

REPORT NUMBERS: 208-CAL-90-08
212-CAL-90-08
301-CAL-90-08

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

**VOLKSWAGEN A.G.
1990 VOLKSWAGEN PASSAT GL
4-DOOR SEDAN**

NHTSA NUMBER: CL5803

CALSPAN TEST NUMBER: 7804-8

March 14, 1990

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
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FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance
400 Seventh Street, S.W.
Room No. 6115 (NEF-31)
Washington, DC 20590

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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1990 Volkswagen Passat GL 4-Door Sedan. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on March 14, 1990. The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards: 1. FMVSS No. 208, "Occupant Crash Protection" 2. FMVSS No. 212, "Windshield Mounting" 3. FMVSS No. 219 (partial), "Windshield Zone Intrusion" 4. FMVSS No. 301, "Fuel System Integrity" The test mode was perpendicular (0°) and the impact velocity was 29.4 mph. The ambient temperature at the impact face was 74°F. The subject test vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219 (partial) and 301. <u>Type of Restraint System:</u> The test vehicle was equipped with a driver and passenger automatic torso seat belt restraint system. The manual lap restraint was not used in this test.					
17. Key Words 30 mph Vehicle Safety Compliance Testing FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity" Frontal Impact			18. Distribution Statement Copies of this report are available from: Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Washington, DC 20590		
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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. DTNH22-88-C-01038. The purpose of this test was to determine if the subject vehicle, a 1990 Volkswagen Passat GL 4-Door Sedan, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS No. 212, "Windshield Mounting"; FMVSS No. 219 (partial), "Windshield Zone Intrusion"; and FMVSS No. 301, "Fuel System Integrity". This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-208-08.

Section 2

SUMMARY OF TEST NUMBER CL5803

A frontal barrier was impacted by a 1990 Volkswagen Passat GL 4-Door Sedan at a velocity of 29.4 mph. The test was performed at the Calspan Corporation Advanced Technology Center on March 14, 1990. 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. Eight high-speed cameras failed during impact due to a power loss.

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

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

The 27 channels of data were recorded on three 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces.

Accelerometer pack #4, located on the bottom of engine block, and accelerometer pack #9, located on fire wall, contained questionable data and are not included in this report. Both accelerometers passed pre-test inspection.

The driver's HIC was 326. The maximum chest deceleration over 3 milliseconds was 39.9 g's. The maximum force on the driver's left femur was 1352 pounds and 1306 pounds on the right femur.

The right front passenger's HIC was 336. The maximum chest deceleration over 3 milliseconds was 40.9 g's and loads were 1063 and 1284 pounds on the left and right femurs respectively.

Table 1

CRASH TEST SUMMARYVehicle NHTSA No.: CL5803 Test Mode: 30 mph Frontal BarrierTest Date.: March 14, 1990 Time: 11:40 Temperature: 74°FVehicle Make/Model/Body Style: 1990 Volkswagen Passat GL 4-Door SedanVehicle Test Weight: 3410 lbs.Vehicle/Barrier Impact Angle: 0°Impact Velocity: 29.4 mphMaximum Static Crush: 16.7"Vehicle Rebound: 11.6"DUMMIES:DRIVERPASSENGER

Type:

Part 572Part 572

Restraint System:

Automatic TorsoAutomatic TorsoBeltBeltNumber of Data Channels: 27Number of Cameras: 1 Real Time14 High SpeedDOOR OPENING DATA: operable - Left Frontoperable - Right Front

Front Seat(s) Data:

DRIVERPASSENGER

Seat Track Failure:

NoneNone

inches of shift

Seat Back Failure:

NoneNoneVISIBLE DUMMY CONTACT POINTS:DRIVERPASSENGER

Head:

upper steering rimchin contacted chest

Abdomen

lower steering rimno contact

Chest

no contactlower dash panel

Knees

lower dash panellower dash panel

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1990 Volkswagen Passat GL 4-Door Sedan
 NHTSA No. CL5803 ; VIN: WVWFB4315LE170328 ; Color: Blue
 Engine Data: 4 cylinders; - CID; 2.0 Litres; - cc
 Placement - Longitudinal or In-Line; X Transverse or Lateral
 Transmission Data: 5 speeds; X Manual; - Automatic; - Overdrive
 Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive
 Major Options: X A/C; X Pwr. Strg.; X Pwr. Brakes; X Pwr. Windows
- Power Door Locks
 Date Received: 2-28-90; Odometer Reading 042.0 miles
 Selling Dealer: Delia Volkswagen, Inc.
 & Address 1500 Niagara Falls blvd., Tonawanda, NY 14150

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Volkswagen AG
 Date of Manufacture: 1-90
 GVWR: 3855 lbs.; GAWR: 2070 lbs. FRONT; 1960 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 39 psi FRONT
44 psi REAR
 Recommended Tire Size: 195/60 R14 85V Load Range: -
 Recommended Cold Tire Pressure: 39 psi FRONT; 44 psi REAR
 Size of Tires on Test Vehicle: 195/60 R14; Manufacturer: Uniroyal
 Vehicle Capacity Data:
 Type of Front Seats: - Bench; X Bucket; - Split Bench
 Number of Occupants: 2 Front; 3 Rear; 5 Total
 Vehicle Capacity Weight (VCW) = 870 lbs.
 No. of Occupants x 150 lbs. = 750 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 120 lbs. (Difference)

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

Right Front = 880 lbs. Right Rear = 610 lbs.
 Left Front = 880 lbs. Left Rear = 570 lbs.
 TOTAL FRONT = 1760 lbs. TOTAL REAR = 1180 lbs.
 % of Total Vehicle Weight = 60 % of Total Weight = 40
 TOTAL DELIVERED WEIGHT = 2940 lbs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 2940 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 120 lbs.
 Weight of 2 P.572 Dummies @ 164 ea. = 328 lbs.
 TARGET TEST WEIGHT = 3388 lbs. (sum)

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

Right Front = 950 lbs. Right Rear = 810 lbs.
 Left Front = 950 lbs. Left Rear = 700 lbs.
 TOTAL FRONT = 1900 lbs. TOTAL REAR = 1510 lbs.
 % of Total Weight = 56 % % of Total Weight = 44 %
 TOTAL TEST WEIGHT = 3410 lbs.
 Weight of Ballast Secured in Vehicle Trunk Area = 0 lbs.
 Vehicle Components Removed for Weight Reduction 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

AS DELIVERED: RF 25.1 LF 25.3 RR 25.8 LR 25.6
 FULLY LOADED: RF 24.0 LF 24.3 RR 23.9 LR 23.9
 AS TESTED: RF 24.6 LF 25.0 RR 24.5 LR 24.6
 Vehicle's Wheel Base: 103.4 in.
 Location of Vehicle's C.G.: 45.8 inches from front wheel center

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 18.5 gallons
 Usable Capacity Figure Furnished by COTR = 18.5 gallons
 Test Volume Range (92 to 94% of Usable Capacity) = 17.0 to 17.4 gallons
 ACTUAL TEST VOLUME = 17.2 gallons (with entire fuel system filled)

Table 3
POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Impact Impact Angle: 0°
 Test Date: March 14, 1990 Time: 11:40 Temperature: 74°F
 Vehicle NHTSA No.: CL5803
 Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.4 mph; Trap No. 2 = 29.4 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	=	<u>178.4 "</u>	C/L =	<u>180.1 "</u>	Left =	<u>178.3 "</u>
Post-Test	Right	=	<u>162.5 "</u>	C/L =	<u>163.4 "</u>	Left =	<u>164.4 "</u>
Crush	Right	=	<u>15.9 "</u>	C/L =	<u>16.7 "</u>	Left =	<u>14.9 "</u>
AVERAGE		=	<u>15.8</u>	inches			

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

	Right	=	<u>10.0 "</u>	C/L =	<u>12.2 "</u>	Left =	<u>12.7 "</u>
AVERAGE		=	<u>11.6</u>	inches			

DOOR OPENING:

	Left	Right
Front	<u>operable</u>	<u>operable</u>
Rear	<u>operable</u>	<u>operable</u>

SEAT MOVEMENT:

	Seat Back Failure	Seat Shift
Front	<u>None</u>	<u>Right = 0.3" Left = 0.0"</u>
Rear	<u>-</u>	<u>-</u>

Table 3

POST IMPACT DATA (cont.)

GLAZING DAMAGE: Slight crack located on lower middle of windshield; due to
stress cracks.

OTHER NOTABLE IMPACT FEATURES: None.

Section 3
OCCUPANT AND VEHICLE DATA

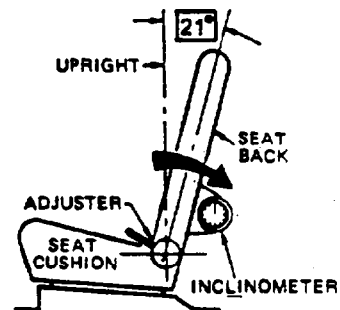
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year: 1990 Vehicle Model: Volkswagen Passat Body Style: 4-Door Sedan

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



Seat back angle for driver's seat 21°

LEFT SIDE VIEW

Measurement instructions: Measurement of seat back angle was made using a 3-dimensional H-point machine.

Seat back angle for passenger's seat 21°

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: Seat placed in 7th detent out of 12 total detents.

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

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 18.5 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.: CL5803 Vehicle: 1990 Volkswagen Passat 4-Door Sedan

SEAT TYPE:

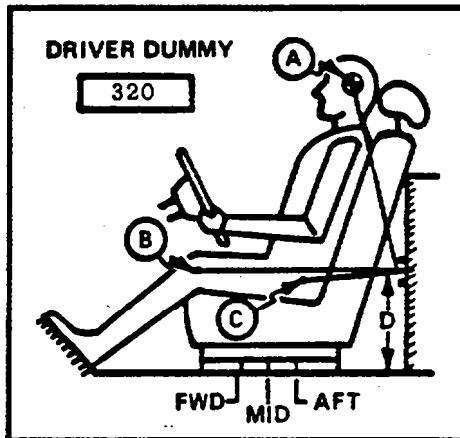
- Bench
X Bucket
- Split Bench

ADJUSTER TYPE:

X Manual
- Power

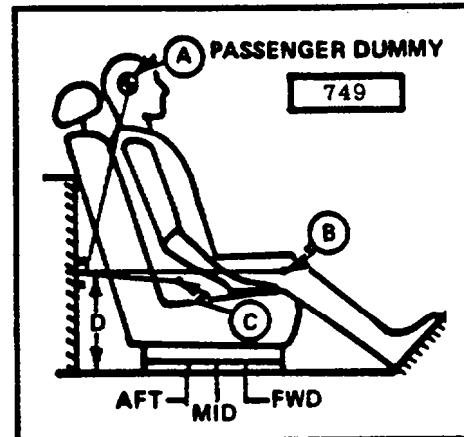
SEAT BACK TYPE:

- Fixed
X Adjustable Reclining



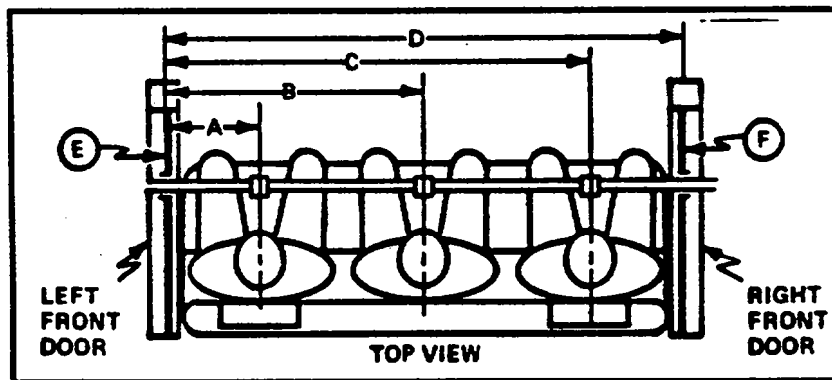
MEASUREMENT LOCATION

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



A = 17.3 in. 5 Degrees
B = 22.4 in. 108 Degrees
C = 10.6 in. 144 Degrees
D = 17.5 in.

A = 17.6 in. 5 Degrees
B = 22.8 in. 105 Degrees
C = 11.0 in. 144 Degrees
D = 17.5 in.



S/N 320

DUMMY ID

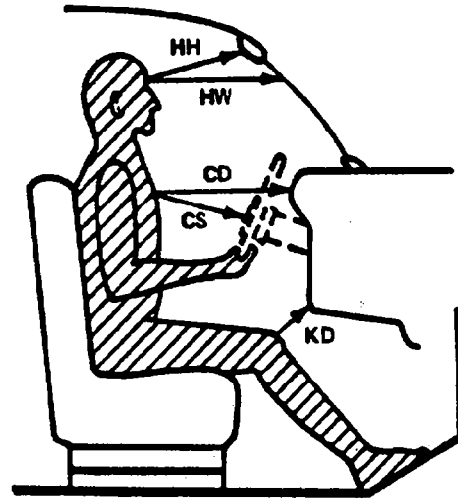
S/N 749

A = Left Door to Driver Centerline 12.5 in.
B = Left Door to Center Passenger Centerline - in.
C = Left Door to Right Passenger Centerline 40.0 in.
D = Left Door to Right Door 52.7 in.
E,F = Window Glass Height (Right and Left Must Be Equal) 10.3 in.

Figure 3

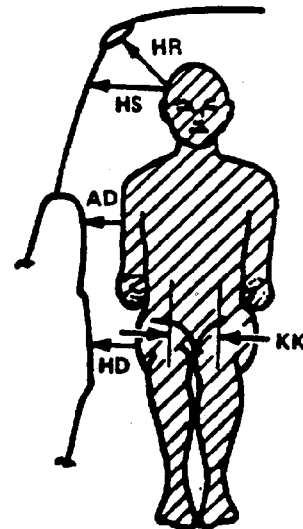
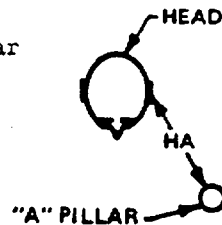
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	16.4	16.5
HW	23.6	23.6
CD*	24.8	25.4
CS	20.3	-
KDL	6.3	4.9
KDR	5.3	5.3
SA	See Note	See Note
TA	21°	21°



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

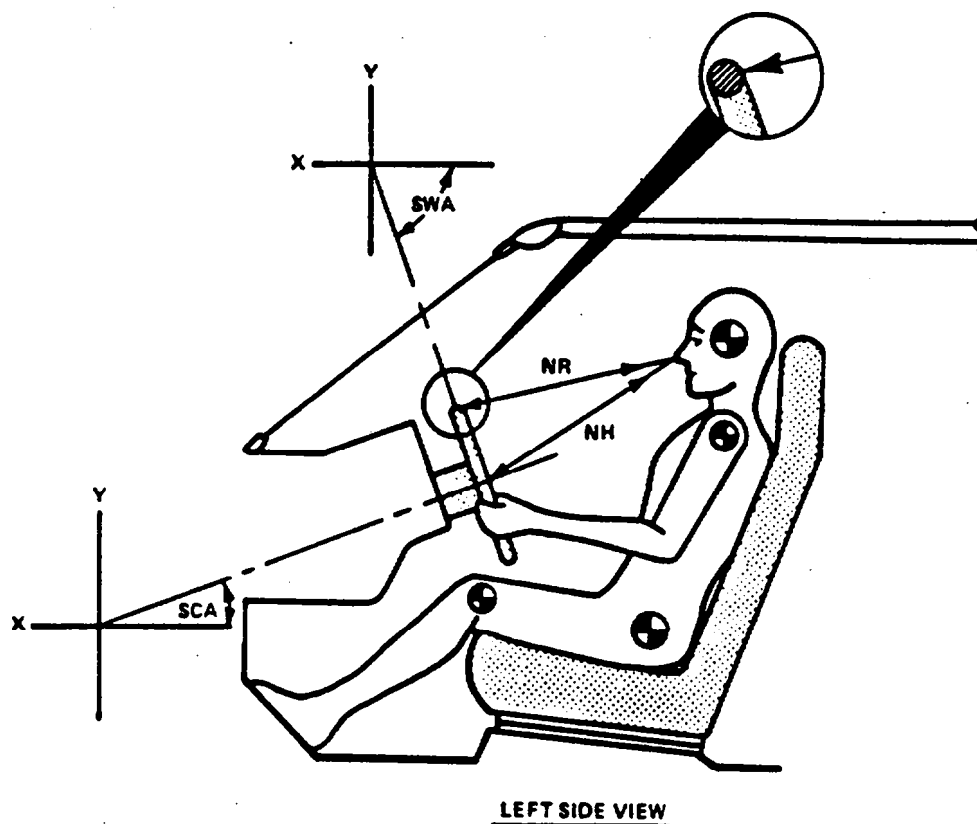


	DRIVER	PASSENGER
HR	6.1	6.0
HS	9.9	9.8
AD	5.3	4.5
HD	6.1	5.9
KK	10.1	7.9
HA	22.5	21.8

Note: Seat back was positioned as specified by manufacturer.

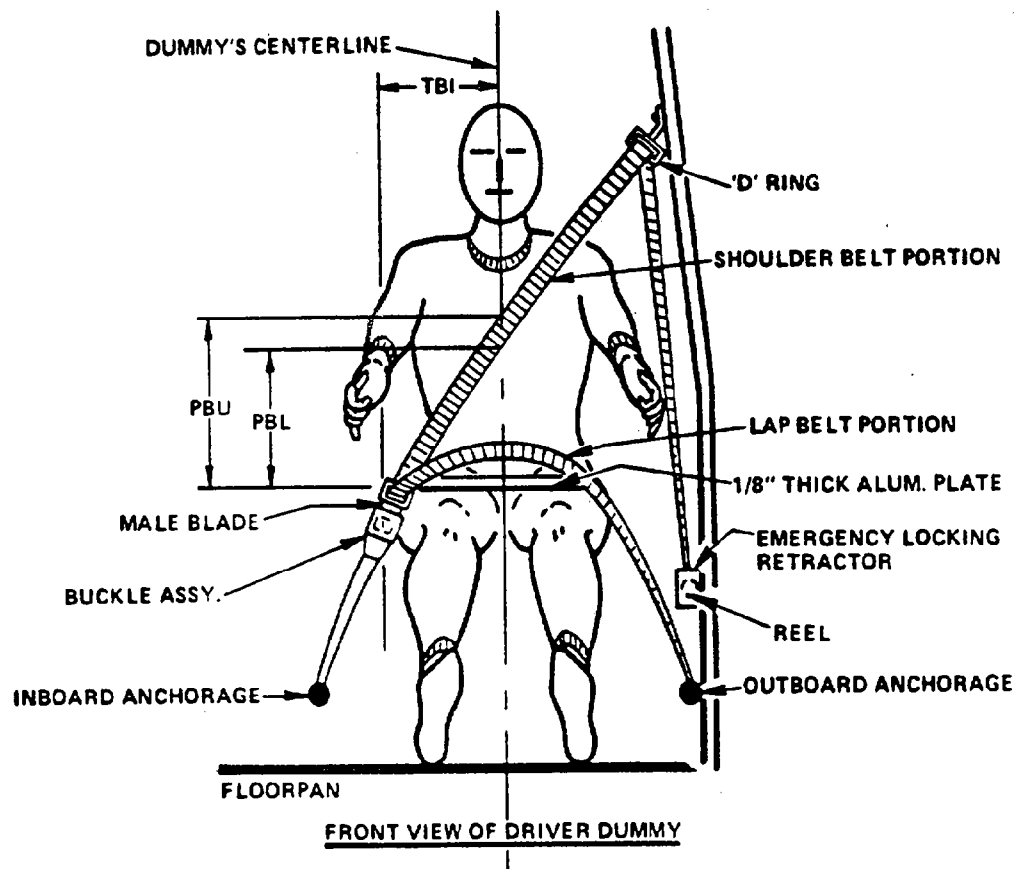
*Measured horizontally

Figure 4
DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



		MEASUREMENTS	
NR	-- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	19.6	Inches
NH	-- Distance from tip of dummy's nose to center of steering column hub	21.3	Inches
SCA	-- Angle of steering column relative to the horizontal X axis	27.5	Degrees
SWA	-- Angle of steering wheel relative to the horizontal X axis	-62.5	Degrees

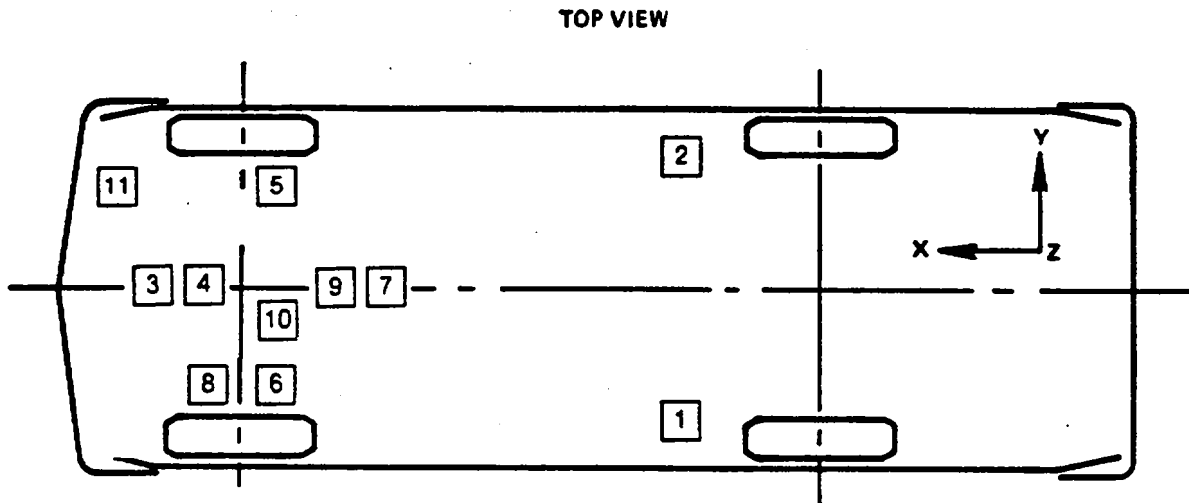
Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	14.3	14.5
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	11.4	11.5
<u>TBI</u> -- Distance from torso centerline to buckle	*	*

*Automatic torso belt used, no inboard buckle.

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		
8	Front Shock Tower	X		
9	Firewall	X		
10	Cradle Frame	X		
11	Radiator Support	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	PRE:	71.4	23.5	15.5				
		POST:	71.4	23.5	15.4				
	LONGITUDINAL ACCELERATION					2	121	-37	61
2	REAR SEAT X-MEMBER AT RIGHT SIDE	PRE:	71.4	-23.5	15.6				
		POST:	71.3	-23.4	15.4				
	LONGITUDINAL ACCELERATION					1	90	-36	53
3	TOP OF ENGINE BLOCK	PRE:	146.9	-1.8	34.3				
		POST:	143.5	-1.7	33.8				
	LONGITUDINAL ACCELERATION					30	46	-108	35
4	BOTTOM OF ENGINE	PRE:	149.7	-8.9	9.0				
		POST:	148.2	-8.8	8.5				
	LONGITUDINAL ACCELERATION					***	***	***	***
5	BRAKE CALIPER AT RIGHT SIDE	PRE:	141.1	-22.8	19.8				
		POST:	141.0	-22.7	19.6				
	LONGITUDINAL ACCELERATION					16	85	-93	42
6	BRAKE CALIPER AT LEFT SIDE	PRE:	141.1	22.9	19.1				
		POST:	140.8	22.7	19.3				
	LONGITUDINAL ACCELERATION					5	65	-80	44
7	DASH PANEL	PRE:	115.7	-2.4	37.2				
		POST:	115.5	-2.4	37.1				
	LONGITUDINAL ACCELERATION					9	114	-69	47

*X + Forward from rear bumper
 Y + Left from vehicle centerline
 Z + Up from ground

**
 LONGITUDINAL:
 LATERAL:
 VERTICAL:

POSITIVE
 FORWARD
 LEFTWARD
 UPWARD

NEGATIVE
 REARWARD
 RIGHTWARD
 DOWNWARD

DISTANCE MEASUREMENTS
 IN INCHES

***Data not available.

Table 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY (cont.)

NO.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
						MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
8	FRONT SHOCK TOWER	PRE:	146.5	22.8	31.6				
		POST:	145.8	19.6	32.1				
	LONGITUDINAL ACCELERATION					121	56	-51	12
9	FIREWALL	PRE:	138.4	16.0	35.3				
		POST:	139.3	15.3	34.5				
	LONGITUDINAL ACCELERATION					***	***	***	***
10	CRADLE FRAME	PRE:	139.1	9.9	5.1				
		POST:	138.6	10.0	4.9				
	LONGITUDINAL ACCELERATION					17	64	-71	37
11	RADIATOR-SUPPORT	PRE:	171.6	6.2	28.1				
		POST:	158.1	5.4	27.3				
	LONGITUDINAL ACCELERATION					38	30	-134	11

*X + Forward from rear bumper
 Y + Left from vehicle centerline
 Z + Up from ground

**
 LONGITUDINAL:
 LATERAL:
 VERTICAL:

POSITIVE
 FORWARD
 LEFTWARD
 UPWARD

NEGATIVE
 REARWARD
 RIGHTWARD
 DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

***Data not available.

Figure 7
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5.

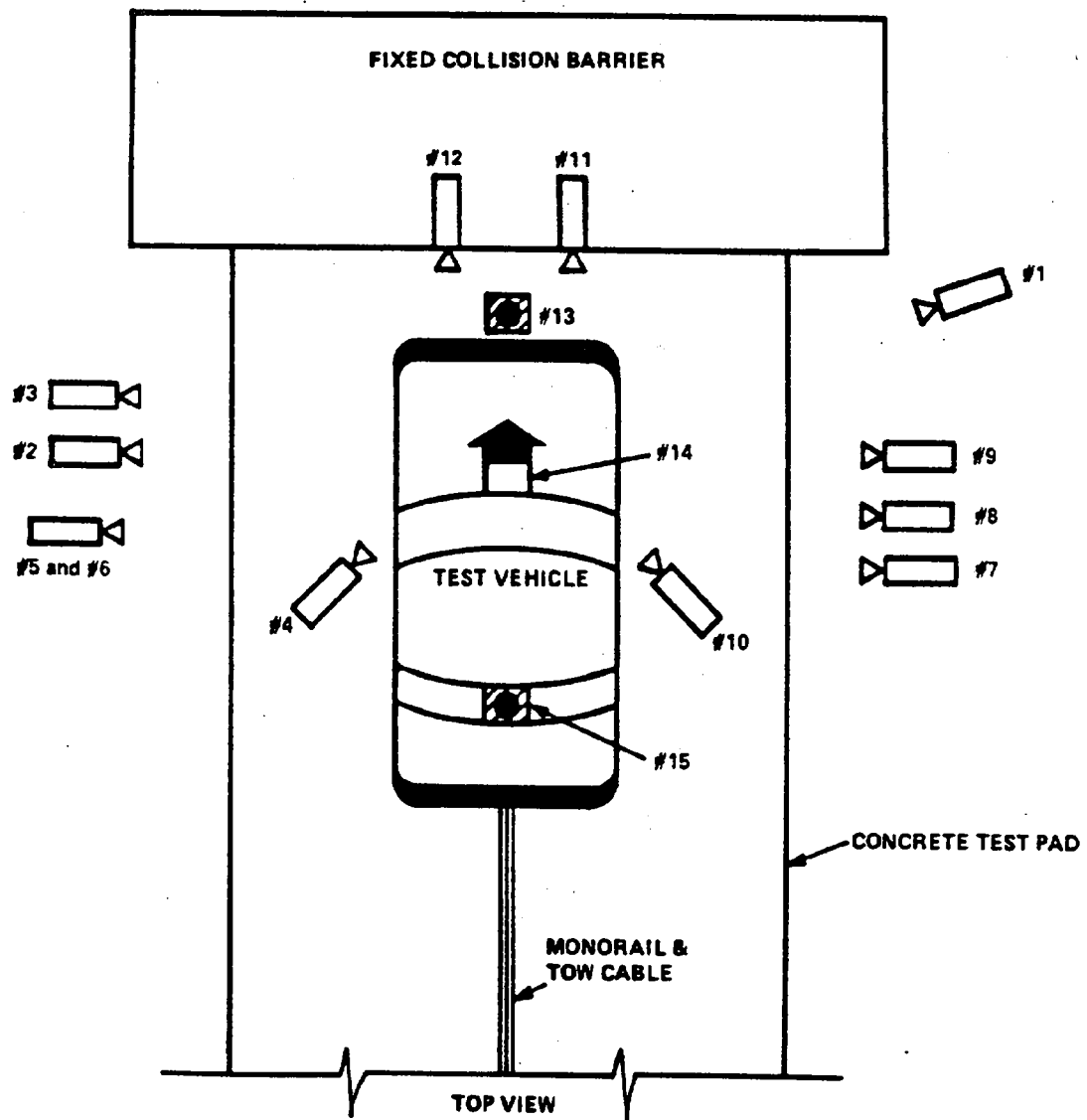


Table 5

HIGH-SPEED CAMERA LOCATIONS

Test No. CL5803

Vehicle: 1990 Volkswagen Passat GL 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	233.0	58.0	41.0	-2.0	217.6	13	****
3	Left Side View	288.0	40.0	41.0	-2.0	272.6	25	****
4	Driver and Interior View	110.0	106.0	75.0	-18.0	-	13	725
5	Steering Column (Bottom)	280.0	75.0	46.0	-4.0	264.6	25	****
6	Steering Column (Top)	279.0	75.0	70.0	-8.0	263.6	25	****
7	Overall Right Side	235.0	67.0	42.0	-3.0	219.6	13	***
8	Right Side View	290.0	48.0	41.0	-1.0	274.6	25	***
9	Right Passenger View	290.0	64.0	57.0	-3.0	274.6	35	***
10	Passenger and Interior View	104.0	101.0	75.0	-24.0	-	13	600
11	Passenger Front View	24.0	17.0	77.0	-46.0	-	13	****
12	Driver Front View	24.0	17.0	77.0	-46.0	-	13	****
13	Windshield View	0.0	0.0	130.0	-47.0	-	25	500
14	Pit View of Engine	0.0	36.0	-120.0	90.0	-	13	****
15	Pit View of Fuel Tank	0.0	119.0	-120.0	90.0	-	13	****

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

*** = timing marks not available

**** = Camera experienced power loss on one phase of power supply

Figure 8
VEHICLE TARGET LOCATIONS

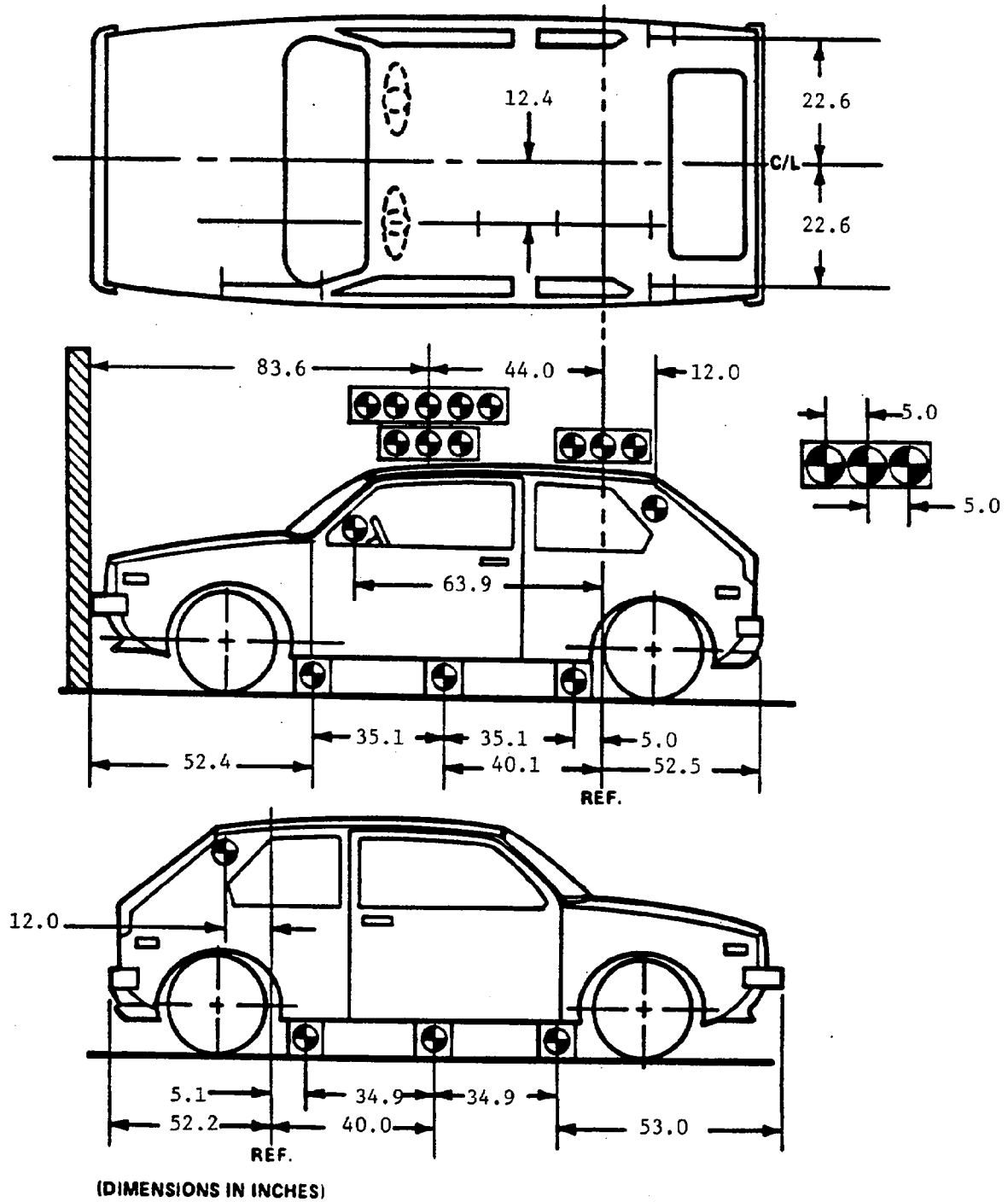


Figure 9
TEST VEHICLE MEASUREMENTS

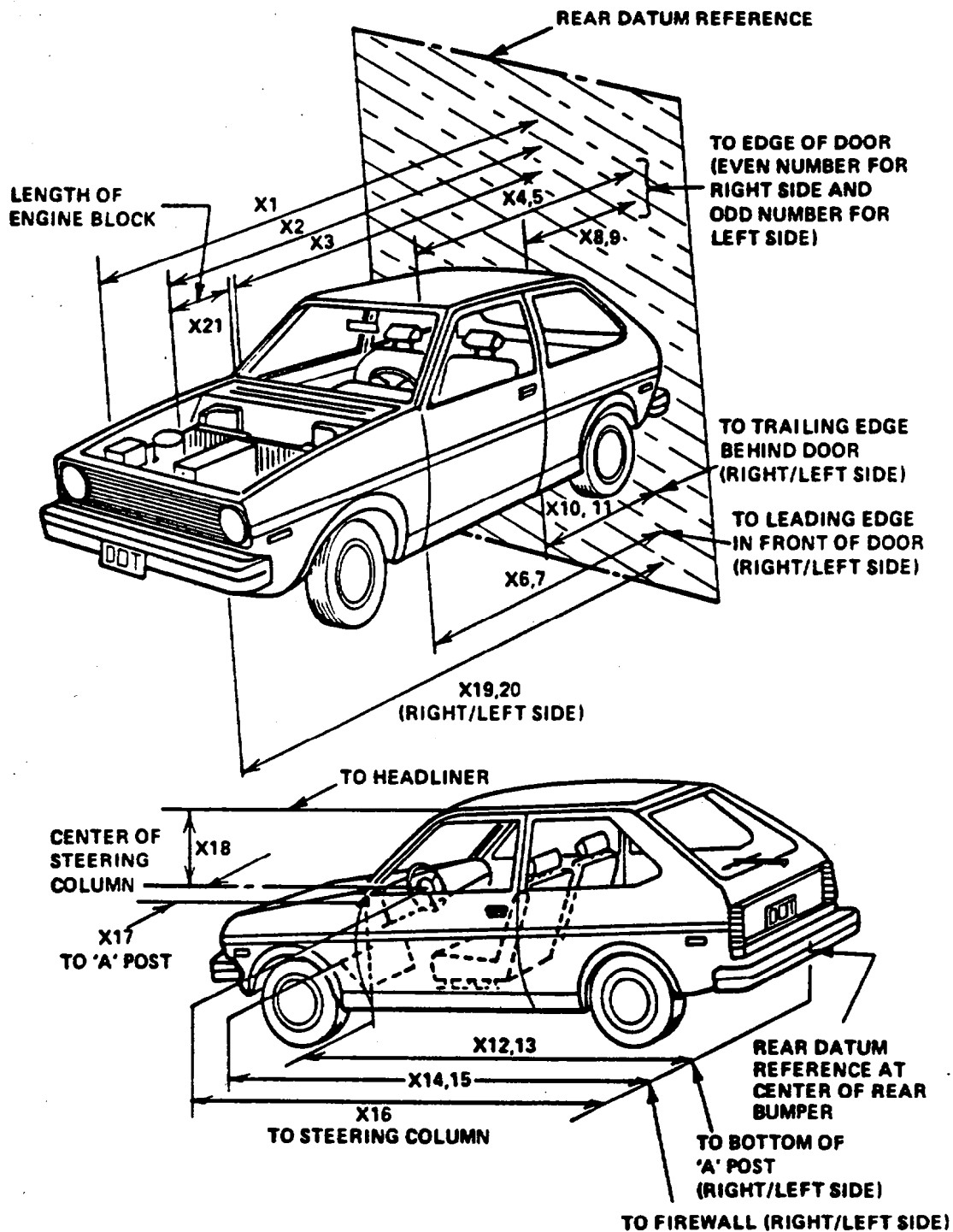


Table 6
VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	180.1	163.4	16.7
X2	Rear Surface of Vehicle to Front of Engine	158.8	152.3	6.5
X3	Rear Surface of Vehicle to Firewall	139.6	139.0	0.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	125.4	125.1	0.3
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	125.5	126.4	-0.9
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	125.5	125.0	0.5
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	125.7	126.2	-0.5
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	84.3	84.0	0.3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	84.8	85.3	-0.5
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	85.6	85.1	0.5
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	85.8	86.0	-0.2
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	126.0	125.3	0.7
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	126.5	126.3	0.3
X14	Rear Surface of Vehicle to Firewall, Right Side	139.7	137.8	1.9
X15	Rear Surface of Vehicle to Firewall, Left Side	140.4	140.2	0.2
X16	Rear Surface of Vehicle to Steering Column	112.5	112.3	0.2
X17	Center of Steering Column to "A" Post	16.8	17.3	-0.5
X18	Center of Steering Column to Headliner	17.9	17.3	0.6
X19	Rear Surface of Vehicle to Right Side of Front Bumper	178.4	162.5	15.9
X20	Rear Surface of Vehicle to Left Side of Front Bumper	178.3	163.4	14.9
X21	Length of Engine Block	16.0	16.0	0.0

Section 4

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

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

Table 7

DUMMY INJURY CRITERIA VALUESNHTSA No.: CL5803 Vehicle: 1990 Volkswagen Passat GL 4-Door Sedan

	MAXIMUM ACCELERATION (g's)							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
Dummy (1)	-83	27	88	120	-40	28	21	39.9
Dummy (2)	-18	-21	50	51	-40	28	-12	40.9

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	1352	1306
Dummy (2)	1063	1284

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
Dummy (1)	326	.07012	.10612	38.3
Dummy (2)	336	.06952	.10552	38.7

*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 = 0.0 sec.

Log time duration of reminder light operation = 7.0 sec.

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

Log time duration of audible warning signal = 0.0 sec.

(audible warning should not operate)

Log time duration of reminder light operation = 7.0 sec.

Note wording of visual warning:

Fasten Seat Belt -

Fasten Belt -

Symbol 101-80 X

Table 9

FMVSS NO. 208 - READINESS INDICATOR

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

Is the system totally mechanical? YES X NO

Table 10

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No.: CL5803
 Make/Model: 1990 Volkswagen Passat GL
 Date of Comfort/Convenience Check: March 8, 1990
 Technician Performing Check: VMP
 GVWR: 3855 lbs.

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

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

1. Automatic seat belts YES X** NO

If yes, go to requirements D1, D2 and D3

2. Manual seat belts* YES NO X

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

YES NO X

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

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

STOP

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

**Manual lap belts were not used for this test.

Table 10 (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

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

Table 10 (cont.)

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 for is 0.4 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Figure 10

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

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

Windshield is bonded in place with 0.3" metal and 0.2" rubber molding along all windshield boundaries. Bottom of windshield is also covered with a plastic trim.

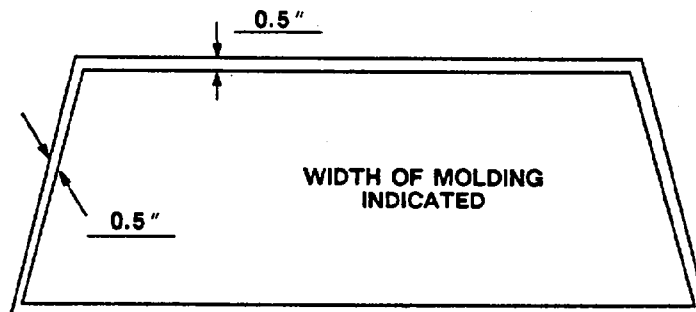
FMVSS 212 REQUIREMENTS:

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		PERCENT RETENTION
	PRE-TEST (in.)	POST-TEST (in.)	
RIGHT SIDE	81.35	81.35	100%
LEFT SIDE	81.35	81.35	100%
TOTAL	162.70	162.70	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS: None.

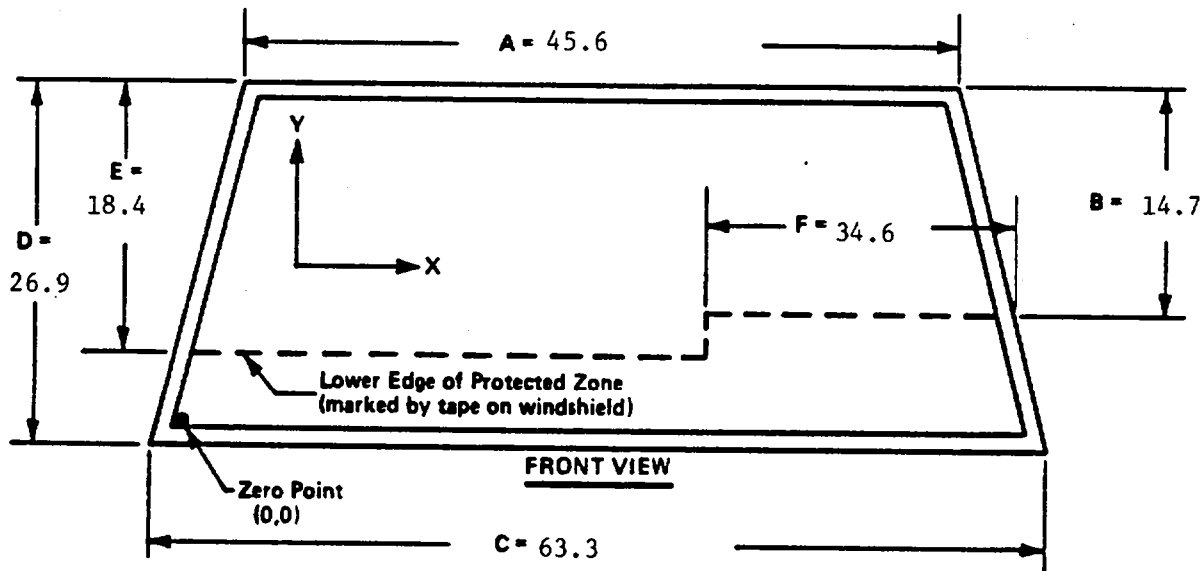
Figure 11

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA: (Dimensions in inches.)



