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REPORT NO. 208-MGA-98-012

SAFETY COMPLIANCE TESTING FOR FMVSS 208
OCCUPANT CRASH PROTECTION
(SLED TEST)

Chevrolet Motor Corporation
1998 Chevrolet Malibu 4 Door
NHTSA NO. CW0105

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: May 29, 1998

Report Date: June 15, 1998

Final Report

Prepared For:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY ASSURANCE
OFFICE OF VEHICLE SAFETY COMPLIANCE
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APPROVED BY: David Winkelbauer DATE: 7/27/98
David Winkelbauer, Project Engineer
MGA Research Corporation

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NHTSA, Office of Vehicle Safety Compliance

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SECTION 1
PURPOSE AND TEST PROCEDURE

PURPOSE

This sled test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by MGA Research Corporation (MGA) under Contract No. DTNH22-93-D-21089. The purpose of this test was to determine whether the subject vehicle, a 1998 Chevrolet Malibu 4 Door, NHTSA No. CW0105, meets the performance requirements of FMVSS 208, "Occupant Crash Protection". The compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-208S-00 dated June 17, 1997.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208S-00 dated June 17, 1997. Data was obtained relative to FMVSS 208, "Occupant Crash Protection".

The test vehicle was instrumented with four (4) accelerometers to measure longitudinal axis accelerations.

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (ATDs). The dummies were positioned in the front outboard seating positions according to the dummy placement procedures specified in Appendix B of the Laboratory Test Procedure.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations; a chest potentiometer to measure longitudinal deflection; an upper neck load cell to measure longitudinal, lateral, and vertical neck forces and moments; and left and right femur load cells to measure axial forces.

The thirty-seven (37) data channels were multiplexed and recorded on five IBM PC compatible computers with Metrabyte DAS-16F A/D converter boards. The data was digitally sampled at 10,000 samples per second and processed per Section 11.7 through 11.9 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and six (6) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by the real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2. The FMVSS 208 data is presented in Section 3. The vehicle, occupant, and camera measurements are presented in Section 4. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the manufacturer's vehicle information.

SECTION 2
COMPLIANCE DATA SUMMARY

TEST RESULTS SUMMARY

This sled test was conducted at MGA Research Corporation on May 29, 1998.

The test vehicle, a 1998 Chevrolet Malibu 4 Door, NHTSA No. CW0105, appeared to comply with the performance requirements of FMVSS 208. The Head Injury Criteria (HIC) calculations were less than 1000, the chest resultant accelerations did not exceed 60 g's. The compressive forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Part 572 E dummies seated in the front outboard designated seating positions. For each Part 572 E dummy, the chest deflection did not exceed 3.0 inches. For each Part 572E dummy, the maximum peak flexion bending moment about the occipital condyle did not exceed 190 N-m. The maximum peak extension bending moment did not exceed 57 N-m. The maximum peak axial tension did not exceed 3300 N. The maximum peak axial compression did not exceed 4000 N. The maximum peak fore and aft shear did not exceed 3100 N. The vehicle's restraint system met the applicable comfort and convenience requirements.

The test vehicle was equipped with an airbag and a Type 2 seat belt in the front outboard designated seating positions. Both dummies were restrained only by the airbag during the test.

The driver's HIC was 285. The maximum peak flexion bending moment about the occipital condyle was 71.8 N-m, the maximum peak extension bending moment was 4.5 N-m, the maximum peak axial tension was 1253.4 N, the maximum peak axial compression was 1434.7 N, the maximum peak fore/aft shear was 952.0 N. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 35 g's. The driver's chest maximum deflection was 1.3 inches. The driver's left and right femur maximum compressive forces were 952 pounds and 733 pounds, respectively.

The right front passenger's HIC was 307. The maximum peak flexion bending moment about the occipital condyle was 77.1 N-m, the maximum peak extension bending moment was 19.2 N-m, the maximum peak axial tension was 600.0 N, the maximum peak axial compression was 2014.1 N, the maximum peak fore/aft shear was 1217.6 N. The right front passenger's chest

maximum resultant acceleration with three (3) milliseconds minimum duration was 40 g's. The right front passenger's chest maximum deflection was 0.5 inches. The right front passenger's left and right femur maximum compressive forces were 1184 pounds and 940 pounds, respectively.

TEST NOTES

TABLE 1 SLED TEST SUMMARY

Vehicle Yr/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

Vehicle NHTSA No.: CW0105 Test Type: Sled Test

Test Date: May 29, 1998 Time: 11:35 a.m. Temp: 71°F

Vehicle Test Weight: 3561 lbs.

Sled Velocity Change: 29.2 mph

Airbag Fire Time: 20 msec

Dummies:	Driver	Passenger
Dummy Type	<u>Part 572E</u>	<u>Part 572E</u>
Serial Number	<u>401</u>	<u>403</u>
Restraint System	<u>Airbag</u>	<u>Airbag</u>
No. of Data Channels	<u>15</u>	<u>15</u>

Number of Cameras: 1 Real Time
6 High Speed

Door Opening Data:	Left Front: <u>Opened</u>	Left Rear: <u>Opened</u>
	Right Front: <u>Opened</u>	Right Rear: <u>Opened</u>

Front Seat(s) Data:	Driver	Passenger
Seat Track Failure	<u>0 in.</u>	<u>0 in.</u>
Seat Back Failure	<u>None</u>	<u>None</u>

Visible Dummy Contact Points:	Driver	Passenger
Head	<u>Airbag, visor, headliner, headrest</u>	<u>Airbag, visor, windshield, headrest</u>
Chest	<u>Airbag</u>	<u>Airbag</u>
Left Knee	<u>Instrument panel, steering column</u>	<u>Instrument panel</u>
Right Knee	<u>Instrument panel, steering column</u>	<u>Instrument panel</u>

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No: CW0105 VIN: 1G1ND52T0WY126697 Body Color: Green

Engine: 4 Cylinders; C.I.D.; 2.4 liters; CC

X Gas; Diesel; Turbocharged

 Longitudinal; X Transverse

Transmission: 4 Speed; Manual; X Automatic; Overdrive

Final Drive: X Front Wheel; Rear Wheel; Four Wheel

Major Option: X A/C; X P/S; X P/B; P/wdo; P/door locks;

 P/seats; X Tilt Wheel; X Anti-skid Brakes; X Cruise Control

Date Received: 5/11/98; Odometer Reading: 34 miles

Dealer's Name/Address: Lynch Chevrolet-Pontiac
P.O. Box 739
Burlington, WI 53105

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Chevrolet Motor Corporation

Date of Manufacture: 9/97; VIN: 1G1ND52T0WY126697

GVWR: 3978 lbs; GAWR Front: 2224 lbs. GAWR Rear: 1754 lbs.

DATA FROM TIRE PLACARD:

Tire Pressure with maximum capacity vehicle load: Front 29 psi Rear 29 psi

Recommended Tire Size: P215/60R15

Recommended Cold Tire Pressure: Front 29 psi Rear 29 psi

Tires on Vehicle: P215/60R15; Manufacturer: Firestone

Type of Spare Tire: Spacesaver

Number of Occupants: 2 Front; 3 Rear; 3rd Seat; 5 TOTAL

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

Type of Front Seat Back: Fixed; X Adj. With; X Lever; Rot. Knob Power

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATA (Cont.)

VEHICLE CAPACITY WEIGHT (VCW) = 917 lbs.
No. Of Occupants x 150 lbs = 750 lbs.
Rated Cargo/Luggage Weight (RCWL) = 167 lbs.

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER

(WITH MAXIMUM FLUIDS) = UDW:

Right Front = 975 lbs Right Rear = 537 lbs
Left Front = 990 lbs Left Rear = 544 lbs
TOTAL FRONT WEIGHT = 1965 lbs (65 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1081 lbs (35 % of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 3046 lbs

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO WEIGHT:

Right Front = 1064 lbs Right Rear = 702 lbs
Left Front = 1070 lbs Left Rear = 725 lbs
TOTAL FRONT WEIGHT = 2134 lbs (60 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1427 lbs (40 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 3561 lbs

VEHICLE ATTITUDE:

Delivered Door Sill Angle: -0.8°
Fully Loaded Door Sill Angle: 0.3°
Test Door Sill Angle: -0.2°
Wheel Base: 107 in

Fuel System Capacity From Owner's Manual = 15.0 gallons
Usable Capacity Figure Furnished by COTR = 15.0 gallons

TABLE 3 VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

Vehicle NHTSA No.: CW0105 ; Test Date: May 29, 1998

ACCELEROMETER LOCATION (inches)				
	Description	X	Y	Z
1	Engine	22.0	0.4 L	32.5
2	Left B-Post	93.7	25.0	17.3
3	Right B-Post	93.3	25.0	17.3
4	Rear Axle	138.9	0	15.6

Reference: X = Front of Sled Carriage
Y = Centerline of Sled Carriage
Z = Top of Sled Carriage

ACCELEROMETER DATA SUMMARY					
No.	DESCRIPTION	MAXIMUM (g's)	TIME (msec)	MINIMUM (g's)	TIME (msec)
1	Engine	2.9	140	-18.7	48
2	Left B-Post	1.4	123	-19.9	72
3	Right B-Post	1.7	124	-17.7	50
4	Rear Axle	2.1	123	18.7	68

TABLE 4 REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

Contract Number: DTNH22-93-D-21089

From: MGA Research Corporation
5000 Warren Road
Burlington, WI 53105

To: Mr. Charles Case, COTR
Office of Vehicle Safety Compliance

The following vehicle has been subjected to testing for FMVSS 208. The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. The vehicle was again inspected after the above test had been conducted, and all changes were noted below. The final condition of the vehicle was also noted in detail.

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

Vehicle NHTSA No.: CW0105 Body Color: Green

VIN: 1G1ND52T0WY126697 Cost: \$17,220

Odometer: Arrival Date: 5/11/98 Reading: 34 miles

Completion Date: 5/29/98 Reading: 36 miles

Engine: 4 Cylinders; 2.4 Liters; Gas; Diesel

Transmission: 4 Speed; Manual; X Automatic

Final Drive: X Front Wheel; Rear Wheel; Four Wheel

Tire Size: P215/60R15 ; Manufacturer: Firestone

Air Conditioner	<u>Yes</u>	Console	<u>Yes</u>	Brakes	<u>Power</u>
Tinted Glass	<u>No</u>	Tachometer	<u>Yes</u>	Front	<u>Disc</u>
Power Steering	<u>Yes</u>	Cruise Control	<u>Yes</u>	Rear	<u>Drum</u>
Power Windows	<u>No</u>	Rear Window Def.	<u>Yes</u>	Front Seats	<u>Bucket</u>
Power Door Locks	<u>No</u>	Sun/Moon Roof	<u>No</u>	Seat Type	
Radio	<u>Yes</u>	T-Top	<u>No</u>	Front	<u>Adjustable</u>
Clock	<u>Yes</u>	Tilt Steering Wheel	<u>Yes</u>	Rear	<u>Non-adjustable</u>
Roof Rack	<u>No</u>	Other Options:	<u> </u>	No. of Seats	<u>5</u>

Equipment that is no longer on the vehicle as noted above: rear seats, all cargo area trim, rear speakers, rear deck lid, exhaust system, gas tank, radiator, spare tire, and jack.

Explanation:

Items removed to allow installation of data acquisition system and vehicle mounting structure.

Vehicle Condition:

The vehicle was subjected to a sled test. The engine and suspension has been fixed and have numerous beams and brackets welded to them. A steel framework is attached to the vehicle. Various interior and exterior portions of the vehicle have been painted and have had holes drilled to facilitate attachment of instrumentation. Various body parts have been removed. THE VEHICLE IS FOR SALVAGE ONLY AND IS NOT TO BE REPAIRED FOR HIGHWAY USE.

SECTION 3
SUMMARY OF RESULTS FOR FMVSS 208

TABLE 5 FMVSS 208 OCCUPANT INJURY CRITERIA

Veh. Yr./Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

Veh. NHTSA No.: CW0105 Test Date: May 29, 1998

MAXIMUM ACCELERATION VALUES: (g's)	DRIVER DUMMY #401	PASSENGER DUMMY #403
Head Channel X	-45.1	-56.9
Head Channel Y	13.0	-29.6
Head Channel Z	22.3	41.3
HEAD RESULTANT	48.9	72.1
Chest Channel X	-34.6	-36.2
Chest Channel Y	2.6	-3.6
Chest Channel Z	10.2	25.1
CHEST RESULTANT	34.9	40.9

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	285	307
t_1 = (msec)	81.7	96.8
t_2 = (msec)	117.7	114.3

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

CHEST INJURY CRITERIA (CLIP) VALUES: (g's)

CLIP	35	40
t^1 = (msec)	102.2	99.8
t^2 = (msec)	105.3	102.9
CHEST DEFLECTION (in)	1.3	0.5

TABLE 5 FMVSS 208 OCCUPANT INJURY CRITERIA (Cont.)

Veh. Yr./Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

Veh. NHTSA No.: CW0105 Test Date: May 29, 1998

MAX. COMPRESSIVE FEMUR FORCES:	DRIVER DUMMY #401	PASSENGER DUMMY #403
Left Side (lbs)	952	1184
Right Side (lbs)	733	940

NECK FORCES:

Neck Force X (N)	952.0	1217.6
Neck Force Y (N)	-179.8	526.3
Neck Force Z (N)	-1434.7	-2014.1

NECK MOMENTS:

Neck Moment X (N-m)	10.7	-19.1
Neck Moment Y (N-m)	70.8	96.8
Neck Moment Z (N-m)	-7.6	25.9

TABLE 5 FMVSS 208 OCCUPANT INJURY CRITERIA (Cont.)

NECK INJURY CRITERIA:	DRIVER DUMMY #401	PASSENGER DUMMY #403
Peak Flexion Bending Moment about the Occipital Condyle (N-m)	71.8	77.1
Peak Extension Bending Moment about the Occipital Condyle (N-m)	4.5	19.2
Peak Axial Tension (N)	1253.4	600.1
Peak Axial Compression (N)	1434.7	2014.1
Peak Fore Shear (N)	952.0	1217.6
Peak Aft Shear (N)	483.9	288.6

TABLE 6 DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel and steering column. The dummy's head impacted the airbag, visor, and headliner with the dummy's head rotating rearward. The driver dummy was restrained by the airbag. The dummy rebounded rearward into the seat back with the dummy's head contacting the head restraint. The driver dummy came to rest in the seat.

RIGHT FRONT PASSENGER DUMMY

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head impacted the airbag, visor, and windshield with the dummy's head rotating rearward. The right front passenger dummy was restrained by the airbag. The dummy rebounded rearward into the seat back with the dummy's head contacting the head restraint. The right front passenger dummy came to rest in the seat.

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

BELT CONTACT FORCE (S7.4.3)

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105 ; Technician: David Winkelbauer Date: May 20, 1998

Designated Seating Position Tested: Left Rear Outboard

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?
() Yes - go to latchplate access
(X) No - continue with this checksheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
() Check
(X) N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
() Check
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
() Check
(X) N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
() Check
(X) N/A

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 1.6 Place each adjustable head restraint in its highest adjustment position.
() Check
(X) N/A
- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
() Check
(X) N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
(X) Check
- 1.9 Fasten the seat belt latch. 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. 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. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.
Contact Force 0.2 lb. (X) 0.0 to 0.7 pounds - Pass
() greater than 0.7 pounds - FAIL*

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

BELT CONTACT FORCE (S7.4.3)

Designated Seating Position Tested: Right Rear Outboard

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?
() Yes - go to latchplate access
(X) No - continue with this checksheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
() Check
(X) N/A

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
() Check
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
() Check
(X) N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
() Check
(X) N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
() Check
(X) N/A
- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
() Check
(X) N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
(X) Check
- 1.9 Fasten the seat belt latch. 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. 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. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.
Contact Force 0.2 lb. (X) 0.0 to 0.7 pounds - Pass
() greater than 0.7 pounds - FAIL*

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

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

LATCHPLATE ACCESS (S7.4.4)

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105 ; Technician: David Winkelbauer Date: May 20, 1998

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

(X) Not Applicable

This vehicle is a passenger car which is not applicable to this requirement.

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

RETRACTION (S7.4.5):

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105 ; Technician: David Winkelbauer Date: May 20, 1998

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

(X) Not Applicable

This vehicle is a passenger car which is not applicable to this requirement.

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105 ; Technician: David Winkelbauer

Date: May 20, 1998

Designated Seating Postion Tested: Left Rear Outboard

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. 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 determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?

(X) Yes - Go to 4.2.

() No - this form is complete

- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay 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)?

(X) Yes - Pass

() No - **FAIL**

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
(X) Yes - Pass
() No - FAIL
- 4.4 The buckle and latch plate 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 unlatched. (X) Check
- (B) The seat is moved to any position to which it is designed to be adjusted. (X) Check
- (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. (X) Check
- (X) Yes - Pass
() No - FAIL
- 4.5 Is the inboard receptacle end of the seat belt assembly, 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)?
(X) Yes - Pass
() No - FAIL

Designated Seating Position Tested: Center Rear

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?

(X) Yes - Go to 4.2.

() No - this form is complete

- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay 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)?

(X) Yes - Pass

() No - **FAIL**

- 4.3 Are the remaining two seat belt parts accessible under normal conditions?

(X) Yes - Pass

() No - **FAIL**

- 4.4 The buckle and latch plate 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 unlatched. (X) Check

(B) The seat is moved to any position to which it is designed to be adjusted. (X) Check

(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position.

(X) Check

(X) Yes - Pass

() No - **FAIL**

- 4.5 Is the inboard receptacle end of the seat belt assembly, 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)?

(X) Yes - Pass

() No - **FAIL**

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

Designated Seating Position Tested: Right Rear Outboard

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. 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 determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?

(X) Yes - Go to 4.2.

() No - this form is complete

- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay 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)?

(X) Yes - Pass

() No - **FAIL**

- 4.3 Are the remaining two seat belt parts accessible under normal conditions?

(X) Yes - Pass

() No - **FAIL**

- 4.4 The buckle and latch plate 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 unlatched. (X) Check

(B) The seat is moved to any position to which it is designed to be adjusted. (X) Check

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position.

☒ Check

☒ Yes - Pass

☐ No - **FAIL**

4.5 Is the inboard receptacle end of the seat belt assembly, 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 - Pass

☐ No - **FAIL**

TABLE 8 FMVSS 208 SEAT BELT WARNING SYSTEM CHECK

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105; Technician: David Winkelbauer;

Date: May 20, 1998

Complete the following to determine which seat belt warning system option (S7.3(a)(1) or S7.3(a)(2)) is used. (Manufacturers may use either option.)

- A. With occupant in driver's position and lap belt in stowed position and ignition switch placed in "Start/On" position:
- A.1 S7.3(a)(1)
Time duration of audible warning signal = 8 seconds
(4 to 8 seconds)
Time duration of reminder light operation = 80 seconds
(no less than 60 seconds)
- A.2 S7.3(a)(2)
Time duration of audible warning signal = seconds
(4 to 8 seconds)(see 49 USCS @ 30124)
Time duration of reminder light operation = seconds
(4 to 8 seconds)
- B. With occupant in driver's position and lap belt in use and ignition switch placed in "Start/On" position:
- B.1 S7.3(a)(1)
Time duration of audible warning signal = 0 seconds
(audible warning not required)
Time duration of reminder light operation = 0 seconds
(reminder light not required)
- B.2 S7.3(a)(2)
Time duration of audible warning signal = seconds
(audible warning not required)
Time duration of reminder light operation = seconds
(4 to 8 seconds)
- C. Note wording of visual warning: ()Fasten seat belt ()Fasten Belt
(X)Symbol 101

TABLE 9 FMVSS 208 READINESS INDICATOR (S4.5.2)

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105; Technician: David Winkelbauer; Date: May 20, 1998

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.

(11/8/94 legal interpretation)

1. Is the system totally mechanical? ☐ Yes ☒ No

(If YES this Data Sheet is complete.)

2. Describe the location of the readiness indicator: Right side of instrument cluster
-

3. Is the readiness indicator clearly visible to the driver?

☒ Yes-Pass ☐ No-FAIL

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

☒ Yes-Pass ☐ No-FAIL

TABLE 10 FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTS

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105 ; Technician: David Winkelbauer ; Date: May 20, 1998

1. Do all rear outboard seating positions have type 2 seat belts?

(X)Yes

()No

If NO, describe the seat belt installed, the seat location, and any other information about the seat that would explain why a type 2 belt was not installed.

TABLE 11 LAP BELT LOCKABILITY

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing **and** that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105; Technician: David Winkelbauer; Date: May 20, 1998

Designated Seating Position Tested: Right Front Outboard

1. Record the seating position. Mid-Position
(Any position is acceptable.)
2. Buckle the seat belt.
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature.
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle.
(X)Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing.
(X)Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
(X)Yes, go to 6.1 () No, go to 7.
 - 6.1 If yes, does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system.
(X)Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle.

TABLE 11 LAP BELT LOCKABILITY (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly.
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system.
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly.
Measured distance between A and B is 41 inches.
11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing.
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal.
The measured force application angle = 10 degrees.

WEBBING TENSION PULL DEVICE

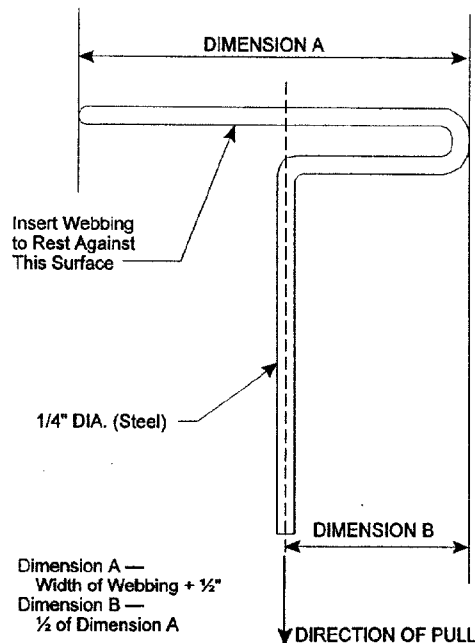


TABLE 11 LAP BELT LOCKABILITY (Cont.)

13. The length between points A and B along the longitudinal centerline of the webbing while the preload is being applied.
Measured distance between A and B is 25 inches.
14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing.
Record onset rate: 20 lb/sec.
Record the distance between points A and B: 25.3 inches
15. Subtract the measurement in 14 from the measurement in 13. Is the difference 2 inches or less? $14-13 = \underline{0.3 \text{ inches}}$ (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 10 from the measurement in 14. Is the difference 3 inches or more? $10-14 = \underline{15.7 \text{ inches}}$ (X)Yes-Pass () No-FAIL

TABLE 11 LAP BELT LOCKABILITY (Cont.)

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105; Technician: David Winkelbauer; Date: May 20, 1998

Designated Seating Position Tested: Left Rear Outboard

1. Record the seating position. Non-adjustable
(Any position is acceptable.)
2. Buckle the seat belt.
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature.
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle.
(X) Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing.
(X) Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
(X) Yes, go to 6.1 () No, go to 7.
 - 6.1 If yes, does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system.
(X) Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle.

TABLE 11 LAP BELT LOCKABILITY (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly.
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system.
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly.
Measured distance between A and B is 39 inches.
11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing.
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal.
The measured force application angle = 12 degrees.

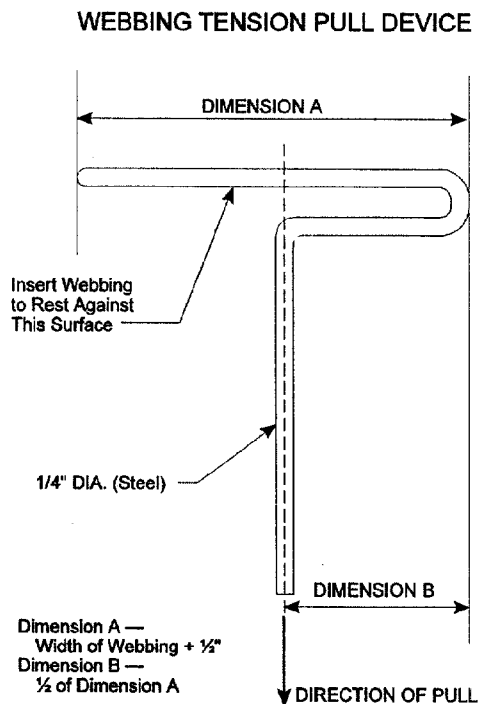


TABLE 11 LAP BELT LOCKABILITY (Cont.)

13. The length between points A and B along the longitudinal centerline of the webbing while the preload is being applied.
Measured distance between A and B is 21 inches.
14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing.
Record onset rate: 25 lb/sec.
Record the distance between points A and B: 21.3 inches
15. Subtract the measurement in 14 from the measurement in 13. Is the difference 2 inches or less? $14-13 = \underline{0.3 \text{ inches}}$ (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 10 from the measurement in 14. Is the difference 3 inches or more? $10-14 = \underline{17.7 \text{ inches}}$ (X)Yes-Pass () No-FAIL

TABLE 11 LAP BELT LOCKABILITY (Cont.)

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105; Technician: David Winkelbauer;

Date: May 20, 1998

Designated Seating Position Tested: Center Rear

1. Record the seating position. Non-Adjustable
(Any position is acceptable.)
2. Buckle the seat belt.
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature.
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle.
(X)Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing.
(X)Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing? (X)Yes, go to 6.1 () No, go to 7.
 - 6.1 If yes, does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system.
(X)Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle.

TABLE 11 LAP BELT LOCKABILITY (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly.
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system.
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly.
Measured distance between A and B is 30 inches.
11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing.
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal.
The measured force application angle = 10 degrees.

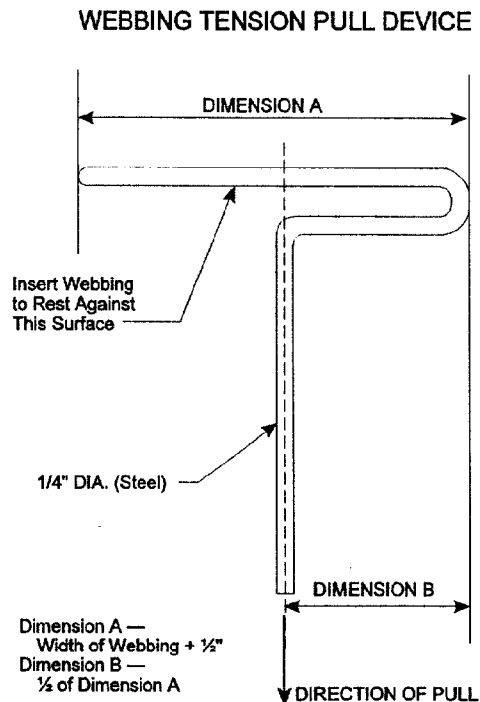


TABLE 11 LAP BELT LOCKABILITY (Cont.)

13. The length between points A and B along the longitudinal centerline of the webbing while the preload is being applied.
Measured distance between A and B is 24.5 inches.
14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing.
Record onset rate: 20 lb/sec.
Record the distance between points A and B: 25 inches
15. Subtract the measurement in 14 from the measurement in 13. Is the difference 2 inches or less? 14-13 = 0.5 inches (X) Yes-Pass () No-**FAIL**
16. Subtract the measurement in 10 from the measurement in 14. Is the difference 3 inches or more? 10-14 = 5.0 inches (X) Yes-Pass () No-**FAIL**

TABLE 11 LAP BELT LOCKABILITY (Cont.)

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105; Technician: David Winkelbauer; Date: May 20, 1998

Designated Seating Position Tested: Right Rear Outboard

1. Record the seating position. Non-Adjustable
(Any position is acceptable.)
2. Buckle the seat belt.
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature.
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle.
(X) Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing.
(X) Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing? (X) Yes, go to 6.1 () No, go to 7.
 - 6.1 If yes, does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system.
(X) Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle.

TABLE 11 LAP BELT LOCKABILITY (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly.
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system.
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly.
Measured distance between A and B is 37.5 inches.
11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing.
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal.
The measured force application angle = 10 degrees.

WEBBING TENSION PULL DEVICE

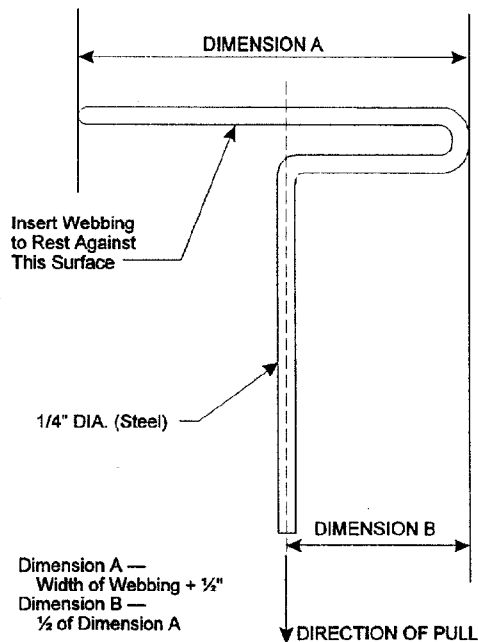


TABLE 11 LAP BELT LOCKABILITY (Cont.)

13. The length between points A and B along the longitudinal centerline of the webbing while the preload is being applied.
Measured distance between A and B is 18.5 inches.
14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing.
Record onset rate: 15 lb/sec.
Record the distance between points A and B: 18.75 inches
15. Subtract the measurement in 14 from the measurement in 13. Is the difference 2 inches or less? 14-13 = 0.25 inches (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 10 from the measurement in 14. Is the difference 3 inches or more? 10-14 = 18.75 inches (X)Yes-Pass () No-FAIL

TABLE 12 AIR BAG LABELS

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

NHTSA No.: CW0105 ; Technician: David Winkelbauer ; Date: May 20, 1998

1. Air bag maintenance label and owner's manual instructions:
 - 1.1. Does the manufacturer recommend periodic maintenance or replacement of the airbag? ☐ Yes, go to 1.2 ☒ No, go to 2
 - 1.2. Does the vehicle have a maintenance or replacement label? ☐ Yes-Pass ☐ No-FAIL
 - 1.3. Does the label contain one of the following?
☐ Yes-Pass ☐ No-FAIL
☐ Schedule on label specifies month and year
☐ Schedule on label specifies vehicle mileage
☐ Schedule on label specifies interval measured from date on certification label
 - 1.4. Is the label permanently affixed within the passenger compartment? ☐ Yes-Pass ☐ No-FAIL
 - 1.5. Is the label lettered in English? ☐ Yes-Pass ☐ No-FAIL
 - 1.6. Is the label in block capitals and numerals? ☐ Yes-Pass ☐ No-FAIL
 - 1.7. Are the letters and numerals at least 3/32 inches high? ☐ Yes-Pass ☐ No-FAIL
 - 1.8. Does the owner's manual set forth the recommended schedule for maintenance or replacement? ☐ Yes-Pass ☐ No-FAIL
2. Does the owner's manual:
 - 2.1. Include a description of the vehicle's airbag system in an easily understandable format? ☒ Yes-Pass ☐ No-FAIL
 - 2.2. Include a statement that the vehicle is equipped with an airbag and a lap/shoulder belt at the front outboard seating positions? ☒ Yes-Pass ☐ No-FAIL

TABLE 12 AIR BAG LABELS (Cont.)

- 2.3 Include a statement that the air bag is a supplemental restraint at the front outboard seating positions?
(X)Yes-Pass () No-FAIL
- 2.4 Emphasize that all occupants, including the driver, should always wear their seat belts whether or not an airbag is also provided at their seating positions to minimize the risk of severe injury or death in the event of a crash?
(X)Yes-Pass () No-FAIL
- 2.5 Provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to insure maximum safety protection for those occupants?
(X)Yes-Pass () No-FAIL
- 2.6 Explain that no objects should be placed over or near the air bag on the steering wheel or on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate?
(X)Yes-Pass () No-FAIL
3. Does the vehicle:
- 3.1. Provide an automatic means to ensure that the airbag does not deploy when a child seat or child with a total mass of 30 kg or less is present on the front outboard passenger? ()Yes (X) No
- 3.2. Incorporate sensors, other than or in addition to weight sensors, which automatically prevent the passenger air bag from deploying in situations in which is might have an adverse effect on infants in rear-facing child seats, and unbelted or improperly belted children? ()Yes (X) No
- 3.3. have a passenger air bag designed to deploy in a manner that does not create a risk of serious injury to infants in rear-facing child seats, and unbelted or improperly belted children? ()Yes (X) No

TABLE 12 AIR BAG LABELS (Cont.)

If yes to 3.1, or 3.2, or 3.3, the vehicle is not required to have a sunvisor warning label, an airbag alert label or a label on the dash and this check sheet is complete. If no to 3.1, 3.2, and 3.3, go to 4.

4. Sun Visor Warning Label

- 4.1. Is the label permanently affixed (may be permanent marking or molding) to either side of the sunvisor at each front outboard seating position with an airbag?

Driver Side - ☒ Yes-Pass ☐ No-FAIL

Passenger Side - ☒ Yes-Pass ☐ No-FAIL

- 4.2. Does the label conform in content (vehicles without back seats may omit the statement: "The back seat is the safest place for children.") to either label shown on the next page as appropriate at each front outboard seating position with an air bag?

- 4.2.1 **Dual air bags:** ☐ Not Applicable

Driver Side - ☒ Yes ☐ No-FAIL

Passenger Side - ☒ Yes ☐ No-FAIL

- 4.2.2 **Vehicle with driver air bag ONLY - either 4.2.2.1 or 4.2.2.2 is applicable, not both.**

- 4.2.2.1 Does the label conform in content to either label shown on the following page as appropriate?

☒ Not Applicable

Driver Side - ☐ Yes-Pass ☐ No-FAIL

- 4.2.2.2 Does the label conform in content to the first label shown on the following page where the label can be modified to omit the pictogram and the message text may read:

TABLE 12 AIR BAG LABELS (Cont.)

DEATH or SERIOUS INJURY can occur.

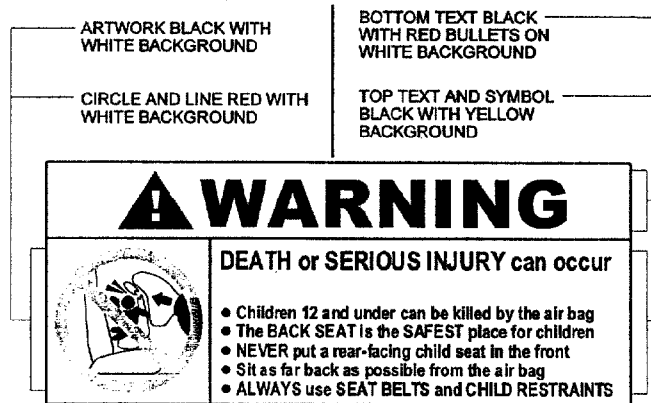
- Sit as far back as possible from the air bag.
- ALWAYS use SEAT BELTS and CHILD RESTRAINTS
- The BACK SEAT is the SAFEST place for children.

(X) Not Applicable

Driver Side - () Yes-Pass () No-FAIL

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK



SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

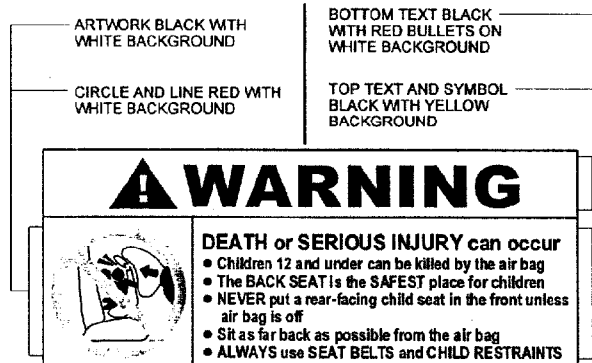


TABLE 12 AIR BAG LABELS (Cont.)

- 4.3 Is the label heading area yellow with the word "warning" and the alert symbol in black?
 Driver Side - (X)Yes-Pass () **No-FAIL**
 Passenger Side - (X)Yes-Pass () **No-FAIL**
- 4.4 Is the message white with black text?
 Driver Side - (X)Yes-Pass () **No-FAIL**
 Passenger Side - (X)Yes-Pass () **No-FAIL**
- 4.5 Is the message area at least 30 cm²? Actual message area: 50 cm²
 Driver Side - (X)Yes-Pass () **No-FAIL**
 Passenger Side - (X)Yes-Pass () **No-FAIL**
- 4.6 Is the pictogram black with a red circle and slash on a white background?
 For vehicles with driver side air bag ONLY () Not Applicable
 Driver Side - (X)Yes-Pass () **No-FAIL**
 Passenger Side - (X)Yes-Pass () **No-FAIL**
- 4.7 Is the pictogram at least 30 mm in diameter? Actual diameter: 32 mm
 For vehicles with driver side air bag ONLY () Not Applicable
 Driver Side - (X)Yes-Pass () **No-FAIL**
 Passenger Side - (X)Yes-Pass () **No-FAIL**
- 4.8 Is the same side of the sun visor to which the sun visor label is affixed free of other information with the exception of an air bag maintenance label?
 Driver Side - (X)Yes-Pass () **No-FAIL**
 Passenger Side - (X)Yes-Pass () **No-FAIL**
- 4.9 Is the sun visor free of other information about air bags or the need to wear seat belts with the exception of the air bag alert label or the utility vehicle label?
 Driver Side - (X)Yes-Pass () **No-FAIL**
 Passenger Side - (X)Yes-Pass () **No-FAIL**

TABLE 12 AIR BAG LABELS (Cont.)

5. Air Bag Alert Label

5.1 Is the Sun Visor Warning Label visible when the sunvisor is in the stowed position?

Driver Side - ☒ Yes, go to 6 ☐ No

Passenger Side - ☐ No air bag ☐ Yes ☐ No

5.2 Does the label conform in content to the label shown below?

Driver Side - ☐ Yes ☐ No-FAIL

Passenger Side - ☐ No air bag ☐ Yes-Pass ☐ No-FAIL

5.3 Is the message area black with yellow text?

Driver Side - ☐ Yes-Pass ☐ No-FAIL

Passenger Side - ☐ No air bag ☐ Yes-Pass ☐ No-FAIL

5.4 Is the message area at least 20 cm²? Actual message area: _____ cm²

Driver Side - ☐ Yes-Pass ☐ No-FAIL

Passenger Side - ☐ No air bag ☐ Yes-Pass ☐ No-FAIL

5.5 Is the pictogram black with a red circle and slash on a white background?

For vehicles with driver side air bag ONLY ☐ Not Applicable

☐ Yes-Pass ☐ No-FAIL

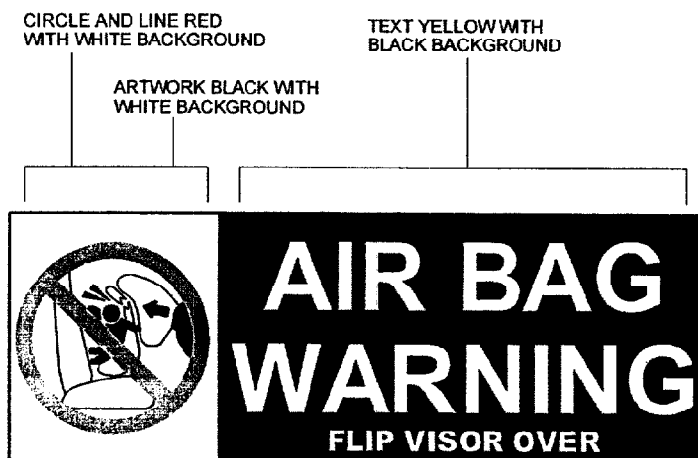
TABLE 12 AIR BAG LABELS (Cont.)

5.6 Is the pictogram at least 20 mm in diameter? Actual diameter _____ mm

For vehicles with driver side air bag ONLY () Not Applicable

() Yes-Pass () **No-FAIL**

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN UP POSITION



6. Label On the Dash

6.1 Does the vehicle have a passenger side air bag?

(X) Yes () No, check sheet is complete.

