

V2234

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

GENERAL MOTORS OF CANADA
1995 CHEVROLET MONTE CARLO LS
2 DOOR SEDAN

NHTSA NUMBER: CS0105

CALSPAN TEST NUMBER: 8221-6

November 14, 1994

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FINAL REPORT

PREPARED FOR:

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National Highway Traffic Safety Administration
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Office of Vehicle Safety Compliance
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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1995 Chevrolet Monte Carlo LS 2 door sedan. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on November 14, 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 29.7 mph. The ambient temperature at the impact face was 65 °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 a passenger air bag restraint system. The manual seat belts were not used for this test.					
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TABLE OF CONTENTS

<u>Section</u>	<u>Page No.</u>
1 PURPOSE AND TEST PROCEDURE	1-1
2 SUMMARY OF FRONTAL BARRIER IMPACT TEST	2-1
3 OCCUPANT AND VEHICLE INFORMATION	3-1
4 SUMMARY OF RESULTS FOR: FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219 (Partial), "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"	4-1
APPENDIX A PHOTOGRAPHS	A-1
APPENDIX B VEHICLE AND DUMMY RESPONSE DATA	B-1
APPENDIX C VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS	C-1

LIST OF FIGURES

<u>Figure No.</u>		<u>Page No.</u>
1	TEST VEHICLE INFORMATION	3-2
2	PART 572 DUMMY IN-VEHICLE POSITION	3-3
3	SEAT BELT POSITIONING DATA	3-5
4	VEHICLE ACCELEROMETER LOCATIONS	3-6
5	CAMERA POSITION FOR FRONTAL IMPACT	3-8
6	VEHICLE TARGET LOCATIONS	3-10
7	TEST VEHICLE MEASUREMENTS	3-11
8	FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET	4-12
9	FMVSS NO. 219 - (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA SHEET	4-13

LIST OF TABLES

<u>Table No.</u>		<u>Page No.</u>
1	CRASH TEST SUMMARY	2-2
2	GENERAL TEST AND VEHICLE PARAMETER DATA	2-3
3	POST-IMPACT DATA	2-5
4	FRONT SEAT OCCUPANT MEASUREMENTS	3-4
5	VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	3-7
6	HIGH SPEED CAMERA LOCATIONS	3-9
7	VEHICLE MEASUREMENTS	3-12
8	DUMMY INJURY CRITERIA VALUES	4-2
9	FMVSS NO. 208 - SEAT BELT WARNING SYSTEM CHECK	4-3
10	FMVSS NO. 208 - LABELING AND DRIVER'S MANUAL INFORMATION	4-4
11	FMVSS NO. 208 - READINESS INDICATOR	4-5
12	FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY	4-6
13	FMVSS NO. 301 - "FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA	4-14
14	FMVSS NO. 301 - STATIC ROLLOVER DATA SHEET	4-15
15	POST TEST AIR BAG DATA	4-19
16	ACCIDENT INVESTIGATION DIVISION DATA	4-20
17	TEST VEHICLE NONCOMPLIANCE NOTICE	4-21

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 1995 Chevrolet Monte Carlo LS 2 door sedan, 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 CS0105

A frontal barrier was impacted by a 1995 Chevrolet Monte Carlo LS 2 door sedan at a velocity of 29.7 mph. The test was performed at the Calspan Corporation Advanced Technology Center on November 14, 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 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 three axis (x, y, and z) accelerometers, chest displacement potentiometers and left/right femur load cells. These ATDs had been certified prior to the test.

The 26 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 120.14. The maximum chest deceleration over 3 milliseconds was 44.371 g's with -1.5 inches of deflection. The maximum force on the driver's left femur was -1057.1 pounds and -1063.0 pounds on the right femur.

The right front passenger's HIC was 320.52. The maximum chest deceleration over 3 milliseconds was 39.987 g's with -0.6 inches of deflection. Loads of -1051.1 and -1094.3 pounds were recorded on the left and right femurs respectively.

Table 1

CRASH TEST SUMMARY

Vehicle NHTSA No. :	<u>CS0105</u>	Test Mode :	<u>30 mph Frontal Barrier</u>
Test Date :	<u>November 14, 1994</u>	Time:	<u>11:30</u> Temperature : <u>65</u> °F
Vehicle Make/Model/Body Style :	<u>1995 Chevrolet Monte Carlo LS 2 door sedan</u>		
Vehicle Test Weight :	<u>3760</u>	lbs	
Vehicle/Barrier Impact Angle :	<u>0</u>	°	
Impact Velocity :	<u>29.7</u>	mph	
Maximum Static Crush :	<u>19.7</u>	inches	
Vehicle Rebound :	<u>19.5</u>	inches	
<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>	
Type :	<u>Part 572E</u>	<u>Part 572E</u>	
Restraint System :	<u>air bag *</u>	<u>air bag *</u>	
Number of Data Channels :	<u>26</u>		
Number of Cameras :	<u>air bag</u>	Real Time	
	<u>14</u>	High Speed	
<u>DOOR OPENING DATA:</u>	<u>Closed/Operable</u>	- Left Front	
	<u>Closed/Operable</u>	- Right Front	
Front Seat(s) Data :	<u>DRIVER</u>	<u>PASSENGER</u>	
Seat Track Failure :	<u>0.0</u>	<u>0.0</u>	
		Inches of shift	
Seat Back Failure :	<u>None</u>	<u>None</u>	
<u>VISIBLE DUMMY CONTACT POINTS :</u>	<u>DRIVER</u>	<u>PASSENGER</u>	
Head :	<u>Face with air bag, rear and top of head with sunvisor.</u>	<u>Face with air bag, top of head with sunvisor.</u>	
Abdomen :	<u>No contact.</u>	<u>Air bag</u>	
Chest	<u>Air bag</u>	<u>Air bag</u>	
Knees	<u>Knee bolster</u>	<u>Lower dash</u>	

* Manual 3-point belt systems were not used for this test.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1995 Chevrolet Monte Carlo LS 2 door sedan

NHTSA No. : CS0105 ; VIN: 2G1WW12M0S9143806 ; Color : Black

Engine Data: 6 cylinders; - CID; 3.1 Liters; - cc

Placement : X Longitudinal or In-Line; - 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 : 9/19/94 ; Odometer Reading 37 miles

Selling Dealer : Paddock Chevrolet, Inc.

& Address: 3232 Delaware Ave., Kenmore NY 14217

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : GENERAL MOTORS OF CANADA

Date of Manufacture August 1994

GVWR : 4403 lbs.; GAWR: 2438 lbs. FRONT; 1965 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 30 psi FRONT
30 psi REAR

Recommended Tire Size : P205/70 R15

* Recommended Cold Tire Pressure : 30 psi FRONT; 30 psi REAR

Size of Tires on Test Vehicle: P205/70 R15 ; Manufacturer: Michelin

Vehicle Capacity Data :

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

Number of Occupants: 3 Front; 3 Rear; 6 Total

Vehicle Capacity Weight (VCW) = 1058 lbs.

No. of Occupants x 150 lbs. = 900 lbs.

Rated Cargo/Luggage Weight (RCLW) = 158 lbs.

*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	=	1003	lbs.	Right Rear	=	621	lbs.
Left Front	=	1103	lbs.	Left Rear	=	559	lbs.
TOTAL FRONT	=	2,106	lbs.	TOTAL REAR	=	1,180	lbs.
TOTAL DELIVERED WEIGHT	=	3,286	lbs.				
% of Total Front of Vehicle Weight	=	64	%	% of Total Rear Weight	=	36	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

Total Delivered Weight	=	3,286	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	158	lbs.
Weight of 2 p.572 Dummies @ 167 each	=	334	lbs.
TARGET TEST WEIGHT	=	3,778	lbs.

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 140 POUNDS OF CARGO WEIGHT:

Right Front	=	1095	lbs.	Right Rear	=	774	lbs.
Left Front	=	1131	lbs.	Left Rear	=	760	lbs.
TOTAL FRONT	=	2,226	lbs.	TOTAL REAR	=	1,534	lbs.
TOTAL TEST WEIGHT	=	3,760	lbs.				
% of Total Front Weight	=	59	%	% of Total Rear Weight	=	40.8	%
Weight of Ballast Secured in Vehicle Trunk Area	=	75	lbs.				
Vehicle Components Removed for Weight Reduction:	None.						

VEHICLE ATTITUDE (all dimension in inches) :

AS DELIVERED :	RF	29.4	LF	29.2	RR	29.3	LR	29.3
FULLY LOADED :	RF	28.0	LF	27.5	RR	28.0	LR	27.8
AS TESTED :	RF	28.1	LF	27.8	RR	28.1	LR	27.8
Vehicle's Wheel Base :	107.6 in.							

Location of Vehicle's C.G. : 43.9 inches rearward of front wheel center.

FUEL SYSTEM DATA :

Fuel System Capacity From Owner's Manual	=	17.1	gallons
Usable Capacity Figure Furnished by COTR	=	17.1	gallons
Test Volume Range (92 to 94% of Usable Capacity)	=	15.7	to 16.1 gallons
ACTUAL TEST VOLUME	=	15.9	gallons (with entire fuel system filled)

Table 3

POST IMPACT DATATYPE OF TEST:

Type of Test : Frontal Barrier Impact Angle : 0°
 Test Date : November 14, 1994 Time: 11:30 Temperature: 65 °F
 Vehicle NHTSA No. : CS0105
 Required Impact Velocity Range : 28.9 to 29.9 mph

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

Trap No. 1 = 29.7 mph; Trap No. 2 = 29.5 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 = 194.2 ; C/L = 200.5 ; Left = 193.5
 Post-Test Right = 174.7 ; C/L = 180.8 ; Left = 177.8
 Crush Right = 19.5 ; C/L = 19.7 ; Left = 15.7
 AVERAGE = 18.3 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point :

Right = 21.3 ; C/L = 17.1 ; Left = 20.2
 AVERAGE = 19.5 inches

DOOR OPENING :

	Left	Right
Front	Closed/Operable	Closed/Operable
Rear	N/A	N/A

SEAT MOVEMENT :

	Seat Back Failure	Seat Shift
Front	None	None
Rear	N/A	N/A

Table 3

POST IMPACT (cont.)

GLAZING DAMAGE :

Windshield cracked on the right side above the passenger air bag cover.

OTHER NOTABLE IMPACT FEATURES :

Steering column stroked upward, steering wheel deformed.

Section 3

OCCUPANT AND VEHICLE DATA

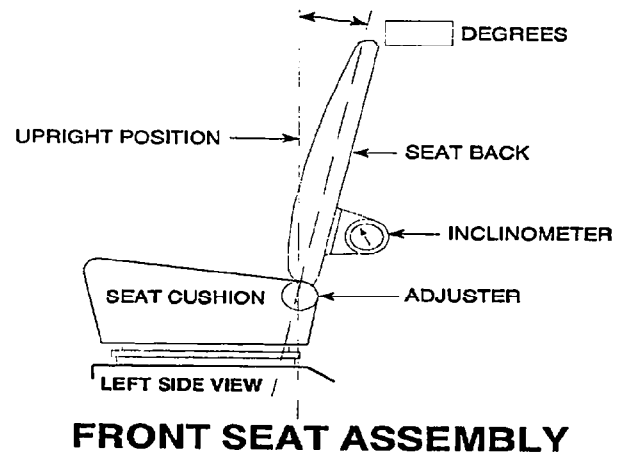
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1995 Vehicle Model: Chevrolet Monte Carlo Body Style : 2 door sedan

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.



Seat back angle for driver's seat : 26°

Measurement instructions : Cut fabric open over the seat frame 2"-3" above the seat back pivot point. Place inclinometer on rear portion of the seat back frame.

Seat back angle for passenger's seat : 26°

Measurement instructions : Same as driver seating position.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Total fore-aft seat travel is 220 mm with 23 positions. Set at detent #12 from full forward, where the forwardmost position is counted as detent #1.

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 17.1 gallons

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

4. Steering Column Position :

Total of six positions. Set at detent #3 from full down, where the full down position is detent #1.

5. Other:

None.

Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

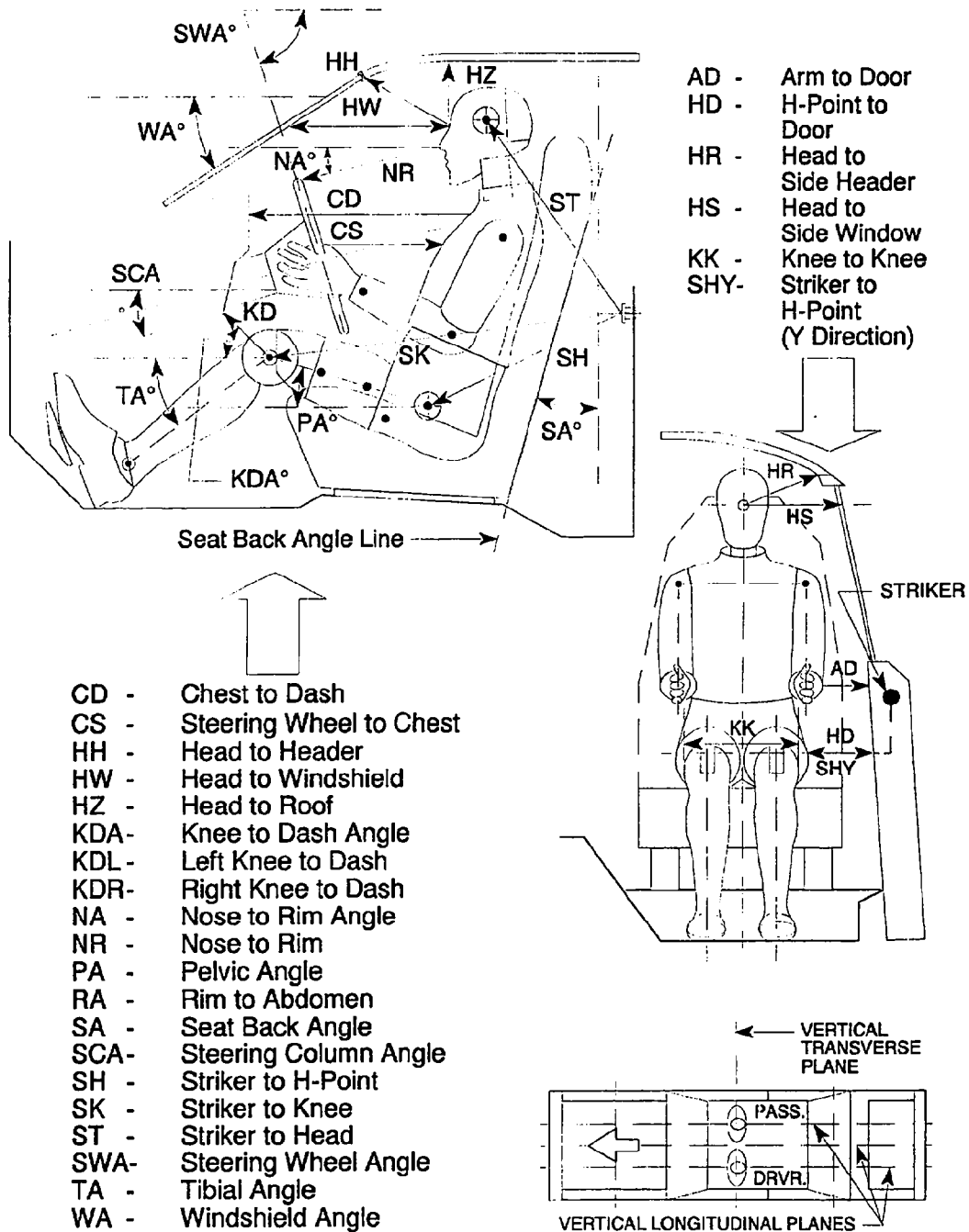


Table 4

FRONT SEAT OCCUPANT MEASUREMENTS

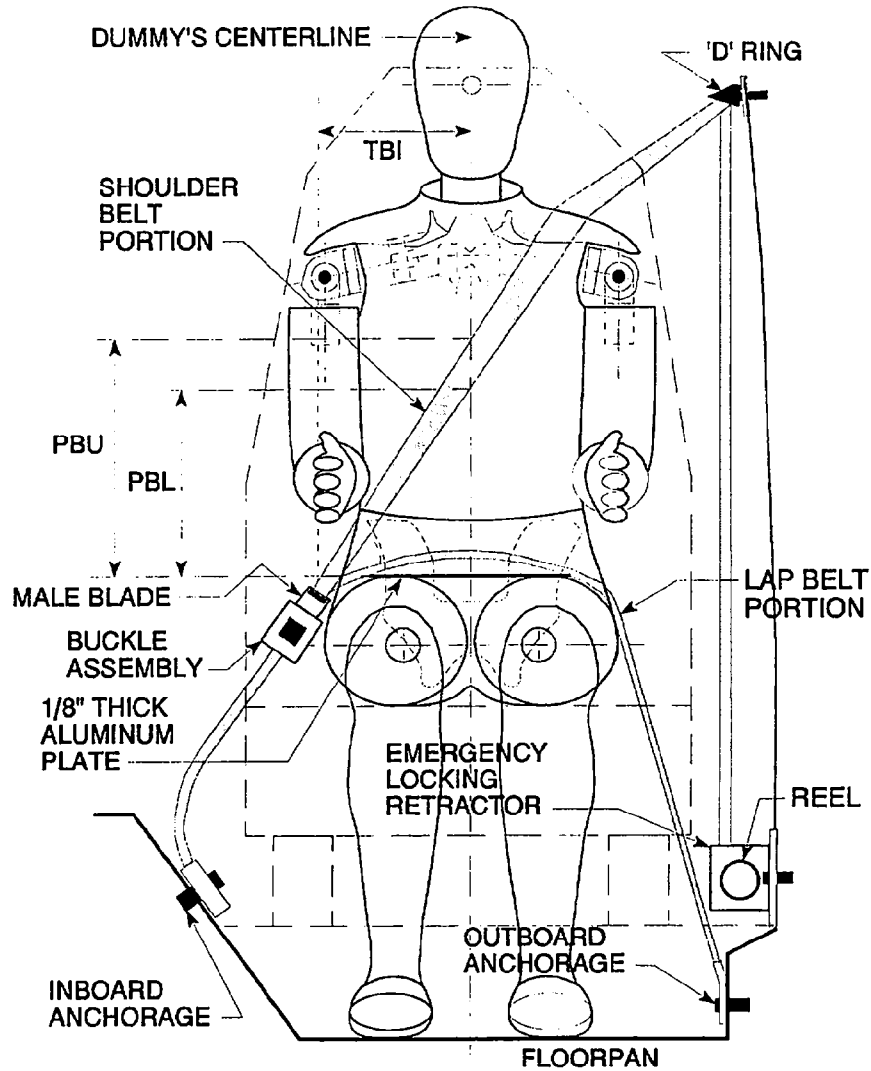
(All dimensions in inches, unless otherwise stated)

	DRIVER (Serial #342)	PASS. (Serial #341)
WA°	24 deg.	-
SWA°	68 deg.	-
SCA°	22 deg.	-
SA°	26 deg.*	26 deg.*
HZ	5.8	5.4
HH	12.1	11.6
HW	19.8	18.5
HR	8.3	8.0
NR	13.9 Angle 13 deg.	-
CD	19.7	19.1
CS	9.8	-
RA	6.3	-
KDL	6.0 Angle (KDA) 36 deg.	6.4
KDR	6.0	6.0 Angle (KDA) 40 deg.
PA°	22 deg.	25 deg.
TA°	40 deg.	36 deg.
KK	12.6	10.6
ST	25.5 Angle 43 deg.	24.7 Angle 42 deg.
SK	35.5 Angle 96 deg.	35.5 Angle 96 deg.
SH	21.4 Angle 110 deg.	21.5 Angle 110 deg.
SHY	11.8	11.7
HS	11.2	13.0
HD	7.5	7.5
AD	3.7	5.9

*Set as specified by vehicle manufacturer.

Figure 3

SEAT BELT POSITIONING DATA



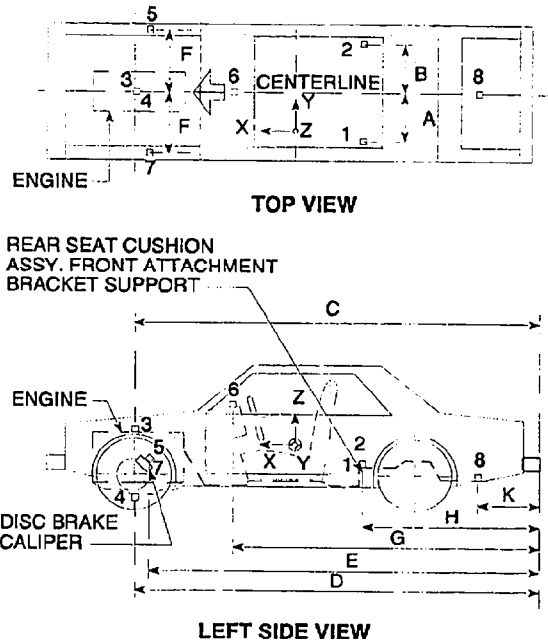
FRONT VIEW OF DUMMY

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

* Vehicle equipped with air bag, manual seat belt not used for this position.

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 Left Rear Seat Crossmember Y	18.3	18.3
B Right Rear Seat Crossmember Y	18.3	18.3
C Top of Engine X	165.3	158.5
D Bottom of Engine X	159.7	156.0
E Disc Brake Calipers X	Left = 153.0 Right = 153.2	Left = 150.3 Right = 152.4
F Disc Brake Calipers Y	22.6	22.9
G Instrument Panel X	121.0	121.2
H Rear Seat Crossmembers X	78.6	78.6
K Trunk X	12.0	12.0

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (G's)			
		Pos.	msec.	Neg.	msec.
1	Rear Seat X-Member @ Left Side	5.1	145.8	-25.7	31.4
2	Rear Seat X-Member @ Right Side	2.2	145.8	-24.2	89.3
3	Top of Engine Block	37.5	65.3	-98.5	44.4
4	Bottom of Engine	18.5	67.8	-62.0	51.2
5	Disc Brake Caliper @ Right Side	16.8	117.4	-58.3	75.0
6	Instrument Panel	24.2	44.8	-92.3	85.3
7	Disc Brake Caliper @ Left Side	16.6	48.5	-117.2	66.2
8	Trunk	21.4	88.9	-13.8	33.1

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information shown on Table 6.

CAMERA POSITIONS FOR FRONTAL IMPACTS

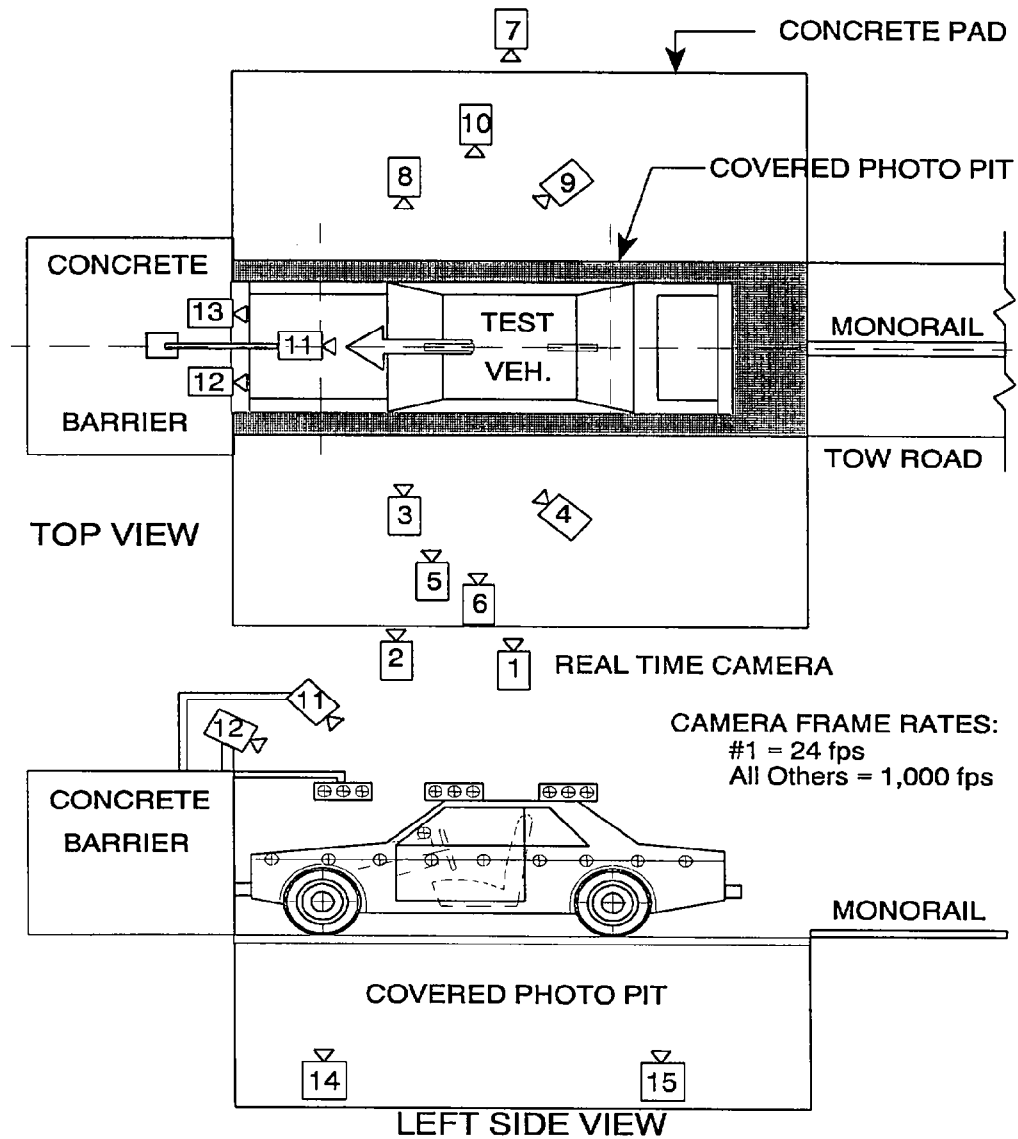


Table 6

HIGH-SPEED CAMERA LOCATIONS

Test No.	CS0105	Vehicle:	1995 Chevrolet Monte Carlo LS 2 door sedan					
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	256	75	41	-4	239.5 in.	13	1000
3	Left Side View	332	54	41	-3	315.5 in.	25	1000
4	Driver and Interior View	112	128	69	-18	-	13	960
5	Steering Column (Bottom)	299	89	46	-3	282.5 in.	25	1100
6	Steering Column (Top)	299	89	70	-9	282.5 in.	25	1105
7	Overall Right Side	261	95	43	-4	244.5 in.	13	1050
8	Right Side View	342	68	41	-3	325.5 in.	25	980
9	Passenger and Interior View	111	122	69	-20	-	13	1105
10	Right Passenger View	340	93	58	-4	323.5 in.	35	860
11	Windshield View	12	0	127	-58	-	13	1100
12	Driver Front View	19	22	74	-41	-	8	1000
13	Passenger Front View	19	22	74	-44	-	8	1000
14	Pit View of Engine	0	40	-86	90	-	13	900
15	Pit View of Fuel Tank	0	120	-86	90	-	13	910

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

Figure 6

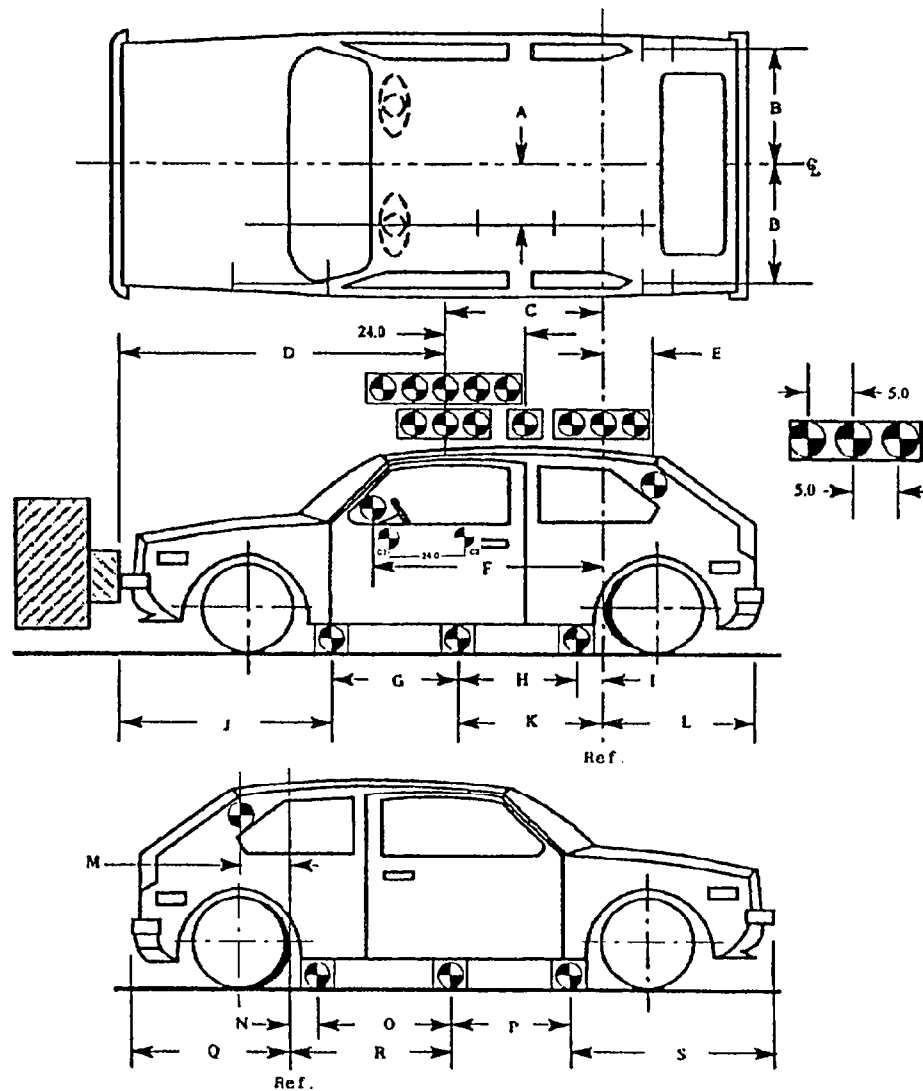
VEHICLE TARGET LOCATIONS
(All dimensions in inches)

Key (Inches)

A = 13.5
B = 21.7

C = 48.0
D = 92.3
E = 0.0
F = 62.3
G = 36.5
H = 36.7
I = 4.0
J = 63.4
K = 40.7
L = 59.9

M = 0.0
N = 4.0
O = 36.8
P = 36.4
Q = 59.5
R = 40.8
S = 63.8



Note: Targets on front fender are 12.0 inches apart.
Targets rearward of front fender are 24.0 inches apart.

