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

**TOYOTA MOTORS CORPORATION
1991 TOYOTA MR2
2-DOOR TURBO COUPE**

NHTSA NUMBER: CM5108

CALSPAN TEST NUMBER: 7920-3

JULY 18, 1991

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
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FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
ENFORCEMENT
Office of Vehicle Safety Compliance
400 Seventh Street, S.W.
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Washington, DC 20590

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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1991 Toyota MR2 2-Door Turbo Coupe. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on July 18, 1991. The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards: 1. FMVSS No. 208, "Occupant Crash Protection" 2. FMVSS No. 212, "Windshield Mounting" 3. FMVSS No. 219 (partial), "Windshield Zone Intrusion" 4. FMVSS No. 301, "Fuel System Integrity" The test mode was perpendicular (0°) and the impact velocity was 29.1 mph. The ambient temperature at the impact face was 85°F. The driver ATD appeared to exceed the maximum allowable chest g level as specified by FMVSS 208. <u>Type of Restraint System:</u> The test vehicle was equipped with a driver side airbag and passenger 3-point manual seat belt restraint system. The driver side manual 3-point belt was not used for this test.					
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Section I

PURPOSE AND TEST PROCEDURE

This 30 mph frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial) and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by Calspan Advanced Technology Center under Contract No. DTNH22-90-C-01003. The purpose of this test was to determine if the subject vehicle, a 1991 Toyota MR2 2-Door Turbo Coupe, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS No. 212, "Windshield Mounting"; FMVSS No. 219 (partial), "Windshield Zone Intrusion"; and FMVSS No. 301, "Fuel System Integrity". This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-208-08, dated September 8, 1989.

Section 2
SUMMARY OF TEST NUMBER CM5108

A frontal barrier was impacted by a 1991 Toyota MR2 2-Door Turbo Coupe at a velocity of 29.1 mph. The test was performed at the Calspan Corporation Advanced Technology Center on July 18, 1991. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

Two Part 572B, 50th percentile male anthropomorphic test device (ATD's), were placed in the driver and passenger seating positions according to dummy placement instructions specified in the OVSC Laboratory Test Procedure.

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

The 23 channels of data were recorded on two 14-channel FM tape recorders. Accelerometer #1(x) - Left Rear Crossmember accelerometer was damaged at approximately 103 msec during the test.

The driver's HIC was 554. The maximum chest deceleration over 3 milliseconds was 62.9 g's. The maximum force on the driver's left femur was 1501 pounds and 1475 pounds on the right femur.

The right front passenger's HIC was 285. The maximum chest deceleration over 3 milliseconds was 29.3 g's. The maximum force on the passenger's left femur was 398 pounds and 280 pound on the right femur.

Table 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: CM5108 Test Mode: 30 mph Frontal Barrier

Test Date: July 18, 1991 Time: 13:50 Temperature: 85F°

Vehicle Make/Model/Body Style: 1991 Toyota MR2 2-Door Coupe

Vehicle Test Weight: 3290 lbs.

Vehicle/Barrier Impact Angle: 0°

Impact Velocity: 29.1 mph

Maximum Static Crush: 19.0 inches

Vehicle Rebound: 46.0 inches

<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Type:	<u>Part 572B</u>	<u>Part 572B</u>
Restraint System:	<u>Air Bag</u>	<u>3-Point Continuous Belt Restraint</u>

Number of Data Channels: 23

Number of Cameras: 1 Real Time
14 High Speed

DOOR OPENING DATA: closed-operable - Left Front
closed-operable - 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: None None

<u>VISIBLE DUMMY CONTACT POINTS:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Head:	<u>Air bag. Forehead, top and back of head with sunvisor</u>	<u>Top and rear of head with sunvisor. Top of head with upper dash panel.</u>
Abdomen:	<u>No Contact</u>	<u>No Contact</u>
Chest:	<u>Air Bag</u>	<u>No Contact</u>
Knees:	<u>Lower Instrument Panel</u>	<u>Glovebox</u>

Table 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1991 Toyota MR2 2-Door
NHTSA No.: CM5108 ; VIN: JT2SW22N3M0033732 ; Color: Black
Engine Data: 4 cylinders; - CID; 2.0 Liters; - cc
Placement: - Longitudinal or In-Line; X Transverse or Lateral
Transmission Data: 5 speeds; X Manual; - Automatic; - 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 Power Windows; X Pwr. Door Locks X Turbo
Date Received: 7/2/91 ; Odometer Reading 69 miles
Selling Dealer: Culligan Toyota, Inc.
& Address 8129 Main Street, Williamsville, NY 14221

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Toyota Motor Corporation
Date of Manufacture: 11/90
GVWR: 3370 lbs.; GAWR: 1480 lbs. FRONT; 1950 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 29 psi FRONT
33 psi REAR
Recommended Tire Size: Front: 195-60R14 85V
Rear: 205/60R14 85V Load Range: -
Recommended Cold Tire Pressure: 29 psi FRONT; 33 psi REAR
Size of Tires on Test Vehicle: Front: 195/60R14 85V
Rear: 205/60R14 88V ; Manufacturer: Bridgestone

Vehicle Capacity Data:

Type of Front Seats: - Bench; X Bucket; - Split Bench
Number of Occupants: 2 Front; - Rear; 2 Total
Vehicle Capacity Weight (VCW) = 400 lbs.
No. of Occupants x 150 lbs. = 300 lbs.
Rated Cargo/Luggage Weight (RCLW) = 100 lbs. (Difference)

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

Right Front = 610 lbs. Right Rear = 830 lbs.
Left Front = 620 lbs. Left Rear = 820 lbs.
TOTAL FRONT = 1230 lbs. TOTAL REAR = 1650 lbs.
% of Total Vehicle Weight = 42.7 % of Total Weight = 57.3 %
TOTAL DELIVERED WEIGHT = 2880 lbs.

Table 2
GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 2880 lbs.
Rated Cargo/Luggage Weight (RCLW) = 100 lbs.
Weight of 2 P.572 Dummies @ 164 ea. = 328 lbs.
TARGET TEST WEIGHT = 3308 lbs. (sum)

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 0 POUNDS OF CARGO WEIGHT:

Right Front = 640 lbs. Right Rear = 1000 lbs.
Left Front = 650 lbs. Left Rear = 1000 lbs.
TOTAL FRONT = 1290 lbs. TOTAL REAR = 2000 lbs.
% of Total Weight = 39.2 % % of Total Weight = 60.8 %
TOTAL TEST WEIGHT = 3290 lbs.

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

Vehicle Components Removed for Weight Reduction: Luggage room carpet, rear storage box lid, outside mirror

VEHICLE ATTITUDE (all dimensions in inches):

AS DELIVERED: RF 25.6" LF 25.3" RR 25.6" LR 25.8"
FULLY LOADED: RF 24.5" LF 24.5" RR 25.0" LR 25.0"
AS TESTED: RF 25.1" LF 25.1" RR 25.2" LR 25.3"

Vehicle's Wheel Base: 94.7 in.

Location of Vehicle's C.G.: 57.6 inches rearward of front wheel center

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 14.3 gallons
Usable Capacity Figure Furnished by COTR = 14.3 gallons
Test Volume Range (92 to 94% of Usable Capacity) = 13.2 to 13.4 gallons
ACTUAL TEST VOLUME = 13.3 gallons (with entire fuel system filled)

Table 3
POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
 Test Date: July 18, 1991 Time: 13:50 Temperature: 85°F
 Vehicle NHTSA No.: CM5108
 Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.1 mph; Trap No. 2 = 29.0 mph
 Distance from vehicle to barrier: (1) entering trap = 52 inches
 (2) exiting trap = 12 inches

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

Vehicle Length:

Pre-Test Right = 162.1 ; C/L = 163.7 ; Left = 162.0
 Post-Test Right = 144.5 ; C/L = 144.7 ; Left = 145.1
 Crush Right = 17.6 ; C/L = 19.0 ; Left = 16.9
 AVERAGE = 17.8 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:
 Right = 45.7 ; C/L = 45.2 ; Left = 47.2
 AVERAGE = 46.0 inches

DOOR OPENING:

	Left	Right
Front	<u>closed-operable</u>	<u>closed-operable</u>
Rear	<u>N/A</u>	<u>N/A</u>

SEAT MOVEMENT:

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

Table 3
POST IMPACT DATA (cont.)

GLAZING DAMAGE: Windshield sustained stress fractures but remained intact.

OTHER NOTABLE IMPACT FEATURES:

Section 3
OCCUPANT AND VEHICLE DATA

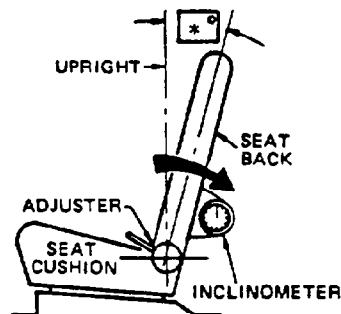
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year: 1991 Vehicle Model: Toyota MR2 Turbo Body Style: 2-Door Coupe

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



*Seat back was positioned according to Manufacturer's specifications

LEFT SIDE VIEW

Seat back angle for driver's seat: _____ *

Measurement instructions: Place seat in 4th detent from most upright position (most upright position = 1st detent).

Seat back angle for passenger's seat: _____ *

Measurement instructions: Same as driver.

2. Seat Fore and Aft Positioning

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

Positioning of the driver's seat: Place seat in 8th detent (mid-position) from a total of 15 detents.

Positioning of the passenger's seat (if applicable): Place seat in 7th detent (one detent rearward of mid-position) from a total of 12 detents.

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 14.3 gallons

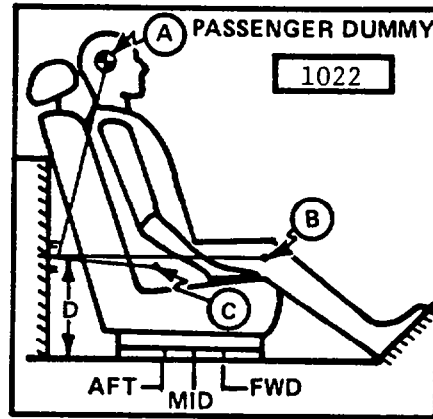
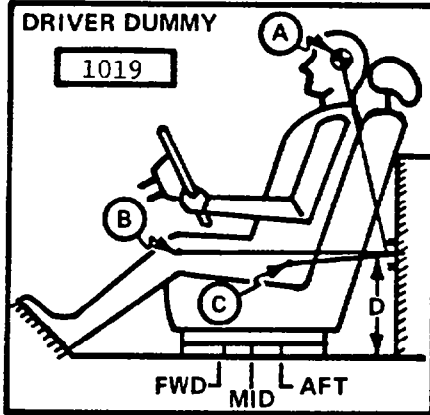
B. "Usable Capacity" of the optional equipment fuel tank is - gallons

Additional Instructions: None.

Figure 2
PART 572 DUMMY IN-VEHICLE POSITION

Test No.: CM5108 Vehicle: 1991 Toyota MR2 2-Door Coupe

<u>SEAT TYPE:</u>	<u>ADJUSTER TYPE:</u>	<u>SEAT BACK TYPE:</u>
<u>-</u> Bench	<u>X</u> Manual	<u>-</u> Fixed
<u>X</u> Bucket	<u>-</u> Power	<u>X</u> Adjustable Reclining
<u>-</u> Split Bench		

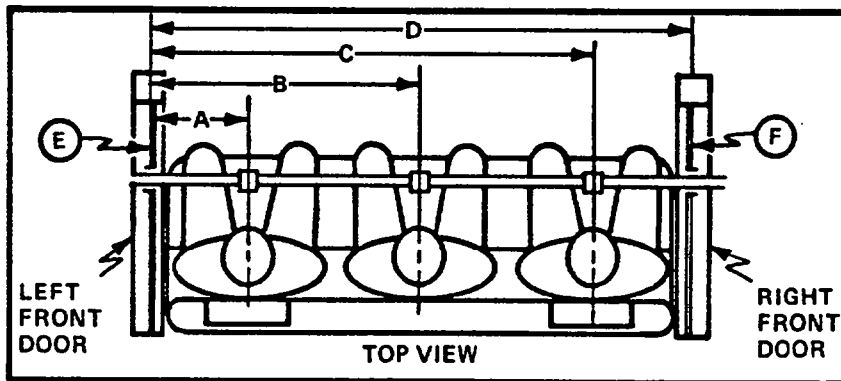


MEASUREMENT LOCATION

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

A = 20.3 in. 22 Degrees
 B = 29.8 in. 100 Degrees
 C = 16.0 in. 125 Degrees
 D = 12.6 in.

A = 20.1 in. 20 Degrees
 B = 29.6 in. 102 Degrees
 C = 15.6 in. 125 Degrees
 D = 12.6 in.



S/N 1019

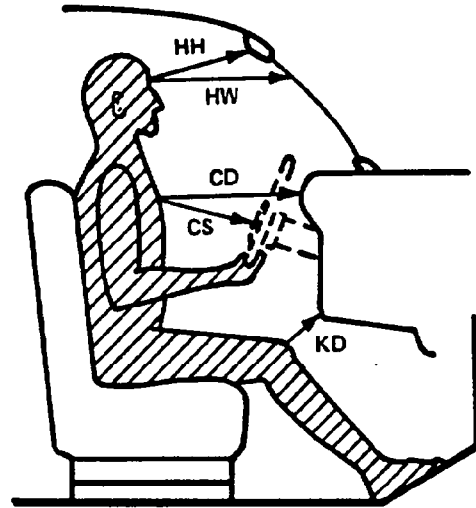
DUMMY ID

S/N 1022

A = Left Door to Driver Centerline	<u>11.2</u> in.
B = Left Door to Center Passenger Centerline	<u>-</u> in.
C = Left Door to Right Passenger Centerline	<u>40.3</u> in.
D = Left Door to Right Door	<u>50.7</u> in.
E, F = Window Glass Height (Right and Left Must Be Equal)	<u>9.2</u> in.

Figure 3
OCCUPANT CLEARANCE DIMENSIONS

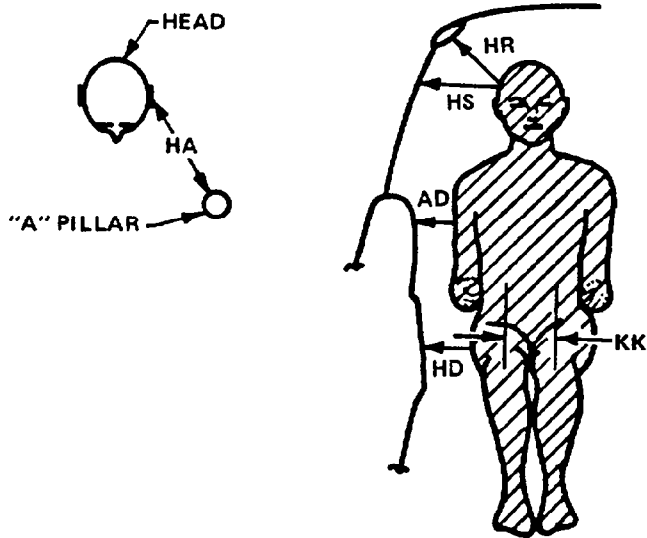
	DRIVER	PASSENGER
HH	14.7	15.5
HW	18.7	18.8
CD	21.2	21.8
CS	12.7	-
KDL	3.8	5.9
KDR	5.0	5.8
SA	*	*
TA	22°	24°



- HH = Head to Windshield Header
- HW = Head to Windshield
- CD = Chest to Dash
- CS = Chest to Steering Wheel
- KD(L/R) = Knee to Dash (Left/Right)
- SA = Seat Back Angle
- TA = Torso Angle

- HA = Head Target to "A" Pillar
- HR = Head to Side Roof
- HS = Head to Side Window
- AD = Arm to Door
- HD = Hip to Door
- KK = Knee to Knee

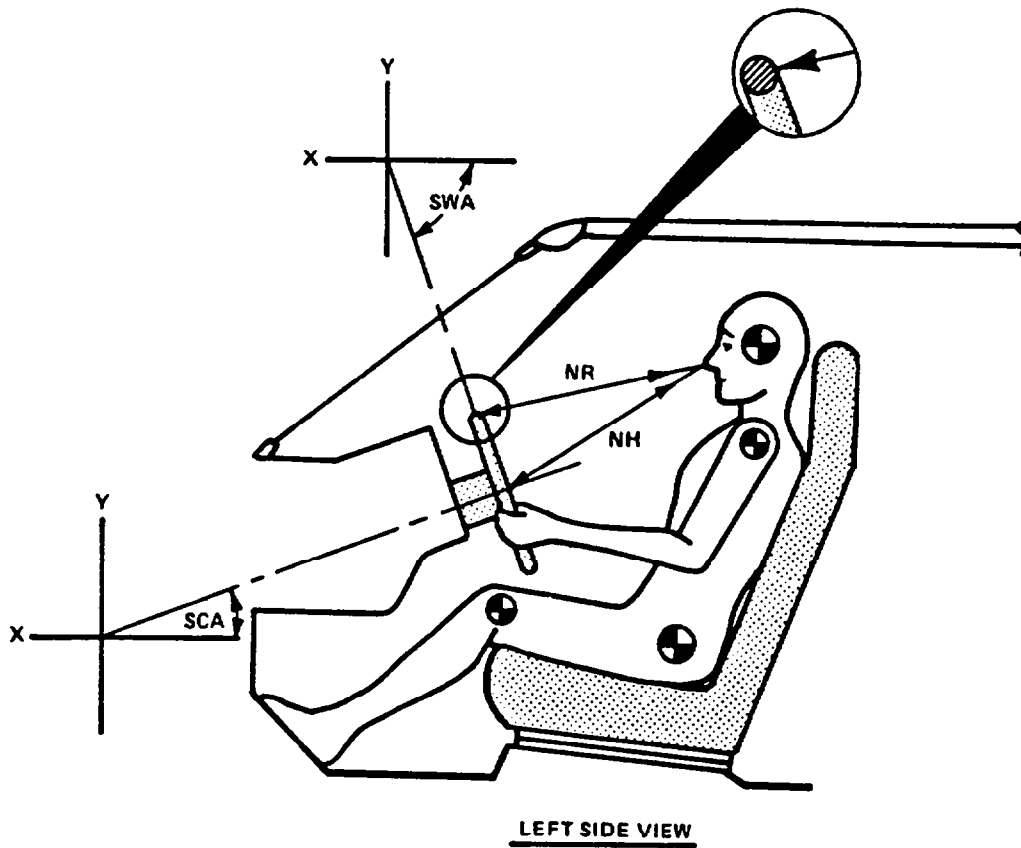
	DRIVER	PASSENGER
HR	3.8	4.0
HS	8.0	7.8
AD	3.2	5.8
HD	** 4.4	** 6.6
KK	9.6	7.2
HA	15.9	16.1



* - Seat set as specified by vehicle manufacturer.
** - To door compartment surface.

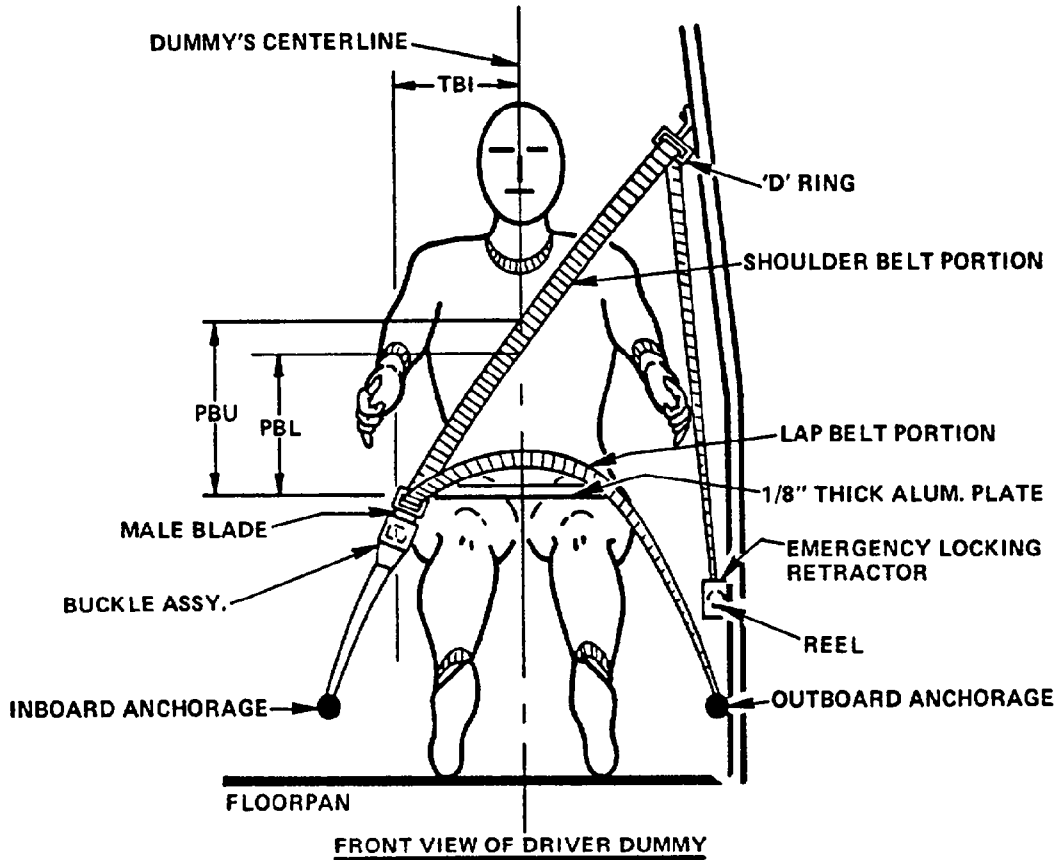
Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



		MEASUREMENTS	
<u>NR</u>	-- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	16.6	Inches
<u>NH</u>	-- Distance from tip of dummy's nose to center of steering wheel hub	17.4	Inches
<u>SCA</u>	-- Angle of steering column relative to the horizontal X axis	21.0	Degrees
<u>SWA</u>	-- Angle of steering wheel relative to the horizontal X axis	-69.0	Degrees

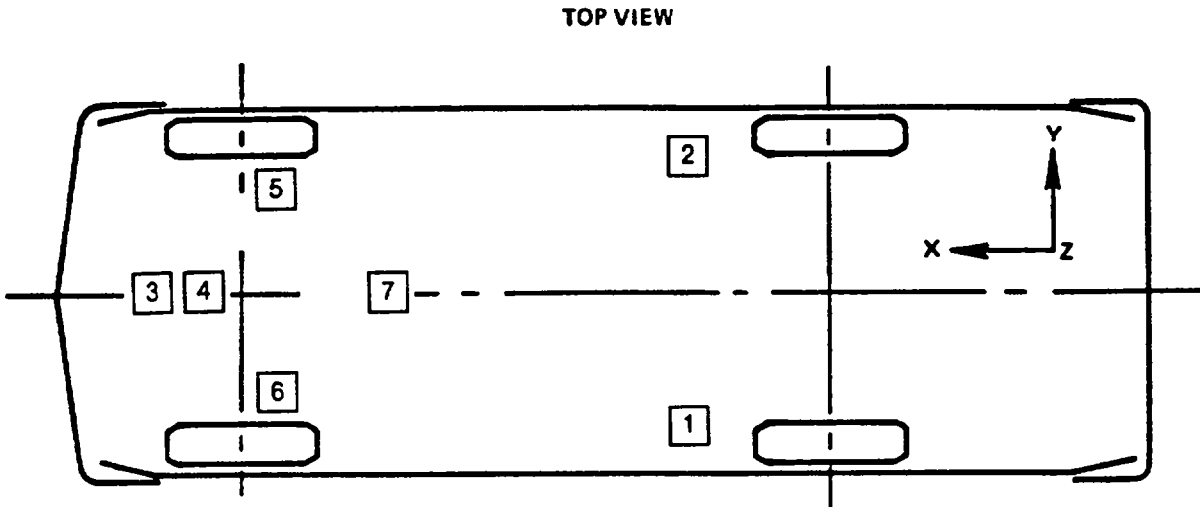
Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	*	13.0
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	*	11.0
<u>TBI</u> -- Distance from torso centerline to buckle	*	8.5

*Driver side equipped with airbag restraint system. Manual 3-point belt not used for this test.

Figure 6
VEHICLE ACCELEROMETER LOCATIONS



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

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

Table 4
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	REAR SEAT X-MEMBER AT LEFT SIDE LONGITUDINAL ACCELERATION	PRE: 63.1	19.5	7.7	Accelerometer damaged at 103 msec.			
		POST: 63.1	19.5	7.3				
		-	-	-	-	-	-	-
2	REAR SEAT X-MEMBER AT RIGHT SIDE LONGITUDINAL ACCELERATION	PRE: 62.9	-19.2	7.9				
		POST: 62.9	-19.2	7.5				
		7	253	-31	42			
3	TOP OF ENGINE BLOCK LONGITUDINAL ACCELERATION	PRE: 30.3	-5.3	33.2				
		POST: 30.3	-5.3	33.0				
		6	152	-26	51			
4	BOTTOM OF ENGINE LONGITUDINAL ACCELERATION	PRE: 42.5	-15.5	11.7				
		POST: 42.5	-15.5	11.4				
		10	149	-34	32			
5	BRAKE CALIPER AT RIGHT SIDE LONGITUDINAL ACCELERATION	PRE: 126.8	-23.5	18.5				
		POST: 124.9	-23.2	18.4				
		5	76	-40	31			
6	BRAKE CALIPER AT LEFT SIDE LONGITUDINAL ACCELERATION	PRE: 126.4	23.5	18.6				
		POST: 124.8	23.1	18.5				
		6	73	-41	56			
7	DASH PANEL LONGITUDINAL ACCELERATION	PRE: 101.1	0.0	31.9				
		POST: 101.1	0.0	31.7				
		17	34	-34	49			

** POSITIVE DIRECTION: FORWARD, NEGATIVE DIRECTION: REARWARD
 *X + Forward from rear bumper LONGITUDINAL;
 Y + Left from vehicle centerline LATERAL;
 Z + Up from ground VERTICAL; POSITIVE DIRECTION: LEFTWARD, NEGATIVE DIRECTION: RIGHTWARD
 POSITIVE DIRECTION: UPWARD, NEGATIVE DIRECTION: DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

Figure 7
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5.

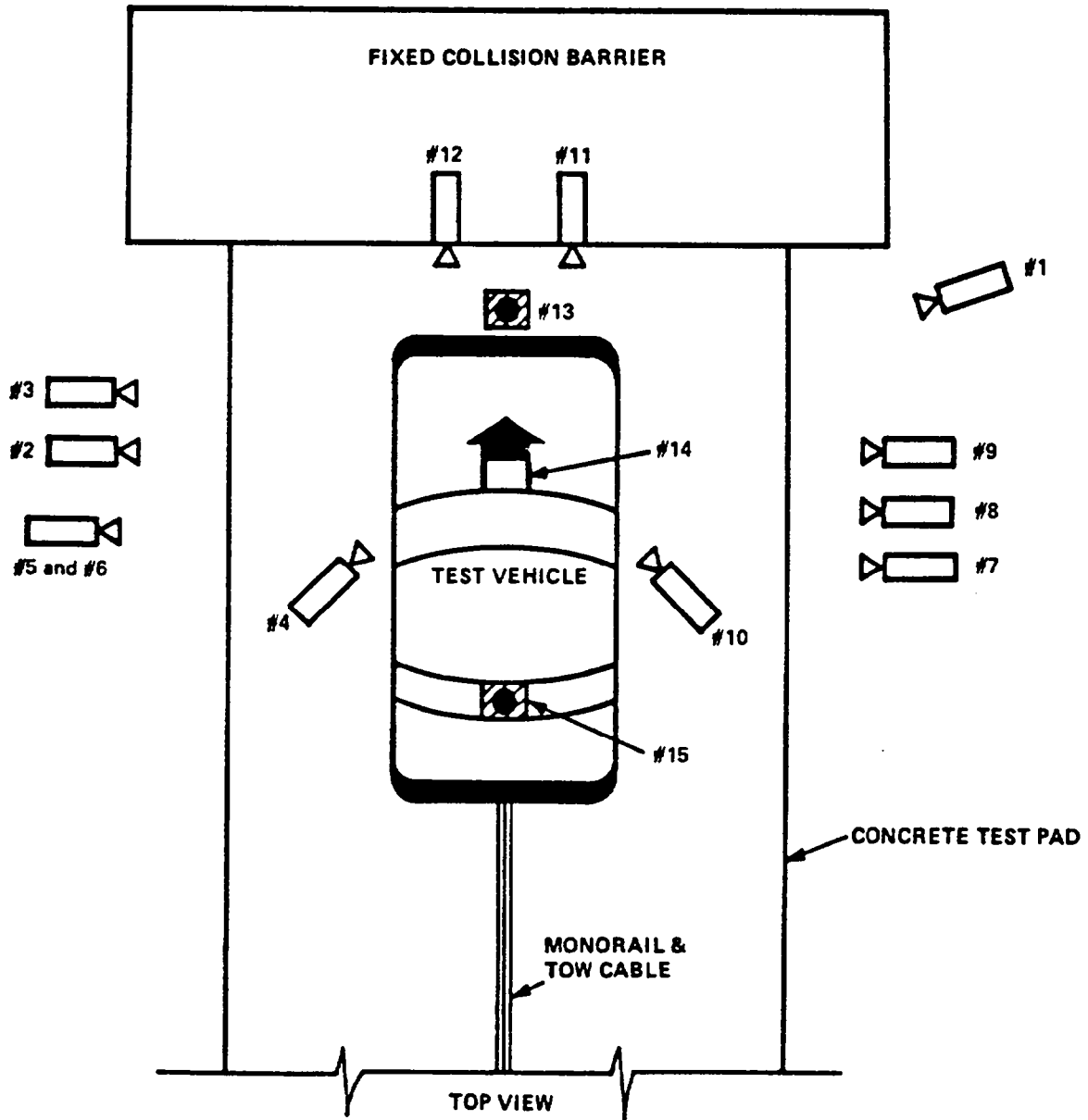


Table 5

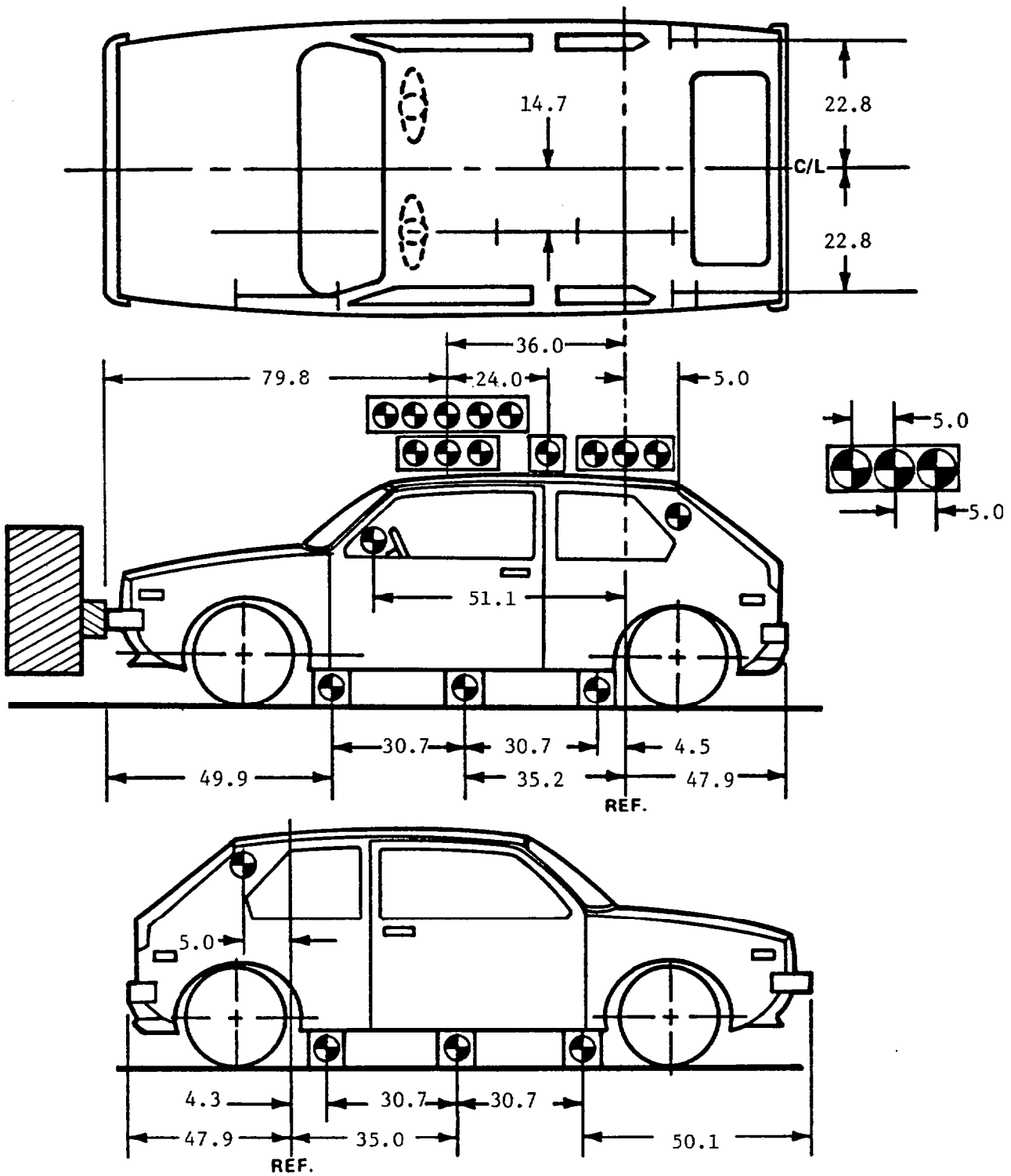
HIGH-SPEED CAMERA LOCATIONS

Test No. CM5108 Vehicle: 1991 Toyota MR2 2-Door Coupe

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	24	
2	Overall Left Side	212	61	41	-3	194.9	540	
3	Left Side View	287	41	41	-3	269.9	555	
4	Driver and Interior View	98	103	68	-20	-	645	
5	Steering Column (Bottom)	256	74	46	-5	238.9	540	
6	Steering Column (Top)	255	74	70	-11	237.9	520	
7	Overall Right Side	207	68	42	-4	189.9	595	
8	Right Side View	238	46	41	-1	220.9	625	
9	Right Passenger View	287	81	54	-4	269.9	550	
10	Passenger and Interior View	98	102	68	-22	-	490	
11	Passenger Front View	21	20	76	-53	-	525	
12	Driver Front View	21	20	76	-50	-	510	
13	Windshield View	0	0	130	-59	-	530	
14	Pit View of Fuel Tank and Engine	0	93	-96	90	-	820	

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

Figure 8
VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

Figure 9
TEST VEHICLE MEASUREMENTS

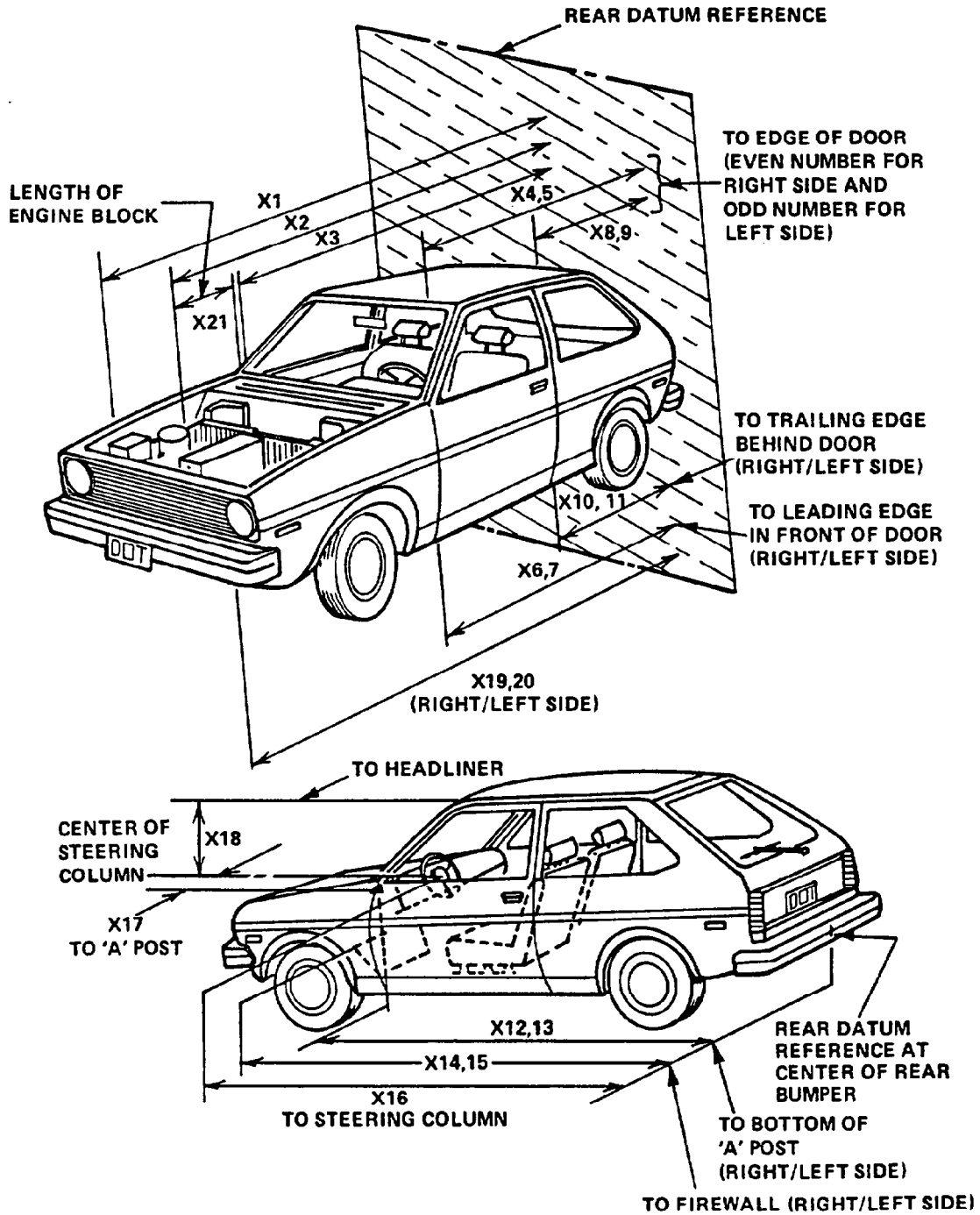


Table 6

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	163.7	144.7	19.0
X2	Rear Surface of Vehicle to Front of Engine	43.8	43.8	0.1
X3	Rear Surface of Vehicle to Firewall	123.8	118.7	5.1
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	109.7	108.8	0.9
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	109.3	109.2	0.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	110.6	109.4	1.2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	110.2	109.2	1.0
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	66.2	65.9	0.3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	65.6	65.7	-0.1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	69.1	68.1	1.0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	68.8	68.1	0.7
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	110.6	109.3	1.3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	110.3	109.3	1.0
X14	Rear Surface of Vehicle to Firewall, Right Side	123.0	118.5	4.5
X15	Rear Surface of Vehicle to Firewall, Left Side	122.7	119.0	3.7
X16	Rear Surface of Vehicle to Steering Column	93.5	93.2	0.3
X17	Center of Steering Column to "A" Post	16.8	16.5	0.3
X18	Center of Steering Column to Headliner	15.4	14.2	1.2
X19	Rear Surface of Vehicle to Right Side of Front Bumper	162.1	144.5	17.6
X20	Rear Surface of Vehicle to Left Side of Front Bumper	162.0	145.1	16.9
X21	Length of Engine Block	9.4	9.4	0.0

Section 4

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

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

Table 7
DUMMY INJURY CRITERIA VALUES

NHTSA No.: CM5108 Vehicle: 1991 Toyota MR2 2-Door Coupe

	MAXIMUM ACCELERATION (g's)							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
Dummy (1)	-122	24	108	164	-67	8	20	62.9
Dummy (2)	-38	36	45	58	-30	38	18	29.3

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	1501	1475
Dummy (2)	398	280

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
Dummy (1)	554	.064560	.067680	125.84
Dummy (2)	285	.115680	.134280	47.21

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Table 8

FMVSS NO. 208 - SEAT BELT WARNING SYSTEM CHECK

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

Log time duration of audible warning signal = 6.0 sec.

Log time duration of reminder light operation = 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 = 0 sec.
(audible warning should not operate)

Log time duration of reminder light operation = 6.0 sec.

Note wording of visual warning:

Fasten Seat Belt -

Fasten Belt -

Symbol 101-80 X

Table 9

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

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

Describe location:

Driver side sunvisor

The manufacturers recommended schedule states:

"After 10 years from date of manufacture noted on the certification regulation label and every two years thereafter, this system requires periodic maintenance by a "Toyota" dealer or qualified service shop."

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

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

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

Was an owner's manual provided? YES NO

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

Table 10
FMVSS NO. 208 - READINESS INDICATOR

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

Is the system totally mechanical? YES - NO X

Describe the location of the readiness indicator:

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 11 (cont.)

D1

CONVENIENCE HOOKS

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

YES - NO X

Check the option which applies to this test vehicle:

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

YES N/A NO N/A

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

YES N/A NO N/A

D2

WEBBING TENSION - RELIEVING DEVICE

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

YES - NO X

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

YES N/A NO N/A

(If NO, provide explanation.)

Check the option which applies to this test vehicle:

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

YES N/A NO N/A

(If NO, provide explanation.)