6.2 Does the vehicle have a label on the dash or steering wheel hub?

(X) Yes-Pass () **No-FAIL**

6.3 Does the label conform in content (vehicles without back seats may omit the statement: "The back seat is the safest place for children 12 and under." to the label shown below. (X) Yes-Pass () **No-FAIL**

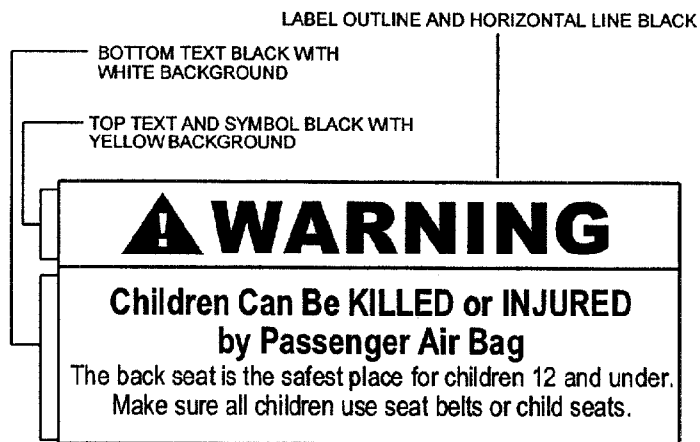
6.4 Is the heading area yellow with the word "warning" and the alert symbol in black?

(X) Yes-Pass () **No-FAIL**

TABLE 12 AIR BAG LABELS (Cont.)

- 6.5 Is the message white with black text? (X)Yes-Pass () No-**FAIL**
- 6.6 Is the message area at least 30 cm²? Actual message area: 45 cm²
(X)Yes-Pass () No-**FAIL**

REMOVABLE LABEL ON DASH



SECTION 4
OCCUPANT, VEHICLE, AND CAMERA INFORMATION

TABLE 13 SEAT AND STEERING COLUMN POSITIONING DATA

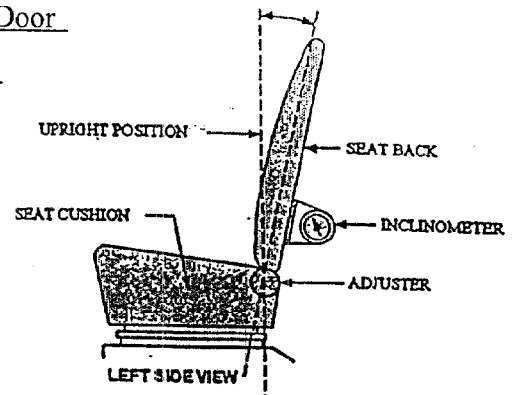
Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

Vehicle NHTSA No.: CW0105 Test Date: May 29, 1998

NOMINAL DESIGN RIDING POSITION:

Driver Seat: Seat Back Angle = 26.2°

Passenger Seat: Seat Back Angle = 25.3°



SEAT FORE AND AFT POSITIONS:

Driver Seat: The seat track had a total position movement of 25 notches and was positioned 13 notches rearward from the foremost position with the forward most locking position as zero.

Passenger Seat: The seat track had a total position movement of 25 notches and was positioned 13 notches rearward from the foremost position with the forward most locking position as zero.

STEERING COLUMN ADJUSTMENTS:

The steering column was placed in the third position out of five total.

FIGURE 1 DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS

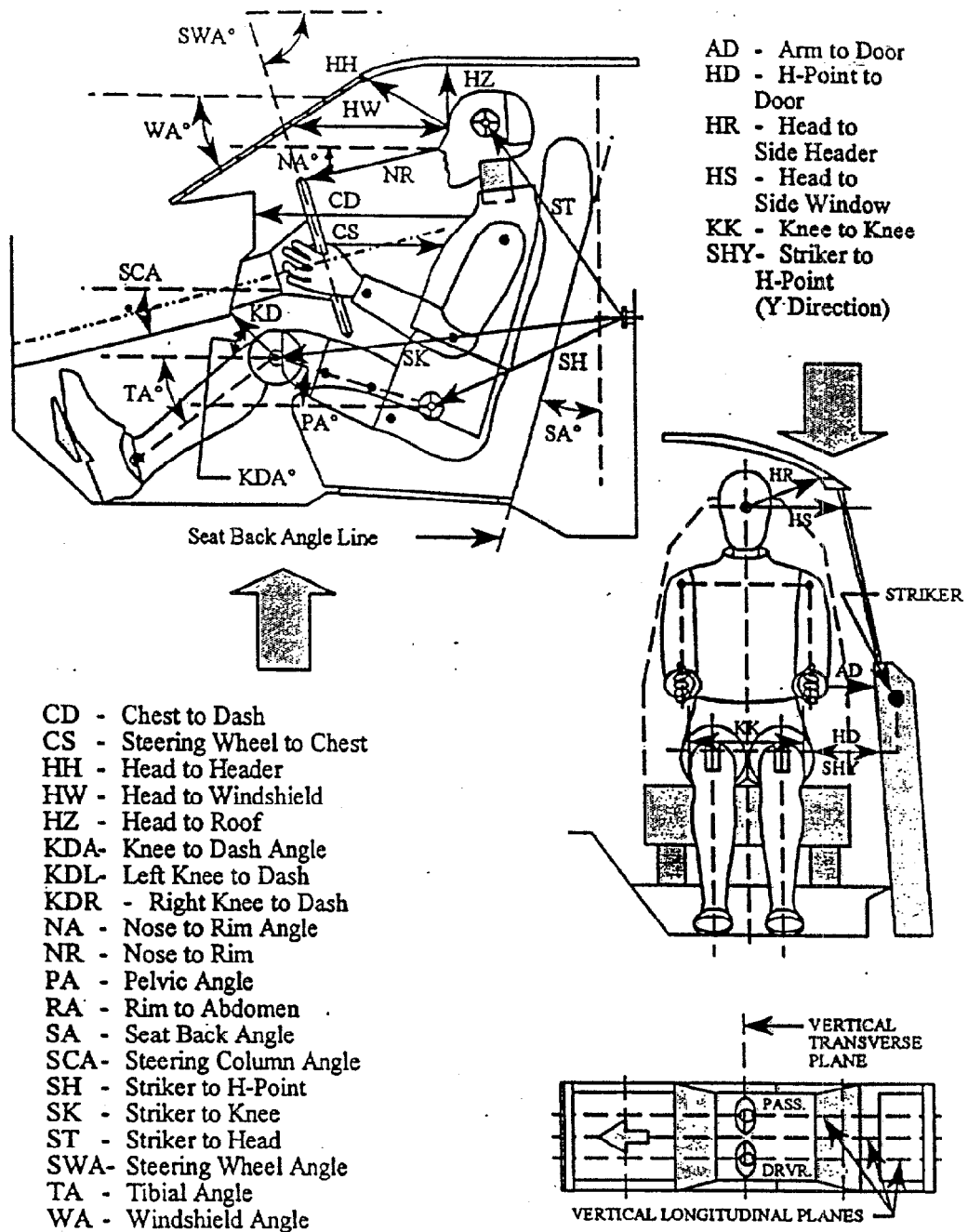


TABLE 14 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

Vehicle Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

Vehicle NHTSA No.: CW0105 Test Date: May 29, 1998

	DRIVER (Serial #401)	PASSENGER (Serial #403)
WA°	28.0°	
SWA°	73.4°	N/A
SCA°	18.8°	N/A
SA°	26.2°	25.3°
HZ	6.8	6.7
HH	13.2	13.4
HW	22.3	22.2
HR	9.3	8.6
NR	15.5 Angle (NA) 13.9°	N/A
CD	21.2	21.4
CS	13.4	N/A
RA	6.2	N/A
KDL	5.8 Angle (KDA) 31.9°	5.4
KDR	6.1	6.5 Angle (KDA) 28.7°
PA°	22.0°	24.0°
TA°	45.3	37.4
KK	10.7	11.3
ST	23.2 Angle 8.2°	22.9 Angle 7.7°
SK	24.2 Angle 85.7°	23.8 Angle 90.8 °
SH	9.1 Angle 107.9°	8.7 Angle 111.7°
SHY	10.7	10.4
HS	12.0	11.8
HD	5.2	5.3
AD	4.1	4.4

FIGURE 2 VEHICLE TARGET LOCATIONS

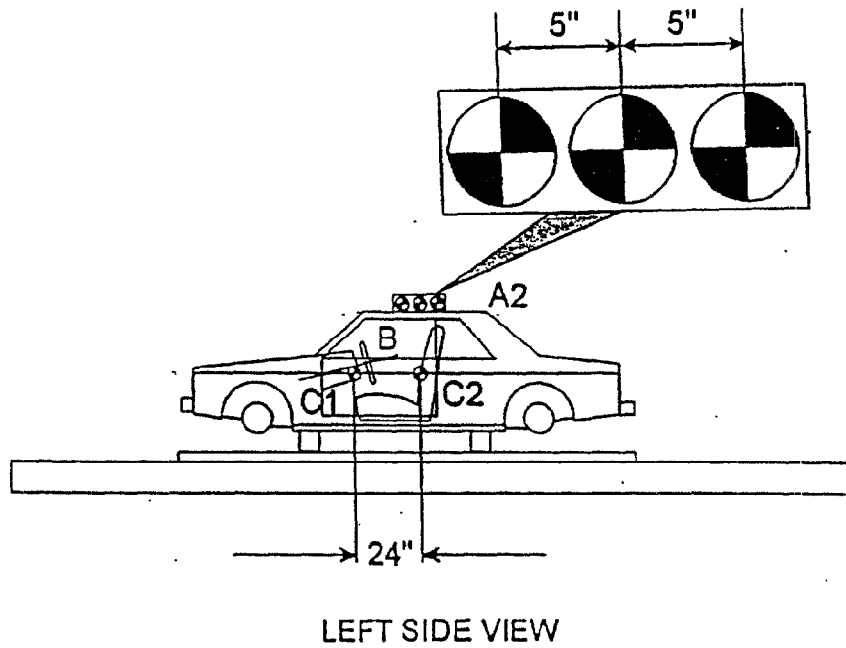
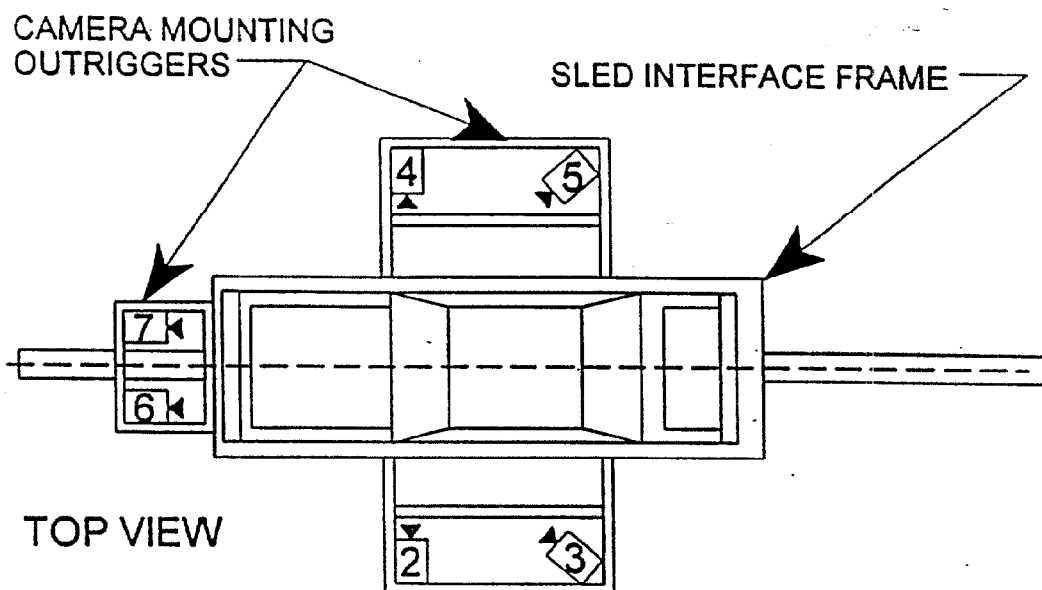


FIGURE 3 CAMERA POSITIONS



CAMERA FRAME RATES:

#1 = 24 fps

All Others = 1,000 fps



REAL TIME CAMERA

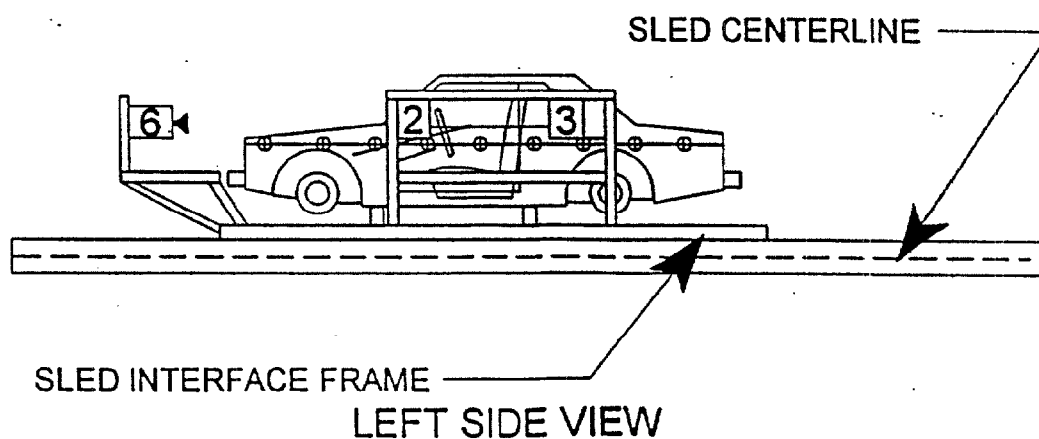


TABLE 15 CAMERA LOCATIONS

Veh. Year/Make/Model/Body Style: 1998/Chevrolet/Malibu/4 Door

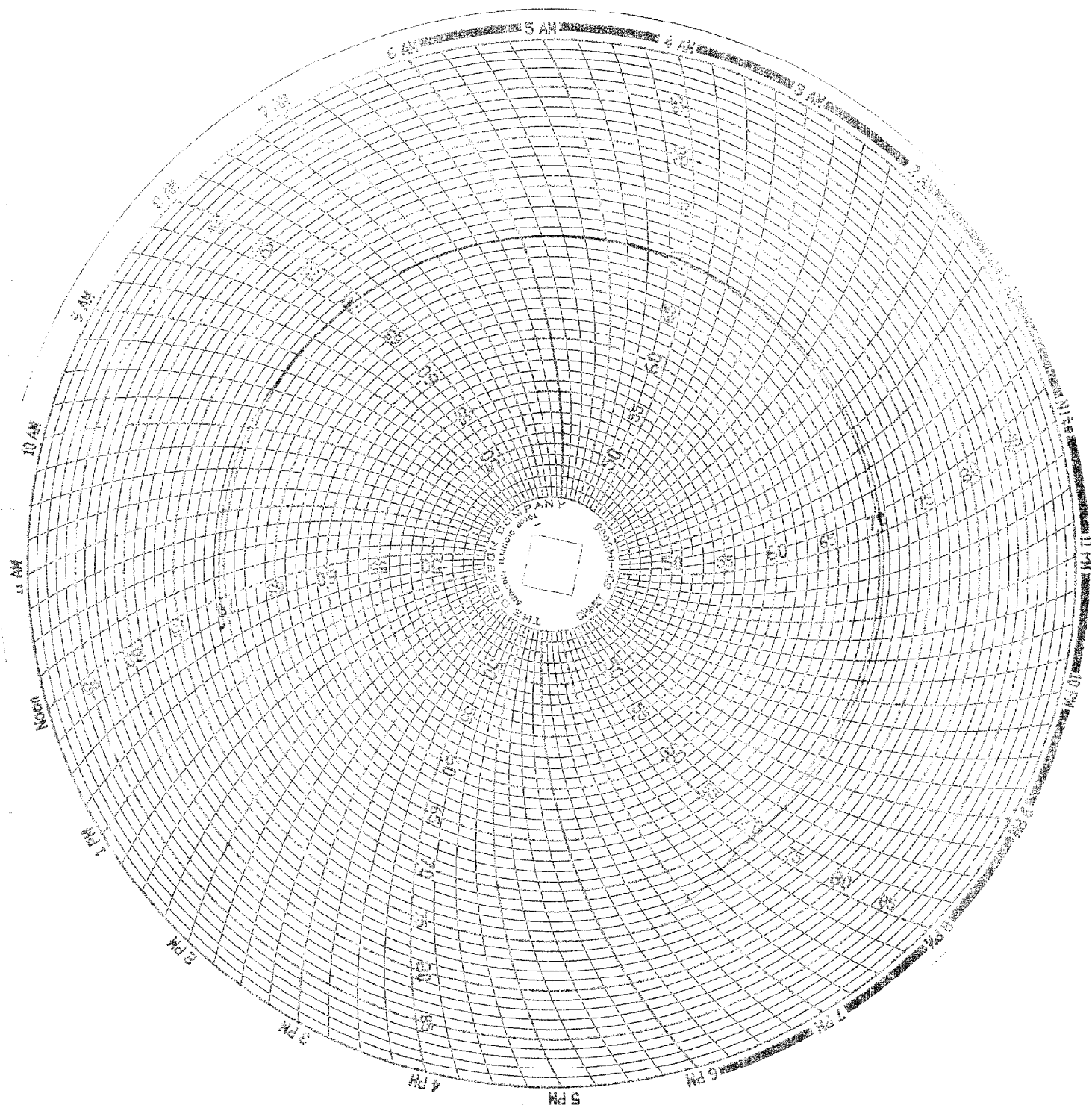
Vehicle NHTSA No.: CW0105 ; Test Date: May 29, 1998

	VIEW	CAMERA POSITIONS (inches)*			ANGLE (deg)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time (Pre and Post)					10	24
2	Onboard Driver	75.0	89.0	37.6	90	13	1075
3	Onboard Driver Angle	143.3	92.1	46.9		13	NR
4	Onboard Passenger	76.1	89.8	42.3	90	13	1053
5	Onboard Passenger Angle	147.0	92.1	47.6		13	1064
6	Onboard Windshield Driver	24.0	13.4	42.1		13	1064
7	Onboard Windshield Passenger	22.6	14.6	42.5		13	1064

NR = Did Not Run

- * +X = Rearward of the front of the sled carriage
 +Y = Right of the sled carriage longitudinal centerline
 +Z = Above the top of the sled carriage

FIGURE 4 AIR PROBE TEMPERATURE



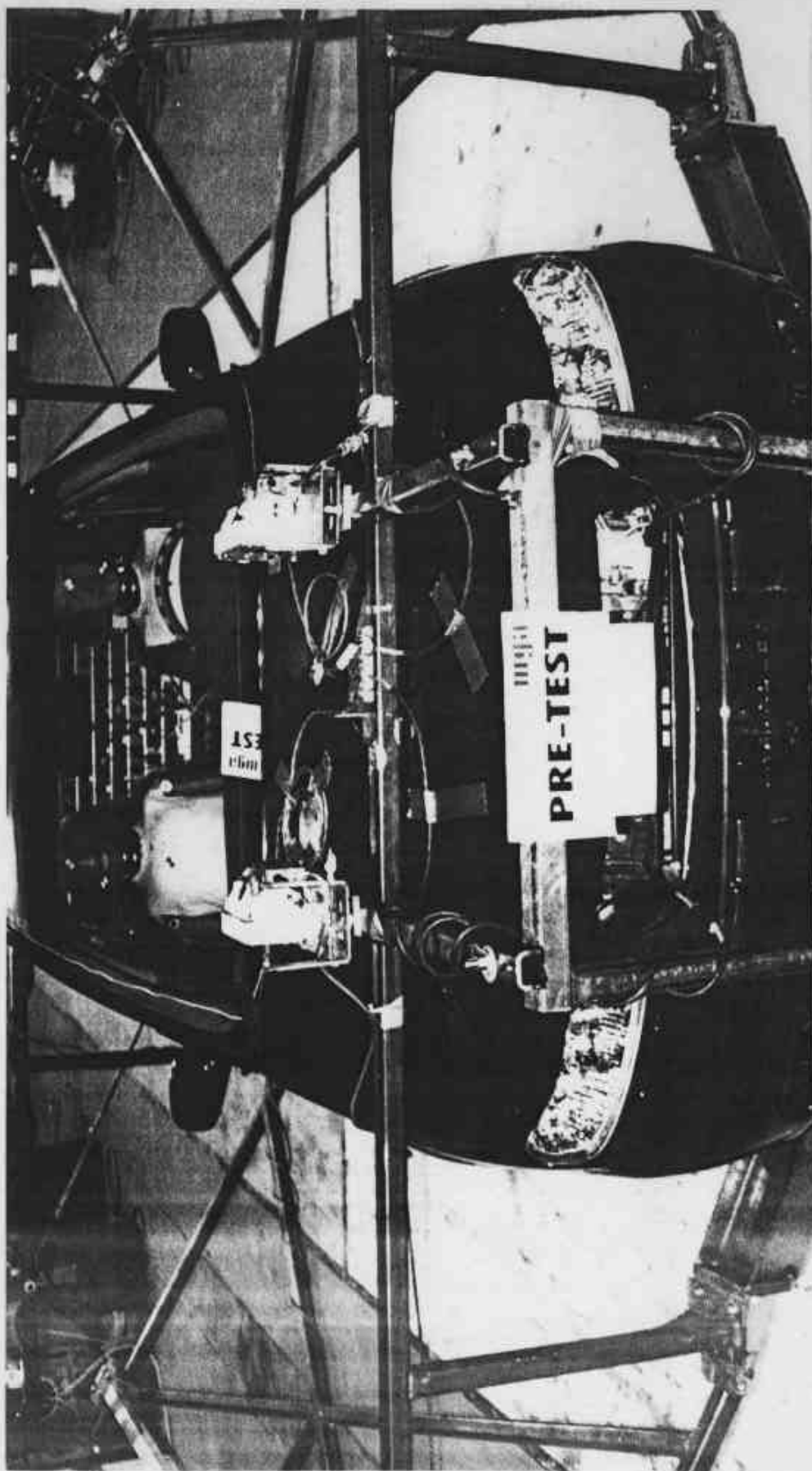
APPENDIX A
PHOTOGRAPHS

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A-1

Photo No. A-1 - Pre-Test Front View

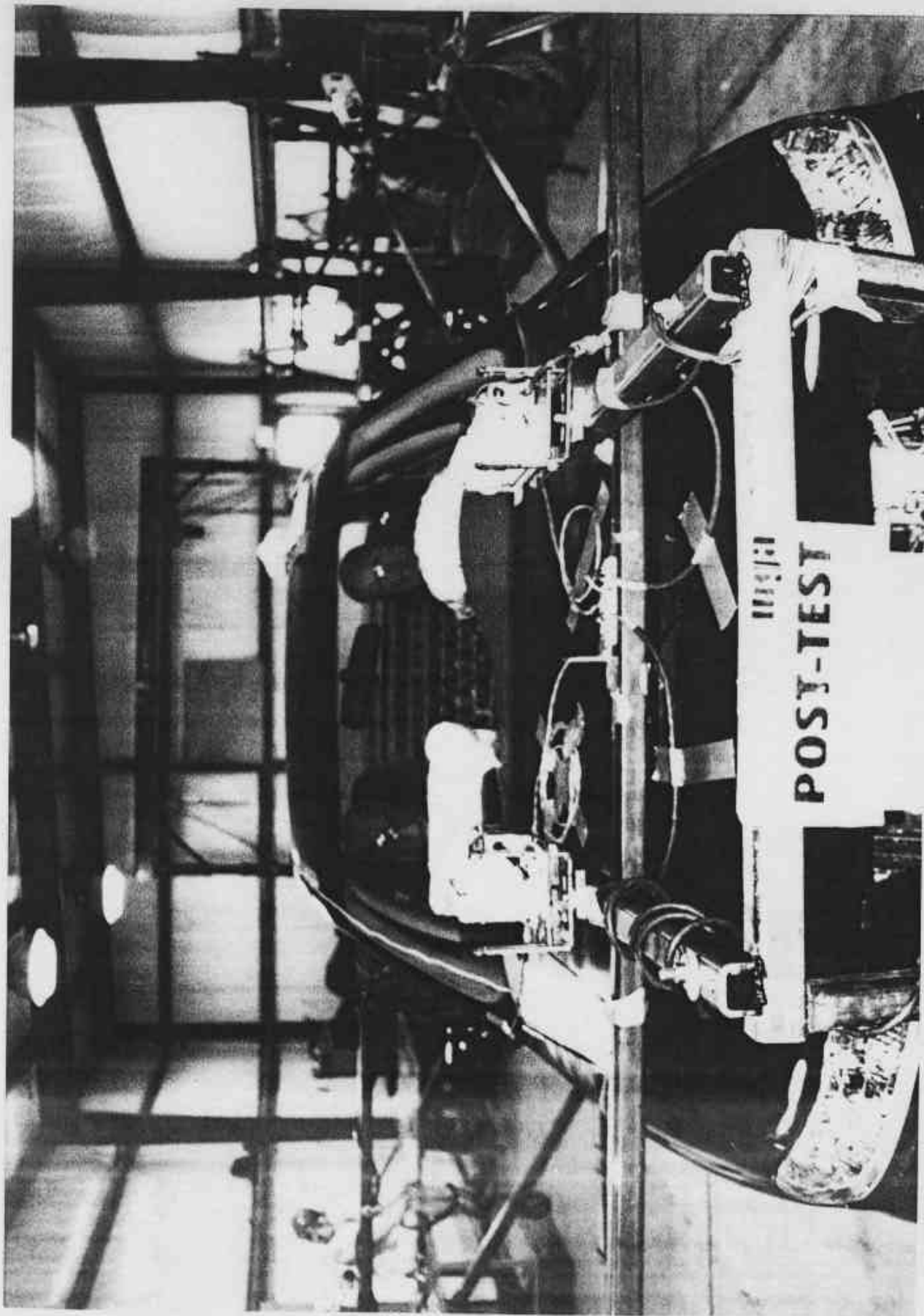


Photo No. A-2 - Post-Test Front View

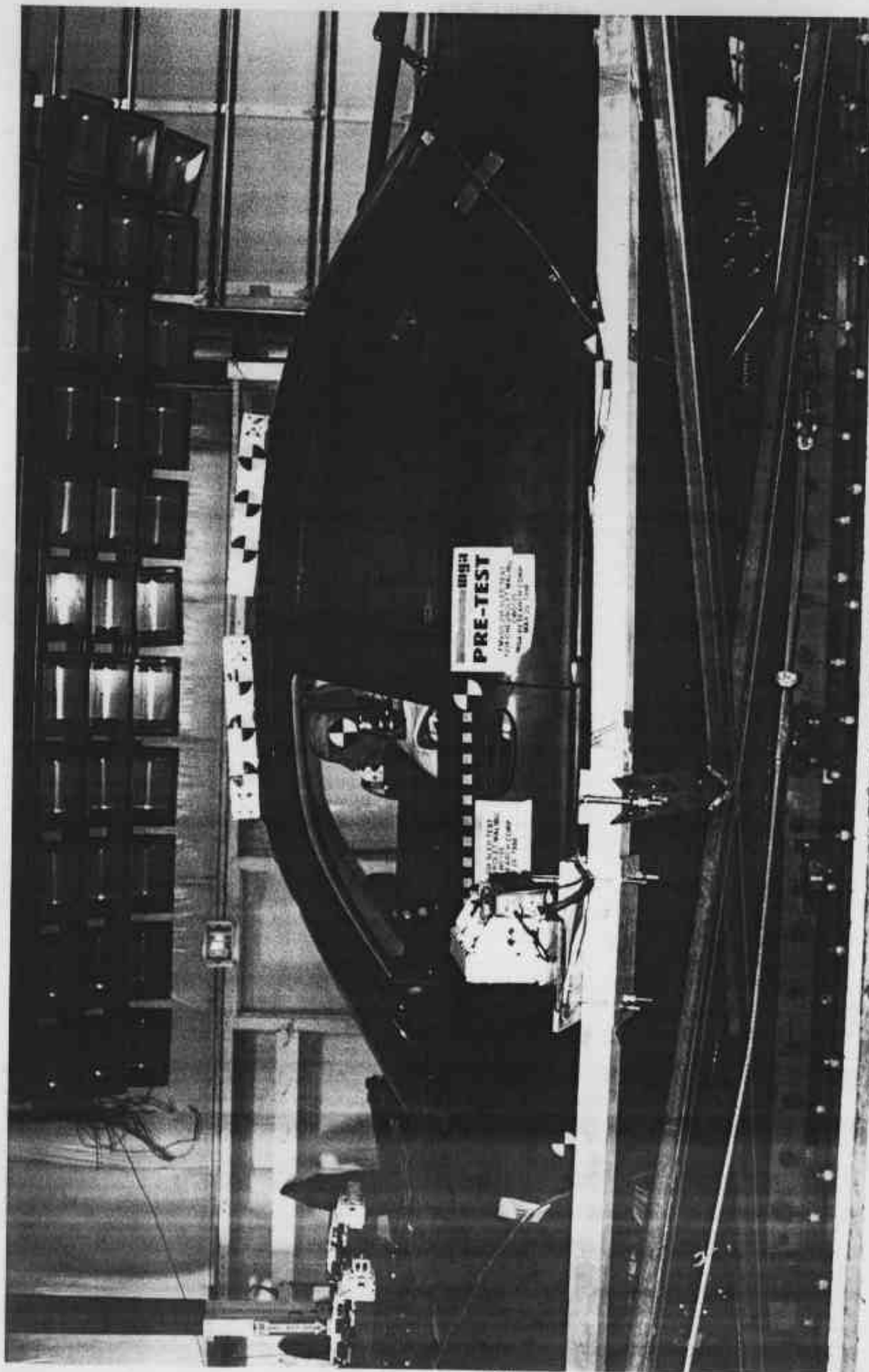


Photo No. A-3 - Pre-Test Left Side View

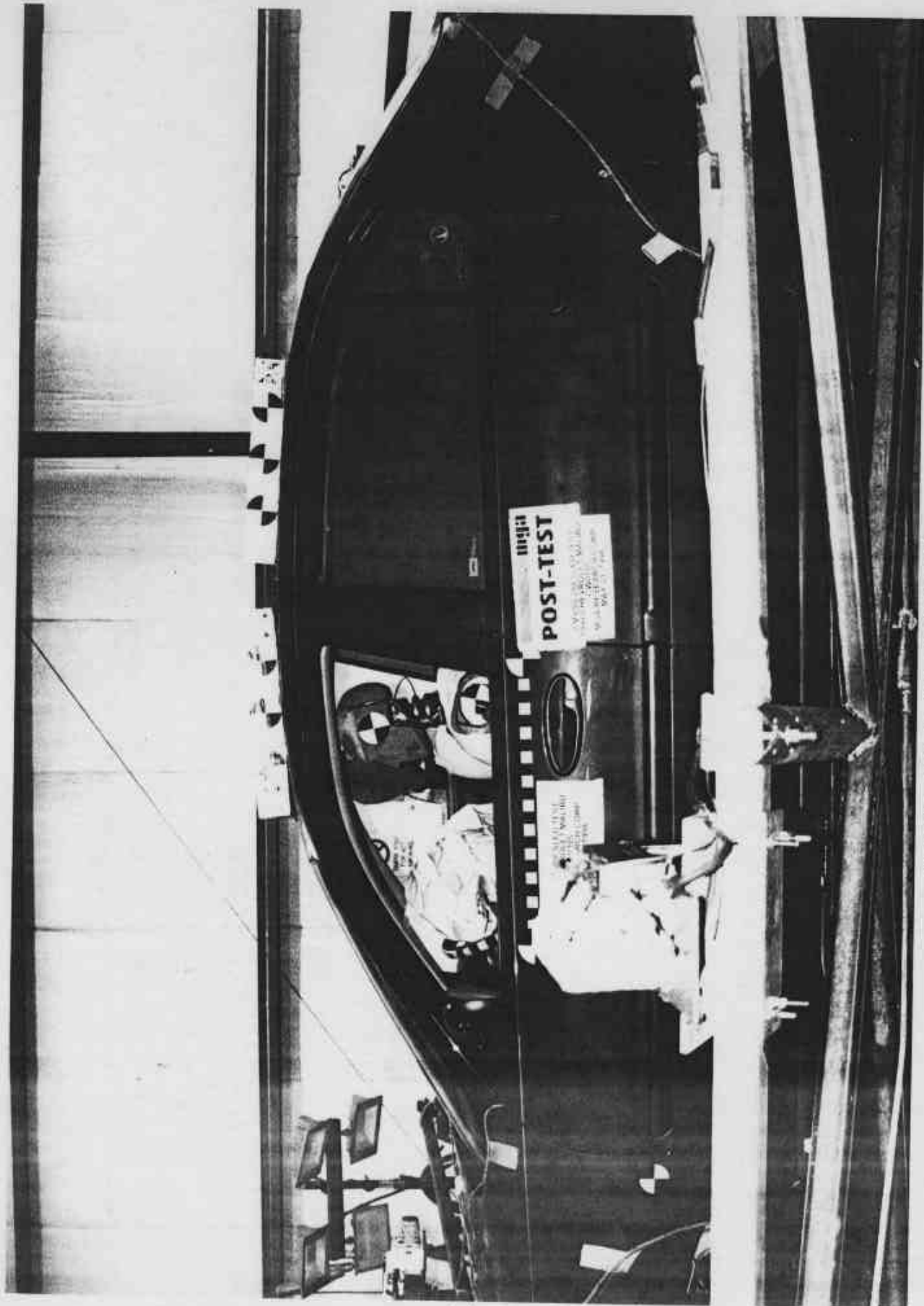
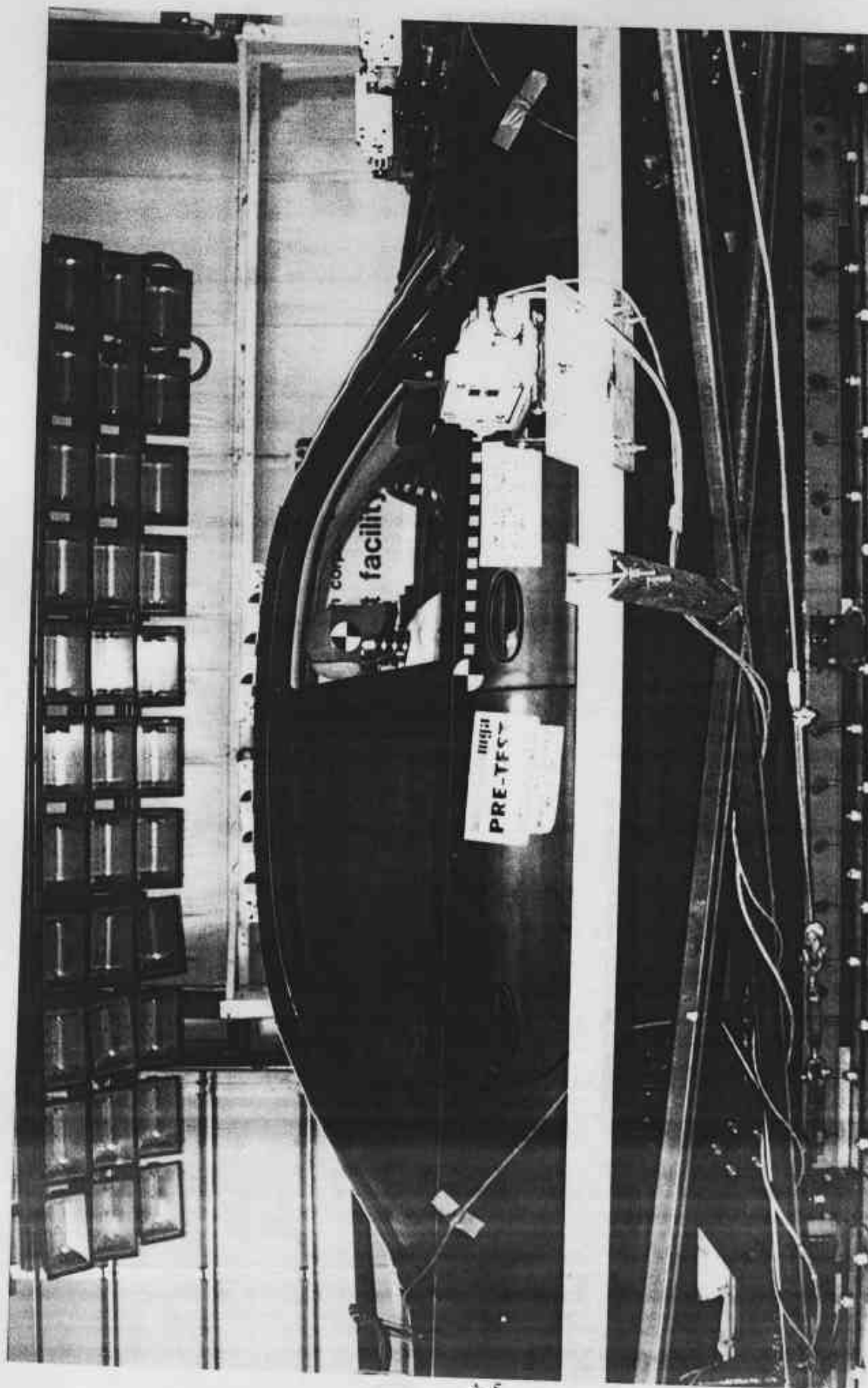


