

V2835

REPORT NO. 208-MGA-98-009

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

Saturn Corporation
1998 Saturn SL2 4 Door
NHTSA NO. CW0106

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: May 5, 1998

Report Date: May 13, 1998

Final Report

Prepared For:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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OFFICE OF VEHICLE SAFETY COMPLIANCE
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APPROVED BY: David Winkelbauer DATE: 5/18/98
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FINAL REPORT ACCEPTED BY:



Contracting Officer's Technical Representative (COTR)
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 Saturn SL2 4 Door, NHTSA No. CW0106, 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 5, 1998.

The test vehicle, a 1998 Saturn SL2 4 Door, NHTSA No. CW0106, 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 199. The maximum peak flexion bending moment about the occipital condyle was 64.8 N-m, the maximum peak extension bending moment was 8.0 N-m, the maximum peak axial tension was 1175.2 N, the maximum peak axial compression was 166.4 N, the maximum peak fore/aft shear was 1115.6 N. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40 g's. The driver's chest maximum deflection was 1.4 inches. The driver's left and right femur maximum compressive forces were 1102 pounds and 914 pounds, respectively.

The right front passenger's HIC was 235. The maximum peak flexion bending moment about the occipital condyle was 15.2 N-m, the maximum peak extension bending moment was 21.7 N-m, the maximum peak axial tension was 1937.4 N, the maximum peak axial compression

was 235.9 N, the maximum peak fore/aft shear was 442.7 N. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 36 g's. The right front passenger's chest maximum deflection was 0.2 inches. The right front passenger's left and right femur maximum compressive forces were 1321 pounds and 1056 pounds, respectively.

TEST NOTES

TABLE 1 SLED TEST SUMMARY

Vehicle Yr/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

Vehicle NHTSA No.: CW0106 Test Type: Sled Test

Test Date: May 5, 1998 Time: 11:11 a.m. Temp: 70°F

Vehicle Test Weight: 2859 lbs.

Sled Velocity Change: 28.9 mph

Airbag Fire Time: 19 msec

Dummies:	Driver	Passenger
Dummy Type	<u>Part 572E</u>	<u>Part 572E</u>
Serial Number	<u>403</u>	<u>401</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</u>	<u>Airbag, A-Post</u>
Chest	<u>Airbag</u>	<u>Airbag</u>
Left Knee	<u>Instrument panel, steering column</u>	<u>Instrument panel, airbag</u>
Right Knee	<u>Instrument panel, steering column</u>	<u>Instrument panel, airbag</u>

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No: CW0106 VIN: 1G8ZJ5279WZ217170 Body Color: Silver

Engine: 4 Cylinders; C.I.D.; 1.9 liters; CC

X Gas; Diesel; Turbocharged

 Longitudinal; X Transverse

Transmission: 5 Speed; X Manual; 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; Anti-skid Brakes; Cruise Control

Date Received: March 4, 1998; Odometer Reading: 148 miles

Dealer's Name/Address: Saturn of Greenfield
4141 South 108th Street
Greenfield, WI 53228

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Saturn Corporation

Date of Manufacture: 1/98; VIN: 1G8ZJ5279WZ217170

GVWR: 3296 lbs; GAWR Front: 1662 lbs. GAWR Rear: 1634 lbs.

DATA FROM TIRE PLACARD:

Tire Pressure with maximum capacity vehicle load: Front 32 psi Rear 32 psi

Recommended Tire Size: P185/65R15

Recommended Cold Tire Pressure: Front 32 psi; Rear 32 psi

Tires on Vehicle: P185/65R15; 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) = 864 lbs.
No. Of Occupants x 150 lbs = 750 lbs.
Rated Cargo/Luggage Weight (RCWL) = 114 lbs.

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER

(WITH MAXIMUM FLUIDS) = UDW:

Right Front = 713 lbs Right Rear = 488 lbs
Left Front = 732 lbs Left Rear = 461 lbs
TOTAL FRONT WEIGHT = 1445 lbs (60 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 949 lbs (40 % of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 2394 lbs

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO WEIGHT:

Right Front = 797 lbs Right Rear = 638 lbs
Left Front = 815 lbs Left Rear = 609 lbs
TOTAL FRONT WEIGHT = 1612 lbs (56 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1247 lbs (44 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 2859 lbs

VEHICLE ATTITUDE:

Delivered Door Sill Angle: 0.2°
Fully Loaded Door Sill Angle: -0.3°
Test Door Sill Angle: 0.0°
Wheel Base: 101.5 in

Fuel System Capacity From Owner's Manual = 12.1 gallons
Usable Capacity Figure Furnished by COTR = 12.46 gallons

TABLE 3 VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

Vehicle NHTSA No.: CW0106 ; Test Date: May 5, 1998

ACCELEROMETER LOCATION (inches)				
	Description	X	Y	Z
1	Engine	31.1	3.9	34.8
2	Left B-Post	78.7	25.2	12.8
3	Right B-Post	79.5	25.2	12.8
4	Rear Axle	118.9	0	11.0

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	5.7	154	-23.4	55
2	Left B-Post	1.5	126	-23.2	49
3	Right B-Post	1.3	128	-23.0	49
4	Rear Axle	1.7	125	-18.8	49

TABLE 4 REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

Contract Number: DTNH22-93-D-21089

From: MGA Research Corporation To: Mr. Charles Case, COTR
5000 Warren Road Office of Vehicle Safety Compliance
Burlington, WI 53105

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/Saturn/SL2/4 Door

Vehicle NHTSA No.: CW0106 Body Color: Silver

VIN: 1G8ZJ5279WZ217170 Cost: \$13,000

Odometer: Arrival Date: March 4, 1998 Reading: 148 miles

Completion Date: May 5, 1998 Reading: 150 miles

Engine: 4 Cylinders; 1.9 Liters; X Gas; Diesel

Transmission: 5 Speed; X Manual; Automatic

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

Tire Size: P185/65R15; Manufacturer: Firestone

Air Conditioner	<u>Yes</u>	Console	<u>No</u>	Brakes	<u>Power</u>
Tinted Glass	<u>Yes</u>	Tachometer	<u>Yes</u>	Front	<u>Disc</u>
Power Steering	<u>Yes</u>	Cruise Control	<u>No</u>	Rear	<u>Drum</u>
Power Windows	<u>No</u>	Rear Window Def.	<u>No</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>No</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/Saturn/SL2/4 Door

Veh. NHTSA No.: CW0106 Test Date: May 5, 1998

MAXIMUM ACCELERATION VALUES: (g's)	DRIVER DUMMY #403	PASSENGER DUMMY #401
Head Channel X	57.0	-36.6
Head Channel Y	4.7	-12.7
Head Channel Z	22.6	24.5
HEAD RESULTANT	57.5	37.5
Chest Channel X	-39.9	-32.9
Chest Channel Y	2.0	1.9
Chest Channel Z	12.1	15.6
CHEST RESULTANT	40.8	36.2

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	199	235
t_1 = (msec)	88.1	94.1
t_2 = (msec)	124.1	130.1

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

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

CLIP	40	36
t^1 = (msec)	97.6	98.1
t^2 = (msec)	100.7	101.2
CHEST DEFLECTION (in)	1.4	0.2

TABLE 5 FMVSS 208 OCCUPANT INJURY CRITERIA (Cont.)

Veh. Yr./Make/Model/Body Style: 1998/Saturn/SL2/4 Door

Veh. NHTSA No.: CW0106 Test Date: May 5, 1998

MAX. COMPRESSIVE FEMUR FORCES:	DRIVER DUMMY #403	PASSENGER DUMMY #401
Left Side (lbs)	1102	1321
Right Side (lbs)	914	1056

NECK FORCES:

Neck Force X (N)	1115.6	442.7
Neck Force Y (N)	-69.0	179.7
Neck Force Z (N)	1175.2	1937.4

NECK MOMENTS:

Neck Moment X (N-m)	-6.1	-23.1
Neck Moment Y (N-m)	79.9	20.9
Neck Moment Z (N-m)	-5.5	192.0

TABLE 5 FMVSS 208 OCCUPANT INJURY CRITERIA (Cont.)

NECK INJURY CRITERIA:	DRIVER DUMMY #403	PASSENGER DUMMY #401
Peak Flexion Bending Moment about the Occipital Condyle (N-m)	64.8	15.2
Peak Extension Bending Moment about the Occipital Condyle (N-m)	8.0	21.7
Peak Axial Tension (N)	1175.2	1937.4
Peak Axial Compression (N)	166.4	235.9
Peak Fore Shear (N)	1115.6	442.7
Peak Aft Shear (N)	284.2	163.6

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. 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 dashboard. The dummy's head impacted the airbag and A-Post with the dummy's head rotating rearward. The right front passenger dummy was restrained by the airbag. 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/Saturn/SL2/4 Door

NHTSA No.: CW0106 ; Technician: Al Chalmers Date: April 27, 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 (Cont.)

- 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 0.4 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 (Cont.)

- 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 0.5 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 (Cont.)

LATCHPLATE ACCESS (S7.4.4)

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106; Technician: Al Chalmers Date: April 27, 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 (Cont.)

RETRACTION (S7.4.5):

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106 ; Technician: Al Chalmers Date: April 27, 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 (Cont.)

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106 ; Technician: Al Chalmers Date: April 27, 1998

Designated Seating Position 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?

☒ 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)?

☒ Yes - Pass

☐ No - **FAIL**

TABLE 7 FMVSS 208 SEAT BELT COMFORT AND
CONVENIENCE TEST SUMMARY (Cont.)

- 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 (Cont.)

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?

☒ 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)?

☒ Yes - Pass

☐ No - **FAIL**

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

☒ 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. ☒ Check

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

(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 7 FMVSS 208 SEAT BELT COMFORT AND
CONVENIENCE TEST SUMMARY (Cont.)

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?

☒ 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)?

☒ Yes - Pass

☐ No - FAIL

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

☒ 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. ☒ Check

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

TABLE 7 FMVSS 208 SEAT BELT COMFORT
AND CONVENIENCE TEST SUMMARY (Cont.)

- (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/Saturn/SL2/4 Door

NHTSA No.: CW0106; Technician: Al Chalmers; Date: April 27, 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 = 120 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 = 8 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)

A. Note wording of visual warning: ()Fasten seat belt ()Fasten Belt
(X)Symbol 101

NHTSA No.: CW0106; Technician: Al Chalmers; Date: April 27, 1998

(11/8/94 legal interpretation)

- [illegible]

TABLE 10 FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTS

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106; Technician: Al Chalmers; Date: April 27, 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/Saturn/SL2/4 Door

NHTSA No.: CW0106; Technician: Al Chalmers; Date: April 27, 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 48 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.

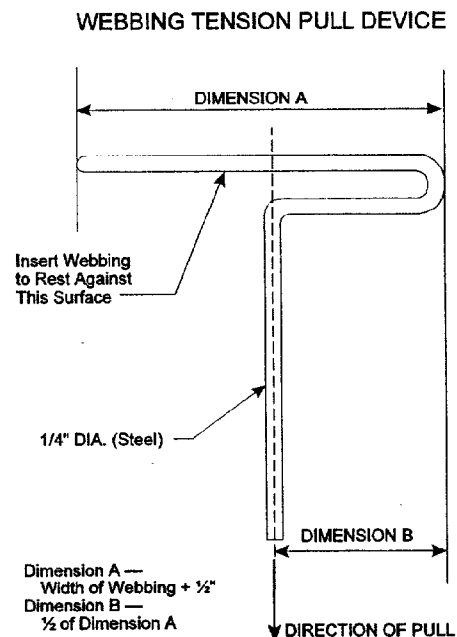


TABLE 11 LAP BELT LOCKABILITY (Cont.)

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 40 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: 40.5 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 = 7.5 inches (X)Yes-Pass () No-FAIL

TABLE 11 LAP BELT LOCKABILITY (Cont.)

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106 ; Technician: Al Chalmers ; Date: April 27, 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 53 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.

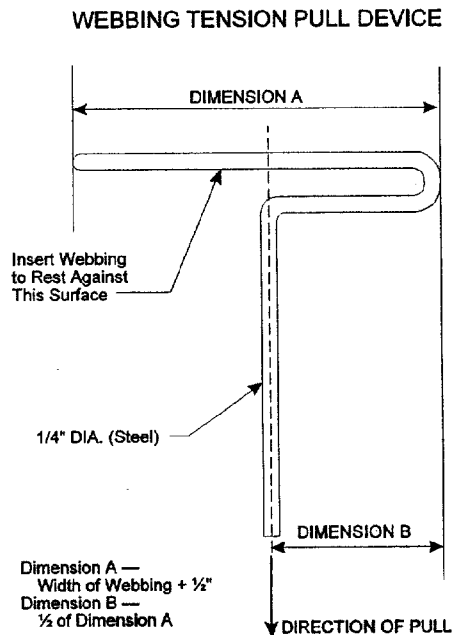


TABLE 11 LAP BELT LOCKABILITY (Cont.)

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 46 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: 46.3 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? $10-14 = \underline{6.7 \text{ inches}}$ (X)Yes-Pass () No-FAIL

TABLE 11 LAP BELT LOCKABILITY (Cont.)

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106 ; Technician: Al Chalmers ; Date: April 27, 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 32.5 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 = 13 degrees.

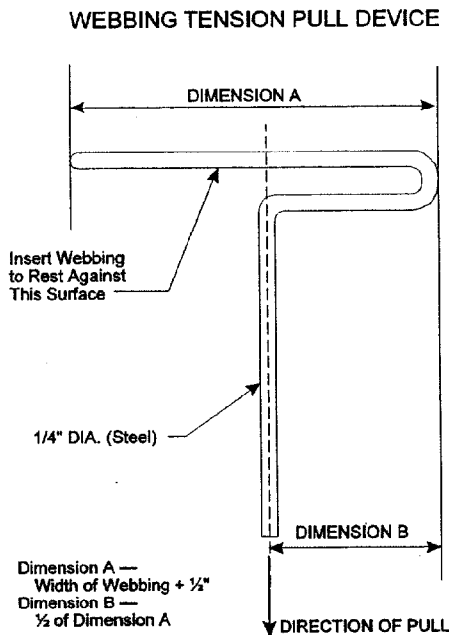


TABLE 11 LAP BELT LOCKABILITY (Cont.)

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 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: 22 lb/sec.
Record the distance between points A and B: 25.8 inches
15. Subtract the measurement in 14 from the measurement in 13. Is the difference 2 inches or less? $14-13 = \underline{0.8 \text{ inches}}$ (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 10 from the measurement in 14. Is the difference 3 inches or more? $10-14 = \underline{6.7 \text{ inches}}$ (X)Yes-Pass () No-FAIL

TABLE 11 LAP BELT LOCKABILITY (Cont.)

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106; Technician: Al Chalmers; Date: April 27, 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 52.5 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 = 12 degrees.

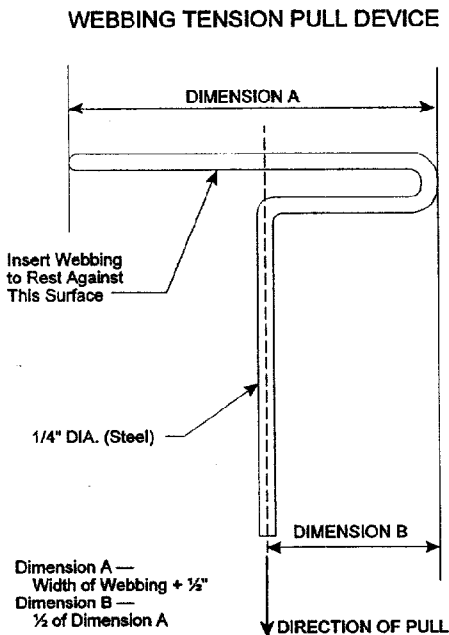


TABLE 11 LAP BELT LOCKABILITY (Cont.)

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 44 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: 44.5 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 = 8 inches (X)Yes-Pass () No-FAIL

TABLE 12 AIR BAG LABELS

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

NHTSA No.: CW0106; Technician: Al Chalmers; Date: April 27, 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 3.2.1 or 3.2.2 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.

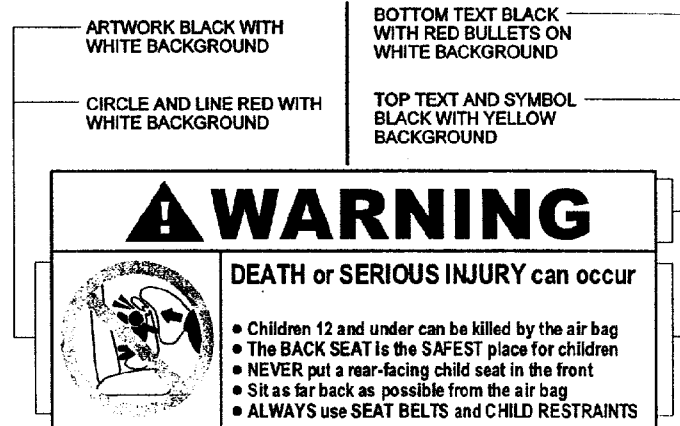
- Sit as far back as possible from the air bag.
- ALWAYS use SEAT BELTS and CHILD RESTRAINTS
- The BACK SEAT is the SAFEST place for children.

() Not Applicable

Driver Side - (X) 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

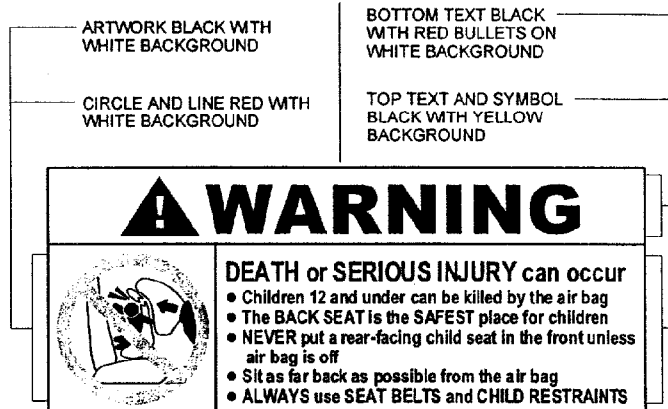


TABLE 12 AIR BAG LABELS (Cont.)

- 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: 56 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: 30 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?

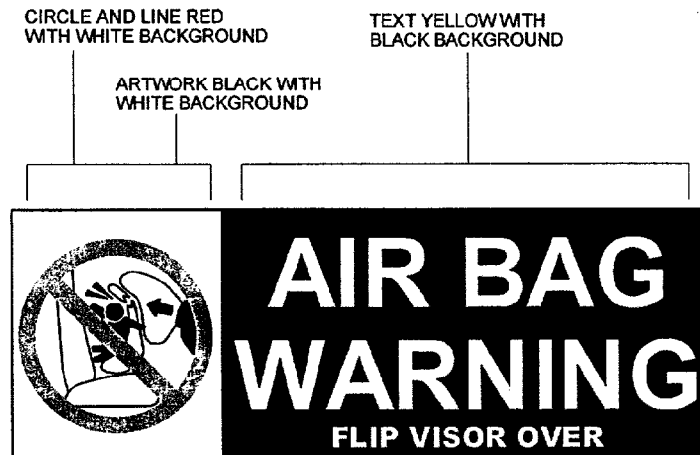
For vehicles with driver side air bag ONLY ☐ Not Applicable

☐ 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



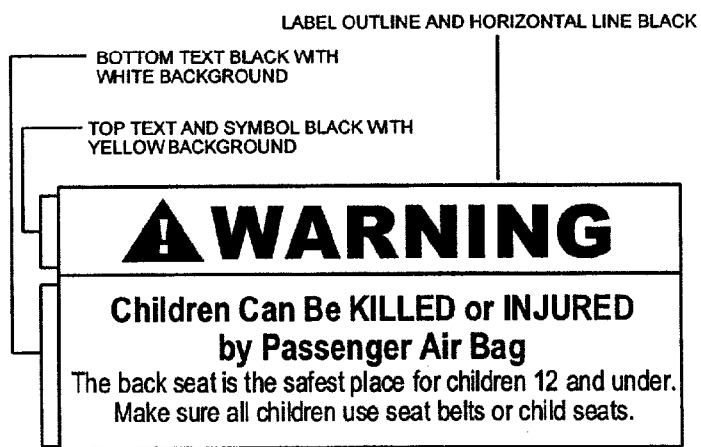
6. Label On the Dash

- 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: 69 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/Saturn/SL2/4 Door

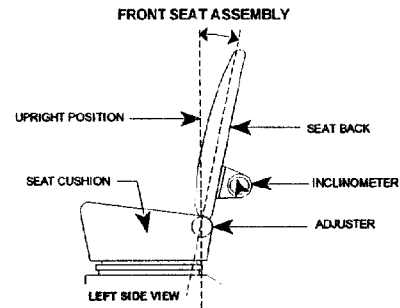
Vehicle NHTSA No.: CW0106 Test Date: May 5, 1998

NOMINAL DESIGN RIDING POSITION:

Driver Seat: Seat Back Angle* = 11.8°

Passenger Seat: Seat Back Angle* = 11.2°

* measured on headrest support



SEAT FORE AND AFT POSITIONS:

Driver Seat: The seat track had a total position movement of 18 notches and was positioned 10 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 18 notches and was positioned 10 notches rearward from the foremost position with the forward most locking position as zero.

STEERING COLUMN ADJUSTMENTS:

The steering column was placed in the mid position.