Figure 7

TEST VEHICLE MEASUREMENTS

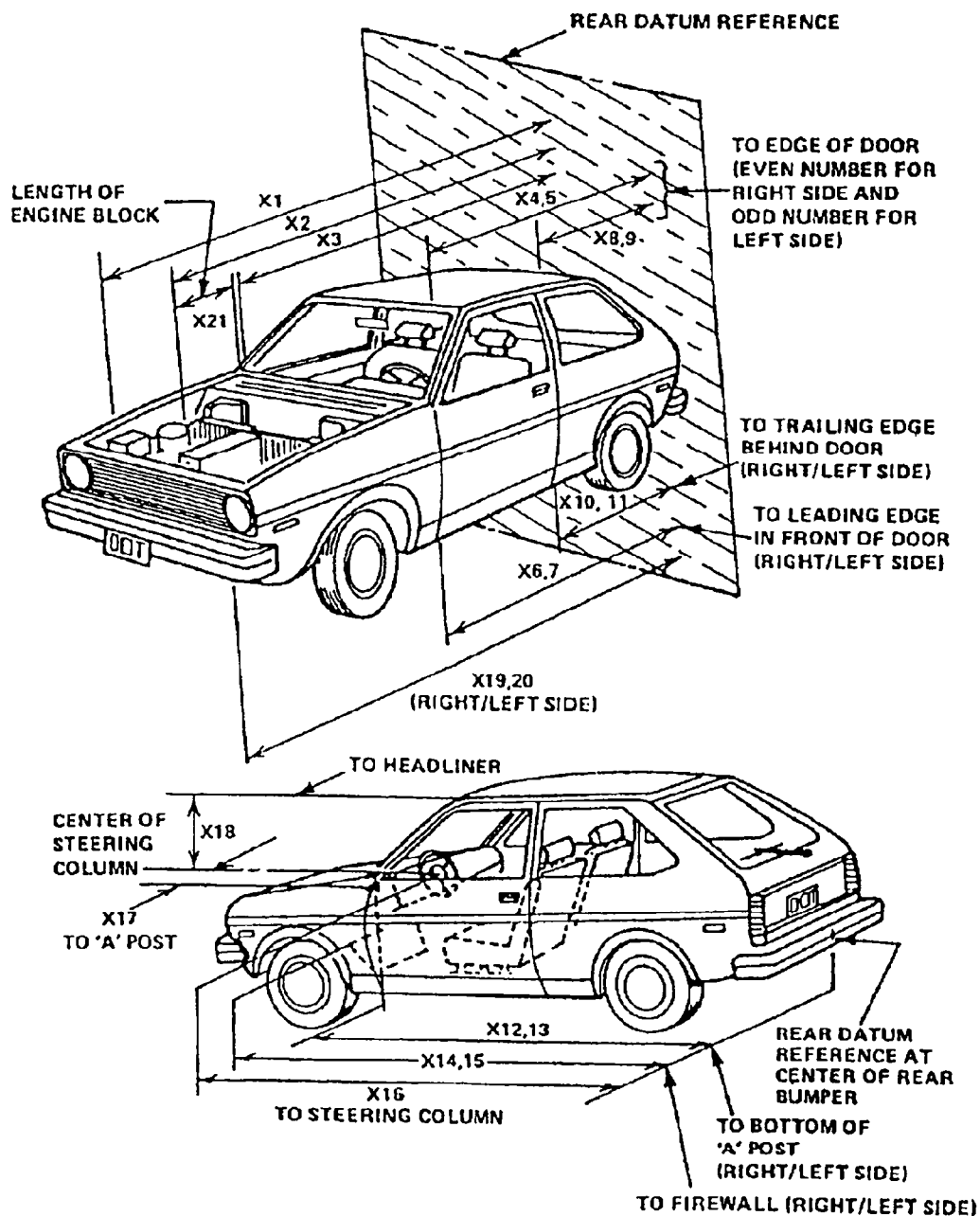


Table 7

VEHICLE MEASUREMENTS

No.		All Dimensions in inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	200.5	180.8	19.7
X2	Rear Surface of Vehicle to Front of Engine	171.0	164.7	6.3
X3	Rear Surface of Vehicle to Firewall	150.0	150.0	0.0
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	135.3	135.3	0.0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	135.4	135.5	-0.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	133.2	133.9	-0.7
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	135.9	134.3	1.6
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	82.0	81.8	0.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	82.4	82.3	0.1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	81.9	82.8	-0.9
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	82.2	83.0	-0.8
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	133.9	134.2	-0.3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	133.9	132.0	1.9
X14	Rear Surface of Vehicle to Firewall, Right Side	148.8	149.4	-0.6
X15	Rear Surface of Vehicle to Firewall, Left Side	150.8	148.5	2.3
X16	Rear Surface of Vehicle to Steering Column	114.8	116.9	-2.1
X17	Center of Steering Column to "A" Post	16.4	15.8	0.6
X18	Center of Steering Column to Headliner	13.6	13.8	-0.2
X19	Rear Surface of Vehicle to Right Side of Front Bumper	194.2	174.7	19.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	193.5	177.8	15.7
X21	Length of Engine Block	17.8	17.8	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 8

DUMMY INJURY CRITERIA VALUESNHTSA No. : CS0105 Vehicle : 1995 Chevrolet Monte Carlo LS 2 door sedan

	MAXIMUM ACCELERATION (g's)								
	HEAD				CHEST				
	X	Y	Z	R	X	Y	Z	R*	Displacement
Dummy (1)	-30.7	11.8	-7.1	31.1	-41.9	-4.7	17.4	44.371	-1.5
Dummy (2)	-56.9	69.6	-17.3	87.7	-39.2	-3.2	18.2	39.987	-0.6

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	-1057.1	-1063.0
Dummy (2)	-1051.1	-1094.3

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc (g)
		t ₁ (msec)	t ₂ (msec)	t ₁ TO t ₂
Dummy (1)	120.14	70.440	106.320	25.70
Dummy (2)	320.52	64.920	95.880	40.37

* 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 = 6.0 sec.

Log time duration of reminder light operation = 6.0 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
(audible warning should not operate) = - sec.

Log time duration of reminder light operation = Continuous 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

The label states, "Regular maintenance of the air bag system is not required."

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 lower left 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. :	CS0105
Make/Model :	1995 Chevrolet Monte Carlo LS 2 door sedan
Date of Comfort/Convenience Check :	11-13-94
Technician Performing Check :	D.J.T.
GVWR :	4403 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 - NO X

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.

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 X NO -

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 (non-engaged)

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 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 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	<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. Seat 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 X NO -

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 0.5" rubber molding along the top and 0.7" rubber molding along the sides. Bottom of windshield is covered by a plastic shroud.

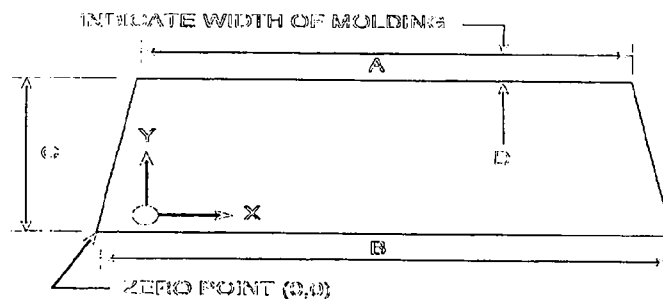
FMVSS 212 REQUIREMENTS :

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	89.65	89.65	100.0
LEFT SIDE	89.65	89.65	100.0
TOTAL	179.3	179.3	100.0

AREA OF
RETENTION
N
FAILURE:



FRONT VIEW OF WINDSHIELD

FAILURE DETAILS : None

Figure 9

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

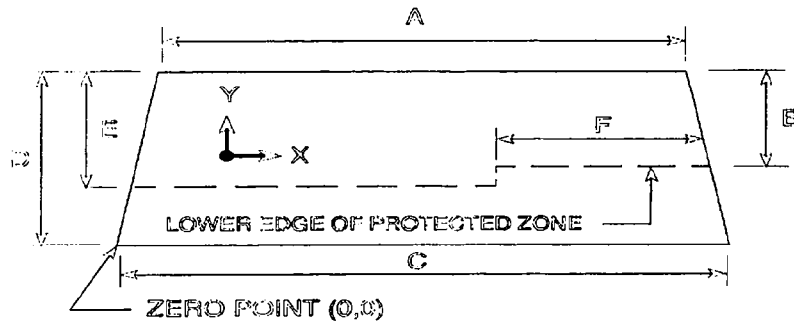
PROTECTED ZONE LOWER EDGE REQUIREMENT :

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.)

KEY:

A = 49.0
B = 15.4
C = 68.3
D = 31.0
E = 19.5
F = 34.3



FRONT VIEW OF WINDSHIELD

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

(Show location of penetration on above sketch)

None

COORDINATES		
	X	Y
1		
2		
3		
4		

Table 13
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

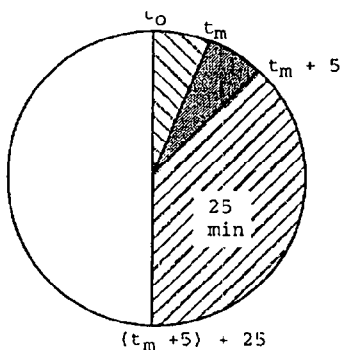
FMVSS NO. 301

TEST VEHICLE NHTSA NO. : CS0105 TEST DATE : November 14, 1994
 Vehicle Mfgr./Make/Model : 1995 Chevrolet Monte Carlo LS 2 door sedan

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 :

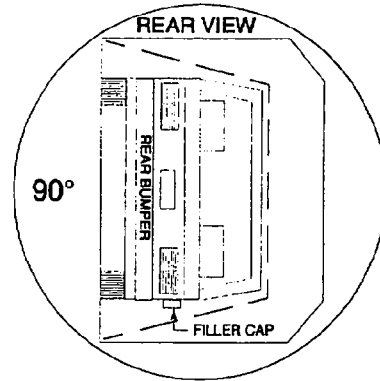
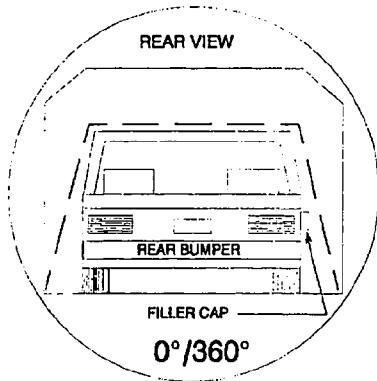
None

Table 14

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE :
0-90 Deg.

Vehicle NHTSA ID No. :
CS0105

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time 2 minutes 15 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 00 seconds

TOTAL 7 minutes 15 seconds
8 minutes

Next whole minute interval

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.

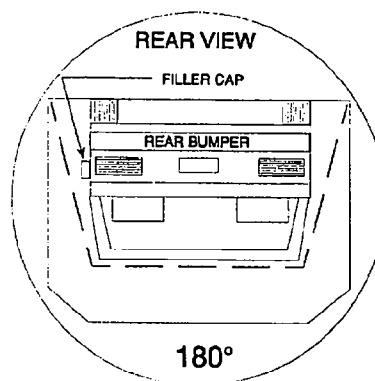
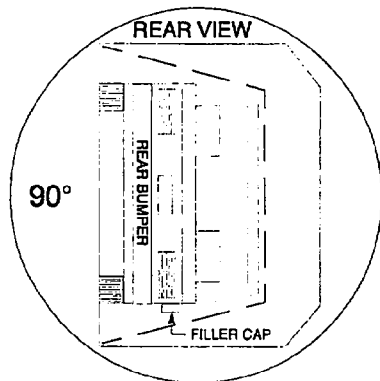
IV. SOLVENT SPILLAGE LOCATION(S) :

None.

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

TEST PHASE :
90-180 Deg.

Vehicle NHTSA ID No. :
CS0105



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

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

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE :

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

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

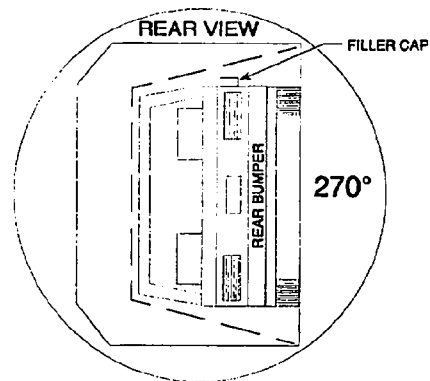
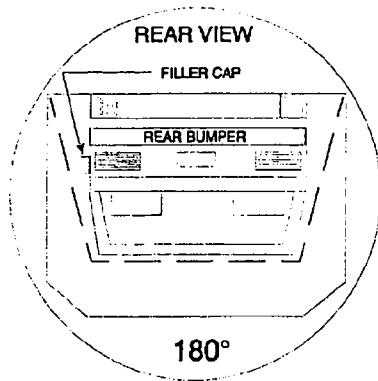
IV. SOLVENT SPILLAGE LOCATION(S) :

None.

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

TEST PHASE :
180-270 Deg.

Vehicle NHTSA ID No. :
CS0105



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	2	minutes	10	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	7	minutes	10	seconds
Next whole minute interval	8	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE :

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

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

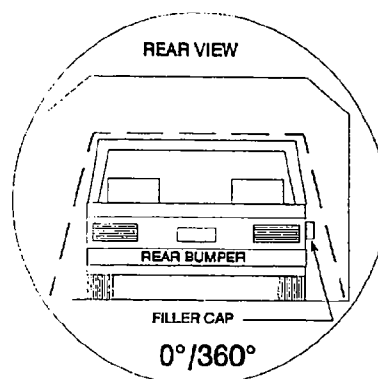
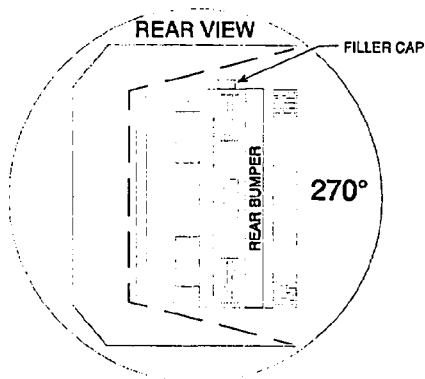
IV. SOLVENT SPILLAGE LOCATION(S) :

None.

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

TEST PHASE :
270-360 Deg.

Vehicle NHTSA ID No. :
CS0105



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	2	minutes	05	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	7	minutes	05	seconds
Next whole minute interval	8	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE :

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

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

IV. SOLVENT SPILLAGE LOCATION(S) :

None.

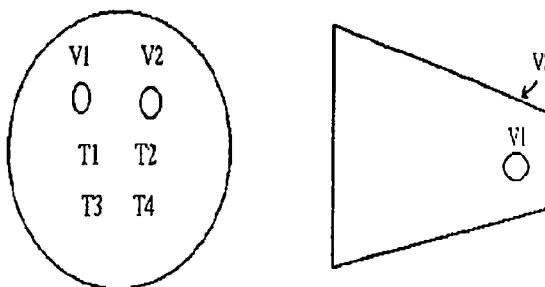
Table 15

POST TEST AIR BAG DATANHTSA No. : CS0105; Test Date: 11/14/94; Technician: R.E.Vehicle Model Year/Make/Model: 1995 Chevrolet Monte Carlo LS

- A. No. of vent holes: 2 -Driver 2 -Passenger
- B. Size of vent holes: (In.²) 0.95 -Driver 0.95 -Passenger
- C. Total vent area: (In.²) 1.9 -Driver 1.9 -Passenger
- D. Deflated air bag length and width dimensions or, if round, diameter. (In inches)
- Driver: - -Length; - -Width; 22.5 -Diameter
- Passenger: 18.0 -Height; 25.0 -Width; 17.5 -Depth
- E. Is the air bag tethered?
- Driver: - -Yes; X -No; If yes, record length of tether- -
- Passenger: X -Yes; - -No; If yes, record length of tether- 12.0 in.

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).



- F. Record part numbers and manufacturer name of the air bag and gas generator.
- Driver: Airbag: P16756616 / TXM942140614 Generator: AB6546I500T0M4
- Passenger: Generator: AL7147IB222C2045
- 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: 1995 Chevrolet Monte Carlo LS 2 door sedan

VEHICLE NHTSA NO. : CS0105 VIN NO. : 2G1WW12M0S9143806

WHEELBASE: 107.6 in. BUILD DATE: August 1994 TEST DATE: November 14, 1994

VEH SIZE CATEGORY: Mid-size TEST WEIGHT: 3760 lbs.

FRONT OVERHANG: - OVERALL WIDTH: 58.3 in.

COLLISION DEFORMATION (CDC) CODE: 12FDEW2

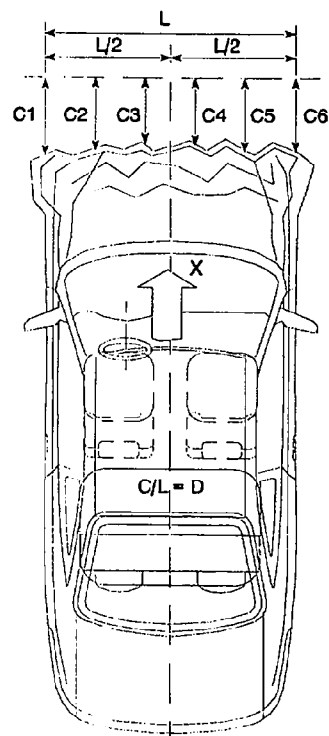
IMPACT MODE: 30 mph Frontal Barrier

CRUSH DEPTH DIMENSIONS: (Inches)

C1 = <u>15.3</u>	C4 = <u>20.1</u>
C2 = <u>18.0</u>	C5 = <u>20.9</u>
C3 = <u>19.3</u>	C6 = <u>17.4</u>

MIDPOINT OF DAMAGE: D =
(Vehicle Longitudinal Centerline) 29.2 in.

LENGTH OF DAMAGE
REGION: L = 58.3 in.



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 : November 14, 1994 Vehicle NHTSA No. : CS0105
Vehicle Manufacturer : GENERAL MOTORS OF CANADA
Model Year : 1995 VIN : 2G1WW12M0S9143806
Model : Monte Carlo Body Style: 2 door sedan Build Date : August 1994
LS
Dummy Stabilized Temperature at Time of Test : 70 °F (Spec. = 69 - 72 °F)
Impact Velocity : 29.7 mph; Time of Test : 11:30
Type of Automatic Restraint System :
Driver : air bag
Passenger : air bag

Failure Details :

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

Appendix A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

<u>Figure</u>	<u>Photograph Title</u>	<u>Page No.</u>
A-1	PRE-TEST FRONT VIEW	A-3
A-2	POST- TEST FRONT VIEW	A-4
A-3	PRE-TEST LEFT SIDE VIEW	A-5
A-4	POST -TEST LEFT SIDE VIEW	A-6
A-5	PRE-TEST RIGHT SIDE VIEW	A-7
A-6	POST -TEST RIGHT SIDE VIEW	A-8
A-7	PRE-TEST FRONT UNDERBODY VIEW	A-9
A-8	POST- TEST FRONT UNDERBODY VIEW	A-10
A-9	PRE-TEST DRIVER SIDE VIEW	A-11
A-10	POST-TEST DRIVER SIDE VIEW	A-12
A-11	PRE-TEST PASSENGER SIDE VIEW	A-13
A-12	POST-TEST PASSENGER SIDE VIEW	A-14
A-13	PRE-TEST UNDERBODY STEERING SHAFT	A-15
A-14	POST-TEST UNDERBODY STEERING SHAFT (Not Available)	A-16
A-15	PRE-TEST STEERING COLUMN/FIREWALL INSIDE VIEW (Not Available)	A-17
A-16	POST-TEST STEERING COLUMN/FIREWALL INSIDE VIEW (Not Available)	A-18
A-17	POST-TEST DRIVER KNEE BOLSTER	A-19
A-18	POST-TEST PASSENGER KNEE BOLSTER	A-20
A-19	VEHICLE IMPACT	A-21
A-20	CERTIFICATION PLACARD	A-22
A-21	TIRE PLACARD	A-23
A-22	POST-TEST DRIVER AIRBAG VIEW	A-24
A-23	POST-TEST PASSENGER AIRBAG VIEW	A-25