Table 11 (cont.)

2. This vehicle is equipped with manual belts, required to meet FMVSS 208 S4.6, and the tension relieving device is 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 N/A NO N/A

(If NO, provide explanation.)

D3

BELT CONTACT FORCE

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in this vehicle incorporate a webbing tension relieving device. Does the vehicle incorporate a tension relieving device?
- YES - NO X
2. Seats are adjusted according to instructions in Appendix B.
- YES X NO -
3. The test dummies are positioned according to dummy position placement instructions in Appendix B and Appendix C.
- YES X NO -
4. Close the vehicle's adjacent door, pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest, then fasten the latch. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. Measure the contact force exerted by the belt webbing on the dummy's chest. The contact force is 0.5 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Table 11 (cont.)

D4

LATCHPLATE ACCESSIBILITY

1. Position the test dummy in the driver's seat or passenger's seat in its forward most adjustment position.
YES X NO -

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

3. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. With the latchplate in the normal stowed position, check to assure that the latchplates are within the reach envelope.
YES X NO -

4. Using the clearance test block, determine if there is sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latchplate or buckle.
YES X NO -

D5

RETRACTION

1. Seats and seat backs are adjusted according to instructions in Appendix B "General Test Conditions" in TP-208-8.
YES X NO -

2. Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B and restrain the dummies, using the belt systems for the positions being tested.
YES X NO -

3. Outboard armrests which are capable of being stowed on vehicle seats shall be placed in their stowed positions.
YES N/A NO N/A

4. Check the option which applies to this test vehicle:
 - a. The torso and lap belt webbing of the seat belt system automatically retract to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.
YES X NO -

Table 11 (cont.)

b. The torso and lap belt webbing of the seat belt system automatically retract when the seat belt latch plate is released.

YES X NO -

5. With the webbing and hardware in the stowed position, close the door to assure that the webbing and hardware are prevented from being pinched.

YES X NO -

6. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, check to assure that the belt system fully retracts when the tension-relief device is manually deactivated.

YES N/A NO N/A

D6

ACCESSIBILITY

The requirements for accessibility do not apply to:

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

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

1. Each manual seat belt assembly whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back has one of the following three parts (the seat belt latchplate, the buckle, or the seat belt webbing) on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant).

YES X NO -

2. The remaining two seat belt parts are accessible under normal conditions.

YES X NO -

Table 11 (cont.)

3. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:

a. The belt is completely retracted or, if the belt is nonretractable, the belt is unattached.

YES - NO X

b. The seat is moved to any position to which it is designed to be adjusted.

YES - NO X

c. The seat back, if foldable, is folded forward as far as possible and then moved backward into positions.

YES - NO X

4. Is the inboard receptacle end of the seat belt assembly which is installed in the outboard designated seating position accessible with the center arm rest in any position to which it can be adjusted without moving the armrest?

YES N/A NO N/A

D7

LATCH MECHANISM

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

1. Whose components are accessible to a seated occupant in both the stowed and operational positions.

YES X NO -

2. That releases both the upper torso restraint and the lap belt simultaneously, if the assembly has a lap belt and an upper torso restraint that require unlatching for release of the occupant.

YES X NO -

3. That releases at a single point by a push button action.

YES X NO -

Figure 10
 FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

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

Windshield is bonded in place with a 0.7" hard rubber trim along the top and both sides of windshield. A 0.2" rubber trim along with a plastic cowl covers the entire bottom of windshield.

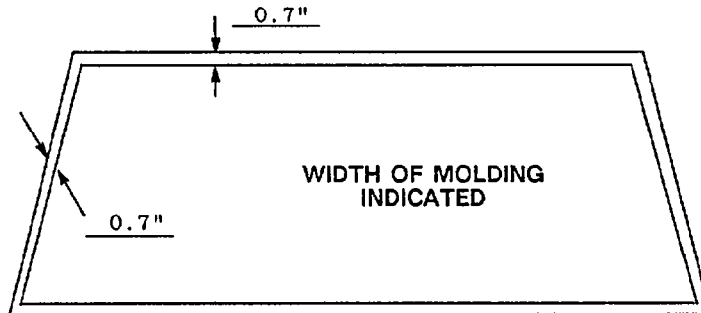
FMVSS 212 REQUIREMENTS:

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

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	77.2	77.2	100%
LEFT SIDE	77.2	77.2	100%
TOTAL	154.4	154.4	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

None.

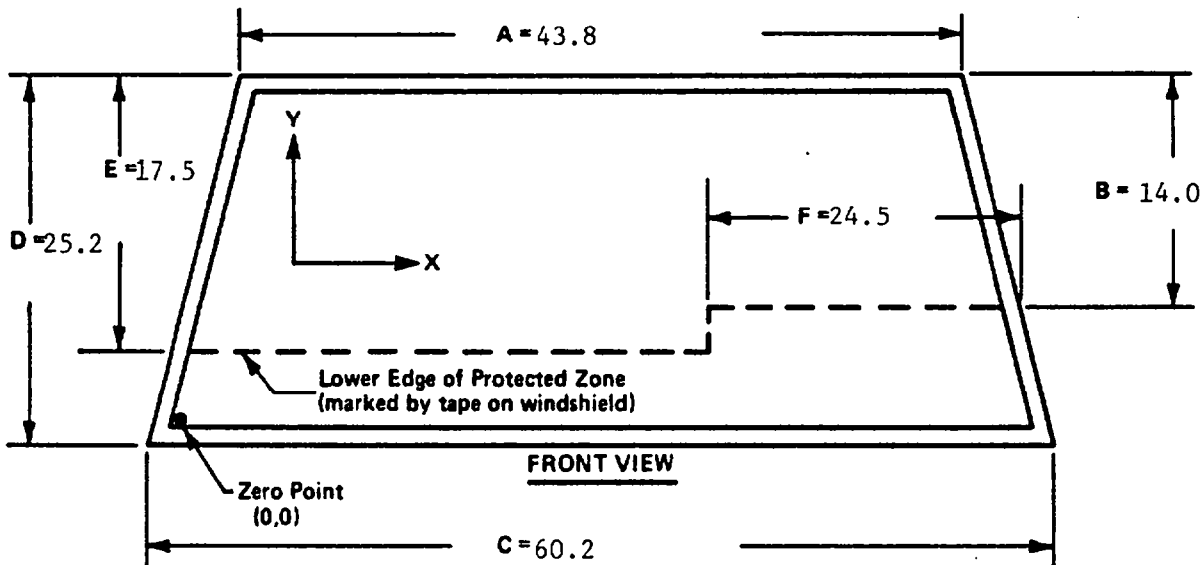
Figure 11

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA: (Dimensions in inches.)



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

(Show location of penetration on above sketch)

None.

	COORDINATES	
	X	Y
1.		
2.		
3.		
4.		

Table 12
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.:

C	M	5	1	0	8
---	---	---	---	---	---

 TEST DATE: July 18, 1991

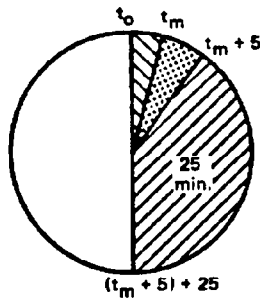
Vehicle Mfgr./Make/Model: 1991 Toyota MR2 2-Door Turbo Coupe

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: 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 5 minute period after vehicle motion ceases
3. For next 25 minutes

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

SOLVENT SPILLAGE DETAILS:

None.

Table 13
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

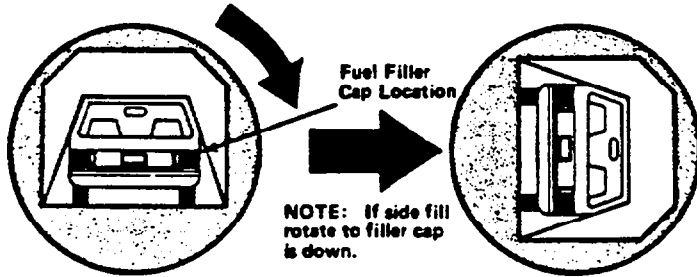
TEST PHASE:

0⁰

90⁰

Vehicle NHTSA ID No.:

 CM5108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time + _____ minutes _____ seconds

TOTAL _____ minutes _____ seconds

Next whole minute interval _____ * minutes

* - Vehicle was not subjected to the FMVSS 301 static rollover.

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

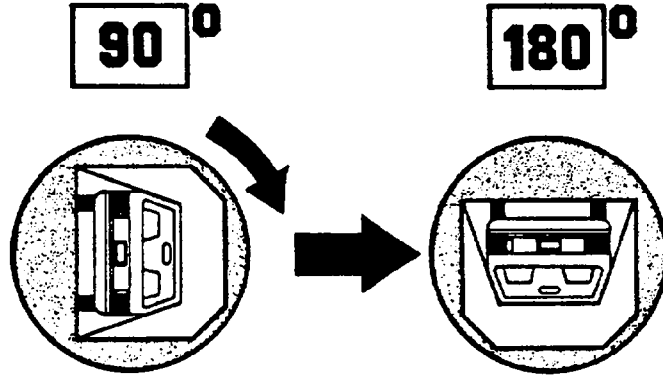
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Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

Table 13
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:



Vehicle NHTSA ID No.:

CM5108

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

* - Vehicle was not subjected to the FMVSS 301 static rollover.

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

--	--	--	--

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

IV. SOLVENT SPILLAGE LOCATION(S):

Table 13
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

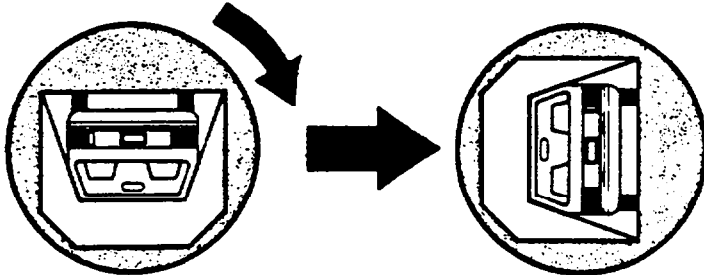
TEST PHASE:

180°

270°

Vehicle NHTSA ID No.:

CM5108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time + _____ minutes _____ seconds

TOTAL _____ minutes _____ seconds

Next whole minute interval _____ * minutes

* - Vehicle was not subjected to the FMVSS 301 static rollover.

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

--	--	--	--

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

IV. SOLVENT SPILLAGE LOCATION(S):

Table 13

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

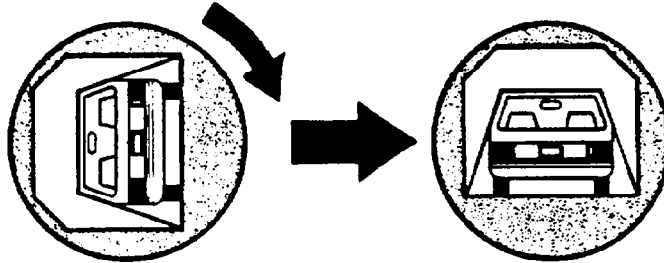
TEST PHASE:

270°

360°

Vehicle NHTSA ID No.:

CM5108



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time + _____ minutes _____ seconds

TOTAL _____ minutes _____ seconds

Next whole minute interval _____ * minutes

* - Vehicle was not subjected to the FMVSS 301 static rollover.

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

--	--	--	--

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

IV. SOLVENT SPILLAGE LOCATION(S):

Table 14

TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA Contract Lab: Calspan Advanced Technology Center

Lab Project Manager & Telephone No.: Walter E. Levan (716) 632-7500

Date of Test: July 18, 1991 Vehicle NHTSA No.: CM5108

Vehicle Manufacturer: Toyota Motor Corporation

Model Year: 1991 VIN: JT2SW22N3M0033732

Body Style: MR2 2-Door Turbo Coupe Build Date: November, 1990

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

Impact Velocity: 29.1 mph Time of Test: 13:50

Type of Automatic Restraint System: Driver: Air Bag;

Passenger: 3-point continuous belt restraint

Failure Details:

Driver dummy appears to exceed the maximum allowable chest g's as described

by FMVSS 208.

Appendix A

PHOTOGRAPHS

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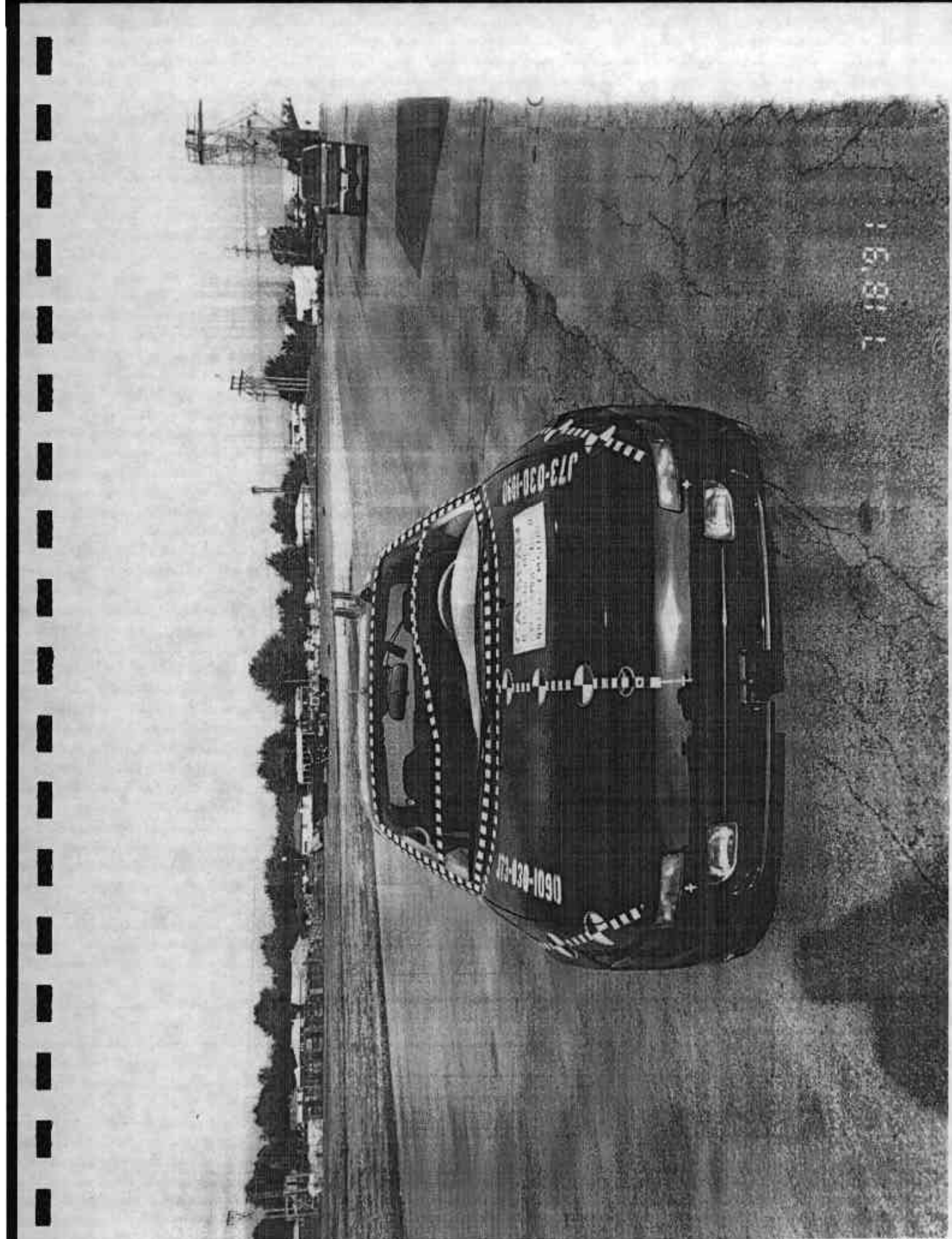


Figure A-1 PRE-TEST FRONT VIEW

A-3

7920-3

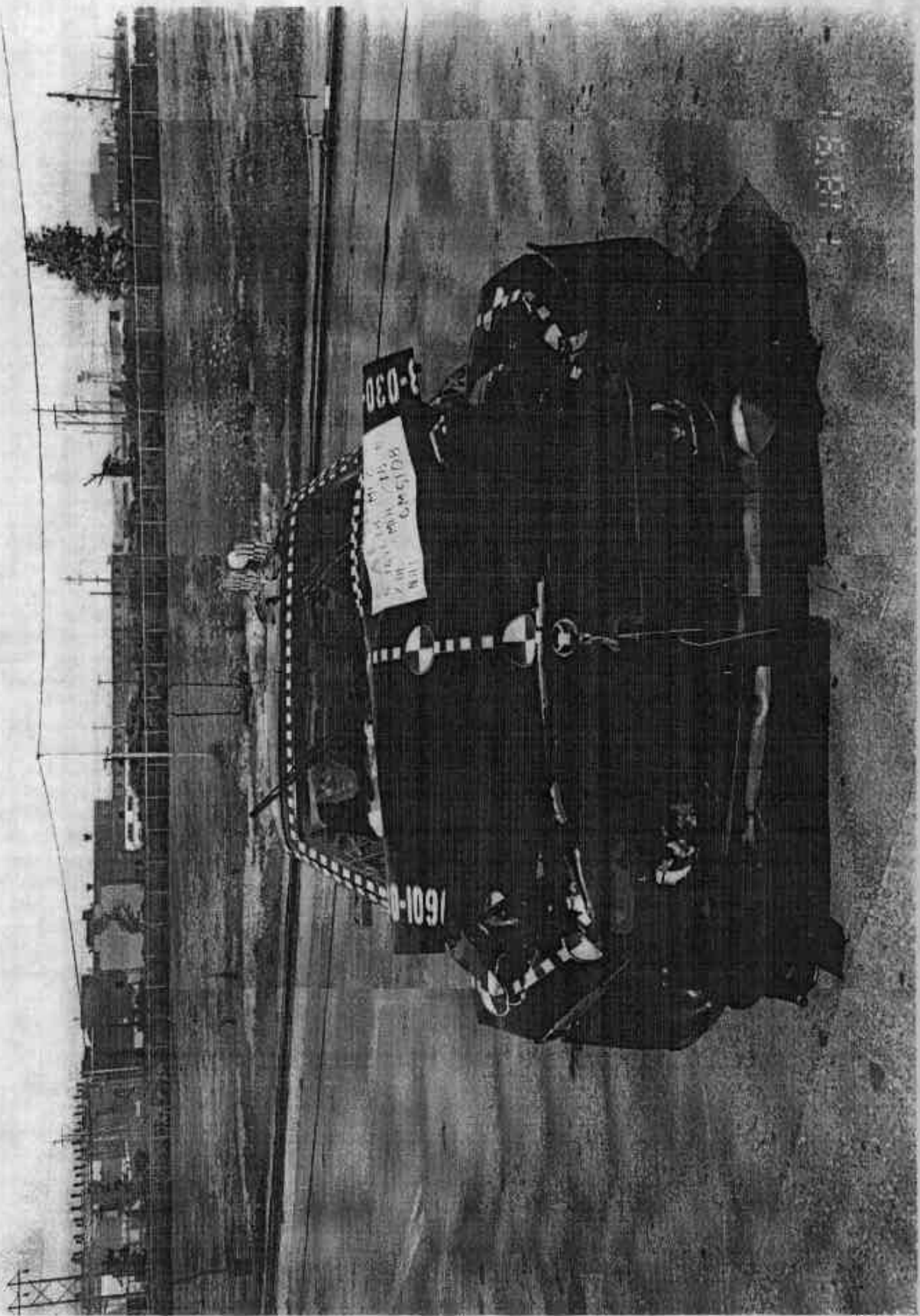
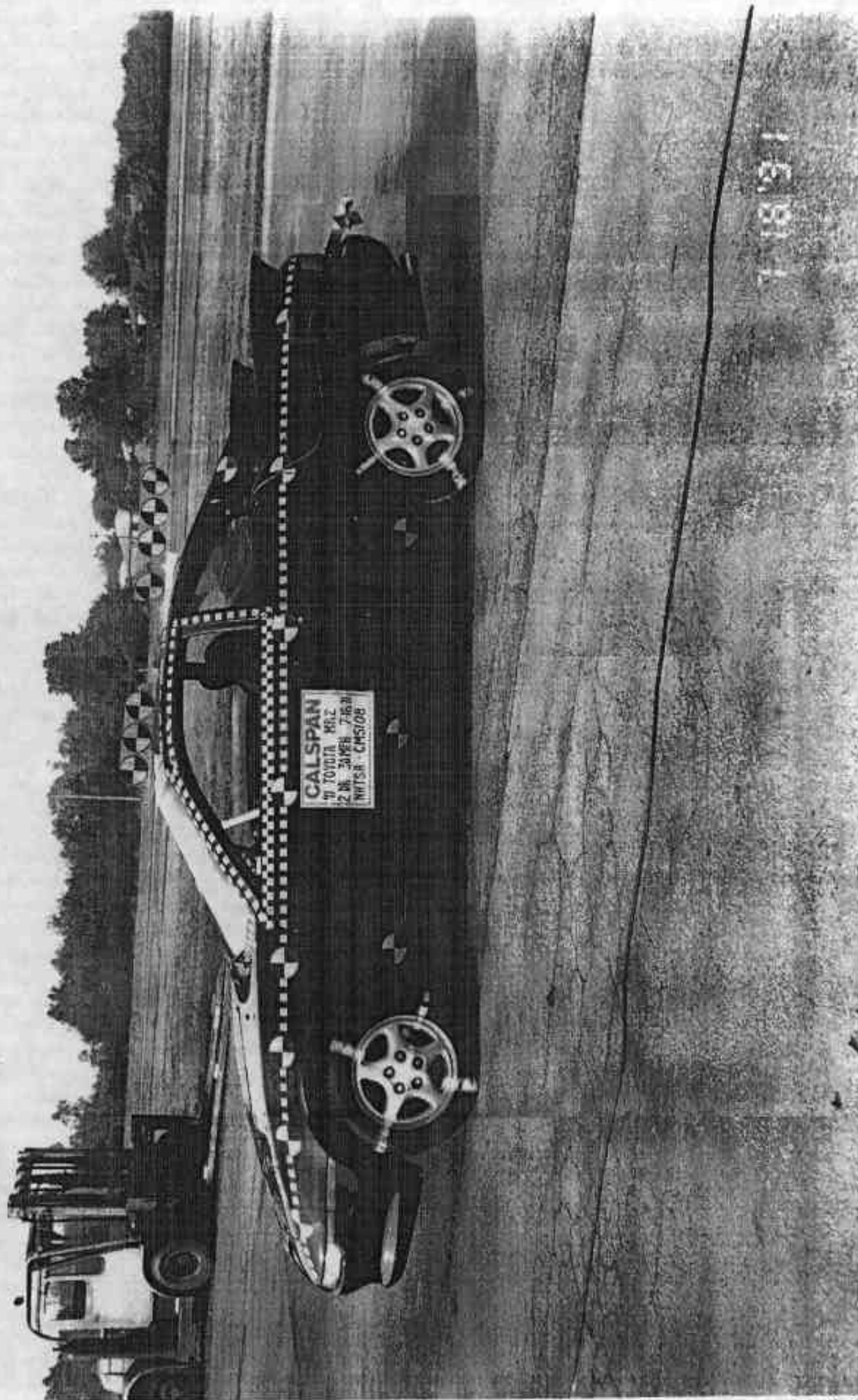


Figure A-2 POST-TEST FRONT VIEW

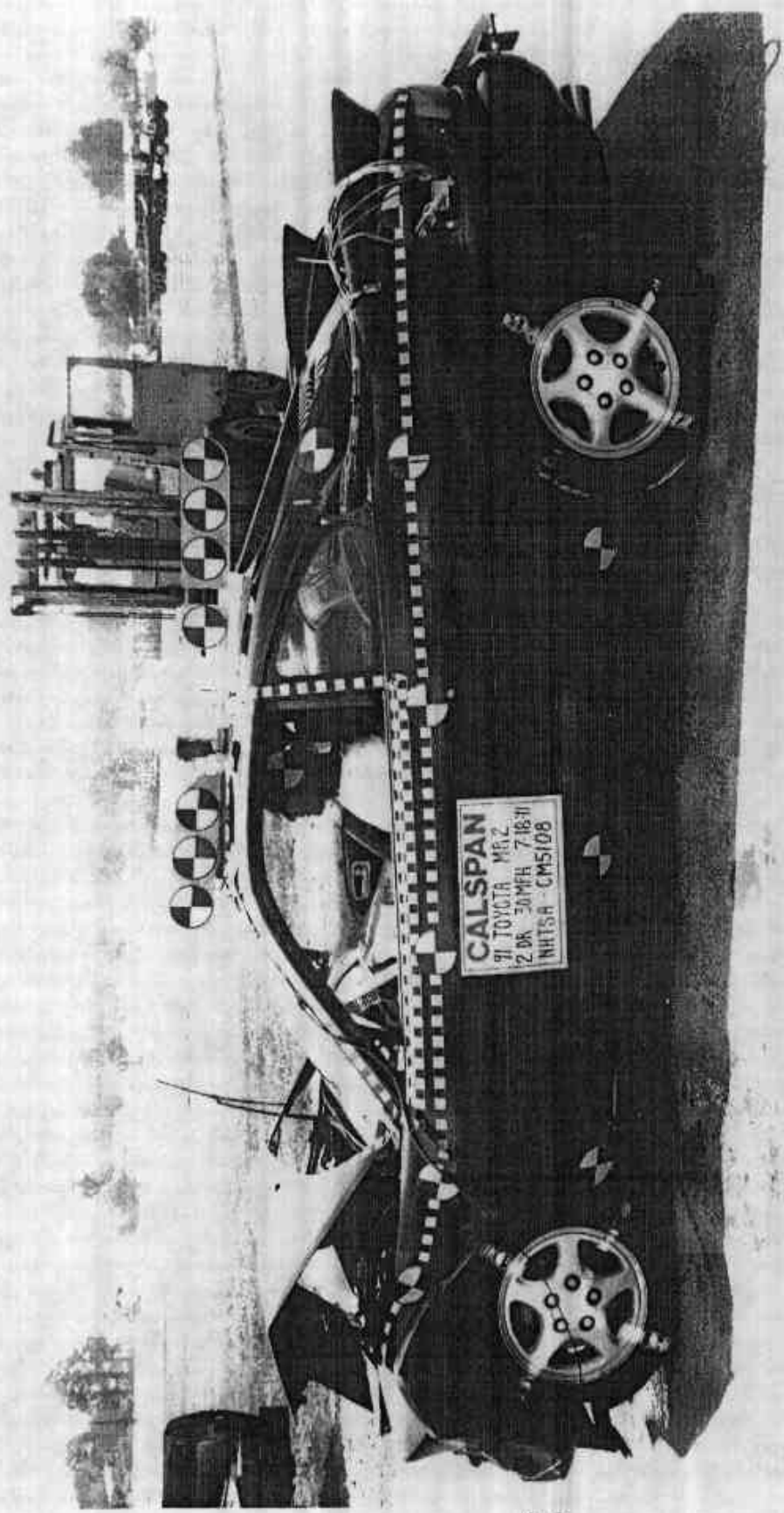


A-5

7920-3

Figure A-3 PRE-TEST LEFT SIDE VIEW

11831



A-6

7920-3

Figure A-4 POST-TEST LEFT SIDE VIEW

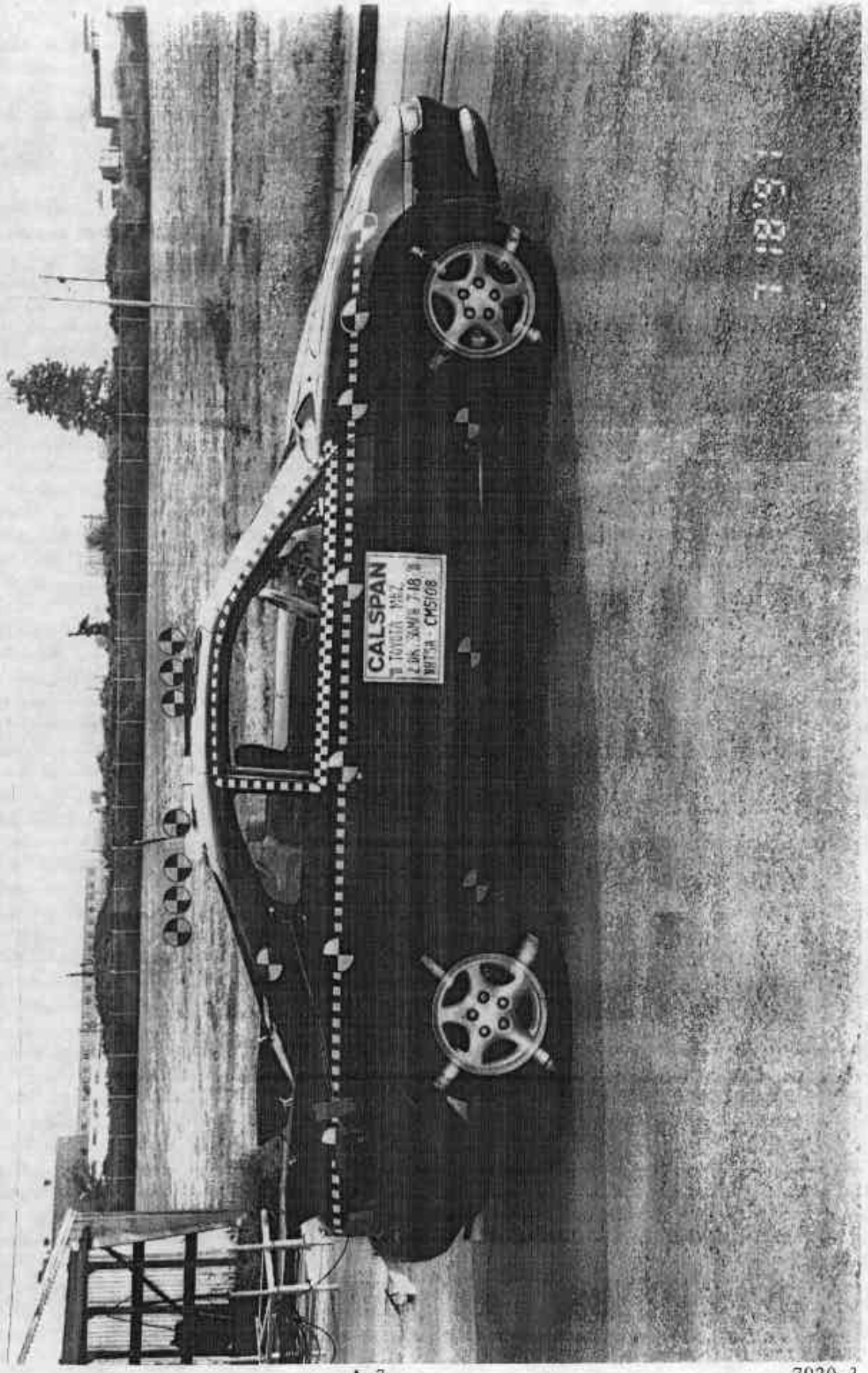


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-7

7920-3

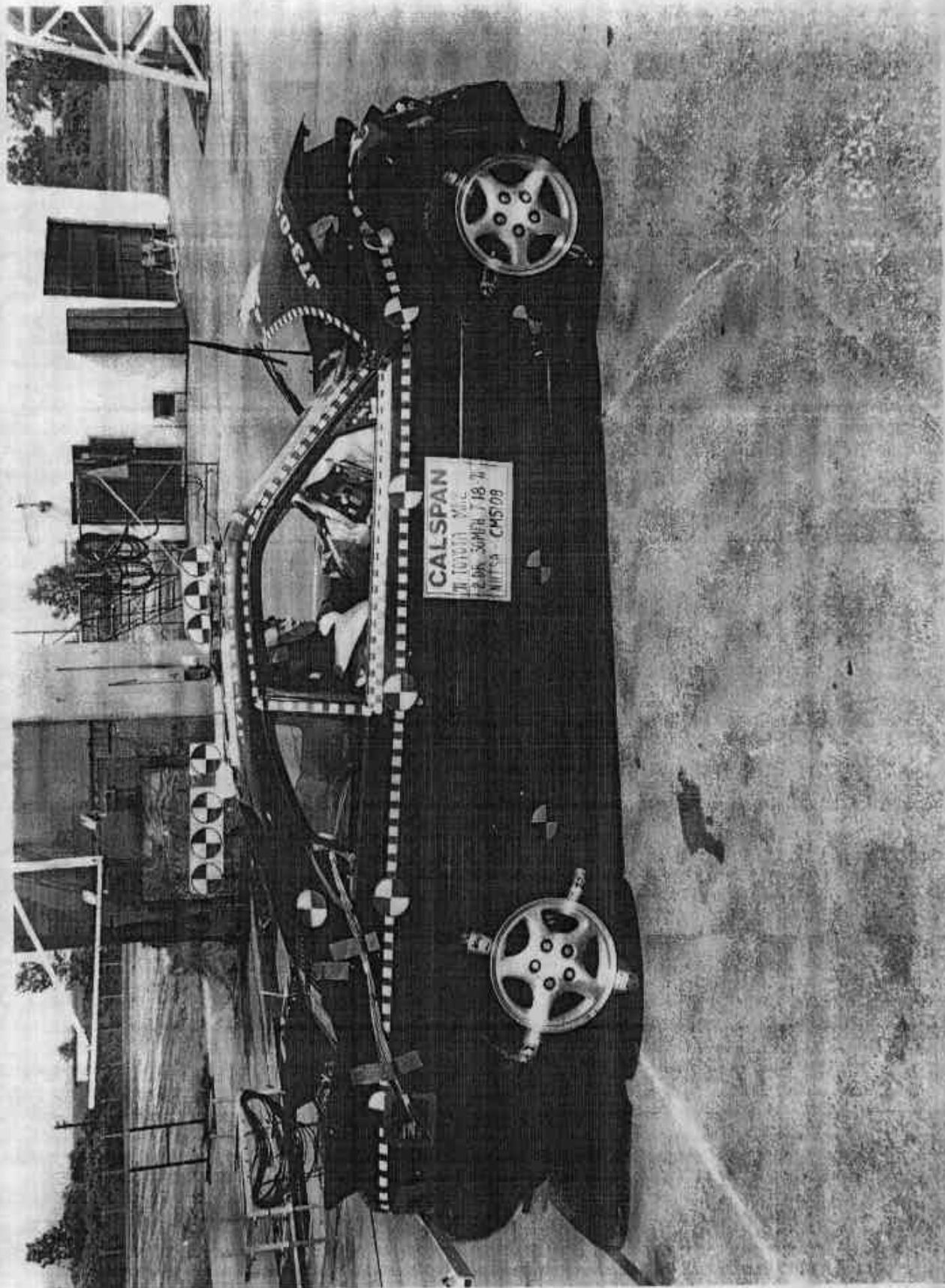


Figure A-6 POST-TEST RIGHT SIDE VIEW

A-8

7920-3



71831

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

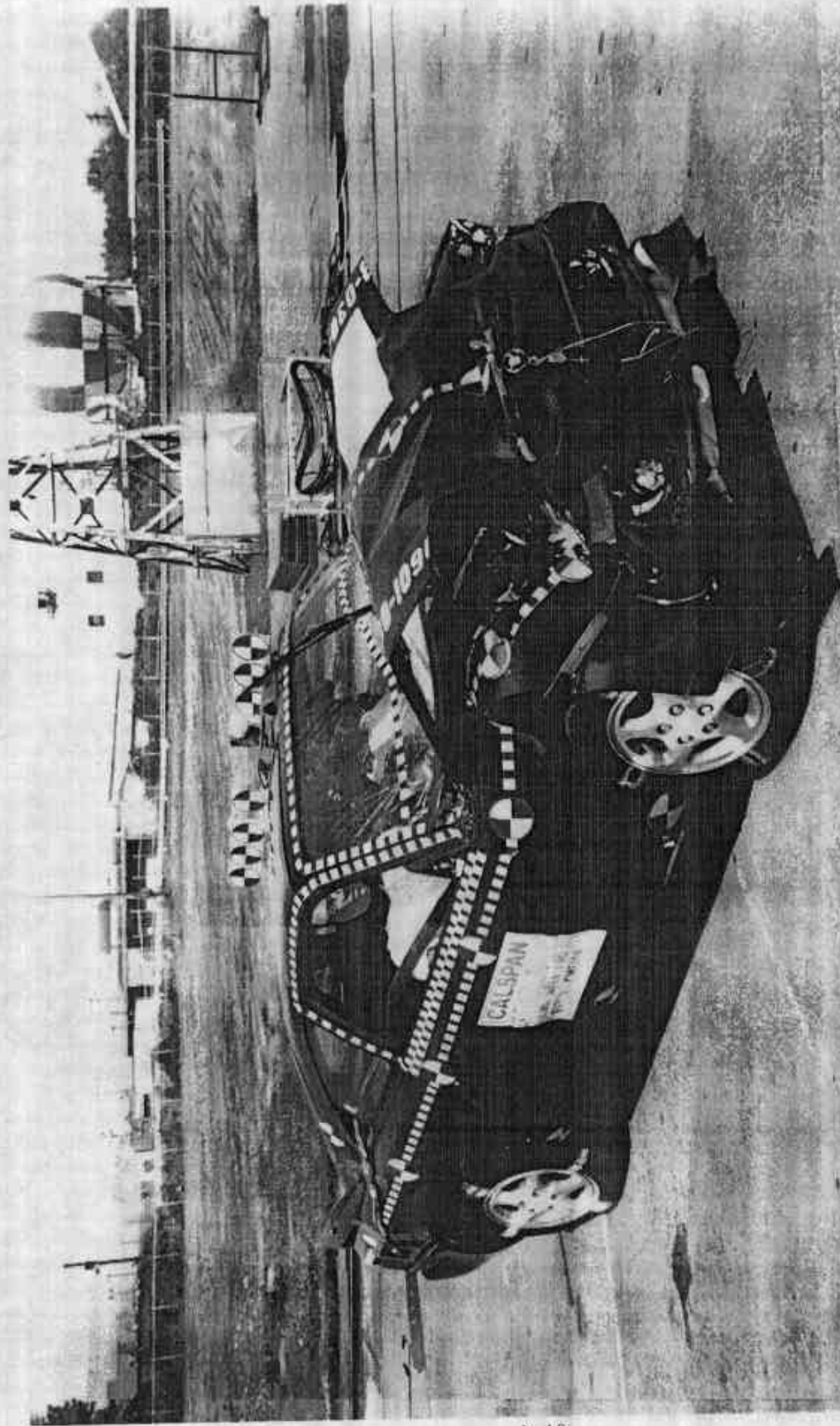


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

7920-3



71891

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

A-11

7920-3

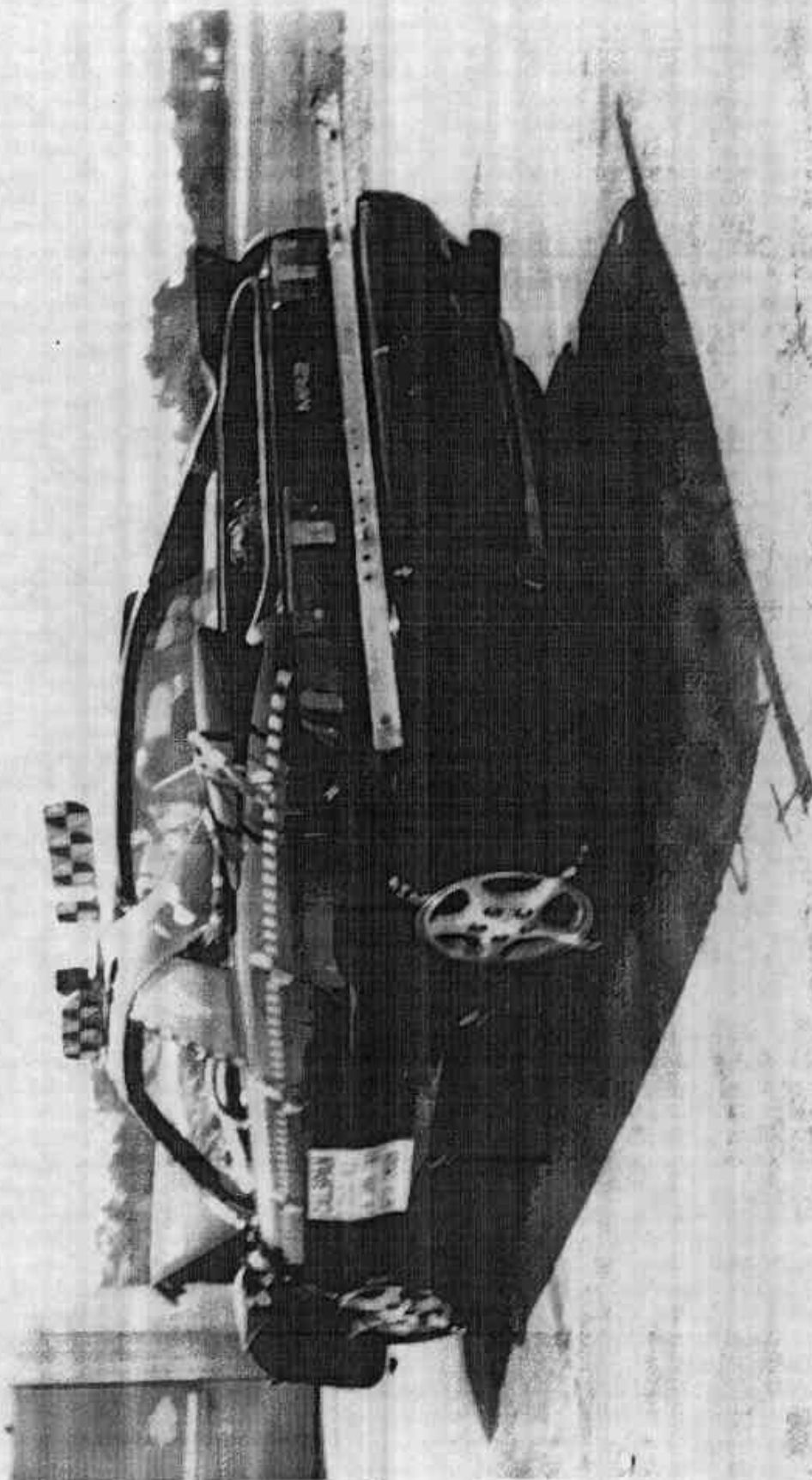
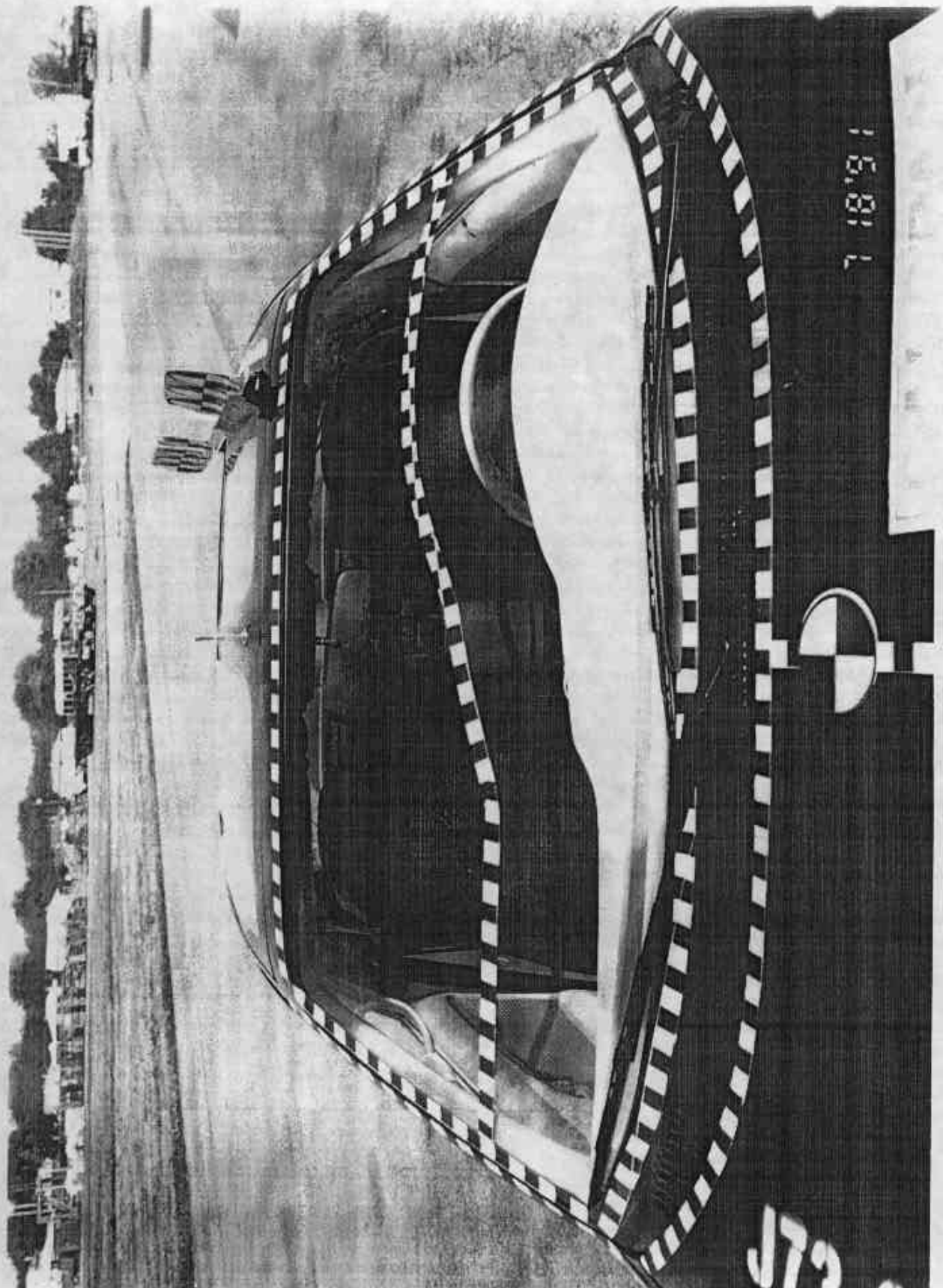


