

V2271

REPORT NUMBER: 301-CAL-95-9

**SAFETY COMPLIANCE TESTING FOR FMVSS 301
FUEL SYSTEM INTEGRITY**

**GENERAL MOTORS CORPORATION OF CANADA
1995 CHEVROLET CAMARO Z28
2-DOOR COUPE**

NHTSA NUMBER: CS0108

CALSPAN TEST NUMBER: 8247-9

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April 11, 1995

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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Section 1

PURPOSE OF COMPLIANCE TEST

This 30 mph rear moving barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 301 Compliance Test Program conducted for the National Highway Traffic Safety Administration (NHTSA) by Calspan Advanced Technology Center under Contract No. DTNH22-94-C-01136. The purpose of this test was to determine if the subject vehicle, a 1995 Chevrolet Camaro Z28 2-Door Coupe, meets the performance requirements of FMVSS No. 301, "Fuel System Integrity." This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-301-01, dated March 28, 1994.

Section 2

COMPLIANCE TEST RESULTS SUMMARY

A 3889 pound 1995 Chevrolet Camaro Z28 2-Door Coupe was impacted from the rear by a 3959 pound moving barrier at a velocity of 29.8 mph. The test was performed by the Calspan Corporation Advanced Technology Center on April 11, 1995.

One instrumented Part 572 E and one non-instrumented Part 572 B, 50th percentile male Anthropomorphic Test Device (ATD) were placed in the driver and right-front passenger seating positions respectively. No additional ballast was secured in the vehicle cargo area.

Average longitudinal crush was 11.1 inches. Pre- and post-test photographs of the vehicle can be found in appendix A.

The 15.5 gallon fuel tank was filled to 92.5 percent capacity with orange Stoddard fluid prior to the impact. After the impact, there was no fluid leakage for the first 30 minutes nor during any phase of the rollover test. The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity." Section 3 presents the results of these tests.

The crash event was recorded by one real-time and eight high-speed cameras. Camera locations and other pertinent camera information are found on pages 3-9 and 3-10 of this report.

Table 1

CRASH TEST SUMMARY

Vehicle NHTSA No.: CS0108 Test Mode: 30 mph Rear Barrier
 Test Date: April 11, 1995 Time: 11:46 Temperature : 59 °F
 Vehicle Make/Model/Body Style: 1995 Chevrolet Camaro Z28 2-Door Coupe
 Vehicle Test Weight: 3889 lbs Impact Velocity: 29.8 mph
 Static Crush: Left Side = 12.5 inches
 Right Side = 10.0 inches
 Centerline = 10.7 inches
 Average Crush: 11.1 inches

TYPE OF FRONT OCCUPANT RESTRAINT SYSTEM INSTALLED IN TEST VEHICLE:

Driver's DSP: Airbag, 3-point belt system
 Right Passenger's DSP: Airbag, 3-point belt system

VISIBLE DUMMY CONTACT POINTS:

Driver: Back of head to top of headrest.

Passenger: Back of head with headrest.

DOOR OPENING DATA:

Closed/Operable - Left Front
Closed/Operable - Right Front

Stoddard Solvent Spillage from Vehicle's Fuel System: None

Remarks: Ratcheting top of gas cap was sheared off at impact, base remained installed in filler hole. Passenger seatback collapsed to full rear position, driver seatback collapsed to approximately halfway back to full rear position. Recline mechanism was inoperable after impact. Rear hatch became unlatched after impact.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1995 Chevrolet Camaro Z28 2-Door Coupe

NHTSA No.: CS0108 ; VIN: 2G1FP22P1S2110965 ; Color: White

Engine Data: 8 cylinders; - CID; 5.7 Liters; - cc

Placement: X Longitudinal or In-Line; - Transverse of Lateral

Transmission Data: 4 speeds; - Manual; X Automatic; X Overdrive

Final Drive: X Rear Wheel Drive; - 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: 9/22/94 ; Odometer Reading 00026 miles

Selling Dealer: Flanigan Chevrolet, Inc.

& Address: 27-29 Main Street, N. Tonawanda, NY 14120

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: General Motors Corporation of Canada

Date of Manufacture: 8/24/94

GVWR: 4245 lbs.; GAWR: 2168 lbs. FRONT; 2077 lbs. REAR

DATA FROM TIRE PLACARD:

Location of Placard on Vehicle: Drivers door

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

Recommended Tire Size: P245/50 ZR-16

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

Size of Tires on Test Vehicle: P245/50 ZR-16

Type of Spare Tire: Temporary

Vehicle Capacity Data: 701 lbs.

Type of Front Seats:	<u>-</u> Bench;	<u>X</u> Bucket;	<u>-</u> Split Bench
Number of Occupants:	<u>2</u> Front;	<u>2</u> Rear;	<u>4</u> Total
Vehicle Capacity Weight (VCW) =	<u>701</u>	<u>lbs.</u>	
No. of Occupants x 150 lbs. =	<u>600</u>	<u>lbs.</u>	
Rated Cargo/Luggage Weight (RCLW) =	<u>101</u>		

*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	=	1013	lbs.	Right Rear	=	747	lbs.
Left Front	=	965	lbs.	Left Rear	=	729	lbs.
TOTAL FRONT	=	1,978	lbs.	TOTAL REAR	=	1,476	lbs.
TOTAL DELIVERED WEIGHT = 3,454 lbs.							
% of Total Front of Vehicle Weight = 57				% of Total Rear Weight = 43 %			

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	3,454	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	101	lbs.
Weight of 2 p.572 Dummies, 167 & 164 lbs	=	331	lbs.
TARGET TEST WEIGHT	=	3,886	lbs.

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 104 POUNDS OF CARGO WEIGHT:

Right Front	=	1143	lbs.	Right Rear	=	822	lbs.
Left Front	=	1103	lbs.	Left Rear	=	821	lbs.
TOTAL FRONT	=	2,246	lbs.	TOTAL REAR	=	1,643	lbs.
TOTAL TEST WEIGHT = 3,889 lbs.							
% of Total Front Weight = 58 %				% of Total Rear Weight = 42 %			

* Weight of Ballast Secured in Vehicle Trunk Area = 0 lbs.

Type of Ballast: -

Method of Securing Ballast: -

Vehicle Components Removed for Weight Reduction: -

VEHICLE ATTITUDE (all dimension in inches):

AS DELIVERED:	RF	27.8	LF	28.0	RR	28.2	LR	28.5
AS TESTED:	RF	26.4	LF	26.6	RR	27.6	LR	27.9
Vehicle's Wheel Base:		101.1 in.						
Location of Vehicle's C.G.:		42.7 inches rearward of front wheel center.						

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual	=	15.5	gallons
Usable Capacity Figure Furnished by COTR	=	15.5	gallons
Test Volume Range (91 to 94 % of Usable Capacity)	=	14.1	to 14.6 gallons
ACTUAL TEST VOLUME=	14.3 gallons (with entire fuel system filled)		

* Ballast weight includes the RCLW, the weight of drained vehicle fluids and the weight of any removed vehicle components less the weight of onboard instrumentation, cameras, and hardware.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

FUEL SYSTEM DATA (continued):

Test Fluid Type:	Stoddard solution
Test Fluid Specific Gravity:	0.764
Test Fluid Kinematic Viscosity:	0.96 centistokes
Test Fluid Color:	Orange ("red" is preferred)
Type of Vehicle Fuel Pump:	
Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF -	
Fuel pump operates	
Details of Fuel System:	Fuel filler is located on the left of the vehicle aft of the rear axle. The fuel tank is located in a cavity above and slightly aft of the rear axle. Fuel lines are attached to the left side of the vehicle underbody.

Table 3

POST IMPACT DATATYPE OF TEST:

Type of Test: Rear Barrier Impact Angle: 0°
 Test Date: April 11, 1995 Time: 11:46 Temperature: 59 °F
 Vehicle NHTSA No.: CS0108
 Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.8 mph; Trap No. 2 = 29.8 mph
 Average Impact Speed = 29.8 mph

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

Vehicle Length:

Pre-Test	Right =	<u>185.3</u>	; C/L =	<u>193.0</u>	; Left =	<u>184.8</u>
Post-Test	Right =	<u>175.3</u>	; C/L =	<u>182.3</u>	; Left =	<u>172.3</u>
Crush	Right =	<u>10.0</u>	; C/L =	<u>10.7</u>	; Left =	<u>12.5</u>
AVERAGE	=	<u>11.1</u>	inches			

Section 3
COMPLIANCE TEST DATA

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION
(FOR REAR IMPACTS ONLY)

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

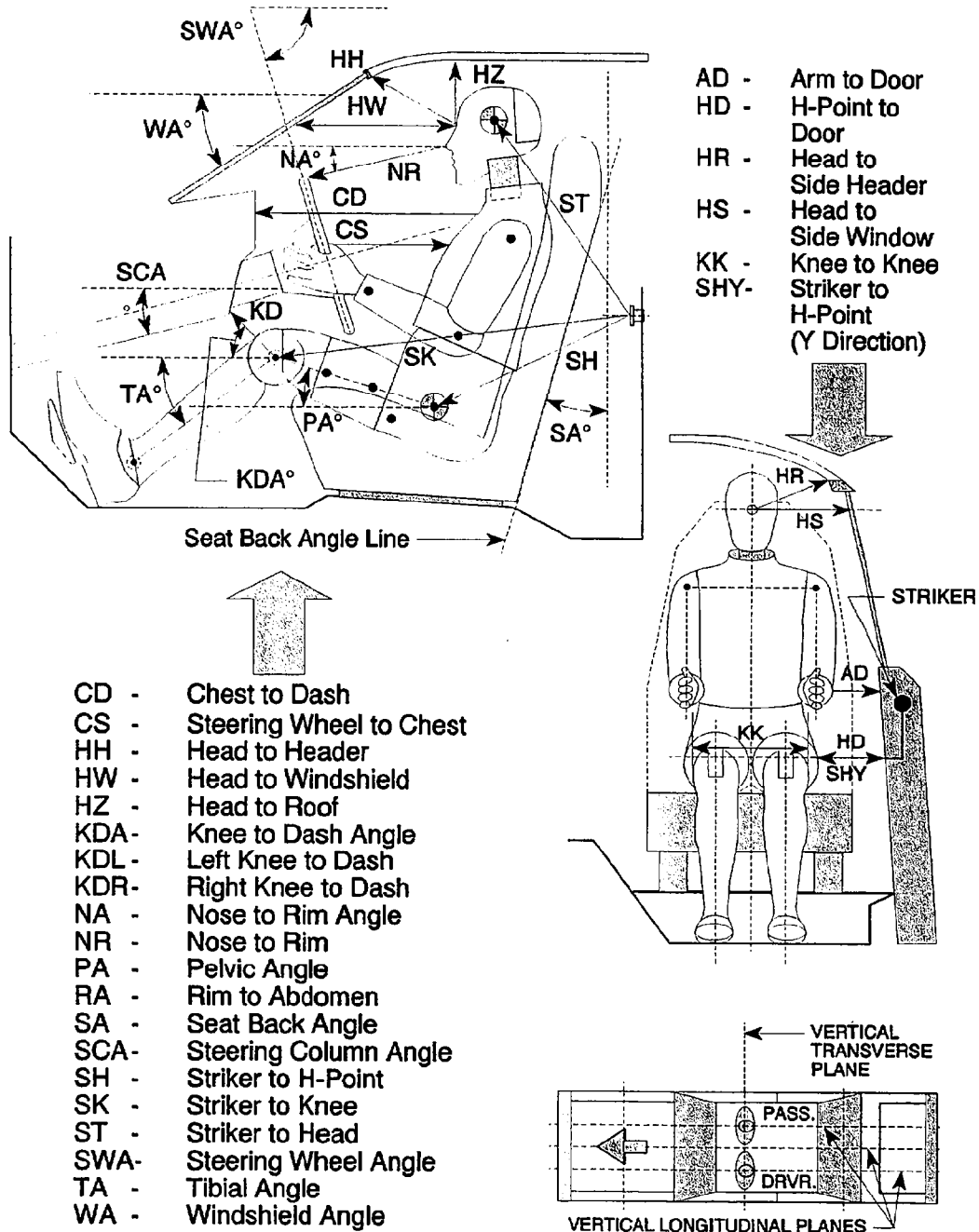


Table 4

FRONT SEAT OCCUPANT MEASUREMENTS
(FOR REAR IMPACT ONLY)

	DRIVER (Serial #366)
WA°	21 deg.
SWA°	73 deg.
SCA°	17 deg.
SA°	26 deg.
HZ	7.2
HH	11.7
HW	25.2
HR	7.4
NR	12.9 Angle -13 deg.
CD	18.1
CS	9.5 (horz.) 10.3 (5" down)
RA	6.7
KDL	6.4 Angle (KDA) 45 deg.
KDR	6.1
PA°	22 deg.
TA°	-31 deg.
KK	10.7
ST	24.4 Angle 44 deg.
SK	37.8 Angle -4 deg.
SH	24.7 Angle -18 deg.
SHY	10.0
HS	12.1
HD	7.5
AD	4.5

Table 5
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: CS0108 TEST DATE: April 11, 1995

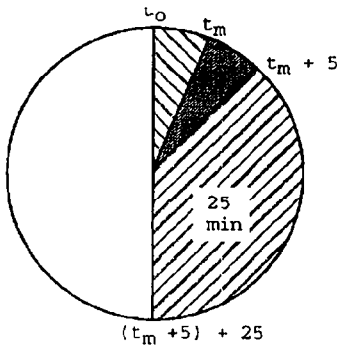
Vehicle Mfr./Make/Model: 1995 Chevrolet Camaro Z28 2-Door Coupe

Test vehicle fuel tank filled to 91% 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:

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

FUEL SPILLAGE MEASUREMENT:



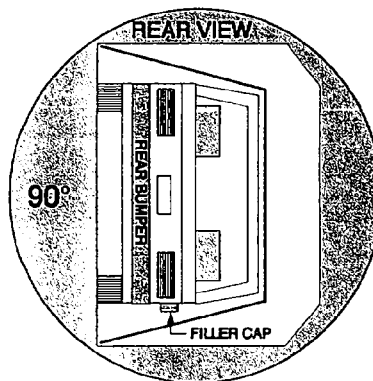
1. From impact until vehicle motion ceases
2. For five minute period after vehicle motion ceases
3. For next 25 minutes

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

SOLVENT SPILLAGE DETAILS:

None

Table 6

FMVSS NO. 301 STATIC ROLLOVER DATA SHEETTEST PHASE :0-90 Deg.Vehicle NHTSA ID No. :CS0108I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time +

TOTAL

Next whole minute interval

2	minutes	10	seconds
5	minutes	00	seconds
7	minutes	10	seconds
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.

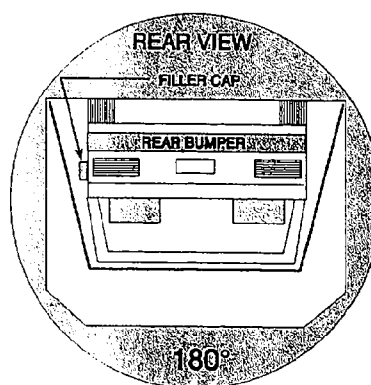
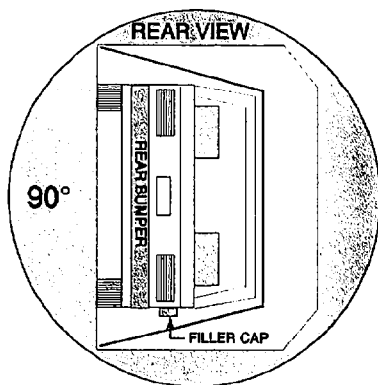
IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 6
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
90-180 Deg.

Vehicle NHTSA ID No. :
CS0108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

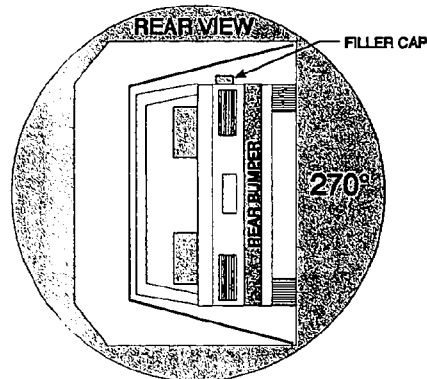
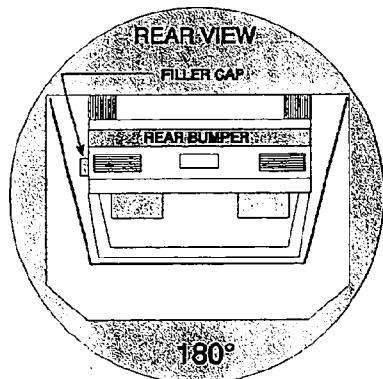
IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 6
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
180-270 Deg.

Vehicle NHTSA ID No. :
CS0108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	56	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	56	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.

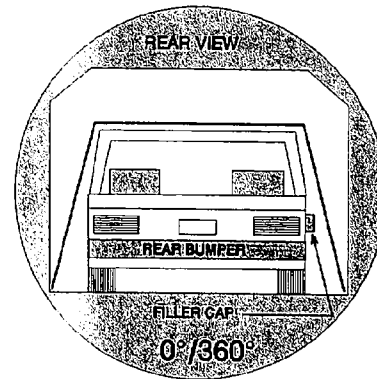
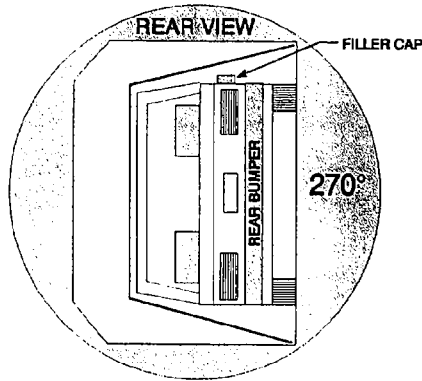
IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 6
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
270-360 Deg.

Vehicle NHTSA ID No. :
CS0108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	58	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	58	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

Figure 2

CAMERA POSITIONS FOR REAR IMPACTS

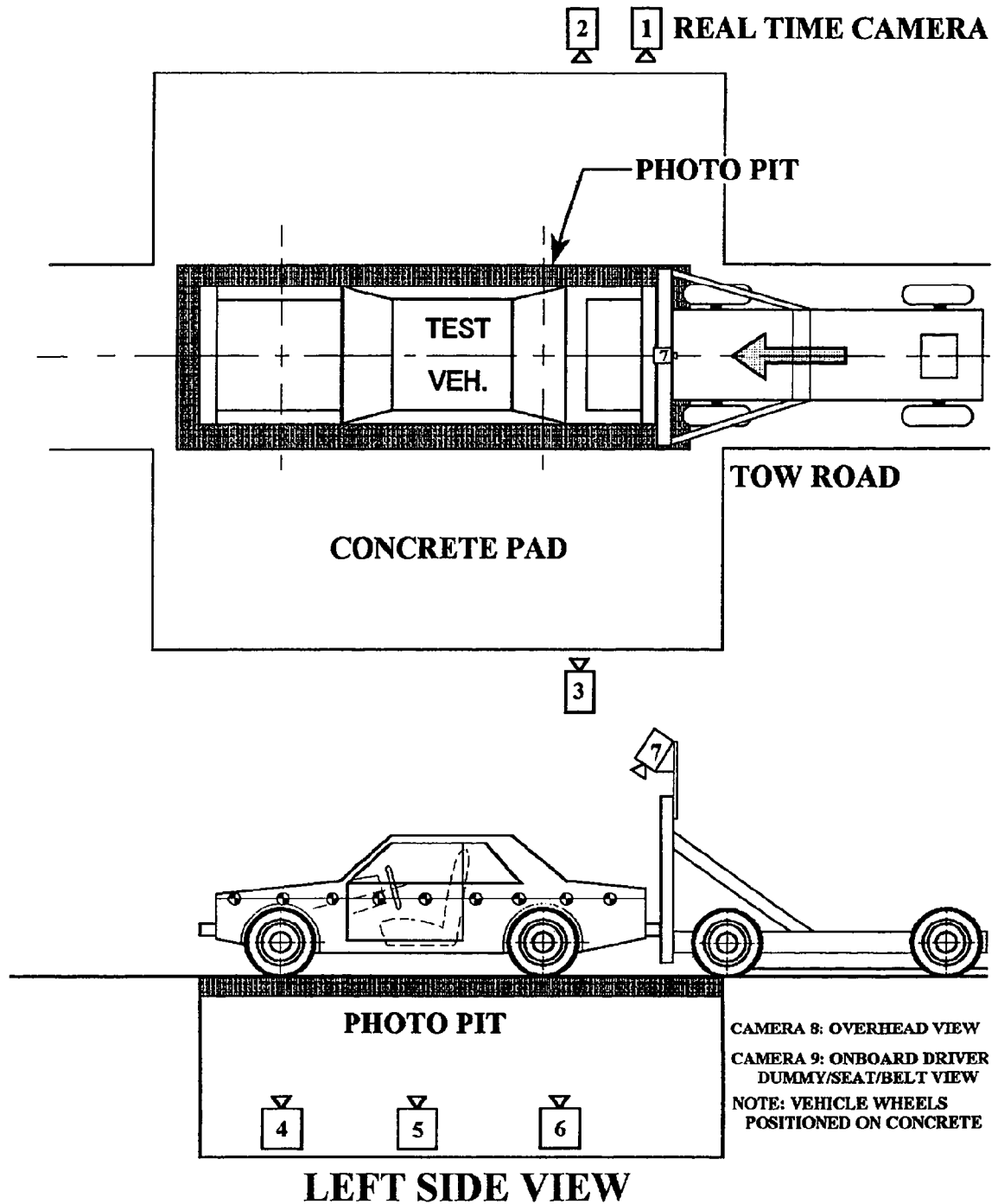


Table 7

HIGH-SPEED CAMERA LOCATIONSNHTSA No. : CS0108 Vehicle : 1995 Chevrolet Camaro Z28 2-Door Coupe

CAMERA NO.	VIEW	CAMERA POSITIONS (inches)*			ANGLE** (degrees)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Camera	-	-	-	-	-	24
2	Right Side View	303	0	43	1	13	760
3	Left Side View	364	64	54	-2	25	840
4	Vehicle Front Underbody View	0	-146	-77	90	13	750
5	Vehicle Mid-Section Underbody View	0	-94	-77	90	13	1000
6	Vehicle Rear Underbody View	0	-38	-77	90	13	785
7	Moving Barrier View	0	0	99	-105	13	830
8	Overhead Overall View	-20	0	386	-90	13	905
9	Onboard Driver Dummy/Seat/Belt View	-	-	-	-	8	565

* X = film plant to monorail centerline (+ to left of rail)

Y = film plane to impact location (+ ahead of impact location)

Z = film plane to ground (+ above ground)

** = referenced to horizontal plane

Appendix A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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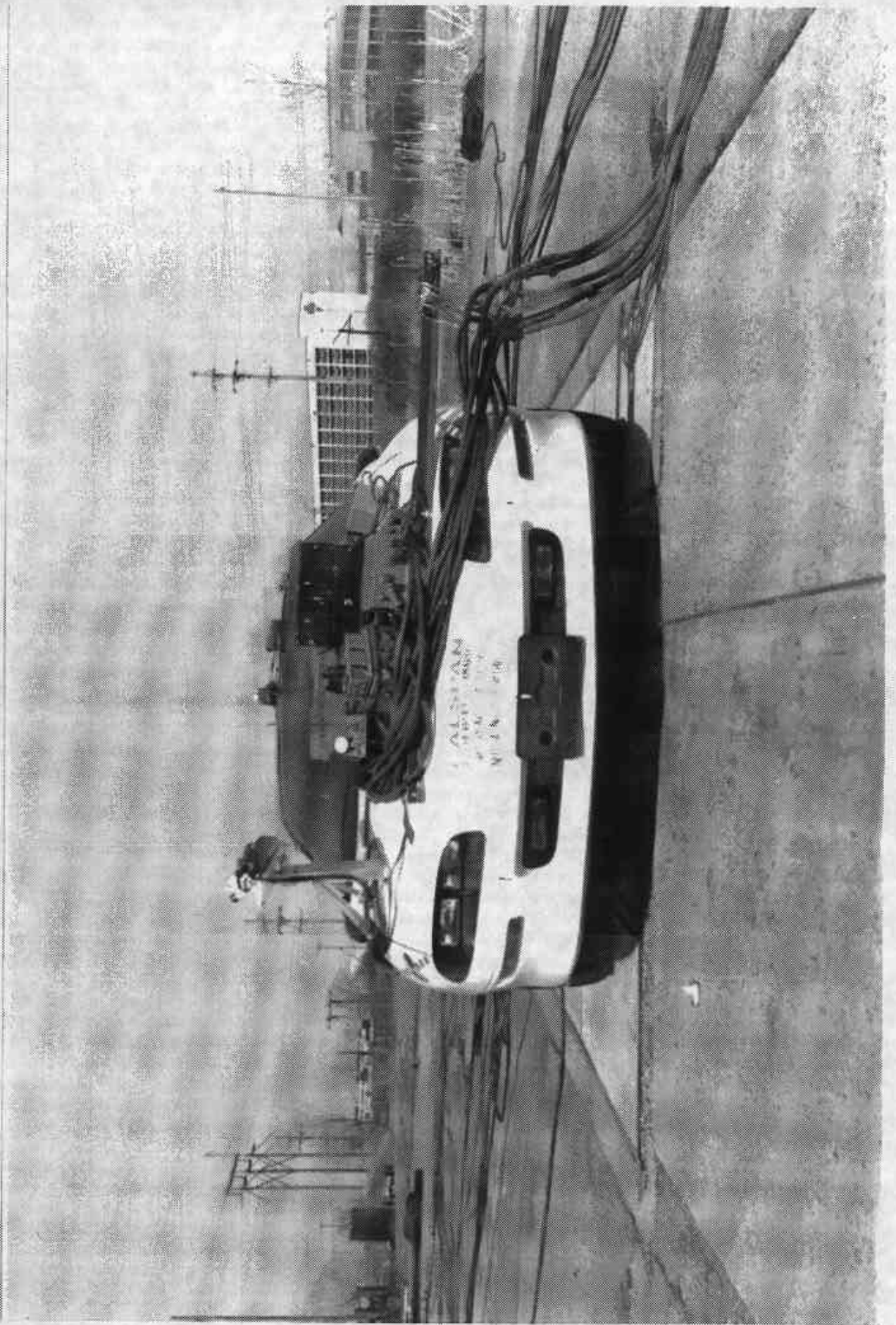