FIGURE 1 DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS

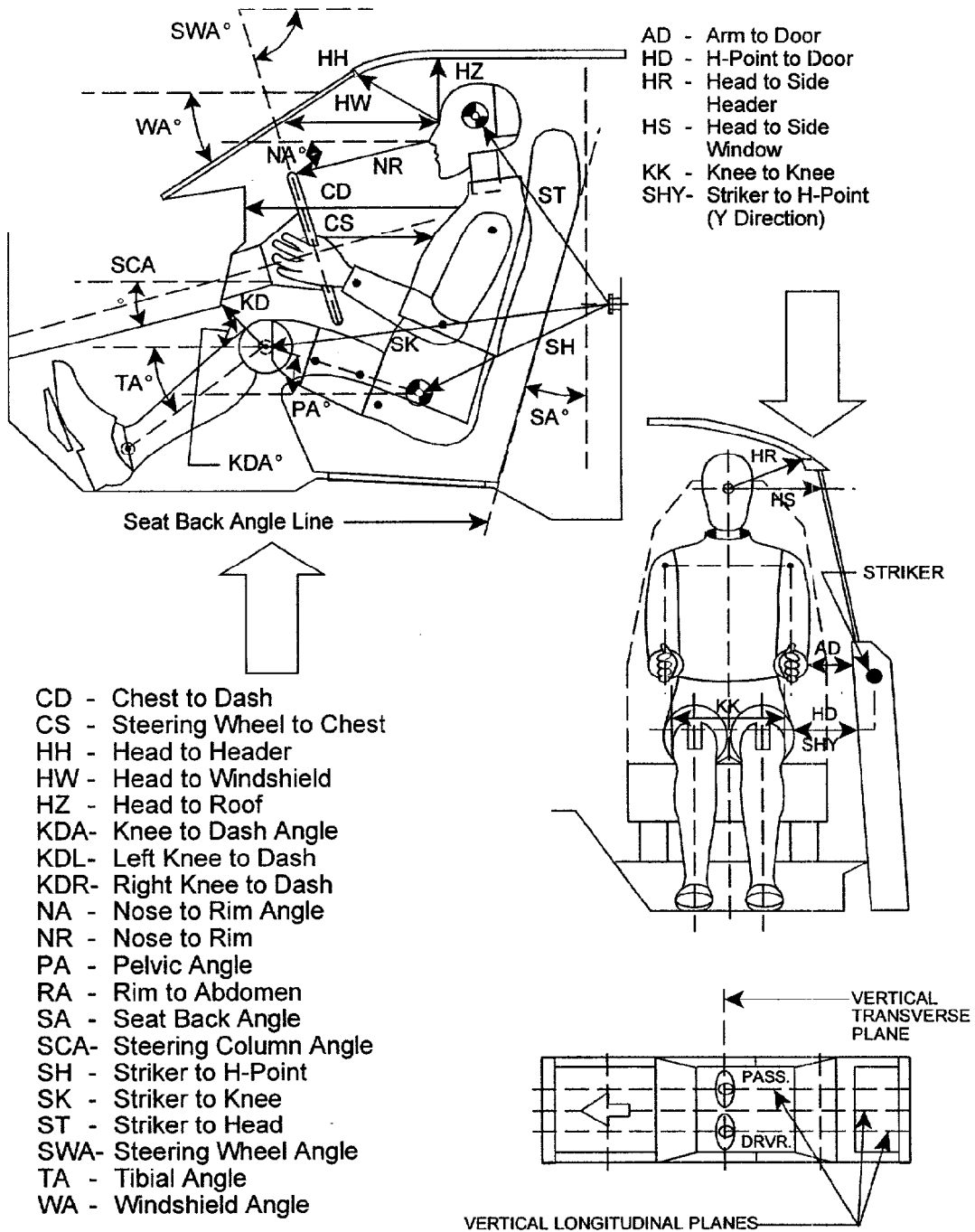


TABLE 14 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

Vehicle NHTSA No.: CW0106 Test Date: May 5, 1998

	DRIVER (Serial #403)	PASSENGER (Serial #401)
WA°	25.0°	
SWA°	70.7°	N/A
SCA°	19.0°	N/A
SA°*	11.8°	11.2°
HZ	7.9	7.7
HH	13.8	13.7
HW	26.3	25.8
HR	9.1	8.8
NR	12.1 Angle (NA) 7.8°	N/A
CD	20.9	19.6
CS	14.1	N/A
RA	8.3	N/A
KDL	7.5 Angle (KDA) 37.8°	7.2
KDR	7.6	7.2 Angle (KDA) 36.6°
PA°	24.5	24.0
TA°	40.5	34.0
KK	12.5	11.1
ST	19.2 Angle 2.2°	19.1 Angle 4.9°
SK	21.3 Angle 92.4°	21.7 Angle 97.3°
SH	8.7 Angle 129.3°	8.9 Angle 135.0°
SHY	8.4	8.4
HS	12.7	12.6
HD	4.8	4.5
AD	4.4	2.8

* measured on headrest

FIGURE 2 VEHICLE TARGET LOCATIONS

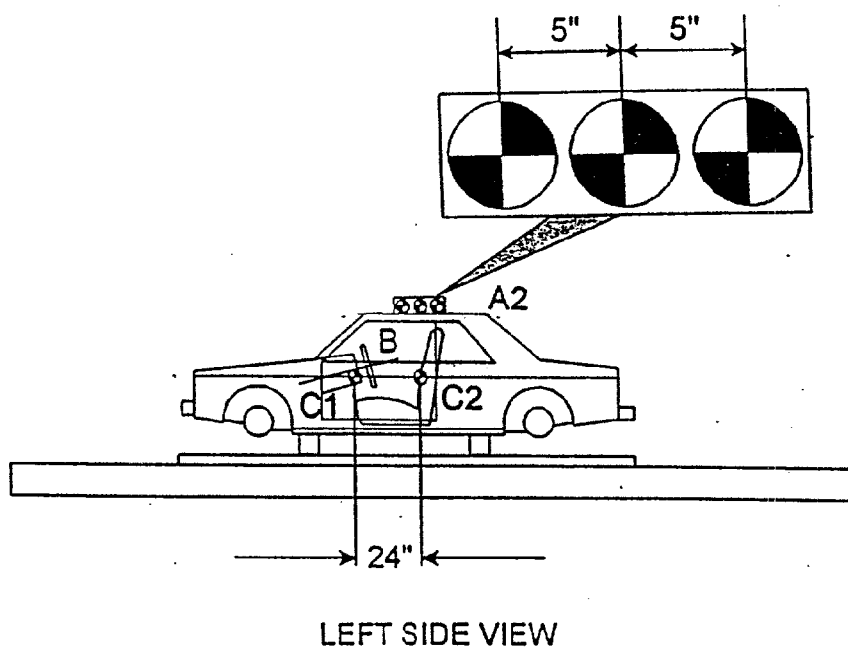
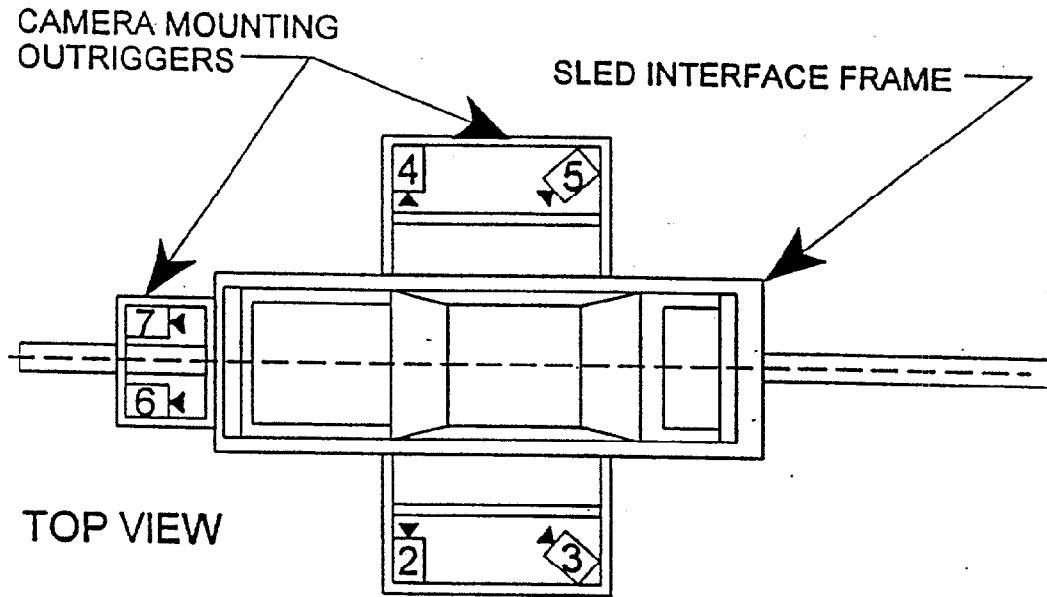


FIGURE 3 CAMERA POSITIONS



CAMERA FRAME RATES:

#1 = 24 fps

All Others = 1,000 fps

1 REAL TIME CAMERA

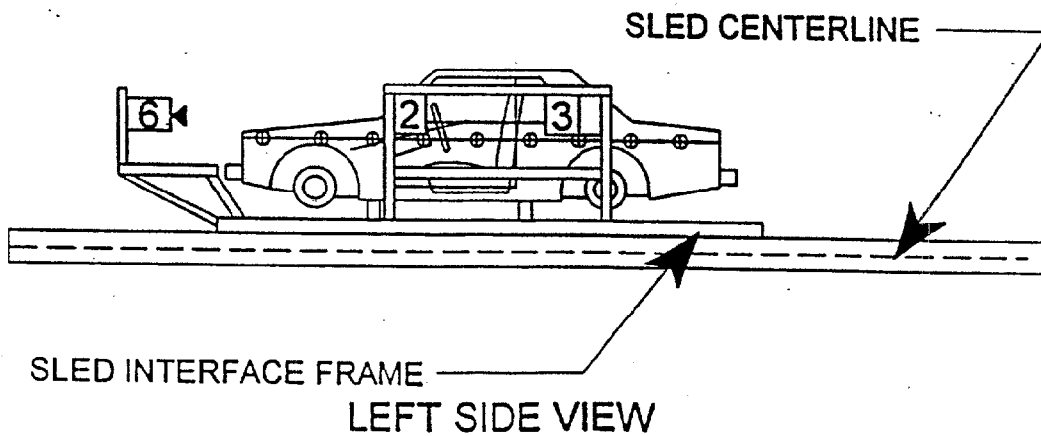


TABLE 15 CAMERA LOCATIONS

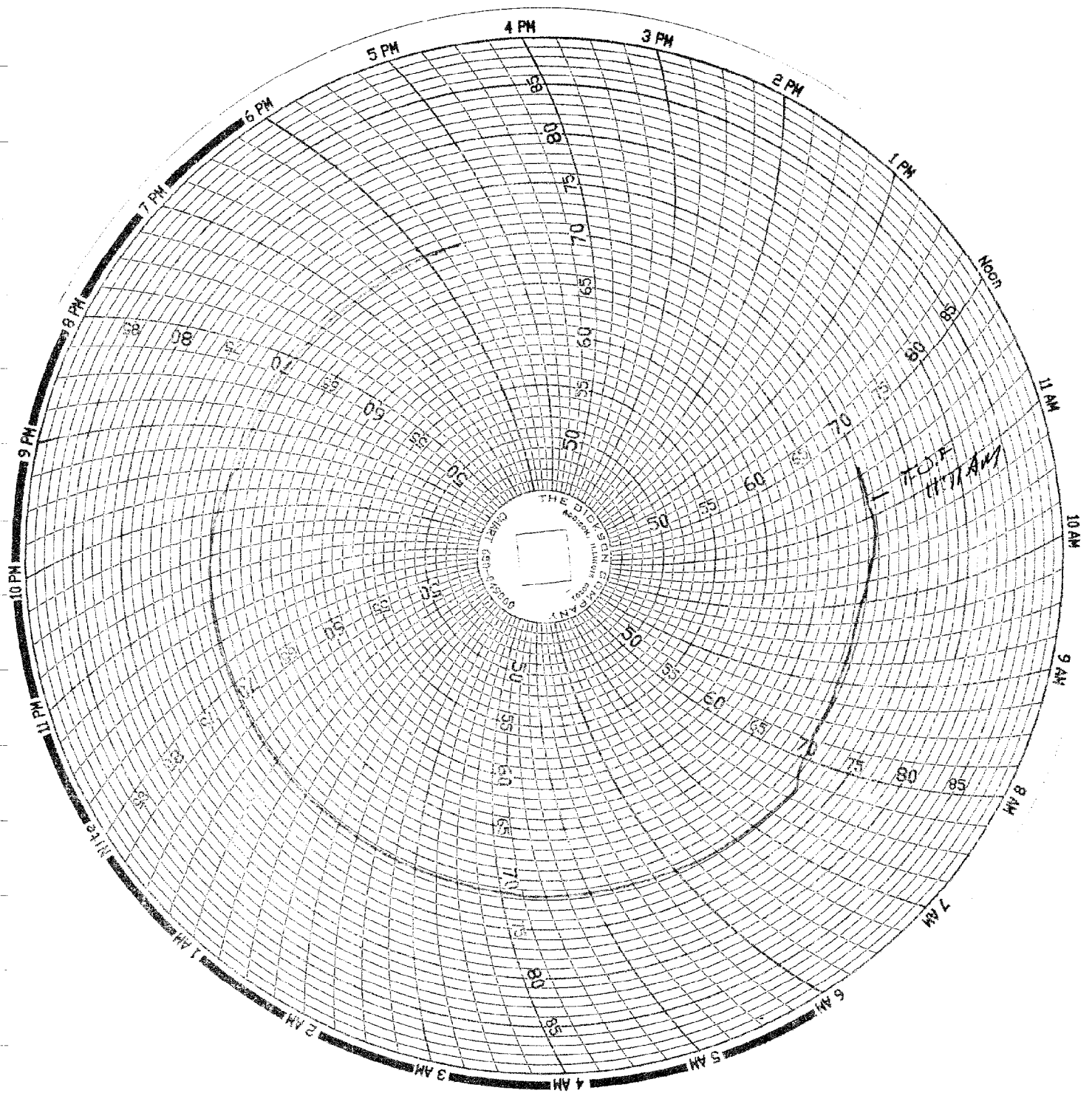
Veh. Year/Make/Model/Body Style: 1998/Saturn/SL2/4 Door

Vehicle NHTSA No.: CW0106 ; Test Date: May 5, 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	79.5	90.9	36.8	90	13	1020
3	Onboard Driver Angle	145.5	89.4	47.2		13	1020
4	Onboard Passenger	75.0	89.3	38.4	90	13	1010
5	Onboard Passenger Angle	149.2	88.4	48.0		13	1031
6	Onboard Windshield Driver	19.9	13.6	41.7		13	1000
7	Onboard Windshield Passenger	19.3	13.4	42.3		13	1010

- * +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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Photo No. A-38 - Vehicle Certification Label	A-38
Photo No. A-39 - Tire Placard	A-39

