

1678

CALSPAN REPORT NUMBER: 7942-5

VEHICLE-TO-VEHICLE FRONTAL 60% OVERLAP
36 MPH IMPACT OF A 1991 DODGE DYNASTY
4-DOOR SEDAN AND A
1991 HONDA ACCORD DX 4-DOOR SEDAN

CALSPAN TEST NUMBER: Y43-5-1148

January 8, 1992

CALSPAN CORPORATION
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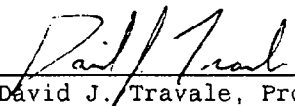
FINAL REPORT

PREPARED FOR:

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

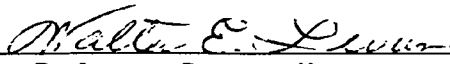
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16. Abstract A vehicle-to-vehicle frontal 36 mph test containing a 60% overlapped 1991 Dodge Dynasty 4-Door Sedan into a 60% overlapped 1991 Honda Accord DX 4-Door Sedan was performed at the Calspan Corporation Advanced Technology Center Crash Test Facility in Buffalo, NY on January 8, 1992. Actual impact speed was 35.2 mph for each vehicle and the ambient temperature at the time of impact was 40°F. Vehicle number one, a 1991 Dodge Dynasty 4-Door Sedan, contained one Hybrid III dummy in the driver seating position. The dummy was restrained using the vehicle's 3-point seat belt restraint system along with a driver side airbag. The driver's HIC was 321 and 3 millisecond clipped chest g's were 55.5. The left femur load was 1136 lbs. and the right femur load was 868 lbs. Vehicle number two, a 1991 Honda Accord DX 4-Door Sedan, contained one Hybrid III dummy in the driver seating position. The dummy was restrained using the vehicle's manual lap and automatic torso belts. The driver's HIC was 848. The 3 millisecond clipped chest g's were 58.2 with femur loads of 1371 and 1061 lbs. on the left and right femur, respectively.					
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Section 1
PURPOSE AND TEST PROCEDURE

This 36 mph offset 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. DTRS57-90-C-00104. The purpose of this Technical Task Directive (TTD 2) is to obtain responses from vehicles and restrained Hybrid III dummies during car-to-car overlapped frontal crashes.

This test was performed using a 1991 Dodge Dynasty 4-door sedan and a 1991 Honda Accord 4-door sedan. The vehicles, each traveling at 36 mph were positioned at a 60% overlap of the vehicle 1 width as measured at its widest point. The vehicles were aligned such that the left front (i.e., driver side) would experience full contact with the oncoming vehicle.

Vehicle number one contained one Hybrid III dummy in the driver seating position. The dummy was restrained using the vehicle's driver airbag and 3-point seat belt restraint system.

Vehicle number two contained one Hybrid III dummy in the driver seating position. The dummy was restrained using the vehicle's automatic torso belt and manual lap belt restraint system.

Section 2

SUMMARY OF TEST Y43-5-1148

A 1991 Dodge Dynasty 4-Door Sedan and a 1991 Honda Accord DX 4-Door Sedan were impacted into each other with each vehicle traveling 35.2 mph. The 1991 Dodge Dynasty 4-Door Sedan was offset such that 60% of its maximum width was engaged to the 1991 Honda Accord. Figure 1 of this report contains a sketch of the test layout. The test was performed at the Calspan Corporation Advanced Technology Center on January 8, 1992. Pre- and post-test photographs of both vehicles and dummies can be found in Appendix A of this report.

The vehicle-to-vehicle test was documented by one real-time camera and 15 high-speed cameras. Film analysis indicated the vehicles struck 0.5 inches from the target point in such a way as to create slightly more overlap. Camera locations and other pertinent camera information can be found in Table 7 and Figure 12 of this report.

Vehicle 1, the 1991 Dodge Dynasty 4-Door Sedan, contained one Hybrid III 50th percentile male anthropomorphic test device (ATD) in the driver seating position. Vehicle 2 (1991 Honda Accord DX) contained one Hybrid III 50th percentile male ATD in the driver seating position. The ATDs were restrained using the vehicle's own restraint systems after being placed in the vehicle following the dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were instrumented with head and chest triaxial accelerometers, chest potentiometer, left/right femur load cells, neck transducers, and upper and lower tibia transducers.

The 77 channels of data were recorded on seven 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces. Test anomalies can be found on page 2-2.

The driver's head in Vehicle 1 had a HIC value of 321. The maximum chest deceleration over 3 milliseconds was 55.5 g's with 1.2 inches deflection. The femur loads were 1136 lbs. on the left and 868 lbs. on the right. The vehicle 1 torso belt load was 1460 lbs.

In Vehicle 2, the driver's HIC was 848. The maximum chest deceleration over 3 milliseconds was 58.2 g's with 1.9 inches of deflection. The left femur load was 1371 lbs. and 1061 lbs. on the right femur load. The Vehicle 2 torso belt was 1928 lbs.

TEST ANOMALIES

Vehicle 1 Driver right upper tibia My contained questionable data after approximately 48 msec.

Vehicle engine top (Z) data cable was cut at approximately 55 msec. Velocity and displacement data traces were removed from this report.

Vehicle left caliper (X) data cable became damaged at approximately 37 msec. Velocity and displacement data traces were removed from this report

Vehicle 2 Driver upper neck Fy contained intermittent data.

Vehicle left caliper (X) data cable became damaged at approximately 54 msec. Velocity and displacement data traces were removed from this report.

Section 3

VEHICLE AND OCCUPANT INFORMATION

Figure 1

VEHICLE-TO-VEHICLE OVERLAP LAYOUT

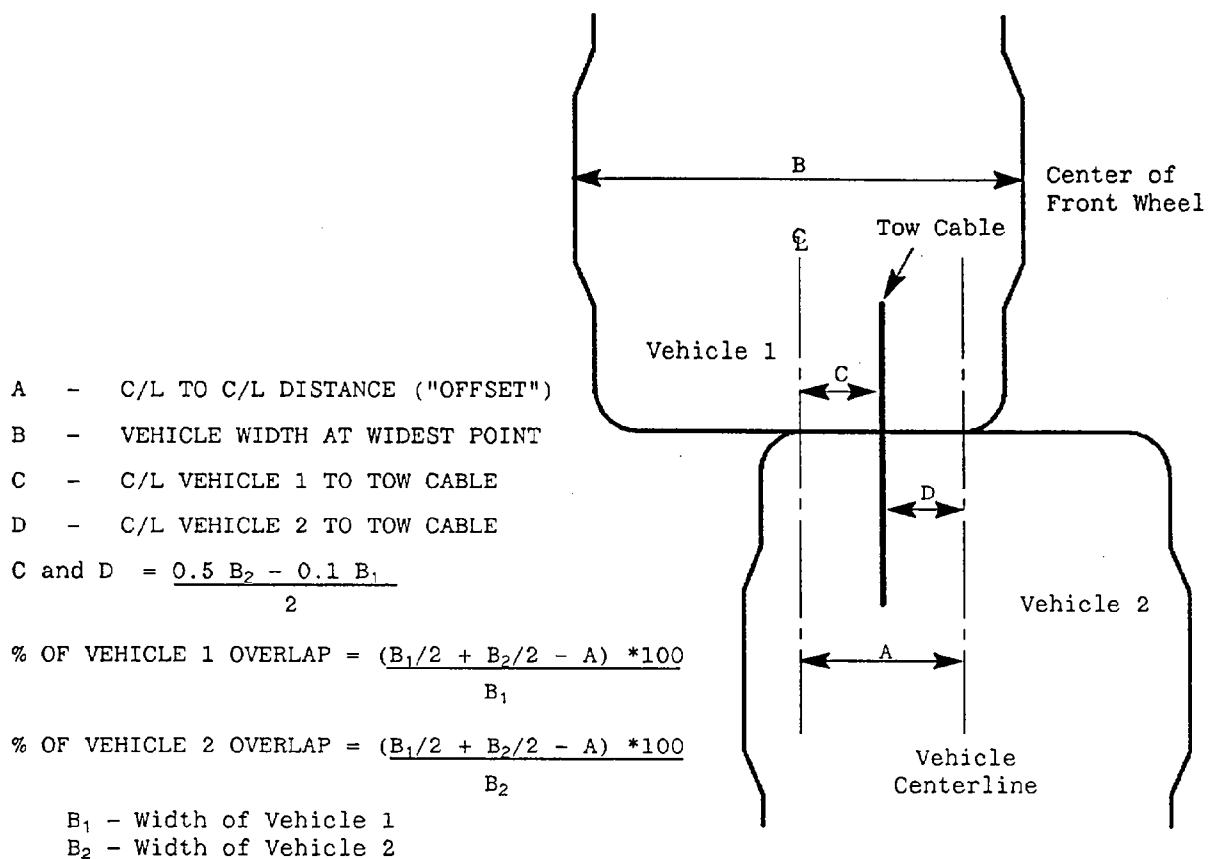


Table 1
VEHICLE-TO-VEHICLE OVERLAP MEASUREMENTS (in.)

Measurement Code	Vehicle 1	Vehicle 2
A	27.1	27.1
B	68.5	67.9
C	13.55	-
D	-	13.55
Target % Vehicle Overlap	60	60.5
Actual % Vehicle Overlap	60.7	61.3

VEHICLE ONE DATA

Table 2

GENERAL TEST AND VEHICLE 1 PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1991 Dodge Dynasty 4-Door SedanNHTSA Test No.: -- VIN.: 1B3XC46K8MD295063Body Color: Maroone Date of Manufacture: 6/91Engine: 4 Cylinders; -- C.I.D.; 2.5 Liters; -- CCX Gas; -- Diesel; -- Turbocharged-- Longitudinal; X TransverseTransmission: 3 Speed; -- Manual; X Automatic; -- OverdriveFinal Drive: X Front Wheel; -- Rear Wheel; -- Four Wheel-- A/C; X P/S; X P/B; -- P/wdo;-- Tilt Wheel -- P/seats; -- Cruise ControlType of Occupant Restraint: Driver airbag and manual 3-point seat belt restraint.DATA RECORDED FROM VEHICLE'S TIRE PLACARD:Tire Pressure (at capacity): Front 32 psi, Rear 32 psiRecommended Tire Size: P195/75R14Recommended Cold Tire Pressure: Front 29 psi, Rear 32 psiTires on Vehicle: P195/75R14; Manufacturer: GoodyearNumber of Occupants: 3 Front; 3 Rear; -- 3rd Seat; 6 TOTALType of Front Seats: -- Bucket; -- Bench; X Split BenchType of Front Seat Back: -- Fixed; X Adj. With X Lever -- Rot. KnobVehicle Capacity Weight (VCW) = 1100 lbs. (A)No. of Occupants x 150 lbs. = 900 lbs. (B)

Rated Cargo and Luggage

Weight (RCLW) A-B = 200 lbs.GVWR 4198 lbs. GAWR: Front 2229 lbs. Rear 2019 lbs.

Table 2

GENERAL TEST AND VEHICLE 1 PARAMETER DATA (cont'd)

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

Right Front = 910 lbs. Right Rear = 560 lbs.
Left Front = 960 lbs. Left Rear = 580 lbs.
TOTAL FRONT WEIGHT = 1870 lbs. (62.1% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1140 lbs. (37.9% of Total Vehicle Weight)
TOTAL DELIVERED WEIGHT = 3010 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMY:

Right Front = 860 lbs. Right Rear = 610 lbs.
Left Front = 1030 lbs. Left Rear = 680 lbs.
TOTAL FRONT WEIGHT = 1890 lbs. (59.4% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1290 lbs. (40.6% of Total Vehicle Weight)
TOTAL DELIVERED WEIGHT = 3180 lbs.
Weight of Ballast Secured in Vehicle Trunk Area = 0 lbs.

TEST VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.7; LF 27.4; RR 27.8; LR 27.6
Test Attitude: RF 27.9; LF 27.3; RR 27.3; LR 26.8
Vehicle's Wheel Base = 105.0 in.
Location of Vehicle's C.G. = 42.6 inches rearward of front wheel center

Table 2

GENERAL TEST AND VEHICLE 1 PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: 60% overlapped frontal Impact Angle: 0°
 Date of Test: January 8, 1992 Time of Test: 12:30
 Ambient Temperature: 40 °F at impact area
 Temperature in Occupant Compartment: 71°F
 Windshield Molding Temperature: 70°F
 Required Impact Velocity Range: 35.0 to 37.0 mph
 Impact Velocity: primary = 35.2 mph, secondary = 35.1 mph
 Distance From Front Bumper to Impact Point When
 Entering Speed Trap: 52
 Exiting Speed Trap: 12

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	Face and top of head with airbag. Rear of head with <u>headrest</u>	<u>NA</u>
Chest	<u>No contact</u>	<u>N/A</u>
Abdomen	<u>No contact</u>	<u>N/A</u>
Left Knee	<u>Lower dash panel</u>	<u>N/A</u>
Right Knee	<u>Lower dash panel</u>	<u>N/A</u>

COMMENTS:

Roof rail deformed along front left side of vehicle*.
 Windshield severely cracked.
 Floor pan under driver seat and left side floor sill were severely deformed.

 *Hole cut in roof above driver prior to test

Table 2
GENERAL TEST AND VEHICLE 1 PARAMETER DATA (cont'd)

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>Closed</u>	<u>Closed</u>	<u>Closed</u>	<u>Closed</u>
<u>Seat Movement</u>	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>None</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Seat Shift (in.)	<u>Not available</u>			
	<u>trim section</u>			
	<u>with reference</u>			
	<u>moved</u>			

Table 3
VEHICLE 1 DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-49	14	19	52	-53	22	-14	55.5
DUMMY (2)	-	-	-	-	-	-	-	-
DUMMY (3)	-	-	-	-	-	-	-	-
DUMMY (4)	-	-	-	-	-	-	-	-

	MAXIMUM FORCE FEMUR LOAD (LBS.)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	868	1136
DUMMY (2)	-	-
DUMMY (3)	-	-
DUMMY (4)	-	-

	MAXIMUM FORCE SEAT BELT LOADS (LBS.)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	1460	-	-
DUMMY (2)	-	-	-
DUMMY (3)	-	-	-
DUMMY (4)	-	-	-

	HEAD INJURY CRITERIA (HIC)			
	HIC	t ₁ (SEC)	t ₂ (SEC)	Average Acceleration t ₁ TO t ₂
DUMMY (1)	321	.06180	.09600	38.8
DUMMY (2)	-	-	-	-
DUMMY (3)	-	-	-	-
DUMMY (4)	-	-	-	-

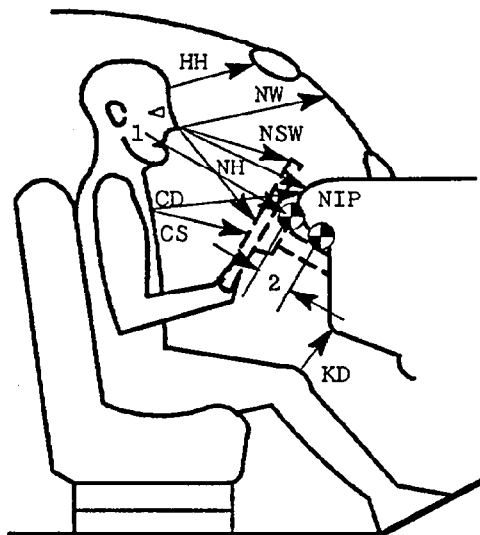
*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Figure 2

VEHICLE 1 OCCUPANT CLEARANCE DIMENSIONS

DRIVER	
HH	14.0
NW	24.1
NSW	14.8
NIP	19.9
NH	14.9
CD	18.6
CS	10.1
KDL	1.9
KDR	2.0
1	24.9
2	2.0
SA	27°
PA	27°
ULA	109°
LLA	231°

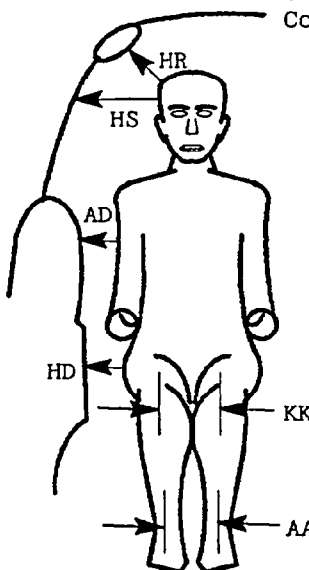


H-POINT FROM TARGET POSITION	
Vertical	0.1" Below
Horizontal	0.0"

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

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

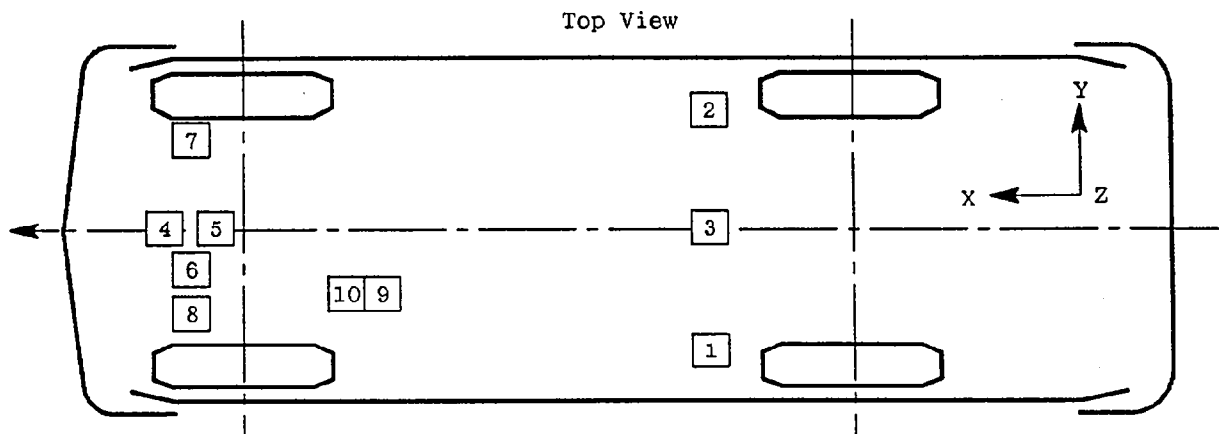
HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee
 AA = Ankle to Ankle
 DT = Dummy Temperature °F



DRIVER	
HR	7.5
HS	10.4
AD	4.9
HD	7.6*
KK	8.5
AA	10.0
DT	69°

*4.8 inches to left arm rest

Figure 3
SUMMARY OF VEHICLE 1 ACCELEROMETER DATA



Vehicle: 1991 Dodge Dynasty 4-Door Sedan

Loc. No.	Description	Axis	Maximum Value (g's)*	
			"-"	"+"
1	Rear seat crossmember left side	x	-36	7
2	Rear seat crossmember right side	x	-31	6
3	Rear seat crossmember centerline, X	x	-38	4
3	Rear seat crossmember centerline, Y	y	-22	13
3	Rear seat crossmember centerline, Z	z	-21	27
4	Top of engine block	x	-93	13
4	Top of engine block	z	-298	22
5	Bottom of engine block	x	-147	62
6	Front suspension crossmember	x	-99	29
6	Front suspension crossmember	z	-31	36
7	Right front brake caliper	x	-78	8
8	Left front brake caliper	x	-193	63
9	Brake pedal	x	-133	31
9	Brake pedal	z	-127	65
10	Toe pan	x	-95	92

*Values filtered using SAE class 60 filter.

Figure 4

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

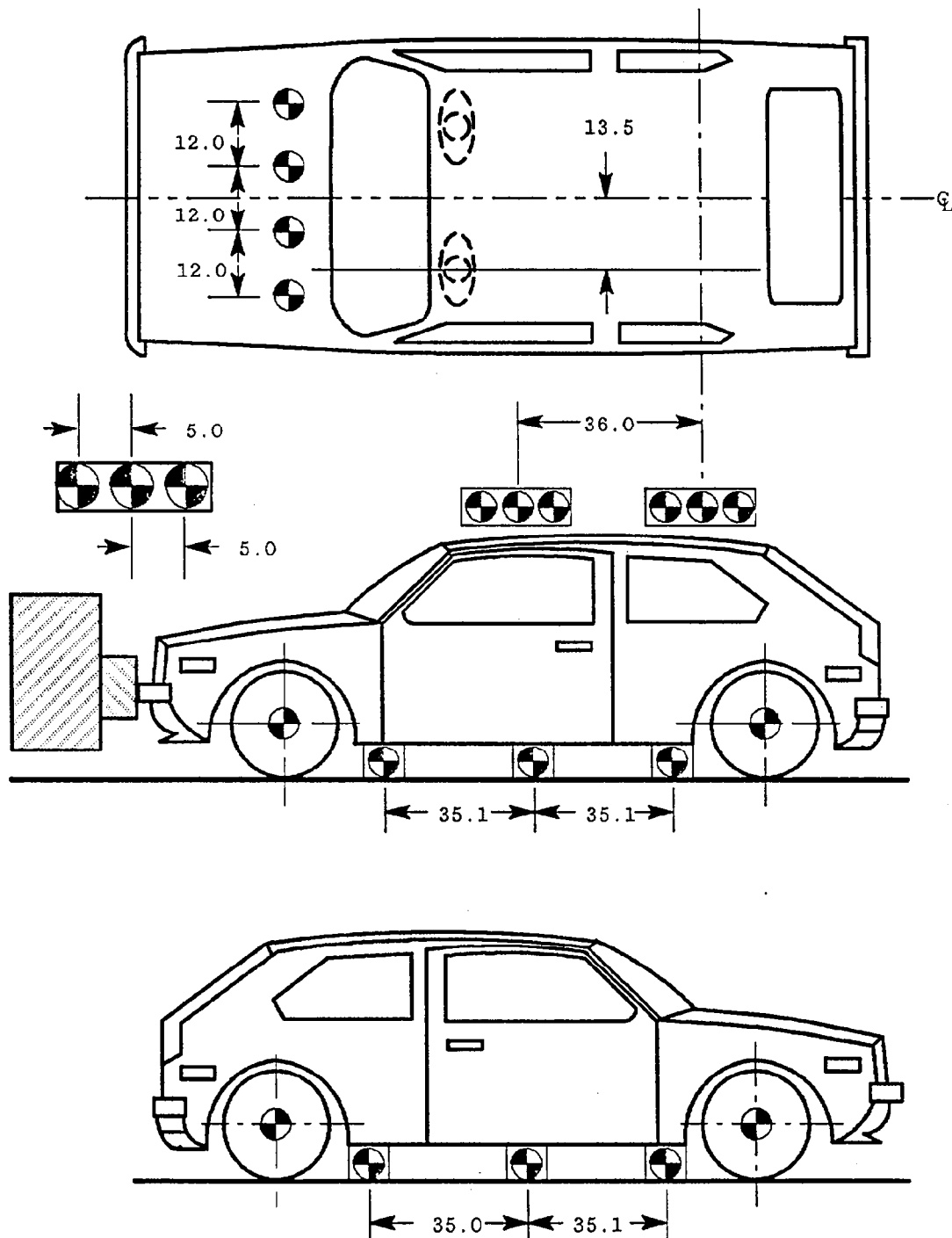
Test Description: 36 mph Offset Frontal Vehicle-to-Vehicle Impact

Test Vehicle: 1991 Dodge Dynasty 4-Door Sedan

Reference Plane: Vehicle plane at rear bumper

Accelerometer Description	LONGITUDINAL LOCATION (in.)		
	Pre-Test	Post-Test	Change
Rear seat crossmember left side	67.9	67.1	0.8
Rear seat crossmember right side	67.9	67.4	0.5
Rear seat crossmember centerline	69.8	69.6	0.2
Top of engine block	153.2	150.5	2.7
Bottom of engine block	152.3	141.4	10.9
Front suspension crossmember	137.4	130.6	6.8
Right front brake caliper	144.5	144.0	1.5
Left front brake caliper	144.3	129.5	14.8
Toe pan	132.9	120.1	12.8
Brake pedal	130.7	120.4	10.3

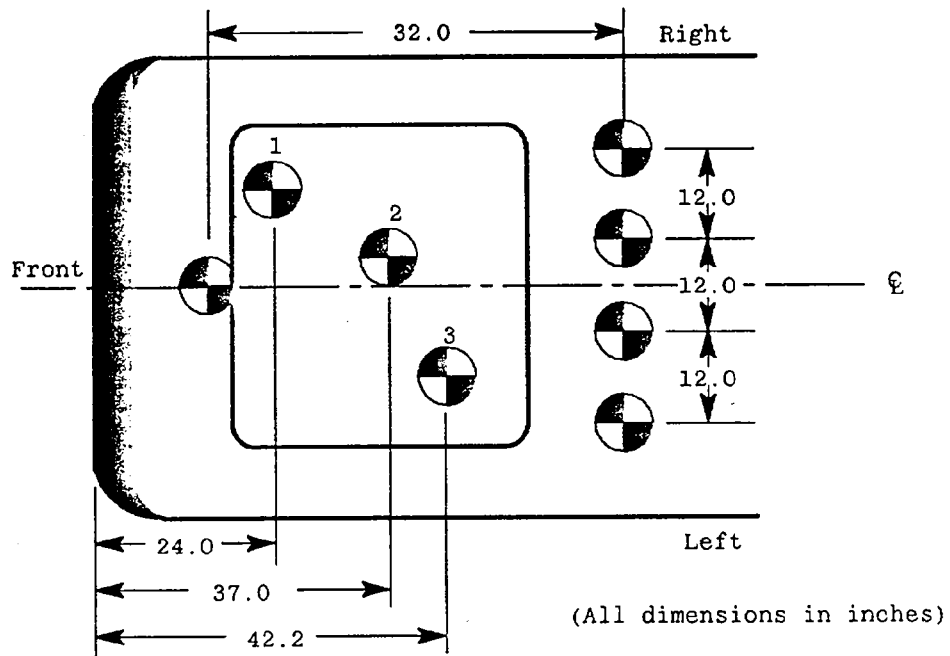
Figure 5
 VEHICLE 1 TARGET LOCATIONS
 (All dimensions in inches)



(Dimensions in inches)

Figure 5

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



Note: Drawing not to scale.

Target 1: Alternator
2: Accelerometer (Engine Top)
3: Air Filter

Figure 6

VEHICLE 1 MEASUREMENT POINTS

(All dimensions in inches)

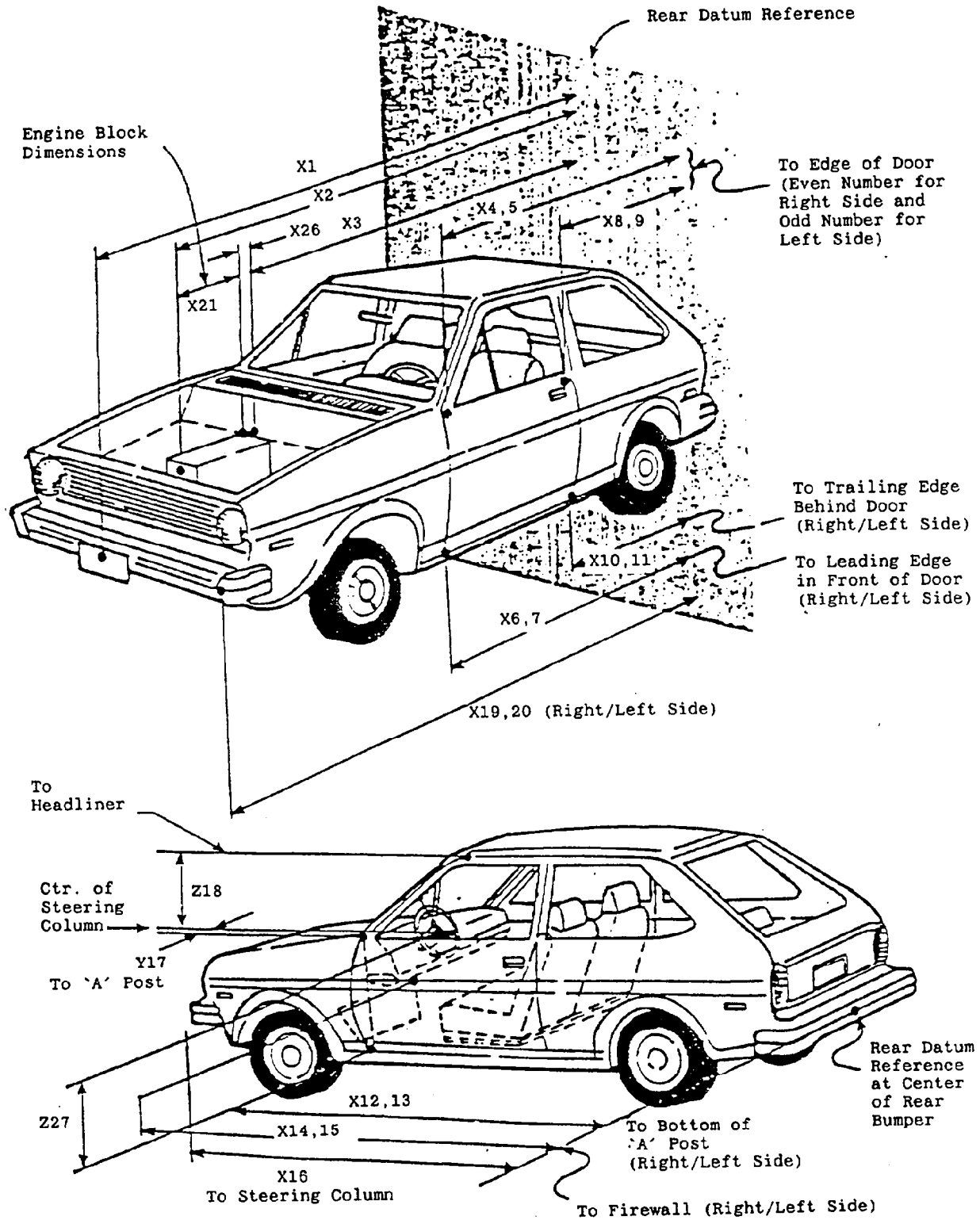


Figure 6

VEHICLE 1 MEASUREMENT POINTS (continued)

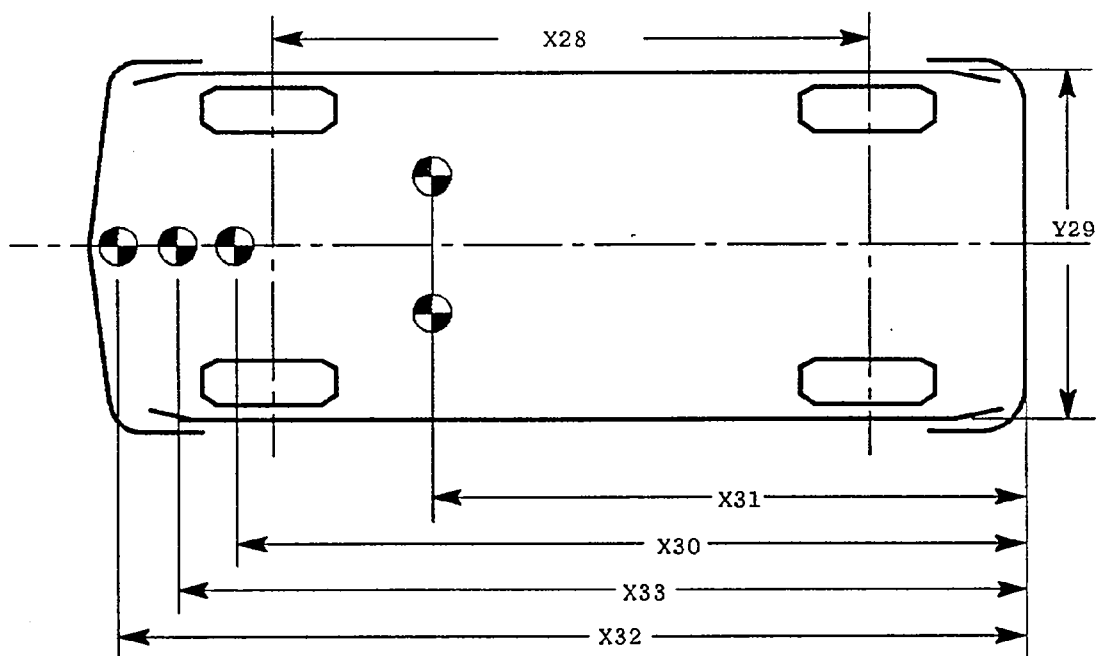
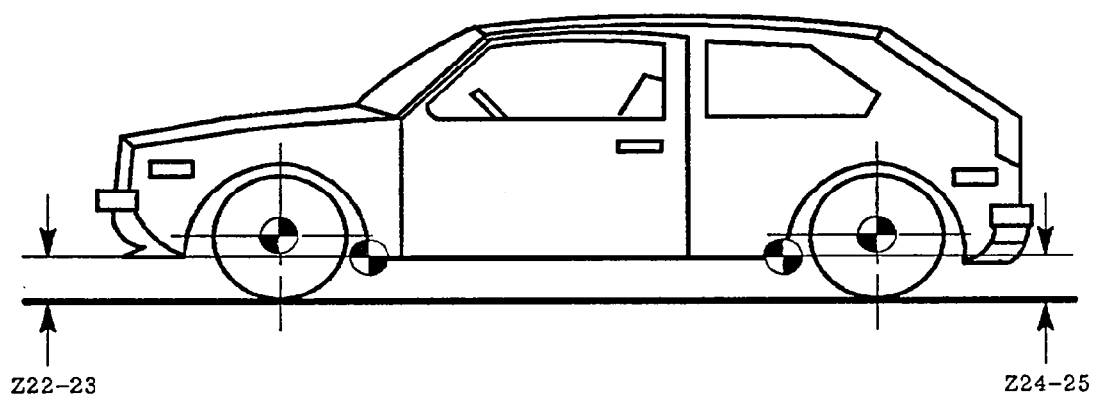


Table 4
VEHICLE 1 MEASUREMENTS

No.	TYPE OF MEASUREMENT	All Dimensions in Inches	
		Pre-Test	Post-Test
X1	Total Length of Vehicle at Centerline	190.2	156.4
X2	Rear Surface of Vehicle to Engine at Centerline	157.5	151.0
X3	Rear Surface of Vehicle to Firewall	140.2	136.0
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	126.9	127.5
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	127.0	123.4
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	126.2	126.0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	126.4	123.5
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	86.2	86.6
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	85.9	83.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	87.0	86.9
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	86.8	84.0
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	125.5	124.5
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	126.6	N/A
X14	Rear Surface of Vehicle to Firewall - Right Side	141.0	137.7
X15	Rear Surface of Vehicle to Firewall - Left Side	141.0	134.6
X16	Rear Surface of Vehicle to Steering Wheel Center	109.0	105.5
Y17	Steering Column to "A" Post	16.2	16.2

Table 4

VEHICLE 1 MEASUREMENTS (continued)

No.	TYPE OF MEASUREMENT	All Dimensions in Inches	
		Pre-Test	Post-Test
Z18	Rear of Windshield Header to Steering Wheel Column	15.8	16.4
X19	Rear Surface of Vehicle to Right Side of Front Bumper	186.8	181.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	186.8	147.2
X21	Width of Engine Block	14.0	14.0
Z22	Right Front Sill to Ground Plane	11.8	14.0
Z23	Left Front Sill to Ground Plane	11.4	10.8
Z24	Right Rear Sill to Ground Plane	11.4	12.3
Z25	Left Rear Sill to Ground Plane	10.4	9.3
X26	Firewall to Engine or Transaxle	3.0	0.0
Z27	Vertical Dim. from Door Sill to Centerline of Steering Column	20.0	24.0
X28	Wheelbase of Vehicle	105.0	Left - 83.3 Right - 108.0
Y29	Width of Vehicle at Maximum Width Point	69.0	68.0
X30	Rear Surface of Vehicle to Engine Target	152.3	141.4
X31	Rear Surface of Vehicle to Compartment Target	126.3	124.0
X32	Rear Surface of Vehicle to Bumper Target	178.5	150.7
X33	Rear Surface of Vehicle to Frame Crossmember	137.4	130.6

VEHICLE TWO DATA

Table 5

GENERAL TEST AND VEHICLE 2 PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1991 Honda Accord DX 4-Door Sedan

NHTSA Test No.: - VIN.: 1HGCB7548MA1G5291

Body Color: Gray Date of Manufacture: 6/91

Engine: 4 Cylinders; 132 C.I.D.; - Liters; - CC
✓ Gas; - Diesel; - Turbocharged
- Longitudinal; ✓ Transverse

Transmission: 5 Speed; ✓ Manual; - Automatic; ✓ Overdrive

Final Drive: ✓ Front Wheel; - Rear Wheel; - Four Wheel
- A/C; ✓ P/S; ✓ P/B; - P/wdo;
✓ Tilt Wheel - P/seats; - Cruise Control

Type of Occupant Restraint: Automatic Torso Belt and Manual Lap Belt

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 29 psi, Rear 29 psi

Recommended Tire Size: P185/70R14875

Recommended Cold Tire Pressure: Front 29 psi, Rear 29 psi

Tires on Vehicle: P185/70R14875; 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; ✓ Adj. With ✓ Lever - Rot. Knob

Vehicle Capacity Weight (VCW) = 850 lbs. (A)

No. of Occupants x 150 lbs. = 750 lbs. (B)

Rated Cargo and Luggage
Weight (RCLW) A-B = 100 lbs.

GVWR 3815 lbs. GAWR: Front 2050 lbs. Rear 1840 lbs.

Table 5

GENERAL TEST AND VEHICLE 2 PARAMETER DATA (cont'd)

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

Right Front = 820 lbs. Right Rear = 560 lbs.
 Left Front = 840 lbs. Left Rear = 550 lbs.
 TOTAL FRONT WEIGHT = 1660 lbs. (59.9% of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1110 lbs. (40.1% of Total Vehicle Weight)
 TOTAL DELIVERED WEIGHT = 2770 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMY:

Right Front = 750 lbs. Right Rear = 640 lbs.
 Left Front = 900 lbs. Left Rear = 730 lbs.
 TOTAL FRONT WEIGHT = 1650 lbs. (54.6% of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1370 lbs. (45.4% of Total Vehicle Weight)
 TOTAL DELIVERED WEIGHT = 3020 lbs.
 Weight of Ballast Secured in Vehicle Trunk Area = - lbs.

TEST VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.4; LF 27.0; RR 27.3; LR 27.0
 Test Attitude: RF 28.2; LF 26.7; RR 26.7; LR 25.8
 Vehicle's Wheel Base = 107.00 in.
 Location of Vehicle's C.G. = 48.5 inches rearward of front wheel center

Table 5

GENERAL TEST AND VEHICLE 2 PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: 60% Overlapped Impact Angle: 0 °
 Date of Test: January 8, 1992 Time of Test: 12:30
 Ambient Temperature: 40 °F at impact area
 Temperature in Occupant Compartment: 70°F
 Windshield Molding Temperature: 70°F
 Required Impact Velocity Range: 35.0 to 37.0 mph
 Impact Velocity: primary = 35.2 mph, secondary = 35.1 mph
 Distance From Front Bumper to Impact Point When
 Entering Speed Trap: 52
 Exiting Speed Trap: 12

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	Forehead with top of <u>steering wheel rim</u>	<u>N/A</u>
Chest	<u>Lower steering wheel rim</u>	<u>N/A</u>
Abdomen	<u>No contact</u>	<u>N/A</u>
Left Knee	<u>Lower dash</u>	<u>N/A</u>
Right Knee	<u>Lower dash</u>	<u>N/A</u>

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>Closed</u>	<u>Closed</u>	<u>Closed</u>	<u>Closed</u>

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

Table 5

GENERAL TEST AND VEHICLE 2 PARAMETER DATA (cont'd)

COMMENTS:

Windshield severely cracked.

Roof rail deformed along front left side of vehicle.

Left foot of dummy separated from lower leg.

Table 6
VEHICLE 2 DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-66	26	63	86	-56	31	-13	58.2
DUMMY (2)	-	-	-	-	-	-	-	-
DUMMY (3)	-	-	-	-	-	-	-	-
DUMMY (4)	-	-	-	-	-	-	-	-

	MAXIMUM FORCE FEMUR LOAD (LBS.)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1061	1371
DUMMY (2)	-	-
DUMMY (3)	-	-
DUMMY (4)	-	-

	MAXIMUM FORCE SEAT BELT LOADS (LBS.)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	1928	-	-
DUMMY (2)	-	-	-
DUMMY (3)	-	-	-
DUMMY (4)	-	-	-

	HEAD INJURY CRITERIA (HIC)			
	HIC	t ₁ (SEC)	t ₂ (SEC)	Average Acceleration t ₁ TO t ₂
DUMMY (1)	848	.06780	.10368	56.2
DUMMY (2)	-	-	-	-
DUMMY (3)	-	-	-	-
DUMMY (4)	-	-	-	-

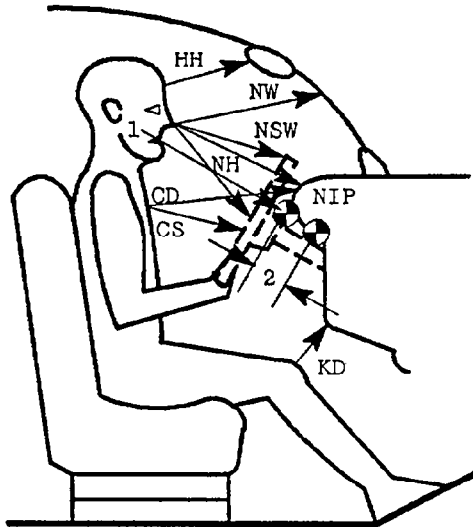
*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Figure 7

VEHICLE 2 OCCUPANT CLEARANCE DIMENSIONS

	DRIVER
HH	14.5
NW	25.6
NSW	18.6
NIP	23.1
NH	18.9
CD	21.9
CS	14.6
KDL	5.6
KDR	5.6
1	27.8
2	2.0
SA	See Note
PA	24°
ULA	108°
LLA	232°



H-POINT FROM TARGET POSITION

Vertical	0.0"
Longitudinal	0.1" below

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

Angles taken relative to vertical

SA = Seat Back Angle

PA = Pelvic Angle

ULA = Upper Leg Angle

LLA = Lower Leg Angle

Note: Seat was placed in 5th detent rearward of full upright

HR = Head to Side Roof

HS = Head to Side Window

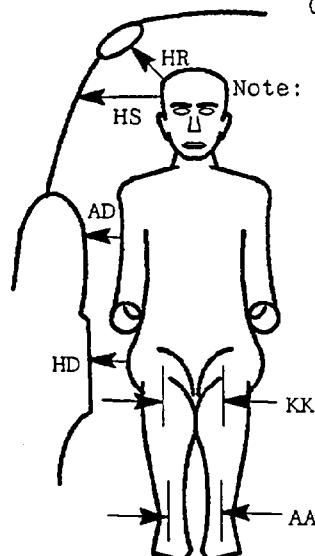
AD = Arm to Door

HD = Hip to Door

KK = Knee to Knee

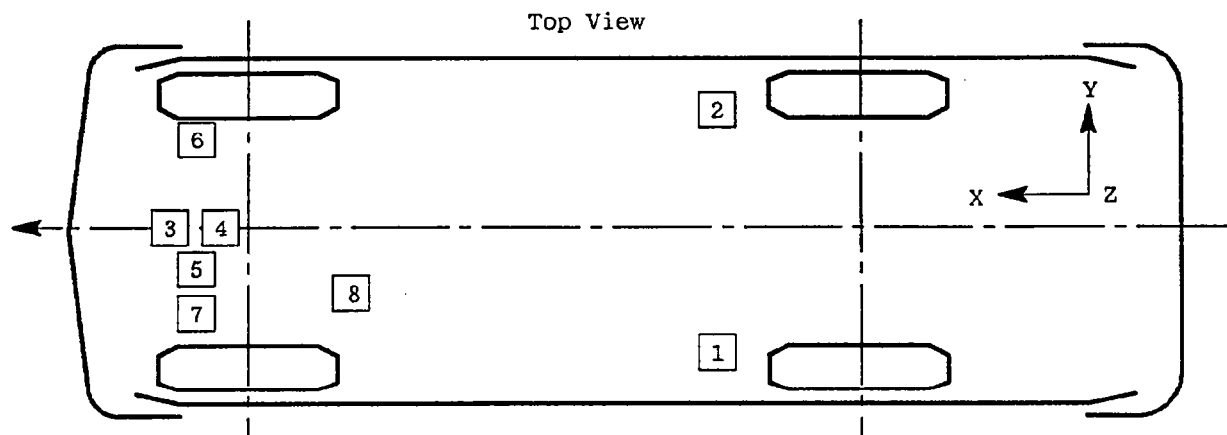
AA = Ankle to Ankle

DT = Dummy Temperature °F



	DRIVER
HR	6.5
HS	10.0
AD	4.3
HD	6.3
KK	9.4
AA	11.1
DT	70°

Figure 8
SUMMARY OF VEHICLE 2 ACCELEROMETER DATA



Vehicle: 1991 Honda Accord DX 4-Door Sedan

Loc. No.	Description	Axis	Maximum Value (g's)*	
			"-"	"+"
1	Rear seat crossmember left side	x	-34	5
2	Rear seat crossmember right side	x	-38	1
3	Top of engine block	x	-65	32
3	Top of engine block	z	-25	9
4	Bottom of engine block	x	-86	18
5	Front suspension crossmember	x	-99	12
5	Front suspension crossmember	z	-13	30
6	Right front brake caliper	x	-61	5
7	Left front brake caliper	x	-156	84
8	Toe pan	x	-69	69

*Values filtered using SAE class 60 filter.

Figure 9

VEHICLE 2 PRE- AND POST-TEST POSITION OF TEST VEHICLE
ACCELEROMETER MOUNTING LOCATIONS

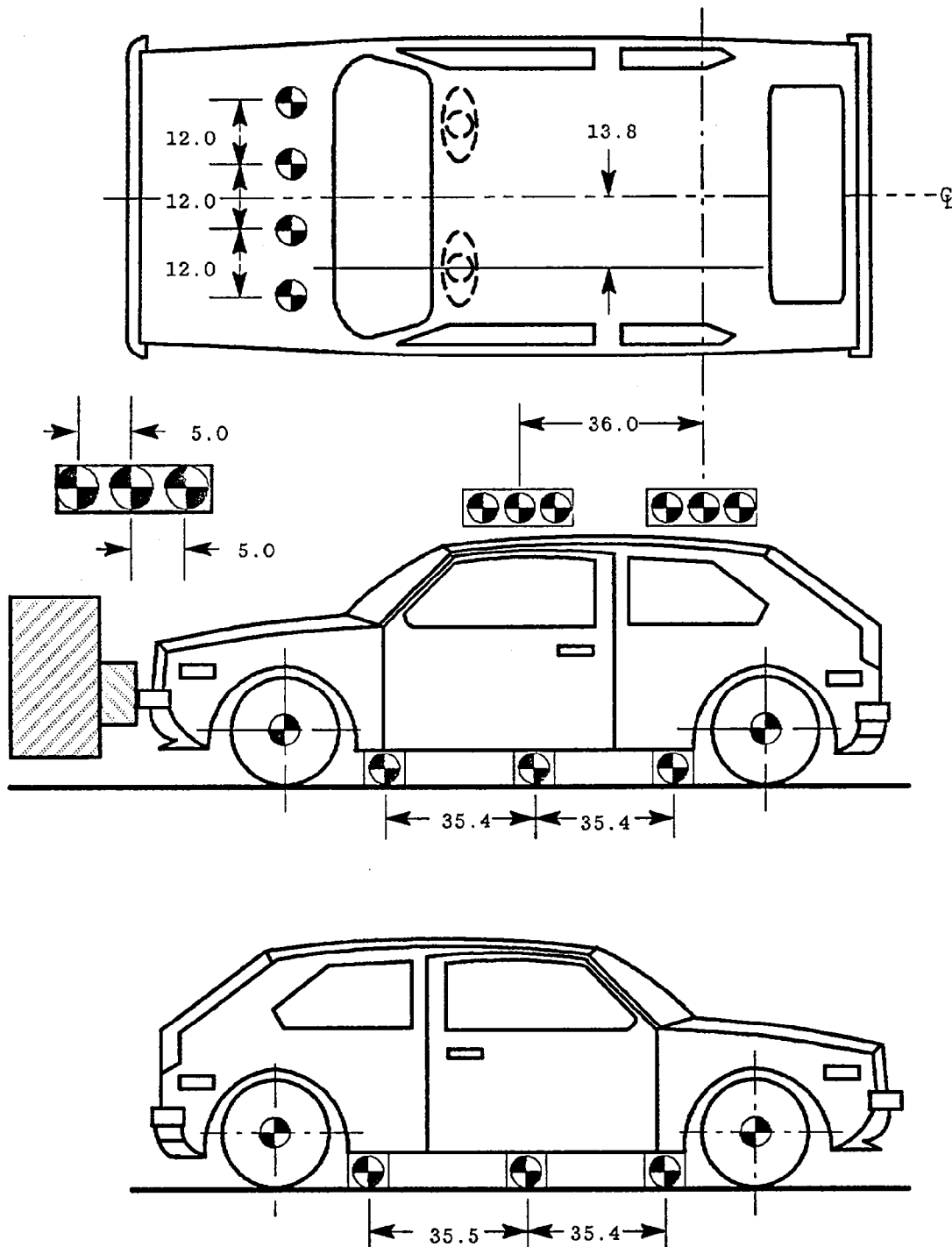
Test Description: 36 mph Offset Frontal Vehicle-to-Vehicle Impact

Test Vehicle: 1991 Honda Accord DX 4-Door Sedan

Reference Plane: Vehicle plane at rear bumper

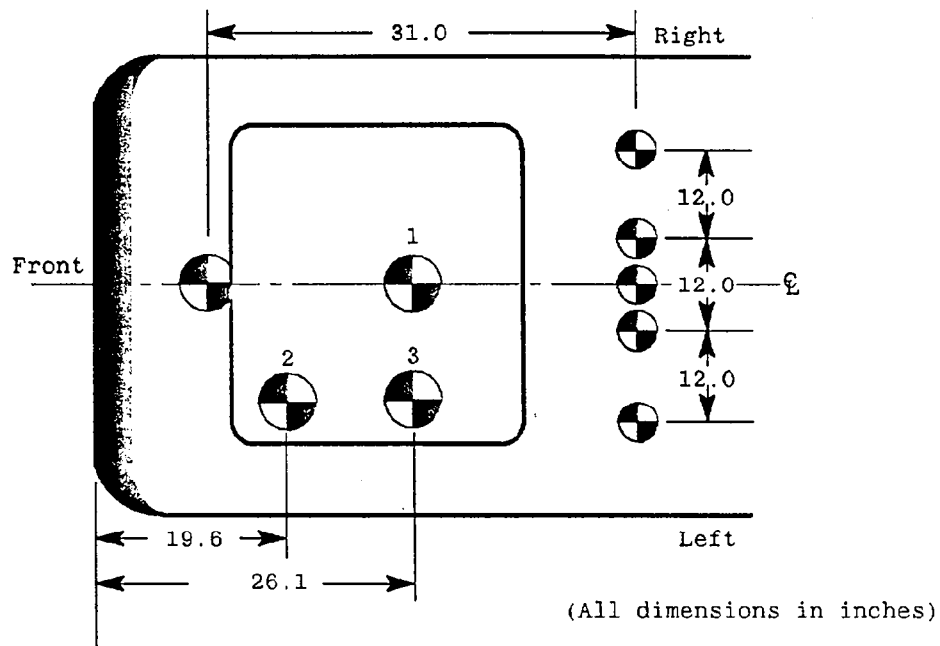
Accelerometer Description	LONGITUDINAL LOCATION (in.)		
	Pre-Test	Post-Test	Change
Rear seat crossmember left side	73.8	73.4	0.4
Rear seat crossmember right side	73.8	73.2	0.6
Top of engine block	158.5	149.5	9.0
Bottom of engine block	153.5	143.1	10.4
Front suspension crossmember	142.7	137.5	5.2
Right front brake caliper	147.0	144.5	2.5
Left front brake caliper	147.1	134.0	13.1
Toe Pan	132.5	129.6	2.9

Figure 10
 VEHICLE 2 TARGET LOCATIONS
 (All dimensions in inches)



(Dimensions in inches)

Figure 10
 VEHICLE 2 TARGET LOCATIONS (continued)
 (TOP VIEW OF HOOD AND ENGINE COMPARTMENT)



Note: Drawing not to scale.

Target 1: Accelerometer (Engine Top)
 2: Power Steering Pump
 3: Valve Cover

Figure 11

VEHICLE 2 MEASUREMENT POINTS

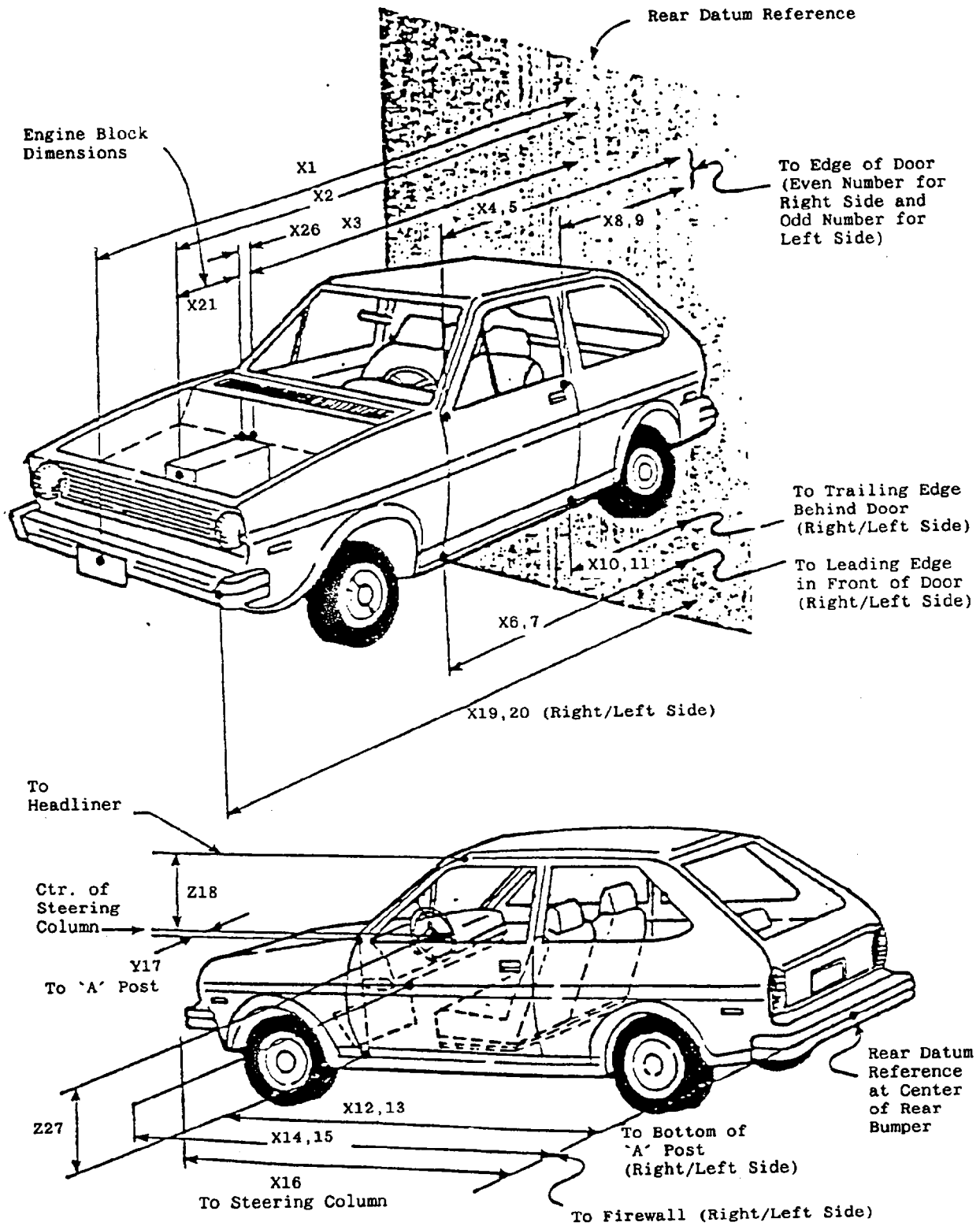


Figure 11
VEHICLE 2 MEASUREMENT POINTS (continued)

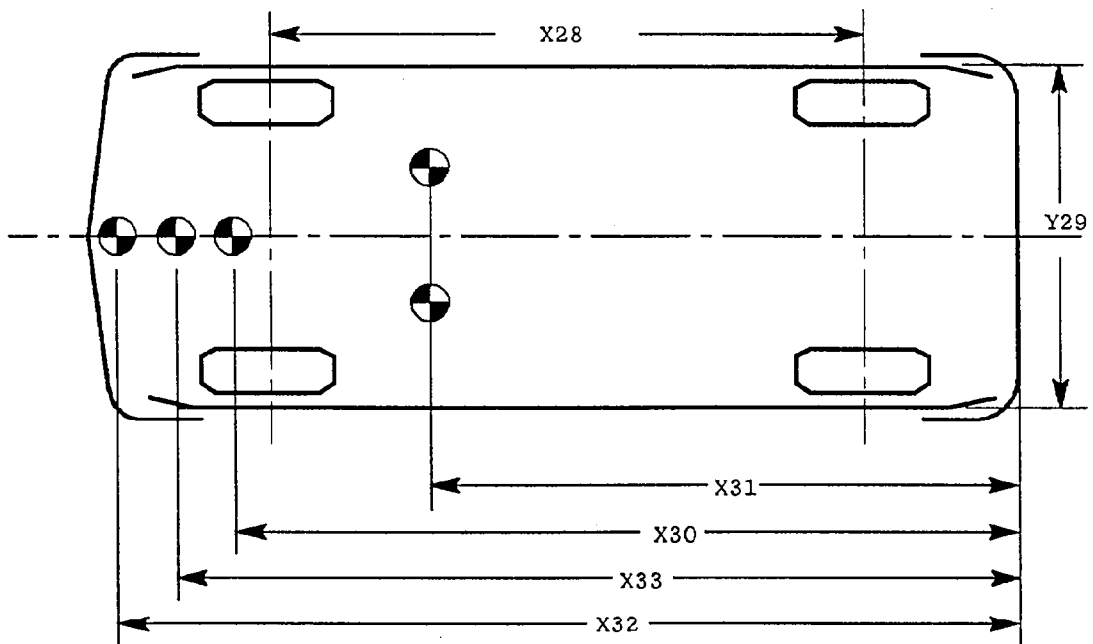
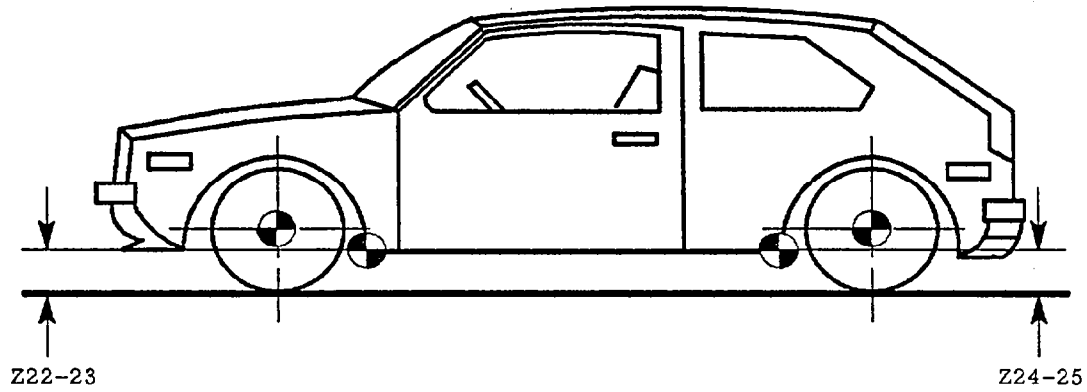


Table 7

VEHICLE 2 MEASUREMENTS

No.	TYPE OF MEASUREMENT	All Dimensions in Inches	
		Pre-Test	Post-Test
X1	Total Length of Vehicle at Centerline	184.6	166.2
X2	Rear Surface of Vehicle to Engine at Centerline	160.7	152.2
X3	Rear Surface of Vehicle to Firewall	140.8	134.7
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	127.6	127.3
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	127.5	123.0
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	128.6	127.1
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	128.5	124.8
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	85.8	85.3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	85.8	82.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	86.8	86.2
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	86.7	84.3
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	128.0	127.3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	128.3	126.8
X14	Rear Surface of Vehicle to Firewall - Right Side	140.4	137.4
X15	Rear Surface of Vehicle to Firewall - Left Side	140.6	134.2
X16	Rear Surface of Vehicle to Steering Wheel Center	110.0	105.2
Y17	Steering Column to "A" Post	15.6	15.6

Table 7

VEHICLE 2 MEASUREMENTS (continued)

No.	TYPE OF MEASUREMENT	All Dimensions in Inches	
		Pre-Test	Post-Test
Z18	Rear of Windshield Header to Steering Wheel Center	17.8	19.6
X19	Rear Surface of Vehicle to Right Side of Front Bumper	179.8	182.2
X20	Rear Surface of Vehicle to Left Side of Front Bumper	180.1	154.0
X21	Width of Engine Block	17.8	17.8
Z22	Right Front Sill to Ground Plane	8.3	7.5
Z23	Left Front Sill to Ground Plane	8.0	4.3
Z24	Right Rear Sill to Ground Plane	8.9	8.0
Z25	Left Rear Sill to Ground Plane	8.9	6.3
X26	Firewall to Engine or Transaxle	4.8	0.0
Z27	Vertical Dim. from Door Sill to Centerline of Steering Column	21.0	23.2
X28	Wheelbase of Vehicle	107.0	Left - 94.5 Right - 107.5
Y29	Width of Vehicle at Maximum Width Point	67.2	67.3
X30	Rear Surface of Vehicle to Engine Target	153.7	143.1
X31	Rear Surface of Vehicle to Compartment Target	127.7	126.4
X32	Rear Surface of Vehicle to Bumper Target	176.1	157.4
X33	Rear Surface of Vehicle to Frame Crossmember	142.8	137.5

Figure 12
CAMERA POSITIONS FOR VTV OFFSET FRONTAL IMPACT

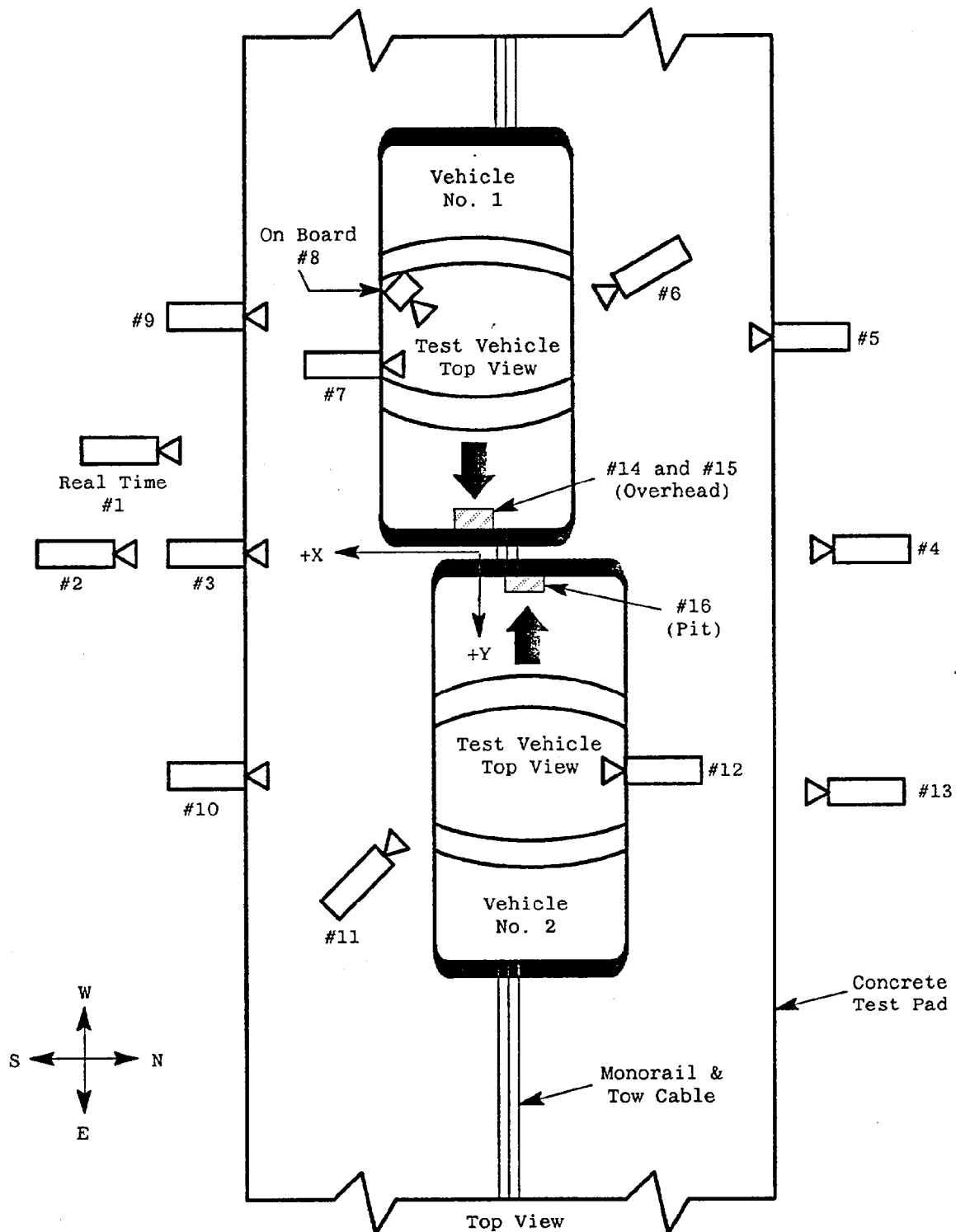


Table 8

HIGH-SPEED CAMERA LOCATIONS

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Camera	-	-	-	-	-	24
2	South Overall Camera	423	-10	70	-7	13	560
3	South Impact Point	327	-5	41	0	25	570
4	North Impact Point	-328	-4	41	-1	25	570
5	Vehicle 1 Driver Side View	-398	-83	46	-1	25	480
6	Vehicle 1 Driver and Interior View	-108	-106	67	-14	13	590
7	Vehicle 1 Onboard Driver View	-	-	-	-	8	550
8	Vehicle 1 Onboard Seat Belt View	-	-	-	-	8	580
9	Vehicle 1 Passenger Side View	539	-93	50	-3	35	520
10	Vehicle 2 Driver Side View	503	11	42	-1	35	540
11	Vehicle 2 Driver and Interior View	104	105	65	-16	13	500
12	Vehicle 2 Onboard Driver View	-	-	-	-	8	520
13	Vehicle 2 Passenger Side View	-394	60	41	-1	25	510
14	Overhead Overall View	0	0	386	-90	13	530
15	Overhead Impact Point View	0	0	386	-90	25	500
16	Underbody View	0	0	-78	90	13	700

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

Appendix A

PHOTOGRAPHS

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OVERALL TEST SETUP

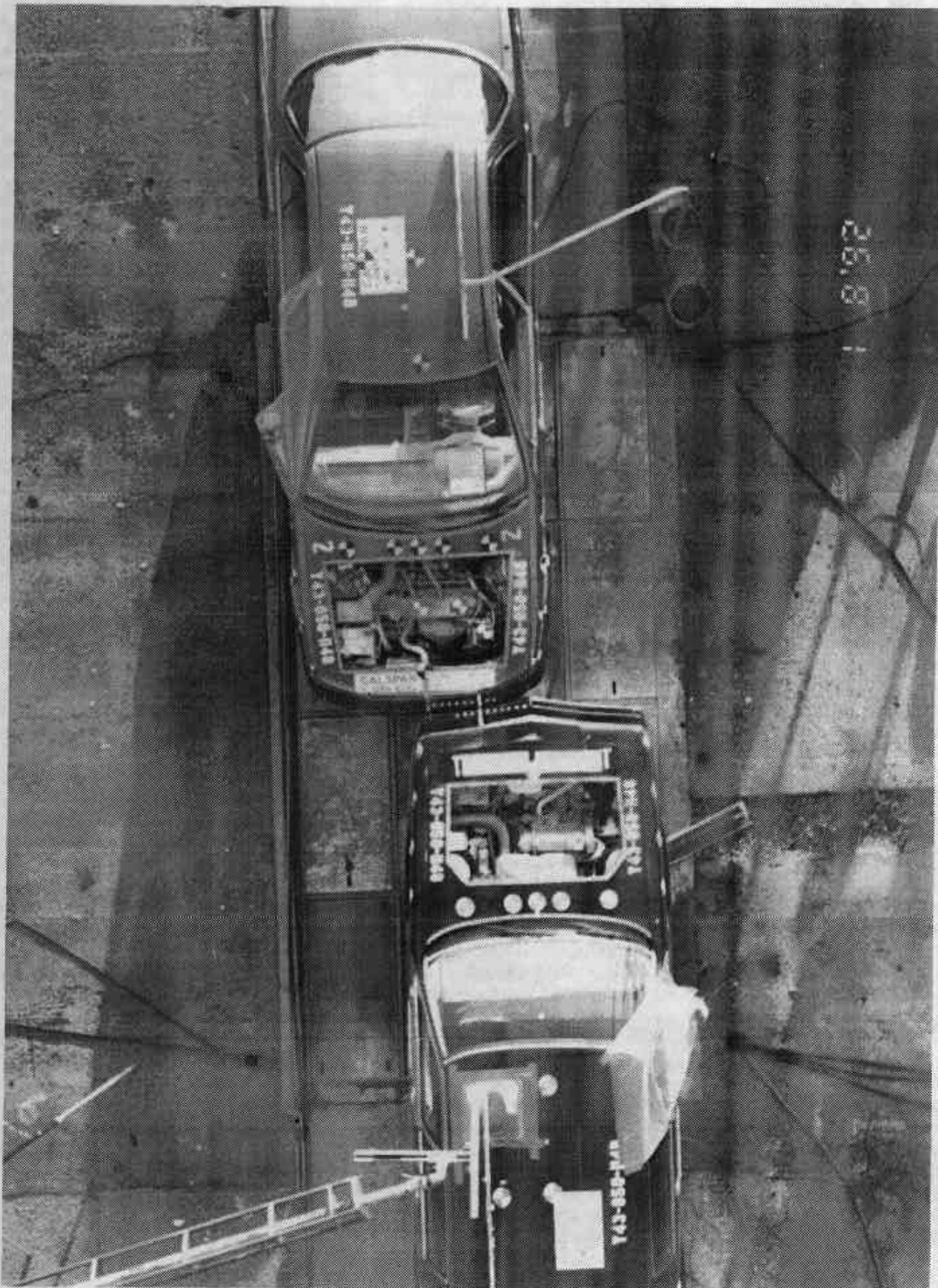


Figure A-1 PRE-TEST OVERHEAD VIEW



Figure A-2 POST-TEST OVERHEAD VIEW

Figure A-3

PRE-TEST OVERALL SIDE VIEW

Photograph is not available

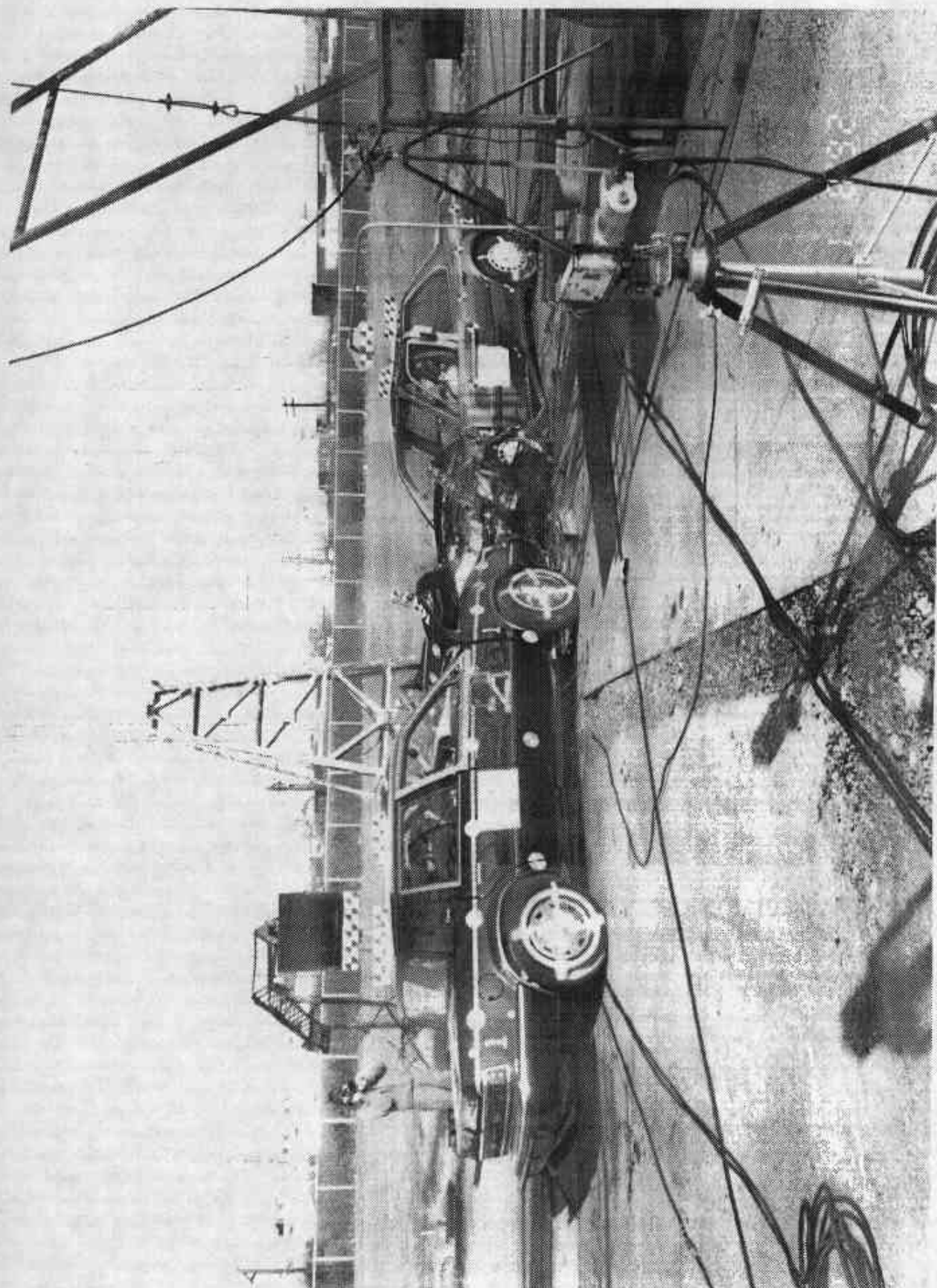


Figure A-4 POST-TEST OVERALL SIDE VIEW

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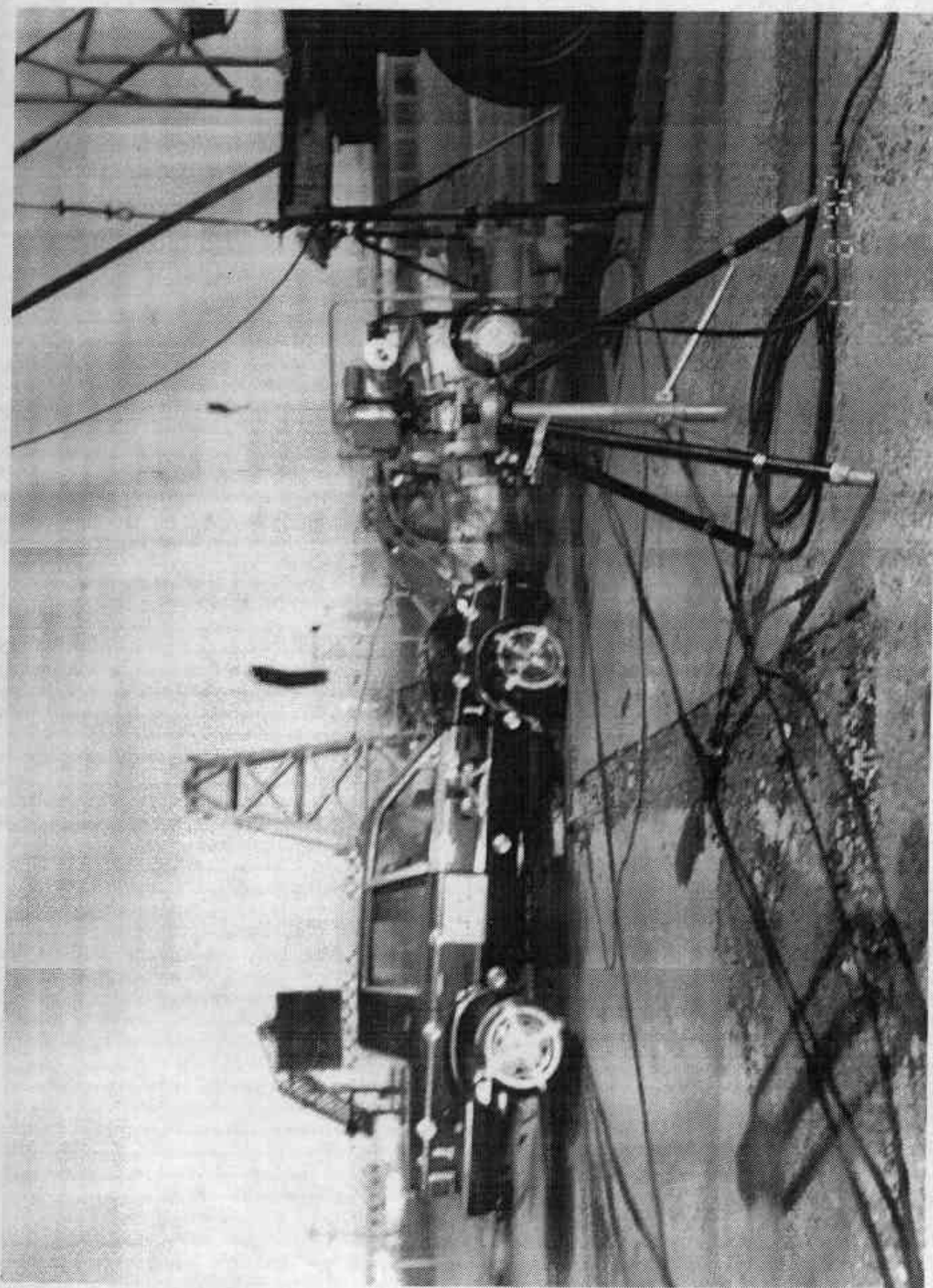


Figure A-5 IMPACT PHOTO

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VEHICLE 1 PHOTOGRAPHS

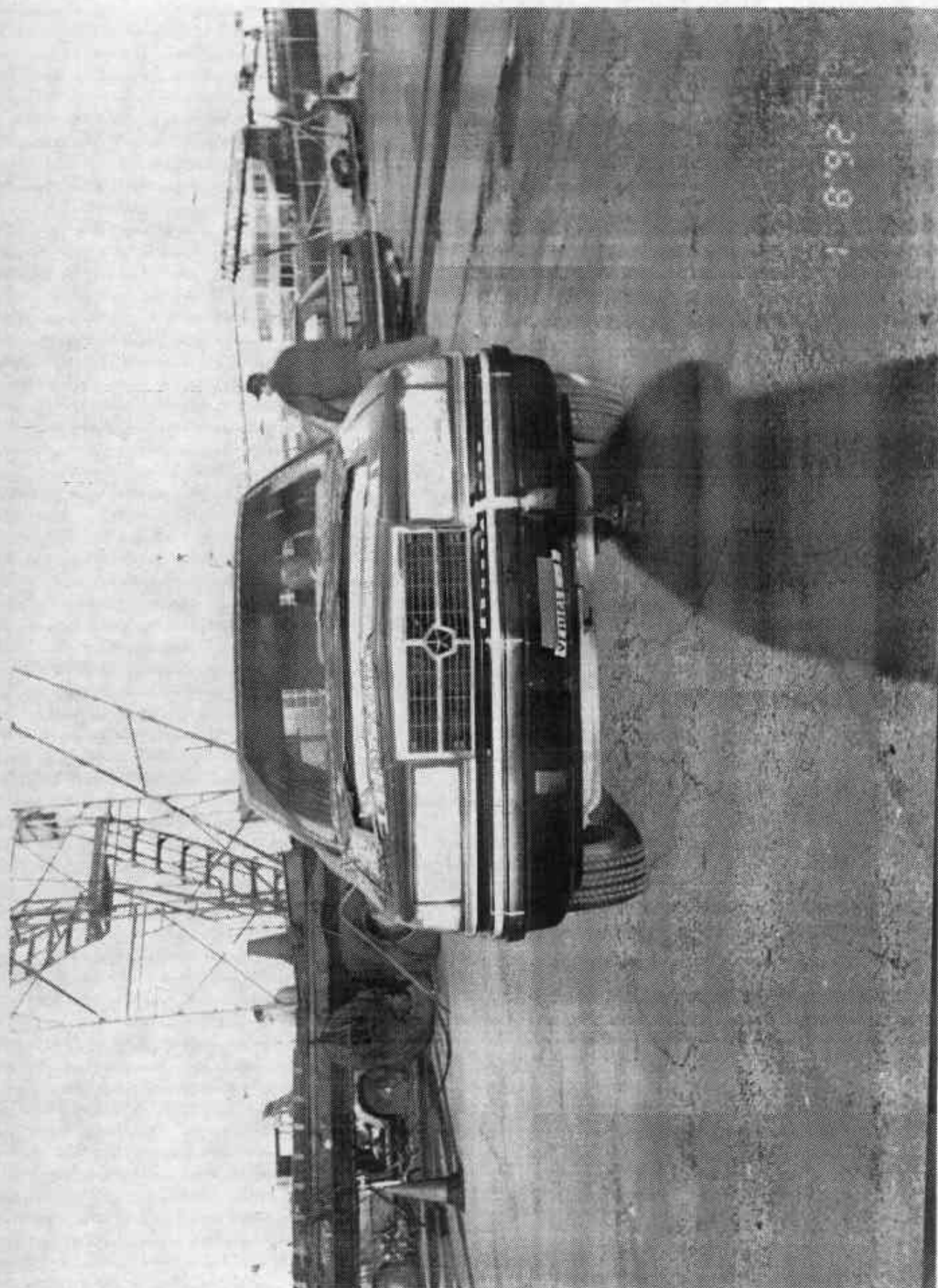


Figure A-6 VEHICLE 1 PRE-TEST FRONT VIEW

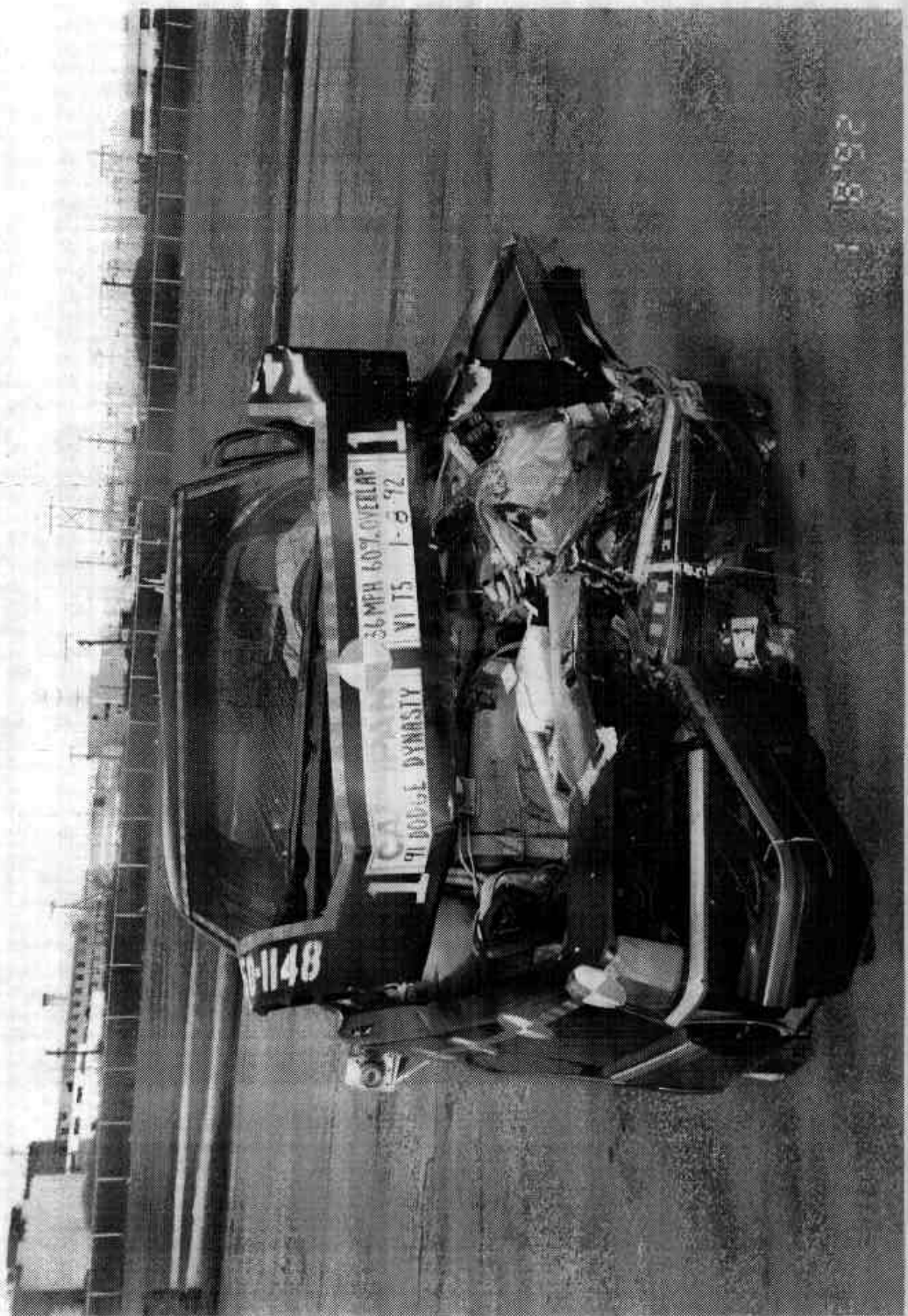


Figure A-7 VEHICLE 1 POST-TEST FRONT VIEW

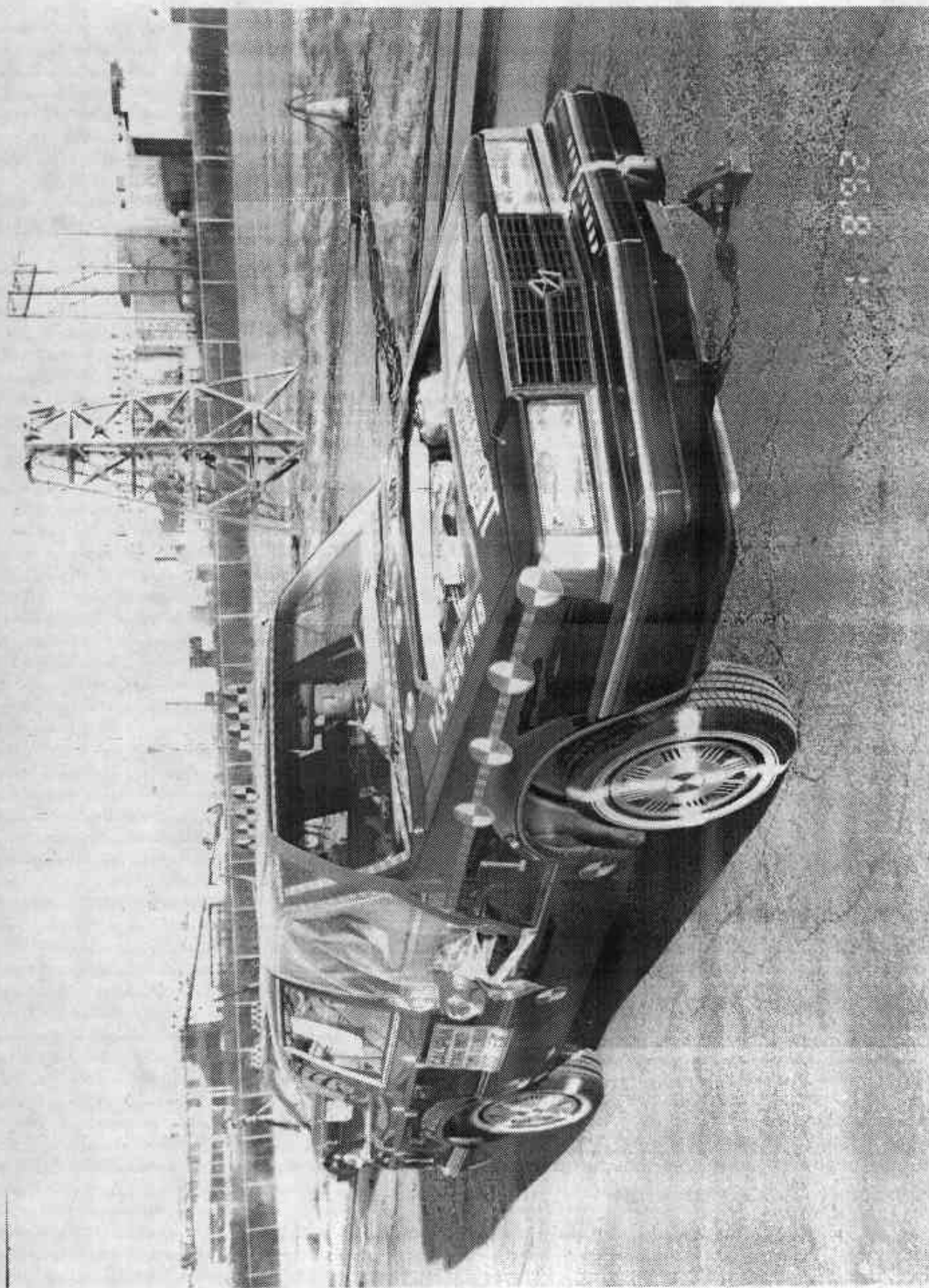


Figure A-8 VEHICLE 1 PRE-TEST FRONT RIGHT THREE QUARTER VIEW

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Figure A-9 VEHICLE 1 POST-TEST FRONT RIGHT THREE QUARTER VIEW

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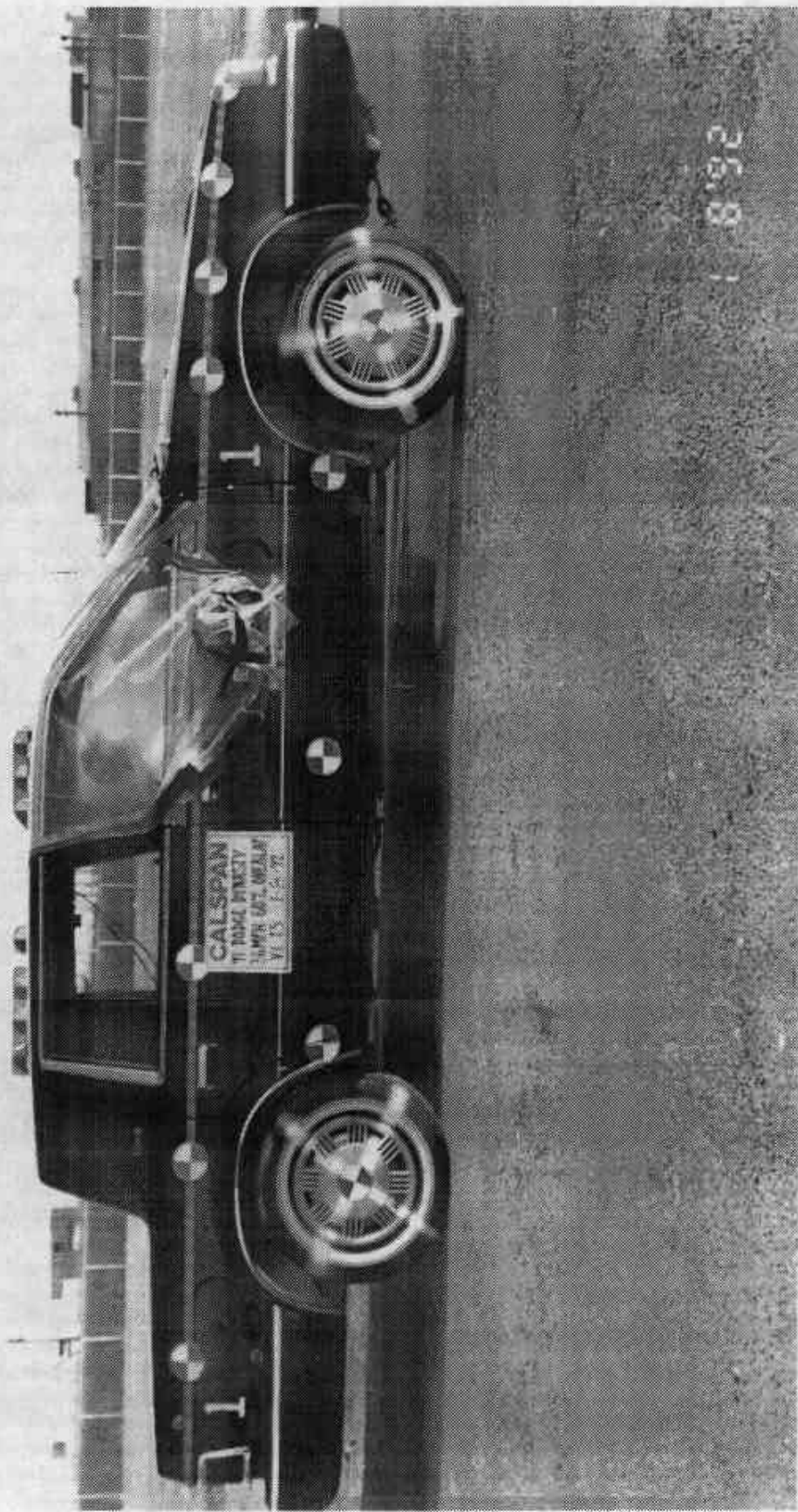


Figure A-10 VEHICLE 1 PRE-TEST RIGHT SIDE VIEW



Figure A-11 VEHICLE 1 POST-TEST RIGHT SIDE VIEW



FIGURE A-12 VEHICLE 1 PRE-TEST REAR RIGHT THREE QUARTER VIEW

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Figure A-13 VEHICLE 1 POST-TEST REAR RIGHT THREE QUARTER VIEW

