

V2099

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212-CAL-94-17
301-CAL-94-17

**VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT CRASH PROTECTION
WINDSHIELD MOUNTING, WINDSHIELD ZONE INTRUSION (PARTIAL)
AND FUEL SYSTEM INTEGRITY**

FORD MOTOR COMPANY, U.S.A.
1994 MERCURY VILLAGER
MPV

NHTSA NUMBER: CR0207

CALSPAN TEST NUMBER: 8221-1

July 19, 1994

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



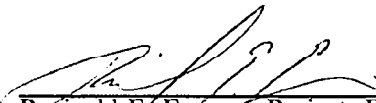
FINAL REPORT

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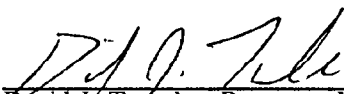
U. S. Department of Transportation
National Highway Traffic Safety Administration
ENFORCEMENT
Office of Vehicle Safety Compliance
400 Seventh Street, S. W.
Room No. 6115 (NEF-30)
Washington, DC 20590

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Prepared By:


Reginald E. Evans, Project Engineer

Approved By:


David J. Travale, Program Manager
Transportation Sciences Center

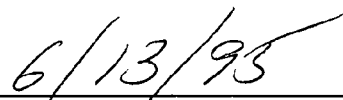
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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1994 Mercury Villager MPV. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on July 19, 1994. The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards: 1. FMVSS No. 208, "Occupant Crash Protection" 2. FMVSS No. 212, "Windshield Mounting" 3. FMVSS No. 219 (partial), "Windshield Zone Intrusion" 4. FMVSS No. 301, "Fuel System Integrity" The test mode was perpendicular (0°) and the impact velocity was 29.0 mph. The ambient temperature at the impact face was 70 °F. The subject test vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219 (partial) and 301. <u>Type of Restraint System:</u> The test vehicle was equipped with a driver air bag and driver and passenger automatic torso belt restraint systems. The manual seat belts were not used for this test.					
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Section 1

PURPOSE AND TEST PROCEDURE

This 30 mph frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial) and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by Calspan Advanced Technology Center under Contract No. DTNH22-93-D-11089. The purpose of this test was to determine if the subject vehicle, a 1994 Mercury Villager MPV, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS No. 212, "Windshield Mounting"; FMVSS No. 219 (partial), "Windshield Zone Intrusion"; and FMVSS No. 301, "Fuel System Integrity". This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-208-09, dated March 15, 1993.

Section 2

SUMMARY OF TEST NUMBER CR0207

A frontal barrier was impacted by a 1994 Mercury Villager MPV at a velocity of 29.0 mph. The test was performed at the Calspan Corporation Advanced Technology Center on July 19, 1994. Pre- and Post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 14 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head and chest three axis (x, y, and z) accelerometers and left/right femur load cells. These ATDs had been certified prior to the test.

The 24 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle and dummy response data traces.

The driver's HIC was 368.59. The maximum chest deceleration over 3 milliseconds was 37.454 g's. The maximum force on the driver's left femur was -1712.6 pounds and -1425.5 pounds on the right femur.

The right front passenger's HIC was 554.18. The maximum chest deceleration over 3 milliseconds was 38.757 g's. Loads of -1328.2 and -980.9 pounds were recorded on the left and right femurs respectively.

Table 1

CRASH TEST SUMMARY

Vehicle NHTSA No. :	<u>CR0207</u>	Test Mode :	<u>30 mph Frontal Barrier</u>
Test Date :	<u>July 19, 1994</u>	Time:	<u>10:45</u> Temperature : <u>70</u> °F
Vehicle Make/Model/Body Style :	<u>1994 Mercury Villager MPV</u>		
Vehicle Test Weight :	<u>4500</u>	lbs	
Vehicle/Barrier Impact Angle :	<u>0</u>	°	
Impact Velocity :	<u>29.0</u>	mph	
Maximum Static Crush :	<u>13.2</u>	inches	
Vehicle Rebound :	<u>8.2</u>	inches	
<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>	
Type :	<u>Part 572B</u>	<u>Part 572B</u>	
Restraint System :	<u>Air bag, automatic torso belt</u>	<u>Automatic Torso Belt</u>	
Number of Data Channels :	<u>24</u>		
Number of Cameras :	<u>1</u>	Real Time	
	<u>14</u>	High Speed	
<u>DOOR OPENING DATA :</u>	<u>Closed/Operable</u>	<u>- Left Front</u>	
	<u>Closed/Operable</u>	<u>- Right Front</u>	
Front Seat(s) Data :	<u>DRIVER</u>	<u>PASSENGER</u>	
Seat Track Failure :	<u>None</u>	<u>None</u>	
		Inches of shift	
Seat Back Failure :	<u>0.0</u>	<u>0.0</u>	
<u>VISIBLE DUMMY CONTACT POINTS :</u>	<u>DRIVER</u>	<u>PASSENGER</u>	
Head :		Rear of head with head-rest and seat, chin with chest.	
	<u>Face with air bag,</u>		
Abdomen :	<u>No contact</u>	<u>No contact</u>	
Chest	<u>No contact</u>	<u>No contact</u>	
Knees	<u>Lower dash panel</u>	<u>Lower dash panel</u>	

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1994 Mercury Villager MPV
 NHTSA No. : CR0207 ; VIN: 4M2DV11W6RDJ40209 ; Color : Mocha Frost
 Engine Data: 6 cylinders; - CID; 3.0 Liters; - cc
 Placement : - Longitudinal or In-Line; X Transverse of Lateral
 Transmission Data : 4 speeds; - Manual; X Automatic; X Overdrive
 Final Drive : - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive
 Major Options : X A/C; X Pwr.Strg.; X Pwr. Brakes
X Pwr. Windows; X Pwr. Door Locks; X Tilt Wheel
 Date Received : May 31, 1994 ; Odometer Reading 120.0 miles
 Selling Dealer : WEST-HERR FLM OF DANSVILLE, INC.
 & Address: 45 Maple Street Dansville, N.Y. 14437

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : FORD MOTOR COMPANY, U.S.A.
 Date of Manufacture May, 1994
 GVWR : 5445 lbs.; GAWR: 2716 lbs. FRONT; 2800 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 35 psi FRONT
35 psi REAR
 Recommended Tire Size : 205/75R15
 * Recommended Cold Tire Pressure : 35 psi FRONT; 35 psi REAR
 Size of Tires on Test Vehicle: 205/75R15 ; Manufacturer: GENERAL
 Vehicle Capacity Data :
 Type of Front Seats: - Bench; X Bucket; - Split Bench
 Number of Occupants: 2 Front; 5 Rear; 7 Total
 Vehicle Capacity Weight (VCW) = 1290 lbs.
 No. of Occupants x 150 lbs. = 1,050 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 240

*Tire pressure used for test

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front	=	1170	lbs.	Right Rear	=	810	lbs.
Left Front	=	1150	lbs.	Left Rear	=	810	lbs.
TOTAL FRONT	=	2,320	lbs.	TOTAL REAR	=	1,620	lbs.
TOTAL DELIVERED WEIGHT = 3,940.0 lbs.							
% of Total Front of Vehicle Weight = 58.9 %				% of Total Rear Weight = 41.1 %			

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

Total Delivered Weight	=	3,940	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	240	lbs.
Weight of 2 p.572 Dummies @ 167 each	=	334	lbs.
TARGET TEST WEIGHT	=	4,514	lbs.

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 226 POUNDS OF CARGO WEIGHT:

Right Front	=	1200	lbs.	Right Rear	=	1060	lbs.
Left Front	=	1190	lbs.	Left Rear	=	1050	lbs.
TOTAL FRONT	=	2,390	lbs.	TOTAL REAR	=	2,110	lbs.
TOTAL TEST WEIGHT = 4,500.0 lbs.							
% of Total Front Weight = 53.1 %				% of Total Rear Weight = 46.9 %			
Weight of Ballast Secured in Vehicle Trunk Area = 200.0 lbs.							
Vehicle Components Removed for Weight Reduction: None							

VEHICLE ATTITUDE (all dimension in inches) :

AS DELIVERED :	RF	31.0	LF	31.3	RR	31.3	LR	31.4
FULLY LOADED :	RF	30.2	LF	30.8	RR	29.8	LR	30.1
AS TESTED :	RF	30.7	LF	30.7	RR	29.9	LR	30.1
Vehicle's Wheel Base : 112.3 in.								
Location of Vehicle's C.G. : 52.7 inches rearward of front wheel center.								

FUEL SYSTEM DATA :

Fuel System Capacity From Owner's Manual	=	20	gallons
Usable Capacity Figure Furnished by COTR	=	20	gallons
Test Volume Range (92 to 94% of Usable Capacity)	=	18.4	to 18.8 gallons
ACTUAL TEST VOLUME	=	18.6	gallons (with entire fuel system filled)

Table 3

POST IMPACT DATATYPE OF TEST:

Type of Test : Frontal Barrier Impact Angle : 0°
 Test Date : July 19, 1994 Time: 10:45 Temperature: 70 °F
 Vehicle NHTSA No. : CR0207
 Required Impact Velocity Range : 28.9 to 29.9 mph

BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 29.0 mph; Trap No. 2 = 29.0 mph
 Distance from vehicle to barrier : (1) entering trap = 52 inches
 (2) exiting trap = 12 inches

VEHICLE STATIC CRUSH: (For frontal and rear impacts only.)

Vehicle Length:

Pre-Test Right = 185.2 ; C/L = 190.0 ; Left = 185.0
 Post-Test Right = 173.5 ; C/L = 174.0 ; Left = 173.0
 Crush Right = 11.7 ; C/L = 16.0 ; Left = 12.0
 AVERAGE = 13.2 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point :

Right = 8.9 ; C/L = 7.9 ; Left = 7.9
 AVERAGE = 8.2 inches

DOOR OPENING :

	Left	Right
Front	<u>Closed/operable</u>	<u>Closed/operable</u>
Rear	<u>N/A</u>	<u>Closed/operable</u>

SEAT MOVEMENT :

	Seat Back Failure	Seat Shift
Front	<u>None</u>	<u>0.0</u>
Rear	<u>None</u>	<u>0.0</u>

Table 3

POST IMPACT (cont.)

GLAZING DAMAGE :

Windshield cracked near left and right "A" Pillars.

OTHER NOTABLE IMPACT FEATURES :

None

Section 3

OCCUPANT AND VEHICLE DATA

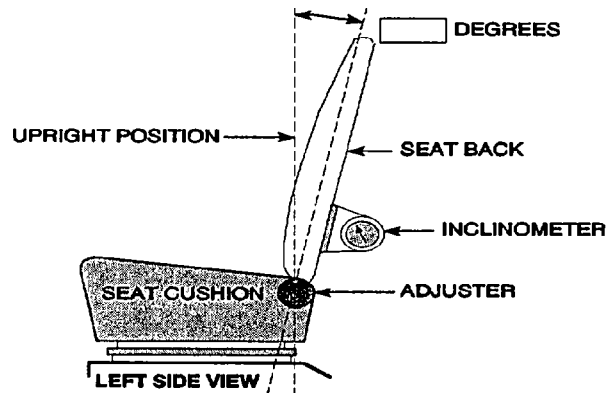
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1994 Vehicle Model: Mercury Villager Body Style : MPV

1. Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat : 24 deg.

Measurement instructions : Pull seat back to forward most locking position (zero). Adjust seat back to 12th locking position rearward of position zero. Nominal design seat back angle.

Seat back angle for passenger's seat : 24 deg.

Measurement instructions : Same as driver seating position.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Seat set at 8th (mid) locking position rearward of foremost (position zero). There are 16 total detents.

Positioning of the passenger's seat (if applicable) : Same as driver seating position.

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 20.0 gallons

B. "Usable Capacity" of the optional equipment fuel tank is - gallons

4. Steering Column Position :

Steering column set at mid position - 3rd notch downward from full upward position. 28 deg.

5. Other:

None

Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

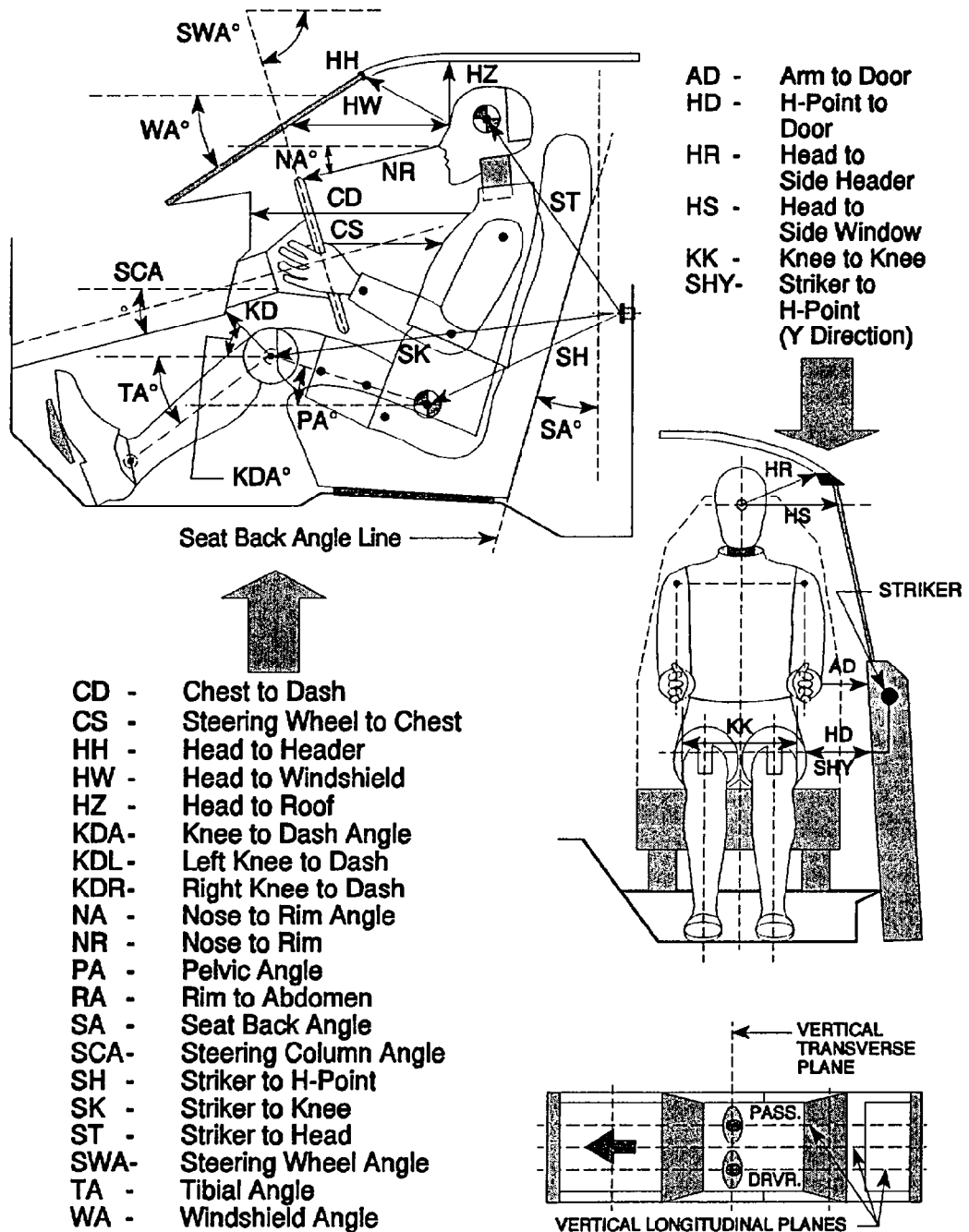


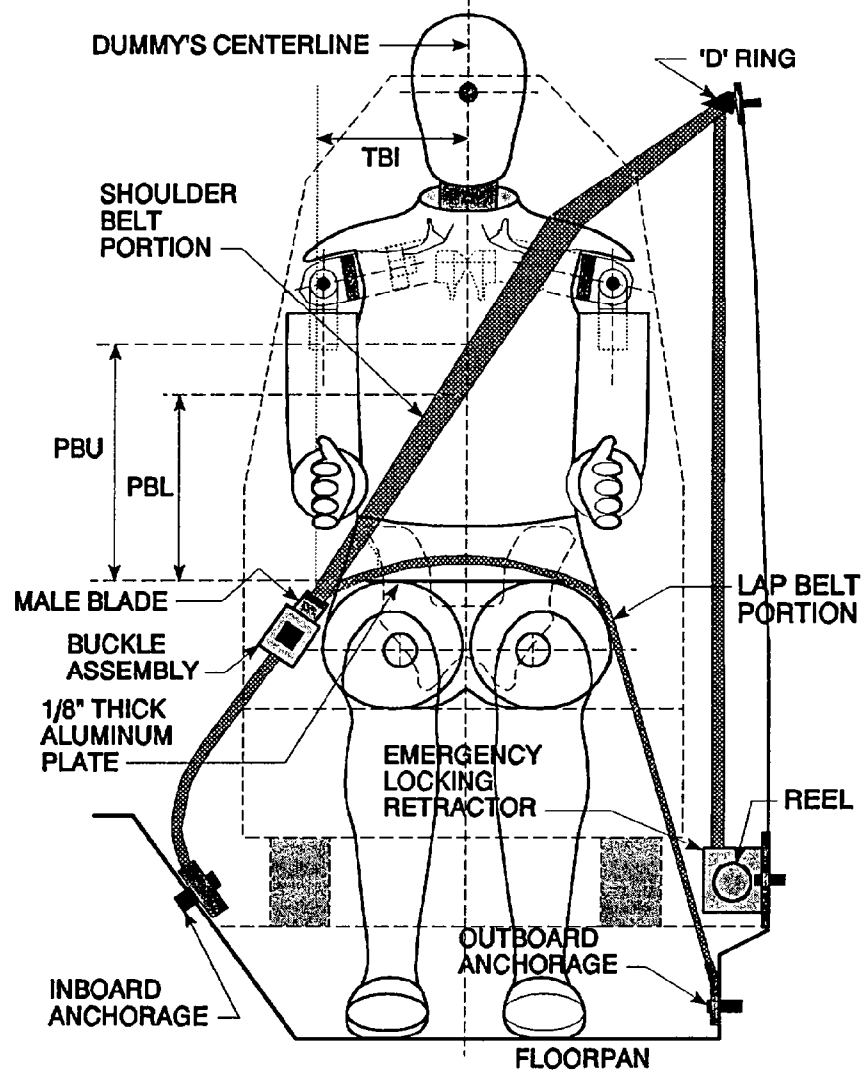
Table 4

FRONT SEAT OCCUPANT MEASUREMENTS

	DRIVER (Serial #1019)	PASS. (Serial #1020)
WA°	32 deg.	-
SWA°	26 deg.	-
SCA°	-64 deg.	-
SA°	24 deg.	24 deg.
HZ	7.0	7.2
HH	18.2	17.3
HW	24.5	24.5
HR	7.9	6.9
NR	17.8 Angle 15 deg.	-
CD	23.2	24.5
CS	13.8	-
RA	7.7	-
KDL	9.3 Angle (KDA) 32 deg.	9.5
KDR	8.5	9.8 Angle (KDA) 33 deg.
Femur°	8 deg.	12 deg.
TA°	45 deg.	45 deg.
KK	10.0	11.9
ST	25.8 Angle 12 deg.	25.8 Angle 13 deg.
SK	26.6 Angle 93 deg.	26.1 Angle 91 deg.
SH	11.0 Angle 105 deg.	10.3 Angle 112 deg.
SHY	9.5	10.3
HS	10.5	9.8
HD	6.3	7.3
AD	5.0	4.8

Figure 3

SEAT BELT POSITIONING DATA



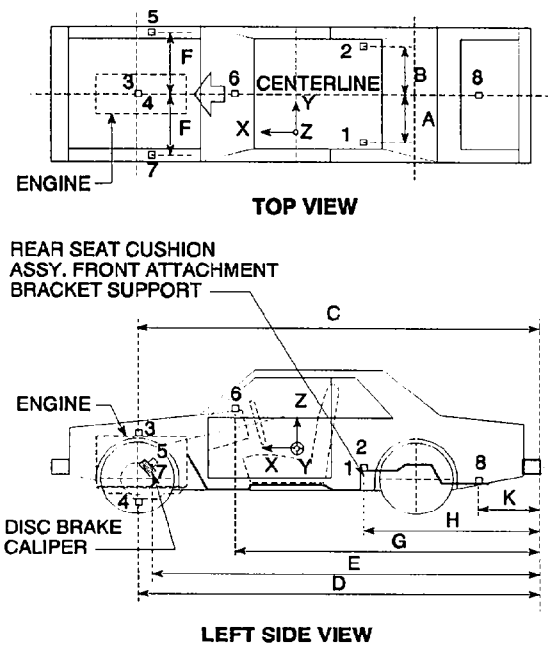
FRONT VIEW OF DUMMY

	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	13.3	12.0
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	10.3	9.5
<u>TBI</u> -- Distance from torso centerline to buckle	*	*

* - Lap belt not used for this test.

Figure 4

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Left Rear Seat Crossmember	X		
2	Right Rear Seat Crossmember	X		
3	Top of Engine	X		
4	Bottom of Engine	X		
5	Right Disc Brake Caliper	X		
6	Instrument Panel	X		
7	Left Disc Brake Caliper	X		
8	Trunk Z			X

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

Table 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

DIMENSION	LENGTH (Inches)	
	PRE-TEST VALUES	POST-TEST VALUES
A	17.3	17.3
B	17.3	17.3
C	166.2	162.5
D	158.7	156.2
E	Right = 149.2 Left = 149.6	Right = 147.6 Left = 150.3
F	Right = 26.3 Left = 24.8	Right = 26.0 Left = 23.8
G	122.3	123.2
H	82.6	82.6
K	14.5	14.5

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE			
		Pos.	msec.	Neg.	msec.
1	Rear Seat X-Member @ Left Side	3.1	186.0	-40.6	42.2
2	Rear Seat X-Member @ Right Side	3.1	187.2	-39.5	44.0
3	Top of Engine Block	44.3	43.1	-130.0	32.4
4	Bottom of Engine	*284.7	129.6	-84.0	33.7
5	Disc Brake Caliper @ Right Side	15.3	73.8	-63.0	57.5
6	Instrument Panel	10.2	94.7	-39.0	53.2
7	Disc Brake Caliper @ Left Side	18.2	91.8	-94.3	49.1
8	Trunk	12.8	101.3	-8.4	186.6

* Data questionable after 110 msec., wire cut.

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information shown on Table 6.

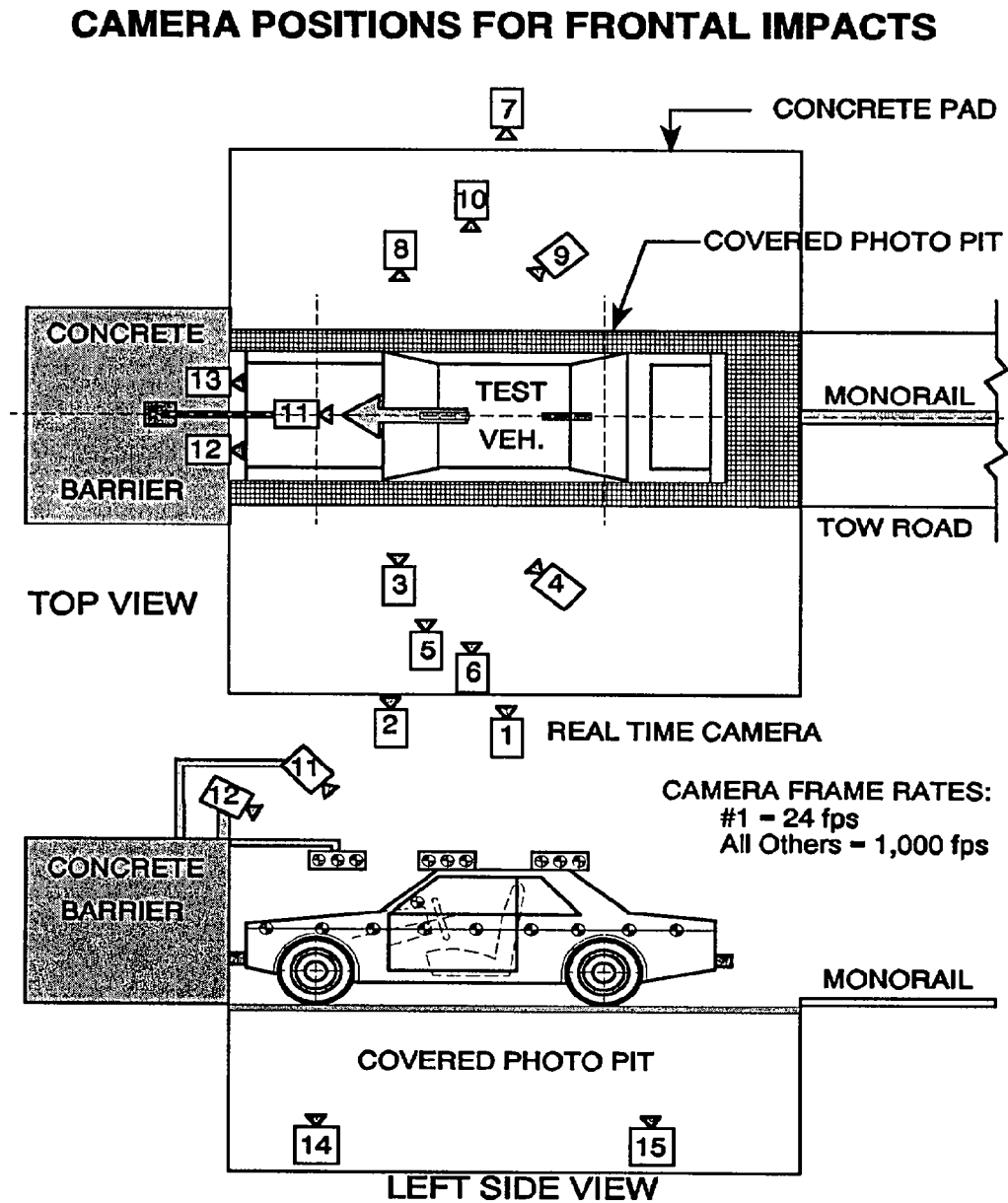


Table 6

HIGH-SPEED CAMERA LOCATIONS

Test No.	VIEW	CAMERA POSITIONS (In.)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	245	78	41	-2	225.7	13	1000
3	Left Side View	312	47	41	-1	292.7	25	1000
4	Driver and Interior View	115	109	73	-15	-	13	990
5	Steering Column (Bottom)	295	96	46	-1	275.7	25	960
6	Steering Column (Top)	295	96	70	-8	275.7	25	1030
7	Overall Right Side	254	80	42	0	234.7	13	N.T.
8	Right Side View	318	61	41	-2	298.7	25	1010
9	Passenger and Interior View	113	114	73	-17	-	13	1105
10	Right Passenger View	325	76	59	-2	305.7	35	1100
11	Windshield View	19	0	127	-60	-	25	1065
12	Driver Front View	25	20	72	-43	-	8	1010
13	Passenger Front View	25	20	72	-41	-	8	1000
14	Pit View of Engine	39	0	-86	90	-	13	700
15	Pit View of Fuel Tank	128	0	-86	90	-	13	680

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

Figure 6

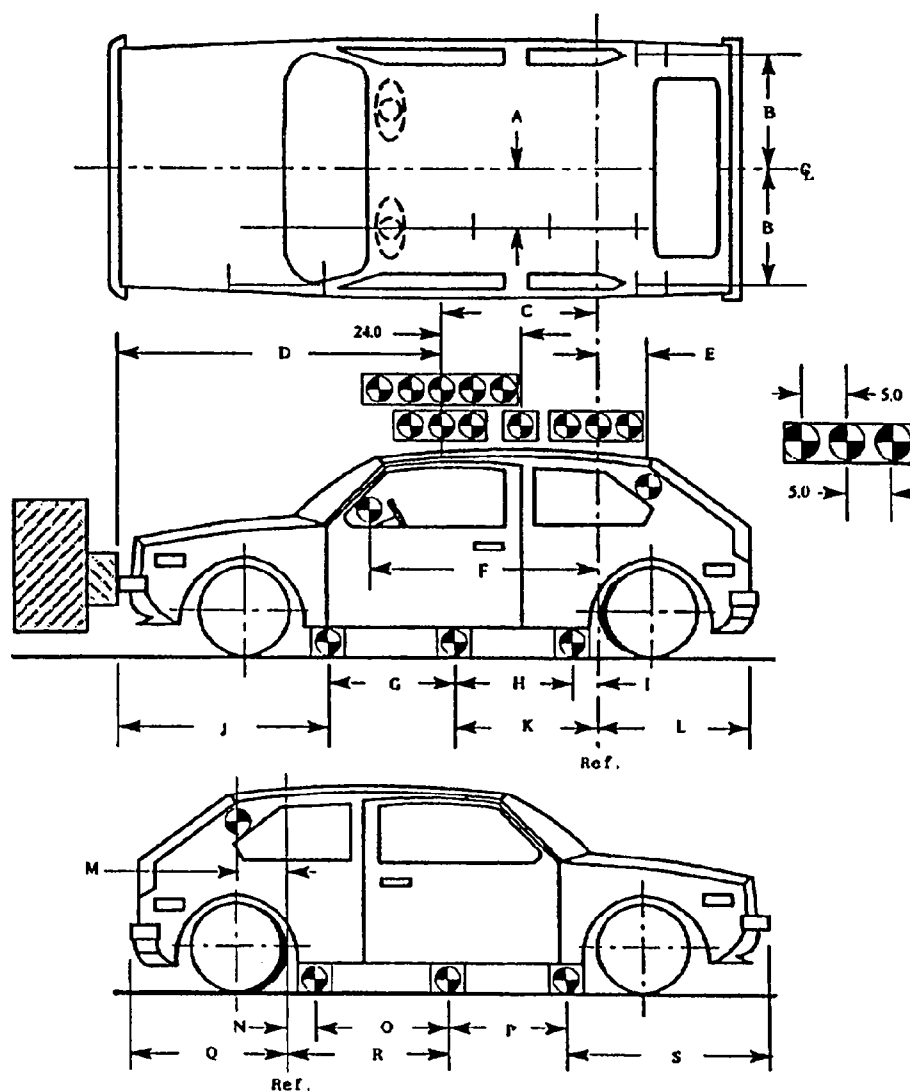
VEHICLE TARGET LOCATIONS
(All dimensions in inches)

Key (Inches)

A = 16.3
B = 23.8

C = 48.0
D = 90.1
E = 0.0
F = 70.2
G = 37.8
H = 37.9
I = 5.0
J = 57.4
K = 42.9
L = 51.9

M = 0.0
N = 5.0
O = 37.9
P = 37.8
Q = 52.0
R = 42.9
S = 57.3



Note: Targets on front fender are 12.0 inches apart.
Targets rearward of front fender (C1 and C2 in TP-208-9) are 24.0 inches apart.

Figure 7

TEST VEHICLE MEASUREMENTS

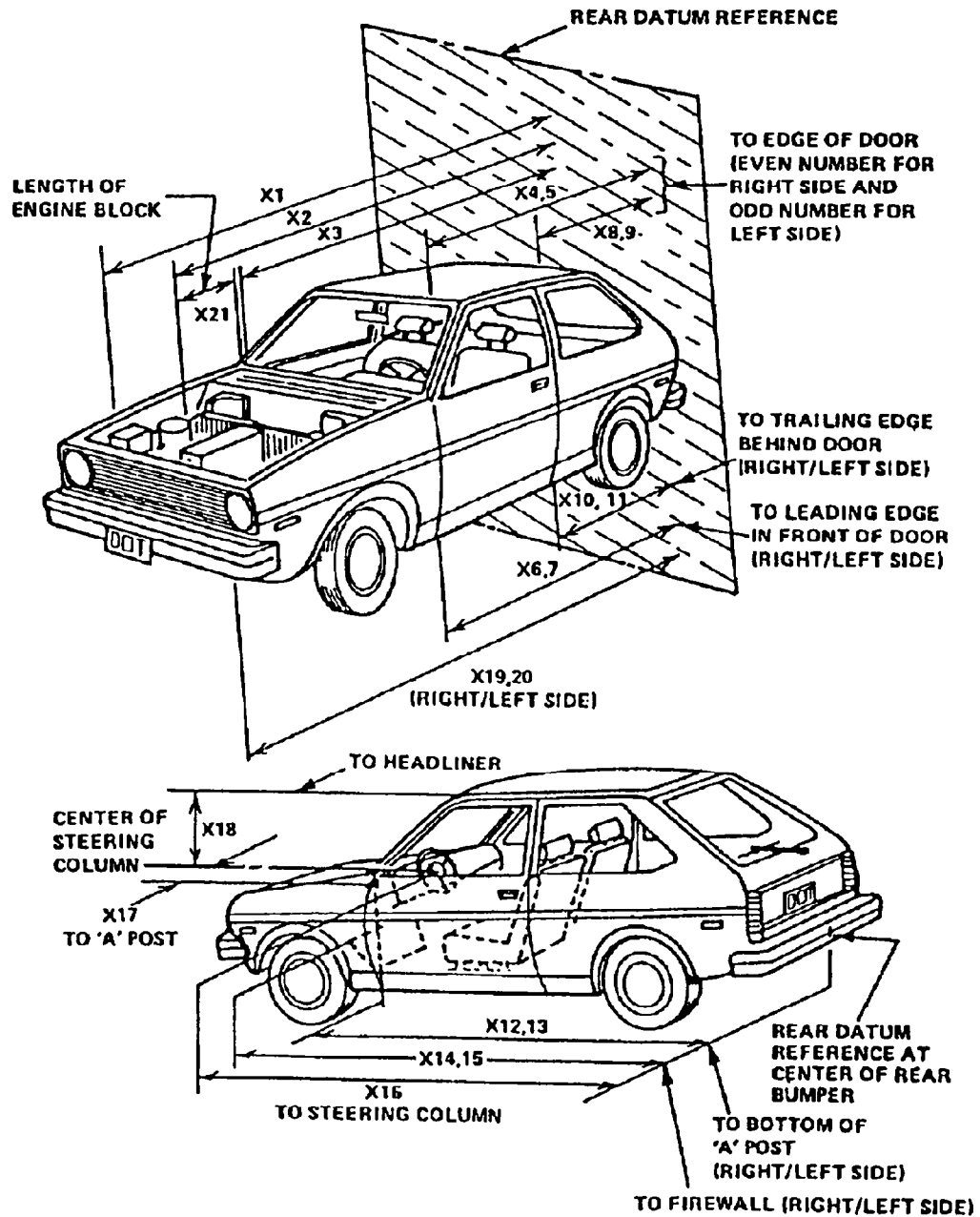


Table 7

VEHICLE MEASUREMENTS

No.		All Dimensions in inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	190.0	174.0	16.0
X2	Rear Surface of Vehicle to Front of Engine	159.1	154.7	4.4
X3	Rear Surface of Vehicle to Firewall	143.1	143.7	-0.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	135.7	136.4	-0.7
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	136.2	136.9	-0.7
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	131.5	131.4	0.1
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	132.1	132.3	-0.2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	88.4	88.9	-0.5
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	88.9	89.9	-1.0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	88.8	88.4	0.4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	88.9	89.4	-0.5
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	129.4	128.9	0.5
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	129.6	129.5	0.1
X14	Rear Surface of Vehicle to Firewall, Right Side	144.1	143.7	0.4
X15	Rear Surface of Vehicle to Firewall, Left Side	142.1	142.6	-0.5
X16	Rear Surface of Vehicle to Steering Column	114.5	117.5	-3.0
X17	Center of Steering Column to "A" Post	15.5	16.5	-1.0
X18	Center of Steering Column to Headliner	18.0	16.0	2.0
X19	Rear Surface of Vehicle to Right Side of Front Bumper	185.2	173.5	11.7
X20	Rear Surface of Vehicle to Left Side of Front Bumper	185.0	173.0	12.0
X21	Length of Engine Block	19.0	19.0	0.0

Section 4

SUMMARY OF RESULTS OF FMVSS NOS. 208, 212, 219 AND 301-75

- "Occupant Crash Protection," FMVSS No. 208 Data
- "Windshield Mounting," FMVSS No. 212 Data
- "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- "Fuel System Integrity," FMVSS No. 301-75

Table 8

DUMMY INJURY CRITERIA VALUESNHTSA No. : CR0207 Vehicle : 1994 Mercury Villager MPV

	MAXIMUM ACCELERATION (g's)								
	HEAD				CHEST				
	X	Y	Z	R	X	Y	Z	R*	Displacement
Dummy (1)	-40.0	-9.2	34.7	51.8	-39.2	-11.5	-9.5	37.454	N/A
Dummy (2)	161.5	8.7	49.9	162.3	-41.9	16.4	-13.9	38.757	N/A

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	-1712.6	-1425.5
Dummy (2)	-1328.2	-980.9

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc (g)
		t ₁ (msec)	t ₂ (msec)	t ₁ TO t ₂
Dummy (1)	368.59	61.800	92.040	43.09
Dummy (2)	554.18	66.720	102.600	47.37

* Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Table 9

FMVSS NO. 208 - SEAT BELT WARNING SYSTEM CHECK

With occupant in driver's position, the lap belt in stowed position, and ignition switch placed in "Start/On" position:

Log time duration of audible warning signal = 6 sec.

Log time duration of reminder light operation = 6 sec.

With occupant in driver's position, lap belt in use, and the ignition switch placed in "Start/On" position :

Log time duration of audible warning signal = 0 sec.
(audible warning should not operate)

Log time duration of reminder light operation = 6 sec.

Note wording of visual warning :

Fasten Seat Belt -

Fasten Belt -

Symbol 101 X

Table 10

FMVSS NO. 208 - LABELING AND DRIVER'S MANUAL INFORMATION

Locate label which describes manufacturers maintenance or replacement schedule for crash-deployed occupant protection system.

Describe location :

Label located on inner panel of driver and passenger sunvisors.

The label states, " Air bag system must be inspected 10 years after date of manufacture shown on certification label."

Were appropriate instructions concerning maintenance and/or replacement of this system provided ?

YES X NO -

Was a description of the functional operation of the system provided ?

YES X NO -

Is there a reference to the instructions and description of the system on the label ?

YES X NO -

Was an owner's manual provided ?

YES X NO -

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the system ?

YES X NO -

Table 11

FMVSS NO. 208 - READINESS INDICATOR

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement.

Is the system totally mechanical ? YES - NO X

Describe the location of the readiness indicator :

Readiness indicator located at top right of instrument cluster.

Is the readiness indicator clearly visible to the driver ? YES X NO -

Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided ?

YES X NO -

Table 12

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No. :	CR0207
Make/Model :	1994 Mercury Villager MPV
Date of Comfort/Convenience Check :	7-18-94
Technician Performing Check :	R.E.
GVWR :	5445 lbs.

Seat belt comfort and convenience requirements cover vehicles manufactured on or after September 1, 1986, which have a gross vehicle weight rating of 10,000 pounds or less. Exemptions to this rule are belts installed in a walk-in, van-type vehicle and manual Type 2 belt systems installed in the front outboard seating positions of passenger automobiles. On or after September 1, 1989, the exemption of the type 2 manual seat belts installed in the front outboard seating positions of passenger automobiles will change depending on the states' enactment of mandatory usage laws.

Was vehicle built after or on September 1, 1986, and is it equipped with :

1. Automatic seat belts YES X ** NO -

If yes, go to requirements D1, D2, and D3

2. Manual seat belts* YES X ** NO -

a. The seat belts, other than Type 2 lap/shoulder belts, are located in the front outboard seating positions of a passenger automobile.

YES - NO X

(Go to requirements D3, D4, D5, and D6)

b. The seat belt system is Type 2 lap/shoulder belt in the front outboard seating positions or the seat belts are located in a walk-in van.

STOP

* If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

** Manual lap belt - Automatic torso belt.

Table 12 (cont.)

D1
CONVENIENCE HOOKS

A convenience hook or other device is provided to stow seat belt webbing to facilitate entering or exiting the vehicle.

YES - NO X

Check the option which applies to this test vehicle:

1. A convenience hook or other device automatically releases the webbing when the automatic belt system is operational and remains in the released mode as long as the vehicle's ignition switch is moved to the "on" or "start" position and the vehicle's drivetrain is engaged.

YES X NO -

2. A convenience hook or other device automatically releases the webbing when the automatic belt system is operational and remains in the released mode as long as the vehicle's ignition switch is moved to the "on" or "start" position and the vehicle's parking brake is in the released mode (non-engaged)

YES X NO -

D2
WEBBING TENSION - RELIEVING DEVICE

The seat belt assembly installed in the outboard designated seating position has either manual or automatic tension relieving devices permitting the introduction of slack in the webbing of the shoulder belt ("comfort clips" or "window shade" devices).

YES - NO X

Check the owner's manual and determine the maximum amount of slack recommended by the manufacturer in inches. The recommended slack is n/a inches. Introduce this slack into the shoulder belt before testing the vehicle to comply with the requirements of FMVSS 208 S5.1. A warning is included in the owner's manual that introducing slack beyond the amount specified can significantly reduce the effectiveness of the shoulder belt.

YES N/A NO N/A

(If NO, provide explanation.)

Check the option which applies to this test vehicle:

1. This vehicle is equipped with automatic seat belts and the tension relieving device is cancelled each time the adjacent door is opened.

YES N/A NO N/A

(If NO, provide explanation.)

Table 12 (cont.)

2. This vehicle is equipped with manual belts, required to meet FMVSS 208 S4.6, and the tension relieving device is cancelled each time one of the following options occurs:
- | | | | | |
|---|-----|------------|----|------------|
| a. The adjacent door is opened. | YES | <u>N/A</u> | NO | <u>N/A</u> |
| b. The latch plate is released from the buckle. | YES | <u>N/A</u> | NO | <u>N/A</u> |
3. This is an open-body vehicle, without doors. Does the manual mean to cancel any shoulder belt slack introduced by a tension relieving device to operate properly ?
- | | | | | |
|--|-----|------------|----|------------|
| | YES | <u>N/A</u> | NO | <u>N/A</u> |
|--|-----|------------|----|------------|

(If NO, provide explanation.)

D3
BELT CONTACT FORCE

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in this vehicle incorporate a webbing tension relieving device. Does the vehicle incorporate a tension relieving device?
- | | | | | |
|--|-----|----------|----|----------|
| | YES | <u>-</u> | NO | <u>X</u> |
|--|-----|----------|----|----------|
2. Seats are adjusted according to instructions in Appendix B.
- | | | | | |
|--|-----|----------|----|----------|
| | YES | <u>X</u> | NO | <u>-</u> |
|--|-----|----------|----|----------|
3. The test dummies are positioned according to dummy position placement instructions in Appendix B and Appendix C.
- | | | | | |
|--|-----|----------|----|----------|
| | YES | <u>X</u> | NO | <u>-</u> |
|--|-----|----------|----|----------|
4. Close the vehicle's adjacent door, pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest, then fasten the latch. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. Measure the contact force exerted by the belt webbing on the dummy's chest. The contact force is 0.3 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Table 12 (cont.)

D4
LATCHPLATE ACCESSIBILITY

- | | | | | | |
|----|--|-----|--------------|----|--------------|
| 1. | Position the test dummy in the driver's seat or passenger's seat in its forward most adjustment position. | YES | <u> X </u> | NO | <u> - </u> |
| 2. | Attach the inboard and outboard reach string. | YES | <u> X </u> | NO | <u> - </u> |
| 3. | Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. With the latchplate in the normal stowed position, check to assure that the latchplates are within the reach envelope. | YES | <u> X </u> | NO | <u> - </u> |
| 4. | Using the clearance test block, determine if there is sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latchplate or buckle. | YES | <u> X </u> | NO | <u> - </u> |

D5
RETRACTION

- | | | | | | |
|----|--|-----|--------------|----|--------------|
| 1. | Seats and seat backs are adjusted according to instructions in Appendix B "General Test Conditions" in TP-208-09, dated March 15, 1993. | YES | <u> X </u> | NO | <u> - </u> |
| 2. | Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B and restrain the dummies, using the belt systems for the positions being tested. | YES | <u> X </u> | NO | <u> - </u> |
| 3. | Outboard armrests which are capable of being stowed on vehicle seats shall be placed in their stowed positions. | YES | <u> X </u> | NO | <u> - </u> |
| 4. | Check the option which applies to this test vehicle: | | | | |
| | a. The torso and lap belt webbing of the seat belt system automatically retract to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released. | YES | <u> X </u> | NO | <u> - </u> |

Table 12 (cont.)

- b. The torso and lap belt webbing of the seat belt system automatically retract when the seat belt latchplate is released.
- YES X NO -
5. With the webbing and hardware in the stowed position, close the door to assure that the webbing and hardware are prevented from being pinched.
- YES X NO -
6. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, check to assure that the belt system fully retracts when the tension-relief device is manually deactivated.
- YES n/a NO n/a

D6
ACCESSIBILITY

The requirements for accessibility do not apply to:

1. Seats whose seat cushions are removable so that the seat back serves a function other than seating;
2. Seats which are removable;
3. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above, then determine if:

1. Each manual seat belt assembly whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back has one of the following three parts (the seat belt latchplate, the buckle, or the seat belt webbing) on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant).
- YES X NO -
2. The remaining two seat belt parts are accessible under normal conditions.
- YES X NO -

Table 12 (cont.)