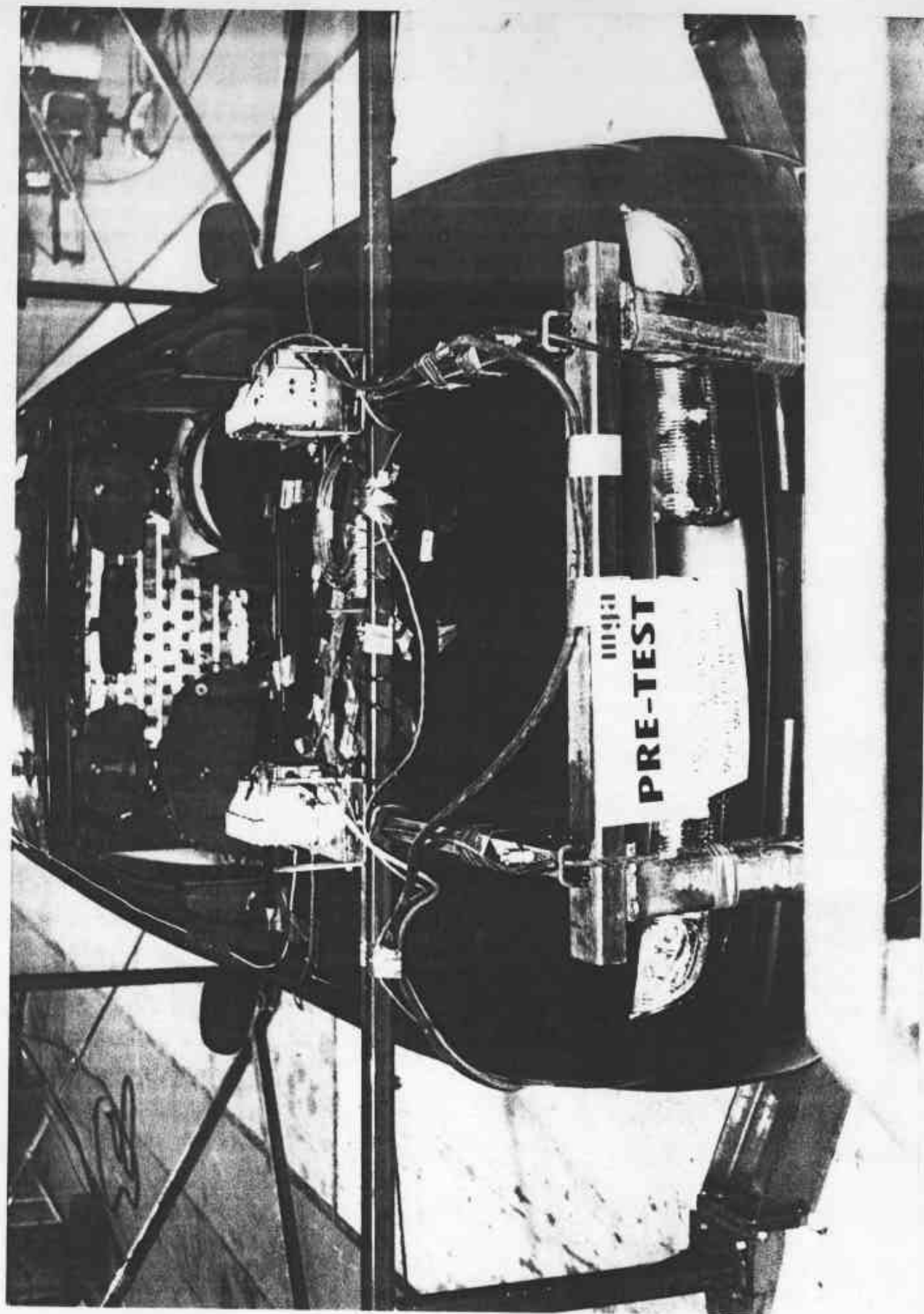


Photo No. A-1 - Pre-Test Front View

A-1

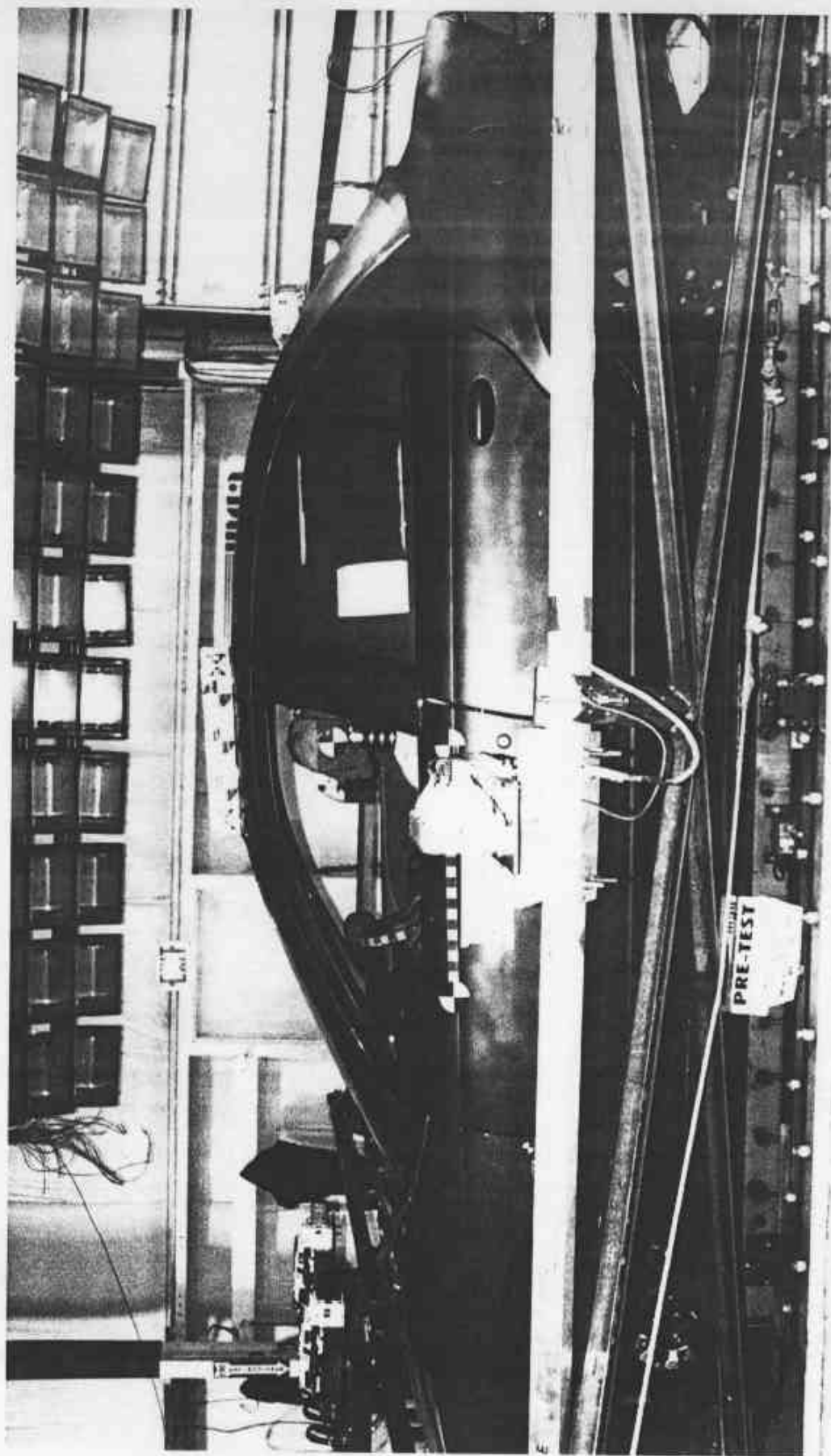


Photo No. A-2 - Pre-Test Left Side View

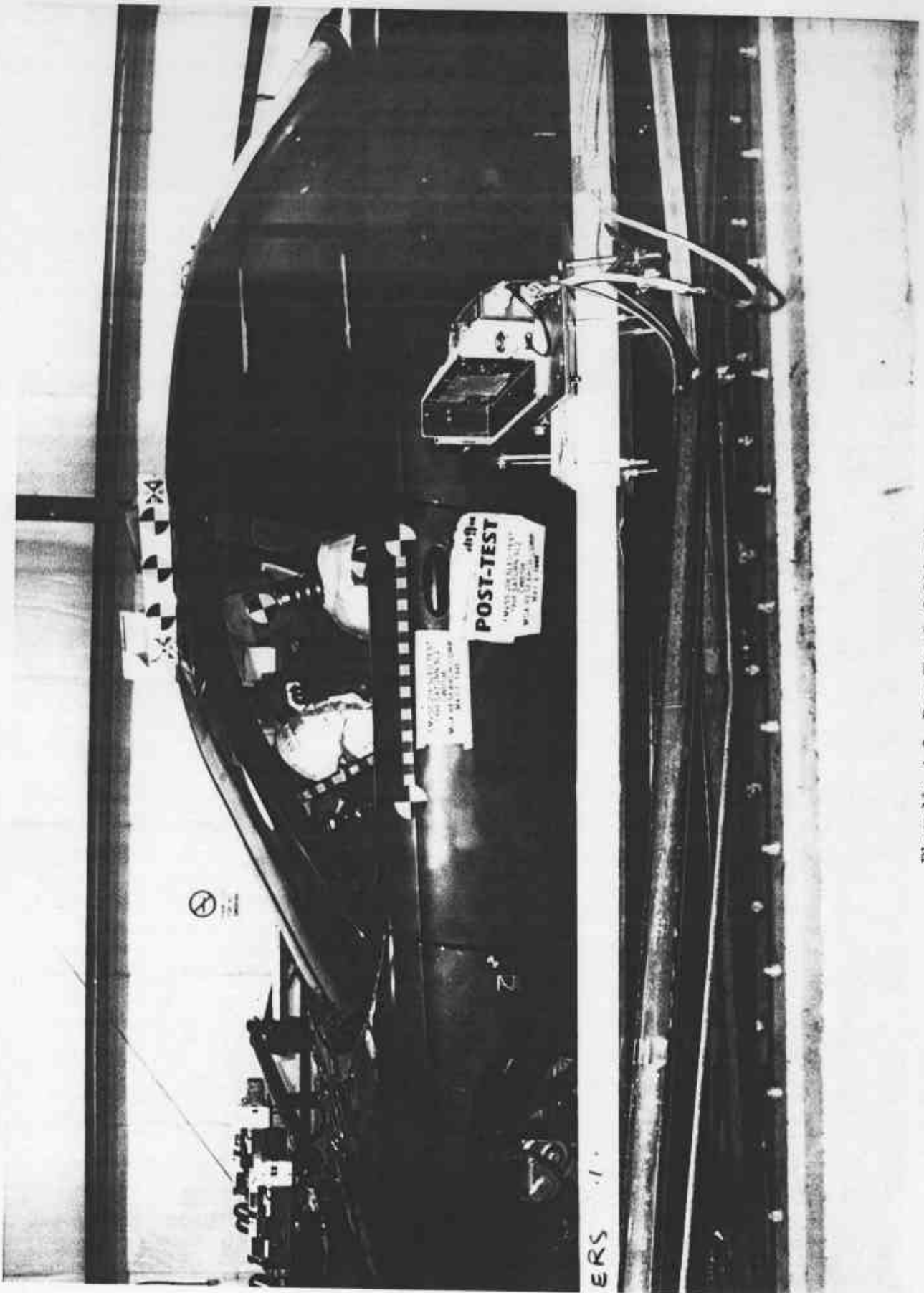


Photo No. A-3 - Post-Test Left Side View

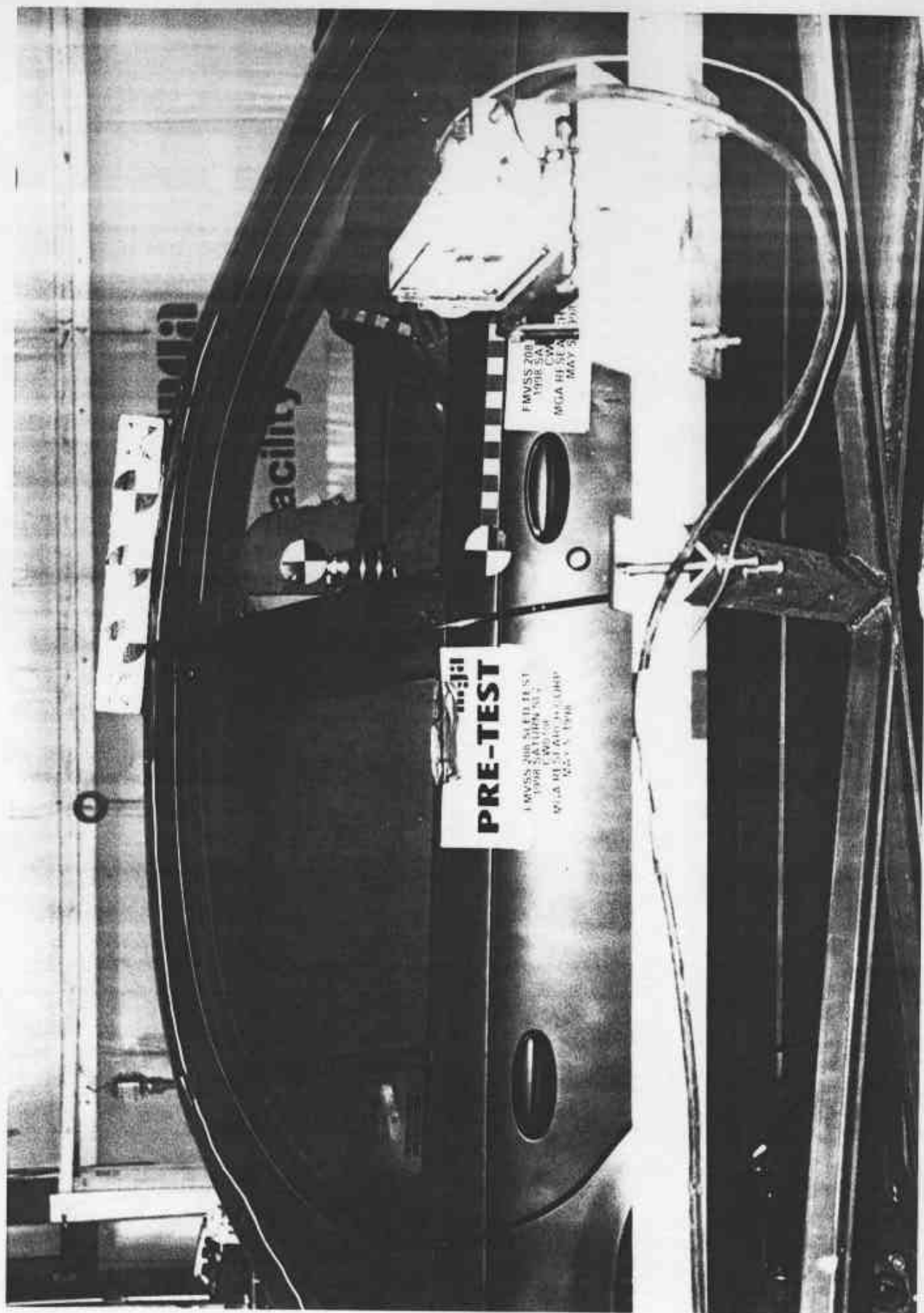


Photo No. A-4 - Pre-Test Right Side View

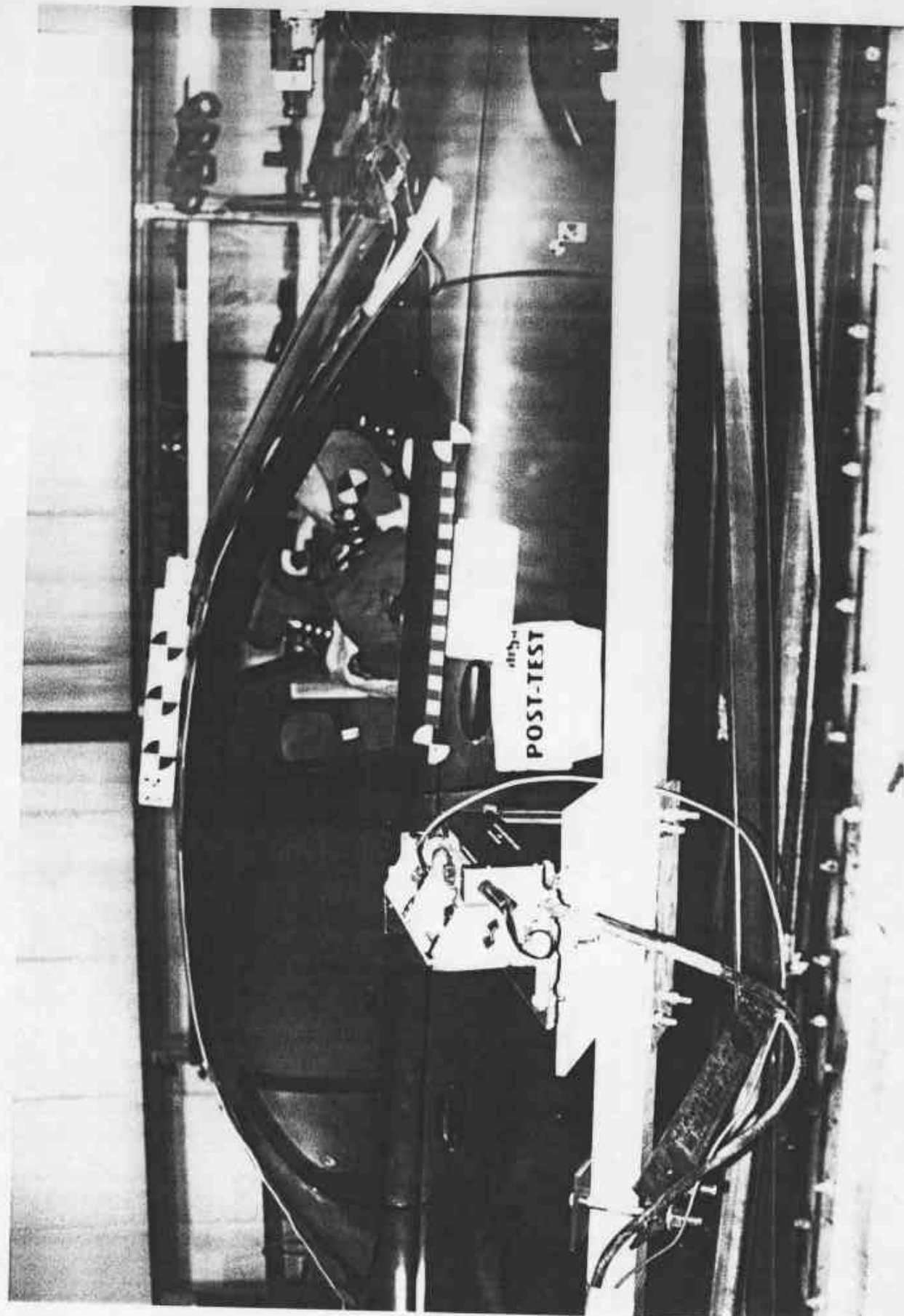


Photo No. A-5 - Post-Test Right Side View

A-5

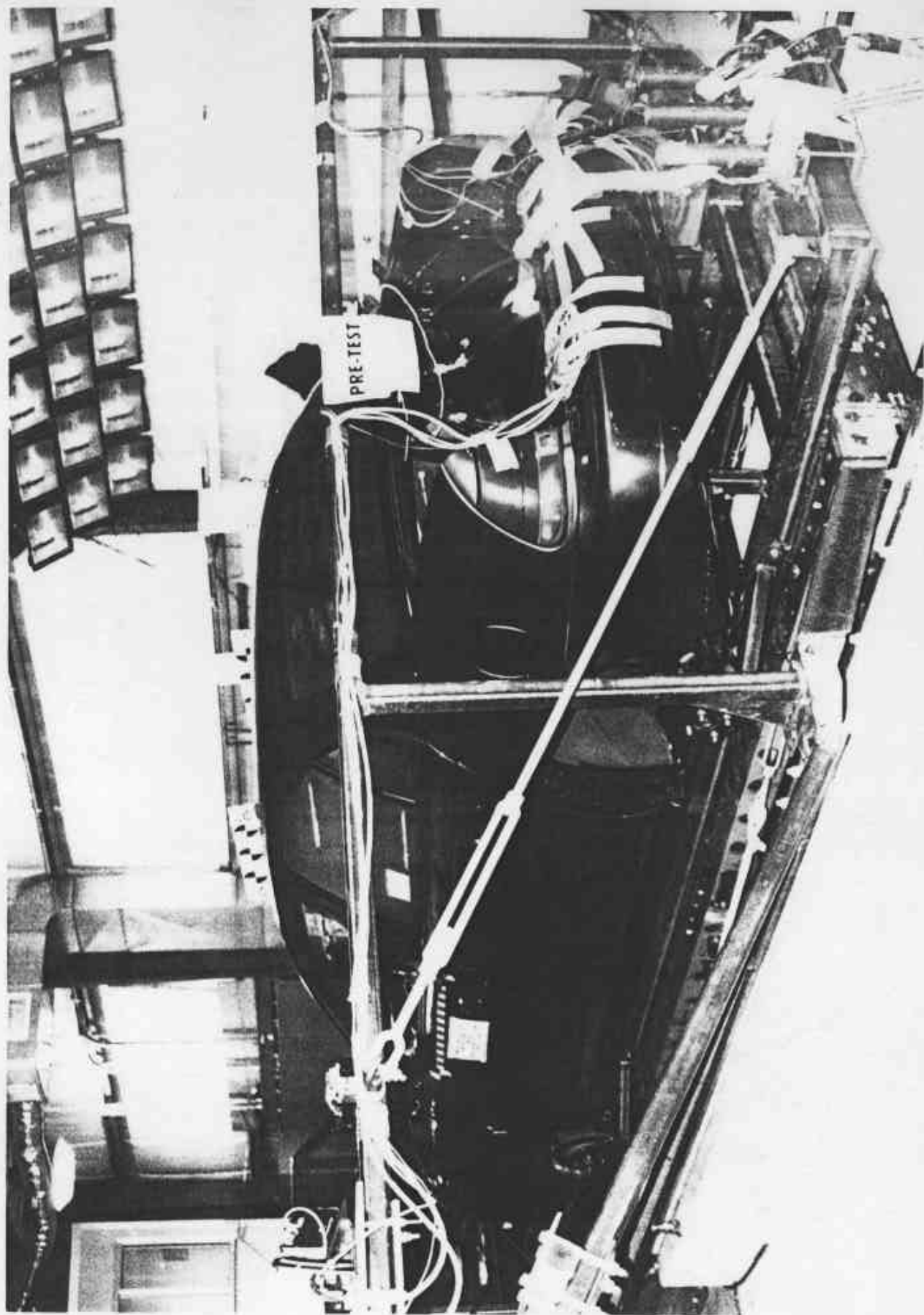


Photo No. A-6 - Pre-Test 3/4 Left Rear View

A-6

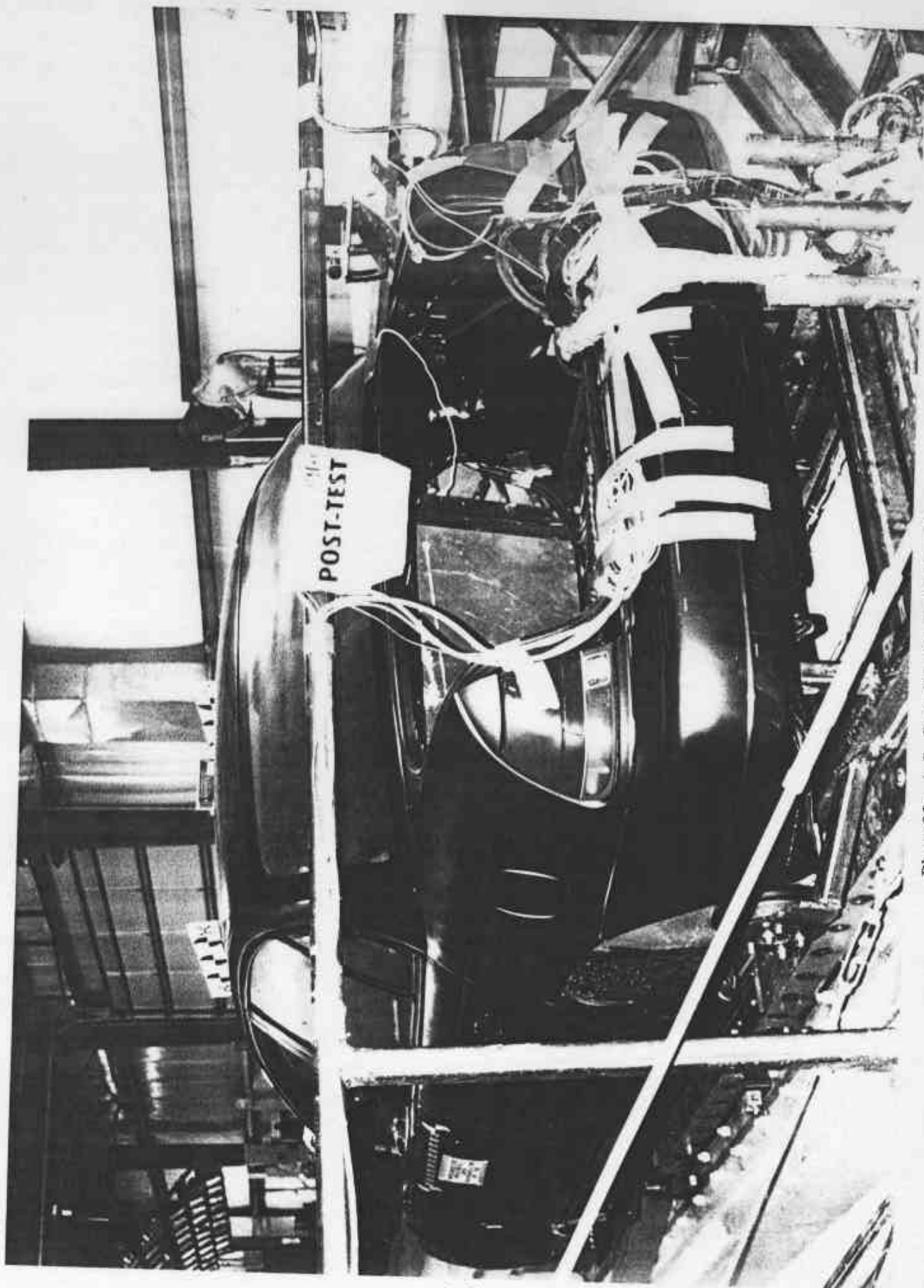


Photo No. A-7 - Post-Test 3/4 Left Rear View

A-7

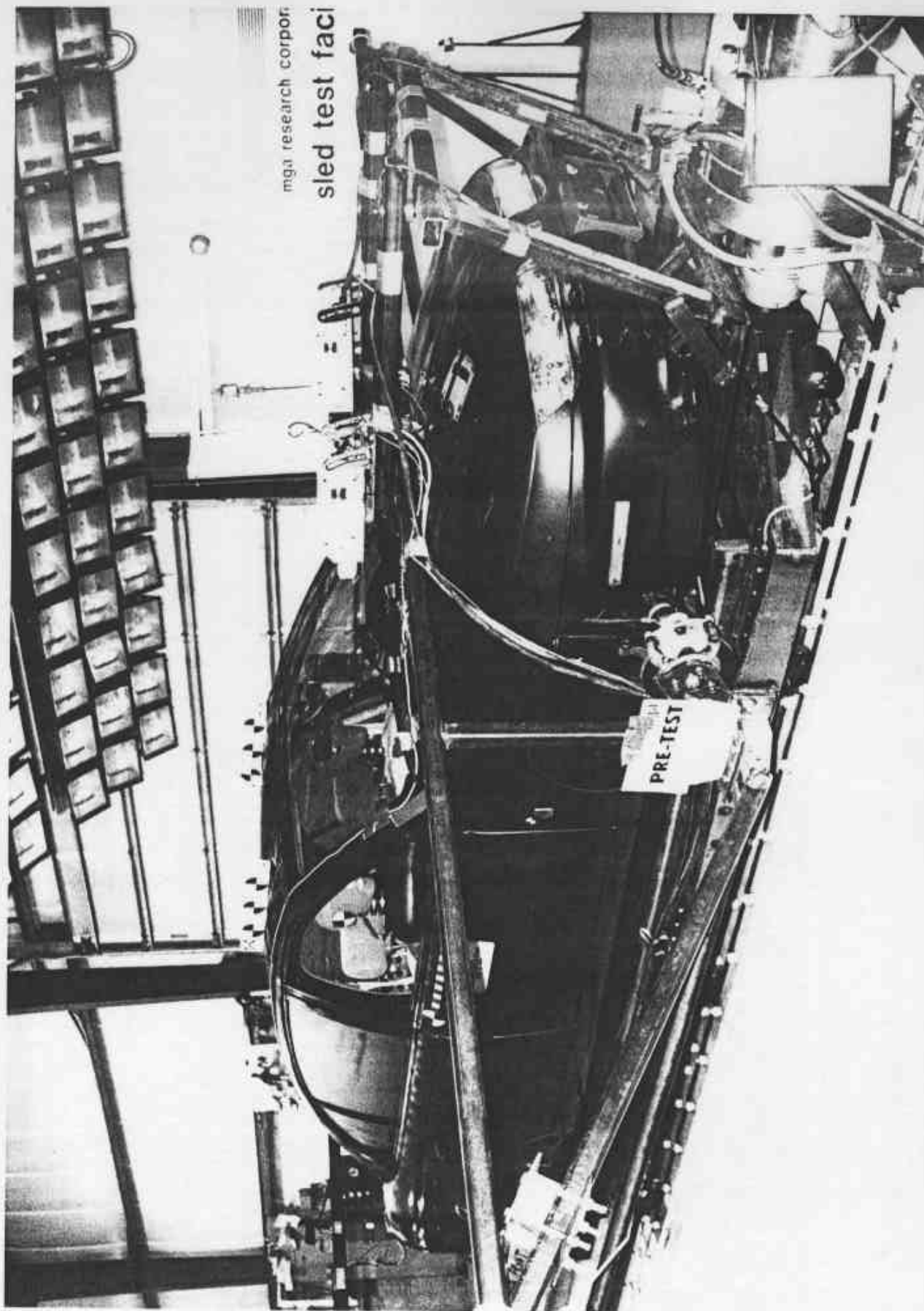


Photo No. A-8 - Pre-Test 3/4 Right Front View