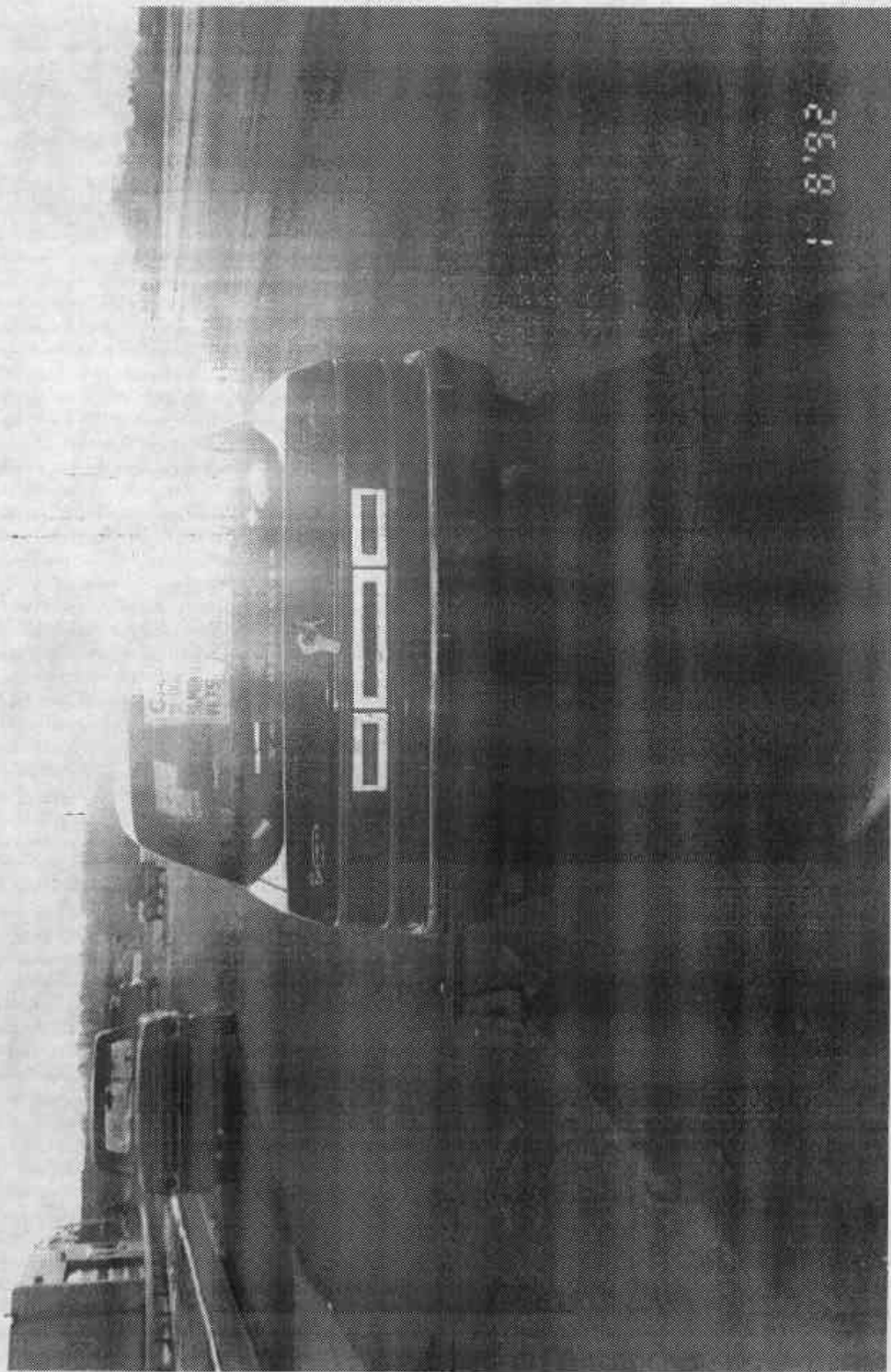


Figure A-14 VEHICLE 1 PRE-TEST REAR VIEW

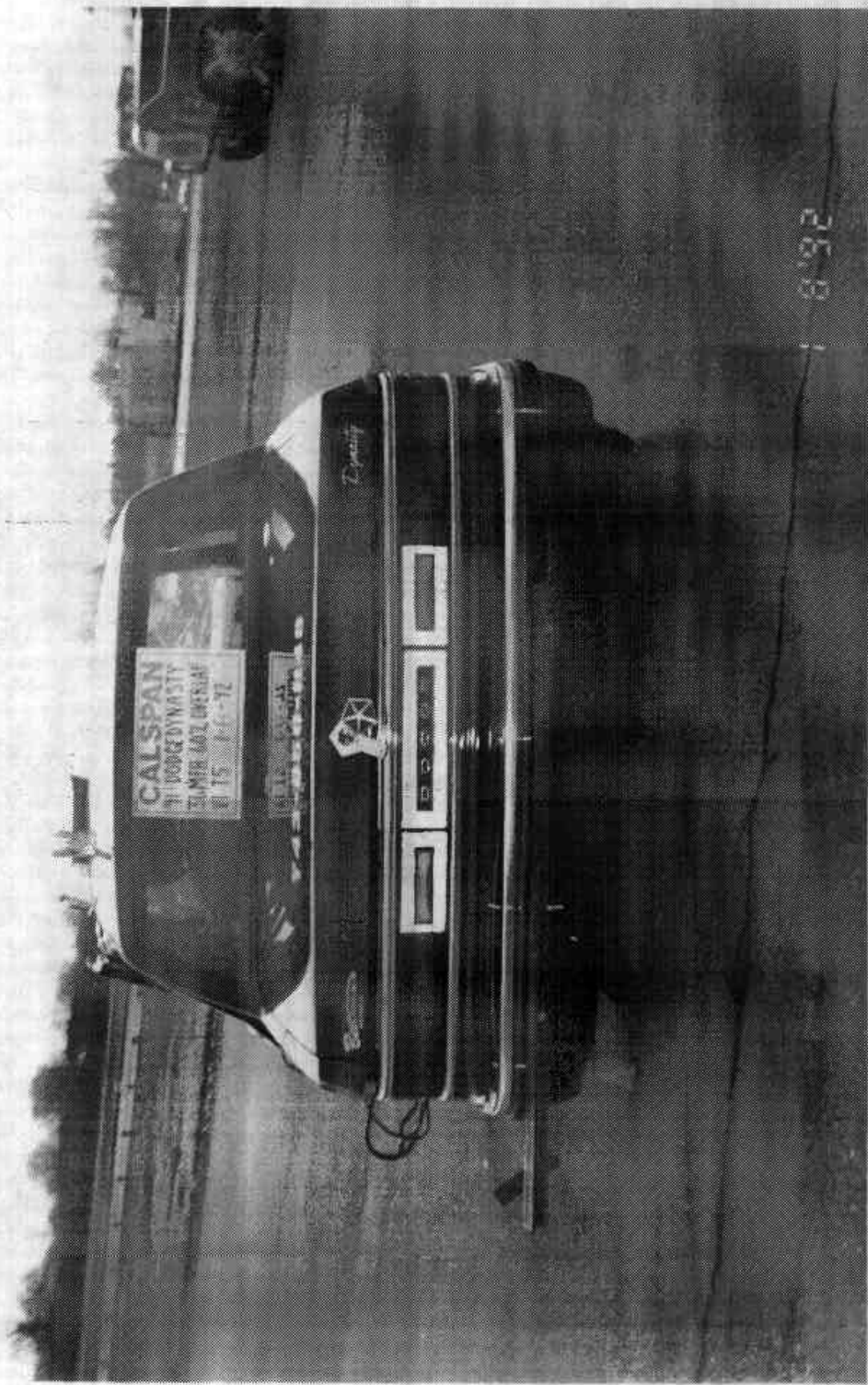


Figure A-15 VEHICLE 1 POST-TEST REAR VIEW



Figure A-16 VEHICLE 1 PRE-TEST REAR LEFT THREE QUARTER VIEW



1 8'32

Figure A-17 VEHICLE 1 POST-TEST REAR LEFT THREE QUARTER VIEW



FIGURE A-18 VEHICLE 1 PRE-TEST LEFT SIDE VIEW

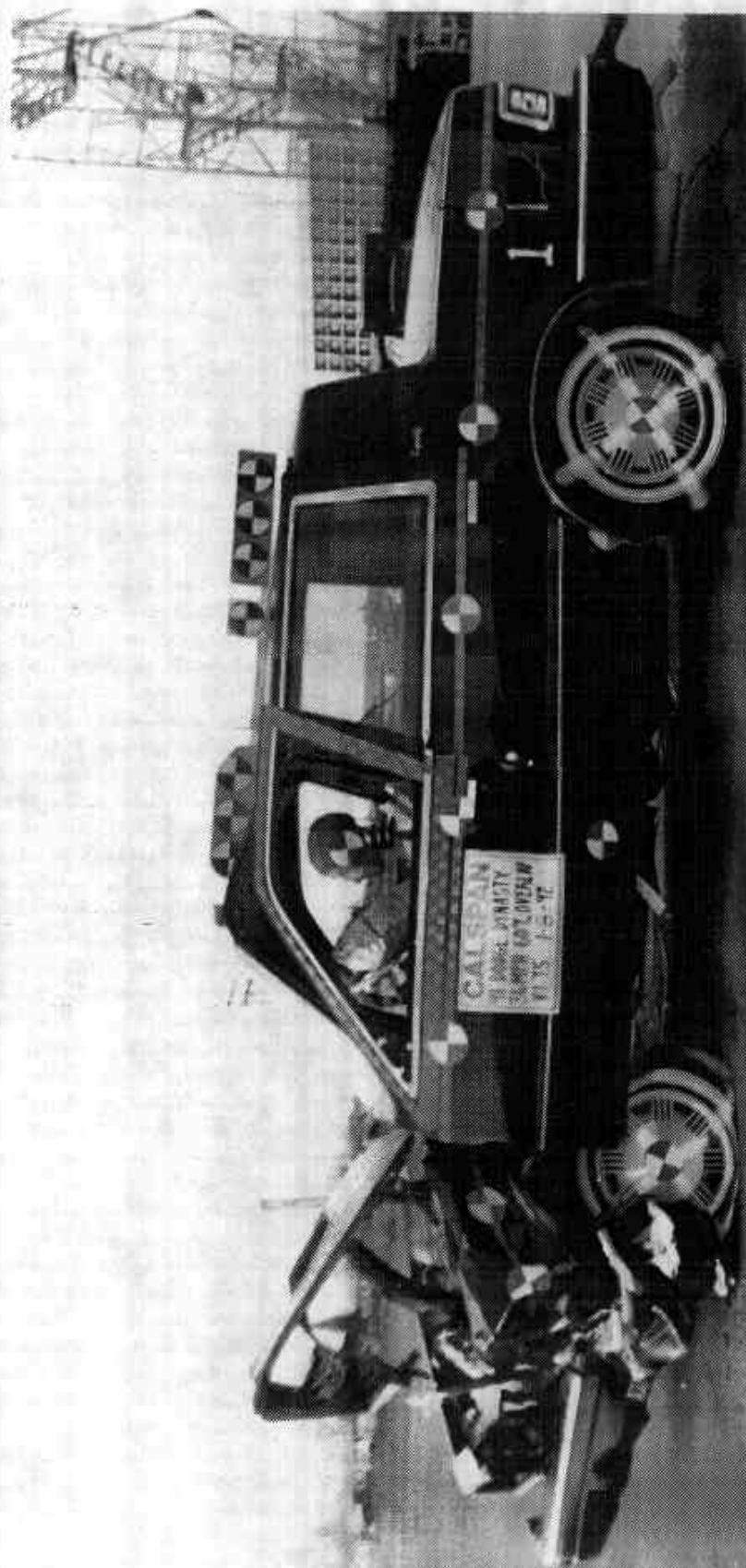


Figure A-19 VEHICLE 1 POST-TEST LEFT SIDE VIEW



Figure A-20 VEHICLE 1 PRE-TEST FRONT LEFT THREE QUARTER VIEW



Figure A-21 VEHICLE 1 POST-TEST FRONT LEFT THREE QUARTER VIEW

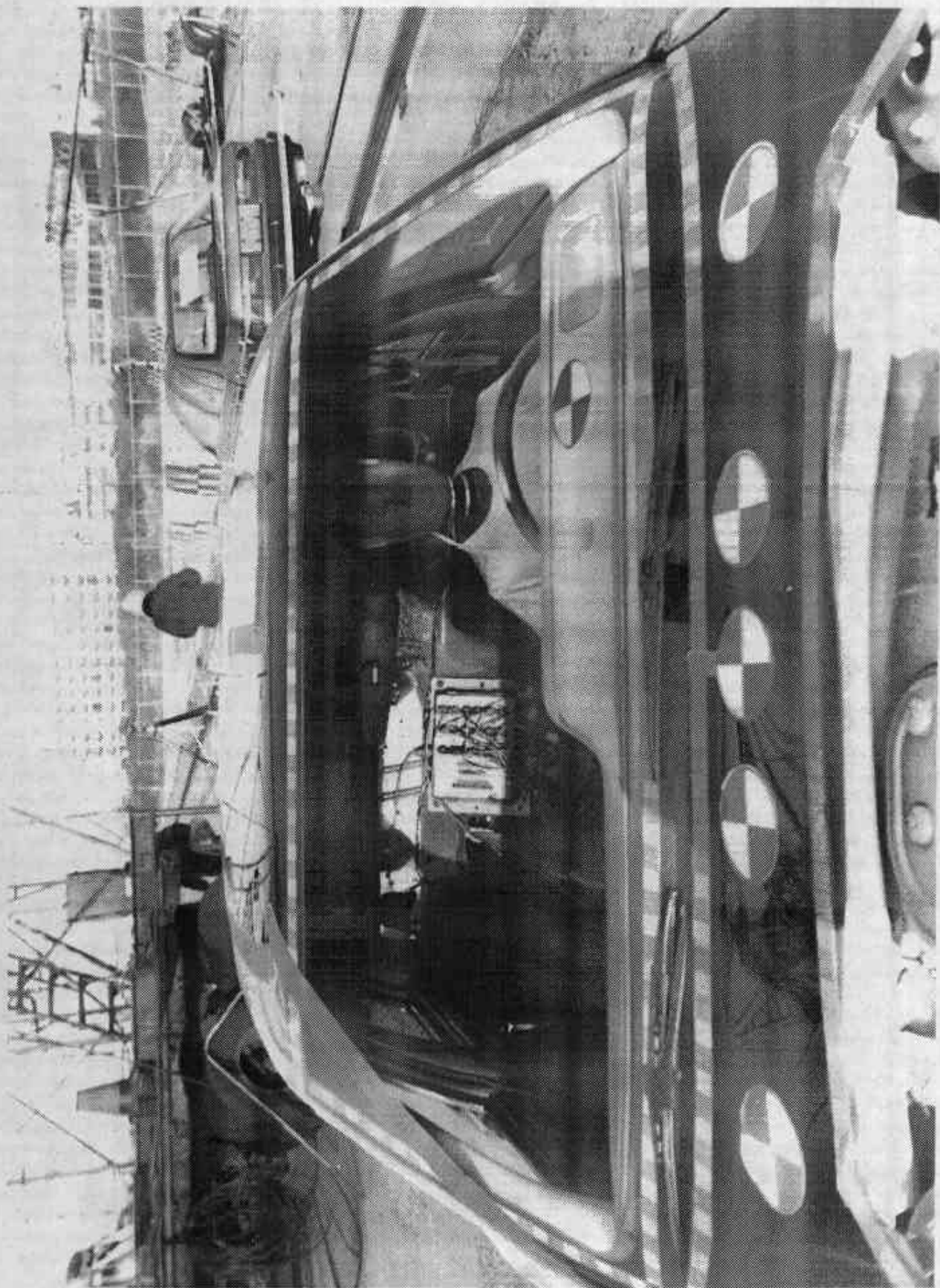


Figure A-22 VEHICLE 1 PRE-TEST WINDSHIELD VIEW



Figure A-23 VEHICLE 1 POST-TEST WINDSHIELD VIEW

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Figure A-24: VEHICLE 1 PRE-TEST OVERHEAD ENGINE COMPARTMENT VIEW



Figure A-25 VEHICLE 1 POST-TEST OVERHEAD ENGINE COMPARTMENT VIEW

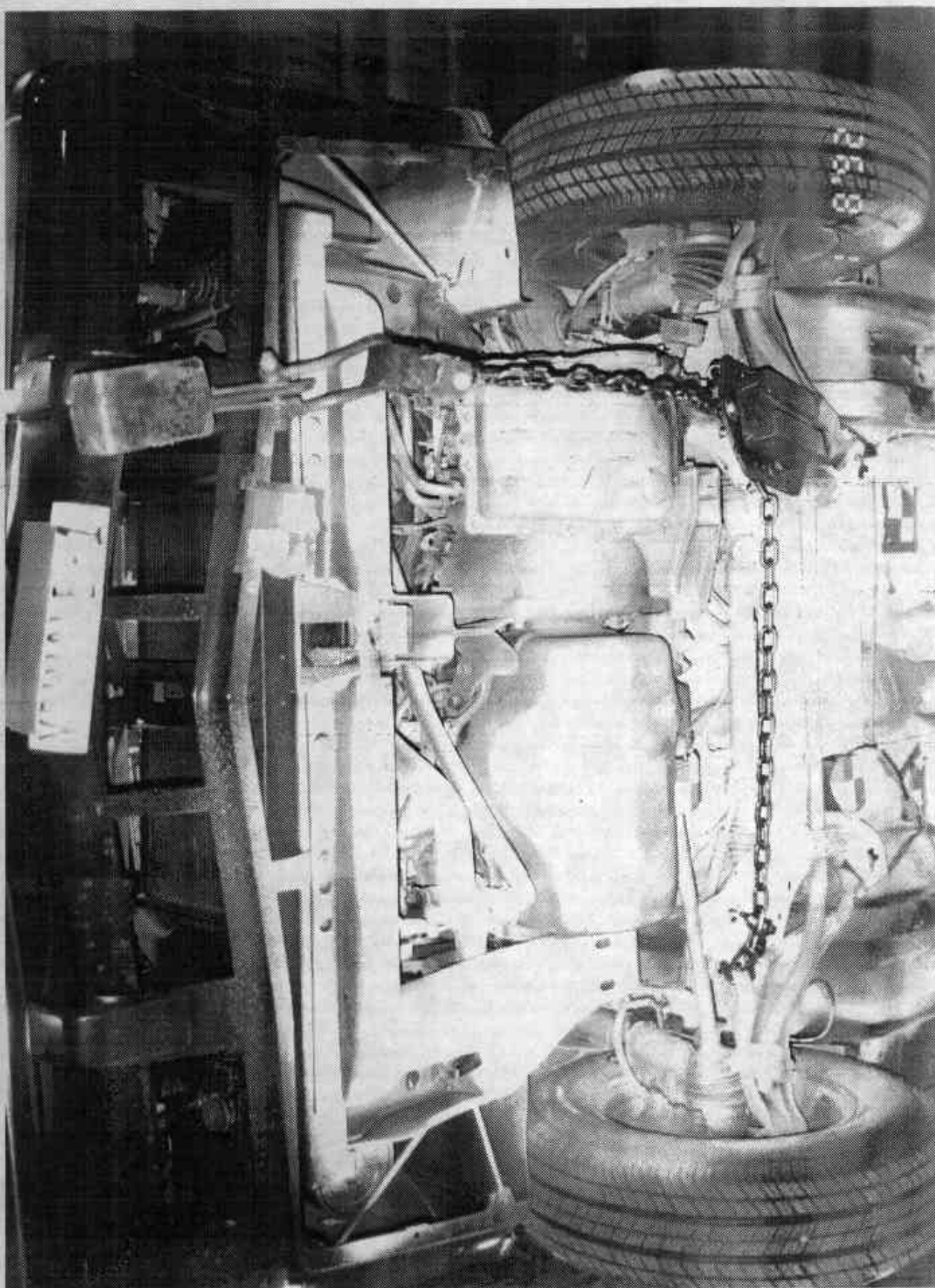


Figure A-26 VEHICLE 1 PRE-TEST UNDERBODY FRONT VIEW



Figure A-27 VEHICLE 1 POST-TEST UNDERBODY FRONT VIEW

A-30

7942-5

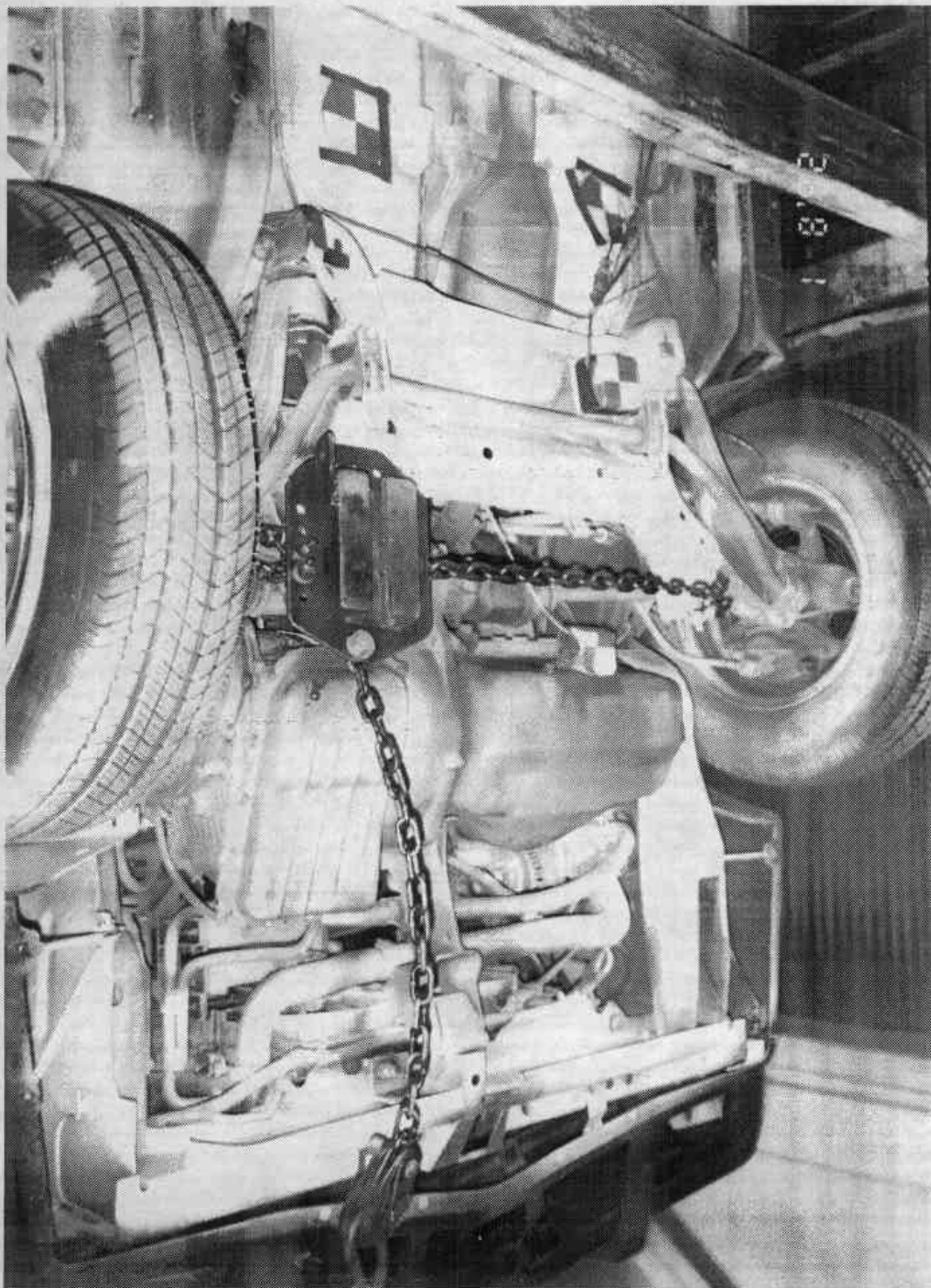


Figure A-28 VEHICLE 1 PRE-TEST UNDERBODY FRONT SIDE VIEW

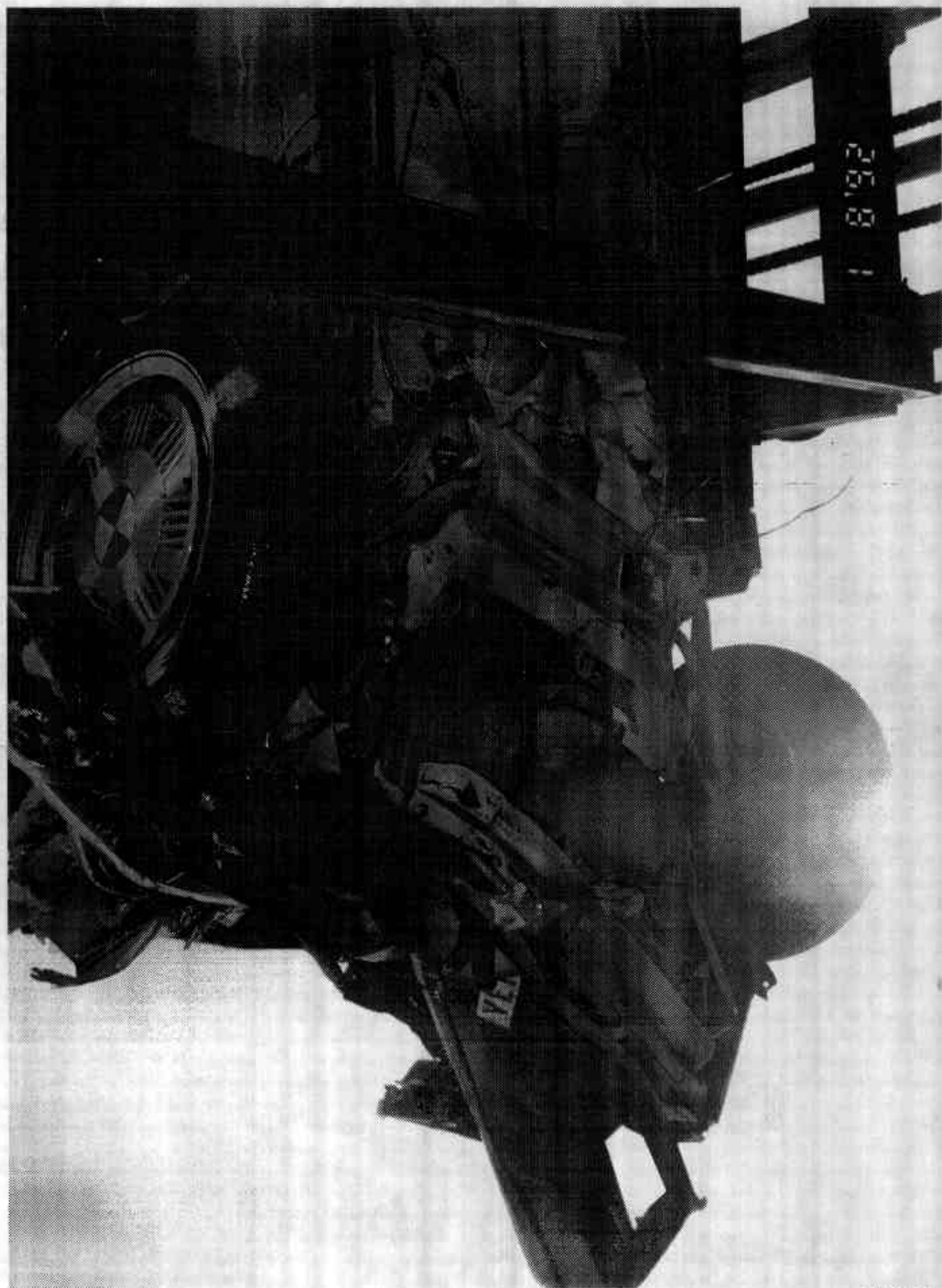


Figure A-29 VEHICLE 1 POST-TEST UNDERBODY FRONT SIDE VIEW

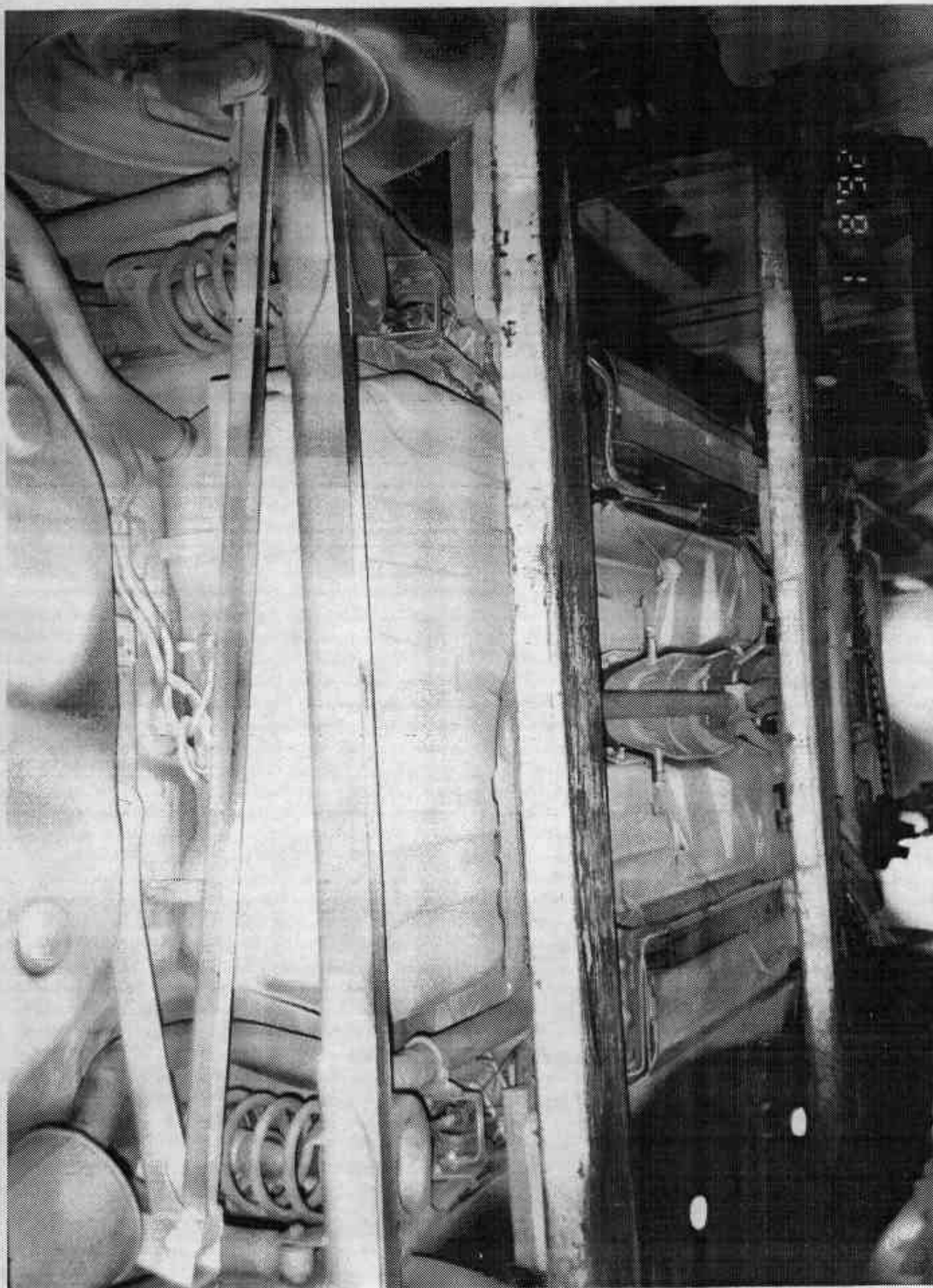


FIGURE A-30. VEHICLE 1 PRE-TEST UNDERBODY REAR VIEW

A-33

7042-5

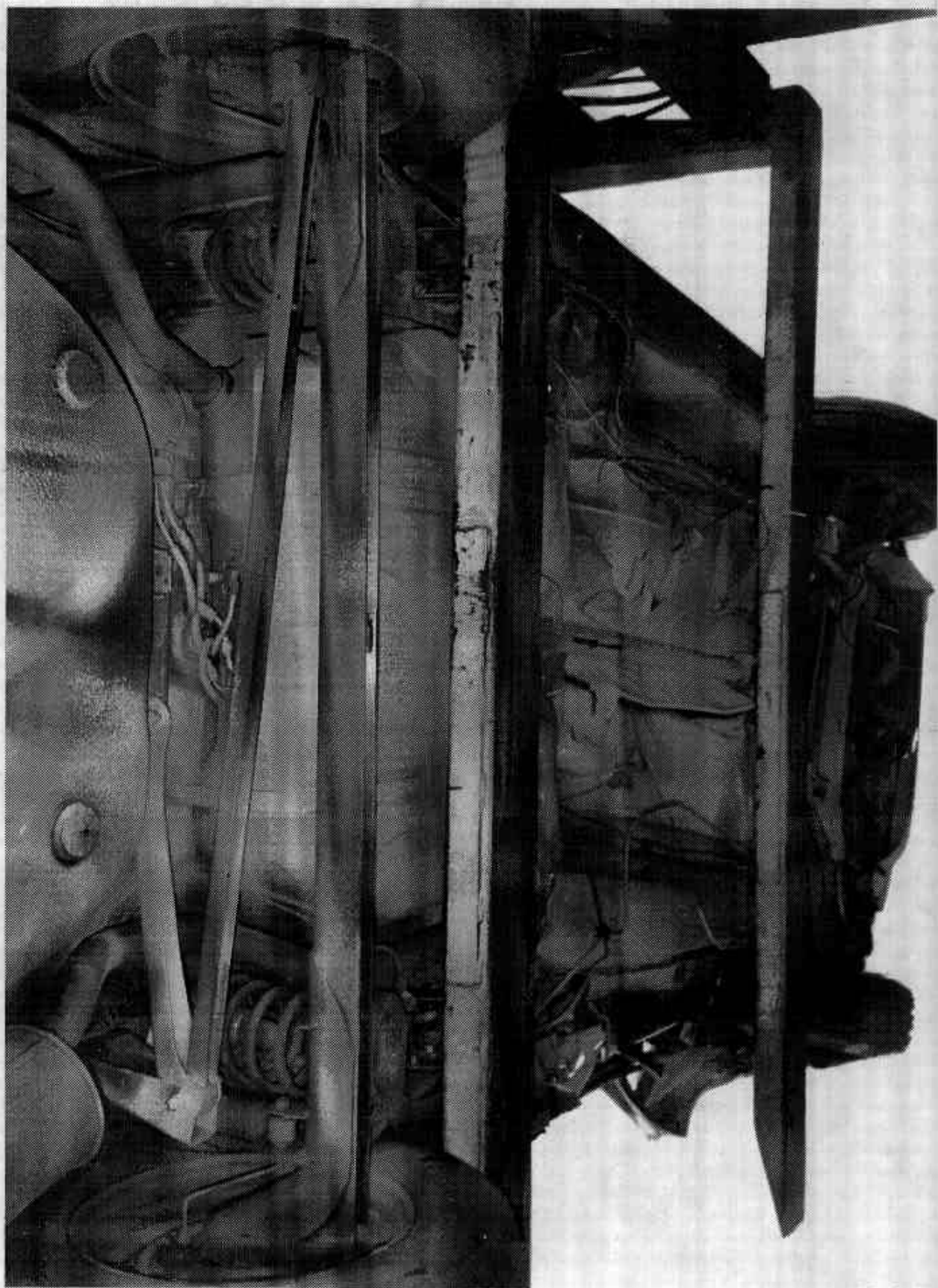


Figure A-31 VEHICLE 1 POST-TEST UNDERBODY REAR VIEW

A-34

7942-5

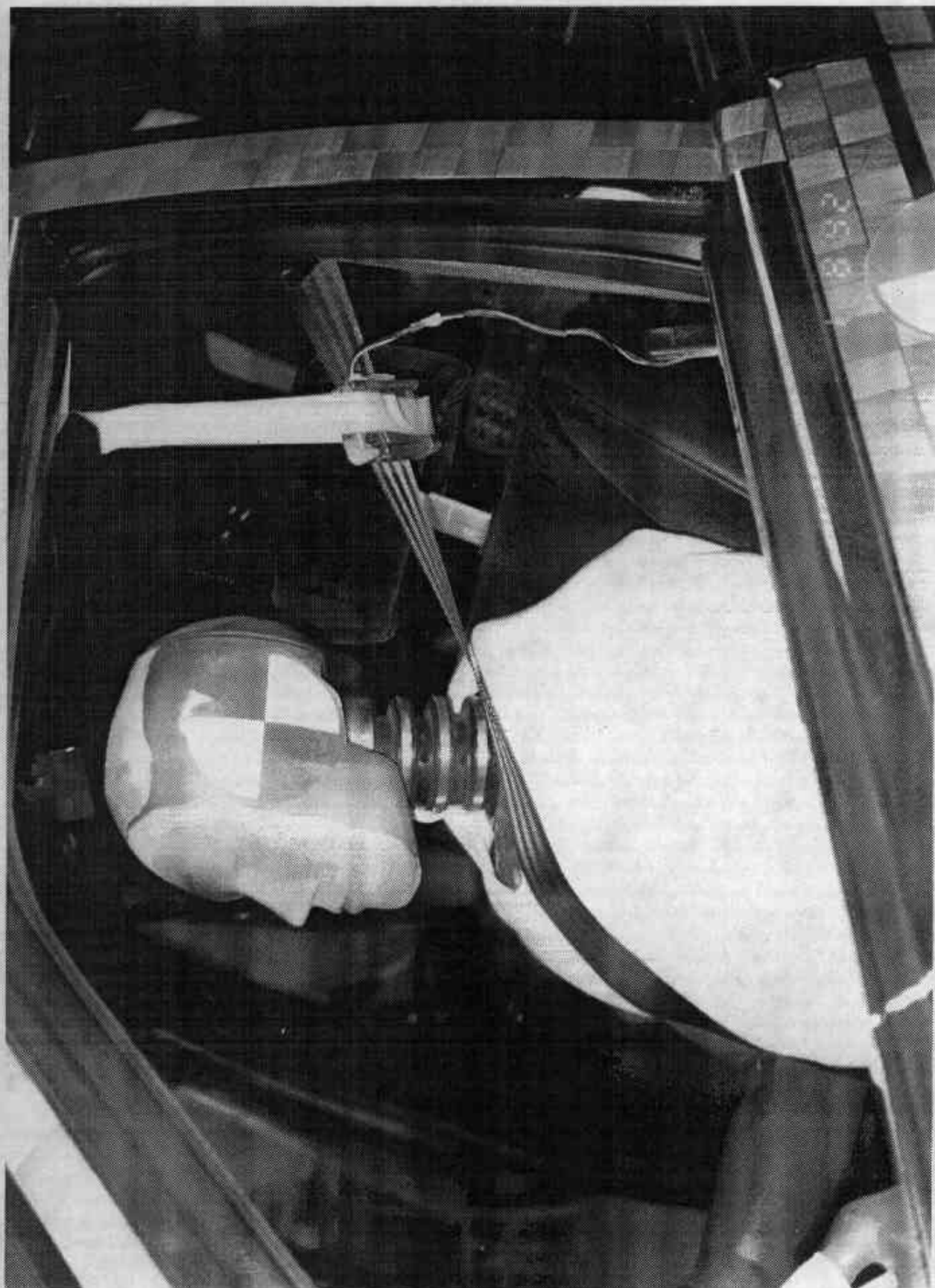


Figure A-32 VEHICLE 1 PRE-TEST DRIVER POSITION VIEW

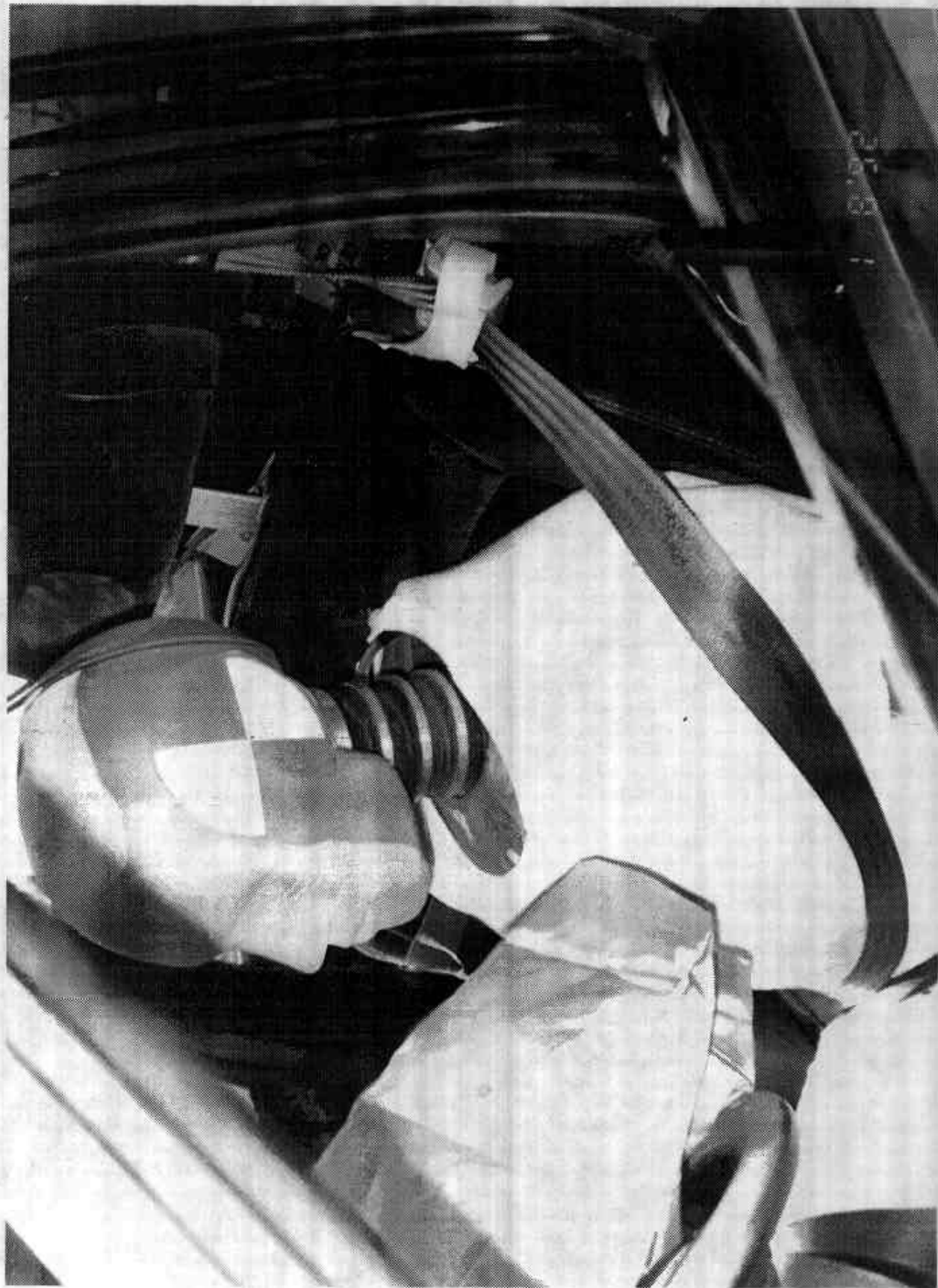
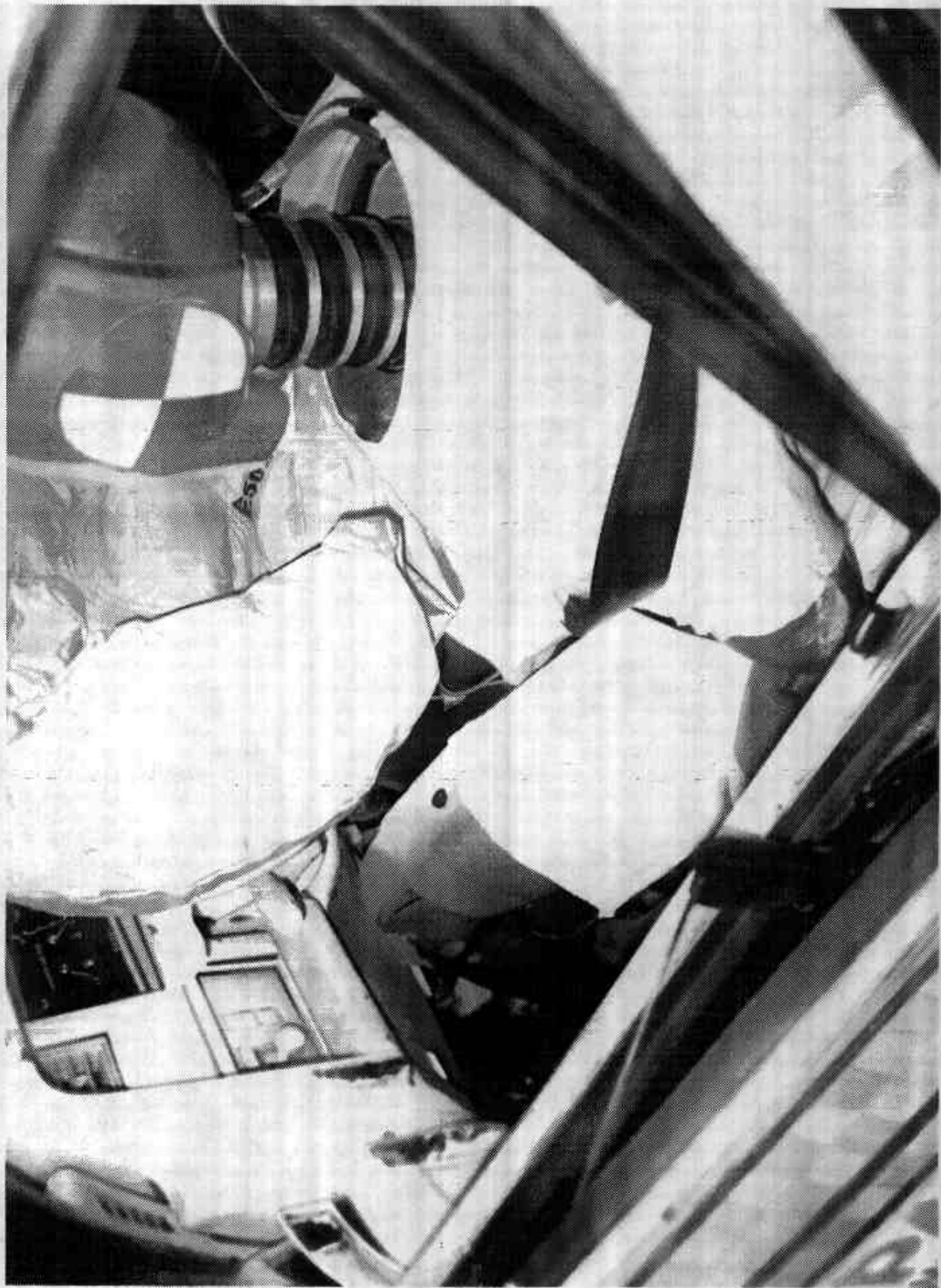


Figure A-33 VEHICLE 1 POST-TEST DRIVER POSITION VIEW



Figure A-34 VEHICLE 1 PRE-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW



A-38

7942-5

Figure A-35 VEHICLE 1 POST-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW

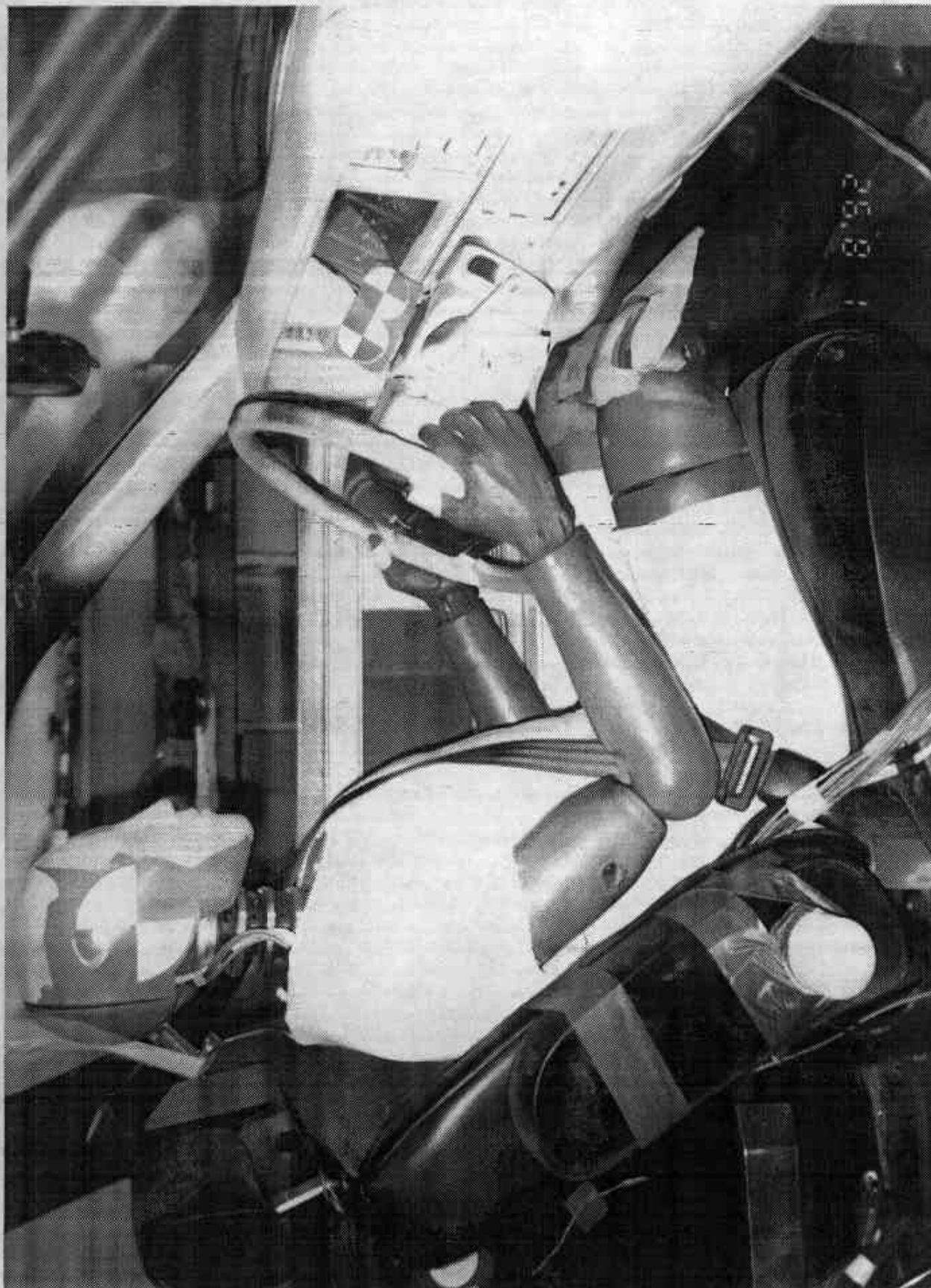


Figure A-36 VEHICLE 1 PRE-TEST DRIVER AND OCCUPANT COMPARTMENT RIGHT SIDE VIEW

A-39

7942-5



Figure A-37 VEHICLE 1 POST-TEST DRIVER AND OCCUPANT COMPARTMENT RIGHT SIDE VIEW

A-40

7942-5

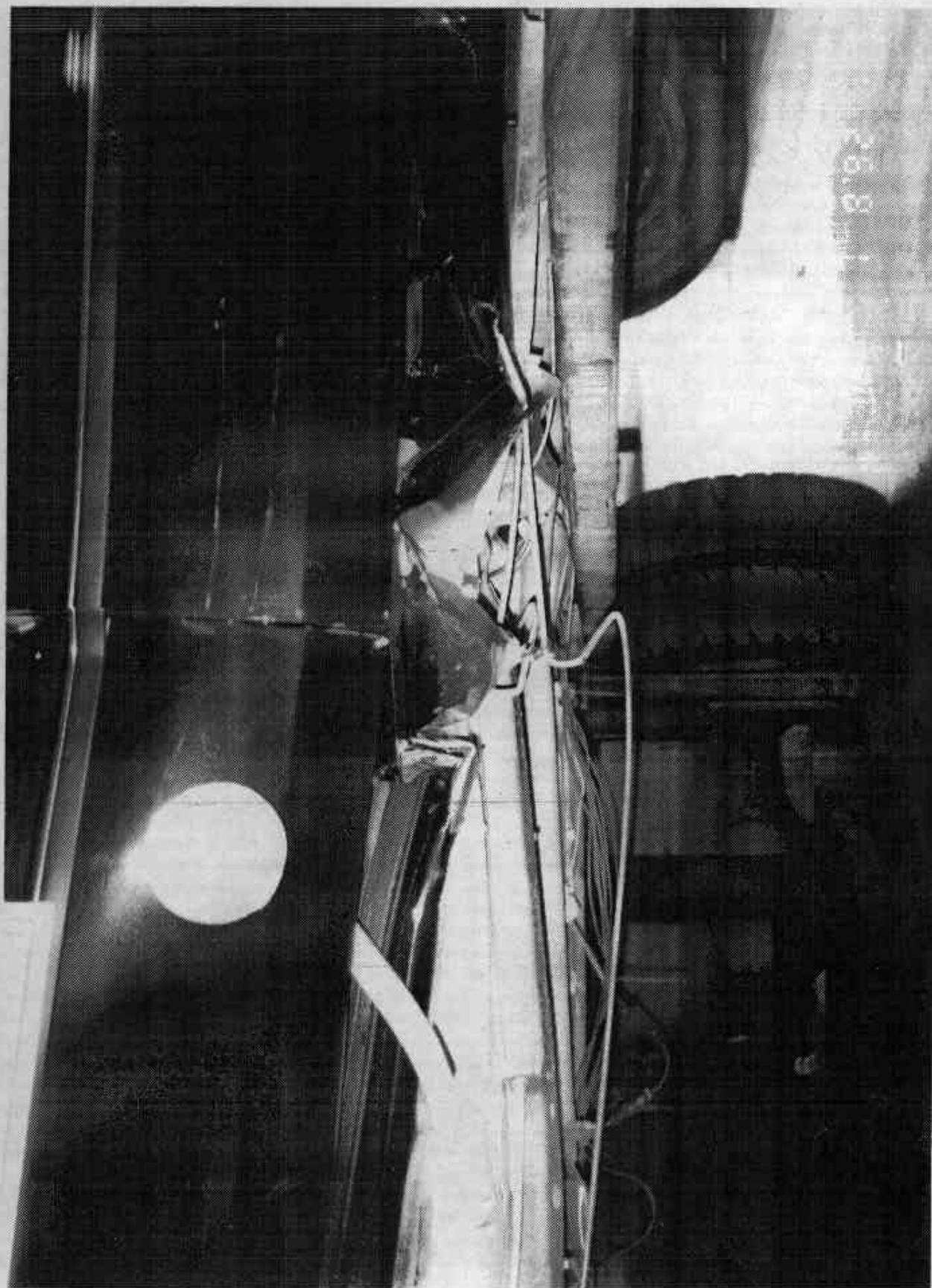
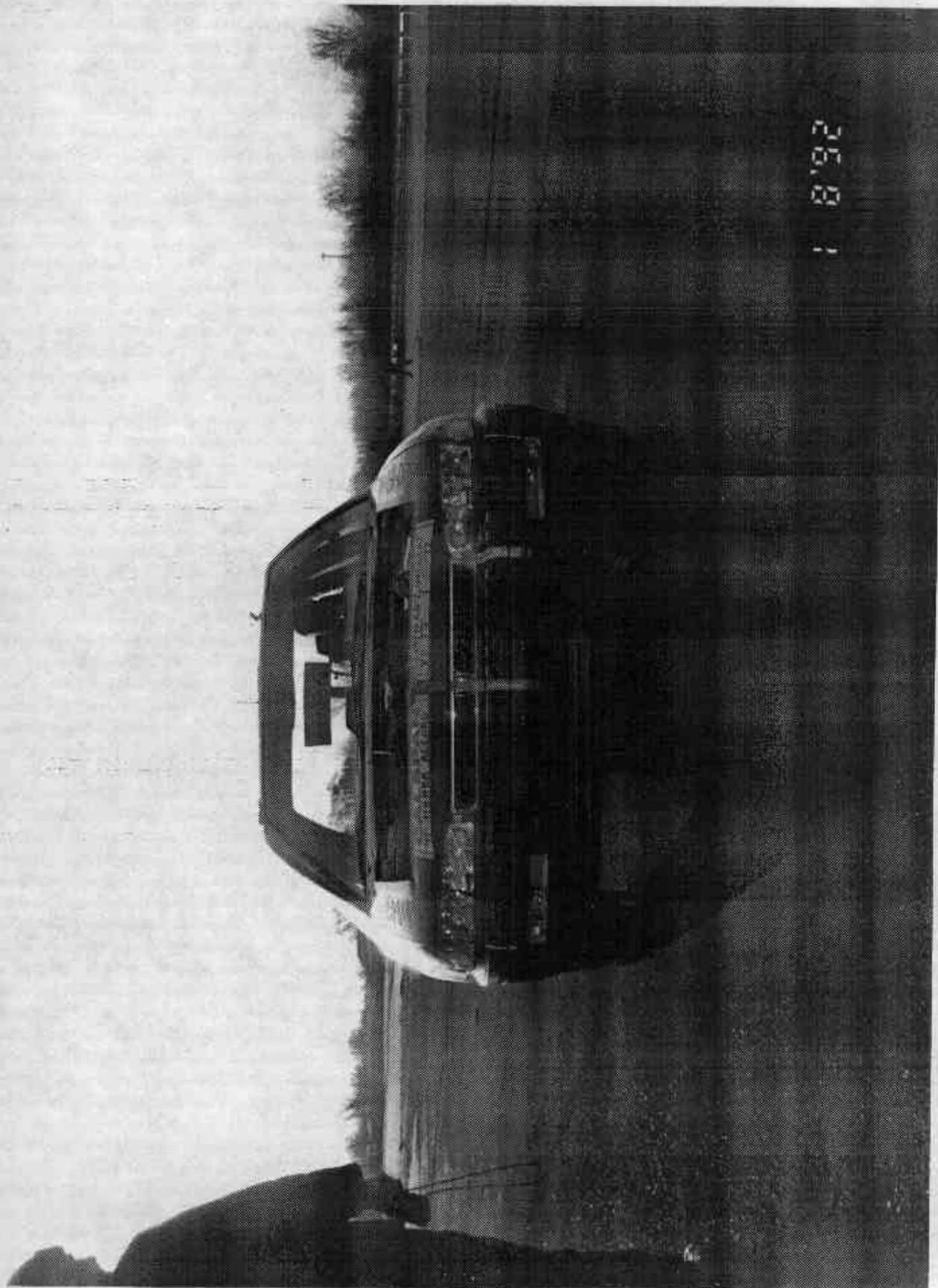


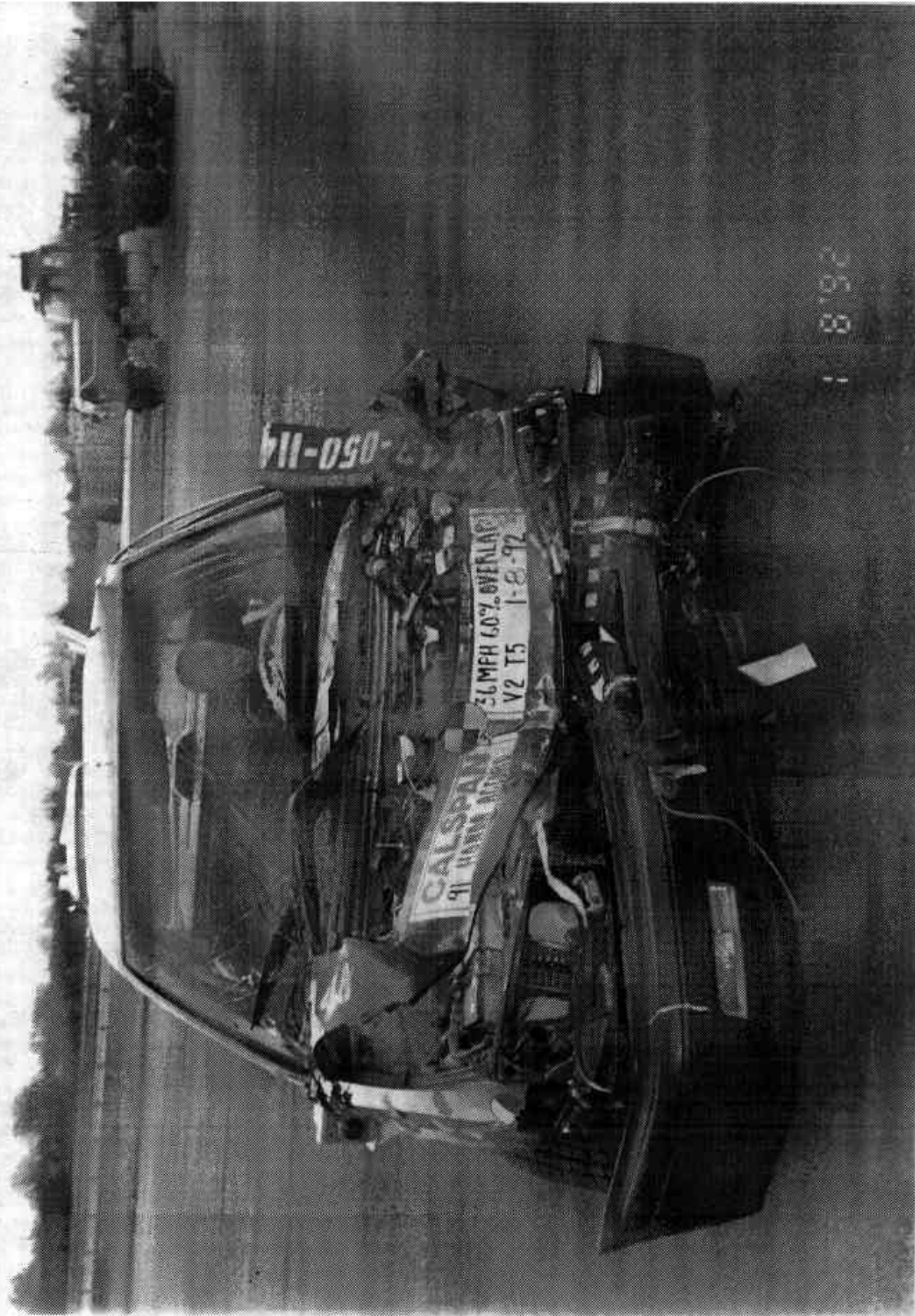
Figure A-38 VEHICLE 1 POST-TEST LOWER LEFT SIDE SILL VIEW

VEHICLE 2 PHOTOGRAPHS



1 8'92

Figure A-39 VEHICLE 2 PRE-TEST FRONT VIEW



1 8 92

Figure A-40 VEHICLE 2 POST-TEST FRONT VIEW



Figure A-41 VEHICLE 2 PRE-TEST FRONT RIGHT THREE QUARTER VIEW

A-45

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A-40

7942-5

Figure A-42 VEHICLE 2 POST-TEST FRONT RIGHT THREE QUARTER VIEW

1 8'32



1 8'32"

Figure A-43 VEHICLE 2 PRE-TEST RIGHT SIDE VIEW

A-47

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1 81932

Figure A-44 VEHICLE 2 POST-TEST RIGHT SIDE VIEW

A-48

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Figure A-45 VEHICLE 2 PRE-TEST REAR RIGHT THREE QUARTER VIEW

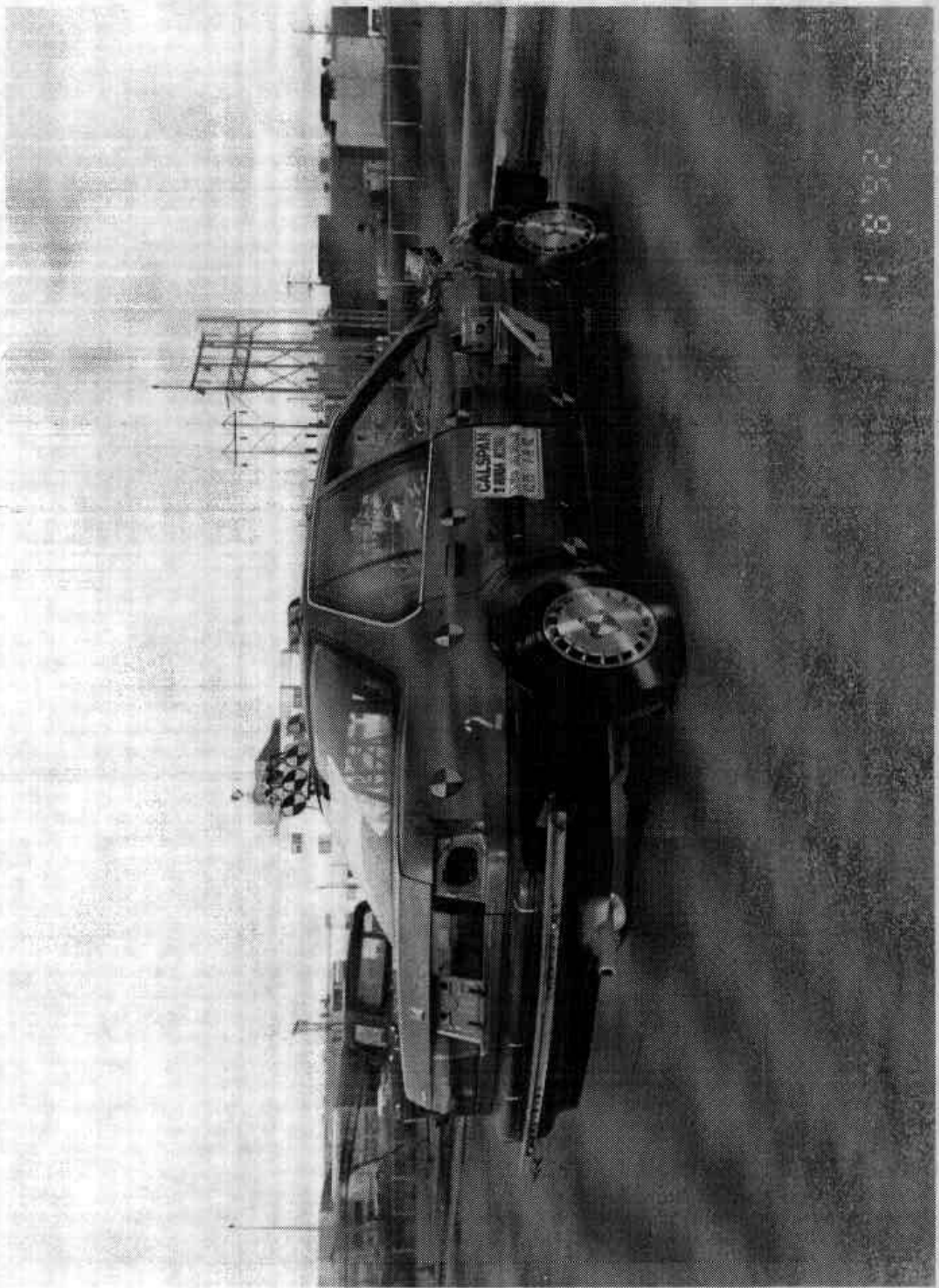


Figure A-48 VEHICLE 2 POST-TEST REAR RIGHT THREE QUARTER VIEW

A-50

7942-5

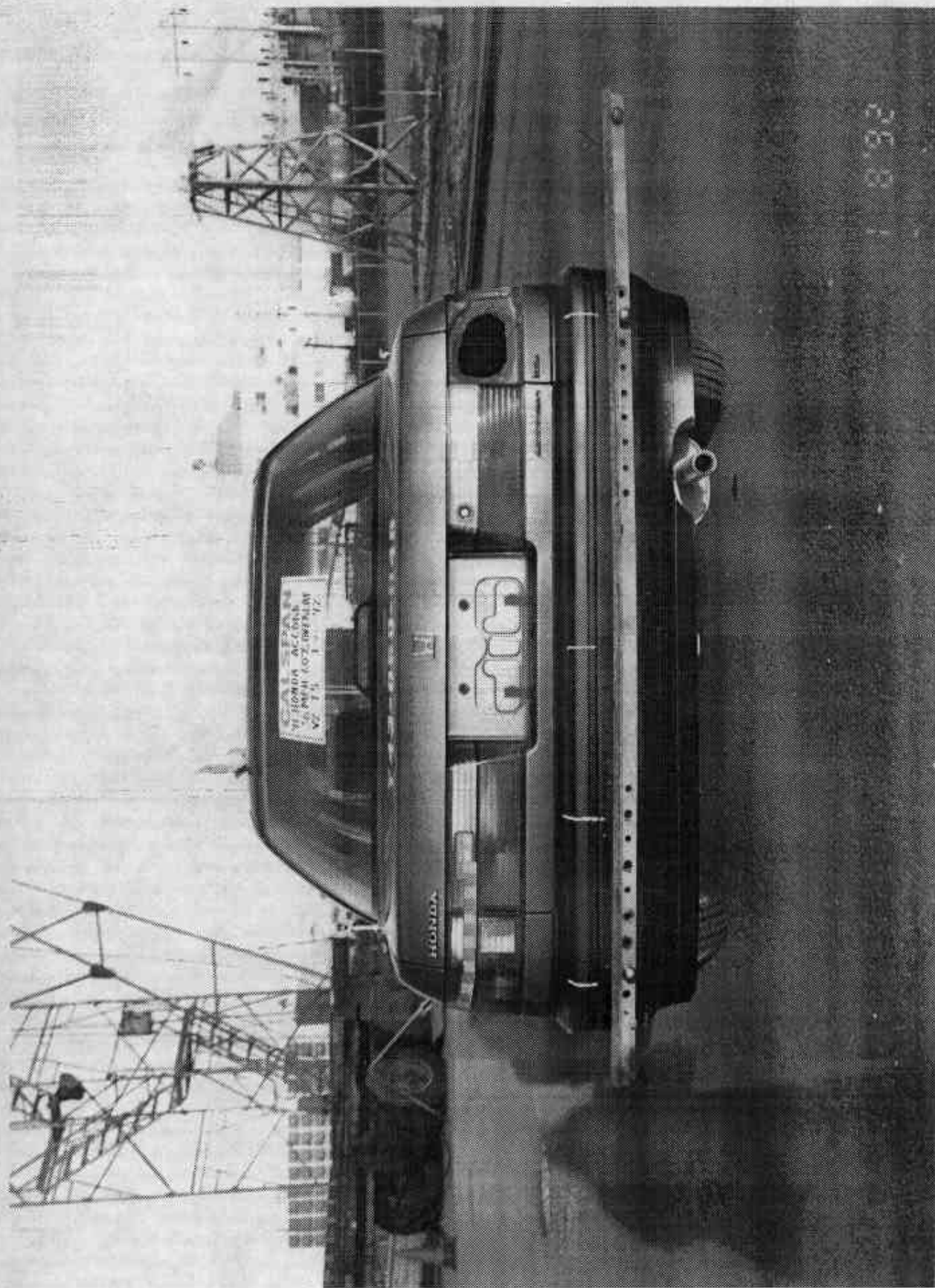


Figure A-47 VEHICLE 2 PRE-TEST REAR VIEW

A-51

7942-5

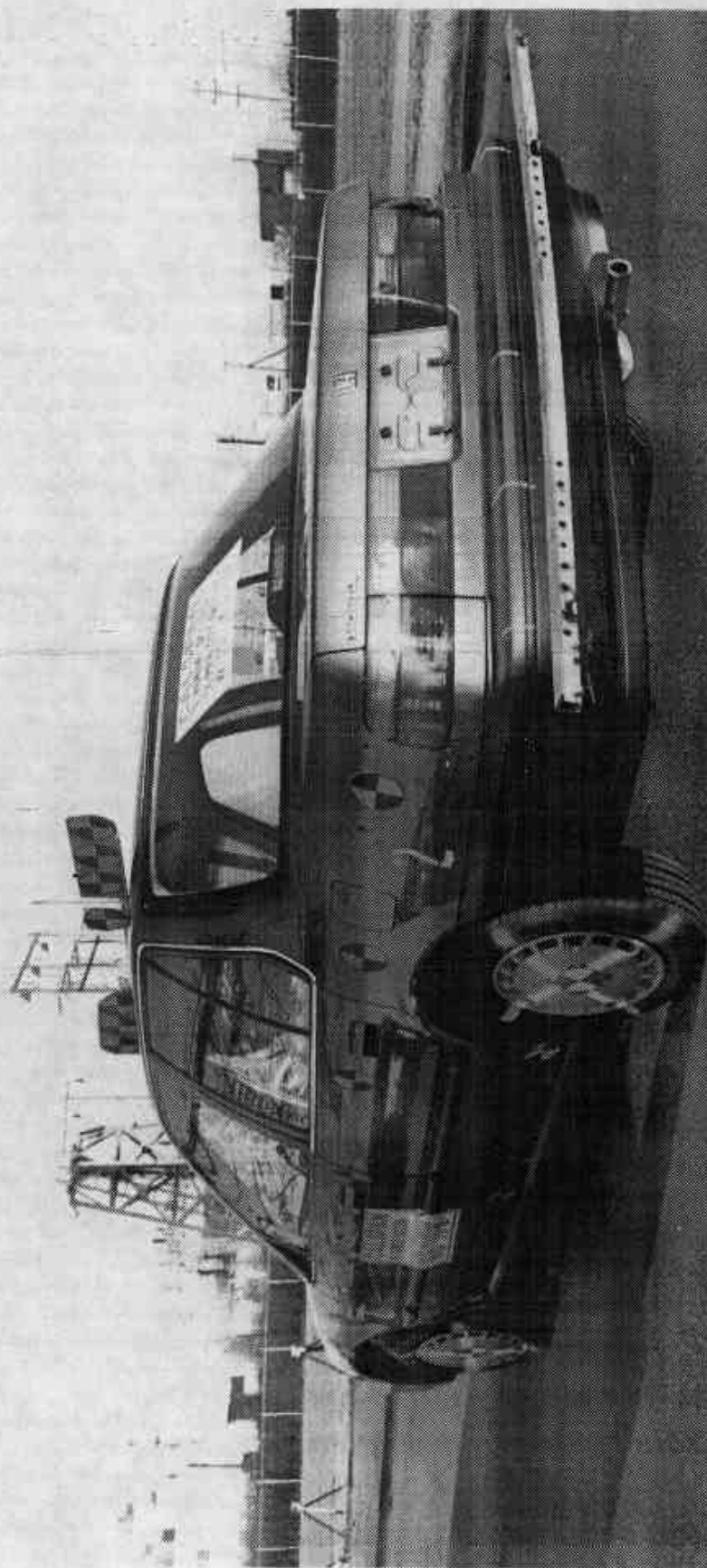


26.8 1 8.92

Figure A-45 VEHICLE 2 POST-TEST REAR VIEW

A-52

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A-53

7942-5

Figure A-49 VEHICLE 2 PRE-TEST REAR LEFT THREE QUARTER VIEW

1 8'92



Figure A-50 VEHICLE 2 POST-TEST REAR LEFT THREE QUARTER VIEW

A-54

7942-5



FIGURE A-51 VEHICLE 2 PRE-TEST LEFT SIDE VIEW

A-55

7942-5

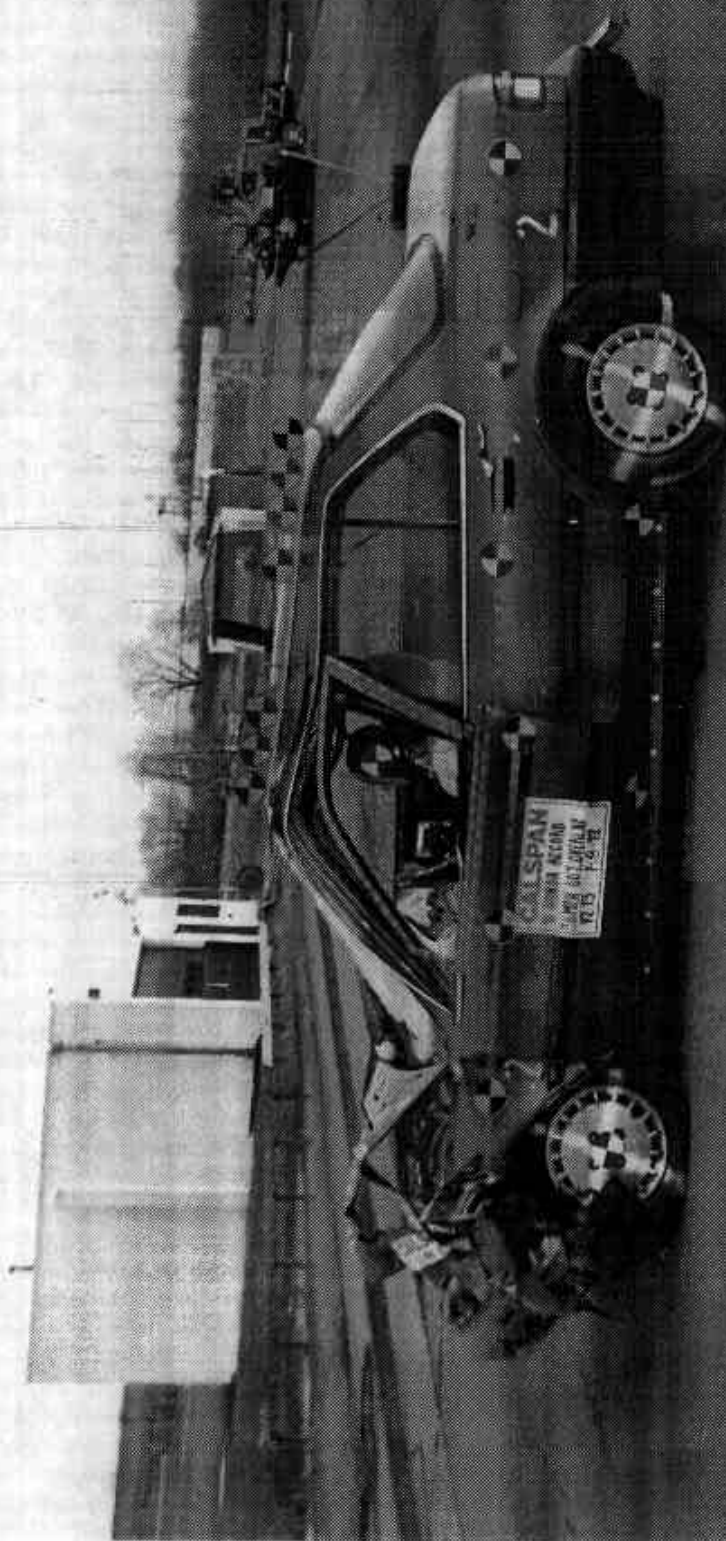


Figure A-52 VEHICLE 2 POST-TEST LEFT SIDE VIEW

A-56

7942-5

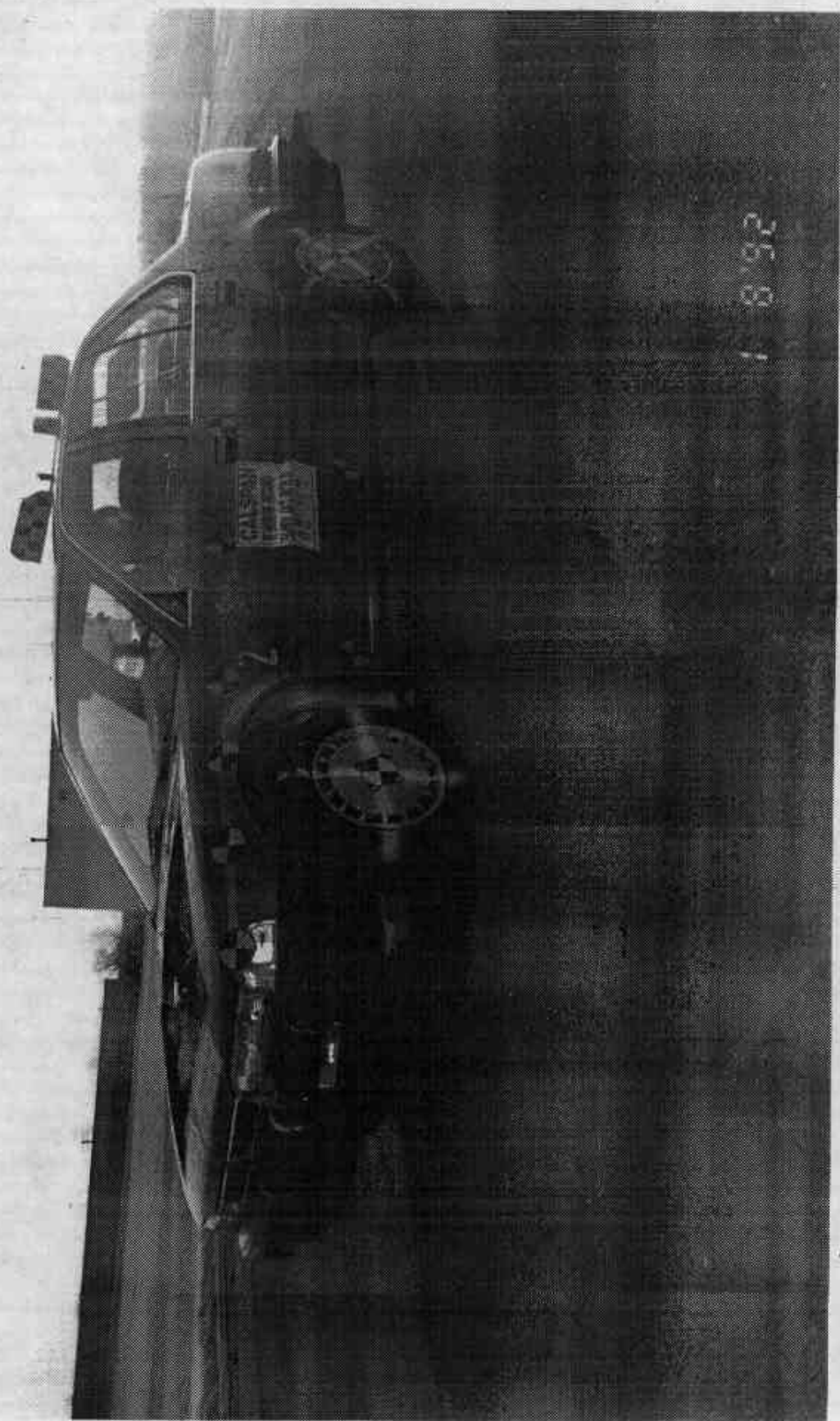


Figure A-53 VEHICLE 2 PRE-TEST FRONT LEFT THREE QUARTER VIEW

A-57

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11-USD

Figure A-54 VEHICLE 2 POST-TEST FRONT LEFT THREE QUARTER VIEW

A-58

7042-5

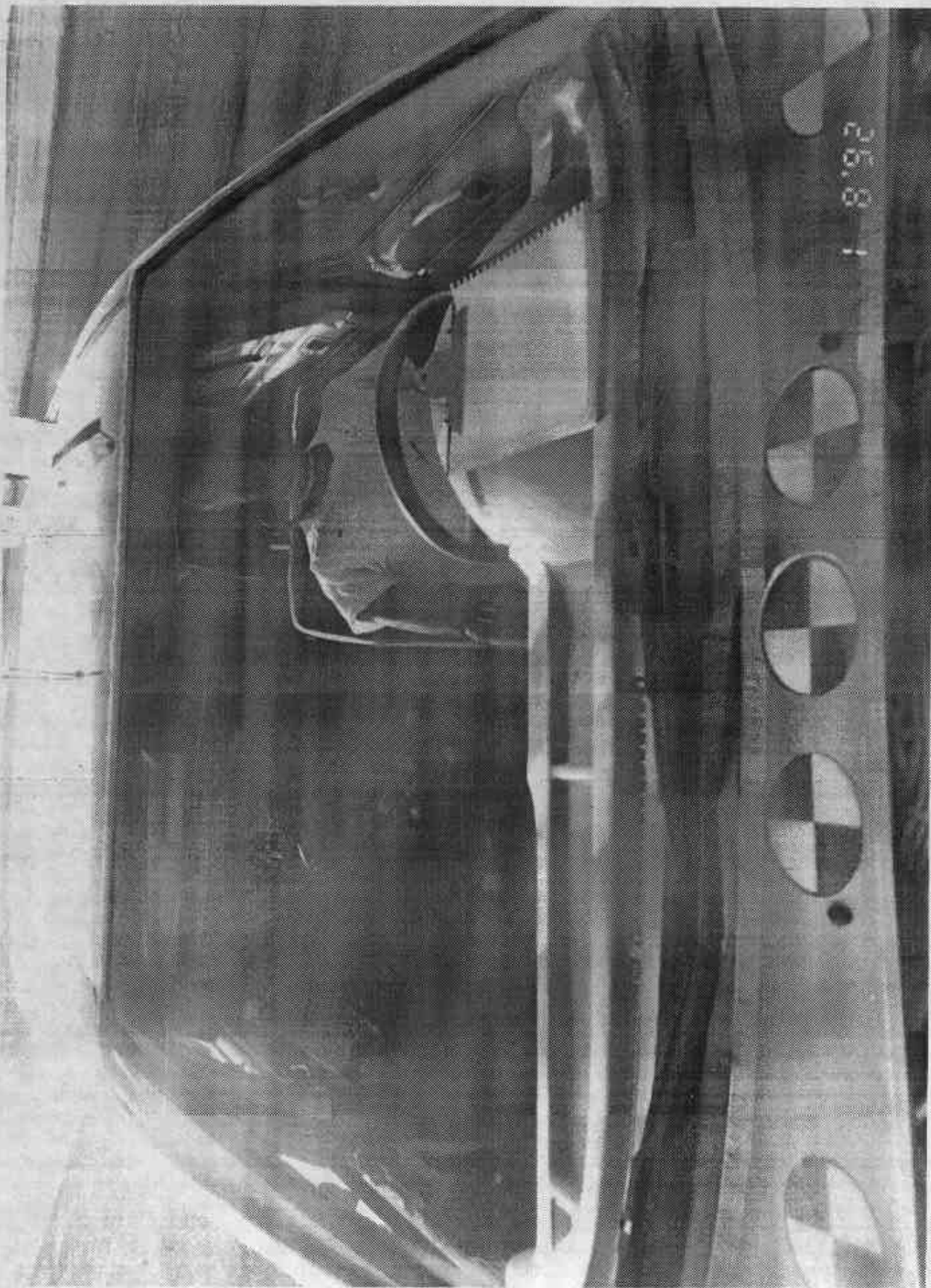


Figure A-55 VEHICLE 2 PRE-TEST WINDSHIELD VIEW

A-59

7942-5

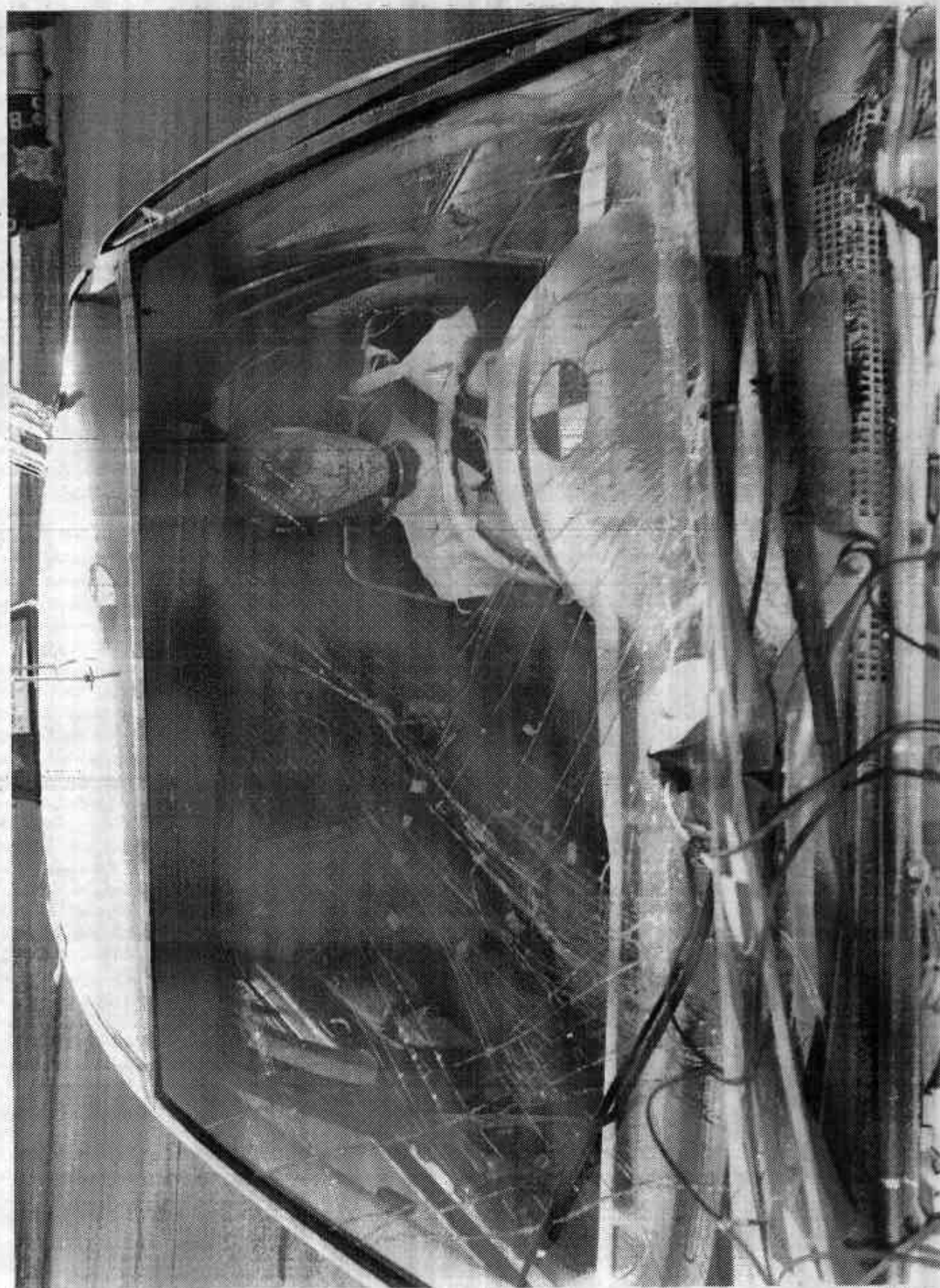


Figure A-56 VEHICLE 2 POST-TEST WINDSHIELD VIEW

A-60

7942-5



Figure A-57 VEHICLE 2 PRE-TEST OVERHEAD ENGINE COMPARTMENT VIEW



Figure A-58 VEHICLE 2 POST-TEST OVERHEAD ENGINE COMPARTMENT VIEW

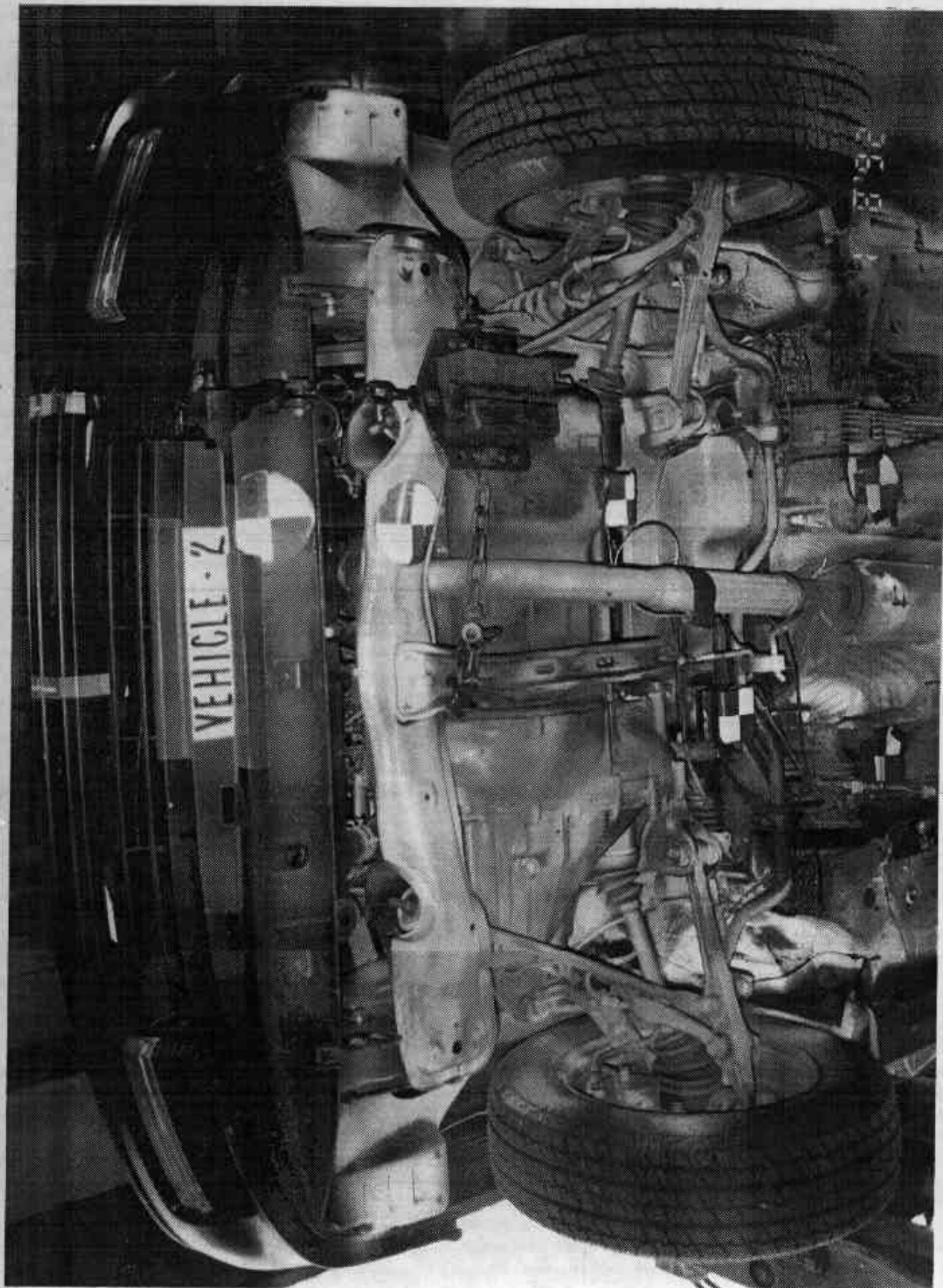
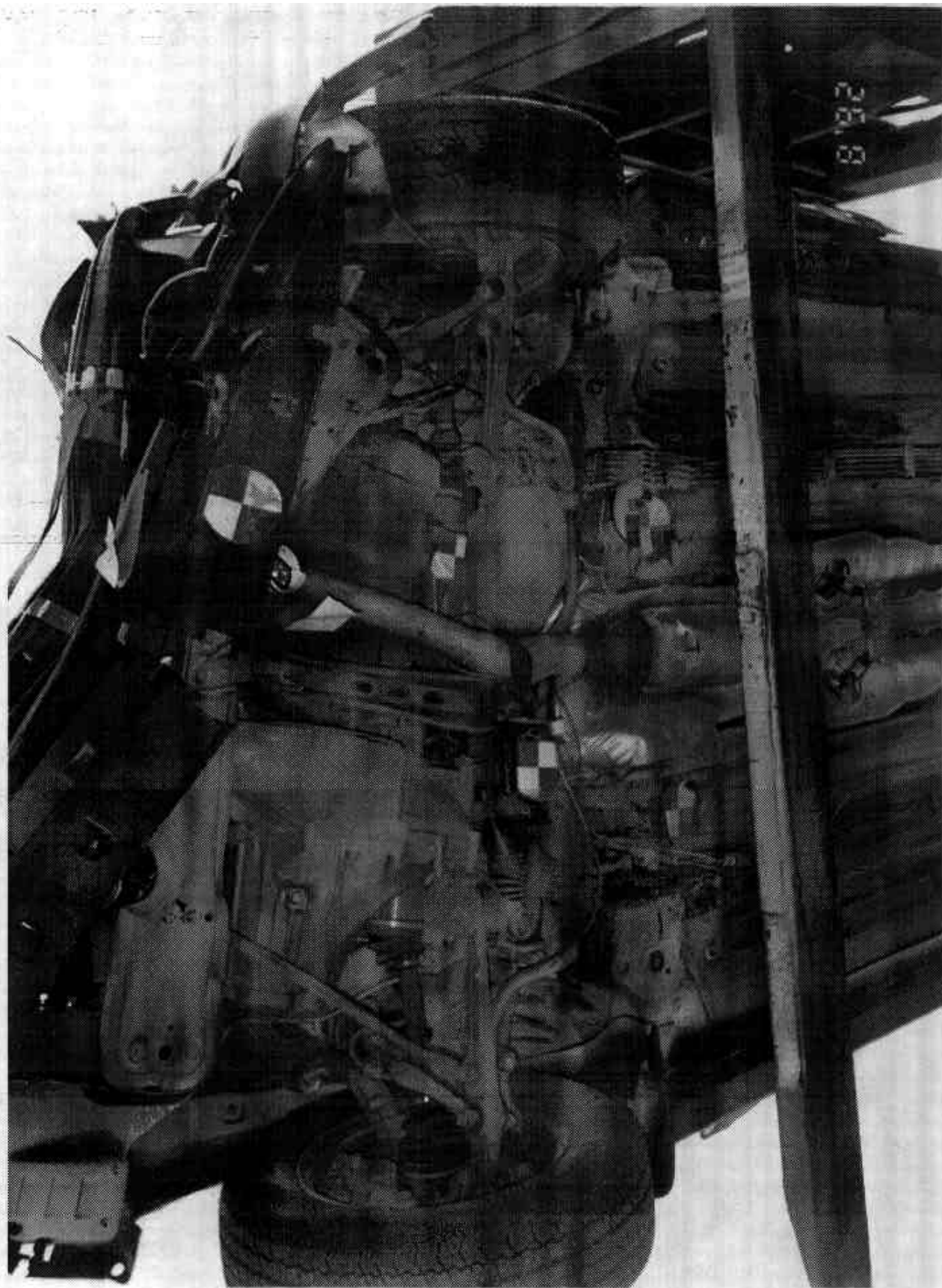