Photo No. A-4 - Post-Test Left Side View



A-5

Photo No. A-5 - Pre-Test Right Side View

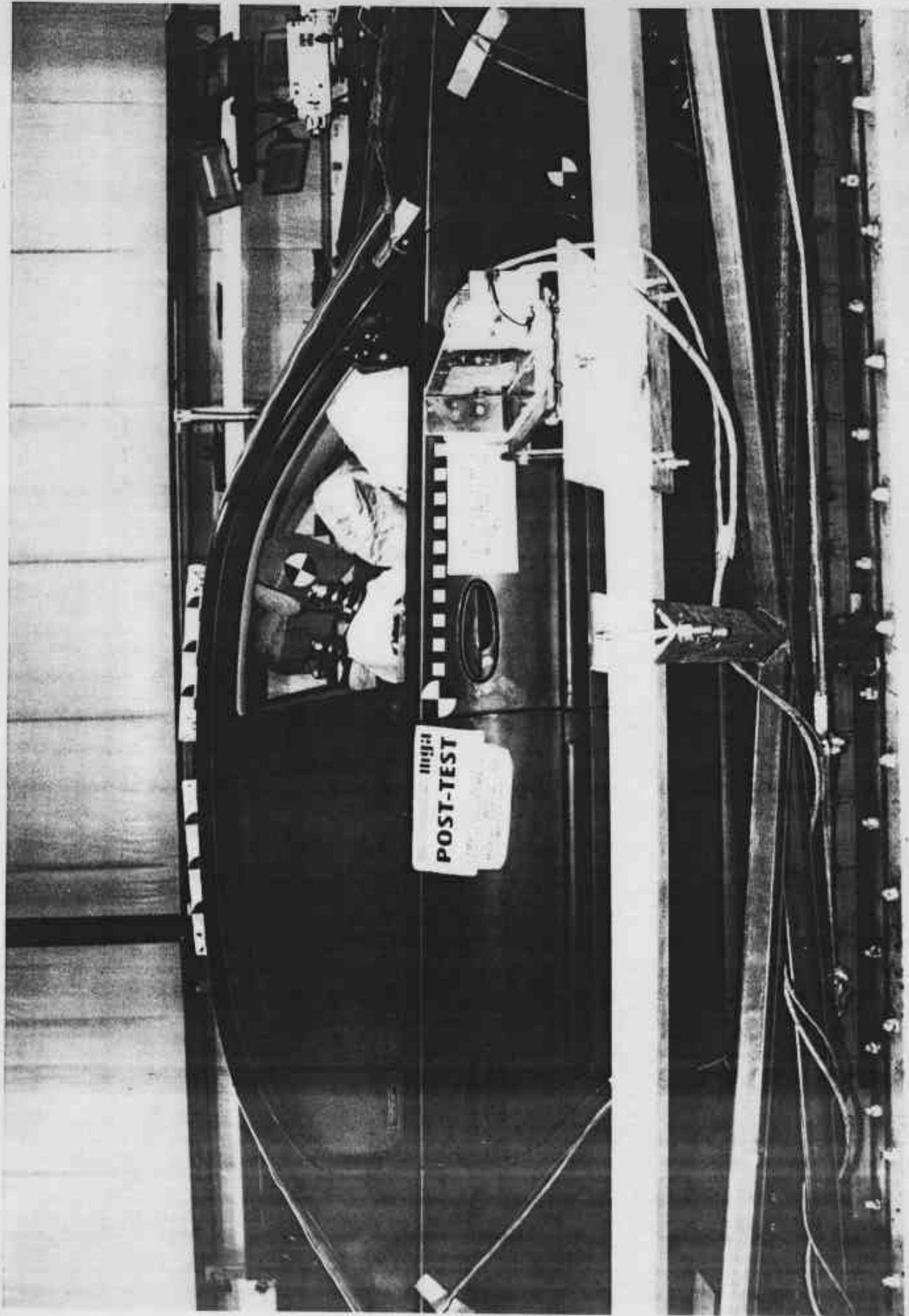


Photo No. A-6 - Post-Test Right Side View

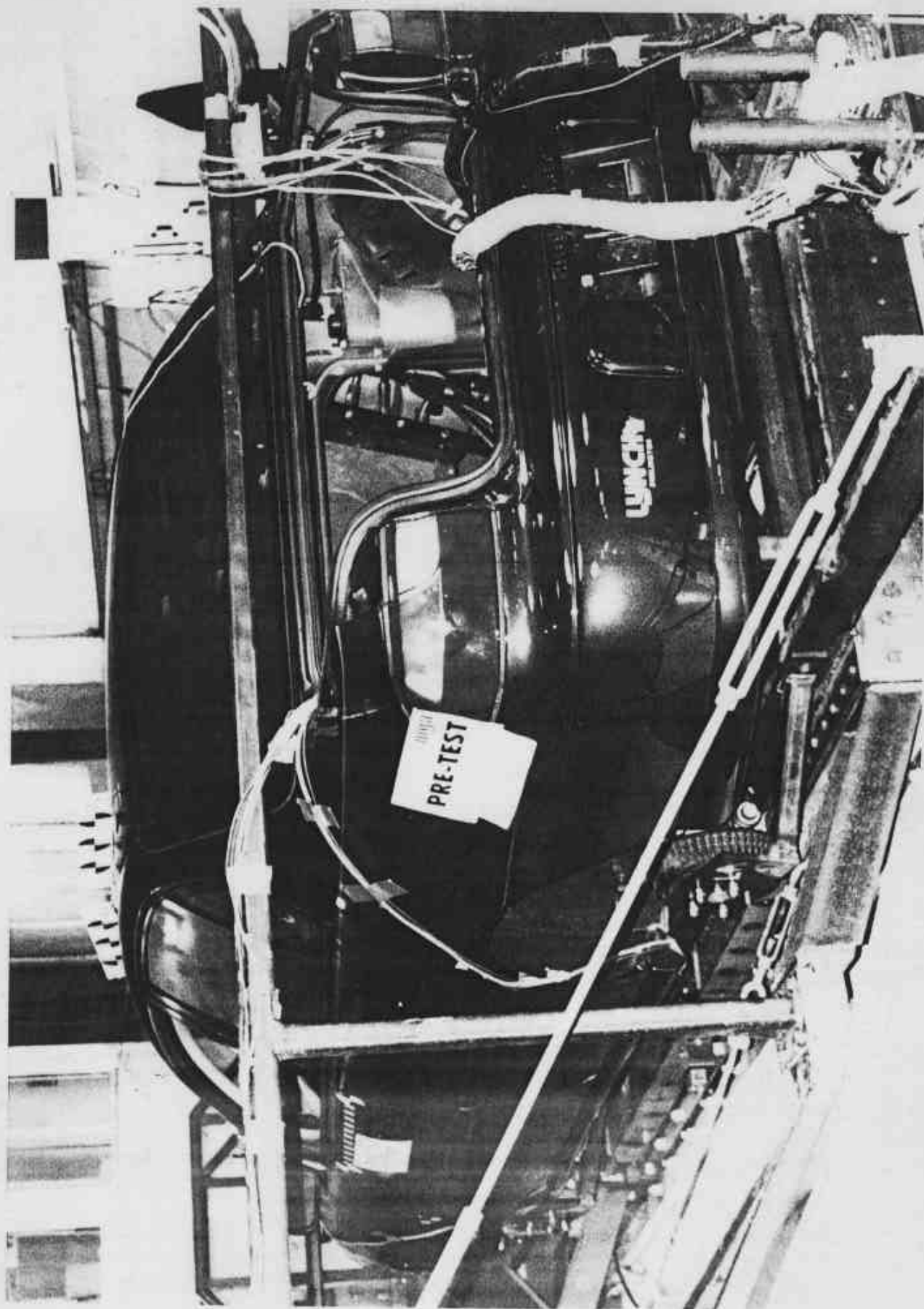


Photo No. A-7 - Pre-Test 3/4 Left Rear View

A-7

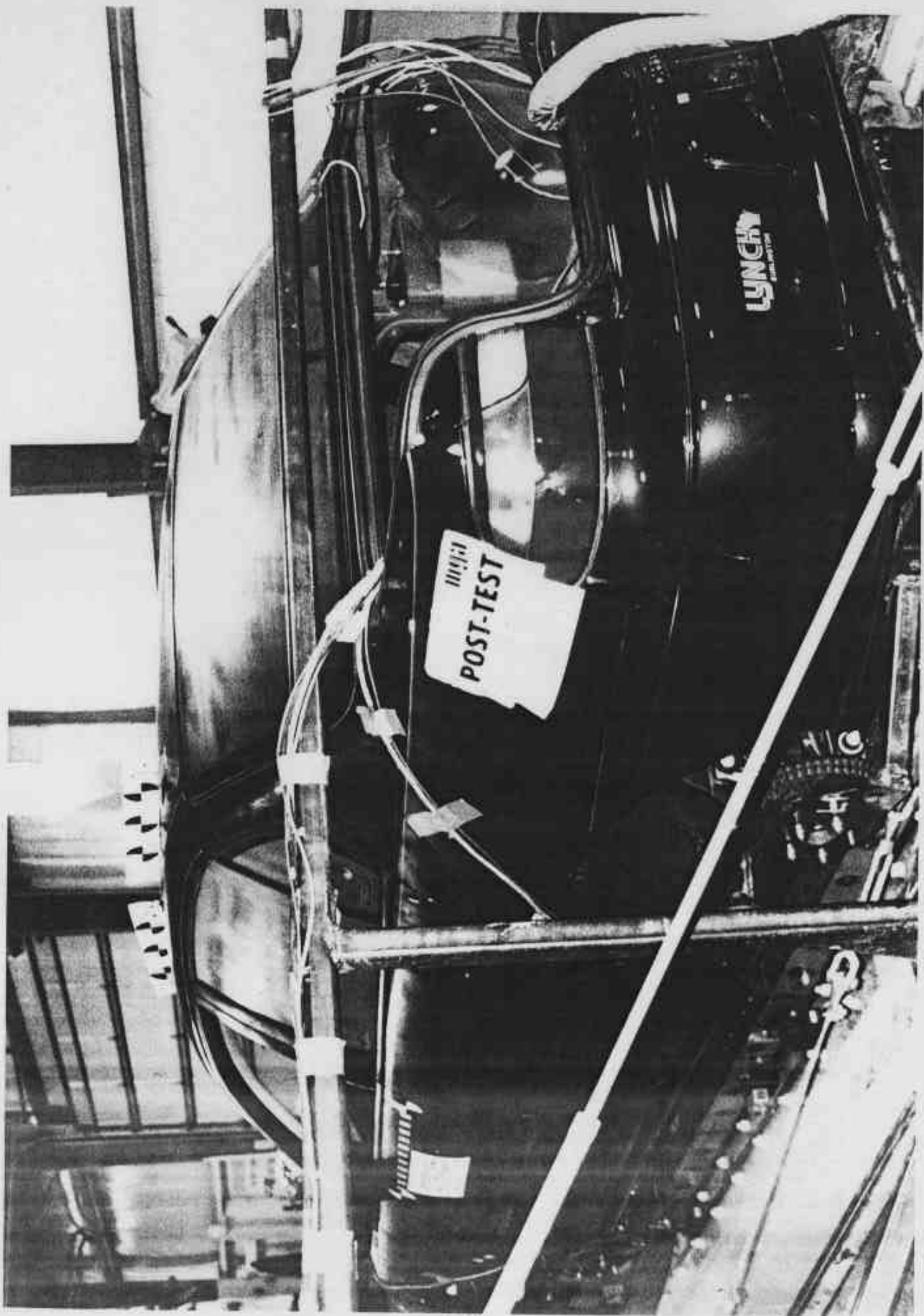
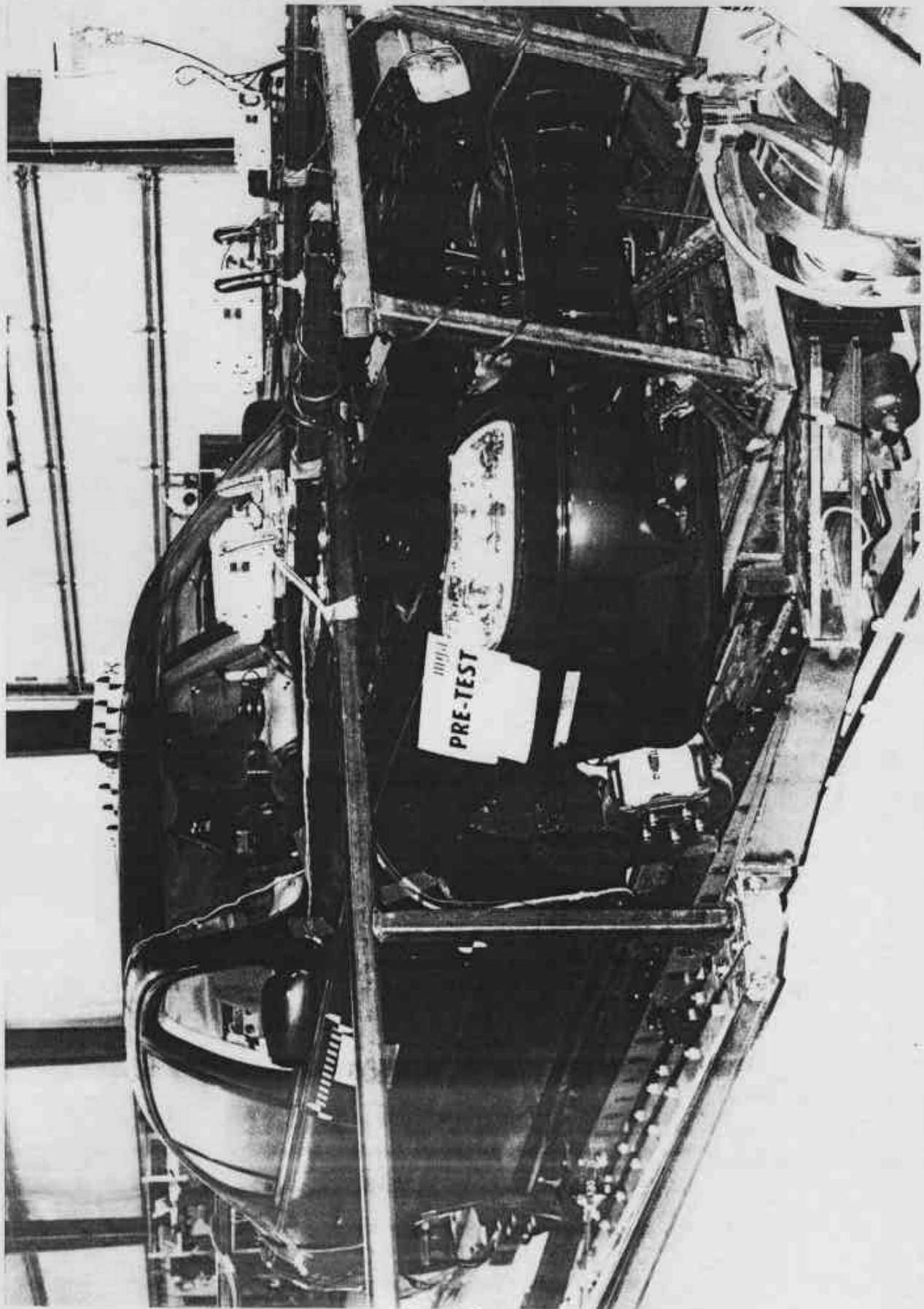
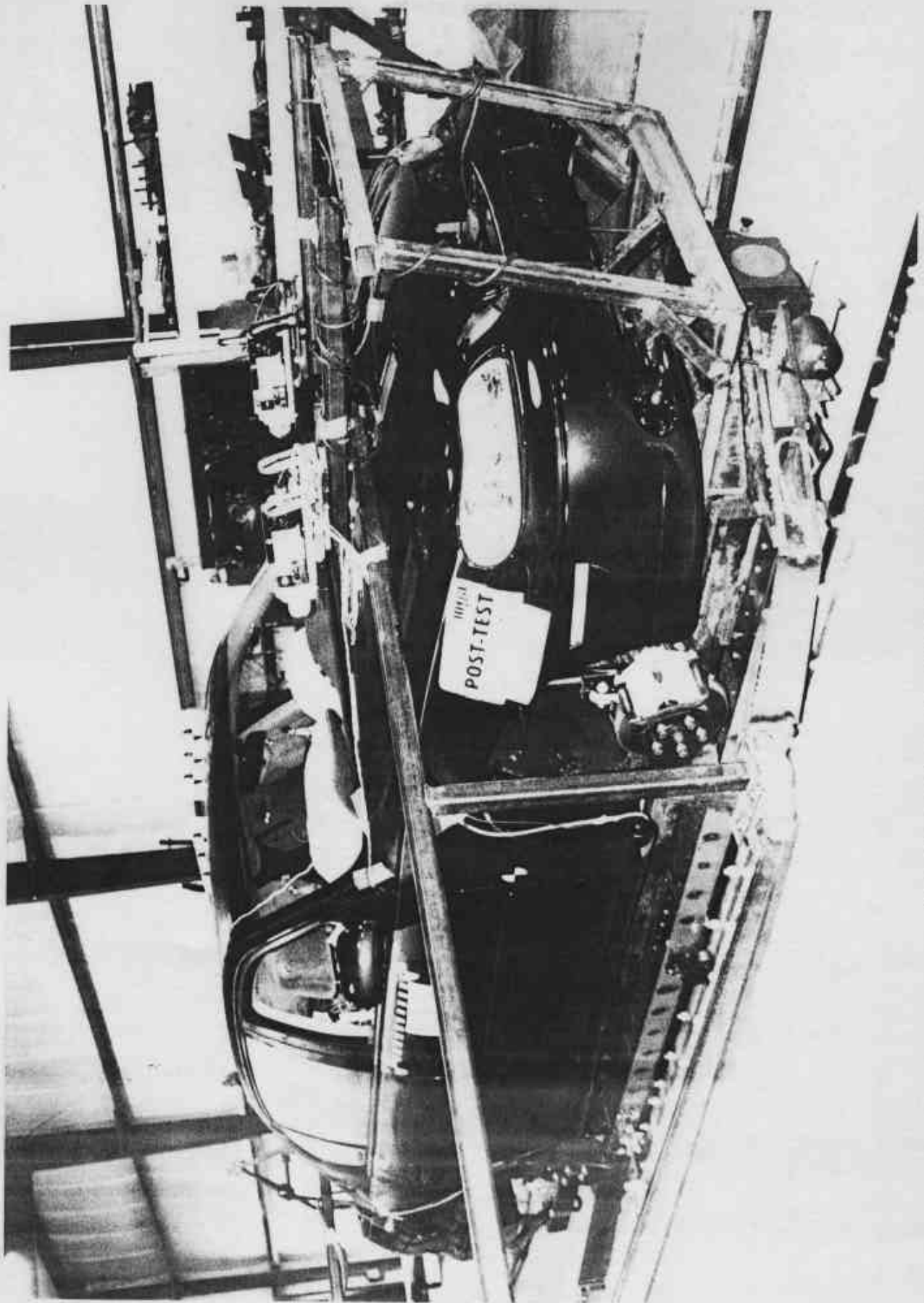


Photo No. A-8 - Post-Test 3/4 Left Rear View



A-9

Photo No. A-9 - Pre-Test 3/4 Right Front View



A-10

Photo No. A-10 - Post-Test 3/4 Right Front View

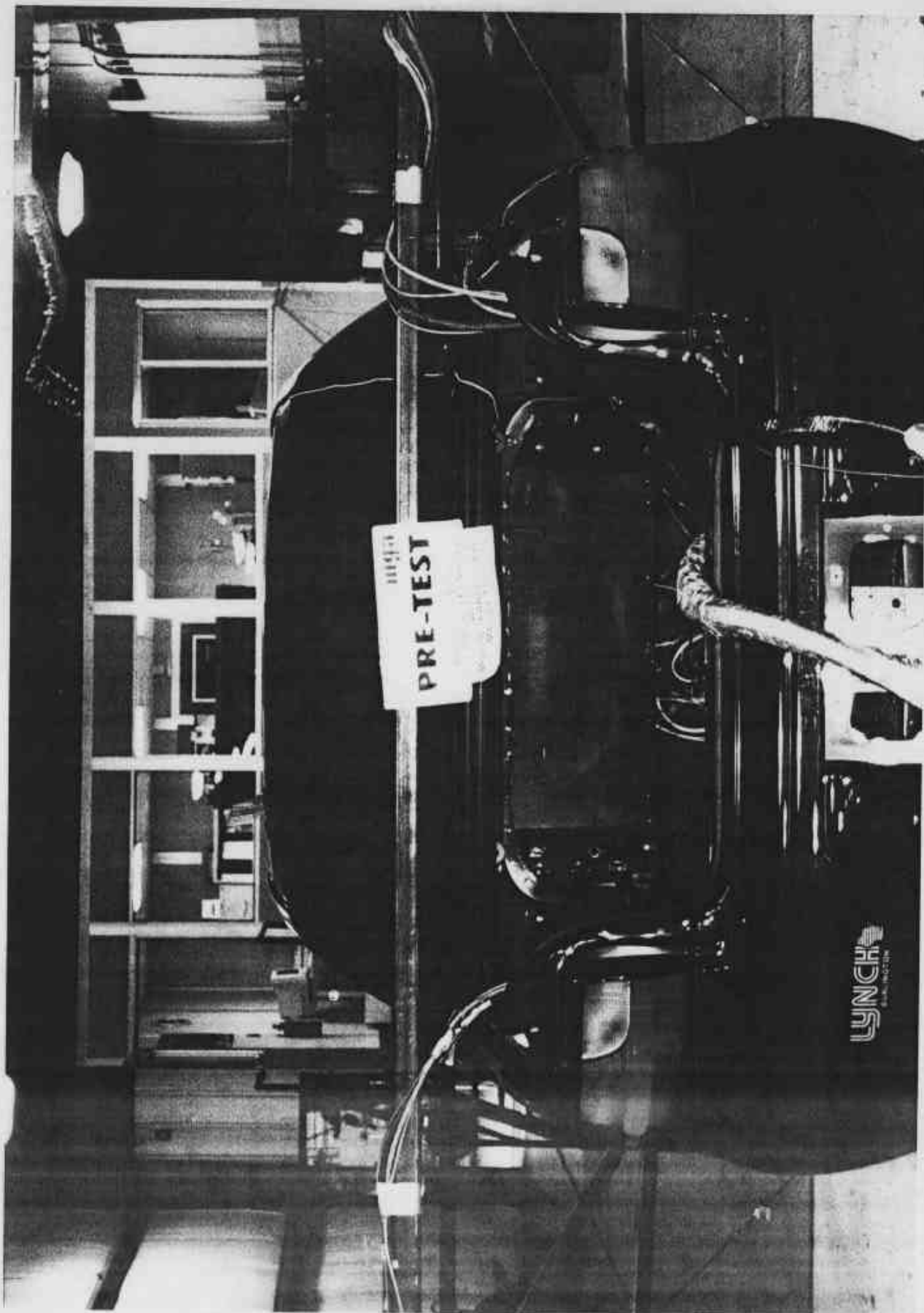


Photo No. A-11 - Pre-Test Rear View

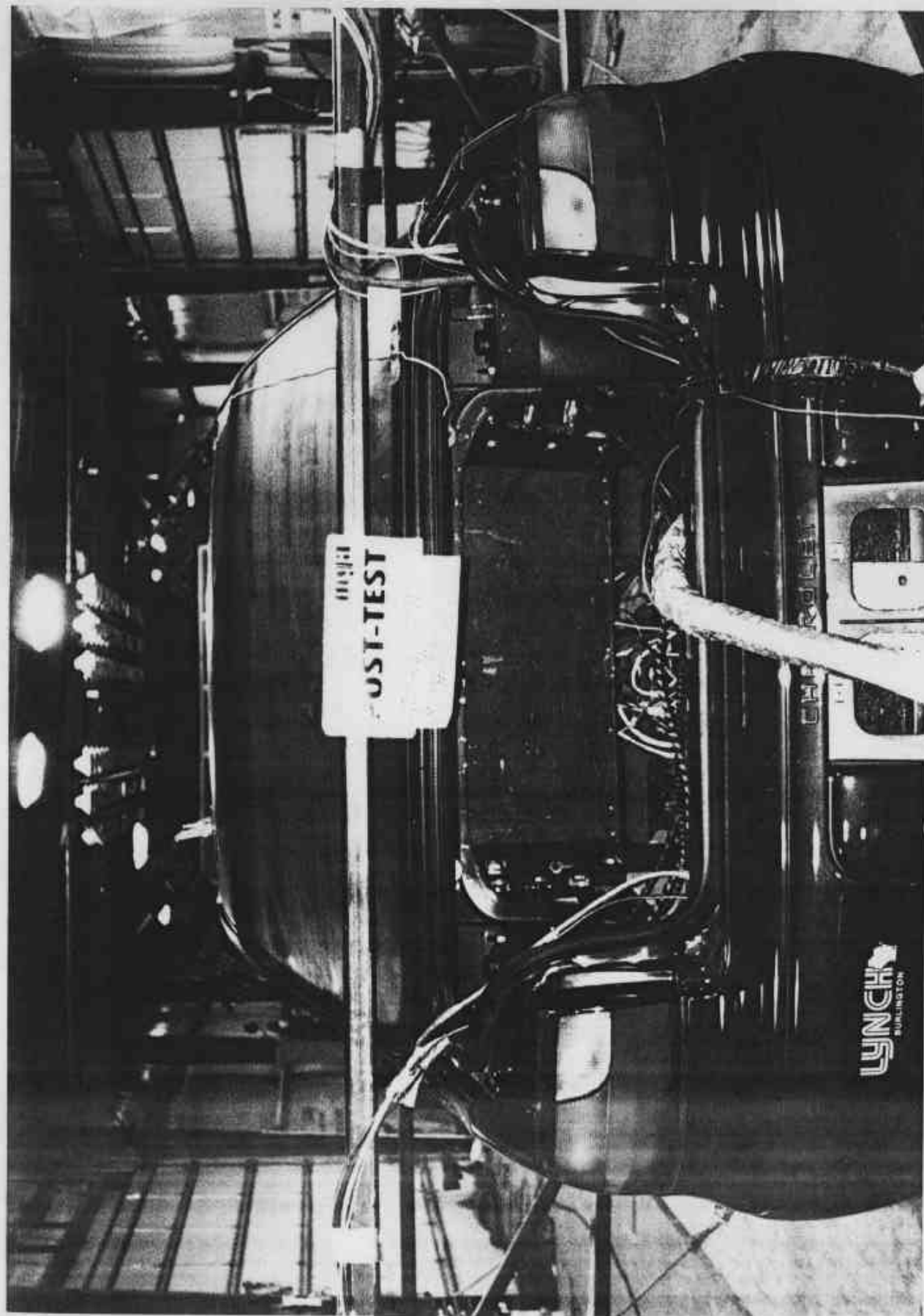


Photo No. A-12 - Post-Test Rear View

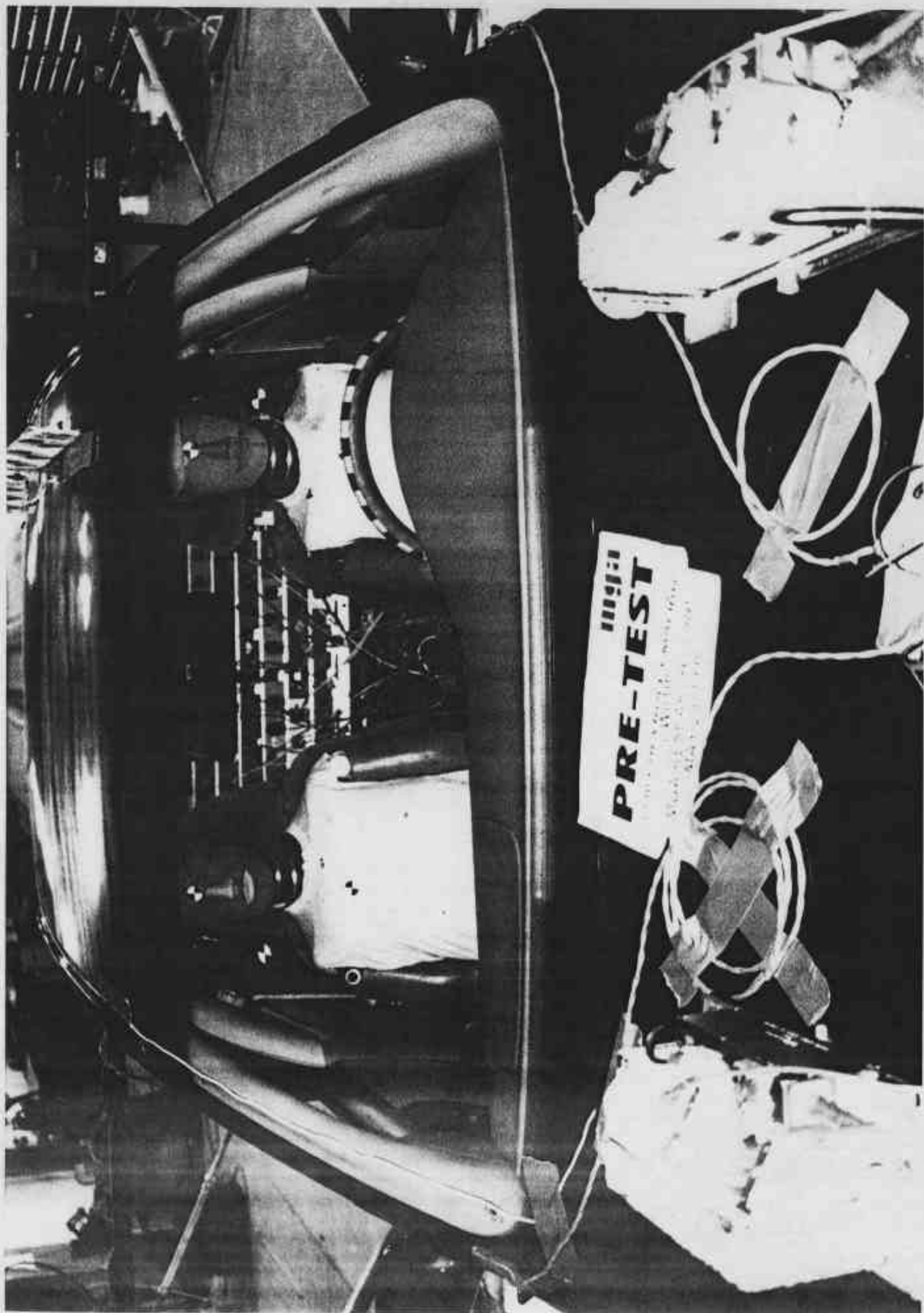


Photo No. A-14 - Pre-Test Windshield View

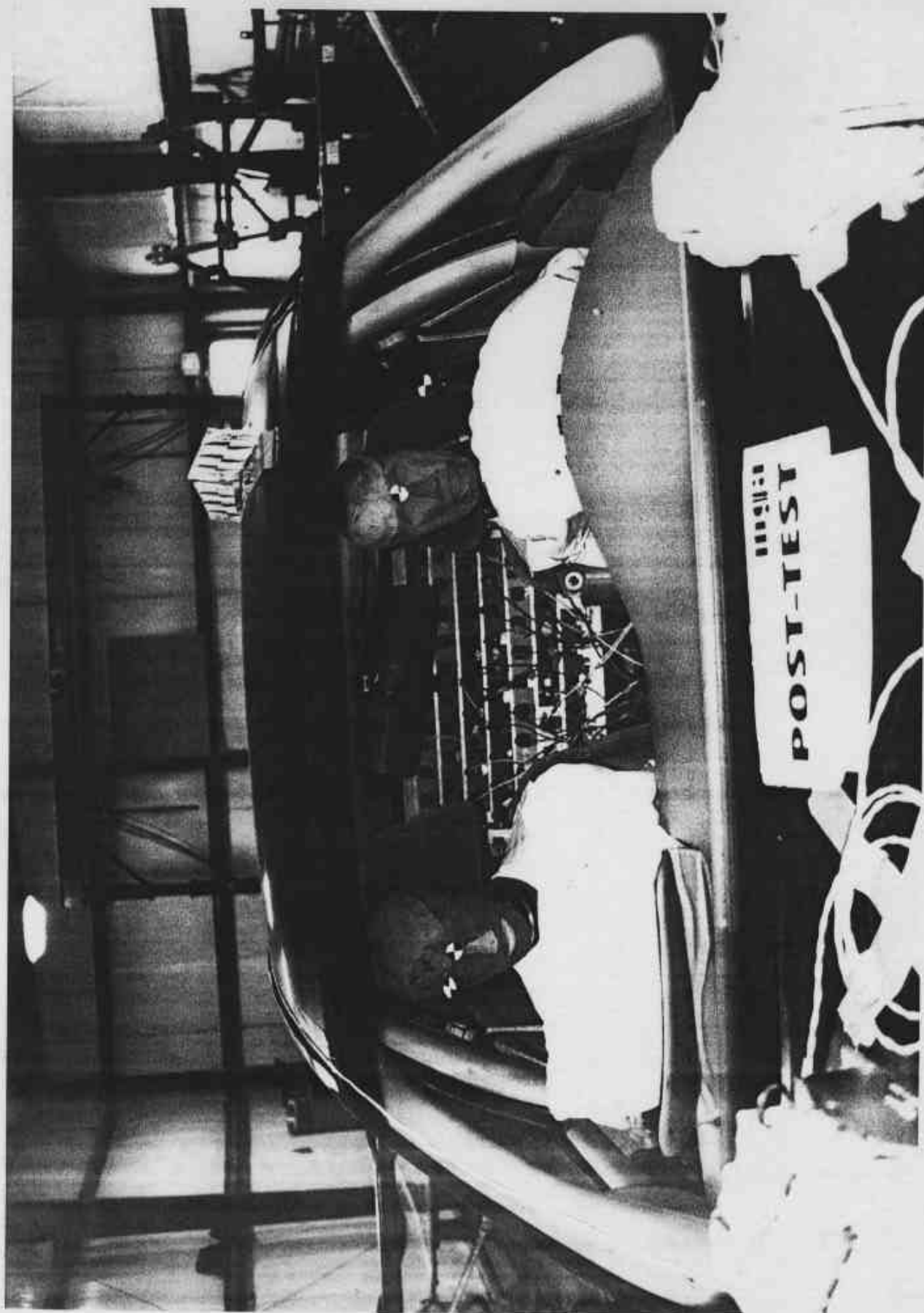


Photo No. A-15 - Post-Test Windshield View

A-15

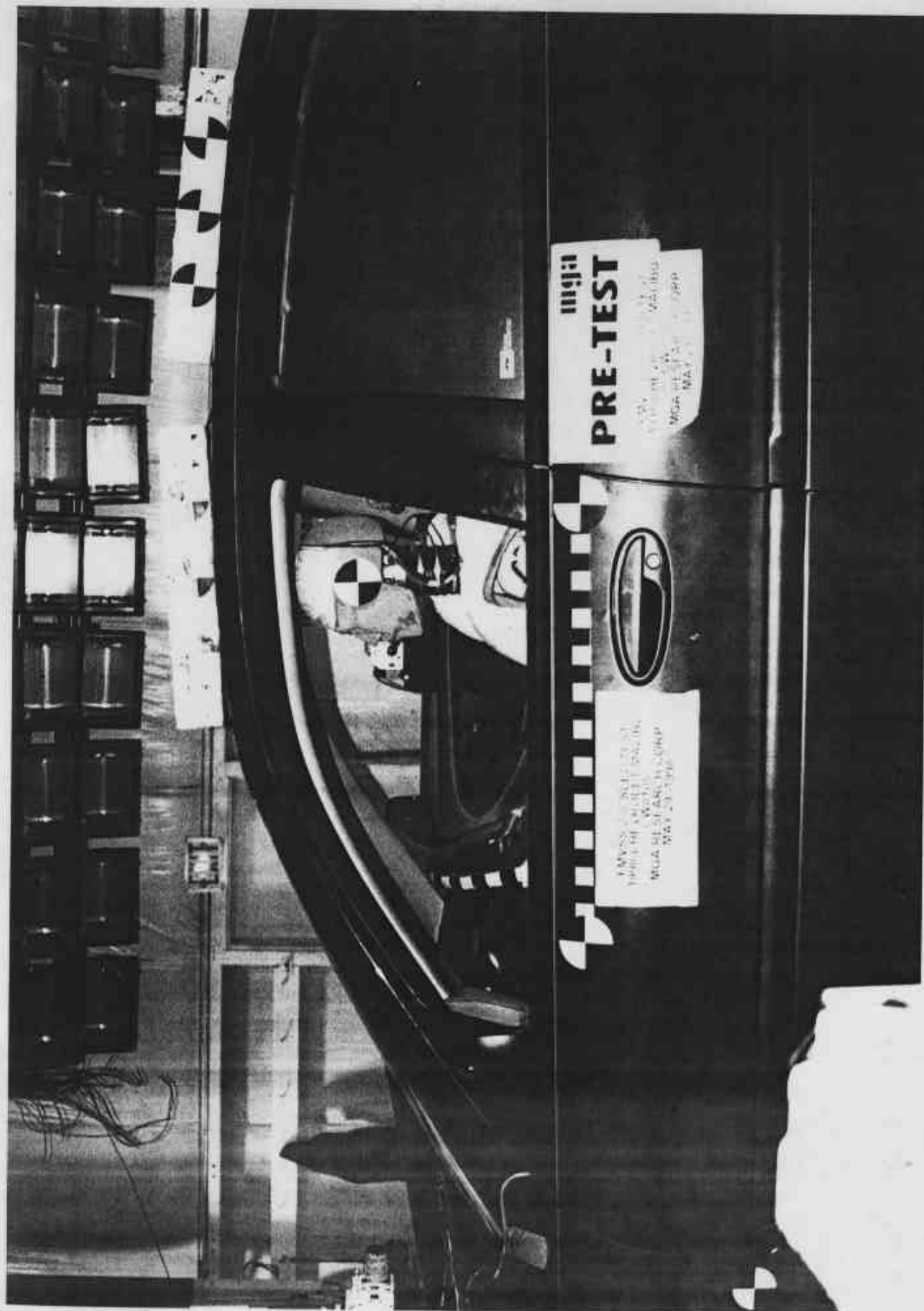


Photo No. A-16 - Pre-Test Driver Dummy Position View



Photo No. A-17 - Post-Test Driver Dummy Position View

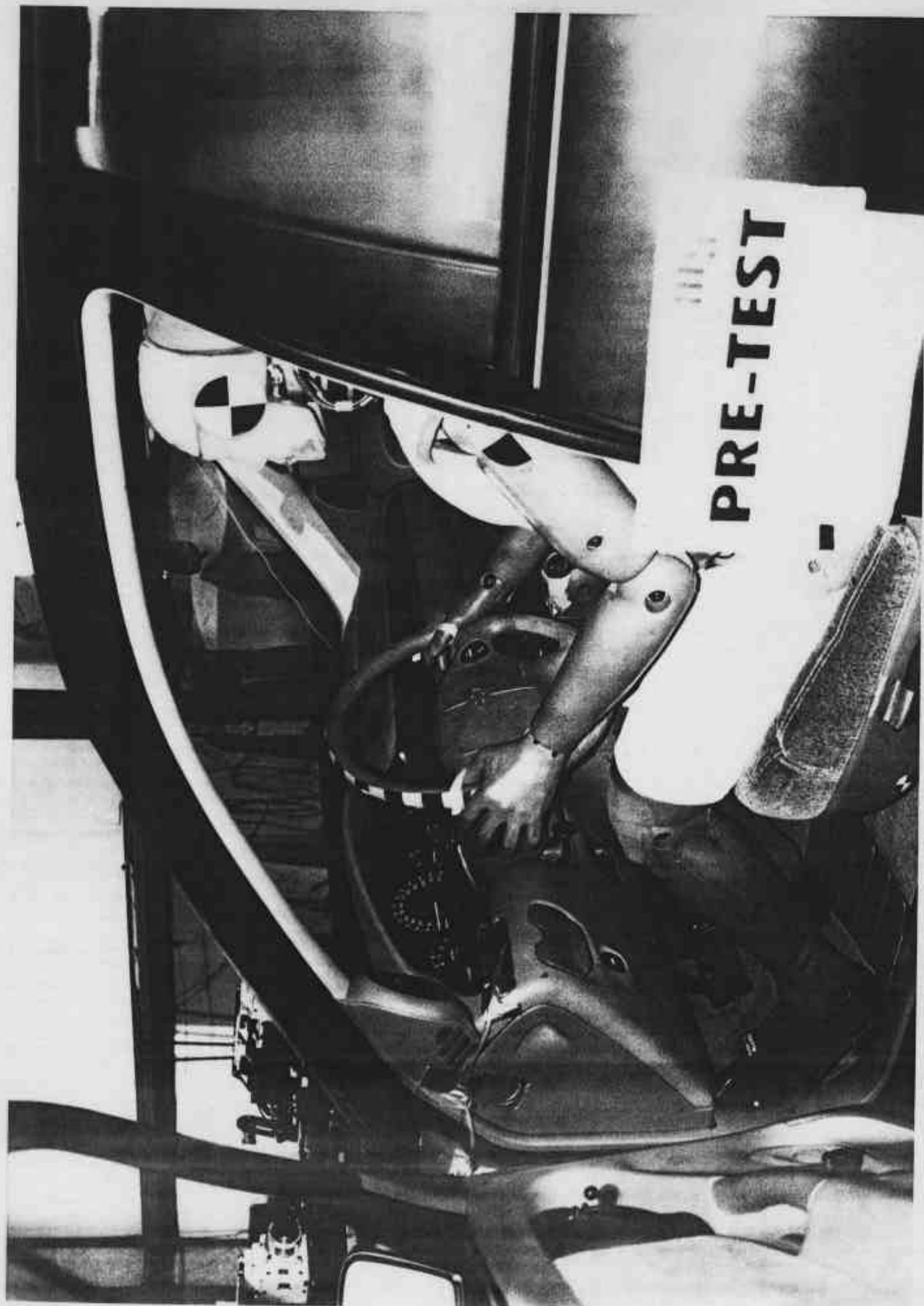


Photo No. A-18 - Pre-Test Driver Dummy Position View (Door Open)



Photo No. A-19 - Post-Test Driver Dummy Position View (Door Open)