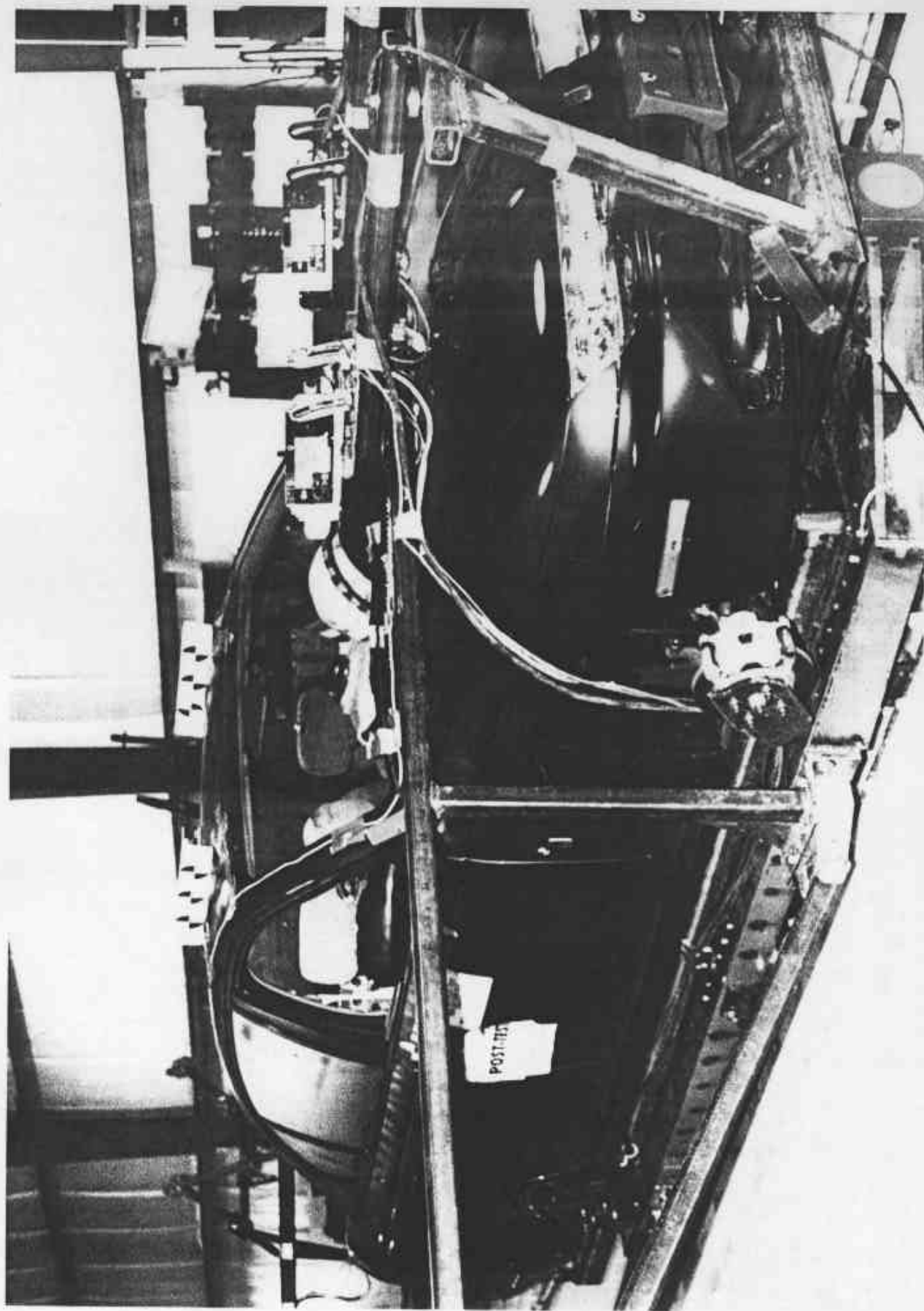


Photo No. A-9 - Post-Test 3/4 Right Front View

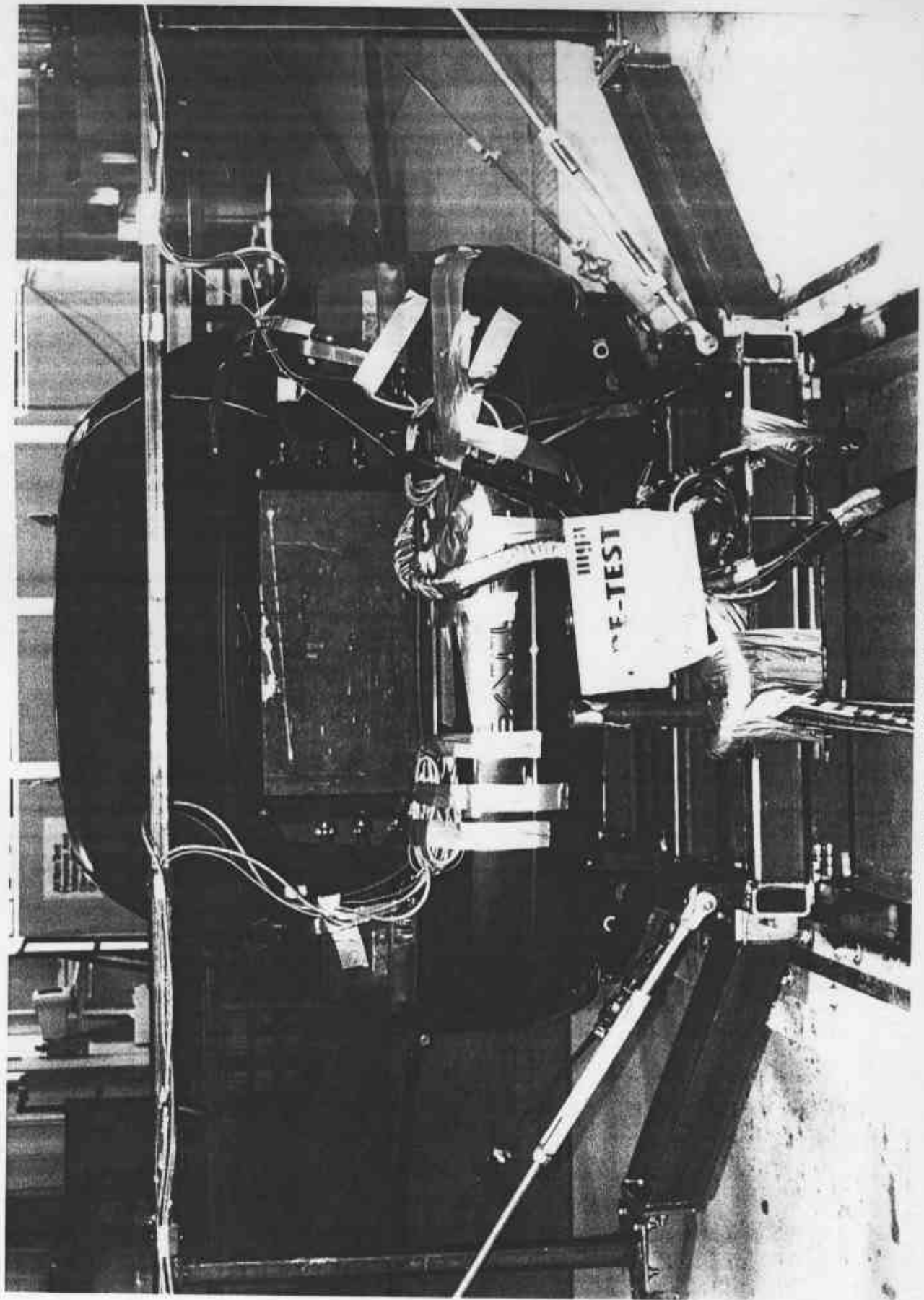


Photo No. A-10 - Pre-Test Rear View

A-10

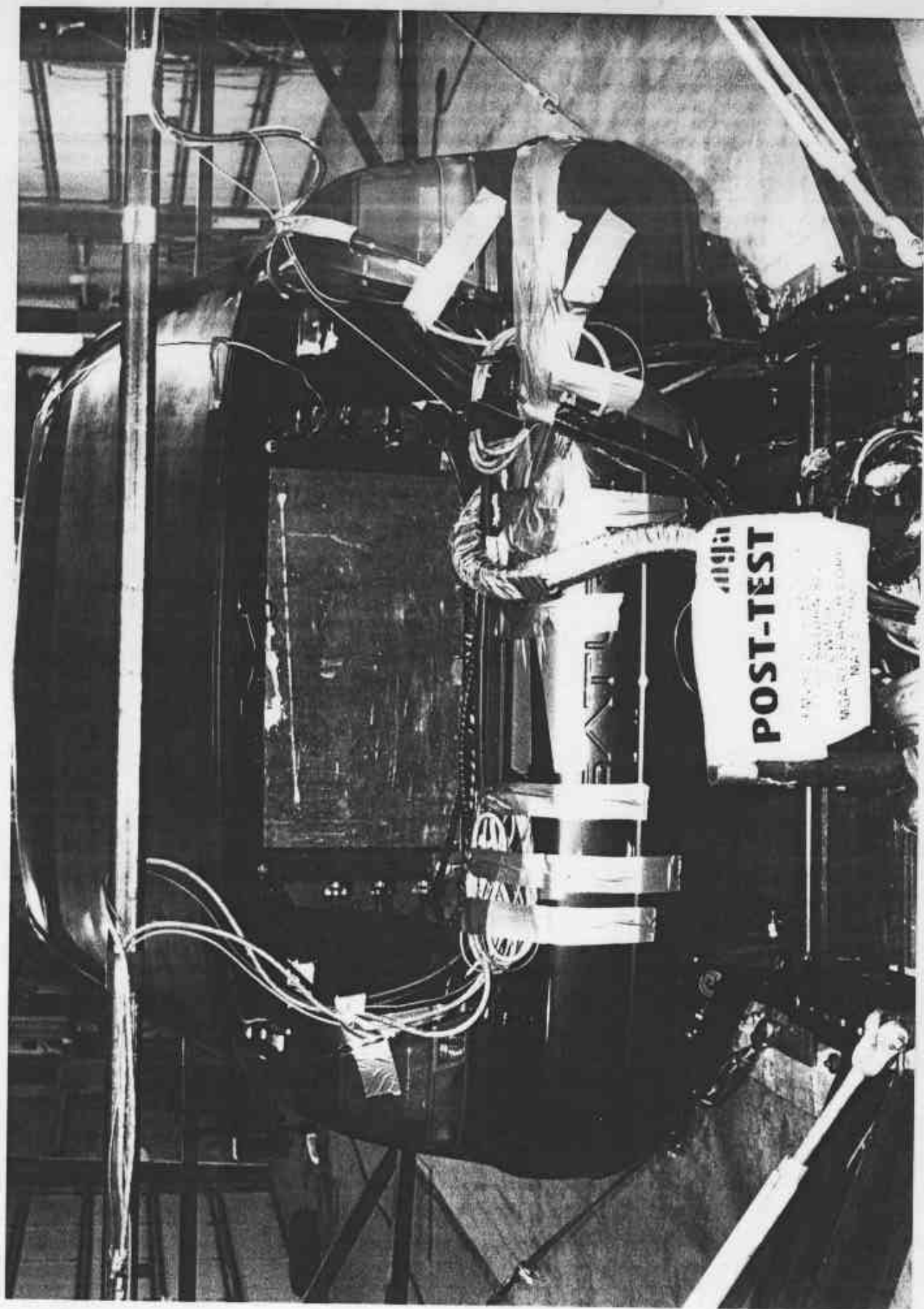


Photo No. A-11 - Post-Test Rear View

A-11

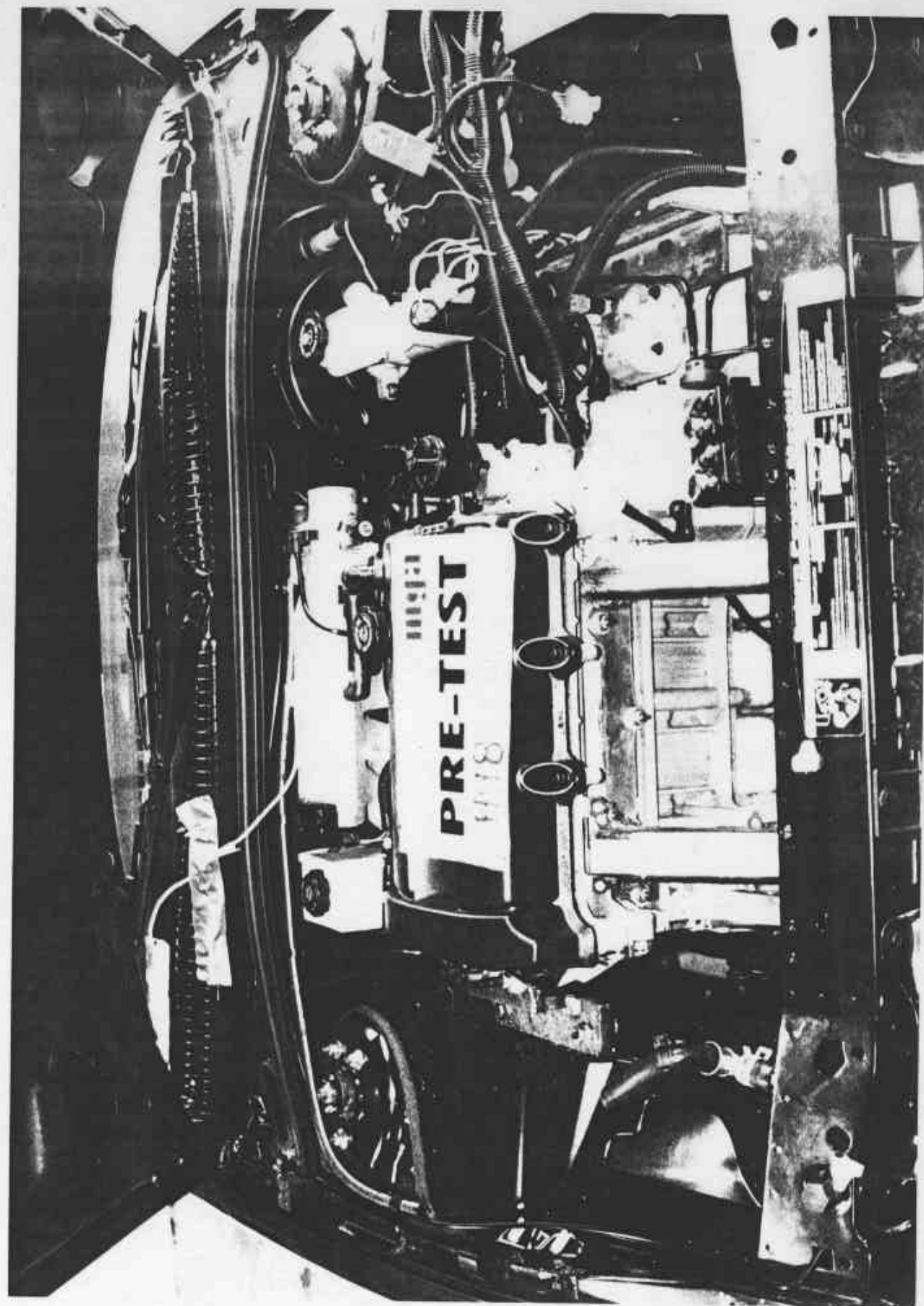


Photo No. A-12 - Pre-Test Engine Compartment View

A-12

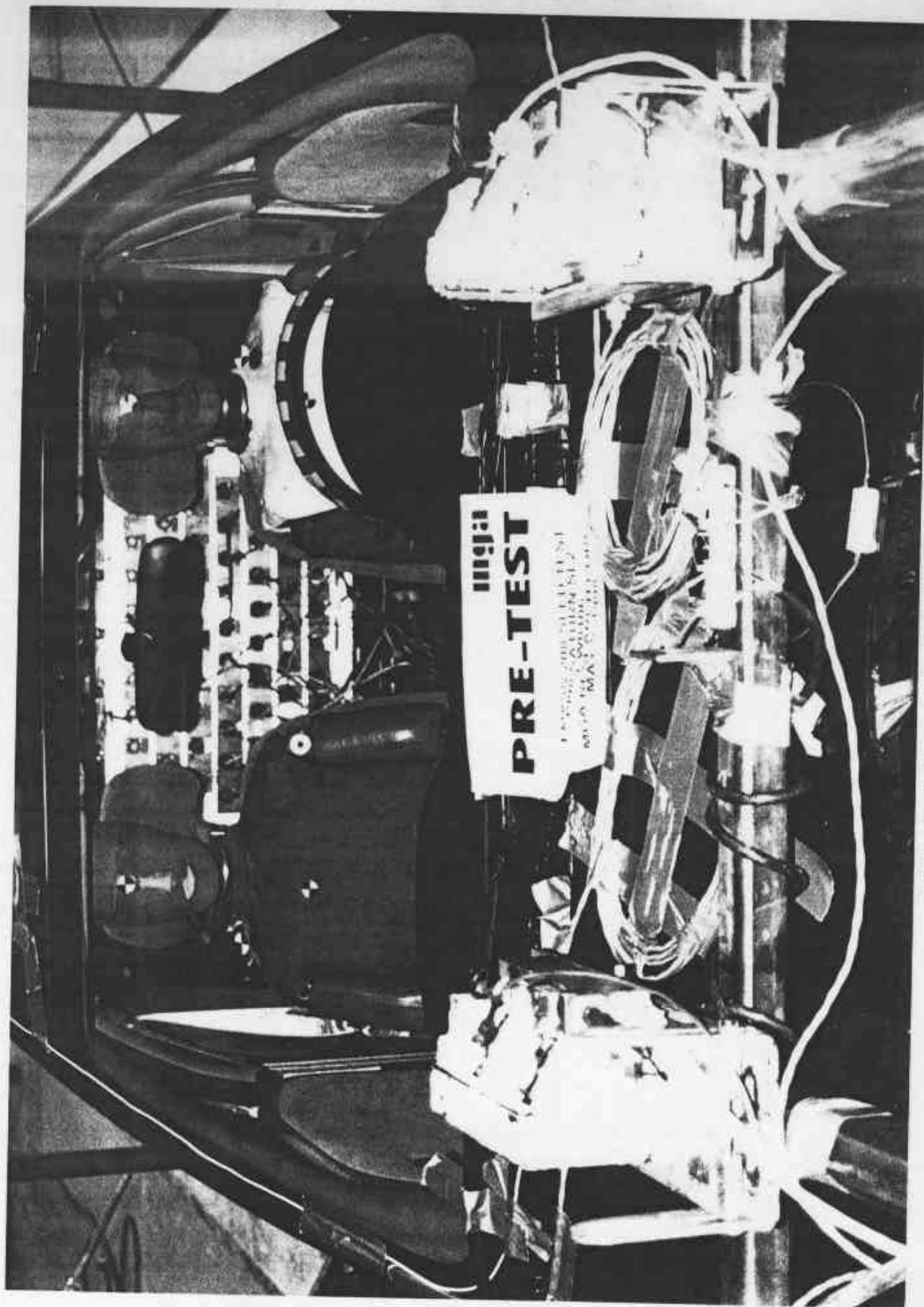


Photo No. A-13 - Pre-Test Windshield View

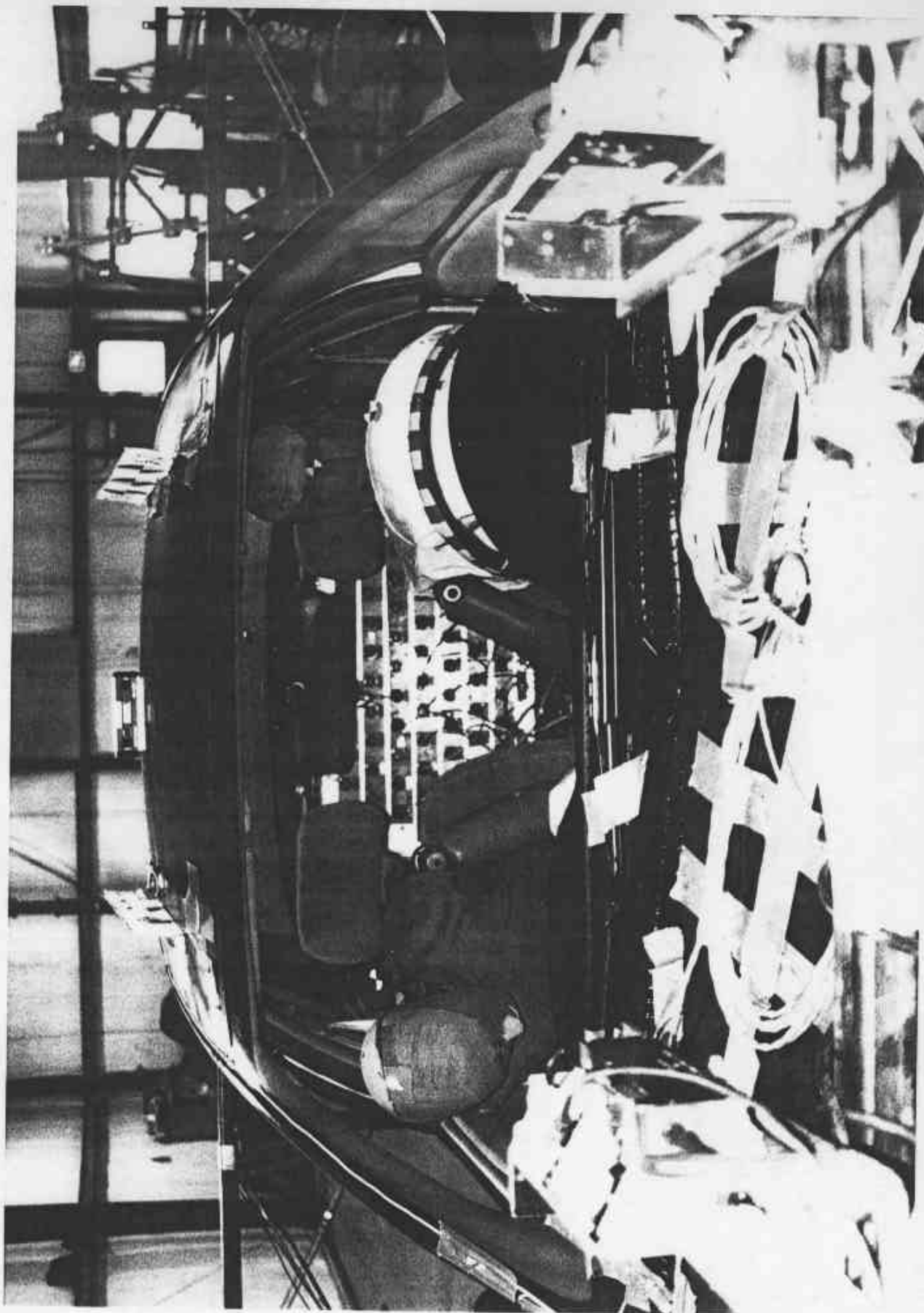


Photo No. A-14 - Post-Test Windshield View

A-14

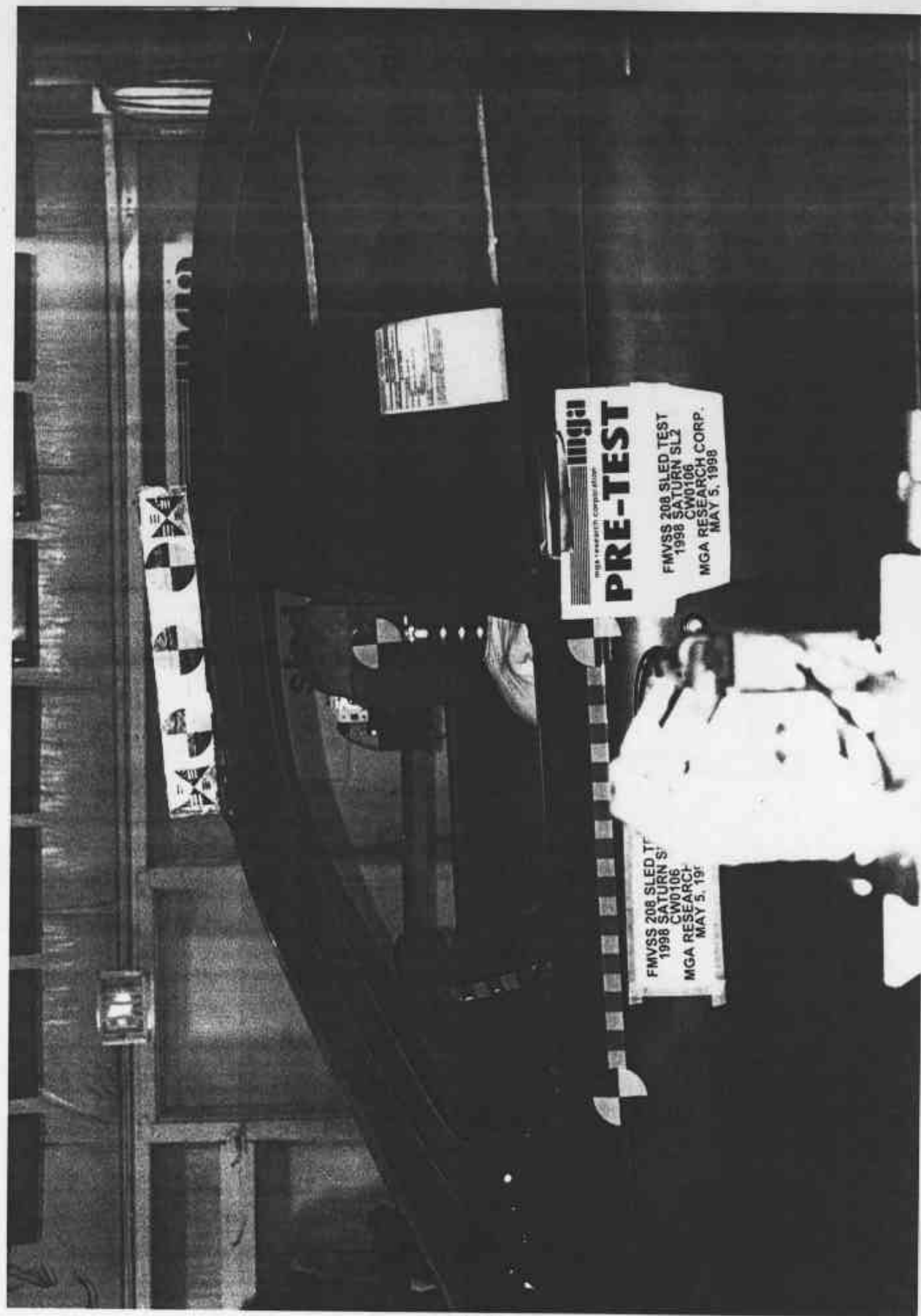


Photo No. A-15 - Pre-Test Driver Dummy Position View



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