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

(Show location of penetration on above sketch)

None

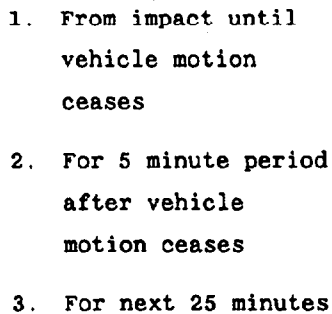
COORDINATES		
	X	Y
1.		
2.		
3.		
4.		

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: CL5803 TEST DATE: March 14, 1990

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.

FUEL SPILLAGE MEASUREMENT:



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

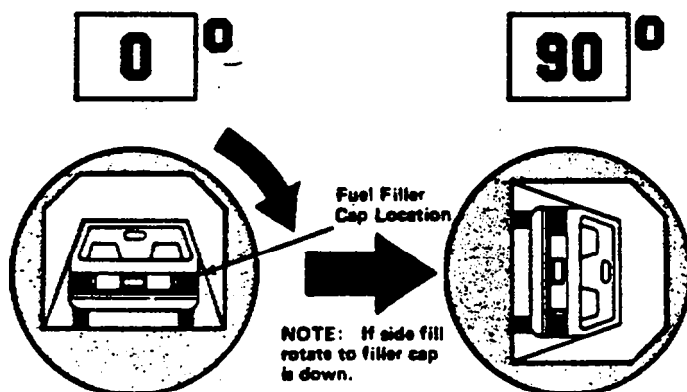
None

Table 12

FMVSS NO. 301 STATIC ROLLOVER DATA SHEETTEST PHASE:

Vehicle NHTSA ID No.:

CL5803

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 02 minutes 59 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

07 minutes 59 seconds

Next whole minute interval

08 minutesII. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

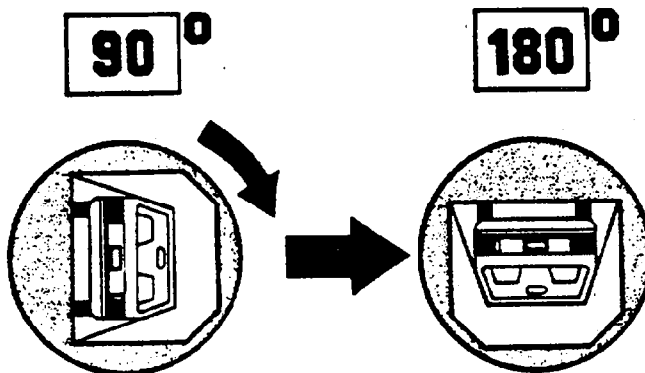
Table 12

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

TEST PHASE:

Vehicle NHTSA ID No.:

CL5803



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 03 minutes 00 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

08 minutes 00 seconds

Next whole minute interval

08 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

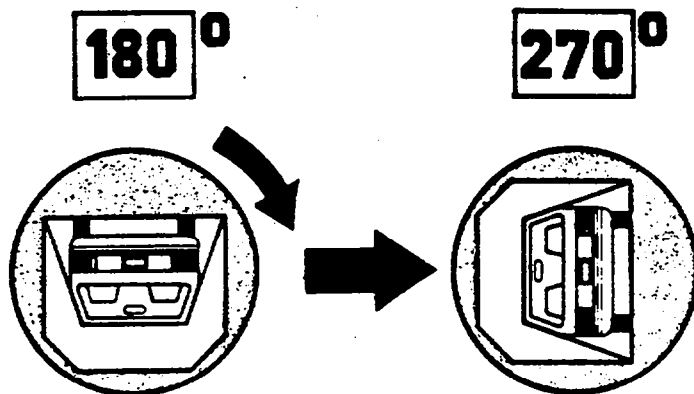
IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 12

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)TEST PHASE:

Vehicle NHTSA ID No.:

CL5803I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 02 minutes 58 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

08 minutes 00 seconds

Next whole minute interval

08 minutesII. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

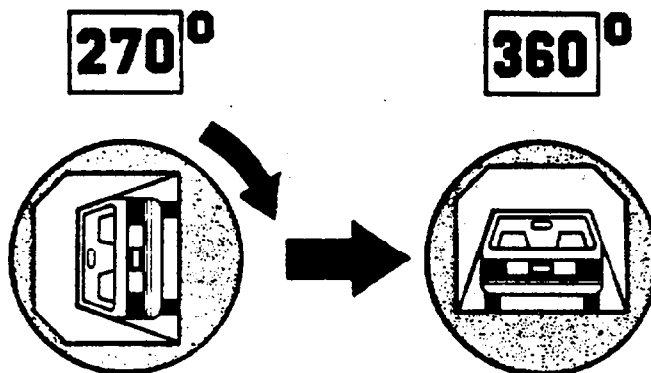
Table 12

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

TEST PHASE:

Vehicle NHTSA ID No.:

CL5803



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 03 minutes 00 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

08 minutes 00 seconds

Next whole minute interval

08 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 13

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: March 14, 1990 Vehicle NHTSA No.: CL5803

Vehicle Manufacturer: Volkswagen AG

Model Year: 1990 VIN: WVWFB4315LE170328

Body Style: Passat GL Build Date: January 1990

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

Impact Velocity: 29.4 mph Time of Test: 11:40

Type of Automatic Restraint System: Automatic Torso Belt

Failure Details:

Vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219
(partial) and 301.

Appendix A

PHOTOGRAPHS

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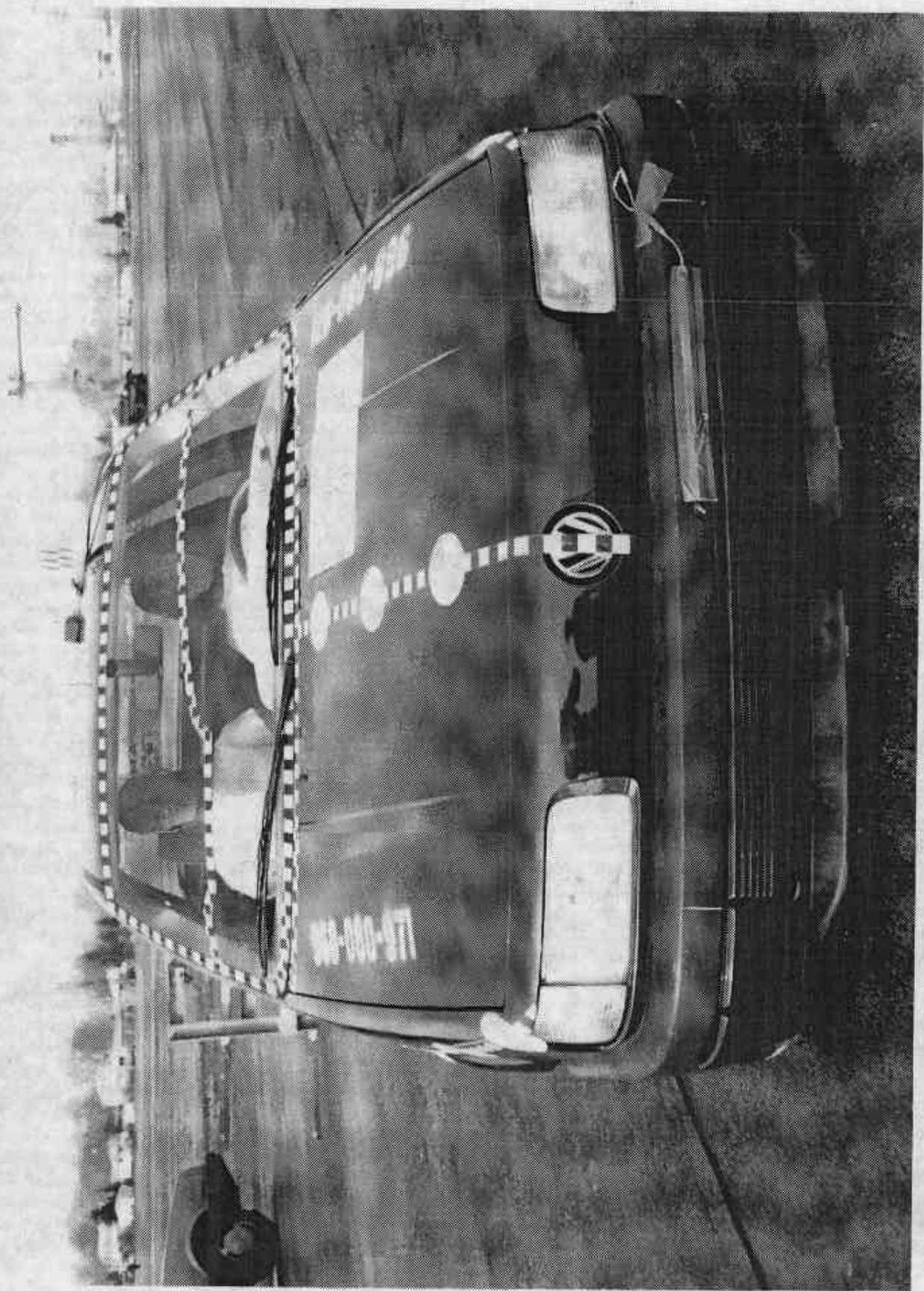