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-12

7920-3



15.811

572

Figure A-11 PRE-TEST WINDSHIELD VIEW

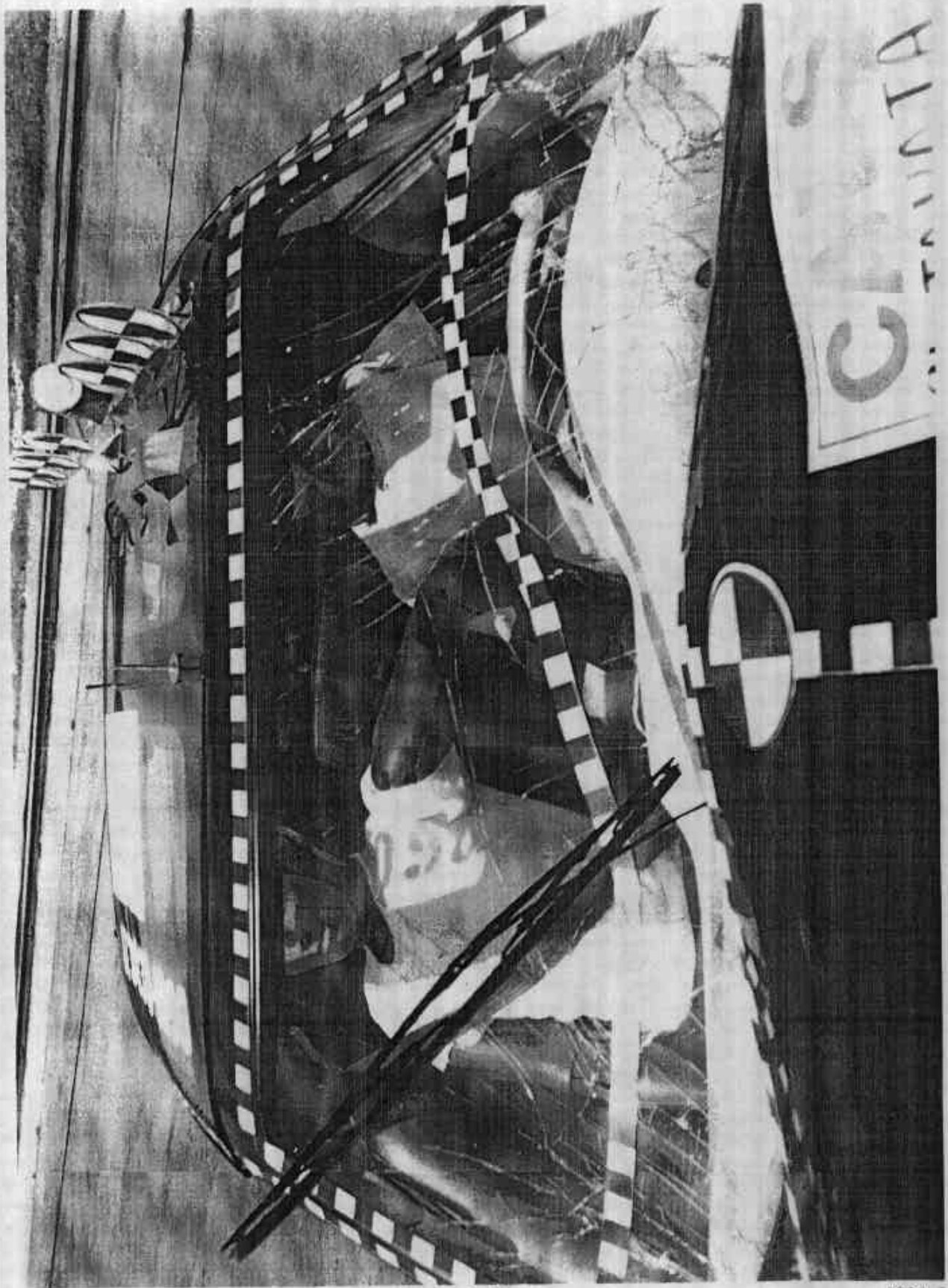


Figure A-12 POST-TEST WINDSHIELD VIEW

A-14

7920-3

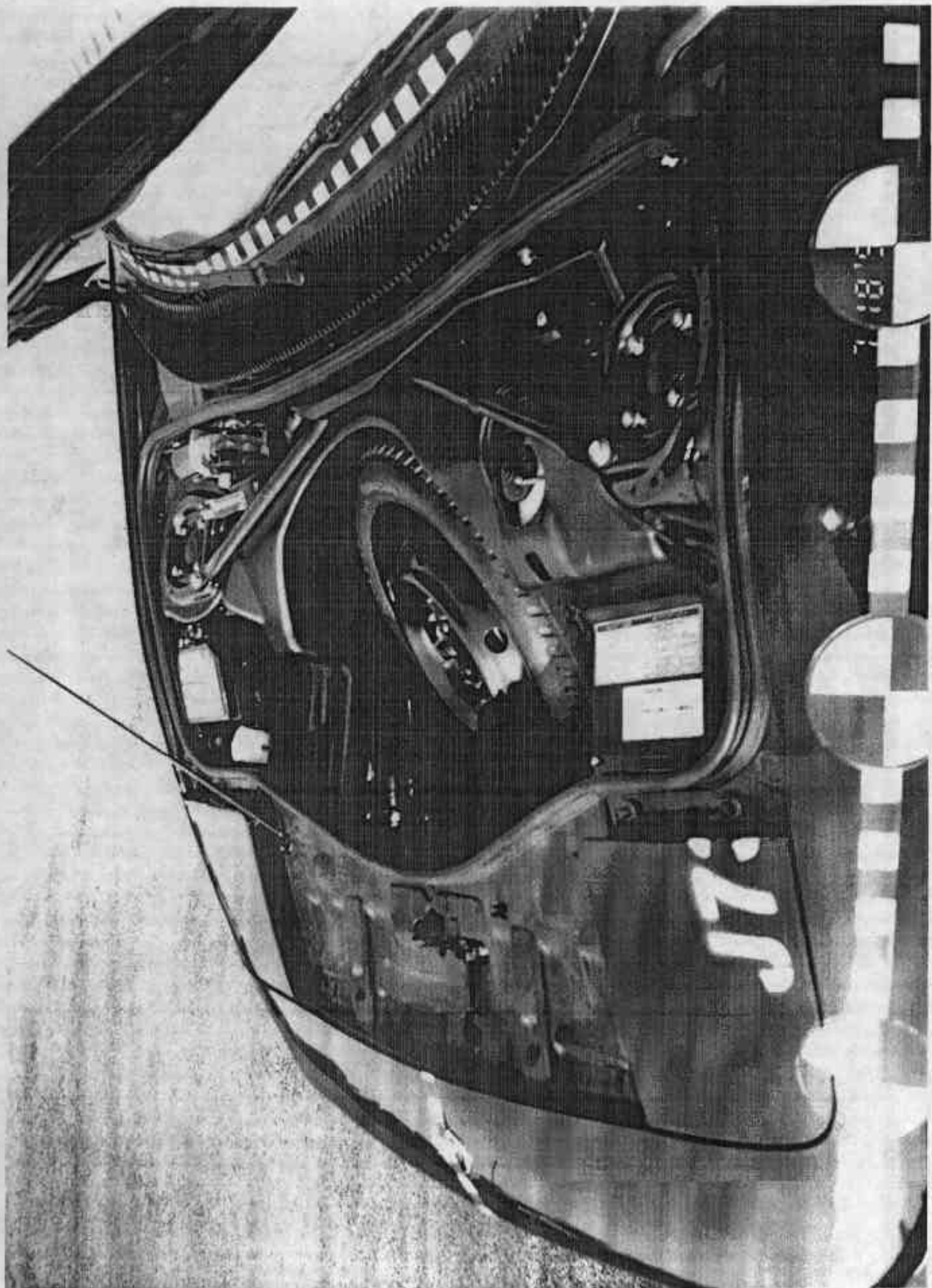
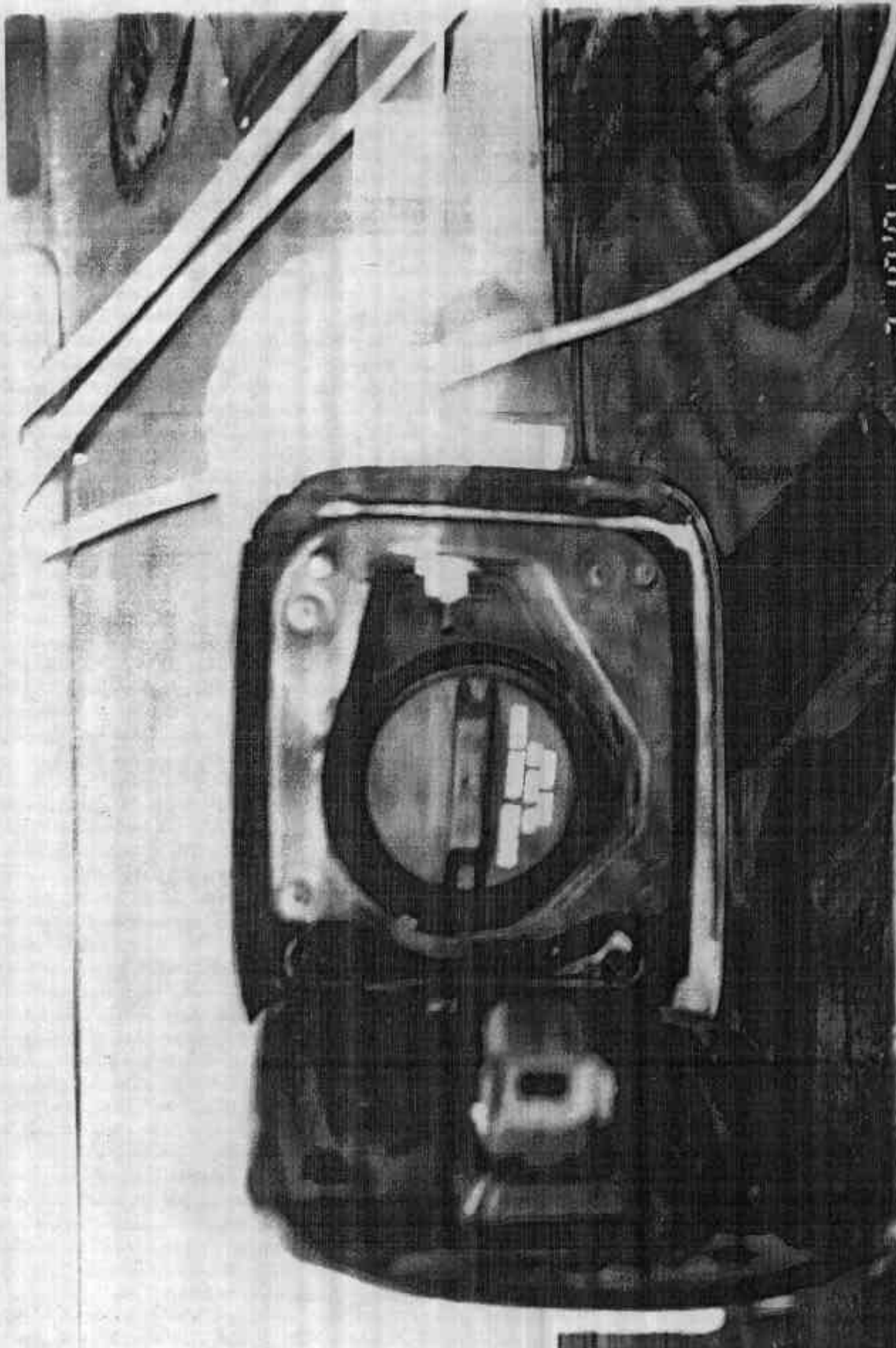


Figure A-13 PRE-TEST FRONT COMPARTMENT VIEW

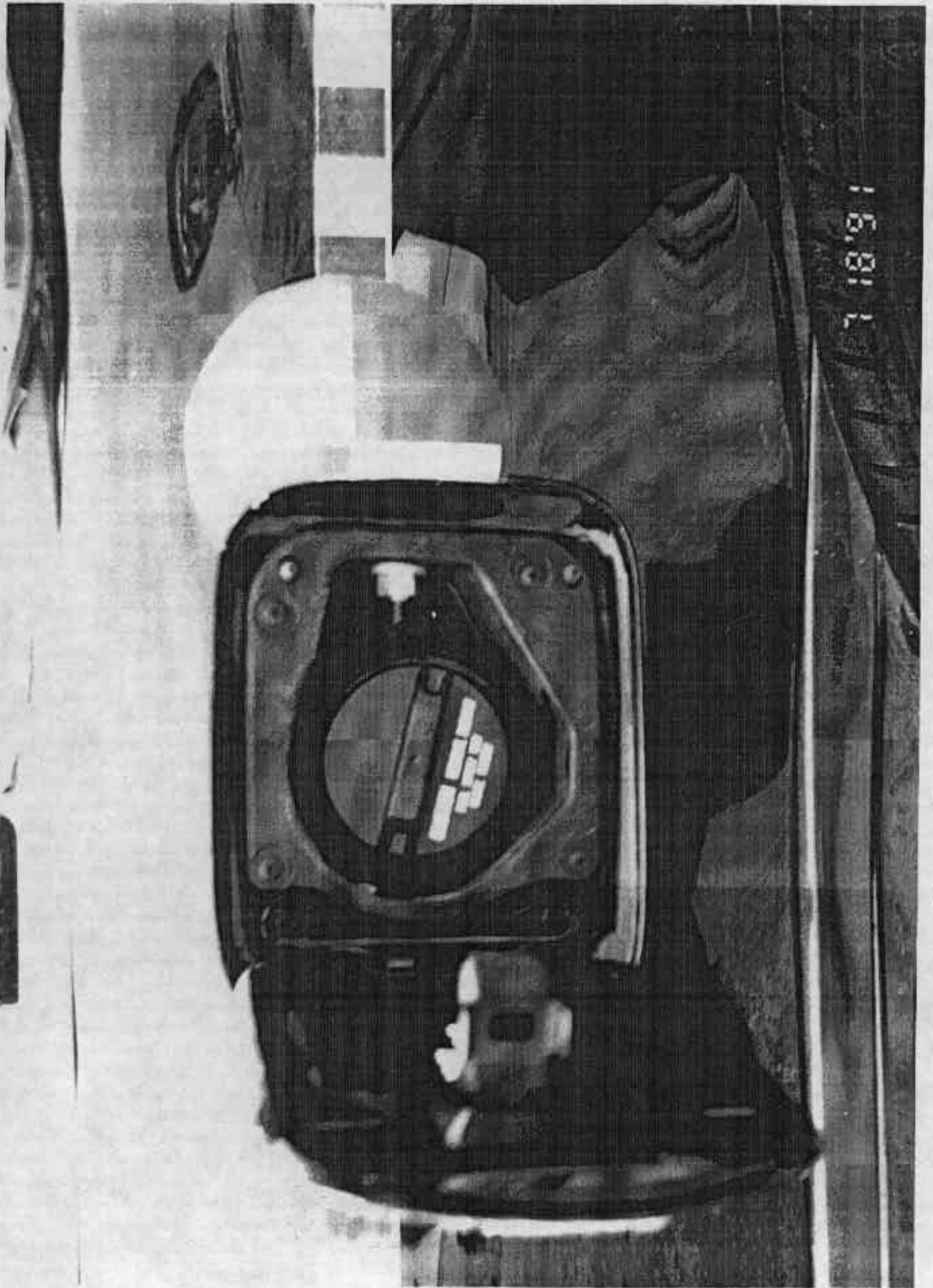


118'91

Figure A-14 PRE-TEST FUEL FILLER CAP PHOTO

A-16

7920-3



7 18 '91

Figure A-15 POST-TEST FUEL FILLER CAP PHOTO

A-17

7920-3

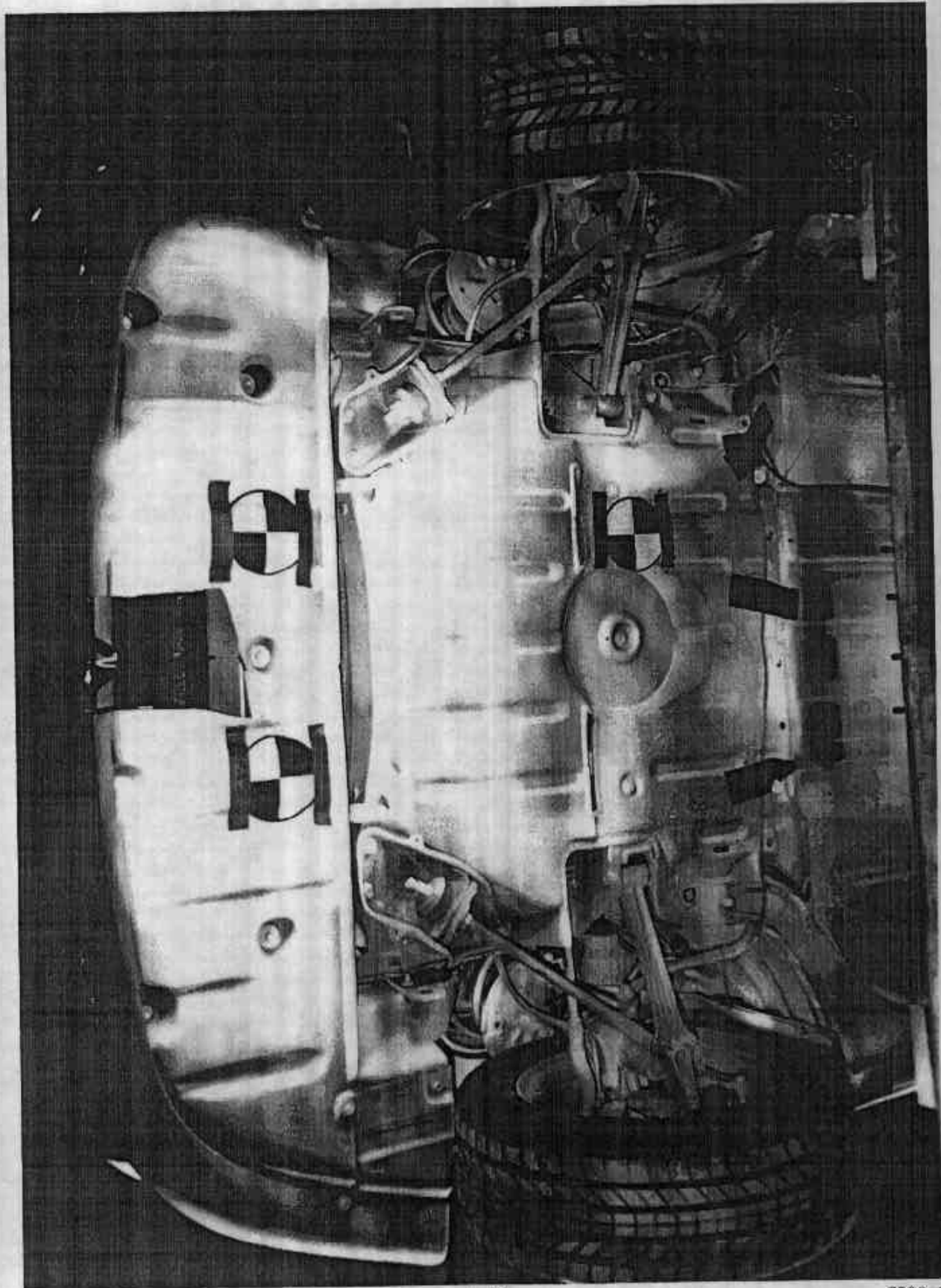


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

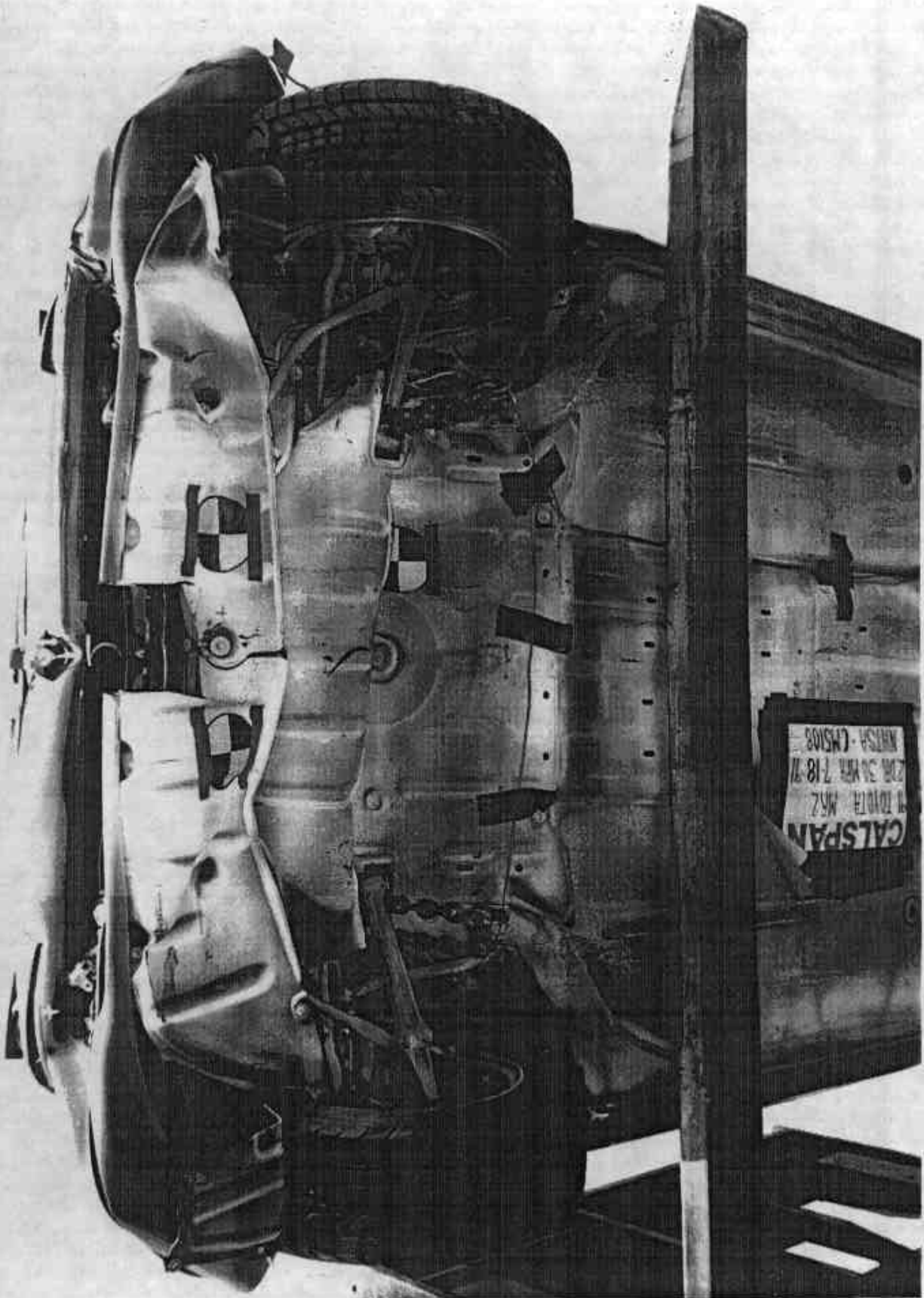


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

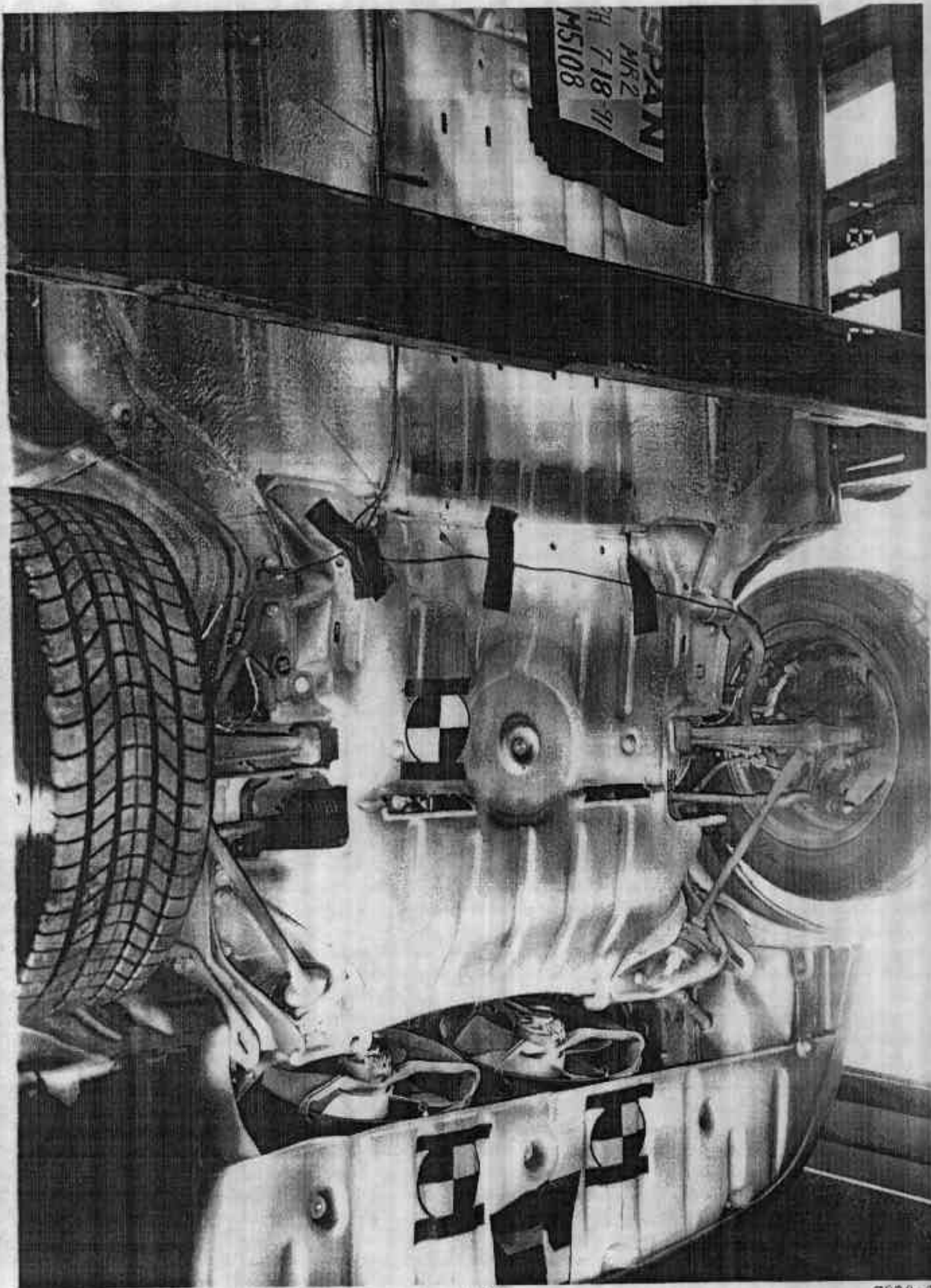


FIGURE A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

A-20

7920-3

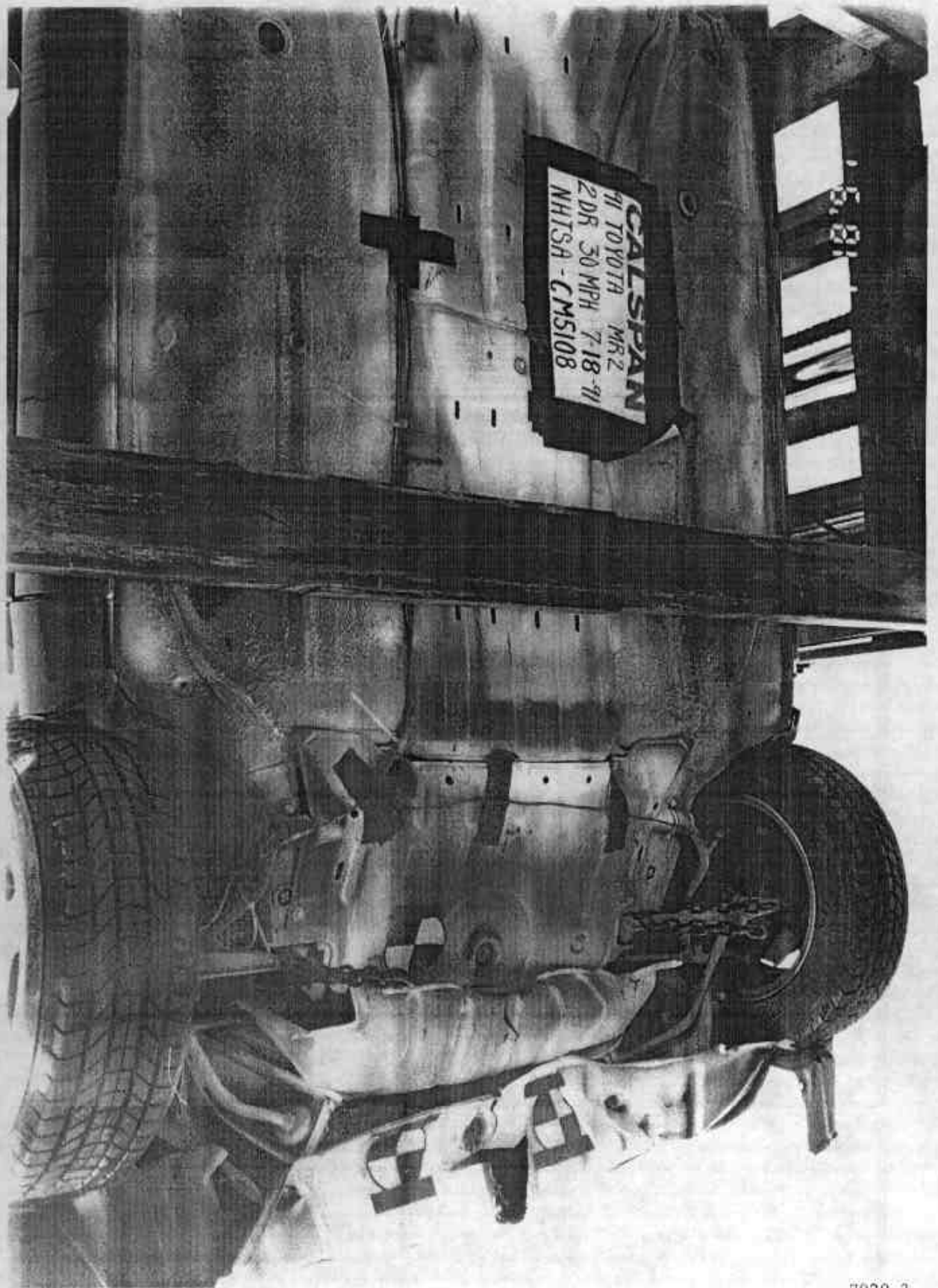
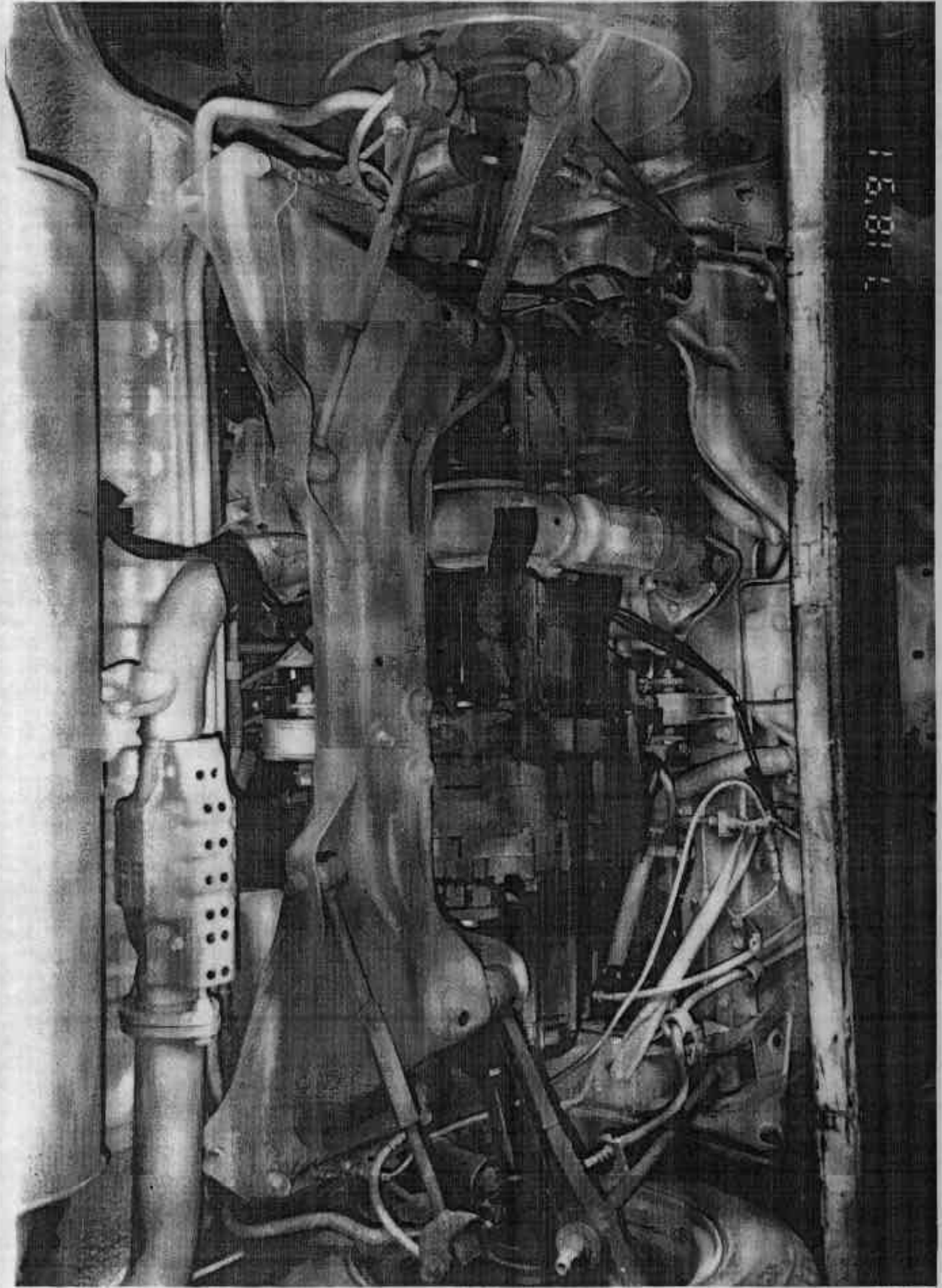


Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW



7 18 '91

Figure A-20 PRE-TEST REAR UNDERBODY VIEW

A-22

7920-3

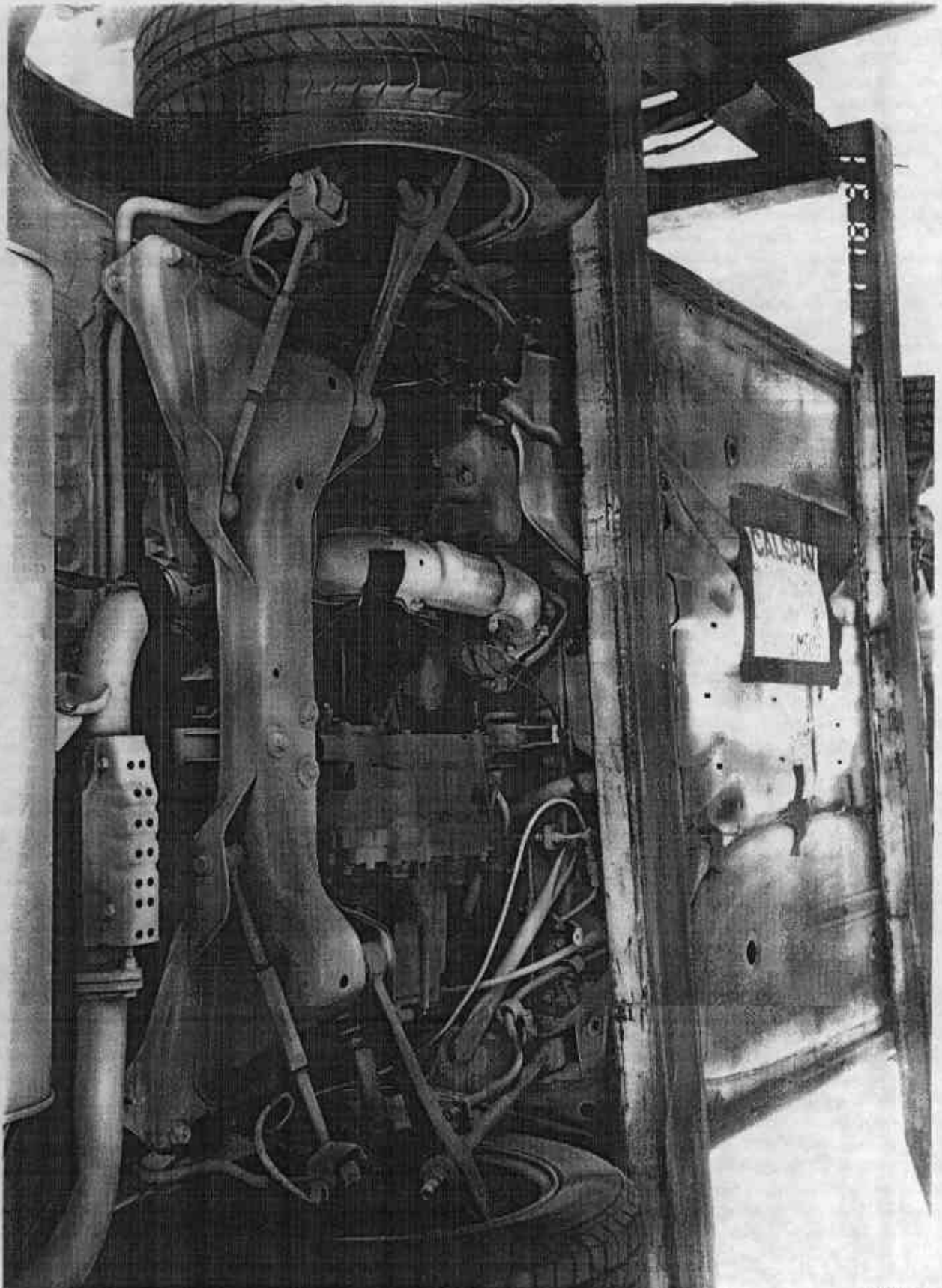


Figure A-21 POST-TEST REAR UNDERBODY VIEW

A-23

7920-3

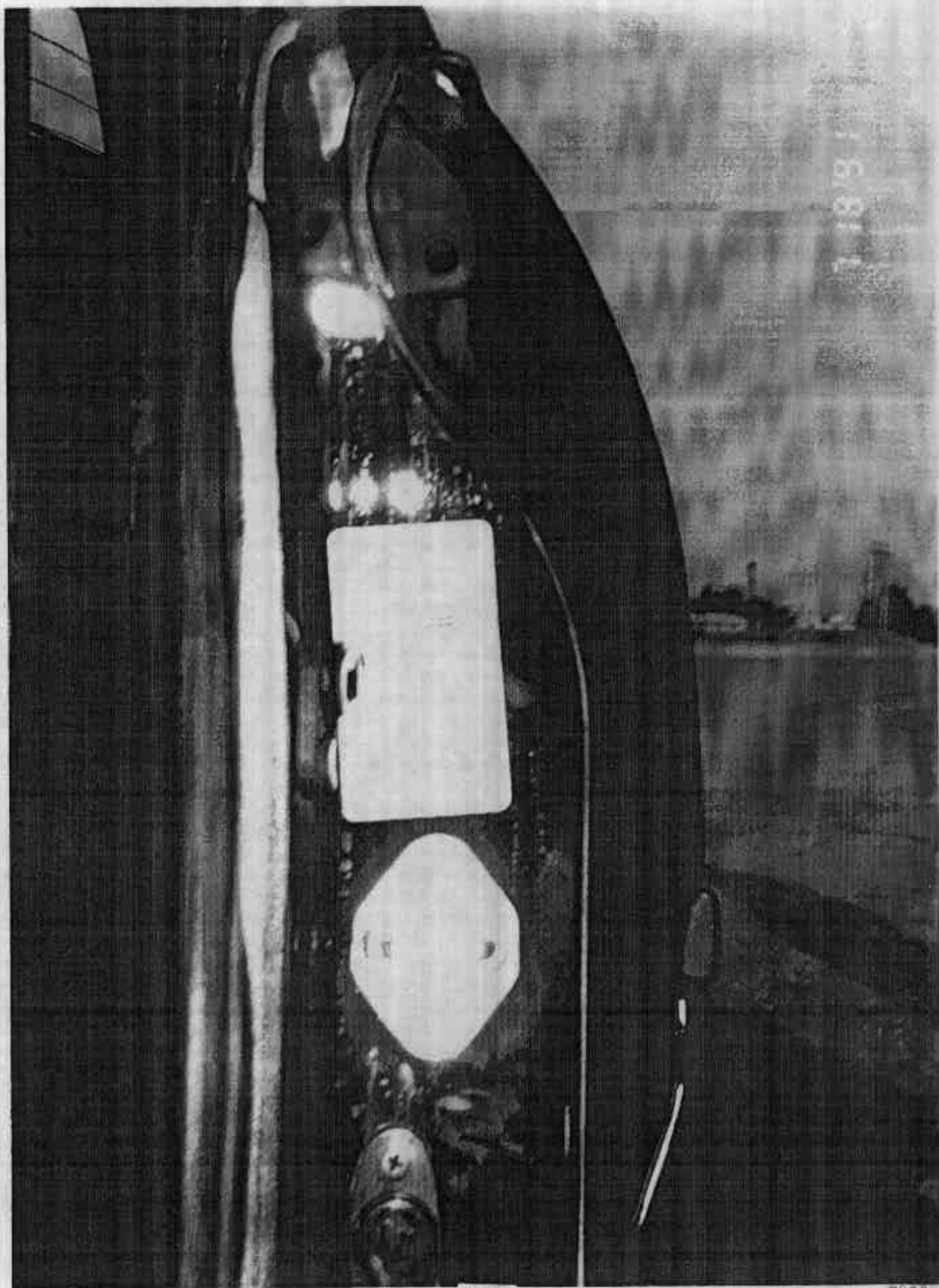
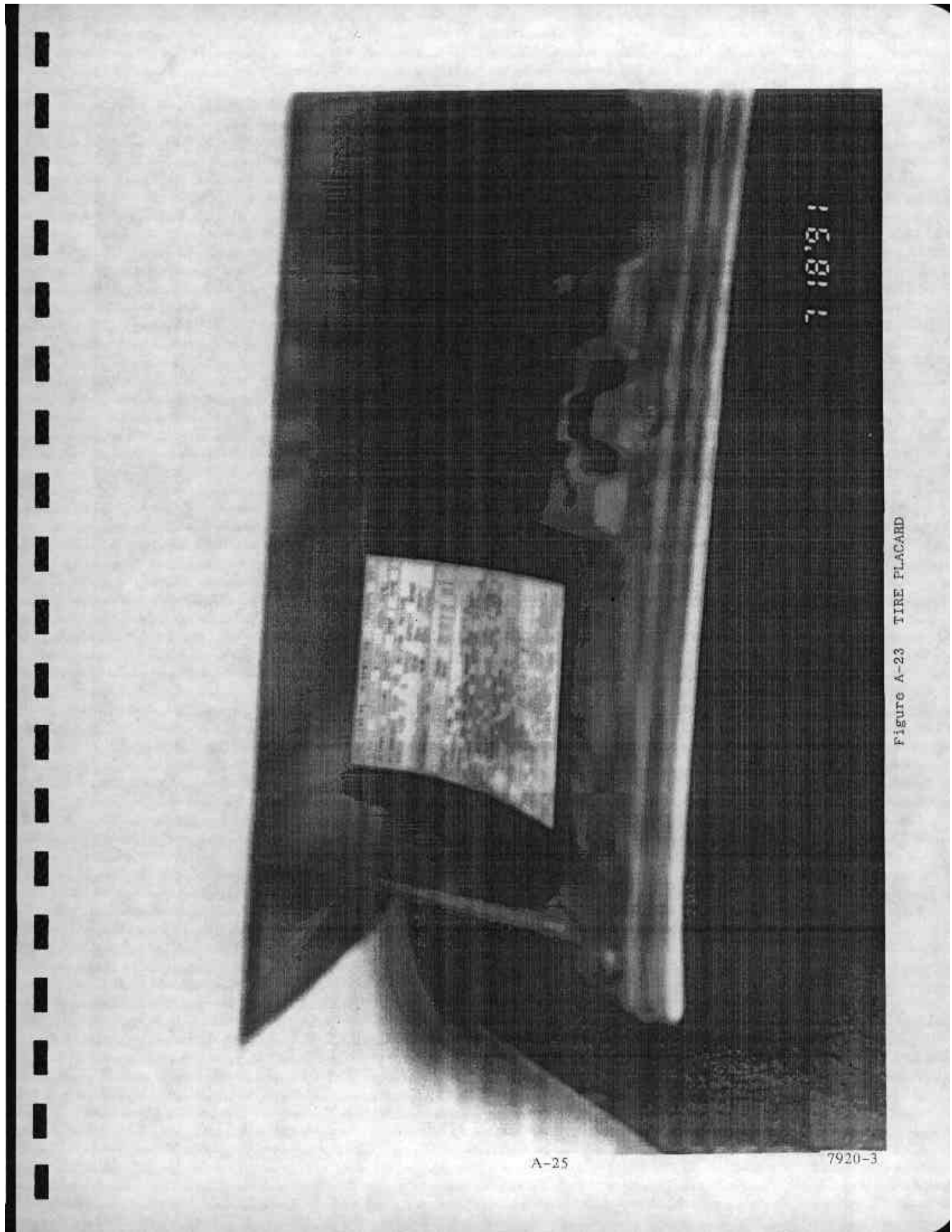


Figure A-22. CERTIFICATION LABEL



71891

Figure A-23 TIRE PLACARD

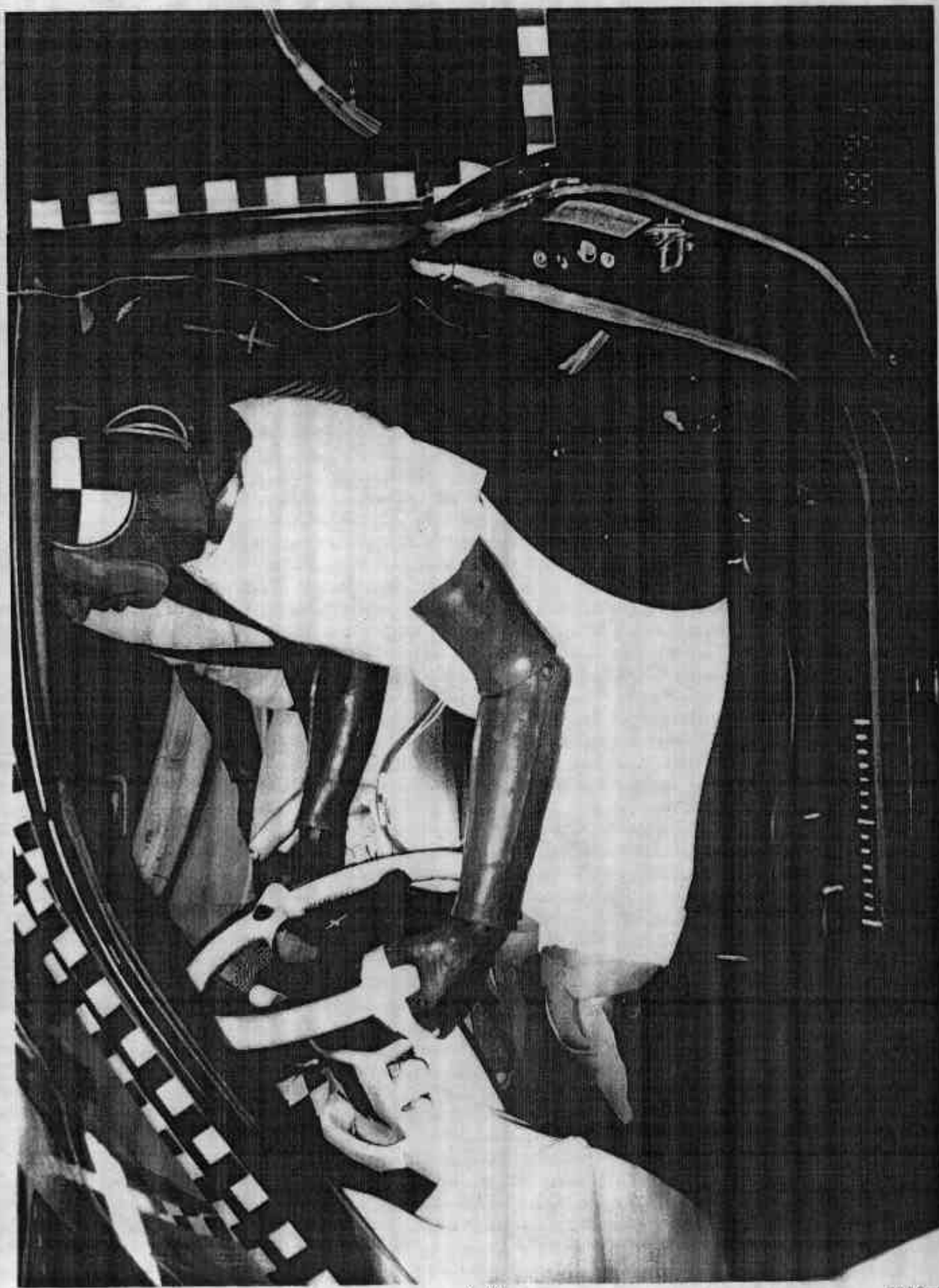


FIGURE A-24 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

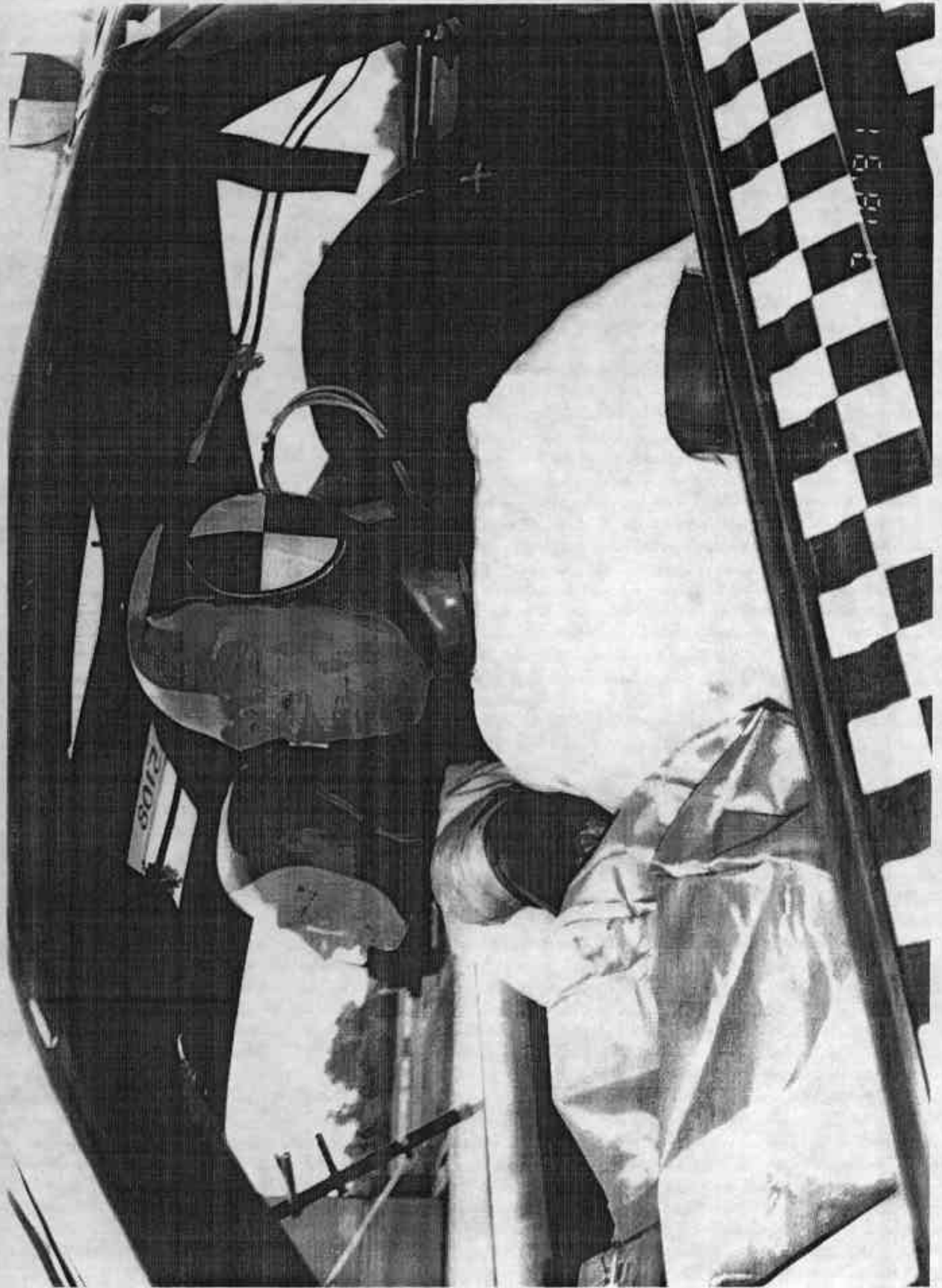


FIGURE A-25 POST-TEST DRIVER DUMMY POSITION

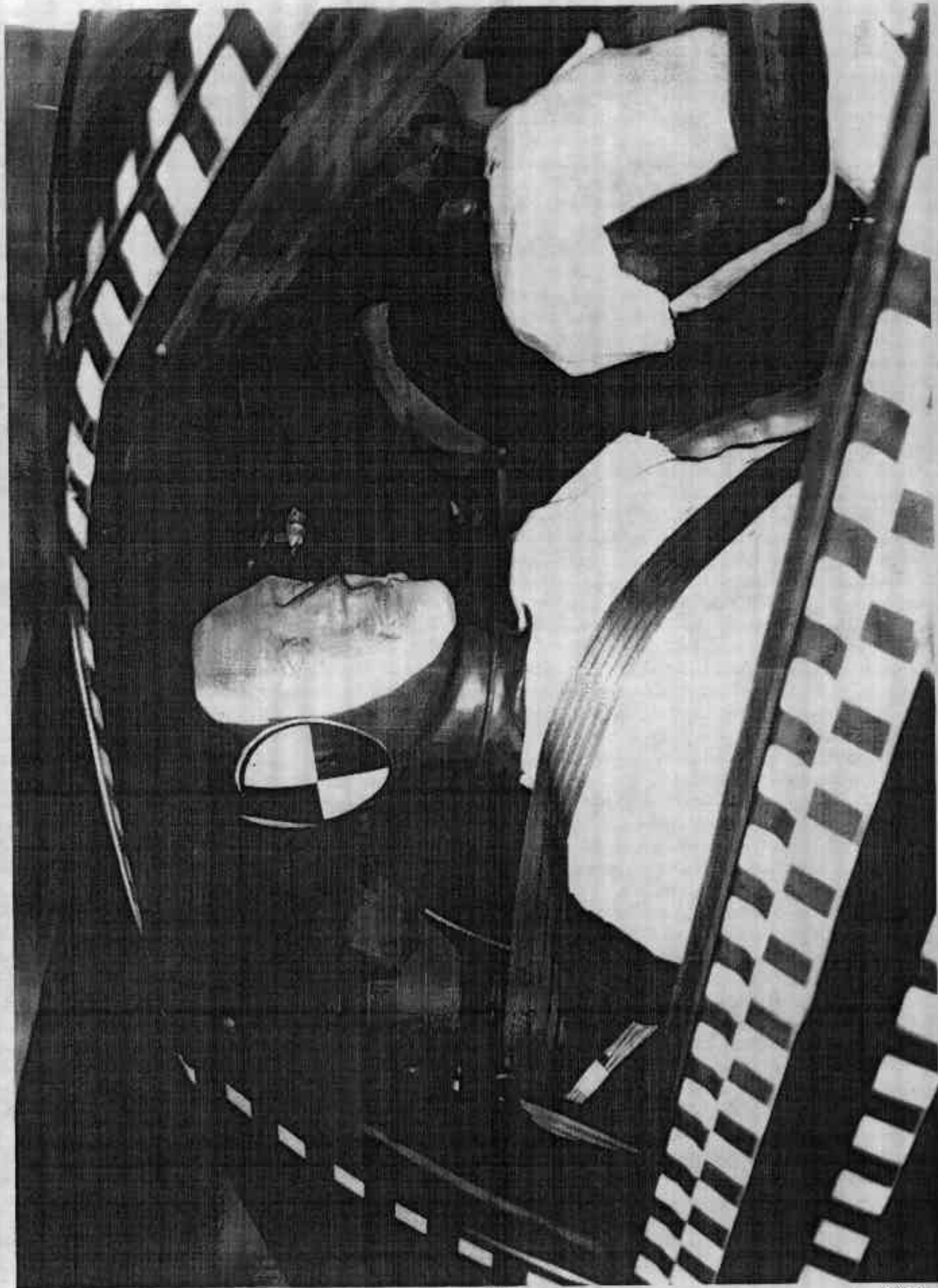


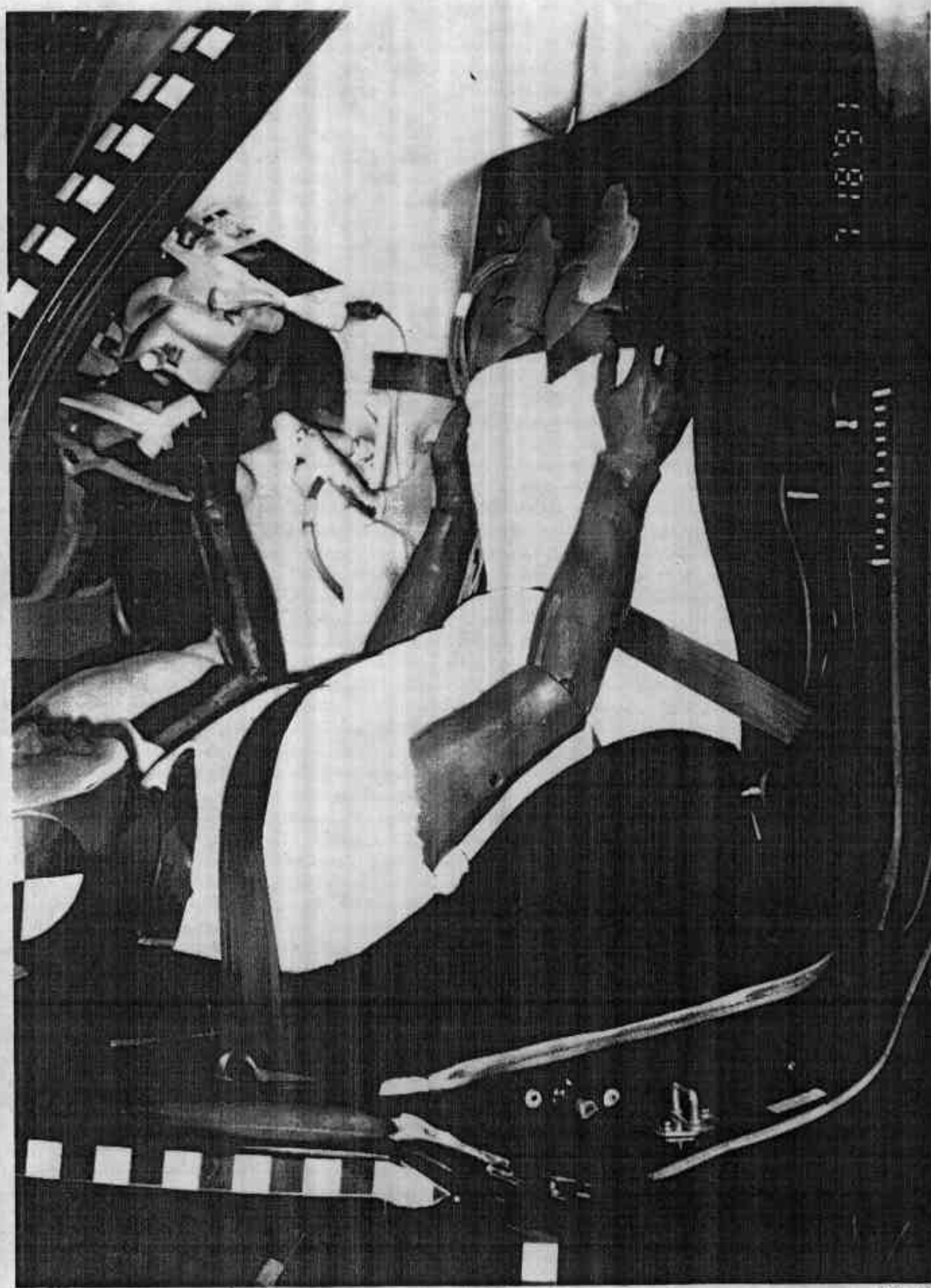
Figure A-26 PRE-TEST PASSENGER DUMMY POSITION

A-28

7920-3



Figure A-27 POST-TEST PASSENGER DUMMY POSITION



16814

Figure A-28 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW



Figure A-29 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW



Figure A-30 POST-TEST DRIVER AIRBAG VIEW

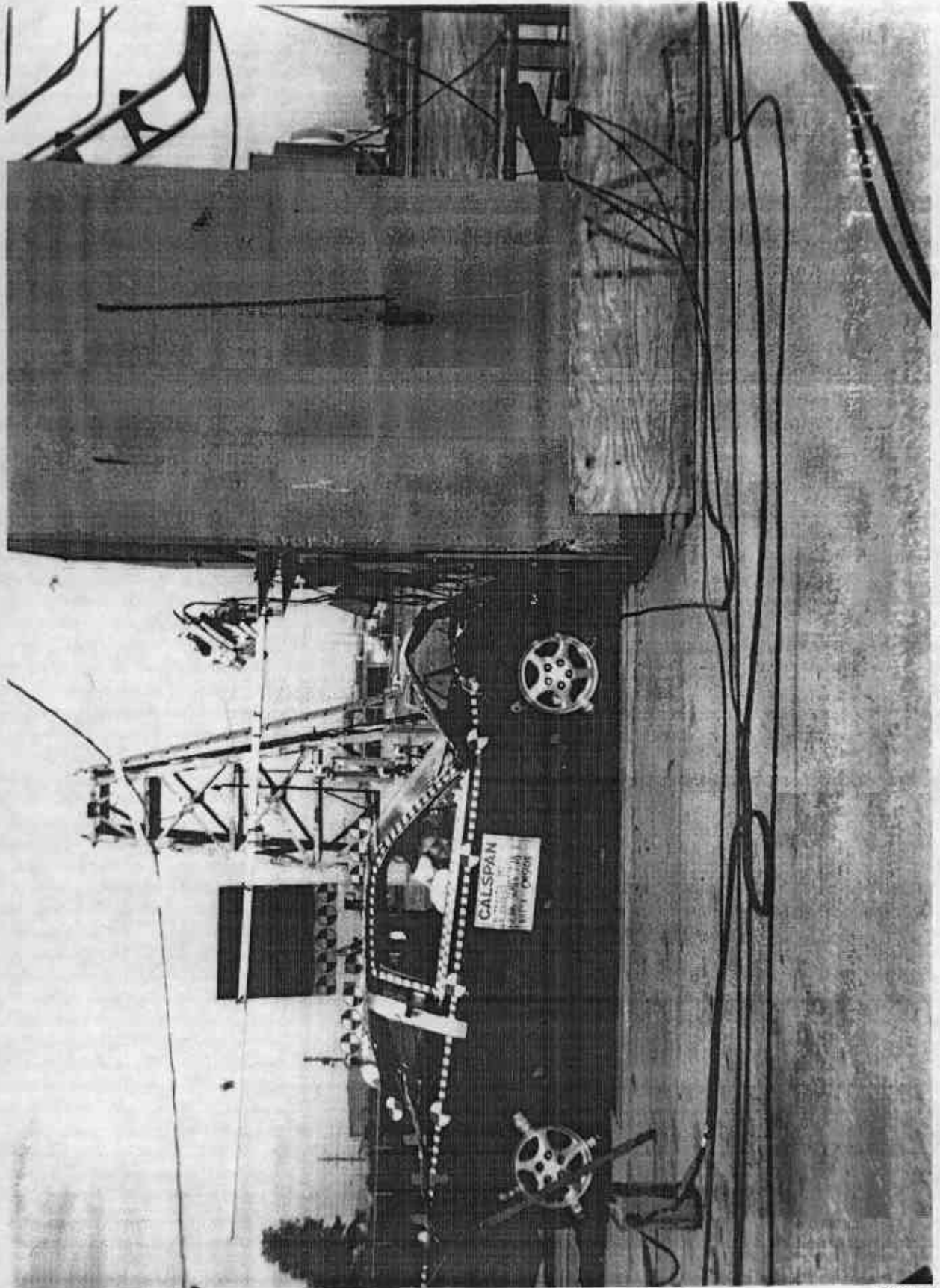


Figure A-31 VEHICLE IMPACT

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CM5108

VEHICLE DATA

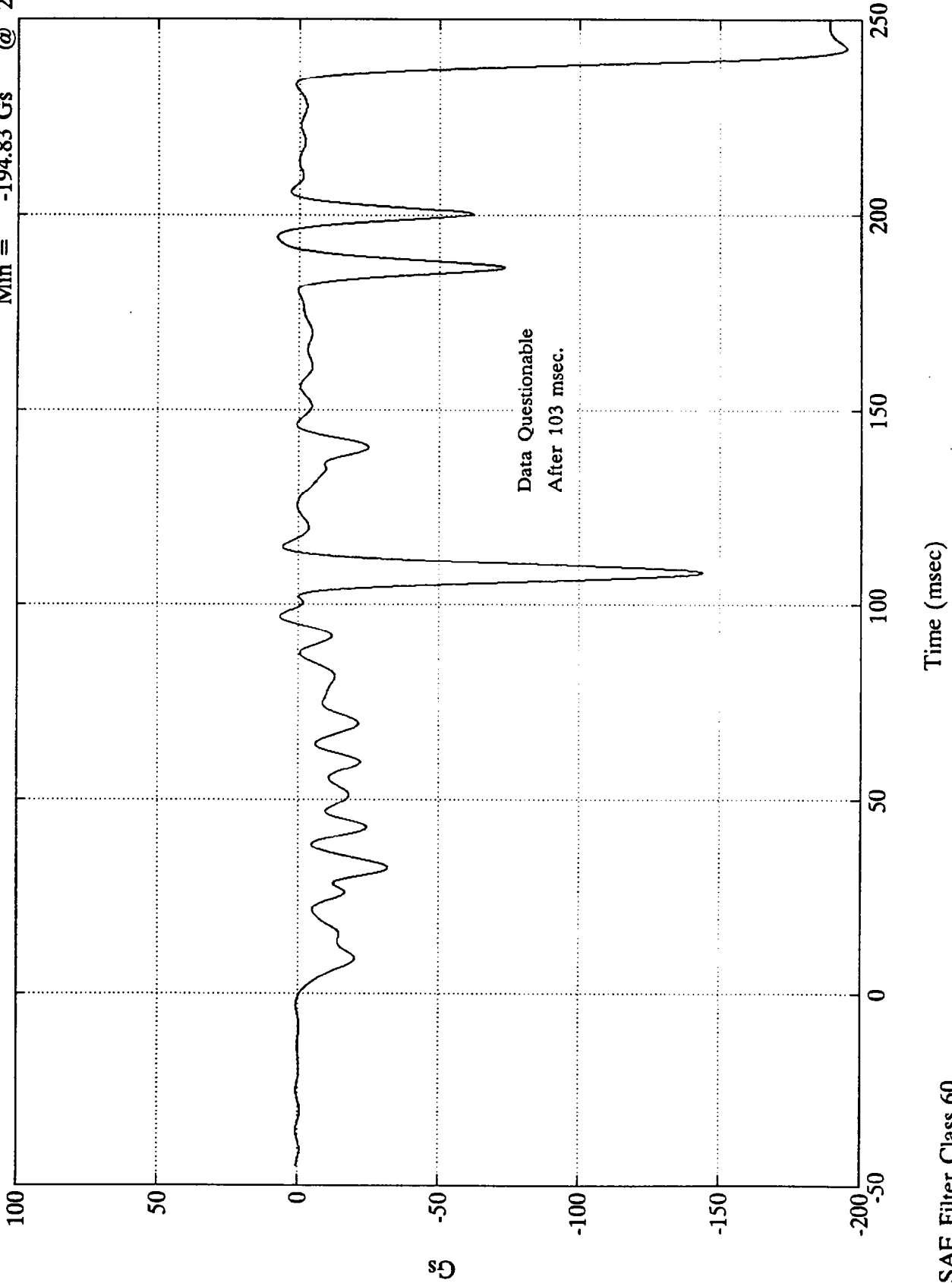
FILTER CHANNEL CLASS

60

Test 1090

L. Rear X-member X (#1)

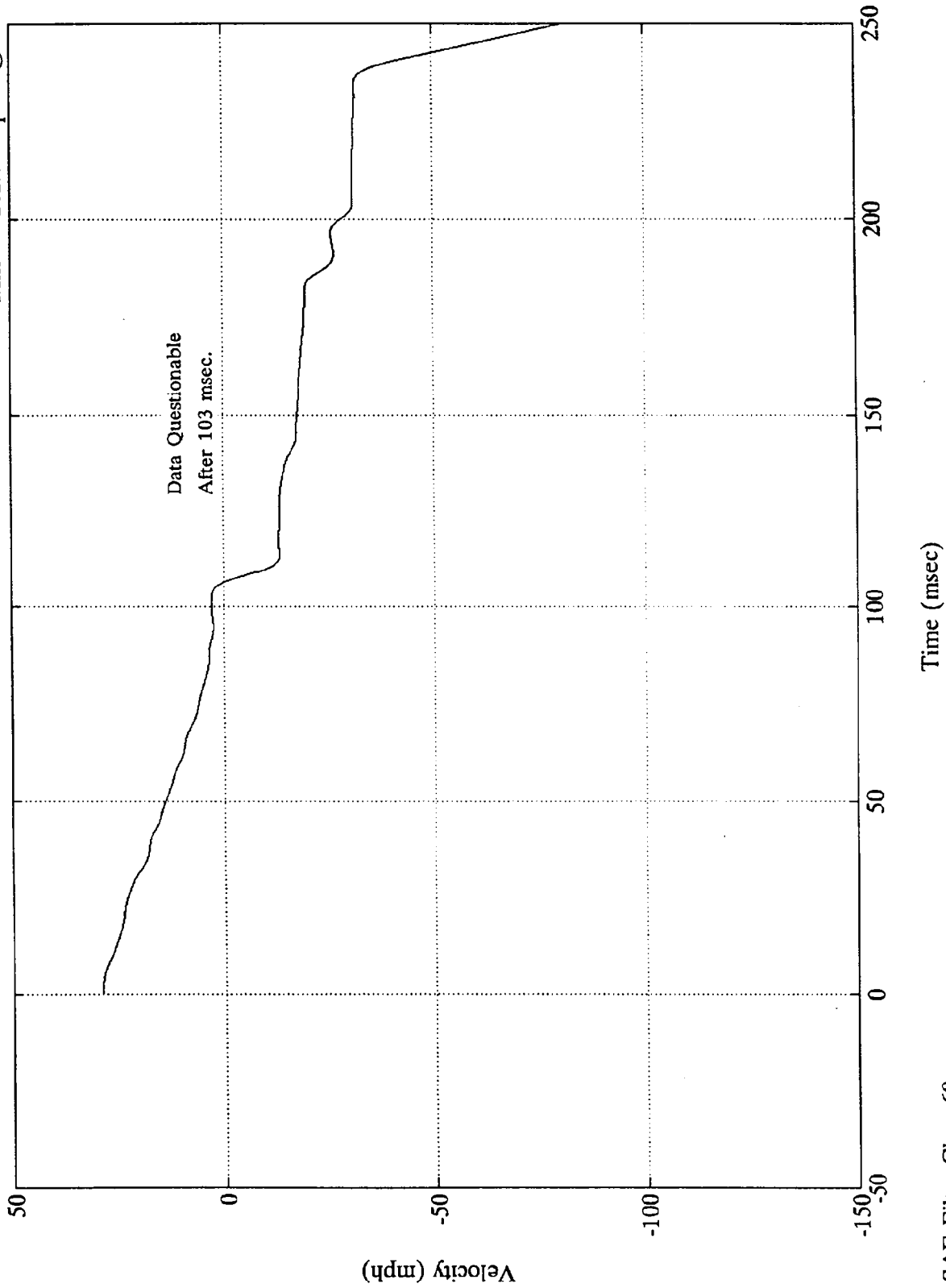
Max = 7.70 Gs @ 194.40 msec
Min = -194.83 Gs @ 242.52 msec



Test 1090

L. Rear X-member X (#1)

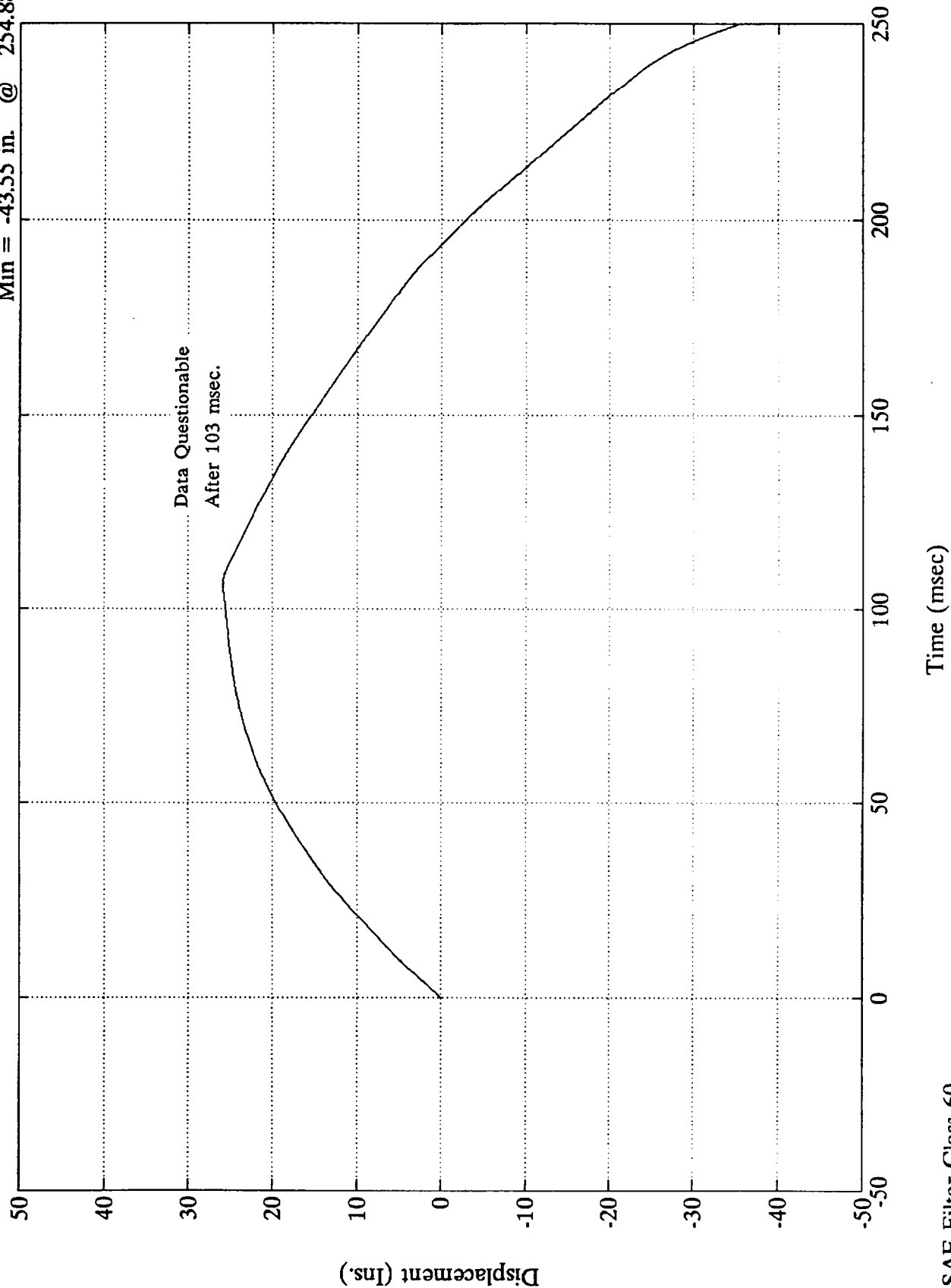
Max = 29.10 mph @ 0.24 msec
Min = -101.66 mph @ 254.88 msec



