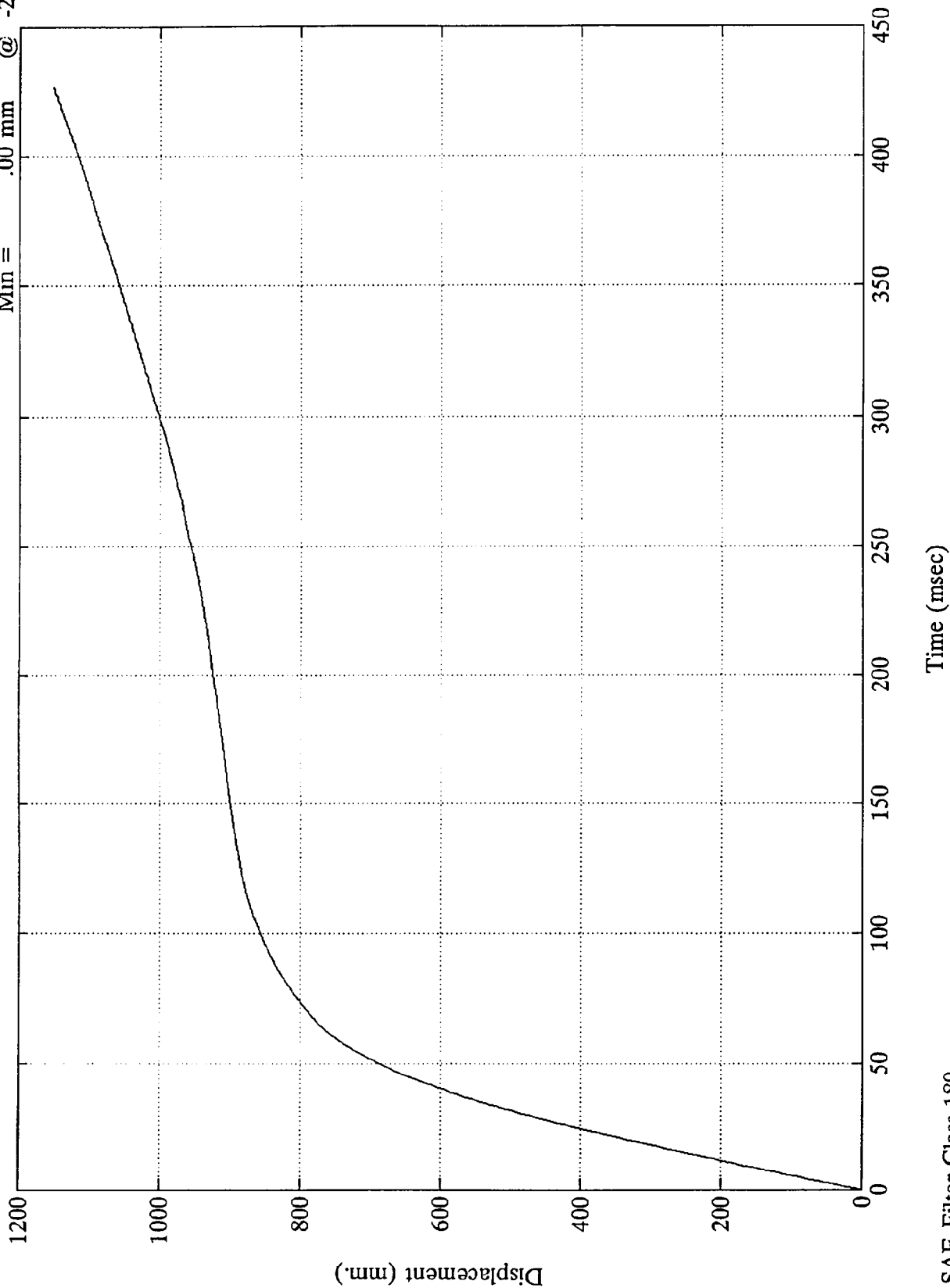


SAE Filter Class 180

VTV TEST #10

V1 R.R. Comp (X)

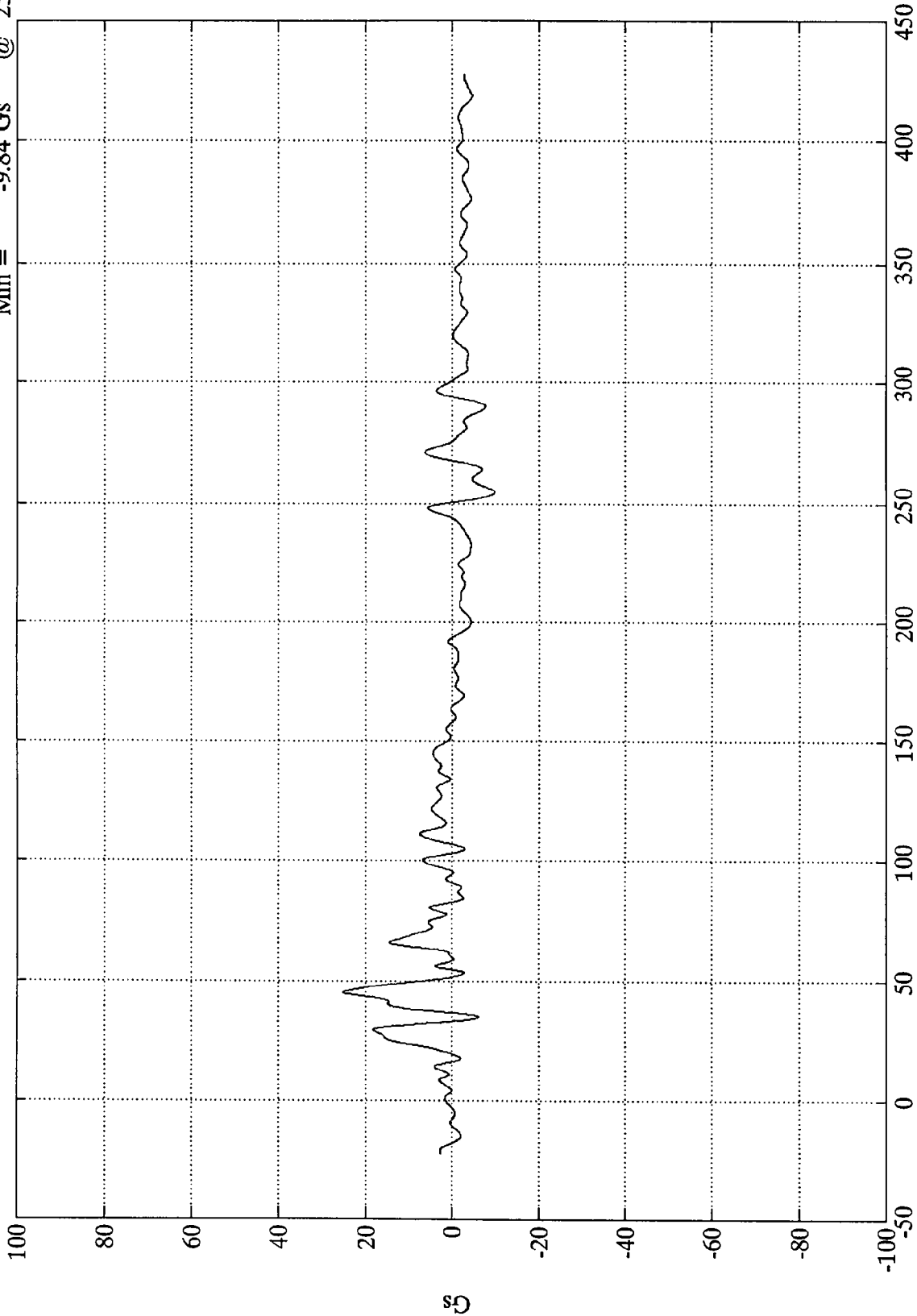
Max = 1151.99 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec



VTV TEST #10

V1 R.R. Comp (Y)

Max = 25.01 Gs @ 45.00 msec  
Min = -9.84 Gs @ 254.88 msec



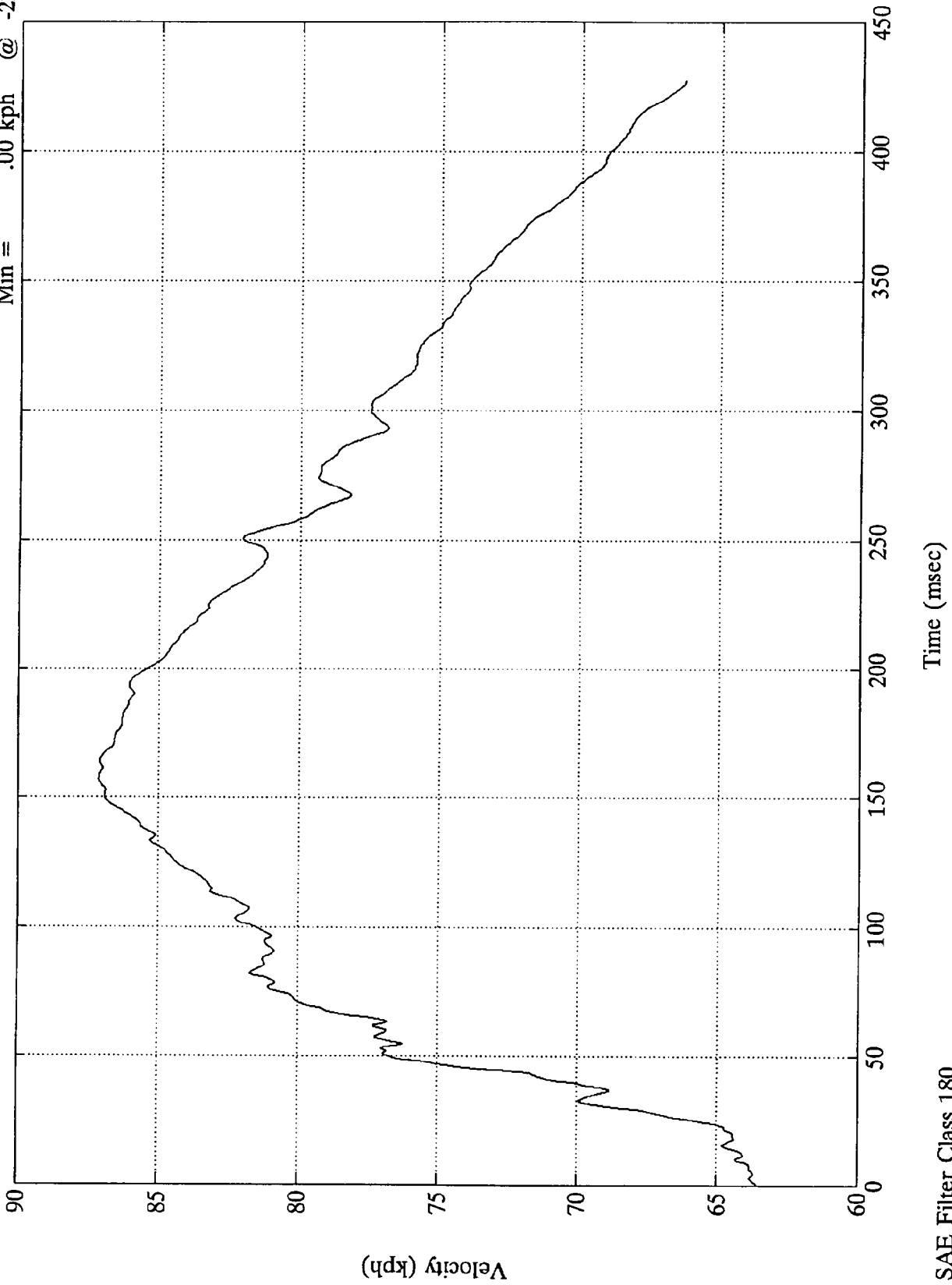
Time (msec)

SAE Filter Class 60

VTV TEST #10

V1 R.R. Comp (Y)

Max = 87.14 kph @ 157.08 msec  
Min = .00 kph @ -22.44 msec

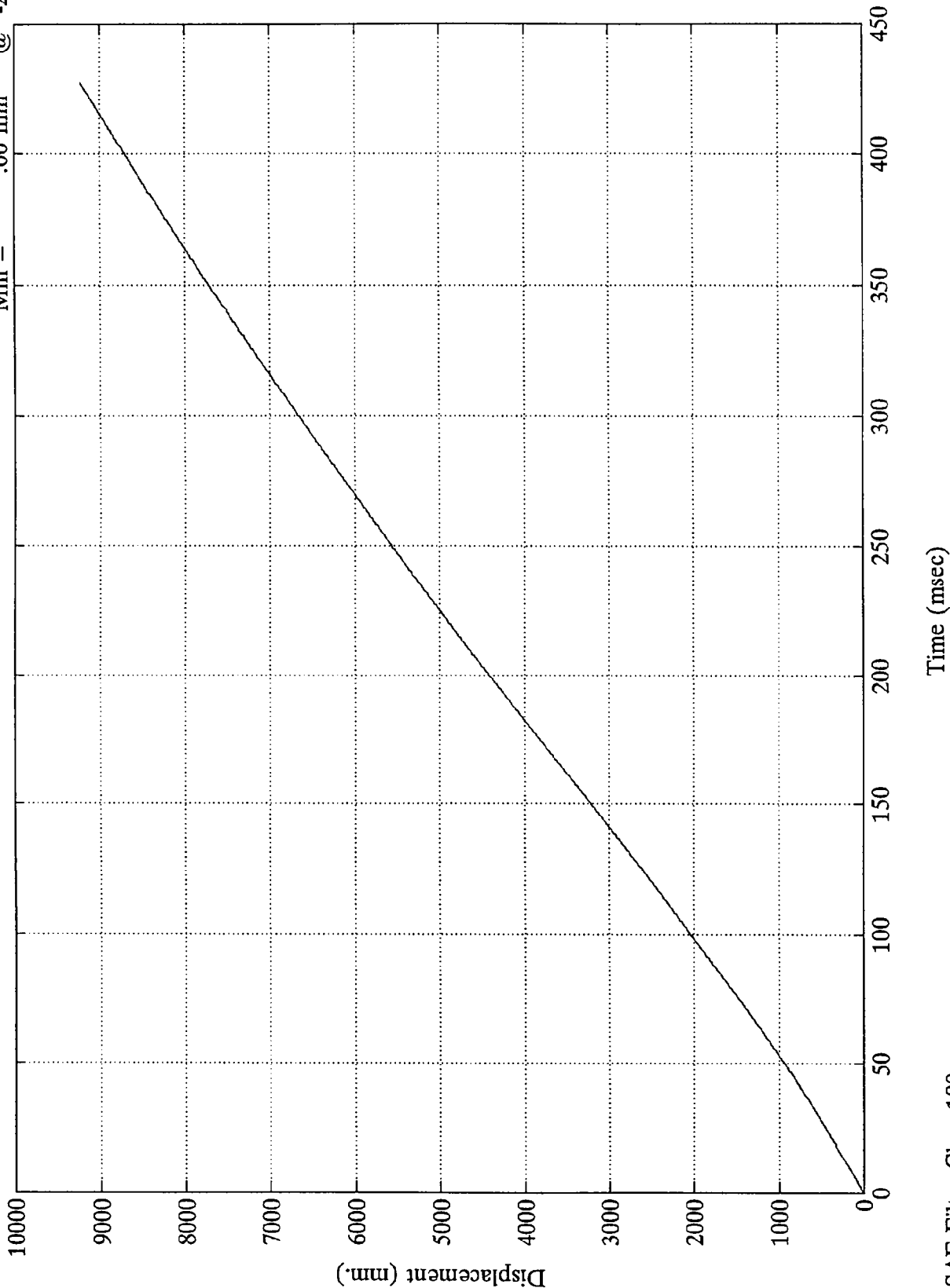


SAE Filter Class 180

VTV TEST #10

V1 R.R. Comp (Y)

Max = 9219.04 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec



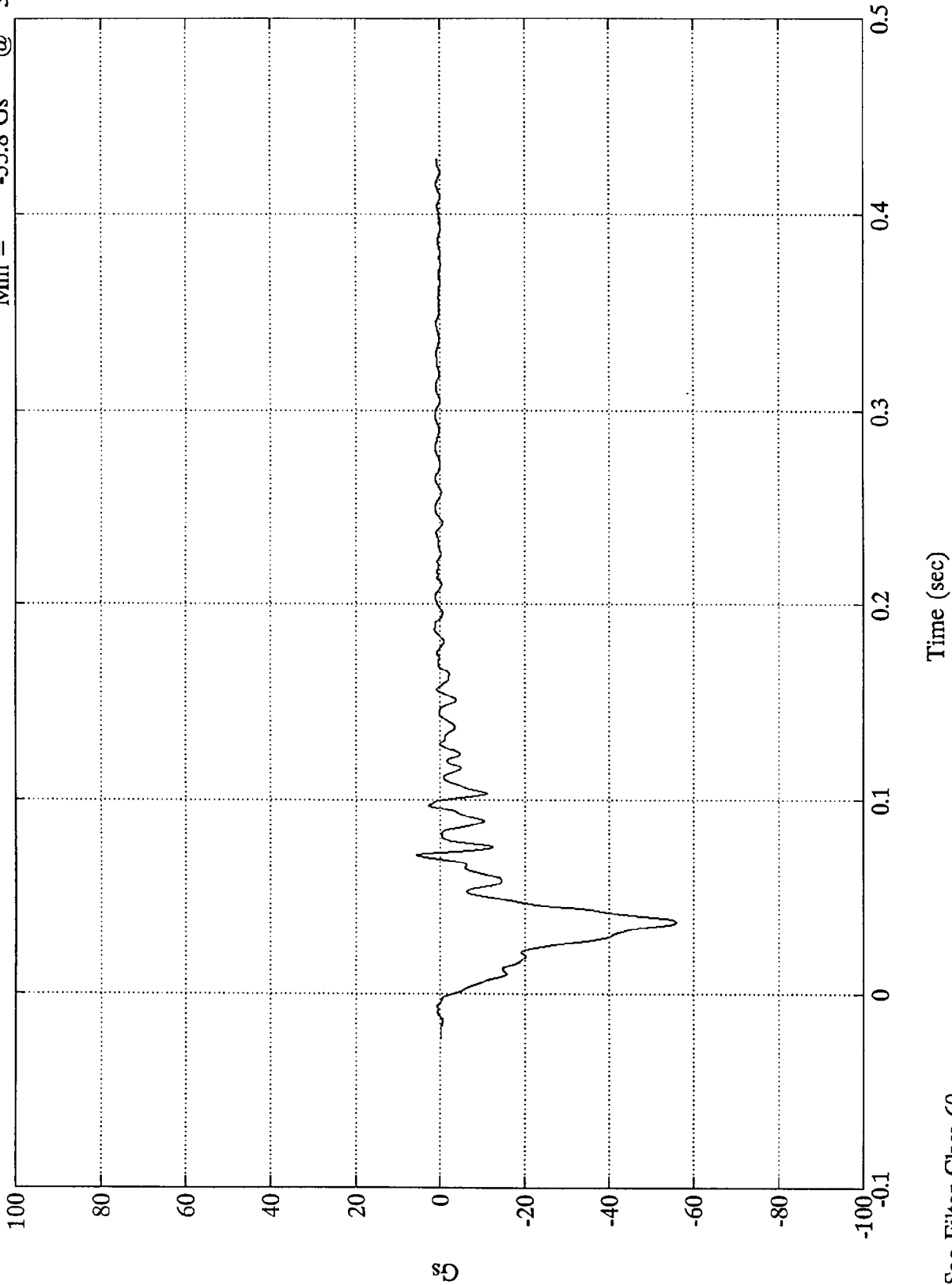
SAE Filter Class 180

VEHICLE TWO DATA

VTIV TEST #10

V2 C.G. X

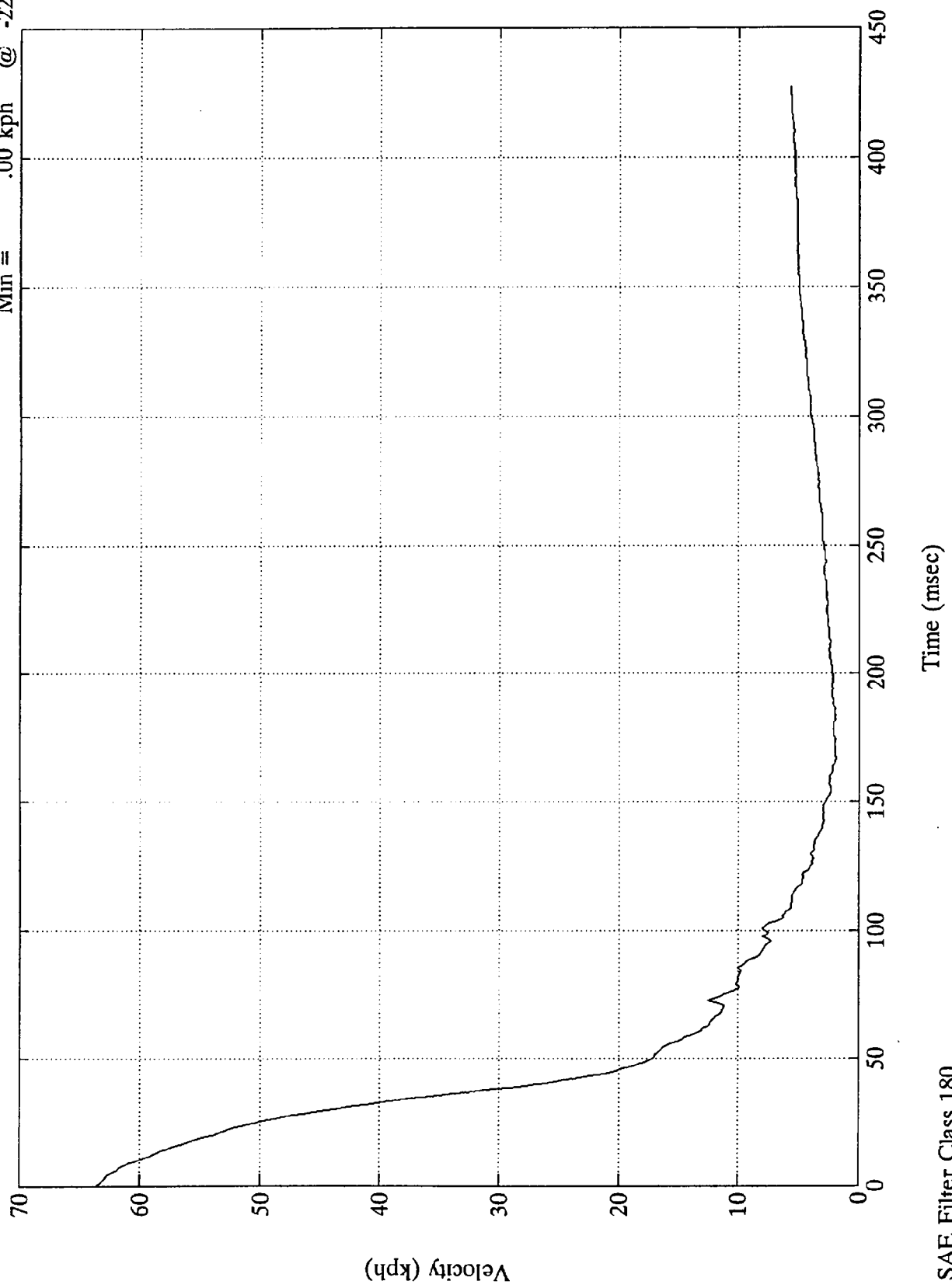
Max = 5.6 Gs @ 71.04 msec  
Min = -55.8 Gs @ 36.60 msec



VTV TEST #10

V2 C.G. X

Max = 63.57 kph @ -0.00 msec  
Min = .00 kph @ -22.44 msec

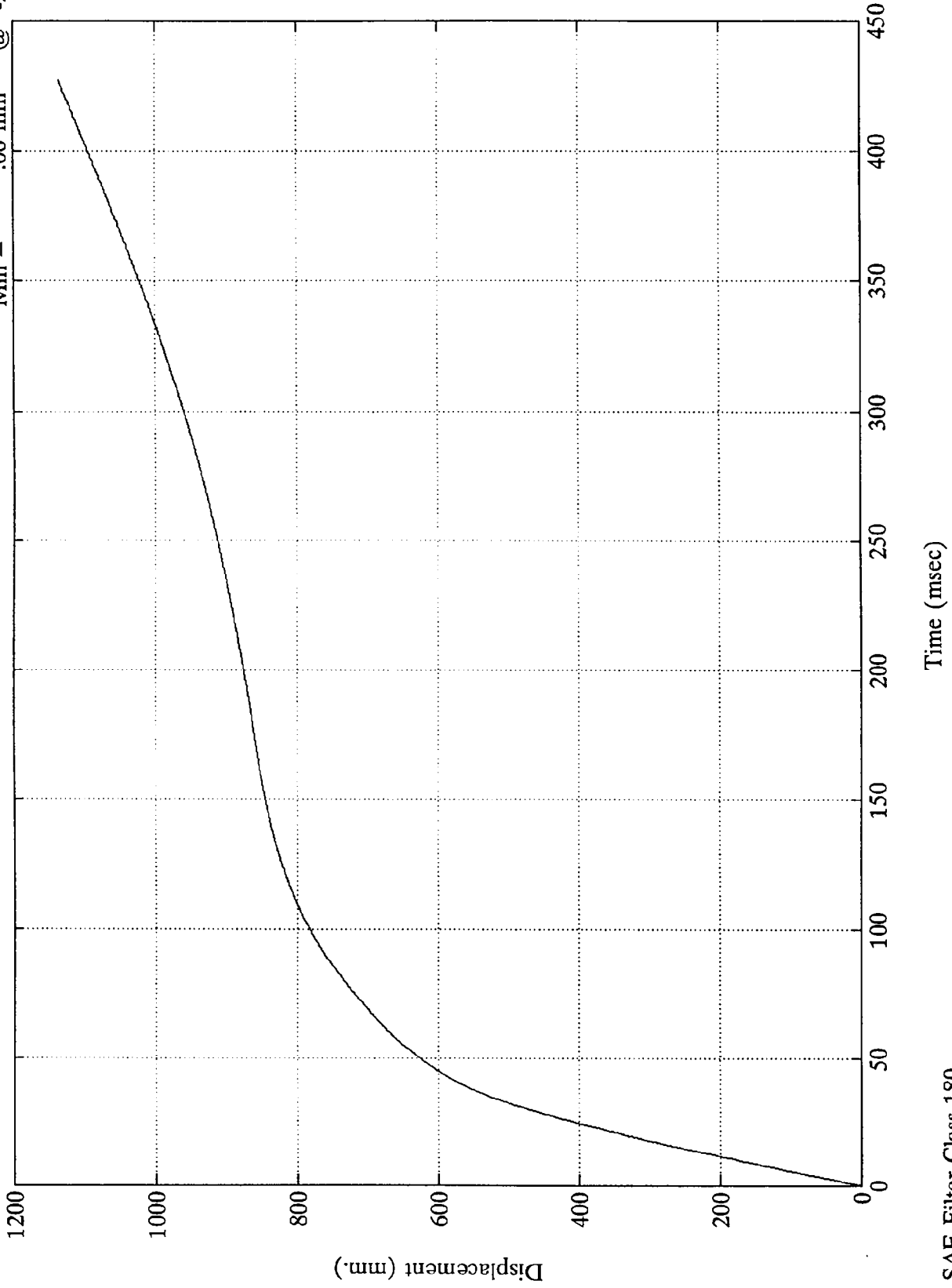


SAE Filter Class 180

VTV TEST #10

Max = 1136.35 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

V2 C.G. X

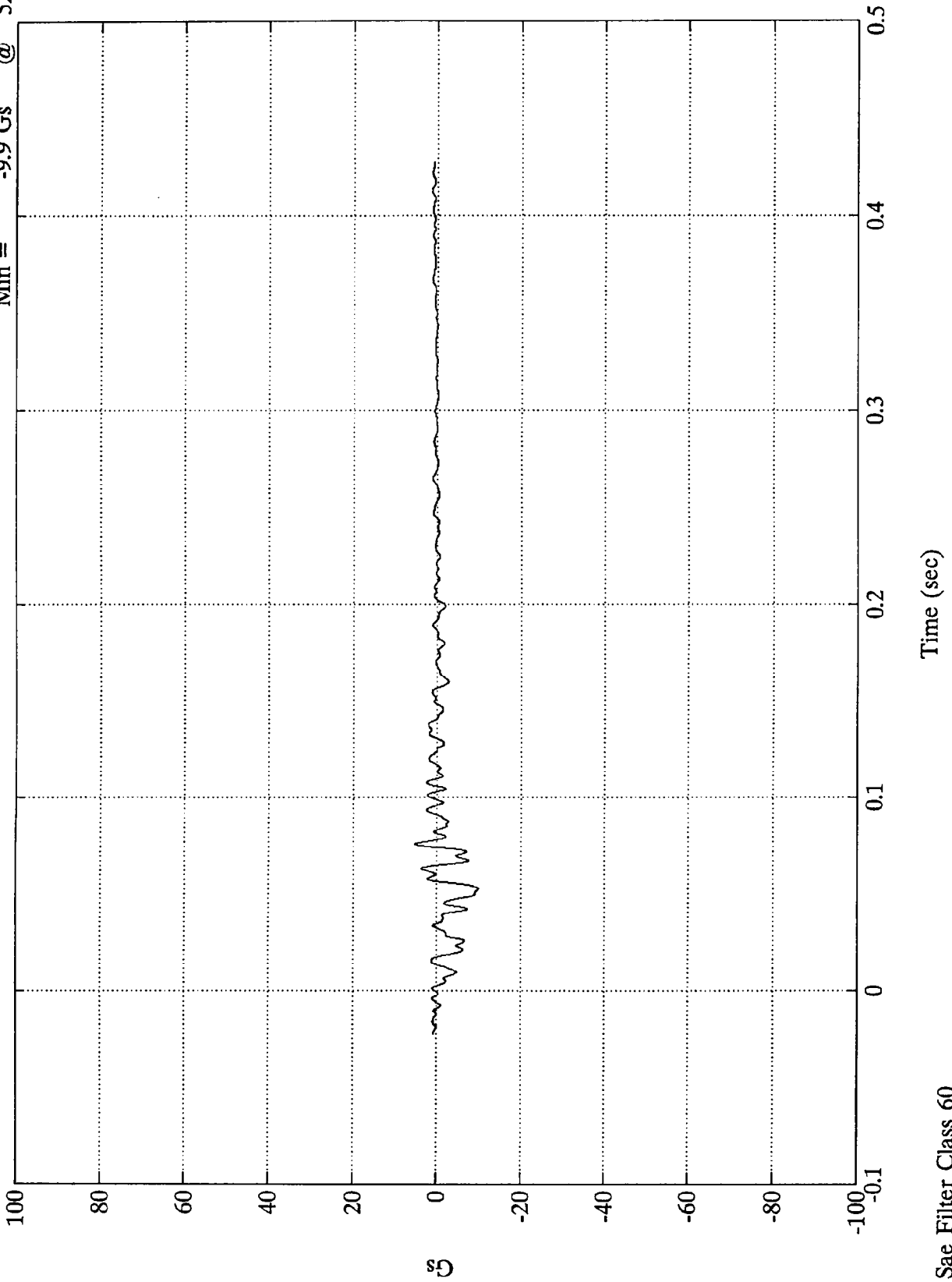


SAE Filter Class 180

VTV TEST #10

V2 C.G. Y

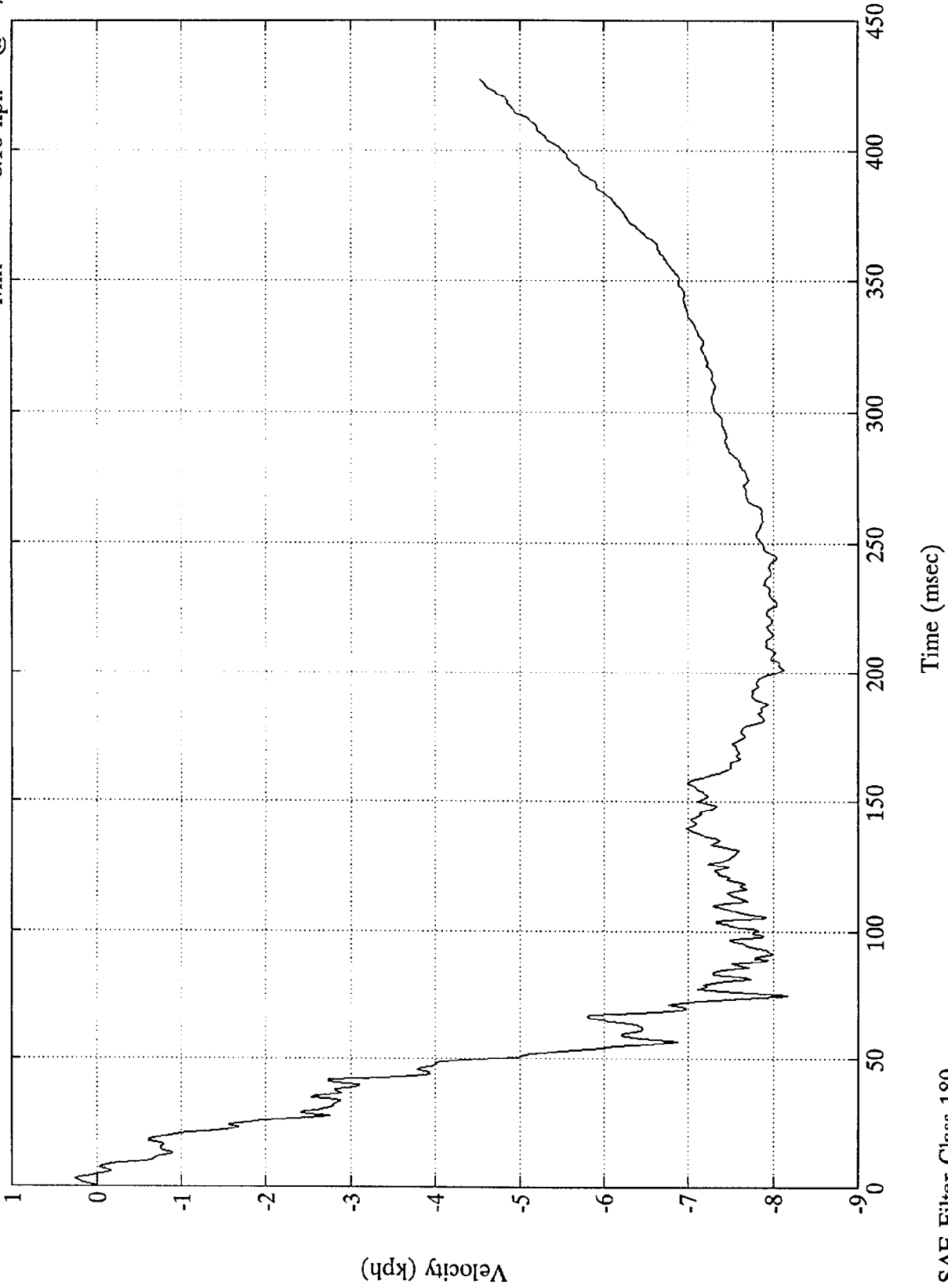
Max = 5.1 Gs @ 76.20 msec  
Min = -9.9 Gs @ 52.92 msec



VTV TEST #10

V2 C.G. Y

Max = .25 kph @ 2.99 msec  
Min = -8.18 kph @ 74.28 msec

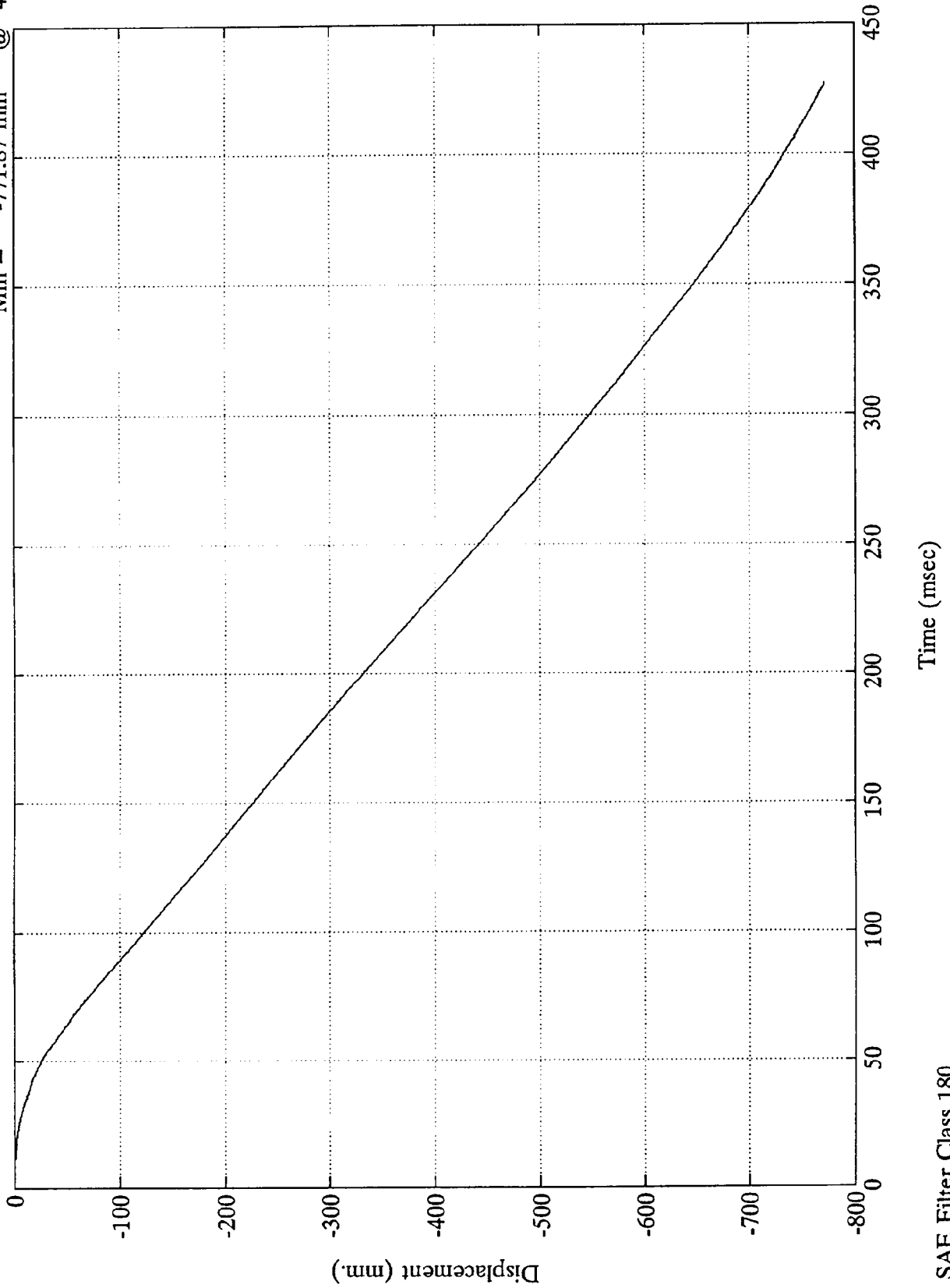


SAE Filter Class 180

VTV TEST #10

V2 C.G. Y

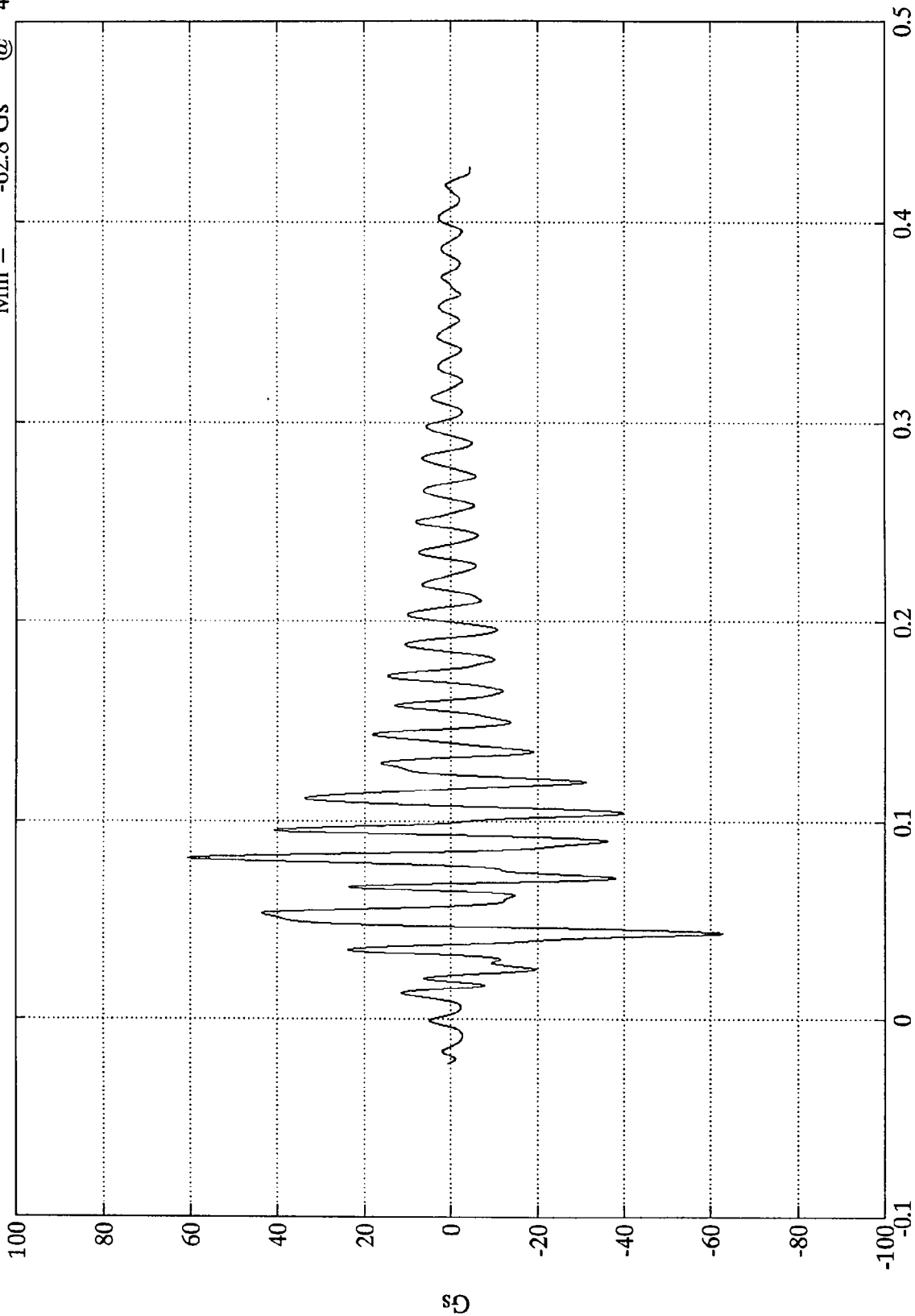
Max = .19 mm @ 4.79 msec  
Min = -771.87 mm @ 427.32 msec



VTV TEST #10

V2 C.G. Z

Max = 60.6 Gs @ 81.72 msec  
Min = -62.8 Gs @ 43.79 msec



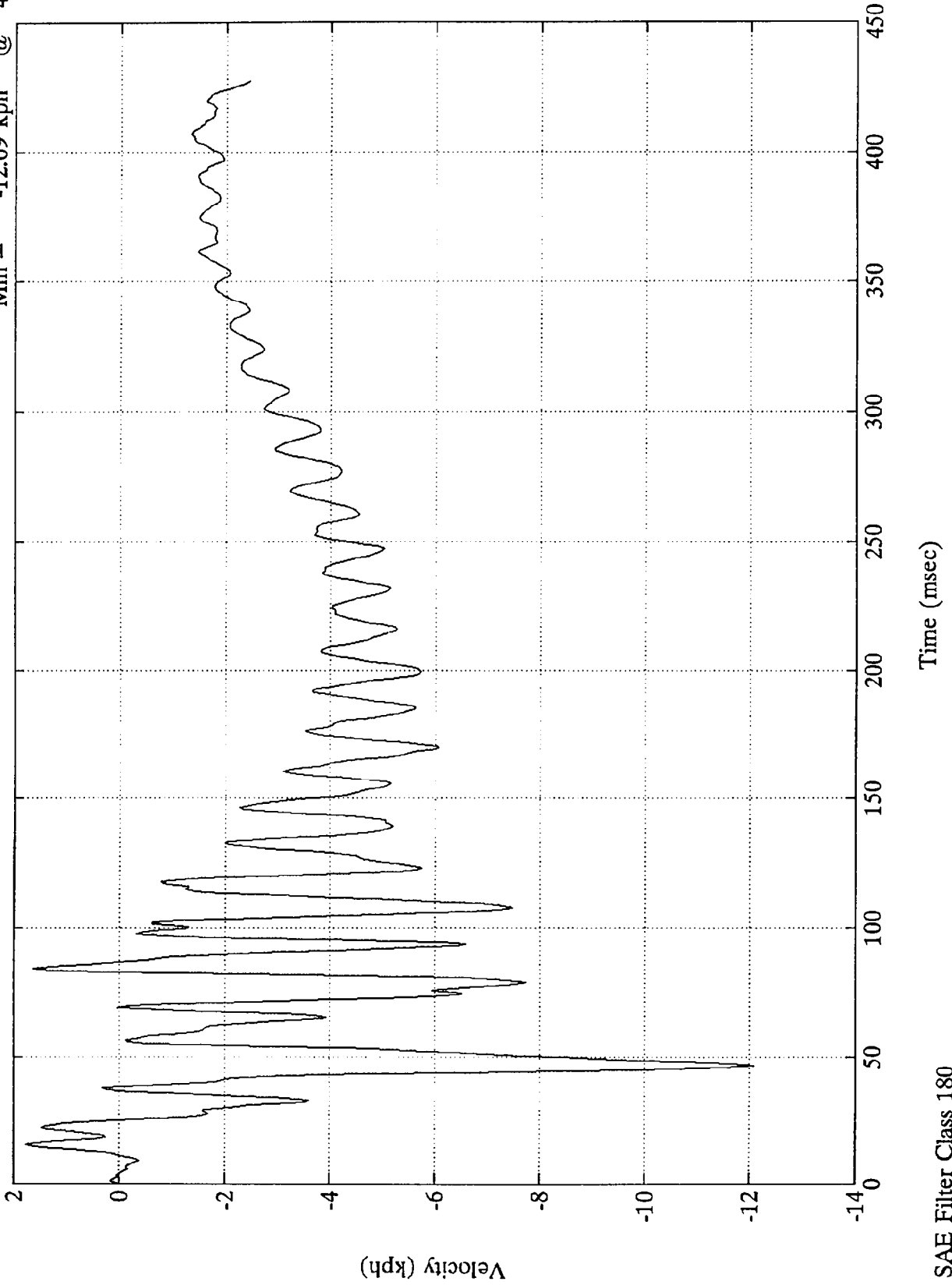
Time (sec)

Sae Filter Class 60

VTV TEST #10

V2 C.G. Z

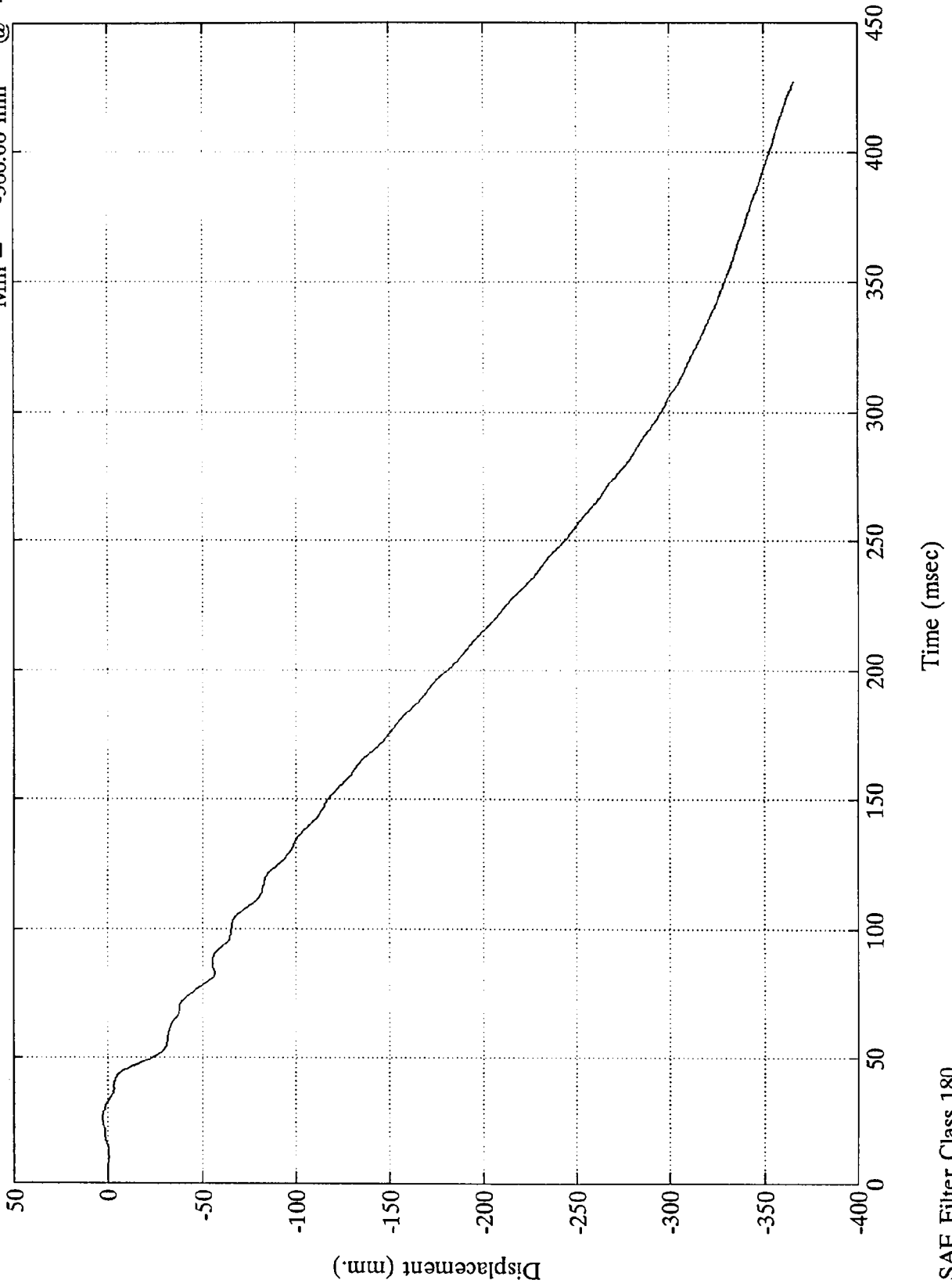
Max = 1.79 kph @ 15.83 msec  
Min = -12.09 kph @ 46.67 msec



VTV TEST #10

Max = 3.23 mm @ 25.20 msec  
Min = -366.06 mm @ 427.32 msec

V2 C.G. Z

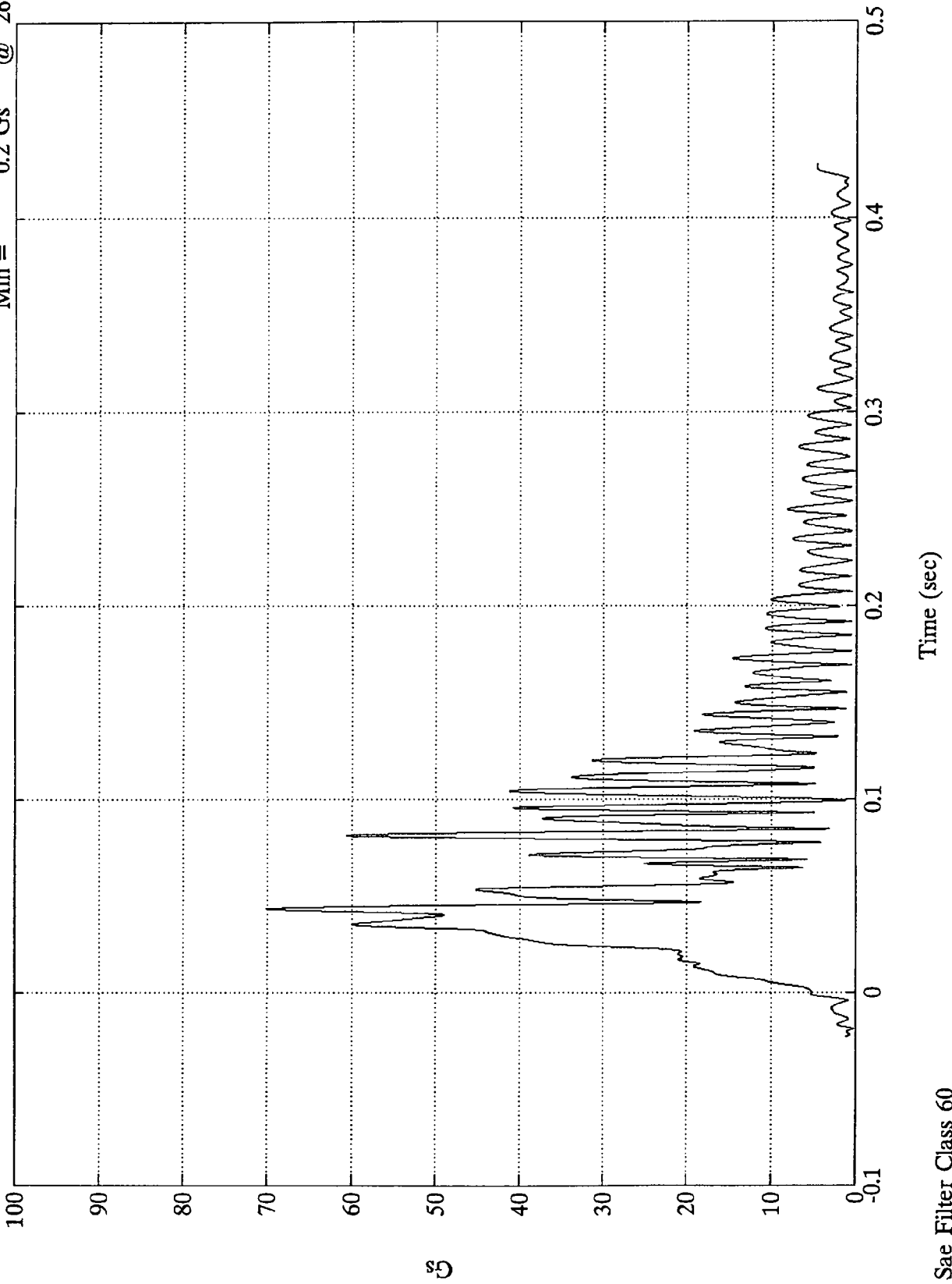


SAE Filter Class 180

VTV TEST #10

V2 C.G.