Figure A-1 PRE-TEST FRONT VIEW

A-3

7804-8

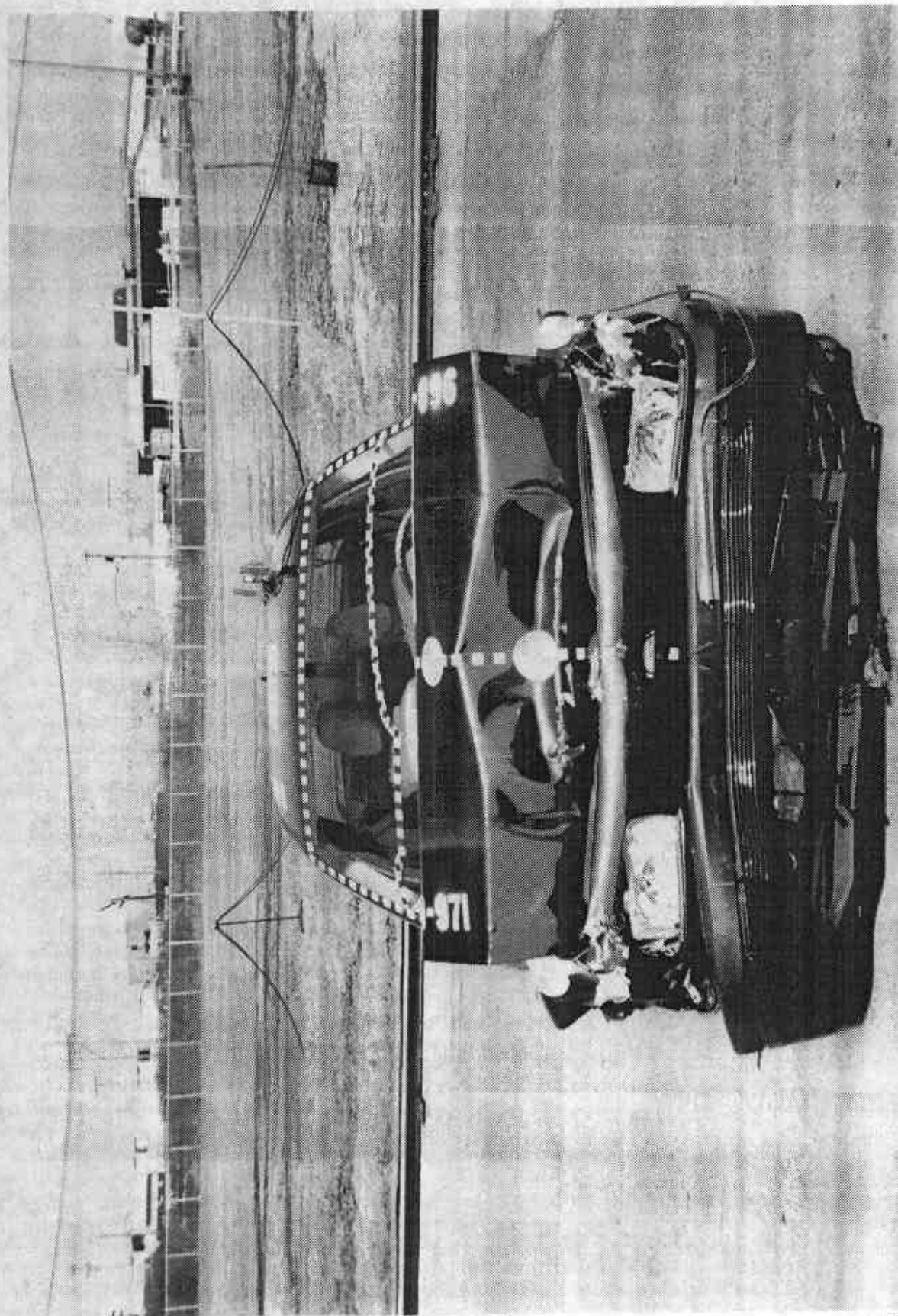


Figure A-2 POST TEST FRONT VIEW

A-4

7804-8

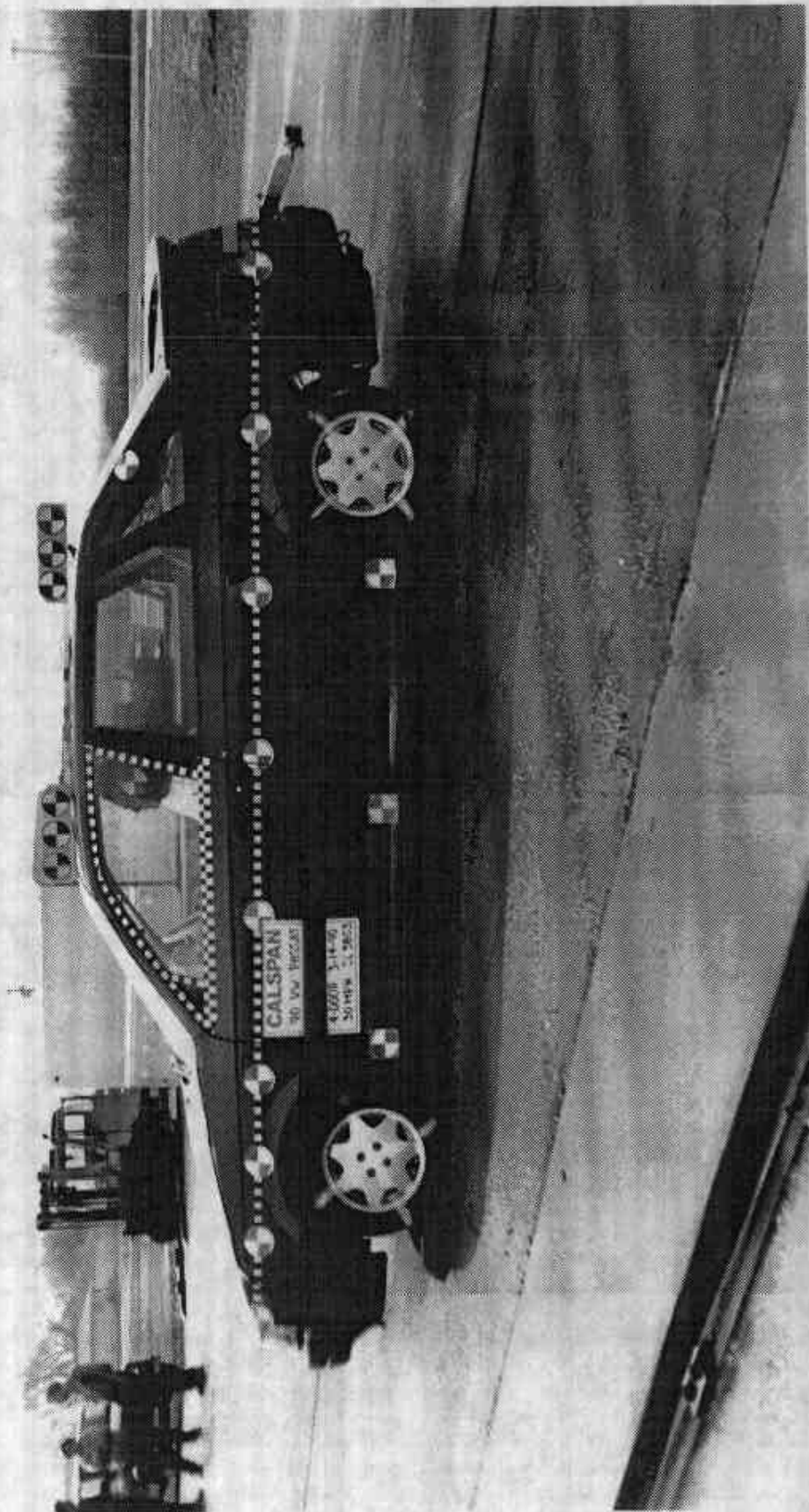


Figure A-3 PRE-TEST LEFT SIDE VIEW

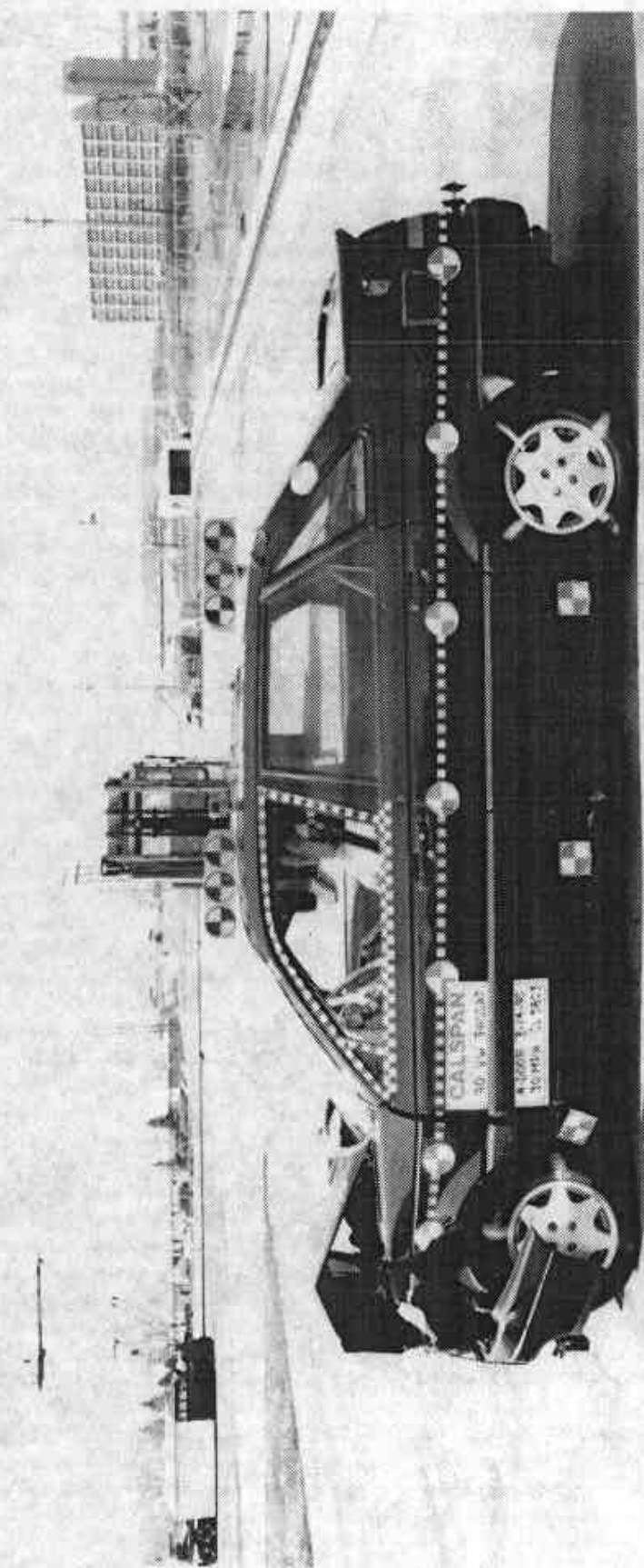


FIGURE A-4 POST TEST LEFT SIDE VIEW

A-6

7804-8

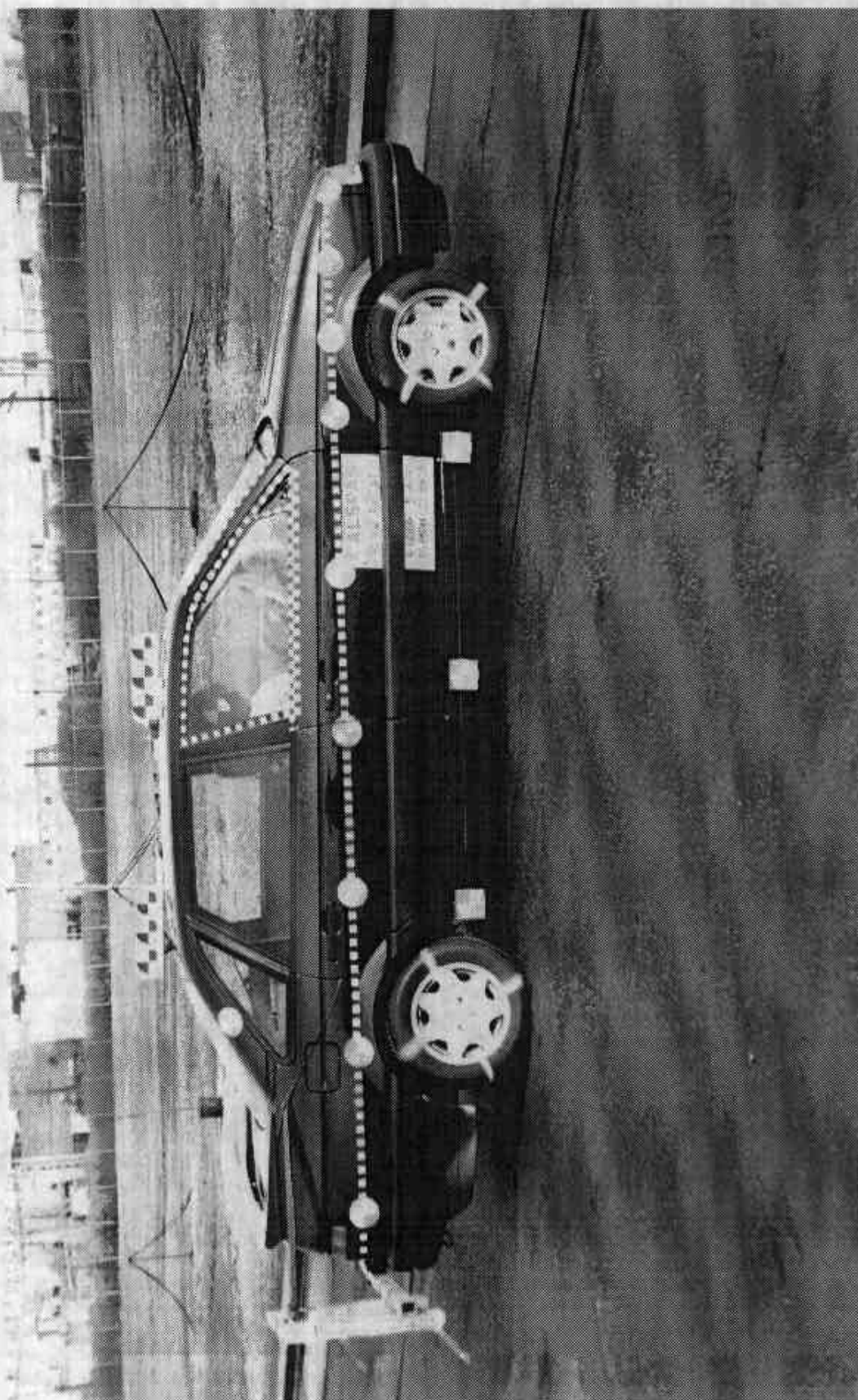


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-7

7804-8

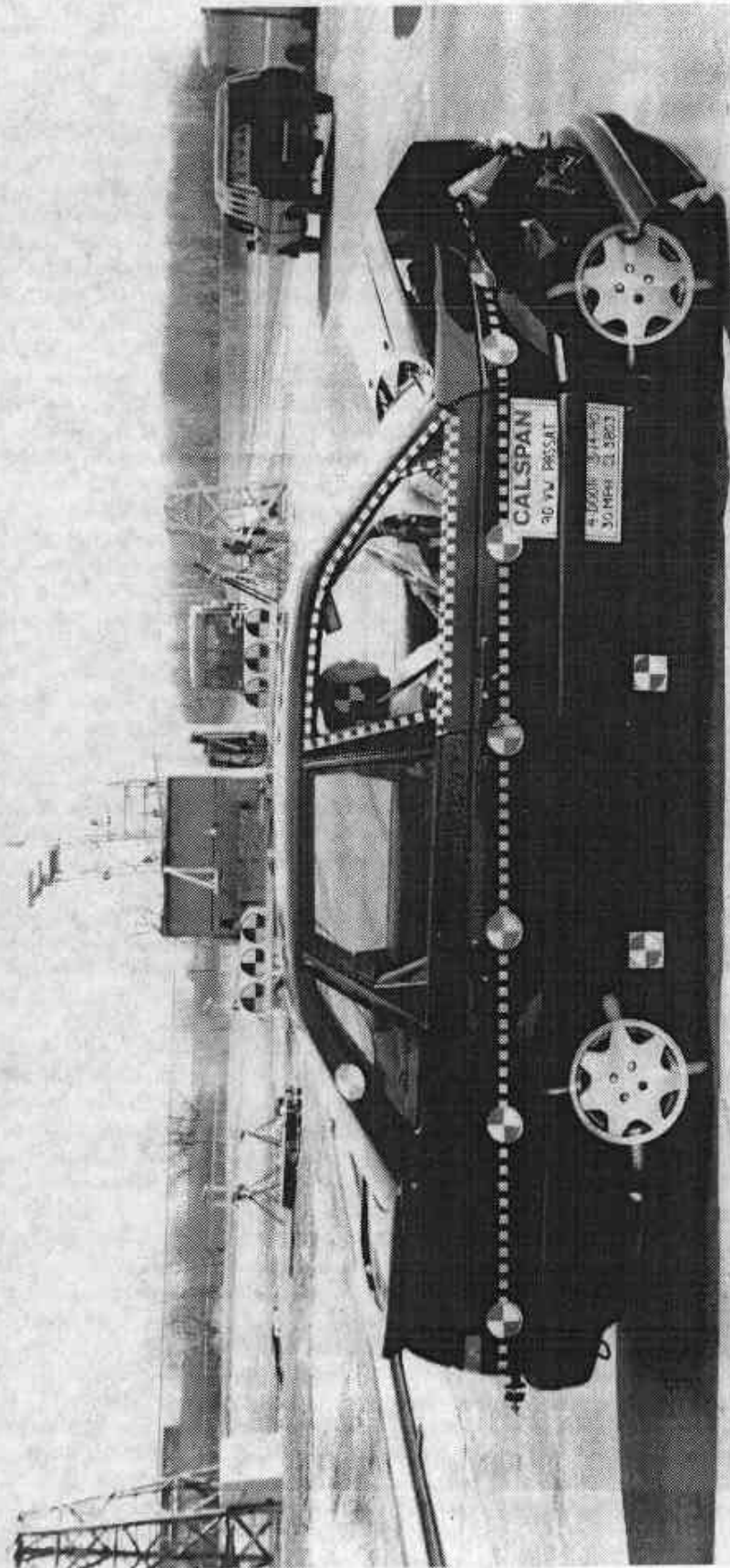


FIGURE A-6 POST-TEST RIGHT SIDE VIEW

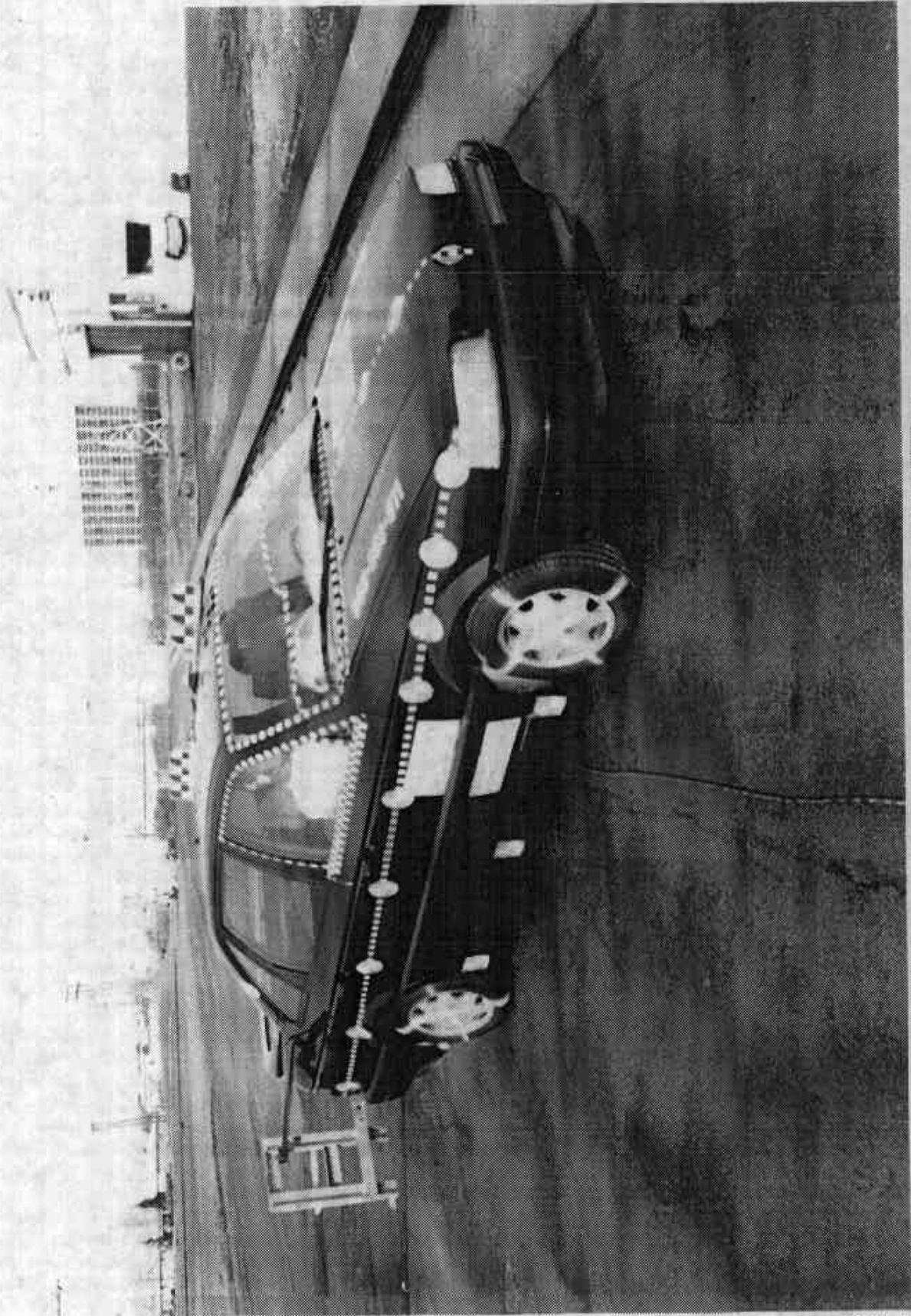


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7804-8

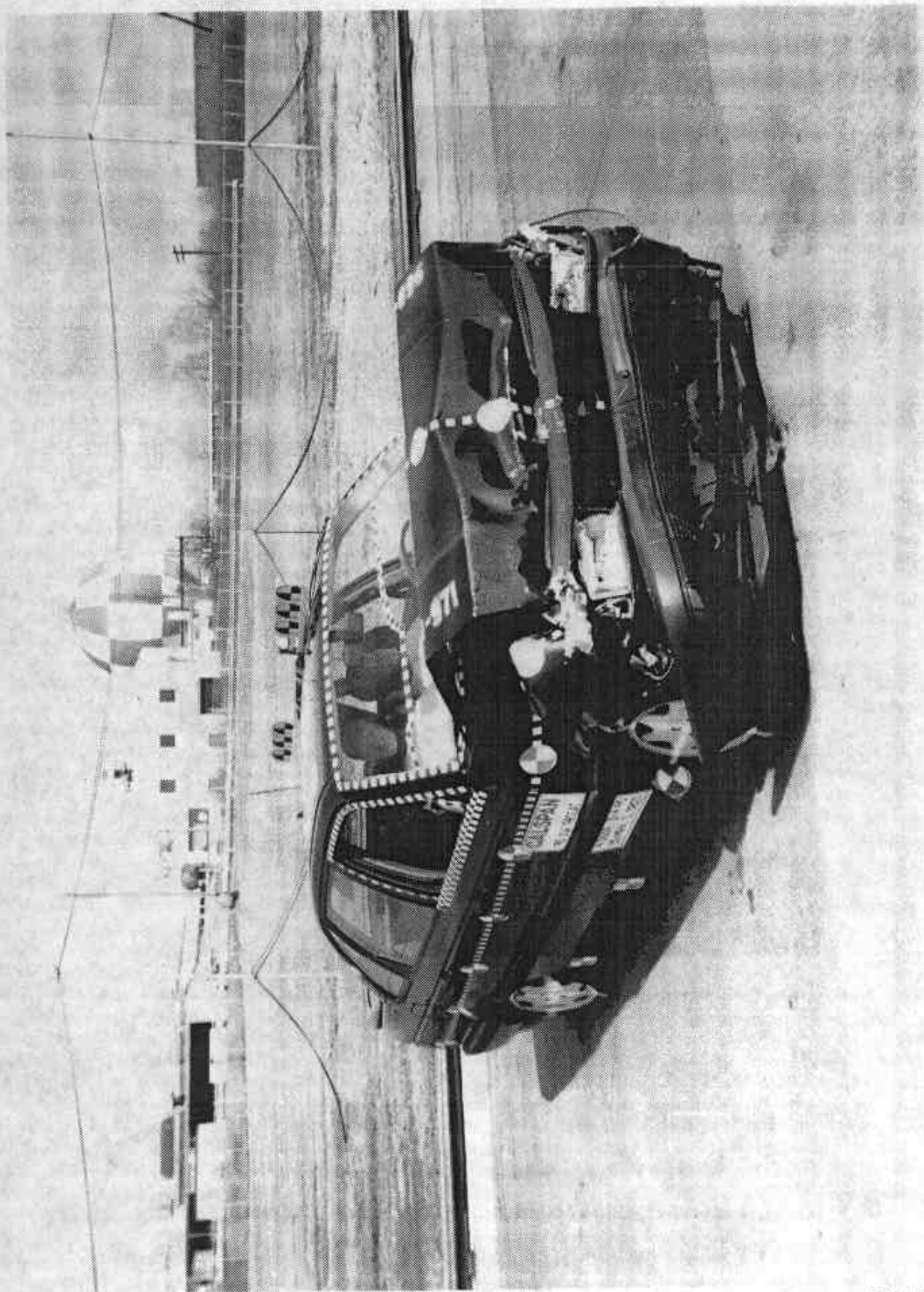


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

7804-8

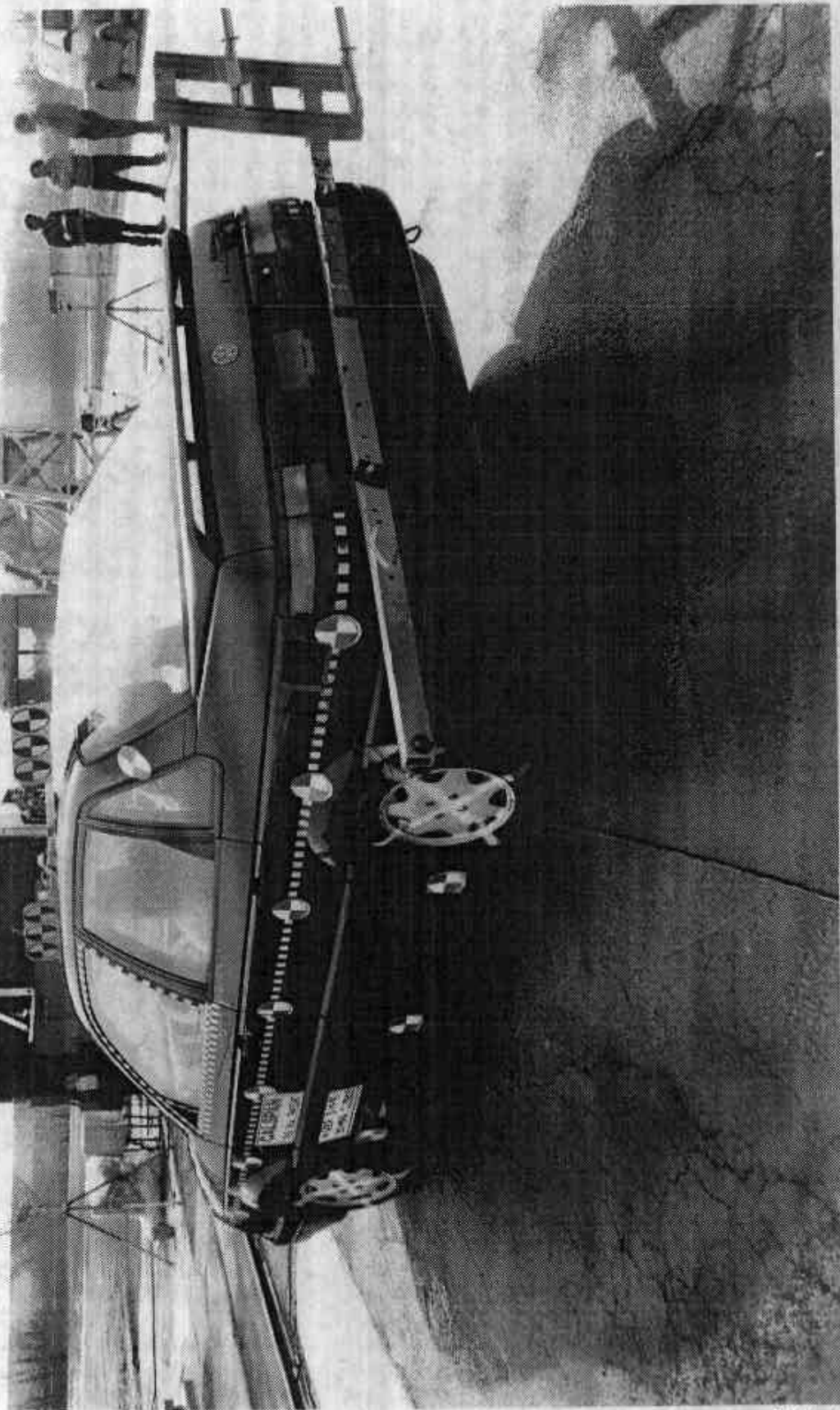


Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-11

7804-8

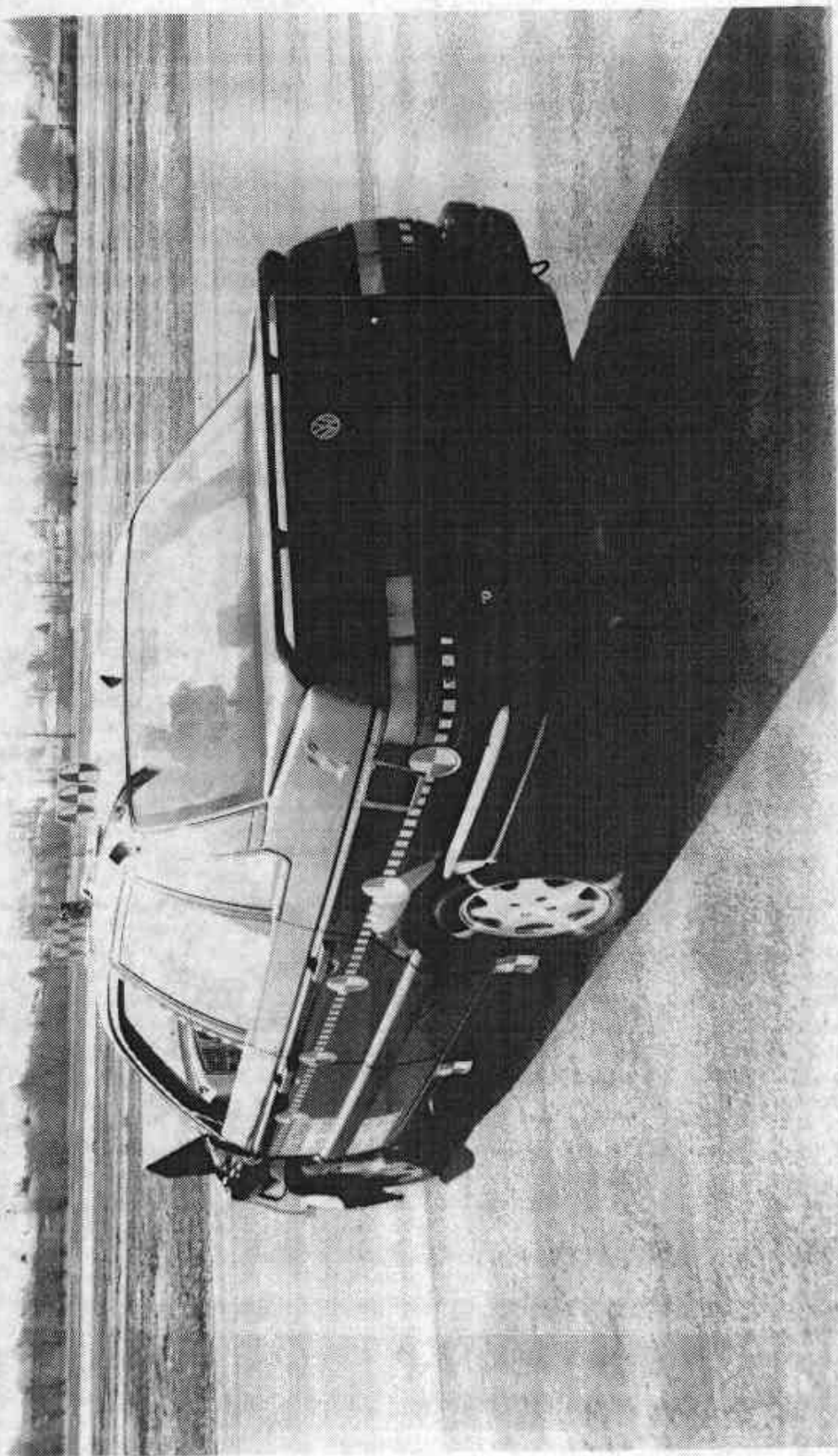


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-11 POST TEST TOP VIEW

A-13

7804-8

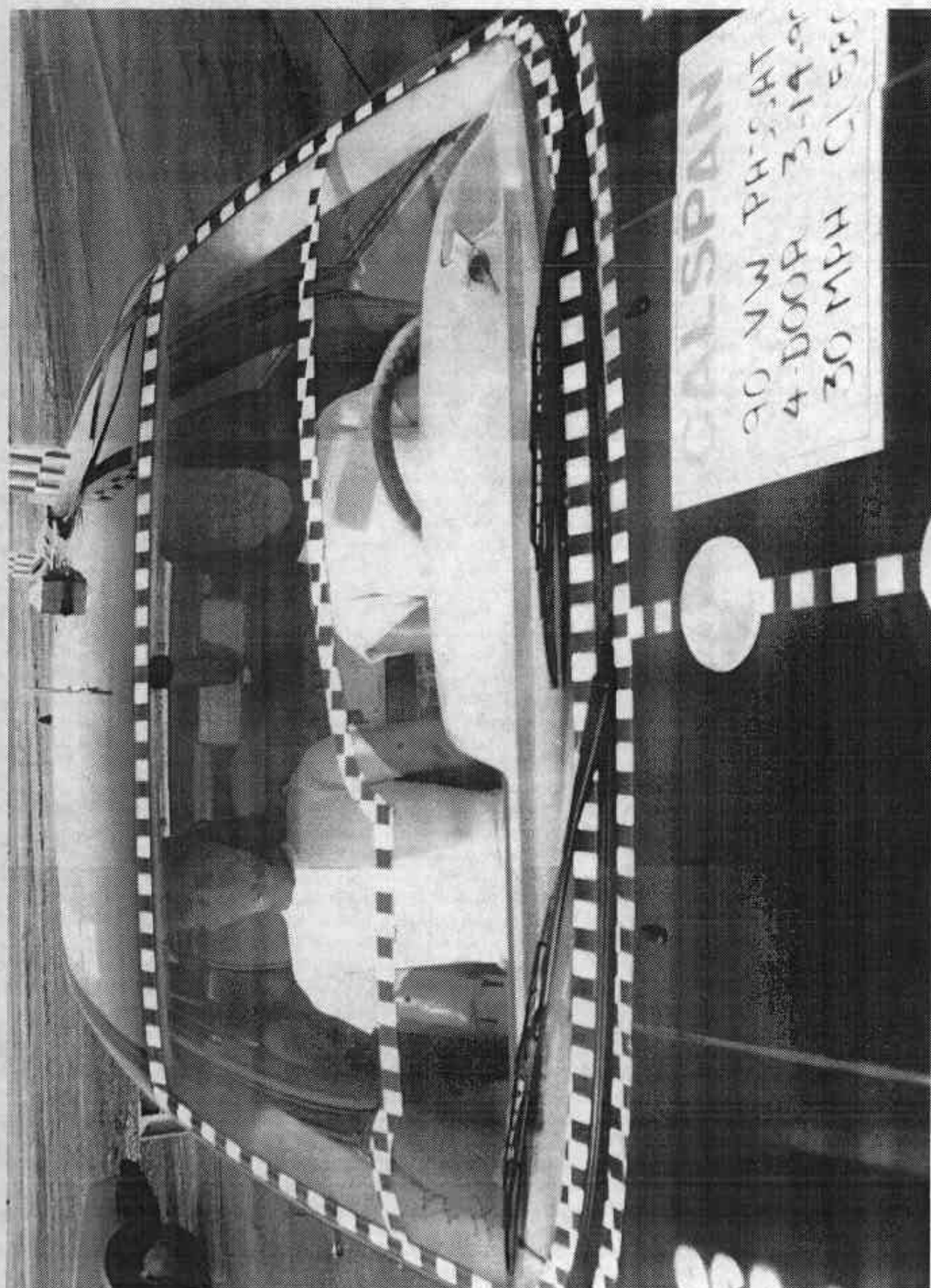


Figure A-12 PRE-TEST WINDSHIELD VIEW

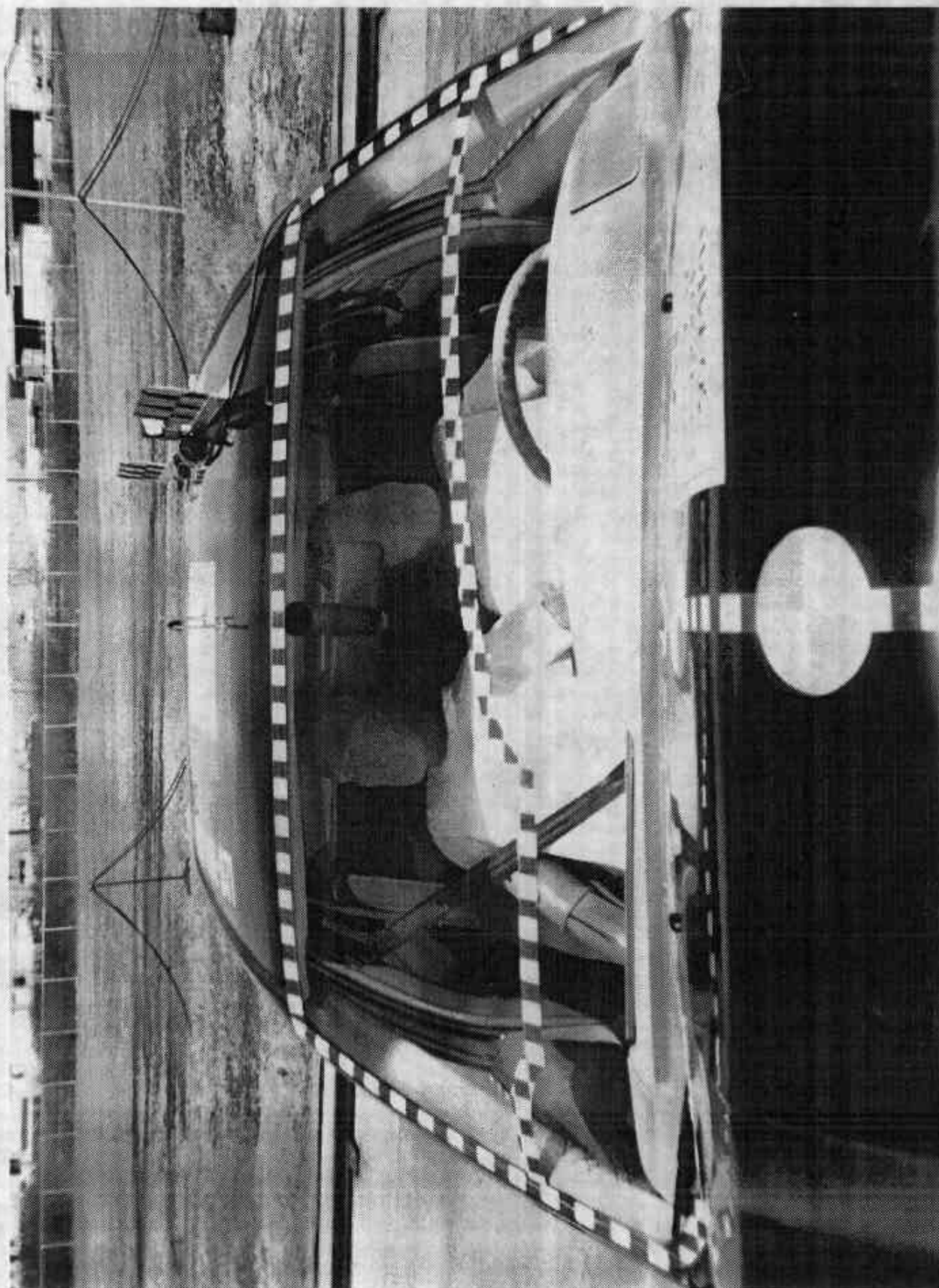


Figure A-13 POST-TEST WINDSHIELD VIEW

A-15

7804-8

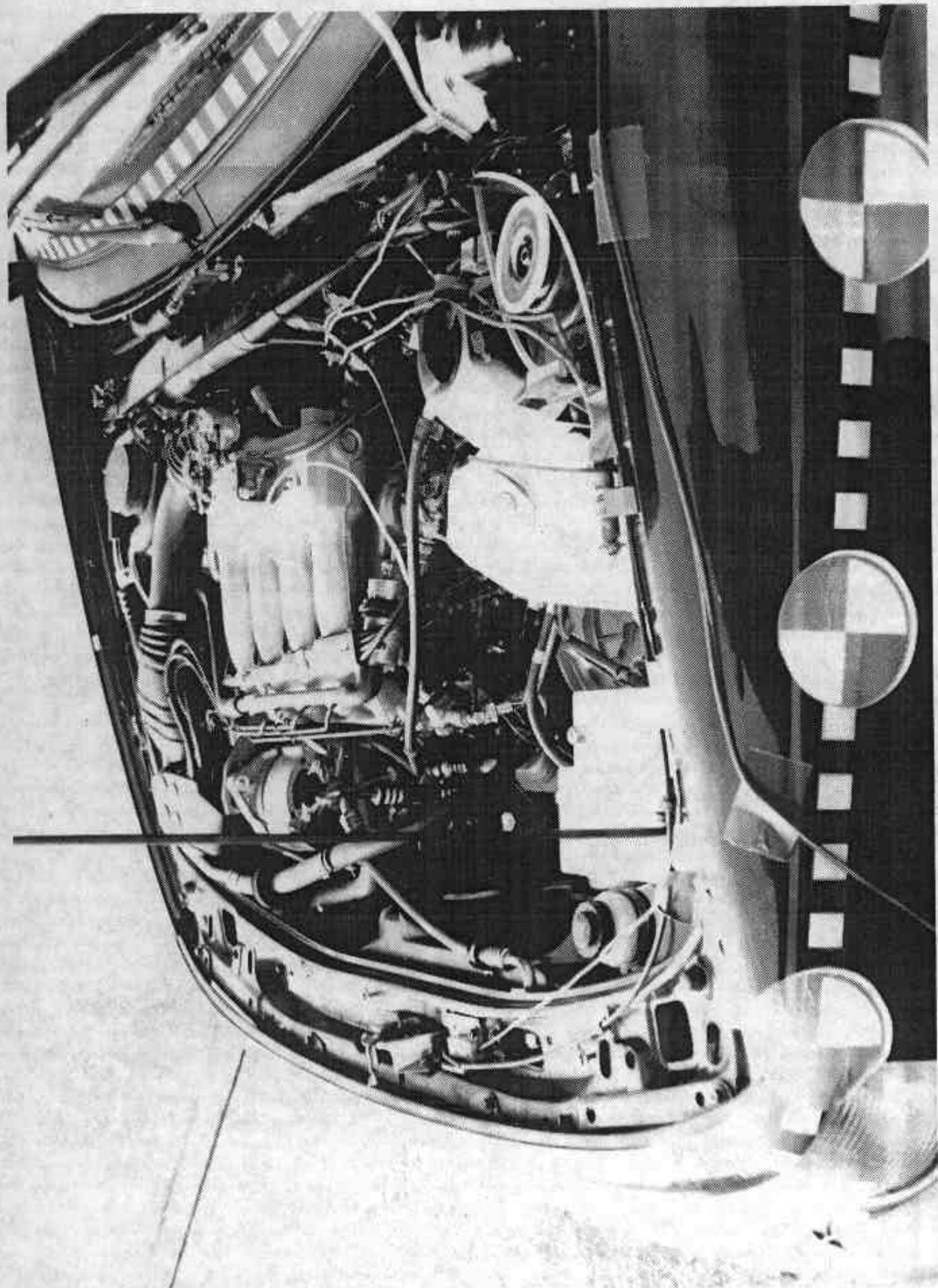


Figure A-14 PRE-TEST ENGINE COMPARTMENT SIDE VIEW

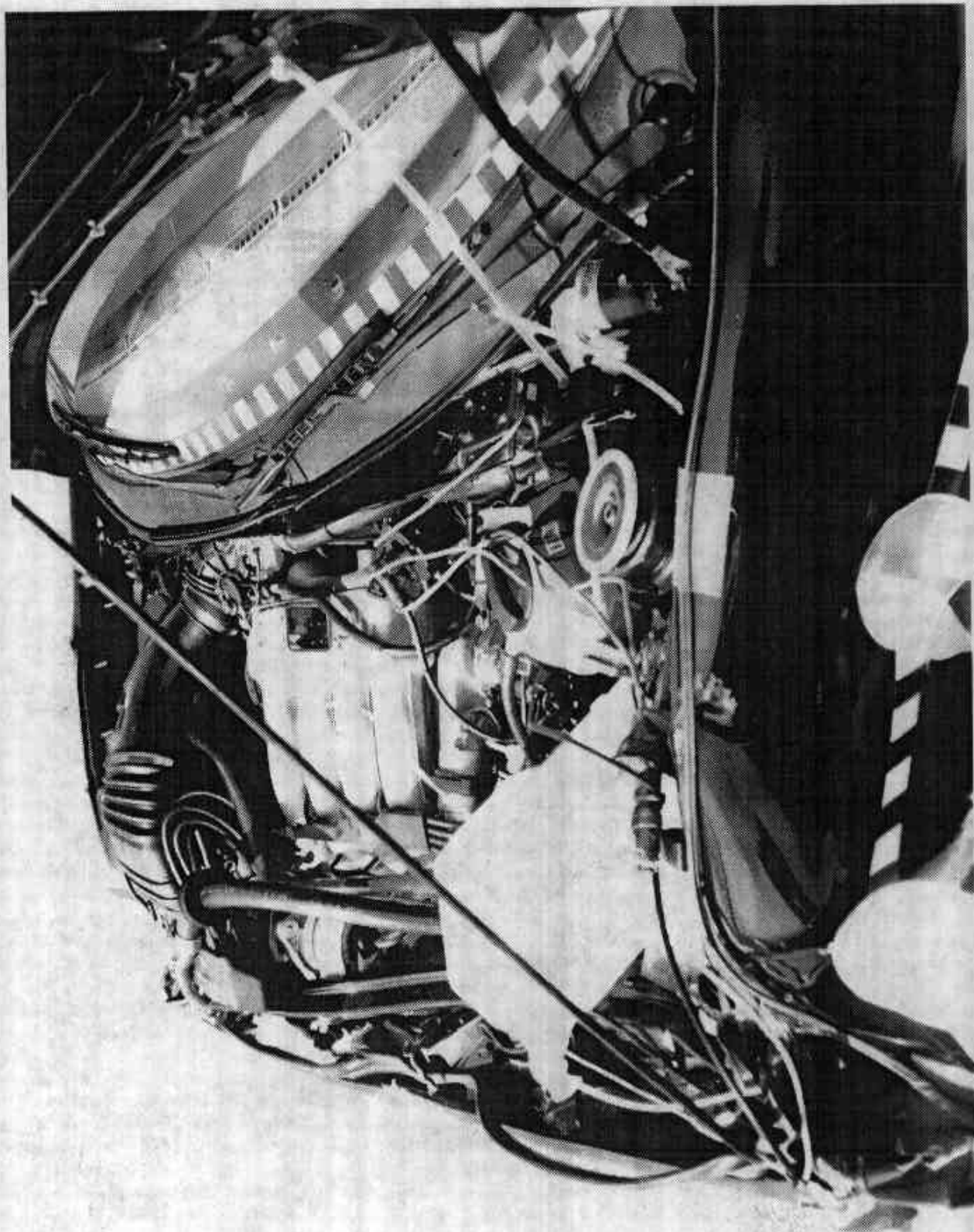


Figure A-15 POST-TEST ENGINE COMPARTMENT FRONT VIEW

PRE-TEST FUEL FILLER CAP PHOTO NOT AVAILABLE

POST-TEST FUEL FILLER CAP PHOTO NOT AVAILABLE

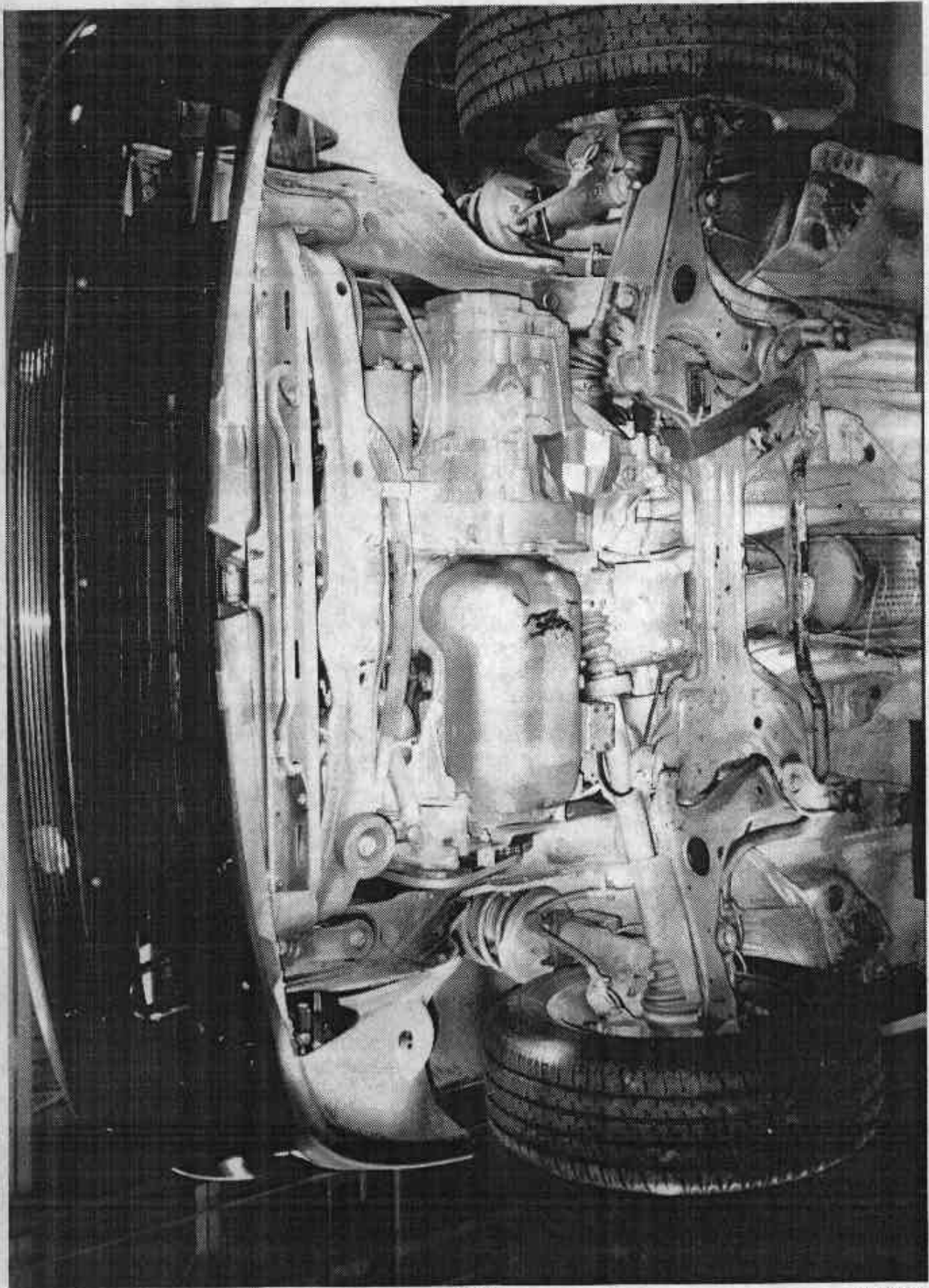


Figure A-18 PRE-TEST FRONT UNDERBODY VIEW

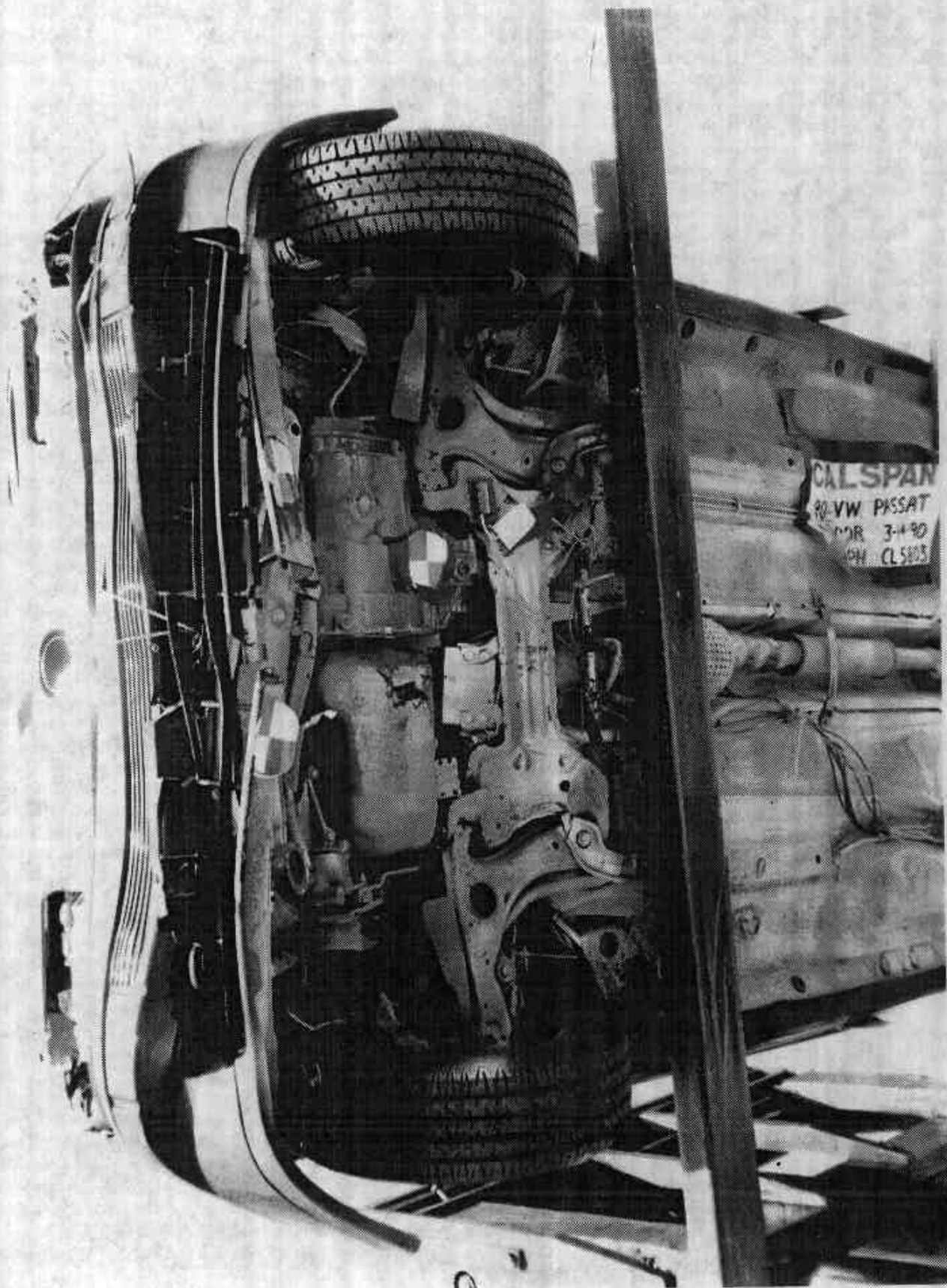


Figure A-19 POST-TEST FRONT UNDERBODY VIEW

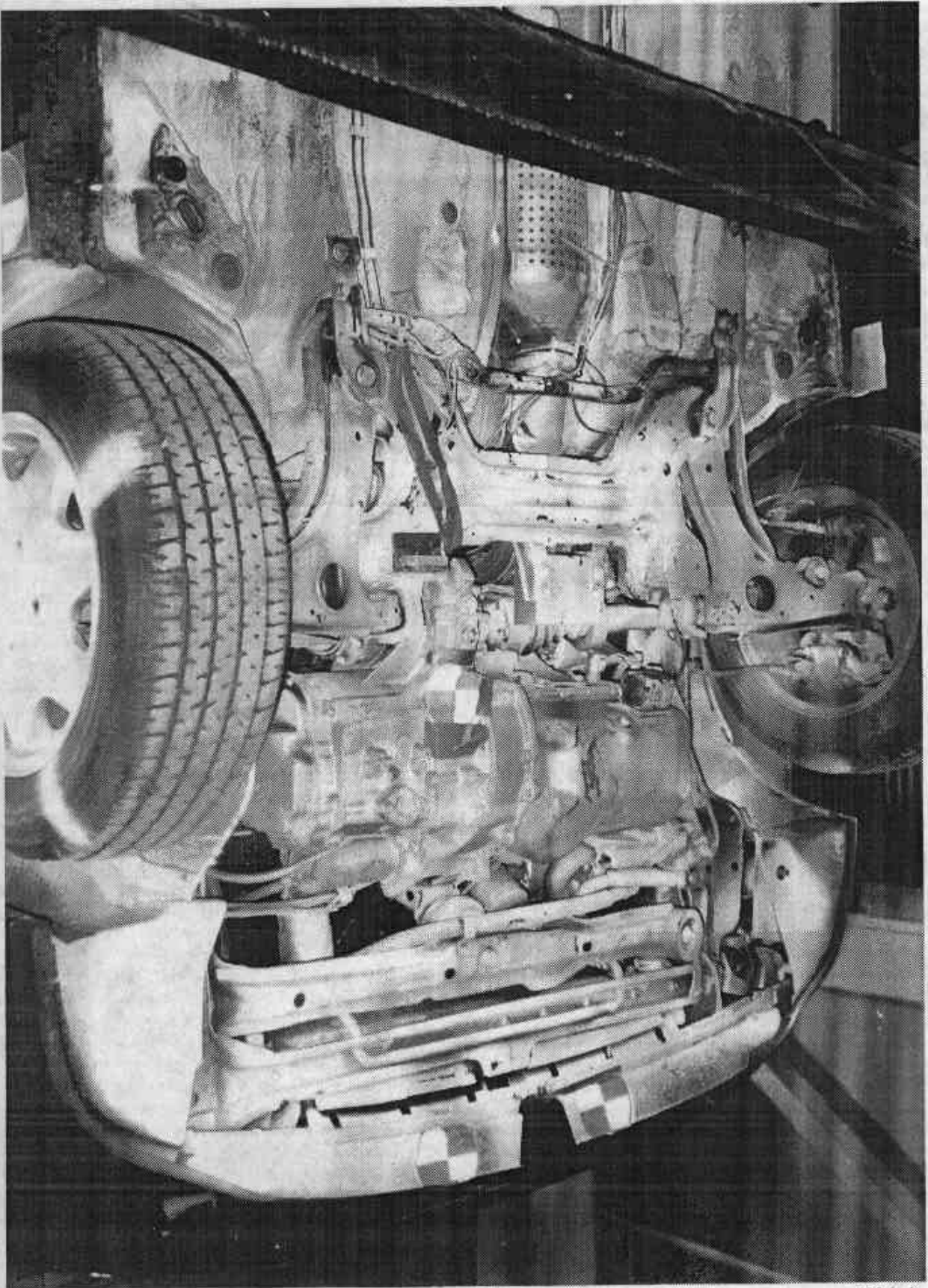


Figure A-20 PRE-TEST FRONT SIDE UNDERBODY VIEW

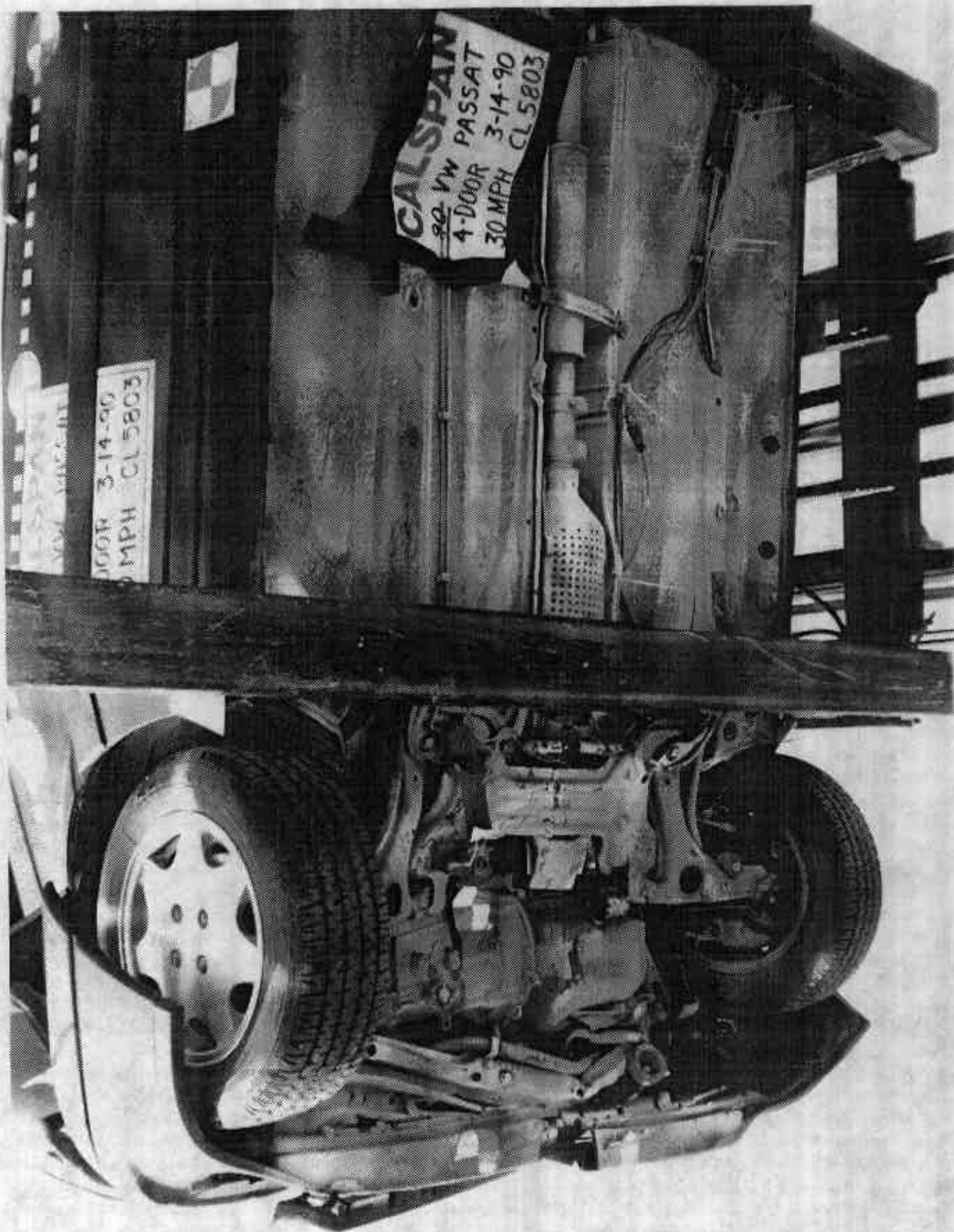


Figure A-21 POST-TEST FRONT SIDE UNDERBODY VIEW

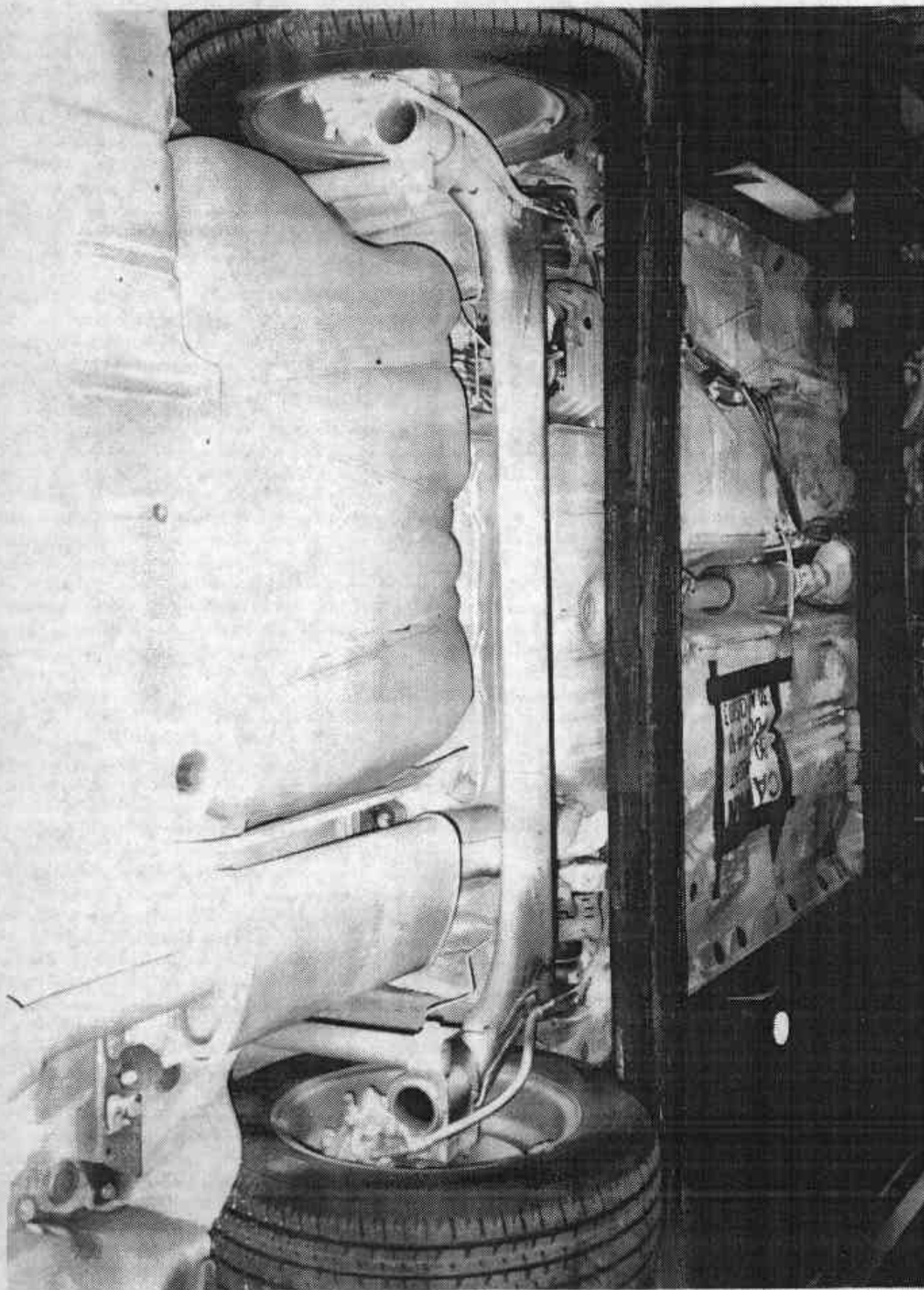


Figure A-22 PRE-TEST REAR UNDERBODY VIEW

A-24

7804-8

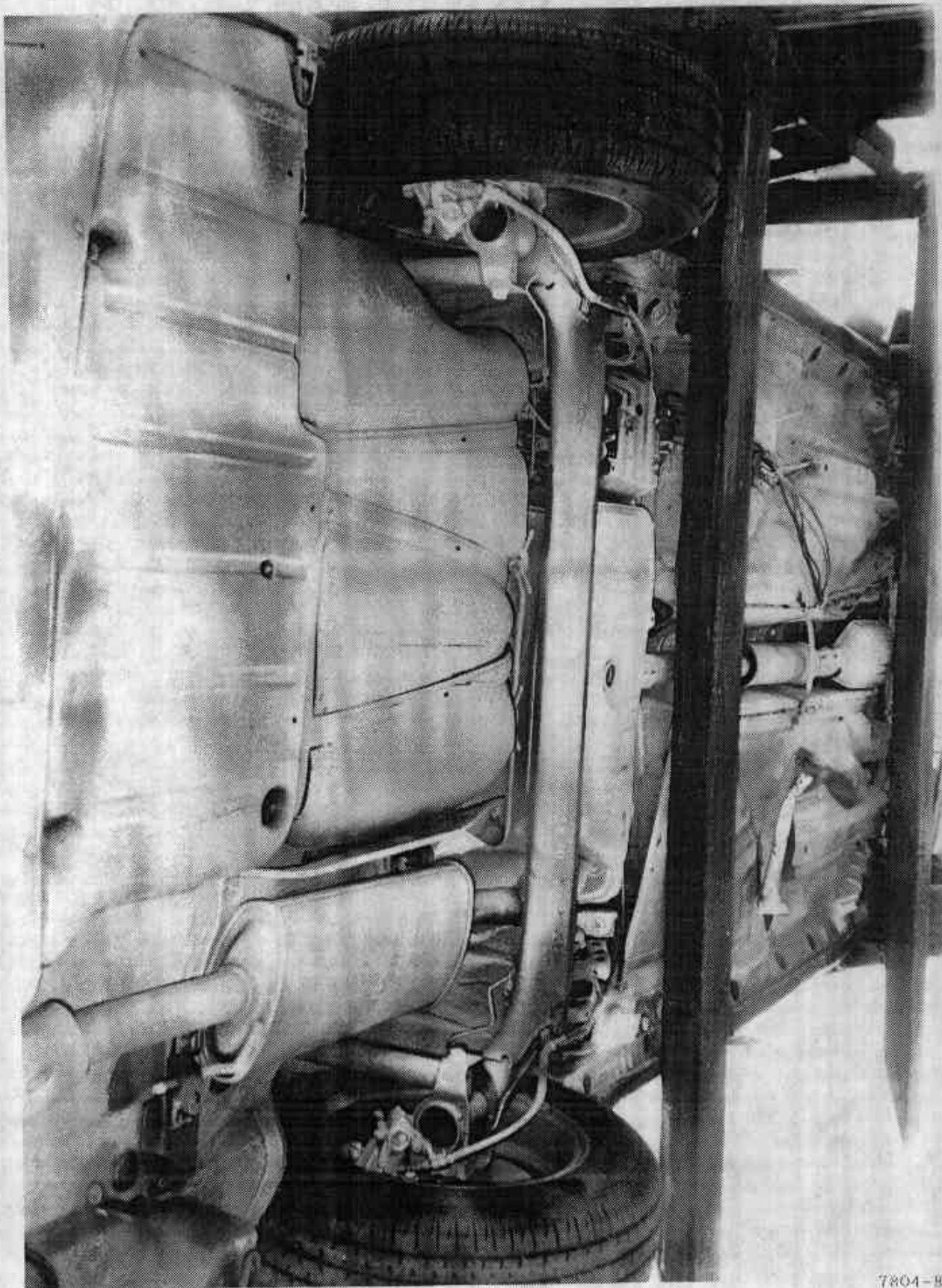


