

V1663

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301-CAL-92-06

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

GENERAL MOTORS CORPORATION
1992 CHEVROLET CAVALIER
2-DOOR COUPE

NHTSA NUMBER: CN0108

CALSPAN TEST NUMBER: 7953-2

NOVEMBER 12, 1991

CALSPAN CORPORATION
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FINAL REPORT

PREPARED FOR:

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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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1992 Chevrolet Cavalier 2-Door Coupe. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on November 12, 1991. 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 29.4 mph. The ambient temperature at the impact face was 37°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 automatic 3-point seat belt restraint at both front outboard seating positions.					
17. Key Words 30 mph Vehicle Safety Compliance Testing FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity" Frontal Impact				18. Distribution Statement <u>Copies of this report are available from:</u> Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 (NAD-52) 400 Seventh St., S.W., Washington, DC 20590	
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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. DTNH22-90-C-01003. The purpose of this test was to determine if the subject vehicle, a 1992 Chevrolet Cavalier 2-Door Coupe, 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-208-08, dated September 8, 1989.

Section 2

SUMMARY OF TEST NUMBER CN0108

A frontal barrier was impacted by a 1992 Chevrolet Cavalier 2-Door Coupe at a velocity of 29.4 mph. The test was performed at the Calspan Corporation Advanced Technology Center on November 12, 1991. 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 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right front passenger seating positions according to dummy placement instructions specified in the OVSC Laboratory Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers, chest displacement potentiometers and left/right femur load cells. These ATDs had been certified prior to the test.

The 25 channels of data were recorded on two 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces.

The driver's HIC was 488. The maximum chest deceleration over 3 milliseconds was 36.4 g's with 1.5 inches of deflection. The maximum force on the driver's left femur was 460 pounds and 832 pounds on the right femur.

The right front passenger's HIC was 353. The maximum chest deceleration over 3 milliseconds was 32.5 g's with 1.4 inches of deflection were recorded. Loads of 990 and 964 lbs. were recorded on the left and right femurs, respectively.

Table 1

CRASH TEST SUMMARYVehicle NHTSA No.: CN0108 Test Mode: 30 mph Frontal BarrierTest Date: November 12, 1991 Time: 12:00 Temperature: 37°FVehicle Make/Model/Body Style: 1992 Chevrolet Cavalier 2-Door CoupeVehicle Test Weight: 2940 lbs.Vehicle/Barrier Impact Angle: 0 °Impact Velocity: 29.4 mphMaximum Static Crush: 25.7 inchesVehicle Rebound: 13.1 inchesDUMMIES:DRIVERPASSENGER

Type:

Part 572EPart 572E

Restraint System:

Automatic 3-Point
Seat belt RestraintAutomatic 3-Point
Seat belt RestraintNumber of Data Channels: 25Number of Cameras: 1 Real Time14 High SpeedDOOR OPENING DATA: Closed - Left FrontClosed - Right Front

Front Seat(s) Data:

DRIVERPASSENGER

Seat Track Failure:

0.00.0

inches of shift

Seat Back Failure:

NoneNoneVISIBLE DUMMY CONTACT POINTS:DRIVERPASSENGER

Head:

Forehead-horn pad,
Rear of head-headrest
Chin with chestRear of head-headrest,
Chin with chest

Abdomen:

No ContactNo Contact

Chest:

Lower steering rimNo Contact

Knees:

Lower dash panelGlove Box Door

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1992 Chevrolet Cavalier 2-Door Coupe
 NHTSA No.: CN0108 ; VIN: 1G1JC1441N7106575 ; Color: Aqua
 Engine Data: 4 cylinders; - CID; 2.2 Liters; - cc
 Placement: - Longitudinal or In-Line; ✓ Transverse or Lateral
 Transmission Data: 5 speeds; ✓ Manual; - Automatic; ✓ Overdrive
 Final Drive: - Rear Wheel Drive; ✓ Front Wheel Drive; - Four Wheel Drive
 Major Options: - A/C; ✓ Pwr.Strg.; ✓ Pwr.Brakes
- Pwr.Windows; ✓ Pwr.Door Locks; ✓ Tilt Wheel
 Date Received: 9/24/91 ; Odometer Reading 26.0 miles
 Selling Dealer: Sweeney Chevrolet, Inc.
 & Address 11234 Main Street. Clarence NY 14031

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: General Motors Corporation
 Date of Manufacture: 8/91
 GVWR: 3460 lbs.; GAWR: 1863 lbs. FRONT; 1597 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 35 psi FRONT
35 psi REAR
 Recommended Tire Size: P185/75R14
 *Recommended Cold Tire Pressure: 35 psi FRONT; 35 psi REAR
 Size of Tires on Test Vehicle: P185/75R14 ; Manufacturer: General
 Vehicle Capacity Data:
 Type of Front Seats: - Bench; ✓ Bucket; - Split Bench
 Number of Occupants: 2 Front; 3 Rear; 5 Total
 Vehicle Capacity Weight (VCW) = 882 lbs.
 No. of Occupants x 150 lbs. = 750 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 132 lbs. (Difference)

* 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 = 790 lbs. Right Rear = 420 lbs.
 Left Front = 820 lbs. Left Rear = 460 lbs.
 TOTAL FRONT = 1610 lbs. TOTAL REAR = 880 lbs.
 % of Total Vehicle Weight = 64.7 % of Total Weight = 35.3 %
 TOTAL DELIVERED WEIGHT = 2490 lbs.

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 2490 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 132 lbs.
 Weight of 2 P.572 Dummies @ 167 ea. = 334 lbs.
 TARGET TEST WEIGHT = 2956 lbs. (sum)

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 116 POUNDS OF CARGO WEIGHT:

Right Front = 840 lbs. Right Rear = 590 lbs.
 Left Front = 890 lbs. Left Rear = 620 lbs.
 TOTAL FRONT = 1730 lbs. TOTAL REAR = 1210 lbs.
 % of Total Weight = 58.8 % % of Total Weight = 41.2 %
 TOTAL TEST WEIGHT = 2940 lbs.
 Weight of Ballast Secured in Vehicle Trunk Area = 0 lbs.
 Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimensions in inches):

AS DELIVERED: RF 26.8" LF 26.5" RR 26.7" LR 26.3"
 FULLY LOADED: RF 25.3" LF 25.1" RR 23.5" LR 23.5"
 AS TESTED: RF 26.2" LF 26.3" RR 24.7" LR 24.7"
 Vehicle's Wheel Base: 101.1 in. Vehicle's Width: 66.3 in.
 Location of Vehicle's C.G.: 41.6 inches rearward of front wheel center.

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 15.2 gallons
 Usable Capacity Figure Furnished by COTR = 15.2 gallons
 Test Volume Range (92 to 94% of Usable Capacity) = 14.0 to 14.3 gallons
 ACTUAL TEST VOLUME = 14.1 gallons (with entire fuel system filled)

Table 3

POST IMPACT DATATYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
 Test Date: November 12, 1991 Time: 12:00 Temperature: 37°F
 Vehicle NHTSA No.: CN0108
 Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.4 mph; Trap No. 2 = 29.3 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 = 177.1; C/L = 181.5; Left = 177.2
 Post-Test Right = 160.4; C/L = 162.6; Left = 158.6
 Crush Right = 16.7; C/L = 18.9; Left = 18.6
 AVERAGE = 18.1 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

Right = 10.9; C/L = 13.3; Left = 15.1
 AVERAGE = 13.1 inches

DOOR OPENING:

	Left	Right
Front	<u>Closed-Operable</u>	<u>Closed-Operable</u>
Rear	<u>N/A</u>	<u>N/A</u>

SEAT MOVEMENT:

	Seat Back Failure	Seat Shift
Front	<u>None</u>	<u>None</u>
Rear	<u>N/A</u>	<u>N/A</u>

Table 3
POST IMPACT DATA (cont.)

GLAZING DAMAGE: None.

OTHER NOTABLE IMPACT FEATURES: Steering column stroked.

Section 3
OCCUPANT AND VEHICLE DATA

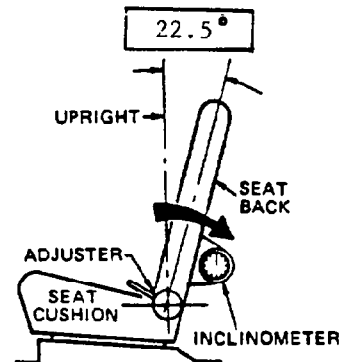
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year: 1992 Vehicle Model: Chevrolet Cavalier Body Style: 2-Door Coupe

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.



LEFT SIDE VIEW

Seat back angle for driver's seat: 22.5°

Measurement instructions: Measure seat back angle by using an inclinometer on the seat back.

Seat back angle for passenger's seat: 22.5°

Measurement instructions: Same as driver.

2. Seat Fore and Aft Positioning

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat: Place seat in 4th detent from rear-most detent (10 total detents)

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

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 15.2 gallons

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

Additional Instructions: None.

Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

Test No.: CN0108 Vehicle: 1992 Chevrolet Cavalier 2-Door Coupe

SEAT TYPE:

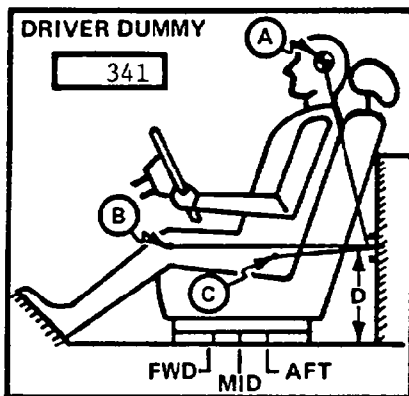
- Bench
✓ Bucket
- Split Bench

ADJUSTER TYPE:

✓ Manual
- Power

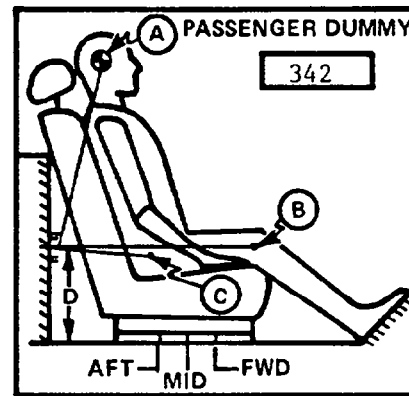
SEAT BACK TYPE:

- Fixed
✓ Adjustable Reclining



MEASUREMENT
LOCATION

- A - Head Target
- B - Knee Joint
- C - Approximate 'H' Point
- D - Sill to Reference Point



A = 24.2 in. 37 Degrees

B* = 33.2 in. 93 Degrees

C = 18.3 in. 108 Degrees

D = 12.4 in.

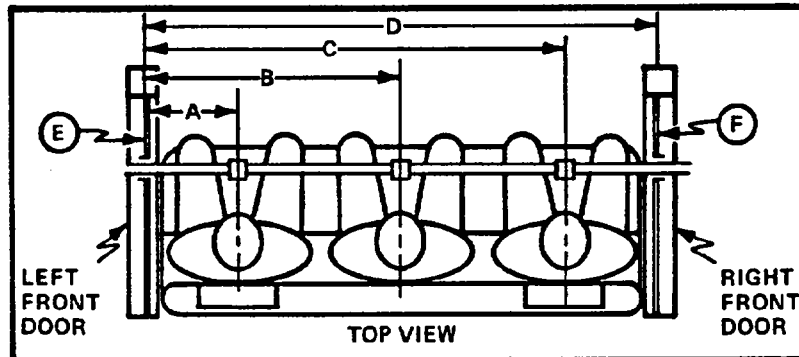
A = 24.6 in. 36 Degrees

B = 34.3 in. 93 Degrees

C = 19.1 in. 105 Degrees

D = 12.4 in.

* Left foot on footrest



S/N 341

DUMMY ID

S/N 342

A = Left Door to Driver Centerline

11.9 in.

B = Left Door to Center Passenger Centerline

- in.

C = Left Door to Right Passenger Centerline

37.3 in.

D = Left Door to Right Door

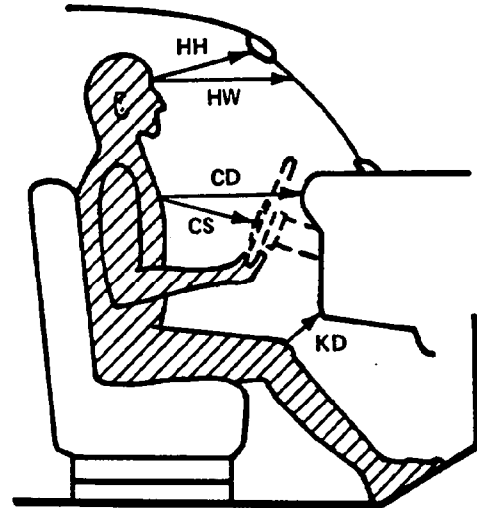
49.5 in.

E, F = Window Glass Height (Right and Left Must Be Equal) 11.0 in.

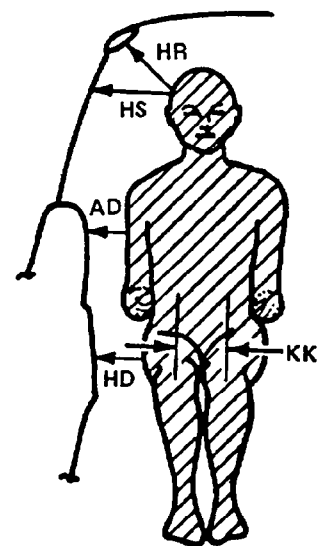
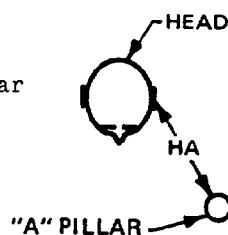
Figure 3
OCCUPANT CLEARANCE DIMENSIONS
(Dimensions in inches)

	DRIVER	PASSENGER
HH	11.7	11.6
HW	17.1	17.5
CD	19.1	18.7
CS	12.1	-
KDL	4.9	4.6
KDR	2.9*	5.1
SA	See Note	See Note
PA	23°	24°

* To Steering Column



HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD(L/R) = Knee to Dash (Left/Right)
 SA = Seat Back Angle
 PA = Pelvic Angle
 HA = Head Target to "A" Pillar
 HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee



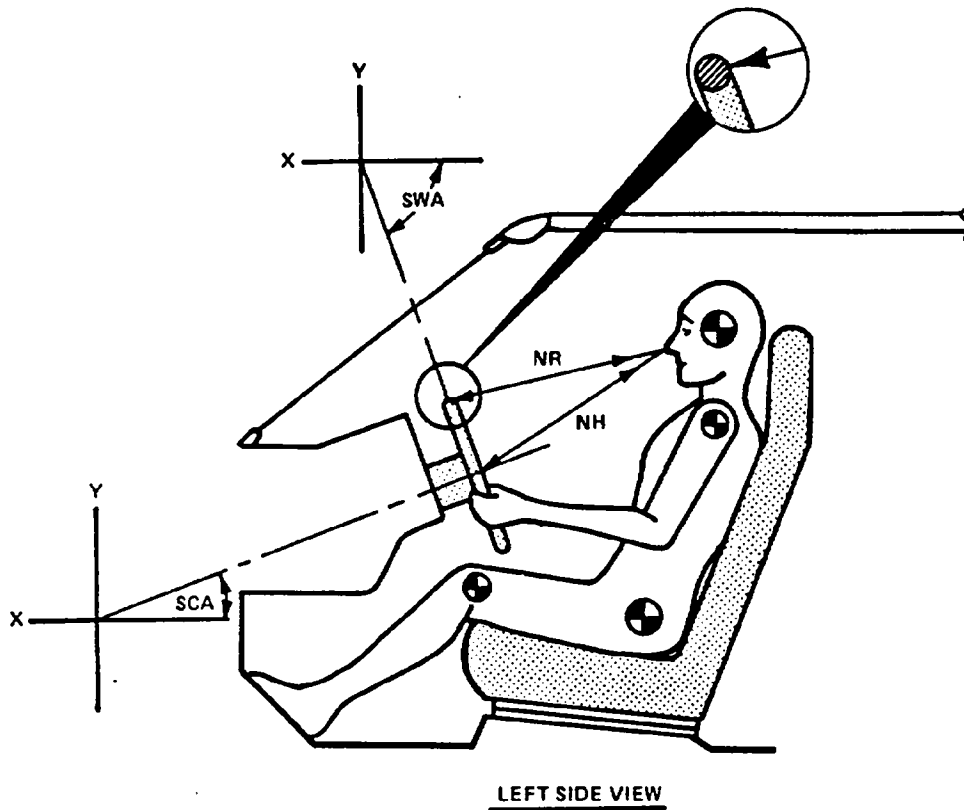
	DRIVER	PASSENGER
HR	5.9	6.3
HS	8.8	9.0
AD	3.6	3.7
HD	3.5	3.2
KK	9.3	7.9
HA	16.8	16.7

H-Point Location

	Longitudinal		Vertical	
	Target (to striker)	Actual	Target (to sill)	Actual
DRIVER	17.6	17.5	4.9	4.6
PASSENGER	18.3	17.9	4.7	4.8

Figure 4

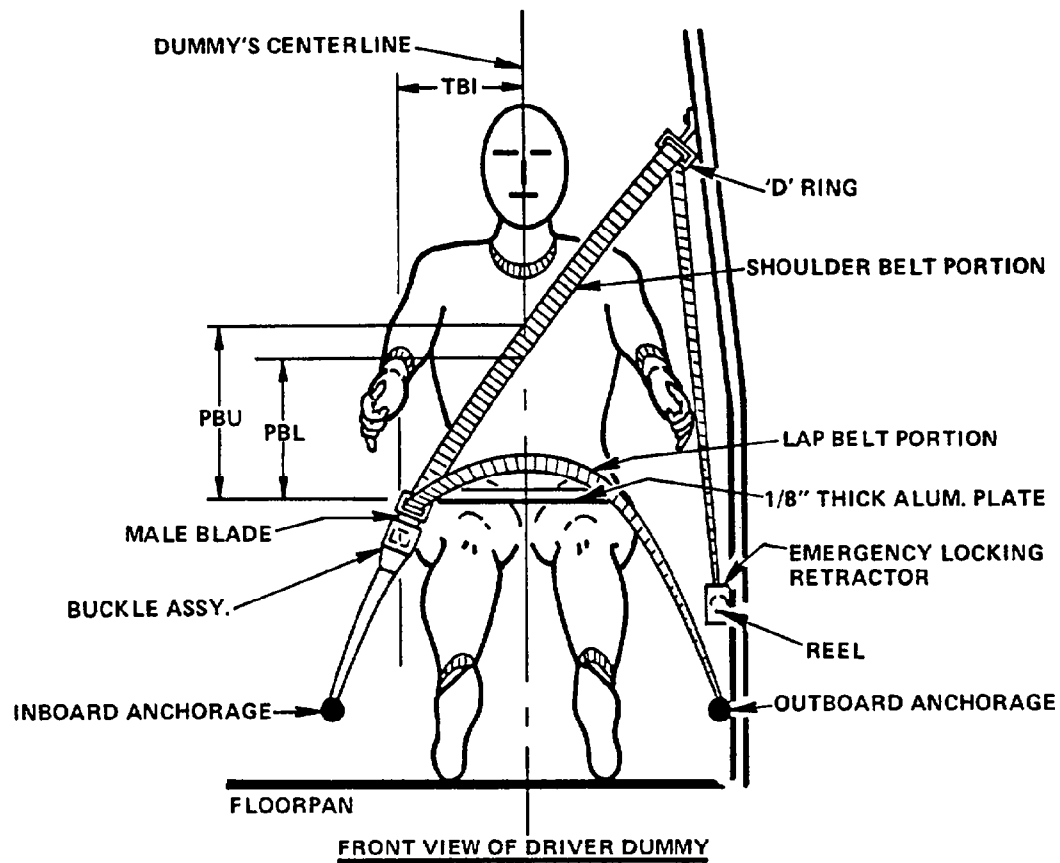
DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY REFERENCE DIMENSIONS



		MEASUREMENTS	
<u>NR</u>	-- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	14.3	Inches
<u>NH</u>	-- Distance from tip of dummy's nose to center of steering wheel hub	15.8	Inches
<u>SCA</u>	-- Angle of steering column relative to the horizontal X axis	19.0*	Degrees
<u>SWA</u>	-- Angle of steering wheel relative to the horizontal X axis	-71.0	Degrees

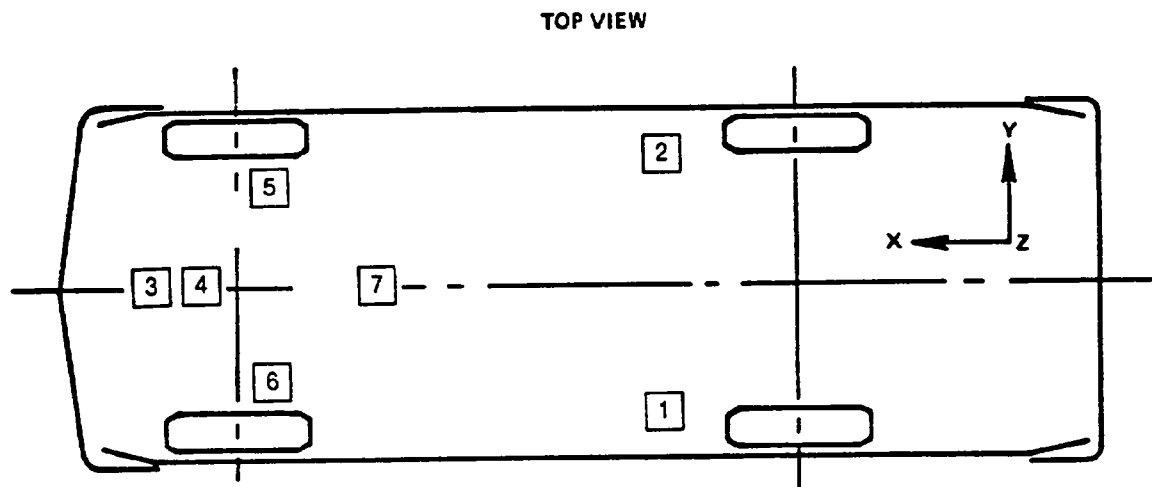
* - Steering column located in mid-position.

Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	13.5	13.6
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	10.5	10.5
<u>TBI</u> -- Distance from torso centerline to buckle	8.4	8.2

Figure 6
VEHICLE ACCELEROMETER LOCATIONS



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	Left Disc Brake Caliper	X		
7	Instrument Panel	X		

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

Table 4
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
						MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	REAR SEAT X-MEMBER	PRE:	69.1	15.2	16.0				
	AT LEFT SIDE	POST:	69.1	15.0	15.9				
	LONGITUDINAL ACCELERATION					9	26	-35	30
2	REAR SEAT X-MEMBER	PRE:	69.1	-15.2	16.0				
	AT RIGHT SIDE	POST:	69.1	-15.2	16.0				
	LONGITUDINAL ACCELERATION					4	27	-38	31
3	TOP OF ENGINE BLOCK	PRE:	147.0	-8.4	30.4				
		POST:	139.0	-8.4	29.9				
	LONGITUDINAL ACCELERATION					27	57	-95	39
4	BOTTOM OF ENGINE	PRE:	154.6	-0.5	9.2				
		POST:	148.5	-0.5	9.0				
	LONGITUDINAL ACCELERATION					36	66	-70	51
5	BRAKE CALIPER AT RIGHT SIDE	PRE:	138.7	-21.3	20.8				
		POST:	132.5	-21.4	21.0				
	LONGITUDINAL ACCELERATION					2	235	-46	48
6	BRAKE CALIPER AT LEFT SIDE	PRE:	138.7	21.3	20.8				
		POST:	132.3	21.4	20.9				
	LONGITUDINAL ACCELERATION					3	143	-63	46
7	DASH PANEL	PRE:	109.5	-0.6	23.2				
		POST:	109.5	-0.6	23.2				
	LONGITUDINAL ACCELERATION					15	76	-53	61

** *X + Forward from rear bumper Y + Left from vehicle centerline Z + Up from ground	LONGITUDINAL: LATERAL: VERTICAL:	<u>POSITIVE</u> FORWARD LEFTWARD UPWARD	<u>NEGATIVE</u> REARWARD RIGHTWARD DOWNWARD
--	---	---	---

DISTANCE MEASUREMENTS IN INCHES

Figure 7

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5.

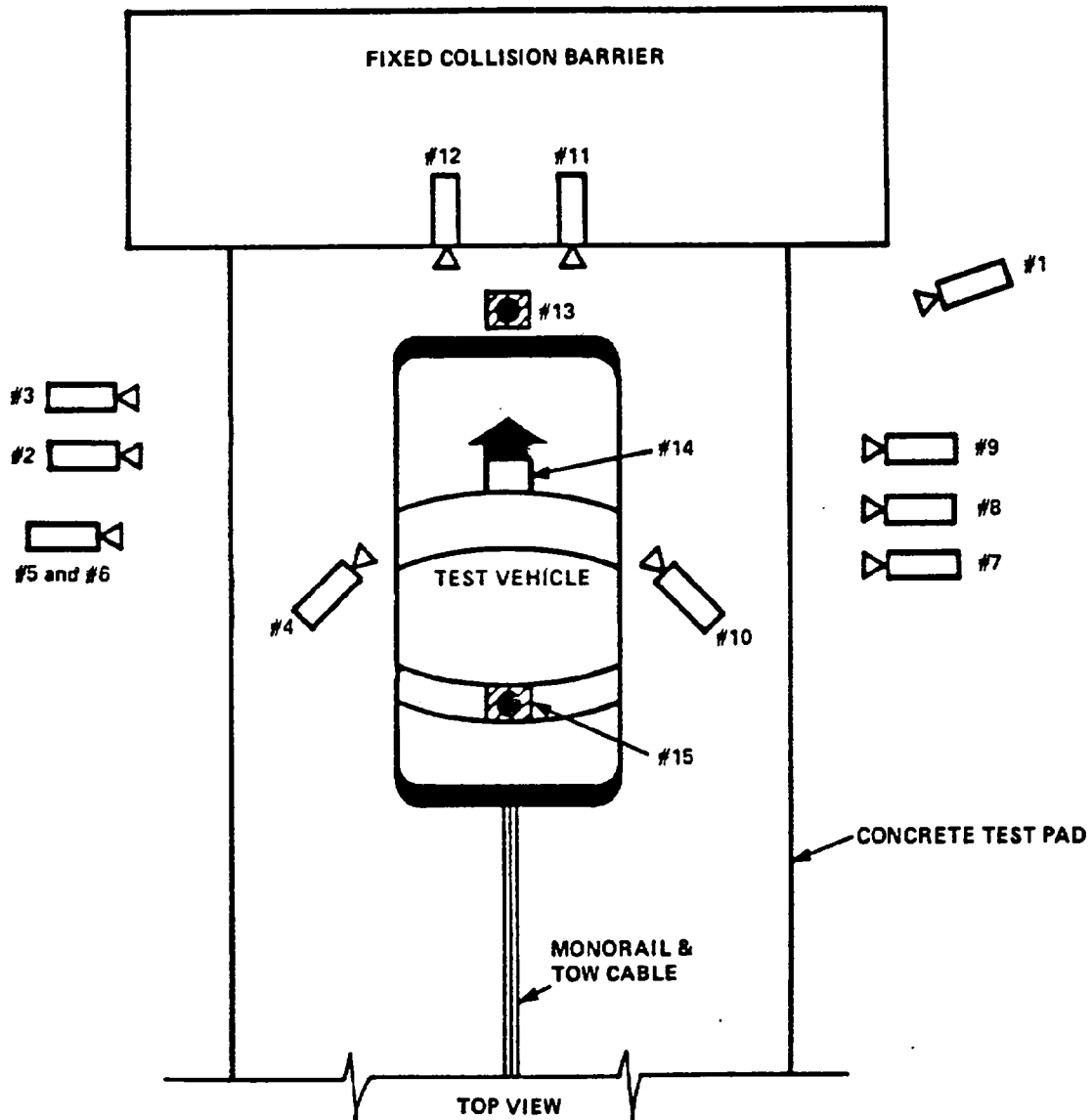


Table 5

HIGH-SPEED CAMERA LOCATIONS

Test No. _____		CN0108		Vehicle: 1992 Chevrolet Cavalier 2-Door Coupe					
CAMERA 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	223	61	41	-3	206.6	13	550	
3	Left Side View	308	39	41	-2	291.6	25	570	
4	Driver and Interior View	116	105	68	-19	--	13	595	
5	Steering Column (Bottom)	274	77	46	-4	257.6	25	535	
6	Steering Column (Top)	274	77	70	-9	257.6	25	505	
7	Overall Right Side	229	73	42	-3	212.6	13	595	
8	Right Side View	314	49	41	-3	297.6	25	590	
9	Right Passenger View	309	72	54	-3	292.6	35	***	
10	Passenger and Interior View	117	102	66	-18	--	13	500	
11	Passenger Front View	21	19	72	-44	--	13	560	
12	Driver Front View	21	19	72	-43	--	13	535	
13	Windshield View	0	0	130	-54	--	25	540	
14	Pit View of Engine	0	110	86.4	90	--	13	N.T.	
15	Pit View of Fuel Tank	0	30	86.4	90	--	13	880	

*X = film plane to monorail centerline
 Y = film plane to impact location
 Z = film plane to ground
 ** = referenced to horizontal plane
 *** = Camera did not operate
 N.T. = No Timing

[illegible]

Figure 9
TEST VEHICLE MEASUREMENTS

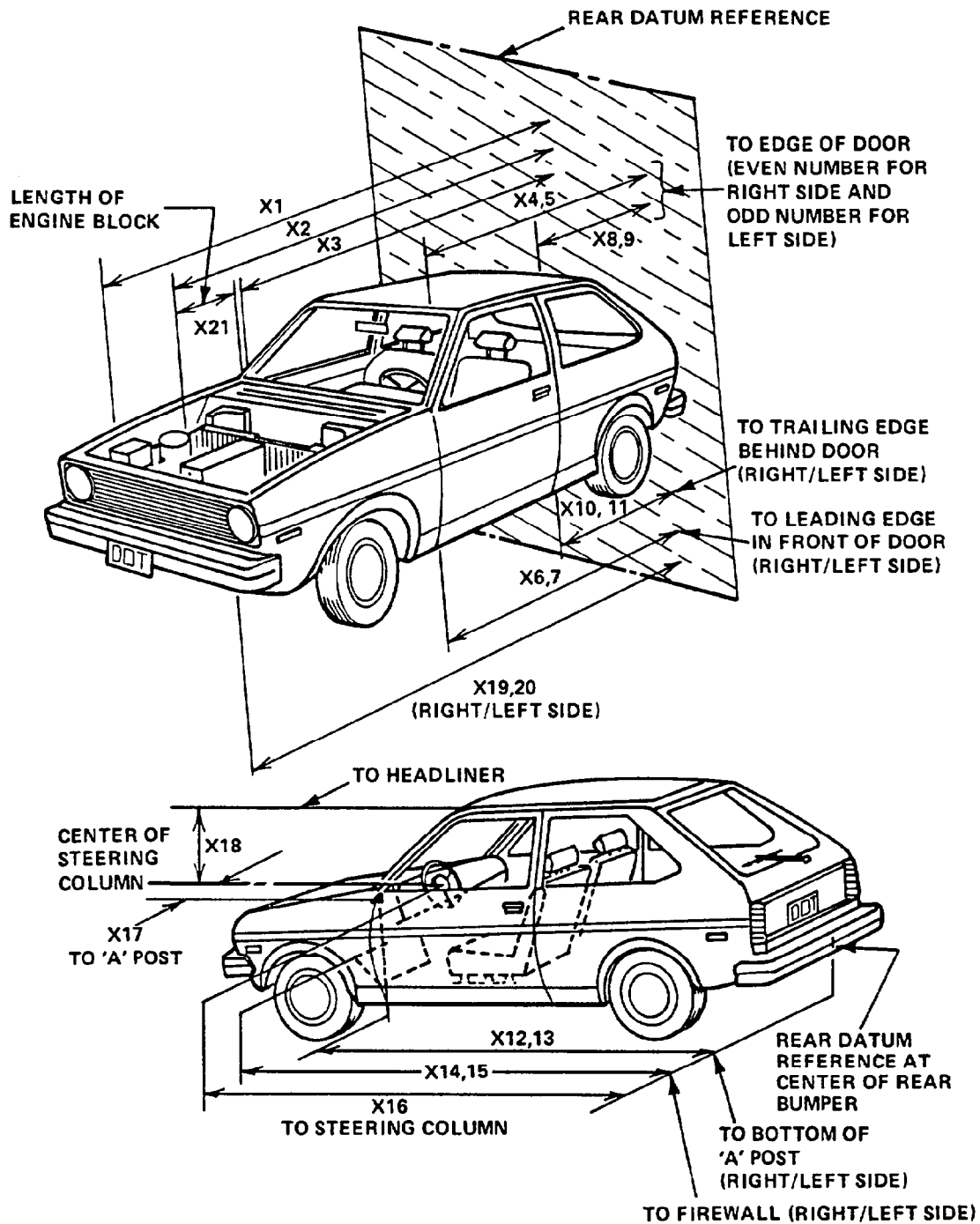


Table 6

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	181.5	162.6	18.9
X2	Rear Surface of Vehicle to Front of Engine	150.7	143.0	7.7
X3	Rear Surface of Vehicle to Firewall	131.2	127.7	3.5
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	119.6	119.2	0.4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	119.6	119.3	0.3
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	119.0	118.4	0.6
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	119.0	118.3	0.7
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	71.4	71.0	0.4
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	71.3	70.9	0.4
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	70.6	70.0	0.6
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	70.5	69.8	0.7
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	118.5	117.4	1.1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	118.4	117.9	0.5
X14	Rear Surface of Vehicle to Firewall, Right Side	130.8	128.7	2.1
X15	Rear Surface of Vehicle to Firewall, Left Side	129.7	129.2	0.5
X16	Rear Surface of Vehicle to Steering Column	103.3	102.6	0.7
X17	Center of Steering Column to "A" Post	16.5	16.3	0.2
X18	Center of Steering Column to Headliner	15.3	14.2	1.1
X19	Rear Surface of Vehicle to Right Side of Front Bumper	177.1	160.4	16.7
X20	Rear Surface of Vehicle to Left Side of Front Bumper	177.2	158.6	18.6
X21	Length of Engine Block	12.8	12.8	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 7
DUMMY INJURY CRITERIA VALUES

NHTSA No.: CN0108 Vehicle: 1992 Chevrolet Cavalier 2-Door Coupe

	MAXIMUM ACCELERATION (g's)							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
Dummy (1)	-49.6	-5.2	40.7	52.2	-36.7	-5.4	-6.5	36.9
Dummy (2)	-34.7	7.0	39.6	47.7	-33.2	-8.9	8.5	33.2

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	460.0	832.0
Dummy (2)	990.0	964.0

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc. (g) t ₁ TO t ₂
		t ₁ (msec)	t ₂ (msec)	
Dummy (1)	488	77.160	113.040	45.0
Dummy (2)	353	84.960	120.840	39.6

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Table 8

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 = 6.0 sec.

Log time duration of reminder light operation = 70.0 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 = 0.0 sec.
(audible warning should not operate)

Log time duration of reminder light operation = 0.0 sec.

Note wording of visual warning:

Fasten Seat Belt -

Fasten Belt -

Symbol 101-80 X

Table 9

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: Vehicle does not employ a crash-deployed occupant protection system

The manufacturers recommended schedule is to replace ____ or repair ____ this system:

- a. by ____ month, ____ year
- b. by ____ miles
- c. or after a time interval of ____ months or ____ years.

Were appropriate instructions concerning maintenance and/or replacement of this system provided? YES ____ NO ____

Was a description of the functional operation of the system provided? YES ____ NO ____

Is there a reference to the instructions and description of the system on the label? YES ____ NO ____

Was an owner's manual provided? YES ____ NO ____

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the systems? YES ____ NO ____

Table 10

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 X NO -

Describe the location of the readiness indicator:

Is the readiness indicator clearly visible to the driver?

YES - NO -

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

YES - NO -

Table 11

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No.:	<u>CN0108</u>
Make/Model:	<u>Chevrolet Cavalier</u>
Date of Comfort/Convenience Check:	<u>11/7/91</u>
Technician Performing Check:	<u>VMP</u>
GVWR:	<u>3460 lbs.</u>

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 - NO X

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.

Table 11 (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 N/A NO N/A

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 (nonengaged).

YES N/A NO N/A

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 - 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 canceled each time the adjacent door is opened.

YES N/A NO N/A

(If NO, provide explanation.)

Table 11 (cont.)