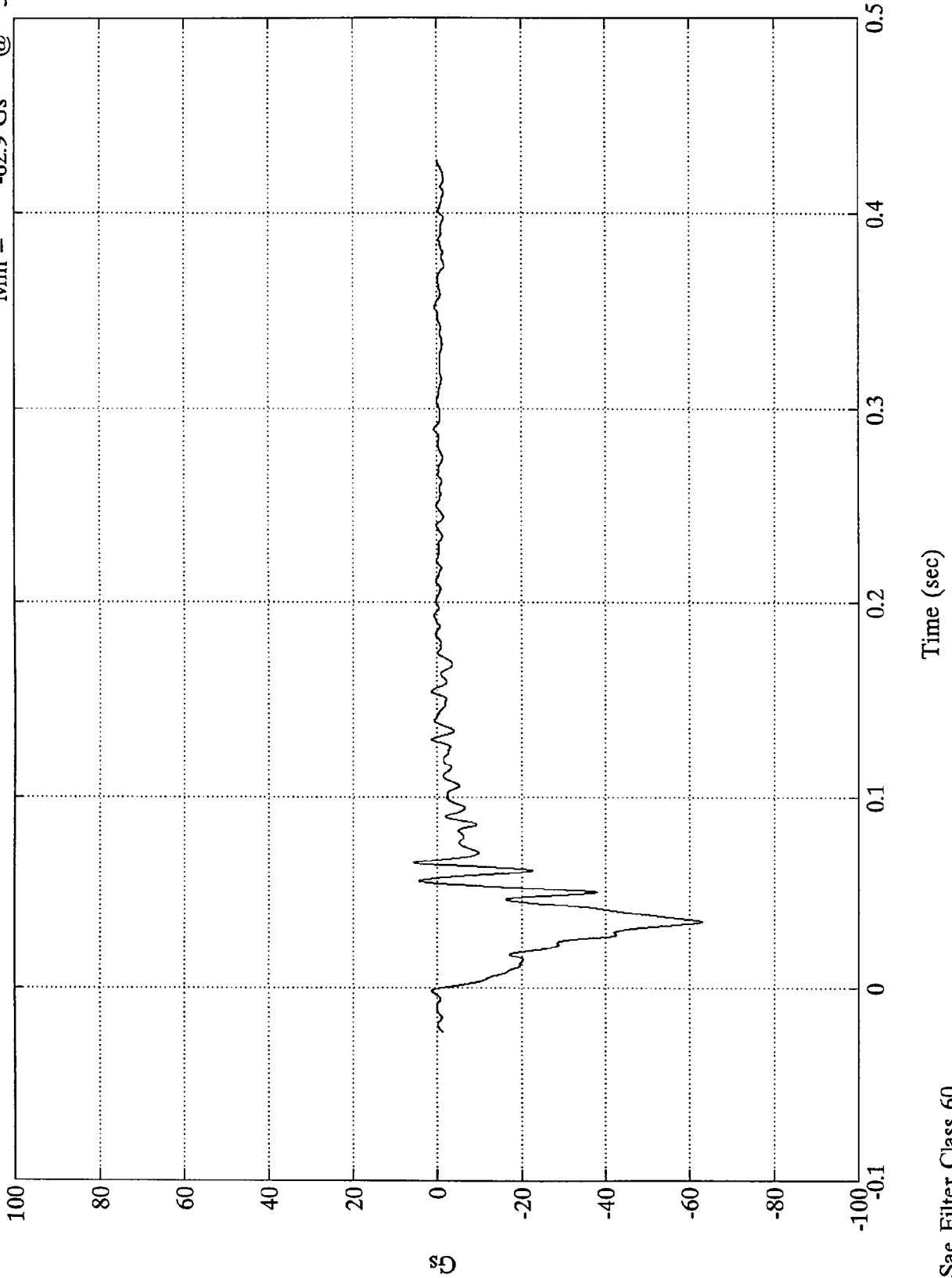
Max = 70.1 Gs @ 43.56 msec  
Min = 0.2 Gs @ 269.76 msec



VTV TEST #10

V2 Left Rail X

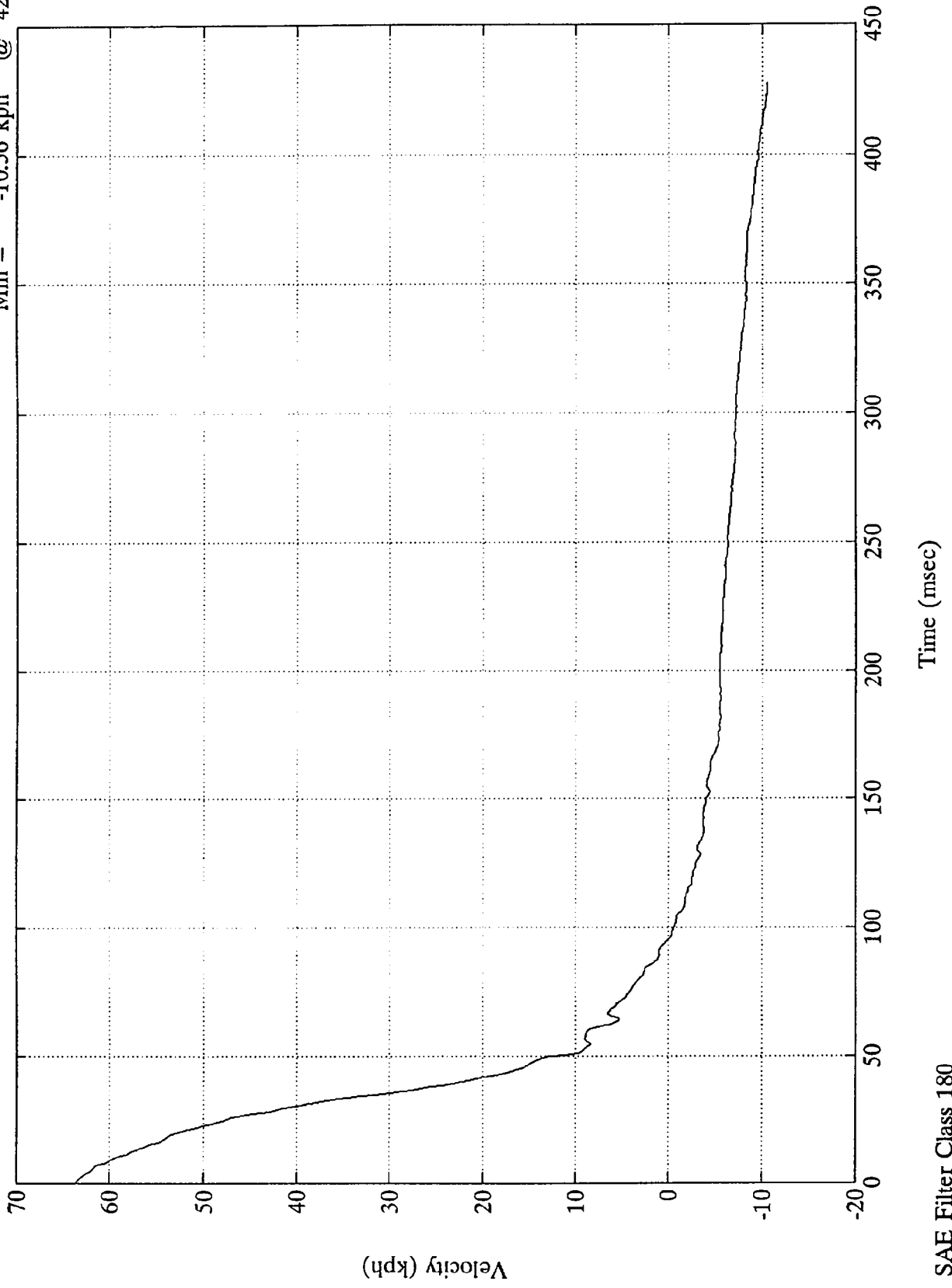
Max = 5.6 Gs @ 65.63 msec  
Min = -62.9 Gs @ 34.79 msec



VTV TEST #10

V2 Left Rail X

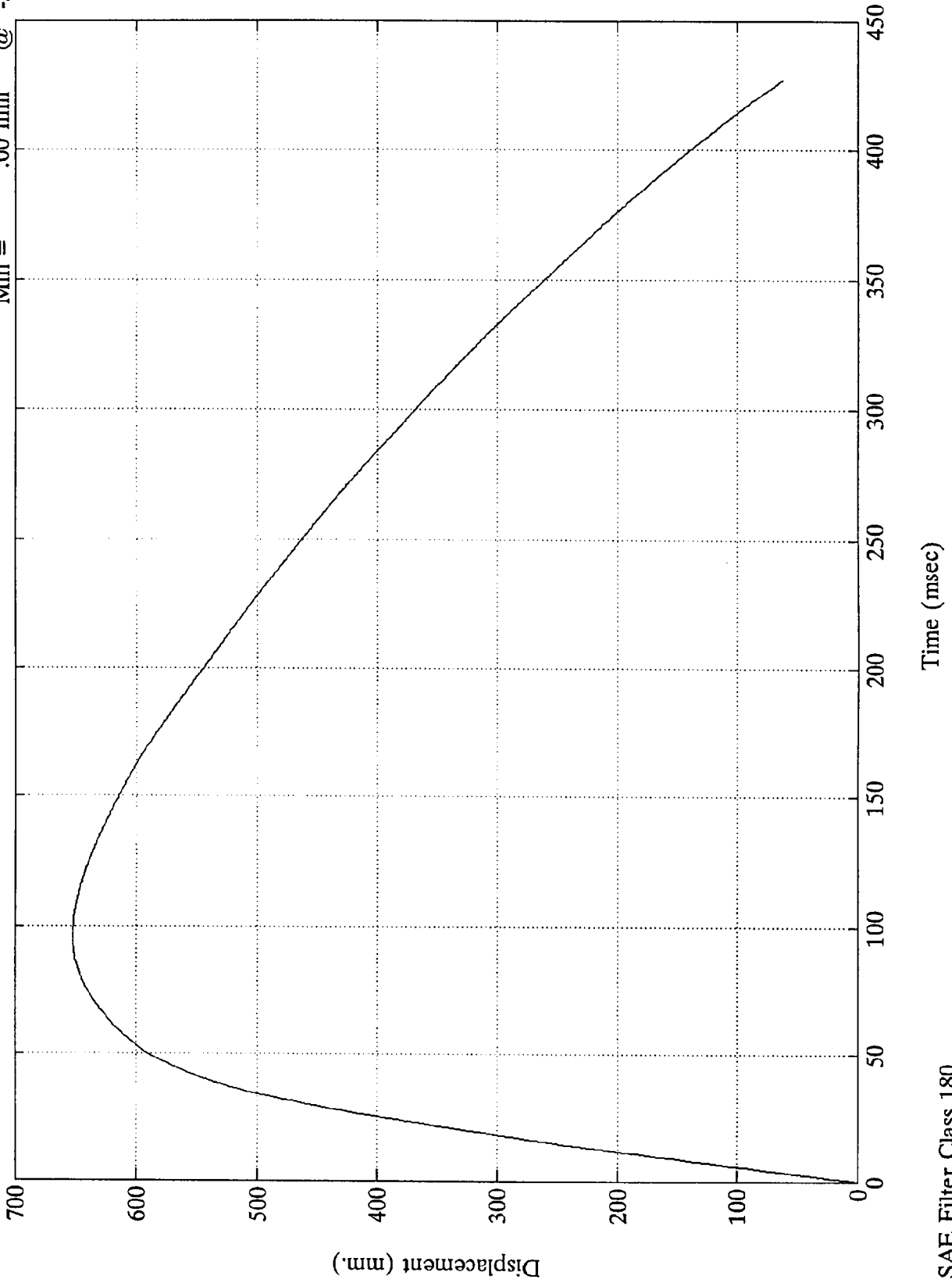
Max = 63.57 kph @ 0.11 msec  
Min = -10.56 kph @ 424.92 msec



VTV TEST #10

V2 Left Rail X

Max = 652.35 mm @ 95.64 msec  
Min = .00 mm @ -22.44 msec

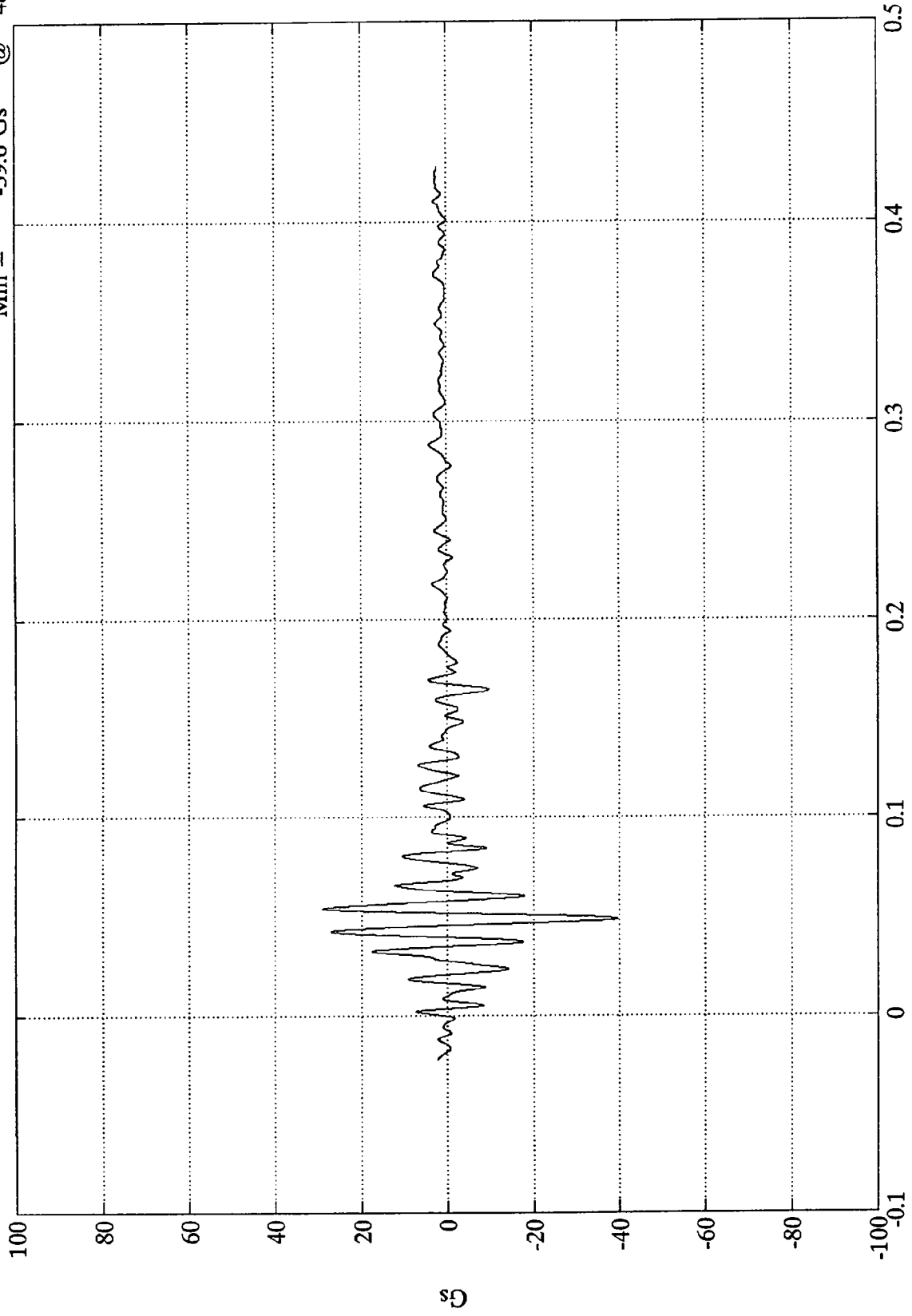


SAE Filter Class 180

VTV TEST #10

V2 Left Rail Y

Max = 29.0 Gs @ 54.11 msec  
Min = -39.6 Gs @ 48.84 msec



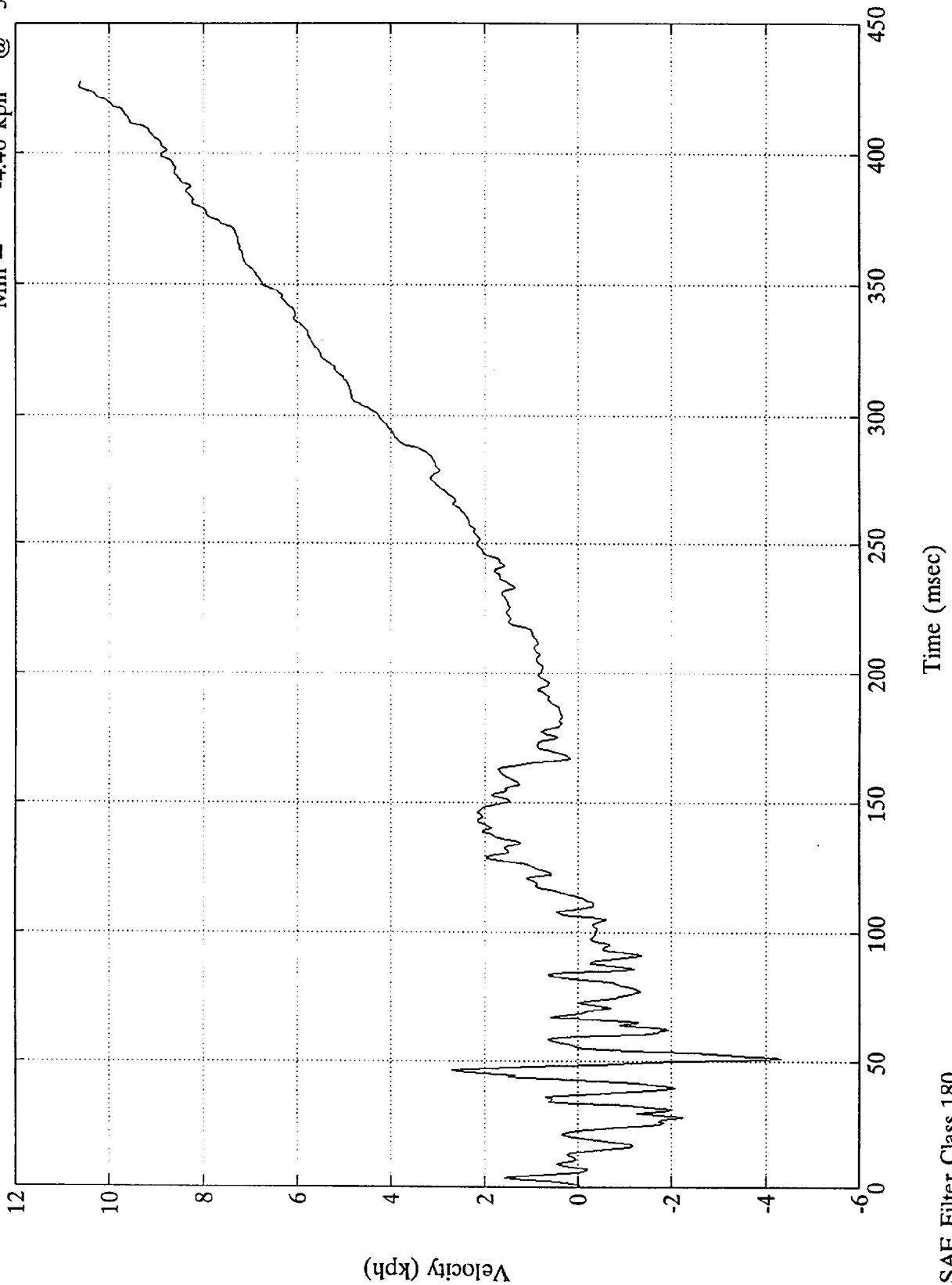
Time (sec)

Sae Filter Class 60

VTV TEST #10

Max = 10.67 kph @ 425.76 msec  
Min = -4.40 kph @ 51.24 msec

V2 Left Rail Y

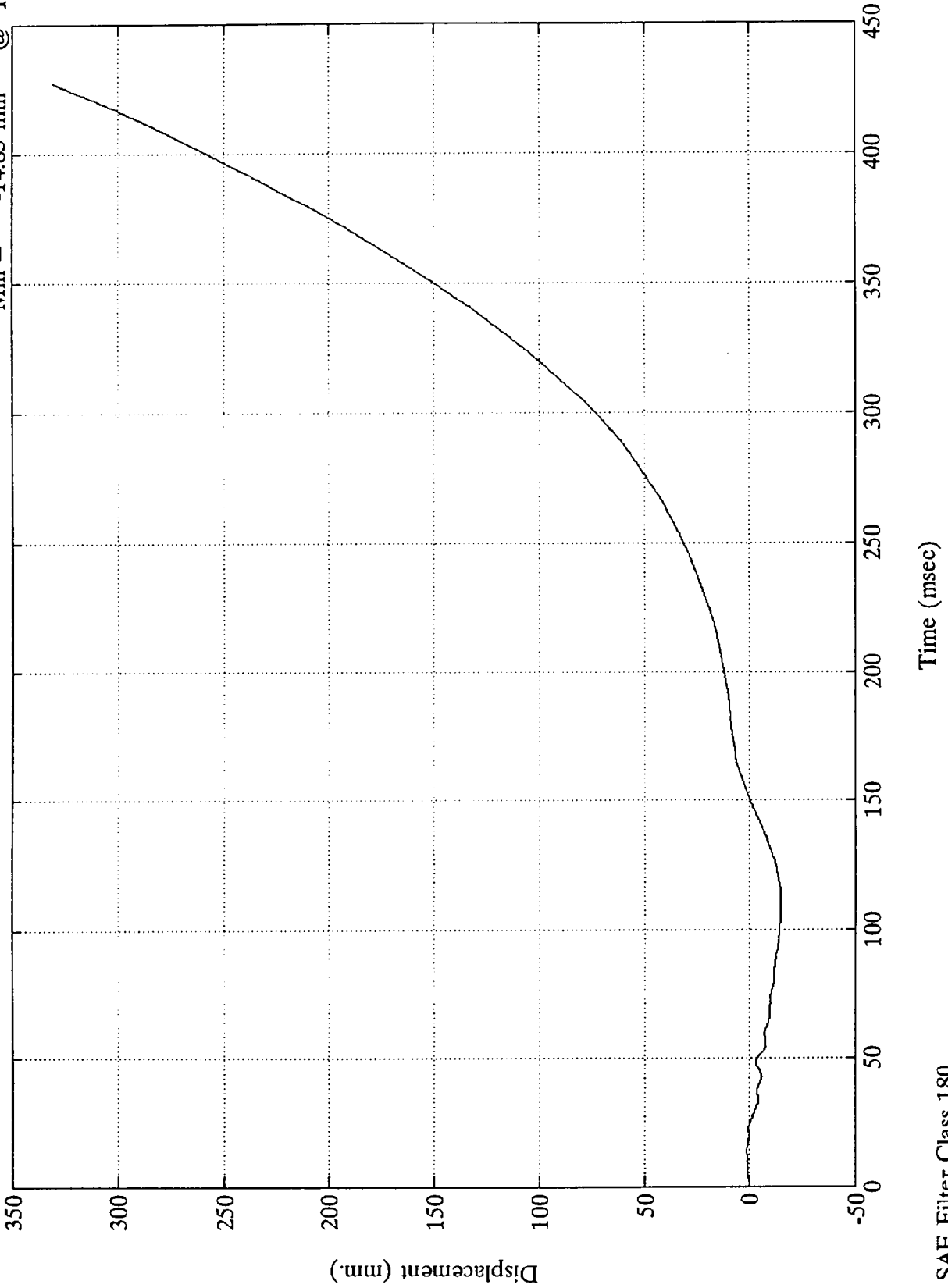


SAE Filter Class 180

VTV TEST #10

V2 Left Rail Y

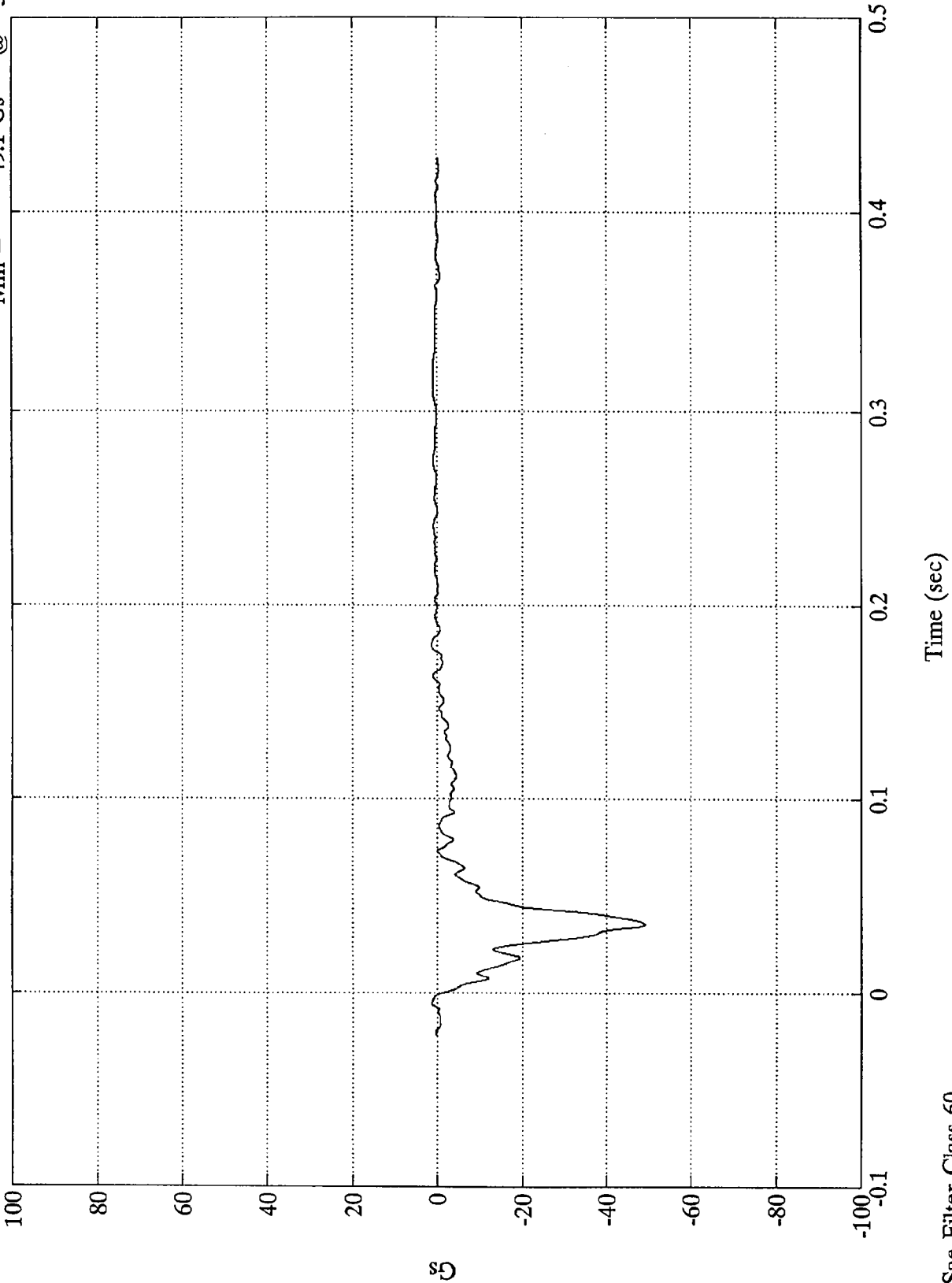
Max = 331.23 mm @ 427.32 msec  
Min = -14.83 mm @ 113.16 msec



VTV TEST #10

V2 Right Rail X

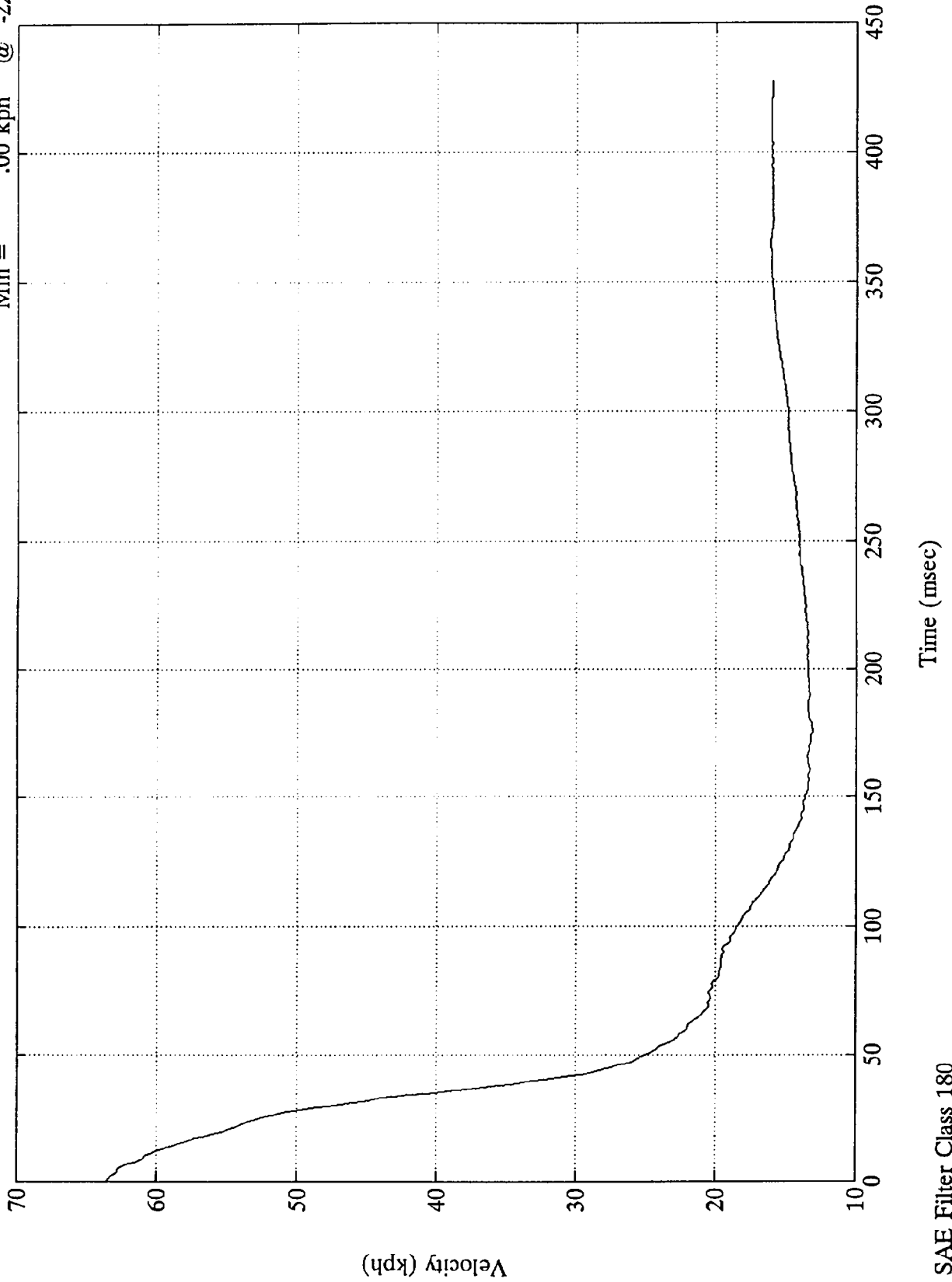
Max = 1.4 Gs @ 179.64 msec  
Min = -49.1 Gs @ 35.52 msec



VTV TEST #10

V2 Right Rail X

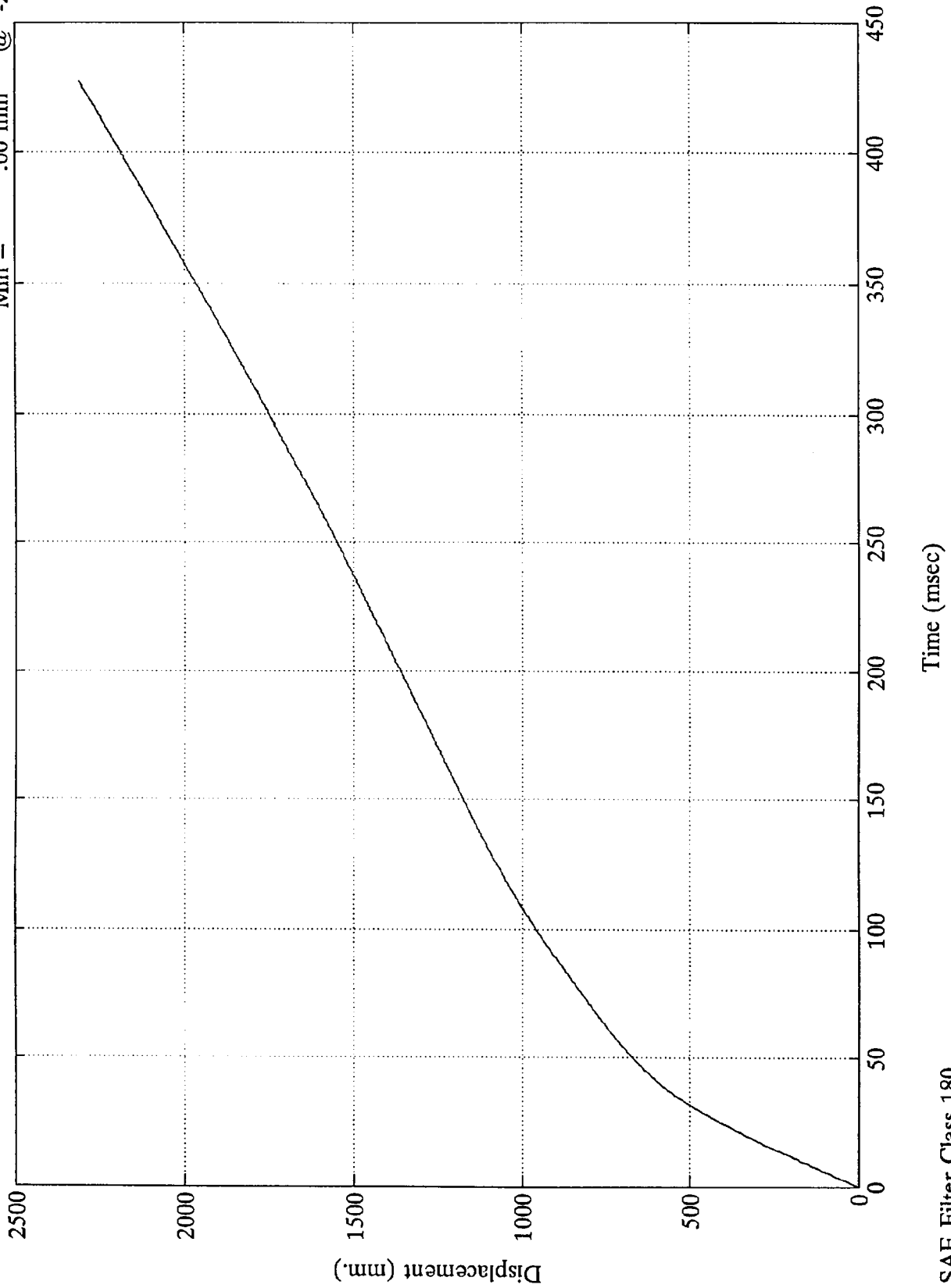
Max = 63.57 kph @ -0.00 msec  
Min = .00 kph @ -22.44 msec



VTV TEST #10

V2 Right Rail X

Max = 2309.21 mm @ 427.32 msec  
Min = .00 mm @ -22.44 msec

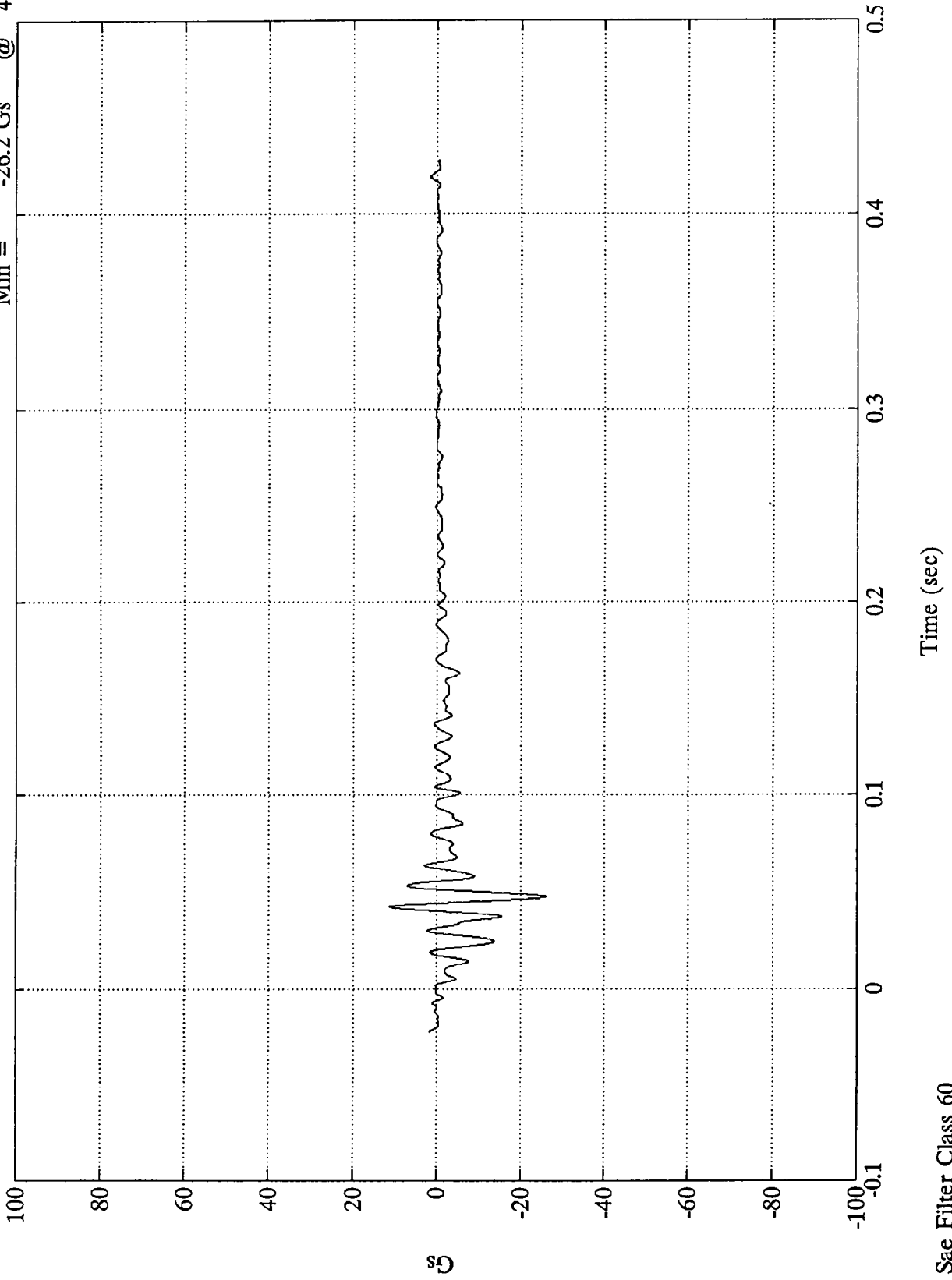


SAE Filter Class 180

VTV TEST #10

V2 Right Rail Y

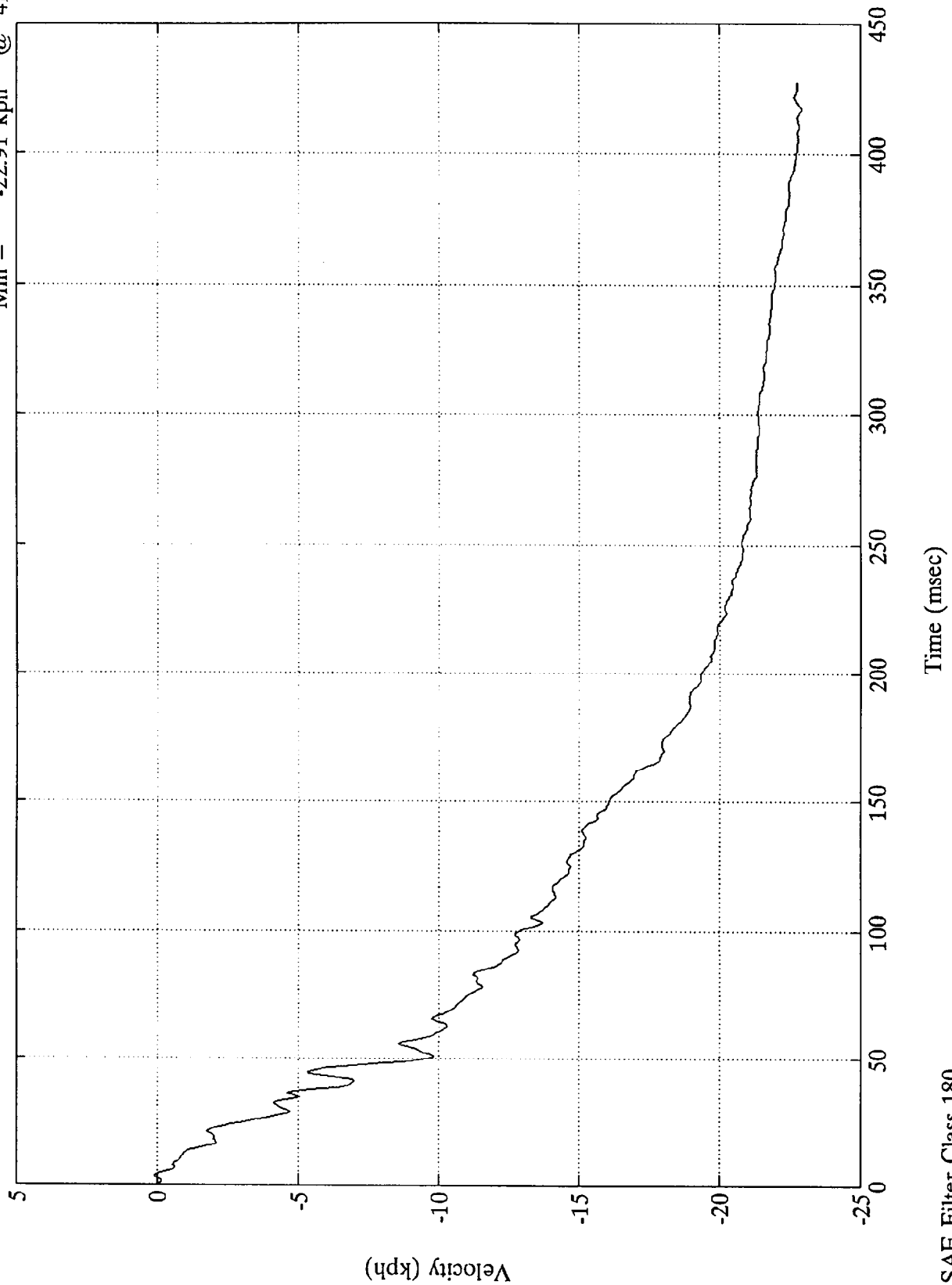
Max = 11.2 Gs @ 42.47 msec  
Min = -26.2 Gs @ 47.63 msec



VTV TEST #10

V2 Right Rail Y

Max = .12 kph @ 3.71 msec  
Min = -22.91 kph @ 416.88 msec

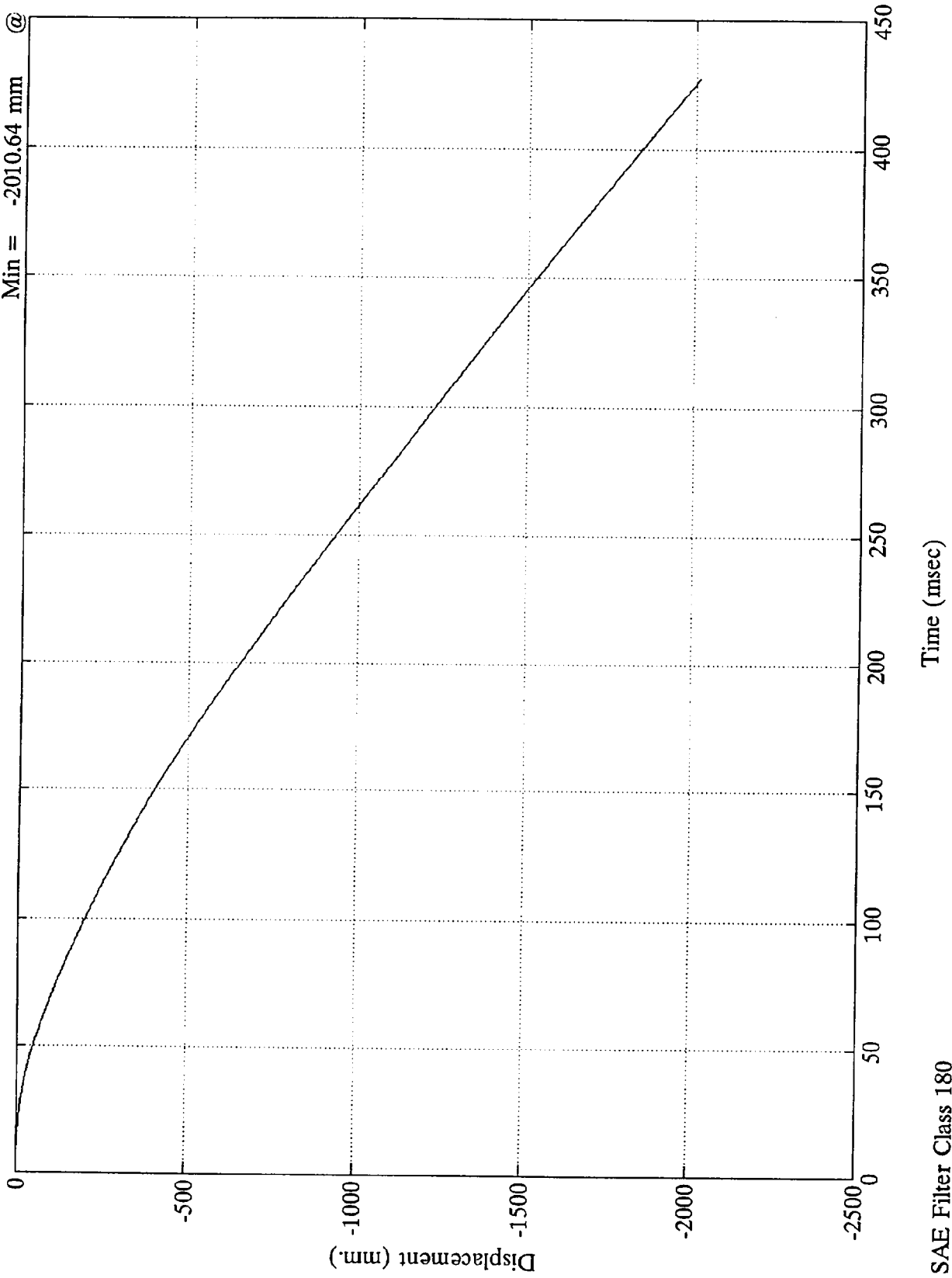


SAE Filter Class 180

VTV TEST #10

V2 Right Rail Y

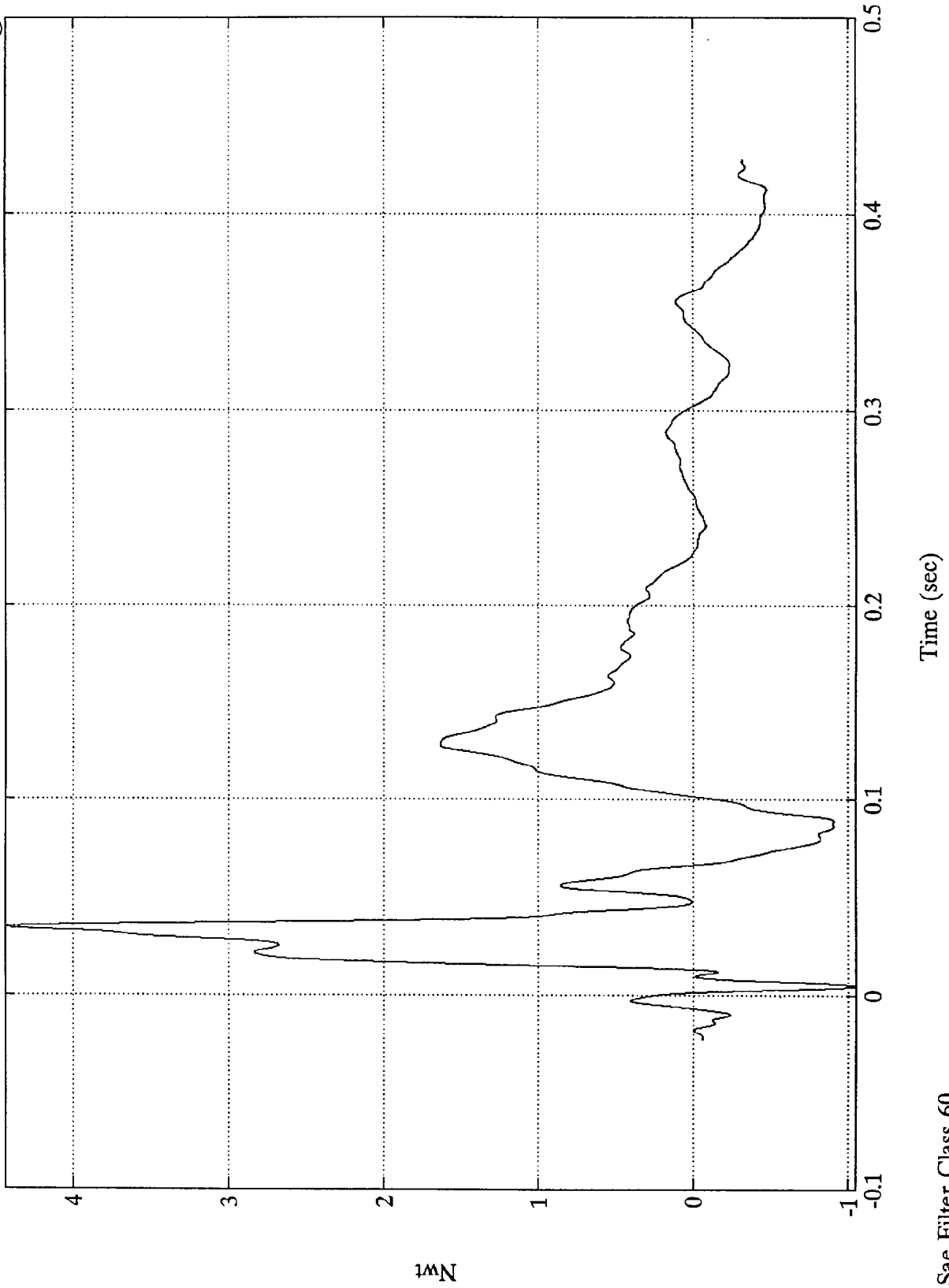
Max = .00 mm @ -0.00 msec  
Min = -2010.64 mm @ 427.32 msec



VTV TEST0#10

V2 TR Load Cell

Max = 44356.2 Nwt @ 35.27 msec  
Min = -10492.5 Nwt @ 5.03 msec

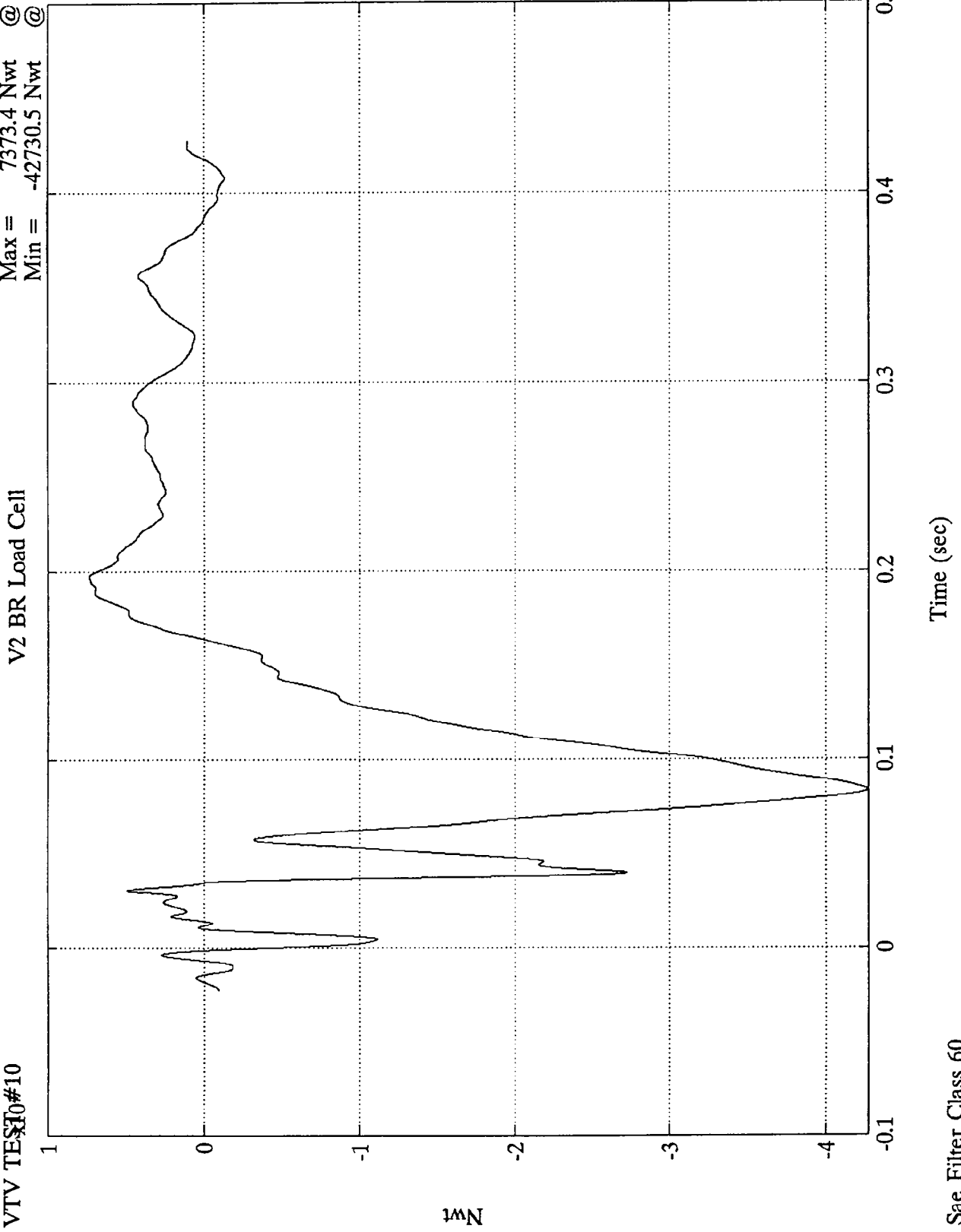


Nwt

Time (sec)

Sae Filter Class 60

VTV TEST#10  
Max = 7373.4 Nwt @ 197.27 msec  
Min = -42730.5 Nwt @ 83.63 msec



Sae Filter Class 60

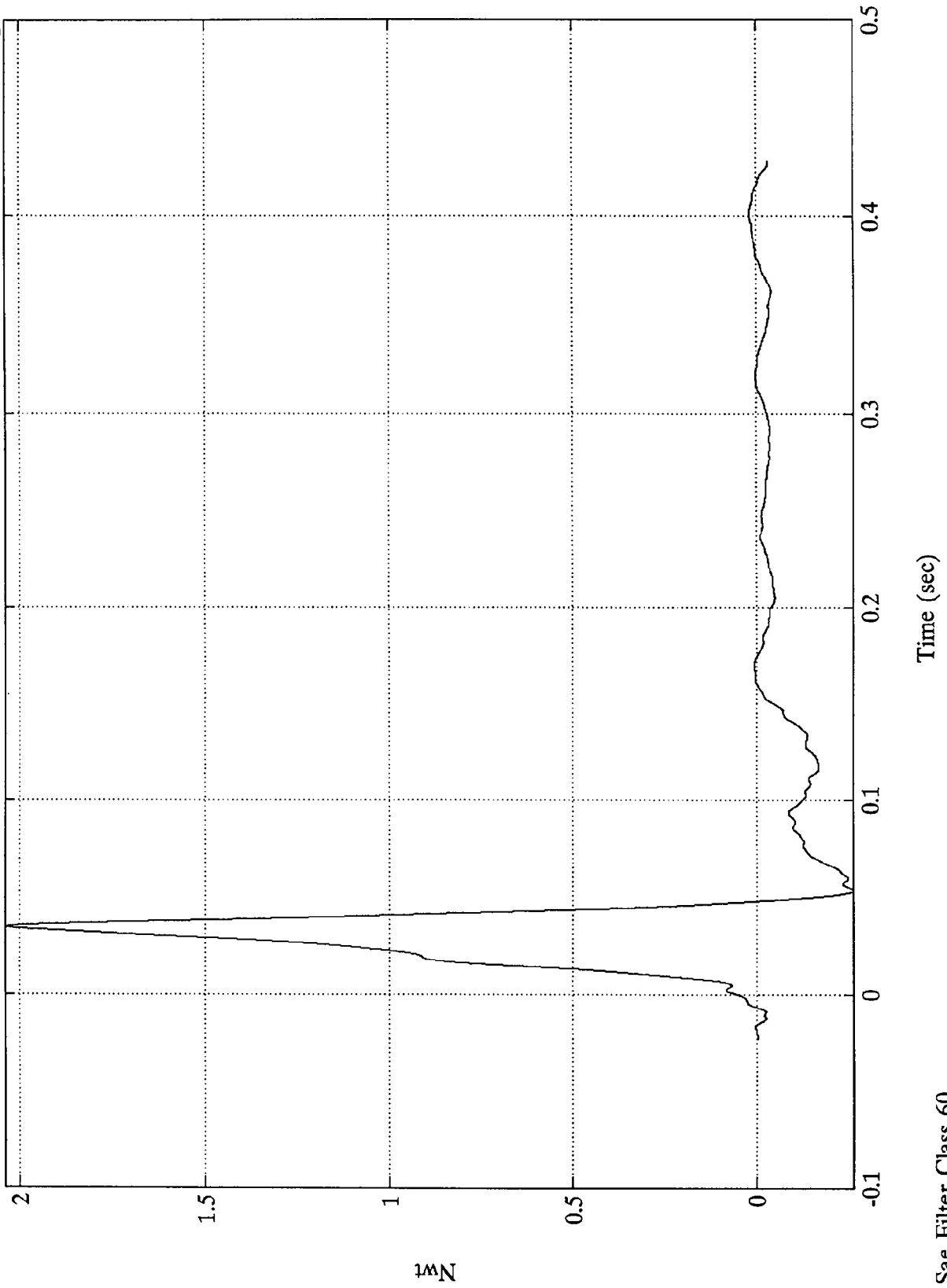
Nwt

VTV TEST#10

V2 TL Load Cell

Max = 203892.0 Nwt @  
Min = -26190.3 Nwt @

35.04 msec  
53.40 msec

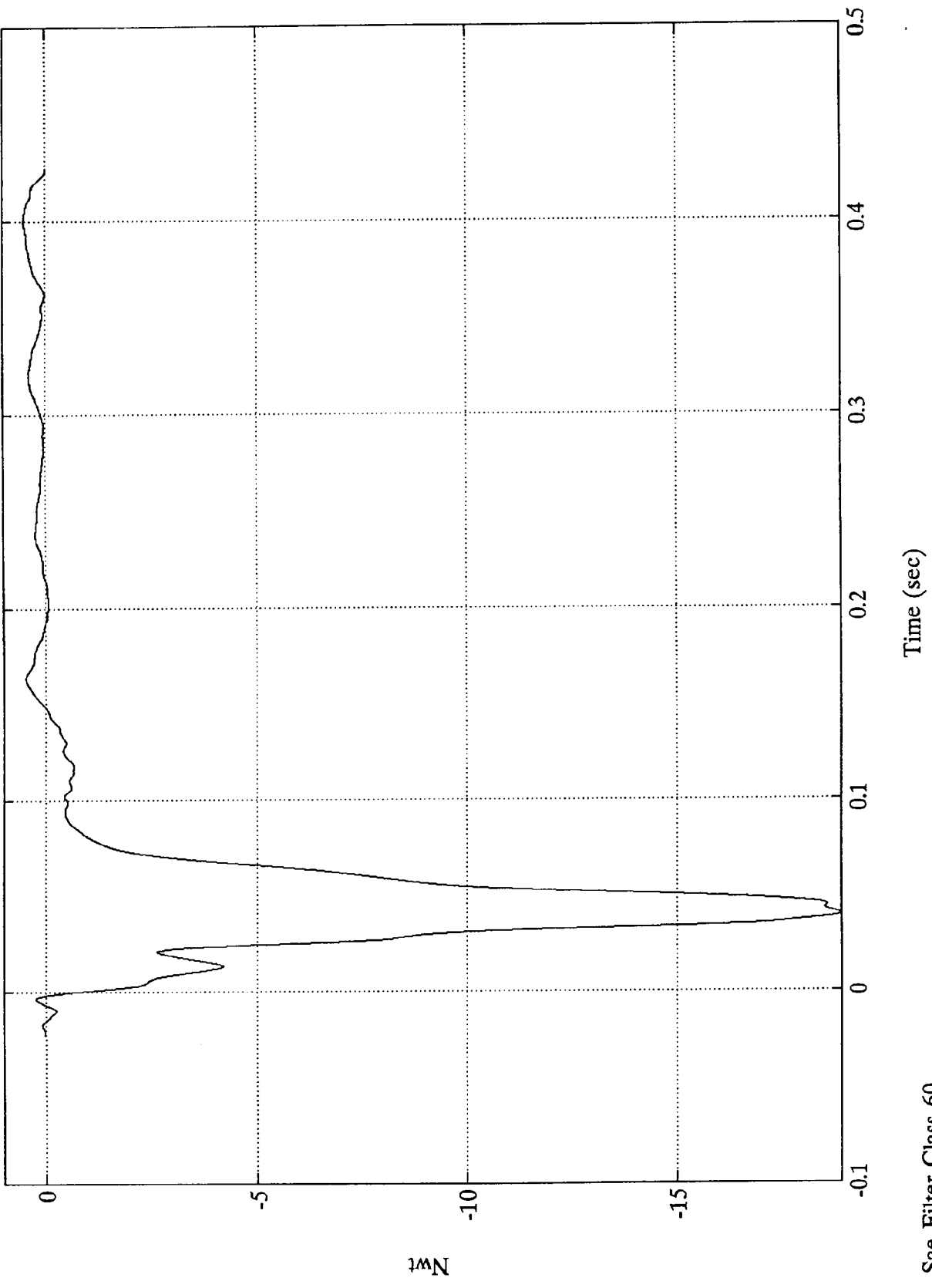


Sae Filter Class 60

Nwt

Time (sec)

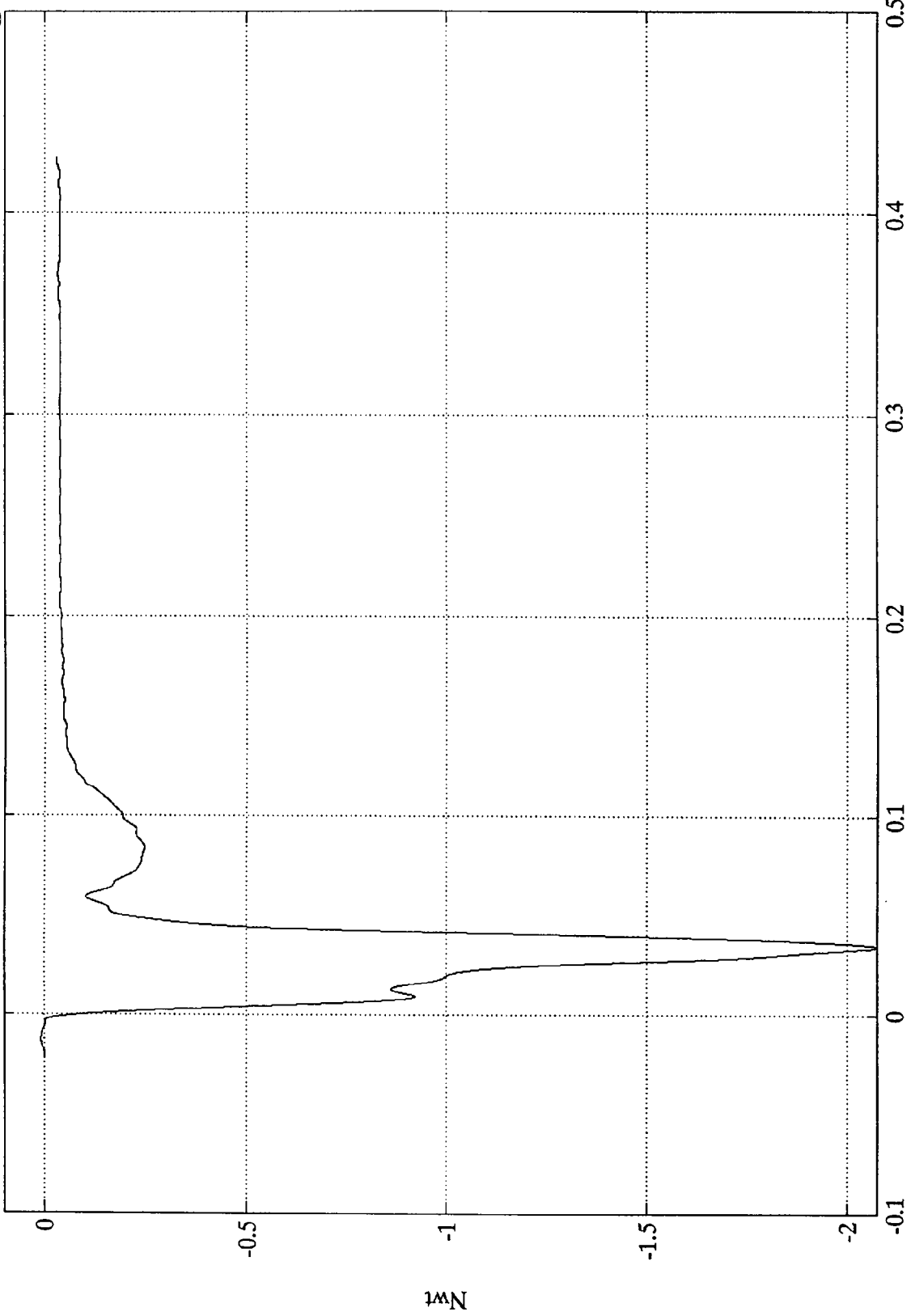
VTV TEST#10      V2 BL Load Cell      Max = 5049.2 Nwt @ 399.60 msec  
Min = -188953.1 Nwt @ 39.95 msec