- | | | | | |
|----|--|-----|----------|-------------|
| 3. | The buckle and latchplate pass through the guides or conduits provided and do not fall behind the seat when the following events occur in order: | | | |
| | a. The belt is completely retracted or, if the belt is non-retractable, the belt is unattached. | YES | <u>X</u> | NO <u>-</u> |
| | b. The seat is moved to any position to which it is designed to be adjusted. | YES | <u>X</u> | NO <u>-</u> |
| | c. The seat back, if foldable, is folded forward as far as possible and then moved backward into positions. | YES | <u>X</u> | NO <u>-</u> |
| 4. | Is the inboard receptacle end of the seat belt assembly which is installed in the outboard designated seating position accessible with the center arm rest in any position to which it can be adjusted without moving the armrest? | YES | <u>X</u> | NO <u>-</u> |

D7

LATCH MECHANISM

A seat belt assembly installed in a passenger car, except an automatic belt assembly, shall have a latch mechanism:

- | | | | | |
|----|--|-----|----------|-------------|
| 1. | Whose components are accessible to a seated occupant in both the stowed and operational positions. | YES | <u>X</u> | NO <u>-</u> |
| 2. | That releases both the upper torso restraint and the lap belt simultaneously, if the assembly has a lap belt and an upper torso restraint that require unlatching for release of the occupant. | YES | <u>X</u> | NO <u>-</u> |
| 3. | That releases at a single point by a push button action. | YES | <u>X</u> | NO <u>-</u> |

Figure 8

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

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

The windshield is bonded in place with 0.7 trim along the top and 1.0 wide plastic trim along the sides.

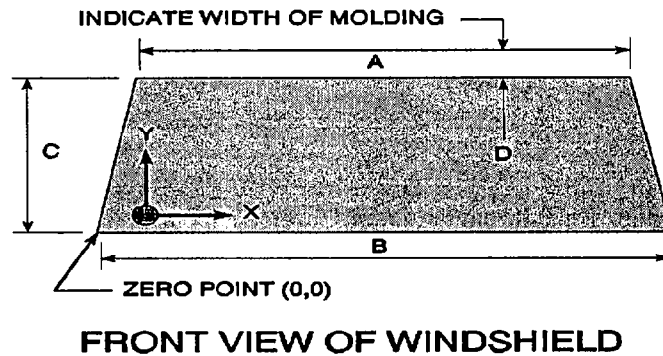
FMVSS 212 REQUIREMENTS :

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

FMVSS 212 TEST DATA :

	WINDSHIELD PERIPHERY		PERCENT RETENTION
	PRE - TEST (in.)	POST - TEST (in.)	
RIGHT SIDE	94.9	94.9	100.0
LEFT SIDE	94.9	94.9	100.0
TOTAL	189.8	189.8	100.0

AREA OF RETENTION FAILURE:



FAILURE DETAILS :

None

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

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

KEY:

The diagram shows a trapezoidal area representing a 'PROTECTED ZONE'. The top horizontal edge is labeled 'A', the bottom horizontal edge is labeled 'C', and the height is labeled 'B'. A coordinate system is centered on the left side of the trapezoid, with the 'Y' axis pointing upwards and the 'X' axis pointing to the right. The origin is labeled 'ZERO POINT (0,0)'. A horizontal line across the middle of the trapezoid is labeled 'LOWER EDGE OF PROTECTED ZONE'. The distance from the left vertical edge to this line is labeled 'D', and the distance from this line to the right vertical edge is labeled 'E'. A horizontal distance 'F' is indicated from the right vertical edge to the right edge of the shaded area.

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4" :

	COORDINATES	
	X	Y
1		
2		
3		
4		

8221-1

Table 13

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO. : CR0207 TEST DATE : July 19, 1994Vehicle Mfr./Make/Model : 1994 Mercury Villager MPV

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

TEST VEHICLE IMPACT TYPE : X Frontal (30 mph)
- Oblique (30 mph) with - ° barrier face first
 contacting -
 (driver/passenger) side
- Rear Moving Barrier (30 mph)
- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT:

1. From impact until vehicle motion ceases
2. For five minute period after vehicle motion ceases
3. For next 25 minutes

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

SOLVENT SPILLAGE DETAILS :

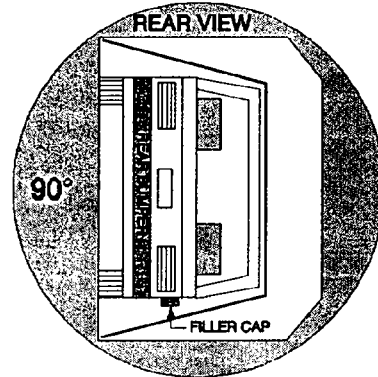
None

Table 14

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE :
0-90 Deg.

Vehicle NHTSA ID No. :
CR0207

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

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

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE :

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

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

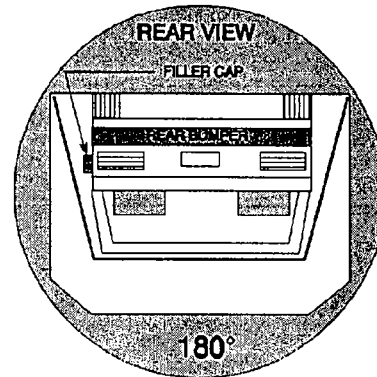
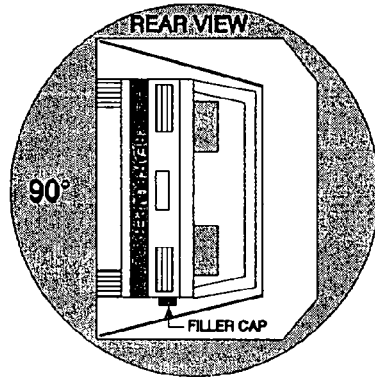
IV. SOLVENT SPILLAGE LOCATION(S) :

None

Table 14
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
90-180 Deg.

Vehicle NHTSA ID No. :
CR0207



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	<u>1</u>	minutes	<u>54</u>	seconds
FMVSS 301 Position Hold Time +	<u>5</u>	minutes	<u>00</u>	seconds
TOTAL	<u>6</u>	minutes	<u>54</u>	seconds
Next whole minute interval	<u>7</u>	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE :

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

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

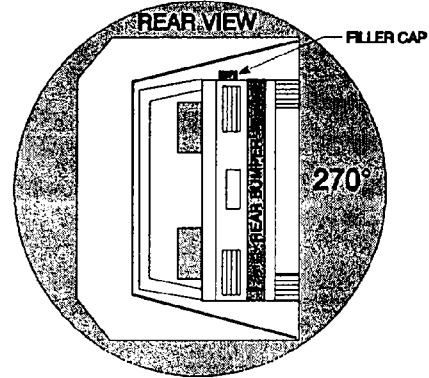
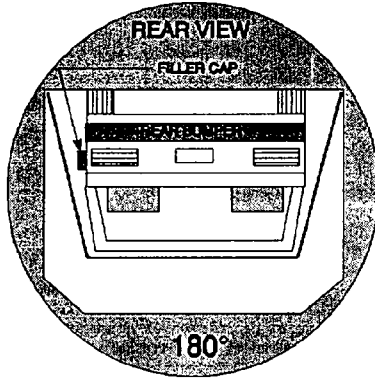
IV. SOLVENT SPILLAGE LOCATION(S) :

None

Table 14
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
180-270 Deg.

Vehicle NHTSA ID No. :
CR0207



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	<u>2</u>	minutes	<u>33</u>	seconds
FMVSS 301 Position Hold Time +	<u>5</u>	minutes	<u>00</u>	seconds
TOTAL	<u>7</u>	minutes	<u>33</u>	seconds
Next whole minute interval	<u>8</u>	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE :

0	0	0	0
---	---	---	---

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

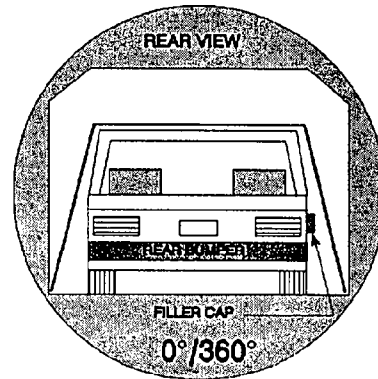
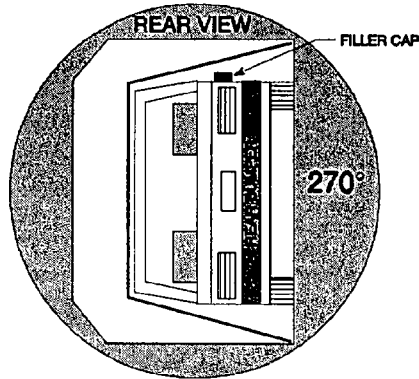
IV. SOLVENT SPILLAGE LOCATION(S) :

None

Table 14
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
270-360 Deg.

Vehicle NHTSA ID No. :
CR0207



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	<u>1</u>	minutes	<u>47</u>	seconds
FMVSS 301 Position Hold Time +	<u>5</u>	minutes	<u>00</u>	seconds
TOTAL	<u>6</u>	minutes	<u>47</u>	seconds
Next whole minute interval	<u>7</u>	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE :

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

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

IV. SOLVENT SPILLAGE LOCATION(S) :

None

Table 15

POST TEST AIR BAG DATA

NHTSA No. : CR0207; Test Date: July 19, 1994; Technician: R.E.

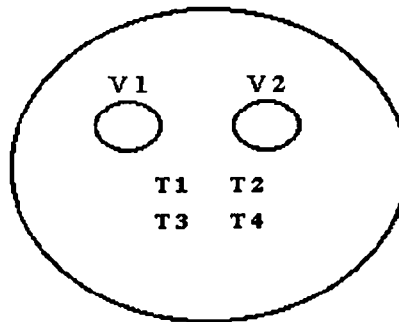
Vehicle Model Year/Make/Model: 1994 Mercury Villager

A.	No. of vent holes:	<u>2</u>	-Driver	<u>N/A</u>	-Passenger
B.	Size of vent holes: (In. ²)	<u>0.81</u>	-Driver	<u>N/A</u>	-Passenger
C.	Total vent area: (In. ²)	<u>2.54</u>	-Driver	<u>N/A</u>	-Passenger
D.	Deflated air bag length and width dimensions or, if round, diameter. (In inches)				
	Driver:	<u>-</u>	-Length;	<u>-</u>	-Width;
					<u>28.0</u> -Diameter
	Passenger:	<u>N/A</u>	-Height;	<u>N/A</u>	-Width;
					<u>N/A</u> -Depth
E.	Is the air bag tethered?				
	Driver:	<u>X</u> -Yes;	<u>-</u> -No;	If yes, record length of tether- <u>10.0</u>	
	Passenger:	<u>N/A</u> -Yes;	<u>N/A</u> -No;	If yes, record length of tether- <u>N/A</u>	

Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

(Note: Not to scale; V_n = Vent hole_n, T_n = Tether_n).

DRIVER AIR BAG



The air bag tether is stitched to the air bag center with four tether straps attached to inflator mechanism at steering wheel center.

- F. Record part numbers and manufacturer name of the air bag and gas generator.

Driver: Airbag: 98570-13405 / 4SS942307 / BBNG001 / KB1E4943 050484
Inflator: G37 *KM0B7943080357* / UT10479/BAM-PT, 0432 / NE5E3H3WAKL

Passenger: The test vehicle was not equipped with a passenger air bag.

- G. Cut out a 6 inch by 6 inch swatch of the bag material and at least one tether from each bag, mark the vehicle's NHTSA number on the swatch, and send these parts to the COTR with the test report.

Table 16

ACCIDENT INVESTIGATION DIVISION DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1994 Mercury Villager MPV

VEHICLE NHTSA NO. : CR0207 VIN NO. : 4M2DV11W6RDJ40209

WHEELBASE: 112.3 BUILD DATE: May, 1994 TEST DATE: July 19, 1994

VEH SIZE CATEGORY: Full size TEST WEIGHT: 4500

FRONT OVERHANG: - OVERALL WIDTH: -

COLLISION DEFORMATION (CDC) CODE: 12FDEW2

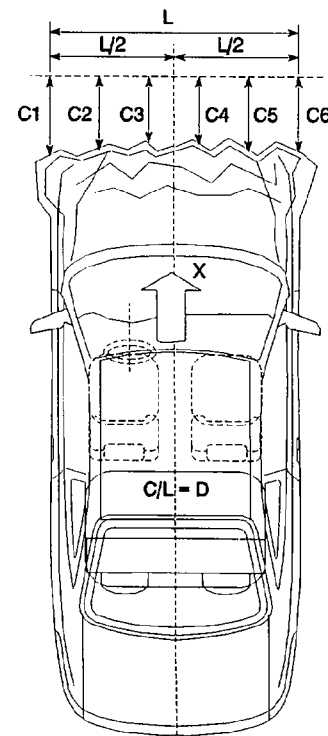
IMPACT MODE: 30 mph frontal barrier

CRUSH DEPTH DIMENSIONS: (Inches)

C1 = <u>9.5</u>	C4 = <u>16.7</u>
C2 = <u>13.8</u>	C5 = <u>15.5</u>
C3 = <u>14.9</u>	C6 = <u>10.7</u>

MIDPOINT OF DAMAGE: D =
(Vehicle Longitudinal Centerline) 31.0

LENGTH OF DAMAGE
REGION: L = 62.0



Remarks: None

Table 17
TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA Contract Lab : Calspan Advanced Technology Center

Lab Project Manager & Telephone No. : David J. Travale (716) 632 - 7500

Date of Test : July 19, 1994 Vehicle NHTSA No. : CR0207

Vehicle Manufacturer : FORD MOTOR COMPANY, U.S.A.

Model Year : 1994 VIN : 4M2DV11W6RDJ40209

Model : Villager Body Style: MPV Build Date : May, 1994

Dummy Stabilized Temperature at Time of Test : 70 °F (Spec. = 66 - 78 °F)

Impact Velocity : 29.0 mph; Time of Test : 10:45

Type of Automatic Restraint System :

Driver : Air bag, automatic torso belt

Passenger : Automatic torso belt

Failure Details :

The vehicle, as tested, appears to comply with the requirements of FMVSS Nos. 208, 212, 219(Partial), and 301.

Appendix A
PHOTOGRAPHS

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Figure A-1 PRE-TEST FRONT VIEW