SAE Filter Class 60

L. Rear X-member X (#1)

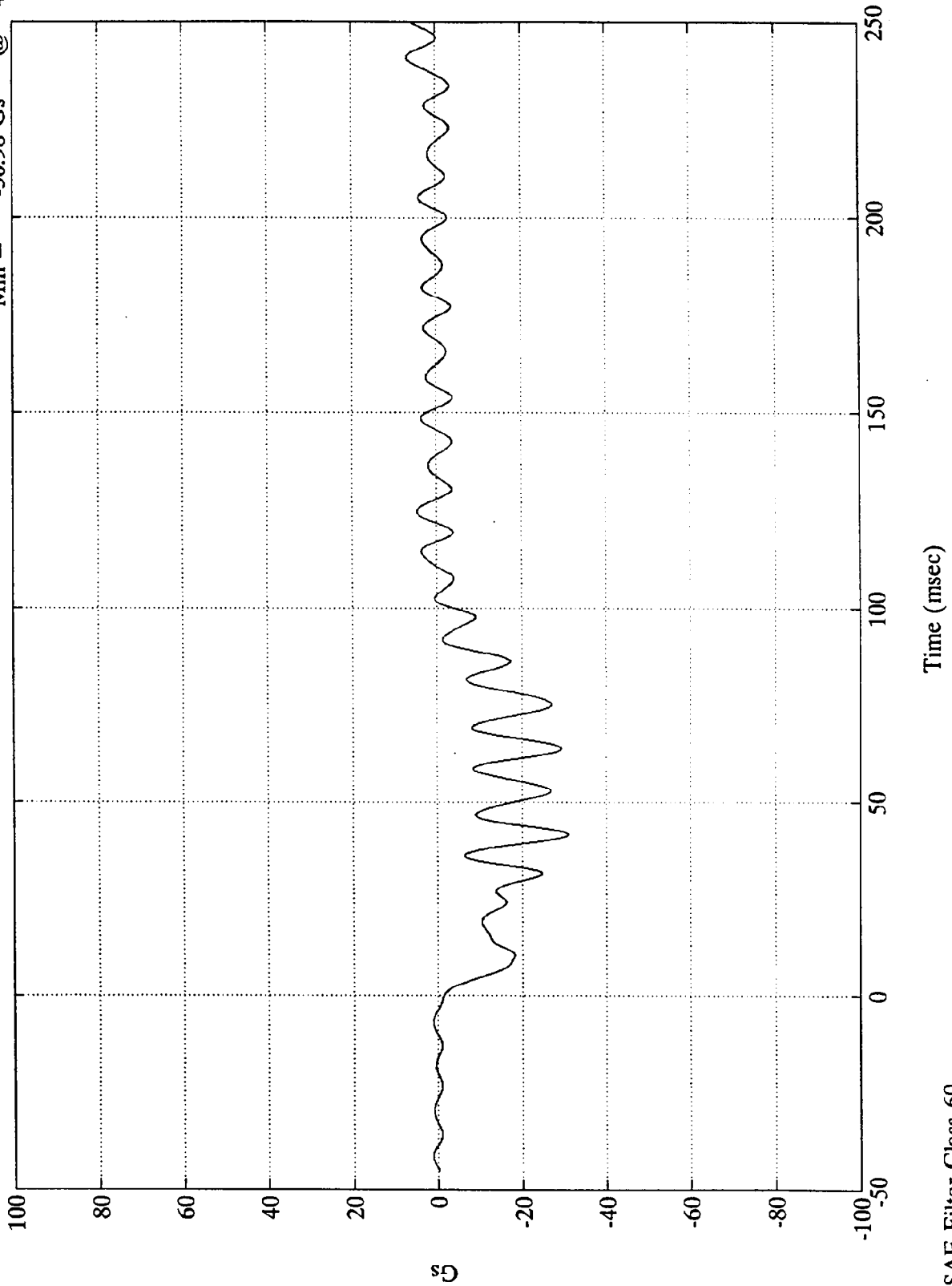
Max = 25.85 in. @ 106.80 msec
Min = -43.55 in. @ 254.88 msec



Test 1090

R. Rear X-member X (#2)

Max = 6.95 Gs @ 253.32 msec
Min = -30.98 Gs @ 41.76 msec



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7920-3

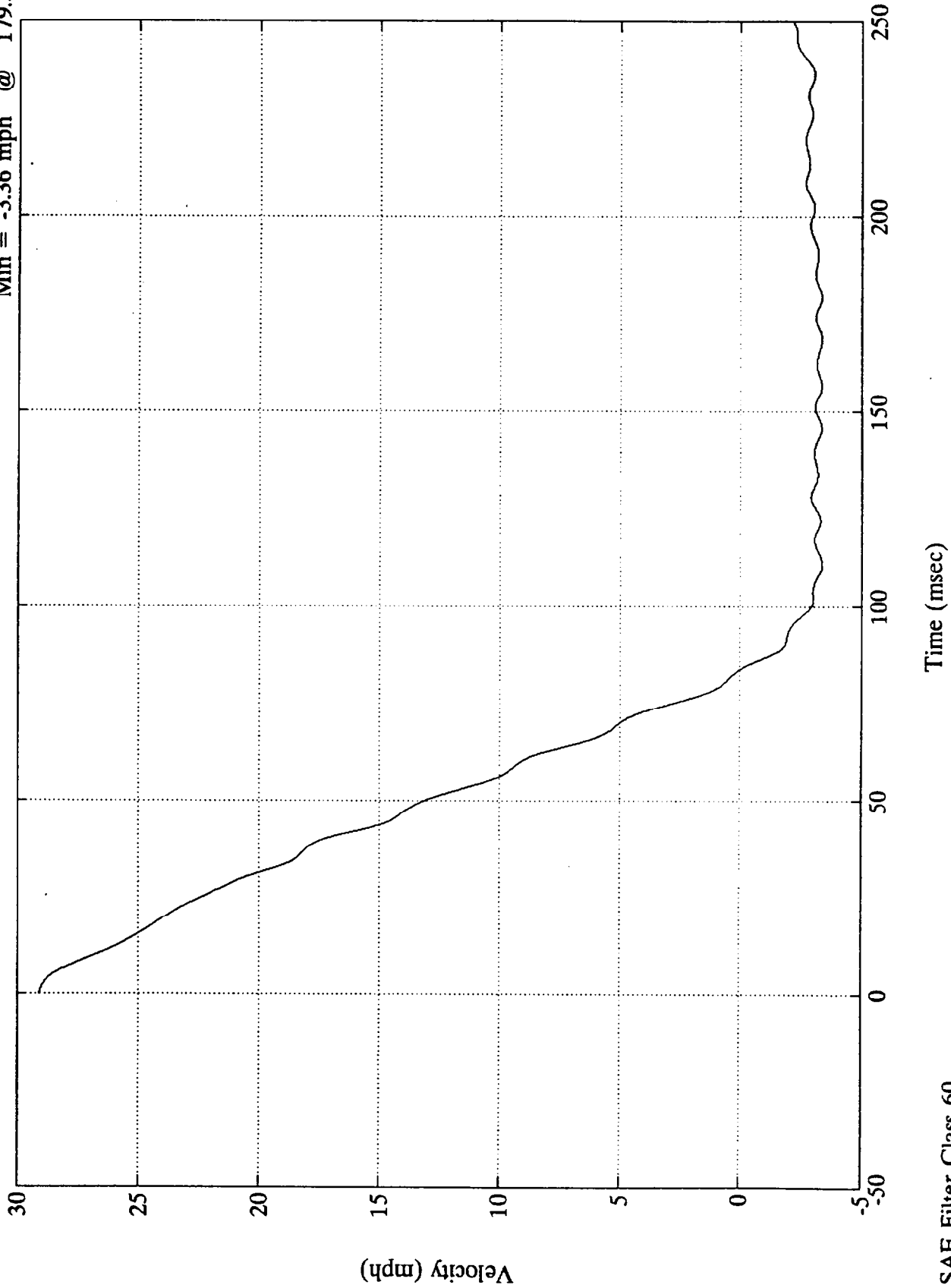
SAE Filter Class 60

Time (msec)

Test 1090

R. Rear X-member X (#2)

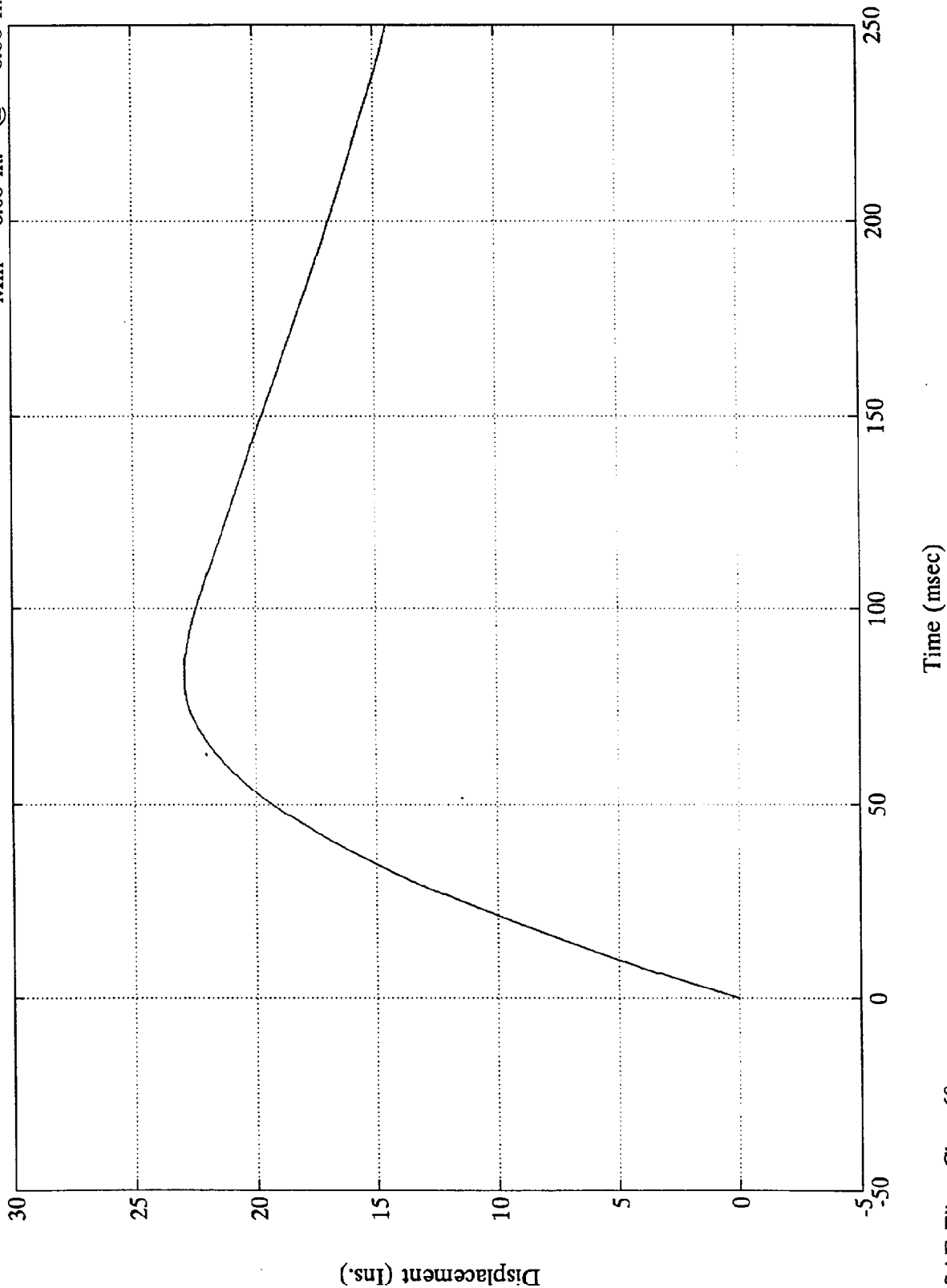
Max = 29.10 mph @ -0.00 msec
Min = -3.36 mph @ 179.52 msec



Test 1090

R. Rear X-member X (#2)

Max = 22.93 in. @ 85.68 msec
Min = 0.00 in. @ -0.00 msec

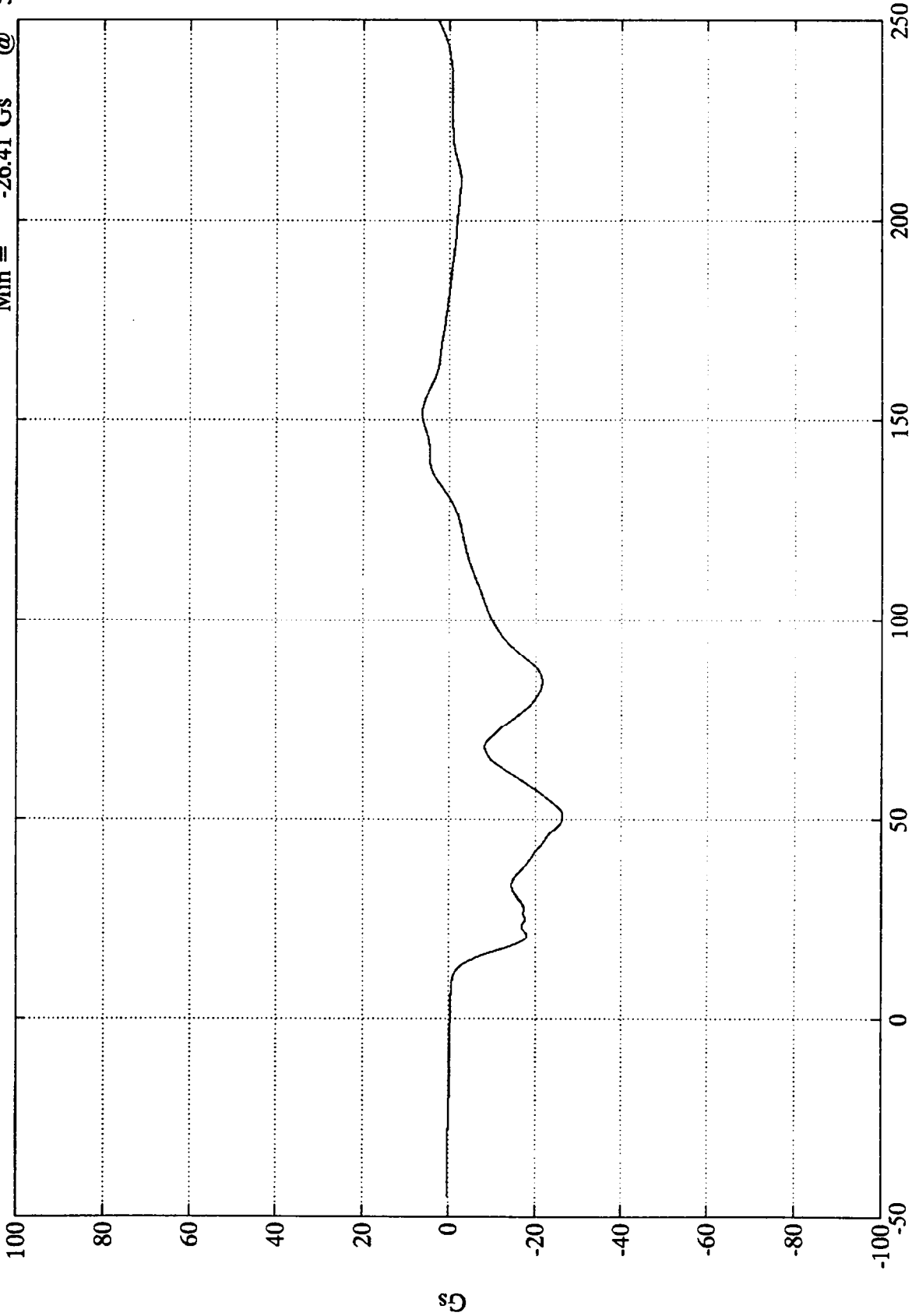


SAE Filter Class 60

Test 1090

Engine Top X (#3)

Max = 6.28 Gs @ 151.56 msec
Min = -26.41 Gs @ 51.00 msec



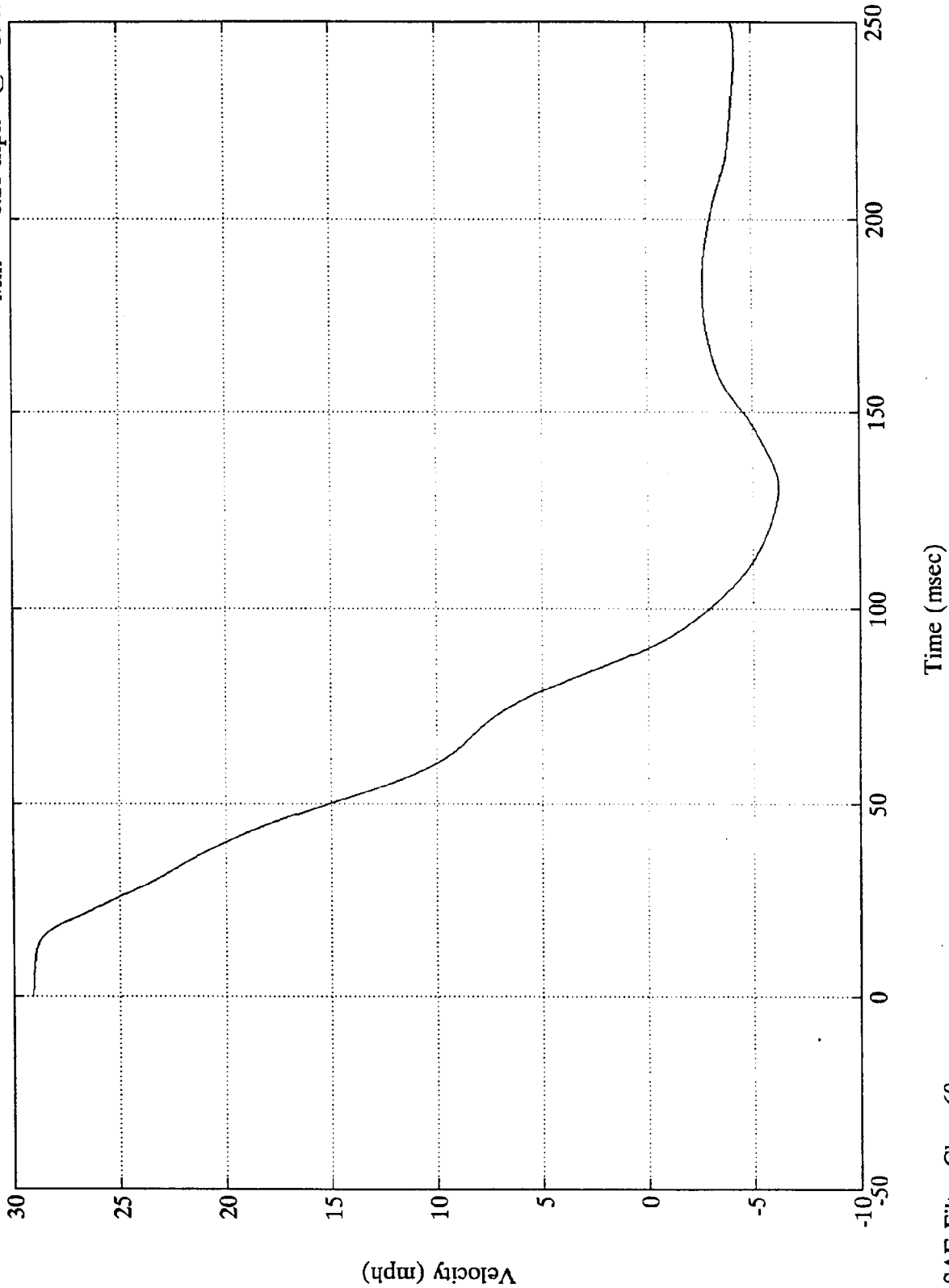
Time (msec)

SAE Filter Class 60

Test 1090

Engine Top X (#3)

Max = 29.10 mph @ 0.48 msec
Min = -6.20 mph @ 130.80 msec

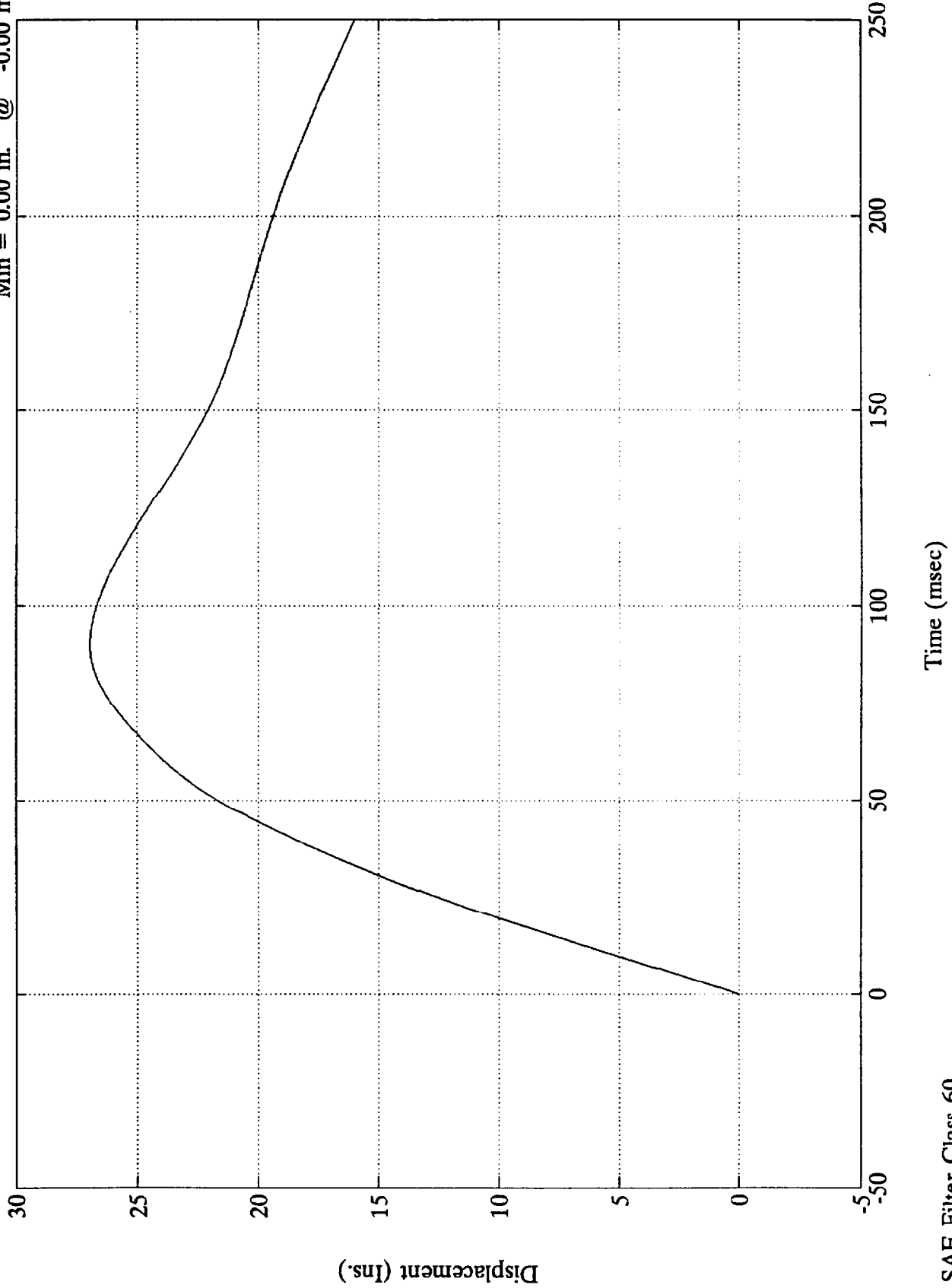


SAE Filter Class 60

Test 1090

Engine Top X (#3)

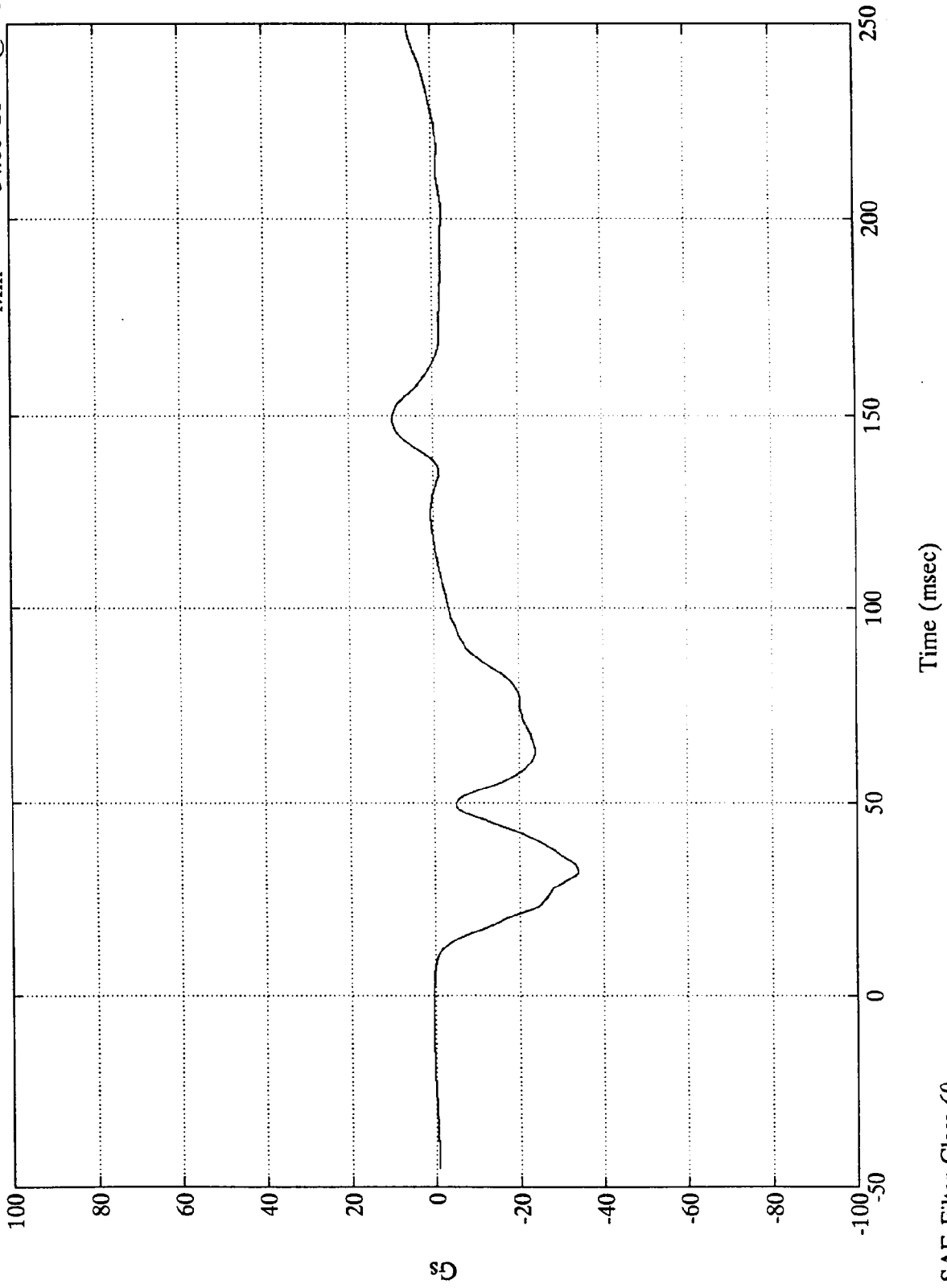
Max = 26.94 in. @ 91.68 msec
Min = 0.00 in. @ -0.00 msec



Test 1090

Engine Bottom X (#4)

Max = 9.61 Gs @ 148.80 msec
Min = -34.06 Gs @ 32.28 msec



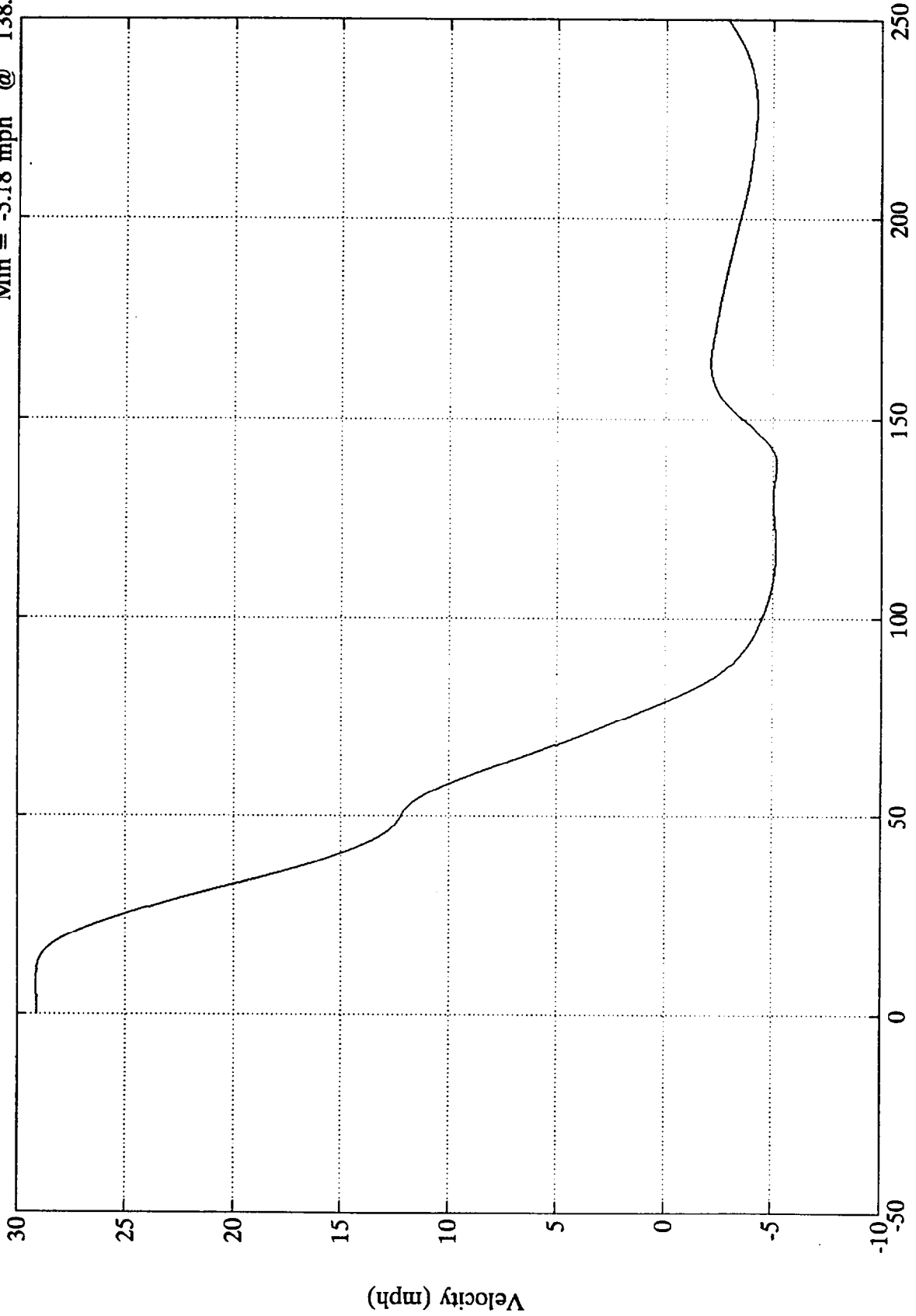
SAE Filter Class 60



Test 1090

Engine Bottom X (#4)

Max = 29.15 mph @ 9.36 msec
Min = -5.18 mph @ 138.72 msec



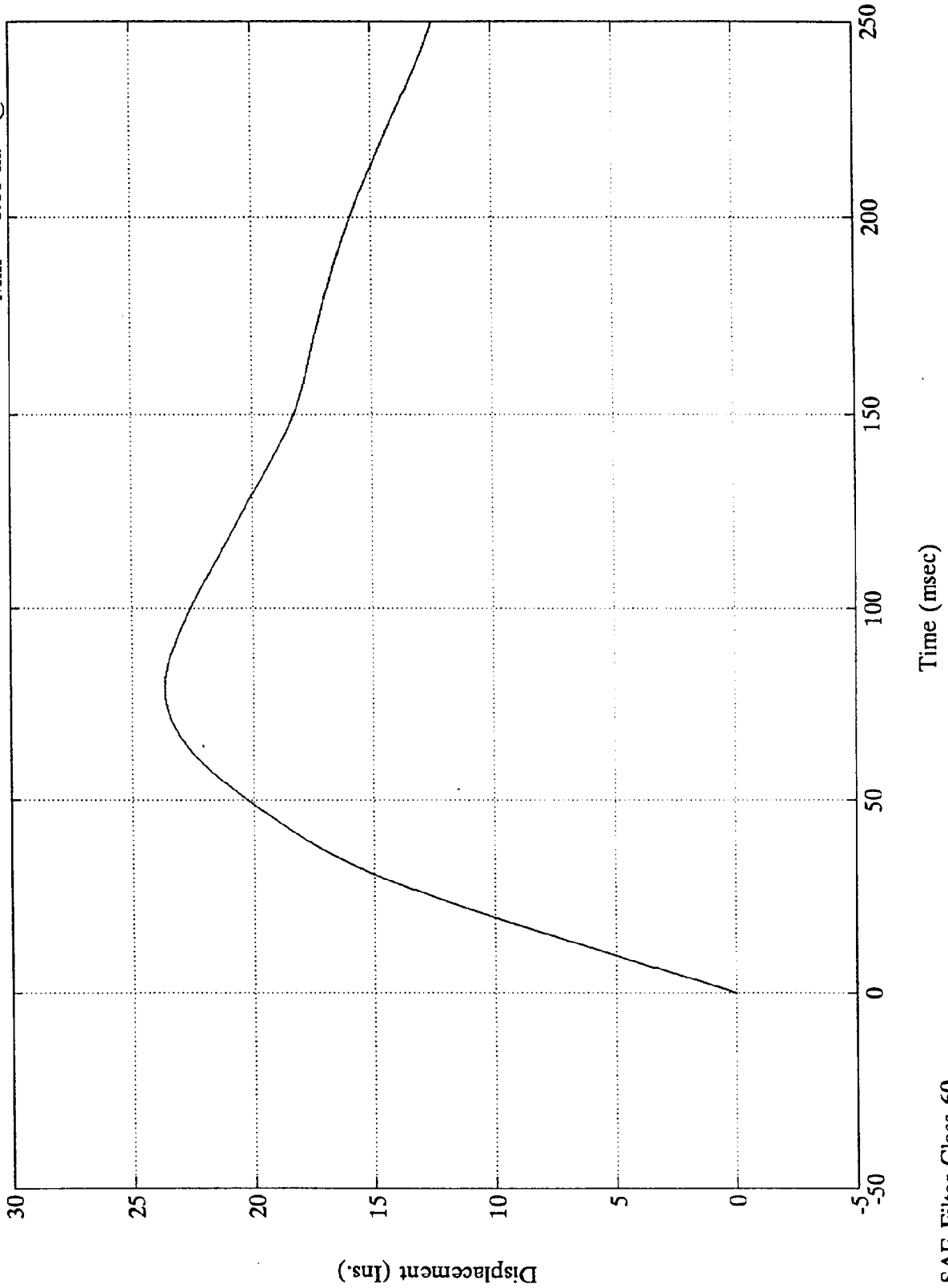
Time (msec)

SAE Filter Class 60

Test 1090

Engine Bottom X (#4)

Max = 23.64 in. @ 80.16 msec
Min = 0.00 in. @ -0.00 msec

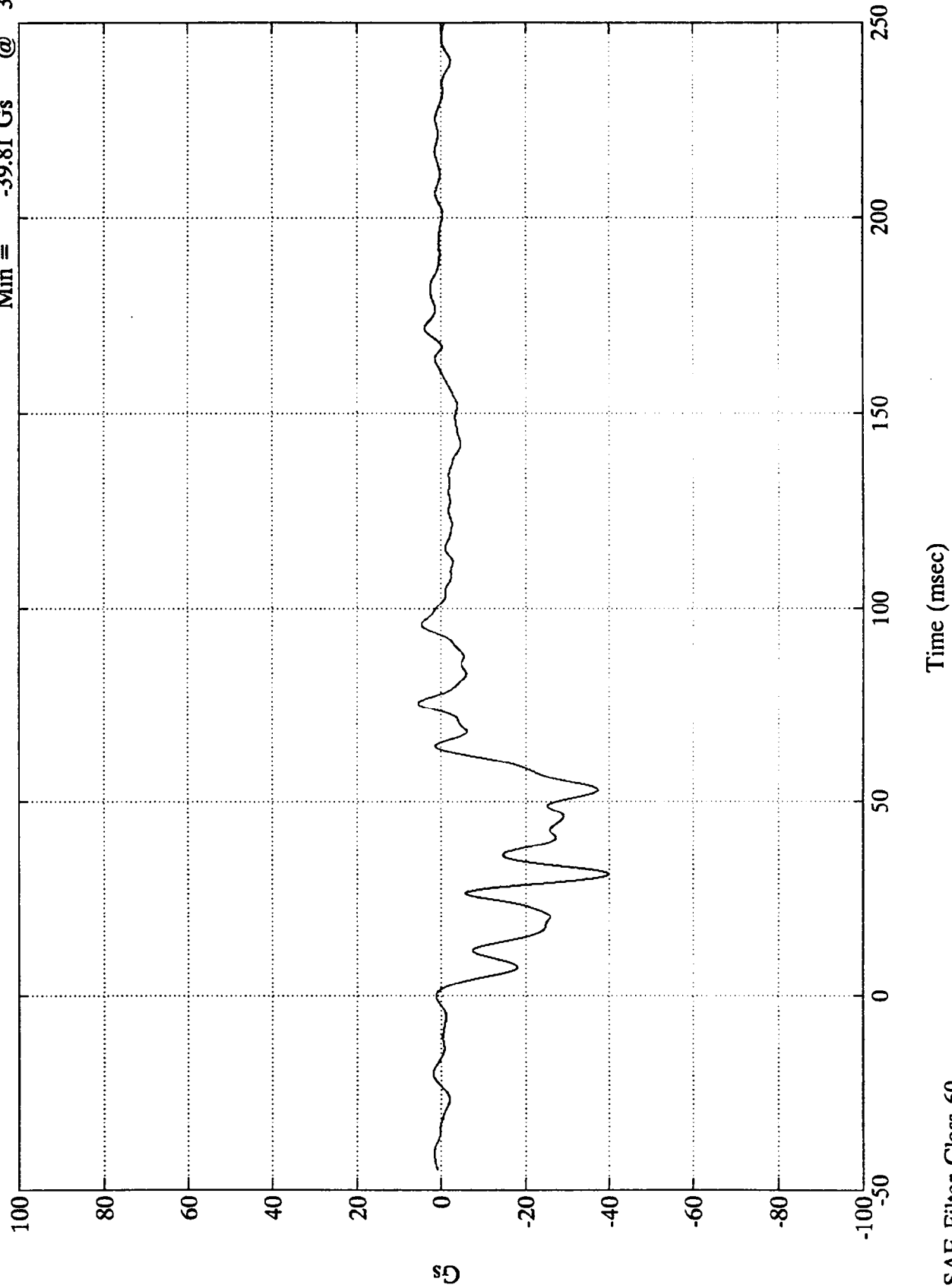


SAE Filter Class 60

Test 1090

R. Brake Caliper X (#5)

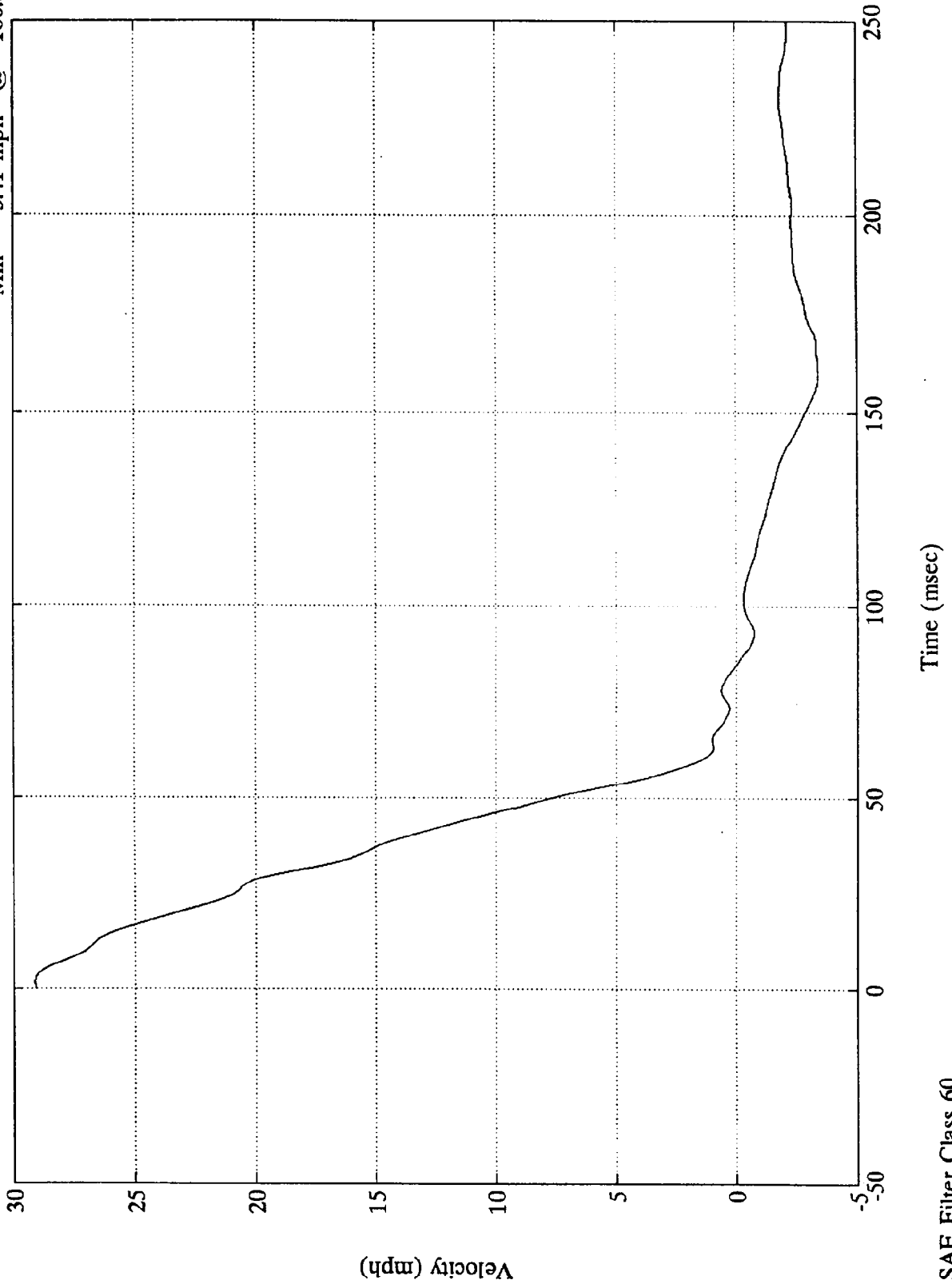
Max = 5.42 Gs @ 75.72 msec
Min = -39.81 Gs @ 31.31 msec