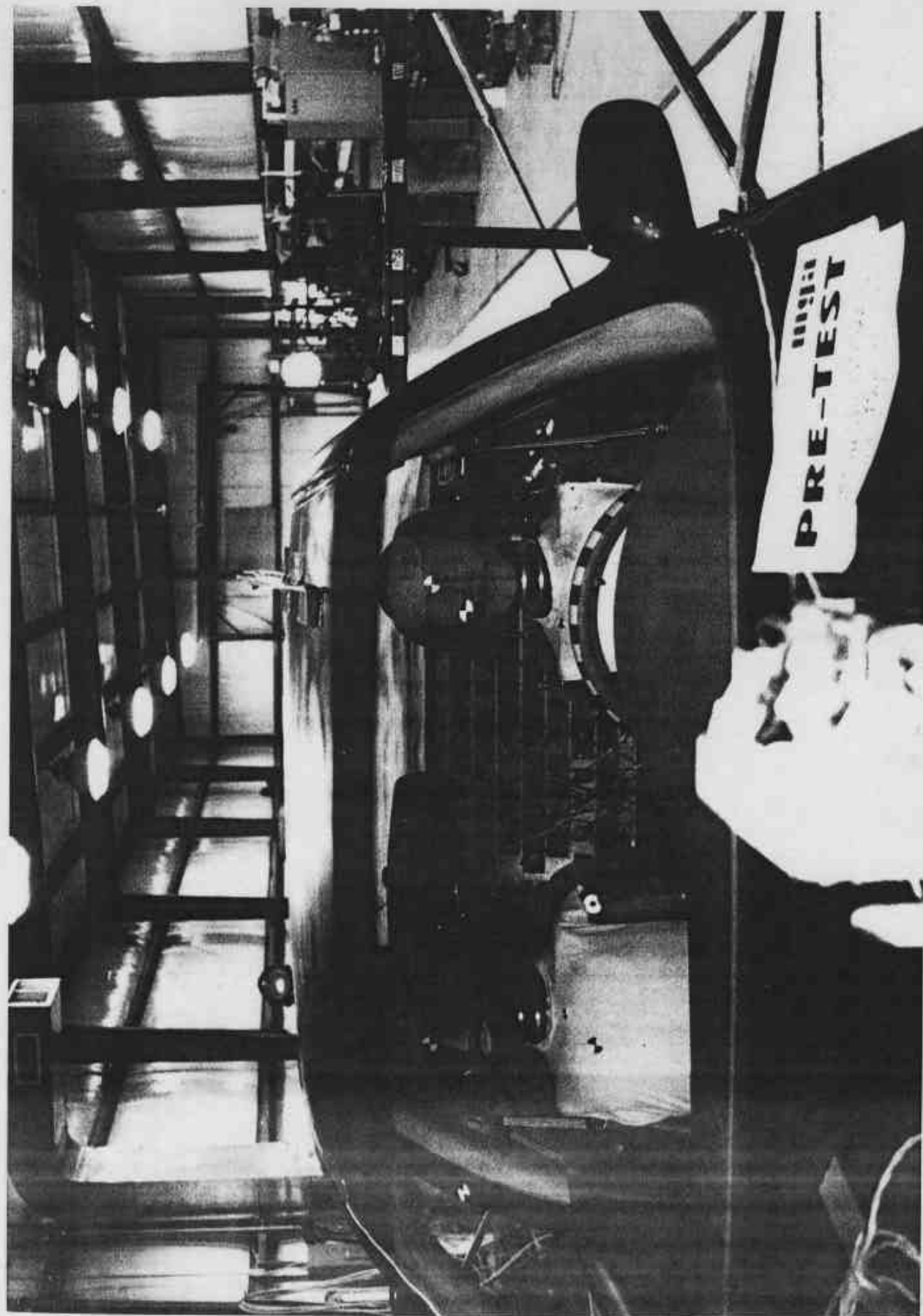
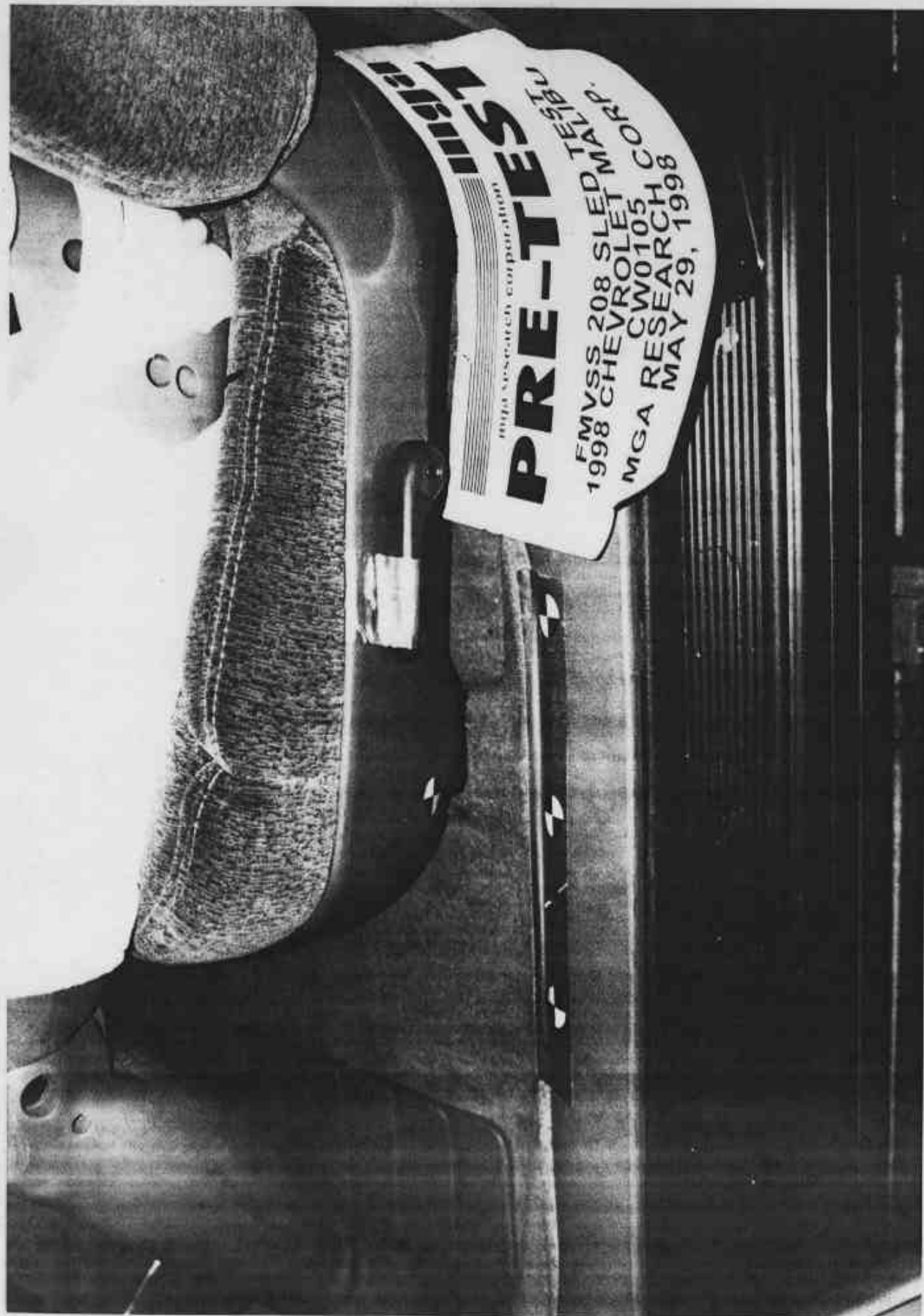


Photo No. A-20 - Pre-Test Driver Windshield View



Photo No. A-21 - Post-Test Driver Windshield View



A-22

Photo No. A-22 - Pre-Test Driver Seat Position View



A-23

Photo No. A-23 - Post-Test Driver Seat Position View





A-25

Photo No. A-25 - Post-Test Driver Knee Bolster View



Photo No. A-26 - Post-Test Driver Airbag View



Photo No. A-27 - Post-Test Driver Head Contact View (visor)



Photo No. A-28 - Pre-Test Passenger Dummy Position View

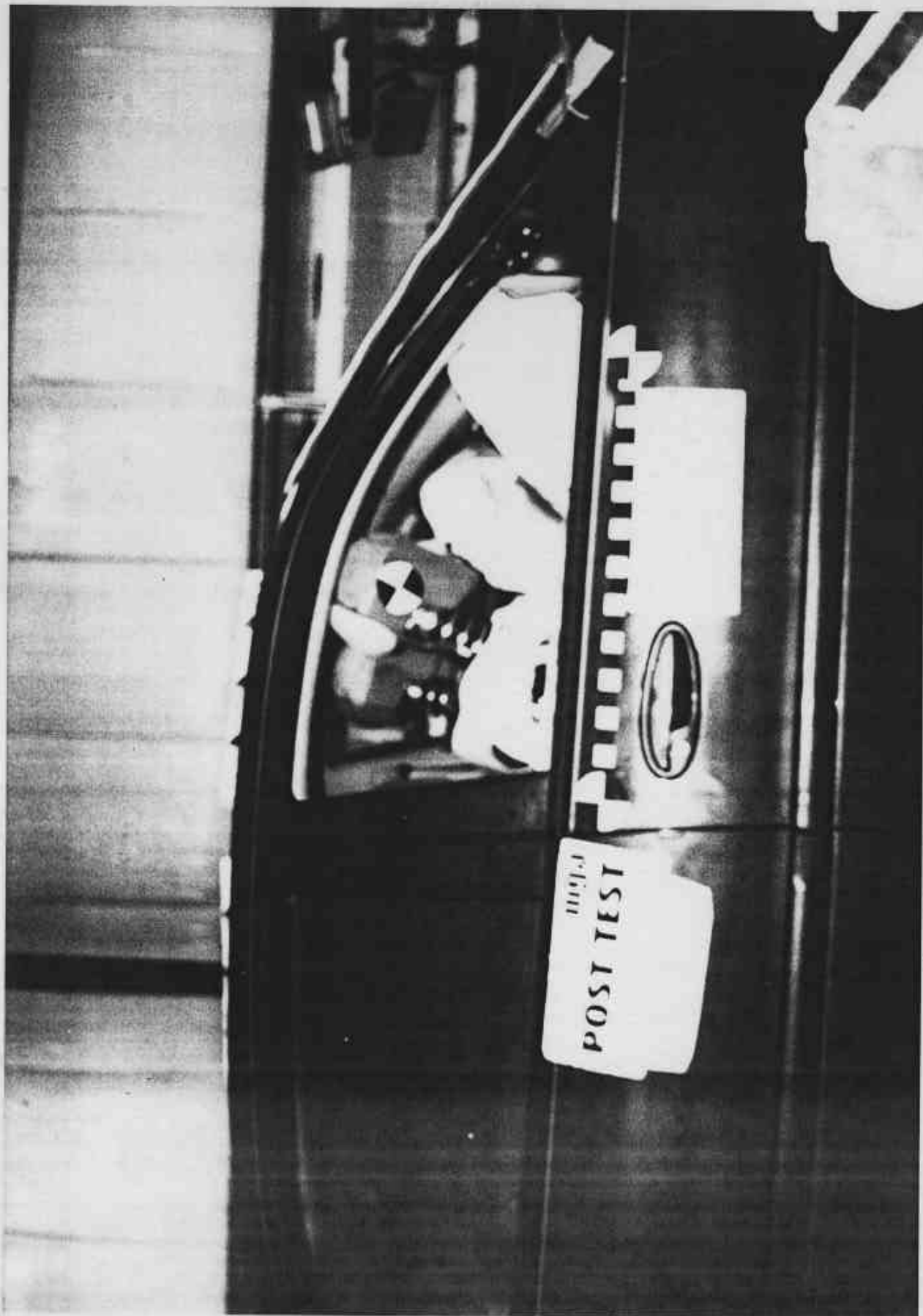


Photo No. A-29 - Post-Test Passenger Dummy Position View



PRE-TEST

FMVSS 208 SLED TEST
1998 CHEVROLET MALIBU
CW0105
MGA RESEARCH CORP.
MAY 29, 1998

Photo No. A-30 - Pre-Test Passenger Dummy Position View (Door Open)



A-31

Photo No. A-31 - Post-Test Passenger Dummy Position View (Door Open)

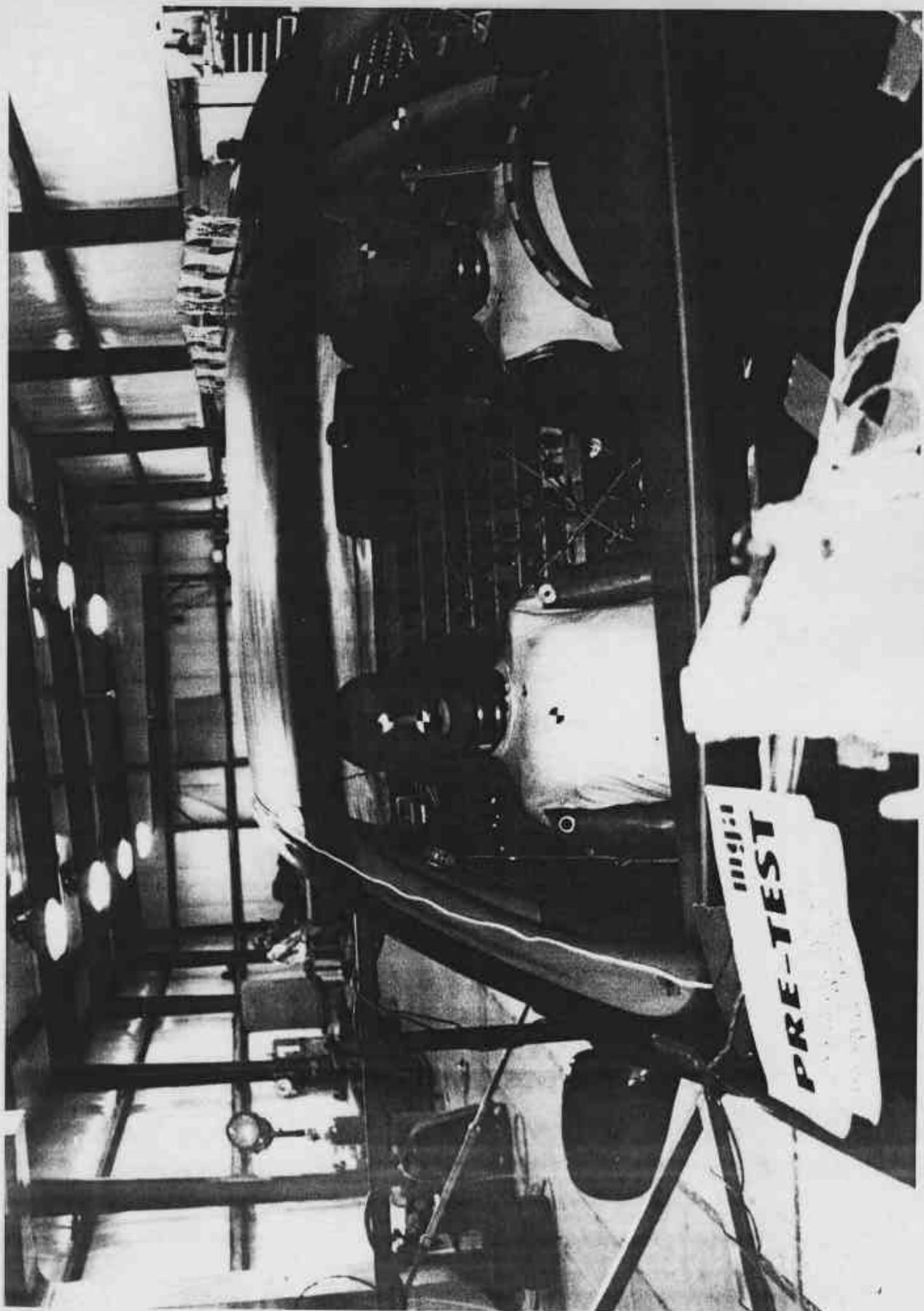


Photo No. A-32 - Pre-Test Passenger Windshield View

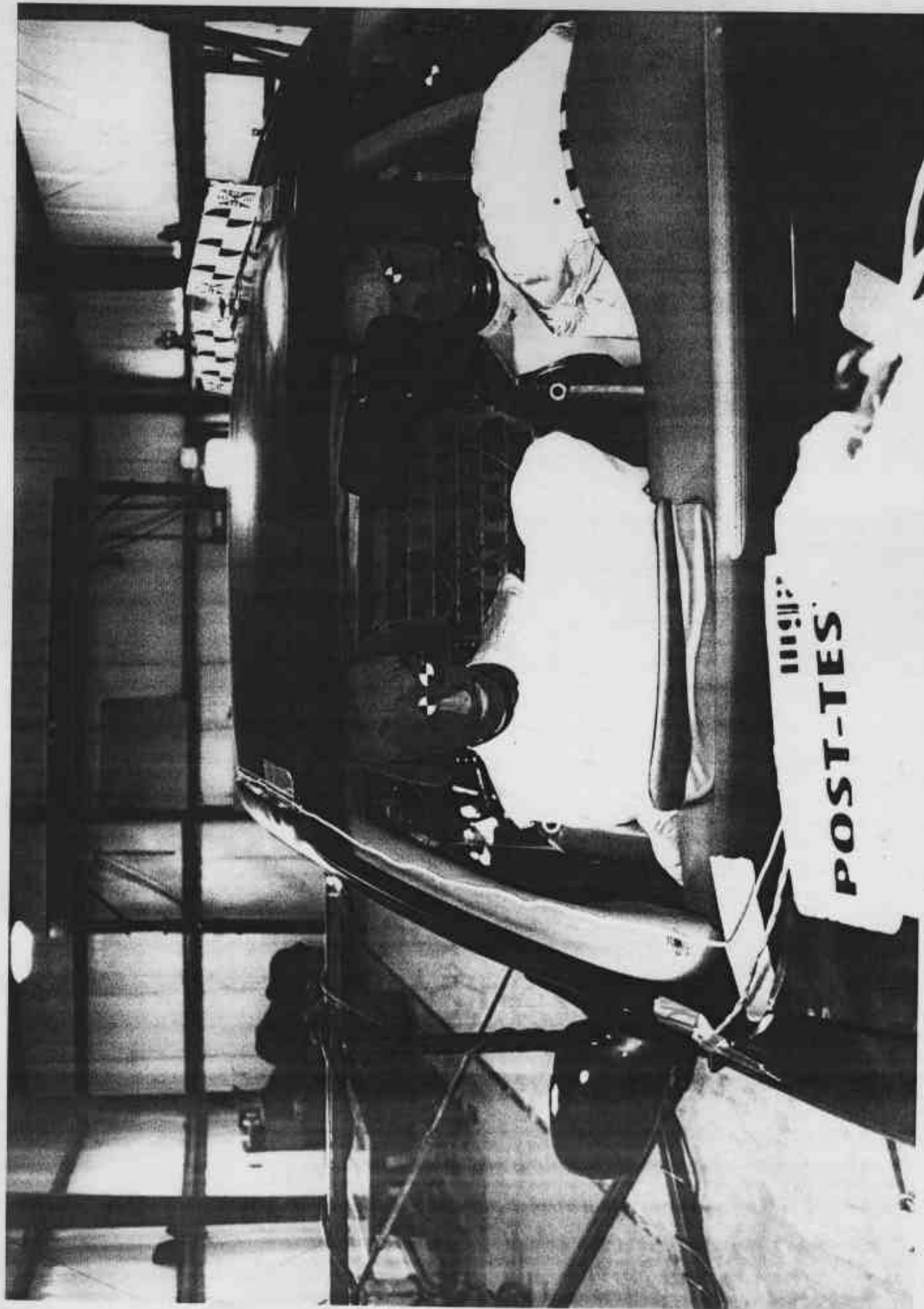


Photo No. A-33 - Post-Test Passenger Windshield View

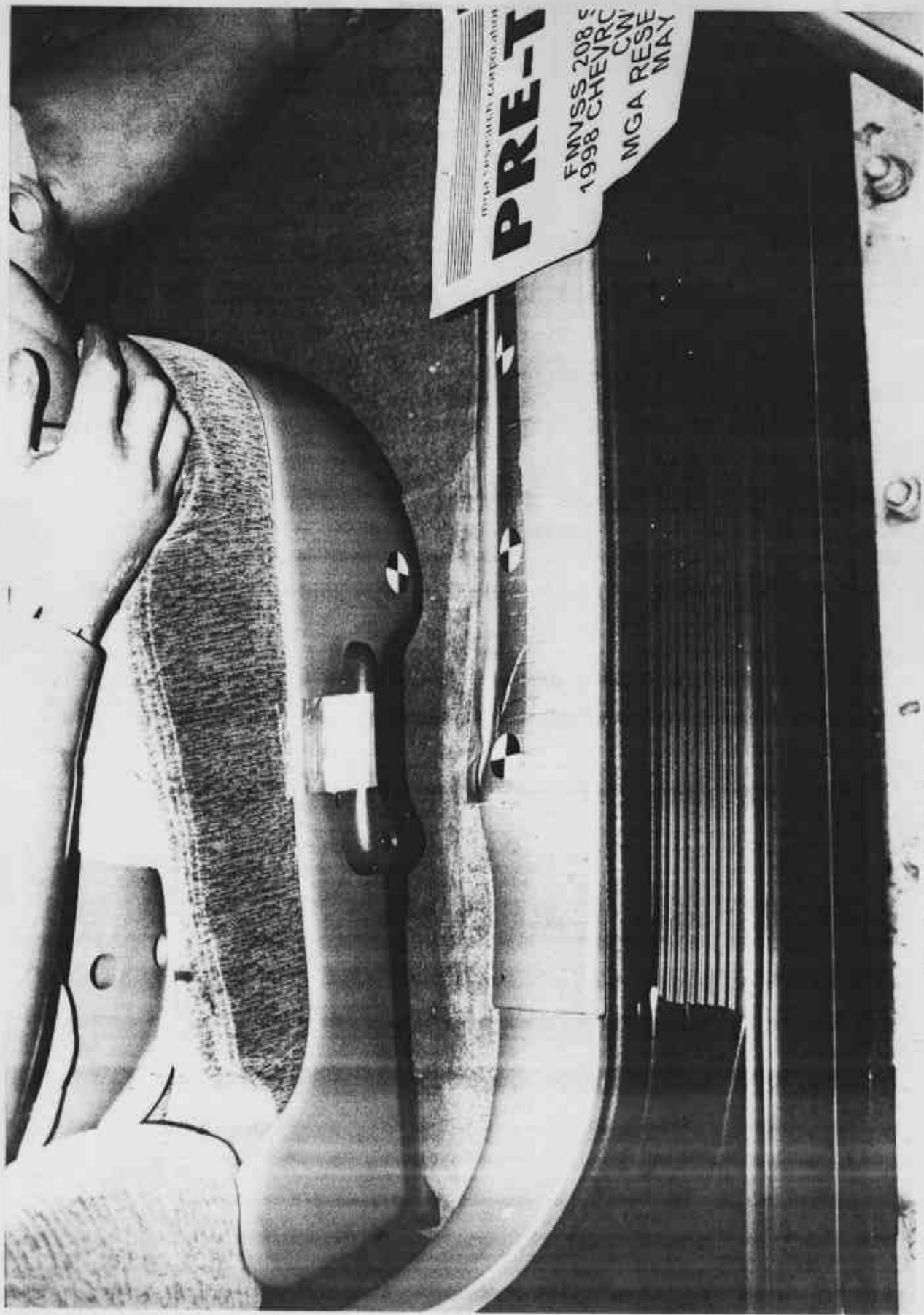


Photo No. A-34 - Pre-Test Passenger Dummy Seat Position View



Photo No. A-35 - Post-Test Passenger Dummy Seat Position View



Photo No. A-36 - Pre-Test Passenger Dummy Knee Bolster View



Photo No. A-37 - Post-Test Passenger Dummy Knee Bolster View



Photo No. A-38 - Post-Test Passenger Dummy Airbag View



Photo No. A-39 - Post-Test Passenger Dummy Head Contact View (visor)



Photo No. A-40 - Post-Test Passenger Dummy Head Contact View (windshield)

 MFG BY GENERAL MOTORS CORP
DATE 08/87
GVWR 1805 KG 3978 LB
GAWR FRT 1008 KG 2224 LB
GAWR RR 788 KG 1754 LB
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR
VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN
EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.
1G1ND52T0WY126697 TYPE: PASS CAR

Photo No. A-41 - Vehicle Certification Label

 TIRE - LOADING INFORMATION

OCCUPANTS			VEHICLE CAP. WT.	
FRT.	CTR.	RR.	TOTAL	KG LBS
2	0	3	5	416 917

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT.
1G1ND52T0WY126697

MODEL: ND69 NBA

TIRE SIZE	SPEED RTG	COLD TIRE PRESSURE
FRT P215/60R15	S	200KPA(29PSI)
RR P215/60R15	S	180KPA(26PSI)
SPA T125/70D15	M	420KPA(60PSI)

IF TIRES ARE HOT, ADD 28KPA(4LBS)
 SEE OWNER'S MANUAL FOR MORE INFORMATION

Photo No. A-42 - Tire Placard

APPENDIX B

DATA PLOTS

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Figure B-45 - Rear Axle X Acceleration vs. Time	B-45

TEST DATE: 05-29-1998

TEST: FMVSS 208 SLED TEST

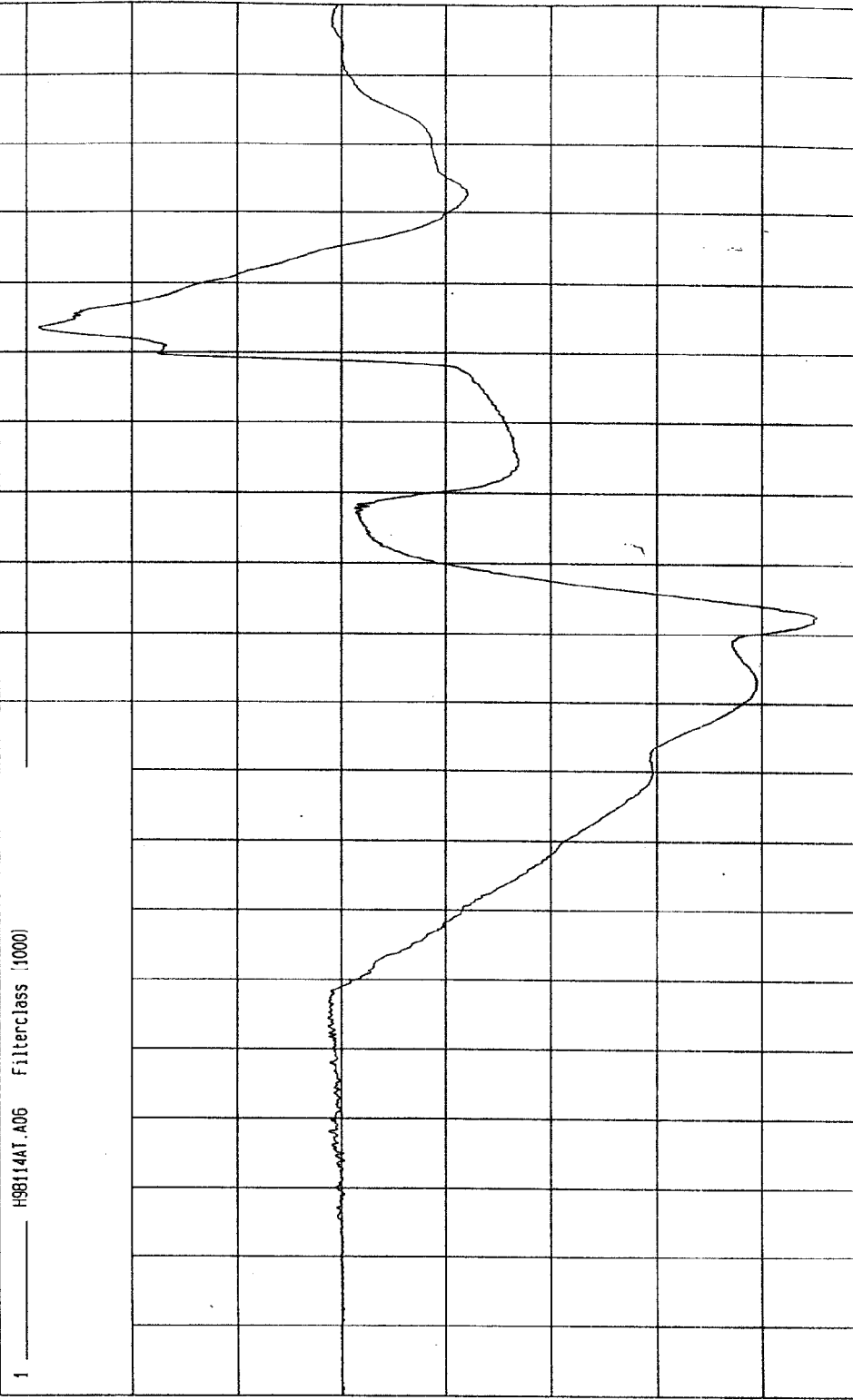
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-45.13629 G'S at 112 msec

YMAX= 28.82498 G'S at 153 msec

DRIVER HEAD X ACCELERATION

1 ——— H981141.A06 Filterclass (1000)



MSA Research
05-29-1998 11.45

TIME (SECONDS)

G.S

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

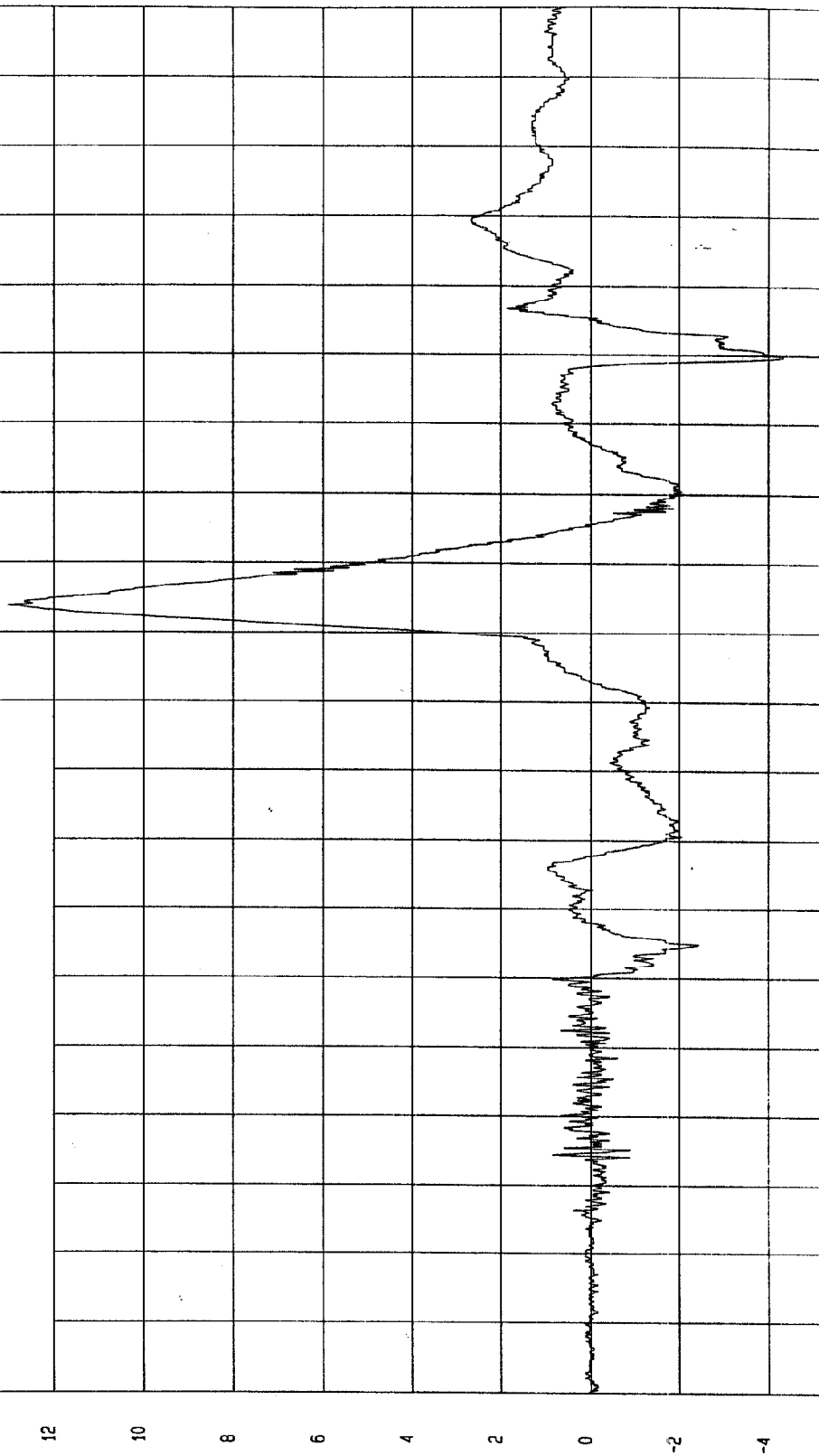
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-4.331054 G'S at 149 msec

YMAX= 13.03081 G'S at 113 msec

DRIVER HEAD Y ACCELERATION

1 ——— H98114AT.A08 Filterclass (1000)



MSA Research
05-29-1998 11:45

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

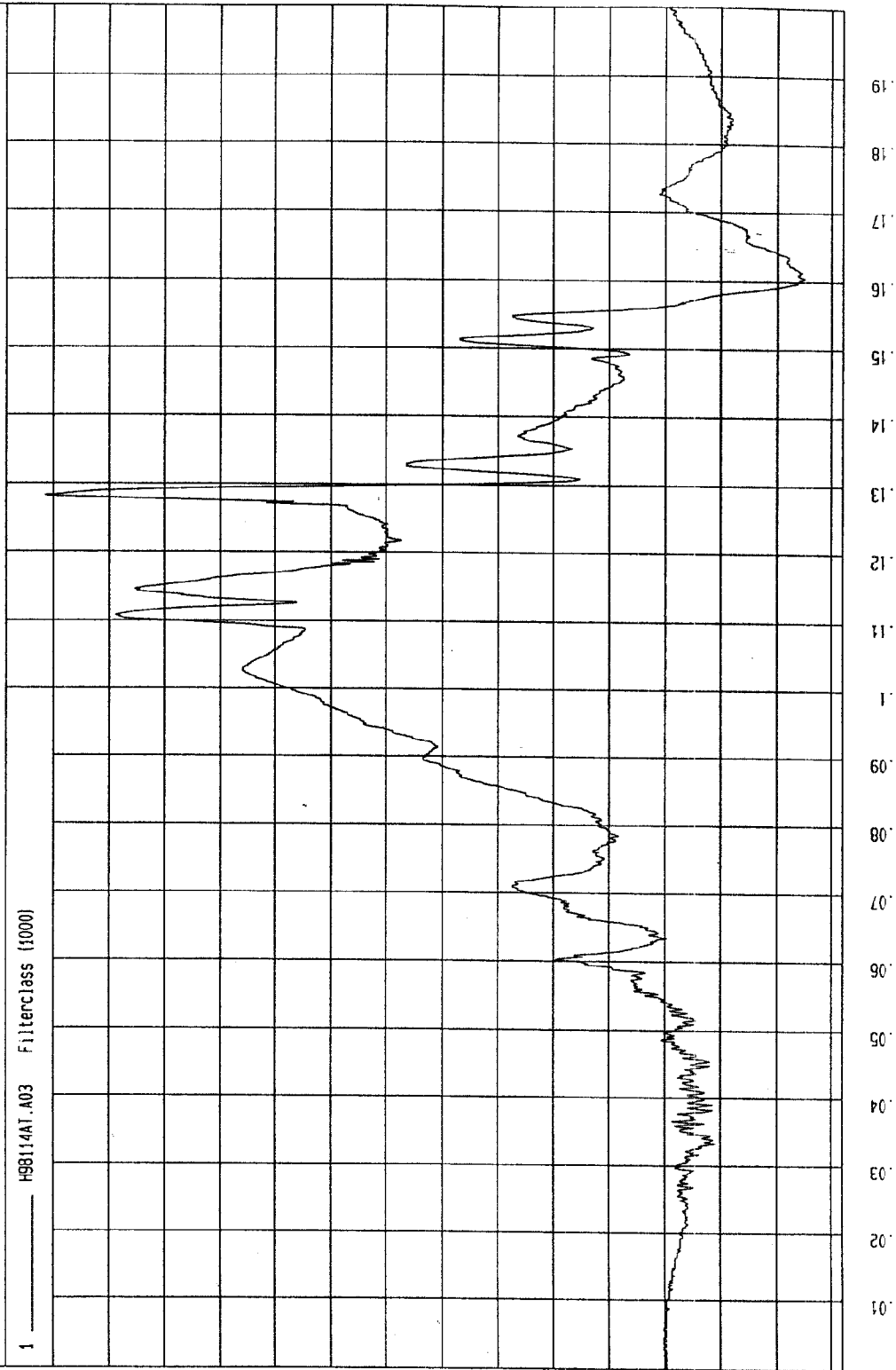
YMIN=-5.030051 G'S at 160 msec

YMAX= 22.27889 G'S at 128 msec

DRIVER HEAD Z ACCELERATION

1 H98114AT.A03 Filterclass (1000)

G.S



MCA Research
03-29-1998 11:46

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

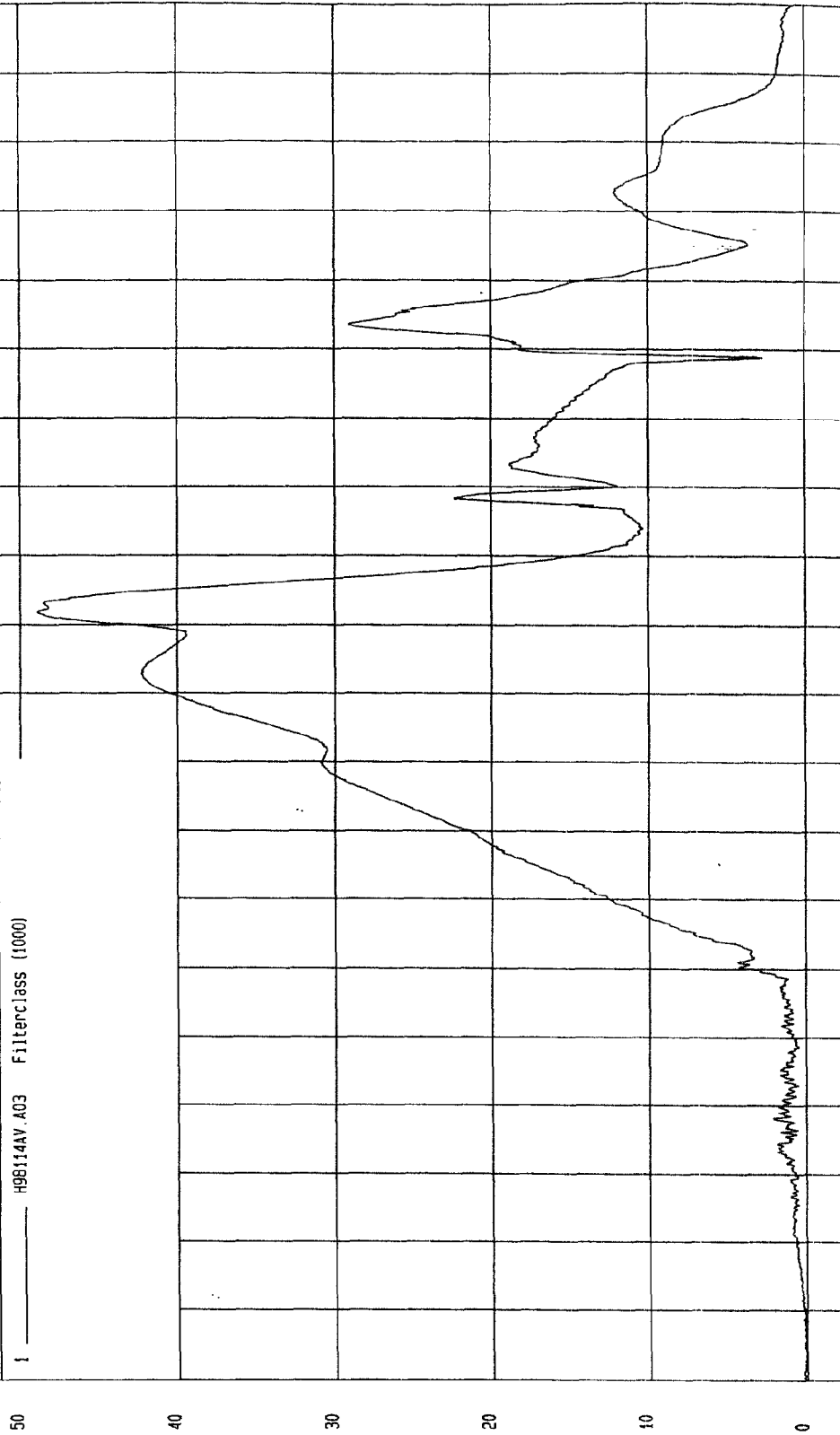
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN= 5.056475E-02 G'S at 1.9 msec

YMAX= 48.93583 G'S at 111 msec

DRIVER HEAD RESULTANT ACCELERATION

1 _____ H98114AV.A03 Filterclass (1000)



MSA Research
05-29-1998 11:46

TEST DATE: 05-29-1998

TEST: FMVSS 208 SLED TEST

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-483.865 N at 173 msec

YMAX= 952.037 N at 105 msec

DRIVER NECK FORCE X

1000

1 _____ H98114FT.F21 Filterclass (1000)

800

600

400

200

0

-200

-400

N

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

TIME (SECONDS)