Figure A-2 POST-TEST FRONT VIEW

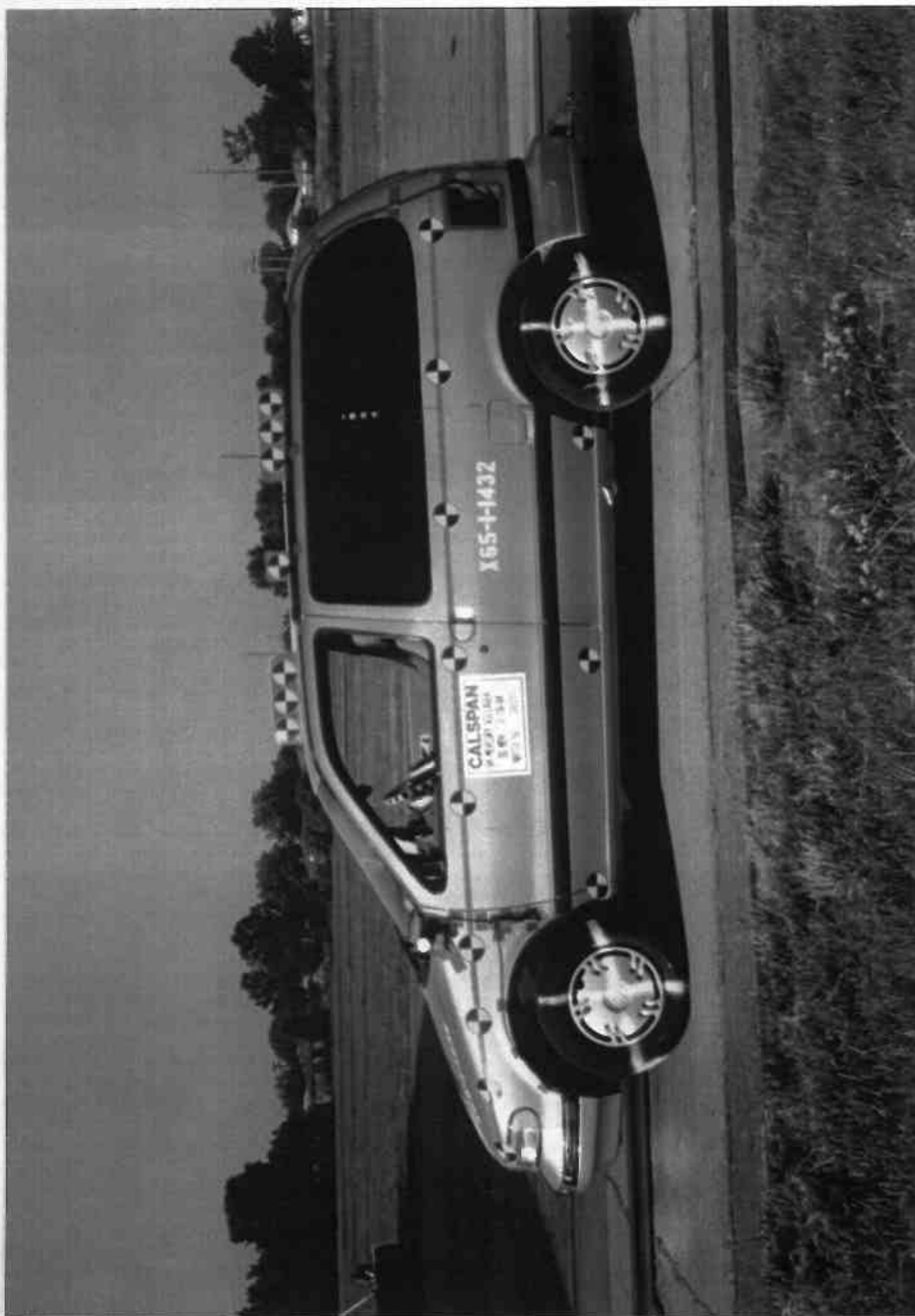


Figure A-3 PRE-TEST LEFT SIDE VIEW

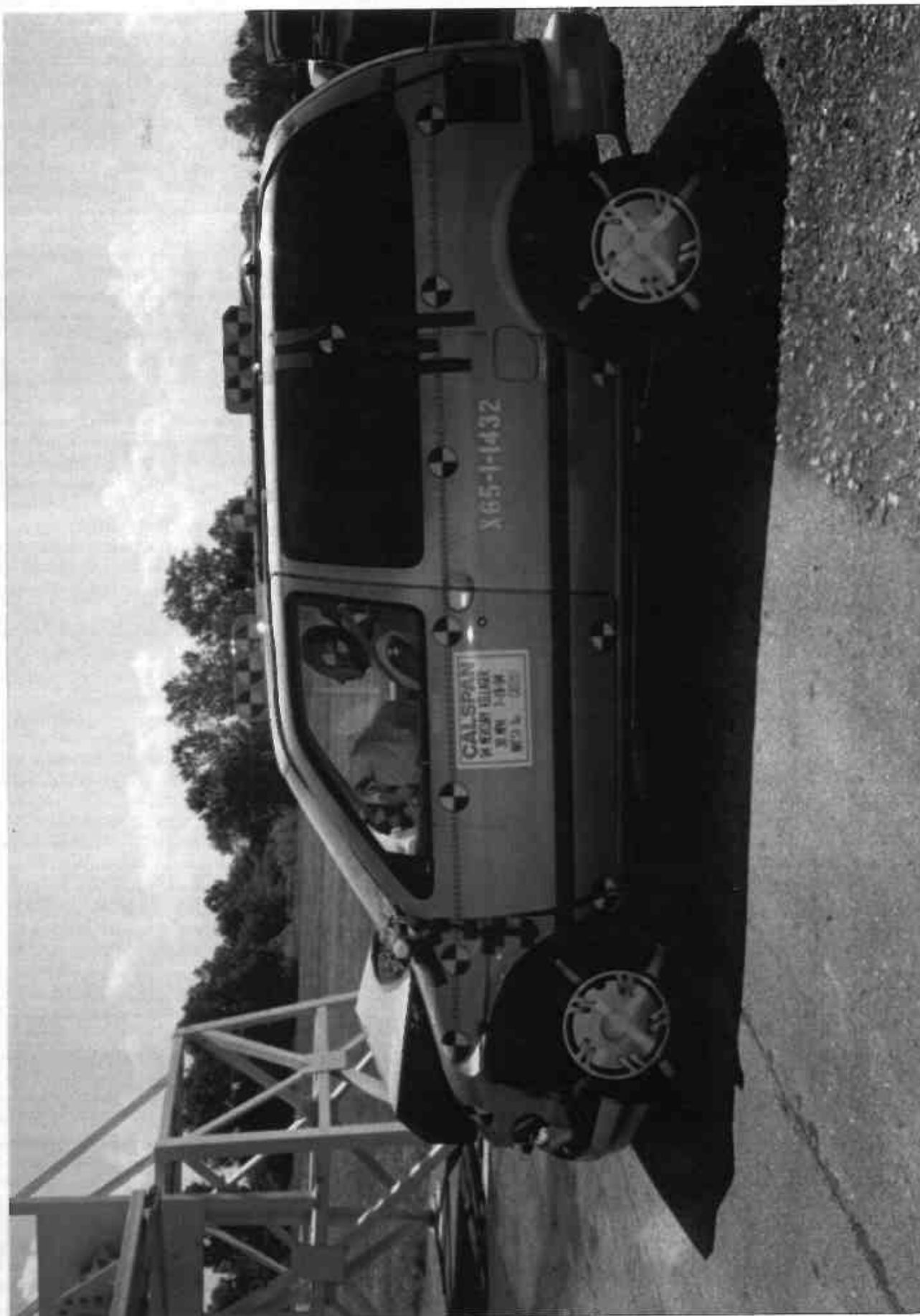


Figure A-4 POST-TEST LEFT SIDE VIEW

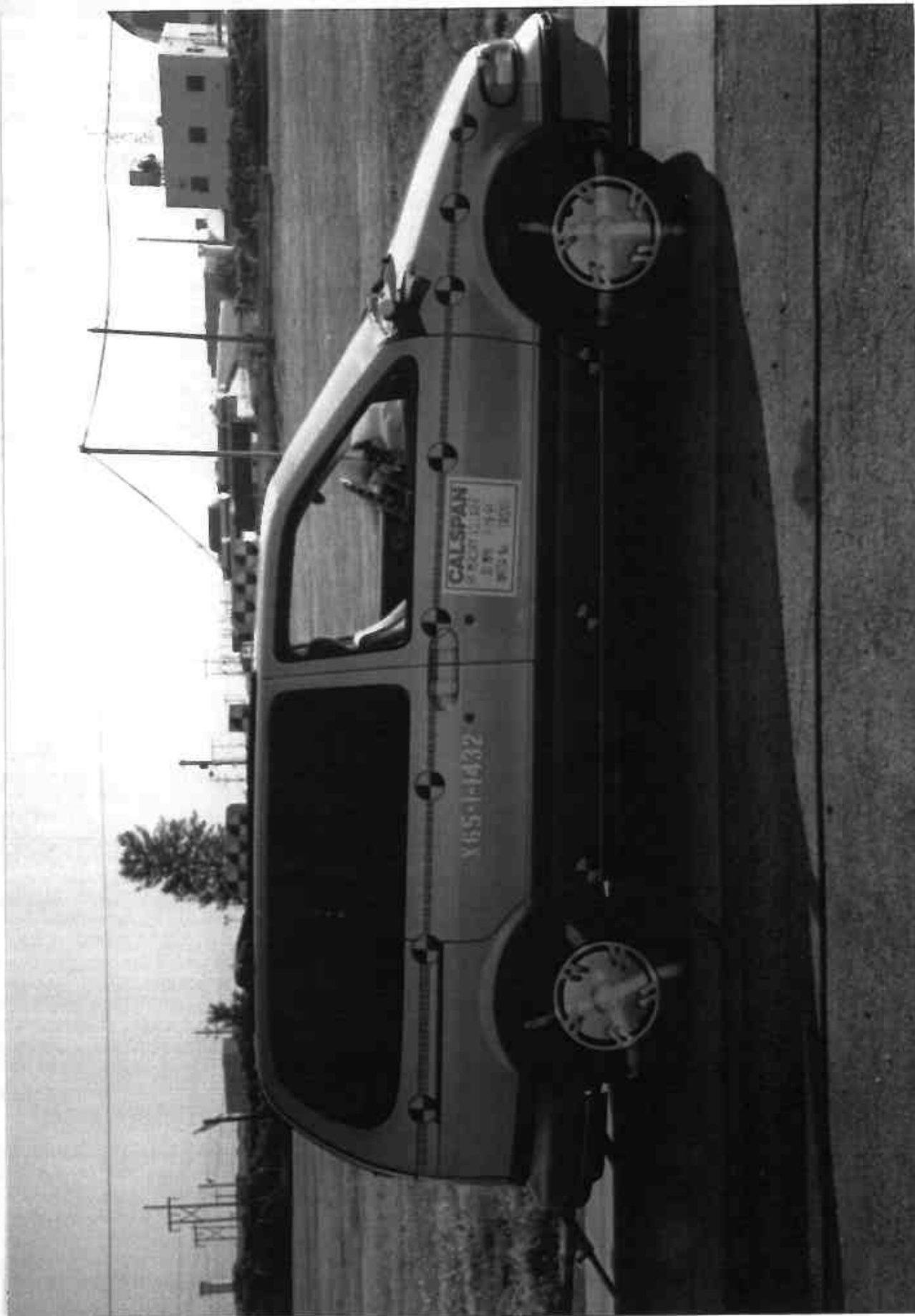


Figure A-5 PRE-TEST RIGHT SIDE VIEW

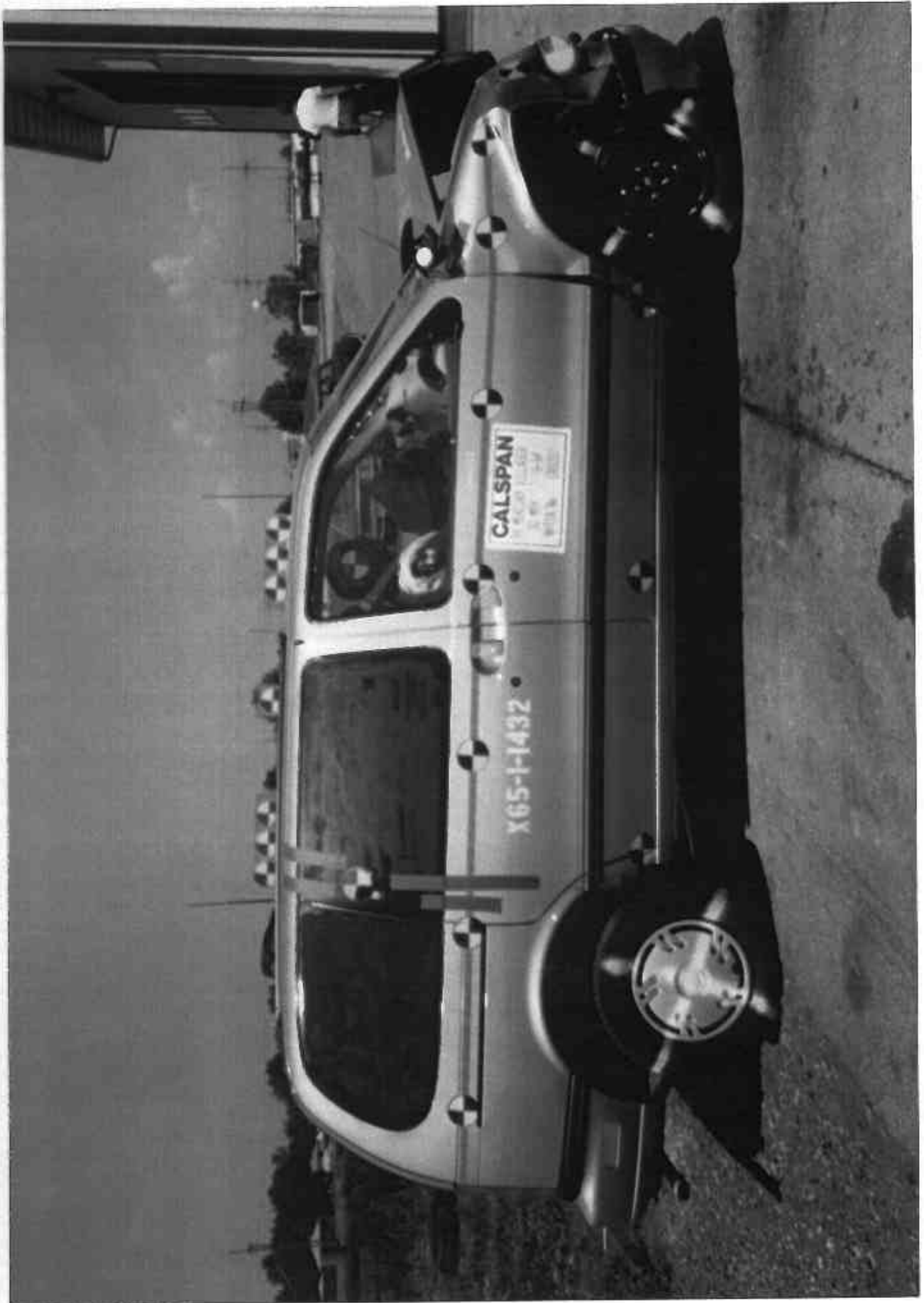


Figure A-6 POST-TEST RIGHT SIDE VIEW



Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



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



Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

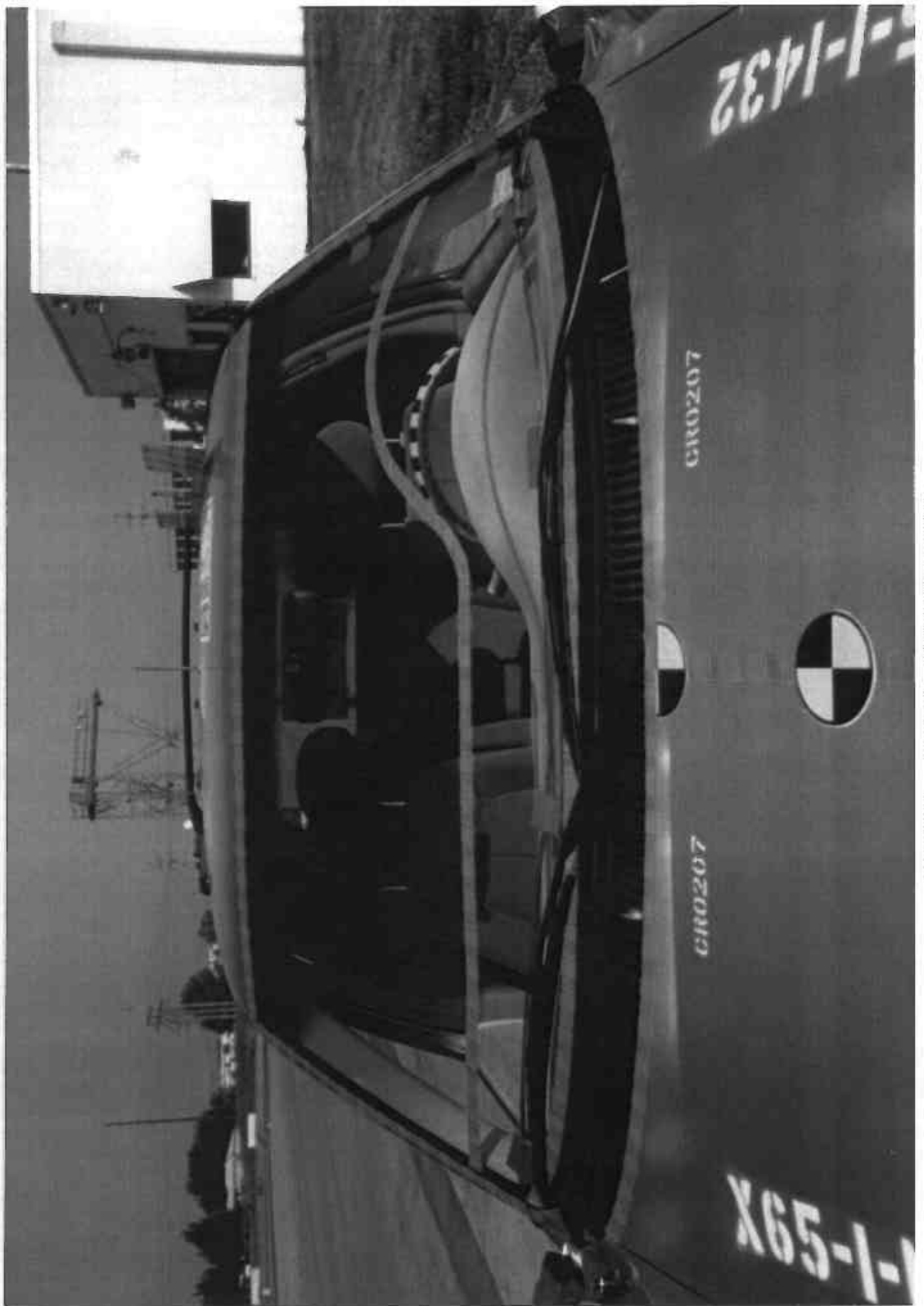


Figure A-11 PRE-TEST WINDSHIELD VIEW

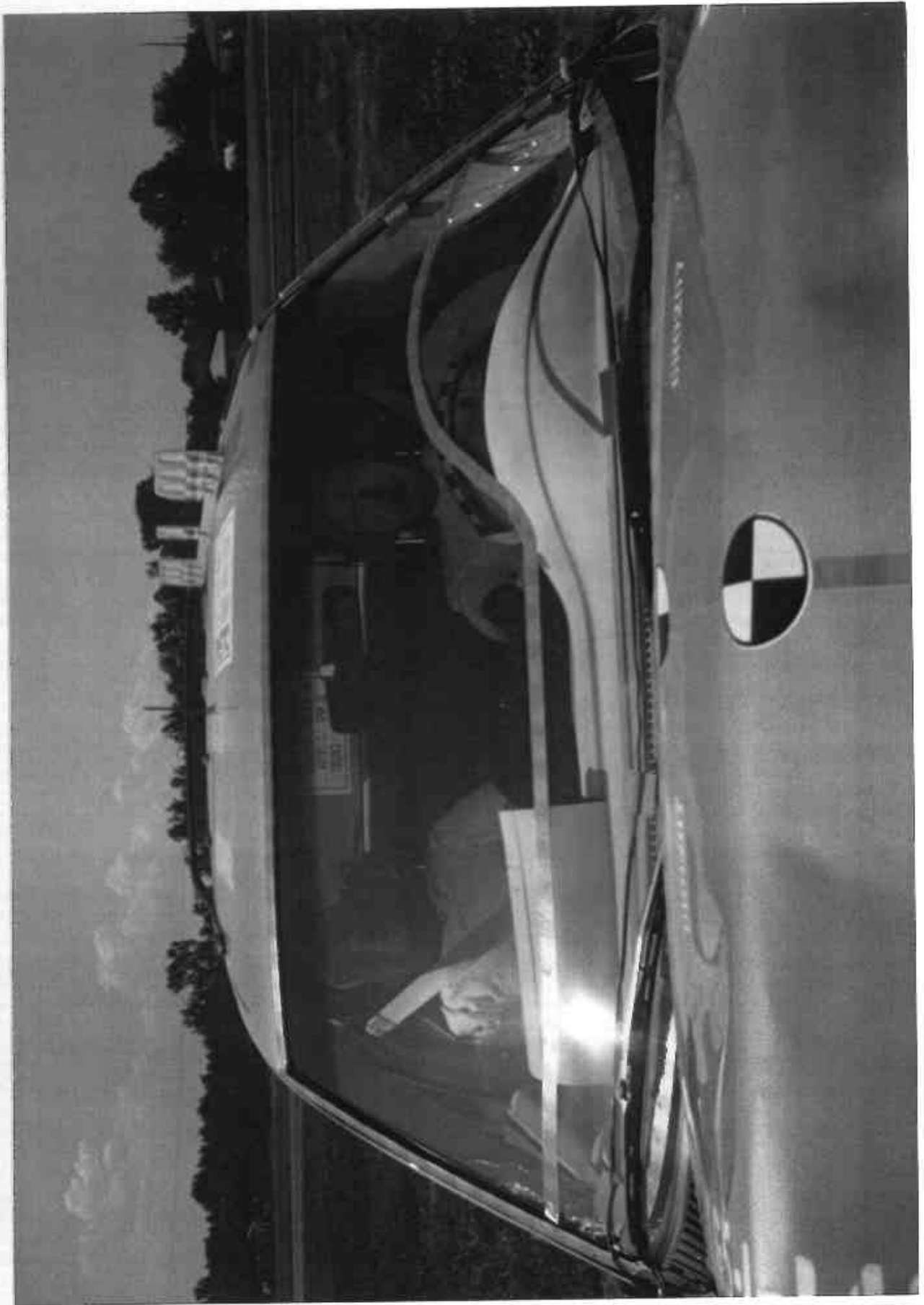


Figure A-12 POST-TEST WINDSHIELD VIEW

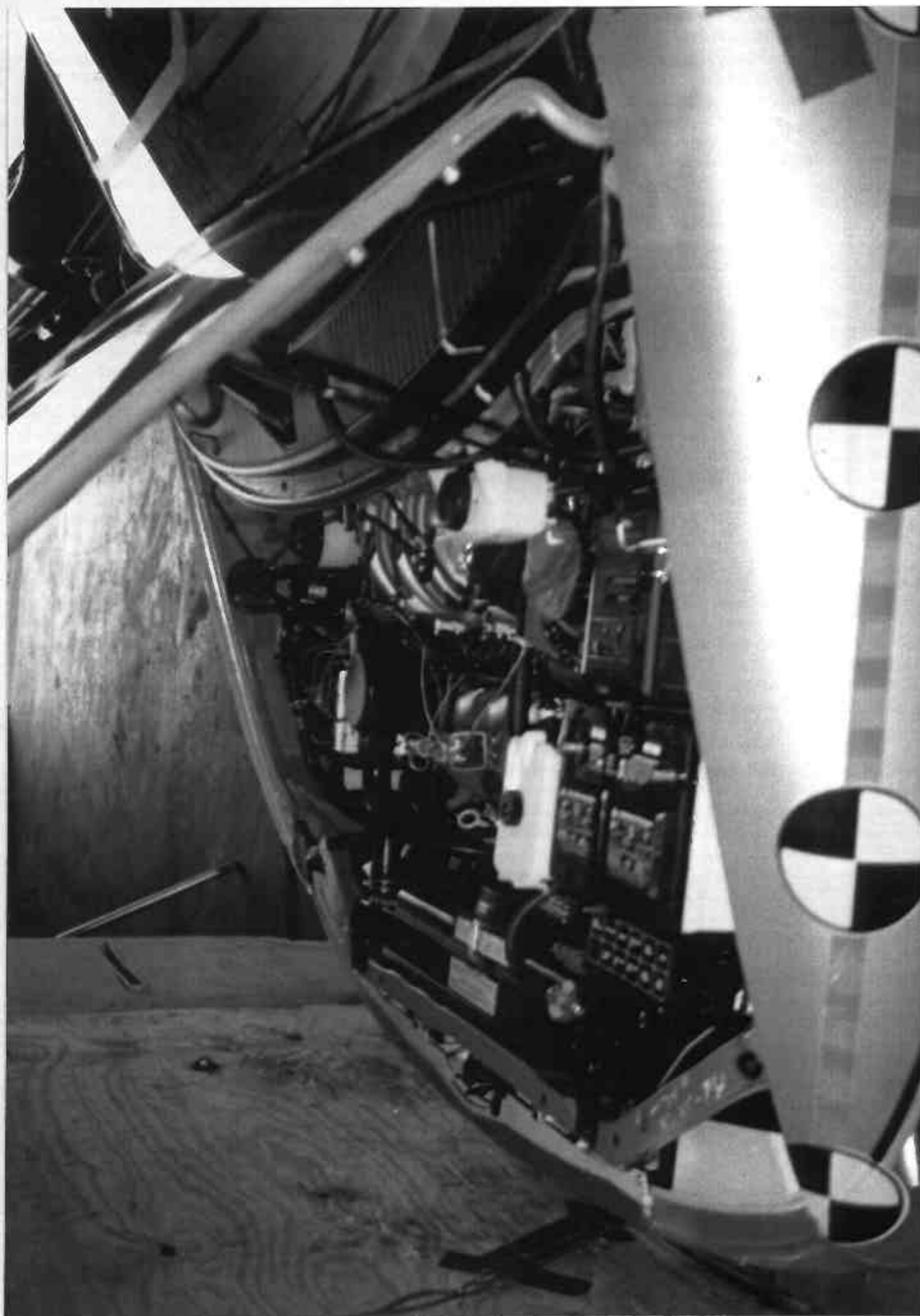


Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

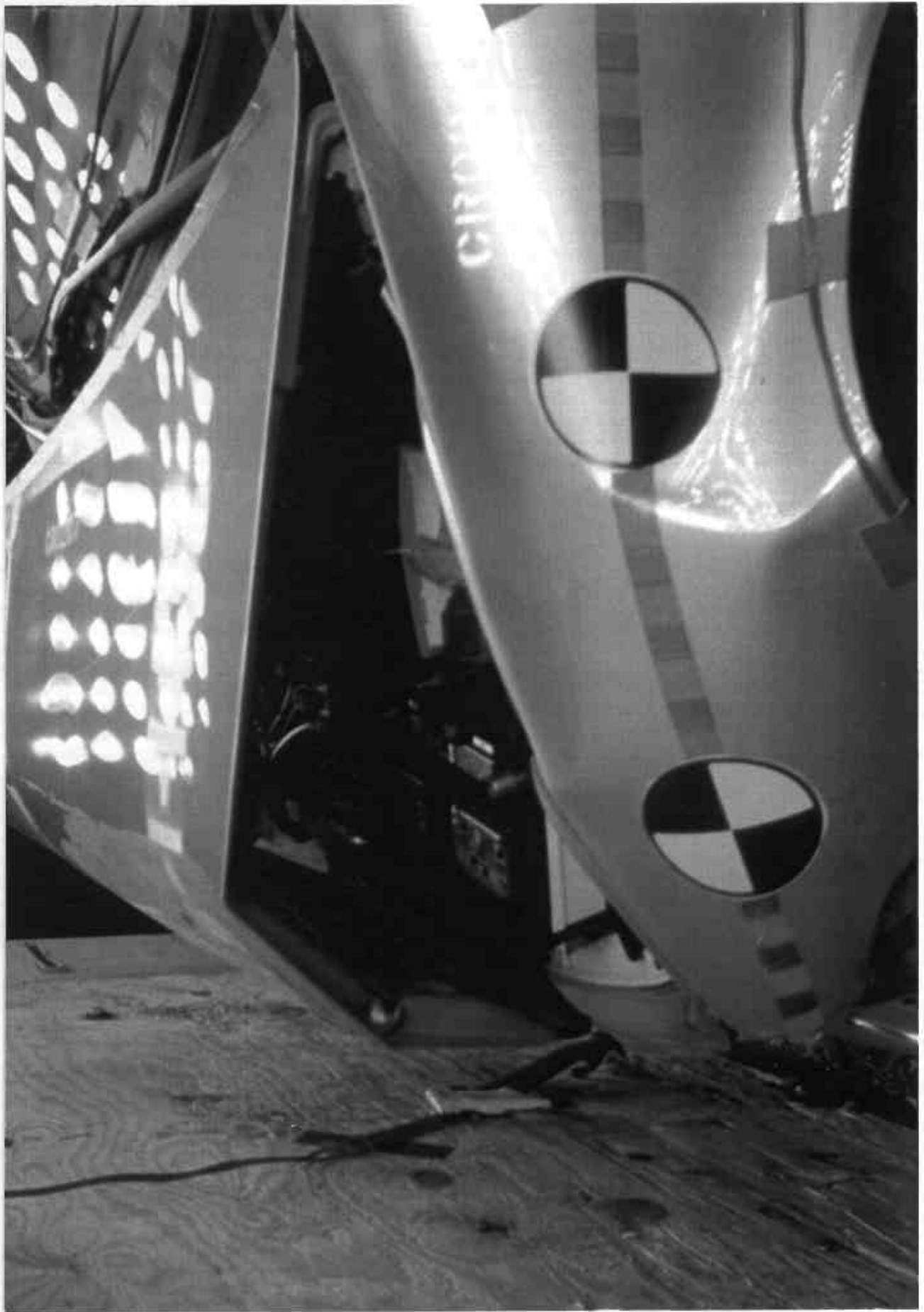


Figure A-14 POST-TEST ENGINE COMPARTMENT VIEW

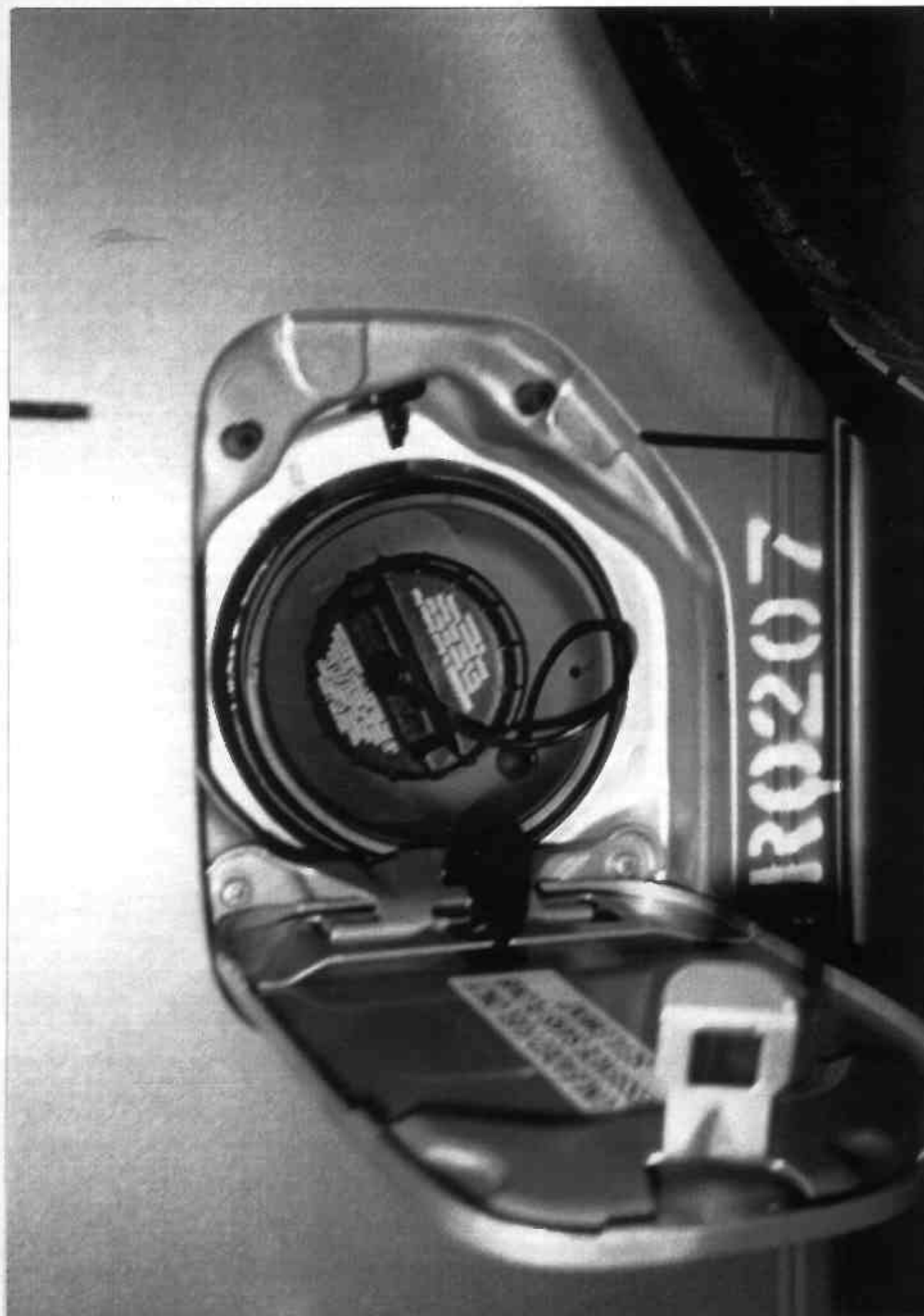


Figure A-15 PRE-TEST FUEL FILLER CAP

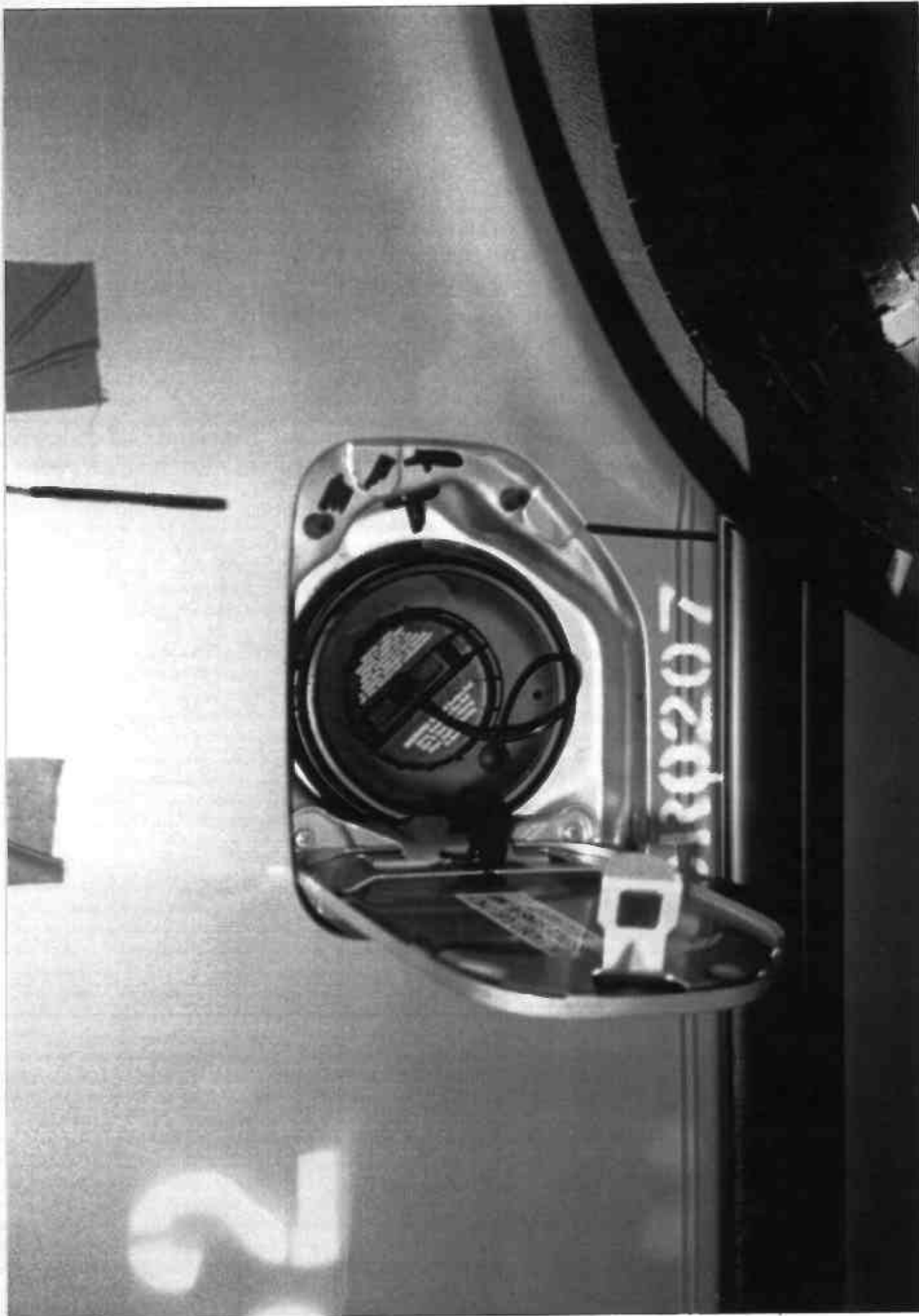


Figure A-16 POST-TEST FUEL FILLER CAP



Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

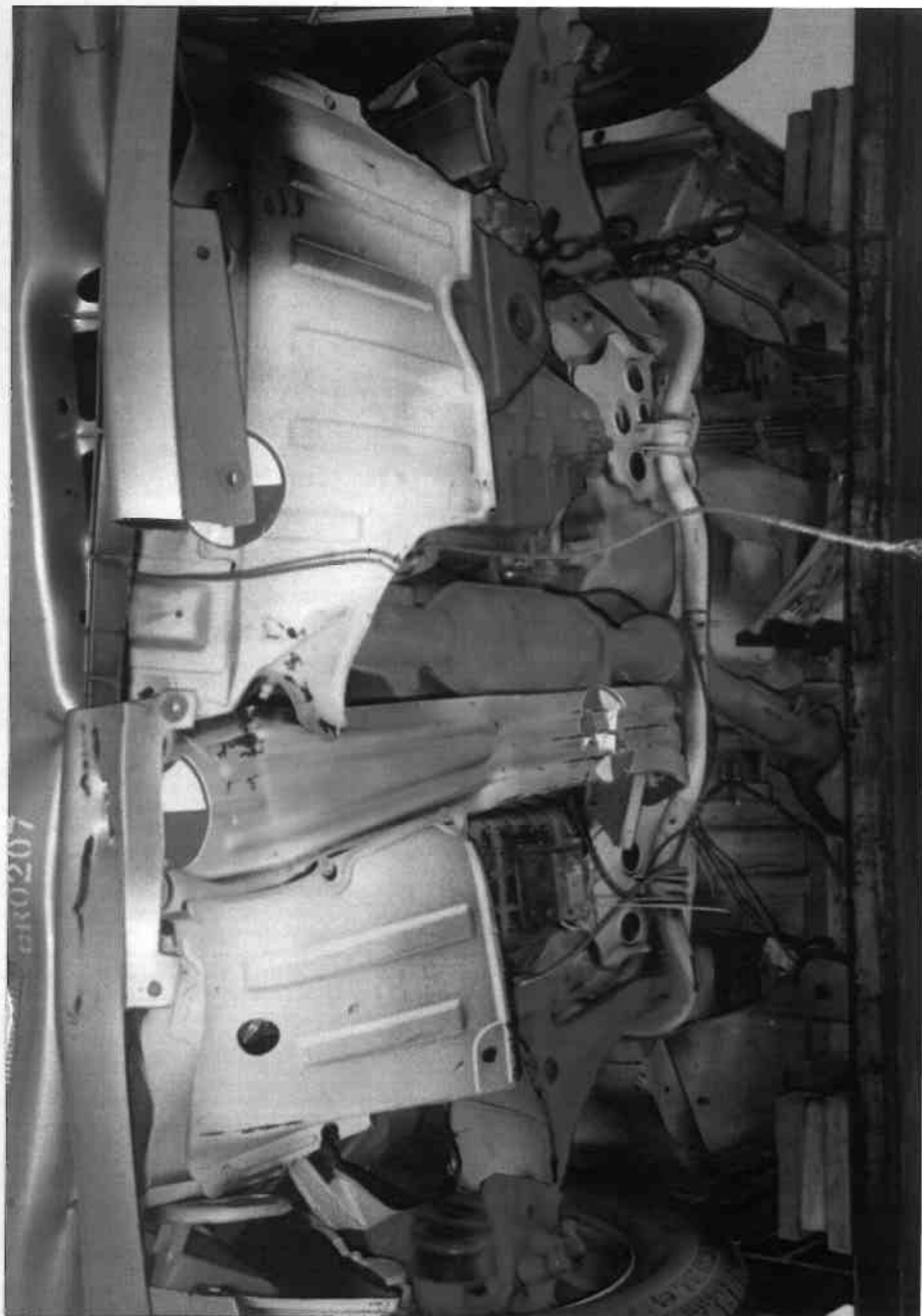


Figure A-18 POST-TEST FRONT UNDERBODY VIEW

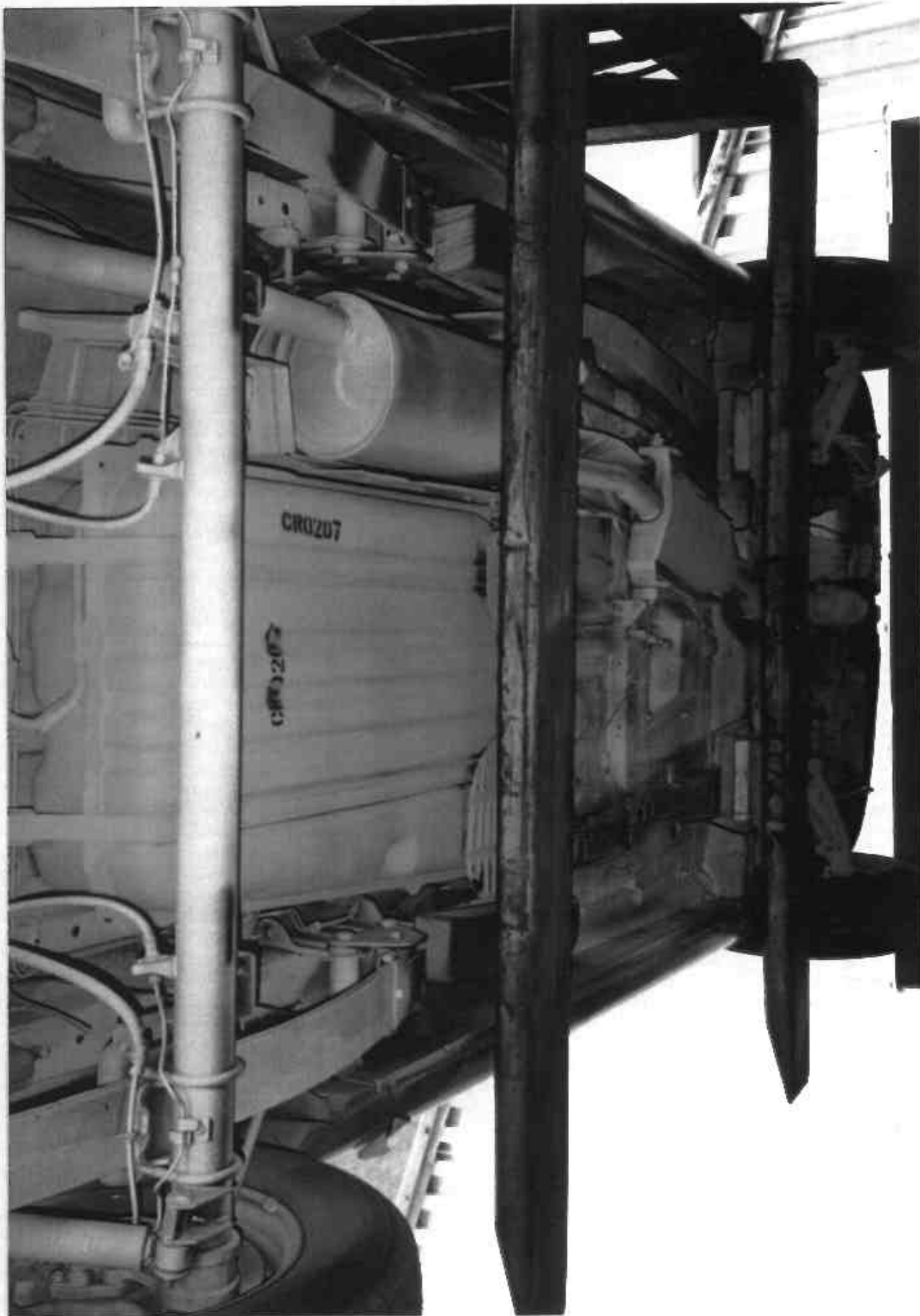


Figure A-19 PRE-TEST REAR UNDERBODY VIEW

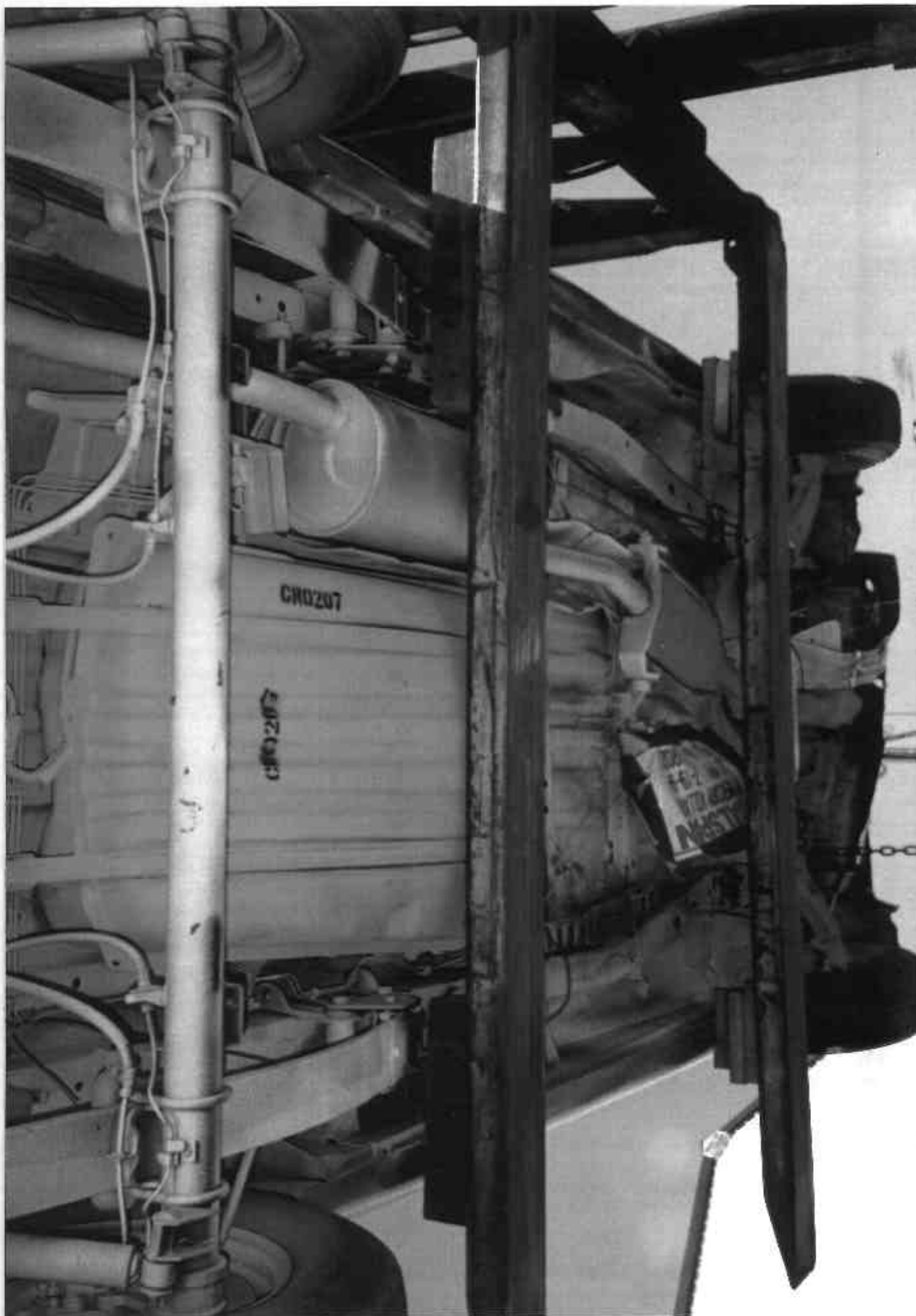


Figure A-20 POST-TEST REAR UNDERBODY VIEW



Figure A-21 PRE-TEST DRIVER SIDE VIEW



Figure A-22 POST-TEST DRIVER SIDE VIEW

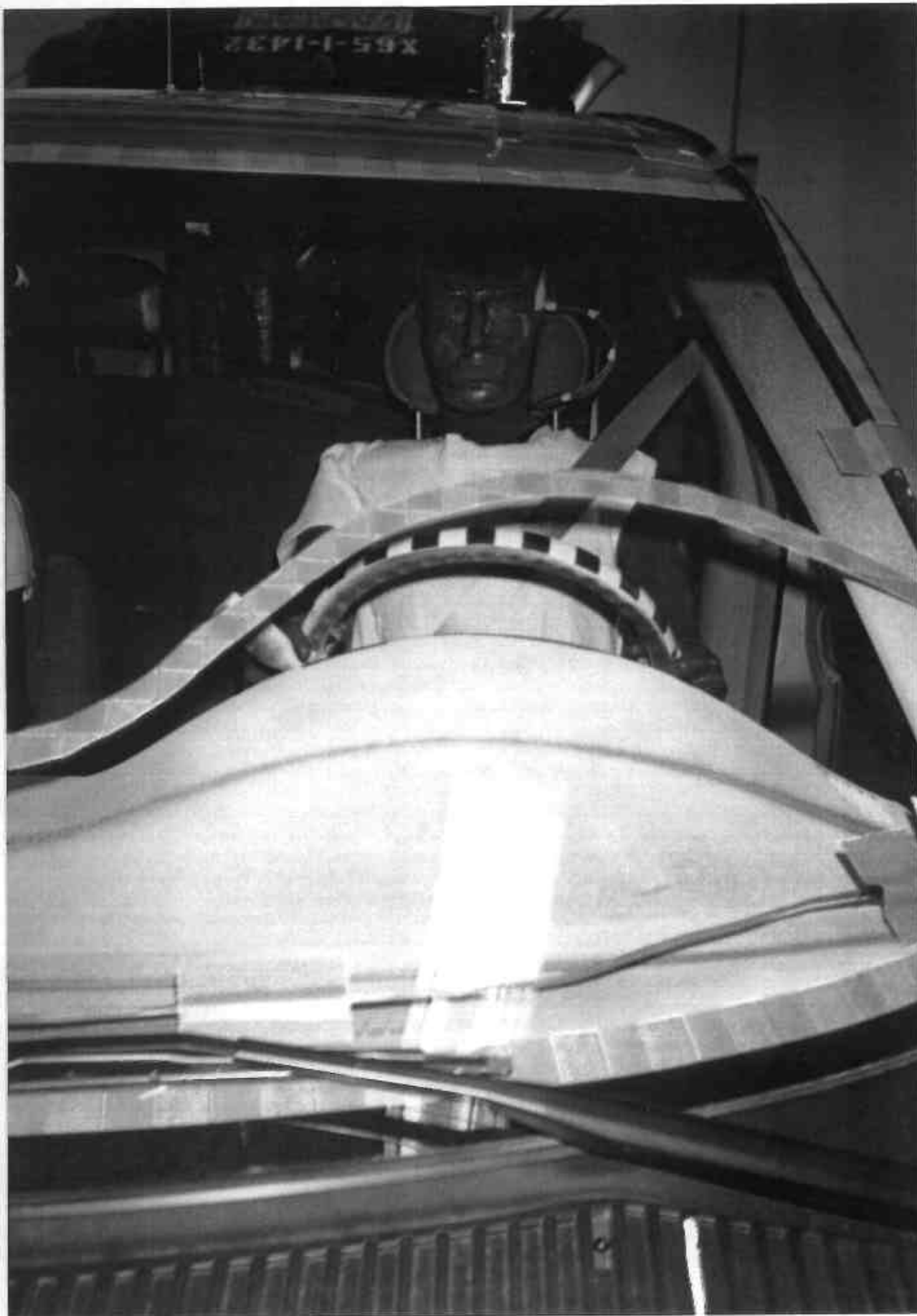


Figure A-23 PRE-TEST DRIVER FRONT VIEW

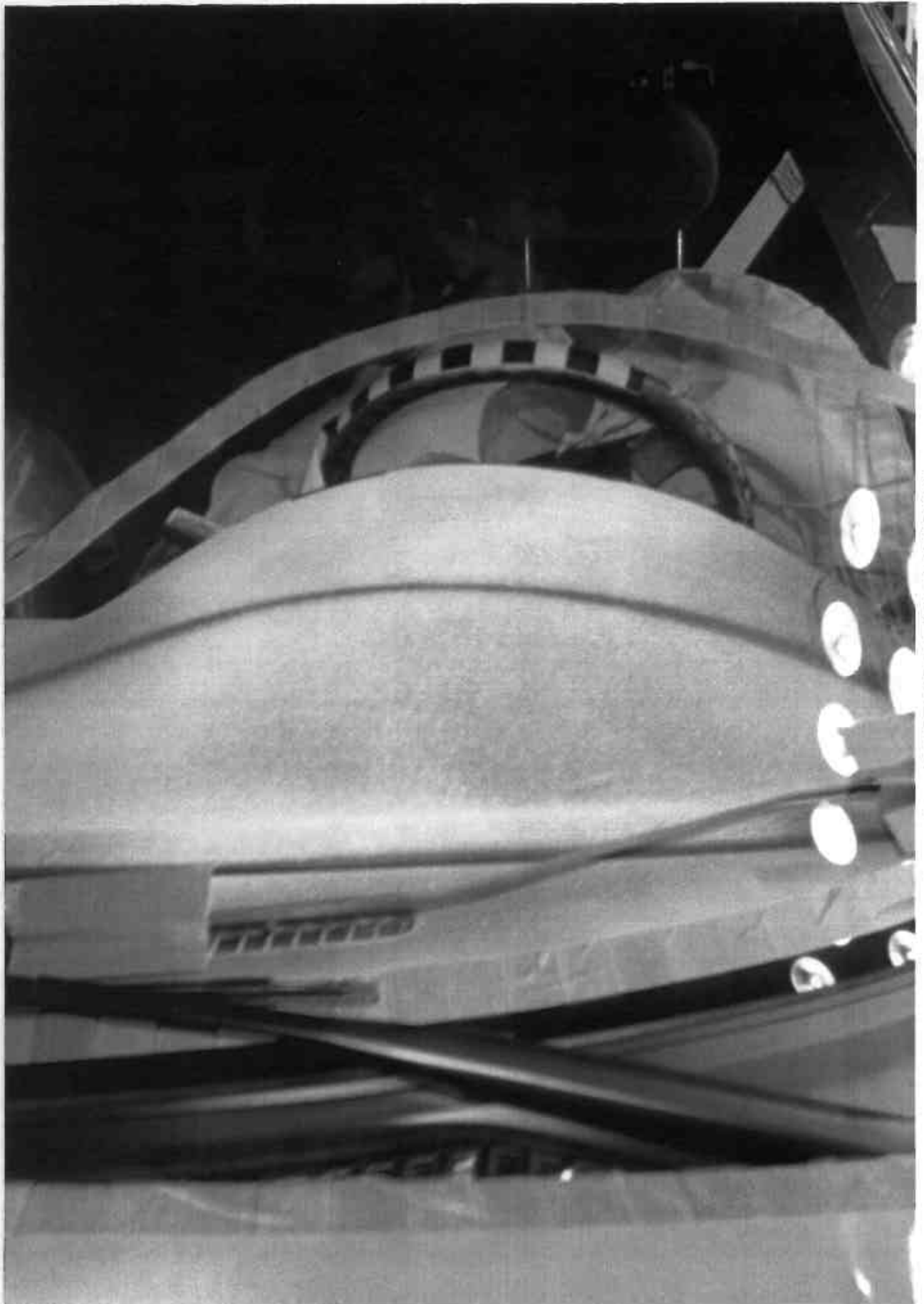


Figure A-24 POST-TEST DRIVER FRONT VIEW

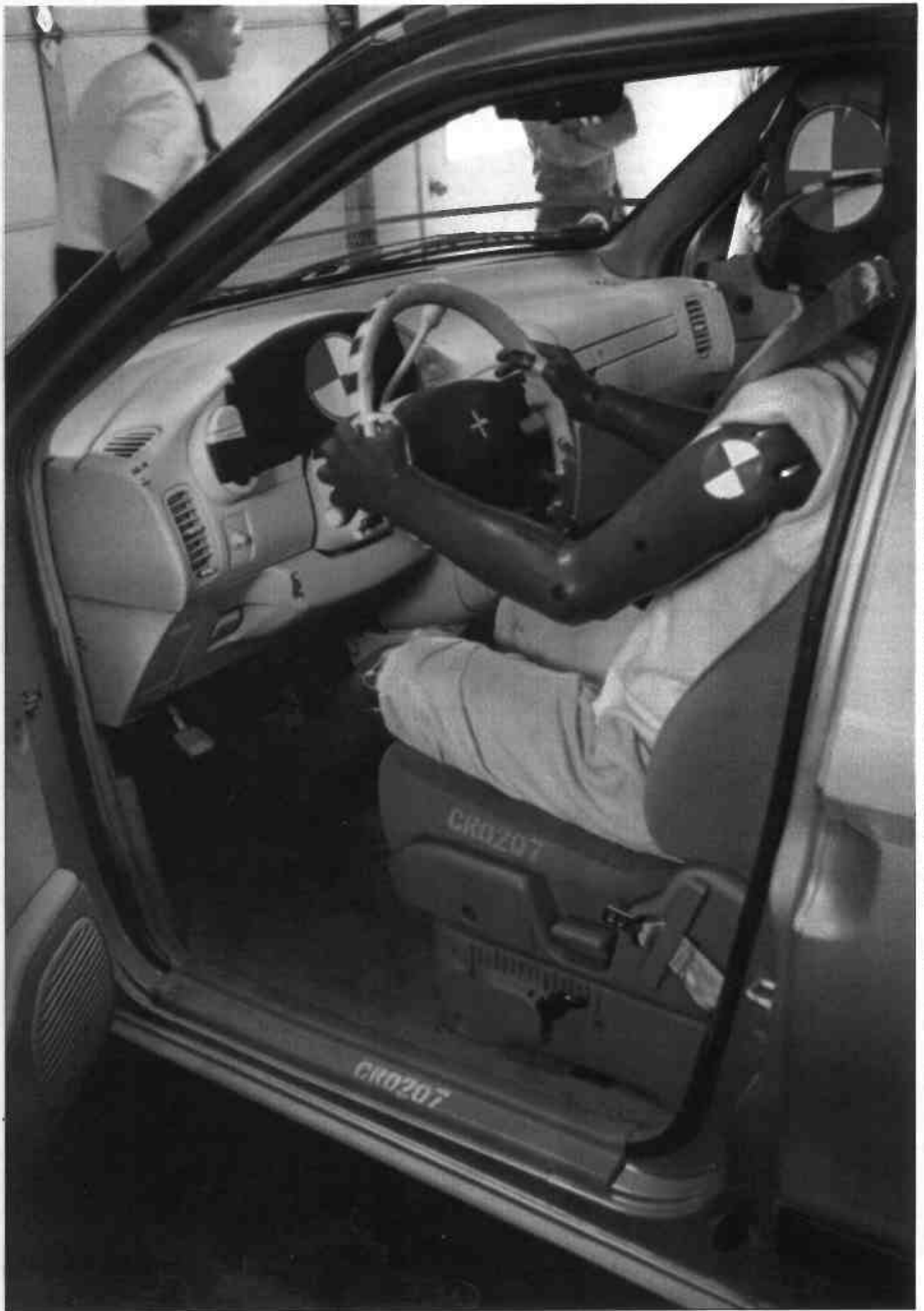


Figure A-25 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW



Figure A-26 POST-TEST DRIVER DUMMY AND INTERIOR VIEW



Figure A-27 PRE-TEST PASSENGER SIDE VIEW

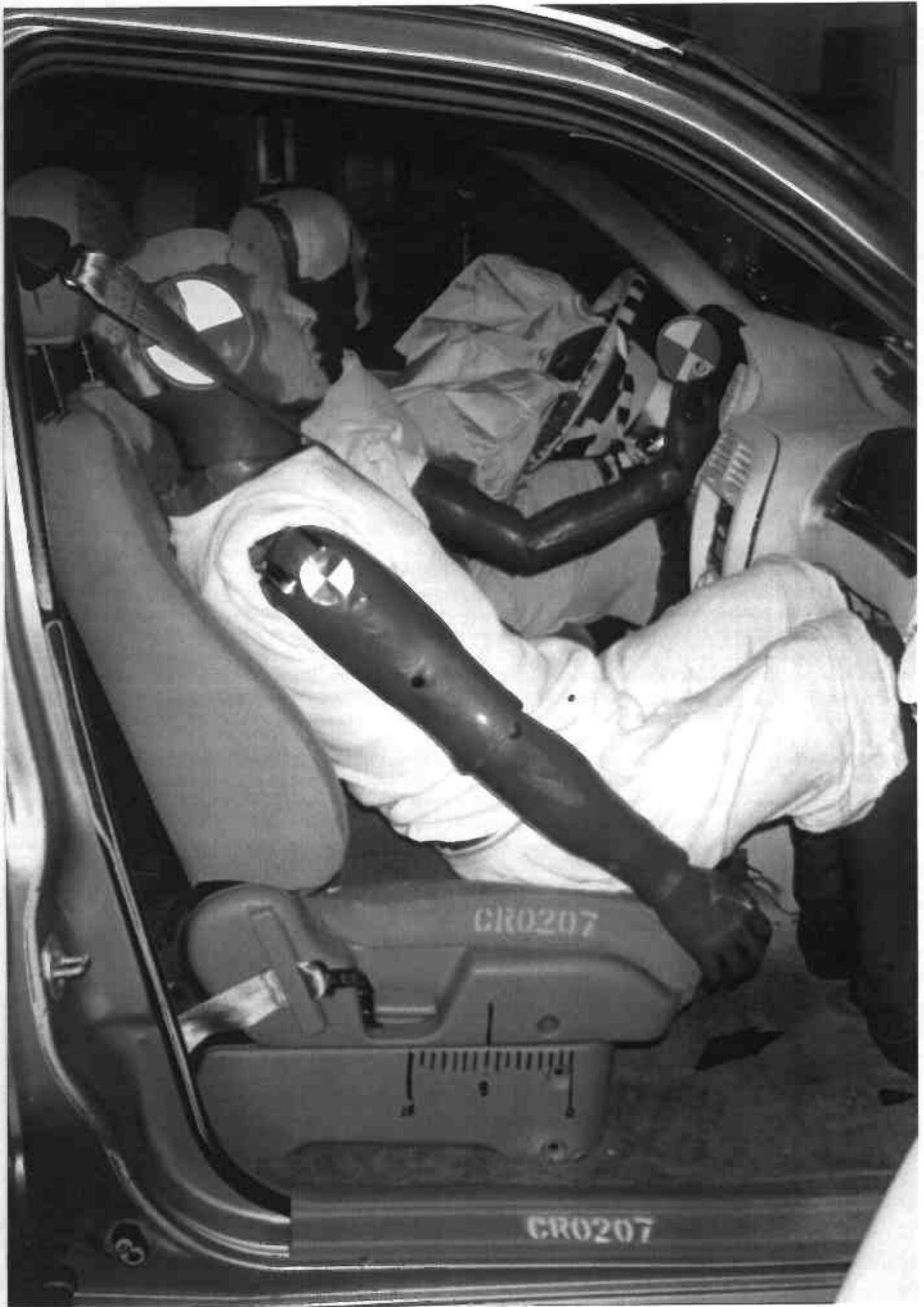


Figure A-28 POST-TEST PASSENGER SIDE VIEW

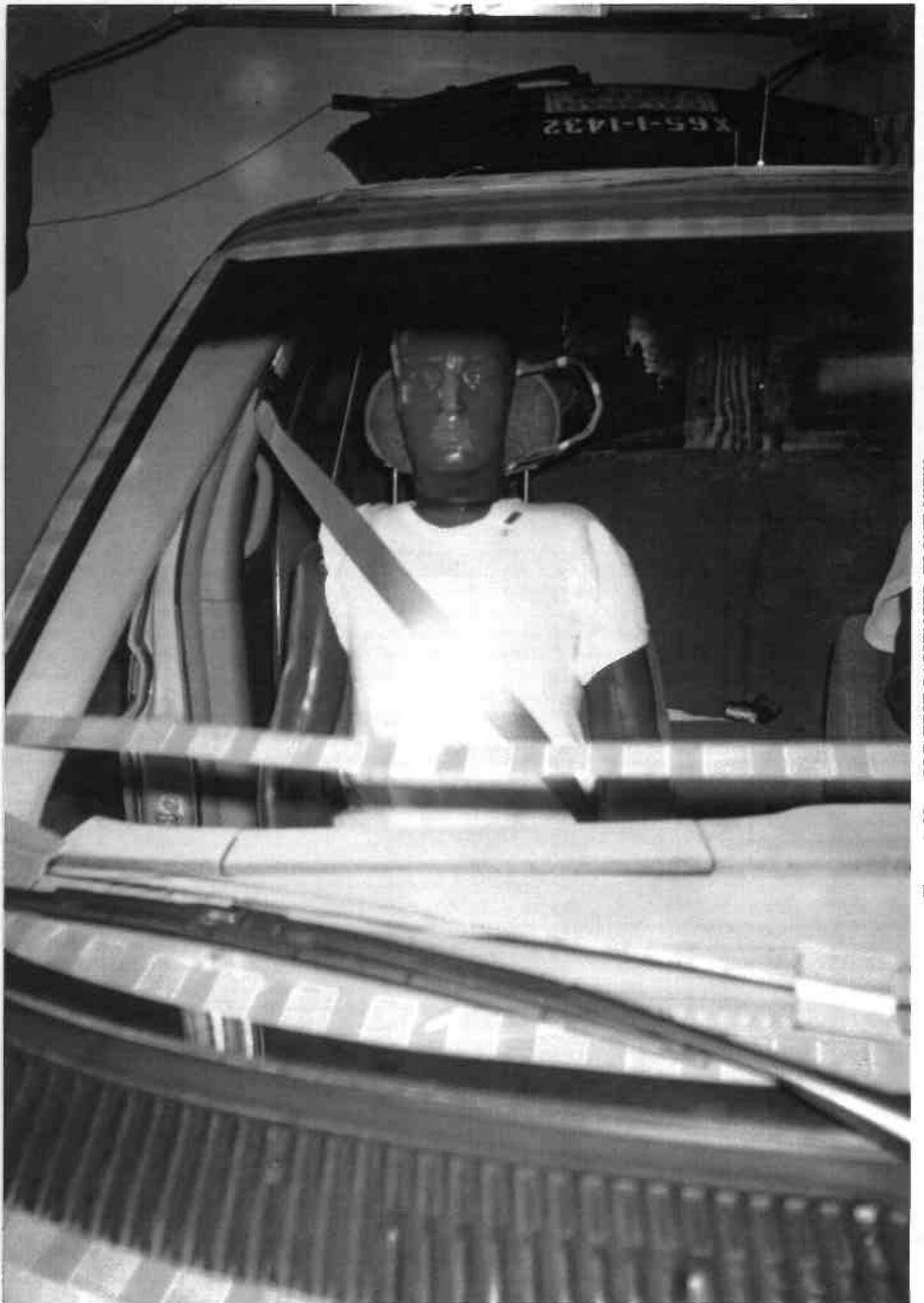


Figure A-29 PRE-TEST PASSENGER FRONT VIEW



Figure A-30 POST-TEST PASSENGER FRONT VIEW



Figure A-31 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW



Figure A-32 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW

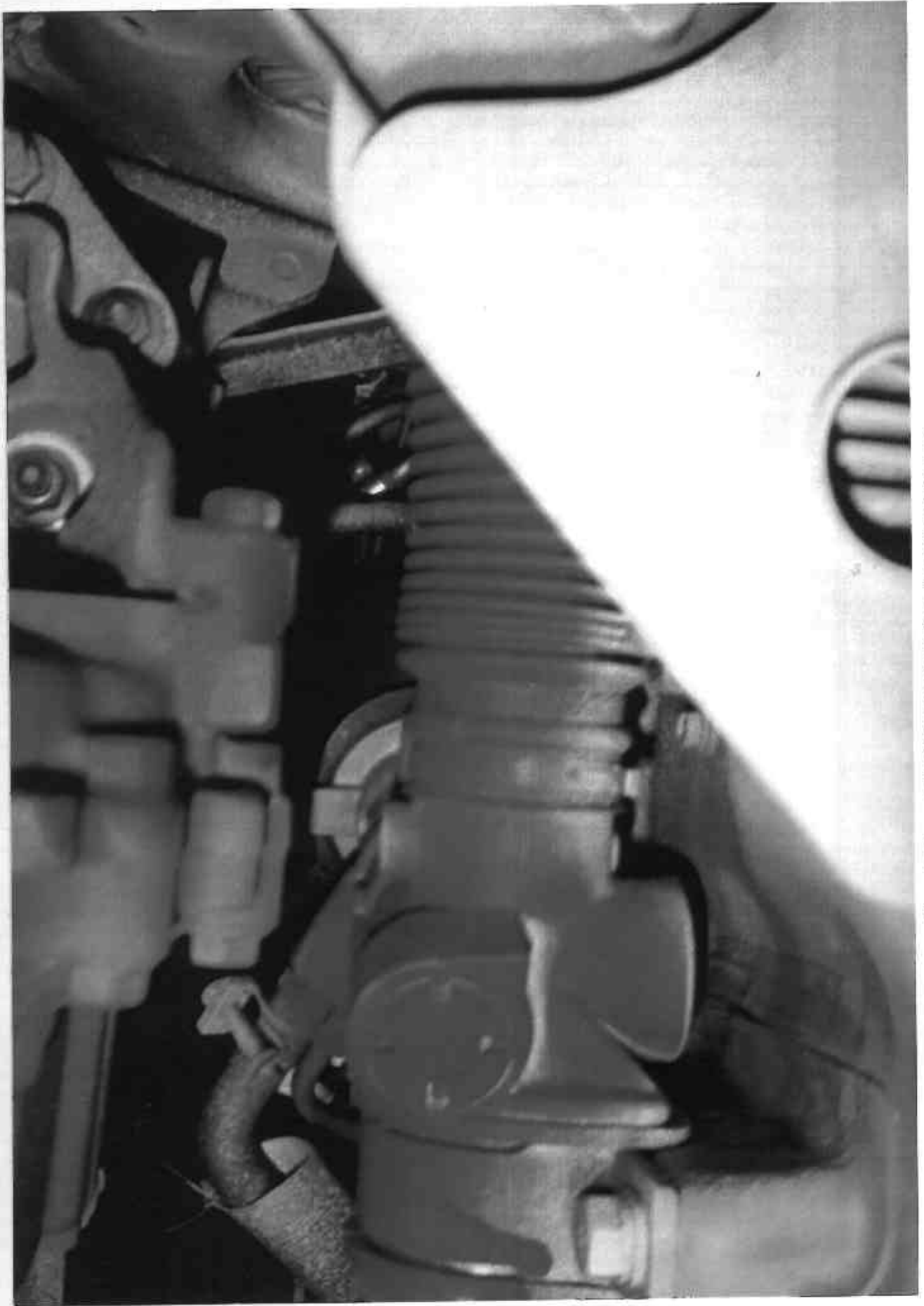


Figure A-33 PRE-TEST UNDERBODY STEERING SHAFT

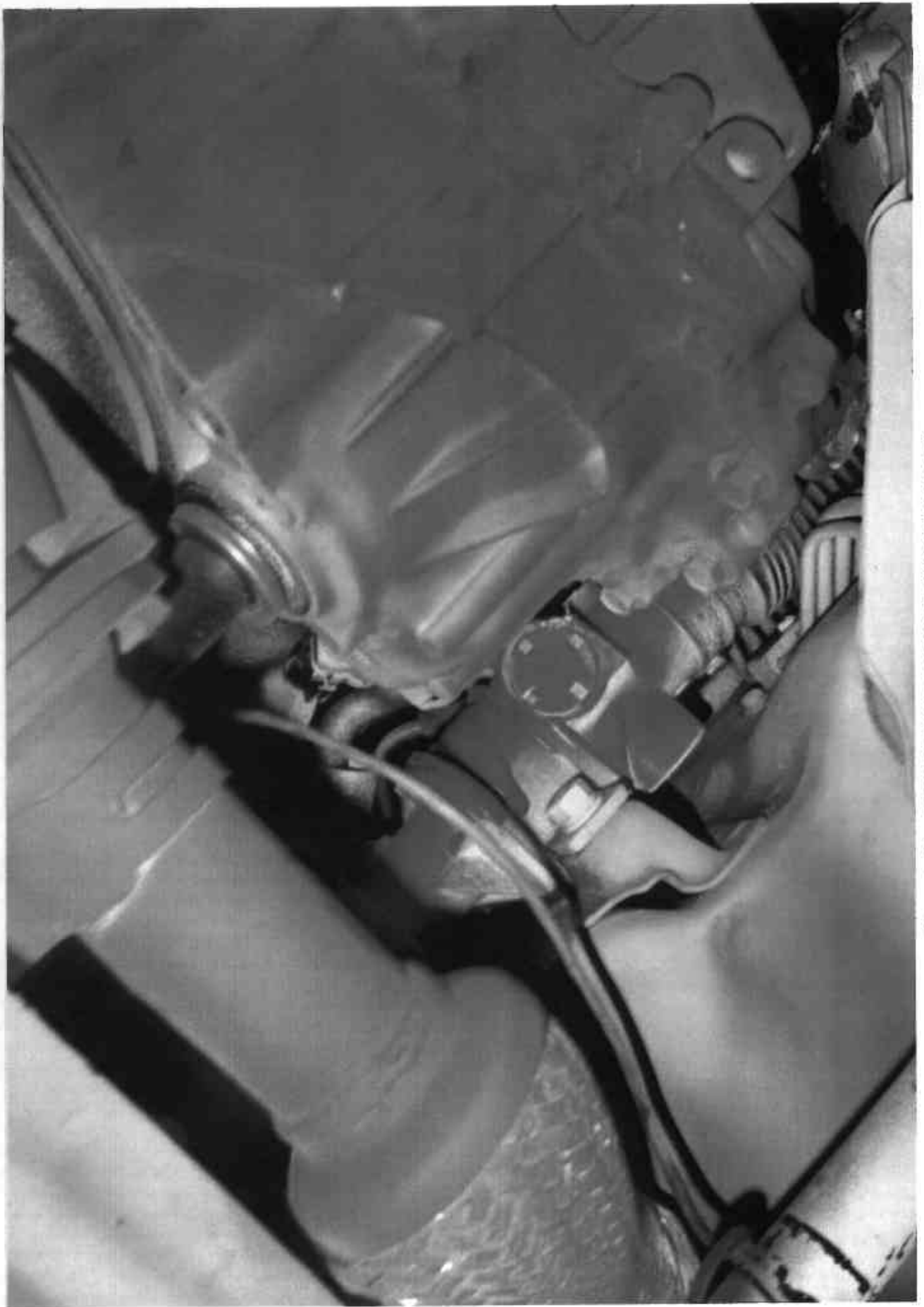


Figure A-34 POST-TEST UNDERBODY STEERING SHAFT



Figure A-35 PRE-TEST STEERING COLUMN/FIREWALL INSIDE VIEW



Figure A-36 POST-TEST STEERING COLUMN/FIREWALL INSIDE VIEW

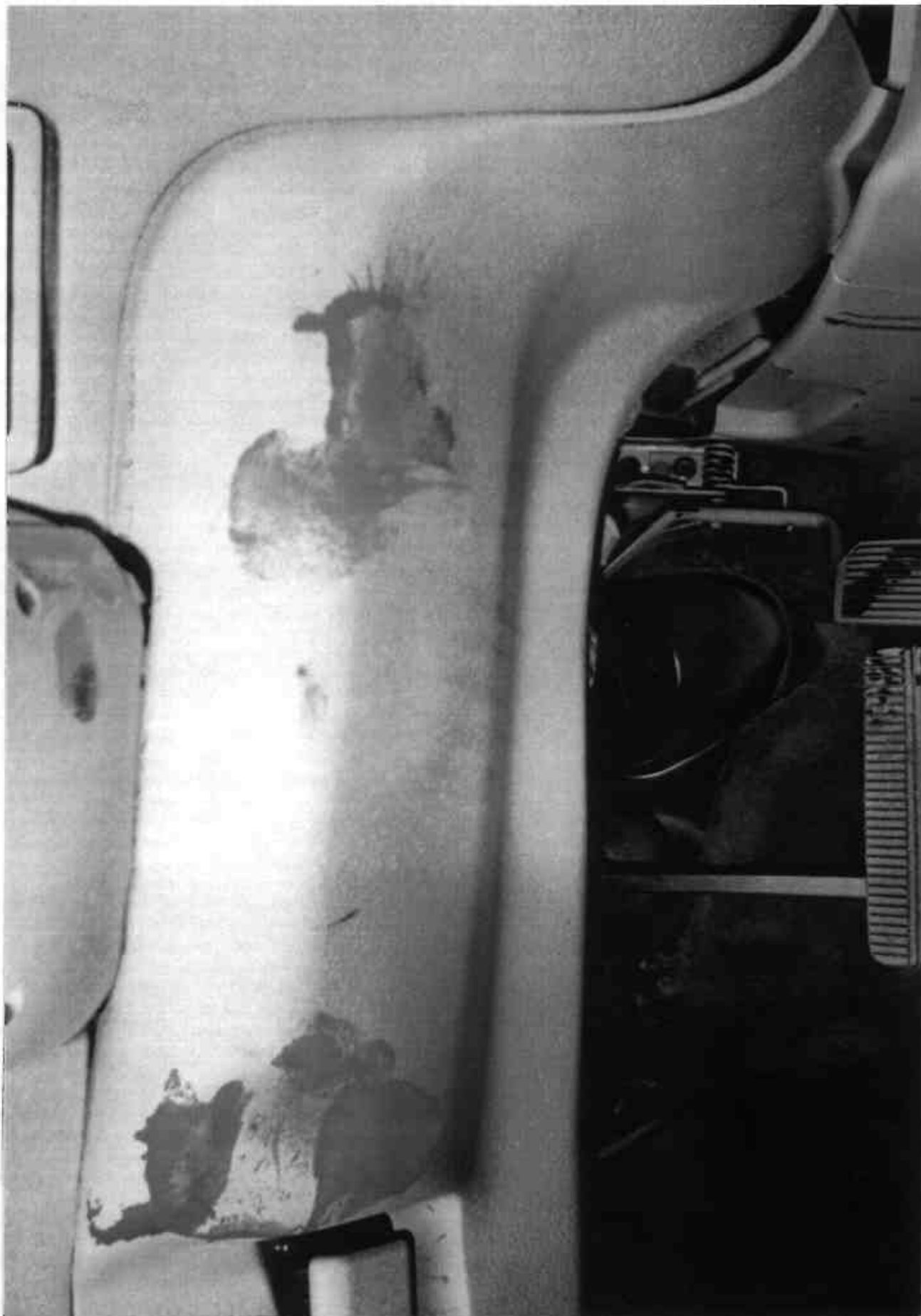


Figure A-37 POST-TEST DRIVER KNEE BOLSTER



Figure A-38 POST-TEST PASSENGER KNEE BOLSTER

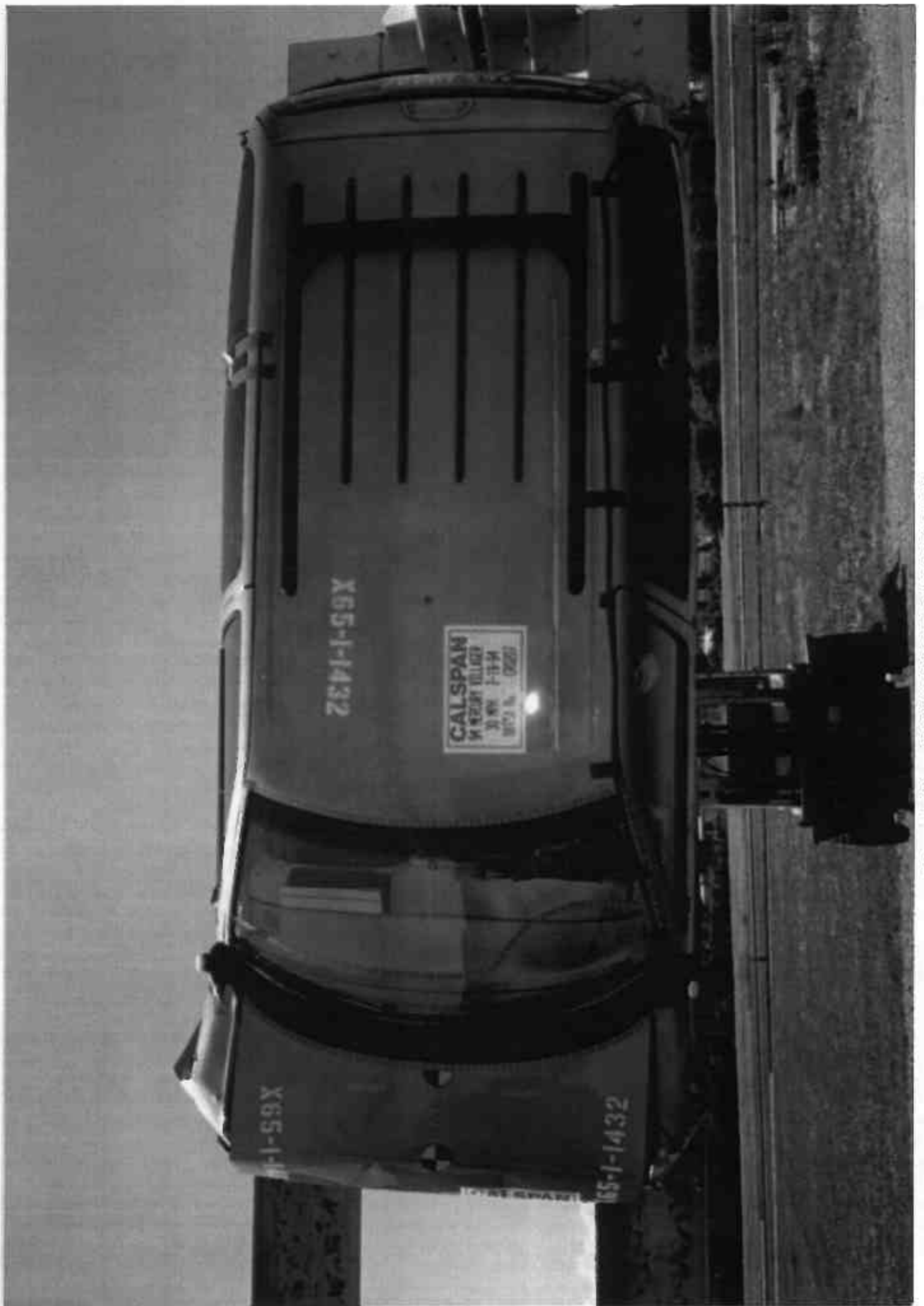


Figure A-39 POST-TEST VEHICLE TOP VIEW