Figure A-1 PRE-TEST FRONT VIEW



Figure A-2 POST-TEST FRONT VIEW

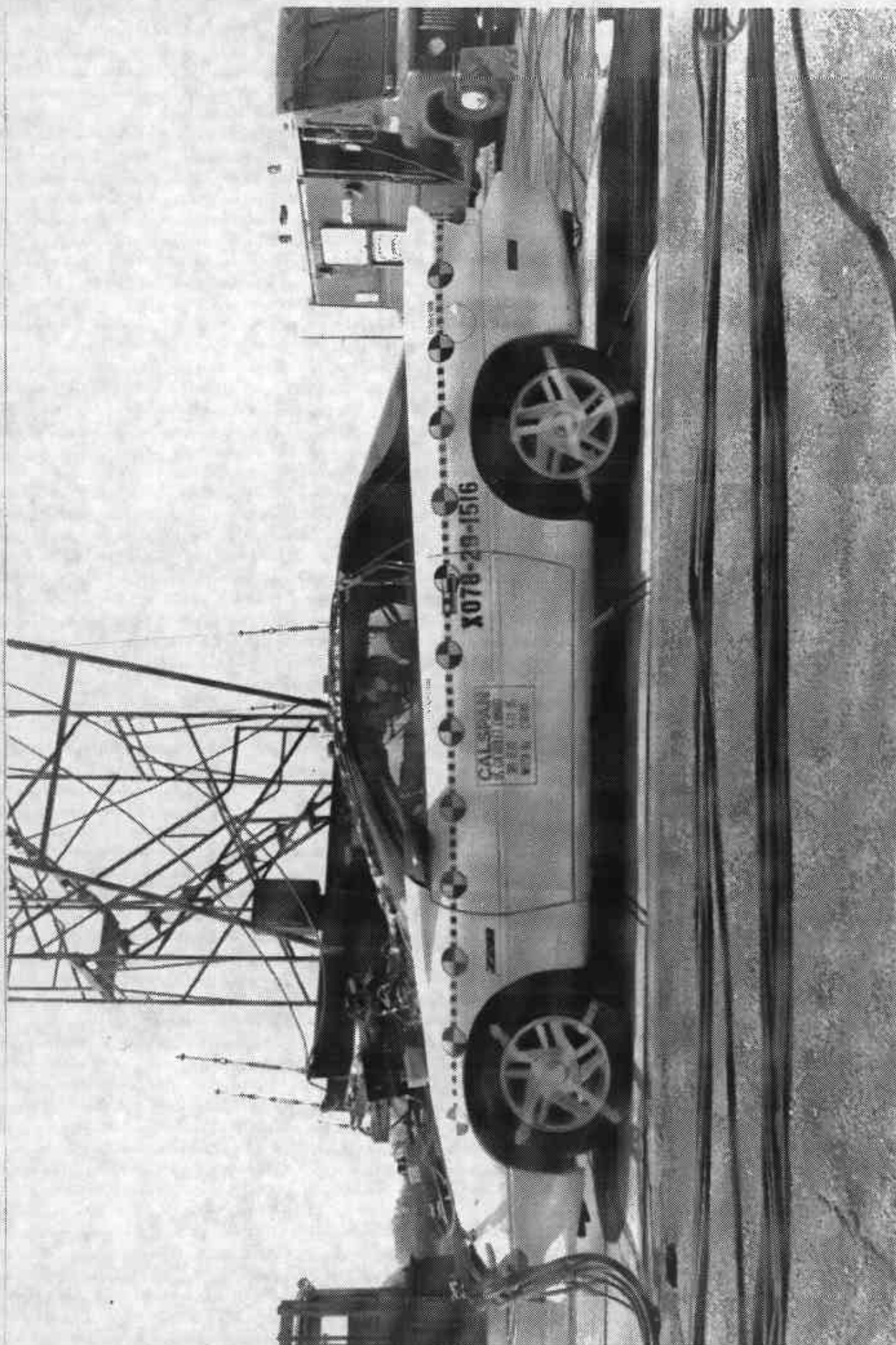


Figure A-3 PRE-TEST LEFT SIDE VIEW

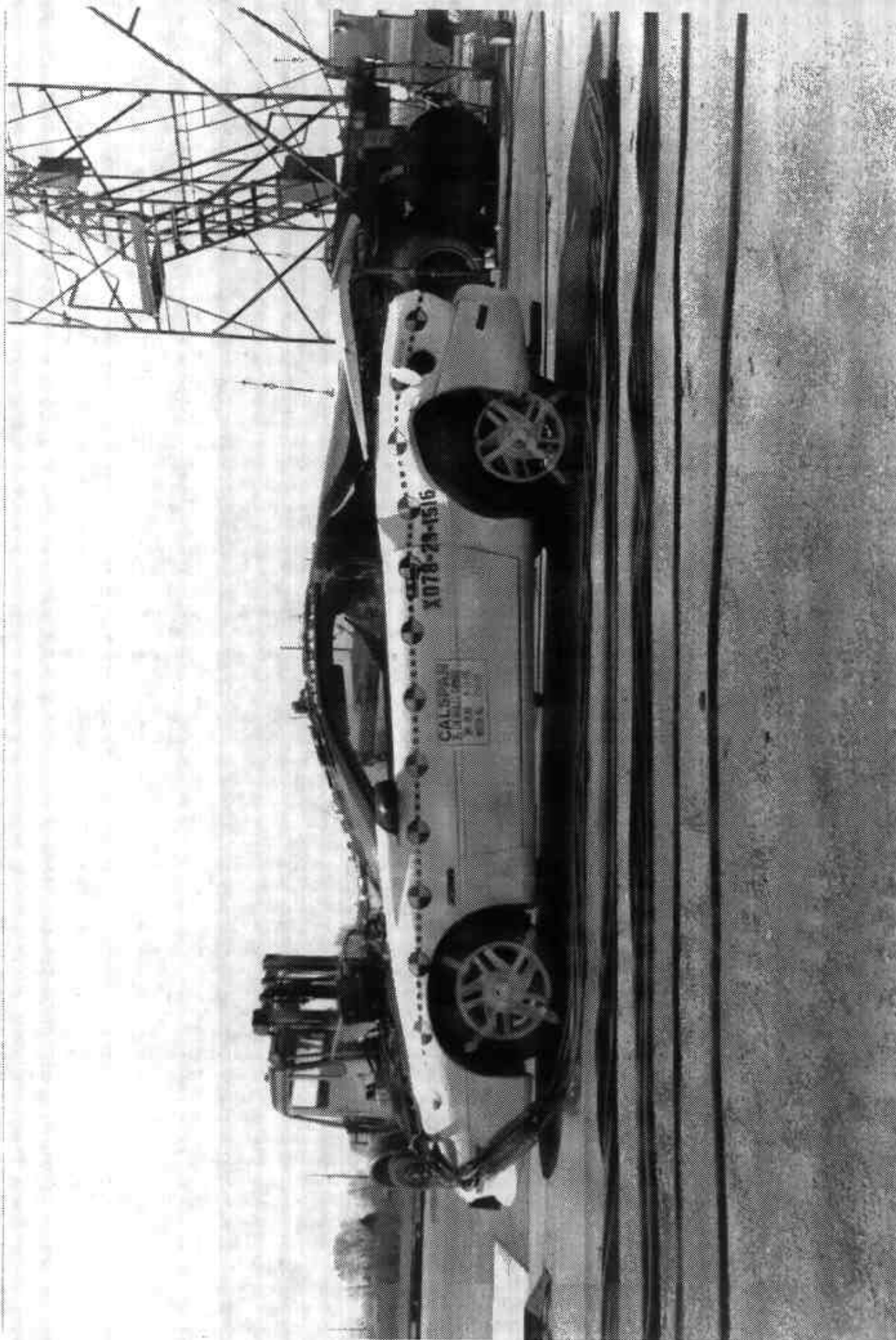


Figure A-4 POST-TEST LEFT SIDE VIEW

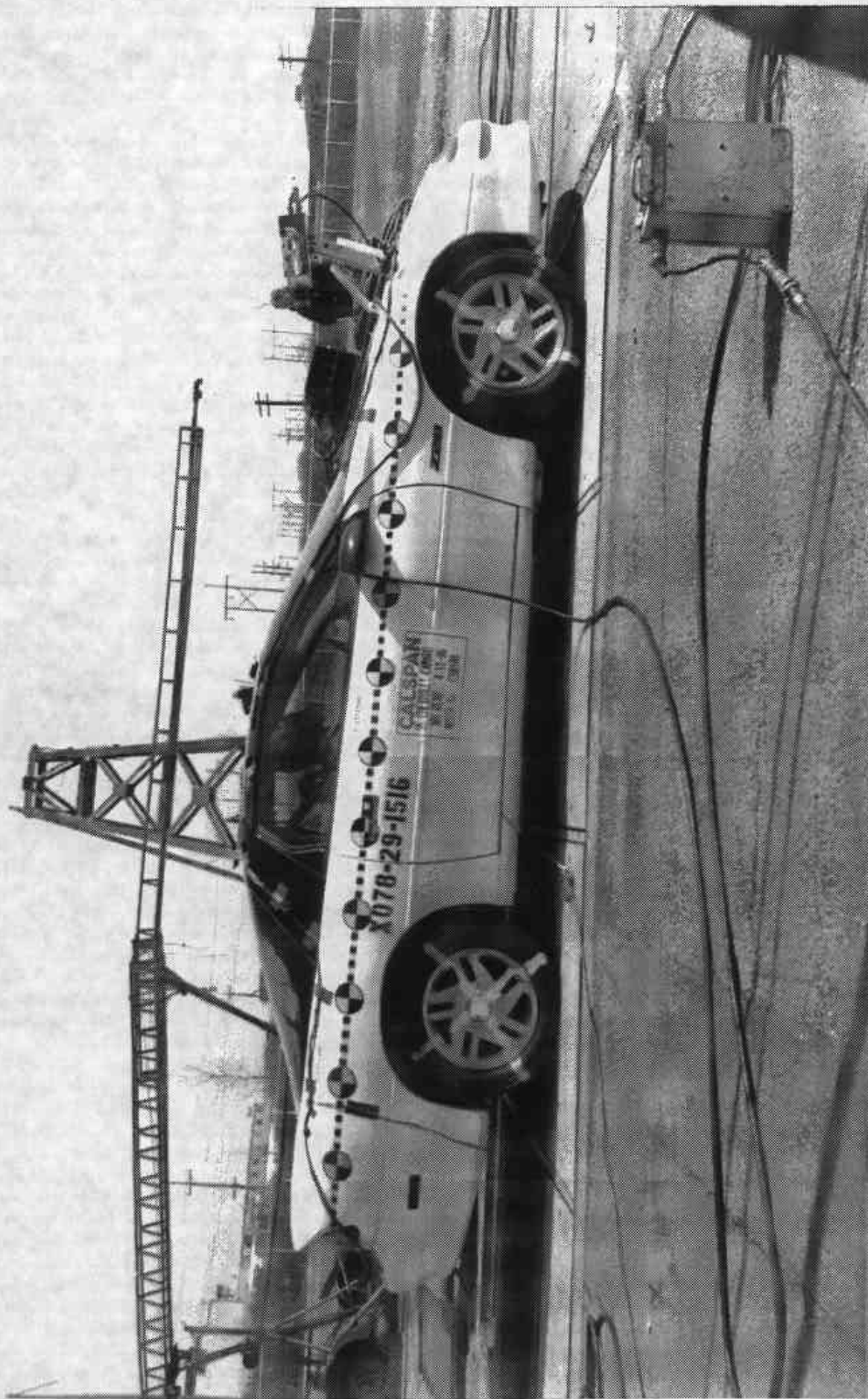


Figure A-5 PRE-TEST RIGHT SIDE VIEW



Figure A-6 POST-TEST RIGHT SIDE VIEW

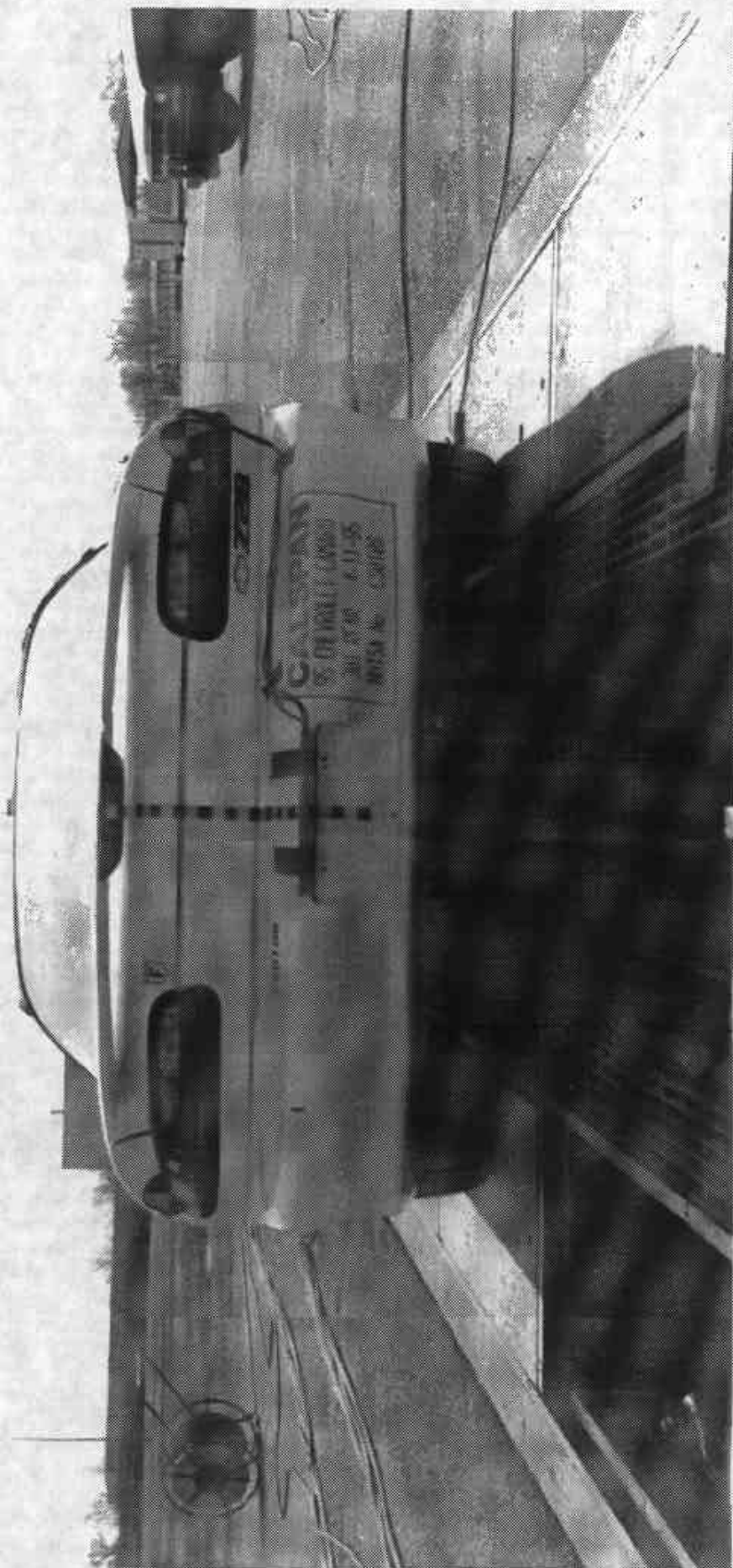


Figure A-7 PRE-TEST REAR VIEW

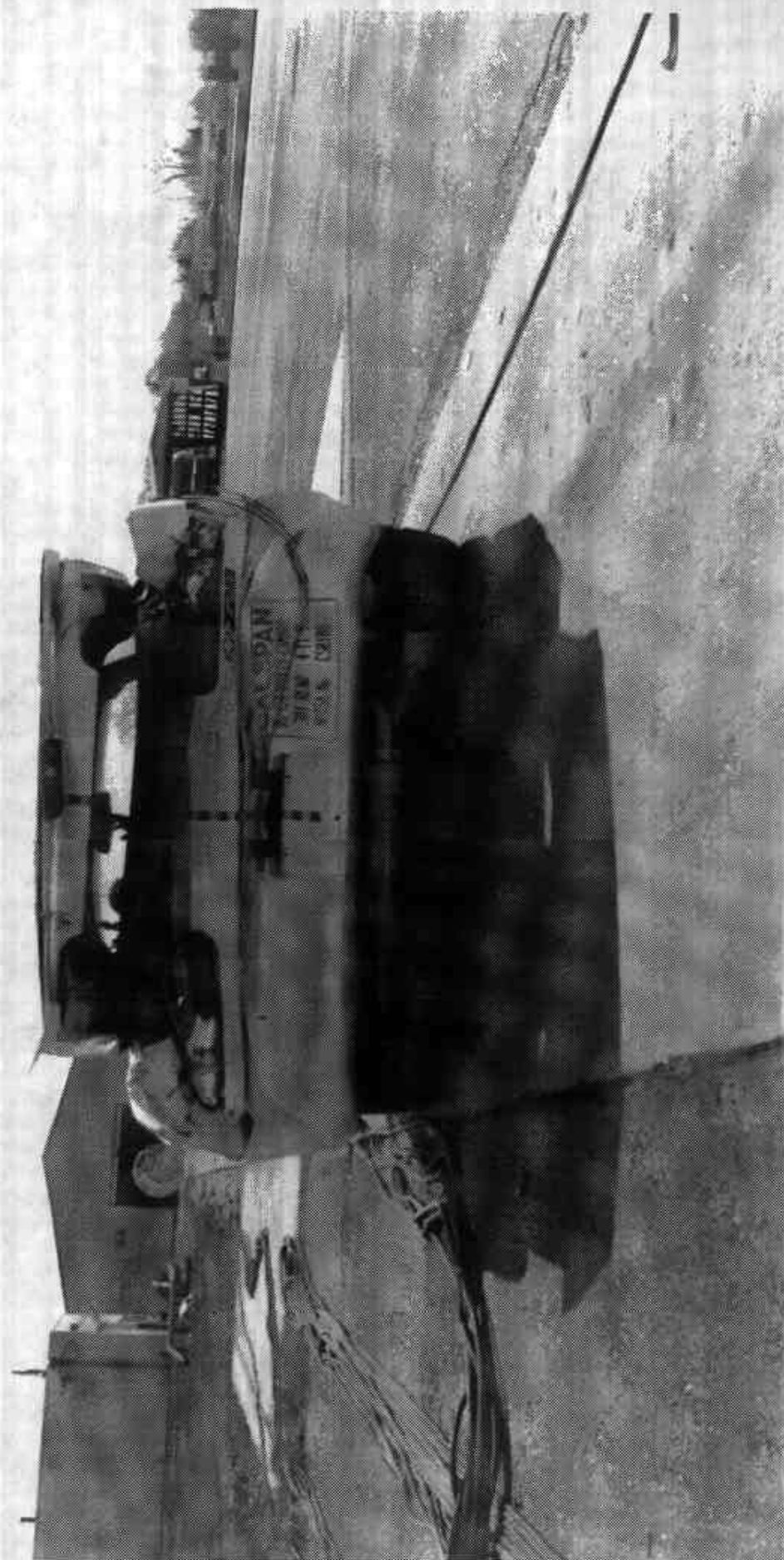


Figure A-8 POST-TEST REAR VIEW

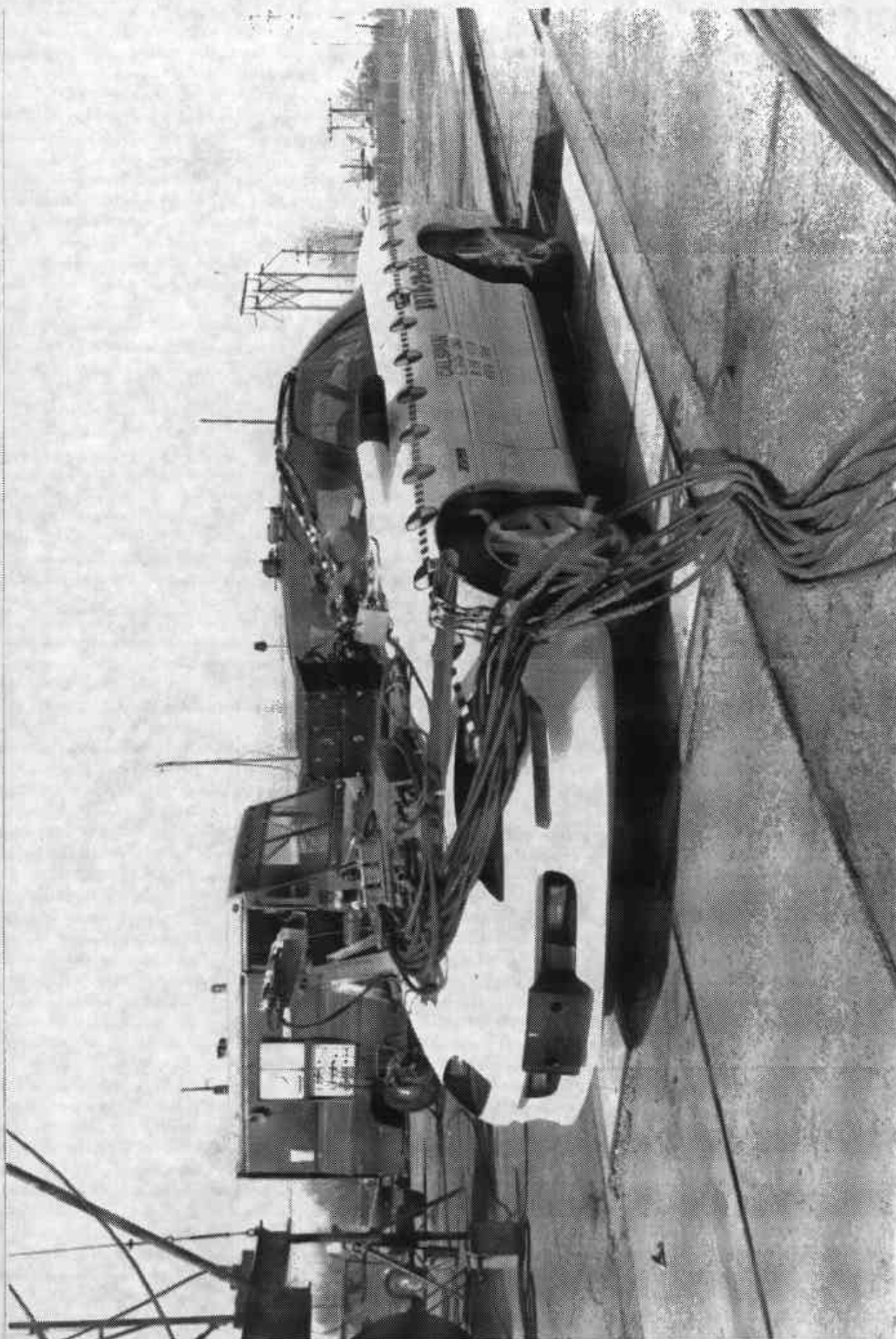


Figure A-9 PRE-TEST LEFT FRONT THREE-QUARTER VIEW

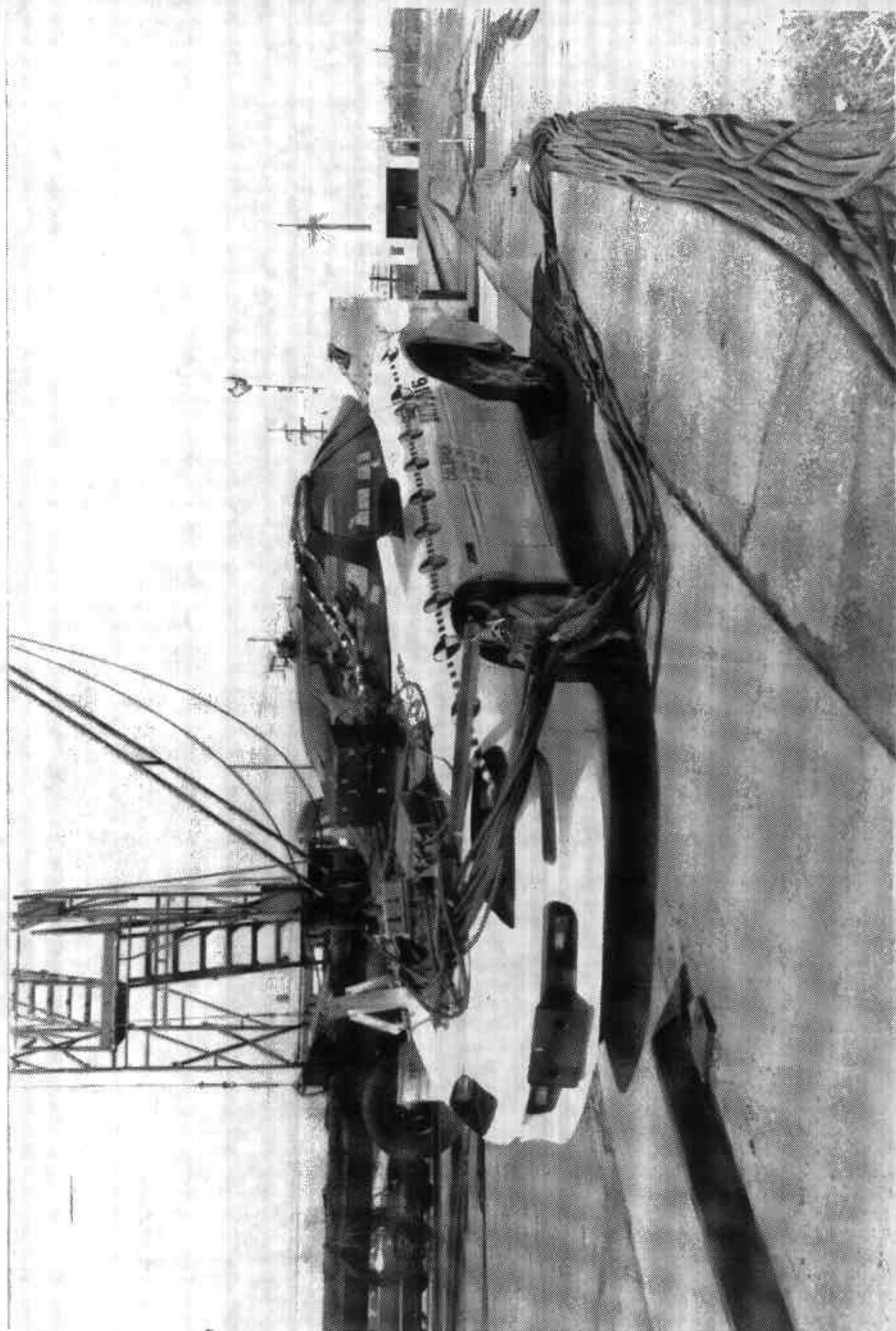


Figure A-10 POST-TEST LEFT FRONT THREE-QUARTER VIEW

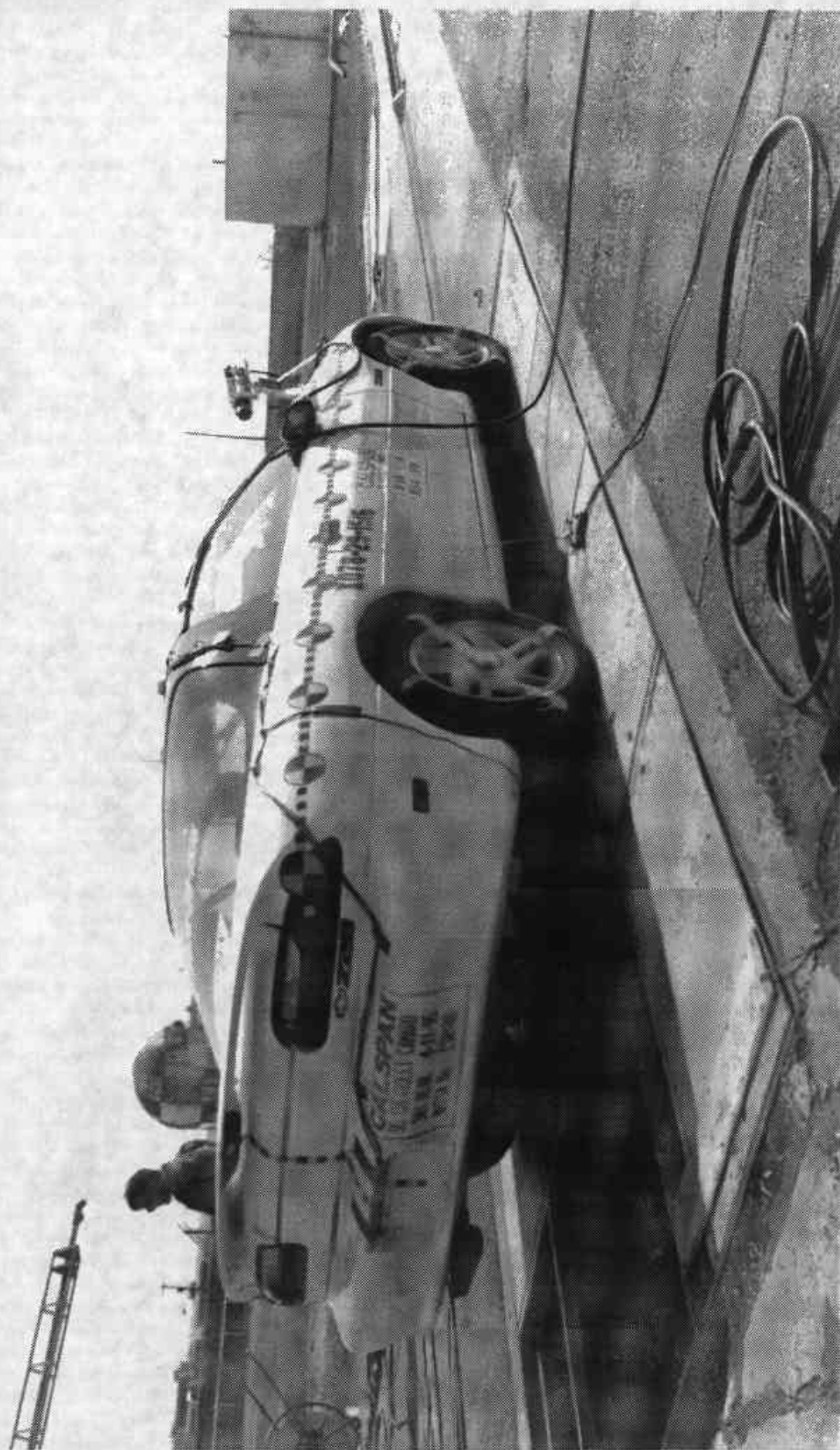


Figure A-11 PRE-TEST RIGHT REAR THREE-QUARTER VIEW

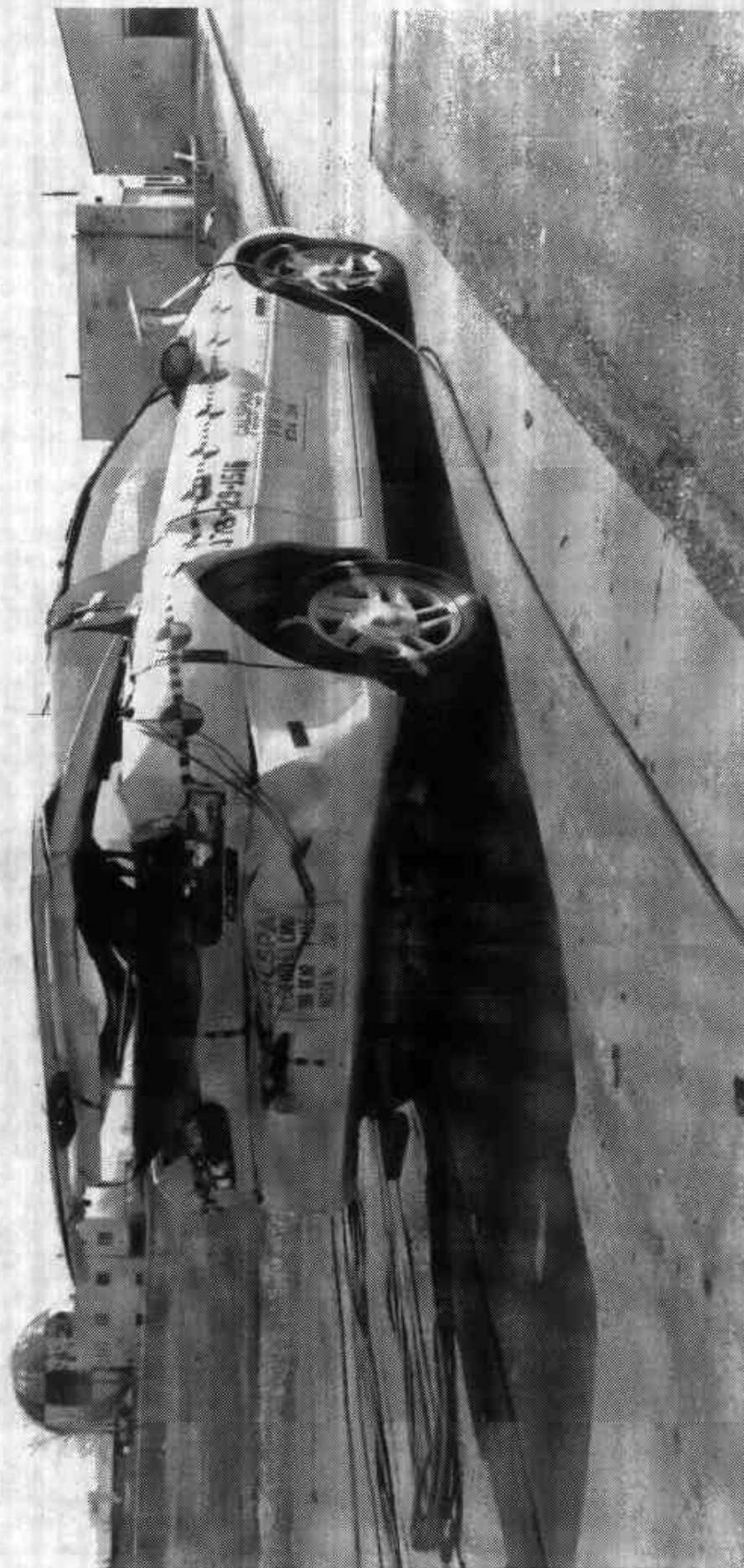


Figure A-12 POST-TEST RIGHT REAR THREE-QUARTER VIEW

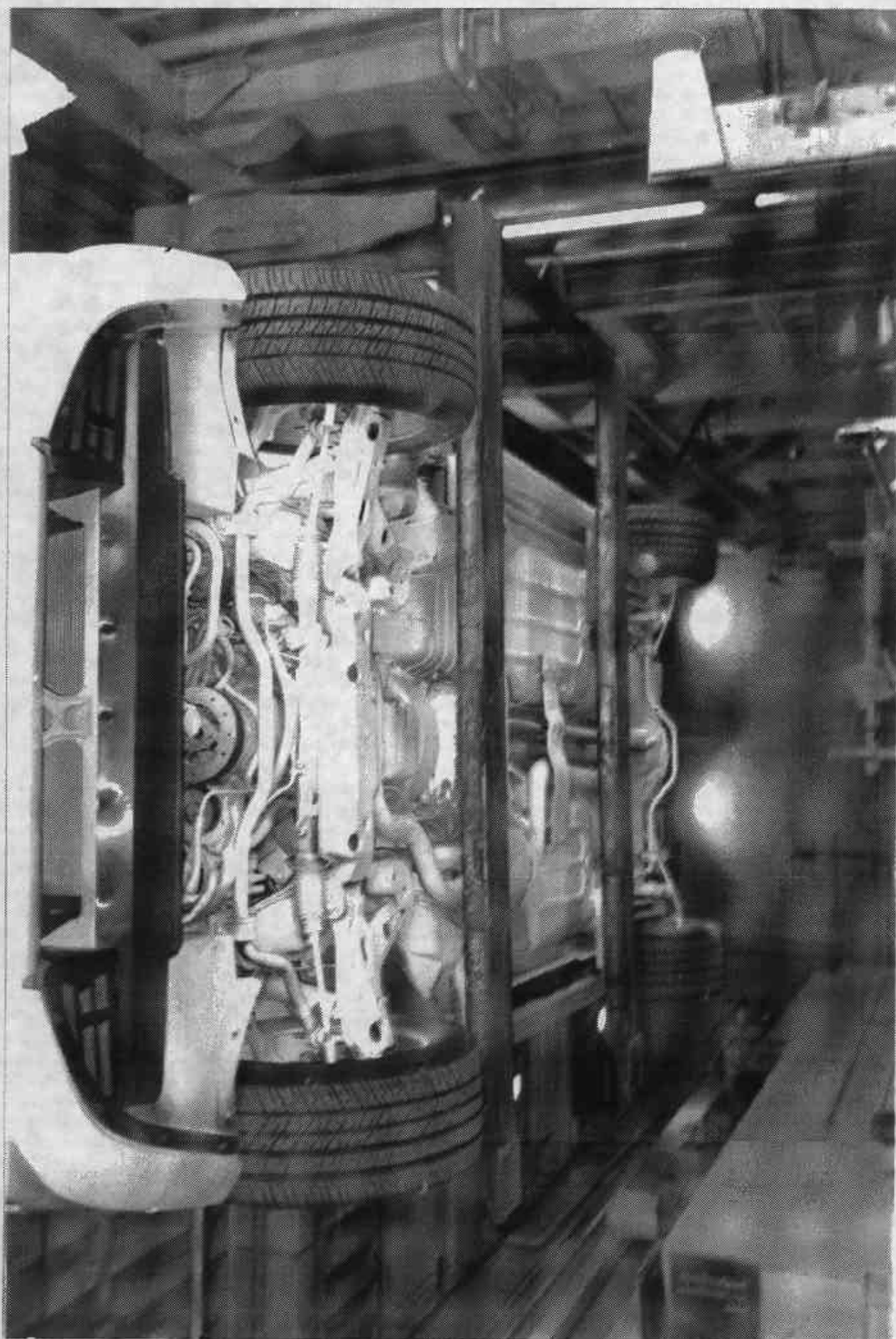


Figure A-13 PRE-TEST FRONT UNDERBODY VIEW

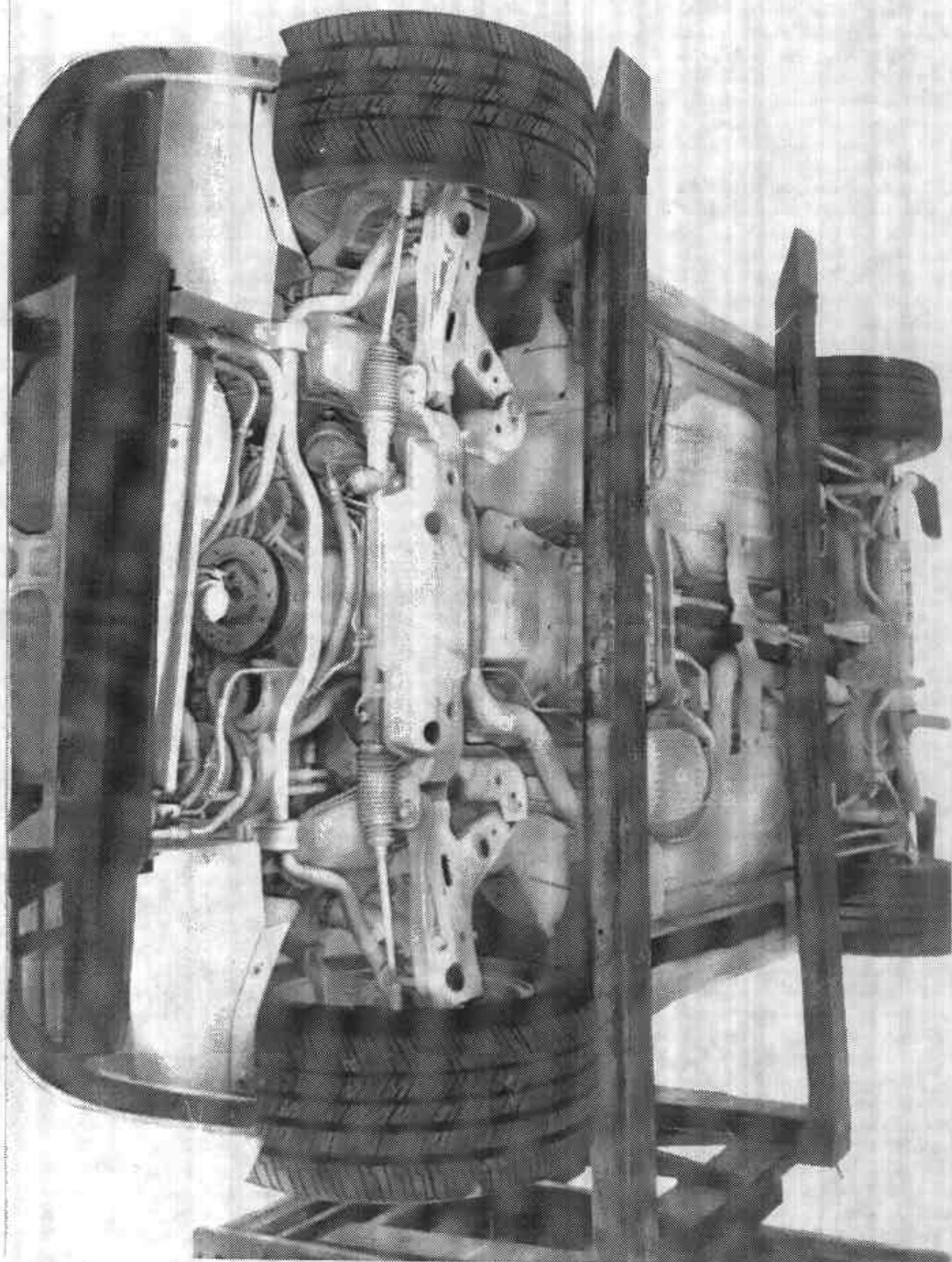


Figure A-14 POST-TEST FRONT UNDERBODY VIEW

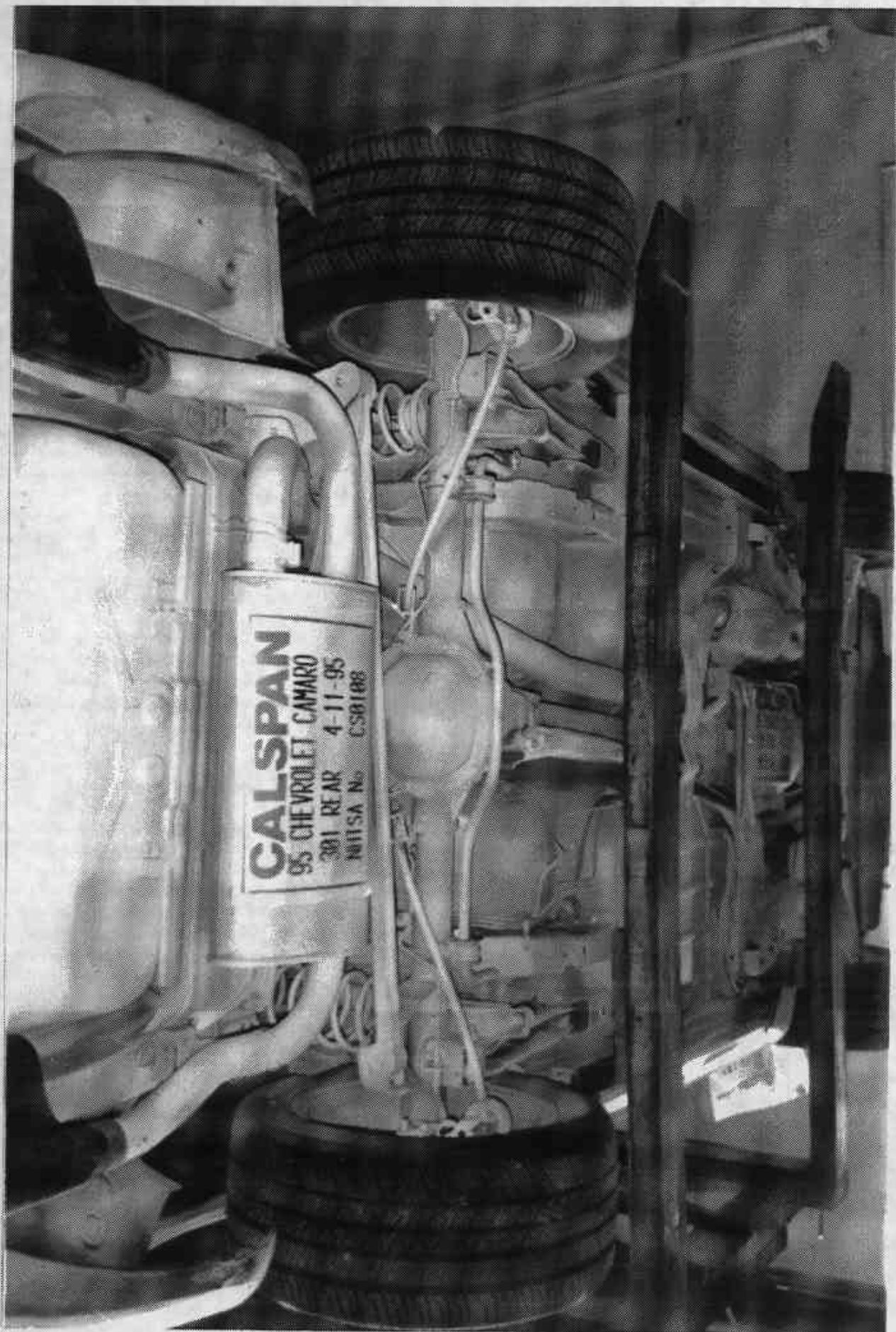


Figure A-15 PRE-TEST REAR UNDERBODY VIEW

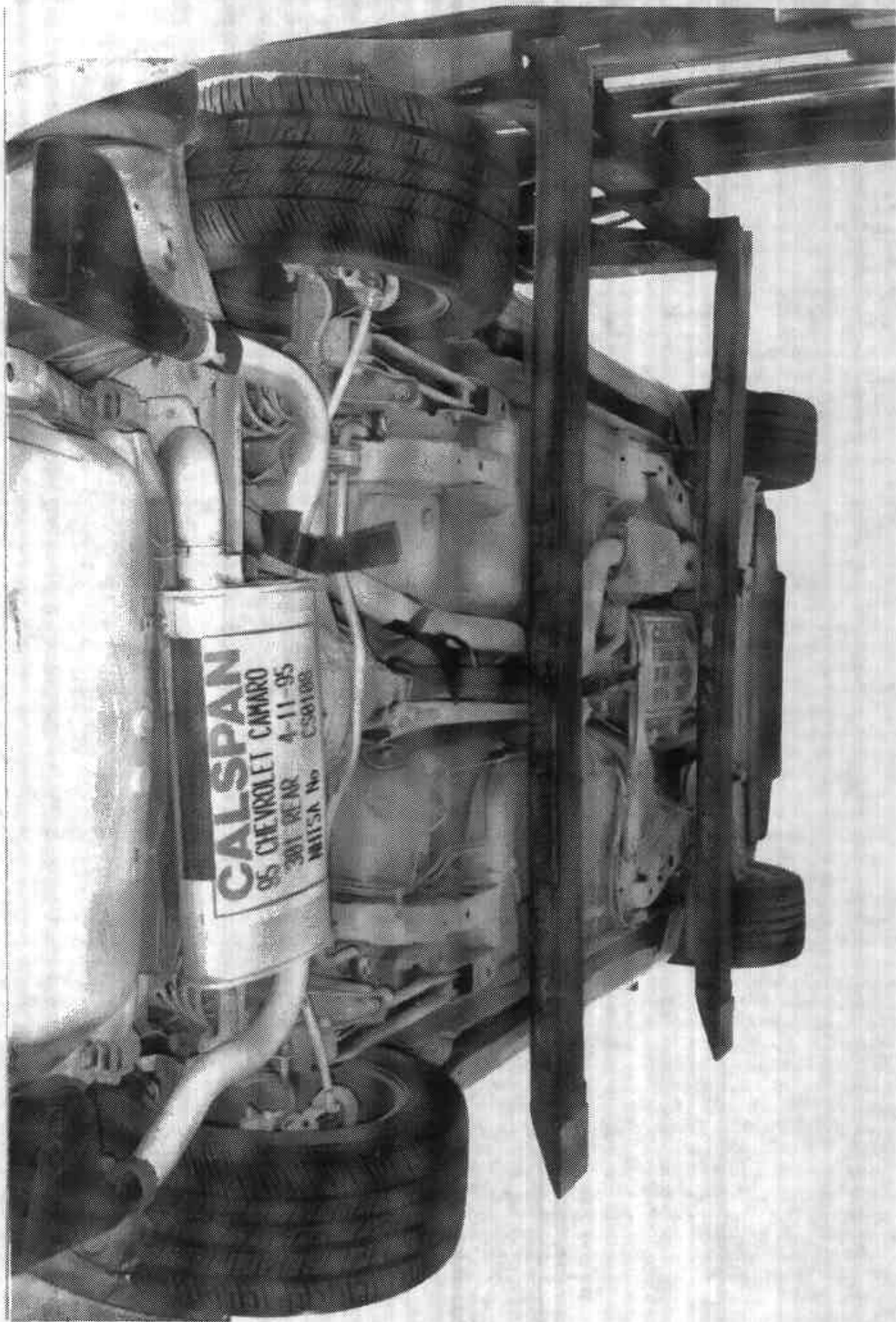


Figure A-16 POST-TEST REAR UNDERBODY VIEW

MFD BY GENERAL MOTORS OF CANADA
 DATE 08/94 GVWR 4245LB FRT 2168LB GAWR 2077LB