MCA Research
01-22-1998 10:54

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

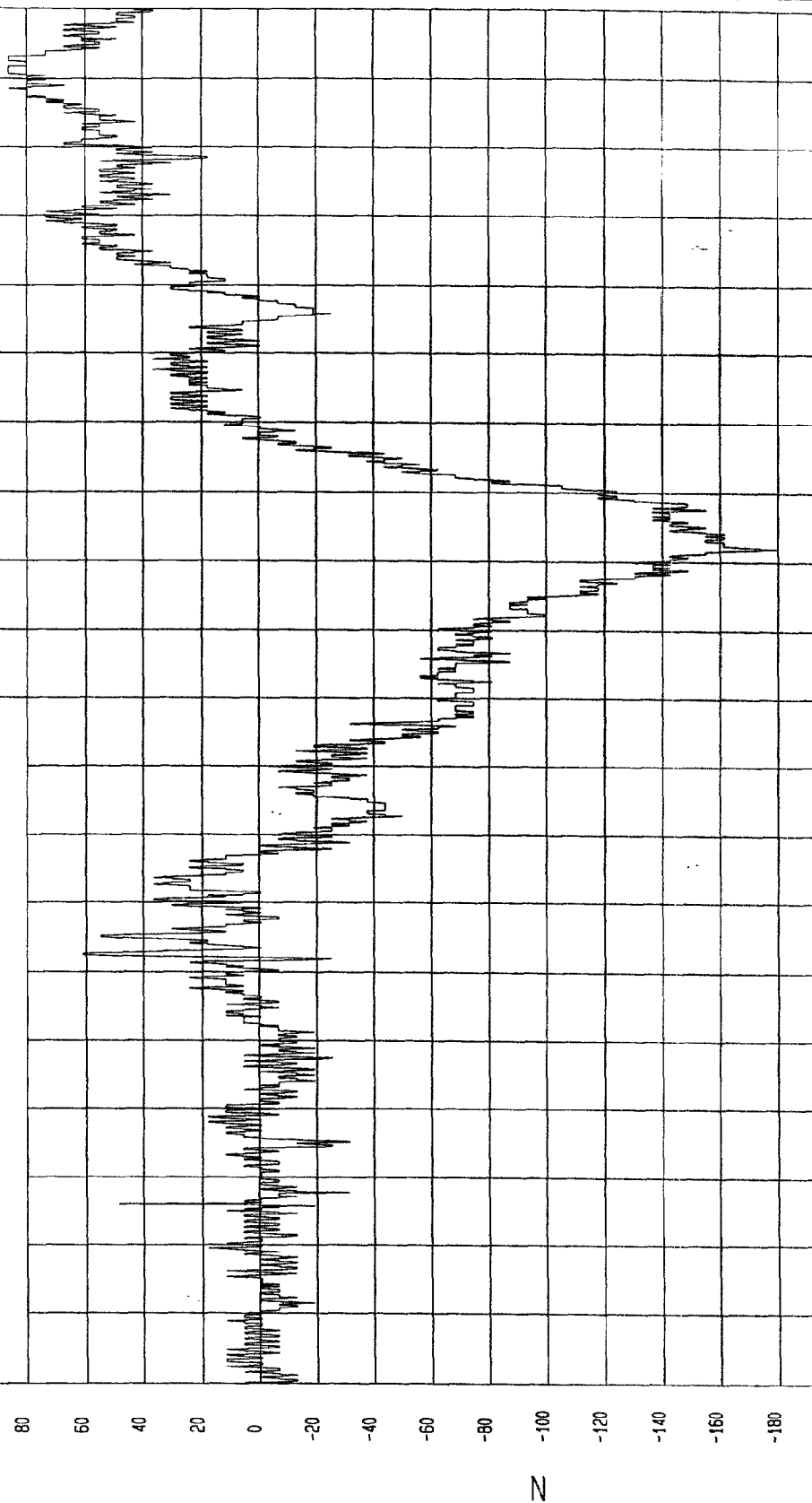
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-179.8378 N at 121 msec

YMAX= 85.98495 N at 188 msec

DRIVER NECK FORCE Y

1 ——— H98114FT.F09 Filterclass (1000)



MSA Research
07-22-1998 10:54

TEST DATE: 05-29-1998

TEST: FMVSS 208 SLED TEST

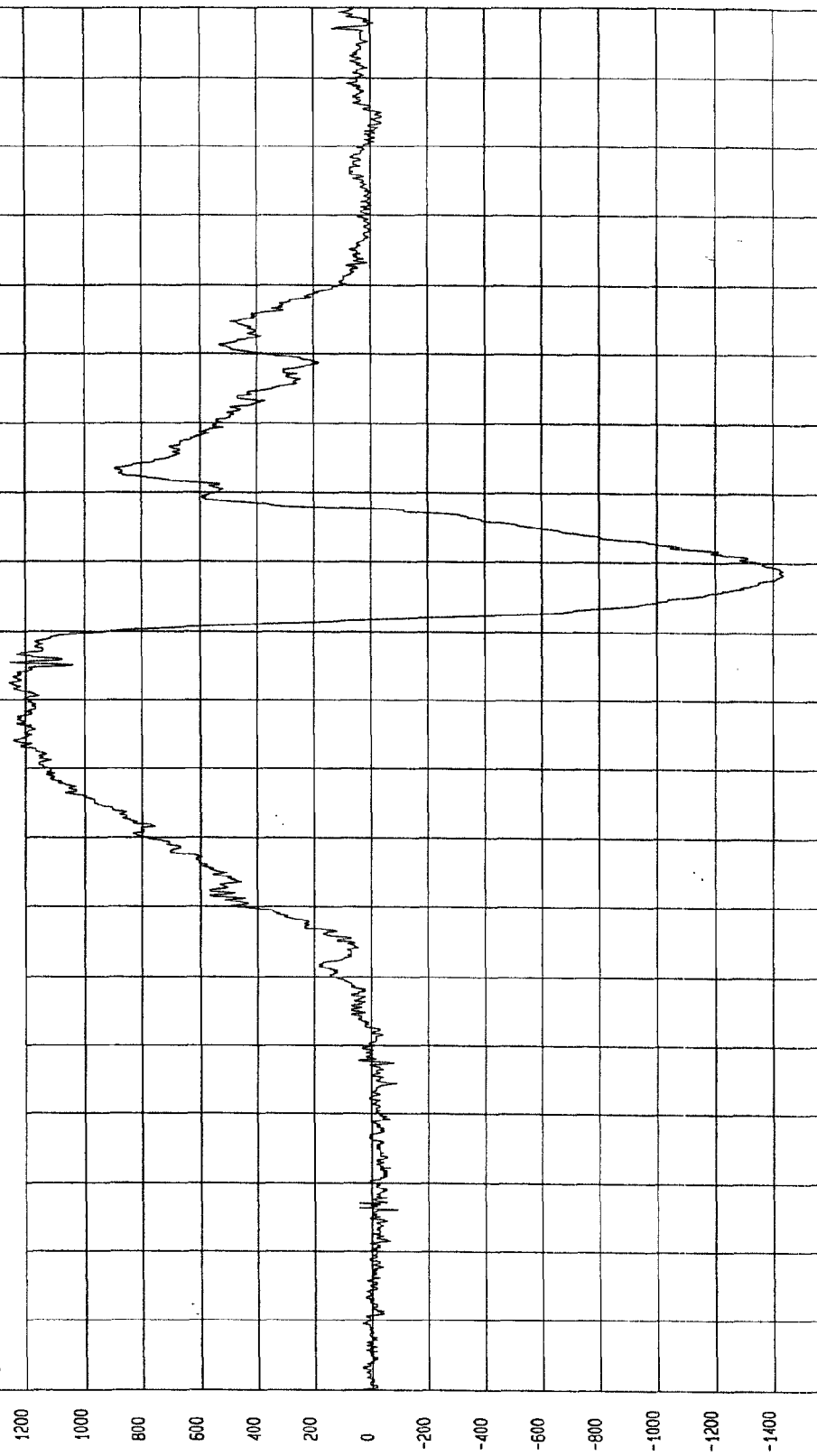
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-1434.721 N at 118 msec

YMAX= 1253.448 N at 102 msec

DRIVER NECK FORCE Z

1 H98114FT.F23 Filterclass (1000)



MGA Research
01-22-1998 10:55

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

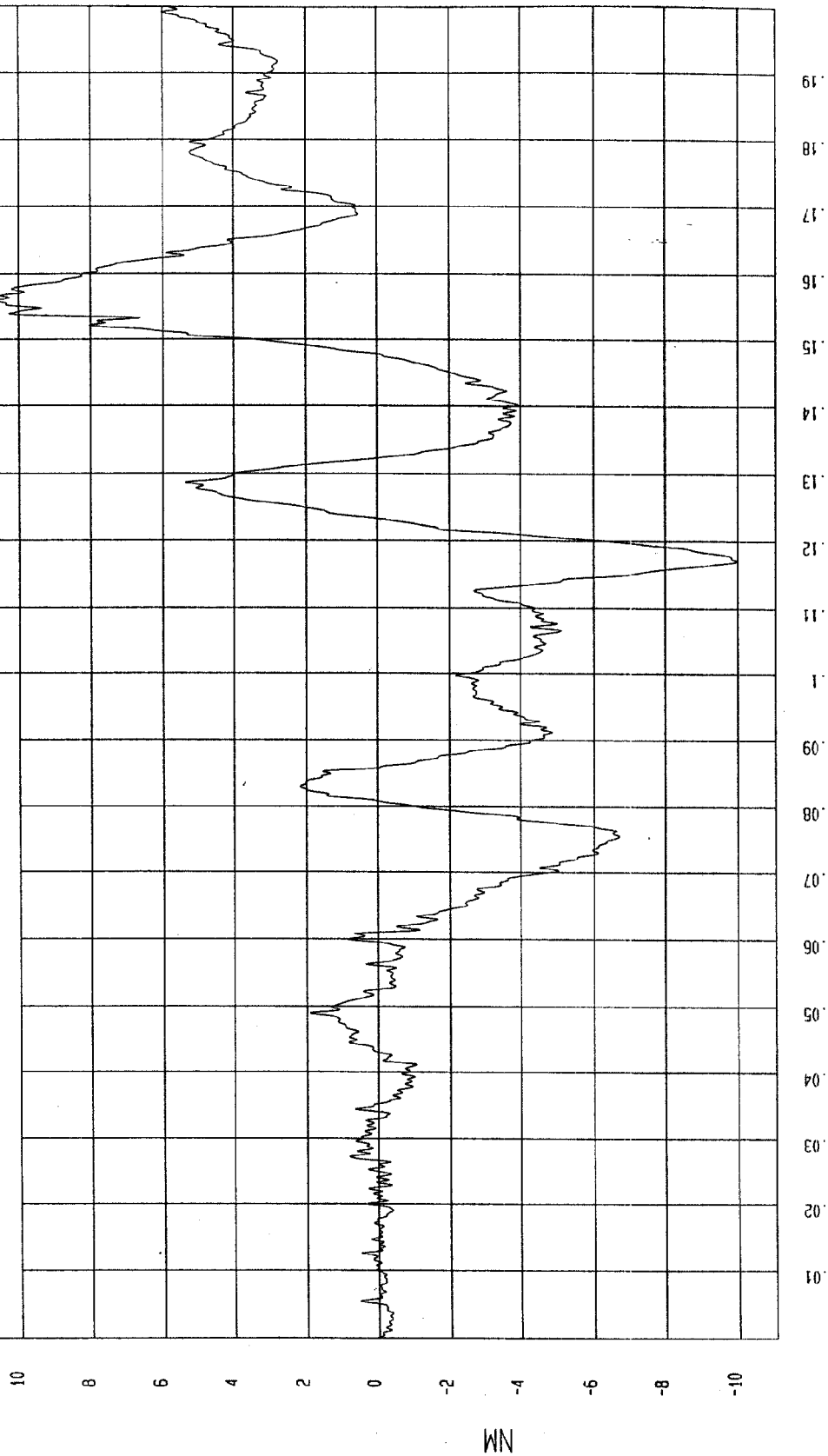
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-10.01321 NM at 117 msec

YMAX= 10.70387 NM at 155 msec

DRIVER NECK MOMENT X

1 ——— H98114MF M24 Filterclass (600)



MCA Research
05-29-1998 11:48

TIME (SECONDS)

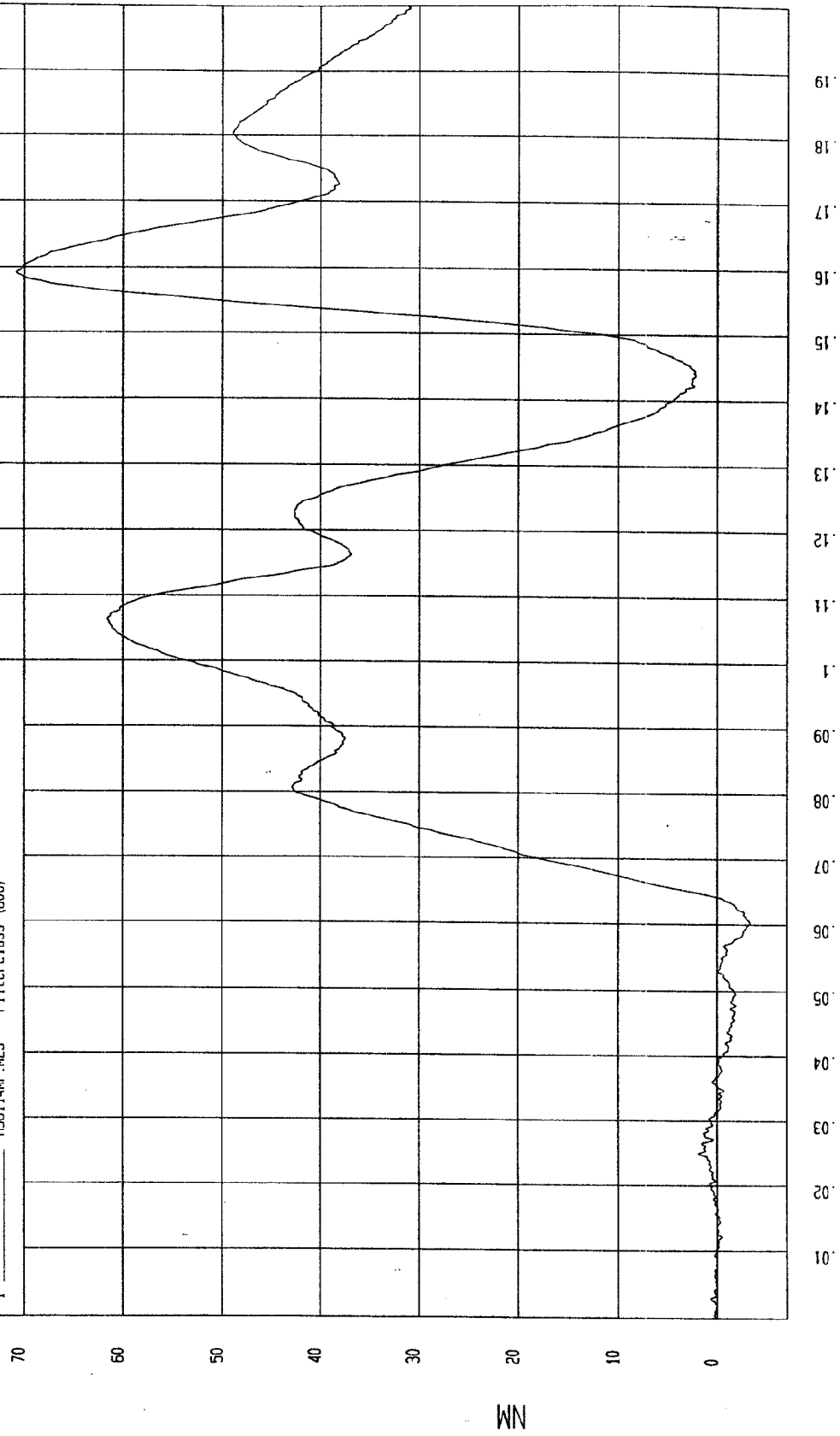
TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-3.380795 NM at 60. msec YMAX= 70.77051 NM at 159 msec

DRIVER NECK MOMENT Y

1 H98114MF.M25 FilterClass (500)



MCA Research
05-29-1998 11:48

TEST: FMVSS 208 SLED TEST

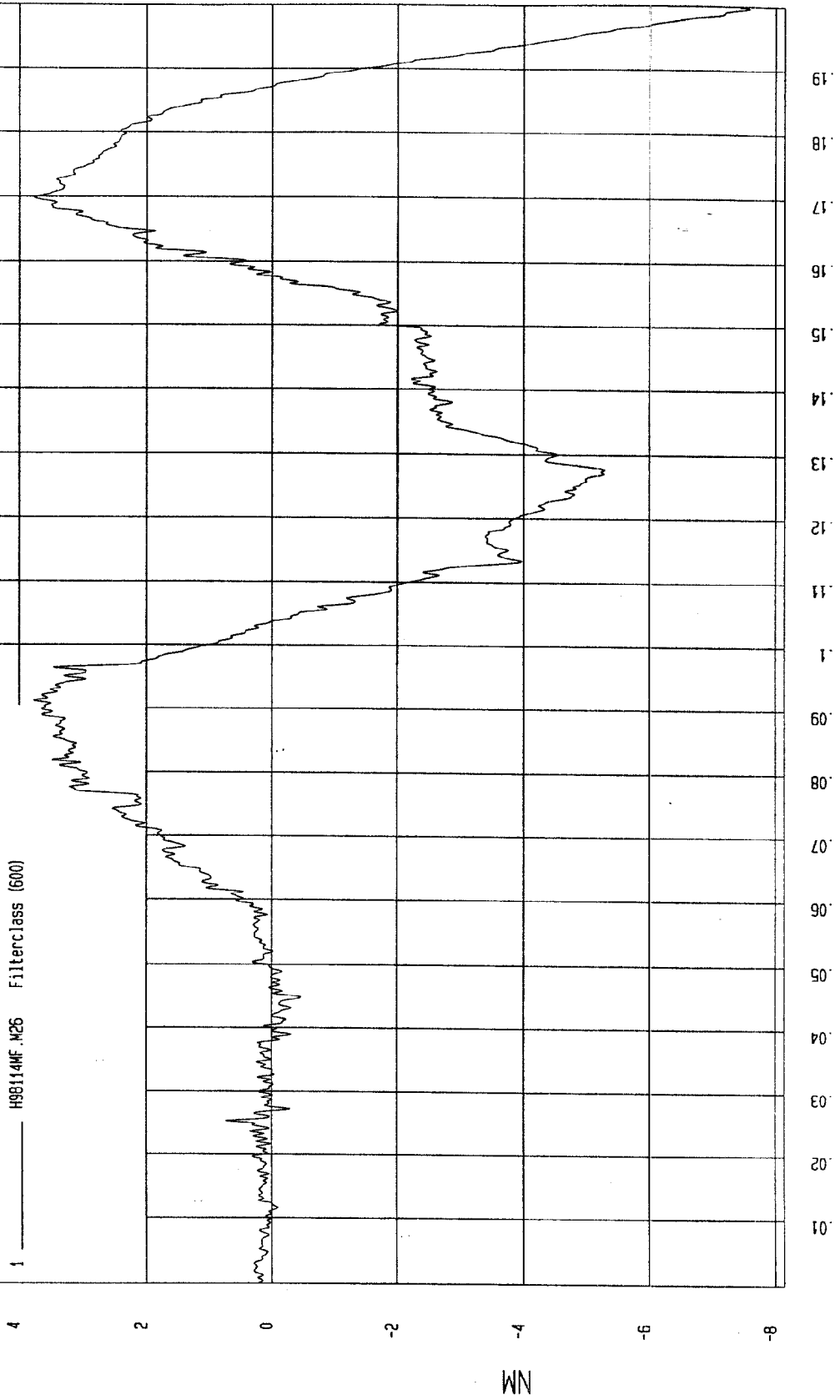
TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-7.57465 NM at 199 msec

YMAX= 3.768476 NM at 169 msec

DRIVER NECK MOMENT Z



MGA Research
05-29-1998 11:49

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

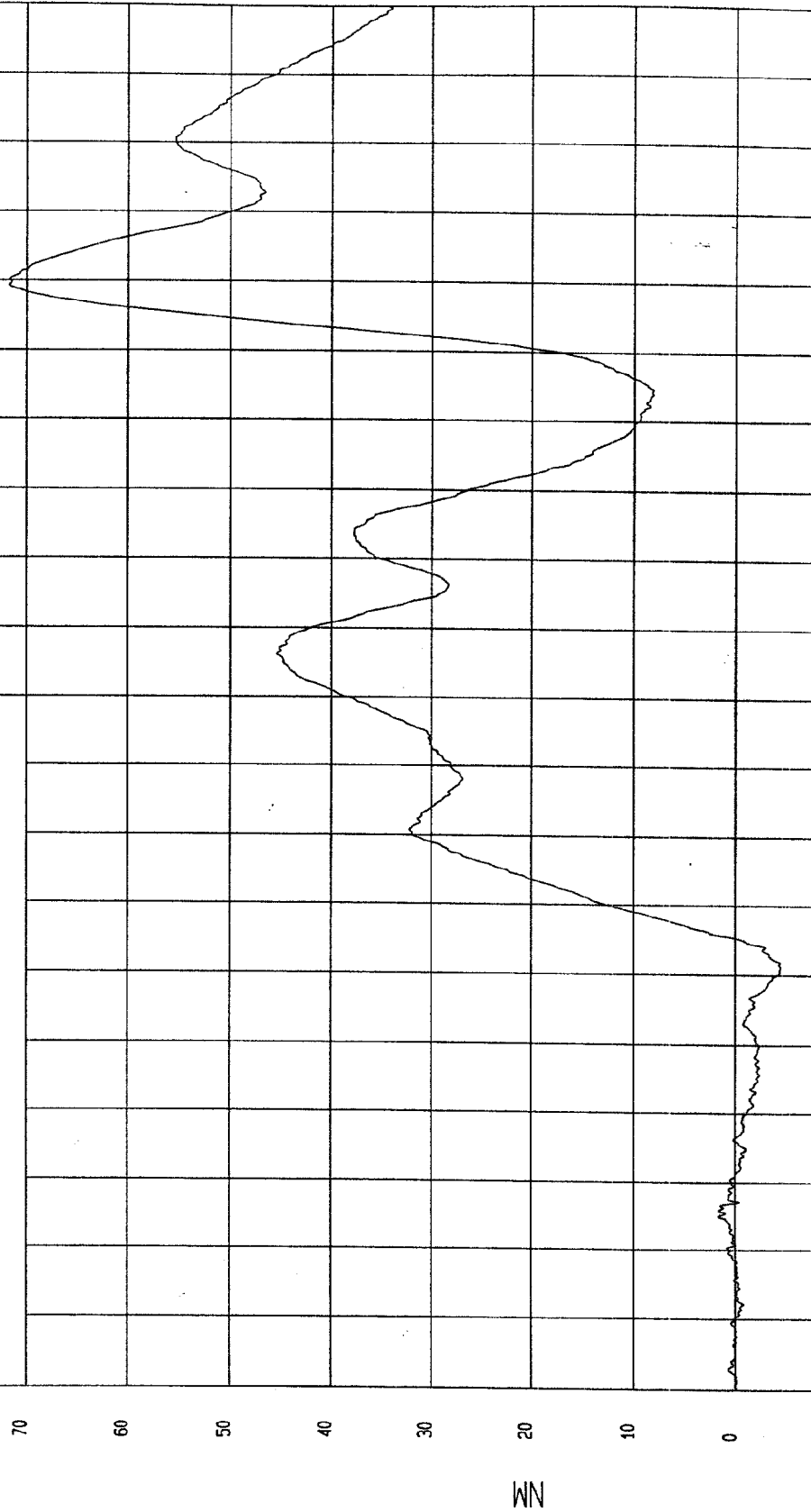
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-4.473473 NM at 61. msec

YMAX= 71.75331 NM at 159 msec

DRIVER OCCIPITAL CONDYLE MOMENT Y

1 — H98114M0.M25 Filterclass (600)



NSA Research
05-29-1998 12:08

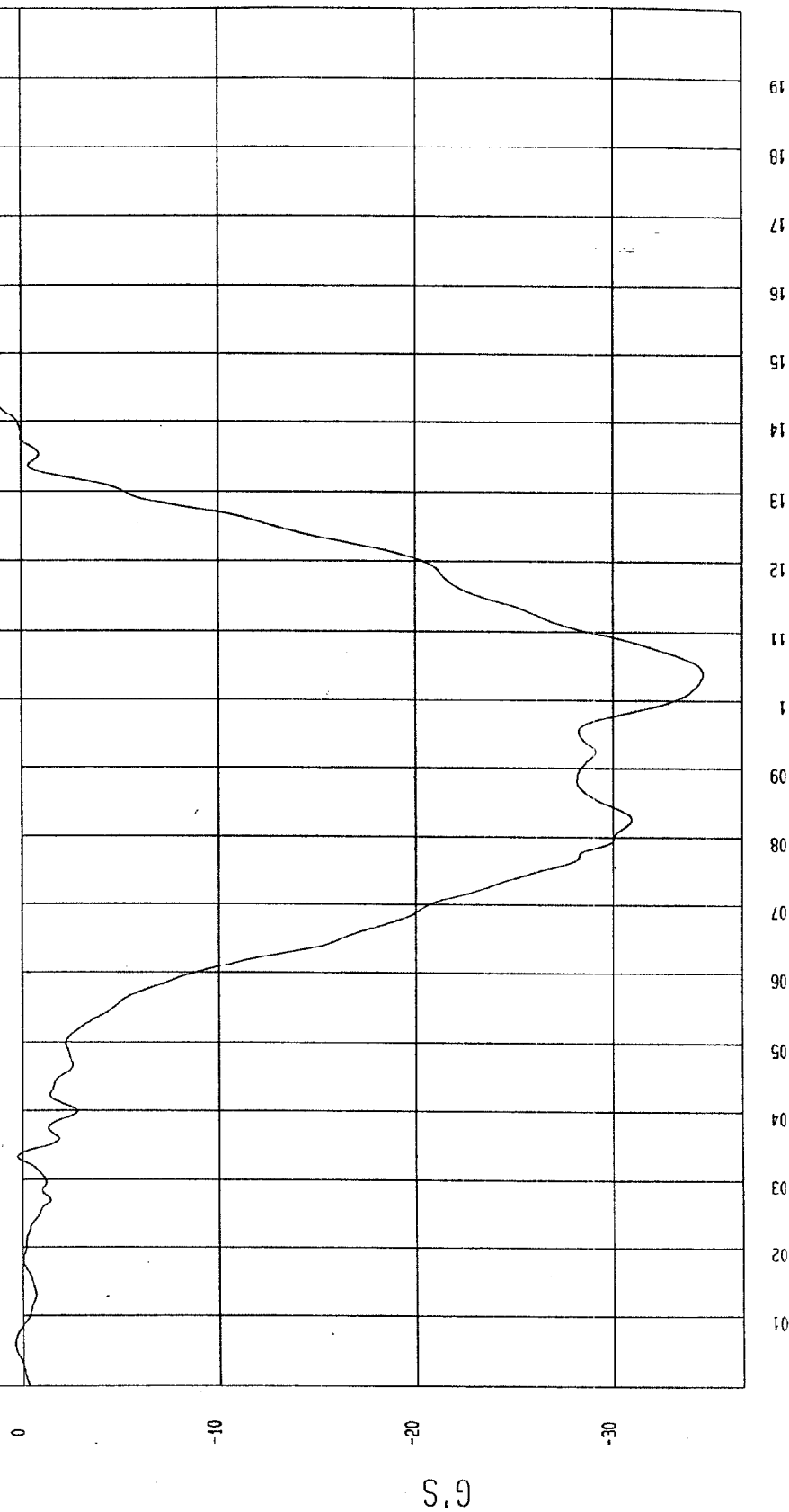
TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-34.59786 G'S at 103 msec YMAX= 4.526635 G'S at 150 msec

DRIVER CHEST X ACCELERATION

1 _____ H98114AF.A12 Filterclass (180)



MGA Research
05-29-1998 11:49

TIME (SECONDS)

G'S

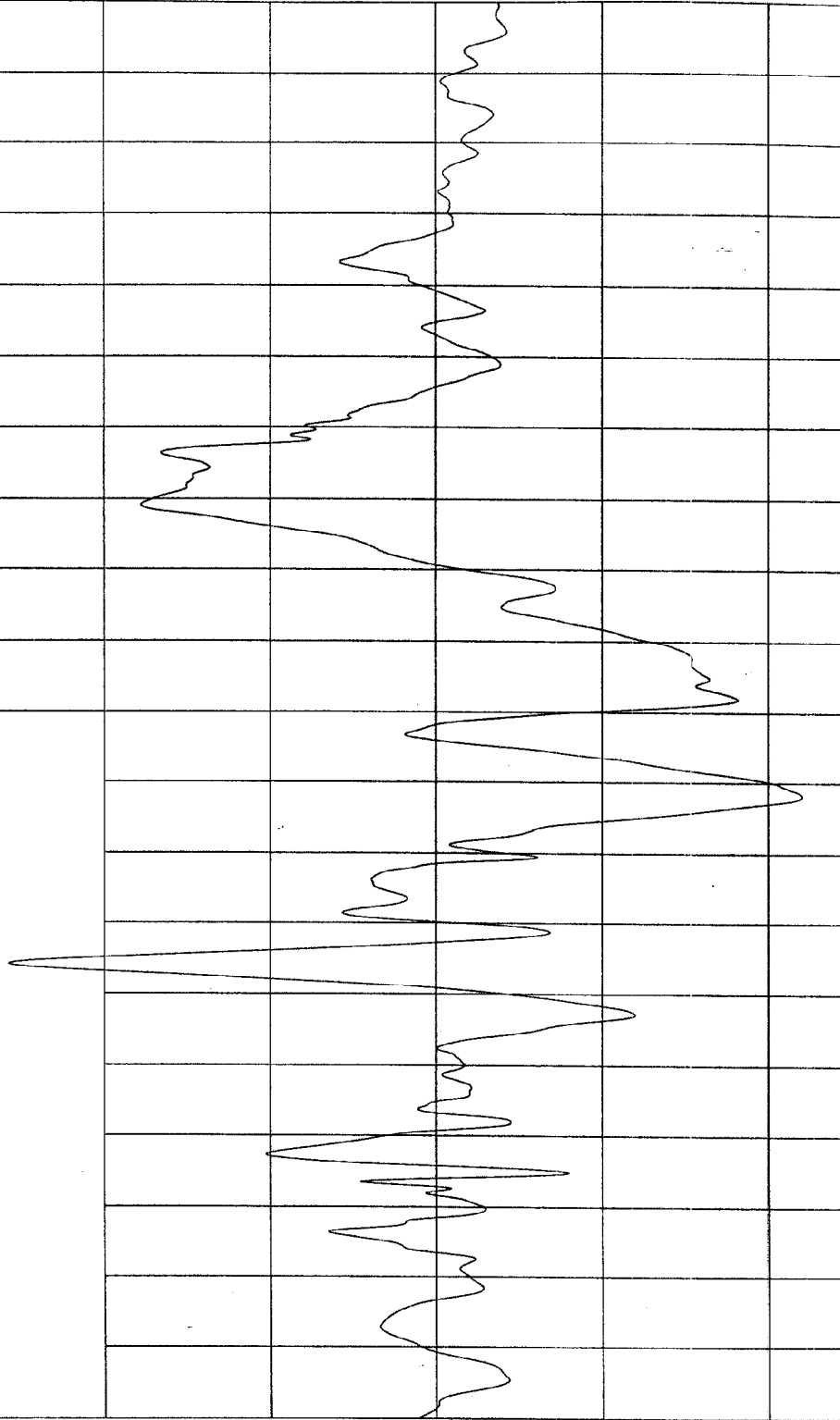
TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-2.207977 G'S at 88. msec YMAX= 2.573447 G'S at 64. msec

DRIVER CHEST Y ACCELERATION

1 H08114AF.A13 Filterclass (180)



MGA Research
05-29-1998 11:49

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

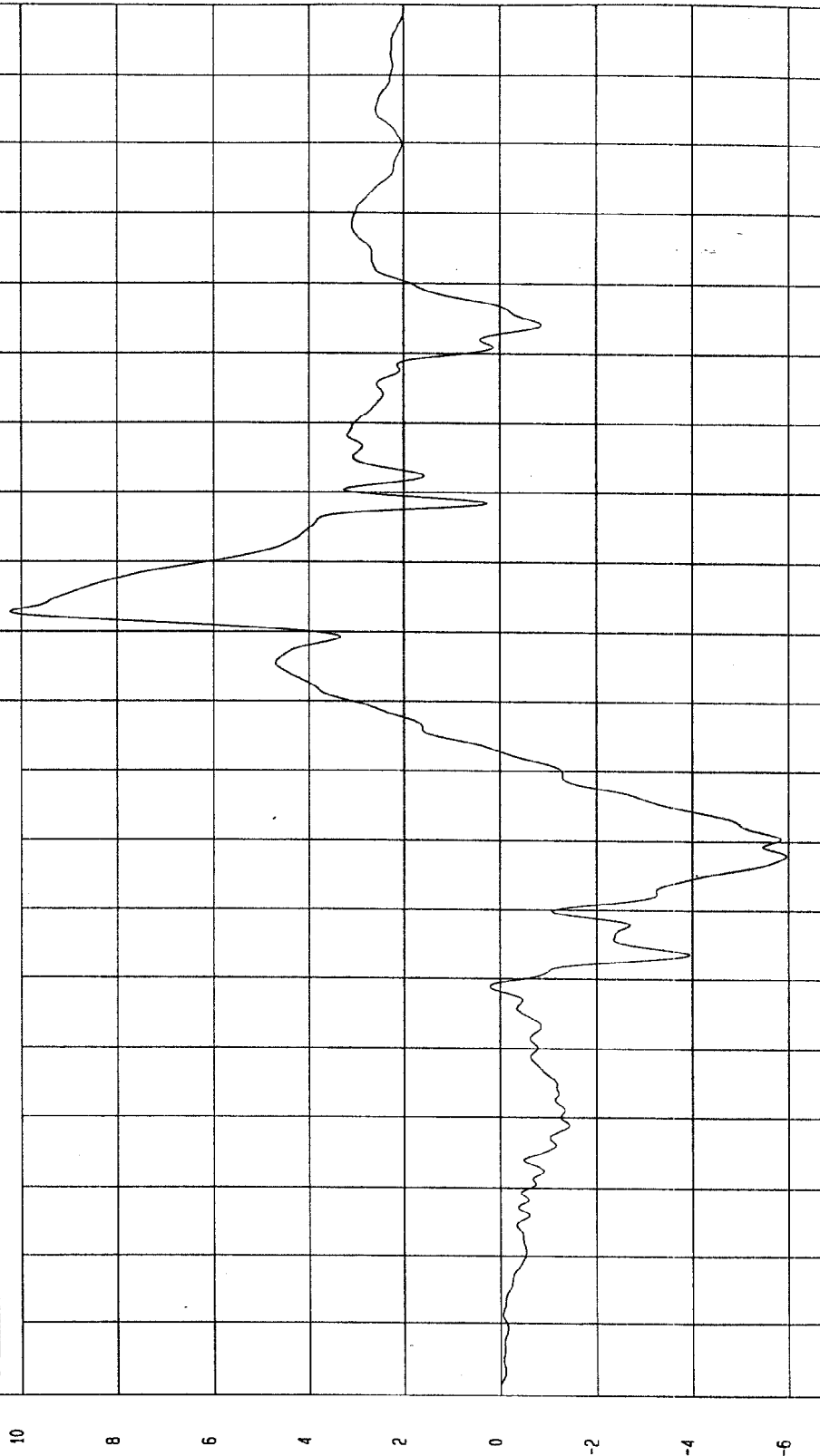
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-5.955953 G'S at 77. msec

YMAX= 10.22505 G'S at 112 msec

DRIVER CHEST Z ACCELERATION

1 — H98114AF.A04 Filterclass (180)



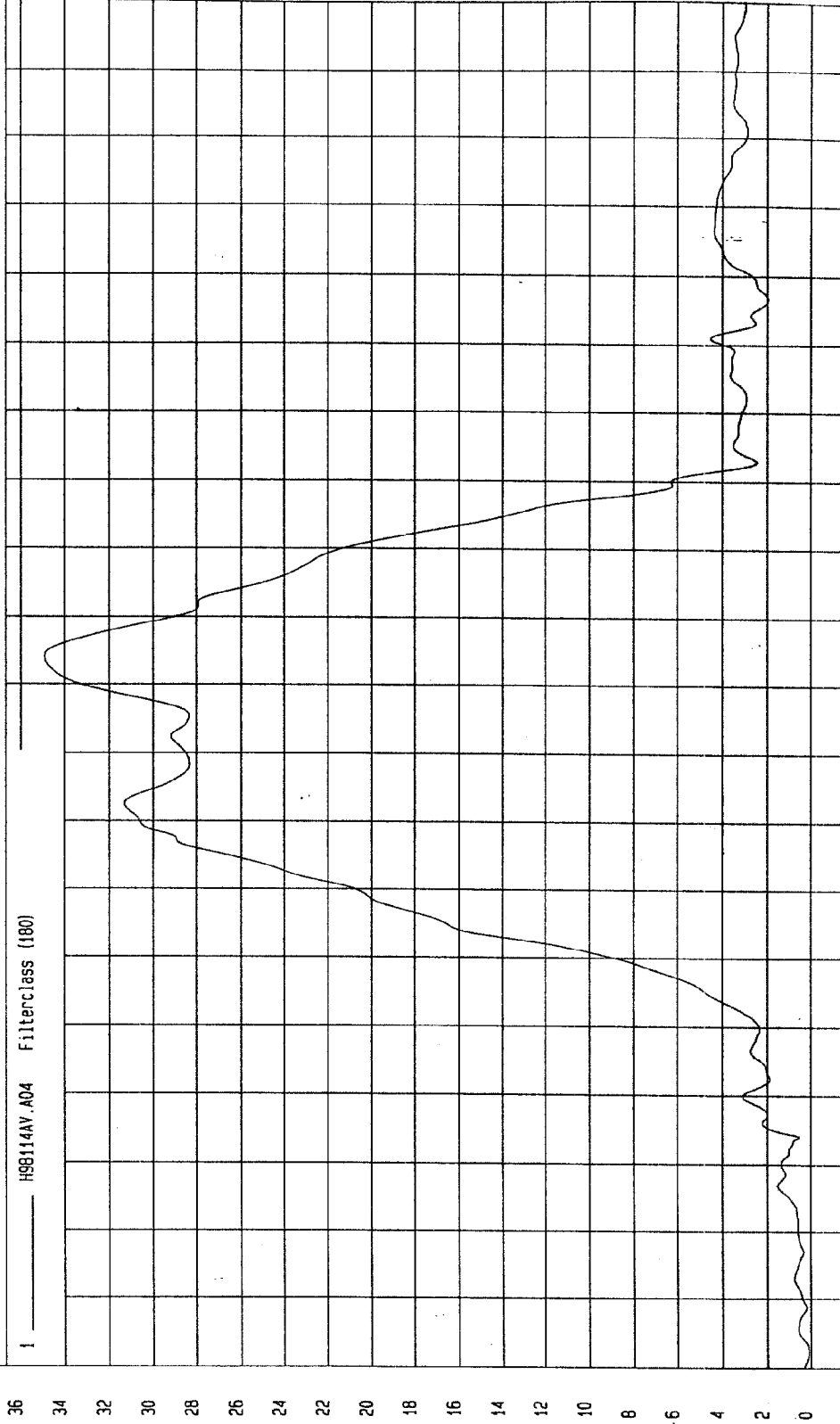
MCA Research
05-29-1998 11:50

TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN= .1114555 6'S at 2.1 msec YMAX= 34.91361 6'S at 104 msec

DRIVER CHEST RESULTANT ACCELERATION



MCA Research
05-29-1998 11:50

TIME (SECONDS)

G'S

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-1.345546 INCHES at 108 msec