2. This vehicle is equipped with manual belts, required to meet FMVSS 208 S4.6, and the tension relieving device is canceled each time one of the following options occurs:
- a. The adjacent door is opened. YES N/A NO N/A
- b. The latch plate is released from the buckle. YES N/A NO N/A
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 N/A NO N/A

(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 - NO X
2. Seats are adjusted according to instructions in Appendix B.
- YES X NO -
3. The test dummies are positioned according to dummy position placement instructions in Appendix B and Appendix C.
- YES X NO -
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 0.4 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Table 11 (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 X NO -
2. Attach the inboard and outboard reach string. YES X NO -
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 X NO -
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 X NO -

D5

RETRACTION

1. Seats and seat backs are adjusted according to instructions in Appendix B "General Test Conditions" in TP-208-8.
YES X NO -
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 X NO -
3. Outboard armrests which are capable of being stowed on vehicle seats shall be placed in their stowed positions.
YES N/A NO N/A
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 X NO -

Table 11 (cont.)

- b. The torso and lap belt webbing of the seat belt system automatically retract when the seat belt latch plate 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 11 (cont.)

3. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- a. The belt is completely retracted or, if the belt is nonretractable, the belt is unattached.
- YES - NO X
- b. The seat is moved to any position to which it is designed to be adjusted.
- YES - NO X
- c. The seat back, if foldable, is folded forward as far as possible and then moved backward into positions.
- YES - NO X
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 N/A NO N/A

D7

LATCH MECHANISM

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

1. Whose components are accessible to a seated occupant in both the stowed and operational positions.
- YES - NO -
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 - NO -
3. That releases at a single point by a push button action.
- YES - NO -

Figure 10

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

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

Windshield is bonded in place with 0.6" trim along top and both sides of windshield.

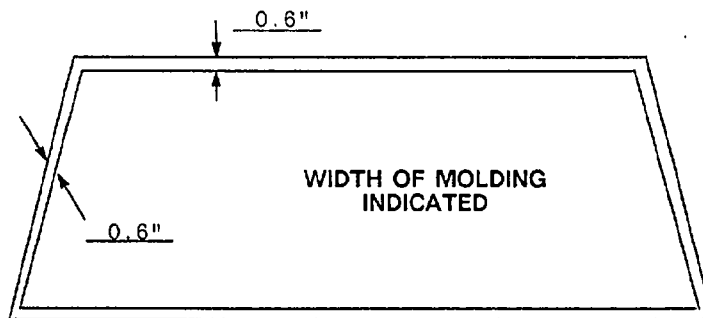
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles 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		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	76.4	76.4	100%
LEFT SIDE	76.4	76.4	100%
TOTAL	152.8	152.8	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

NONE.

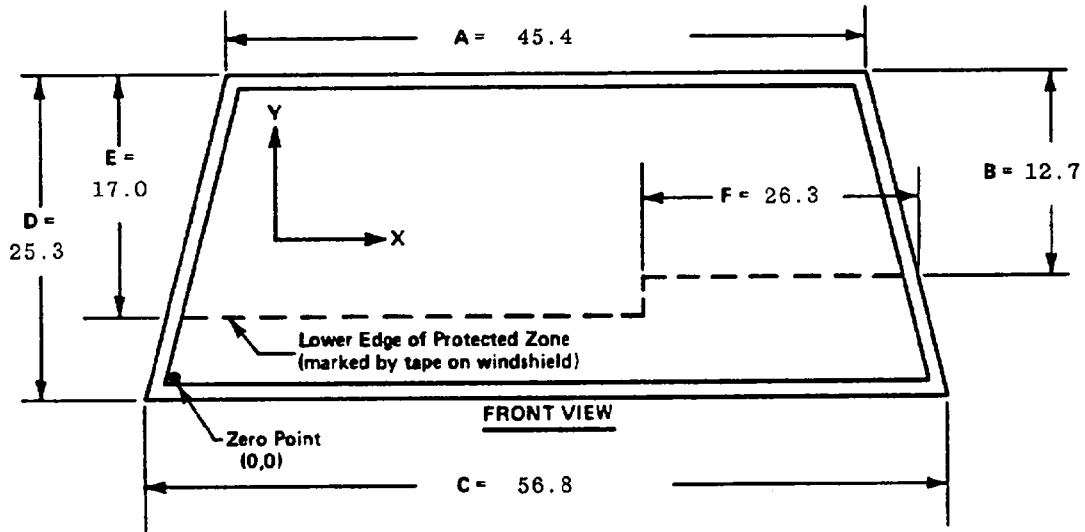
Figure 11

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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.

FMVSS 219 TEST DATA: (Dimensions in inches.)



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

(Show location of penetration on above sketch)

None.

COORDINATES		
	X	Y
1.		
2.		
3.		
4.		

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

TEST VEHICLE NHTSA NO.:

C	N	O	1	0	8
---	---	---	---	---	---

Vehicle Mfgr./Make/Model: 1992 Chevrolet Cavalier 2-Door Coupe

TEST VEHICLE IMPACT TYPE: X Frontal (30 mph)

(driver/passenger) side

 - Rear Moving Barrier (30 mph)

 - Lateral Moving Barrier (20 mph)

The diagram shows a circle representing a total time. A vertical line divides the circle into two halves. The right half is further divided into two sectors. The larger sector on the right is white and labeled '25 min.'. The smaller sector on the right is shaded with diagonal lines and labeled $t_m + 5$. A very small sector at the top right is shaded with a different pattern and labeled t_m . The total time is indicated as $(t_m + 5) + 25$ at the bottom.

1. From impact until vehicle motion ceases
2. For 5 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.

None.

Table 13

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

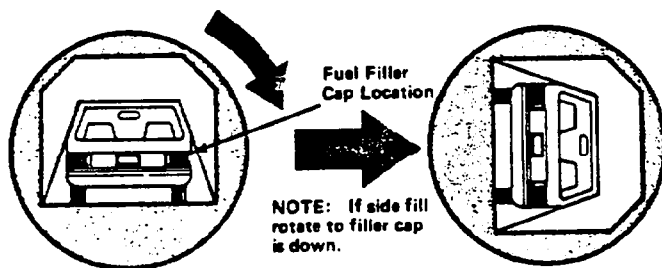
TEST PHASE:

0°

90°

Vehicle NHTSA ID No.:

CN0108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time _____ 1 _____ minutes _____ 55 _____ seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + _____ 5 _____ minutes _____ 00 _____ seconds

TOTAL _____ 6 _____ minutes _____ 55 _____ seconds

Next whole minute interval _____ 7 _____ minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min 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 13

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

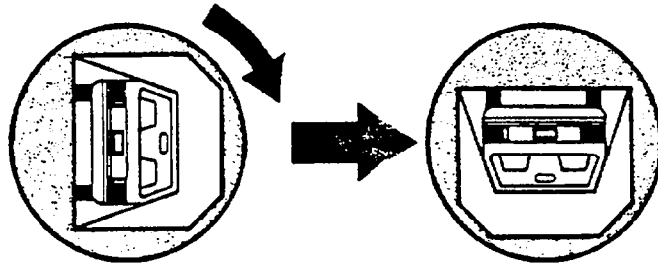
TEST PHASE:

90°

180°

Vehicle NHTSA ID No.:

CN0108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time _____ 1 _____ minutes _____ 55 _____ seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + _____ 5 _____ minutes _____ 00 _____ seconds

TOTAL _____ 6 _____ minutes _____ 55 _____ seconds

Next whole minute interval _____ 7 _____ minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min 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 13

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

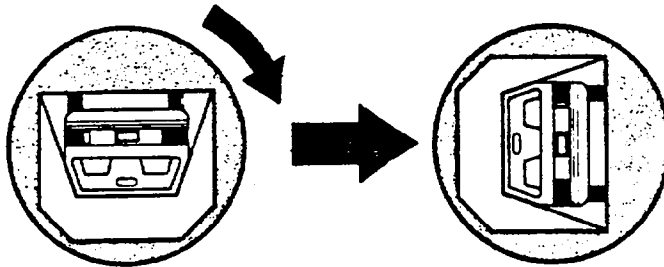
TEST PHASE:

180°

270°

Vehicle NHTSA ID No.:

CN0108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time _____ 1 _____ minutes _____ 45 _____ seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + _____ 5 _____ minutes _____ 00 _____ seconds

TOTAL _____ 6 _____ minutes _____ 45 _____ seconds

Next whole minute interval _____ 7 _____ minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min 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 13

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

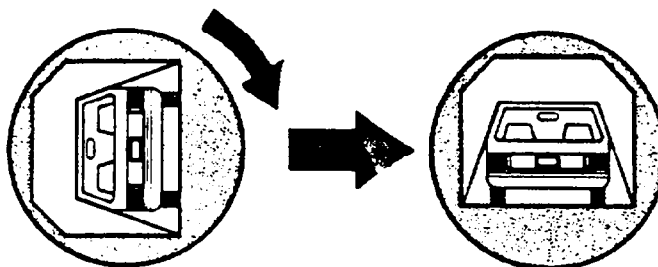
TEST PHASE:

270°

360°

Vehicle NHTSA ID No.:

CN0108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

1 minutes 50 seconds

FMVSS 301 Position Hold Time +

5 minutes 00 seconds

TOTAL

6 minutes 50 seconds

Next whole minute interval

7 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min 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

TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA Contract Lab: Calspan Advanced Technology Center
Lab Project Manager & Telephone No.: Walter E. Levan (716) 632-7500
Date of Test: November 12, 1991 Vehicle NHTSA No.: CN0108
Vehicle Manufacturer: General Motors Corporation
Model Year: 1992 VIN: 1G1JC1441N7106575
Model: Cavalier Body Style: 2-Door Coupe Build Date: 8/91
Dummy Stabilized Temperature at Time of Test: 72 °F (Spec. = 66-78°F)
Impact Velocity: 29.4 mph Time of Test: 12:00
Type of Automatic Restraint System: Automatic 3-Point seat belt restraint system
for driver and right front passenger

Failure Details:

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

Appendix A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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Figure A-1 PRE-TEST FRONT VIEW

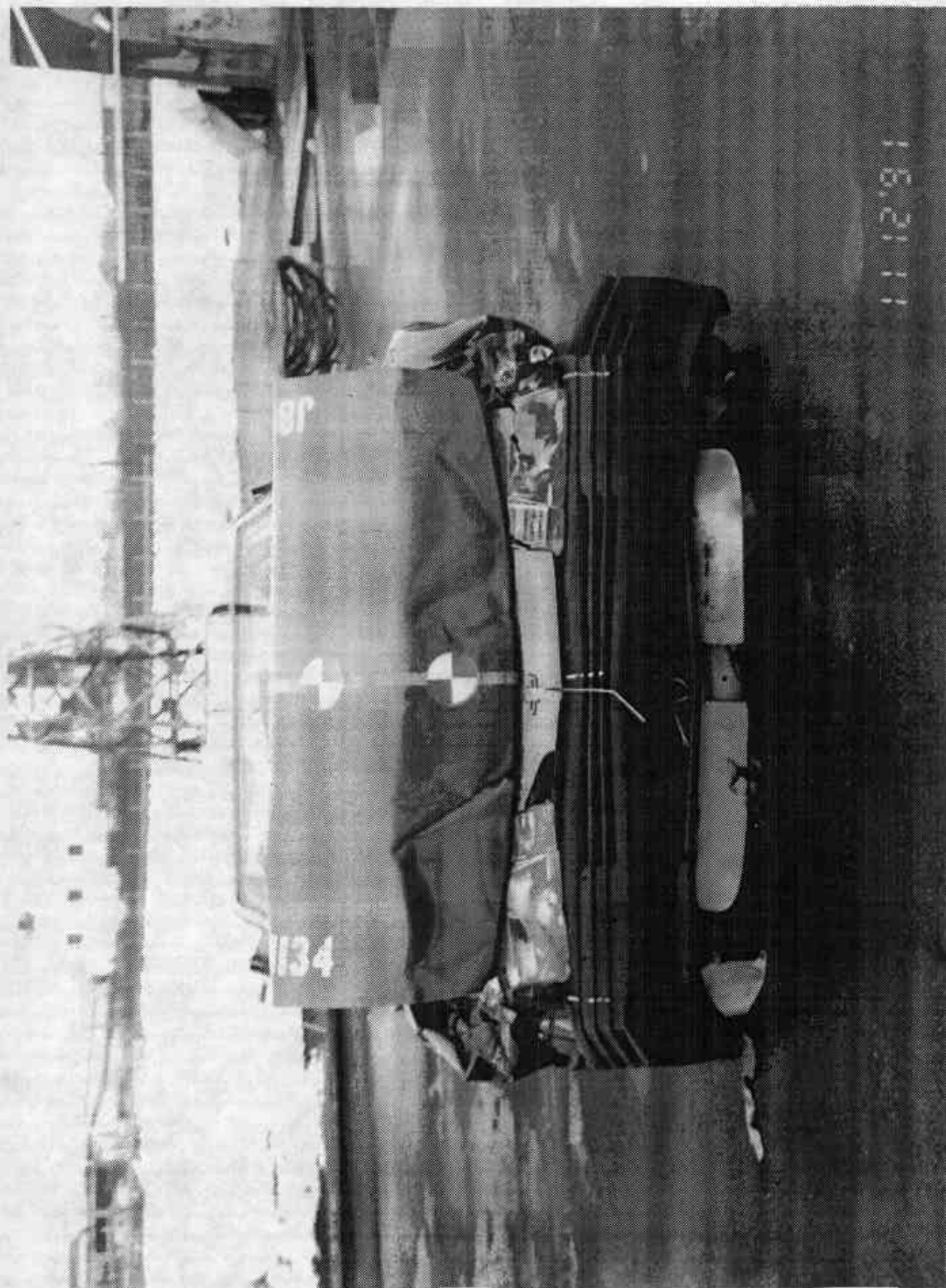


Figure A-2 POST-TEST FRONT VIEW



Figure A-3 PRE-TEST LEFT SIDE VIEW



Figure A-4 POST-TEST LEFT SIDE VIEW



Figure A-5 PRE-TEST RIGHT SIDE VIEW

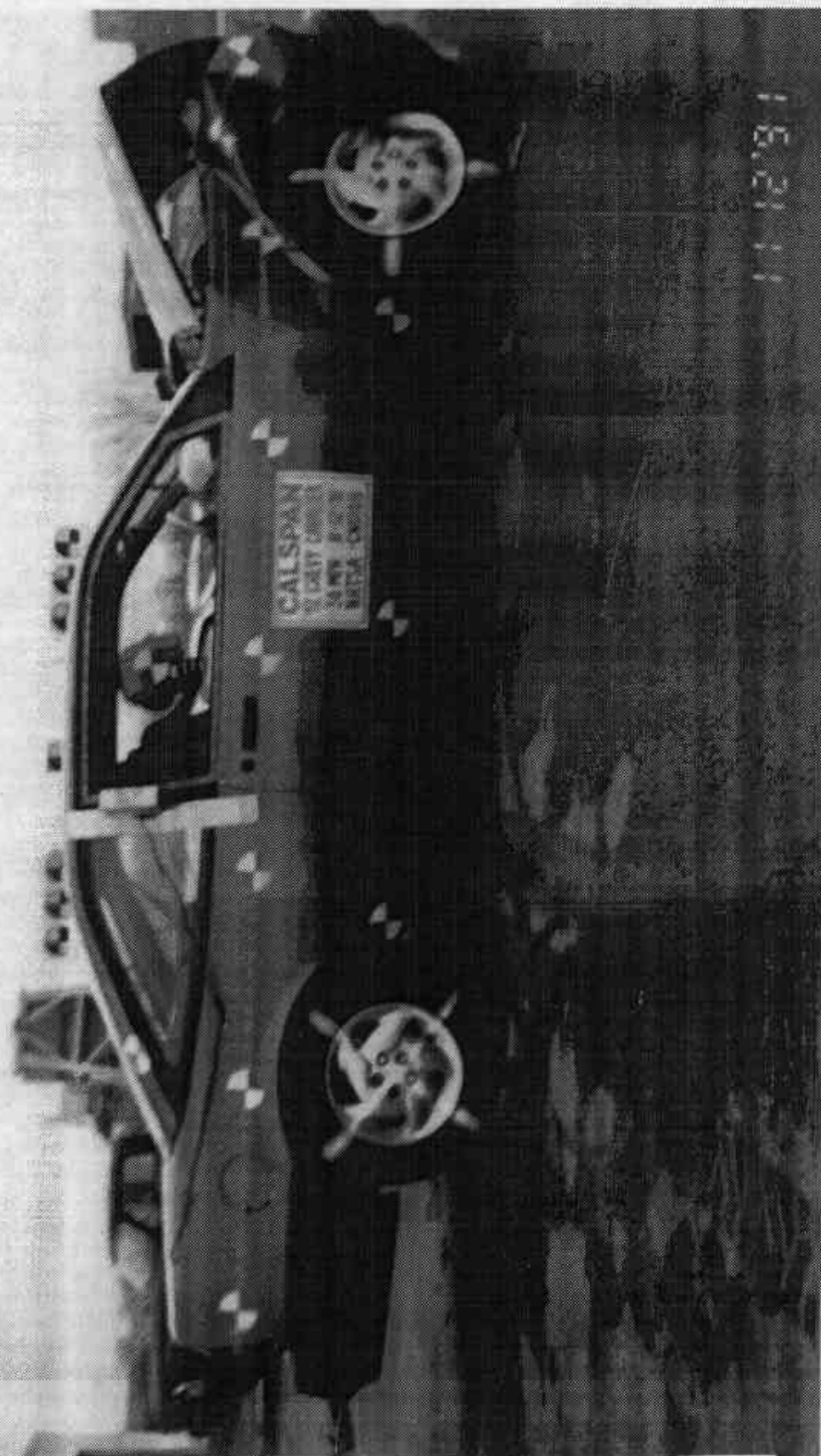


Figure A-6 POST-TEST RIGHT SIDE VIEW



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



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

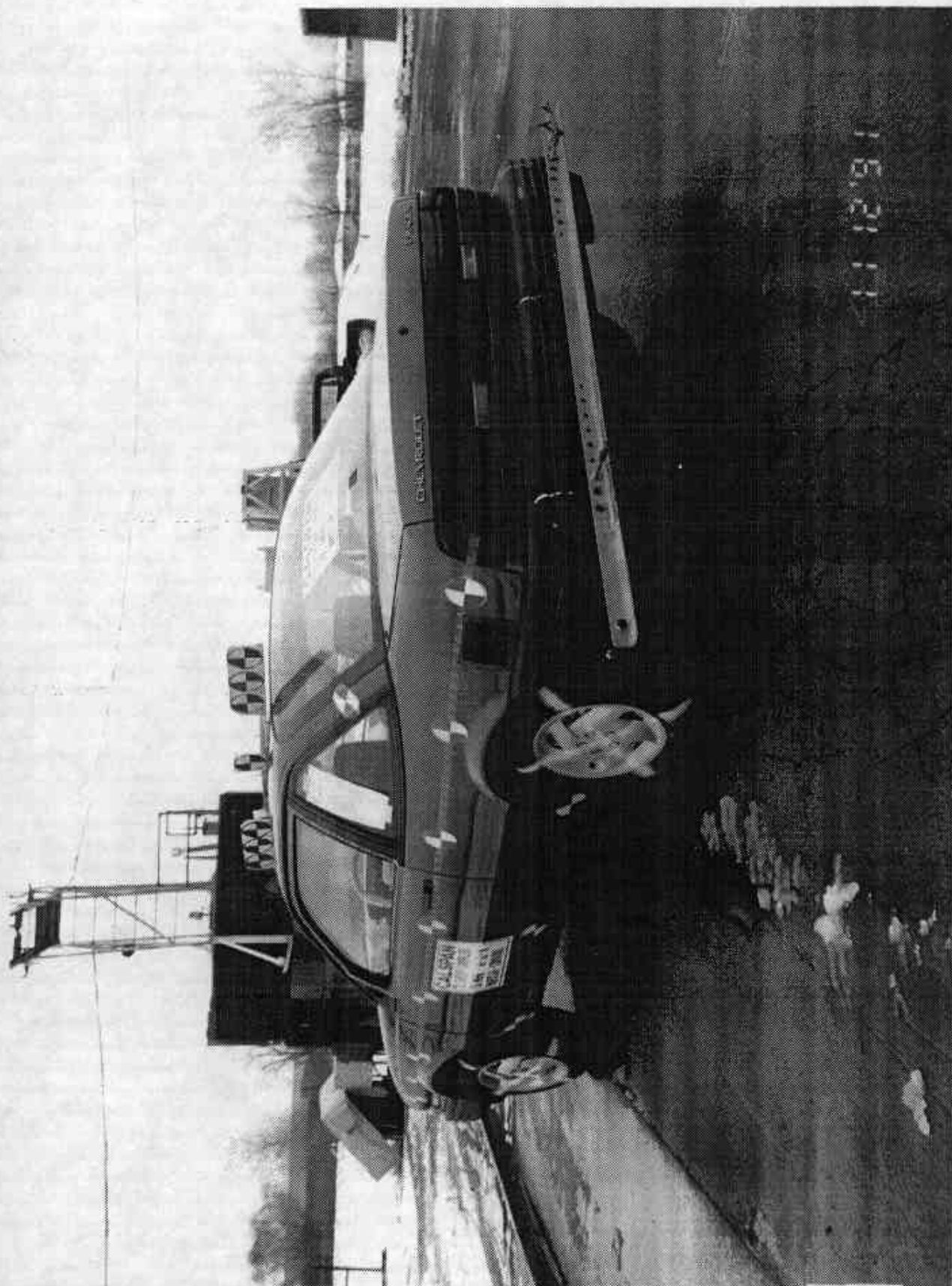
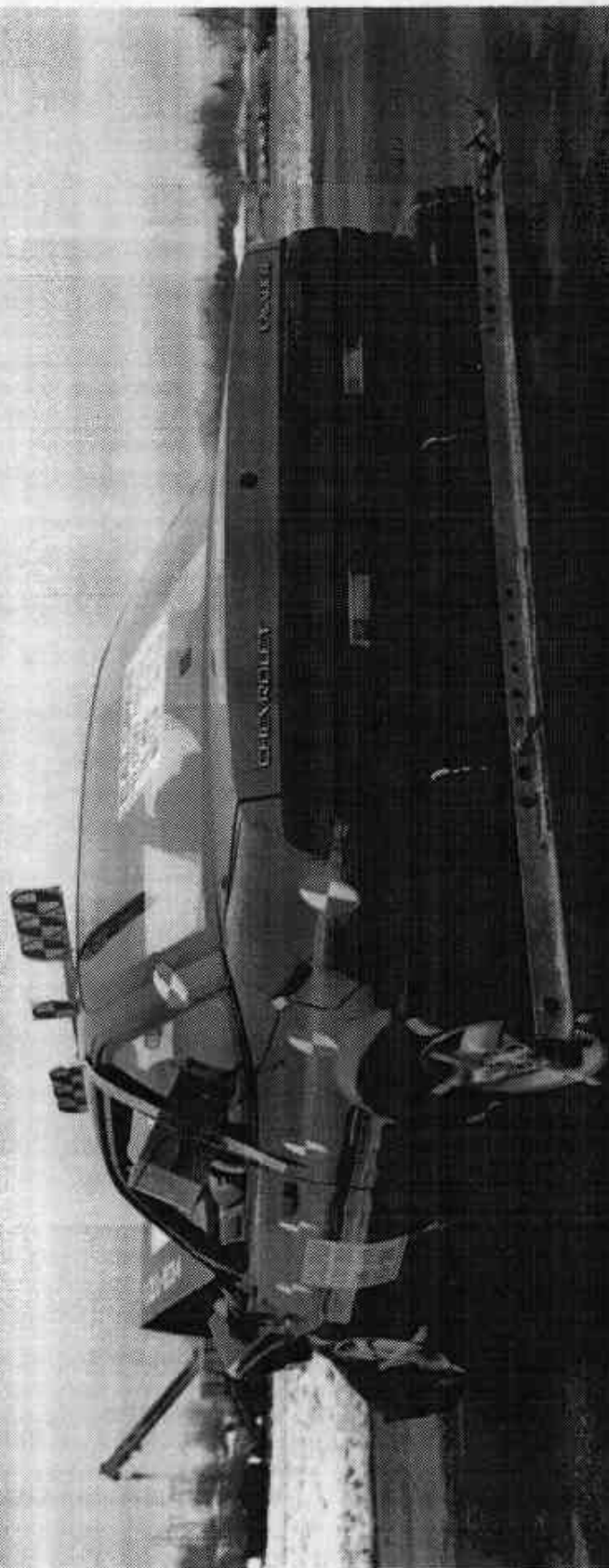


Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW



11 12'91

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



Figure A-11 POST-TEST TOP VIEW



Figure A-12 PRE-TEST WINDSHIELD VIEW



FIGURE A-13 POST-TEST WINDSHIELD VIEW

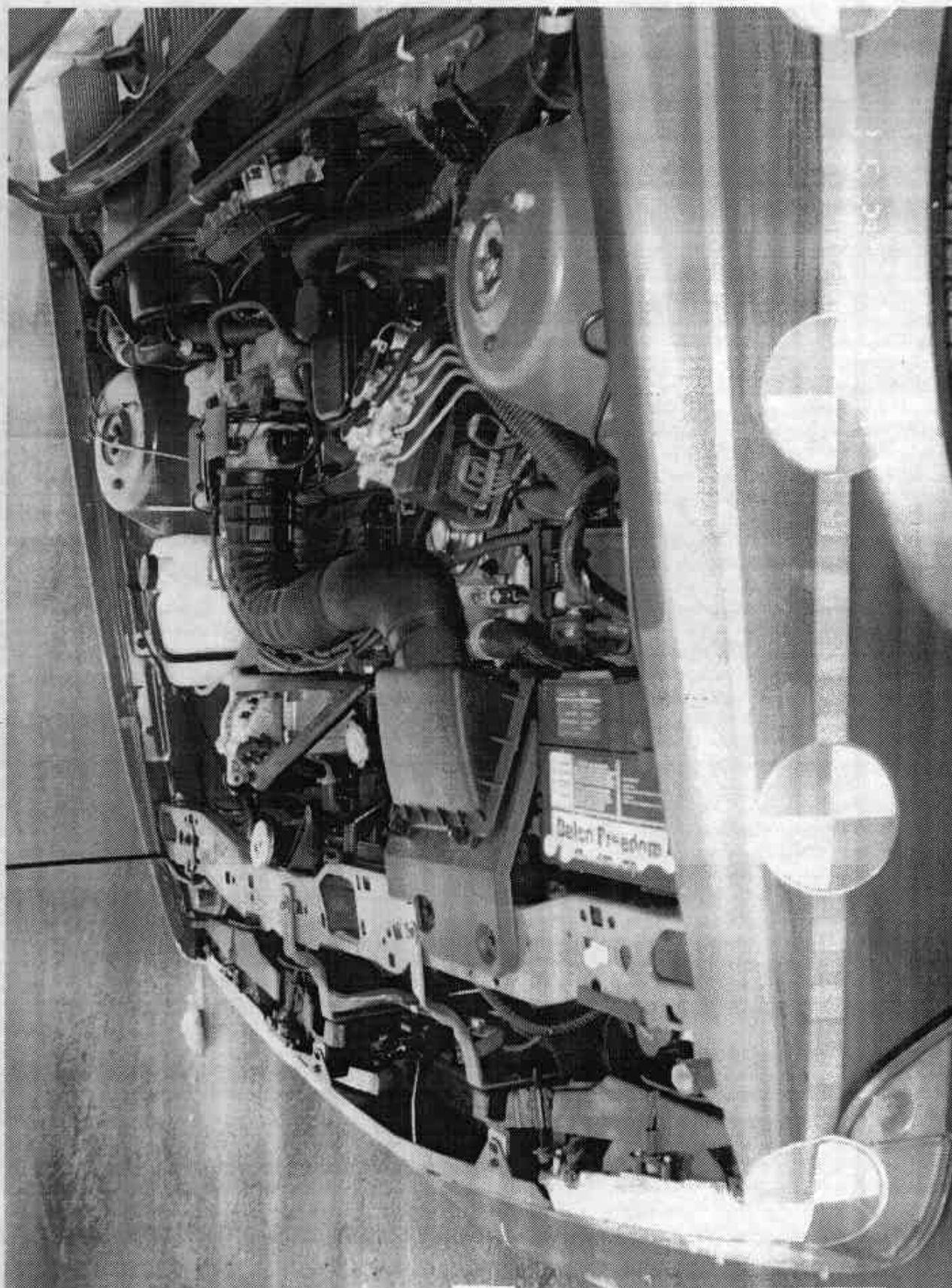


FIGURE A-14 PRE-TEST ENGINE COMPARTMENT VIEW

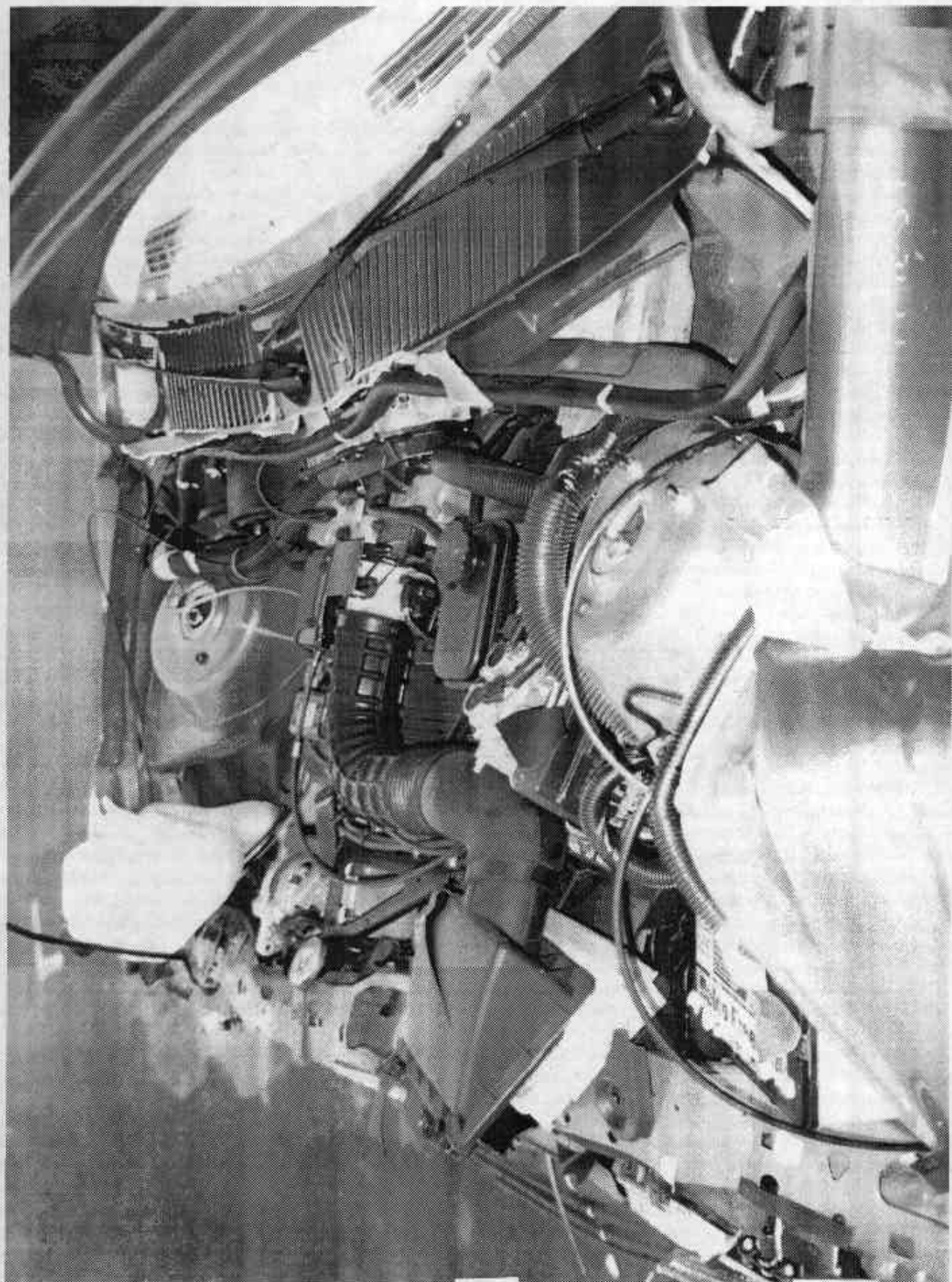


FIGURE A-15 POST-TEST ENGINE COMPARTMENT VIEW

A-17

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11 12'91

Figure A-16 PRE-TEST FUEL FILLER CAP PHOTO



11.12.91

Figure A-17 POST-TEST FUEL FILLER CAP PHOTO

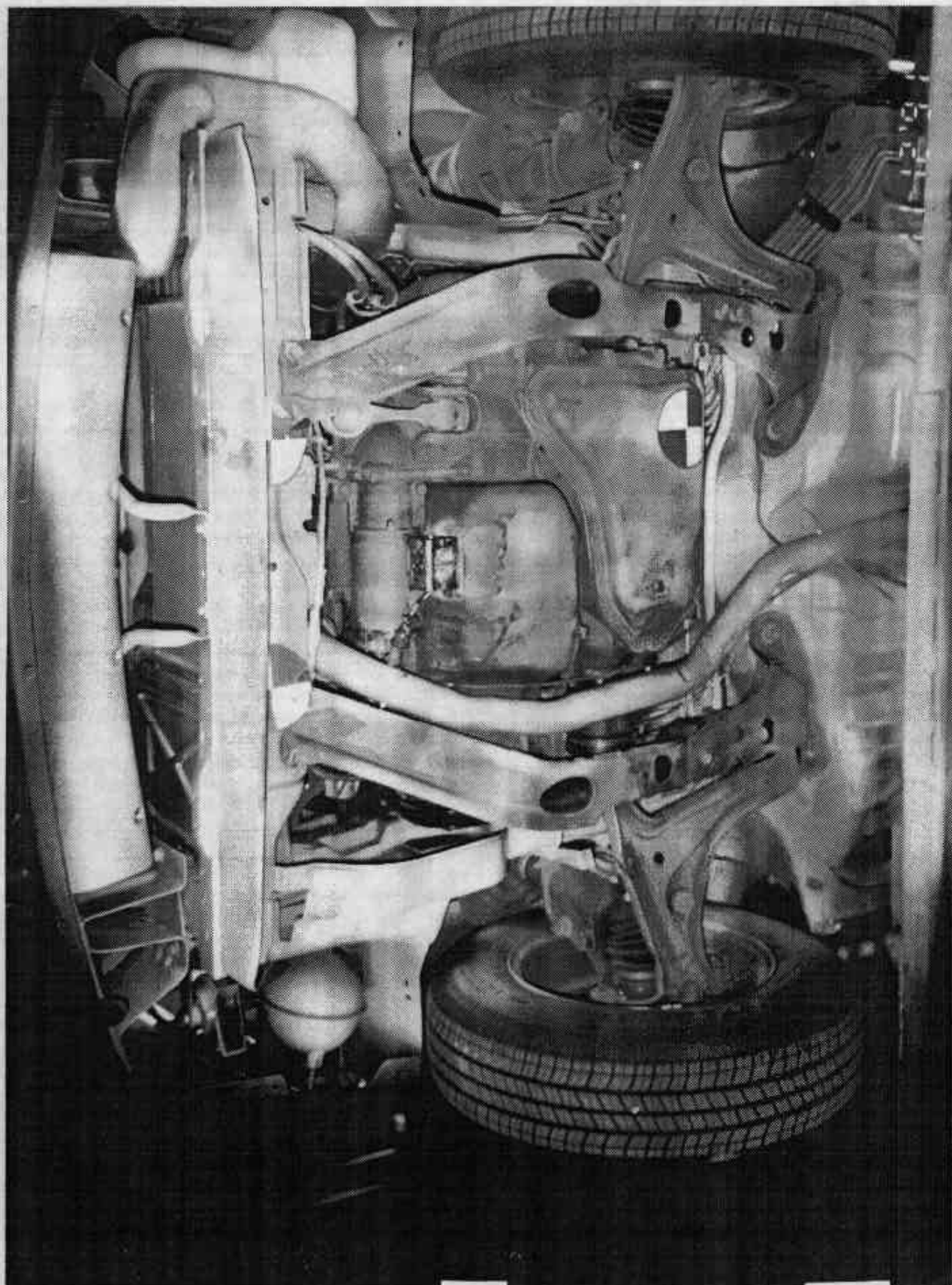


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

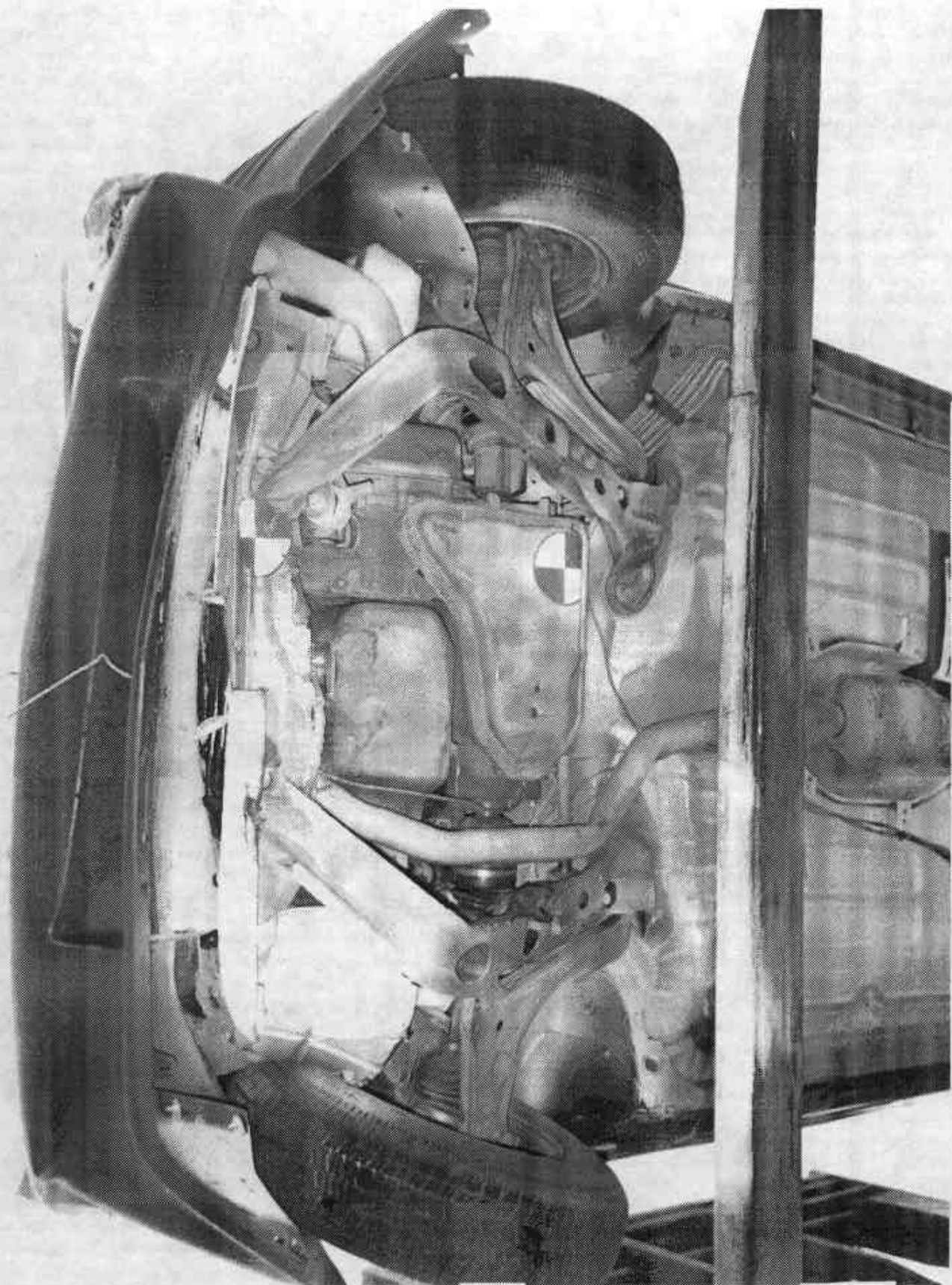


Figure A-19 POST-TEST FRONT UNDERBODY VIEW

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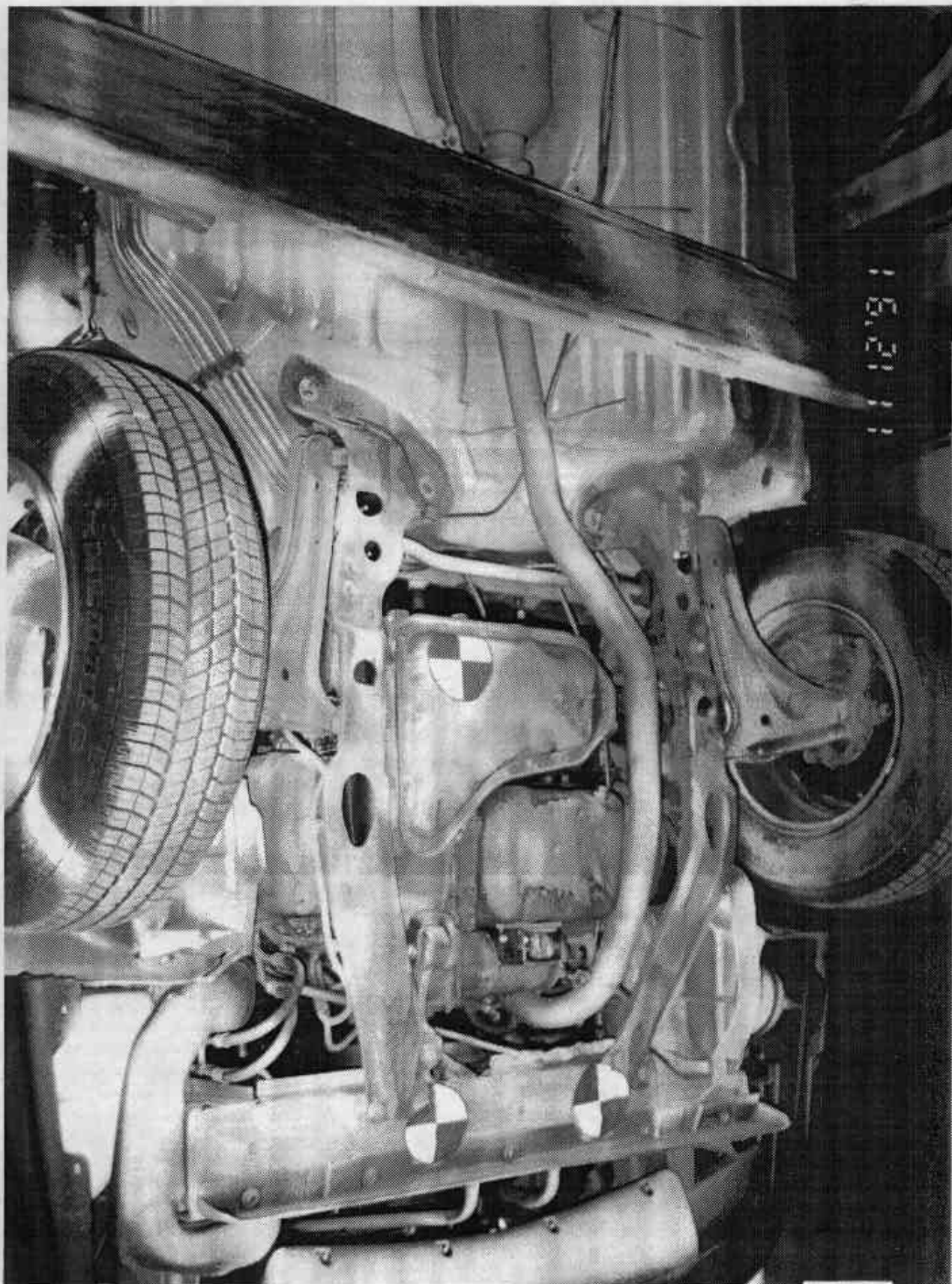


Figure A-20 PRE-TEST FRONT SIDE UNDERBODY VIEW

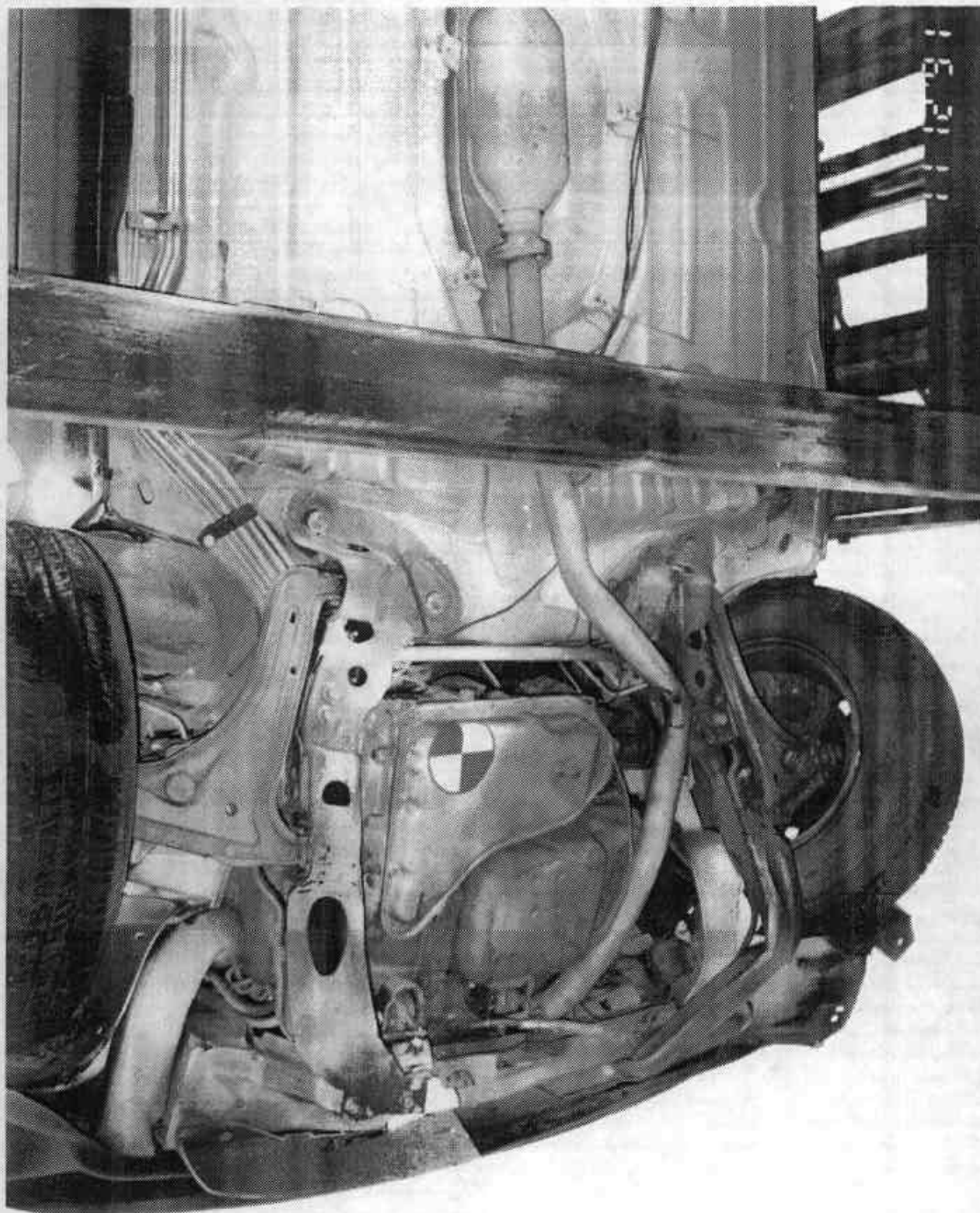
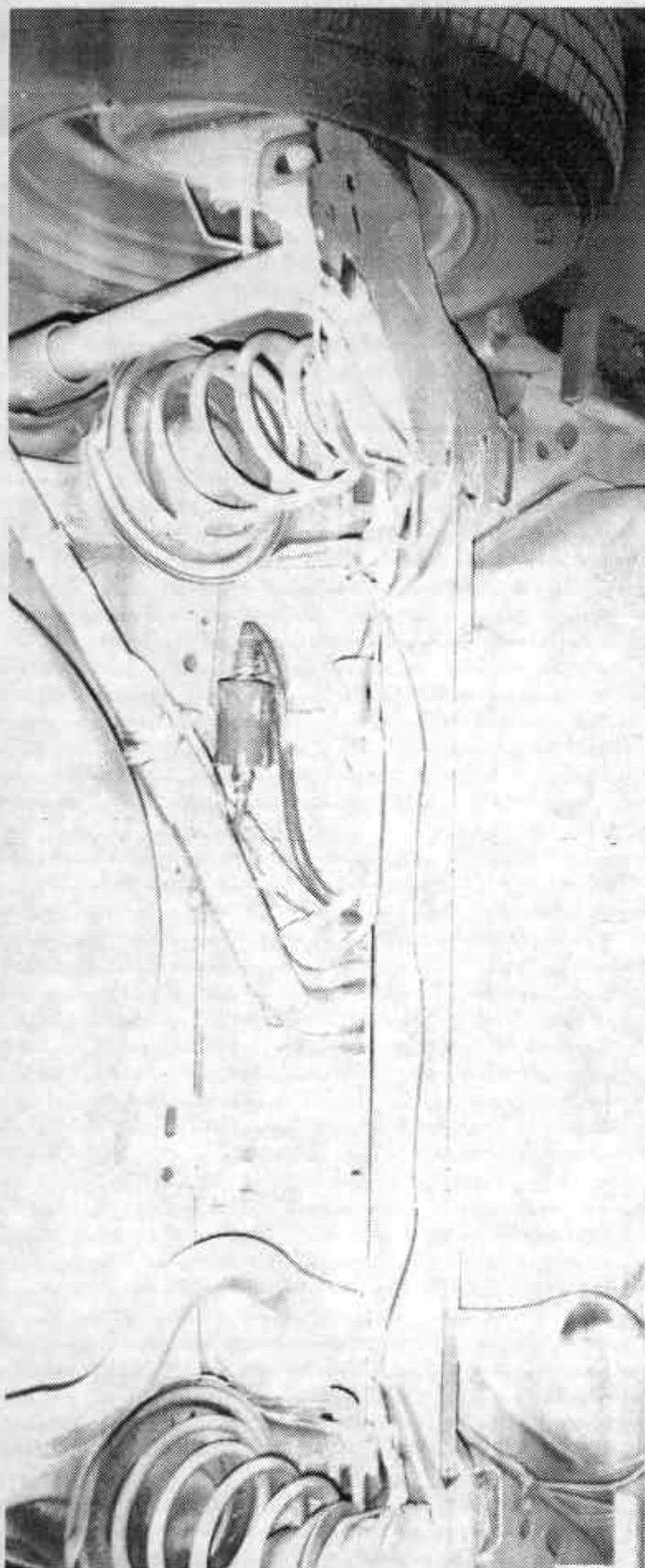


Figure A-21 POST-TEST FRONT SIDE UNDERBODY VIEW



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Figure A-22 PRE-TEST REAR UNDERBODY VIEW



FIGURE A-23 POST-TEST REAR UNDERBODY VIEW

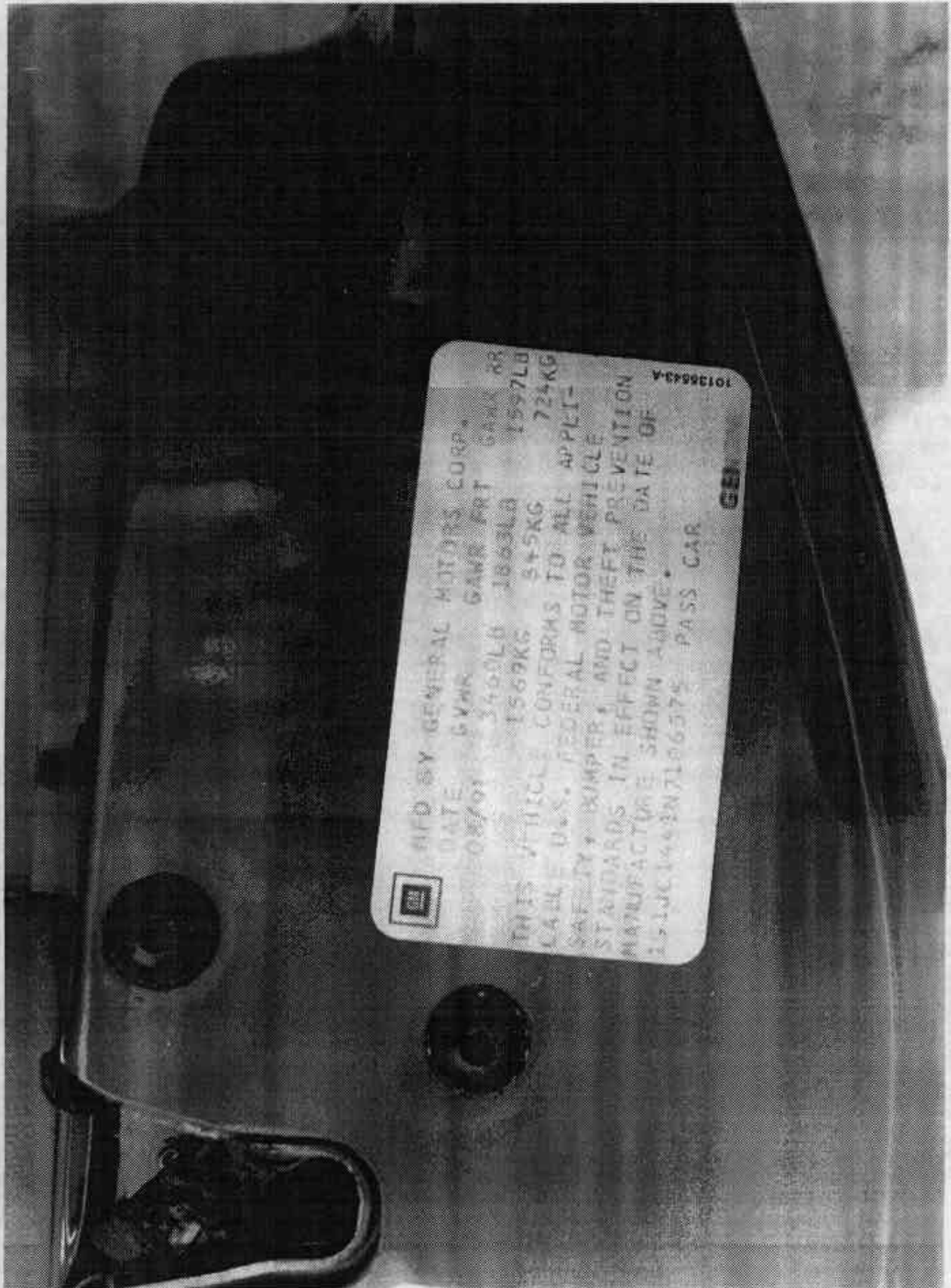


Figure A-24 CERTIFICATION LABEL



GM TIRE-LOADING INFORMATION

OCCUPANTS	VEHICLE	GAP, WT.
FRONT CTR. NR.	TOTAL	LB. KG
2	5	862 400
MAX. LOADING 3 SEAT SAME AS VEHICLE		
CAPACITY WEIGHT		
MODEL 1000		
TIRE SIZE		
FRONT	P185/75R14	
RR	P185/75R14	
SPA.	T185/70D14	
IF TIRES ARE HOT, ADD 4 PSI / 27 KPA		
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION		

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Figure A-25 TIRE PLACARD

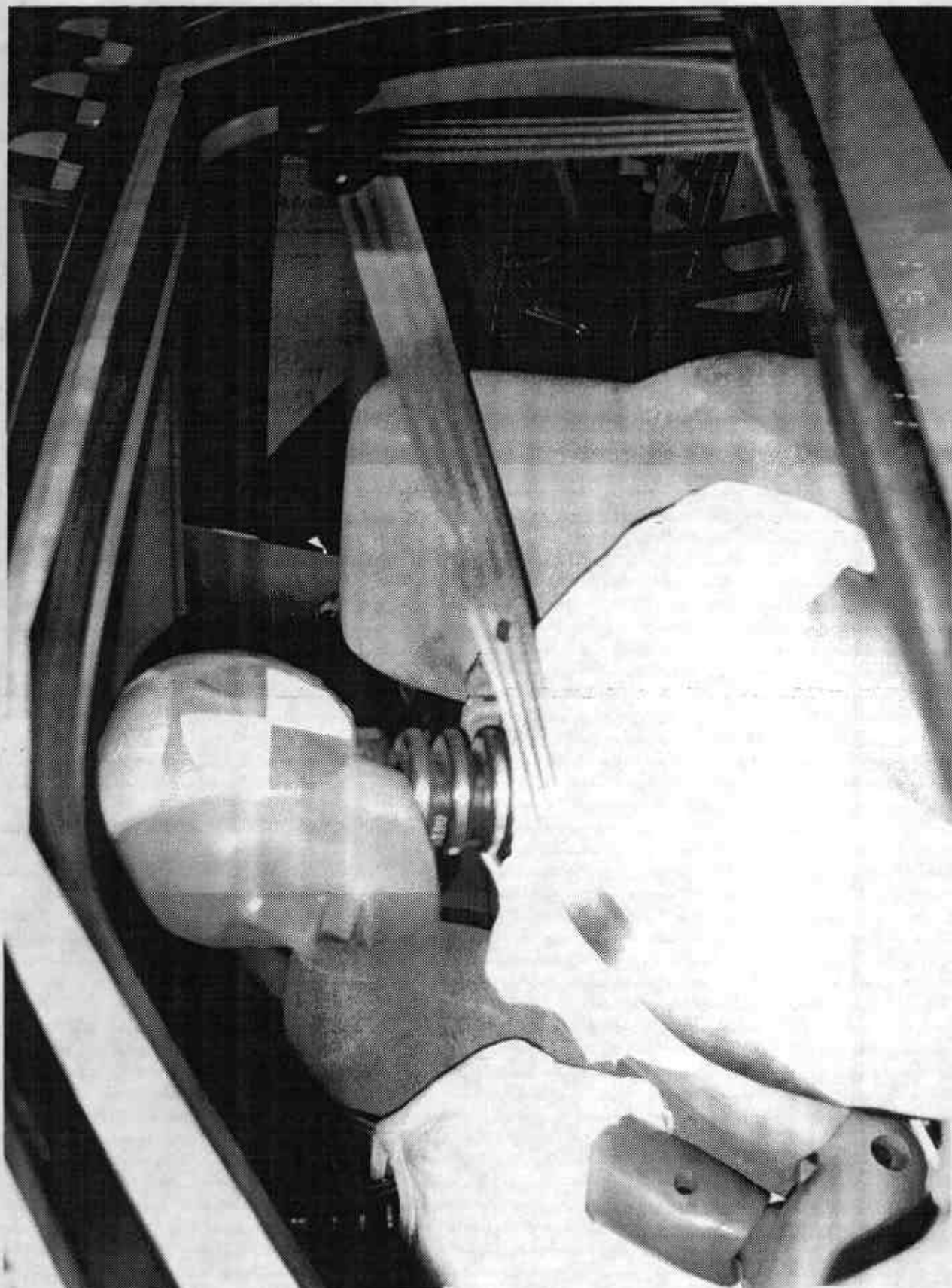


FIGURE A-26 PRE-TEST DRIVER DUMMY POSITION



Figure A-27 POST-TEST DRIVER DUMMY POSITION



FIGURE A-28 PRE-TEST PASSENGER DUMMY POSITION



Figure A-29 POST-TEST PASSENGER DUMMY POSITION

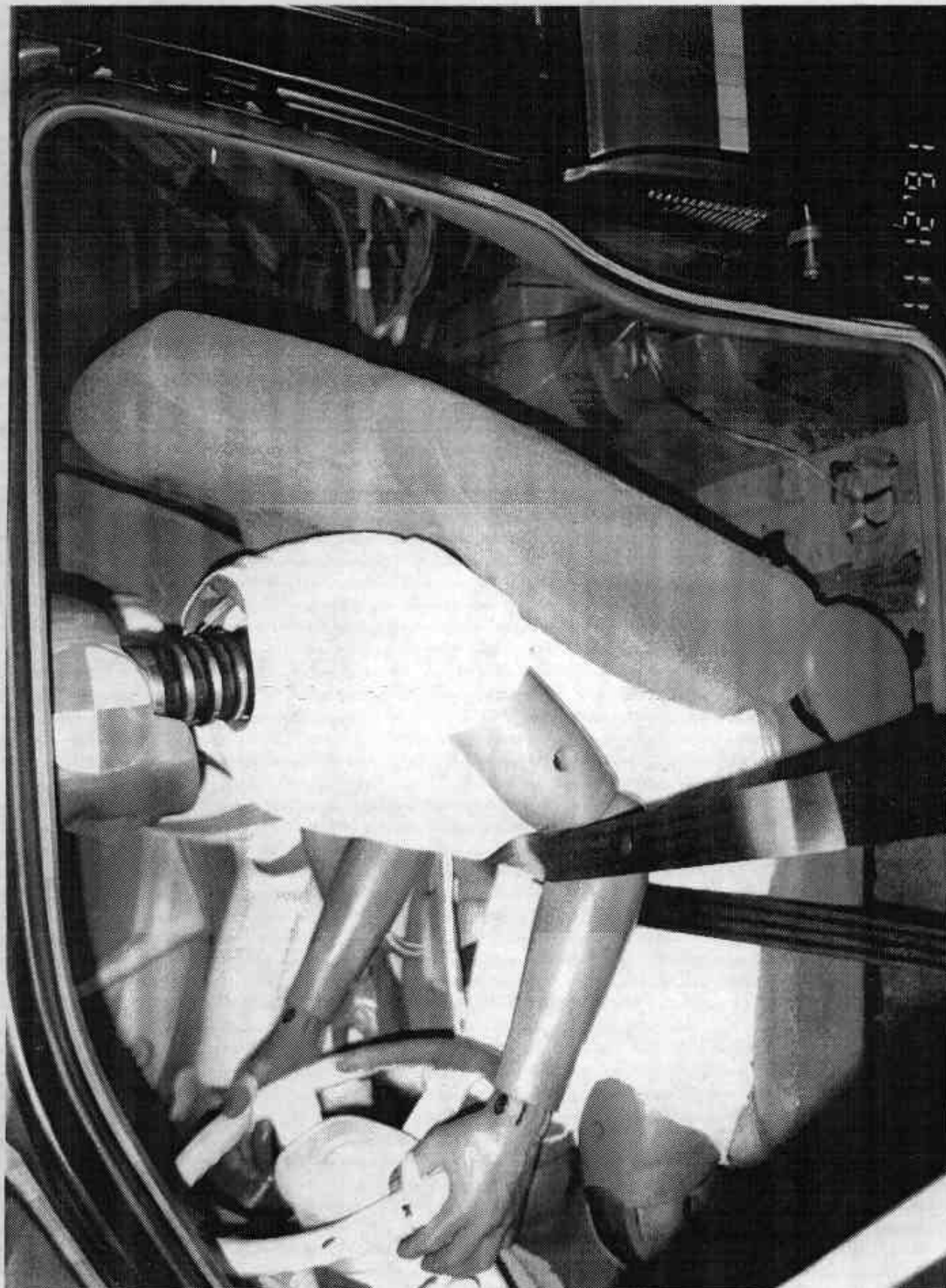


Figure A-30 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW



Figure A-31 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

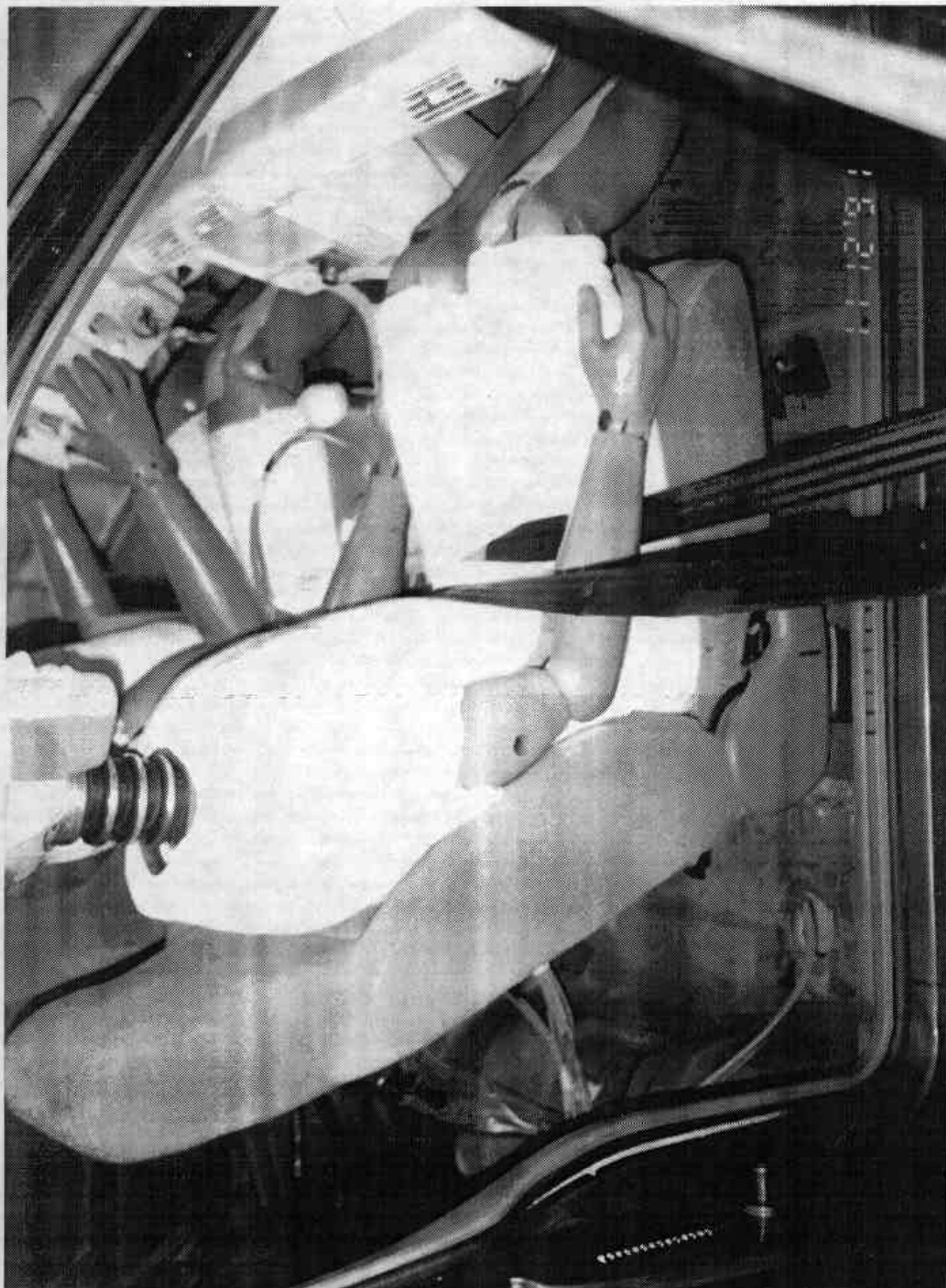


Figure A-32 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW



Figure A-33. POST-TEST PASSENGER DUMMY AND INTERIOR VIEW

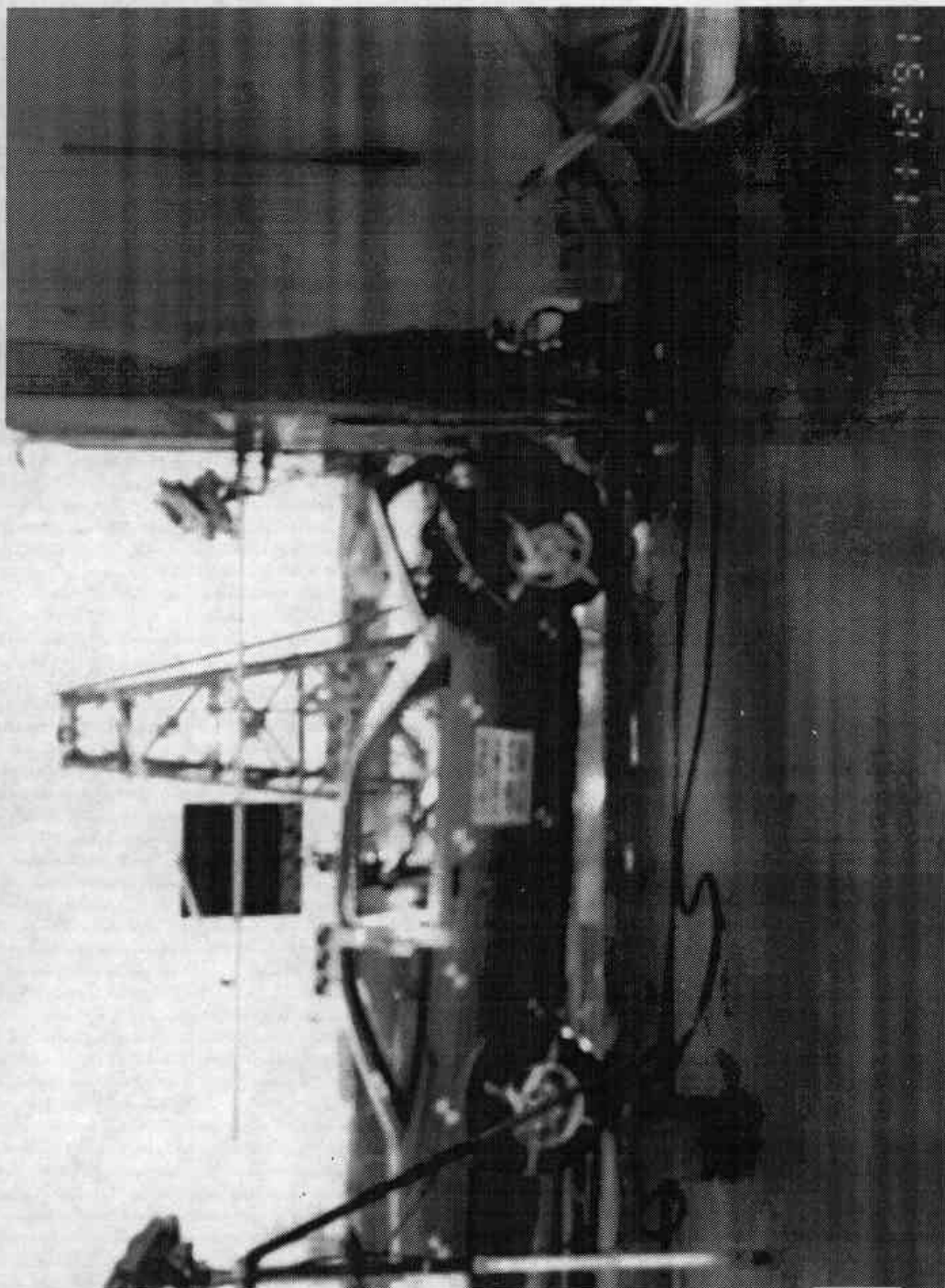


Figure A-34 VEHICLE IMPACT

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

NOTE: Calspan meets and follows the requirements of SAE J211.