FIGURE A-59 VEHICLE 2 PRE-TEST UNDERBODY FRONT VIEW



A-64

7942-5

Figure A-60 VEHICLE 2 POST-TEST UNDERBODY FRONT VIEW

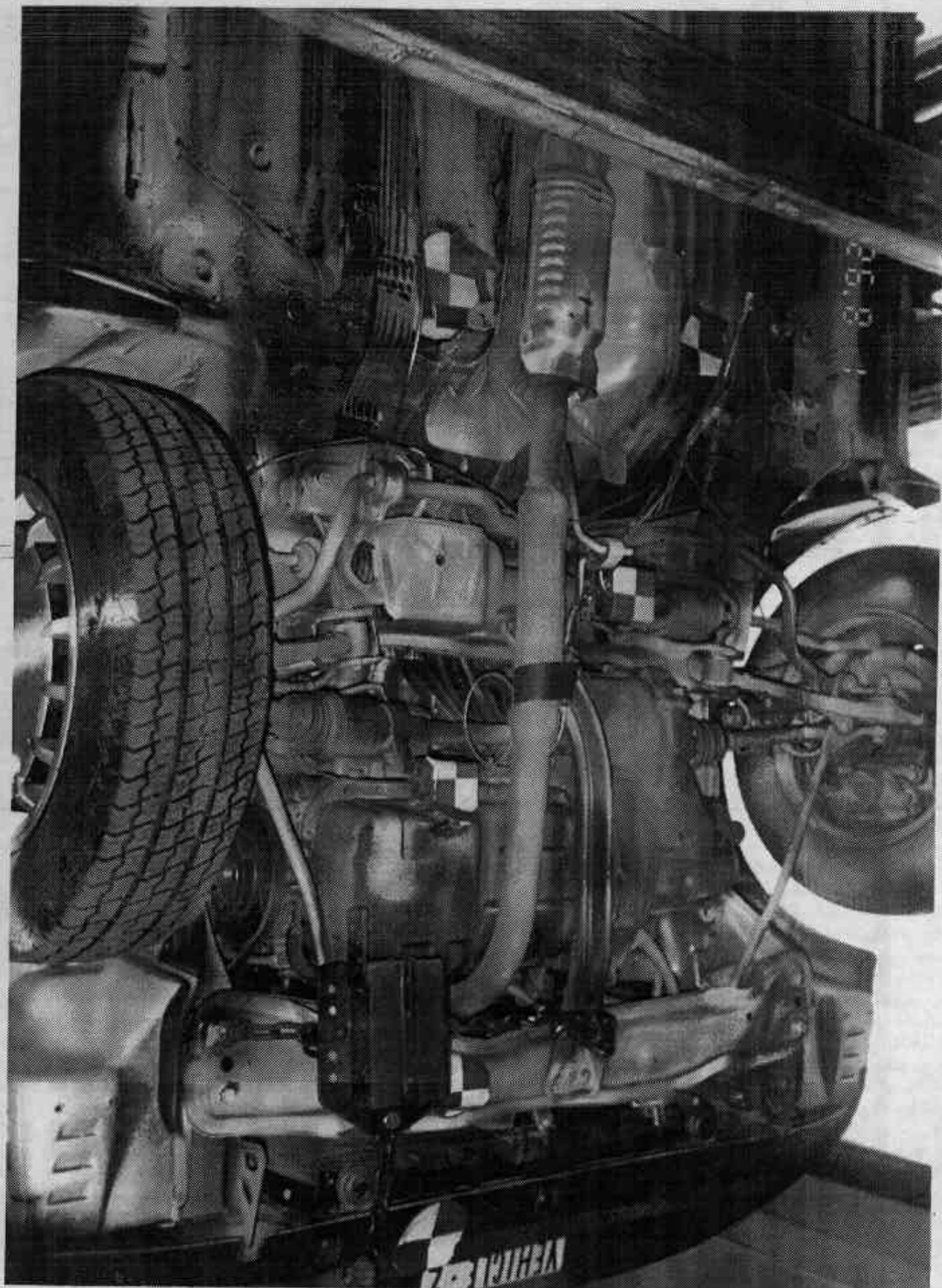


Figure A-61 VEHICLE 2 PRE-TEST UNDERBODY FRONT SIDE VIEW

A-65

7942-5

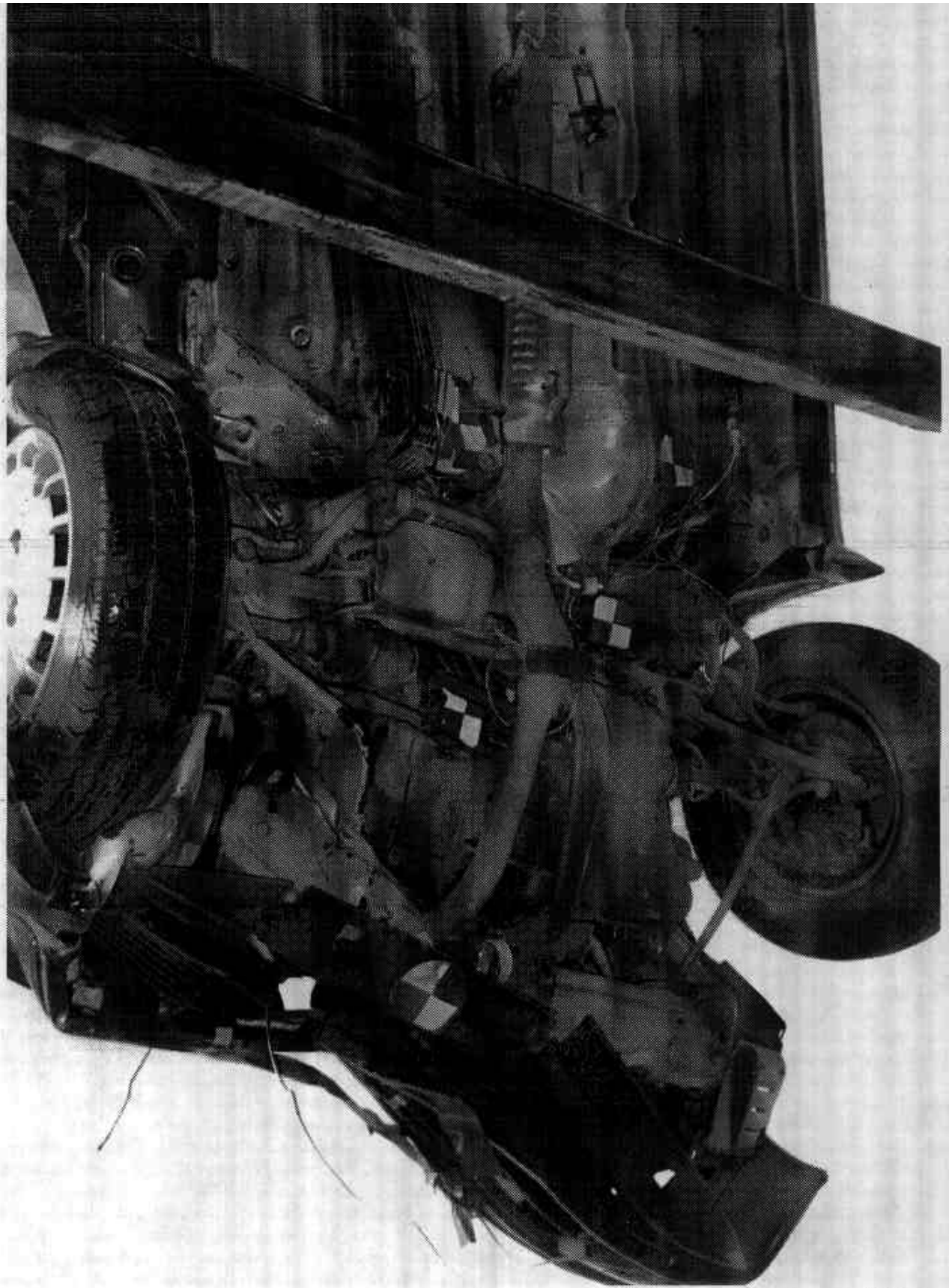


Figure A-62 VEHICLE 2 POST-TEST UNDERBODY FRONT SIDE VIEW

A-66

7942-5

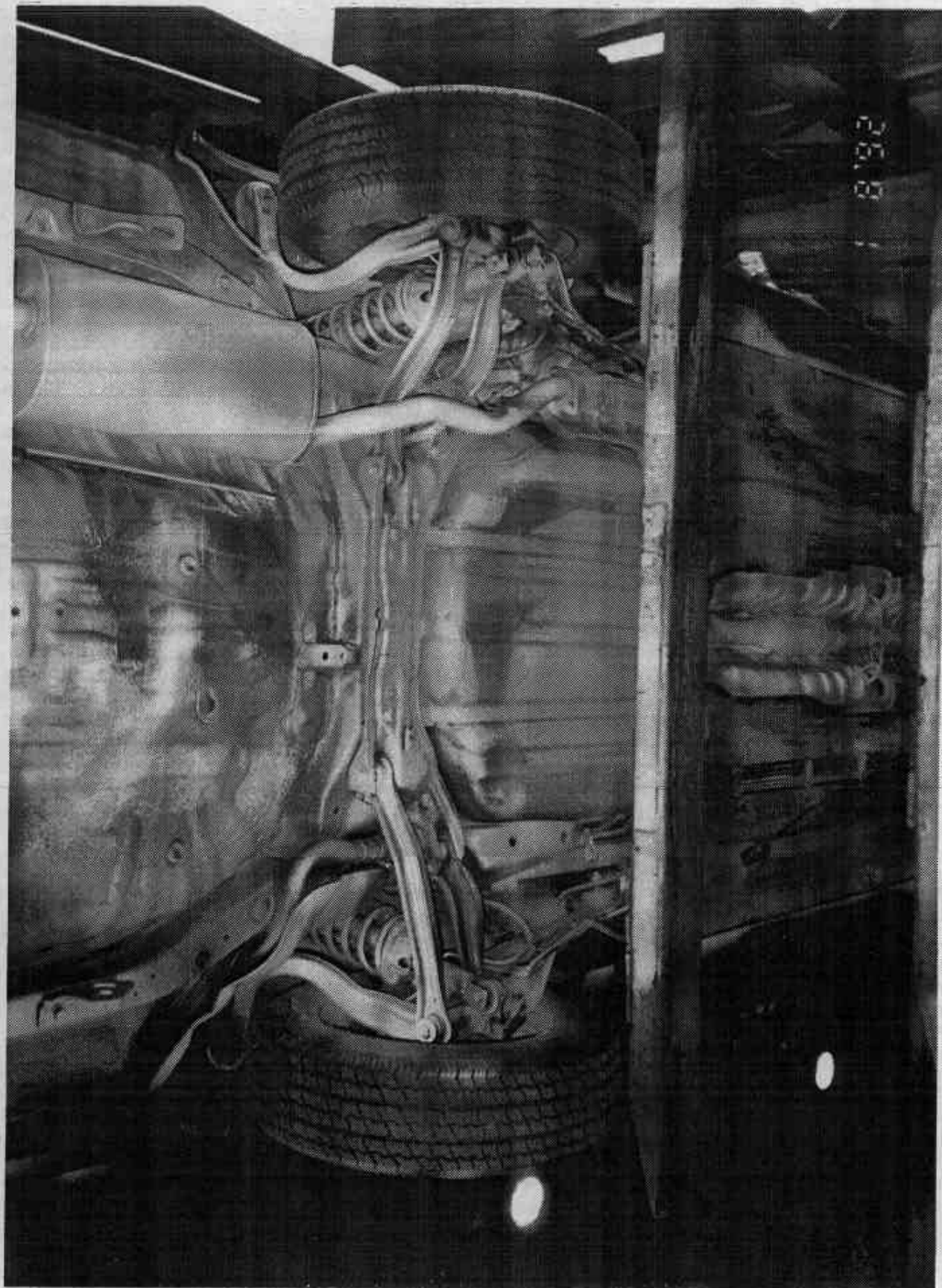


Figure A-63 VEHICLE 2 PRE-TEST UNDERBODY REAR VIEW

A-67

7942-5

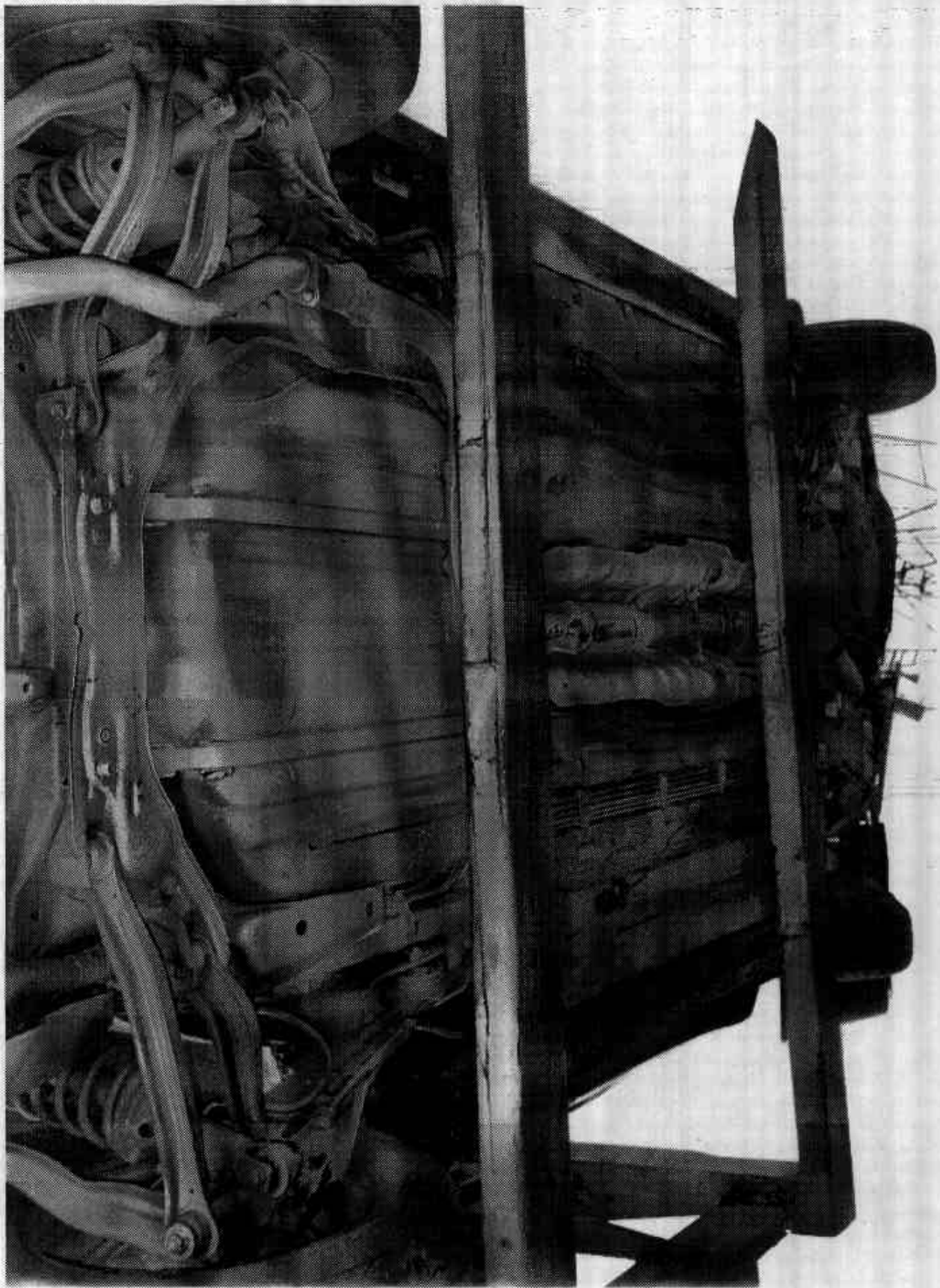


Figure A-64 VEHICLE 2 POST-TEST UNDERBODY REAR VIEW

A-68

7942-5

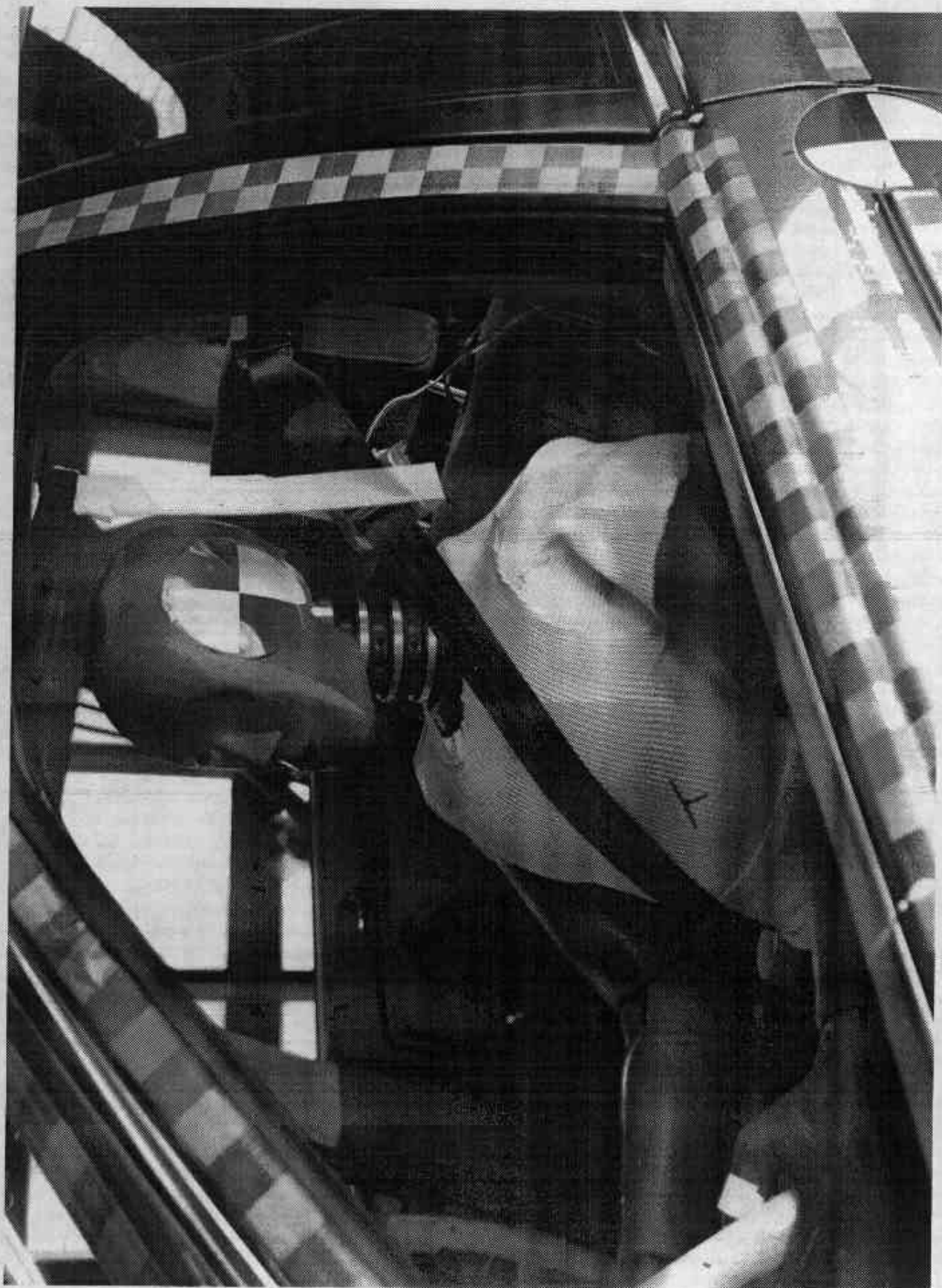


Figure A-65 VEHICLE 2 PRE-TEST DRIVER POSITION VIEW

A-69

7942-5

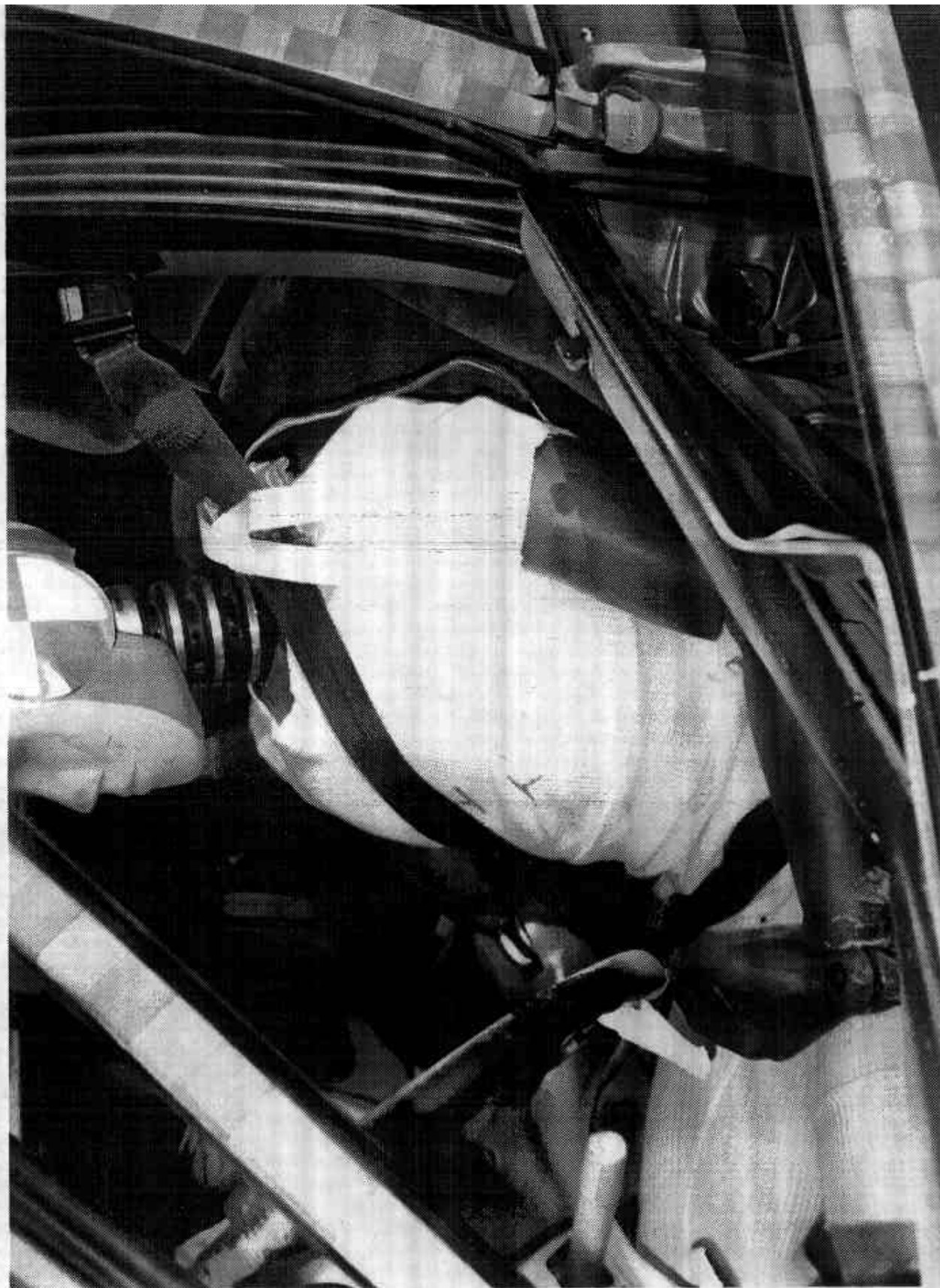


Figure A-66 VEHICLE 2 POST-TEST DRIVER POSITION VIEW

A-70

7942-5

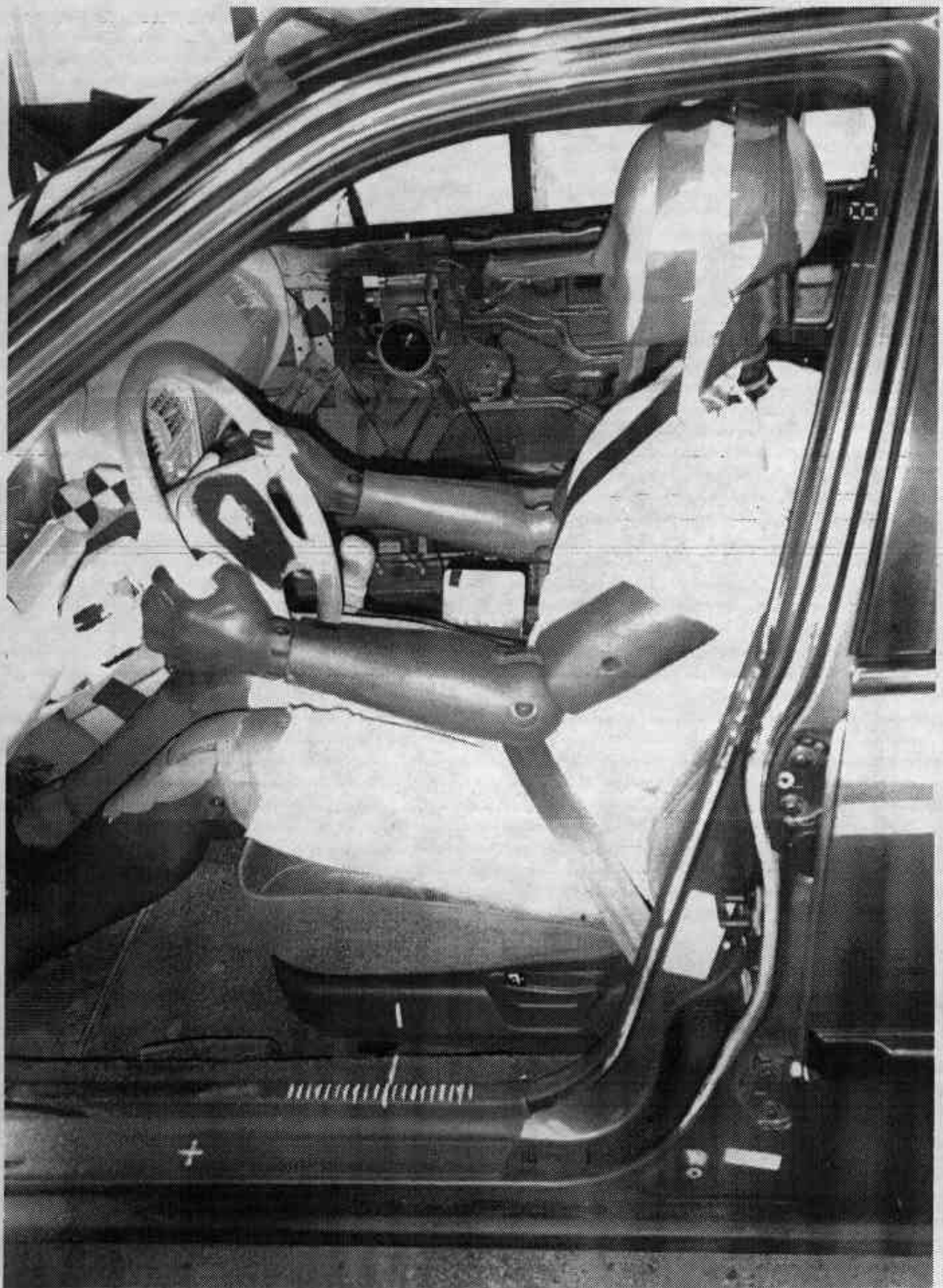


FIGURE A-67 VEHICLE 2 PRE-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW

A-71

7942-5



Figure A-68 VEHICLE 2 POST-TEST DRIVER AND OCCUPANT COMPARTMENT VIEW

A-72

7942-5

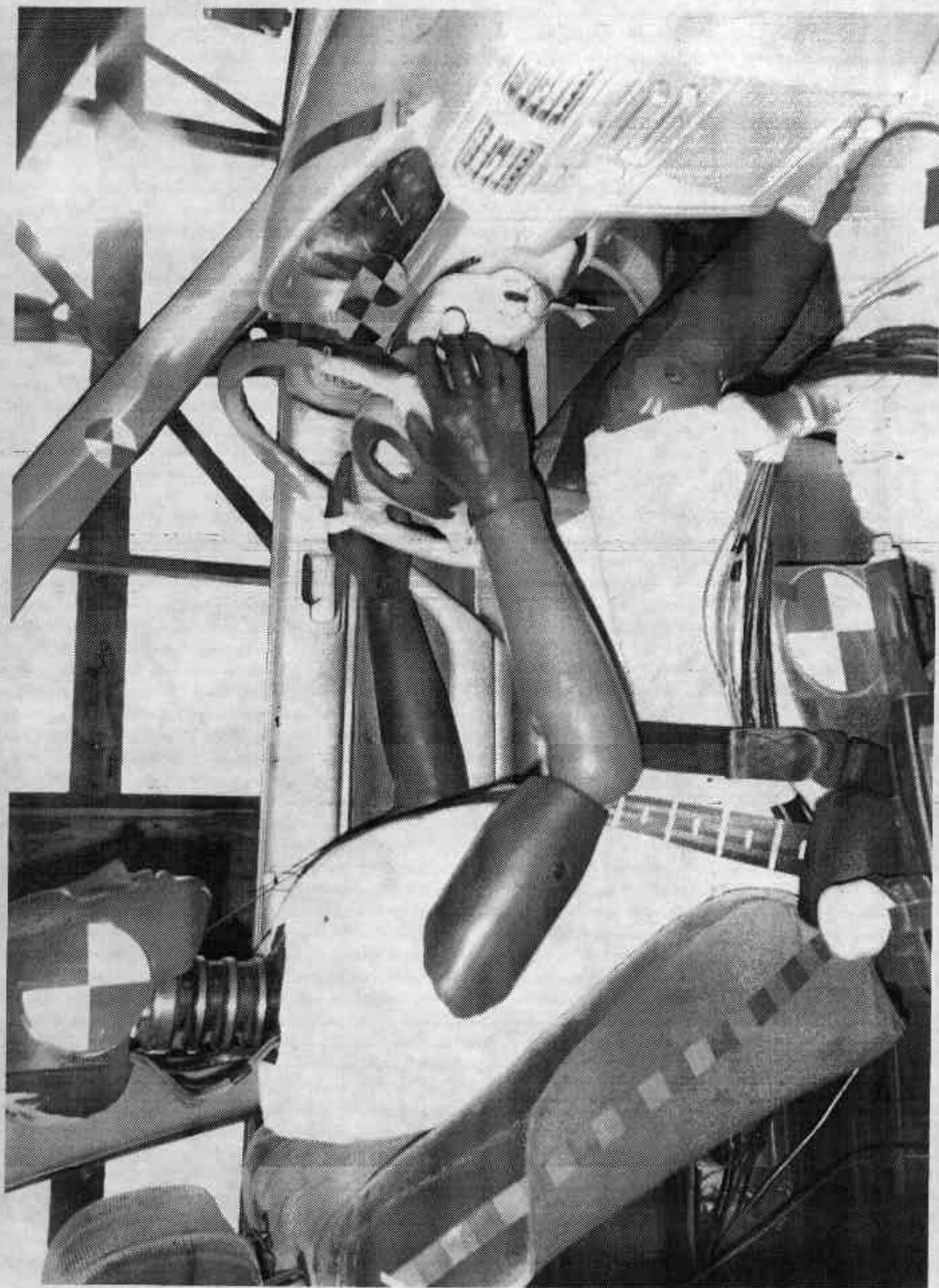


Figure A-69 VEHICLE 2 PRE-TEST DRIVER AND OCCUPANT COMPARTMENT RIGHT SIDE VIEW

A-73

7942-5

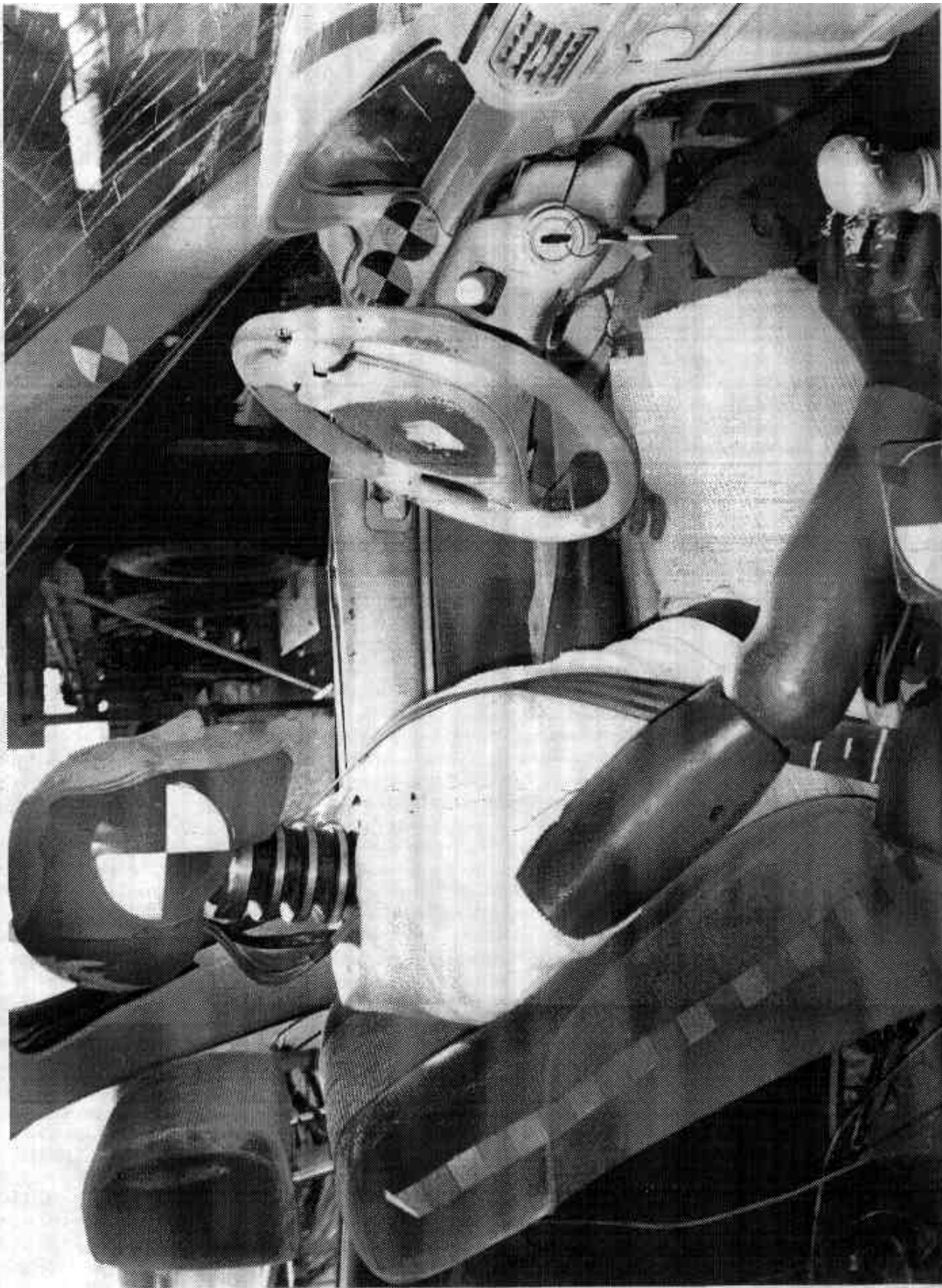


Figure A-70 VEHICLE 2 POST-TEST DRIVER AND OCCUPANT COMPARTMENT RIGHT SIDE VIEW

A-74

7942-5

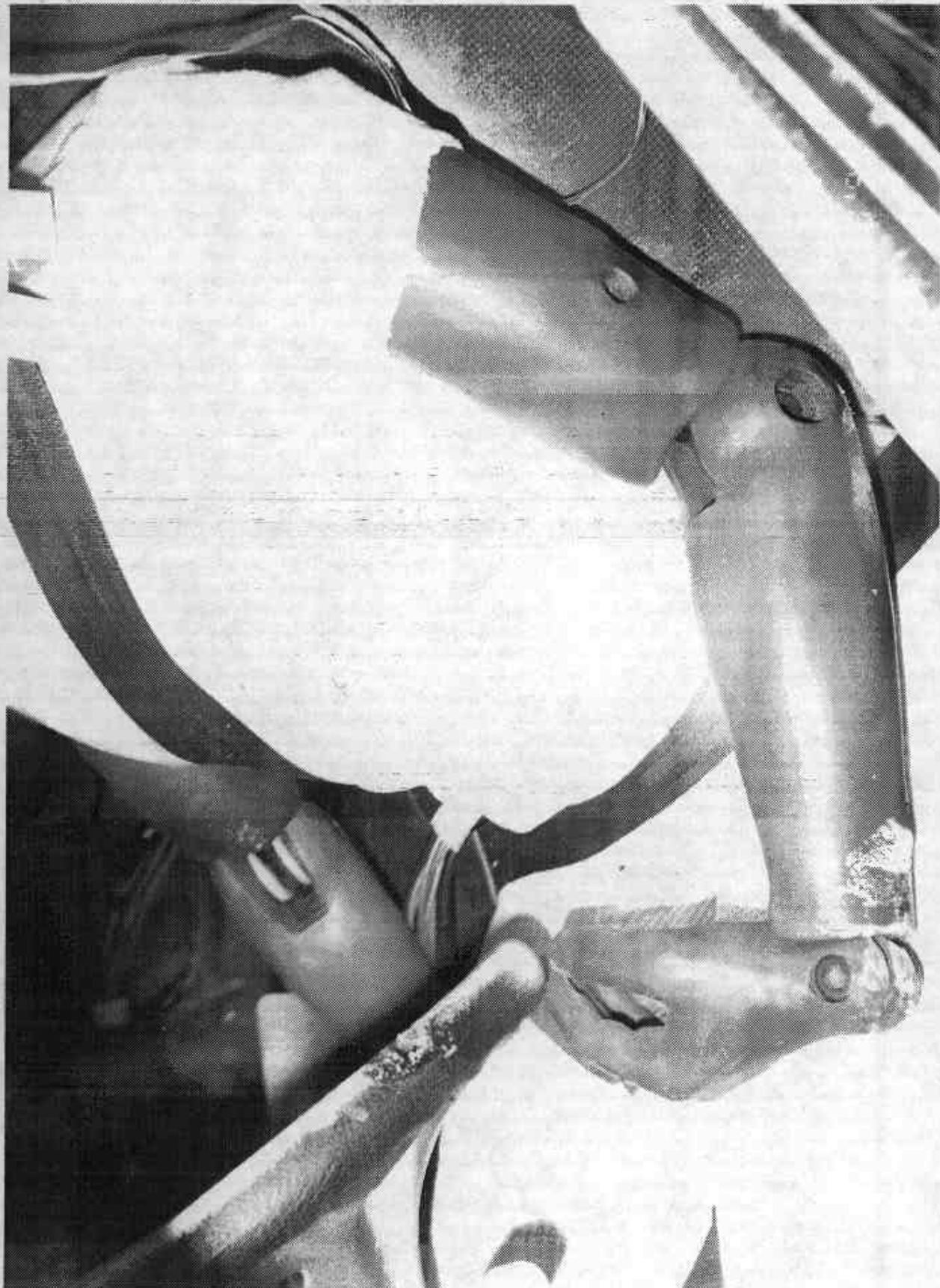


Figure A-71 VEHICLE 2 POST-TEST CHEST CONTACT VIEW

A-75

7942-5

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

VEHICLE ONE DATA

1991 DODGE DYNASTY 4-DOOR SEDAN

TEST NO. Y43-5-1148

VEHICLE DATA

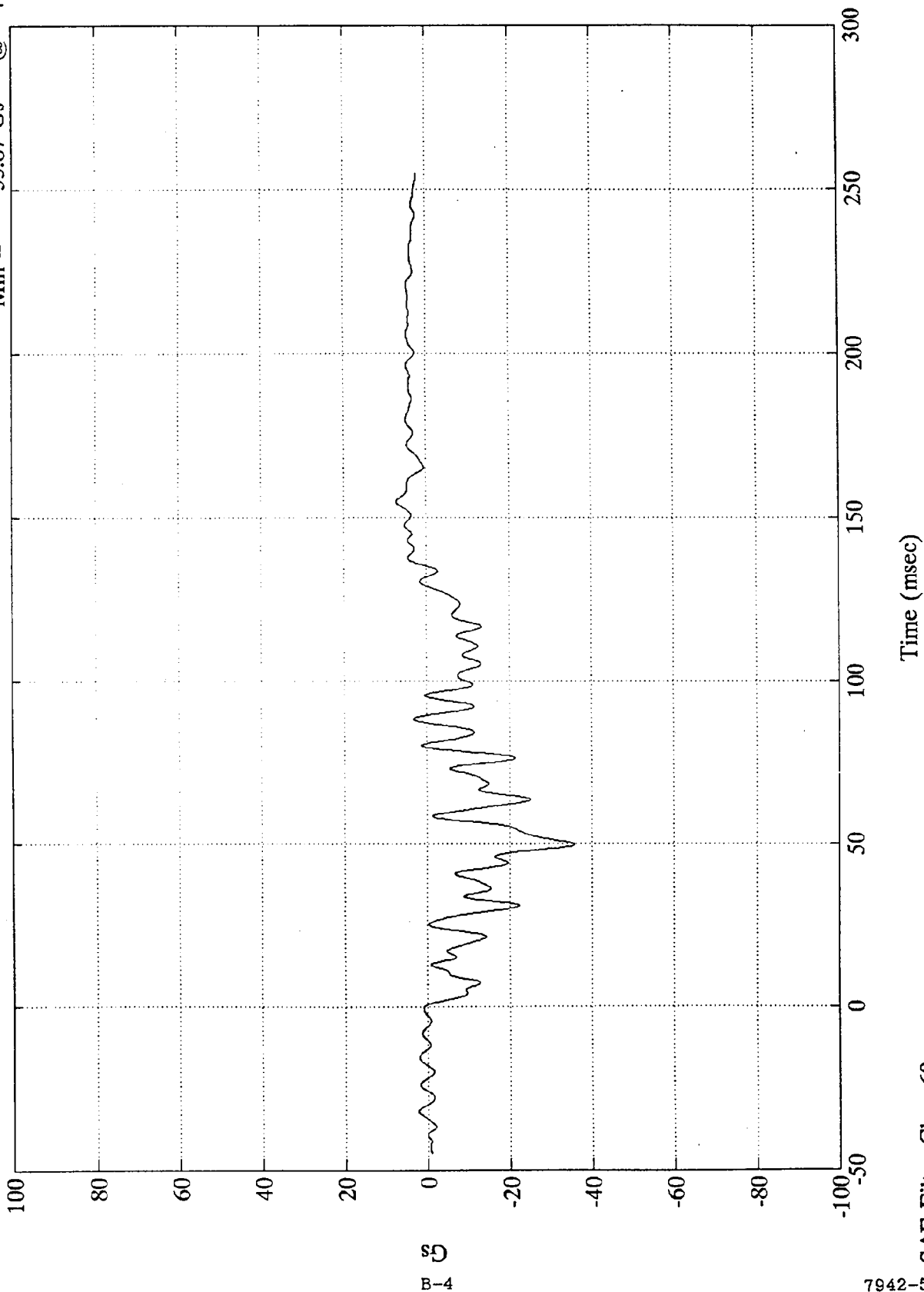
SAE FILTER CHANNEL CLASS

60

VTV TEST 5

Veh. 1 L R Seat (X)

Max = 7.20 Gs @ 155.04 msec
 Min = -35.87 Gs @ 49.79 msec



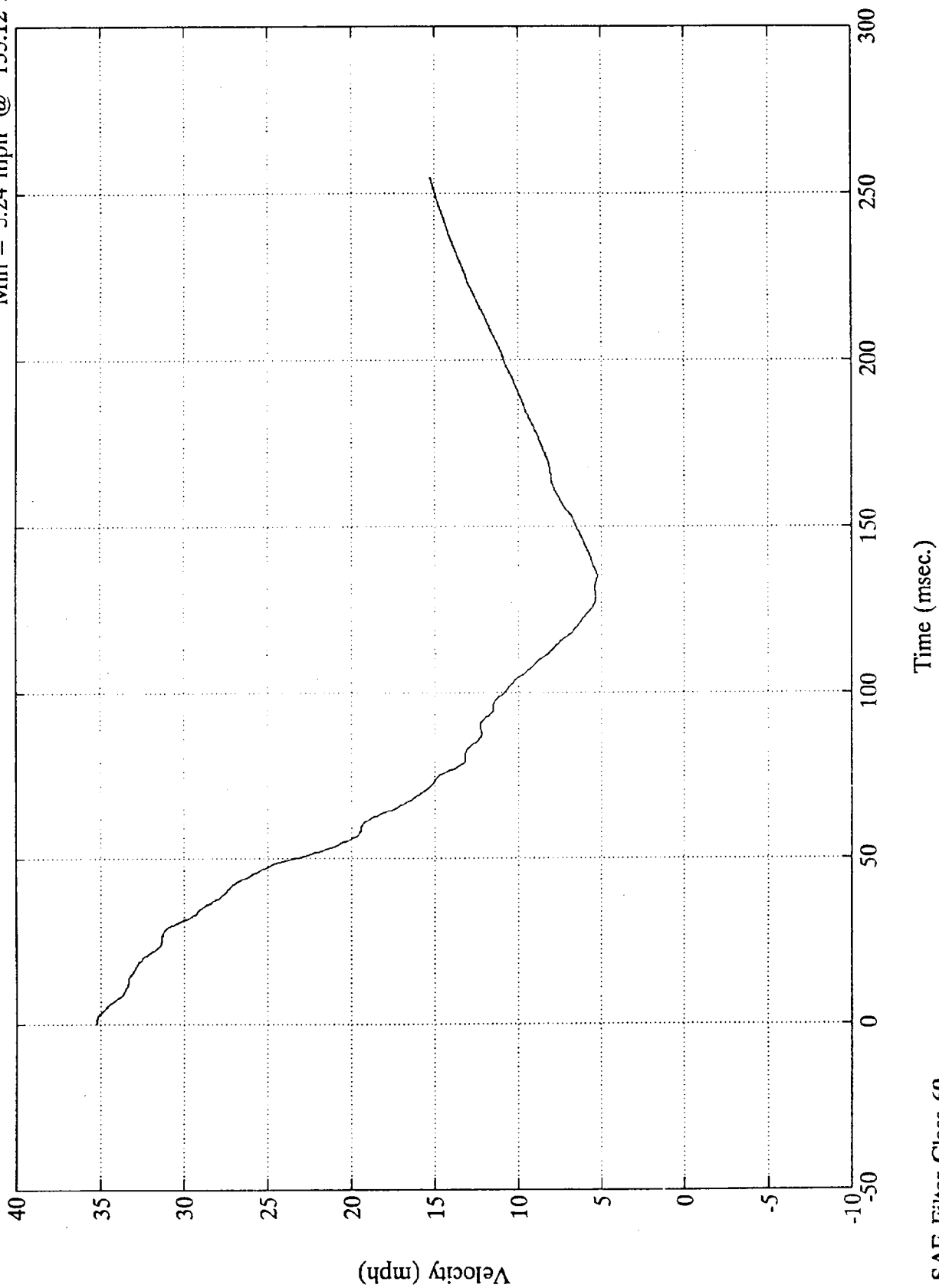
B-4

SAE Filter Class 60

VTV TEST 5

Veh. 1 L R Seat (X)

Max = 35.21 mph @ 0.48 msec
Min = 5.24 mph @ 135.12 msec

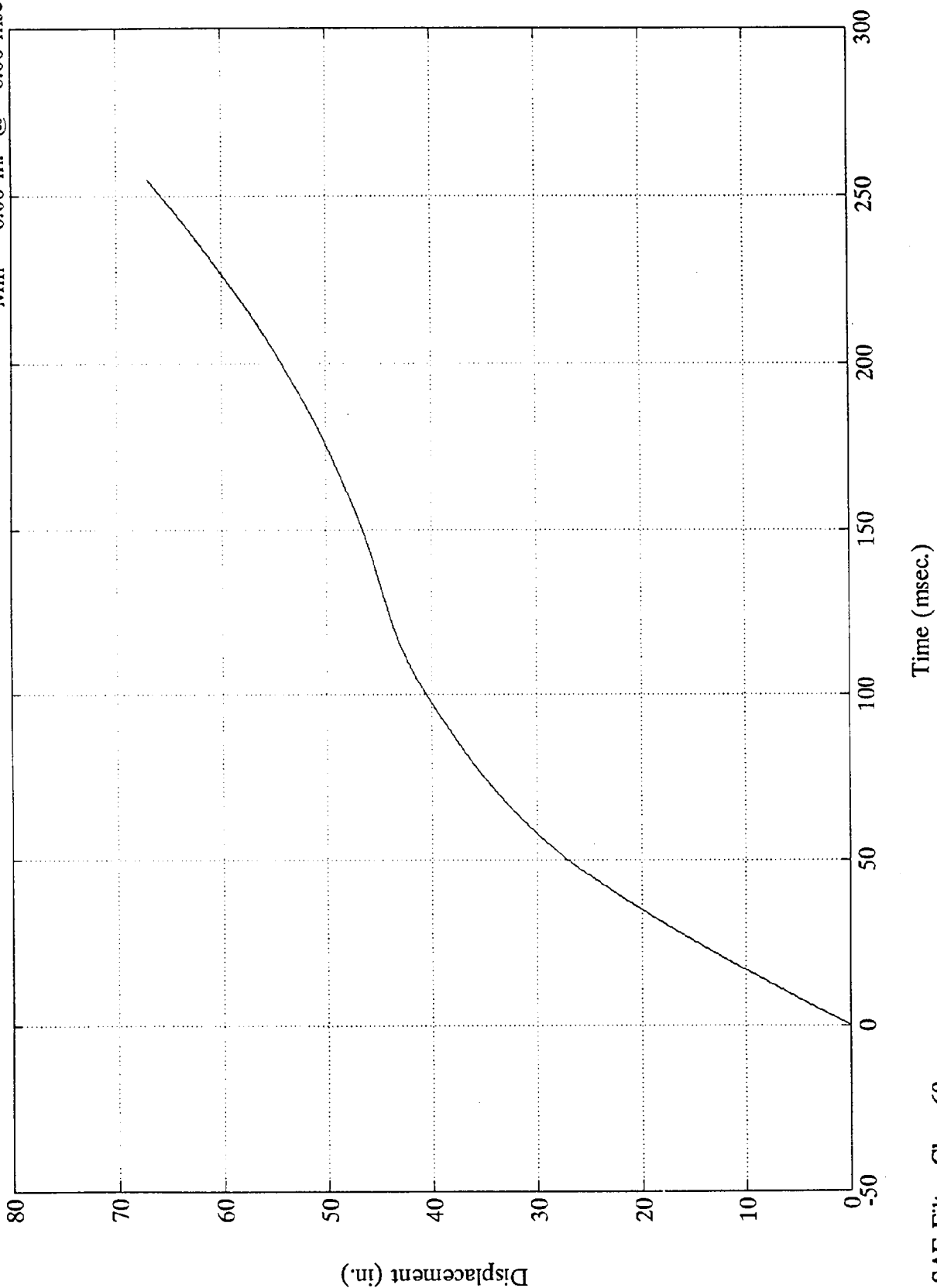


B-5

VTV TEST 5

Veh. 1 L R Seat (X)

Max = 67.03 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec

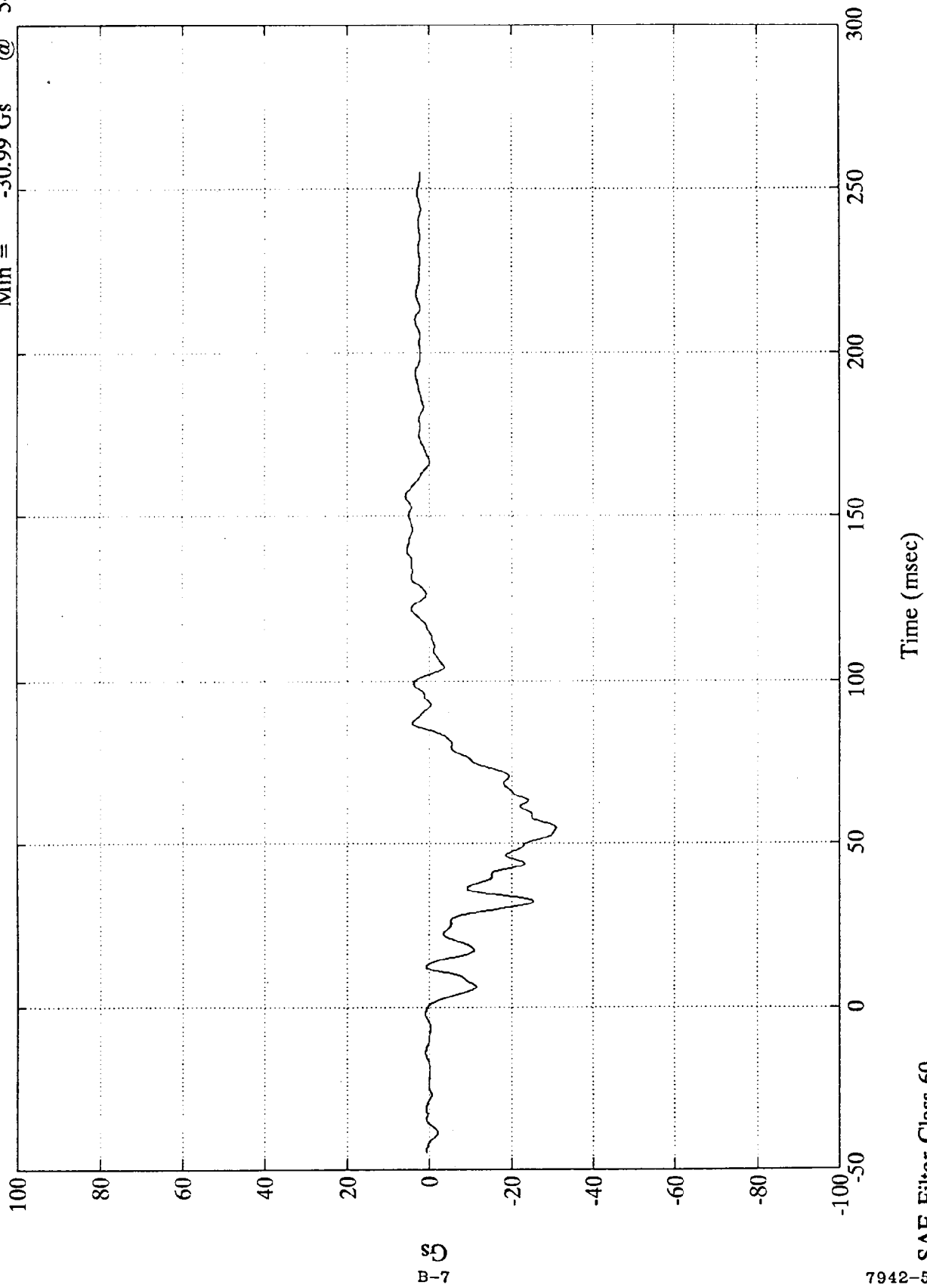


SAE Filter Class 60

VTV TEST 5

Veh. 1 R R Seat (X)

Max = 5.75 Gs @ 156.11 msec
Min = -30.99 Gs @ 54.72 msec

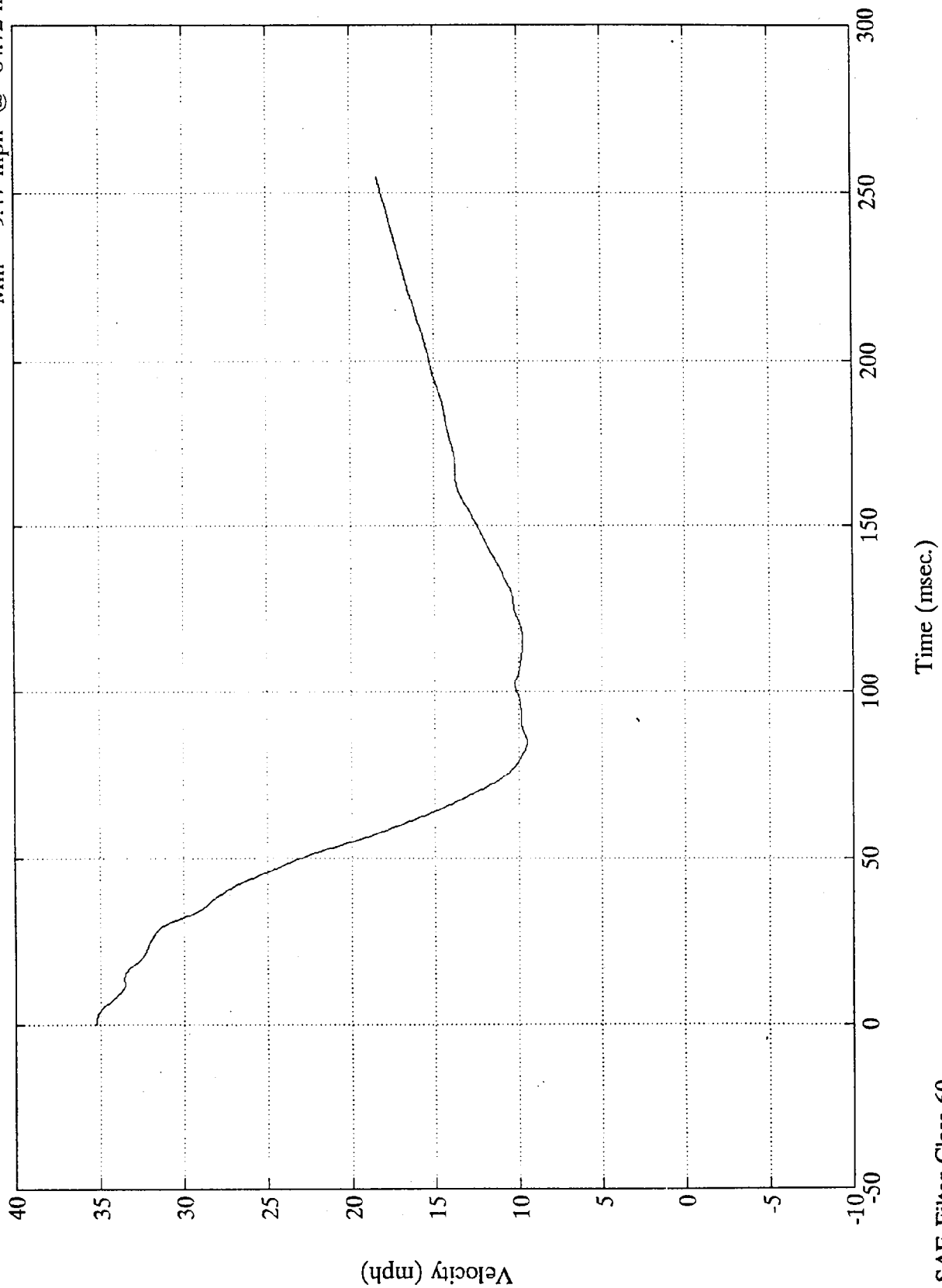


B-7

VTV TEST 5

Veh. 1 R R Seat (X)

Max = 35.20 mph @ 1.20 msec
Min = 9.47 mph @ 84.72 msec



B-8

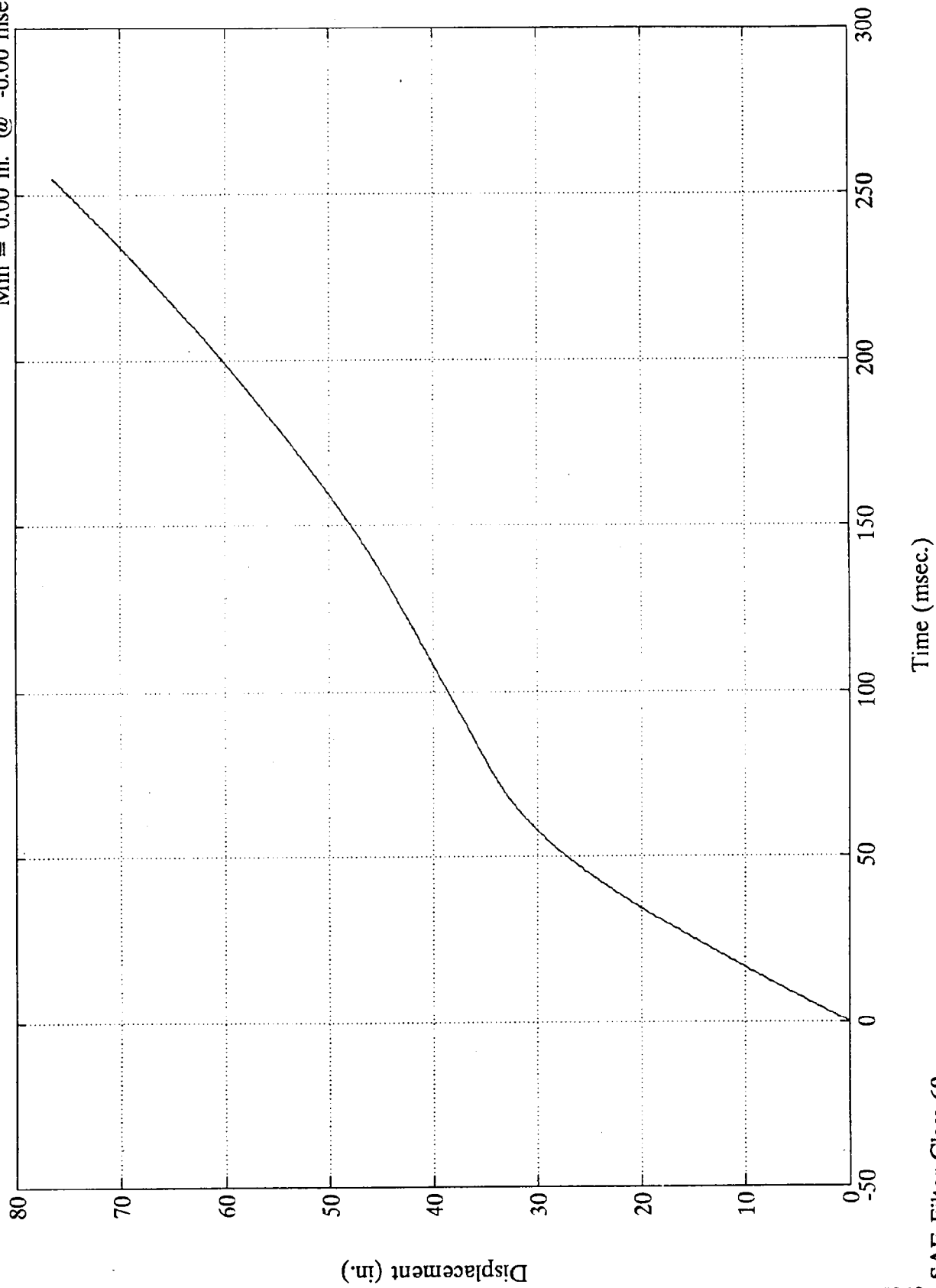
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 R R Seat (X)

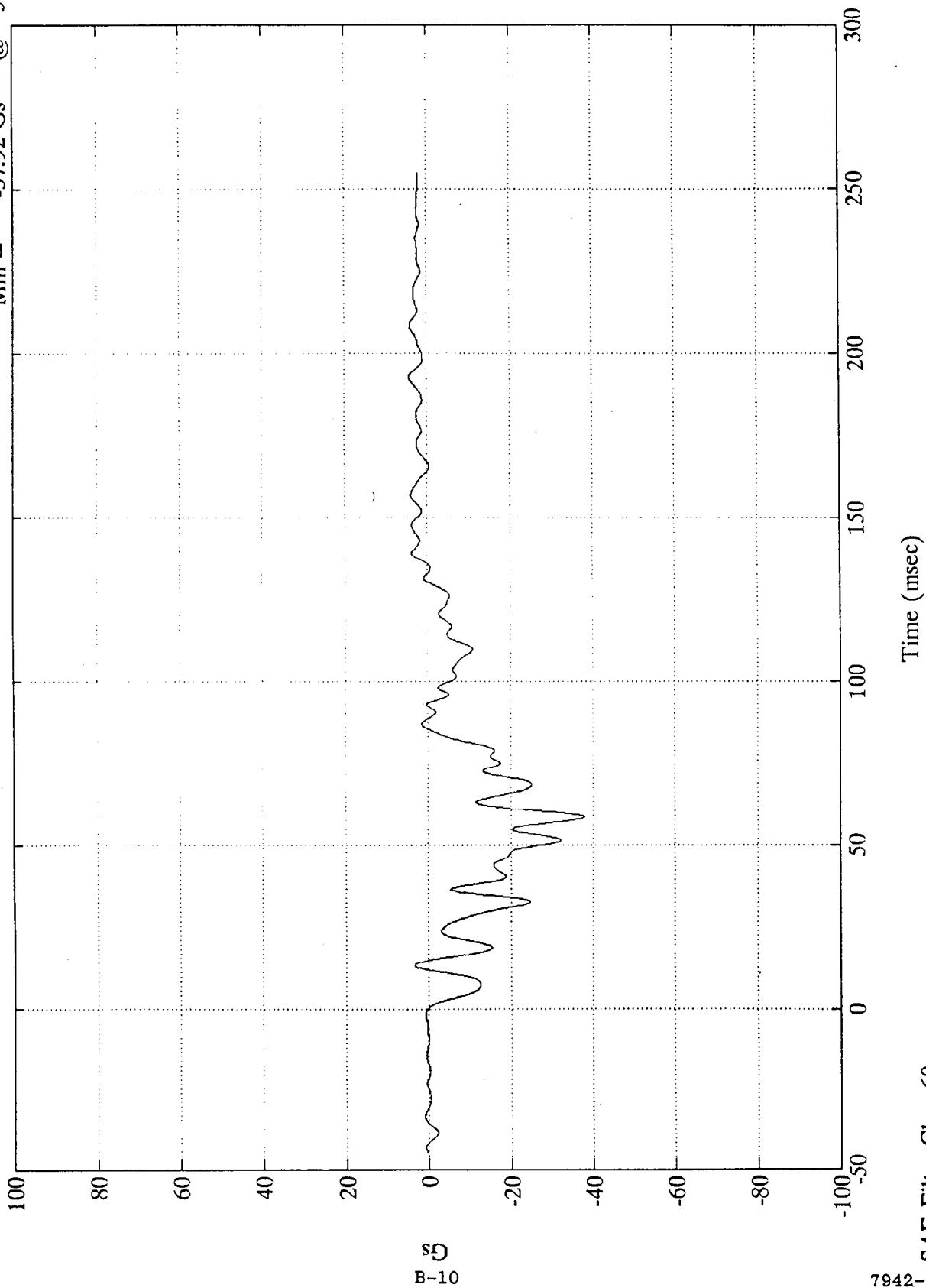
Max = 76.50 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



VTV TEST 5

Veh. 1 C/L Seat (X)

Max = 4.26 Gs @ 192.72 msec
Min = -37.92 Gs @ 58.68 msec



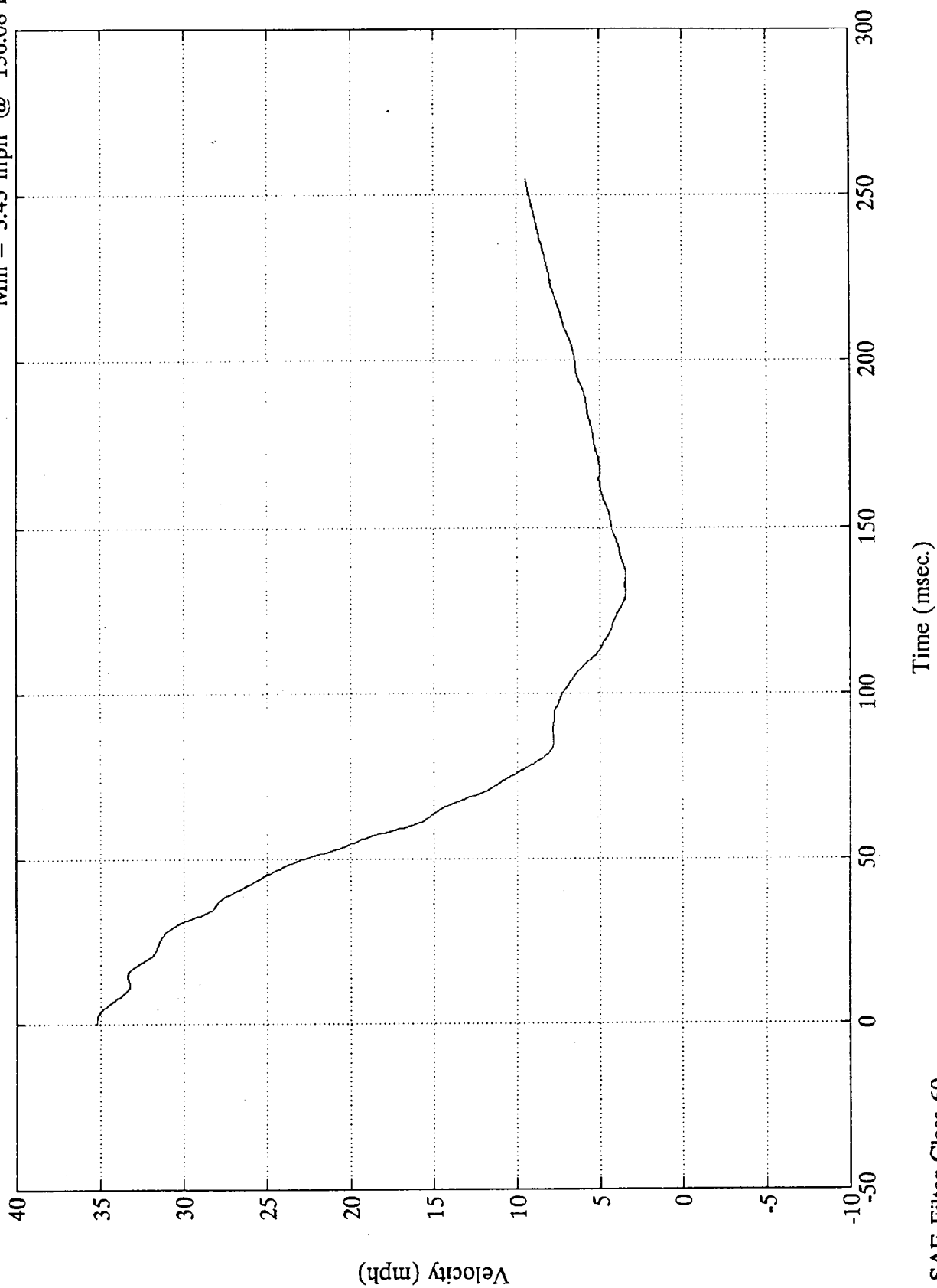
SAE Filter Class 60

7942-5

VTV TEST 5

Veh. 1 C/L Seat (X)

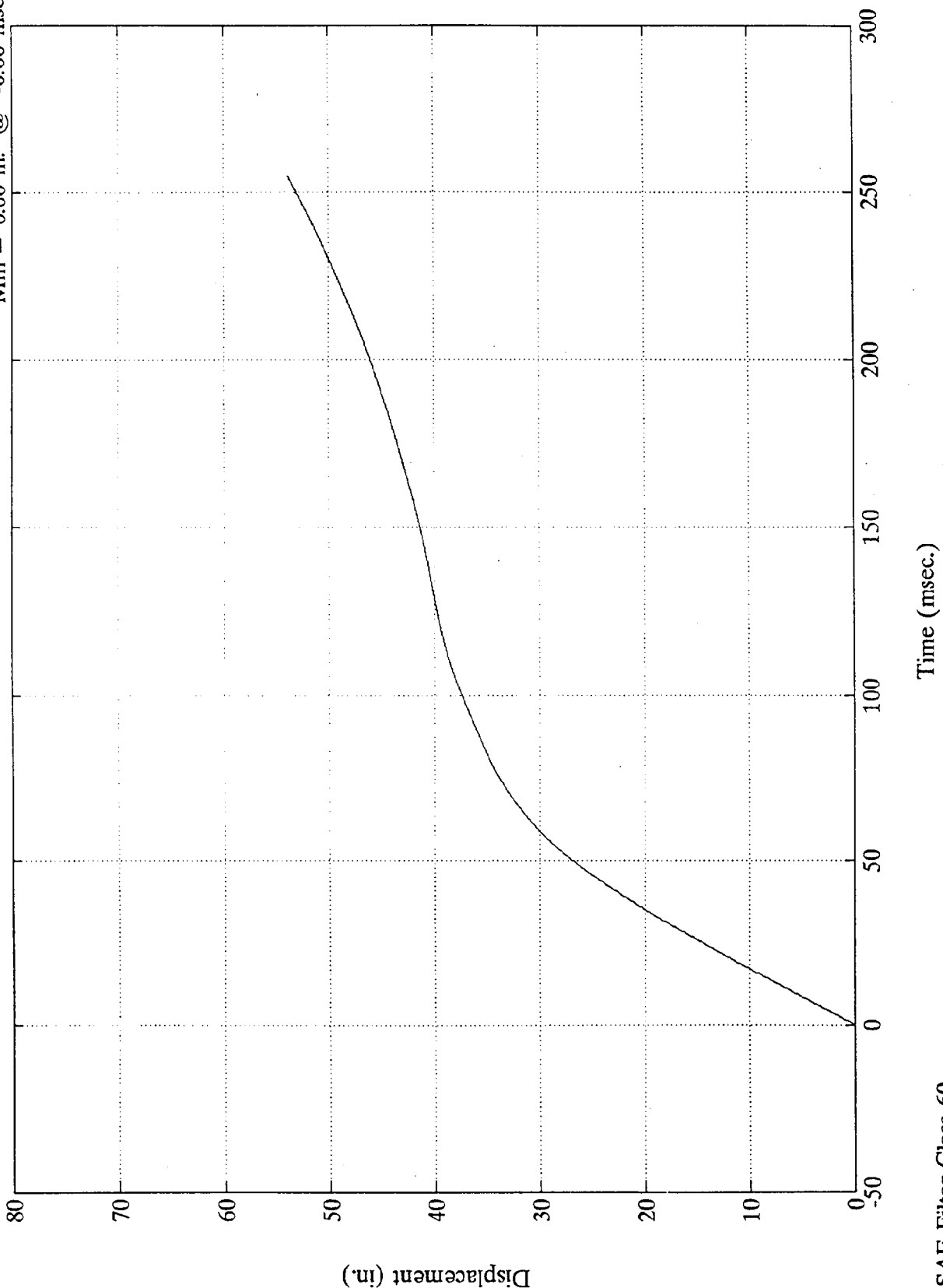
Max = 35.20 mph @ 0.72 msec
Min = 3.43 mph @ 136.08 msec



VTV TEST 5

Veh. 1 C/L Seat (X)

Max = 53.87 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec

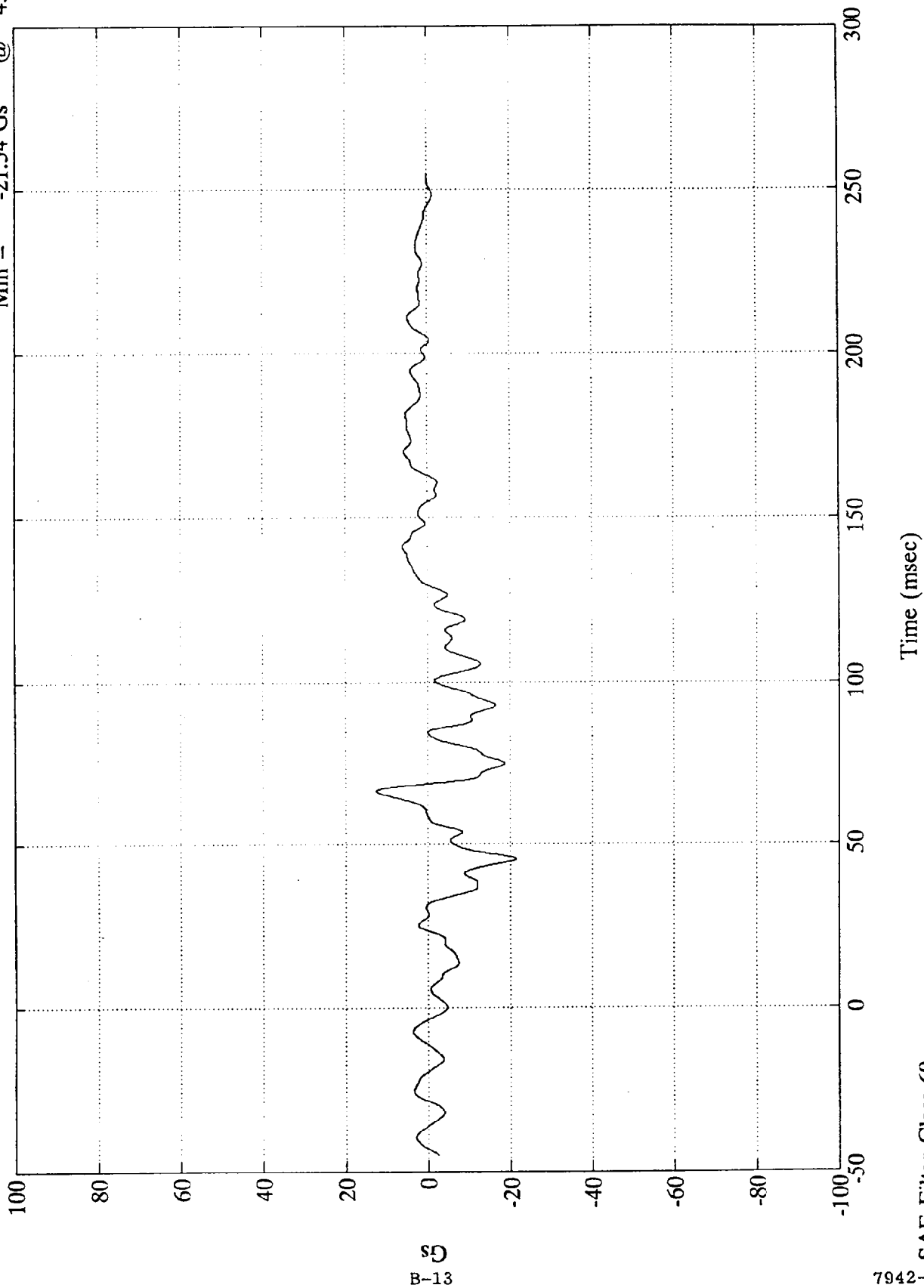


B-12

VTV TEST 5

Veh. 1 C/L Seat (Y)

Max = 12.52 Gs @ 66.23 msec
Min = -21.54 Gs @ 45.48 msec



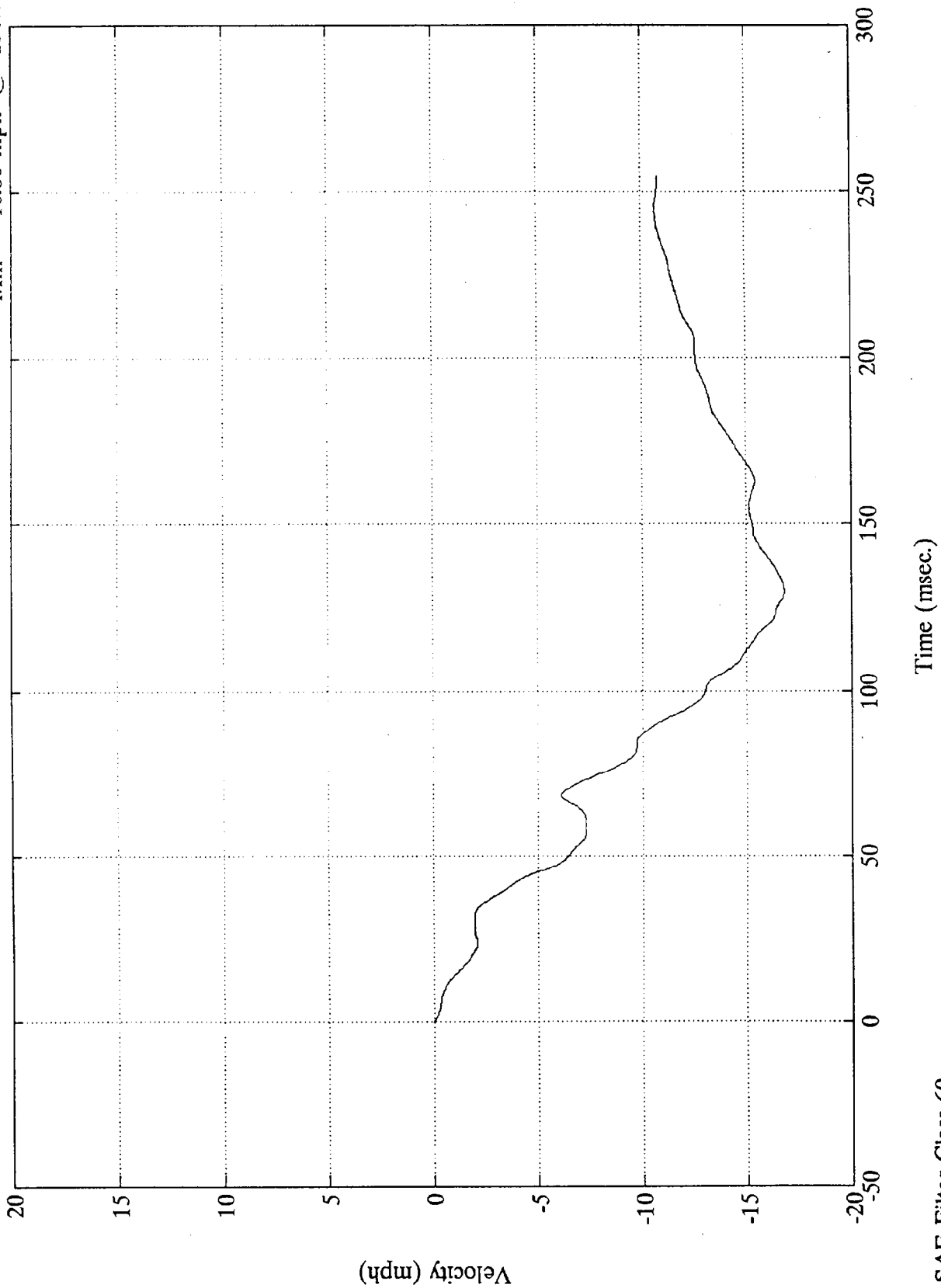
B-13

7942-5 SAE Filter Class 60

VTV TEST 5

Veh. 1 C/L Seat (Y)

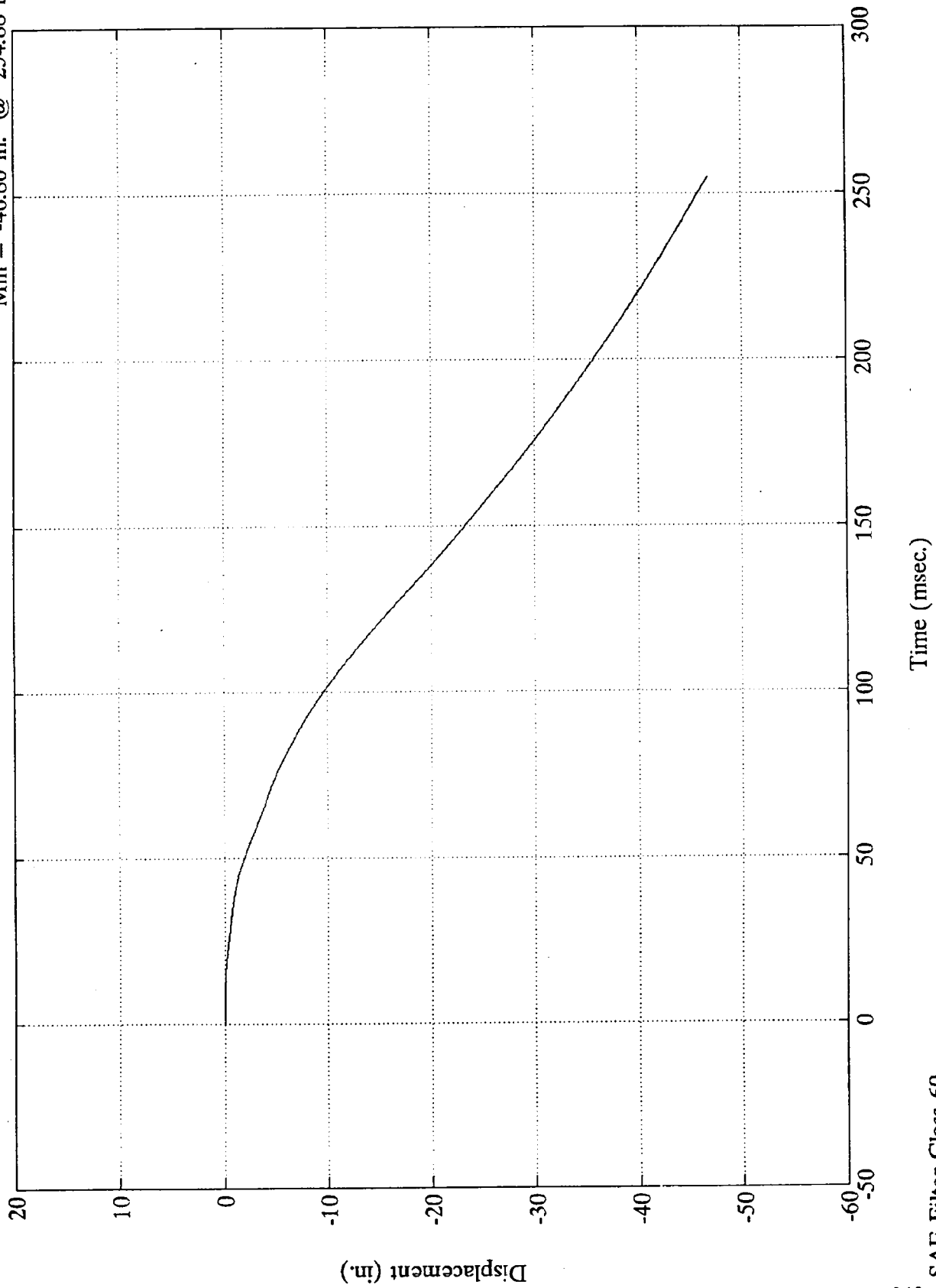
Max = 0.00 mph @ -0.00 msec
Min = -16.80 mph @ 130.08 msec



VTV TEST 5

Veh. 1 C/L Seat (Y)

Max = 0.00 in. @ -0.00 msec
Min = -46.80 in. @ 254.88 msec



B-15

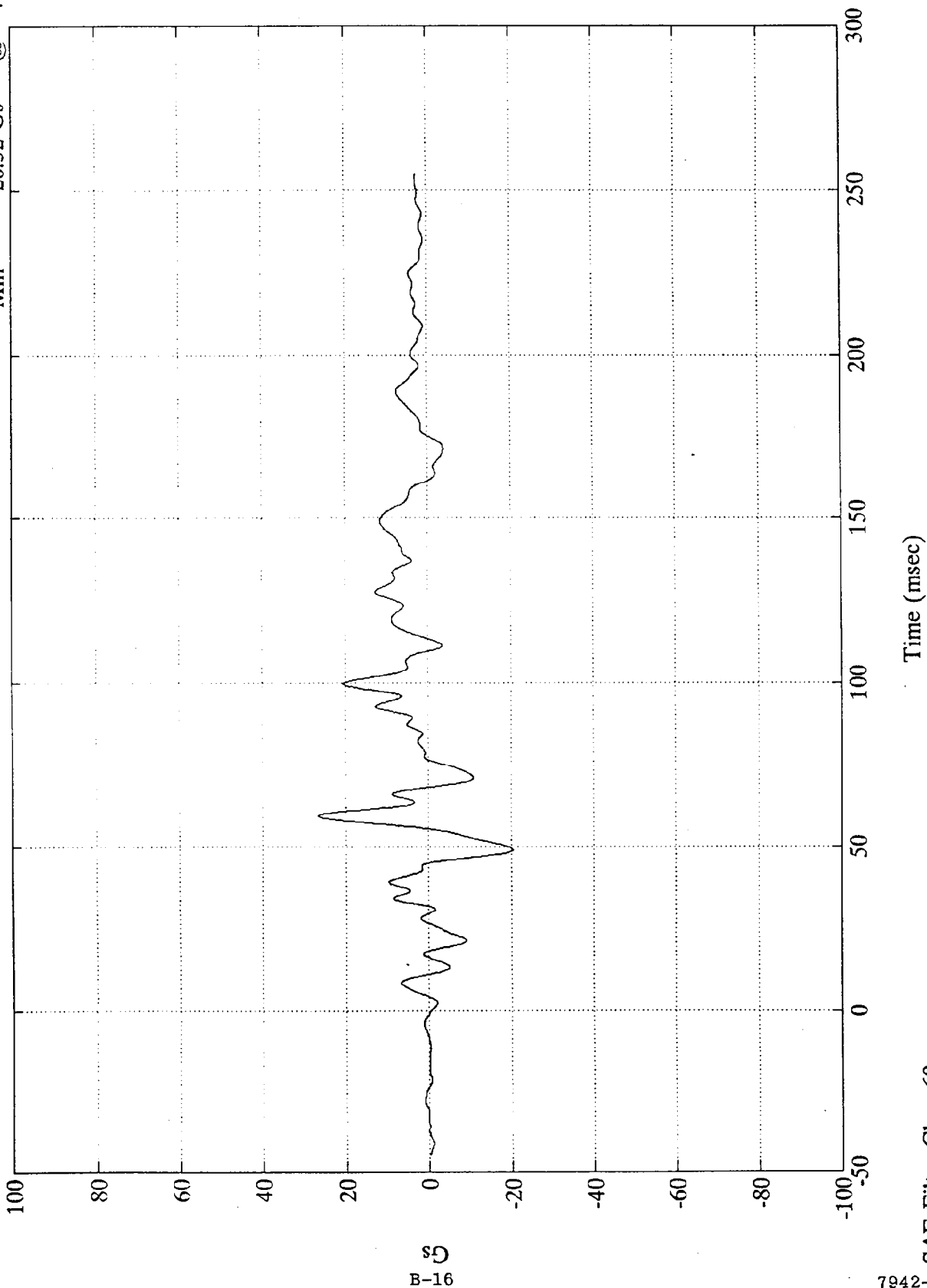
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 C/L Seat (Z)

Max = 26.64 Gs @ 59.52 msec
Min = -20.52 Gs @ 49.20 msec



SAE Filter Class 60

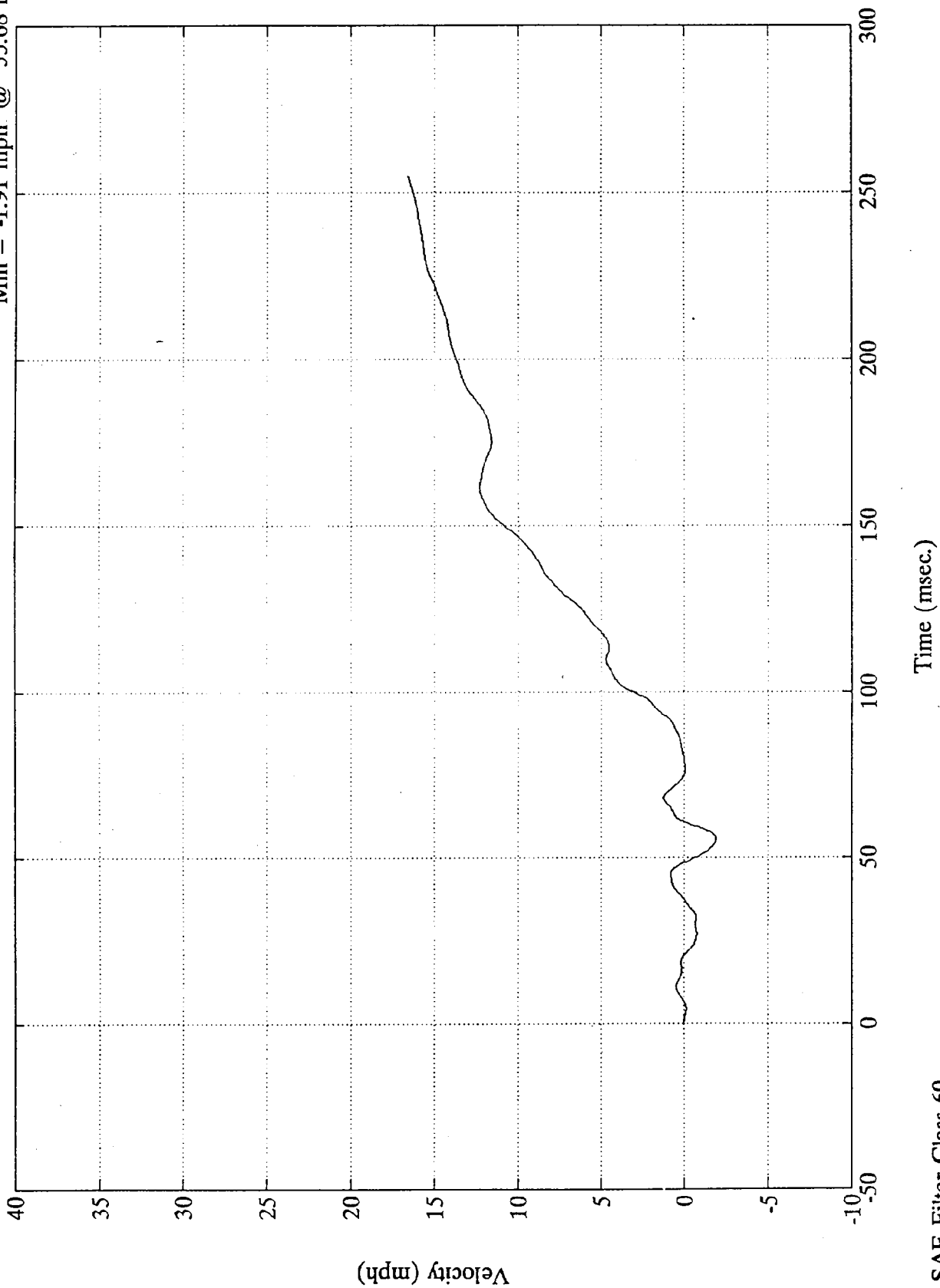
7942-5

B-16

VTV TEST 5

Veh. 1 C/L Seat (Z)

Max = 16.55 mph @ 254.88 msec
Min = -1.91 mph @ 55.68 msec



B-17

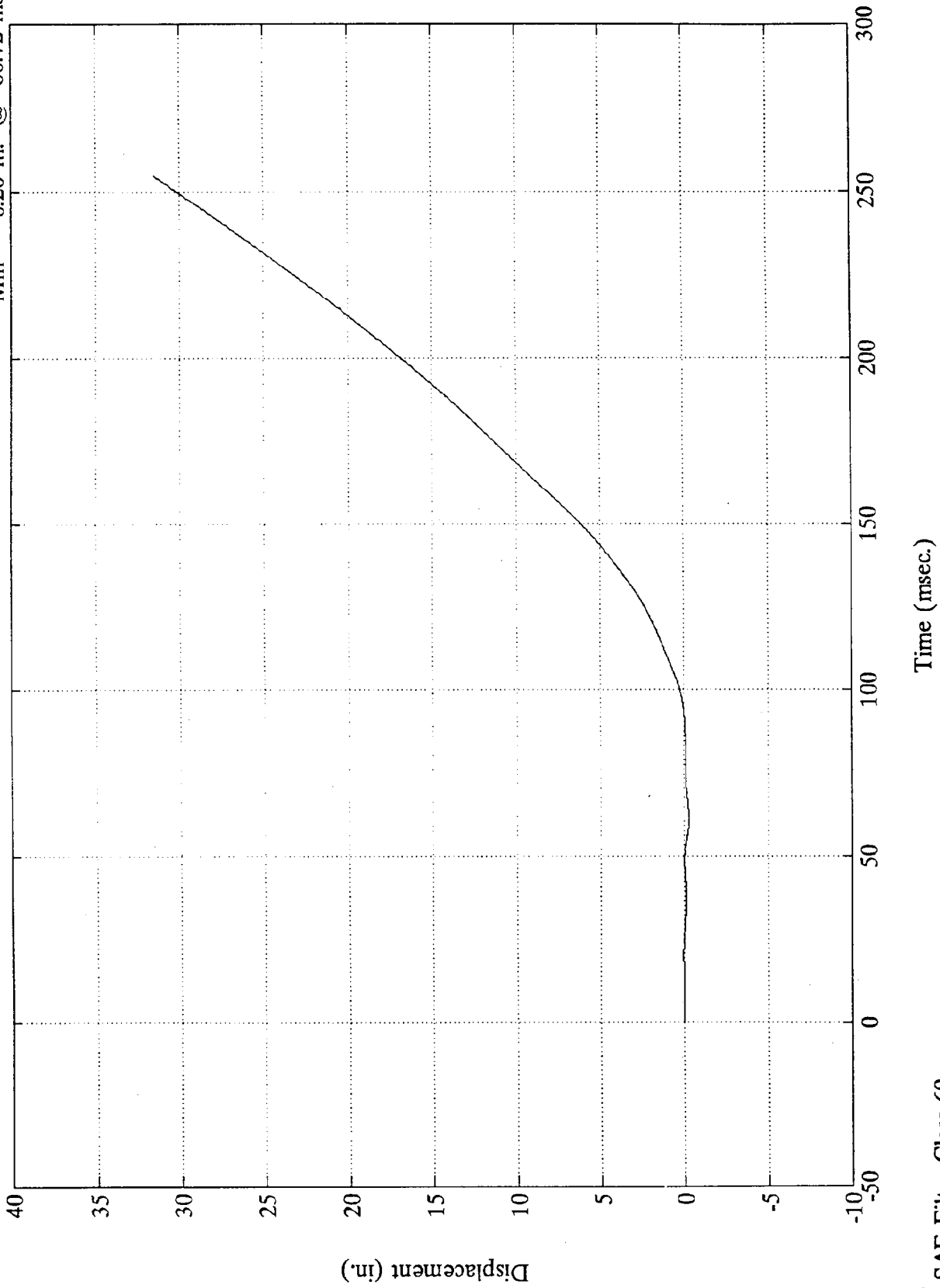
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 C/L Seat (Z)

Max = 31.53 in. @ 254.88 msec
Min = -0.26 in. @ 60.72 msec



B-18

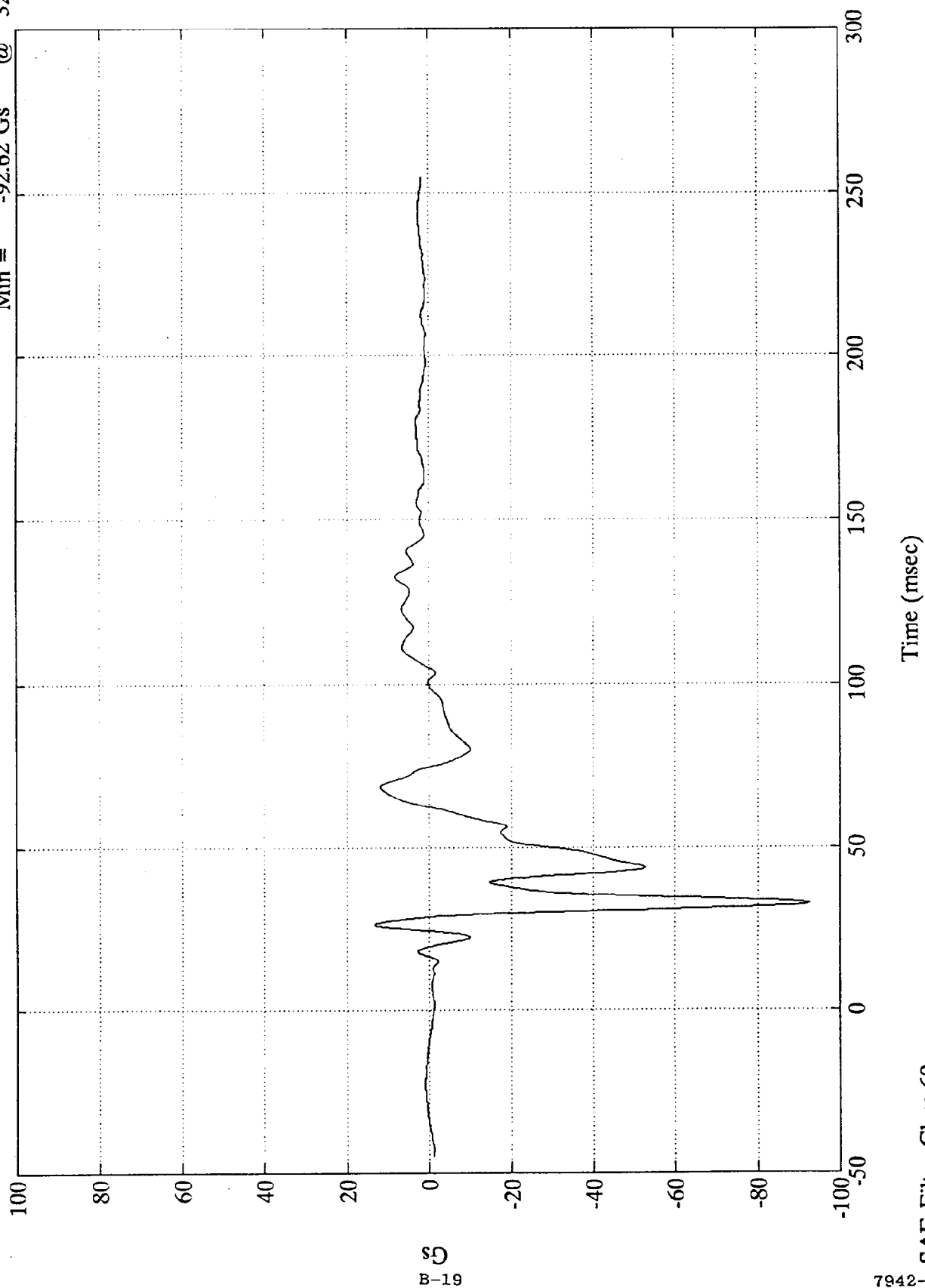
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 Engine Top (X)