 1926KG 984KG 942KG

THIS VEHICLE CONFORMS TO ALL APPLI-
 CABLE U.S. FEDERAL MOTOR VEHICLE
 SAFETY, DUMPER, AND THEFT PREVENTION
 STANDARDS IN EFFECT ON THE DATE OF
 MANUFACTURE SHOWN ABOVE.

201FP22P182110965 PASS CAR

10135543-A

GENUINE

TIRE-LOADING INFORMATION
 OCCUPANTS VEHICLE CAP WT
 FRT CTR RR TOTAL LBS KG
 2 0 2 4 701 318
 MAX LOADING & CURB SAME AS VEHICLE

Figure A-17 CERTIFICATION PLACARD

CABLE U S FEDERAL MOTOR VEHICLE
SAFETY, BUMPER, AND THEFT PREVENTION
STANDARDS IN EFFECT ON THE DATE OF
MANUFACTURE SHOWN ABOVE.

201FP22R152110965 PASS CAR

10135543-B

CHRYSLER

TIRE-LOADING INFORMATION

OCCUPANTS VEHICLE CAP. WT.

FR	CL	RR	TOTAL	LBS	KG
2	0	2		701	318

MAX. LOADING OVER SAME AS VEHICLE

CAPACITY WEIGHT FAH COLD TIRE

MODEL PRESS. SPEED PRESSURE

TIRE SIZE RTG PSI/KPA

FR P245/50R16 Z 30/210

RR P245/50R16 Z 30/210

SPA T125/70R15 M 60/420

IF TIRES ARE HIT, ADD 4PSI/28KPA
SEE OWNER'S MANUAL FOR ADDITIONAL
INFORMATION

10135543-B

CHRYSLER

Figure A-18 TIRE PLACARD



Figure A-19 ROLLOVER 90°

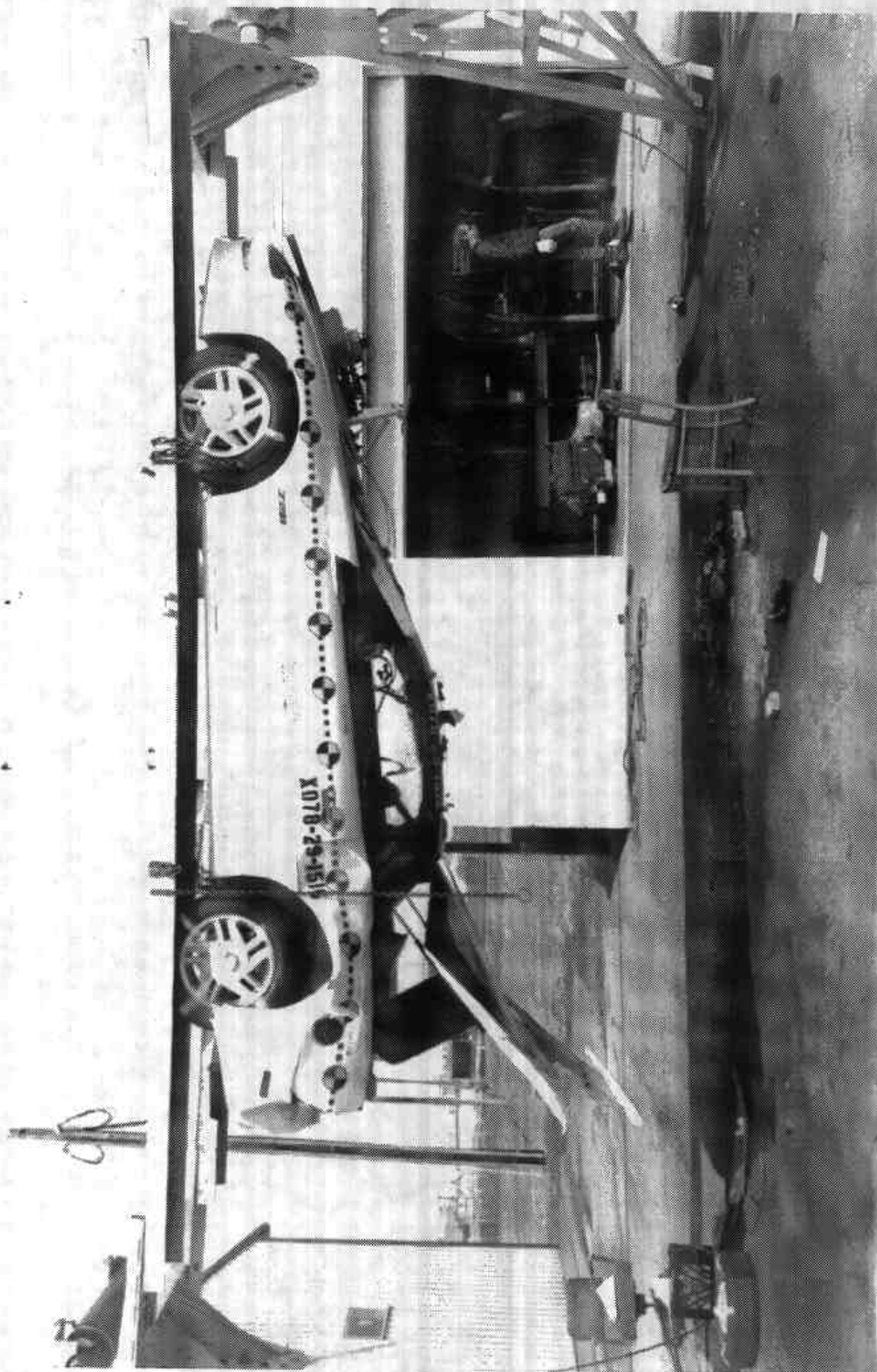


Figure A-20 ROLLOVER 180°

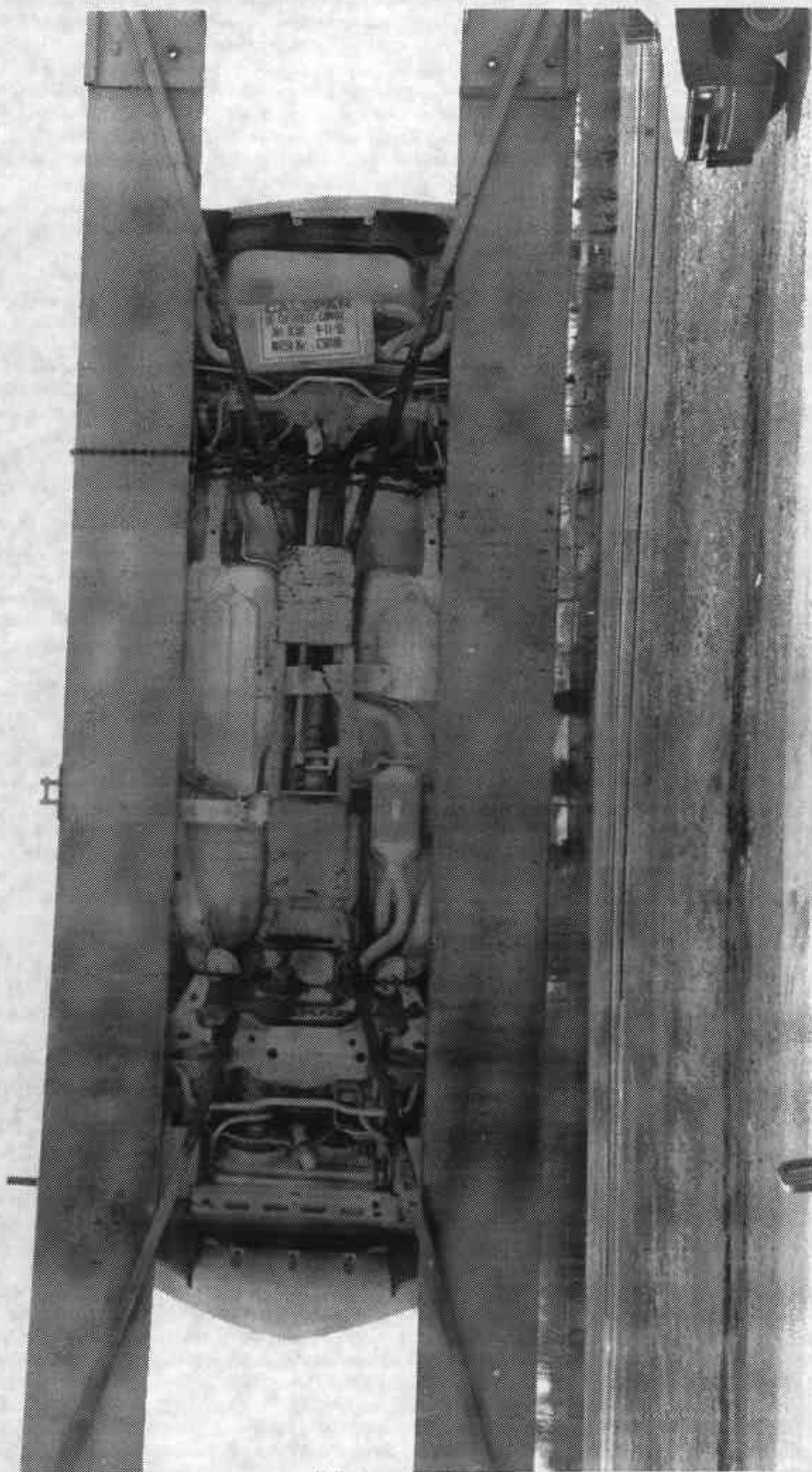


Figure A-21 ROLLOVER 270°

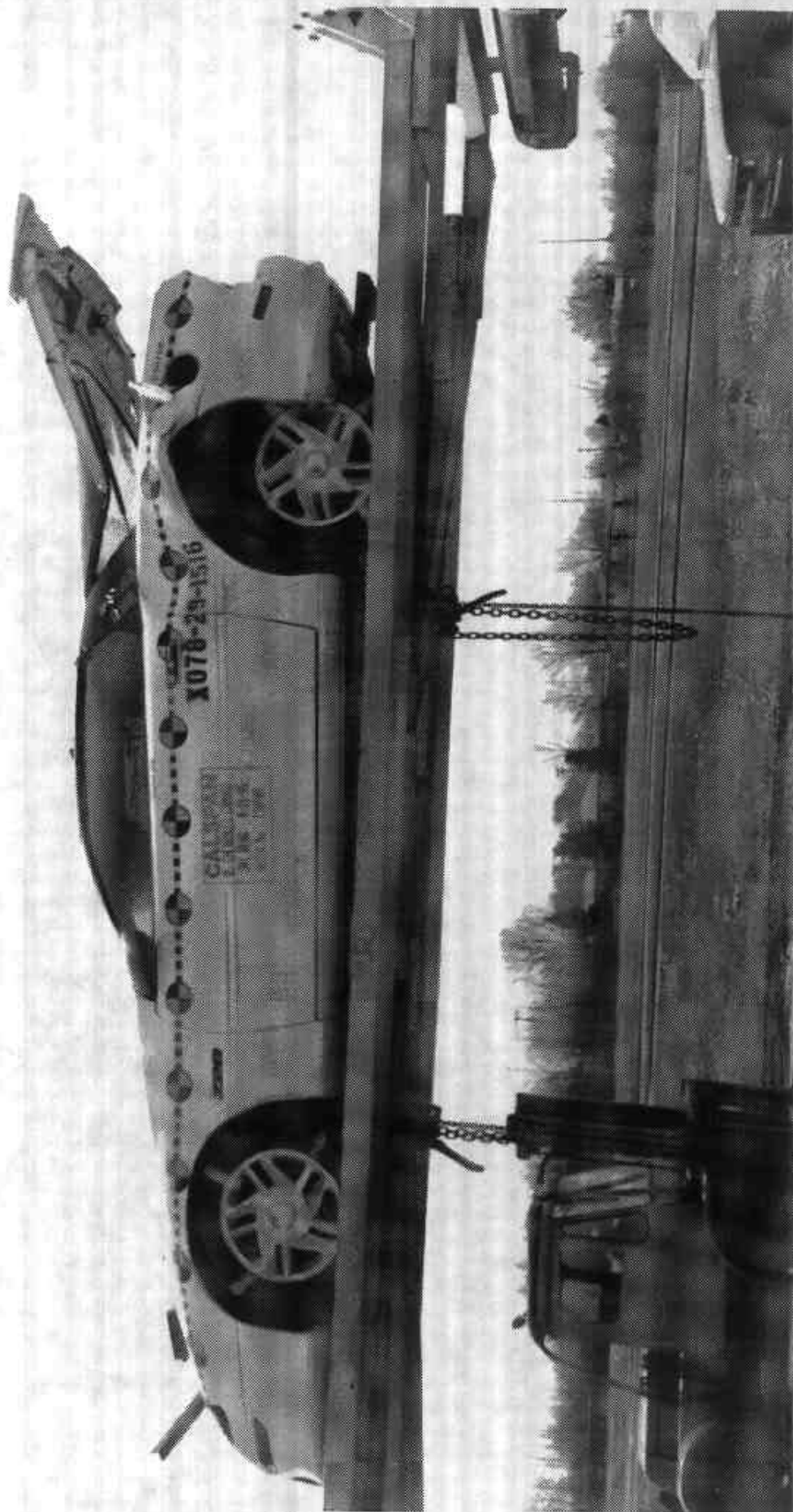


Figure A-22 ROLLOVER 360°

Appendix B
VEHICLE AND DUMMY RESPONSE DATA
(REAR IMPACT ONLY)