Figure A-23 POST-TEST REAR UNDERBODY VIEW

A-25

7804-B

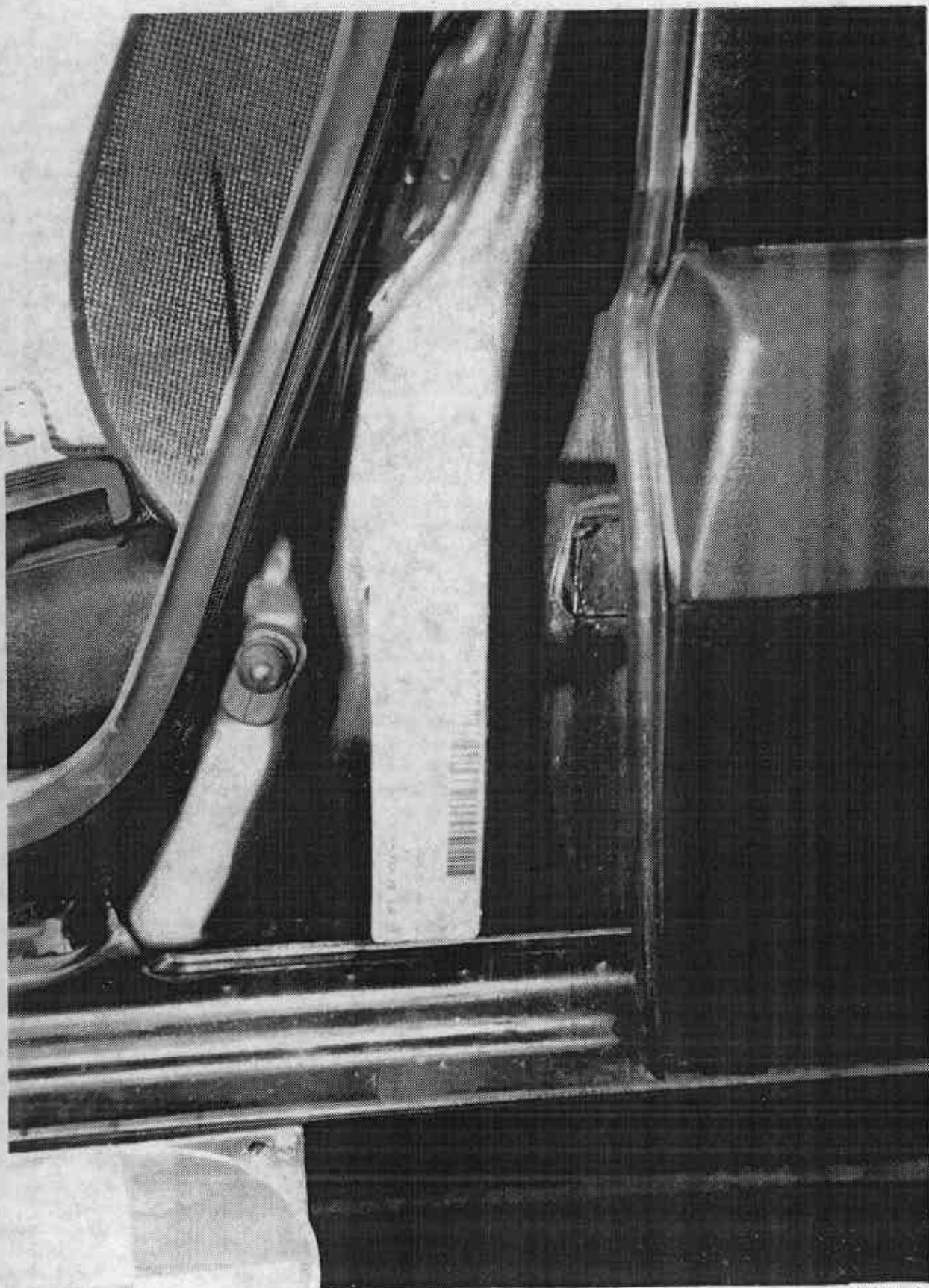


Figure A-24 CERTIFICATION LABEL

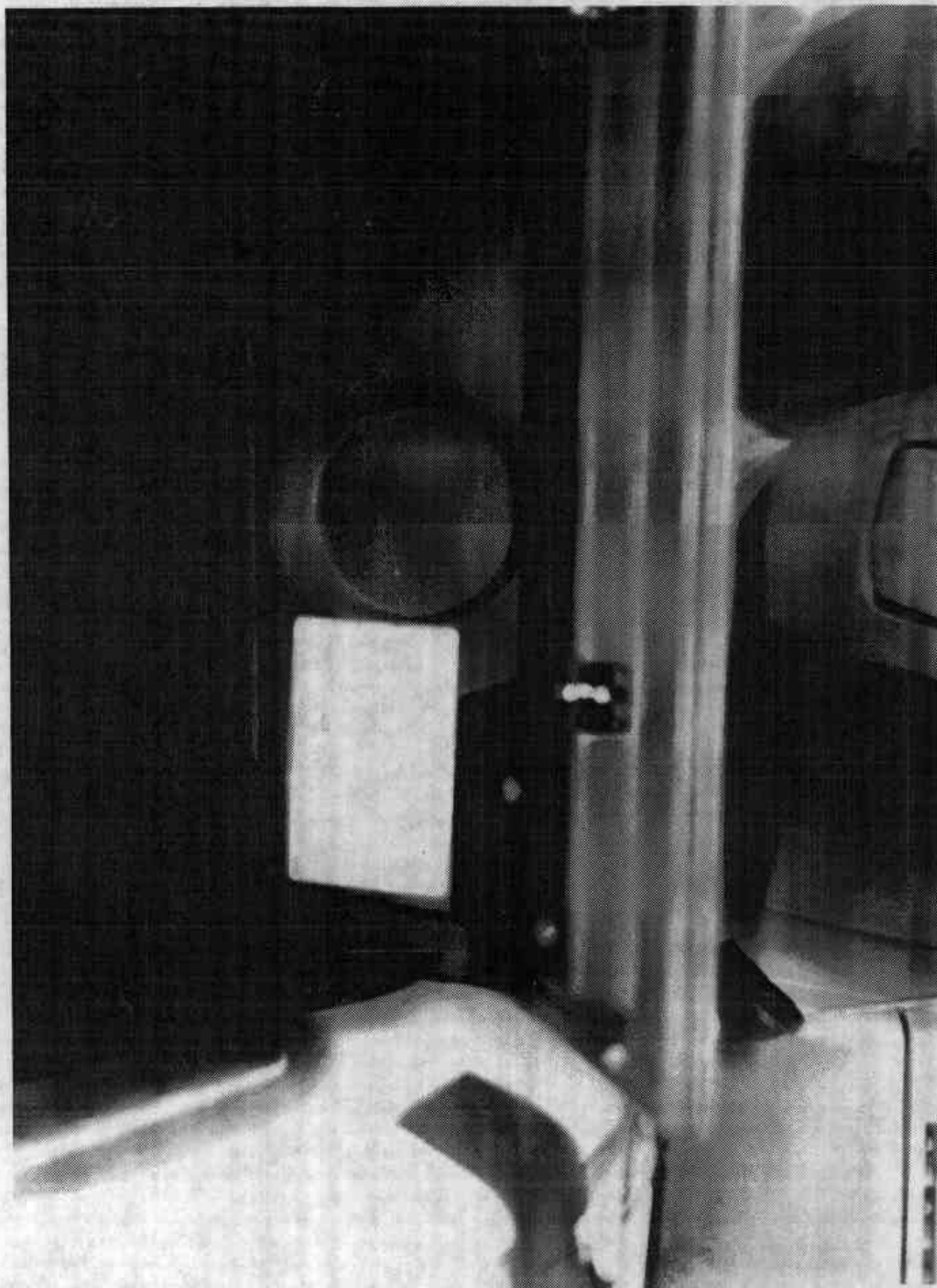


Figure A-25 TIRE PLACARD



FIGURE A-26 PRE-TEST DRIVER DUMMY POSITION

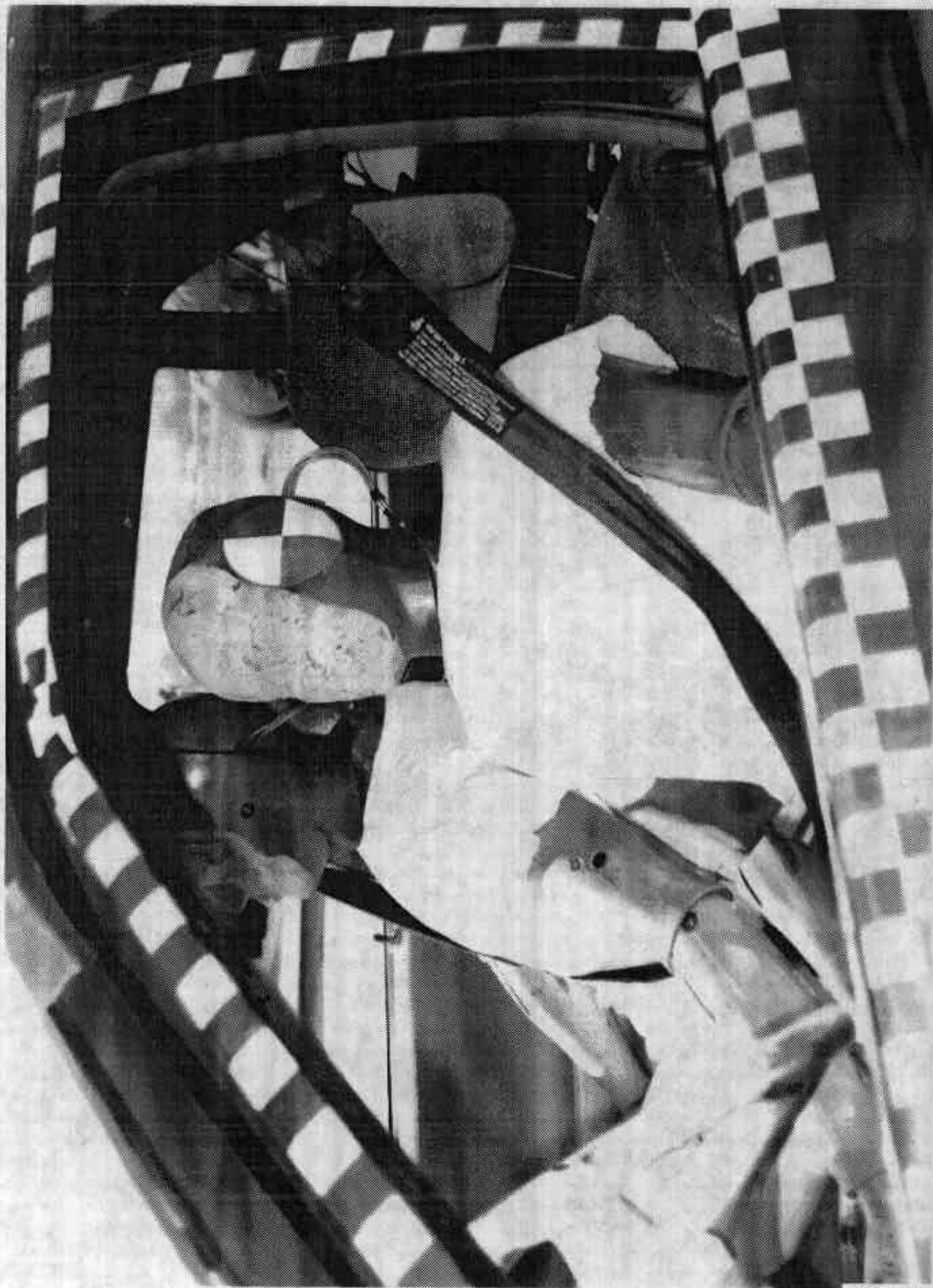


FIGURE A-27 POST-TEST DRIVER DUMMY POSITION

A-29

7804-8



Figure A-28 PRE-TEST PASSENGER DUMMY POSITION

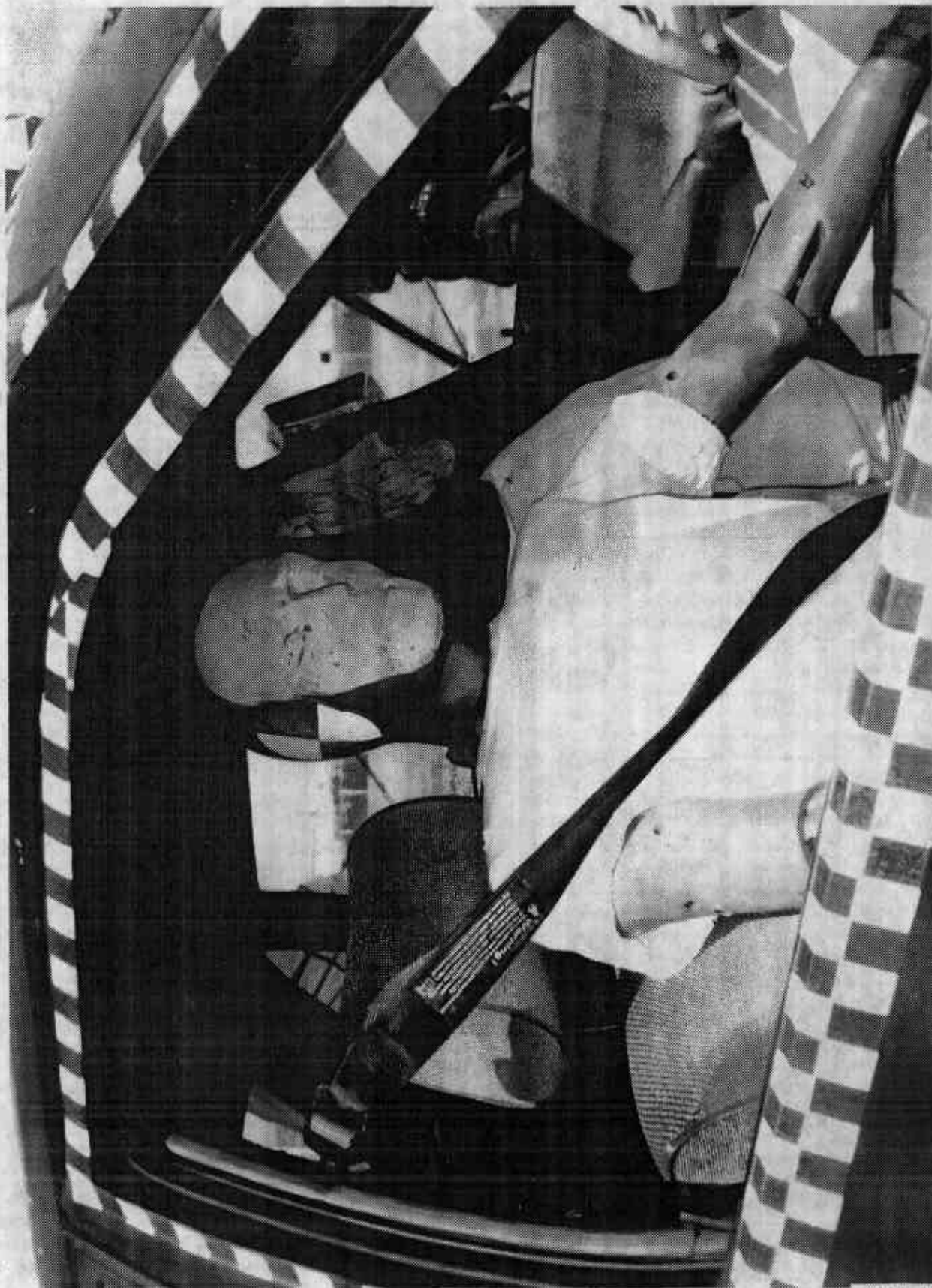


Figure A-29 POST-TEST PASSENGER DUMMY POSITION

A-31

7804-8

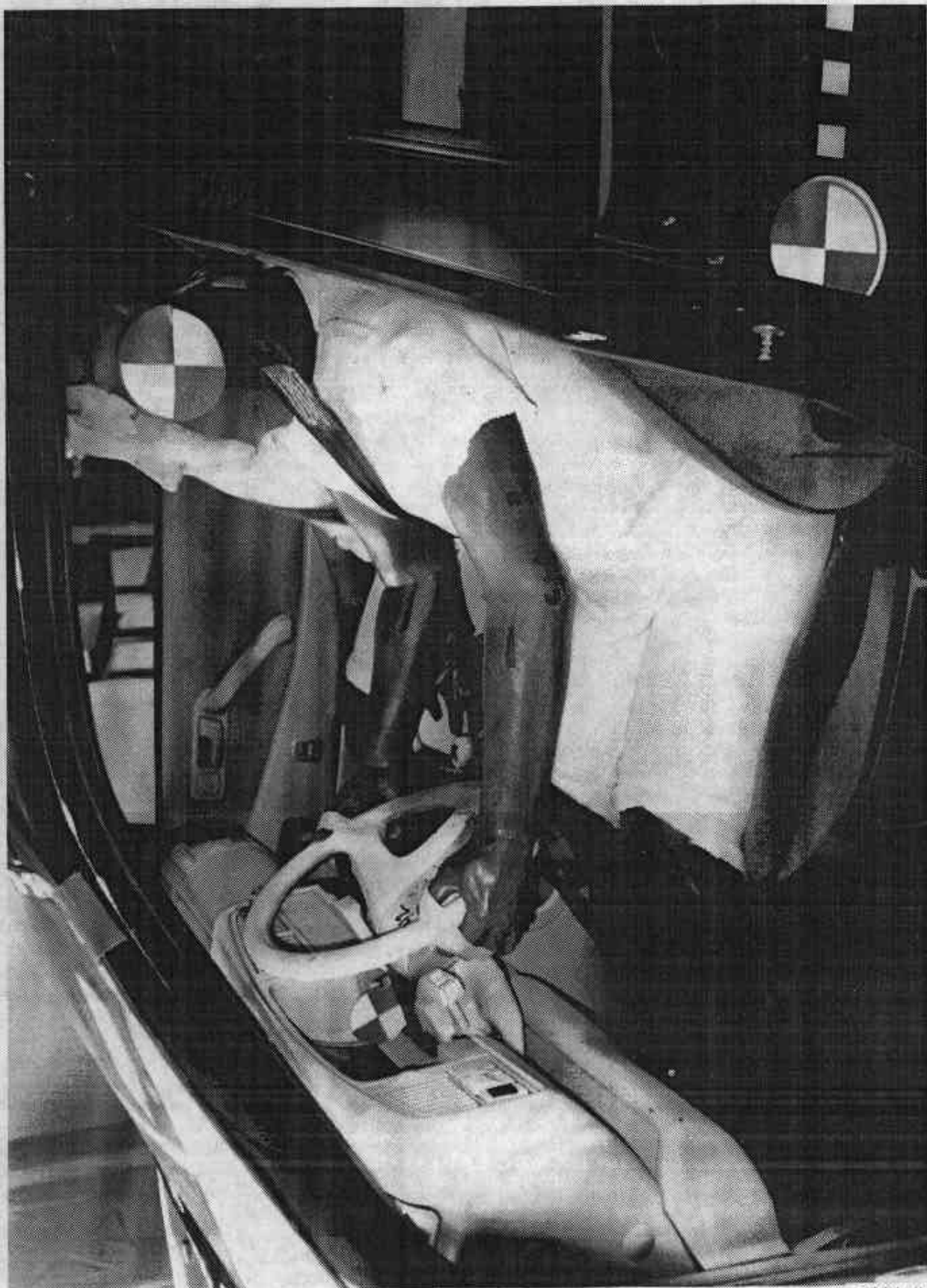


Figure A-30 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

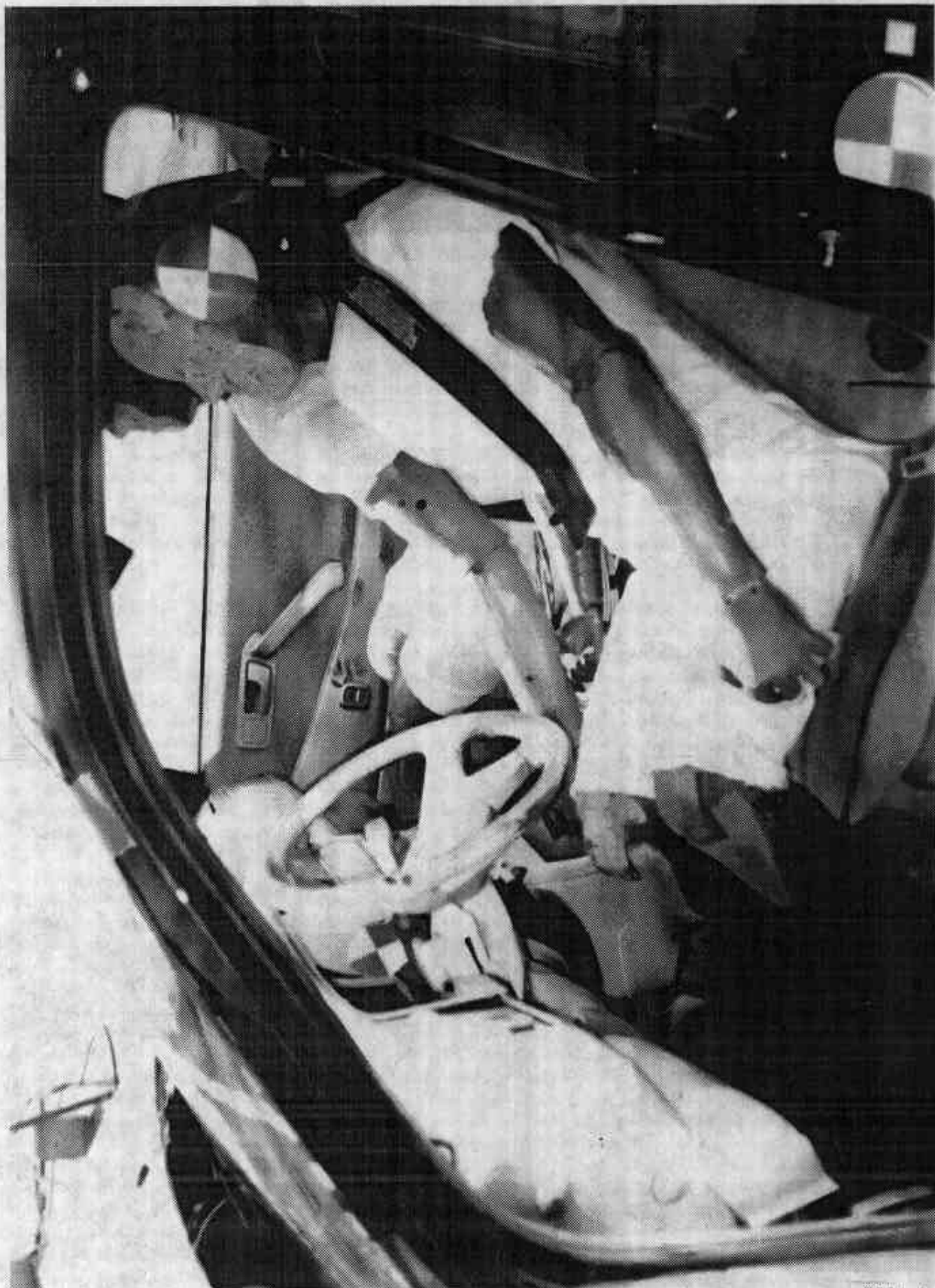


Figure A-31 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

A-33

7804-8



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



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

A-35

7804-8

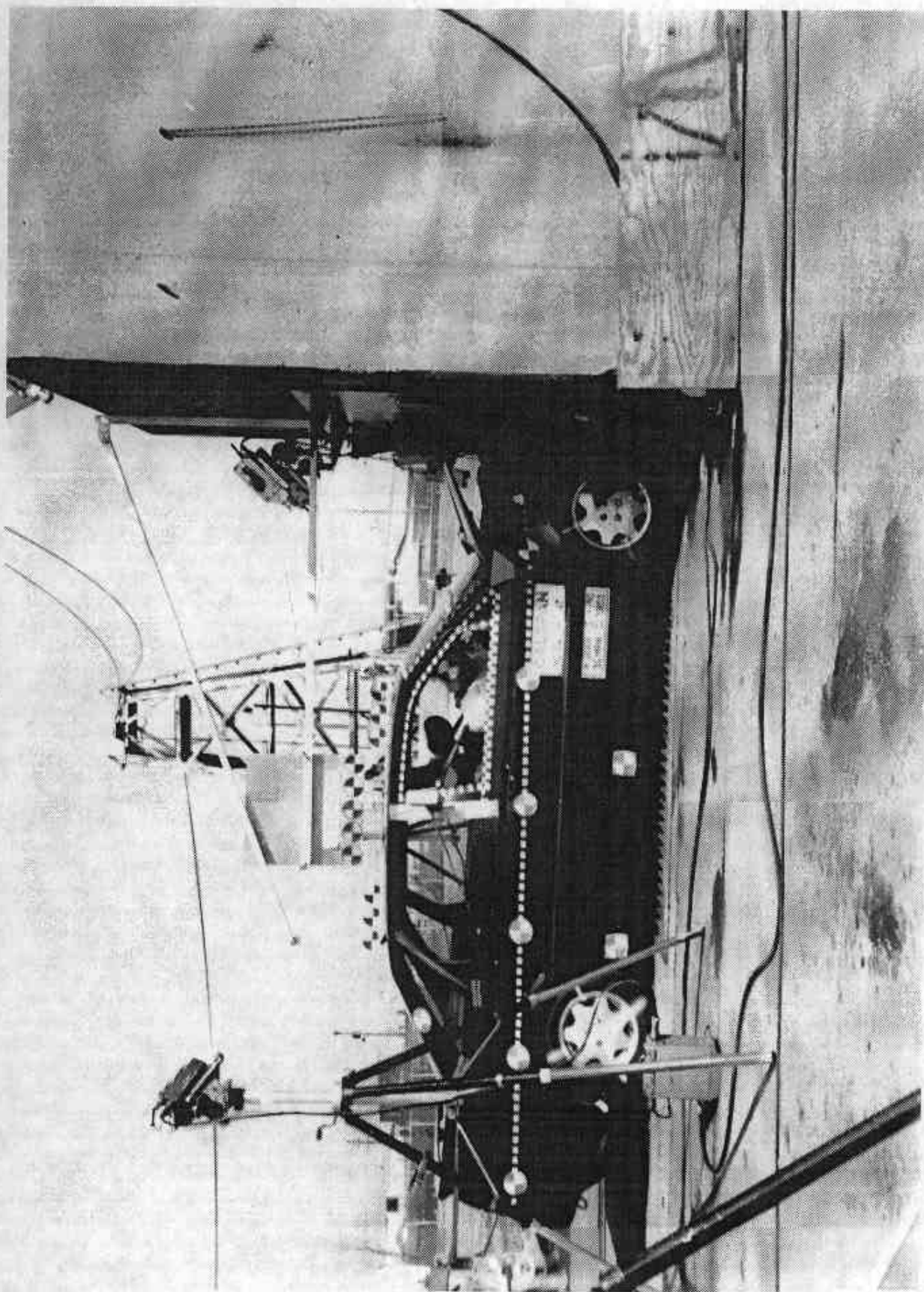


FIGURE A-34 VEHICLE IMPACT

A-36

7804-8

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CL5803

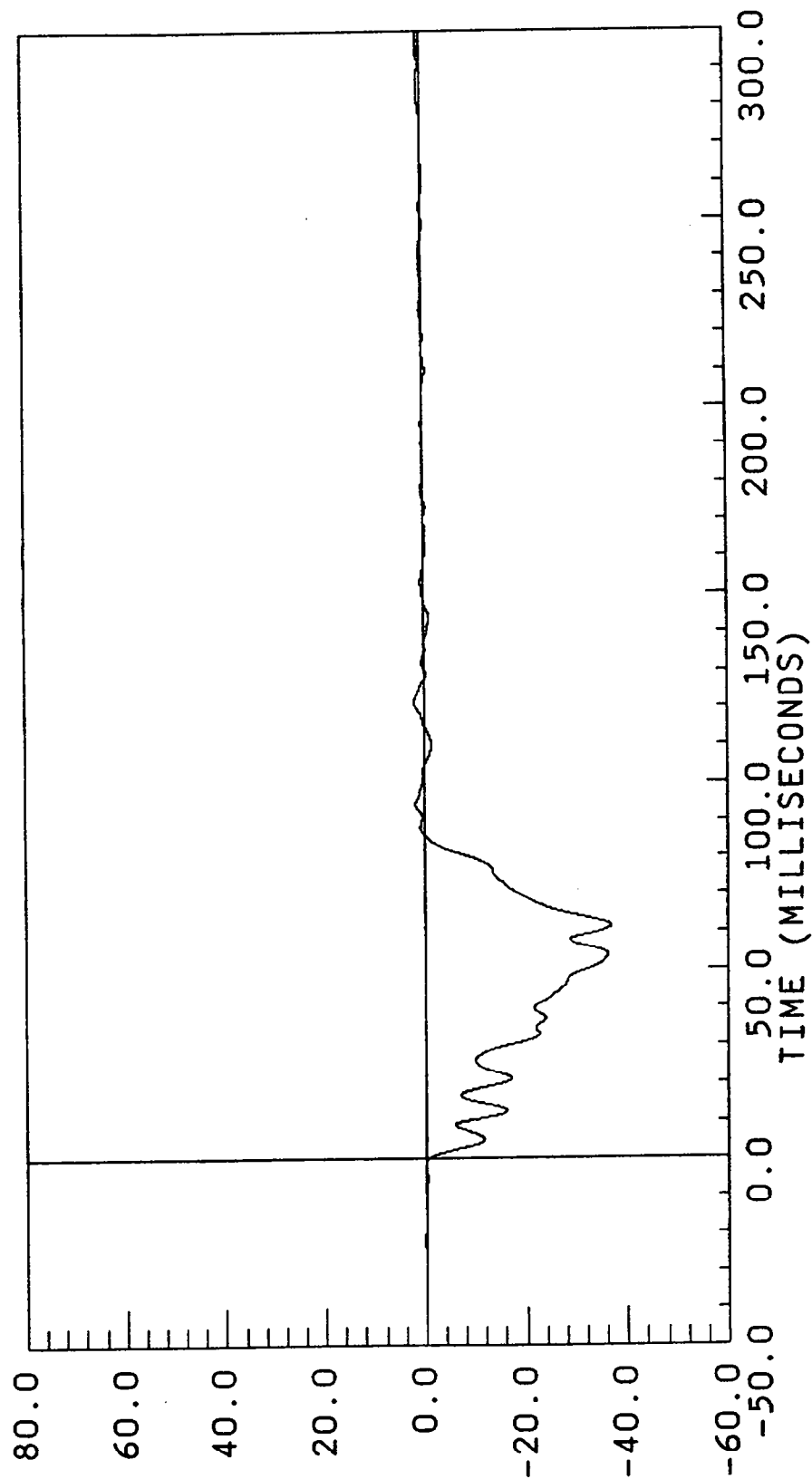
VEHICLE DATA

FILTER CHANNEL CLASS

60

29.40 mph

ACC PACK #1(X)
 FILTERED
 FILTER CUTOFF: 100HZ
 XL AXIS
 YMIN = -37.08935 at 61.35000
 YMAX = 1.903030 at 121.2750

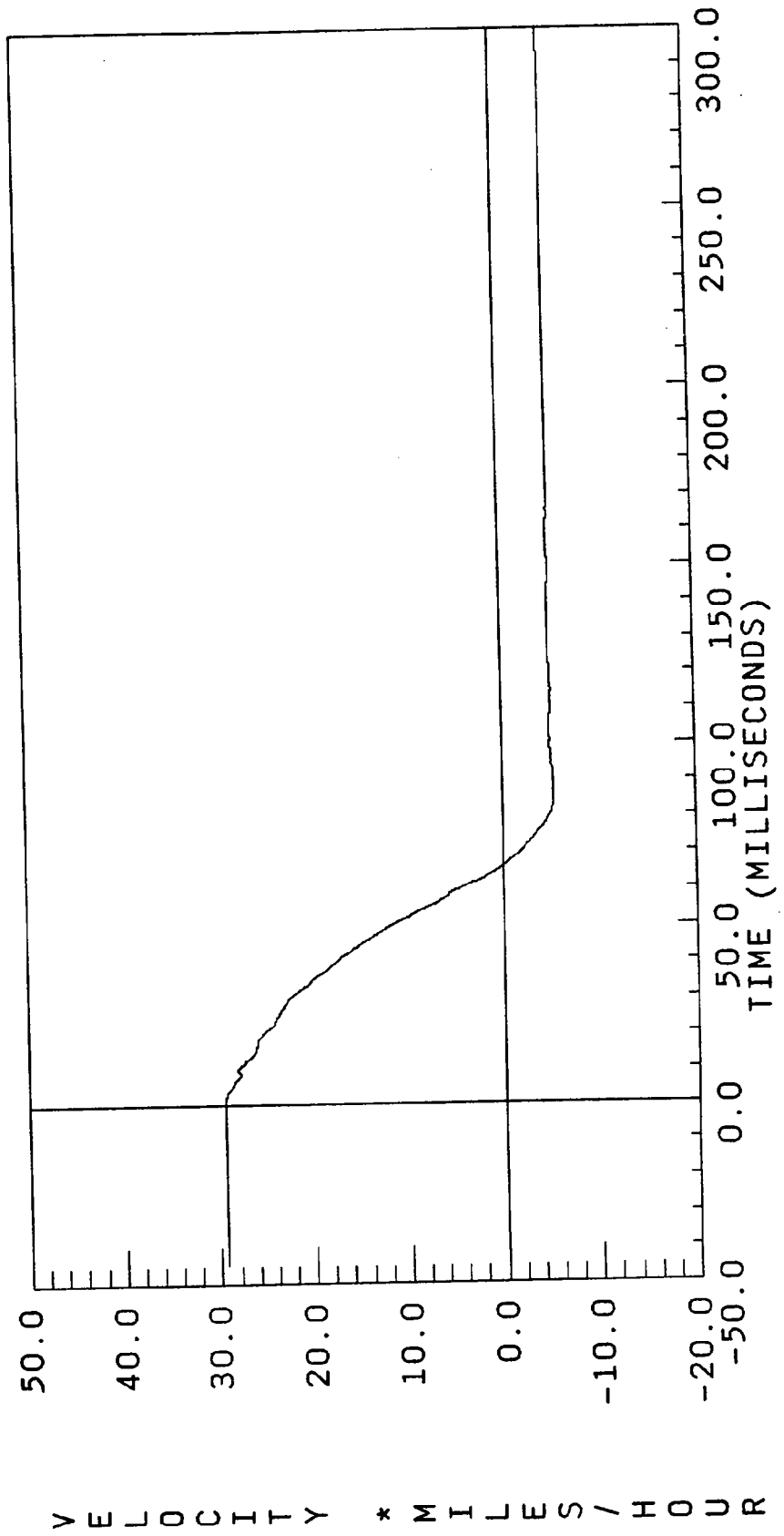


ACCELERATION * G, S *

V971-17.DAT

29.40 mph

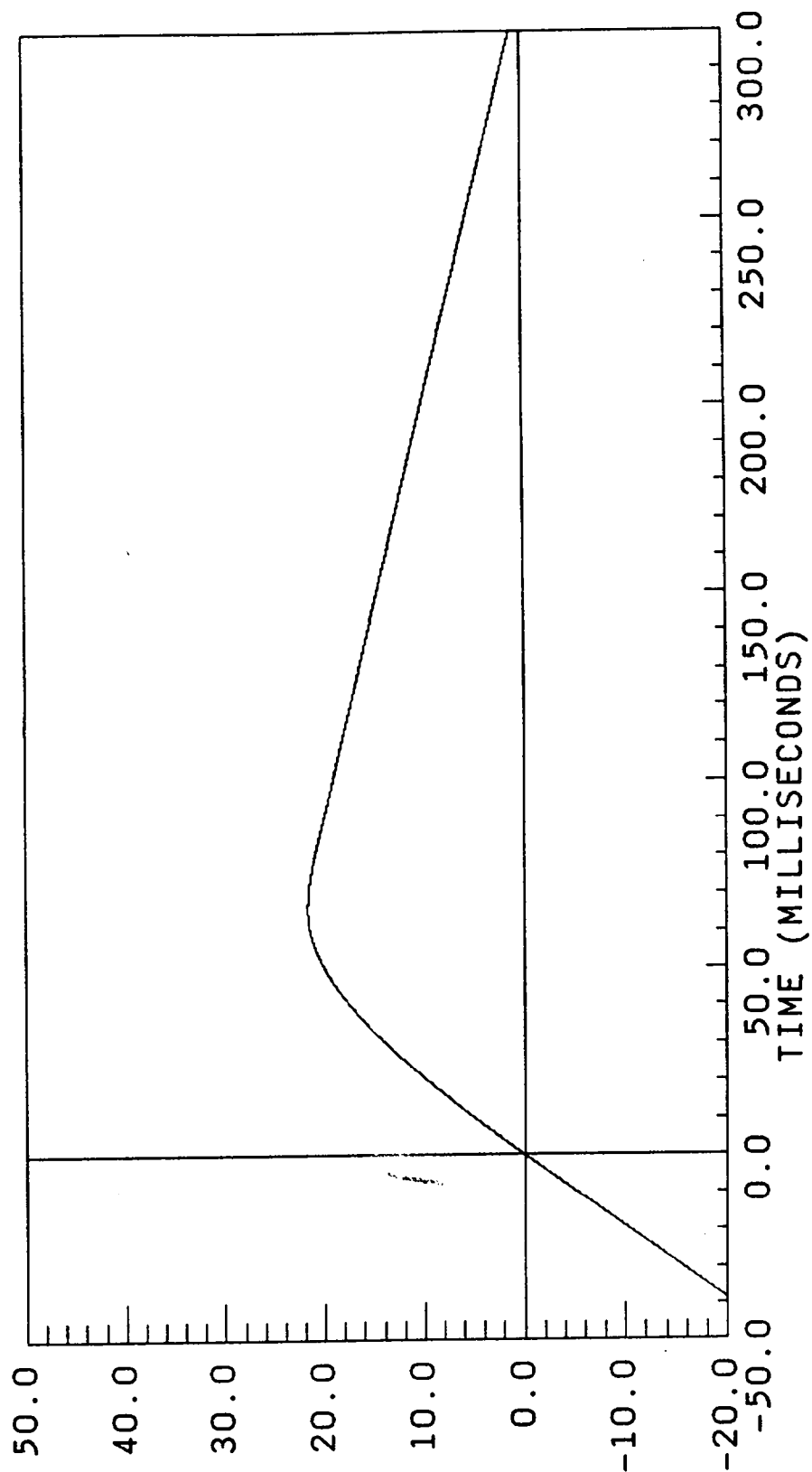
ACC PACK #1(X)
COMPUTED
FILTER CUTOFF: OHZ
XL AXIS
YMIN = -5.384021 at 85.95000
YMAX = 29.43185 at -9.675000



29.40 mph

ACC PACK #1(X)
COMPUTED
FILTER CUTOFF: 0Hz

XL AXIS
YMIN = -23.27189 at 85.95000
YMAX = 21.59815 at 66.07500

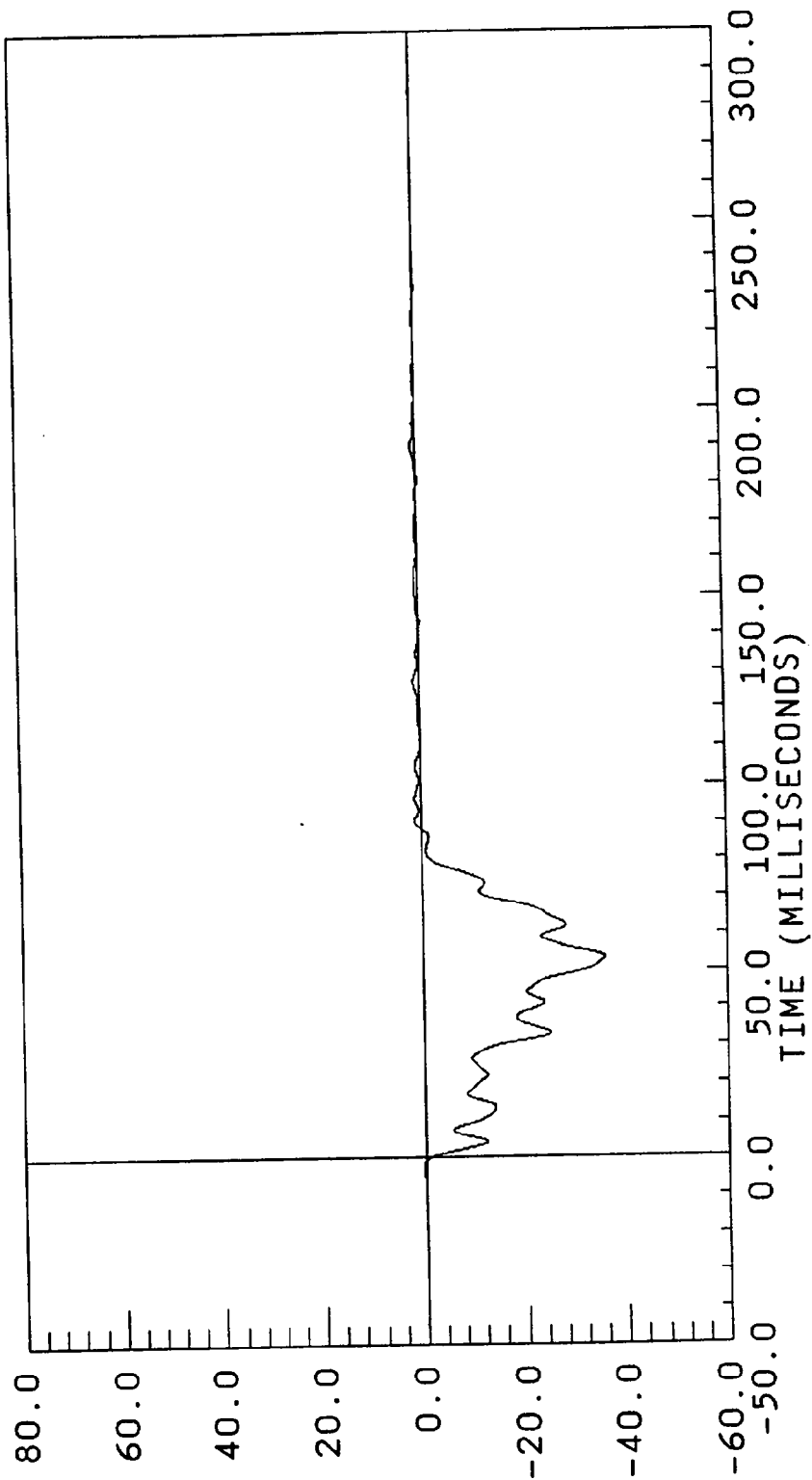


DISPLACEMENT * INCHES

BW971-18.DAT

29.40 mph

ACC PACK #2(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -35.89511 at 53.25000
YMAX = 1.278500 at 90.30000



ACCELERATION * G, S *

B-6

7804-8

29.40 mph

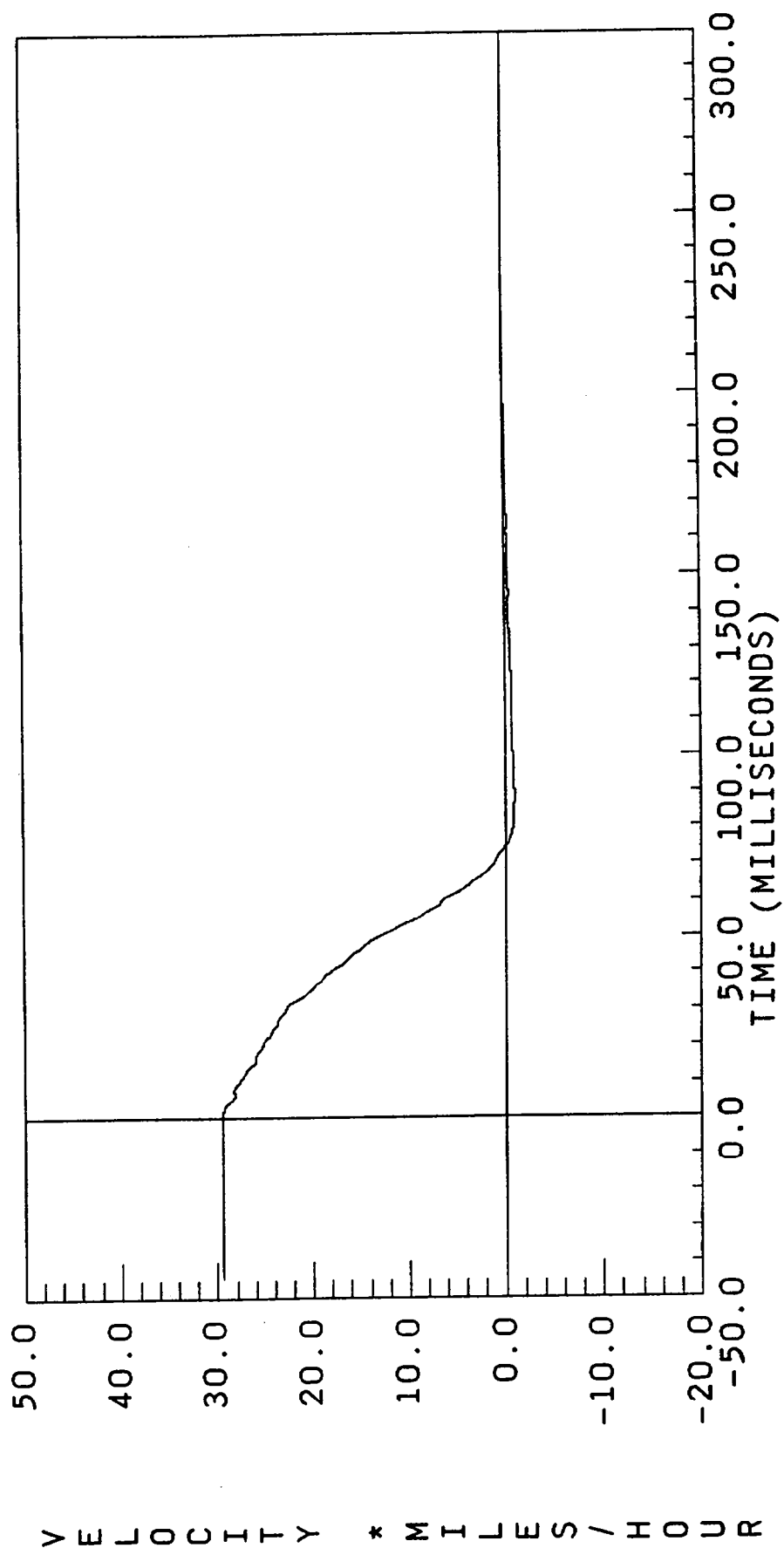
ACC PACK #2(X)
COMPUTED
FILTER CUTOFF:

OHZ

XL AXIS

YMIN = -1.070862 at 87.97501

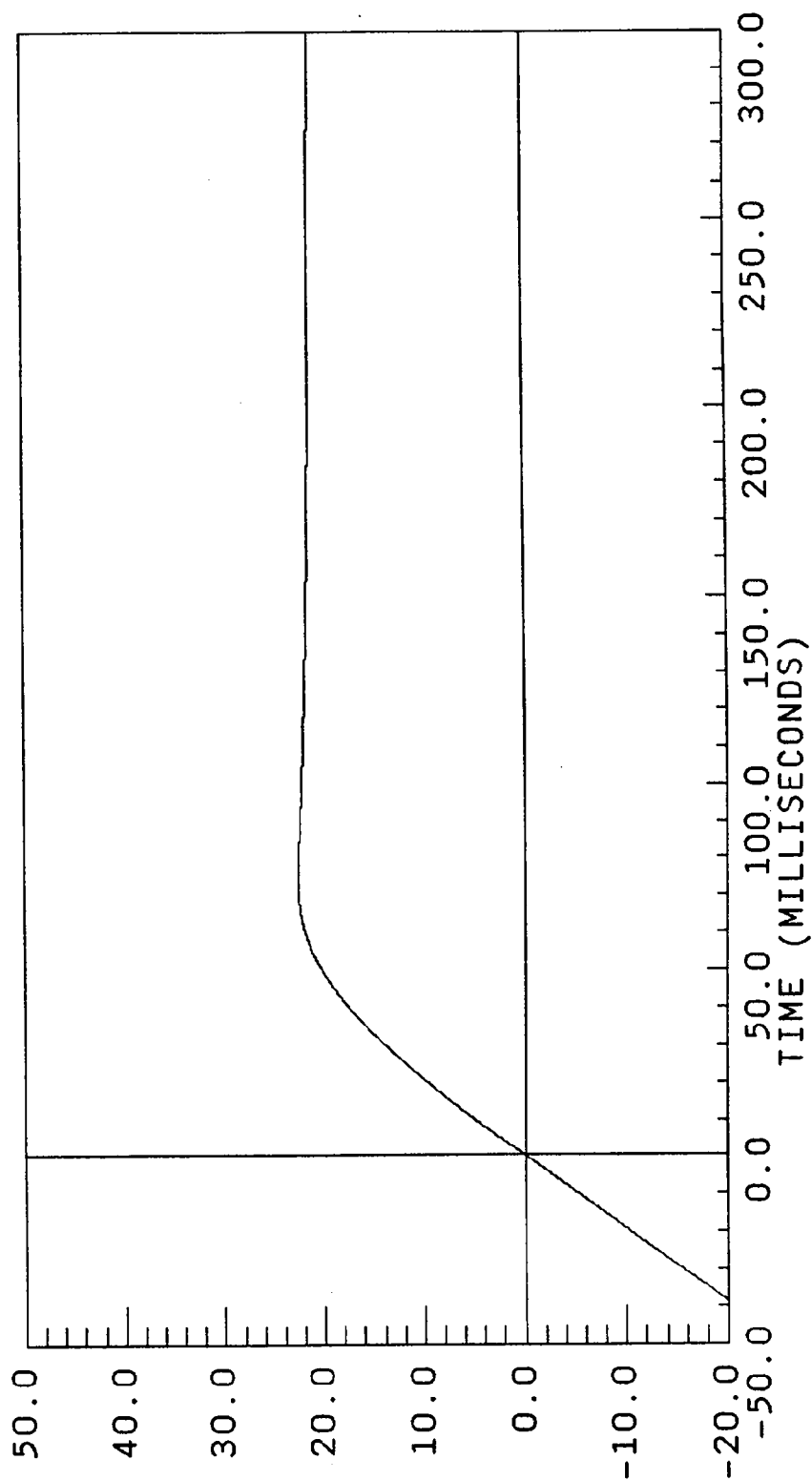
YMAX = 29.41283 at -24.67500



D971-18.DAT

29.40 mph

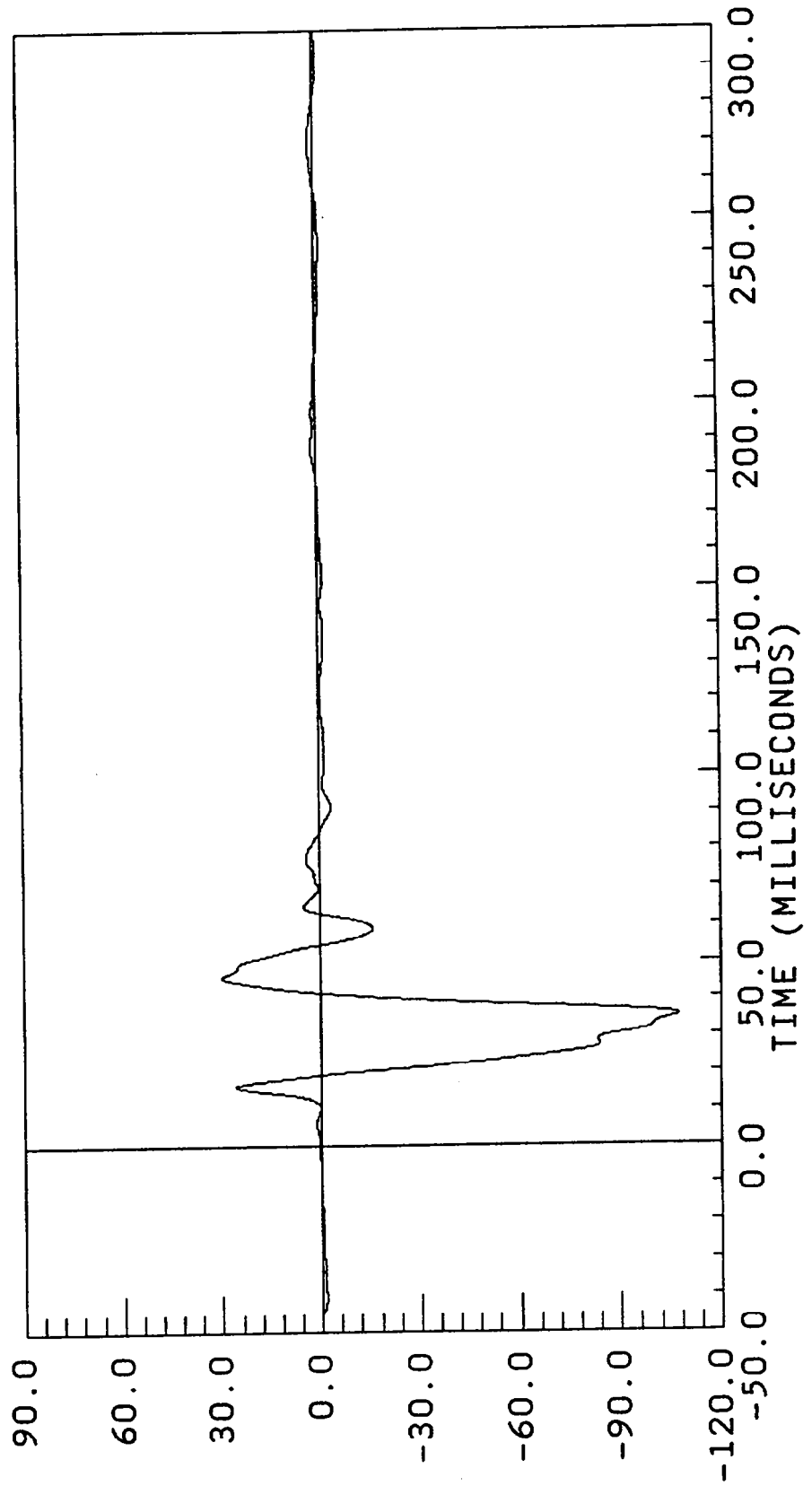
ACC PACK #2(X) XL AXIS
COMPUTED YMIN = -23.25001 at 87.97501
FILTER CUTOFF: OHZ YMAX = 22.53148 at 74.32500



DISPLACEMENT * INCHES

29.40 mph

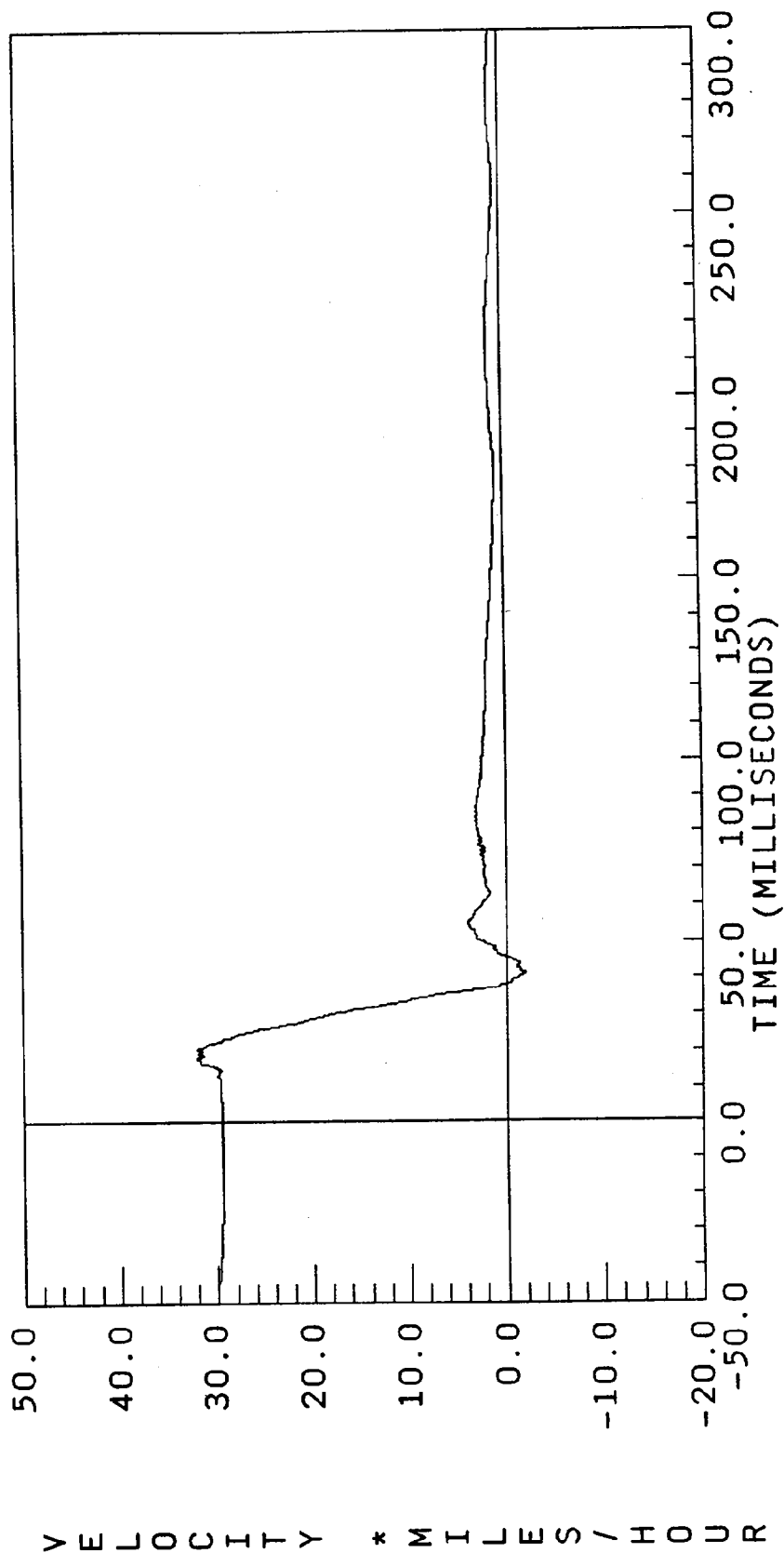
ACC PACK #3(X) XL AXIS
 FILTERED YMIN = -107.4993 at 35.40000
 FILTER CUTOFF: 100Hz YMAX = 30.00737 at 45.75000



V971-19.DAT

29.40 mph

ACC PACK #3(X) XL AXIS
COMPUTED YMIN = -2.098084 at 41.10000
FILTER CUTOFF: OHZ YMAX = 32.09505 at 17.85000

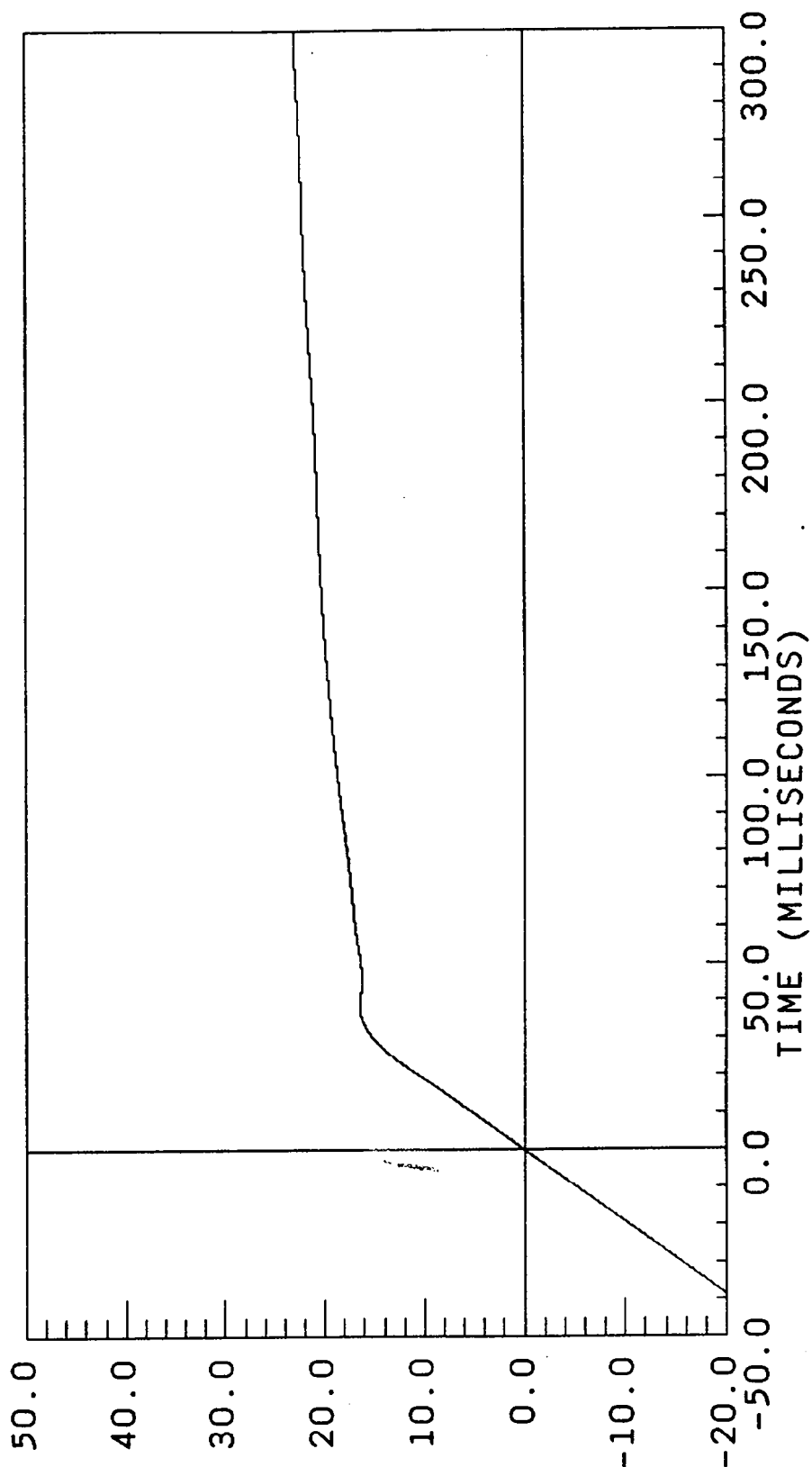


D971-19.DAT

29.40 mph

ACC PACK #3(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = -23.31216 at 41.10000
YMAX = 22.90867 at 300.0000

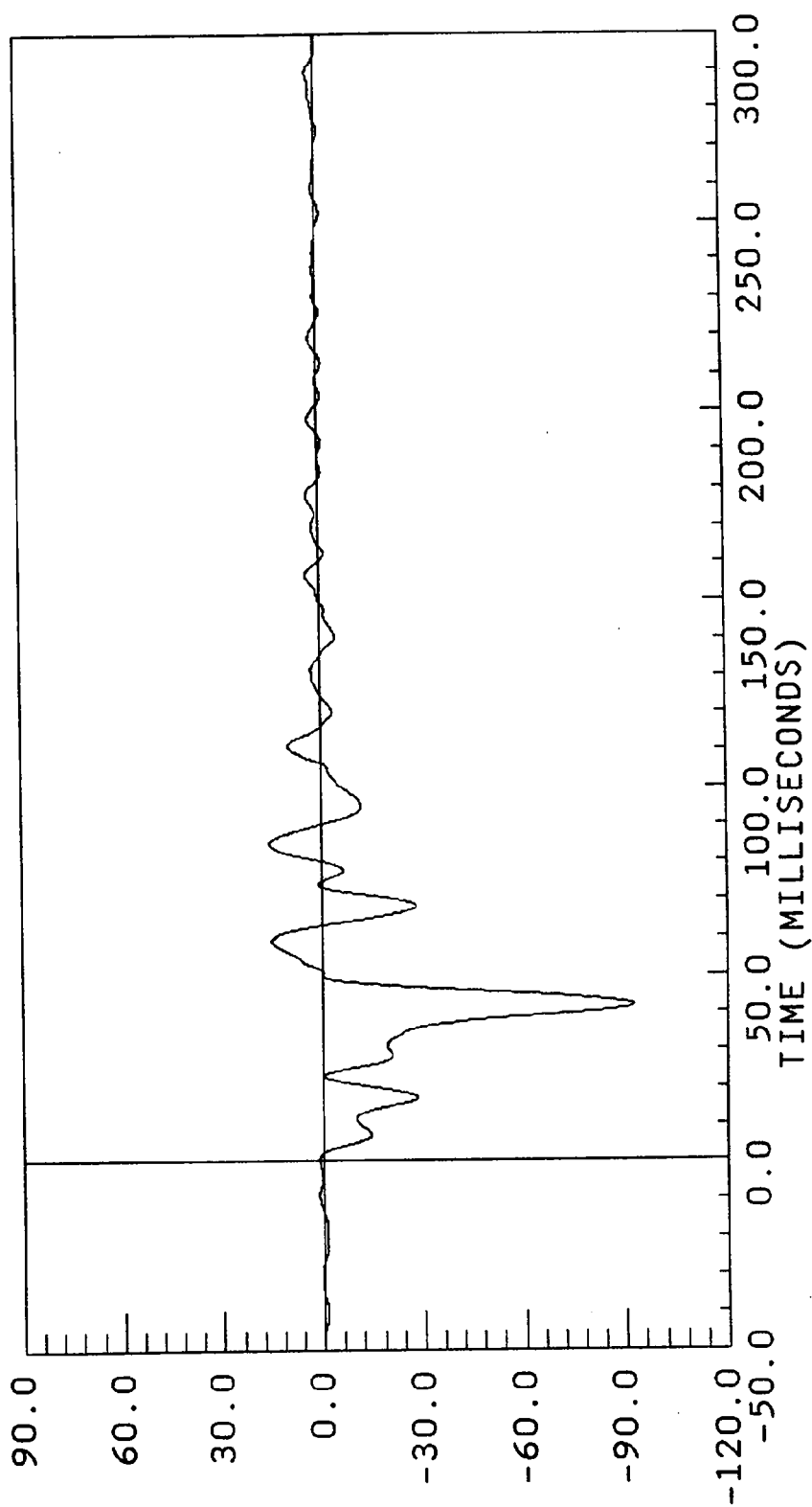


DISPLACEMENT * INCHES

BW971-20.DAT

29.40 mph

ACC PACK #5(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -92.64406 at 41.85000
YMAX = 15.67318 at 84.67500



ACCELERATION * G, S *

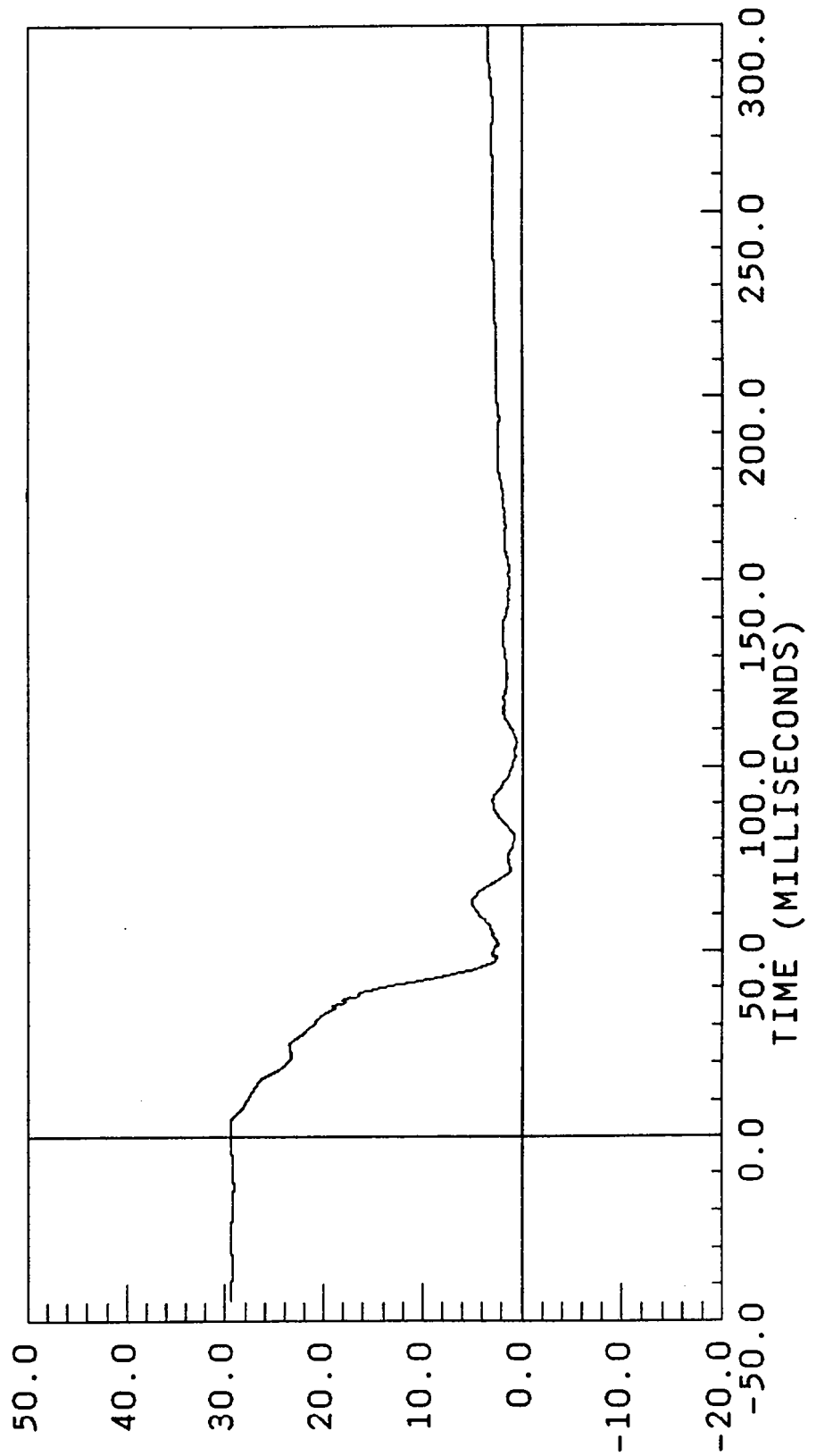
B-12

B-13

29.40 mph

ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = 0.483435 at 106.5750
YMAX = 29.47436 at 2.850000

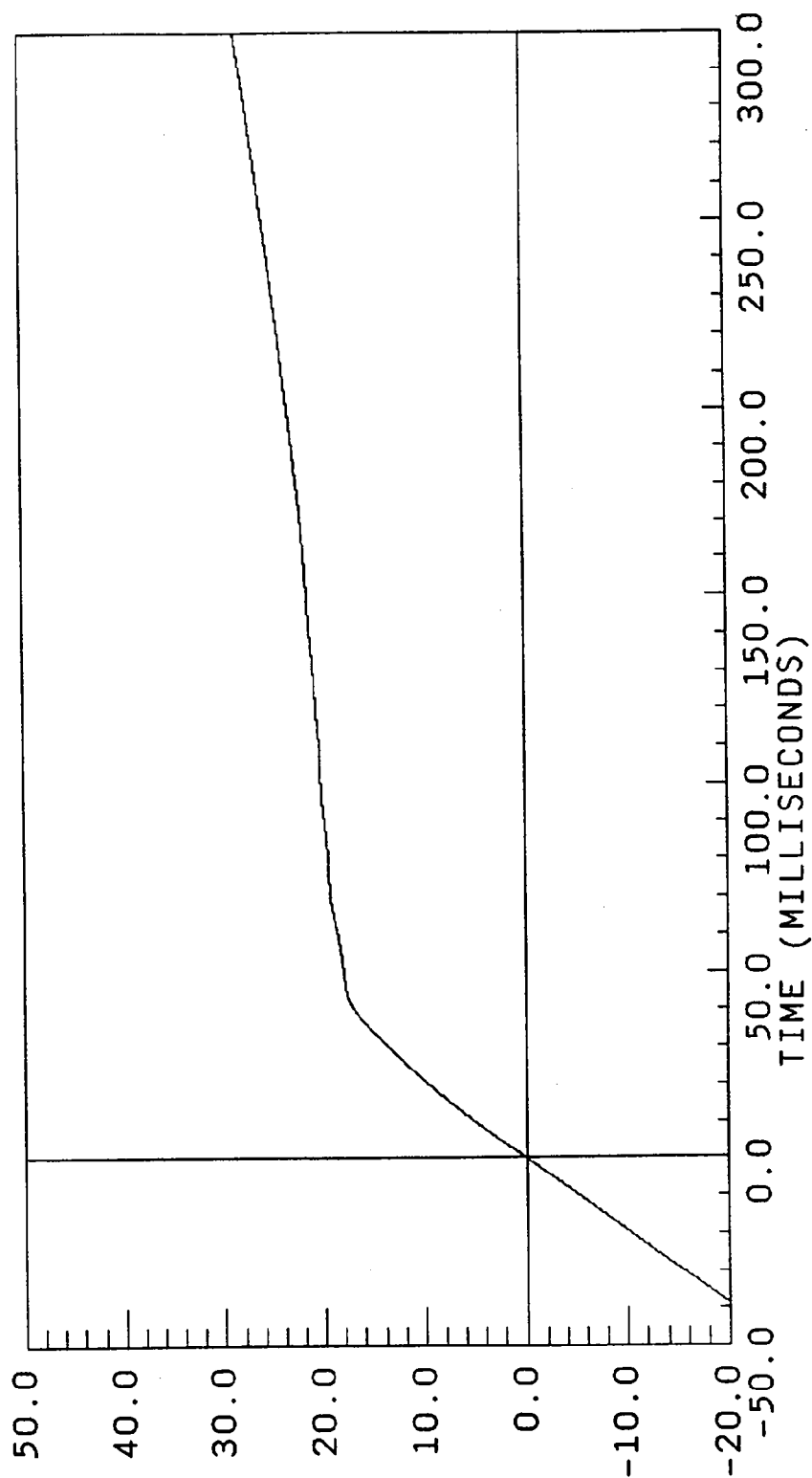


VELOCITY * MILES / HOUR

D971-20.DAT

29.40 mph

ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: OHZ
XL AXIS
YMIN = -23.17391 at 106.5750
YMAX = 28.39002 at 300.0000



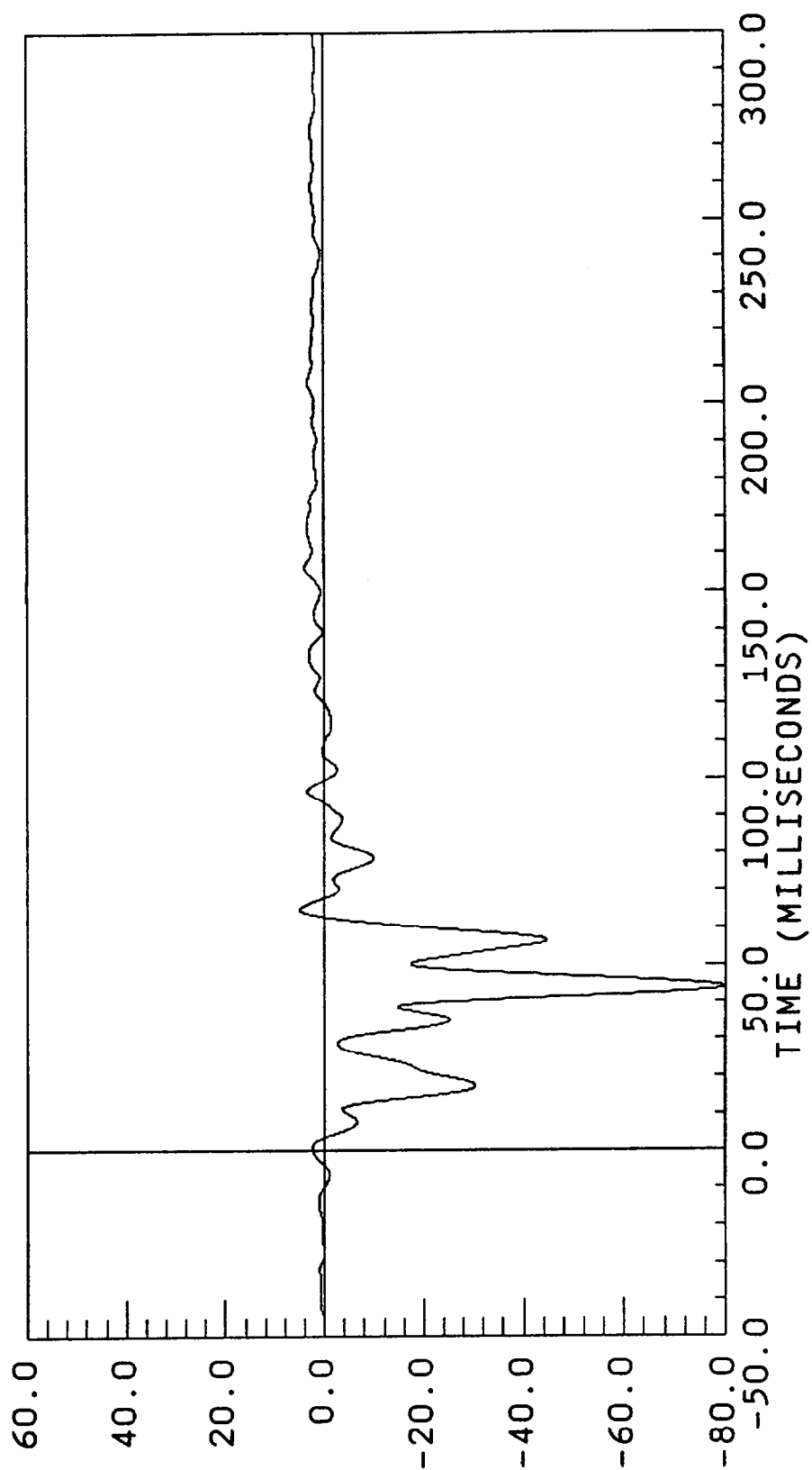
DISPLACEMENT * INCHES

29.40 mph

ACC PACK #6(X)
 FILTERED
 FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -79.80489 at 43.95000
 YMAX = 4.961180 at 64.87500

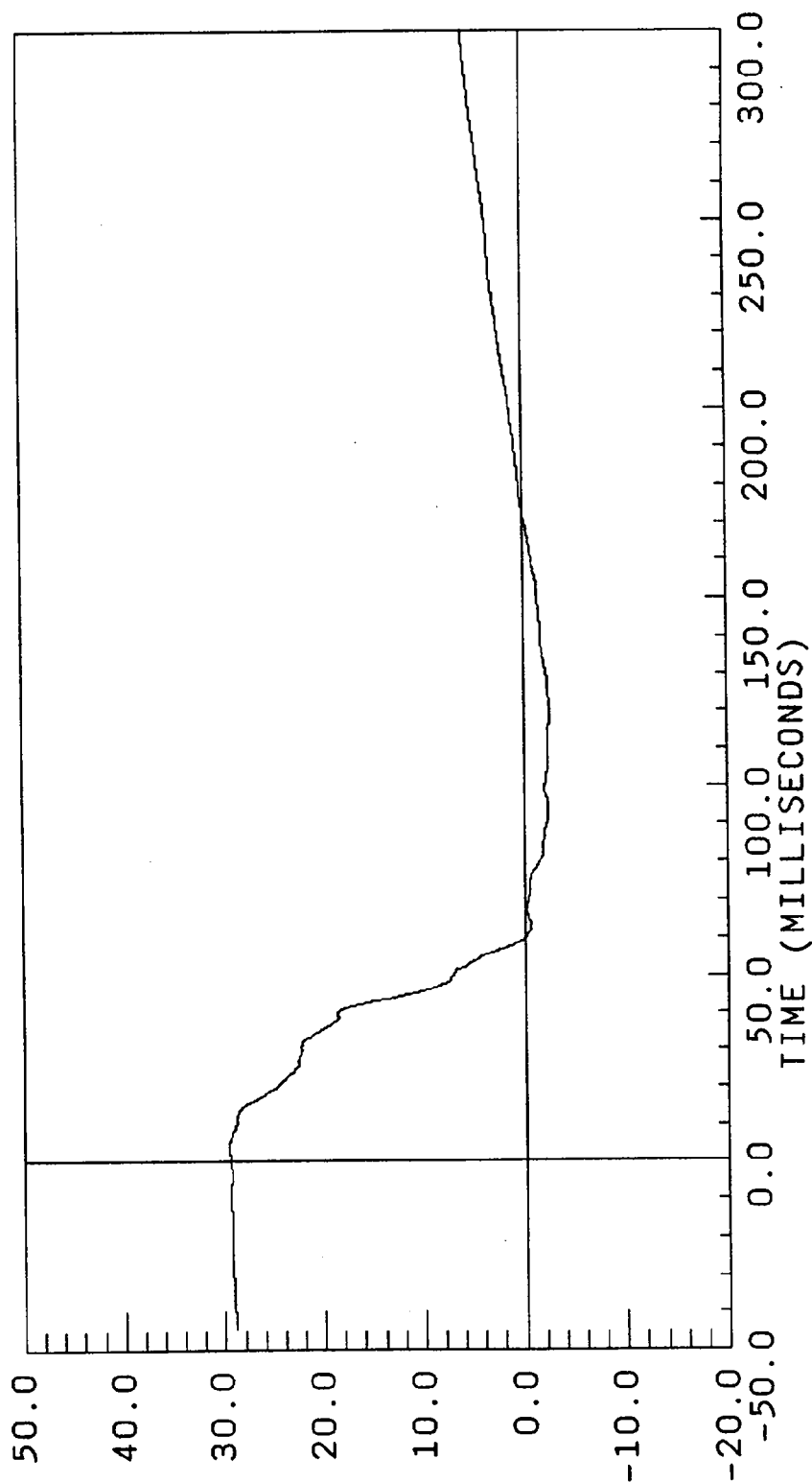


ACCELERATION * G, S *

V971-21.DAT

29.40 mph

ACC PACK #6(X) XL AXIS
COMPUTED YMIN = -2.550953 at 121.4250
FILTER CUTOFF: 0Hz YMAX = 29.58961 at 4.125000



VELOCITY * MILES / HOUR

B-17

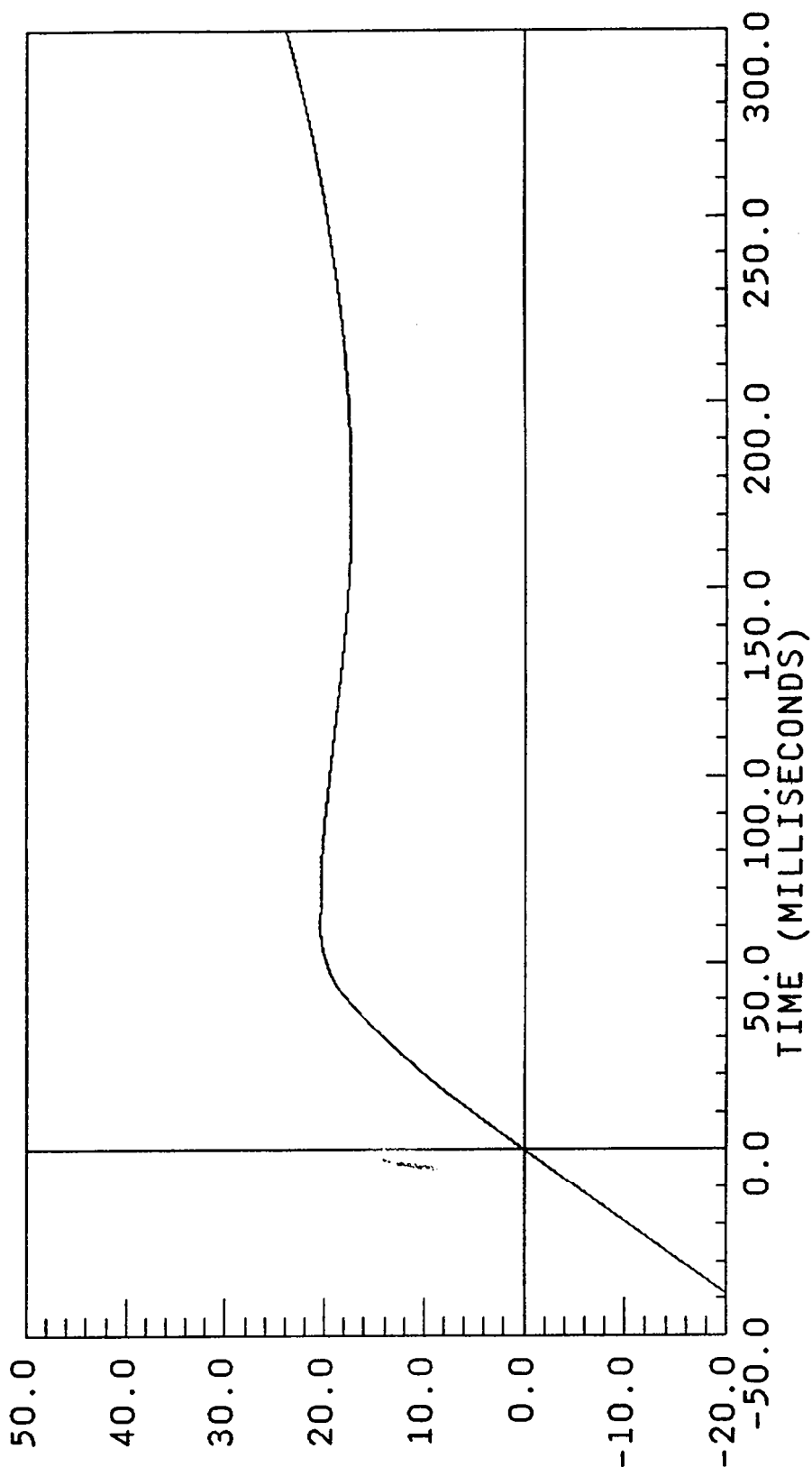
7804-8

D971-21.DAT

29.40 mph

ACC PACK #6(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = -23.08685 at 121.4250
YMAX = 23.83929 at 300.0000

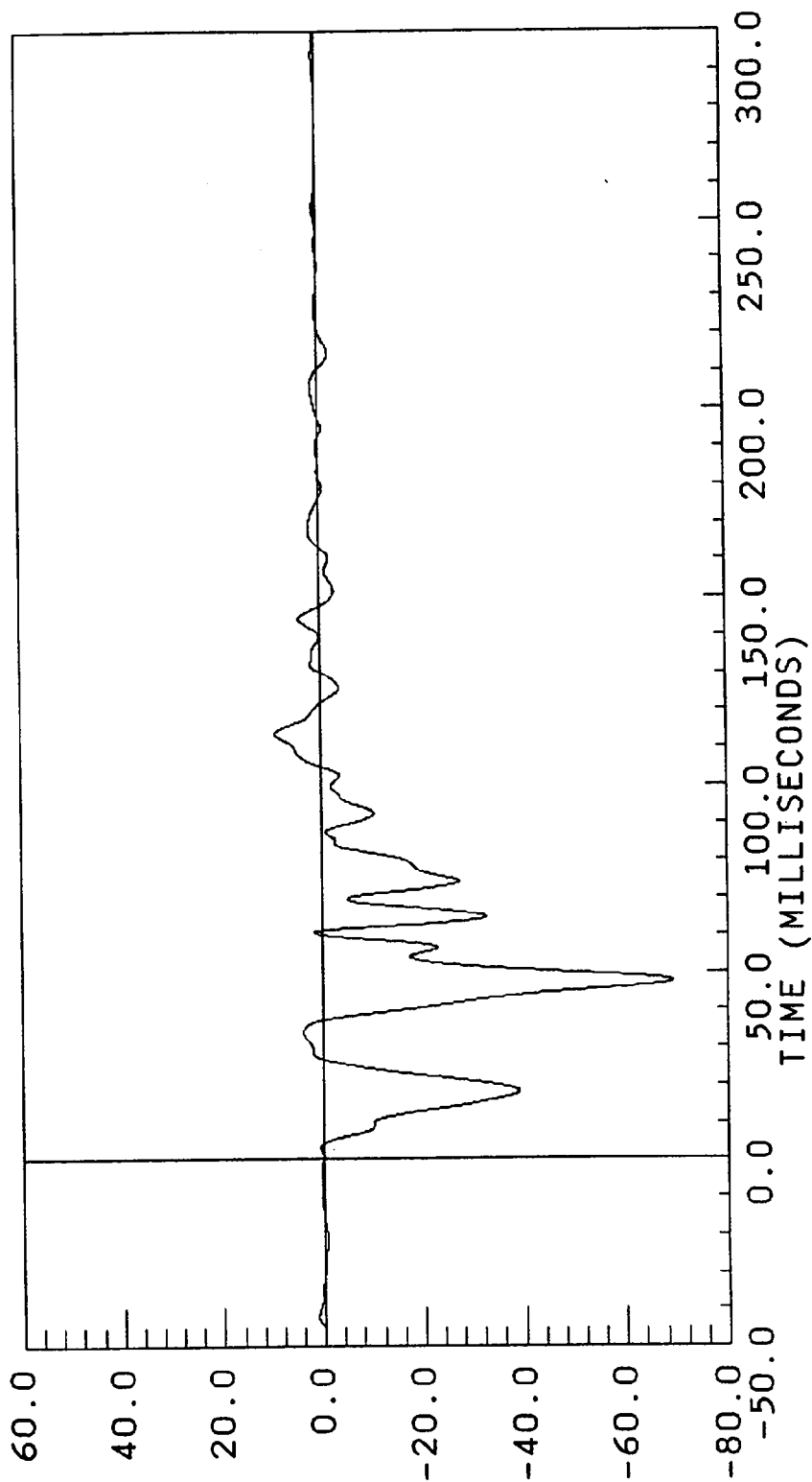


DISPLACEMENT * INCHES

BW971-22.DAT

29.40 mph

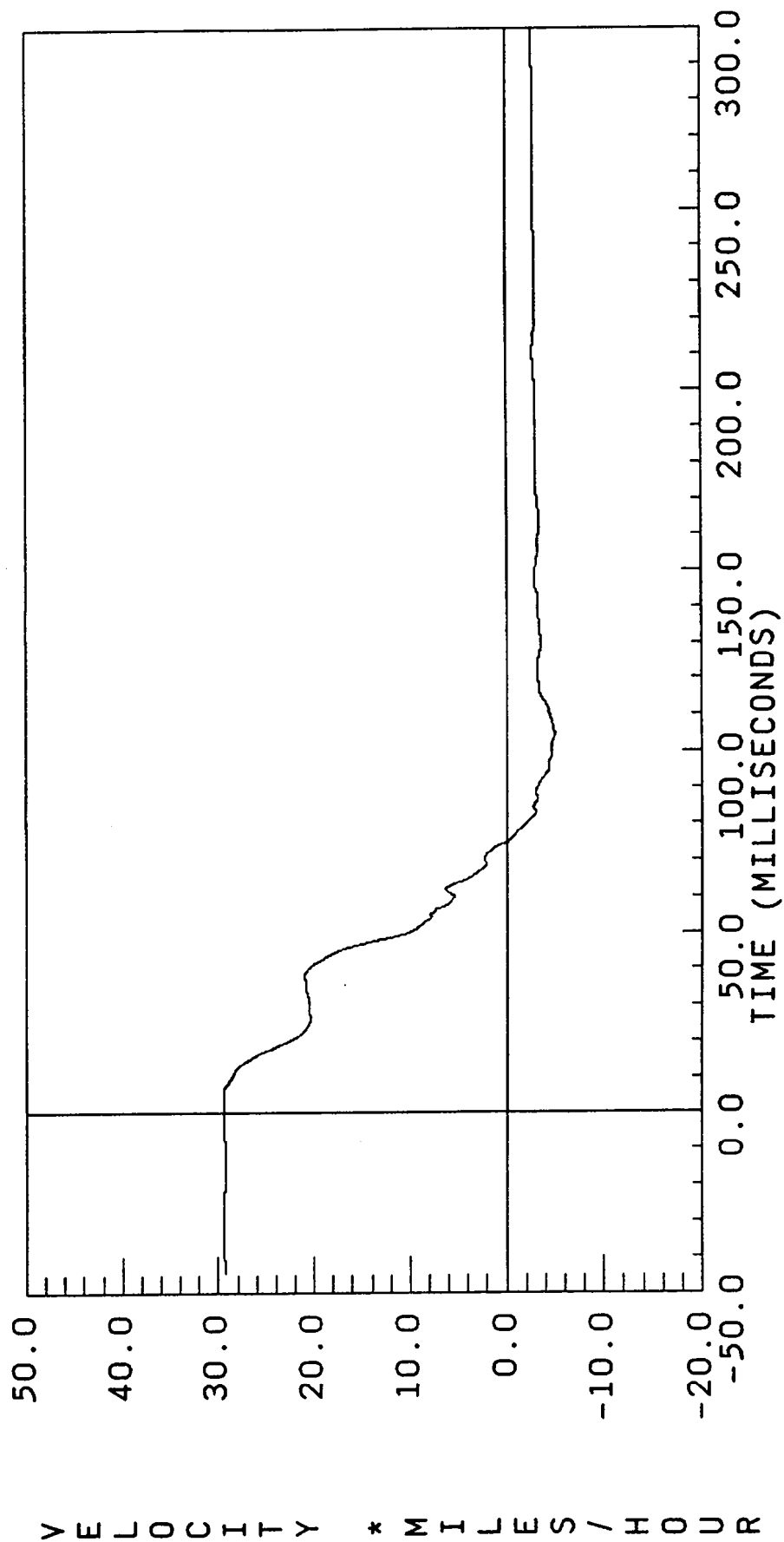
ACC PACK #7(X)
FILTERED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -69.31004 at 47.55000
YMAX = 9.254146 at 113.7750