VTV TEST#10

V2 CL Load Cell

Max = 952.3 Nwt @ -12.72 msec  
Min = -207572.7 Nwt @ 34.68 msec



Time (sec)

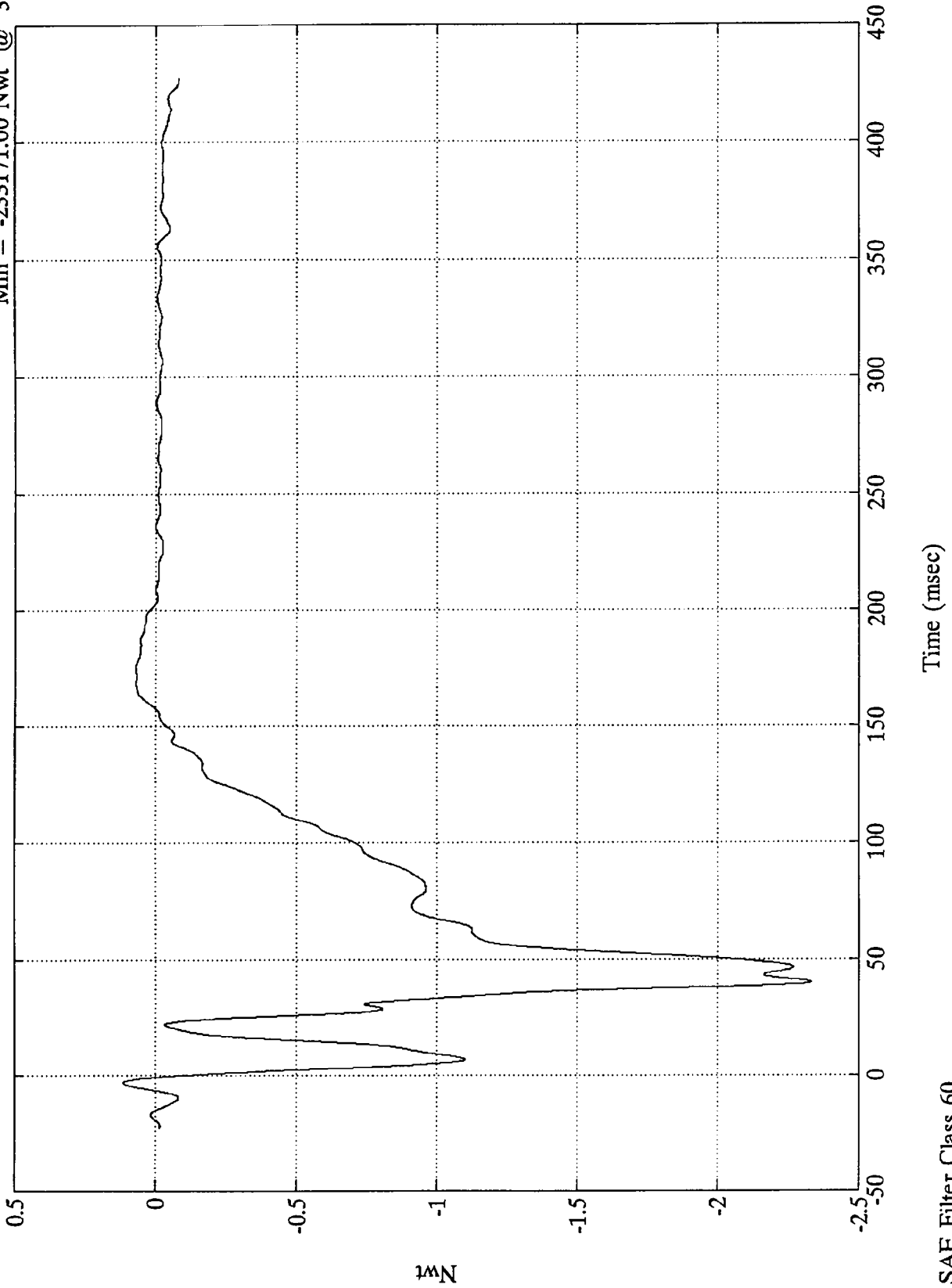
Sae Filter Class 60

VTV TEST #10

$\times 10^5$

V2 Load Cell Barrier Sum

Max = 11508.19 Nwt @ -3.36 msec  
Min = -233171.00 Nwt @ 39.96 msec



SAE Filter Class 60

TEST NO. Y49-10-1455

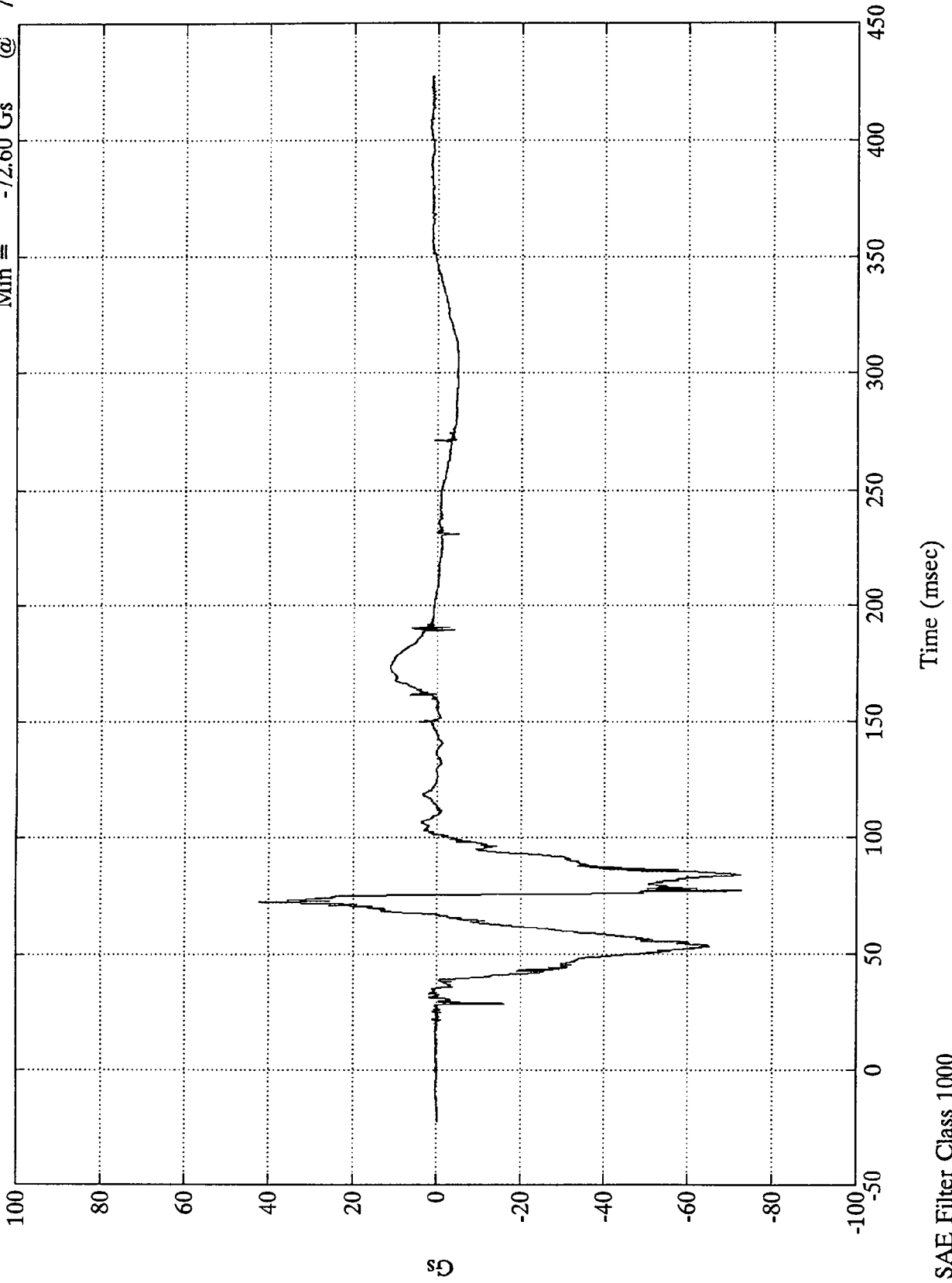
VEHICLE 1 - DUMMY DATA

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

VTV TEST #10

V1-P1 Head X

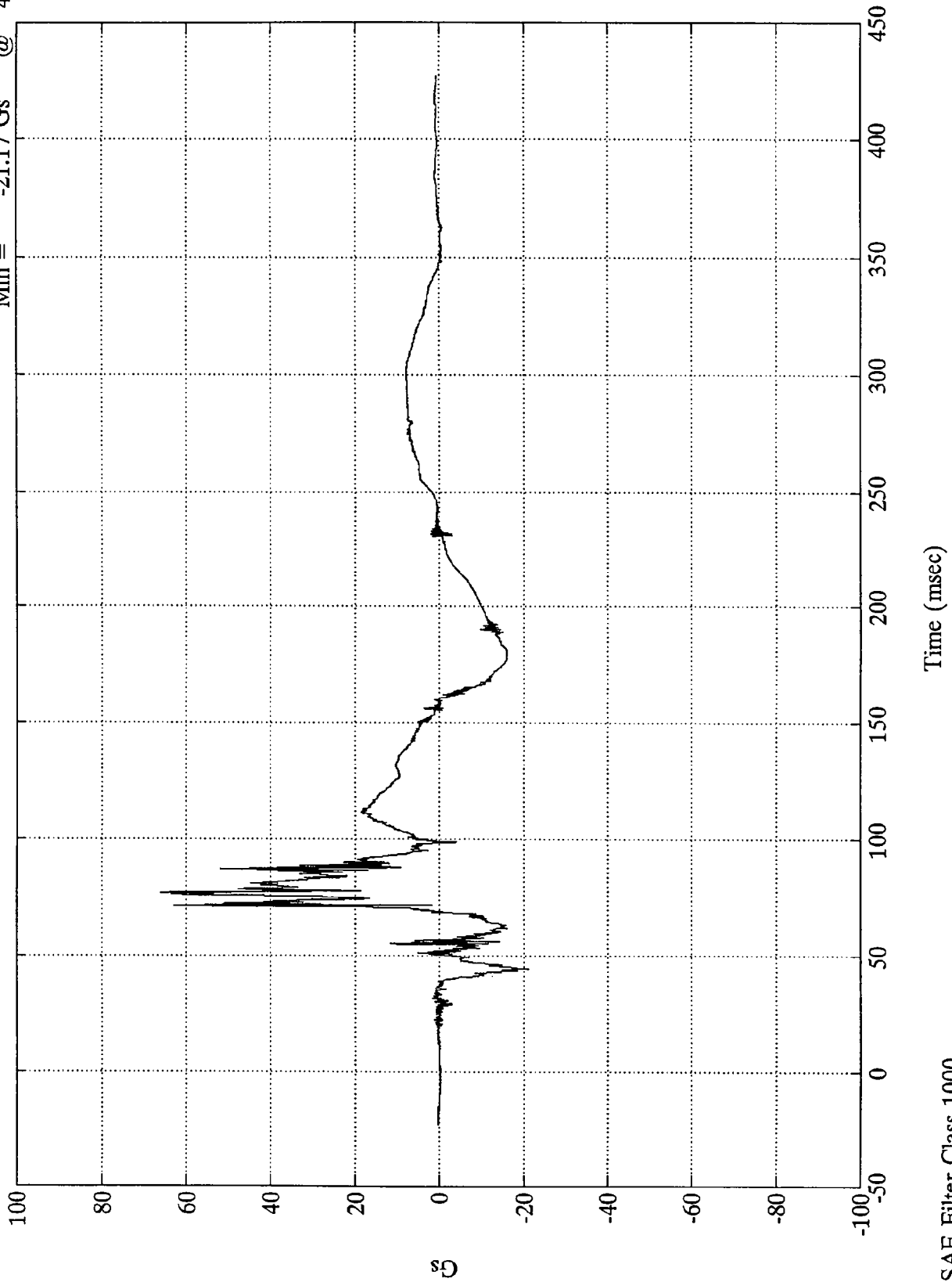
Max = 42.33 Gs @ 72.12 msec  
Min = -72.60 Gs @ 76.92 msec



VTV TEST #10

Max = 66.08 Gs @ 76.80 msec  
Min = -21.17 Gs @ 44.27 msec

V1-P1 Head Y

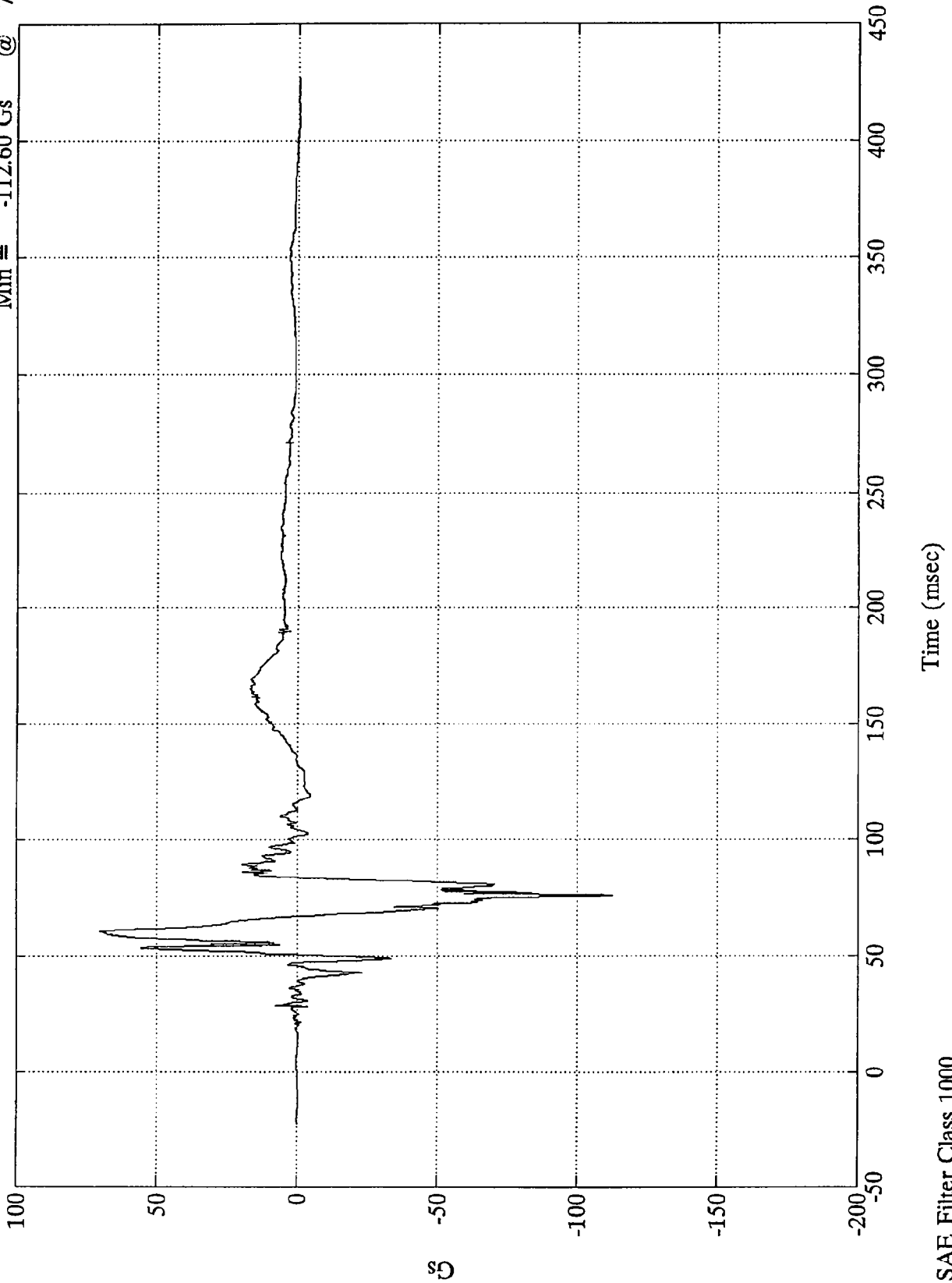


SAE Filter Class 1000

VTV TEST #10

V1-P1 Head Z

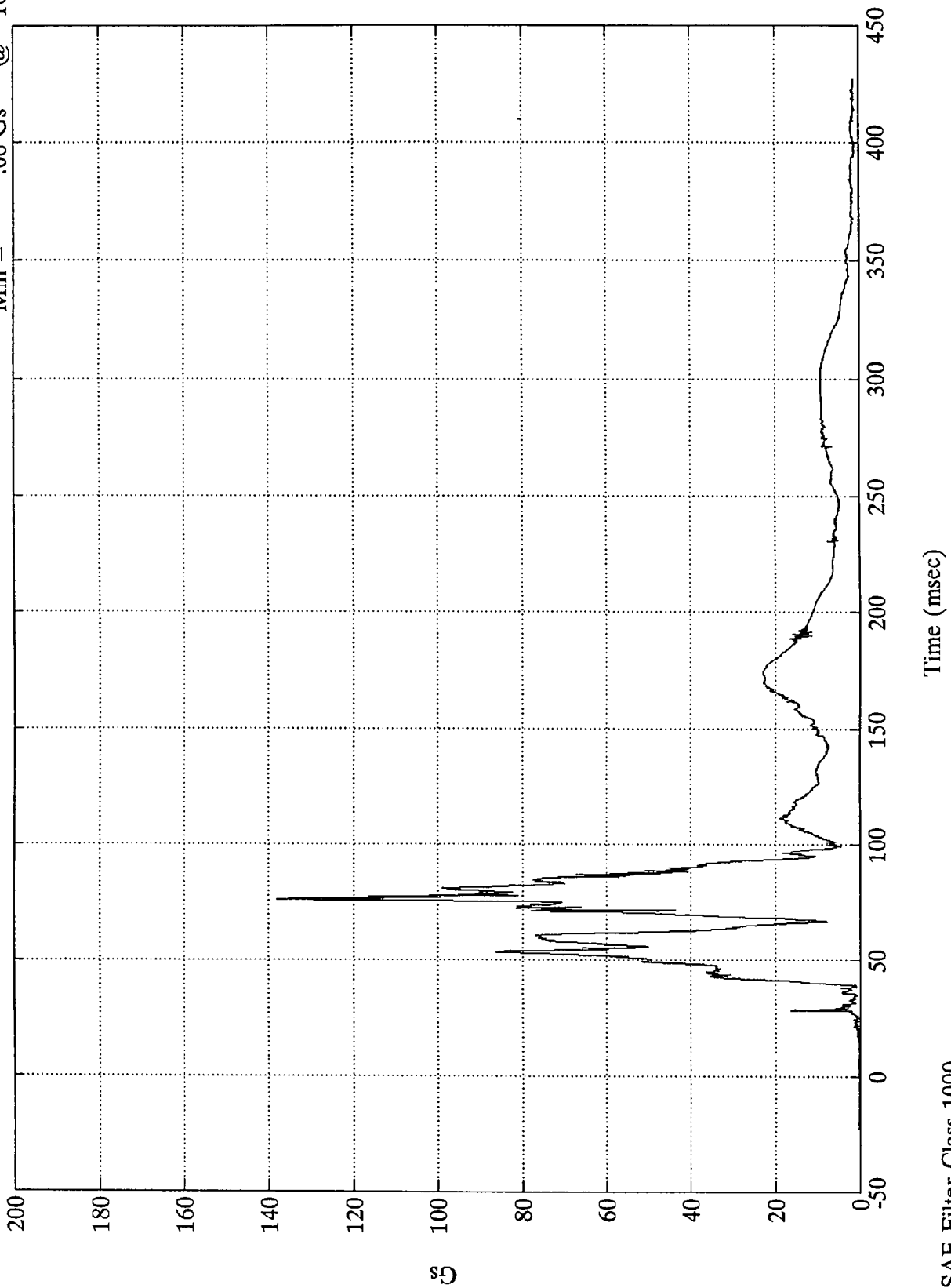
Max = 70.31 Gs @ 60.60 msec  
Min = -112.60 Gs @ 75.84 msec



VTV TEST #10

Head Resultant

Max = 138.17 Gs @ 75.95 msec  
Min = .06 Gs @ 10.79 msec

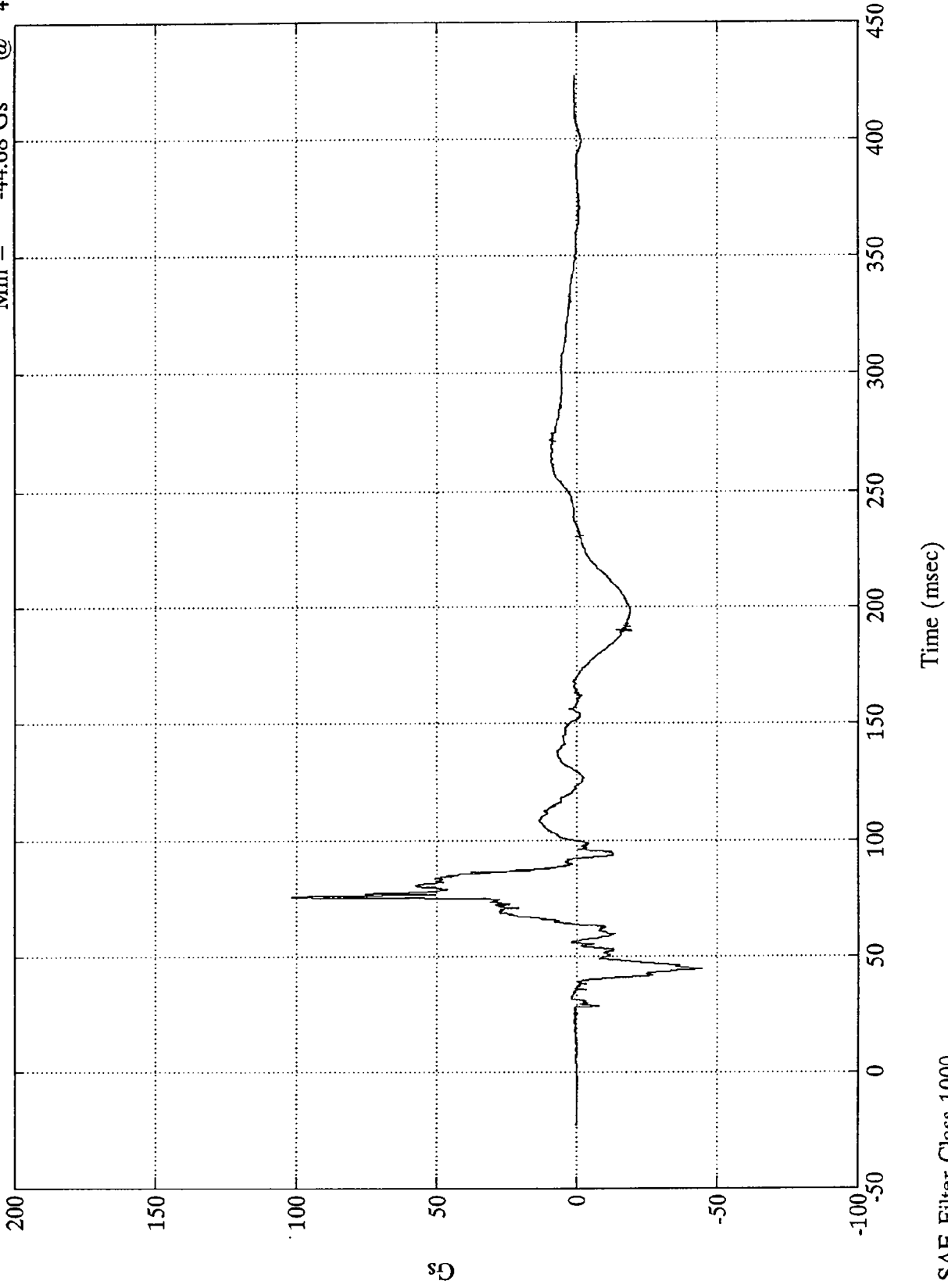


SAE Filter Class 1000

VTV TEST #10

V1-P1 HD9X (Y)

Max = 101.58 Gs @ 75.95 msec  
Min = -44.68 Gs @ 44.27 msec

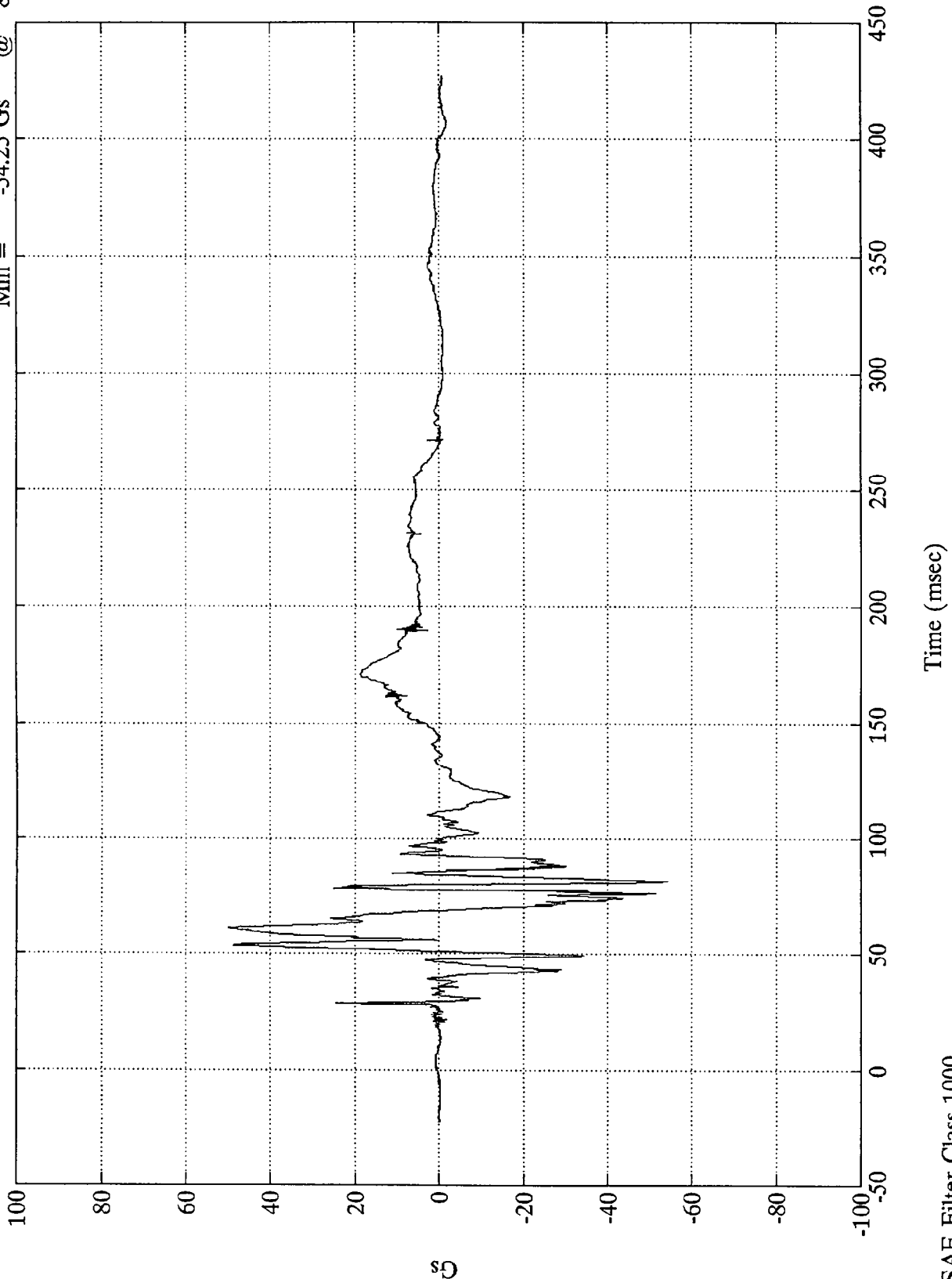


SAE Filter Class 1000

VTV TEST #10

VI-P1 HD9X (Z)

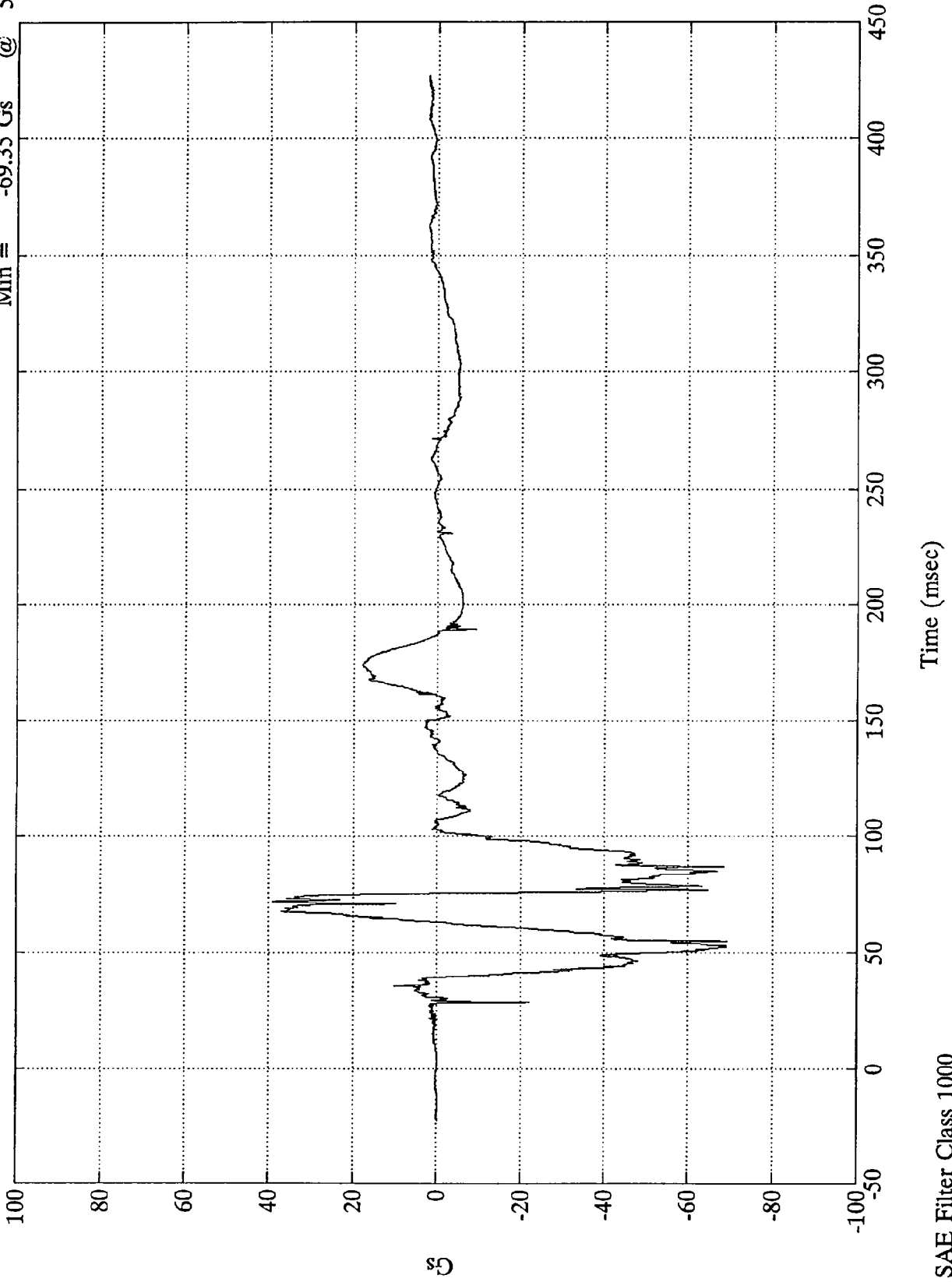
Max = 49.89 Gs @ 60.84 msec  
Min = -54.25 Gs @ 81.12 msec



VTV TEST #10

V1-P1 HD9Y (X)

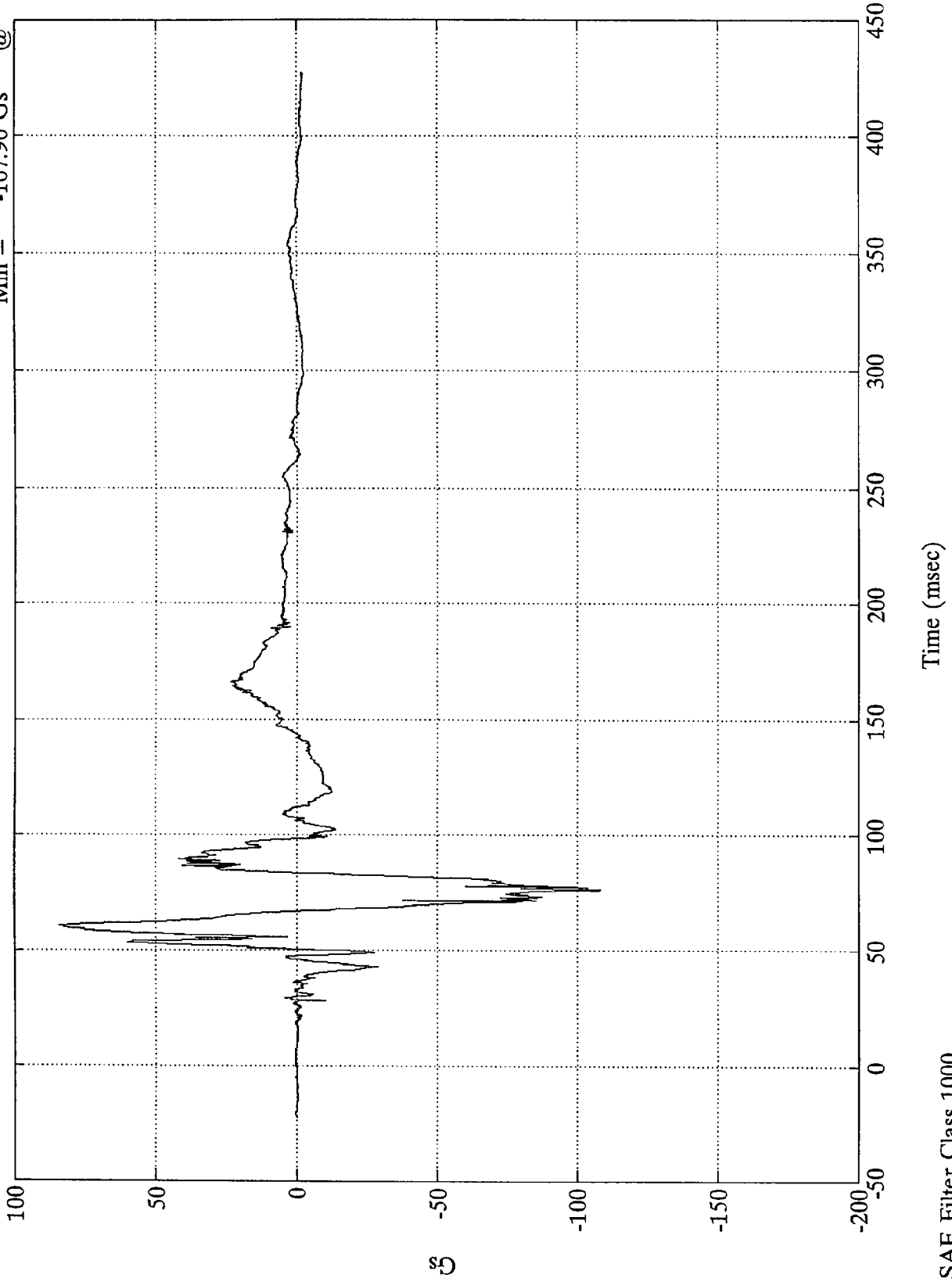
Max = 39.15 Gs @ 72.00 msec  
Min = -69.35 Gs @ 54.96 msec



VTV TEST #10

V1-P1 HD9Y (Z)

Max = 84.22 Gs @ 60.48 msec  
Min = -107.90 Gs @ 76.20 msec

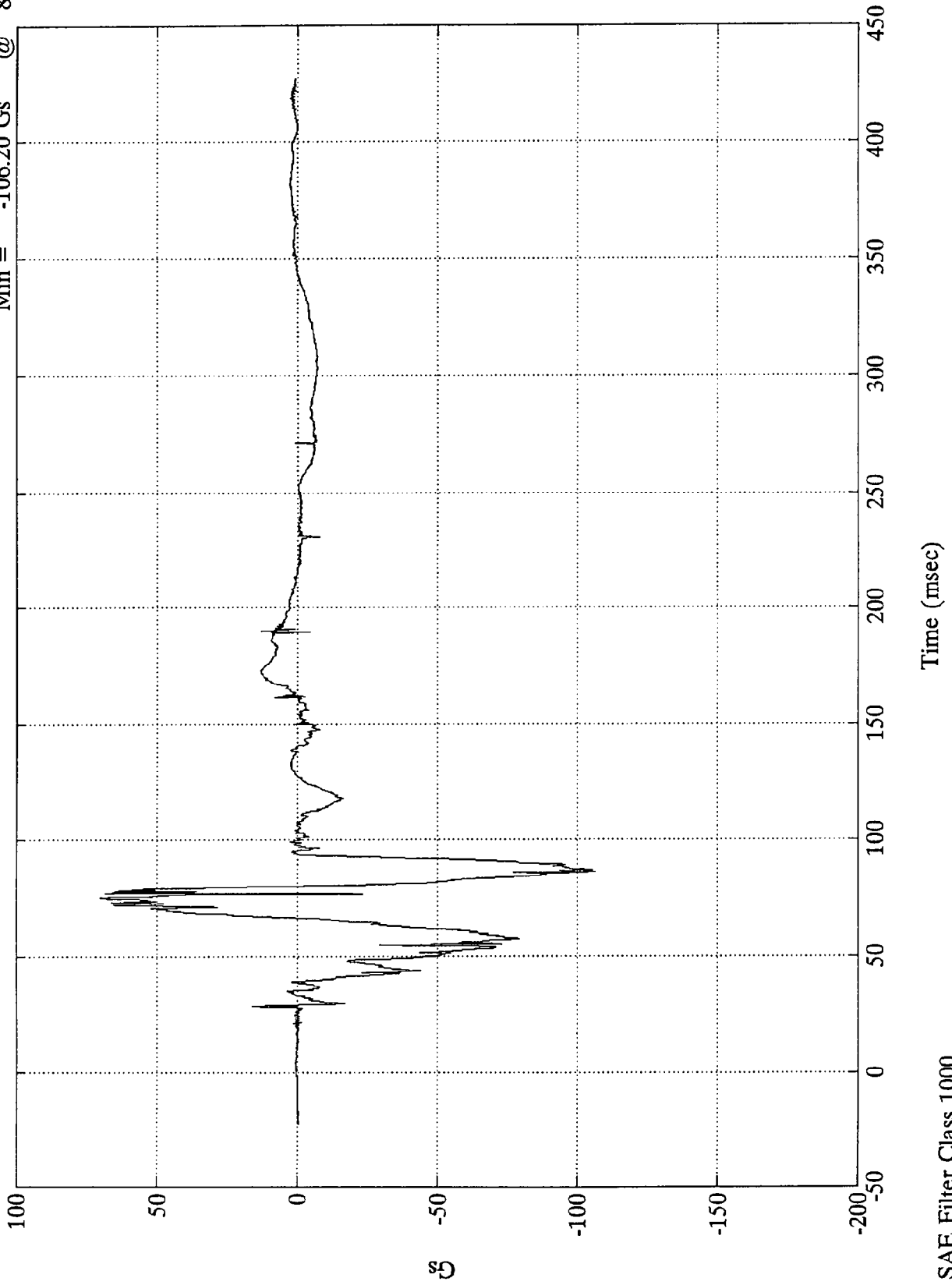


SAE Filter Class 1000

VTV TEST #10

V1-P1 HD9Z (X)

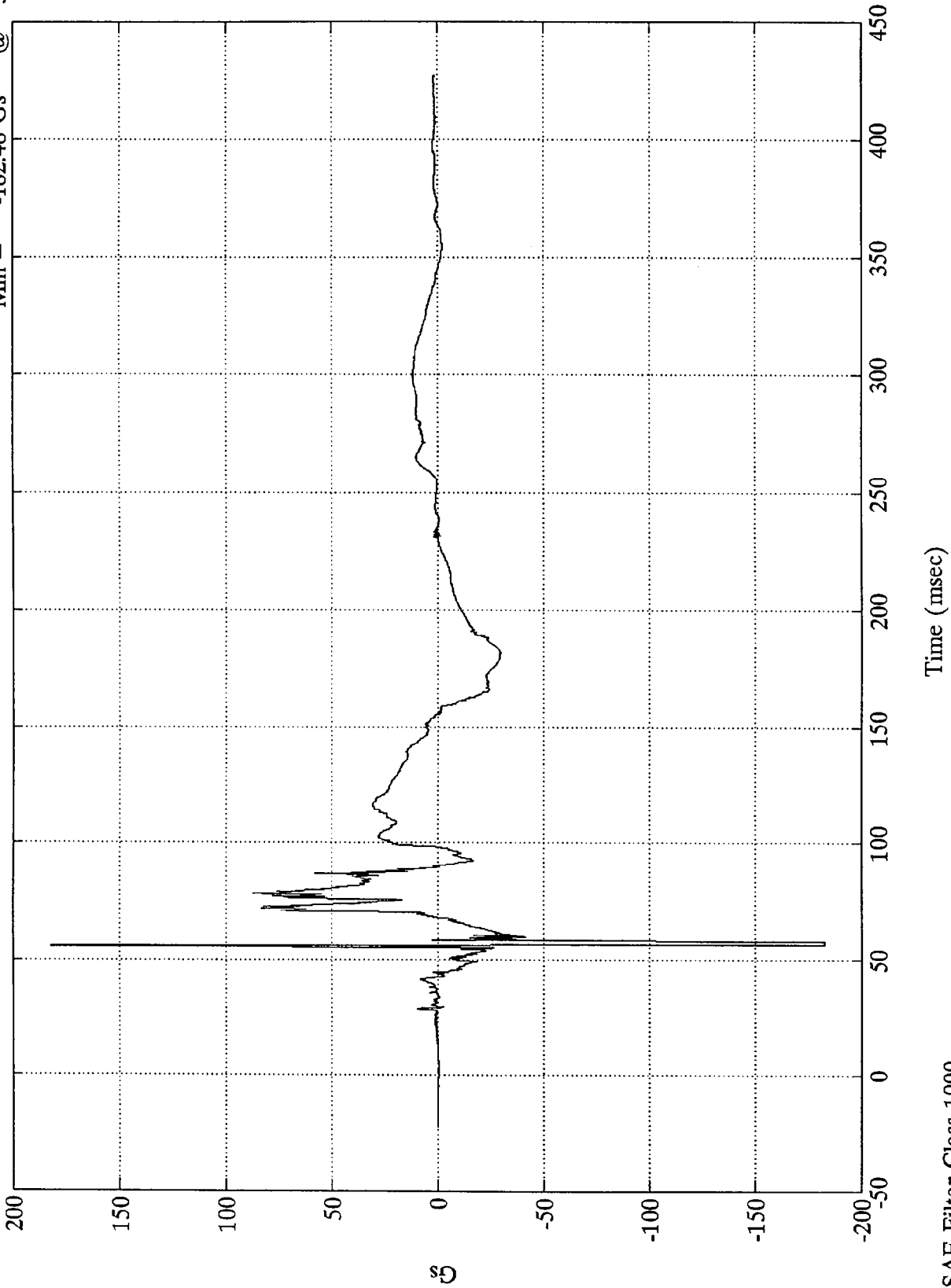
Max = 70.29 Gs @ 75.12 msec  
Min = -106.20 Gs @ 86.28 msec



VTV TEST #10

V1-P1 HD9Z (Y)

Max = 182.18 Gs @ 56.04 msec  
Min = -182.48 Gs @ 58.08 msec

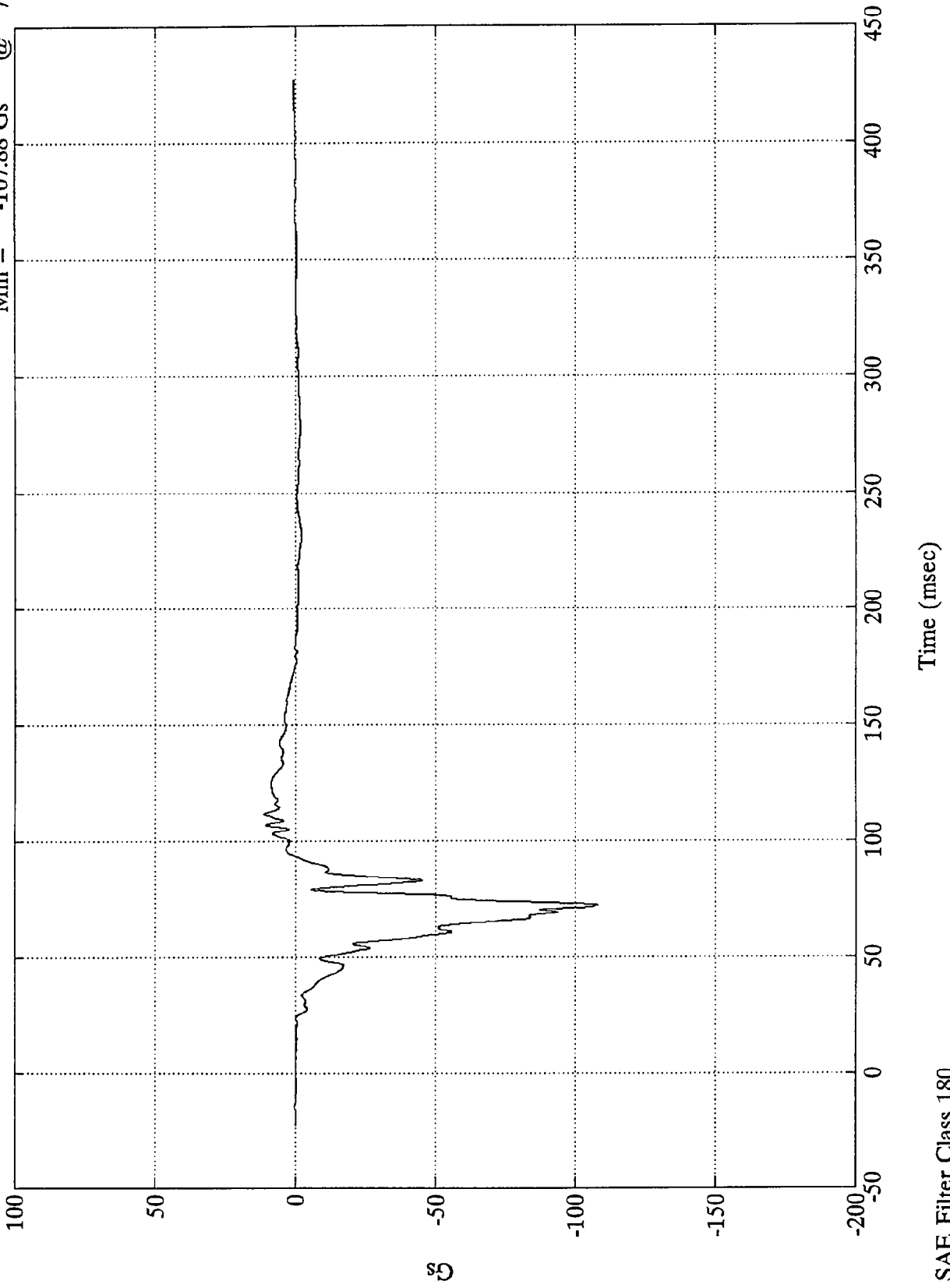


SAE Filter Class 1000

VTV TEST #10

V1-P1 Chest X

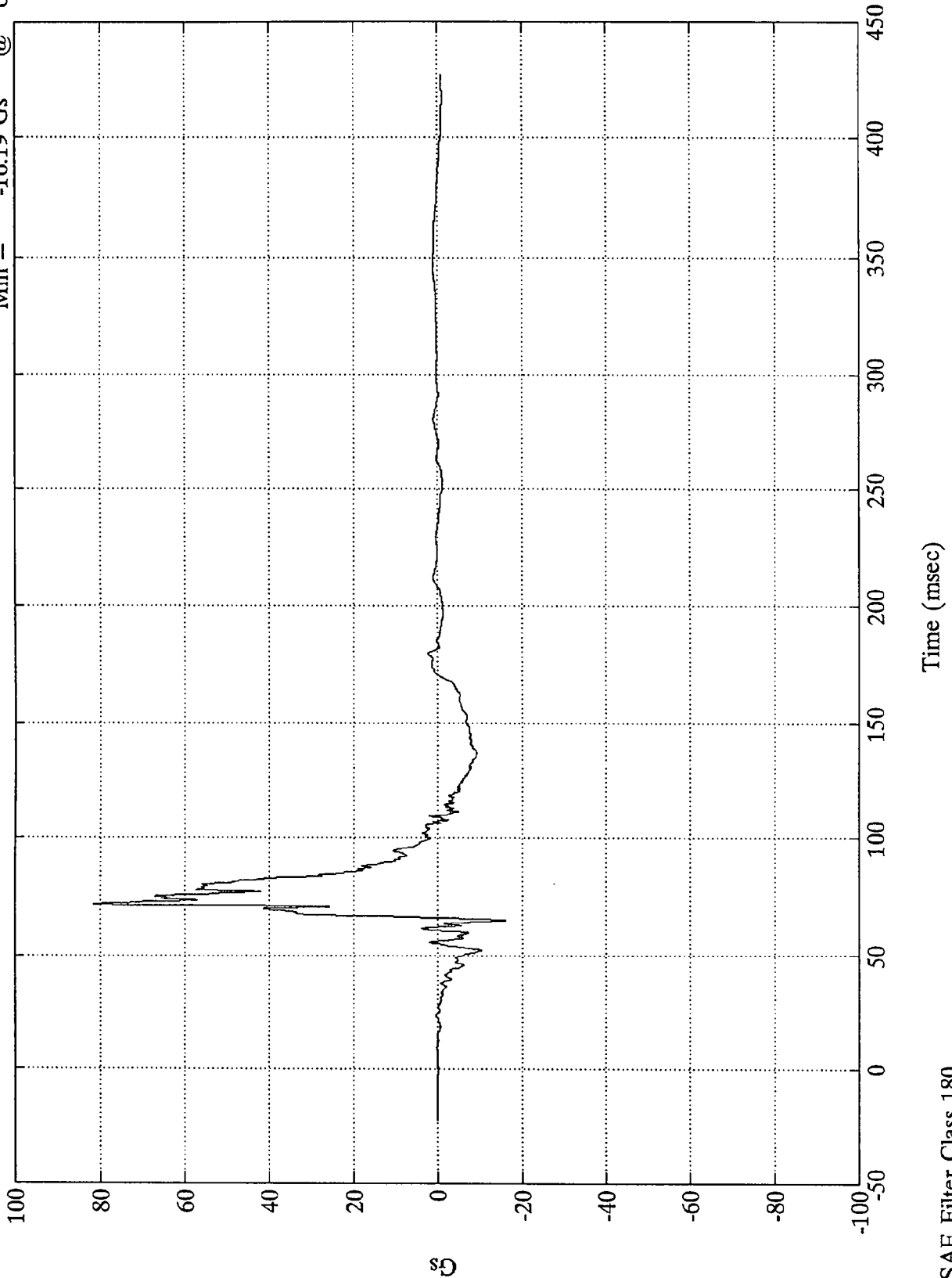
Max = 11.29 Gs @ 111.84 msec  
Min = -107.88 Gs @ 72.36 msec



VTV TEST #10

V1-P1 Chest Y

Max = 81.54 Gs @ 71.88 msec  
Min = -16.19 Gs @ 65.15 msec



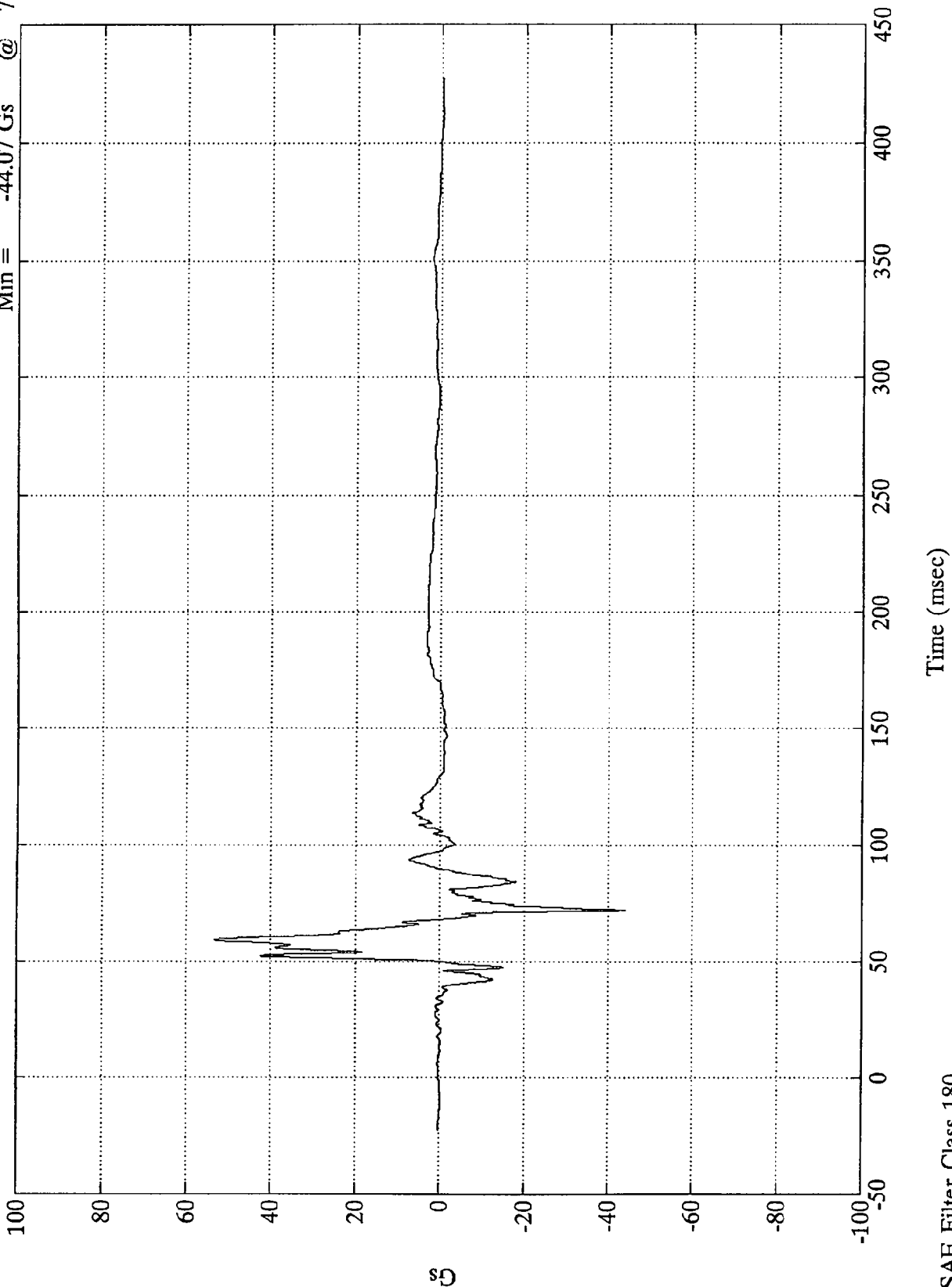
Time (msec)

SAE Filter Class 180

VTV TEST #10

V1-P1 Chest Z

Max = 53.24 Gs @ 59.15 msec  
Min = -44.07 Gs @ 71.88 msec

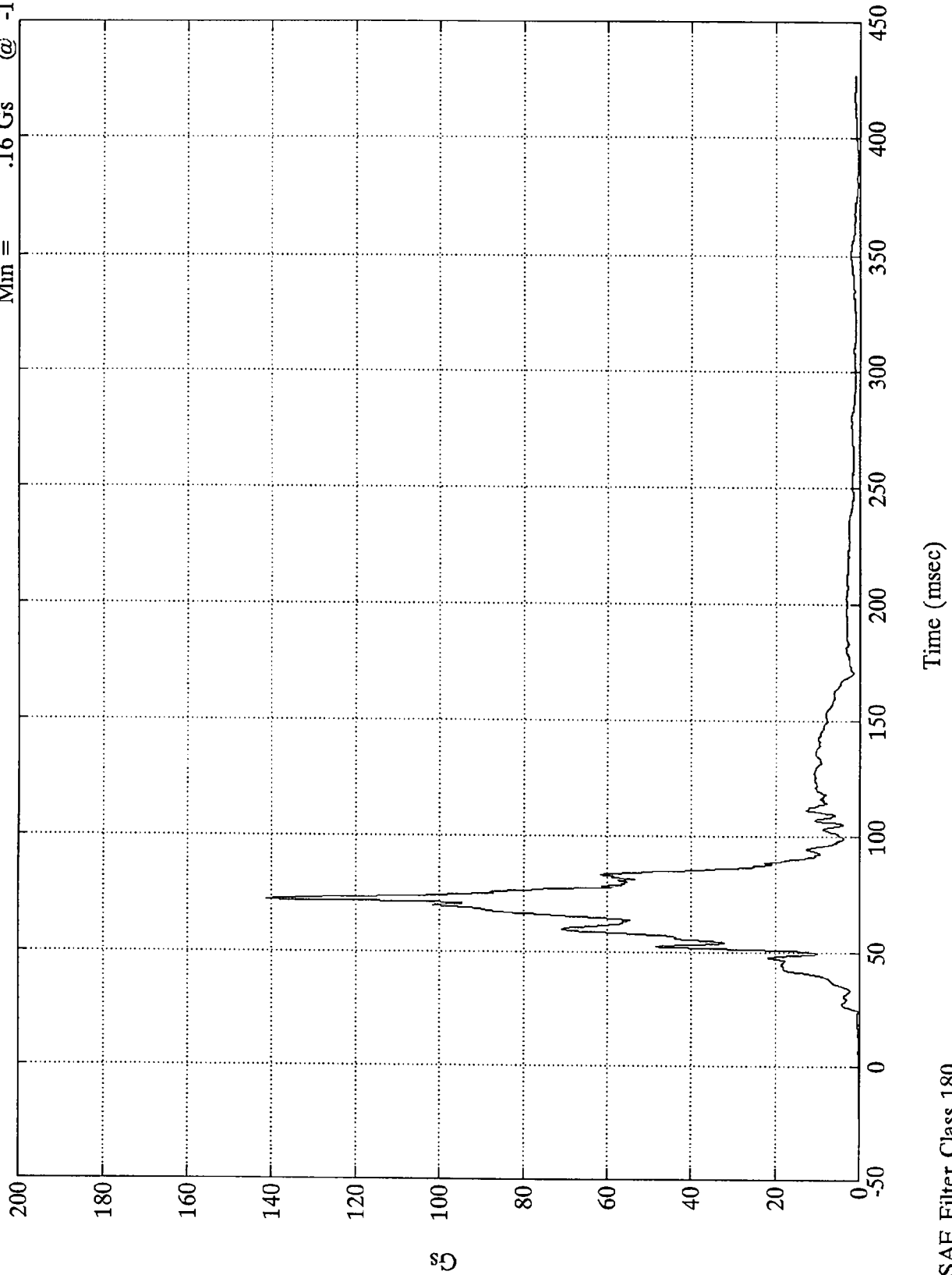


SAE Filter Class 180

VTV TEST #10

Max = 141.26 Gs @ 71.88 msec  
Min = .16 Gs @ -18.12 msec

Chest Resultant



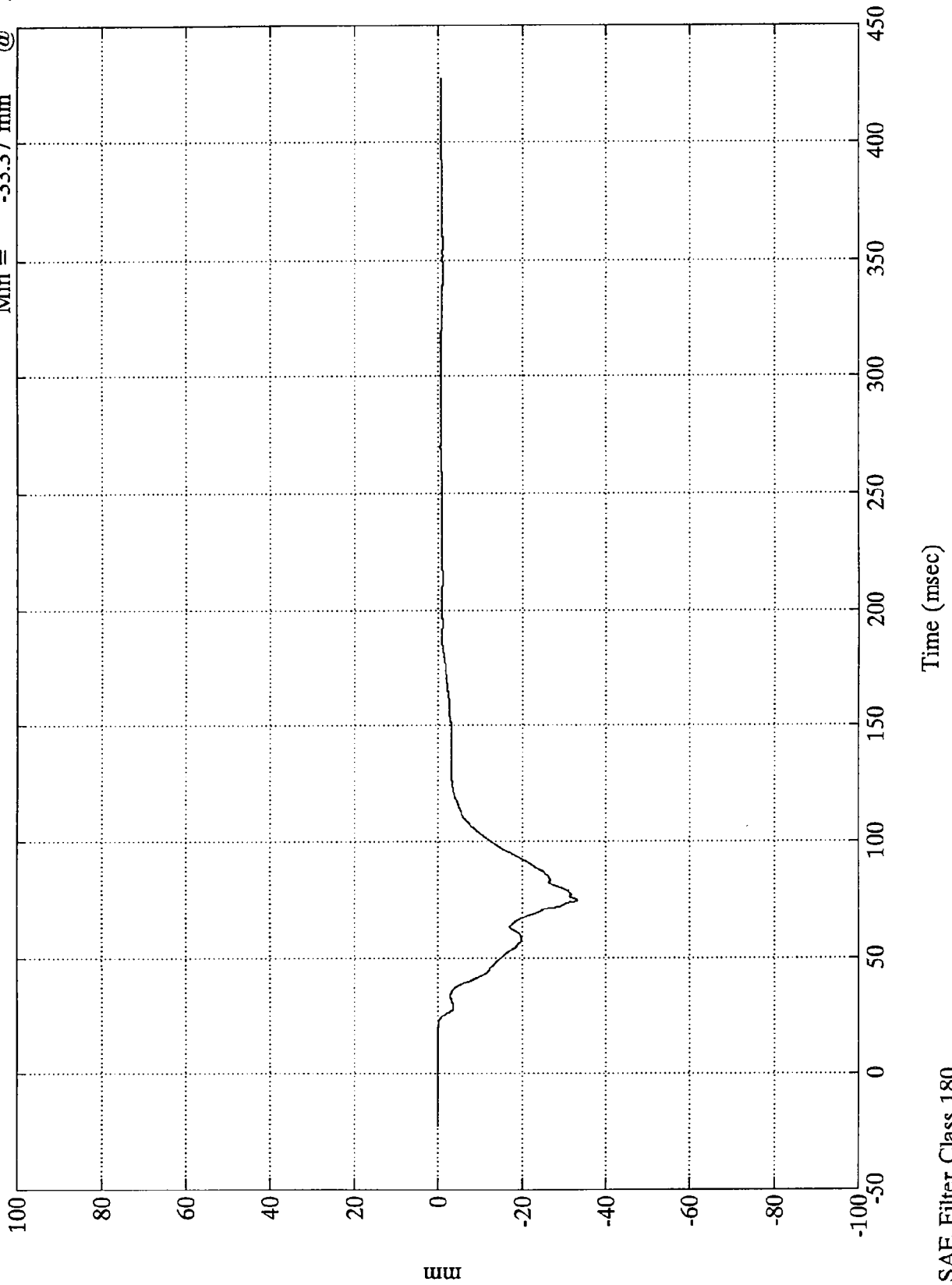
SAE Filter Class 180

VTV TEST #10

V1-P1 Chest Disp.