FACILITY: TRACK

TEST DATE: 11 Apr 1995

RUN #: 1516

TEST TIME: 10:37:12

SERIES #: 1

BOARD: a

TITLE: 301 Rear 30 MPH-1995 Chevrolet Camaro

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP msec	MINIMUM AMP msec	FILTER CLASS
1	Pos. 1 Head X	Gs	38.0 139.7	-5.7 359.9	1000.0
2	Pos. 1 Head Y	Gs	4.5 140.0	-6.0 143.2	1000.0
3	Pos. 1 Head Z	Gs	28.7 118.2	-.6 46.1	1000.0
4	Pos. 1 Chest Disp.	Ins	.1 172.9	.0 222.8	180.0
5	Pos. 1 Chest X	Gs	10.8 96.1	-4.0 141.7	180.0
6	Pos. 1 Chest Y	Gs	2.2 88.9	-1.5 102.5	180.0
7	Pos. 1 Chest Z	Gs	7.3 82.0	-1.3 244.7	180.0
8	Pos. 1 Lap Belt	lbs	141.0 153.7	-15.9 40.1	60.0
9	Pos. 1 Pelvic X	Gs	19.0 63.6	-3.9 156.1	1000.0
10	Pos. 1 Pelvic Y	Gs	3.8 76.6	-6.3 359.9	1000.0
11	Pos. 1 Pelvic Z	Gs	5.5 140.3	-4.3 359.9	1000.0
12	Left Rear Crossmember X	Gs	15.6 56.4	-4.1 121.3	60.0
13	Pos. 1 Upper Neck Fx	lbs	135.2 139.7	-64.7 67.3	1000.0
14	Pos. 1 Upper Neck Fy	lbs	50.5 49.3	-15.4 151.3	1000.0
15	Pos. 1 Upper Neck Fz	lbs	633.8 143.2	-21.7 49.7	1000.0
16	Right Rear Crossmember X	Gs	17.8 39.2	-2.9 123.6	60.0
17	Pos. 1 Head Resultant	Gs	44.4 140.2	.0 7.9	1000.0
18	Pos. 1 Chest Resultant	Gs	11.8 94.9	.0 -53.5	180.0
19	Pos. 1 Pelvic Resultant	Gs	19.4 63.5	.0 8.8	1000.0
20	Pos. 1 Neck Force Res.	lbs	637.1 143.2	.9 14.5	1000.0

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

hic: 200.56

t1 = 115.200 msec

t2 = 151.080 msec

Average G's Over Hic Duration = 31.55

CLIP SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 11.550 G's

Tstart = 93.8400 ms

Tend = 96.9600 ms

CSI = 24.351

FACILITY: TRACK TEST DATE: 11 Apr 1995
RUN #: 1516 TEST TIME: 10:37:12
SERIES #: 1 BOARD: b

TITLE: 301 Rear 30 MPH-1995 Chevrolet Camaro

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	Pos. 1 Upper Neck Mx	ft-lbs	4.8	109.0	-5.6	139.9	600.0
2	Pos. 1 Upper Neck My	ft-lbs	14.3	93.5	-34.5	143.3	600.0
3	Pos. 1 Upper Neck Mz	ft-lbs	5.3	143.5	-1.5	162.1	600.0
4	Upper Seatback X	Gs	28.3	120.2	-39.1	114.0	60.0
5	Lower Seatback X	Gs	16.0	120.2	-22.5	113.2	60.0
6	Pos. 1 Belt Spoolout	Ins	.0	7.1	-3.3	53.8	60.0
17	Pos. 1 Neck Moment Res.	ft-lbs	35.0	143.3	.0	-6.2	600.0

TEST NO. CS0108

VEHICLE

SAE FILTER CHANNEL CLASS

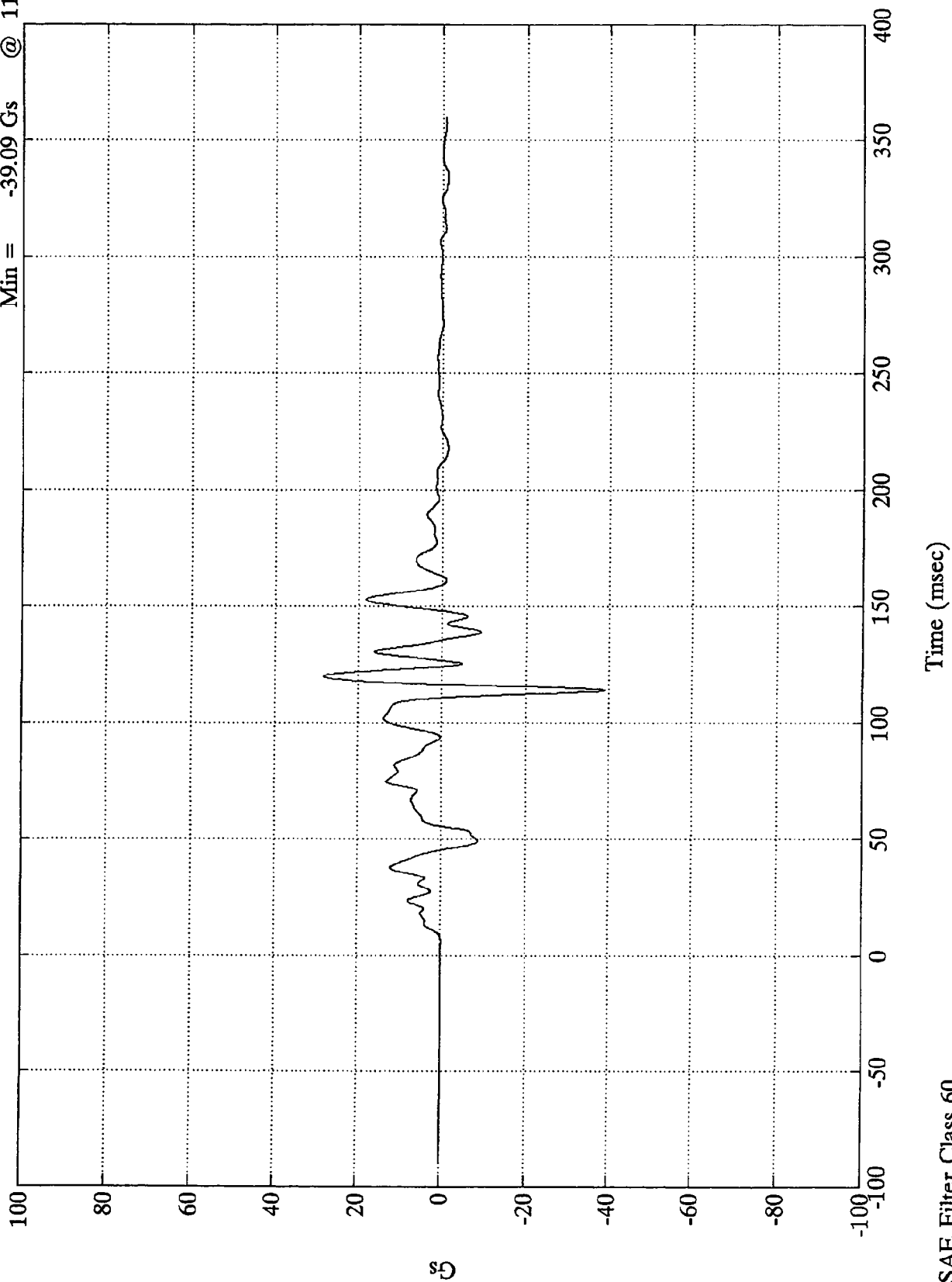
60

Note: Angular seatback position is measured in degrees of rotation from the initial (design) position.

301 Rear 30 MPH-1995 Chevrolet Camaro

Upper Seatback X

Max = 28.27 Gs @ 120.24 msec
Min = -39.09 Gs @ 114.00 msec



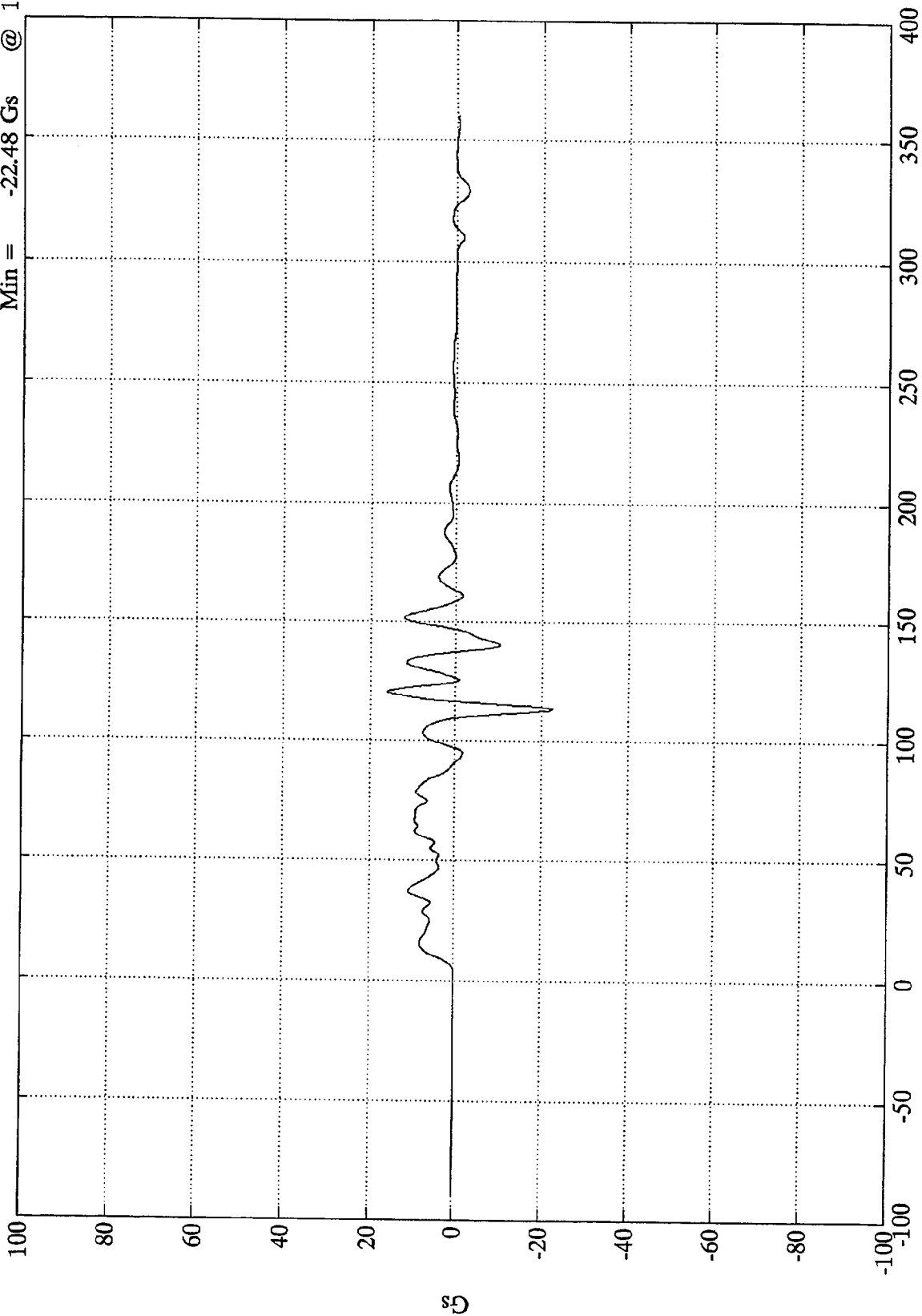
SAE Filter Class 60

Time (msec)

301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 16.04 Gs @ 120.24 msec
Min = -22.48 Gs @ 113.15 msec

Lower Seatback X



Time (msec)

SAE Filter Class 60

8247-9

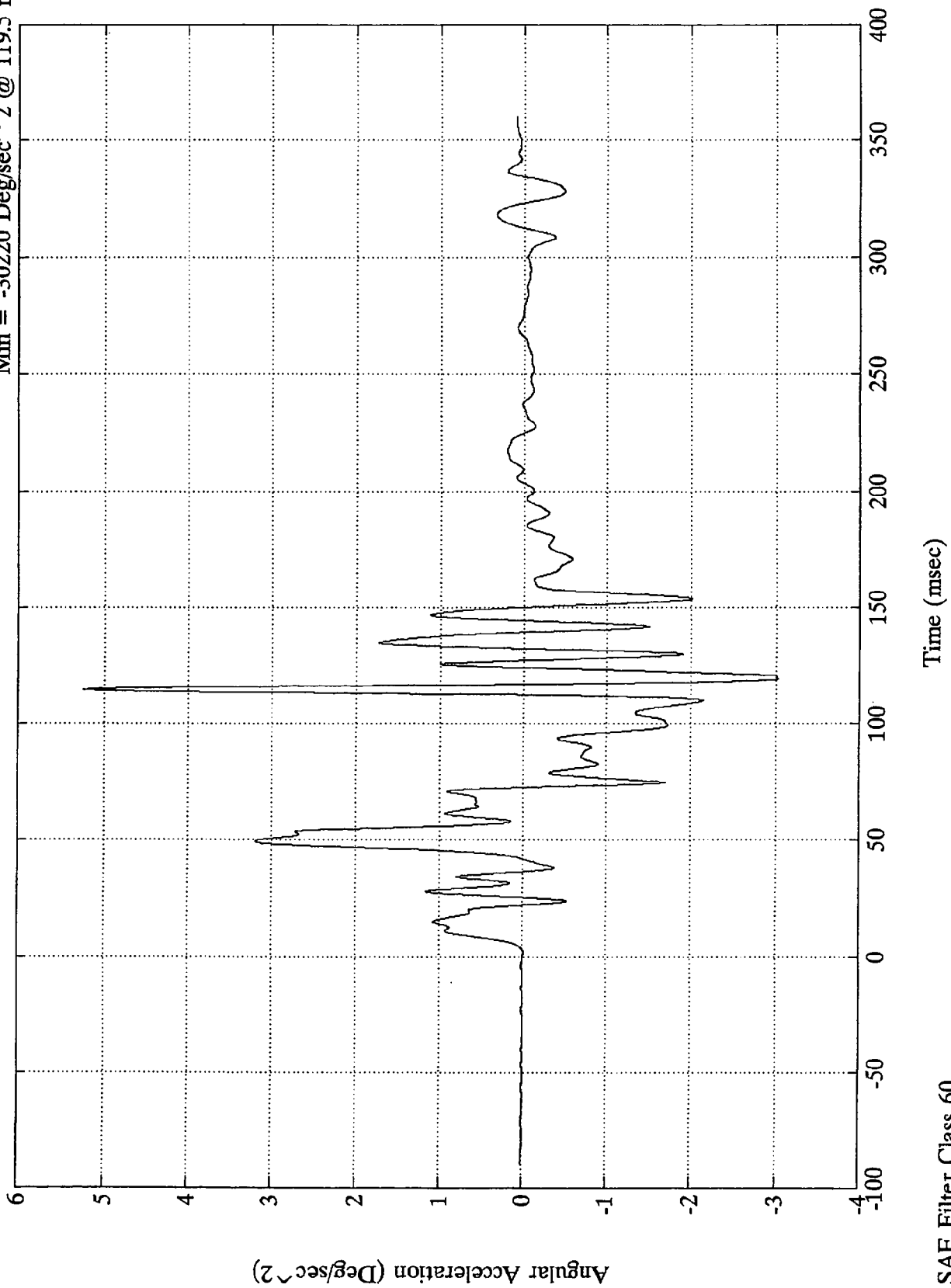
B-6

301 Rear 30 MPH-1995 Chevrolet Camaro

$\times 10^4$

Seatback Angular Acceleration

Max = 52370 Deg/sec² @ 114.6 msec
Min = -30220 Deg/sec² @ 119.5 msec

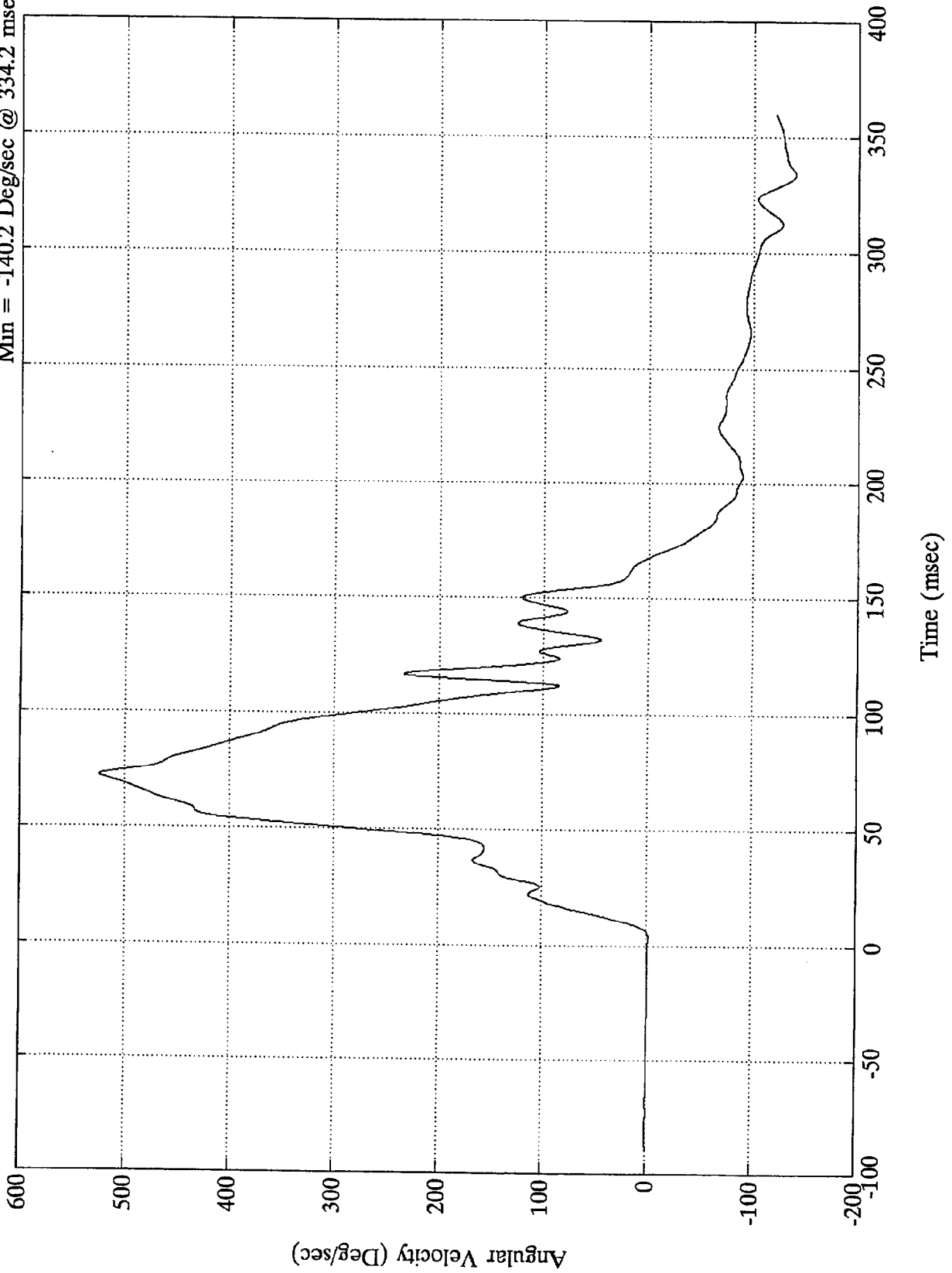


SAE Filter Class 60

301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 524.2 Deg/sec @ 72.36 msec
Min = -140.2 Deg/sec @ 334.2 msec

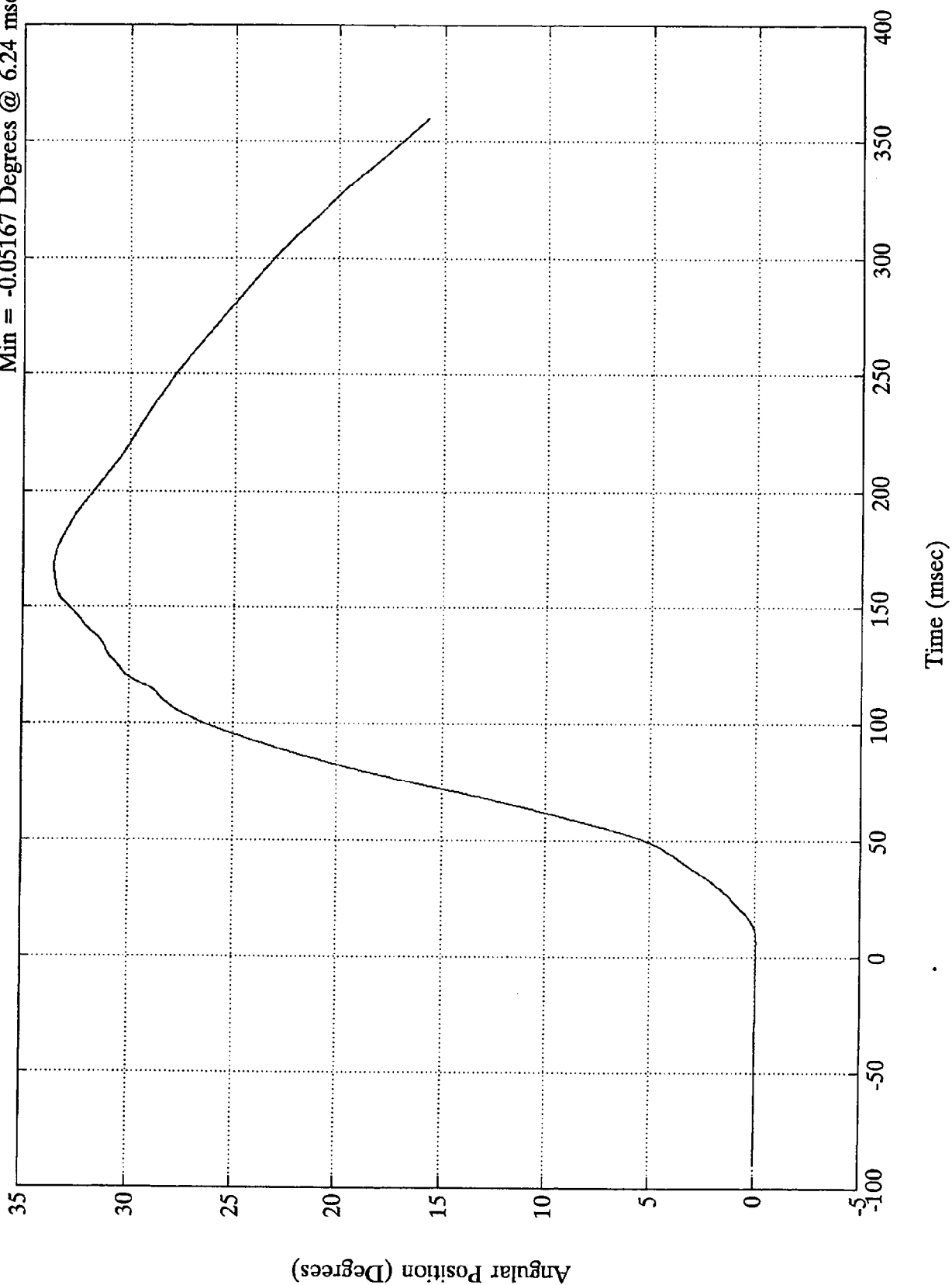
Seatback Angular Velocity



301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 33.52 Degrees @ 167.5 msec
Min = -0.05167 Degrees @ 6.24 msec