Figure A-1 PRE-TEST FRONT VIEW

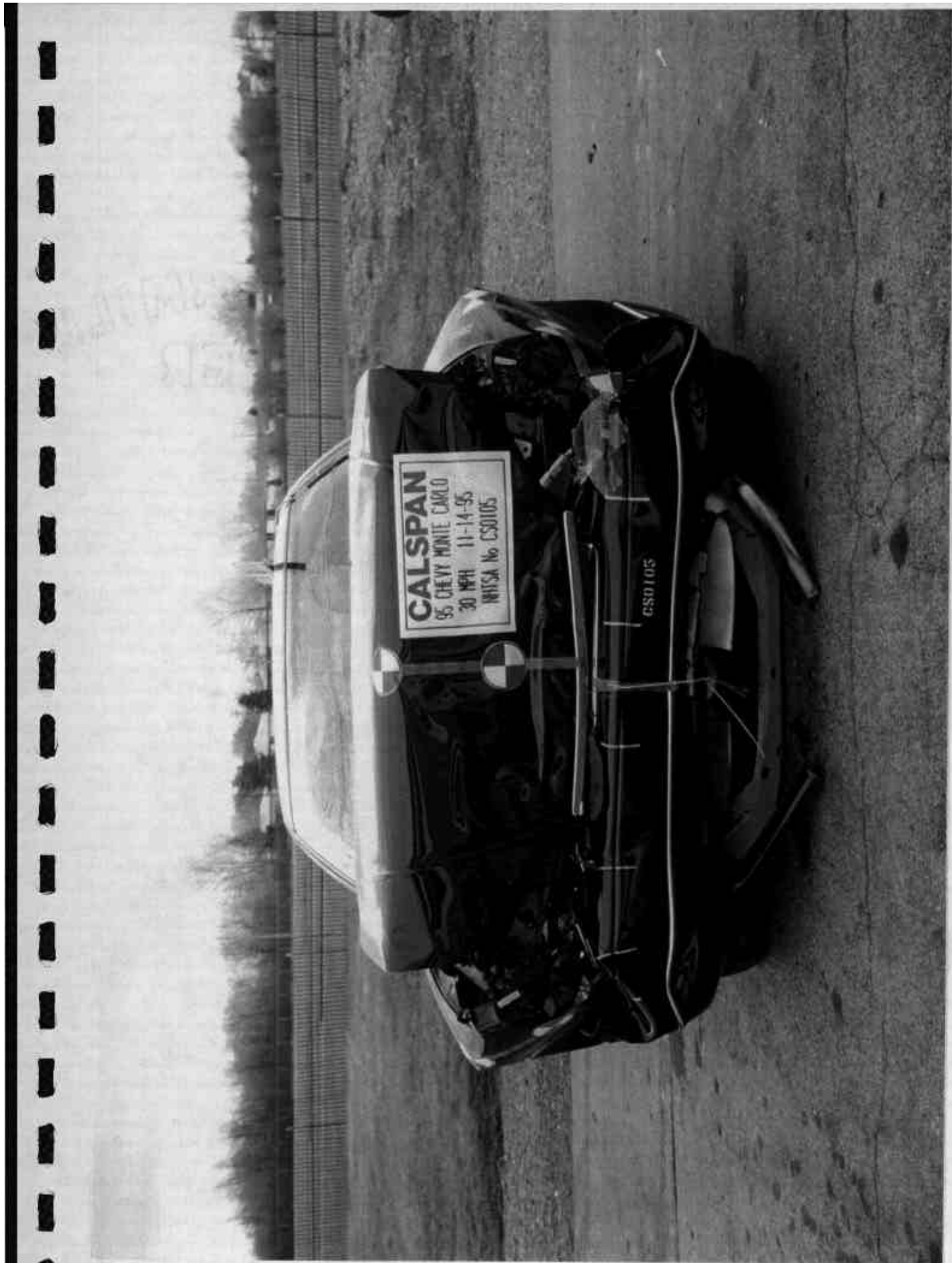


Figure A-2 POST-TEST FRONT VIEW



Figure A-3 PRE-TEST LEFT SIDE VIEW

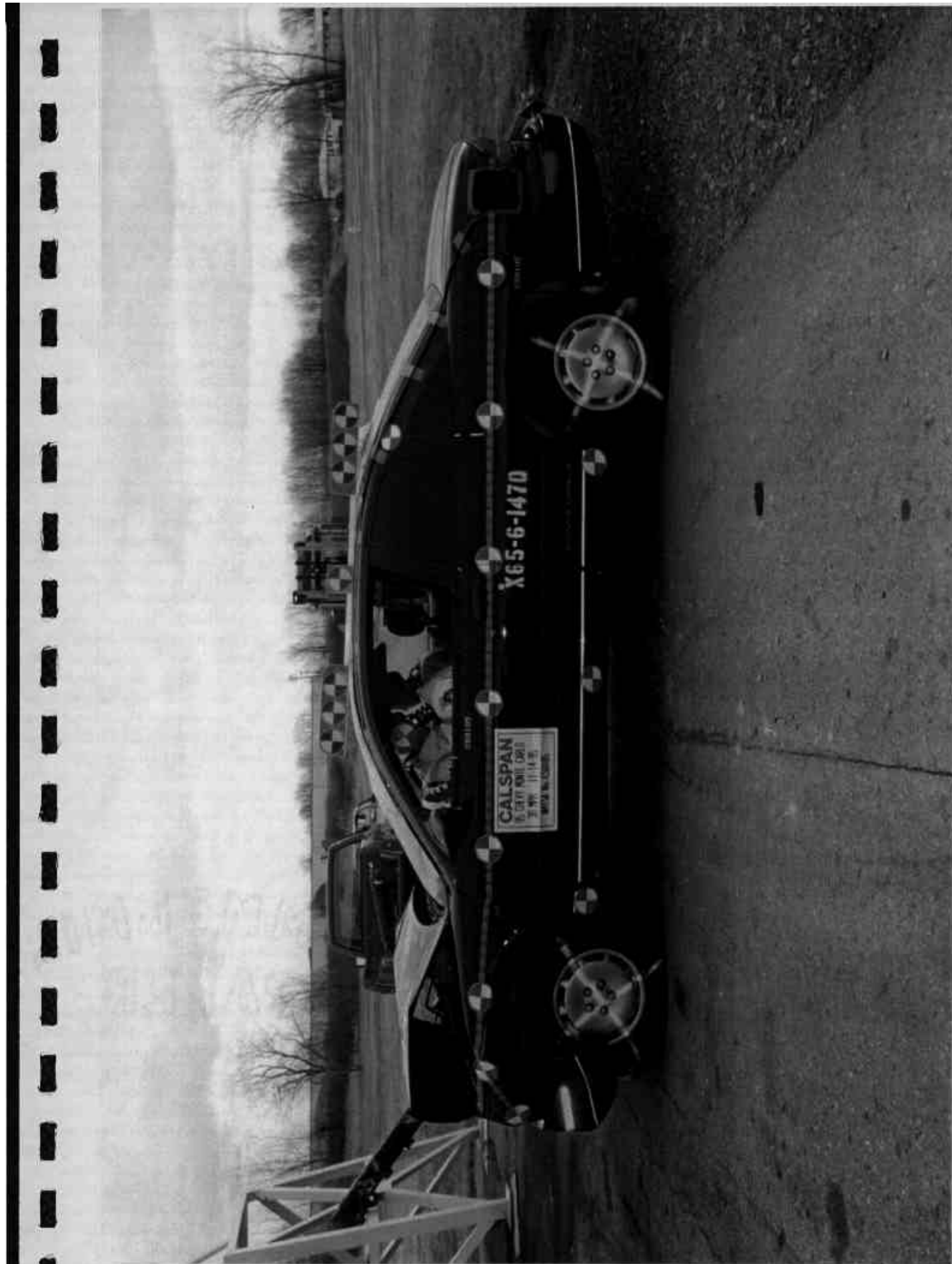


Figure A-4 POST-TEST LEFT SIDE VIEW



Figure A-5 PRE-TEST RIGHT SIDE VIEW



Figure A-6 POST-TEST RIGHT SIDE VIEW

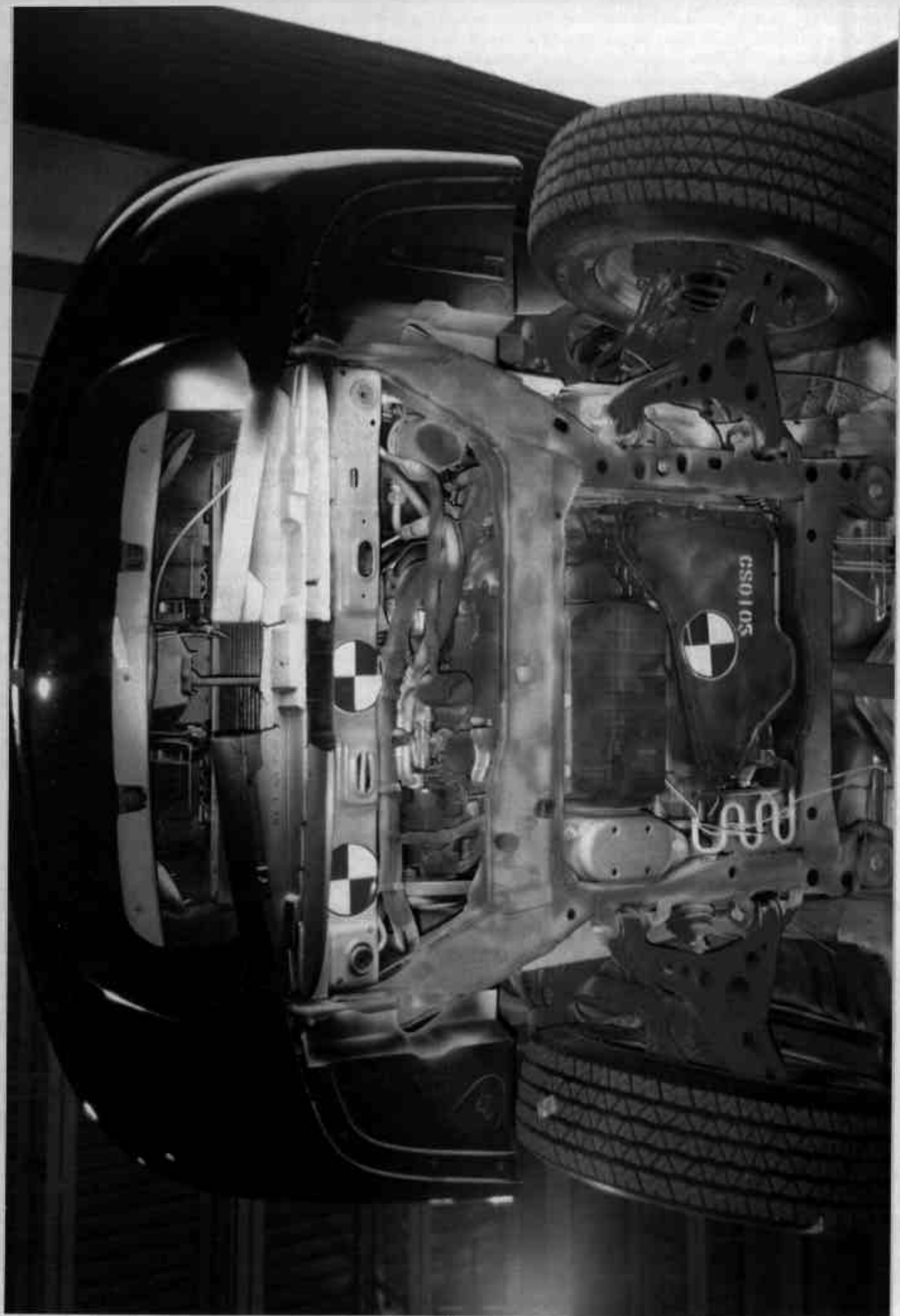


Figure A-7 PRE-TEST FRONT UNDERBODY VIEW

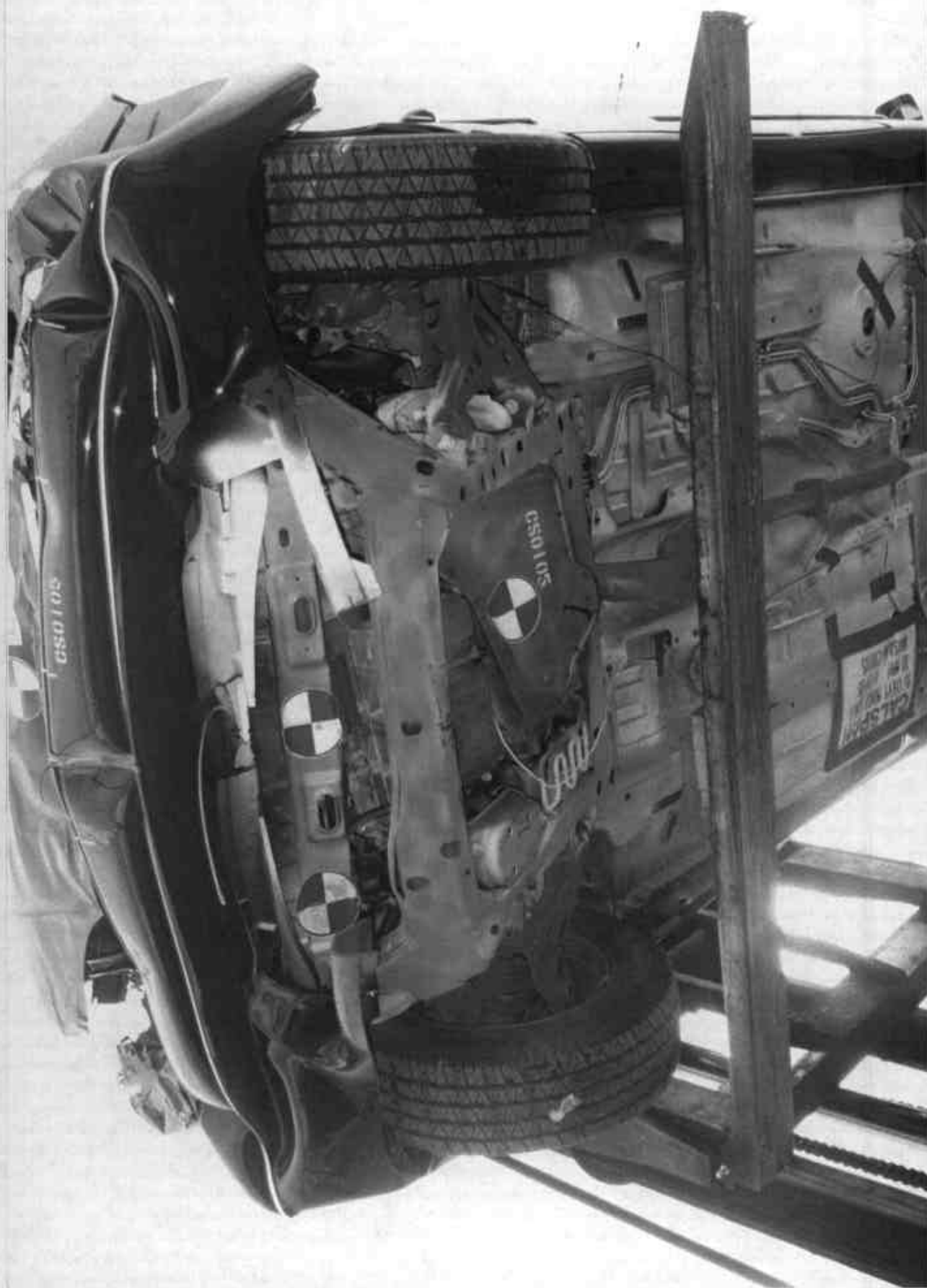


Figure A-8 POST-TEST FRONT UNDERBODY VIEW



Figure A-9 PRE-TEST DRIVER SIDE VIEW



Figure A-10 POST-TEST DRIVER SIDE VIEW
A-12



Figure A-11 PRE-TEST PASSENGER SIDE VIEW



Figure A-12 POST-TEST PASSENGER SIDE VIEW

A-14

8221-6



Figure A-13 PRE-TEST UNDERBODY STEERING SHAFT

PHOTOGRAPH NOT AVAILABLE

PHOTOGRAPH NOT AVAILABLE

PHOTOGRAPH NOT AVAILABLE



Figure A-17 POST-TEST DRIVER KNEE BOLSTER



Figure A-18 POST-TEST PASSENGER KNEE BOLSTER

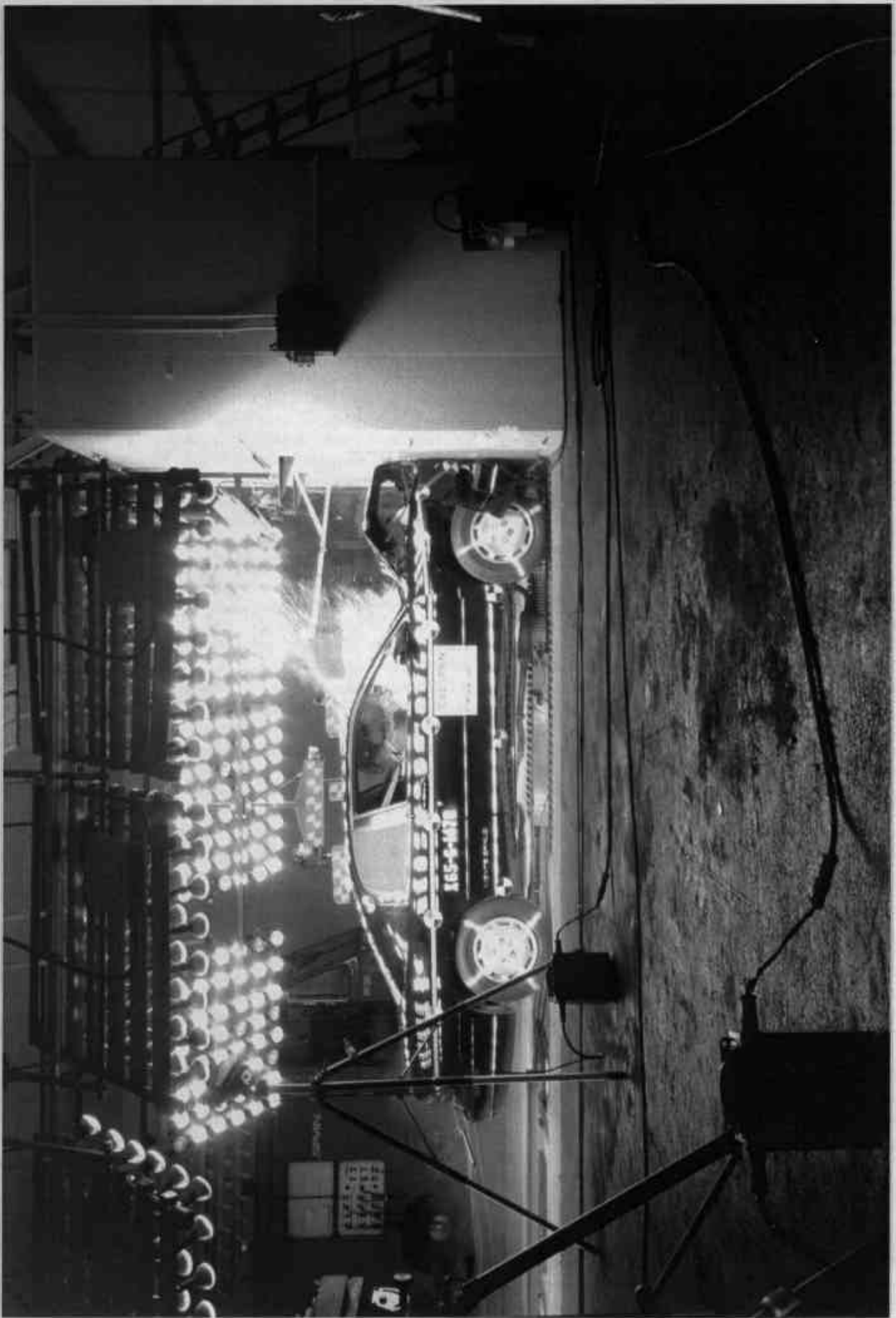


Figure A-19 VEHICLE IMPACT

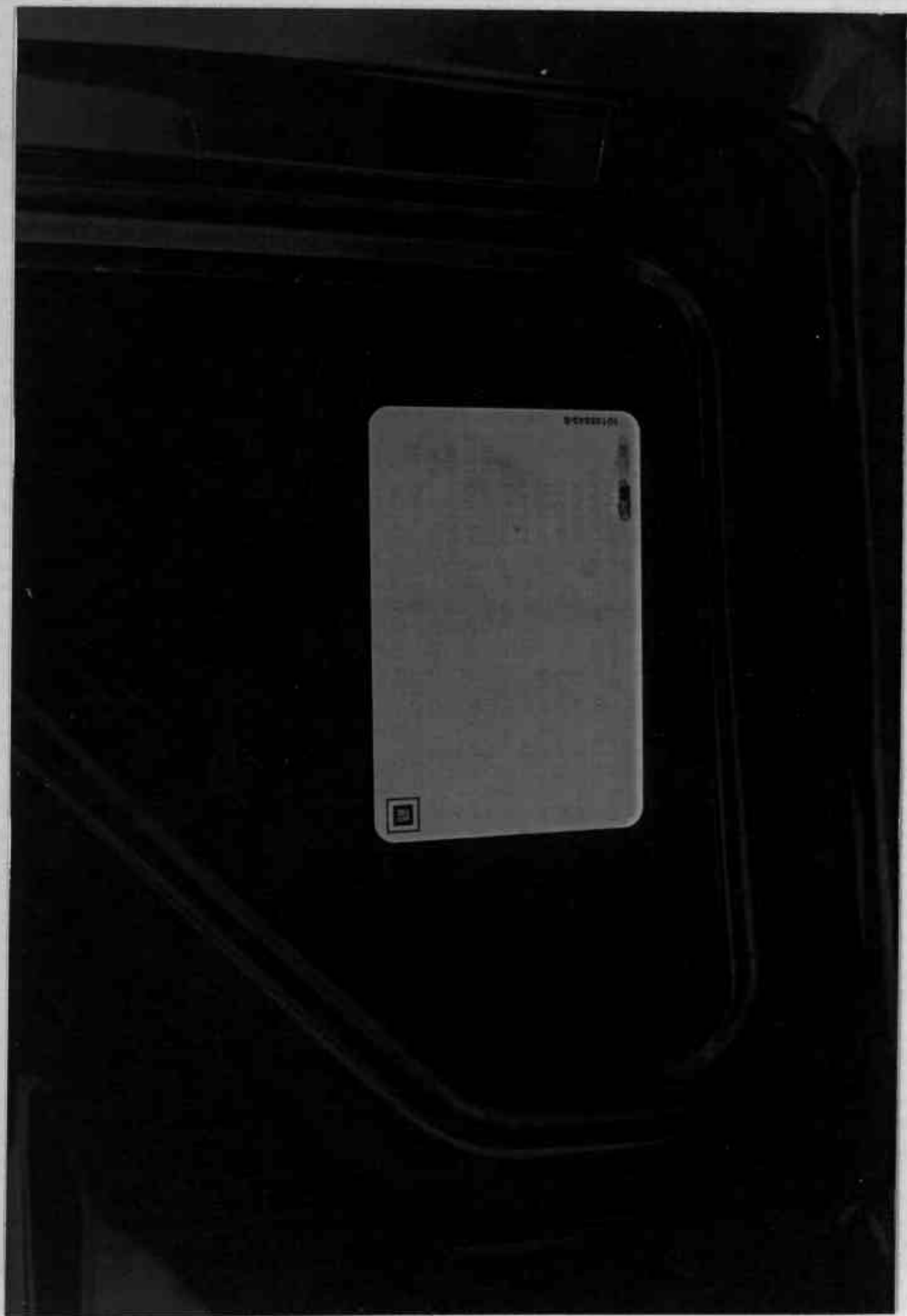


Figure A-21 TIRE PLACARD



Figure A-22 POST-TEST DRIVER AIRBAG VIEW



Figure A-23 POST-TEST PASSENGER AIRBAG VIEW

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. CS0105

VEHICLE

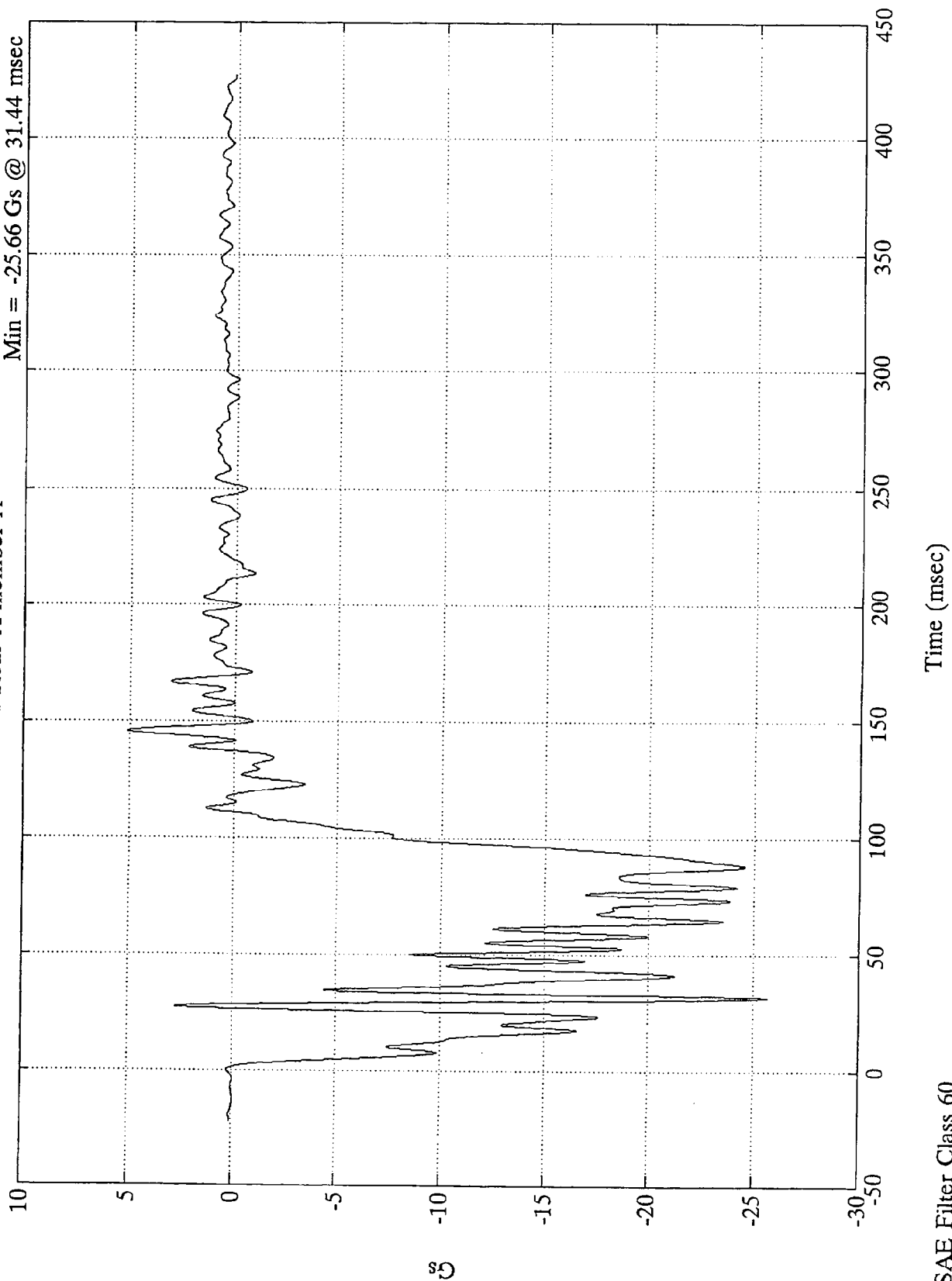
SAE FILTER CHANNEL CLASS

60

FMVSS 208 -95 Chevrolet Monte Carlo

L. Rear X-member X

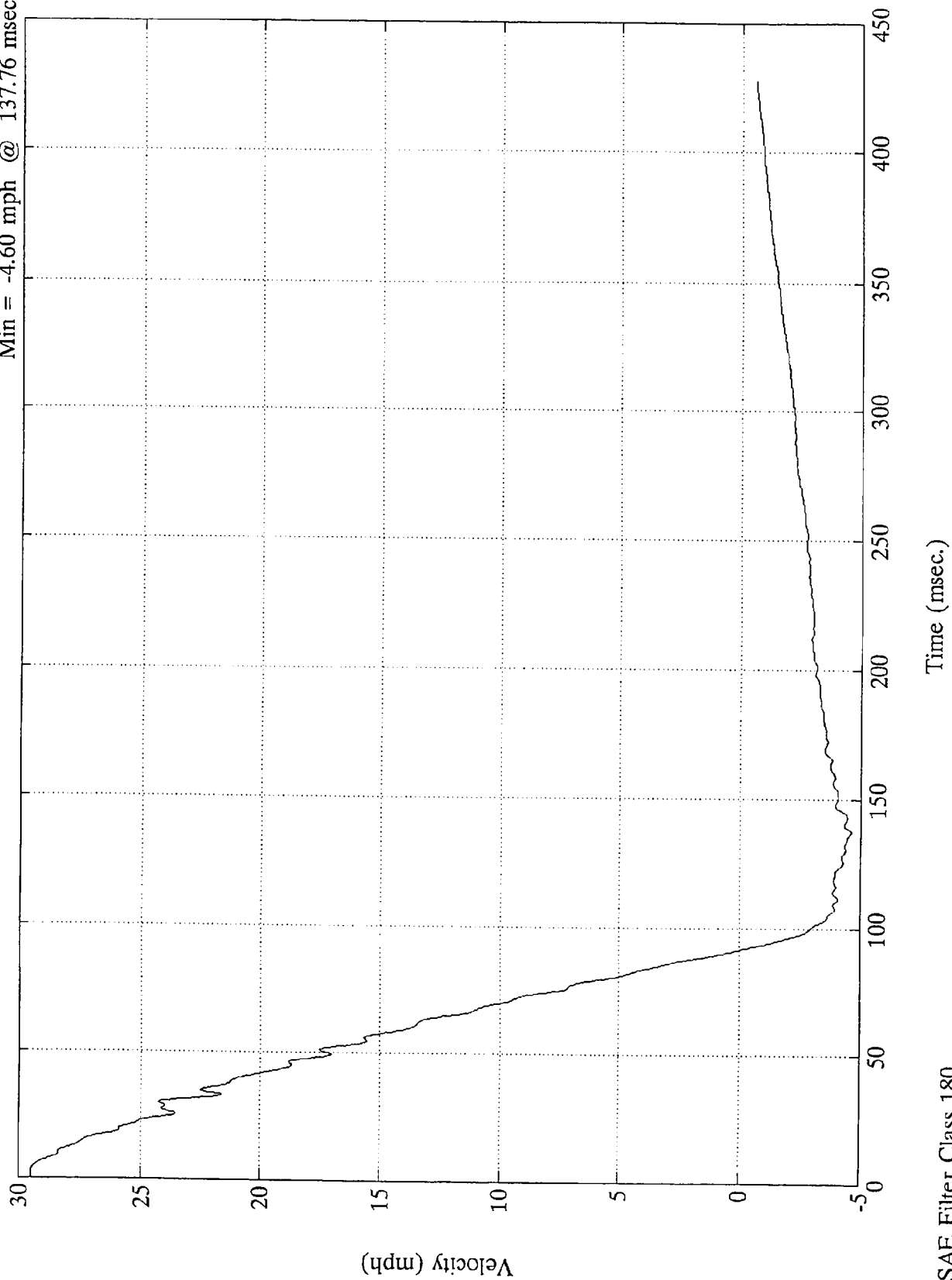
Max = 5.10 Gs @ 145.80 msec
Min = -25.66 Gs @ 31.44 msec



FMVSS 208 -95 Chevrolet Monte Carlo

L. Rear X-member X

Max = 29.50 mph @ 0.72 msec
Min = -4.60 mph @ 137.76 msec

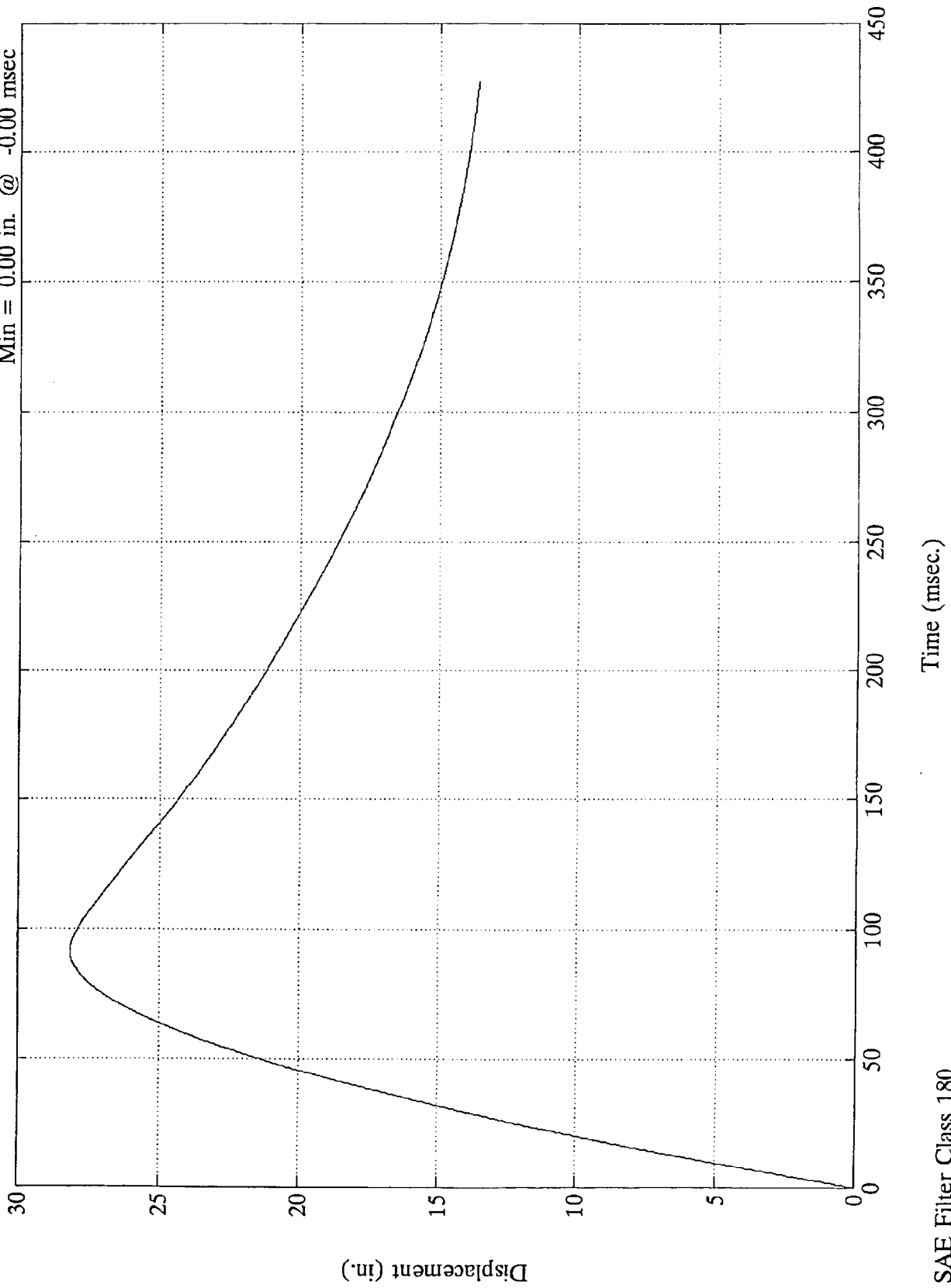


SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

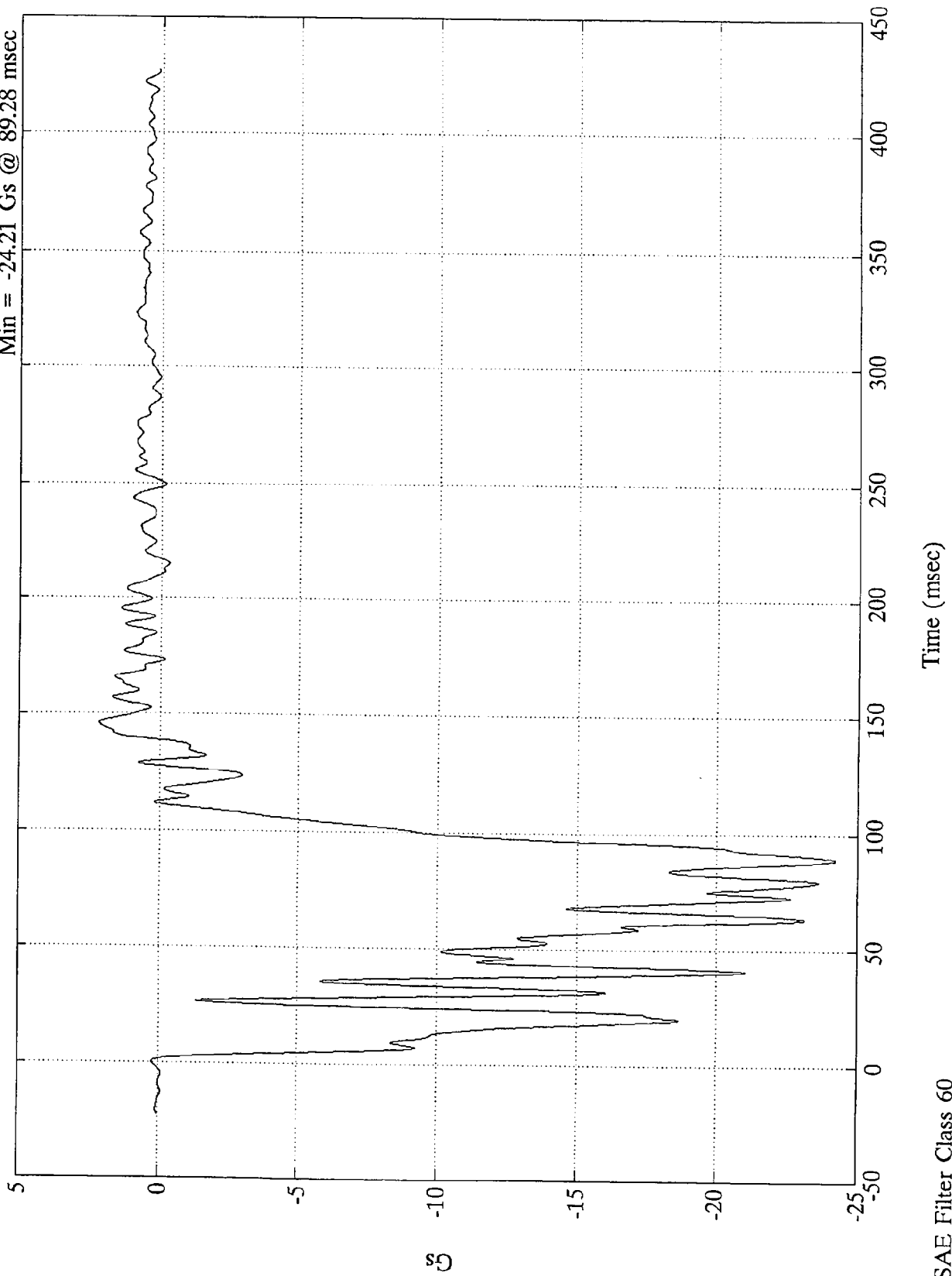
L. Rear X-member X

Max = 28.17 in. @ 92.40 msec
Min = 0.00 in. @ -0.00 msec



FMVSS 208 -95 Chevrolet Monte Carlo

R. Rear X-member X
Max = 2.15 Gs @ 145.80 msec
Min = -24.21 Gs @ 89.28 msec

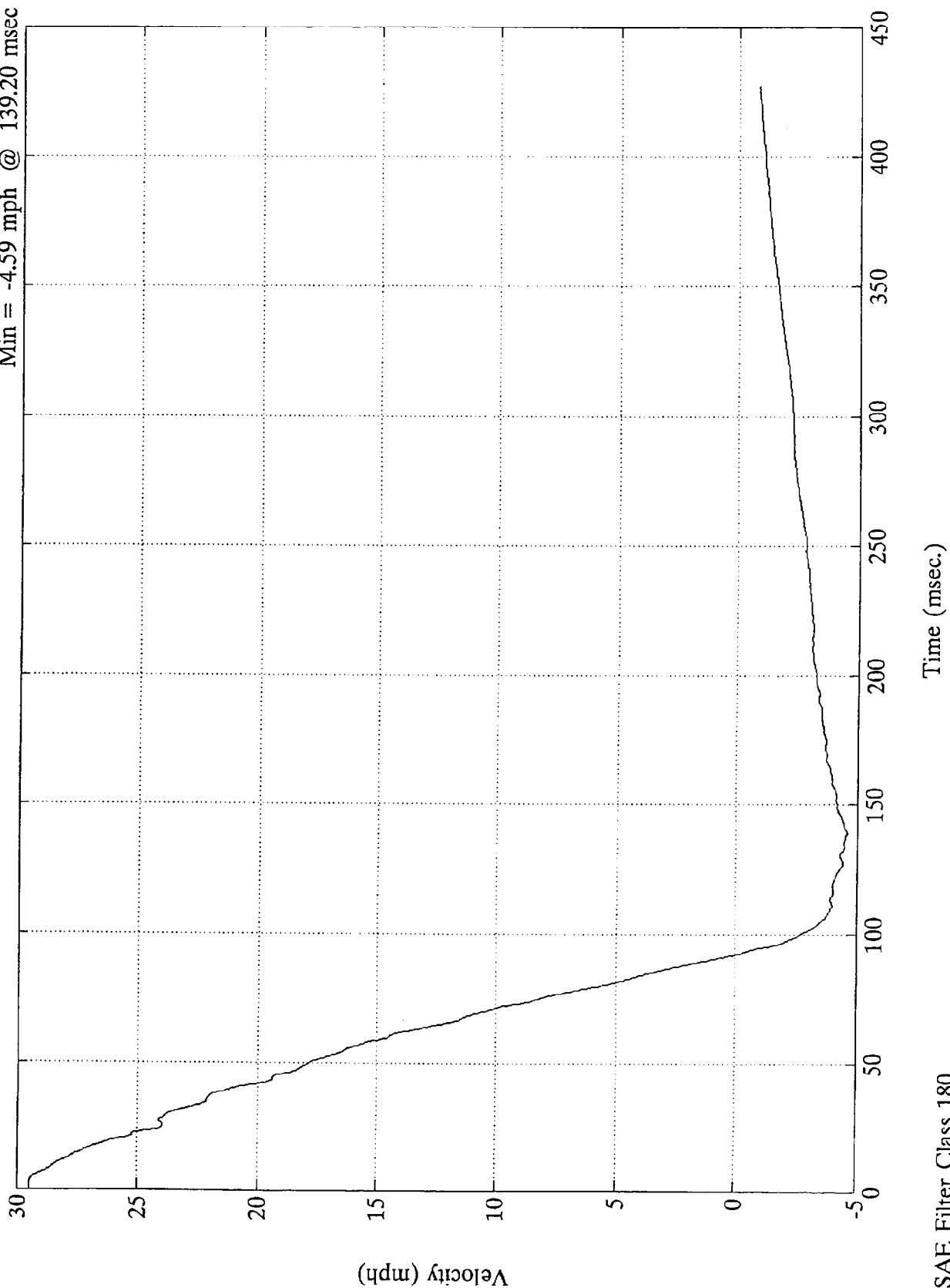


SAE Filter Class 60

FMVSS 208 -95 Chevrolet Monte Carlo

R. Rear X-member X

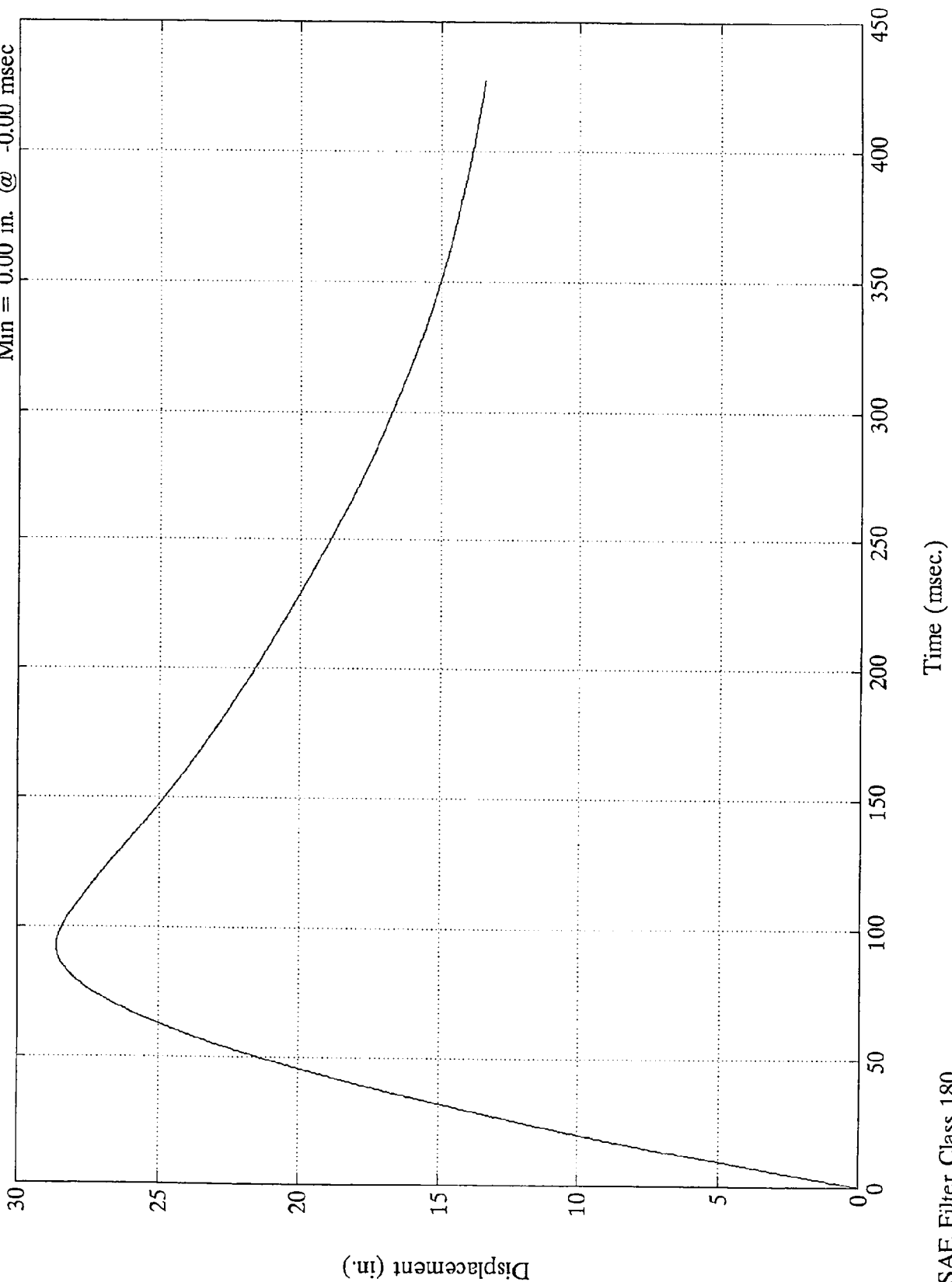
Max = 29.50 mph @ 2.88 msec
Min = -4.59 mph @ 139.20 msec