Max = .01 mm  
Min = -33.37 mm

@ -4.20 msec  
@ 74.76 msec

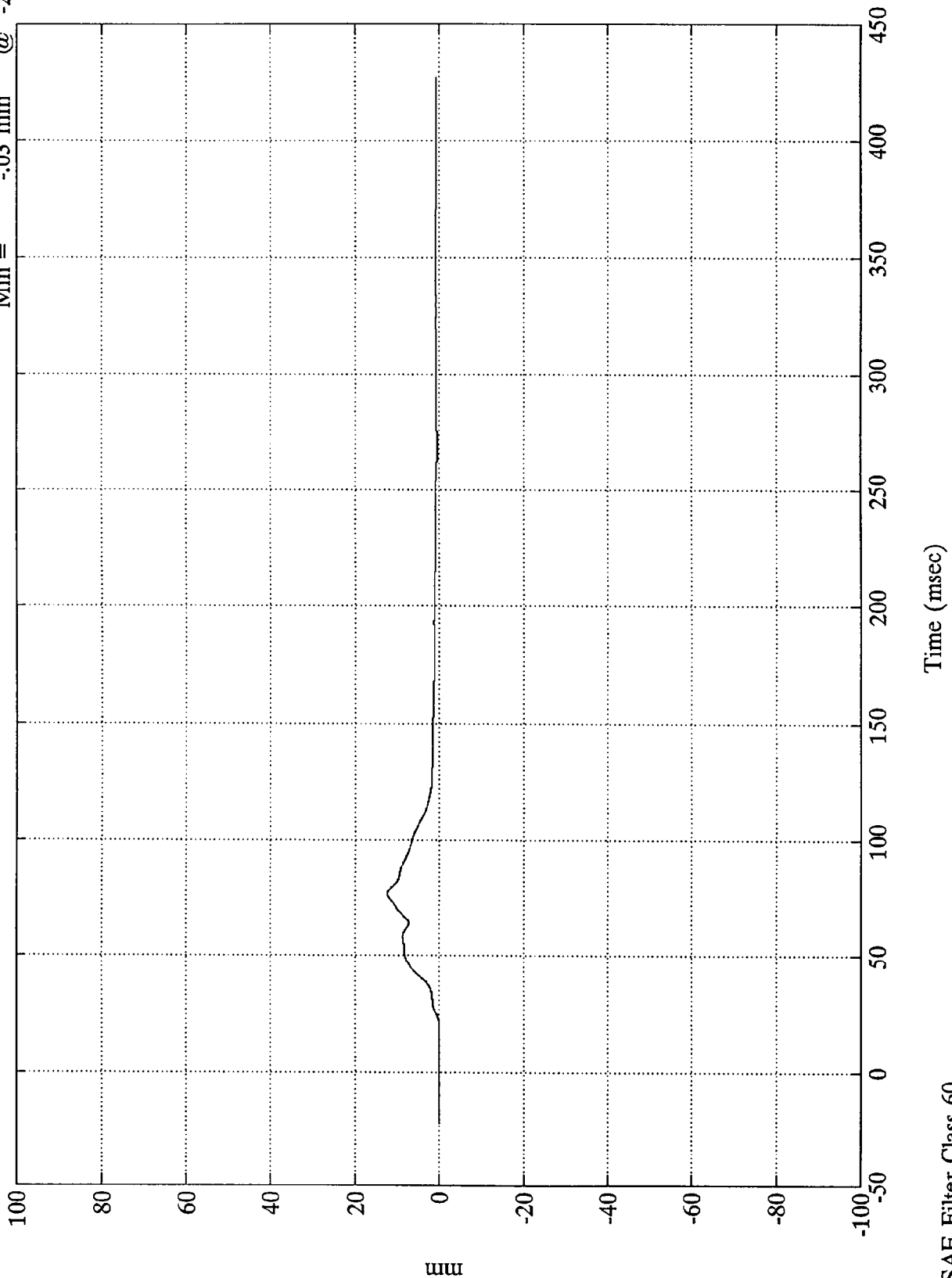


SAE Filter Class 180

VTV TEST #10

Chest Displacement #125

Max = 12.32 mm @ 76.20 msec  
Min = -0.03 mm @ -22.44 msec

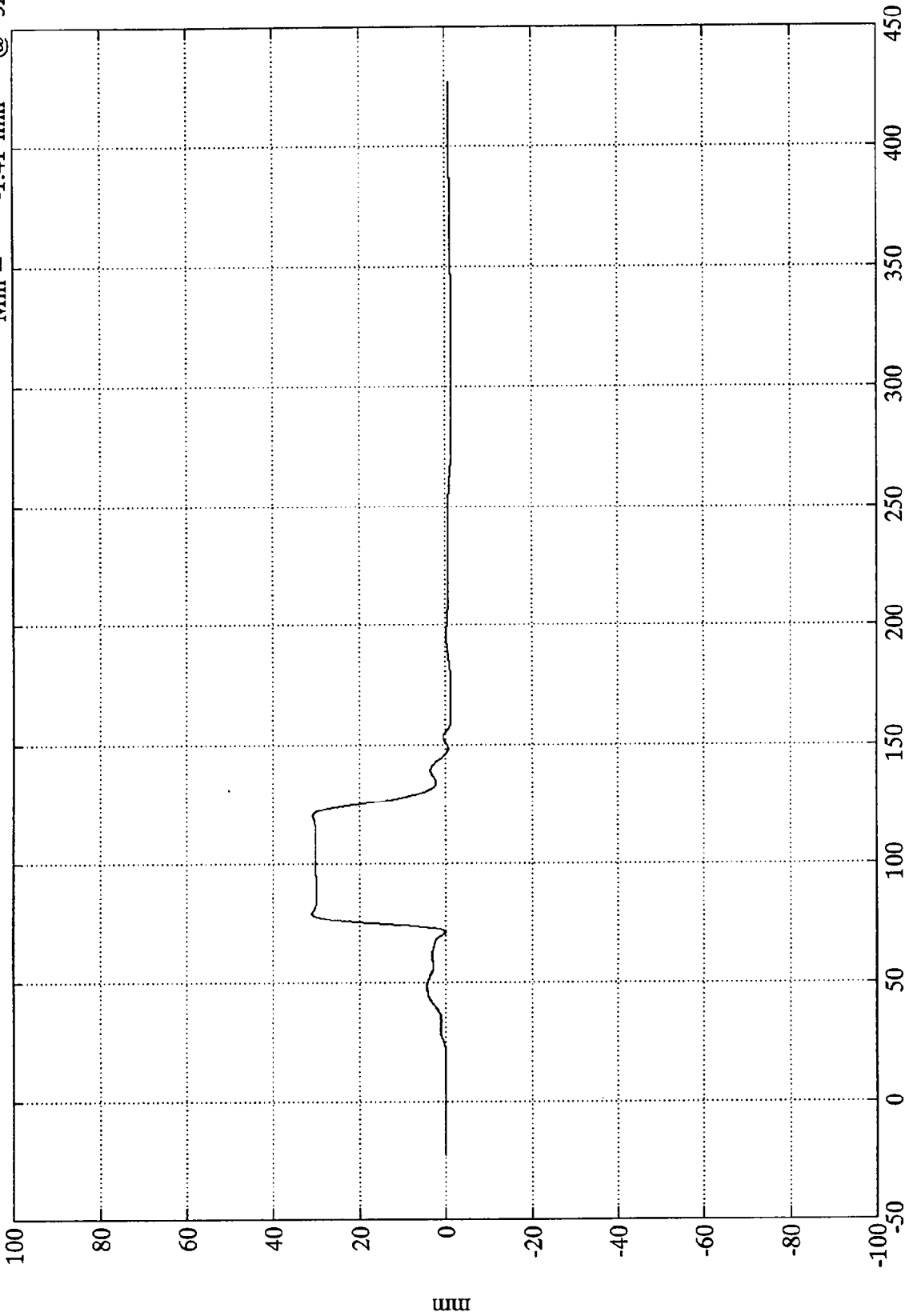


SAE Filter Class 60

VTV TEST #10

Chest Displacement #126

Max = 31.04 mm @ 78.60 msec  
Min = -1.41 mm @ 324.00 msec



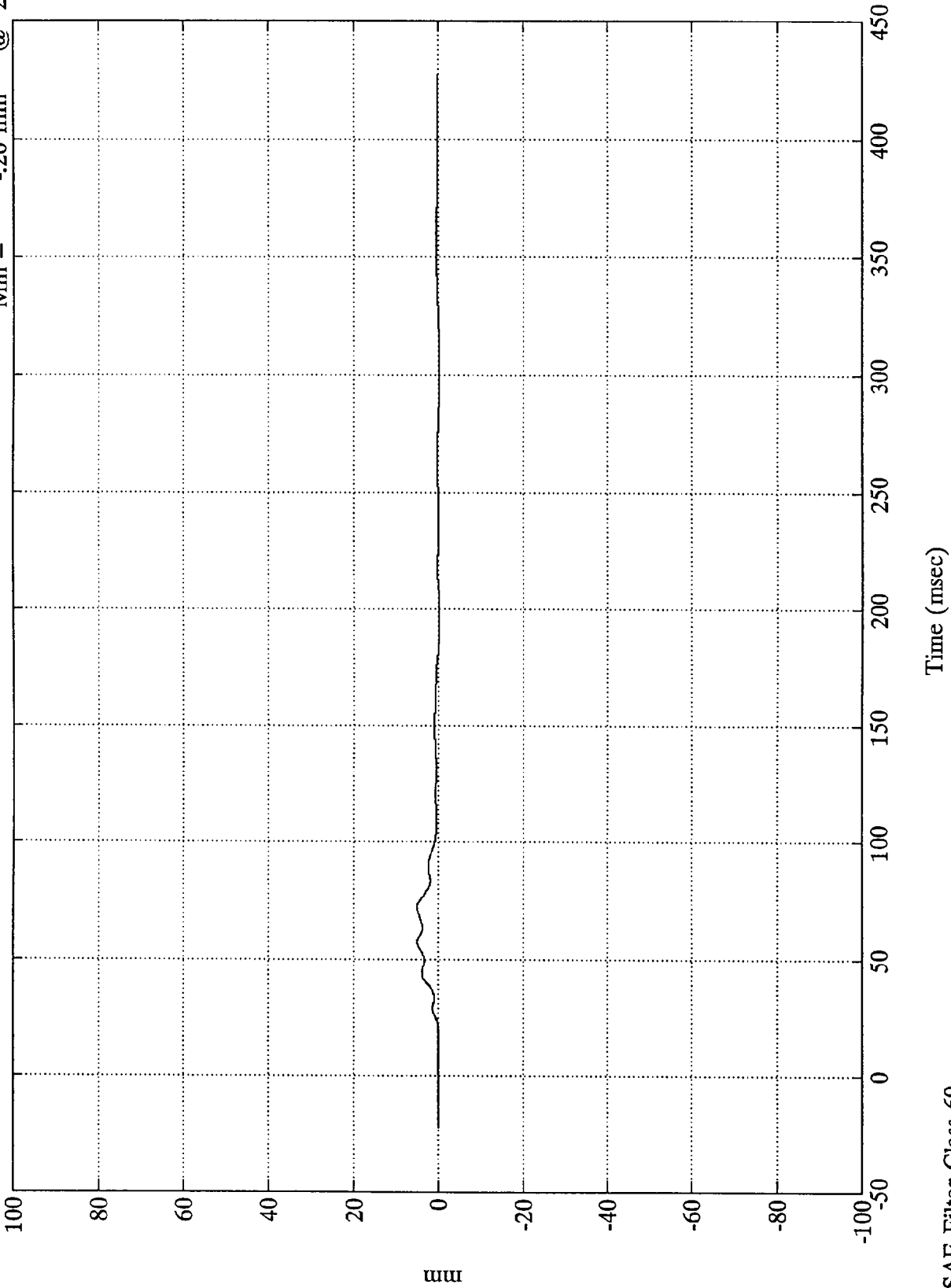
Time (msec) Data inaccurate 70 - 125msec

SAE Filter Class 60

VTV TEST #10

Chest Displacement #127

Max = 4.98 mm @ 72.12 msec  
Min = -2.26 mm @ 297.48 msec

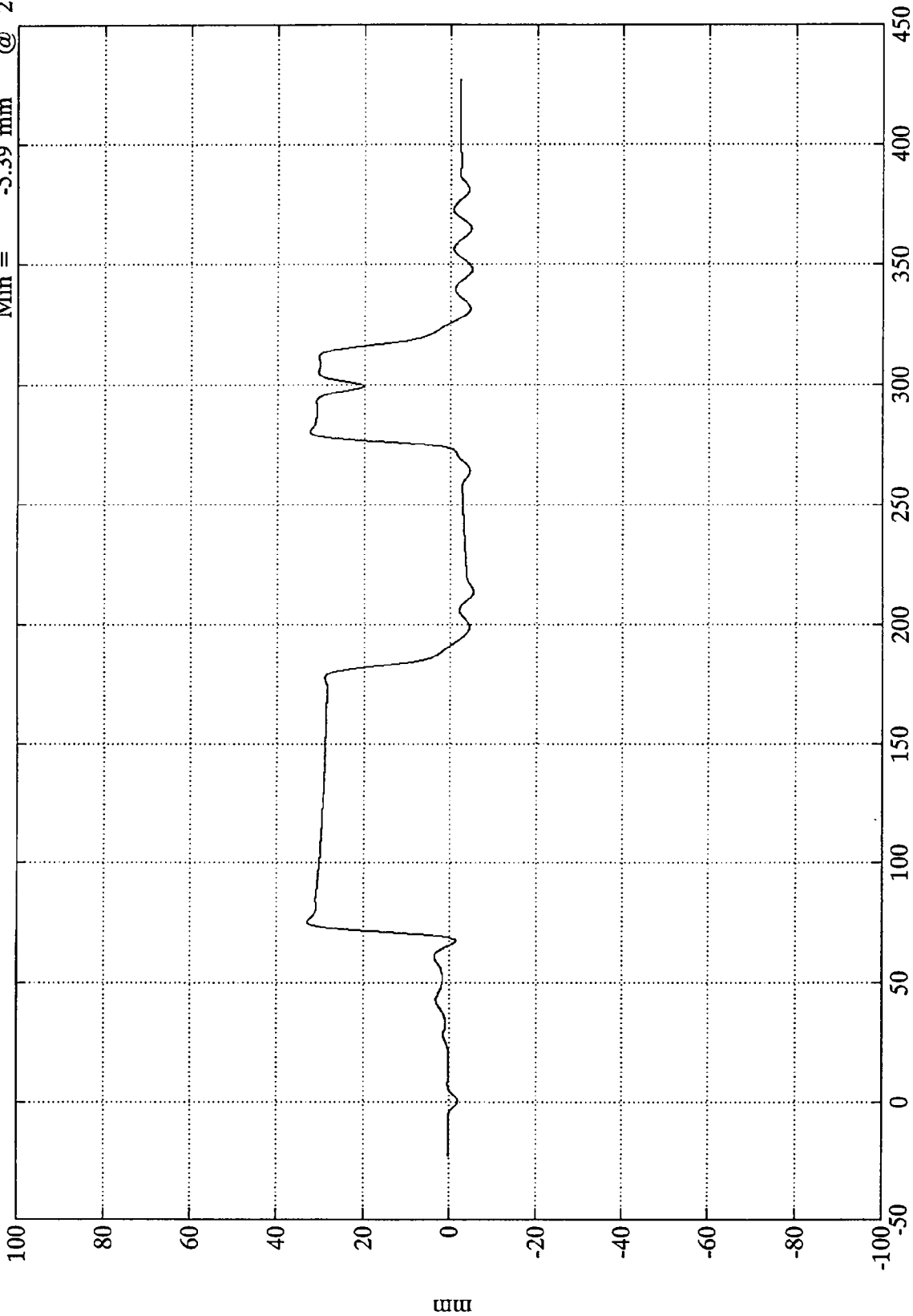


SAE Filter Class 60

VTV TEST #10

Chest Displacement #128

Max = 32.86 mm @ 75.23 msec  
Min = -5.39 mm @ 214.08 msec



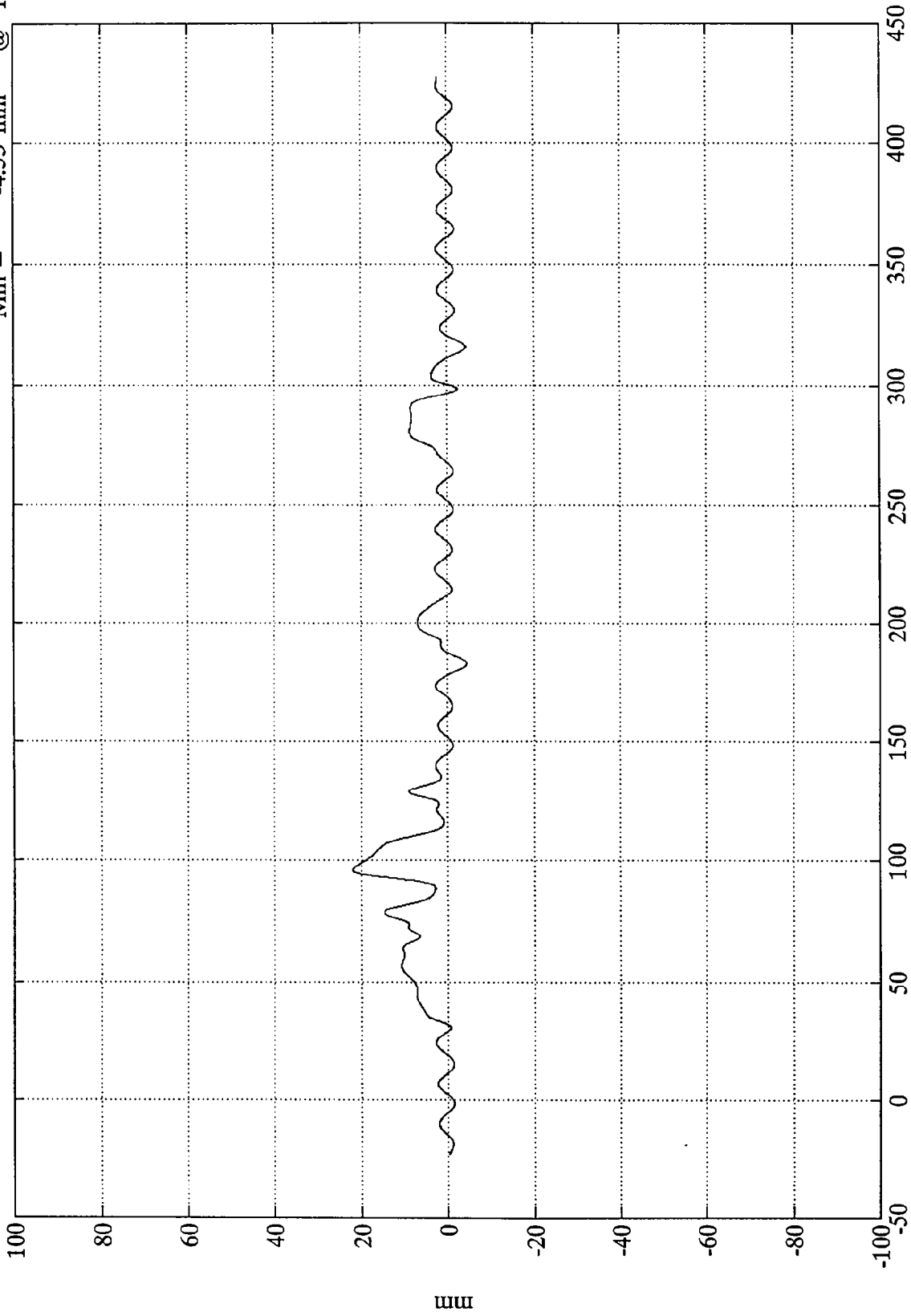
Time (msec) Data questionable

SAE Filter Class 60

VTV TEST #10

Chest Displacement #129

Max = 21.97 mm @ 96.24 msec  
Min = -4.53 mm @ 183.00 msec

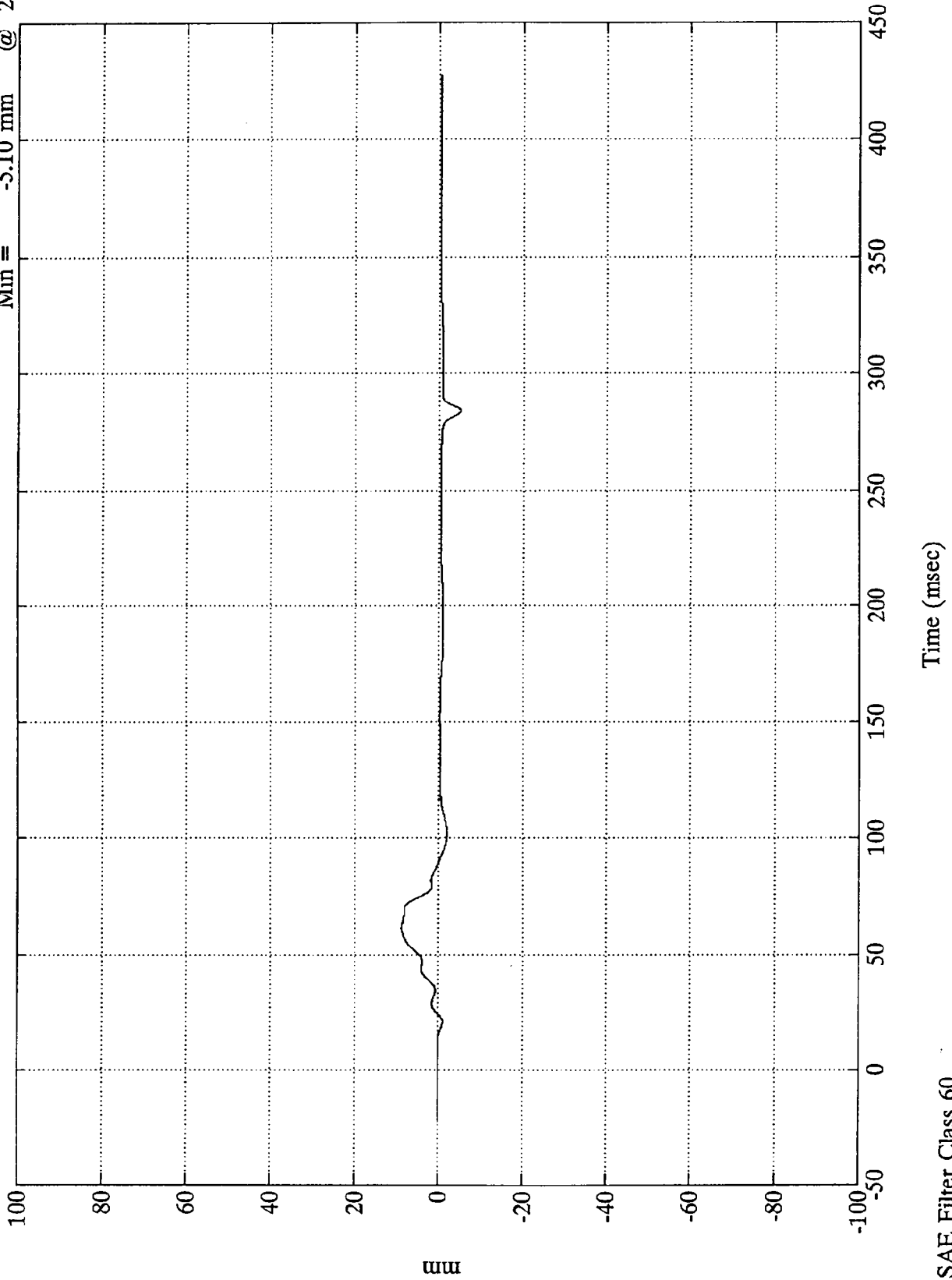


SAE Filter Class 60 Data questionable

VTV TEST #10

Chest Displacement #130

Max = 8.86 mm @ 61.32 msec  
Min = -5.10 mm @ 283.92 msec

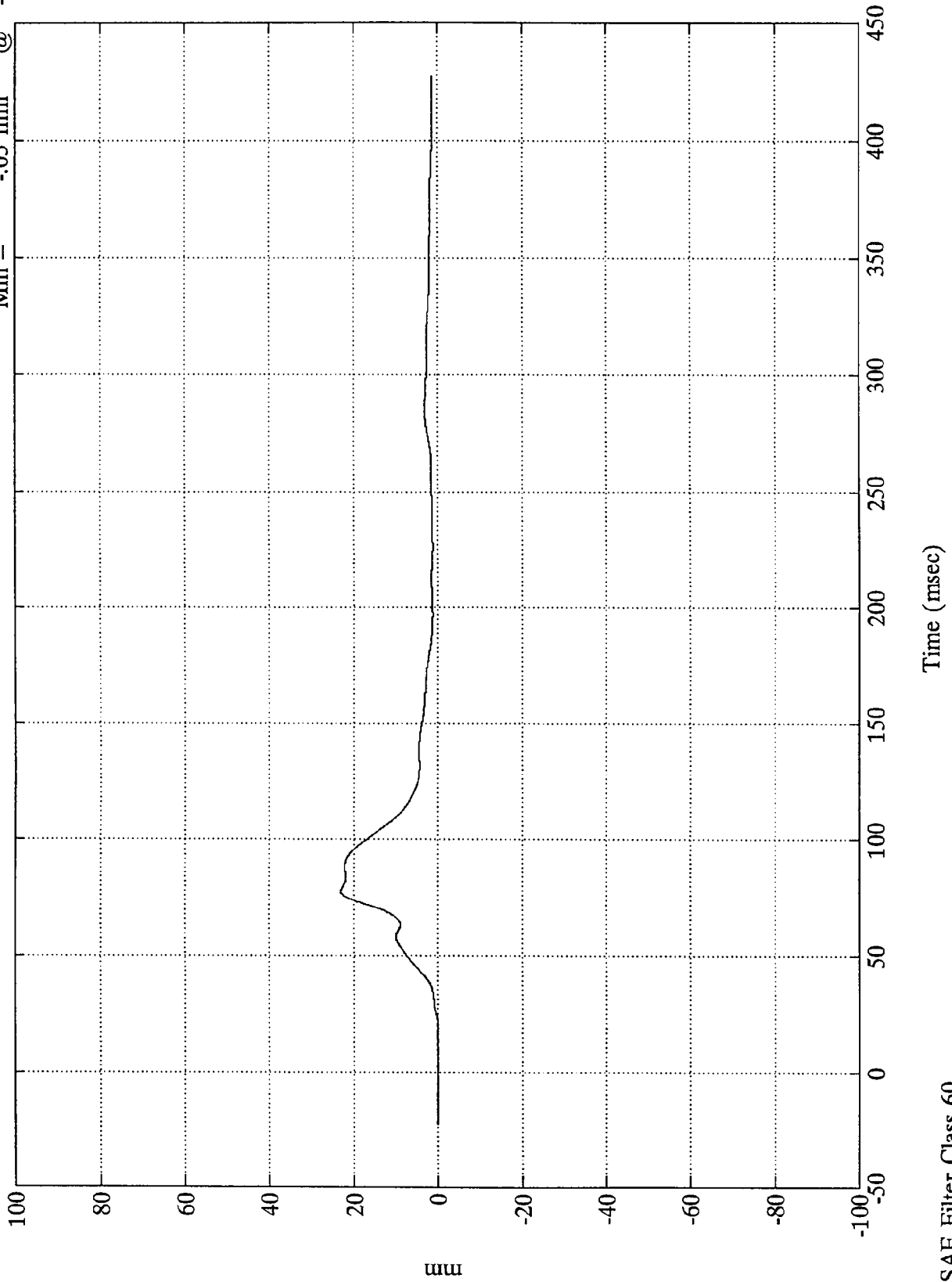


SAE Filter Class 60

VTV TEST #10

Chest Displacement #131

Max = 23.04 mm @ 77.04 msec  
Min = -0.05 mm @ -1.32 msec

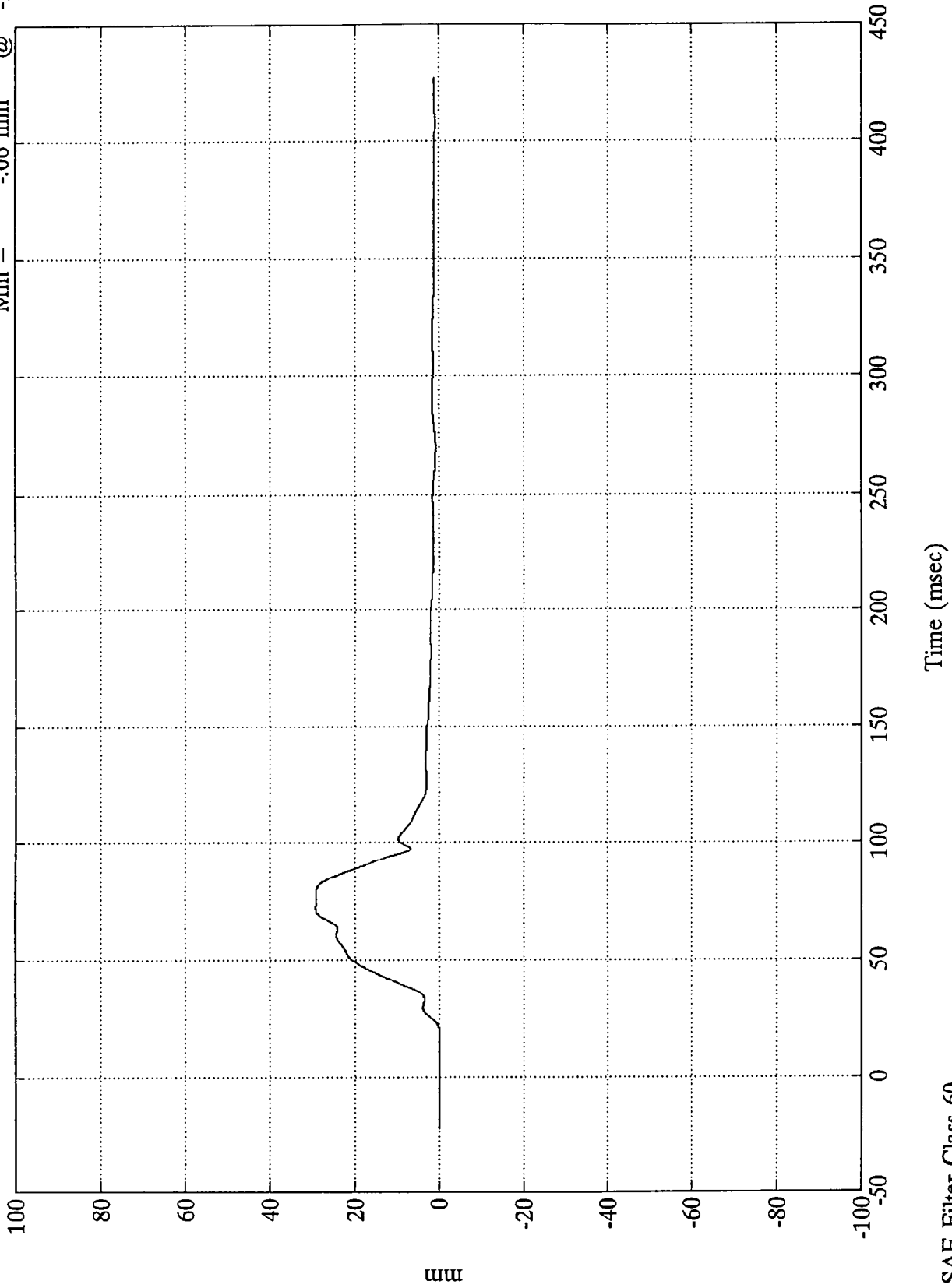


SAE Filter Class 60

VTV TEST #10

Chest Displacement #132

Max = 29.23 mm @ 72.00 msec  
Min = -0.06 mm @ -1.08 msec



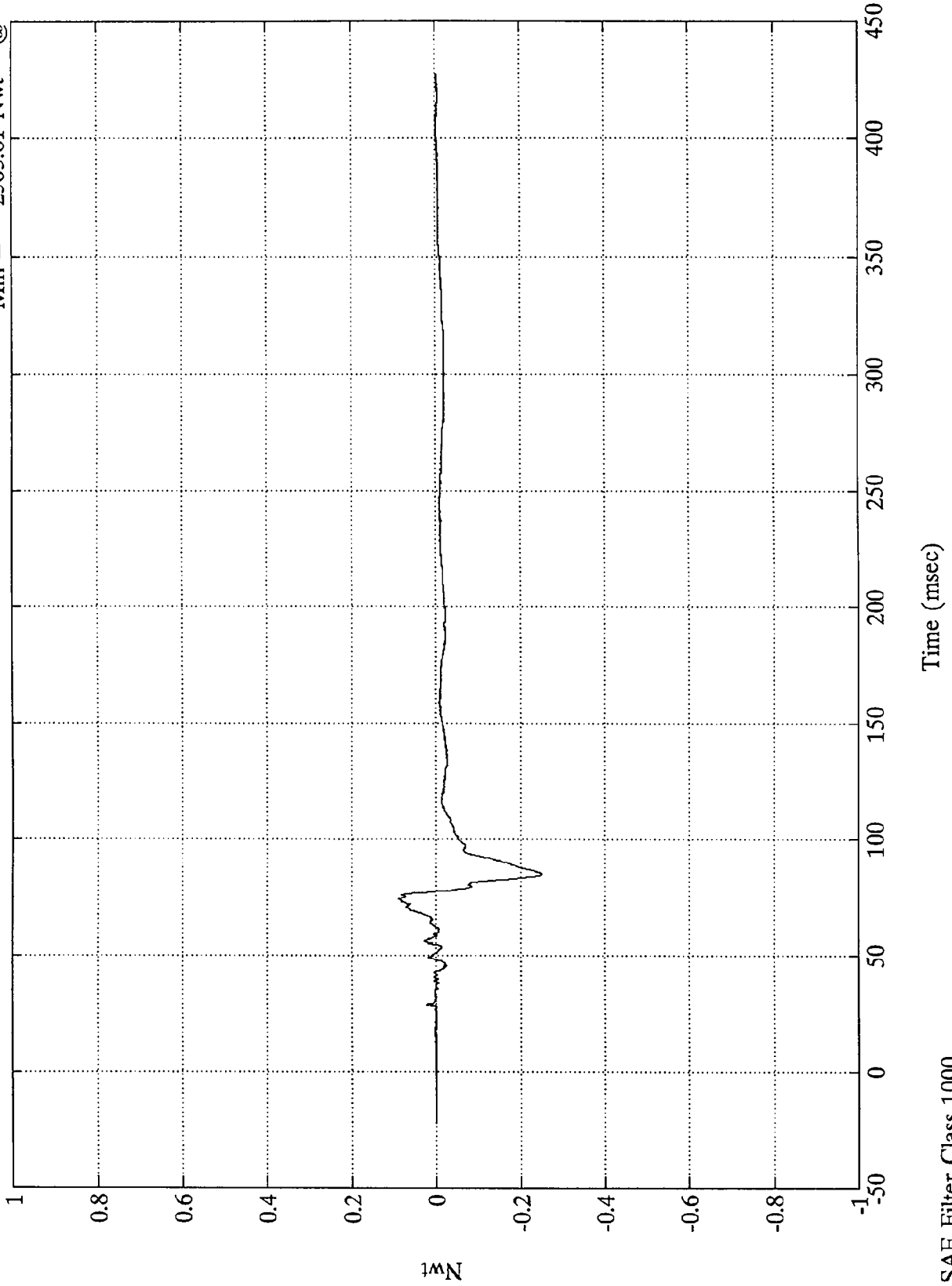
SAE Filter Class 60

VTV TEST #10  
x10<sup>4</sup>

V1-P1 Upper Neck Fx

Max = 894.46 Nwt  
Min = -2503.61 Nwt

@ 74.16 msec  
@ 85.08 msec

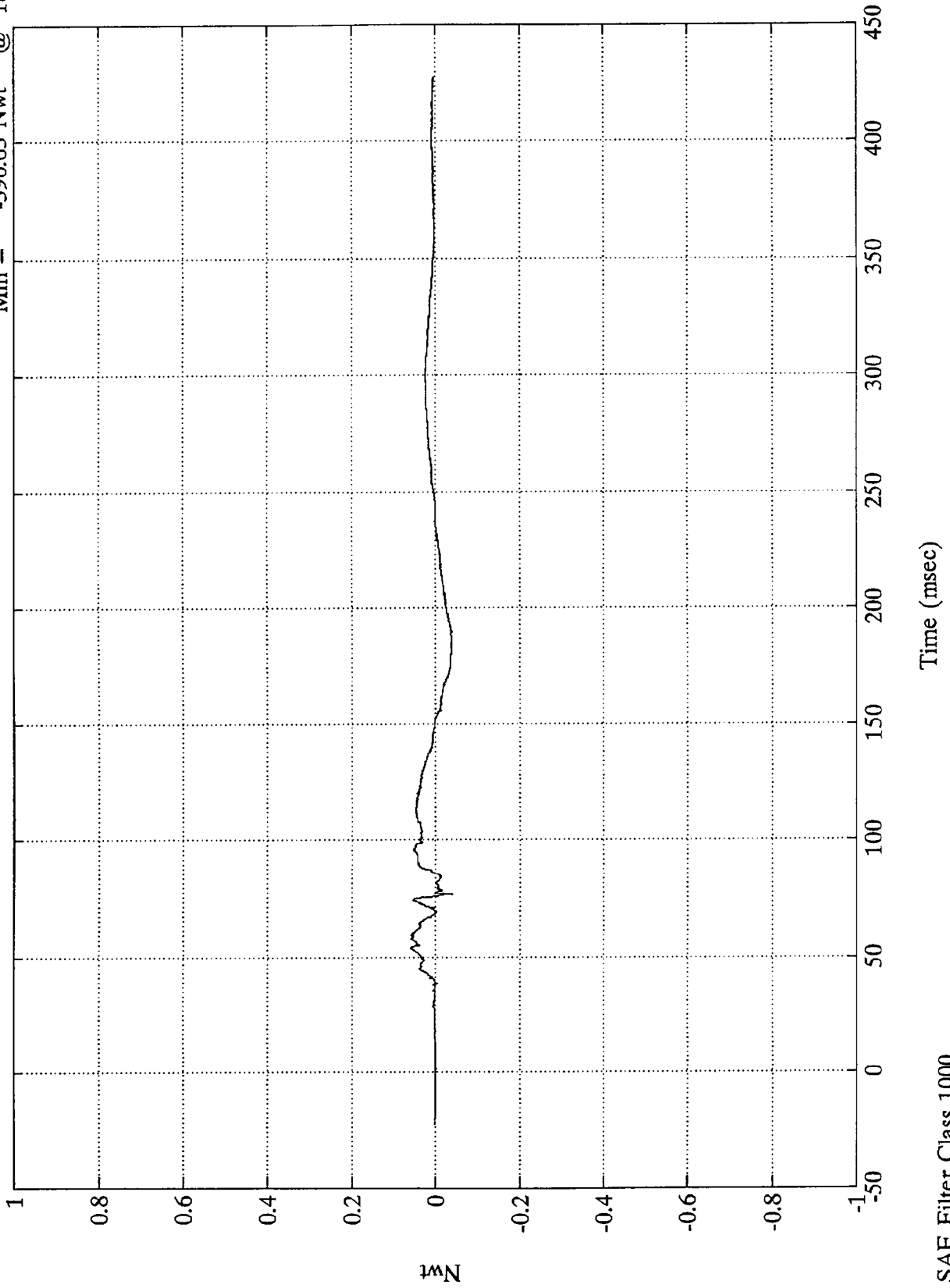


SAE Filter Class 1000

VTV TEST #10  
x10<sup>4</sup>

V1-P1 Upper Neck Fy

Max = 587.42 Nwt @ 59.27 msec  
Min = -390.63 Nwt @ 189.83 msec

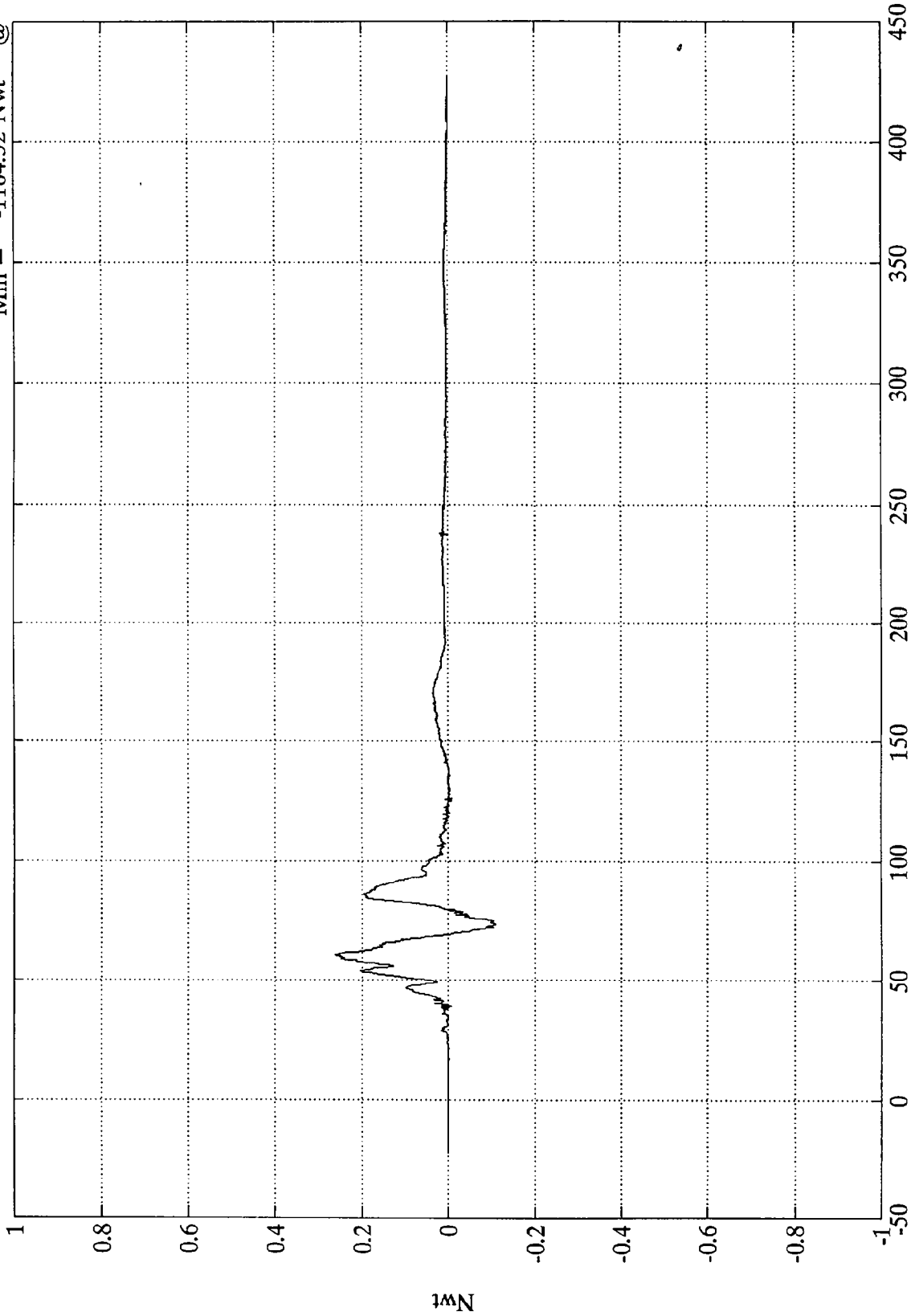


VTV TEST #10  
x10<sup>4</sup>

V1-P1 Upper Neck Fz

Max = 2630.19 Nwt @  
Min = -1104.52 Nwt @

60.48 msec  
73.08 msec



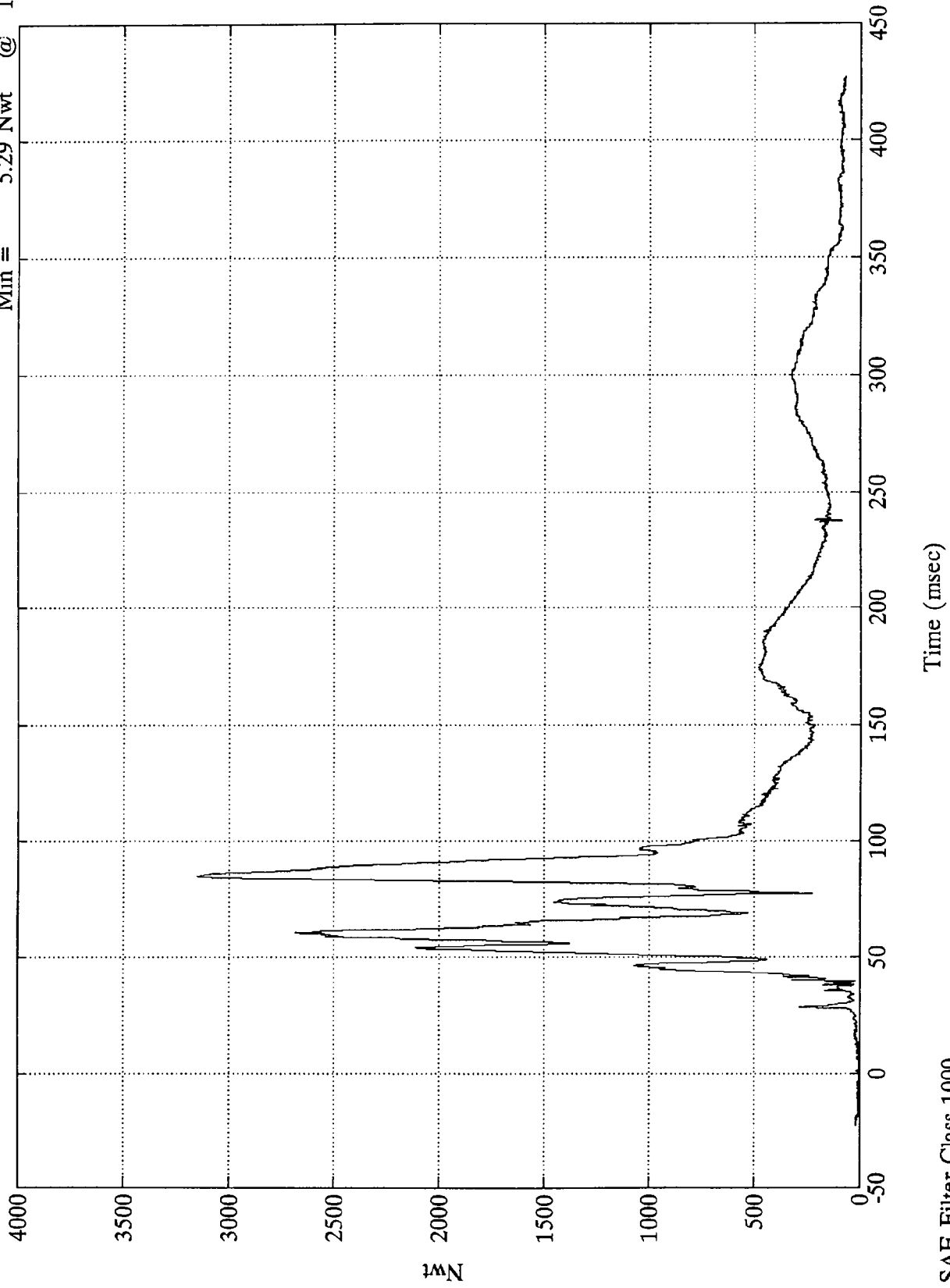
Time (msec)

SAE Filter Class 1000

VTV TEST #10

Upper Neck Force Res.

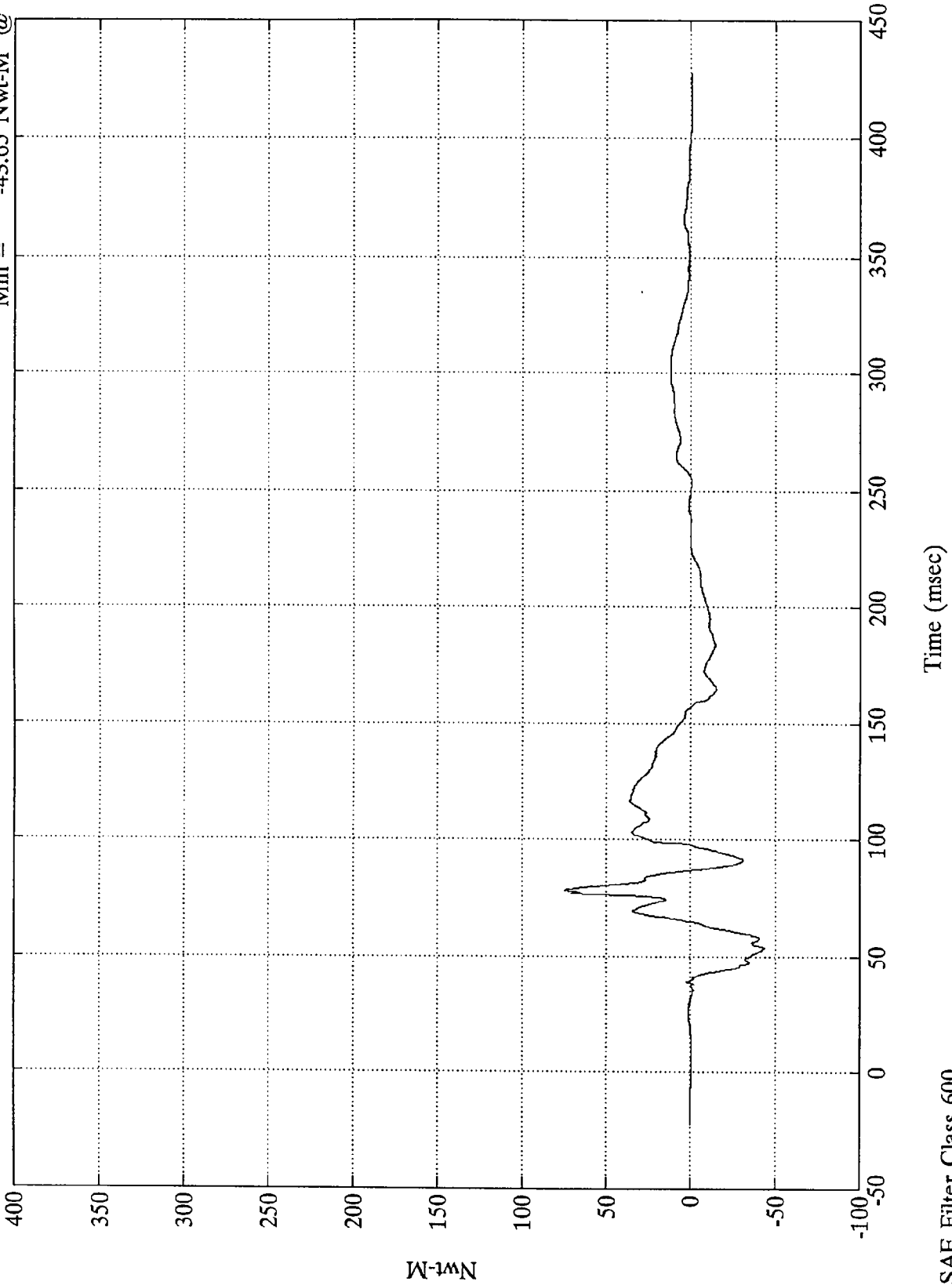
Max = 3150.41 Nwt @ 84.72 msec  
Min = 5.29 Nwt @ 13.43 msec



VTV TEST #10

V1-P1 Upper Neck Mx

Max = 74.68 Nwt-M @ 78.00 msec  
Min = -43.65 Nwt-M @ 53.88 msec

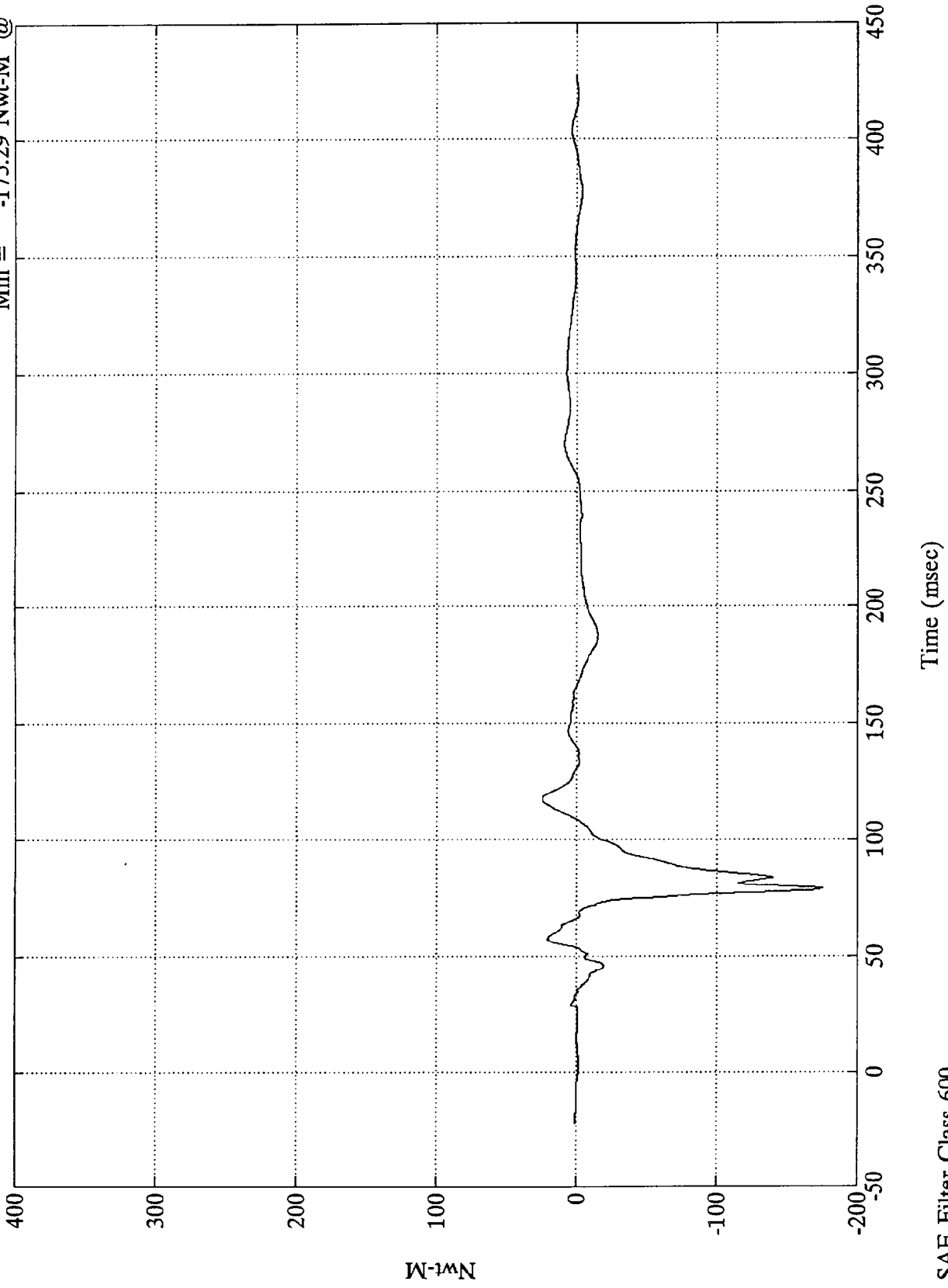


SAE Filter Class 600

VTV TEST #10

V1-P1 Upper Neck My

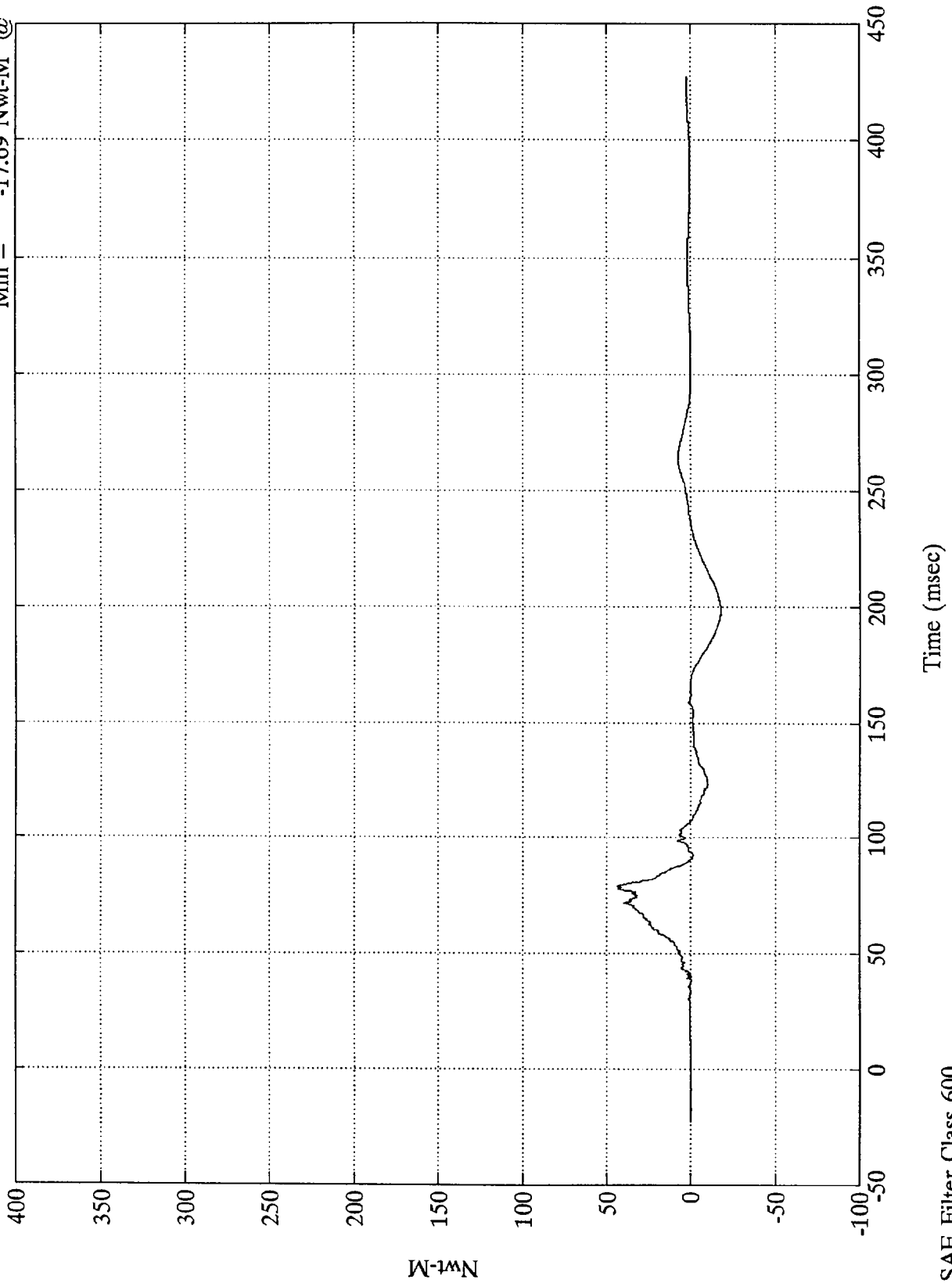
Max = 24.36 Nwt-M @ 118.08 msec  
Min = -175.29 Nwt-M @ 78.95 msec



VTV TEST #10

V1-P1 Upper Neck Mz

Max = 43.73 Nwt-M @ 78.72 msec  
Min = -17.69 Nwt-M @ 198.24 msec

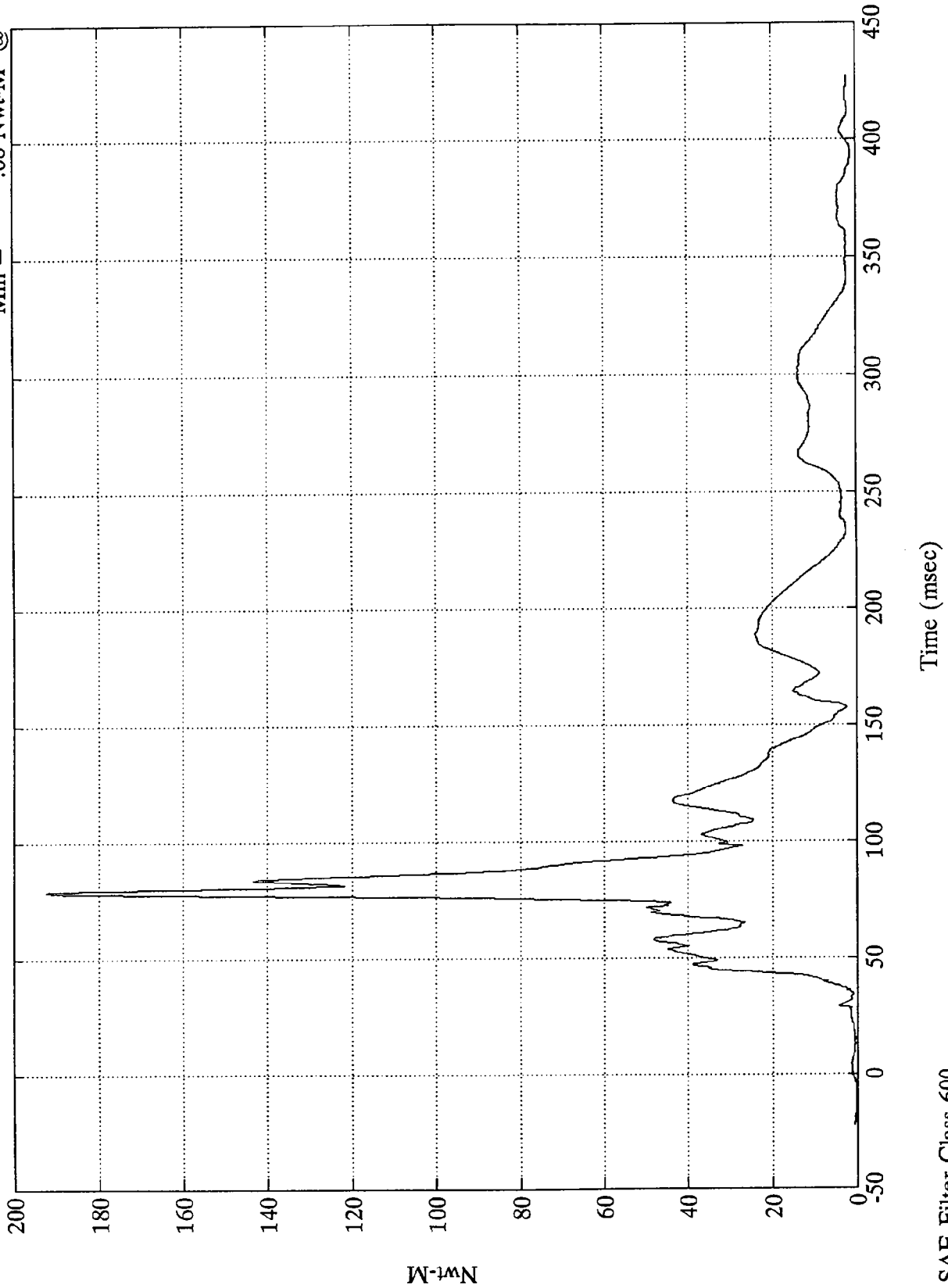


SAE Filter Class 600

VTV TEST #10

Upper Neck Moment Res.