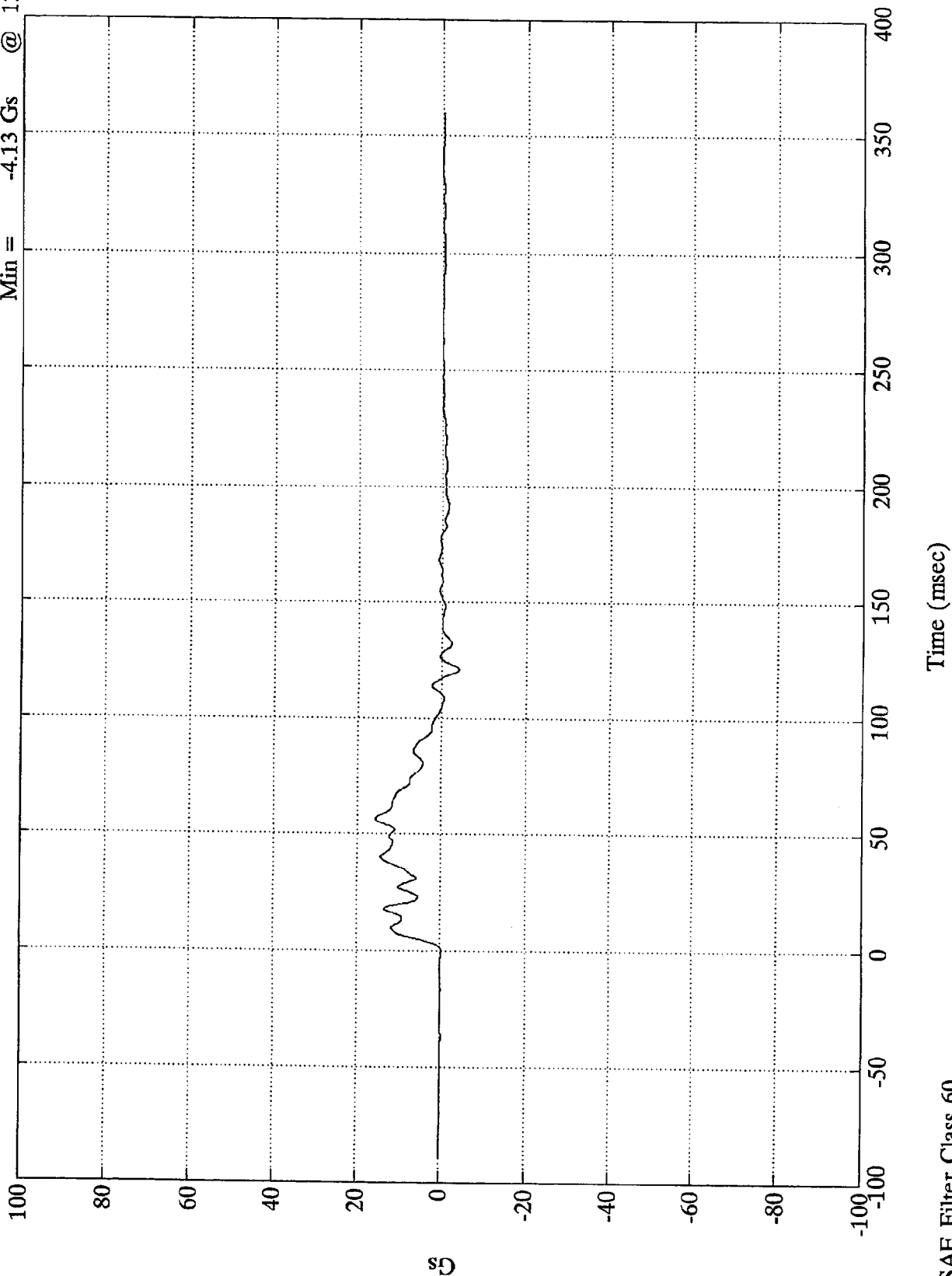
Seatback Angular Position



301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 15.59 Gs @ 56.40 msec
Min = -4.13 Gs @ 121.31 msec

Left Rear Crossmember X

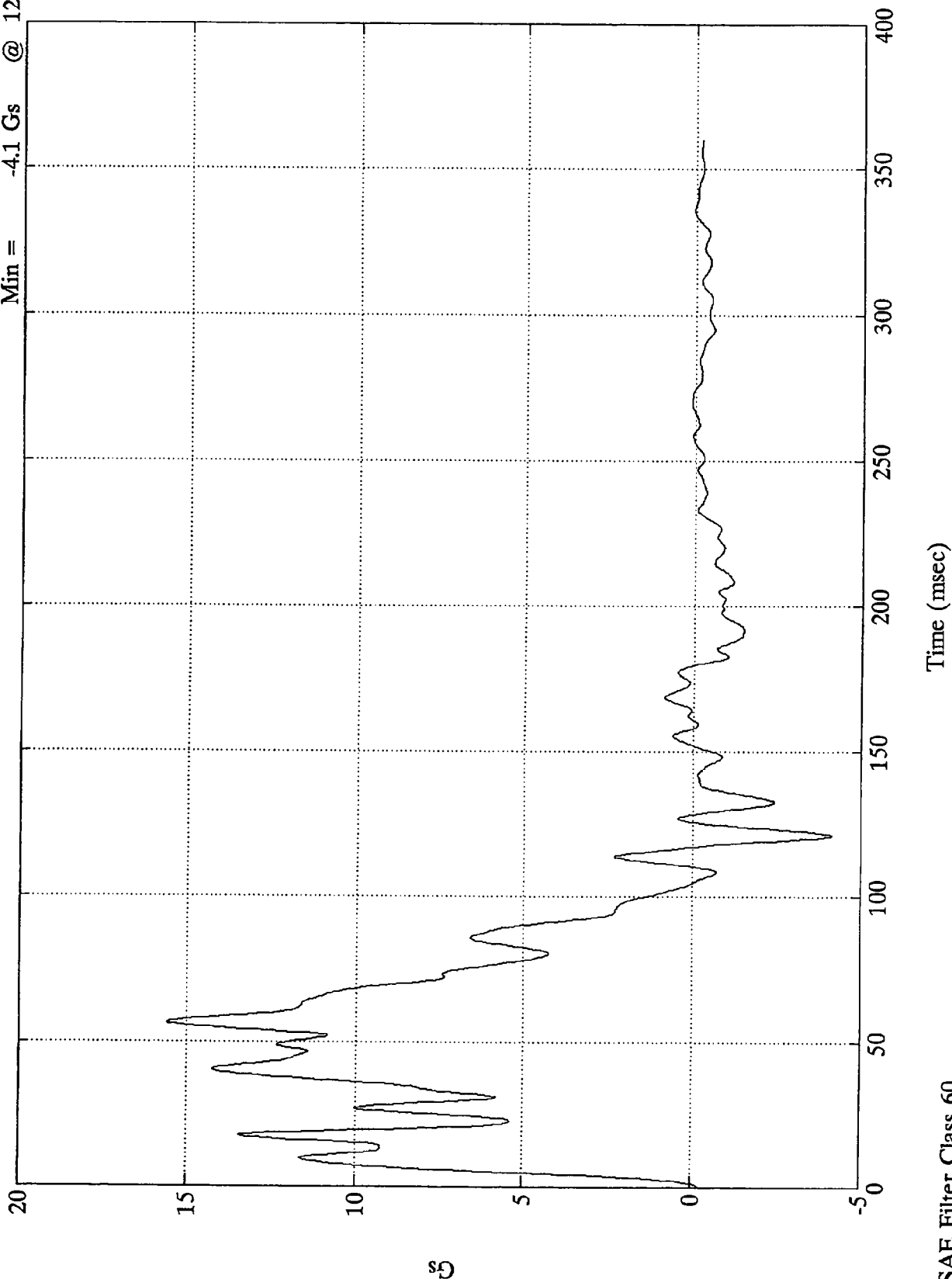


SAE Filter Class 60

301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 15.5 Gs @ 56.40 msec
Min = -4.1 Gs @ 121.32 msec

Left Rear Crossmember X



SAE Filter Class 60

Gs

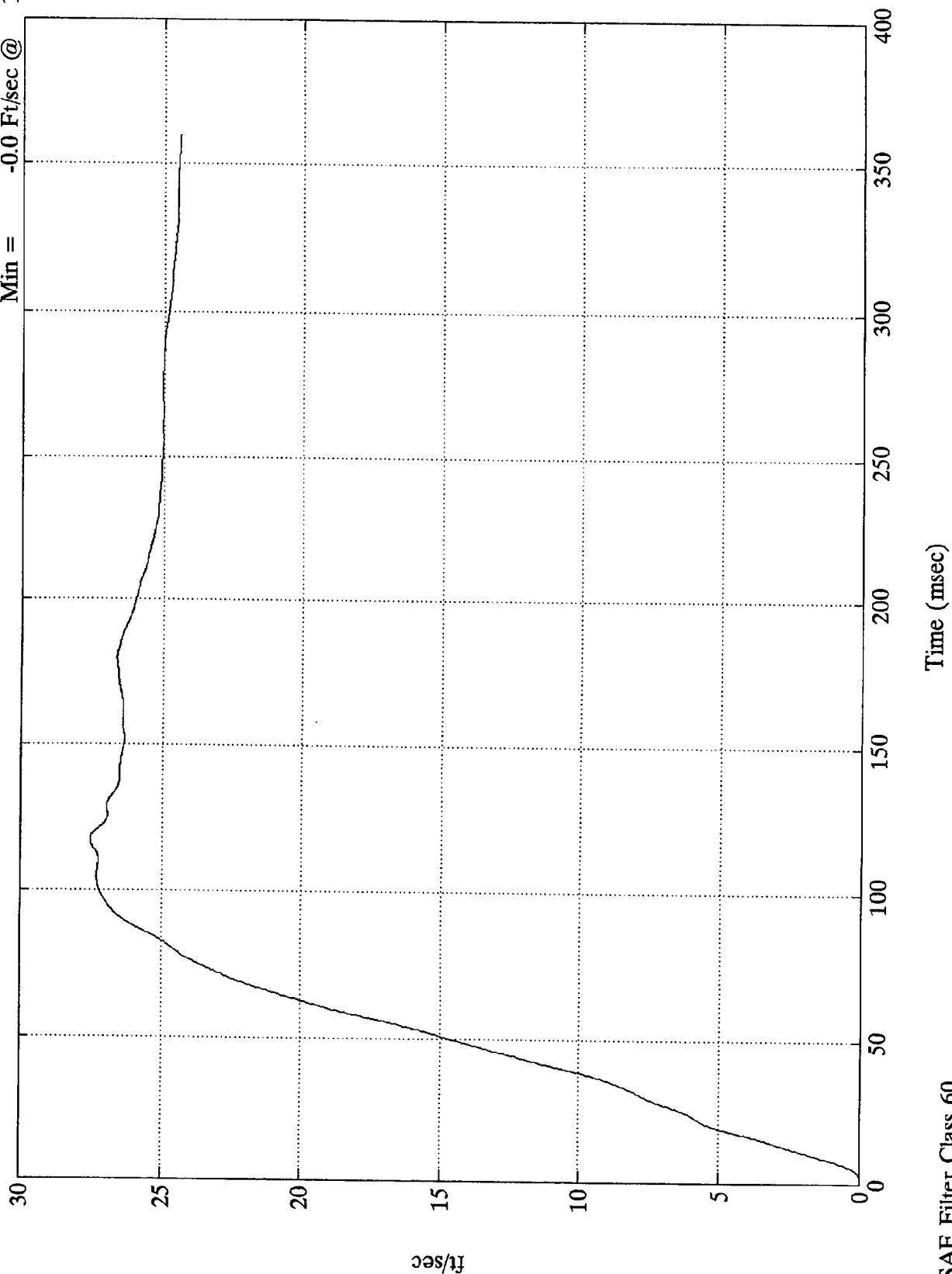
B-11

8247-9

301 Rear 30 MPH-1995 Chevrolet Camaro

1st Integral Left Rear Crossmember X

Max = 27.5 Ft/sec @ 117.24 msec
Min = -0.0 Ft/sec @ 1.31 msec

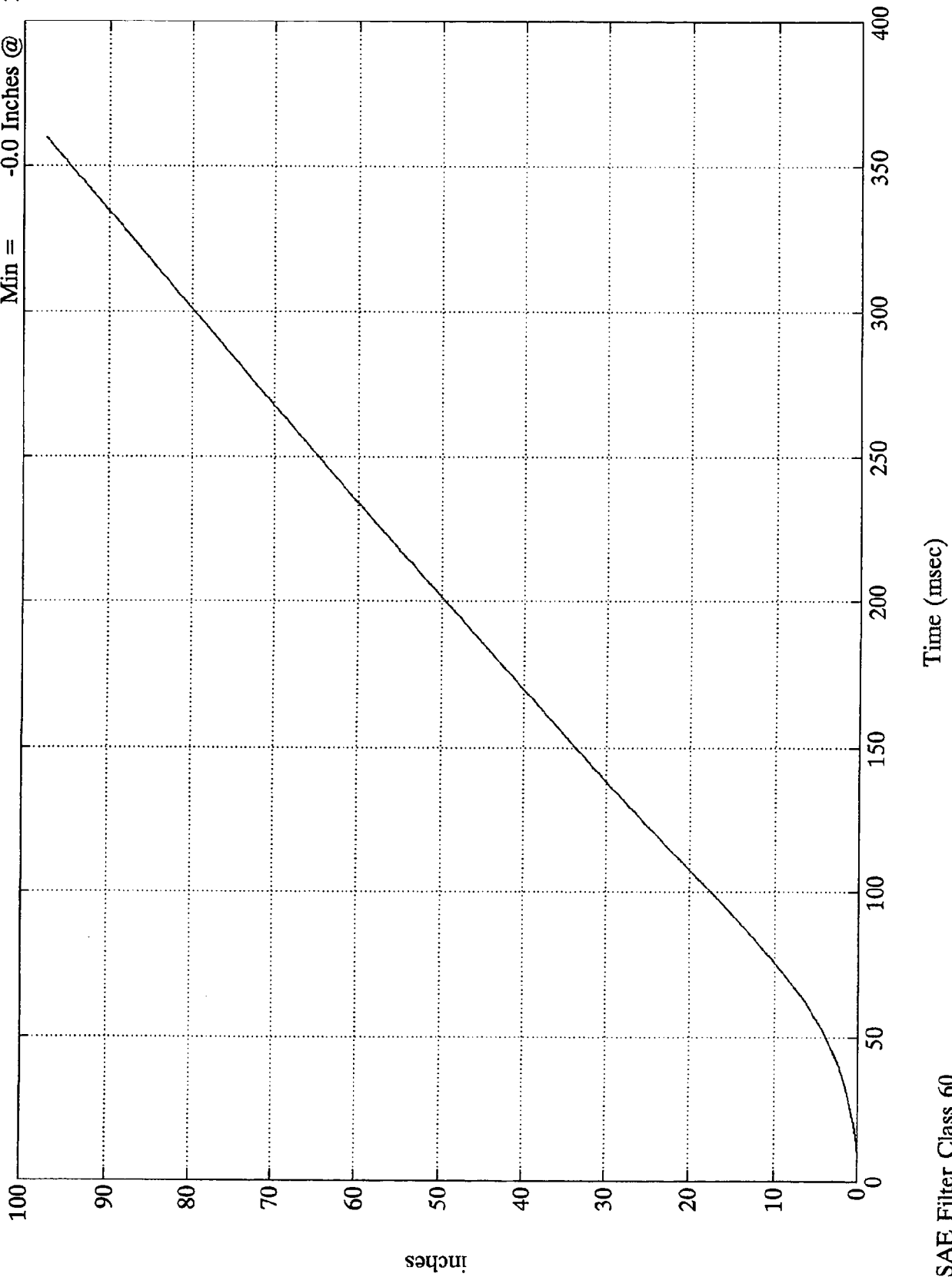


SAE Filter Class 60

301 Rear 30 MPH-1995 Chevrolet Camaro

2nd Integral Left Rear Crossmember X

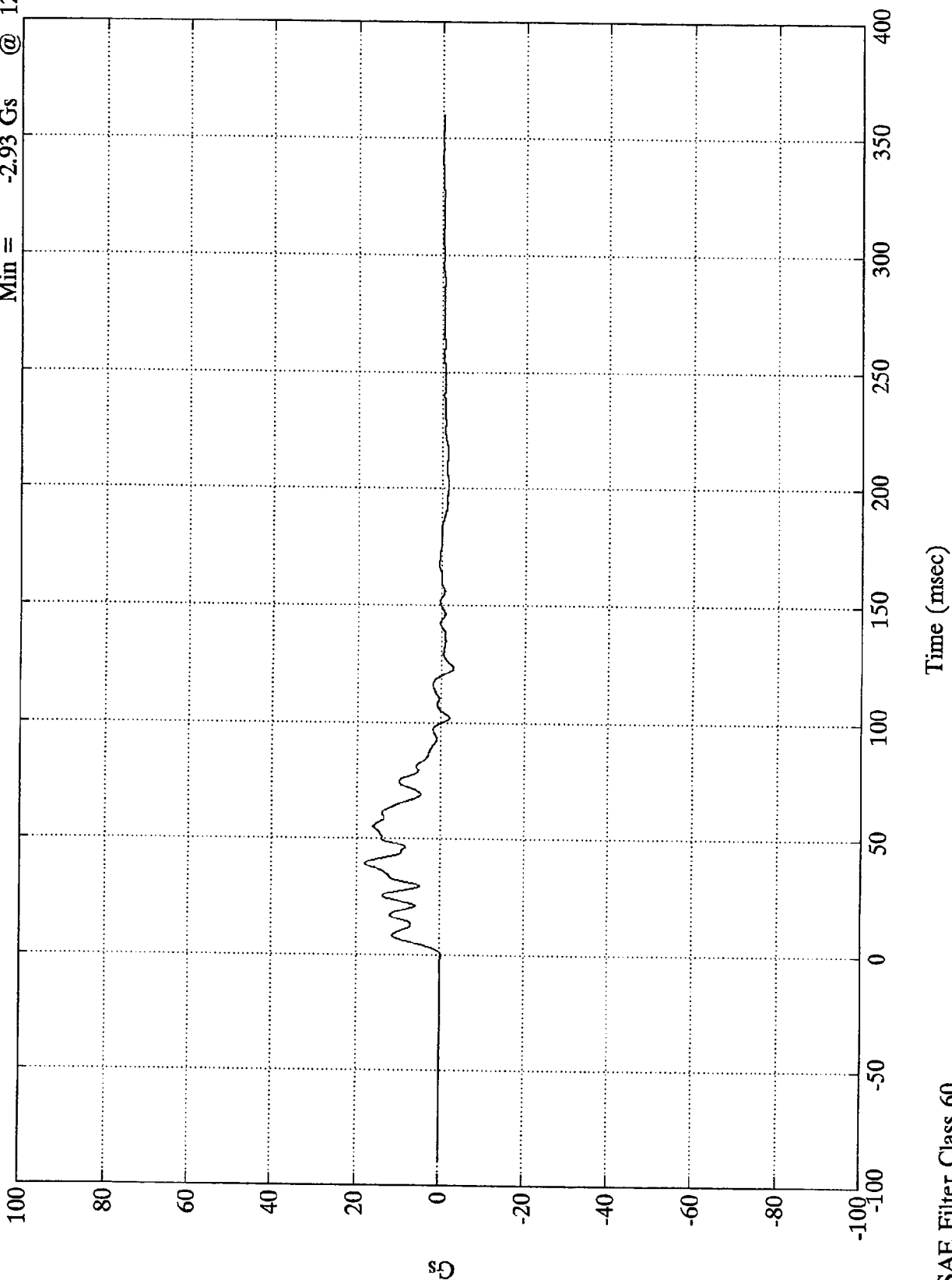
Max = 97.4 Inches @ 359.88 msec
Min = -0.0 Inches @ 2.15 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Right Rear Crossmember X

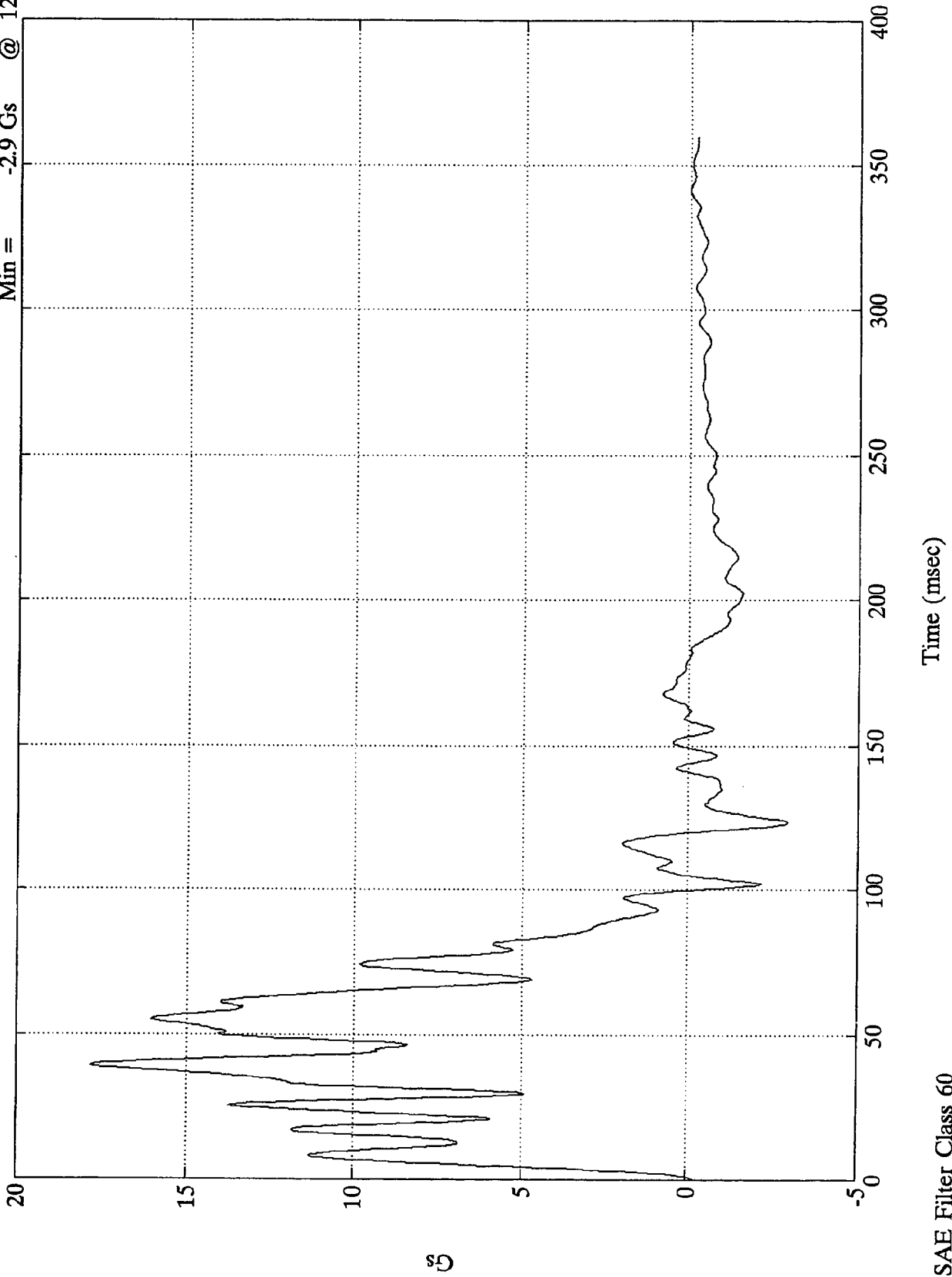
Max = 17.83 Gs @ 39.23 msec
Min = -2.93 Gs @ 123.60 msec



SAE Filter Class 60

301 Rear 30 MPH-1995 Chevrolet Camaro

Right Rear Crossmember X
Max = 17.8 Gs @ 39.36 msec
Min = -2.9 Gs @ 123.60 msec



Gs

B-15

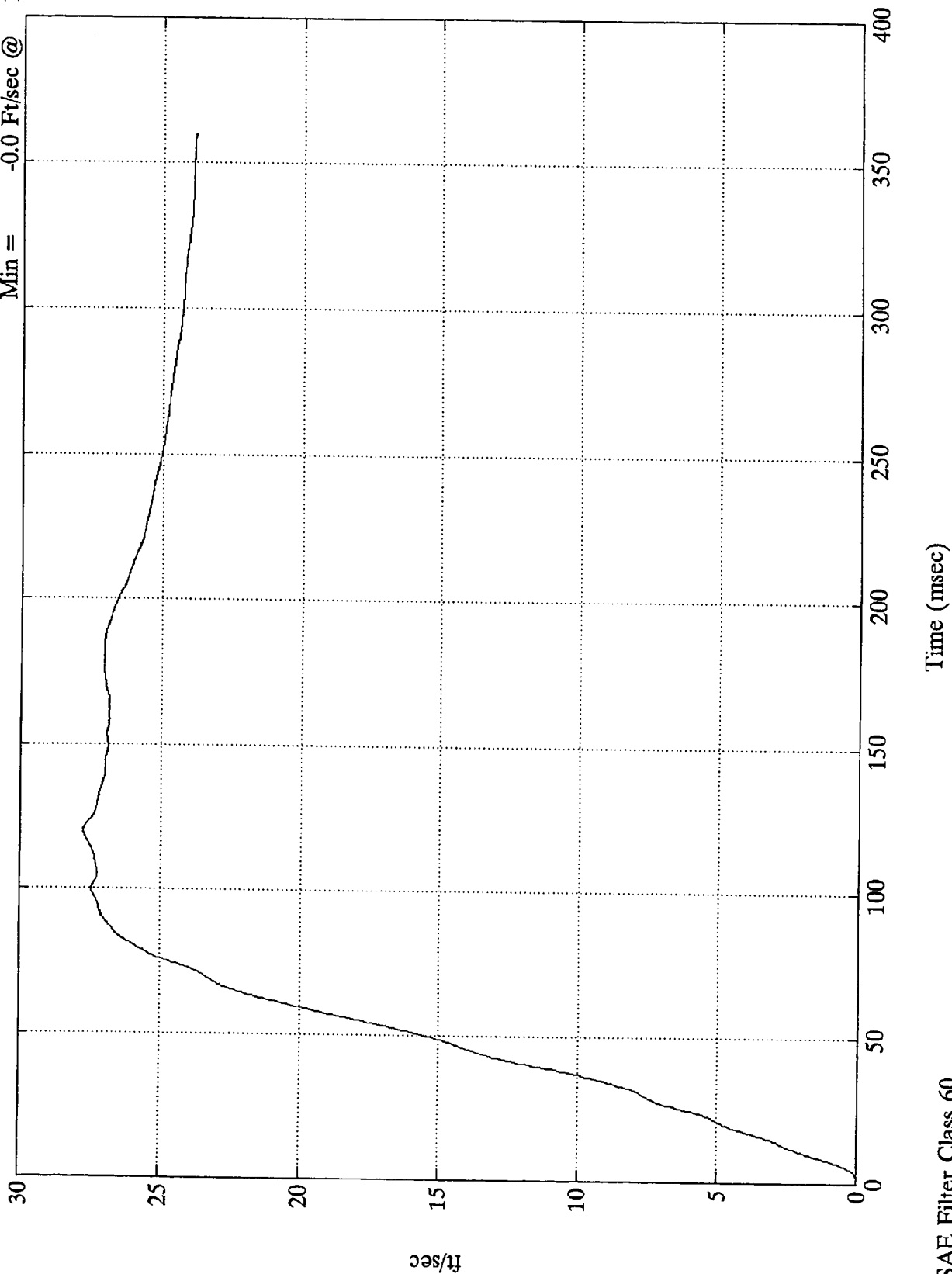
8247-9

SAE Filter Class 60

301 Rear 30 MPH-1995 Chevrolet Camaro

1st Integral Right Rear Crossmember X

Max = 27.7 Ft/sec @ 120.00 msec
Min = -0.0 Ft/sec @ 1.07 msec

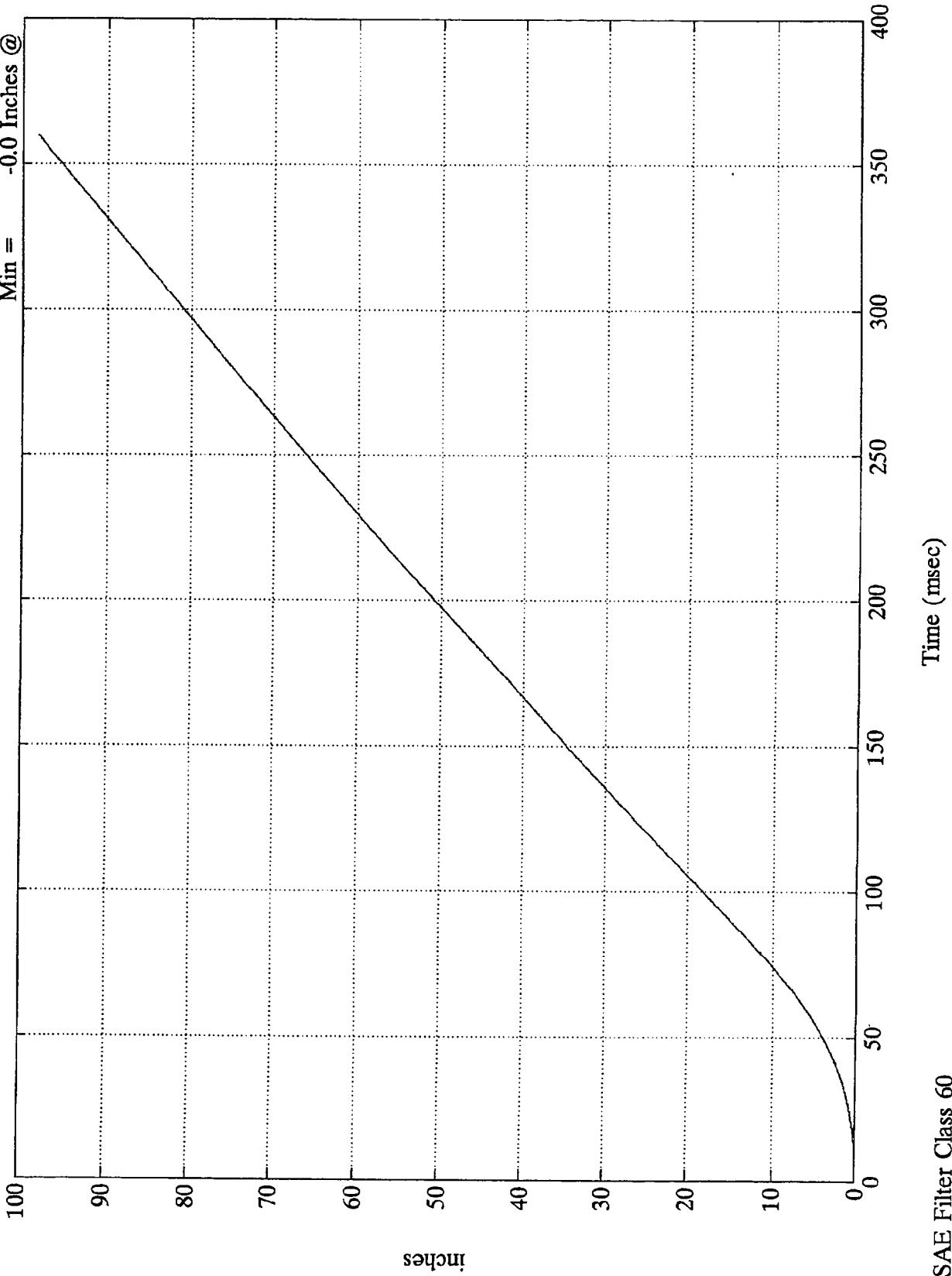


SAE Filter Class 60

301 Rear 30 MPH-1995 Chevrolet Camaro

2nd Integral Right Rear Crossmember X

Max = 98.2 Inches @ 359.88 msec
Min = -0.0 Inches @ 1.79 msec



TEST NO. CS0108

DRIVER DUMMY (Pos. 1)