Photo No. A-17 - Pre-Test Driver Dummy Position View (Door Open)



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

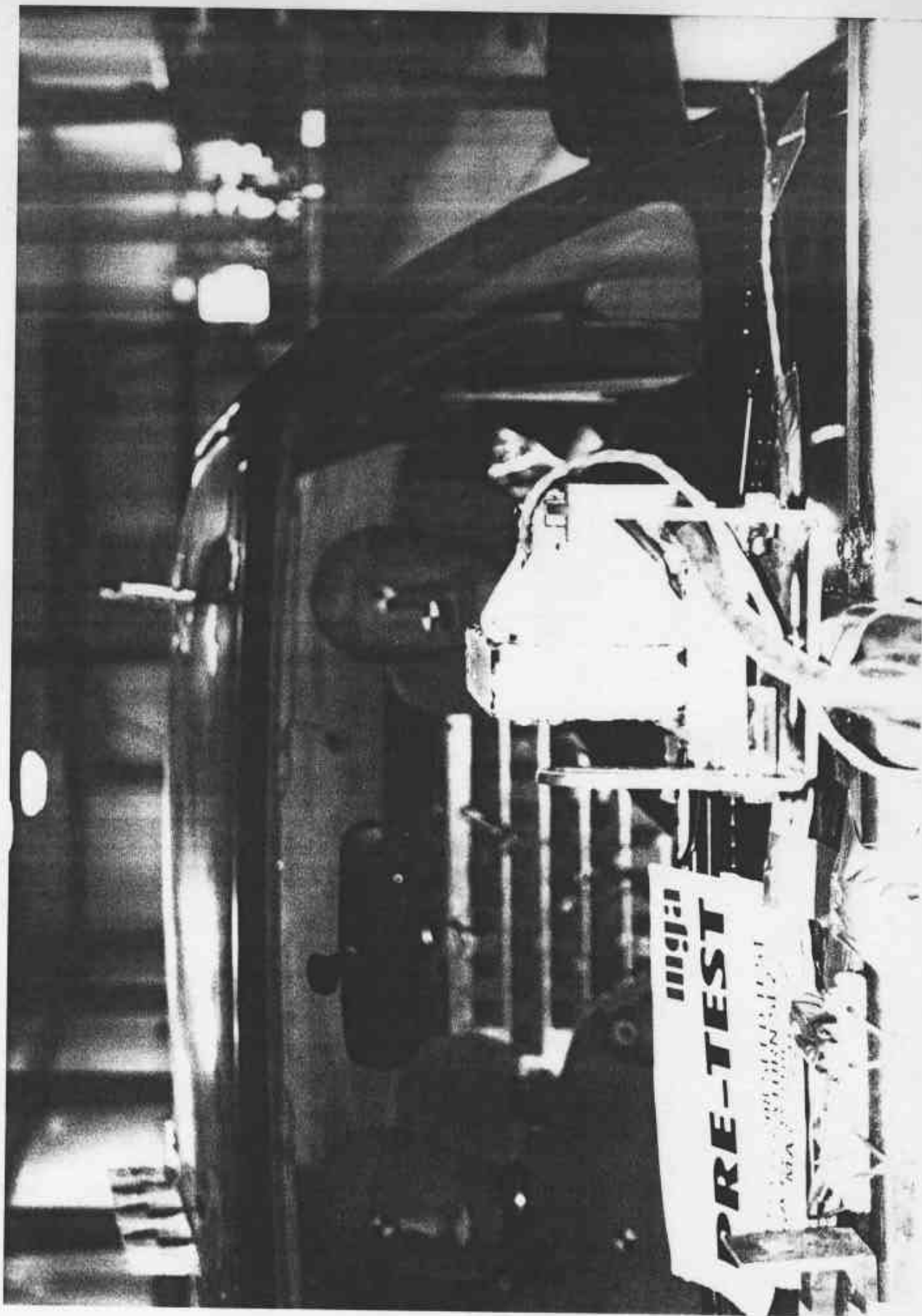


Photo No. A-19 - Pre-Test Driver Windshield View

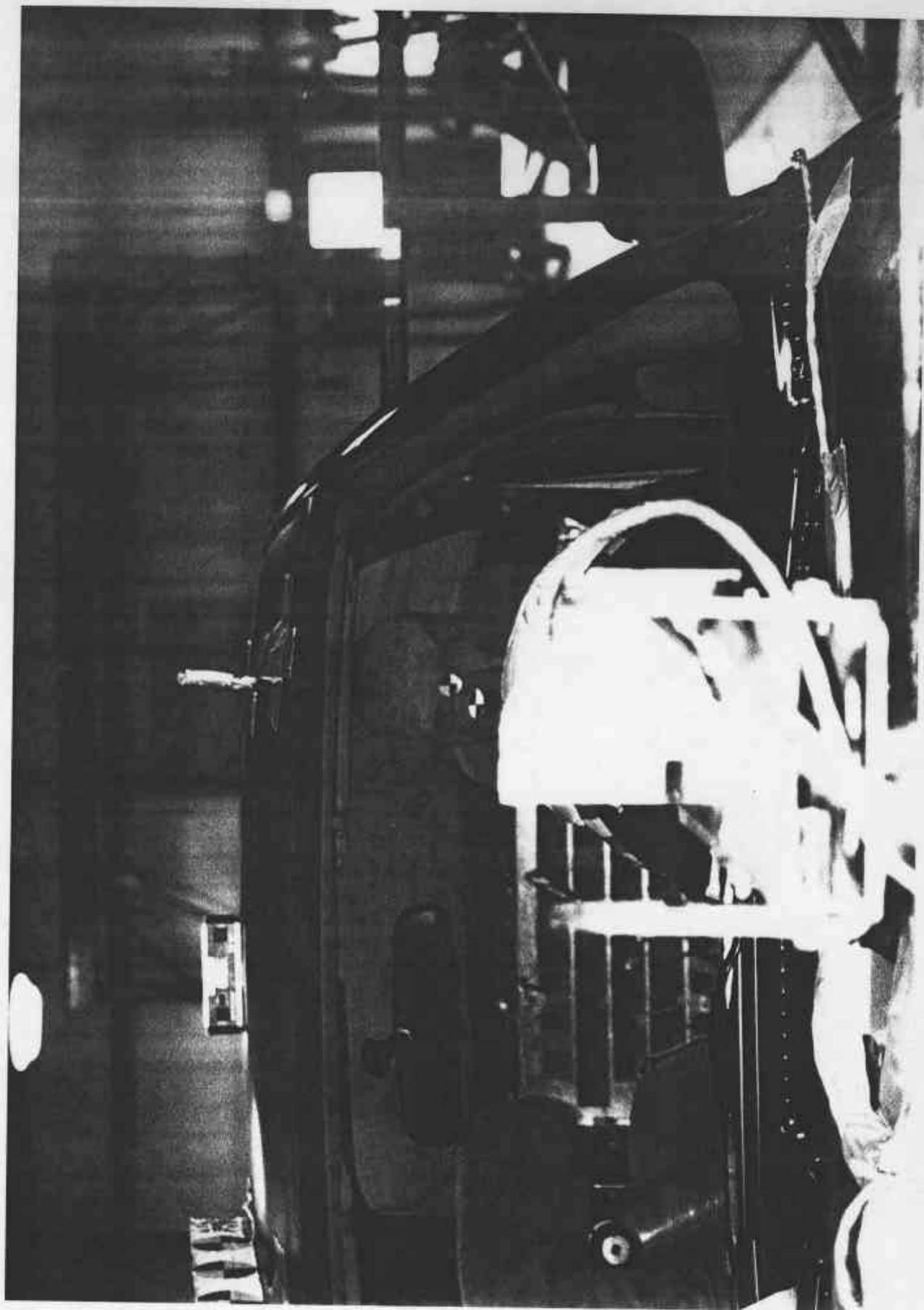


Photo No. A-20 - Post-Test Driver Windshield View

A-20



Photo No. A-21 - Pre-Test Driver Seat Position View



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



Photo No. A-23 - Pre-Test Driver Knee Bolster View



Photo No. A-24 - Post-Test Driver Knee Bolster View



Photo No. A-25 - Post-Test Driver Airbag View

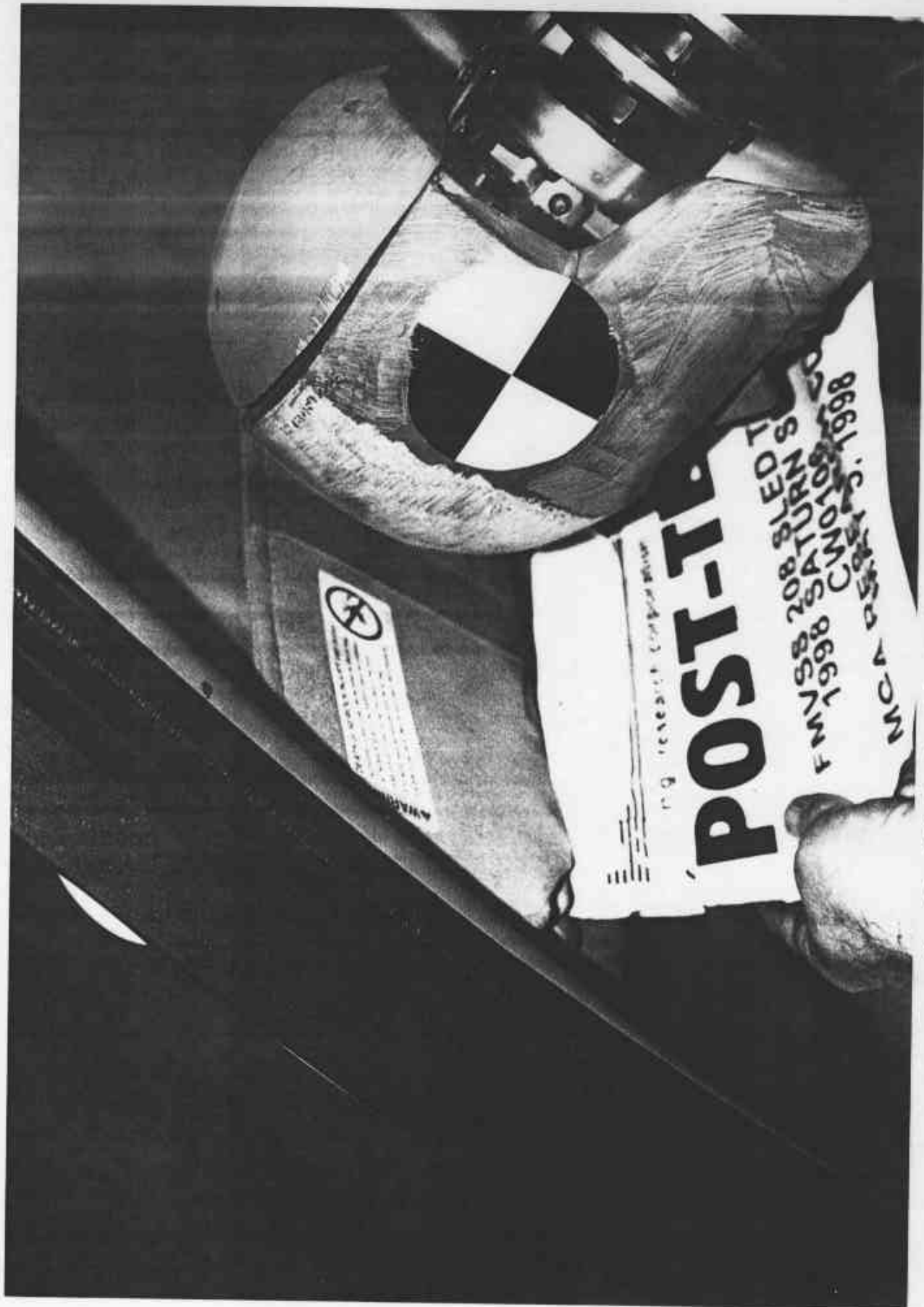


Photo No. A-26 - Post-Test Driver Head Contact View (visor)