FMVSS 208 -95 Chevrolet Monte Carlo

R. Rear X-member X

Max = 28.63 in. @ 93.84 msec
Min = 0.00 in. @ -0.00 msec

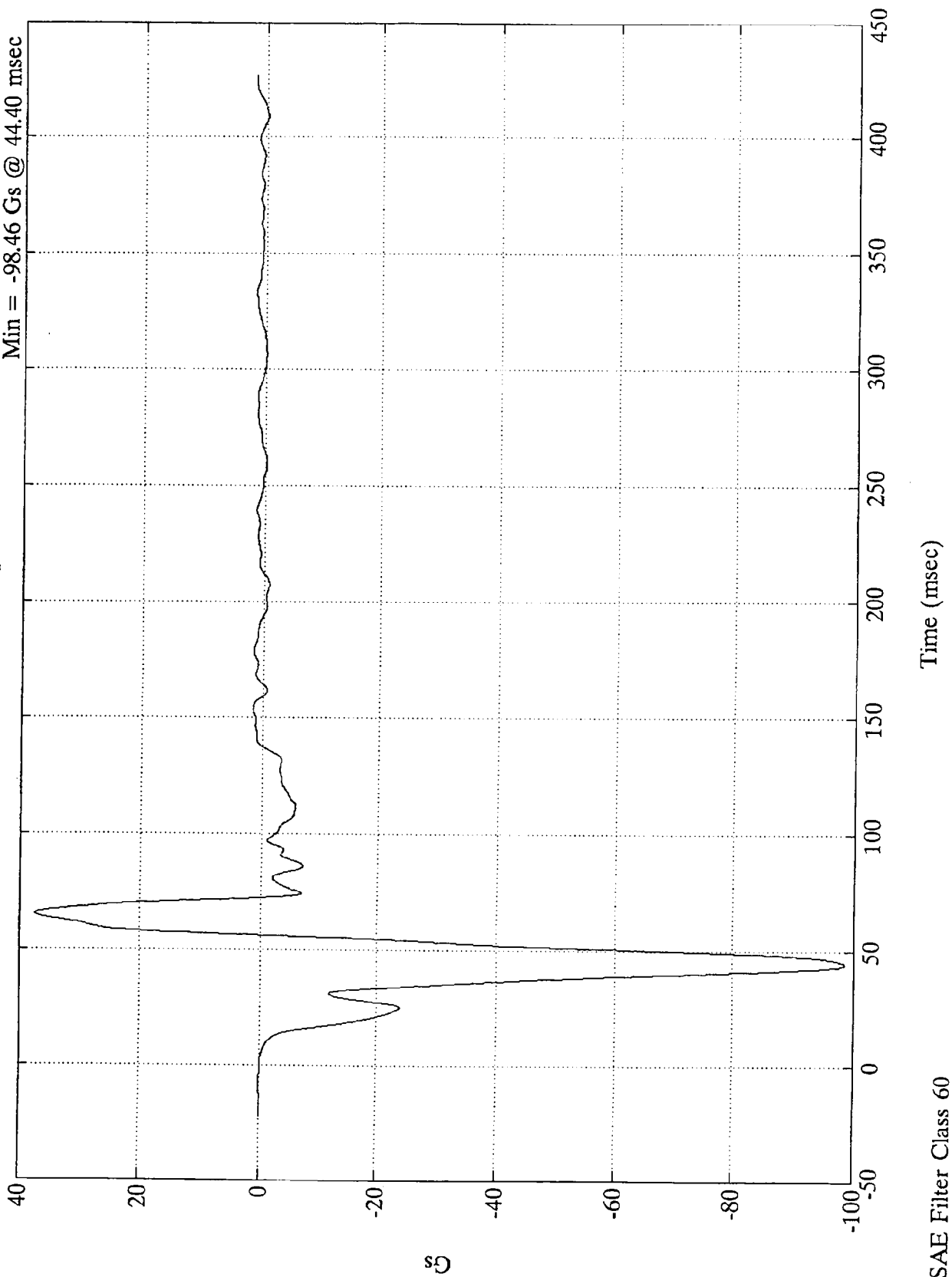


SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

Engine Top X

Max = 37.47 Gs @ 65.28 msec
Min = -98.46 Gs @ 44.40 msec



SAE Filter Class 60

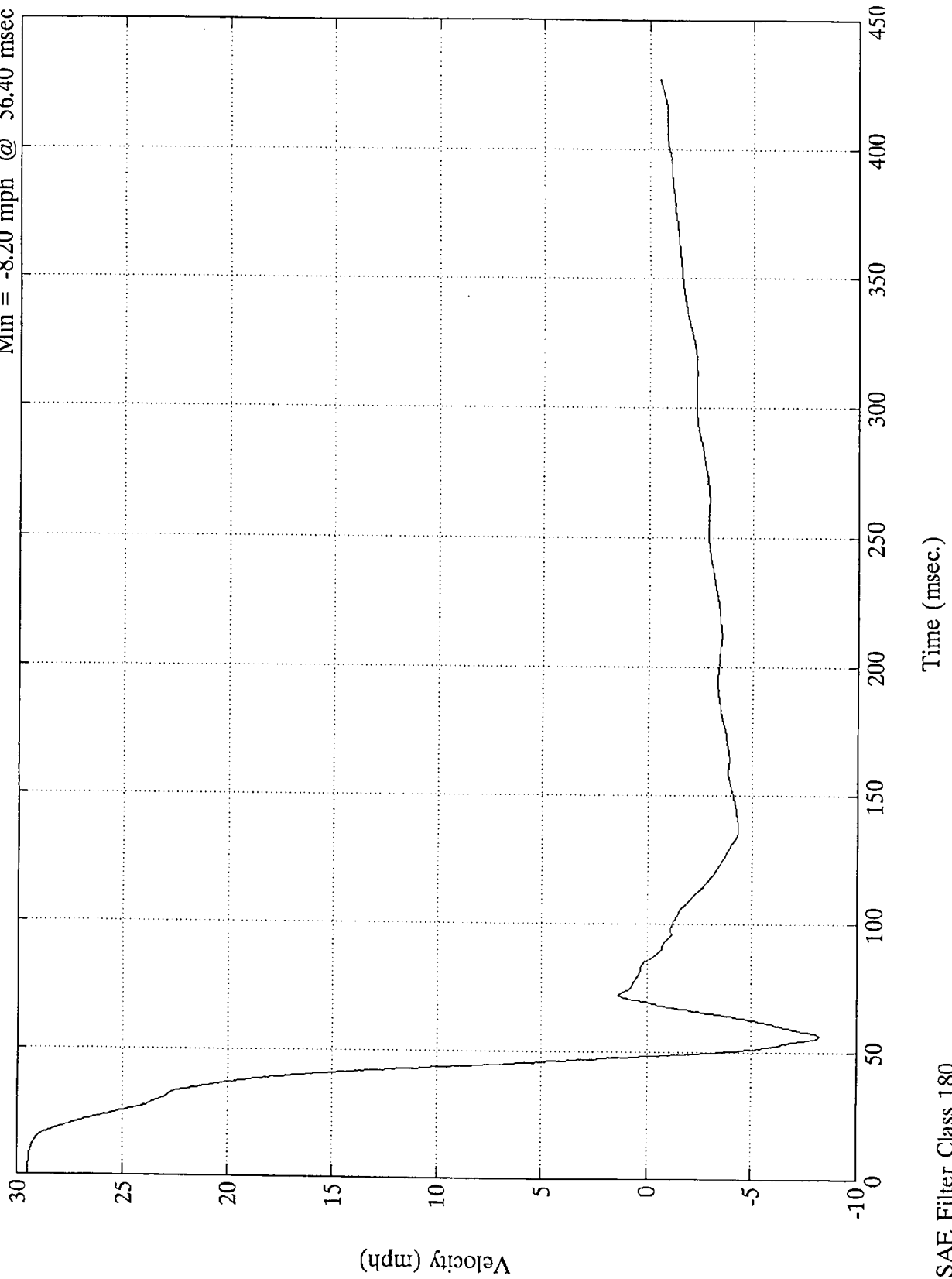
Gs

Time (msec)

FMVSS 208 -95 Chevrolet Monte Carlo

Engine Top X

Max = 29.50 mph @ 1.68 msec
Min = -8.20 mph @ 56.40 msec

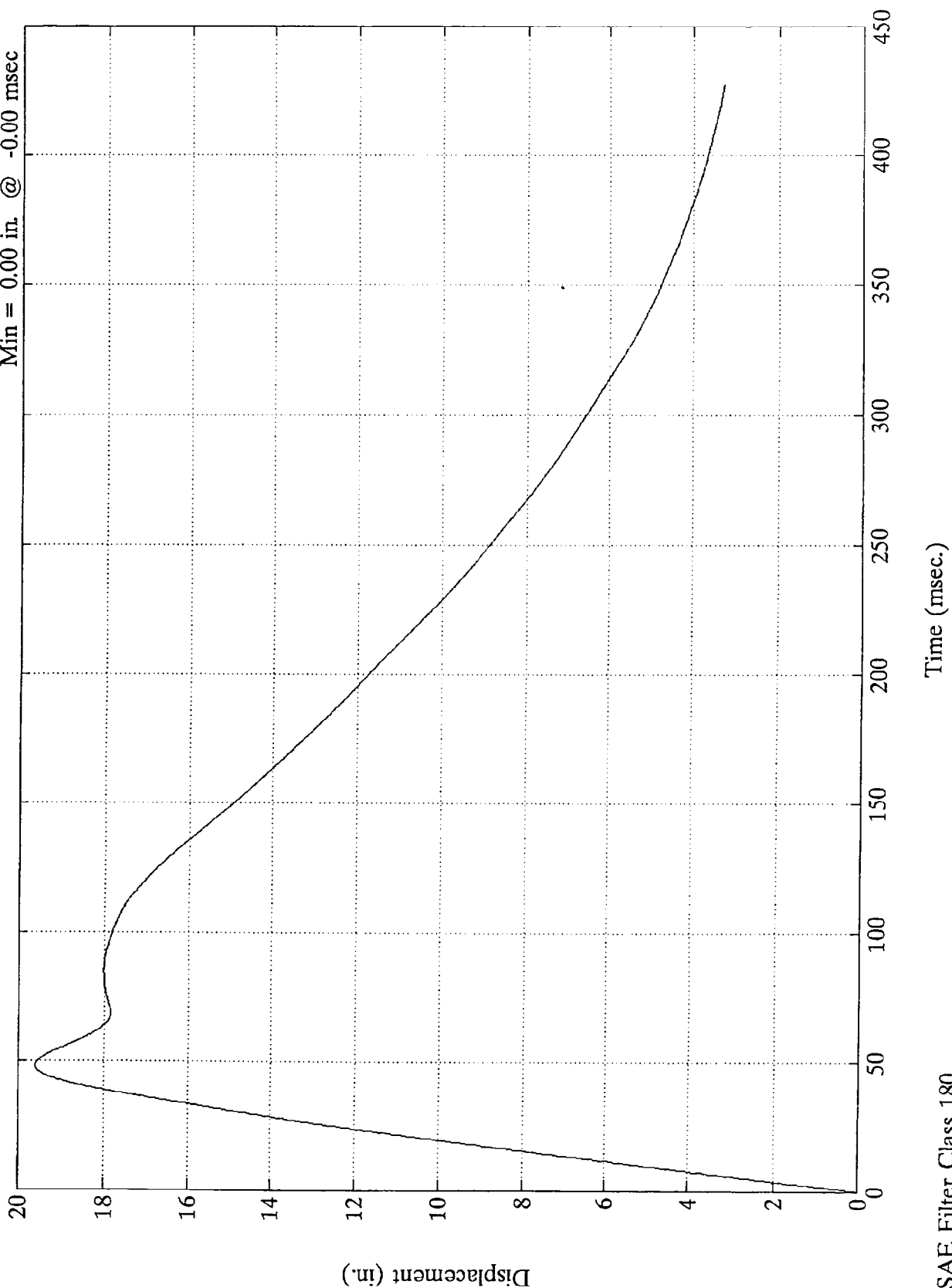


SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

Engine Top X

Max = 19.60 in. @ 48.48 msec
Min = 0.00 in. @ -0.00 msec

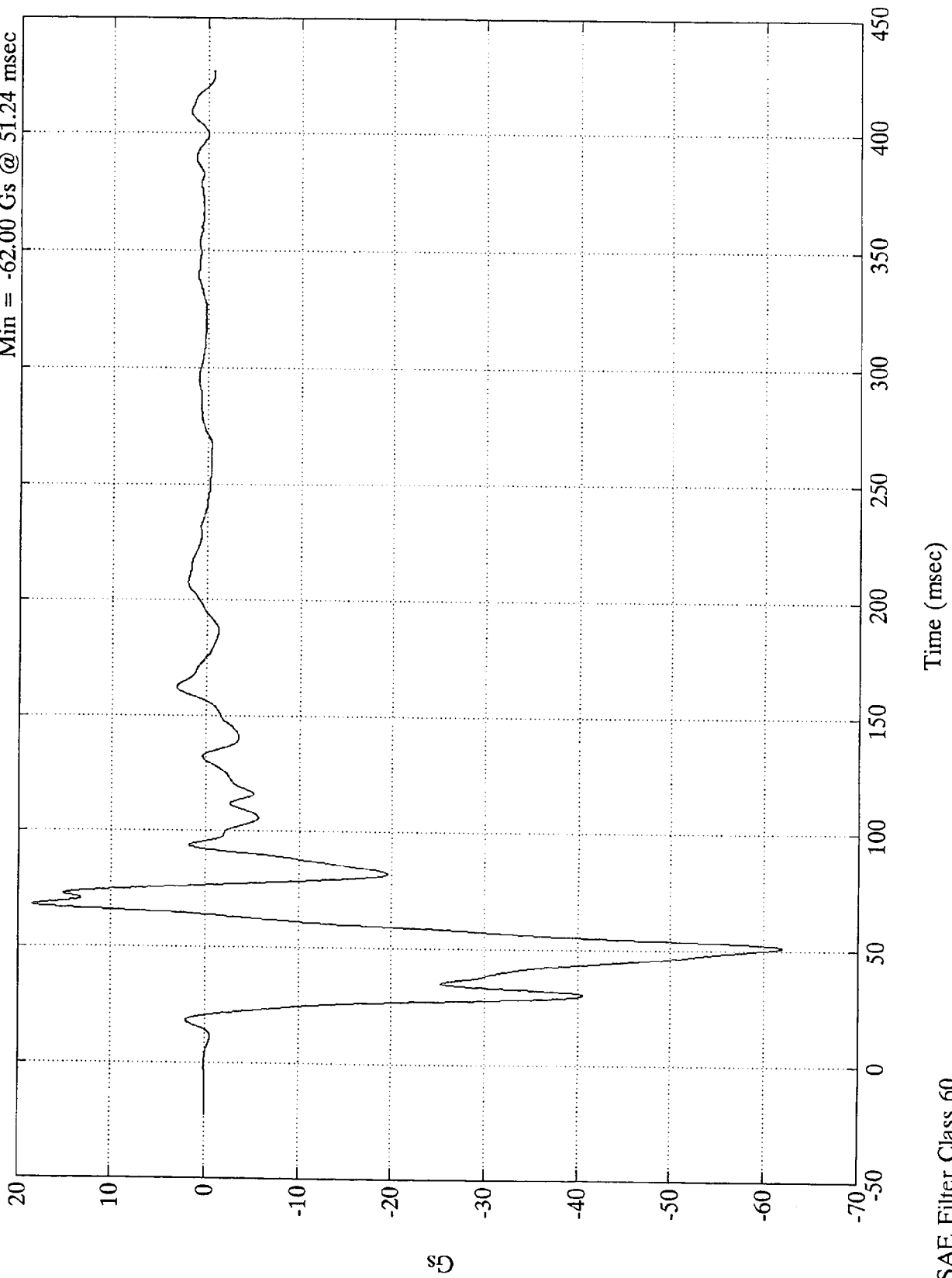


SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

Engine Bottom X

Max = 18.46 Gs @ 67.80 msec
Min = -62.00 Gs @ 51.24 msec

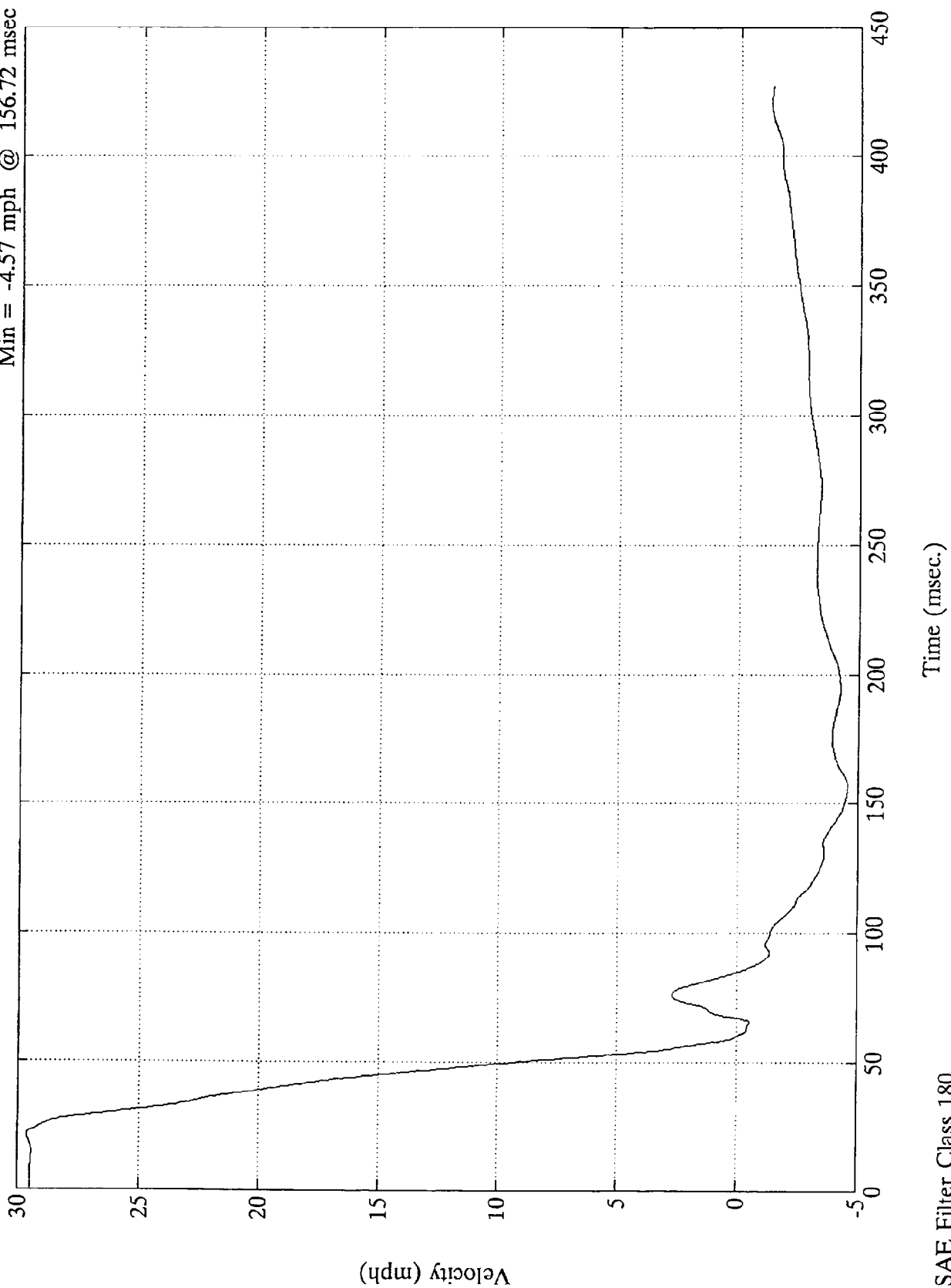


Gs

FMVSS 208 -95 Chevrolet Monte Carlo

Engine Bottom X

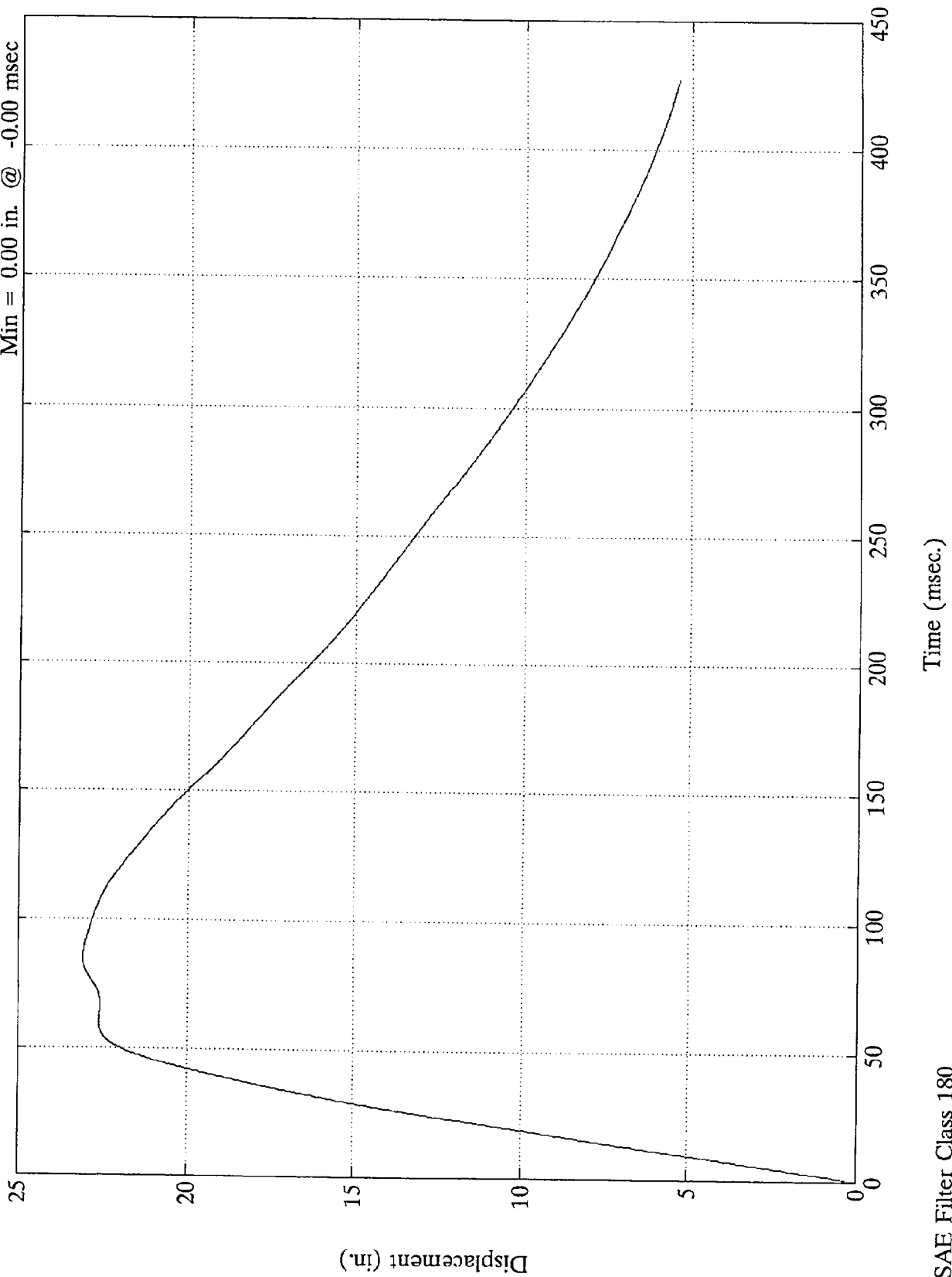
Max = 29.63 mph @ 21.36 msec
Min = -4.57 mph @ 156.72 msec