Figure A-40 VEHICLE IMPACT

RECOMMENDED COLD TIRE INFLATION PRESSURE PRESSIONS DE GONFLAGE RECOMMANDÉES (À FROID)					TEMPERATURE POUR LE SECOND PNEU		FRONT PNEU AVANT (PSI)		REAR PNEU ARRIÈRE (PSI)	
TIRE SIZE DIMENSION DES PNEUS	RIM SIZE DIMENSION DES JANTES		FRONT PNEU AVANT (PSI)	REAR PNEU ARRIÈRE (PSI)	71°F / 21°C		80 (113)		80 (113)	
700R / 16012	5.5J / 16012		35 (240)	20 (140)	DO NOT USE IN EXCESS OF 50 mph, 80 km/h. NE PAS UTILISER À UNE VITESSE DÉPASSANT 80 mph, 80 km/h. POUR PLUS DE DÉTAILS SE RÉFÉRER AU MANUEL DE L'USAGER.					
	5.5J / 16012									
	5.5J / 16012									
VEHICLE CAPACITY WEIGHT CAPACITÉ PONDÉRALE DU VÉHICULE			TOTAL OCCUPANTS NOMBRE TOTAL D'OCCUPANTS		SEATING CAPACITY / PLACES SIÈGES					
1500 lb. / 680 kg			9		1st SEAT 1 ^{er} SIÈGE		2nd SEAT 2 ^e SIÈGE		3rd SEAT 3 ^e SIÈGE	
			1		2		3		N/A N/D	
									3	

Figure A-42 TIRE PLACARD



Figure A-43 POST-TEST DRIVER AIRBAG VIEW

PHOTOGRAPH NOT AVAILABLE

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

NOTE : Data trace scales are automatically scaled at the
request of the COTR. Use caution when
reviewing data.

TEST NO. CR0207

VEHICLE

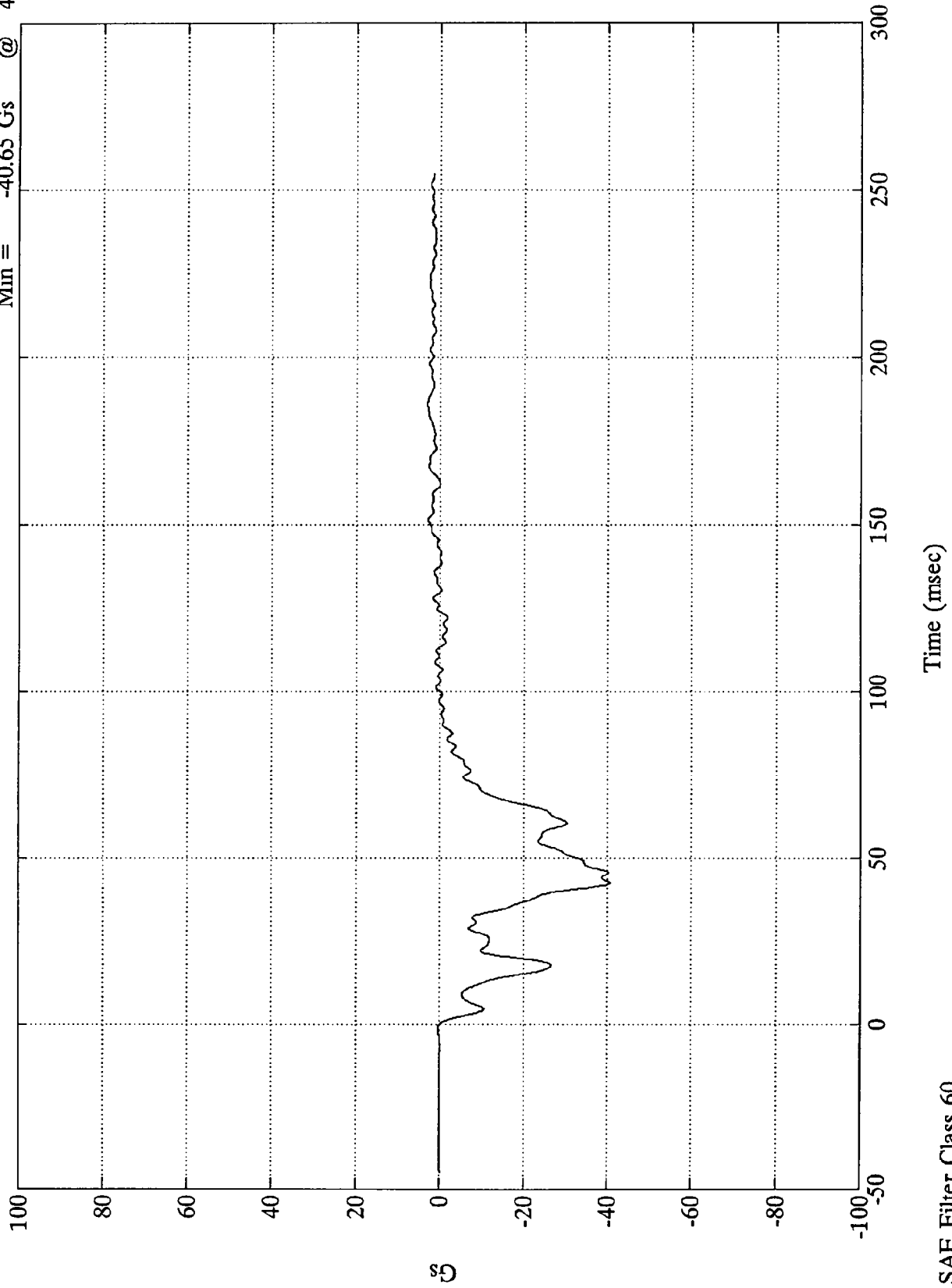
SAE FILTER CHANNEL CLASS

60

NHTSA 208 TEST - 1994 Mercury Villager

L. Rear X-member X (#1)

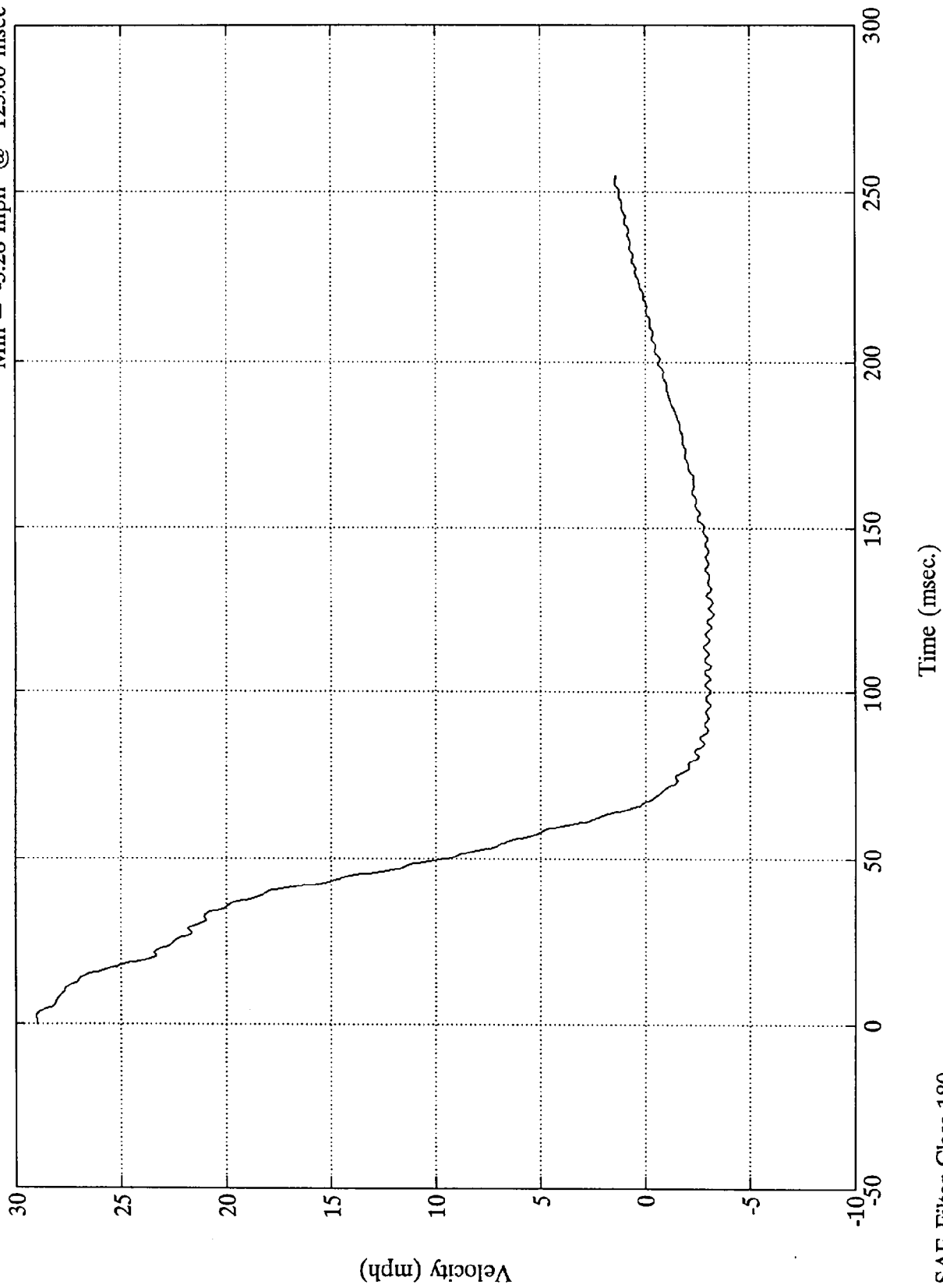
Max = 3.09 Gs @ 186.00 msec
Min = -40.65 Gs @ 42.24 msec



FMVSS 208 Test - 1994 Mercury Villager

L. Rear X-member X (#1)

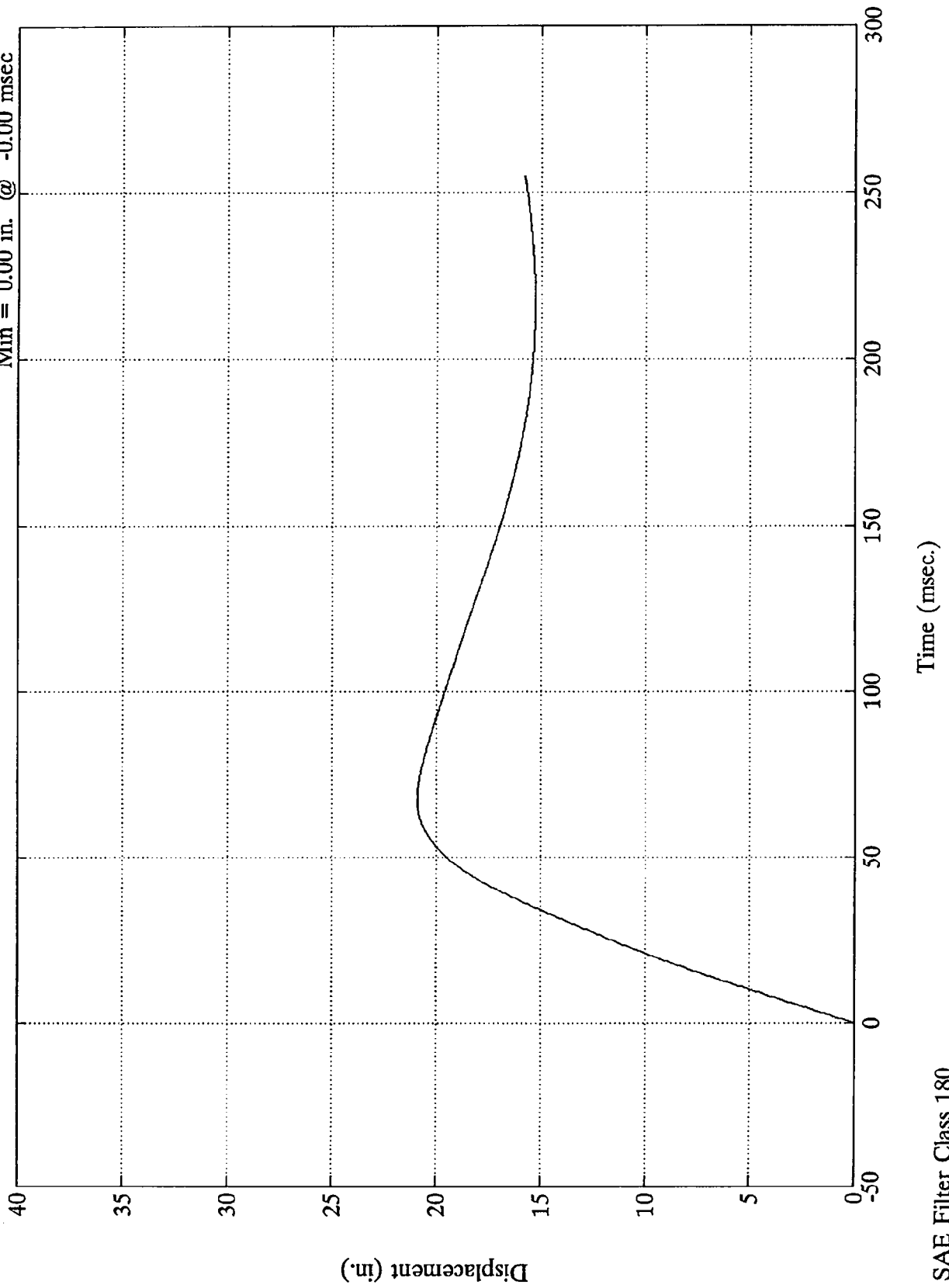
Max = 29.01 mph @ 2.16 msec
Min = -3.28 mph @ 123.60 msec



FMVSS 208 Test - 1994 Mercury Villager

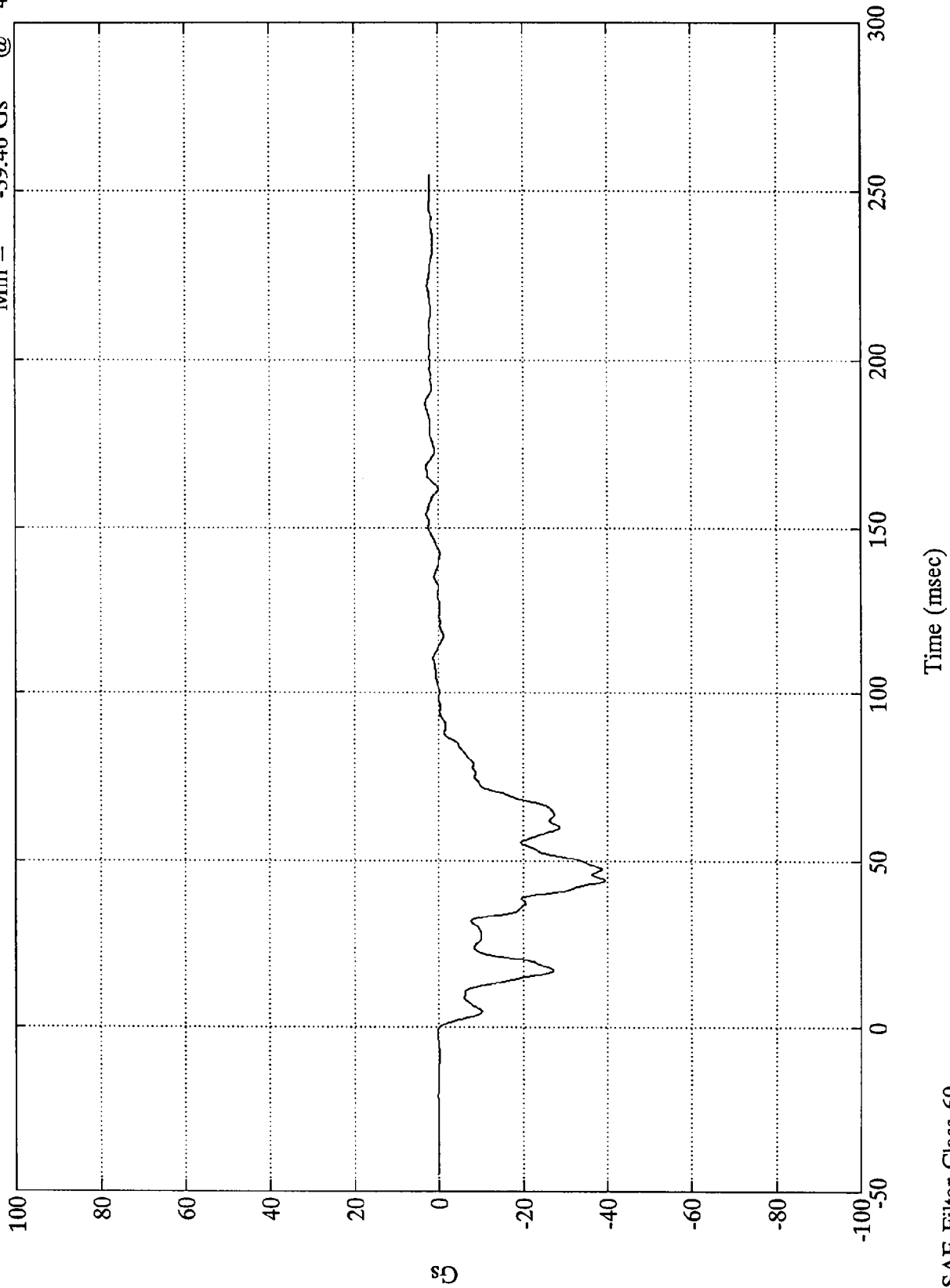
L. Rear X-member X (#1)

Max = 20.91 in. @ 68.16 msec
Min = 0.00 in. @ -0.00 msec



NHTSA 208 TEST - 1994 Mercury Villager

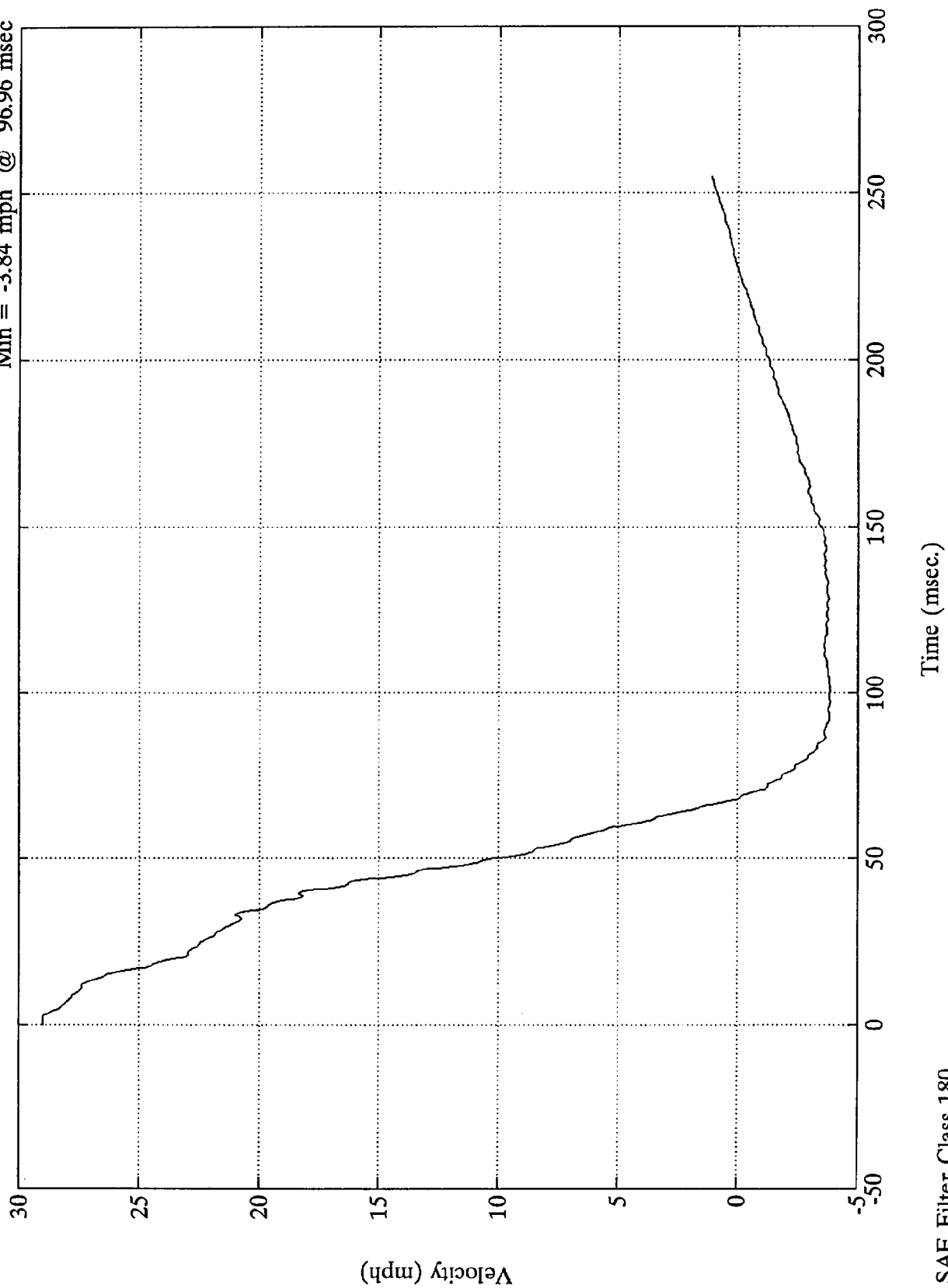
R. Rear X-member X (#2)
Max = 3.07 Gs @ 187.20 msec
Min = -39.46 Gs @ 44.04 msec



FMVSS 208 Test - 1994 Mercury Villager

R. Rear X-member X (#2)

Max = 29.00 mph @ 1.68 msec
Min = -3.84 mph @ 96.96 msec



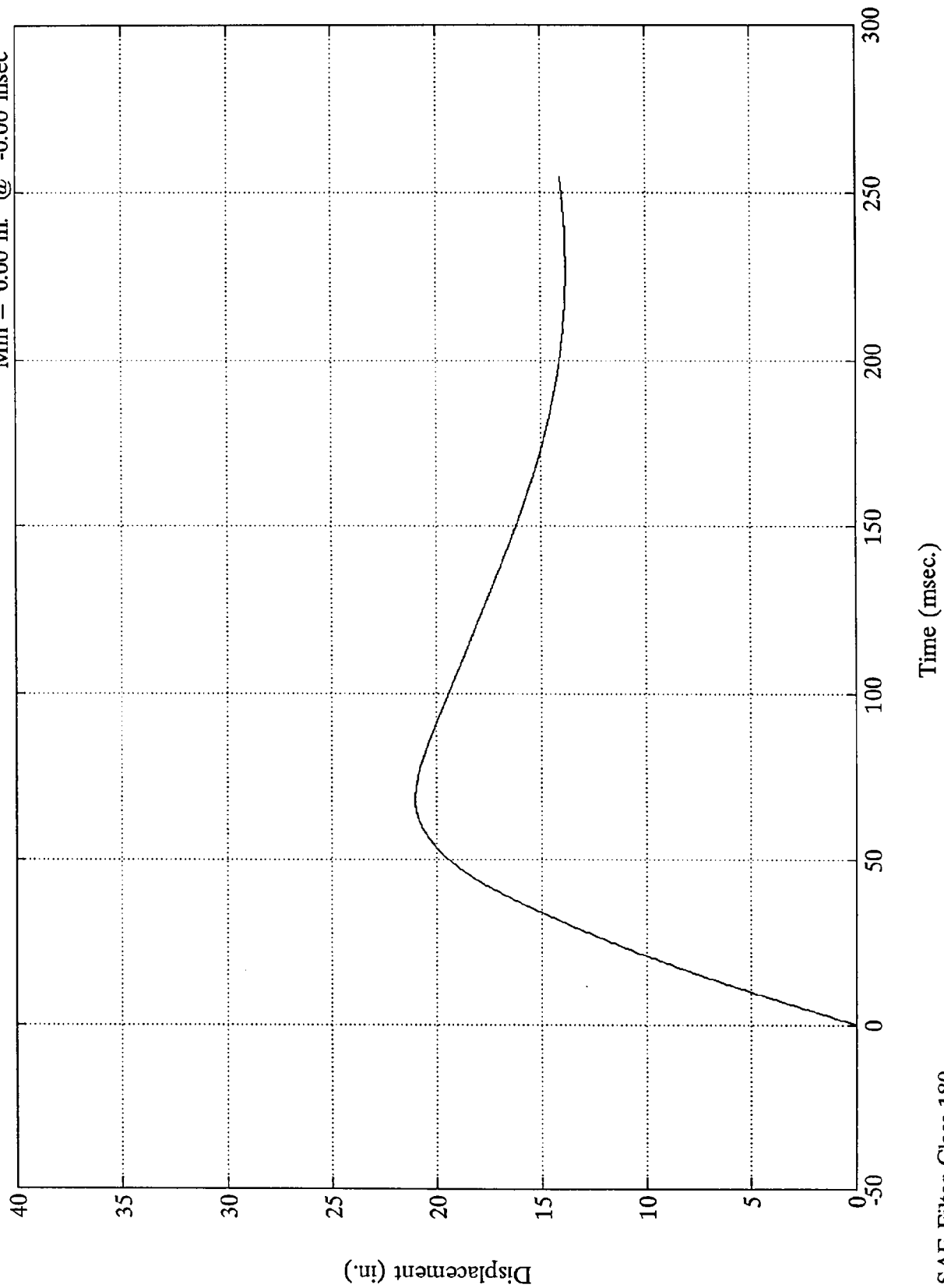
8221-1

SAE Filter Class 180

FMVSS 208 Test - 1994 Mercury Villager

R. Rear X-member X (#2)

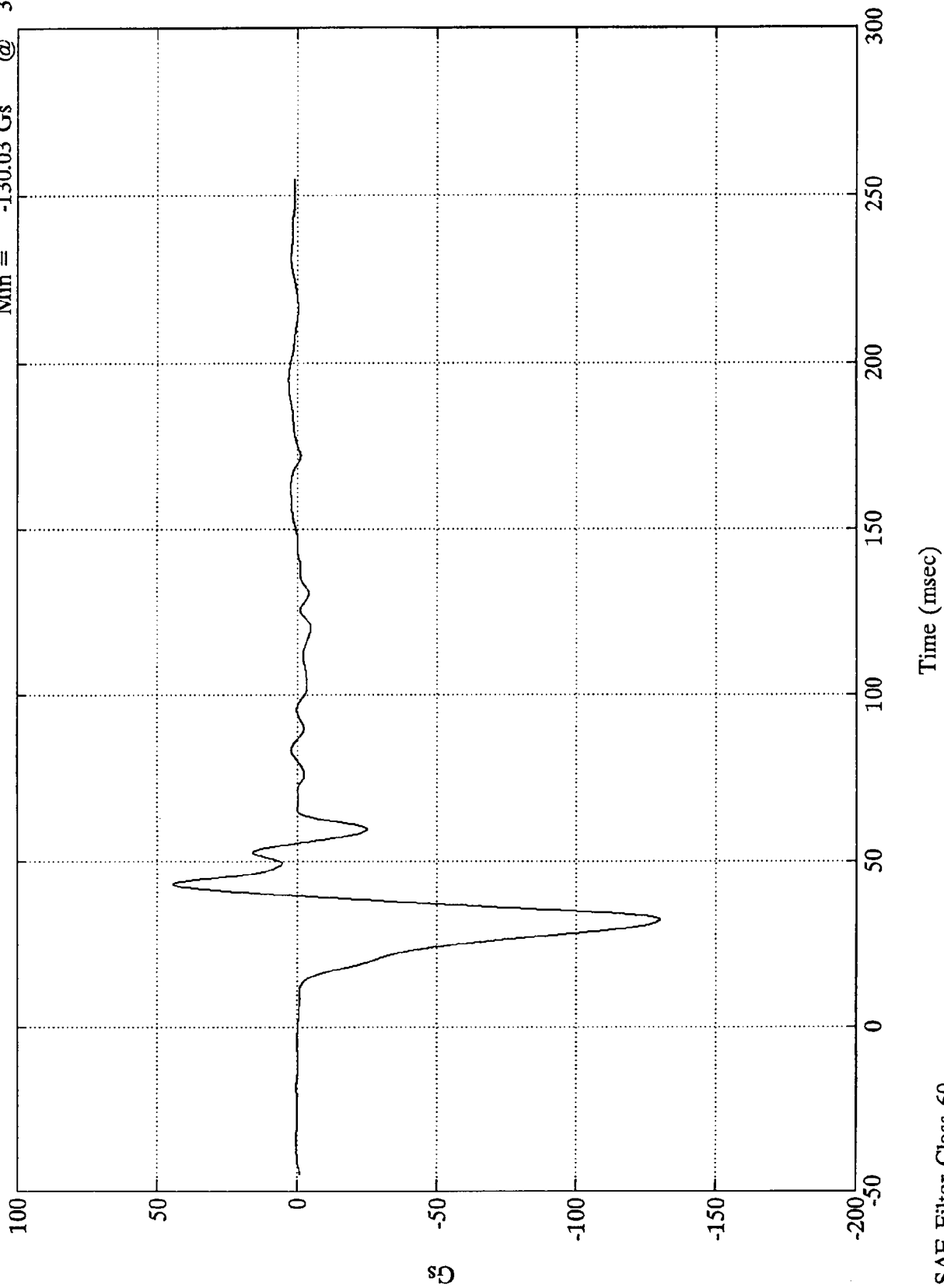
Max = 21.03 in. @ 69.36 msec
Min = 0.00 in. @ -0.00 msec



NHTSA 208 TEST - 1994 Mercury Villager

Max = 44.33 Gs @ 43.08 msec
Min = -130.03 Gs @ 32.40 msec

Engine Top X (#3)

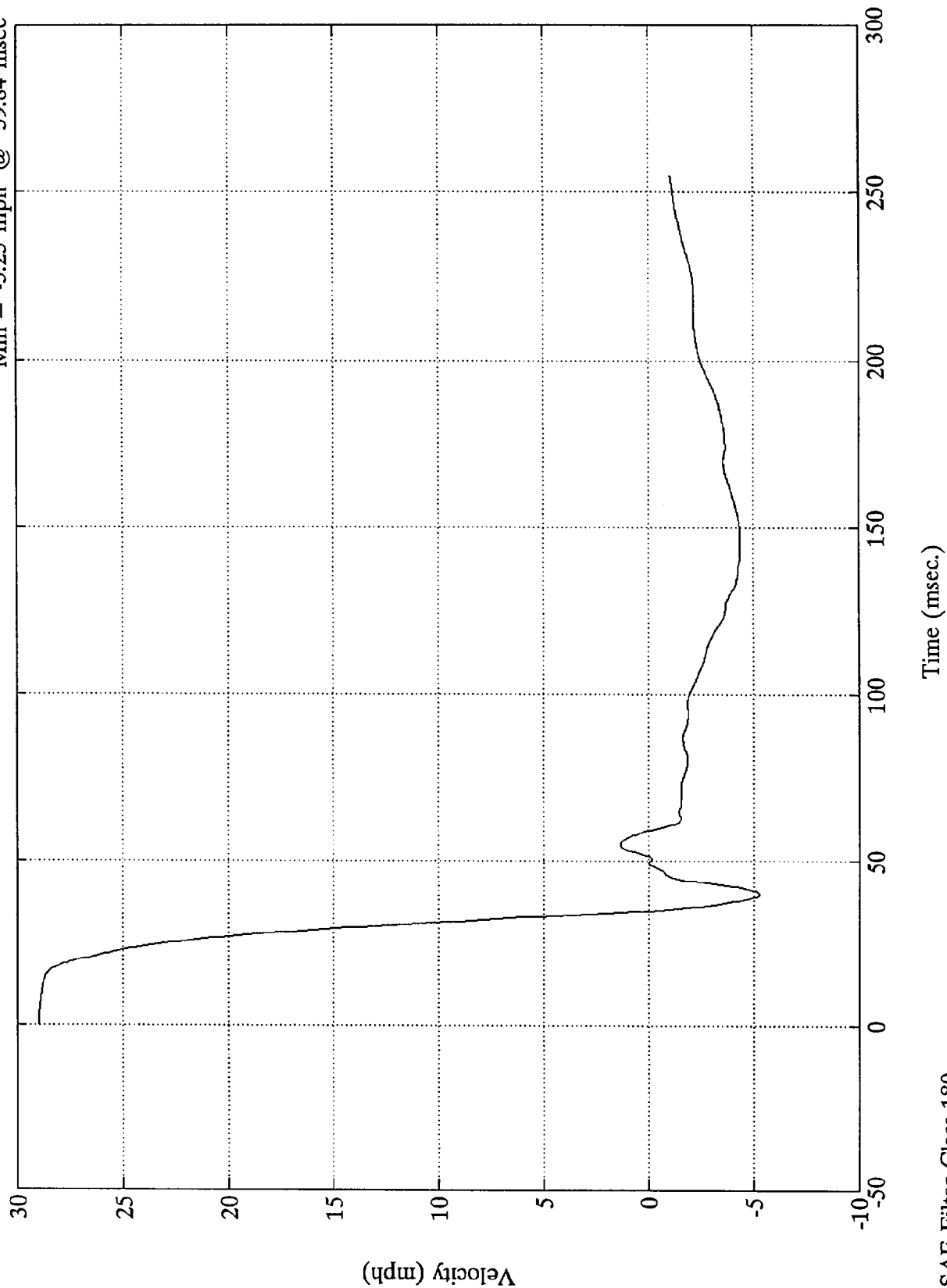


SAE Filter Class 60

FMVSS 208 Test - 1994 Mercury Villager

Engine Top X (#3)

Max = 29.00 mph @ 0.48 msec
Min = -5.25 mph @ 39.84 msec



SAE Filter Class 180

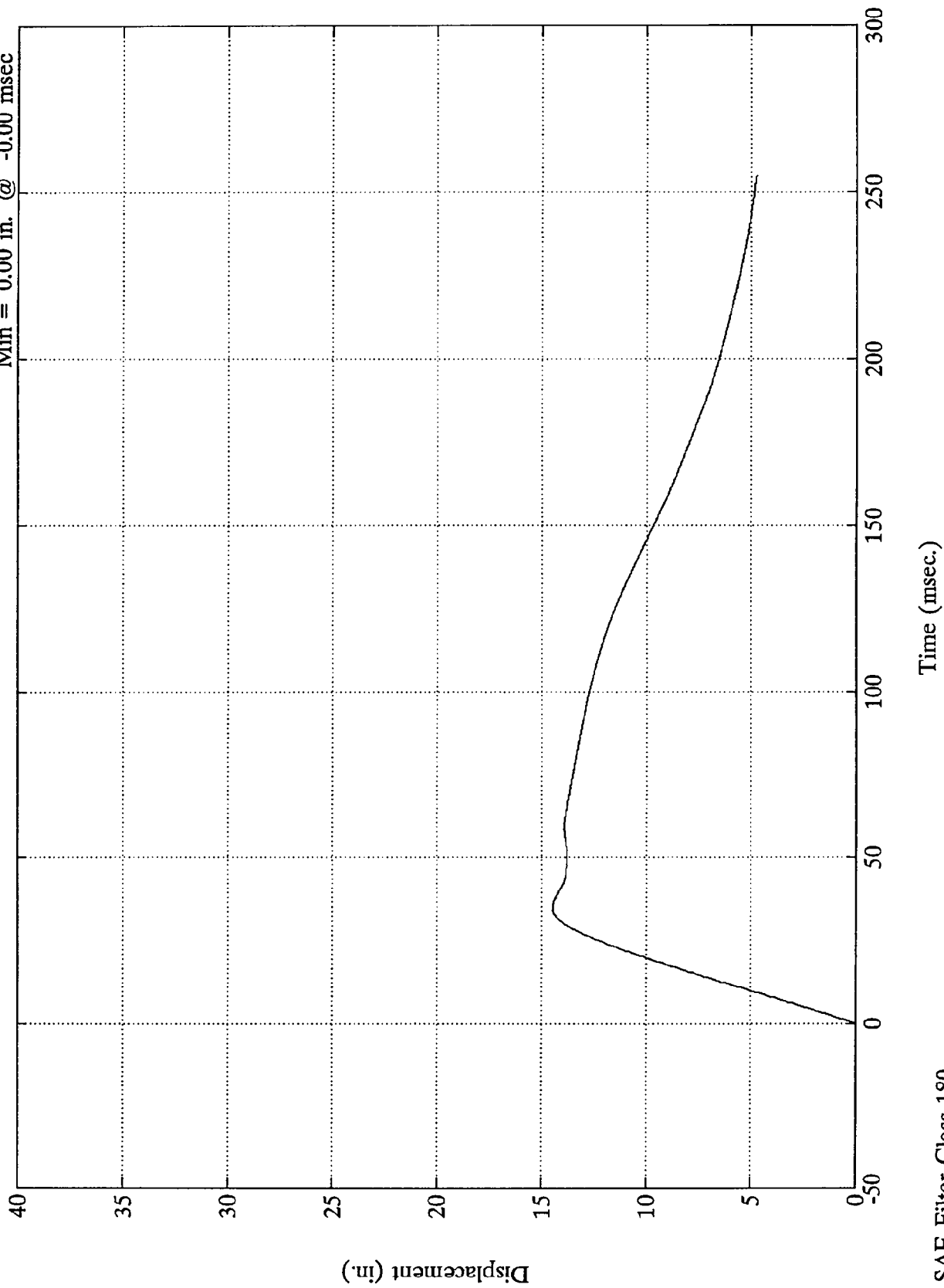
8221-1

B-10

FMVSS 208 Test - 1994 Mercury Villager

Engine Top X (#3)