V971-22.DAT

29.40 mph

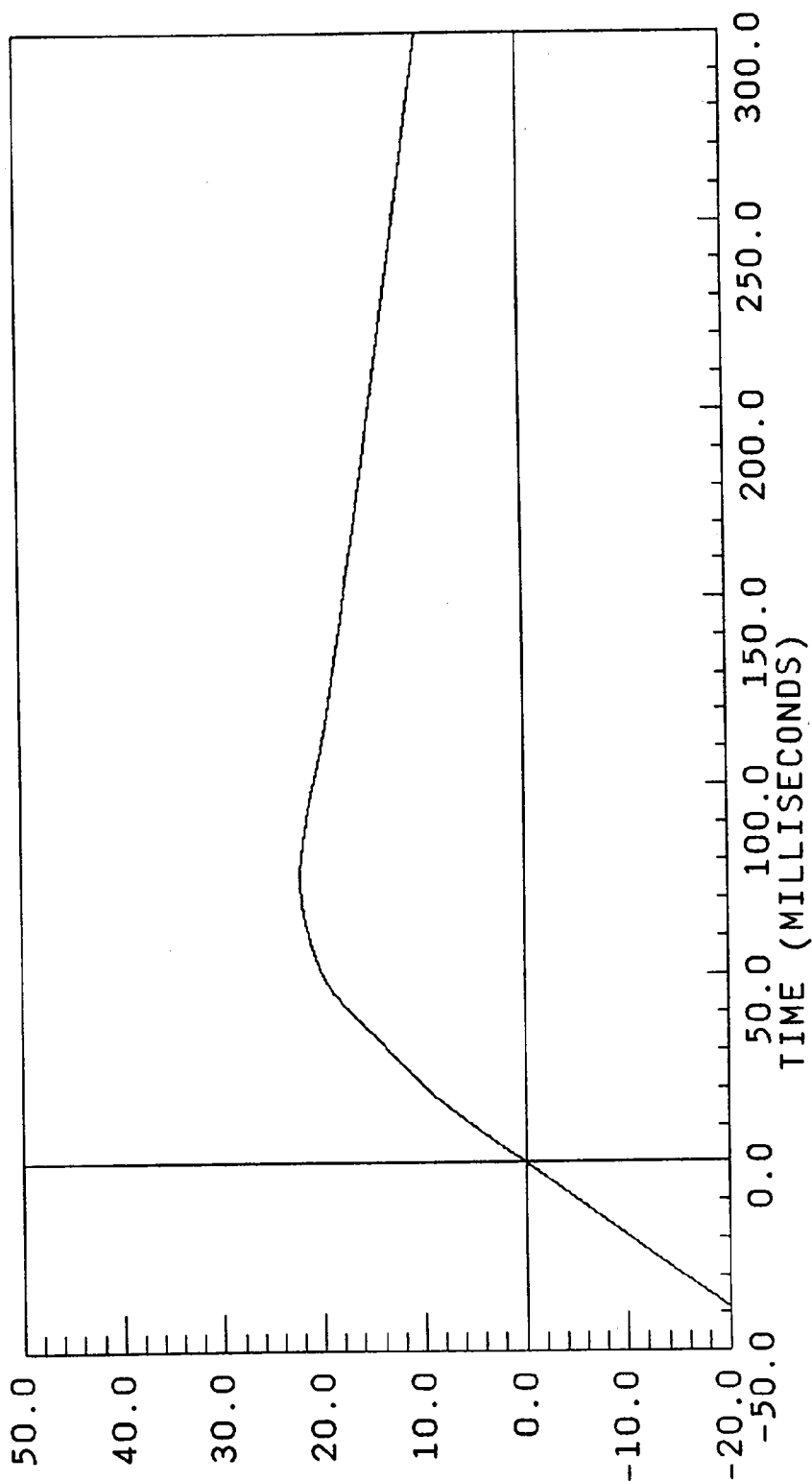
ACC PACK #7(X)
COMPUTED
FILTER CUTOFF: OHZ
XL AXIS
YMIN = -4.953510 at 104.3250
YMAX = 29.47159 at 5.925000



D971-22.DAT

29.40 mph

ACC PACK #7(X) XL AXIS
COMPUTED YMIN = -23.19560 at 104.3250
FILTER CUTOFF: OHZ YMAX = 22.14970 at 74.77500



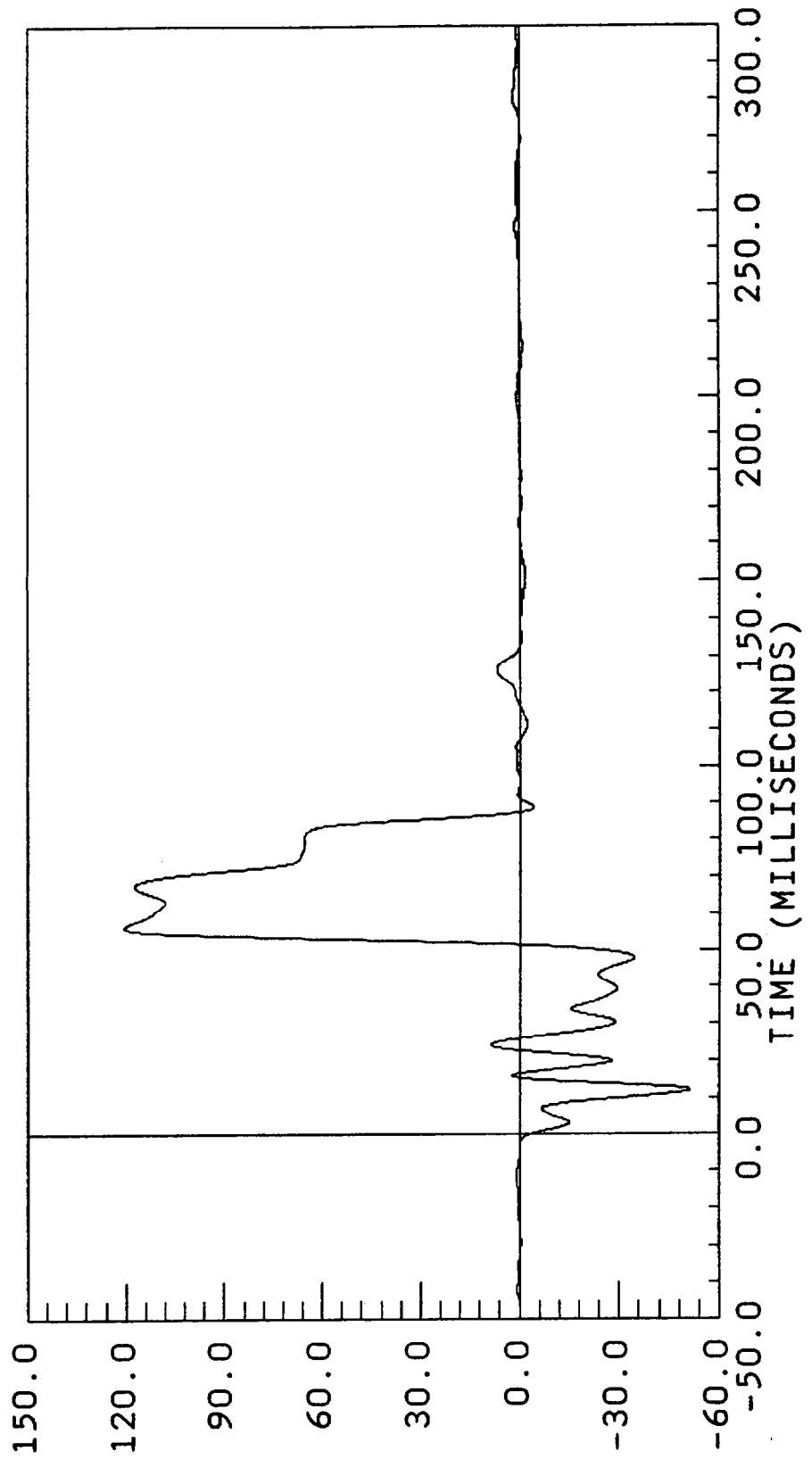
DISPLACEMENT * INCHES

29.40 mph

ACC PACK #8(X)
 FILTERED
 FILTER CUTOFF: 100HZ

XL AXIS

YMIN = -51.35000 at 11.92500
 YMAX = 120.6068 at 56.02500

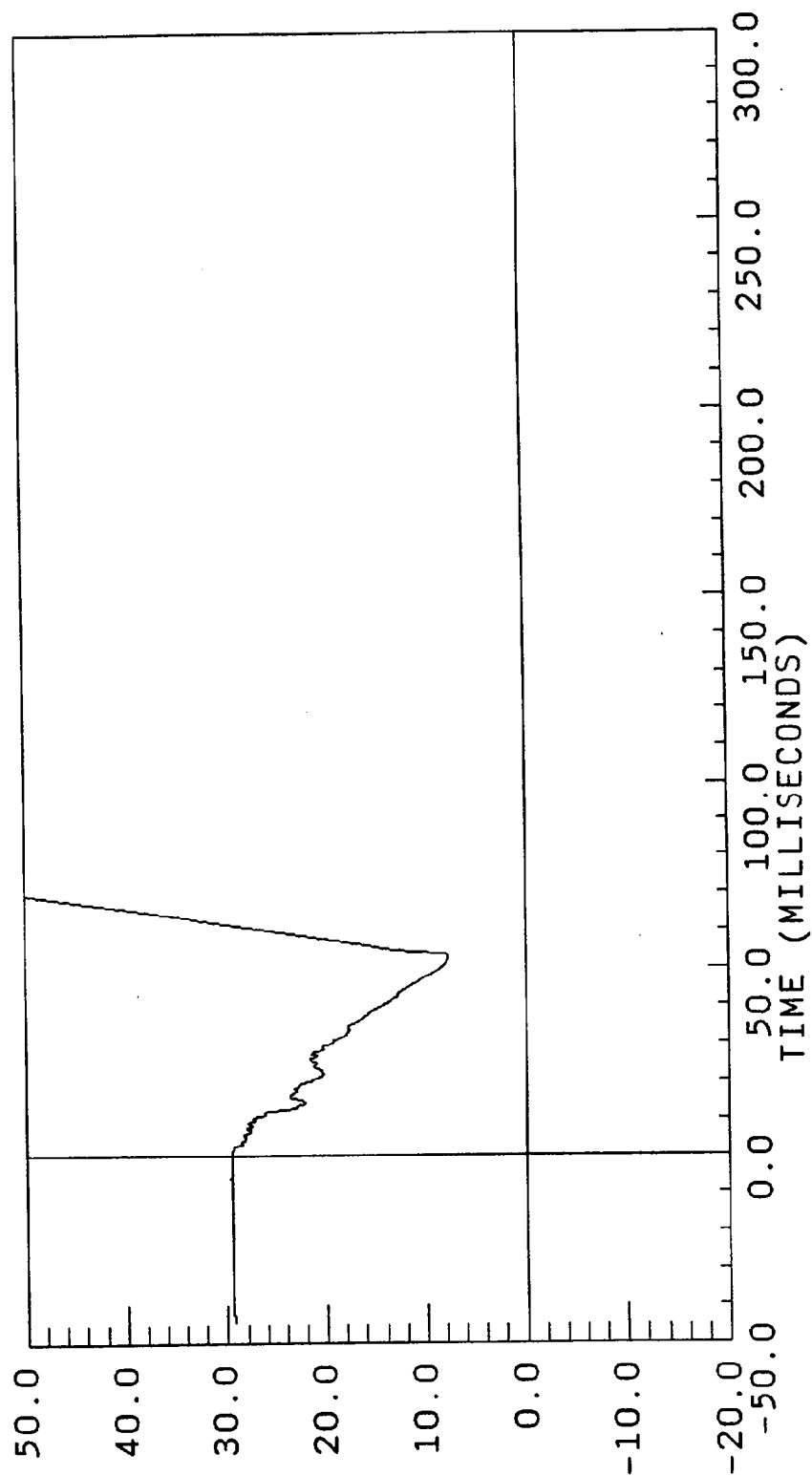


ACCELERATION * G, S *

V971-23.DAT

29.40 mph

ACC PACK #8(X) XL AXIS
COMPUTED YMIN = 7.603983 at 52.27500
FILTER CUTOFF: 0Hz YMAX = 74.52944 at 132.6750

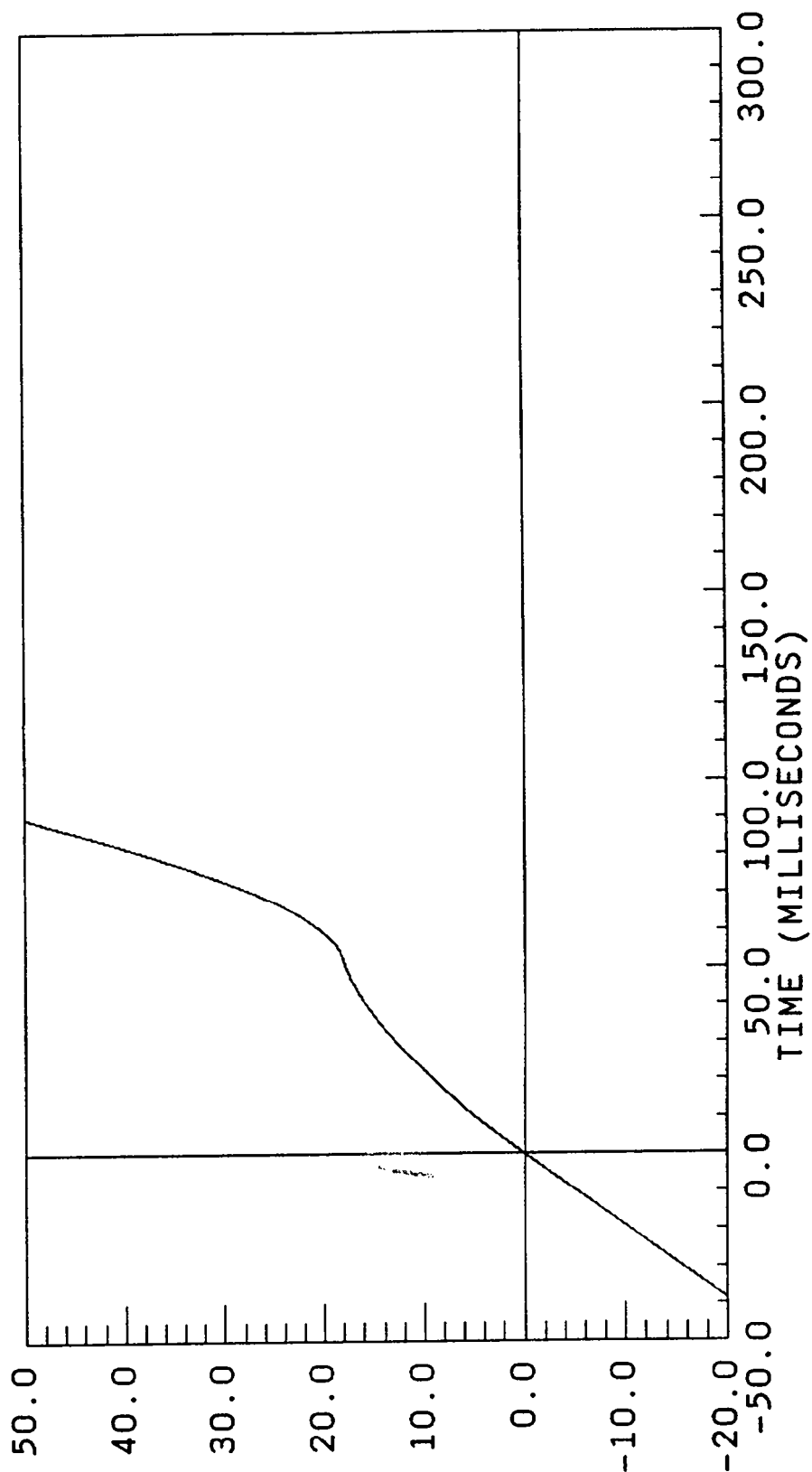


VELOCITY * MILES / HOUR
B-23 7804-8

29.40 mph

ACC PACK #8(X)
COMPUTED
FILTER CUTOFF: OHZ

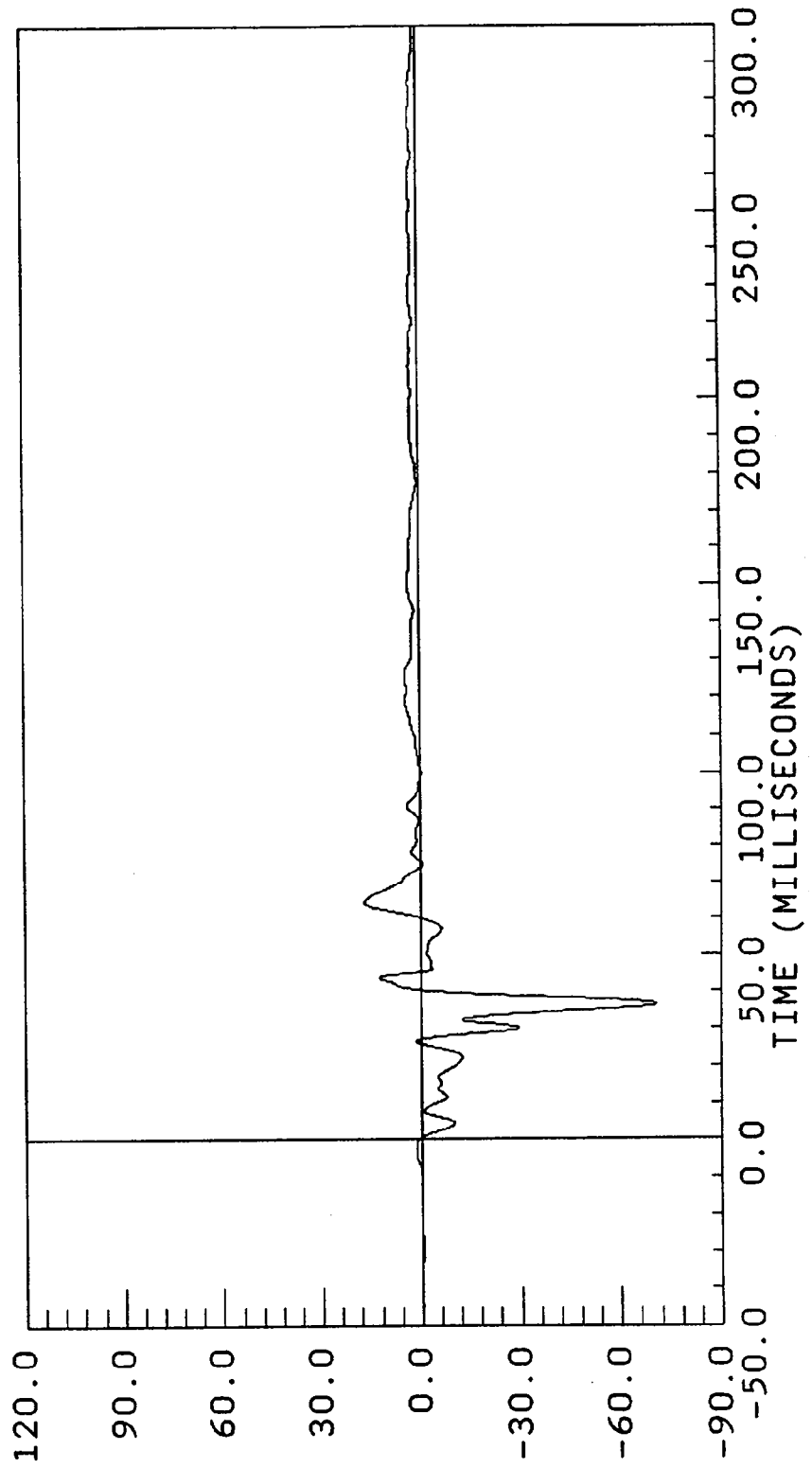
XL AXIS
YMIN = -23.23794 at 52.27500
YMAX = 323.1175 at 300.0000



BW971-24.DAT

29.40 mph

ACC PACK #10(X) XL AXIS
FILTERED YMIN = -70.74346 at 36.60000
FILTER CUTOFF: 100HZ YMAX = 17.02152 at 64.12500

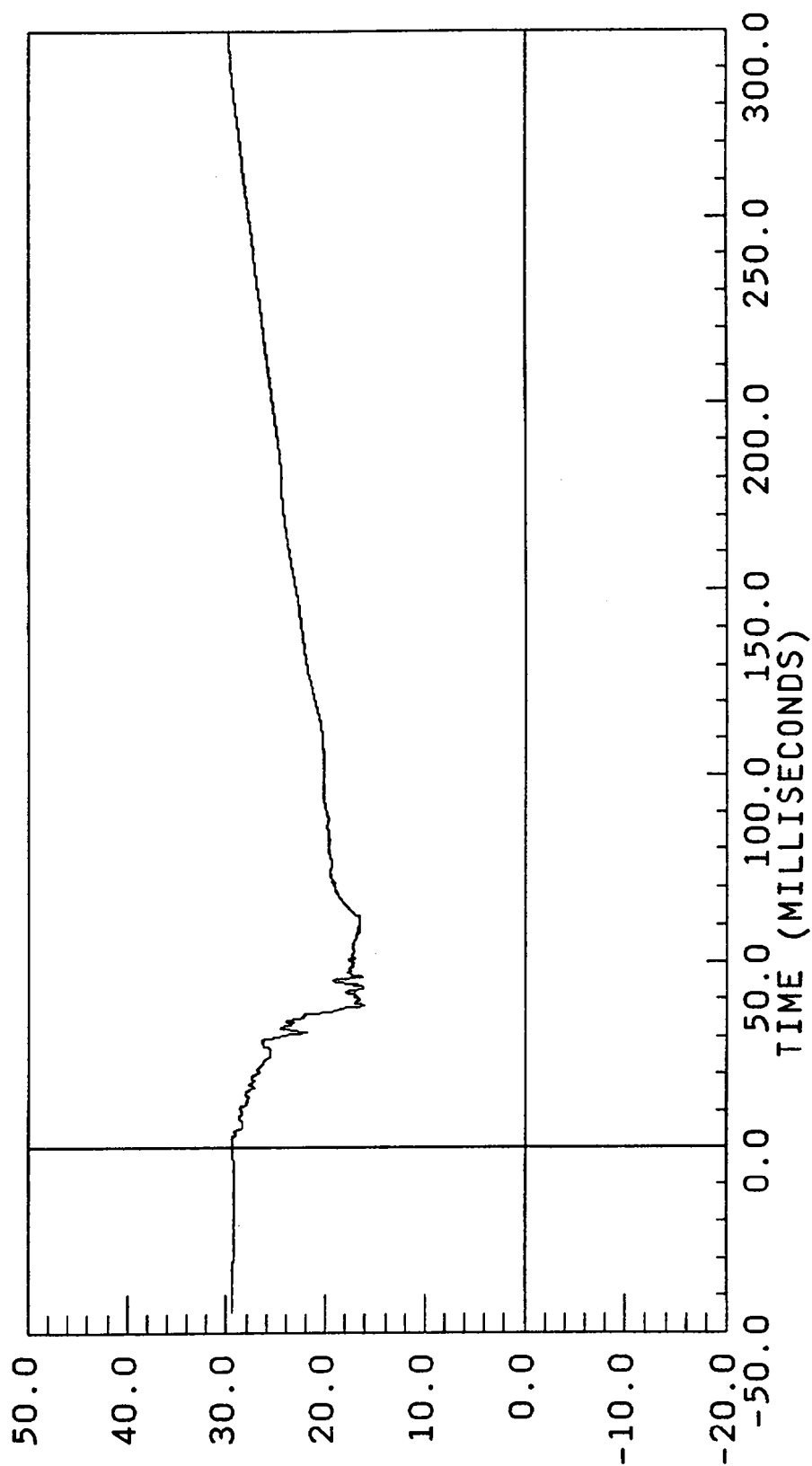


ACCELERATION * G, S *

29.40 mph

ACC PACK #10(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = 16.04471 at 38.40000
YMAX = 29.77898 at 300.0000



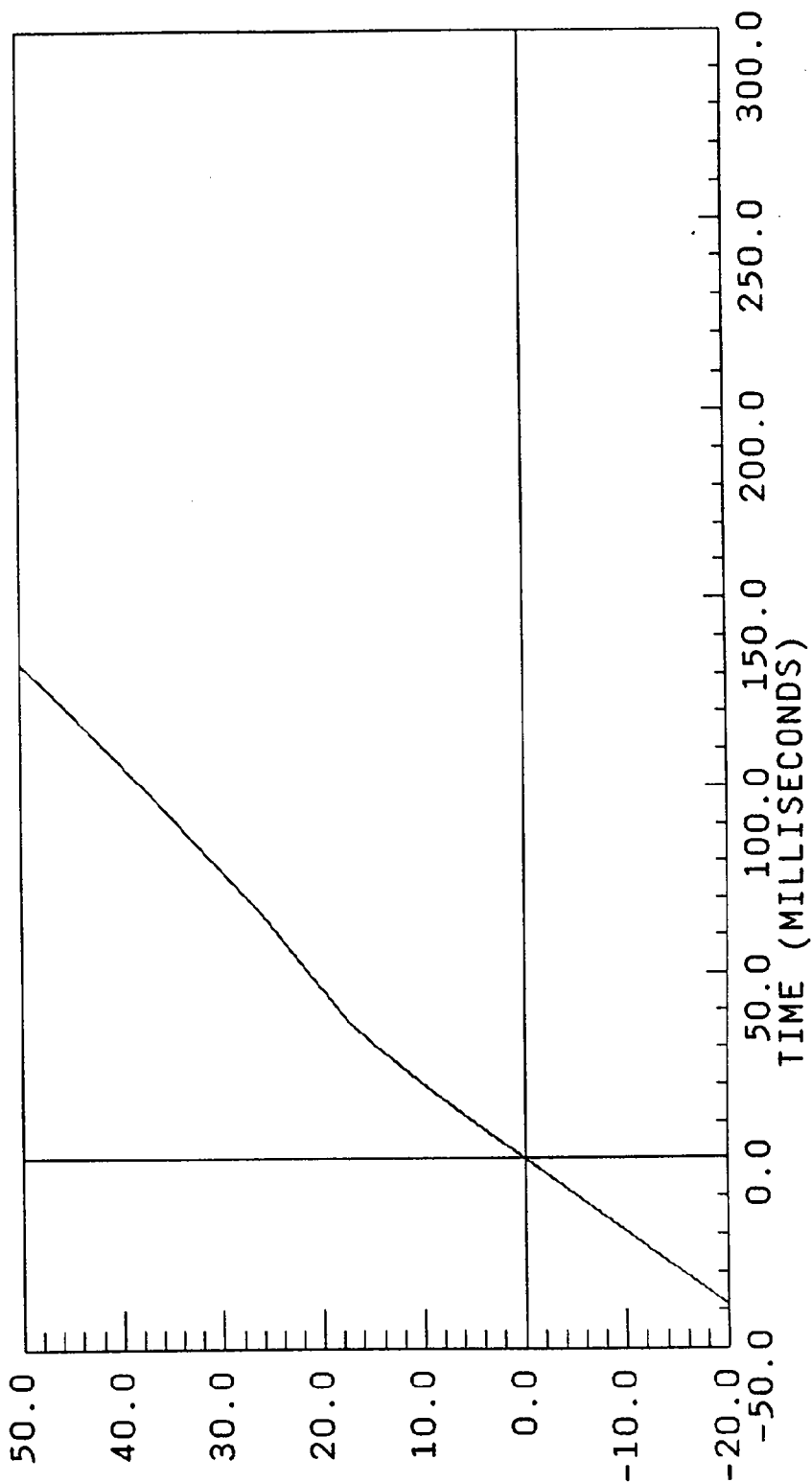
VELOCITY * MILES / HOUR

D971-24.DAT

29.40 mph

ACC PACK #10(X)
COMPUTED
FILTER CUTOFF: 0HZ

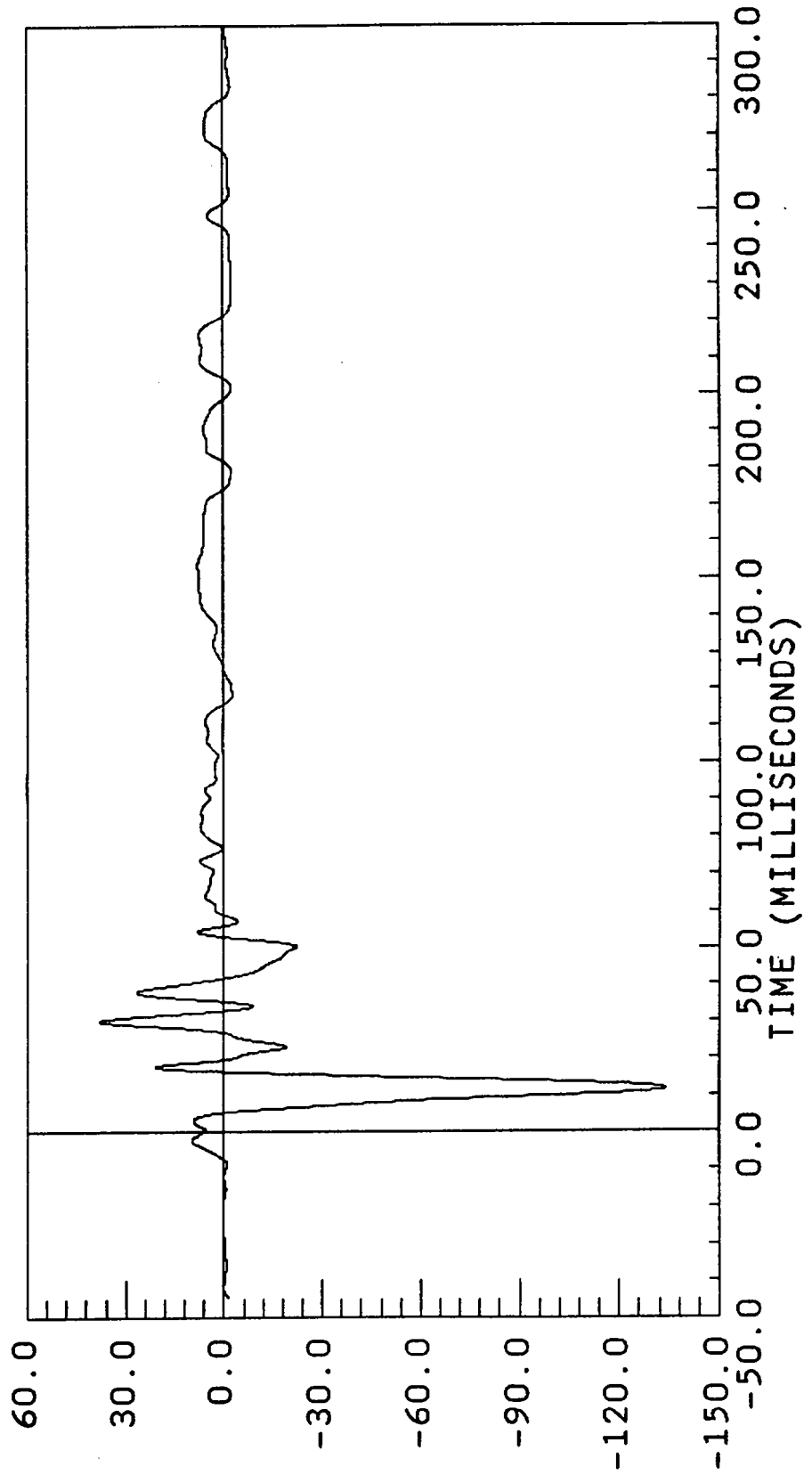
XL AXIS
YMIN = -23.16908 at 38.40000
YMAX = 126.9458 at 300.0000



DISPLACEMENT * INCHES

29.40 mph

ACC PACK #11(X) XL AXIS
 FILTERED YMIN = -133.9836 at 11.55000
 FILTER CUTOFF: 100HZ YMAX = 38.19077 at 30.00000



V971-25.DAT

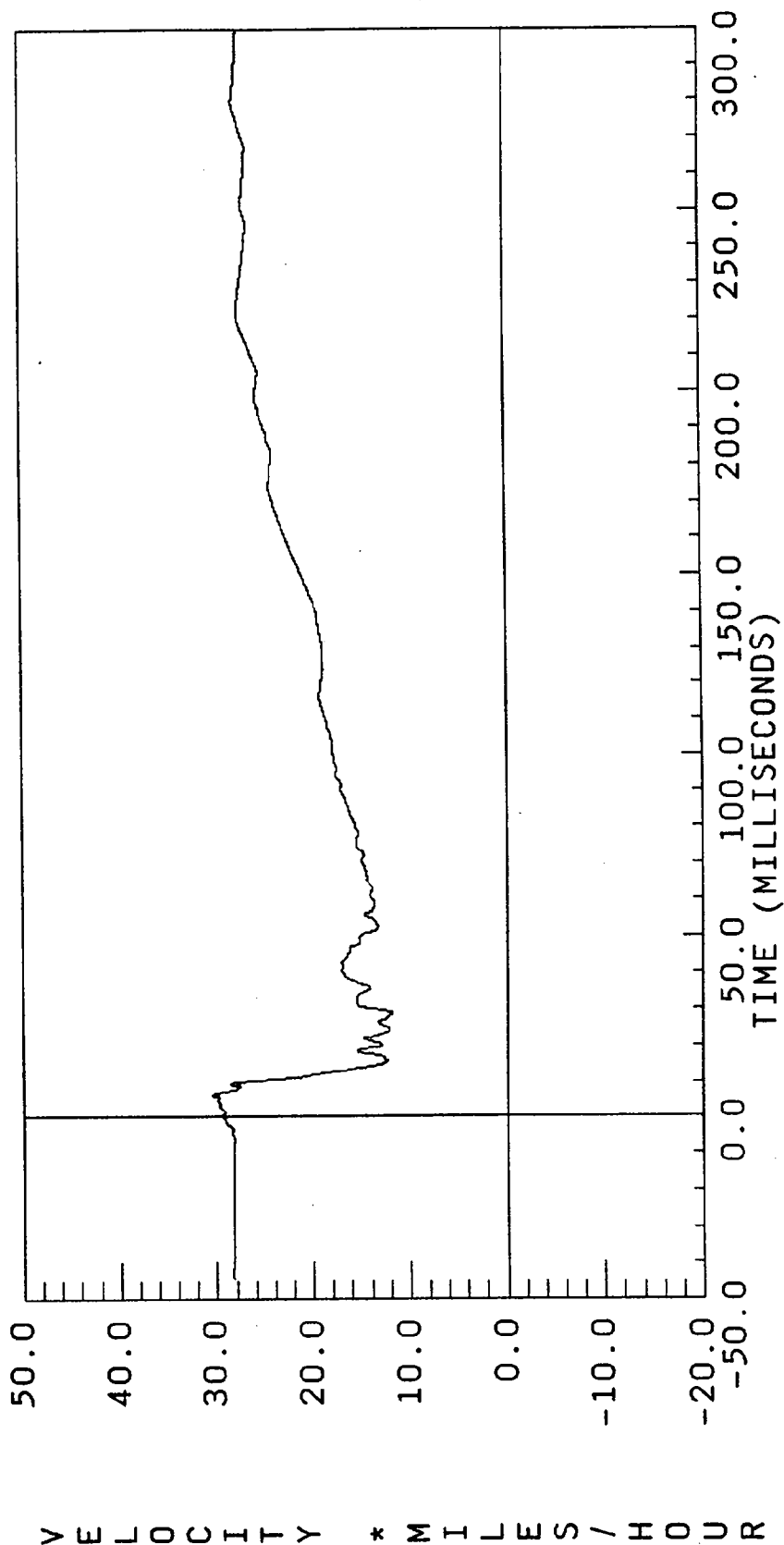
29.40 mph

ACC PACK #11(X)
COMPUTED
FILTER CUTOFF:

OHZ

XL AXIS

YMIN = 11.78648 at 28.72500
YMAX = 30.51228 at 6.150000

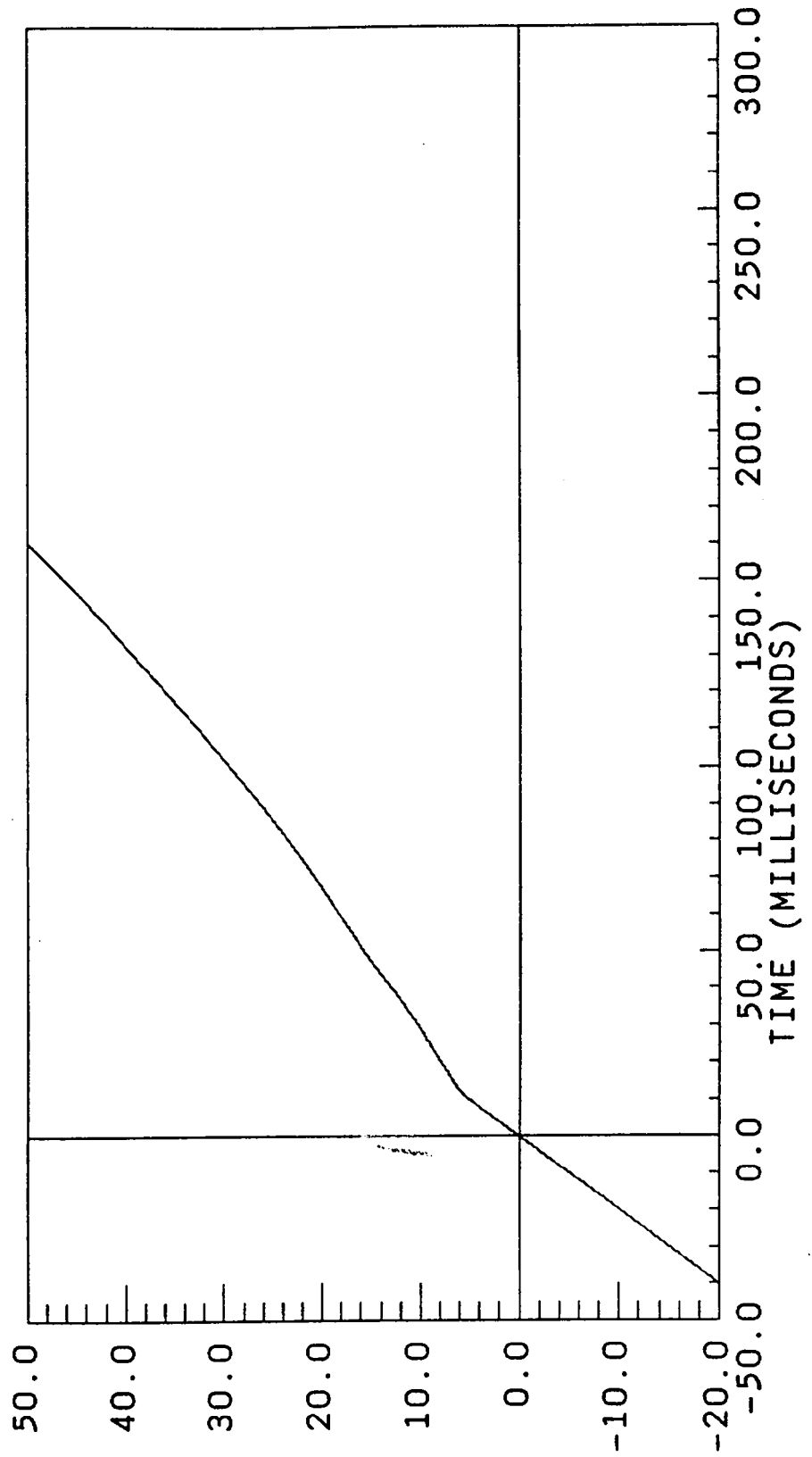


D971-25.DAT

29.40 mph

ACC PACK #11(X)
COMPUTED
FILTER CUTOFF: 0Hz

XL AXIS
YMIN = -22.39066 at 28.72500
YMAX = 114.3202 at 300.0000



TEST NO. CL5802

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
35MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

PUN= 971

POS#1 HEAD R

HIC= 326.4 FROM T1= .07012 TO T2= .10612

AVERAGE ACCELERATION BETWEEN T1 AND T2= 38.35'S

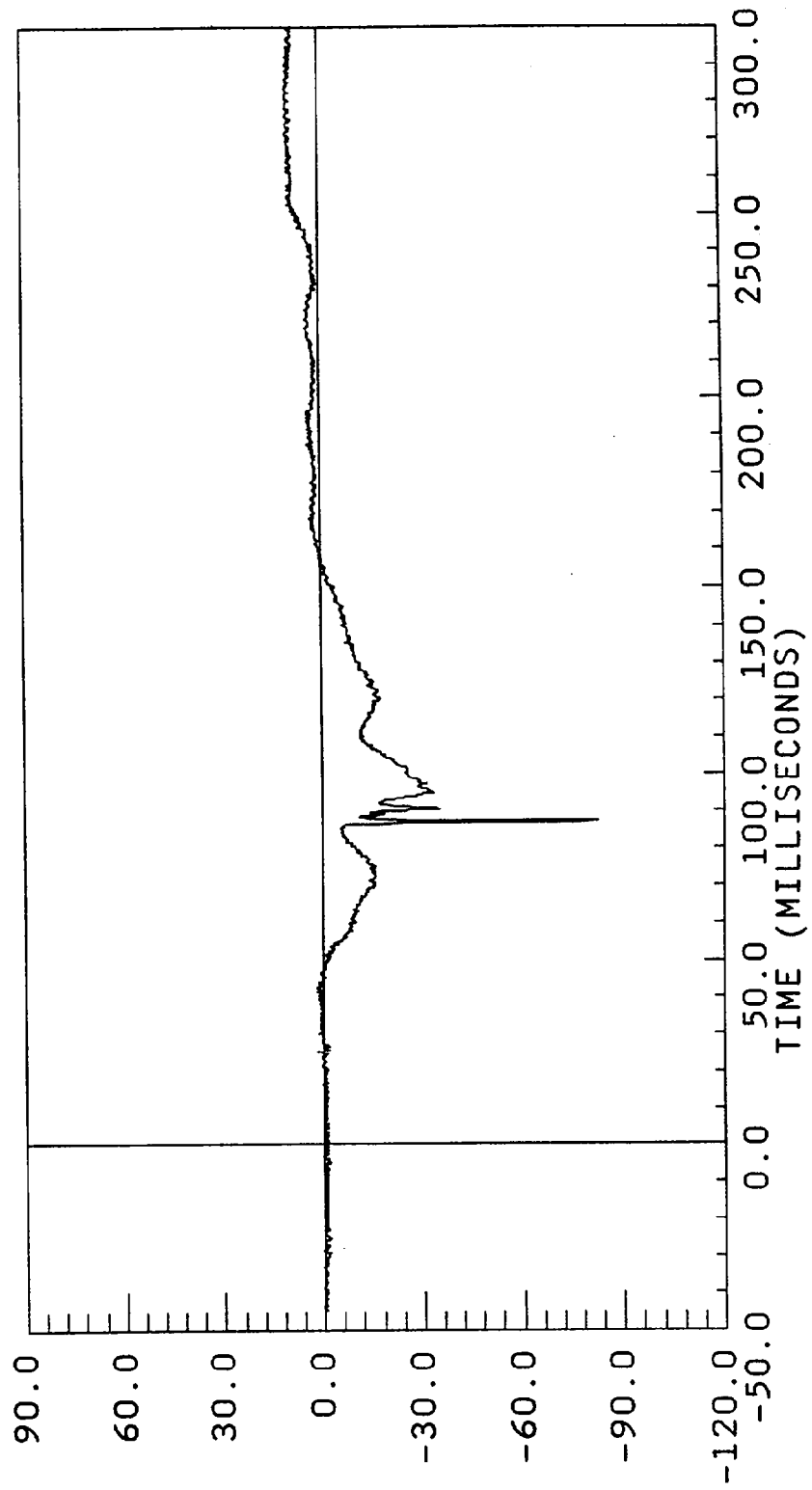
EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 472.8