FMVSS 208 -95 Chevrolet Monte Carlo

Engine Bottom X

Max = 23.08 in. @ 86.40 msec
Min = 0.00 in. @ -0.00 msec

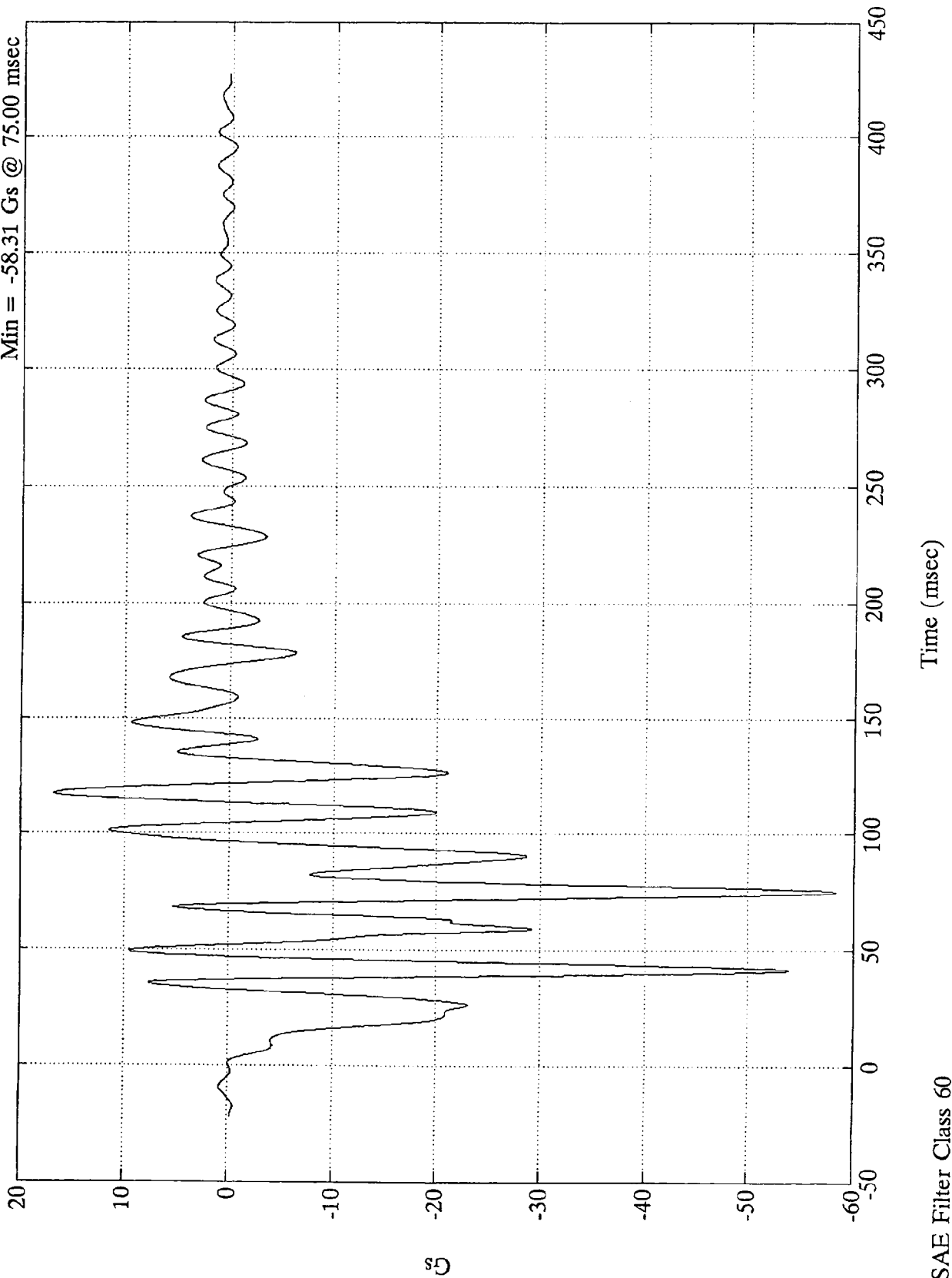


SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

R. Brake Caliper X

Max = 16.77 Gs @ 117.36 msec
Min = -58.31 Gs @ 75.00 msec

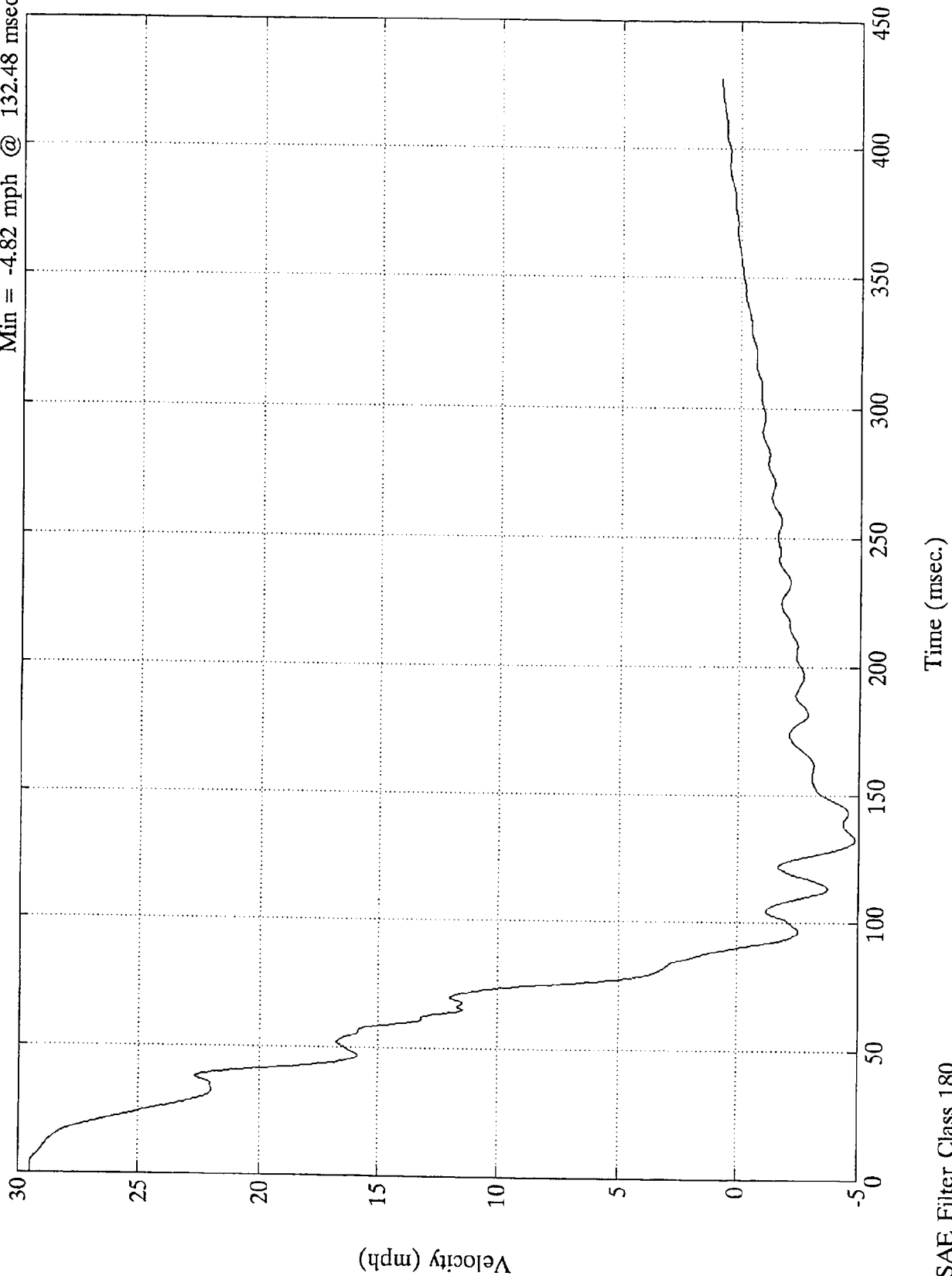


SAE Filter Class 60

FMVSS 208 -95 Chevrolet Monte Carlo

R. Brake Caliper X

Max = 29.50 mph @ -0.00 msec
Min = -4.82 mph @ 132.48 msec

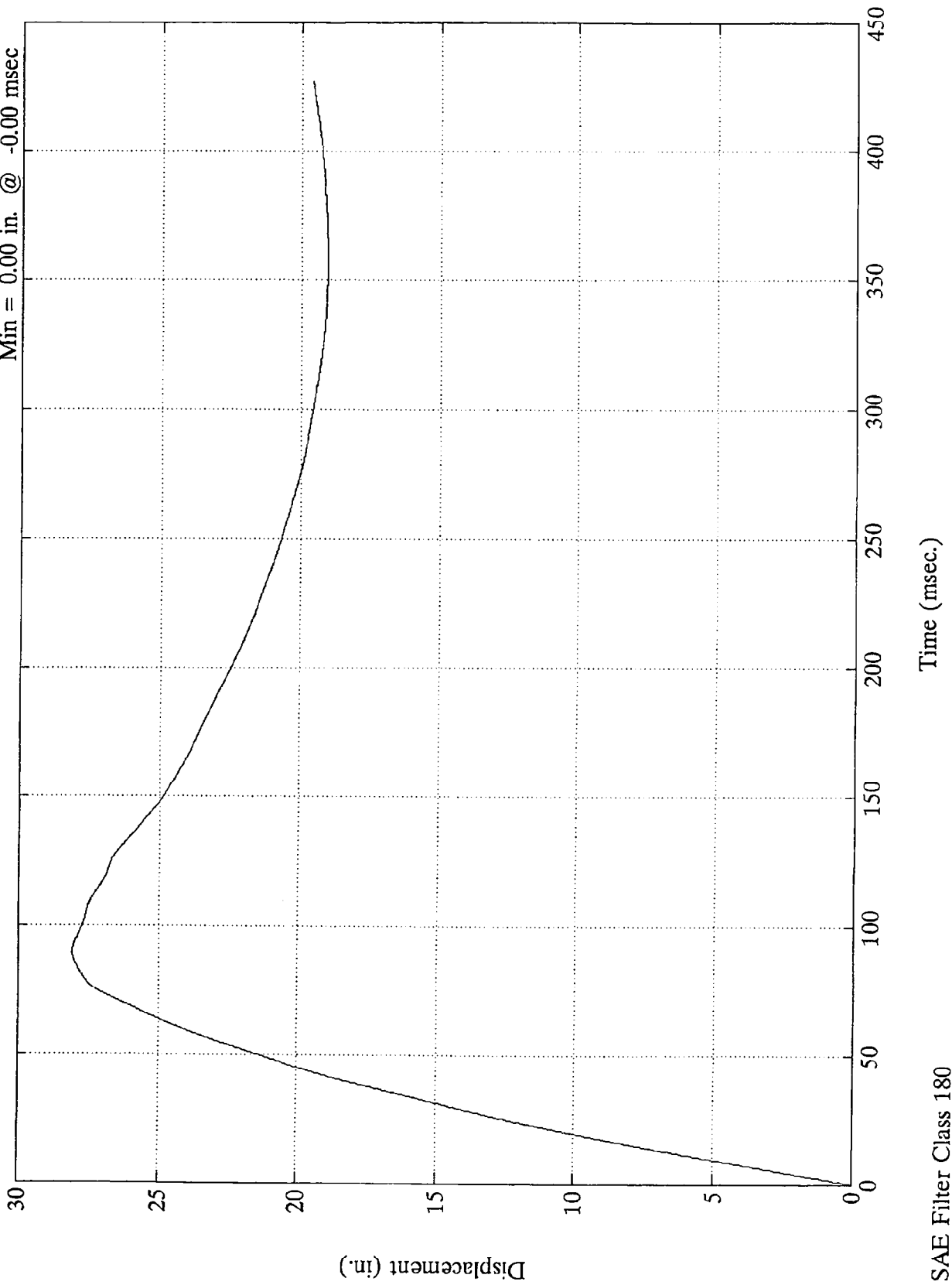


FMVSS 208 -95 Chevrolet Monte Carlo

R. Brake Caliper X

Max = 28.09 in. @ 90.48 msec

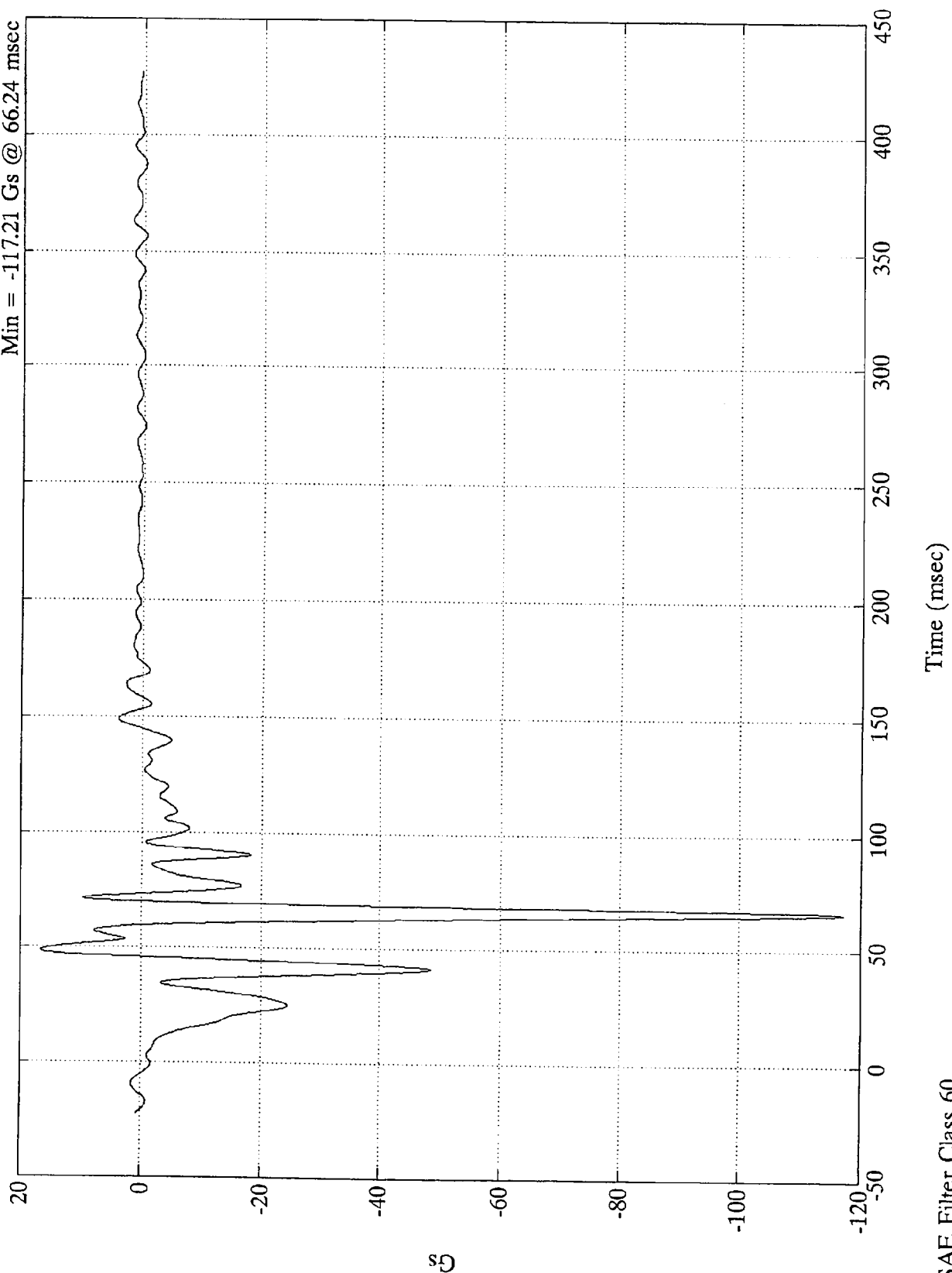
Min = 0.00 in. @ -0.00 msec



FMVSS 208 -95 Chevrolet Monte Carlo

L. Brake Caliper X

Max = 16.57 Gs @ 48.48 msec
Min = -117.21 Gs @ 66.24 msec



SAE Filter Class 60

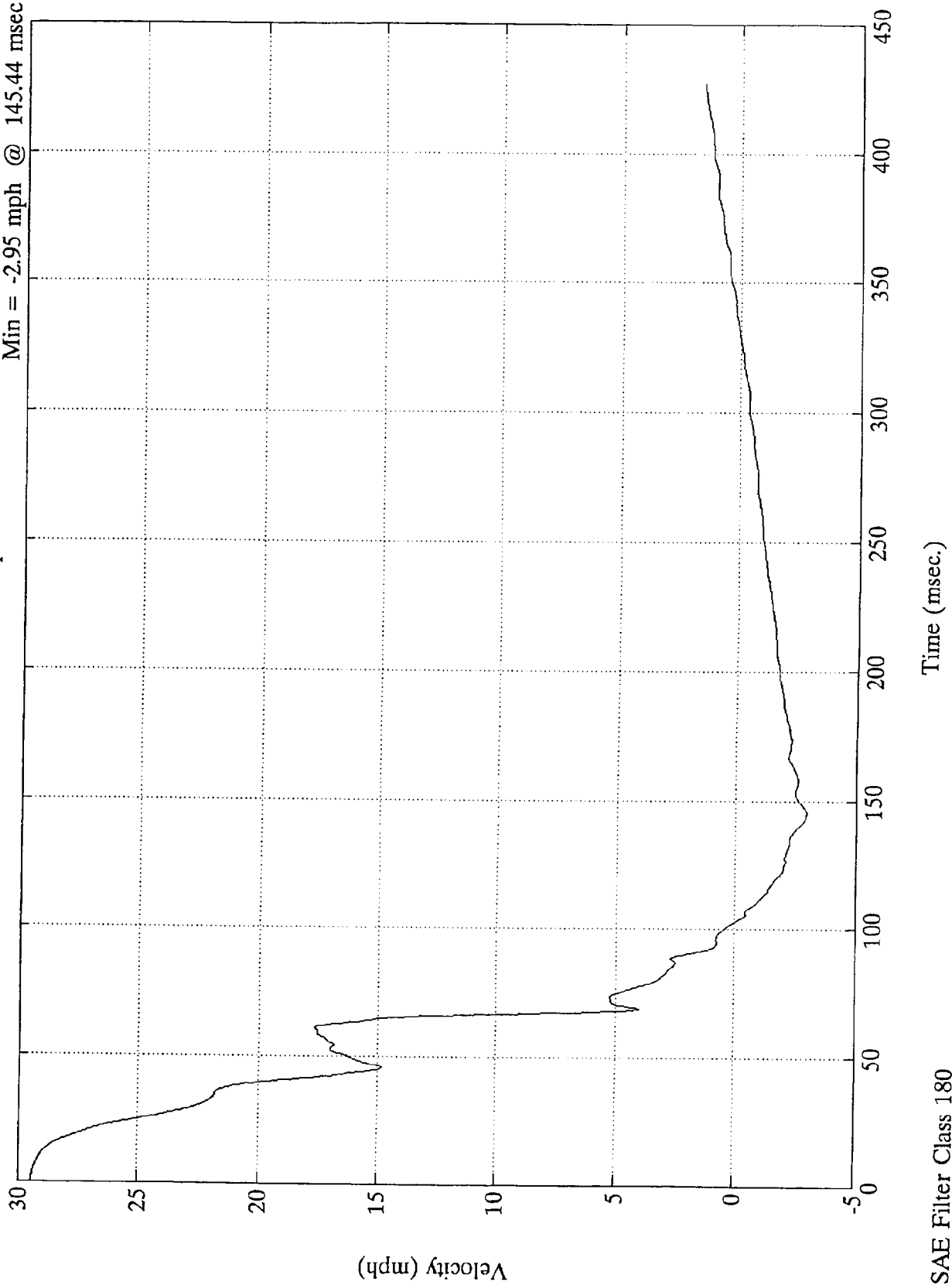
Gs

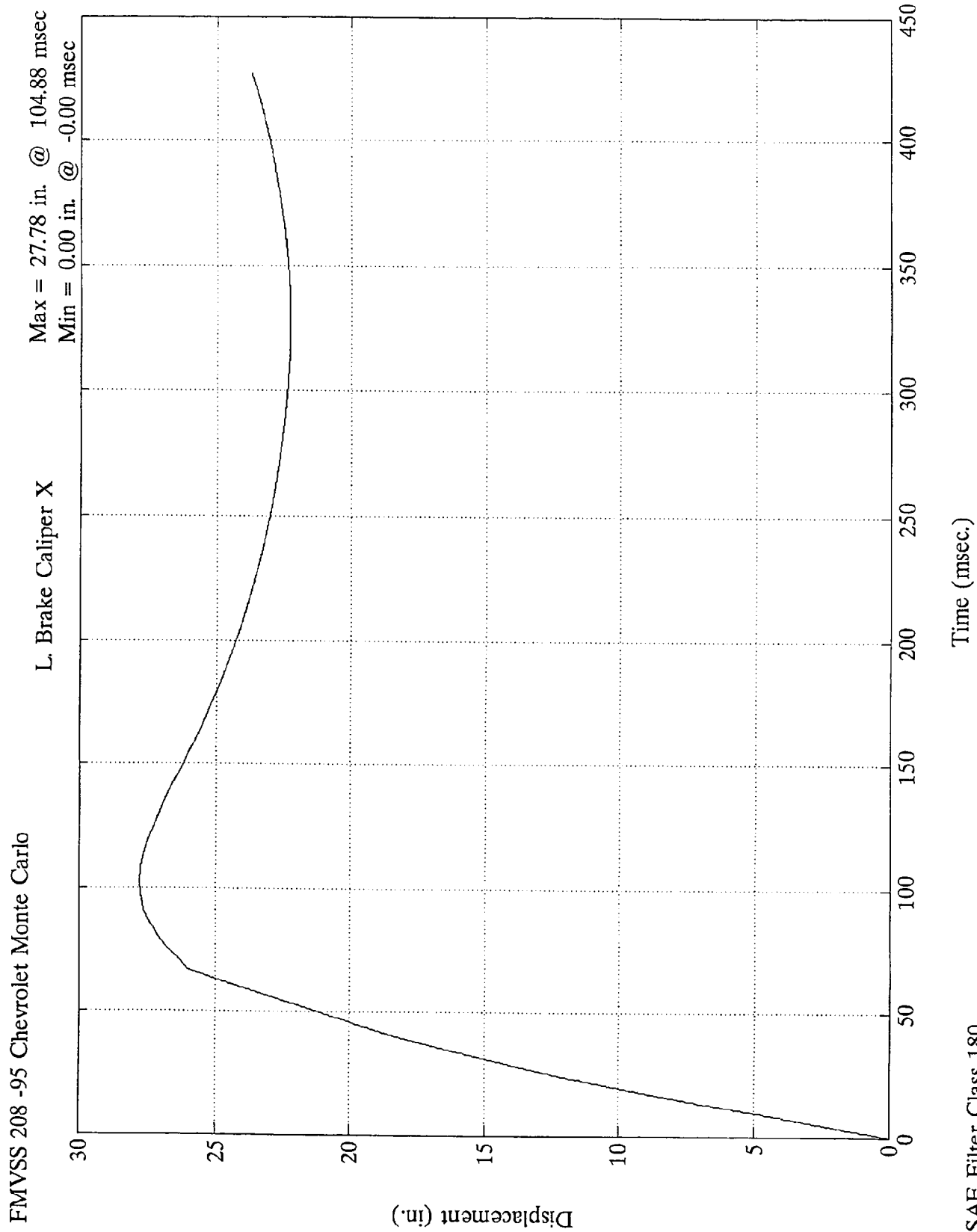
Time (msec)

FMVSS 208 -95 Chevrolet Monte Carlo

L. Brake Caliper X

Max = 29.50 mph @ -0.00 msec
Min = -2.95 mph @ 145.44 msec

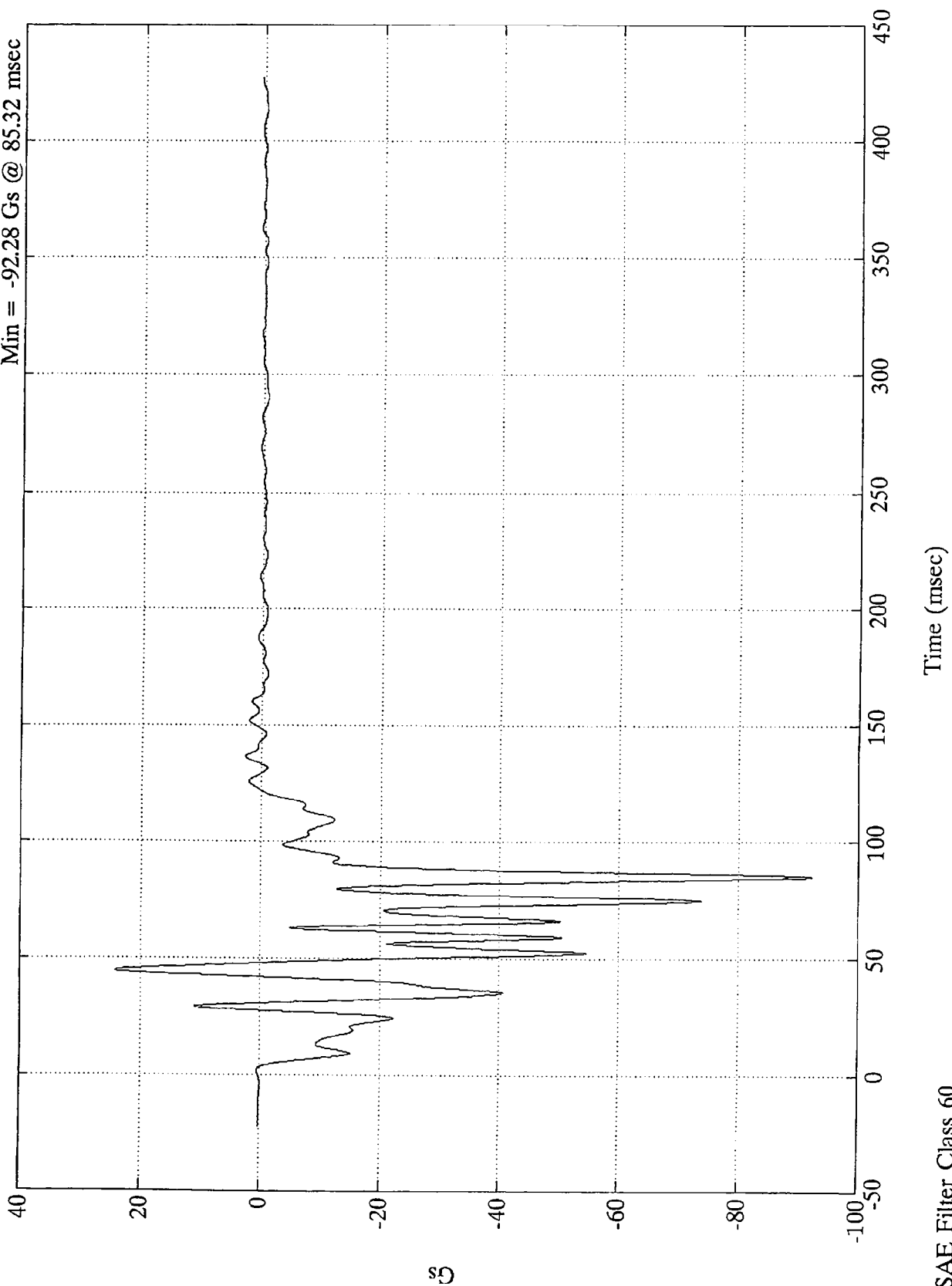




FMVSS 208 -95 Chevrolet Monte Carlo

Instrument Panel X

Max = 24.18 Gs @ 44.76 msec
Min = -92.28 Gs @ 85.32 msec



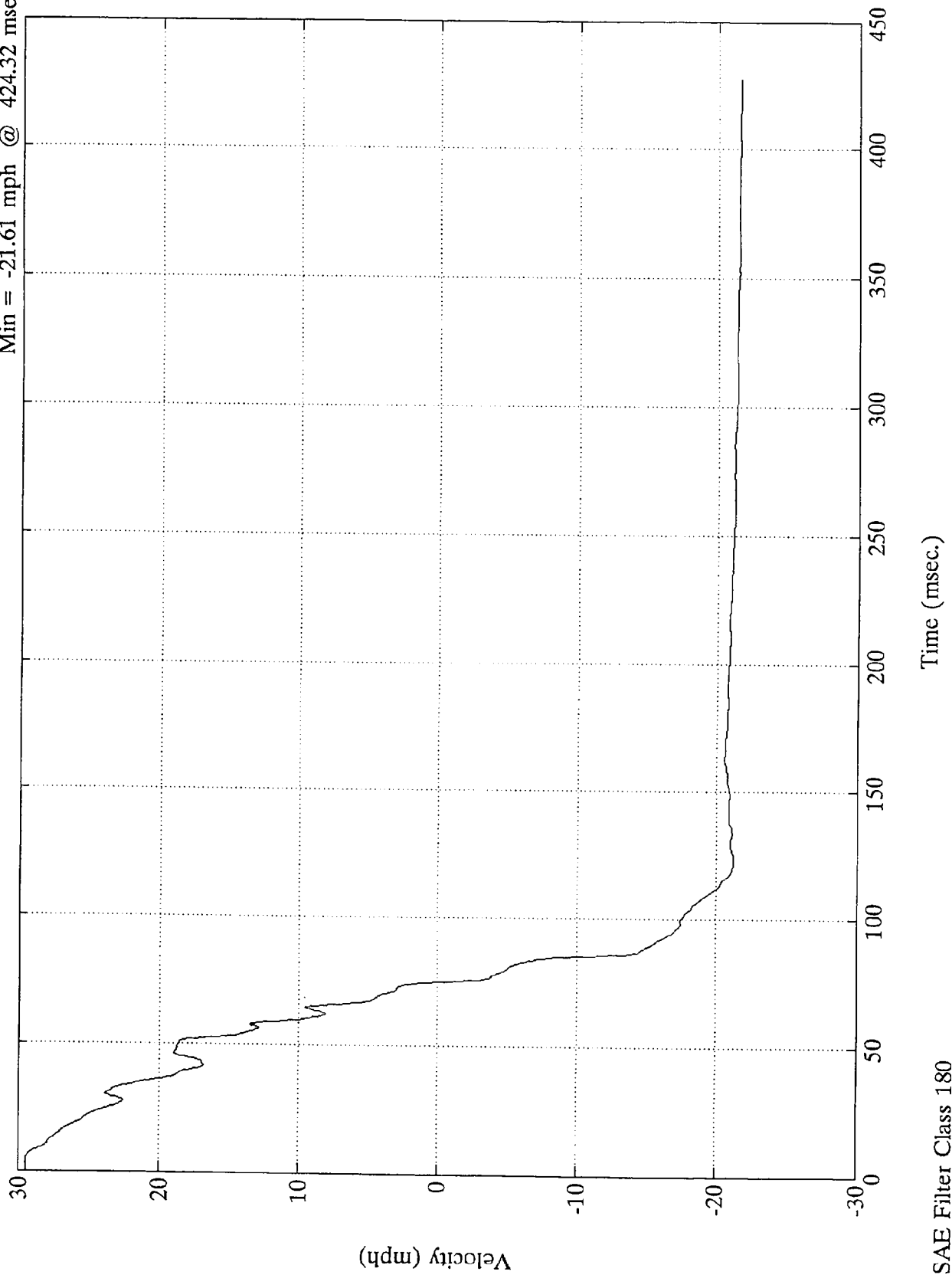
Gs

Time (msec)

SAE Filter Class 60

FMVSS 208 -95 Chevrolet Monte Carlo

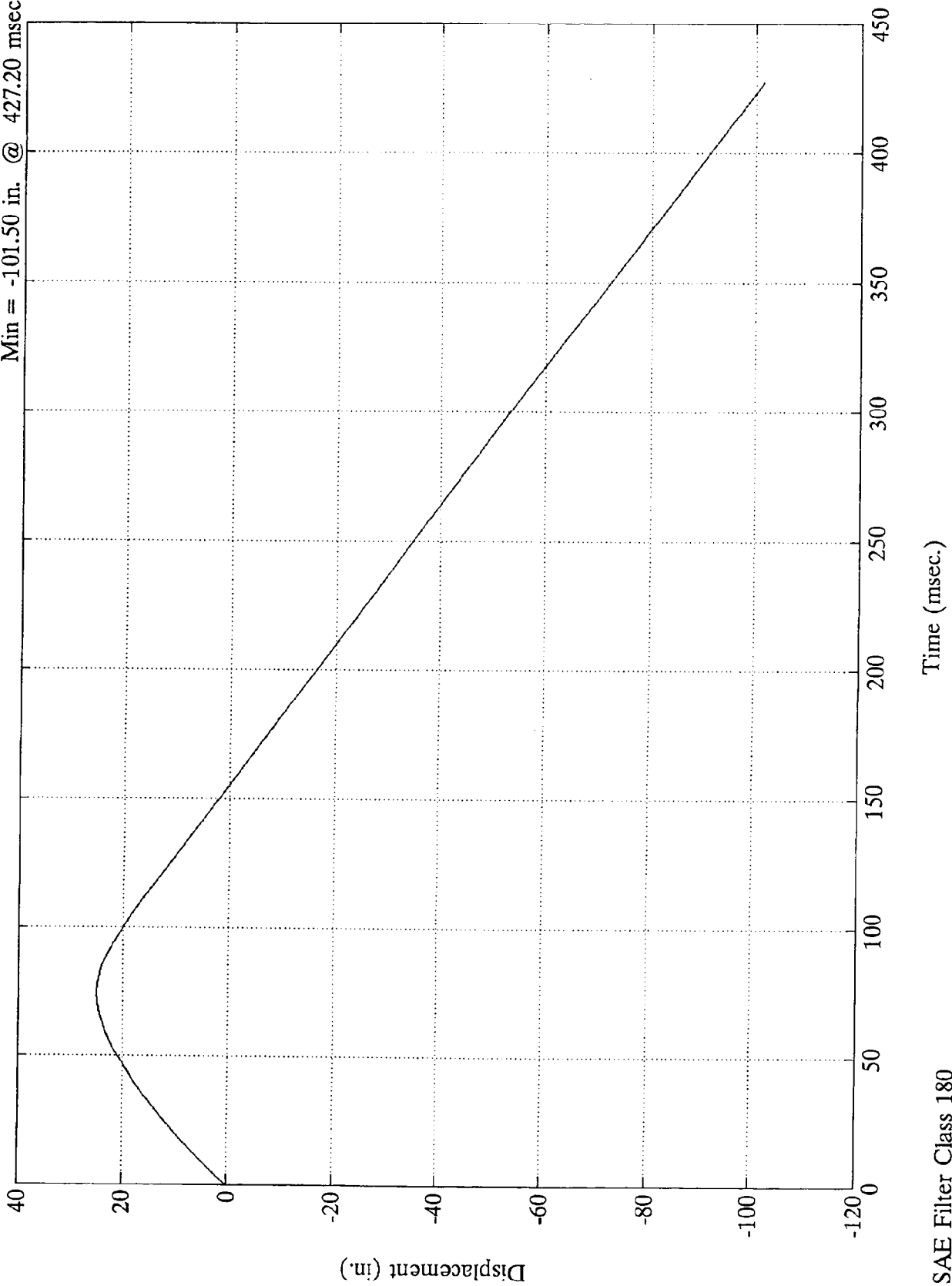
Instrument Panel X
Max = 29.51 mph @ 3.60 msec
Min = -21.61 mph @ 424.32 msec



FMVSS 208 -95 Chevrolet Monte Carlo

Instrument Panel X

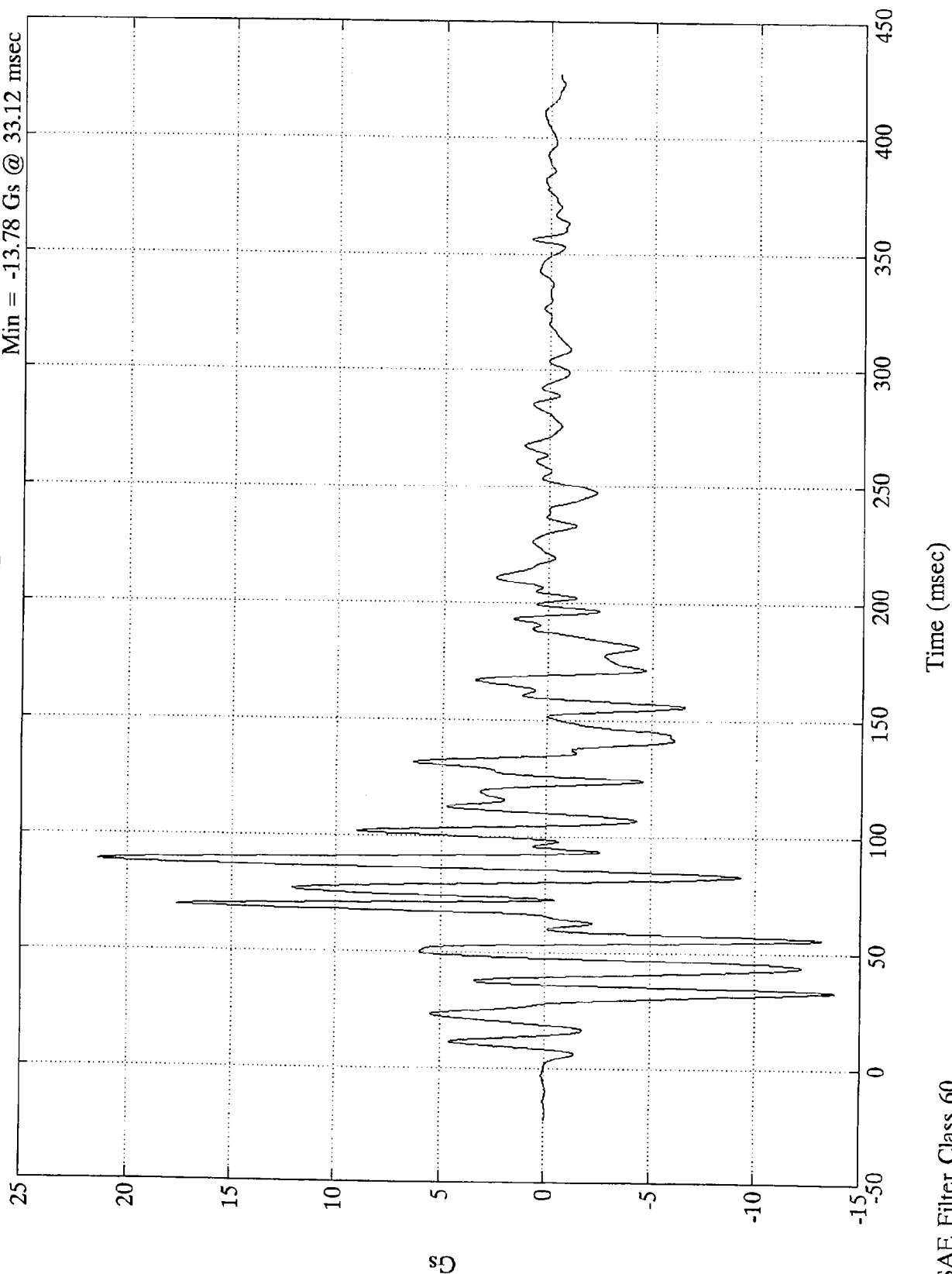
Max = 24.98 in. @ 74.88 msec
Min = -101.50 in. @ 427.20 msec



FMVSS 208 -95 Chevrolet Monte Carlo

Max = 21.40 Gs @ 88.92 msec
Min = -13.78 Gs @ 33.12 msec

Trunk Z



Gs

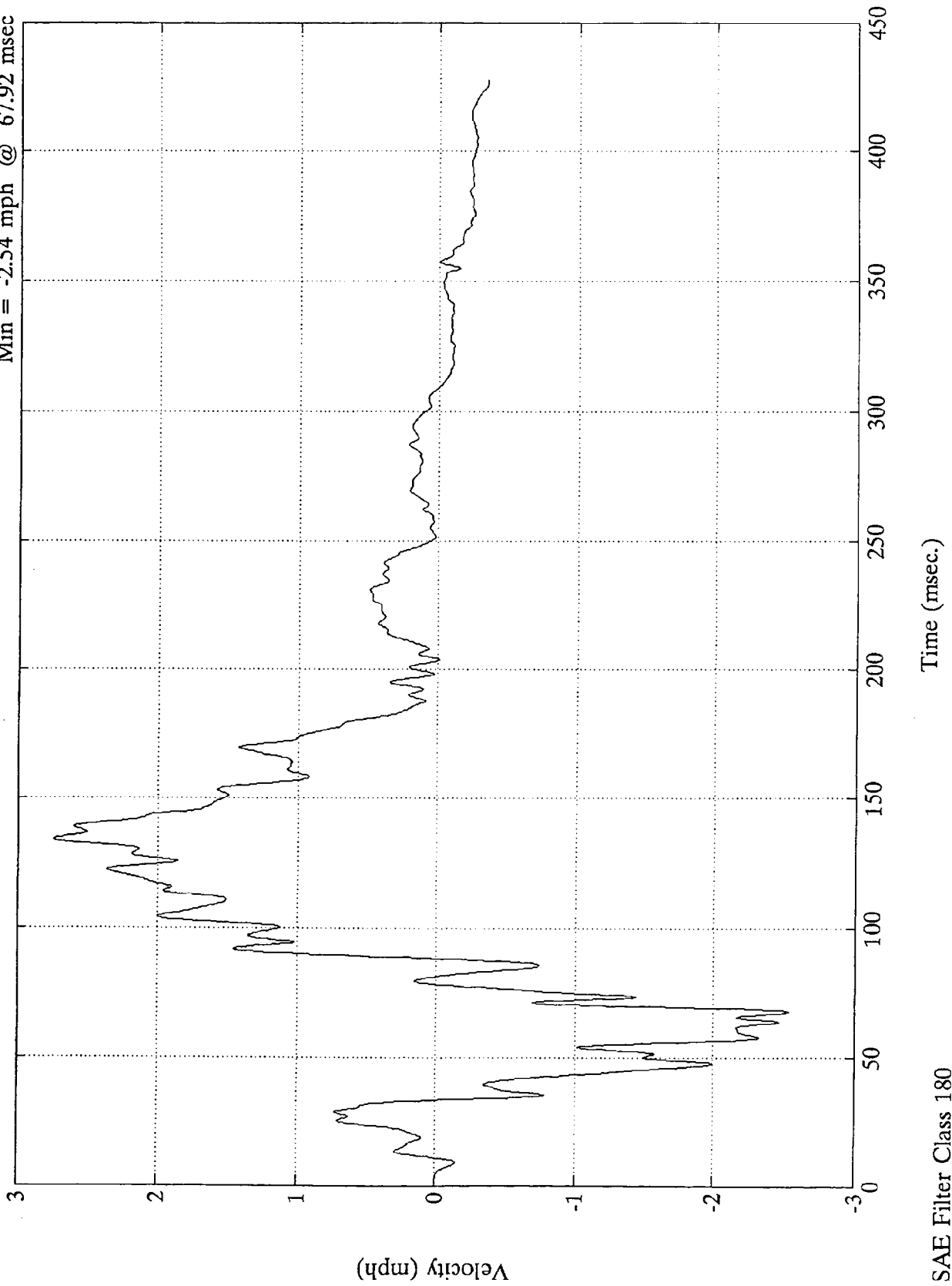
B-24

SAE Filter Class 60

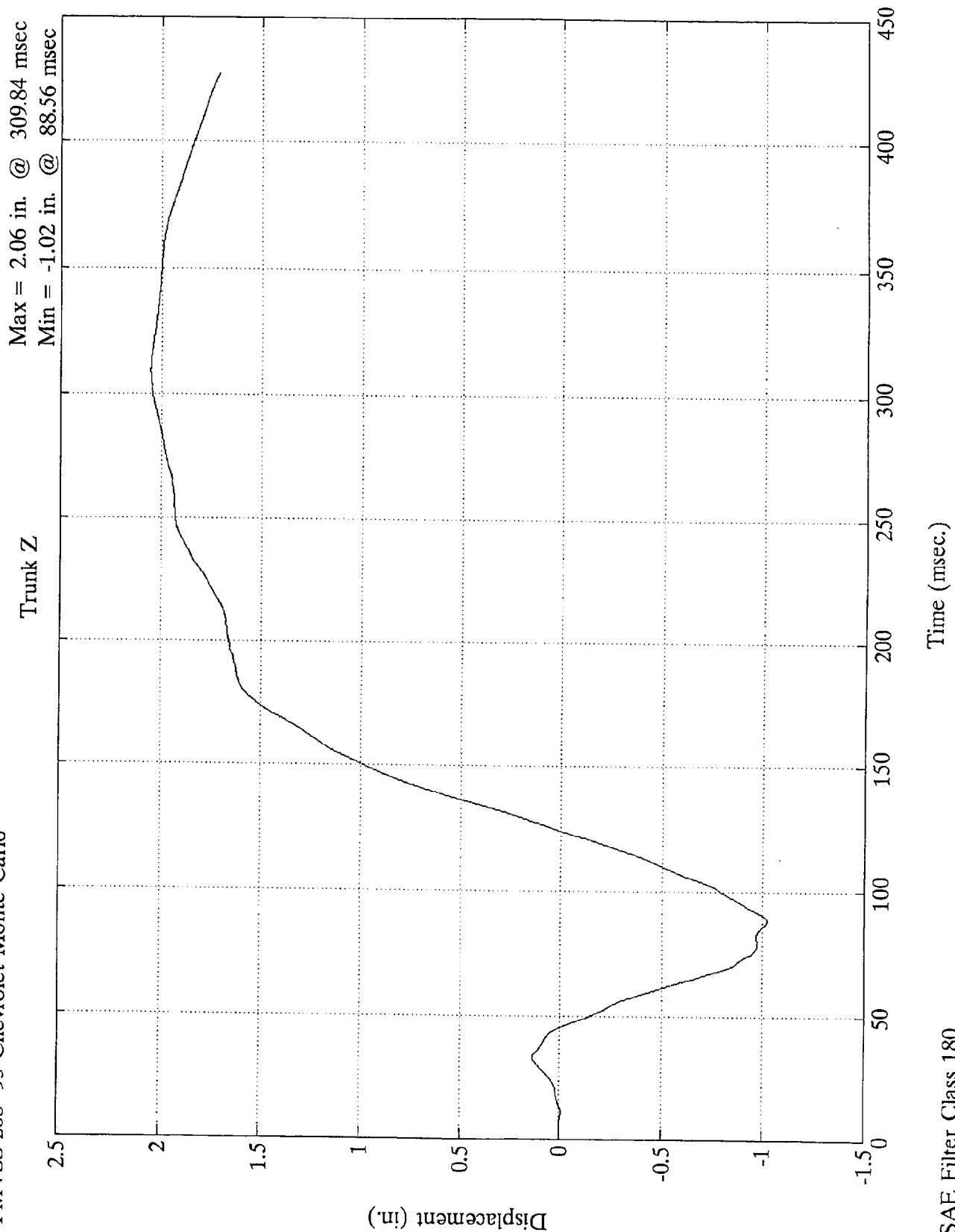
8221-6

FMVSS 208 -95 Chevrolet Monte Carlo

Trunk Z
Max = 2.75 mph @ 133.92 msec
Min = -2.54 mph @ 67.92 msec



FMVSS 208 -95 Chevrolet Monte Carlo



TEST NO. CS0105

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

FACILITY: TRACK
RUN #: 1470
SERIES #: 16

TEST DATE: 14 Nov 1994
TEST TIME: 12:04:14
BOARD: a

TITLE: 208 TEST #6 - 1995 CHEVROLET MONTE CARLO

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	msec	MINIMUM AMP	msec	FILTER CLASS
1	Pos. 1 Head X	Gs	16.0	194.5	-30.7	81.8	1000.0
2	Pos. 1 Head Y	Gs	11.8	107.9	-3.5	171.4	1000.0
3	Pos. 1 Head Z	Gs	6.8	125.0	-7.1	61.9	1000.0
4	Pos. 1 Left Femur	lbs	44.8	197.2	-1057.1	75.5	600.0
5	Pos. 1 Chest X	Gs	2.8	162.4	-41.9	87.5	180.0
6	Pos. 1 Chest Y	Gs	4.6	96.8	-4.7	81.5	180.0
7	Pos. 1 Chest Z	Gs	17.4	91.8	-7.3	63.7	180.0
8	Pos. 1 Right Femur	lbs	35.4	165.2	-1063.0	63.0	600.0
9	Pos. 2 Head X	Gs	10.2	124.3	-56.9	71.9	1000.0
10	Pos. 2 Head Y	Gs	69.6	73.7	-6.8	59.0	1000.0
11	Pos. 2 Head Z	Gs	13.8	90.8	-17.3	65.2	1000.0
12	Pos. 2 Left Femur	lbs	43.6	209.3	-1051.1	87.6	600.0
13	Pos. 2 Chest X	Gs	2.8	380.4	-39.2	82.8	180.0
14	Pos. 2 Chest Y	Gs	1.6	101.4	-3.2	71.9	180.0
15	Pos. 2 Chest Z	Gs	18.2	92.8	-9.3	66.4	180.0
16	Pos. 2 Right Femur	lbs	44.7	221.5	-1094.3	89.8	600.0
17	Pos. 1 Head Resultant	Gs	31.1	81.7	.0	-8.3	1000.0
18	Pos. 1 Chest Resultant	Gs	44.8	90.5	.0	-20.3	180.0
19	Pos. 2 Head Resultant	Gs	87.7	73.7	.0	-6.2	1000.0
20	Pos. 2 Chest Resultant	Gs	40.6	82.9	.0	-8.2	180.0