TEST NO. CNO108

VEHICLE DATA

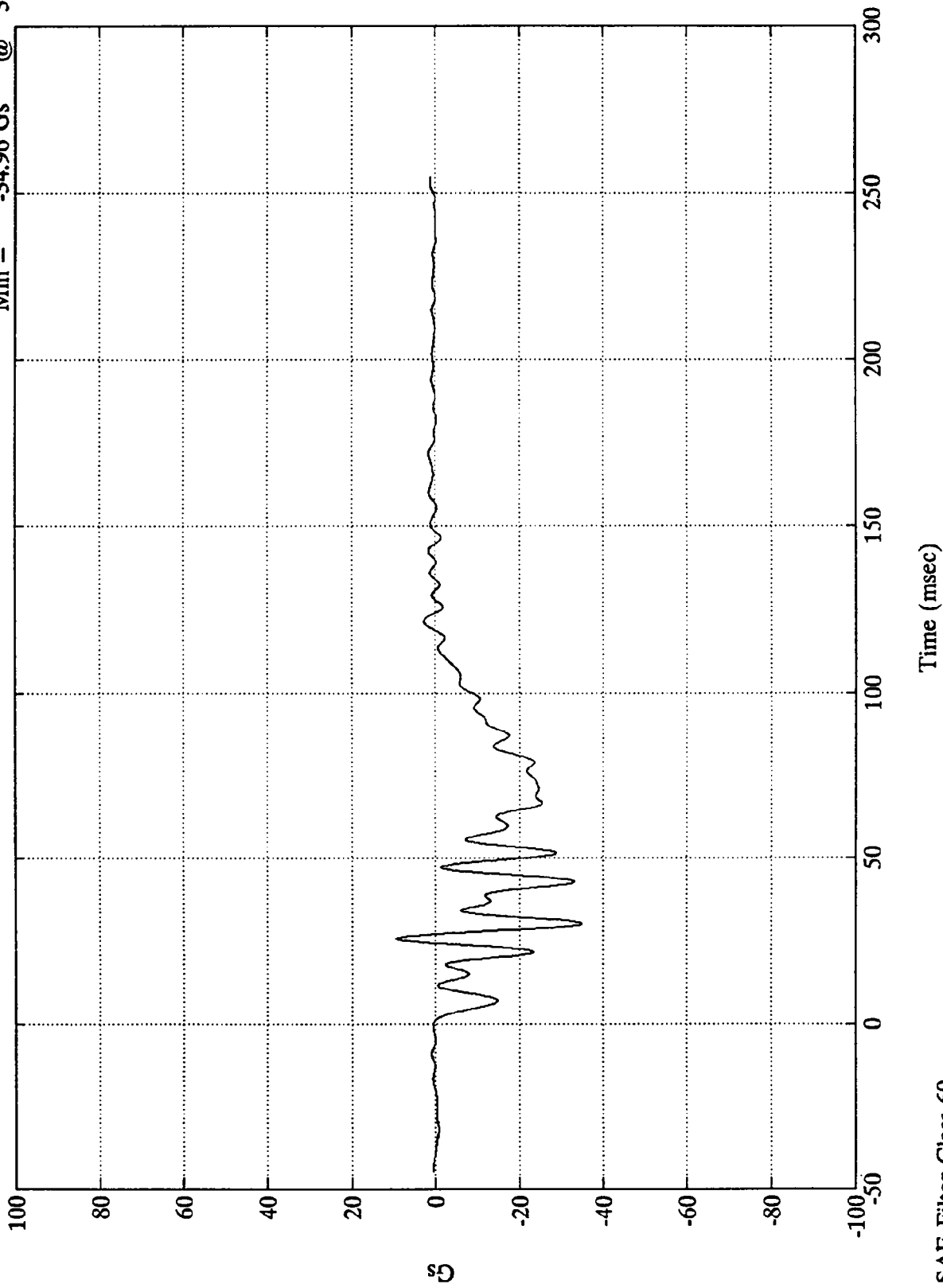
SAE FILTER CHANNEL CLASS

60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

L. Rear X-member X (#1)

Max = 9.31 Gs @ 25.68 msec
 Min = -34.96 Gs @ 30.12 msec

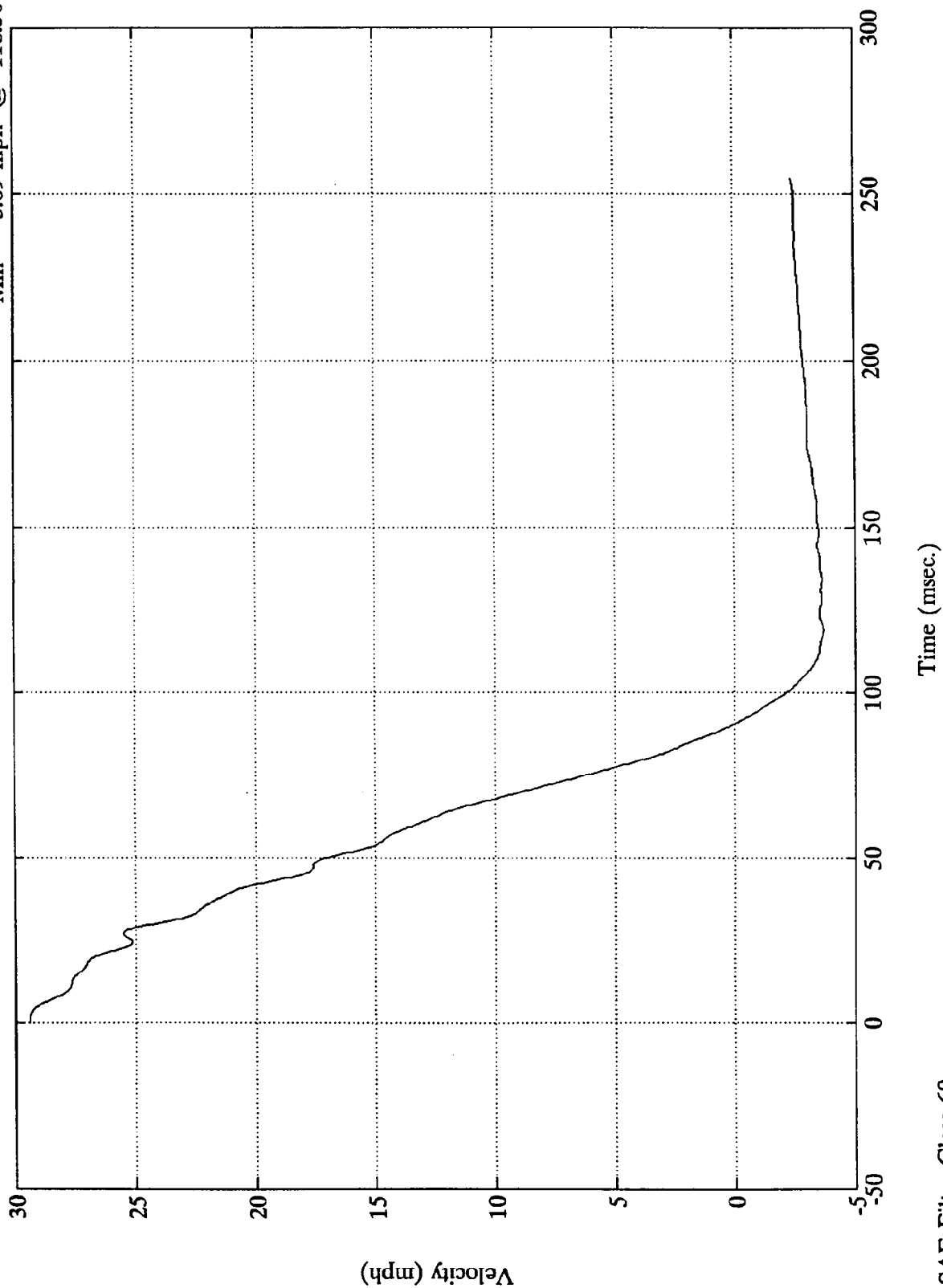


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

L Rear X-member X (#1)

Max = 29.41 mph @ 1.44 msec
Min = -3.69 mph @ 118.56 msec

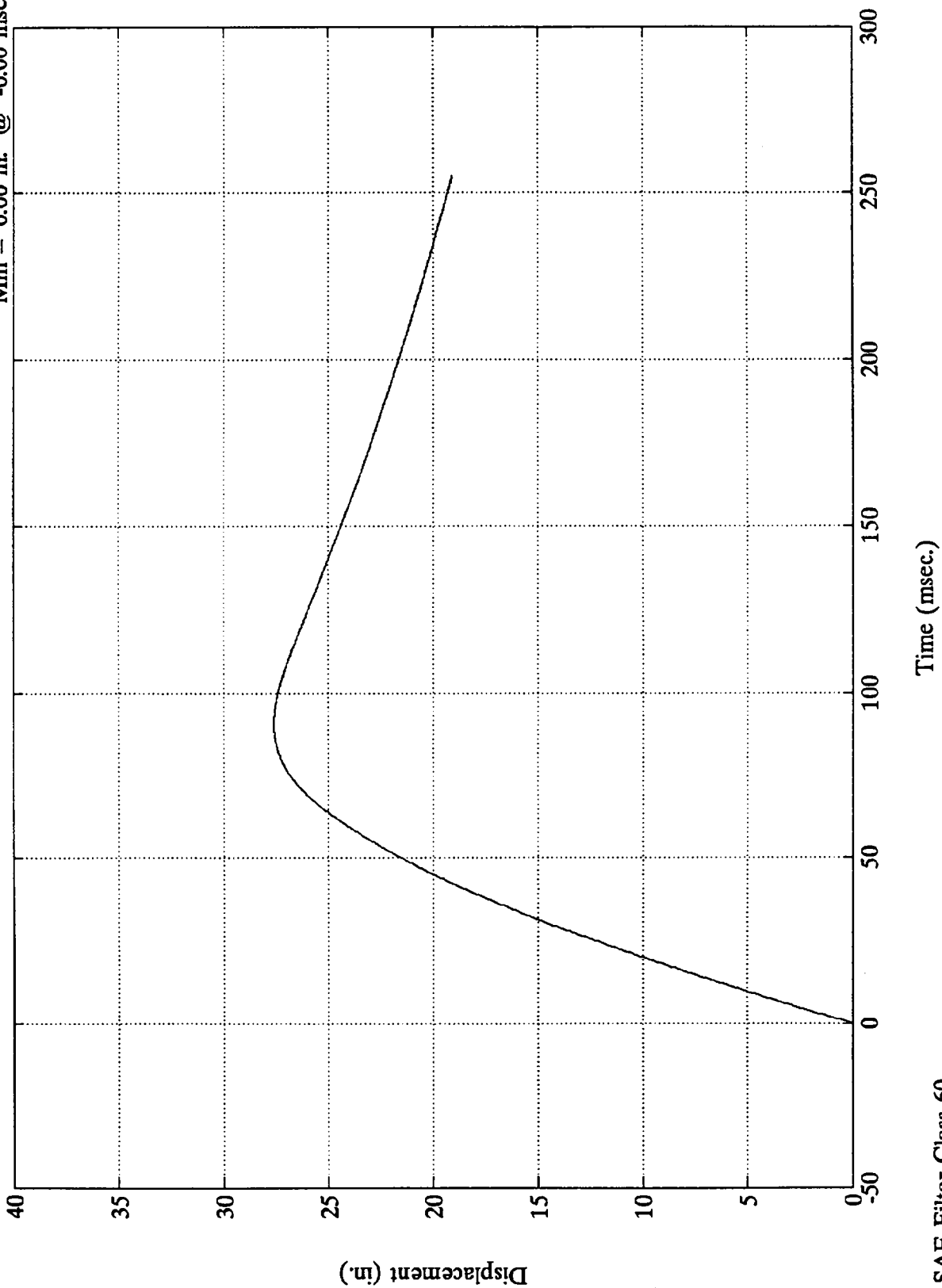


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

L. Rear X-member X (#1)

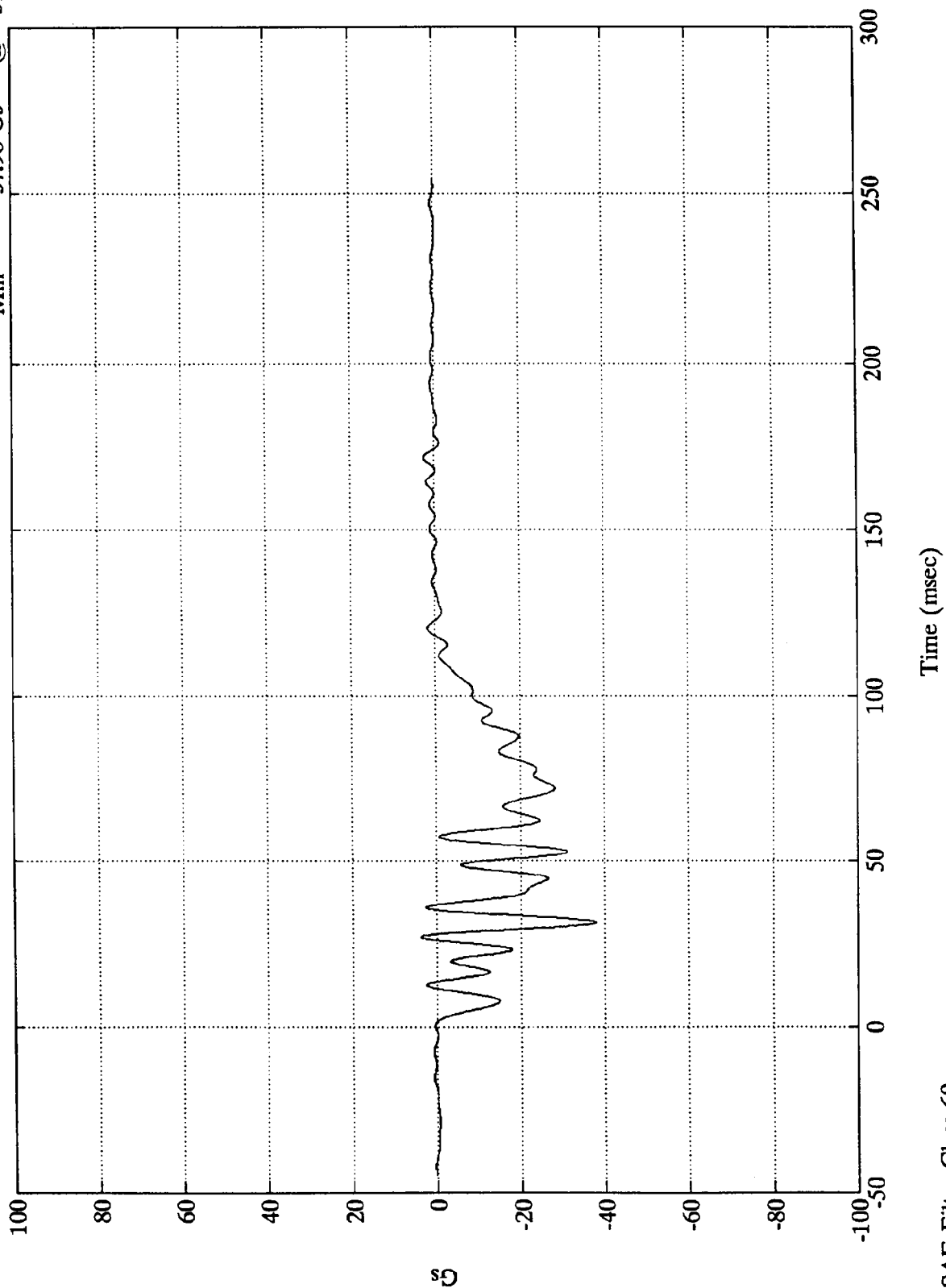
Max = 27.60 in. @ 91.68 msec
Min = 0.00 in. @ -0.00 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

R. Rear X-member X (#2)

Max = 3.78 Gs @ 26.87 msec
Min = -37.98 Gs @ 31.19 msec

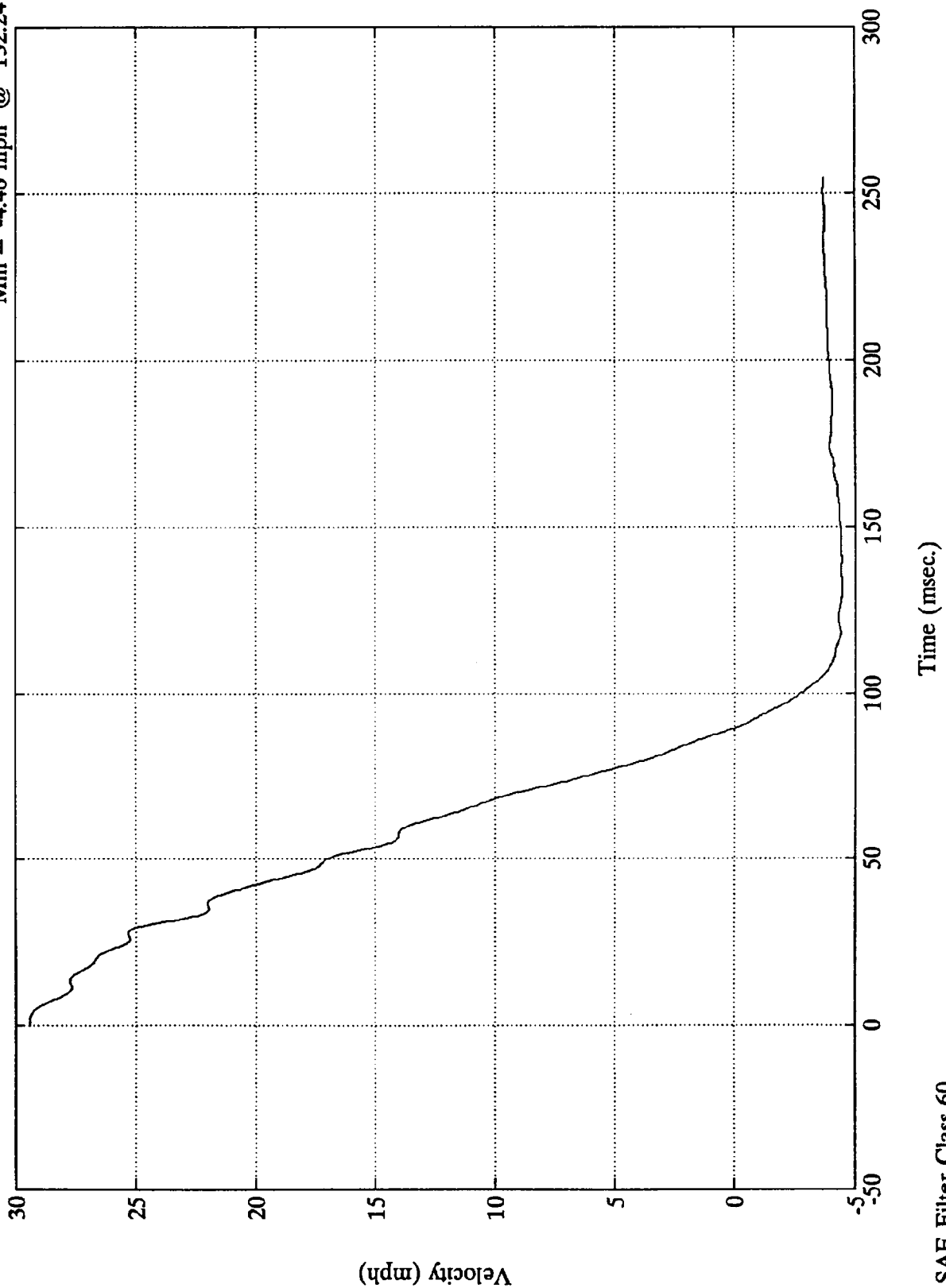


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

R. Rear X-member X (#2)

Max = 29.41 mph @ 1.44 msec
Min = -4.46 mph @ 132.24 msec

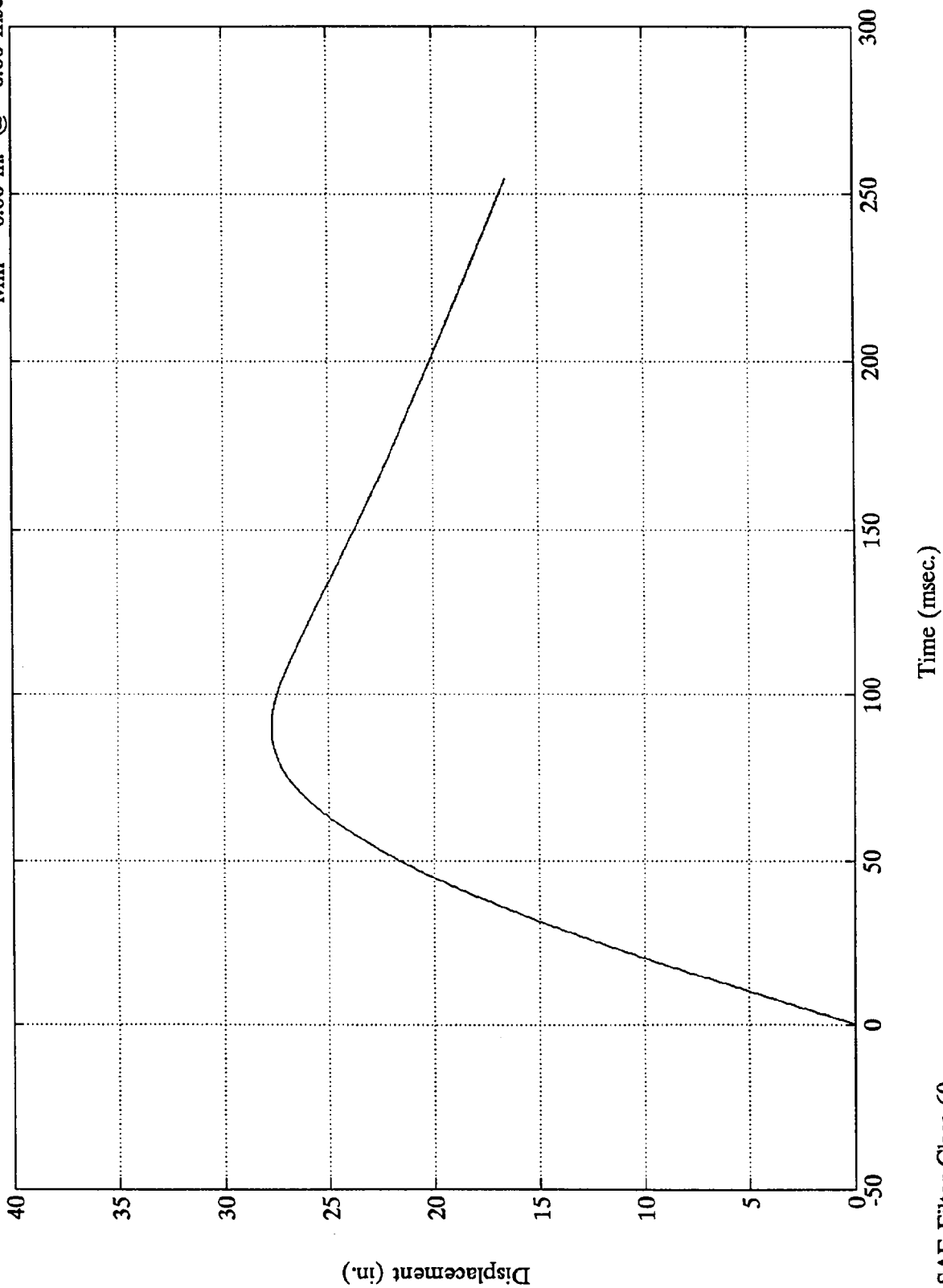


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

R. Rear X-member X (#2)

Max = 27.72 in. @ 90.96 msec
Min = 0.00 in. @ -0.00 msec

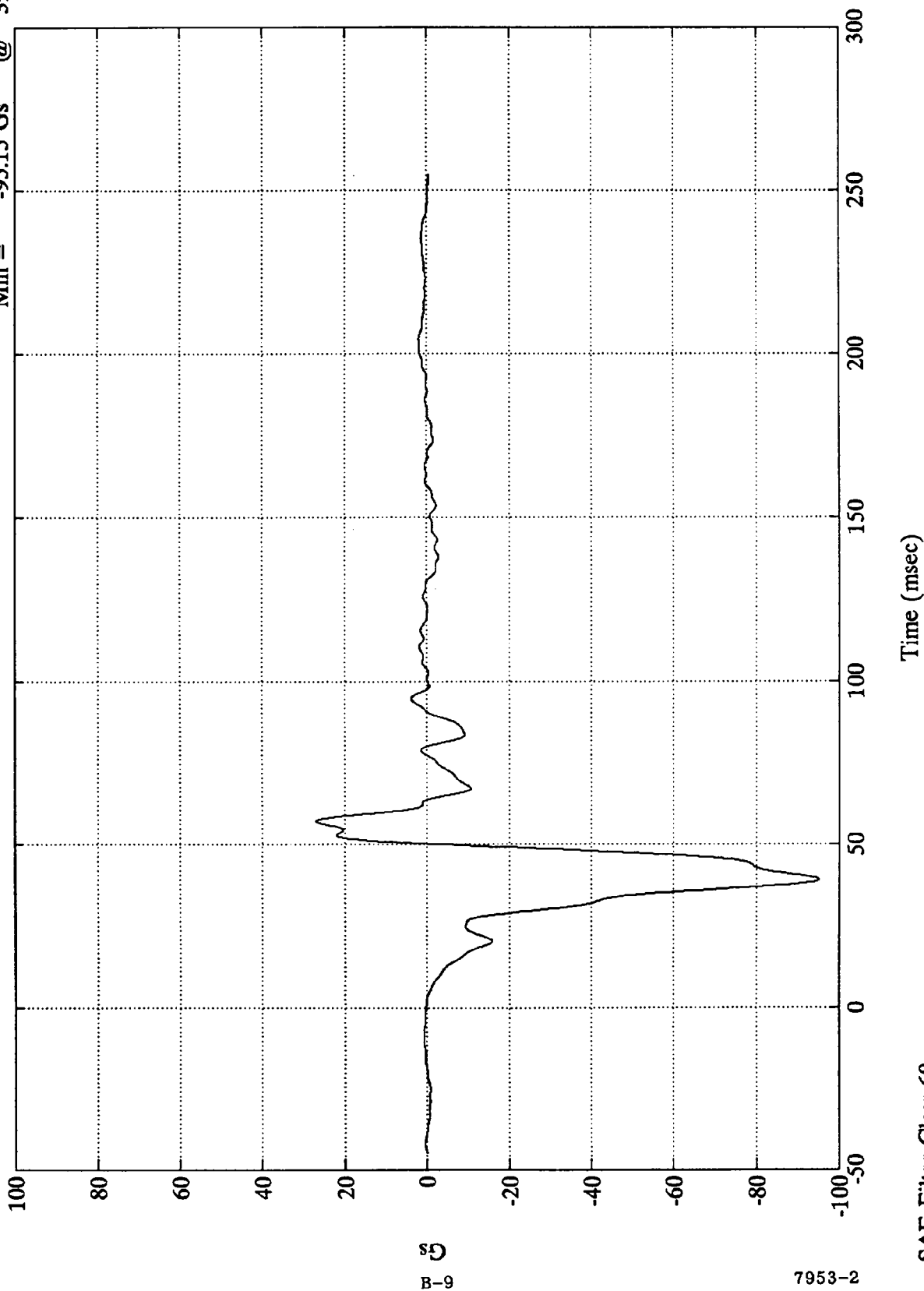


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Max = 26.99 Gs @ 57.11 msec
Min = -95.15 Gs @ 39.11 msec

Engine Top X (#3)



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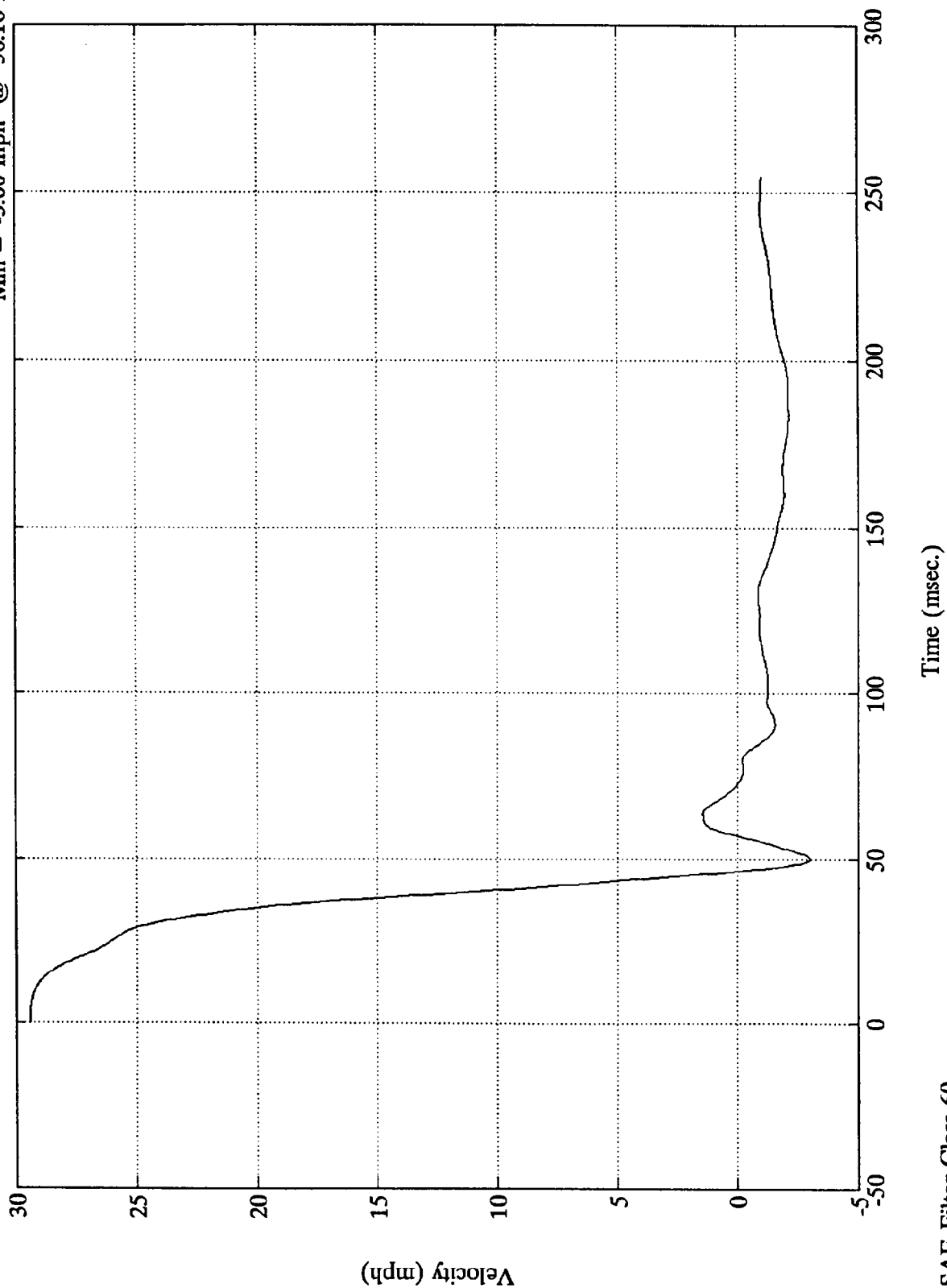
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SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Max = 29.41 mph @ 4.08 msec
Min = -3.00 mph @ 50.16 msec

Engine Top X (#3)

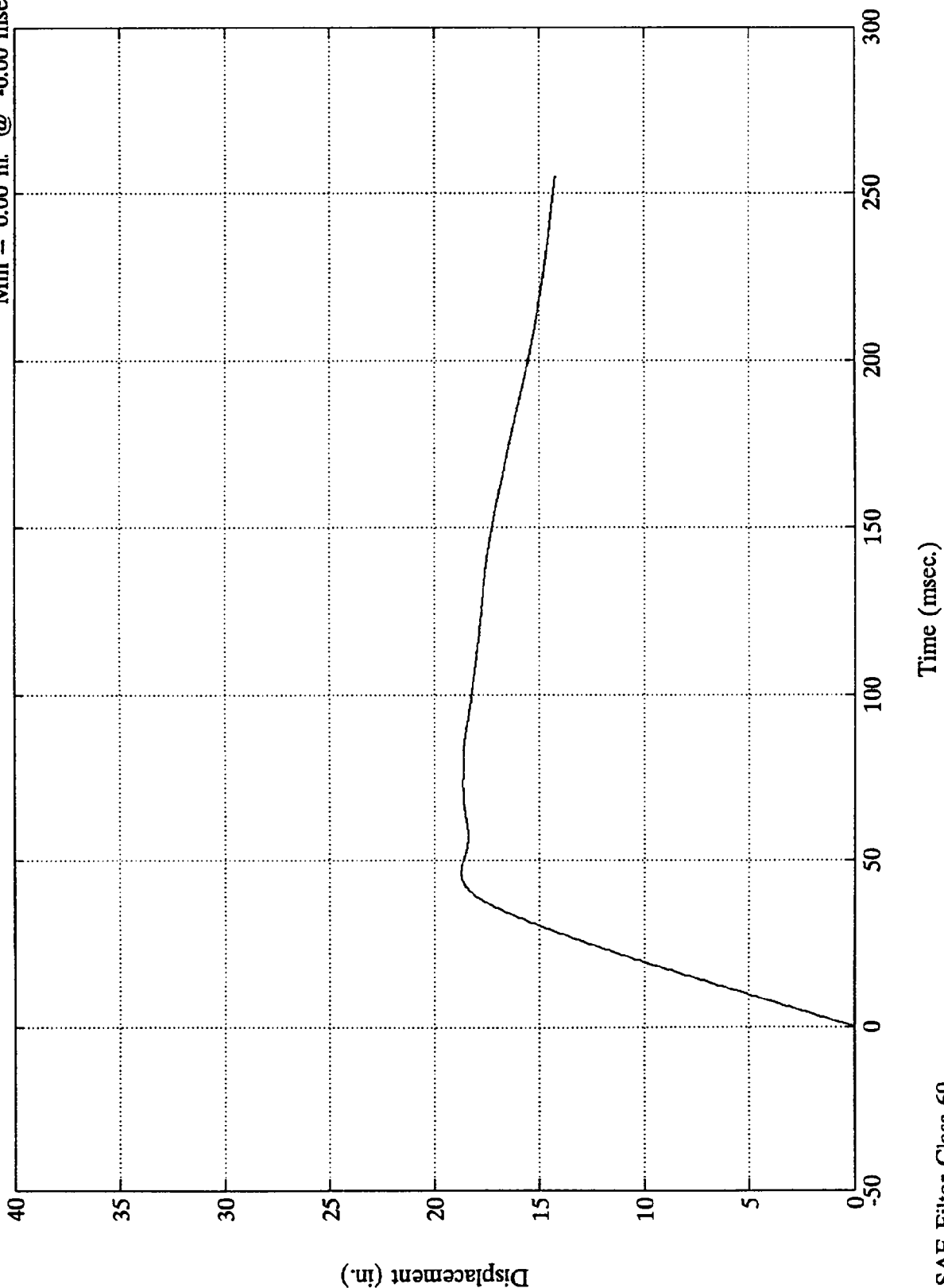


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Engine Top X (#3)

Max = 18.74 in. @ 47.04 msec
Min = 0.00 in. @ -0.00 msec

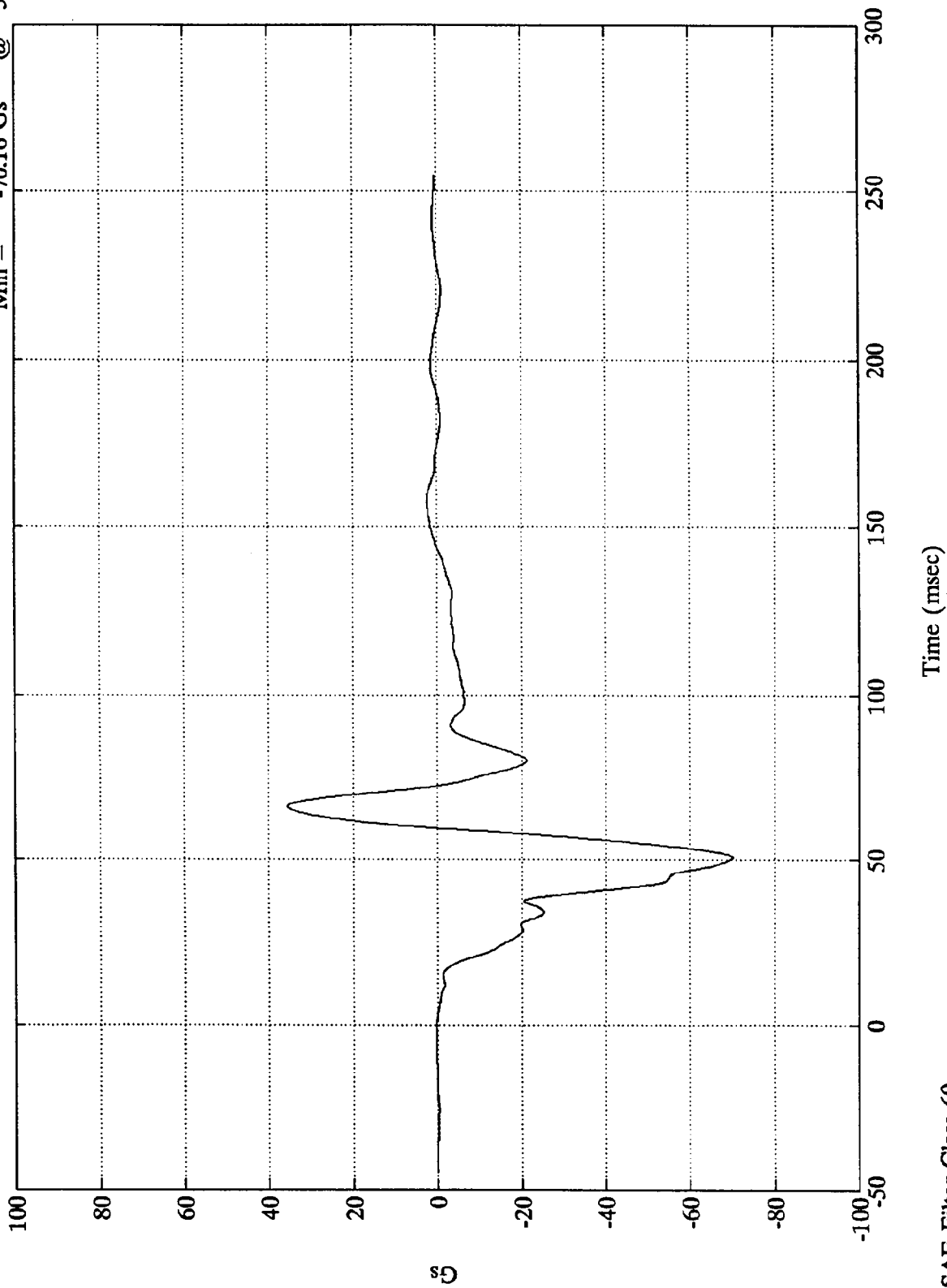


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Engine Bottom X (#4)