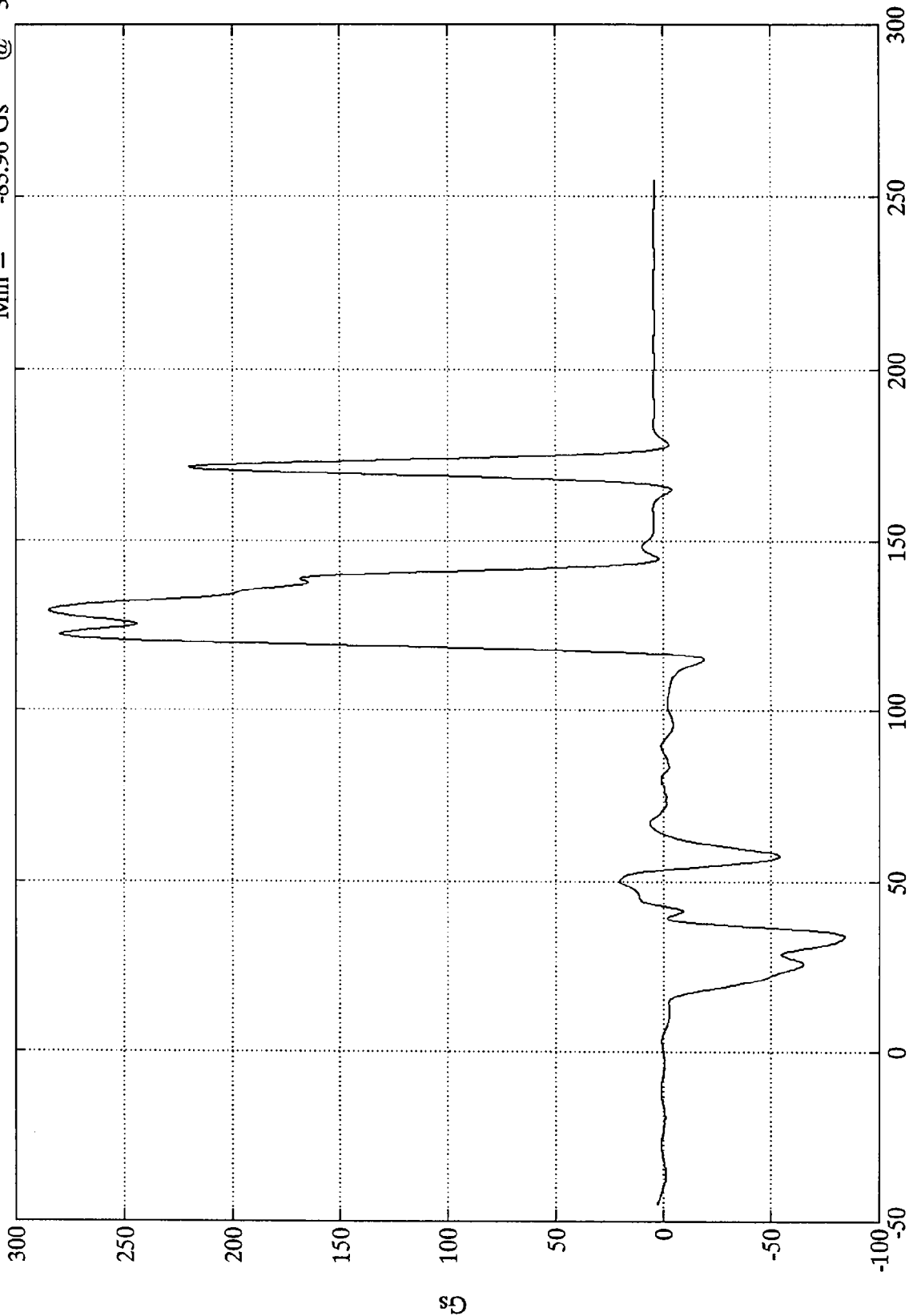
Max = 14.47 in. @ 34.56 msec
Min = 0.00 in. @ -0.00 msec



SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Engine Bottom X (#4)
Max = 284.74 Gs @ 129.60 msec
Min = -83.96 Gs @ 33.72 msec



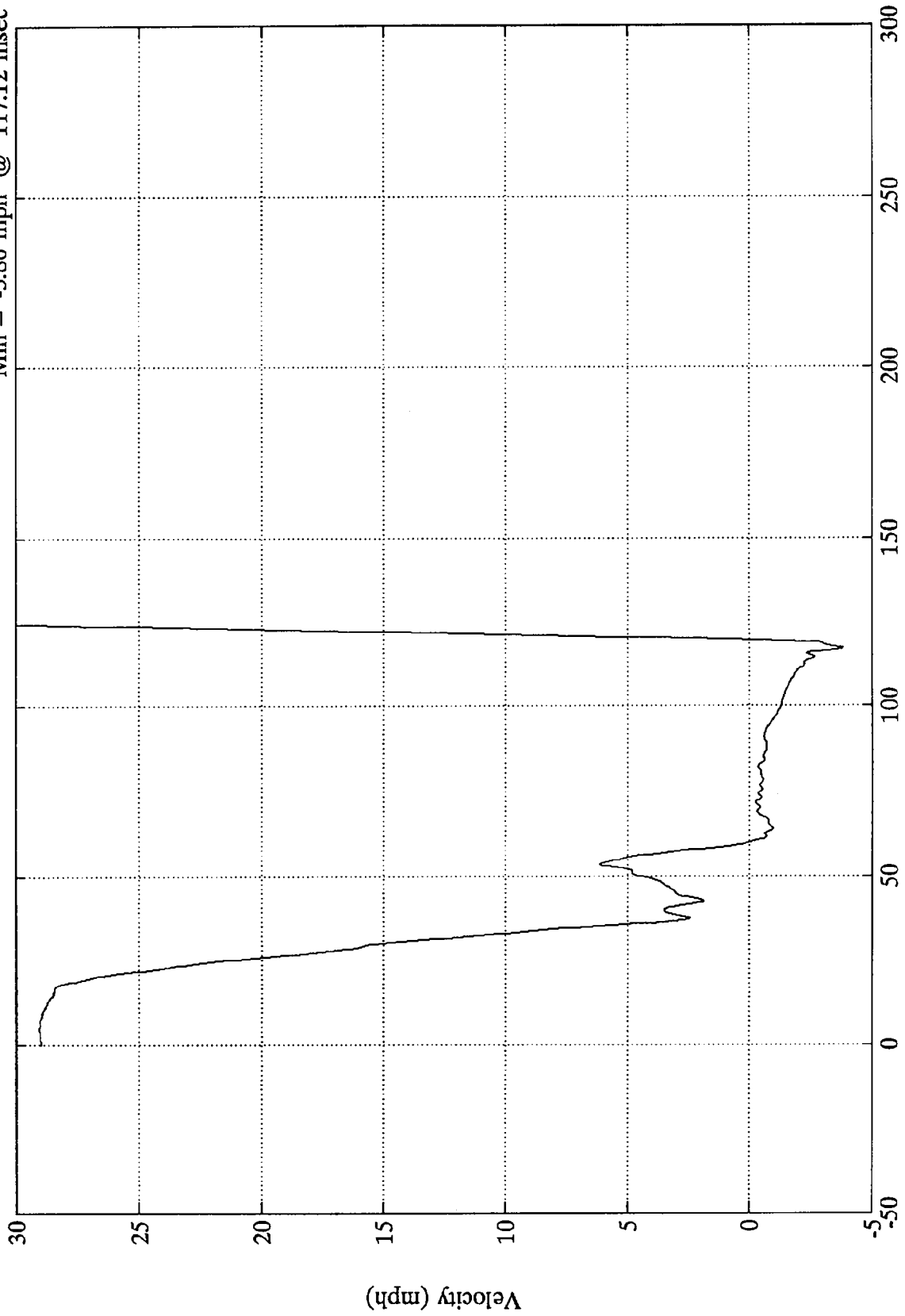
Time (msec) Data Questionable After 110msec, Wire Cut

SAE Filter Class 60

FMVSS 208 Test - 1994 Mercury Villager

Engine Bottom X (#4)

Max = 144.41 mph @ 254.88 msec
Min = -3.80 mph @ 117.12 msec

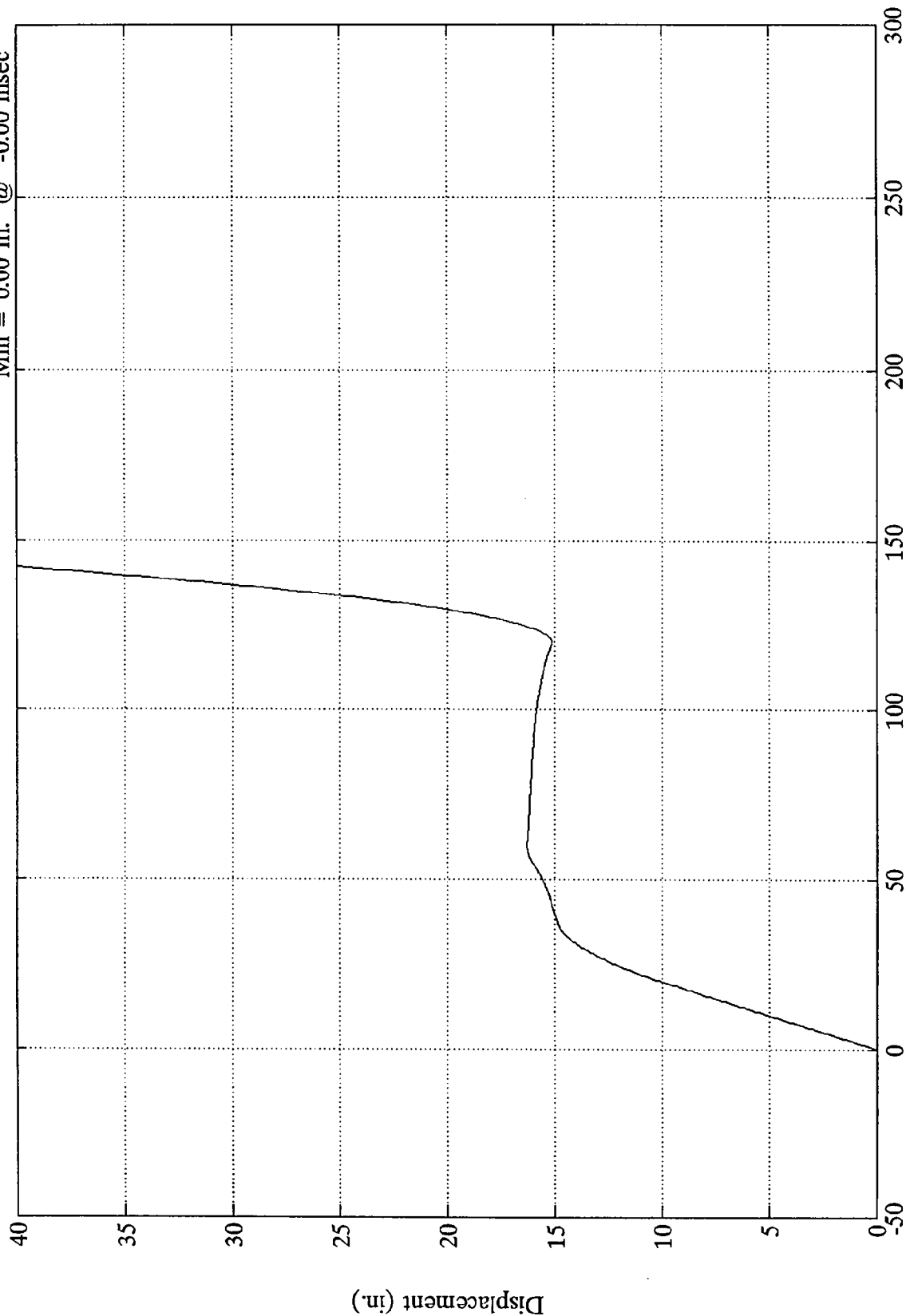


Time (msec.) Data Questionable After 110msec, Wire Cut

SAE Filter Class 180

Max = 304.60 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec

Engine Bottom X (#4)



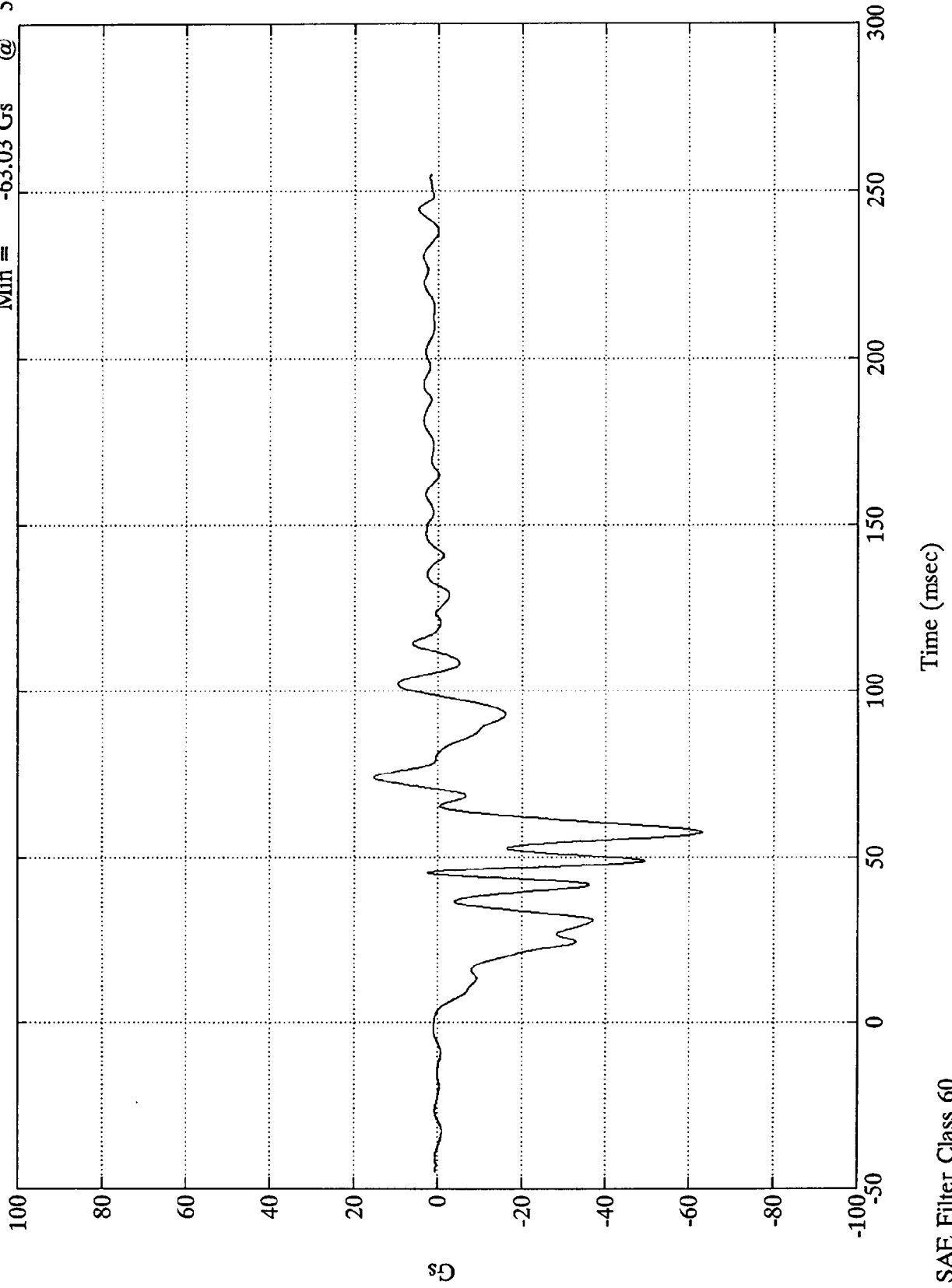
Time (msec.) Data Questionable After 110msec, Wire Cut

SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

R. Brake Caliper X (#5)

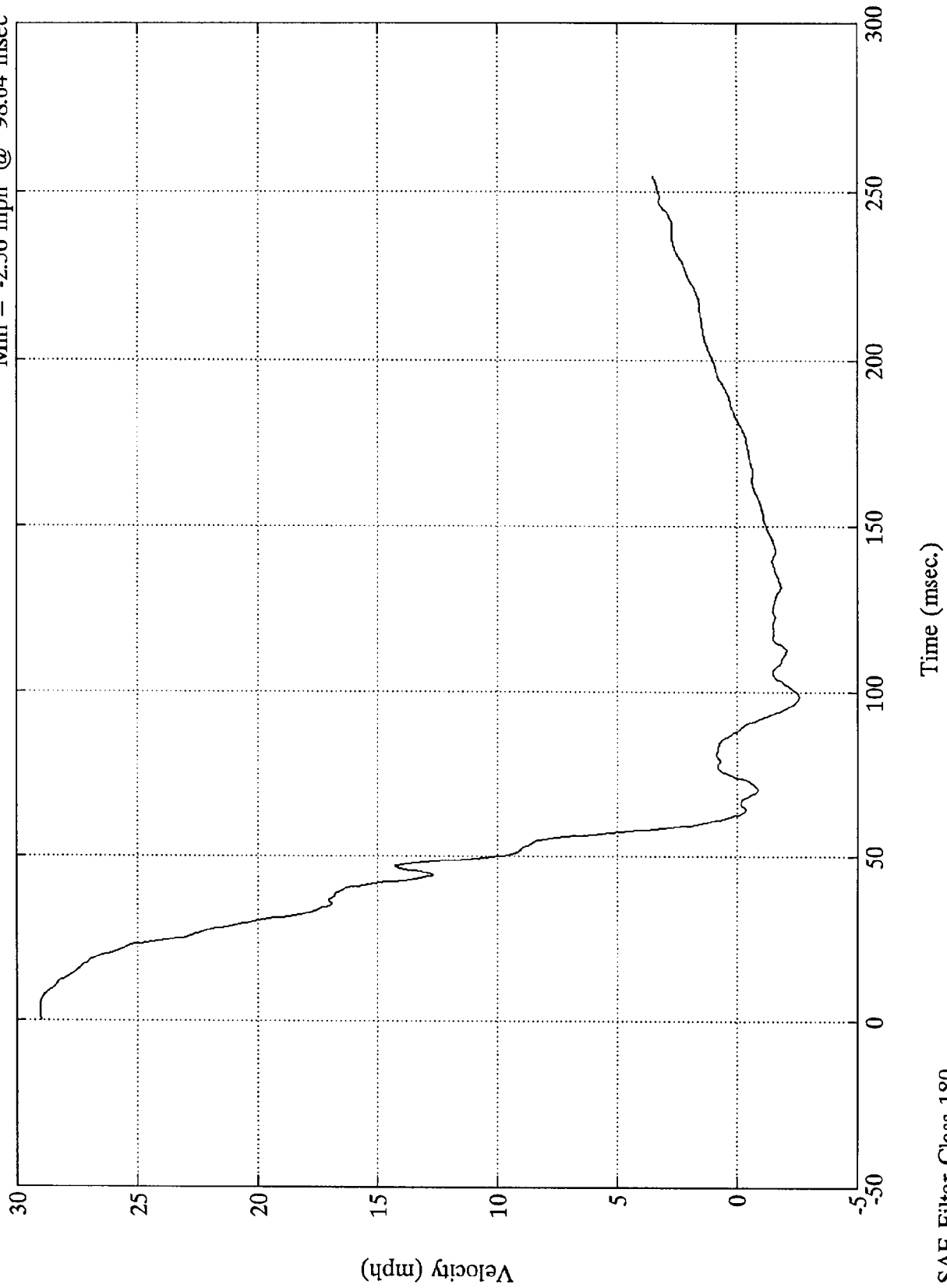
Max = 15.29 Gs @ 73.80 msec
Min = -63.03 Gs @ 57.47 msec



FMVSS 208 Test - 1994 Mercury Villager

R. Brake Caliper X (#5)

Max = 29.04 mph @ 3.84 msec
Min = -2.56 mph @ 98.64 msec



SAE Filter Class 180

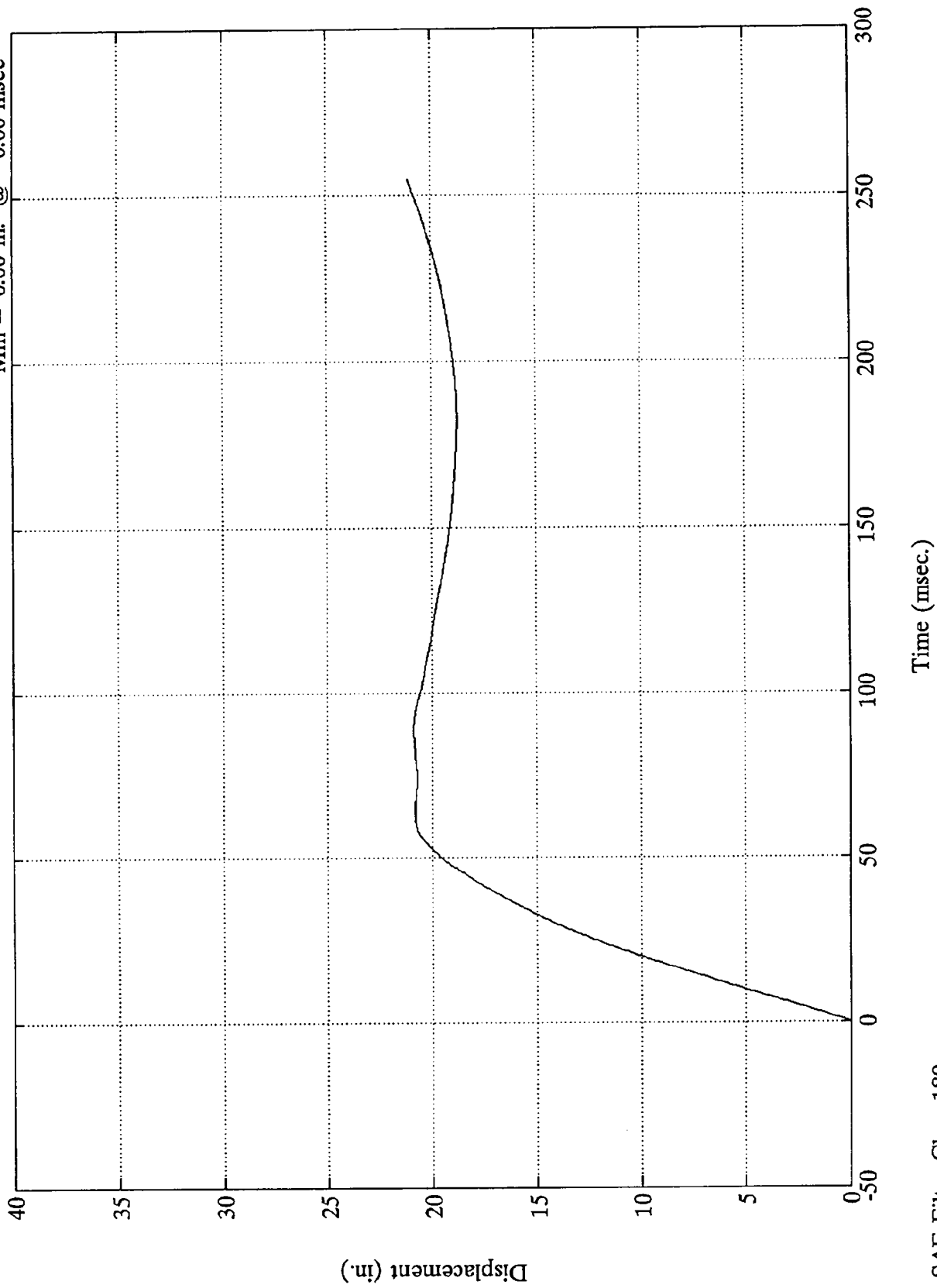
8221-1

B-16

FMVSS 208 Test - 1994 Mercury Villager

R. Brake Caliper X (#5)

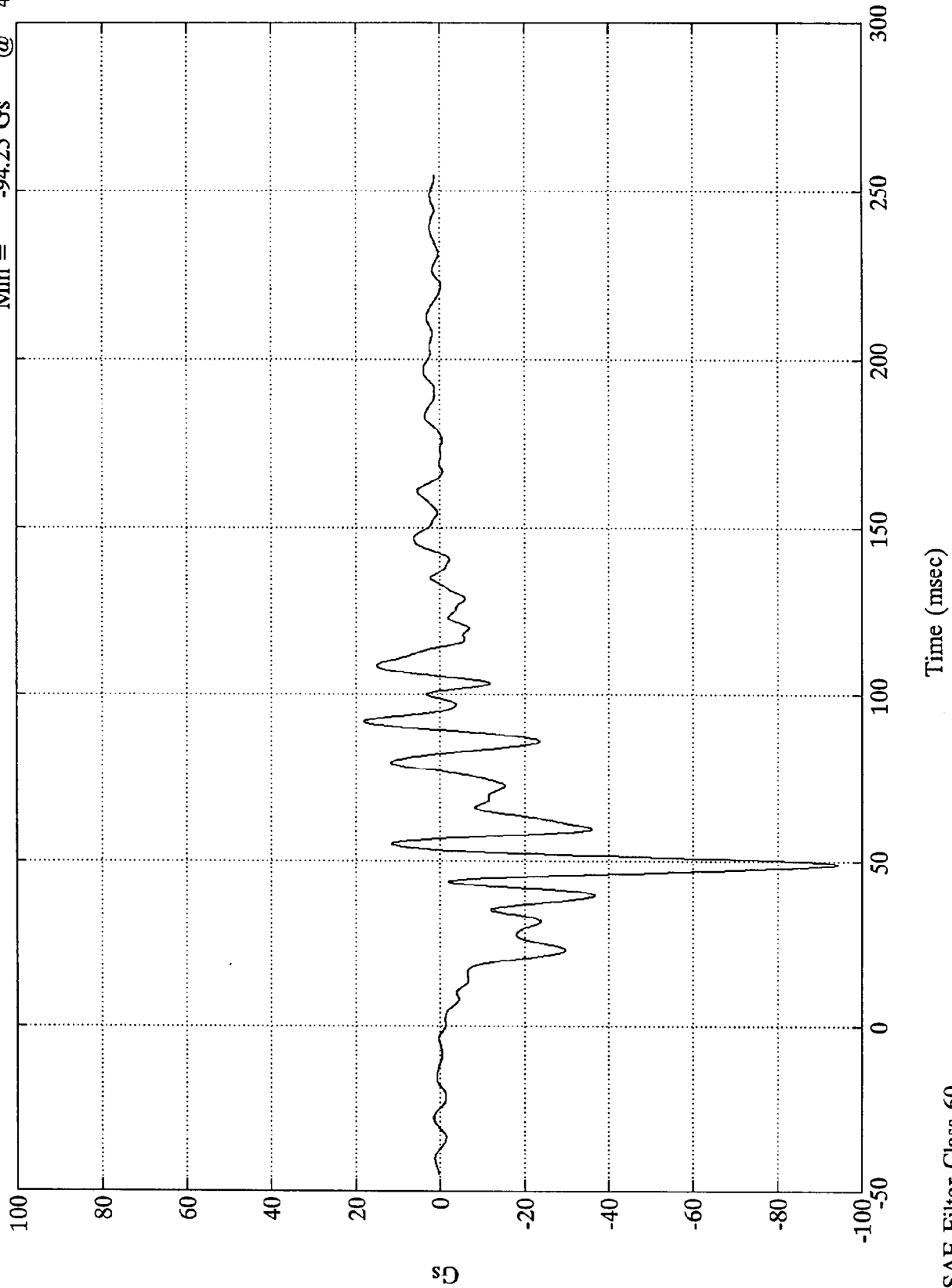
Max = 21.10 in. @ 254.88 msec
Min = 0.00 in. @ -0.00 msec



NHTSA 208 TEST - 1994 Mercury Villager

L. Brake Caliper X (#6)

Max = 18.16 Gs @ 91.80 msec
Min = -94.25 Gs @ 49.07 msec

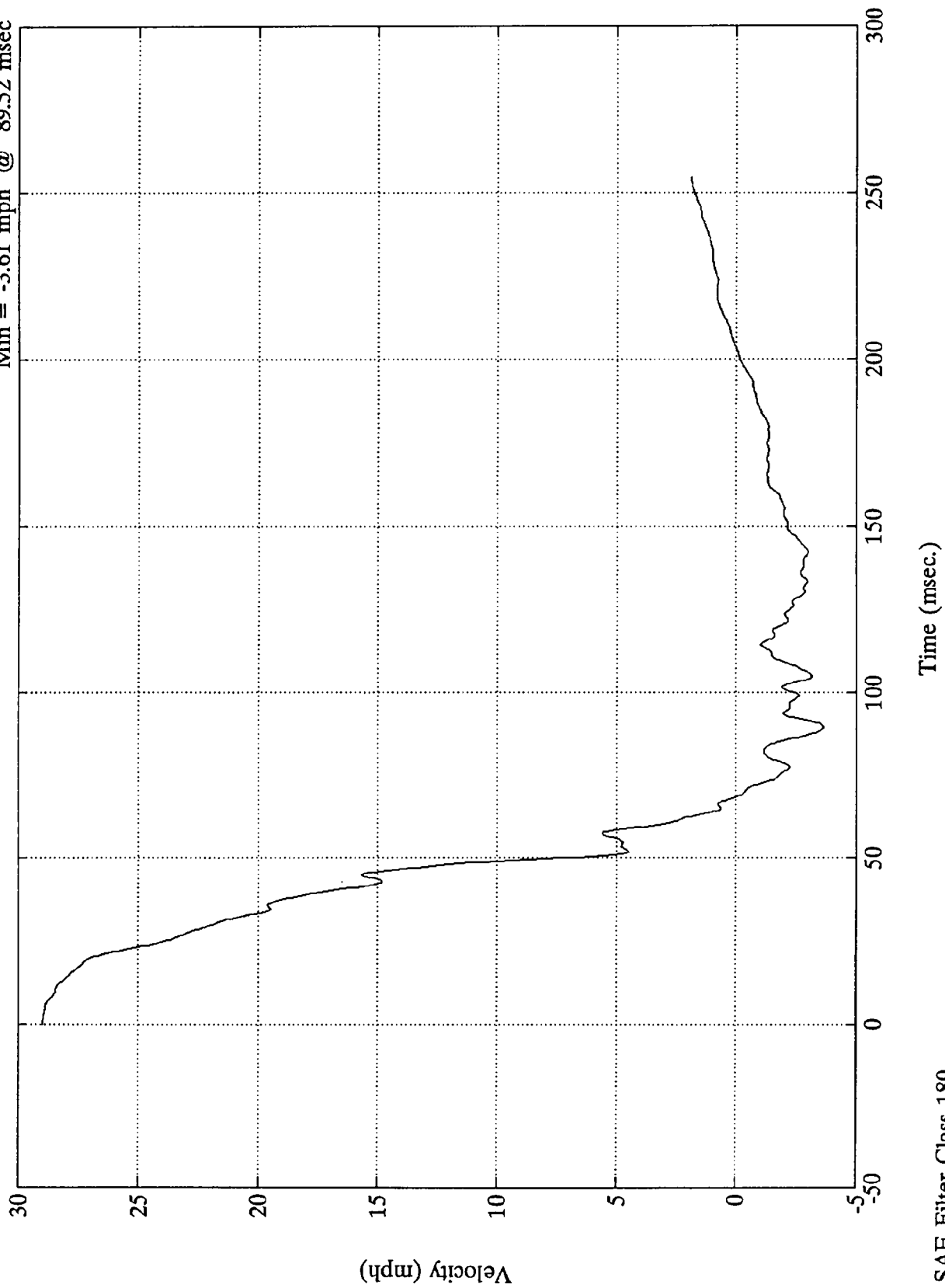


SAE Filter Class 60

FMVSS 208 Test - 1994 Mercury Villager

L. Brake Caliper X (#6)

Max = 29.00 mph @ -0.00 msec
Min = -3.61 mph @ 89.52 msec

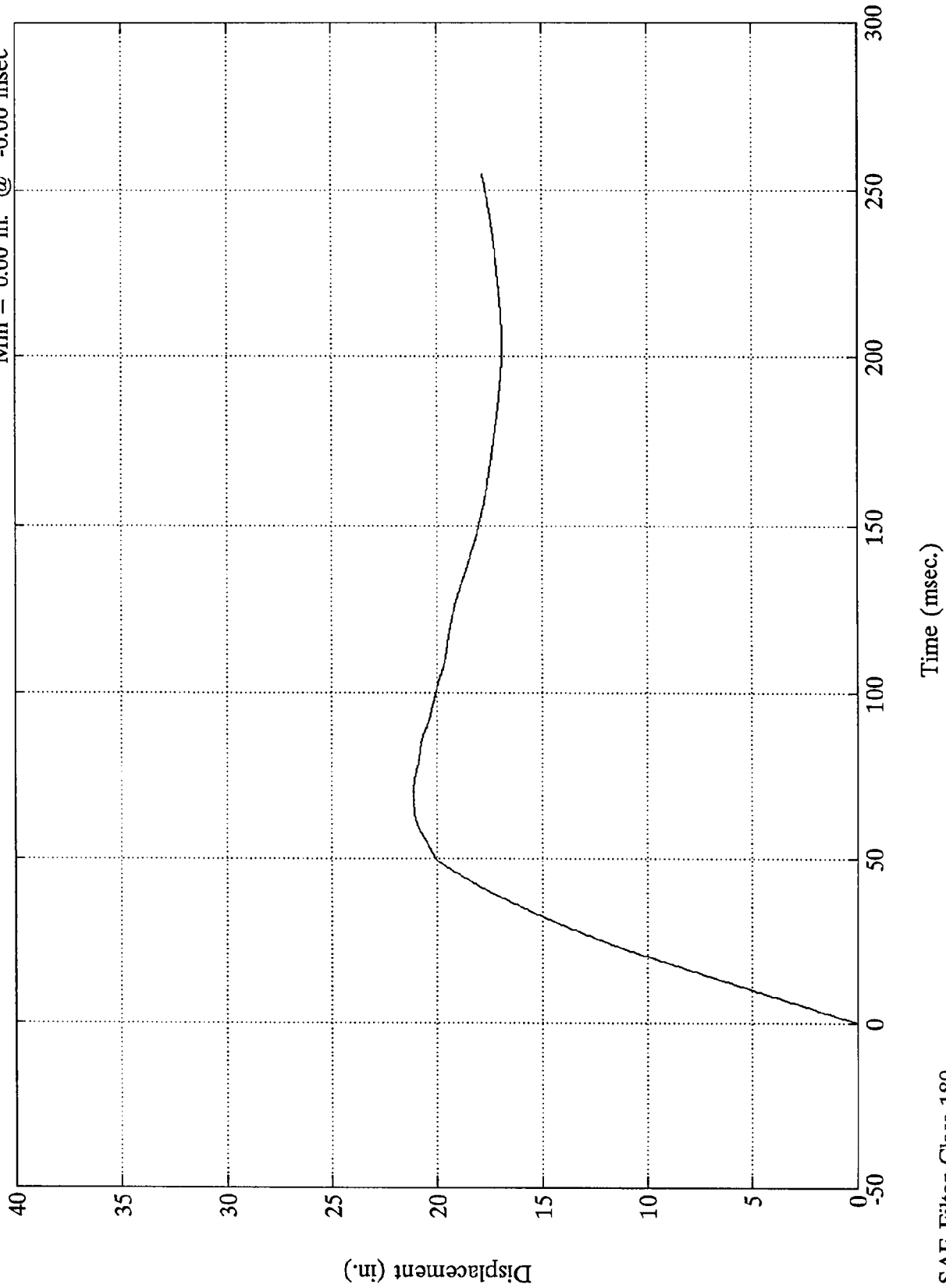


SAE Filter Class 180

FMVSS 208 Test - 1994 Mercury Villager

L. Brake Caliper X (#6)

Max = 21.13 in. @ 70.32 msec
Min = 0.00 in. @ -0.00 msec



SAE Filter Class 180

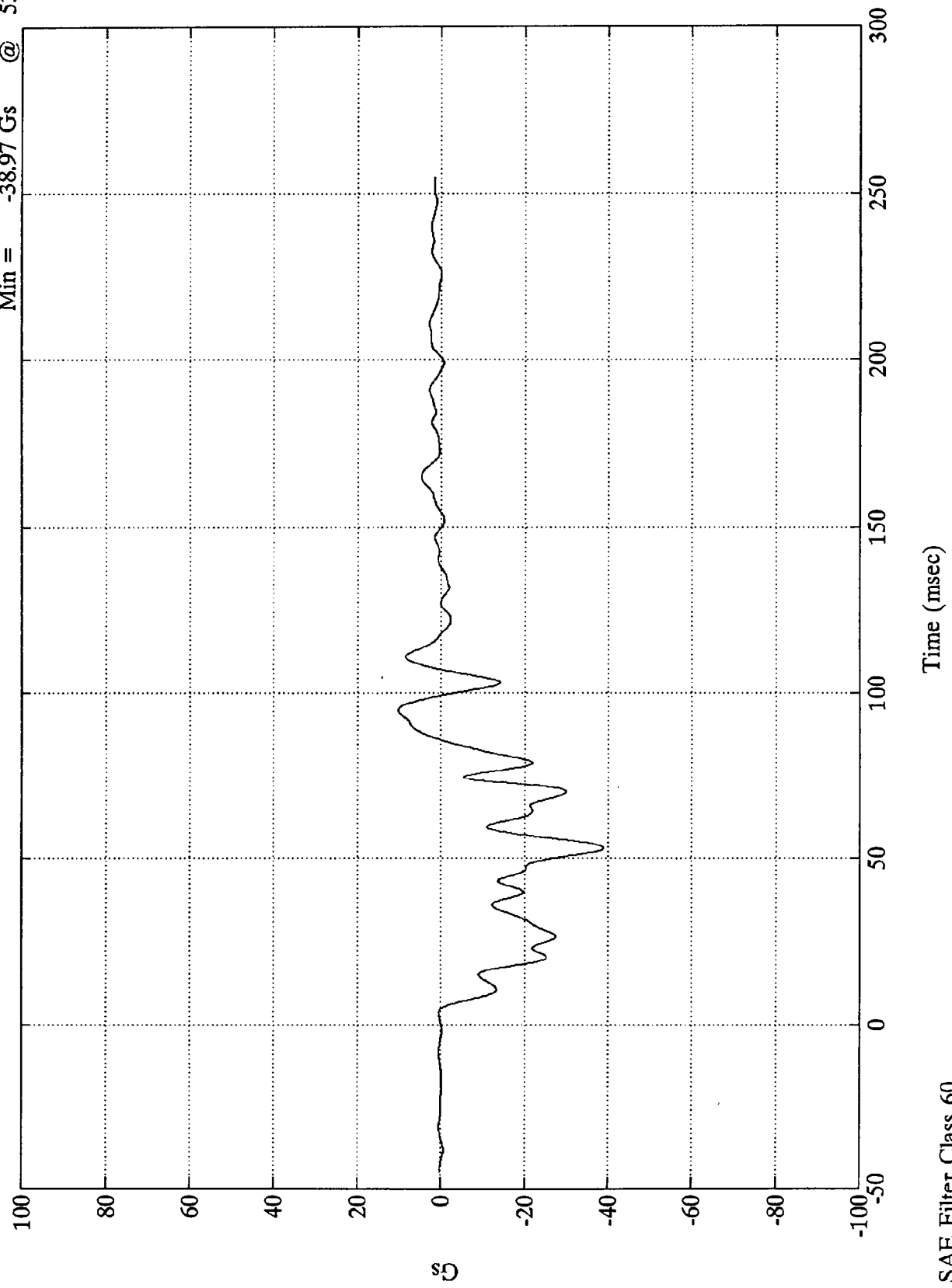
8221-1

B-20

NHTSA 208 TEST - 1994 Mercury Villager

Instrument Panel X (#7)

Max = 10.21 Gs @ 94.68 msec
Min = -38.97 Gs @ 53.15 msec

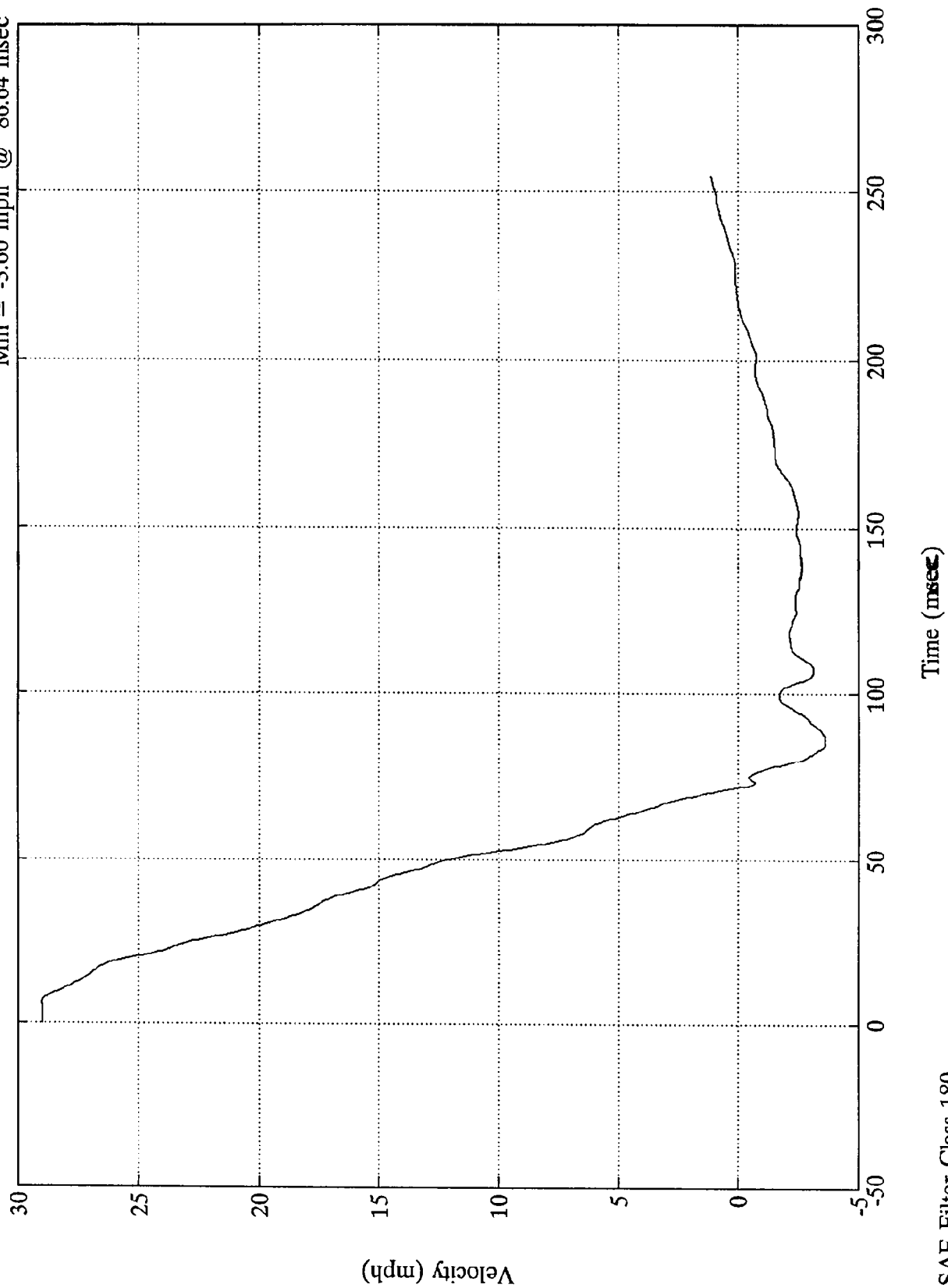


SAE Filter Class 60

FMVSS 208 Test - 1994 Mercury Villager

Instrument Panel X (#7)