 MGA research corporation
POST-TEST

FMVSS 208 SLED TEST
1998 SATURN SL2

CW0106

MGA RESEARCH CORP
MAY 5, 1998

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



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



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



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

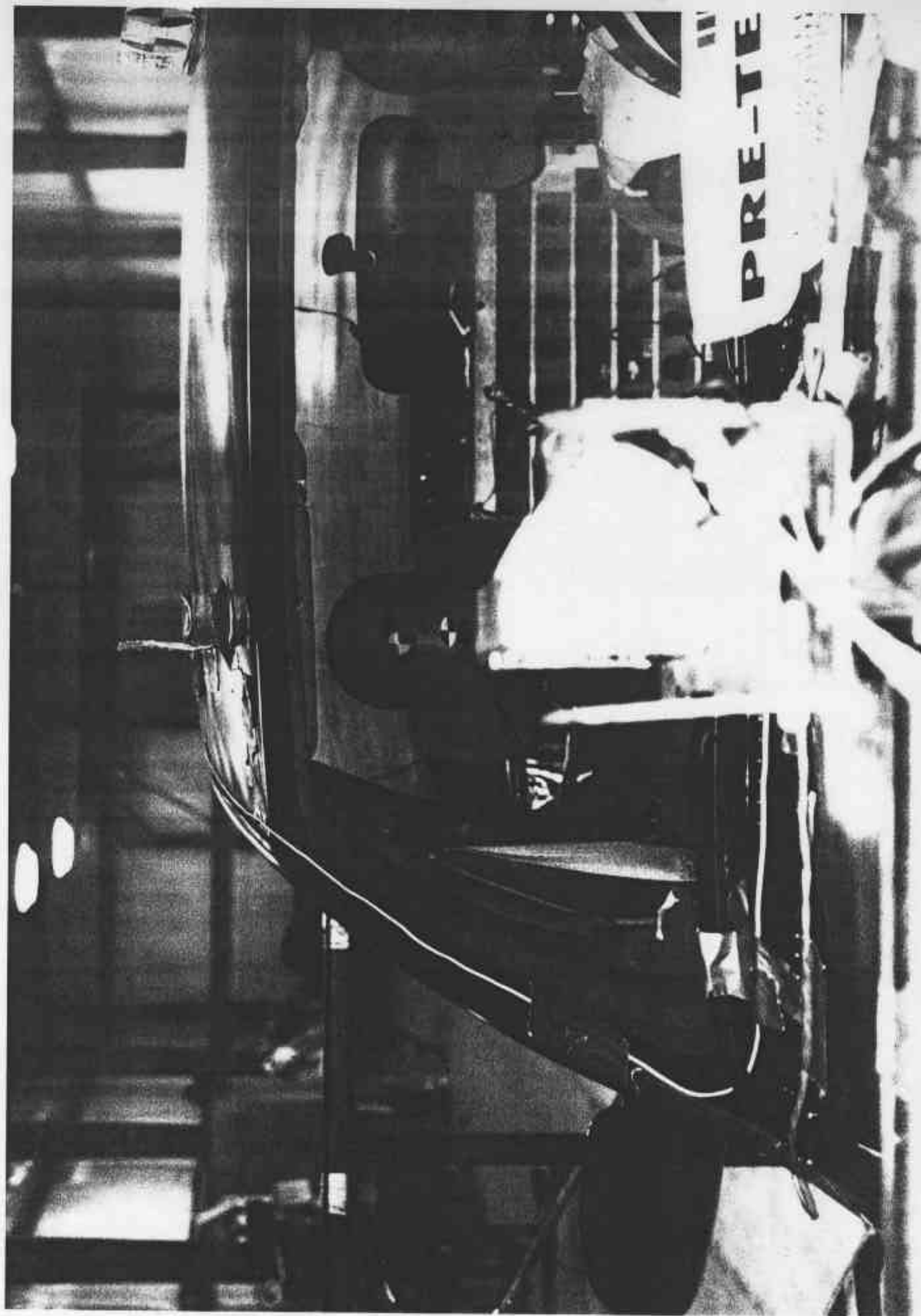


Photo No. A-31 - Pre-Test Passenger Windshield View

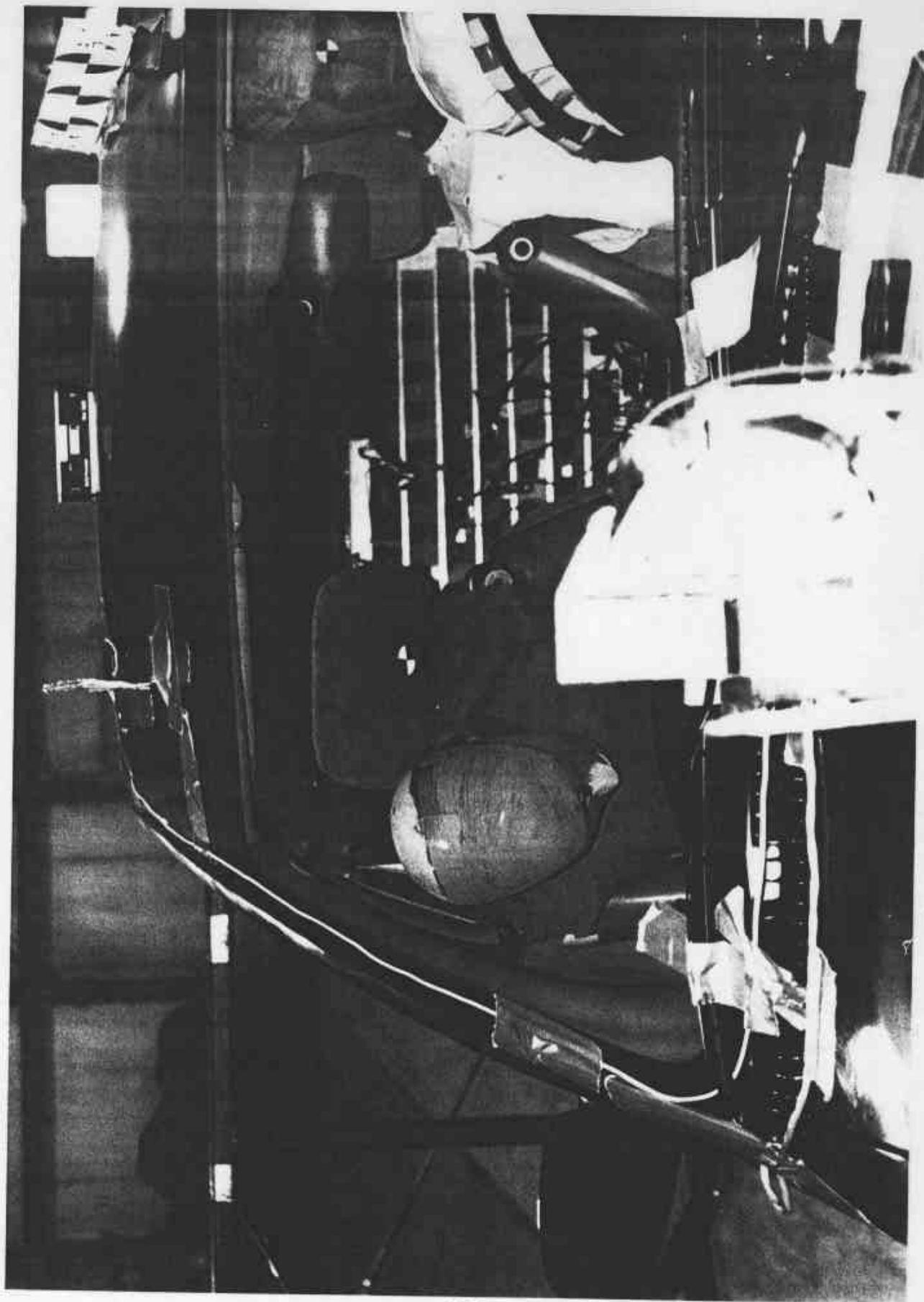


Photo No. A-32 - Post-Test Passenger Windshield View

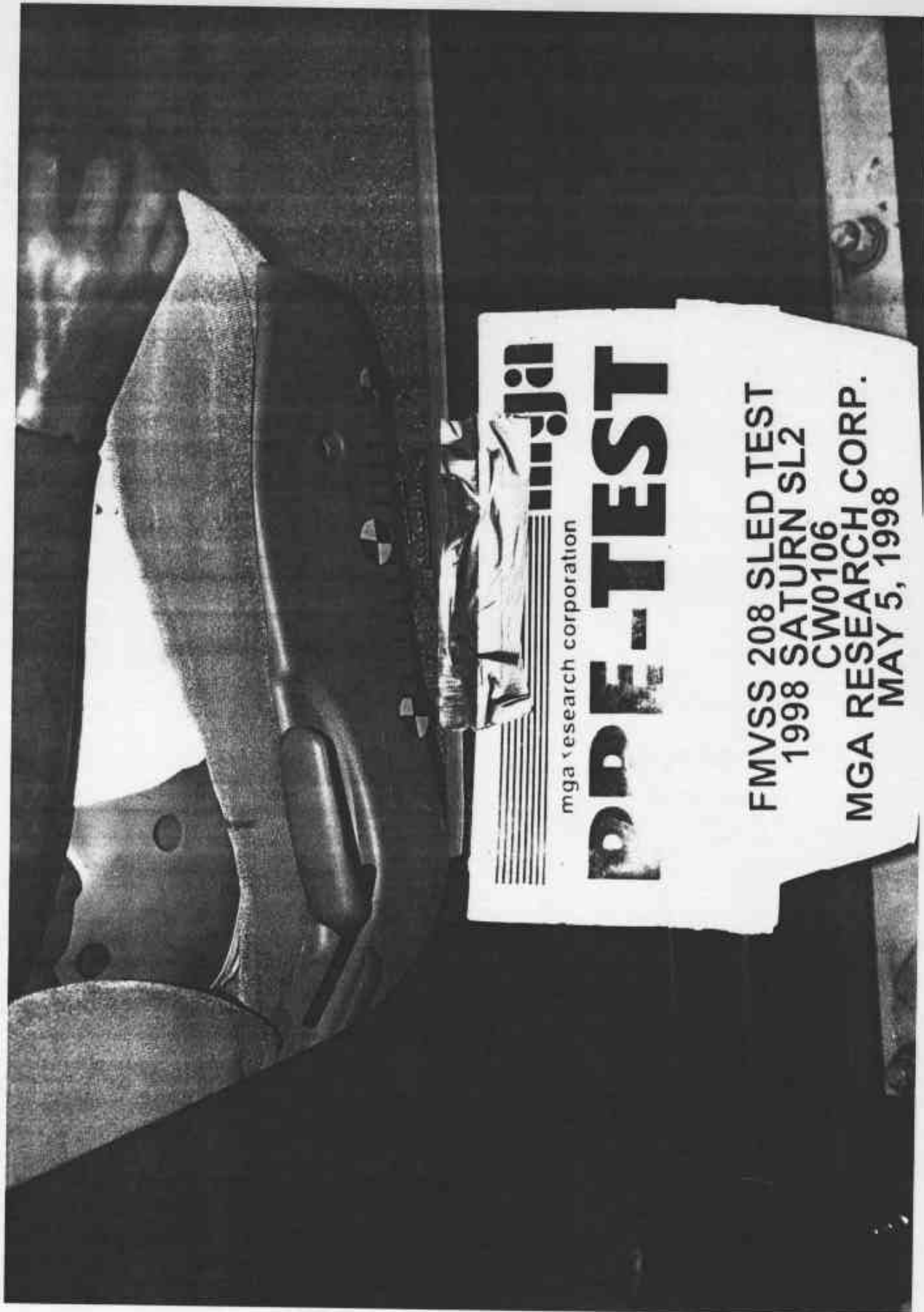


Photo No. A-33 - Pre-Test Passenger Dummy Seat Position View

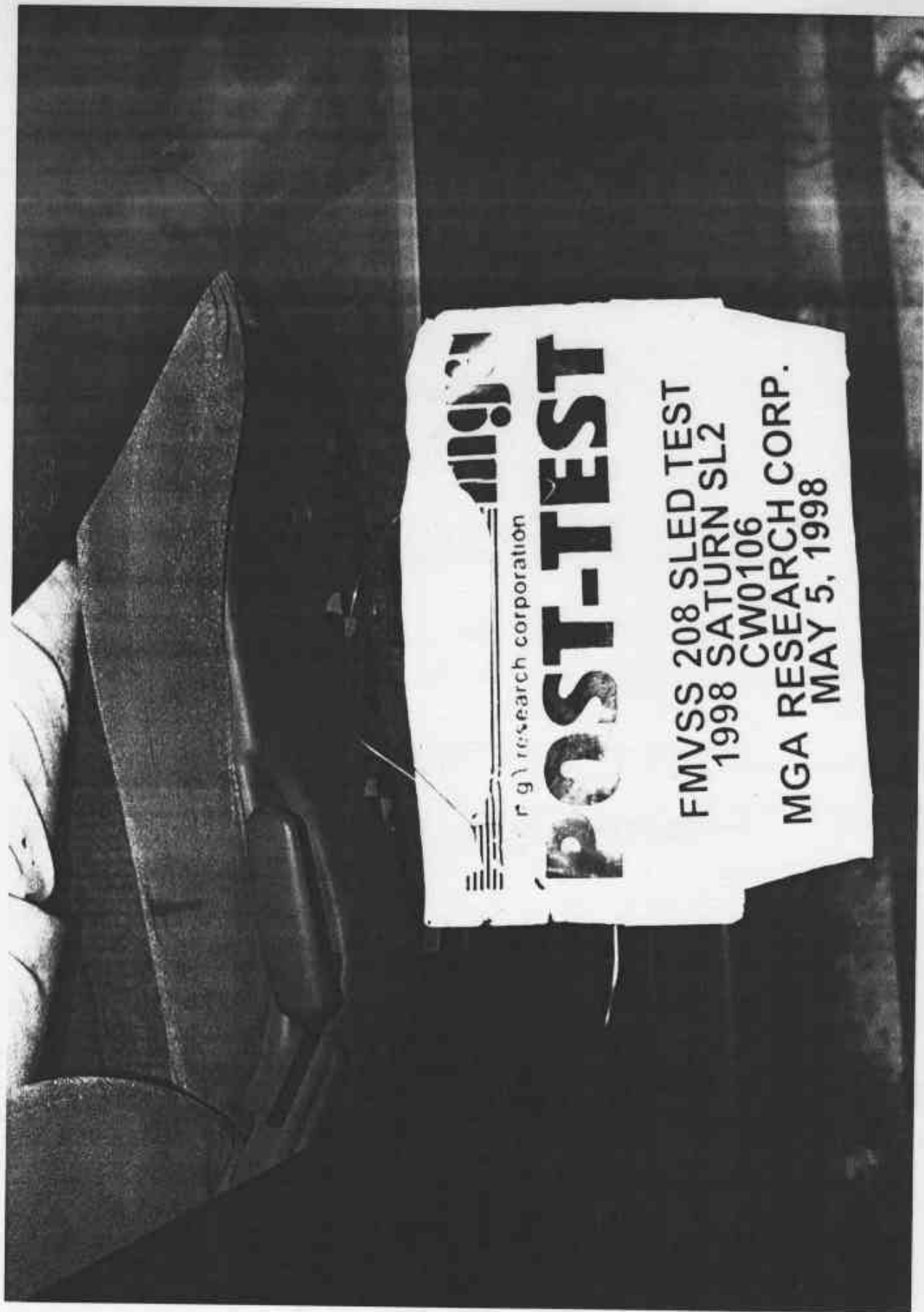


Photo No. A-34 - Post-Test Passenger Dummy Seat Position View



Photo No. A-35 - Pre-Test Passenger Dummy Knee Bolster View

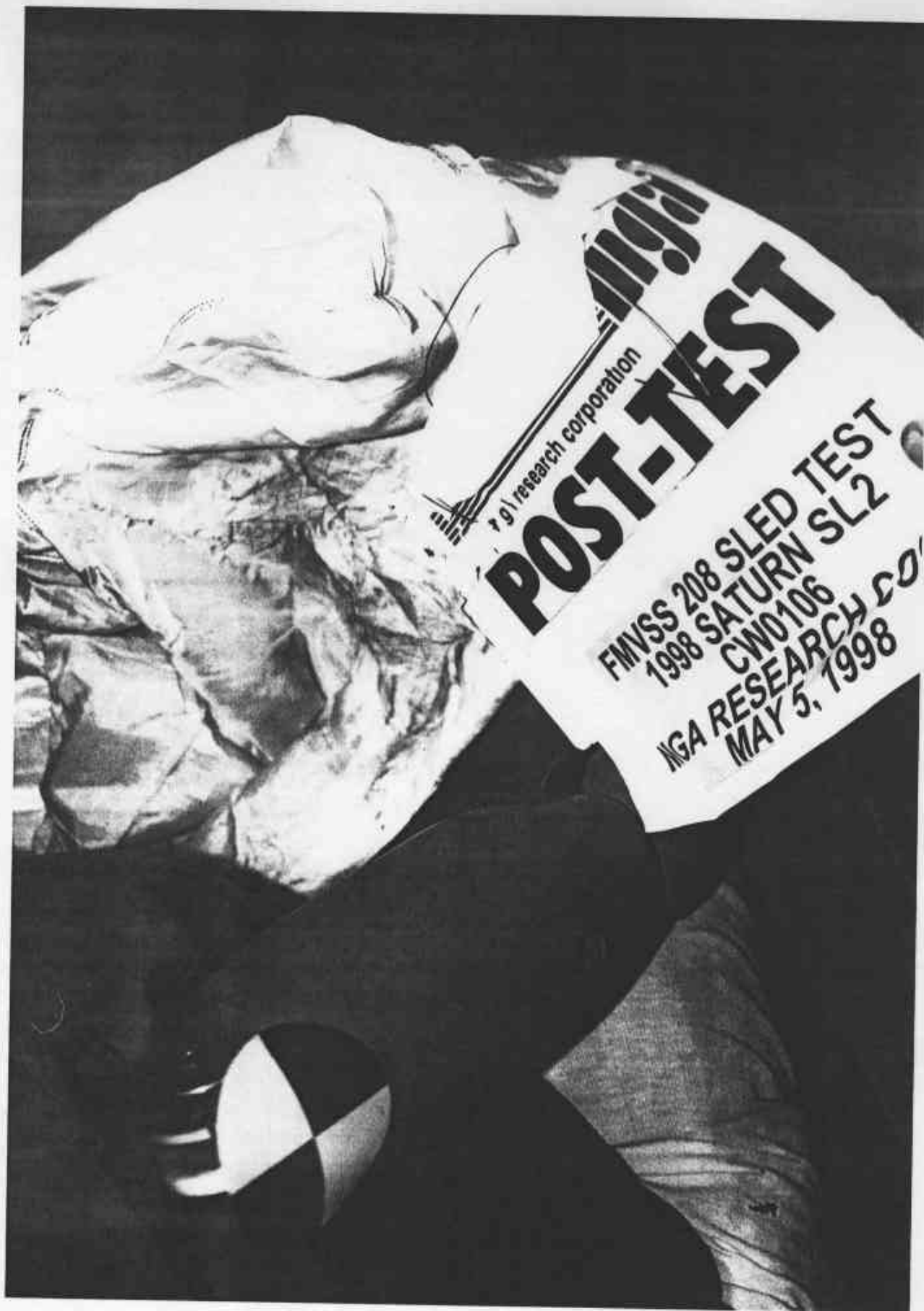


Photo No. A-36 - Post-Test Passenger Dummy Airbag View

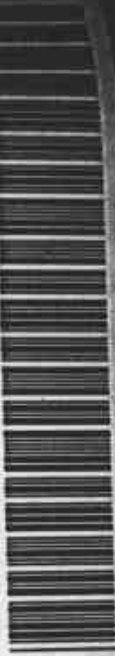


Photo No. A-37 - Post-Test Passenger Dummy Head Contact View (A-Post)

MFD BY SATURN CORPORATION
 DATE GWR GWR FRT GWR
 01/98 3296LB 1662LB 1634LB
 1495KG 0754KG 0741KG

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.

1G8ZJ5279WZ217170 PASS CAR



OCCUPANTS
 FBI - CTG. 89.
 MAXIMUM WEIGHT
 1000 LBS
 IF EXCEEDS
 SEE OWNER'S
 INFORMATION

Photo No. A-38 - Vehicle Certification Label

TIRE-LOADING INFORMATION

OCCUPANTS **VEHICLE CAPACITY WT.**

FRT. CTR. RR. TOTAL
2 3 5
0 864 942

MAXIMUM LOADING AT GVWR:
SAME AS VEHICLE CAPACITY WEIGHT

2247

**COLD TIRE
PRESSURE**

TIRE SIZE SPEED RATING

FRONT P185/65R15
REAR P185/65R15
SPARE T115/70R14

IF TIRES ARE HOT, ADD 4 PSI (28 KPA)

**SEE OWNER'S MANUAL FOR ADDITIONAL
INFORMATION**

Photo No. A-39 - Tire Placard

APPENDIX B
DATA PLOTS

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Figure B-7 - Driver Neck Force Z vs. Time	B-7
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Figure B-9 - Driver Neck Moment Y vs. Time	B-9
Figure B-10 - Driver Neck Moment Z vs. Time	B-10
Figure B-11 - Driver Occipital Condyle Moment Y vs. Time	B-11
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Figure B-22 - Passenger Head Resultant Acceleration vs. Time	B-22
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TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

COMPONENT: 1998 SATURN SL2 (CW0106)

YMAX= 56.96968 G'S at 179 msec

YMIN= -35.37197 G'S at 96. msec

DRIVER HEAD X ACCELERATION

1 _____ H98111AT.A06 Filterclass (1000)

60

40

20

0

-20

G'S

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

MGA Research
05-05-1998 11:30

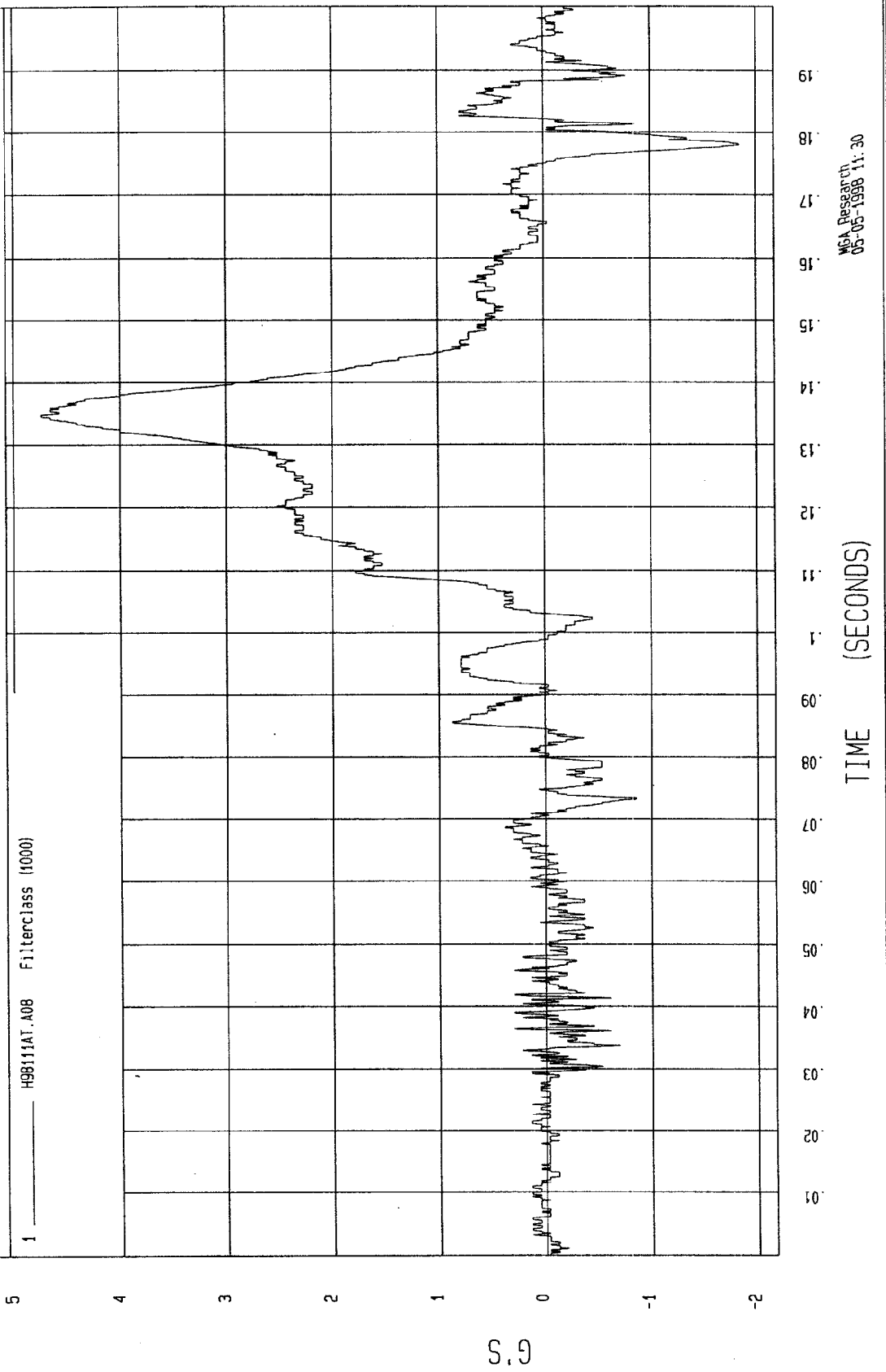
TIME (SECONDS)