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

hic: 120.14
t1 = 70.440 msec
t2 = 106.320 msec
Average G's Over Hic Duration = 25.70

CLIP SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 44.371 G's
Tstart = 88.5600 ms
Tend = 91.6800 ms
CSI = 318.490

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

hic: 320.52
t1 = 64.920 msec
t2 = 95.880 msec
Average G's Over Hic Duration = 40.37

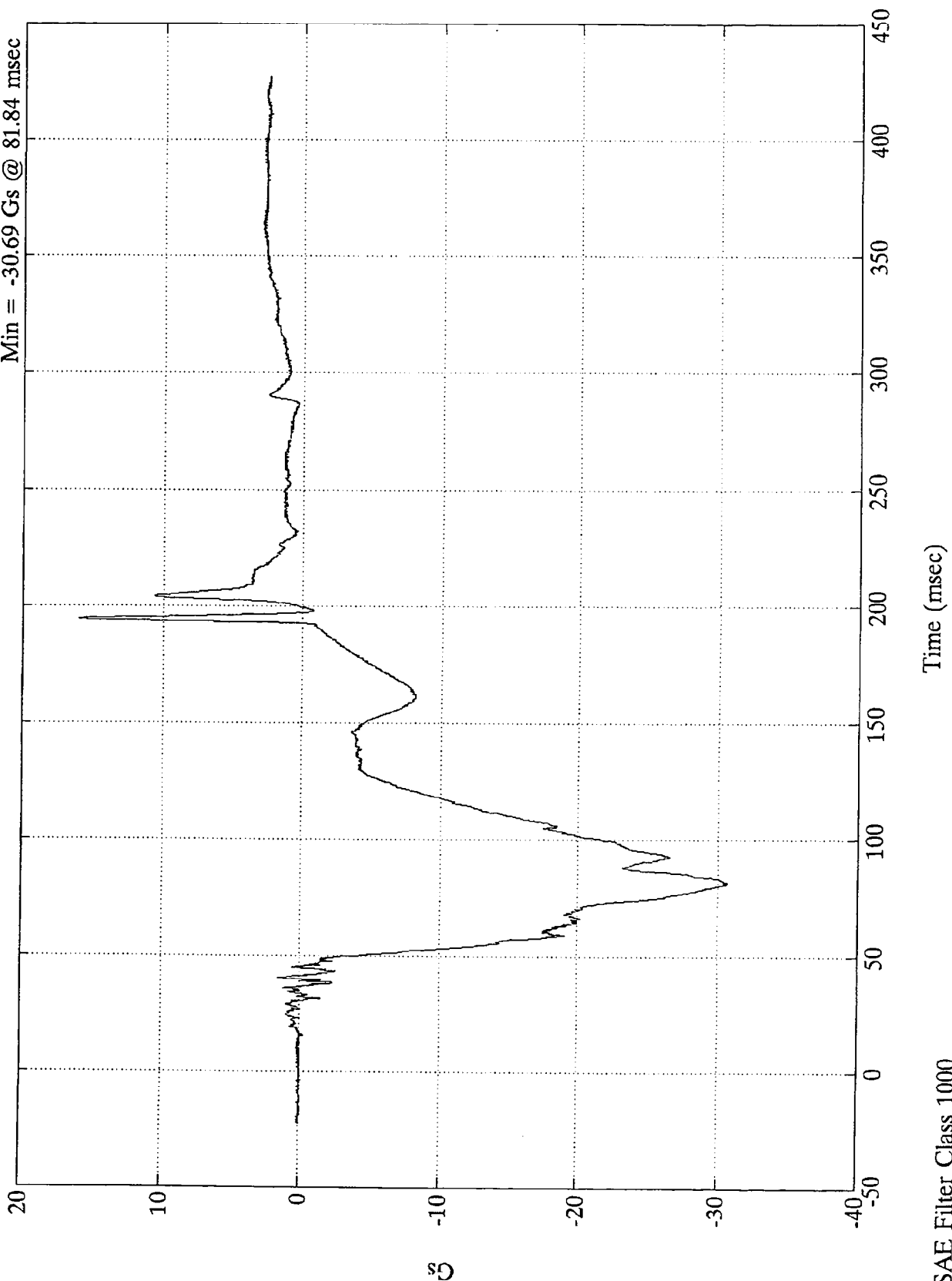
CLIP SUMMARY: Pos. 2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 39.987 G's
Tstart = 87.3600 ms
Tend = 90.3600 ms
CSI = 272.469

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 1 Head X

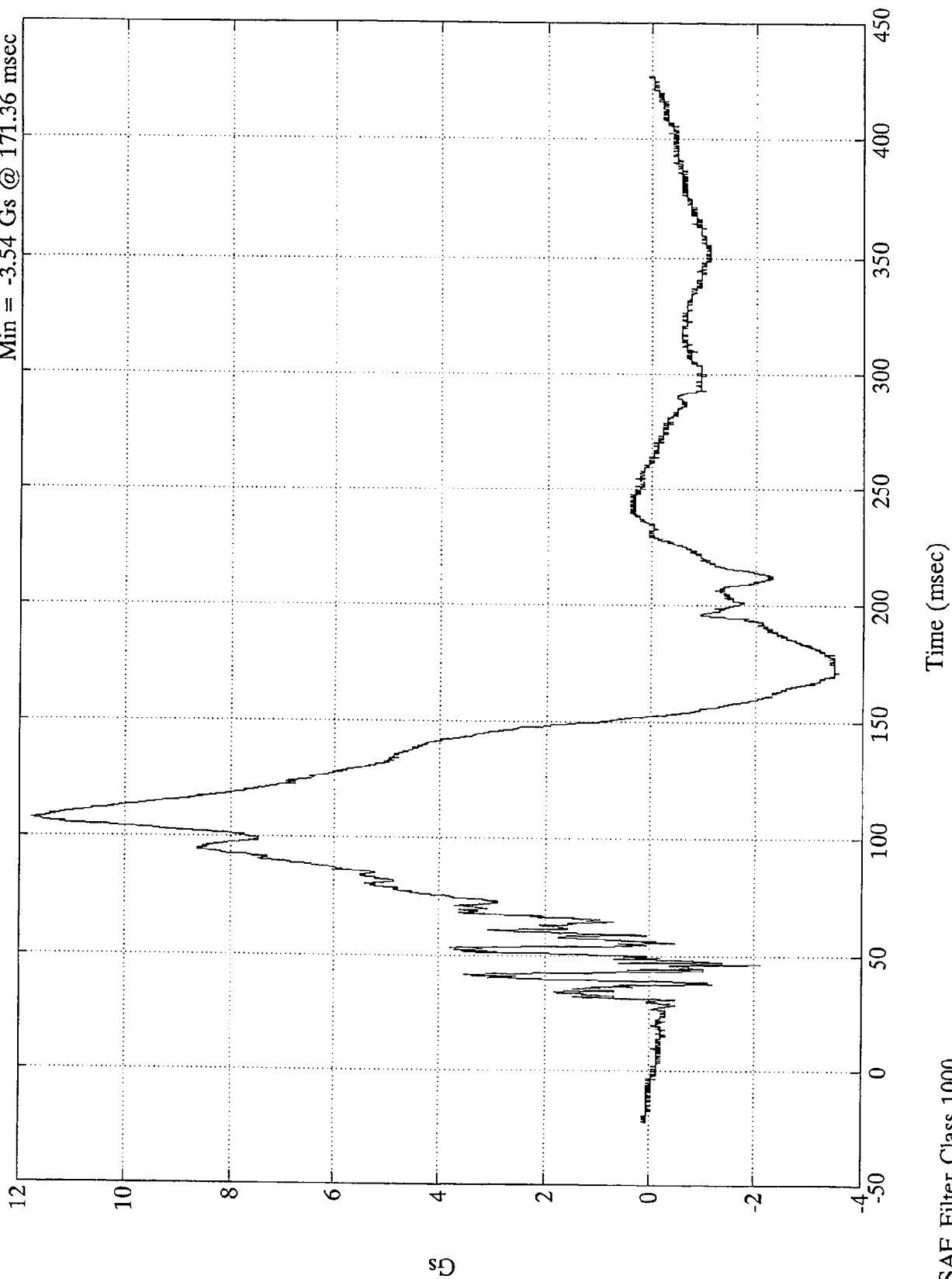
Max = 16.03 Gs @ 194.52 msec
Min = -30.69 Gs @ 81.84 msec



FMVSS 208 -95 Chevrolet Monte Carlo

Max = 11.77 Gs @ 107.88 msec
Min = -3.54 Gs @ 171.36 msec

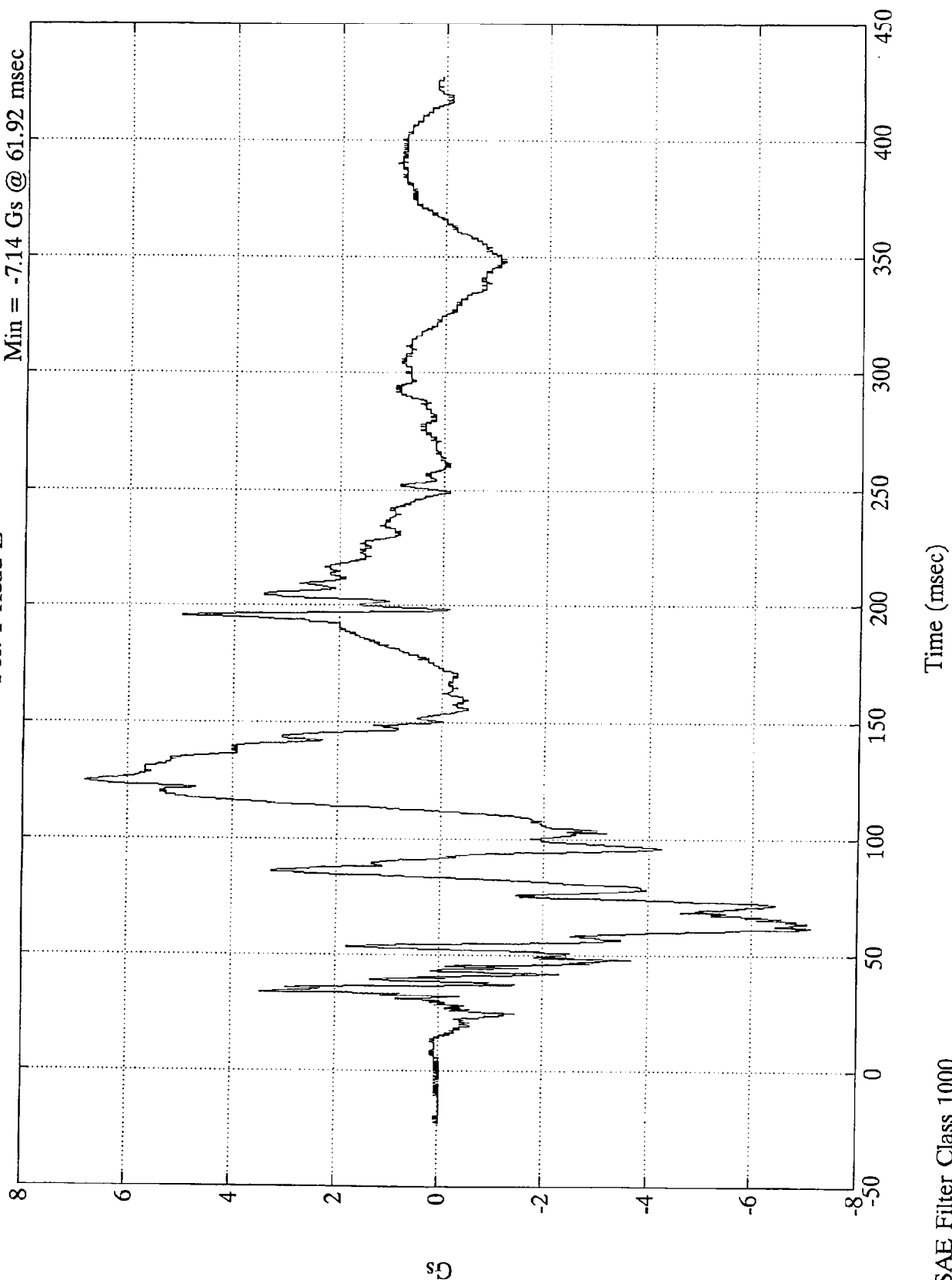
Pos. 1 Head Y



SAE Filter Class 1000

FMVSS 208 -95 Chevrolet Monte Carlo

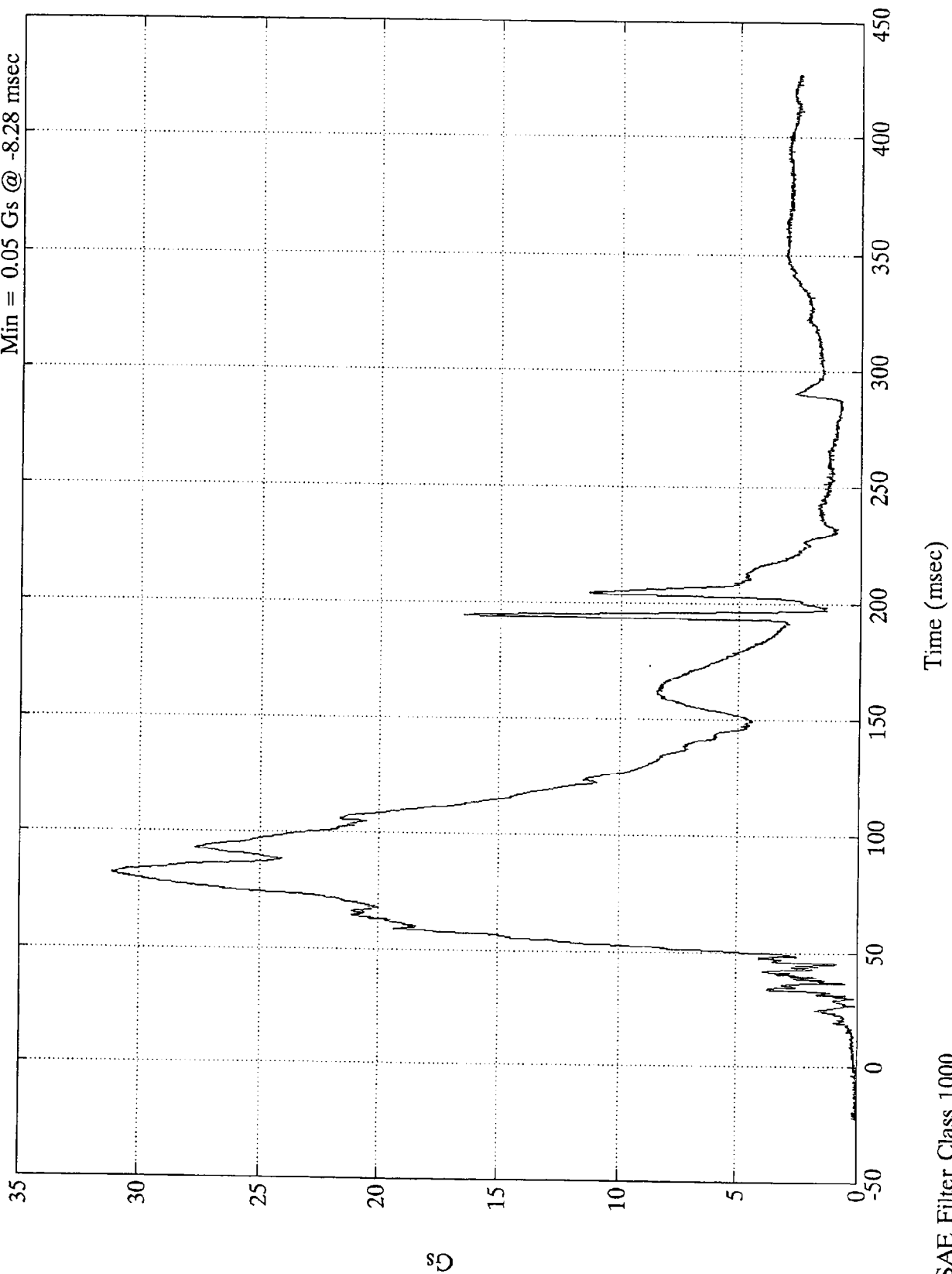
Pos. 1 Head Z
Max = 6.81 Gs @ 125.04 msec
Min = -7.14 Gs @ 61.92 msec



FMVSS 208 -95 Chevrolet Monte Carlo

Max = 31.13 Gs @ 81.72 msec
Min = 0.05 Gs @ -8.28 msec

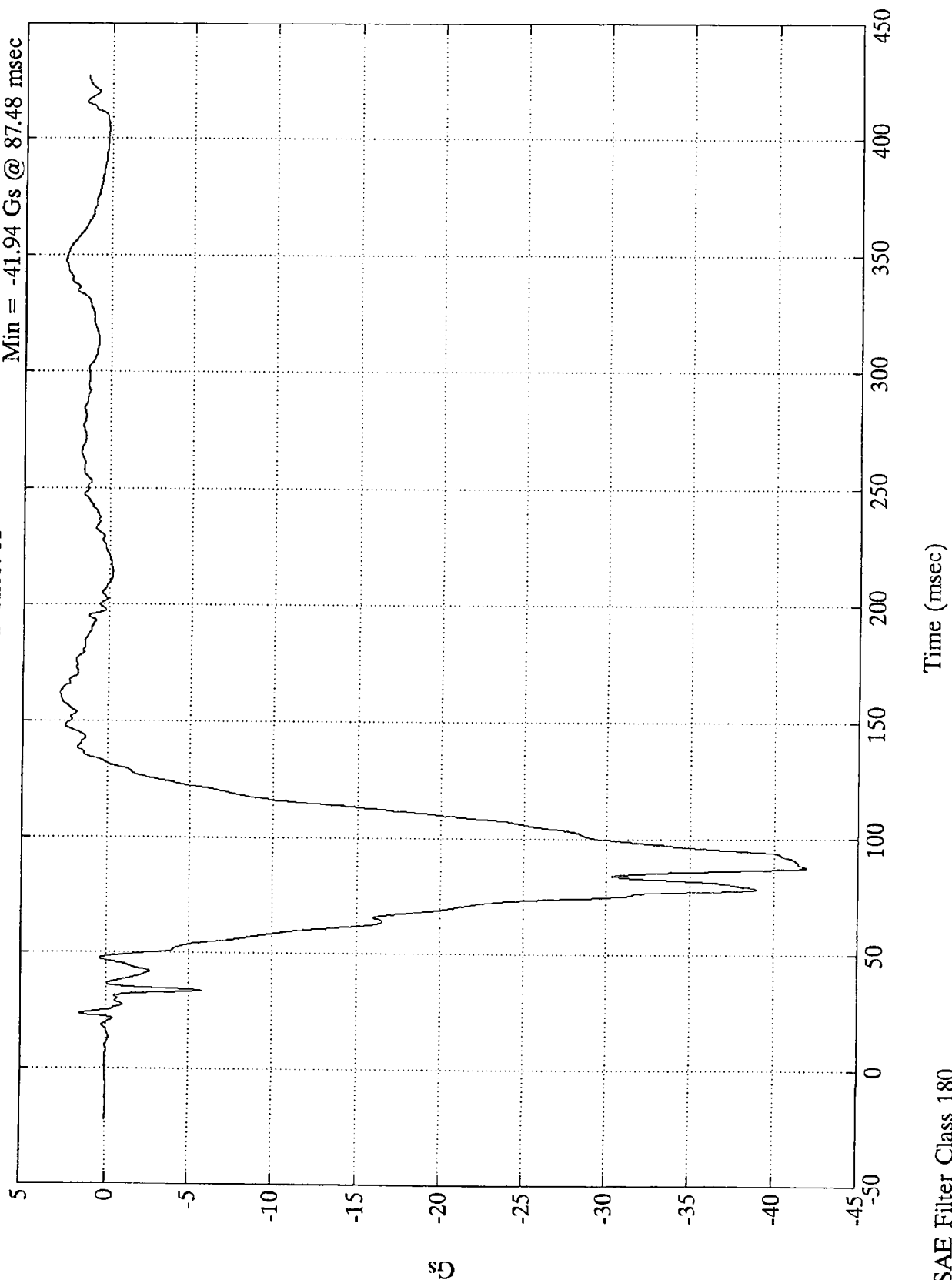
Pos. 1 Head Resultant



SAE Filter Class 1000

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 1 Chest X
Max = 2.83 Gs @ 162.36 msec
Min = -41.94 Gs @ 87.48 msec



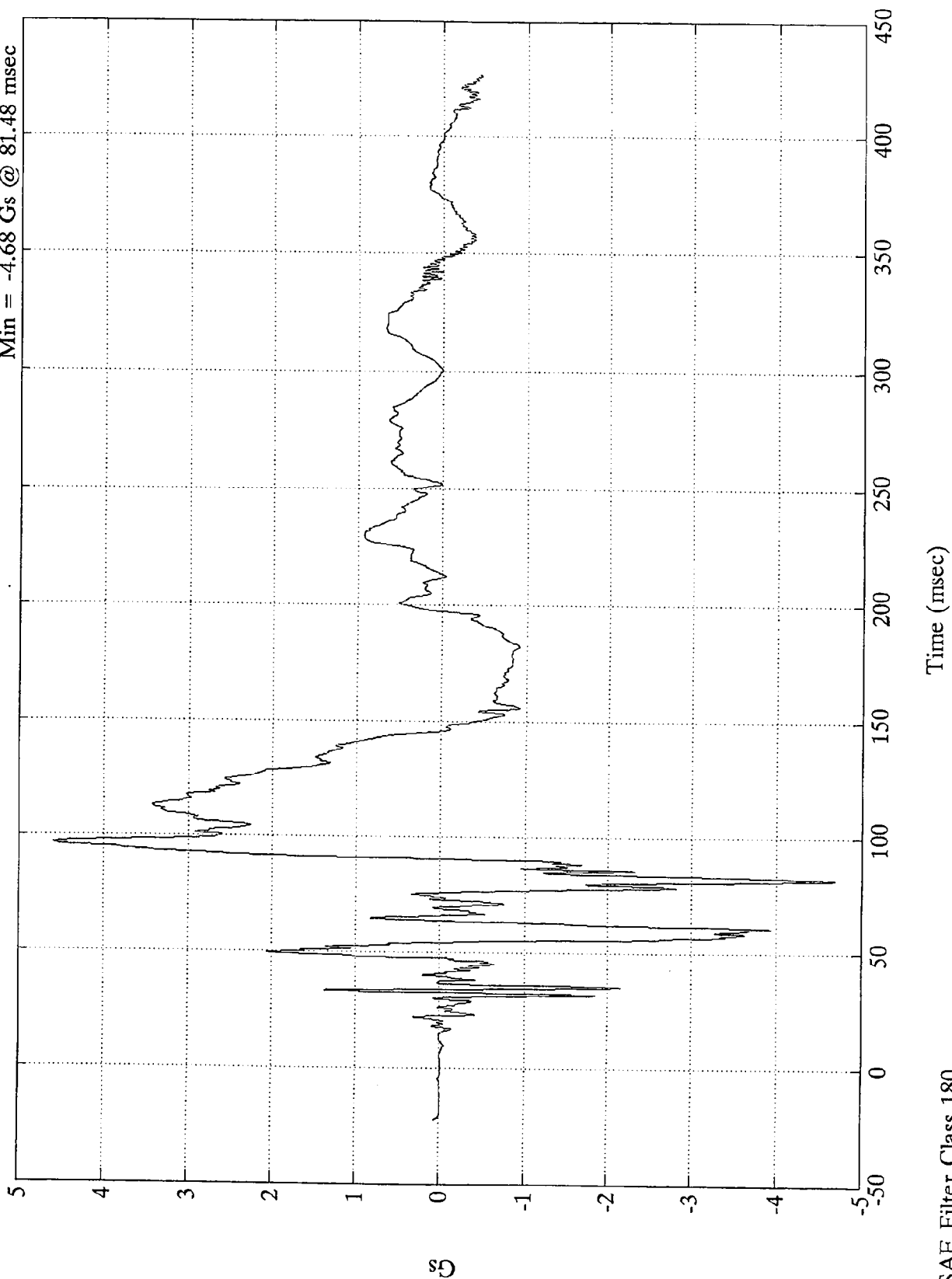
Gs

SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 1 Chest Y

Max = 4.58 Gs @ 96.84 msec
Min = -4.68 Gs @ 81.48 msec



Gs

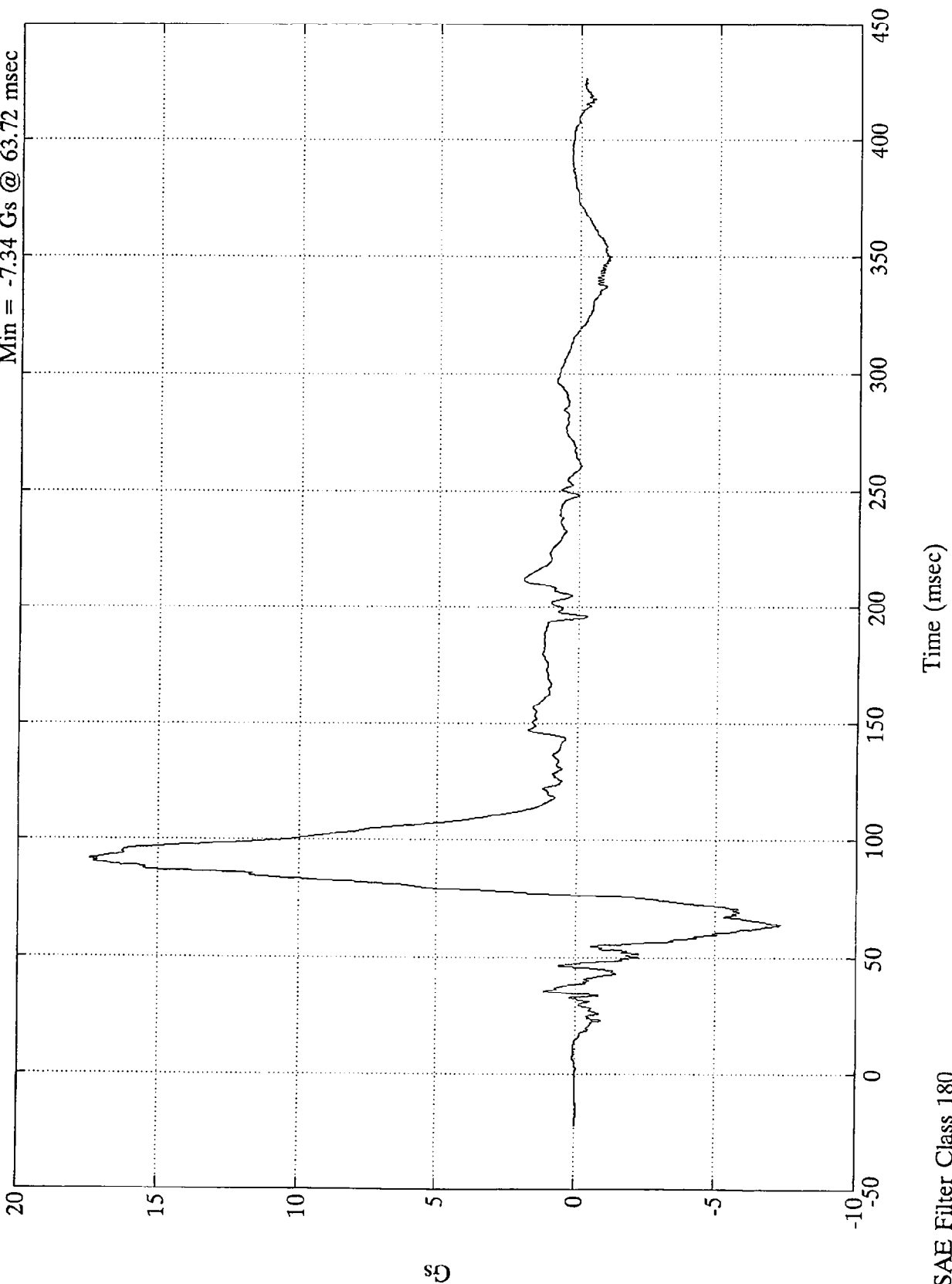
SAE Filter Class 180

Time (msec)