Max = 29.02 mph @ 6.24 msec
Min = -3.60 mph @ 86.64 msec



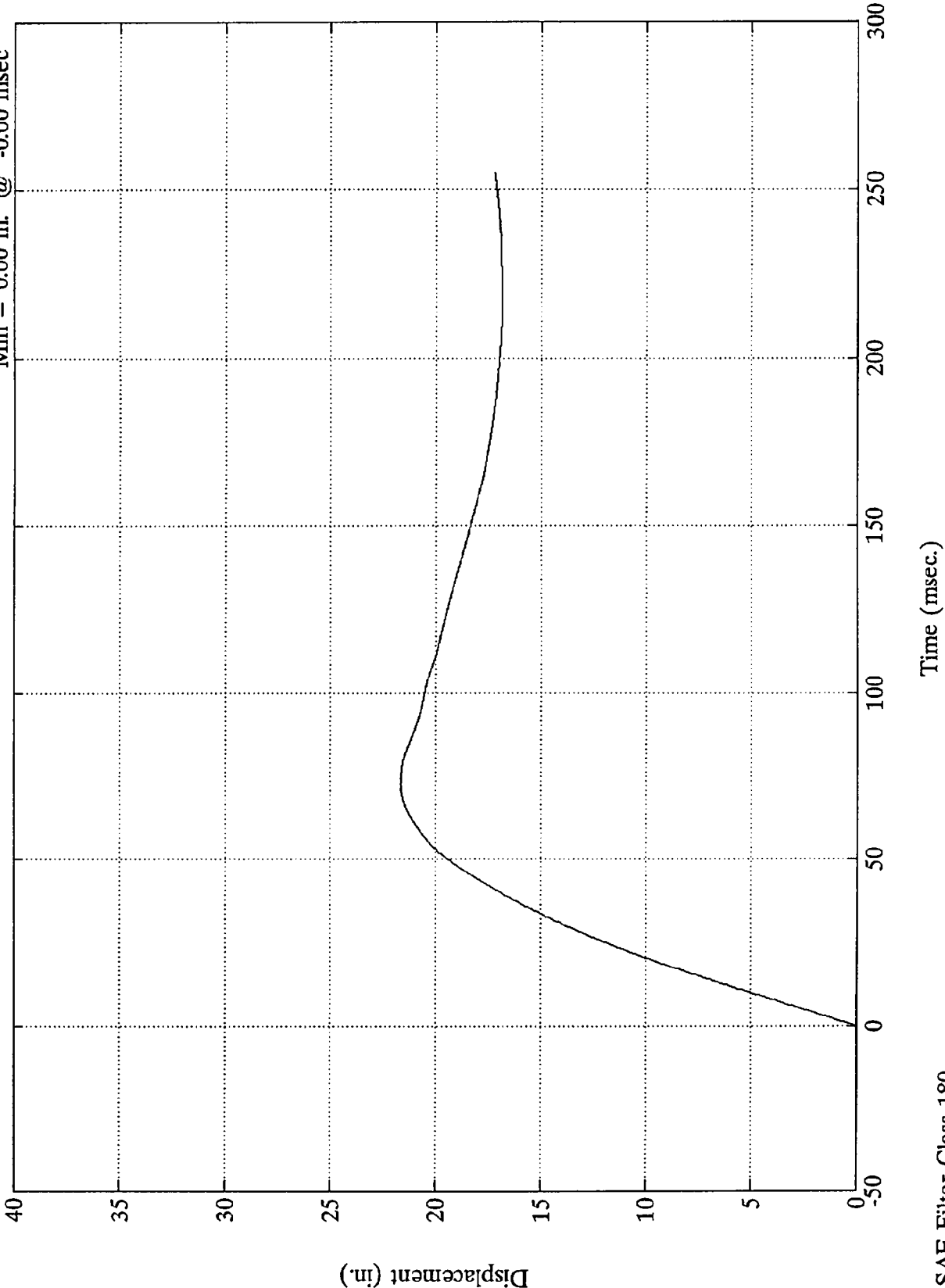
8221-1

SAE Filter Class 180

FMVSS 208 Test - 1994 Mercury Villager

Instrument Panel X (#7)

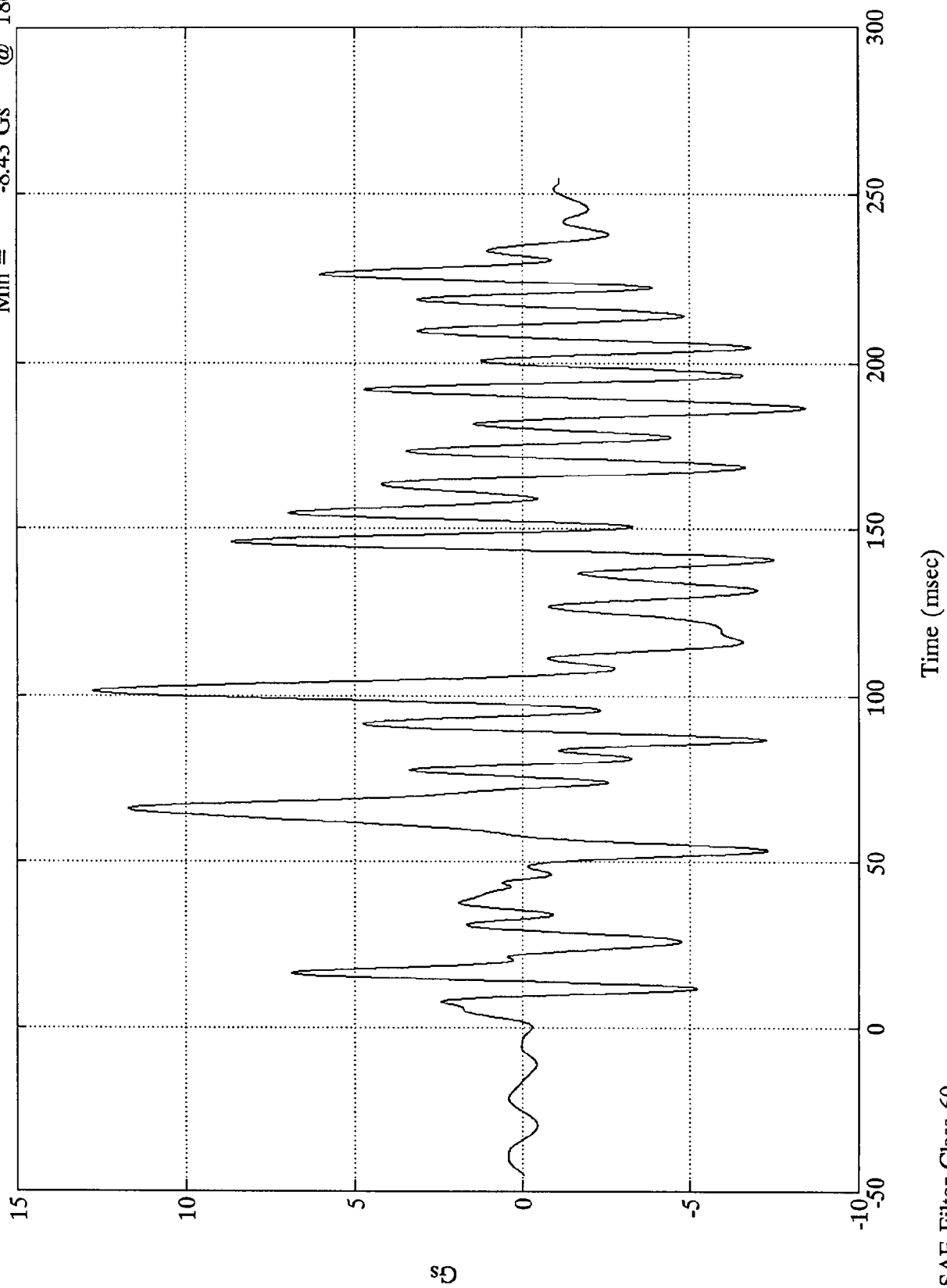
Max = 21.67 in. @ 72.72 msec
Min = 0.00 in. @ -0.00 msec



NHTSA 208 TEST - 1994 Mercury Villager

Max = 12.77 Gs @ 101.28 msec
Min = -8.43 Gs @ 186.60 msec

Trunk Z



SAE Filter Class 60

TEST NO. CR0207

DUMMY	SAE FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600

FACILITY: TRACK
RUN #: 1432
SERIES #: 16

TEST DATE: 19 Jul 1994
TEST TIME: 10:45:08
BOARD: A

TITLE: NHTSA 208 TEST - 1994 Mercury Villager

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	Pos. 1 Head X	Gs	8.0	210.8	-40.0	80.8	1000.0
2	Pos. 1 Head Y	Gs	3.9	209.3	-9.2	84.8	1000.0
3	Pos. 1 Head Z	Gs	34.7	71.4	-5.8	111.2	1000.0
4	Pos. 1 Left Femur	lbs	29.4	126.5	-1712.6	62.6	600.0
5	Pos. 1 Chest X	Gs	5.8	207.1	-39.2	61.9	180.0
6	Pos. 1 Chest Y	Gs	3.8	202.6	-11.5	78.4	180.0
7	Pos. 1 Chest Z	Gs	3.8	199.1	-9.5	105.1	180.0
8	Pos. 1 Right Femur	lbs	6.2	119.5	-1425.5	62.5	600.0
9	Pos. 2 Head X	Gs	161.5	146.0	-37.7	98.9	1000.0
10	Pos. 2 Head Y	Gs	8.7	96.4	-8.4	145.4	1000.0
11	Pos. 2 Head Z	Gs	49.9	88.1	-24.6	146.8	1000.0
12	Pos. 2 Left Femur	lbs	136.7	52.0	-1328.2	61.0	600.0
13	Pos. 2 Chest X	Gs	18.1	175.9	-41.9	81.8	180.0
14	Pos. 2 Chest Y	Gs	16.4	76.7	-4.0	139.9	180.0
15	Pos. 2 Chest Z	Gs	9.0	176.5	-13.9	84.4	180.0
16	Pos. 2 Right Femur	lbs	113.9	56.4	-980.9	84.0	600.0
17	Pos. 1 Head Resultant	Gs	51.8	71.8	.0	-11.3	1000.0
18	Pos. 1 Chest Resultant	Gs	40.0	61.9	.0	6.2	180.0
19	Pos. 2 Head Resultant	Gs	162.3	146.0	.1	-24.5	1000.0
20	Pos. 2 Chest Resultant	Gs	44.3	81.8	.0	-25.6	180.0

36 ms Fixed Duration HIC SUMMARY: Pos. 1 Head Resultant

hic: 368.59
t1 = 61.800 msec
t2 = 92.040 msec
Average G's Over Hic Duration = 43.09

36 ms Fixed Duration HIC SUMMARY: Pos. 2 Head Resultant

hic: 554.18
t1 = 66.720 msec
t2 = 102.600 msec
Average G's Over Hic Duration = 47.37

CLIP SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 37.454 G's
Tstart = 60.6000 ms
Tend = 63.7200 ms
CSI = 243.169

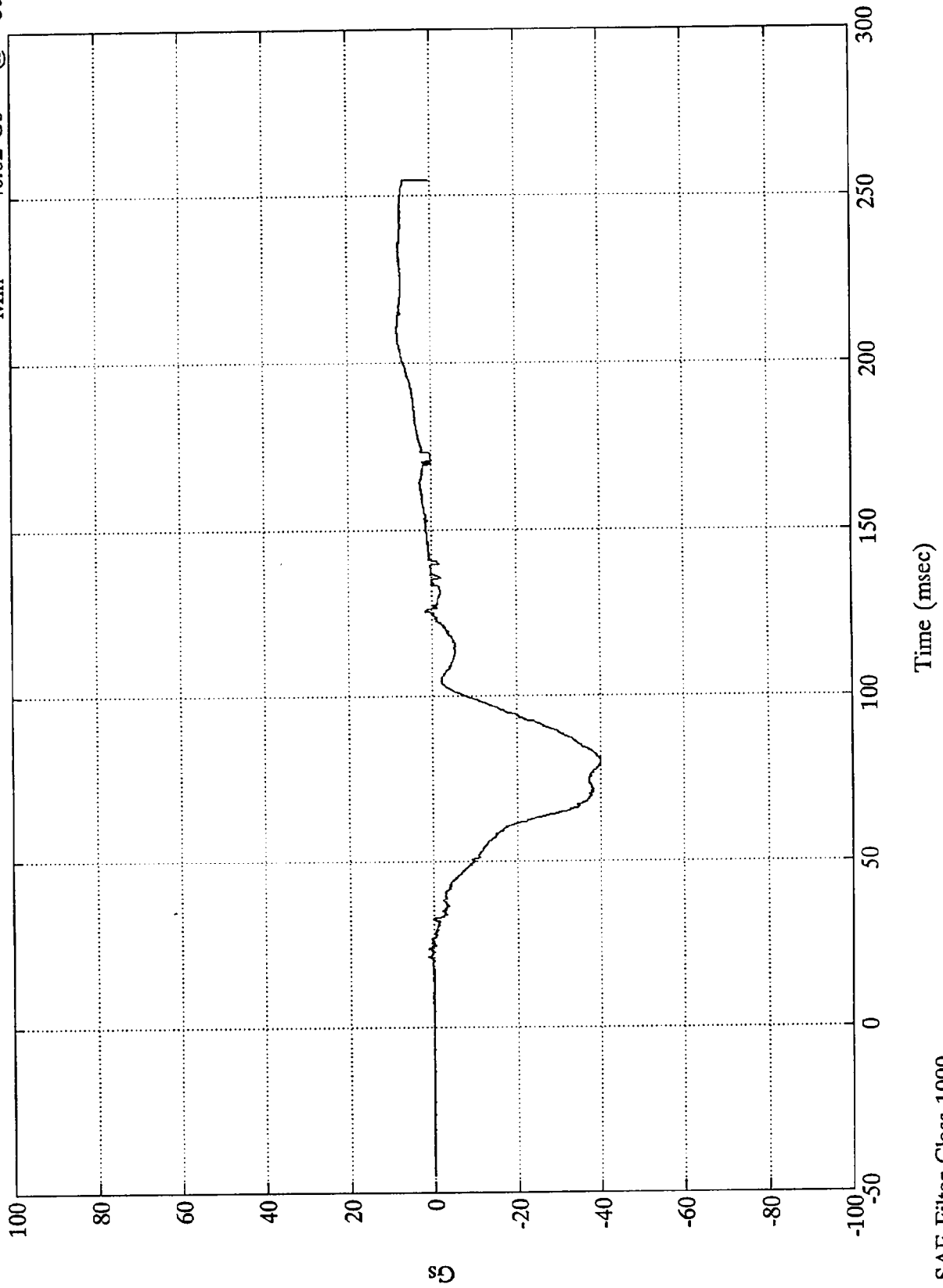
CLIP SUMMARY: Pos. 2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 38.757 G's
Tstart = 80.2800 ms
Tend = 83.4000 ms
CSI = 352.981

NHTSA 208 TEST - 1994 Mercury Villager

Pos. 1 Head X

Max = 8.05 Gs @ 210.83 msec
Min = -40.02 Gs @ 80.76 msec

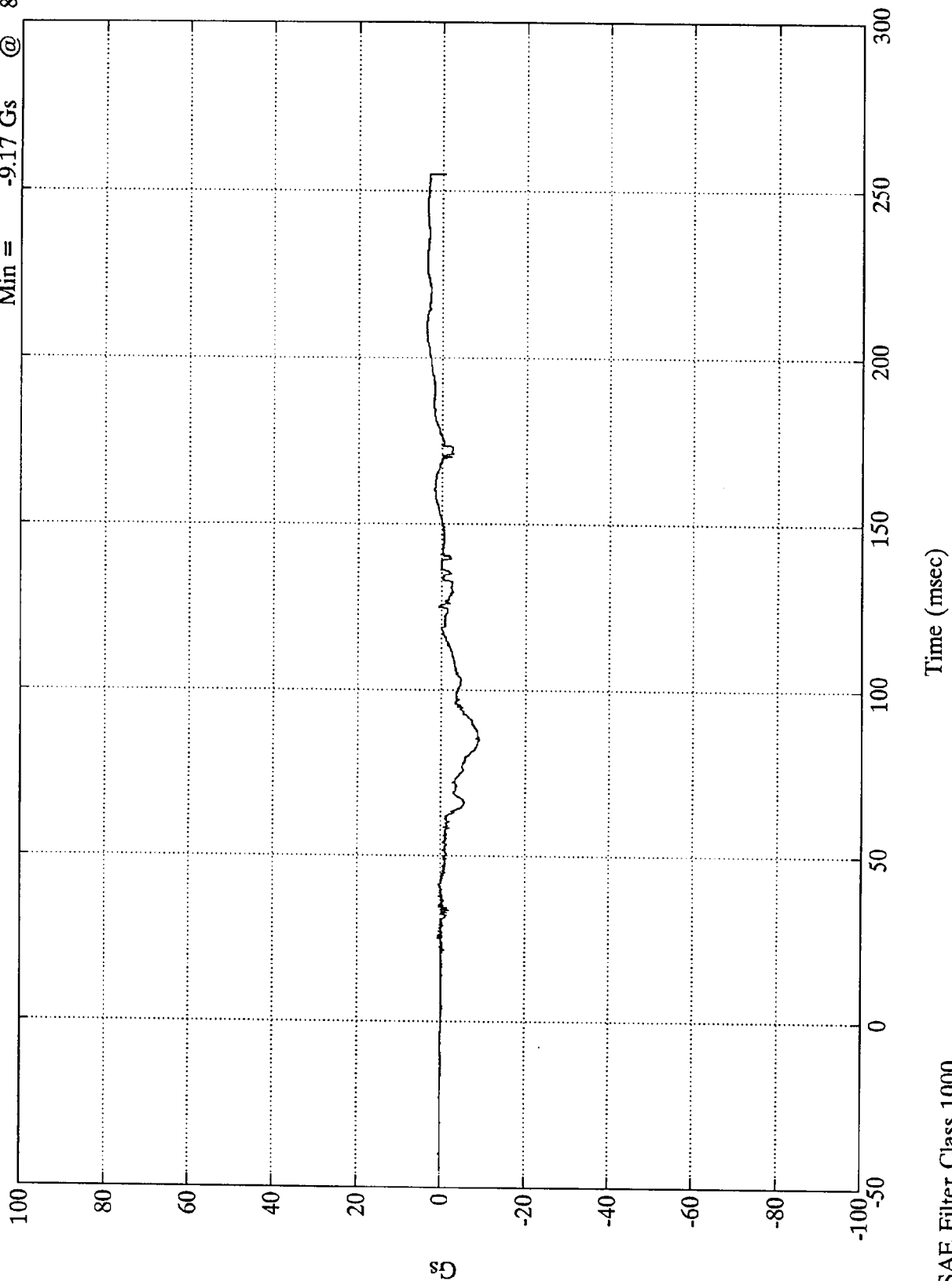


SAE Filter Class 1000

NHTSA 208 TEST - 1994 Mercury Villager

Max = 3.91 Gs @ 209.27 msec
Min = -9.17 Gs @ 84.83 msec

Pos. 1 Head Y

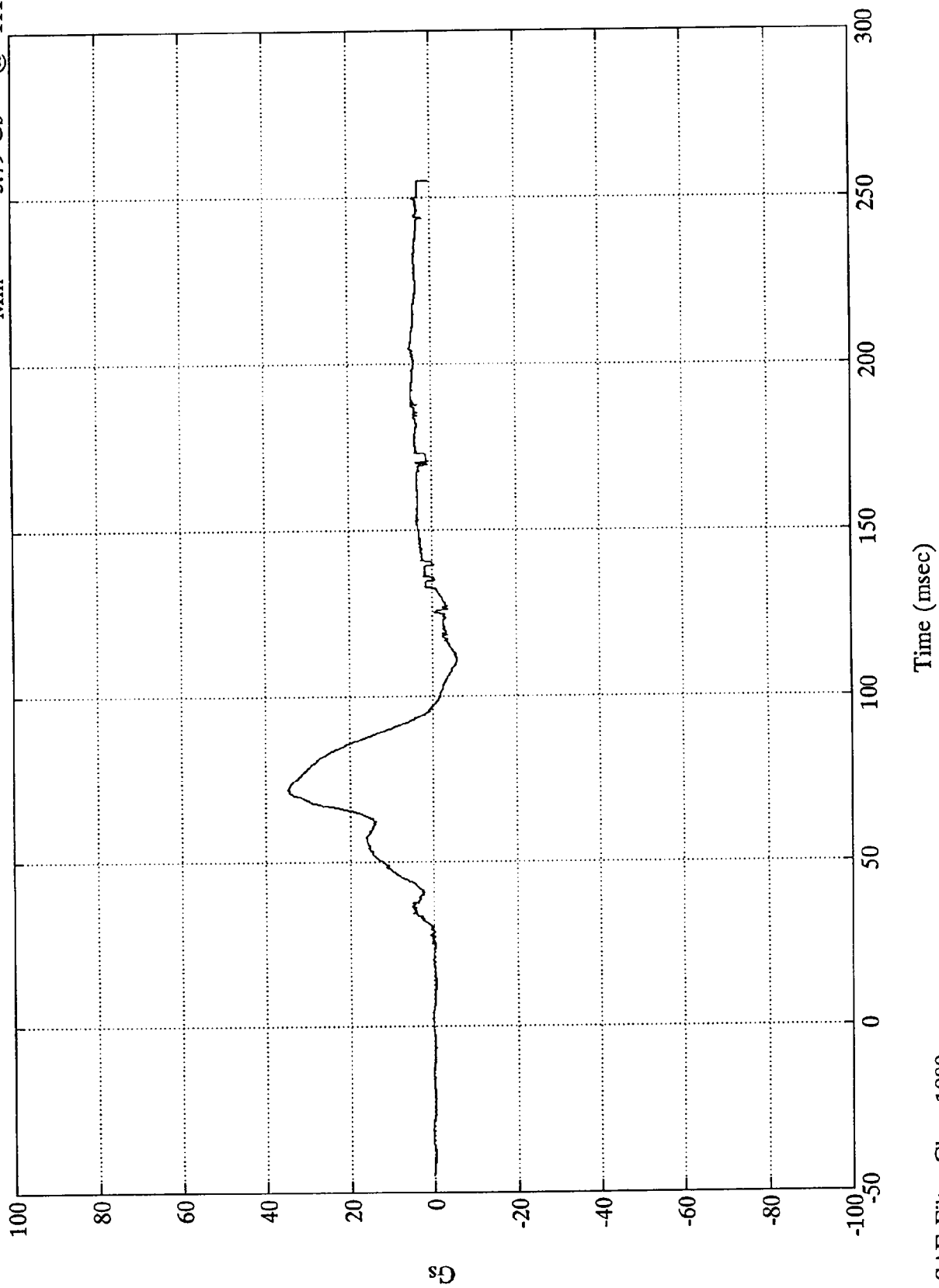


SAE Filter Class 1000

NHTSA 208 TEST - 1994 Mercury Villager

Max = 34.71 Gs @ 71.40 msec
Min = -5.79 Gs @ 111.23 msec

Pos. 1 Head Z

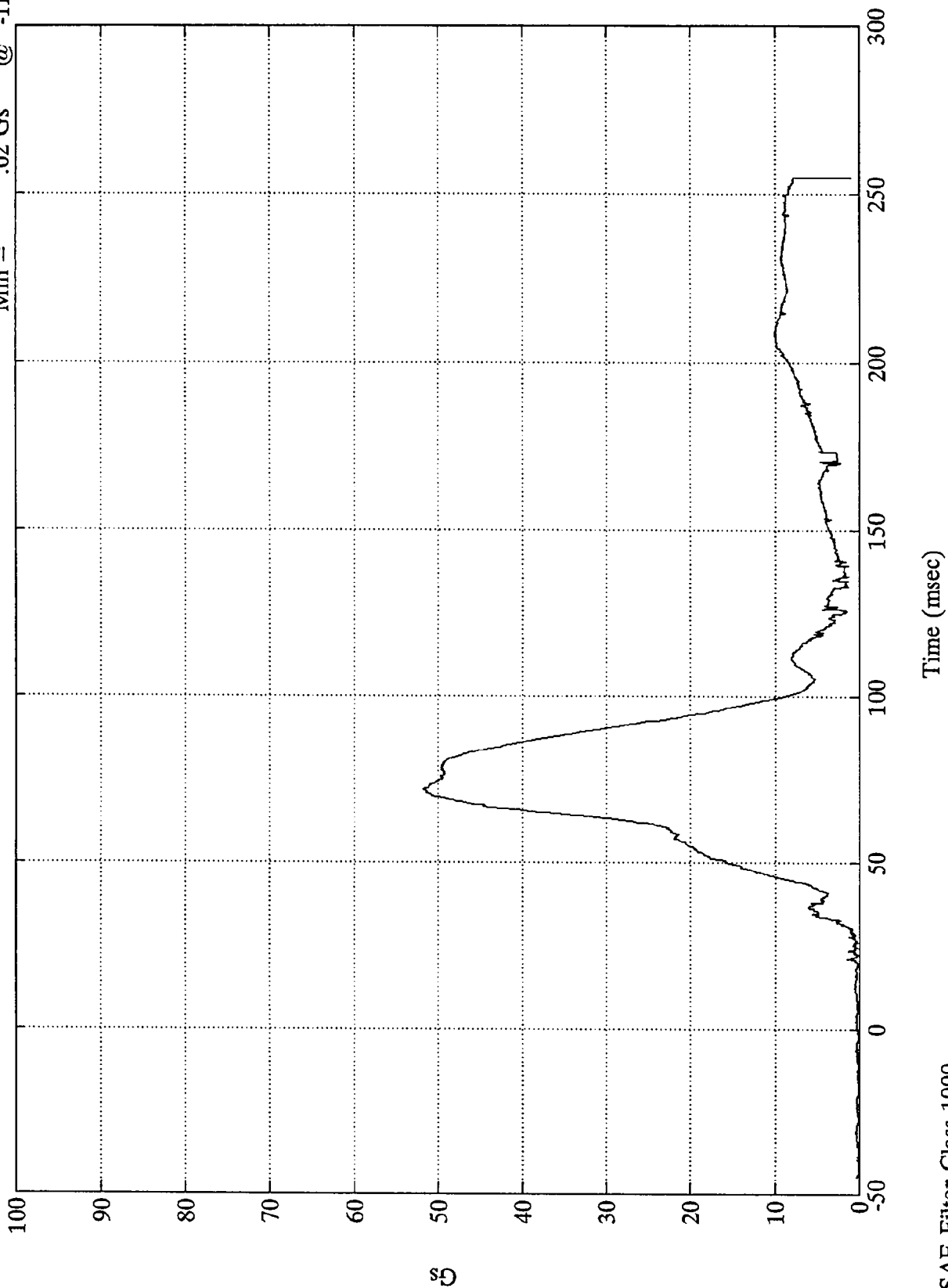


SAE Filter Class 1000

NHTSA 208 TEST - 1994 Mercury Villager

Max = 51.81 Gs @ 71.76 msec
Min = .02 Gs @ -11.28 msec

Pos. 1 Head Resultant

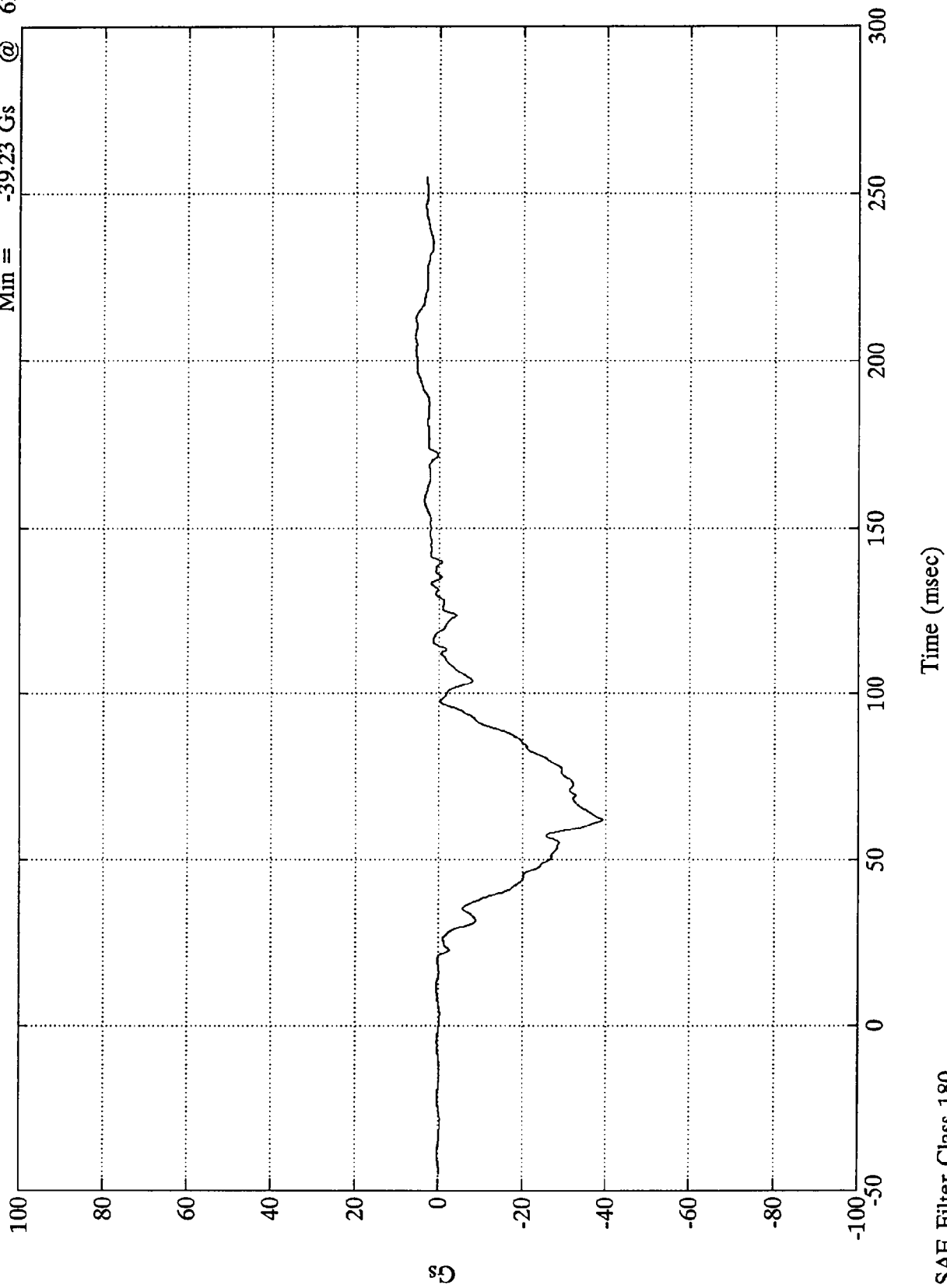


SAE Filter Class 1000

NHTSA 208 TEST - 1994 Mercury Villager

Max = 5.83 Gs @ 207.11 msec
Min = -39.23 Gs @ 61.92 msec

Pos. 1 Chest X

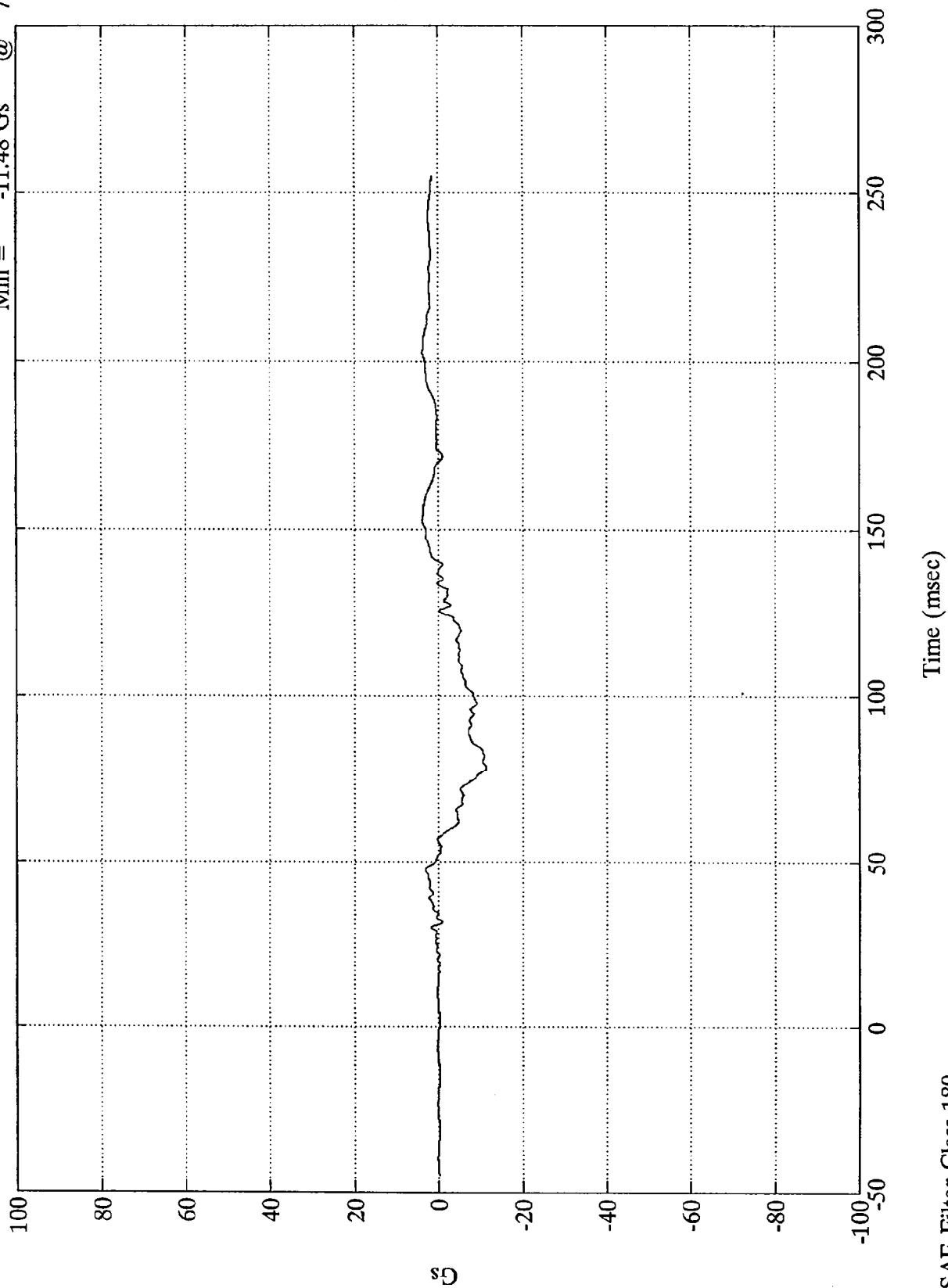


SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Max = 3.79 Gs @ 202.56 msec
Min = -11.48 Gs @ 78.36 msec

Pos. 1 Chest Y

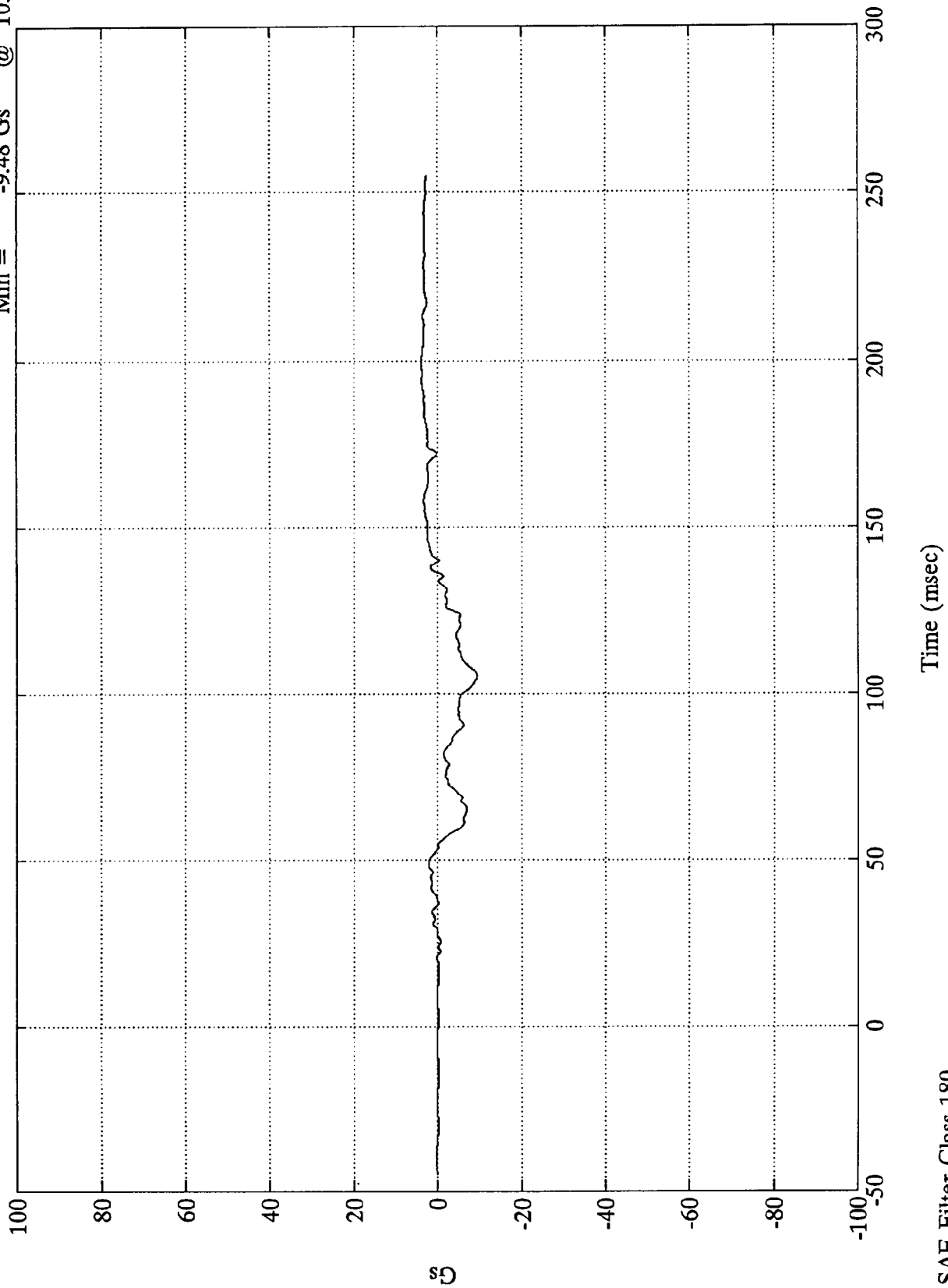


SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Max = 3.83 Gs @ 199.08 msec
Min = -9.48 Gs @ 105.12 msec

Pos. 1 Chest Z

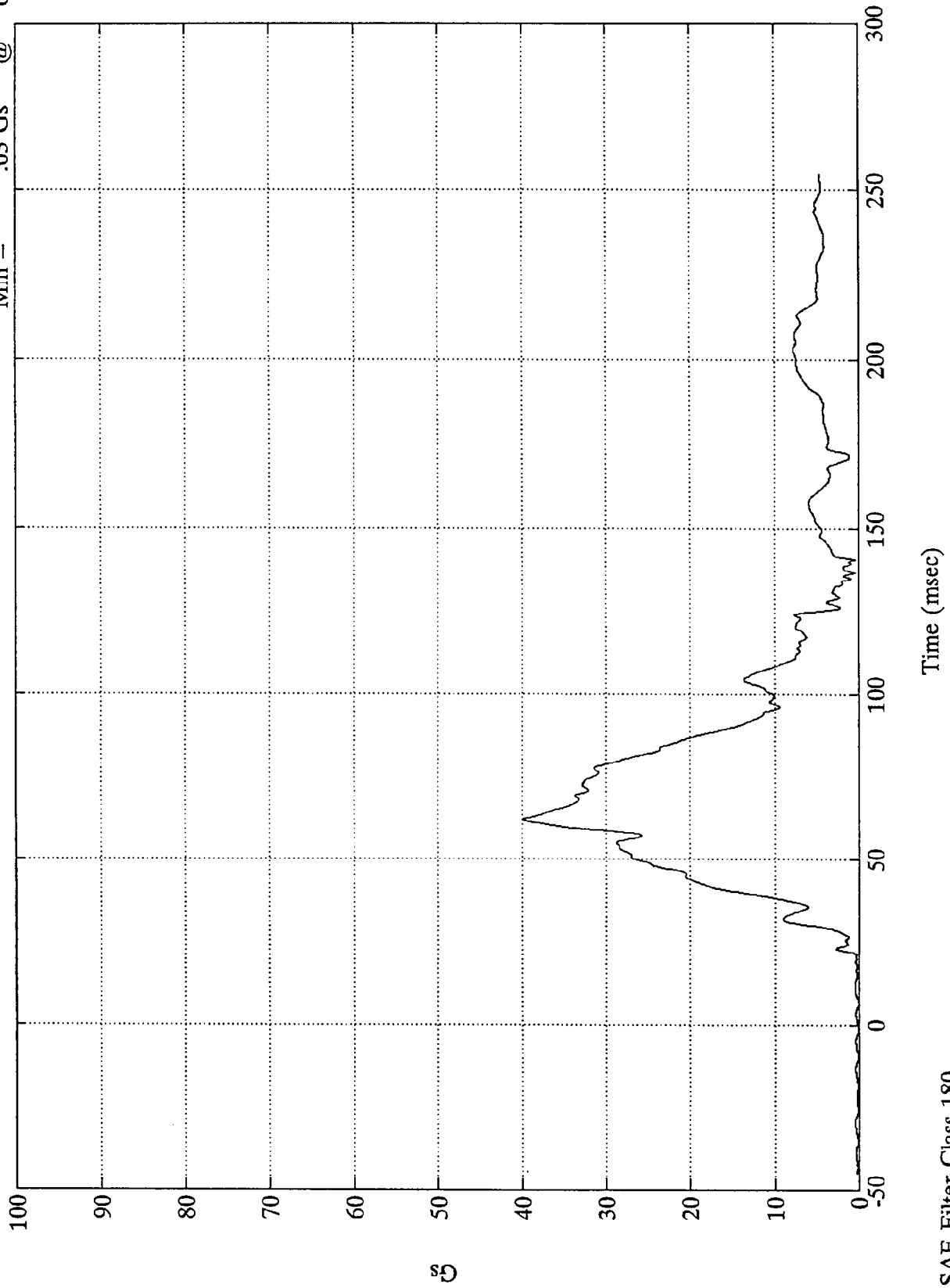


SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Max = 40.00 Gs @ 61.92 msec
Min = .03 Gs @ 6.23 msec

Pos. 1 Chest Resultant

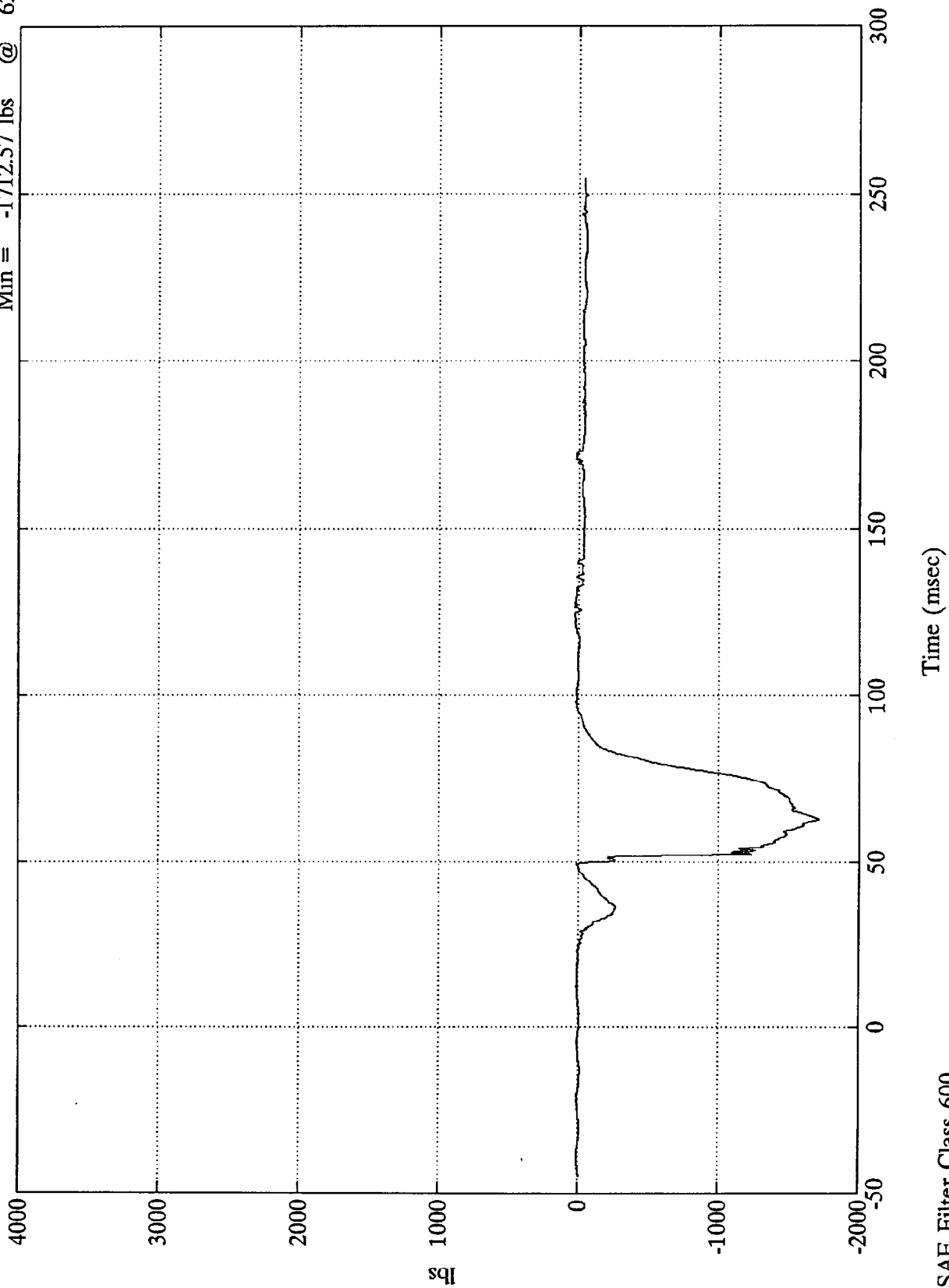


SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Max = 29.35 lbs @ 126.47 msec
Min = -1712.57 lbs @ 62.64 msec