UDS\$971-1.DAT

29.40 mph

POS#1 HEAD X
XL AXIS
YMIN = -82.50100 at 87.07500
YMAX = 9.821100 at 269.4750
FILTER CUTOFF: 0Hz



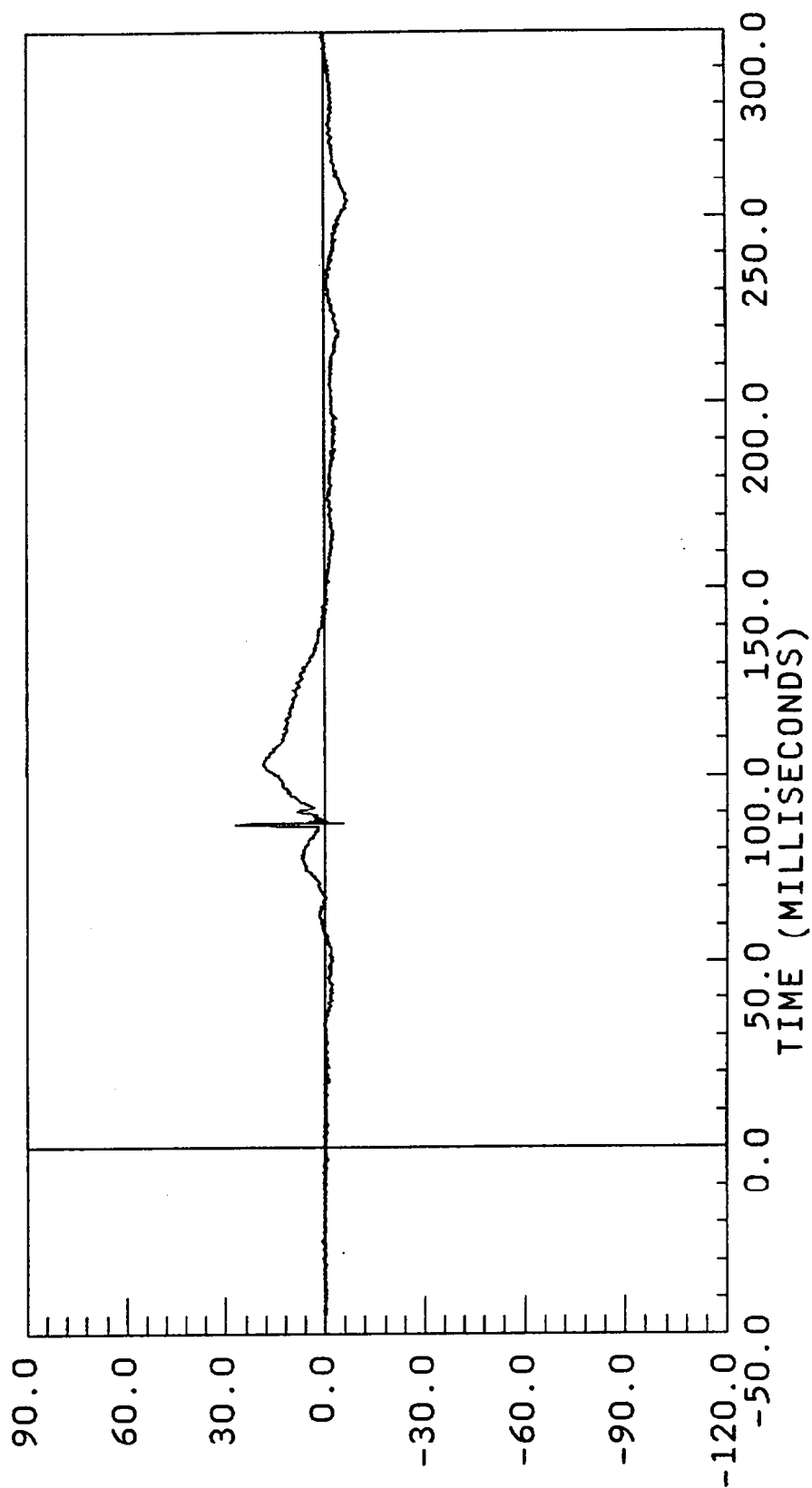
ACCELERATION * G * S *

B-33

7804-8

0.00 mph

POS#1 HEAD Y
 YL AXIS
 YMIN = -7.247300 at 254.6250
 YMAX = 27.17900 at 86.85001
 FILTER CUTOFF: OHZ

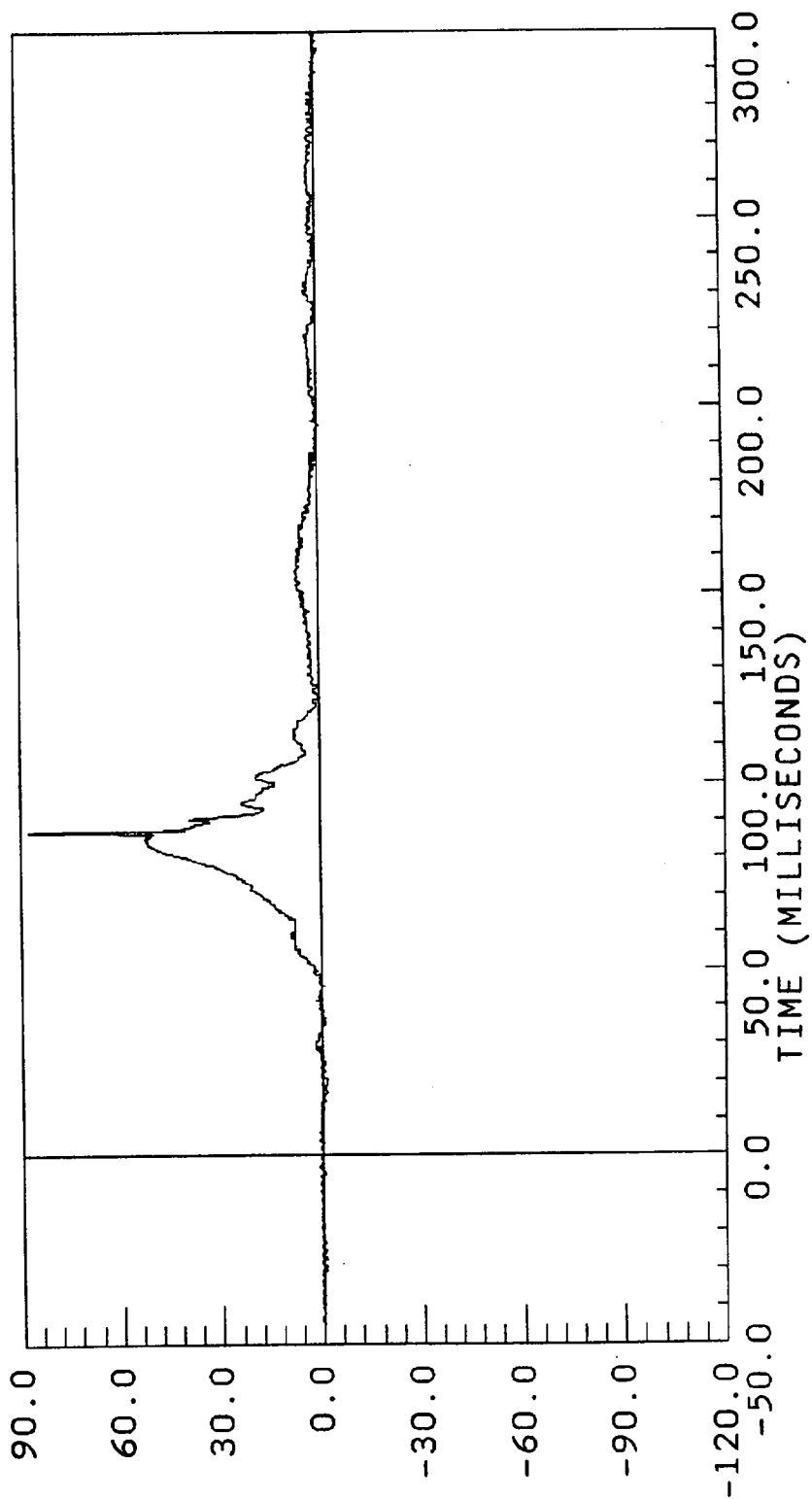


ACCELERATION * G * S *

UDS\$971-3.DAT

0.00 mph

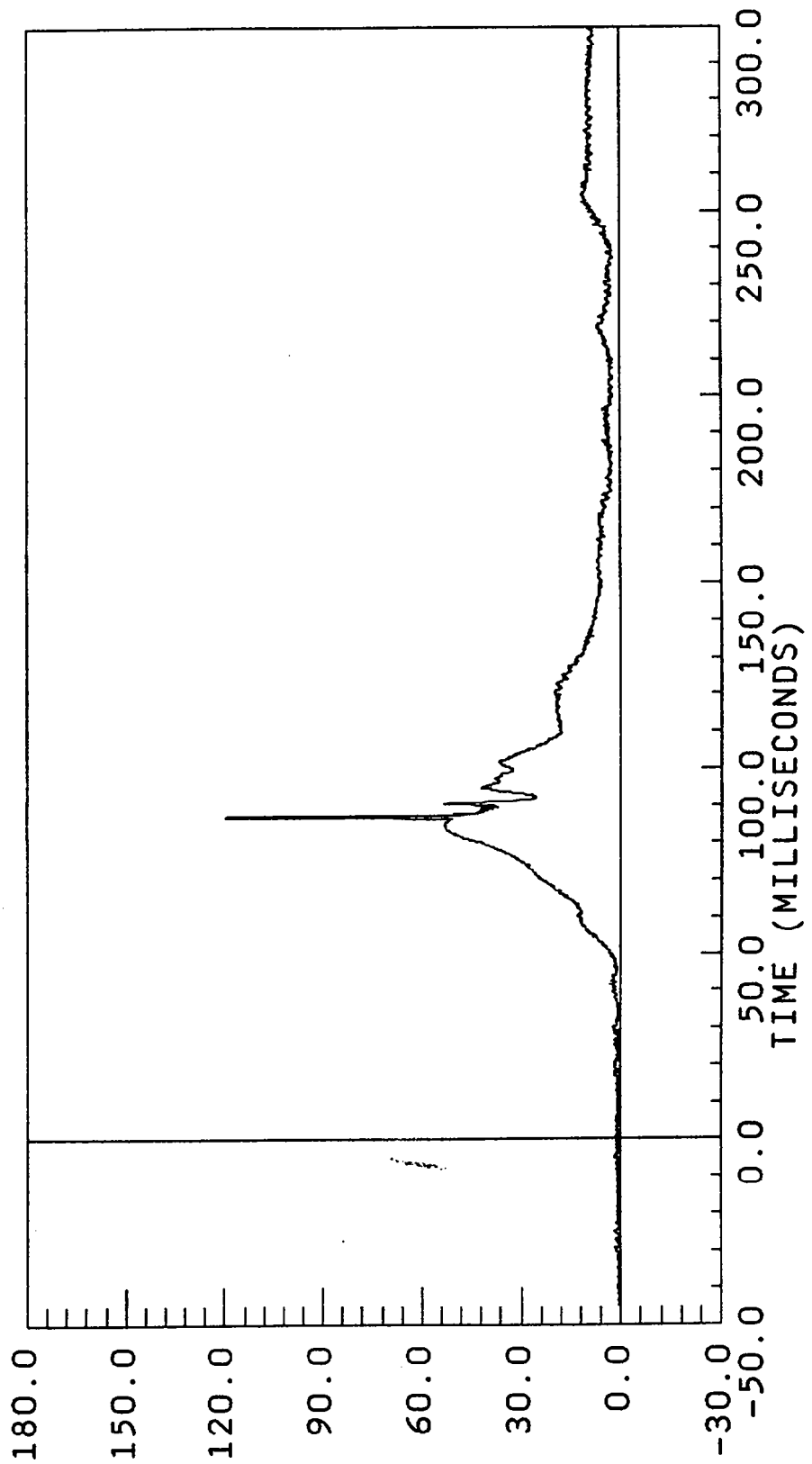
POS#1 HEAD Z ZL AXIS
YMIN = -1.367500 at 16.87500
YMAX = 87.94400 at 86.92500
FILTER CUTOFF: OHZ



ACCELERATION * G, S *
B-35 7804-8

0.00 mph

POS#1 HEAD
NONSTANDARD
FILTER CUTOFF: OHZ
RS AXIS
YMIN = 0.491430 at -44.62500
YMAX = 119.5542 at 86.92500



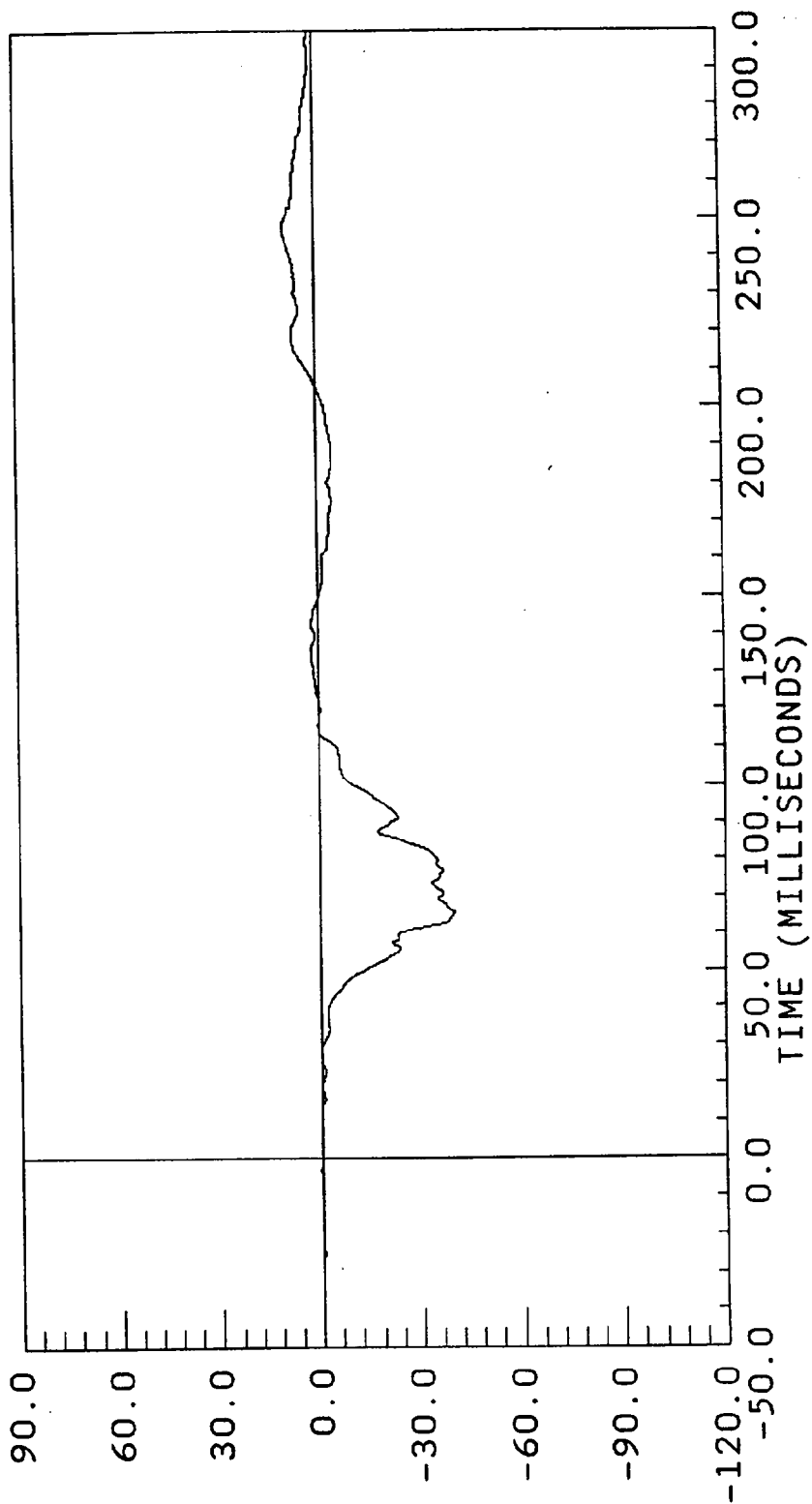
ACCELERATION * G, S *

BW971-4.DAT

29.40 mph

POS#1 CHEST X
FILTERED
FILTER CUTOFF: 300Hz

XL AXIS
YMIN = -39.78257 at 65.77500
YMAX = 9.547265 at 248.3250



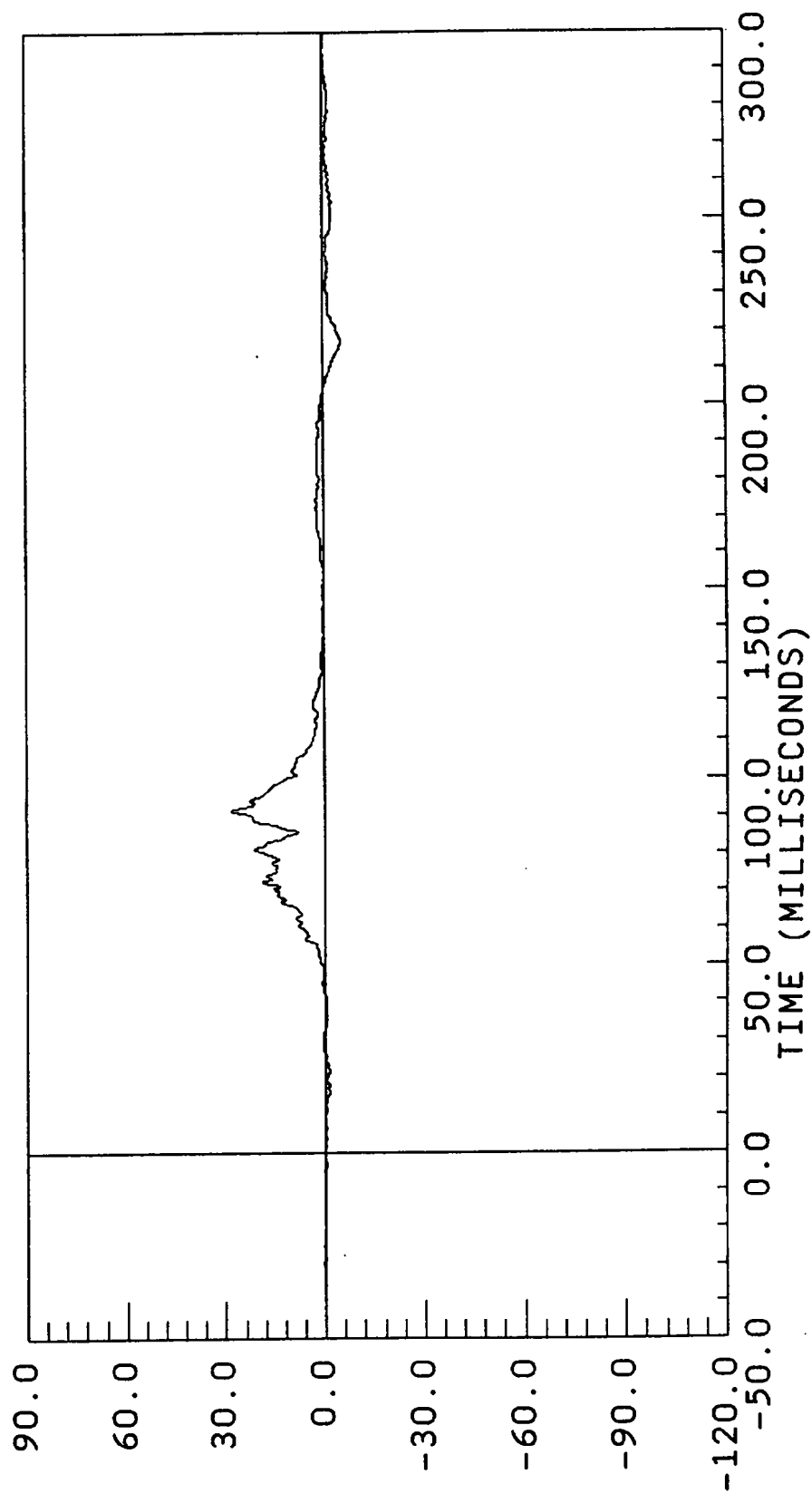
ACCELERATION * G, S *

BW971-5.DAT

0.00 mph

POS#1 CHEST Y
FILTERED
FILTER CUTOFF: 300HZ

YL AXIS
YMIN = -5.281952 at 217.1250
YMAX = 28.38677 at 91.57500



ACCELERATION * G, S *

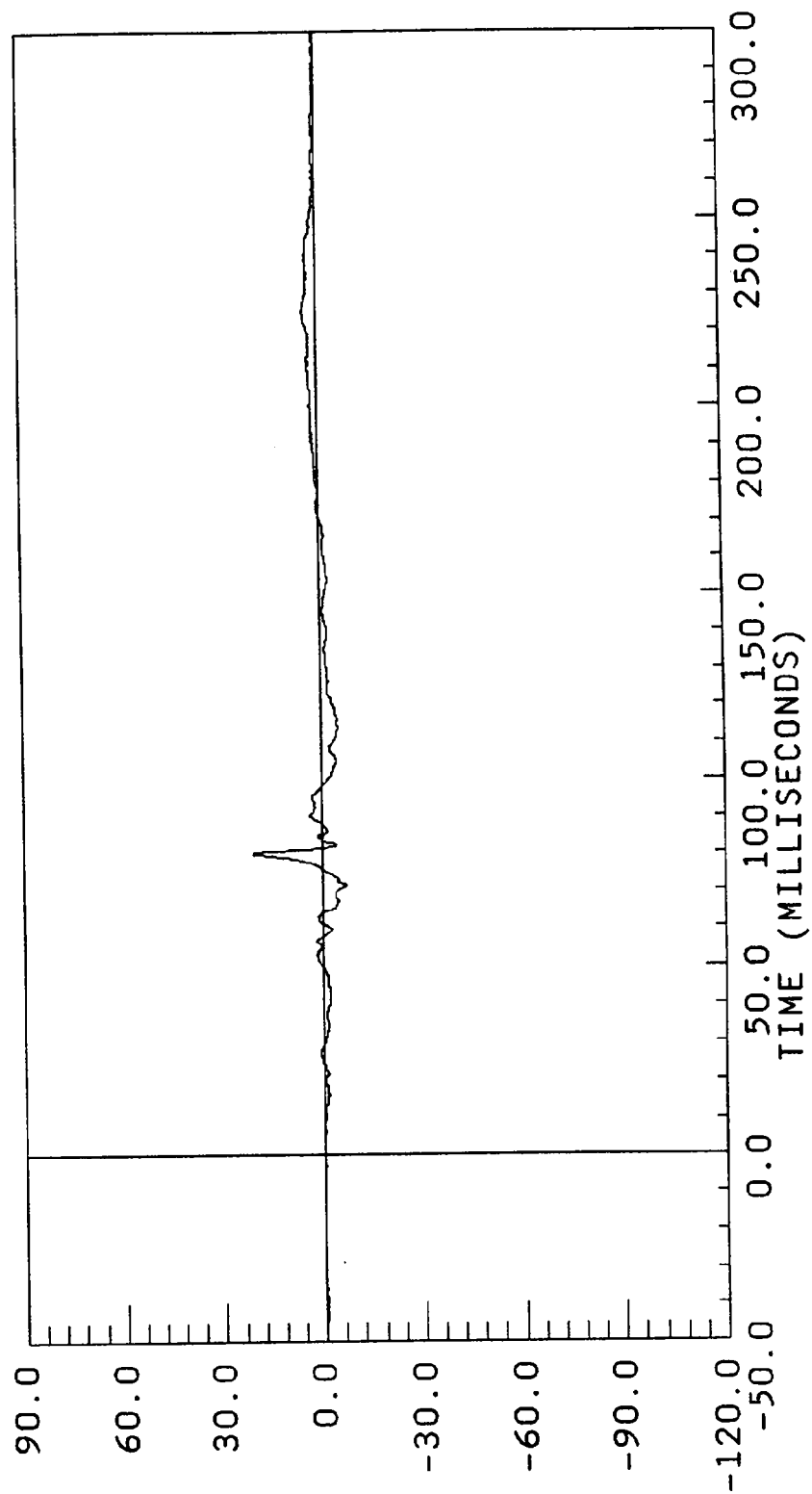
B-38

7804-8

BW971-6.DAT

0.00 mph

POS#1 CHEST Z
FILTERED
FILTER CUTOFF: 300Hz
ZL AXIS
YMIN = -7.229588 at 71.40000
YMAX = 20.90111 at 79.95000



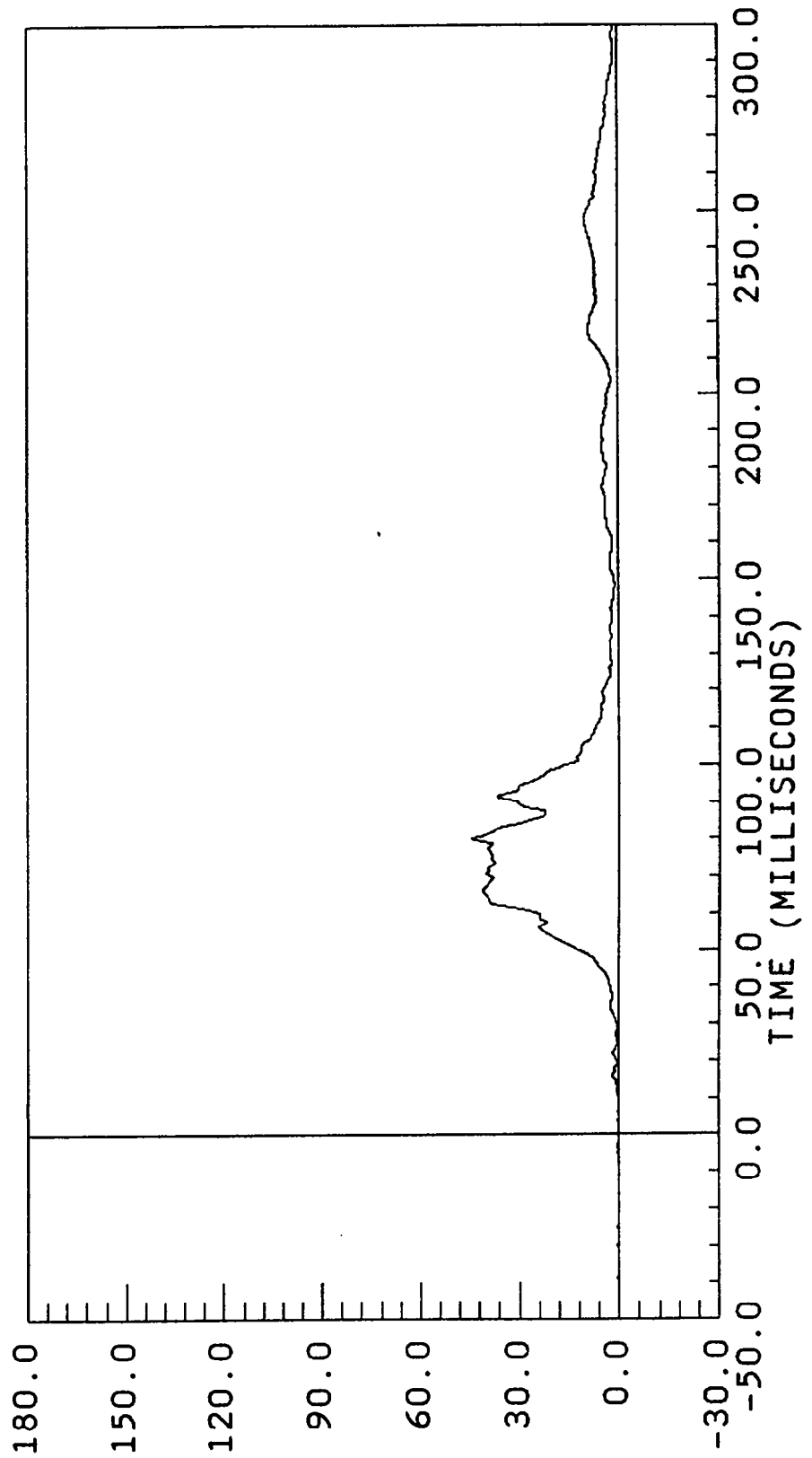
ACCELERATION * G, S
B-39 7804-8

CHST971-1.DAT

0.00 mph

POS#1 CHEST
COMPUTED
FILTER CUTOFF: 300Hz

RS AXIS
YMIN = 0.0417485 at -19.95000
YMAX = 44.44288 at 80.02500



ACCELERATION * G, S *

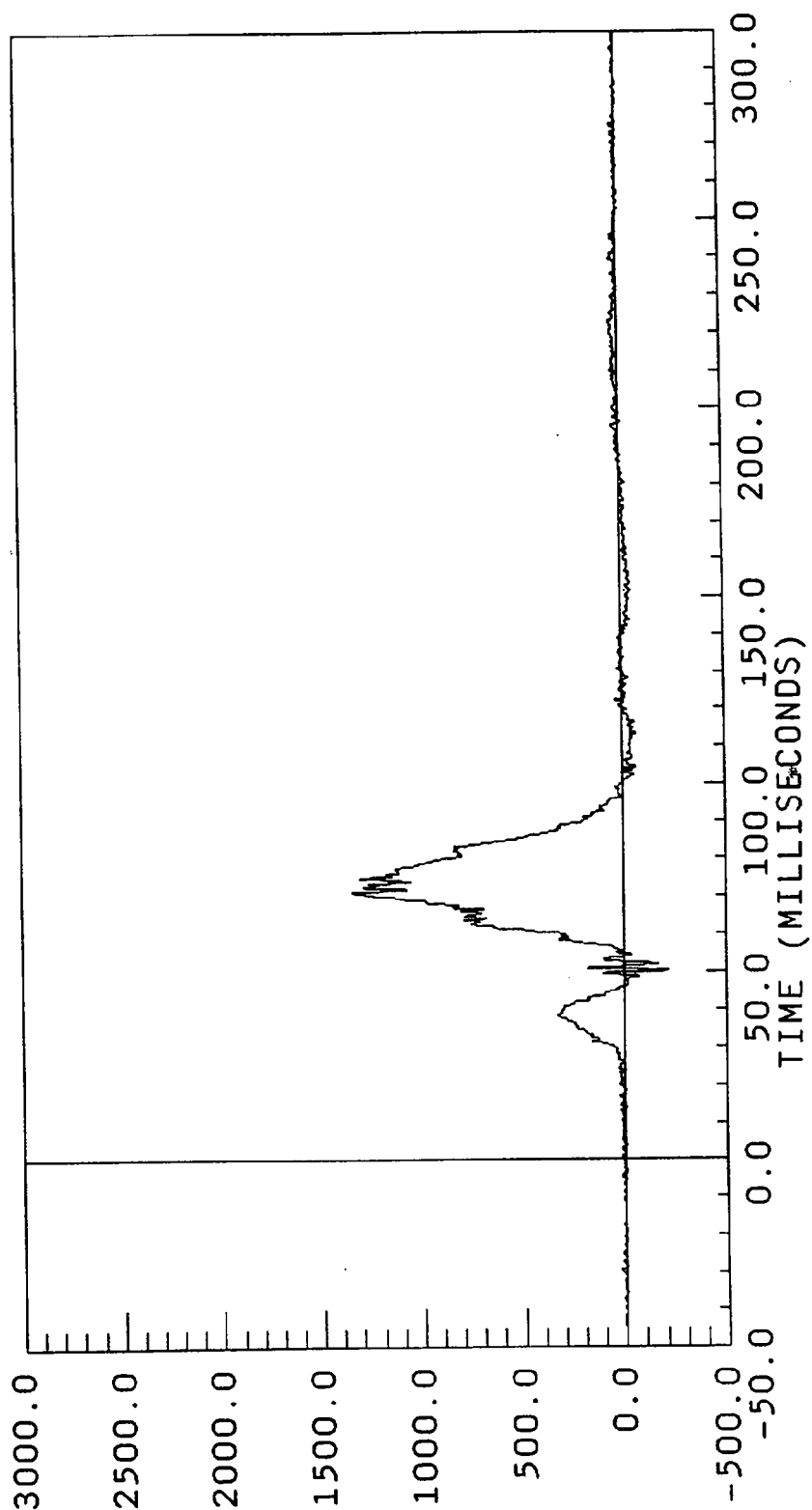
B-40

7804-8

BW971-7.DAT

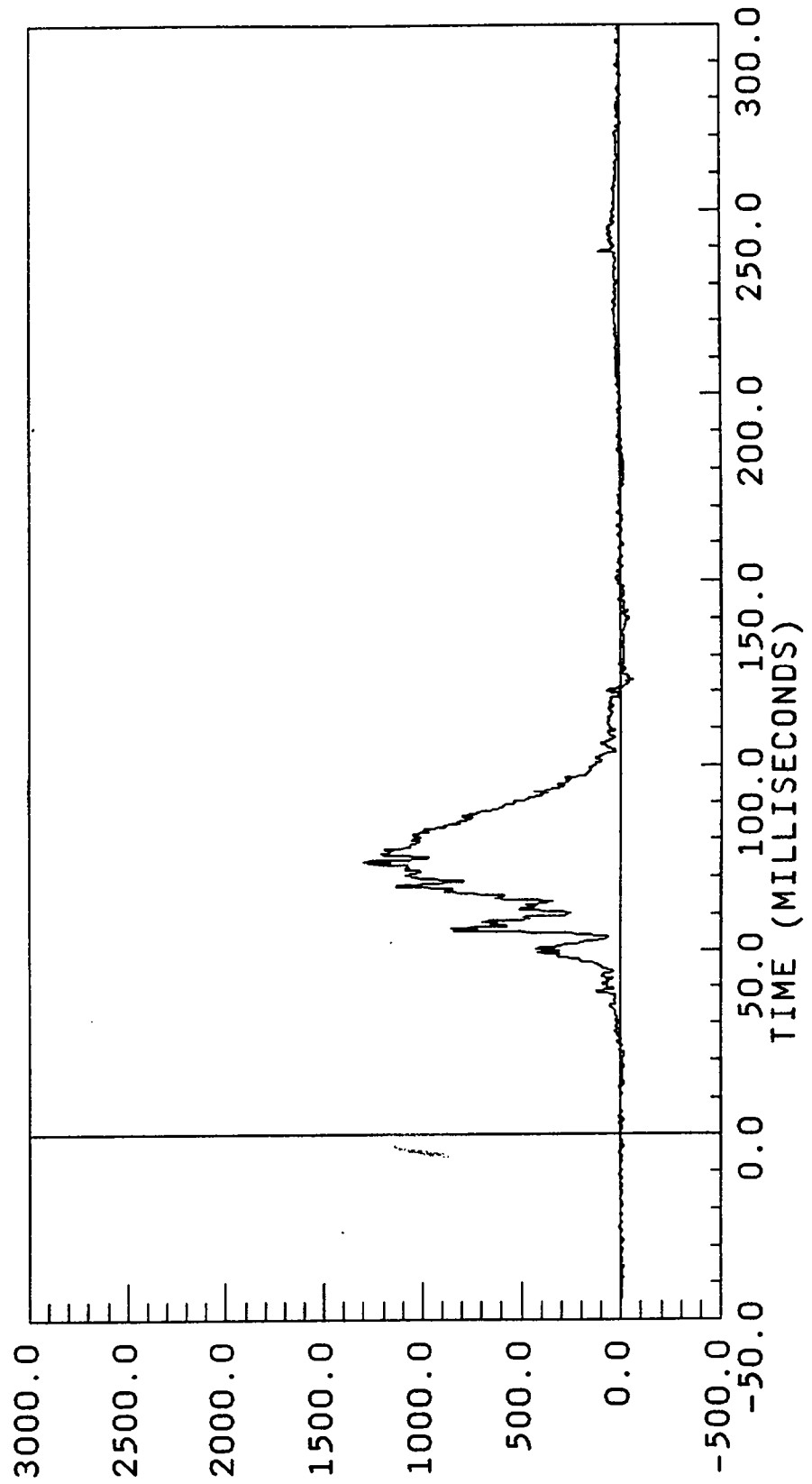
0.00 mph

POS#1 LEFT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -220.1715 at 50.17500
YMAX = 1351.620 at 71.17500



0.00 mph

POS#1 RIGHT FEMUR
 FILTERED
 FILTER CUTOFF: 1000HZ
 NA AXIS
 YMIN = -65.86034 at 123.2250
 YMAX = 1305.529 at 74.10001



HEAD INJURY CRITERION
HEAD SEVERITY INDEX
35MS MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

RUN= 971

POS#2 HEAD R

HIC= 335.9 FROM T1= .06352 TO T2= .10552
AVERAGE ACCELERATION BETWEEN T1 AND T2= 38.75'G
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 466.3