Test 1090

R. Brake Caliper X (#5)

Max = 29.13 mph @ 2.16 msec
Min = -3.41 mph @ 160.56 msec

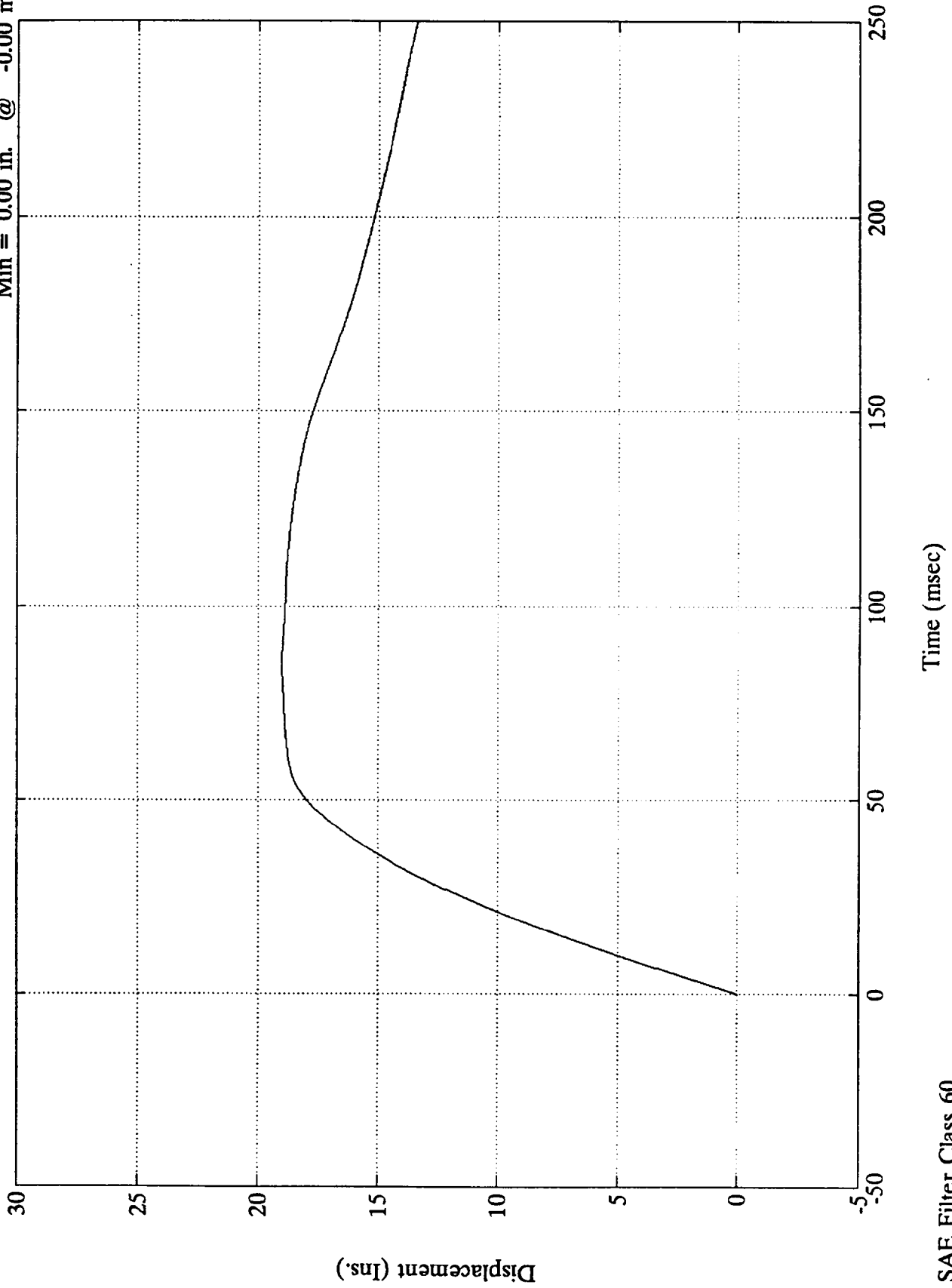


SAE Filter Class 60

Test 1090

R. Brake Caliper X (#5)

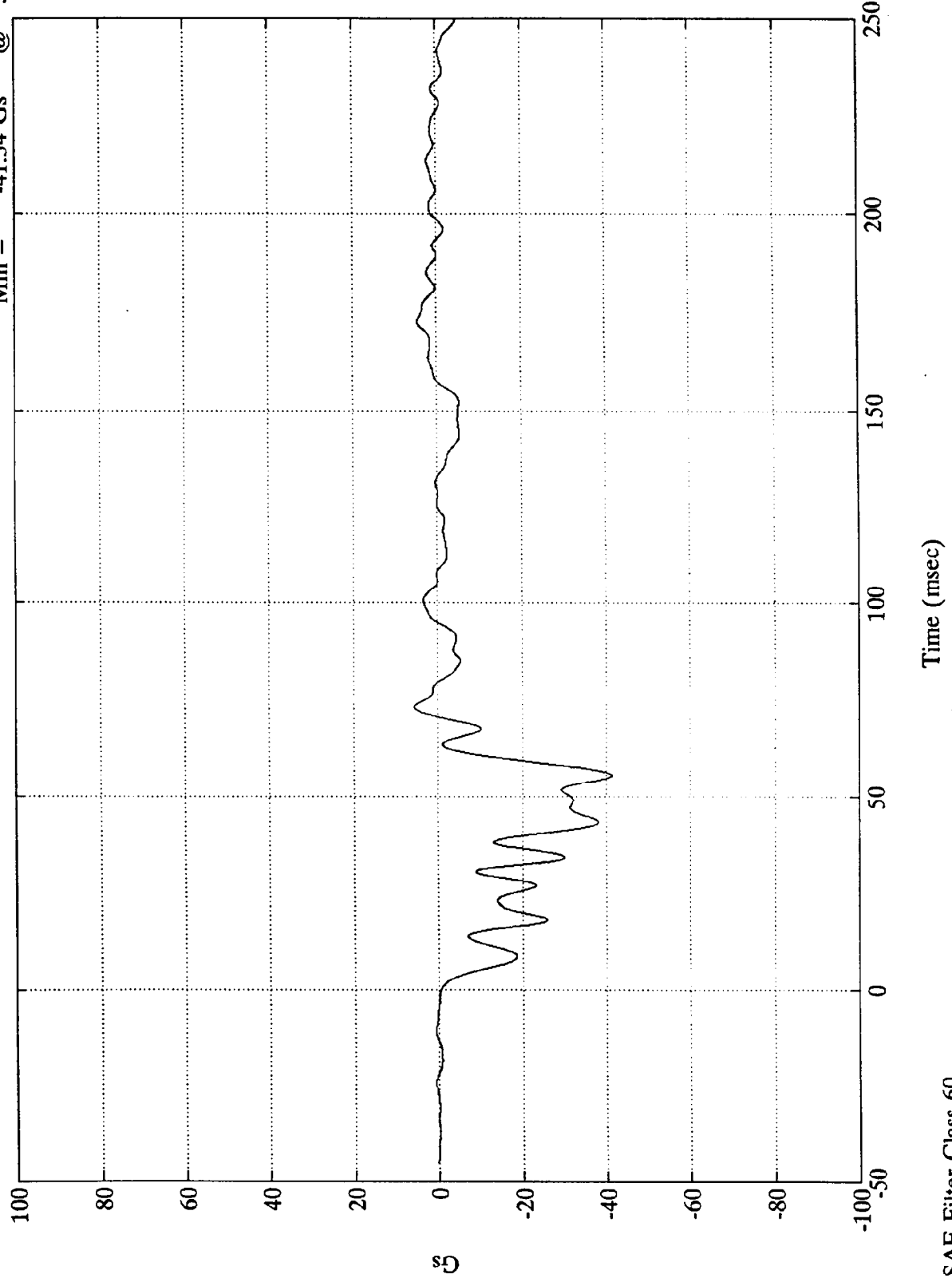
Max = 19.00 in. @ 85.44 msec
Min = 0.00 in. @ -0.00 msec



Test 1090

L. Brake Caliper X (#6)

Max = 5.63 Gs @ 73.08 msec
Min = -41.34 Gs @ 55.68 msec



SAE Filter Class 60

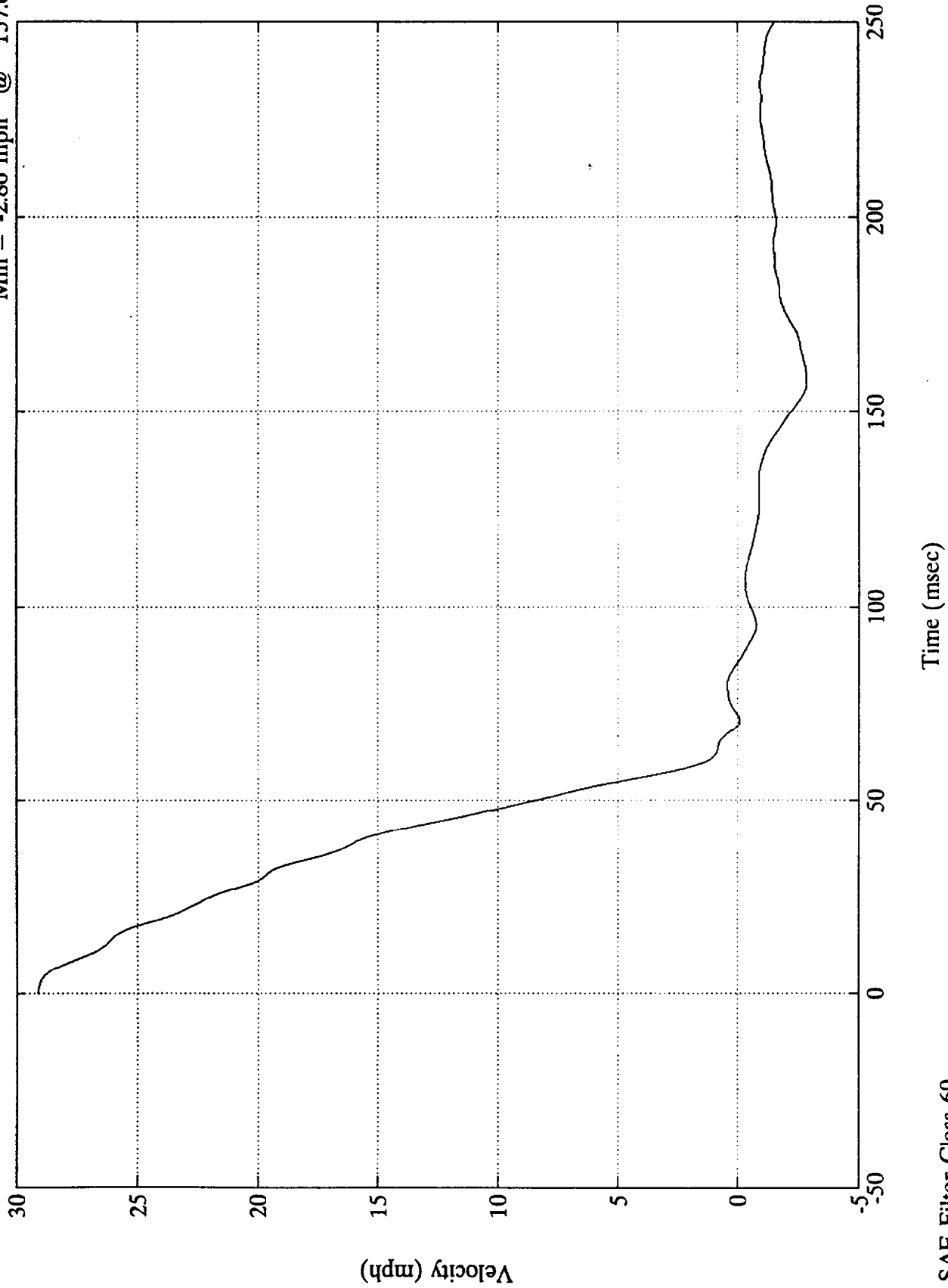
Time (msec)

Gs

Test 1090

L. Brake Caliper X (#6)

Max = 29.10 mph @ 0.24 msec
Min = -2.86 mph @ 157.68 msec

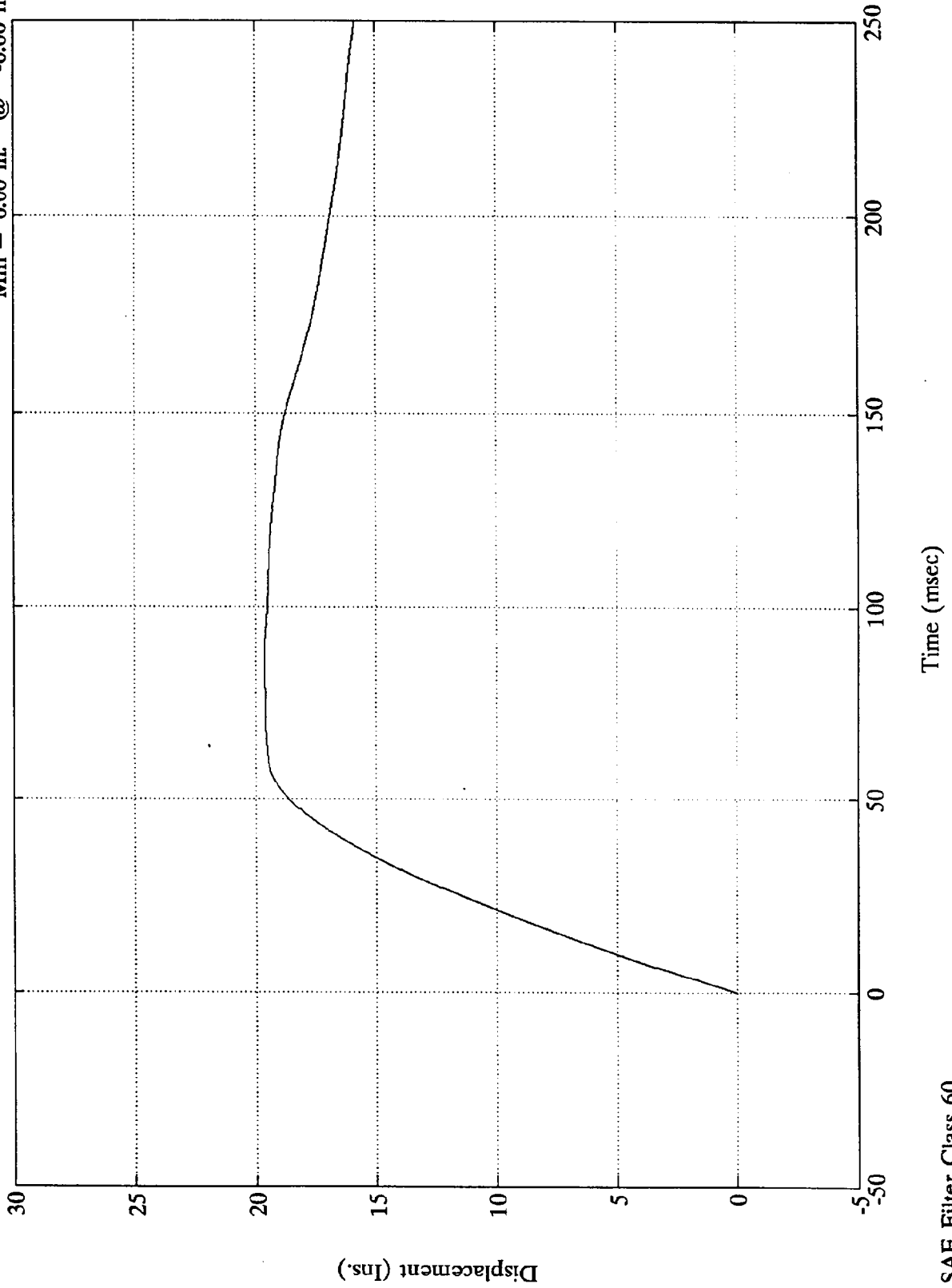


SAE Filter Class 60

Test 1090

L. Brake Caliper X (#6)

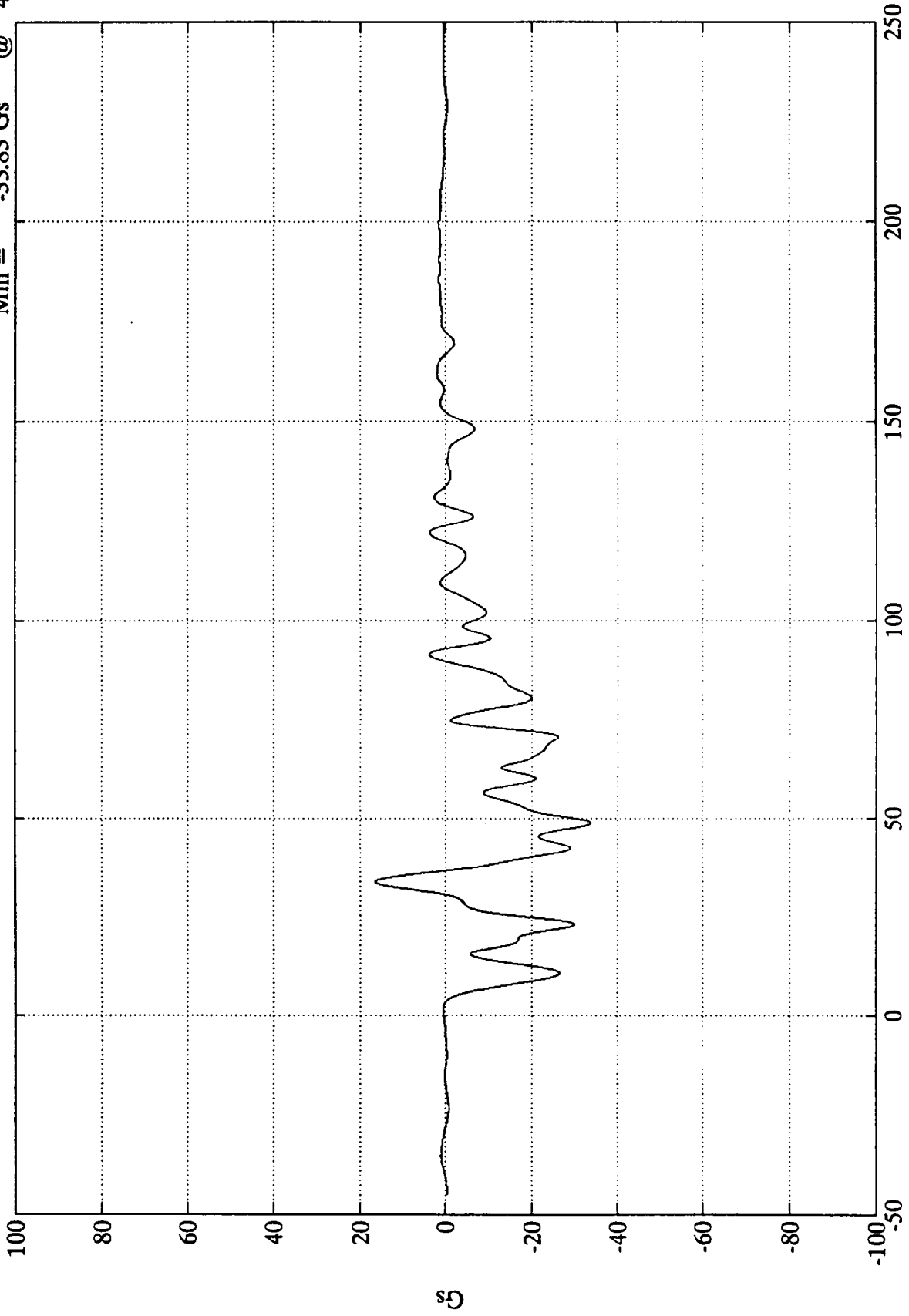
Max = 19.65 in. @ 87.60 msec
Min = 0.00 in. @ -0.00 msec



Test 1090

Instrument Panel X (#7)

Max = 16.58 Gs @ 33.72 msec
Min = -33.83 Gs @ 48.95 msec



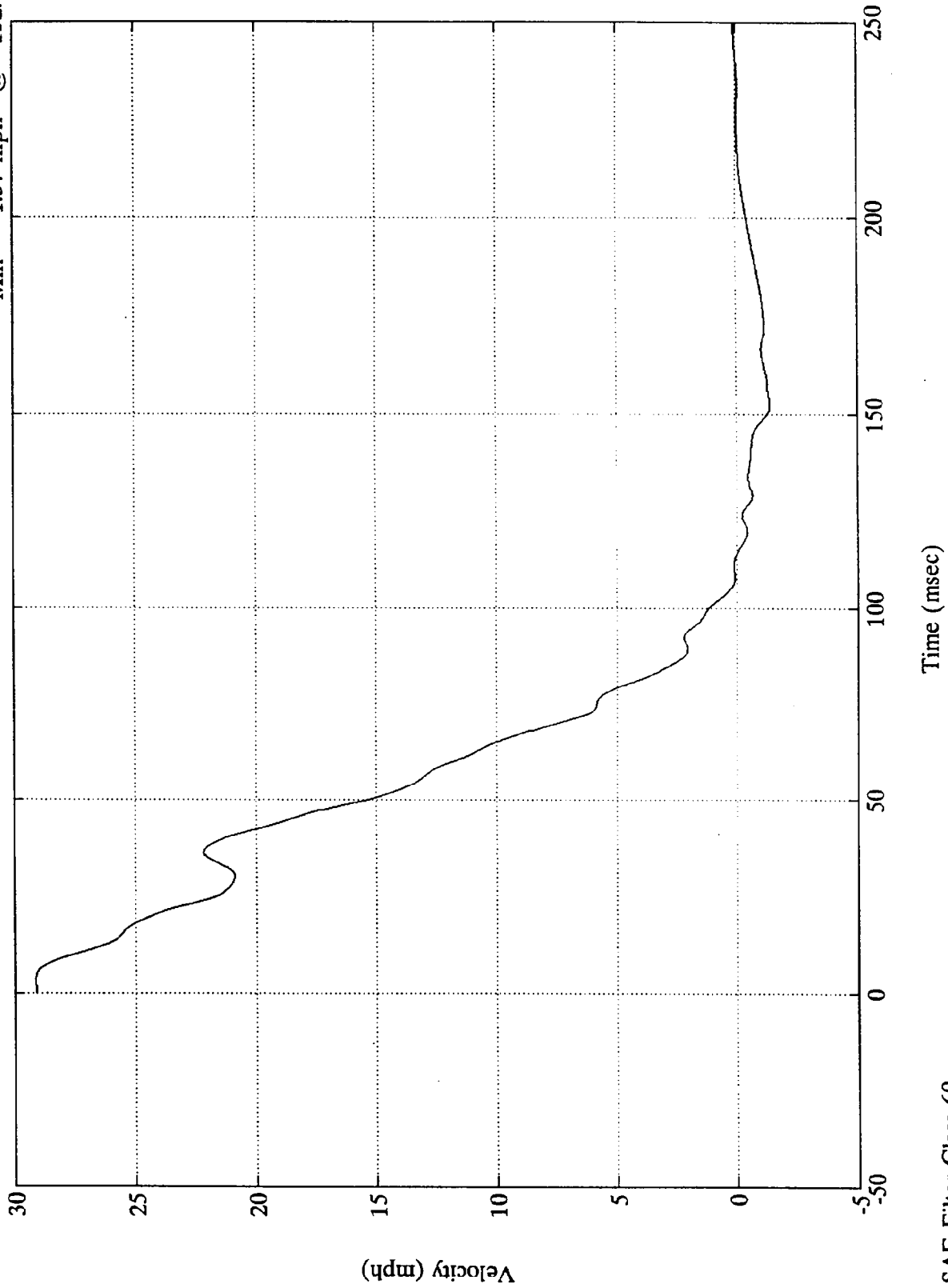
Time (msec)

SAE Filter Class 60

Test 1090

Instrument Panel X (#7)

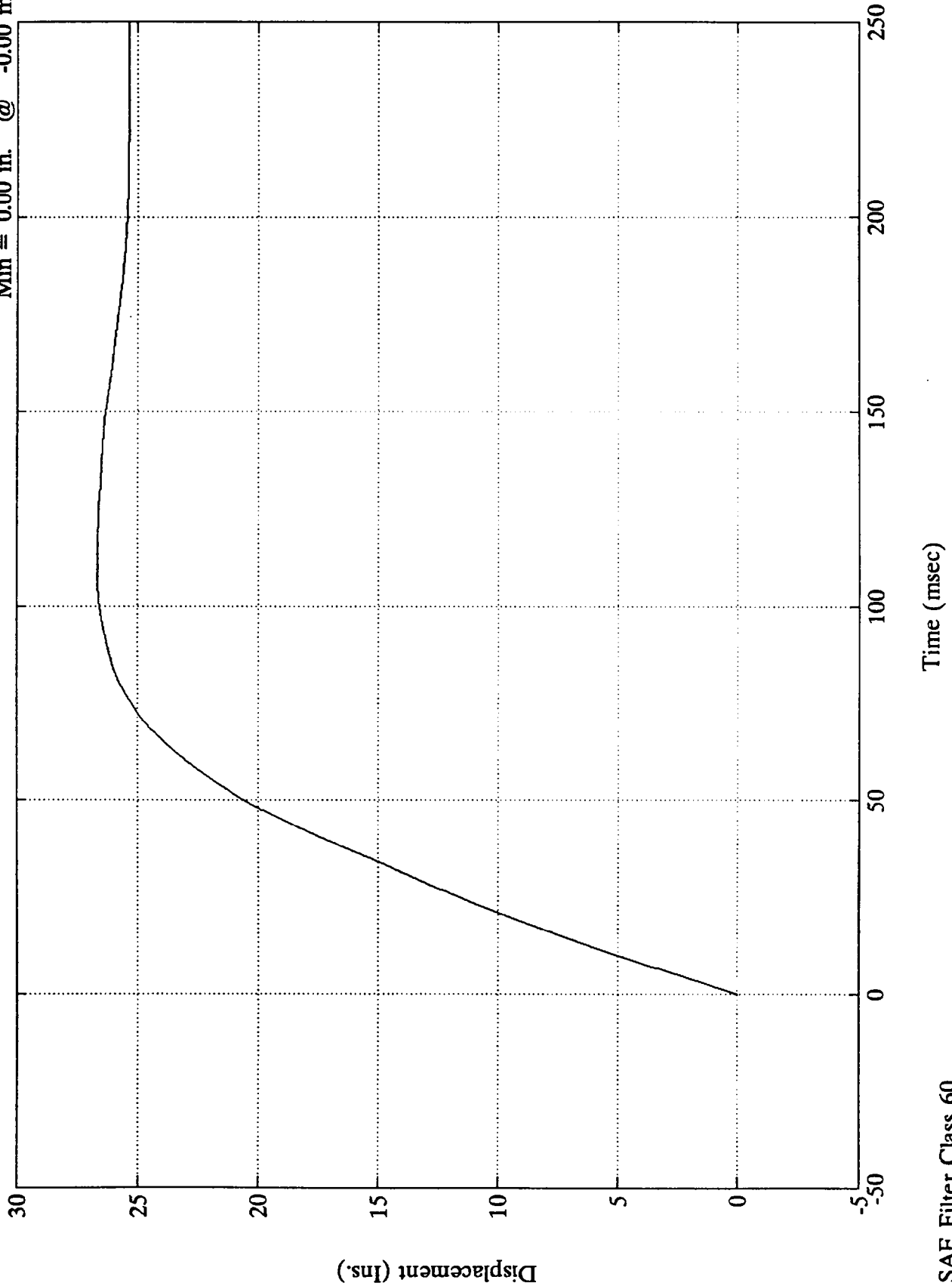
Max = 29.13 mph @ 3.84 msec
Min = -1.37 mph @ 152.40 msec



SAE Filter Class 60

Test 1090

Instrument Panel X (#7)
Max = 26.64 in. @ 117.36 msec
Min = 0.00 in. @ -0.00 msec



TEST NO. CM5108

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

FACILITY: TRACK
RUN #: 1090
SERIES #: 15

TEST DATE: 18 Jul 1991
TEST TIME: 12:39:07
BOARD: a

TITLE: NHTSA 208 TEST # 15 TOYOTA MR2

HIC SUMMARY: Pos. 1 Head Resultant

hic: 554.27
t1 = 64.560 msec
t2 = 67.680 msec
Average G's Over Hic Duration = 125.84

HIC SUMMARY: Pos. 2 Head Resultant

hic: 284.89
t1 = 115.680 msec
t2 = 134.280 msec
Average G's Over Hic Duration = 47.21

CLIP SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 62.945 G's
Tstart = 78.2400 ms
Tend = 81.3600 ms
CSI = 429.693

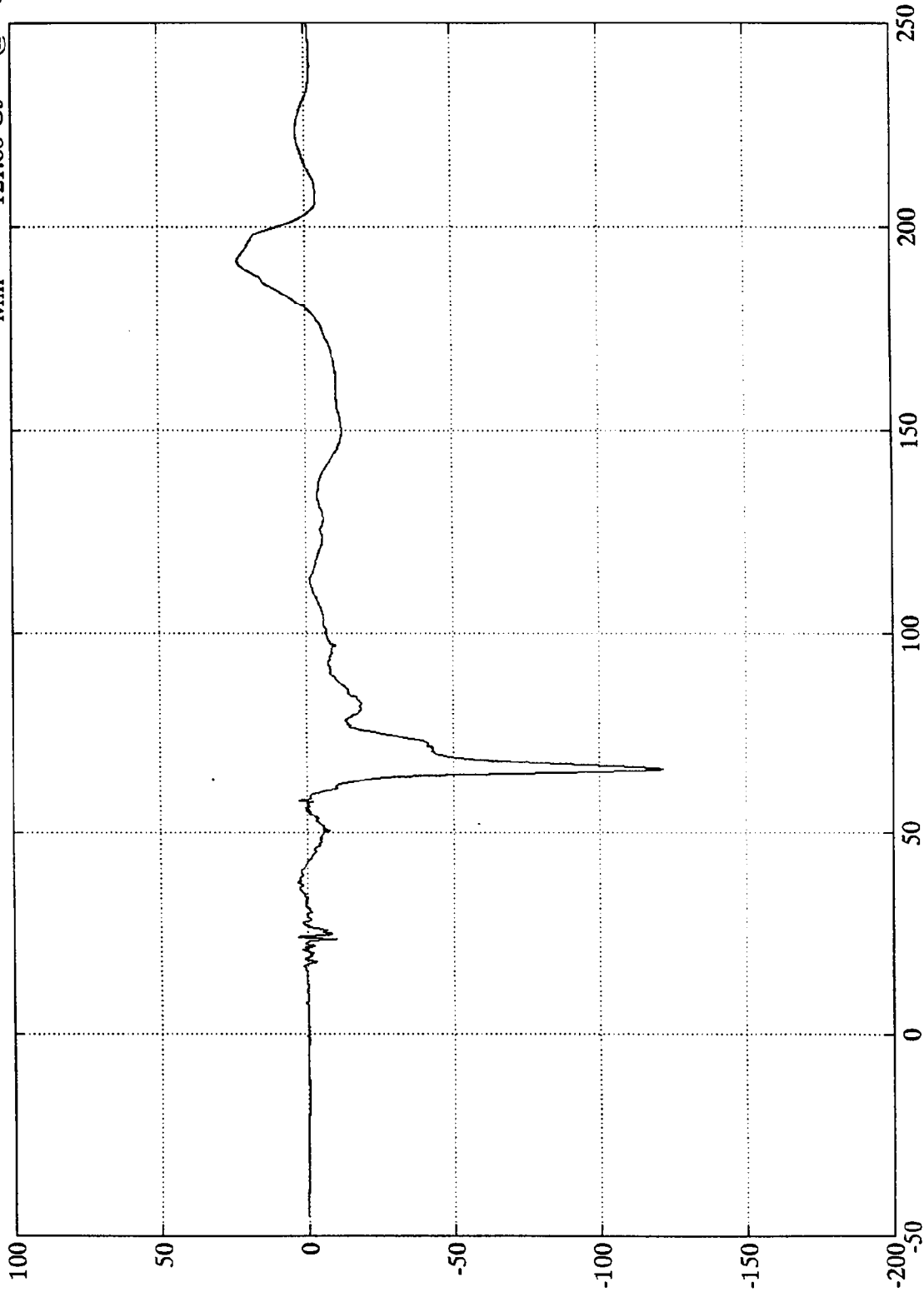
CLIP SUMMARY: Pos. 2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 29.293 G's
Tstart = 74.0400 ms
Tend = 77.1600 ms
CSI = 213.084

Test 1090

Pos. 1 Head X

Max = 23.21 Gs @ 191.88 msec
Min = -121.88 Gs @ 66.00 msec



Time (msec)

SAE Filter Class 1000

85

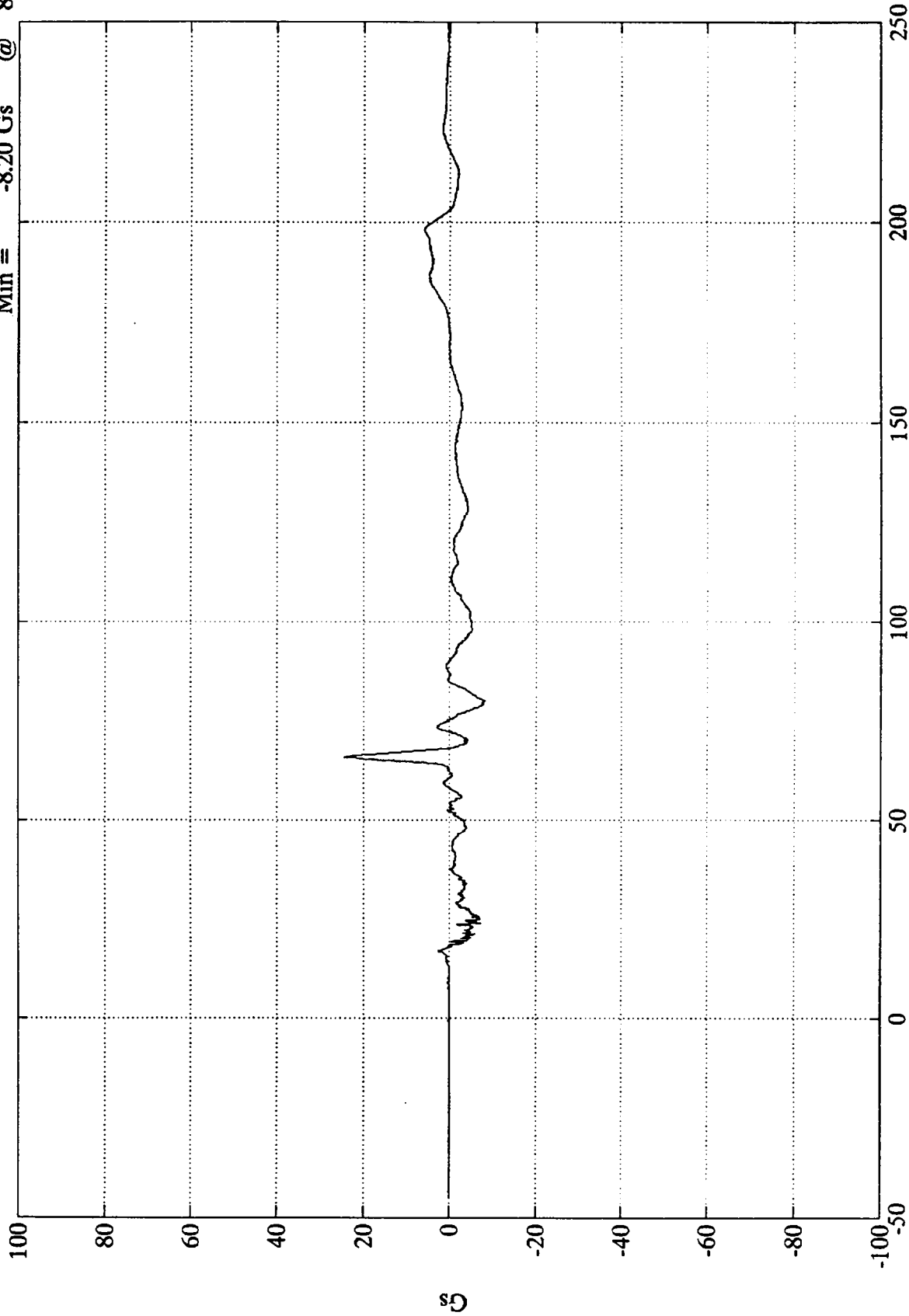
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Test 1090

Pos. 1 Head Y

Max = 24.30 Gs @ 65.87 msec
Min = -8.20 Gs @ 80.27 msec



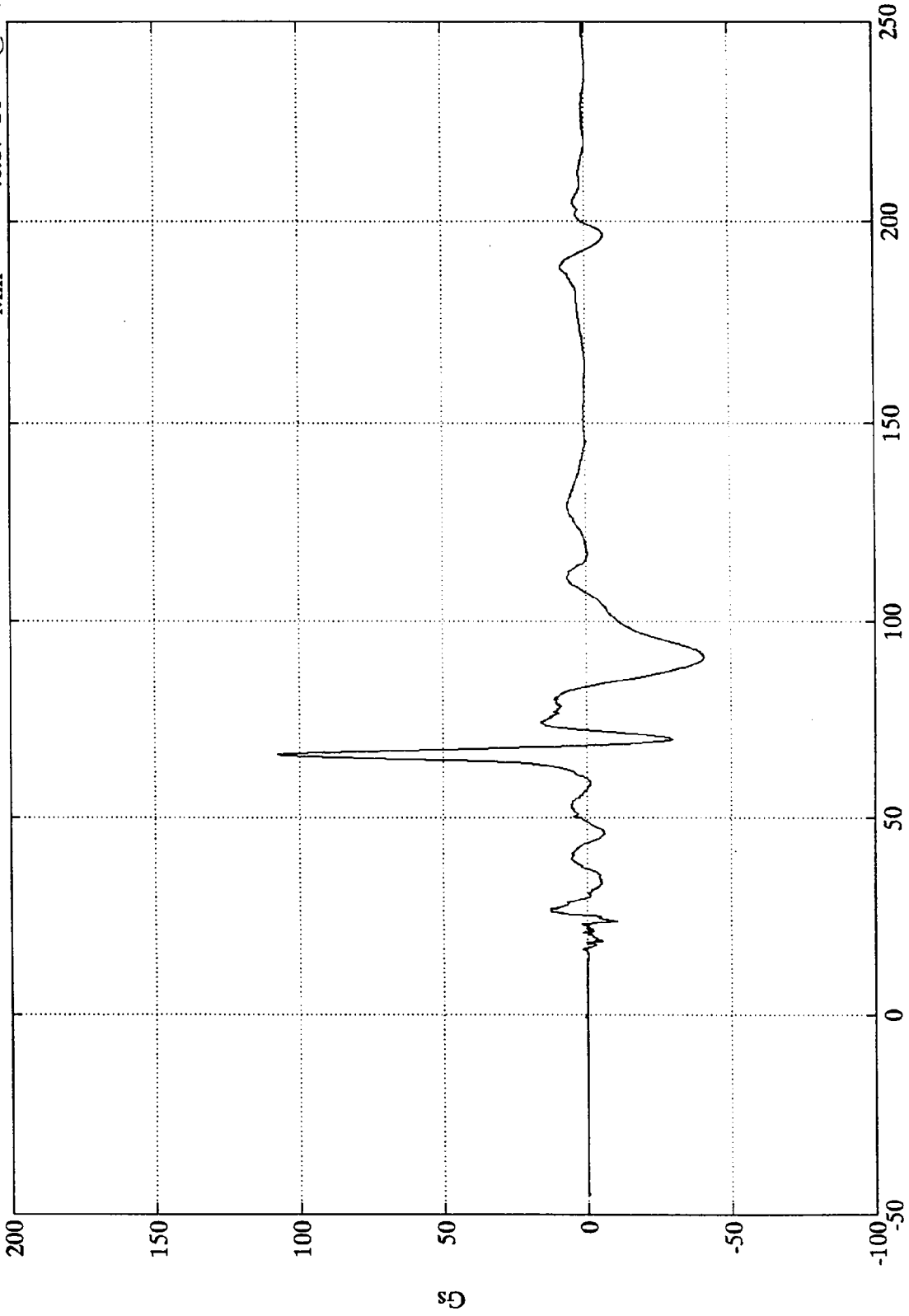
Time (msec)