YMAX= 2.295111E-02 INCHES at 27. msec

DRIVER CHEST COMPRESSION



MCA Research
05-29-1998 12:03

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

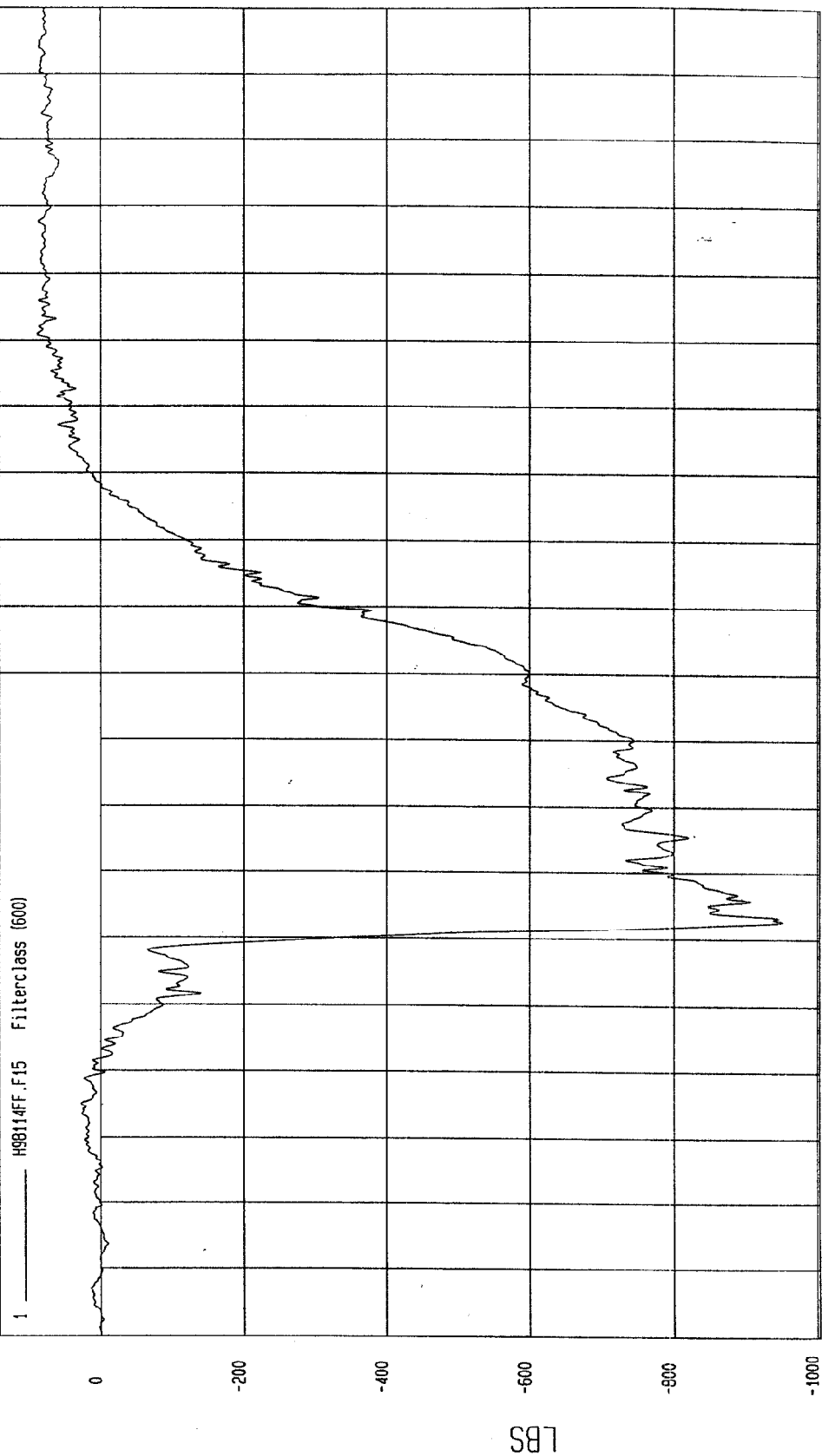
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-951.7136 LBS at 62. msec

YMAX= 87.4027 LBS at 150 msec

DRIVER LEFT FEMUR FORCE

1 ——— H98114FF.F15 Filterclass (600)



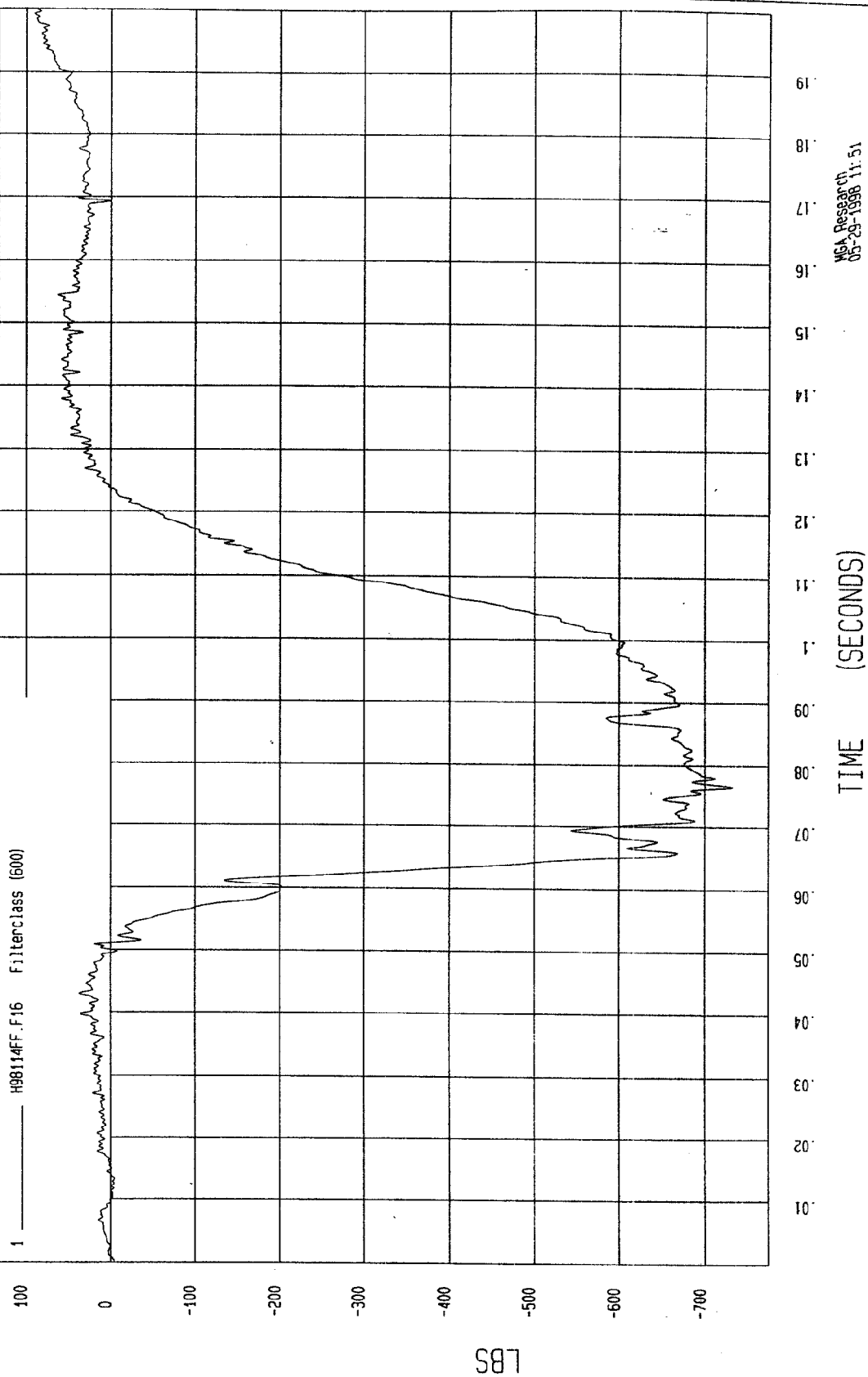
MGA Research
05-29-1998 11:51

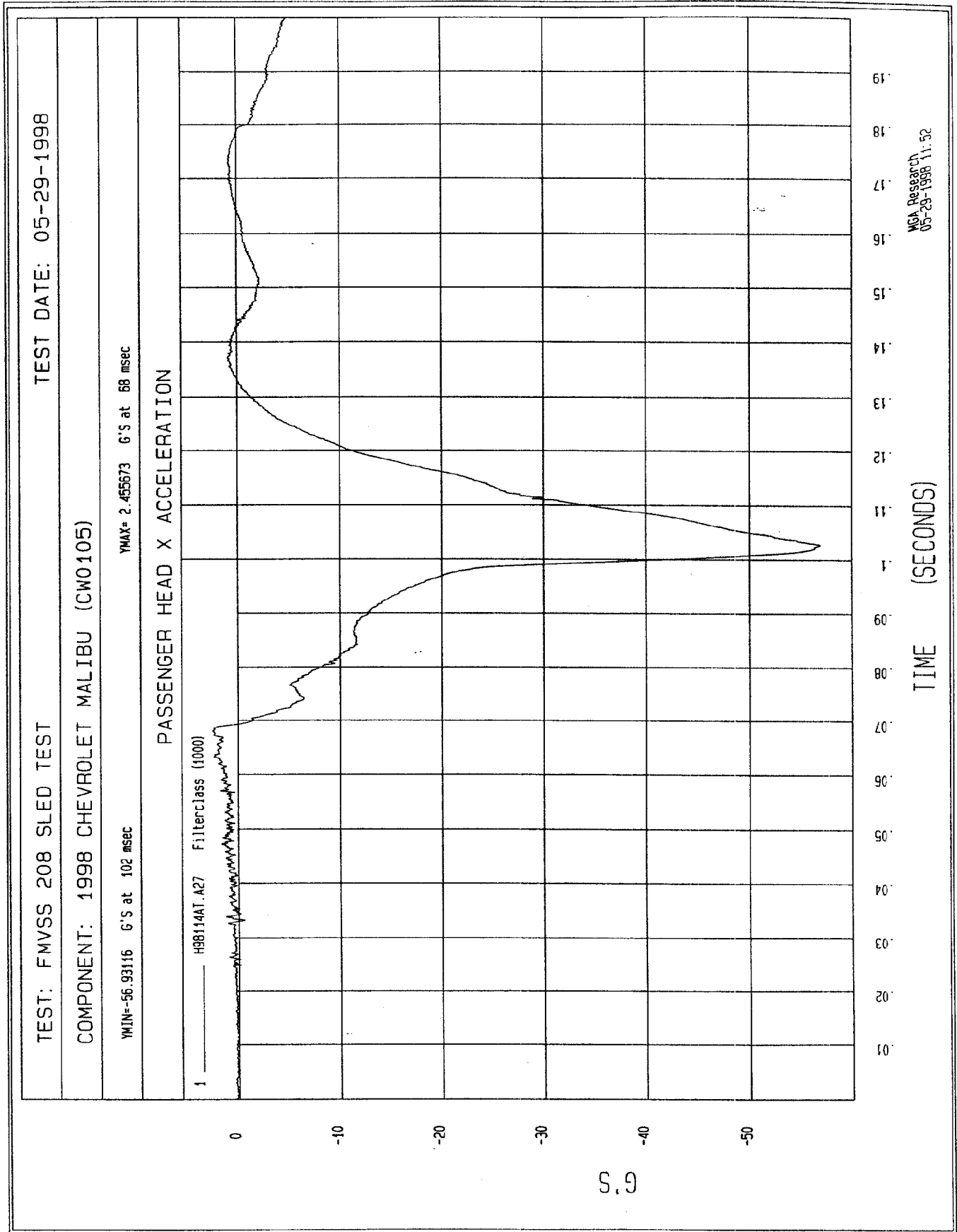
TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-733.3548 LBS at 76. msec YMAX= 90.63255 LBS at 199 msec

DRIVER RIGHT FEMUR FORCE





TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

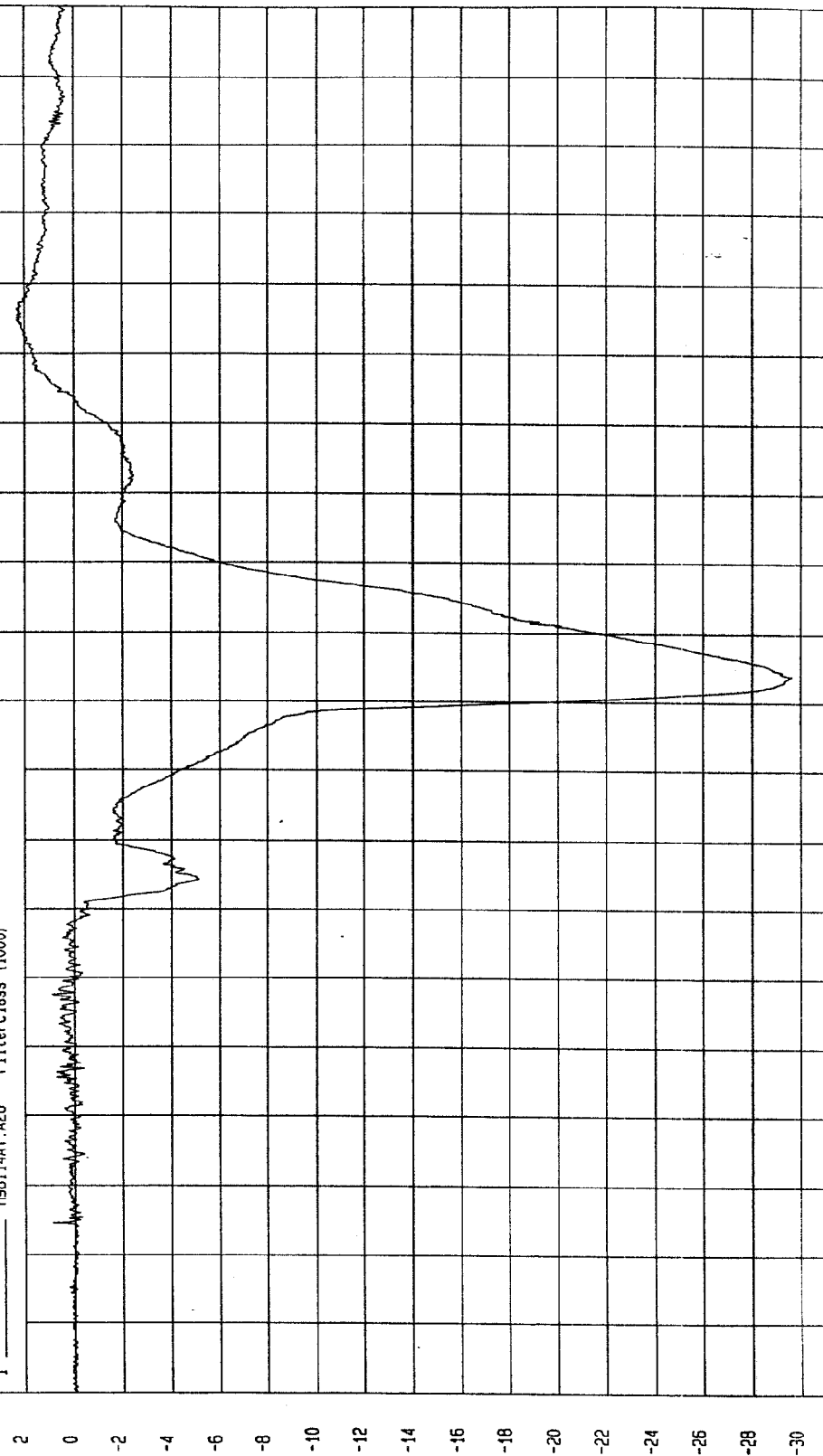
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-29.62501 G'S at 103 msec

YMAX= 2.302005 G'S at 154 msec

PASSENGER HEAD Y ACCELERATION

1 H98114AT.A28 FilterClass (1000)



MSA Research
05-29-1998 11:52

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

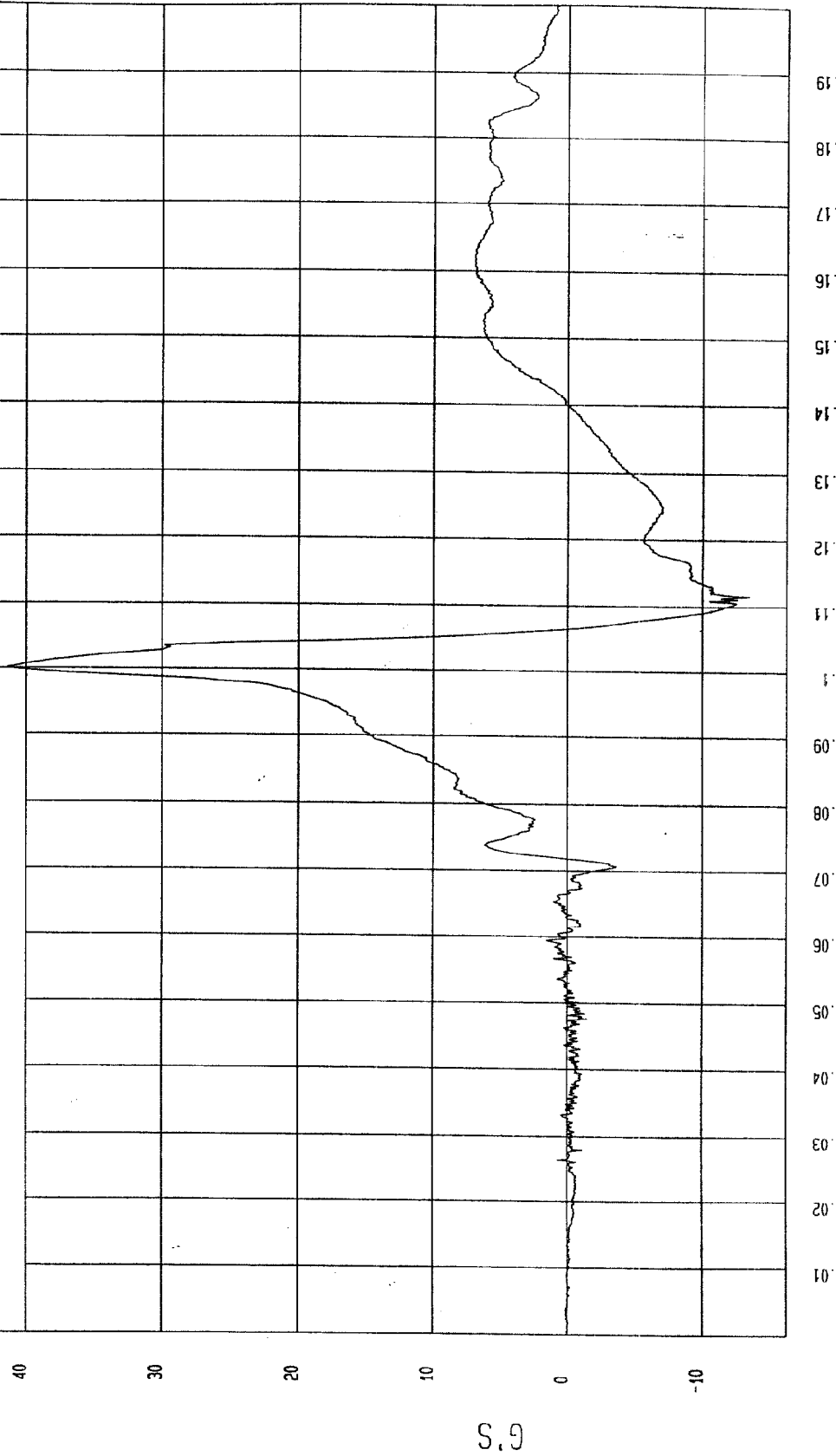
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-13.51464 G'S at 111 msec

YMAX= 41.34255 G'S at 100 msec

PASSENGER HEAD Z ACCELERATION

1 H98114AT A29 Filterclass (1000)



MSA Research
05-29-1998 11:52

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

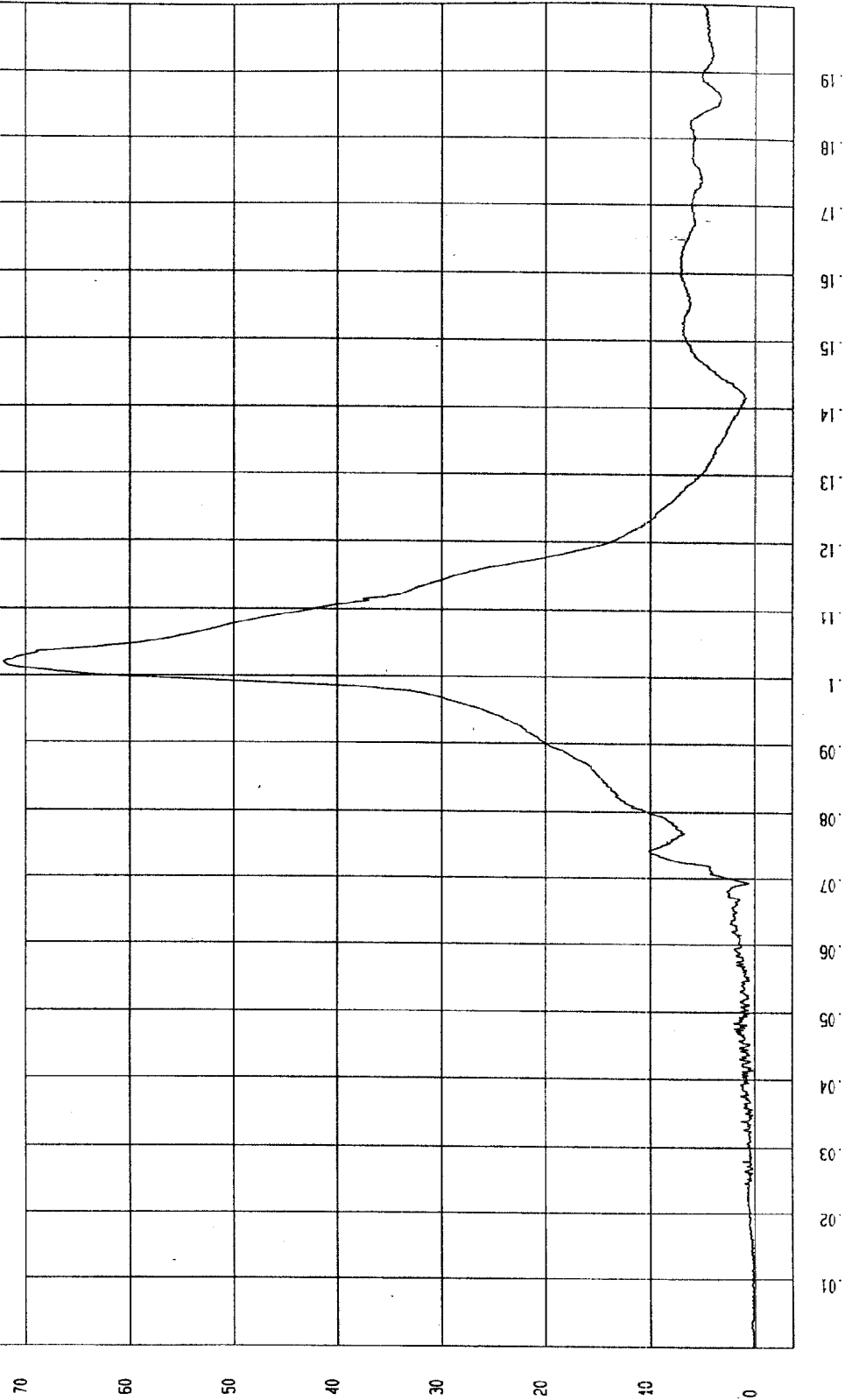
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN= 5.45477E-02 G'S at 5.6 msec

YMAX= 72.05838 G'S at 101 msec

PASSENGER HEAD RESULTANT ACCELERATION

1 ——— H98114AV.A27 Filterclass (1000)



MCA Research
05-29-1998 11:53

TIME (SECONDS)

G's

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

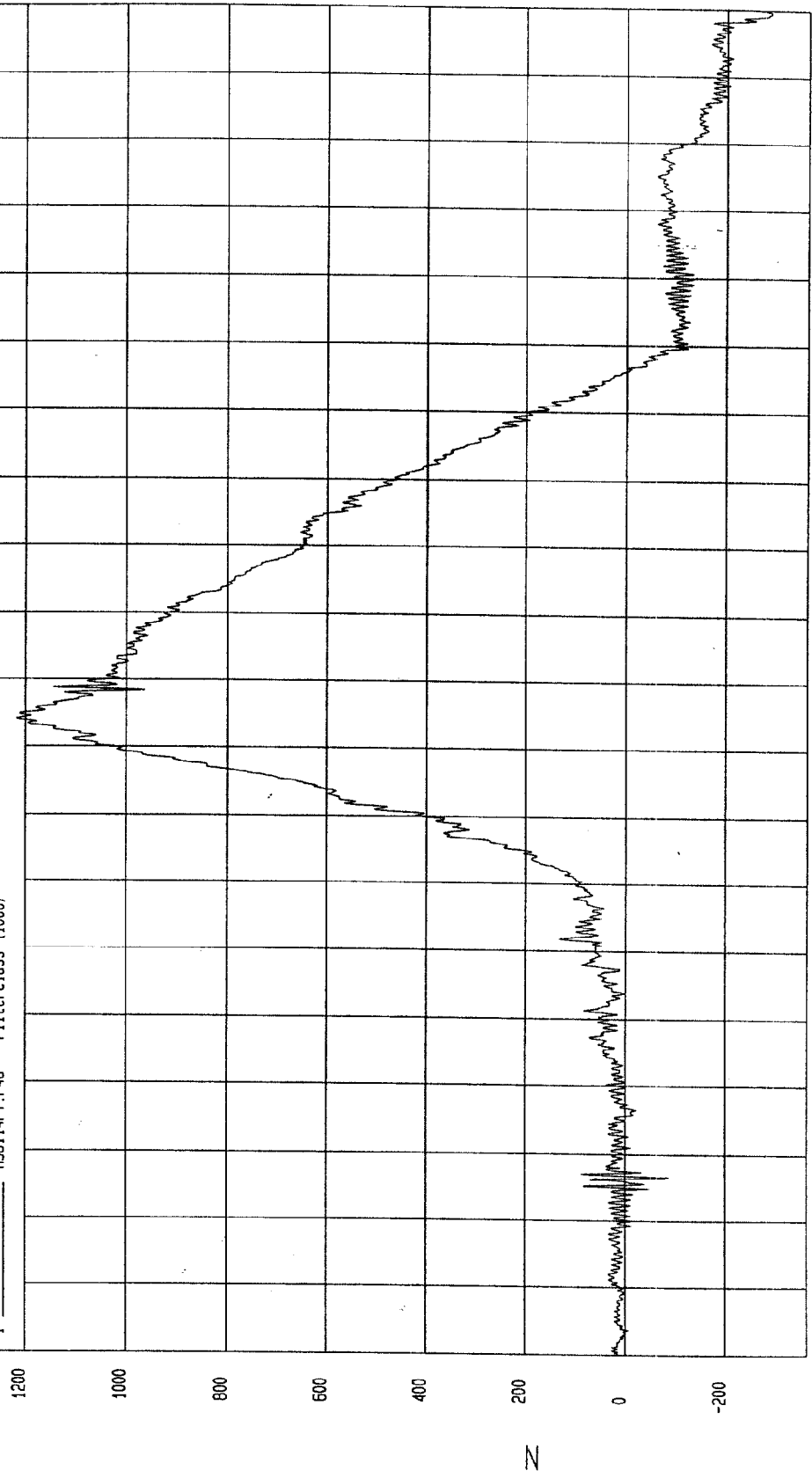
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-288.5663 N at 199 msec

YMAX= 1217.639 N at 94. msec

PASSENGER NECK FORCE X

1 H98114FT.F48 Filterclass (1000)



MGA Research
07-22-1998 10:55

TEST DATE: 05-29-1998

TEST: FMVSS 208 SLED TEST

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMAX= 528.3441 N at 121 msec

YMIN= -30.58122 N at 62. msec

PASSENGER NECK FORCE Y

1 ——— H98114FT.F32 Filterclass (1000)

500

400

300

200

100

0

N

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

MGA Research
07-22-1998 10:55

TIME (SECONDS)

TEST DATE: 05-29-1998

TEST: FMVSS 208 SLED TEST

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-2014.057 N at 104 msec YMAX= 600.0751 N at 98 msec

PASSENGER NECK FORCE Z

1 ——— H98114FT.F33 Filterclass (1000)

600
400
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000

TIME (SECONDS)

WGA Research
07-22-1998 10:56

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

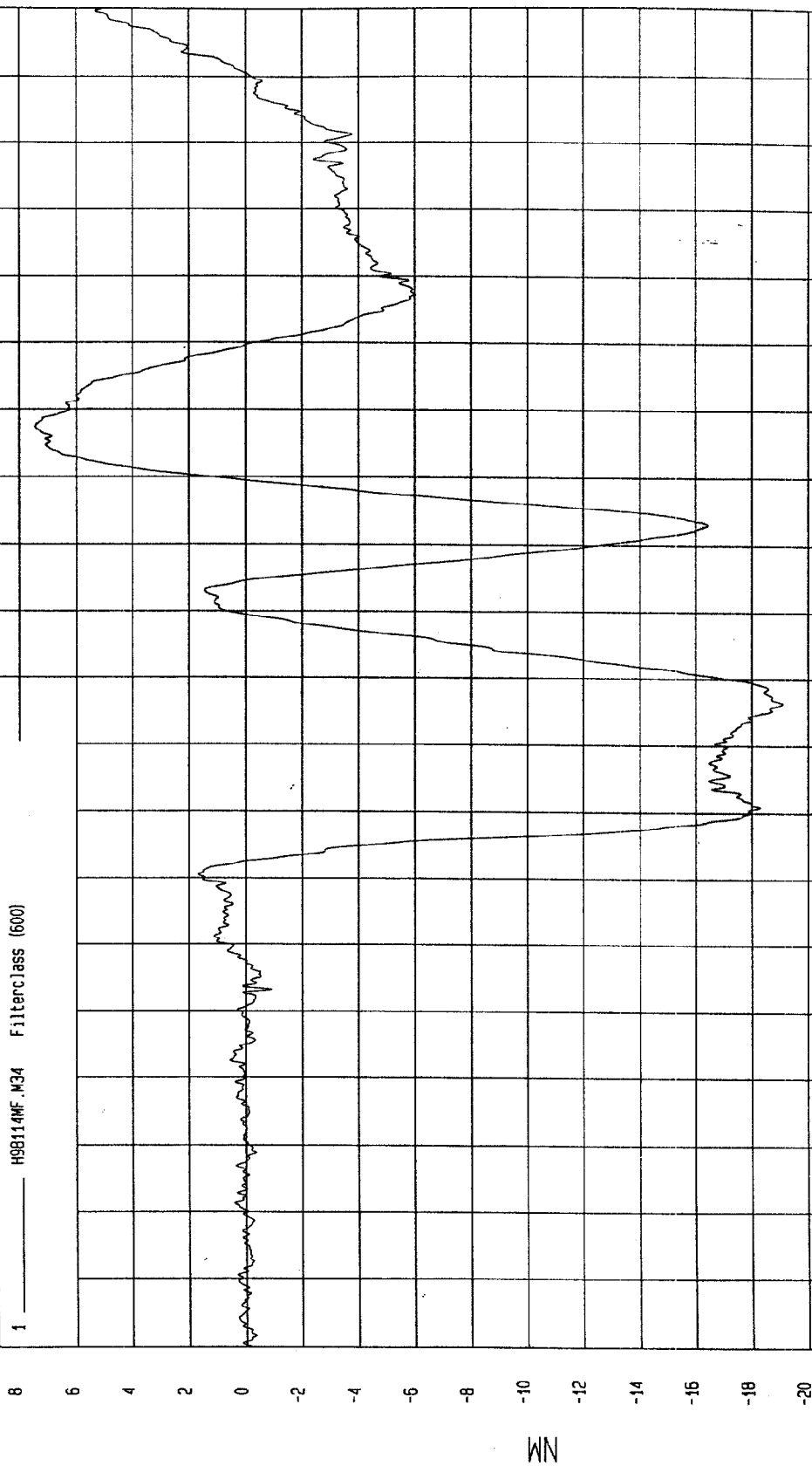
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-19.09556 NM at 96. msec

YMAX= 7.443665 NM at 137 msec

PASSENGER NECK MOMENT X

1 _____ H98114MF.M34 Filterclass (600)



MCA Research
05-29-1998 11:55

TIME (SECONDS)

NM

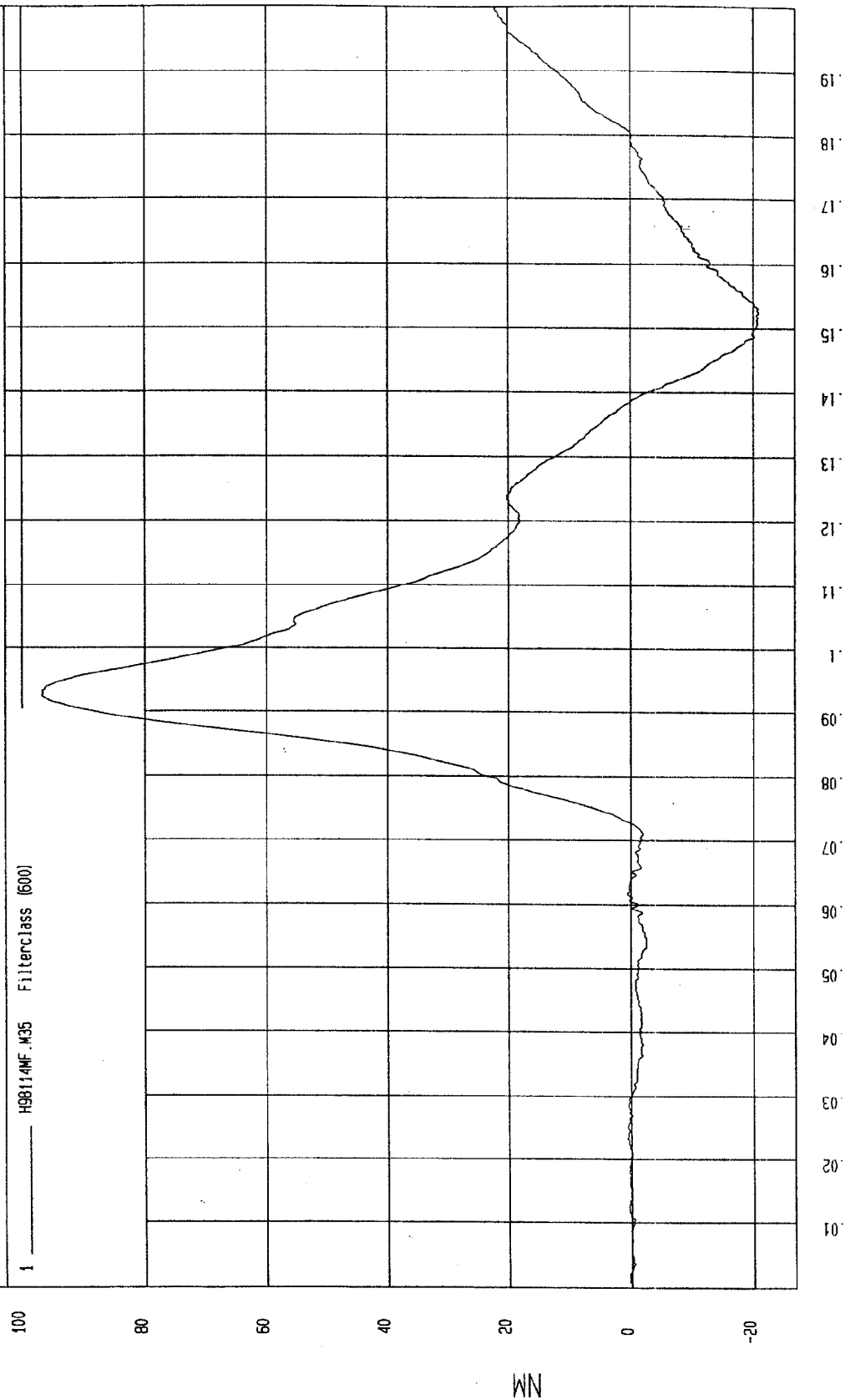
TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-20.86239 NM at 152 msec YMAX= 96.80264 NM at 92. msec

PASSENGER NECK MOMENT Y

1 H98114MF.M35 FilterClass (500)



MCA Research
05-29-1998 11:55

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

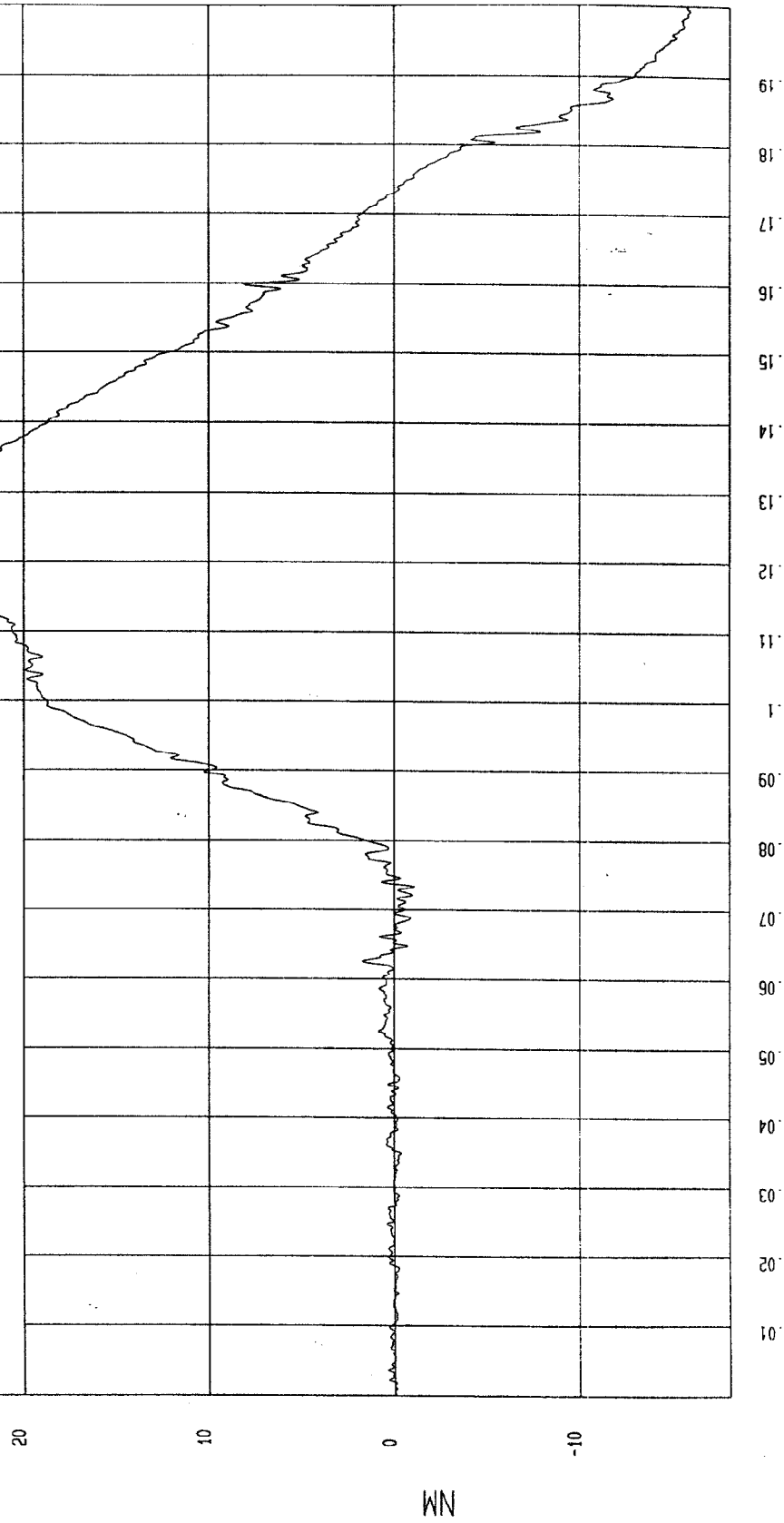
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-15.94031 NM at 199 msec

YMAX= 25.93325 NM at 125 msec

PASSENGER NECK MOMENT Z

1 _____ H98114MF.M36 Filterclass (600)



WDA Research
05-29-1998 11:55

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

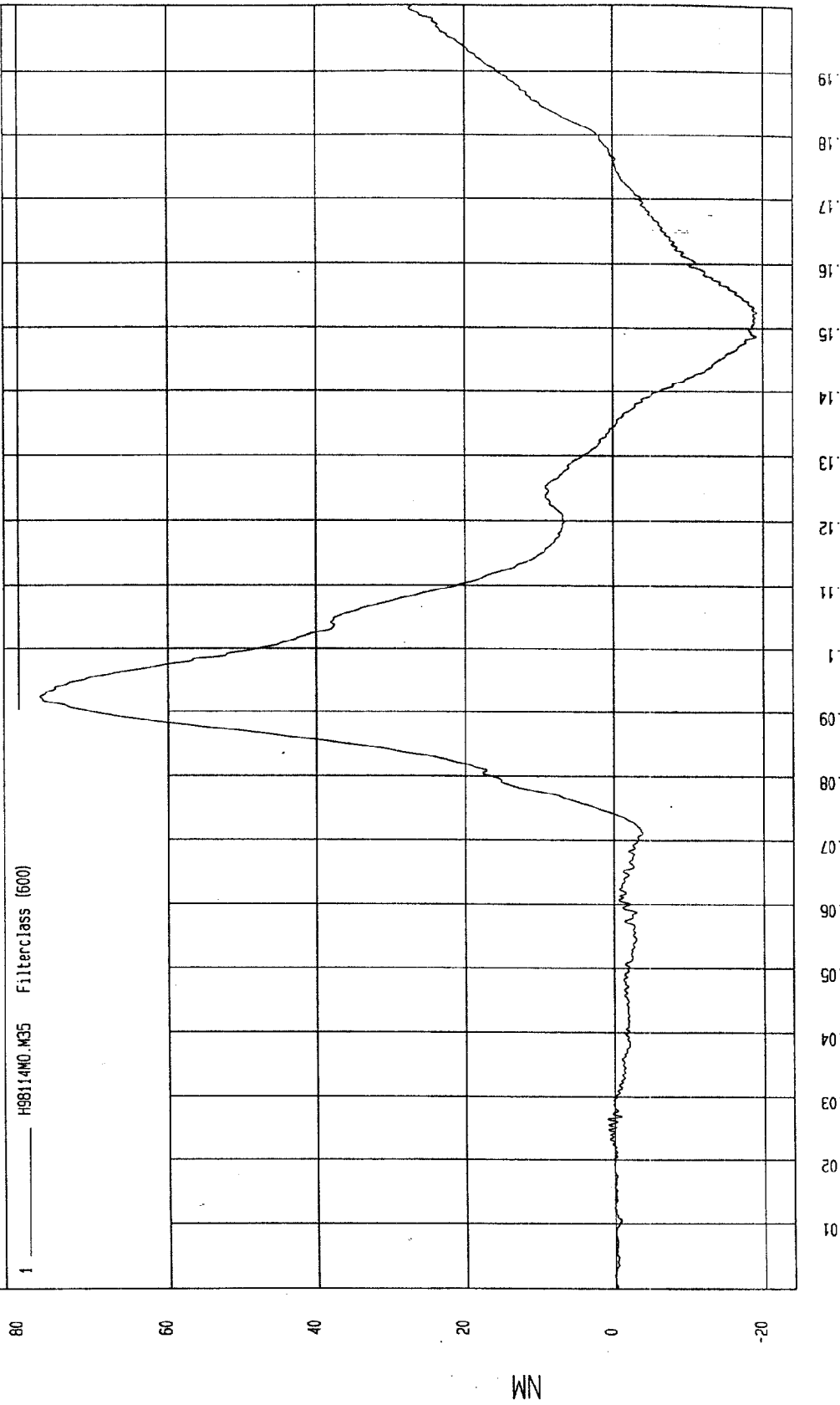
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-19.15622 NM at 152 msec