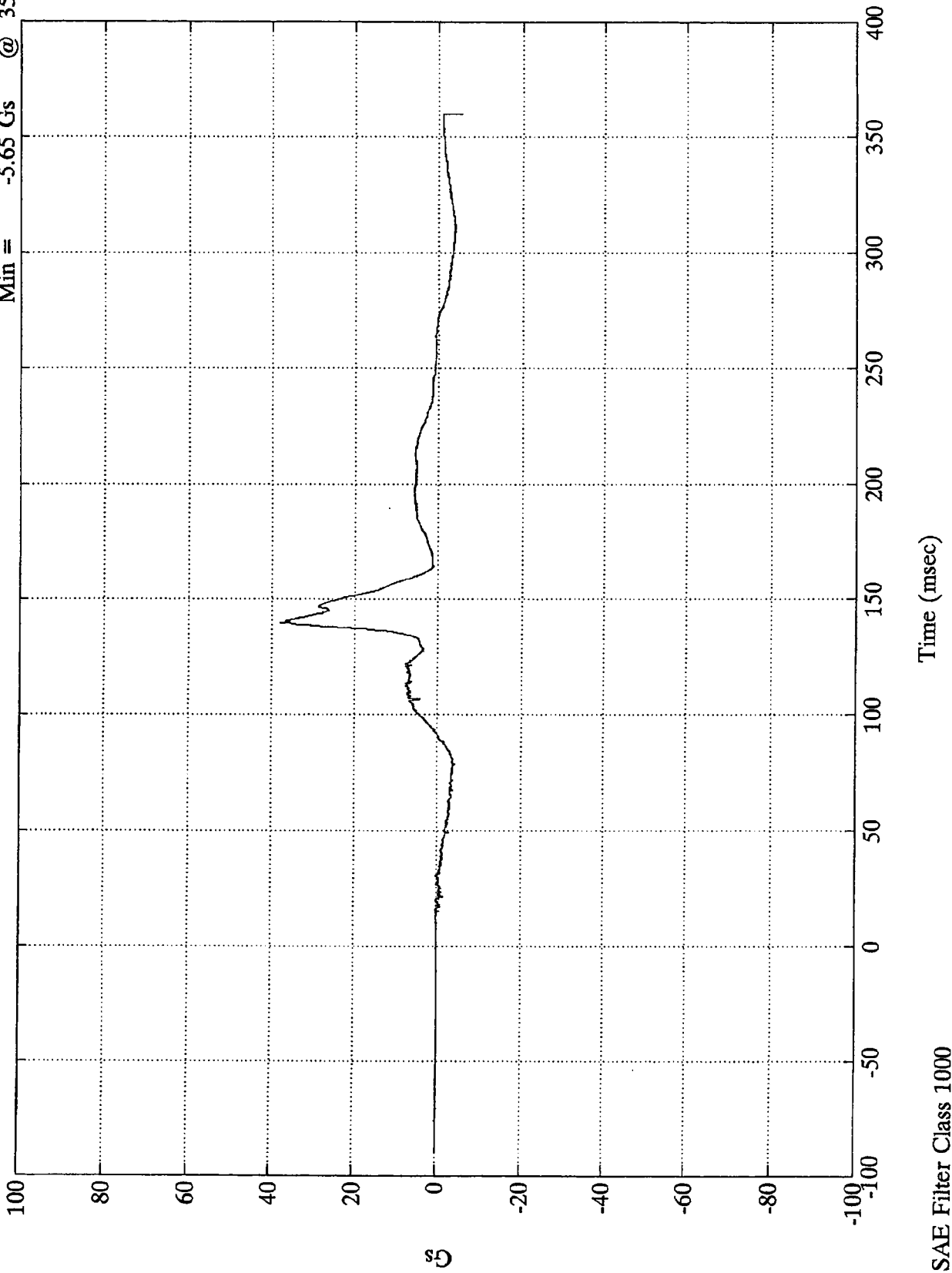
SAE FILTER CHANNEL CLASS

Head Accelerations	1000
Chest Accelerations	180
Pelvic Accelerations	1000
Upper Neck Forces	1000
Upper Neck Moments	600
Belt Forces	60
Belt Spoolout	60

301 Rear 30 MPH-1995 Chevrolet Camaro

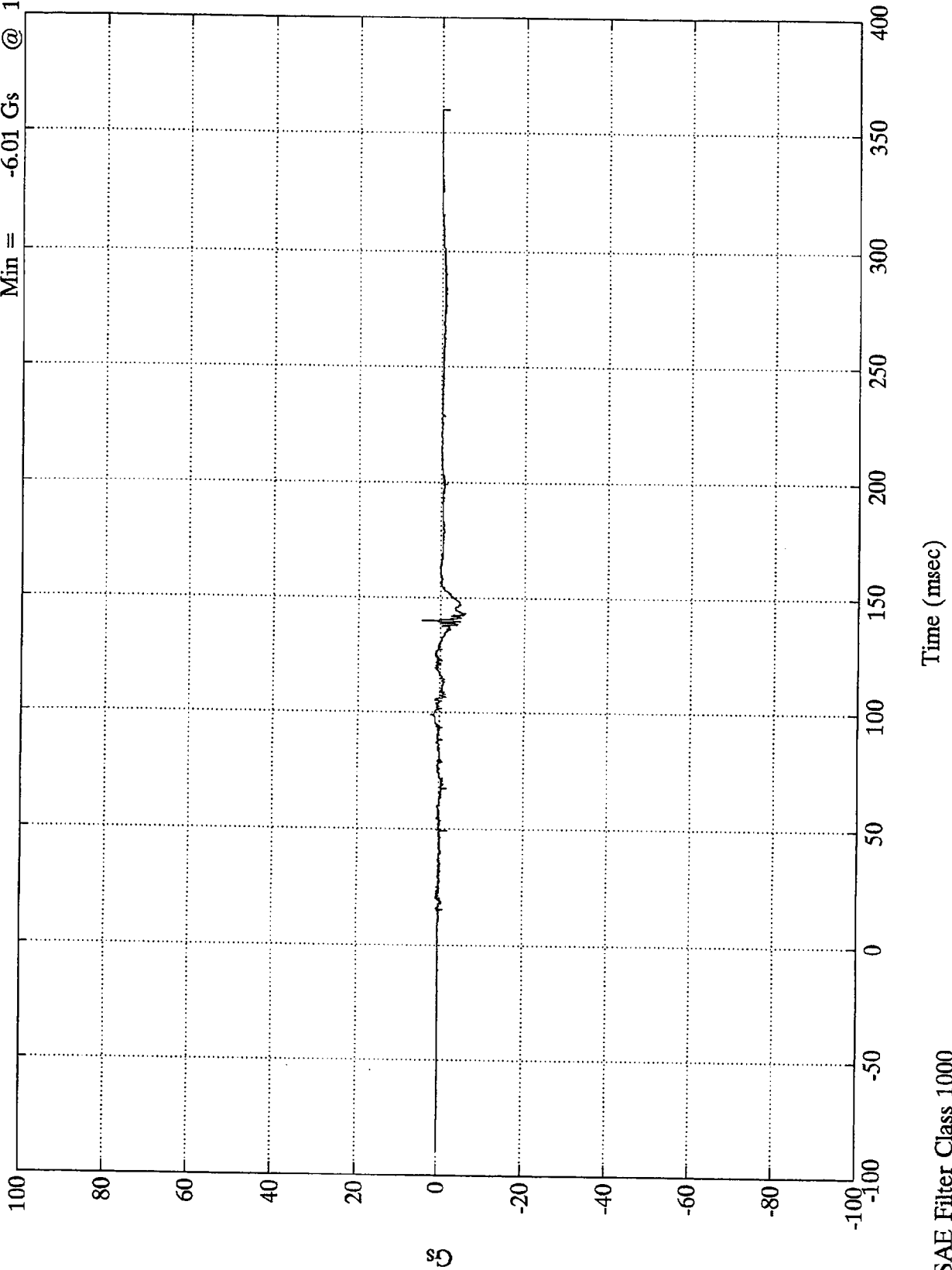
Pos. 1 Head X

Max = 37.99 Gs @ 139.67 msec
Min = -5.65 Gs @ 359.88 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Head Y
Max = 4.48 Gs @ 140.04 msec
Min = -6.01 Gs @ 143.16 msec



Gs

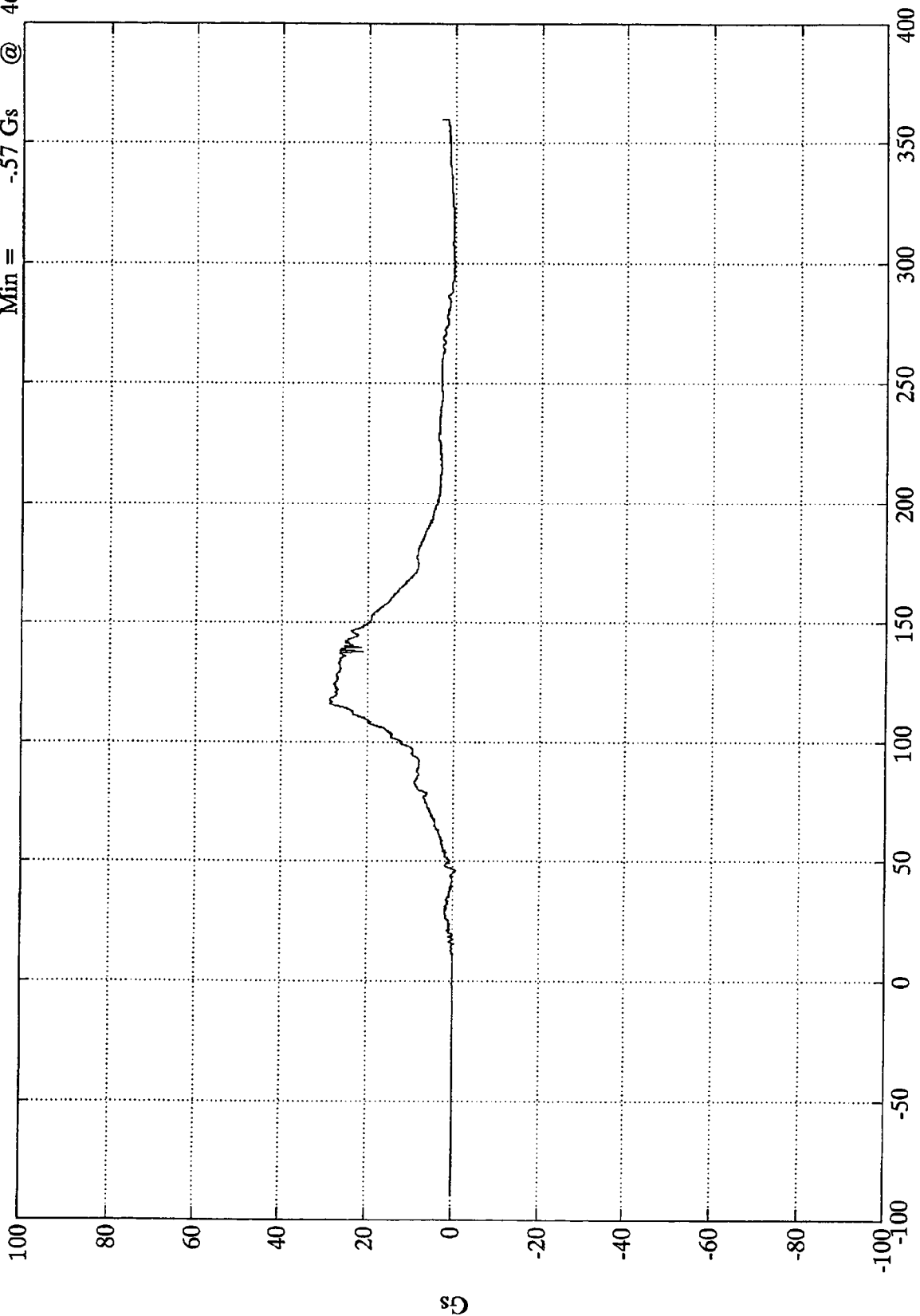
Time (msec)

SAE Filter Class 1000

301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Head Z

Max = 28.65 Gs @ 118.20 msec
Min = -5.57 Gs @ 46.08 msec

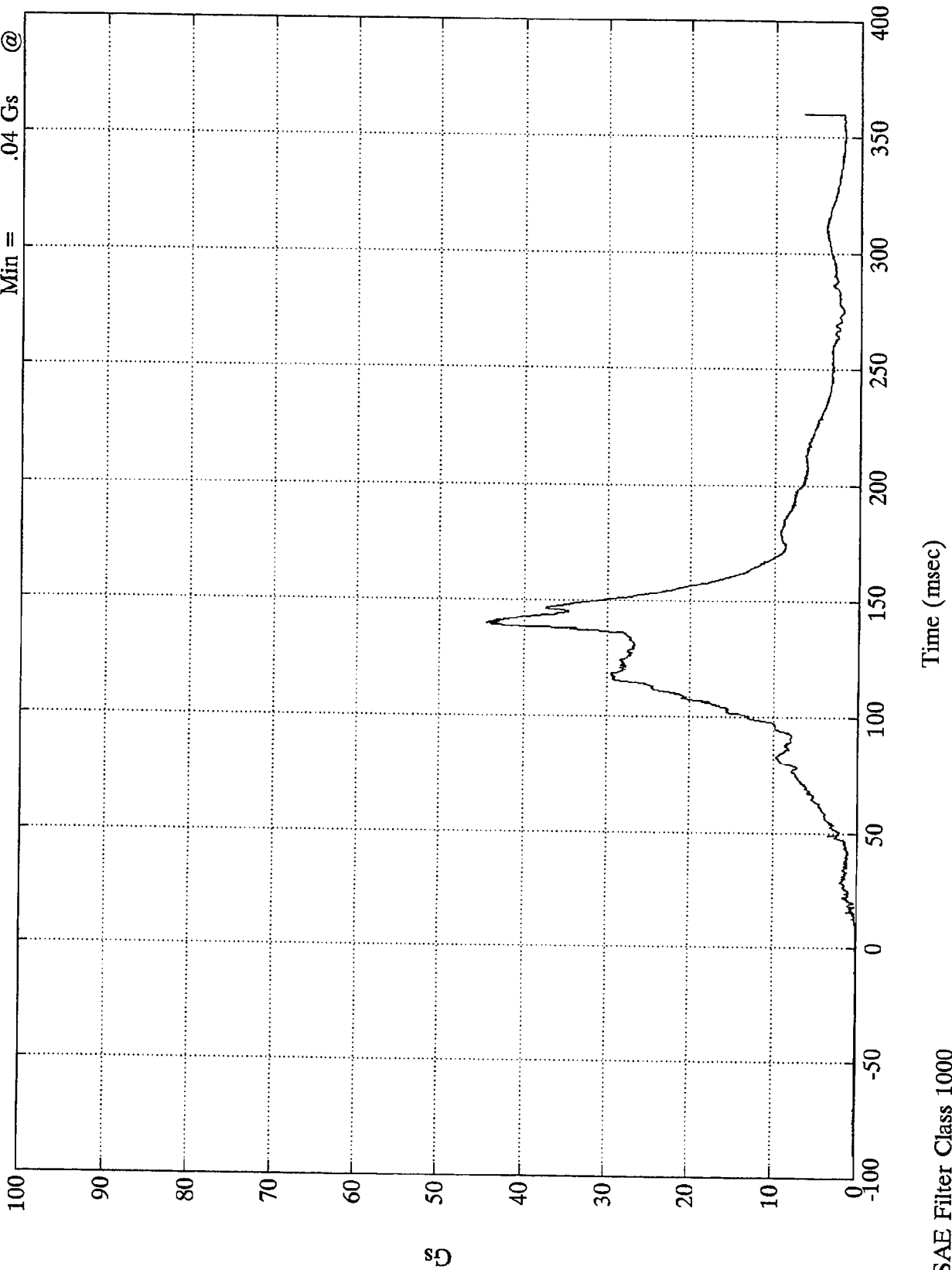


Time (msec)

SAE Filter Class 1000

301 Rear 30 MPH-1995 Chevrolet Camaro

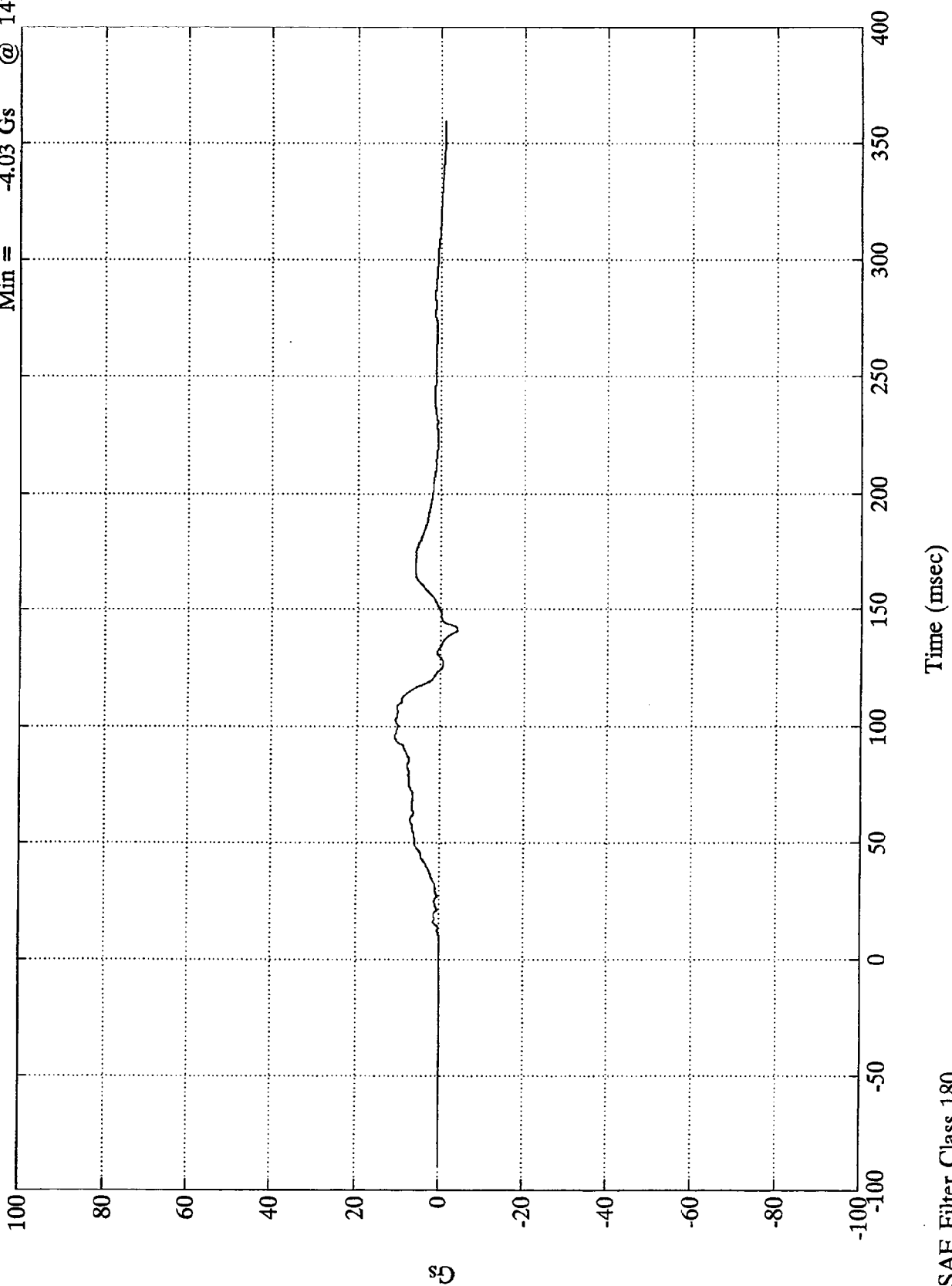
Pos. 1 Head Resultant
Max = 44.39 Gs @ 140.16 msec
Min = .04 Gs @ 7.91 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Chest X

Max = 10.80 Gs @ 96.12 msec
Min = -4.03 Gs @ 141.72 msec



Gs

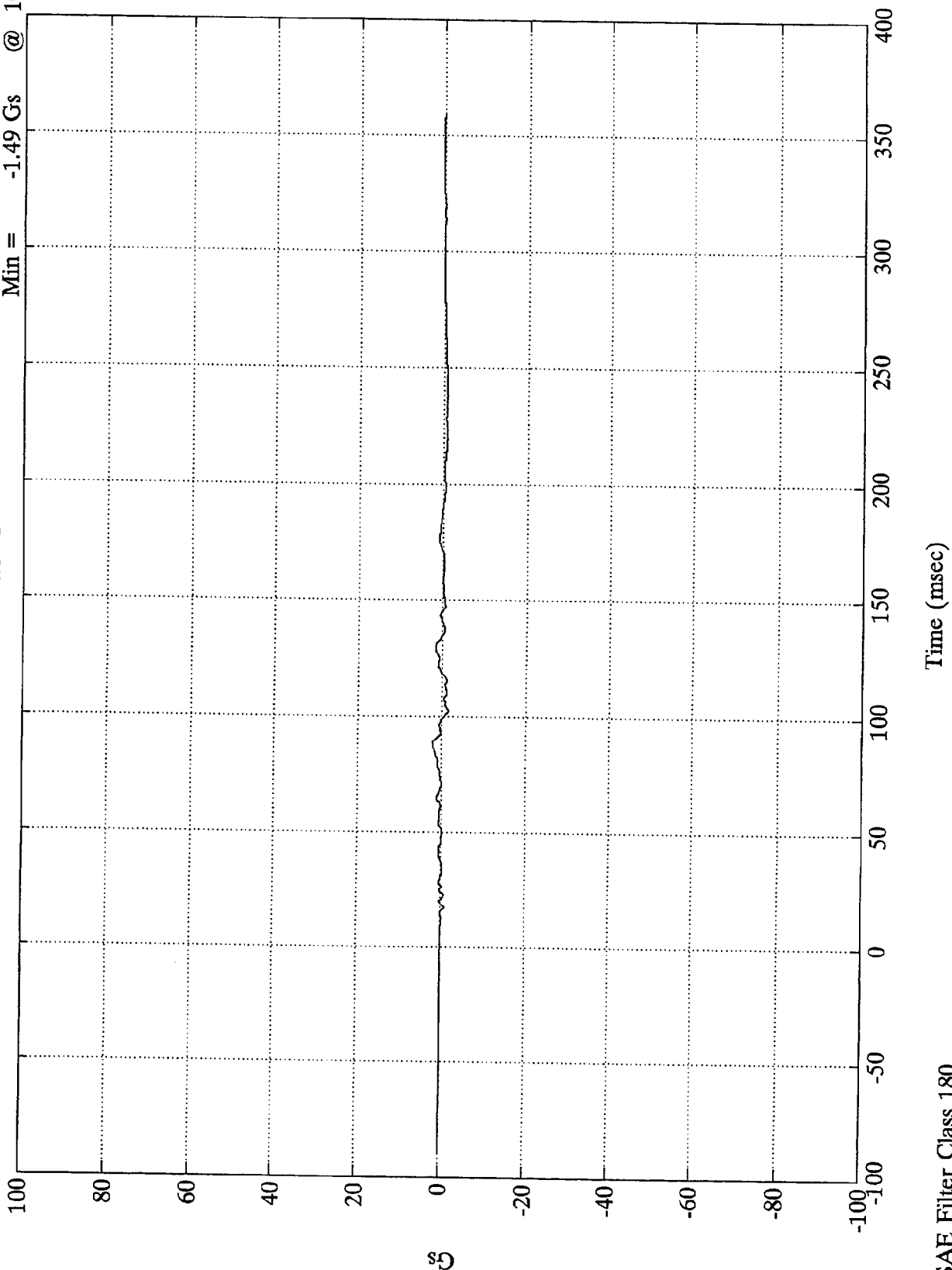
B-23

8247-9

301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Chest Y

Max = 2.23 Gs @ 88.92 msec
Min = -1.49 Gs @ 102.48 msec



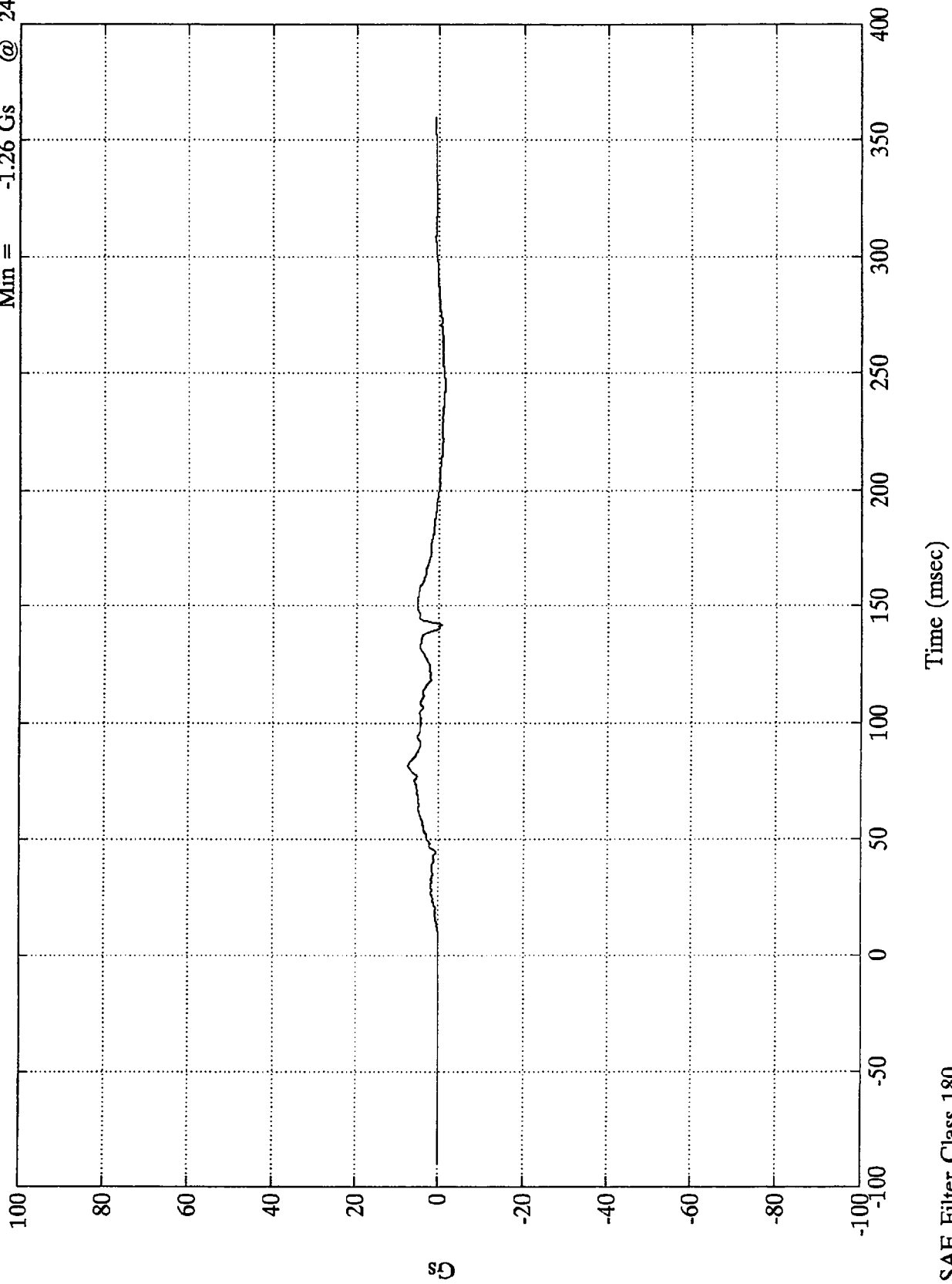
SAE Filter Class 180

Gs

Time (msec)