SAE Filter Class 1000

Test 1090

Pos. 1 Head Z

Max = 107.76 Gs @ 66.00 msec
Min = -40.87 Gs @ 91.20 msec



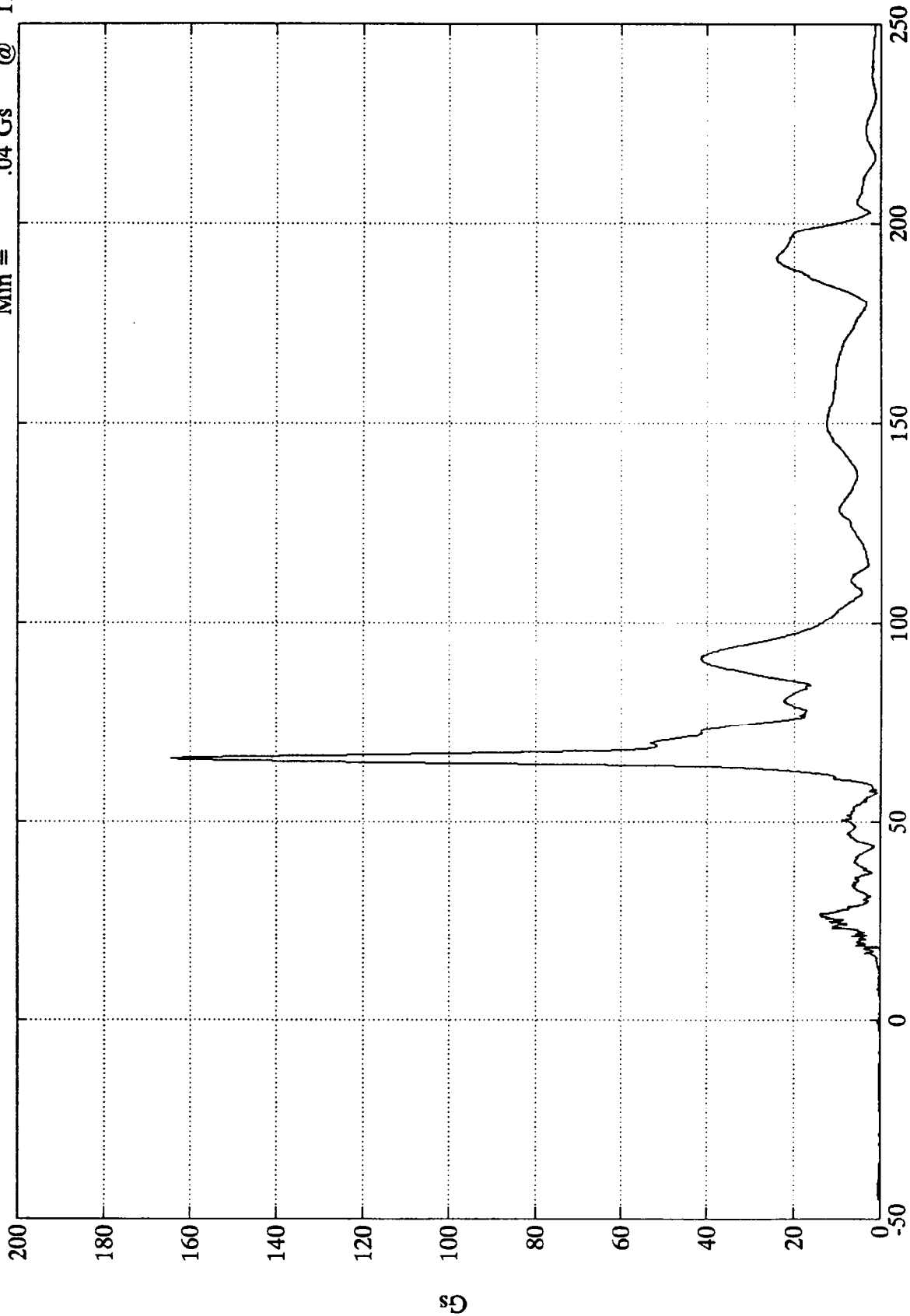
Time (msec)

SAE Filter Class 1000

Test 1090

Pos. 1 Head Resultant

Max = 164.38 Gs @ 66.00 msec
Min = .04 Gs @ 11.51 msec



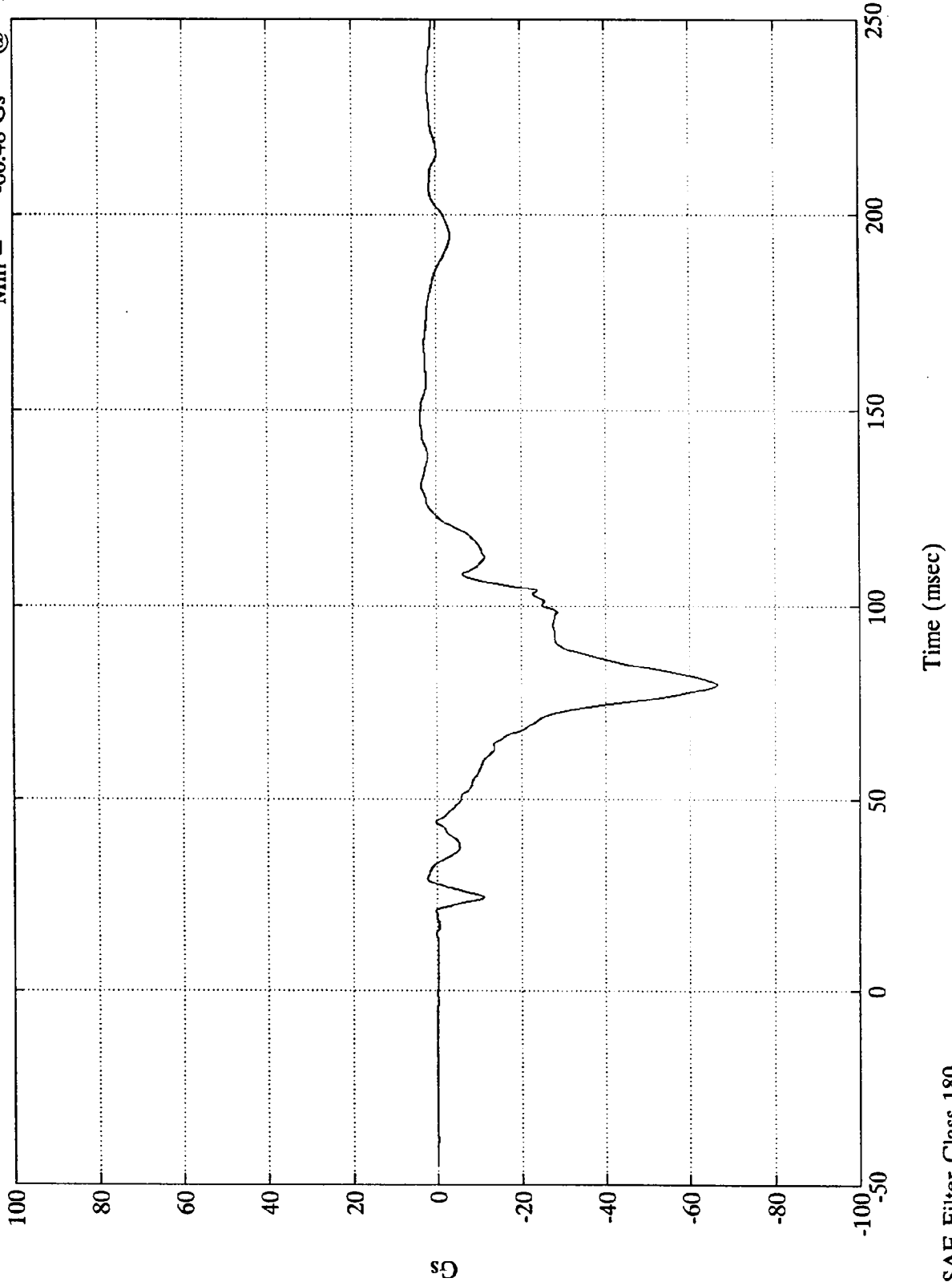
Time (msec)

SAE Filter Class 1000

Test 1090

Pos. 1 Chest X

Max = 3.82 Gs @ 146.88 msec
Min = -66.48 Gs @ 79.68 msec



Gs

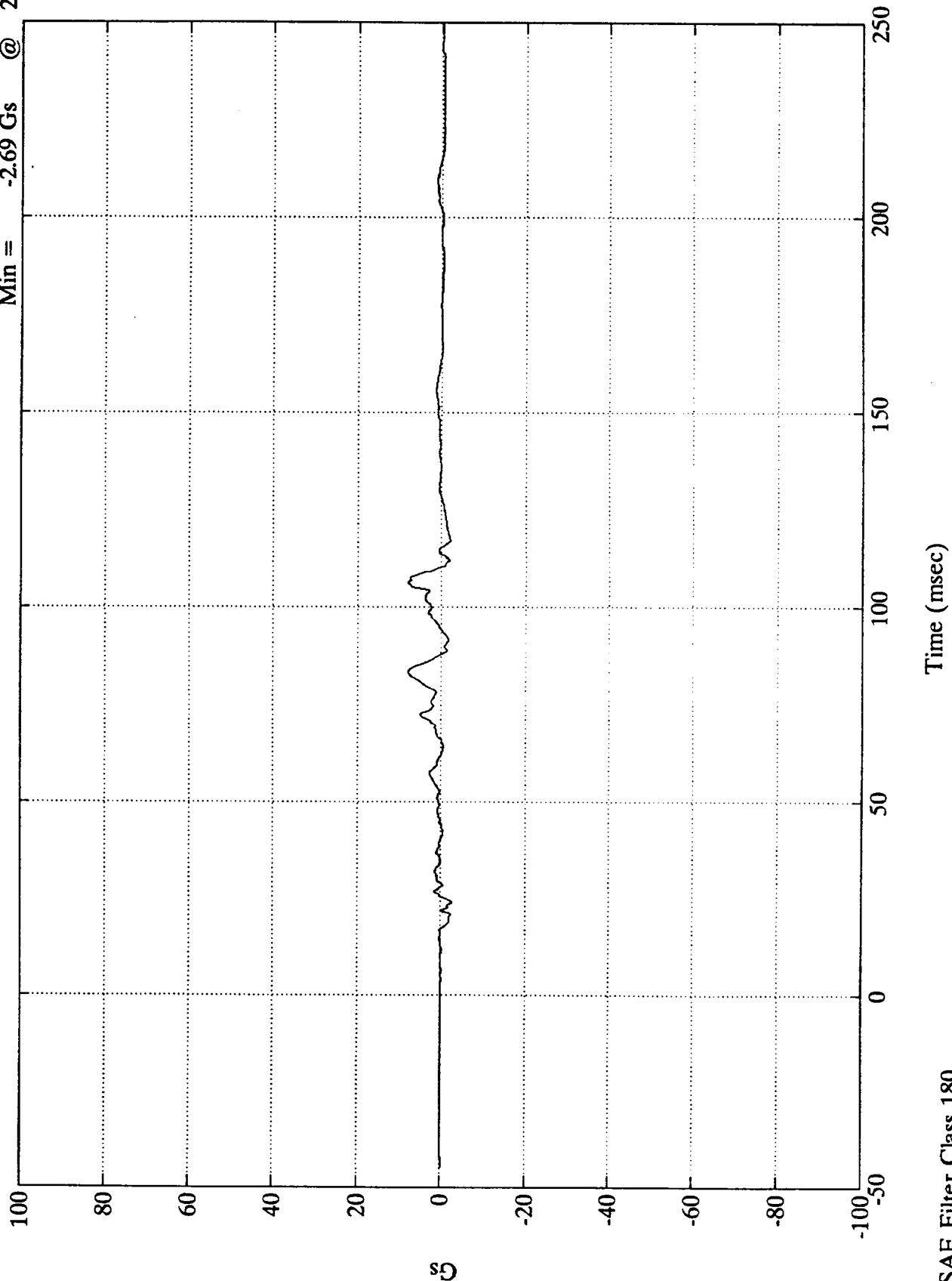
Time (msec)

SAE Filter Class 180

Test 1090

Pos. 1 Chest Y

Max = 7.84 Gs @ 106.31 msec
Min = -2.69 Gs @ 23.76 msec

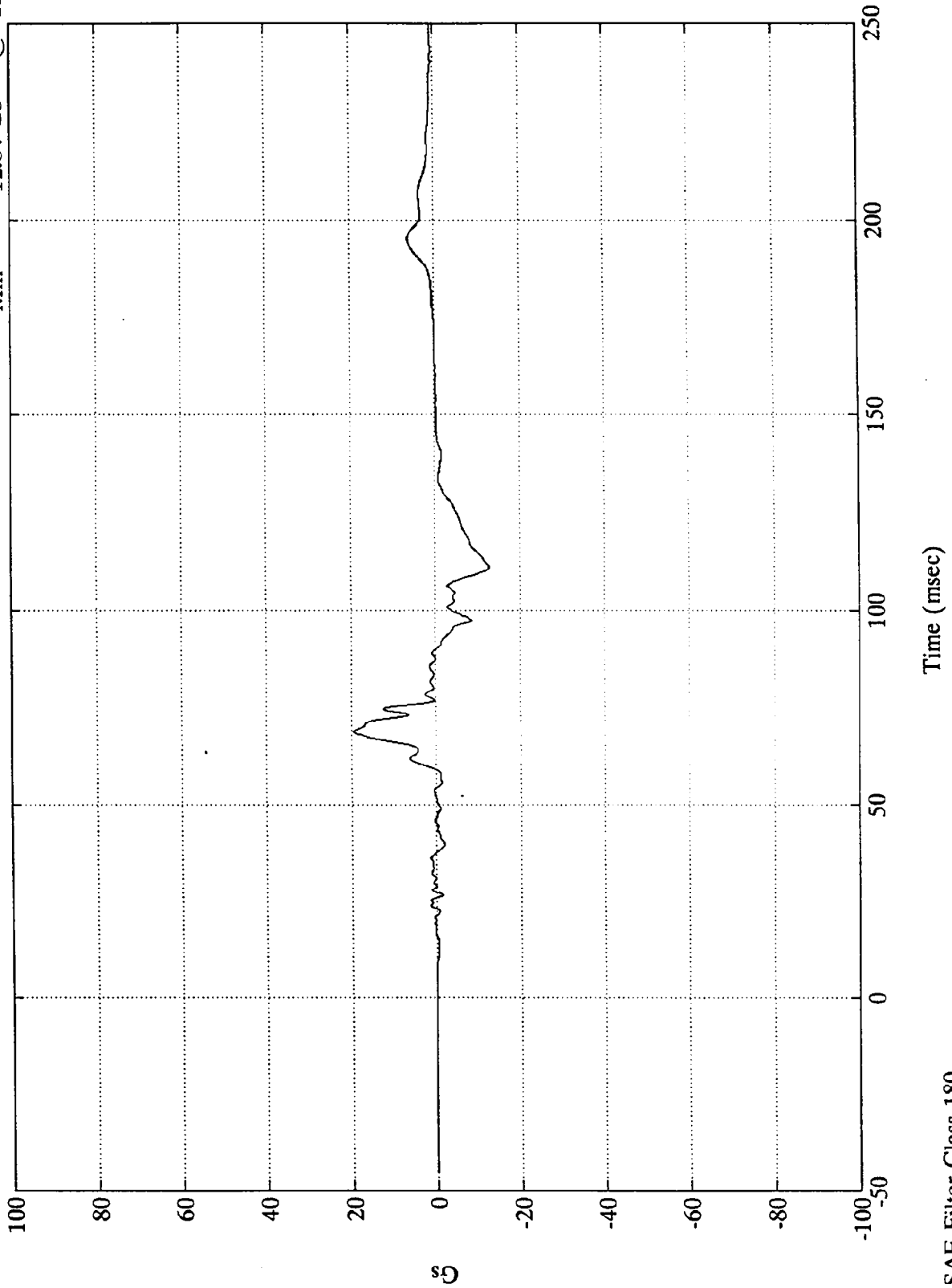


sD

Test 1090

Pos. 1 Chest Z

Max = 19.50 Gs @ 68.76 msec
Min = -12.84 Gs @ 111.36 msec

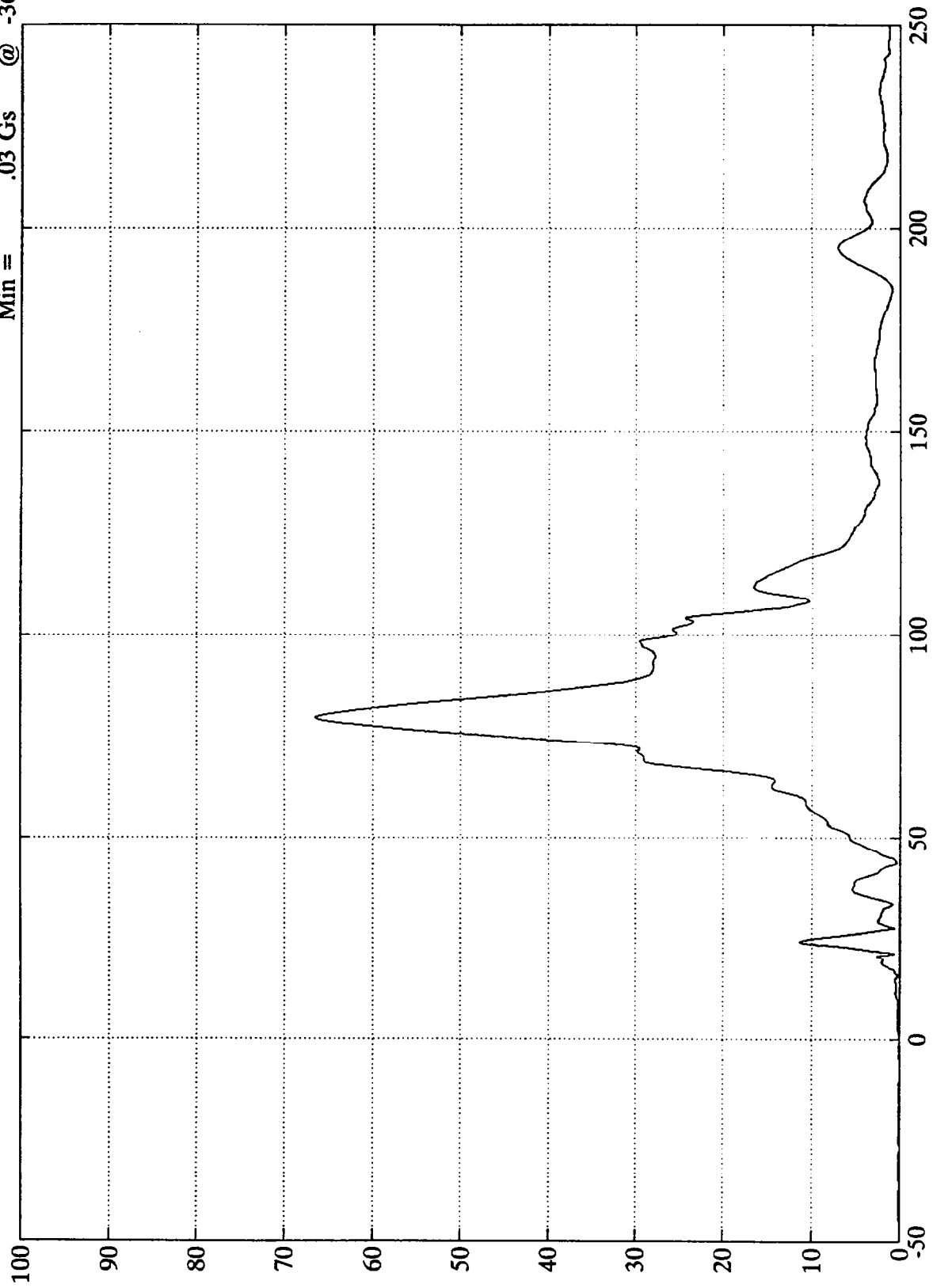


SAE Filter Class 180

Test 1090

Max = 66.54 Gs @ 79.68 msec
Min = .03 Gs @ -36.36 msec

Pos. 1 Chest Resultant



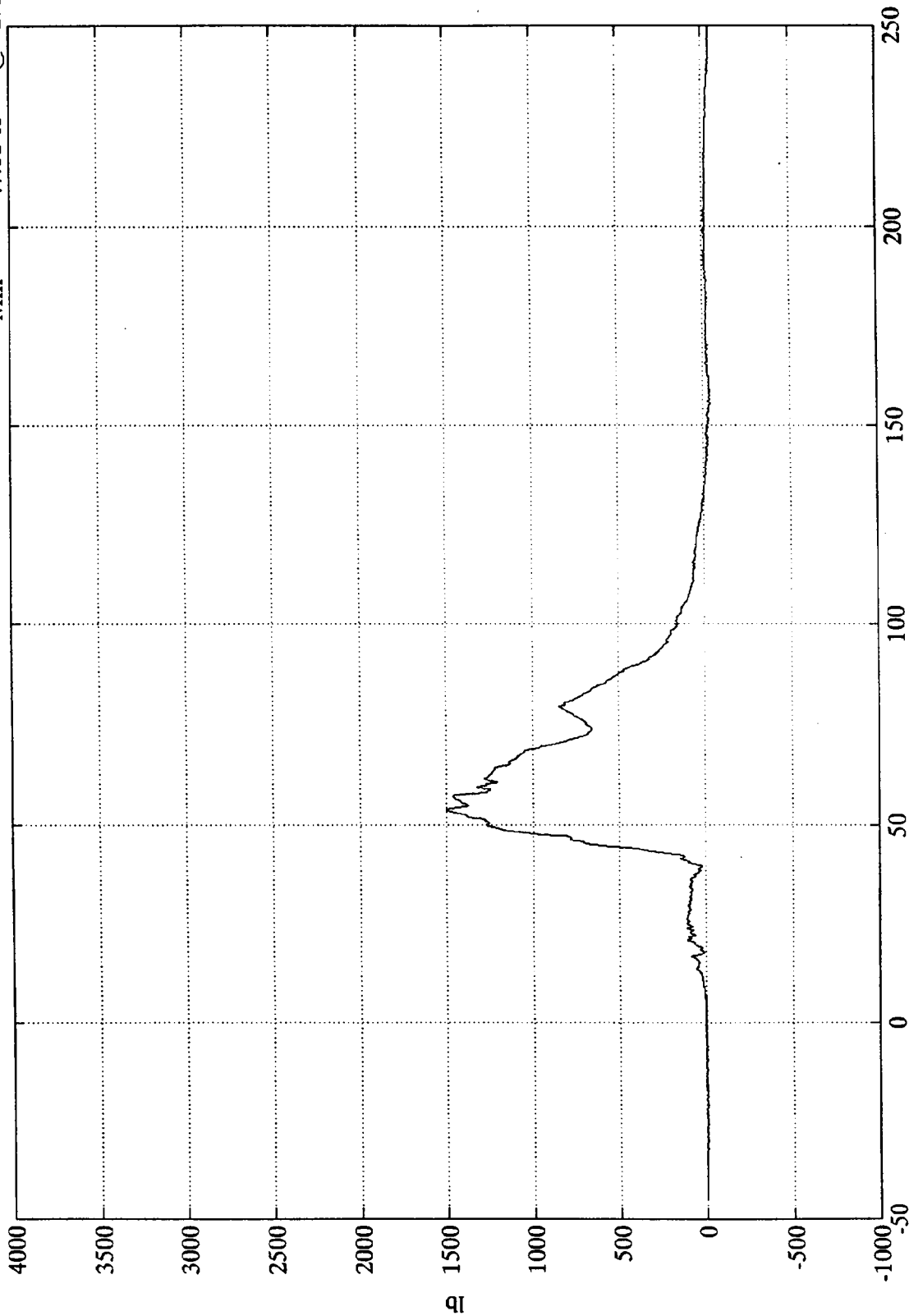
Time (msec)

SAE Filter Class 180

Test 1090

Pos. 1 Left Femur

Max = 1500.83 lb @ 53.88 msec
Min = -47.08 lb @ 252.72 msec



91

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Time (msec)

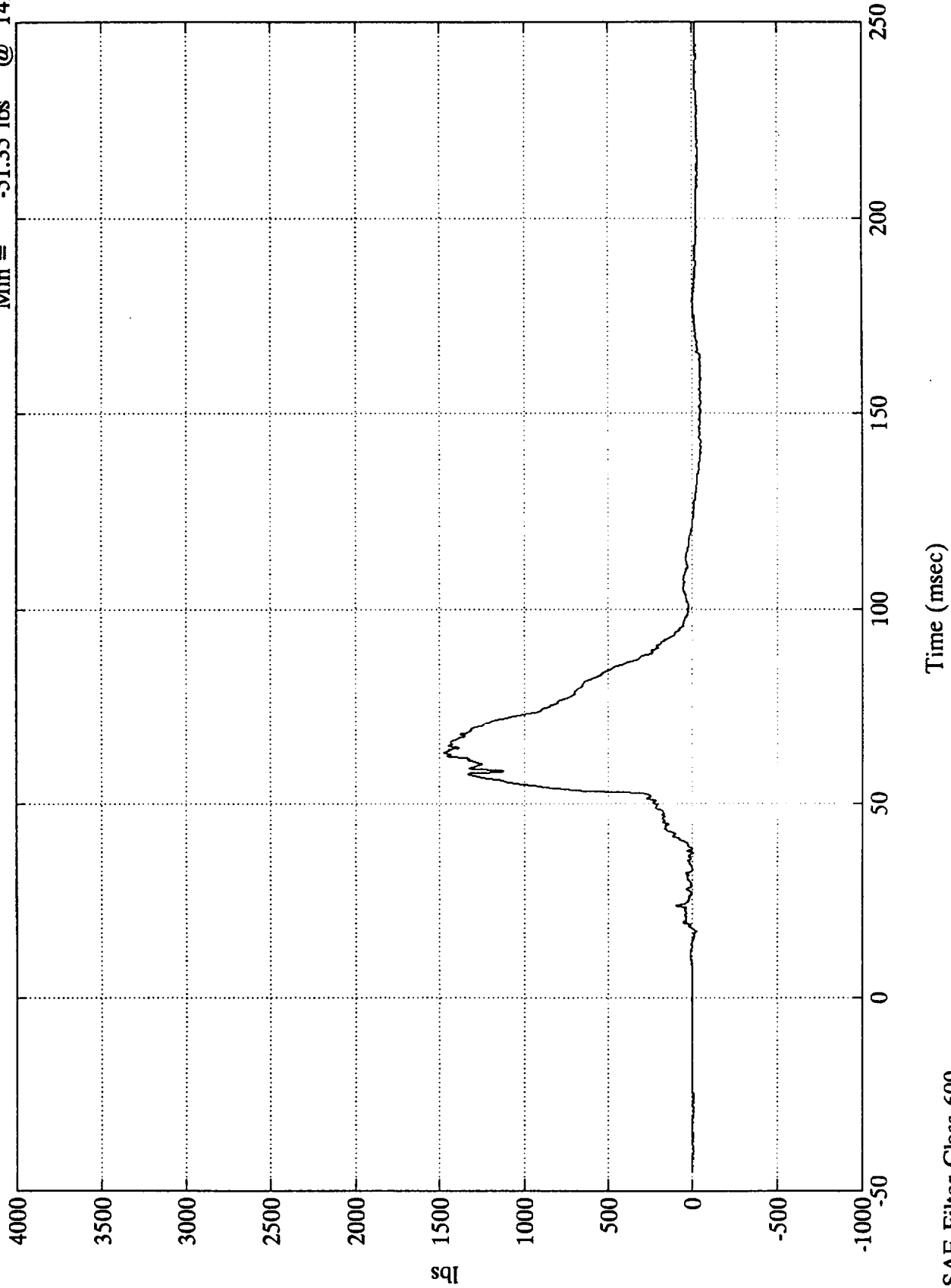
SAE Filter Class 600

7920-3

Test 1090

Pos. 1 Right Femur

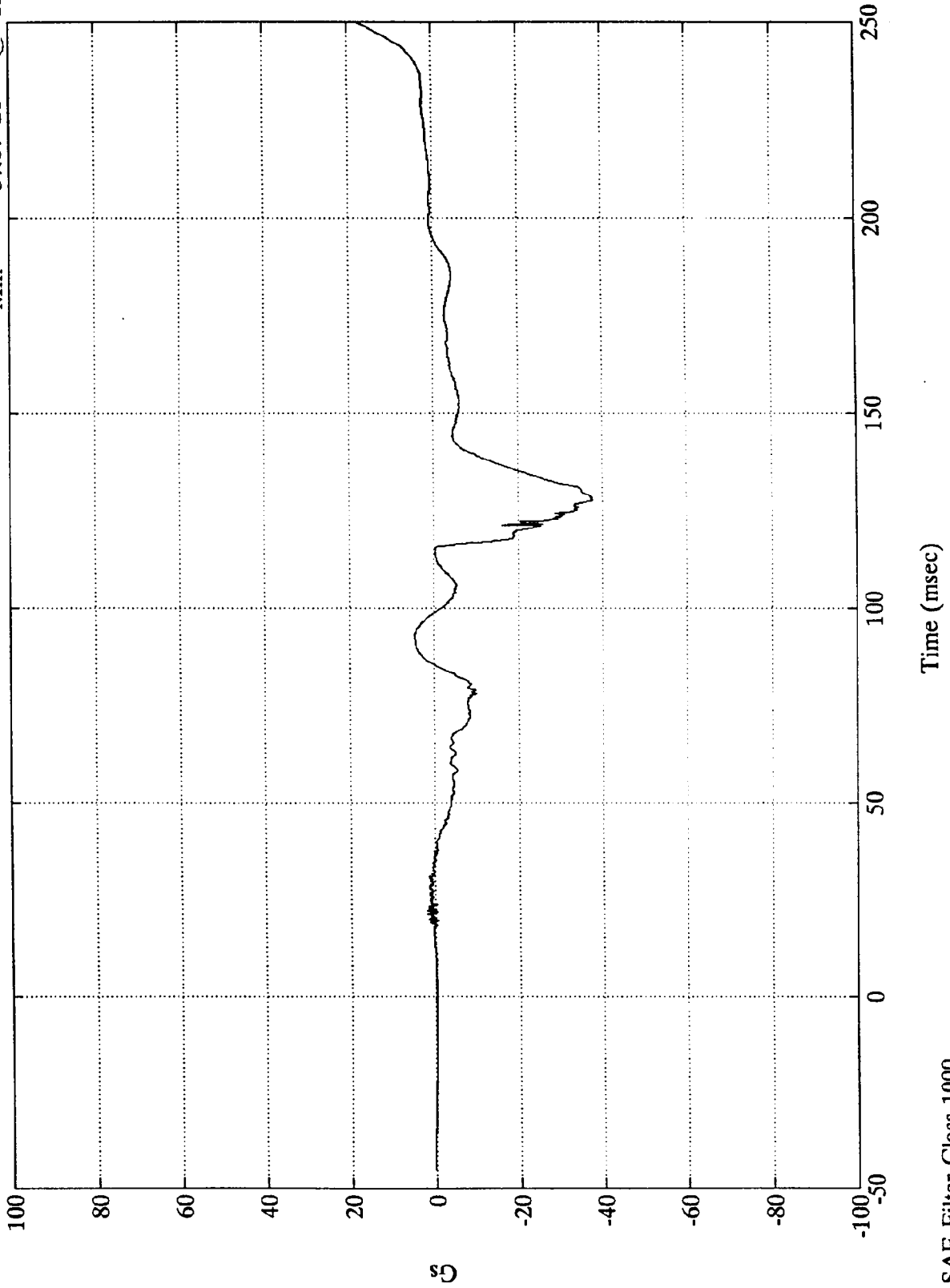
Max = 1475.00 lbs @ 63.11 msec
Min = -51.35 lbs @ 141.24 msec



Test 1090

Pos. 2 Head X

Max = 24.45 Gs @ 254.04 msec
Min = -37.67 Gs @ 127.56 msec



G

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7920-3

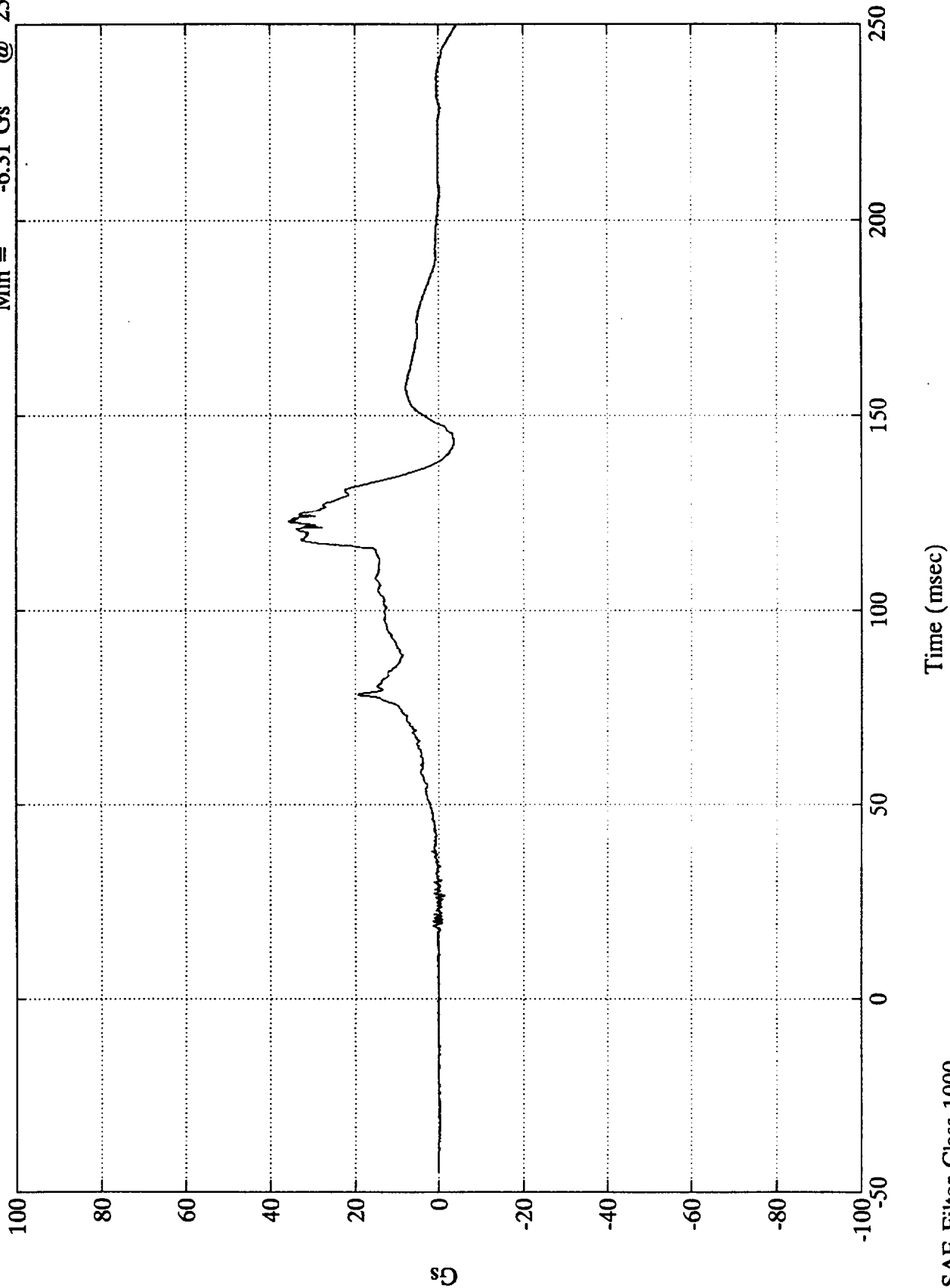
SAE Filter Class 1000

Time (msec)

Test 1090

Pos. 2 Head Y

Max = 35.62 Gs @ 122.88 msec
Min = -6.31 Gs @ 254.04 msec



Gs

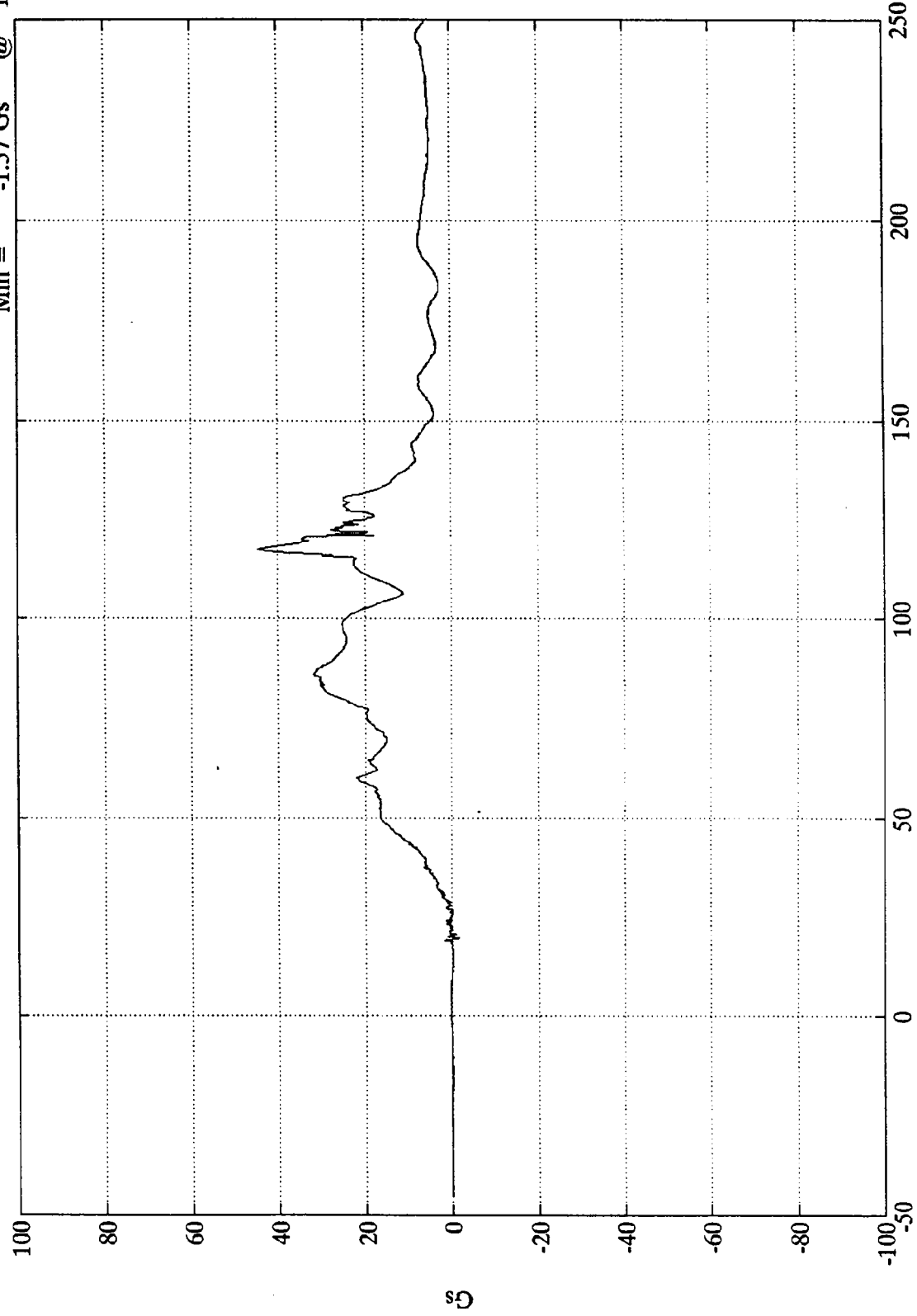
Time (msec)

SAE Filter Class 1000

Test 1090

Pos. 2 Head Z

Max = 44.58 Gs @ 117.72 msec
Min = -1.57 Gs @ 19.67 msec



80

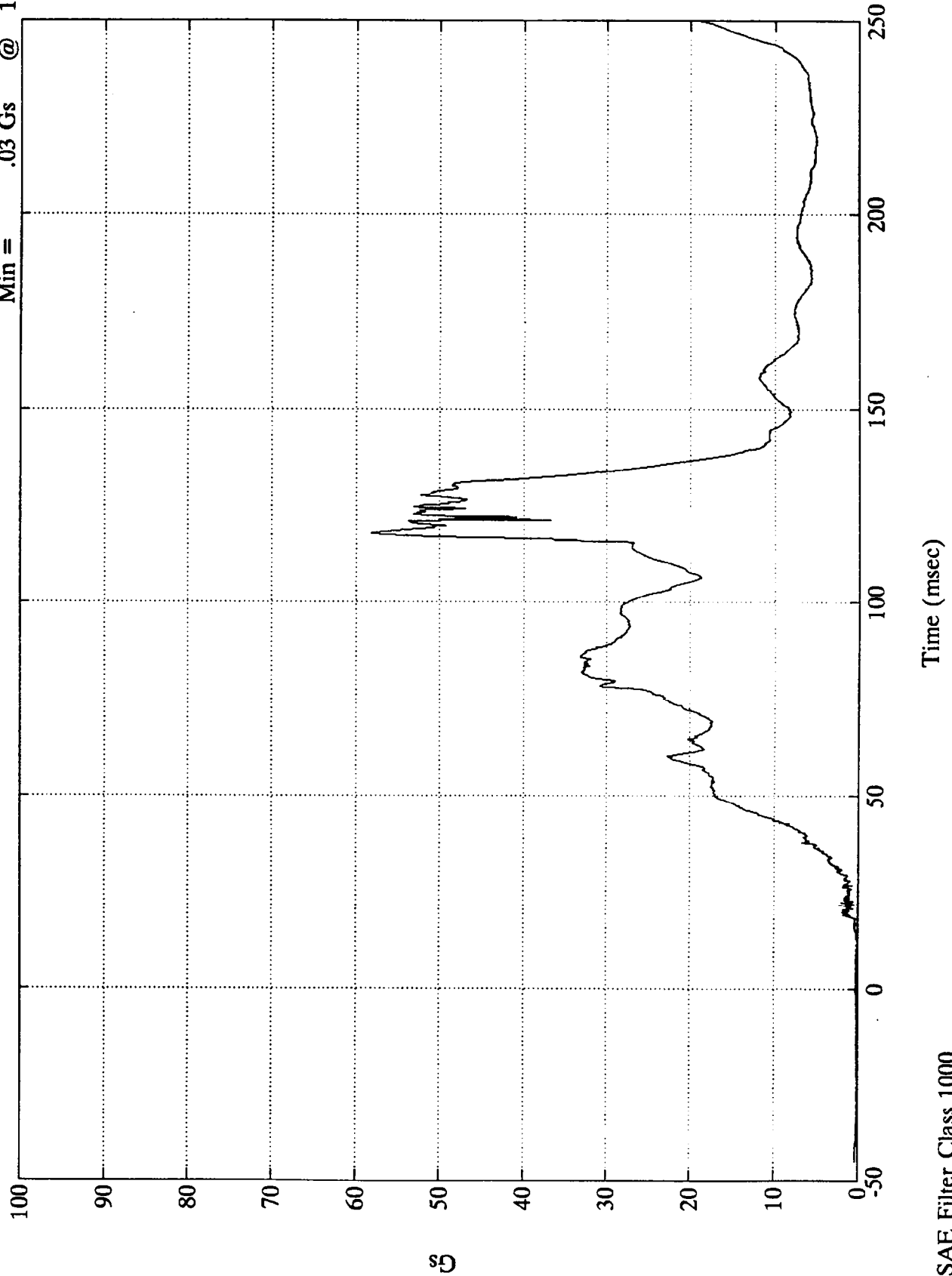
Time (msec)