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 1 Chest Z

Max = 17.44 Gs @ 91.80 msec
Min = -7.34 Gs @ 63.72 msec



Gs

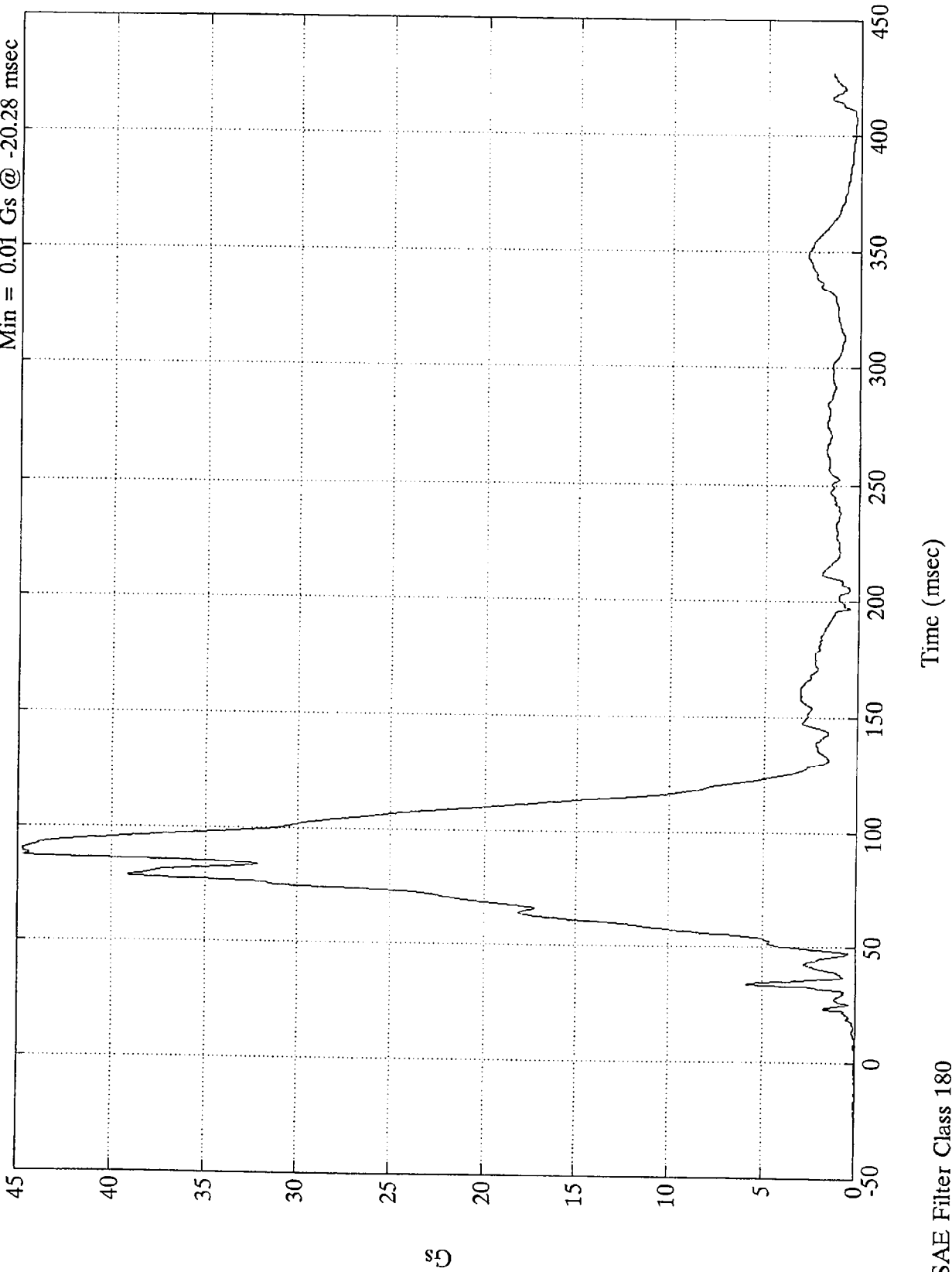
SAE Filter Class 180

Time (msec)

FMVSS 208 -95 Chevrolet Monte Carlo

Max = 44.78 Gs @ 90.48 msec
Min = 0.01 Gs @ -20.28 msec

Pos. 1 Chest Resultant



SAE Filter Class 180

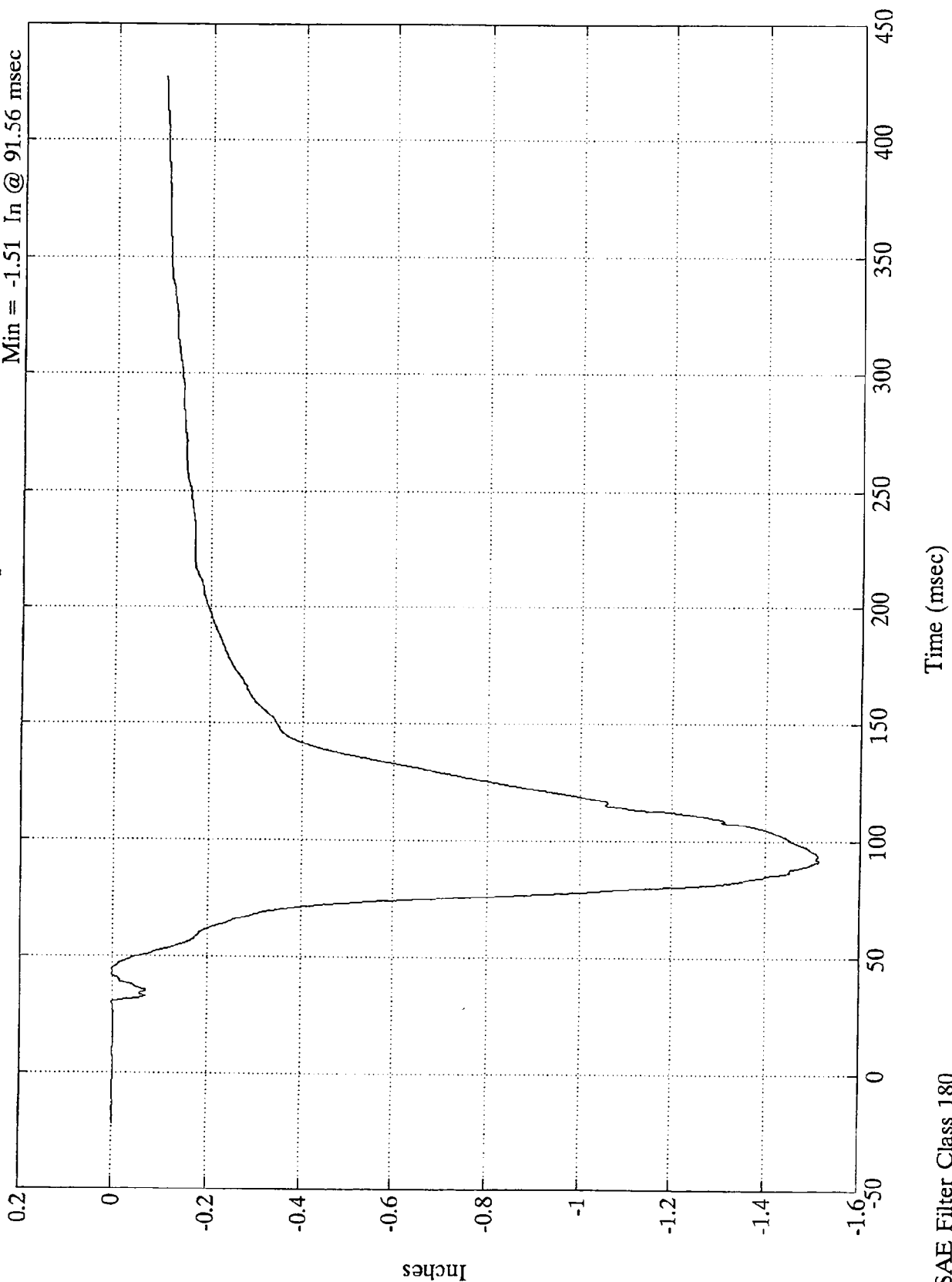
B-36

8221-6

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 1 Chest displacement

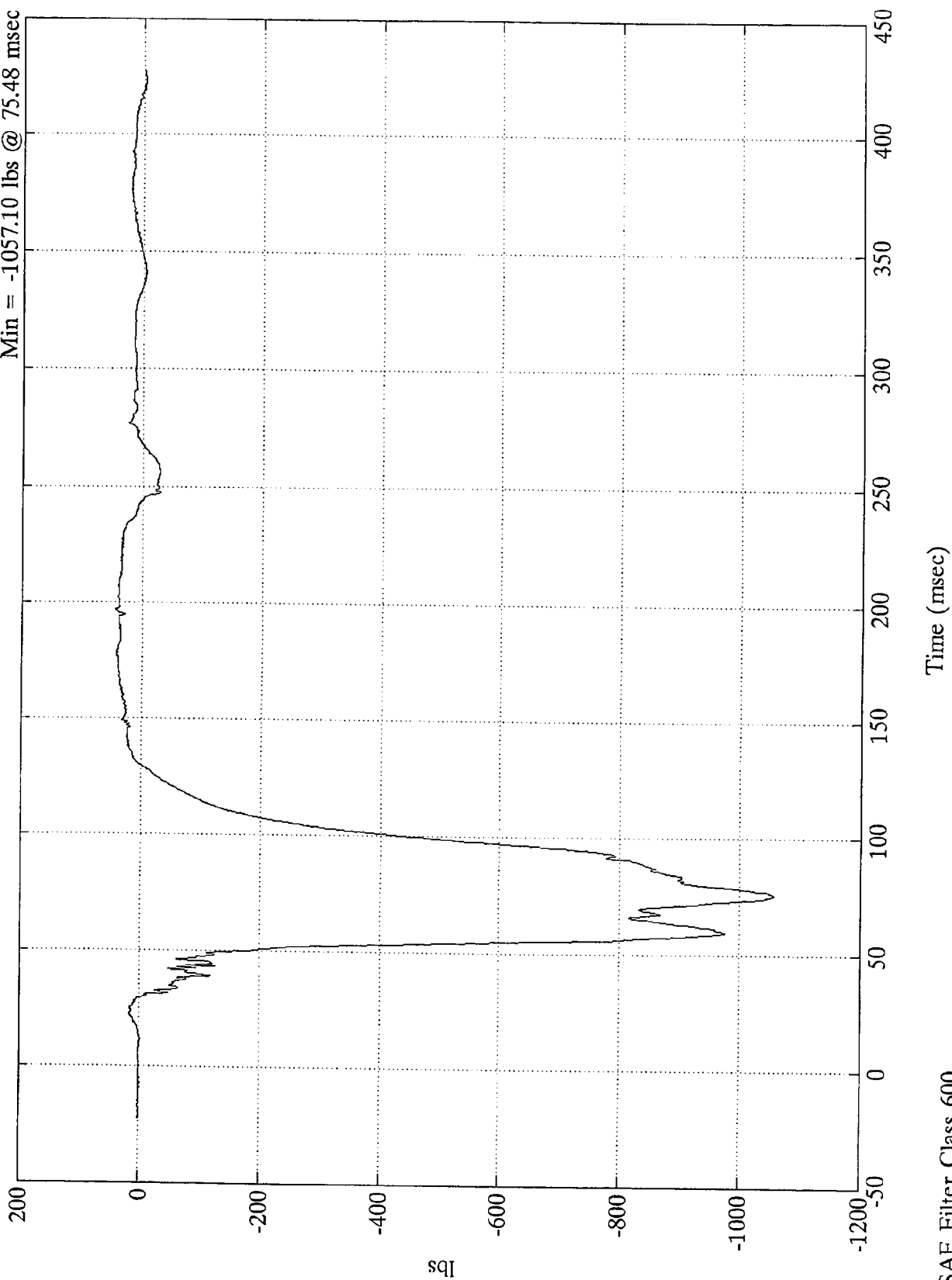
Max = 0.00 In. @ 42.36 msec
Min = -1.51 In @ 91.56 msec



FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 1 Left Femur

Max = 44.85 lbs @ 197.16 msec
Min = -1057.10 lbs @ 75.48 msec

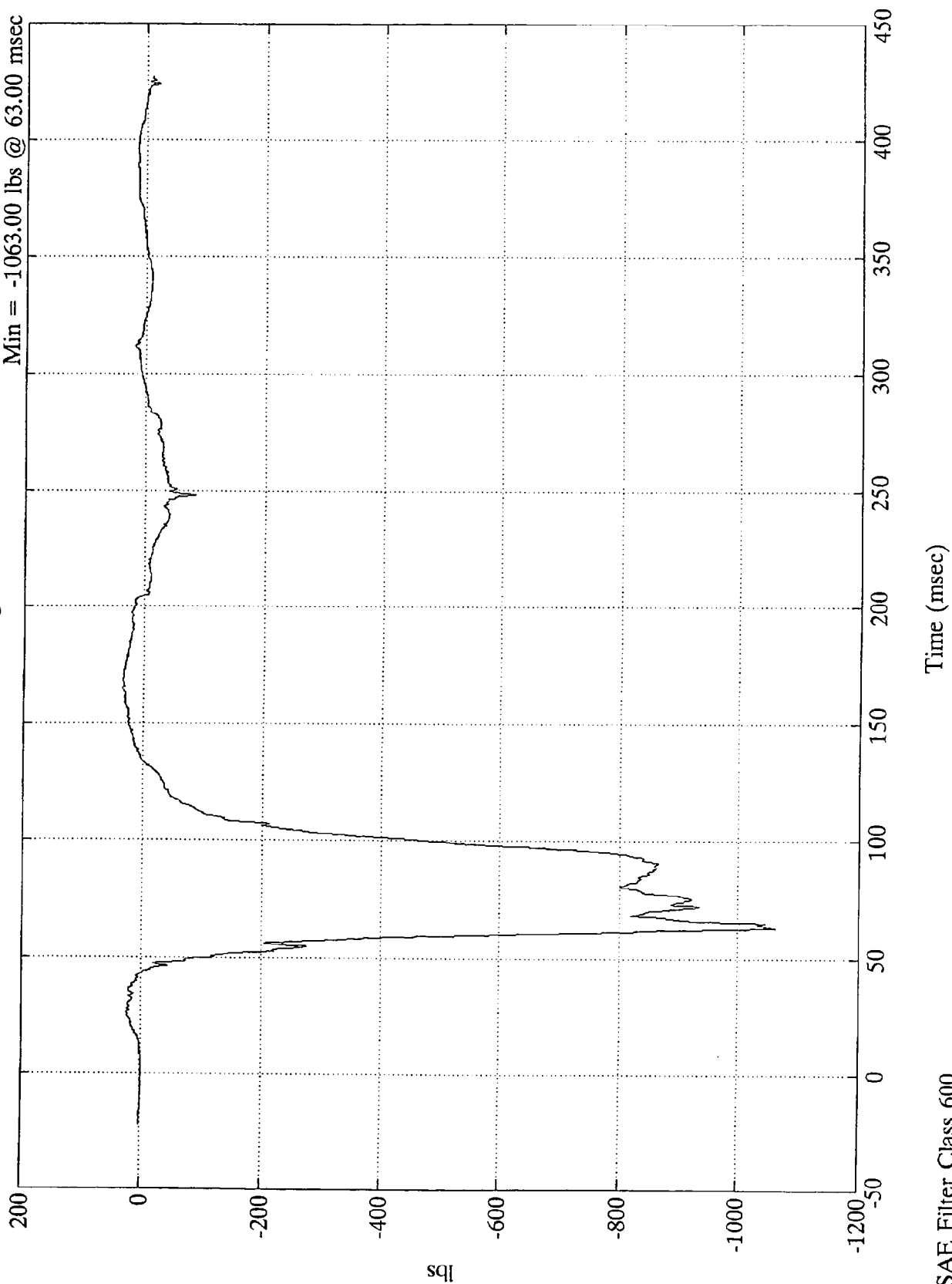


SAE Filter Class 600

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 1 Right Femur

Max = 35.42 lbs @ 165.24 msec
Min = -1063.00 lbs @ 63.00 msec



lbs

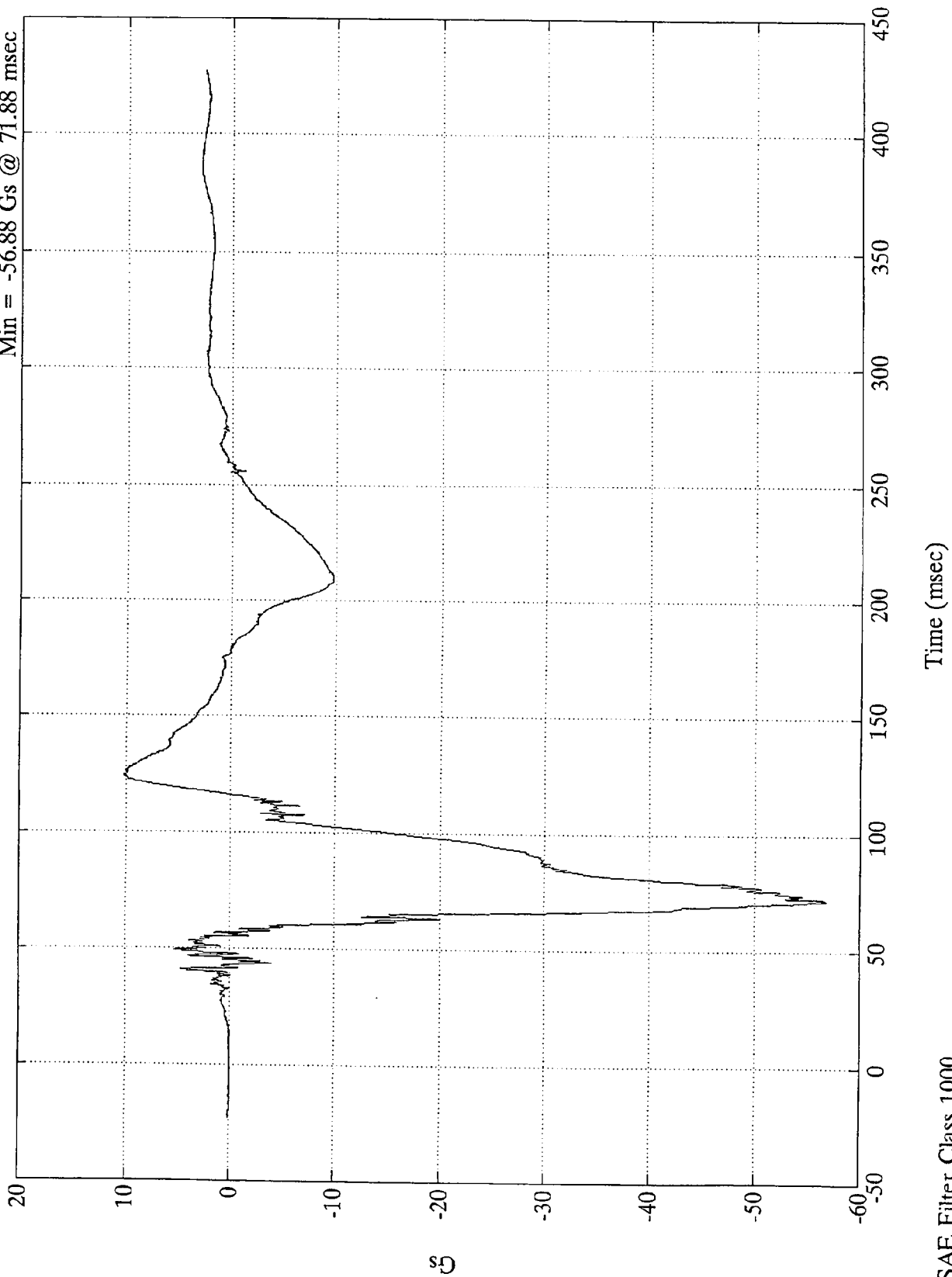
Time (msec)

SAE Filter Class 600

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 2 Head X

Max = 10.18 Gs @ 124.32 msec
Min = -56.88 Gs @ 71.88 msec

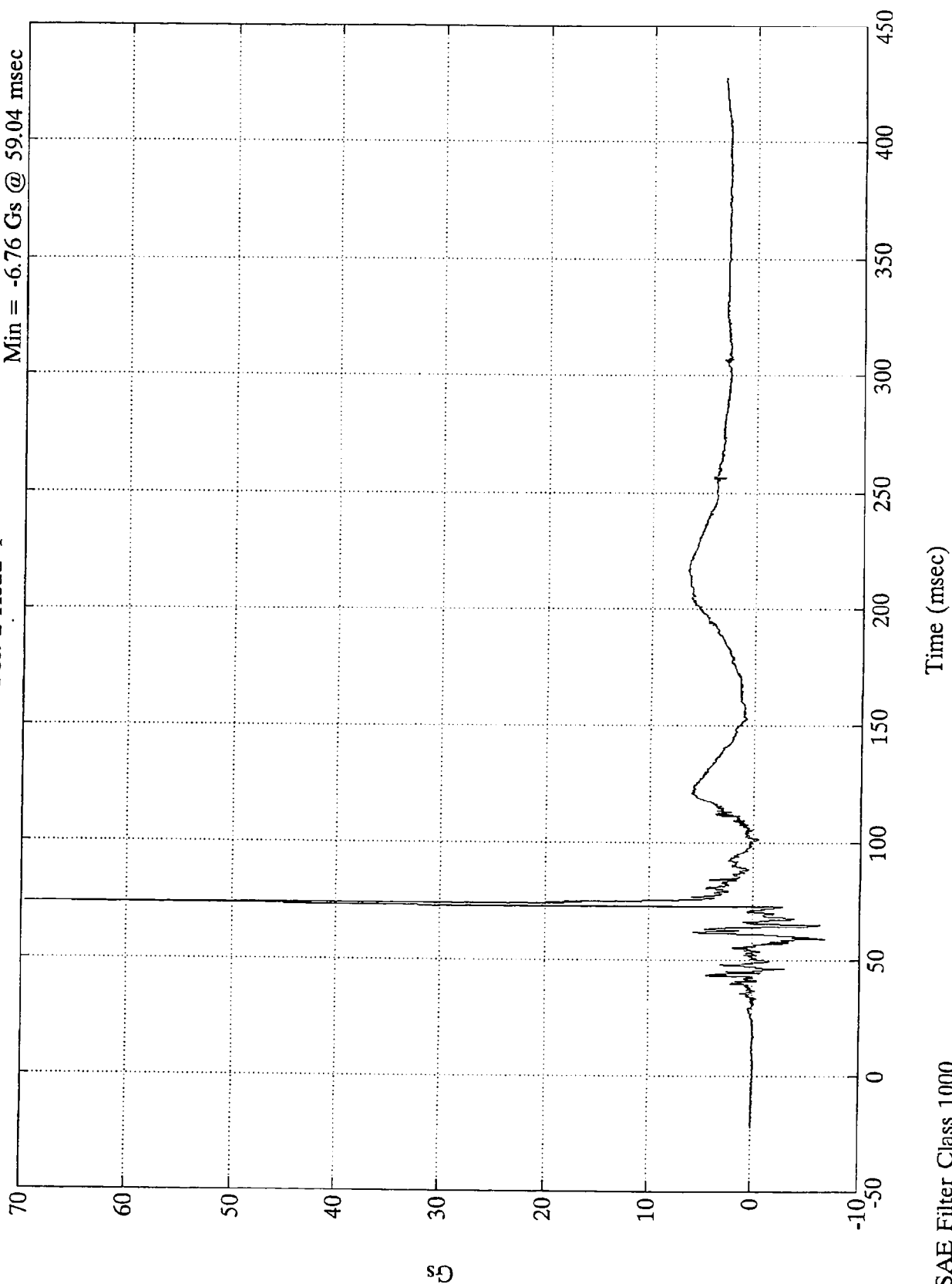


SAE Filter Class 1000

FMVSS 208 -95 Chevrolet Monte Carlo

Max = 69.63 Gs @ 73.68 msec
Min = -6.76 Gs @ 59.04 msec

Pos. 2 Head Y



SAE Filter Class 1000

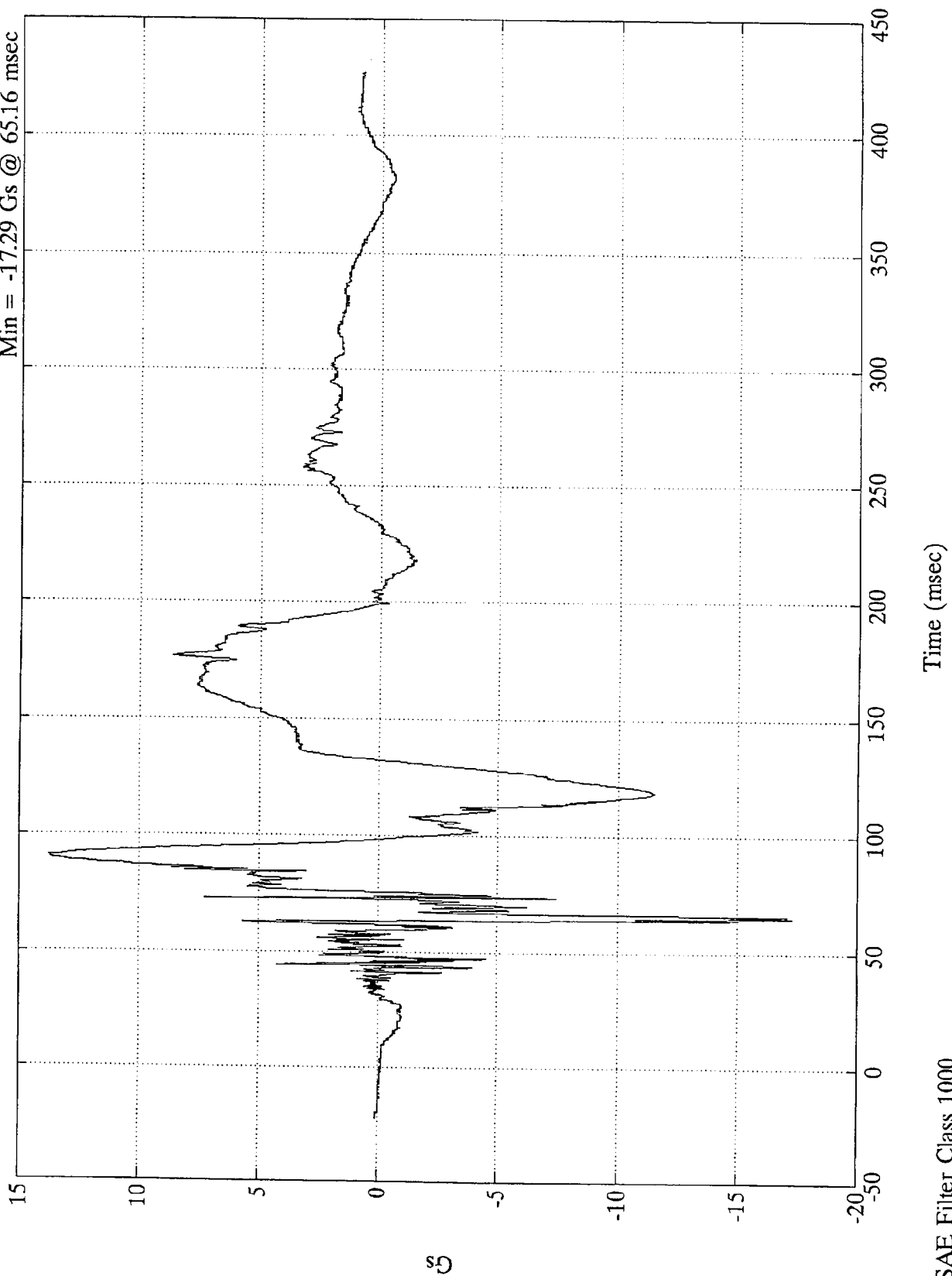
8221-6

B-41

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 2 Head Z

Max = 13.79 Gs @ 90.84 msec
Min = -17.29 Gs @ 65.16 msec



Gs

SAE Filter Class 1000

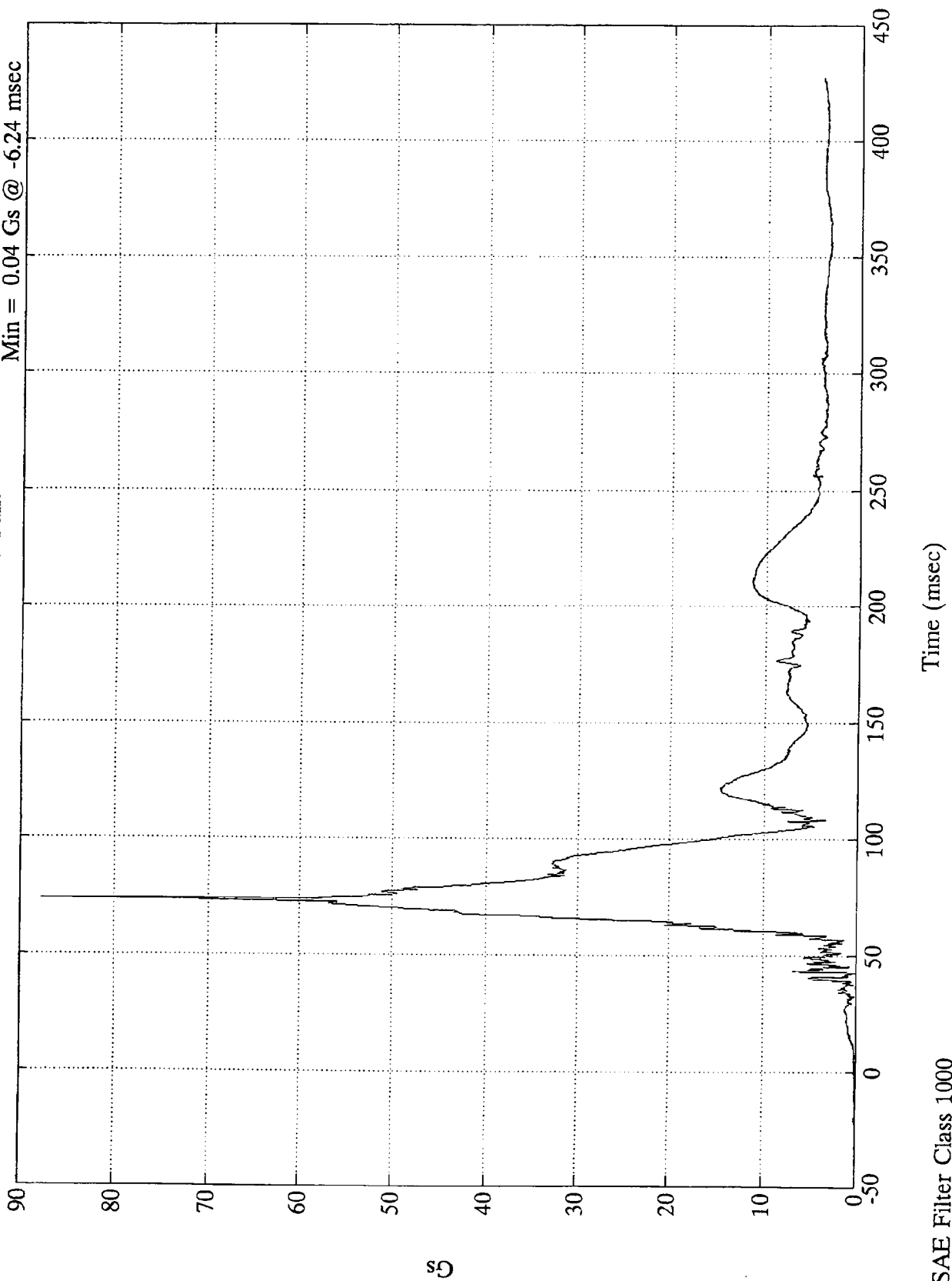
8221-6

B-42

FMVSS 208 -95 Chevrolet Monte Carlo

Max = 87.69 Gs @ 73.68 msec
Min = 0.04 Gs @ -6.24 msec

Pos. 2 Head Resultant

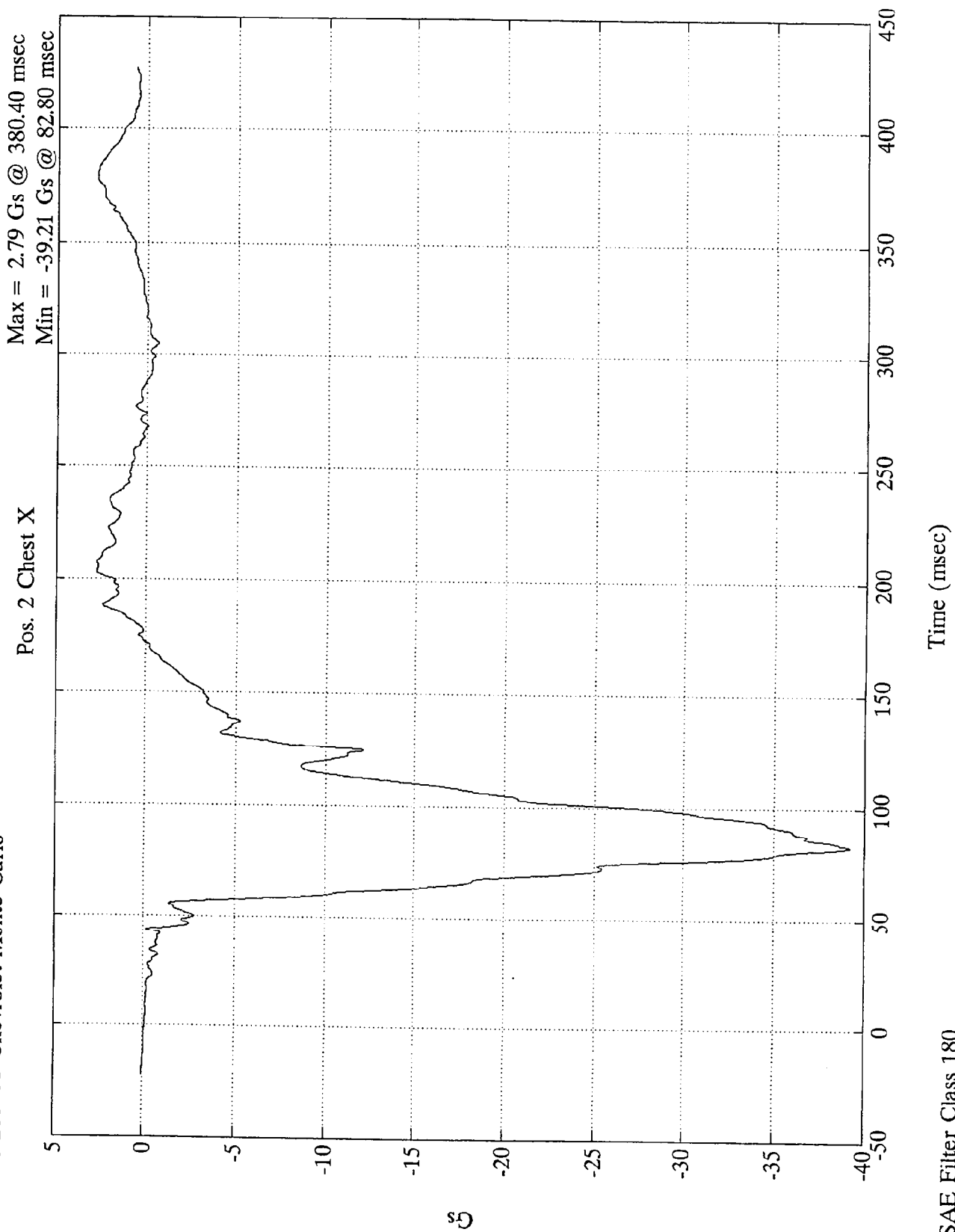


SAE Filter Class 1000

Gs

Time (msec)