Max = 192.34 Nwt-M @ 78.84 msec  
Min = .06 Nwt-M @ -6.72 msec



Nwt-M

Time (msec)

SAE Filter Class 600

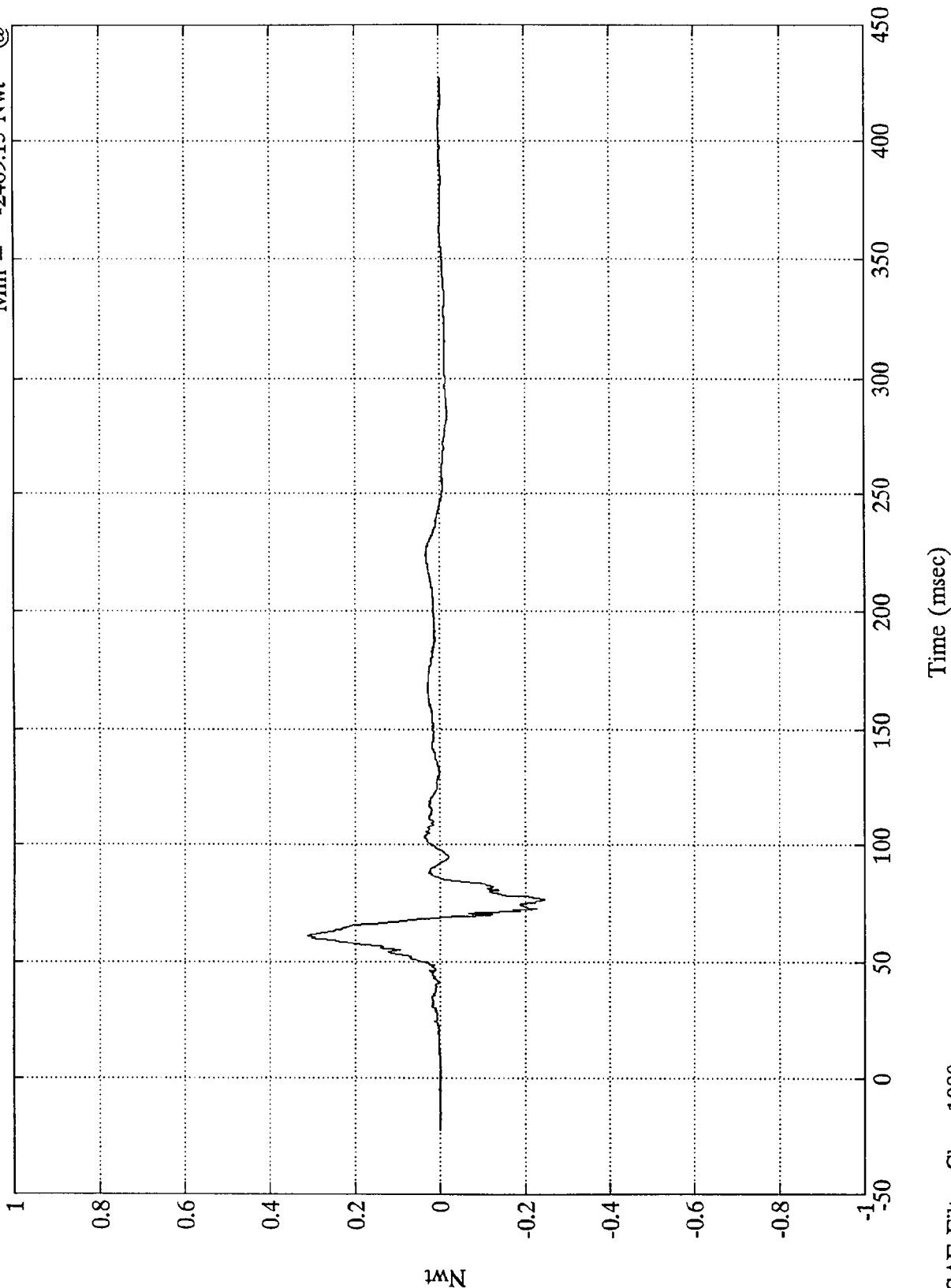
VTV TEST #10

$\times 10^4$

V1-P1 Lower Neck Fx

Max = 3107.52 Nwt @  
Min = -2469.15 Nwt @

61.20 msec  
76.44 msec



SAE Filter Class 1000

VTV TEST #10

$\times 10^4$

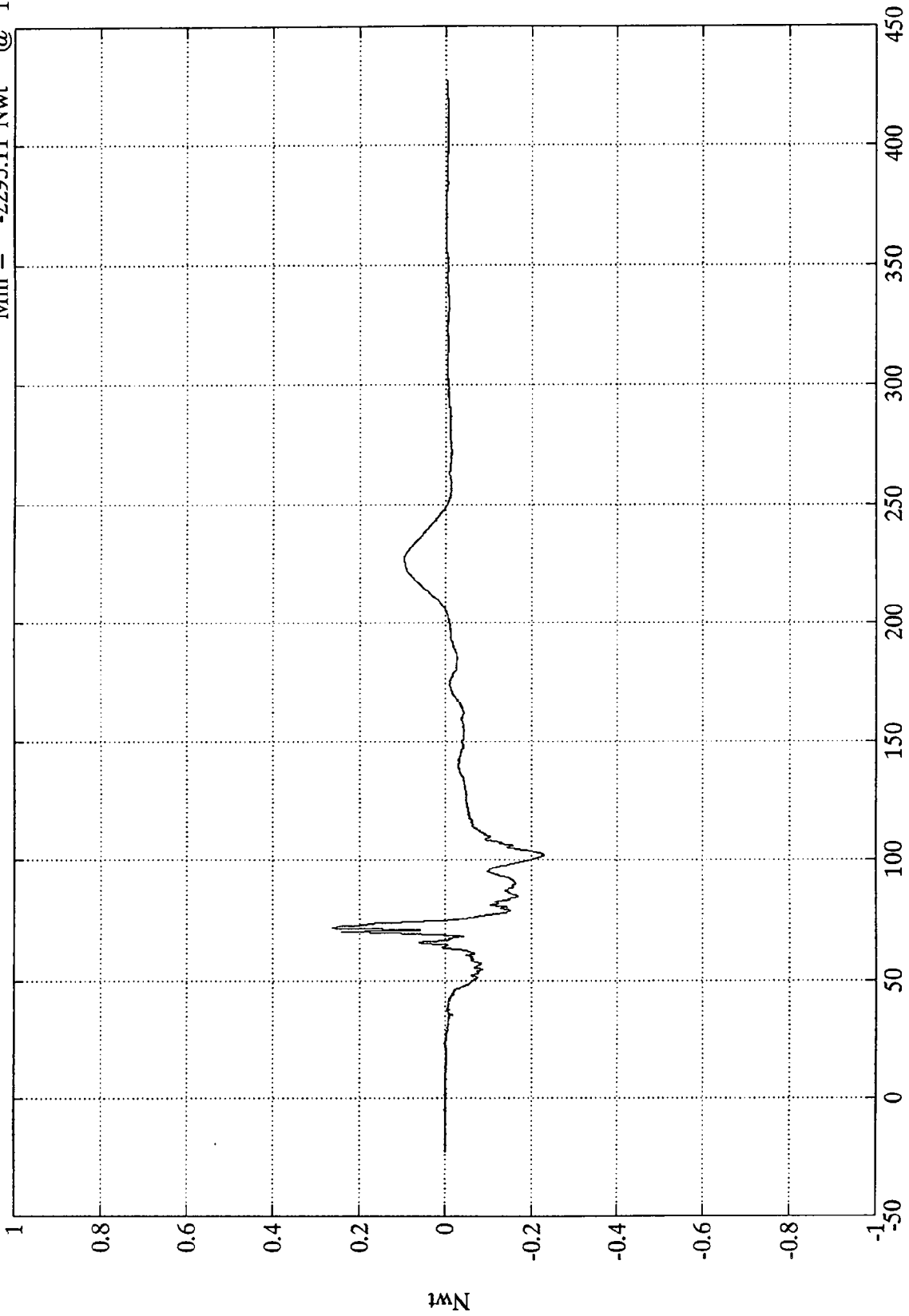
V1-P1 Lower Neck Fy

Max = 2609.87 Nwt

@ 71.88 msec

Min = -2295.11 Nwt

@ 102.36 msec



Time (msec)

SAE Filter Class 1000

Nwt

B-141

8118-10

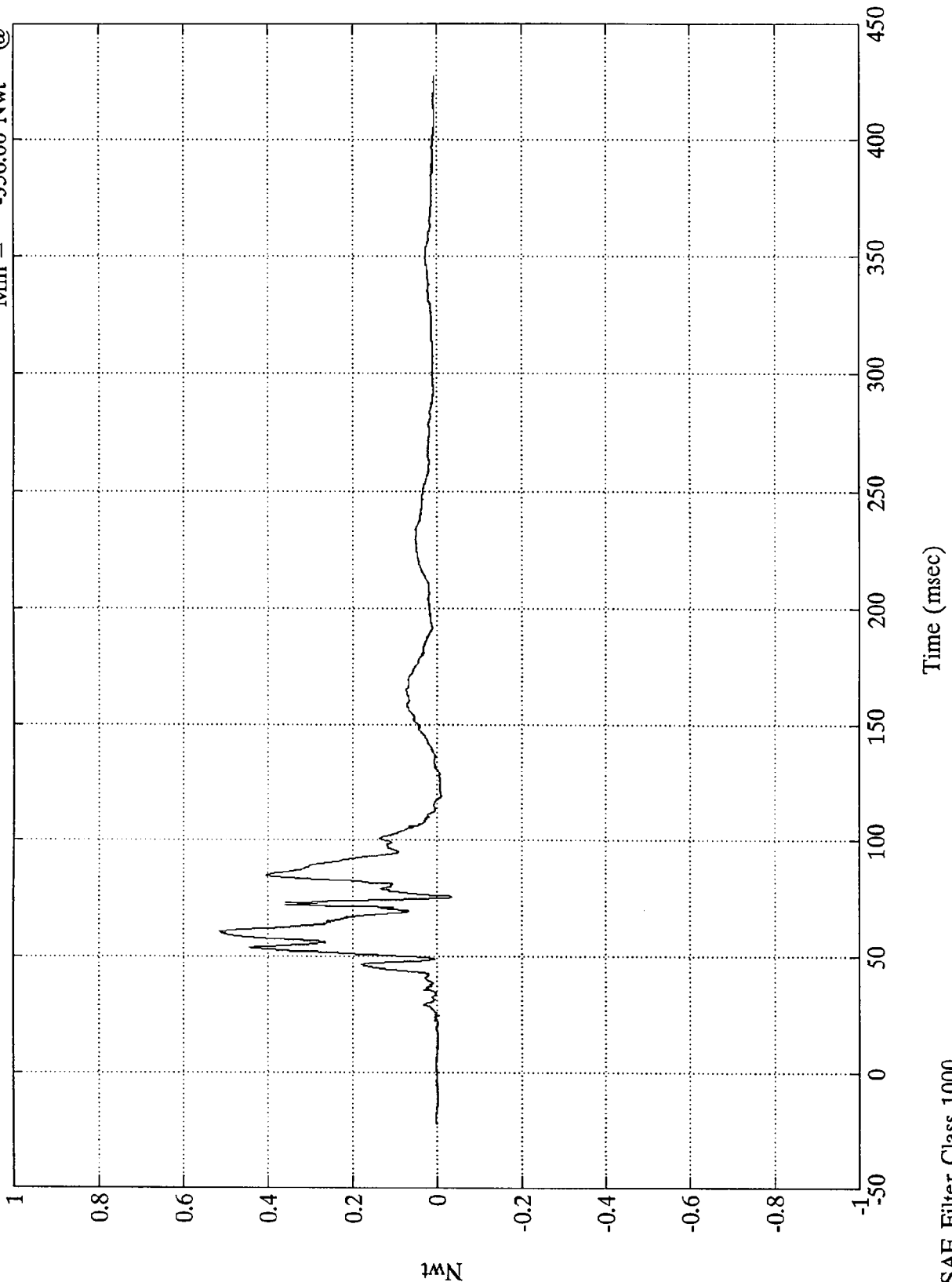
VTV TEST #10

$\times 10^4$

V1-P1 Lower Neck Fz

Max = 5143.30 Nwt @  
Min = -356.00 Nwt @

60.48 msec  
75.12 msec



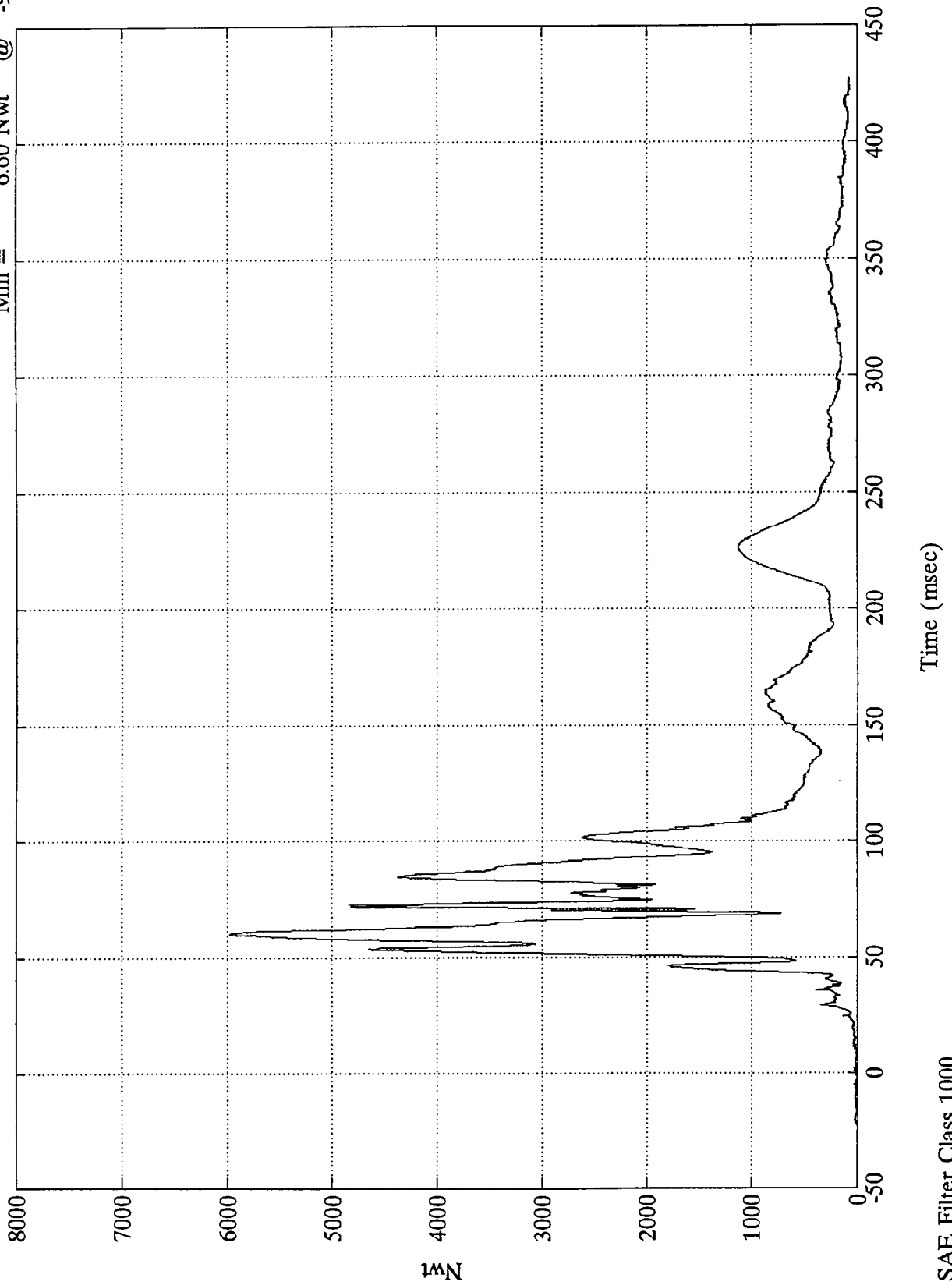
Time (msec)

SAE Filter Class 1000

VTV TEST #10

V1-P1 Lower Neck F(res)

Max = 5975.82 Nwt @ 60.24 msec  
Min = 6.60 Nwt @ -9.48 msec



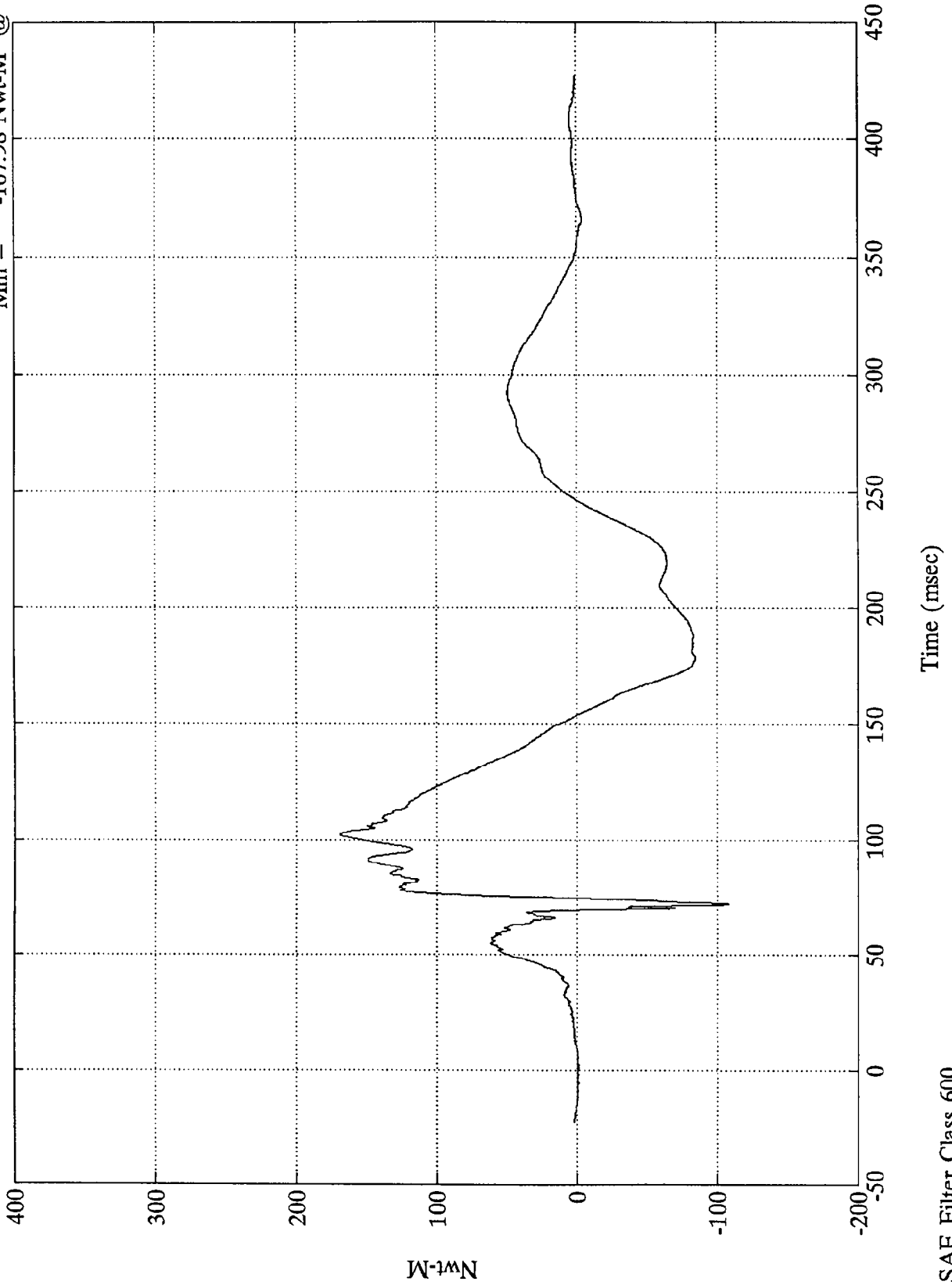
Time (msec)

SAE Filter Class 1000

VTV TEST #10

Max = 169.37 Nwt-M @ 102.48 msec  
Min = -107.98 Nwt-M @ 72.00 msec

V1-P1 Lower Neck Mx

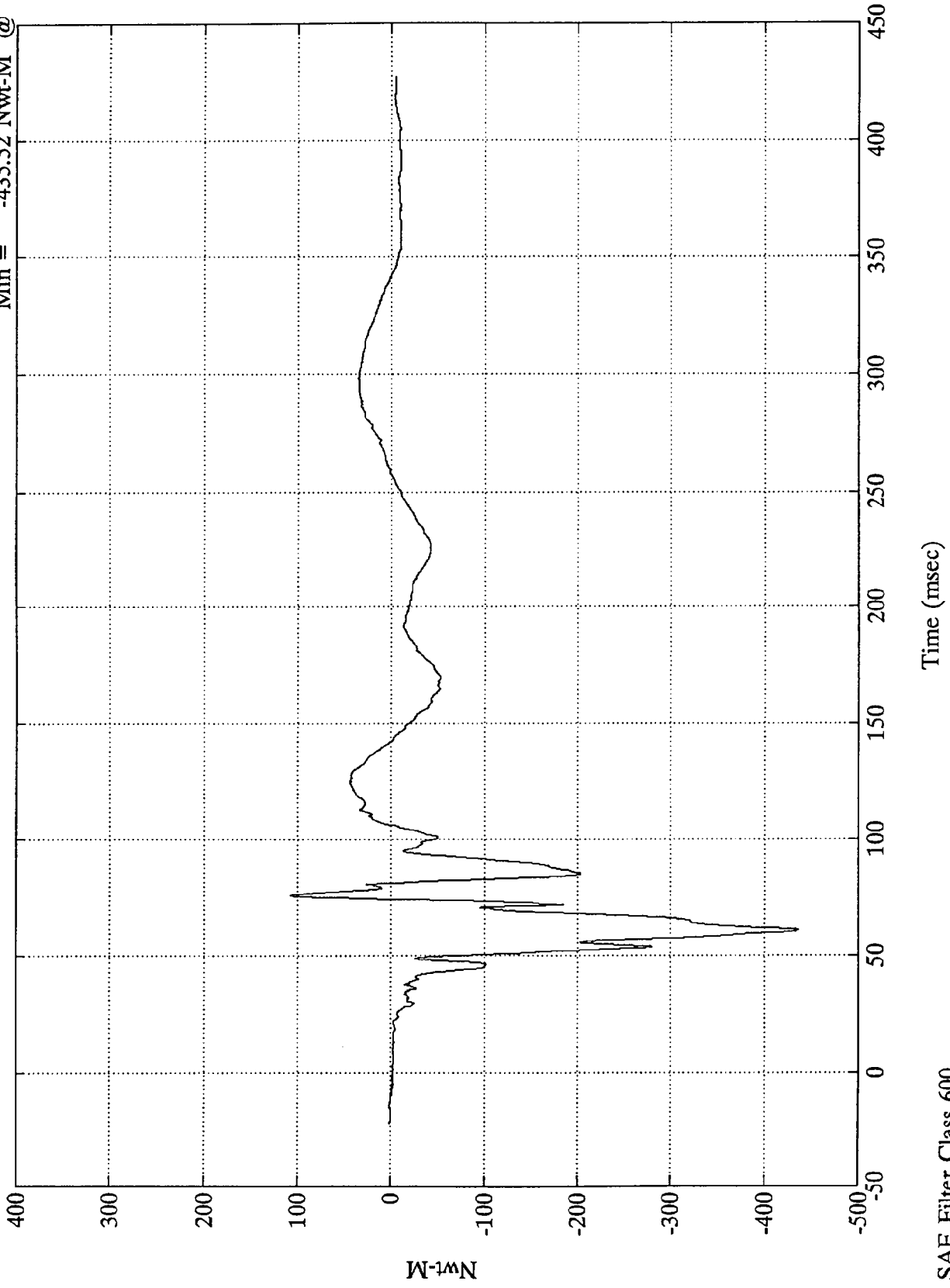


SAE Filter Class 600

VTV TEST #10

V1-P1 Lower Neck My

Max = 108.63 Nwt-M @ 75.47 msec  
Min = -435.52 Nwt-M @ 61.08 msec

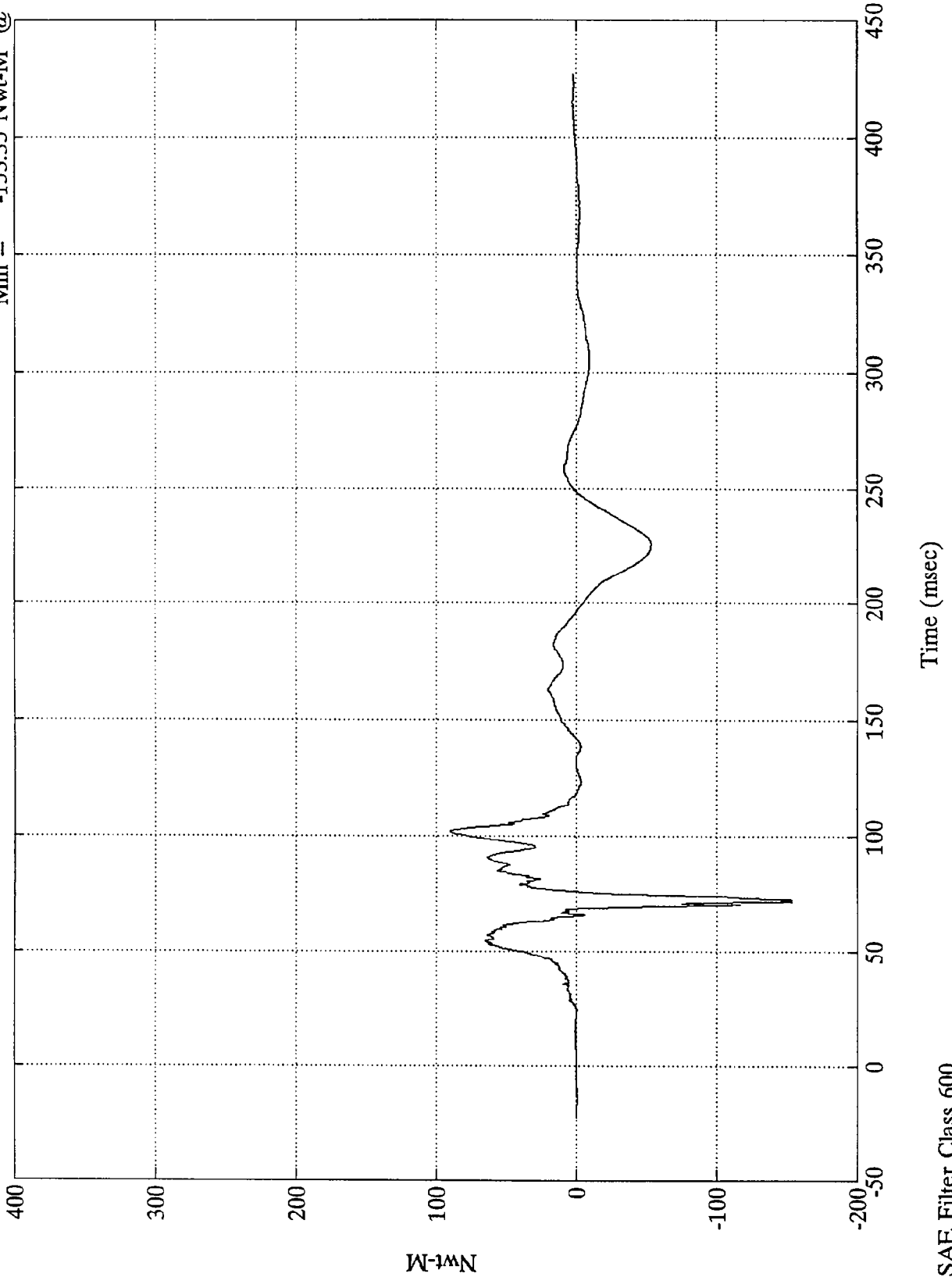


SAE Filter Class 600

VTV TEST #10

Max = 90.29 Nwt-M @ 102.12 msec  
Min = -153.35 Nwt-M @ 71.63 msec

V1-P1 Lower Neck Mz

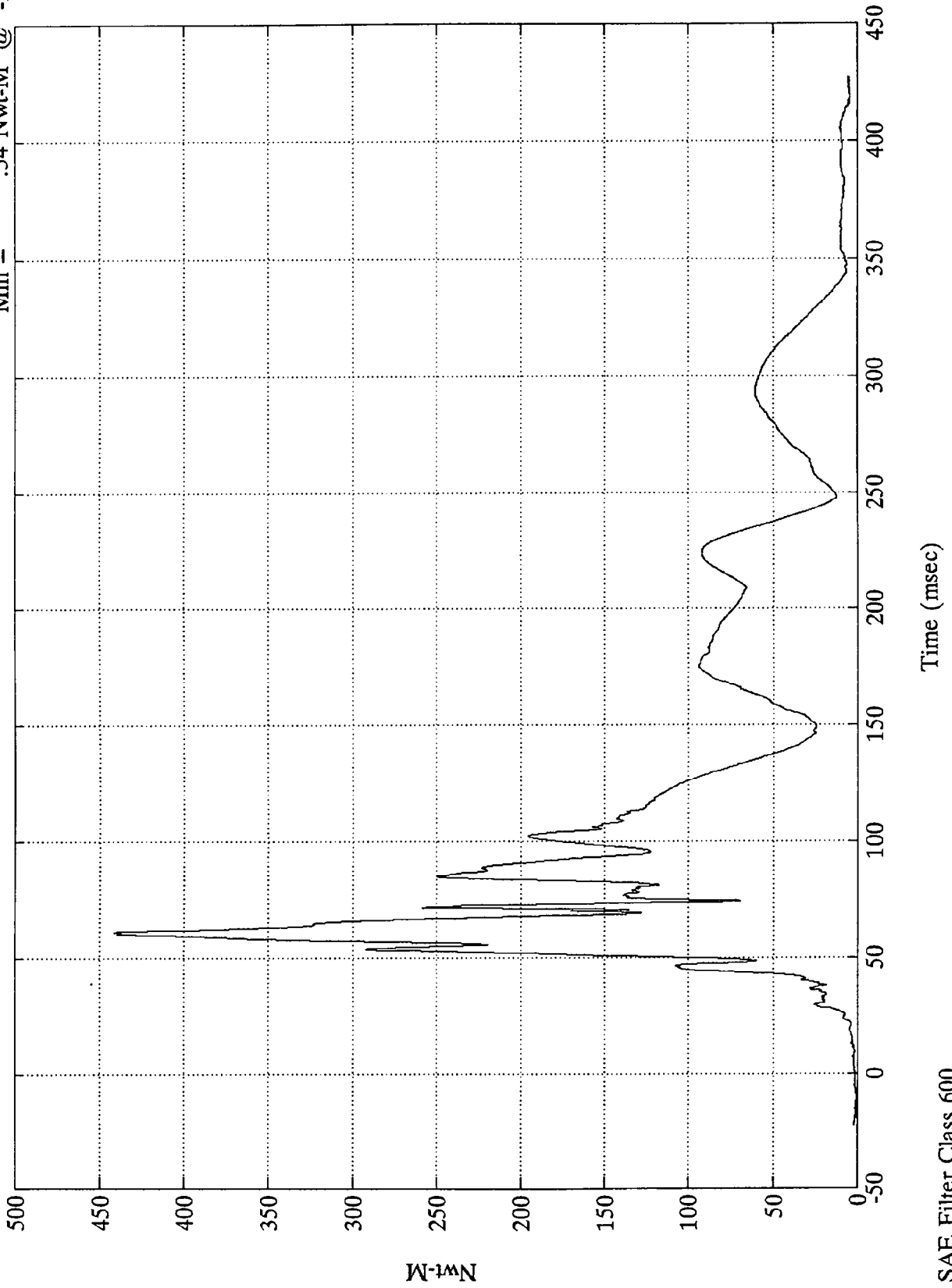


SAE Filter Class 600

VTV TEST #10

V1-P1 Lower Neck M(res)

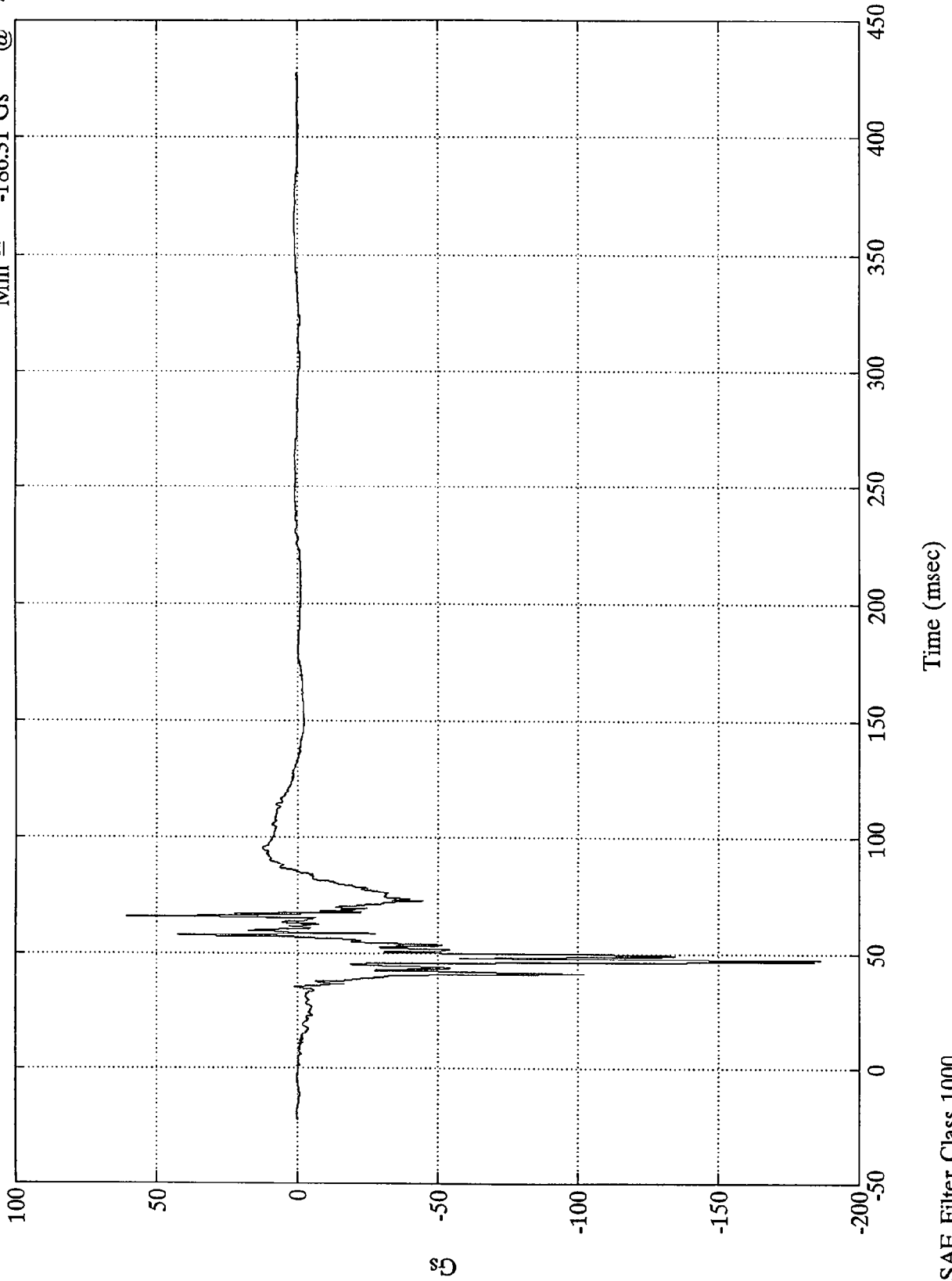
Max = 441.35 Nwt-M @ 61.08 msec  
Min = .54 Nwt-M @ -10.32 msec



VTV TEST #10

V1-P1 Pelvic X

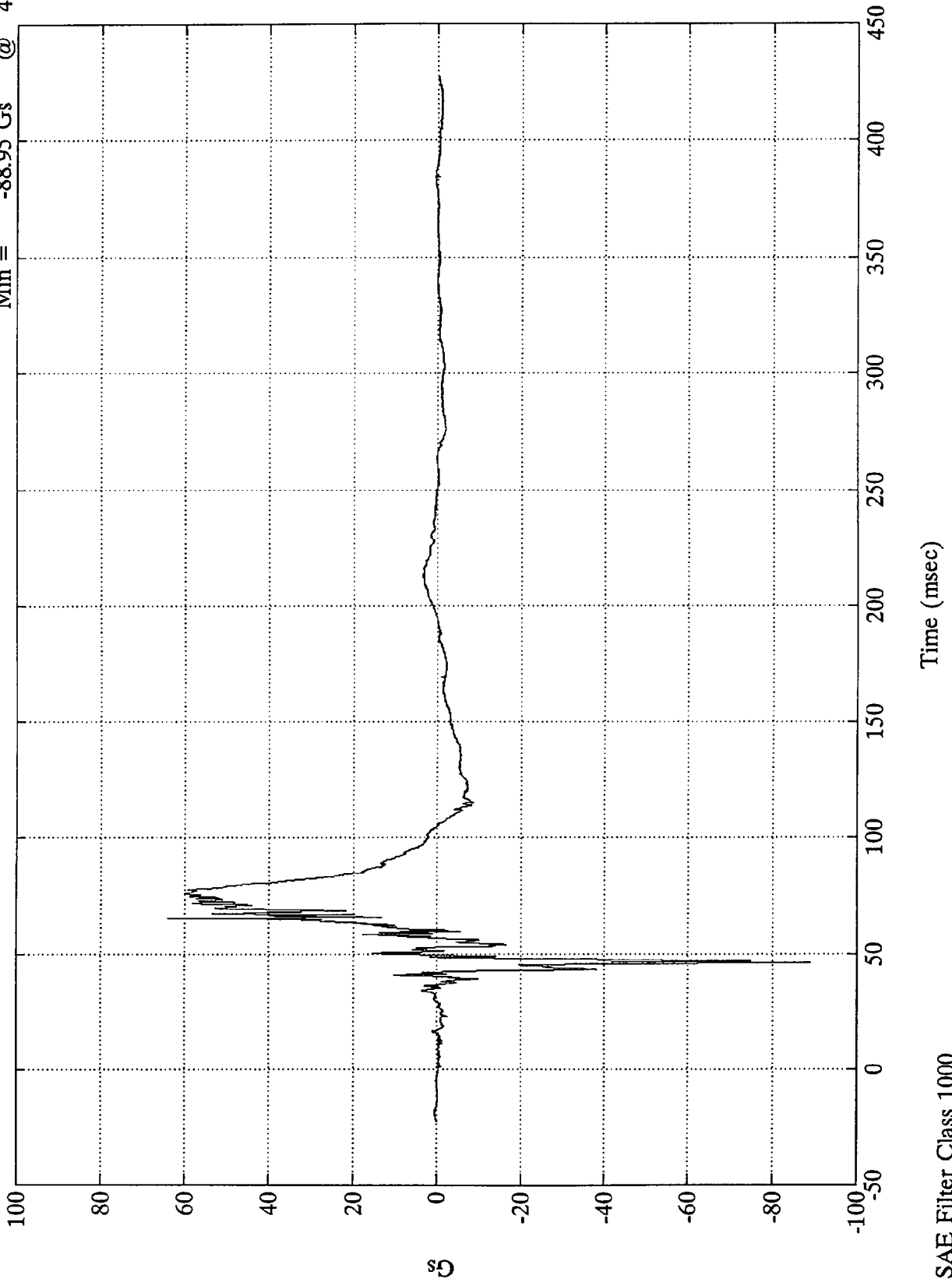
Max = 60.65 Gs @ 65.76 msec  
Min = -186.31 Gs @ 47.15 msec



VTV TEST #10

V1-P1 Pelvic Y

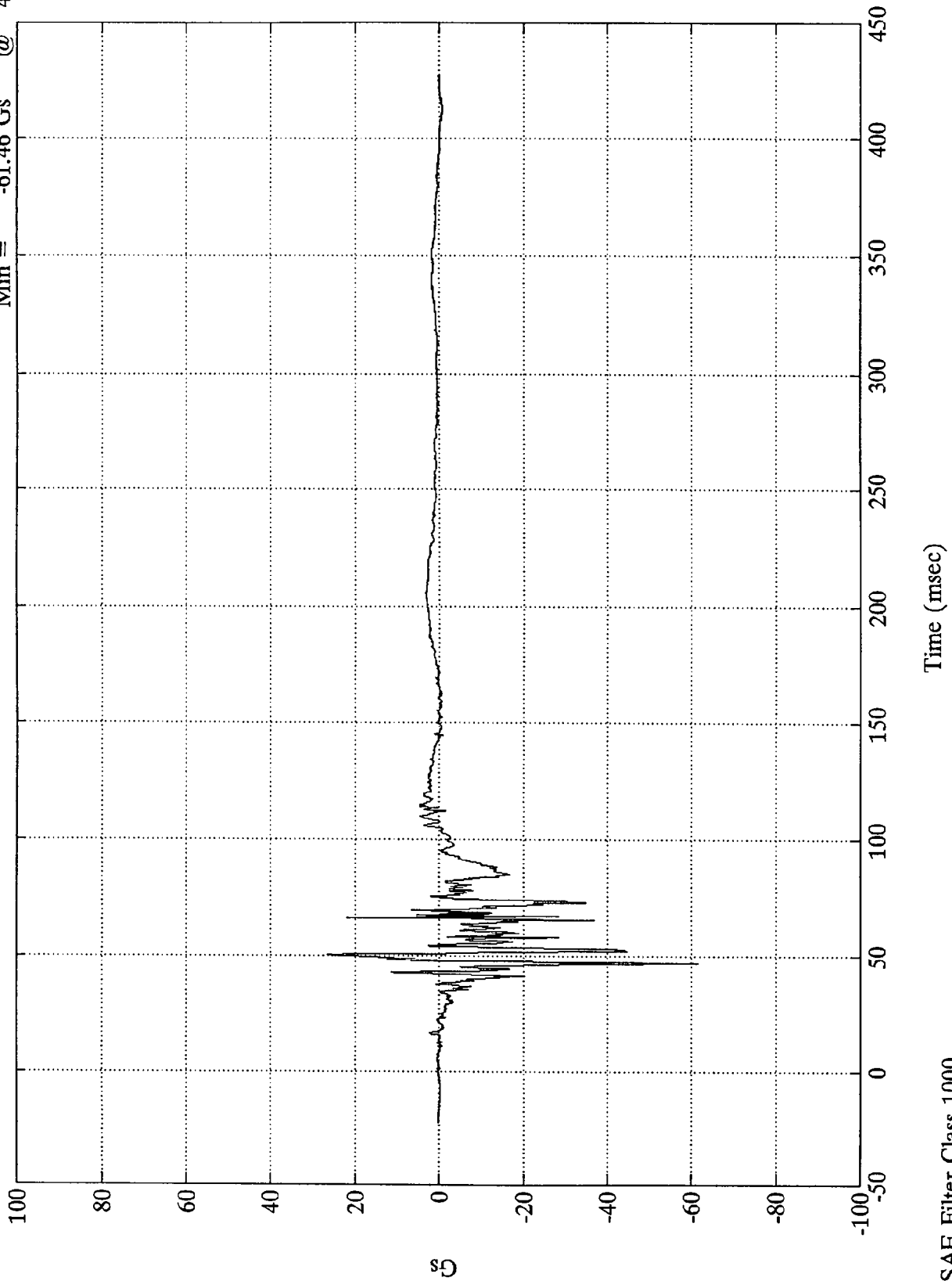
Max = 64.07 Gs @ 65.40 msec  
Min = -88.95 Gs @ 46.44 msec



VTV TEST #10

V1-P1 Pelvic Z

Max = 26.60 Gs @ 50.28 msec  
Min = -61.46 Gs @ 46.80 msec

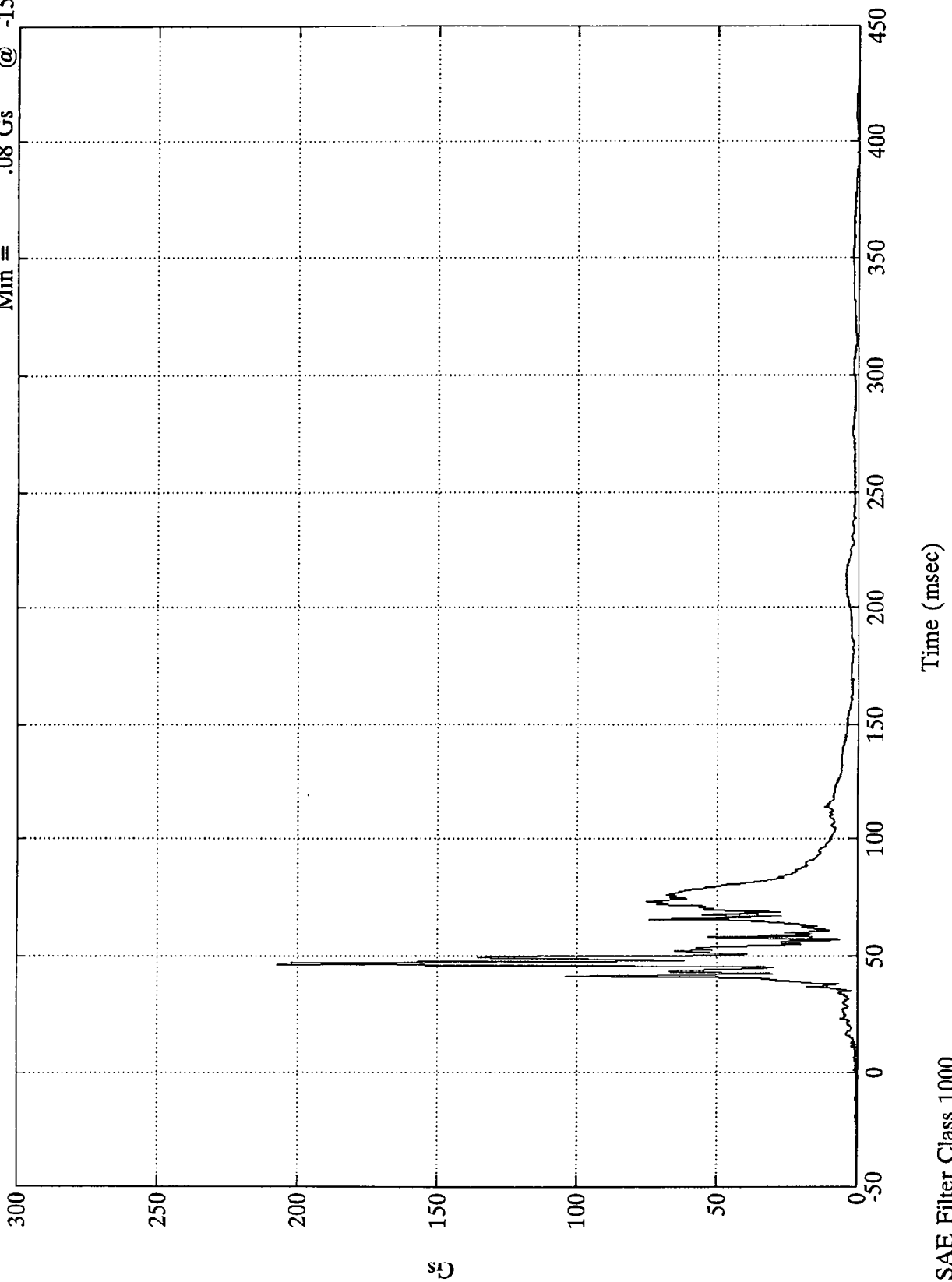


SAE Filter Class 1000

VTV TEST #10

V1-P1 Pelvic Res.