301 Rear 30 MPH-1995 Chevrolet Camaro

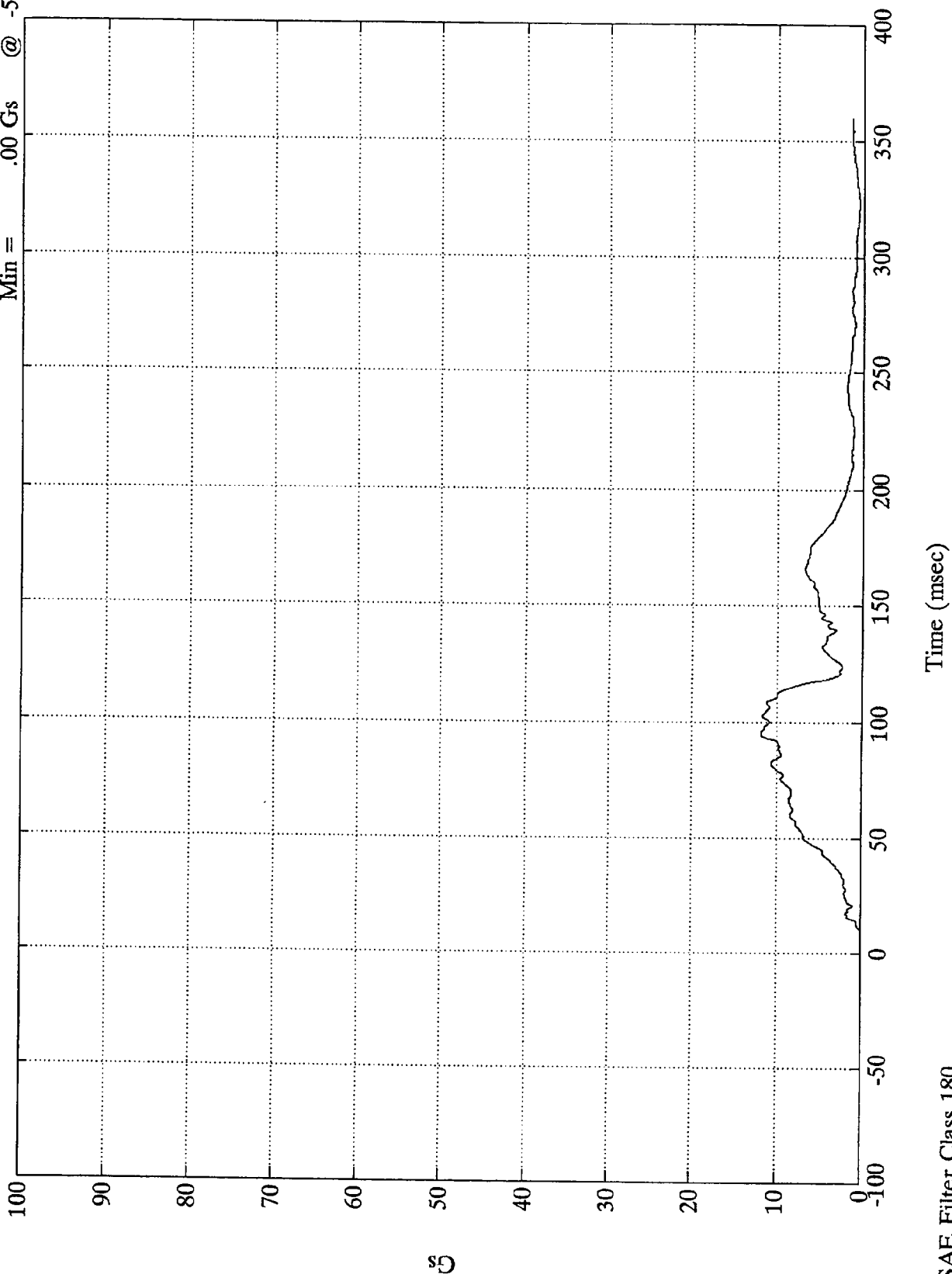
Pos. 1 Chest Z
Max = 7.33 Gs @ 81.95 msec
Min = -1.26 Gs @ 244.68 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 11.78 Gs @ 94.91 msec
Min = .00 Gs @ -53.52 msec

Pos. 1 Chest Resultant



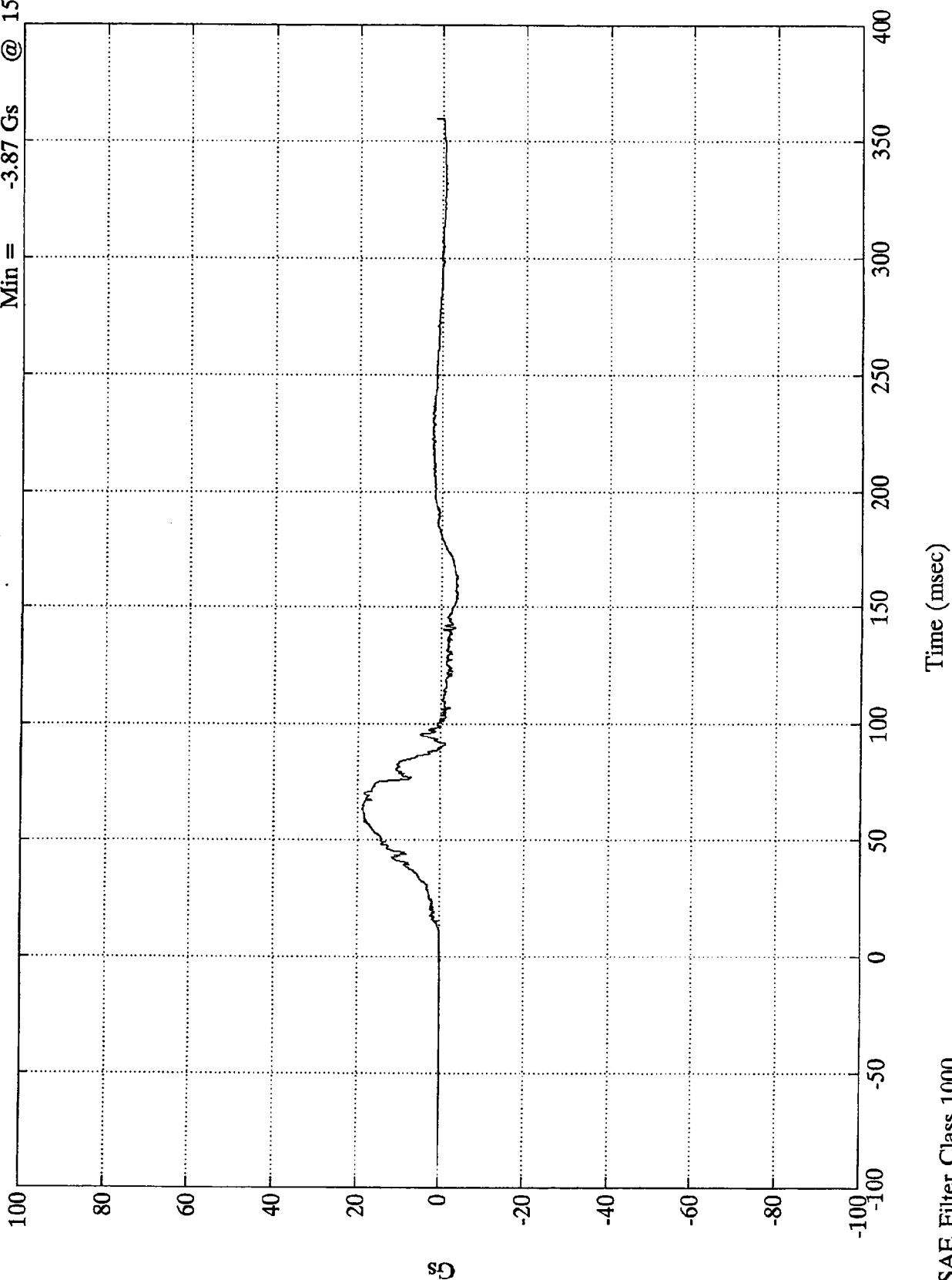
B-26

8247-9

301 Rear 30 MPH-1995 Chevrolet Camaro

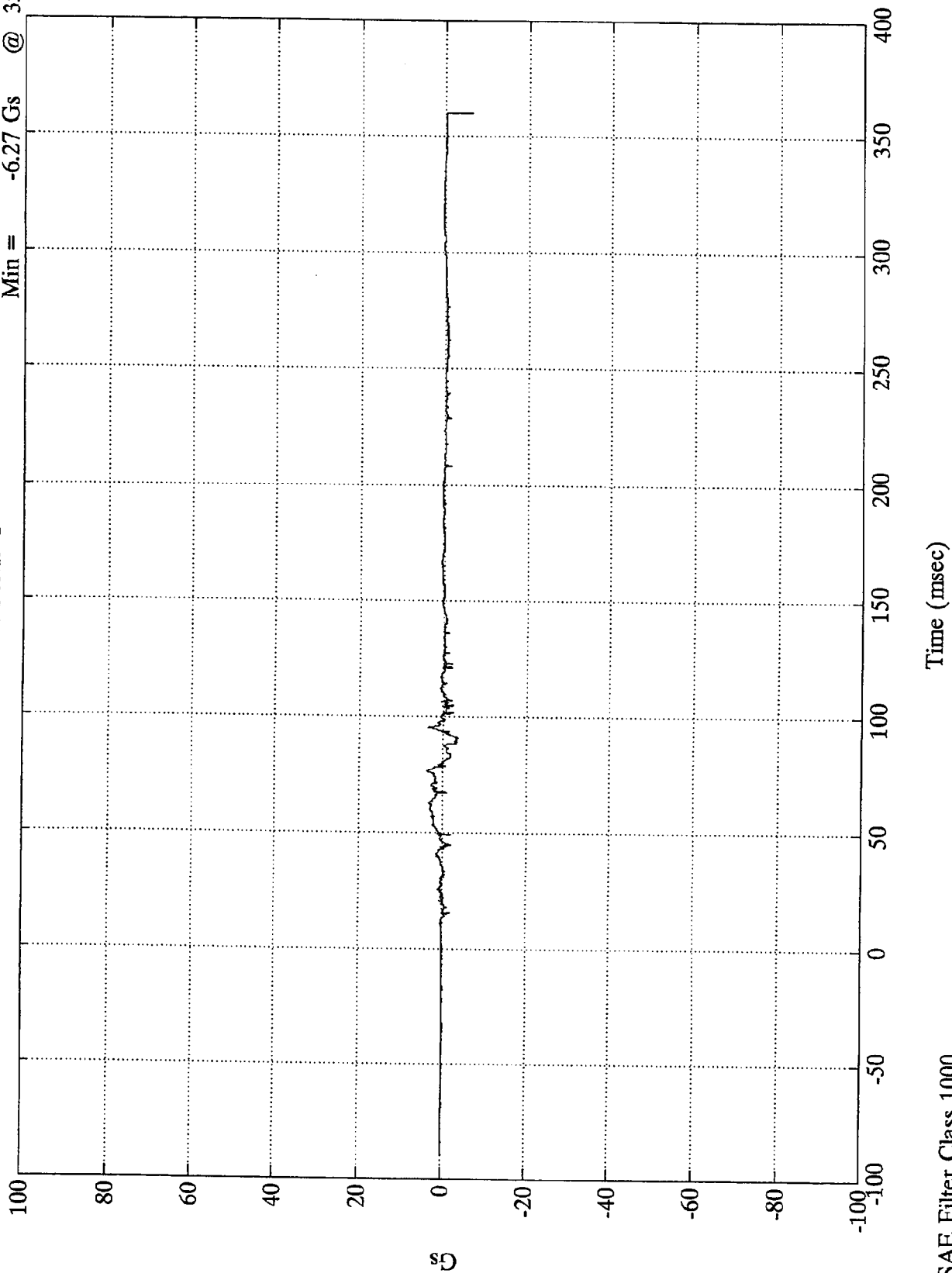
Pos. 1 Pelvic X

Max = 19.02 Gs @ 63.60 msec
Min = -3.87 Gs @ 156.11 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

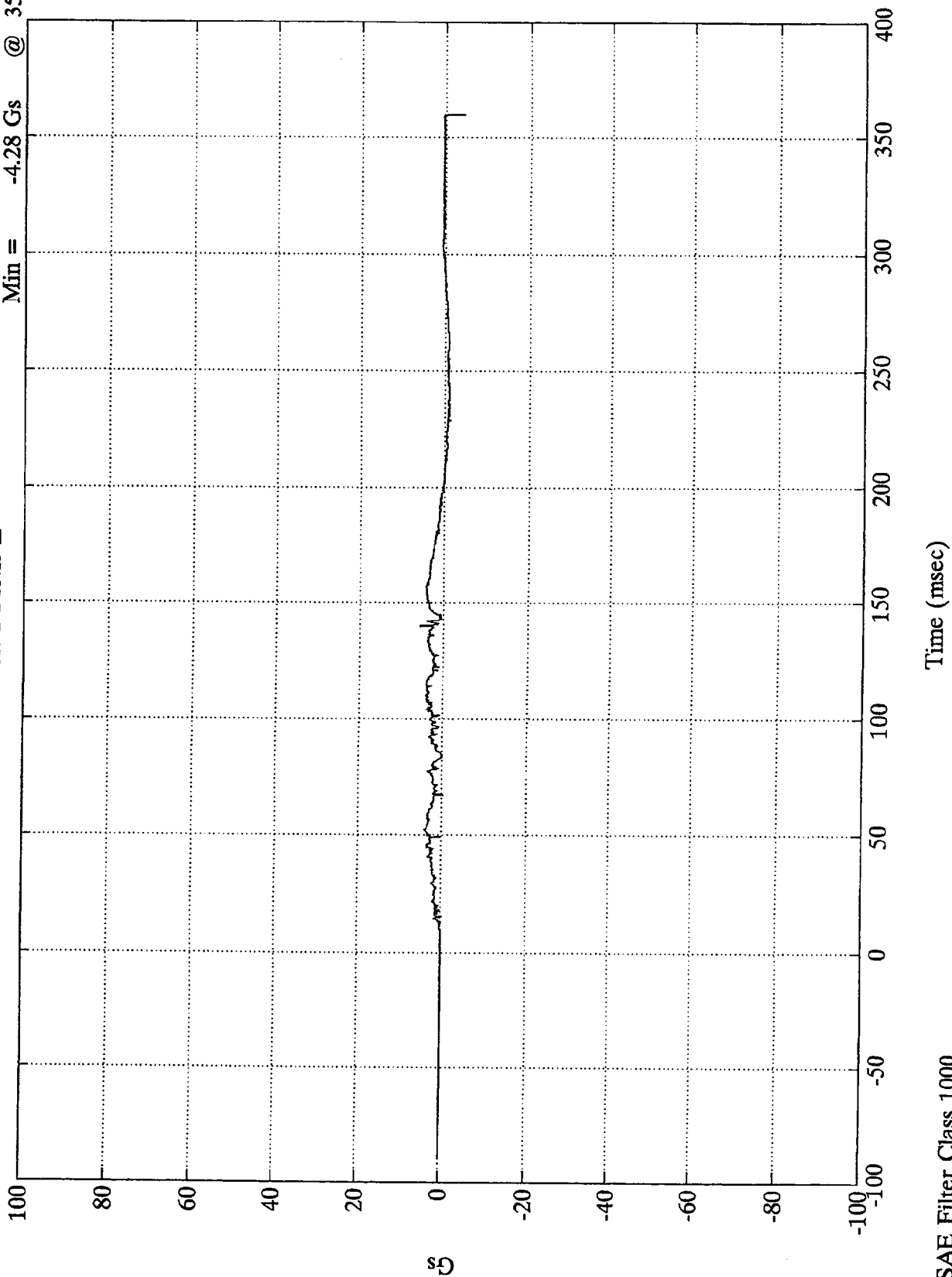
Pos. 1 Pelvic Y
Max = 3.80 Gs @ 76.55 msec
Min = -6.27 Gs @ 359.88 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Pelvic Z

Max = 5.50 Gs @ 140.28 msec
Min = -4.28 Gs @ 359.88 msec



Gs

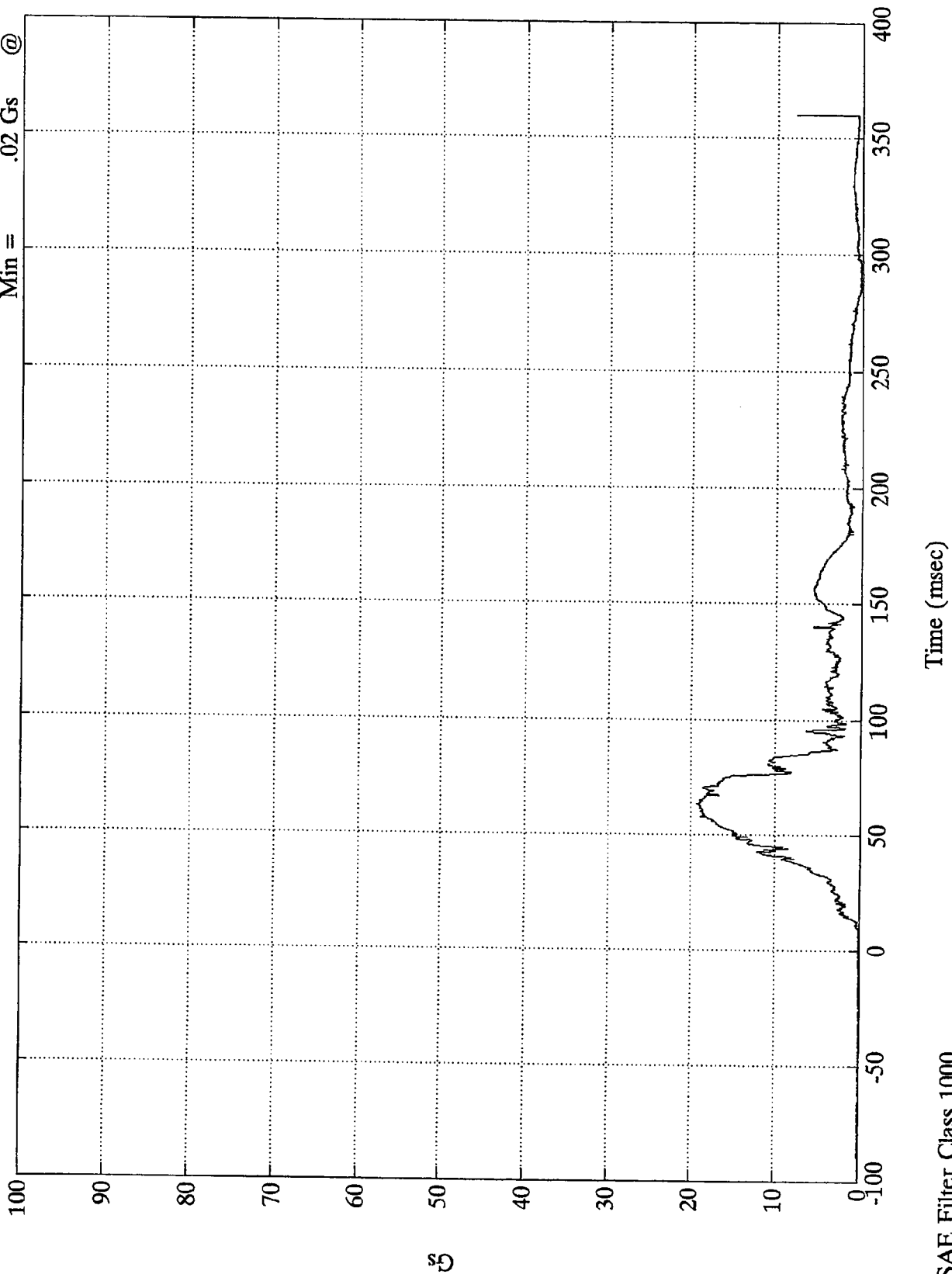
Time (msec)

SAE Filter Class 1000

301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 19.37 Gs @ 63.47 msec
Min = .02 Gs @ 8.75 msec

Pos. 1 Pelvic Resultant



SAE Filter Class 1000

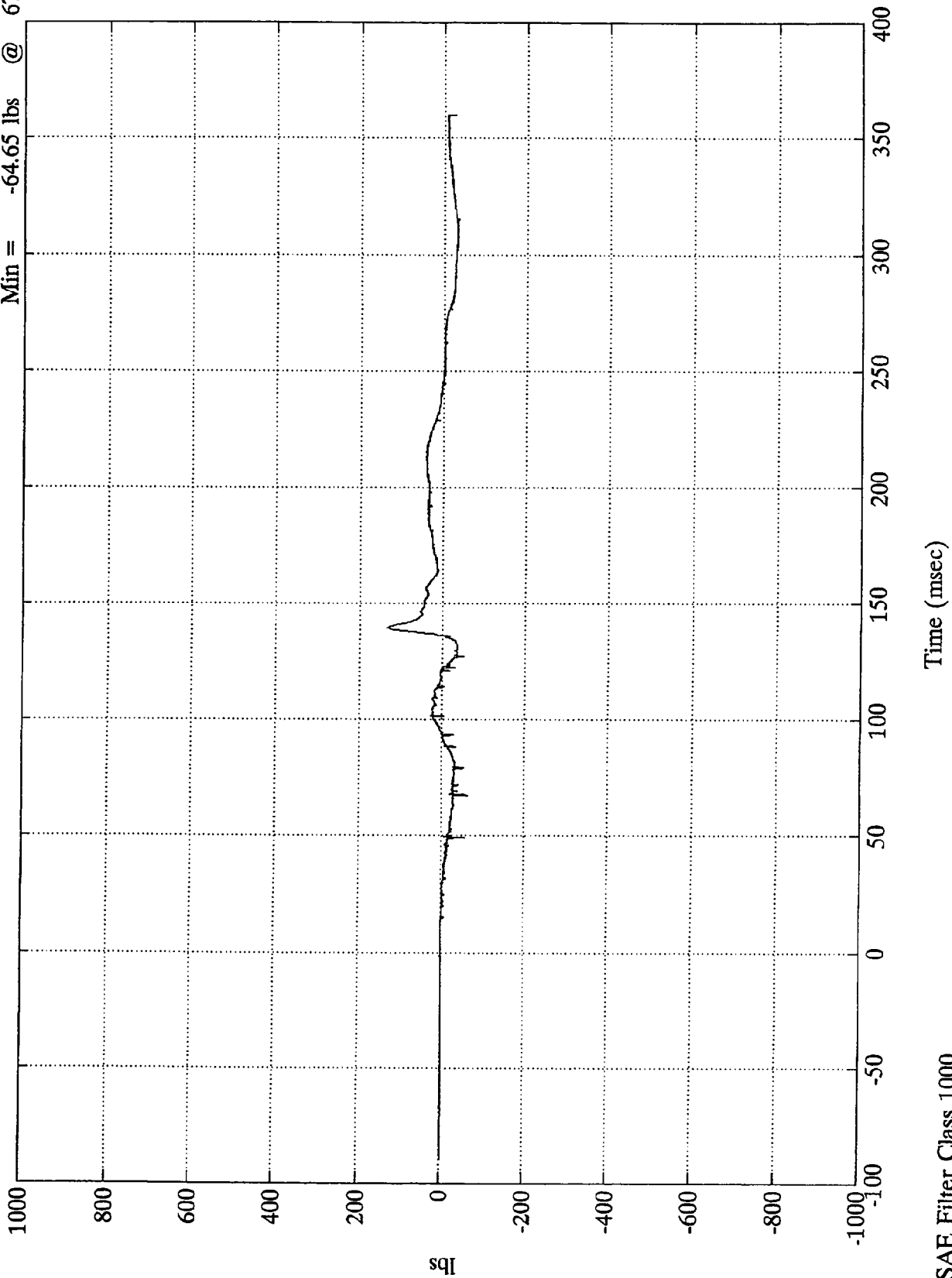
B-30

8247-9

301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Upper Neck Fx

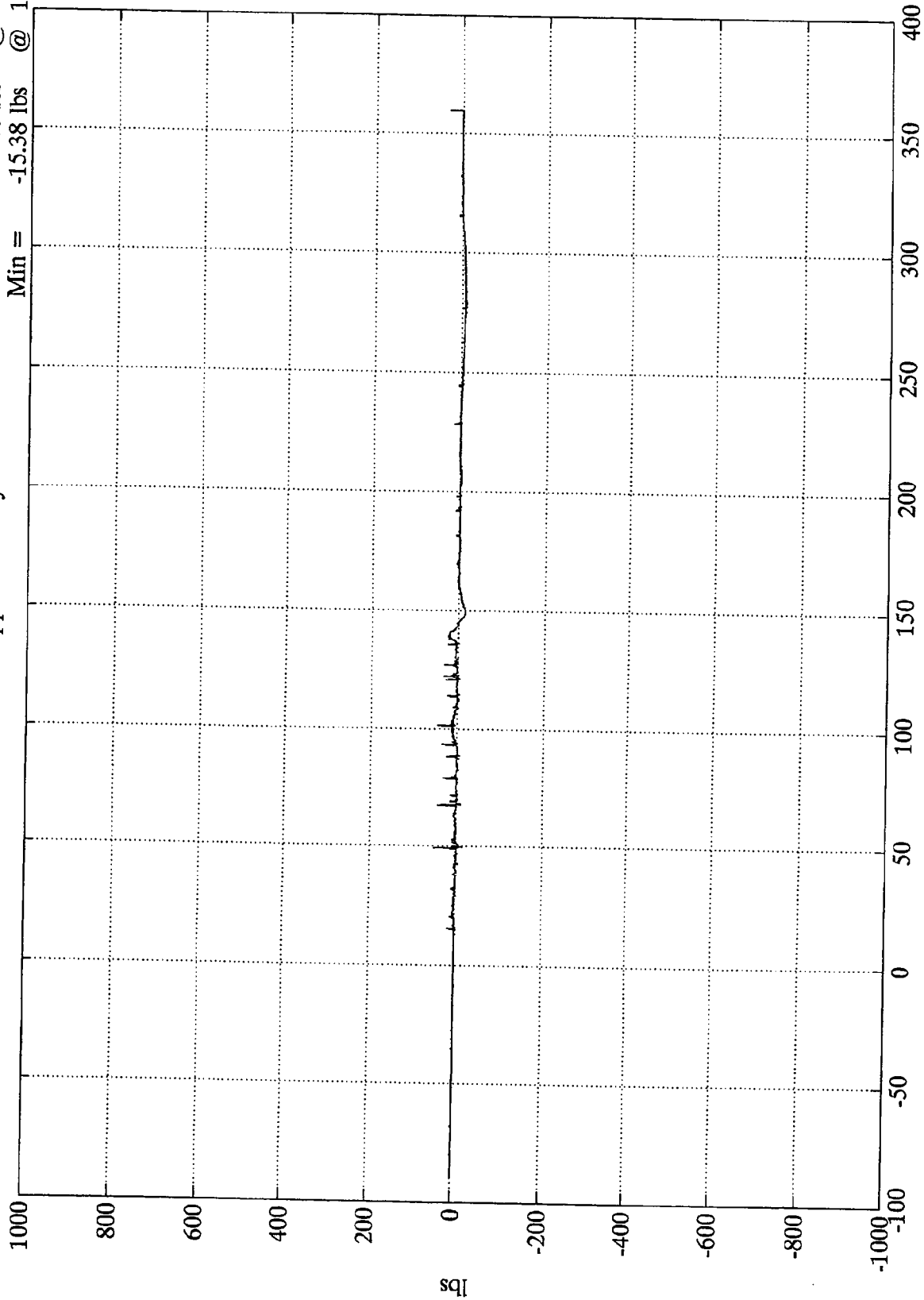
Max = 135.21 lbs @ 139.67 msec
Min = -64.65 lbs @ 67.32 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Upper Neck Fy