Max = 35.58 Gs @ 66.23 msec
Min = -70.16 Gs @ 50.76 msec



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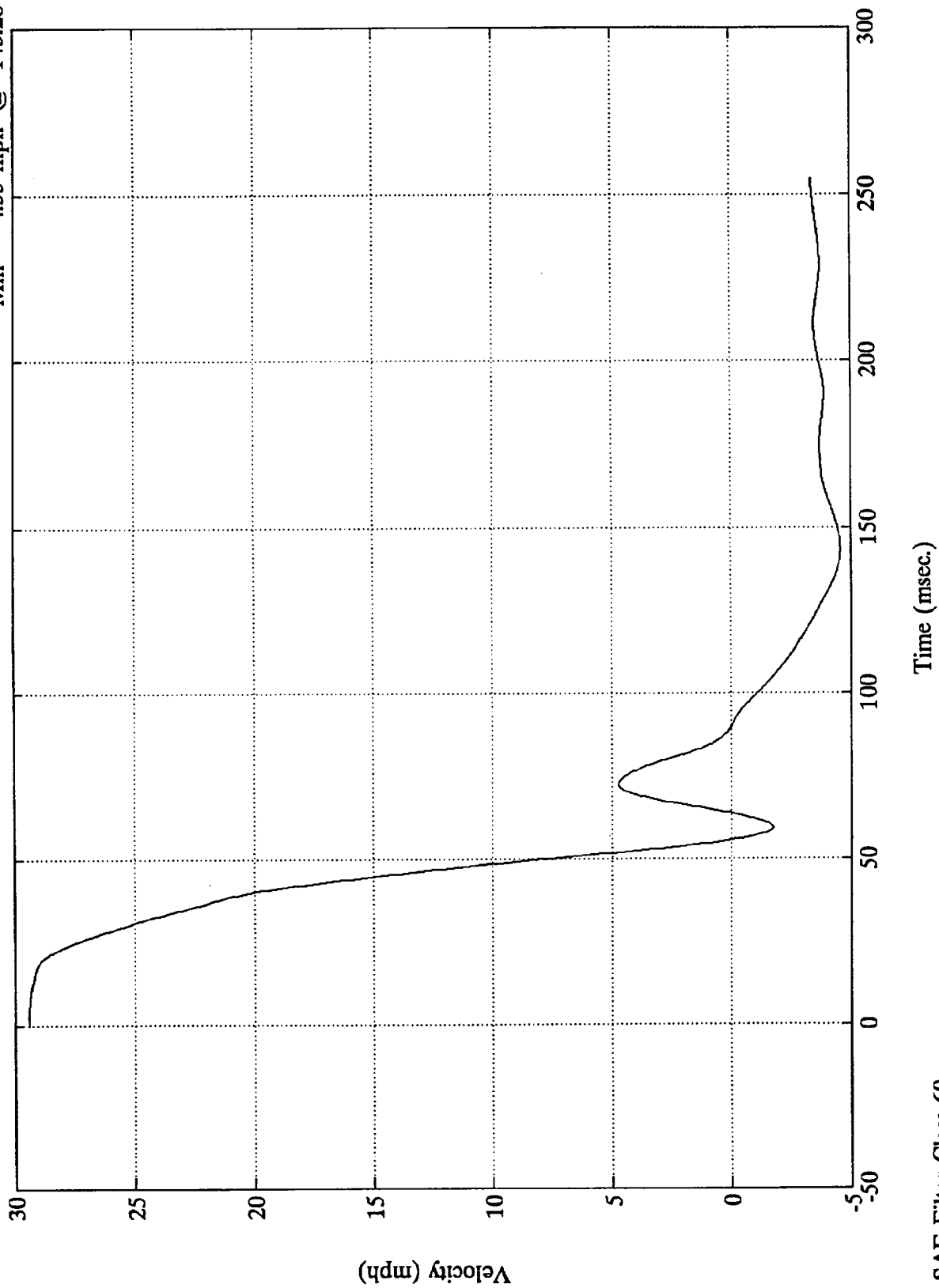
7953-2

SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Engine Bottom X (#4)

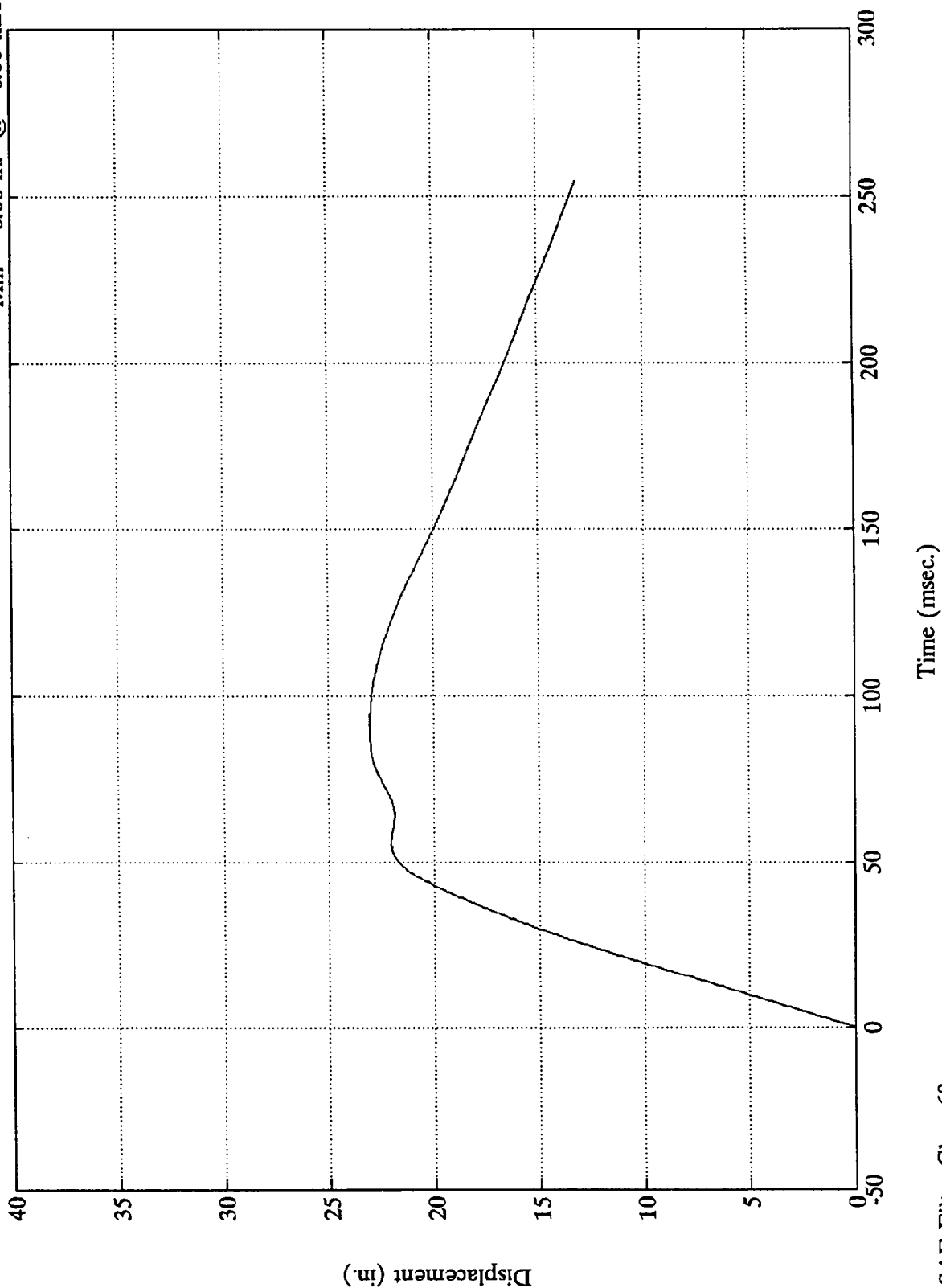
Max = 29.41 mph @ 4.56 msec
Min = -4.55 mph @ 143.28 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Engine Bottom X (#4)

Max = 23.04 in. @ 92.64 msec
Min = 0.00 in. @ -0.00 msec

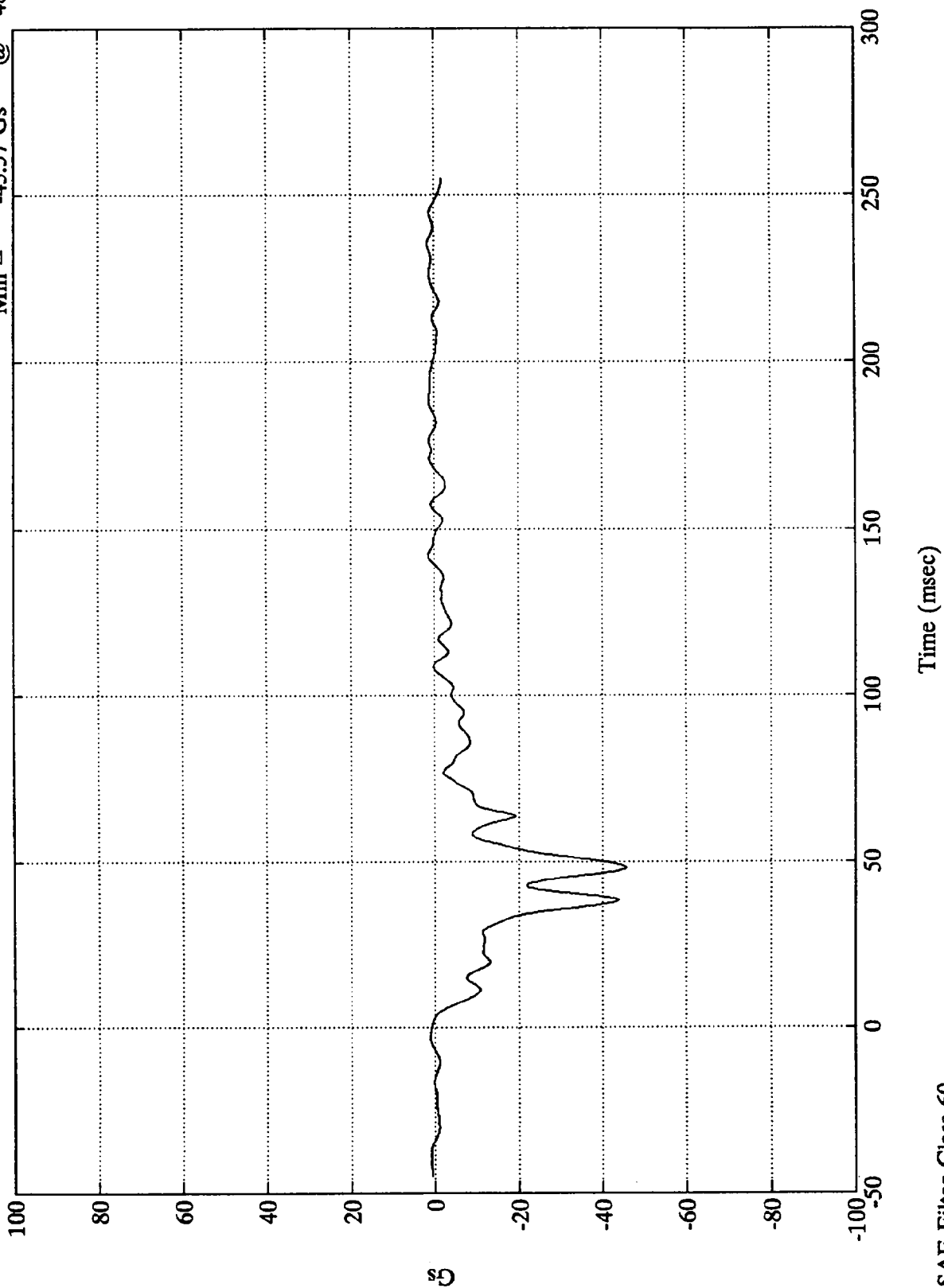


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

R. Brake Caliper X (#5)

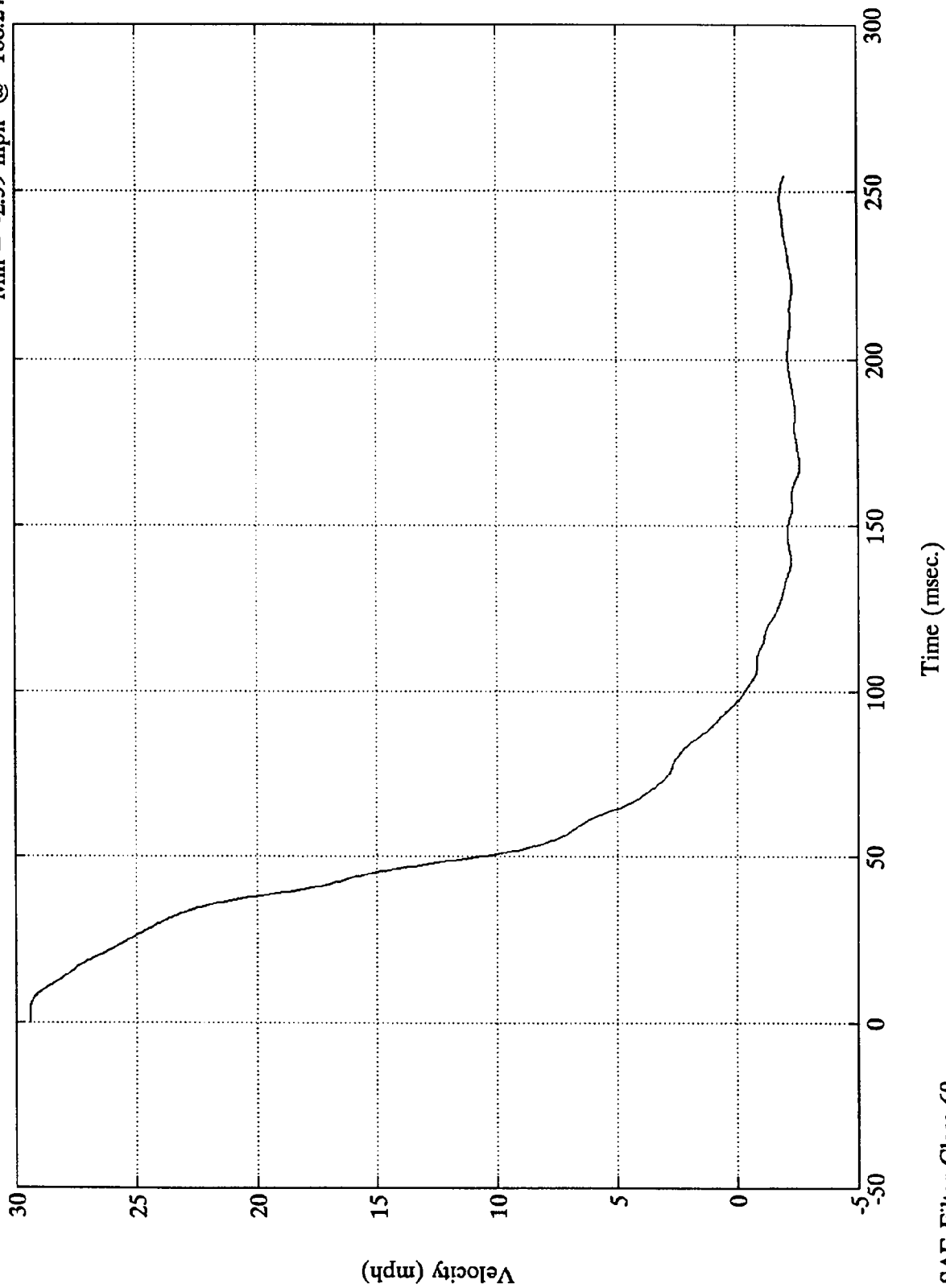
Max = 1.52 Gs @ 235.32 msec
Min = -45.57 Gs @ 48.24 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

R. Brake Caliper X (#5)

Max = 29.43 mph @ 4.08 msec
Min = -2.59 mph @ 168.24 msec

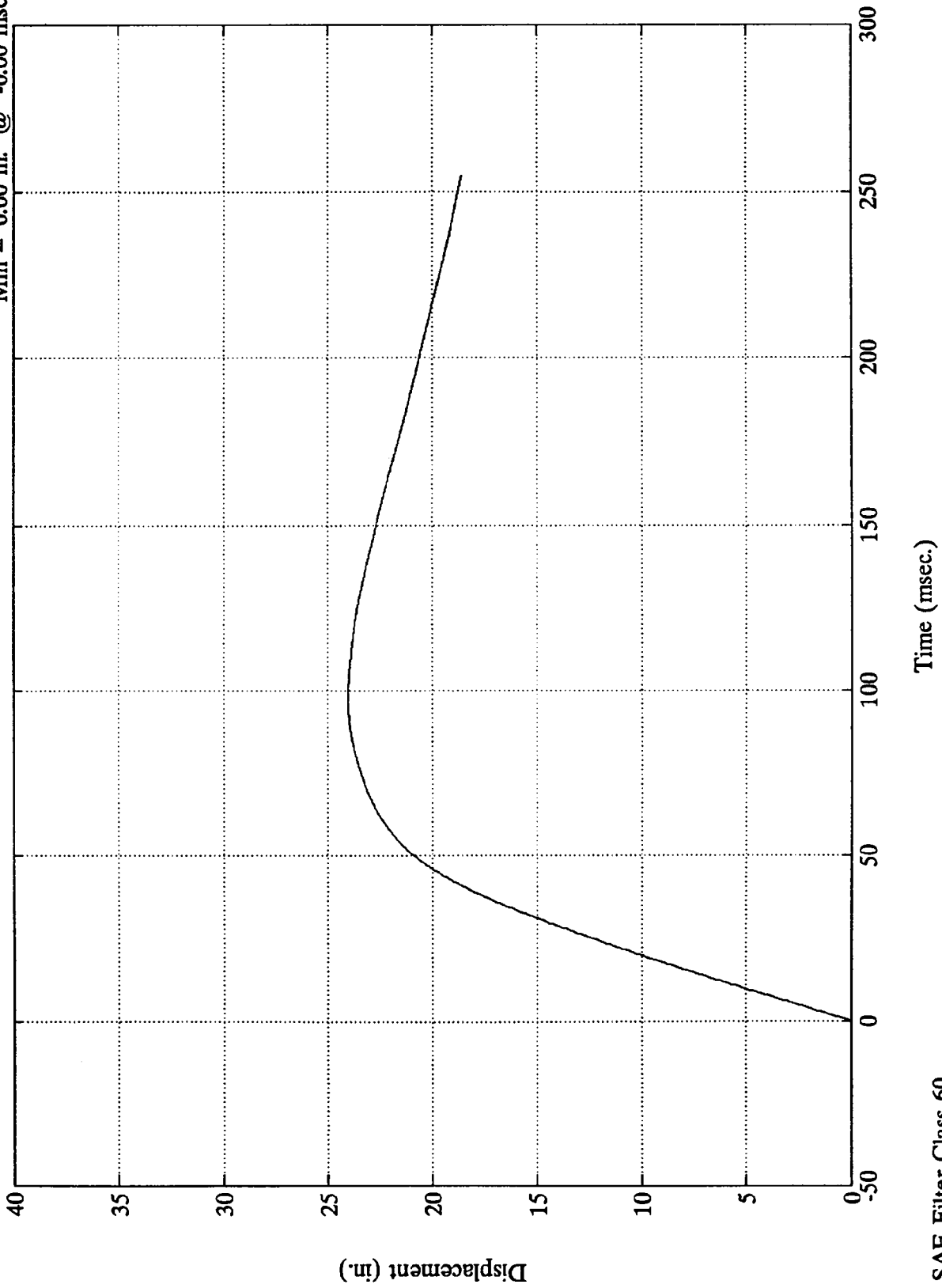


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

R. Brake Caliper X (#5)

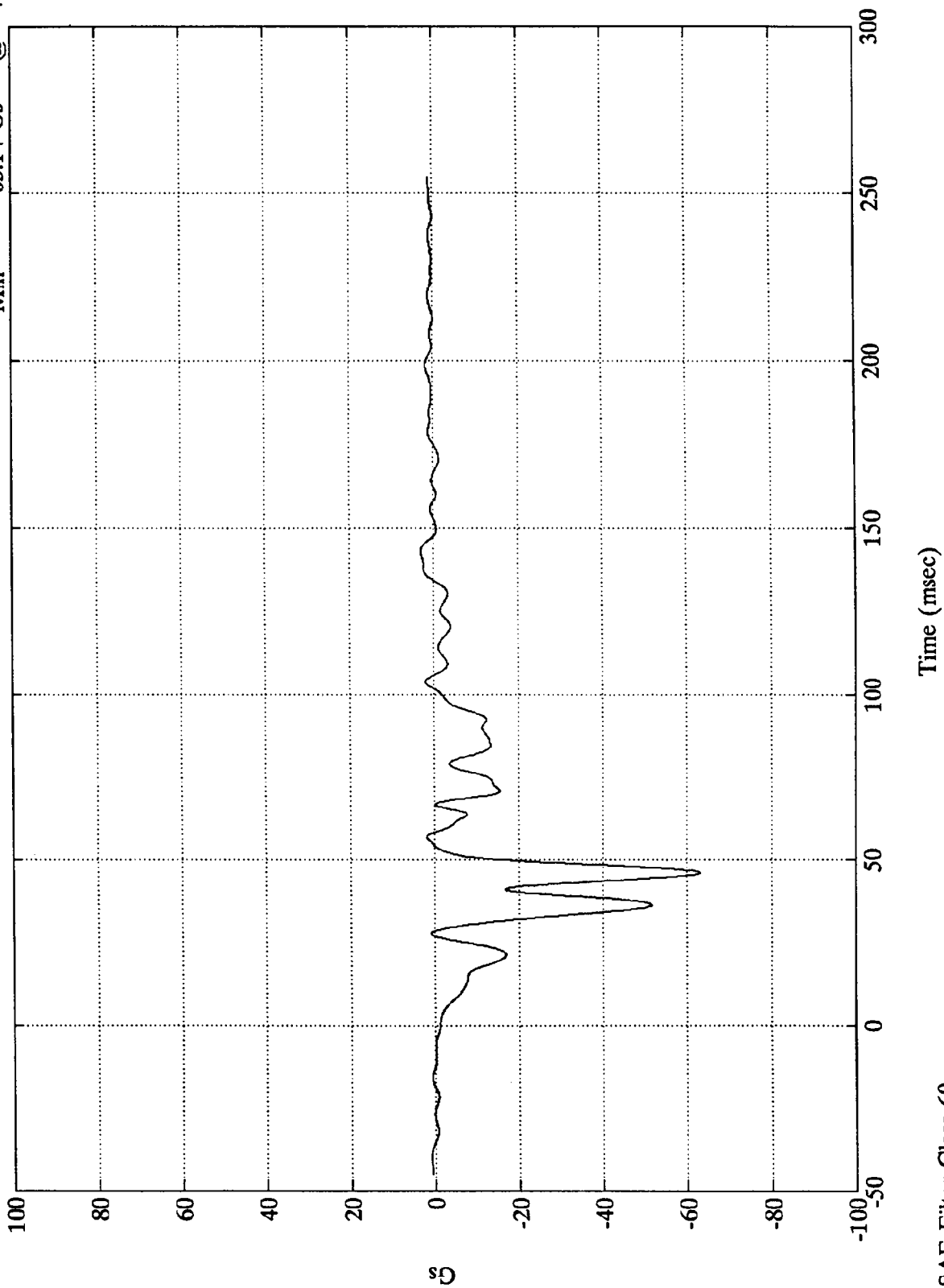
Max = 24.04 in. @ 98.64 msec
Min = 0.00 in. @ -0.00 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

L. Brake Caliper X (#6)

Max = 3.03 Gs @ 143.27 msec
Min = -63.14 Gs @ 46.20 msec

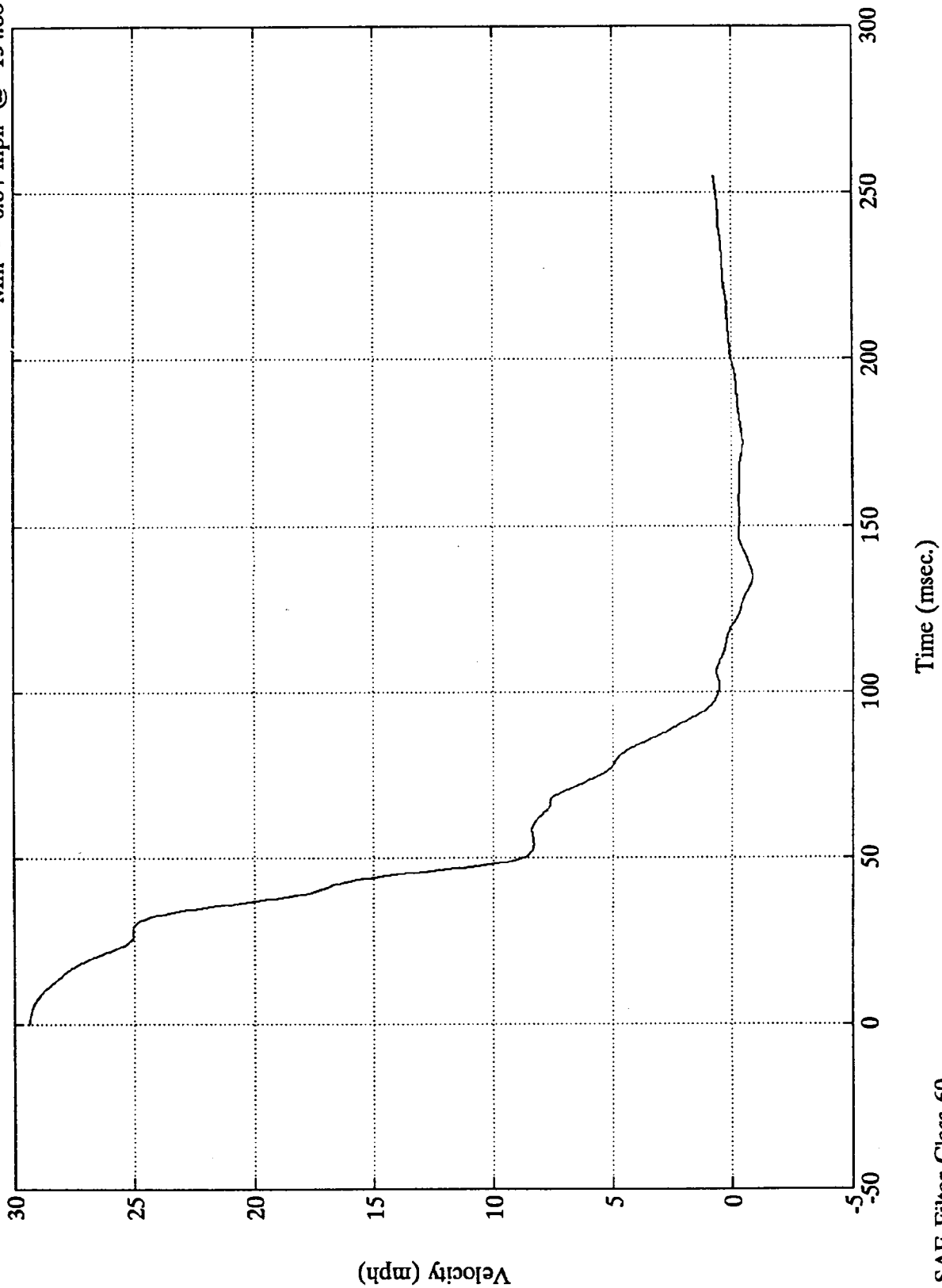


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

L. Brake Caliper X (#6)

Max = 29.40 mph @ -0.00 msec
Min = -0.84 mph @ 134.88 msec

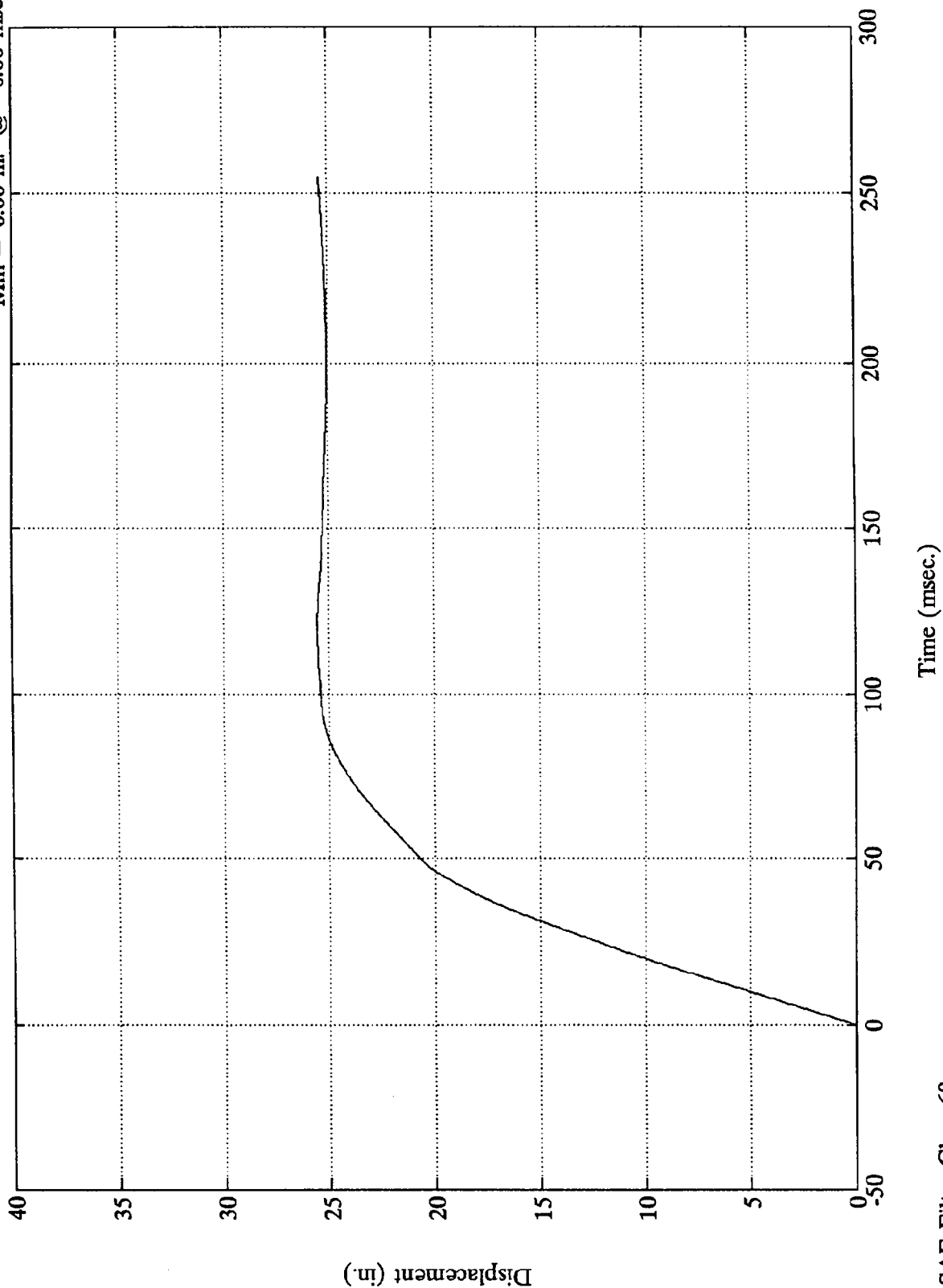


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

L Brake Caliper X (#6)

Max = 25.55 in. @ 122.40 msec
Min = 0.00 in. @ -0.00 msec

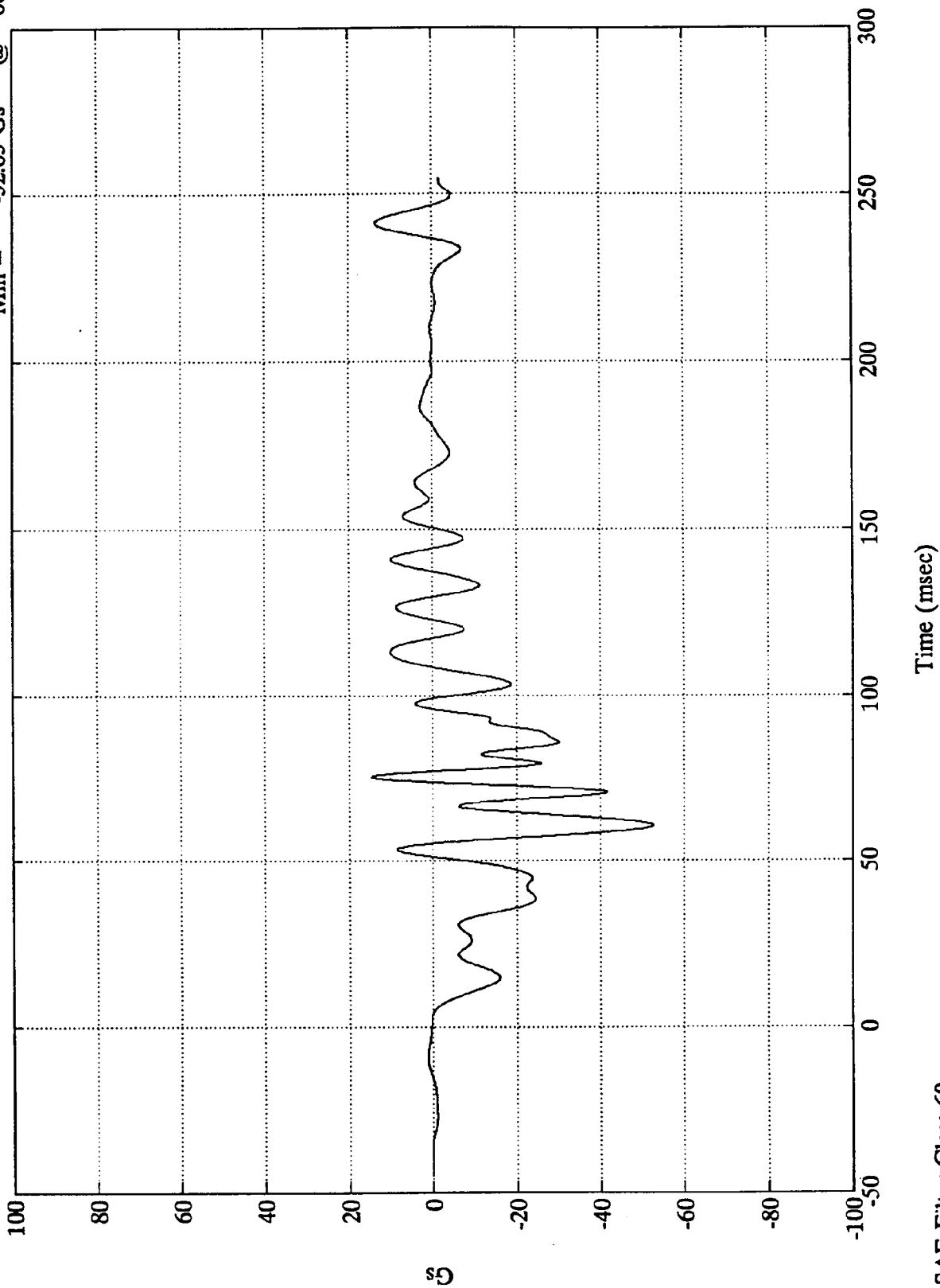


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Instrument Panel X (#7)