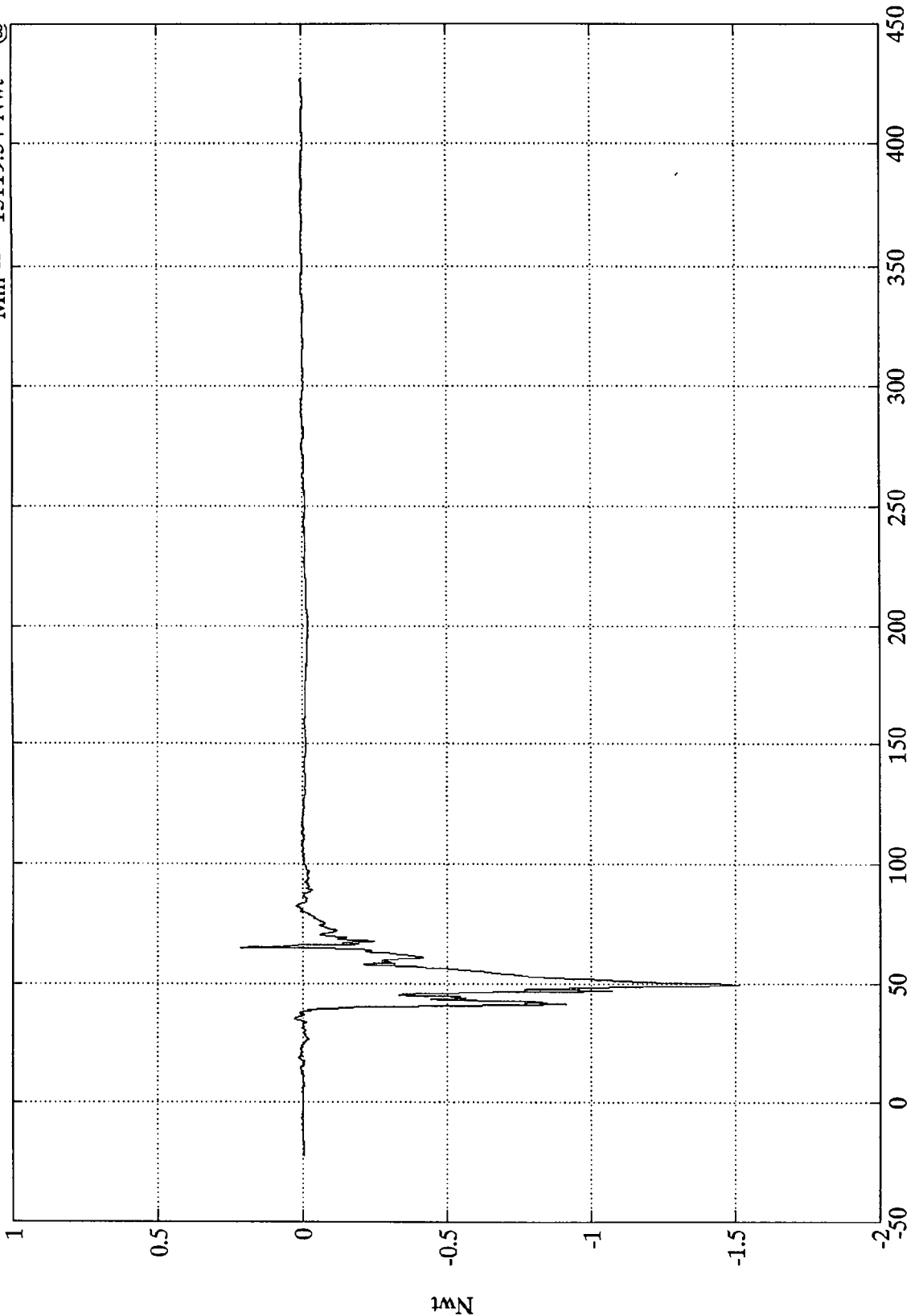
Max = 207.51 Gs @ 46.44 msec  
Min = .08 Gs @ -15.84 msec



VTV TEST #10  
x10<sup>4</sup>

V1-P1 Left Femur

Max = 2157.66 Nwt @ 65.15 msec  
Min = -15119.34 Nwt @ 49.43 msec



Time (msec)

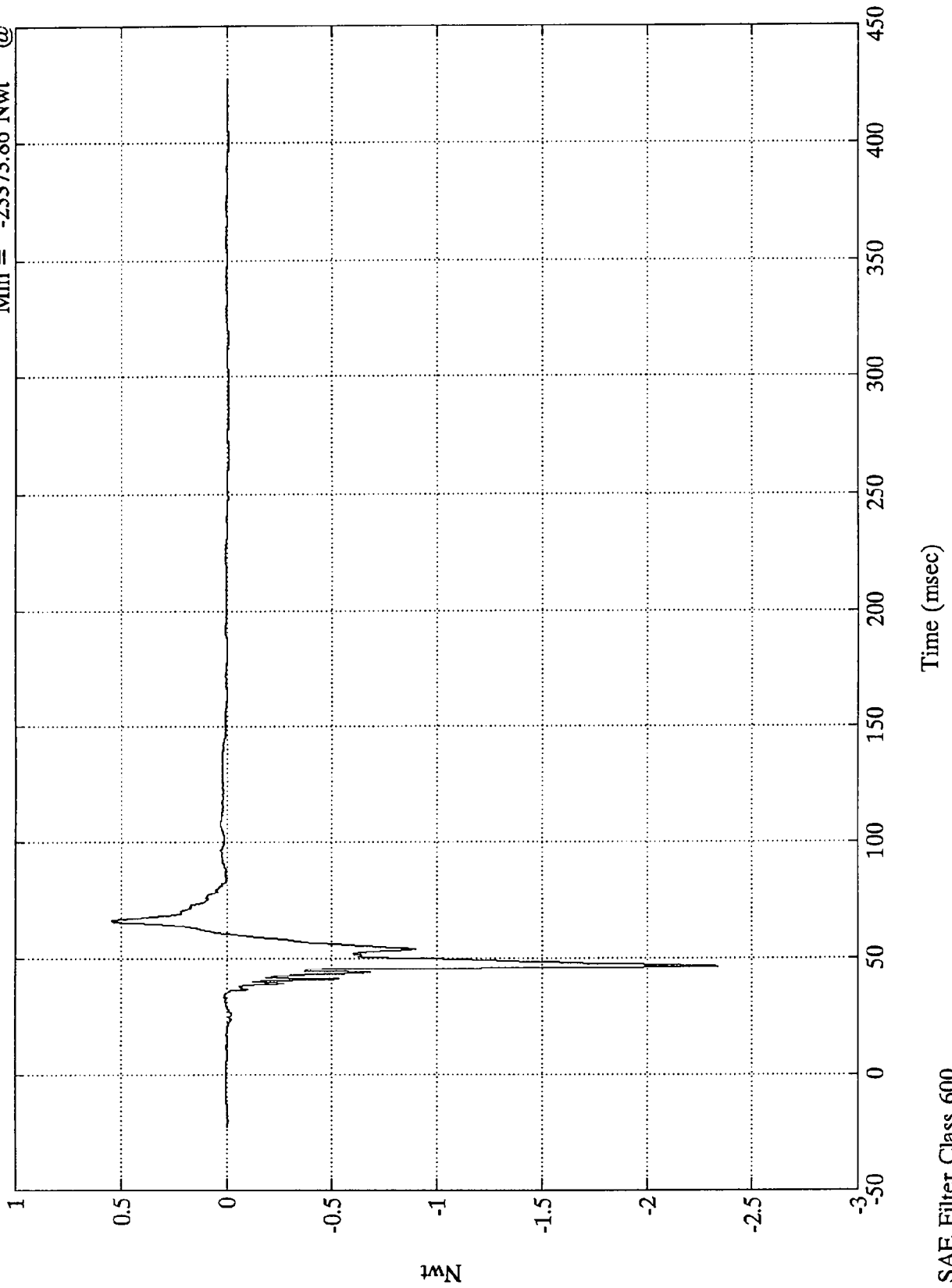
SAE Filter Class 600

VTV TEST #10  
x10<sup>4</sup>

V1-P1 Right Femur

Max = 5440.75 Nwt @  
Min = -23373.86 Nwt @

65.87 msec  
46.56 msec



SAE Filter Class 600

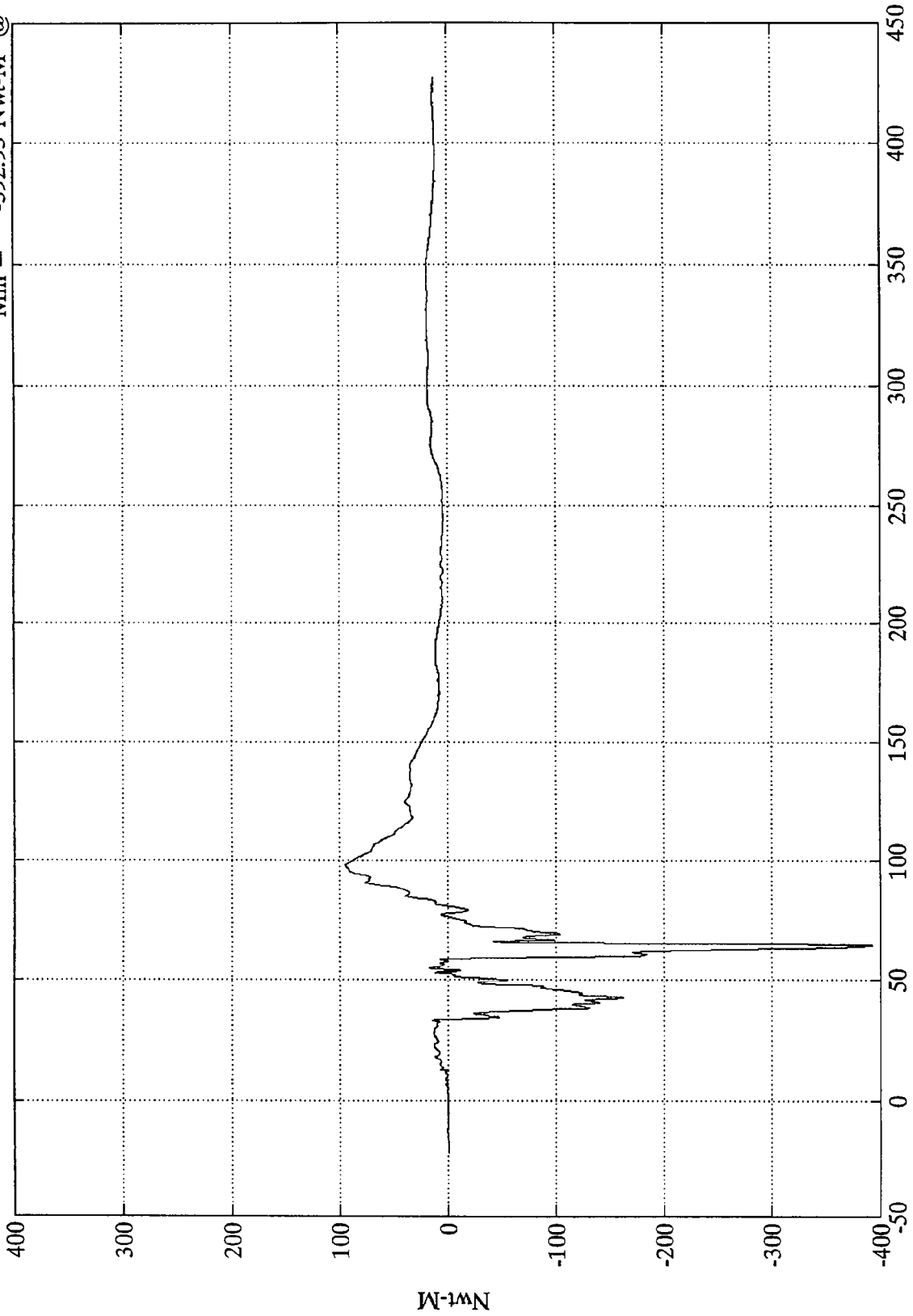
Nwt

Time (msec)

VTV TEST #10

V1-P1 Lt Upper Tibia Mx

Max = 94.82 Nwt-M @ 98.40 msec  
Min = -392.93 Nwt-M @ 64.31 msec



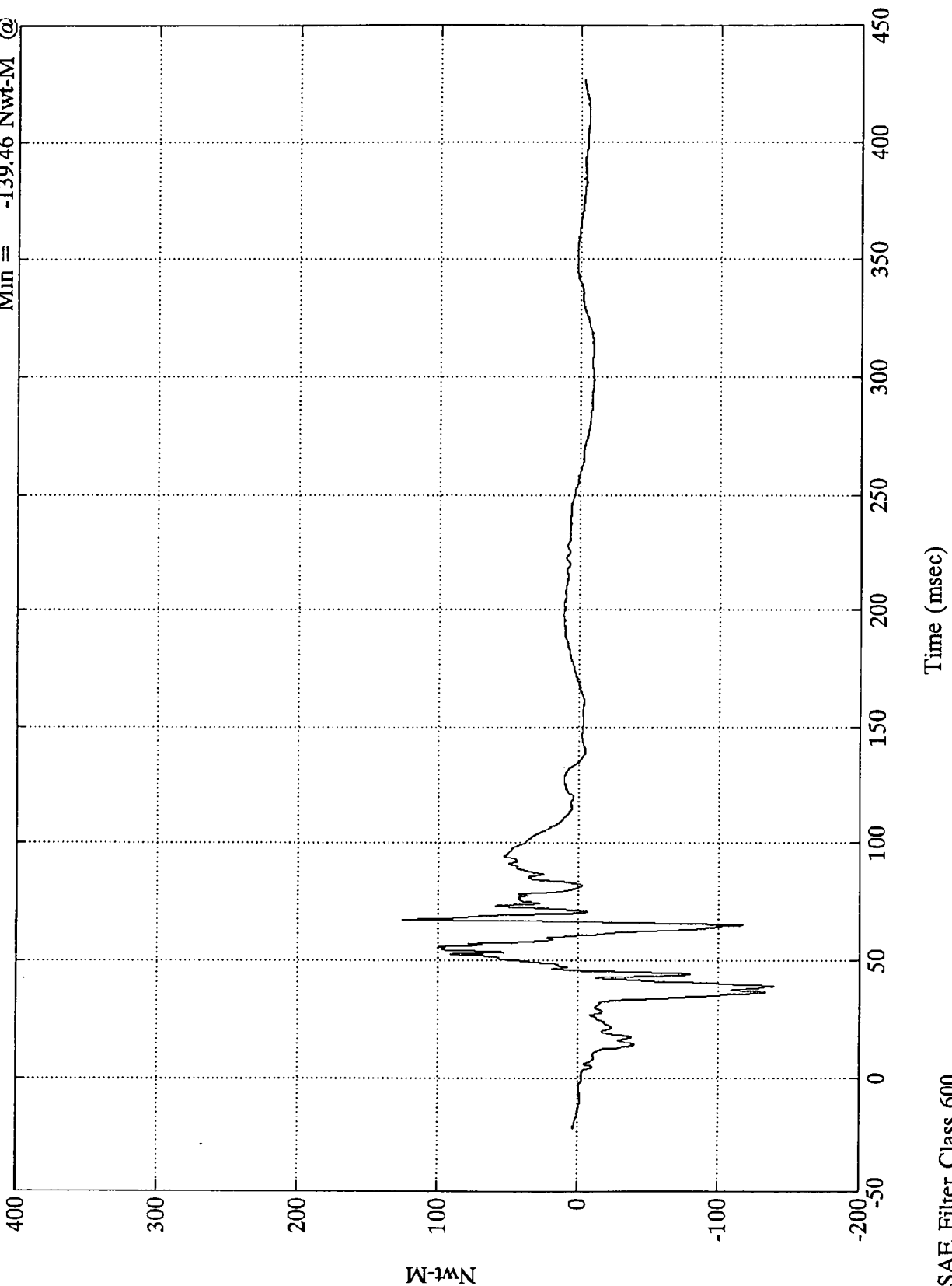
Time (msec)

SAE Filter Class 600

VTV TEST #10

V1-P1 Lt Upper Tibia My

Max = 125.75 Nwt-M @ 67.08 msec  
Min = -139.46 Nwt-M @ 39.36 msec

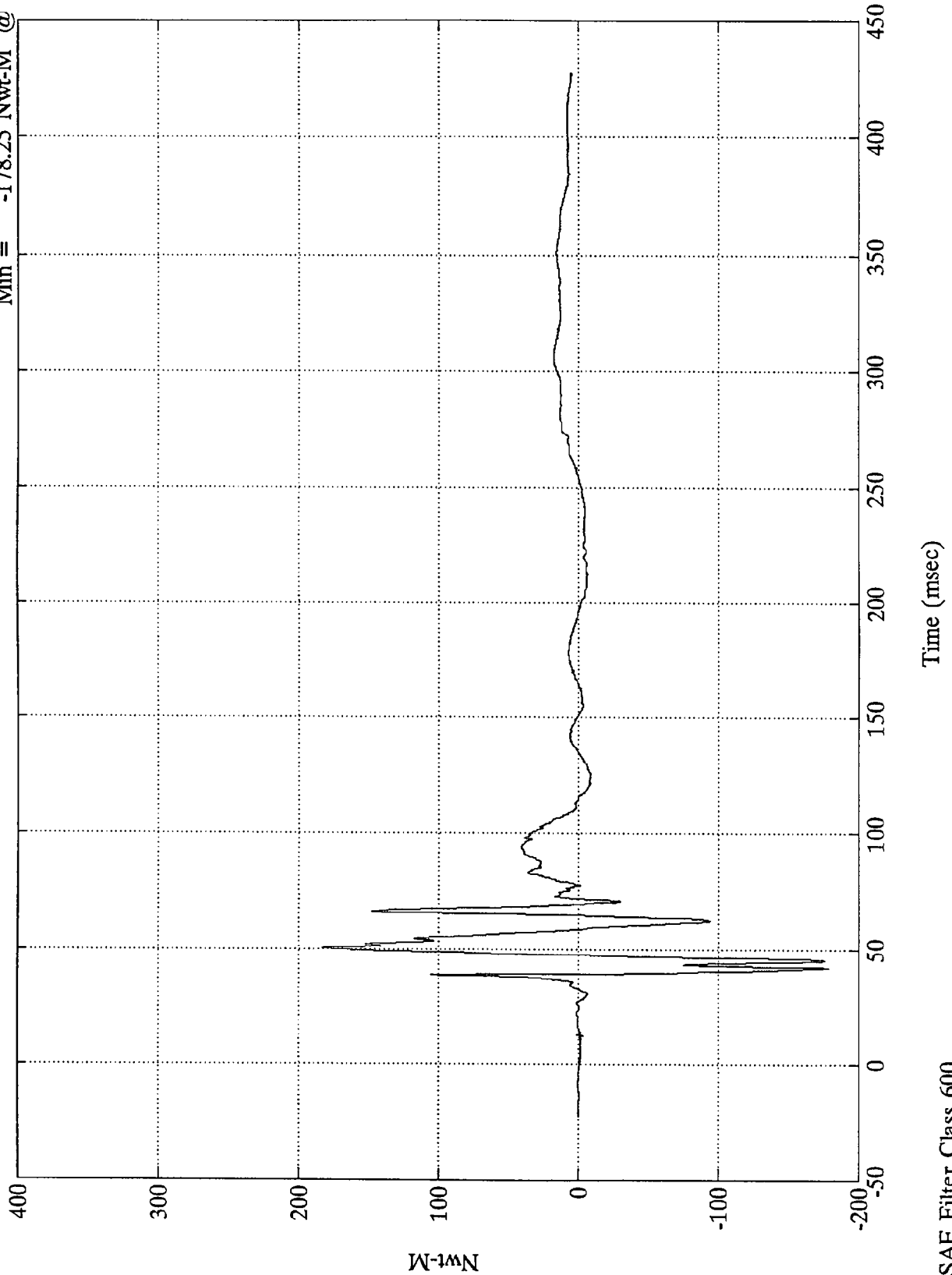


SAE Filter Class 600

VTV TEST #10

V1-P1 Rt Upper Tibia Mx

Max = 183.45 Nwt-M @ 50.52 msec  
Min = -178.25 Nwt-M @ 41.88 msec

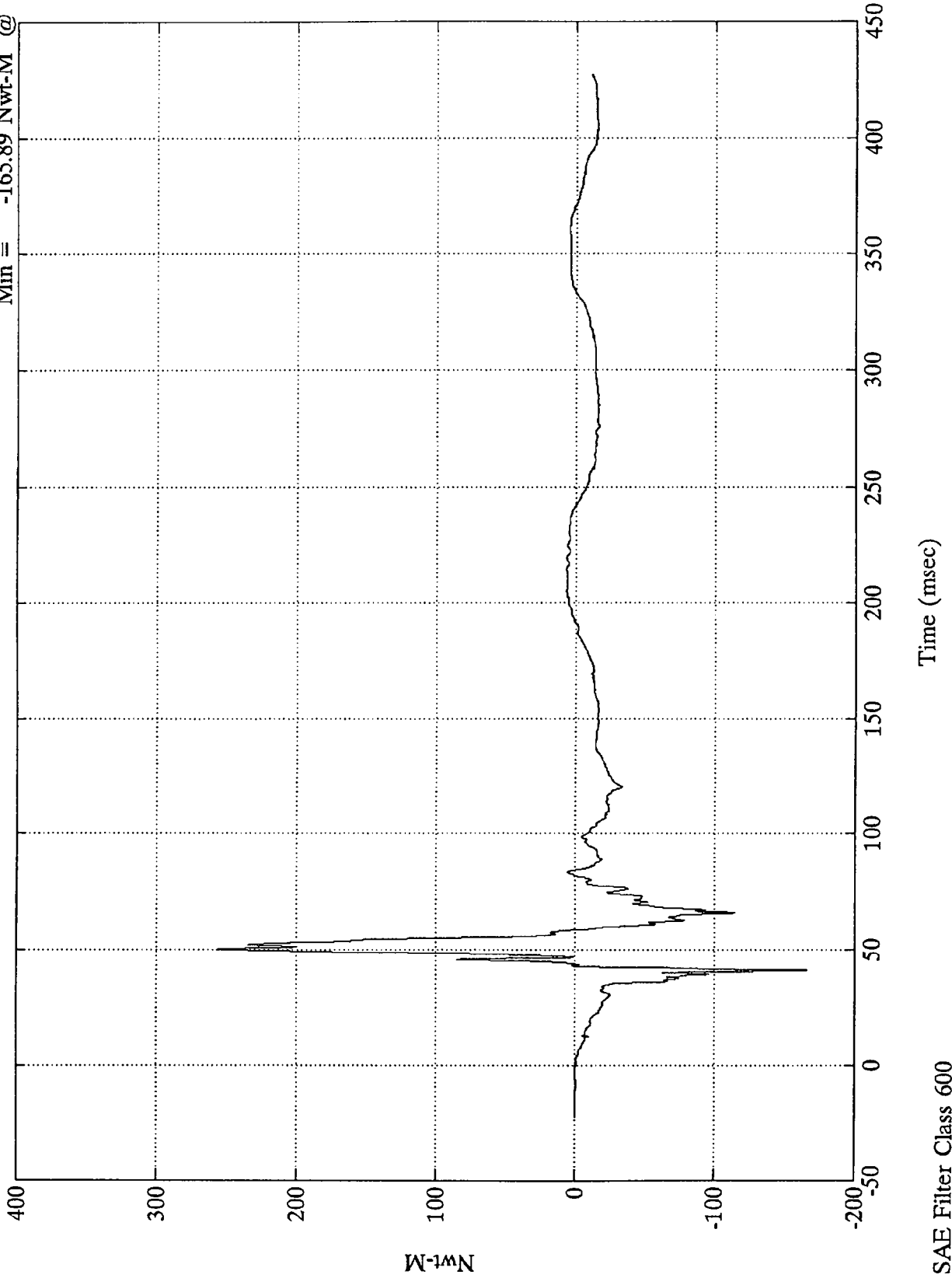


SAE Filter Class 600

VTV TEST #10

V1-P1 Rt Upper Tibia My

Max = 257.31 Nwt-M @ 50.16 msec  
Min = -165.89 Nwt-M @ 40.80 msec

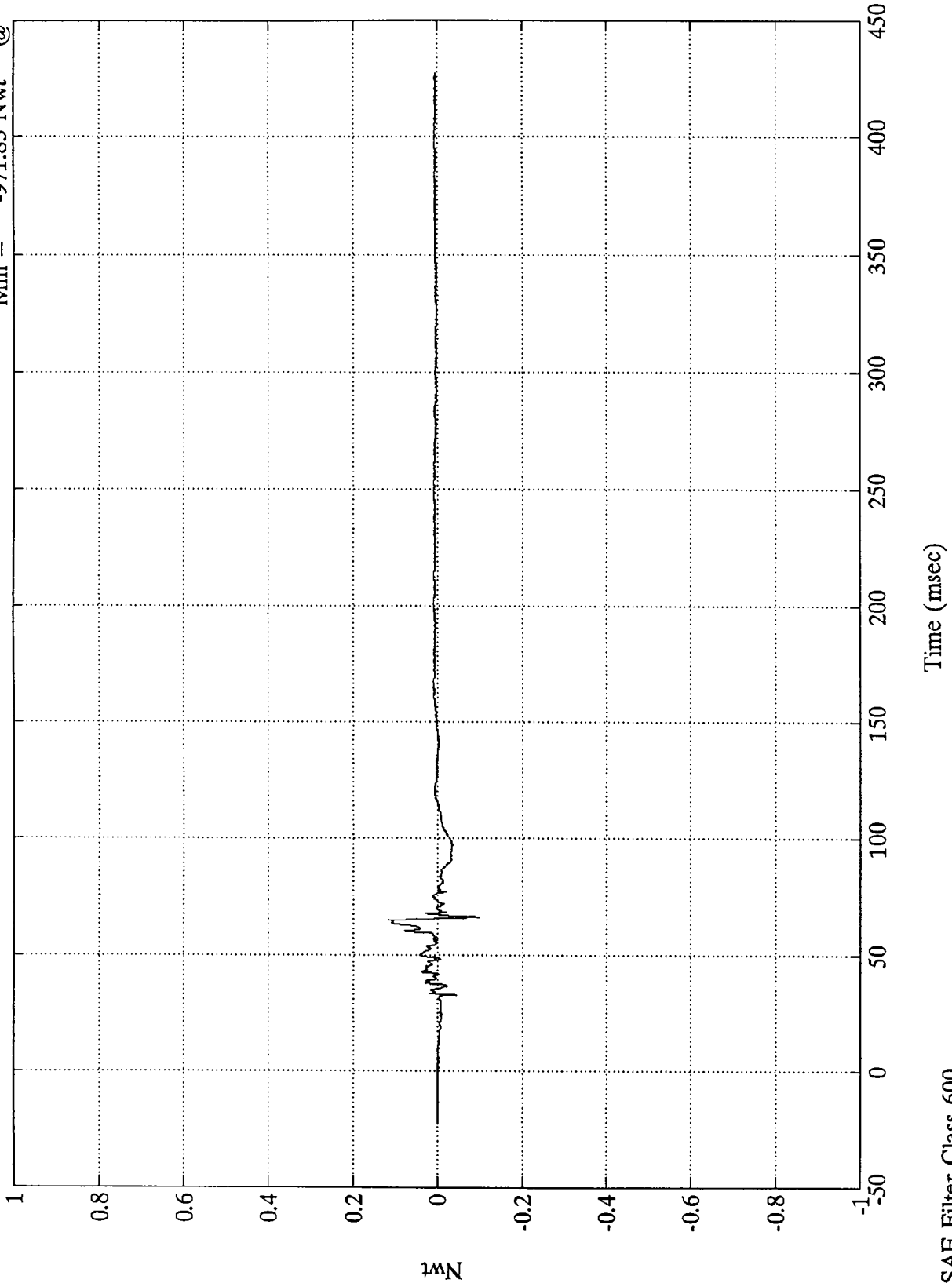


VTV TEST #10  
x10<sup>4</sup>

V1-P1 Lt Lower Tibia Fy

Max = 1159.16 Nwt @  
Min = -971.83 Nwt @

64.91 msec  
66.24 msec



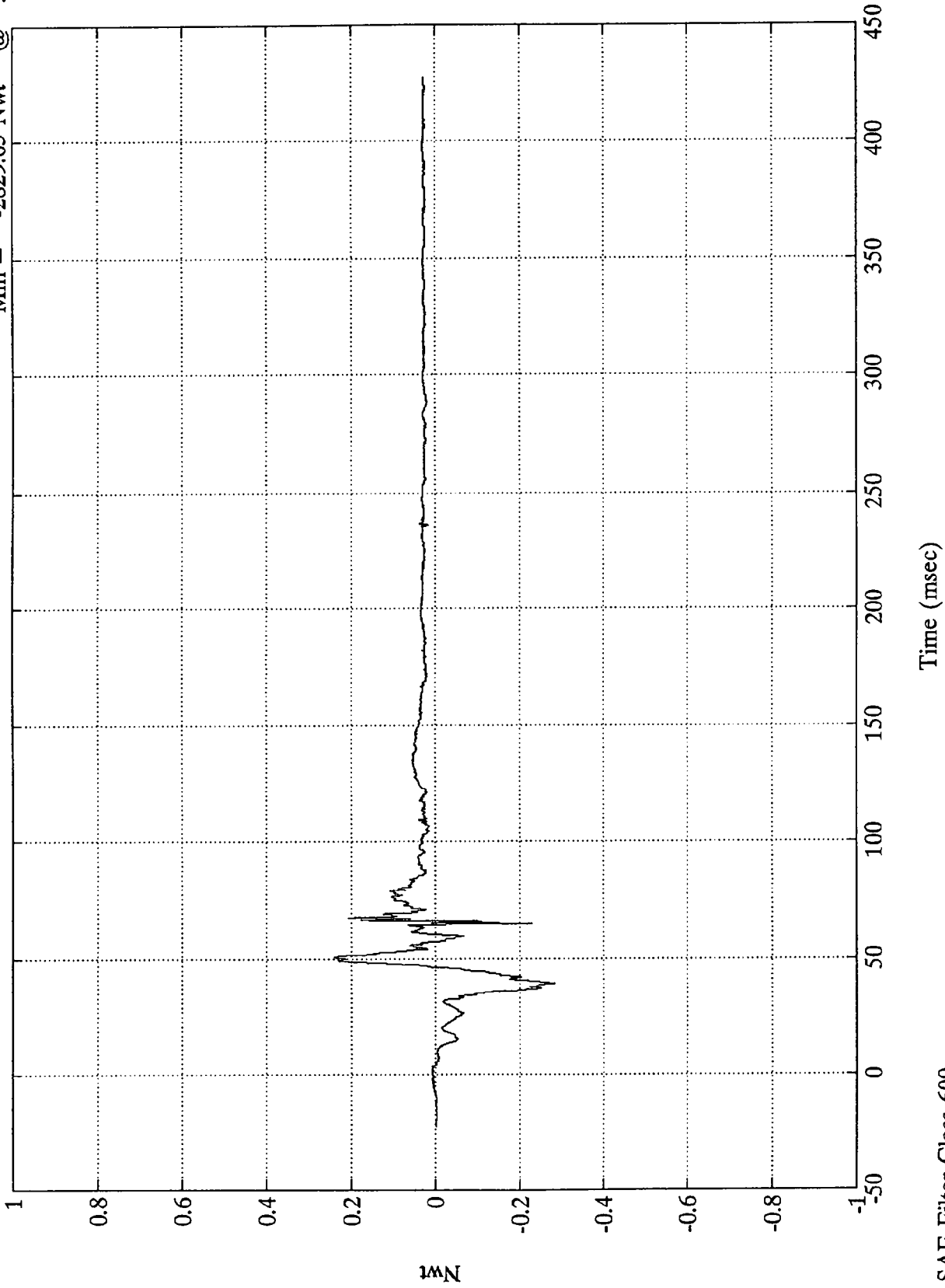
SAE Filter Class 600

VTV TEST #10

$\times 10^4$

V1-P1 Lt Lower Tibia Fz

Max = 2406.34 Nwt @ 50.76 msec  
Min = -2829.65 Nwt @ 39.36 msec

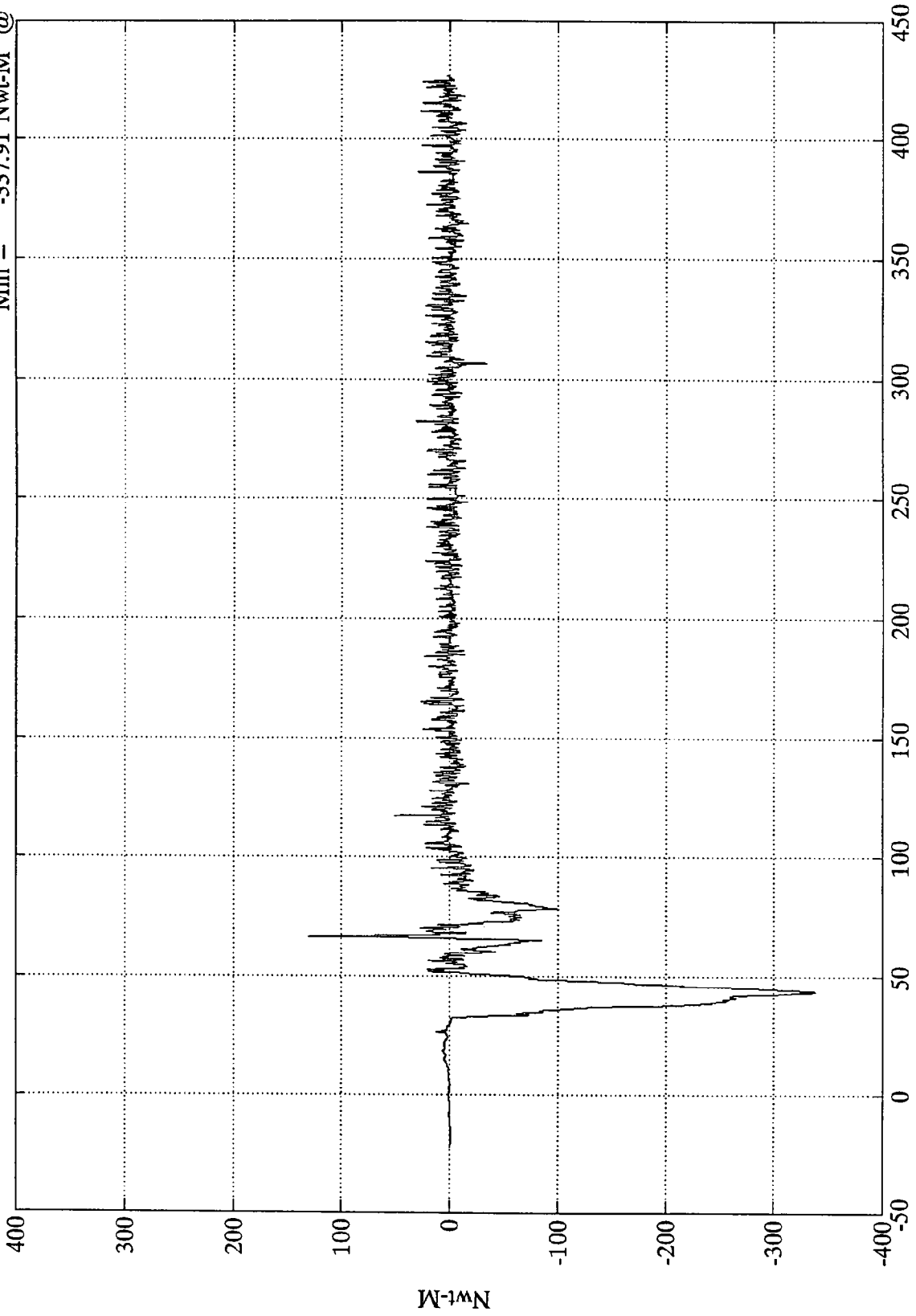


SAE Filter Class 600

VTV TEST #10

V1-P1 Lt Lower Tibia Mx

Max = 131.05 Nwt-M @ 66.36 msec  
Min = -337.91 Nwt-M @ 43.56 msec



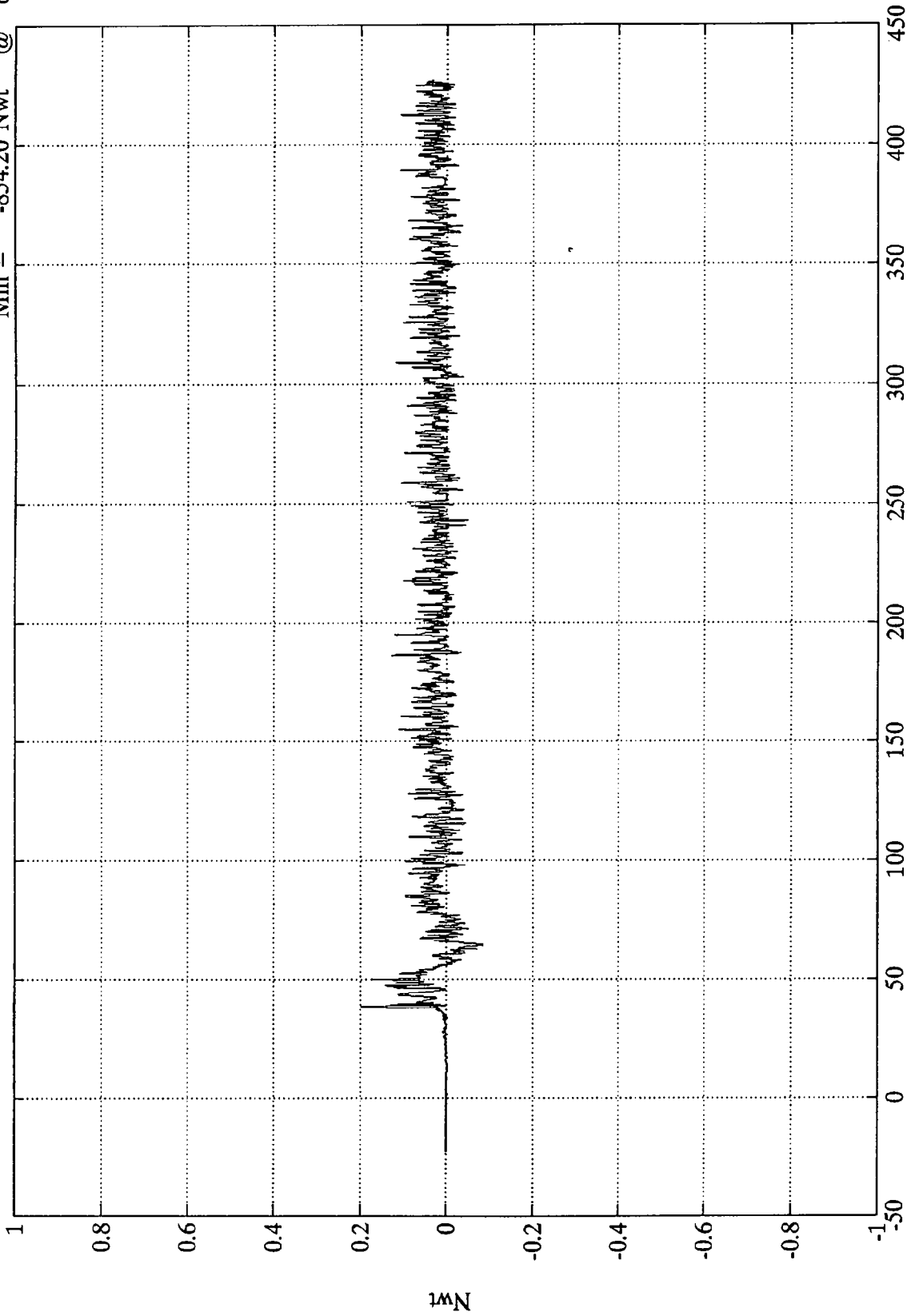
SAE Filter Class 600  
Noise in data after 45msec

VTV TEST #10

$\times 10^4$

V1-P1 Rt Lower Tibia Fy

Max = 1976.76 Nwt @ 38.27 msec  
Min = -854.20 Nwt @ 64.44 msec



Time (msec) Noise in data after 45msec

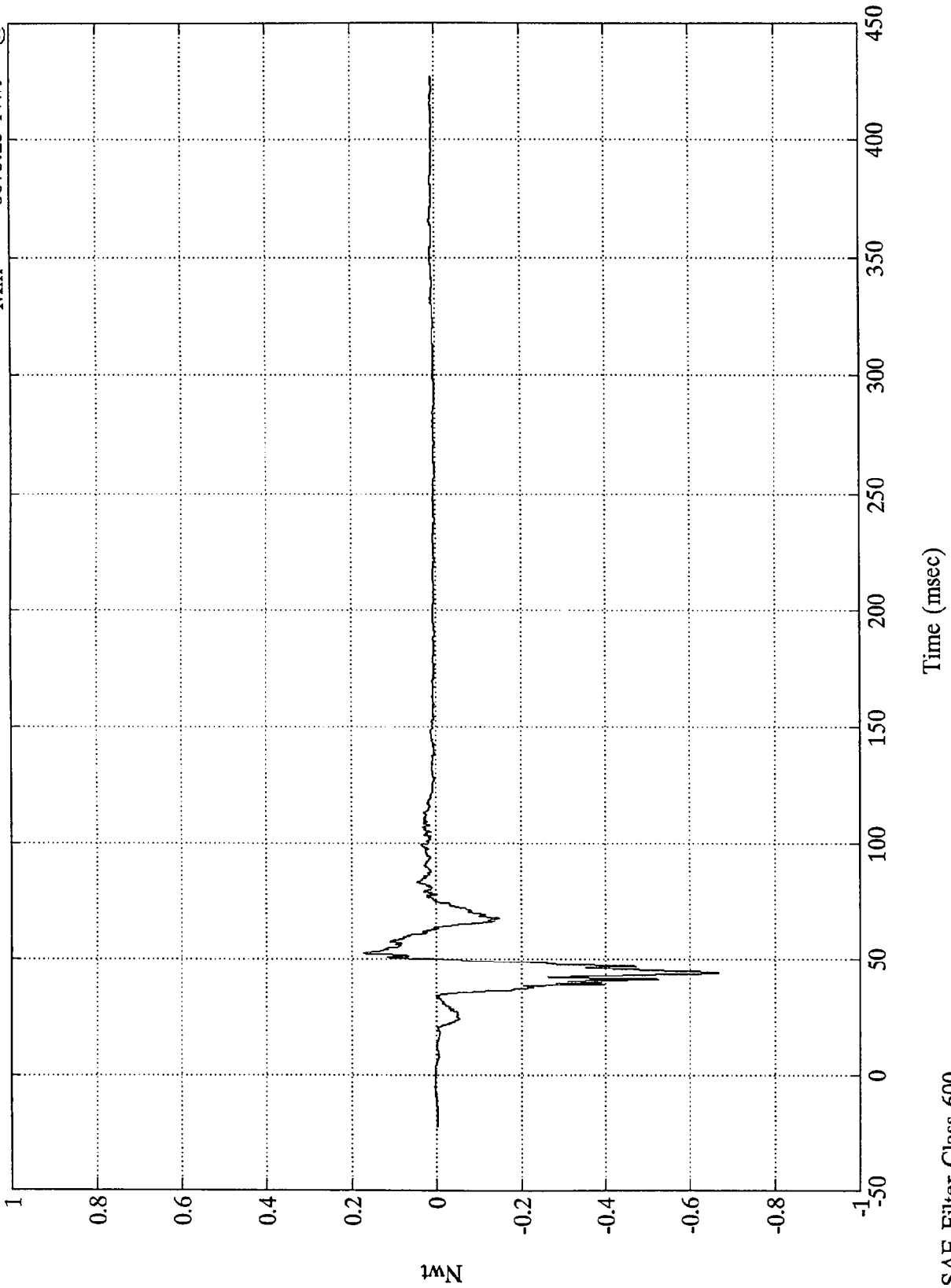
SAE Filter Class 600

VTV TEST #10

$\times 10^4$

V1-P1 Rt Lower Tibia Fz

Max = 1727.94 Nwt @ 52.44 msec  
Min = -6675.23 Nwt @ 43.68 msec

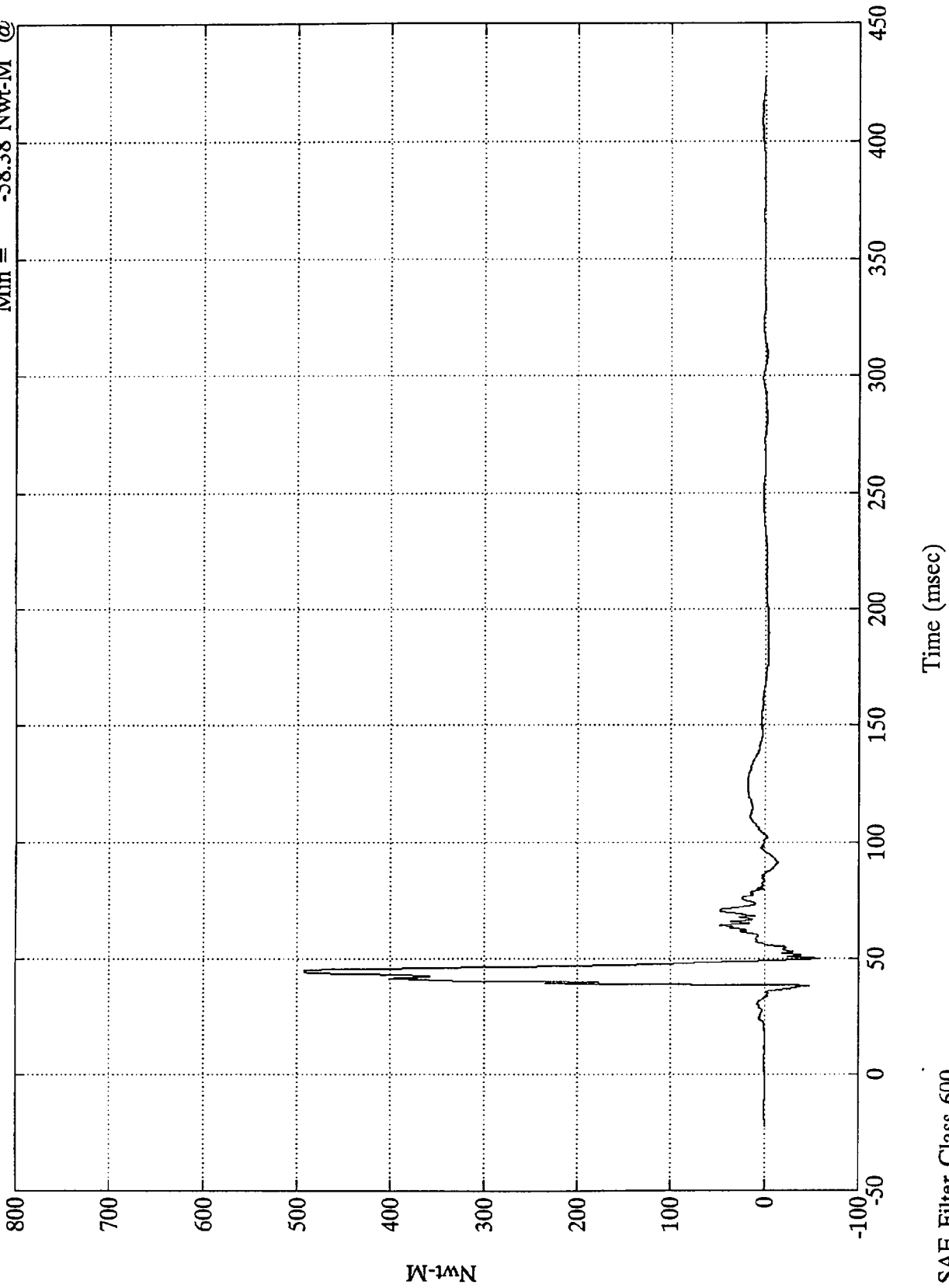


SAE Filter Class 600

VTV TEST #10

V1-P1 Rt Lower Tibia Mx

Max = 492.08 Nwt-M @ 44.88 msec  
Min = -58.38 Nwt-M @ 50.04 msec

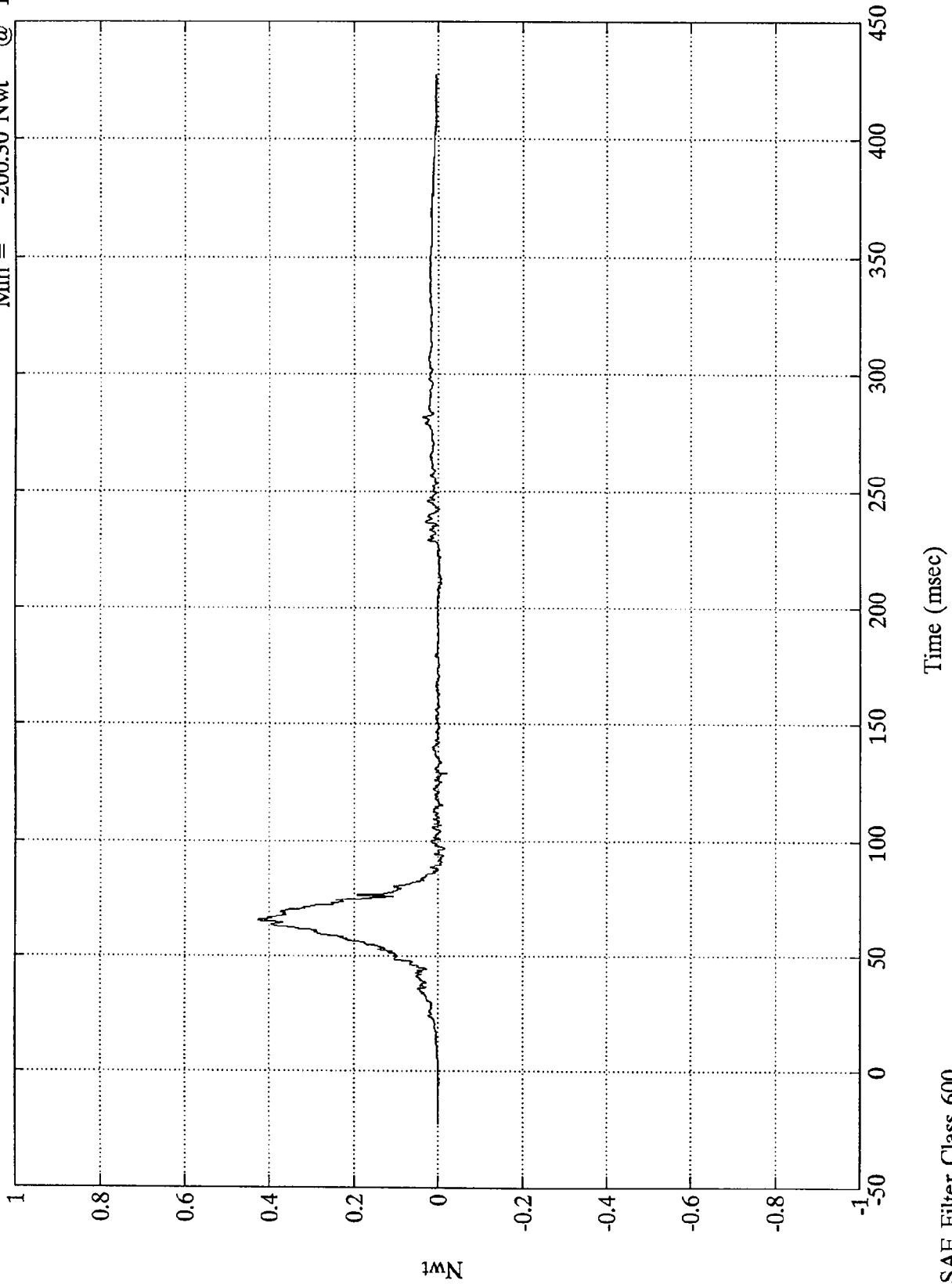


SAE Filter Class 600

VTV TEST #10  
x10<sup>4</sup>

V1-P1 Torso Belt Load

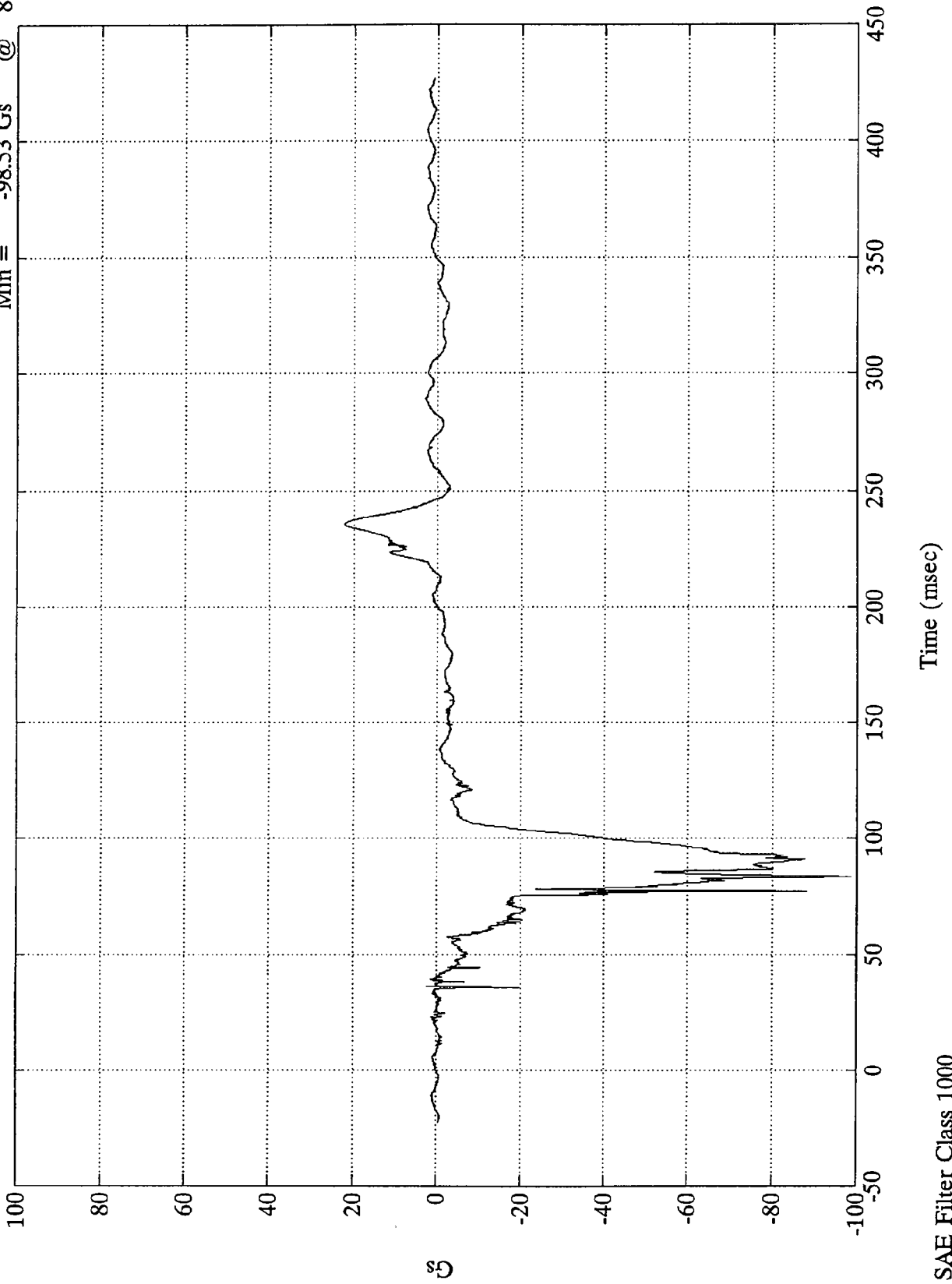
Max = 4274.69 Nwt @ 65.76 msec  
Min = -200.30 Nwt @ 128.76 msec



VTV TEST #10

V1-P2 Head X

Max = 22.21 Gs @ 235.68 msec  
Min = -98.53 Gs @ 83.63 msec

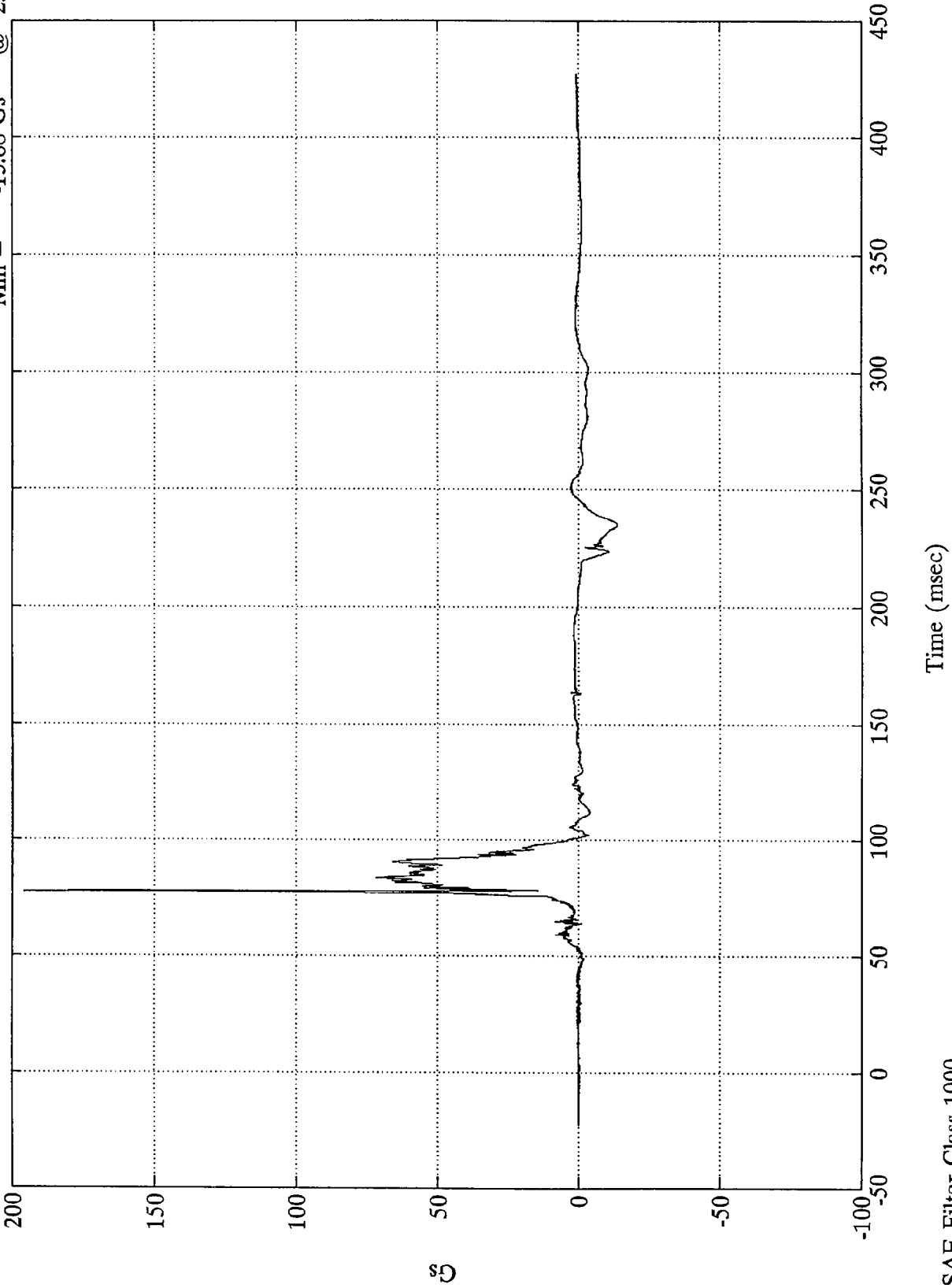


SAE Filter Class 1000

VTV TEST #10

V1-P2 Head Y

Max = 195.94 Gs @ 77.27 msec  
Min = -13.88 Gs @ 235.08 msec

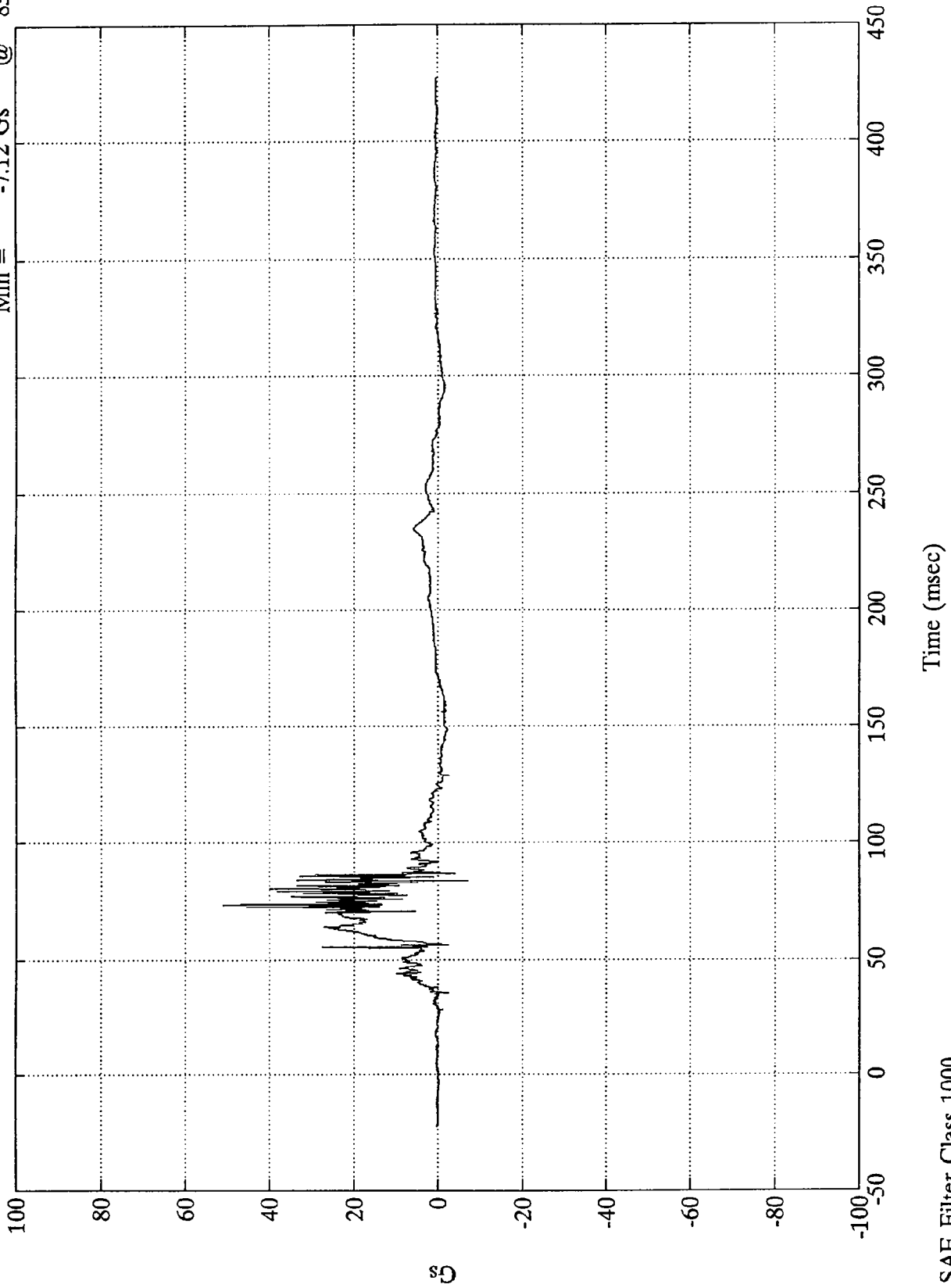


SAE Filter Class 1000

VTV TEST #10

V1-P2 Head Z

Max = 51.04 Gs @ 73.55 msec  
Min = -7.12 Gs @ 83.52 msec



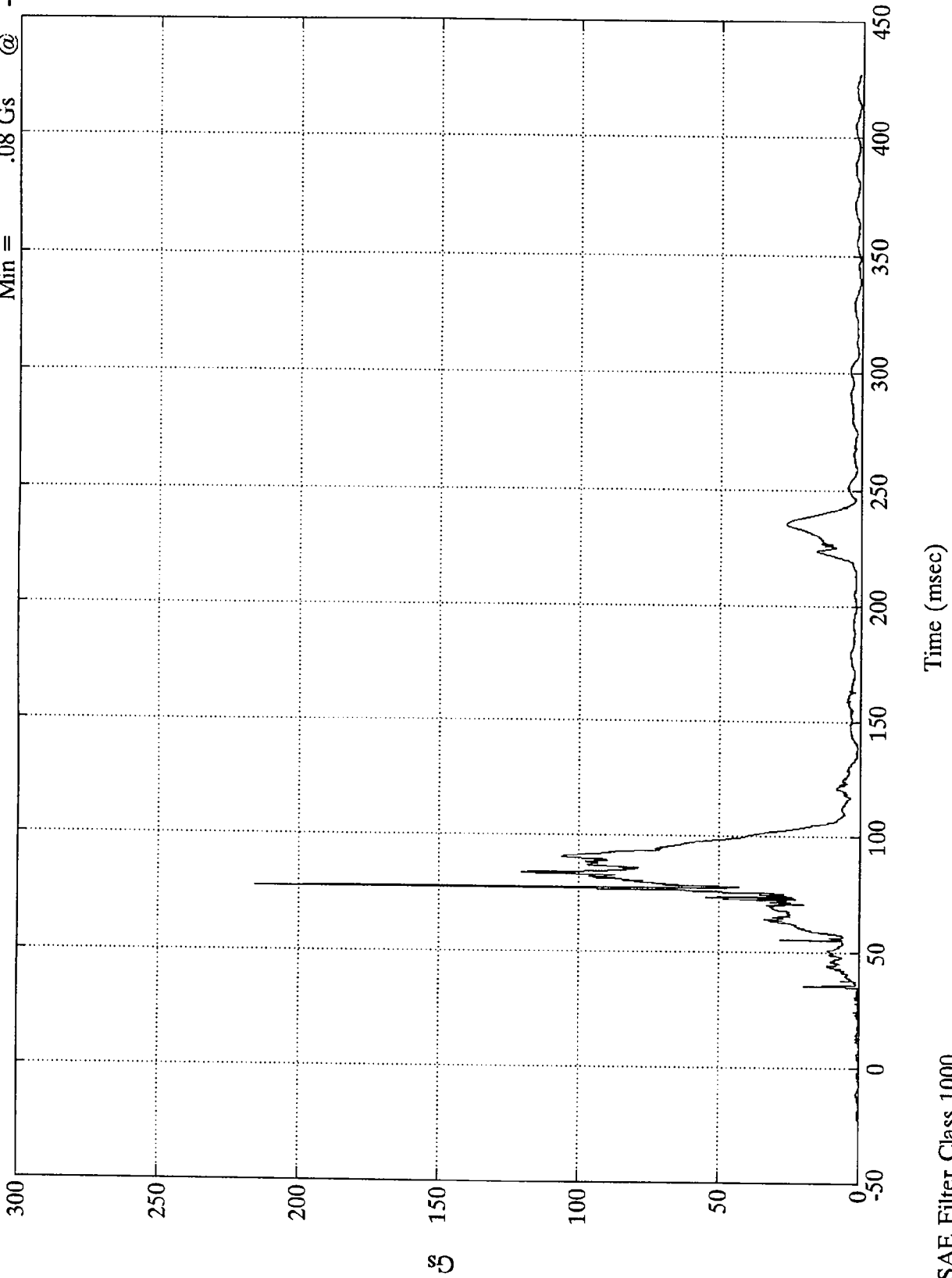
Time (msec)