Max = 13.24 Gs @ 26.15 msec
Min = -92.62 Gs @ 32.63 msec



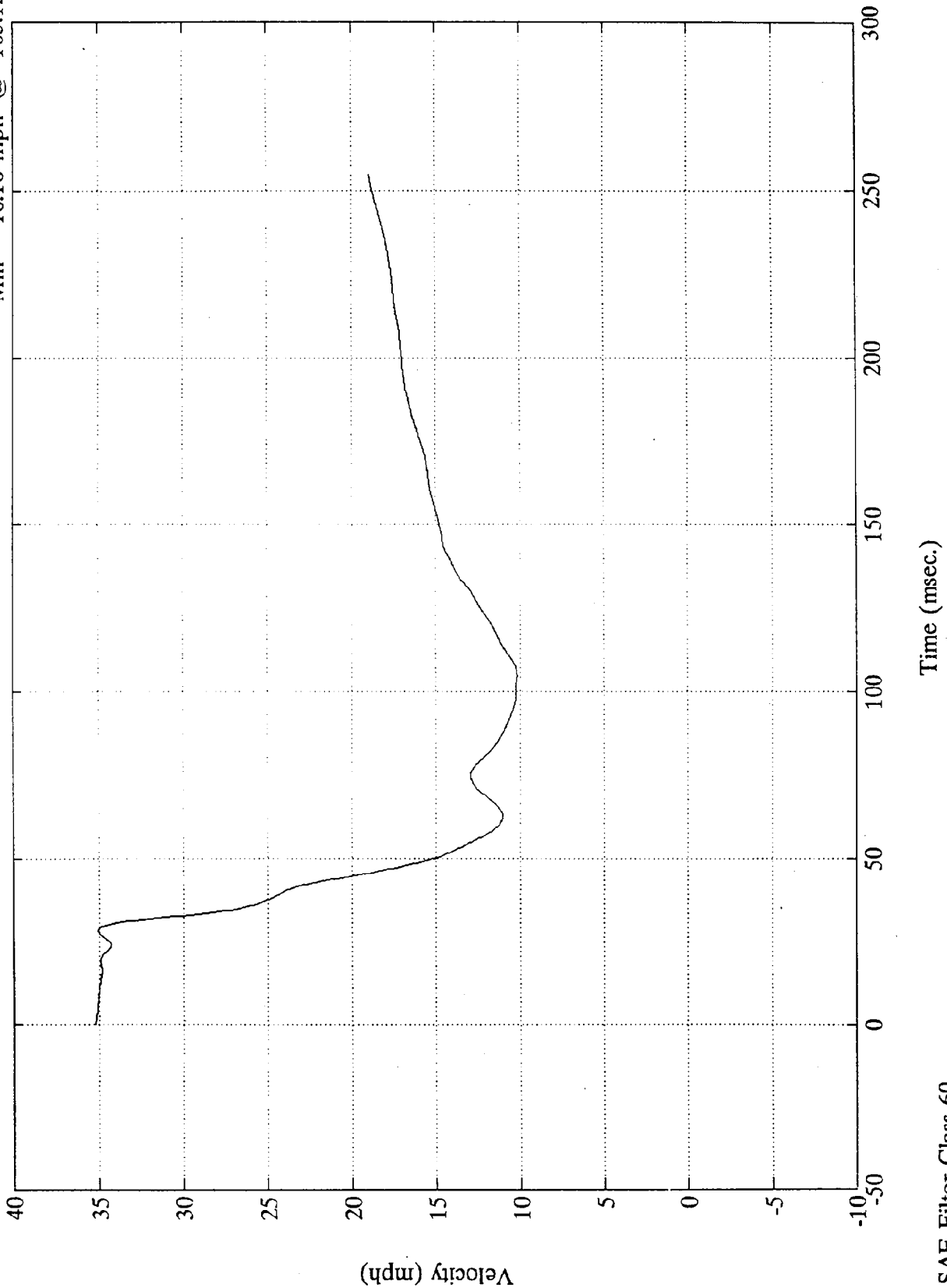
B-19

7942-5 SAE Filter Class 60

VTV TEST 5

Veh. 1 Engine Top (X)

Max = 35.20 mph @ -0.00 msec
Min = 10.16 mph @ 105.12 msec

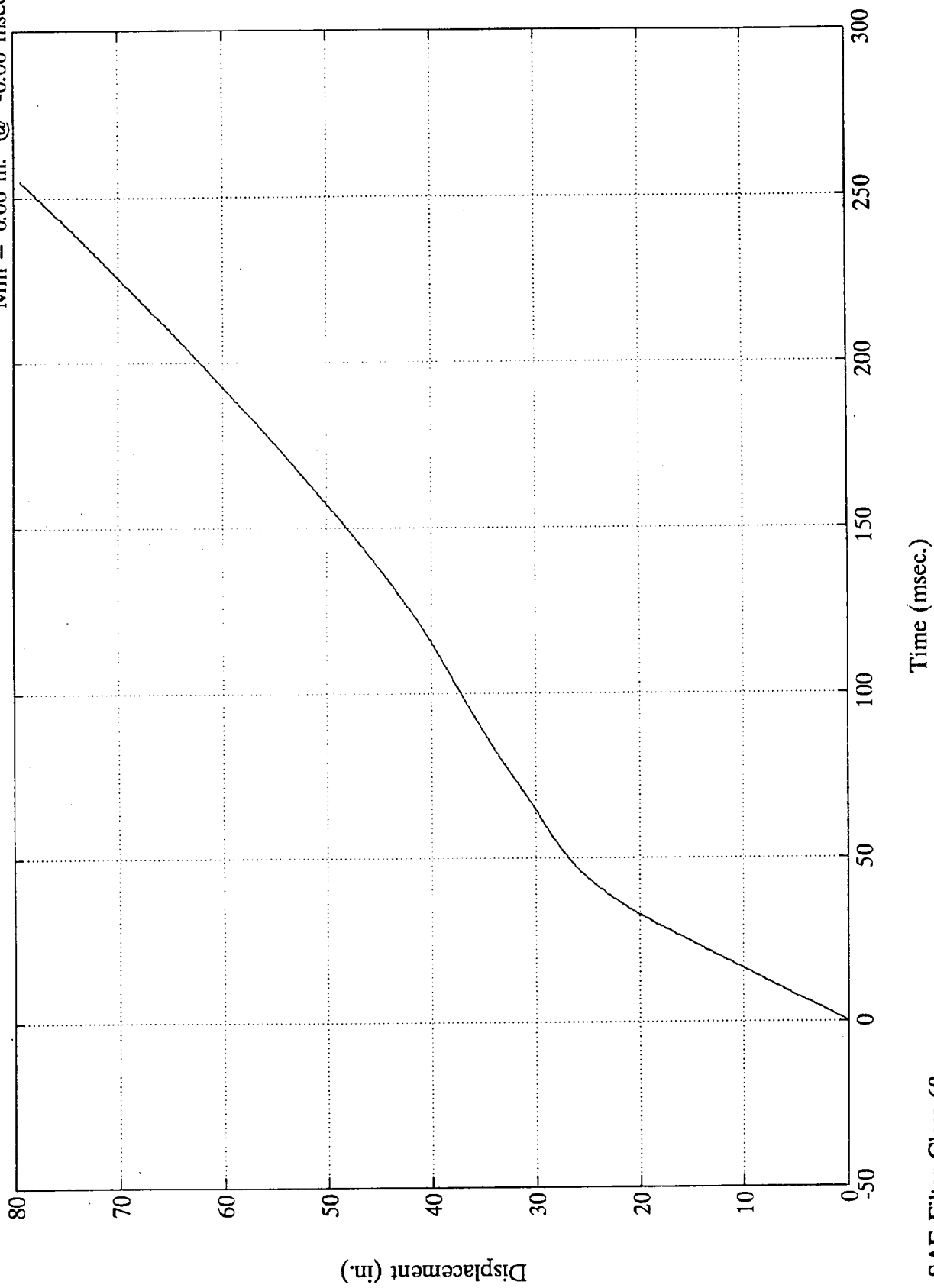


B-20

VTV TEST 5

Veh. 1 Engine Top (X)

Max = 79.34 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



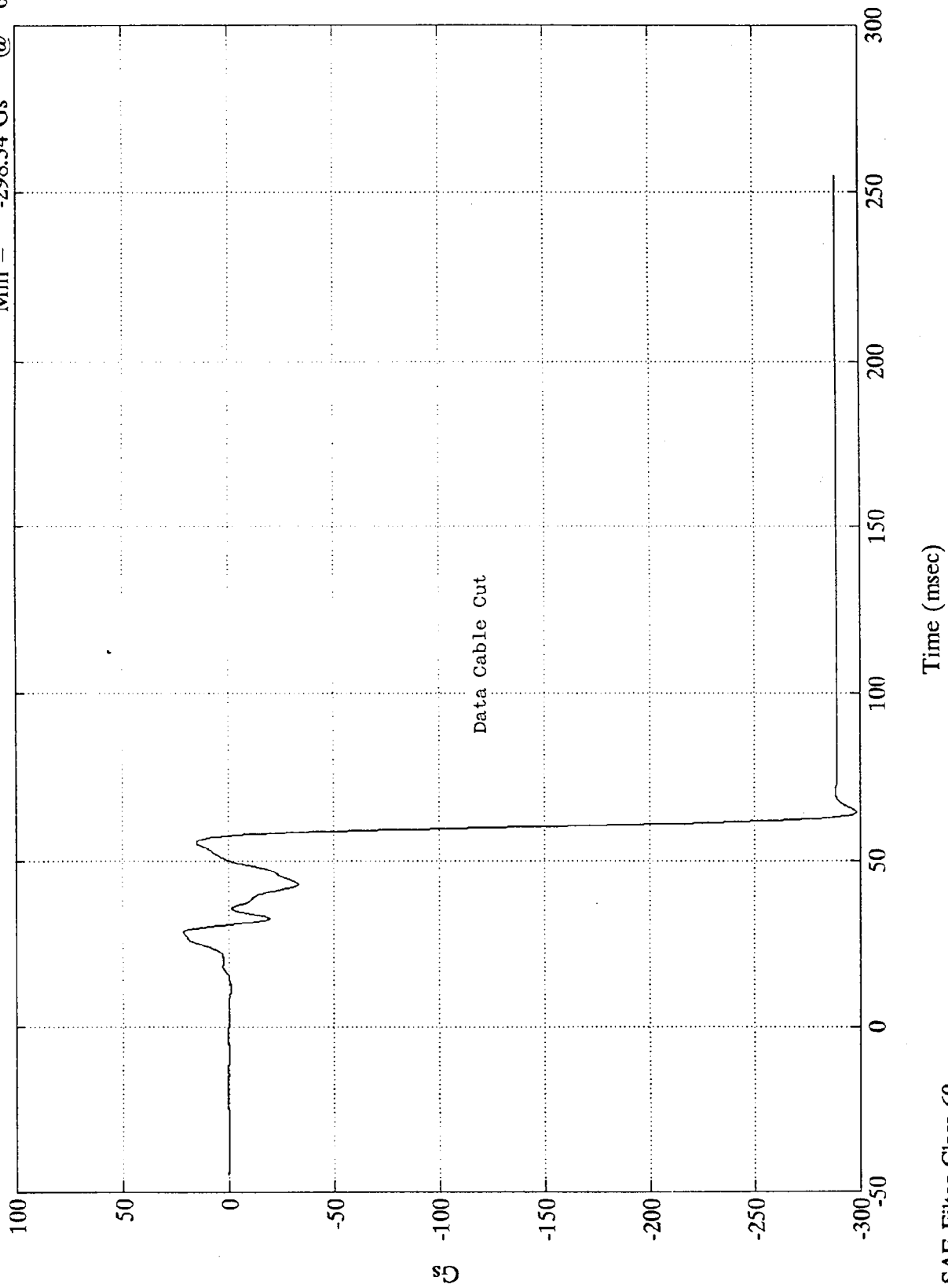
SAE Filter Class 60

5-7462-5

B-21

VTV TEST 5

Veh. 1 Engine Top (Z) Max = 21.51 Gs @ 28.55 msec
Min = -298.34 Gs @ 64.44 msec



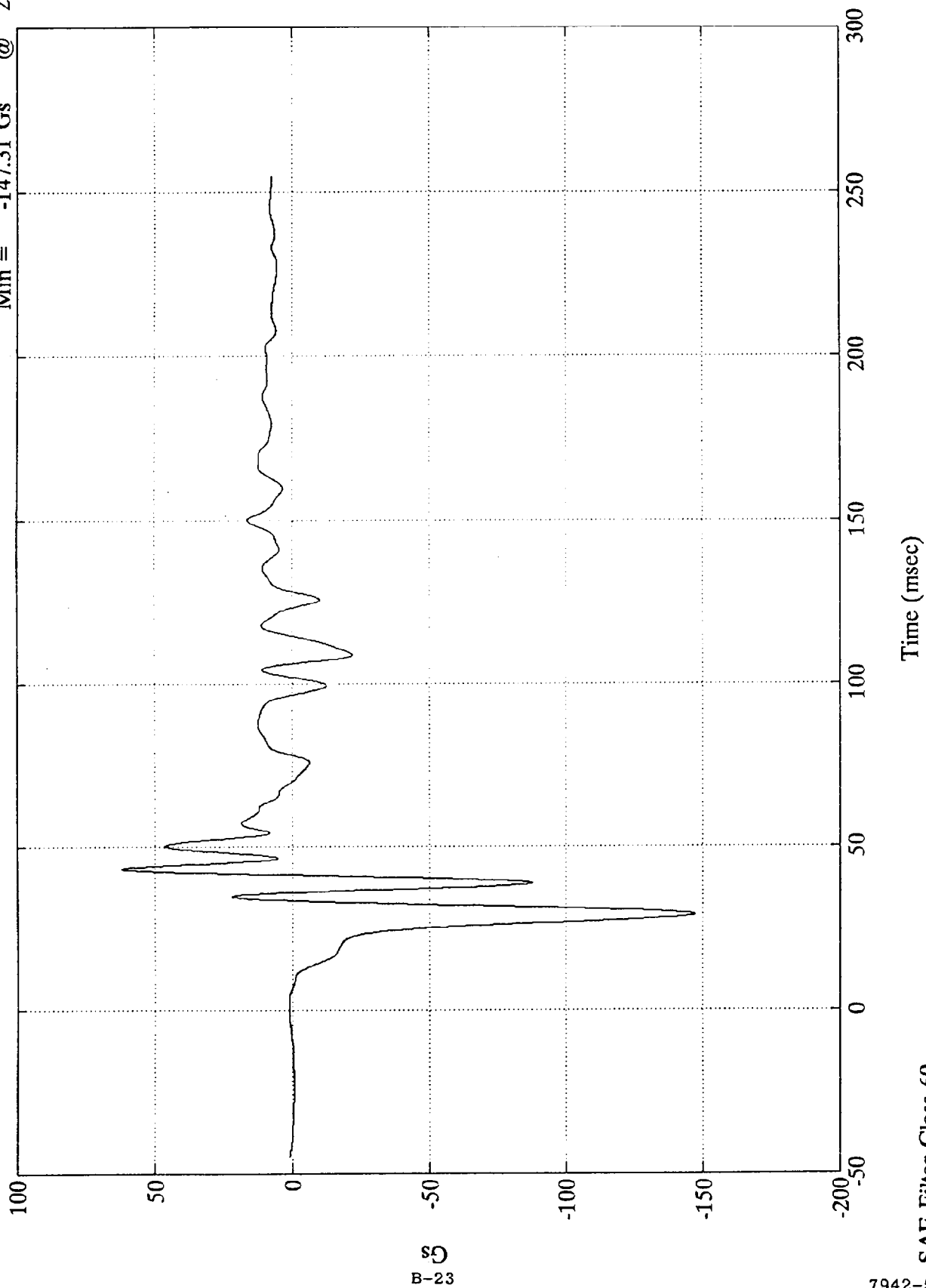
B-22

7942-5
SAE Filter Class 60

VTV TEST 5

Veh. 1 Engine Bottom (X)

Max = 61.96 Gs @ 43.31 msec
Min = -147.31 Gs @ 29.15 msec

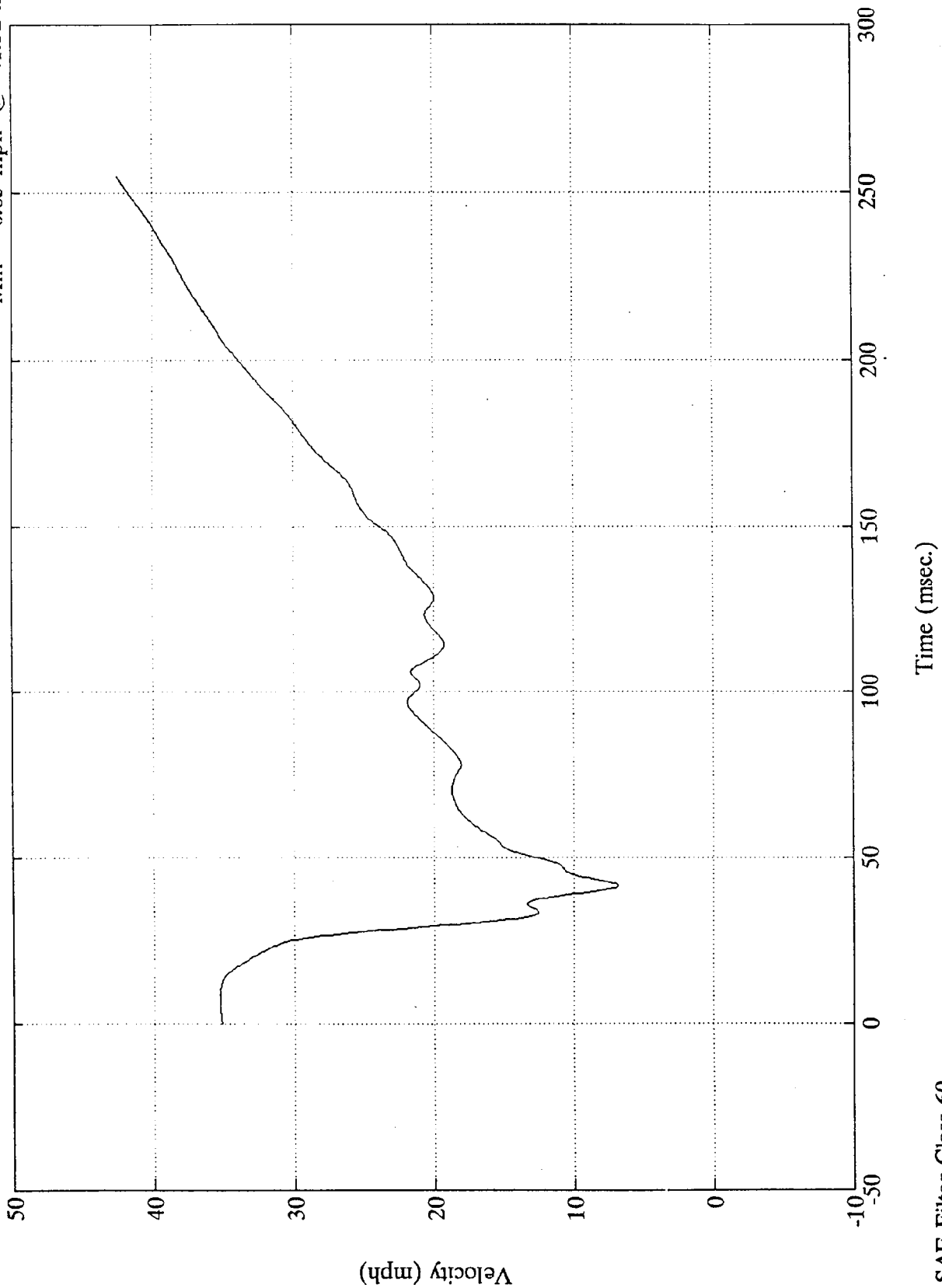


SAE Filter Class 60

VTV TEST 5

Veh. 1 Engine Bottom (X)

Max = 42.51 mph @ 254.88 msec
Min = 6.85 mph @ 41.52 msec



B-24

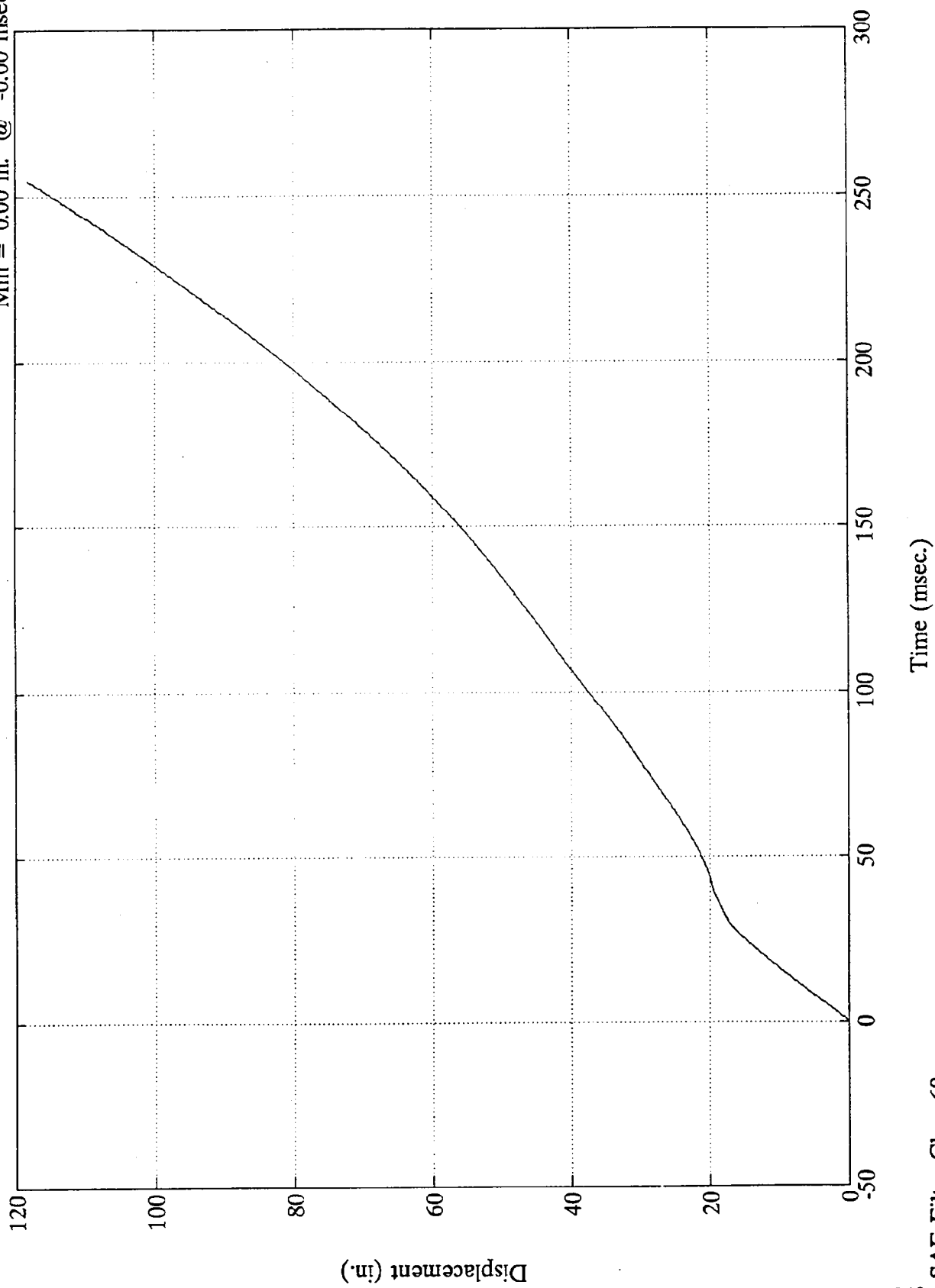
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 Engine Bottom (X)

Max = 118.30 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



B-25

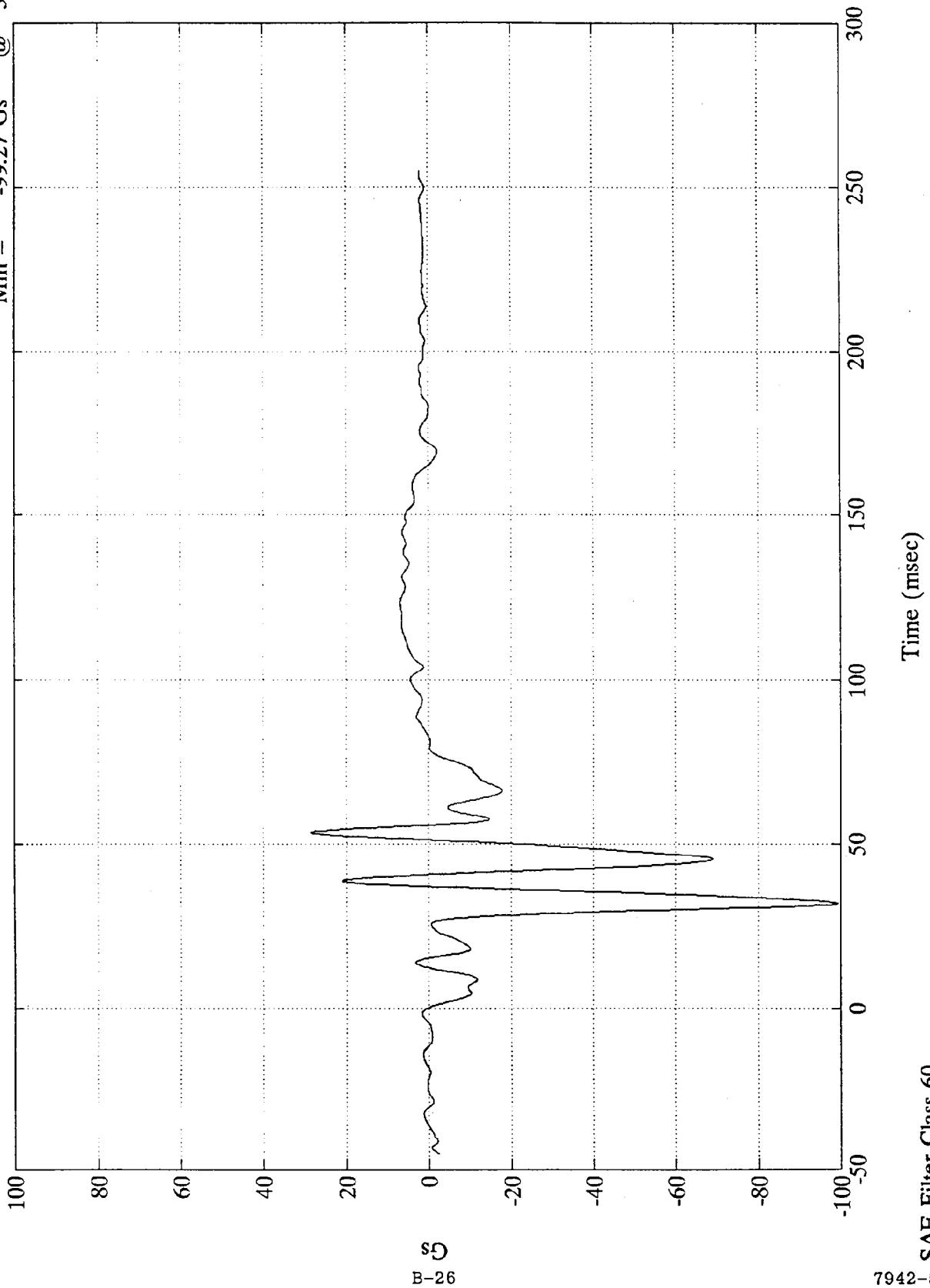
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 Front X Mem. (X)

Max = 28.56 Gs @ 53.52 msec
Min = -99.27 Gs @ 31.79 msec



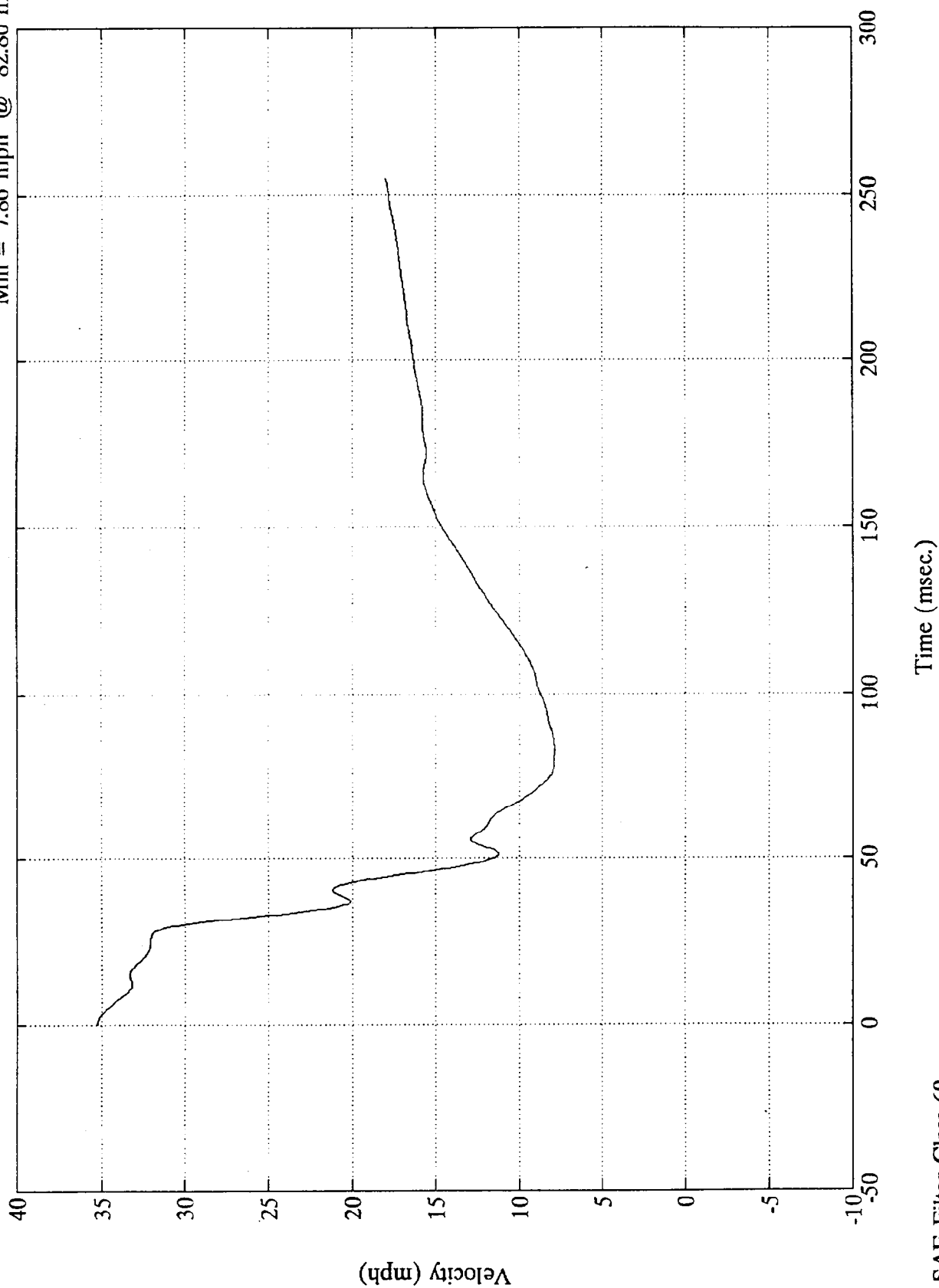
SAE Filter Class 60

7942-5

VTV TEST 5

Veh. 1 Front X Mem. (X)

Max = 35.20 mph @ 0.48 msec
Min = 7.86 mph @ 82.80 msec



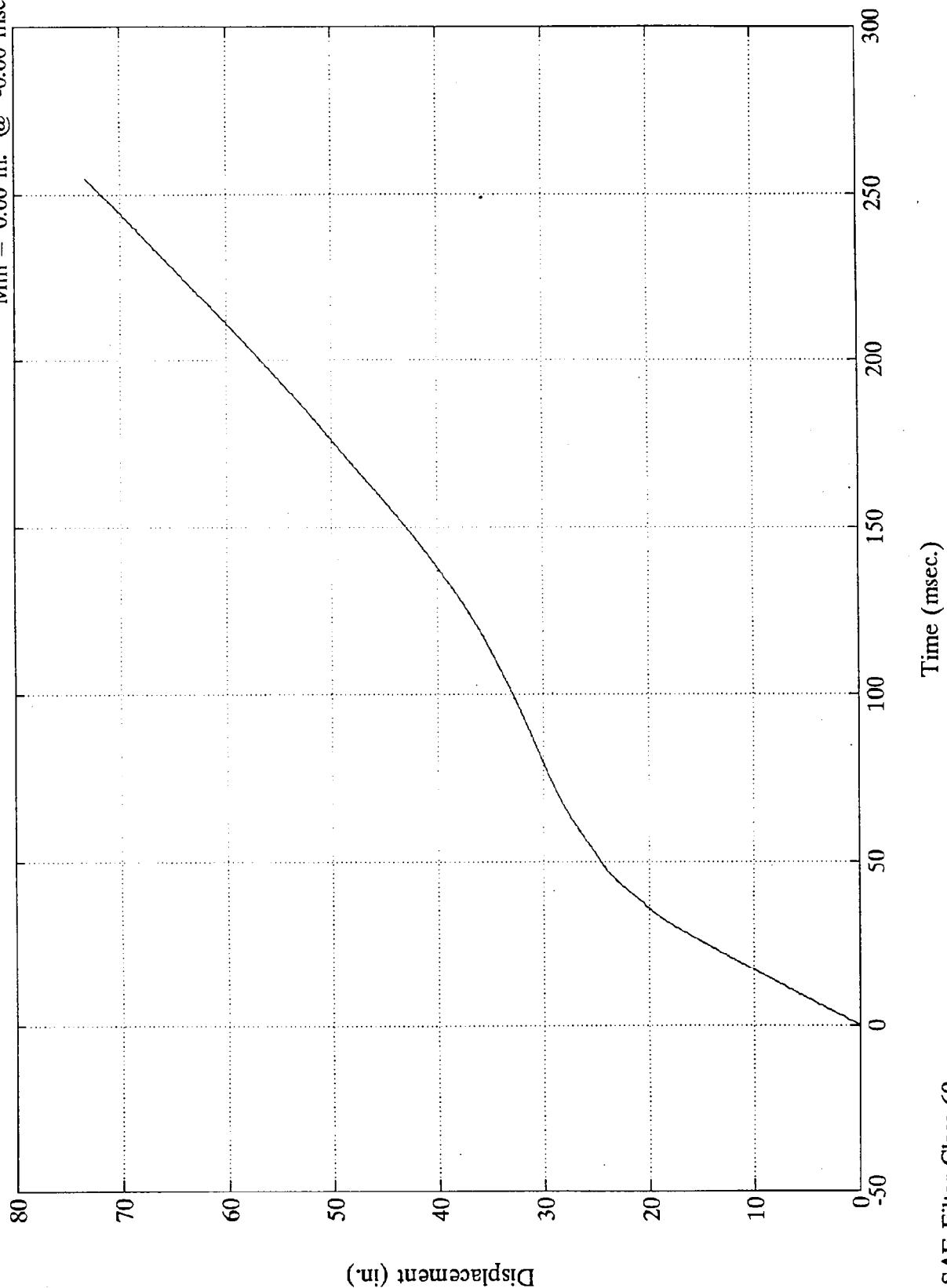
B-27

7942-5 SAE Filter Class 60

VTV TEST 5

Veh. 1 Front X Mem. (X)

Max = 73.30 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



B-28

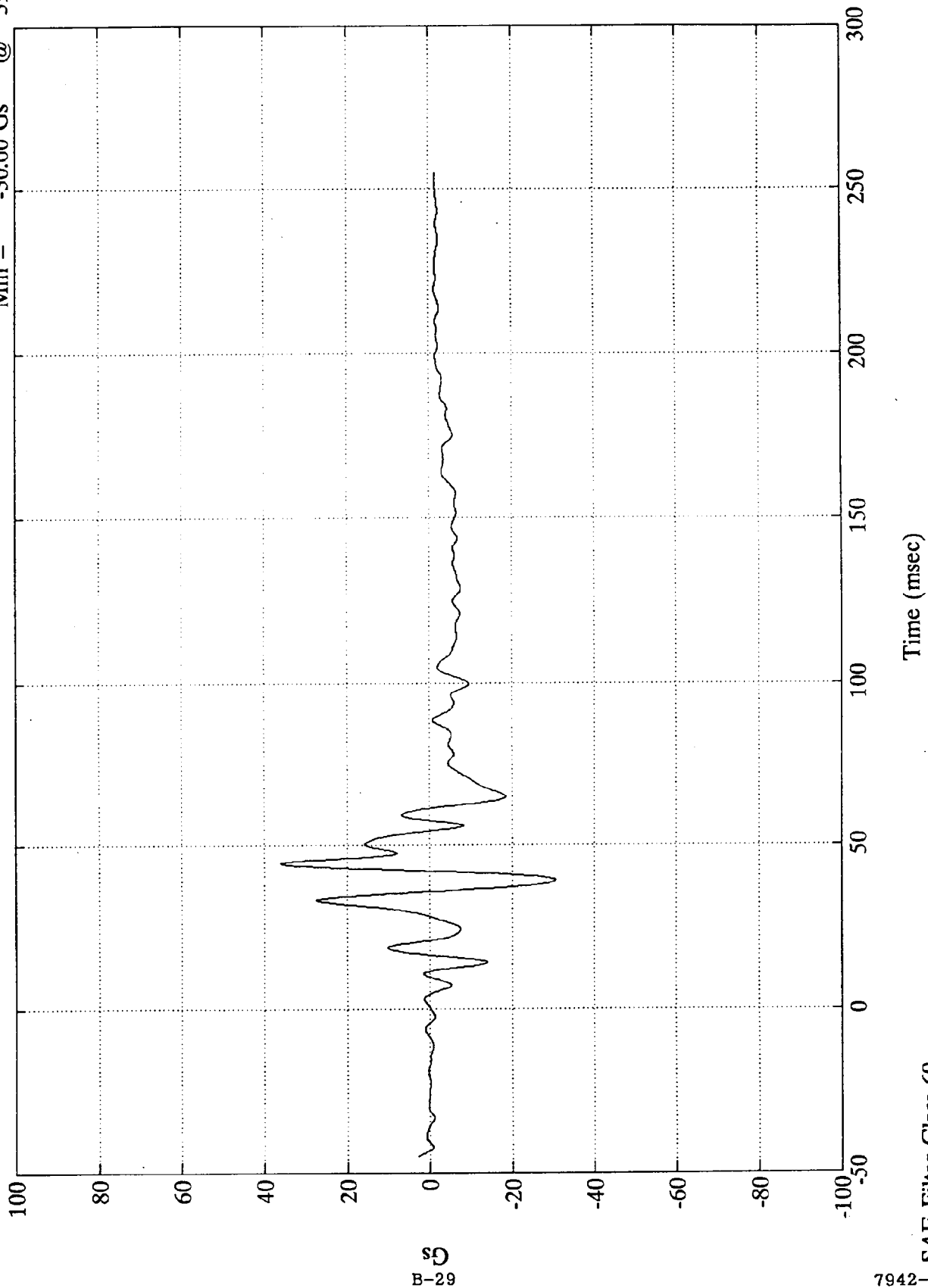
7942-5

SAE Filter Class 60

VTIV TEST 5

Veh. 1 Front X Mem. (Z)

Max = 35.98 Gs @ 44.52 msec
Min = -30.60 Gs @ 39.36 msec



B-29

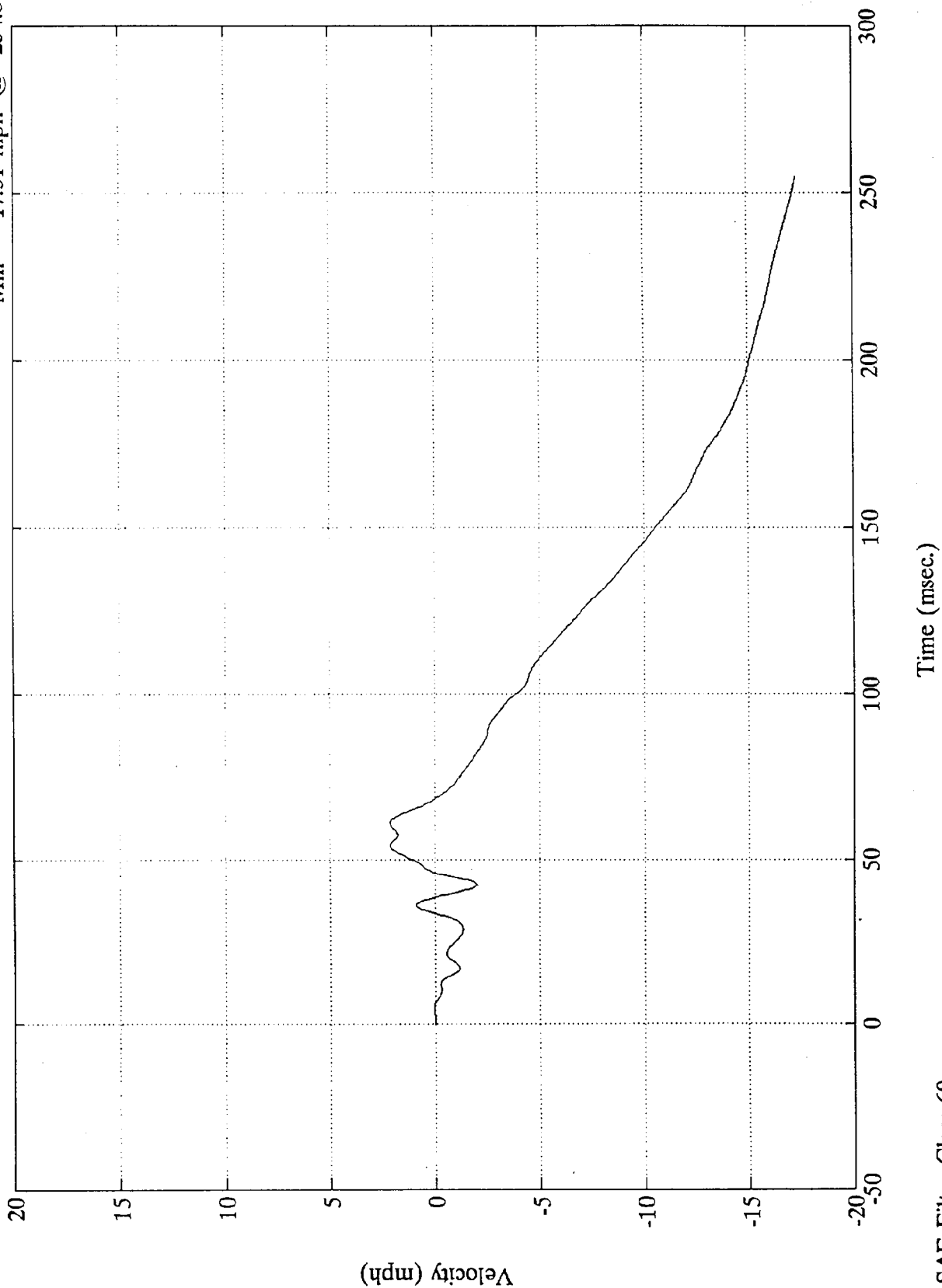
SAE Filter Class 60

7942-5

VTV TEST 5

Veh. 1 Front X Mem. (Z)

Max = 2.16 mph @ 61.20 msec
Min = -17.31 mph @ 254.88 msec



B-30

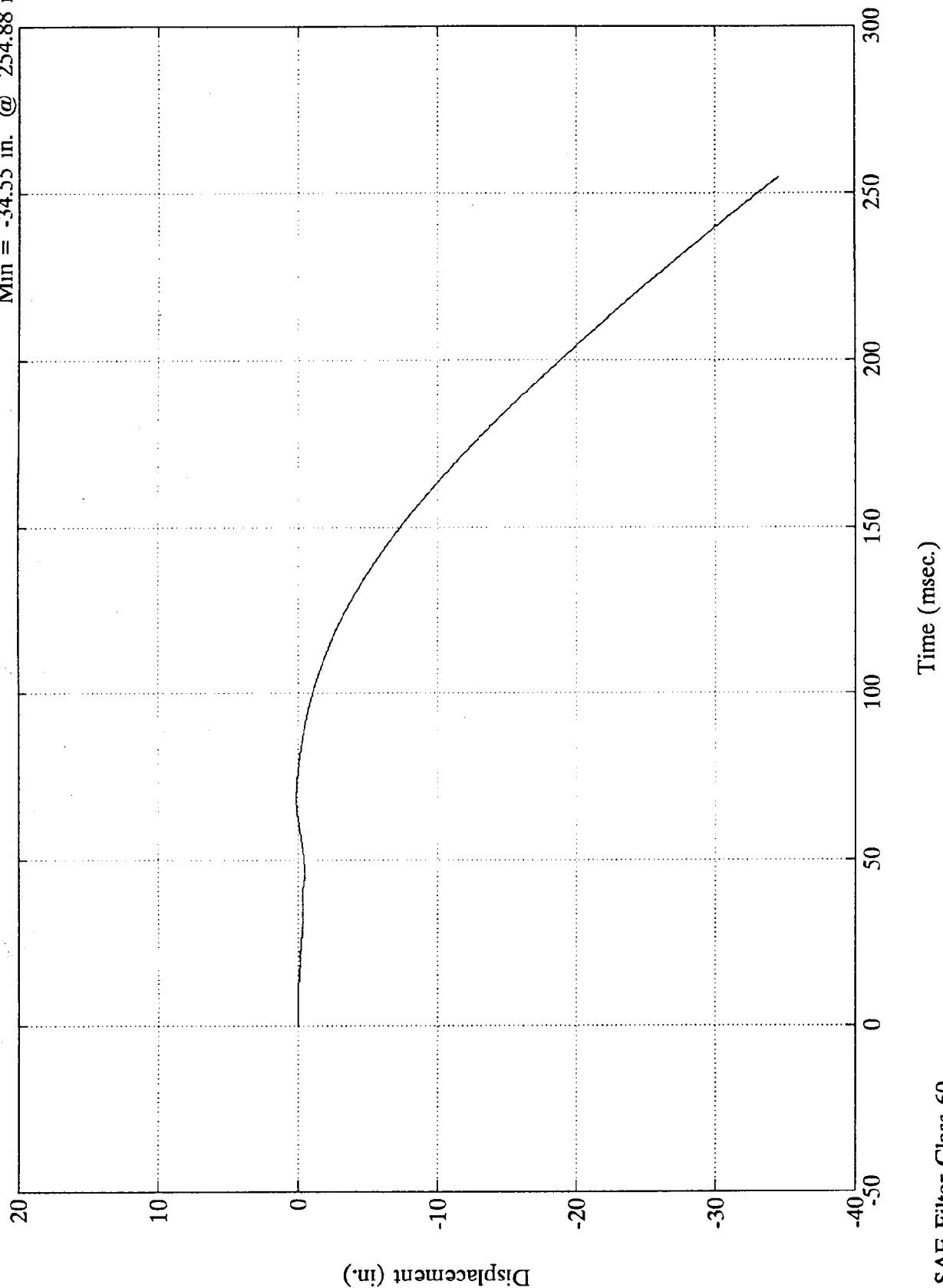
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 Front X Mem. (Z)

Max = 0.12 in. @ 68.40 msec
Min = -34.55 in. @ 254.88 msec



18-B

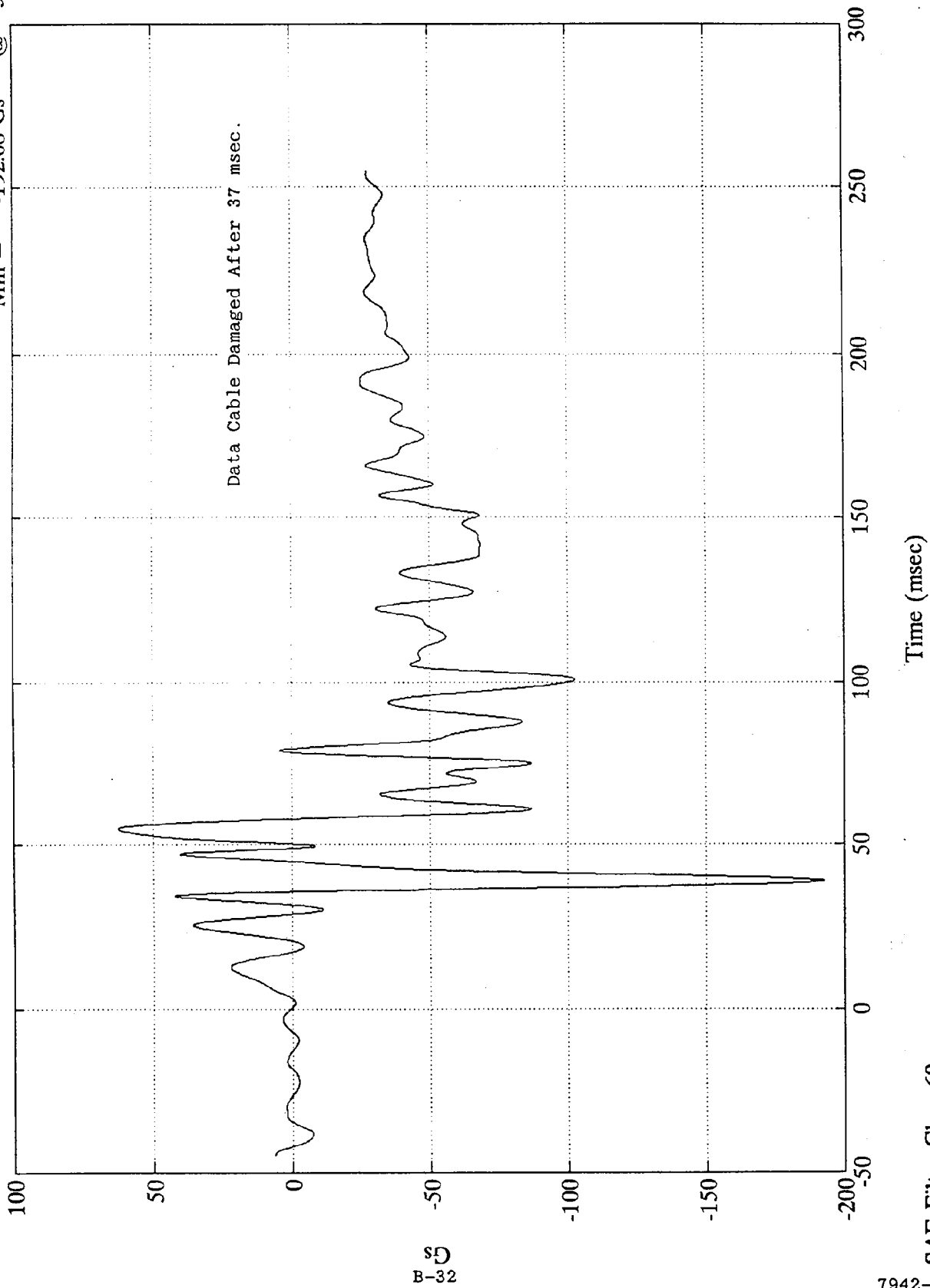
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 Left Caliper (X)

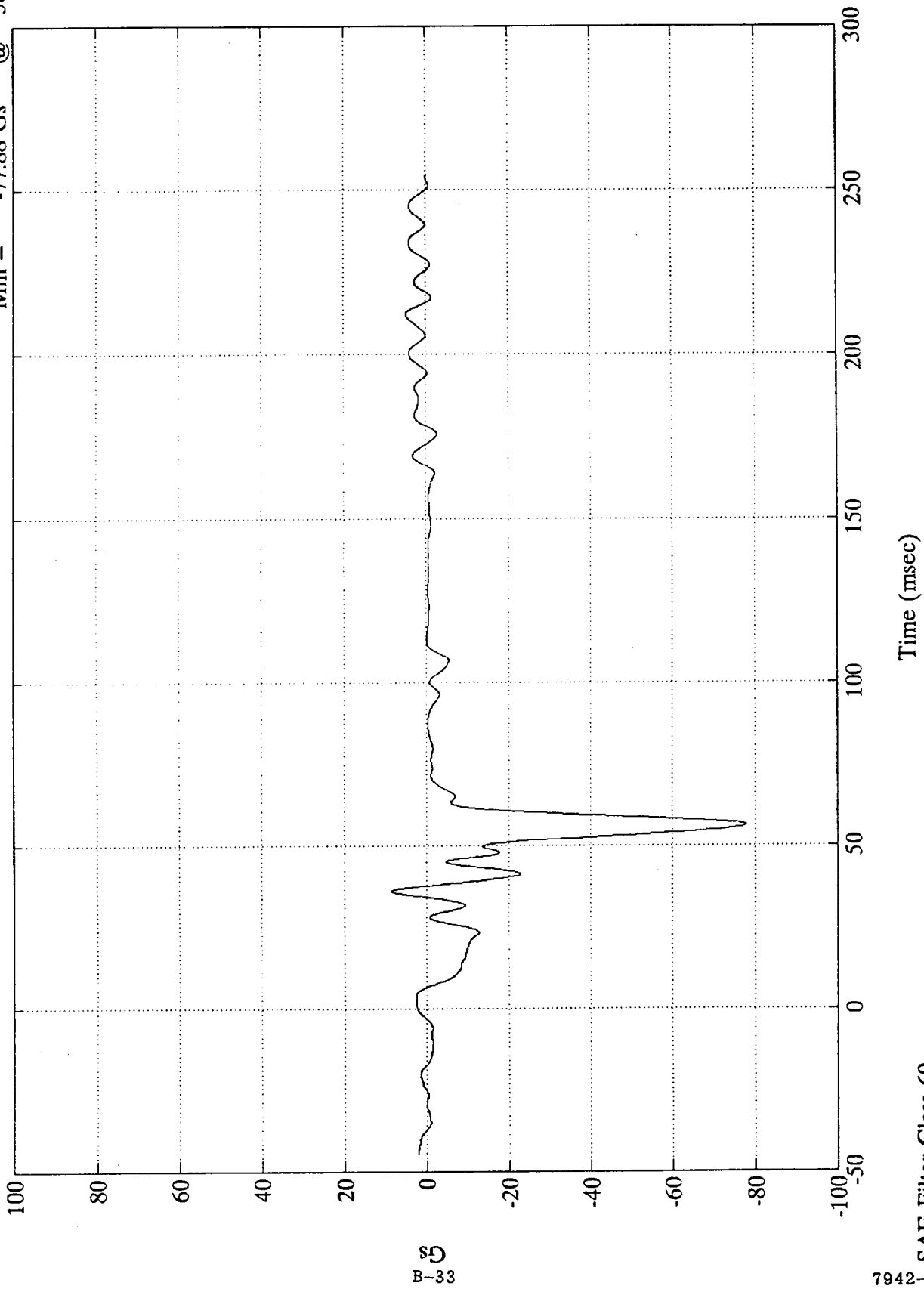
Max = 62.54 Gs @ 54.96 msec
Min = -192.68 Gs @ 38.63 msec



VTV TEST 5

Veh. 1 Right Caliper (X)

Max = 8.43 Gs @ 36.00 msec
Min = -77.88 Gs @ 56.28 msec



B-33

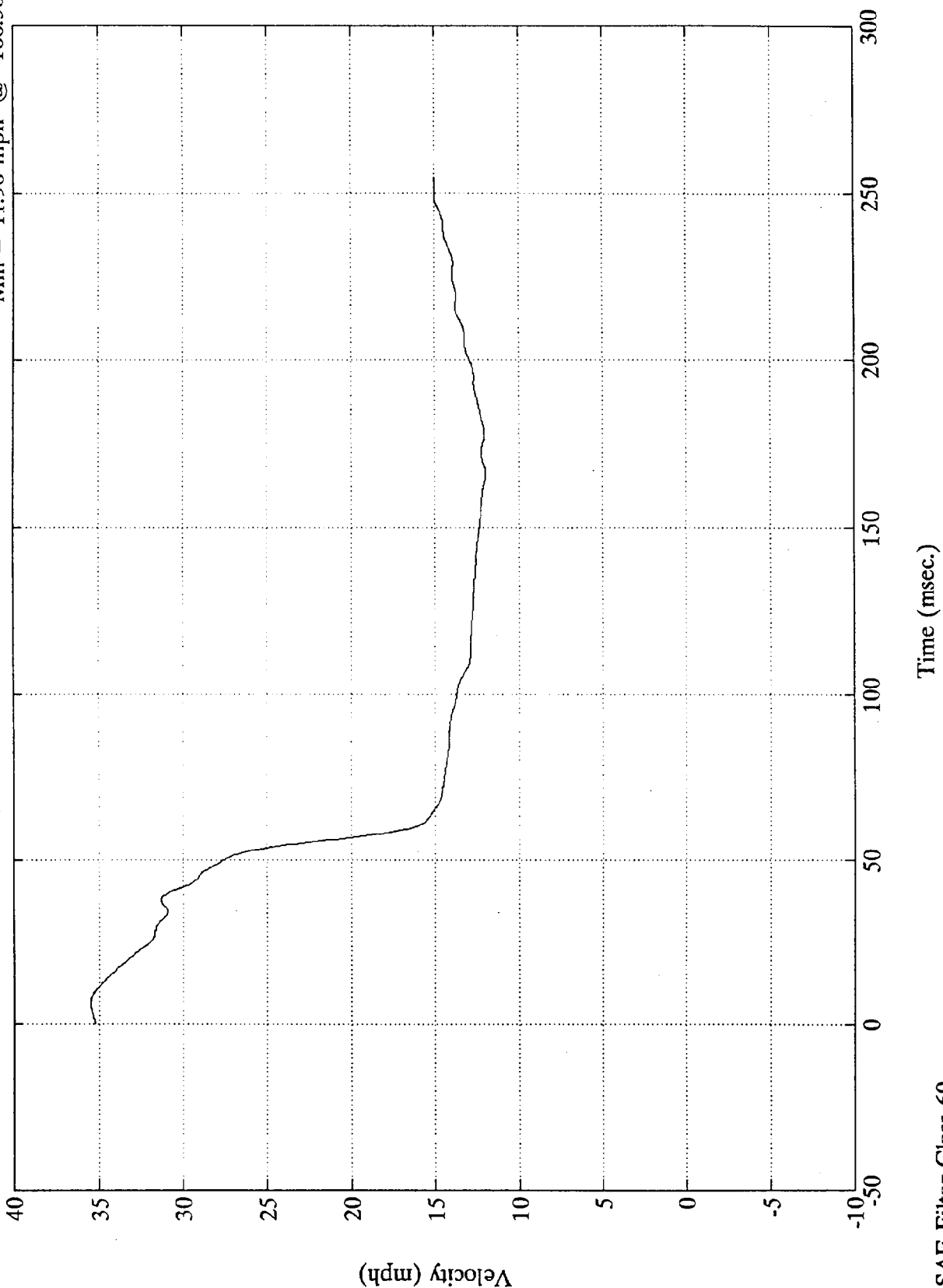
SAE Filter Class 60

7942-5

VTV TEST 5

Veh. 1 Right Caliper (X)

Max = 35.50 mph @ 6.48 msec
Min = 11.96 mph @ 166.56 msec



B-34

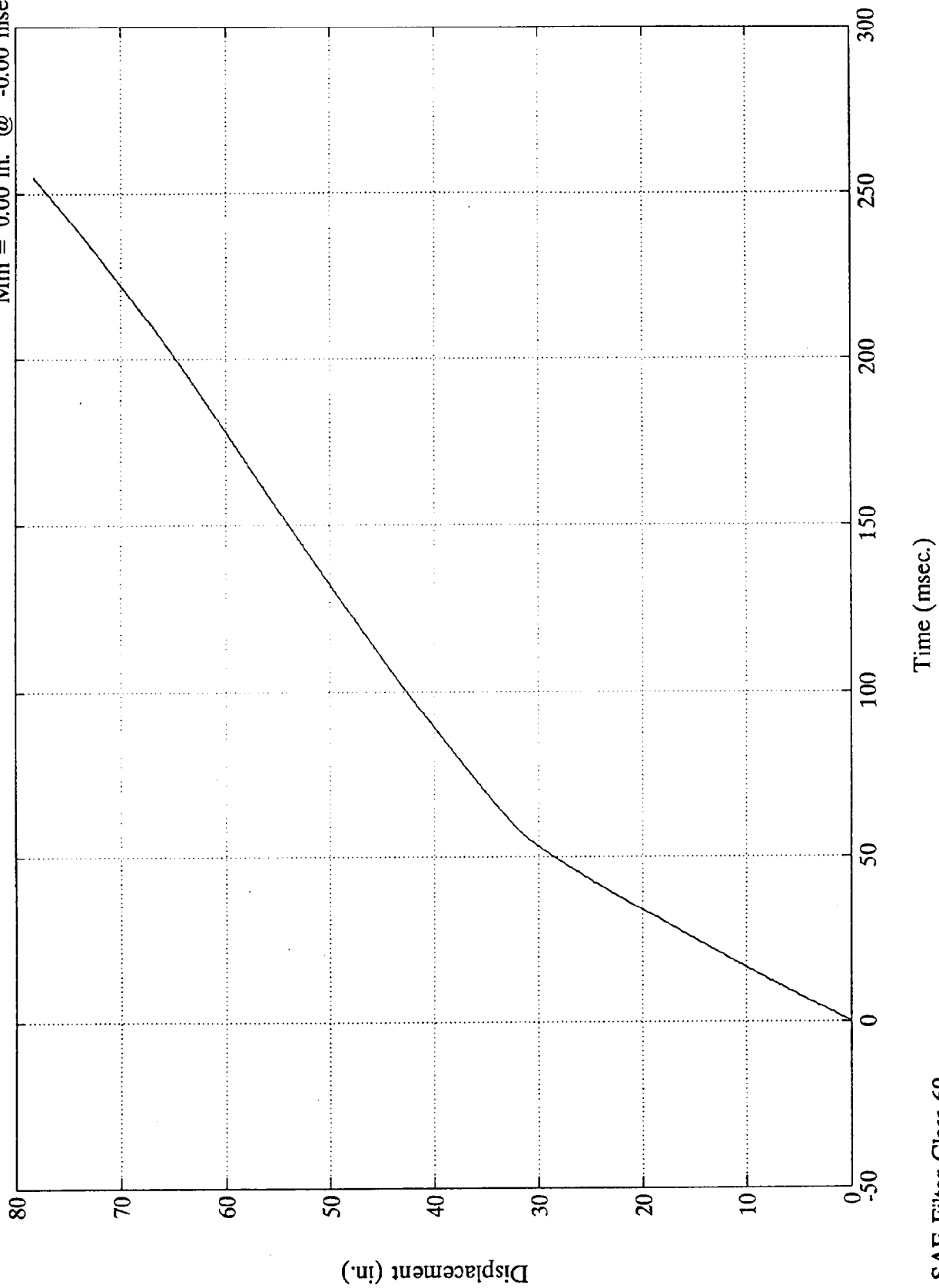
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 Right Caliper (X)

Max = 78.32 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



B-35

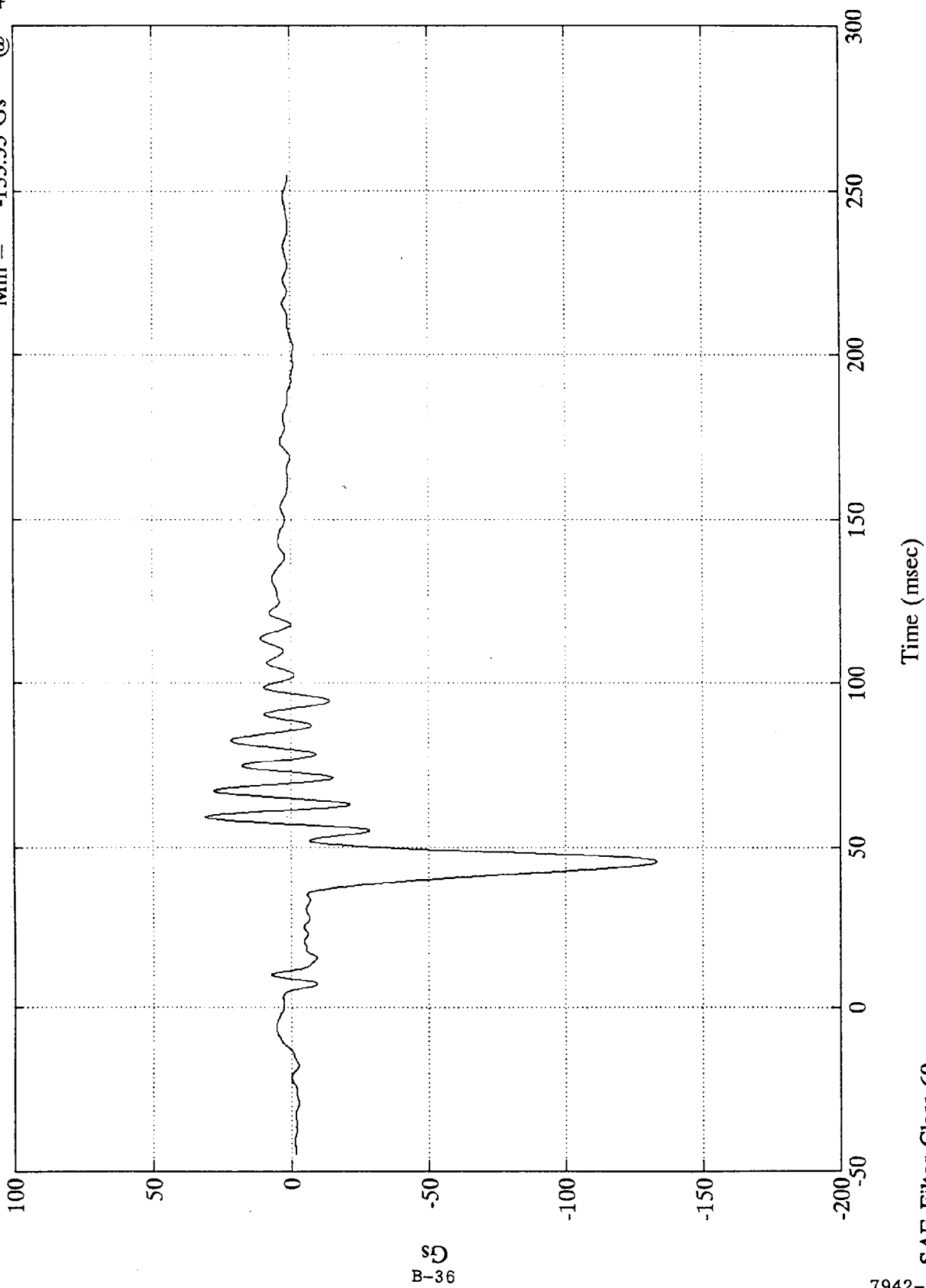
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 1 Brake Pedal (X)

Max = 31.18 Gs @ 59.27 msec
 Min = -133.33 Gs @ 45.48 msec

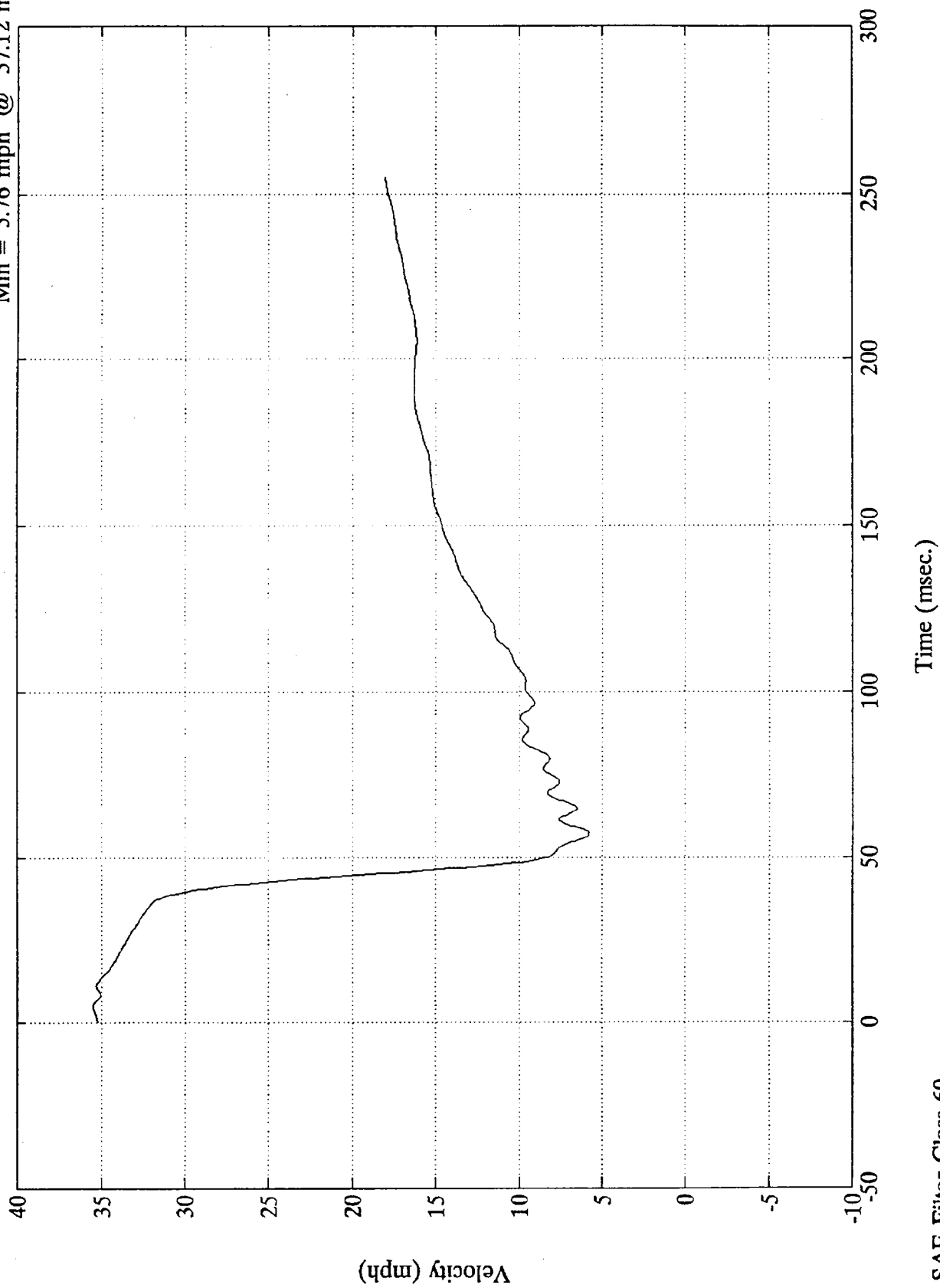


SAE Filter Class 60

VTV TEST 5

Veh. 1 Brake Pedal (X)

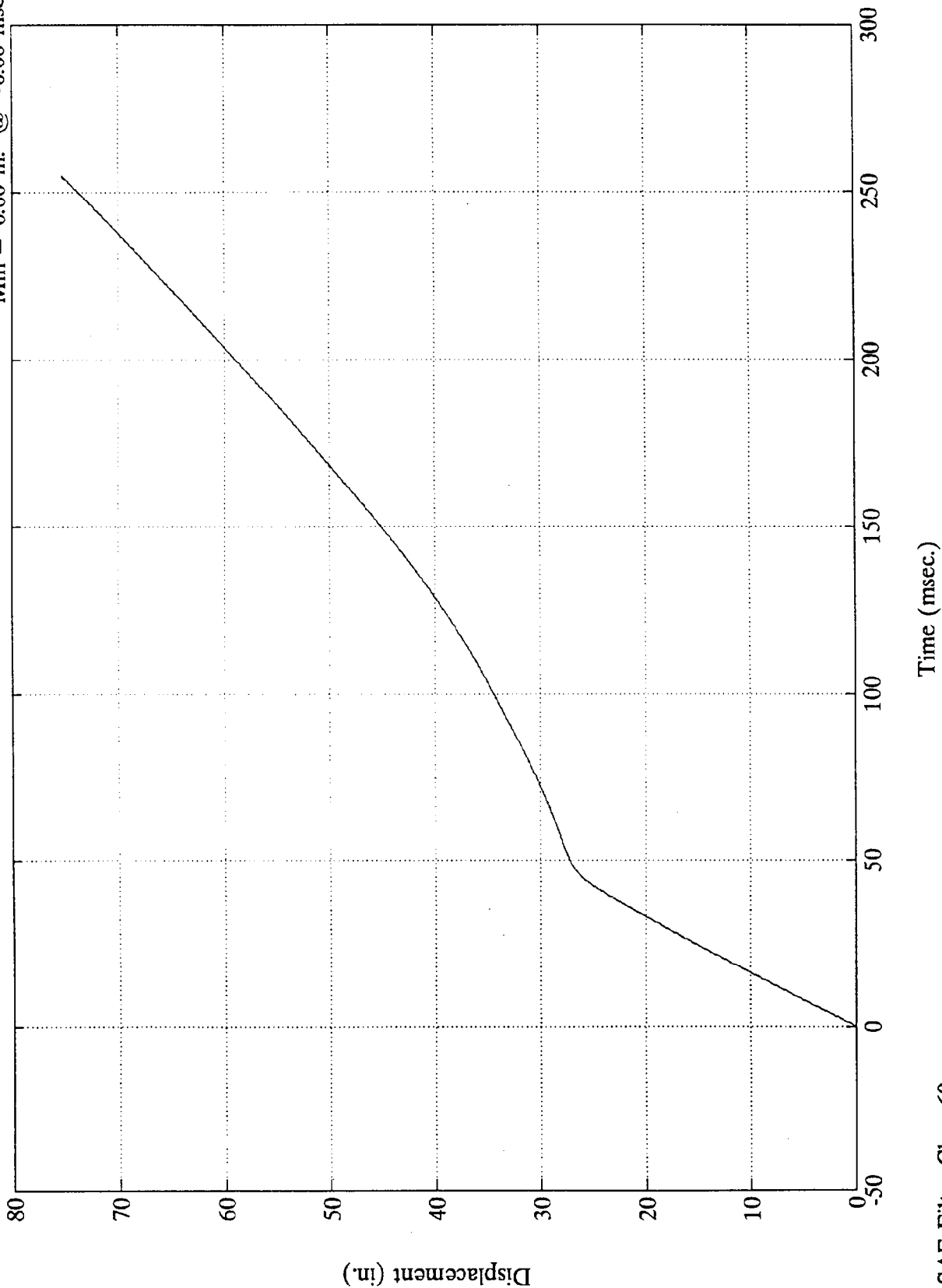
Max = 35.48 mph @ 5.04 msec
Min = 5.76 mph @ 57.12 msec



VTV TEST 5

Veh. 1 Brake Pedal (X)

Max = 75.30 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec

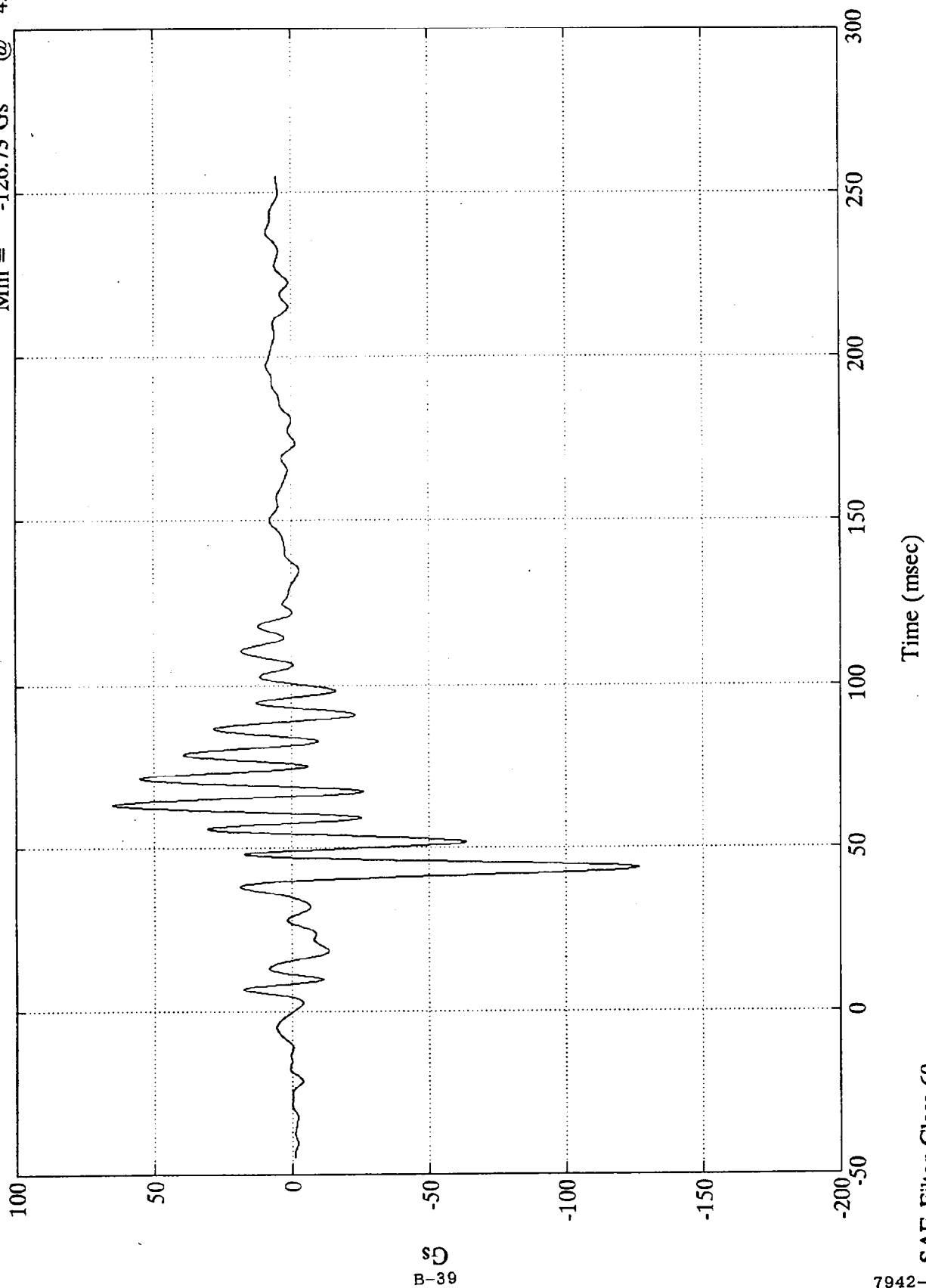


SAE Filter Class 60

VTV TEST 5

Veh. 1 Brake Pedal (Z)

Max =	64.99 Gs	@	63.00 msec
Min =	-126.73 Gs	@	43.79 msec

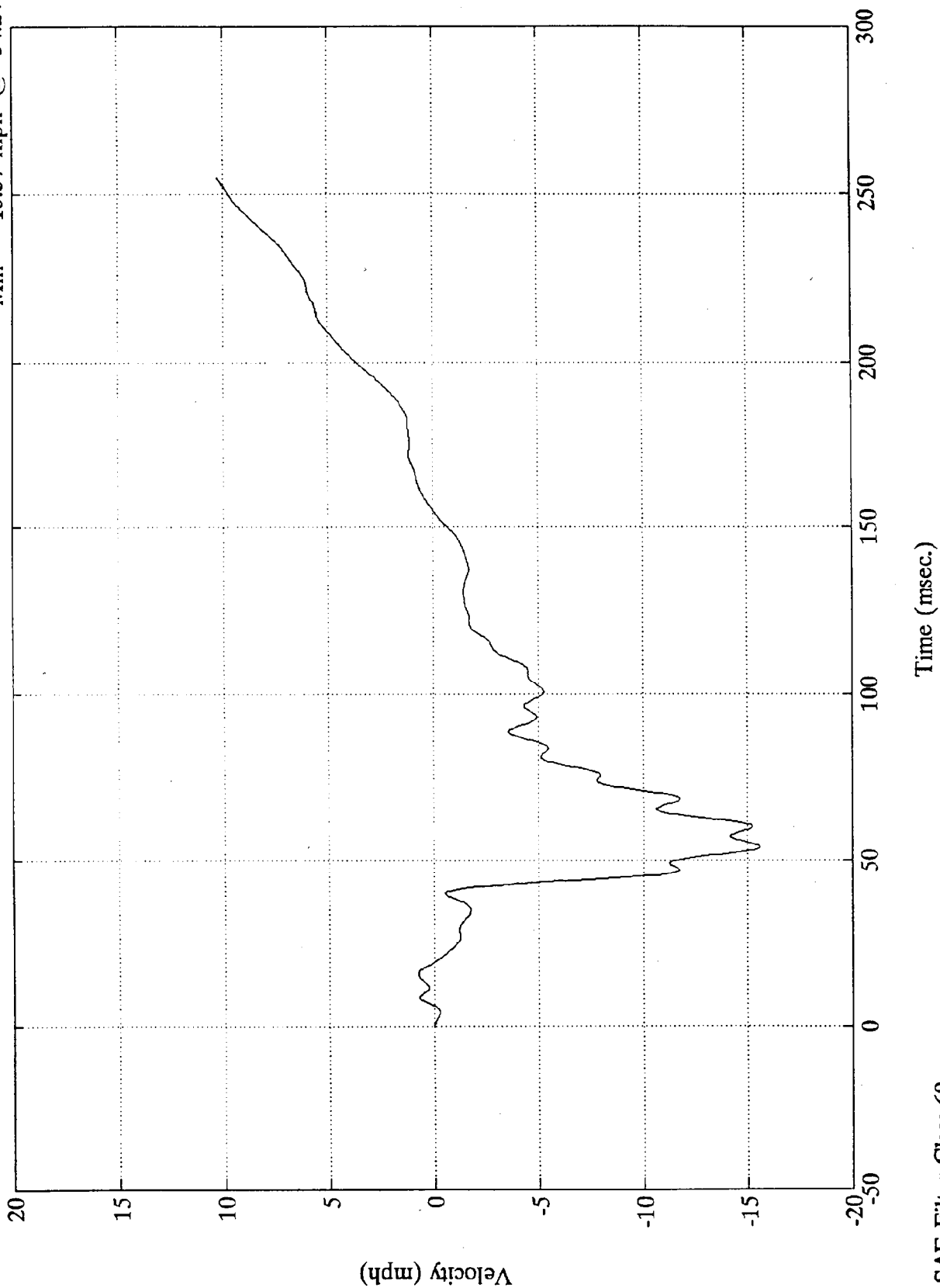


B-39

VTV TEST 5

Veh. 1 Brake Pedal (Z)

Max = 10.26 mph @ 254.88 msec
Min = -15.57 mph @ 54.24 msec



B-40

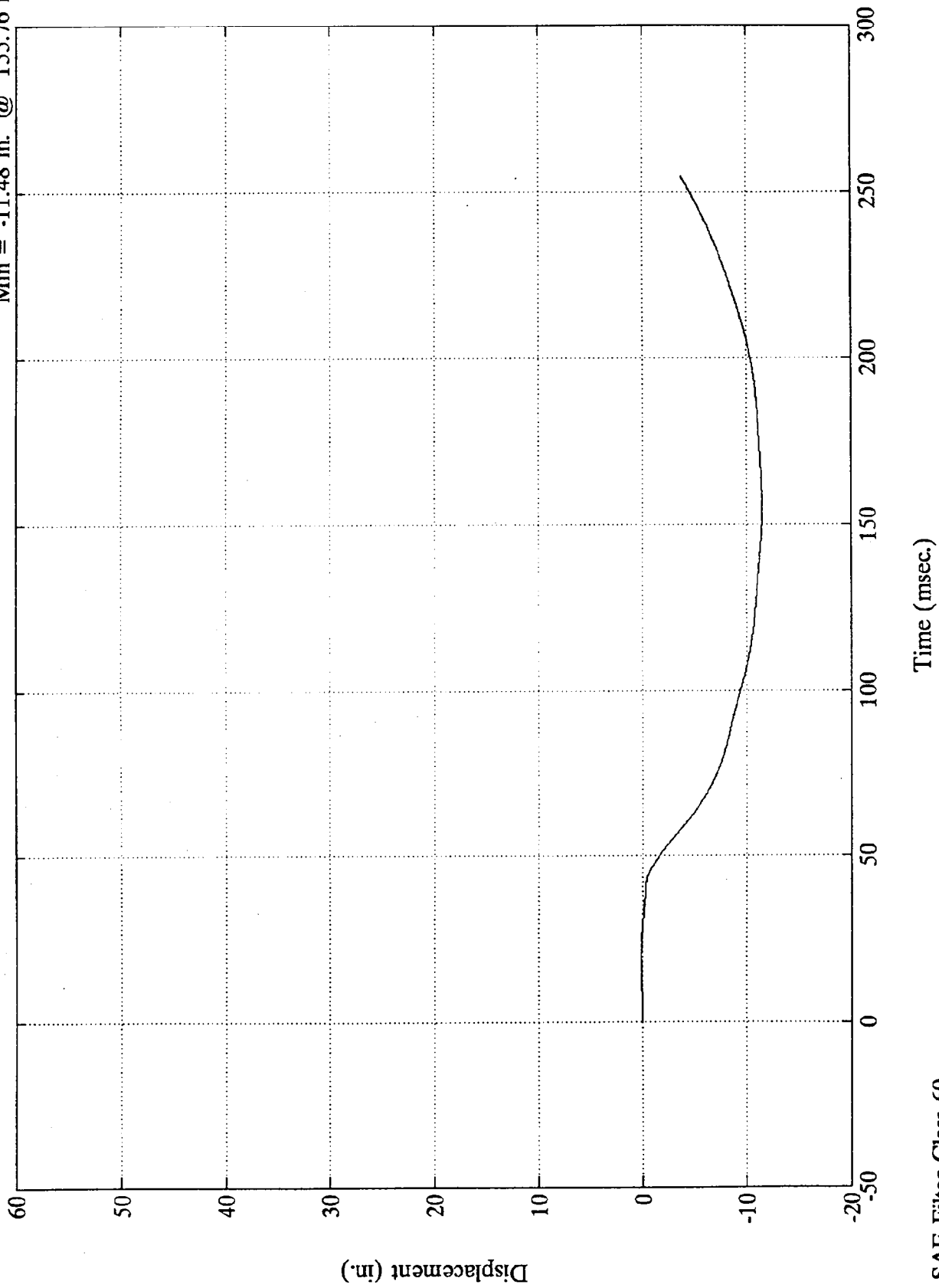
7942-5

SAE Filter Class 60

VTV TEST 5

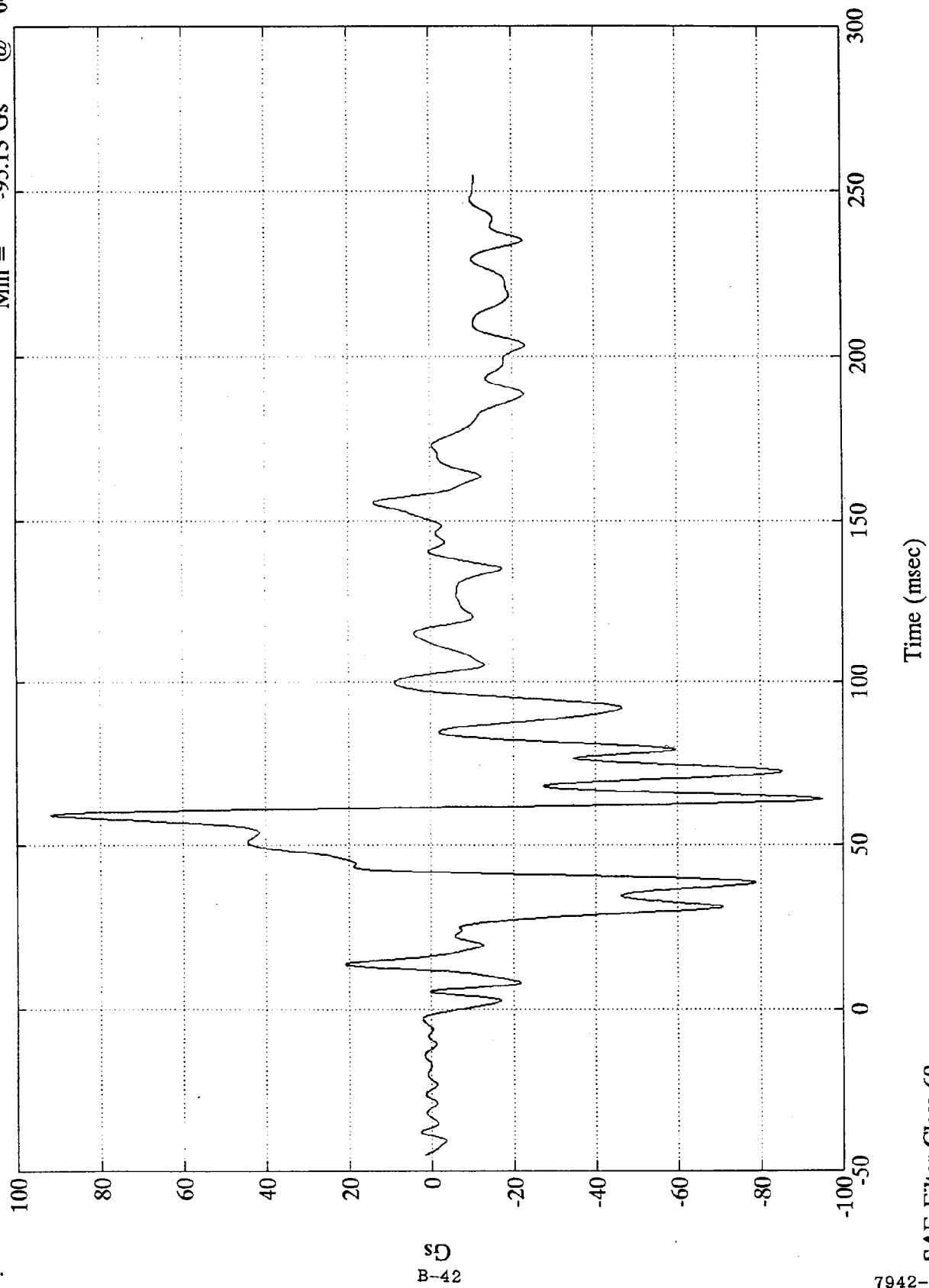
Veh. 1 Brake Pedal (Z)

Max = 0.10 in. @ 19.44 msec
Min = -11.48 in. @ 155.76 msec



VTV TEST 5

Veh. 1 Toe Pan (X) Max = 92.08 Gs @ 59.40 msec
Min = -95.13 Gs @ 64.19 msec



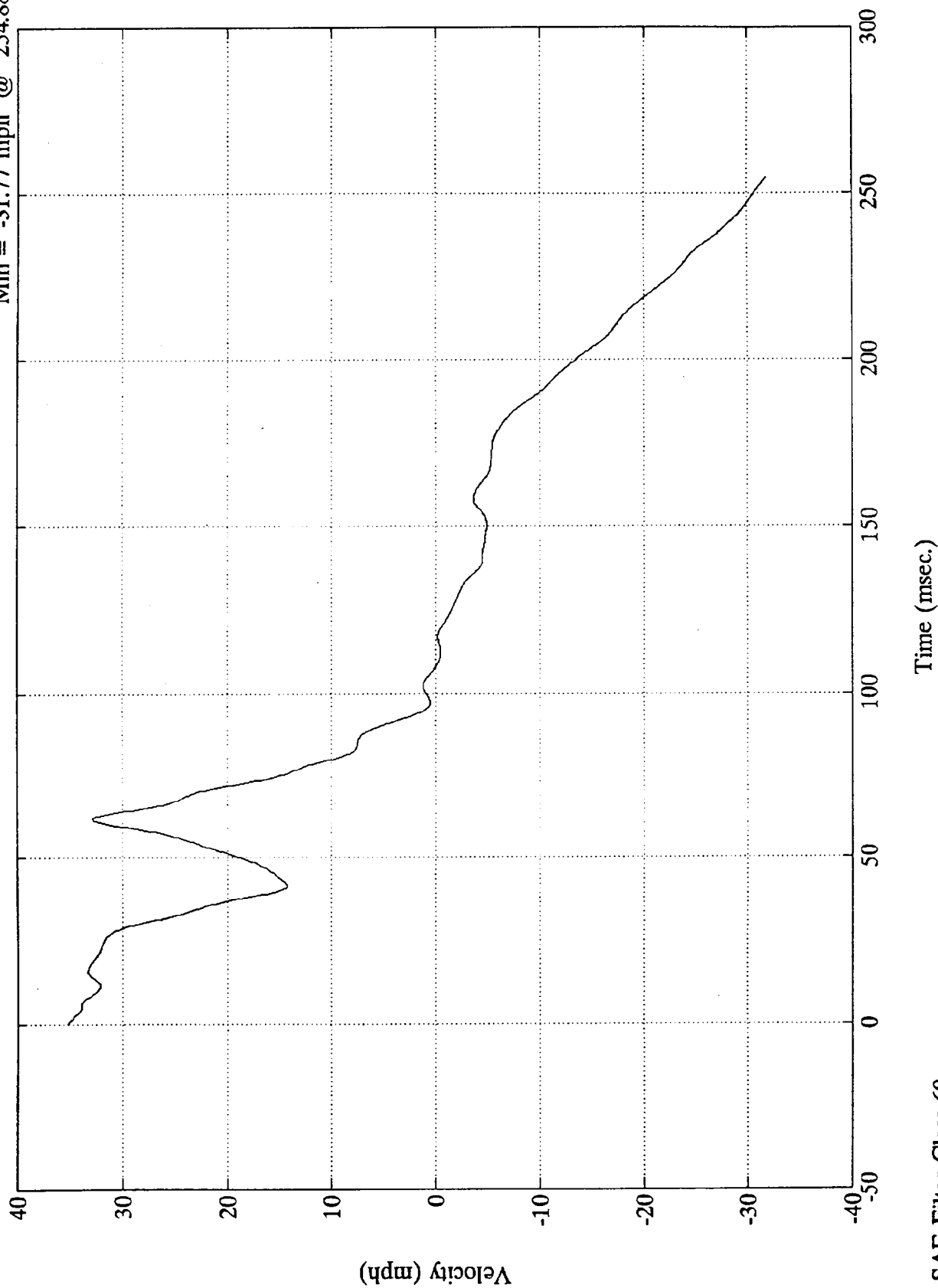
B-42

SAE Filter Class 60

7942-5

Veh. 1 Toe Pan (X)

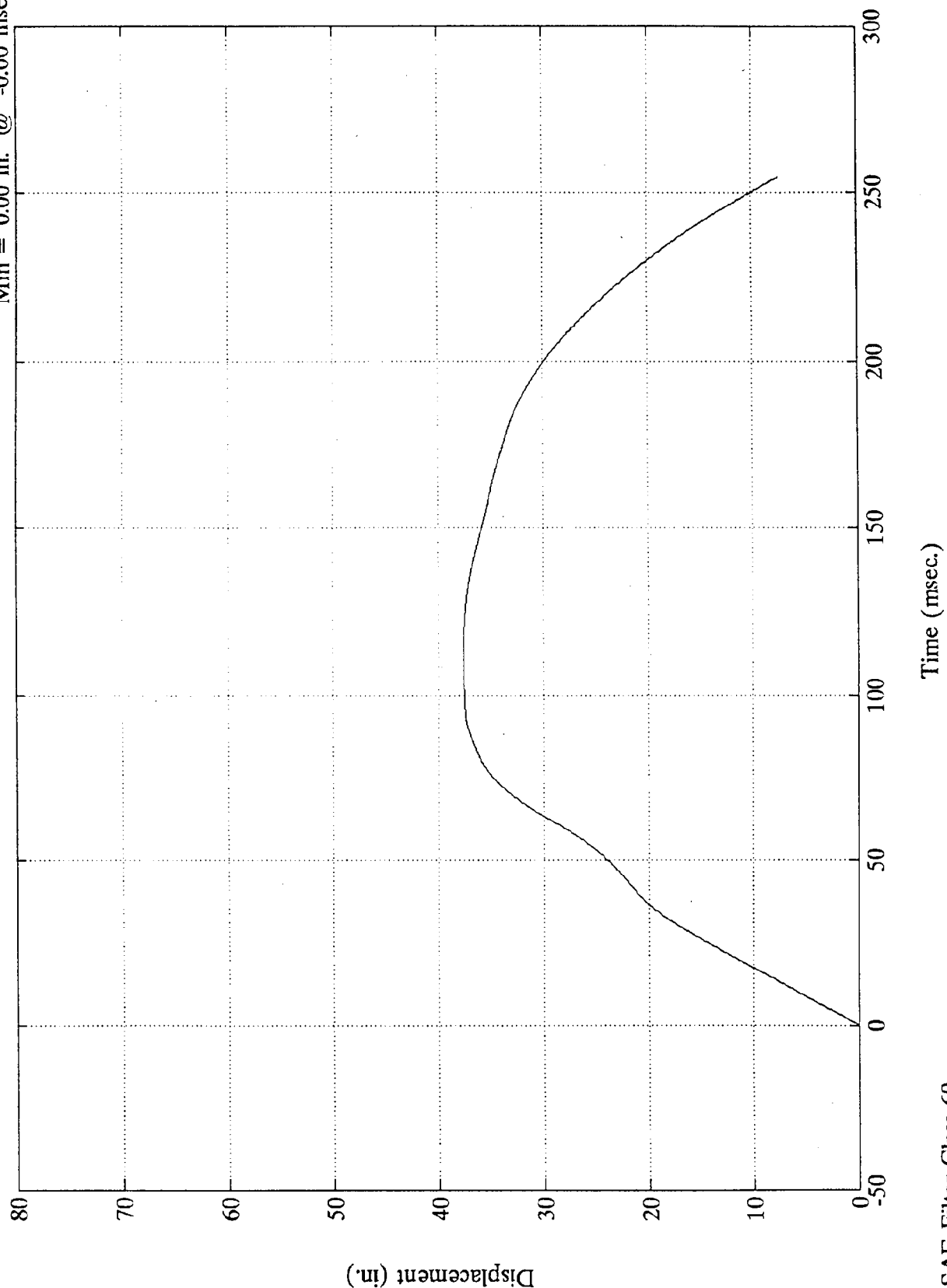
Max = 35.20 mph @ -0.00 msec
Min = -31.77 mph @ 254.88 msec



VTV TEST 5

Veh. 1 Toe Pan (X)

Max = 37.63 in. @ 108.24 msec
Min = 0.00 in. @ -0.00 msec



SAE Filter Class 60

TEST NO. Y43-5-1148

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

FACILITY: TRACK
RUN #: 1148
SERIES #: 5

TEST DATE: 08 Jan 1992

TITLE: VTV TEST 5

36 ms Fixed Duration HIC SUMMARY: Veh.1-Pos.1 Head Result.

hic: 321.23
t1 = 61.800 msec
t2 = 96.000 msec
Average G's Over Hic Duration = 38.83

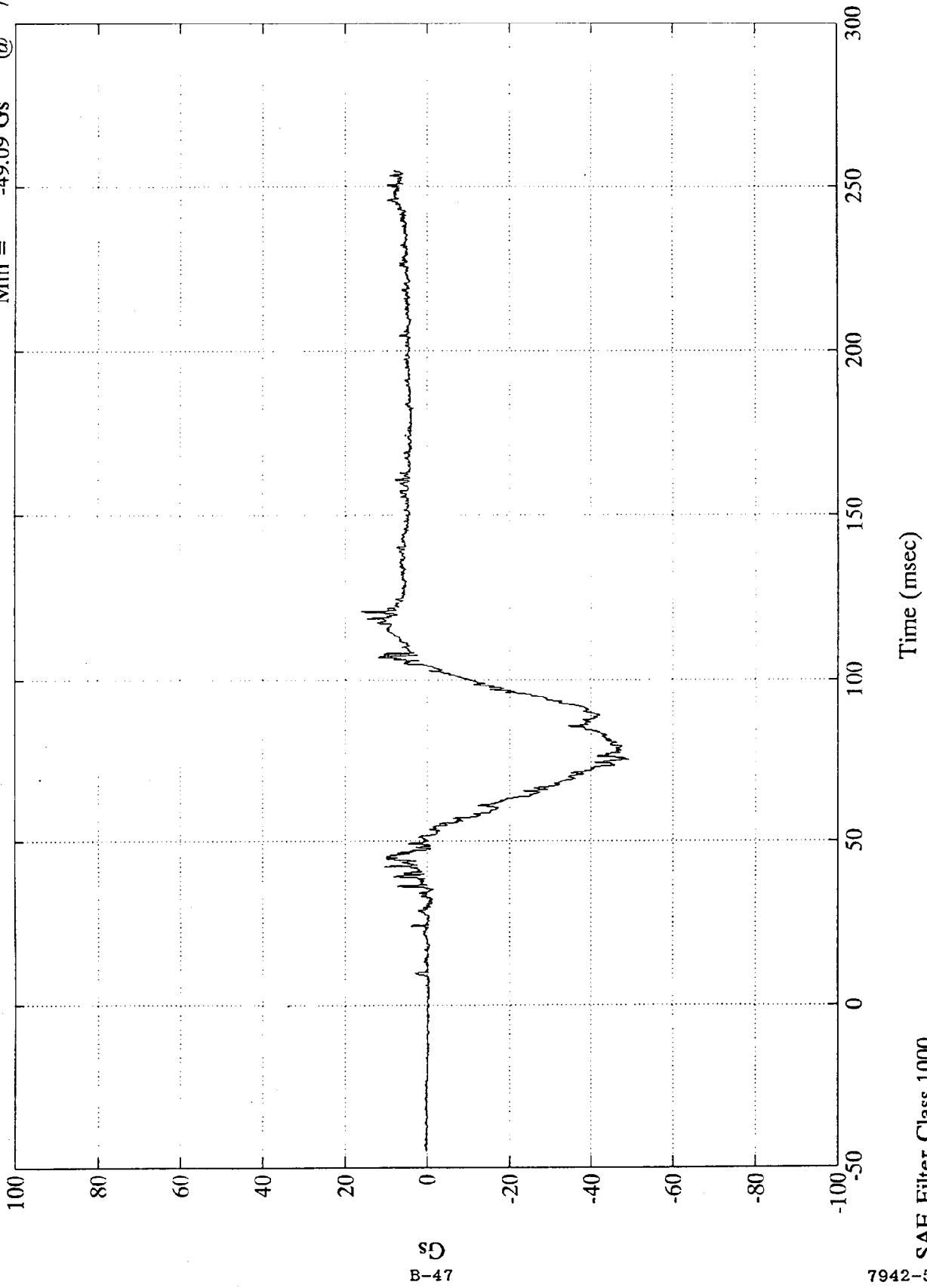
CLIP SUMMARY: Veh.1-Pos.1 Chest Result.