Max = 14.65 Gs @ 75.47 msec
Min = -52.65 Gs @ 60.48 msec

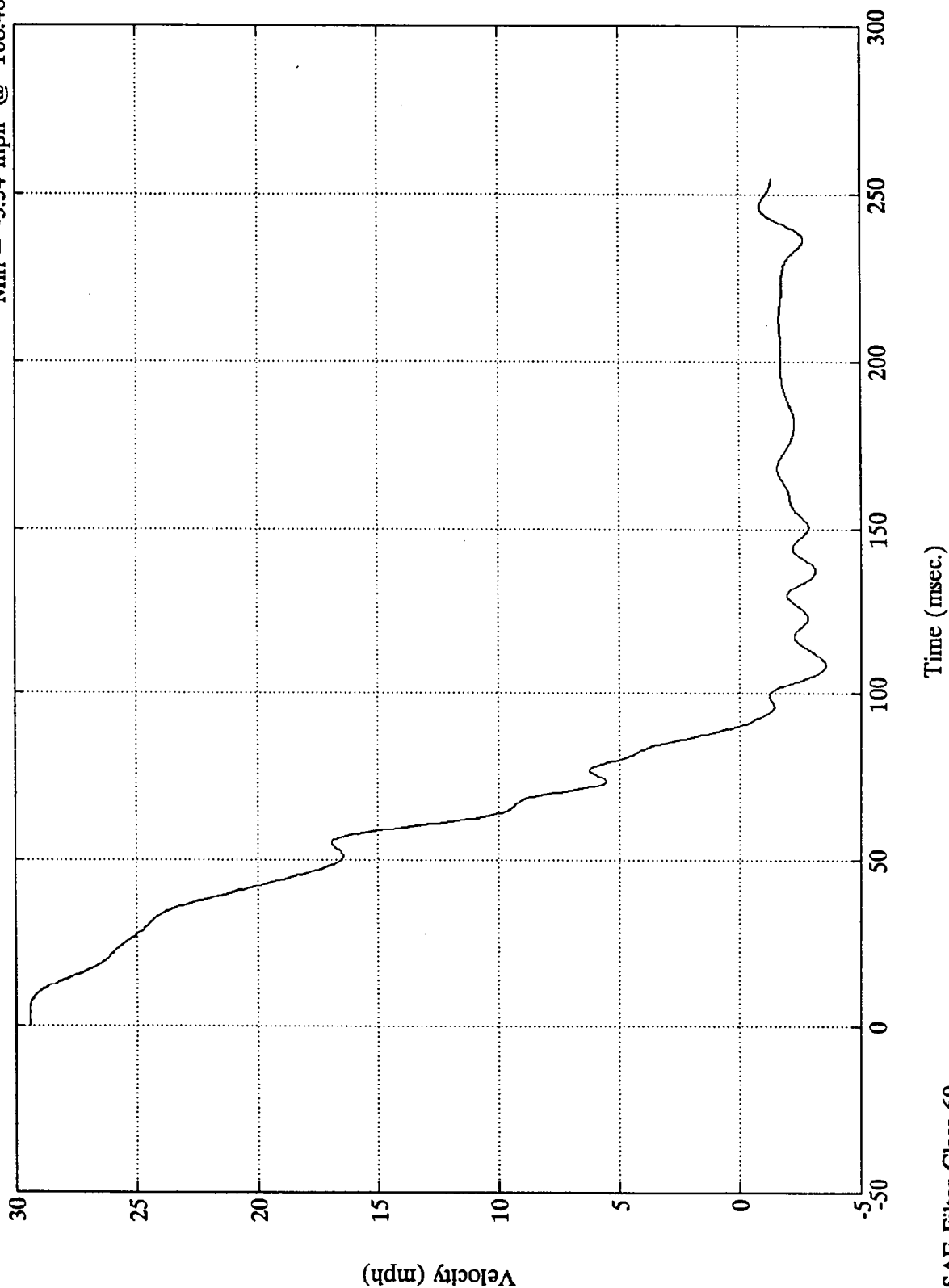


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Instrument Panel X (#7)

Max = 29.42 mph @ 5.04 msec
Min = -3.54 mph @ 108.48 msec

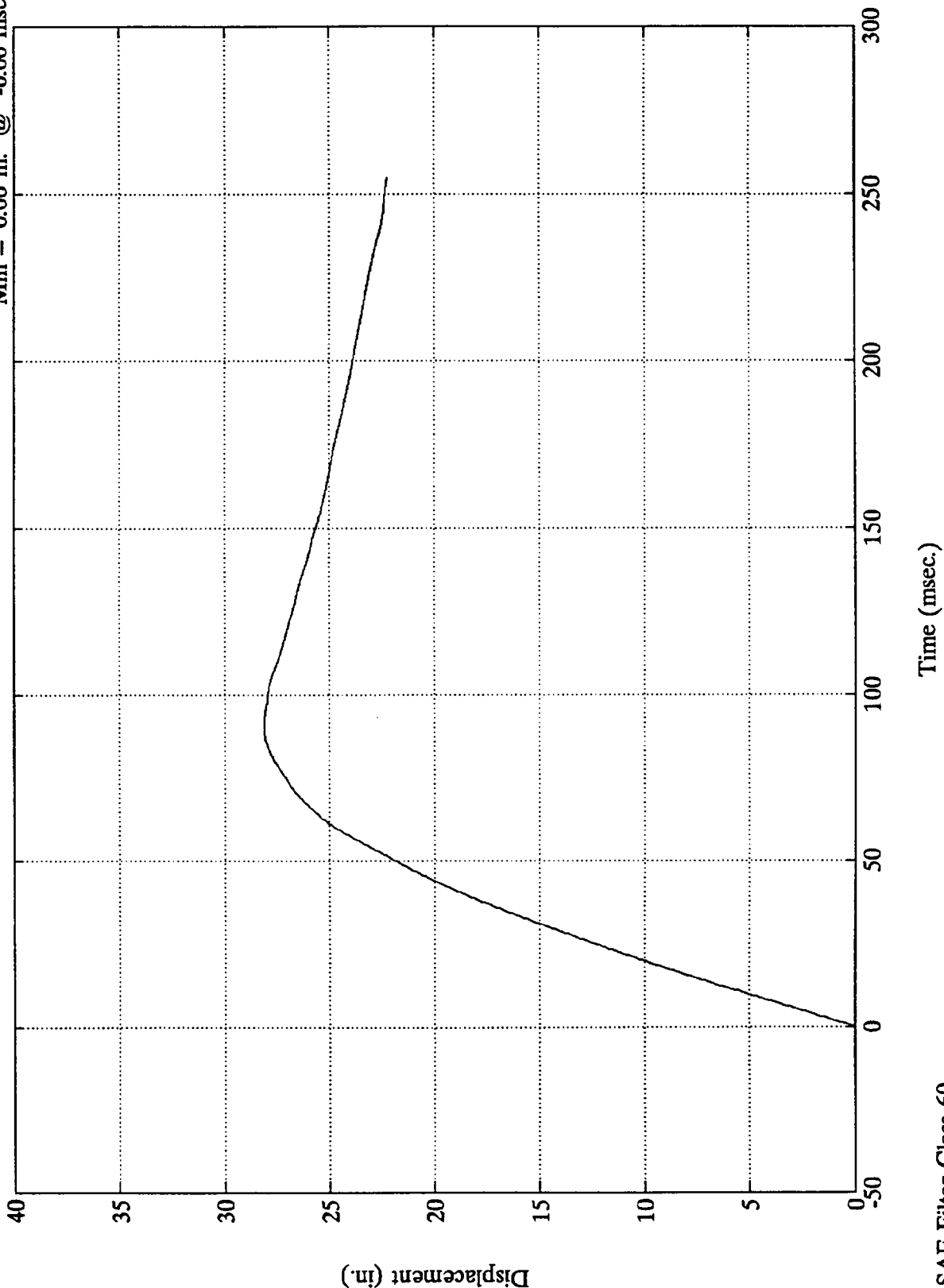


SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Instrument Panel X (#7)

Max = 28.11 in. @ 91.92 msec
Min = 0.00 in. @ -0.00 msec



SAE Filter Class 60

TEST NO. CN0108

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

FACILITY: TRACK
RUN #: 1134
SERIES #: 6

TEST DATE: 12 Nov 1991

TITLE: NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

CLIP SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 36.393 G's
Tstart = 80.2800 ms
Tend = 83.4000 ms
CSI = 276.947

HIC SUMMARY: Pos. 1 Head Resultant

hic: 488.06
t1 = 77.160 msec
t2 = 113.040 msec
Average G's Over Hic Duration = 45.02

CLIP SUMMARY: Pos. 2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 32.514 G's
Tstart = 84.8400 ms
Tend = 87.9600 ms
CSI = 249.302

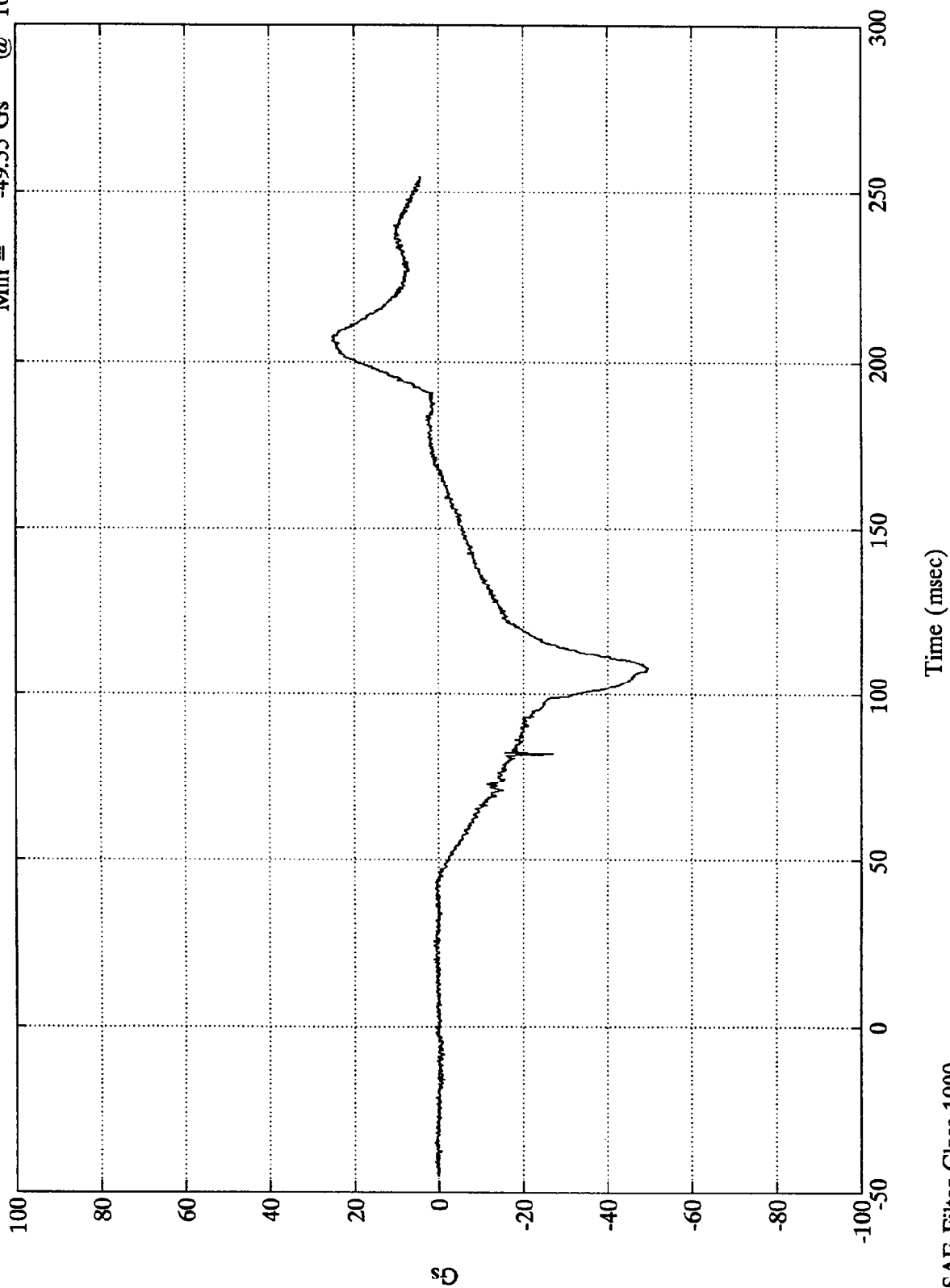
HIC SUMMARY: Pos. 2 Head Resultant

hic: 353.24
t1 = 84.960 msec
t2 = 120.840 msec
Average G's Over Hic Duration = 39.56

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Max = 25.04 Gs @ 207.48 msec
Min = -49.55 Gs @ 107.76 msec

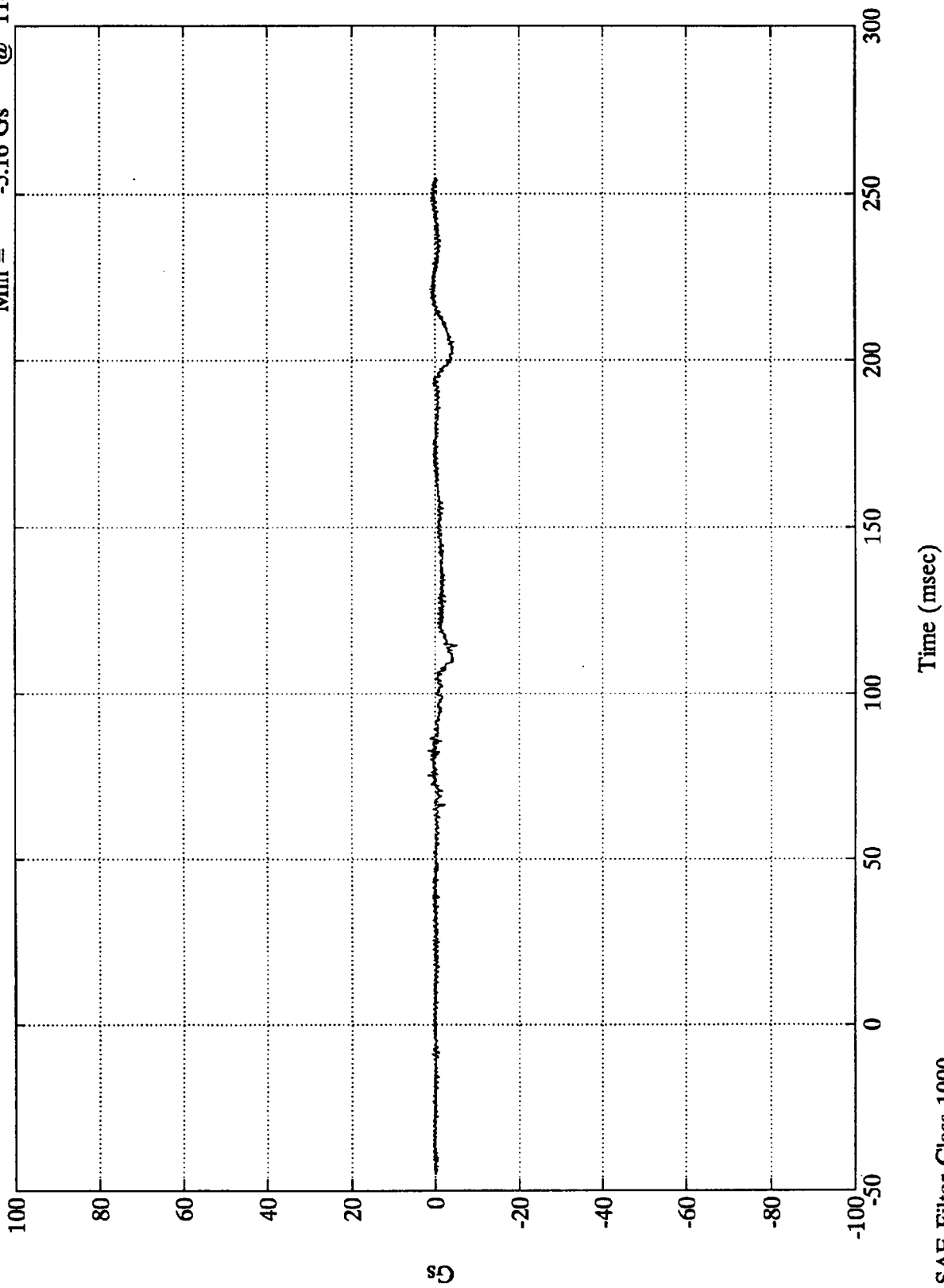
Pos. 1 Head X



SAE Filter Class 1000

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

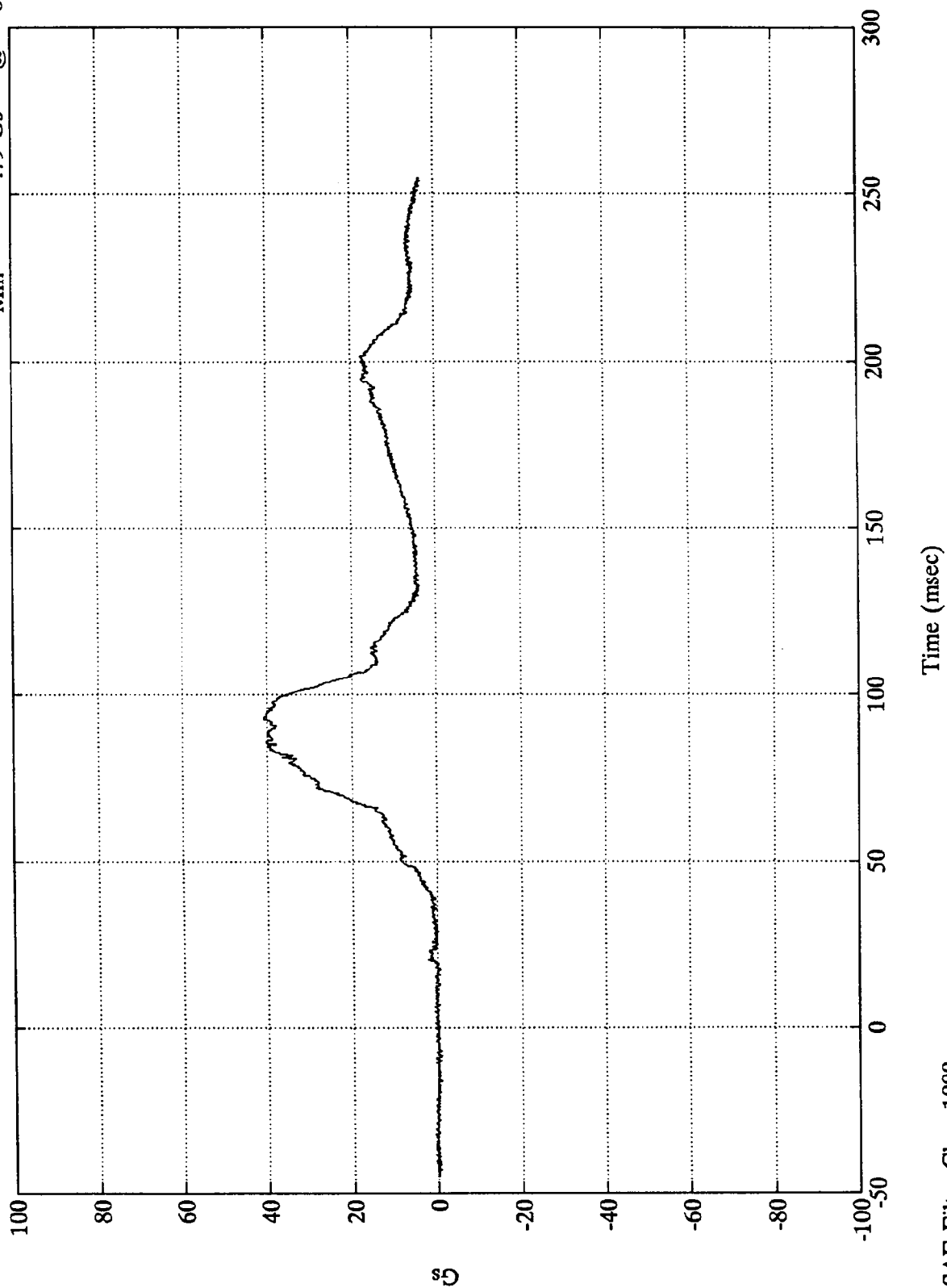
Pos. 1 Head Y
Max = 1.68 Gs @ 75.12 msec
Min = -5.16 Gs @ 114.60 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 1 Head Z

Max = 40.66 Gs @ 93.23 msec
Min = -7.9 Gs @ -6.96 msec

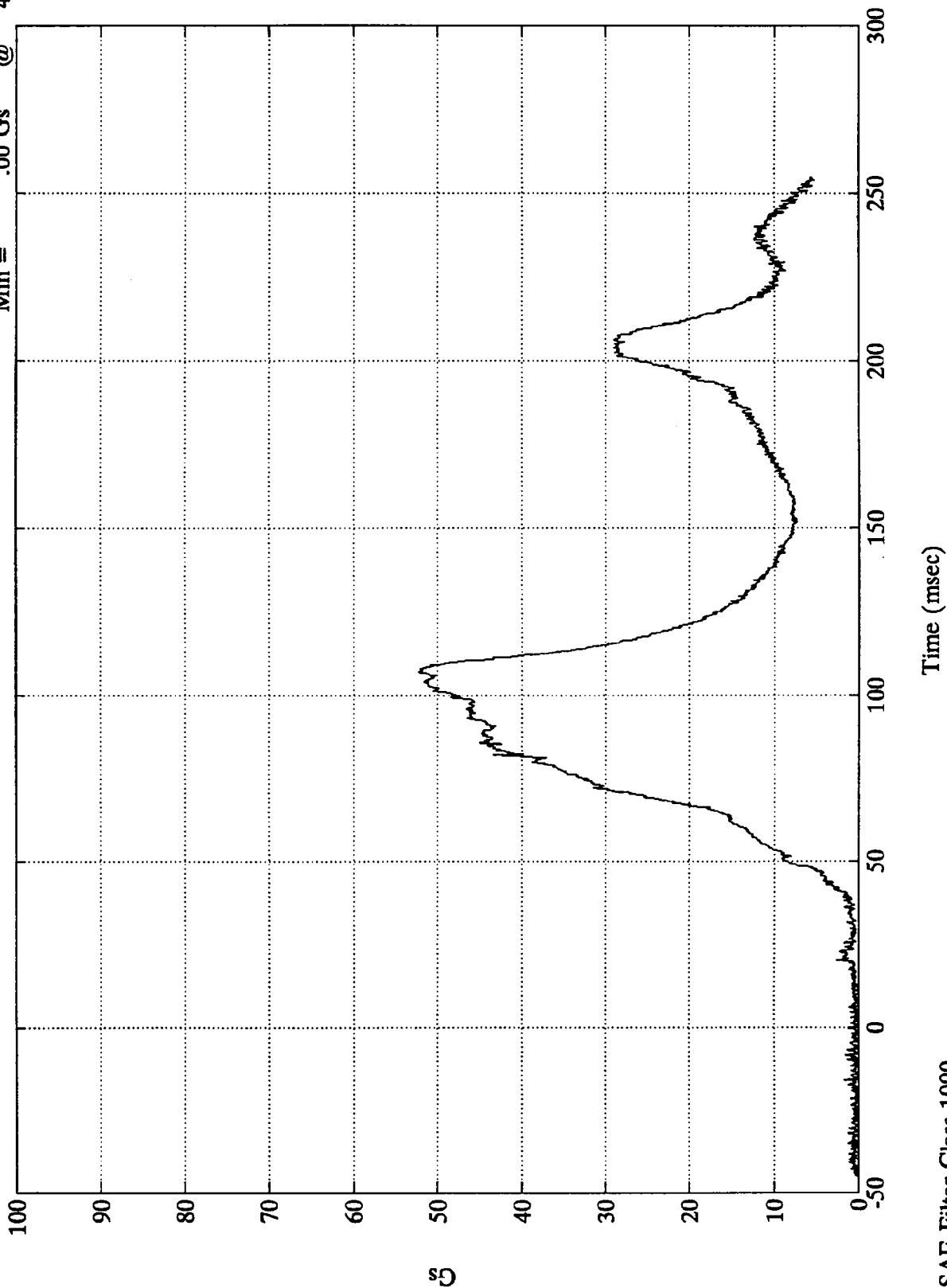


SAE Filter Class 1000

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 1 Head Resultant

Max = 52.21 Gs @ 106.92 msec
Min = .00 Gs @ 4.19 msec

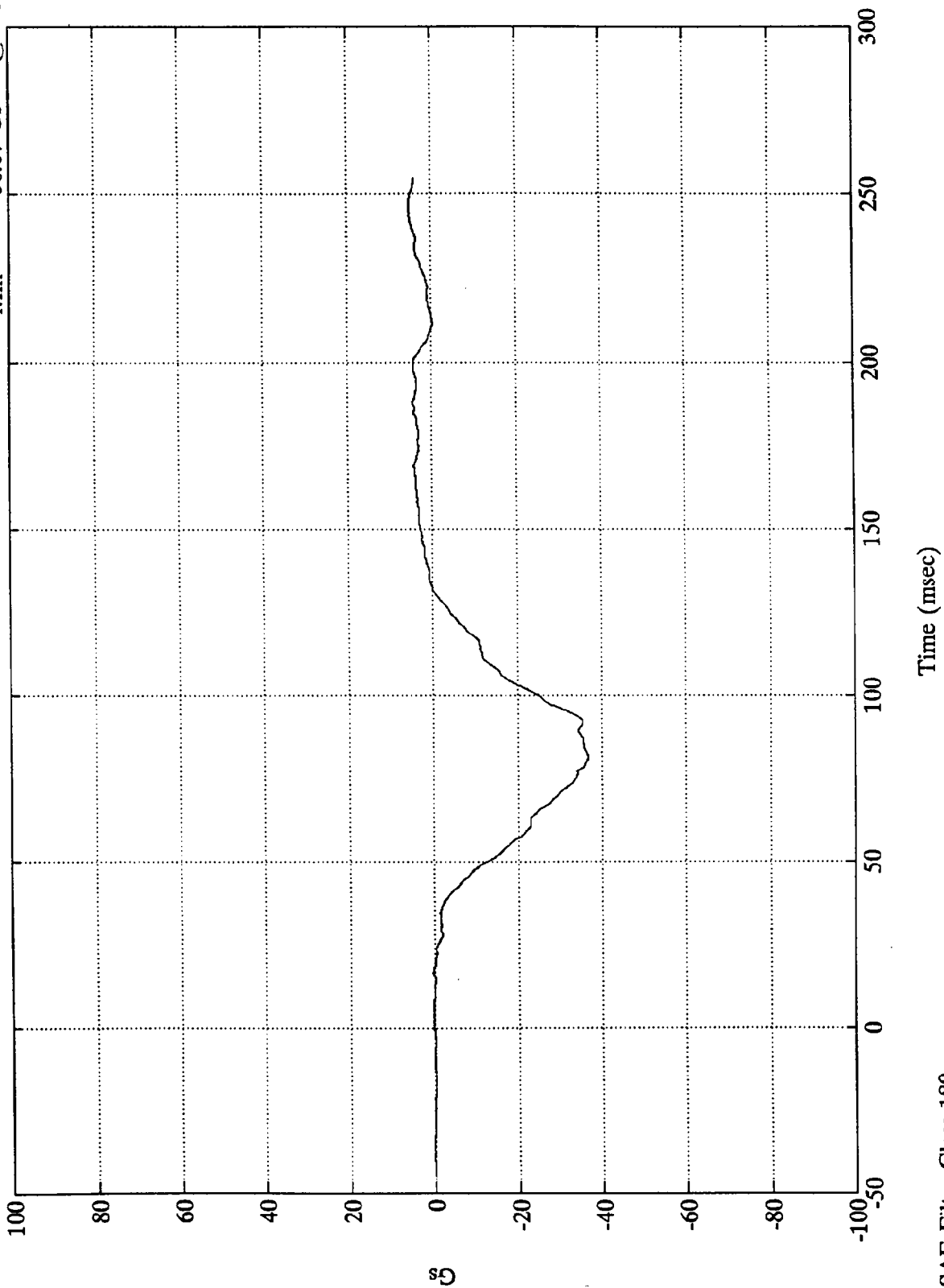


SAE Filter Class 1000

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Max = 5.18 Gs @ 246.36 msec
Min = -36.67 Gs @ 81.60 msec

Pos. 1 Chest X



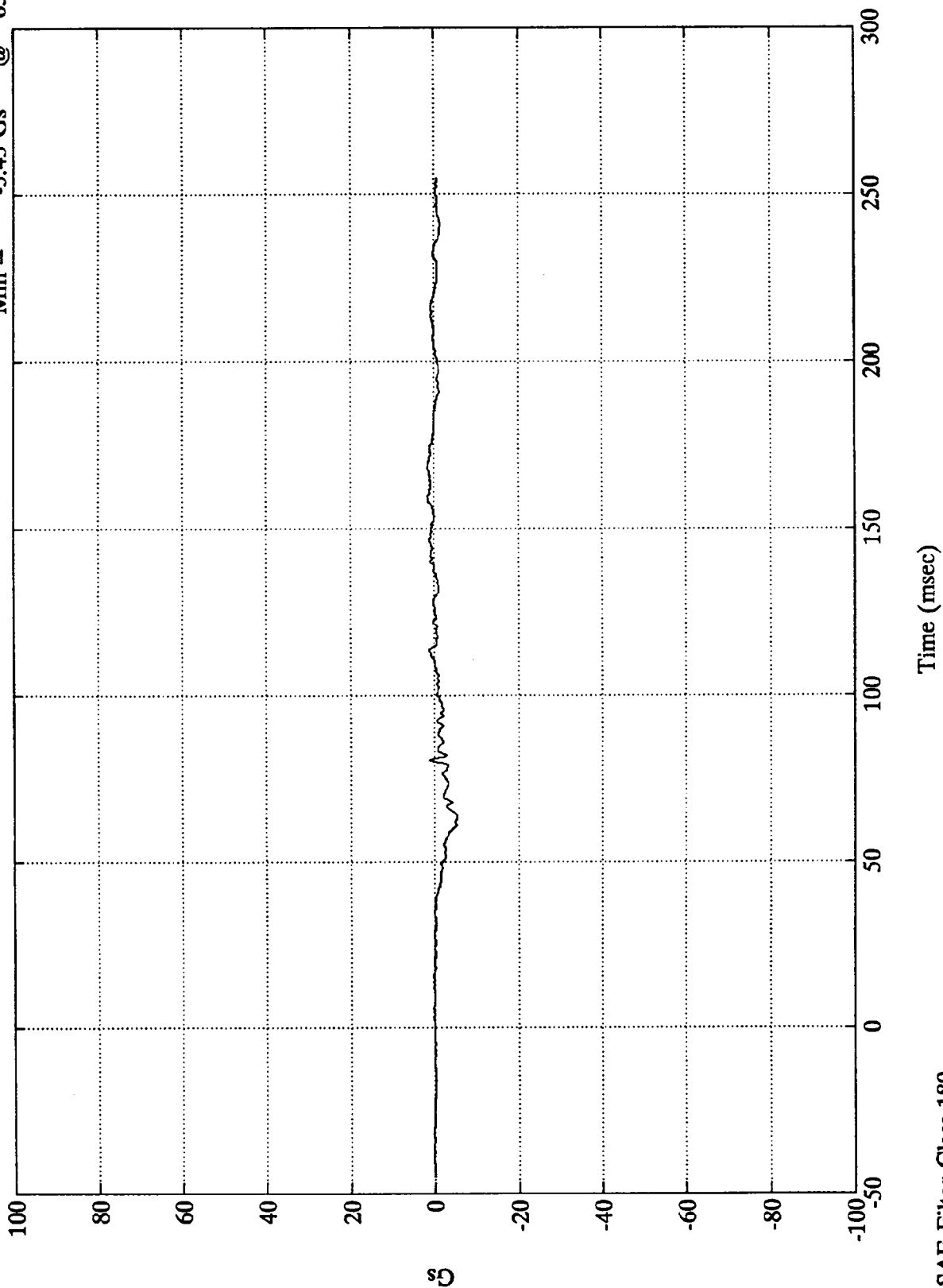
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SAE Filter Class 180

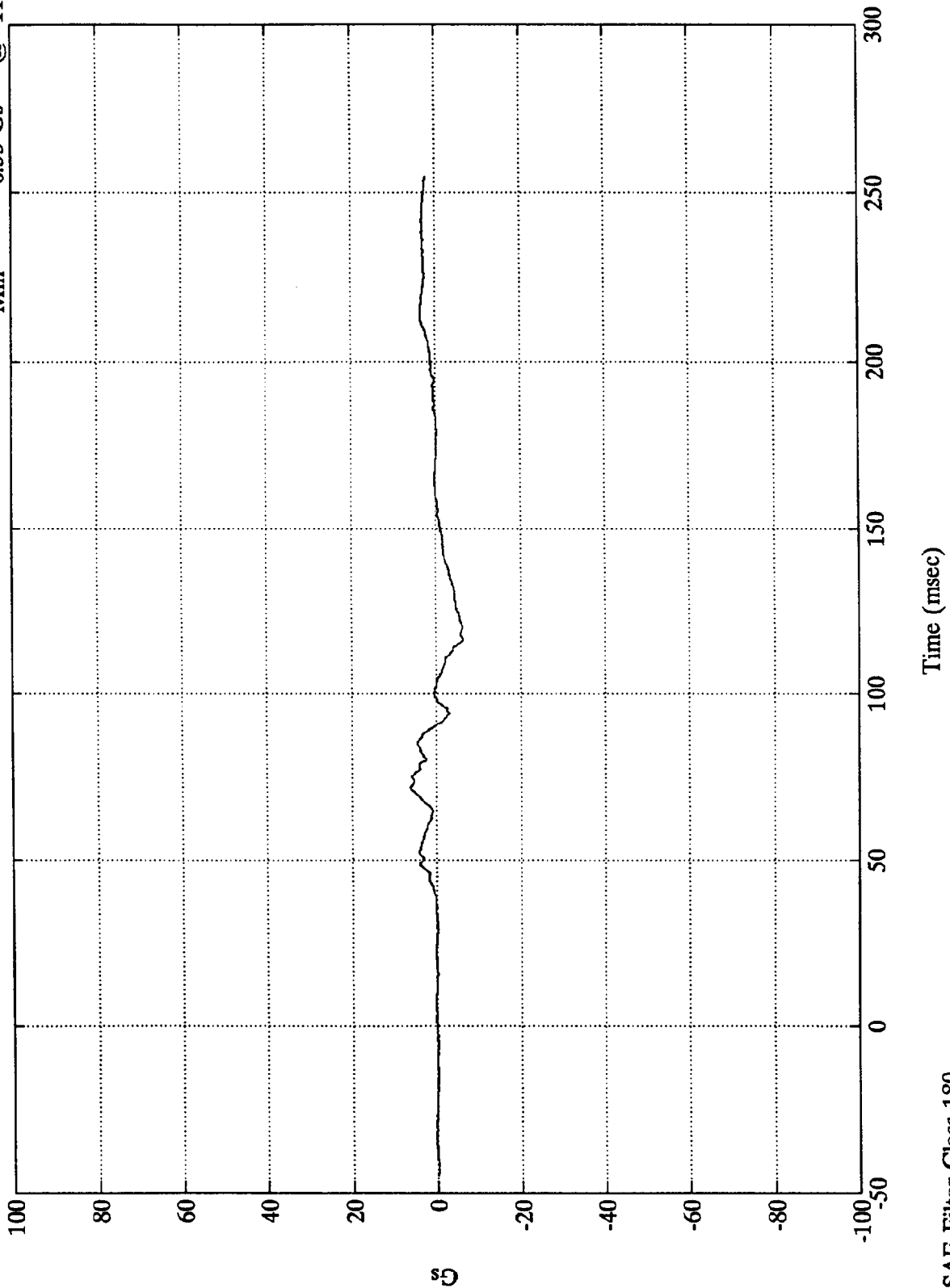
NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 1 Chest Y
Max = 1.60 Gs @ 168.24 msec
Min = -5.43 Gs @ 63.84 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 1 Chest Z
 Max = 6.22 Gs @ 71.63 msec
 Min = -6.53 Gs @ 116.28 msec