29.40 mph

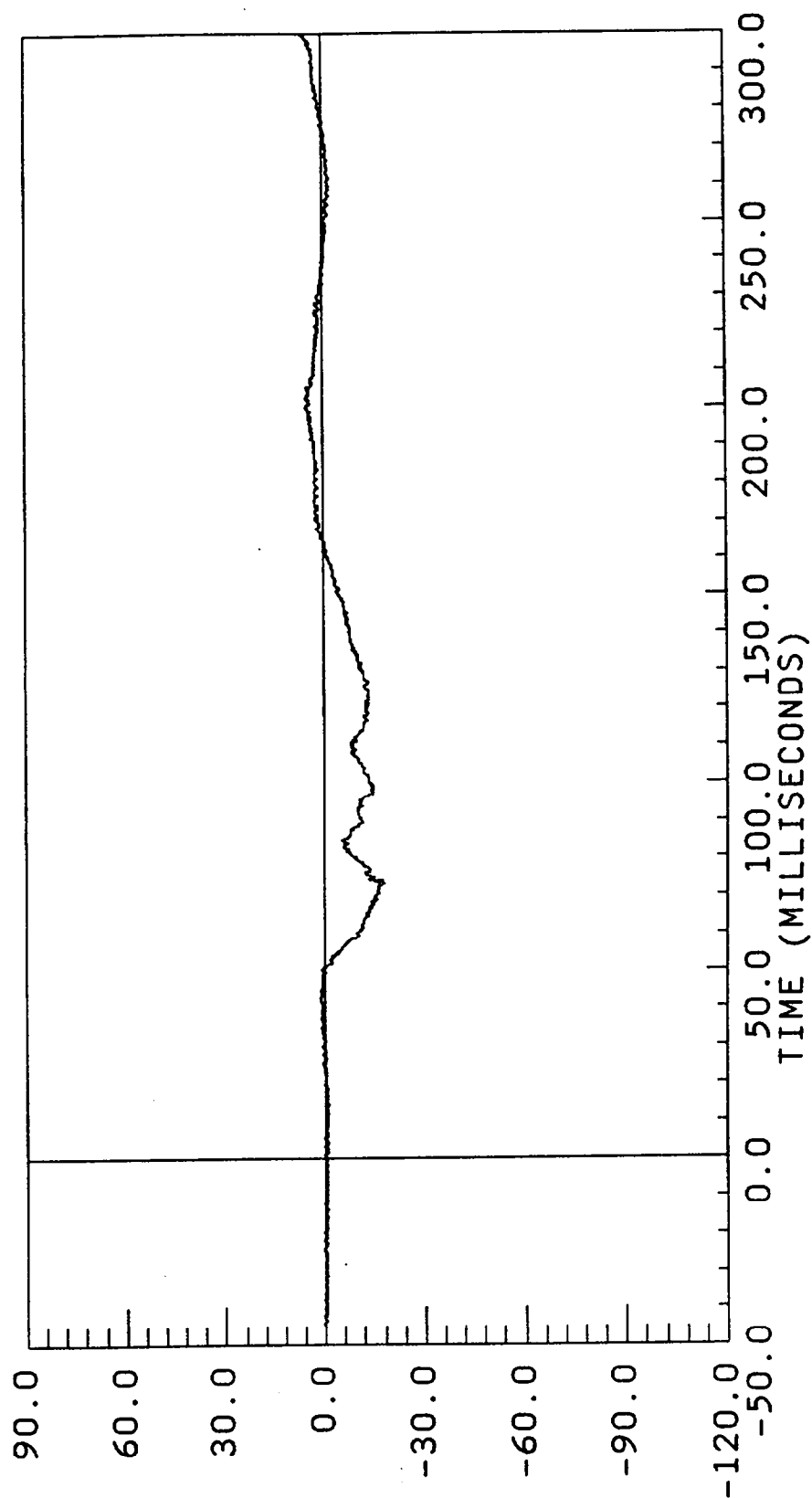
POS#2 HEAD X

XL AXIS

YMIN = -18.08500 at 73.05000

YMAX = 6.491700 at 299.5500

FILTER CUTOFF: OHZ



ACCELERATION * G * S *

UDS\$971-12.DA

0.00 mph

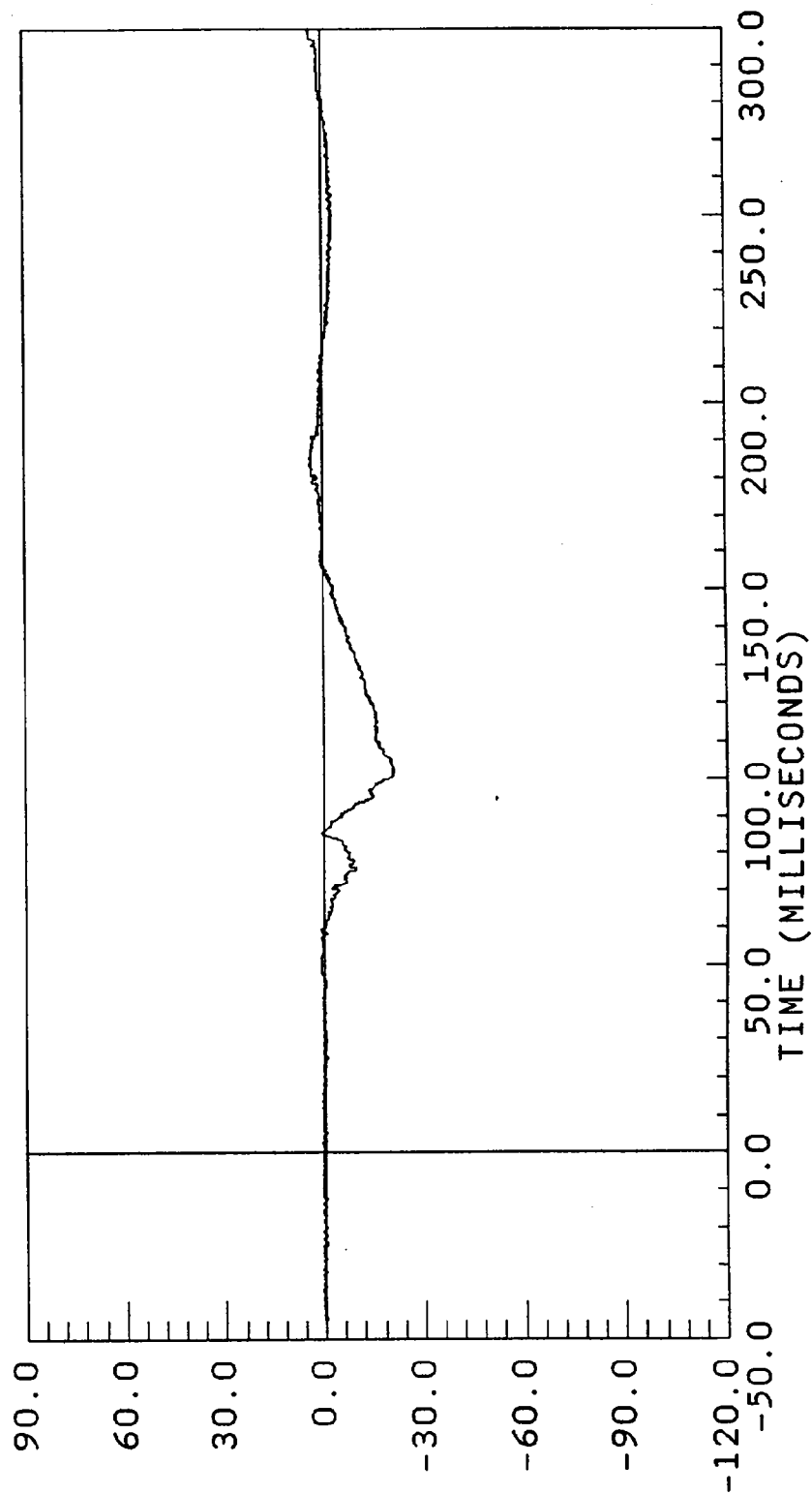
POS#2 HEAD Y

YL AXIS

YMIN = -21.23900 at 101.9250

YMAX = 4.581200 at 299.9250

FILTER CUTOFF: 0HZ



ACCELERATION * G, S *
B-45 7804-8

UDS\$971-13.DA

0.00 mph

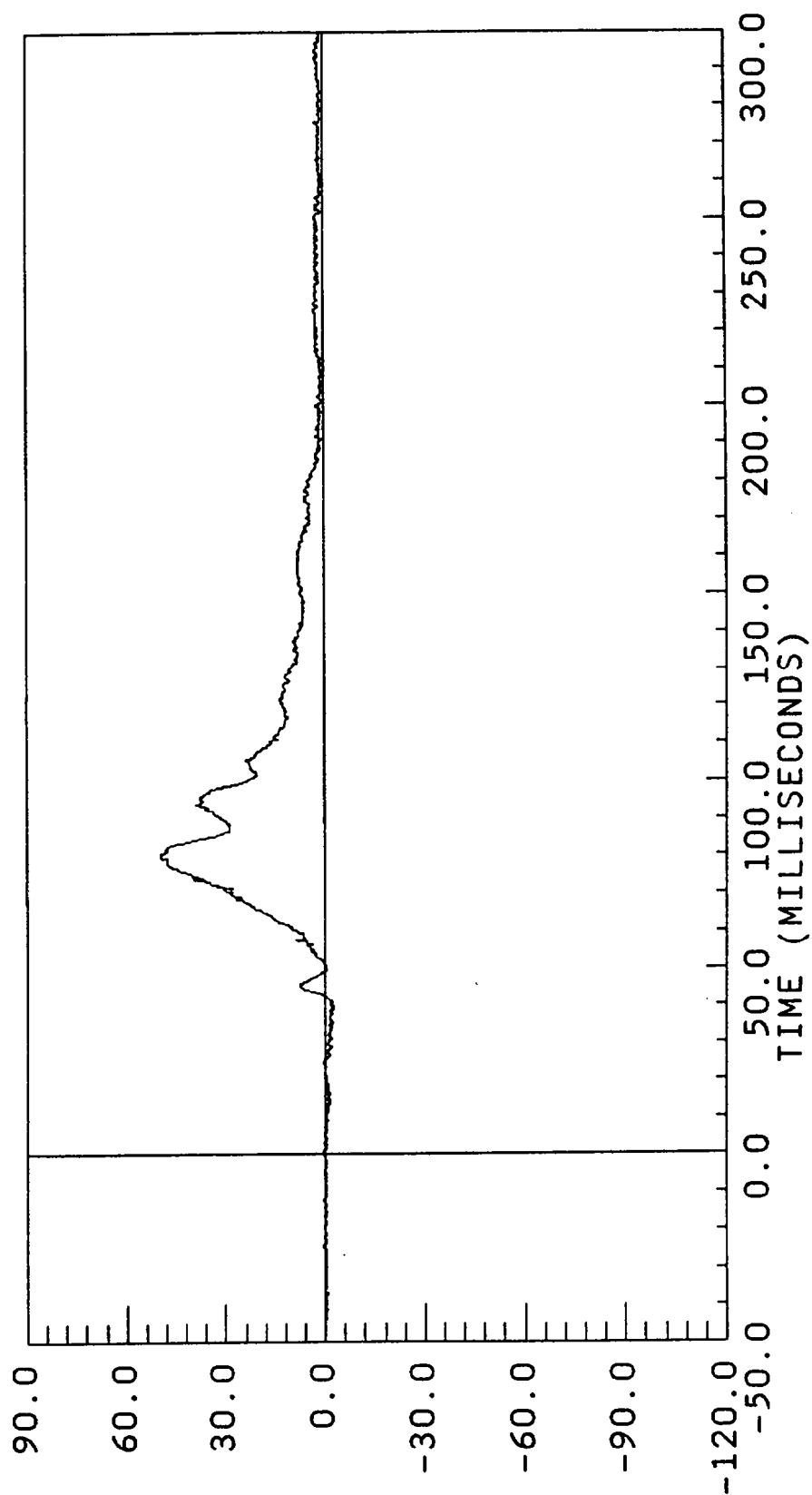
POS#2 HEAD Z

ZL AXIS

YMIN = -2.347800 at 35.17500

YMAX = 49.69300 at 79.57500

FILTER CUTOFF: 0Hz

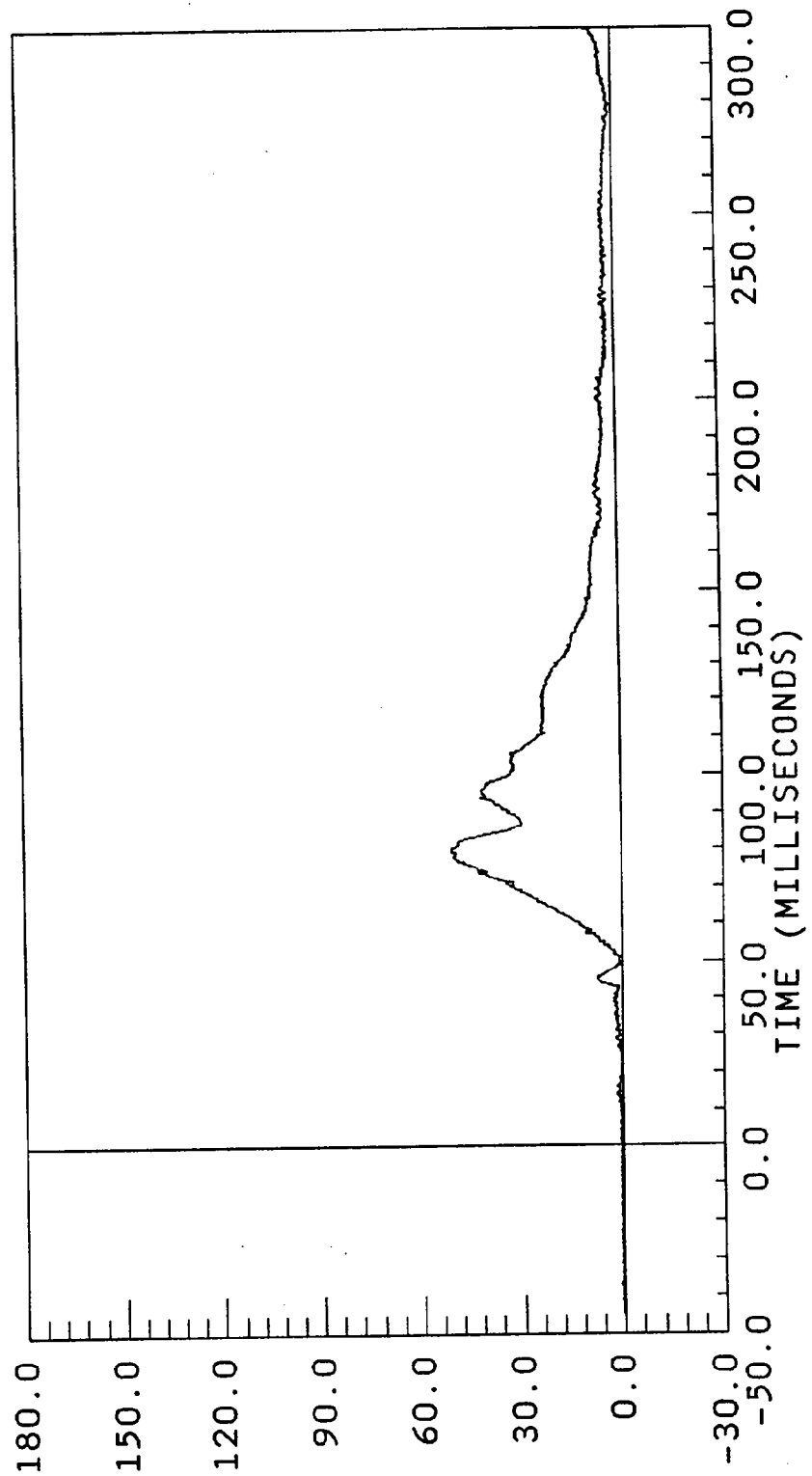


ACCELERATION * G, S *

HRES971-2.DAT

0.00 mph

POS#2 HEAD RS AXIS
NONSTANDARD YMIN = 0.623233 at -44.77500
FILTER CUTOFF: . OHZ YMAX = 51.18999 at 79.65000



ACCELERATION * G, S *

B-47

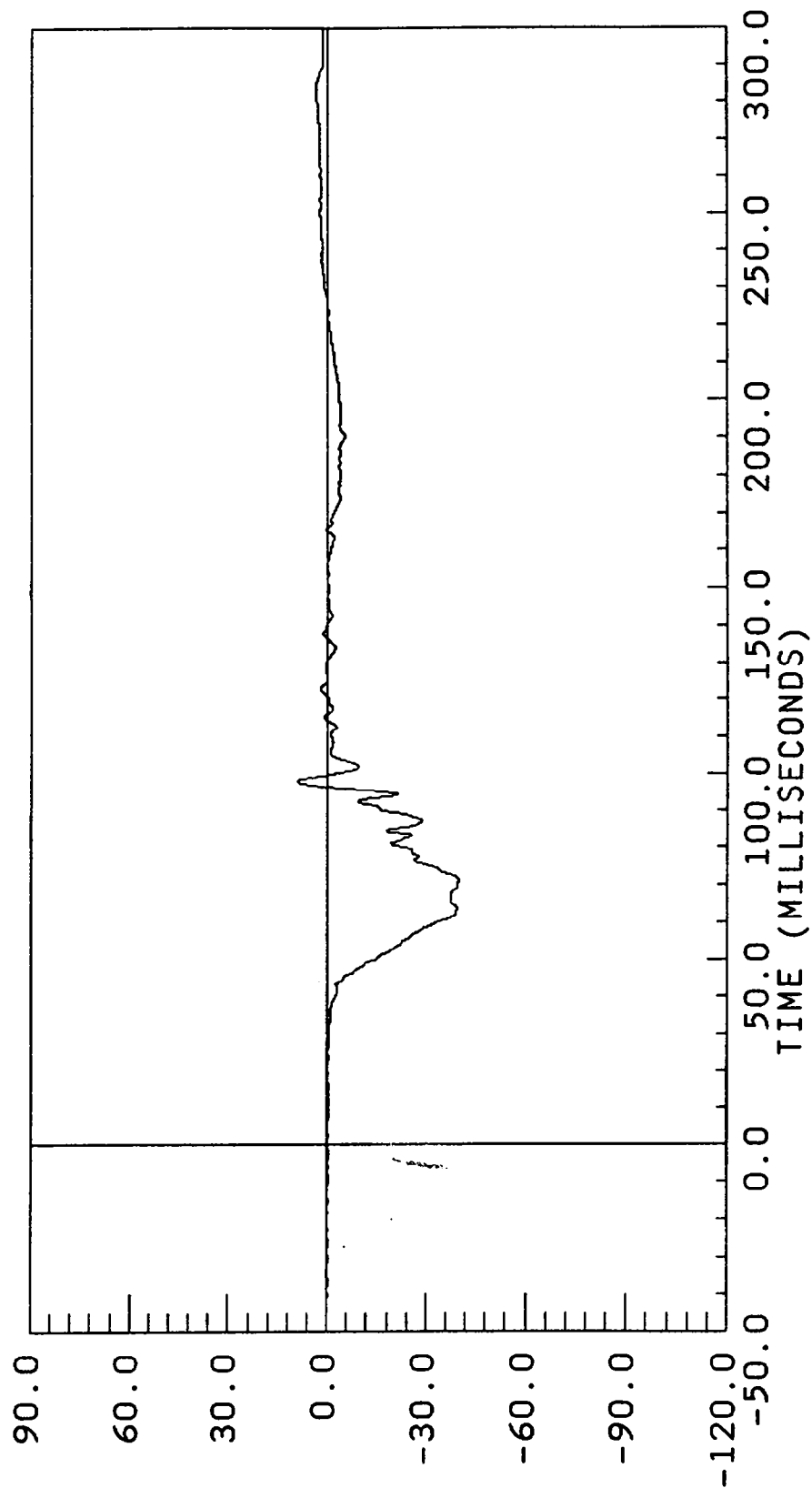
7804-8

29.40 mph

POS#2 CHEST X
 FILTERED
 FILTER CUTOFF: 300HZ

XL AXIS

YMIN = -39.79029 at 71.25000
 YMAX = 9.165165 at 98.02500

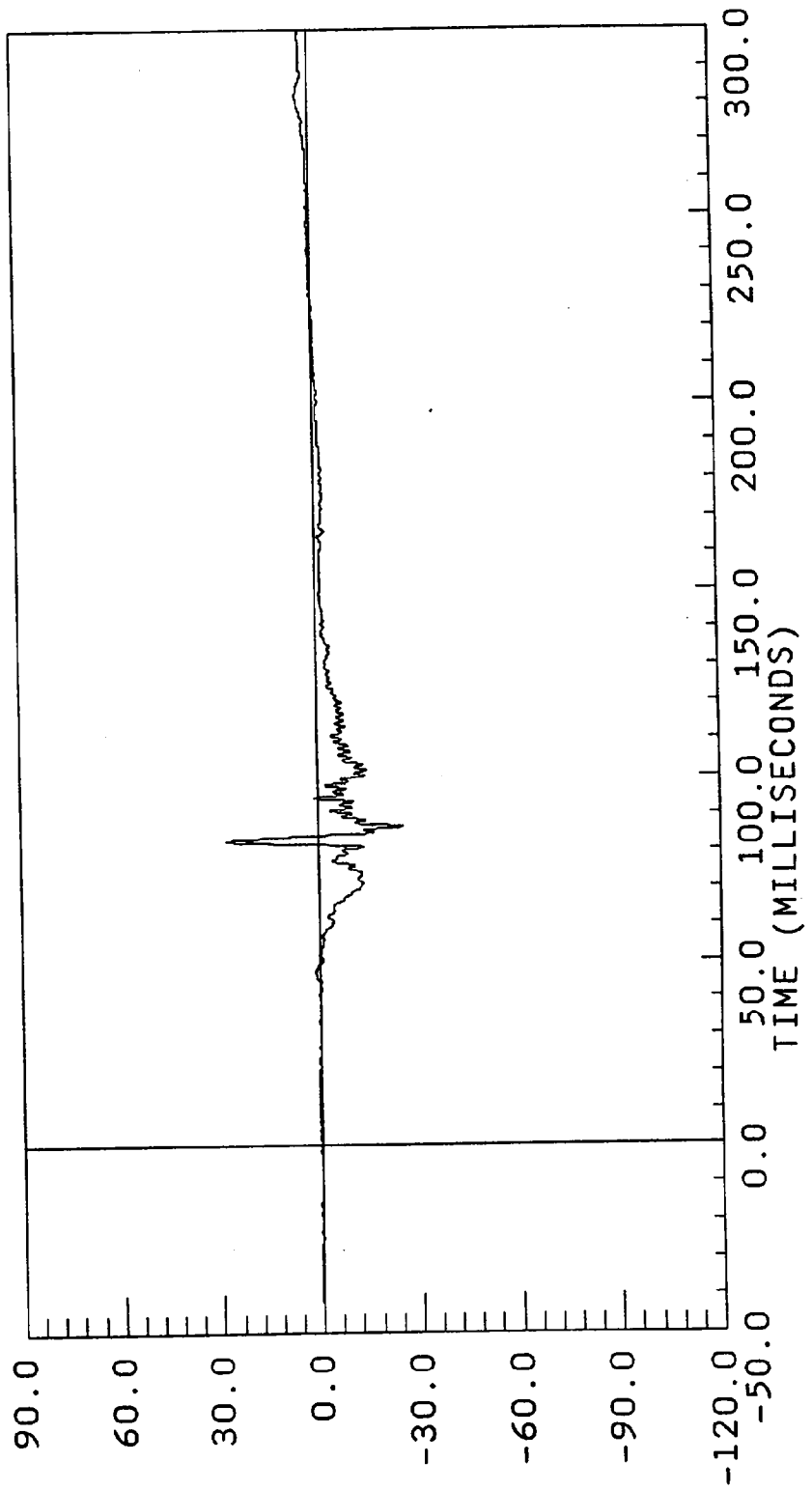


ACCELERATION * G, S *

BW971-15.DAT

0.00 mph

POS#2 CHEST Y
FILTERED
FILTER CUTOFF: 300HZ
YL AXIS
YMIN = -25.39707 at 86.62500
YMAX = 28.01335 at 82.80000



ACCELERATION * G, S *

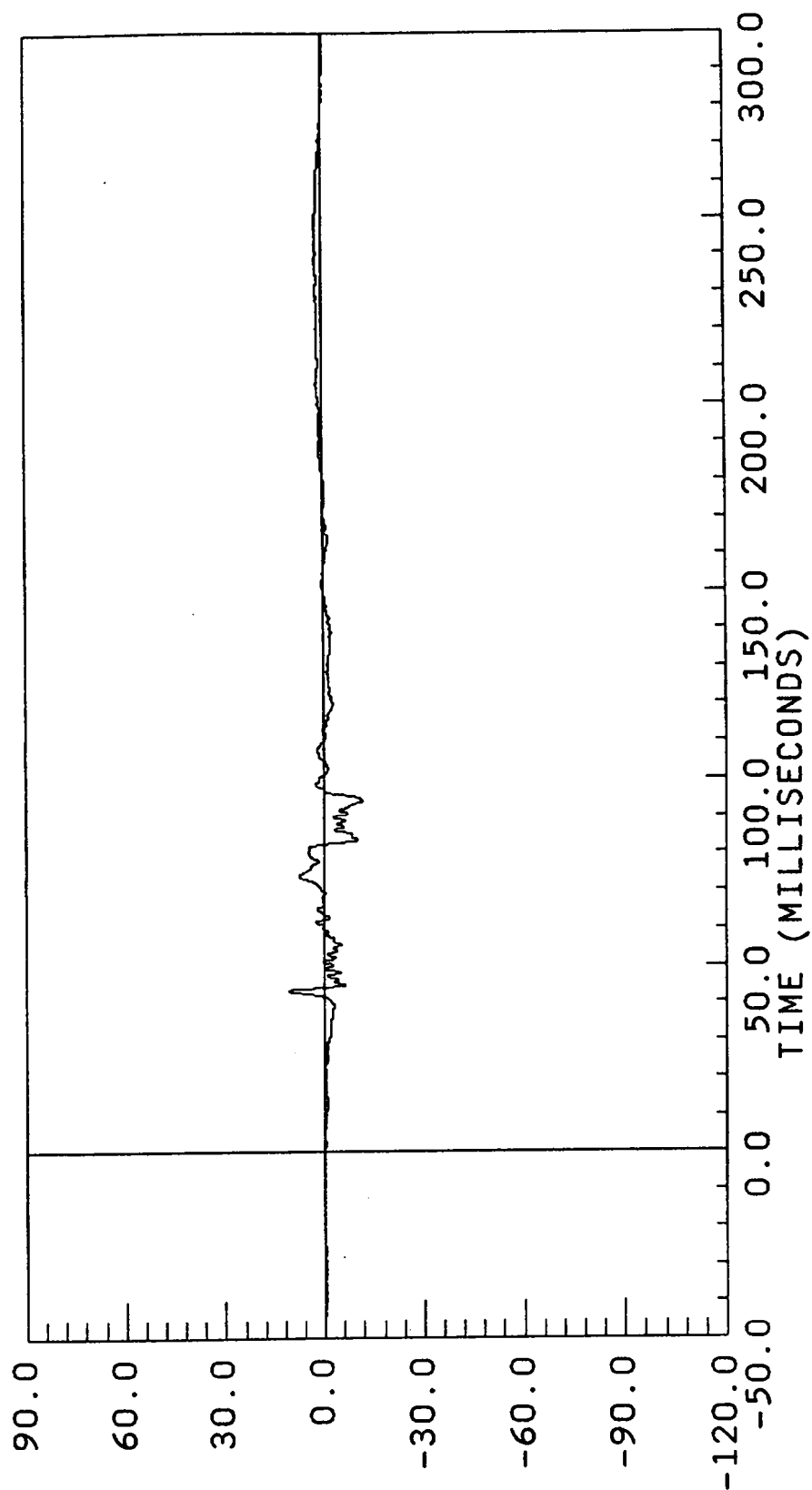
B-49

7804-8

0.00 mph

POS#2 CHEST Z
 FILTERED
 FILTER CUTOFF: 300Hz

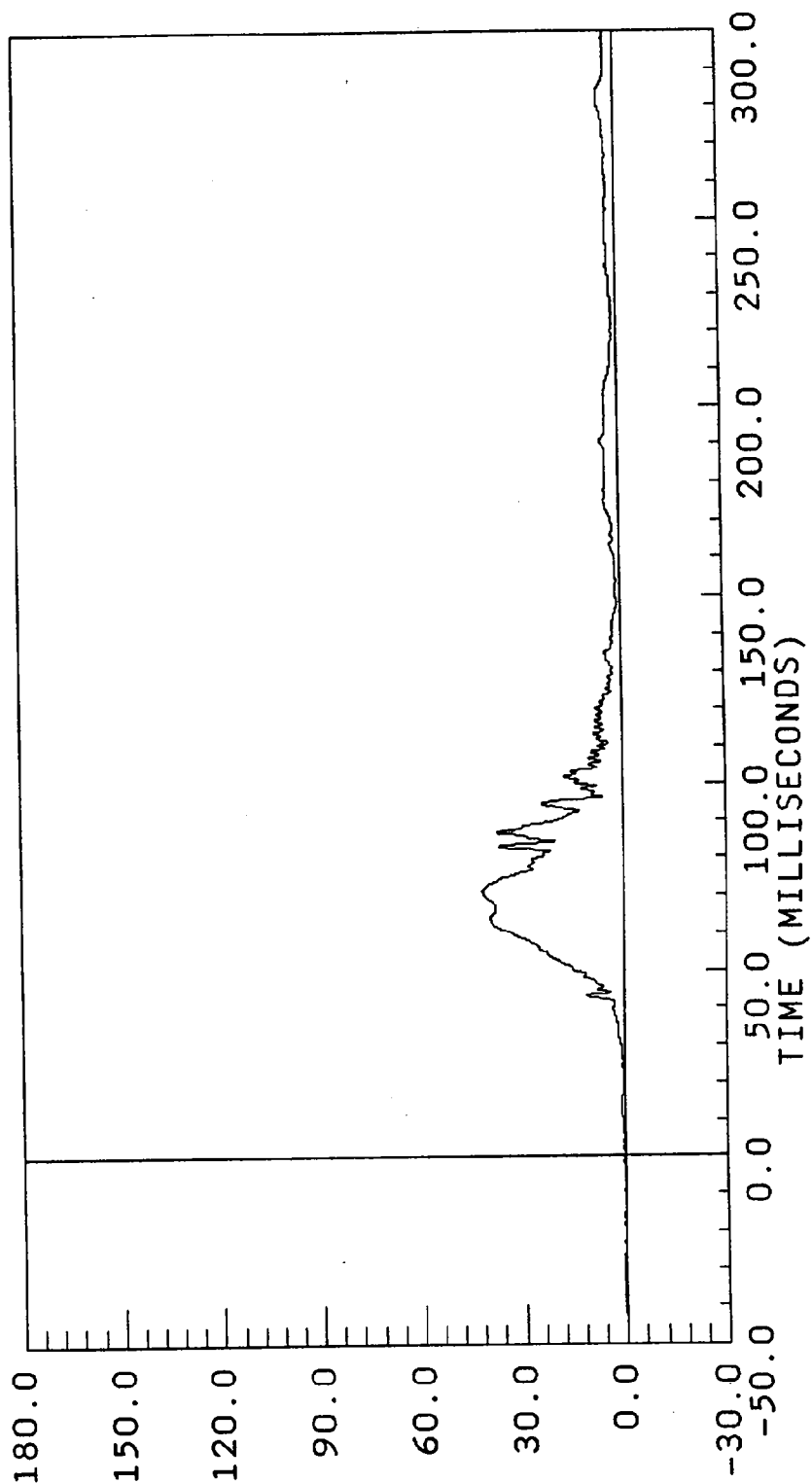
ZL AXIS
 YMIN = -11.60760 at 94.35001
 YMAX = 11.02180 at 43.20000



CHST971-2.DAT

0.00 mph

POS#2 CHEST
COMPUTED
FILTER CUTOFF: 300HZ
RS AXIS
YMIN = 0.0231994 at -19.95000
YMAX = 42.01742 at 71.25000



ACCELERATION * G, S *

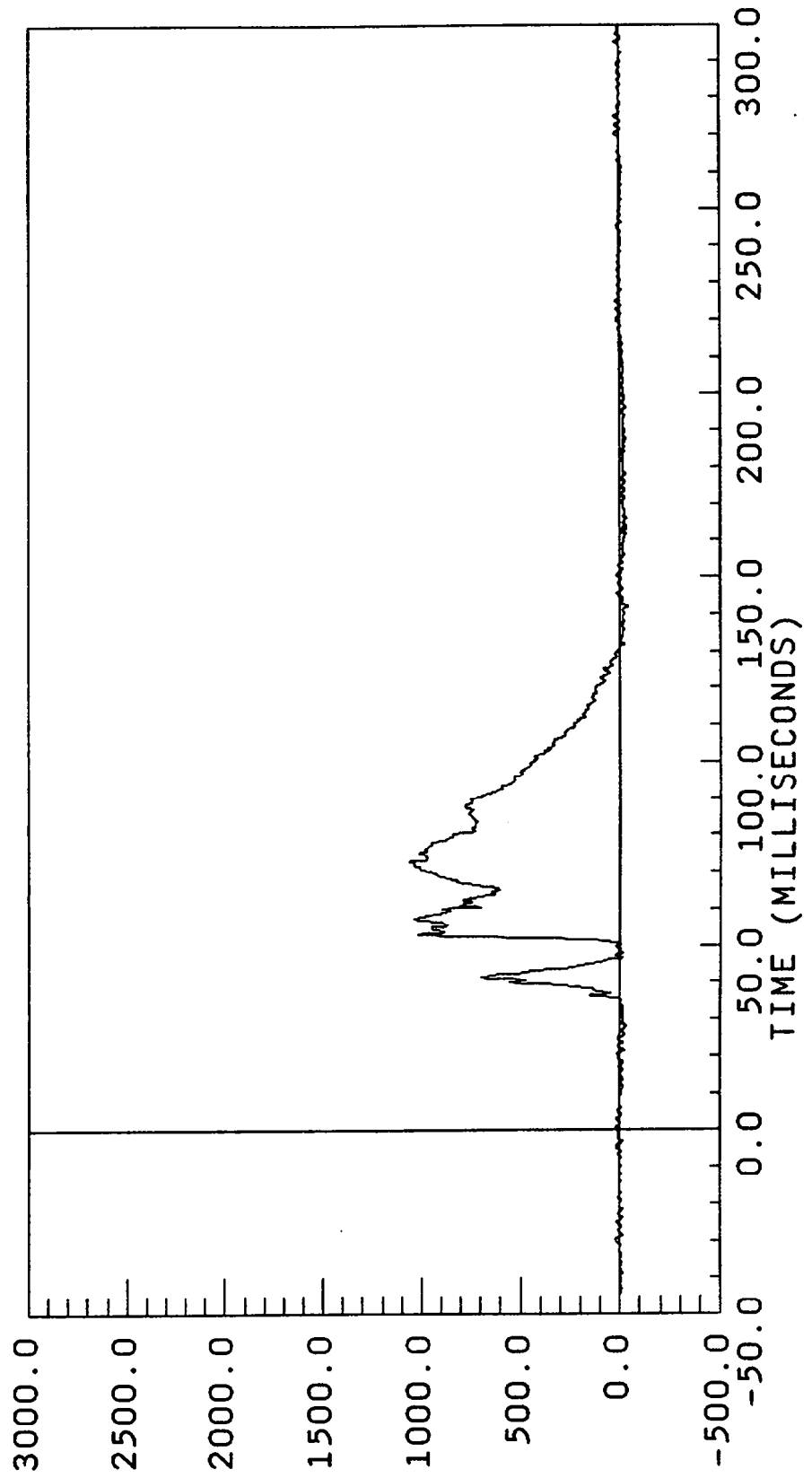
B-51

7804-8

0.00 mph

POS#2 LEFT FEMUR
 FILTERED
 FILTER CUTOFF: 1000Hz

NA AXIS
 YMIN = -42.40626 at 142.0500
 YMAX = 1062.628 at 72.75000



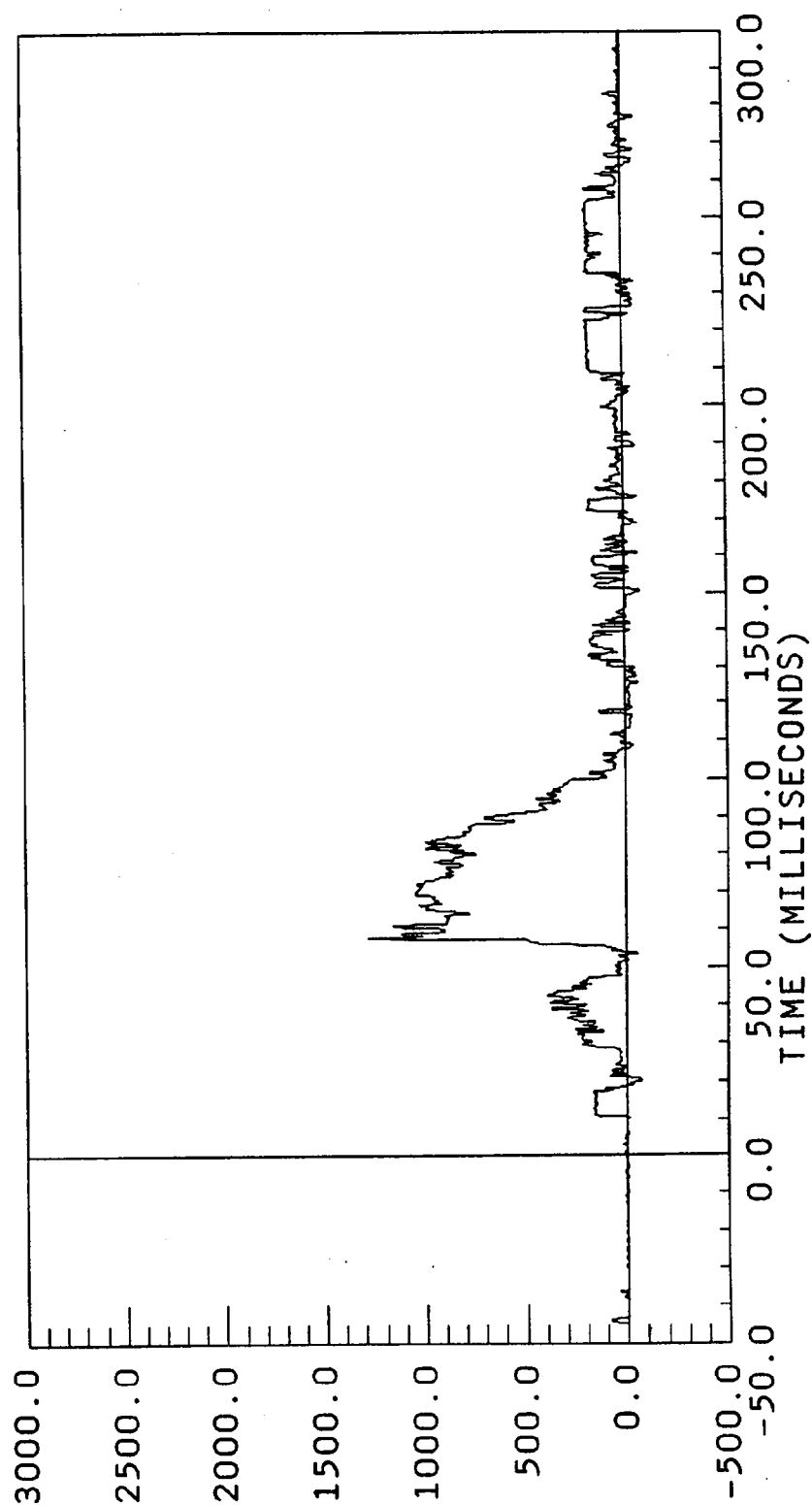
FORCE * LBS *

BW971-10.DAT

0.00 mph

POS#2 RIGHT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ

NA AXIS
YMIN = -75.44666 at 19.95000
YMAX = 1284.028 at 57.67500



* L B S *

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

CONTROLS AND EQUIPMENT

SAFETY BELTS

WARNING

Safety belts have been shown to be the single most effective means available for reducing the potential for serious injury and death in automobile accidents. Therefore for your own protection as well as that of your passengers always properly wear safety belts when the vehicle is in motion. Also, pregnant women, injured or physically impaired persons should use safety belts.

In order to provide the maximum level of protection safety belts must be properly positioned on the body. Improperly positioned safety belts can cause serious personal injury in case of an accident. Therefore read and always observe all of the following instructions and warnings pertaining to the use of the safety belts installed in your vehicle.

- The shoulder belt should be positioned midway over the shoulder – never across the neck. See illustration on page 16.

- Always make certain that the safety belt tongue is inserted into the safety belt buckle associated with the corresponding seat. Attaching the safety belt to the buckle for another seat could reduce safety belt effectiveness and cause injury.

- Do not wear shoulder part of belt under your arm or otherwise out of position. This would increase the risk of serious injury in case of an accident.

- Do not use comfort clips or devices which create slack in the shoulder belt portion and can increase the risk of injury in an accident. However such clips may be required in the proper use of some child restraint systems.

- Never strap in more than one person, including small children, with each belt. It is especially dangerous to place a safety belt over a child sitting on your lap.

- The lap belt must be worn low and tight across the pelvis. Make sure any slack is wound on the retractor.

- Belts should not be worn twisted.

- Do not wear belts over rigid or breakable objects in or on your clothing, such as eye glasses, pens, keys, etc. as these may cause injury.

- Several layers of heavy clothing may interfere with proper positioning of belts and reduce the overall effectiveness of the system.

CONTROLS AND EQUIPMENT

- Keep belt buckles free of any obstruction that may prevent secure locking.
- Make sure the belts of the unoccupied seats are in their stowed positions.
- Belts that have been subjected to excessive stretch forces in an accident must be replaced.
- Belts must not rub against sharp objects.
- Do not allow safety belts to become damaged by becoming caught in door or seat hardware.
- Inspect your belts periodically. If belts show damage to webbing bindings, buckles or retractors, they must be replaced.
- If belts do not work properly, see your Volkswagen dealer.

- Do not modify or disassemble the safety belts in your vehicle.
- The belts must be kept clean as otherwise the retractors may not work properly (also see "Vehicle care", page 85).

The front seats of your vehicle may be equipped with either a Passive Restraint System with motorized belts (see next page) or with combination lap-shoulder belts (see page 19).

Notes

- The chapter "Lap-shoulder belts" on page 19 applies to the front seats as well as to the outer rear seating positions on all models.
- The lap belt for the rear center seating position on all versions is described on page 20.
- You can find the chapter "Child Safety" on page 21.

CONTROLS AND EQUIPMENT

Passive Restraint System with motorized belts*

The Volkswagen Automatic Seatbelt System is a passive restraint system. Driver and front seat passenger are buckled up automatically as they sit down, close the door and the ignition key is turned in the lock.

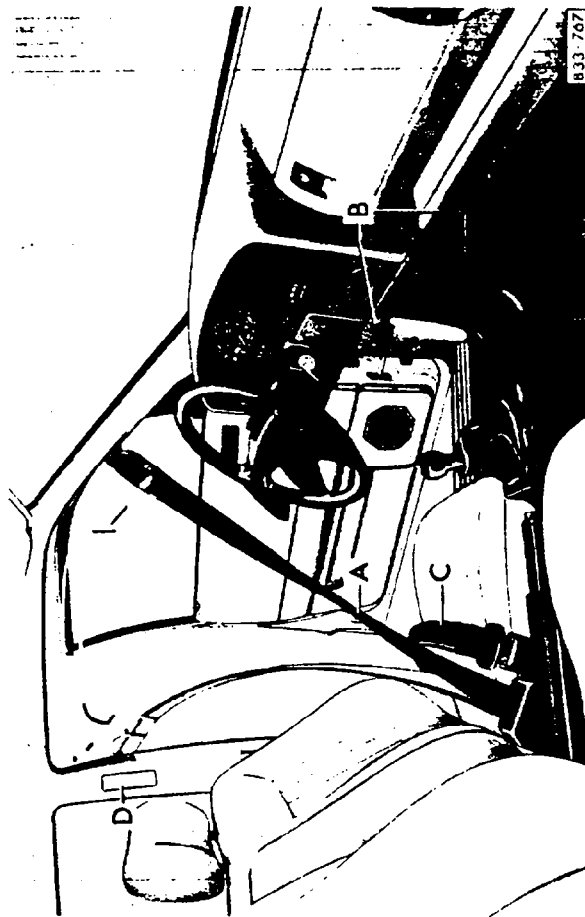
How the automatic seatbelt system works

The front seats of your Passat are equipped with an automatic passive restraint system consisting of a motorized upper torso belt (A) and an integrated knee bar (B). The Passat is also equipped with an additional lap belt (C).

The upper torso belt automatically moves rearwards along a track above the door opening after you have entered the car, closed the door and turned the ignition key in the lock.

If the torso belts do not work properly, use the special latching tongues (D) — see page 18.

The safety belt warning light (see page 51) and the chime will come on briefly to check the system. See next page if both do not go out after the belt slides are fully latched.



WARNING

■ Never attach the Driver's torso belt to belt slide on the passenger's side. Conversely never attach the passenger's torso belt to the slide on the Driver's side.

■ Make sure that the belt is positioned midway over the shoulder — it must never rest against the neck. If necessary, use the seat height adjustment to fit the upper torso belt properly.

WARNING continued

- Make sure no objects like sunvisors or other obstructions near or in the window track interfere with the movement of belt slide and/or belt.
- Front seat passengers should not ride in a moving vehicle with the seatback reclined. Safety belts only offer optimum protection when the seatback is in an upright position as illustrated on the previous page.
- Do not hold on to the torso belt or buckle while entering or exiting the car.
- Never lean out of the opened driver's or passengers door with ignition key in. The upper torso belt will move forward and could cause injury.

Note

On the driver's side, the upper torso belt will not move forward when you shift into reverse (Manual transmission) or into reverse or neutral (Automatic transmission) with the ignition on.

Always heed **WARNING** on pages 14 and 15.

Upon opening the door or removing the ignition key, the upper torso belt moves forwards and out of the way without any action on your part.

WARNING

The automatic seatbelt must never be used to hold a child's seat as the diagonal belt will not provide the needed protection. For details see page 22.

Belt warning system

If the safety belt warning light and the chime go out a few seconds after the torso belt slides are in their fully latched position, the restraint system is working properly.

The warning light will not go out, if

- a door is not fully closed
- the belt buckle is not properly engaged on the driver's side,
- the torso belts are buckled on the wrong sides
- a belt slide is not in its fully latched position.

The chime will sound if the driver's door is opened with the ignition key turned in the ignition lock. The chime will sound as long as the door stays open.

Note

If the seatbelt system does not work properly and the warning light does not go out, use the additional special latching ton-gues on driver's and passenger's side - see next page - and contact your nearest Volkswagen dealer.

Inertia reel retractor

The belt automatically takes up any belt slack and adjusts to your normal wearing position and movements so that you can conveniently reach all operating controls.

In a sudden stop or impact, the belt's inertia reel retractor automatically locks the belt. Sudden acceleration or hard braking, fast cornering or driving up or down steep hills also locks the belt. To release a locked belt, lean back to take the body pressure off the belt.

Knee bar

The knee bar integrated into the dashboard is designed to restrain the forward movement of the lower torso during an impact and to prevent the occupant from sliding down in the seat and moving underneath the belt. The use of a knee bar also serves to protect the sensitive abdominal region from impact loadings and reduces the potential for serious injury in a wide range of accidents.

Note

The knee bar must not be removed.

CONTROLS AND EQUIPMENT

Additional lap belt

The additional lap belt offers those front seat occupants who are more accustomed to a combination lap-shoulder belt the ability to use a system which more closely resembles the seatbelts on previous vehicles which they have become used to.

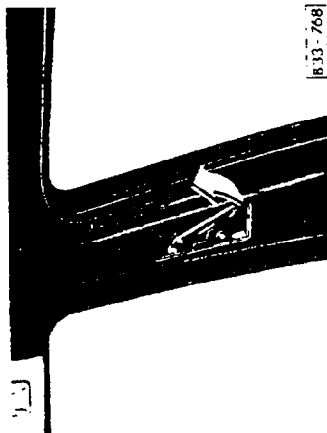
The lap belt may also offer additional comfort under more extreme road and driving conditions when it may be difficult to maintain firm contact with the seat. Furthermore in some types of accidents the lap belt may provide additional occupant restraint and mitigate certain types of occupant injury.

WARNING

The additional lap belt must be routed in front of the automatic belt – see illustration on page 16.

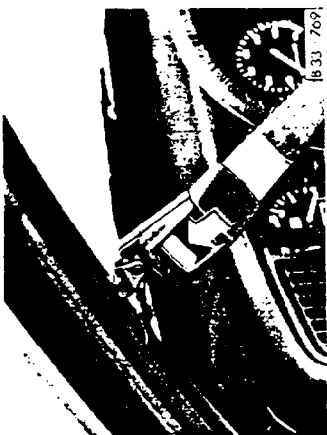
Note

On the passenger's side, the lap belt must not be used to secure a child restraint – please see page 22 for details.



Special latching tongues

Remove the cover plates and turn out the special latching tongues (arrow), e. g. by use of the ignition key.



Release torso belt buckles by pushing the red buttons located on the window side of the buckles. Then fasten buckles to special latching tongues.