SAE Filter Class 1000

VTV TEST #10

V1-P2 Head Resultant

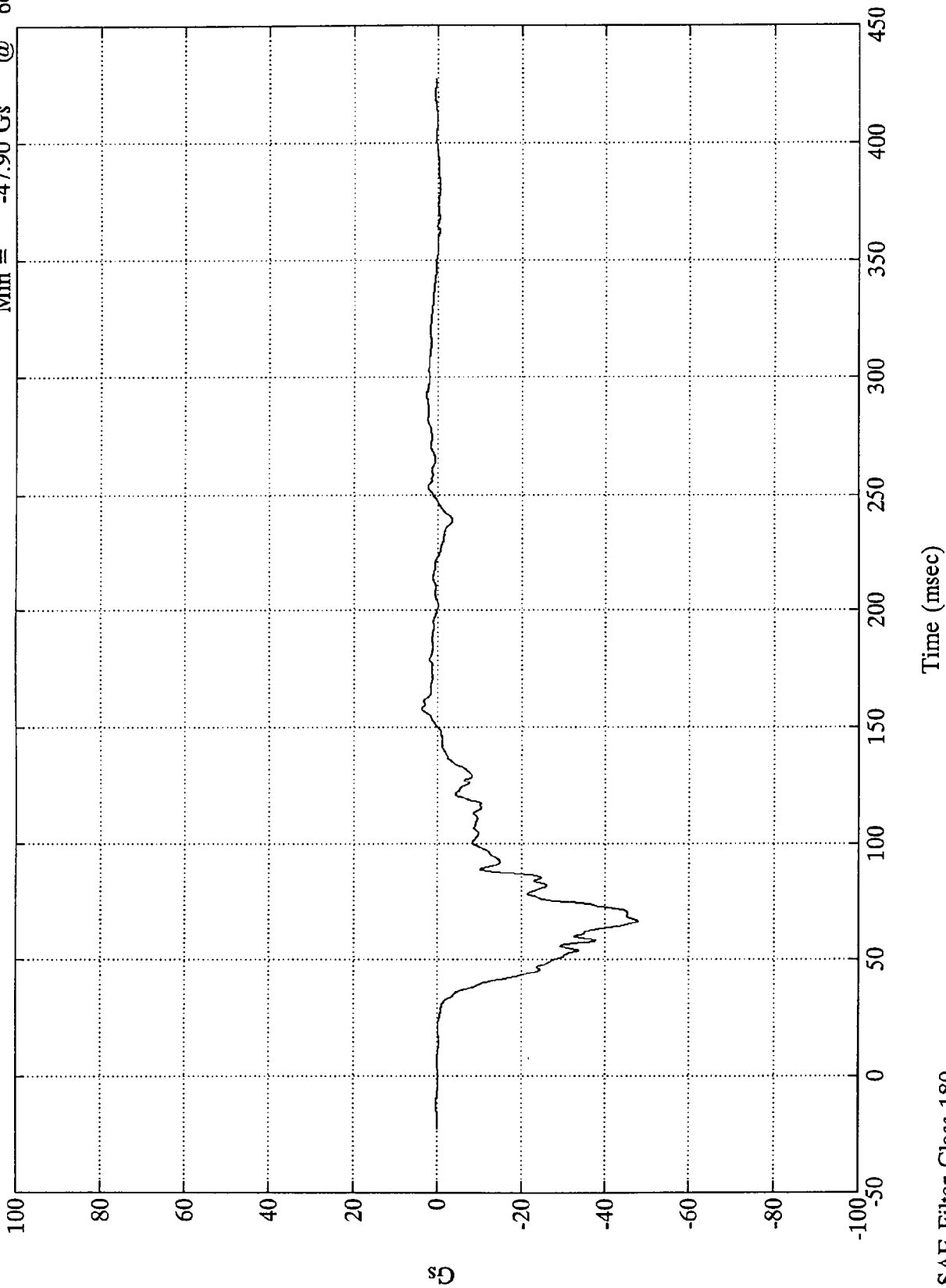
Max = 215.75 Gs @ 77.27 msec  
Min = .08 Gs @ -0.60 msec



VTV TEST #10

V1-P2 Chest X

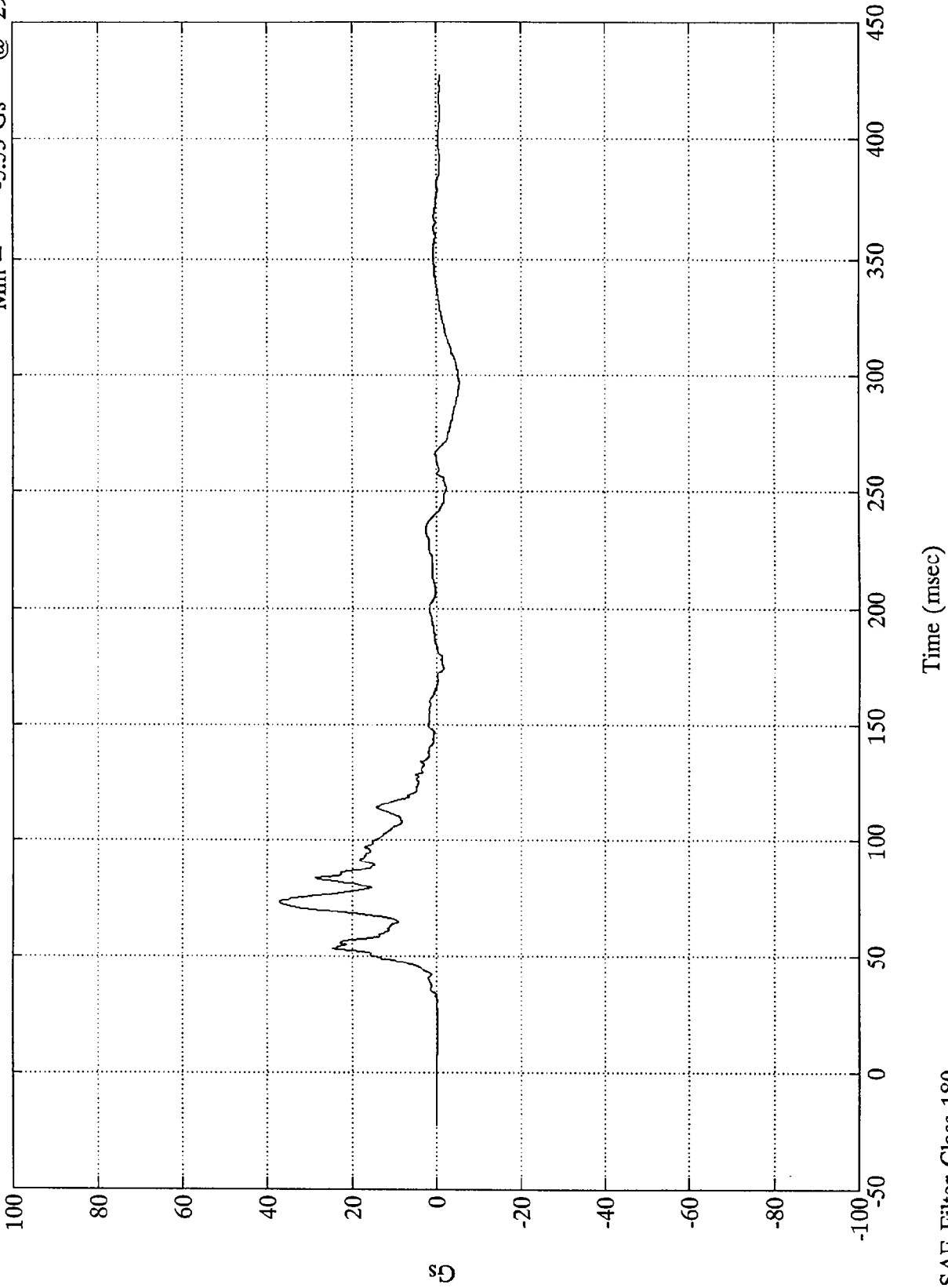
Max = 3.70 Gs @ 157.68 msec  
Min = -47.90 Gs @ 66.60 msec



VTV TEST #10

V1-P2 Chest Y

Max = 37.19 Gs @ 73.20 msec  
Min = -5.53 Gs @ 296.76 msec

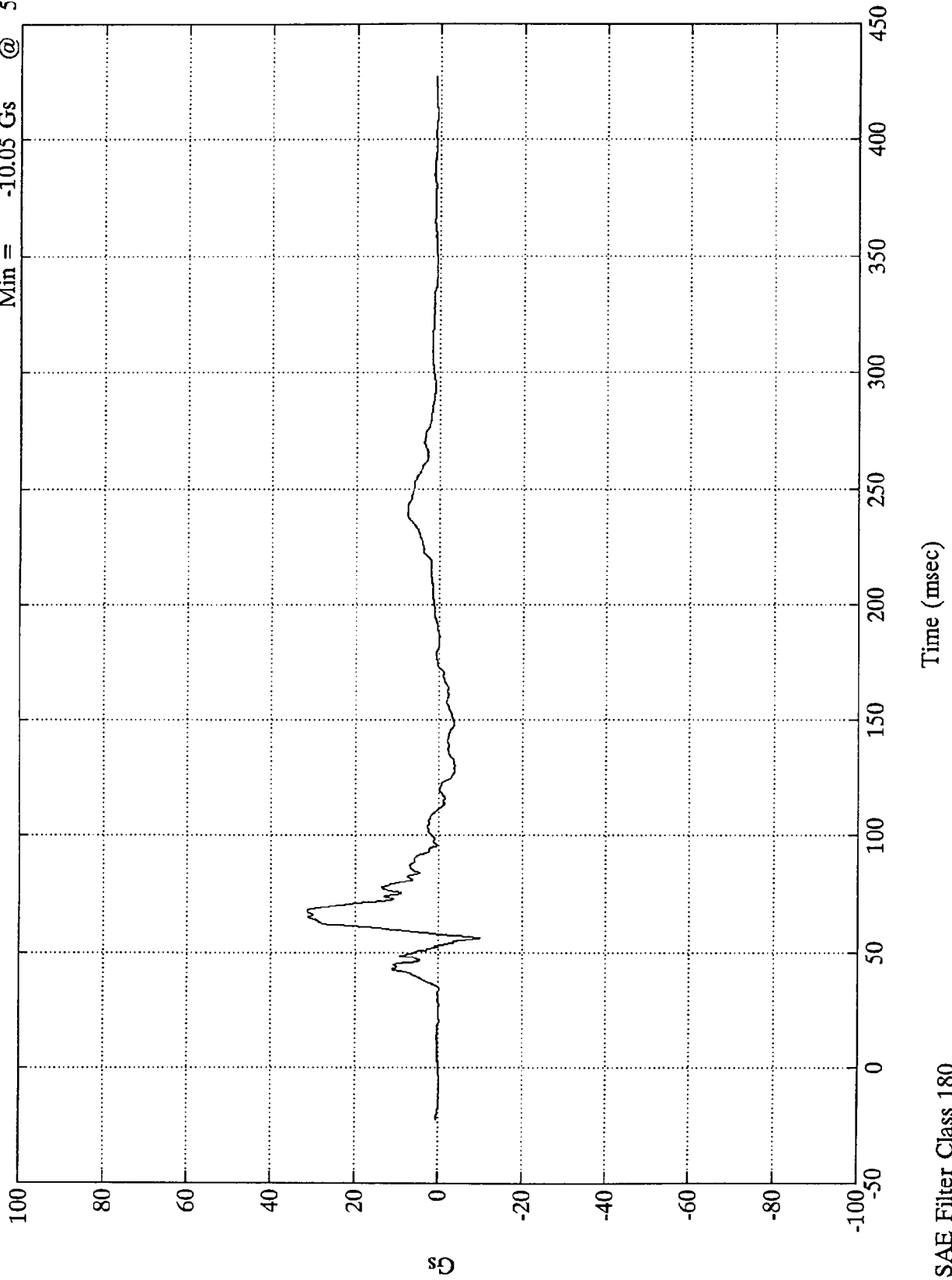


SAE Filter Class 180

VTV TEST #10

V1-P2 Chest Z

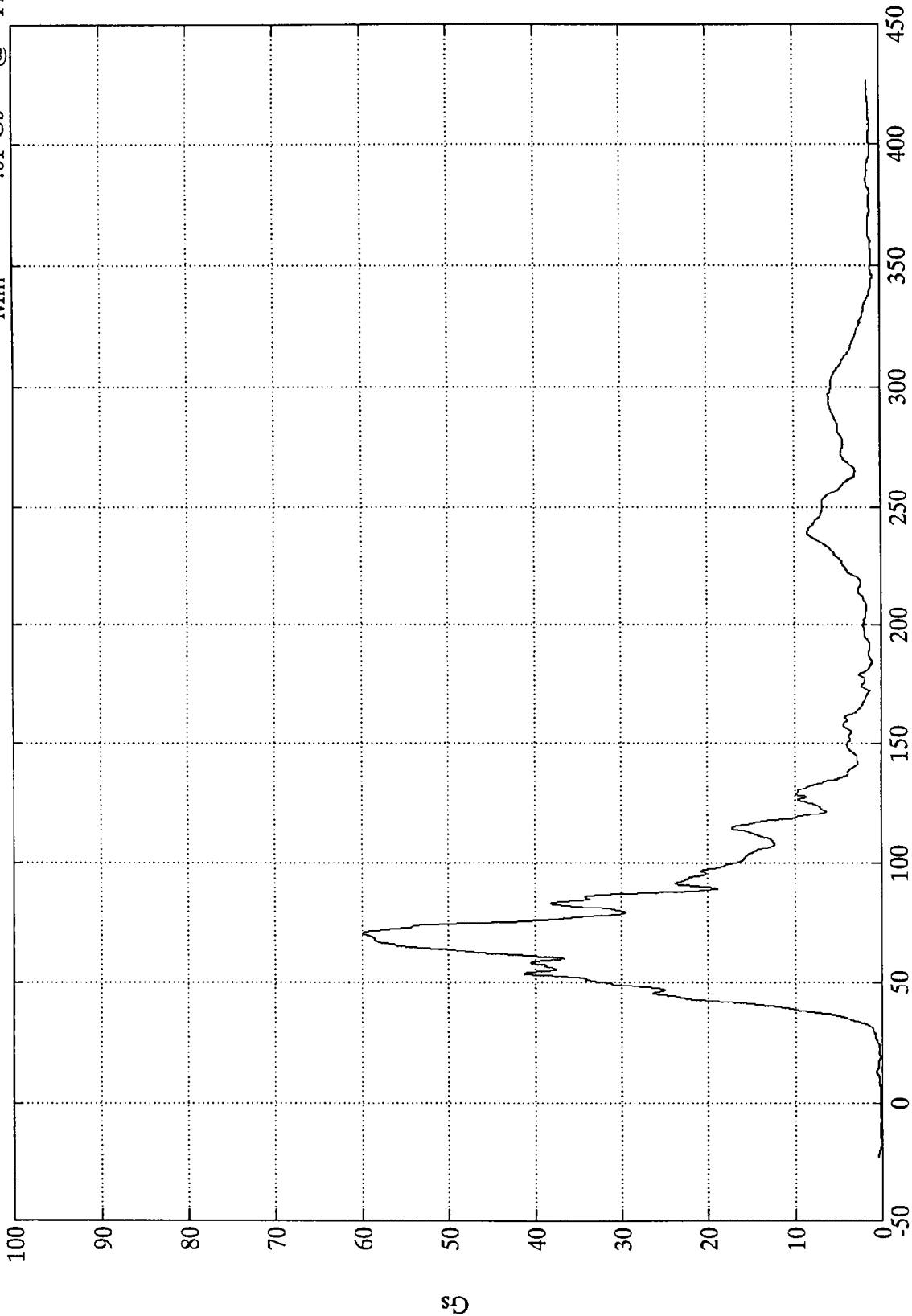
Max = 31.40 Gs @ 67.80 msec  
Min = -10.05 Gs @ 56.28 msec



VTV TEST #10

Max = 59.95 Gs @ 70.31 msec  
Min = .01 Gs @ -17.04 msec

V1-P2 Chest Resultant



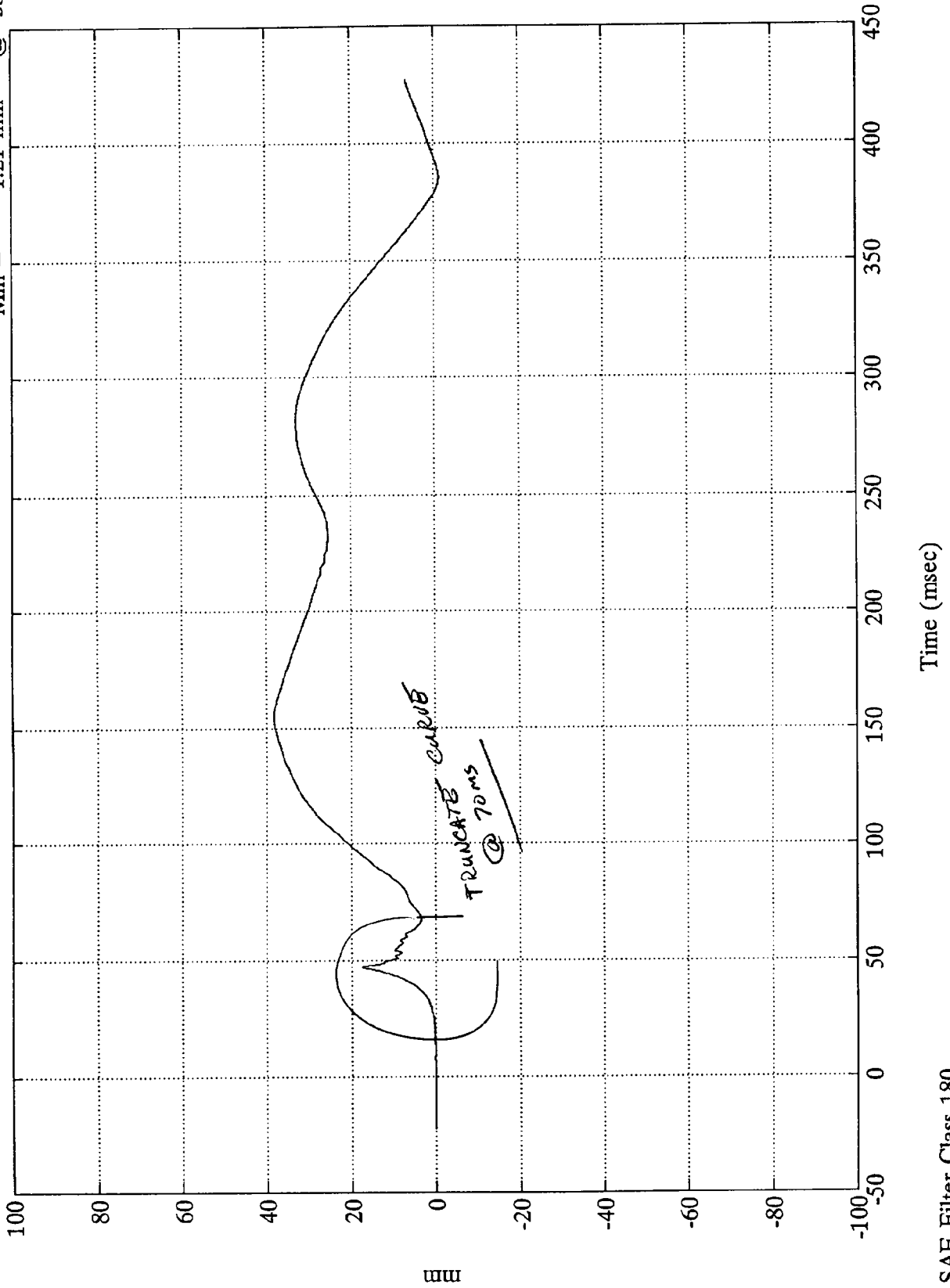
Time (msec)

SAE Filter Class 180

VTV TEST #10

V1-P2 Chest Disp.

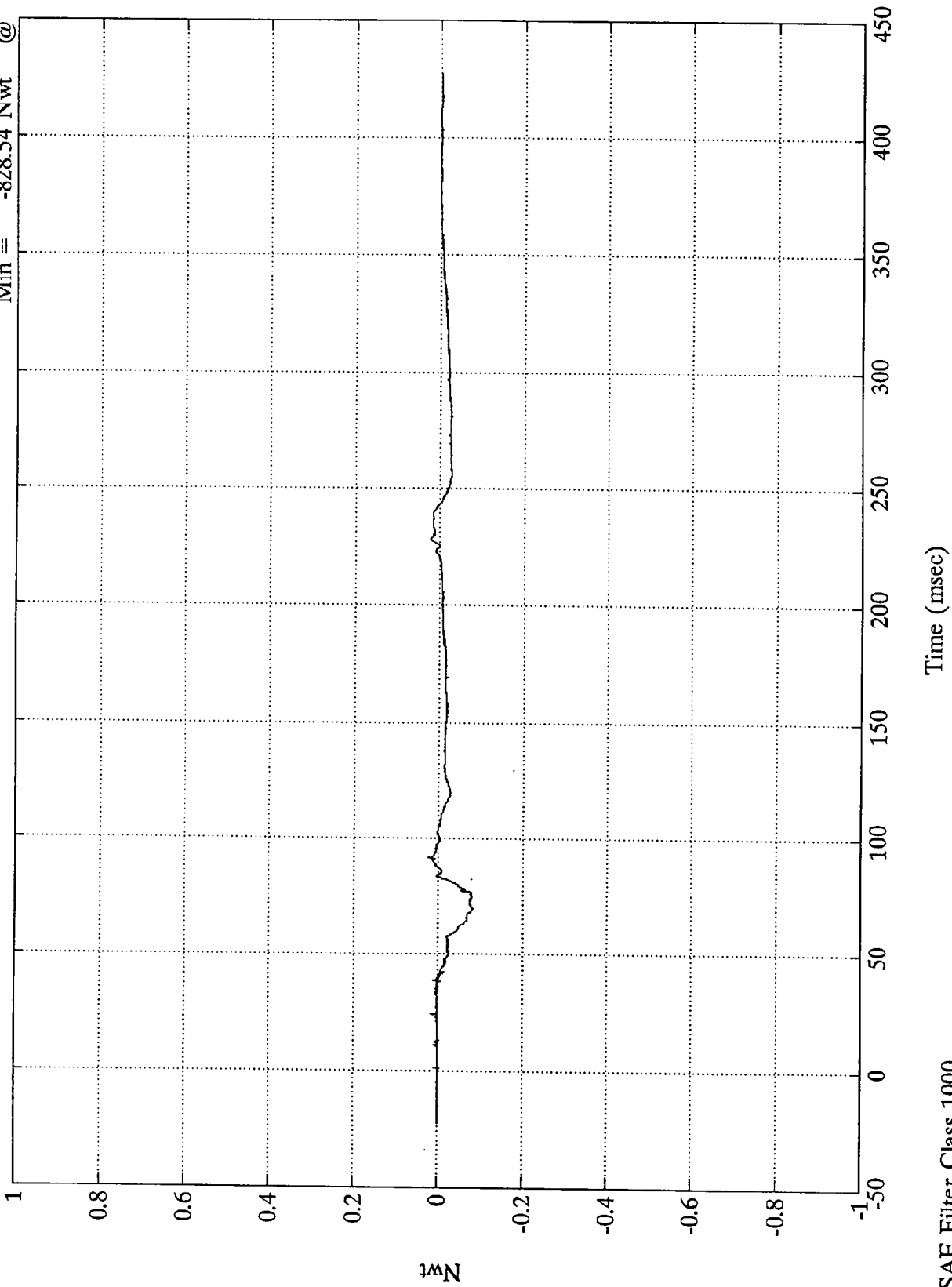
Max = 38.26 mm @ 155.76 msec  
Min = -1.21 mm @ 385.55 msec



VTV TEST #10  
x10<sup>4</sup>

V1-P2 Upper Neck Fx

Max = 219.13 Nwt @ 228.48 msec  
Min = -828.54 Nwt @ 69.36 msec

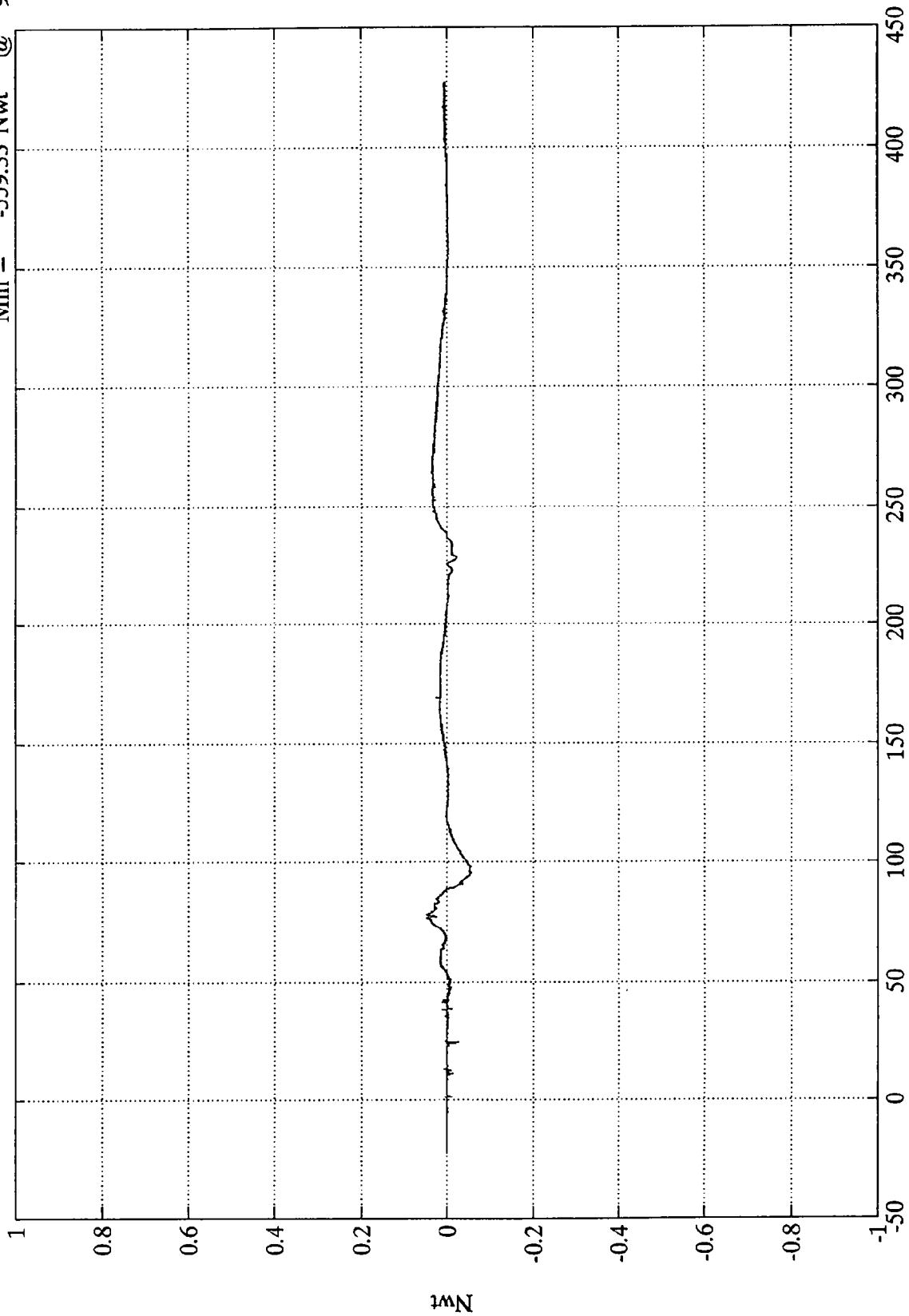


SAE Filter Class 1000

VTV TEST #10

Max = 473.83 Nwt @ 78.00 msec  
Min = -559.33 Nwt @ 95.52 msec

V1-P2 Upper Neck Fy



Time (msec)

SAE Filter Class 1000

VTV TEST #10

$\times 10^4$

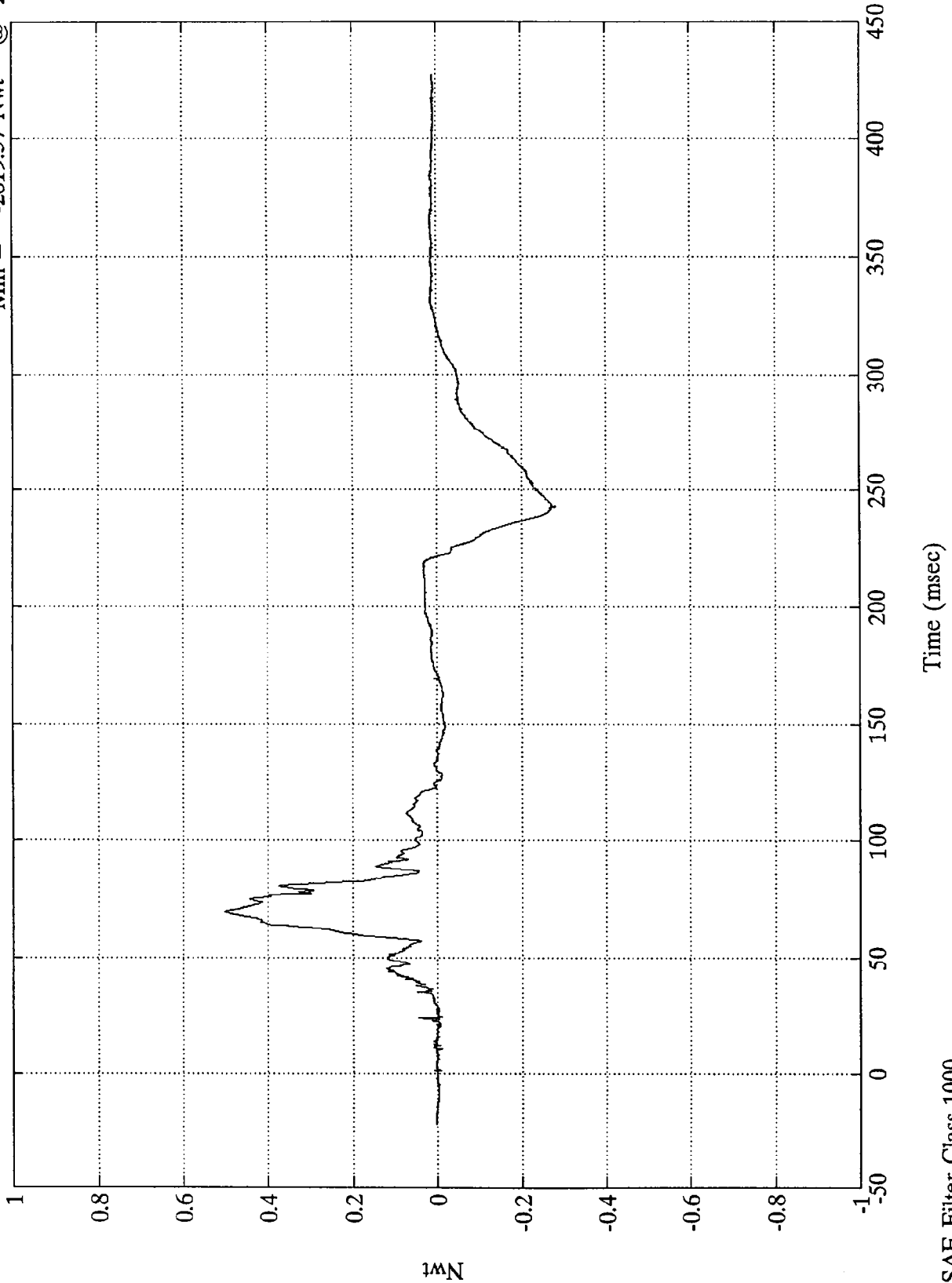
V1-P2 Upper Neck Fz

Max = 5028.04 Nwt

Min = -2819.37 Nwt

@ 69.48 msec

@ 242.52 msec

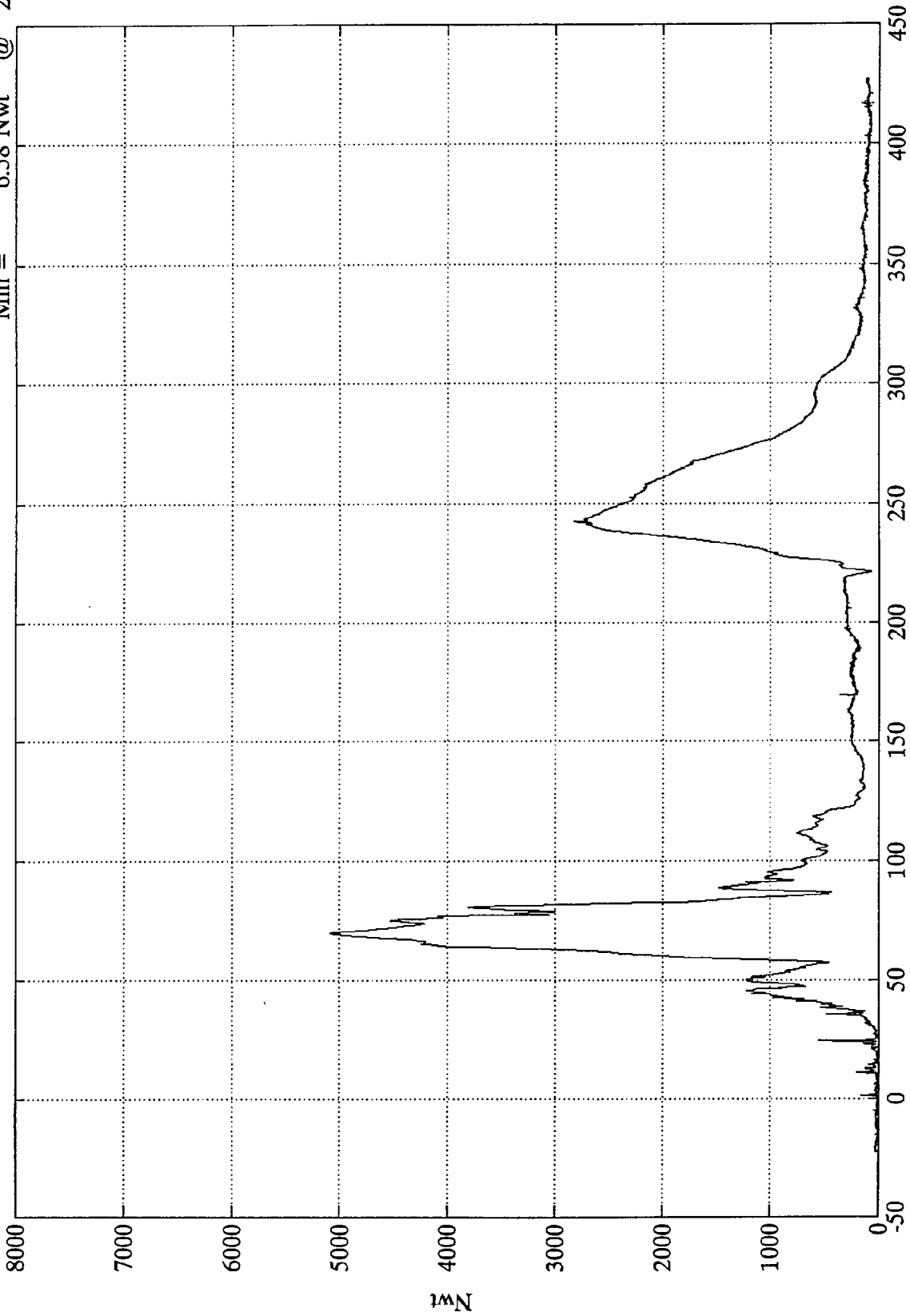


SAE Filter Class 1000

VTV TEST #10

V1-P2 Upper Neck F(res)

Max = 5094.46 Nwt @ 69.48 msec  
Min = 6.58 Nwt @ 26.39 msec



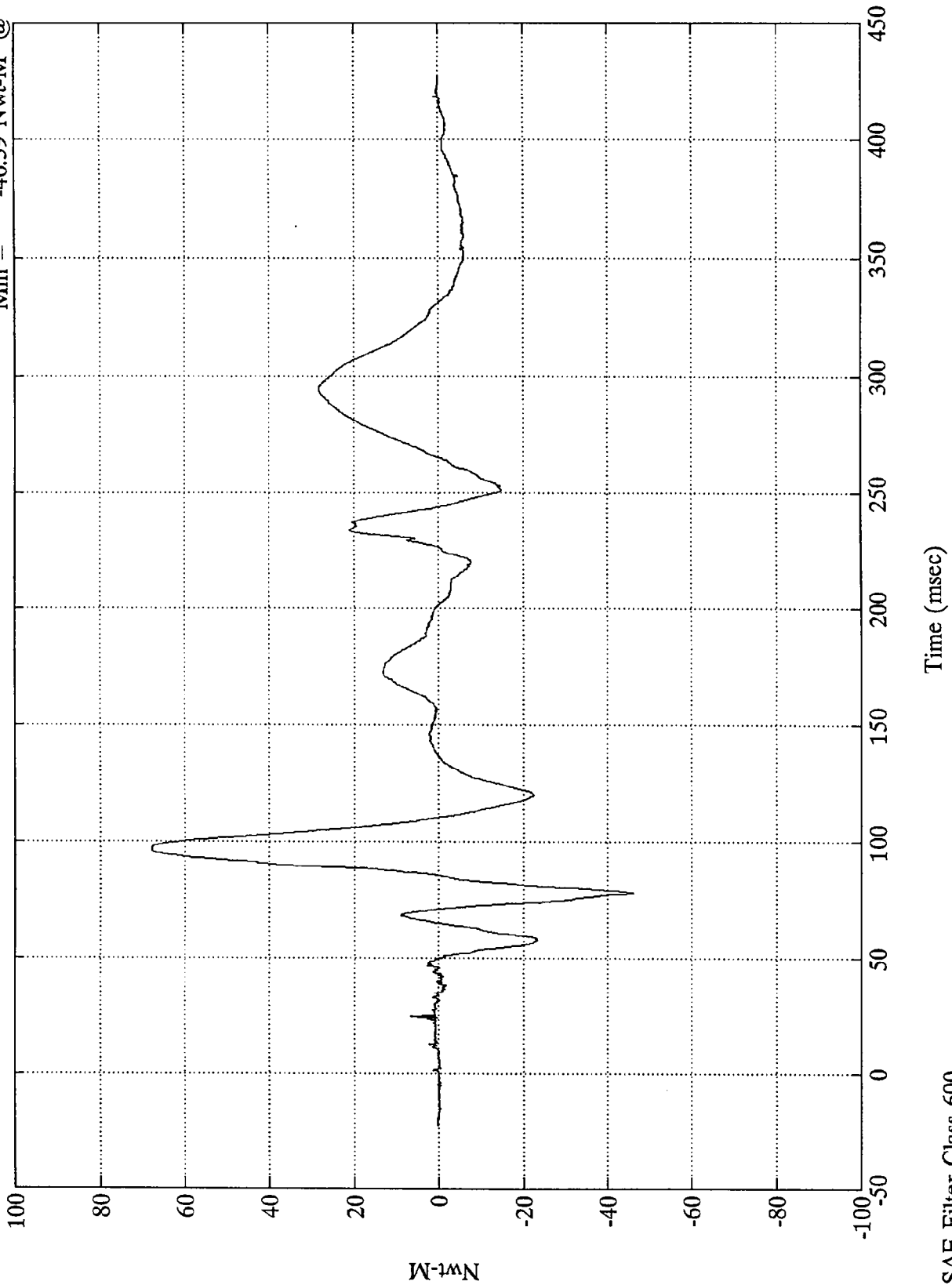
Time (msec)

SAE Filter Class 1000

VTV TEST #10

V1-P2 Upper Neck Mx

Max = 67.81 Nwt-M @ 97.32 msec  
Min = -46.39 Nwt-M @ 78.12 msec



SAE Filter Class 600

VTV TEST #10

V1-P2 Upper Neck My

Max =

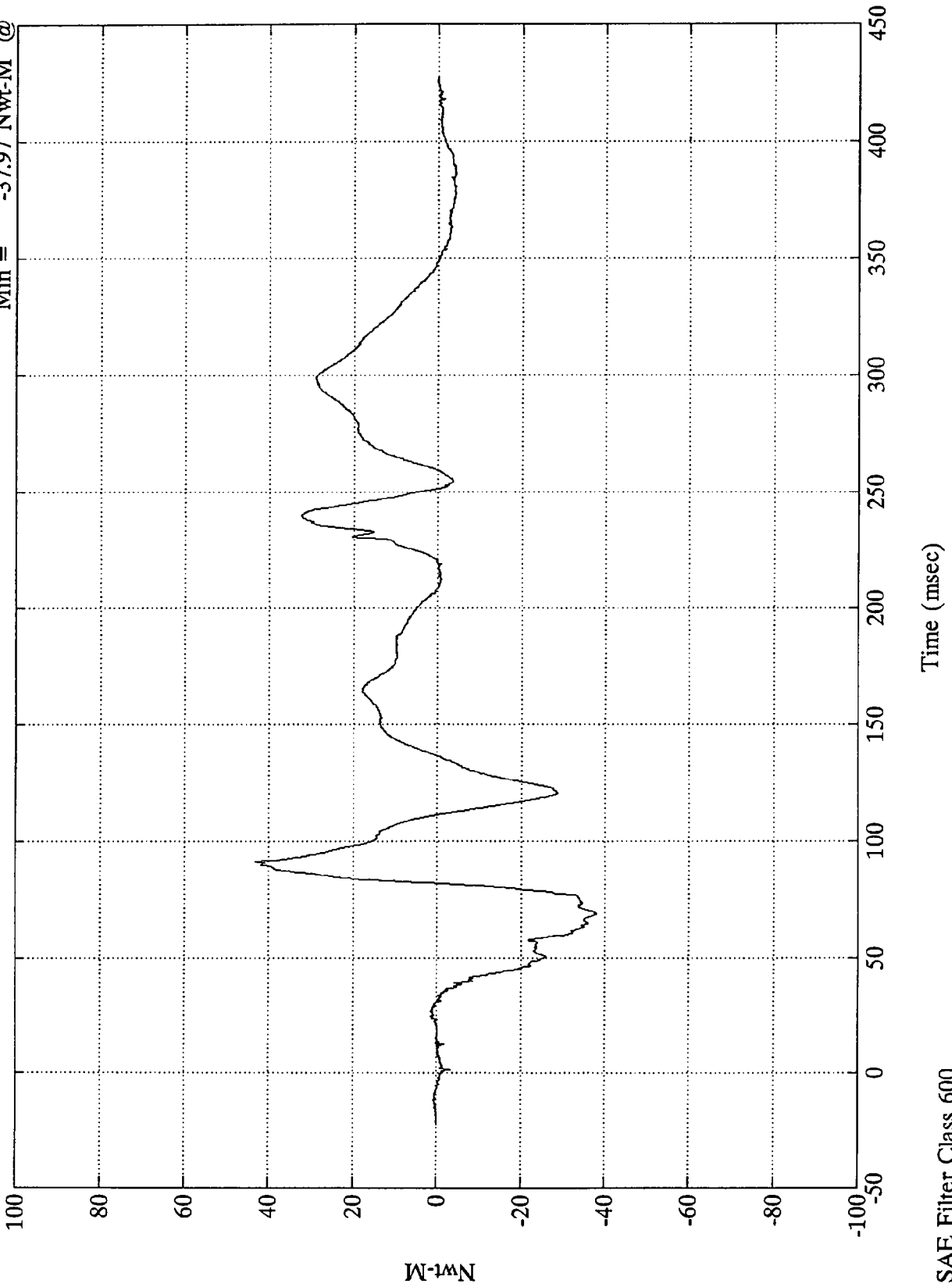
43.23 Nwt-M @

91.68 msec

Min =

-37.97 Nwt-M @

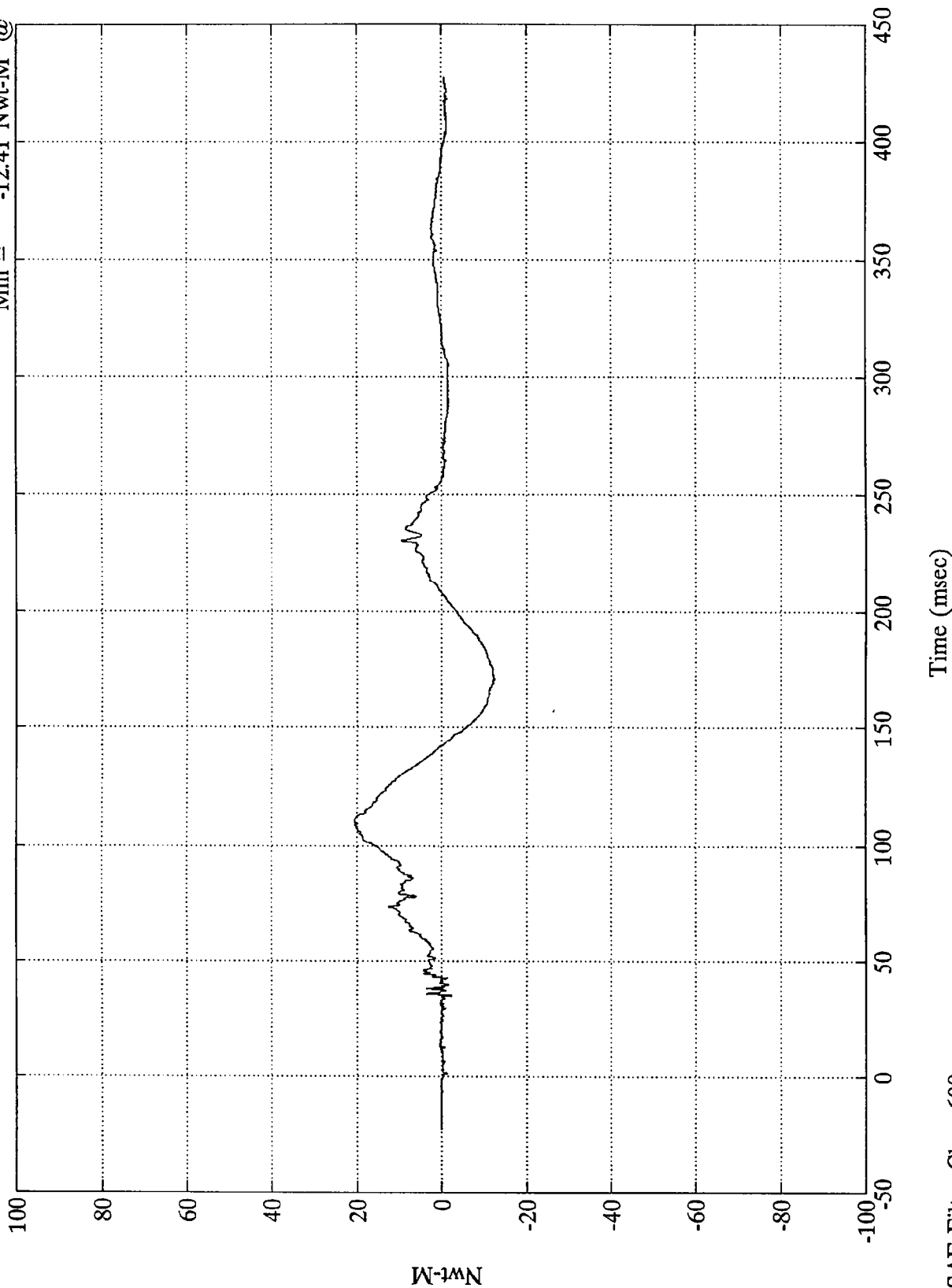
68.87 msec



VTV TEST #10

V1-P2 Upper Neck Mz

Max = 20.58 Nwt-M @ 108.84 msec  
Min = -12.41 Nwt-M @ 170.76 msec

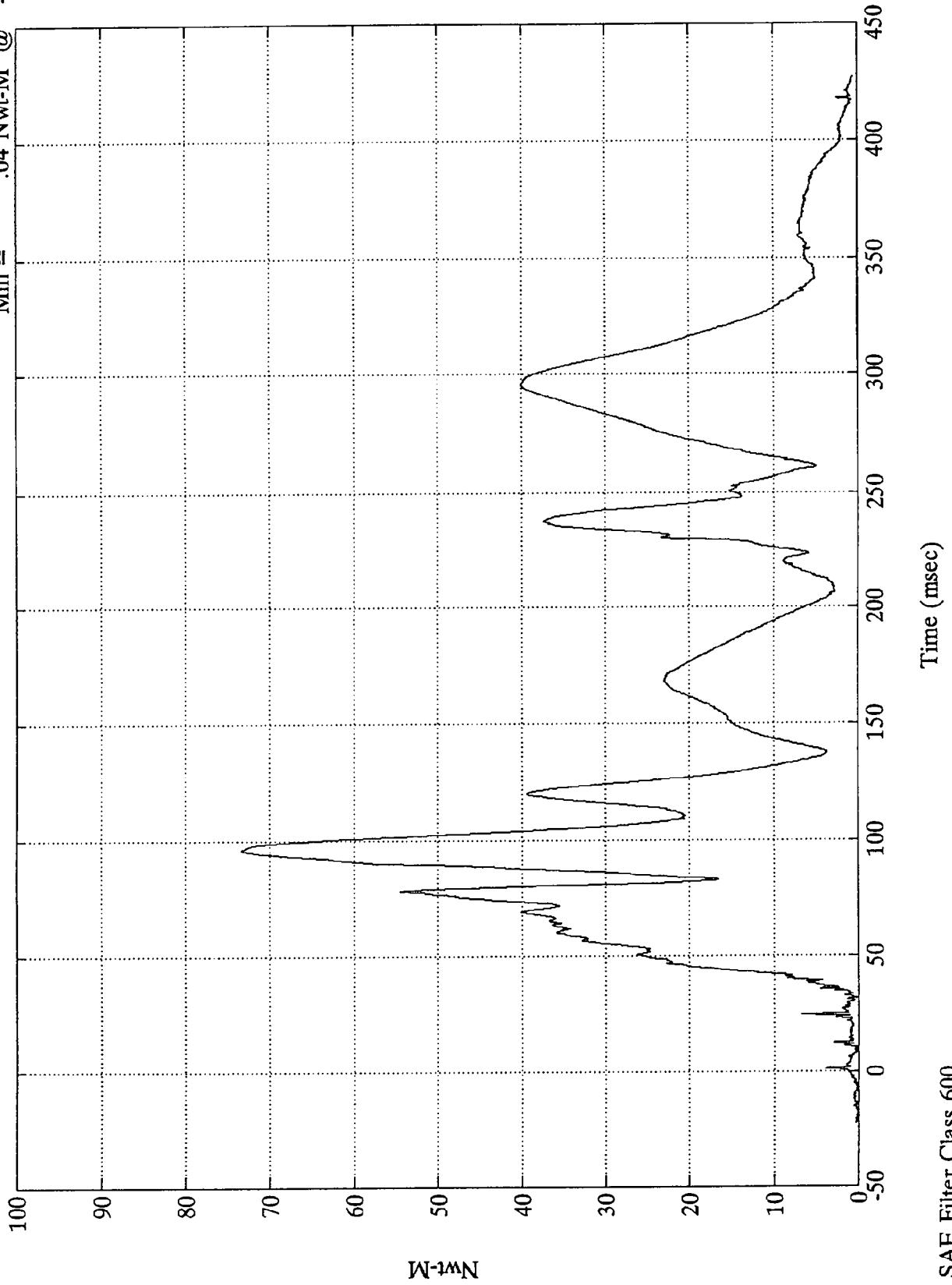


SAE Filter Class 600

VTV TEST #10

V1-P2 Upper Neck M(res)

Max = 73.36 Nwt-M @ 96.12 msec  
Min = .04 Nwt-M @ -5.88 msec

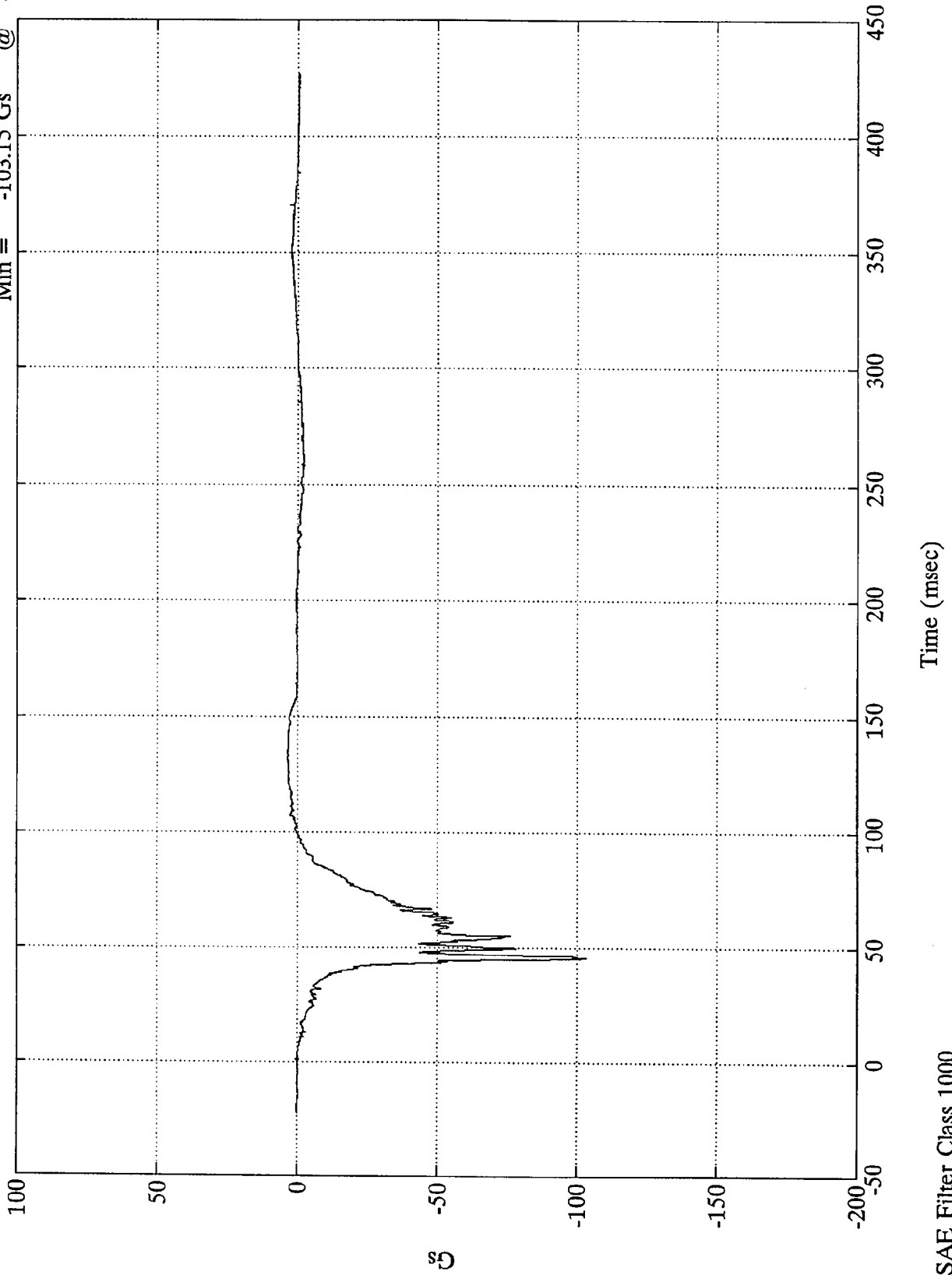


SAE Filter Class 600

VTV TEST #10

V1-P2 Pelvic X

Max = 3.75 Gs @ 135.12 msec  
Min = -103.15 Gs @ 45.48 msec

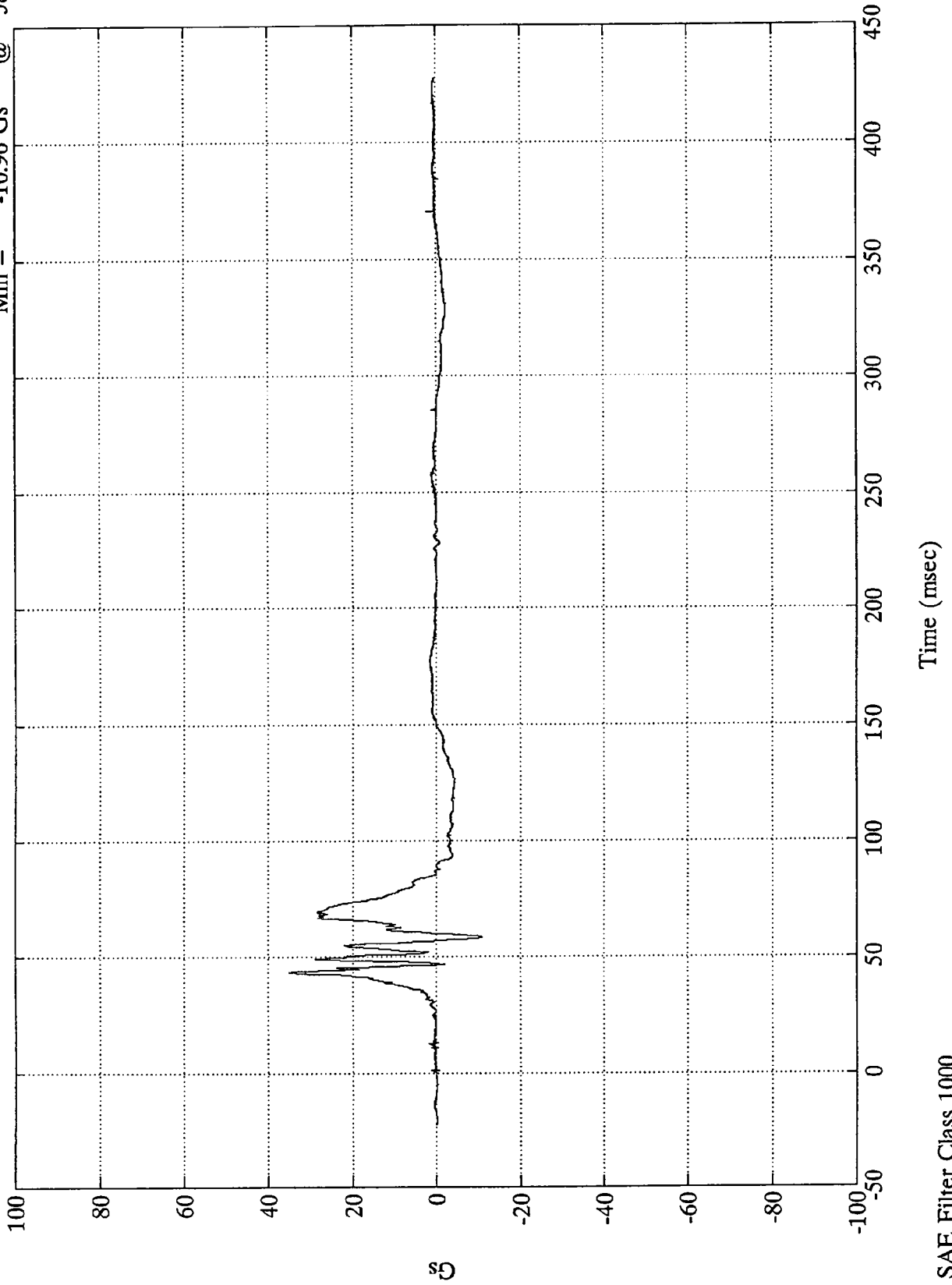


SAE Filter Class 1000

VTV TEST #10

V1-P2 Pelvic Y

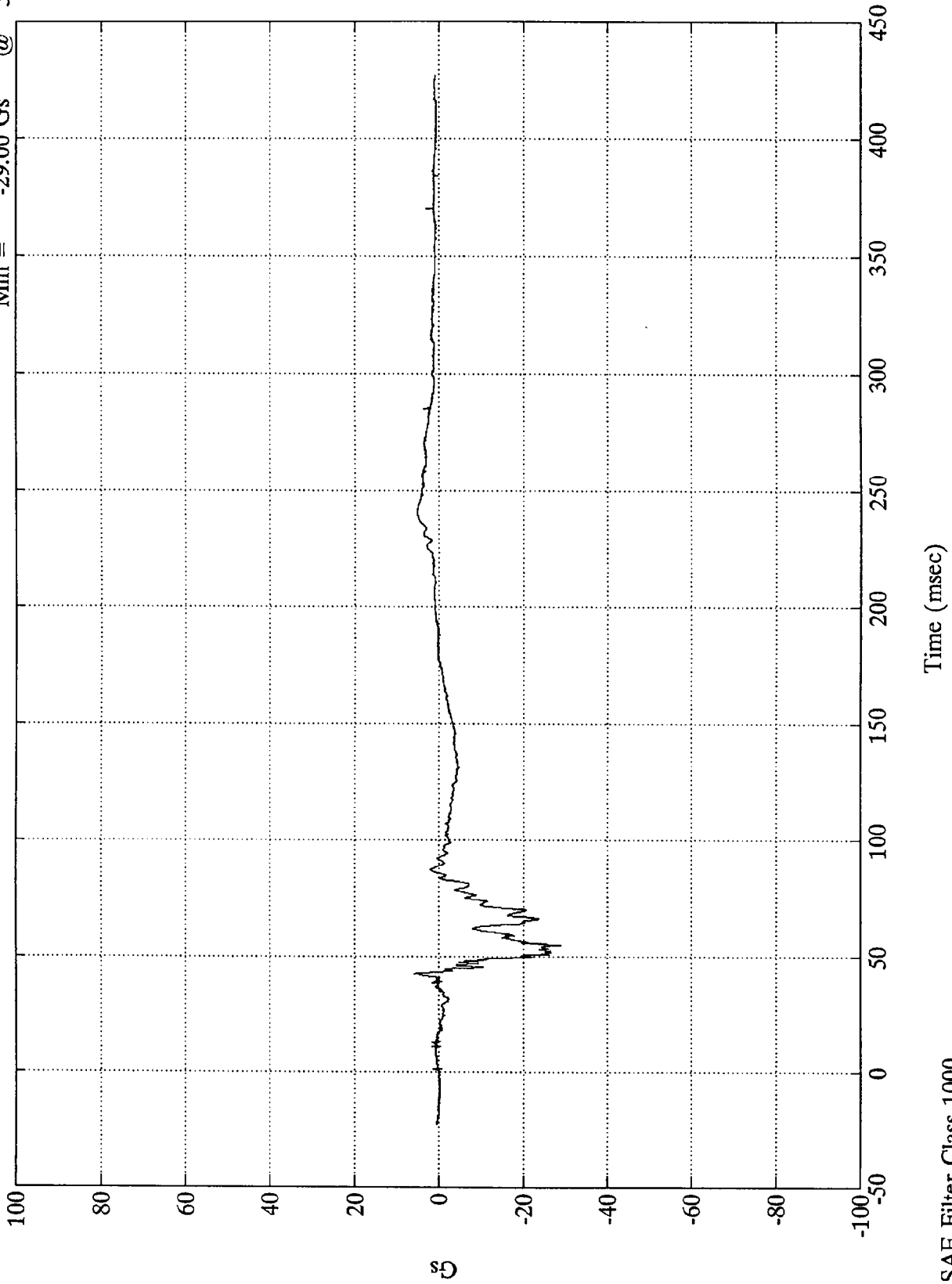
Max = 35.13 Gs @ 43.31 msec  
Min = -10.96 Gs @ 58.20 msec



VTV TEST #10

V1-P2 Pelvic Z

Max = 5.91 Gs @ 42.47 msec  
Min = -29.00 Gs @ 54.84 msec

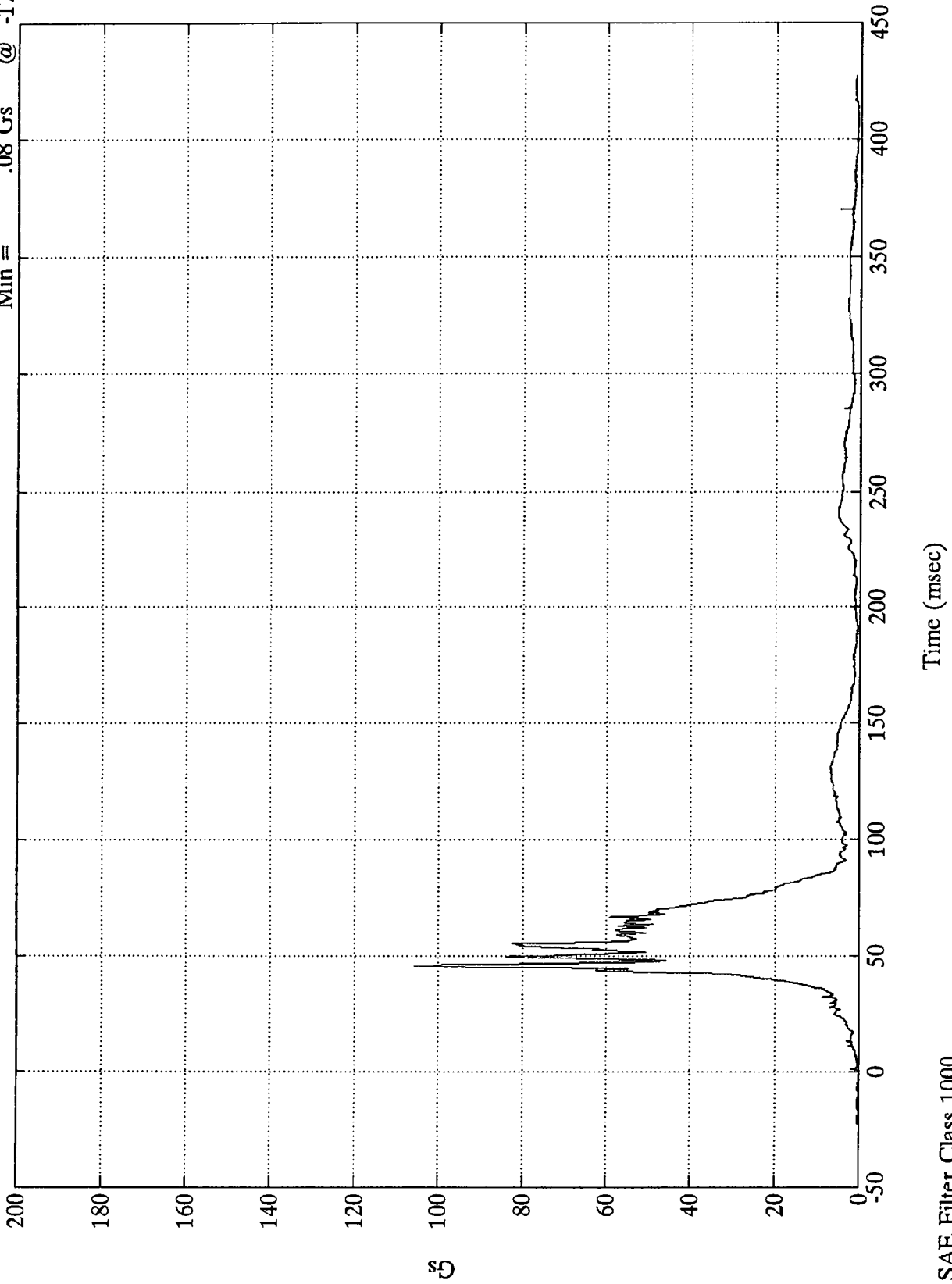


SAE Filter Class 1000

VTV TEST #10

V1-P2 Pelvic Res.