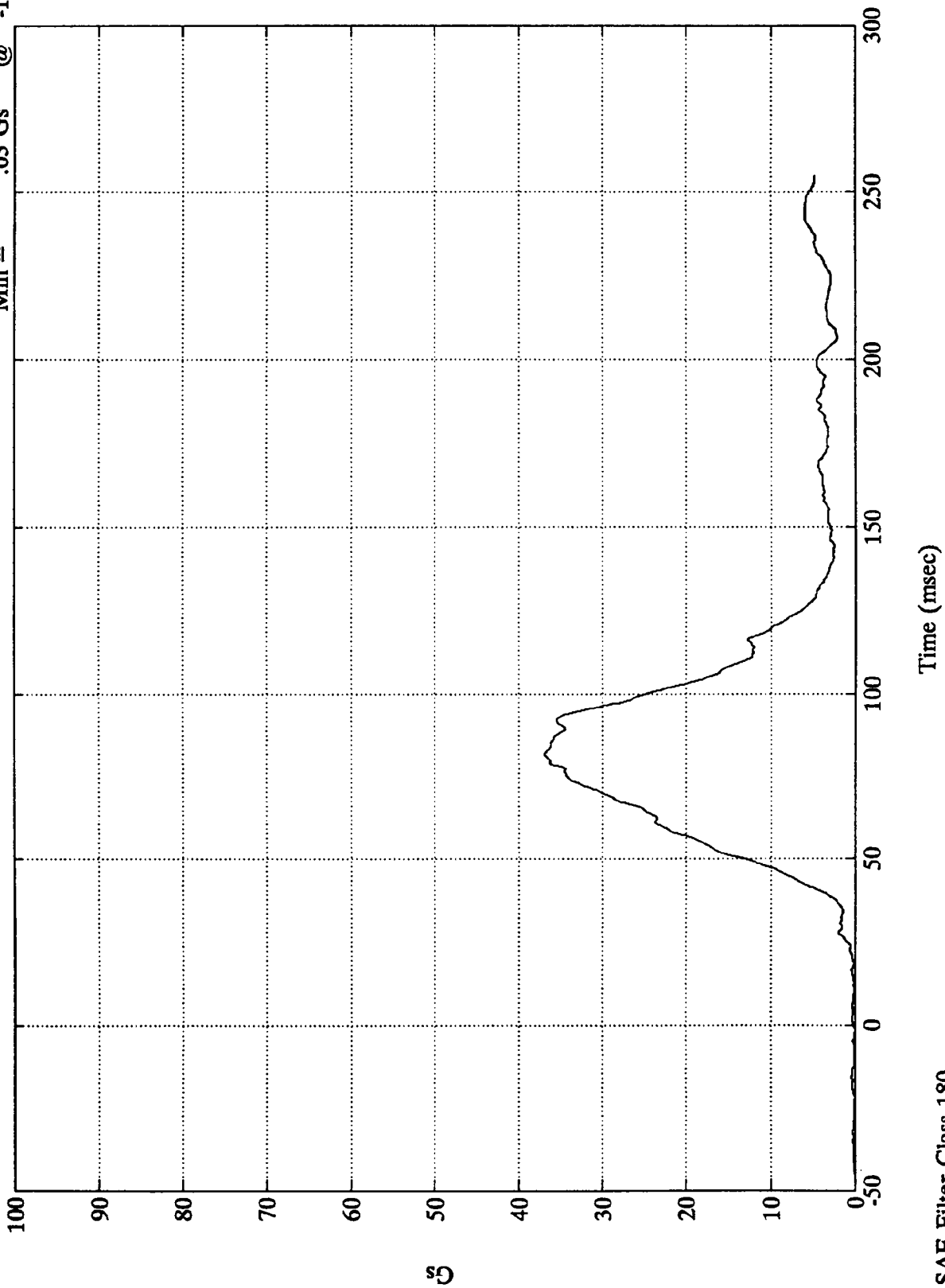


SAE Filter Class 180

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 1 Chest Resultant

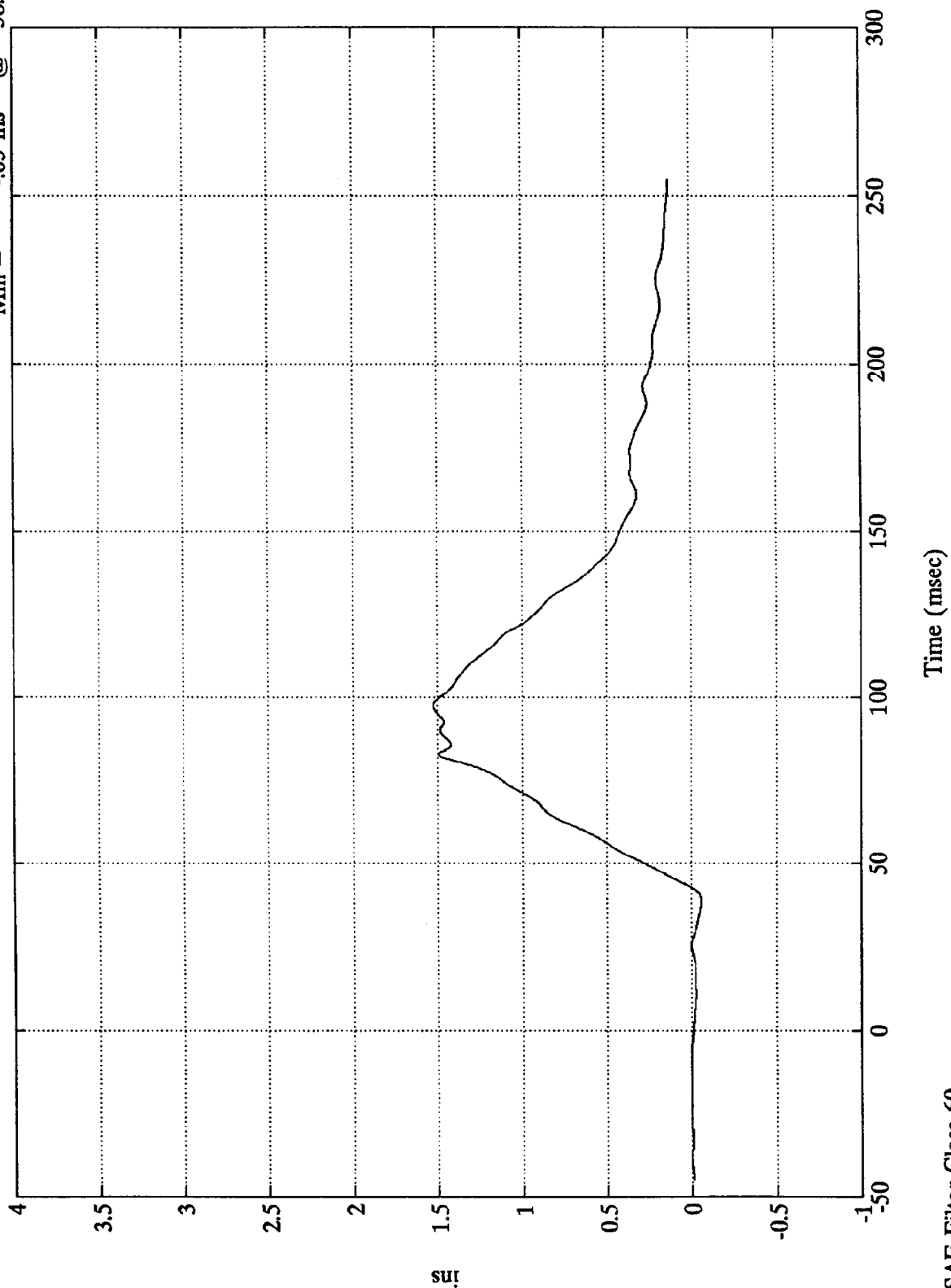
Max = 36.90 Gs @ 81.84 msec
Min = .03 Gs @ -1.68 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 1 Chest Disp.

Max = 1.52 ins @ 97.44 msec
Min = -.05 ins @ 38.63 msec



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B-34

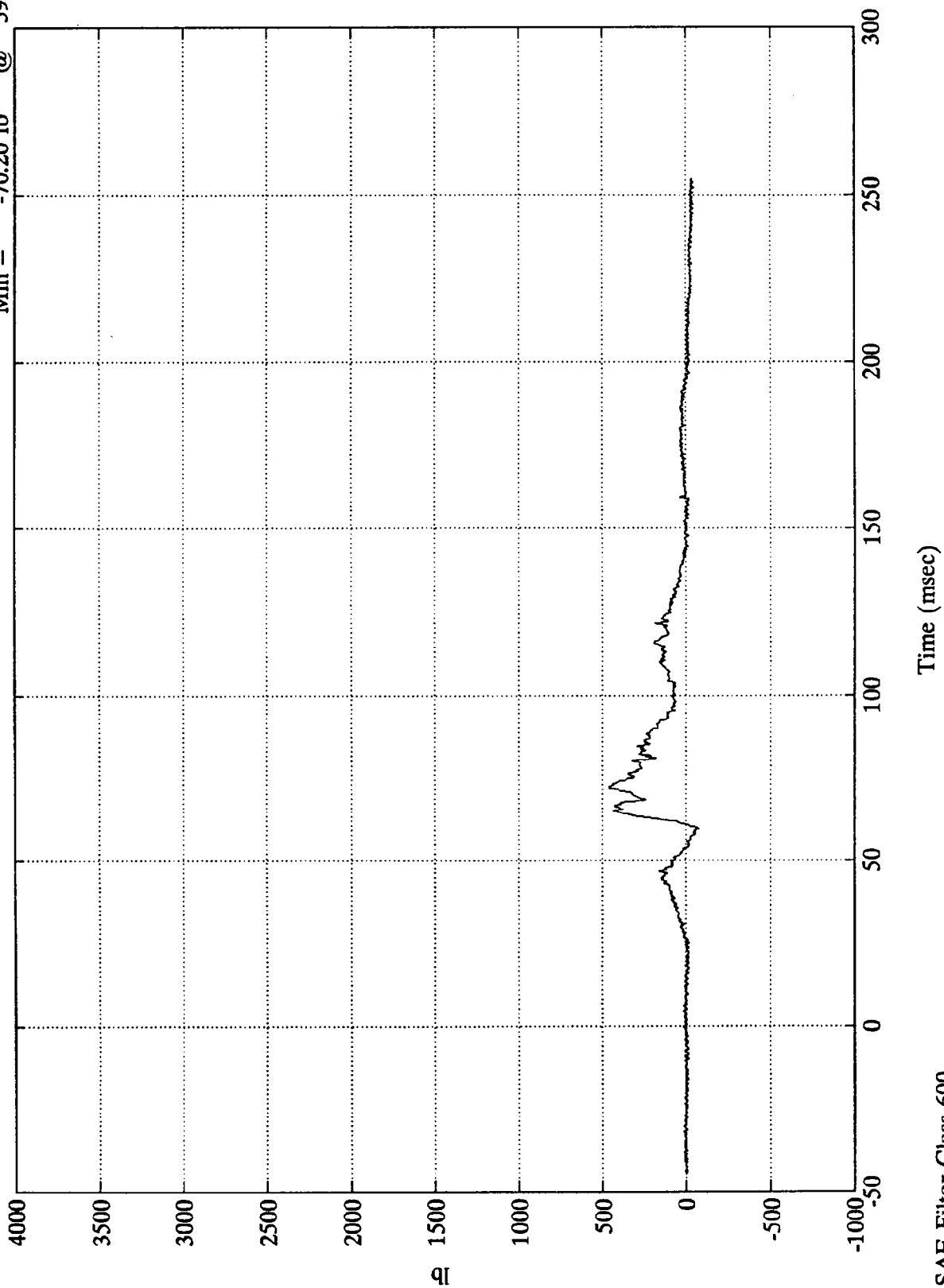
7953-2

SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Max = 460.03 lb @ 72.48 msec
Min = -70.20 lb @ 59.52 msec

Pos. 1 Left Femur

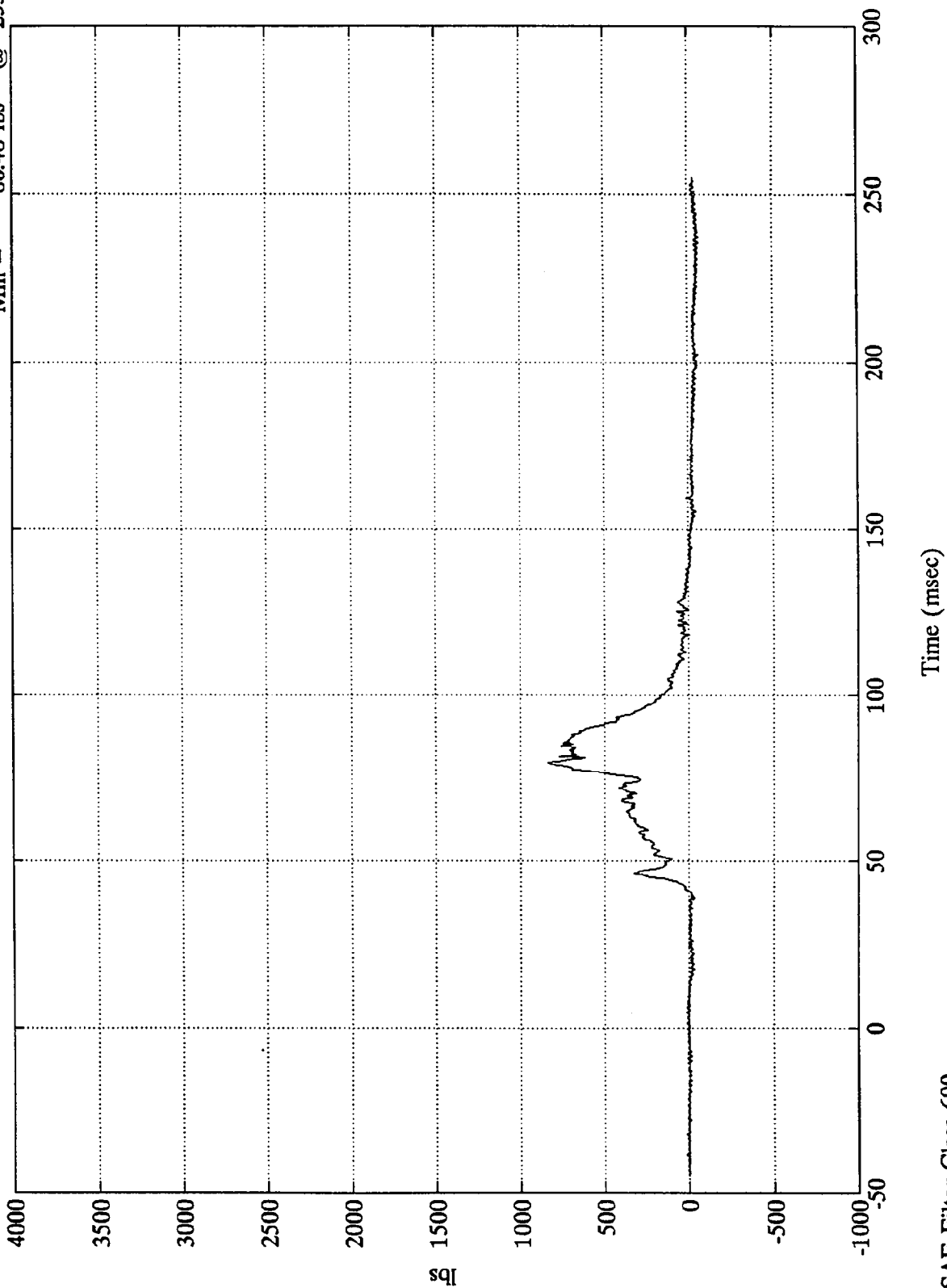


SAE Filter Class 600

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 1 Right Femur

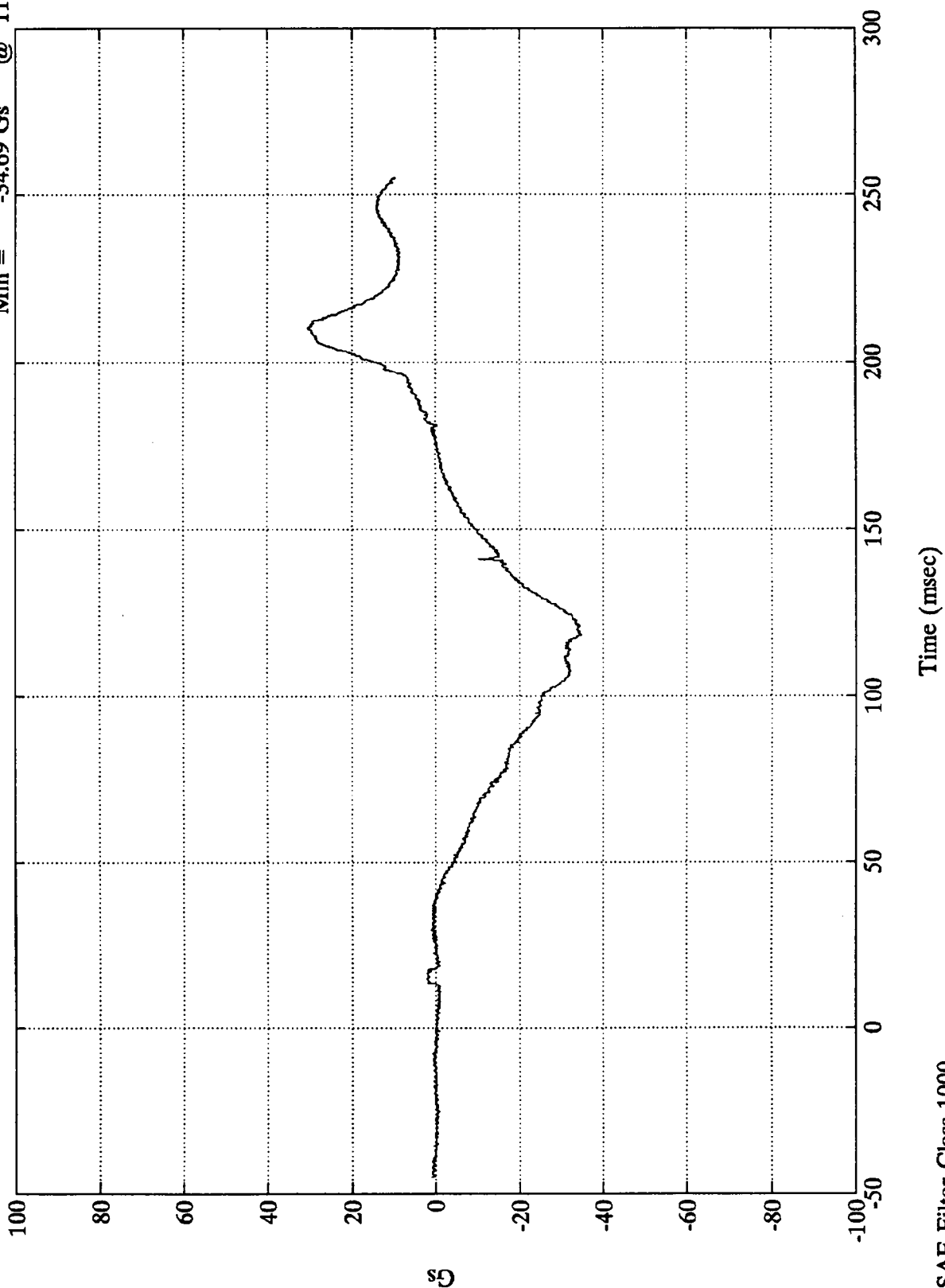
Max = 832.35 lbs @ 79.68 msec
Min = -66.48 lbs @ 235.80 msec



SAE Filter Class 600

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

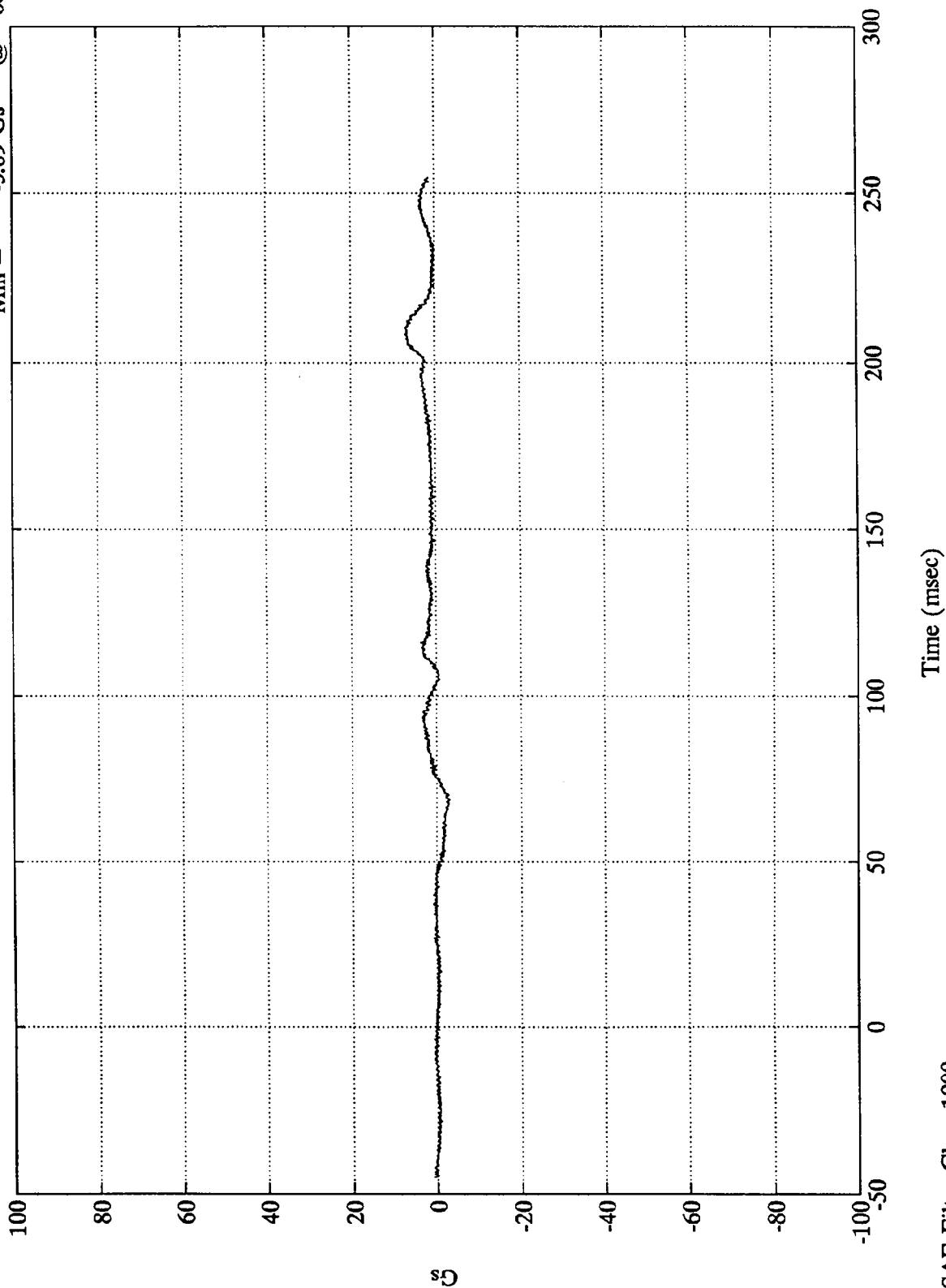
Pos. 2 Head X
Max = 30.39 Gs @ 210.24 msec
Min = -34.69 Gs @ 118.55 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Max = 6.98 Gs @ 210.36 msec
Min = -3.09 Gs @ 68.40 msec

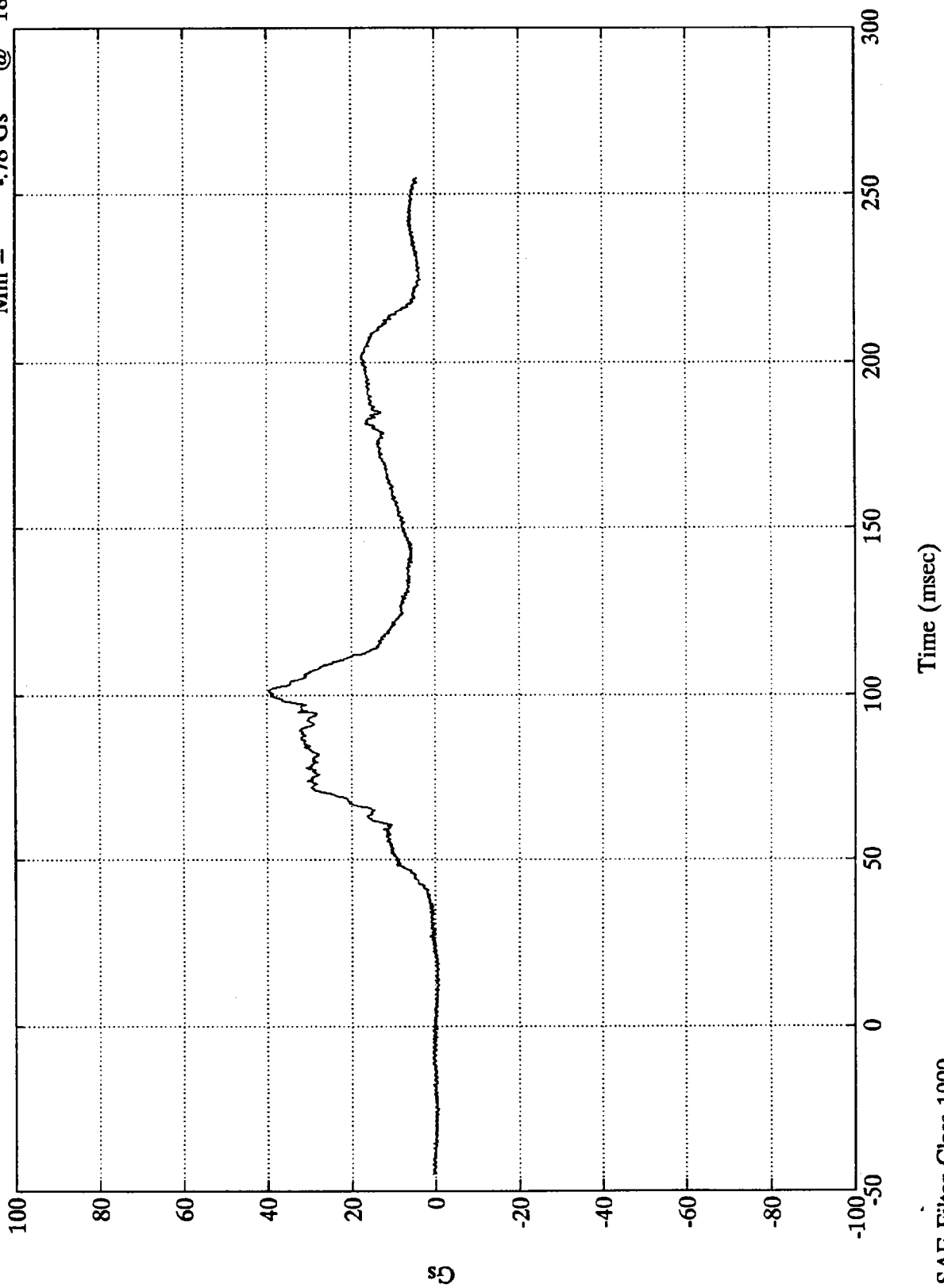
Pos. 2 Head Y



SAE Filter Class 1000

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

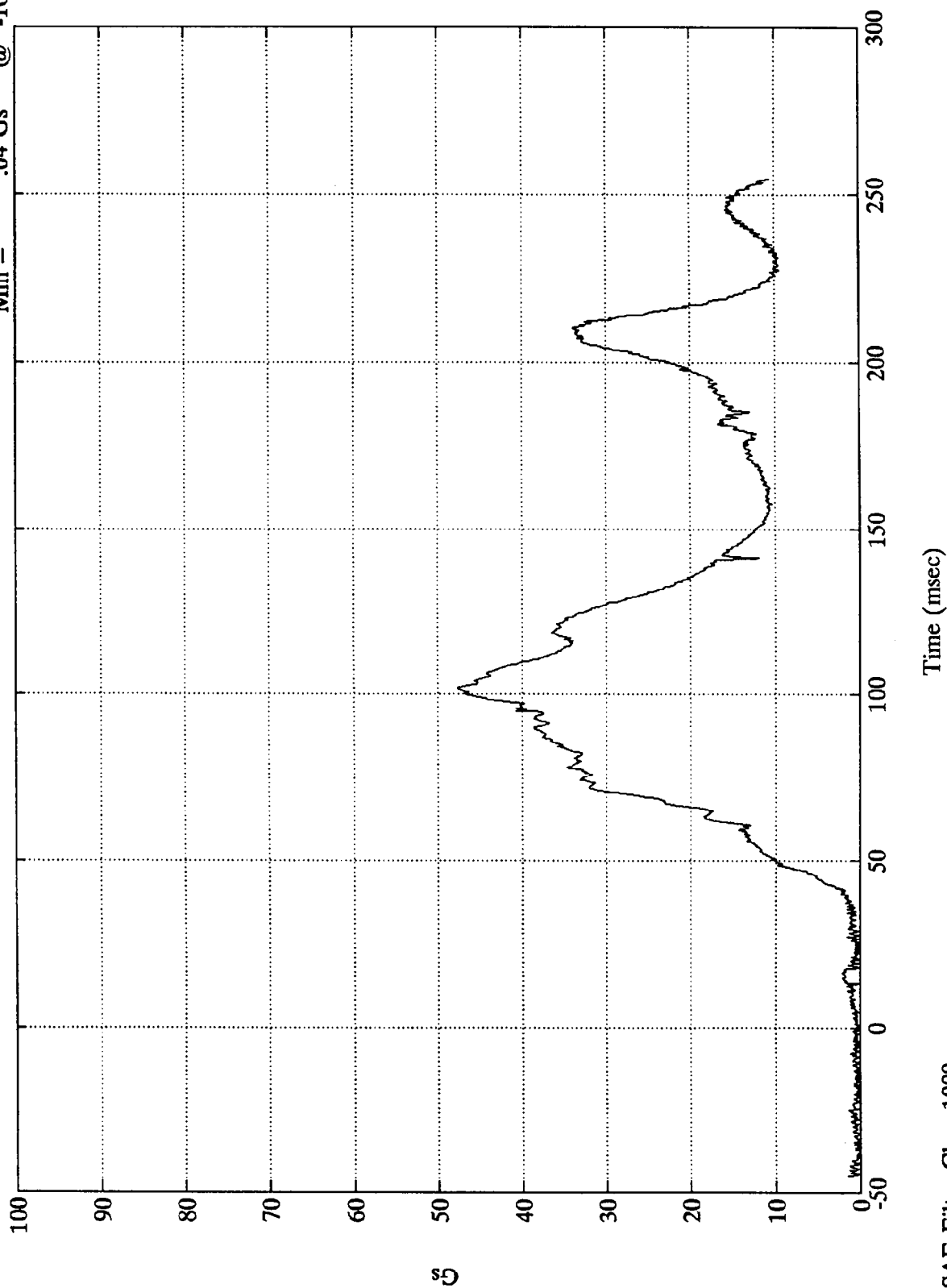
Pos. 2 Head Z
Max = 39.60 Gs @ 101.28 msec
Min = -7.78 Gs @ 18.84 msec



NHTSA '208" TEST 6 - 1992 CHEVY CAVALIER

Max = 47.68 Gs @ 101.63 msec
 Min = .04 Gs @ -10.32 msec

Pos. 2 Head Resultant



SAE Filter Class 1000

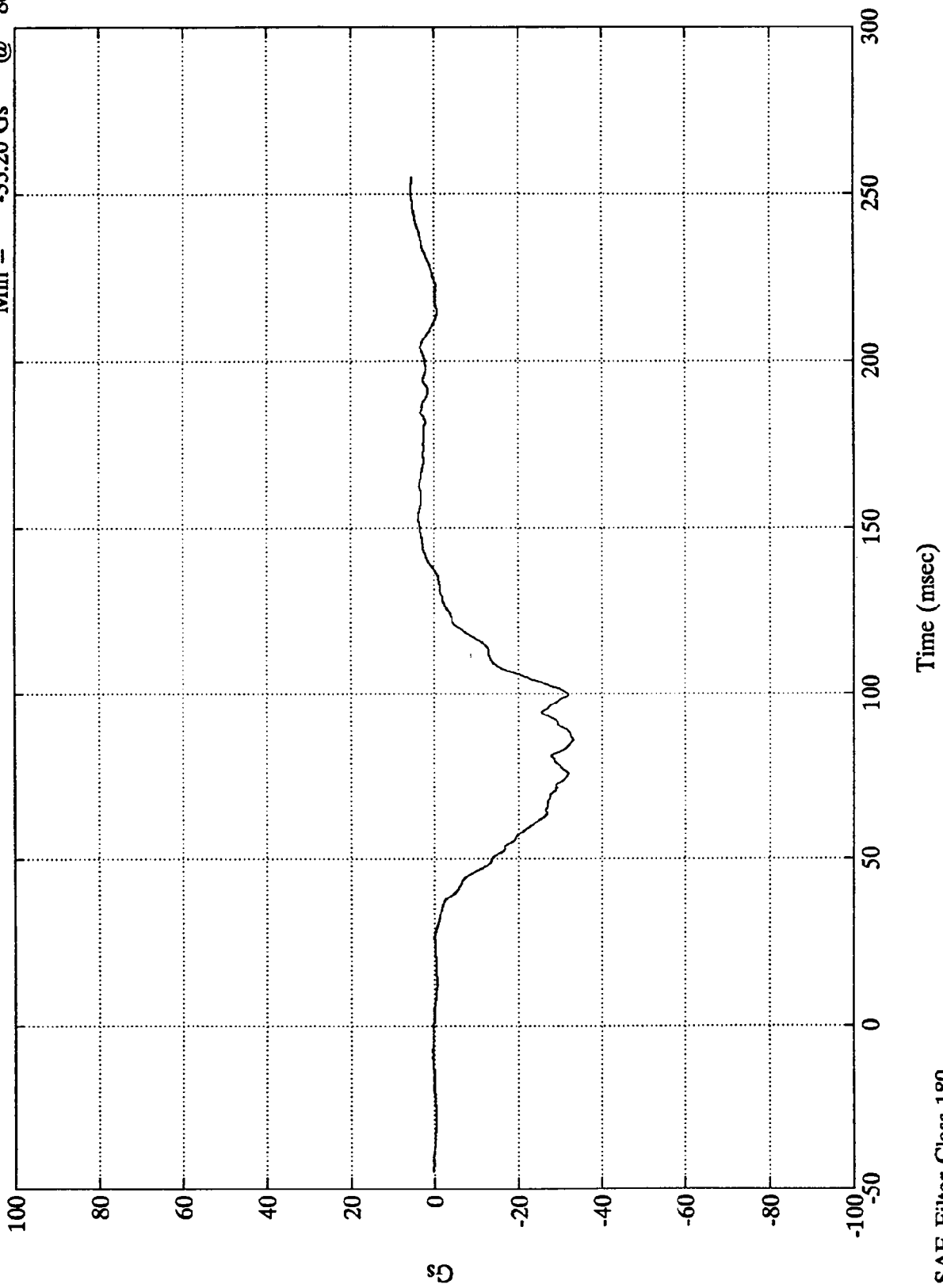
Gs

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NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

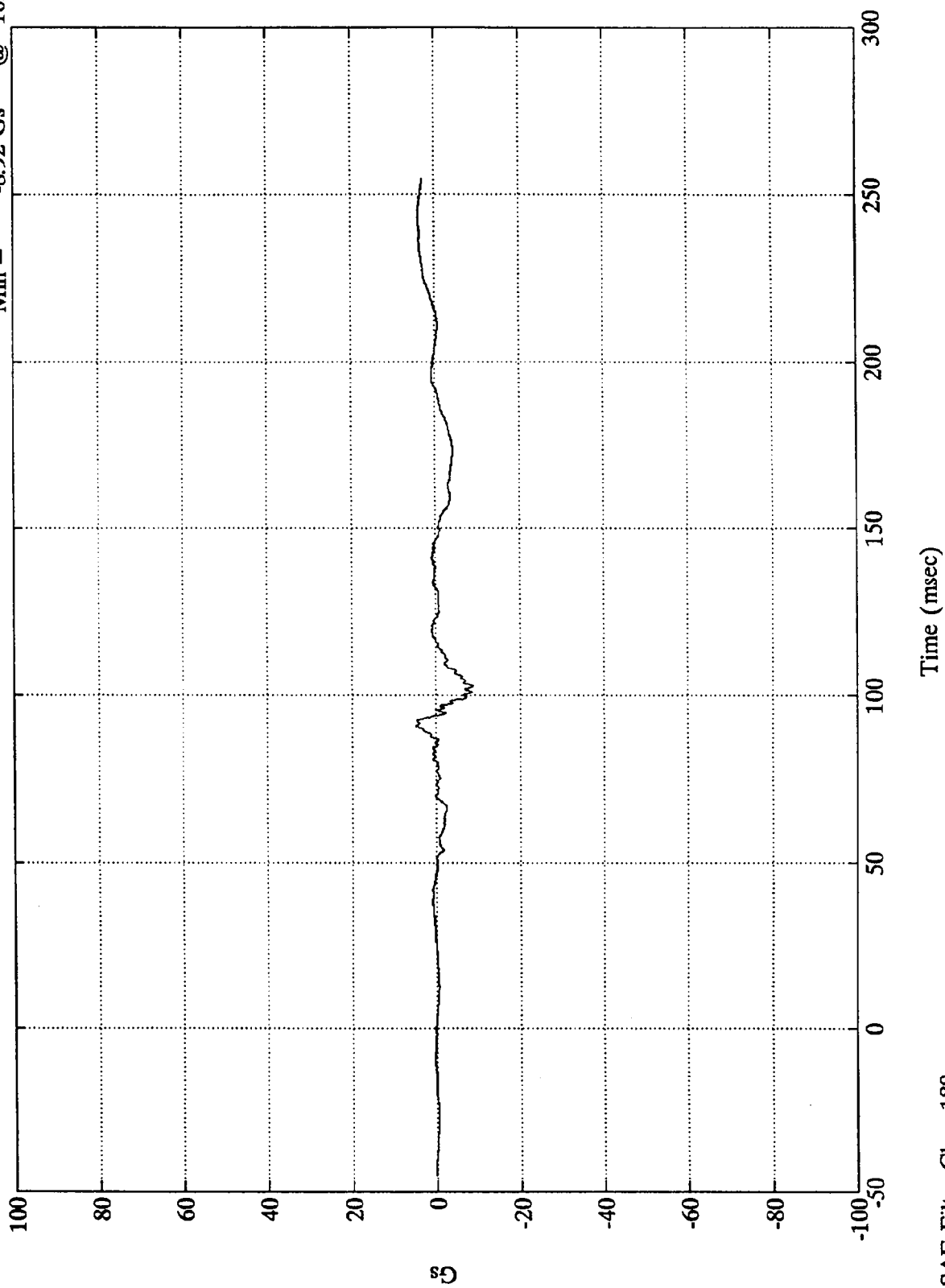
Pos. 2 Chest X
 Max = 5.60 Gs @ 251.15 msec
 Min = -33.20 Gs @ 86.04 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Max = 4.78 Gs @ 90.84 msec
Min = -8.92 Gs @ 102.59 msec