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

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-1.840521 G'S at 178 msec YMAX= 4.740742 G'S at 134 msec

DRIVER HEAD Y ACCELERATION



TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMAX= 22.64925 G'S at 102 msec

YMIN=-4.418931 G'S at 183 msec

DRIVER HEAD Z ACCELERATION

24

22

20

18

16

14

12

10

8

6

4

2

0

-2

-4

G.S

1 H98111AT.A03 Filterclass (1000)

19

18

17

16

15

14

13

12

11

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09

08

07

06

05

04

03

02

01

MSA Research
05-05-1998 11:30

TIME (SECONDS)

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

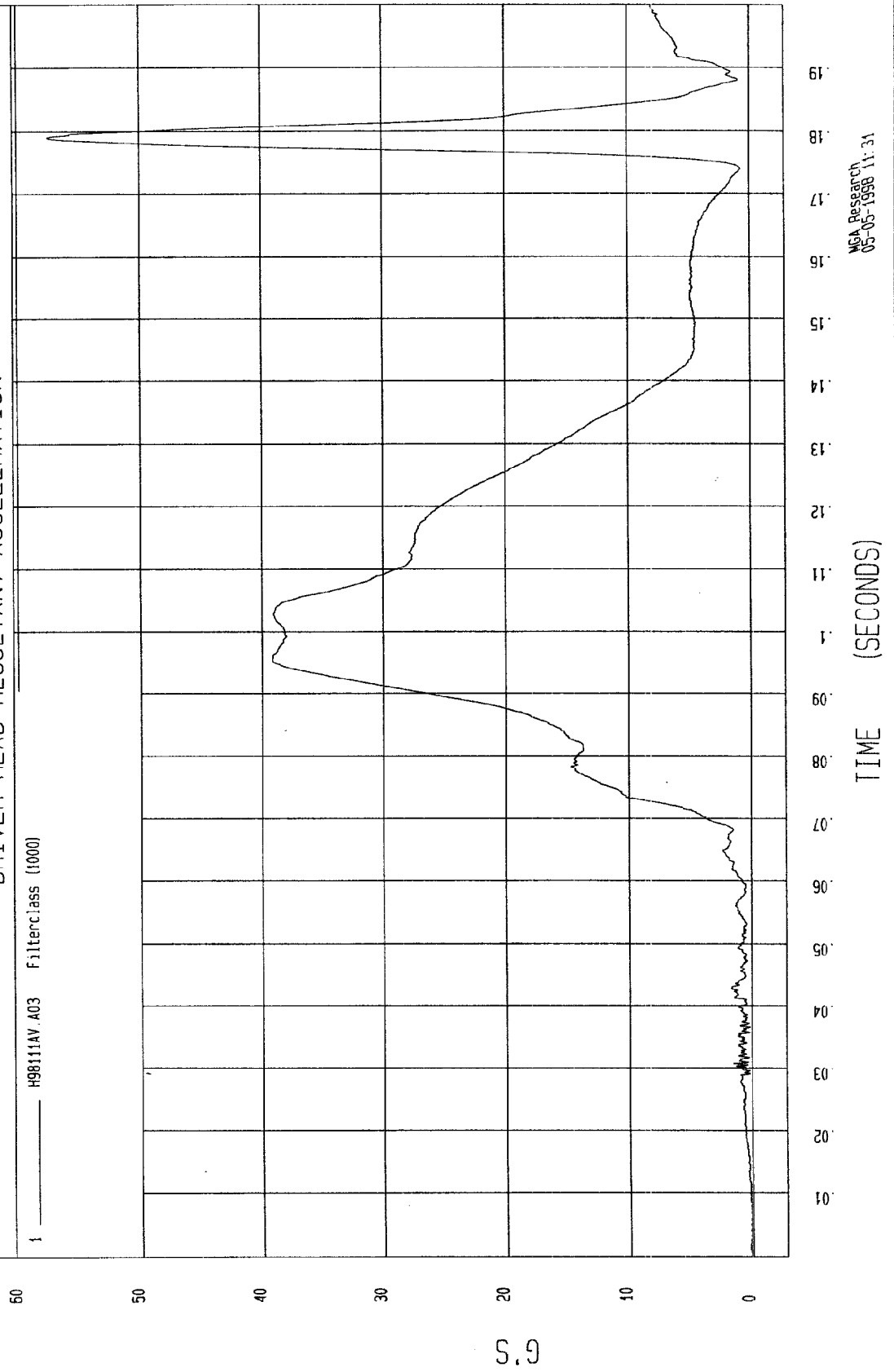
COMPONENT: 1998 SATURN SL2 (CW0106)

YMAX= 57.48716 G'S at 179 msec

YMIN= 5.37751E-02 G'S at .2 msec

DRIVER HEAD RESULTANT ACCELERATION

1 H98111AV.A03 Filterclass (1000)



MCA Research
05-05-1998 11:31

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

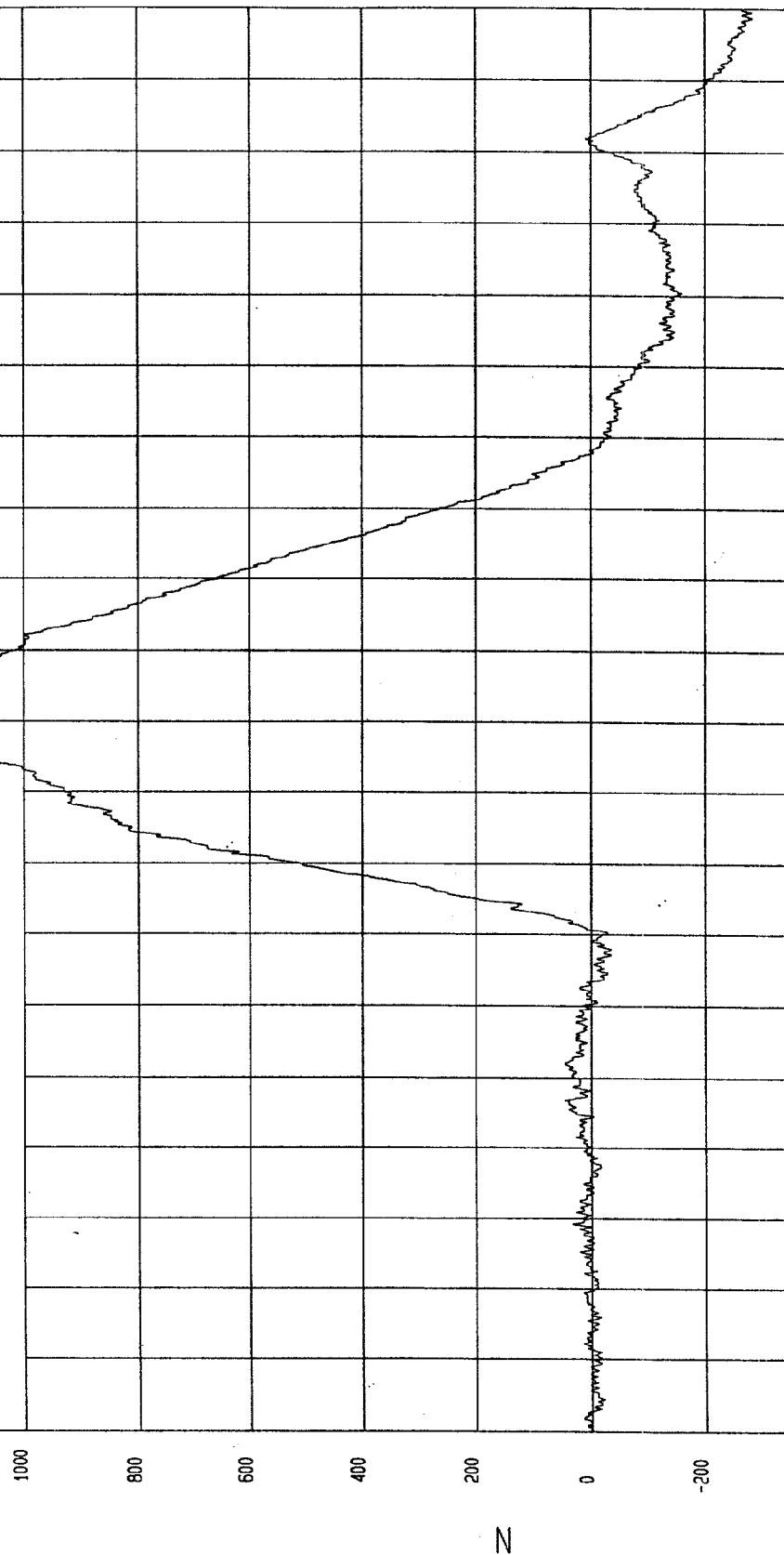
COMPONENT: 1998 SATURN SL2 (CW0106)

YMAX= 1115.599 N at 100 msec

YMIN=-284.2417 N at 198 msec

DRIVER NECK FORCE X

1 _____ H98111FT.F21 Filterclass (1000)



MGA Research
07-02-1998 15:19

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

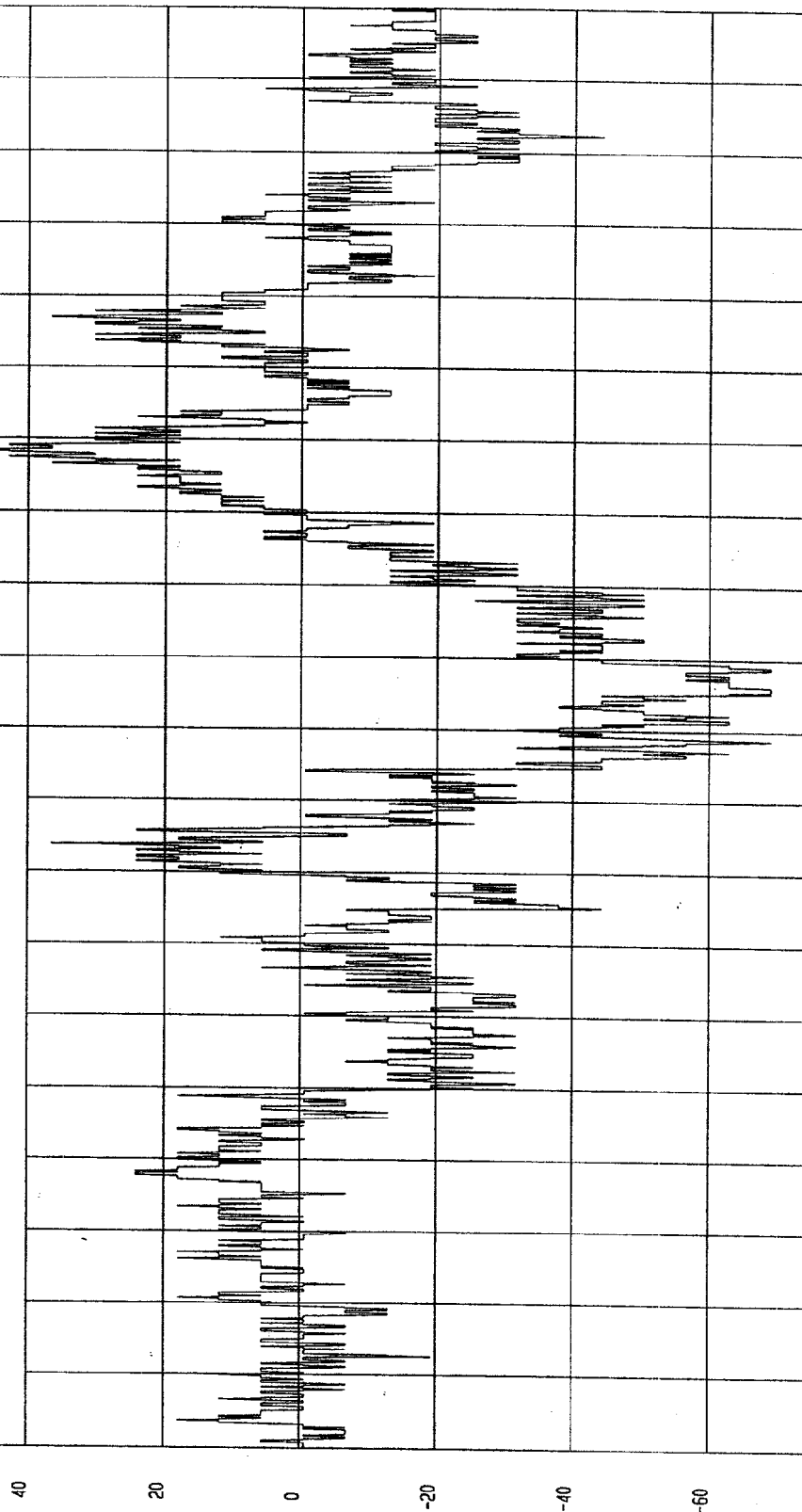
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-69.00627 N at 98. msec

YMAX= 48.99446 N at 138 msec

DRIVER NECK FORCE Y

1 _____ H98111FT.F22 FilterClass [1000]



MSA Research
07-02-1998 15.19

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-166.394 N at 183 msec

YMAX= 1175.246 N at 95. msec

DRIVER NECK FORCE Z

1 H98111FT.F23 FilterClass (1000)

1200

1000

800

600

400

200

0

-200

N

0.01

0.02

0.03

0.04

0.05

0.06

0.07

0.08

0.09

0.1

0.11

0.12

0.13

0.14

0.15

0.16

0.17

0.18

0.19

TIME (SECONDS)

MCA Research
07-02-1998 15:20

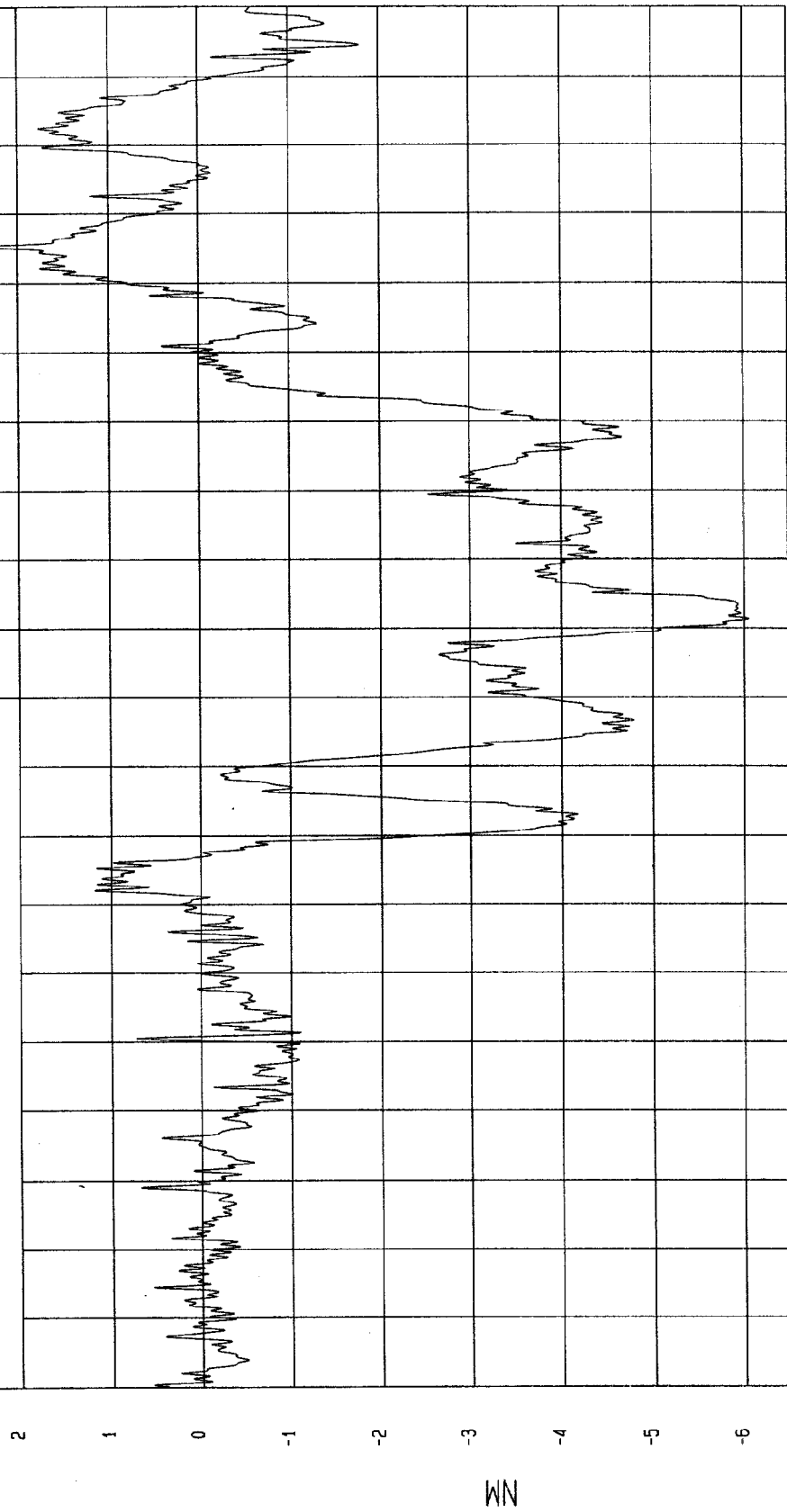
TEST: FMVSS 208 SLED TEST TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-6.058603 NM at 111 msec YMAX= 2.480858 NM at 165 msec

DRIVER NECK MOMENT X

1 _____ H9811MF.M24 Filterclass [600]



TIME (SECONDS)

MGA Research
05-05-1998 11:32

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

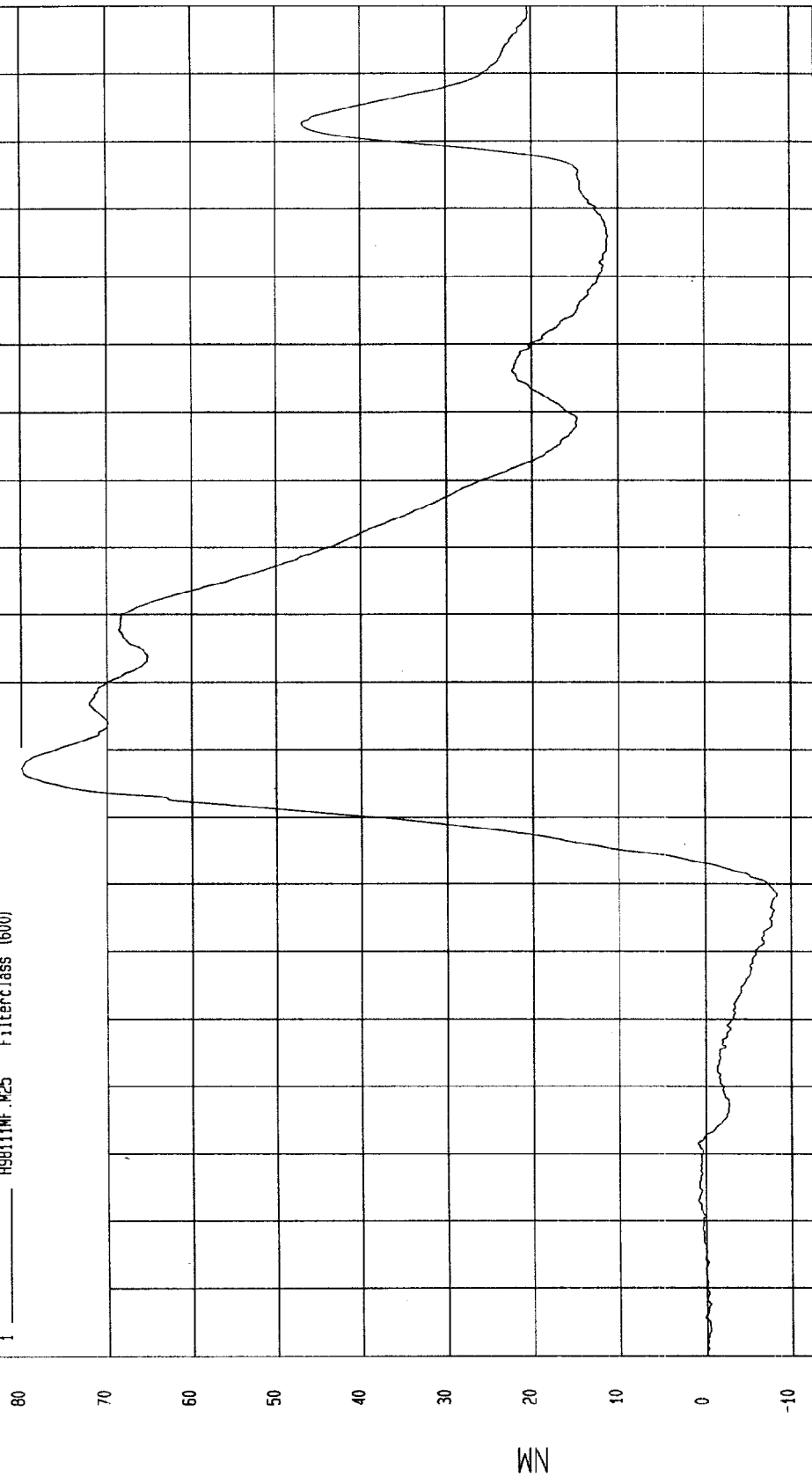
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-8.340532 NM at 68. msec