YMAX= 77.1283 NM at 92. msec

PASSENGER OCCIPITAL CONDYLE MOMENT Y

1 ——— H98114M0.M35 Filterclass (600)



NSA Research
05-29-1998 12.08

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

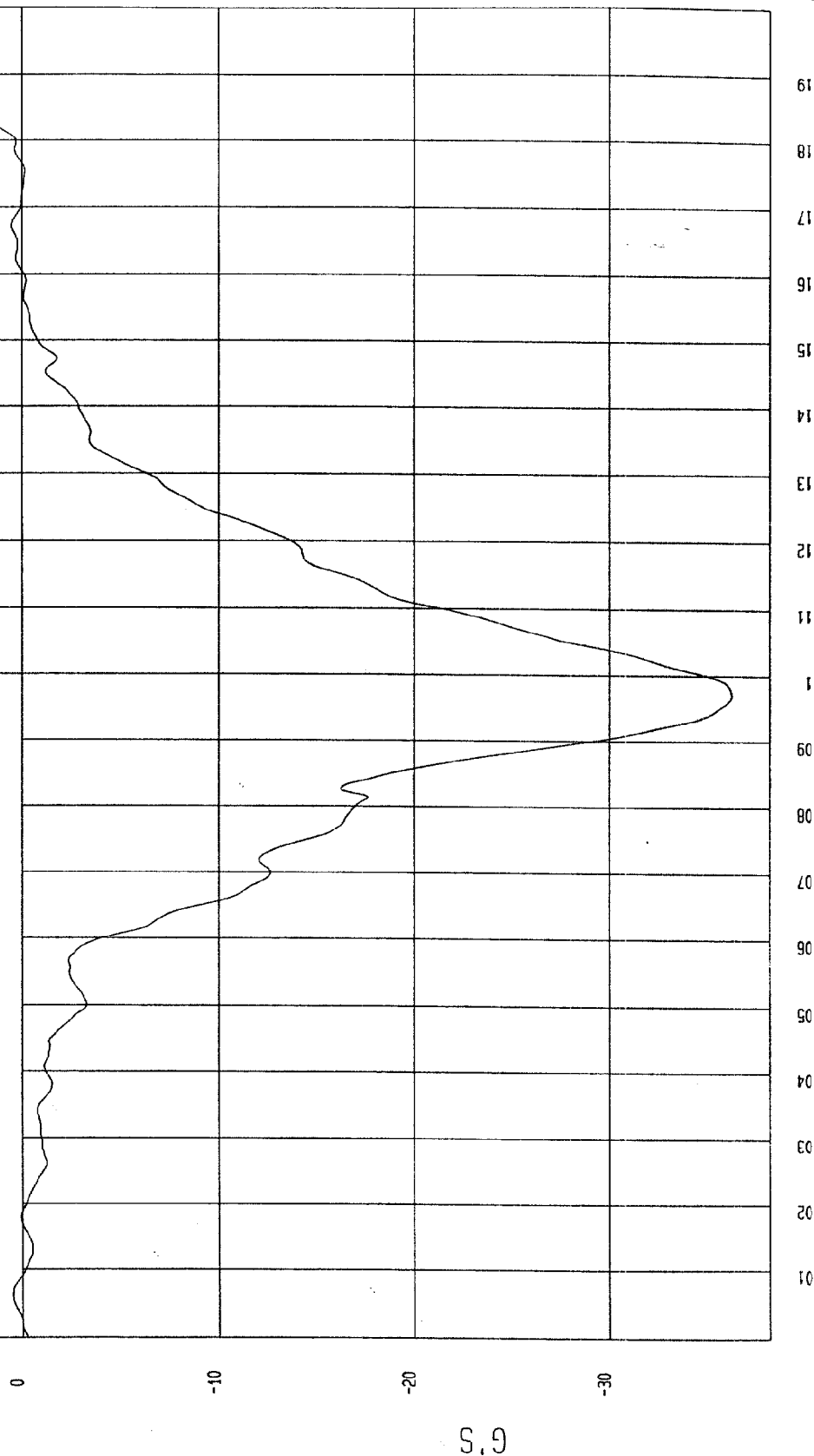
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-36.23389 G'S at 97. msec

YMAX= 1.778409 G'S at 189 msec

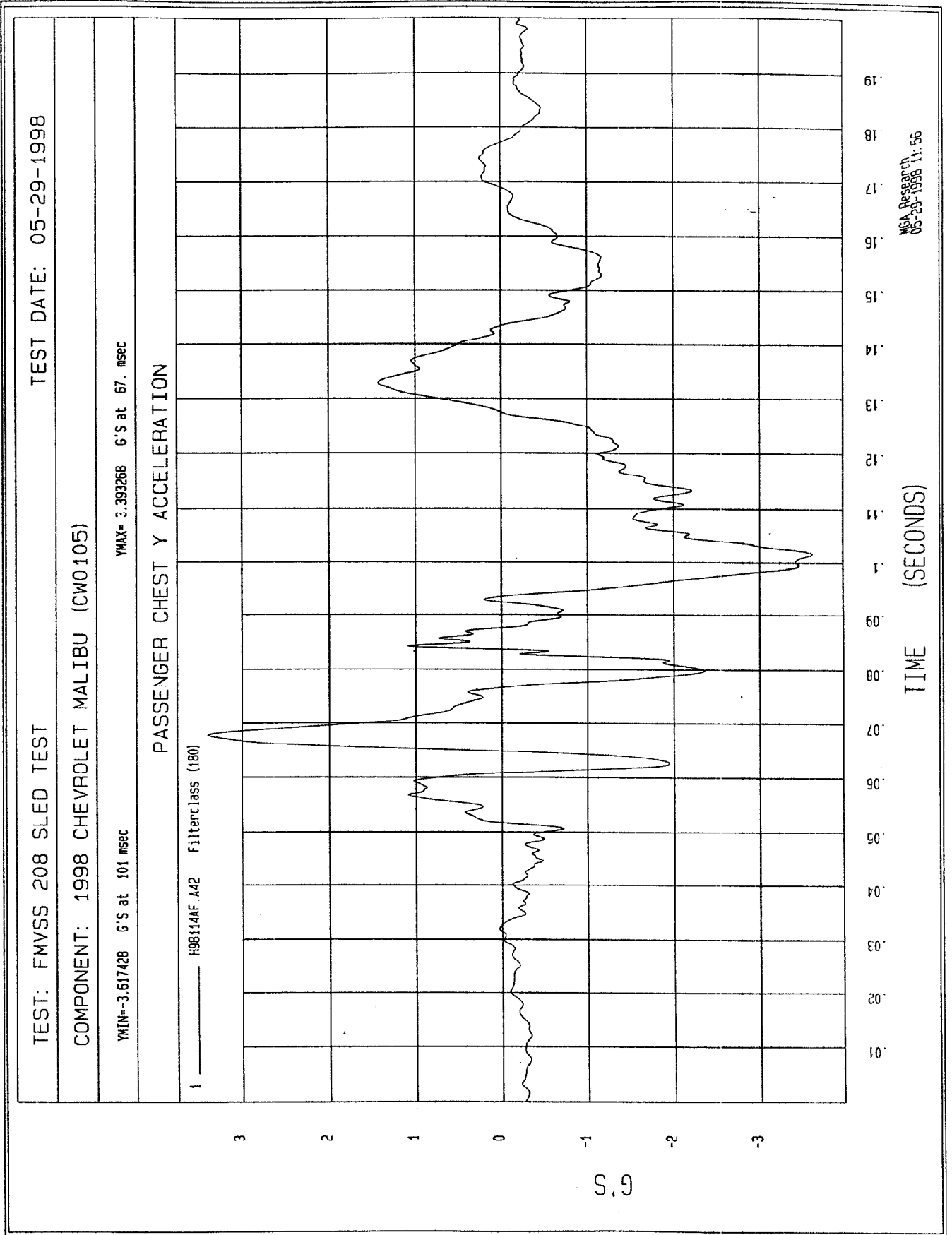
PASSENGER CHEST X ACCELERATION

1 H98114AF.A17 Filterclass (180)



MCA Research
05-29-1998 11:56

TIME (SECONDS)

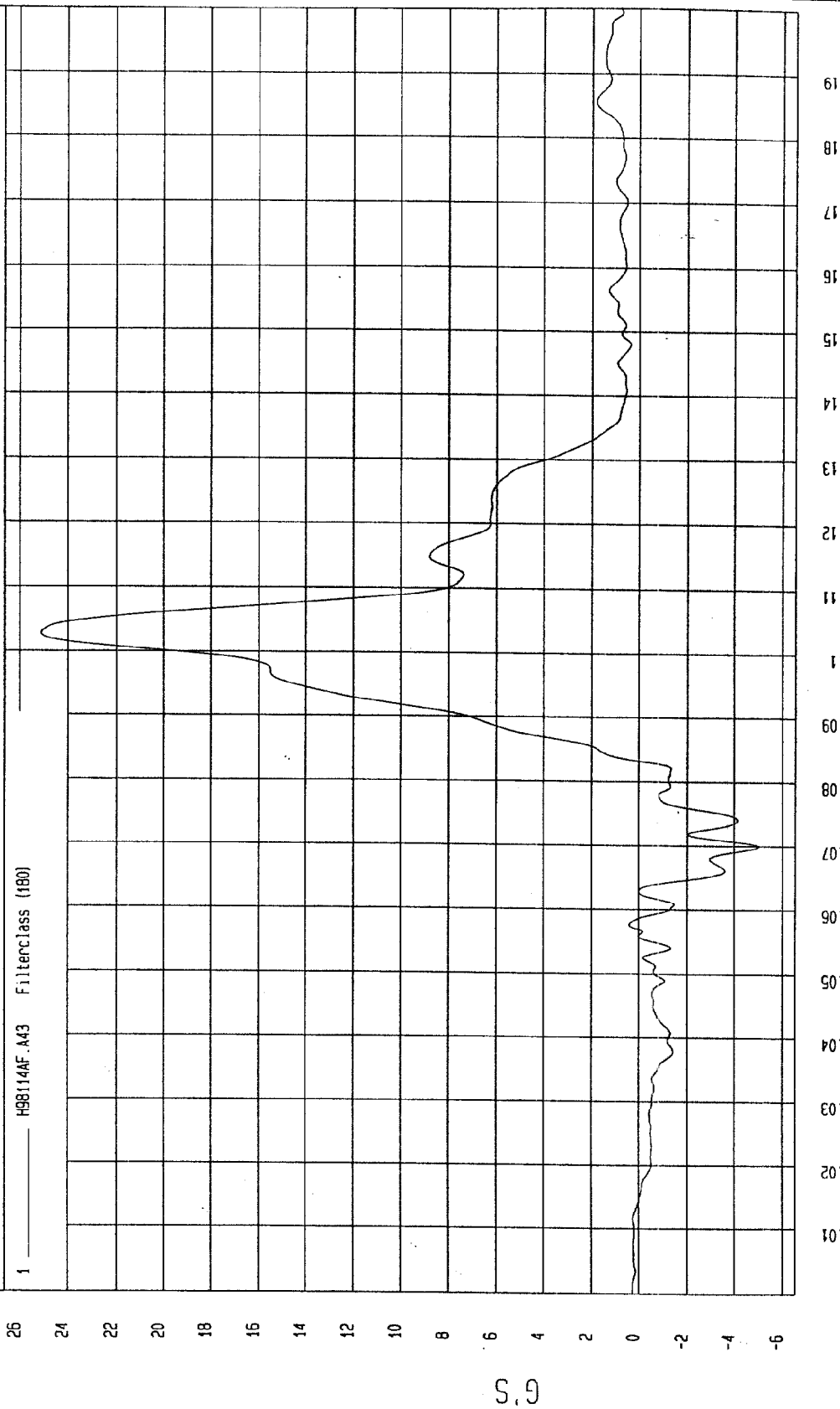


TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-5.022303 G'S at 69. msec YMAX= 25.12145 G'S at 102 msec

PASSENGER CHEST Z ACCELERATION



MCA Research
05-29-1998 11:56

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

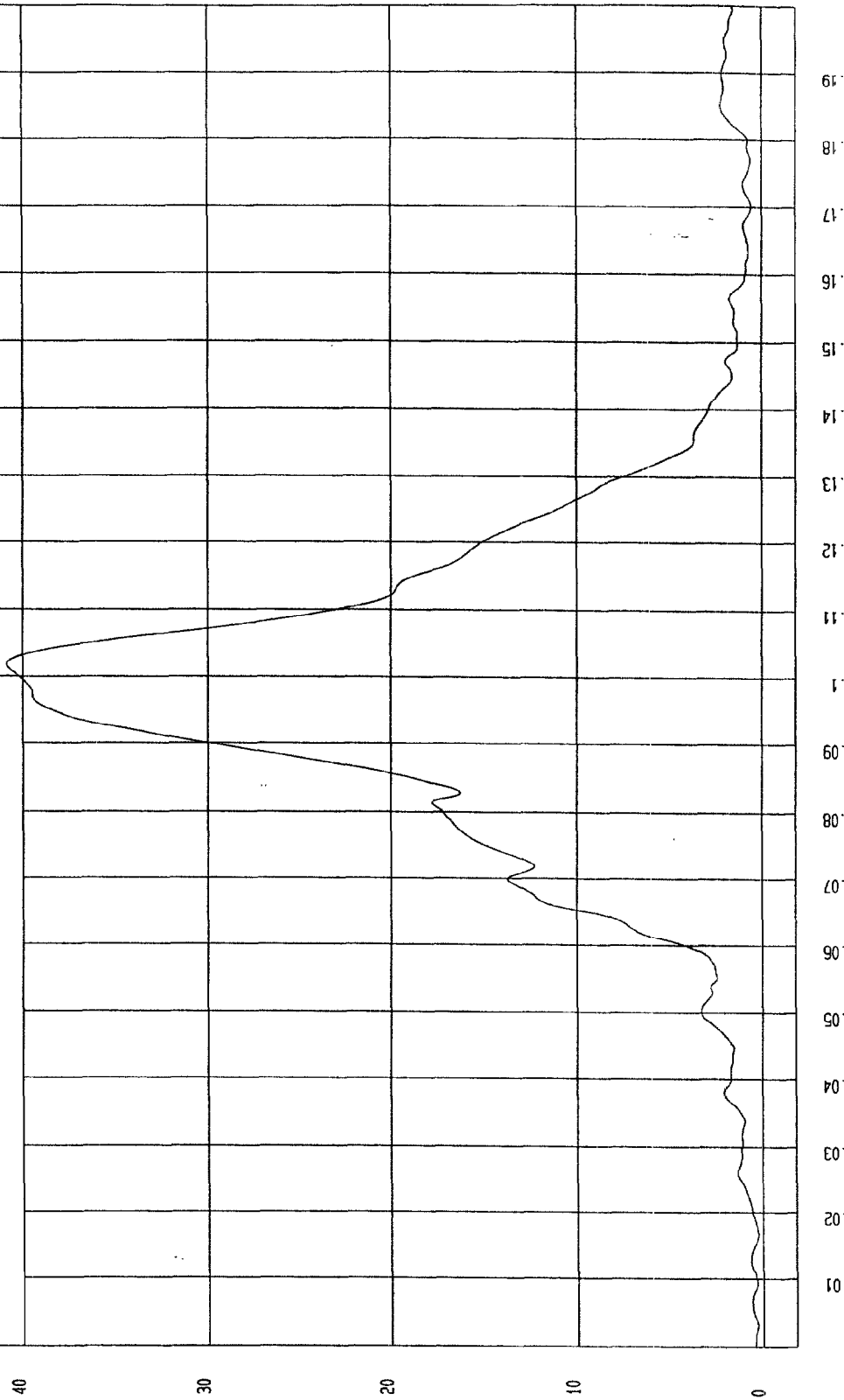
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN= .2321666 G'S at 16. msec

YMAX= 40.87343 G'S at 101 msec

PASSENGER CHEST RESULTANT ACCELERATION

1 ——— H98114AY A17 Filterclass (180)



MCA Research
05-29-1998 11:57

TIME (SECONDS)

G.S

TEST: FMVSS 208 SLED TEST

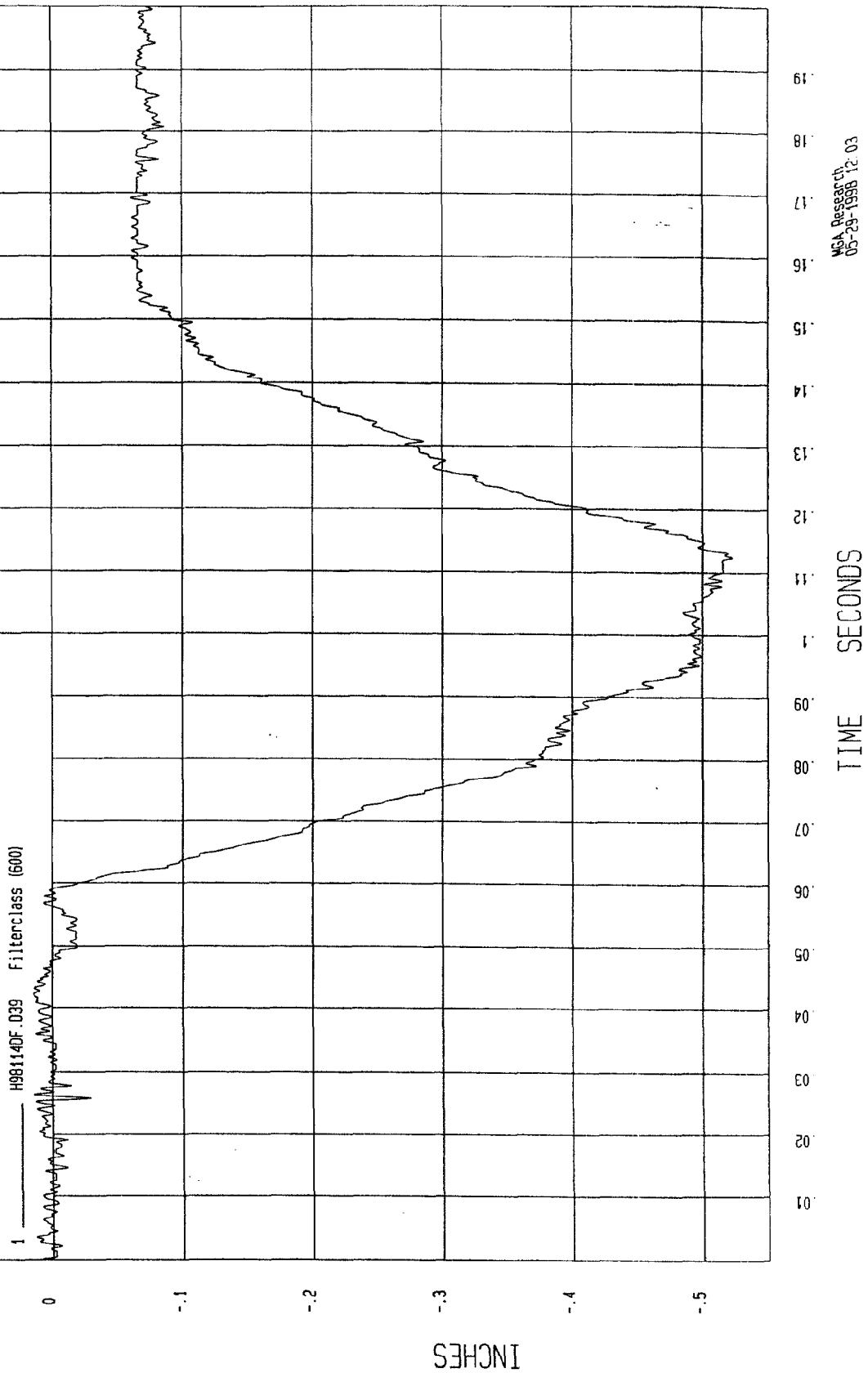
TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN = .5231618 INCHES at 112 msec

YMAX = 1.461531E-02 INCHES at 25. msec

PASSENGER CHEST COMPRESSION



TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

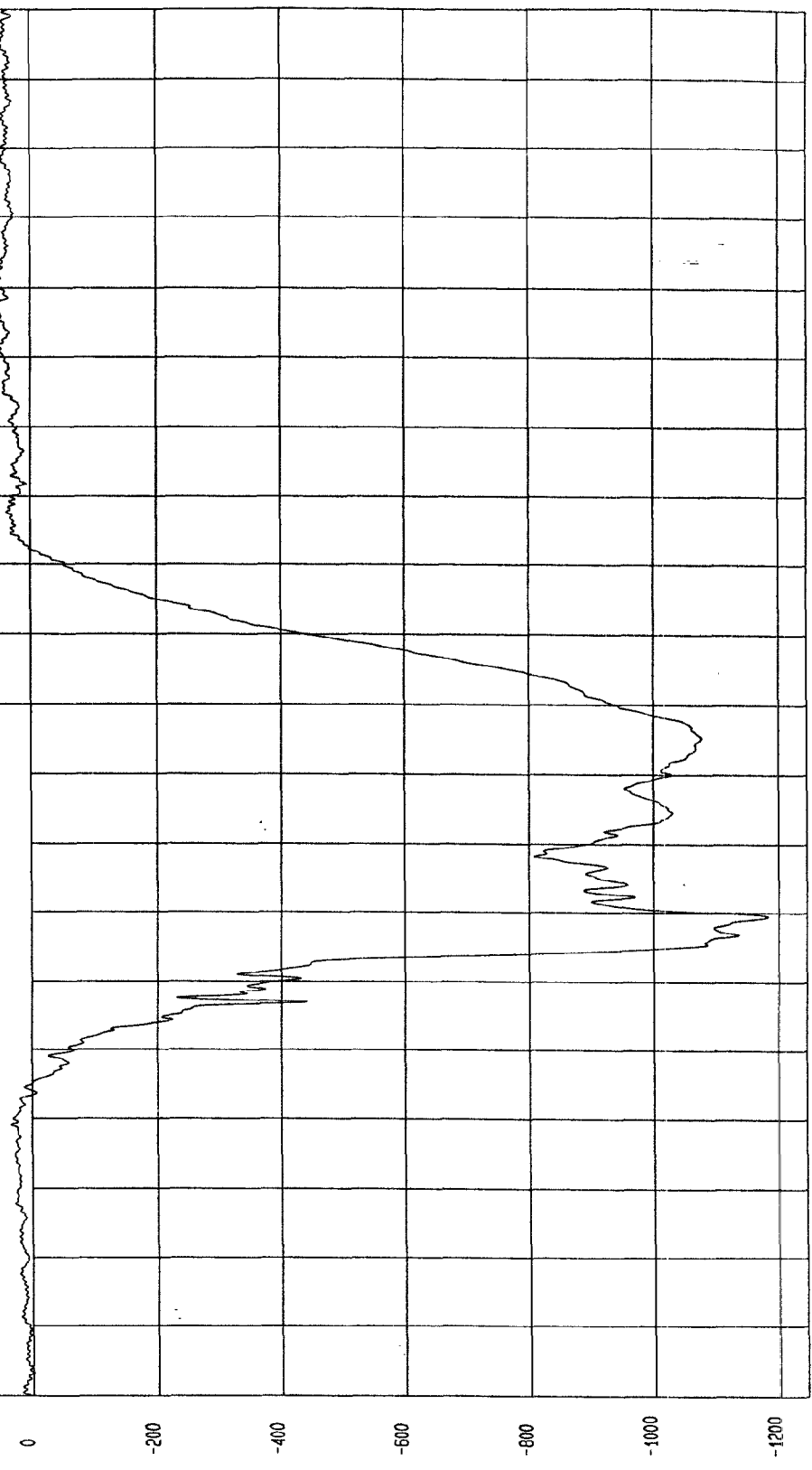
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-1183.513 LBS at 69. msec

YMAX= 54.87112 LBS at 157 msec

PASSENGER LEFT FEMUR FORCE

1 ——— H98114FF.F44 Filterclass (600)



MCA Research
05-29-1998 11:58

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

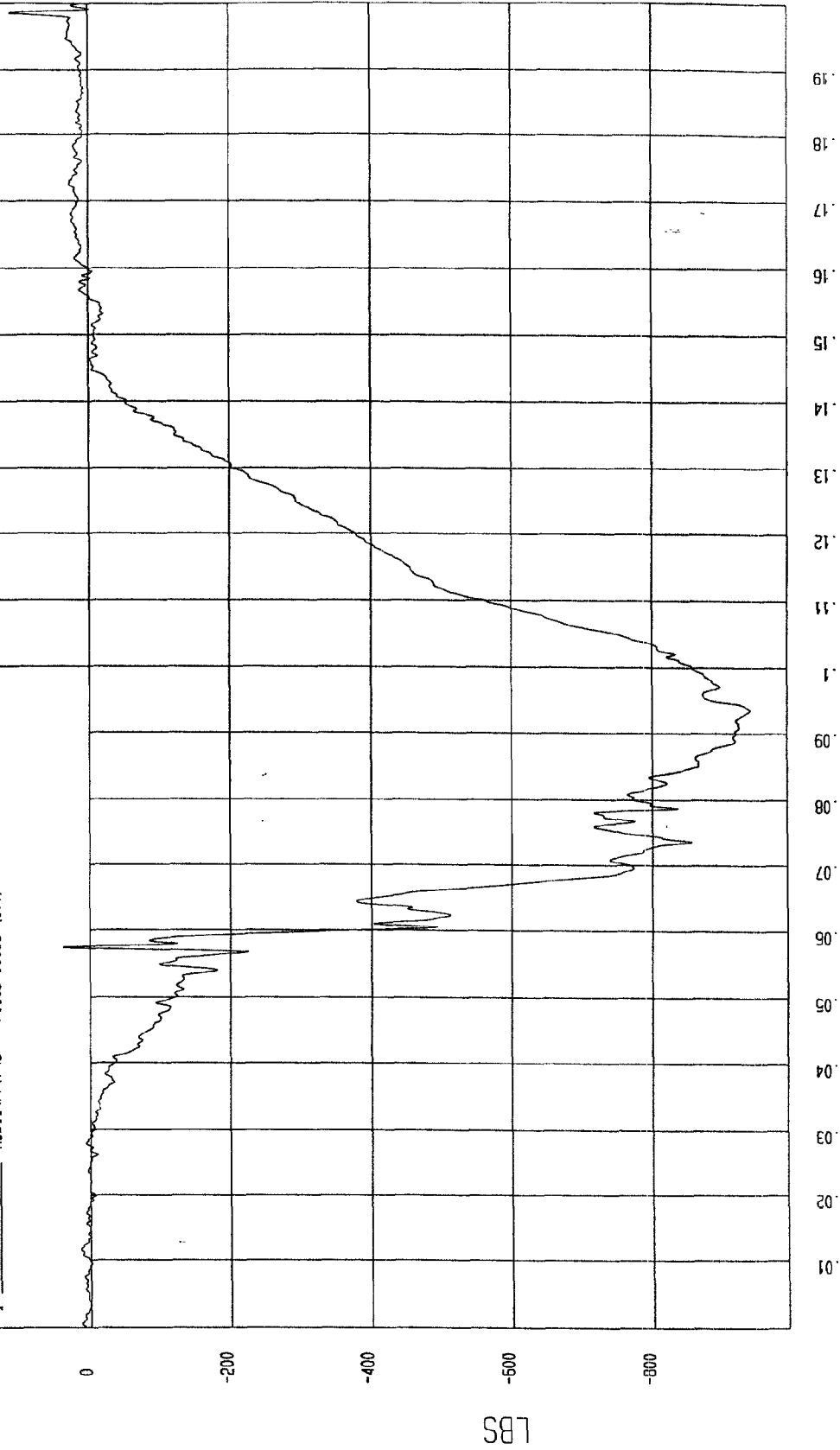
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-939.597 LBS at 93. msec

YMAX= 109.5063 LBS at 198 msec

PASSENGER RIGHT FEMUR FORCE

1 _____ H98114FF.F45 Filterclass (600)



MSA Research
05-29-1998 11:58

TEST: FMYSS 208 SLED TEST

TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

Minimum = -1.24 G'S at 122.1 msec

Maximum = 17.52 G'S at 65.4 msec

SLED ACCELERATION

1 ——— H98114AF.A01 Filterclass (60)

20

18

16

14

12

10

8

6

4

2

-2

G'S

0

.01

.02

.03

.04

.05

.06

.07

.08

.09

.1

.11

.12

.13

.14

.15

.16

.17

.18

.19

TIME (SECONDS)

MGA Research
05-29-1998 11:43

TEST DATE: 05-29-1998

TEST: FMVSS 208 SLED TEST

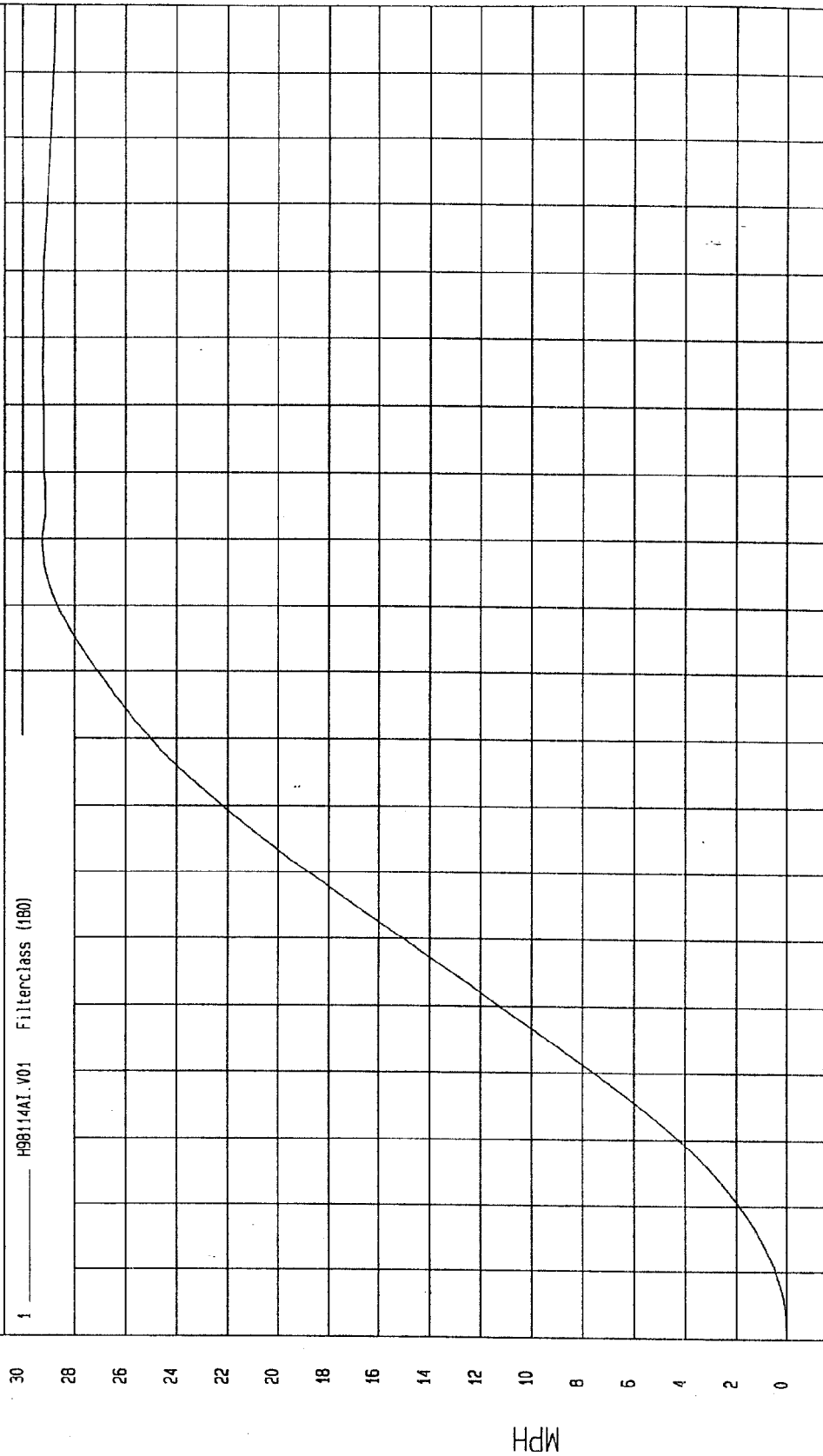
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN= 0 MPH at 9.9 msec

YMAX= 29.24023 MPH at 119 msec

SLED X VELOCITY

1 H98114AI.V01 Filterclass (180)



MCA Research
05-29-1998 11:38

TIME Seconds

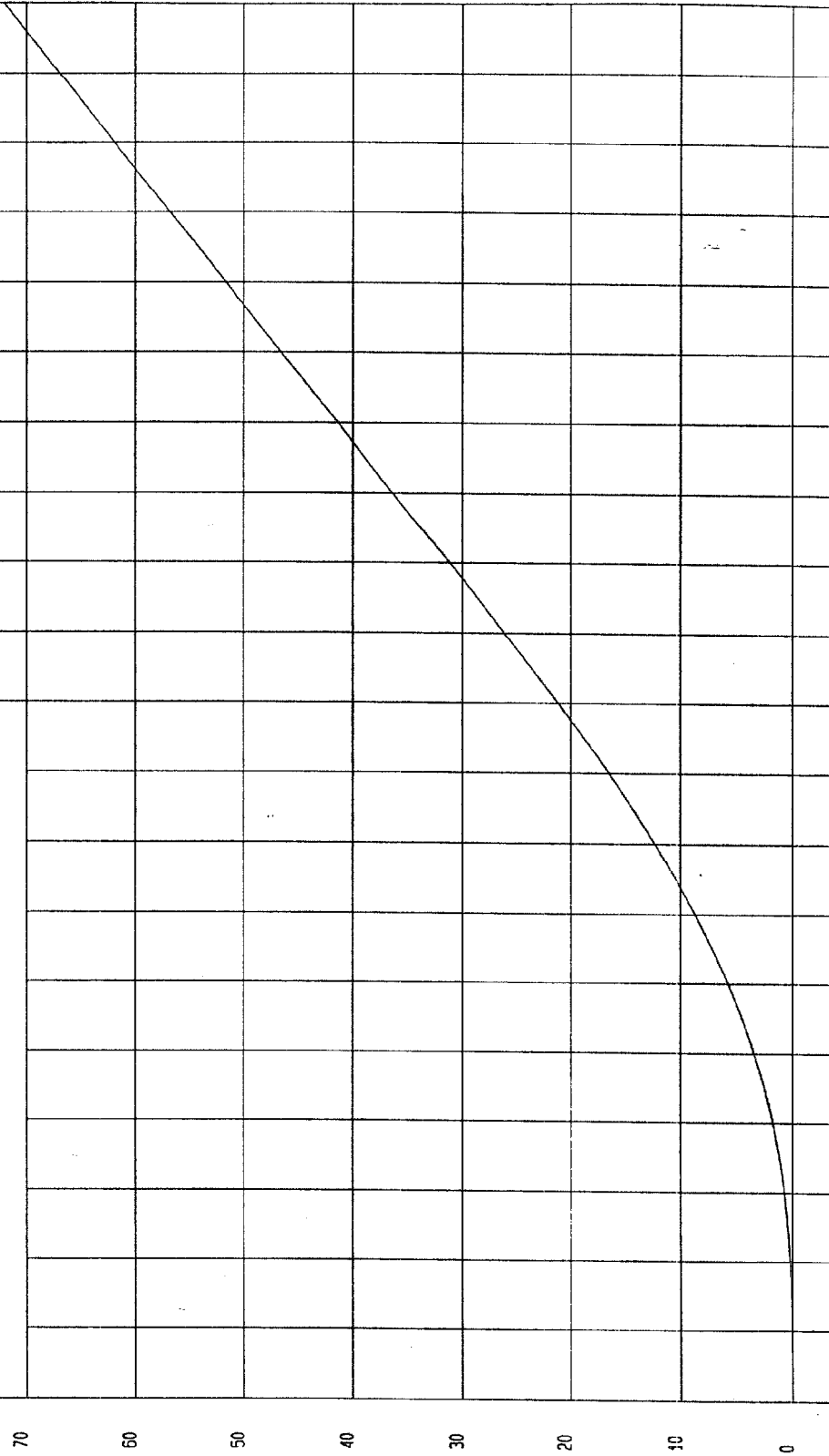
TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN= 0 IN at 9.9 msec YMAX= 72.04784 IN at 200 msec

SLED X DISPLACEMENT

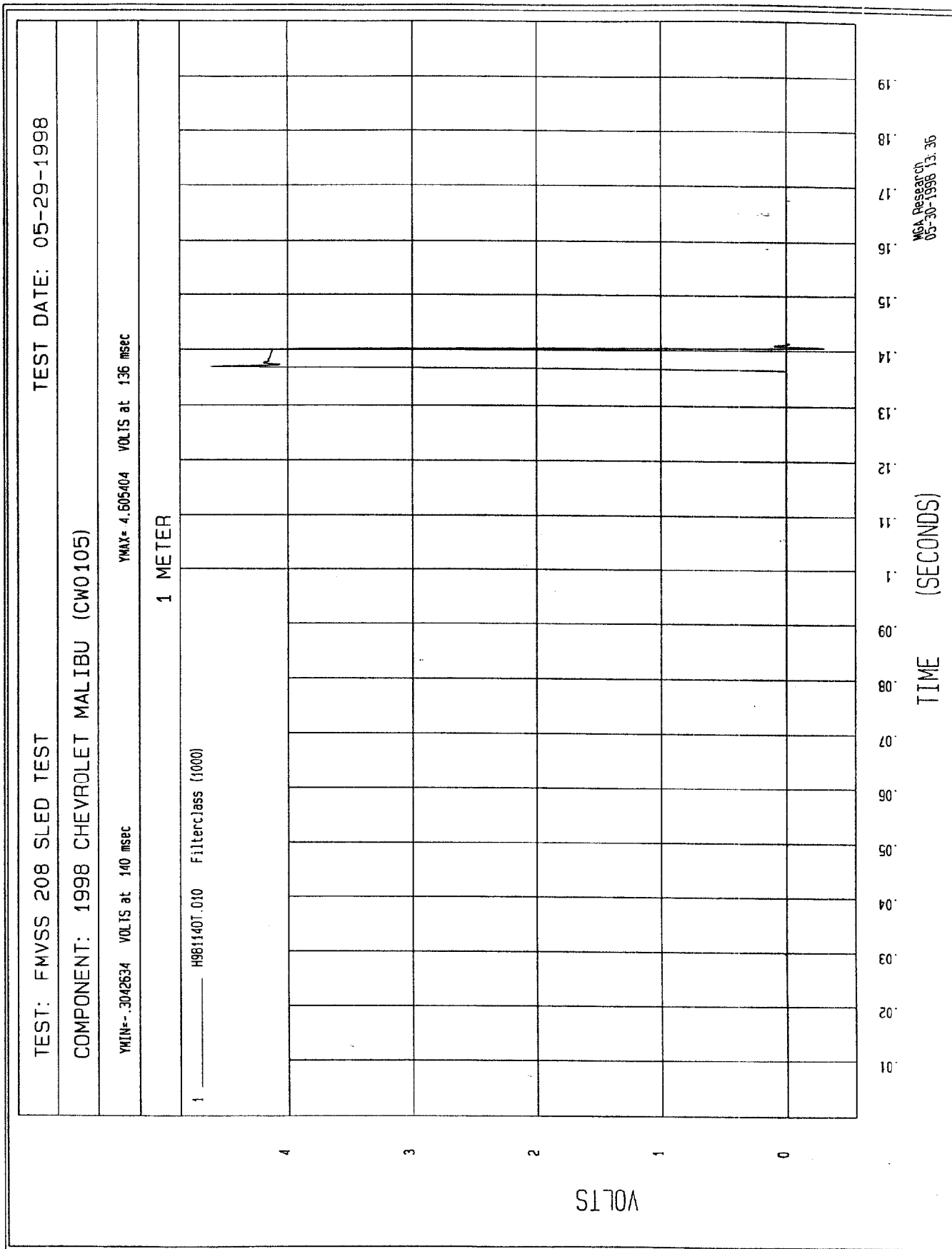
1 _____ H98114AI.D01 Filterclass (180)