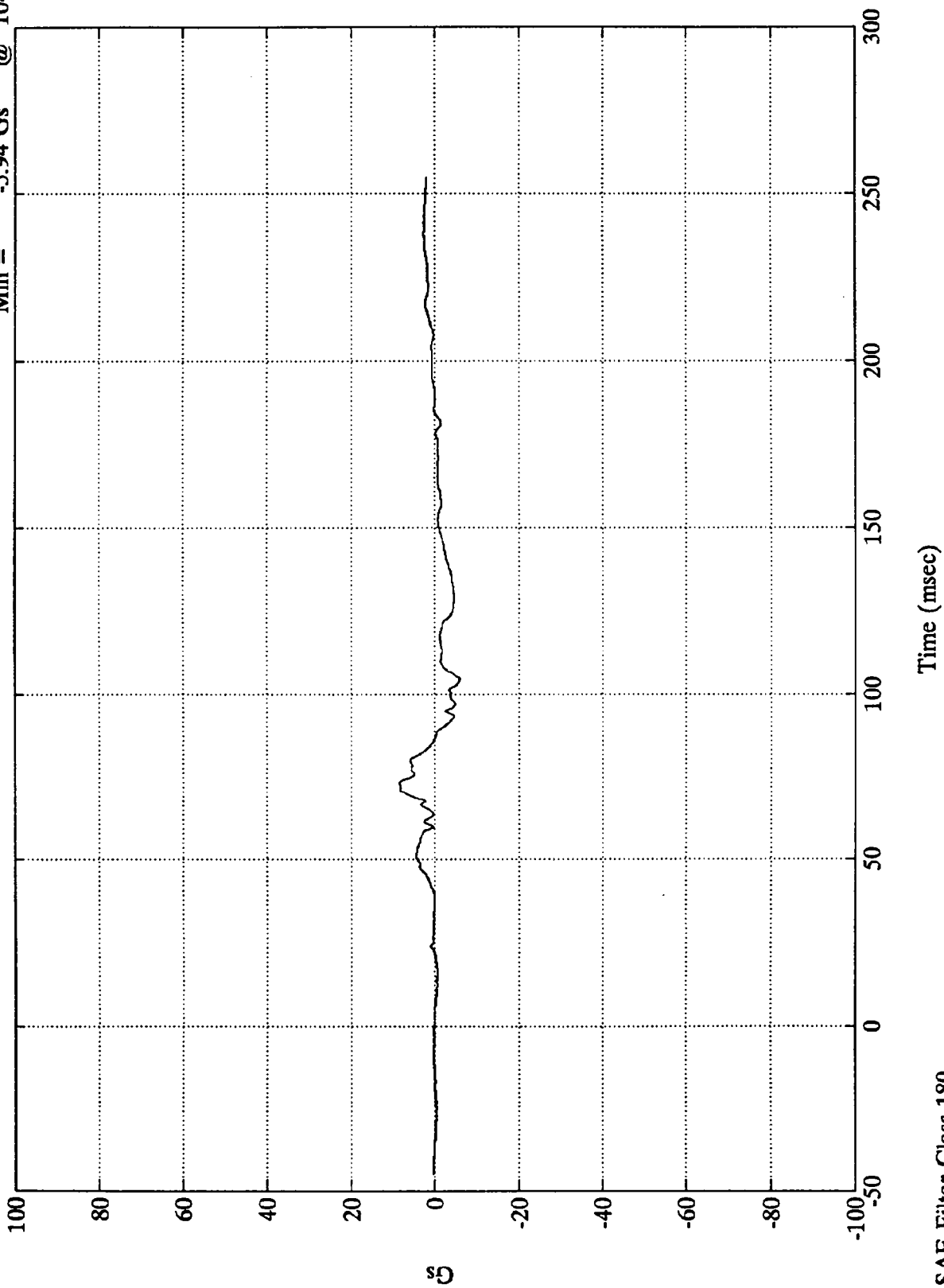
Pos. 2 Chest Y



SAE Filter Class 180

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

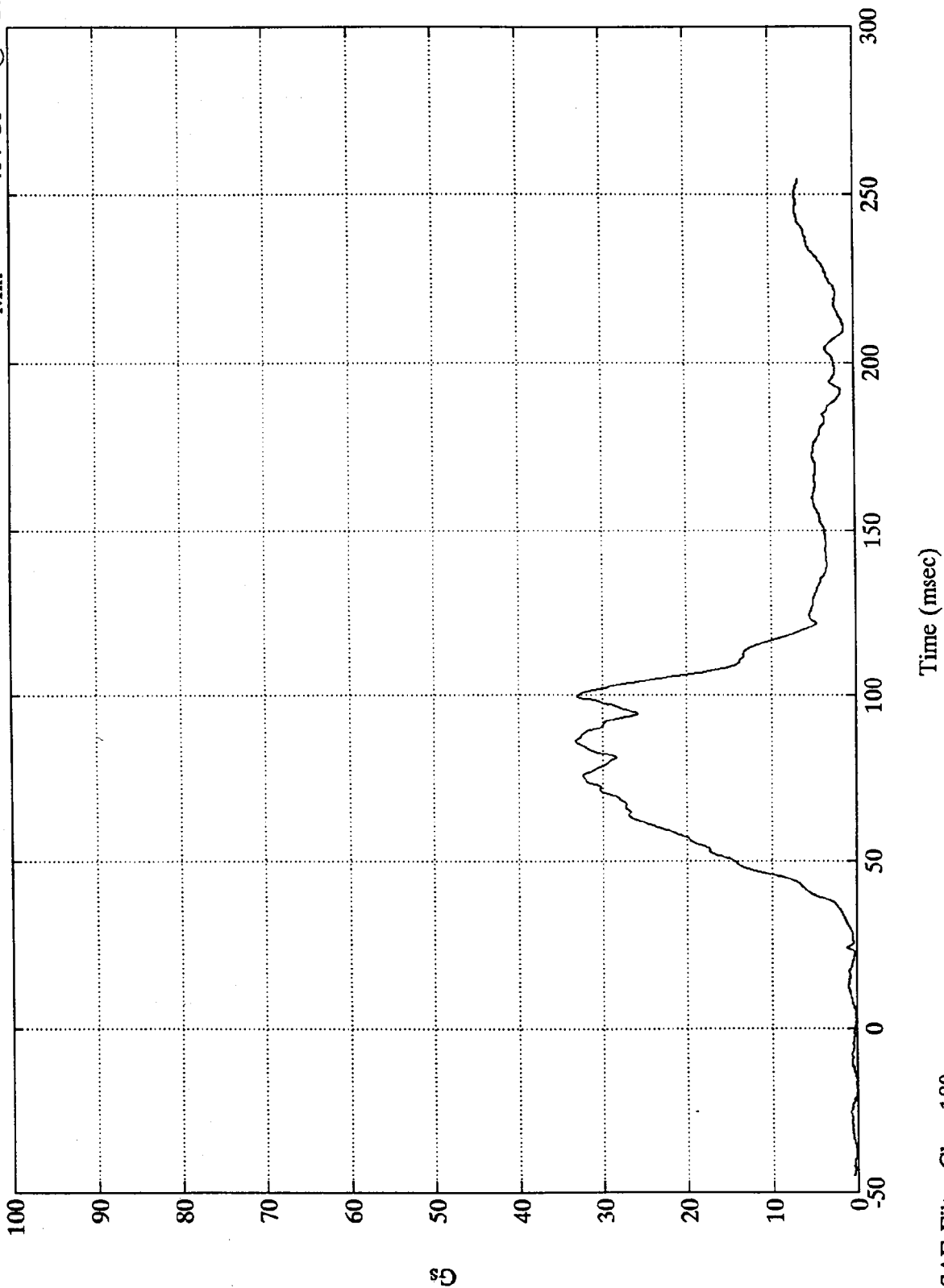
Pos. 2 Chest Z
Max = 8.48 Gs @ 73.08 msec
Min = -5.94 Gs @ 104.63 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 2 Chest Resultant

Max = 33.20 Gs @ 86.04 msec
Min = .04 Gs @ -18.48 msec

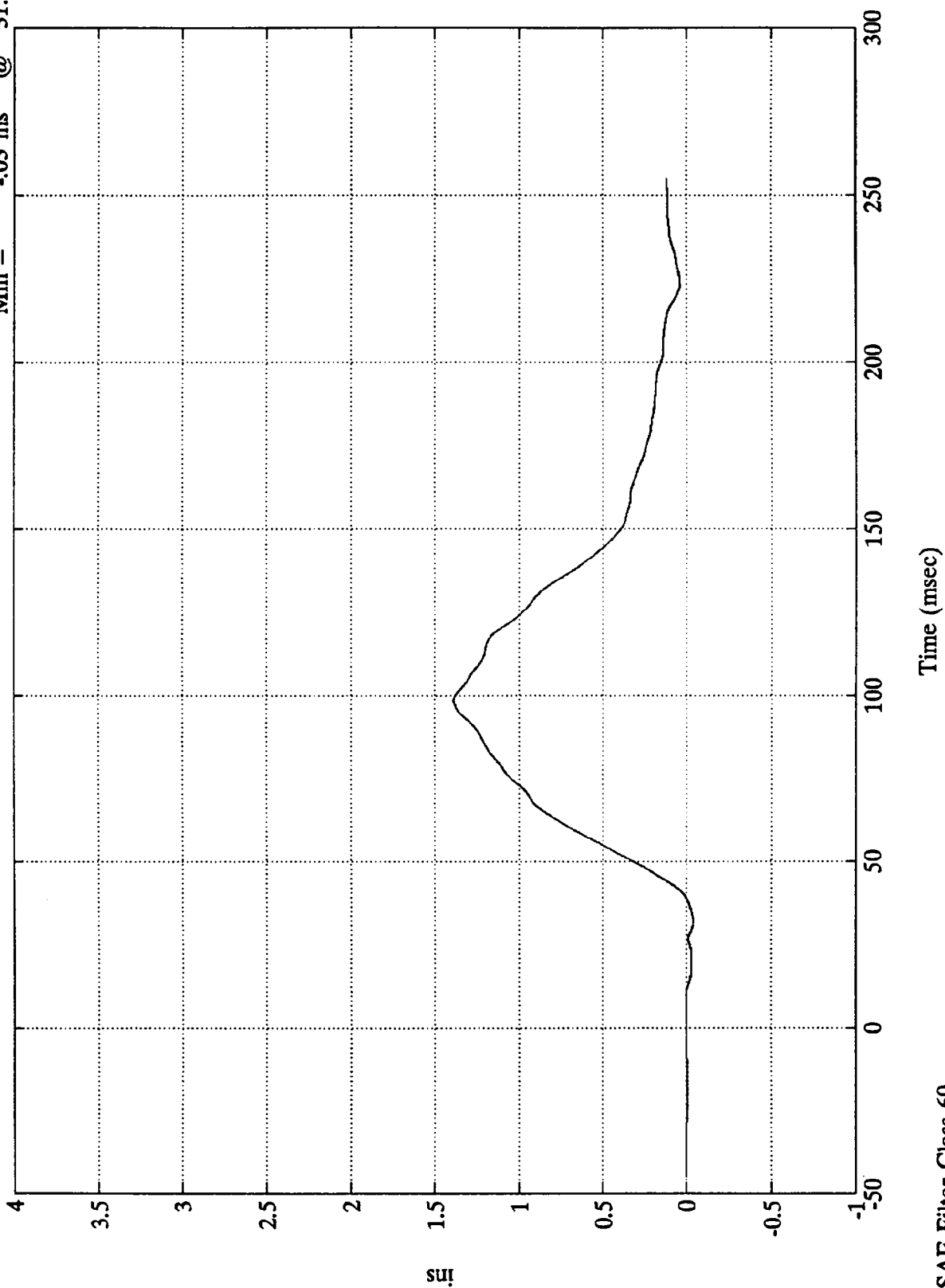


SAE Filter Class 180

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 2 Chest Disp.

Max = 1.38 ins @ 98.52 msec
Min = -.03 ins @ 31.79 msec



su
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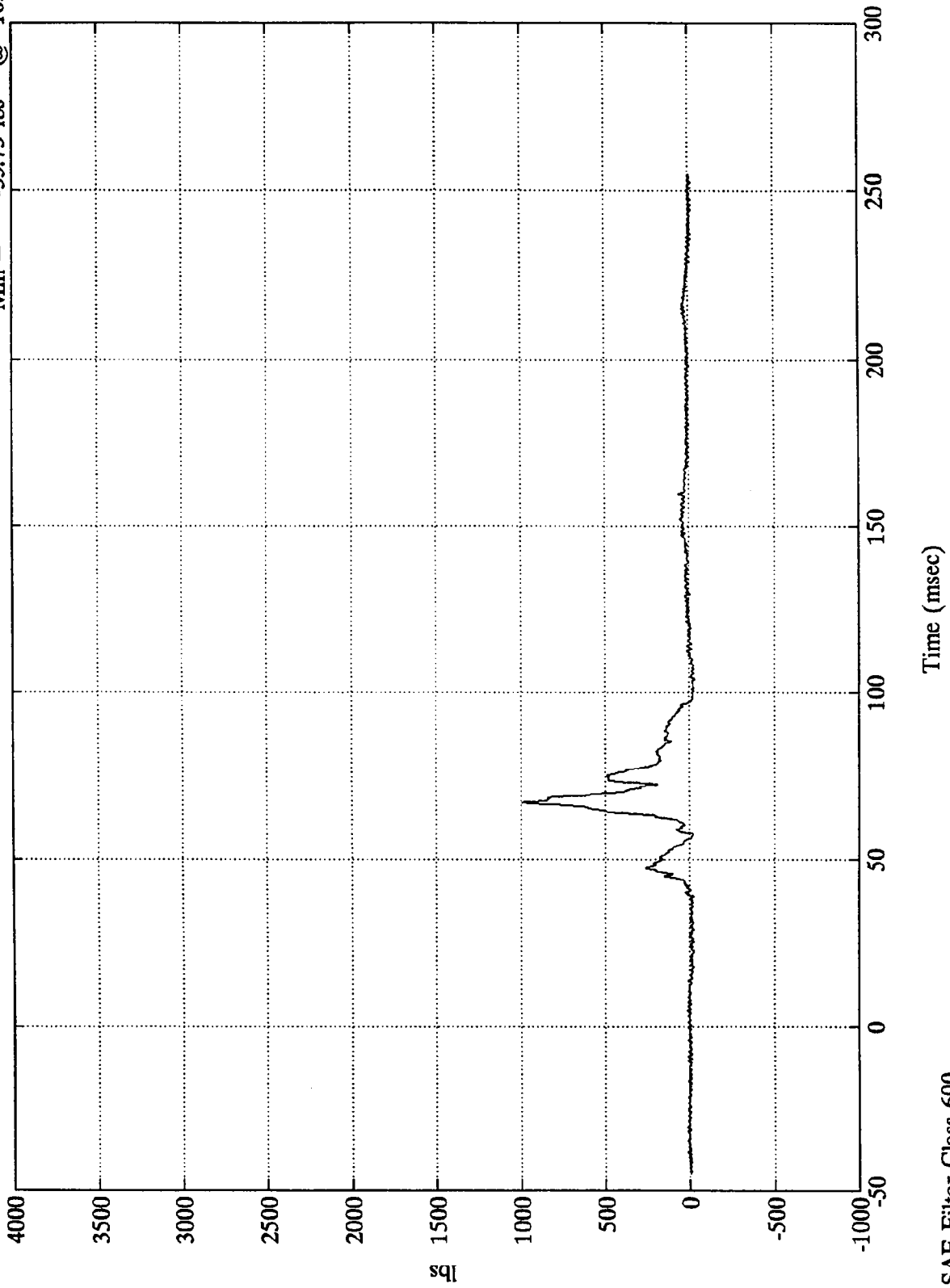
7953-2

SAE Filter Class 60

NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 2 Left Femur

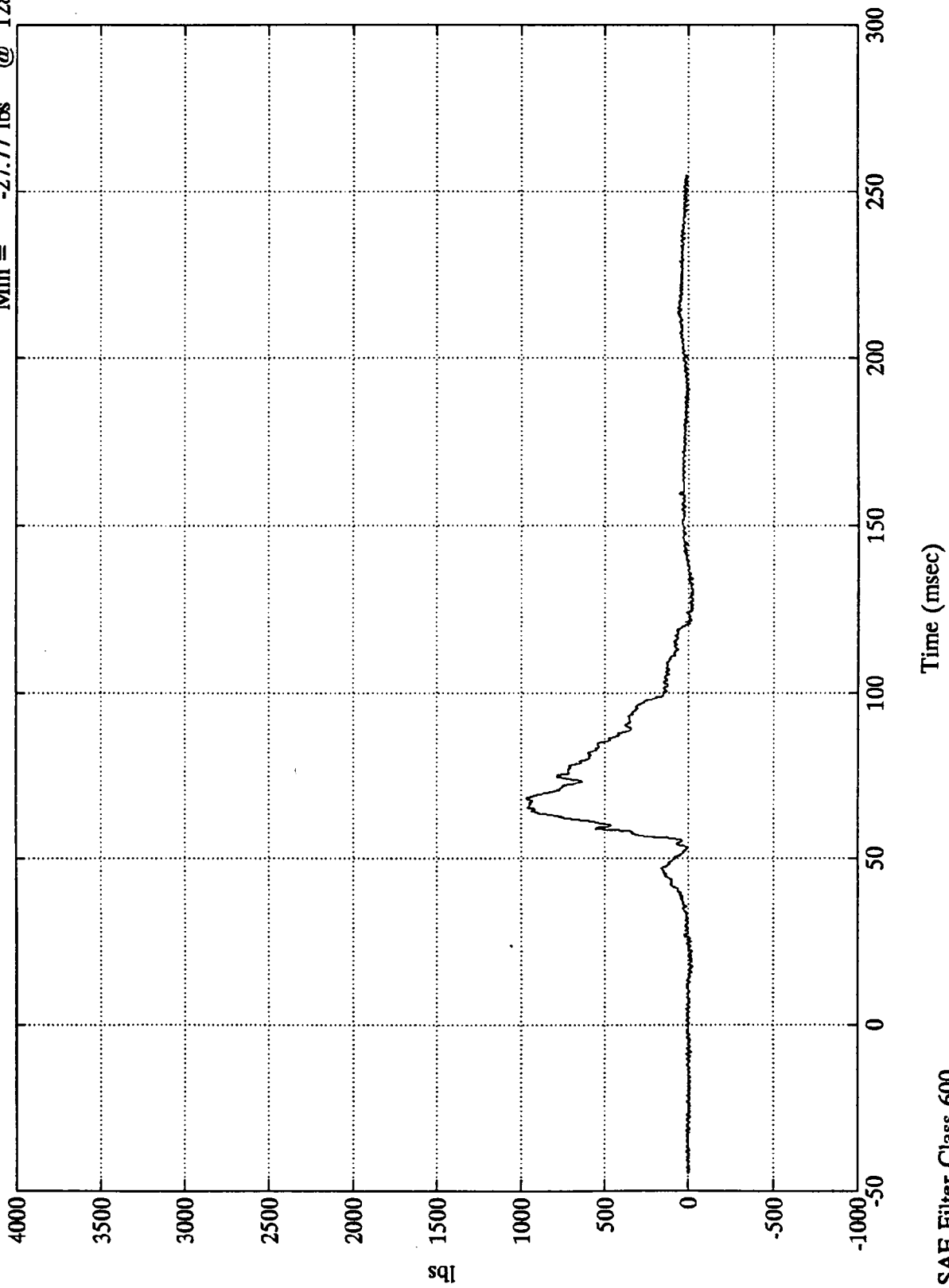
Max = 989.91 lbs @ 67.08 msec
Min = -33.73 lbs @ 103.80 msec



NHTSA "208" TEST 6 - 1992 CHEVY CAVALIER

Pos. 2 Right Femur

Max = 964.17 lbs @ 67.91 msec
Min = -27.77 lbs @ 128.03 msec



Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS



To Raise the Split-Folding Rear Seat:

1. Push down on the edge of the seatback and pull up the filler panel.
2. Lift the seatback until it locks in place. Push back and forth on the seatback to be sure it is locked in place.



To Lower the One-Piece Rear Seat:

1. Pull down on the release lever located on the right side of the seat.
2. Pull the seatback forward and down. Once folded, the weight of the one-piece seatback will hold it down.

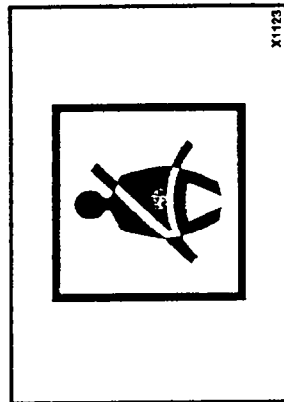
To Raise the One-Piece Rear Seat:

1. Lift the seatback until it locks in place. Push back and forth on the seatback to be sure it is locked in place.

**■ Safety Belts:
They're For Everyone**

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

Seats & Safety Belts



■ Safety Belts:

They're For Everyone (Cont.)

CAUTION

⚠ Don't let anyone ride where they can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.

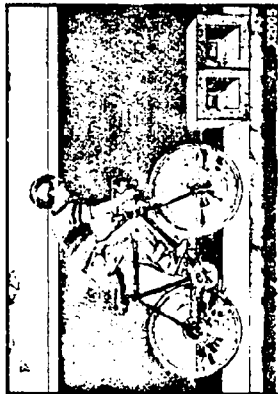


You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are very mild. In them, you won't get hurt even if you're not buckled up. And some crashes can be so serious, like being hit by a train, that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could be badly hurt or killed.

After 25 years of safety belts in vehicles, the facts are clear. In most crashes, buckling up does matter... a lot!

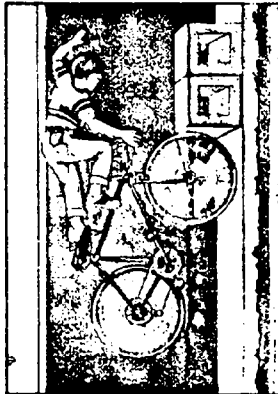
This figure lights up when you turn the key to **Run or Start** when your safety belt isn't buckled, and you'll hear a chime. It's the reminder to buckle up. In many states and Canadian provinces, the law says to wear safety belts. Here's why: **They work.**



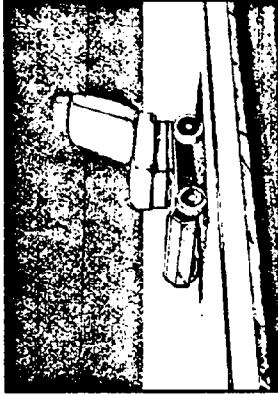
Why Safety Belts Work

When you ride in or on anything, you go as fast as it goes.

1. For example, if the bike is going 10 mph (16 km/h), so is the child.

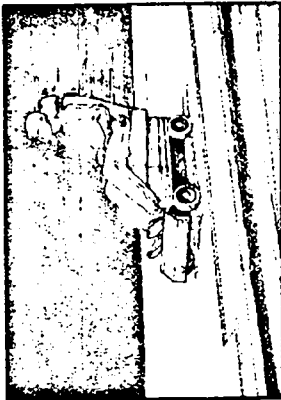


2. When the bike hits the block, it stops. But the child keeps going!



3. Take the simplest "car." Suppose it's just a seat on wheels.

Seats & Safety Belts

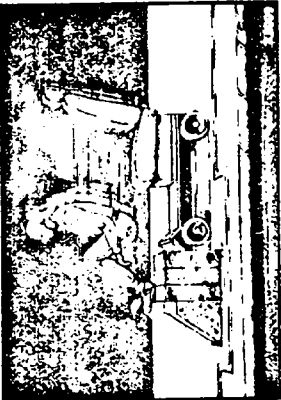


Why Safety Belts Work (CONT.)

4. Put someone on it.



7. or the instrument panel...



5. Get it up to speed. Then stop the "car." The rider doesn't stop.



8. or the safety belts!



6. The person keeps going until stopped by something. In a real vehicle, it could be the windshield...

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

... 20

***Here Are Questions Many People
Ask About Safety Belts—
and the Answers***

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You could be—whether you're wearing a safety belt or not. But you can easily unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you can unbuckle and get out, is **much** greater if you are belted.

Q: Why don't they just put in air bags so people won't have to wear safety belts?

A: "Air bags," or Supplemental Inflatable Restraint systems, are in some vehicles today and will be in more of them in the future. But they are supplemental systems only—so they work with safety belts, not instead of them. Every "air bag" system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has "air bags," you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

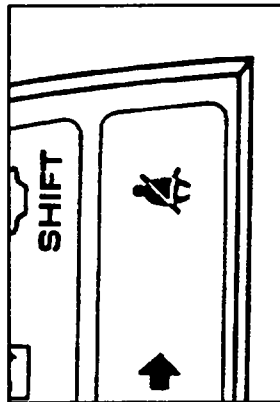
Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident—even one that isn't your fault—you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

Seats & Safety Belts



Safety Belt Warning Light

When the key is turned to **Run** or **Start**, a chime will come on for about eight seconds to remind people to fasten their safety belts, unless the driver's safety belt is buckled.

The safety belt light will also come on and stay on for about a minute. If the driver's belt is buckled, neither the chime nor the light will come on.

CAUTION

If your safety belt light ever comes on or stays on after the front doors are closed and the driver's belt is buckled, have your vehicle fixed. If you don't, you might not have the protection you'd need in a crash.

How to Wear Safety Belts Properly—Adults

This section is only for people of adult size.

CAUTION

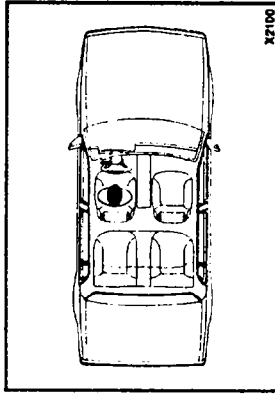
There are special things to know about safety belts and children. And there are different rules for babies and smaller children. If a child will be riding in your Chevrolet, see the *Index* under *Children and Safety Belts*. Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has. We'll start with the driver position.

Vehicles First Sold in Canada

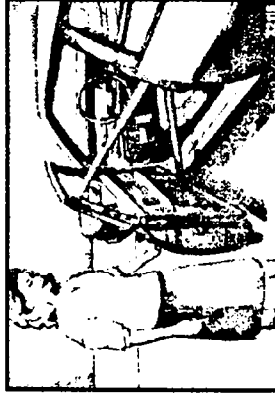
Was your Chevrolet first sold, when new, in Canada? (If it was, a sticker on the driver's door will say "conforms to all applicable Canada motor vehicle ..." etc.) If so, then the rest of Part 1 does not apply to your vehicle.

To learn how to use your safety belts, please read the Owner's Manual Safety Belt Supplement. It comes with every new Chevrolet first sold in Canada.



Driver Position

This section describes the driver's restraint system.



Automatic Lap-Shoulder Belt

This safety belt is called "automatic" because you don't have to buckle up when you get into your vehicle.

Seats & Safety Belts

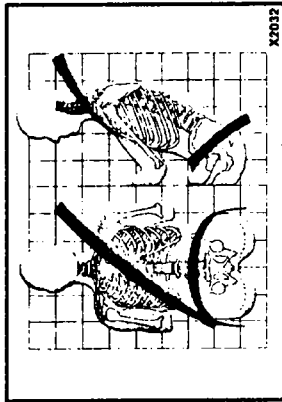


Automatic Lap-Shoulder Belt

(CONT.)

And you don't have to unbuckle when you get out.

Just get into your vehicle. Then close and lock the door. Adjust the seat so you can sit up straight. To see how, see the *Index* under *Seat Controls*.



The lap belt should be as low on the hips as possible. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

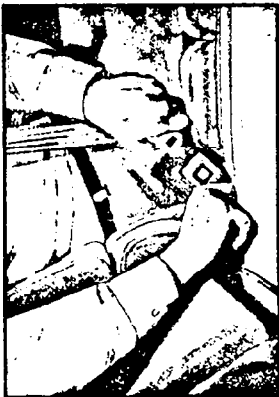
The safety belt locks if there's a sudden stop or a crash.

It's possible that an automatic belt could keep you from fully opening a door. That can happen if the door was slammed shut very hard. Just close the door all the way, then slowly open it. If that doesn't fix it, then your Chevrolet needs service.

We hope you'll always keep your automatic belt buckled. However, you may need to unbuckle it in an emergency.

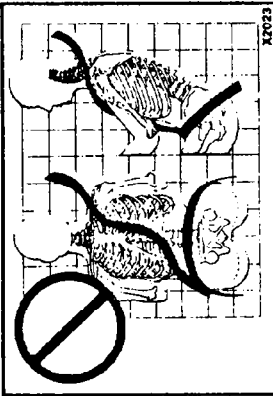


To unbuckle the automatic belt, just push the button on the buckle.



To Reattach the Automatic Belt:

1. Close and lock the door.
2. Adjust the seat so you can sit up straight. To see how, see the *Index* under *Seat Controls*.
3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.
4. Push the latch plate into the buckle until it clicks.



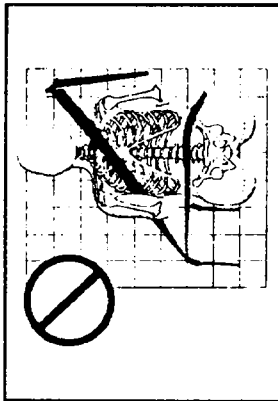
Q: What's wrong with this?

A: The shoulder belt is too loose. It won't give nearly as much protection this way.

CAUTION

⚠ You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could significantly increase injury. The shoulder belt should fit against your body.

Seats & Safety Belts



Automatic Lap-Shoulder Belt

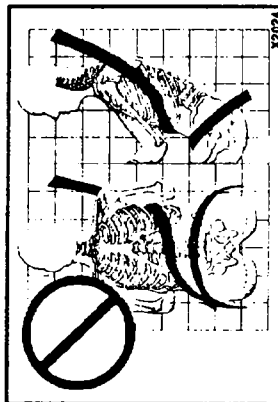
(CONT.)

Q: What's wrong with this?

A: The belt is buckled in the wrong place.

CAUTION

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

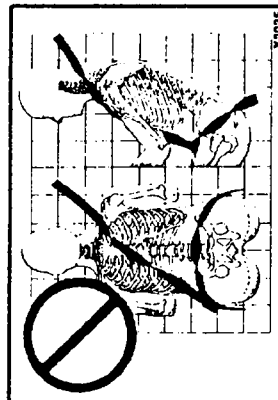


Q: What's wrong with this?

A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

CAUTION

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.



Q: What's wrong with this?

A: The belt is twisted across the body.

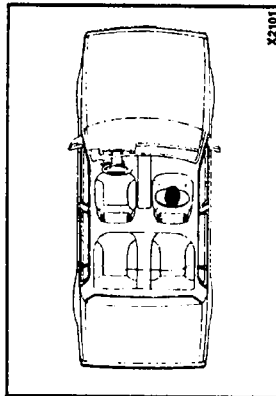
CAUTION

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to take the impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.



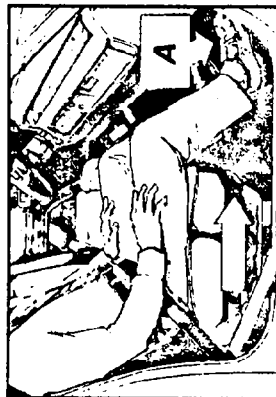
Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts. A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible throughout the pregnancy. The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.



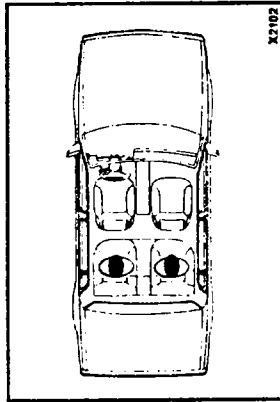
Right Front Passenger Position

The right front passenger's safety belt works the same way as the driver's safety belt. See the *Index* under *Driver Position*.



Adjust the seat so you can sit up straight. To see how, see the *Index* under *Seat Controls*. Move your seat far enough forward that your feet touch the part of the vehicle that is called the "toeboard" (A). That way you'd be less likely to slide under the lap belt in a crash.

Seats & Safety Belts



Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.



Here's How to Wear One Properly:

1. Pick up the latch plate and pull it across you. Don't let it get twisted.

Rear Seat Outside Passenger Positions

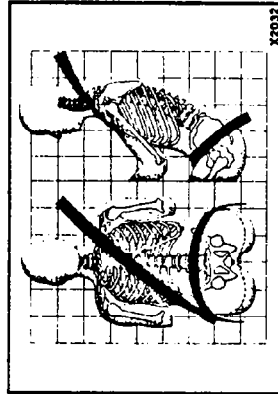
The positions next to the windows have lap-shoulder belts.



2. Push the latch plate into the buckle until it clicks. If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle it.



3. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder part.
If the belt is not long enough, see the *Index* under *Safety Belt Extender*.
Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.



The lap part of the belt should be low and snug below the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

Seats & Safety Belts



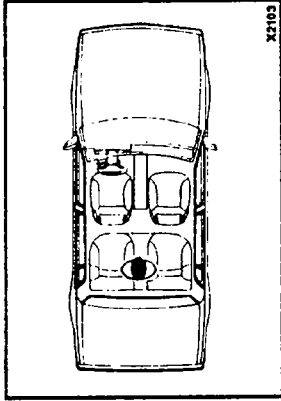
Rear Seat Outside Positions

(CONT.)

The safety belt locks if there's a sudden stop or a crash.

CAUTION

 You can be seriously hurt if your shoulder belt is too loose. In a crash you would move forward too much, which could increase injury. The shoulder belt should fit against your body.



Center Passenger Position

If your vehicle has a rear bench seat, someone can sit in the center position. When you sit in a center seating position, you have a lap safety belt, which has no retractor.

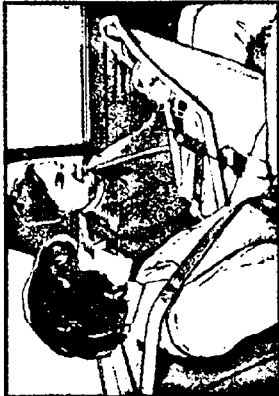
... 30



To make the belt longer, tilt the latch plate and pull it along the belt.



To make the belt shorter, pull its free end as shown, until the belt is snug. Buckle, position and release it the same way as a lap-shoulder belt. If the belt isn't long enough, see the *Index* under *Safety Belt Extender*. Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.



■ Children

Everyone in a vehicle needs protection! That includes infants and all children smaller than adult size. In fact, the law in every state and Canadian province says children up to some age must be restrained while in a vehicle.

Seats & Safety Belts

Smaller Children and Babies

CAUTION

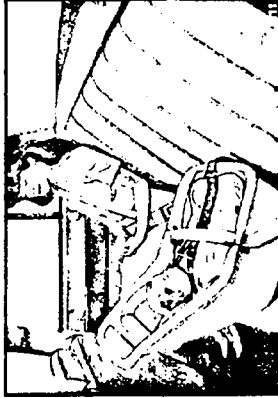
Smaller children and babies should always be restrained in a child or infant restraint. The instructions for the restraint will say whether it is the right type and size for your child. A very young child's hip bones are so small that a regular belt might not stay low on the hips, as it should. Instead, the belt will likely be over the child's abdomen. In a crash the belt would apply force right on the child's abdomen, which could cause serious or fatal injuries. So, be sure that any child small enough for one is always properly restrained in a child or infant restraint.



CAUTION

Never hold a baby in your arms while riding in a vehicle. A baby doesn't weigh much—until a crash. During a crash a baby will become so heavy you can't hold it. For example, in a crash at only 25 mph (40 km/h), a 12-pound (5.5 kg) baby will suddenly become a 240-pound (110 kg) force on your arms. The baby would be almost impossible to hold.

(Continued)



Smaller Children and Babies (CONT.)

CAUTION

(Continued)

Secure the baby in an infant restraint.

Child Restraints

Be sure to follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both. These restraints use the belt system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. The instructions that come with the infant or child restraint will show you how to do that.

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We at General Motors therefore recommend that you put your child restraint in the rear seat unless the child is an infant and you're the only adult in the vehicle. In that case, you might want to secure the restraint in the front seat where you can keep an eye on the baby.

Wherever you install it, be sure to secure the child restraint properly.

CAUTION

 An unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle—even when no child is in it.