Peak Resultant (3 ms CLIPPED DURATION) = 55.507 G's
Tstart = 83.6400 ms
Tend = 86.7600 ms
CSI = 438.702

VTV TEST 5

Veh.1-Pos.1 Head X

Max = 15.98 Gs @ 120.48 msec
Min = -49.09 Gs @ 75.59 msec



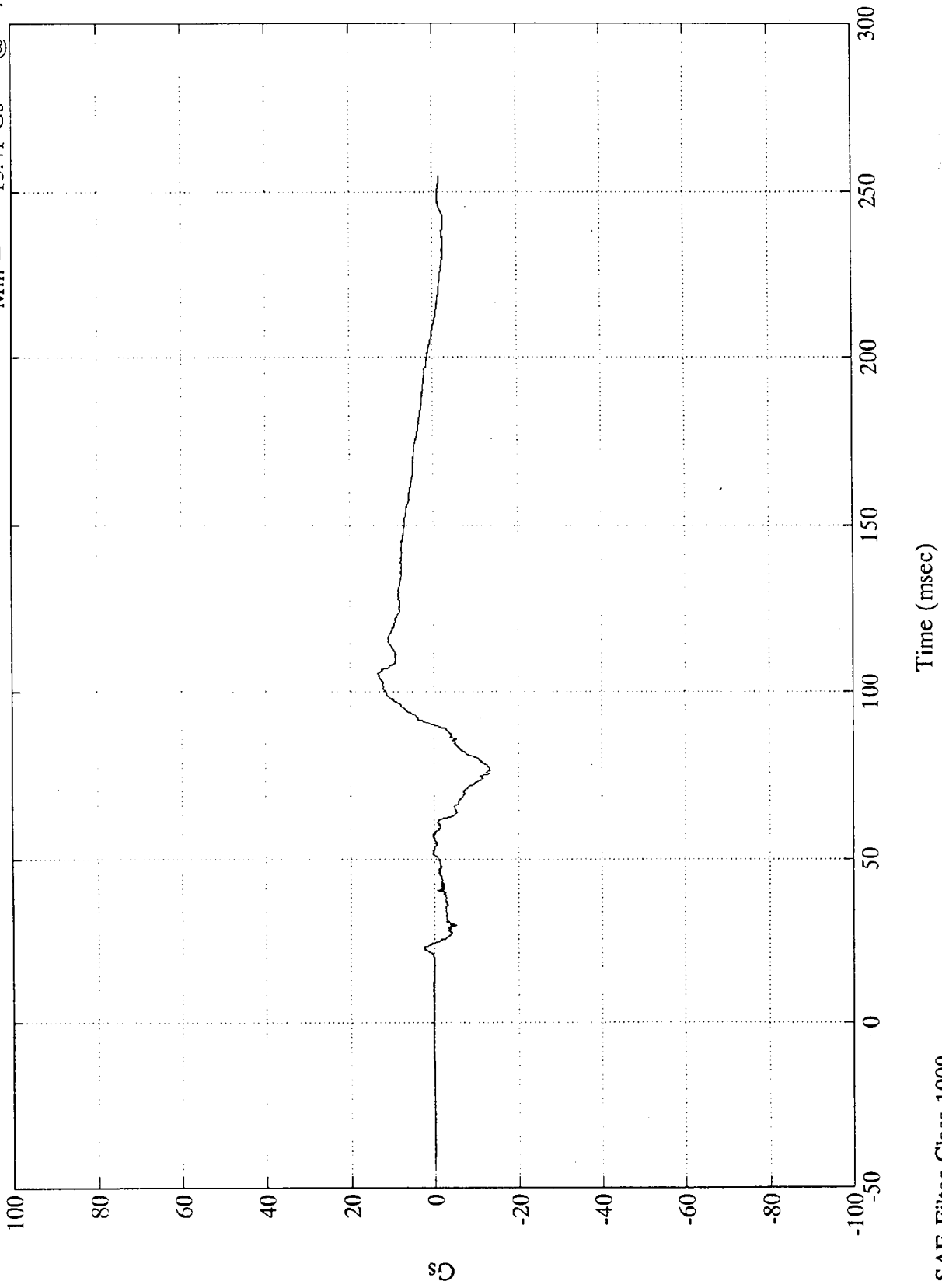
B-47

7942-5 SAE Filter Class 1000

VTV TEST 5

Veh.1-Pos.1 Head Y

Max =	13.50 Gs	@	105.48 msec
Min =	-13.41 Gs	@	76.92 msec

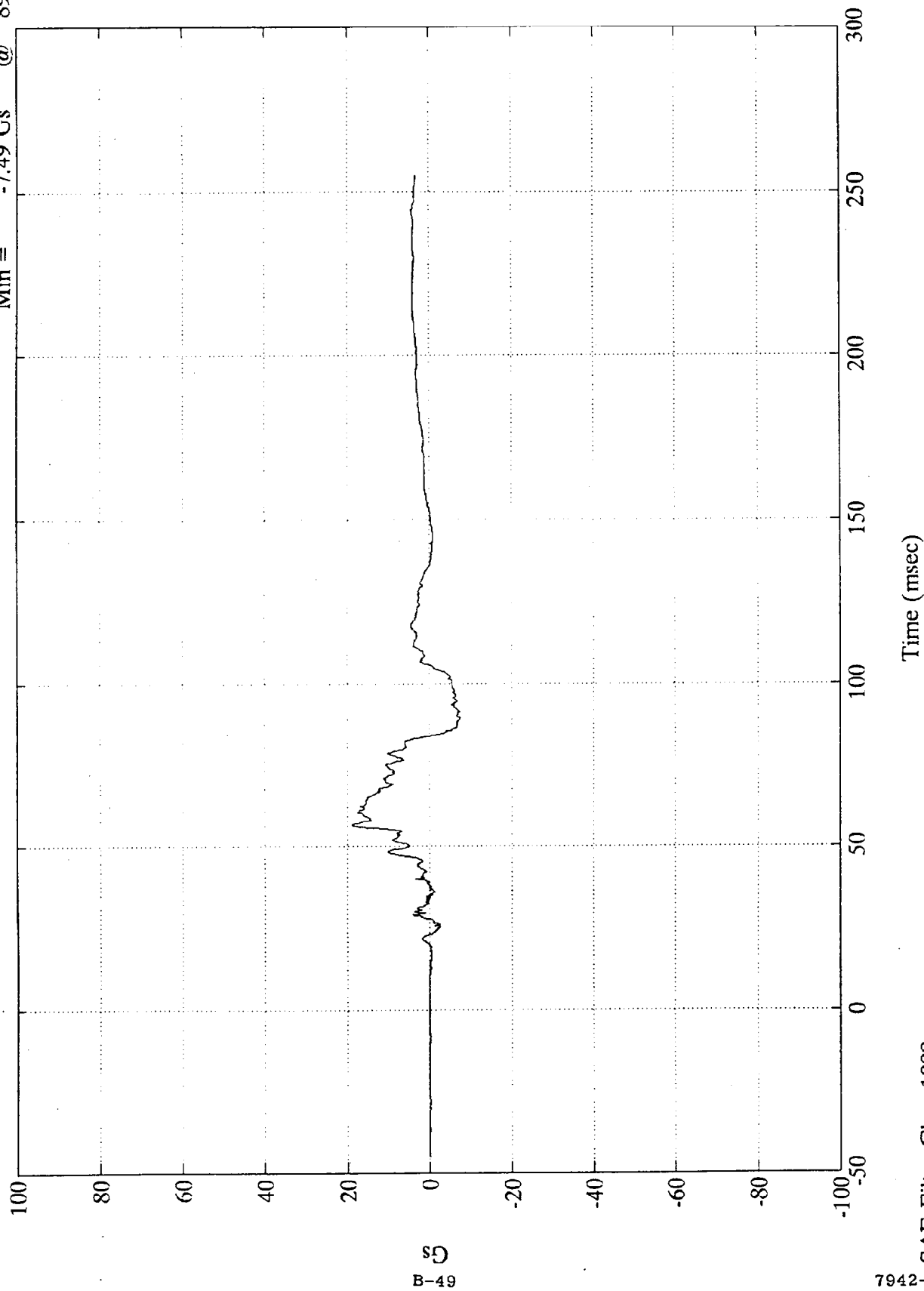


B-48

VTV TEST 5

Veh.1-Pos.1 Head Z

Max =	18.73 Gs	@	56.76 msec
Min =	-7.49 Gs	@	89.40 msec

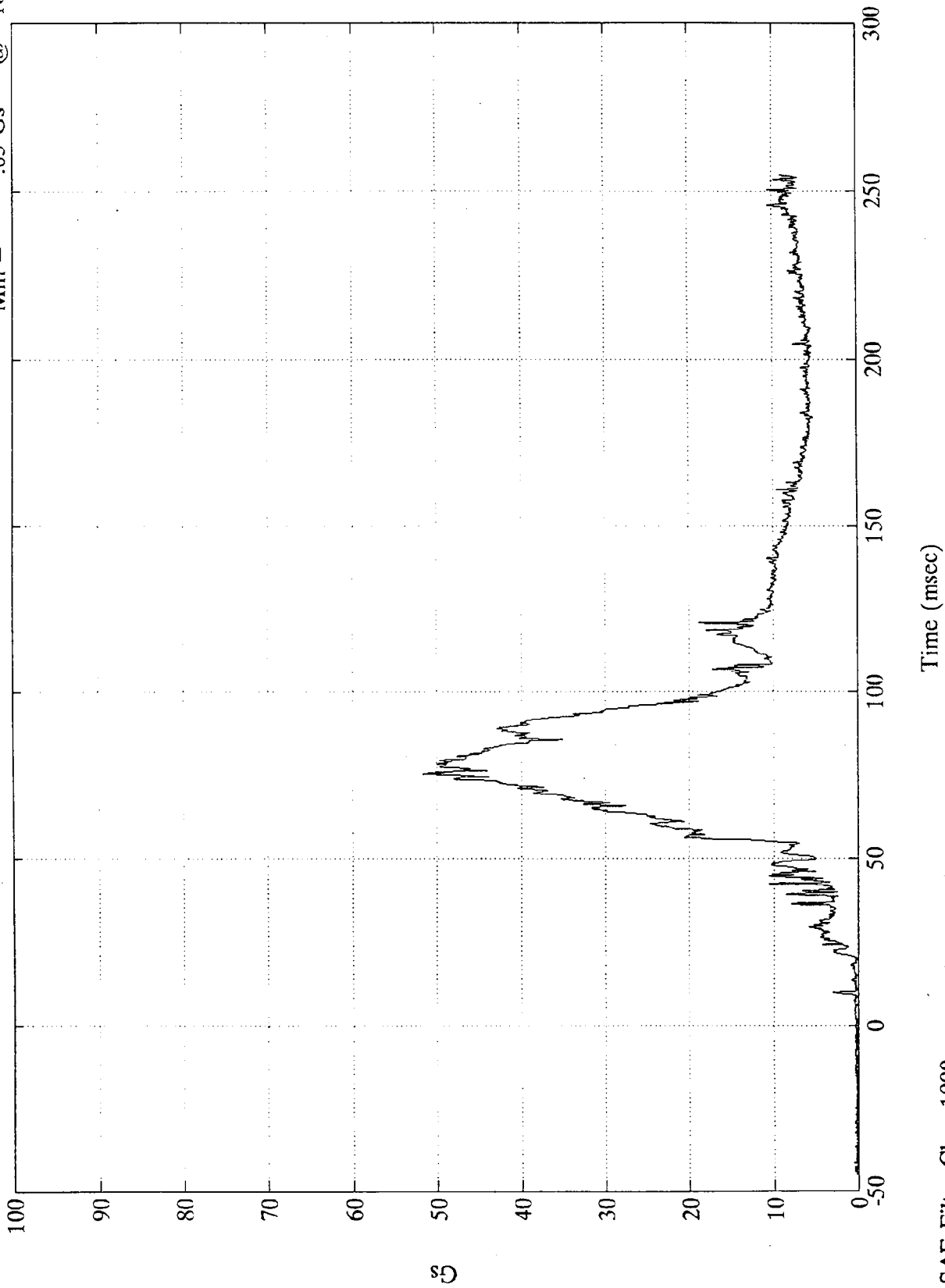


B-49

VTV TEST 5

Veh.1-Pos.1 Head Result.

Max = 51.64 Gs @ 75.59 msec
Min = .05 Gs @ -16.32 msec

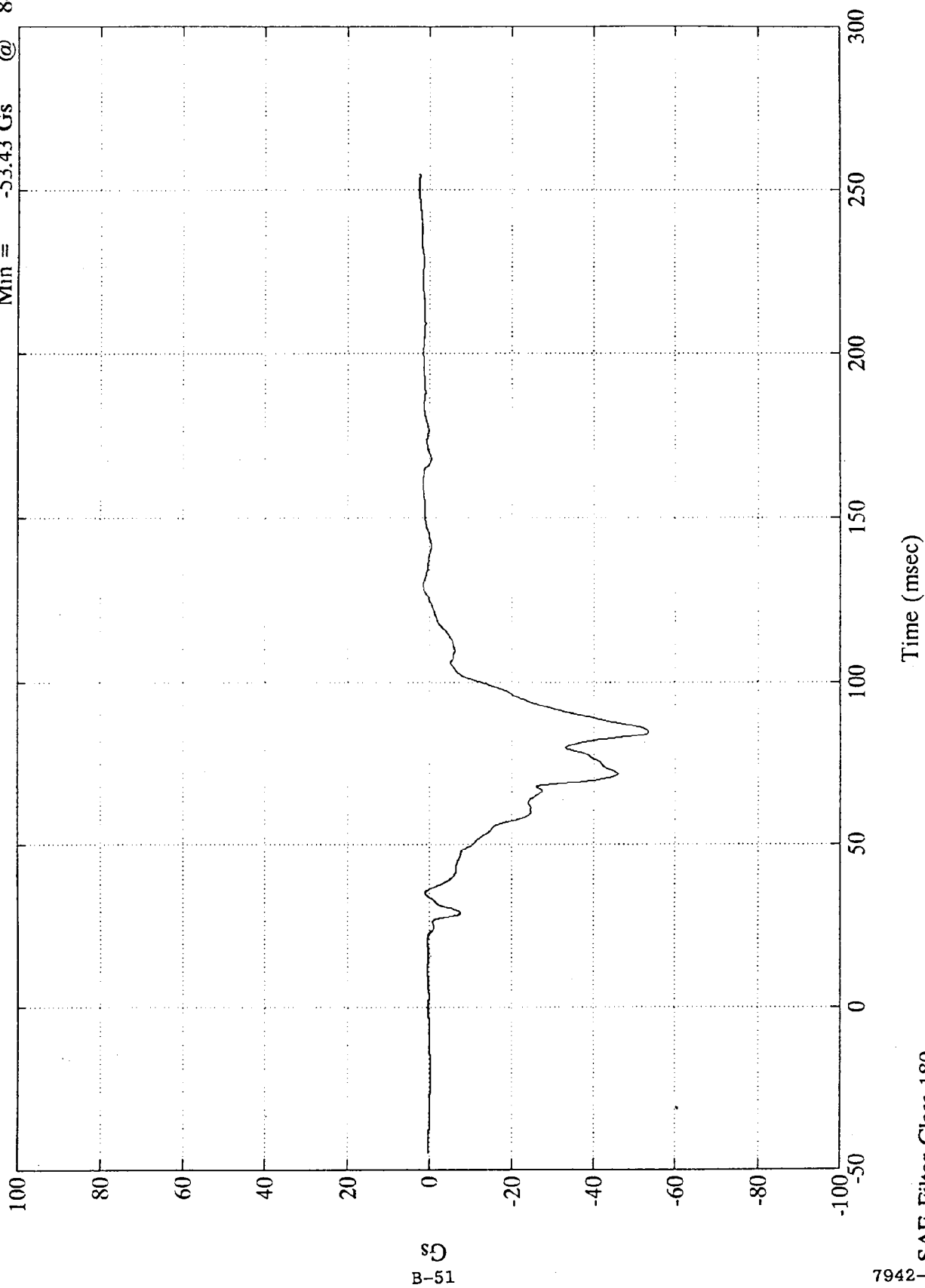


B-50

VTV TEST 5

Veh.1-Pos.1 Chest X

Max = 2.42 Gs @ 248.52 msec
Min = -53.43 Gs @ 84.72 msec

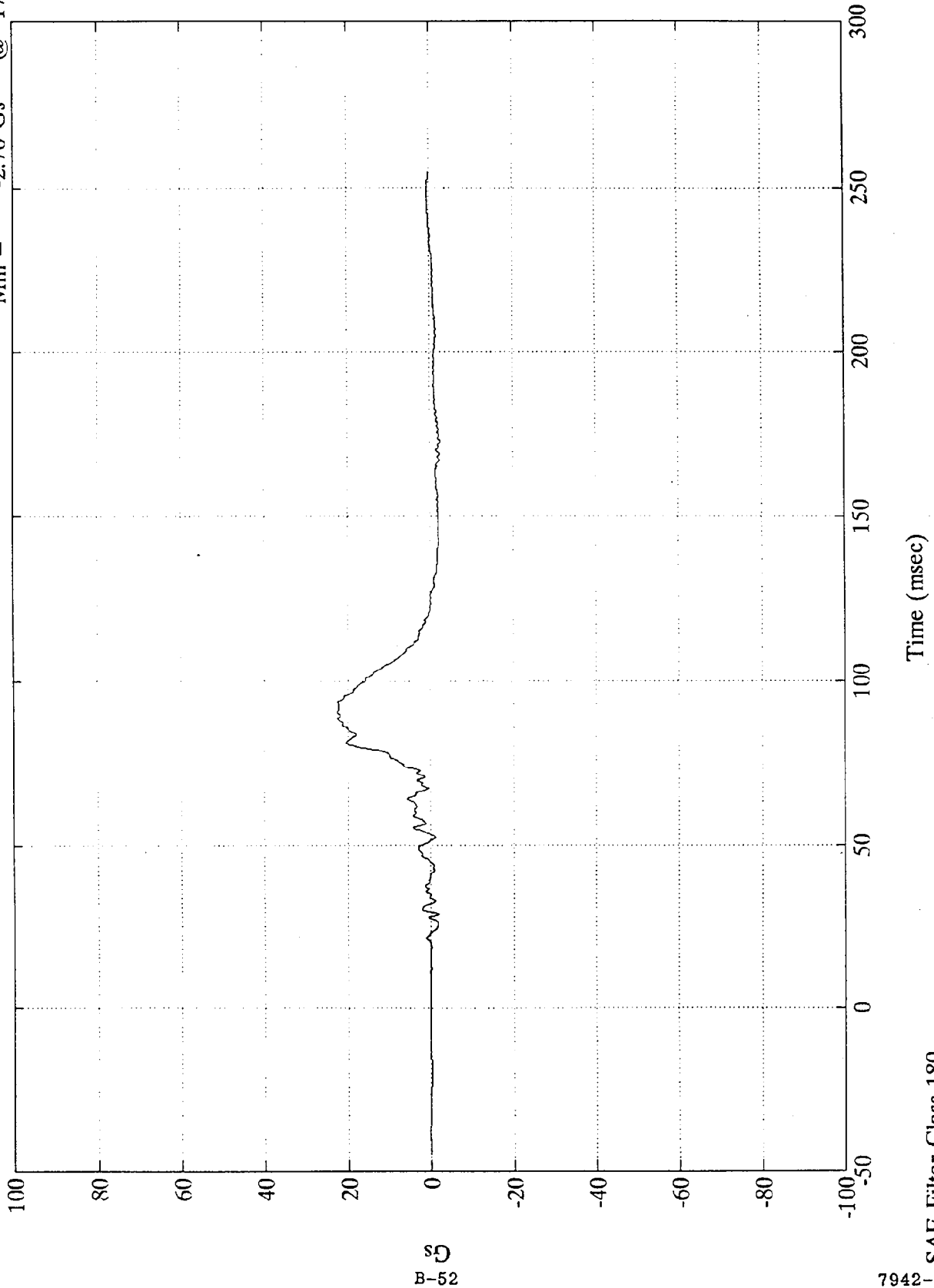


B-51

VTV TEST 5

Veh.1-Pos.1 Chest Y

Max =	22.42 Gs	@	88.55 msec
Min =	-2.76 Gs	@	172.68 msec



B-52

7942-5 SAE Filter Class 180

VTV TEST 5

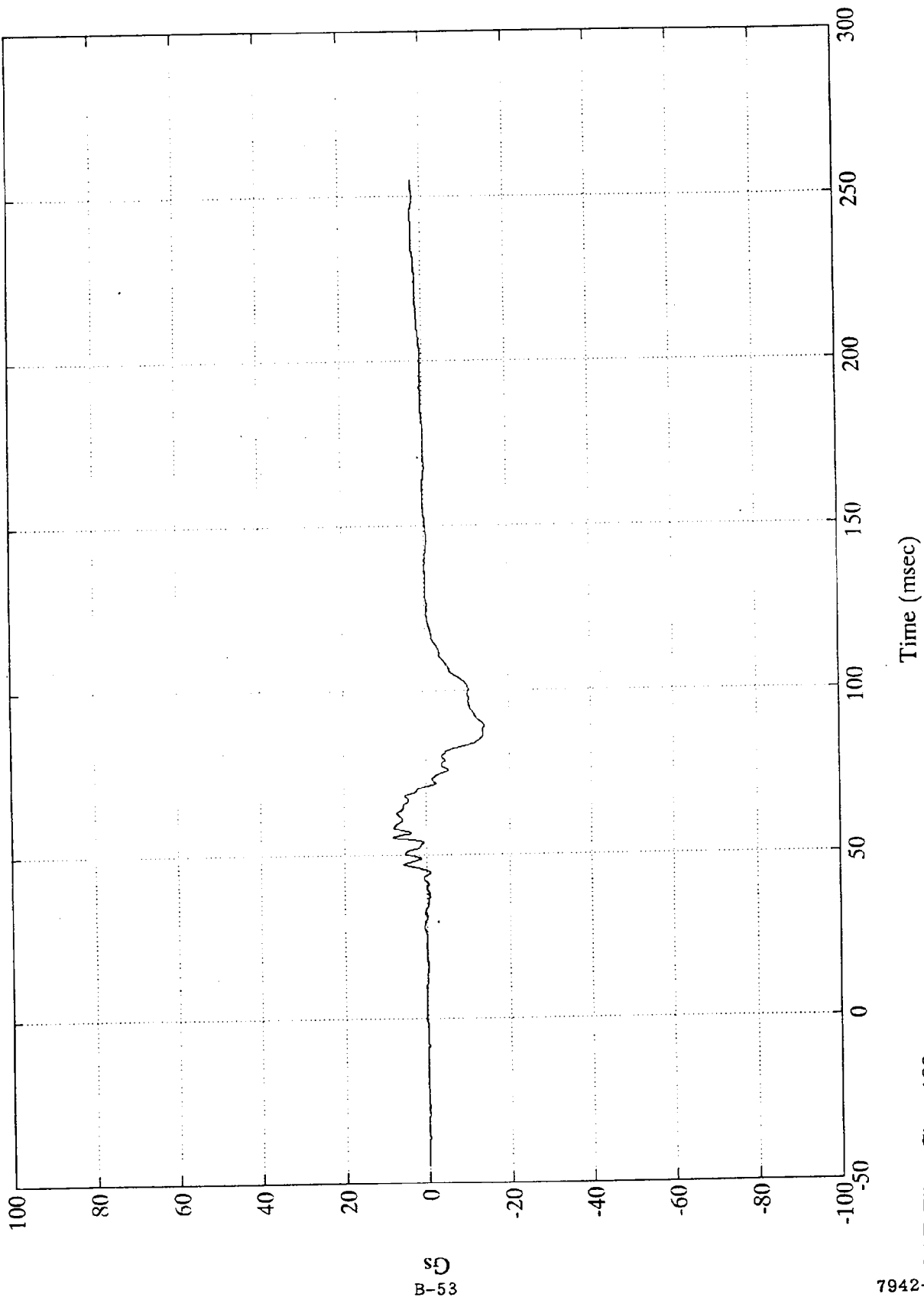
Veh.1-Pos.1 Chest Z

Max =
Min =

8.05 Gs
-14.22 Gs

@
@

55.44 msec
89.04 msec



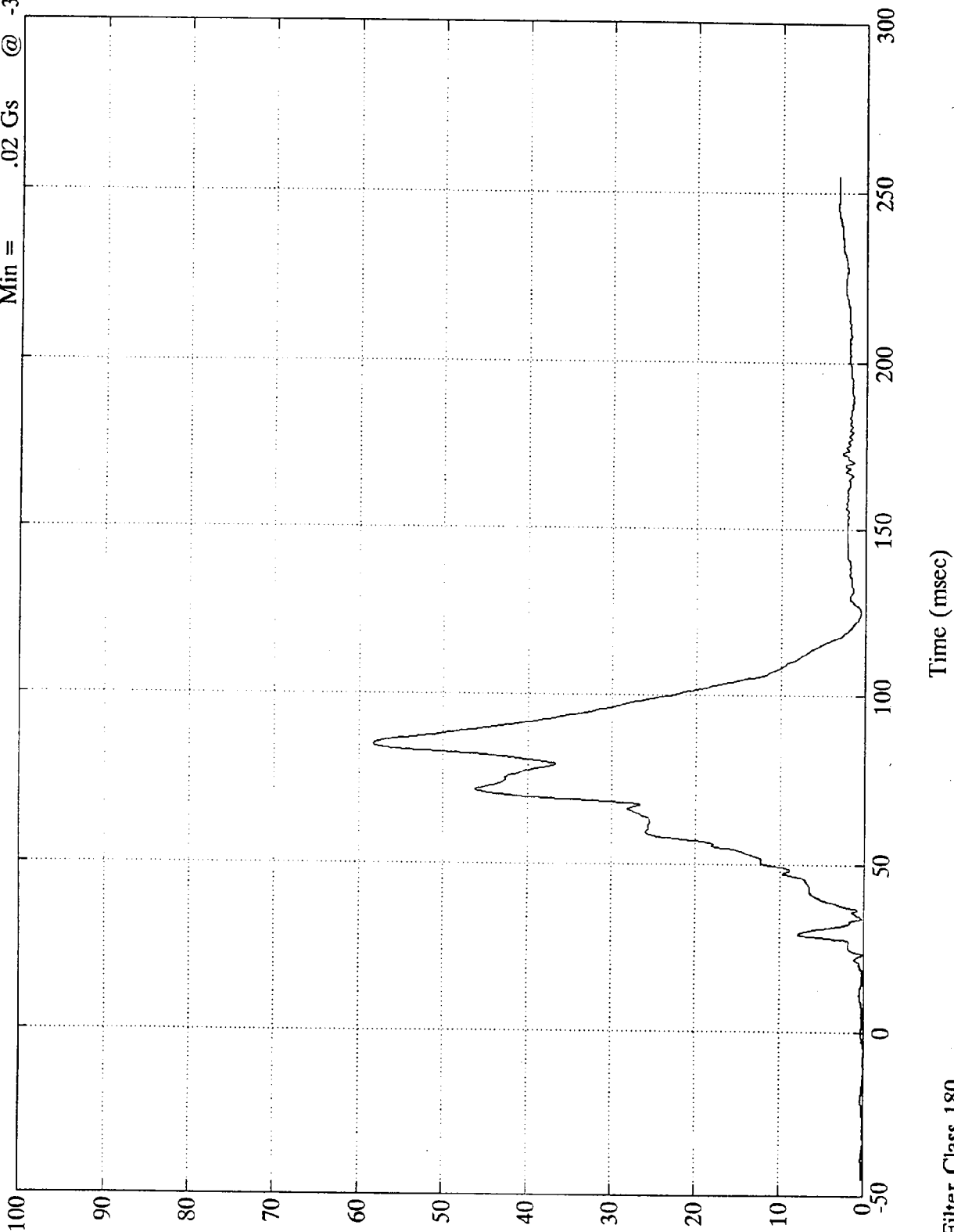
B-53

7942-5

SAE Filter Class 180

VTV TEST 5

Veh.1-Pos.1 Chest Result.
Max = 58.28 Gs @ 85.08 msec
Min = .02 Gs @ -33.48 msec

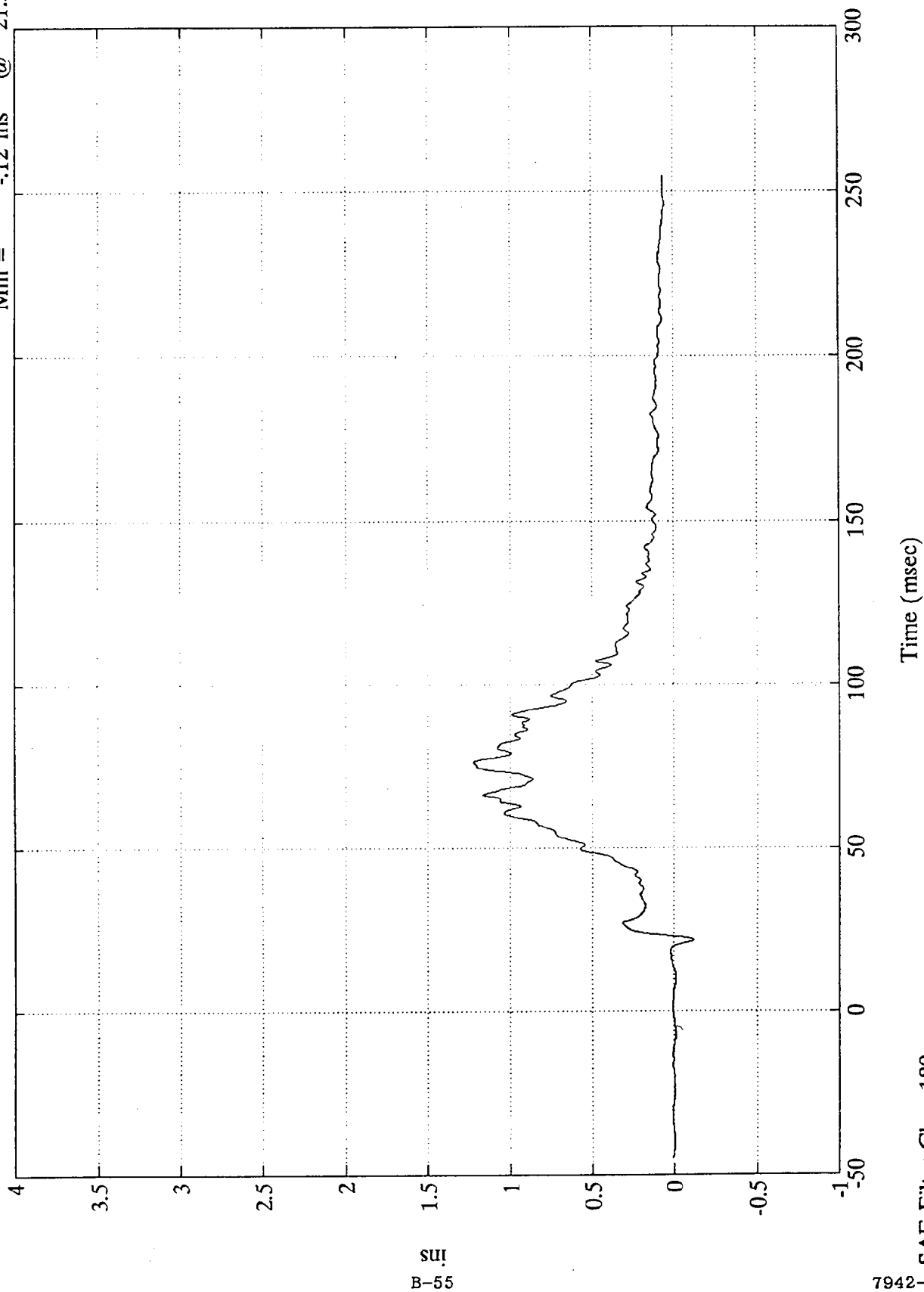


B-54

VTV TEST 5

Veh.1-Pos.1 Chest Displ.

Max = 1.21 ins @ 76.31 msec
Min = -.12 ins @ 21.59 msec

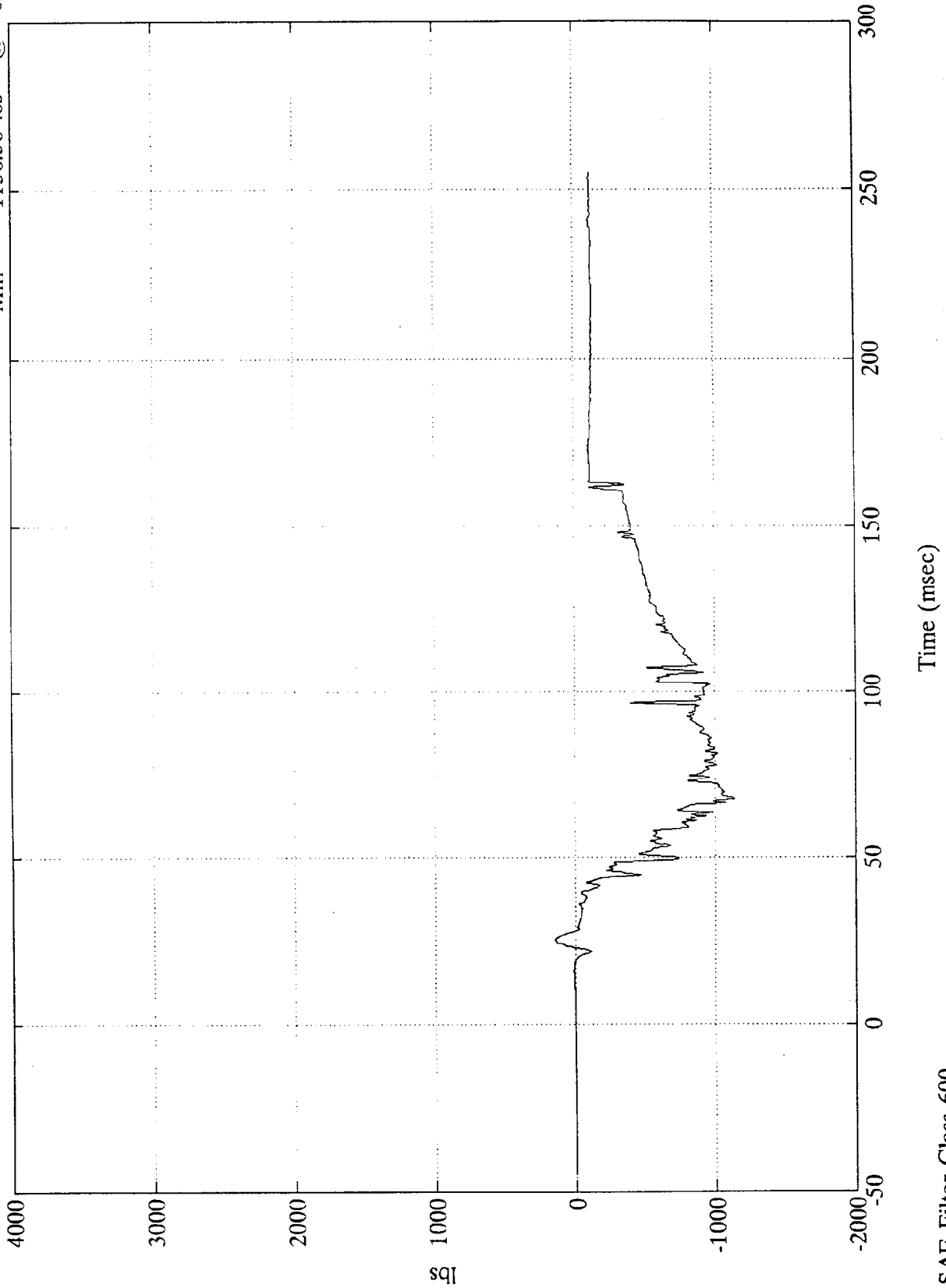


B-55

VTV TEST 5

Max = 150.46 lbs @ 25.20 msec
Min = -1136.30 lbs @ 67.56 msec

Veh.1-Pos.1 Left Femur



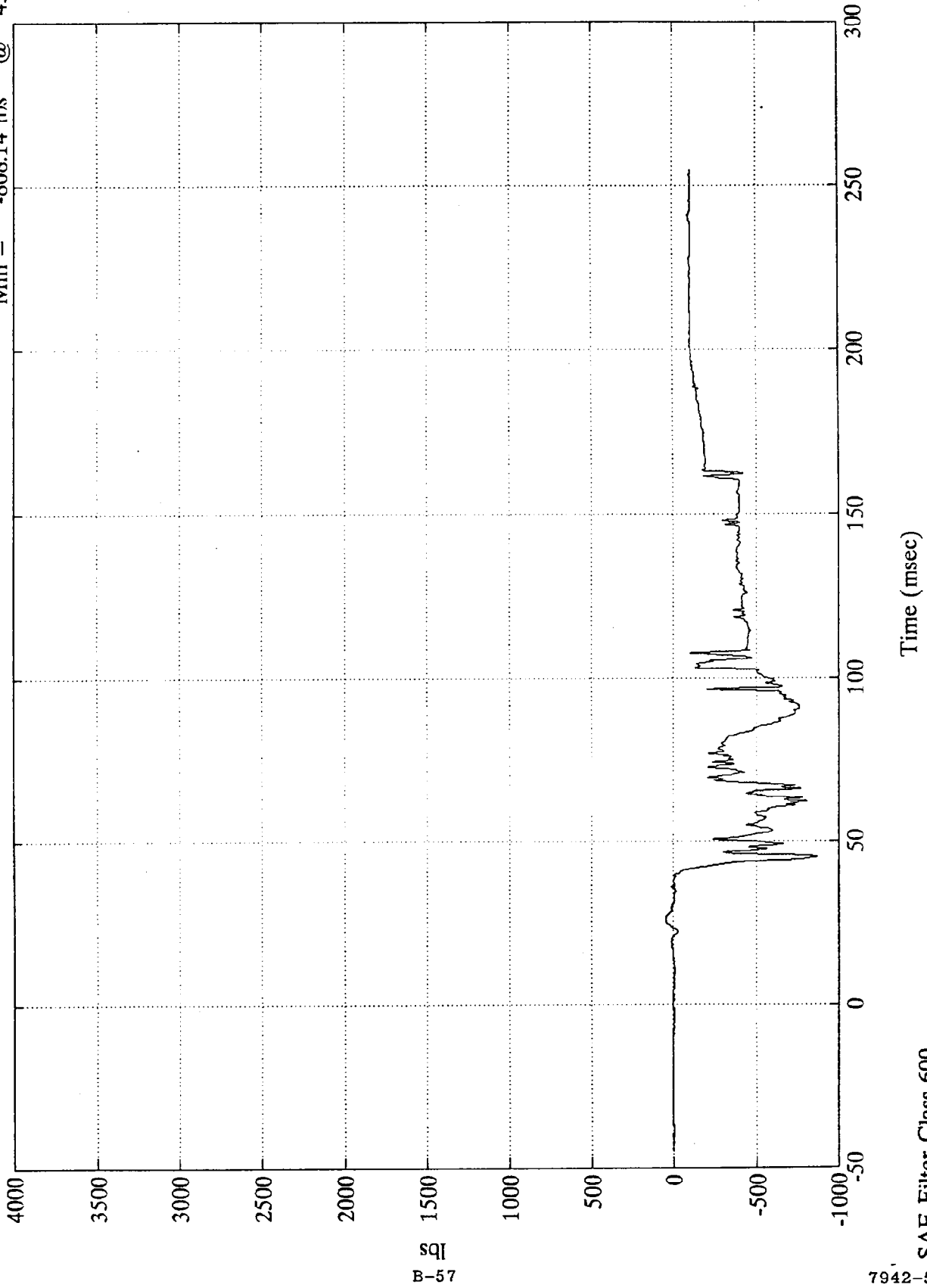
B-56

7942-5
SAE Filter Class 600

VTV TEST 5

Veh.1-Pos.1 Right Femur

Max = 49.06 lbs @ 25.31 msec
Min = -868.14 lbs @ 45.12 msec



B-57

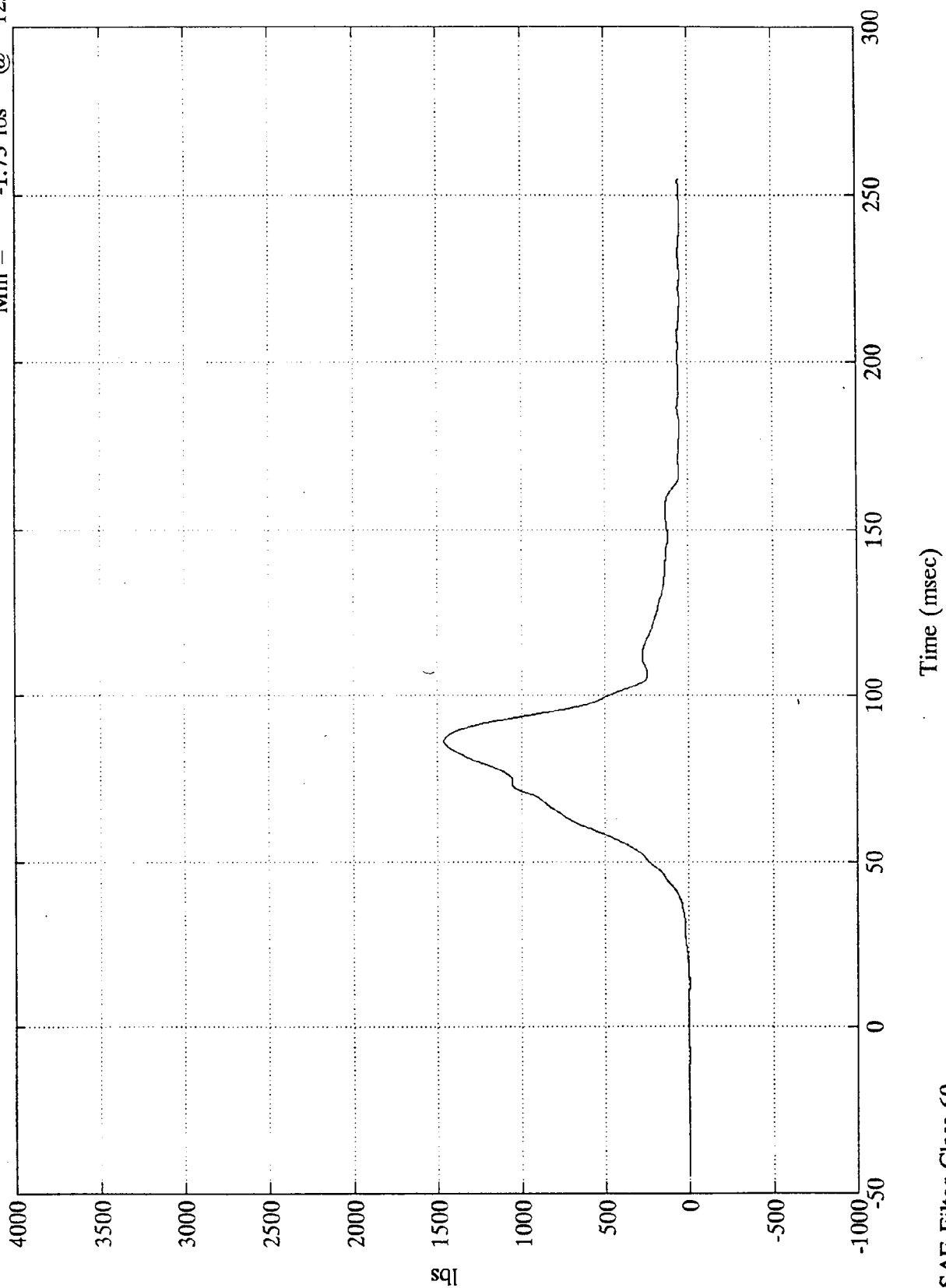
7942-5

SAE Filter Class 600

VTV TEST 5

Veh. 1 Torso Belt L.C.

Max = 1460.09 lbs @ 86.28 msec
Min = -1.73 lbs @ 12.83 msec



B-58

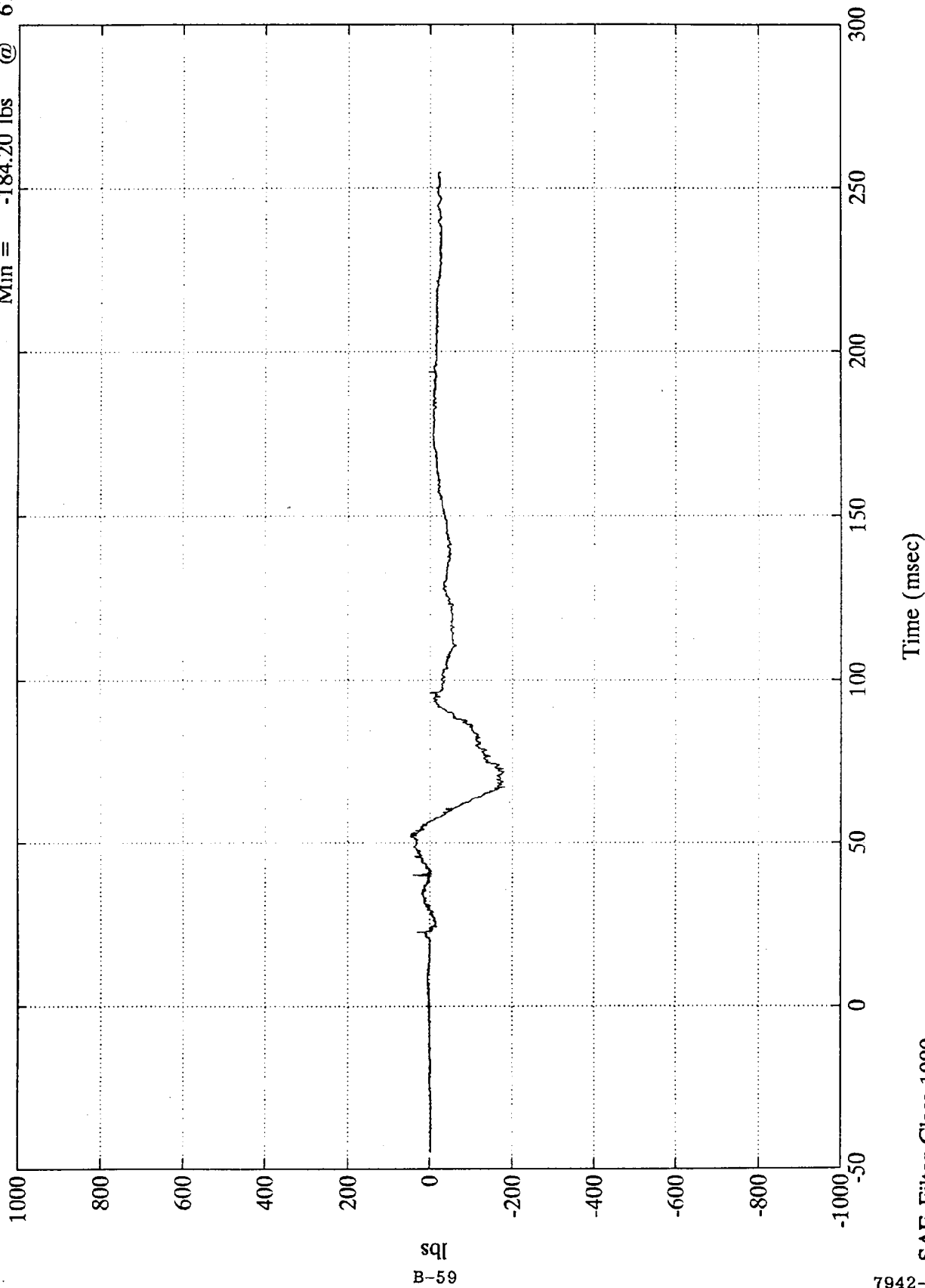
7942-5

SAE Filter Class 60

VTV TEST 5

Veh.1-Pos.1 Upper Neck Fx

Max = 46.21 lbs @ 52.08 msec
Min = -184.20 lbs @ 67.19 msec

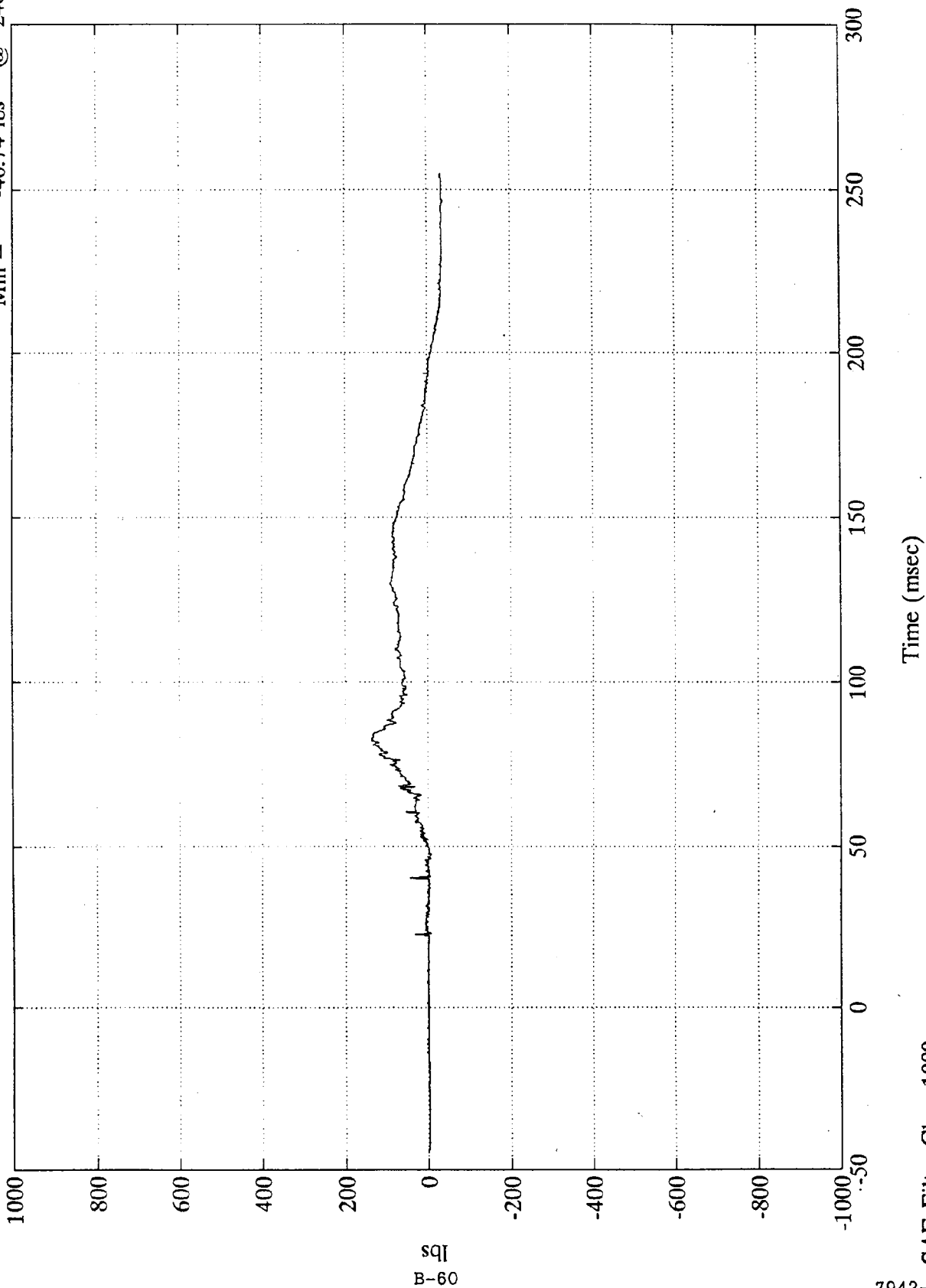


B-59

SAE Filter Class 1000

VTV TEST 5

Veh.1-Pos.1 Upper Neck Fy
Max = 137.62 lbs @ 82.80 msec
Min = -40.74 lbs @ 246.72 msec

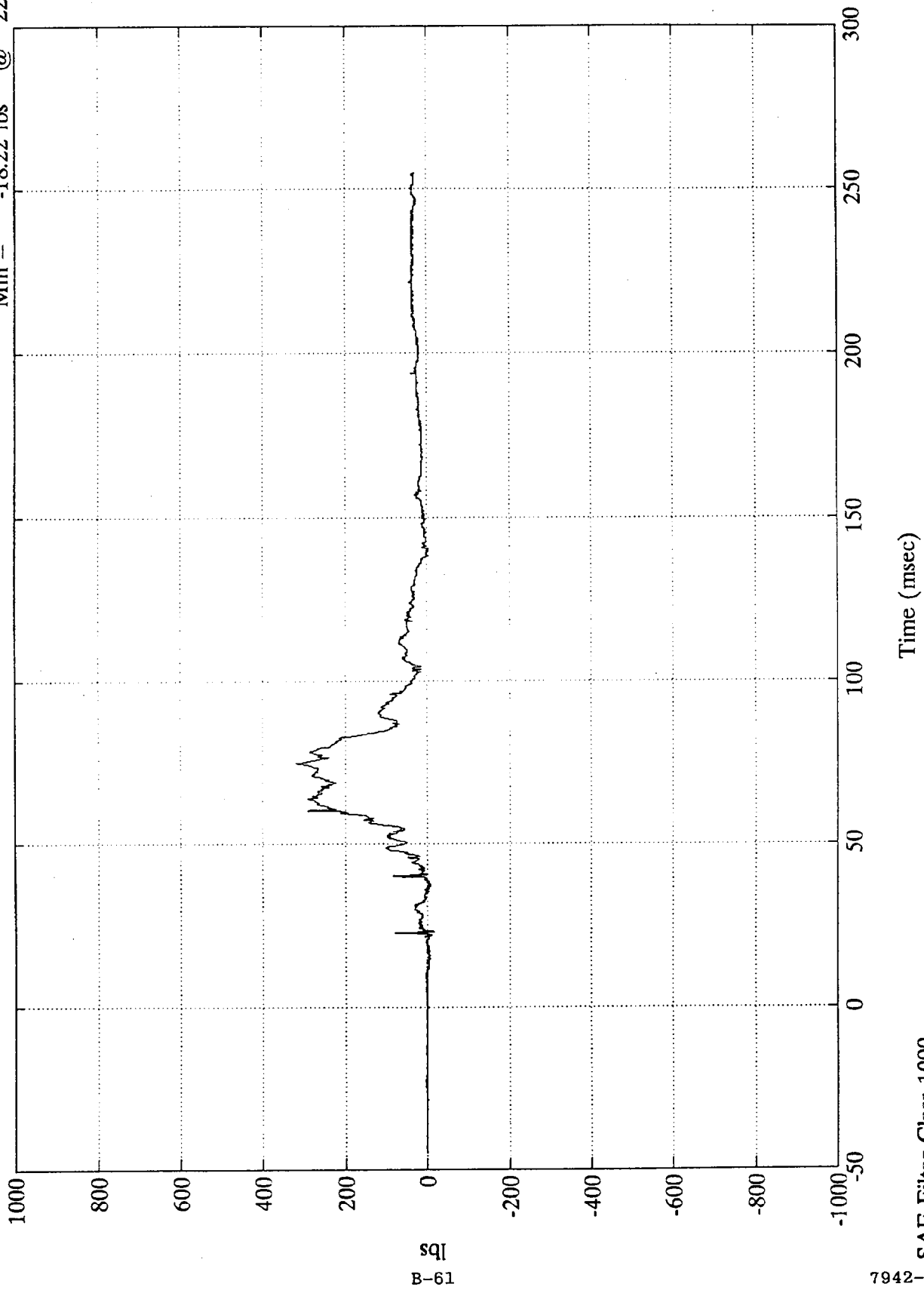


SAE Filter Class 1000

VTV TEST 5

Veh.1-Pos.1 Upper Neck Fz

Max =	319.29 lbs	@	74.88 msec
Min =	-18.22 lbs	@	22.92 msec

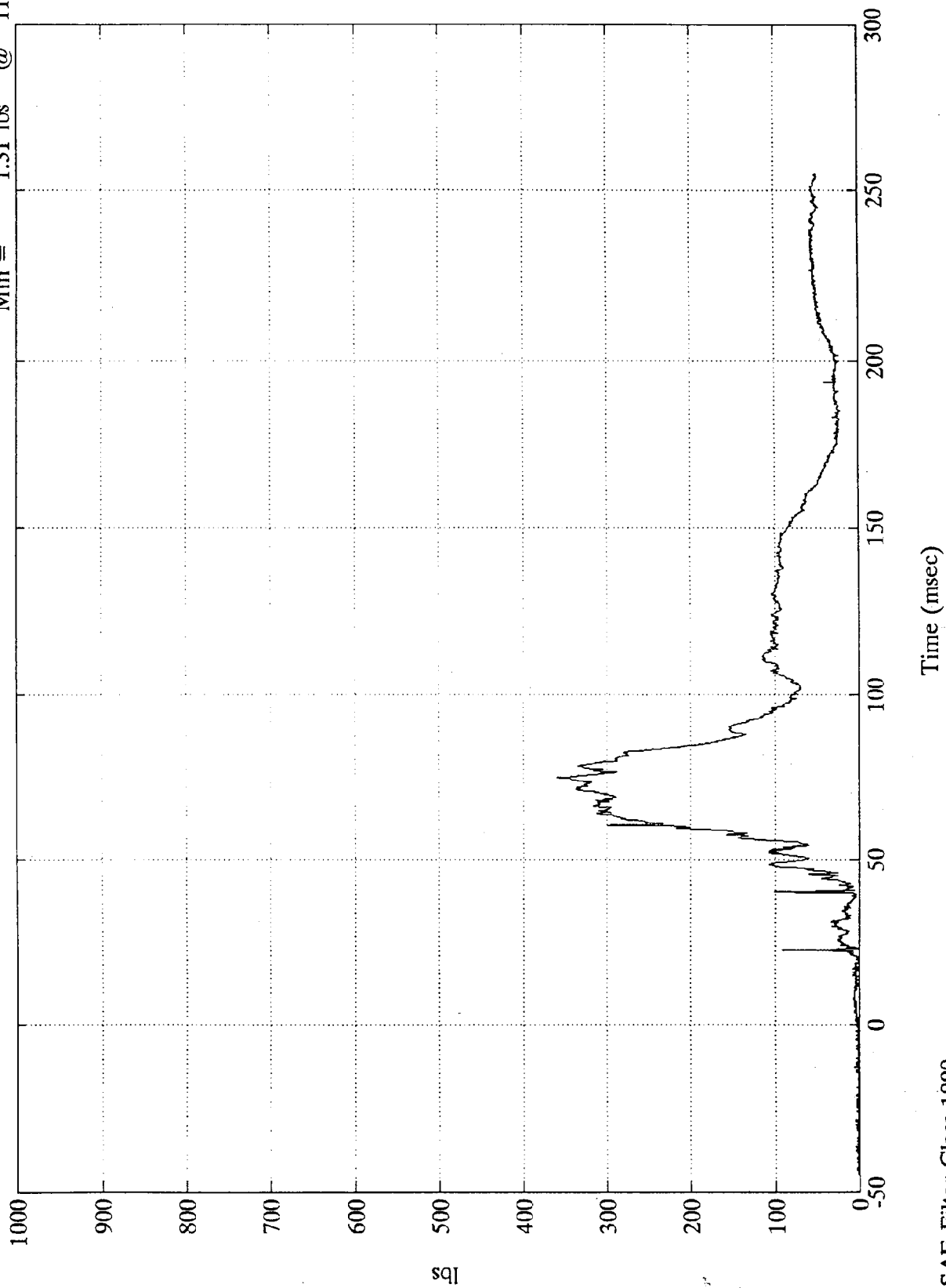


sq
B-61

VTV TEST 5

Veh.1-Pos.1 Neck Force Re

Max = 359.24 lbs @ 74.88 msec
 Min = 1.31 lbs @ 11.51 msec



sq|
 B-62

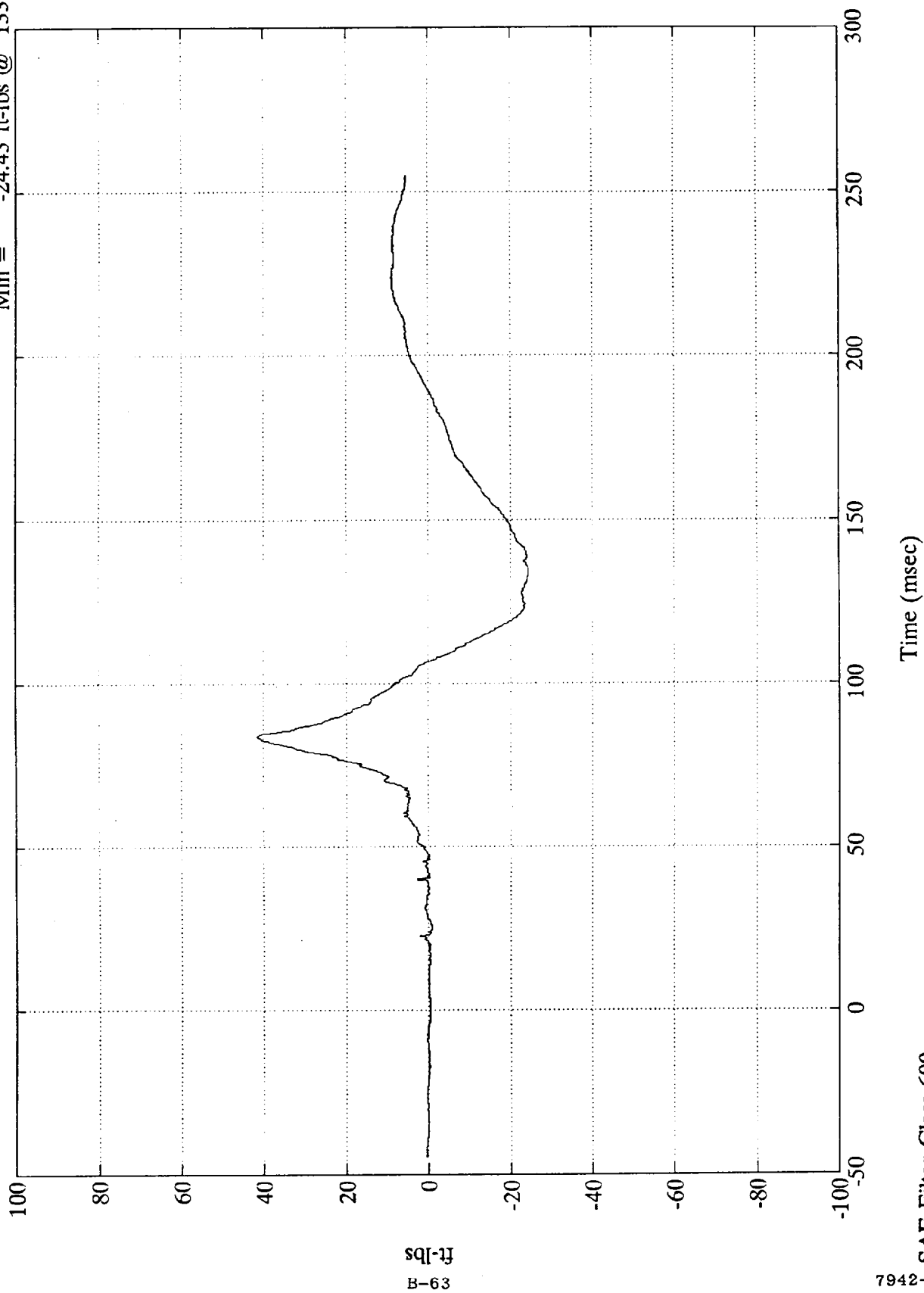
SAE Filter Class 1000

7942-5

VTV TEST 5

Veh.1-Pos.1 Upper Neck Mx

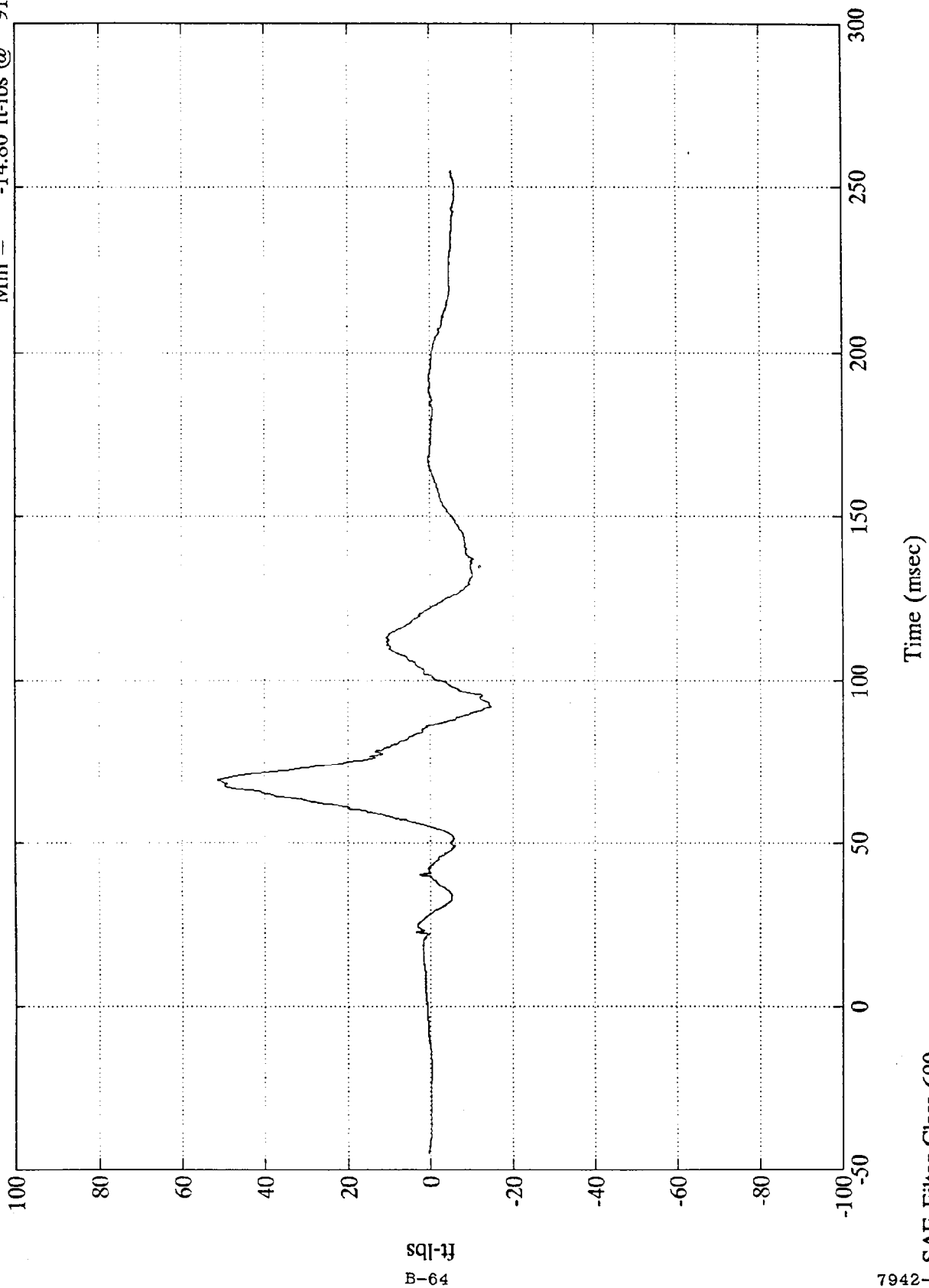
Max = 41.55 ft-lbs @ 83.63 msec
Min = -24.43 ft-lbs @ 133.91 msec



B-63
sq[-1]

VTV TEST 5

Veh.1-Pos.1 Upper Neck My
Max = 51.45 ft-lbs @ 69.24 msec
Min = -14.80 ft-lbs @ 91.92 msec



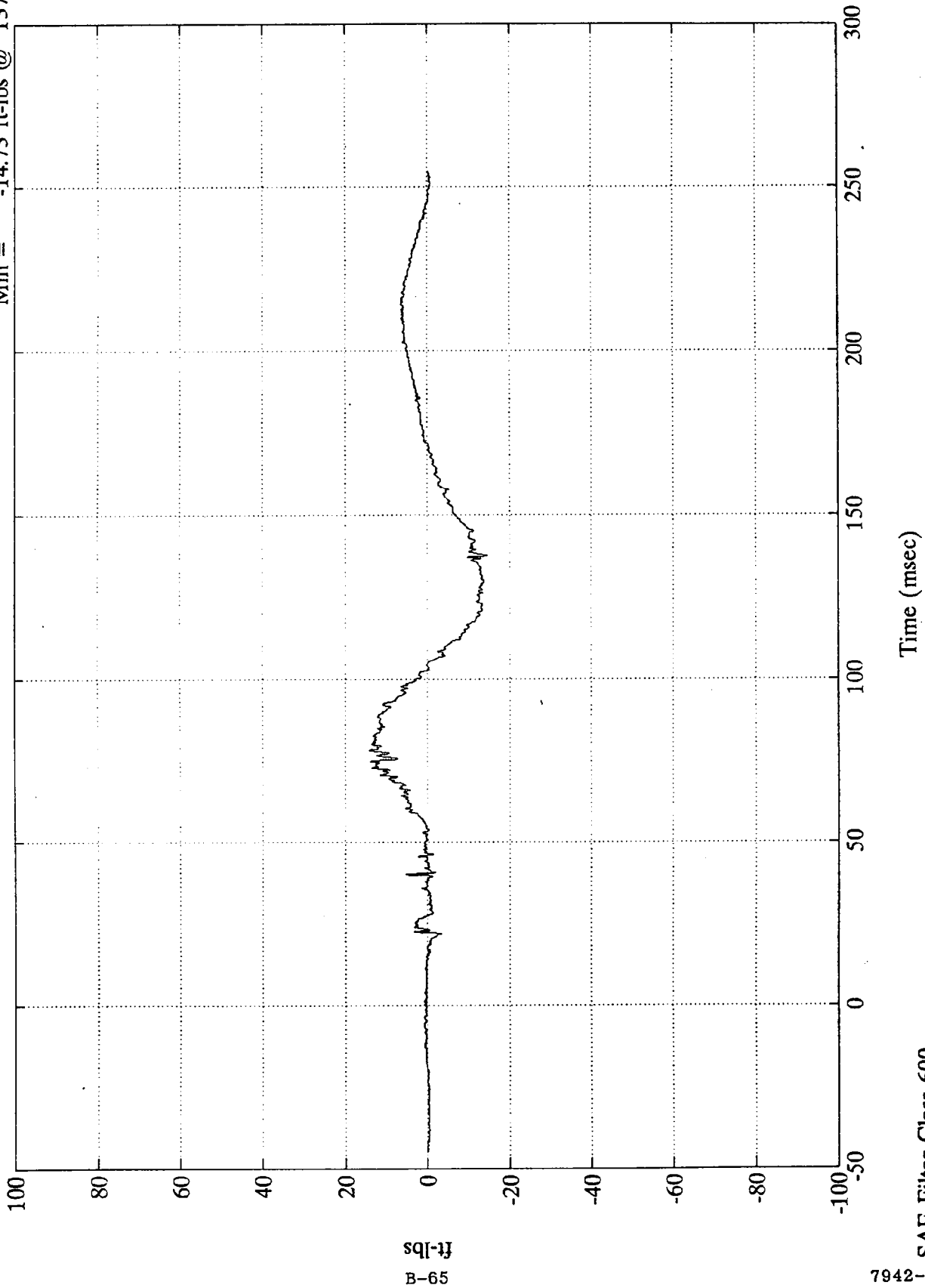
B-64

7942-5

SAE Filter Class 600

VTV TEST 5

Veh.1-Pos.1 Upper Neck Mz
Max = 14.11 ft-lbs @ 78.12 msec
Min = -14.73 ft-lbs @ 137.63 msec



B-65

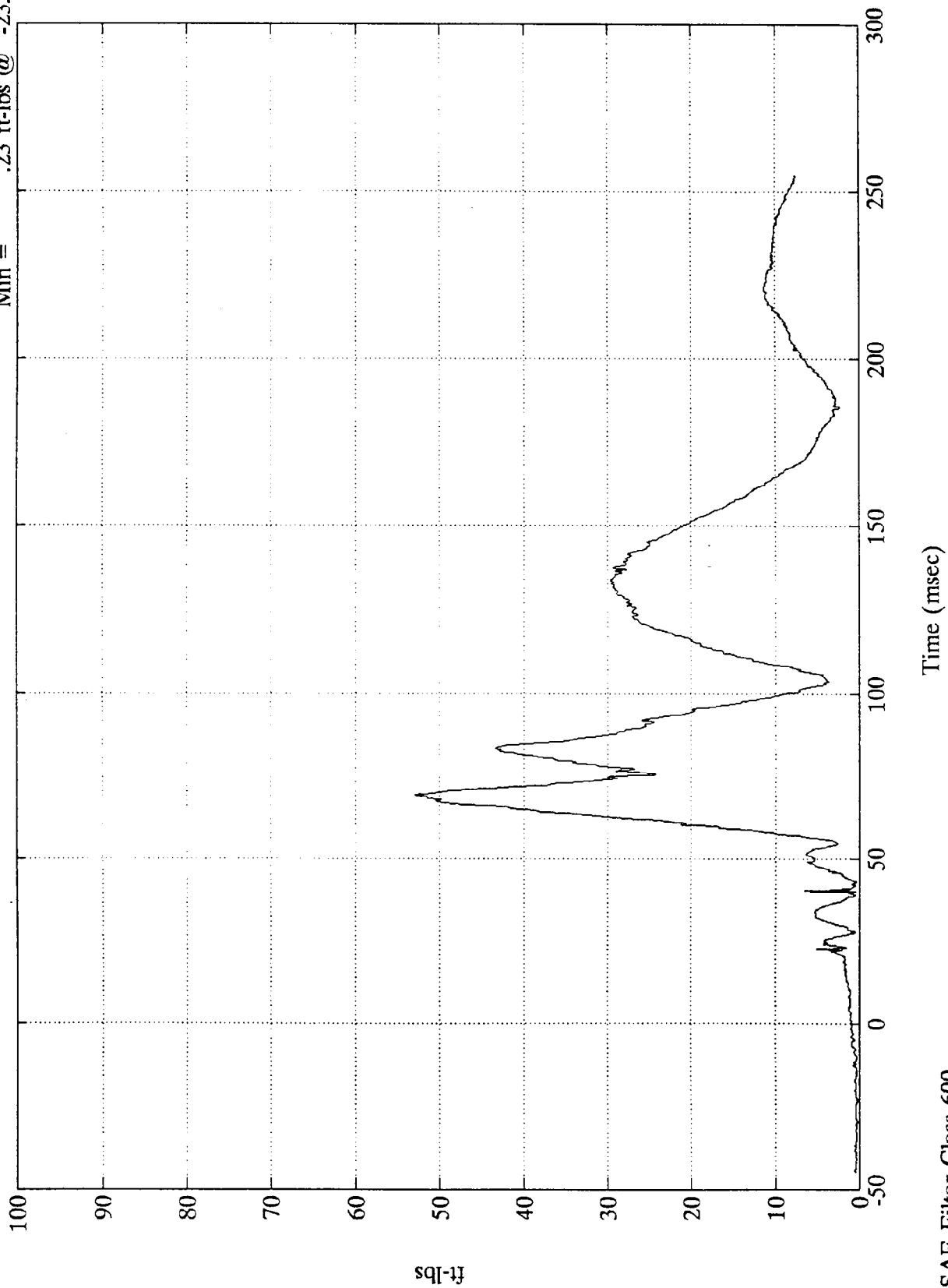
SAE Filter Class 600

7942-5

VTV TEST 5

Veh.1-Pos.1 Neck Mom. Res

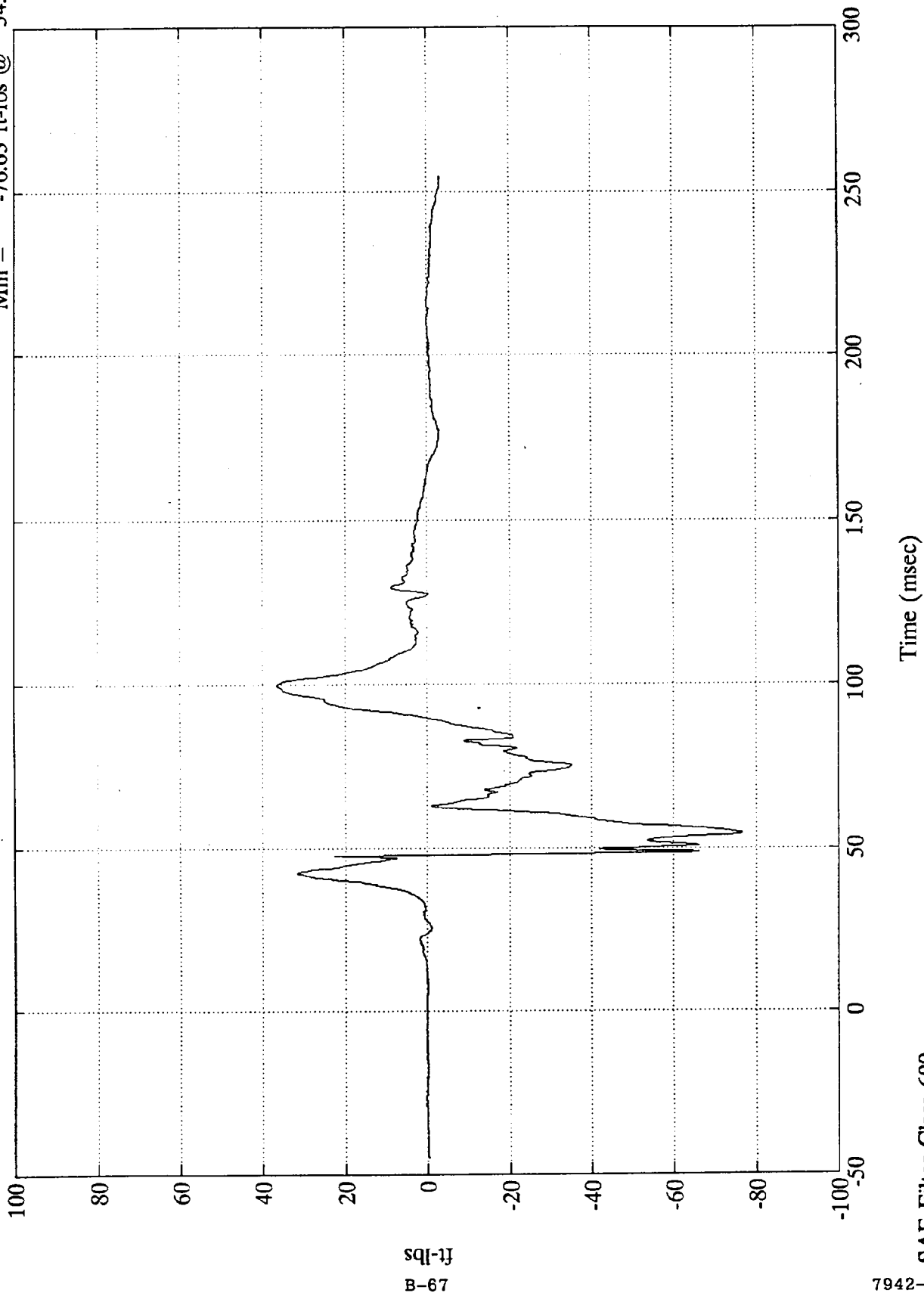
Max = 52.88 ft-lbs @ 69.24 msec
Min = -23.28 msec



ft-lbs
B-66

VTV TEST 5

Veh.1-Pos.1 Lt U Tibia Mx
Max = 36.38 ft-lbs @ 99.59 msec
Min = -76.63 ft-lbs @ 54.59 msec

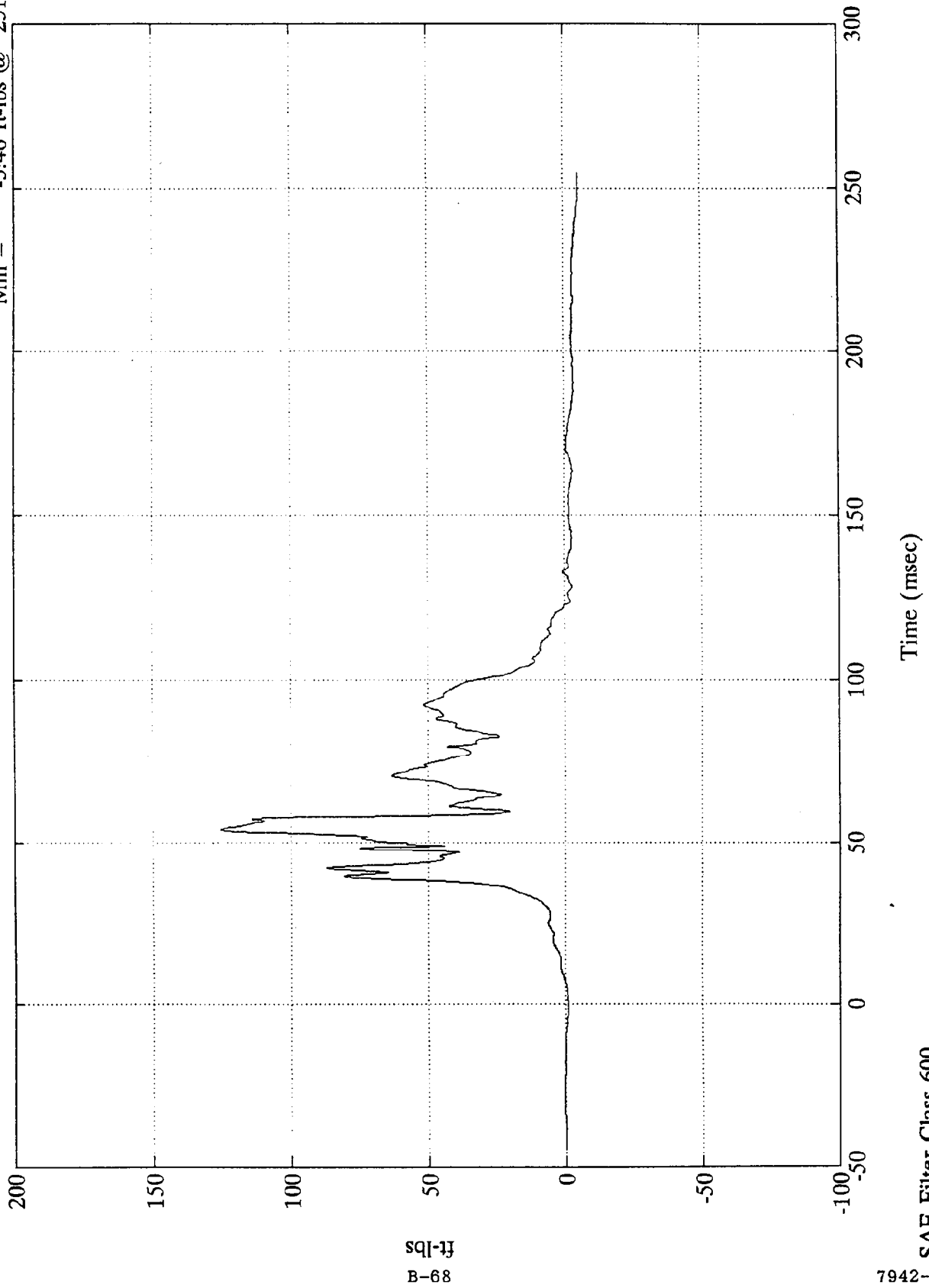


sq[-1]
B-67

SAE Filter Class 600

VTV TEST 5

Veh.1-Pos.1 Lt U Tibia My
Max = 125.45 ft-lbs @ 54.11 msec
Min = -5.46 ft-lbs @ 251.15 msec

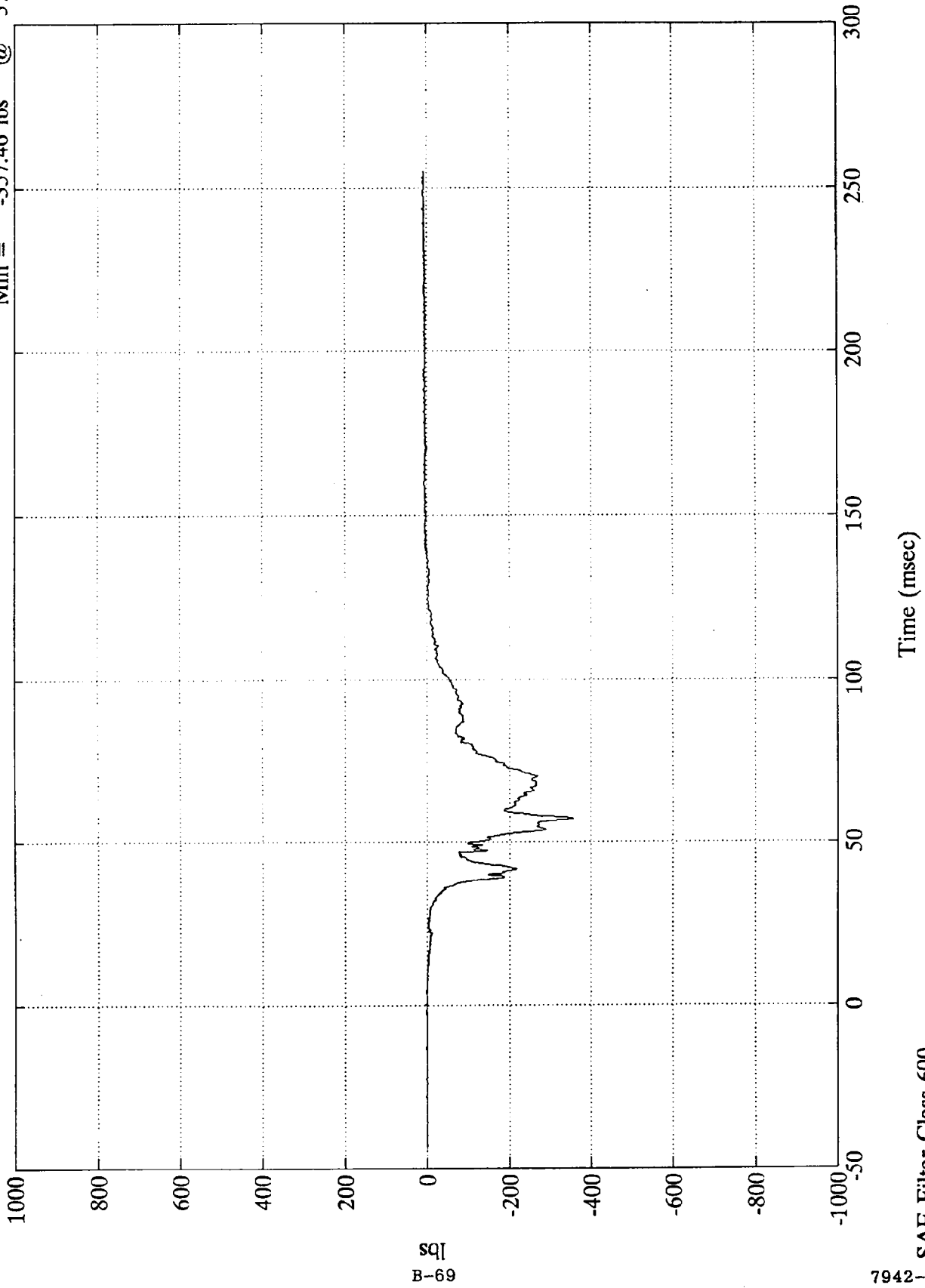


B-68
sqj-1j

VTV TEST 5

Veh.1-Pos.1 Lt L Tibia Fy

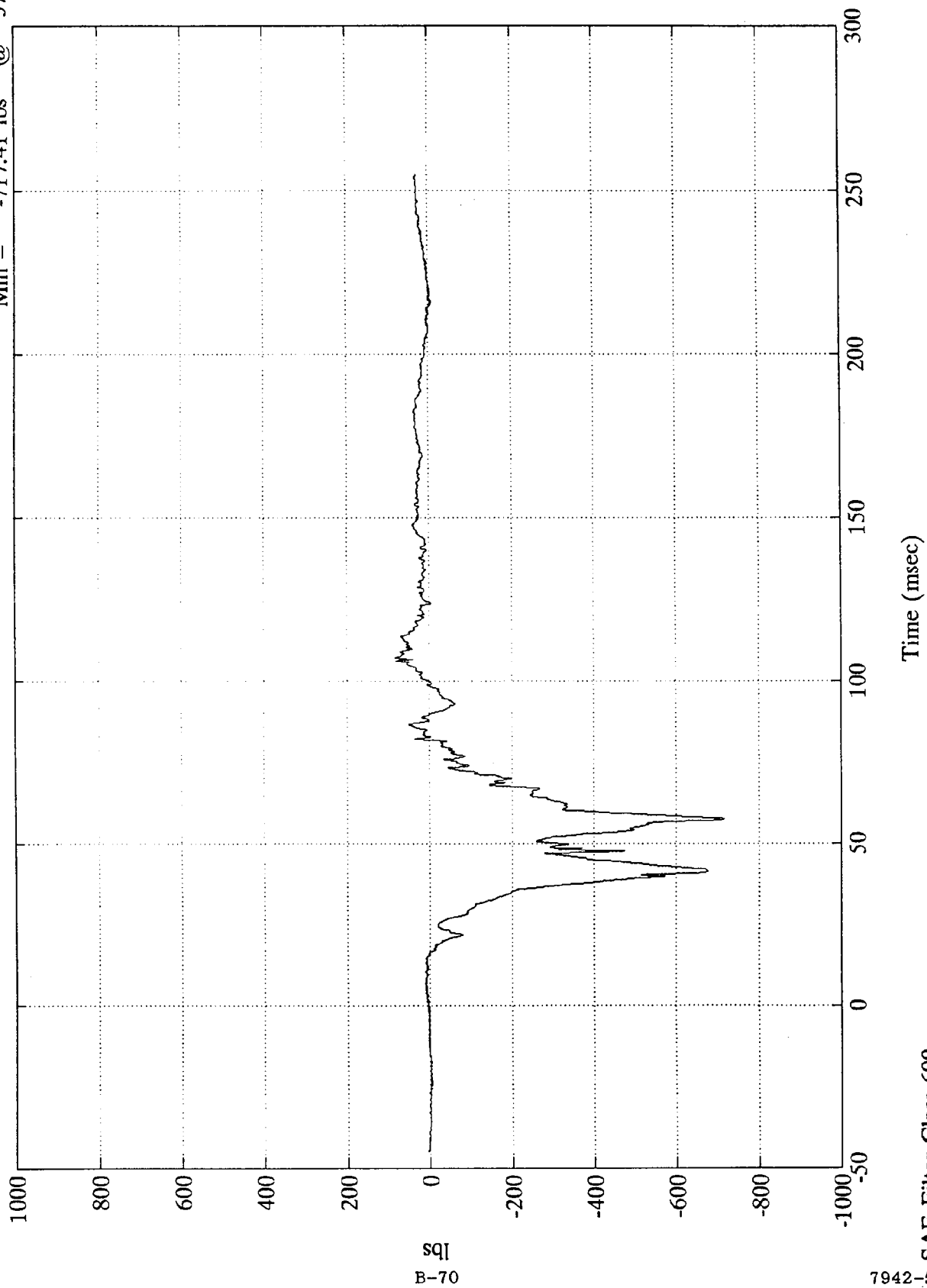
Max = 8.95 lbs @ 247.92 msec
Min = -357.46 lbs @ 57.24 msec



B-69

VTV TEST 5

Veh.1-Pos.1 Lt L Tibia Fz
Max = 82.75 lbs @ 107.27 msec
Min = -717.41 lbs @ 57.60 msec

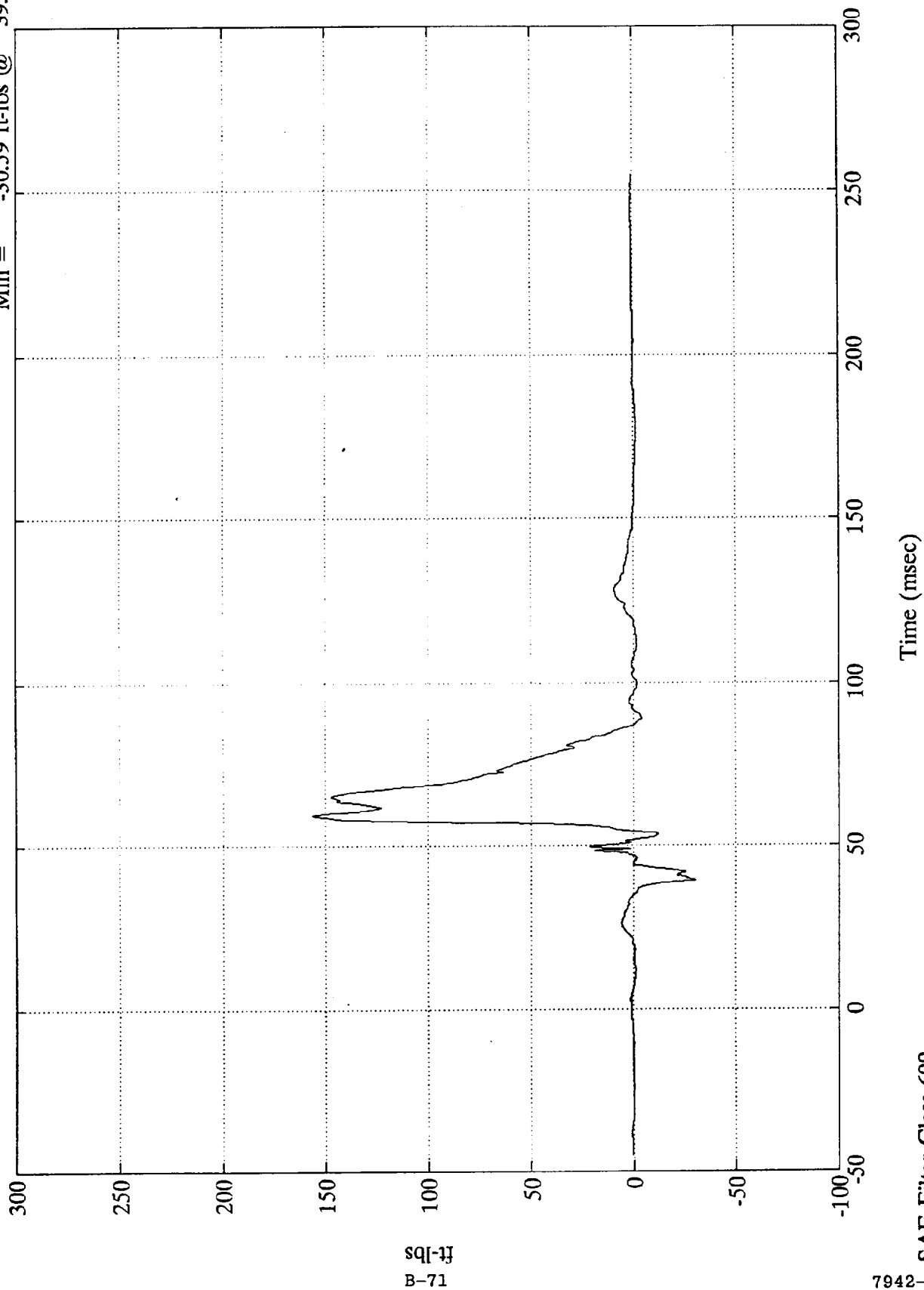


sqI
B-70

VTV TEST 5

Max = 156.39 ft-lbs @ 59.40 msec
Min = -30.59 ft-lbs @ 39.23 msec

Veh.1-Pos.1 Lt L Tibia Mx



B-71
sq[-t]