MSA Research
05-29-1998 11:39

TIME Seconds

NI



TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

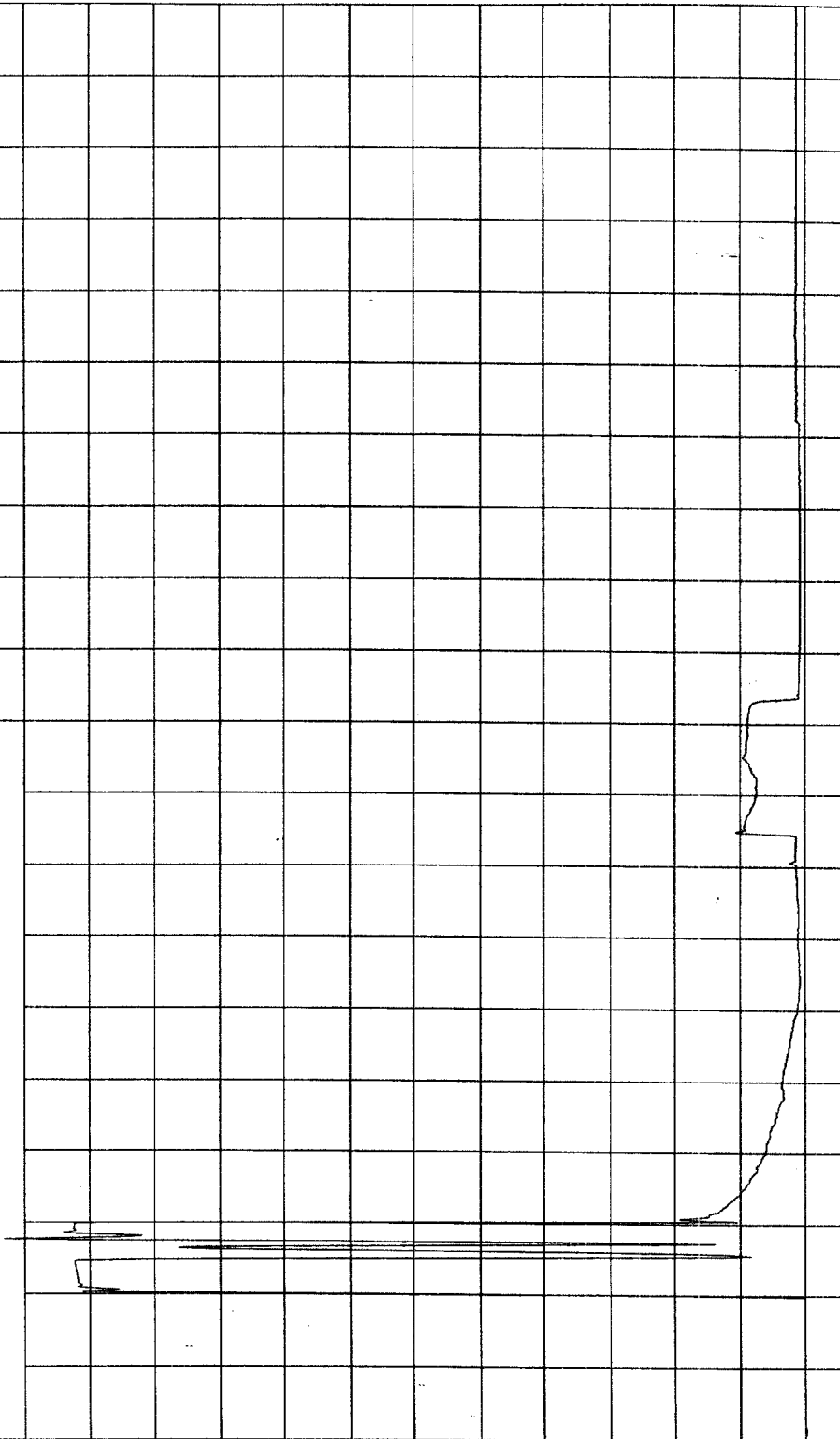
YMIN=-2.392082E-03 VOLTS at .9 msec

YMAX= 2.463428 VOLTS at 27. msec

AIRBAG TIMING

1 H981140T.005 Filterclass (1000)

VOLTS



MGA Research
05-29-1998 12:00

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

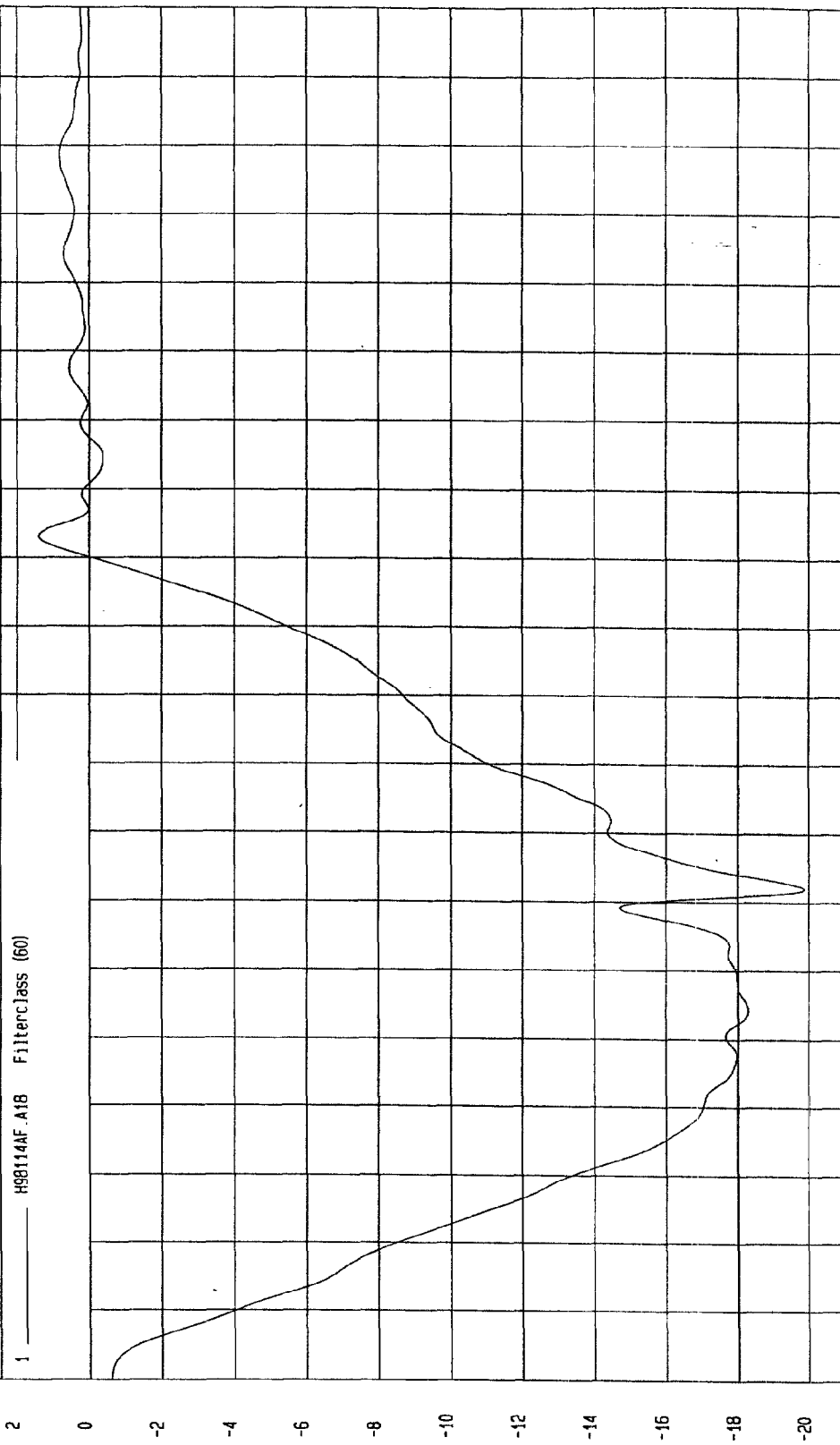
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-19.88522 G'S at 72 msec

YMAX= 1.389511 G'S at 123 msec

LEFT B POST X ACCELERATION

1 ——— H98114AF.A18 Filterclass (60)



MGA Research
05-29-1998 11:59

TIME (SECONDS)

S.9

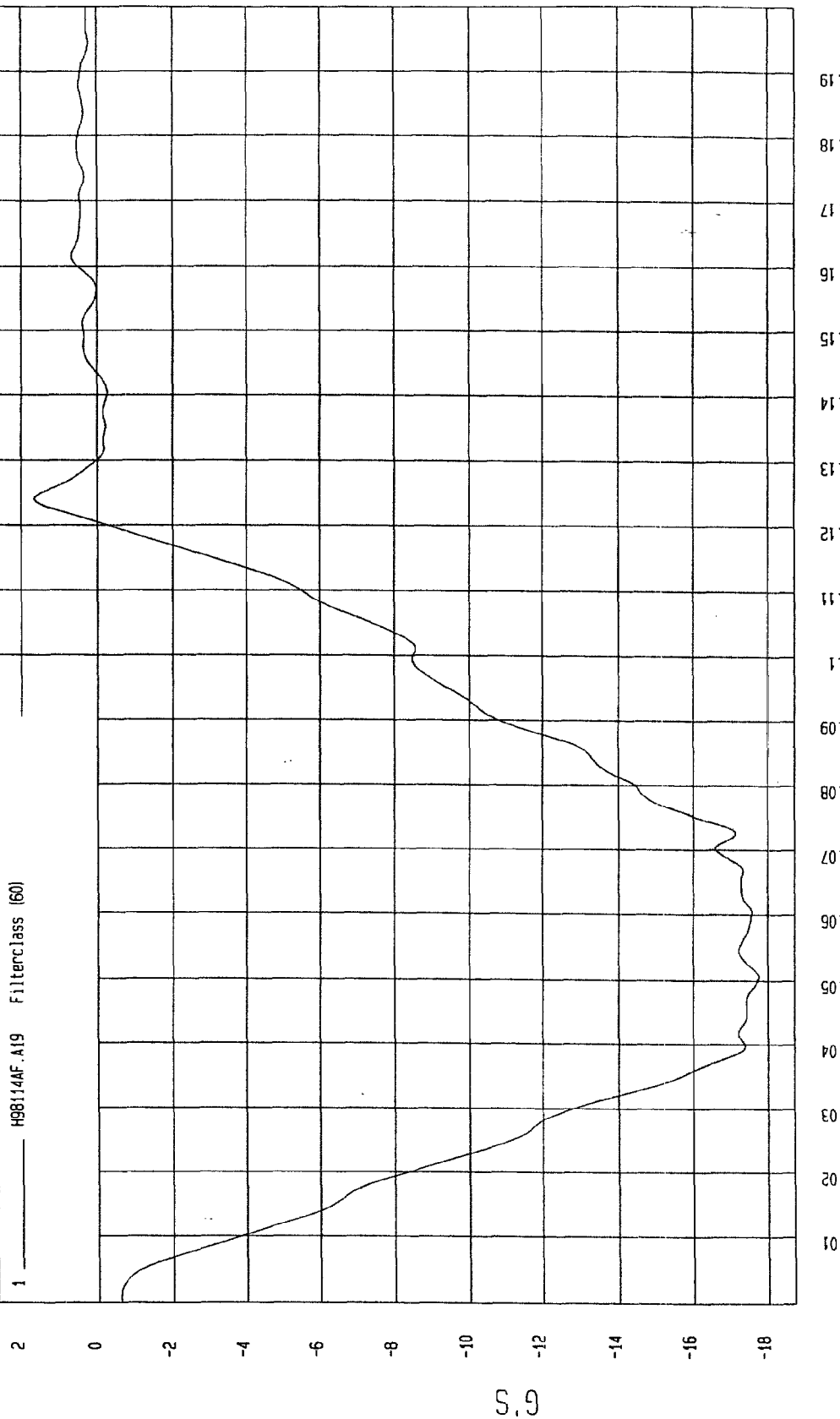
TEST: FMVSS 208 SLED TEST TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-17.74607 G'S at 50. msec YMAX= 1.662253 G'S at 124 msec

RIGHT B POST X ACCELERATION

1 H98114AF.A19 Filterclass (60)



MSA Research
05-29-1998 11:59

TIME (SECONDS)

G's

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

COMPONENT: 1998 CHEVROLET MALIBU (CWO105)

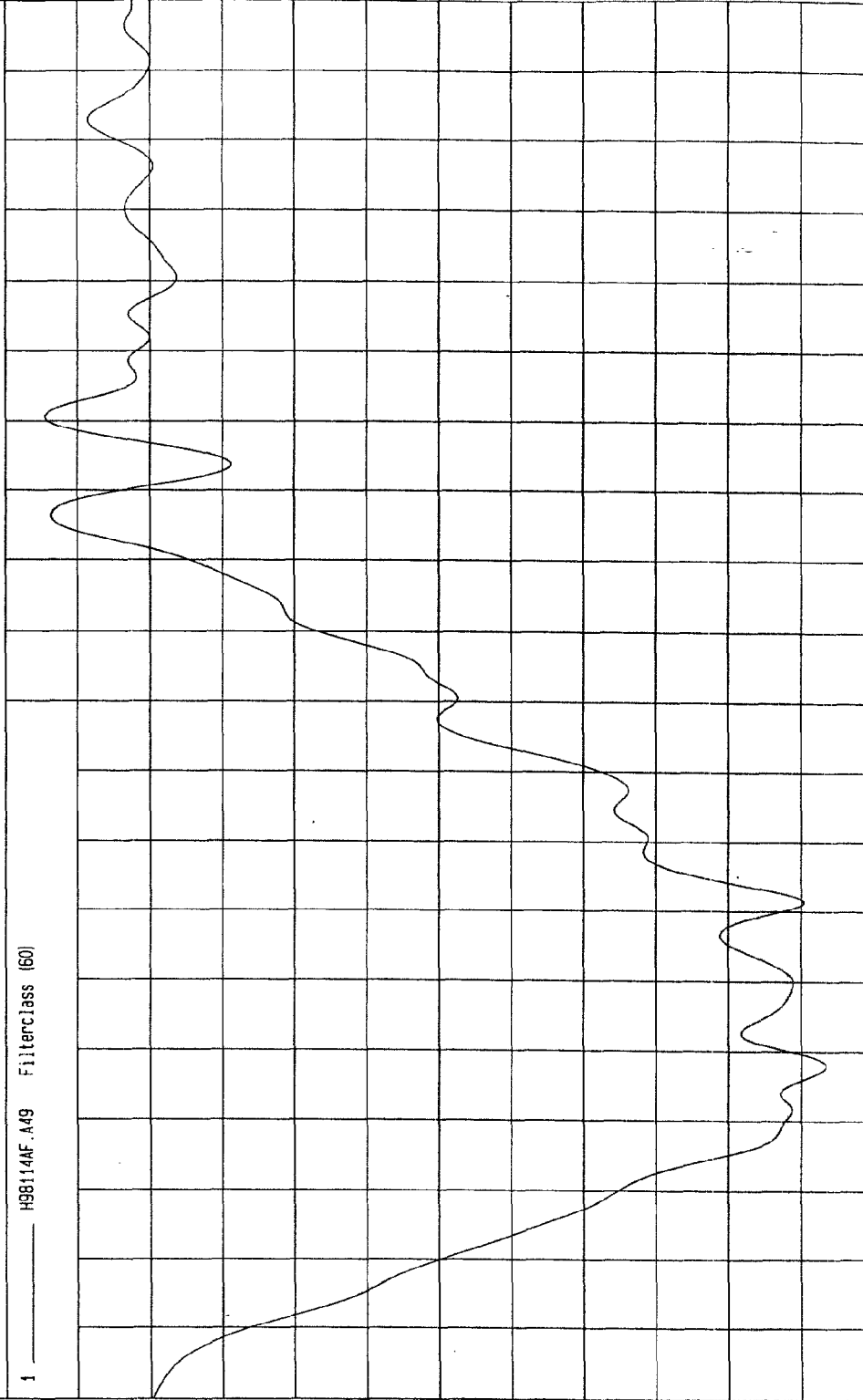
YMIN=-18.68859 G'S at 48 msec

YMAX= 2.87808 G'S at 140 msec

ENGINE X ACCELERATION

1 H98114AF.A49 Filterclass (60)

G.S



MGA Research
05-29-1998 11:59

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-29-1998

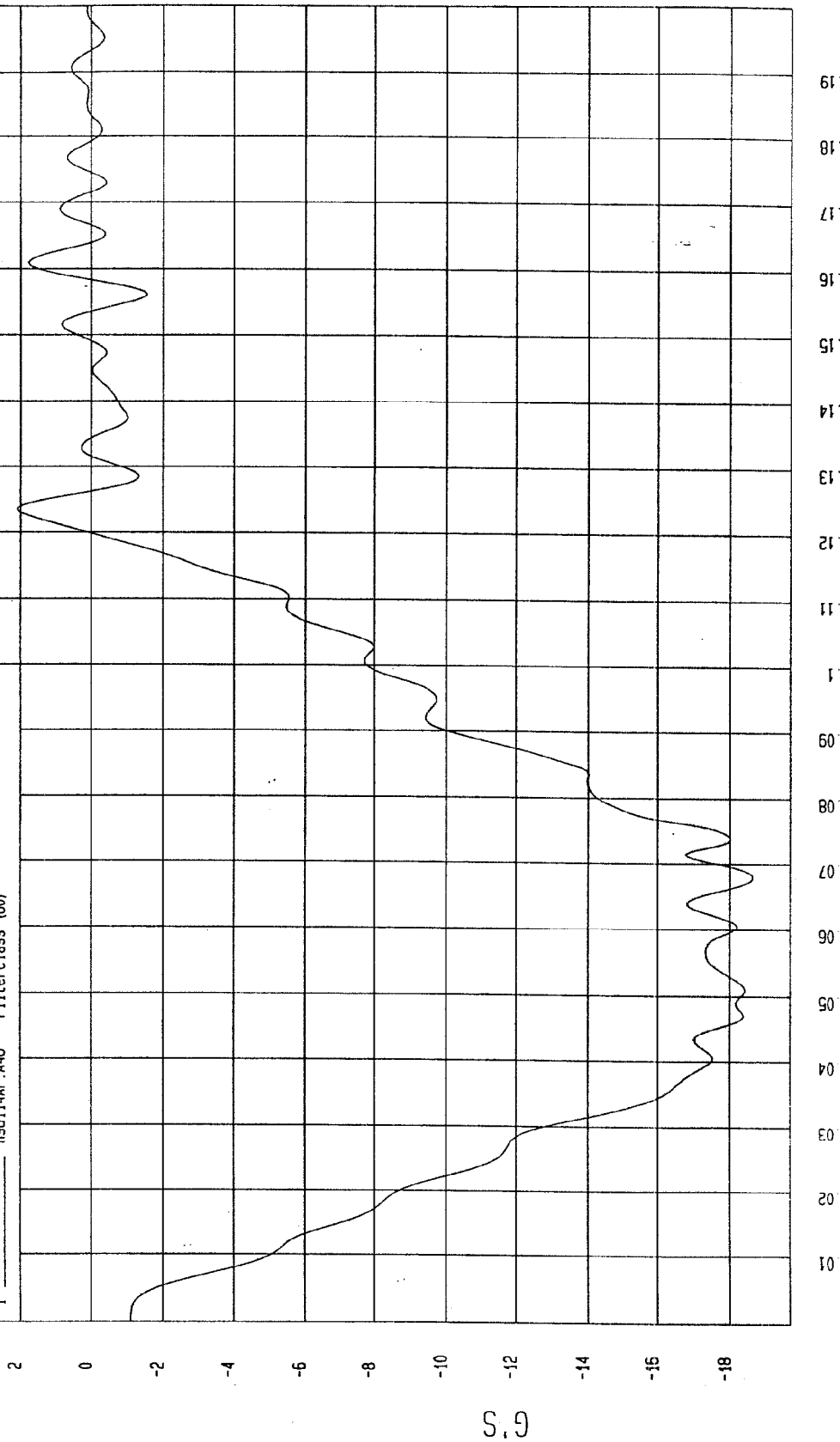
COMPONENT: 1998 CHEVROLET MALIBU (CW0105)

YMIN=-18.66089 G'S at 68 msec

YMAX= 2.084754 G'S at 123 msec

VEHICLE REAR AXLE X ACCELERATION

1 ——— H98114AF.A46 Filterclass (60)



MGA Research
05-29-1998 12:03

TIME (SECONDS)

APPENDIX C
MANUFACTURER'S VEHICLE INFORMATION

OVSC QUESTIONS & GM RESPONSES
REGARDING FMVSS 208 INFORMATION REQUEST
1998 Chevrolet Malibu
NSA-31CCa / OA:208970811Z

Item 1

Please inform OVSC if the air bag restraint system is certified to meet the requirements of S4.1.5.1(a)(1) or S13.

If the air bags were installed to meet the requirements of S4.1.5.1(a)(1), please provide a copy of the certification test reports for the frontal/angular barrier impact tests of the automatic restraint system with the manual safety belts unfastened and fastened.

If the air bags were installed to meet the requirements of S13, please provide a copy of the certification test reports for the frontal/angular barrier impact tests of the automatic restraint system with the manual safety belts fastened and the certification test reports for the sled test with only the automatic restraint system.

GM Response

The air bag restraint system provided at the driver's and passenger's front seating positions in the subject vehicle is installed to meet S13. In addition, the air bag restraint system provided at the driver's and passenger's front seating positions, along with the manual 3-point safety belt, were installed to meet the requirements of paragraphs S4.1.5.1(a)(3) of FMVSS 208.

Since the subject vehicle's driver and passenger air bag restraint system are installed to meet the requirements of S13, no response is required.

Attachment A includes those portions of the frontal barrier and sled test reports pertinent to the requirements of FMVSS 208. Front right seating position dummy data on test N15161 is excluded due to dummy component malfunction during the test.

Item 2

If the air bags are or will be depowered or changed from the previous model year, explain the changes.

GM Response

The air bags for both the driver and right front passenger in the subject vehicle were reduced in force by incorporating a 300 Kpa system in the 1998 model. The 1997 model used a 400 KPA system.

Item 3

If the air bag has been depowered or changed, explain how it can be determined, prior to purchase, that a particular vehicle has a depowered air bag.

GM Response

All 1998 models of the subject vehicle have depowered air bags. A 1998 model year vehicle can be verified by confirming that the 10th digit of the vehicle identification number (VIN) is the letter W.

Item 4

If the vehicle was certified with unrestrained dummies to meet the requirements of S13, describe how to disconnect the air bags from the vehicle sensors and connect them to the triggering mechanism used in the sled test. Describe the method used in certification to determine when to trigger the air bag and the system used to trigger the air bag.

GM Response

Sled tests used to meet the requirements of S13 were performed on a sled buck in which the air bags were never connected to vehicle sensors. Air bags for full scale tests can be electrically disconnected from the vehicle harness and a separate electrical harness can be attached directly to the air bags, specifically for test deployment. For the 1998 Chevrolet Malibu, the battery should be disconnected for at least one hour before the air bag module harness is disconnected. The harness can be found at the base of the steering column for the driver air bag and under the right instrument panel lower hush panel for the passenger air bag. The harnesses are bright yellow and connect directly to the respective driver and passenger air bags.

For GM's sled testing, the air bags are powered and activated by a remote system whether a full vehicle or a sled buck is used. This remote air bag control system is electronically wired to the air bag through a junction box. To deploy the air bags, the air bag control system provides the power through the interconnect of electronic wiring. The air bag control system is programmed to activate the air bag as follows:

The FMVSS 208 requirement states that the air bag "is to be activated at 20 ms $\pm$ 2 ms from the time that 0.5 g is measured on the dynamic test platform." GM's sled facility generates a time reference signal when the sled reaches 1.0 g. After reviewing the reference signal's time difference between 0.5 and 1.0 g in several sled tests, the average difference was determined to be 0.61 ms. Using this information, the remote air bag control system at GM's sled facility is programmed to trigger at 19 ms after the 1.0 g reference level to activate the air bag within the required timing stated above.

Item 5

State, for any safety belt system in this vehicle, whether or not it is equipped with a tension-relieving device. Provide a copy of the information furnished in accordance with S7.4.2, if the tension-relieving device is used.

GM Response

The safety belt systems used in the subject vehicle are not equipped with a tension-relieving device.

Item 6

FMVSS No. 208, S8.1.5 allows the manufacturer the option of having movable vehicle windows and vents placed in the closed position. State whether the vehicle's movable windows and vents were opened or closed for the certification tests.

GM Response

To facilitate camera coverage, there were no side doors present in the rigidized body used for the sled tests. In the full vehicle barrier test C11619, the windows were closed on the left side of the vehicle.

Item 7

Submit dummy placement measurements, including diagrams or photographs which show exactly where measurements were taken. Enclosed is a diagram of some of OVSC's dummy measurements. Where possible, use the dimension shown in the diagram to provide the individual dummy placement measurements.

State whether the vehicle has a foot rest for the driver.

GM Response

Dummy placement information is included in Attachment B.

The subject vehicle does not incorporate a driver foot rest.

Item 8

Provide the seat positioning, steering column positioning, and fuel tank data on the enclosed form. If more than one front seating configuration, steering column, or fuel tank are available on this vehicle, provide separate information for each.

GM Response

Attachment C includes the requested information.

Item 9

If the vehicle is equipped with adjustable seat [belt] anchorages, provide the manufacturer's nominal design position for a 50th percentile adult male occupant.

GM Response

The 1998 Chevrolet Malibu is equipped with height-adjustable shoulder belt guides for the driver and right front passenger. The nominal design position for a 50th percentile male occupant is one (1) position down from full up.

Item 10

For barrier tests, provide the speed at impact, vehicle test weight, and resulting injury criteria (i.e., HIC, chest acceleration, chest compression, and femur loads) recorded for all certification tests conducted to meet the requirements of S4.1.5.1(a)(1). For sled tests, provide the resulting injury criteria (i.e., HIC, chest acceleration, chest compression, femur loads, and neck moments and forces) recorded for all certification tests conducted to meet the requirements of S13.

GM Response

Attachment D includes a summary of the requested injury criteria information.

Item 11

When vehicle components must be removed to obtain the proper test weight for the barrier test, what components do you recommend for removal and in what priority order do you recommend removal?

GM Response

GM does not typically prioritize which components are to be removed from a test vehicle to accommodate test weight. However, components that have been removed during our testing include trunk interior trim, spare tire and jack, rear seats and rear carpeting. Additional components that may have been removed during specific tests include rear door trim, rear bumper fascia, rear bumper, and the deck lid or liftgate.

Item 12

If the vehicle uses a pressure vessel to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of S9.1.

GM Response

Attachment E includes the requested information.

Item 13

If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of S9.1.

GM Response

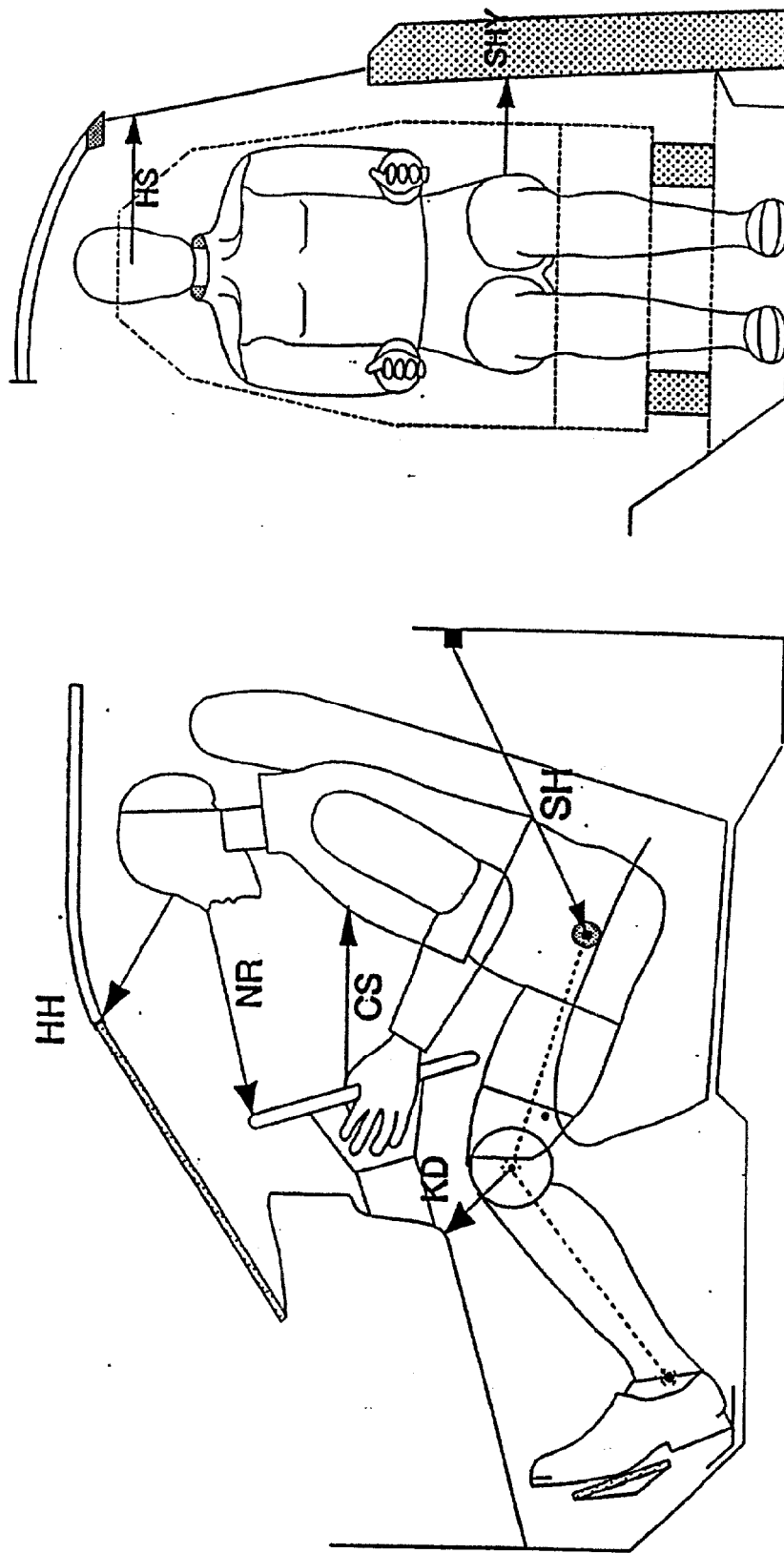
The air bags installed in the subject vehicle do not incorporate an explosive device to inflate the system.

Attachment B

USG 3354

**3 pages
(including this cover)**

DUMMY MEASUREMENTS FOR FRONT SEAT PASSENGERS



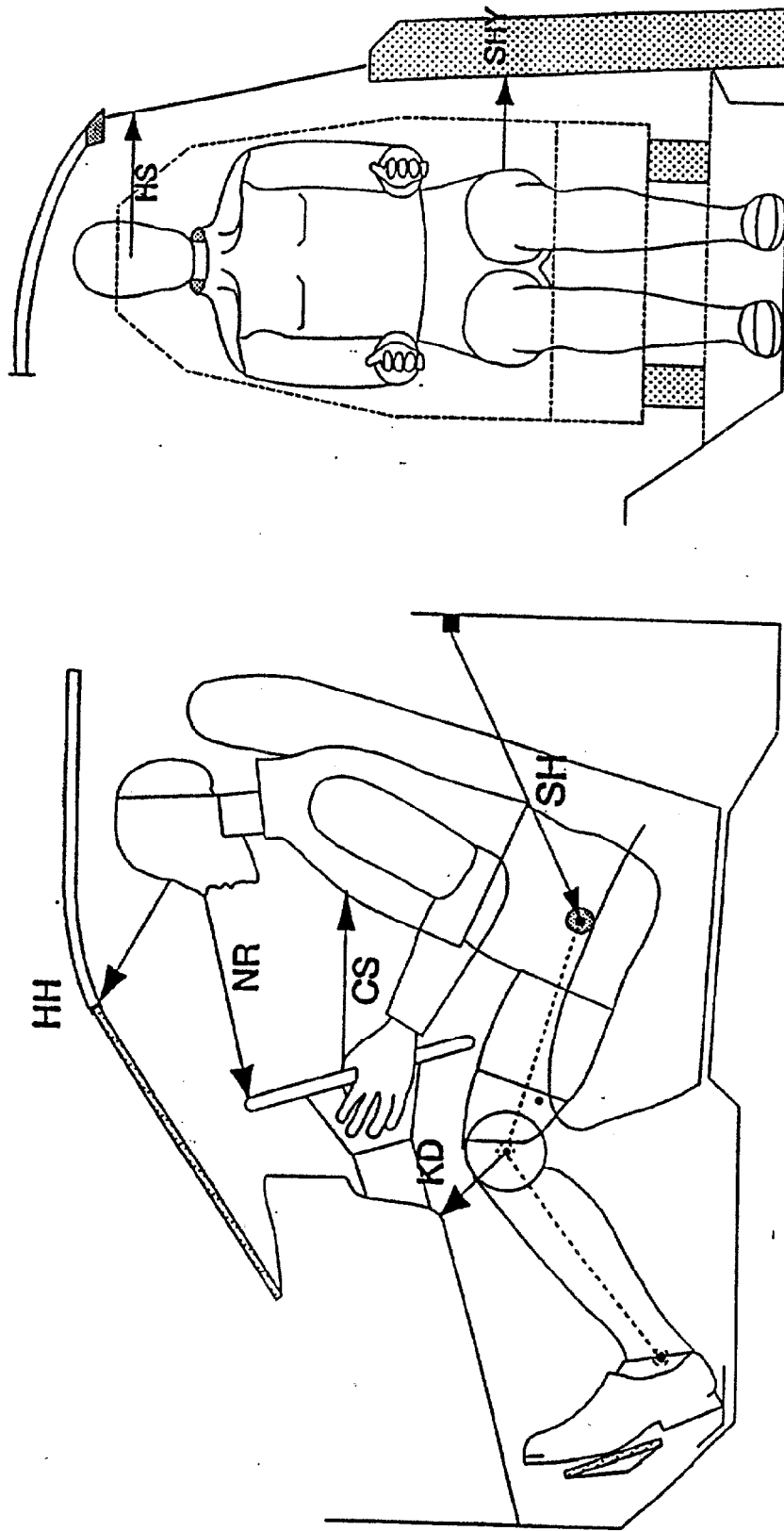
39 mm - HH - Head to Header
 41.5 mm - NR - Nose to Rim
 31.0 mm - CS - Steering Wheel to Chest
 16.5 mm - KD/KDR - Knee to Dash
 N/A - SH - Striker to H-Point

N/A - SHY - Striker to H-Point (Y Dir.)
 33.0 mm - HS - Head to Side Window

Driver

July 10, 1992

DUMMY MEASUREMENTS FOR FRONT SEAT PASSENGERS



34.0 mm - HH - Head to Header
 N/A NR - Nose to Rim
 N/A CS - Steering Wheel to Chest
 16.5 mm - KD/KDR - Knee to Dash
 N/A SH - Striker to H-Point

N/A - SHY - Striker to H-Point (Y Dir.)
 33.0 mm - HS - Head to Side Window

Passenger

July 10, 1992

Attachment C

USG 3354

3 pages
(including this cover)

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 1998 CHEVROLET
 Vehicle Model & Body Style: MALIBU 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. Indicate, if applicable, how the detents are numbered (Is the first detent "0" or "1"?). Indicate if the seat back angle is measured with the dummy in the seat.

Seat back angle for driver's seat = 27 degrees.

Measurement Instructions:

MEASURE WITH DUMMY IN SEAT. REMOVE

FOAM FROM SEAT BACK RECLINER AND

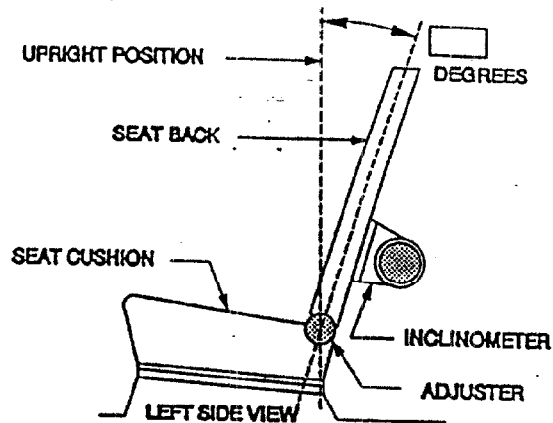
MEASURE ON FLAT SURFACE. APPROX. 3 NOTCHES

REARWARD FROM UPRIGHT.

Seat back angle for passenger's seat = 27 degrees.

Measurement Instructions:

SAME AS DRIVER



2. SEAT FORE & AFT POSITIONS --

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, indicate how the detents are numbered (Is the first detent "0" or "1"?). Provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat:

POWER SEAT - ADJUST PER POSITIONING INFORMATION IN STANDARD.

MANUAL SEAT - ADJUST SEAT FULL FORWARD, MARK POSITION, THEN FULL

REARWARD & MARK POSITION. POSITION SEAT AT NEAREST NOTCH TO MID PD
DIMENSION.

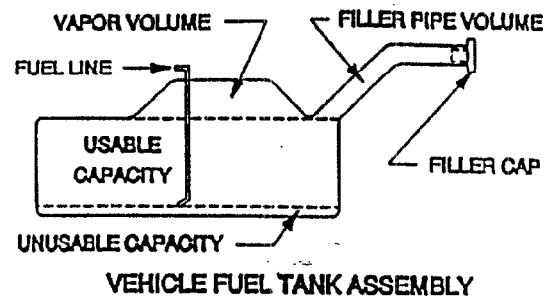
Positioning of the passenger's seat (if applicable):

SAME AS DRIVER

Rev. 7/11/94

3. FUEL TANK CAPACITY DATA - -

- 3.1 A. "Usable Capacity" of standard equipment fuel tank = 56.7 gallons.
11765
- B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.
- C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 = 56.7 gallons.
11765



Operational Instructions:

Operational instructions:
REMOVE ALL FUEL (USABLE & UNUSABLE) FROM
TANK. FILL TANK WITH UNUSABLE (0.1 liters)
AND 95% OF USABLE (53,865 liters).

- 3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = $\frac{53.865}{+0.1 \text{ unusable}} \frac{\text{gallons}}{118.25}$
- 3.3 Is vehicle equipped with electric fuel pump? X YES ___ NO
If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

When the ignition is first turned to the ON position, without the engine running, the PCM turns the fuel pump relay *On* for two seconds. This builds up the fuel pressure quickly. If the engine is not started within two seconds, the PCM shuts the fuel pump *Off* and waits until ignition reference pulses are present. As soon as the engine is cranked, the PCM turns the relay *On* which powers the fuel pump.

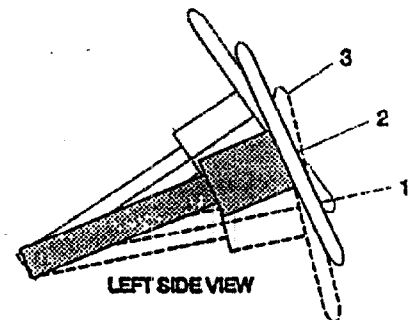
4. STEERING COLUMN ADJUSTMENTS - -

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

ADJUSTABLE COLUMN HAS 5 POSITIONS.

MID POSITION IS IN 3RD POSITION.



STEERING COLUMN ASSEMBLY