Pos. 1 Left Femur

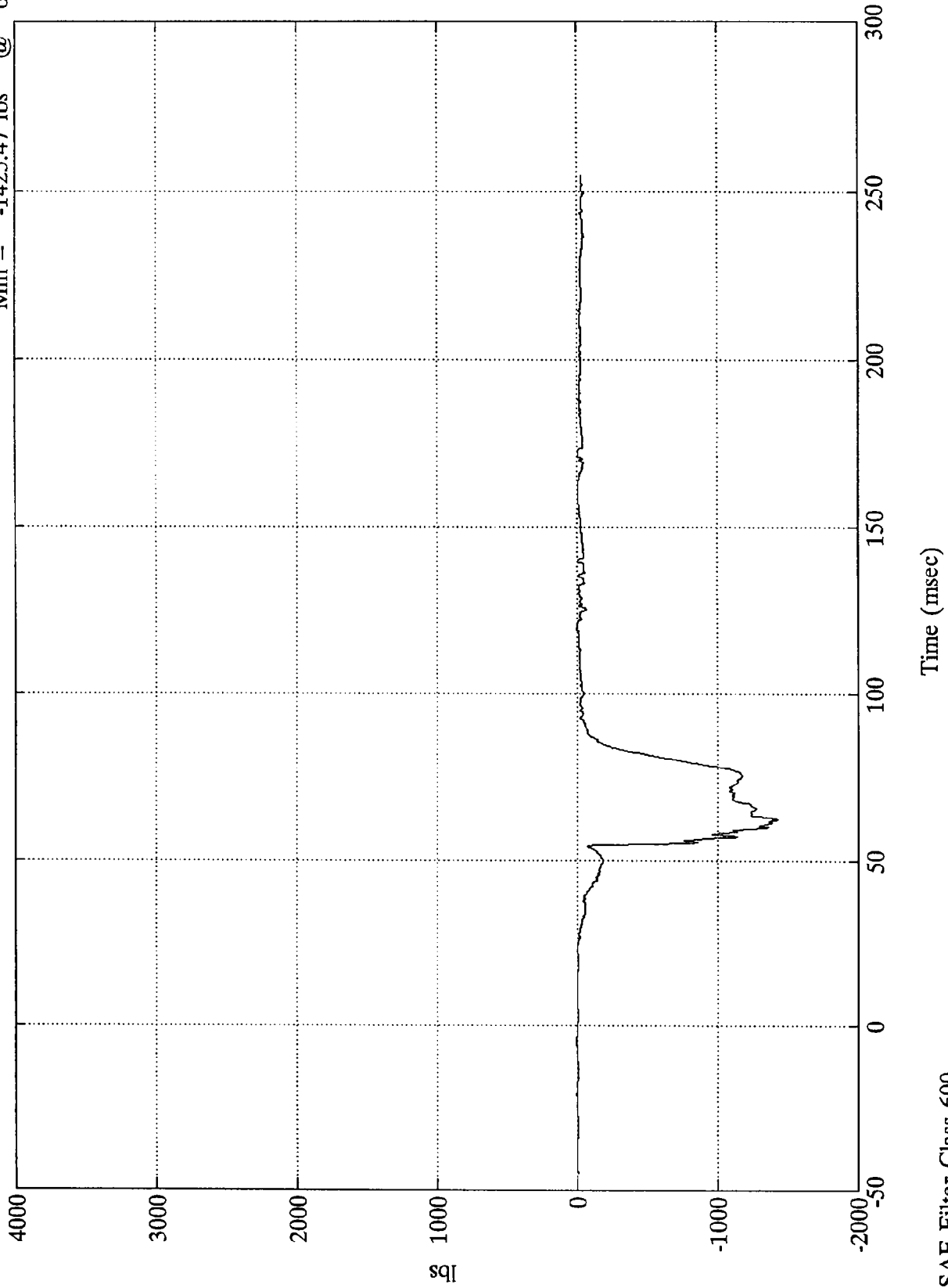


SAE Filter Class 600

NHTSA 208 TEST - 1994 Mercury Villager

Max = 6.23 lbs @ 119.52 msec
Min = -1425.47 lbs @ 62.51 msec

Pos. 1 Right Femur

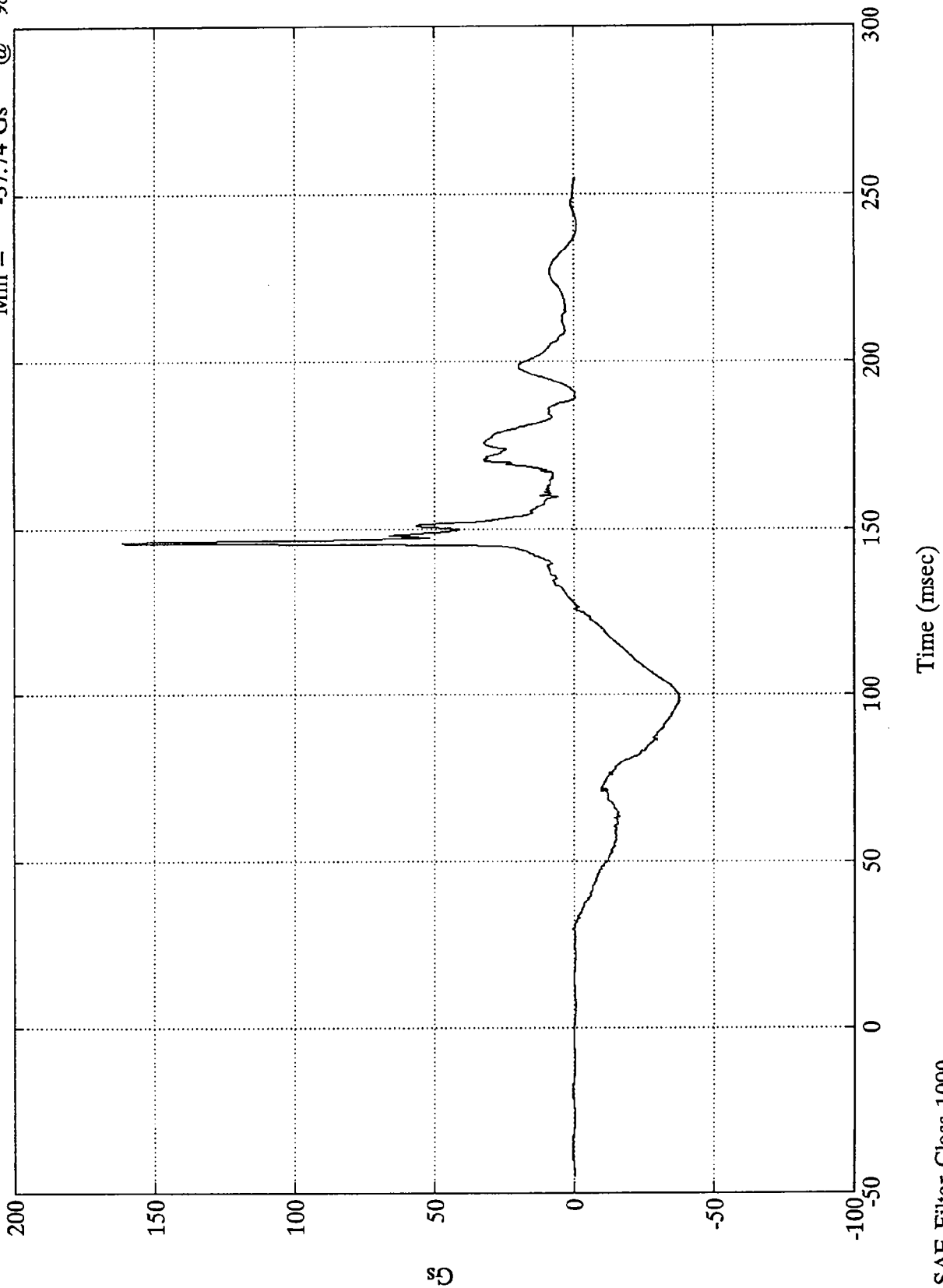


SAE Filter Class 600

NHTSA 208 TEST - 1994 Mercury Villager

Max = 161.50 Gs @ 146.04 msec
Min = -37.74 Gs @ 98.87 msec

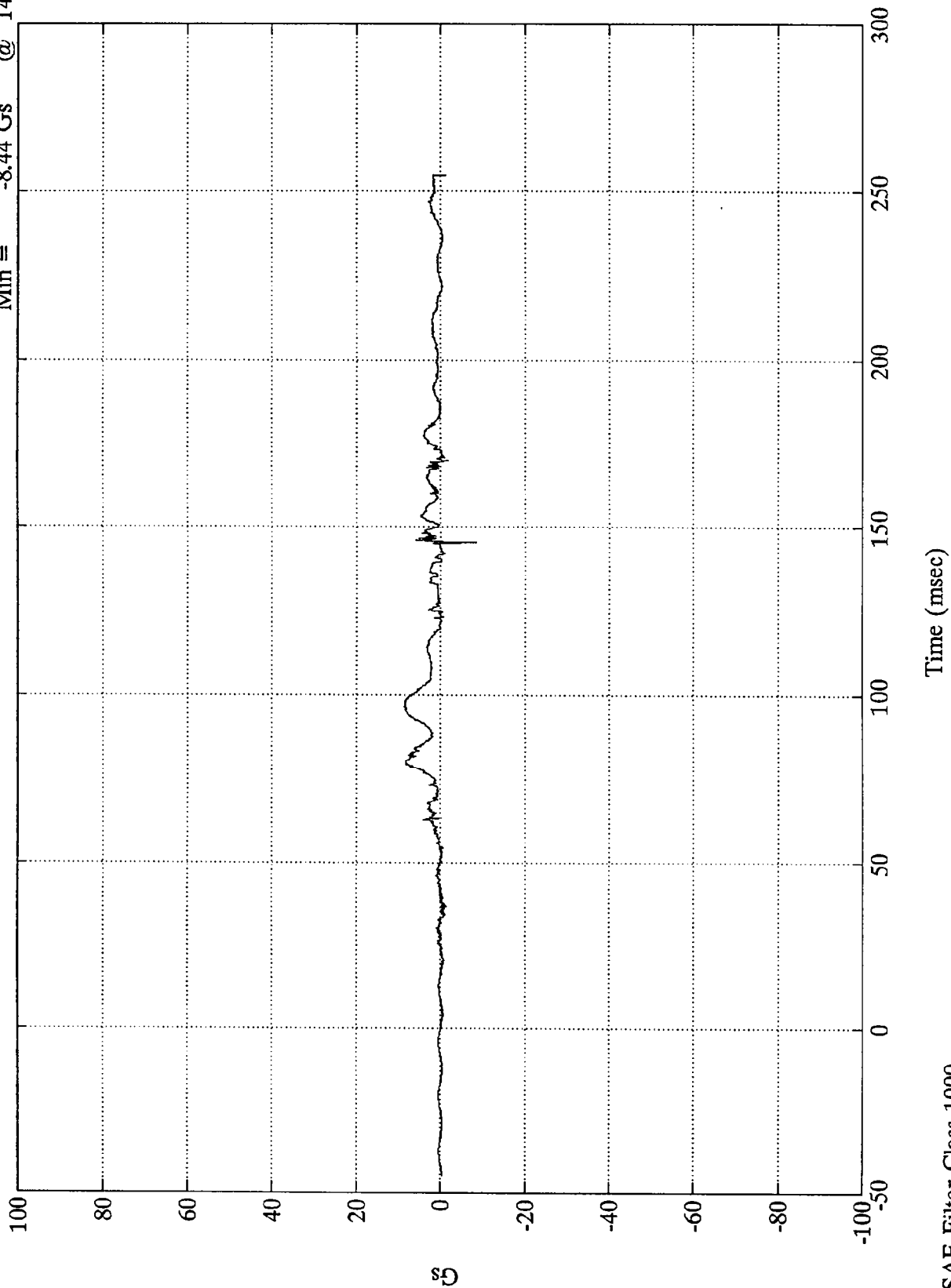
Pos. 2 Head X



SAE Filter Class 1000

NHTSA 208 TEST - 1994 Mercury Villager

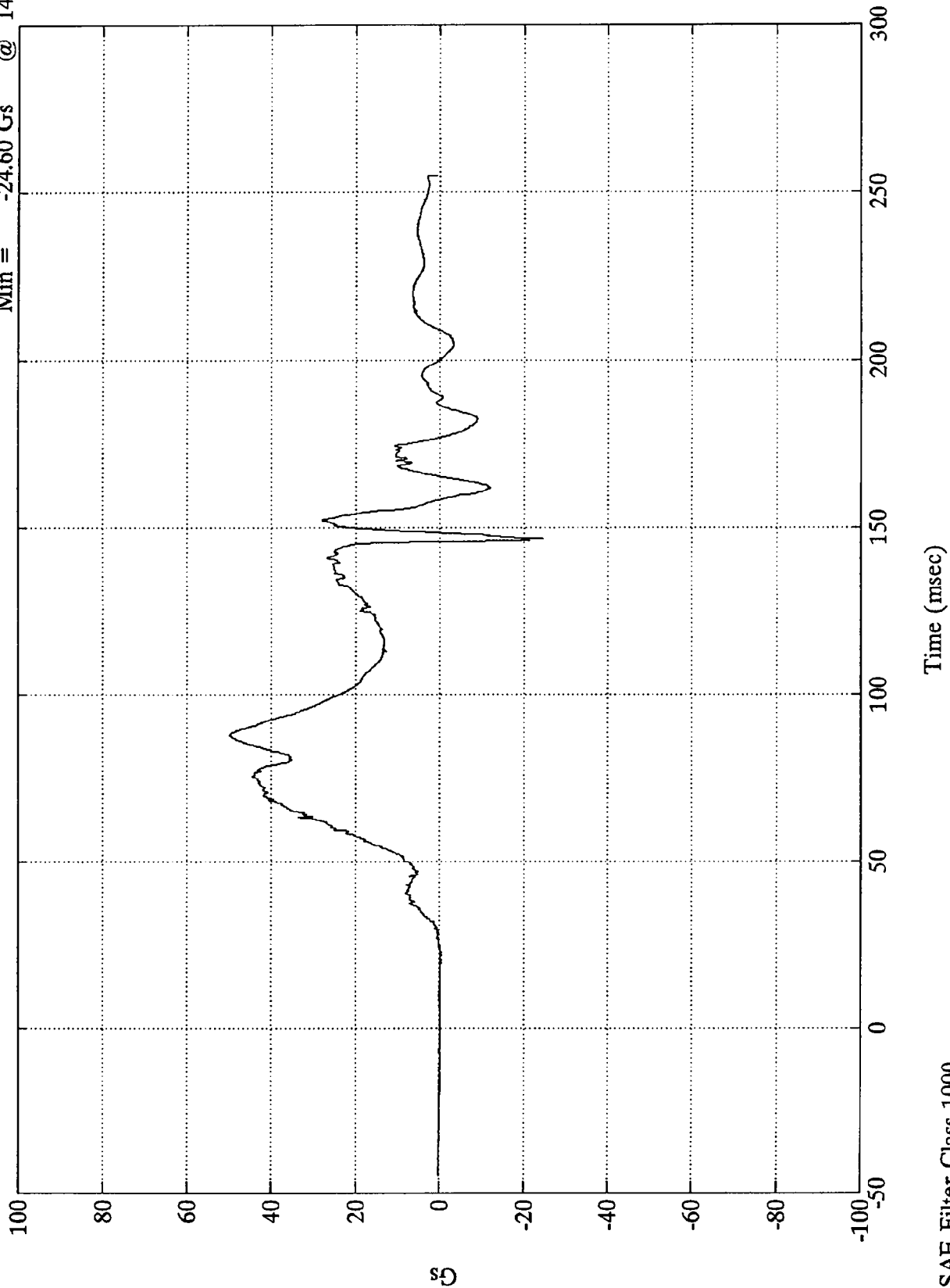
Pos. 2 Head Y
Max = 8.74 Gs @ 96.36 msec
Min = -8.44 Gs @ 145.44 msec



NHTSA 208 TEST - 1994 Mercury Villager

Max = 49.95 Gs @ 88.08 msec
Min = -24.60 Gs @ 146.75 msec

Pos. 2 Head Z

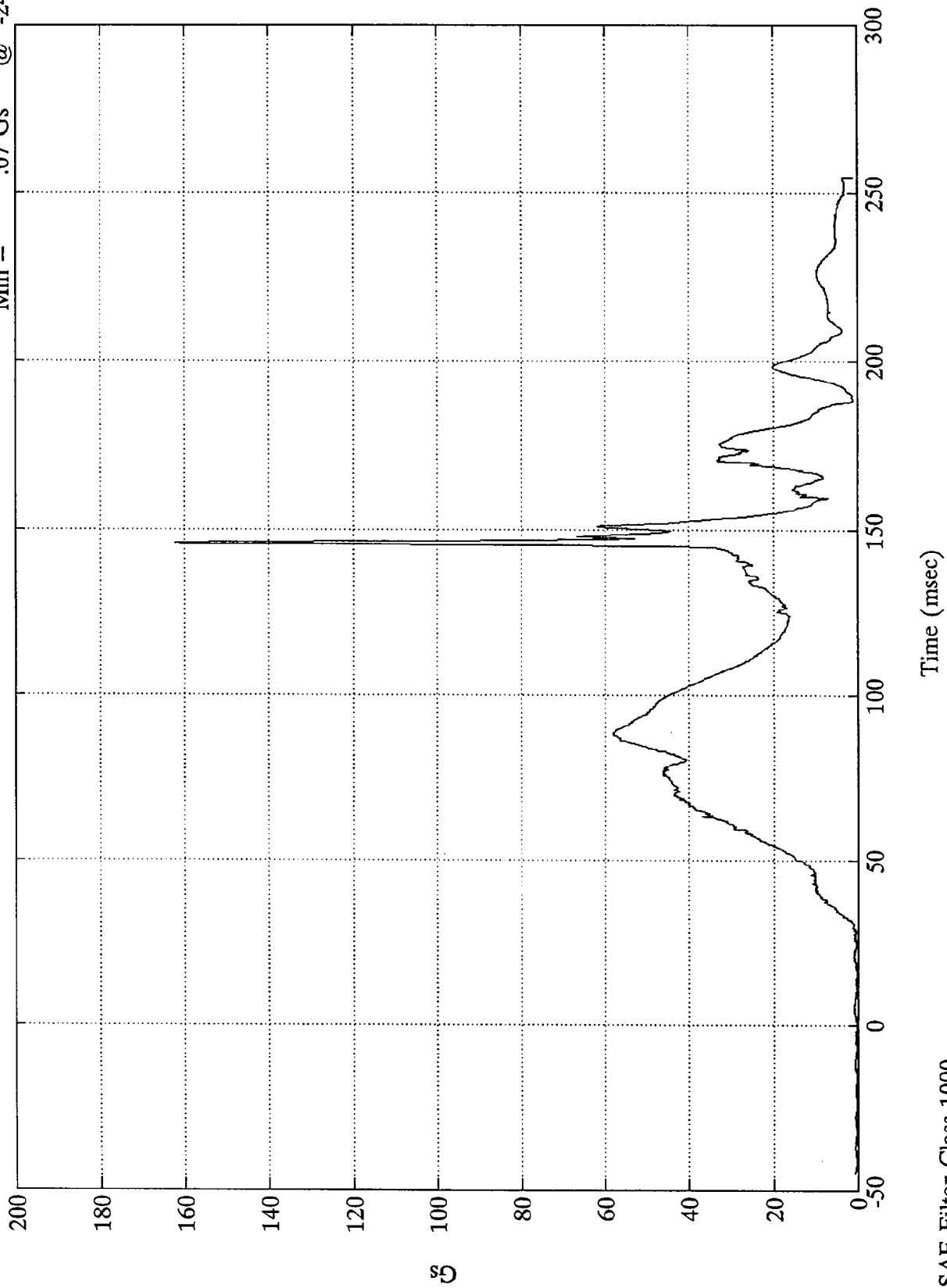


SAE Filter Class 1000

NHTSA 208 TEST - 1994 Mercury Villager

Max = 162.27 Gs @ 146.04 msec
Min = .07 Gs @ -24.48 msec

Pos. 2 Head Resultant



Gs

8221-1

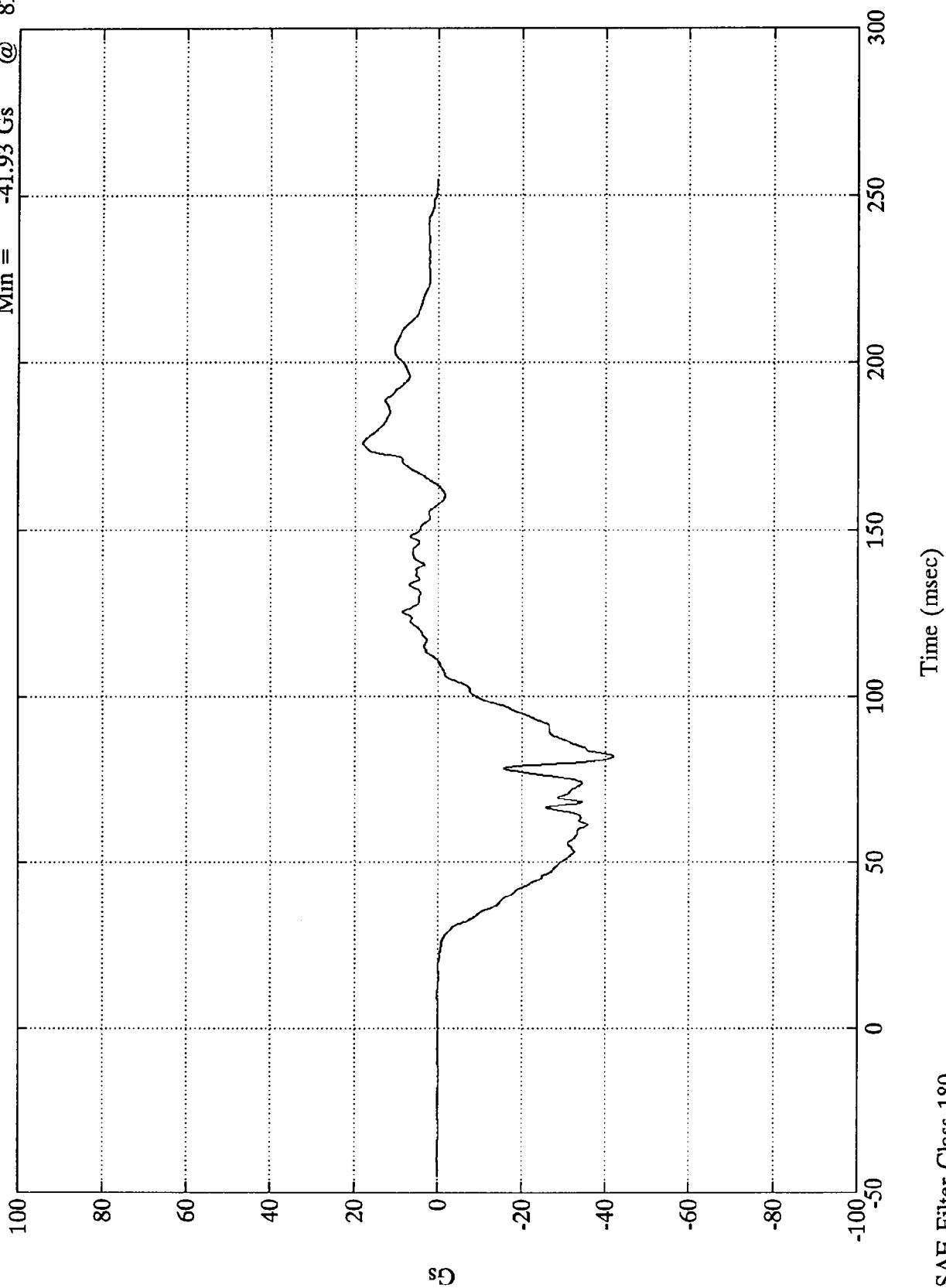
SAE Filter Class 1000

B-40

NHTSA 208 TEST - 1994 Mercury Villager

Max = 18.11 Gs @ 175.92 msec
Min = -41.93 Gs @ 81.84 msec

Pos. 2 Chest X



Gs

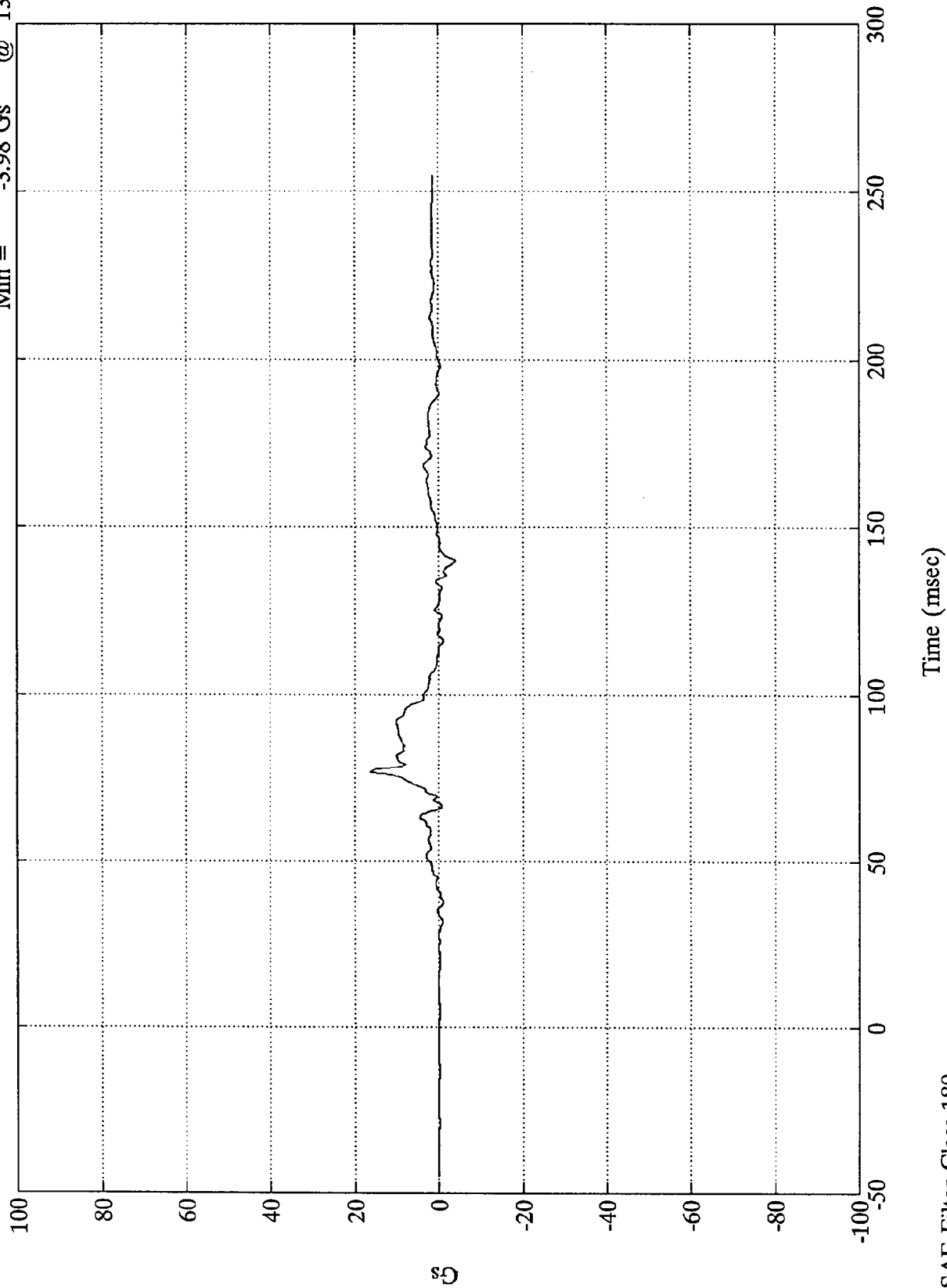
Time (msec)

SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Max = 16.44 Gs @ 76.68 msec
Min = -3.98 Gs @ 139.92 msec

Pos. 2 Chest Y

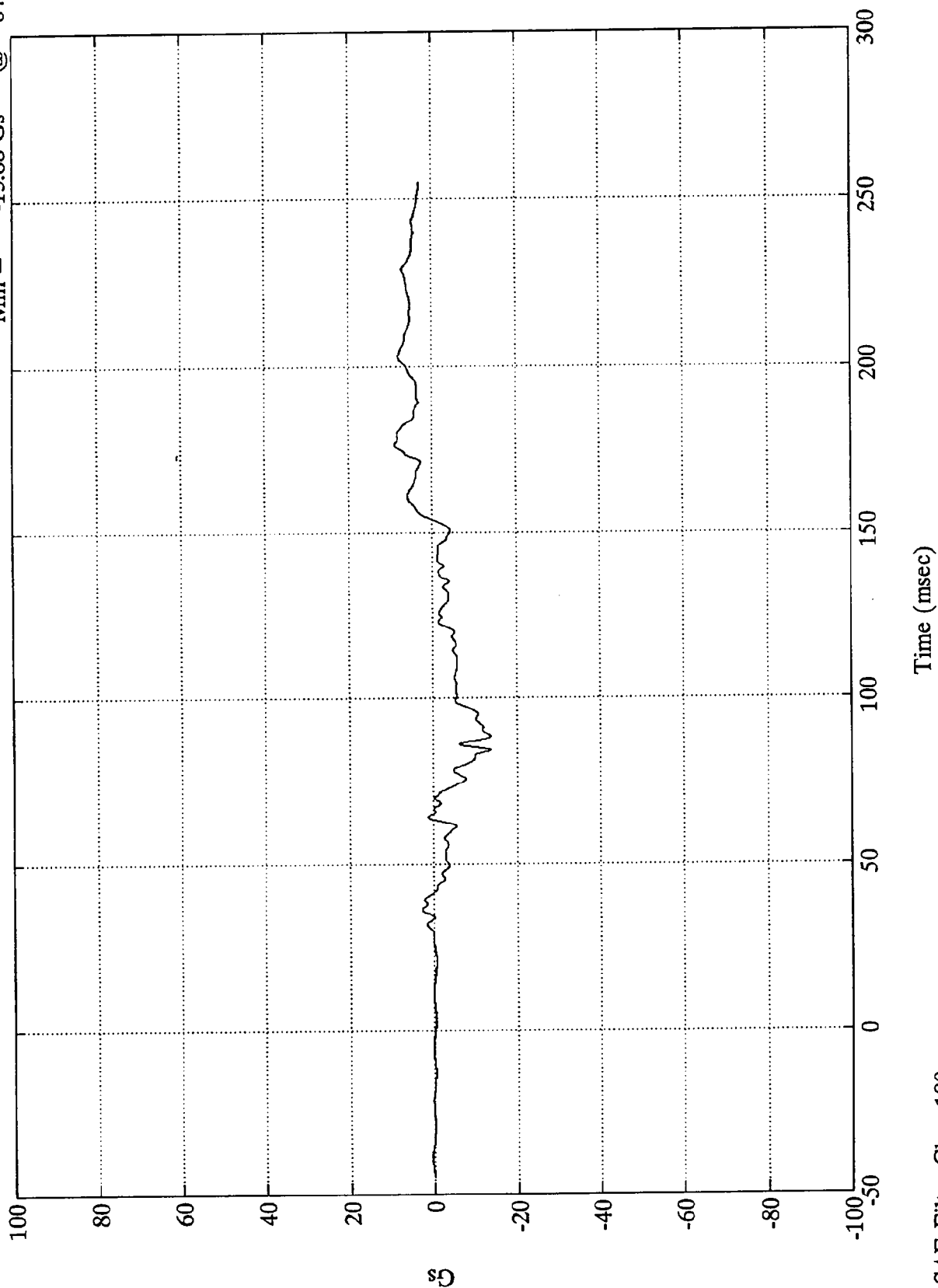


SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Max = 8.97 Gs @ 176.52 msec
Min = -13.88 Gs @ 84.36 msec

Pos. 2 Chest Z

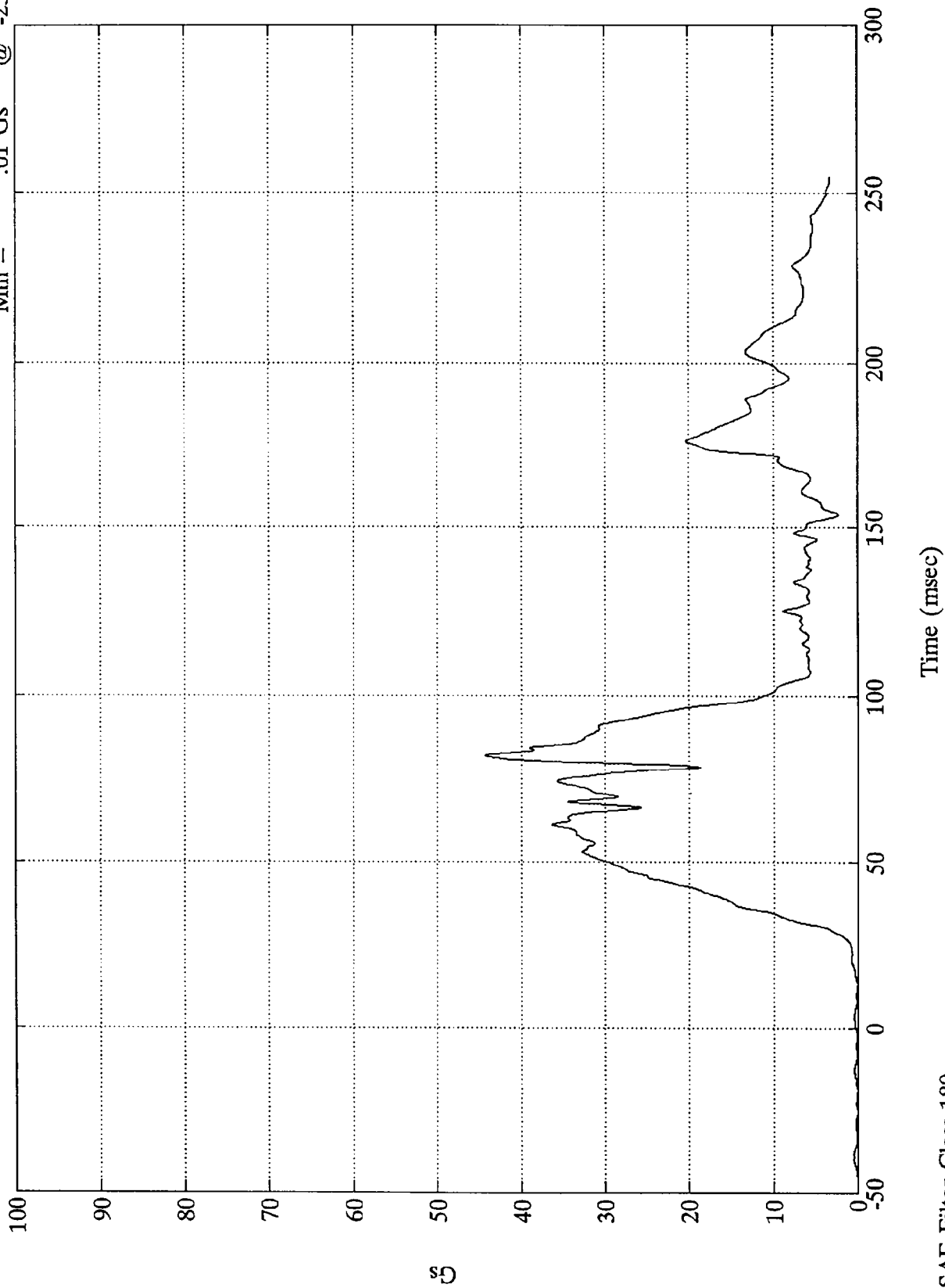


SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Max = 44.27 Gs @ 81.84 msec
Min = .01 Gs @ -25.56 msec

Pos. 2 Chest Resultant

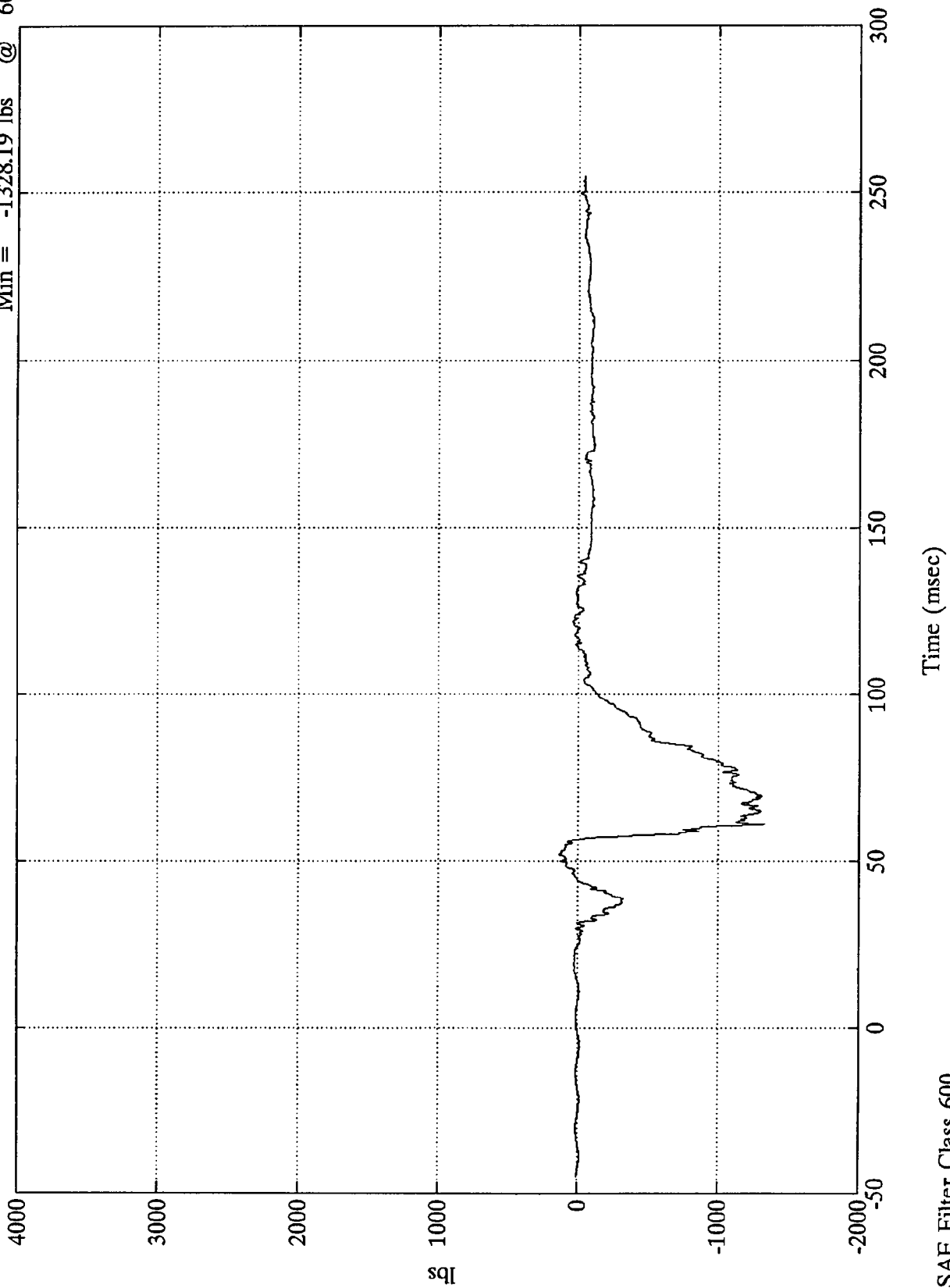


SAE Filter Class 180

NHTSA 208 TEST - 1994 Mercury Villager

Pos. 2 Left Femur

Max = 136.68 lbs @ 51.95 msec
Min = -1328.19 lbs @ 60.96 msec

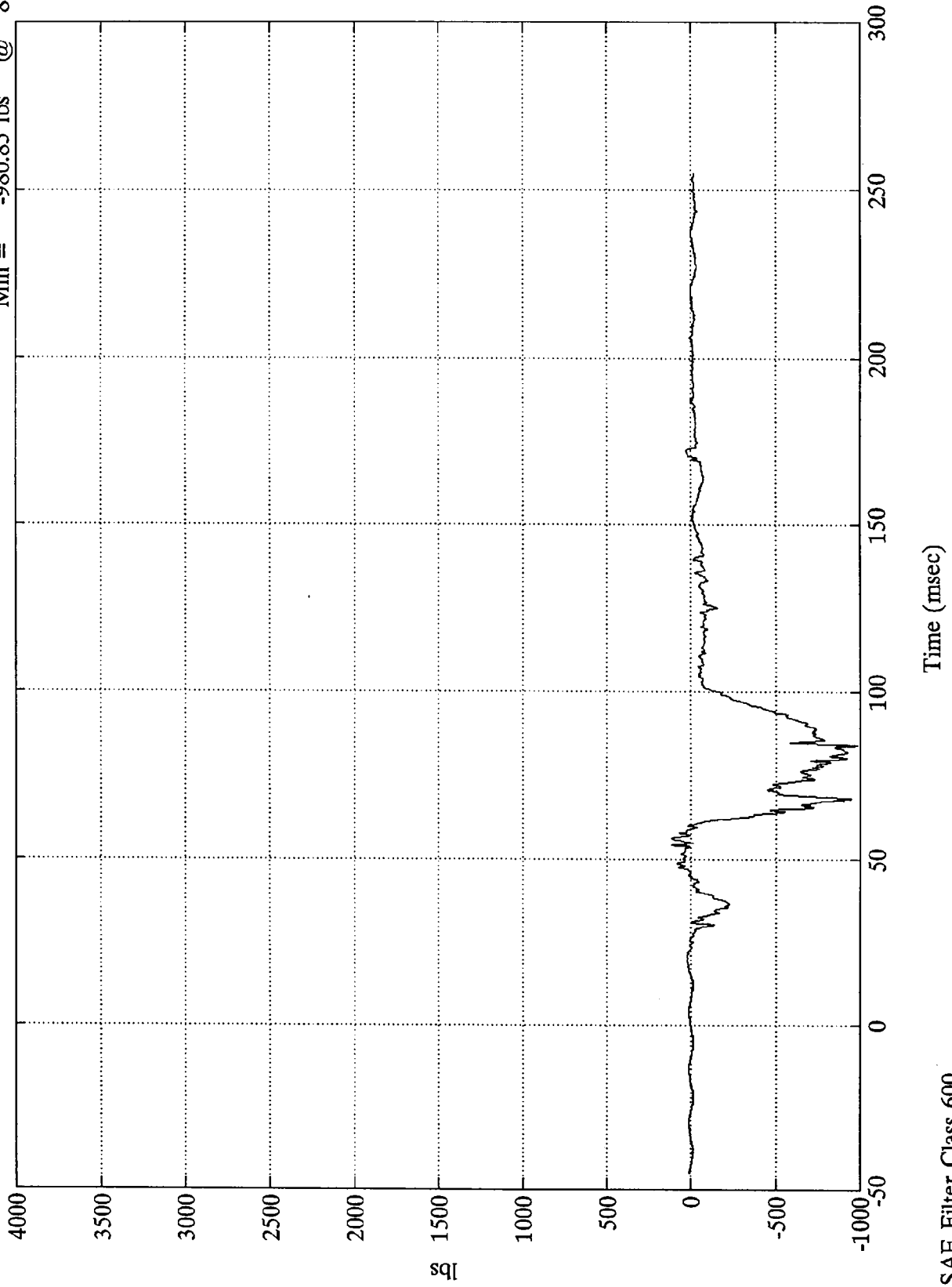


SAE Filter Class 600

NHTSA 208 TEST - 1994 Mercury Villager

Max = 113.90 lbs @ 56.40 msec
Min = -980.85 lbs @ 84.00 msec

Pos. 2 Right Femur



SAE Filter Class 600

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

SAFETY RESTRAINTS



Using Safety Restraints Properly	20
Air Bag Supplemental Restraint System (SRS)	47
Safety Restraints for Children	54

Using Safety Restraints Properly

Safety Belts

Using safety belts will help to restrain you and your passengers in case of a collision. In most states, the law requires their use. We strongly recommend that you use them every time you travel in your vehicle.

Safety belts provide best restraint when:

- the seatback is upright
- the occupant is sitting upright (not slouched)
- the lap belt is snug and low on the hips
- the shoulder belt is snug against the chest
- the knees are straight forward

For your safety, your Villager has different types of safety belts which include:

- Motorized shoulder belt passive restraints — an automatic, motorized shoulder belt for people who sit in either of the front seats.
- Manual front lap belts — for people who sit in the front seat and have an automatic, motorized shoulder belt.
- Combination lap and shoulder belts — for the outside rear seating positions.
- A lap belt without a retractor — for the center rear seating position.