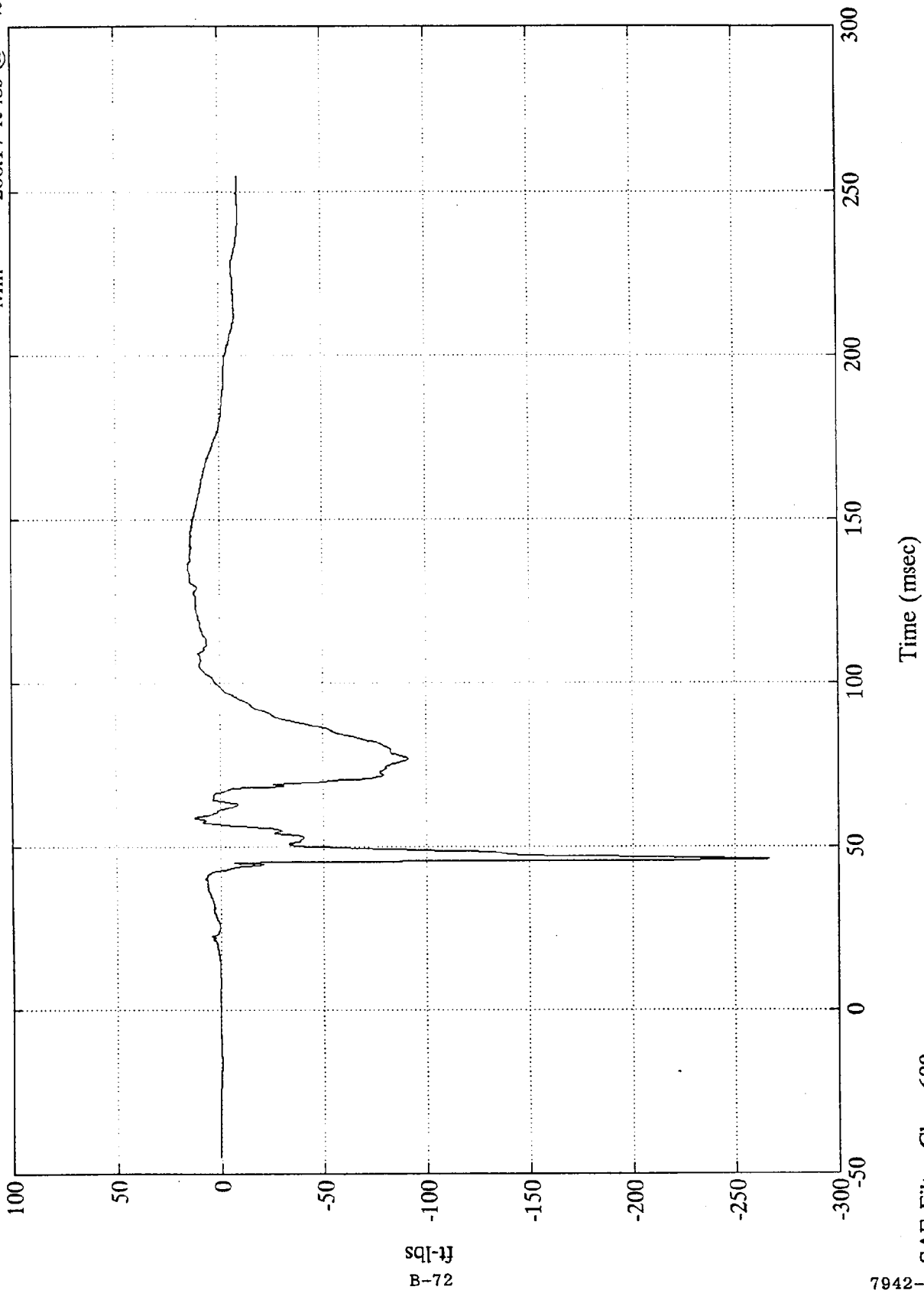
SAE Filter Class 600

7942-5

VTV TEST 5

Veh.1-Pos.1 Rt U Tibia Mx

Max = 15.23 ft-lbs @ 134.88 msec
Min = -266.17 ft-lbs @ 45.96 msec

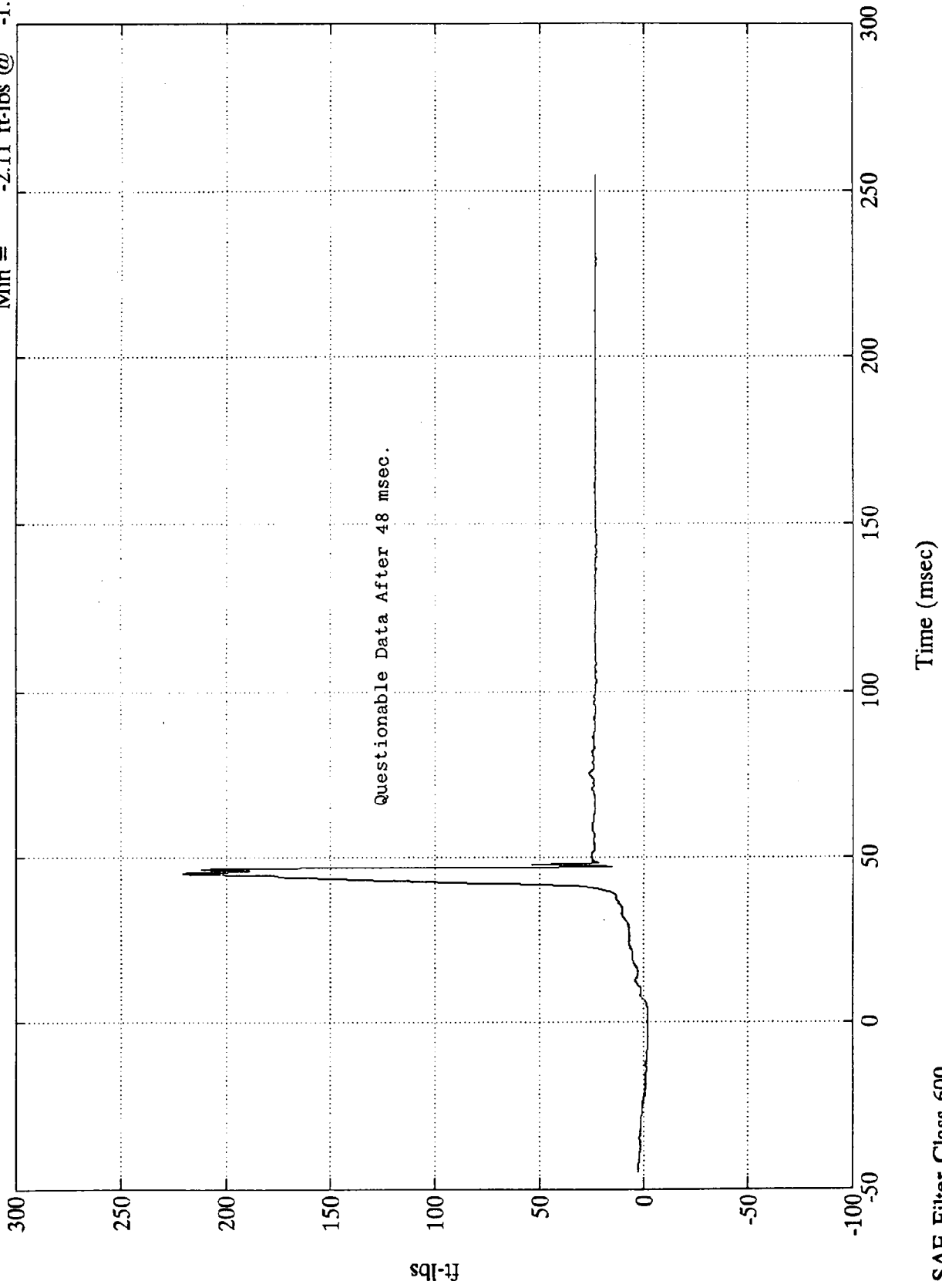


SAE Filter Class 600

VTV TEST 5

Veh.1-Pos.1 Rt U Tibia My

Max = 220.41 ft-lbs @ 45.24 msec
Min = -2.11 ft-lbs @ -1.68 msec

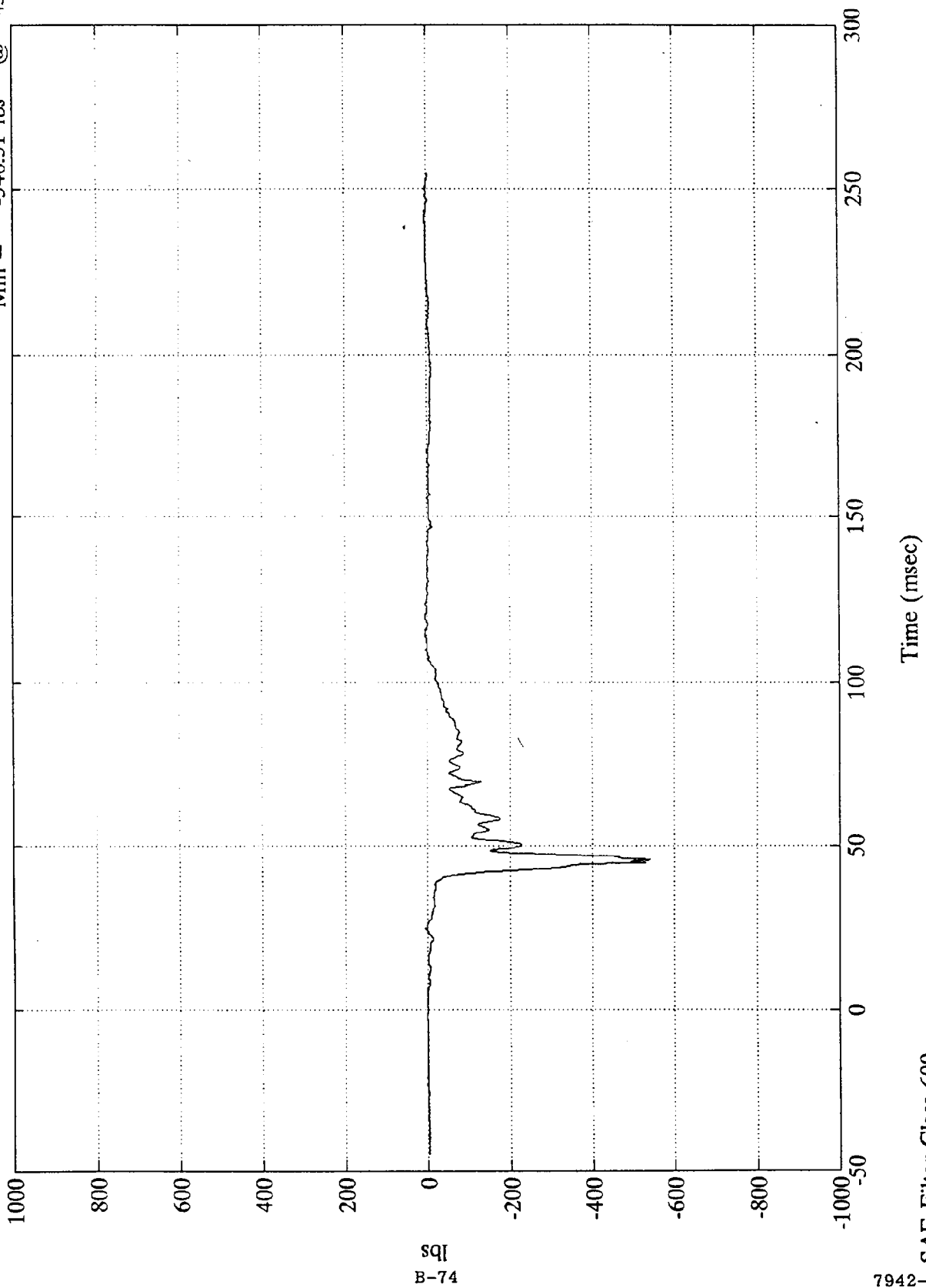


sq[-1j
B-73

VTV TEST 5

Veh.1-Pos.1 Rt L Tibia Fy

Max = 5.87 lbs @ 24.96 msec
Min = -540.51 lbs @ 45.72 msec

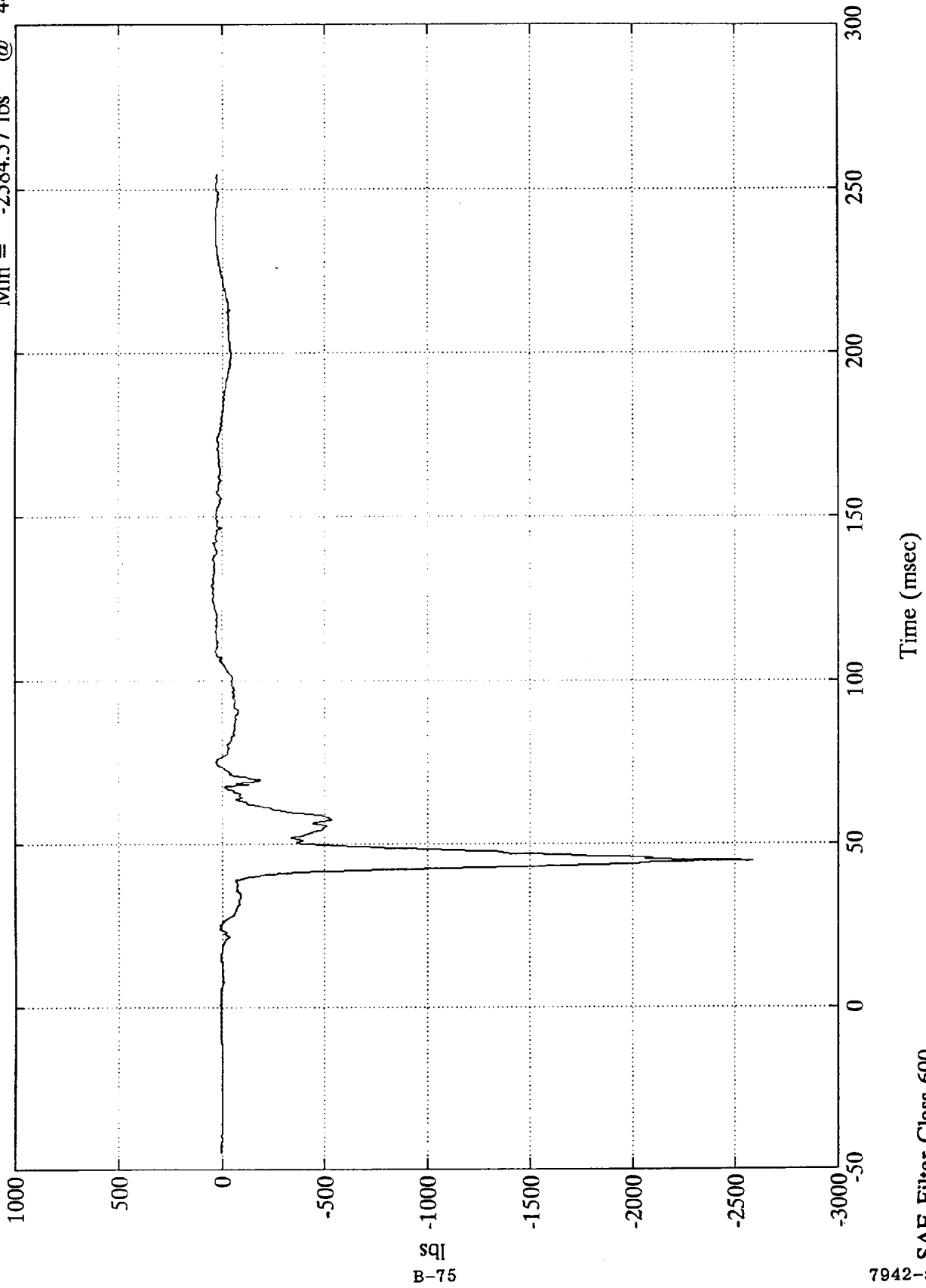


B-74

7942-5

VTV TEST 5

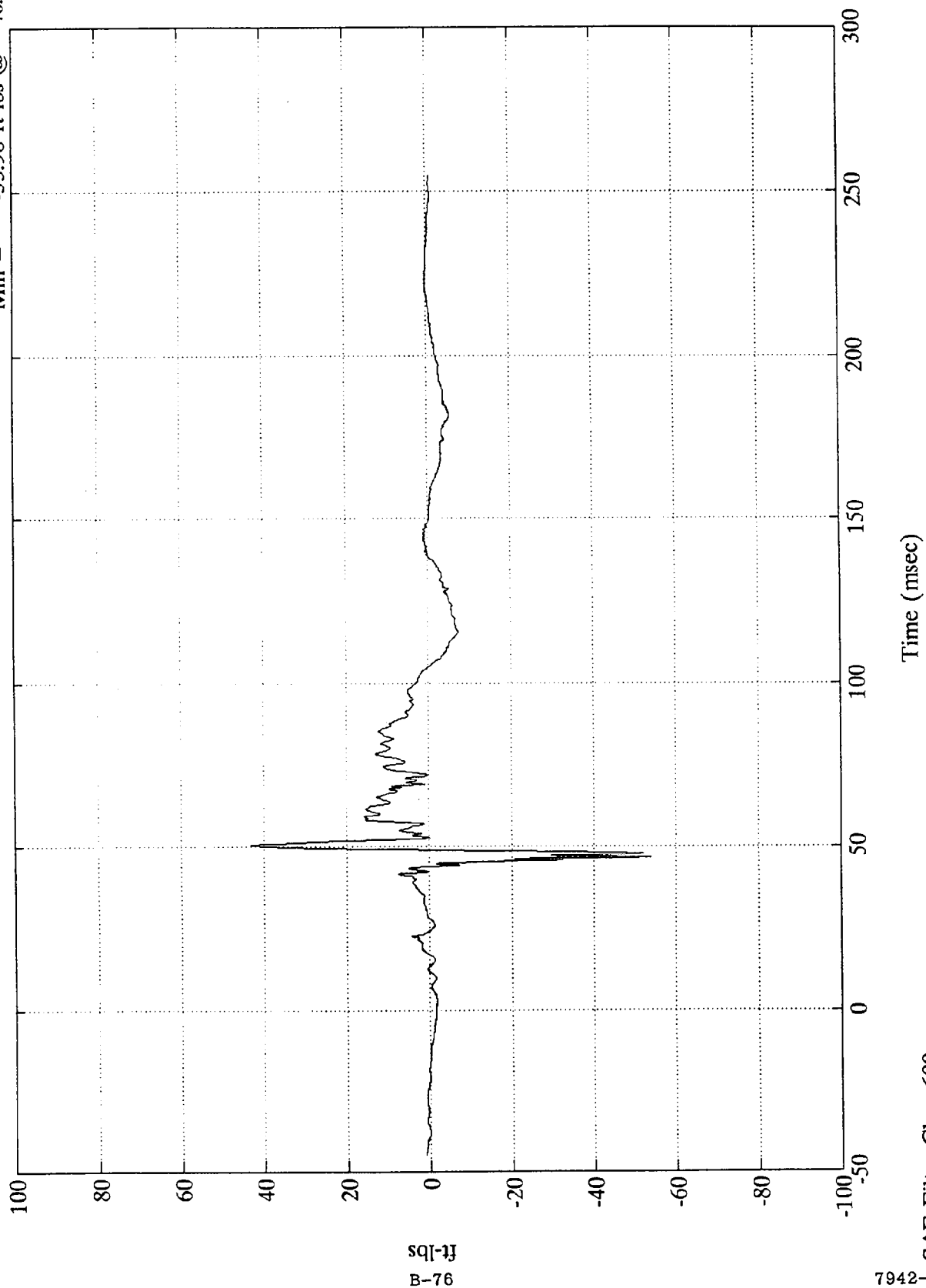
Veh.1-Pos.1 Rt L Tibia Fz
Max = 47.09 lbs @ 129.00 msec
Min = -2584.57 lbs @ 44.75 msec



sqll
B-75

VTV TEST 5

Veh.1-Pos.1 Rt L Tibia Mx
Max = 43.15 ft-lbs @ 50.52 msec
Min = -53.98 ft-lbs @ 46.31 msec



7942-5 SAE Filter Class 600

VEHICLE TWO DATA

1991 HONDA ACCORD DX 4-DOOR SEDAN

TEST NO. Y43-5-1148

VEHICLE DATA

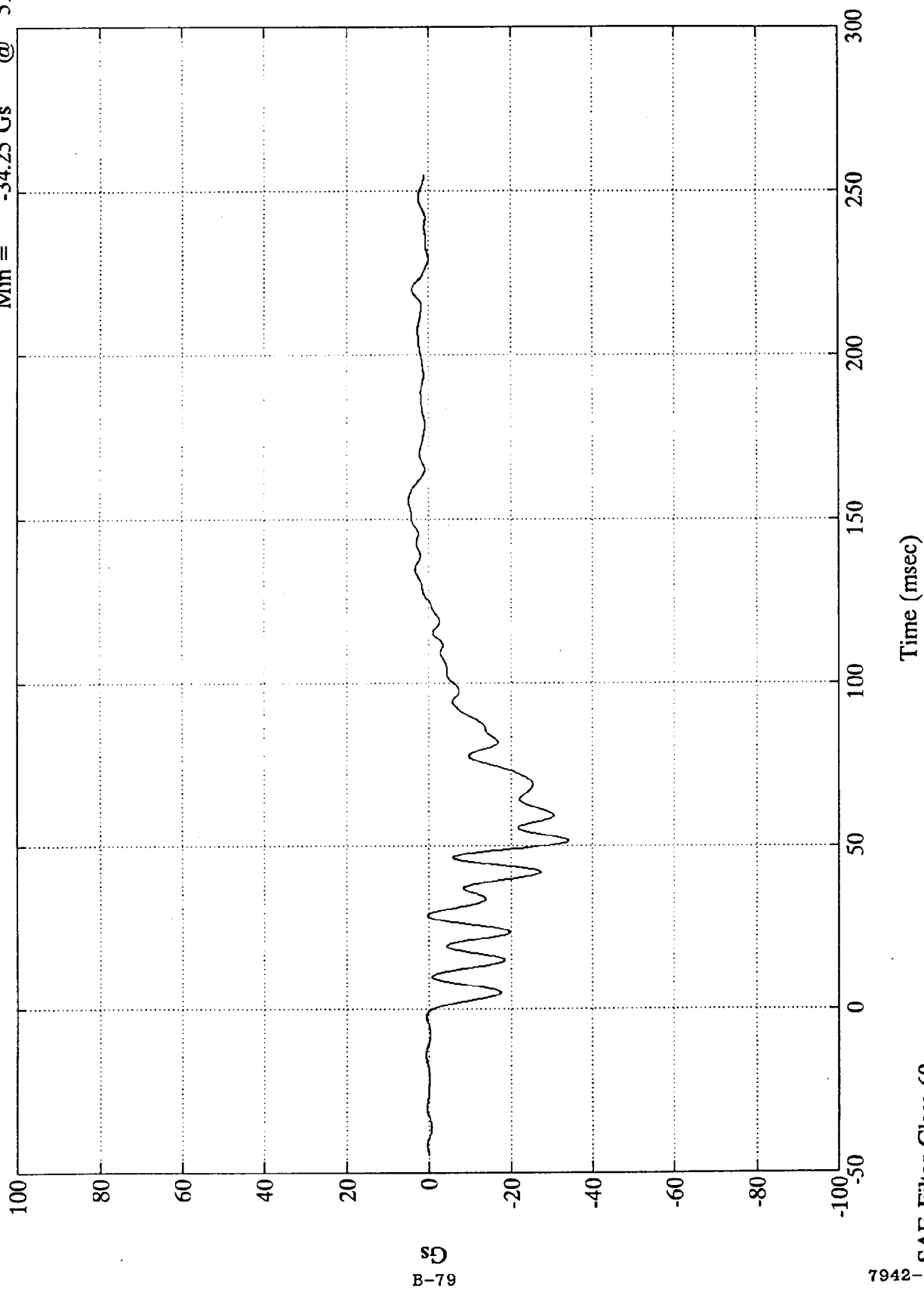
SAE FILTER CHANNEL CLASS

60

VTV TEST 5

Veh. 2 L R Seat (X)

Max = 4.95 Gs @ 155.63 msec
Min = -34.25 Gs @ 51.60 msec



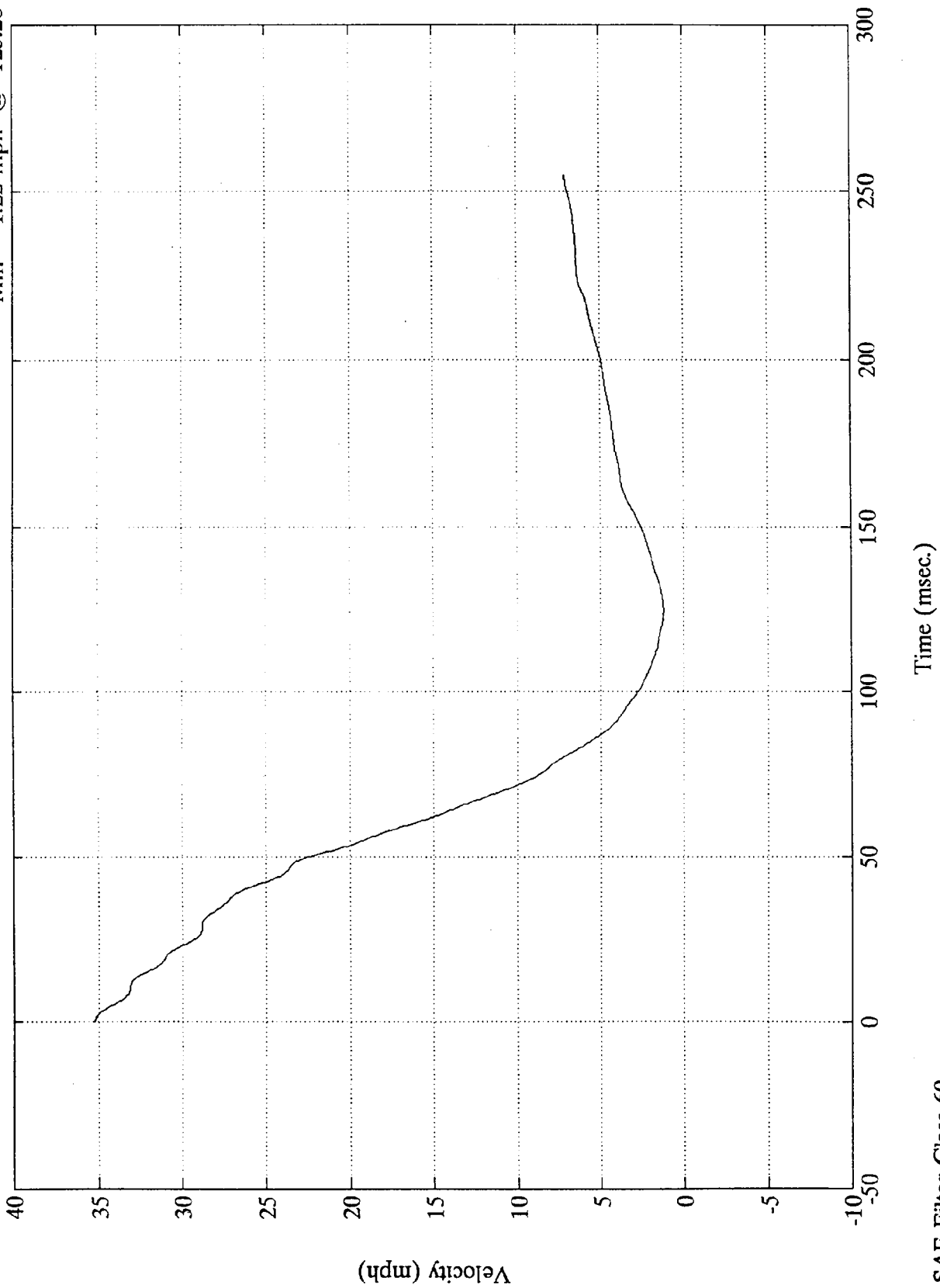
B-79
Gs

7942-5
SAE Filter Class 60

VTV TEST 5

Veh. 2 L R Seat (X)

Max = 35.20 mph @ -0.00 msec
Min = 1.22 mph @ 125.28 msec



B-80

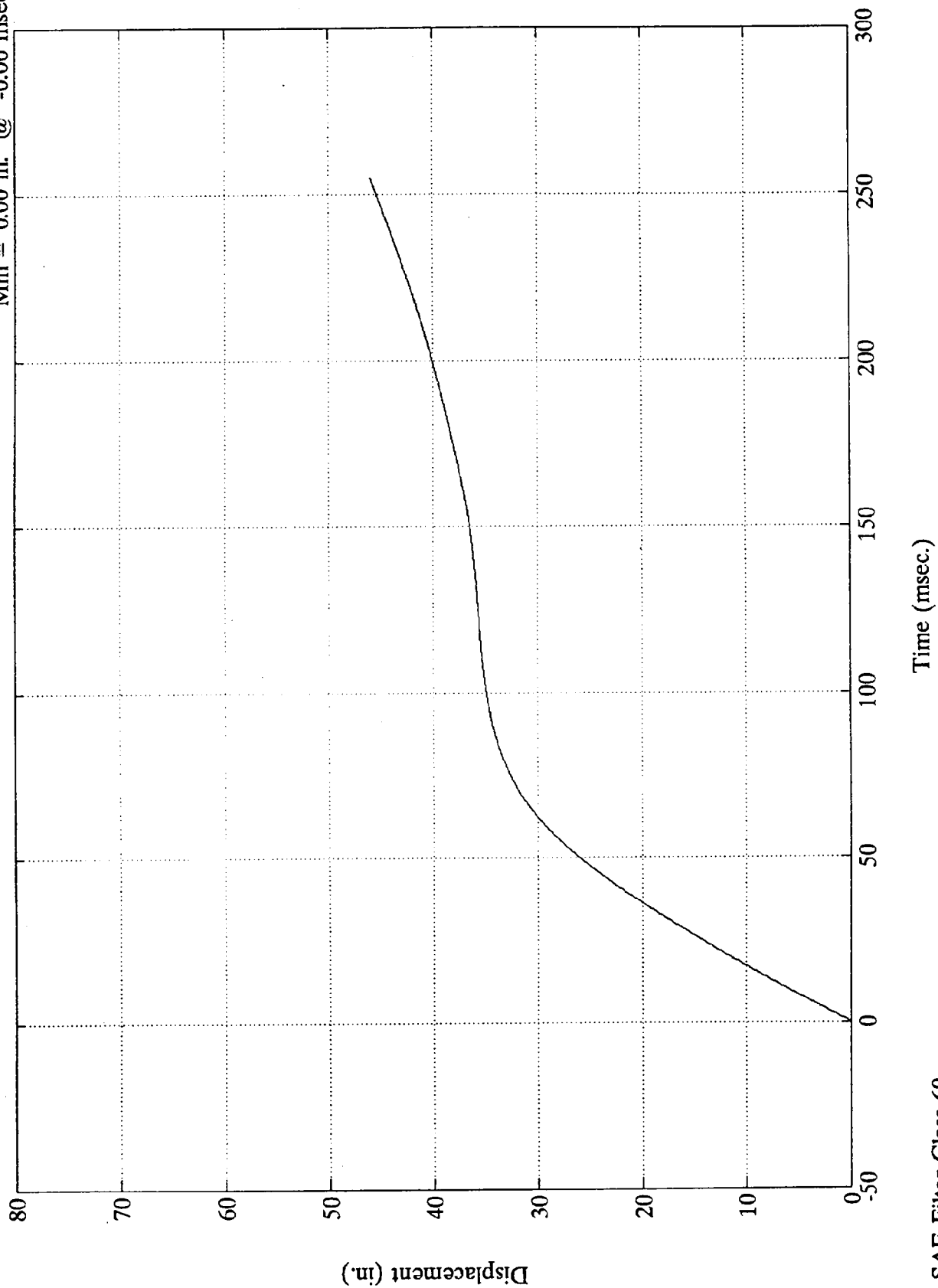
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 L R Seat (X)

Max = 45.99 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



B-81

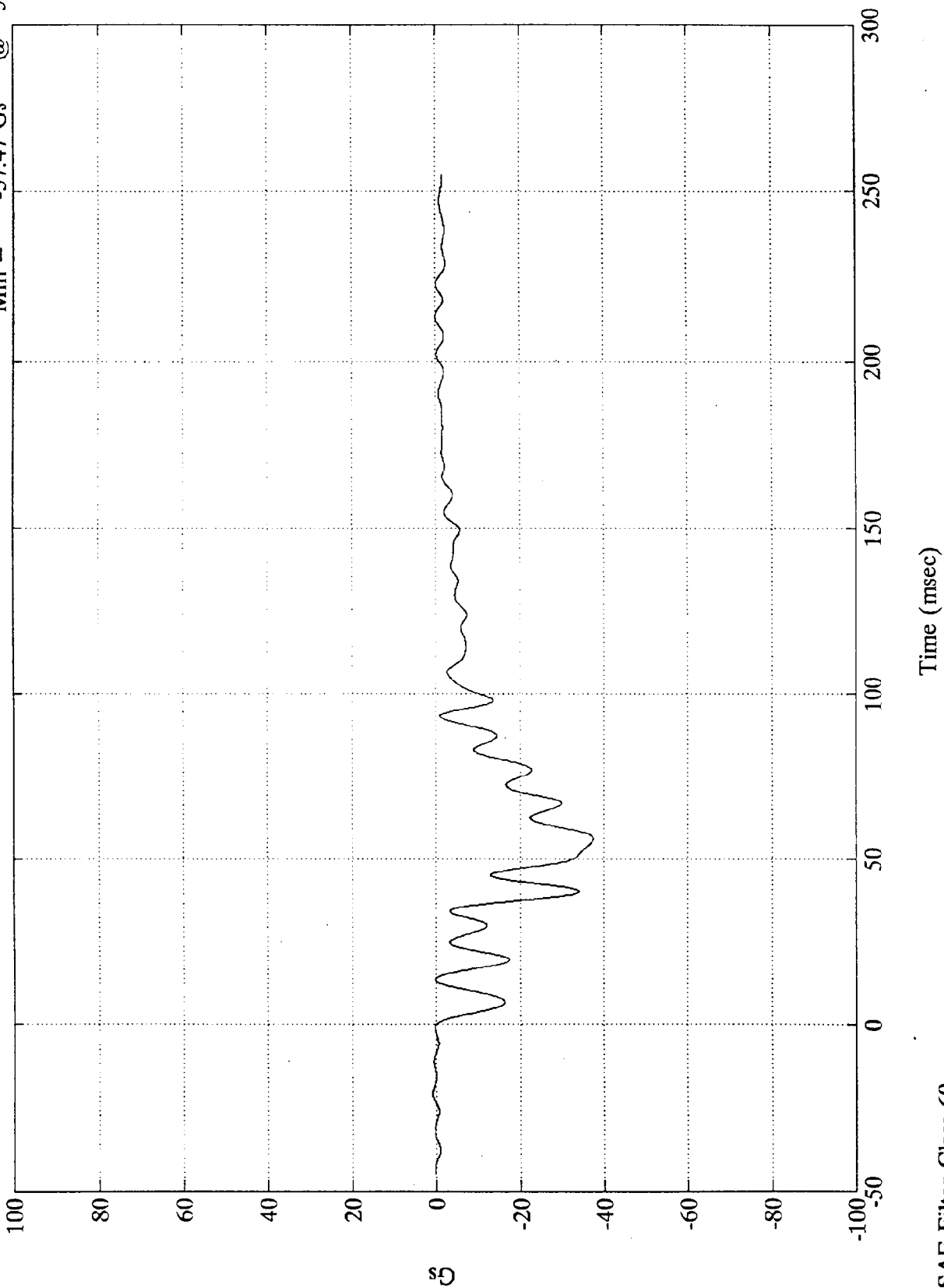
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 R R Seat (X)

Max = .89 Gs @ -20.88 msec
 Min = -37.47 Gs @ 56.15 msec

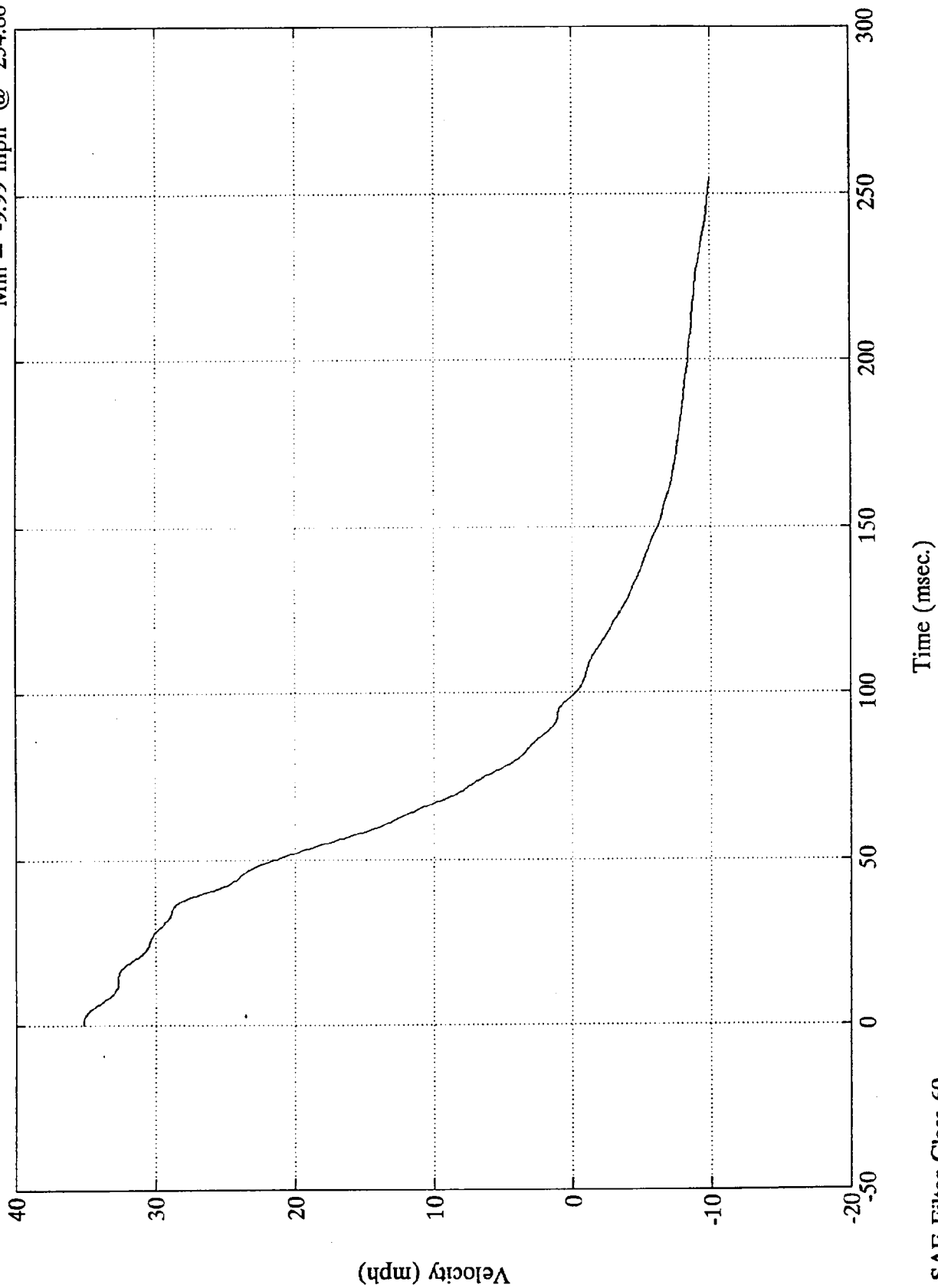


SAE Filter Class 60

VTV TEST 5

Veh. 2 R R Seat (X)

Max = 35.20 mph @ 0.48 msec
Min = -9.99 mph @ 254.88 msec



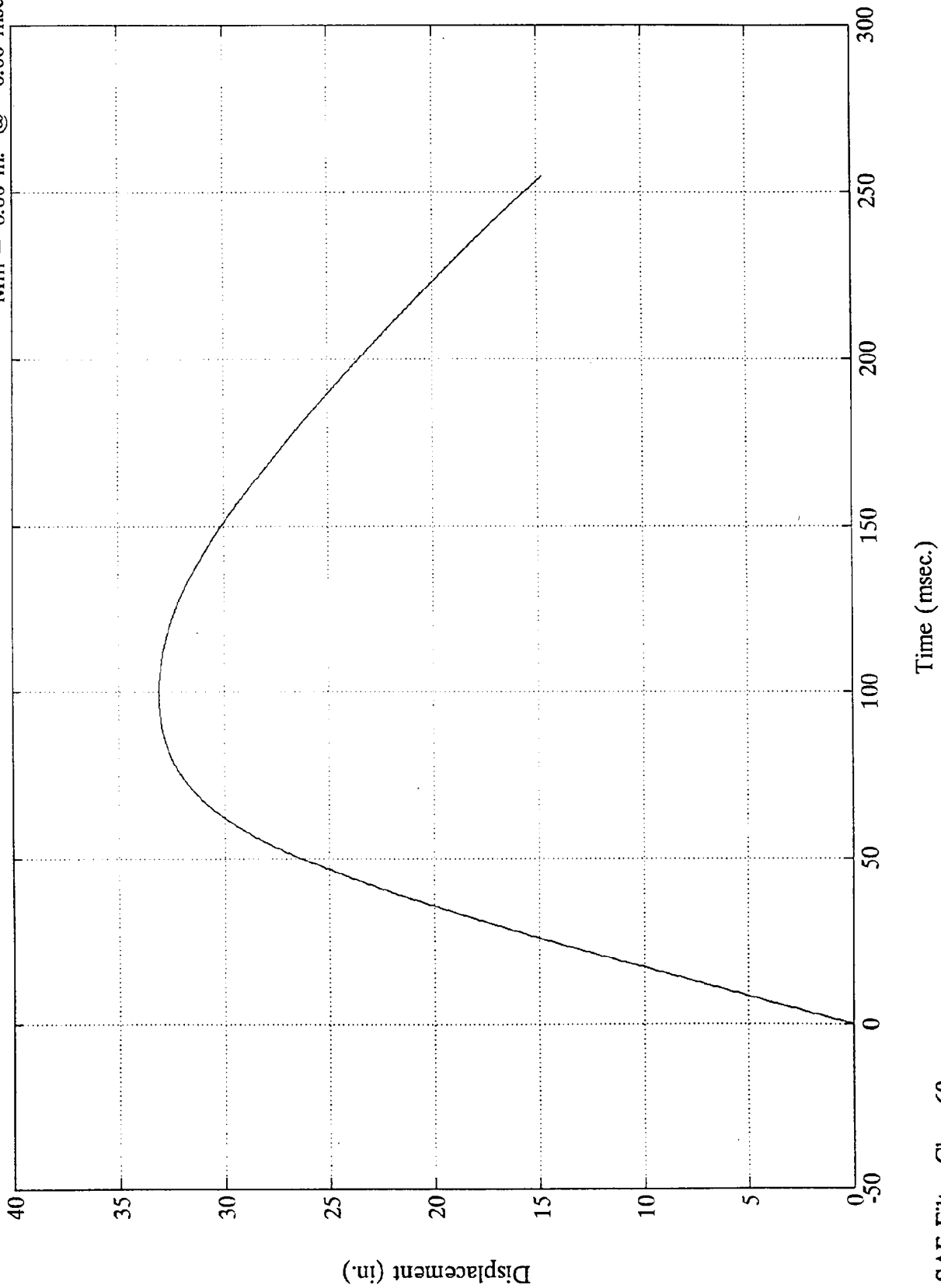
B-83

7942-5 SAE Filter Class 60

VTV TEST 5

Veh. 2 R R Seat (X)

Max = 33.08 in. @ 100.56 msec
Min = 0.00 in. @ -0.00 msec



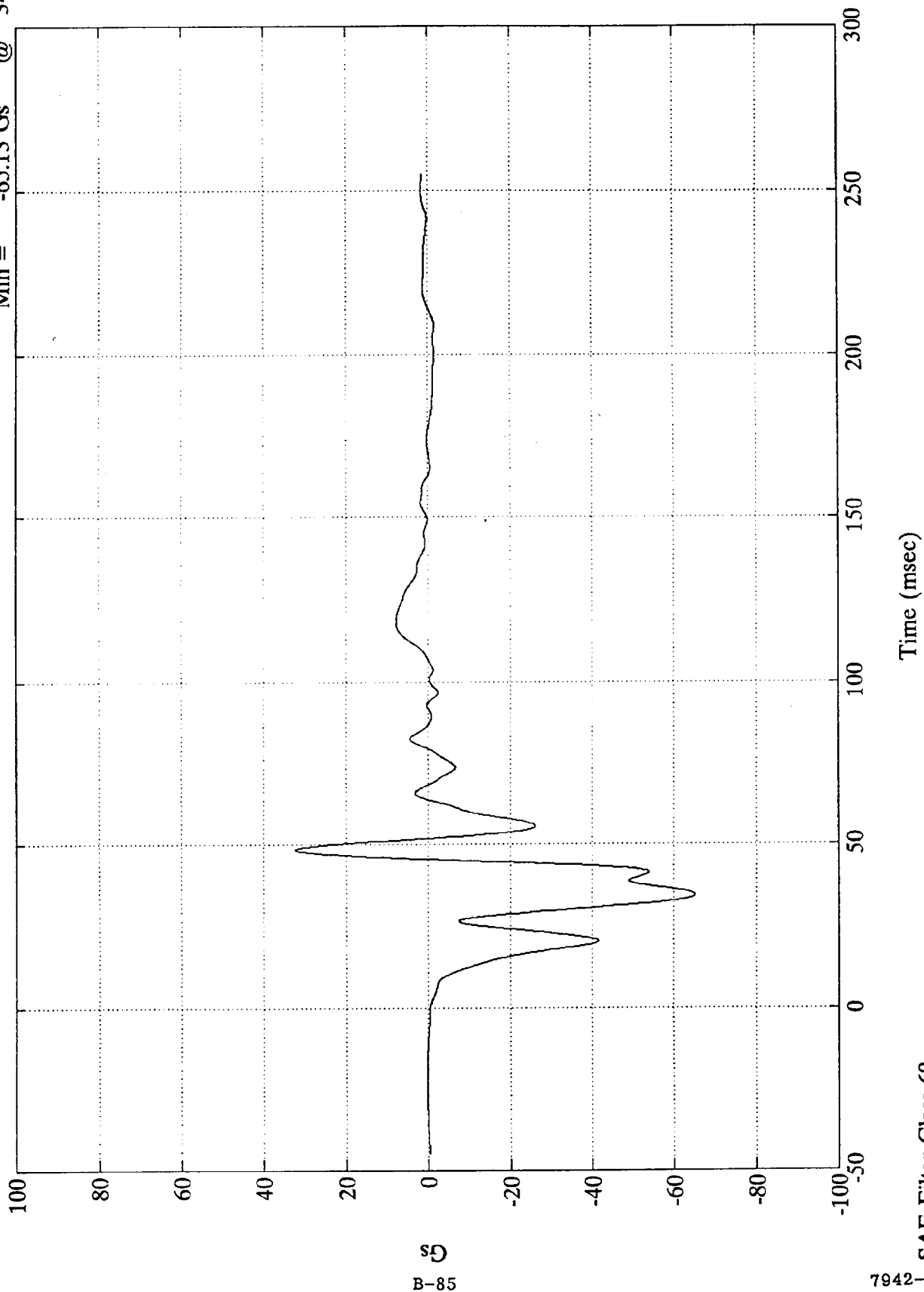
B-84

7942-5
SAE Filter Class 60

VTV TEST 5

Veh. 2 Engine Top (X)

Max = 32.36 Gs @ 48.36 msec
Min = -65.13 Gs @ 34.43 msec



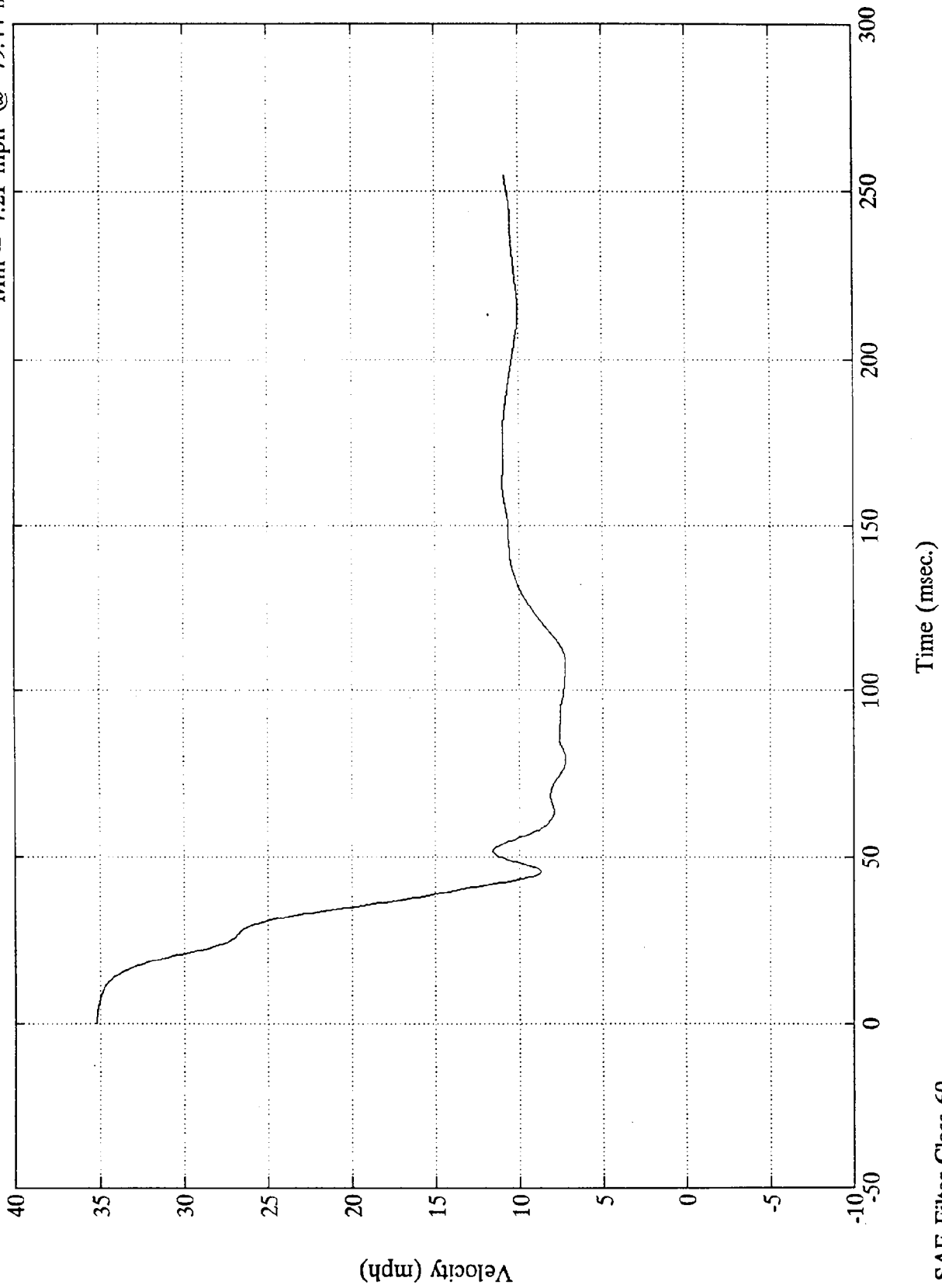
B-85

SAE Filter Class 60

7942-5

VTV TEST 5

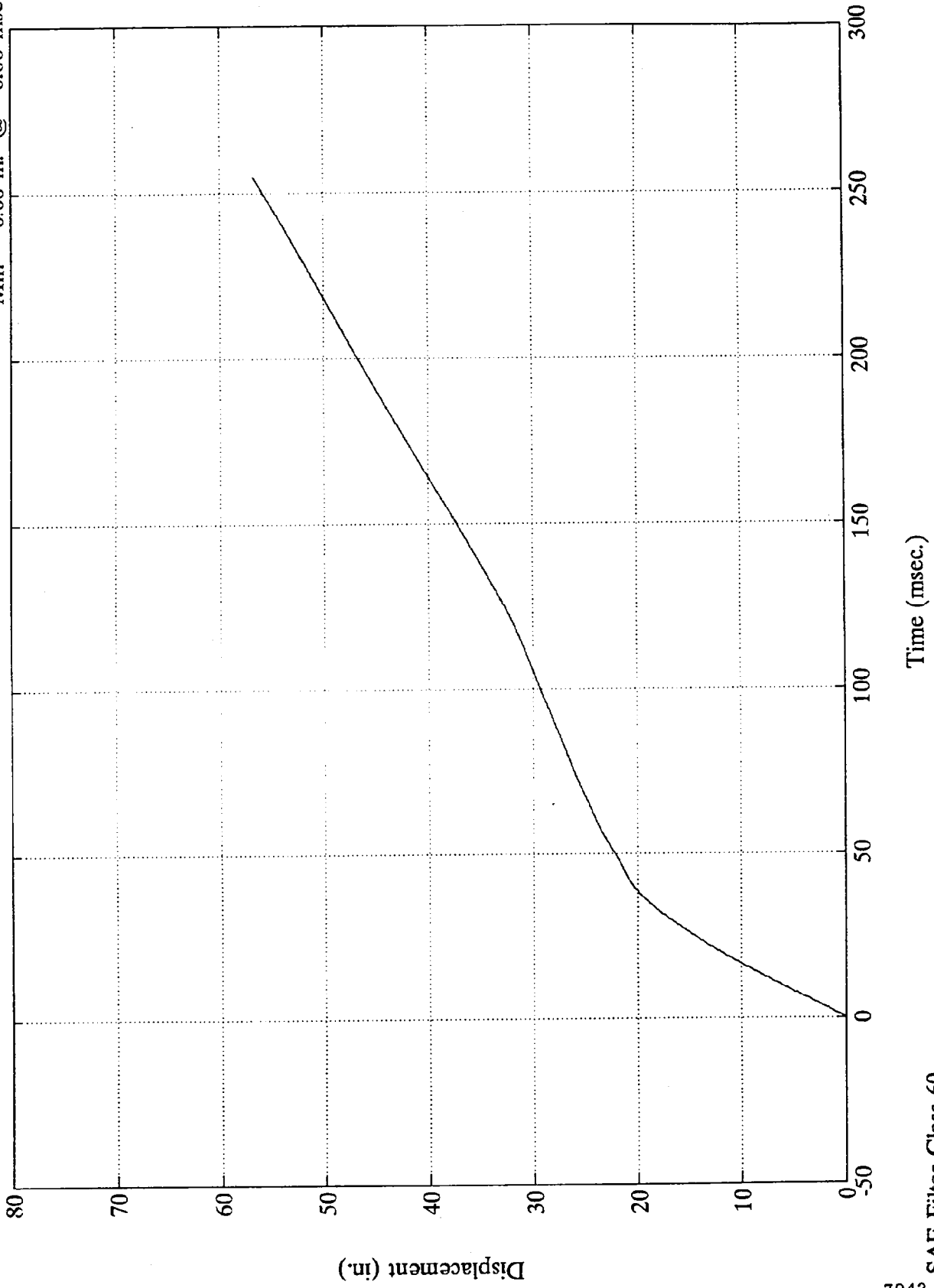
Veh. 2 Engine Top (X)
Max = 35.20 mph @ 0.24 msec
Min = 7.21 mph @ 79.44 msec



VTV TEST 5

Veh. 2 Engine Top (X)

Max = 56.74 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



B-87

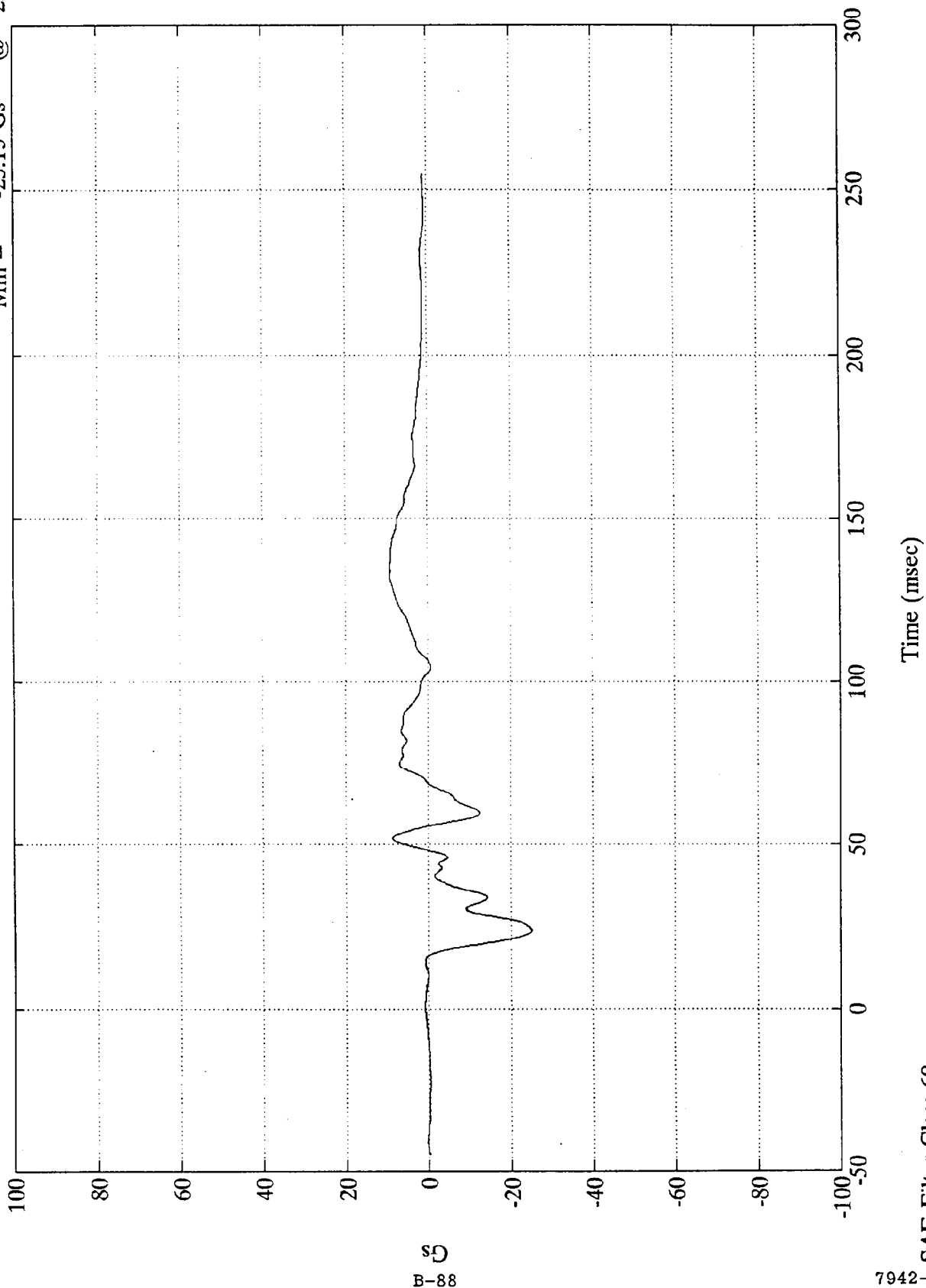
7942-5

SAE Filter Class 60

VTV TEST 5

Max = 9.13 Gs @ 132.60 msec
 Min = -25.15 Gs @ 23.76 msec

Veh. 2 Engine Top (Z)



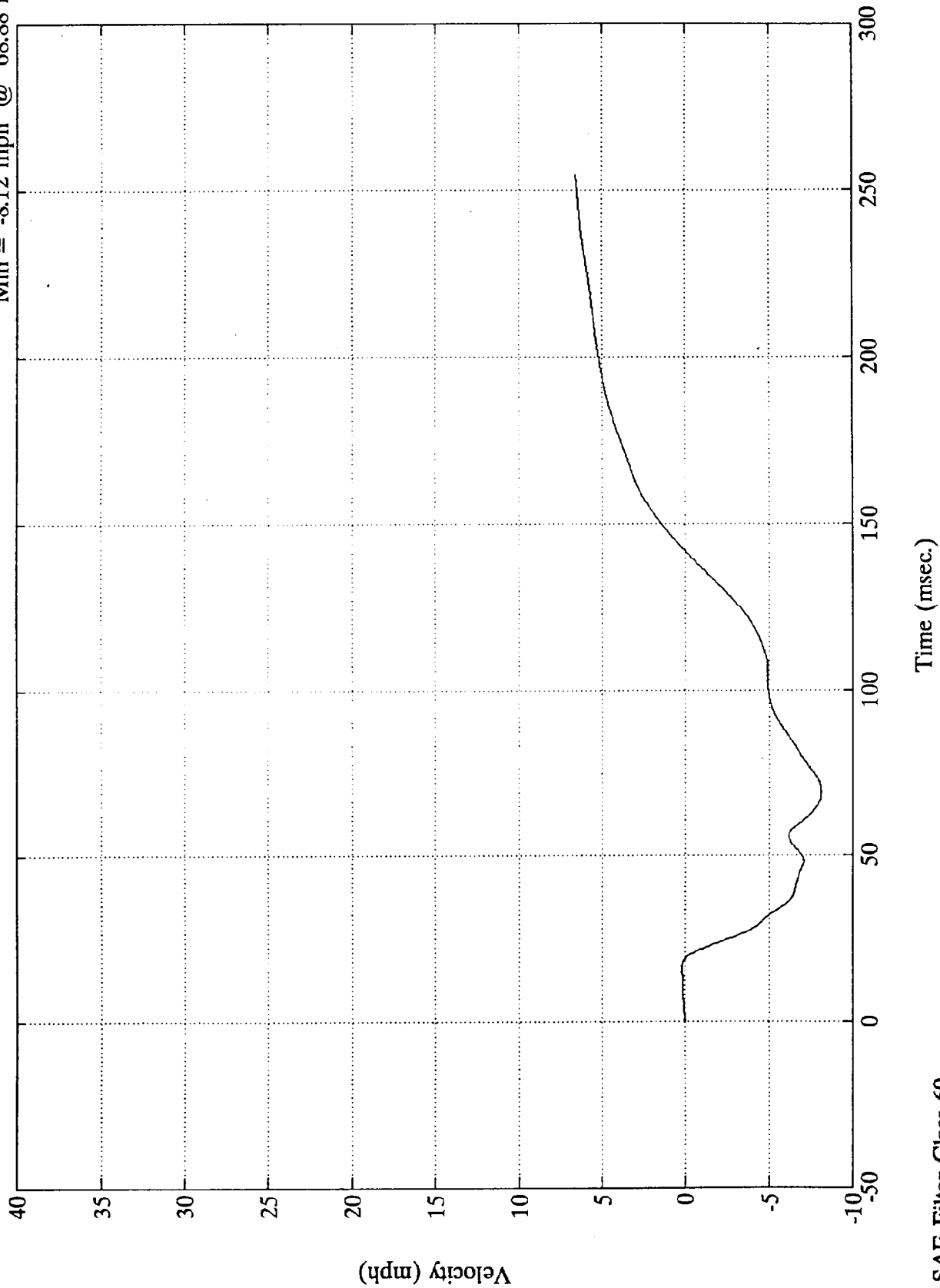
B-88

7942-5 SAE Filter Class 60

VTV TEST 5

Veh. 2 Engine Top (Z)

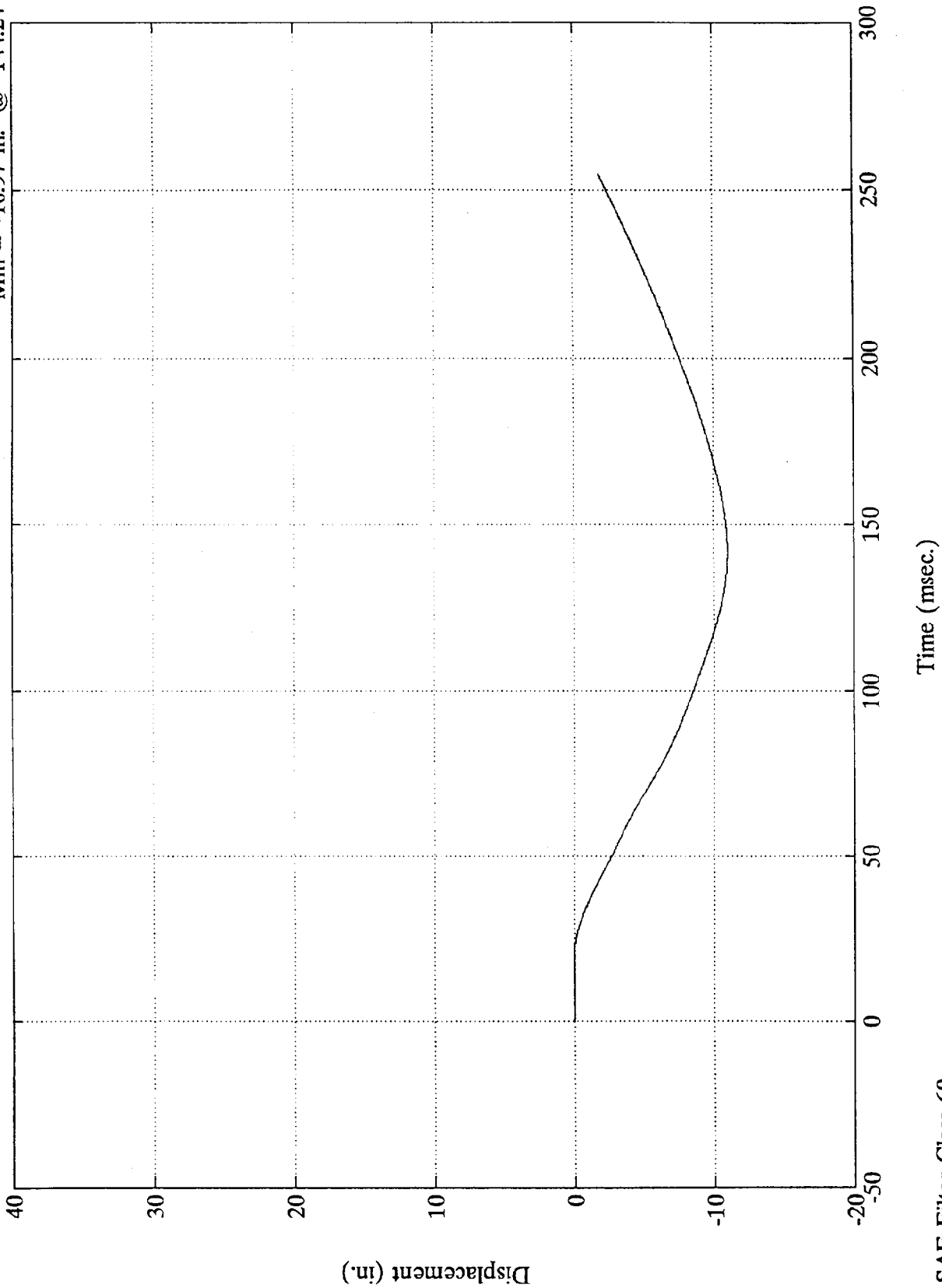
Max = 6.57 mph @ 254.88 msec
Min = -8.12 mph @ 68.88 msec



VTV TEST 5

Veh. 2 Engine Top (Z)

Max = 0.04 in. @ 18.96 msec
Min = -10.97 in. @ 144.24 msec



B-90

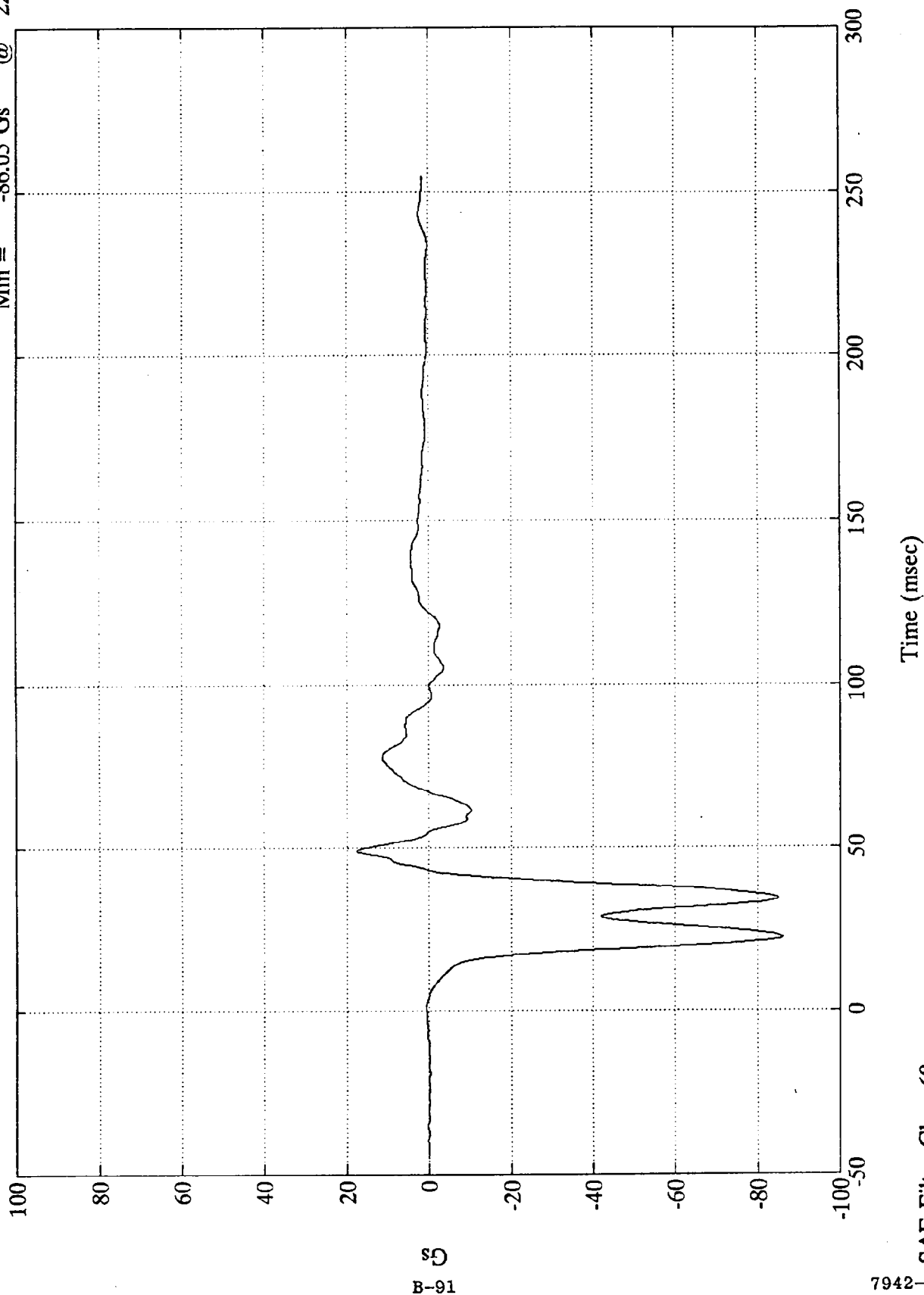
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 Engine Bottom (X)

Max = 17.56 Gs @ 49.07 msec
Min = -86.05 Gs @ 22.31 msec

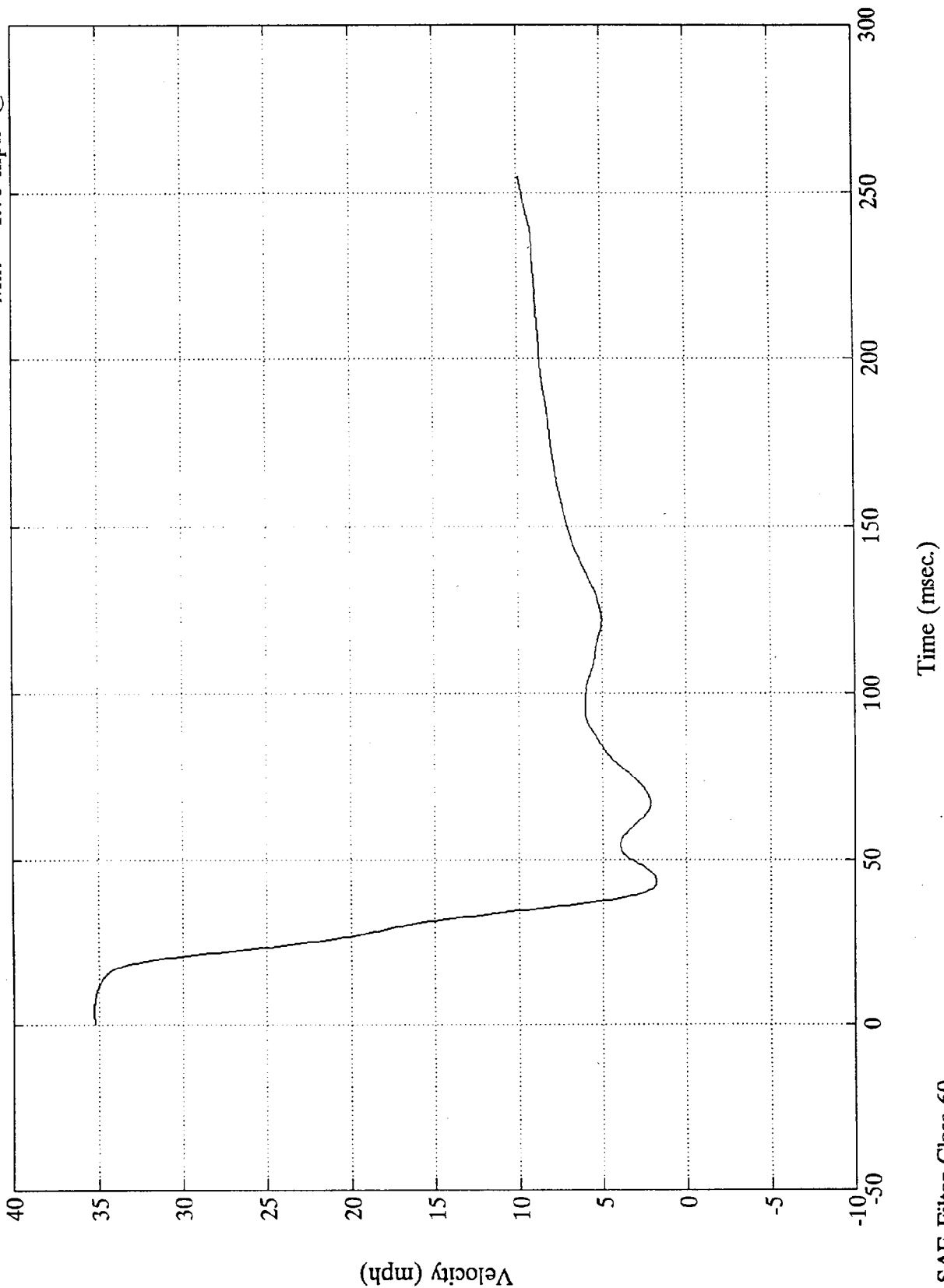


B-91

VTV TEST 5

Veh. 2 Engine Bottom (X)

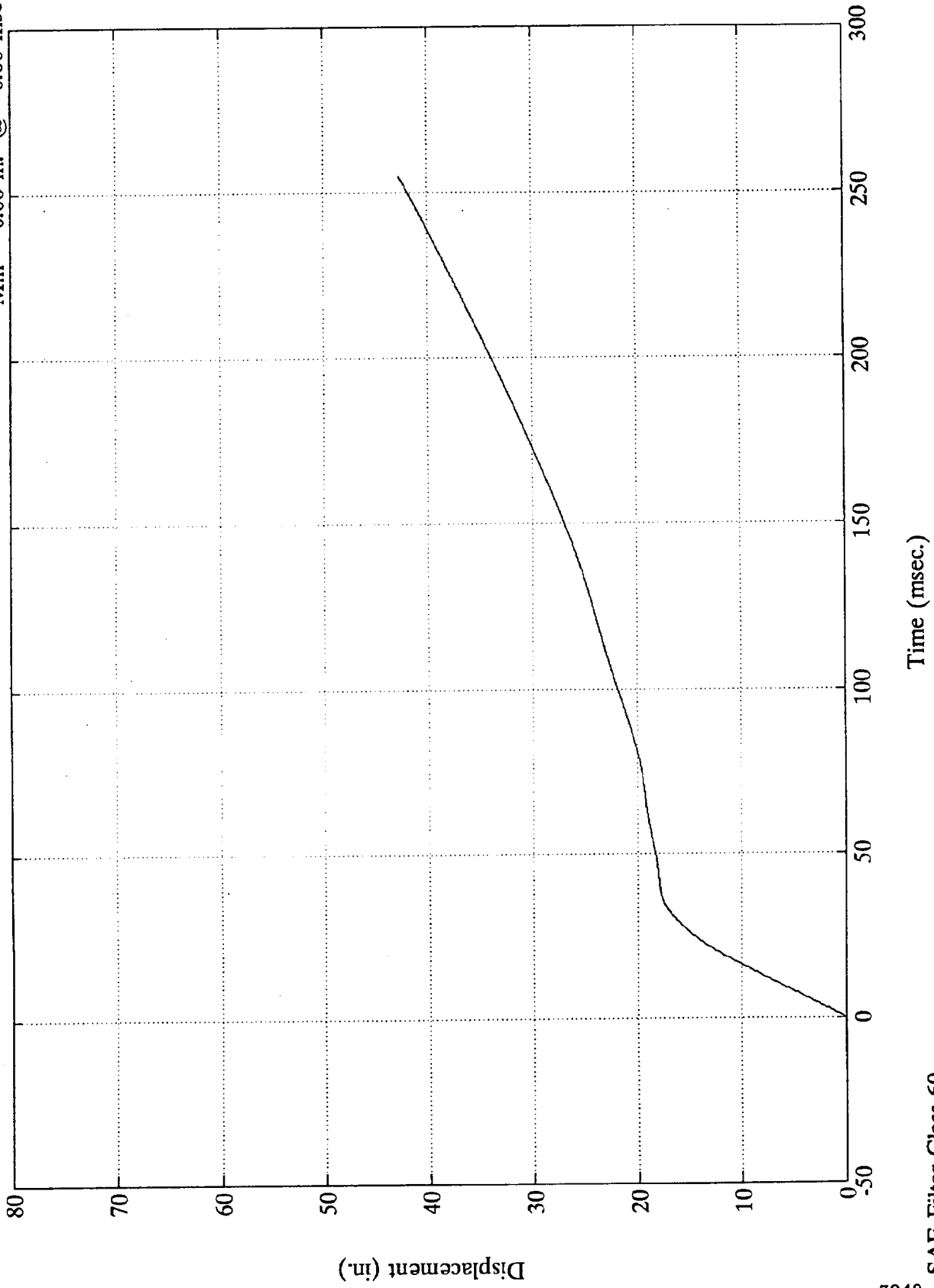
Max = 35.24 mph @ 4.80 msec
Min = 1.78 mph @ 42.96 msec



VTV TEST 5

Veh. 2 Engine Bottom (X)

Max = 42.70 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



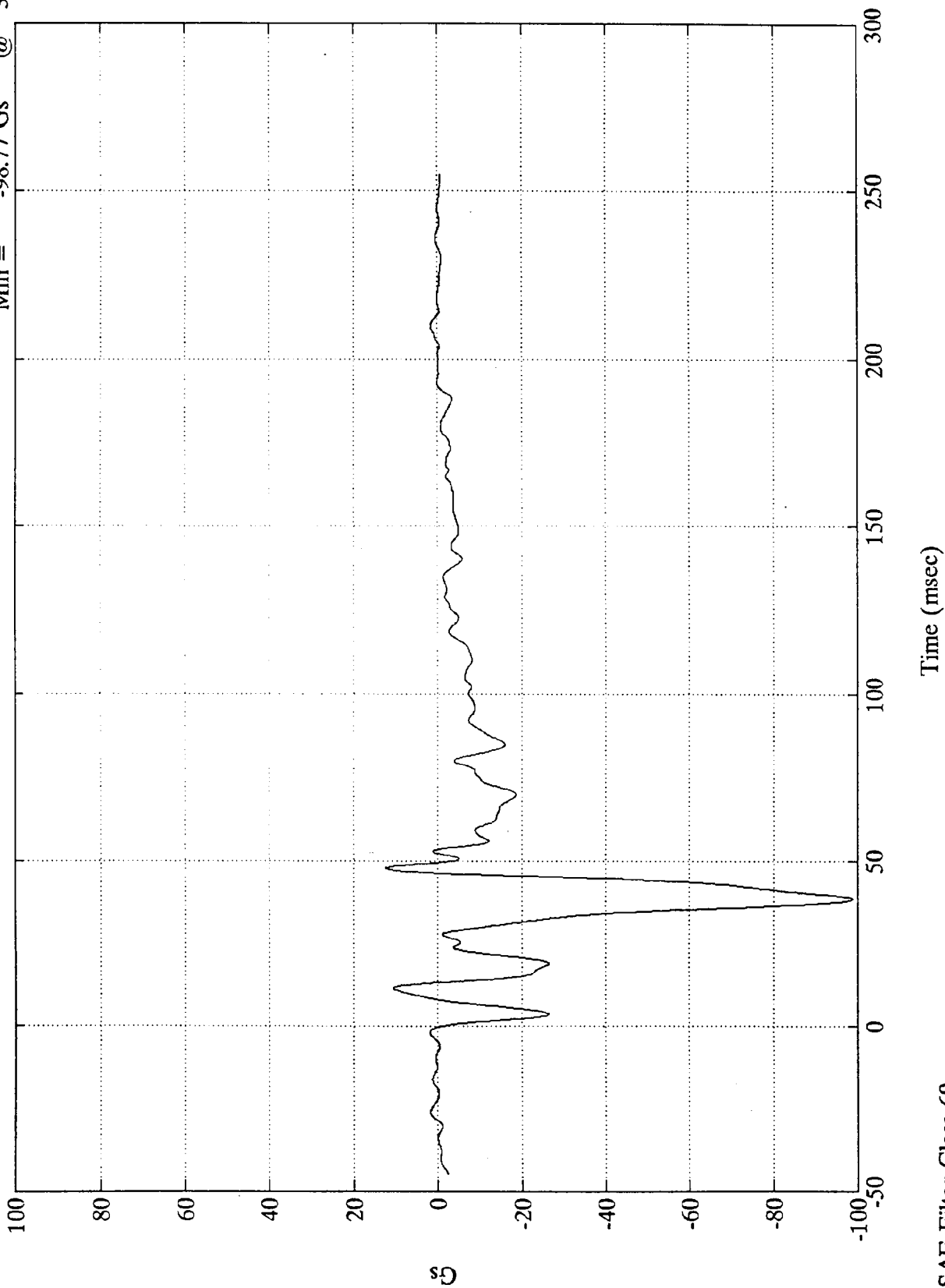
B-93

7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 Front X Mem. (X) Max = 12.35 Gs @ 47.88 msec
 Min = -98.77 Gs @ 38.40 msec



B-94

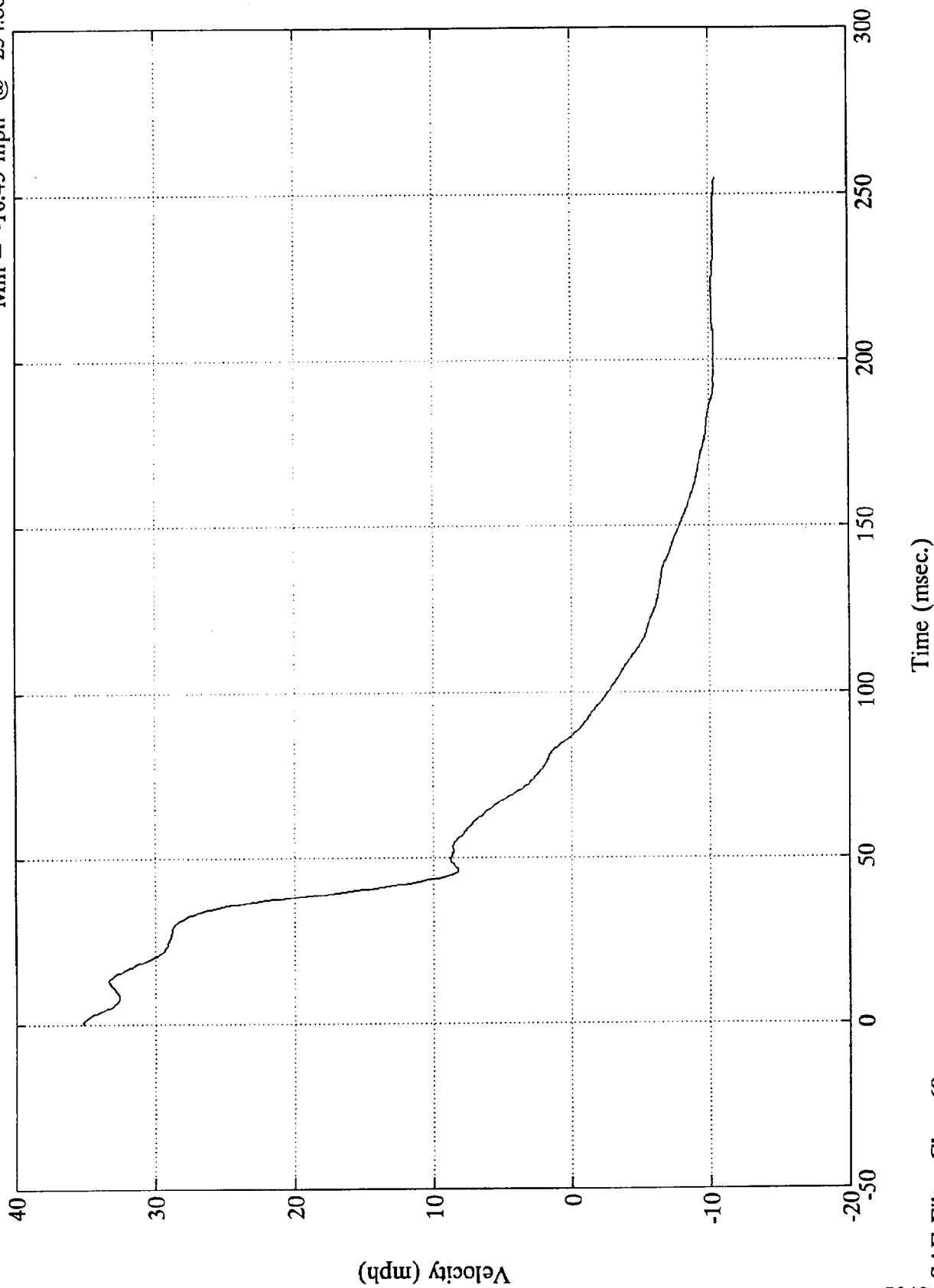
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 Front X Mem. (X)

Max = 35.20 mph @ -0.00 msec
Min = -10.43 mph @ 254.88 msec



B-95

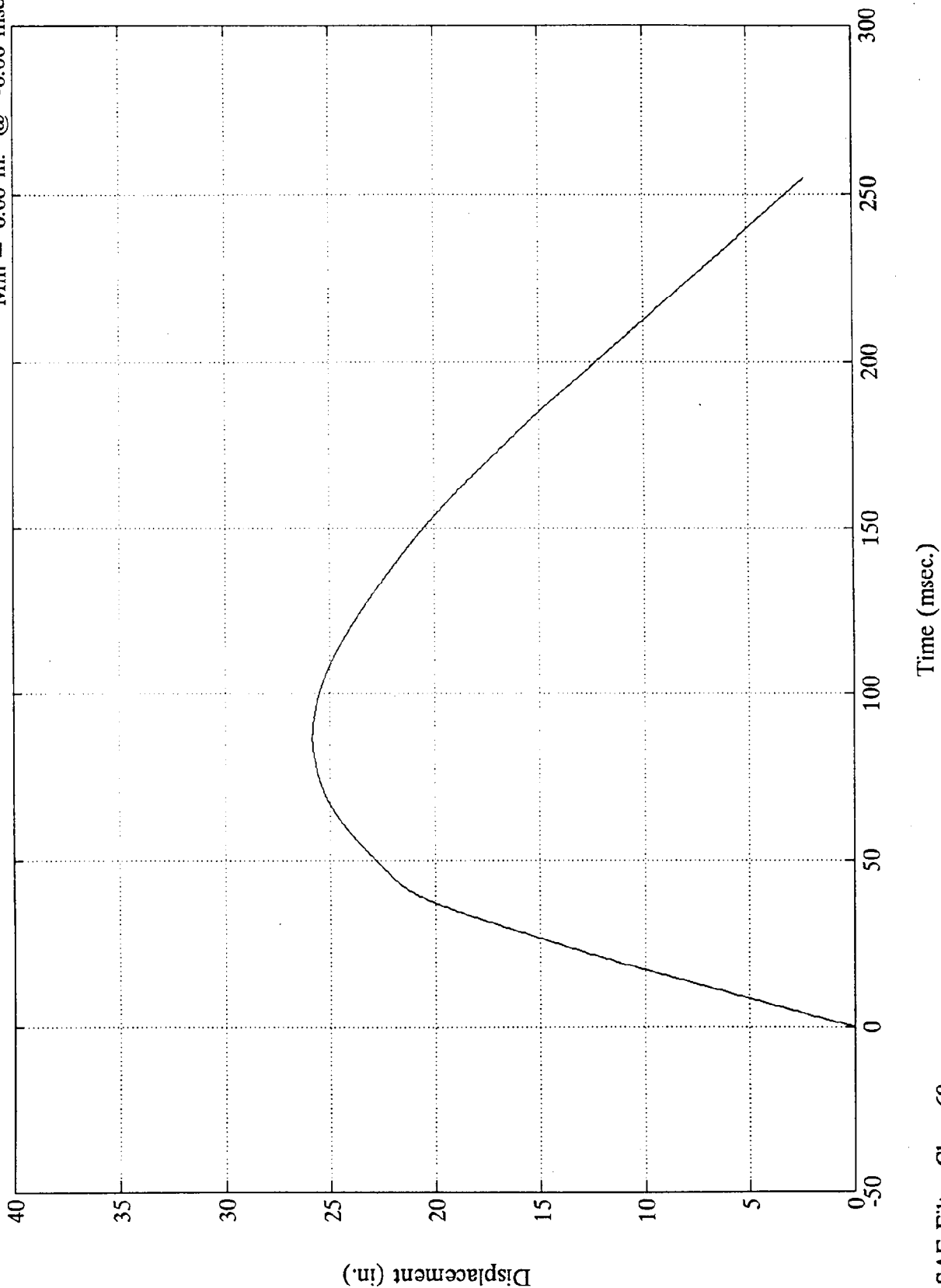
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 Front X Mem. (X)

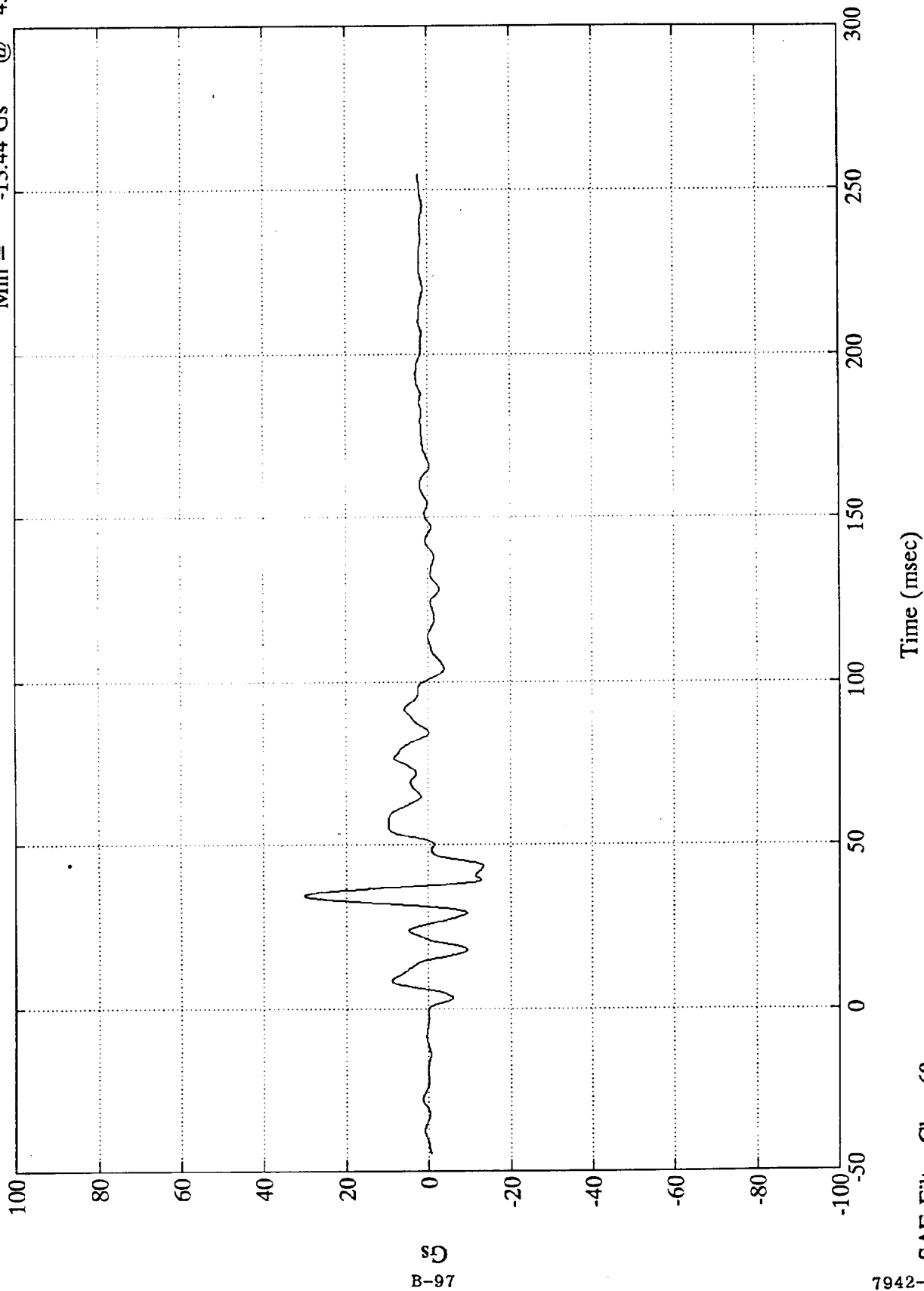
Max = 25.85 in. @ 87.60 msec
Min = 0.00 in. @ -0.00 msec



VTV TEST 5

Veh. 2 Front X Mem. (Z)

Max = 30.11 Gs @ 34.20 msec
Min = -13.44 Gs @ 43.31 msec



B-97

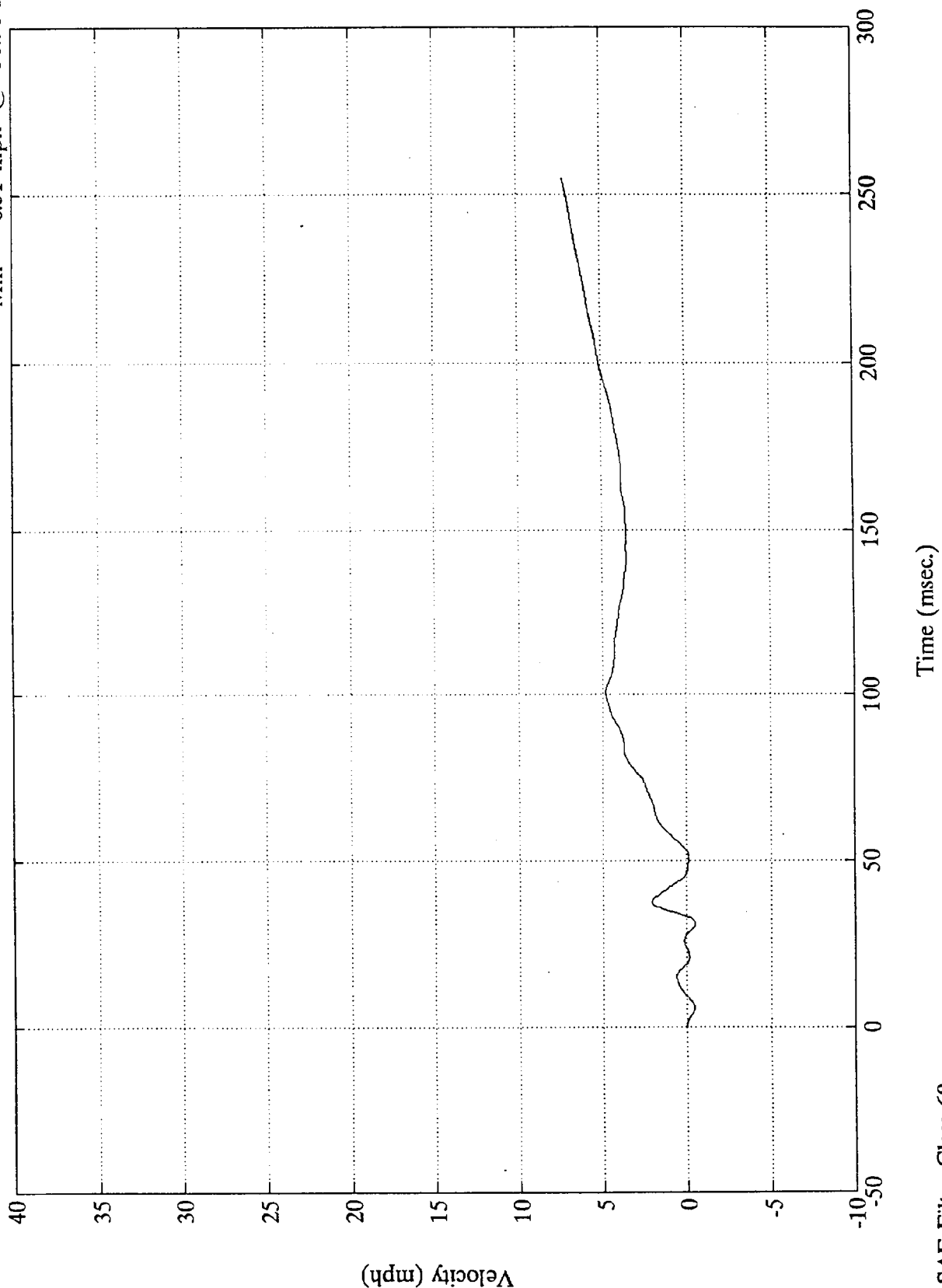
SAE Filter Class 60

7942-5

VTV TEST 5

Veh. 2 Front X Mem. (Z)