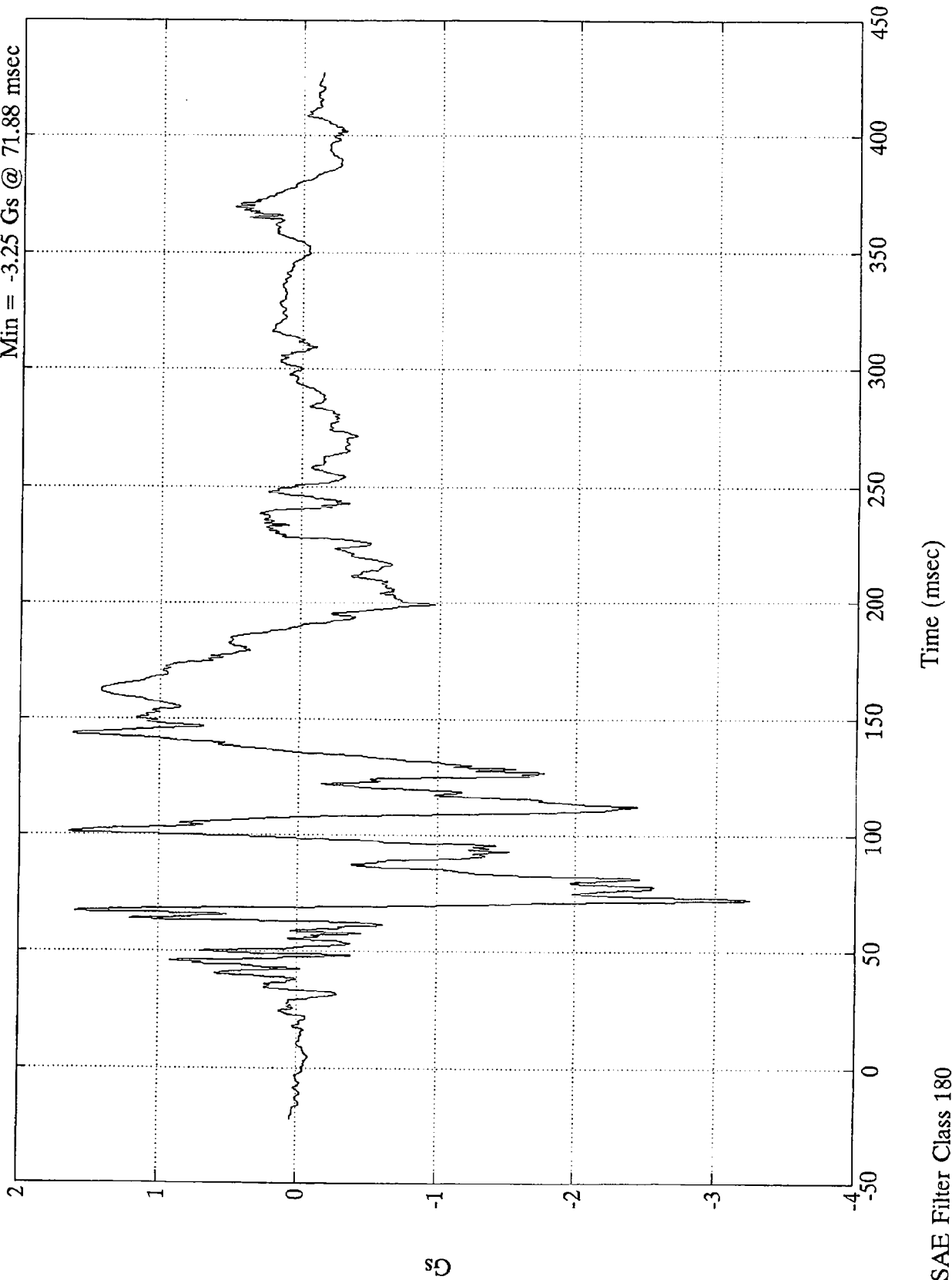
FMVSS 208 -95 Chevrolet Monte Carlo



Gs

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 2 Chest Y
Max = 1.64 Gs @ 101.40 msec
Min = -3.25 Gs @ 71.88 msec



Gs

B-45

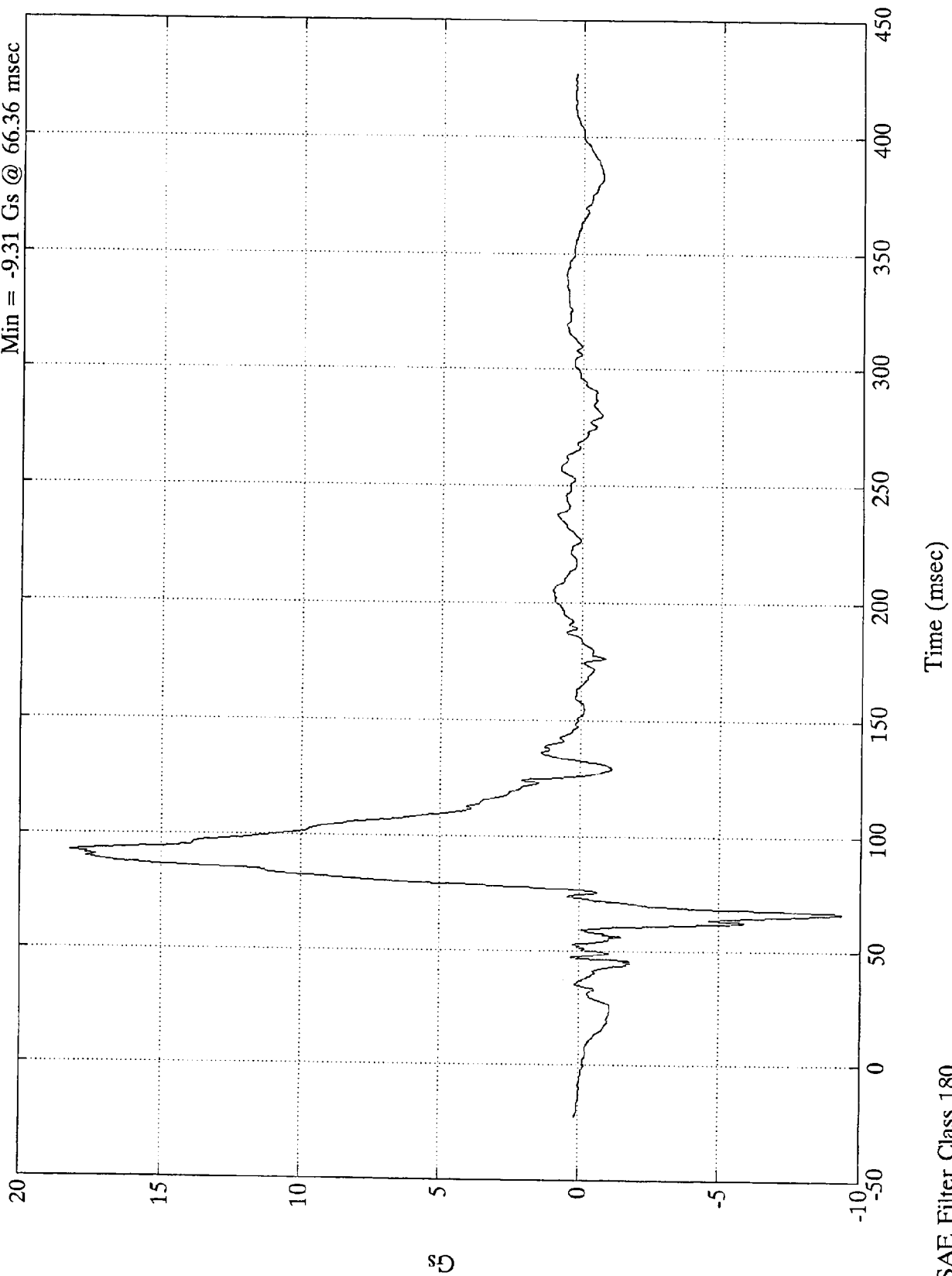
8221-6

SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 2 Chest Z

Max = 18.22 Gs @ 92.76 msec
Min = -9.31 Gs @ 66.36 msec

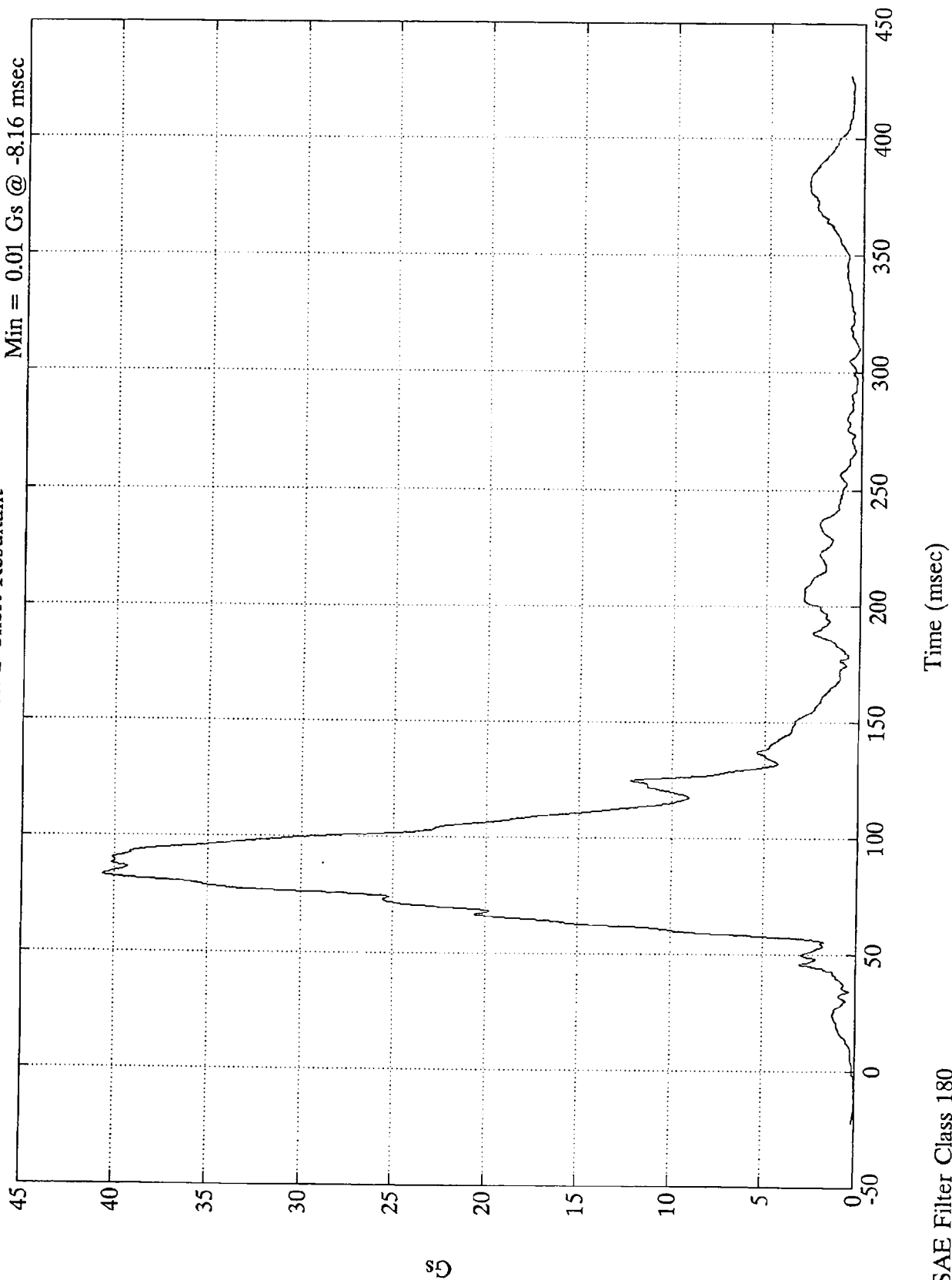


SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

Max = 40.61 Gs @ 82.92 msec
Min = 0.01 Gs @ -8.16 msec

Pos. 2 Chest Resultant



SAE Filter Class 180

Gs

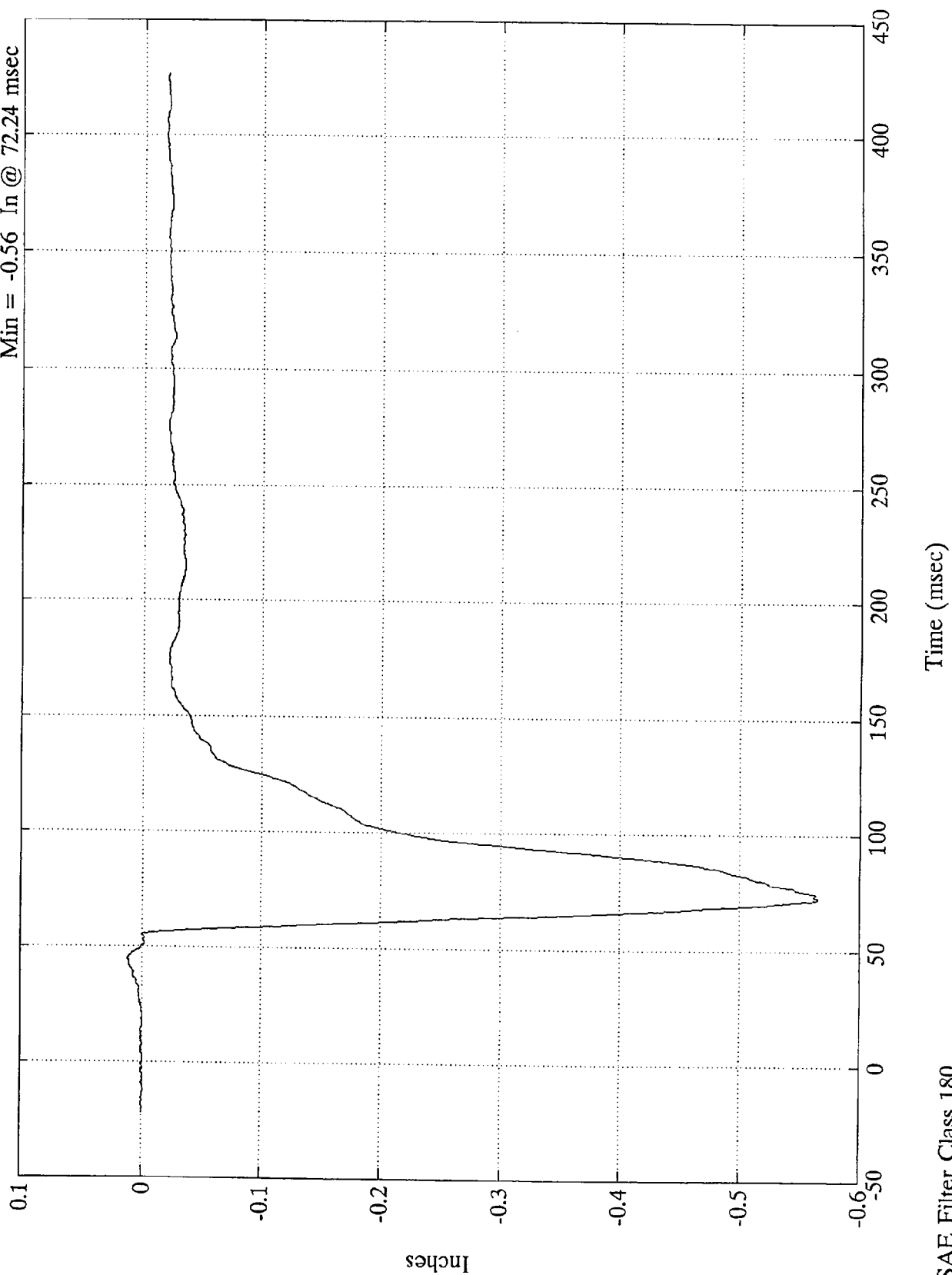
B-47

8221-6

FMVSS 208 -95 Chevrolet Monte Carlo

Max = 0.01 In @ 45.12 msec
Min = -0.56 In @ 72.24 msec

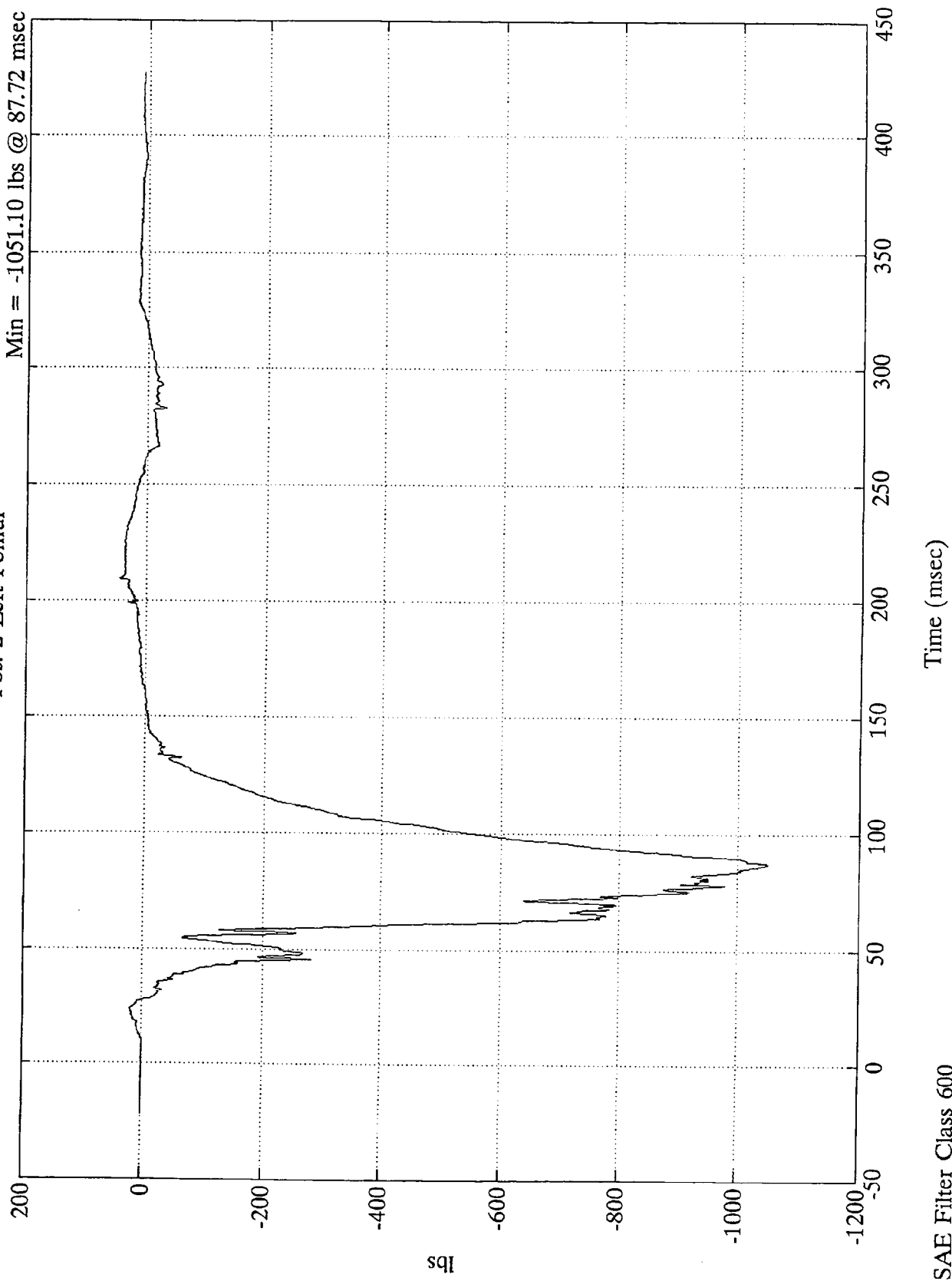
Pos. 2 Chest displacement



SAE Filter Class 180

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 2 Left Femur
Max = 43.57 lbs @ 209.28 msec
Min = -1051.10 lbs @ 87.72 msec



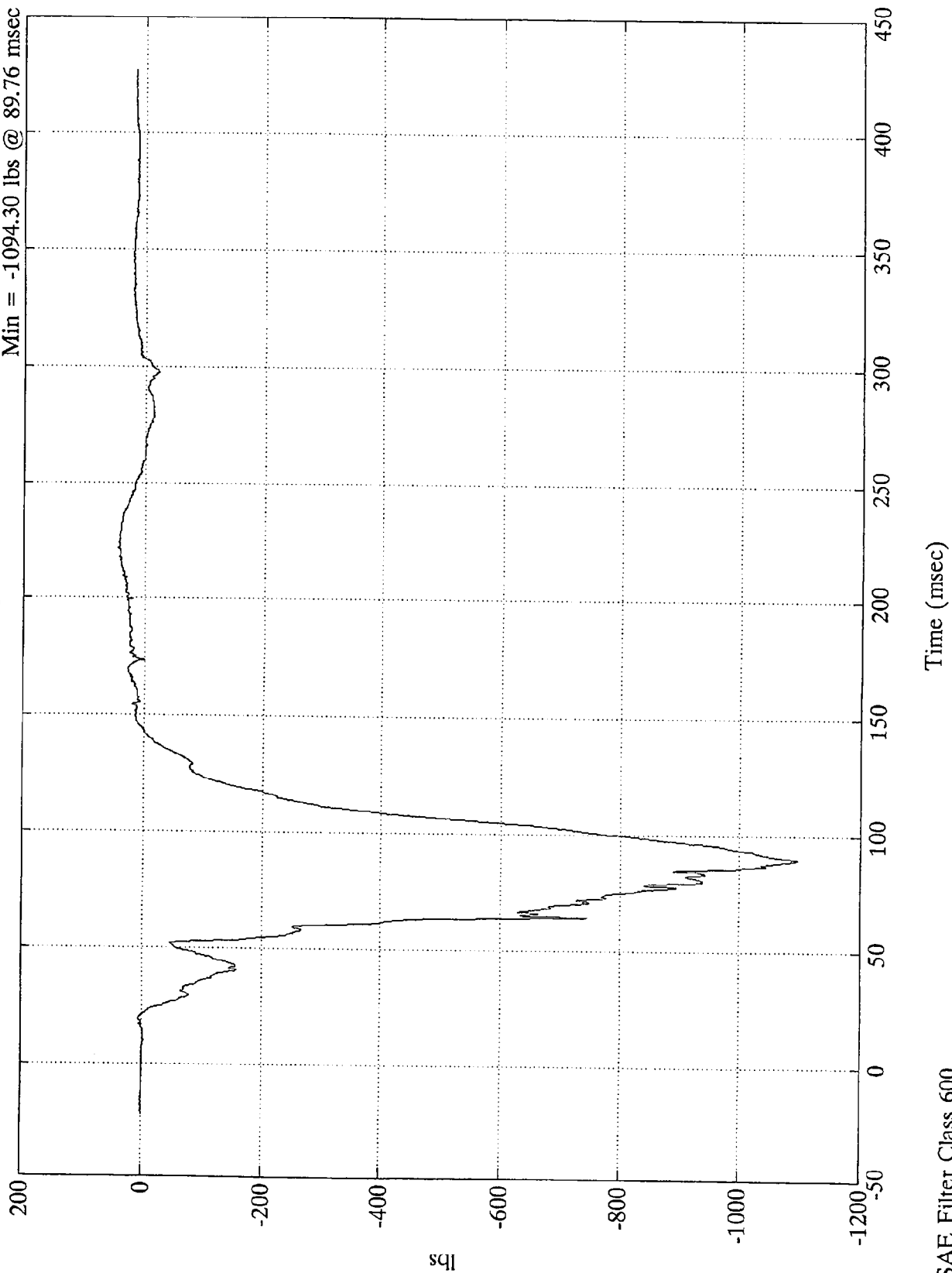
sql

SAE Filter Class 600

FMVSS 208 -95 Chevrolet Monte Carlo

Pos. 2 Right Femur

Max = 44.66 lbs @ 221.52 msec
Min = -1094.30 lbs @ 89.76 msec



SAE Filter Class 600

lbs

Time (msec)

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

How To Wear Safety Belts Properly

Adults

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your Chevrolet, see the part of this manual called "Children." 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.

Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat (to see how, see "Seats and Seat Controls" in the Index) so you can sit up straight.



3. Pick up the latch plate and pull the belt across you. Don't let it get twisted. The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.
4. Push the latch plate into the buckle until it clicks.

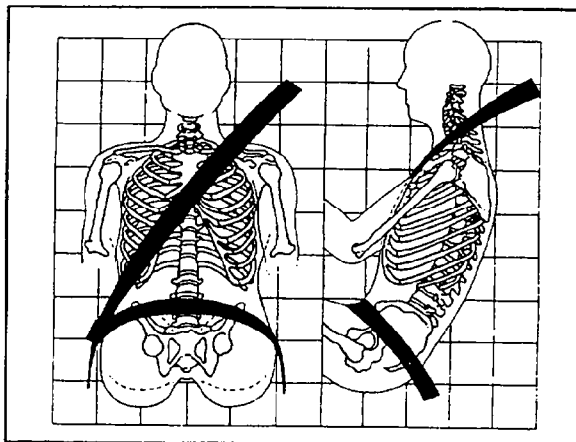
1-12

Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.

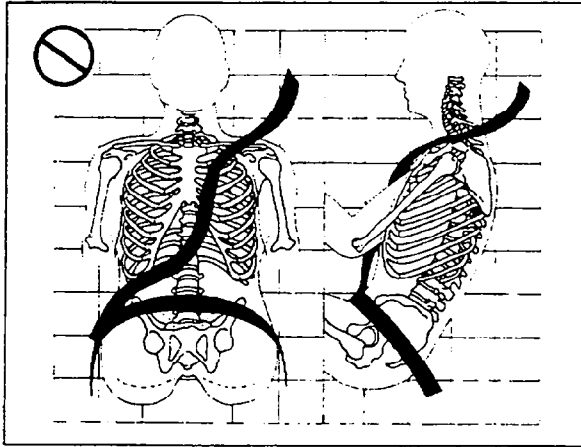


The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even 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.

The safety belt locks if there's a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

1-13

Q: What's wrong with this?



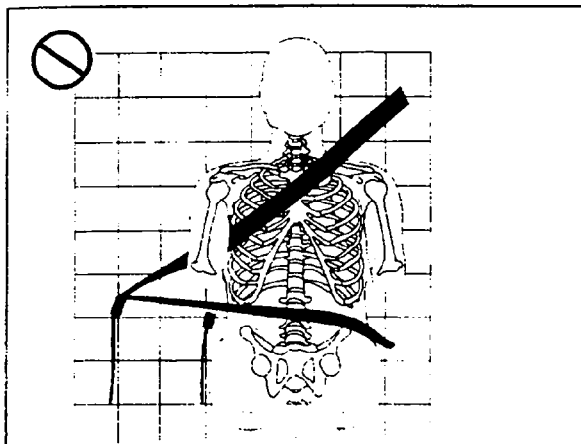
⚠ CAUTION:

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.

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

1-14

Q: What's wrong with this?



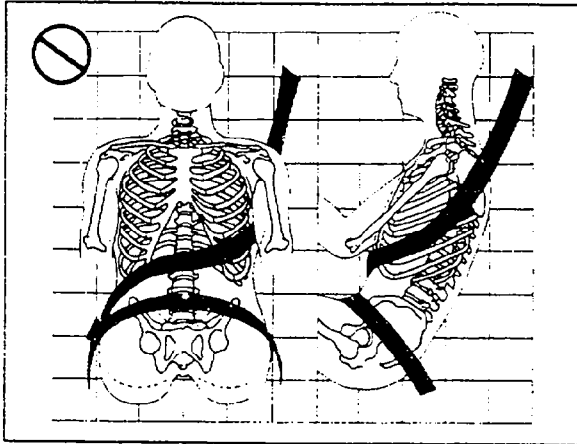
⚠ CAUTION:

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.

A: The belt is buckled in the wrong place.

1-15

Q: What's wrong with this?



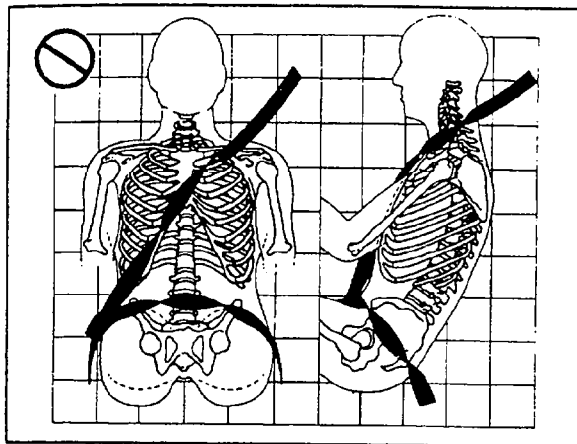
⚠ CAUTION:

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.

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

1-16

Q: What's wrong with this?



⚠ CAUTION:

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

A: The belt is twisted across the body.

1-17



To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Air Bag System

This part explains the air bag system.

Your Chevrolet has two air bags -- one air bag for the driver and another air bag for the right front passenger. Here are the most important things to know:

CAUTION:

Even with an air bag, if you're not wearing a safety belt and you're in a crash, your injuries may be much worse. Air bags are not designed to inflate in rollovers or in rear, side or low-speed frontal crashes. You need to wear your safety belt to reduce the chance of hitting things inside the vehicle or being ejected from it. Always wear your safety belt, even with an air bag.

1-18

CAUTION:

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. Safety belts help keep you in position for an air bag inflation in a crash. Always wear your safety belt, even with an air bag. The driver should sit as far back as possible while still maintaining control of the vehicle.

CAUTION:

An inflating air bag can seriously injure small children. Always secure children properly in your vehicle. To read how, see the part of this manual called "Children" and the caution label on the right front passenger's safety belt.

AIR BAG

There is an air bag readiness light on the instrument panel, which shows AIR BAG.

The system checks for electrical malfunctions, and the light tells you if there is a problem. See "Air Bag Readiness Light" in the Index.

1-19

How The Air Bag System Works



Where is the air bag?

The driver's air bag is in the middle of the steering wheel.



The right front passenger's air bag is in the instrument panel on the passenger's side.

1-20

CAUTION:

Don't put anything on, or attach anything to, the steering wheel or instrument panel. Also, don't put anything (such as pets, or objects) between any occupant and the steering wheel or instrument panel. If something is between an occupant and an air bag, it could affect the performance of the air bag -- or worse, it could cause injury.

When should an air bag inflate?

The air bag is designed to inflate in moderate to severe frontal or near-frontal crashes. The air bag will inflate only if you're going fast enough. For example, if your vehicle goes straight into a wall that doesn't move or deform, the air bag will inflate at between 9 and 15 mph (14 and 24 km/h). However, if your vehicle strikes something that will move or deform, such as a parked car, your air bag will inflate only at a higher speed. The air bag is not designed to inflate in rollovers, side impacts, or rear impacts, because inflation would not help the occupant.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage on the vehicles or because of what the repair costs were. Inflation is determined by the angle of the impact and the vehicle's deceleration. Vehicle damage is only one indication of this.

What makes an air bag inflate?

In a frontal or near-frontal impact of sufficient severity, the air bag sensing system detects that the vehicle is suddenly stopping as a result of a crash. The sensing system triggers a chemical reaction of the sodium azide sealed in the inflator. The reaction produces nitrogen gas, which inflates a cloth bag. The inflator, cloth bag, and related hardware are all part of the air bag inflator modules packed inside the steering wheel and in the instrument panel in front of the right front passenger.

How does an air bag restrain?

In moderate to severe frontal or near-frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. The air bag supplements the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But air bags would not help you in many types of collisions, including rollovers and rear and side impacts, primarily

1-21

because an occupant's motion is not toward the air bag. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions.

What will you see after an air bag inflates?

After the air bag inflates, it quickly deflates. This occurs so quickly that some people may not even realize the air bag inflated. Some components of the air bag module in the steering wheel hub for the driver's air bag, or the instrument panel for the right front passenger's bag, may be hot for a short time, but the part of the bag that comes into contact with you will not be hot to the touch. There will be some smoke and dust coming from vents in the deflated air bags. Air bag inflation will not prevent the driver from seeing or from being able to steer the vehicle, nor will it stop people from leaving the vehicle.

CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or door.

- In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may occur in vehicles with right front passenger air bags because the windshield acts as a reaction surface for the inflating air bag.
- The air bags are designed to inflate only once. After they inflate, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.

1-22

- Your vehicle is equipped with a diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the sensors are activated and driver's safety belt usage at deployment.
- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

NOTICE:

If you damage the cover for the driver's or the right front passenger's air bag, they may not work properly. You may have to replace the air bag on the steering wheel or both the air bag and the instrument panel for the right front passenger's air bag. Do not open or break the air bag covers.

Servicing Your Air Bag-Equipped Chevrolet

Air bags affect how your Chevrolet should be serviced. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your Chevrolet dealer and the 1995 Monte Carlo Service Manual have information about servicing your vehicle and the air bag system. To purchase a service manual, see "Service Publications" in the Index.

The air bag system does not need regular maintenance.

CAUTION:

For up to 2 minutes after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid wires wrapped with yellow tape, or yellow connectors. They are probably part of the air bag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

1-23