Max = 105.58 Gs @ 45.48 msec  
Min = .08 Gs @ -17.28 msec



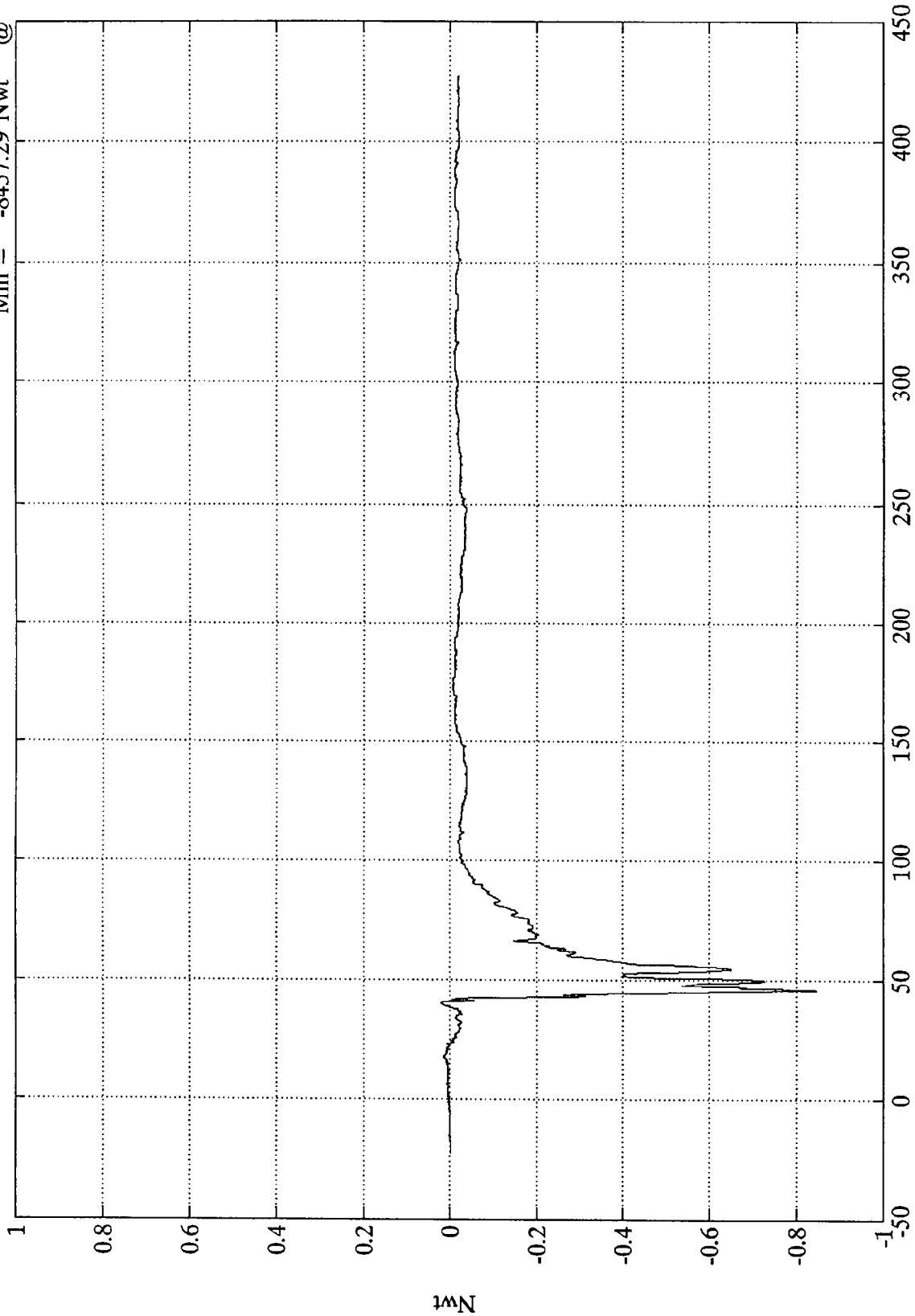
SAE Filter Class 1000

VTV TEST #10

x10<sup>4</sup>

V1-P2 Left Femur

Max = 206.68 Nwt @ 40.31 msec  
Min = -8457.29 Nwt @ 45.72 msec



Time (msec)

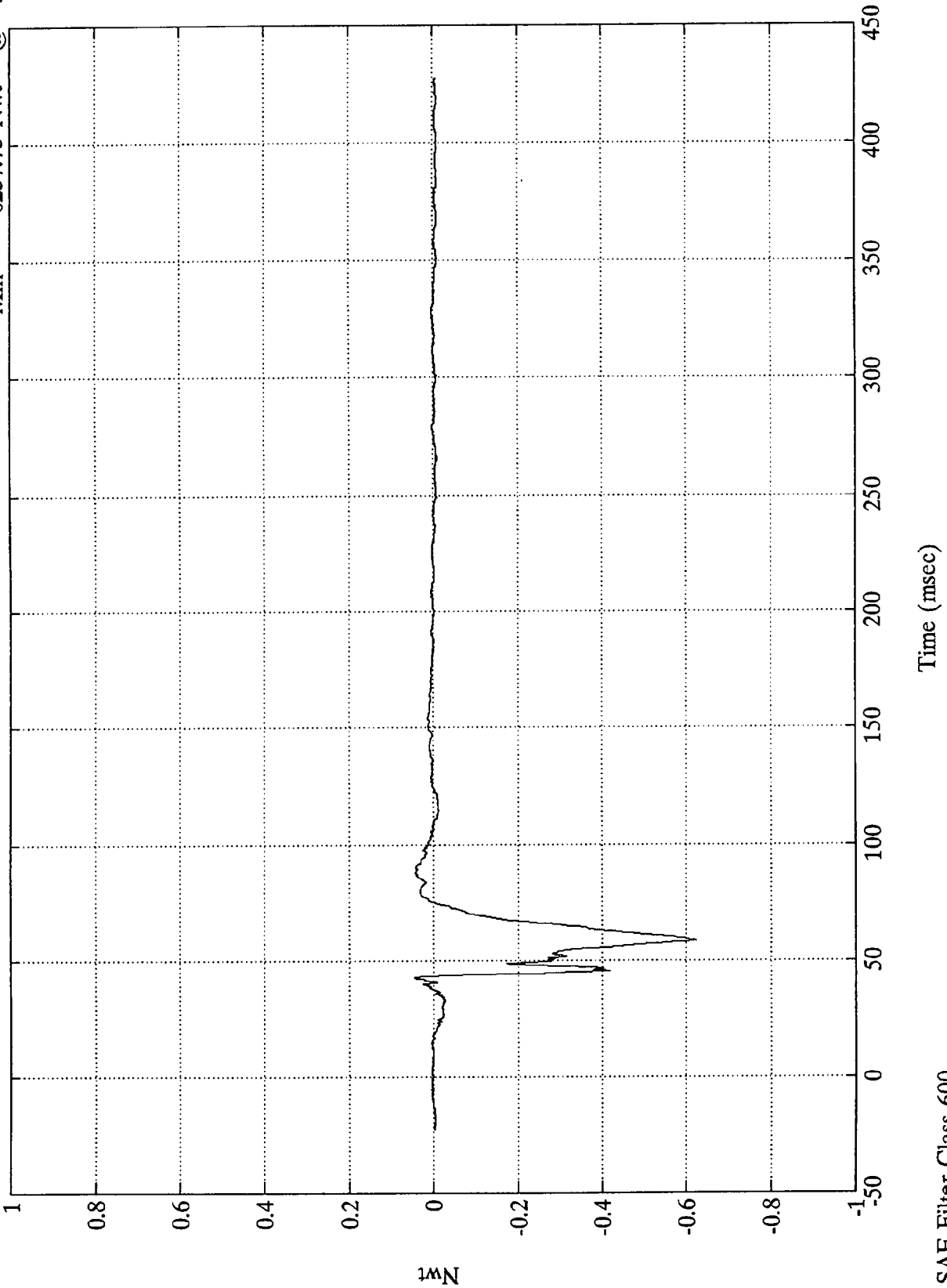
SAE Filter Class 600

VTV TEST #10

$\times 10^4$

V1-P2 Right Femur

Max = 456.06 Nwt @ 42.24 msec  
Min = -6237.73 Nwt @ 58.56 msec

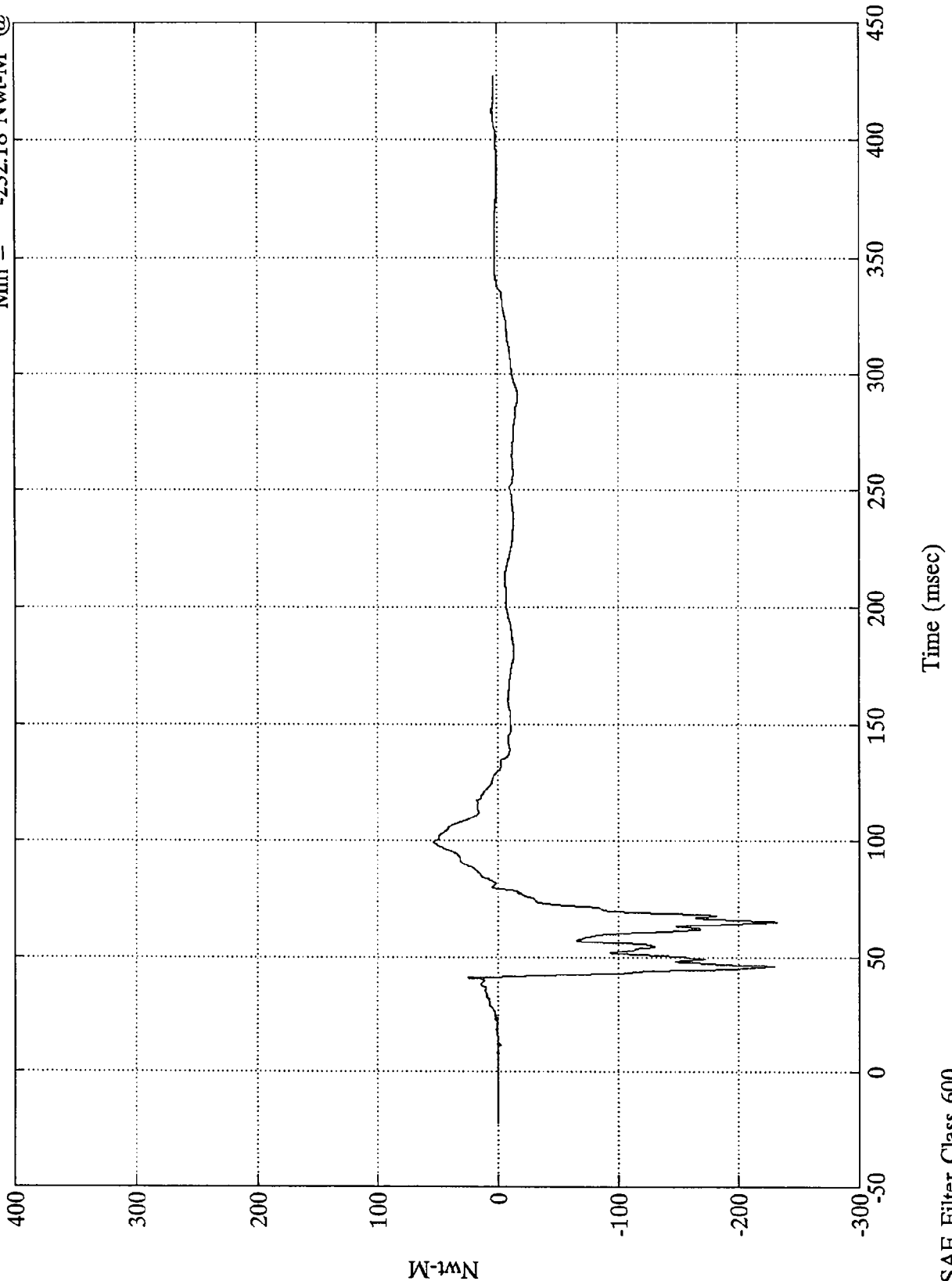


SAE Filter Class 600

VTV TEST #10

V1-P2 Lt Upper Tibia Mx

Max = 53.77 Nwt-M @ 99.24 msec  
Min = -232.18 Nwt-M @ 65.04 msec



Nwt-M

Time (msec)

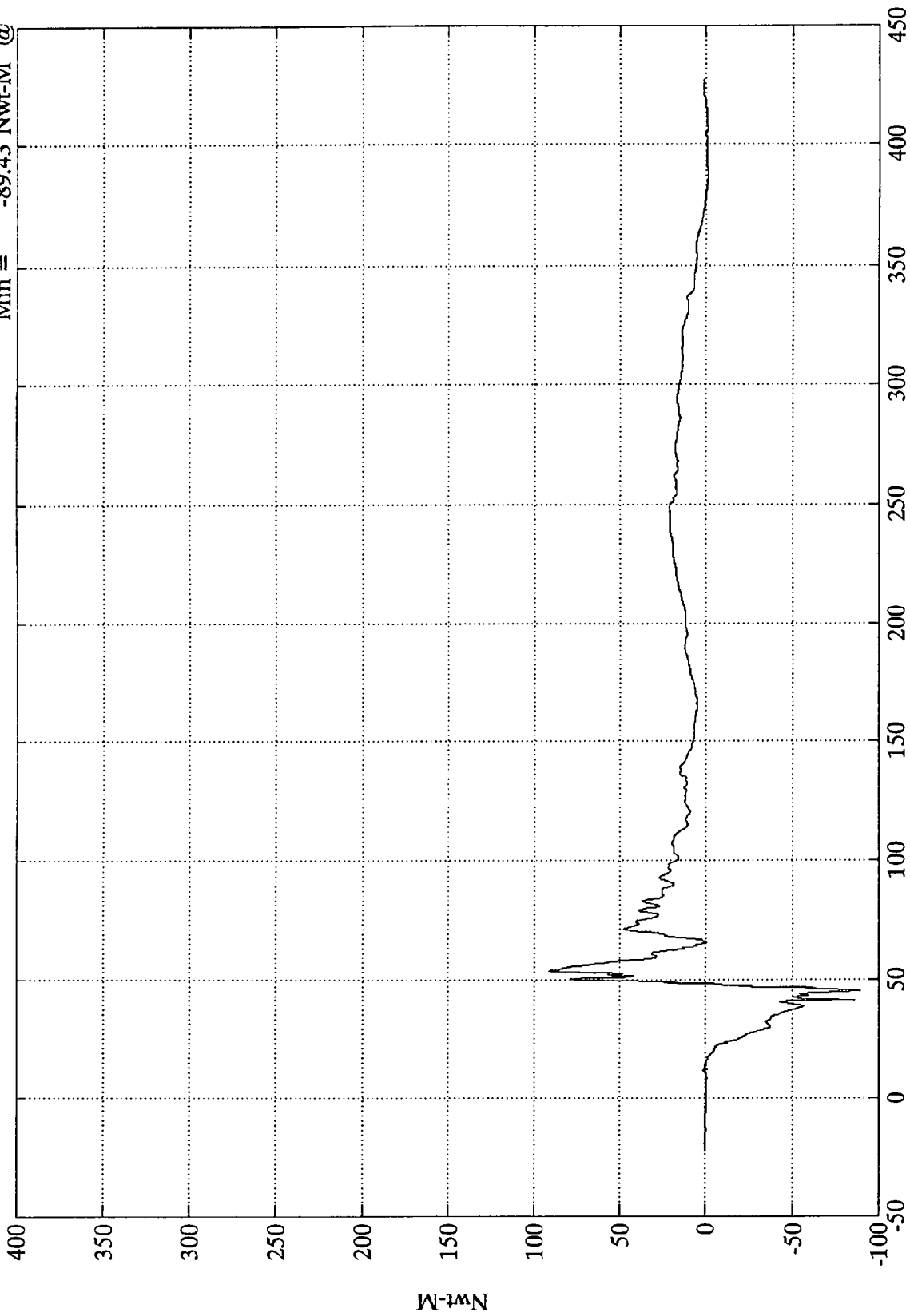
SAE Filter Class 600

VTV TEST #10

V1-P2 Lt Upper Tibia My

Max = 91.38 Nwt-M @  
Min = -89.43 Nwt-M @

53.63 msec  
45.12 msec



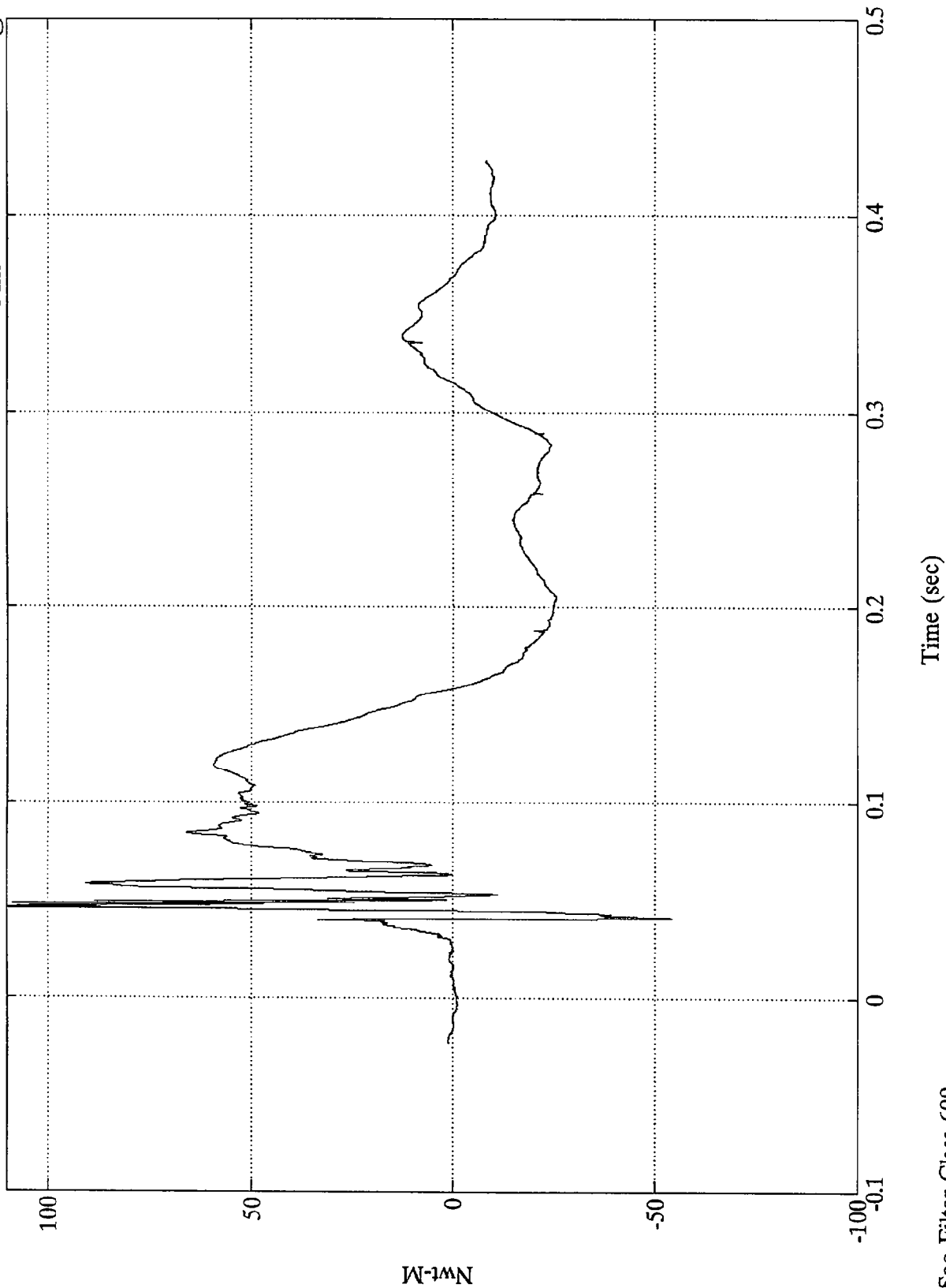
Time (msec)

SAE Filter Class 600

VTV TEST #10

V1-P2 Rt Upper Tibia Mx

Max = 109.8 Nwt-M @ 46.08 msec  
Min = -54.0 Nwt-M @ 41.04 msec

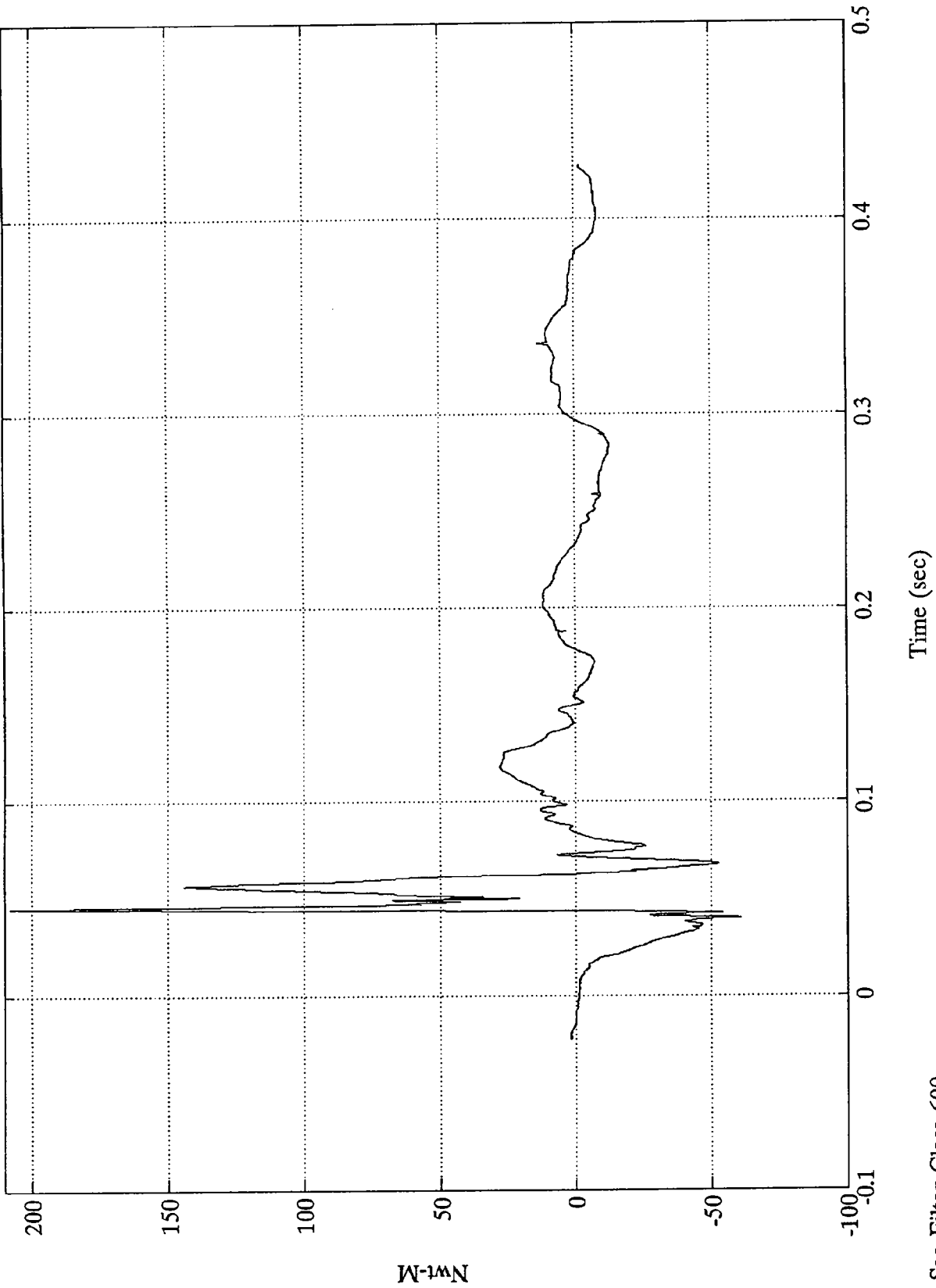


Sae Filter Class 600

VTV TEST #10

V1-P2 Rt Upper Tibia My

Max = 207.8 Nwt-M @ 45.60 msec  
Min = -60.7 Nwt-M @ 40.07 msec

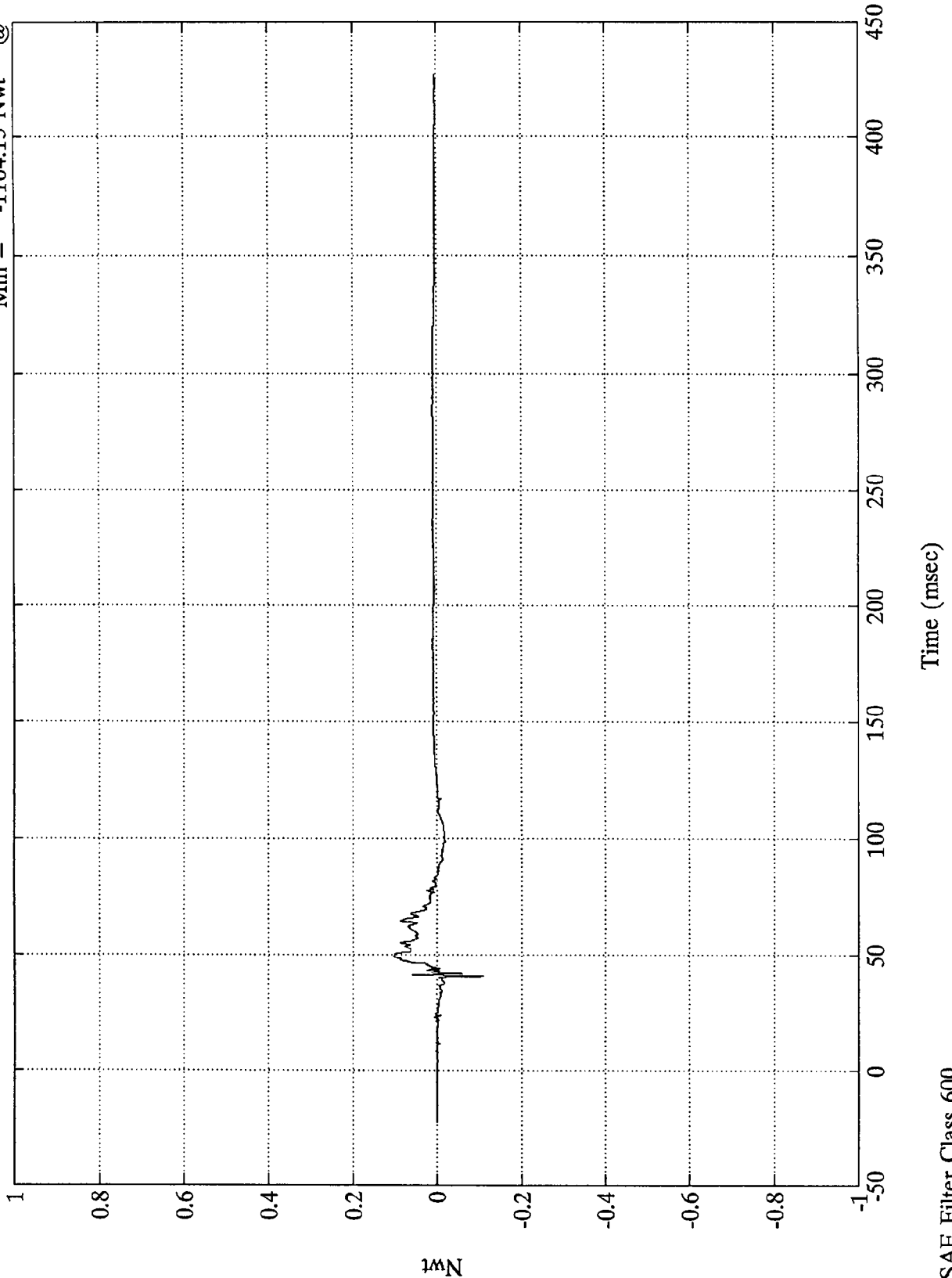


Sae Filter Class 600

VTV TEST #10  
x10<sup>4</sup>

V1-P2 Lt Lower Tibia Fy

Max = 1029.26 Nwt @ 49.31 msec  
Min = -1104.15 Nwt @ 40.56 msec



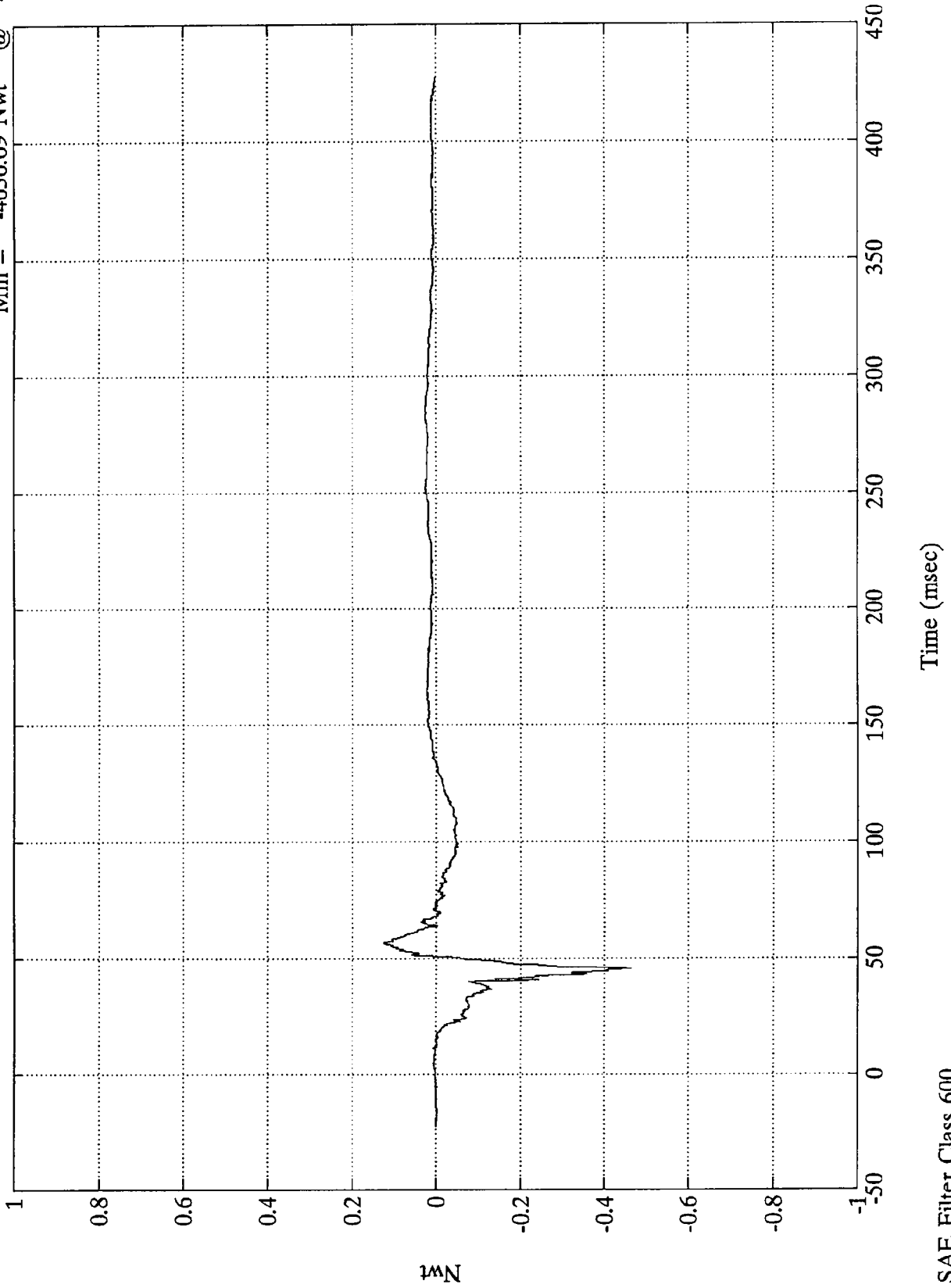
SAE Filter Class 600

VTV TEST #10

$\times 10^4$

V1-P2 Lt Lower Tibia Fz

Max = 1250.21 Nwt @ 56.64 msec  
Min = -4636.69 Nwt @ 45.60 msec



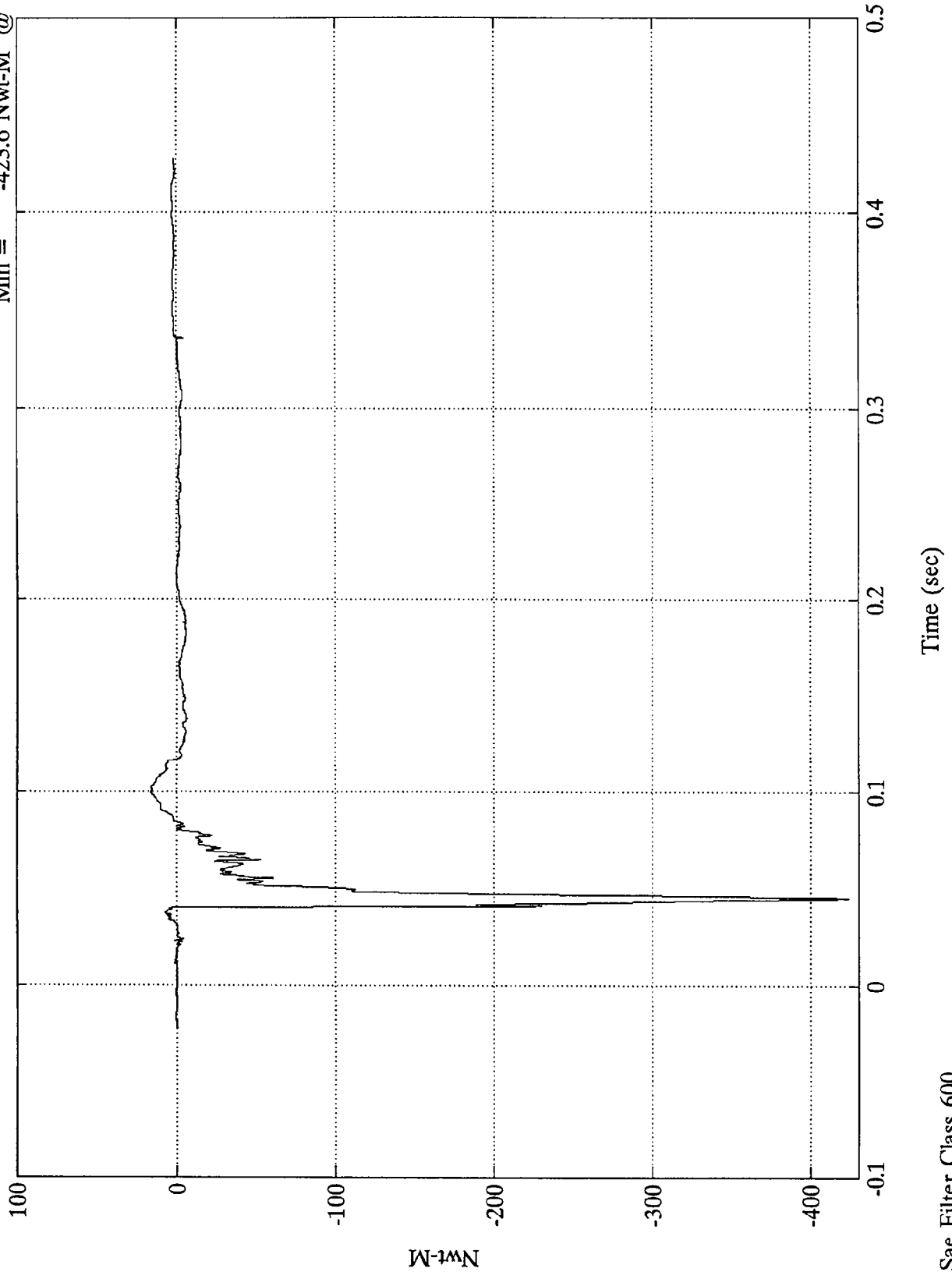
Time (msec)

SAE Filter Class 600

VTV TEST #10

Max = 16.2 Nwt-M @ 99.72 msec  
Min = -423.6 Nwt-M @ 45.36 msec

V1-P2 Lt Lower Tibia Mx

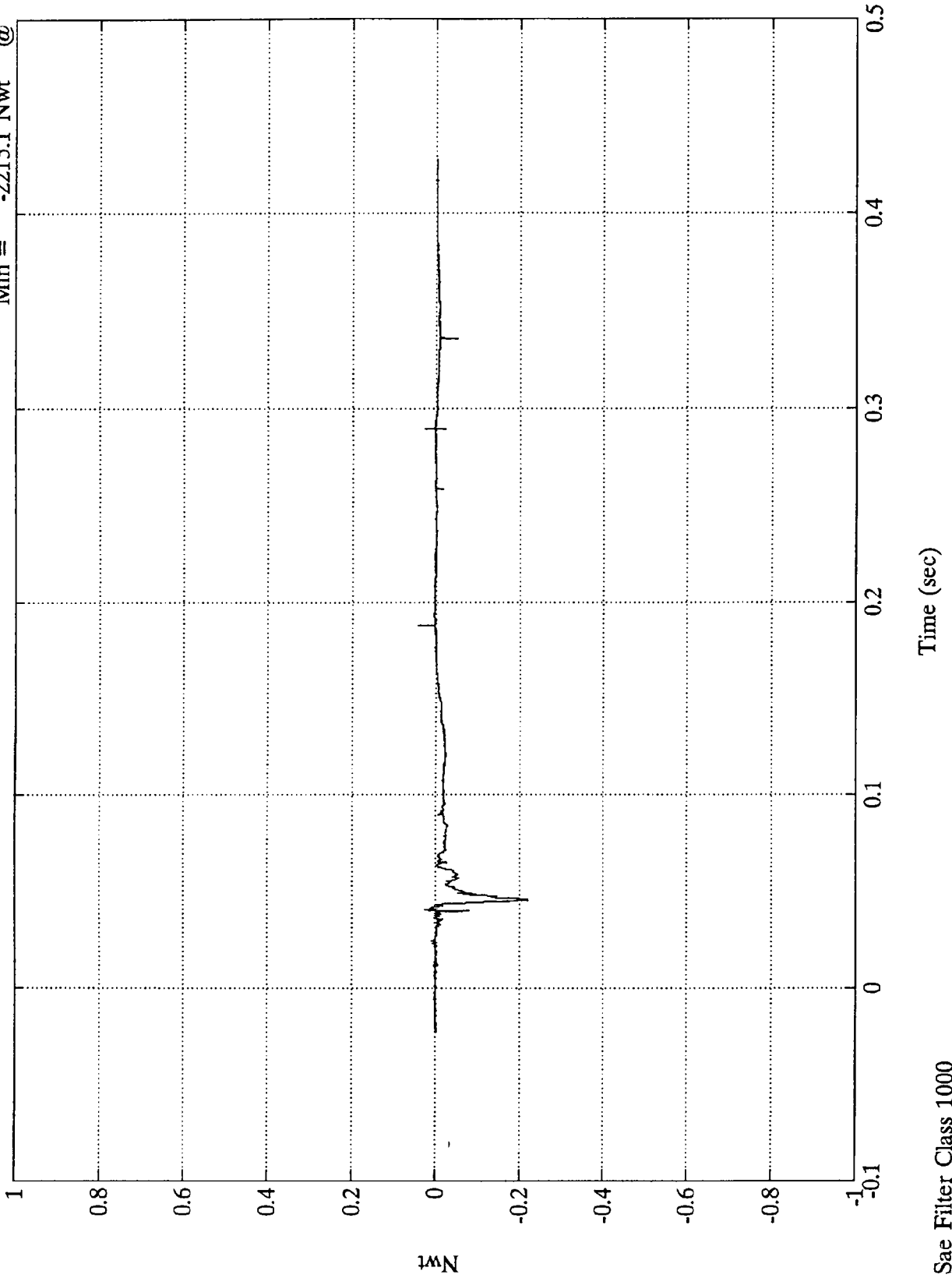


Sae Filter Class 600

VTV TEST#10

V1-P2 Rt Lower Tibia Fy

Max = 424.0 Nwt @ 188.04 msec  
Min = -2215.1 Nwt @ 45.60 msec

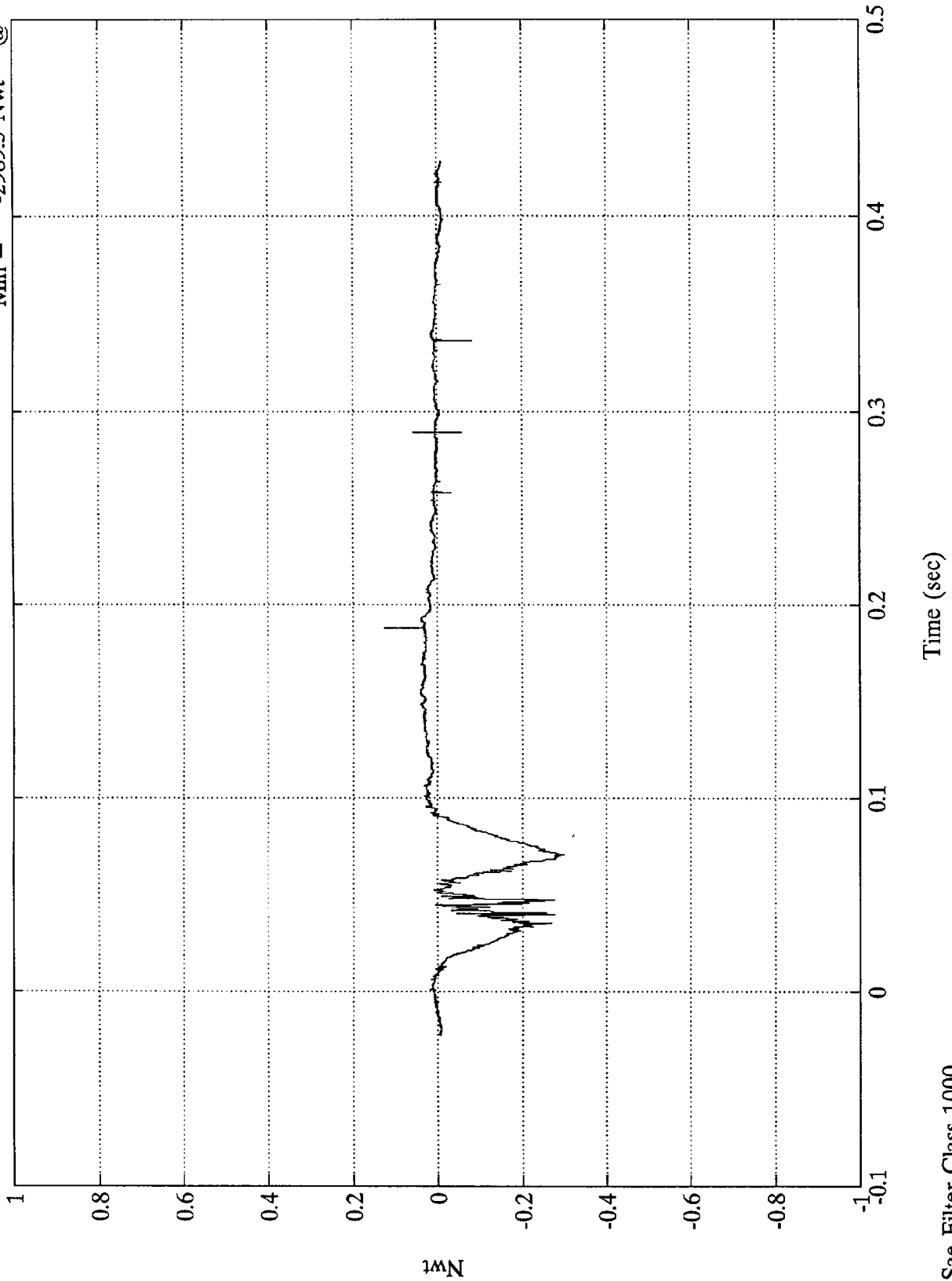


Sae Filter Class 1000

VTV TEST#10

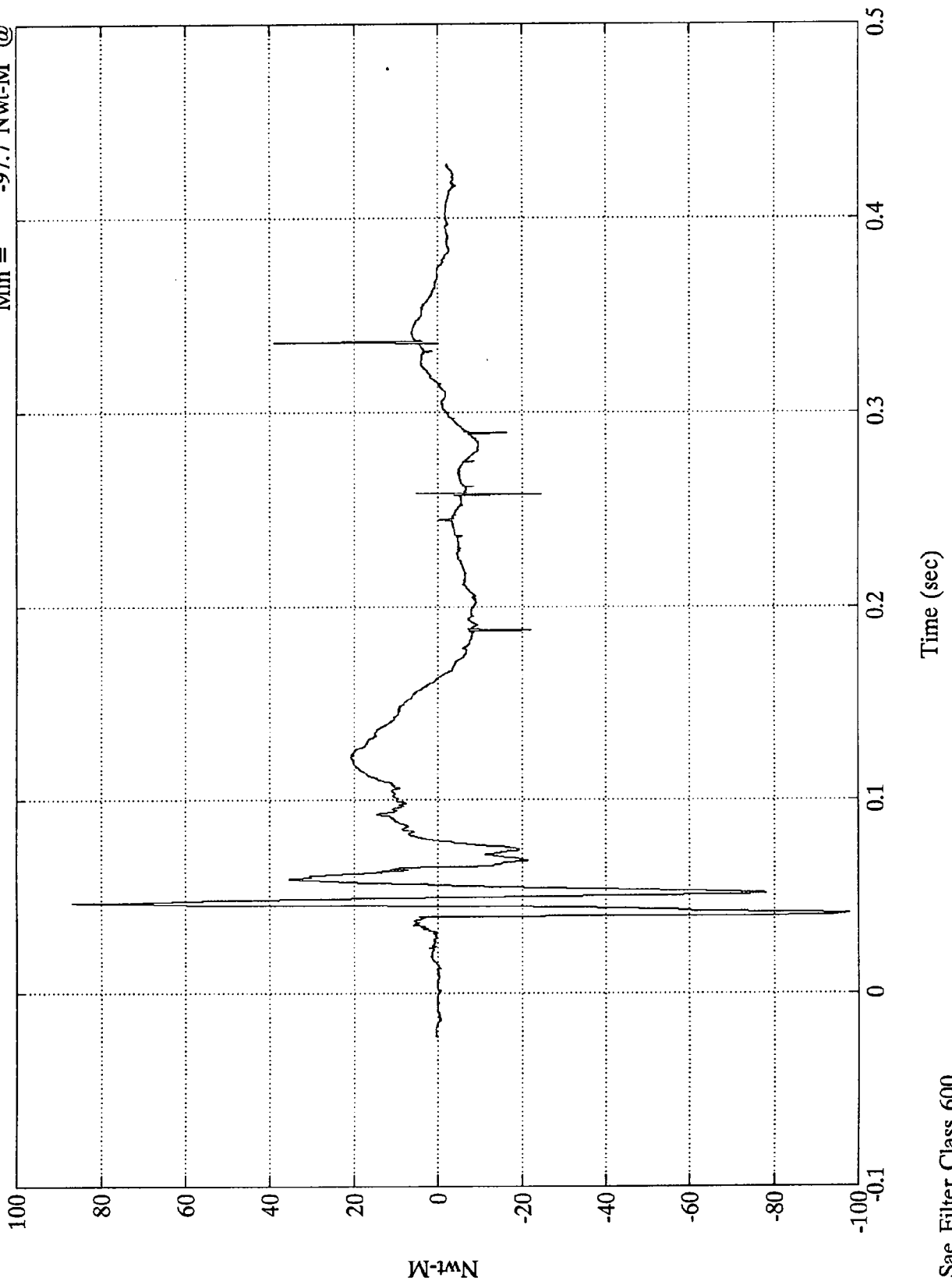
V1-P2 Rt Lower Tibia Fz

Max = 1265.5 Nwt @ 188.04 msec  
Min = -2989.5 Nwt @ 70.92 msec



Sae Filter Class 1000

VTV TEST #10  
V1-P2 Rt Lower Tibia Mx  
Max = 86.8 Nwt-M @ 46.56 msec  
Min = -97.7 Nwt-M @ 41.28 msec



**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.

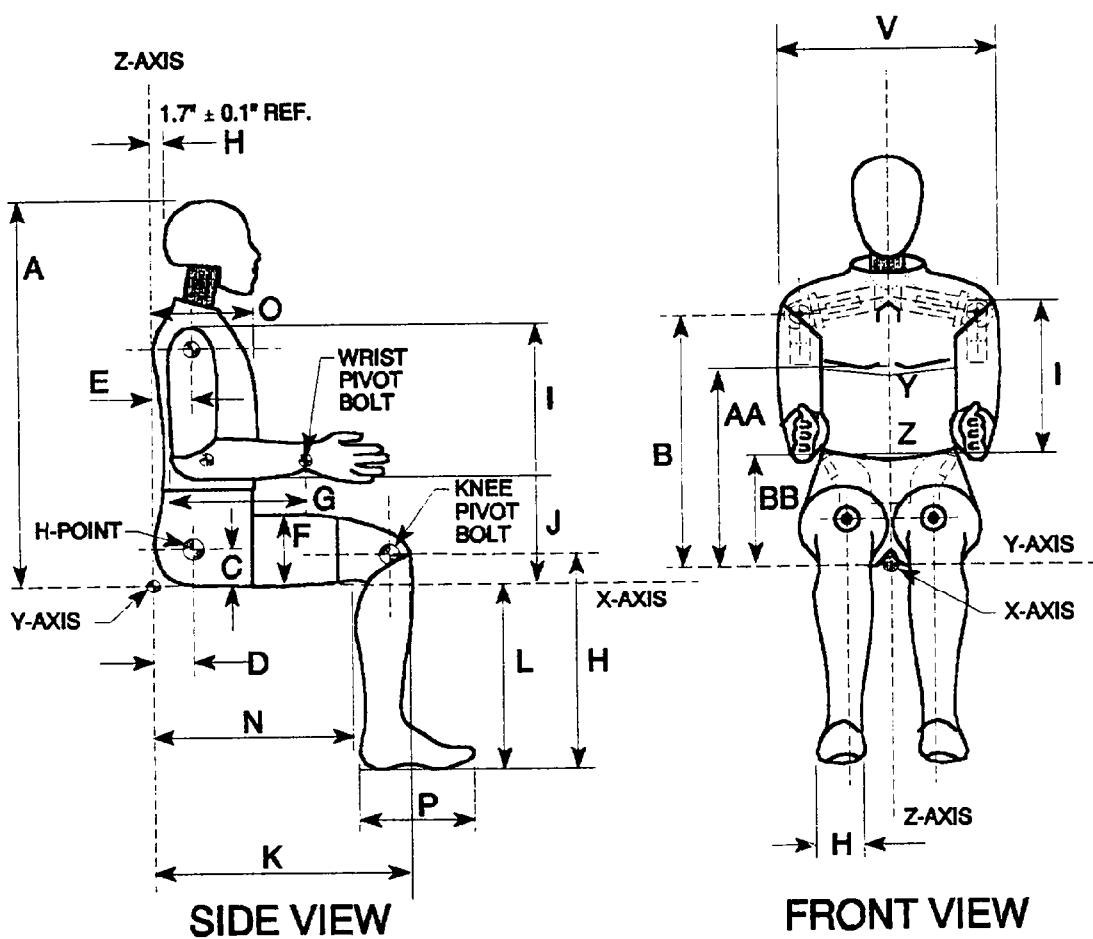
The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation, Advanced Technology Center. A summary of the test results, and Part 572 specifications are included in the Appendix.

Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
150	3-22-94
245	9-10-94

FIGURE 9

EXTERNAL DIMENSIONS SETUP SPECIFICATIONS



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

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 MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 3/3/94

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 150 HEAD DROP CAL

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
 TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 3/22/94

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN:150 CAL NECK FLEXION

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
 TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 3/22/94

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN:150 CAL NECK FLEXION

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
THORAX IMPACT TEST  
HYBRID III

DATE : 3/1/94

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 150 H.S. THORAX CAL

TEST PARAMETER	HIGH SPEED TEST	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

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

B. CALIBRATION LABORATORY INSTRUMENTS

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

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: 9/10/94

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

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 8/30/94

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 245 HEAD DROP CAL

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT

NECK EXTENSION TEST

HYBRID III

DATE : 9/2/94

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN:245 CAL NECK EXTENSION

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
 TRANSPORTATION RESEARCH DEPARTMENT  
NECK FLEXION TEST  
 HYBRID III

DATE : 8/31/94

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN:245 CAL NECK FLEXION

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT  
THORAX IMPACT TEST  
HYBRID III

DATE : 8/29/94

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN 245 H.S. THORAX CAL

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9/9/94

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 245 KNEE 11LB. CAL

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION  
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9/9/94

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 1

HY3 SN: 245 KNEE 11LB. CAL

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

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 045

A. DUMMY INSTRUMENTS

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

B. CALIBRATION LABORATORY INSTRUMENTS

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