Max = 7.23 mph @ 254.88 msec
Min = -0.51 mph @ 30.96 msec



B-98

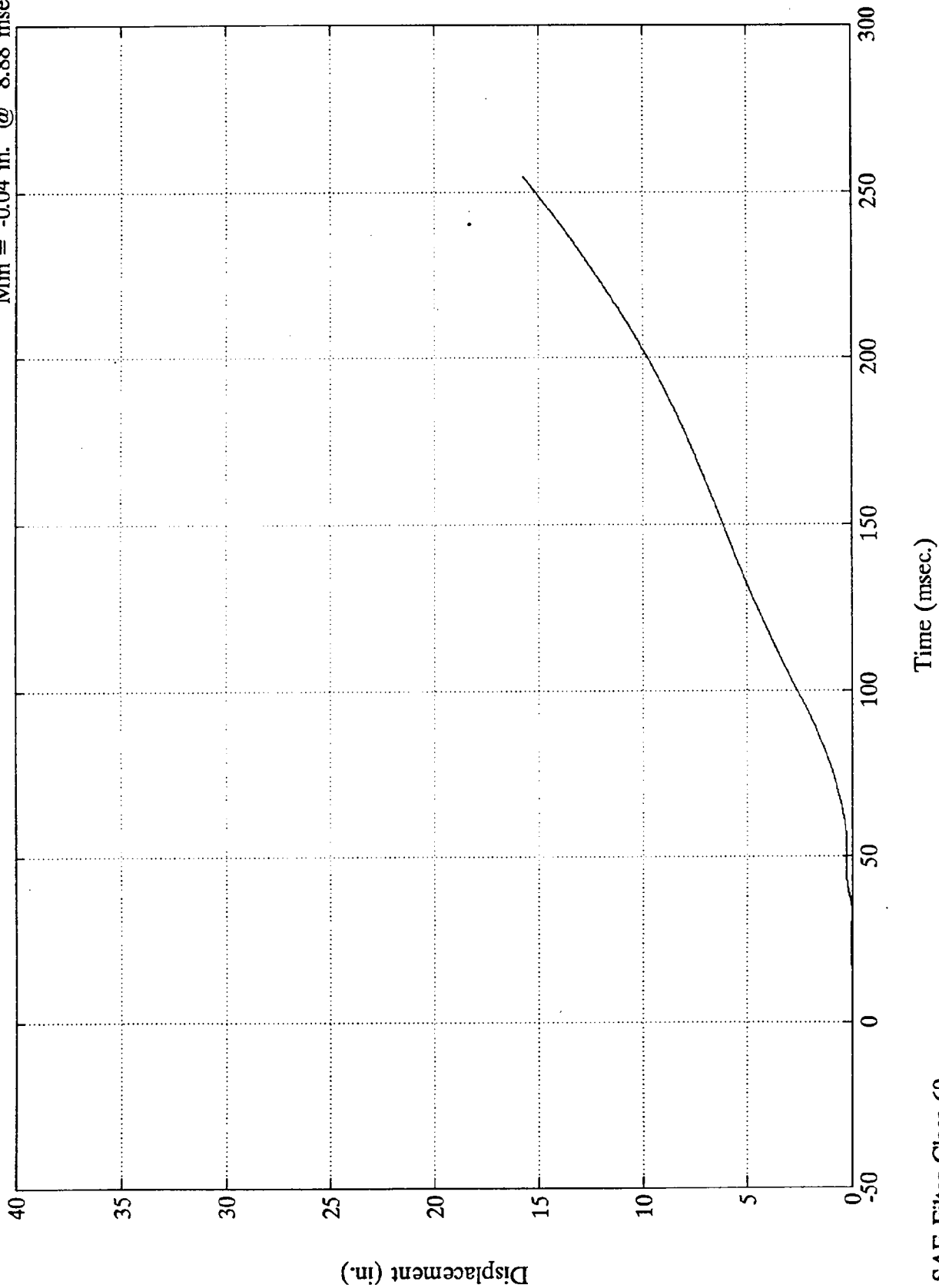
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 Front X Mem. (Z)

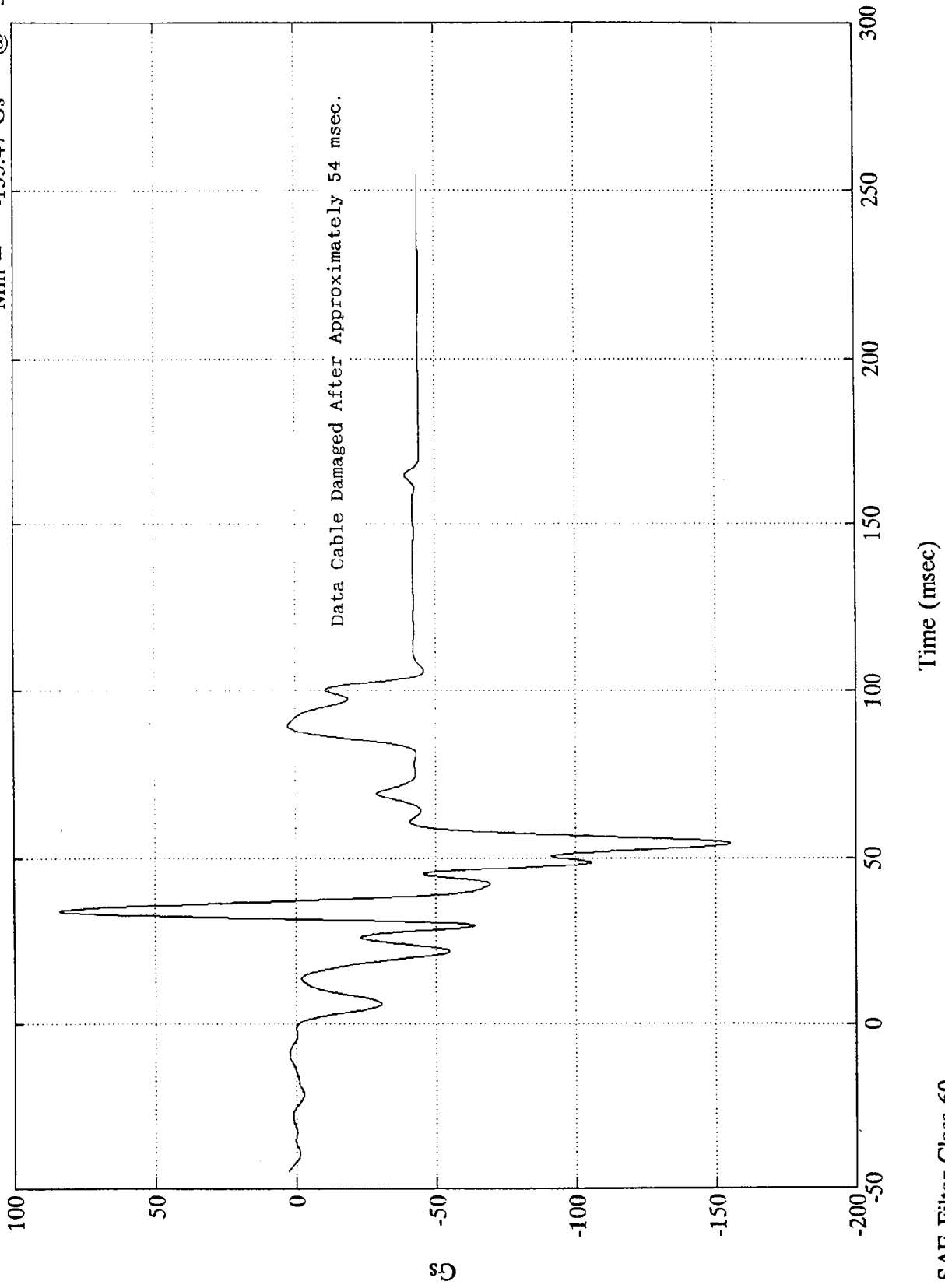
Max = 15.73 in. @ 254.88 msec
Min = -0.04 in. @ 8.88 msec



VTV TEST 5

Veh. 2 Left Caliper (X)

Max = 83.83 Gs @ 34.07 msec
Min = -155.47 Gs @ 54.47 msec



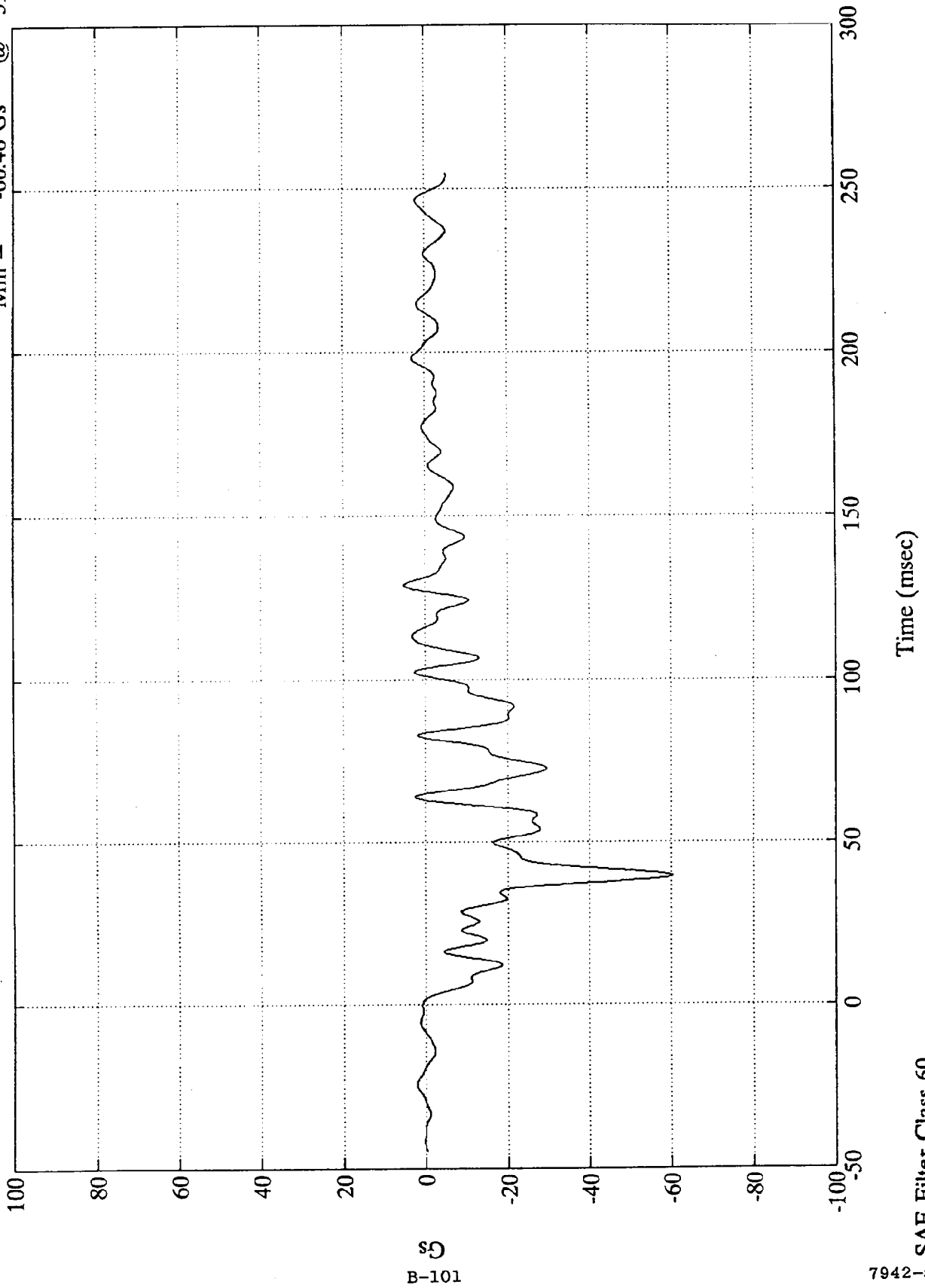
B-100

7942-5
SAE Filter Class 60

VTV TEST 5

Veh. 2 Right Caliper (X)

Max = 5.14 Gs @ 129.00 msec
Min = -60.46 Gs @ 39.59 msec



B-101

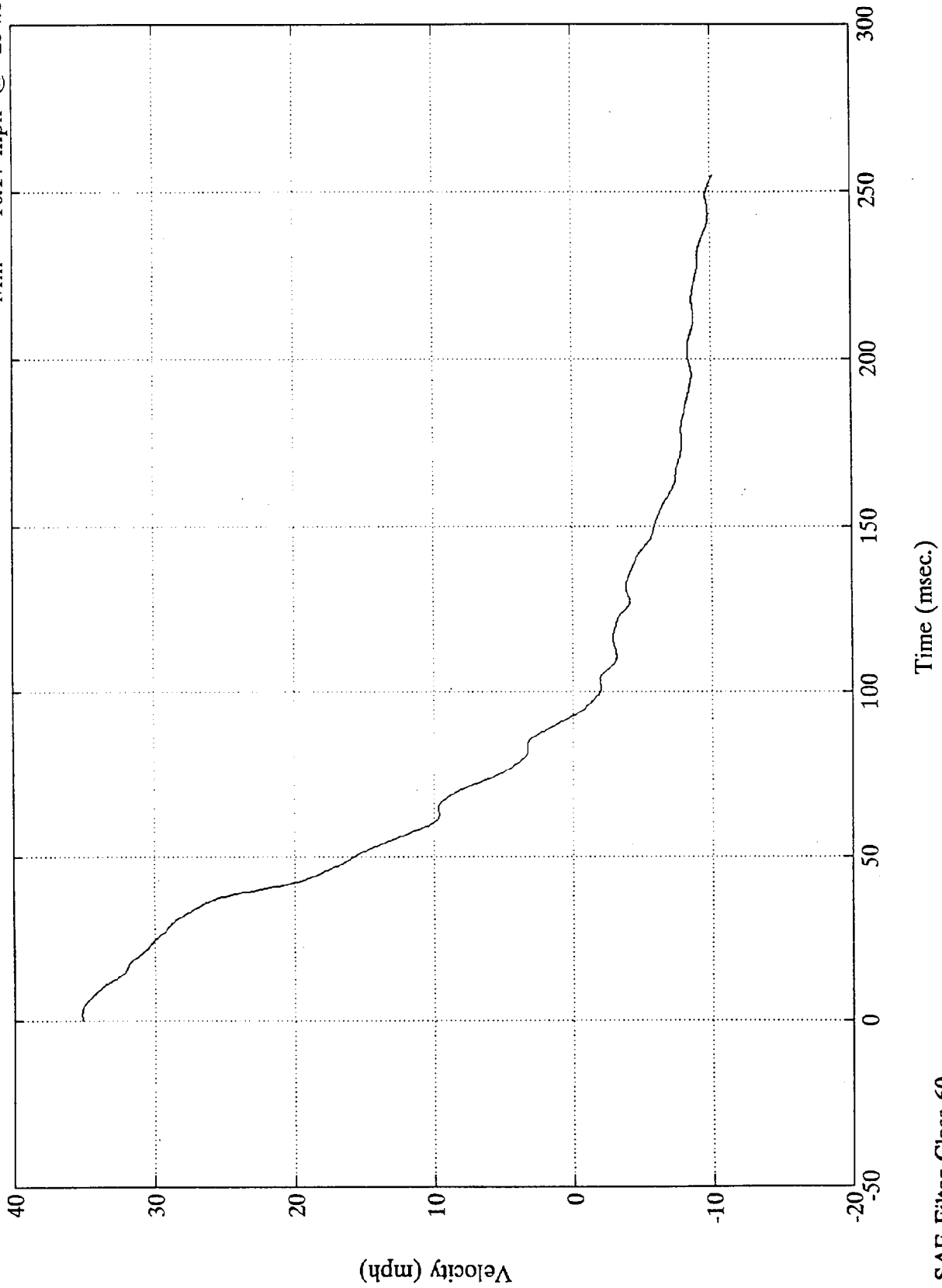
SAE Filter Class 60

7942-5

VTV TEST 5

Veh. 2 Right Caliper (X)

Max = 35.22 mph @ 1.92 msec
Min = -10.17 mph @ 254.88 msec

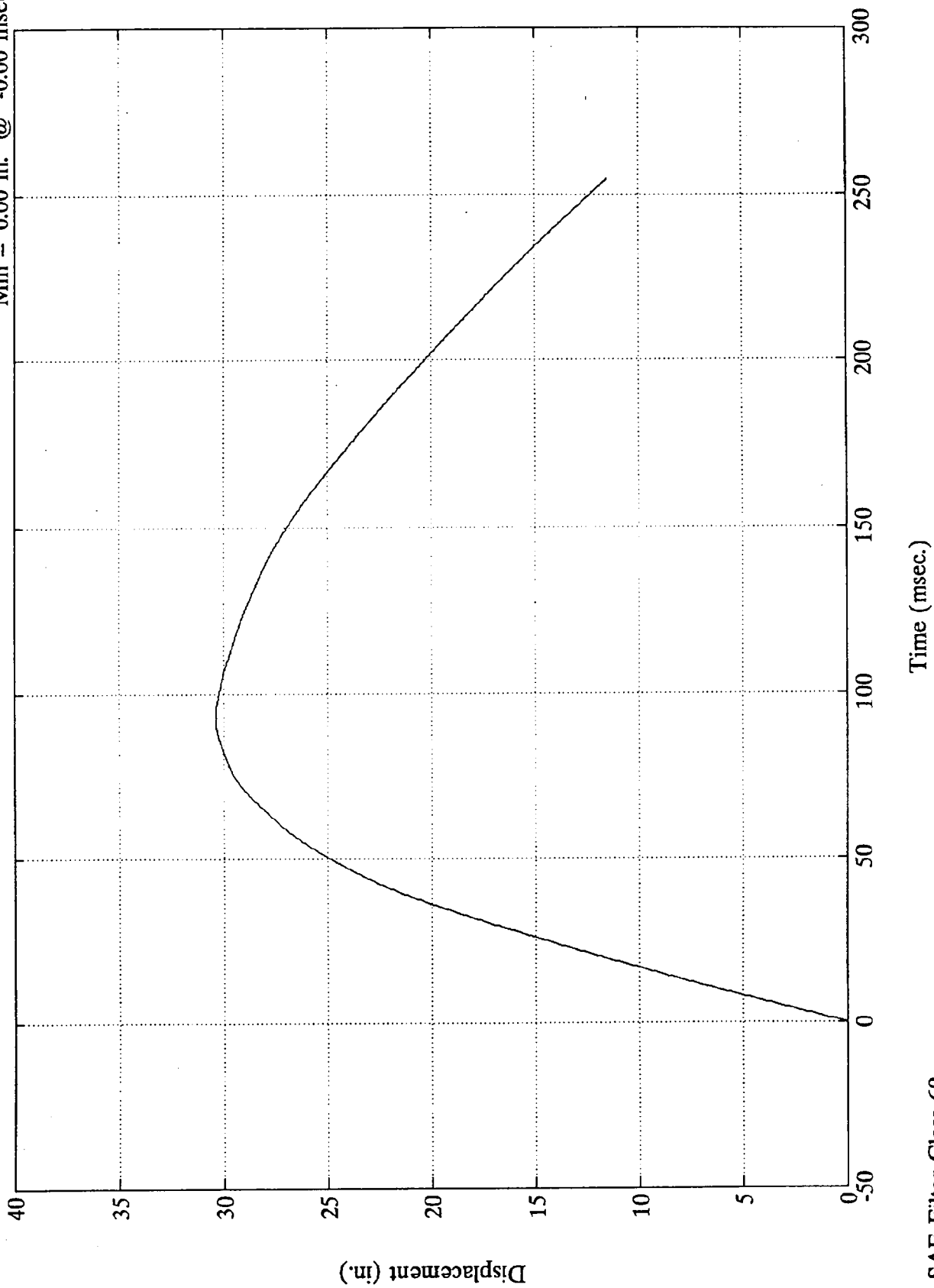


SAE Filter Class 60

VTV TEST 5

Veh. 2 Right Caliper (X)

Max = 30.36 in. @ 94.08 msec
Min = 0.00 in. @ -0.00 msec



B-103

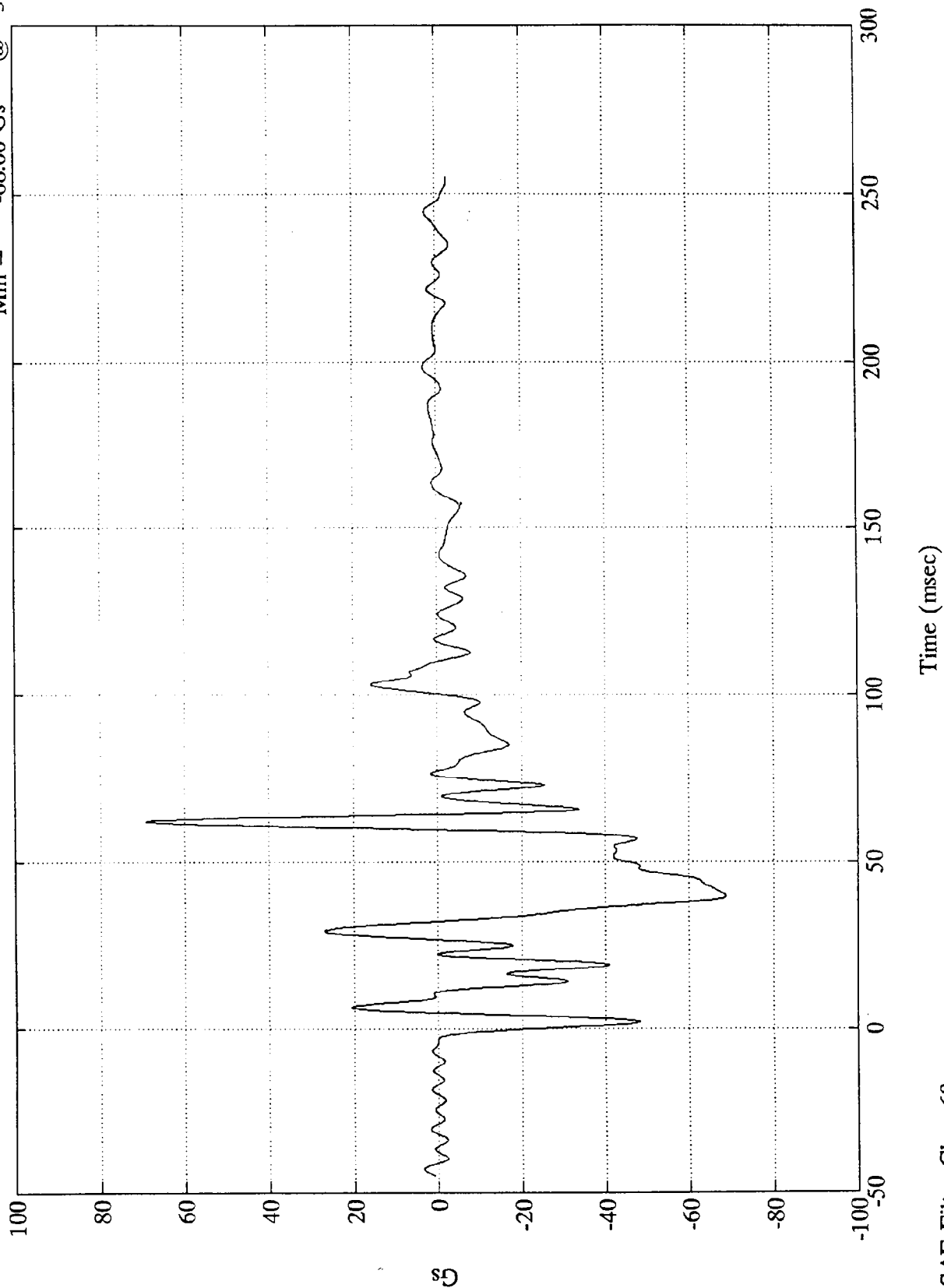
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 Toe Pan (X)

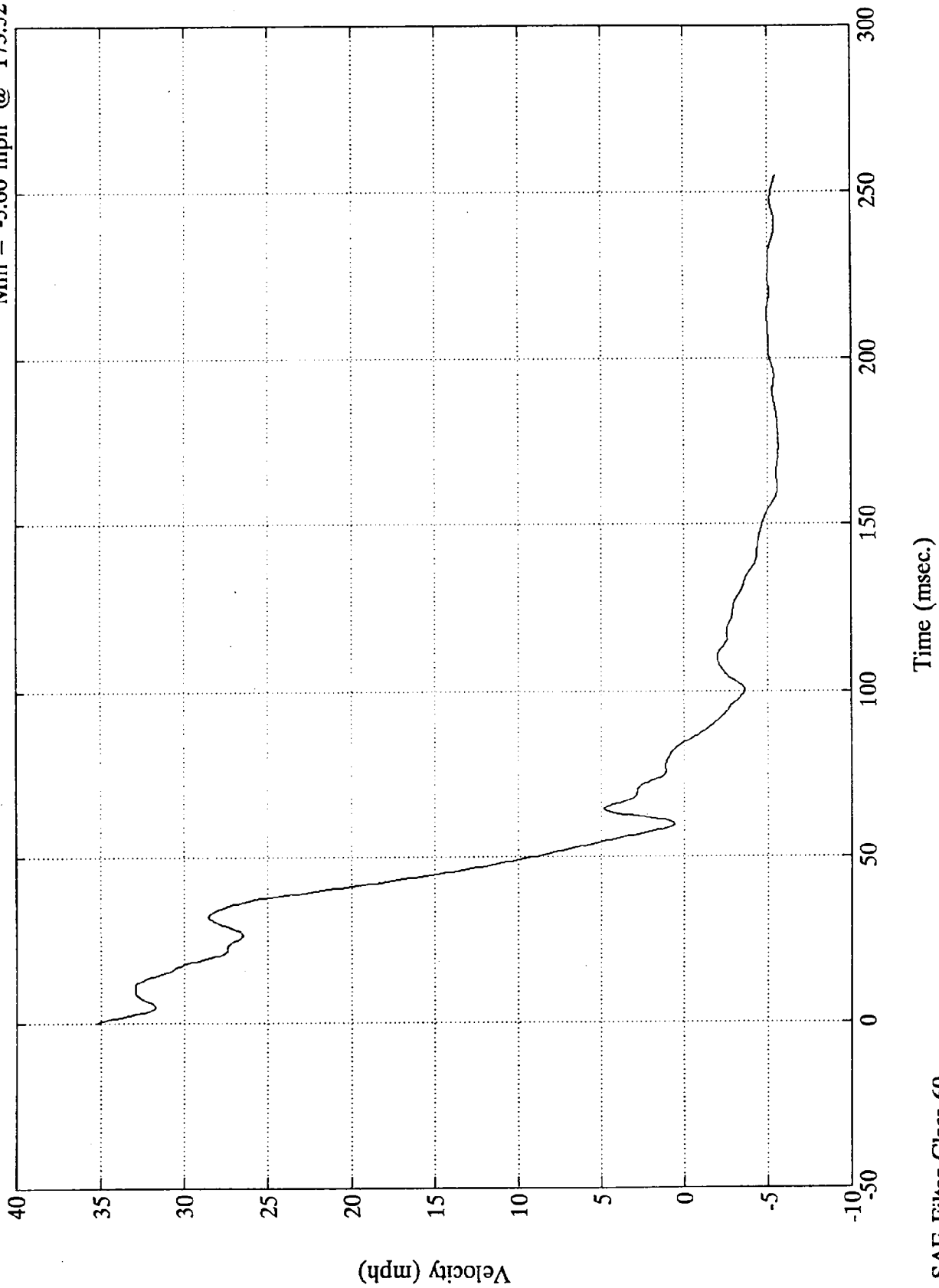
Max = 69.07 Gs @ 62.04 msec
Min = -68.66 Gs @ 39.84 msec



VTV TEST 5

Veh. 2 Toe Pan (X)

Max = 35.20 mph @ -0.00 msec
Min = -5.66 mph @ 173.52 msec



B-105

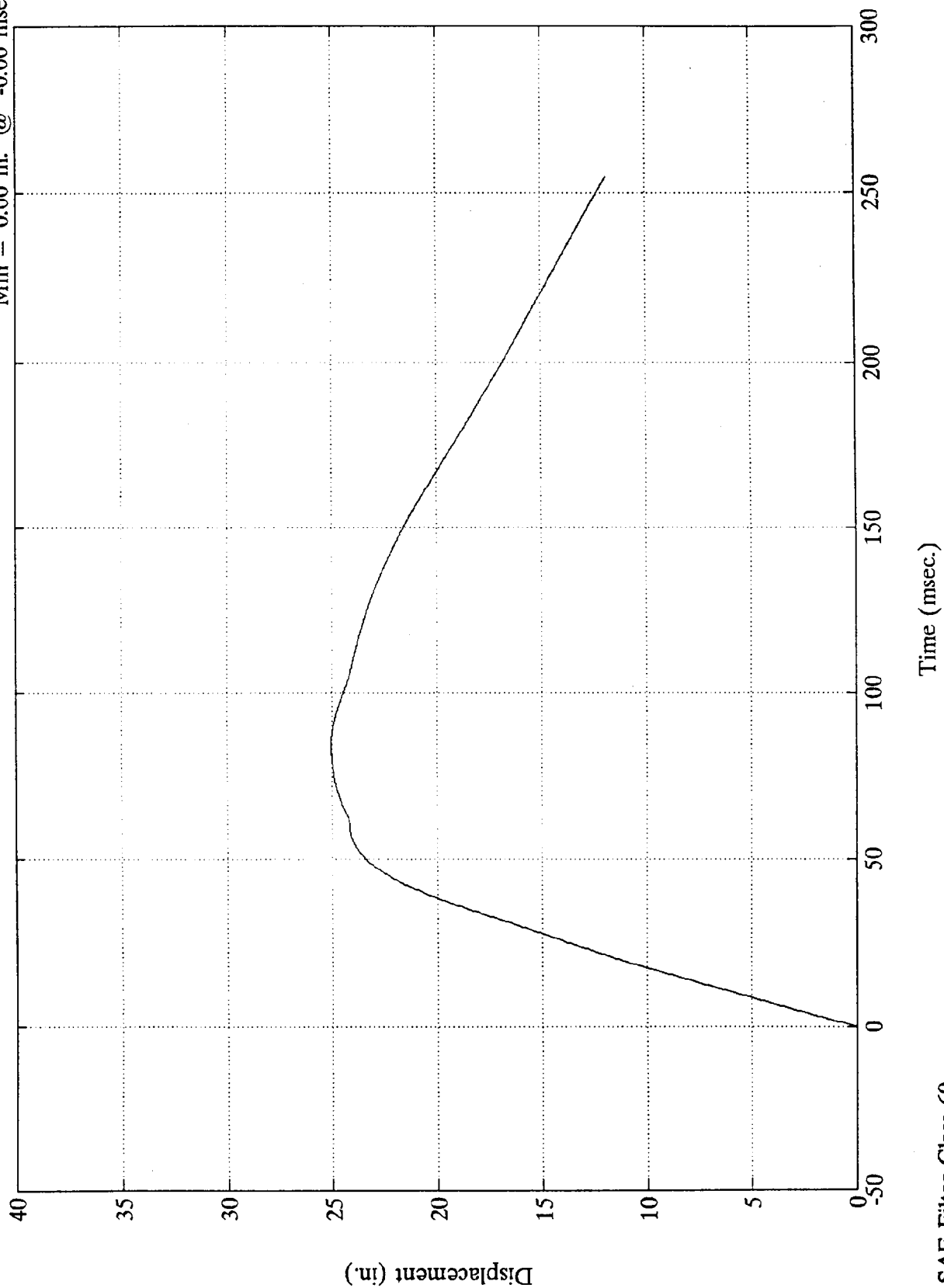
7942-5

SAE Filter Class 60

VTV TEST 5

Veh. 2 Toe Pan (X)

Max = 25.06 in. @ 84.72 msec
Min = 0.00 in. @ -0.00 msec



B-106

7942-5

SAE Filter Class 60

TEST NO. Y43-5-1148

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

FACILITY: TRACK
RUN #: 1148
SERIES #: 5

TEST DATE: 08 Jan 1992

TITLE: VTV TEST 5

36 ms Fixed Duration HIC SUMMARY: Veh.2-Pos.1 Head Result.

hic: 848.15
t1 = 67.800 msec
t2 = 103.680 msec
Average G's Over Hic Duration = 56.16

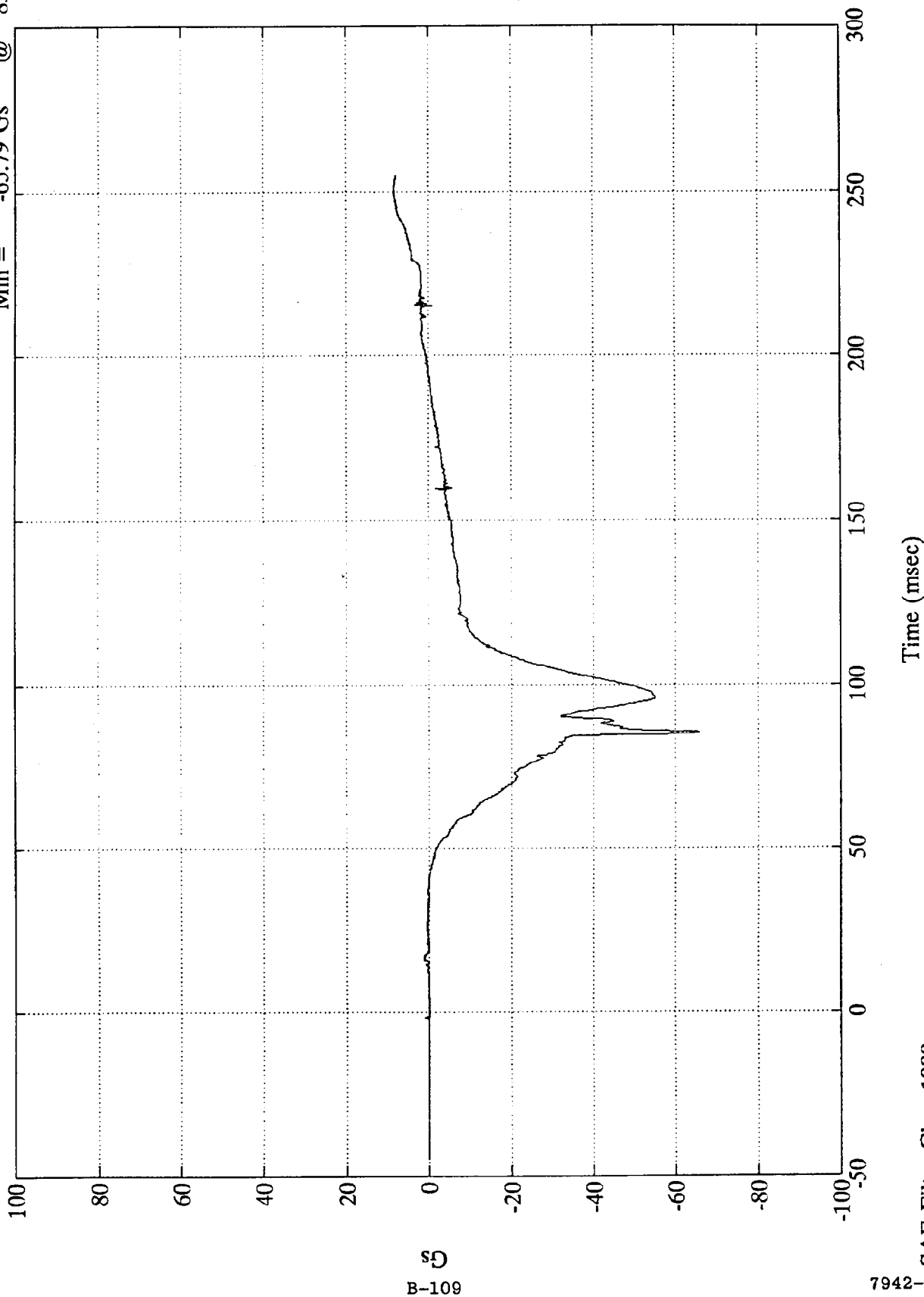
CLIP SUMMARY: Veh.2-Pos.1 Chest Result.

Peak Resultant (3 ms CLIPPED DURATION) = 58.222 G's
Tstart = 74.7600 ms
Tend = 77.7600 ms
CSI = 487.710

VTV TEST 5

Veh.2-Pos.1 Head X

Max = 8.26 Gs @ 252.00 msec
Min = -65.79 Gs @ 85.20 msec



B-109

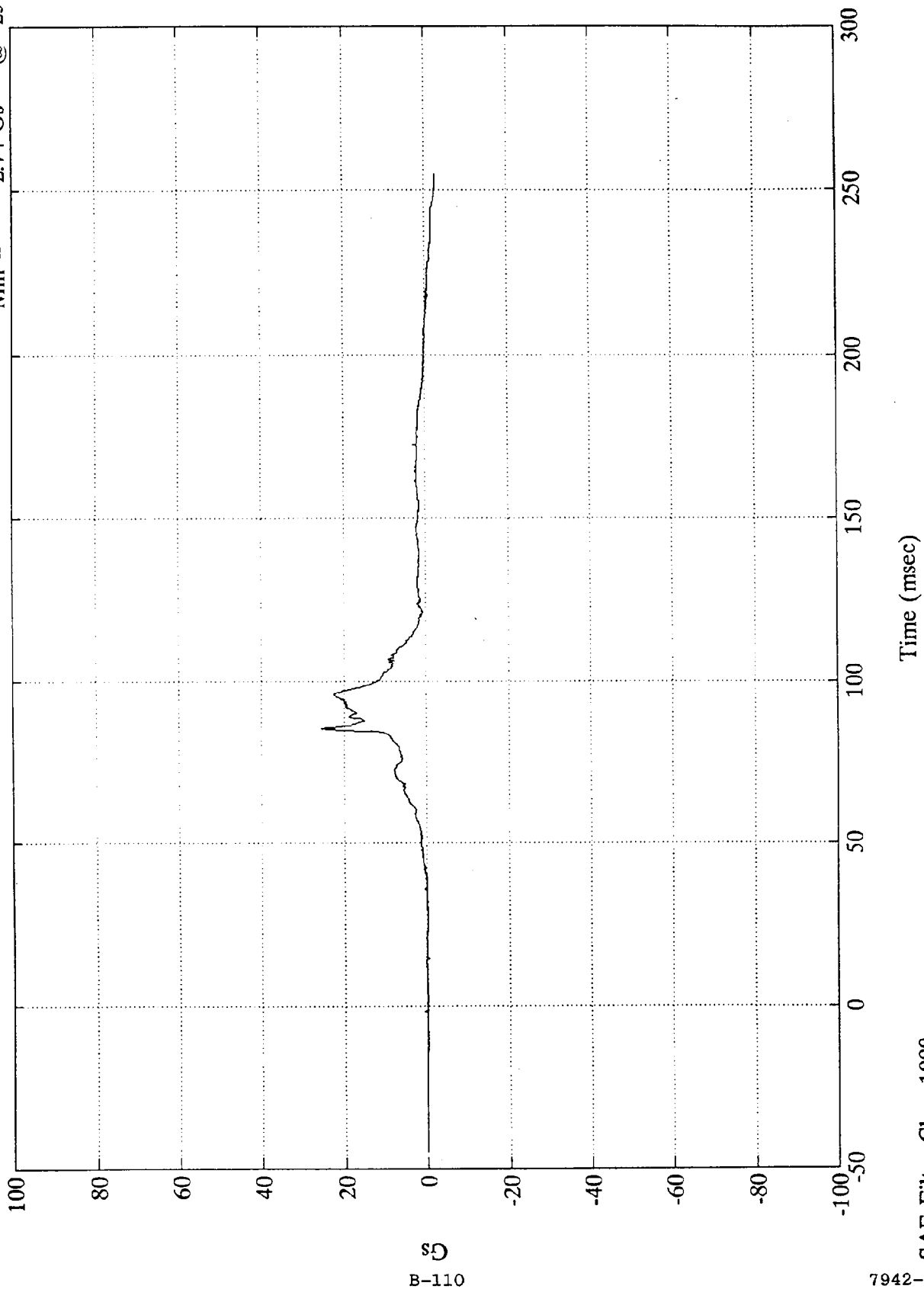
7942-5

SAE Filter Class 1000

VTV TEST 5

Veh.2-Pos.1 Head Y

Max =	25.61 Gs	@	85.44 msec
Min =	-2.74 Gs	@	254.88 msec



B-110

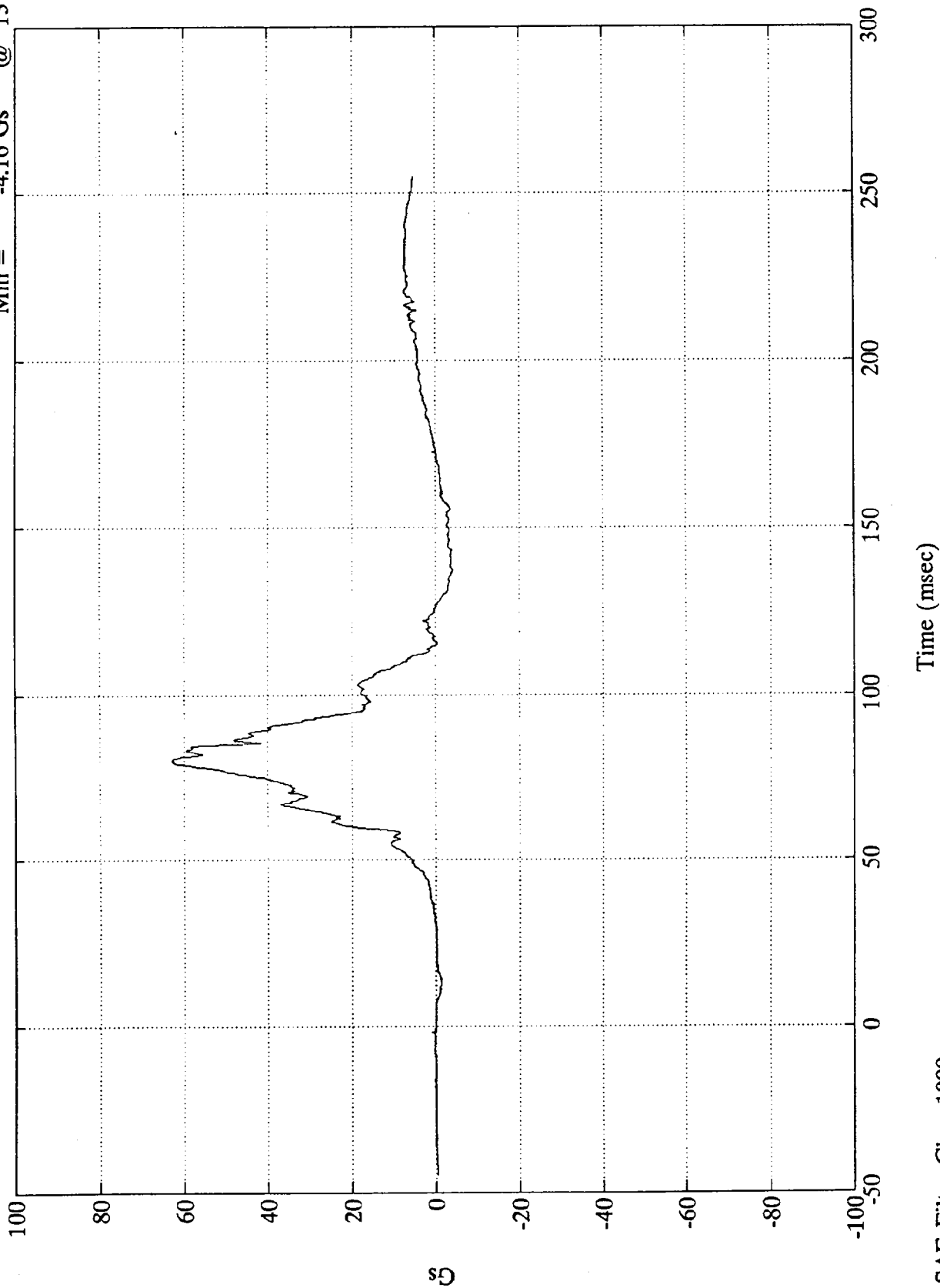
7942-5

SAE Filter Class 1000

VTV TEST 5

Max = 62.74 Gs @ 80.63 msec
Min = -4.16 Gs @ 137.16 msec

Veh.2-Pos.1 Head Z

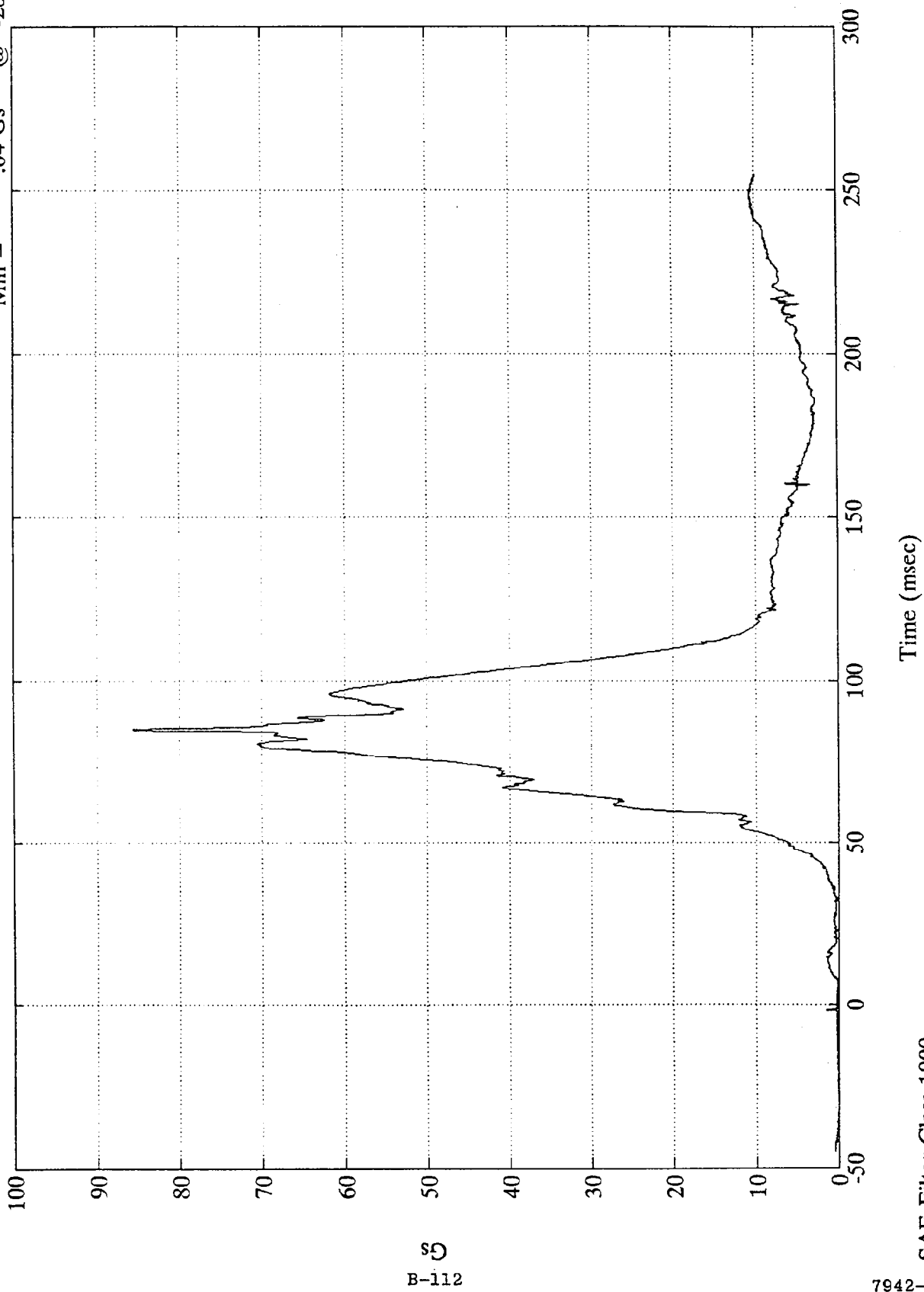


B-111

VTV TEST 5

Veh.2-Pos.1 Head Result.

Max = 85.55 Gs @ 85.08 msec
Min = .04 Gs @ -20.52 msec



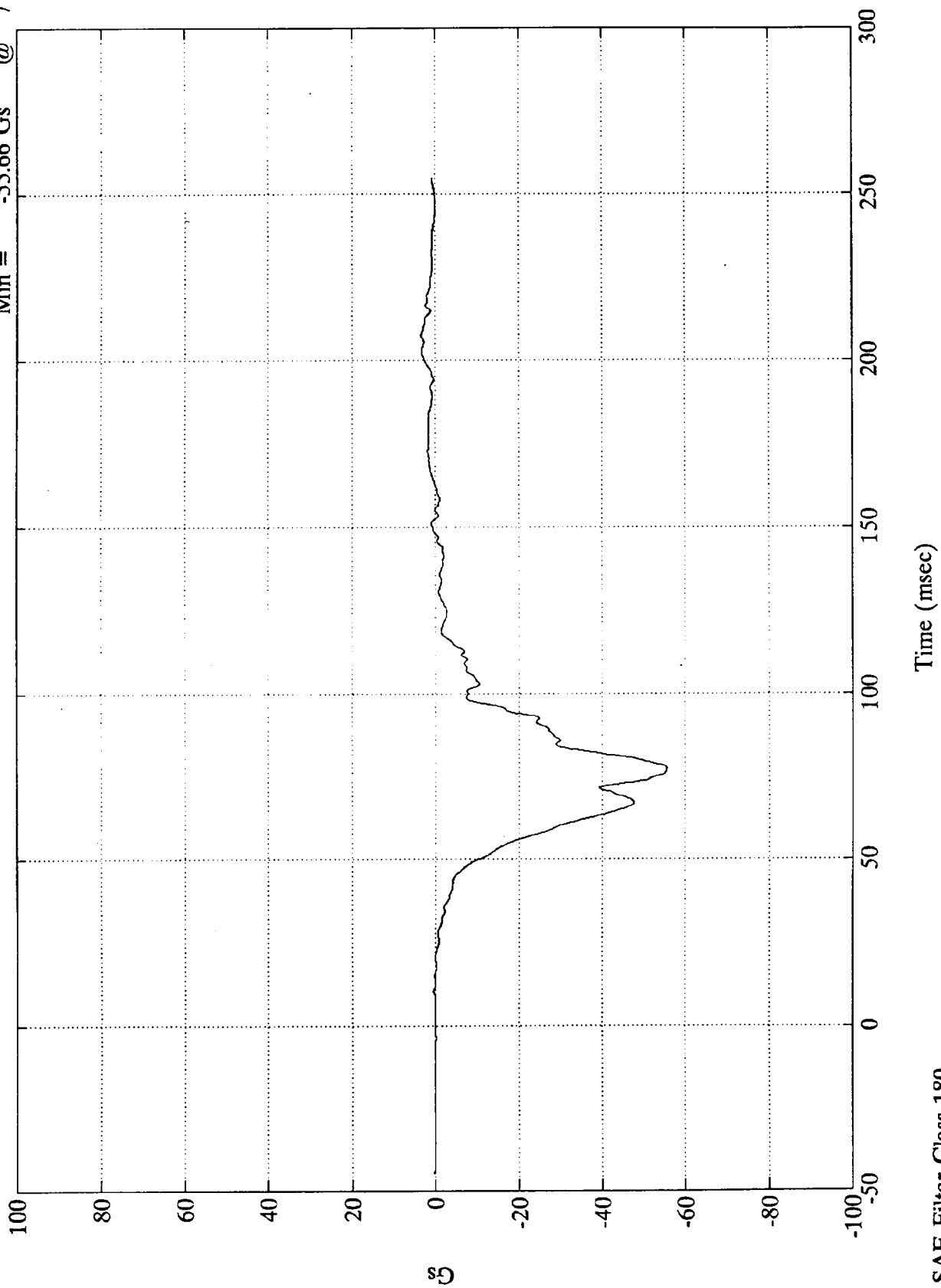
B-112

SAE Filter Class 1000

7942-5

VTV TEST 5

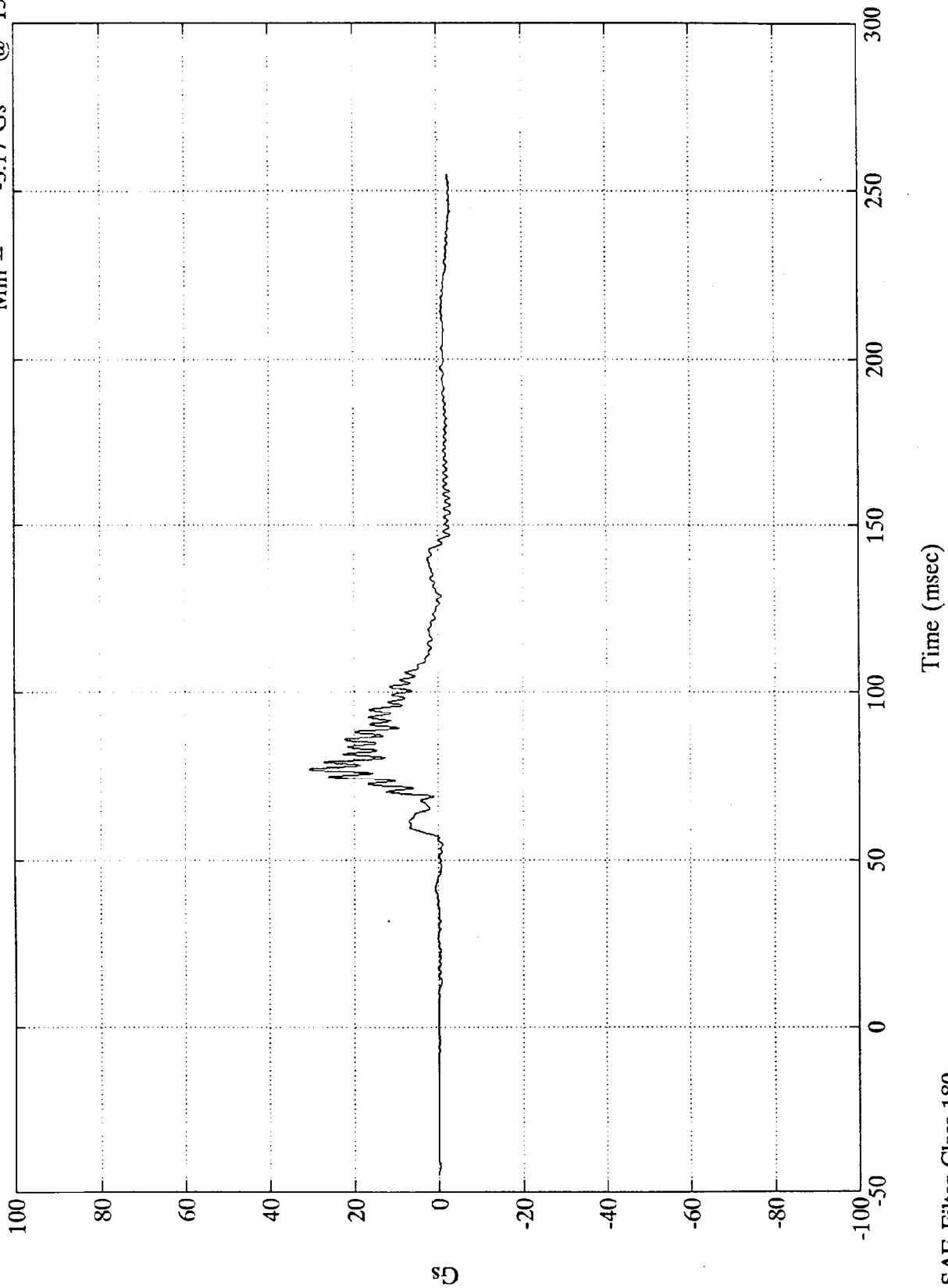
Veh.2-Pos.1 Chest X Max = 3.36 Gs @ 207.48 msec
Min = -55.66 Gs @ 77.40 msec



VTV TEST 5

Max = 30.69 Gs @ 77.27 msec
Min = -3.17 Gs @ 153.84 msec

Veh.2-Pos.1 Chest Y

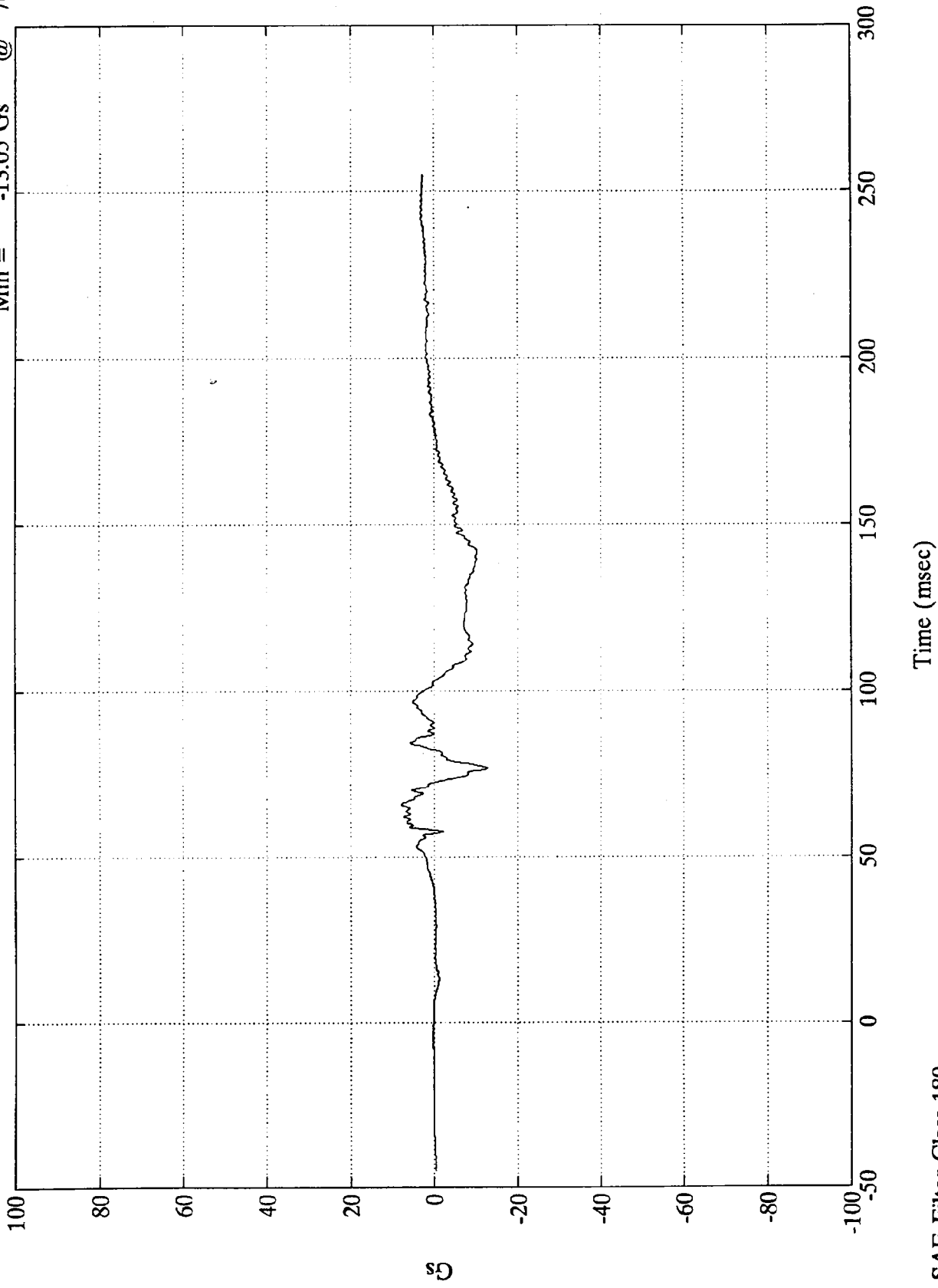


B-114

VTV TEST 5

Veh.2-Pos.1 Chest Z

Max =	7.80 Gs	@	66.00 msec
Min =	-13.05 Gs	@	76.80 msec



B-115

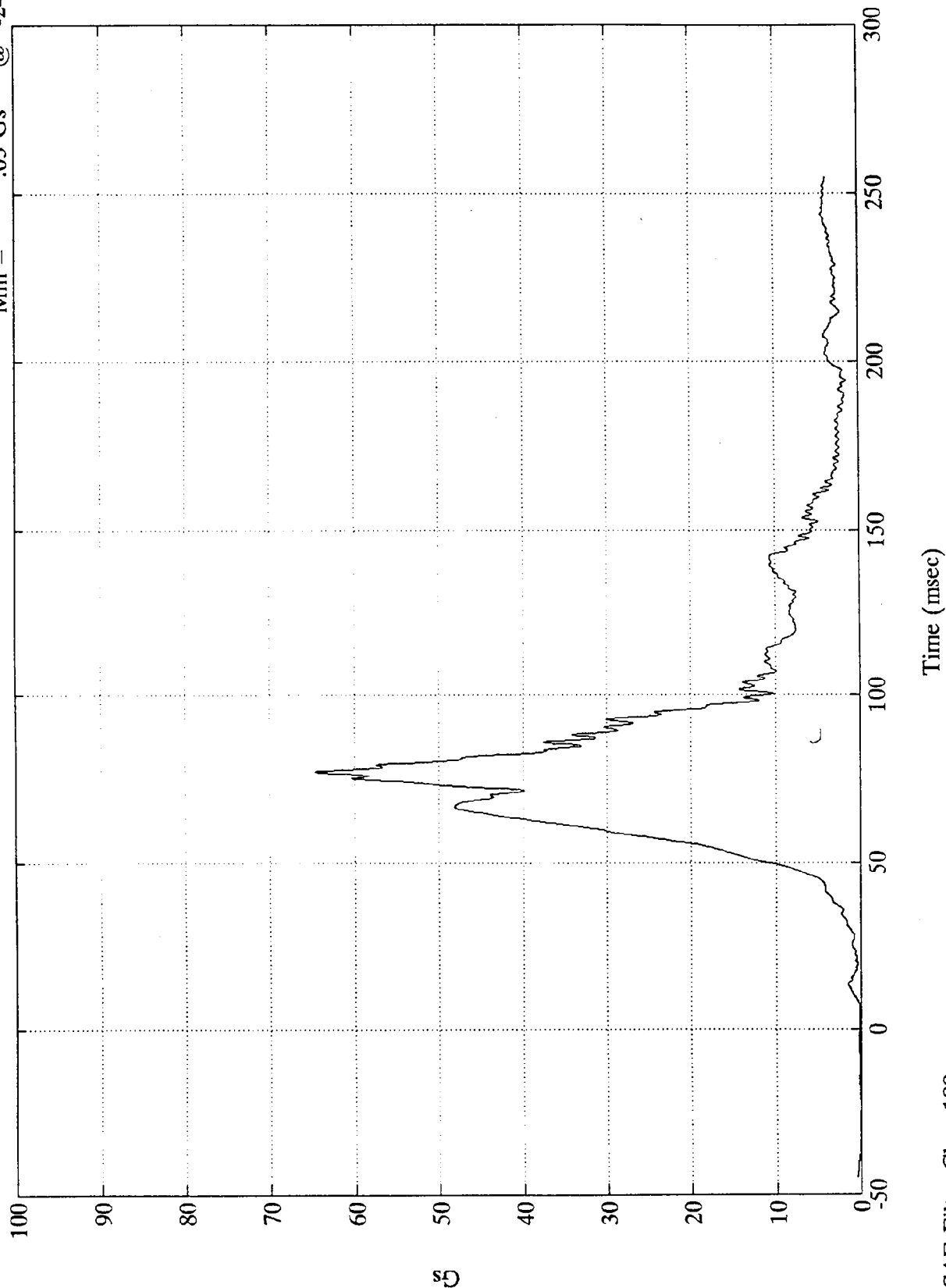
SAE Filter Class 180

7942-5

VTV TEST 5

Veh.2-Pos.1 Chest Result.

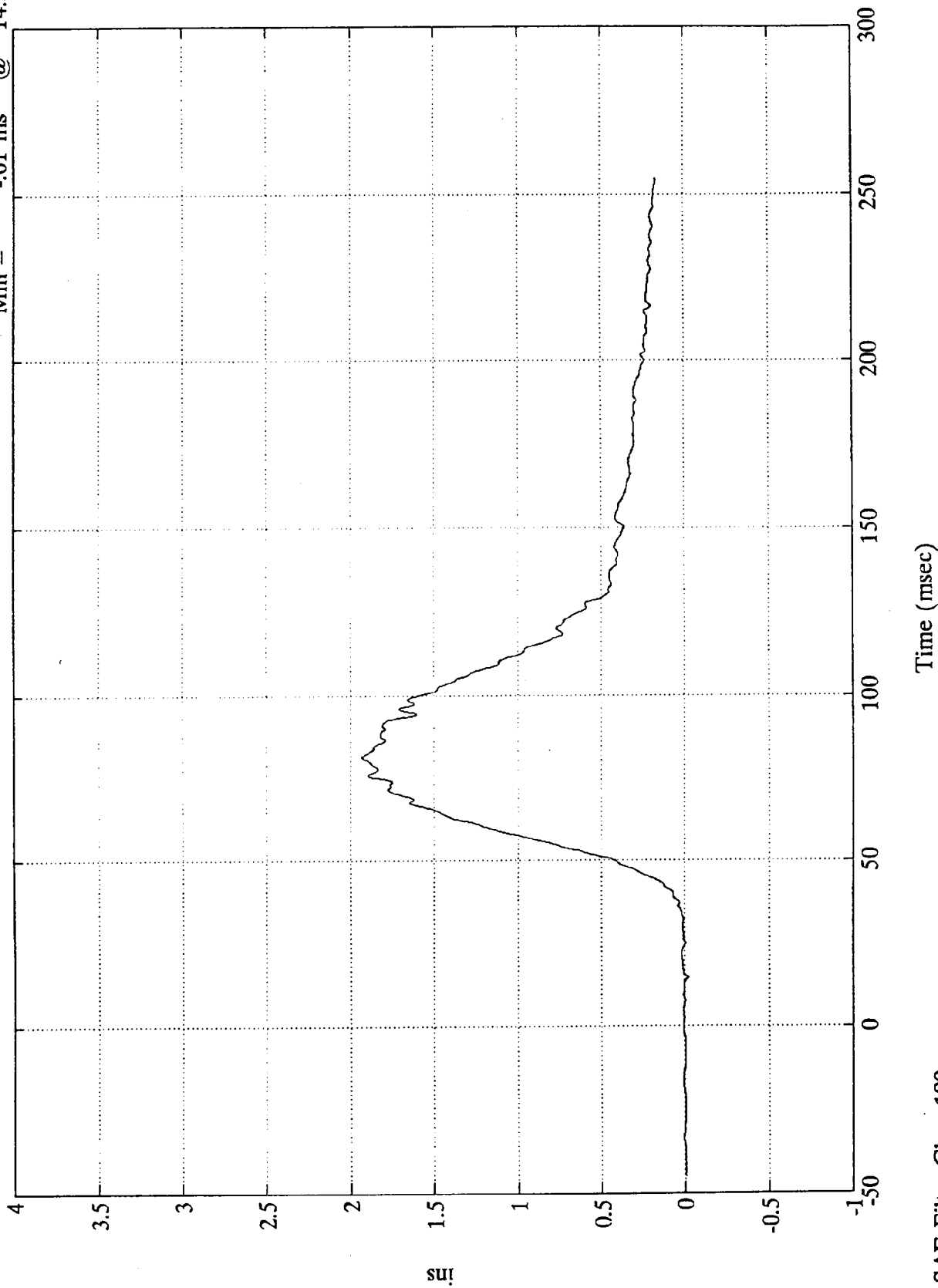
Max = 64.62 Gs @ 77.27 msec
Min = .03 Gs @ -24.00 msec



V₁TV TEST 5

Veh.2-Pos.1 Chest Displ.

Max = 1.92 ins @ 81.36 msec
Min = -.01 ins @ 14.51 msec



ins
B-117

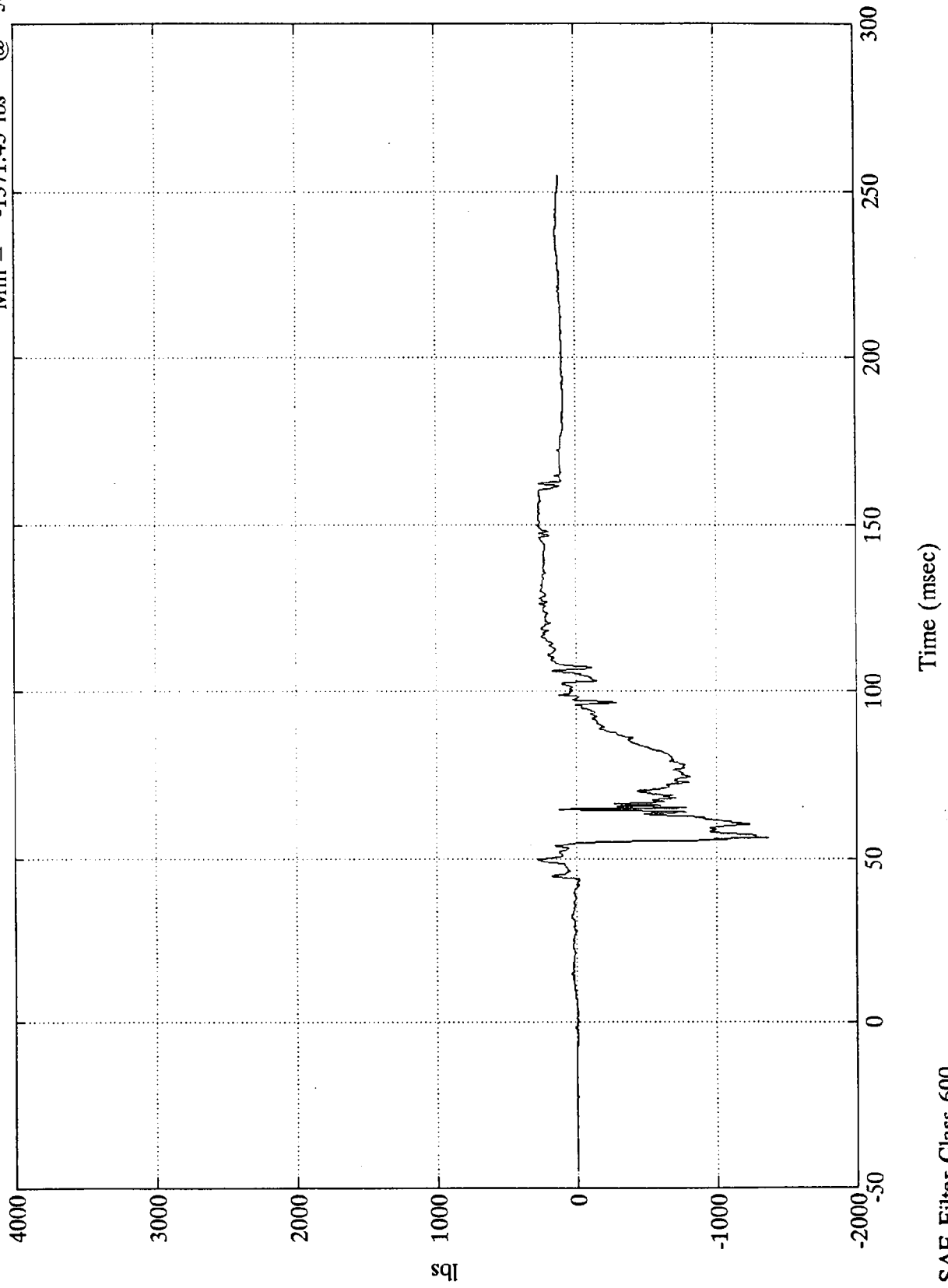
SAE Filter Class 180

7942-5

VTV TEST 5

Veh.2-Pos.1 Left Femur

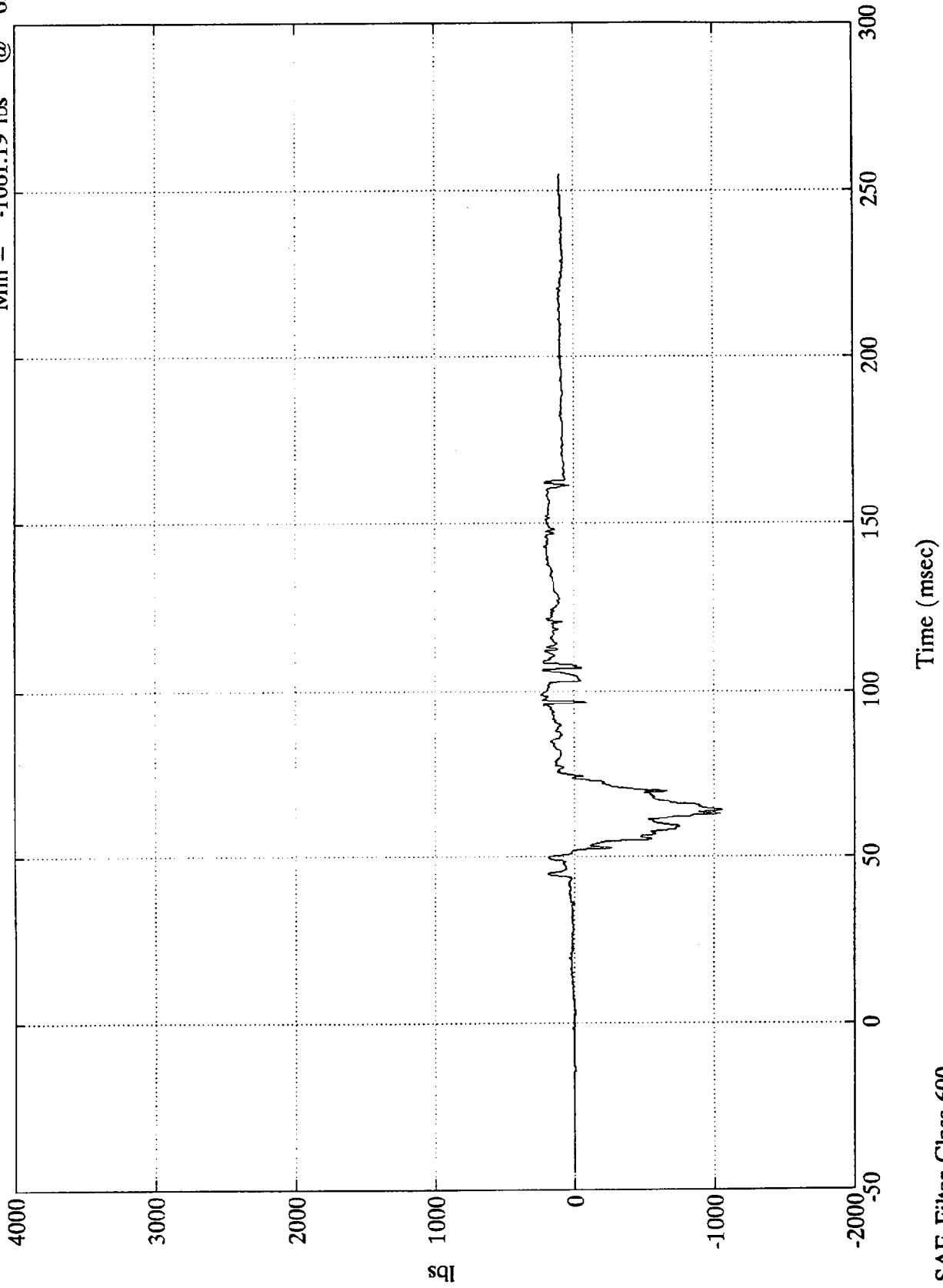
Max = 274.88 lbs @ 49.79 msec
Min = -1371.43 lbs @ 56.40 msec



VTV TEST 5

Veh.2-Pos.1 Right Femur

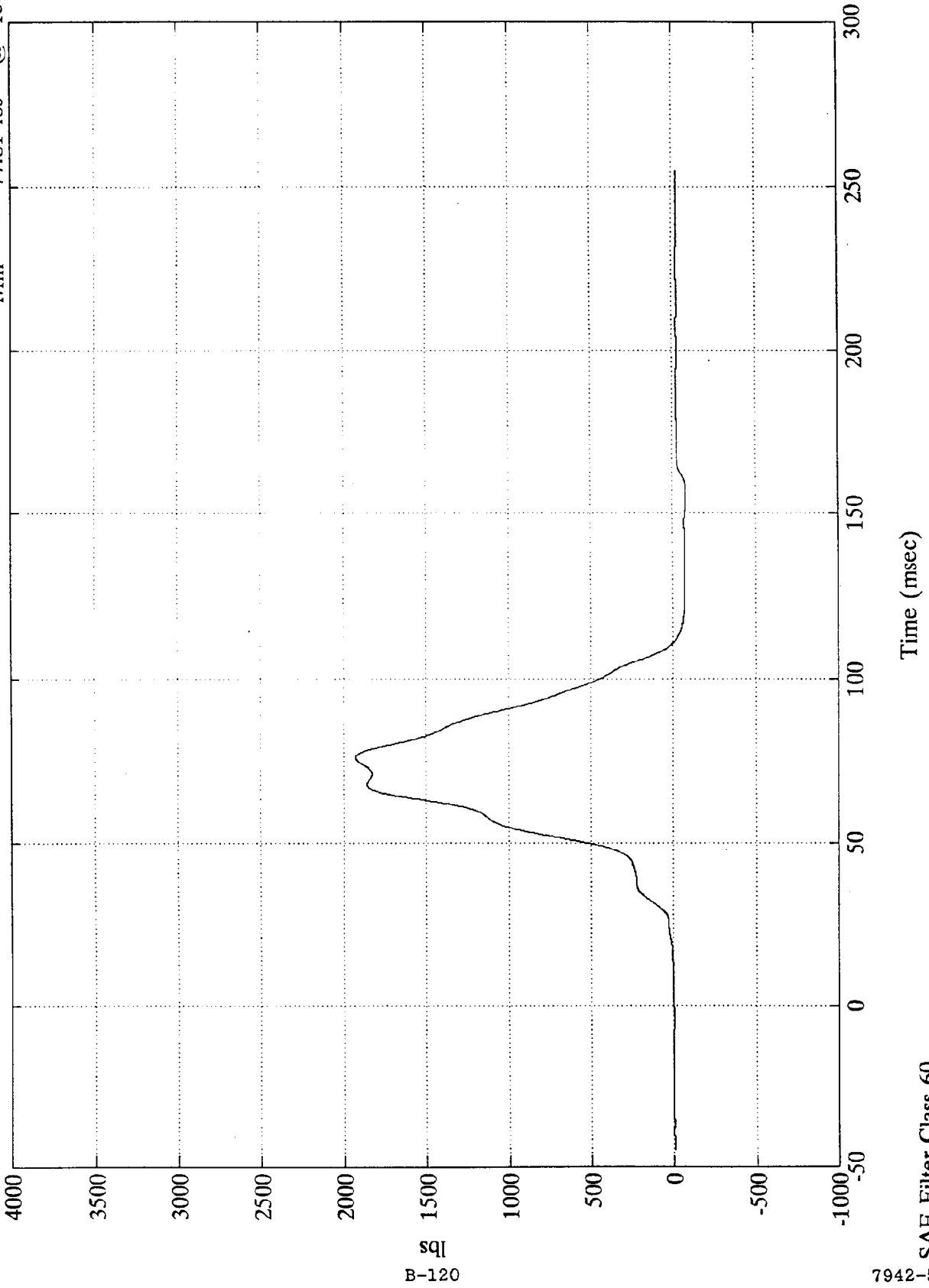
Max = 245.42 lbs @ 98.87 msec
Min = -1061.19 lbs @ 63.95 msec



VTV TEST 5

Veh. 2 Torso Belt L.C.

Max = 1927.73 lbs @ 75.84 msec
Min = -77.81 lbs @ 156.96 msec



B-120

VTV TEST 5

Veh.2-Pos.1 Upper Neck Fx

Max = 359.02 lbs @ 83.16 msec
Min = -24.01 lbs @ 252.84 msec



B-121

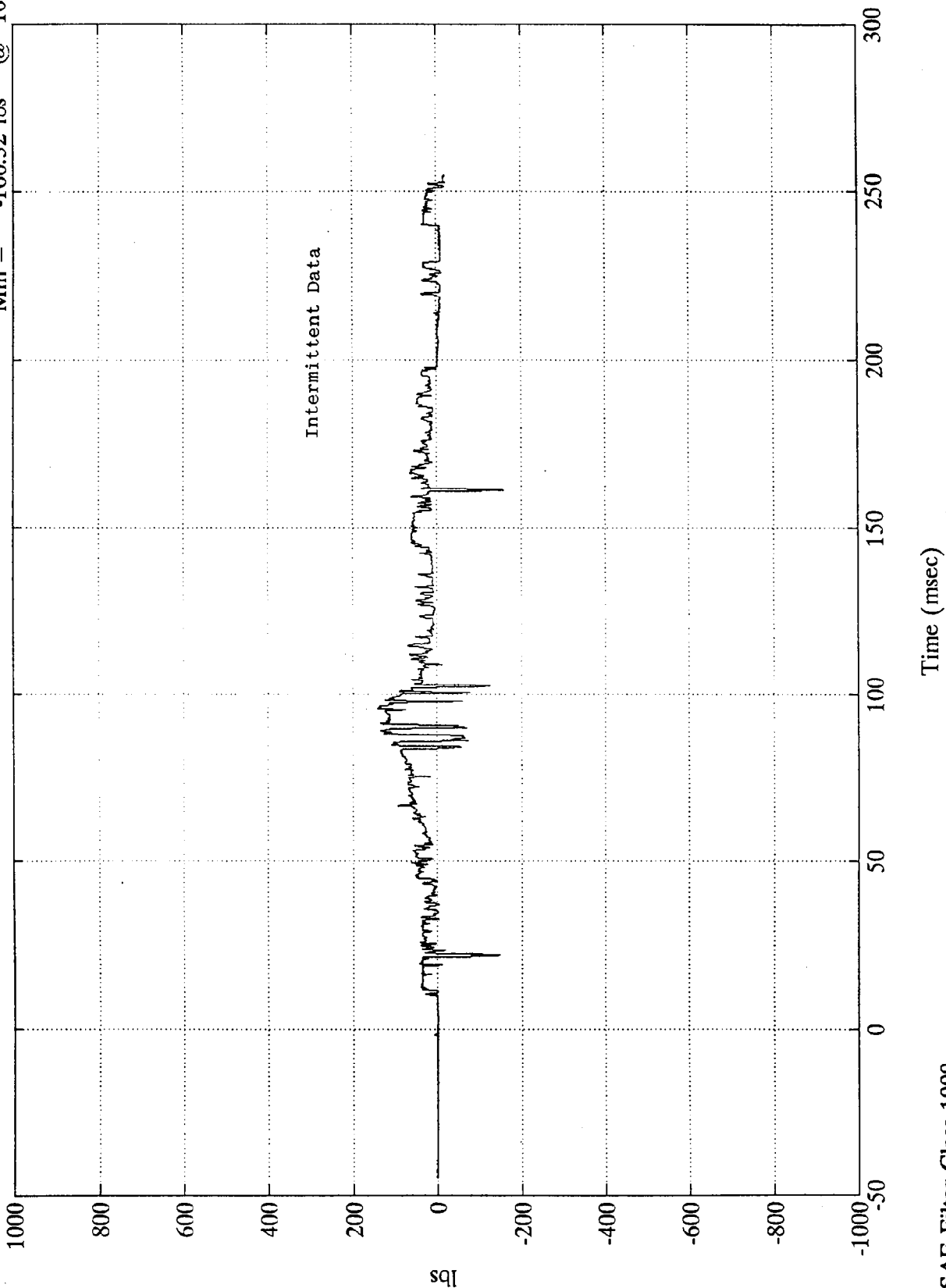
7942-5

SAE Filter Class 1000

VTV TEST 5

Veh.2-Pos.1 Upper Neck Fy

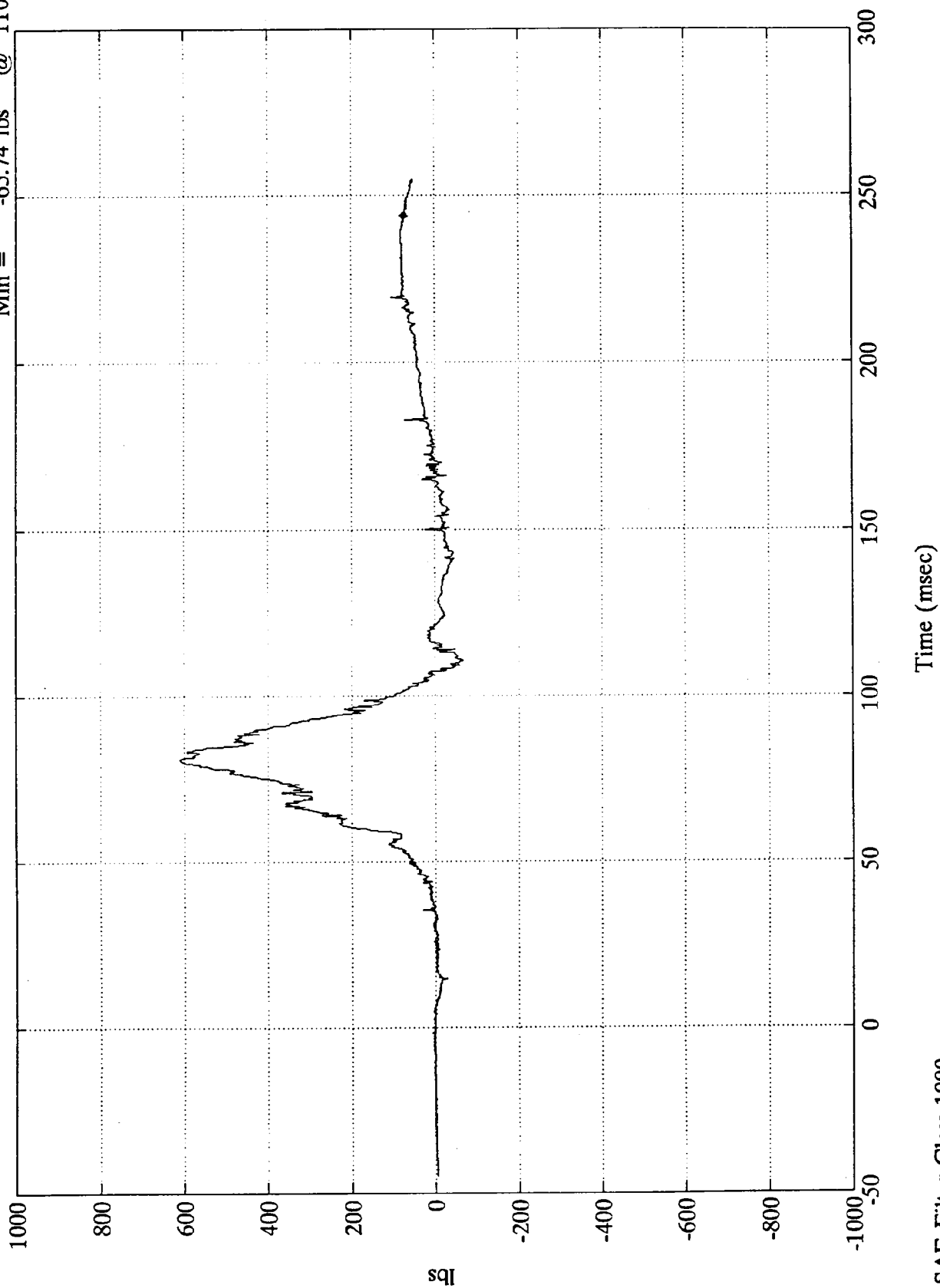
Max = 141.89 lbs @ 95.76 msec
 Min = -160.32 lbs @ 161.16 msec



VTV TEST 5

Veh.2-Pos.1 Upper Neck Fz

Max = 611.96 lbs @ 80.88 msec
Min = -65.74 lbs @ 110.76 msec



B-123

7942-5

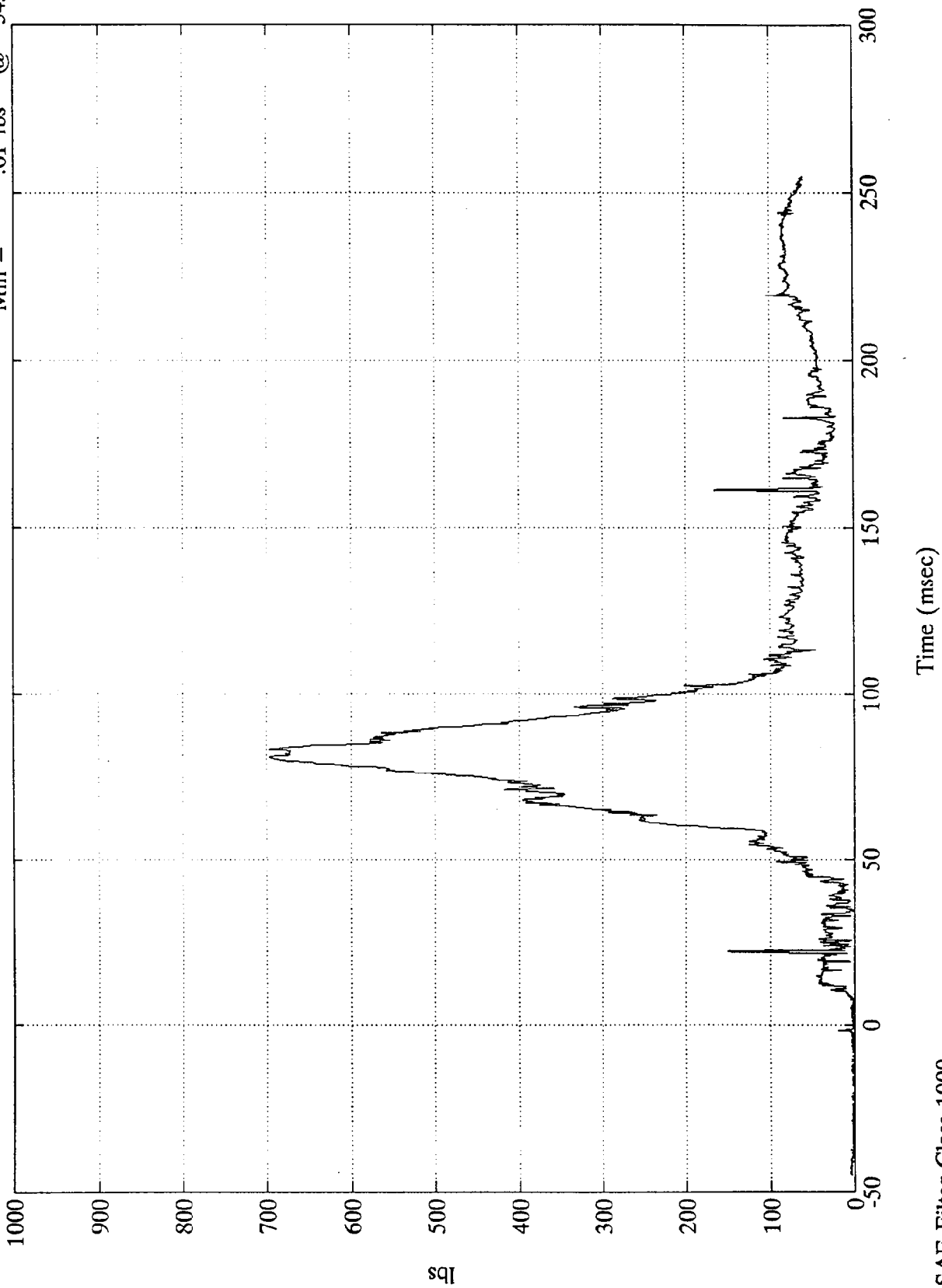
SAE Filter Class 1000

VTV TEST 5

Veh.2-Pos.1 Neck Force Re

Max = 697.30 lbs @ 83.28 msec

Min = .61 lbs @ 34.55 msec



B-124

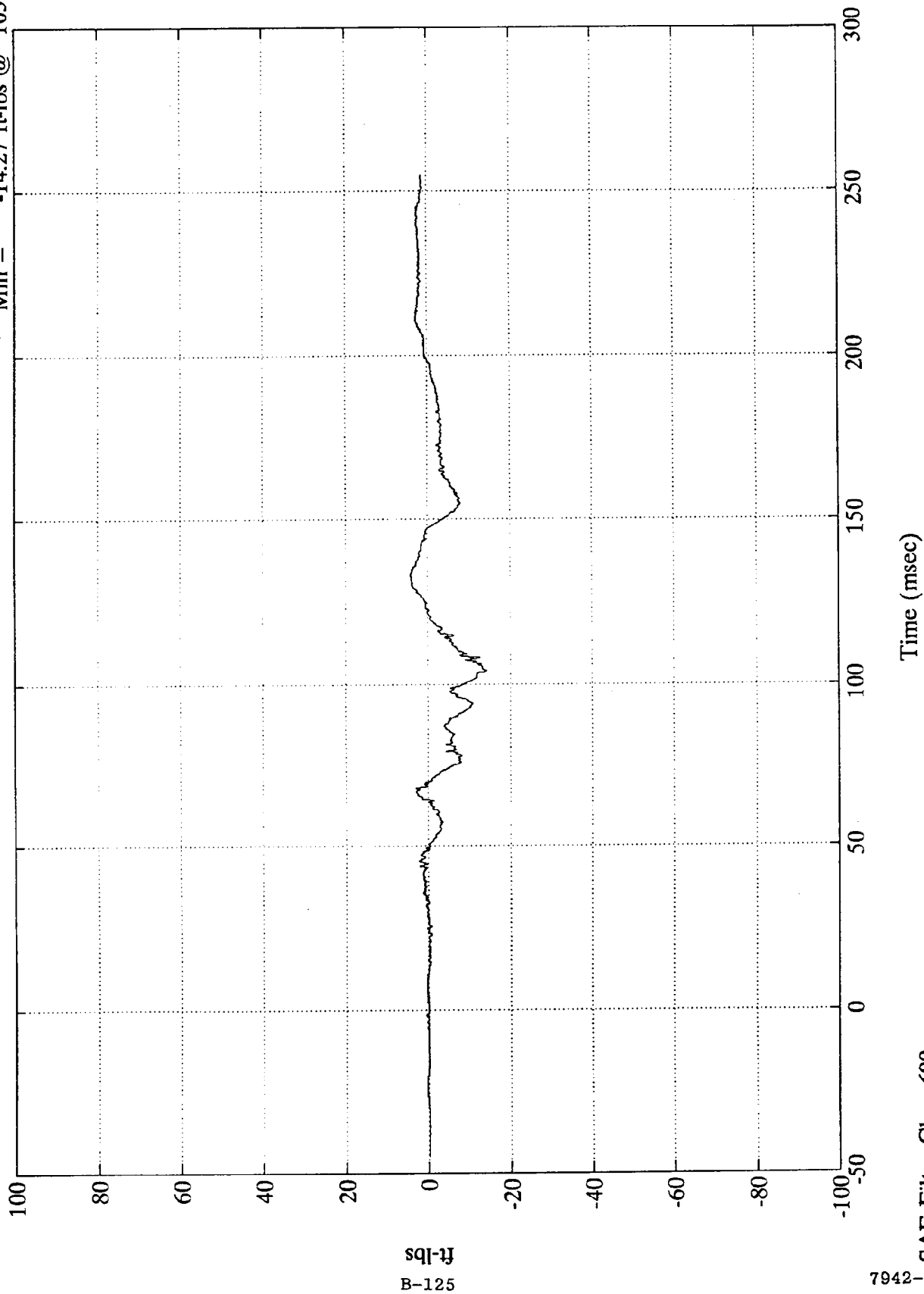
7942-5

SAE Filter Class 1000

VTV TEST 5

Veh.2-Pos.1 Upper Neck Mx

Max = 4.14 ft-lbs @ 131.75 msec
Min = -14.27 ft-lbs @ 103.92 msec



B-125

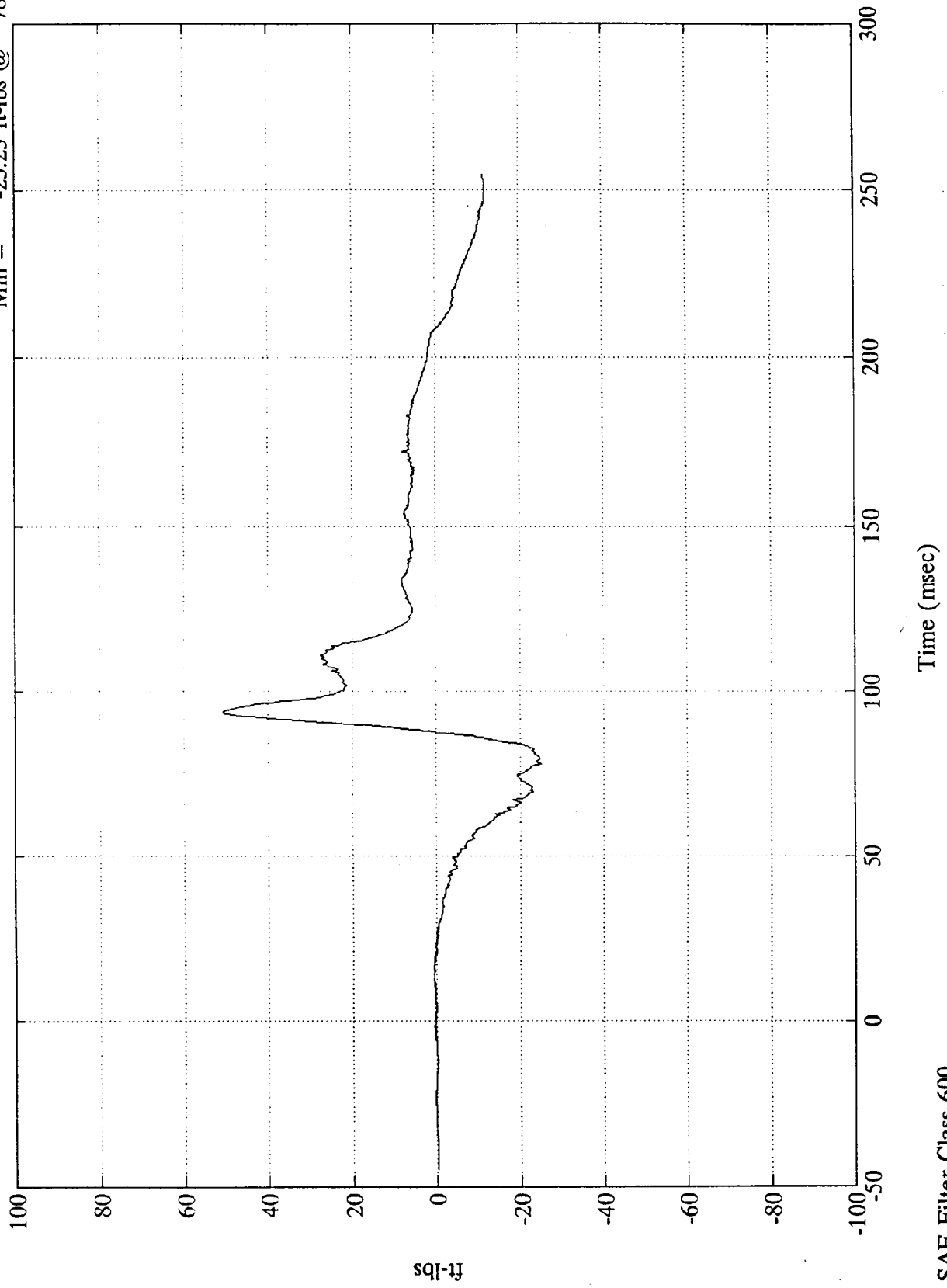
7942-5

SAE Filter Class 600

VTV TEST 5

Veh.2-Pos.1 Upper Neck My

Max = 50.69 ft-lbs @ 93.84 msec
Min = -25.23 ft-lbs @ 78.48 msec



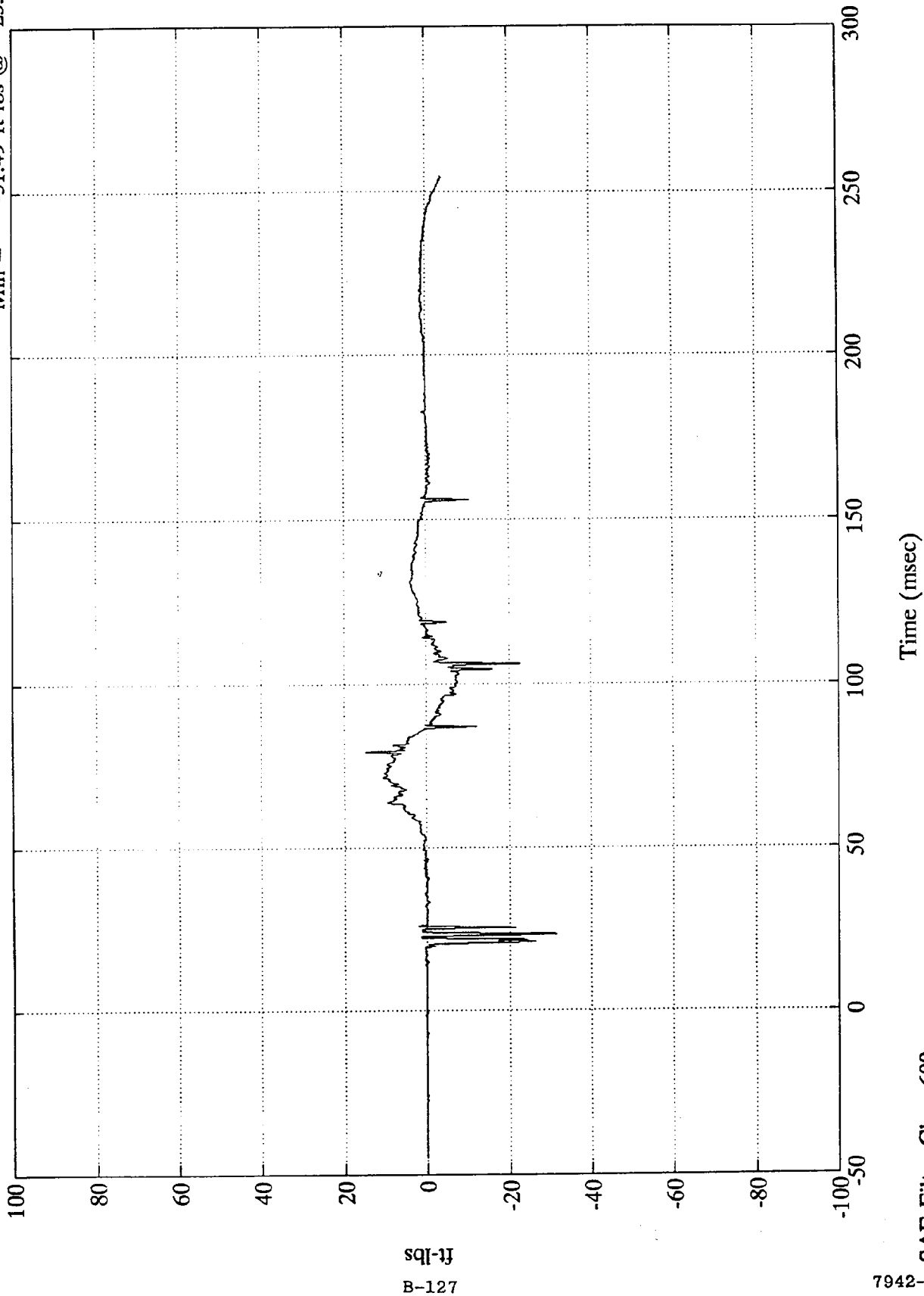
sqi-1j
B-126

SAE Filter Class 600
7942-5

VTV TEST 5

Veh.2-Pos.1 Upper Neck Mz

Max = 14.70 ft-lbs @ 79.31 msec
Min = -31.49 ft-lbs @ 23.15 msec

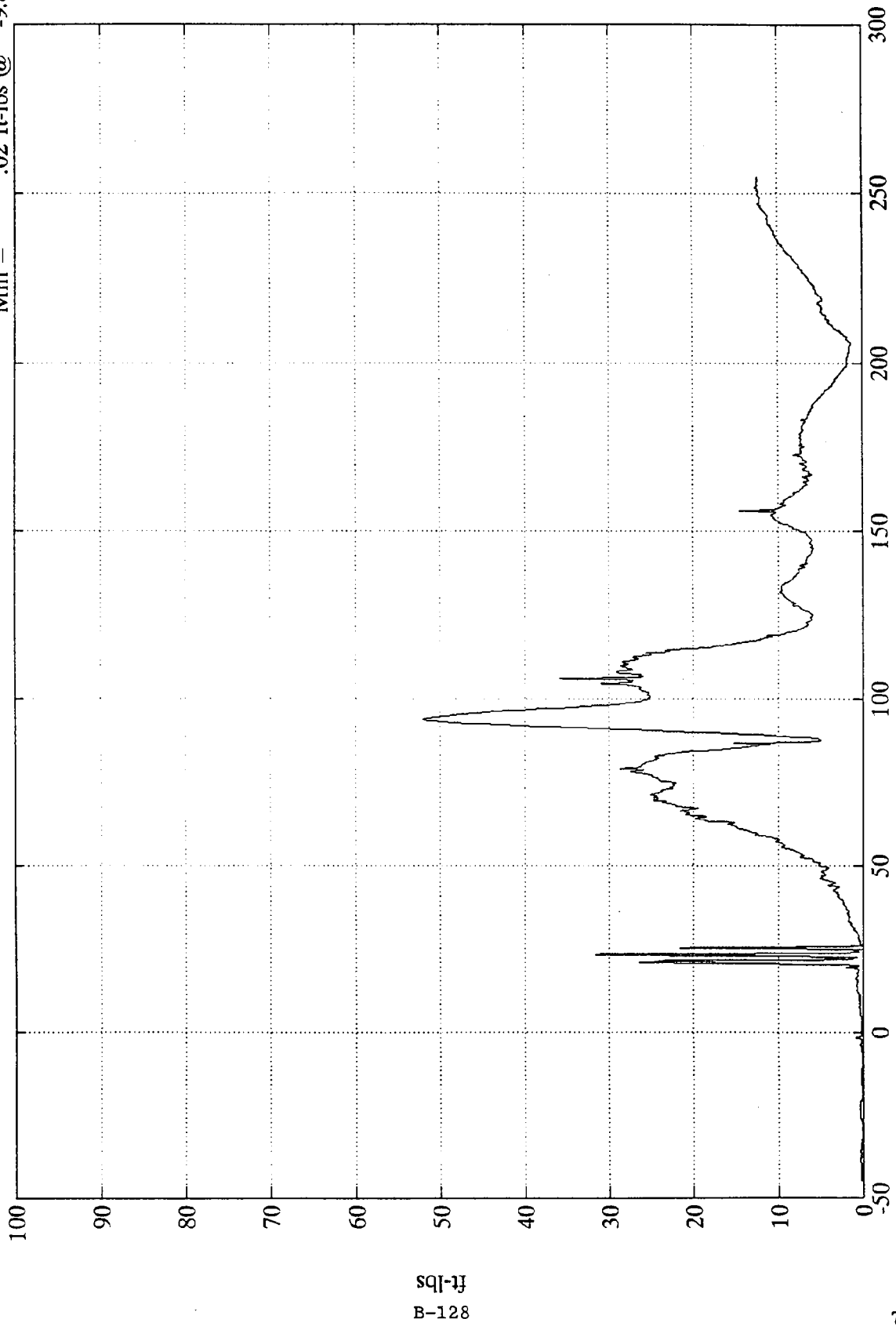


B-127
sq[1-1]