SAE Filter Class 1000

Test 1090

Pos. 2 Head Resultant

Max = 58.18 Gs @ 117.83 msec
Min = .03 Gs @ 12.11 msec



Gs

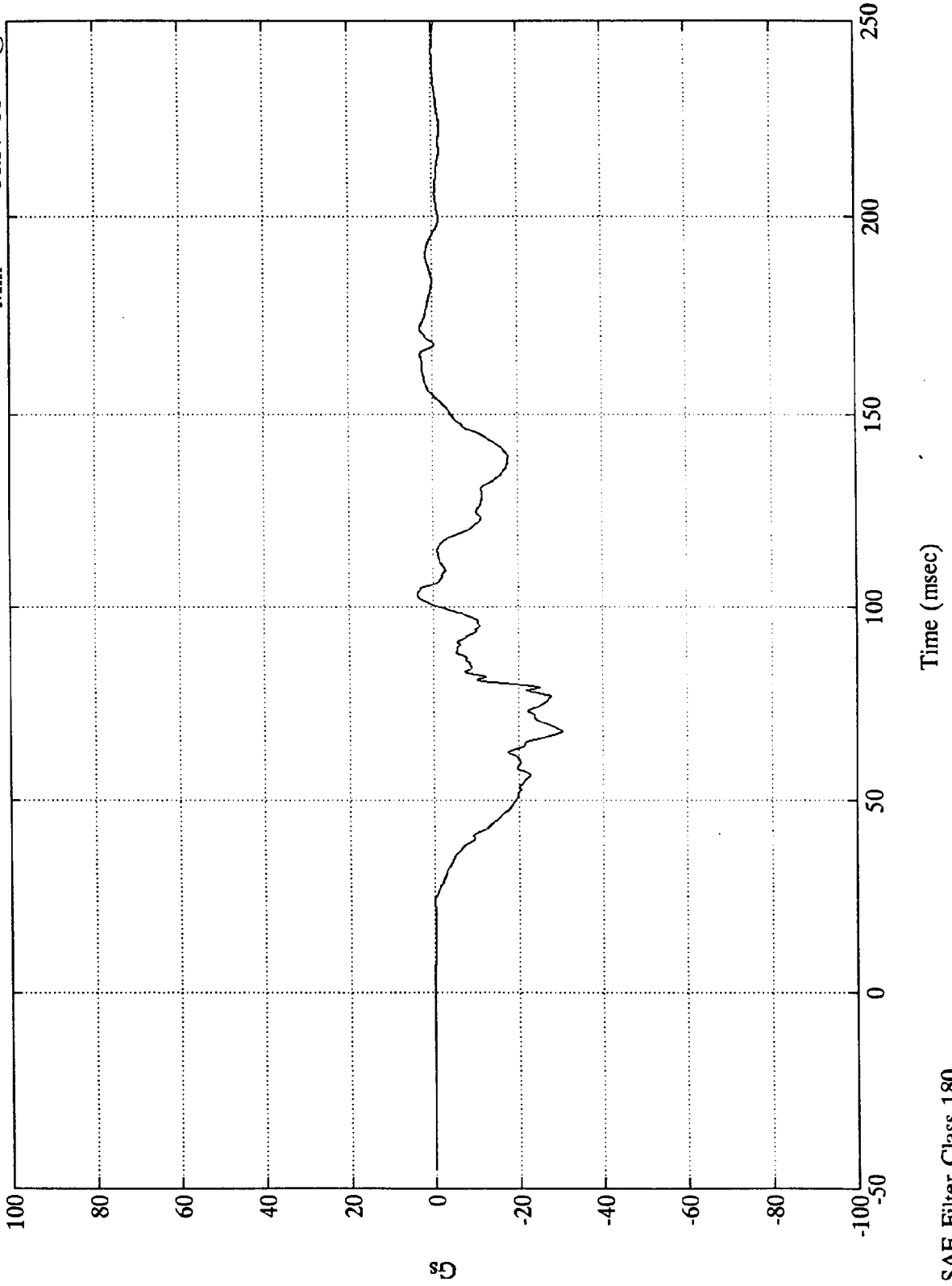
Time (msec)

SAE Filter Class 1000

Test 1090

Pos. 2 Chest X

Max = 3.92 Gs @ 103.31 msec
Min = -30.37 Gs @ 67.68 msec



B-40

7920-3

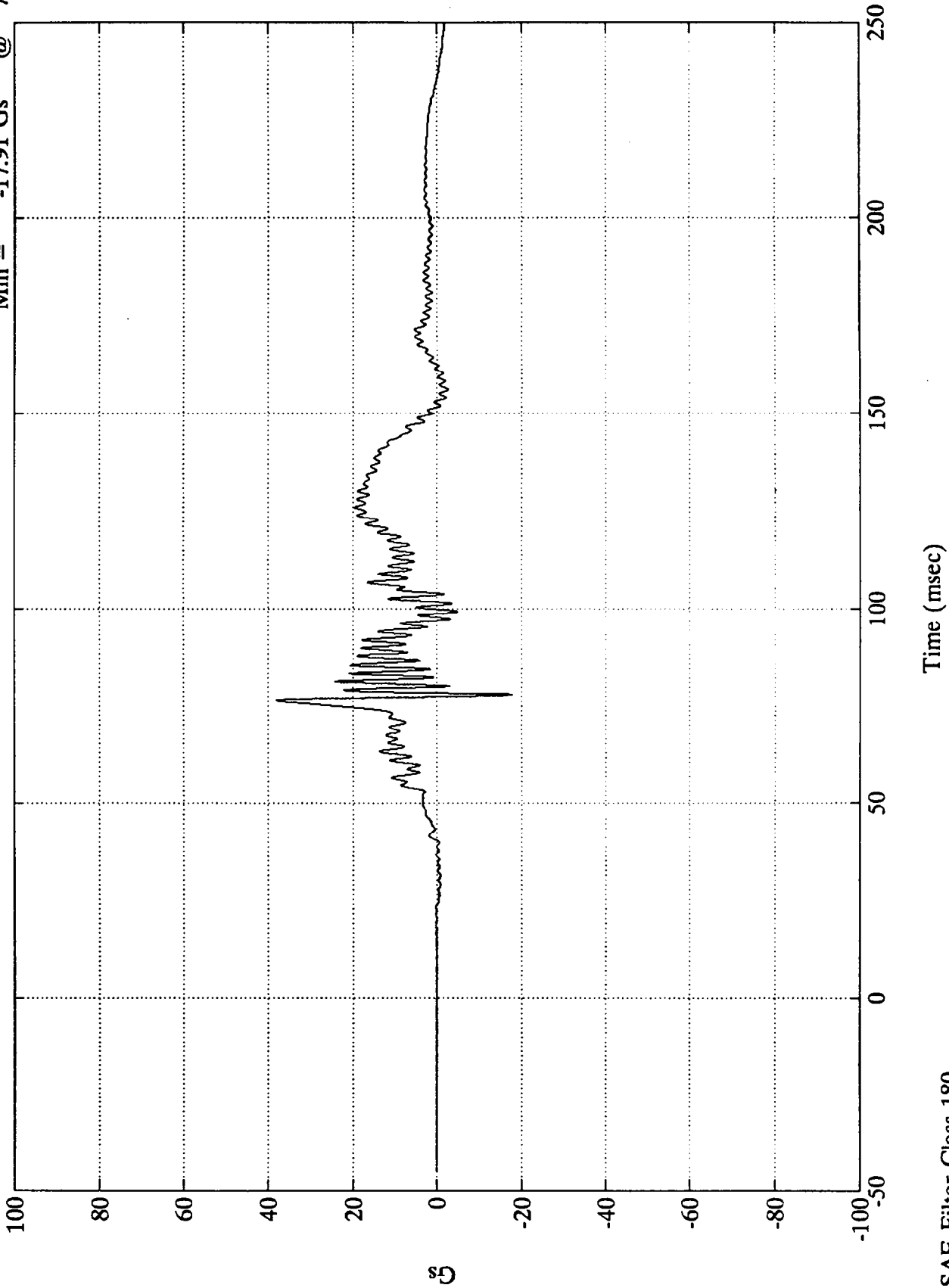
SAE Filter Class 180



Test 1090

Pos. 2 Chest Y

Max = 37.99 Gs @ 76.44 msec
Min = -17.91 Gs @ 78.00 msec



B-41

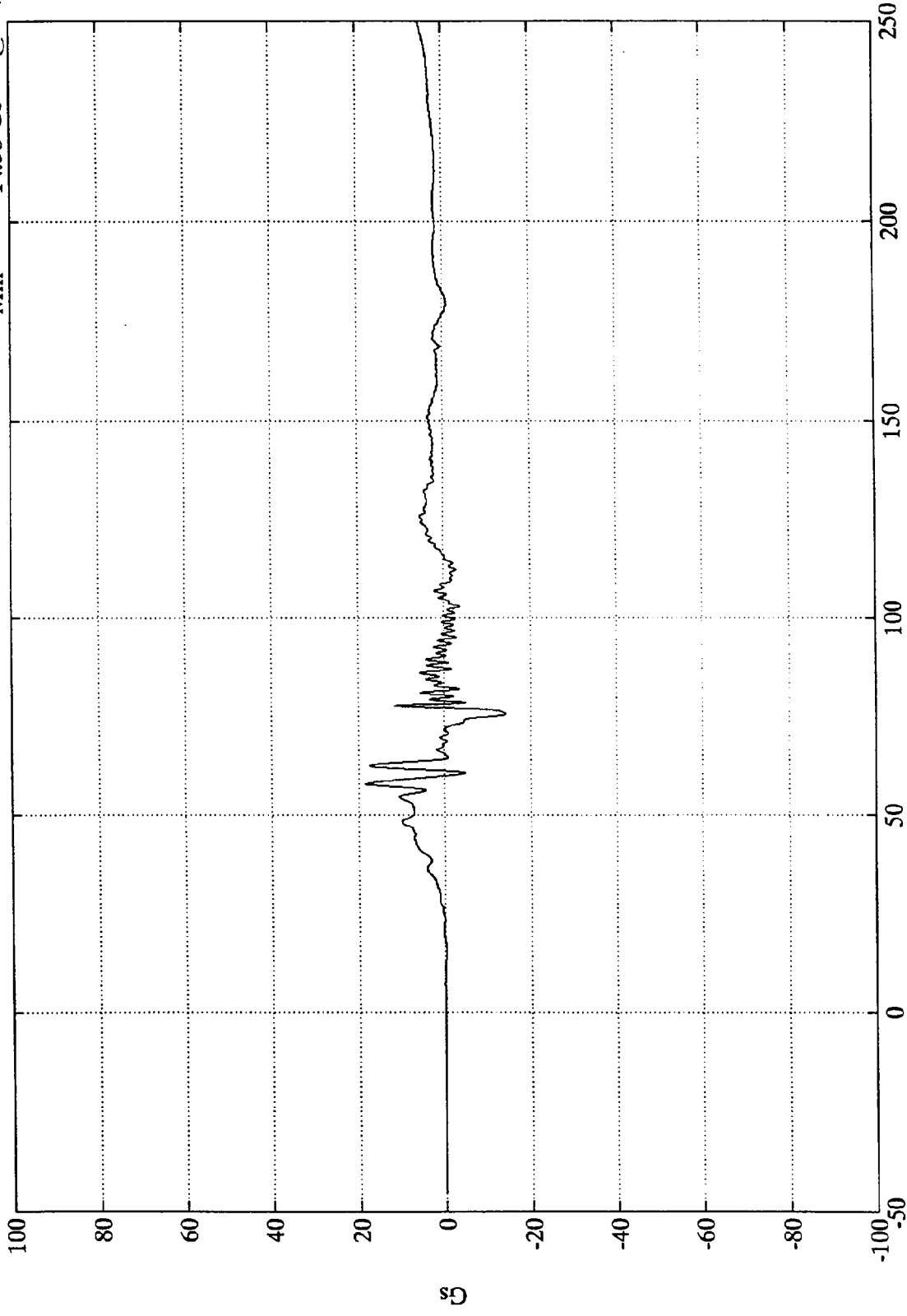
7920-3

SAE Filter Class 180

Test 1090

Pos. 2 Chest Z

Max = 18.31 Gs @ 58.08 msec
Min = -14.38 Gs @ 75.59 msec



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7920-3

SAE Filter Class 180

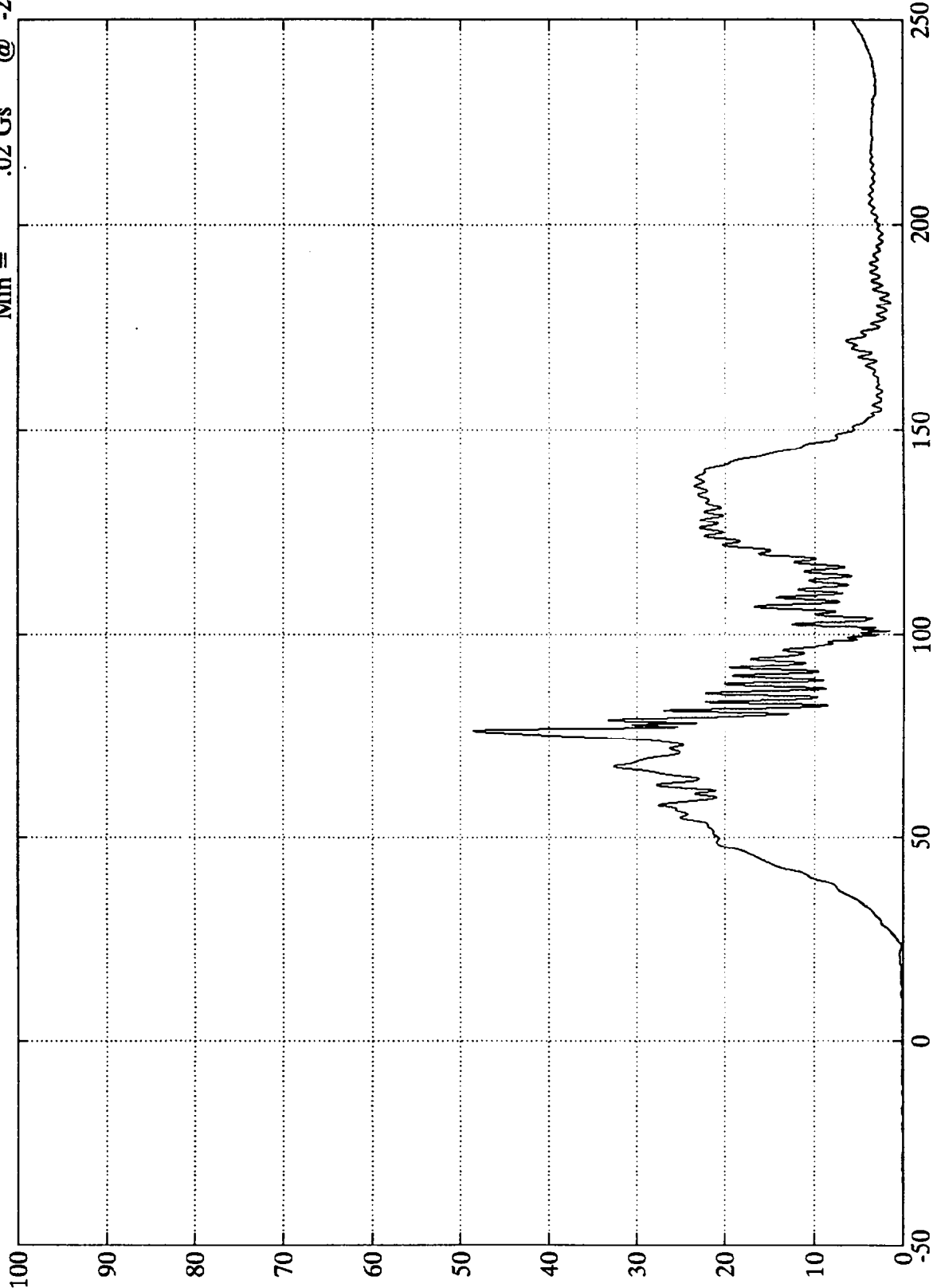
Time (msec)



Test 1090

Pos. 2 Chest Resultant

Max = 48.60 Gs @ 76.44 msec
Min = .02 Gs @ -23.76 msec



Time (msec)

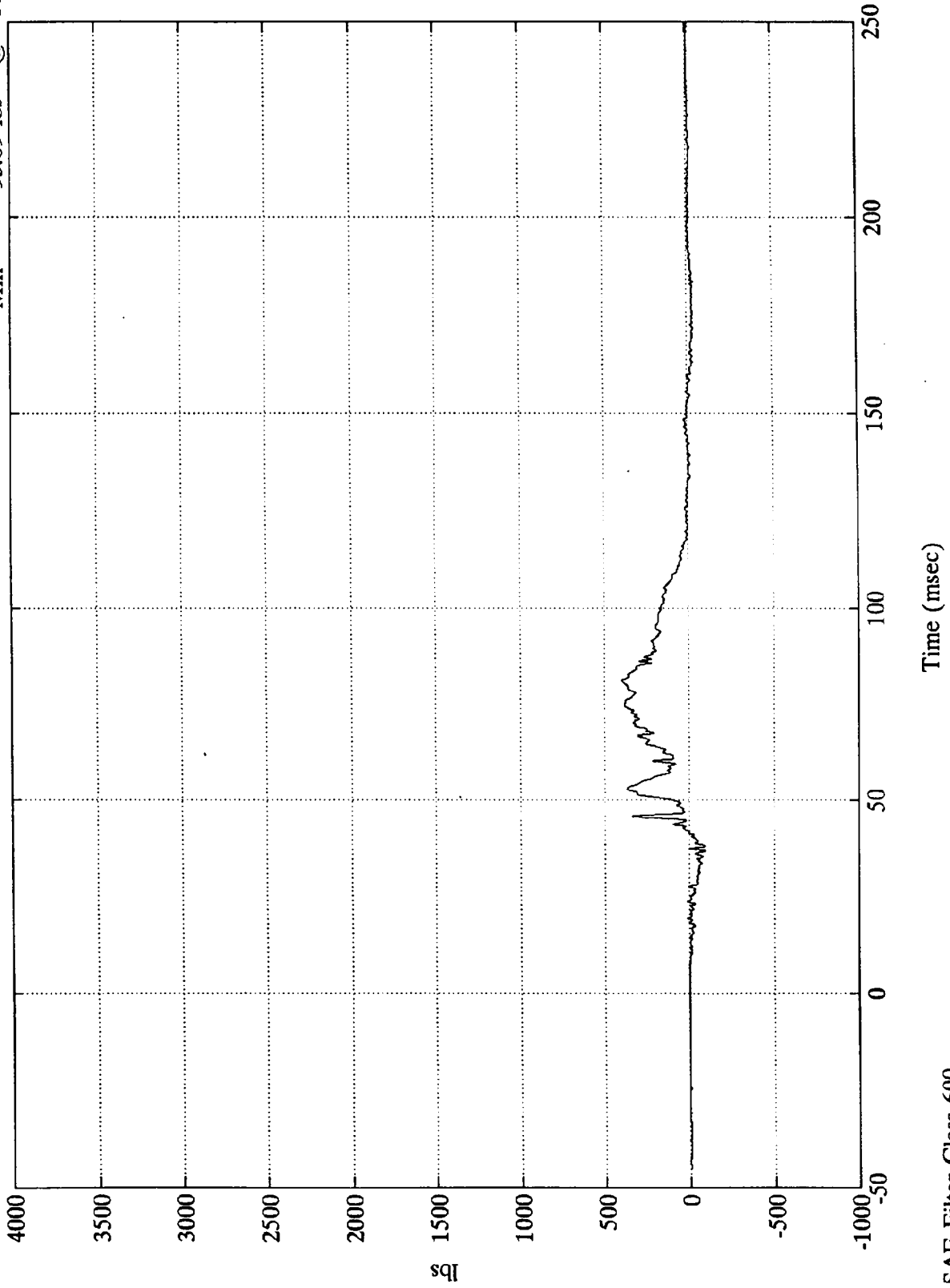
SAE Filter Class 180

Gs

Test 1090

Pos. 2 Left Femur

Max = 397.52 lbs @ 81.36 msec
Min = -95.09 lbs @ 38.27 msec

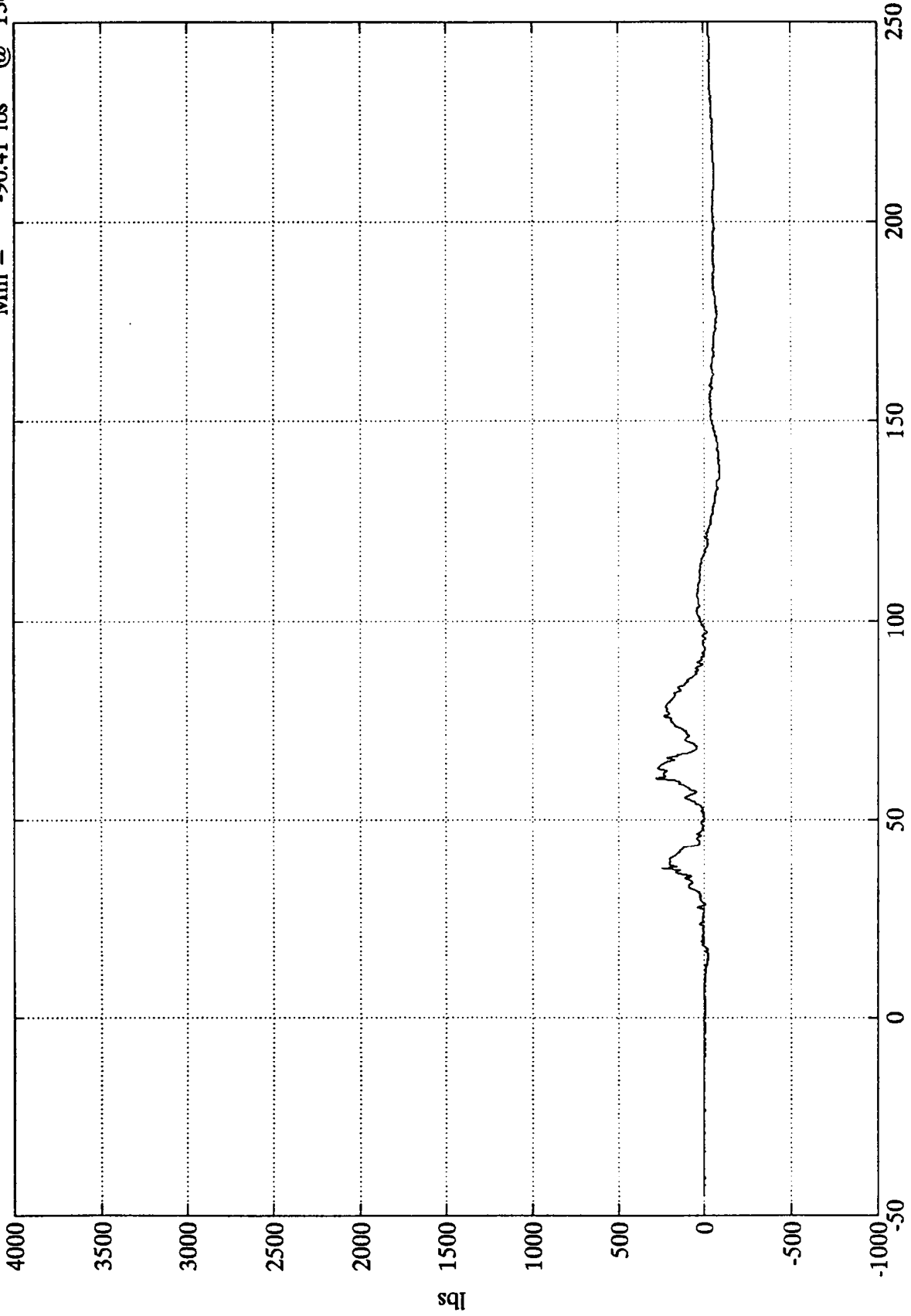


SAE Filter Class 600

Test 1090

Pos. 2 Right Femur

Max = 280.09 lbs @ 60.48 msec
Min = -90.41 lbs @ 136.08 msec



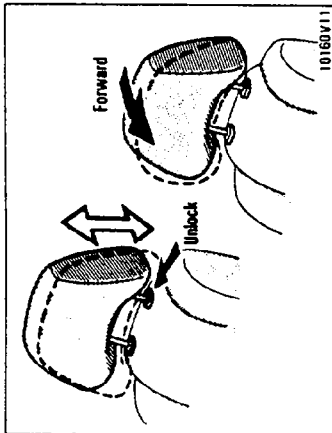
Time (msec)

SAE Filter Class 600

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Headrests
(vertically and rotationally adjustable type)



To raise the headrest, pull it up. To lower it, press the lock release button and push the headrest down. To move the headrest forward, pull on the top.

Pulling the top of the headrest as far as it can go will return it to the upright position.

The headrest is most effective when it is close to your head. Therefore, using a cushion on the seatback is not recommended.

CAUTION: Adjust the top of the headrest so that it is closest to the top of your ears.

- After adjusting the headrest, make sure it is locked in position.
- Do not drive with the headrests removed.

Seat belts—
—Seat belt precautions

Toyota recommends that the driver and passenger in the vehicle be properly restrained at all times with the seat belts provided. Failure to do so could increase the chance of injury and/or the severity of injury in accidents.

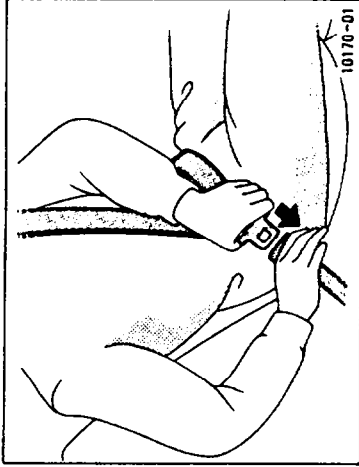
Baby or small child. Use a child restraint system which fits your vehicle. See "Child restraint" for details.

Child. If he/she is too big for a child restraint system, he/she should sit in the seat and be restrained with the lap/shoulder belt. If the shoulder belt falls across the child's neck or face, move the seat fully backward so that the belt lays across the child's shoulder. Do not allow the child to stand up or kneel on the seat.

Pregnant woman. Toyota recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

Injured person. Toyota recommends the use of a seat belt. Depending on the injury, however, first check with your doctor.

— Seat belts



Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

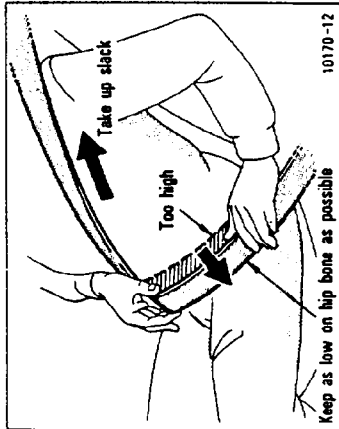
The retractor will lock the belt during a sudden stop or on impact. At other times you can move around freely.

- Inspect the belt system periodically. Check for cuts, frays, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.
- Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners—they may severely weaken the belts.
- Replace the belt assembly if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.



CAUTION: Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury in the event of sudden braking or a collision. When using the seat belts, observe the following:

- Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.
- After inserting the tab, make sure that the connection is secure and the belt is not twisted.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (See the seat adjustment instructions.)
- Be careful not to damage the belt webbing or hardware, and take care that they do not get caught or pinched in the seat or doors.



10170-12

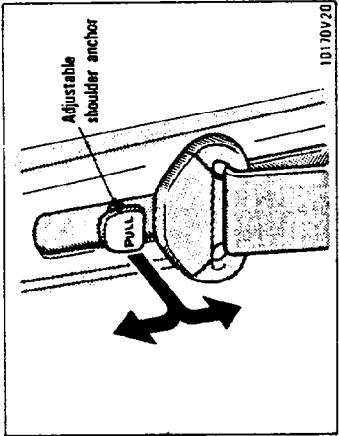
Adjust the position of the lap and shoulder belts.

Position the lap belt as low as possible on your hips—not on your waist, then adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

CAUTION:

- High-positioned lap belts and loose-fitting shoulder belts both could increase the chance of injury due to sliding under the lap belt during an accident.

- For your safety, do not place the shoulder belt under your arm.



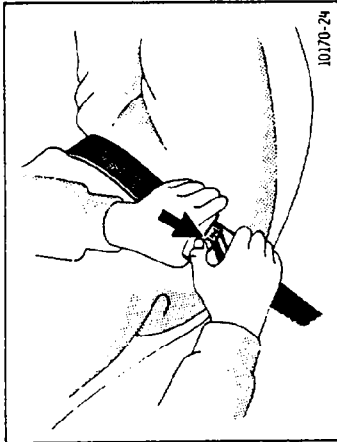
10170V20

Adjust the shoulder anchor position to your size.

To adjust the anchor position, pull the knob out and slide it up or down. Release the knob and make sure the anchor is locked in position.

CAUTION:

- Always be sure that the belt is positioned well across the shoulder. Failure to do so could reduce the amount of protection in an accident and increase the chance of injury.



10170-24

To release the belt, press the buckle-release button and allow the belt to retract.

If the belt does not smoothly retract, pull it out and check for kinks or twists. Then make sure that it remains untwisted as it retracts.

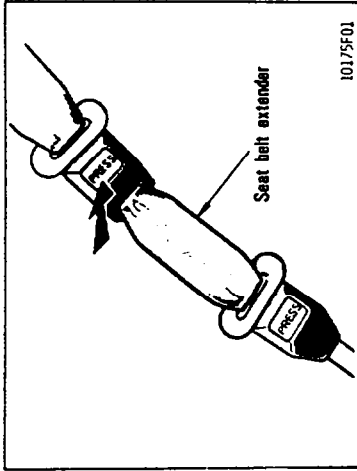
—Seat belt extender

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Toyota dealer free of charge.

Please contact your local Toyota dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Toyota dealer.

CAUTION: When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person and at different seating position than specified.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the buckle-release buttons of the extender and the seat belt are located on the same side as shown.

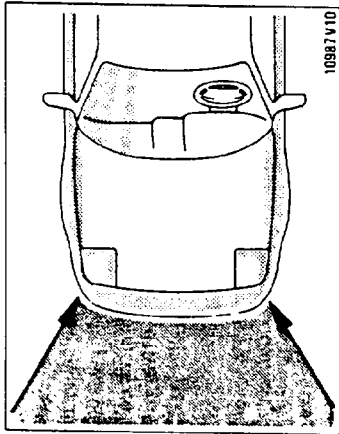
You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle-release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

CAUTION: After inserting the tab, make sure that the connection is secure and the seat belt extender is not twisted.

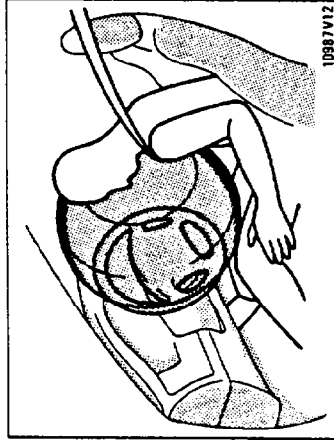
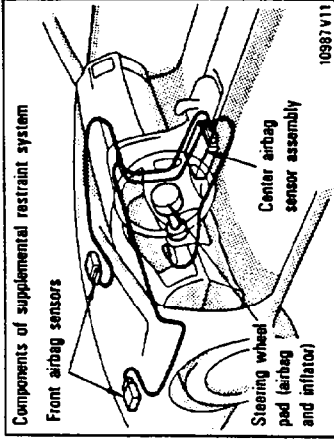
SRS airbag (U.S.A.)



The SRS (Supplemental Restraint System) airbag is designed to be activated in response to a severe frontal impact within the shaded area as shown in the illustration, and to provide the driver with further protection in addition to the protection provided by the driver's seat belt.

The SRS airbag system is not designed to protect the driver from an impact from the side or rear, or if the vehicle overturns. For instructions and precautions concerning the seat belt system, see "Seat belts".

CAUTION: The SRS airbag system is designed only as a supplement to the driver's seat belt system. To obtain maximum protection in an accident, the driver and passenger in the vehicle should always wear his/her seat belts when driving.



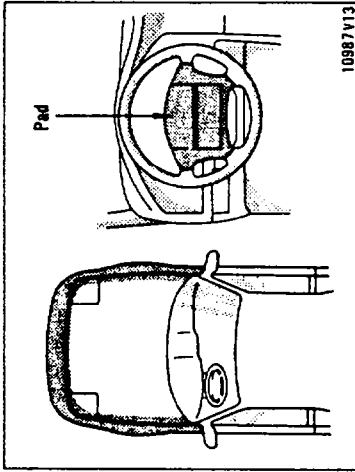
The center airbag sensor assembly consists of a safing sensor and center airbag sensor. In the event of a severe frontal impact, a front airbag sensor and safing sensor, or center airbag sensor and safing sensor detect the shock, the center airbag sensor assembly triggers the inflator, and the inflator fills the bag to restrain the driver's forward motion.

When the SRS airbag inflates, an operating noise will be heard and a small amount of smoke-like gas will be released. This gas is harmless and does not indicate that a fire is occurring.

CAUTION: ::
Do not modify or remove any component or wiring, such as the steering wheel, column cover, center airbag sensor assembly or front airbag sensors. Doing any of these may cause sudden SRS airbag inflation or disable the system, which could result in personal injury.

::
NOTICE:

Do not perform any of the following changes without prior approval from Toyota dealers. Repairs or service of this kind can interfere with proper operation of the SRS airbag system in some cases.



- The front part of the vehicle (shown in the illustration) was involved in an accident which was not of the extent to cause the SRS airbag to inflate.
- The pad section of the steering wheel is scratched, cracked, or otherwise damaged.

NOTICE:

Do not disconnect the battery cables before contacting your Toyota dealer.

- Installation of electronic items such as a mobile two-way radio, cassette tape player or Compact Disc player.
 - Repairs made on or near the front fenders, front console, steering column or steering wheel.
- In the following cases, contact your Toyota dealer as soon as possible:
- The SRS airbag system malfunctions. This SRS airbag system has a warning light to indicate operating problems. See "Warning lights and buzzers" in Chapter 1-5.
 - The SRS airbag has been inflated.

Child restraint—

—Child restraint precautions

Toyota strongly urges the use of child restraint systems for children small enough for the child restraint system.

The laws of all fifty states in the U.S.A. and most provinces in Canada now require the use of child restraint system.

CAUTION: For effective protection in automobile accidents and sudden stops, children holding a child in your arms is not a substitute for a child restraint system. In an accident, a child held in a person's arms can be crushed between the vehicle's interior and an unrestrained person.

—Child restraint system

A child restraint system for a small child or baby must be restrained on the seat with the lap portion of the lap/shoulder belt.

The child restraint system should conform to the size of the child and properly fit the vehicle seat.

When installing a child restraint system, you must use a locking clip.

When installing a child restraint system, refer to the instructions provided by the manufacturer of the system and follow the directions listed under the following illustrations.

Your vehicle is provided with an anchor for securing the top strap of a child restraint system. The anchor nut is welded beneath the sheet metal to permit installation of an anchor bracket for a child restraint system.

To install an anchor bracket, use an 8 mm X 30 mm X 1.25 mm coarse thread metric bolt and a 0.6 in. (15 mm) spacer. Note that the bolts accompanying many child restraint systems are not metric. You can damage the anchor nut on your vehicle if you force a bolt with different thread into the anchor nut.

If any of the necessary parts does not come with your child restraint system, you can purchase it from your Toyota dealer. Details are as follows:

• CRS installation kit
(Part No. 04731-22012)

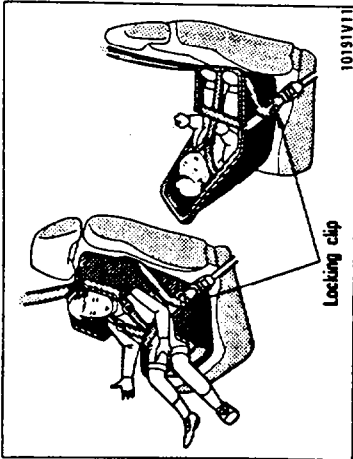
Kit contains bolt, 3 types of spacers and locking clip.

• Bolt (Part No. 91511-60830)

• Locking clip (Part No. 73119-22010)

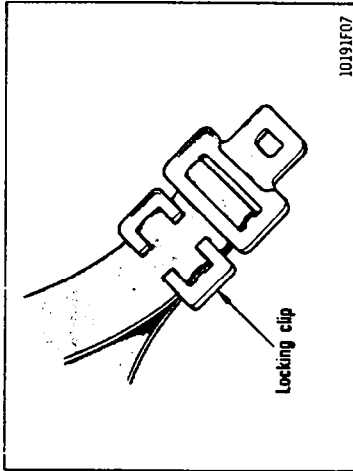
CAUTION: After installation, make sure the child restraint system is secure in place. If the child restraint system is not restrained securely, it may cause injury to the child in case of vehicle accident and sudden stops.

When not using the child restraint system, keep it secured with the seat belt or remove it and place it somewhere other than in the vehicle to prevent injury to the passenger in event of a sudden stop or accident.



INSTALLATION

1. Fasten the lap and shoulder belt over the child restraint system.
2. Take up the slack in the lap portion of the belt.
3. Holding the tab in that position, release the buckle.



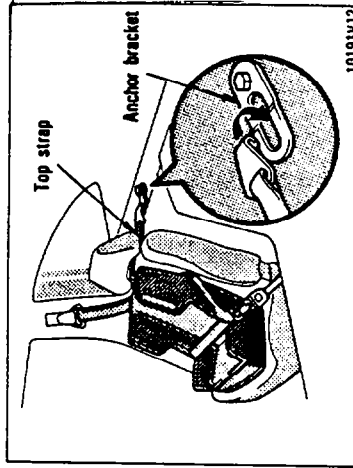
4. Install a locking clip near the tab of the lap and shoulder belt.

To install the locking clip, insert the lap and shoulder webbing through the recesses of the locking clip.

5. Buckle the belt again. If necessary, slide the seat forward and remove any slack.

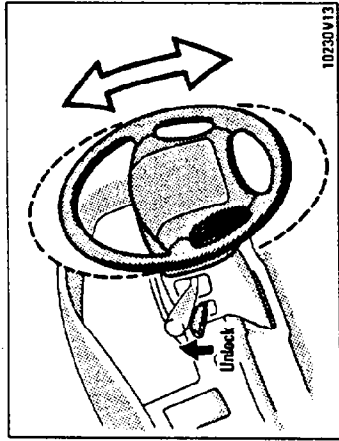
6. Place the shoulder portion of the belt between the vehicle seatback and the child restraint system.

Always remove the locking clip when the child restraint system is not installed.



If your child restraint system requires the use of a top strap, latch the hook onto the anchor bracket and tighten the top strap.

Tilt steering wheel



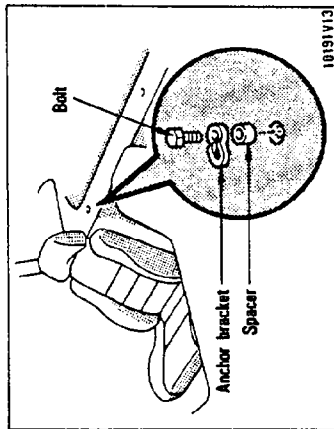
To change the steering wheel angle, hold the steering wheel, pull up the lock release lever, tilt the steering wheel to the desired angle and release the lever.

The steering wheel will spring up to the highest position when the lock release lever is pulled up.

CAUTION:

- This adjustment should not be made while the vehicle is moving.
- After adjusting the steering wheel, try moving it up and down to make sure it is locked in position.

If you remove the anchor bracket when the child restraint system is necessary no longer, replace the bolt in the hole to prevent entry of exhaust emissions, water or dirt.



TOP STRAP ANCHOR AND LOCATION

On the partition panel behind the passenger's seat

- Remove the cover on the partition panel.
- Insert a 0.6 in. (15mm) spacer and tighten down the anchor bracket for your child restraint system with a bolt. Torque the bolt to 12.2–18.2 ft.-lb (1.68–2.52 kg-m, 16.5–24.7 N.m).

To comply with the Canada Motor Vehicle Safety Standard, vehicles sold in Canada are provided with a bracket set in the glovebox, designed for use with the anchor location shown in the illustration.