Read this entire chapter for directions on how to use these safety belts properly. Also see *Safety Restraints for Children* in this chapter for special instructions about using safety belts and safety seats for children.

SAFETY RESTRAINTS

WARNING

Make sure that you and your passengers, including pregnant women, wear safety belts. Be sure that the lap belt portion of your safety belt fits snugly and as low as possible around the hips. If safety belts are not used properly, the risk of you or your passengers being injured in a collision greatly increases.

WARNING

Always drive and ride with your seatback upright and the lap belt snug and low across the hips to reduce the risk of serious injury to the abdomen or neck that could be caused by sliding under the safety belts in a collision.

No one should ride in your Villager's cargo area. People who do not ride in seats with safety belts fastened are much more likely to be injured in a collision.

Never let a passenger hold a child on his or her lap while riding in your vehicle. A passenger cannot protect a child from injury in a collision.

Children should always ride with the seatback in the fully upright position. When the seatback is not fully upright, there is a greater risk that the child will slide under the safety belt and be seriously injured in a collision.

Never use a single belt for more than one person or across more than one seating position. This greatly increases the risk that one or both of the people will be injured in a collision. Each seating position in your vehicle has a specific safety belt assembly which is made up of one buckle and one tongue that are designed to be used as a pair.

SAFETY RESTRAINTS

WARNING

Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around the neck over the inside shoulder. Failure to follow these precautions could increase the risk and/or severity of injury in an accident.

WARNING

Lock the doors of your Villager before driving to lessen the risk of the door coming open in a collision.

Important for Your Safety

Before driving your Villager, read the labels on the front and back of the sun visor (U.S. vehicles) or on the headliner (Canadian vehicles). See the following illustrations.

! WARNING

Fasten Lap Belt

Read Other Side

AVERTISSEMENT

Attacher la ceinture sous-abdominale.

Lire les directives au verso.

This vehicle has an AIR BAG for the driver, with a lap belt and a motorized shoulder belt for each front occupant.

▲ WARNING
ALWAYS WEAR BOTH THE LAP AND SHOULDER BELTS.
EVEN WITH AN AIR BAG. AND HERE'S WHY:

EVEN WITH AN AIR BAG, AND HERE'S WHY:

- Air bags are not designed to inflate in rollovers or in rear, side, or low speed frontal crashes.
- Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, it could seriously injure you. Your legs and shoulder belts help keep you in position for air bag inflation in a crash.
- **NOT WEARING YOUR LAP BELT** could also result in serious or fatal injury.
- **THE AIR BAG SYSTEM MUST BE INSPECTED 10 YEARS AFTER DATE OF MANUFACTURE SHOWN ON THE VEHICLE CERTIFICATION LABEL.** If the air bag readiness light comes on while you are driving, or doesn't come on when you first start your vehicle, see your dealer for service.

See your Owner's Manual for more information about the restraint system, it's use with small occupants and children, and it's warning lights.

⚠ WARNING

**ALWAYS WEAR BOTH THE LAP AND SHOULDER BELTS,
AND HERE'S WHY:**

- **Not wearing your lap belt** increases the chance of severe or fatal injury in an accident. The shoulder belt alone may not restrain you in all accidents.

The safety belt warning light will remain on indefinitely if the automatic shoulder belt is not operating properly.

See your Owner's Manual for more information about the restraint system, its use with small occupants and children, and child restraint seats.

Safety Belt Warning Light and Chime

The safety belt warning light and chime remind you to fasten your safety belt.

- If either the driver or passenger shoulder belt is not fastened before the ignition is turned to ON, the chime sounds for about 6 seconds, and the warning light comes on for about one minute, or until the driver's lap belt is fastened.
- If the driver lap belt is not fastened before the ignition is turned to ON, the chime sounds for about 6 seconds, and the warning light comes on for about one minute, or until the driver's lap belt is fastened.
- If the driver and passenger shoulder belts and the driver lap belt are fastened before the ignition is turned to ON, the chime does not sound, but the warning light comes on for about 6 seconds to remind your passengers to fasten their belts.
- Finally, if either the driver or passenger motorized shoulder belt does not reach its locked position at the B-pillar, the warning light comes on and the chime sounds continuously. If this situation occurs, see *What to do if your shoulder belt does not engage properly* later in this chapter, before driving your vehicle.



Safety belt warning light

SAFETY RESTRAINTS

Manual Front Lap Belts

You must always wear the lap belt in addition to the shoulder belt.

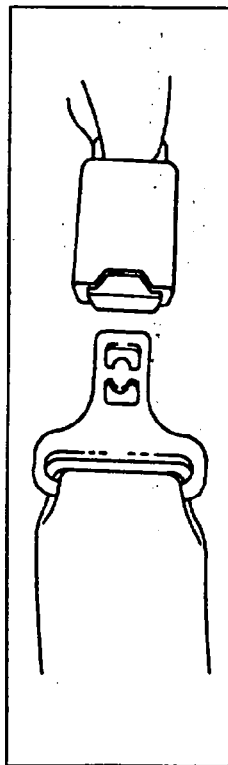
WARNING

The lap belt must be manually buckled by the driver and passenger and should fit snugly and as low as possible around the hips, not around the waist. Failure to do so may increase the risk of injury in the event of a collision.

WARNING

Each front seat has a motorized shoulder belt and a manual lap belt. To reduce the risk of serious injury, the manual belt must be fastened and must be snugly positioned as low as possible around the hips, not the waist. The shoulder belt should rest over the outside shoulder and across the chest.

To fasten the lap belt, pull the belt out of the retractor and bring it across your lap. Insert the tongue into the buckle until it snaps and locks into place.

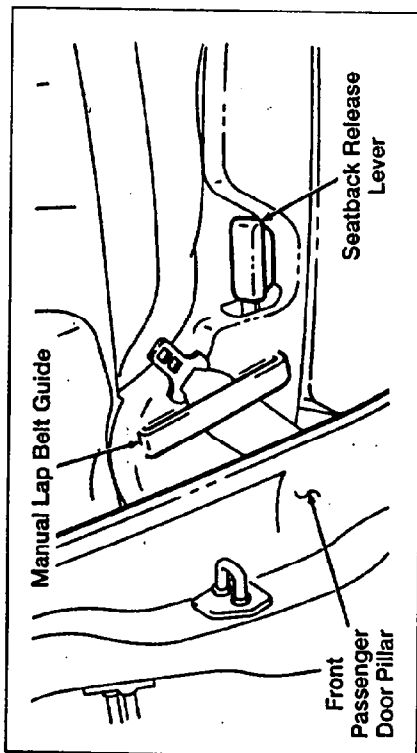


The lap belt

A chime will sound for approximately six seconds if the driver's lap belt is not fastened when the ignition switch is turned to ON.

SAFETY RESTRAINTS

The manual lap belts for front seat passengers feed through a lap belt guide on the sides of the seats. These lap belt guides make it easier for passengers to reach their lap belts.



The manual lap belt guide

Dual Locking Mode Front Passenger Seat Lap Belt Retractor

Your vehicle is equipped with a dual locking mode retractor on the lap belt for the front seat passenger. The retractor modes function as follows:

Vehicle Sensitive (Emergency) Locking Mode

In this operating mode, the lap belt retractor will allow the occupant freedom of movement, locking tight only on hard braking, hard cornering or impacts of approximately 5 mph (8 km/h) or more. The retractor cannot be made to lock by jerking on the belt.

Automatic Locking Mode

In this operating mode, the lap belt retractor will remain locked and does not allow the occupant freedom of movement. This mode provides the following:

- A tight lap belt on the hips.
- Child seat or infant carrier installation.

This mode must be used when installing a child seat. For more information, see *Installing a Child Safety Seat in the Front Passenger Seat with the Manual Lap Belt* later in this chapter.

NOTE: This mode is activated whenever all of the belt webbing is pulled out of the retractor. While in this mode, the belt will retract or tighten but cannot be pulled back out to obtain more length. To disengage the automatic locking mode, unbuckle the belt and allow the webbing to retract fully.

Motorized Shoulder Belt Passive Restraint System (for front seat passengers)

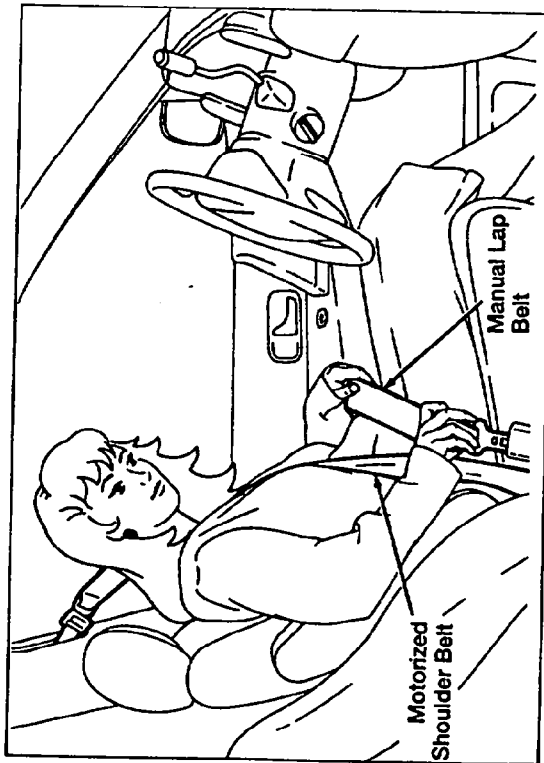
The passive restraint system helps reduce the risk of injury if you are in a collision. The motorized shoulder belts in the front seat automatically adjust to provide protection in the event of a collision.

While you drive, the shoulder belt adjusts to your movement. However, if you brake hard, turn hard, or if your vehicle receives an impact of 5 mph (8 km/h) or more, the shoulder belt locks to help reduce your forward movement.

WARNING Always fasten the manual lap belt. Be sure it is worn snugly and as low as possible around the hips, not around the waist. Failure to follow these instructions could increase the risk of serious injury in a collision.

WARNING

Never place any safety belt around more than one person. Doing so will increase the risk of serious injury in an accident.



Fastening the manual lap belt

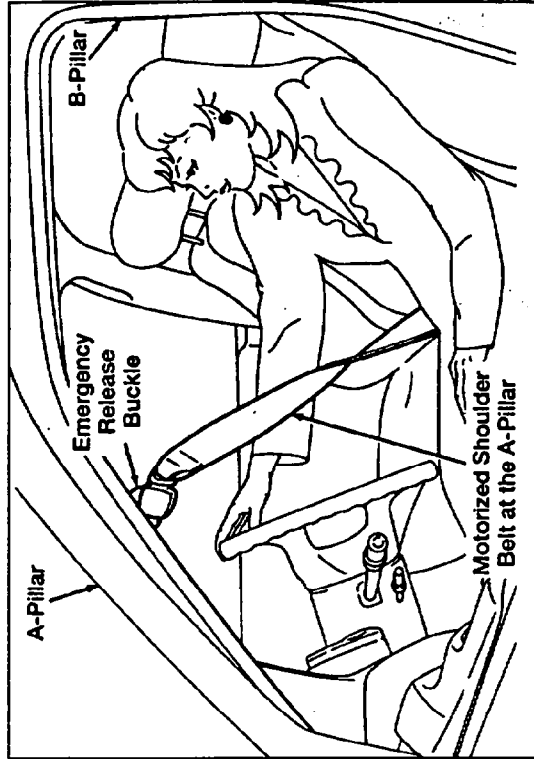
To operate the motorized shoulder belt:

1. Get into your vehicle and close the door. Check to be sure the shoulder belt is latched to the emergency release buckle.
2. Turn the ignition key to the ON position.

A motor causes the shoulder belt to slide along its track from the A-pillar to the B-pillar until it locks in place.

SAFETY RESTRAINTS

If the belt does not lay flat against you, or if the belt has a twist in it at the retractor, unlatch the belt at the buckle, remove the twist, and re-attach the belt into the buckle.



The shoulder belt sliding along its track

SAFETY RESTRAINTS

With the ignition in the ON position and the doors closed, the safety belt warning light will remain illuminated if either of the front motorized shoulder belts are detached from the emergency release buckle. A chime will also sound for about six seconds.

In the unlikely event that the shoulder belt should stall before it reaches the B-pillar, the chime will sound and the indicator light will remain illuminated until the shoulder belt is in its locked position at the B-pillar. If the indicator light remains illuminated for more than one minute, check to be sure that both shoulder belts are latched to the emergency release buckles. If the indicator light remains illuminated with both front seat shoulder belts latched to the emergency release buckles, refer to *What to do if your shoulder belt does not engage properly* later in this chapter before driving the vehicle.

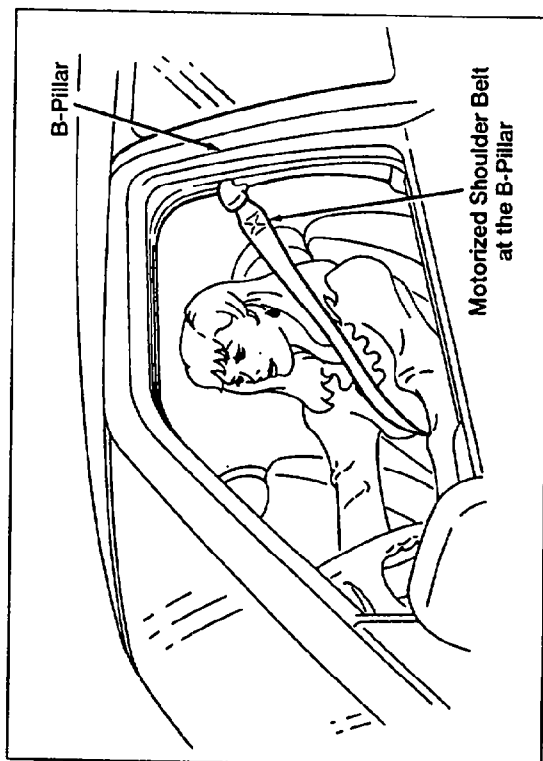
WARNING

Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the risk and/or severity of injury in an accident.

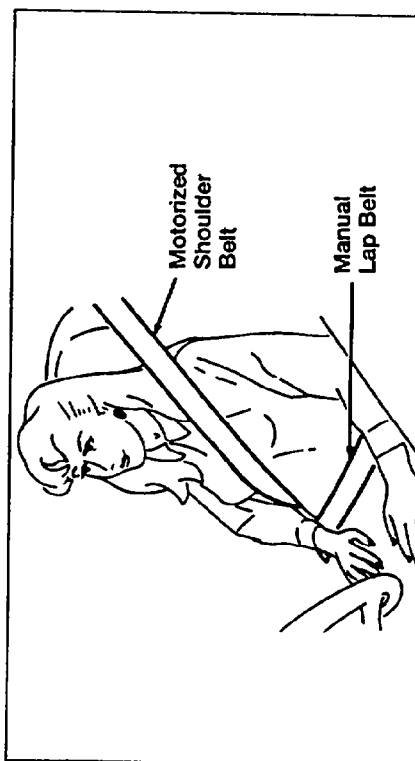
When the ignition is in any position and the door is opened, the shoulder belt will move forward to the A-pillar. This will allow ample room for the driver or passenger to exit from the vehicle. DO NOT use the belt as an assist handle when entering or exiting the vehicle. The door should not be opened while the vehicle is in motion.

WARNING

Always drive and ride with your seatback upright and the lap belt snug across the hips to reduce the risk of serious injury to the abdomen or neck that could be caused by sliding under the safety belts in a collision.



The shoulder belt in the locked position



The lap and shoulder belts fastened

WARNING

Children should always ride with the seatback in the fully upright position. When the seatback is not fully upright, there is a greater risk that the child will slide under the safety belt and be seriously injured in a collision.

What to do if your shoulder belt does not engage properly

If your shoulder belt does not move all the way across to the locked position on the B-pillar, follow these steps:

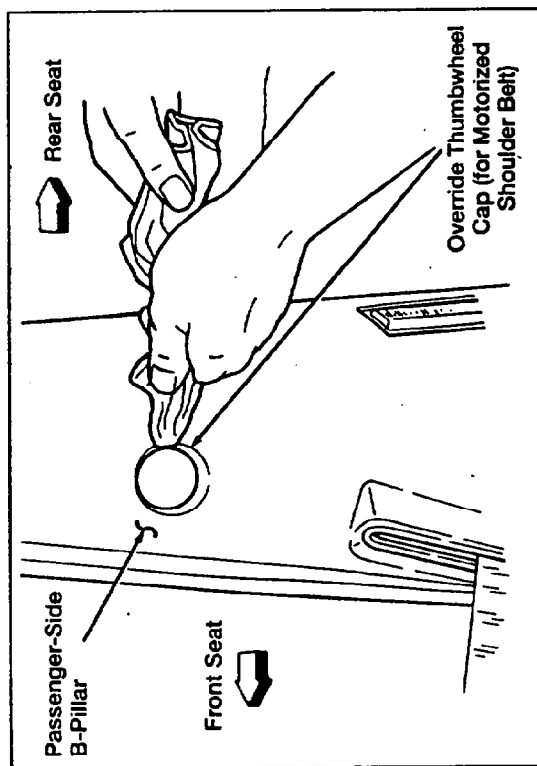
1. Make sure the ignition switch is in the LOCK position.
2. Make sure your door is fully closed. The shoulder belt will not move to the B-pillar if your door is open; it will remain in the forward position at the A-pillar.

WARNING

Lock the doors of the Villager before driving to lessen the risk of a door coming open in a collision.

3. Unbuckle the shoulder belt by pressing the red emergency release button on the buckle. Then, reinsert the shoulder belt tongue into the buckle until you hear a snap and feel the latch engage.
4. Turn the key to the ON position.
5. If the shoulder belt doesn't move across you, turn the ignition switch to the LOCK position and then release the shoulder belt from the buckle.
6. Use a screwdriver covered with a soft cloth to remove the override thumbwheel cap located in the B-pillar. You may need to move or tilt the front seat for easier access.

SAFETY RESTRAINTS



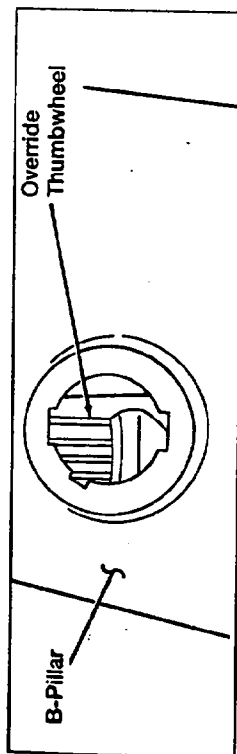
Removing the override thumbwheel cap

7. Turn the thumbwheel inside the access hole toward the front of the vehicle for the passenger's shoulder belt and toward the back of the vehicle for the driver's shoulder belt. (The doors must be closed.) You should see the safety belt buckle move toward the B-pillar. Keep turning the thumbwheel until the buckle reaches the (B-pillar) back of the door guide rail.

SAFETY RESTRAINTS

WARNING

After an accident, refer to *Safety Belt Maintenance* in this chapter.



The shoulder belt manual override thumbwheel

8. Reinsert the shoulder belt tongue into the buckle.

WARNING

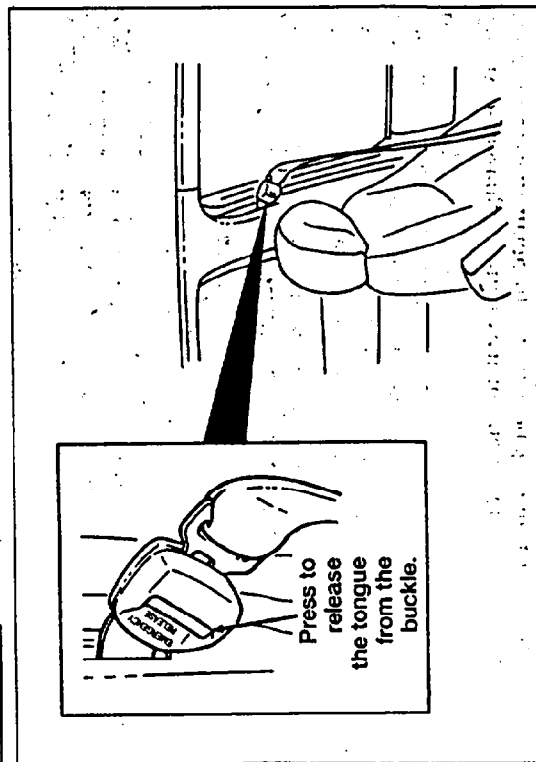
If it is necessary to use the override thumbwheel to put the shoulder belt in position, have the system serviced by a qualified technician as soon as possible.

9. If the safety belt does not return to the A-pillar when the door is opened, the tongue must be manually removed from the emergency release buckle in order to exit from the vehicle.
10. The belt must be manually connected to and disconnected from the emergency release buckle until the system is serviced.

Shoulder belt emergency release button

If the shoulder belt locks up in an accident, it may stay locked. To unlock the belt, press the emergency release button on the shoulder belt buckle. This allows the tongue to unlatch from the buckle. With the engine running and the doors closed, the safety belt warning light will remain illuminated if either of the front motorized shoulder belts are detached from the emergency release buckle. A chime will also sound for about six seconds.

To insert the tongue back into the shoulder belt buckle, push it in until you hear a click.



Motorized shoulder belt emergency release button

If your shoulder belts stop working after a collision, the fuel pump shut-off switch may have been triggered. The shut-off switch cuts power to the motors that move the shoulder belts in addition to stopping the flow of fuel to the engine. To reset the switch, see the section called *Fuel pump shut-off switch*. Refer to the Index, located in the back of this manual.

If your shoulder belts are not working properly, they should be checked and serviced as soon as possible.

SAFETY RESTRAINTS

WARNING

If the fuel pump shut-off switch was not triggered and is not the reason that the shoulder belt will not move, you should have the system serviced by a qualified technician as soon as possible.

WARNING

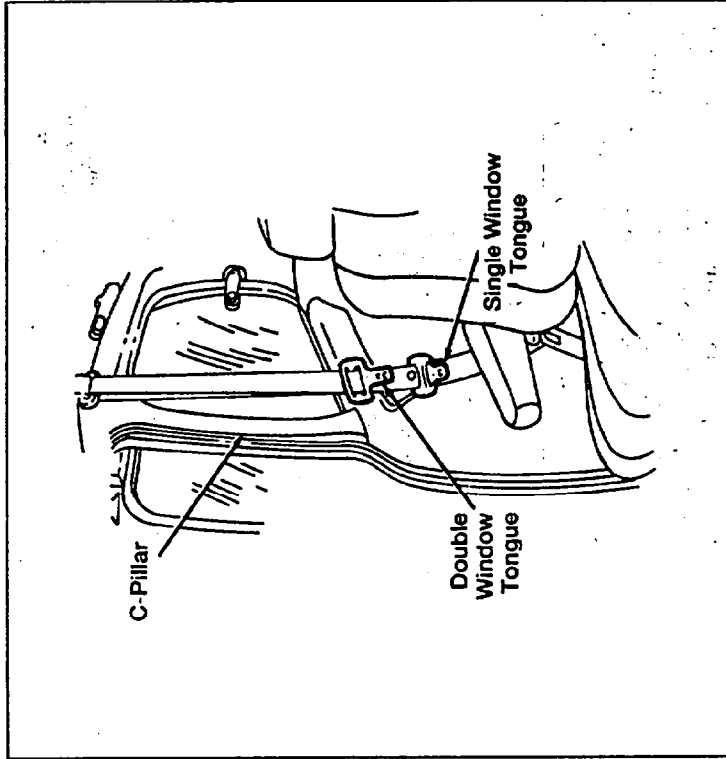
If the shoulder belt is released from the emergency release buckle, store the tongue end away from the seat tracks. Failure to do this may result in the safety belt being cut or torn when the seat is adjusted forward or back. Any damaged shoulder belt must be replaced.

Auxiliary Safety Restraint System for the Second Row Bench Seat (7 passenger vehicle)

There is a unique safety restraint system for the outside seating position of the second row bench seat. It is very important that you read and understand this section before anyone rides in the outside seating position (near the sliding door) of the two-passenger bench seat.

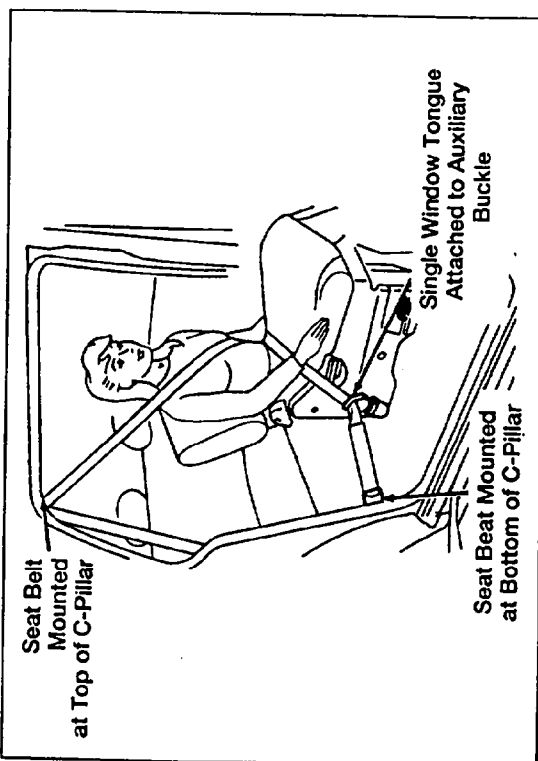
The two-passenger bench seat in the second row has a safety restraint system made up of two buckles and two tongues. There is an anchor location at the bottom of the C-pillar and another anchor location at the top of the C-pillar that attach each end of the seat belt webbing to the bodyside.

One of the seat belt tongues has two "windows" (or holes) and the other has only one "window". The seat belt tongue with one window attaches to the buckle mounted to the side of the seat. The seat belt tongue with two windows should be pulled across the passenger's chest and fastened to the buckle mounted in the standard location in the middle of the seat.



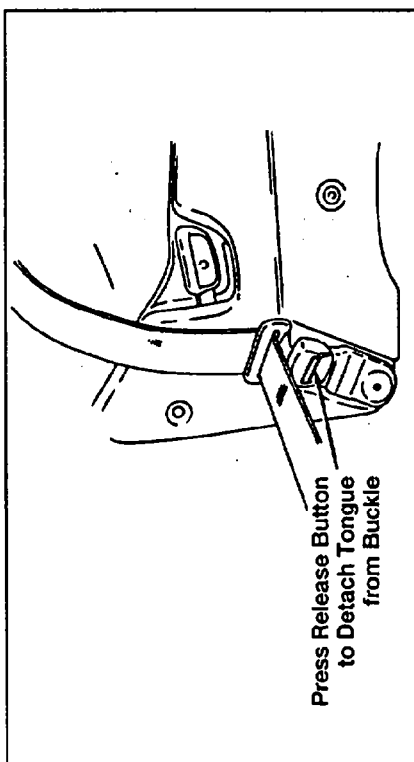
The auxiliary safety restraint system for the second row bench seat

SAFETY RESTRAINTS



The auxiliary safety restraint system fastened

A twisted belt may prevent the retractor from working properly. If the unique safety belt system is twisted, disengage the single window tongue from the buckle on the side of the seat, remove the twist and re-install the tongue into the buckle until you hear a snap and feel the latch engage.



Unfastening the auxiliary safety restraint system

Both tongues must be attached to their appropriate buckles whenever someone is riding in that seating position.

When the two-passenger bench seat is removed from the vehicle, you must detach the single window tongue from the auxiliary buckle.

Third-row passengers must be very careful when exiting if the auxiliary restraint system is being used by a second-row passenger. It is important to step over the seat belt guide and belt webbing to avoid tripping.

SAFETY RESTRAINTS

NOTE: If the three-passenger bench seat is moved up to the second-row position, the outside passenger (near the sliding door) only needs to use the double window tongue and the standard buckle. Because the third-row seat is wider and is closer to the sliding door, the single window tongue and the auxiliary buckle are not necessary.

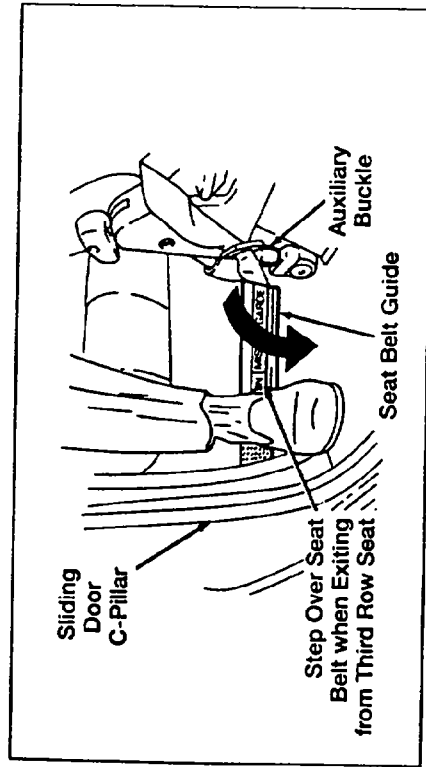
Rear Seat Combination Lap and Shoulder Belts

After you get into your vehicle, close the door and lock it. Then, adjust the seat to the position that suits you best.

Make sure that all buckles are in place on the seat and have not been pushed under the seat cushion.

To fasten the belt, pull the combination lap and shoulder belt from the retractor so that the shoulder belt portion of the belt crosses your shoulder and chest. Insert the belt tongue into the proper buckle until you hear a snap and feel it latch.

Third-row passengers should be aware that the proper safety belt for their seating position is slightly behind their seat. They should not use the second-row safety belts which are in front of the third seat.



Exiting a vehicle with the auxiliary safety restraint system

Labels are provided on the back of the second-row bench seat to remind passengers to use care when exiting.

CAUTION

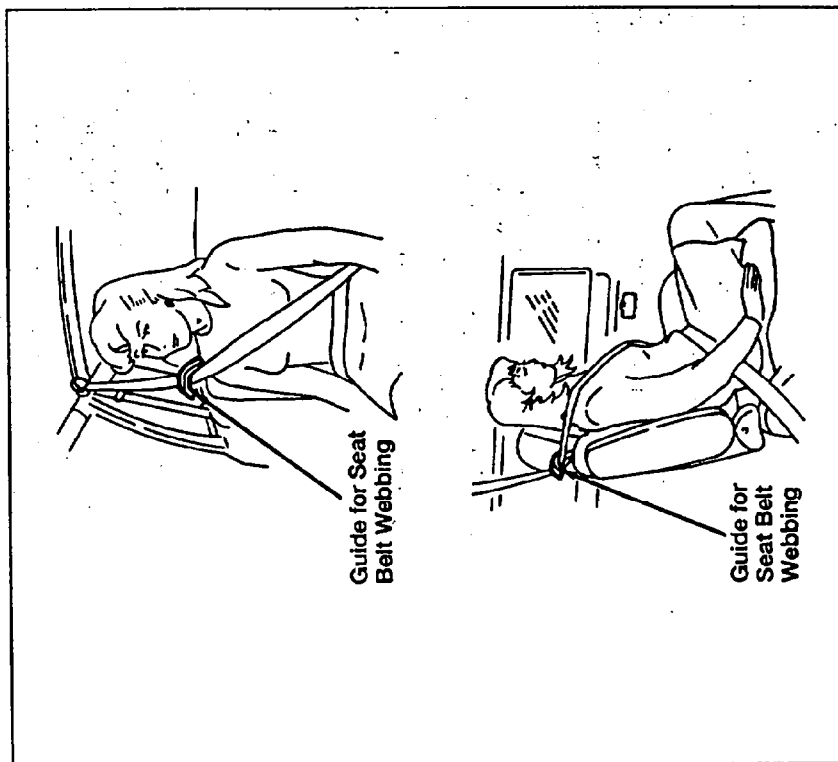
Step over lower part of seat belt system (to avoid tripping). Release buckle on seat if necessary, but always reattach buckle.

MISE EN GARDE

Passer par-dessus la partie inférieure de la ceinture (pour éviter de trébucher). Déboucler la ceinture sur le siège au besoin, mais toujours la reboucler.

SAFETY RESTRAINTS

maximum comfort. This guide is only needed when the two-passenger second row bench seat is removed and the three-passenger bench seat is moved up to the second-row position.



Using the seat belt guide with the three-passenger bench seat in the second row position



Rear Seat Combination Lap and Shoulder Belt

Fastening the rear seat combination lap and shoulder belt

WARNING Use the shoulder belt only on the shoulder that is closest to the side of the vehicle. Never wear the belt under your arm. Never swing it around your neck over the inside shoulder. If you do not use the shoulder belt properly, the chances of your being injured in a collision greatly increase.

To tighten the lap portion of the belt, pull up on the shoulder belt until it fits you snugly. The belt should rest as low on your hips as possible.

The passenger seated in the seating position near the sliding door in the three-passenger bench seat can route the safety belt webbing under the guide located on the head restraint. This safety belt guide is designed to help keep the safety belt webbing properly positioned across the passenger's chest for

SAFETY RESTRAINTS

NOTE: The second row two-passenger bench seat has a unique safety restraint system. If your vehicle has the two-passenger bench seat it is very important that the unique safety belt system is used properly. Please read *Auxiliary safety restraint system for the second row bench seat* in this section which explains the unique safety belt system and be sure that you understand it before anyone rides in the two-passenger bench seat.

Dual Locking Mode Lap/Shoulder Belt Retractor

All rear seat combination lap and shoulder belts are equipped with a dual locking mode retractor on the upper end of the lap/shoulder belt. This retractor switches from vehicle sensitive (emergency) locking mode to automatic locking mode. The retractor modes function as follows:

Vehicle Sensitive (Emergency) Locking Mode

In this operating mode, the lap belt retractor will allow the occupant freedom of movement, locking tight only on hard braking, hard cornering or impacts of approximately 5 mph (8 km/h) or more. The retractor cannot be made to lock by jerking on the belt.

Automatic Locking Mode

In this operating mode, the lap belt retractor will remain locked and does not allow the occupant freedom of movement. This mode is provided for child seat or infant carrier installation. This mode **must be used** when installing a child seat in seating positions having the combination lap/shoulder belt restraints.

NOTE: The automatic mode is activated whenever all of the belt webbing is pulled out of the retractor. While in this mode, the belt will retract or tighten but cannot be pulled back out to obtain more length. To disengage the automatic locking mode, unbuckle the belt and allow the webbing to retract fully.

Lap Belt Without a Retractor (for the three-passenger bench seat)

The center seat of the three-passenger bench seat has a lap belt without a retractor. To make the belt longer, tip the tongue at a right angle to the belt and pull the belt over your lap until the tongue reaches the buckle.

To fasten the belt, pull the belt across your hips and insert the tongue into the correct buckle on your seat until you hear a snap and feel it lock. Make sure the buckle is securely fastened.

Adjust the belt so that it fits snugly and as low as possible around the hips:

- If you need to lengthen the belt, unfasten it and repeat the procedure above.
- If you need to shorten the belt, pull on the loose end of the webbing.

To store the belt:

Fasten the center tongue and buckle when not in use. This will prevent the belt from falling between the seat and the seatback.

To Untwist or Unjam a Safety Belt Retractor

If you should jam the belt retractor by allowing the belt to retract when it is twisted, you can free the webbing with the following procedure:

1. Pull on the belt with both hands to tighten it on the retractor spool.

SAFETY RESTRAINTS

2. Feed the belt back into the retractor until it is completely retracted. Repeat previous step if necessary.
3. Pull the belt out of its holder as far as it will go and untwist the belt or remove the object that is jamming the belt. Let the belt retract.
4. Pull the belt out and let it retract several times to make sure that the belt works properly.

Safety Belt Extension Assembly

For some people, the safety belt may be too short even when it is fully extended. You can add about eight inches (20 cm) to the belt length with a safety belt extension assembly. Safety belt extensions are available from your dealer at no cost.

WARNING

Use only extensions manufactured by the same supplier as the safety belt. Manufacturer identification is located at the end of the webbing on a label. Also, use the safety belt extension only if the safety belt is too short for you when fully extended. Do not use the extension to change the fit of the shoulder belt across the torso. Failure to follow these instructions will affect the performance of the safety belts and increase the risk of personal injury.

Safety Belt Maintenance

Check your safety belt system periodically to make sure that it works properly and is not damaged. If the webbing shows any wear, nicks or cuts, have it examined by a qualified technician to determine if replacement is necessary. A damaged belt may fail during a collision. Always have your safety belt system checked after a collision.

For information on cleaning the webbing of safety belt assemblies, see *Cleaning safety belts* in the Index, located in the back of this manual.

WARNING

All safety belt assemblies, including retractors, buckles, front seat belt buckle support assemblies (slide bar) (if so equipped), and attaching hardware, should be inspected after any collision. Ford recommends that all safety belt assemblies used in vehicles involved in a collision be replaced. However, if the collision was minor and a qualified technician finds that the belts do not show damage and continue to operate properly, they do not need to be replaced. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

When a motorized passive restraint shoulder belt is in use during a collision, it must be replaced along with the motorized track assembly. The support assembly (slide bar) for the front seat lap/shoulder safety belt retractor assembly must also be replaced.

Air Bag Supplemental Restraint System (SRS)

Your vehicle is equipped with a driver side air bag supplemental restraint system, located in the steering wheel and identified by the letters "SRS air bag" in the center of the wheel.

The driver air bag is a Supplemental Restraint System (SRS), provided in addition to the driver lap and shoulder belts, and is designed to supplement the protection provided to a properly belted driver in moderate to severe frontal collisions. The supplemental air bag system does not provide restraint to the lower body.

The Importance of Wearing Safety Belts

WARNING ALWAYS WEAR YOUR SAFETY BELT!

WARNING All occupants of the vehicle, including the driver, should always wear their safety belts, whether or not an air bag Supplemental Restraint System is also provided at their seating position. Failure to do so may increase the risk of severe injury or death in the event of a collision.

There are four very important reasons to use safety belts even with a supplemental air bag system. Use your safety belts to:

- help keep you in the proper position when the supplemental air bag inflates
- reduce the risk of harm in rollover, side or rear impact accidents. The air bag supplemental restraint system is not designed to inflate in such situations
- reduce the risk of harm in frontal collisions that are not severe enough to activate the supplemental air bag
- reduce the risk of being thrown from your vehicle

The Importance of Being Properly Seated

In an accident, the supplemental air bag must inflate extremely fast to help provide additional protection for you. In order to do this, the supplemental air bag must inflate with considerable force. If you are not seated in a normal riding position with your back against the seatback, the supplemental air bag may not protect you properly and could possibly hurt you as it inflates.

SAFETY RESTRAINTS

WARNING Do not place objects or mount equipment on or near the air bag module cover (identified by the letters "SRS airbag") on the steering wheel and instrument panel, or in front seat areas that may come in contact with a deploying air bag, because any such objects could cause harm if the vehicle is in a collision severe enough to cause the air bag to inflate. Failure to follow this instruction may increase the risk of personal injury in the event of a collision.

How the Air Bag Supplemental Restraint System Operates

The driver Air Bag Supplemental Restraint System has two main parts. One part is the supplemental air bag system with the air bag and inflator located in the center of the steering wheel. The second part is the electrical system which has impact sensors, a diagnostic module, and an electronic control unit which sends electrical signals to the supplemental air bag module. The diagnostic module monitors its own internal circuits and the supplemental air bag electrical system readiness, including the crash sensors, system wiring, the supplemental air bag readiness light, supplemental air bag power, and the supplemental air bag igniter.

The supplemental air bag system uses a readiness light to indicate the condition of the system. The readiness light is in the instrument cluster. When you turn the ignition key to ON, the light will illuminate for approximately six (6) seconds and then turn off. This indicates that the system is operating normally.

WARNING A problem with the system is indicated by one or more of the following:

SAFETY RESTRAINTS

- the readiness light will either flash or stay lit,
- or it will not light when the ignition is turned to ON,
- or the readiness light does not come on for approximately six (6) seconds and then go off as described.

If any of these indications occurs, have the supplemental air bag system serviced at your dealer immediately.

WARNING
Do not attempt to service, repair, or modify the Air Bag Supplemental Restraint System; tampering could cause activation of the system and increase the risk of personal injury. For servicing of the Air Bag Supplemental Restraint System, see your dealer.

The supplemental air bag system is designed to stay out of sight until it is activated. The supplemental air bag system only operates in certain frontal and front-angled collisions. After receiving a signal from the crash sensors, the supplemental air bag system inflates very quickly.

The following three steps show how the supplemental air bag system works:

1. Sensors in the vehicle will detect the degree of severity of a frontal impact. When two sensors (one primary and one safing) close at the same time, electric current flows to the inflator and the system ignites the gas generant.
2. The chemical then rapidly burns in the metal container. The rapid burning produces nitrogen gas and small amounts of dust. The nitrogen gas and dust are cooled and filtered during inflation of the supplemental air bag.

3. The inflating supplemental air bag splits open the trim cover. The supplemental air bag then rapidly unfolds and inflates in front of the driver.

NOTE: STEPS 1 — 3 TAKE PLACE IN A FRACTION OF A SECOND.

After inflation, the gas empties through holes in the supplemental air bag. The supplemental air bag deflates at once.

The surface of the supplemental air bag and the vehicle interior may be dusted with a powdery residue. The powder is corn starch or talcum powder, which is used to lubricate the supplemental air bag as it inflates, and sodium compounds such as sodium carbonates (e.g., baking soda), and possibly a very small amount of sodium hydroxide that may be irritating to the skin and eyes, but is not toxic.

Right after supplemental air bag inflation, you may hear a fairly loud deploying noise, followed by a release of smoke (from the powder and dust). You may also smell the burnt chemicals. This is normal.

NOTE: Several supplemental air bag system components get hot after inflation. Do not try to touch them after inflation.

Supplemental air bags may not inflate in certain frontal collisions, even though the vehicle may be badly damaged. The fact that your supplemental air bag did not inflate in such a collision does not mean that something is wrong with the supplemental air bag system. Rather, it means the crash forces were not severe enough to inflate the supplemental air bag.

SAFETY RESTRAINTS

Service and Information labels

Service and information labels regarding the supplemental air bag system are attached to the driver's visor (visible when the visor is down), and on the top of the radiator. See the following illustrations.

NOTE: The supplemental air bag system must be inspected 10 years after the date of manufacture shown on the vehicle certification label.

The vehicle certification label is located as shown in the *Driving Your Villager* chapter of this Owner's Manual. The date of manufacture is located in the upper right-hand corner of the label. Return your vehicle to your Lincoln Mercury dealer for inspection.



Inflated driver-side supplemental air bag

WARNING

The supplemental air bag will inflate only once. The system is designed to function on a one-time-only basis. If the supplemental air bag is inflated, THE SUPPLEMENTAL AIR BAG WILL NOT FUNCTION AGAIN AND MUST BE REPLACED IMMEDIATELY. If the supplemental air bag is not replaced, the unrepaired area will increase the risk of injury in a collision.

Disposal of supplemental air bag equipped vehicles

For disposal of supplemental air bags or supplemental air bag equipped vehicles, see your dealer, or refer to the procedures in a Villager 1994 Service Manual. Information on how to order a service manual is available from your dealer. You can also order a service manual by using the order form in the *Accessories* chapter of this Owner's Manual.

This vehicle has an AIR BAG for the driver, with a lap belt and a motorized shoulder belt for each front occupant.

WARNING ALWAYS WEAR BOTH THE LAP AND SHOULDER BELTS, EVEN WITH AN AIR BAG, AND HERE'S WHY:

- Air bags are not designed to inflate in rollovers or in rear, side, or low speed frontal crashes.
- Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, it could seriously injure you. Your lap and shoulder belts help keep you in position for air bag inflation in a crash.
- NOT WEARING YOUR LAP BELT could also result in serious or fatal injury.
- THE AIR BAG SYSTEM MUST BE INSPECTED 10 YEARS AFTER DATE OF MANUFACTURE SHOWN ON THE VEHICLE CERTIFICATION LABEL. If the air bag readiness light comes on while you are driving, or doesn't come on when you first start your vehicle, see your dealer for service.

See your Owner's Manual for more information about the restraint system. It's use with small occupants and children, and it's warning lights.

WARNING SRS AIRBAG

- THIS VEHICLE IS EQUIPPED WITH SRS AIRBAG SYSTEM TO SUPPLEMENT THE SEAT BELT.
- ALL S.R.S. ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW.
- DO NOT USE ELECTRICAL TEST EQUIPMENT ON THESE CIRCUITS.
- TAMPERING WITH OR DISCONNECTING THE S.R.S. WIRING AND CONNECTORS COULD RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIR BAGS OR MAKE THE SYSTEM INOPERATIVE, WHICH MAY RESULT IN SERIOUS INJURY.

XXXXXX XXXXX

Safety Restraints for Children

In most states, you are required by law to use safety restraints for children. If small children ride in your vehicle — this generally includes children who are four years old or younger and who weigh 40 pounds (18 kg) or less — you must put them in safety seats that are made specifically for children. Safety belts alone do not provide maximum protection for these children. Check your local and state laws for specific requirements.

WARNING



Never let a passenger hold a child on his or her lap while riding in your vehicle. A passenger cannot protect a child from injury in a collision, and the body of a person holding a child can increase the child's injuries in an accident by crushing the child against the vehicle interior.