Max = 50.46 lbs @ 49.31 msec
Min = -15.38 lbs @ 151.32 msec



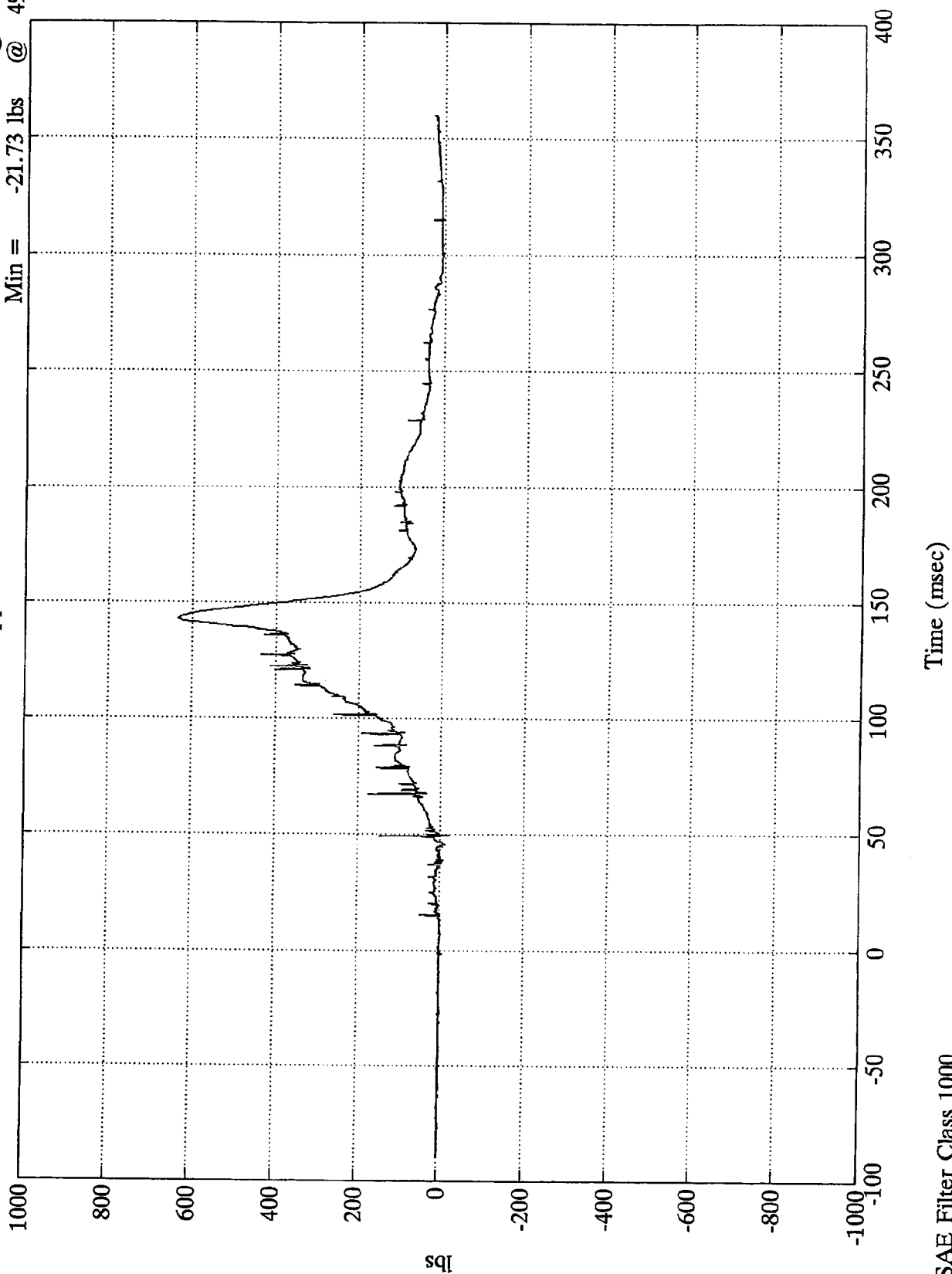
Time (msec)

SAE Filter Class 1000

301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Upper Neck Fz

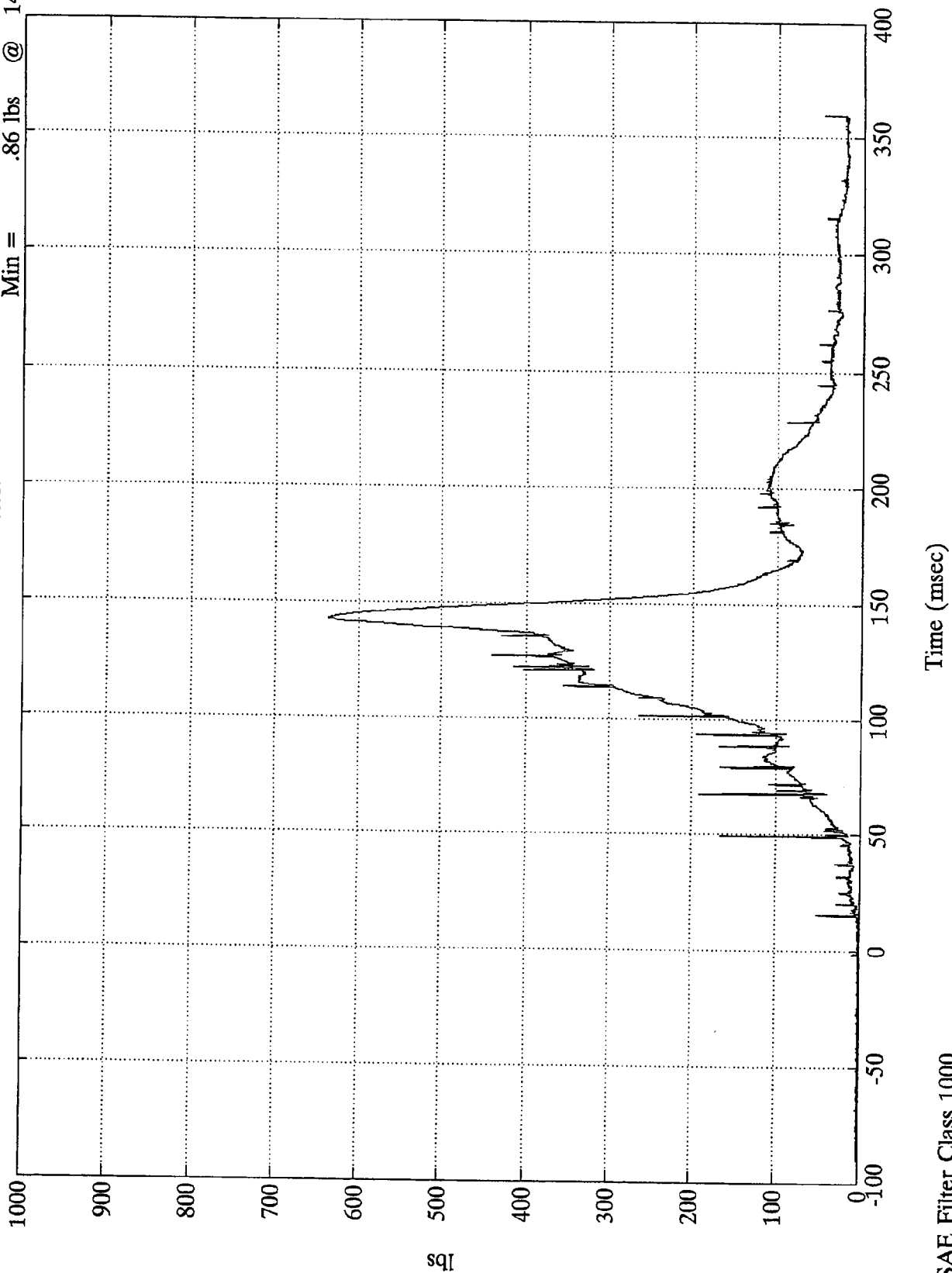
Max = 633.76 lbs @ 143.16 msec
Min = -21.73 lbs @ 49.68 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 637.10 lbs @ 143.16 msec
Min = .86 lbs @ 14.51 msec

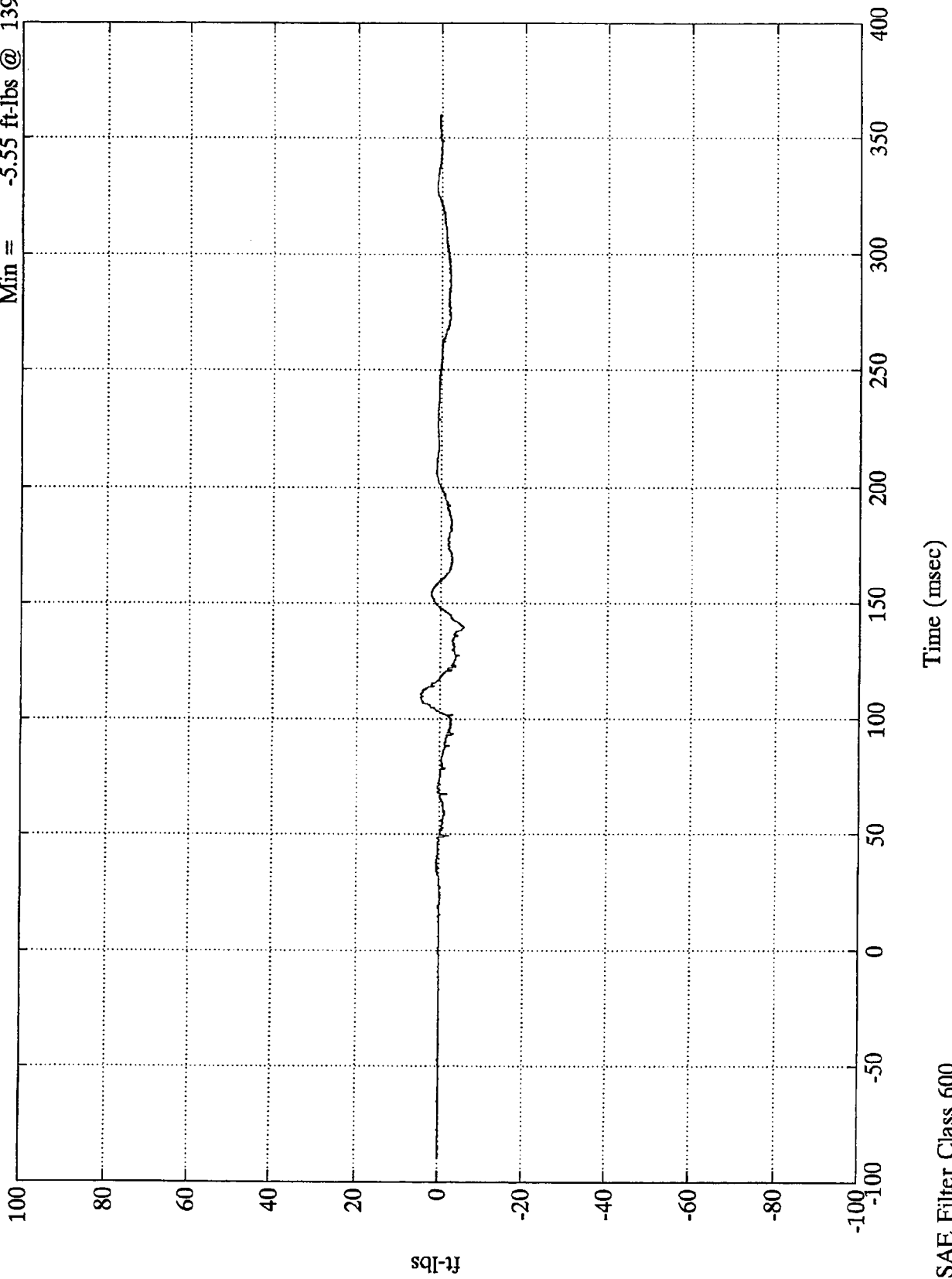
Pos. 1 Neck Force Res.



301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Upper Neck Mx

Max = 4.83 ft-lbs @ 108.95 msec
Min = -5.55 ft-lbs @ 139.91 msec



ft-lbs

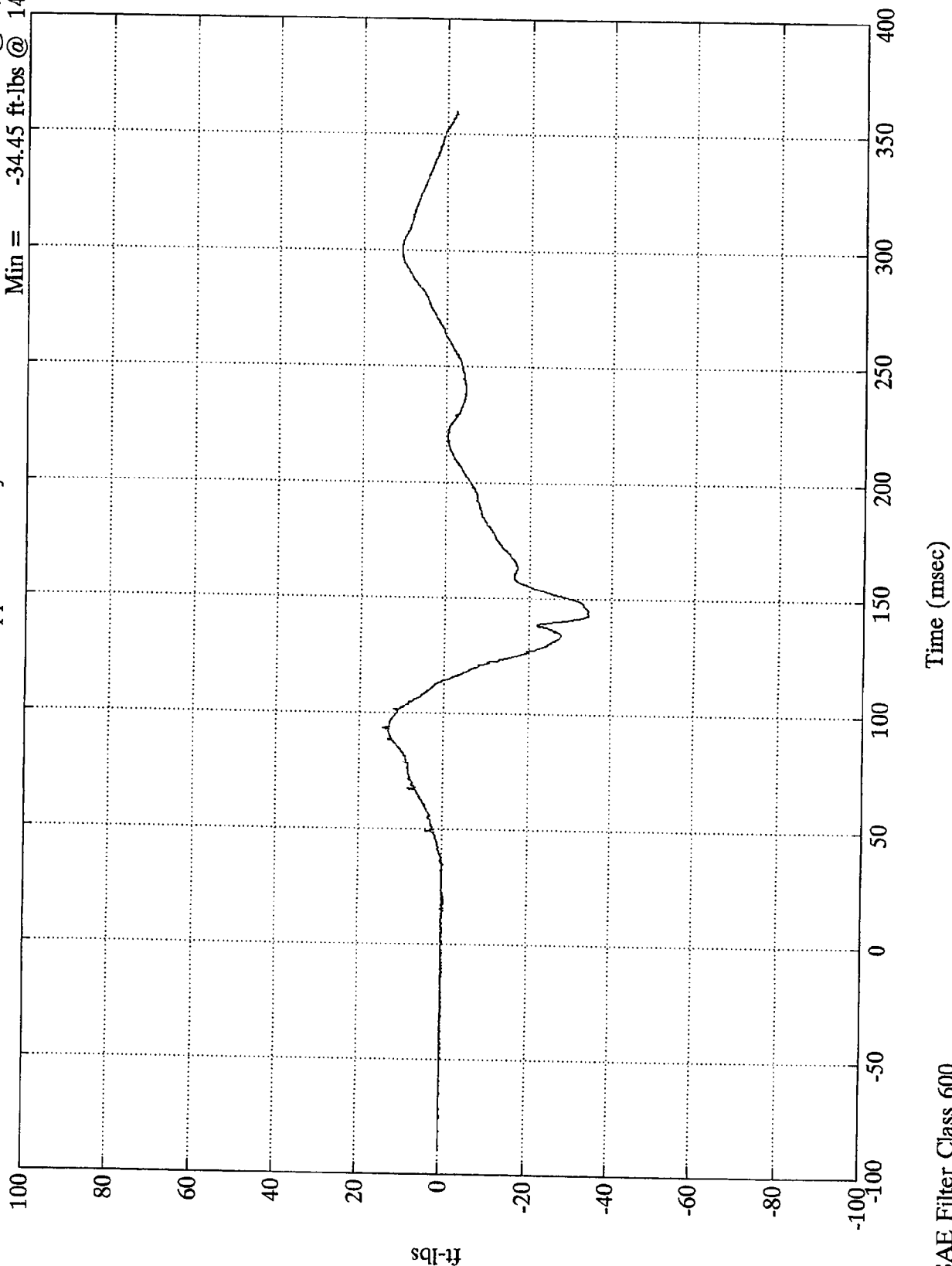
B-35

8247-9

301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Upper Neck My

Max = 14.33 ft-lbs @ 93.47 msec
Min = -34.45 ft-lbs @ 143.27 msec

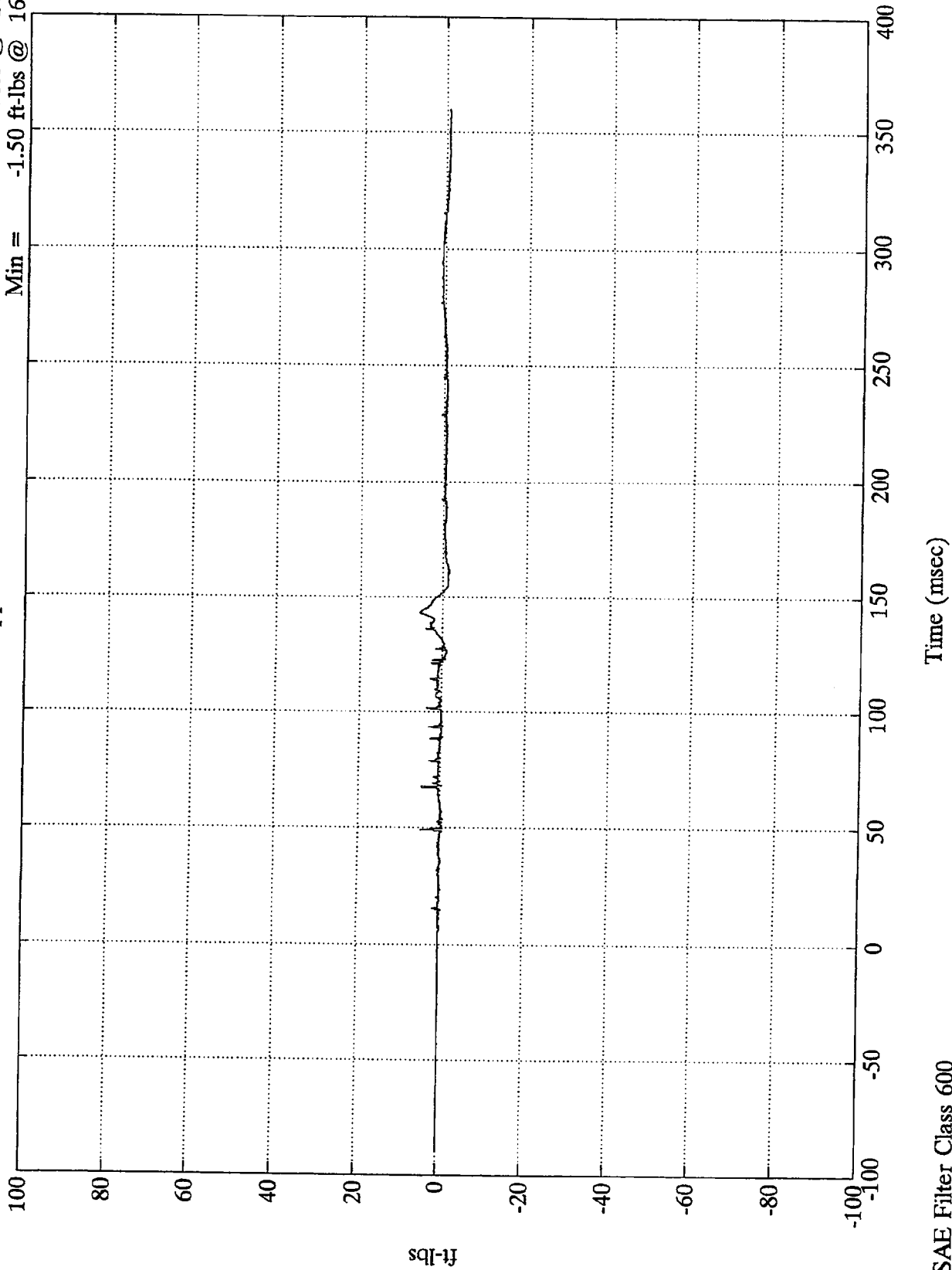


SAE Filter Class 600

301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Upper Neck Mz

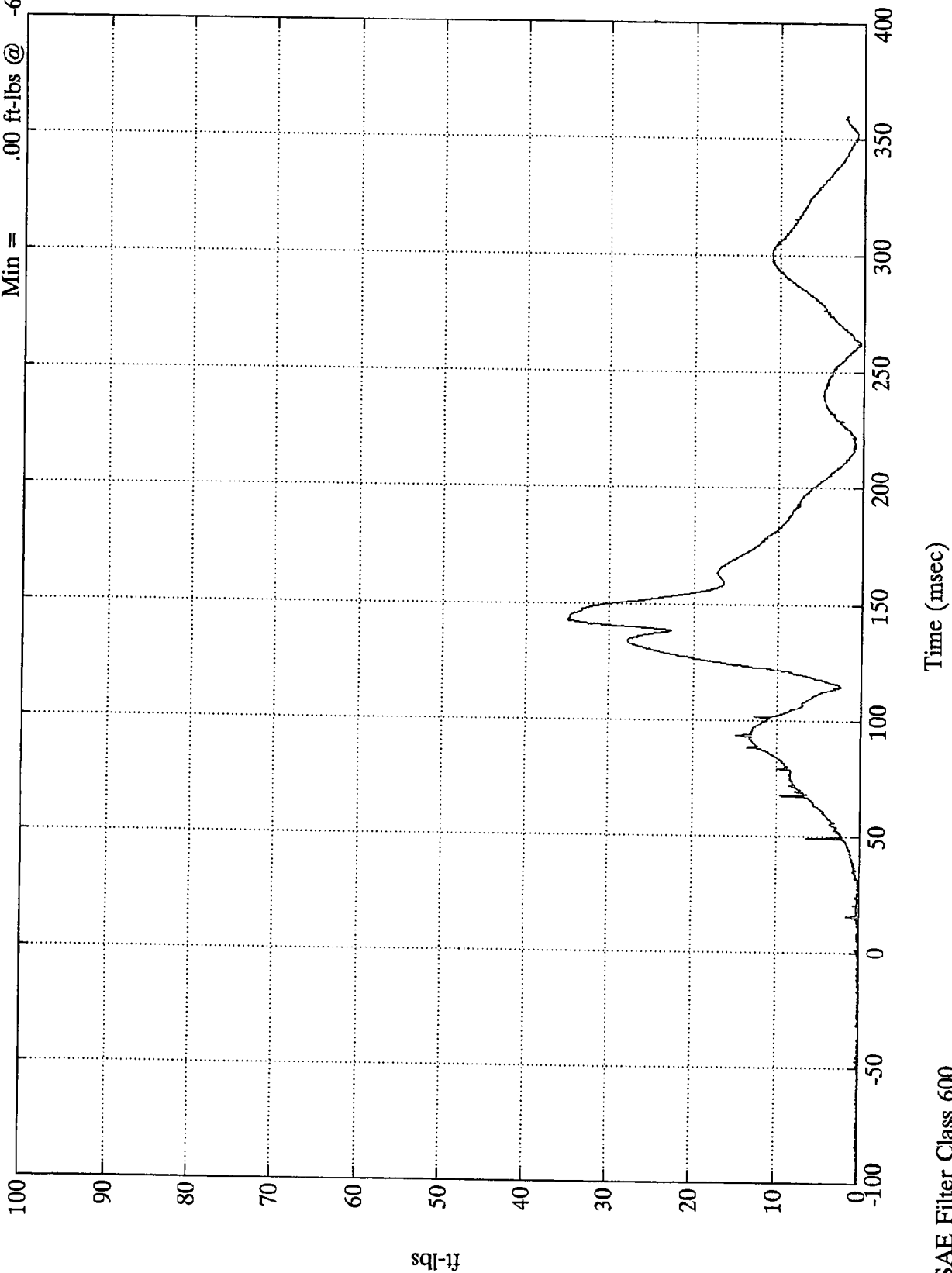
Max = 5.33 ft-lbs @ 143.52 msec
Min = -1.50 ft-lbs @ 162.11 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Max = 34.95 ft-lbs @ 143.27 msec
Min = .00 ft-lbs @ -6.24 msec

Pos. 1 Neck Moment Res.



ft-lbs

B-38

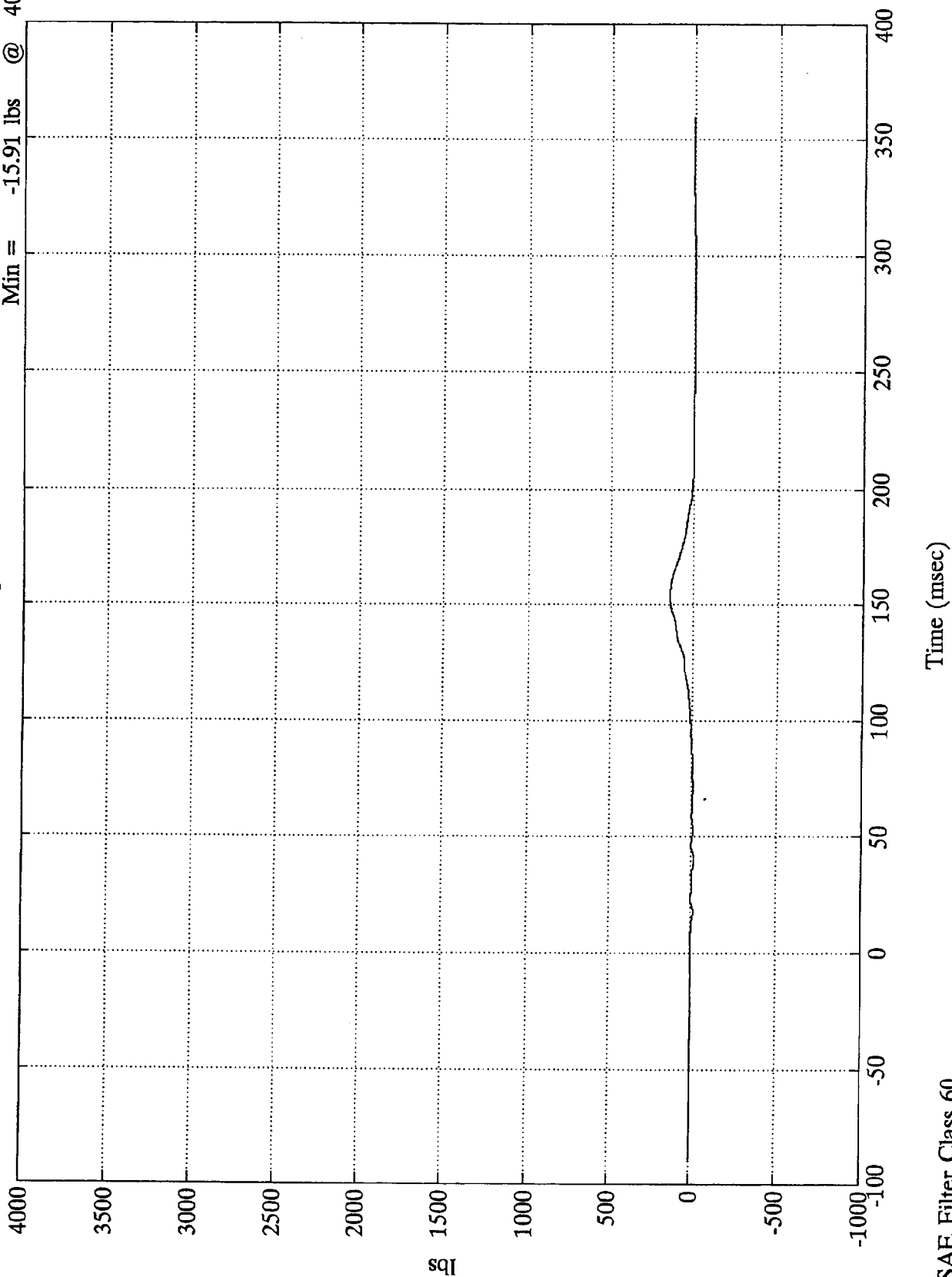
8247-9

SAE Filter Class 600

301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Lap Belt

Max = 141.03 lbs @ 153.72 msec
Min = -15.91 lbs @ 40.07 msec



301 Rear 30 MPH-1995 Chevrolet Camaro

Pos. 1 Belt Spoolout
Max = .00 Ins @ 7.07 msec
Min = -3.27 Ins @ 53.75 msec