VTV TEST 5

Veh.2-Pos.1 Neck Mom. Res

Max =	51.97 ft-lbs @	93.84 msec
Min =	.02 ft-lbs @	-9.84 msec



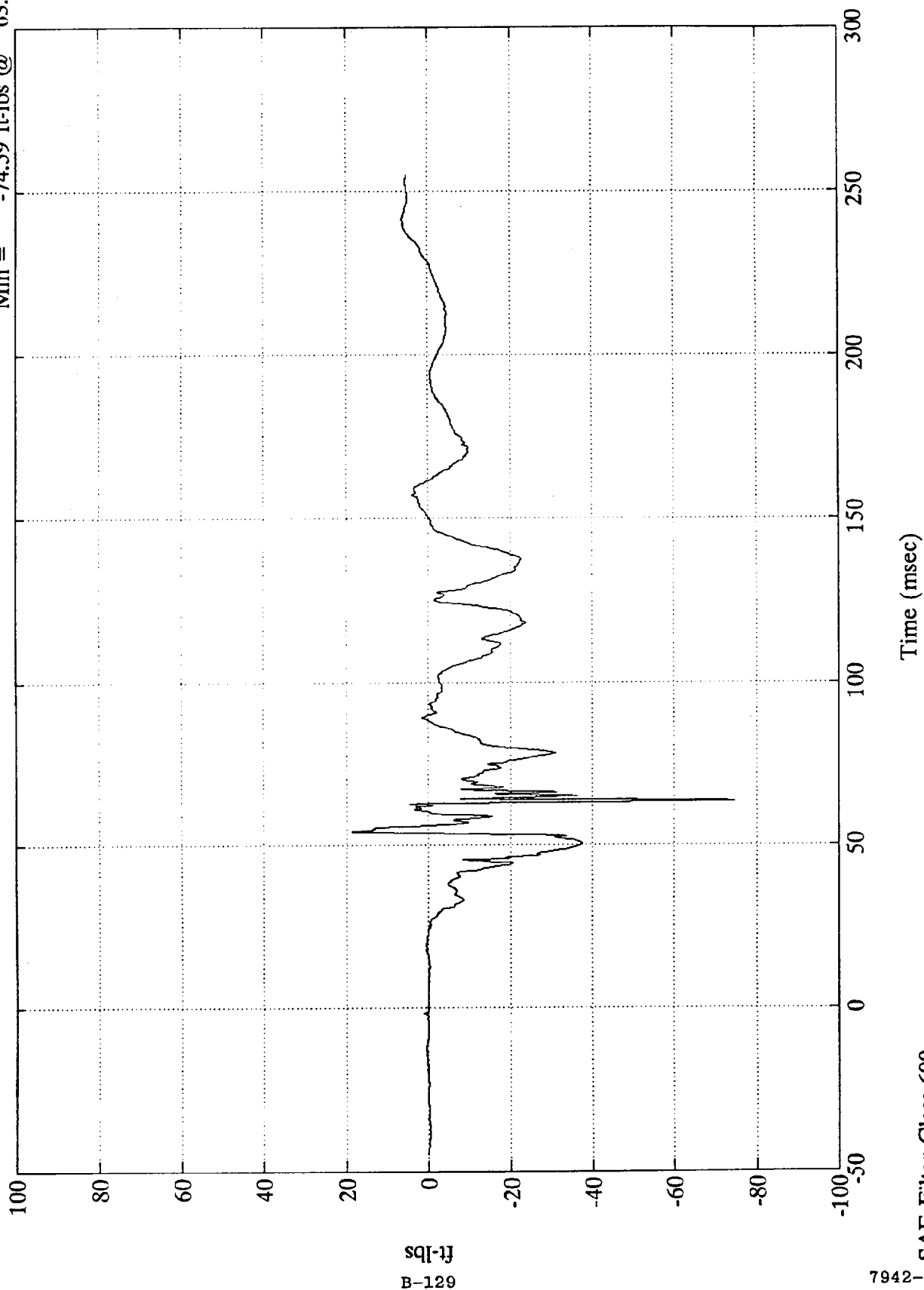
Time (msec)

SAE Filter Class 600

VTV TEST 5

Max = 18.53 ft-lbs @ 54.23 msec
Min = -74.59 ft-lbs @ 63.48 msec

Veh.2-Pos.1 Lt. U Tibia Mx



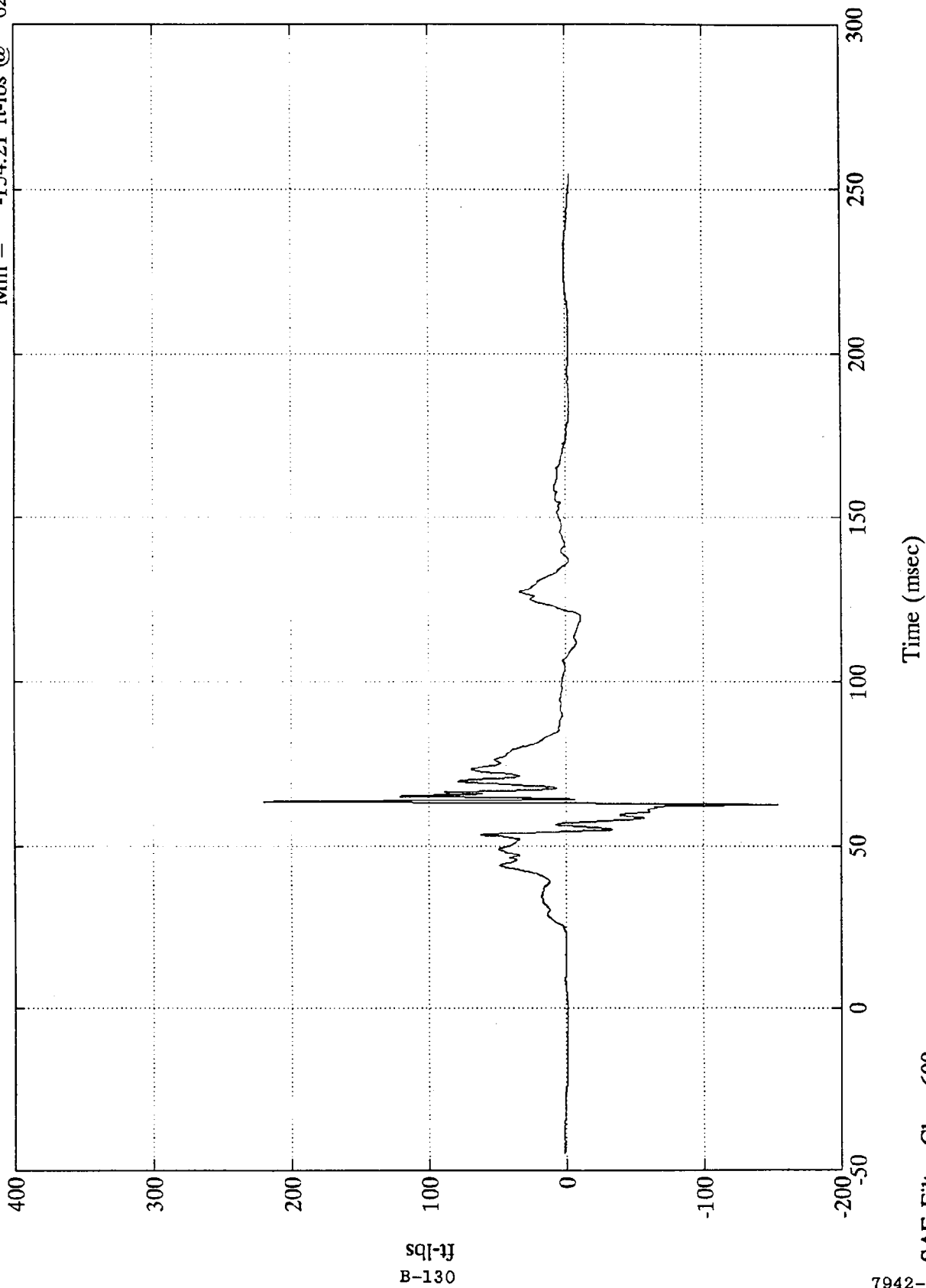
B-129
ft-lbs

7942-5

SAE Filter Class 600

VTV TEST 5

Veh.2-Pos.1 Lt U Tibia My Max = 220.14 ft-lbs @ 63.48 msec
Min = -154.21 ft-lbs @ 62.51 msec



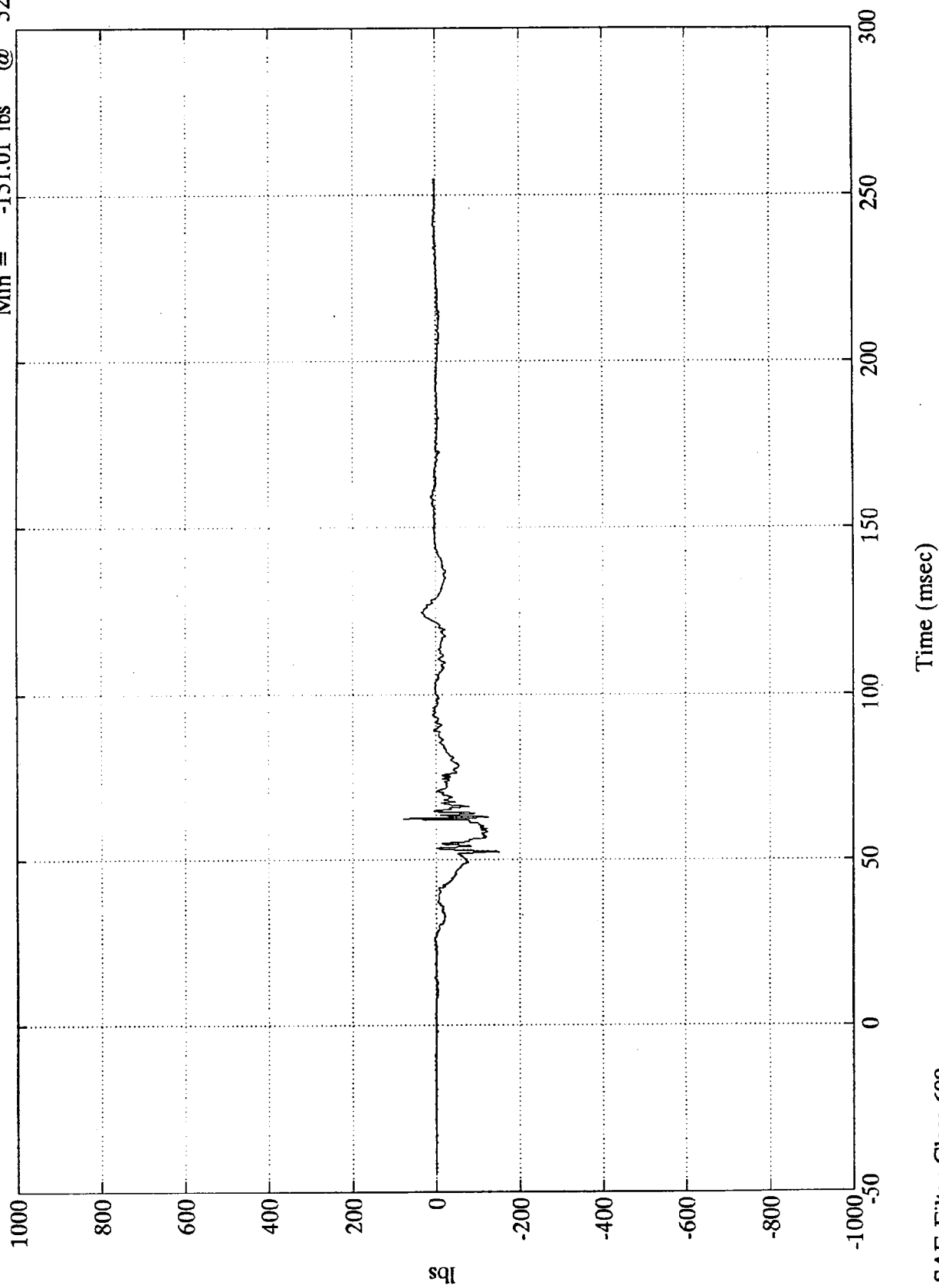
sq[-1]
B-130

SAE Filter Class 600

7942-5

VTV TEST 5

Veh.2-Pos.1 Lt L Tibia Fy
Max = 78.36 lbs @ 62.27 msec
Min = -151.01 lbs @ 52.44 msec

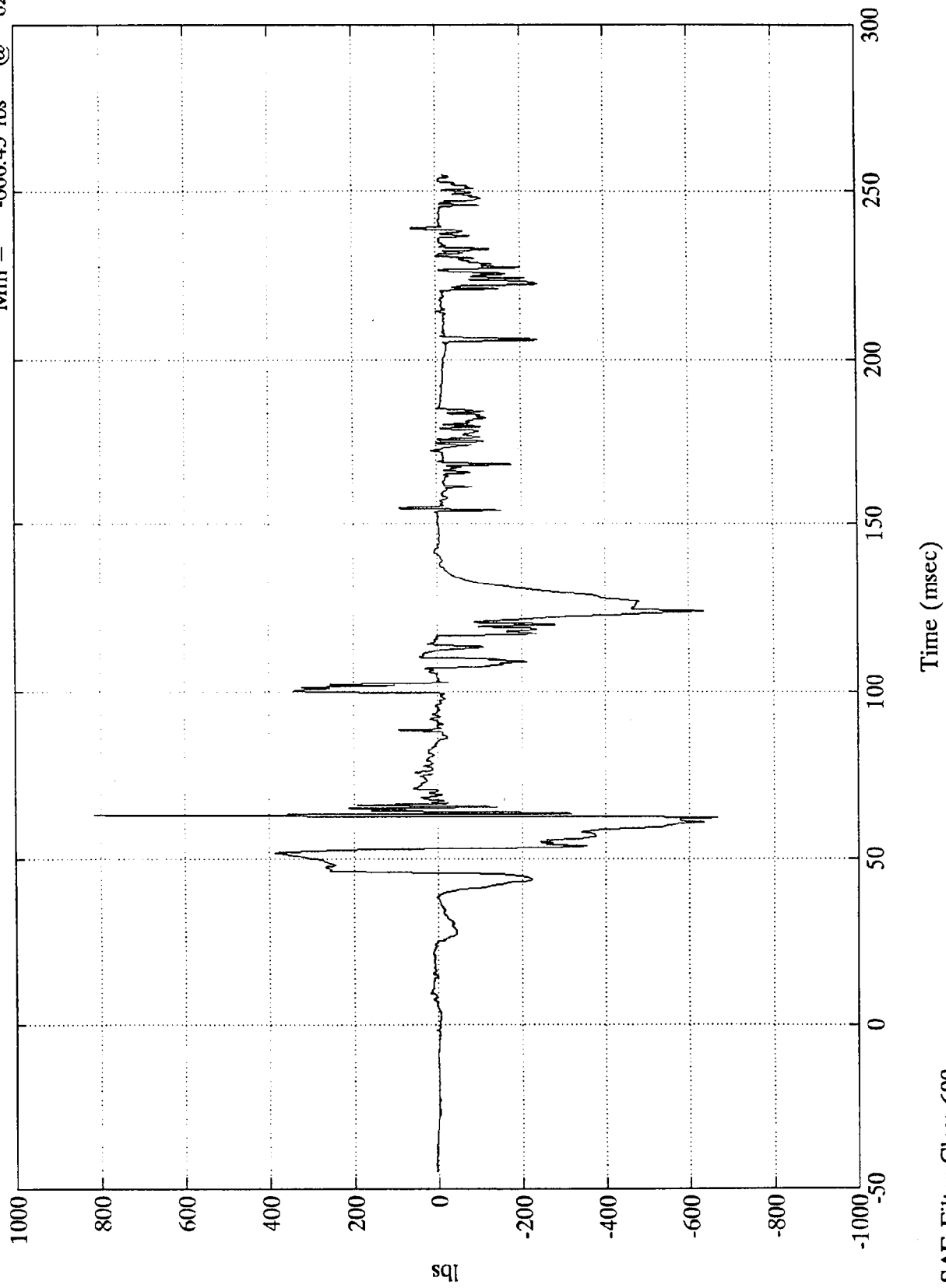


B-131

VTV TEST 5

Veh.2-Pos.1 Lt L Tibia Fz

Max = 814.12 lbs @ 63.00 msec
Min = -666.43 lbs @ 62.15 msec



B-132

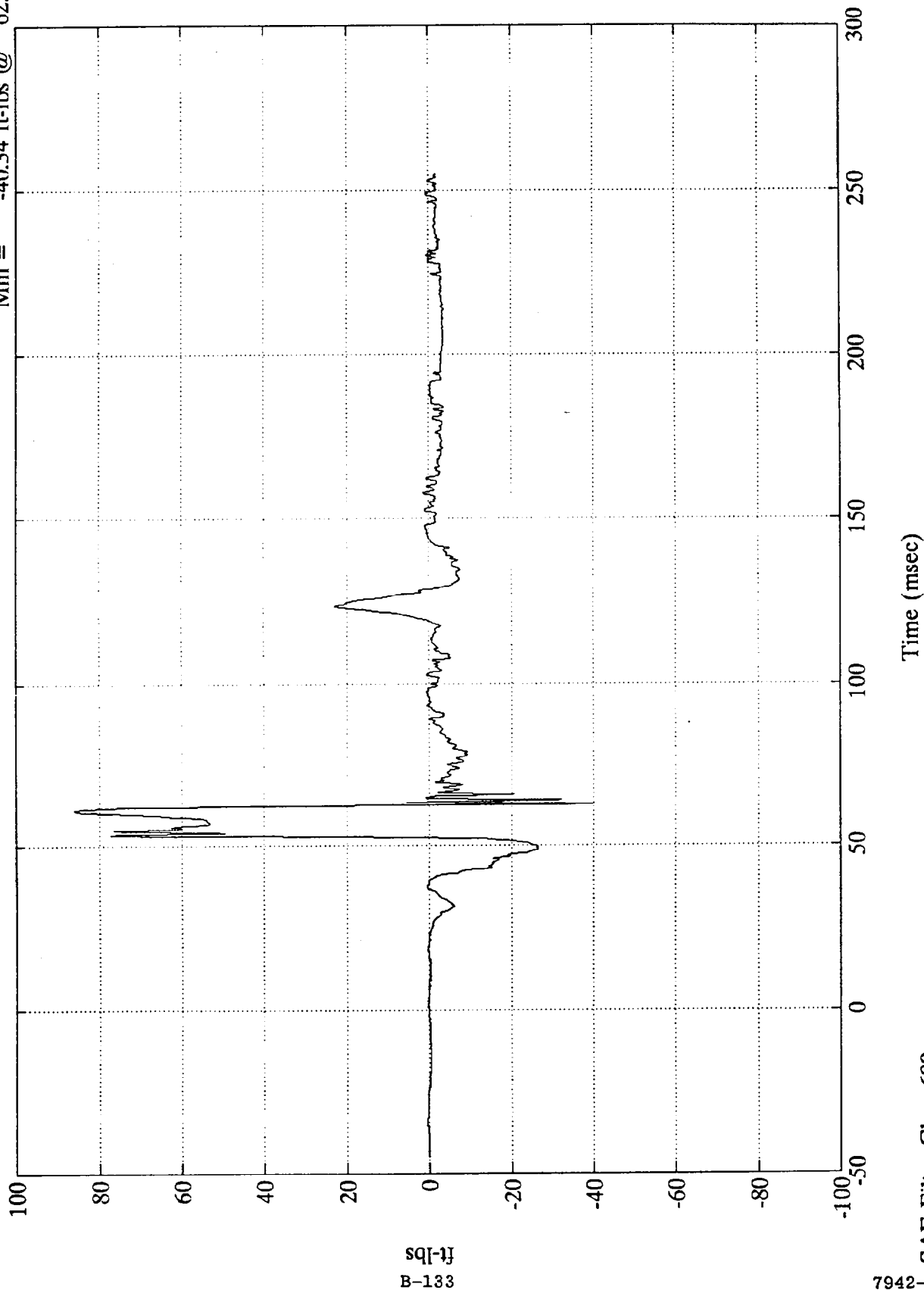
7942-5

SAE Filter Class 600

VTV TEST 5

Max = 85.96 ft-lbs @ 60.84 msec
Min = -40.34 ft-lbs @ 62.76 msec

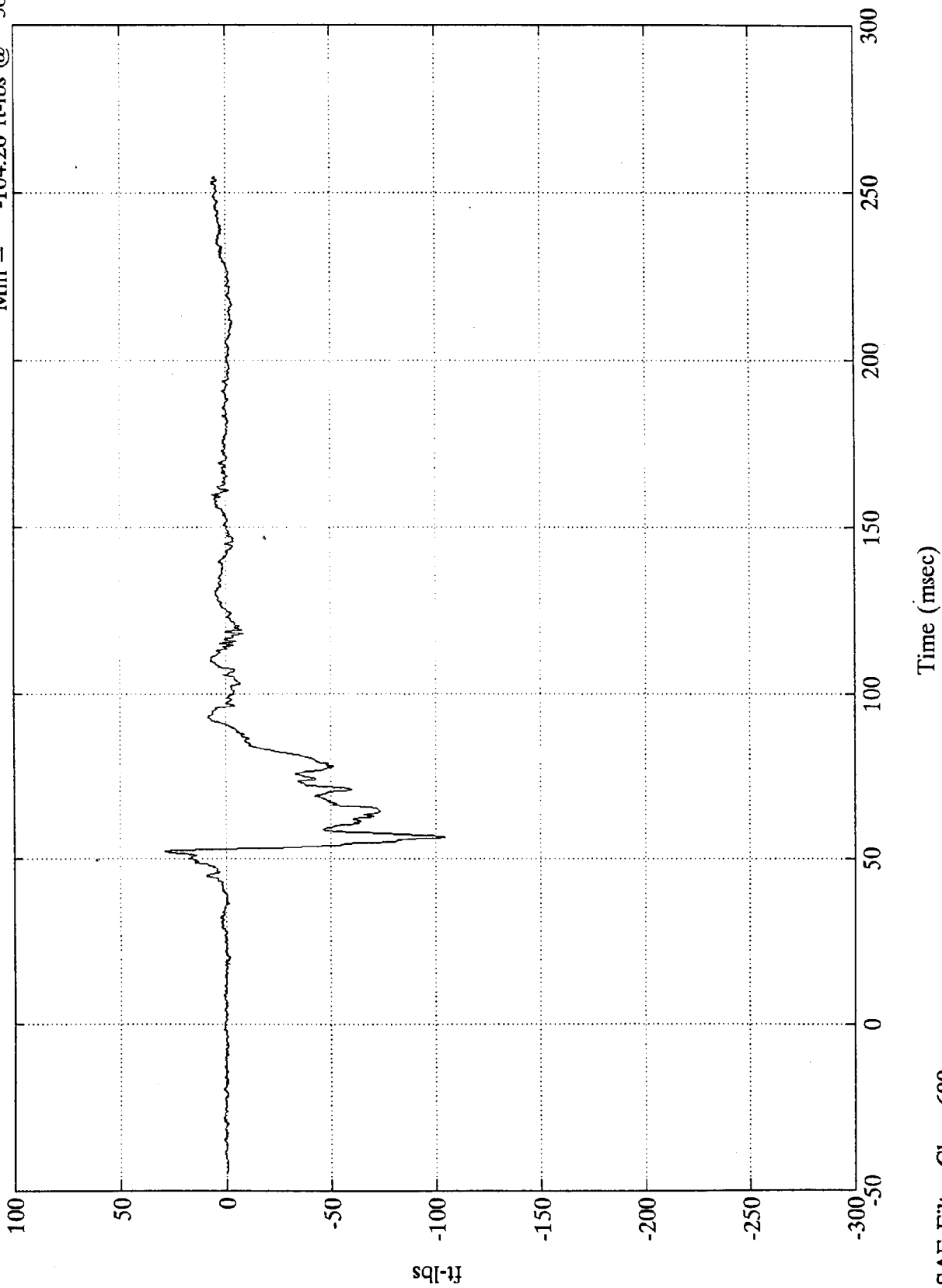
Veh.2-Pos.1 Lt L Tibia Mx



B-133

VTV TEST 5

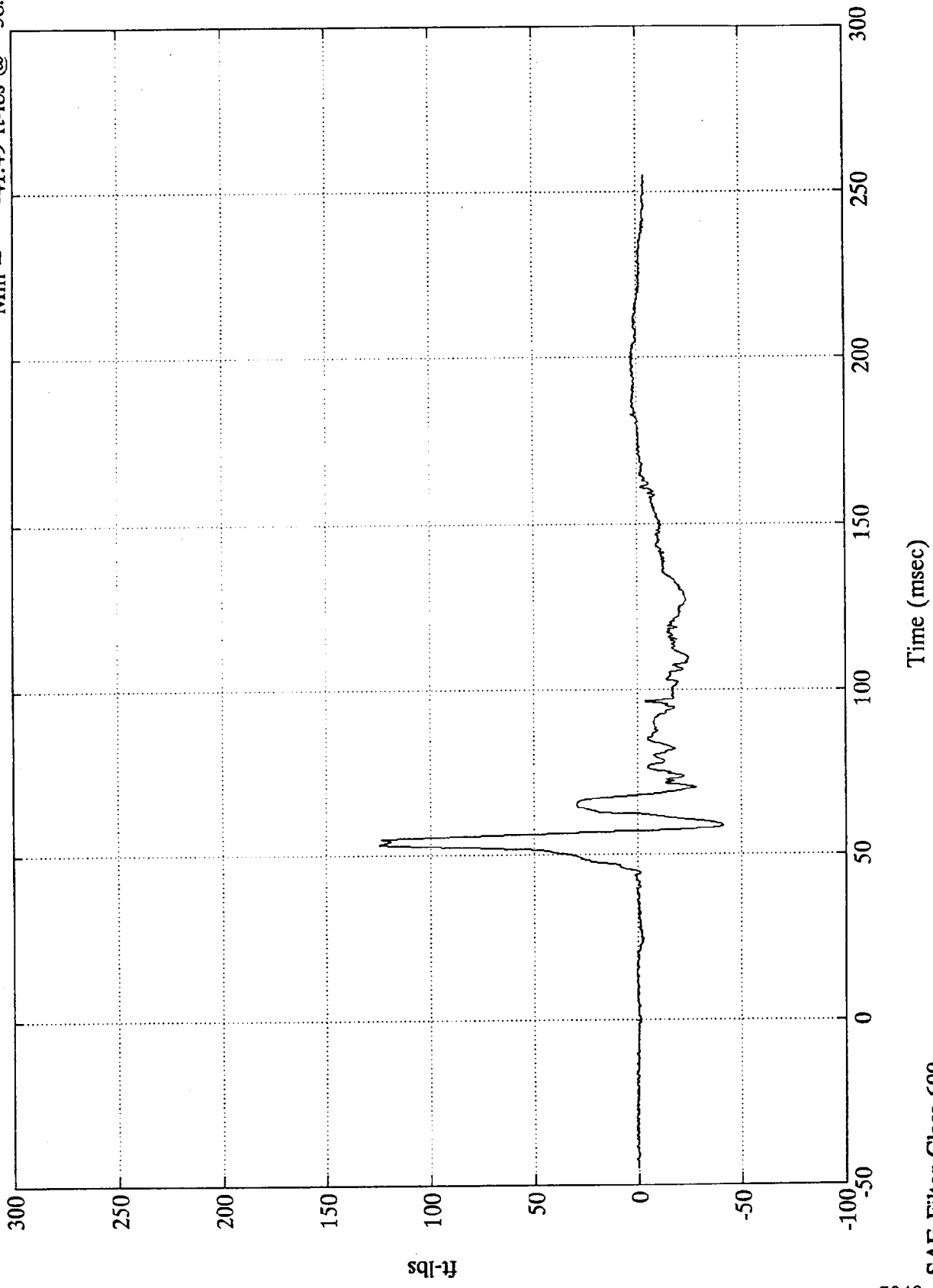
Veh.2-Pos.1 Rt U Tibia Mx
Max = 28.96 ft-lbs @ 52.31 msec
Min = -104.26 ft-lbs @ 56.63 msec



VTV TEST 5

Veh.2-Pos.1 Rt U Tibia My

Max = 124.66 ft-lbs @ 53.27 msec
Min = -41.49 ft-lbs @ 58.68 msec



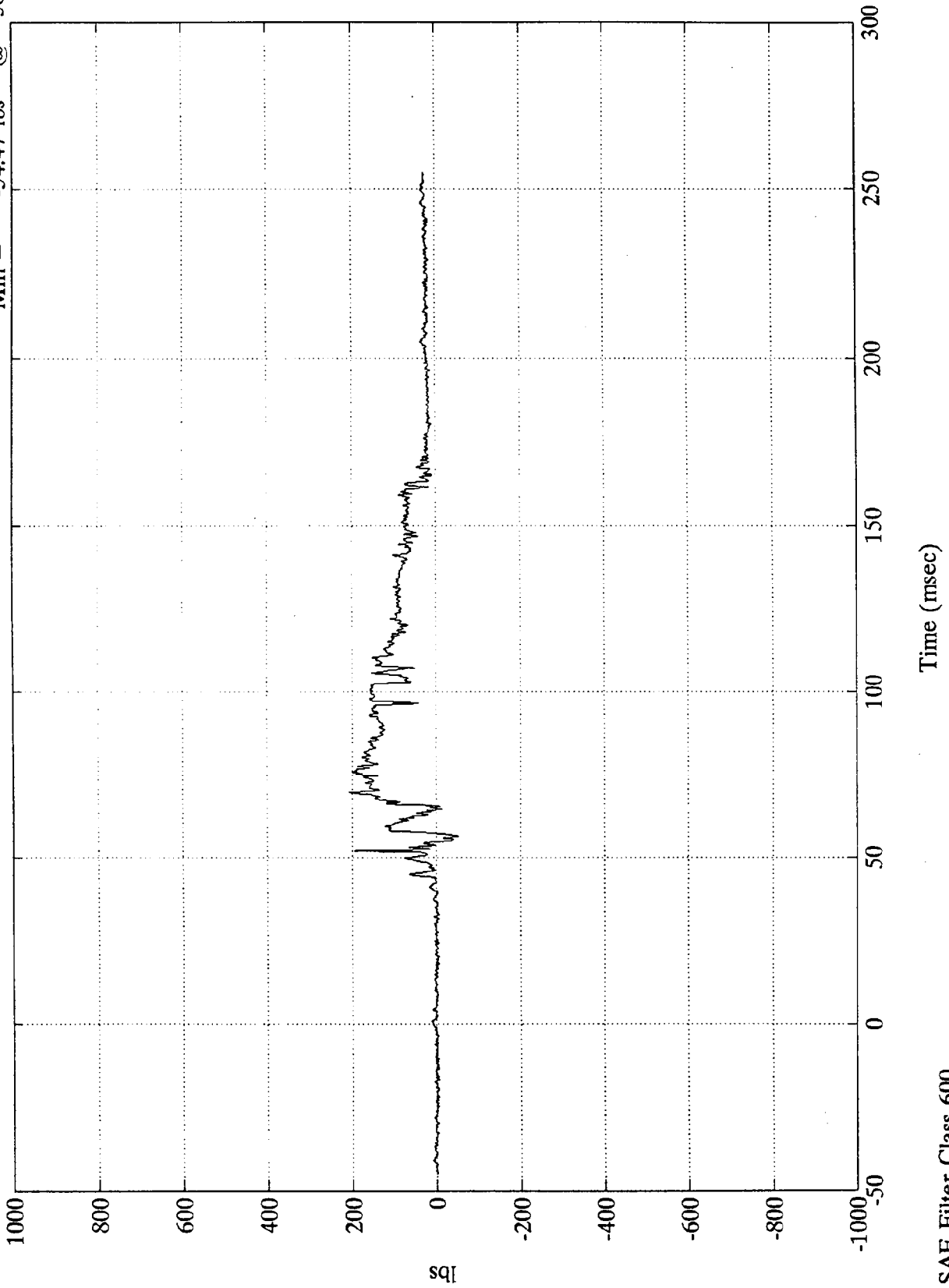
B-135

SAE Filter Class 600

7942-5

VTV TEST 5

Veh.2-Pos.1 Rt L Tibia Fy Max = 206.03 lbs @ 69.48 msec
Min = -54.47 lbs @ 56.40 msec



B-136

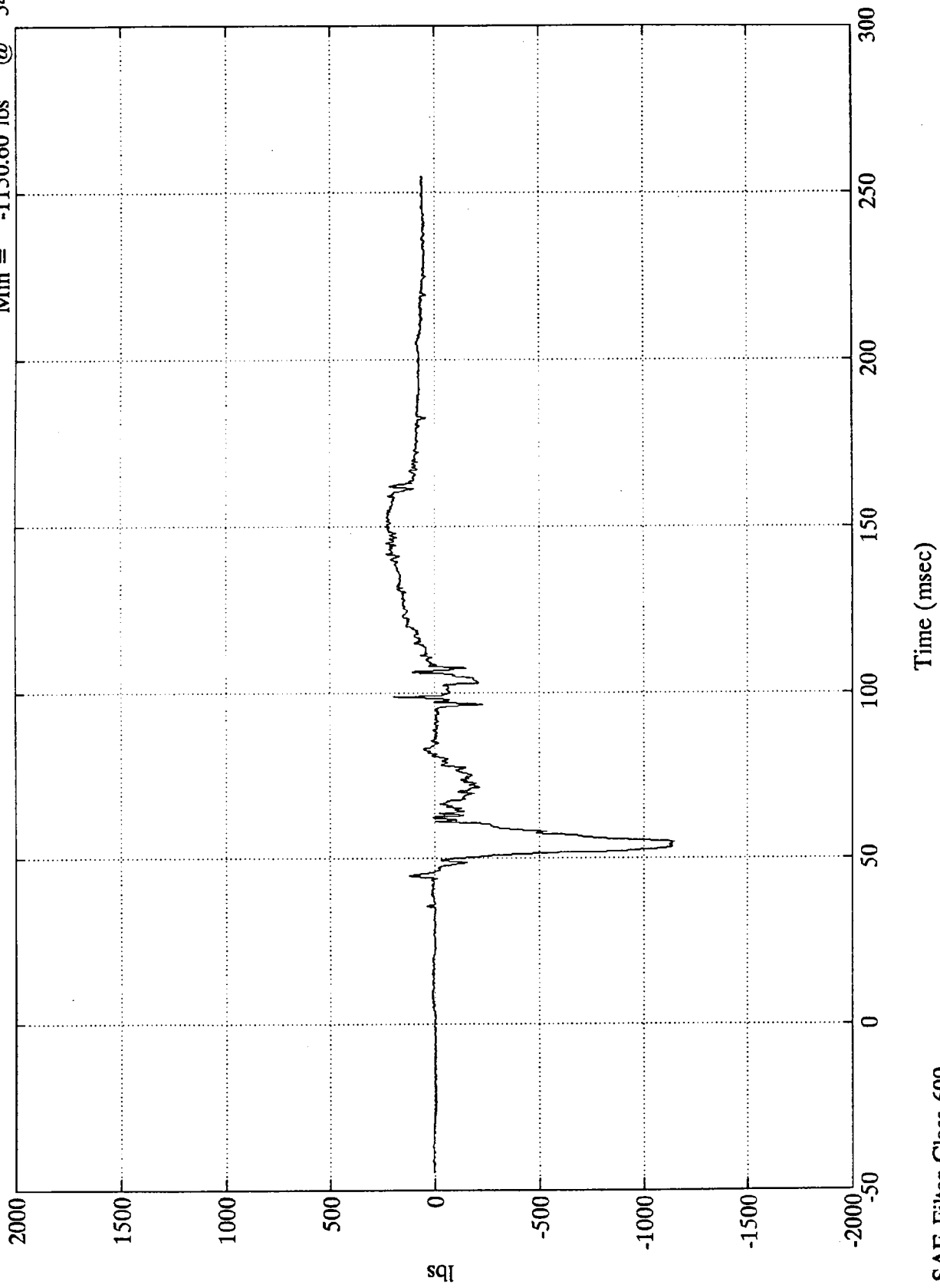
7942-5

SAE Filter Class 600

VTV TEST 5

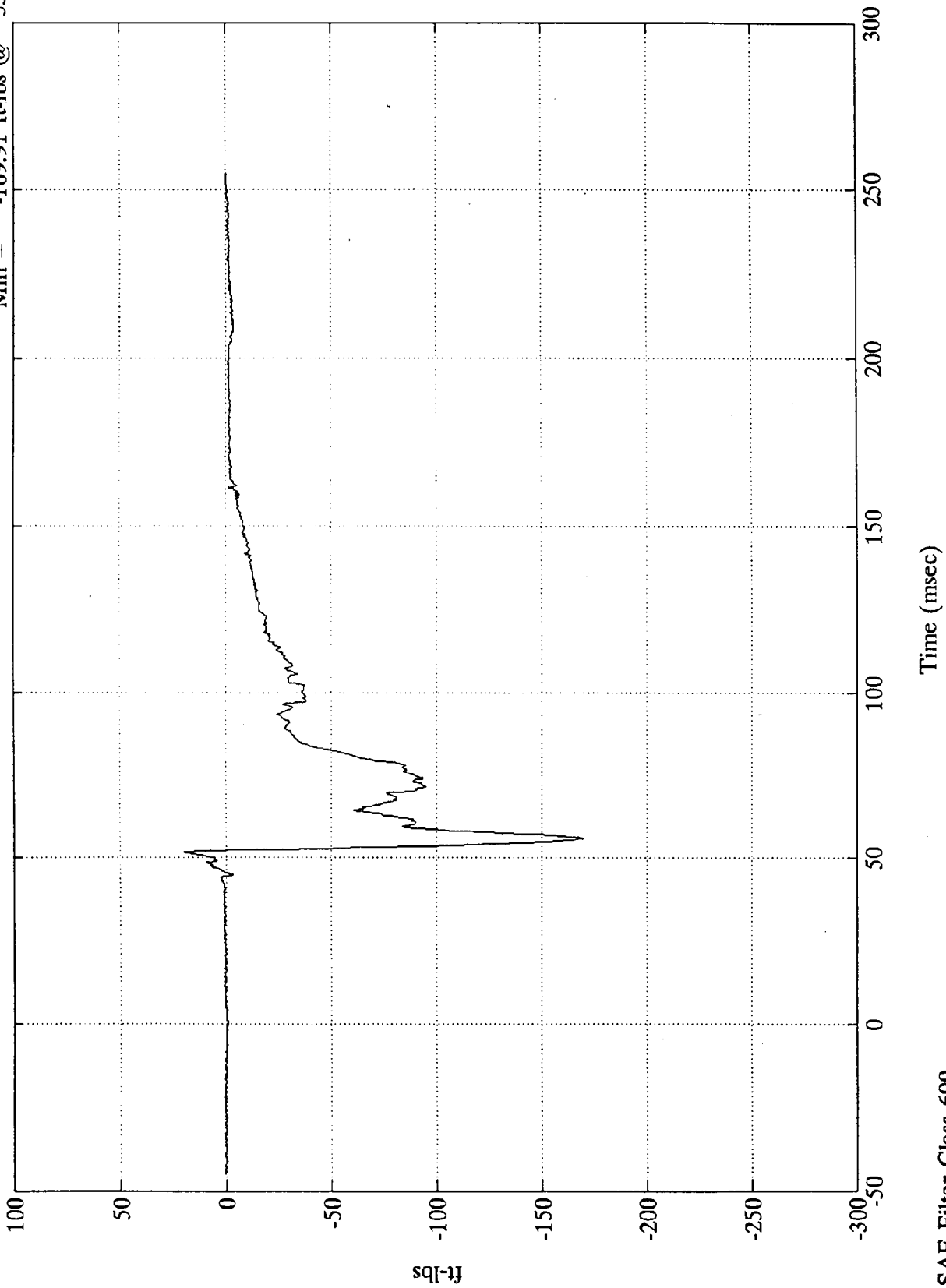
Veh.2-Pos.1 Rt L Tibia Fz

Max = 234.55 lbs @ 141.72 msec
Min = -1150.60 lbs @ 54.84 msec



VTV TEST 5

Veh.2-Pos.1 Rt L Tibia Mx
Max = 19.88 ft-lbs @ 51.60 msec
Min = -169.91 ft-lbs @ 55.80 msec



B-138
ft-lbs

SAE Filter Class 600

7942-5

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 this Appendix.

Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
45	9-20-91
245	12-4-91

Figure 12

EXTERNAL DIMENSIONS SETUP SPECIFICATIONS

VEHICLE 1, POSITION 1 - DRIVER DUMMY

Manufacturer: Humanoid

Serial No.: 45

HYBRID III EXTERNAL DIMENSIONS

S/N HUMANOID

DUMMY SERIAL NO. 45

DATE:

TEMPERATURE		70 DEG. F
RELATIVE HUMIDITY		50 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	16.9-17.1 IN	17.1 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)	8.9-9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)	38.2-39.4 IN	38.8 IN
WAIST CIRCUMFERENCE (Z)	32.1-34.1 IN	33.3 IN
CHEST DEPTH (O)	8.4-9.0 IN	8.7 IN
H-POINT HEIGHT (C)	3.3-3.5 IN	3.4 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	1.6 IN
TOTAL SITTING HEIGHT (A)	34.6-35.0 IN	34.8 IN
THIGH CLEARANCE (F)	5.5-6.1 IN	5.7 IN
BUTTOCK KNEE LENGTH (K)	22.8-23.8 IN	23.4 IN
BUTTOCK POPLITAL LENGTH (N)	17.8-18.8 IN	17.9 IN
POPLITEAL LENGTH (L)	16.9-17.9 IN	17.4 IN
KNEE PIVOT HEIGHT (M)	19.1-19.7 IN	19.3 IN
FOOT LENGTH (P)	9.9-10.5 IN	10.2 IN
FOOT BREADTH (W)	3.6-4.2 IN	4.1 IN
SHOULDER PIVOT FROM BACKLINE (E)	3.3-3.7 IN	3.6 IN
SHOULDER BREADTH (V)	16.6-17.2 IN	16.9 IN
SHOULDER PIVOT HEIGHT (B)	19.9-20.5 IN	20.0 IN
ELBOW REST HEIGHT (J)	7.5-8.3 IN	7.9 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	11.9 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
NECK EXTENSION TEST
HYBRID III

DATE : 9-20-91

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 2

HY3 SN: 45 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY		10% - 70%	44 %
IMPACT VELOCITY		19.50 - 20.30 FPS	20.3 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	18.06 G'S
	20 MS	14.00 - 19.00 G'S	17.71 G'S
	30 MS	11.00 - 16.00 G'S	15.15 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	15.15 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	44.88 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	95.2 DEG.
	TIME	72 - 82 MS	75.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-59.0/-39.0 FT.-LBS.	-51.03 FT.-LBS.
	TIME	65 - 79 MS	69 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.25 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	129.75 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
NECK FLEXION TEST
HYBRID III

DATE : 9-20-91

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 2

HY3 SN: 45 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY		10% - 70%	44 %
IMPACT VELOCITY		22.60 - 23.40 FPS	23.4 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	23.74 G'S
	20 MS	17.60 - 22.60 G'S	22.39 G'S
	30 MS	12.50 - 18.50 G'S	17.1 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	17.1 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	41.75 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	72.63 DEG.
	TIME	57 - 64 MS	59.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	75.18 FT.-LBS.
	TIME	47 - 58 MS	52.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	120.75 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	99.38 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
THORAX IMPACT TEST
HYBRID III

DATE : 10-22-91

CALSPAN SEQUENTIAL NUMBER 2

HY3 SN 45

H.S. THORAX

CAL

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	36 %
PENDULUM VELOCITY	21.6 - 22.4 FT/SEC	21.6 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.56 INCHES
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1240 POUNDS
INTERNAL HYSTERESIS	69% - 85%	75.2 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9-19-91

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 2

HY3 SN: 45 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	42 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1063 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 9-19-91

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 2

HY3 SN: 45 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	68 DEG. F
RELATIVE HUMIDITY	10% - 70%	44 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1072 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
HEAD DROP TEST
HYBRID III

DATE : 8-19-91

CALSPAN SEQUENTIAL NUMBER 2

HY3 SN: 45 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	42 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	252.1 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	5.0 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 45

A. DUMMY INSTRUMENTS

1. HEAD ACCELEROMETER

HX LONGITUDINAL

HY LATERAL

HZ VERTICAL

2. CHEST ACCELEROMETER

CX LONGITUDINAL

CY LATERAL

CZ VERTICAL

3. FEMUR LOAD CELLS

LEFT SIDE

RIGHT SIDE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	CS75	10/91	4/92
ENDEVCO	CY89	10/91	4/92
ENDEVCO	CE76	10/91	4/92
CEC	A147	10/91	4/92
ENDEVCO	CJ54	10/91	4/92
CEC	A148	10/91	4/92
GSE	951	11/91	5/92
GSE	952	11/91	5/92

B. CALIBRATION LABORATORY
INSTRUMENTS

1. PENDULUM ACC.

2. TEST PROBE
ACCELEROMETER

3. LUMBAR FLEXION TEST
PUSH FORCE GAUGE

4. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

5. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
CEC	A160	12/91	6/92
CEC	A161	12/91	6/92
TRANS- DUCER INC	20051	1/92	7/92
BLH	72952	1/92	7/92
CIC	567-11	1/92	7/92

VEHICLE 2, POSITION 1 - DRIVER DUMMY

Manufacturer: Humanoid

Serial No.: 245

HYBRID III EXTERNAL DIMENSIONS

S/N 245 HUMANOID

DUMMY SERIAL NO. 245

DATE: 11-21-90

TEMPERATURE		72 DEG. F
RELATIVE HUMIDITY		39 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)	16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)	8.9-9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)	38.2-39.4 IN	39.3 IN
WAIST CIRCUMFERENCE (Z)	32.1-34.1 IN	33.6 IN
CHEST DEPTH (O)	8.4-9.0 IN	8.4 IN
H-POINT HEIGHT (C)	3.3-3.5 IN	3.5 IN
H-POINT FROM SEAT BACK (D)	5.3-5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)	1.6-1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)	34.6-35.0 IN	35.0 IN
THIGH CLEARANCE (F)	5.5-6.1 IN	6.1 IN
BUTTOCK KNEE LENGTH (K)	22.8-23.8 IN	23.6 IN
BUTTOCK POPLITAL LENGTH (N)	17.8-18.8 IN	18.5 IN
POPLITEAL LENGTH (L)	16.9-17.9 IN	17.1 IN
KNEE PIVOT HEIGHT (M)	19.1-19.7 IN	19.3 IN
FOOT LENGTH (P)	9.9-10.5 IN	10.2 IN
FOOT BREADTH (W)	3.6-4.2 IN	3.8 IN
SHOULDER PIVOT FROM BACKLINE (E)	3.3-3.7 IN	3.7 IN
SHOULDER BREADTH (V)	16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGHT (B)	19.9-20.5 IN	20.4 IN
ELBOW REST HEIGHT (J)	7.5-8.3 IN	8.2 IN
SHOULDER-ELBOW LENGTH (I)	13.0-13.6 IN	13.3 IN
BACK OF ELBOW TO WRIST PIVOT (G)	11.4-12.0 IN	11.5 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN: IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
NECK EXTENSION TEST
HYBRID III

DATE : 12/3/91

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN:245 CAL NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY		10% - 70%	35 %
IMPACT VELOCITY		19.50 - 20.30 FPS	20.0 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G'S	19.93 G'S
	20 MS	14.00 - 19.00 G'S	18.39 G'S
	30 MS	11.00 - 16.00 G'S	15.76 G'S
MAX PENDULUM G'S ABOVE 30 MS		22 G'S MAX	15.76 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		38 - 46 MS	42.75 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	92.88 DEG.
	TIME	72 - 82 MS	72.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	-59.0/-39.0 FT.-LBS.	-51.91 FT.-LBS.
	TIME	65 - 79 MS	67.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	147.25 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	128.13 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

NECK FLEXION TEST

HYBRID III

DATE : 12/3/91

6 AXIS NECK TRANSDUCER

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN:245 CAL NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	69 DEG. F
RELATIVE HUMIDITY		10% - 70%	36 %
IMPACT VELOCITY		22.60 - 23.40 FPS	23.3 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G'S	23.64 G'S
	20 MS	17.60 - 22.60 G'S	21.31 G'S
	30 MS	12.50 - 18.50 G'S	18.45 G'S
MAX PENDULUM G'S ABOVE 30 MS		29 G'S MAX	18.45 G'S
DECELERATION -TIME CURVE DECAY TIME TO 5 G'S		34 - 42 MS	41.5 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	73.21 DEG.
	TIME	57 - 64 MS	58.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.-LBS.	73.32 FT.-LBS.
	TIME	47 - 58 MS	54.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	101.75 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT
THORAX IMPACT TEST
HYBRID III

DATE : 12/2/91

CALSPAN SEQUENTIAL NUMBER 4

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%	30 %
PENDULUM VELOCITY	21.6 - 22.4 FT/SEC	21.6 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.54 INCHES
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1235 POUNDS
INTERNAL HYSTERESIS	69% - 85%	76.2 %

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 12/4/91

KNEE: LEFT

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 245 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	32 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1100 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

KNEE IMPACT TEST

HYBRID III

DATE : 12/4/91

KNEE: RIGHT

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 245 KNEE 11LB. CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	32 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	7.0 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1169 LBS.
PROBE WEIGHT	11 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

CALSPAN CORPORATION
TRANSPORTATION RESEARCH DEPARTMENT

HEAD DROP TEST

HYBRID III

DATE : 12/3/91

CALSPAN SEQUENTIAL NUMBER 4

HY3 SN: 245 HEAD DROP CAL

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	68 - 78 DEG. F	69 DEG. F
RELATIVE HUMIDITY	10% - 70%	37 %
PEAK RESULTANT ACCELERATION	225 - 275 G'S	258.1 G'S
PEAK LATERAL ACCELERATION	15 G'S MAX	3.3 G'S
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY I.D. NUMBER: 245

A. DUMMY INSTRUMENTS

1. HEAD ACCELEROMETER

HX LONGITUDINAL

HY LATERAL

HZ VERTICAL

2. CHEST ACCELEROMETER

CX LONGITUDINAL

CY LATERAL

CZ VERTICAL

3. FEMUR LOAD CELLS

LEFT SIDE

RIGHT SIDE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	ER72	10/91	4/92
ENDEVCO	GD54	10/91	4/92
ENDEVCO	CK11	10/91	4/92
CEC	A145	10/91	4/92
ENDEVCO	FL04	10/91	4/92
CEC	A149	10/91	4/92
GSE	548	11/91	5/92
GSE	549	11/91	5/92

B. CALIBRATION LABORATORY
INSTRUMENTS

1. PENDULUM ACC.

2. TEST PROBE
ACCELEROMETER

3. LUMBAR FLEXION TEST
PUSH FORCE GAUGE

4. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

5. ABDOMINAL COMPRESS.
TEST FORCE GAUGE

MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
CEC	A160	12/91	6/92
CEC	A161	12/91	6/92
TRANS- DUCER INC	20051	1/92	7/92
BLH	72952	1/92	7/92
CIC	567-11	1/92	7/92

Appendix D

ADDITIONAL PRE-TEST MEASUREMENTS AND PRE-TEST PHOTOGRAPHS

OF STEERING ASSEMBLY

Table 9
 ADDITIONAL PRE-TEST MEASUREMENTS
 (All measurements in inches)

1. VEHICLE EXTERIOR DIMENSIONS	VEHICLE 1	VEHICLE 2
E1 Top of Front Bumper to Ground	23.5	21.2
E2 Bottom of Front Bumper to Ground	15.3	11.5
E3 Top of Rear Bumper to Ground	23.9	23.1
E4 Bottom of Rear Bumper to Ground	14.1	11.5
E5 Front Rocker Panel to Ground	11.2	7.8
E6 Rear Rocker Panel to Ground	11.2	8.3
E7 Floorboard to Ground	10.8	8.7
2. FRONT COMPARTMENT MEASUREMENTS (Refer to Figure 13)	VEHICLE 1	VEHICLE 2
M1 Front Axle to Reference Plane (RPD)	40.5	44.5
M2 Heel Point to Toeboard/Floorboard Intersection	4.6	5.3
M3 RPD to Toeboard/Floorboard Intersection	24.8	23.8
M4 RPD to Firewall	31.1	32.4
M5 RPD to Bottom of Dashboard	15.5	17.8
M6 RPD to Steering Wheel Pivot Point	6.3	7.6
M7 Windshield/Dashboard Intersection to Edge of Dashboard	14.0	21.9
M8 RPD to Edge of Dashboard	9.5	10.8
M9 RPD to Foremost Point of Header	2.7	1.6
M10 RPD to Rearmost Point of Seat Cushion	14.8	14.7
M11 Seat Travel from Rearmost to Foremost Position	7.5	7.8
M12 RPD to H-Point	7.9	9.8
M13 Windshield/Dashboard Intersection to Floor	27.7	25.5
M14 Bottom of Dashboard to Floor	12.0	12.3
M15 Steering Wheel Pivot Point to Floor	22.6	22.5
M16 Foremost Point of Header to Floor	40.8	41.9
M17 Seat Rise from Rearmost to Foremost Position	0.6	0.8
M18 Rearmost Point of Seat Cushion to Floor	7.8	7.3
M19 H-Point to Floor	13.3	9.7

Table 9 (cont'd)

ADDITIONAL PRE-TEST MEASUREMENTS

2. FRONT COMPARTMENT MEASUREMENTS (cont'd)		VEHICLE 1	VEHICLE 2
(Refer to Figure 13)			
M20	Toeboard Angle	47°	49°
M21	Steering Column Angle	25°	27°
M22	Length of Windshield	28.1	35.1
M23	Windshield Angle	149°	151°
M24	Seat Cushion Angle	23°	17°
M25	Length of Seat Cushion	21.4	20.8
M26	Length of Seat Back	23.0	22.3
M27	Seat Back Angle		20°
M28	Dashboard Wire Profile on Inch Checkboard (Photo)	Figure D-1	Figure D-6
3. STEERING ASSEMBLY MEASUREMENTS		VEHICLE 1	VEHICLE 2
(Refer to Figure 14)			
S1	Steering Wheel Outer Diameter	15.1	14.7
S2	Steering Wheel Rim Diameter	14.1	13.7
S3	Steering Wheel Pivot Point to Top Surface of Rim	1.5	3.8
S4	Steering Wheel Pivot Point to Top of Hub	5.1	4.3
S5	Steering Wheel Pivot Point to Centerline of Column	2.5	0.7
S6	Steering Wheel Pivot Point to Shear Capsule	9.6	2.9
S7	Firewall to Shear Capsule	15.9	18.8
S8	Steering Column Attachment to Dash Panel (photo)	Figure D-2	Figure D-6
S9	Steering Column Attachment to Firewall (photo)	Figure D-3	Figure D-7
S10	Steering Wheel (photo)	Figures D-4, D-5	Figures D-7, D-8
S11	Weight of Steering Wheel in pounds	Not Available	Not Available

Table 9 (cont'd)

ADDITIONAL PRE-TEST MEASUREMENTS

4. OCCUPANT RESTRAINT SYSTEM MEASUREMENTS

Vehicle 1:		From the Floor	From the Firewall	From Center of X-Z Plane
R1	D-ring location	36.1	54.3	11.4
R2	Torso Belt Spool Location	****	****	****
R3	Outboard Lap Belt Anchor Location	1.5	48.2	11.9
R4	Belt Buckle Location	13.2	41.3	8.4

Vehicle 2:		From the Floor	From the Firewall	From Center of X-Z Plane
R1	D-ring location	***	***	***
R2	Torso Belt Spool Location	9.1	43.9	8.9
R3	Outboard Lap Belt Anchor Location	2.1	52.5	10.5
R4	Belt Buckle Location	9.3	40.4	9.9

*** D-ring not visible on vehicle.

**** Retractor not visible.

VEHICLE FRONT COMPARTMENT MEASUREMENTS

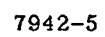
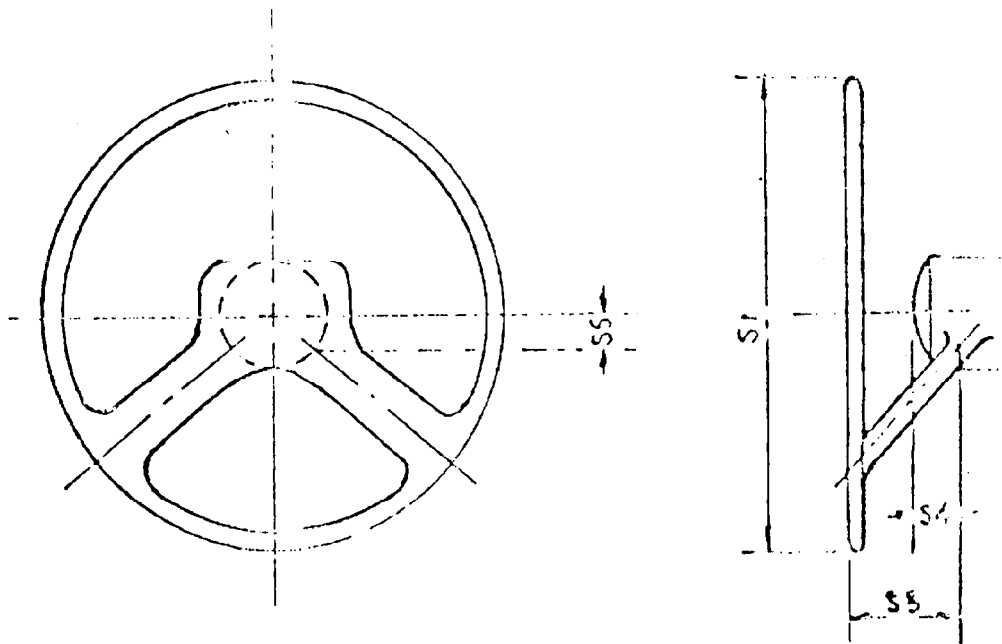


Figure 14
STEERING WHEEL MEASUREMENTS



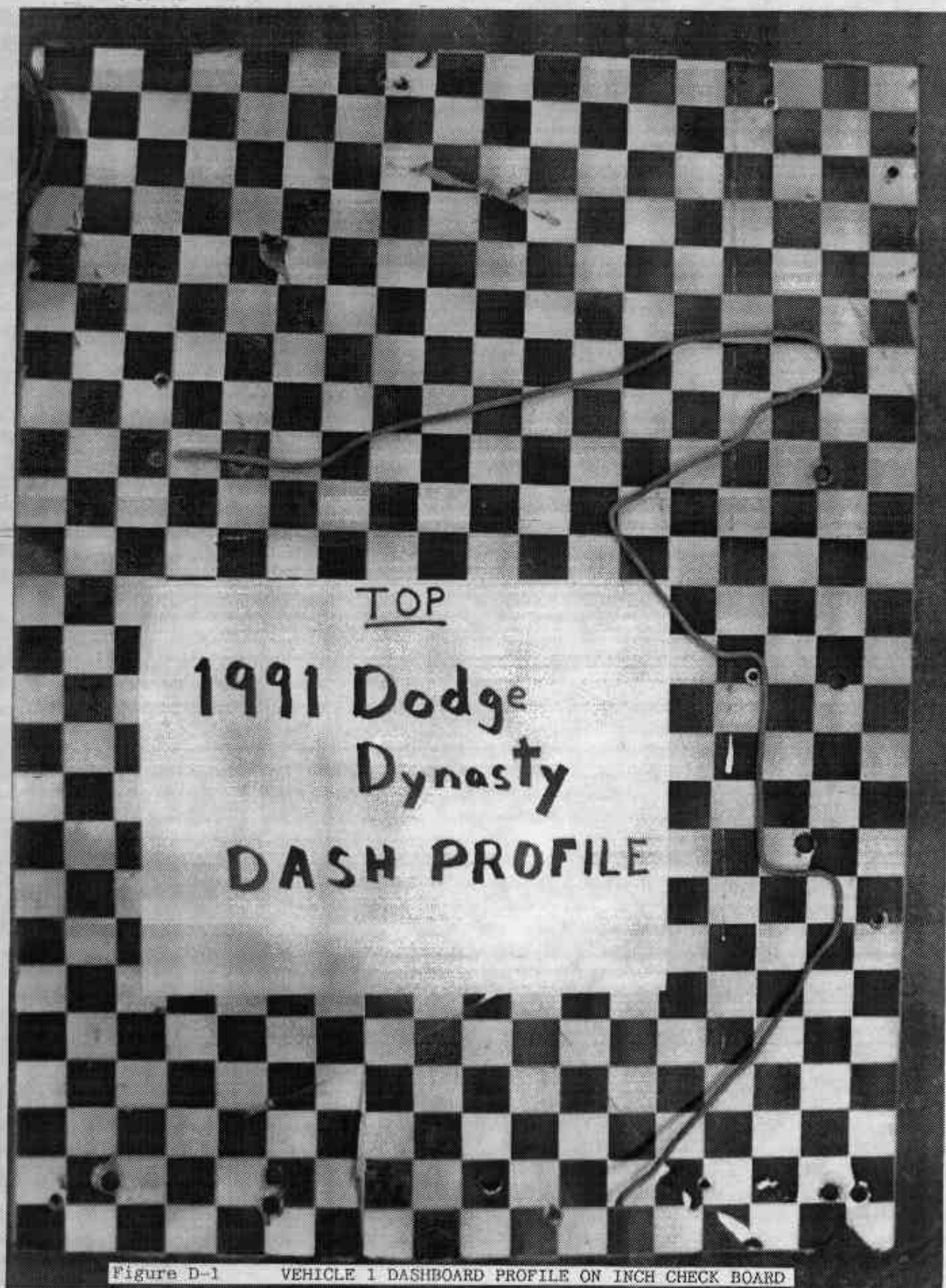


Figure D-1 VEHICLE 1 DASHBOARD PROFILE ON INCH CHECK BOARD

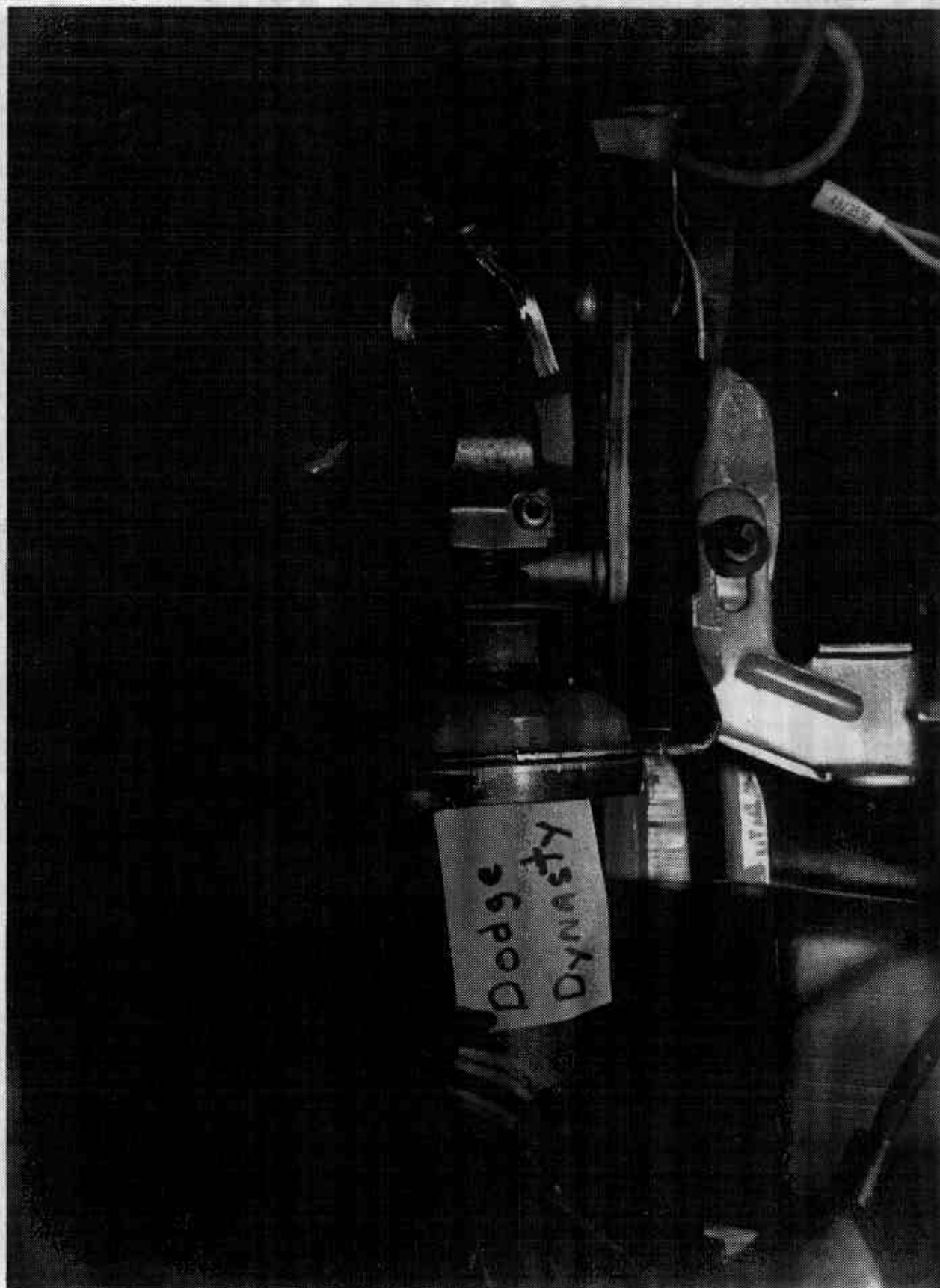


Figure D-2 VEHICLE 1 STEERING COLUMN ATTACHMENT TO DASHBOARD

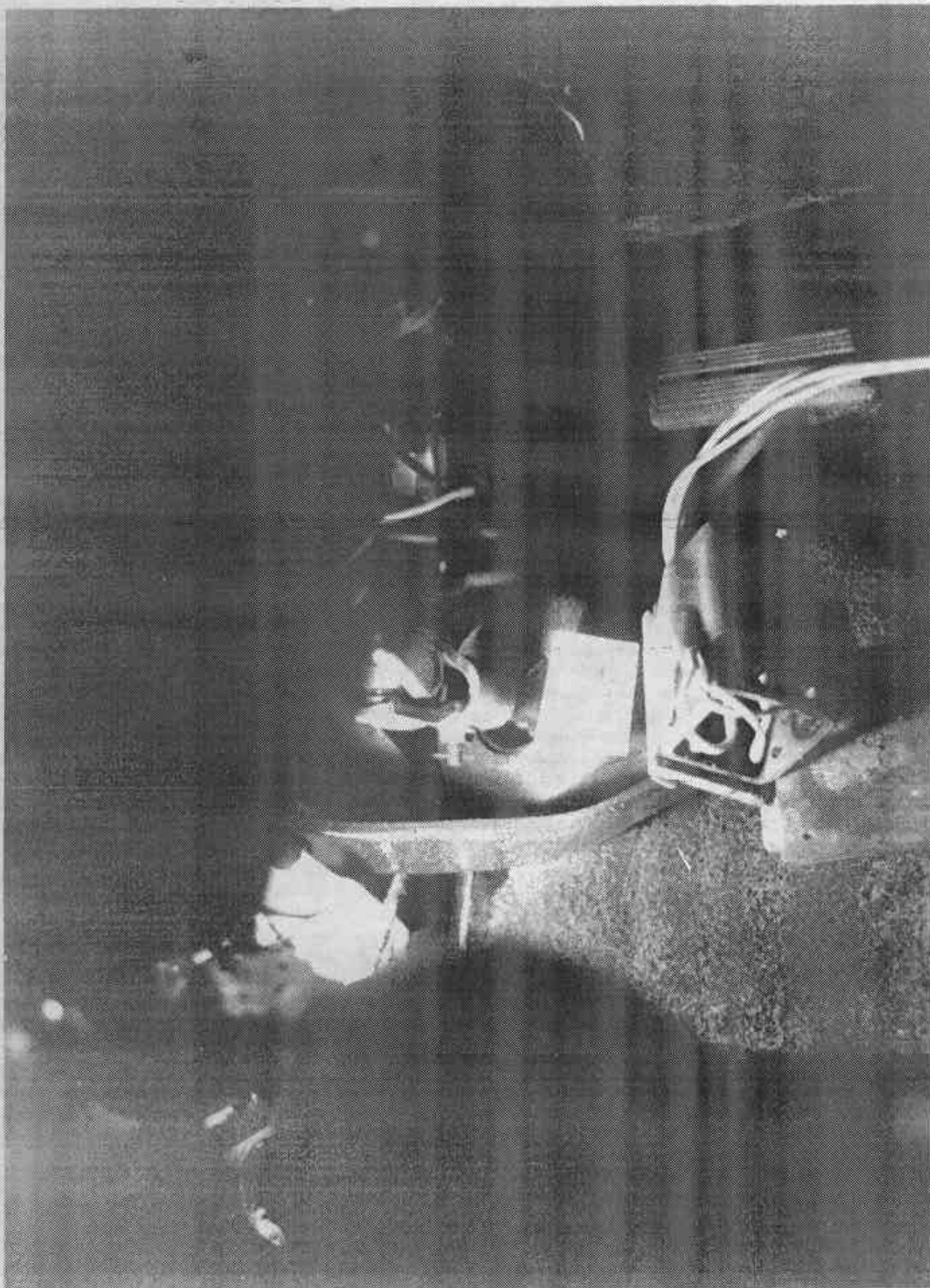


Figure D-3 VEHICLE 1 STEERING COLUMN ATTACHMENT TO FIREWALL

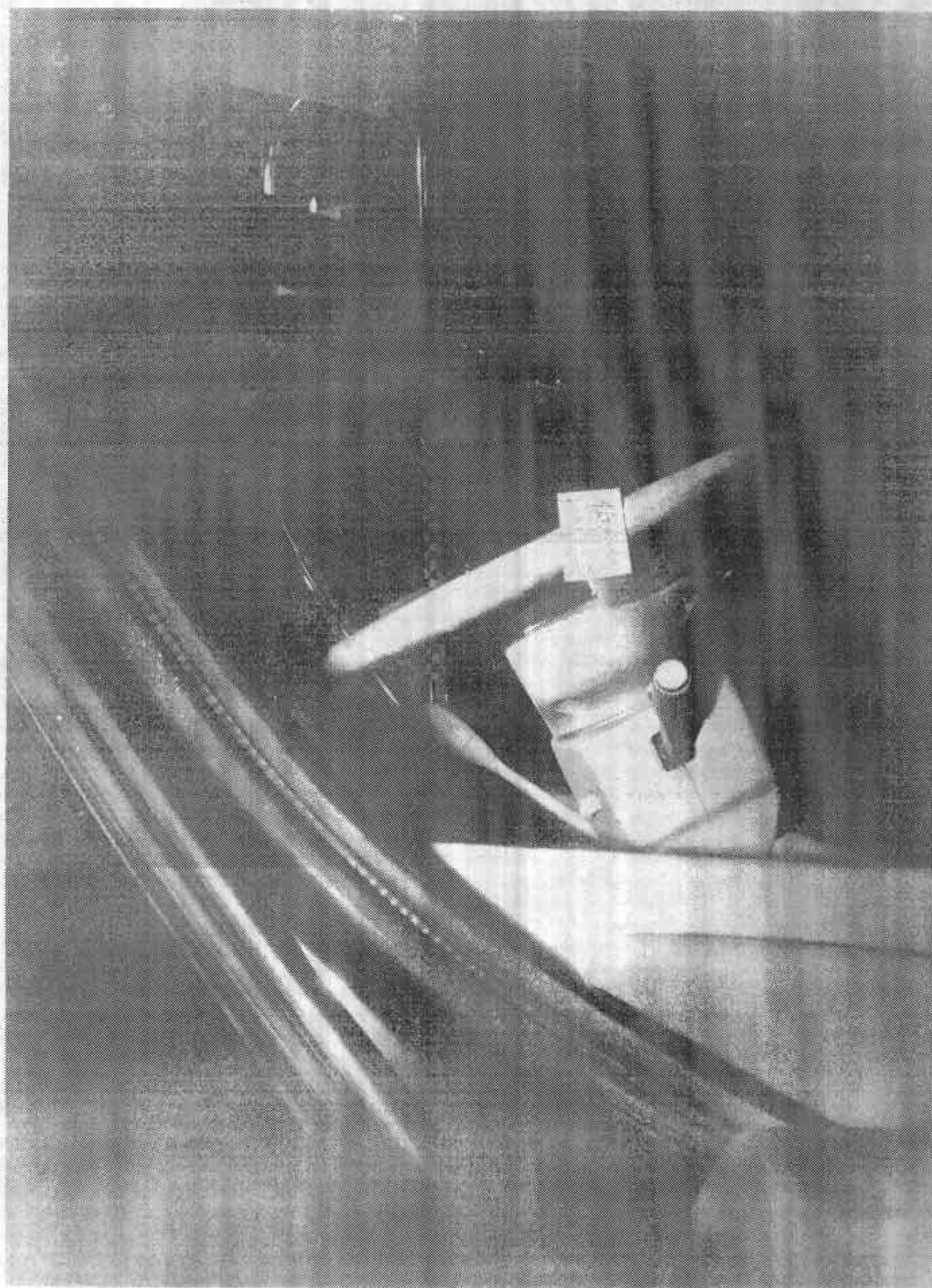


Figure D-4 VEHICLE 1 STEERING WHEEL LEFT SIDE VIEW

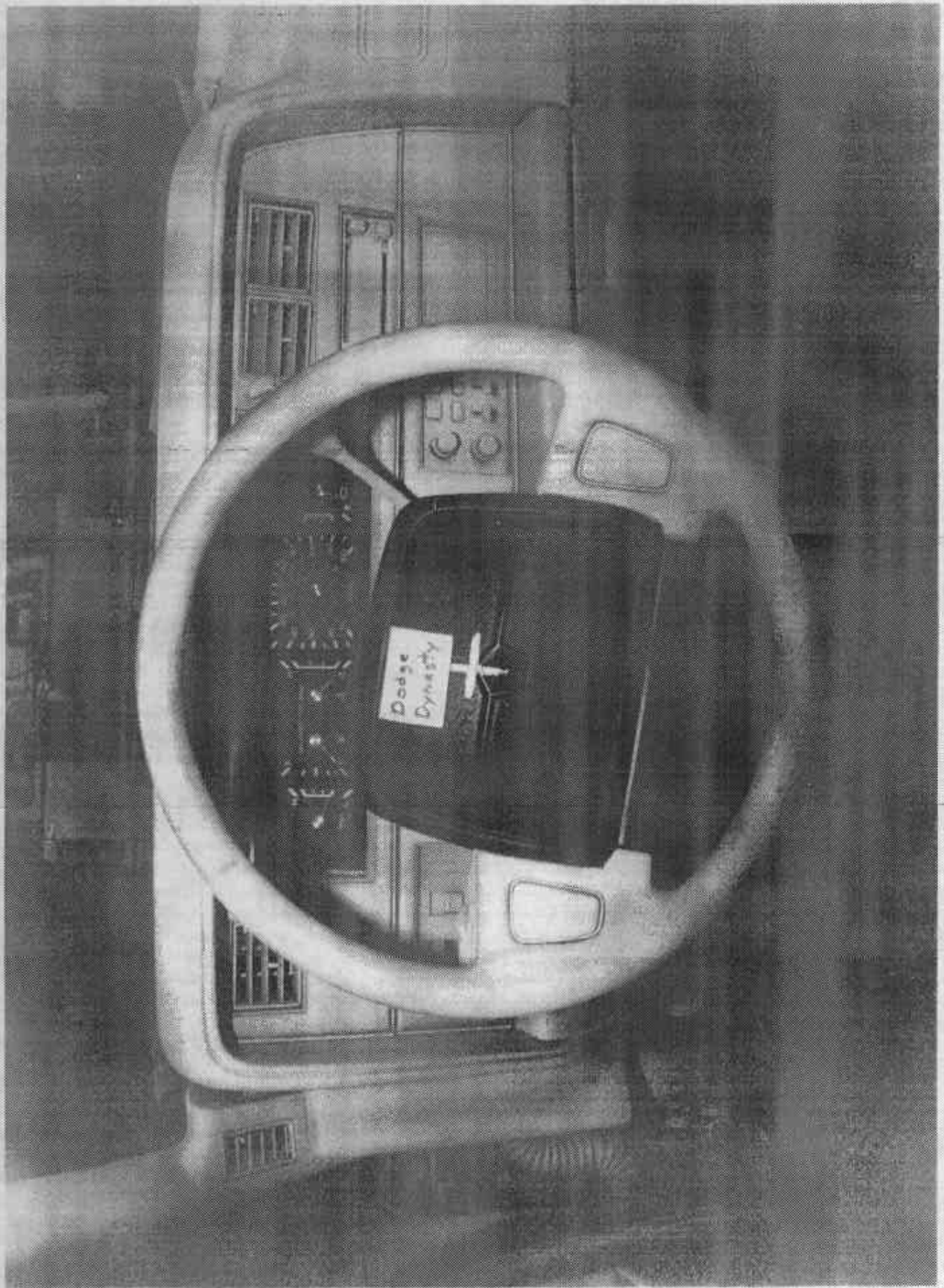


Figure D-5 VEHICLE 1 STEERING WHEEL TOP VIEW

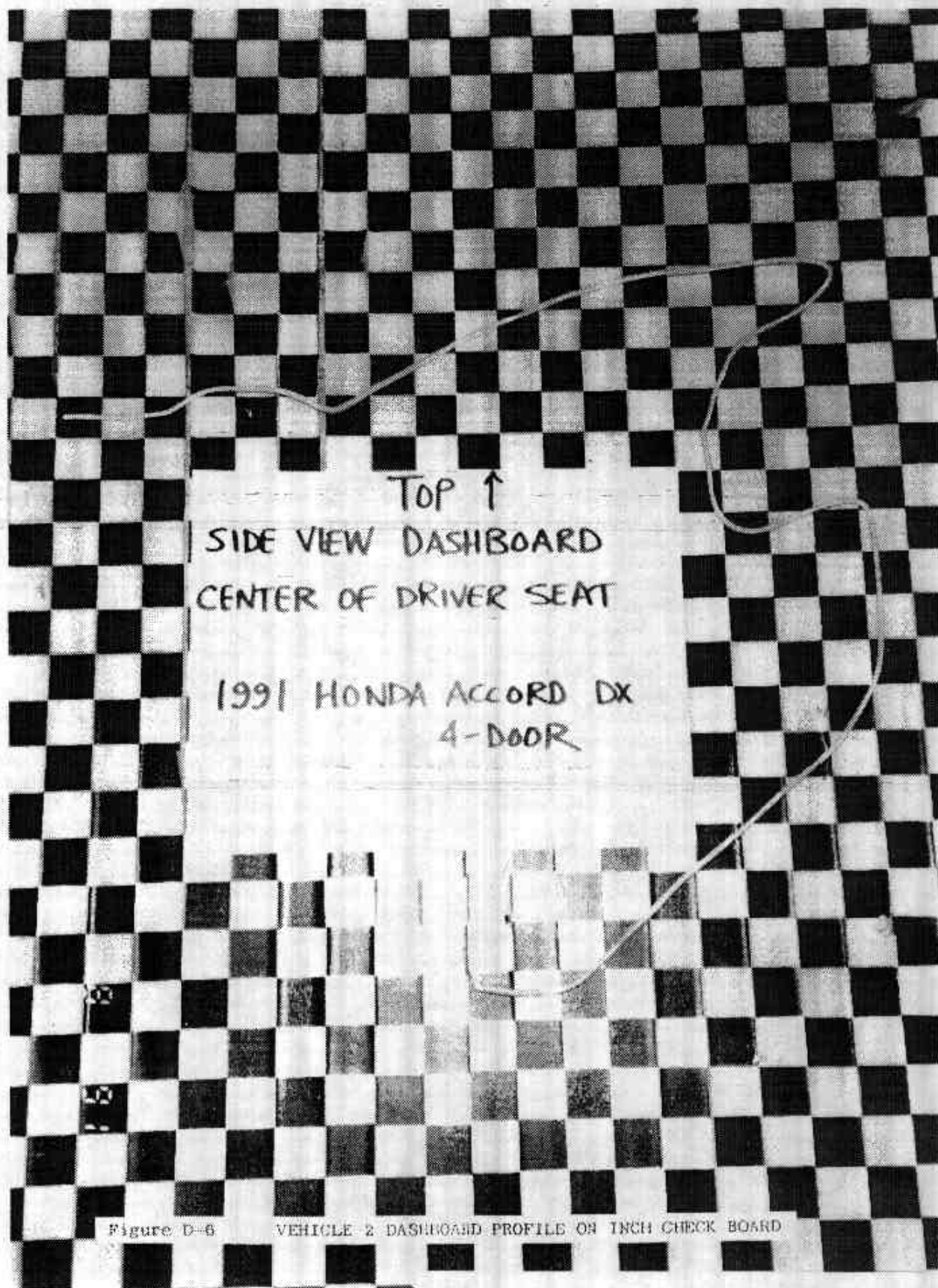


Figure D-6

VEHICLE 2 DASHBOARD PROFILE ON INCH CHECK BOARD

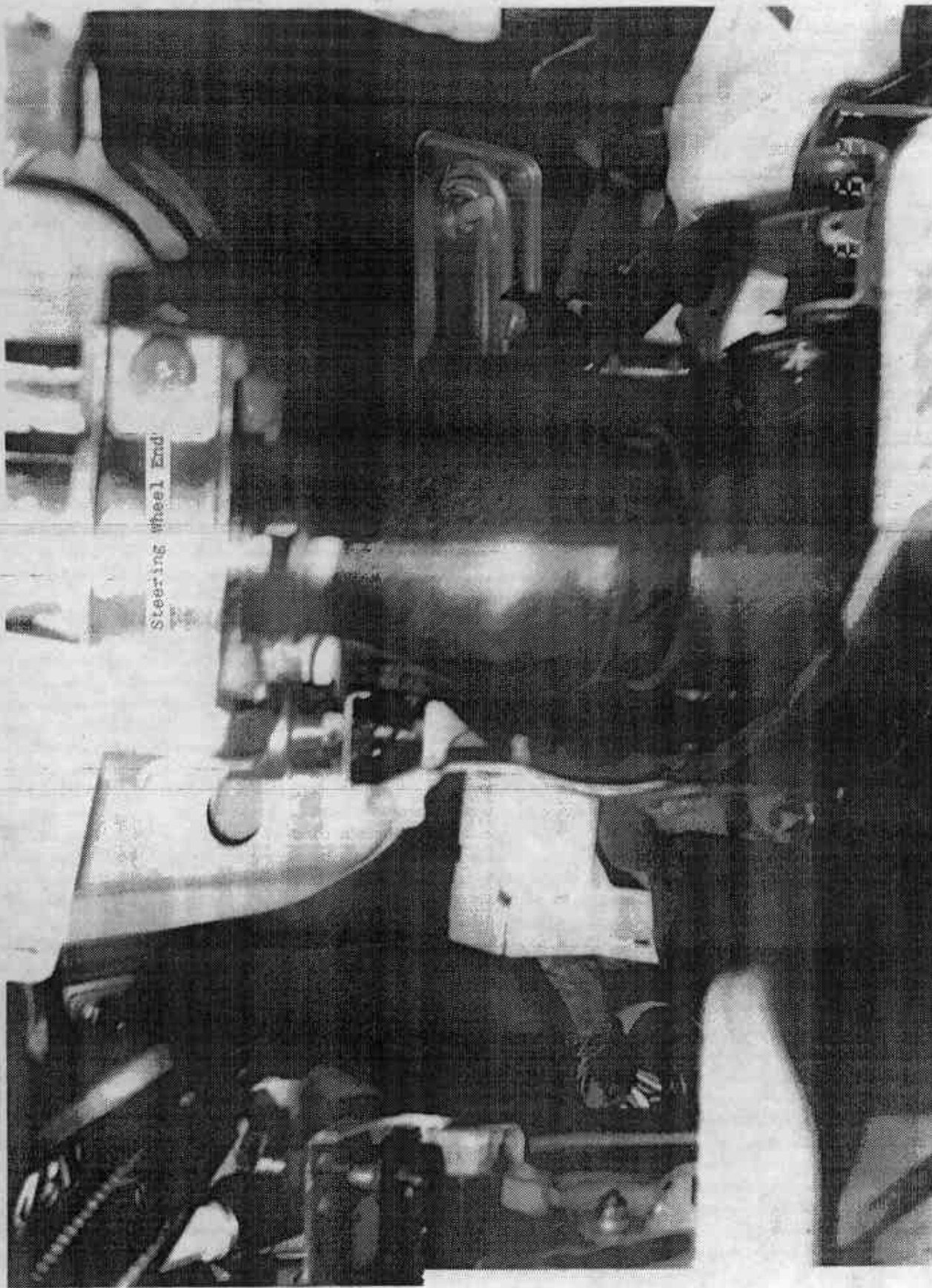


Figure D-7 VEHICLE STEERING COLUMN ATTACHMENT TO DASHBOARD



Figure D-8 VEHICLE'S STARTING COLDEN ATTACHMENT TO FIREWALL.



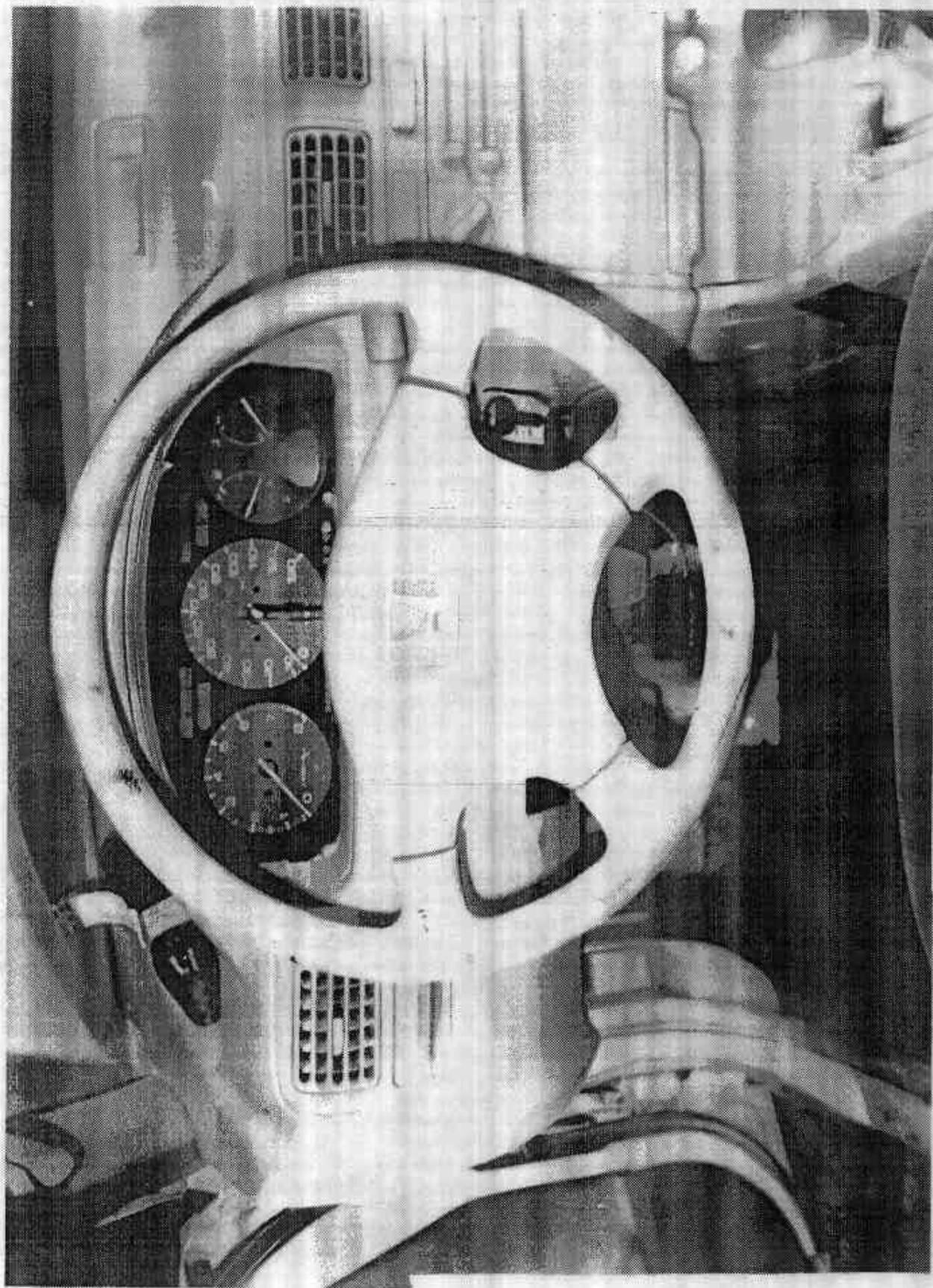


Figure D-10 VEHICLE 2 STEERING WHEEL TOP VIEW