YMAX= 79.92214 NM at 87. msec

DRIVER NECK MOMENT Y

1 ——— H98111MF.M25 Filterclass (600)



MCA Research
05-05-1998 11:51

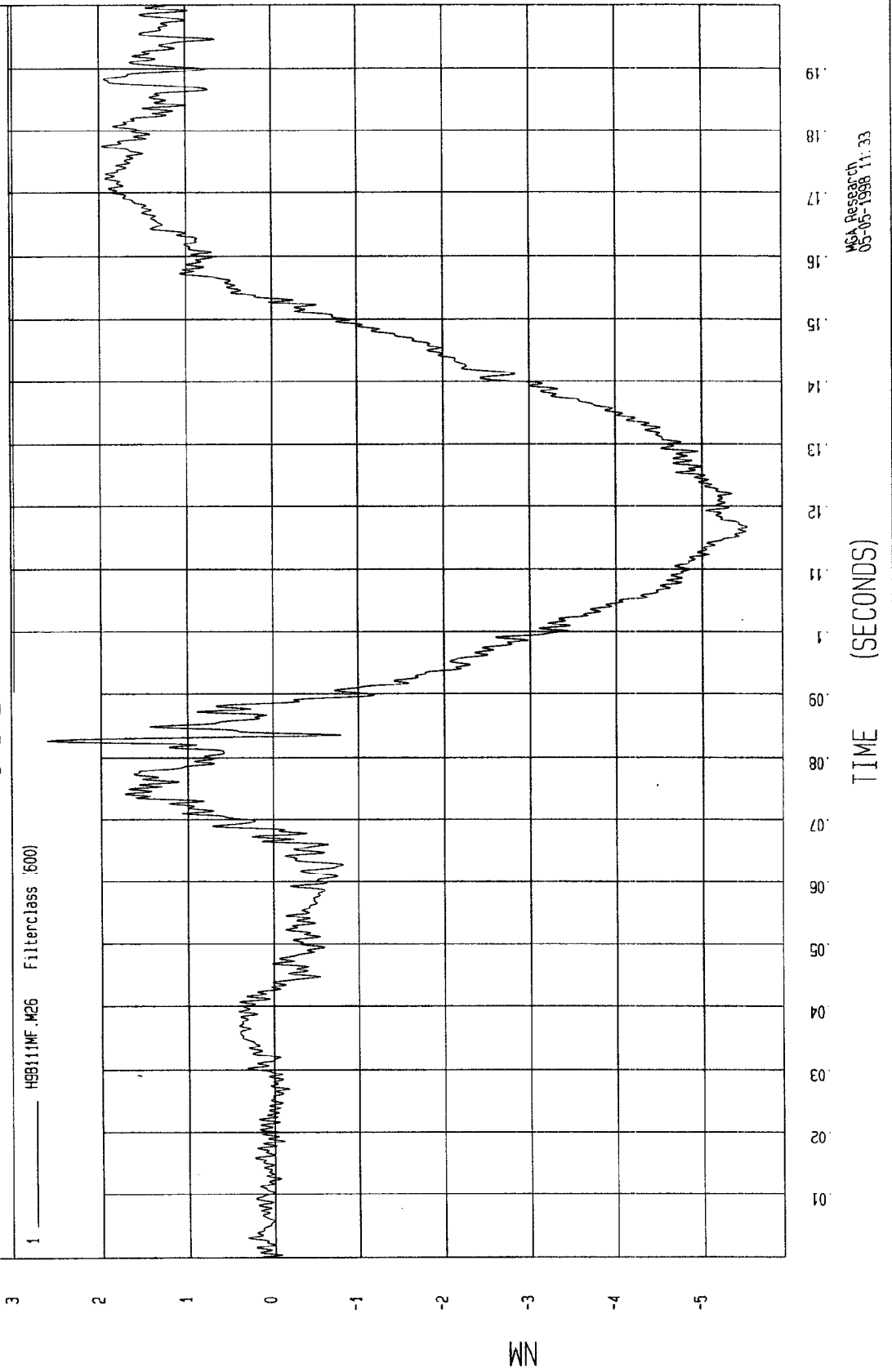
TIME (SECONDS)

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

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-5.528177 NM at 116 msec YMAX= 2.625569 NM at 82. msec

DRIVER NECK MOMENT Z



TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

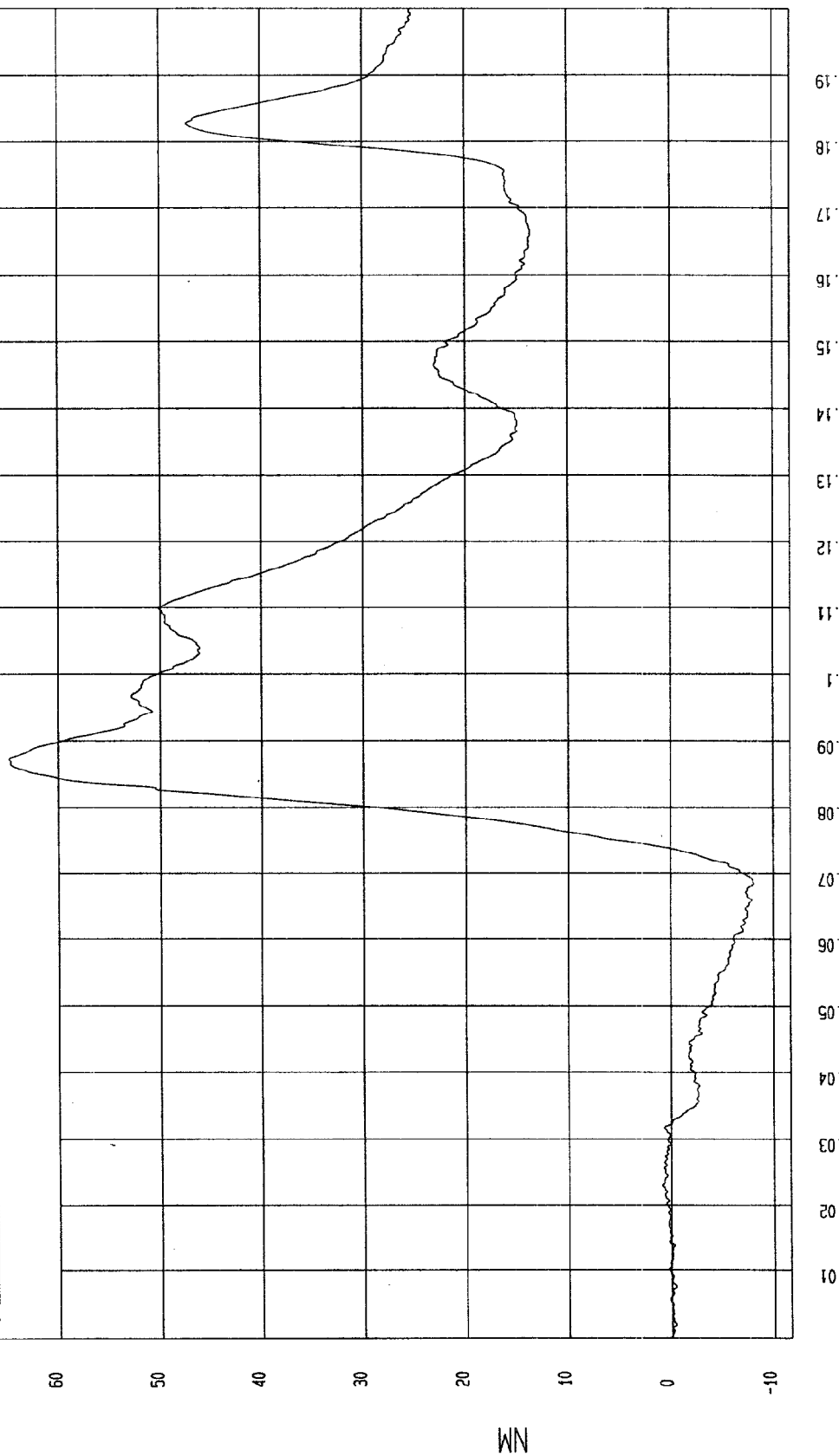
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-8.008554 NM at 68. msec

YMAX= 64.77908 NM at 87. msec

DRIVER OCCIPITAL CONDYLE MOMENT Y

1 H9811140.M25 Filterclass (600)



WCA Research
05-05-1998 11:57

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

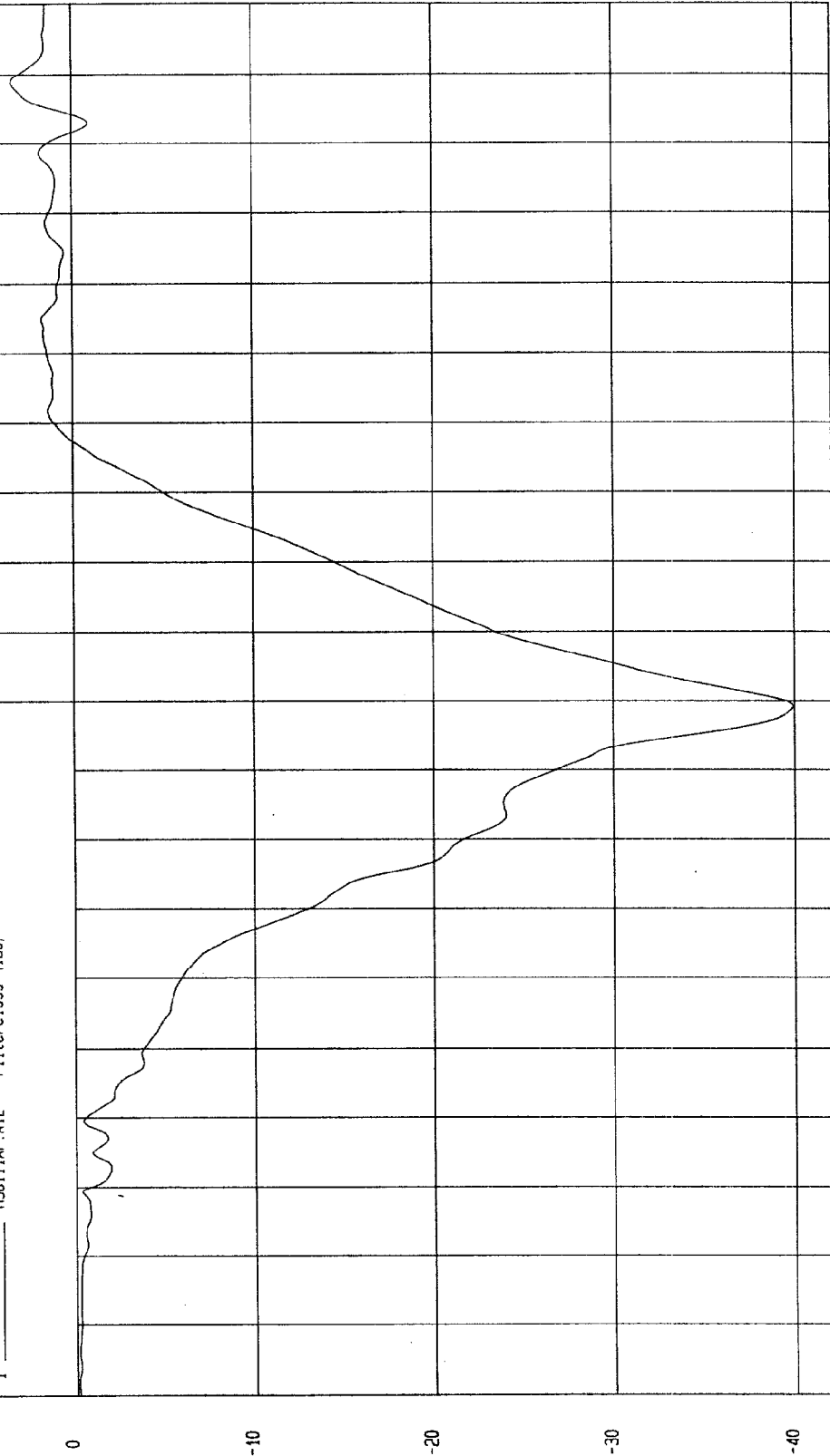
COMPONENT: 1998 SATURN SL2 (CW0106)

YMAX= 3.343468 G'S at 188 msec

YMIN= -39.92659 G'S at 99 msec

DRIVER CHEST X ACCELERATION

1 H98111AF.A12 Filterclass (180)



TIME (SECONDS)

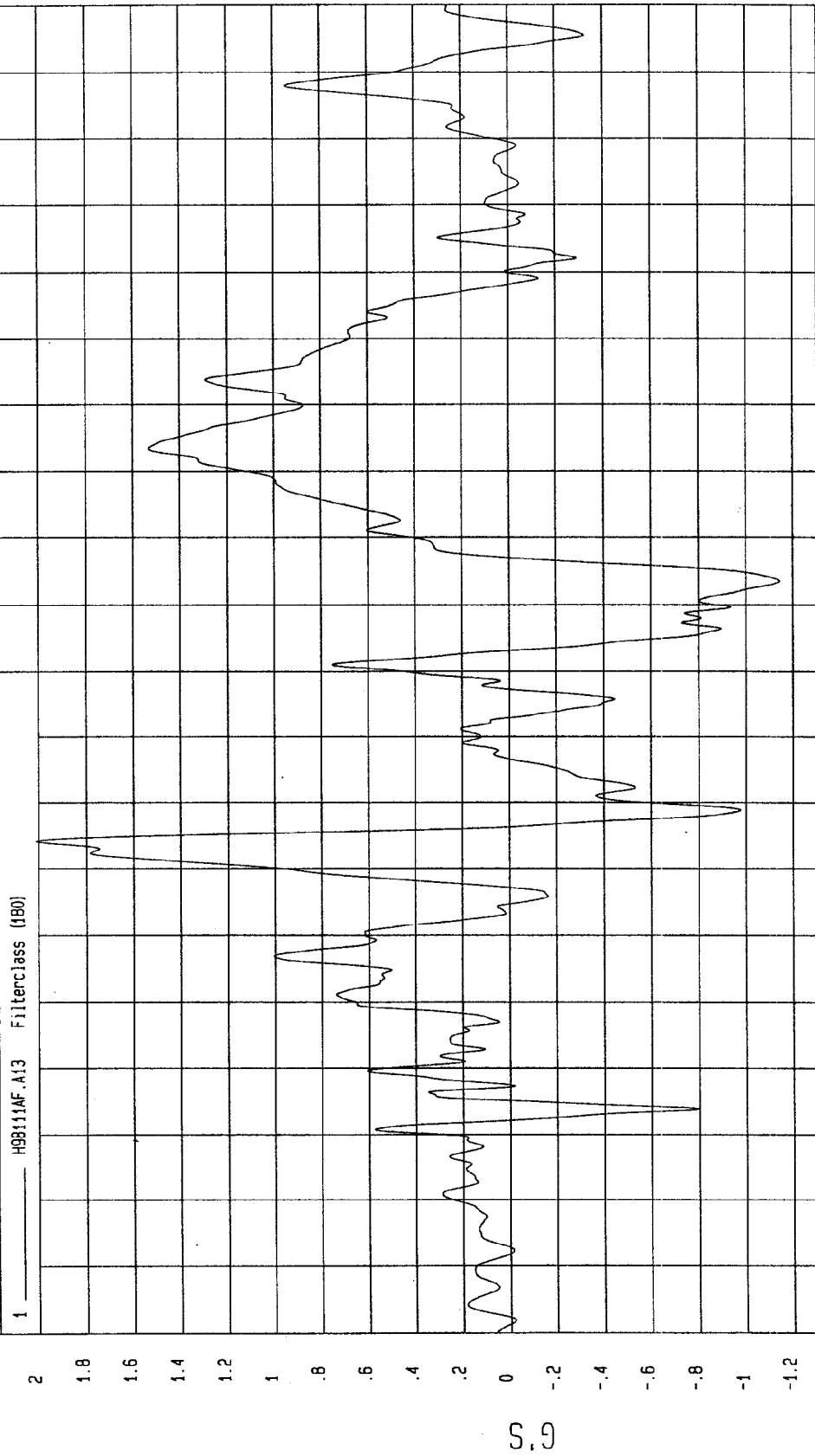
MGA Research
05-05-1998 11:34

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

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-1.143253 G'S at 113 msec YMAX= 2.01238 G'S at 74. msec

DRIVER CHEST Y ACCELERATION



MGA Research
05-05-1998 11:34

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

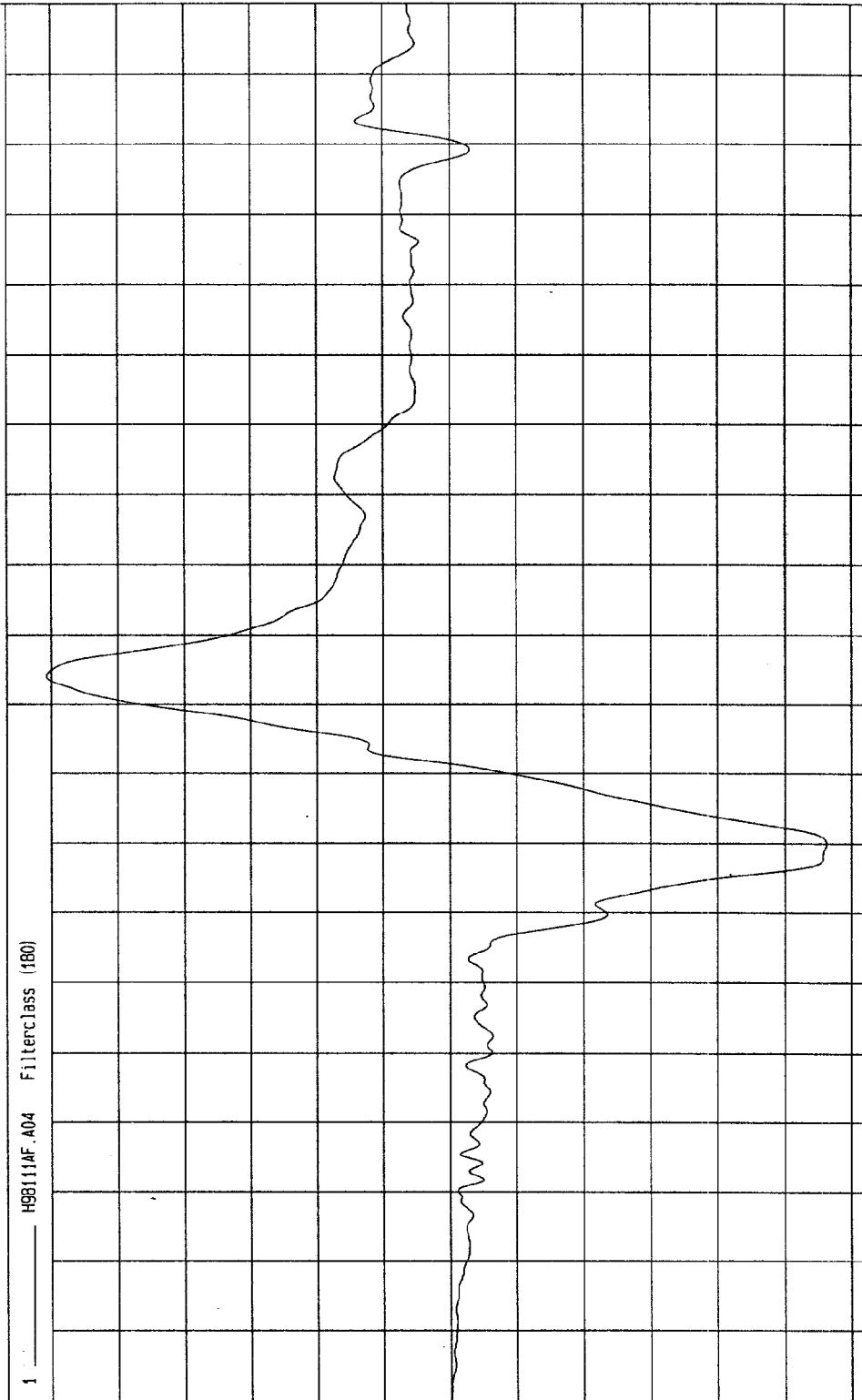
YMIN=-11.2624 G'S at 79. msec

YMAX= 12.12895 G'S at 104 msec

DRIVER CHEST Z ACCELERATION

1 H9B111AF.A04 Filterclass (180)

G.S



MGA Research
05-05-1998 11:34

TIME (SECONDS)

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

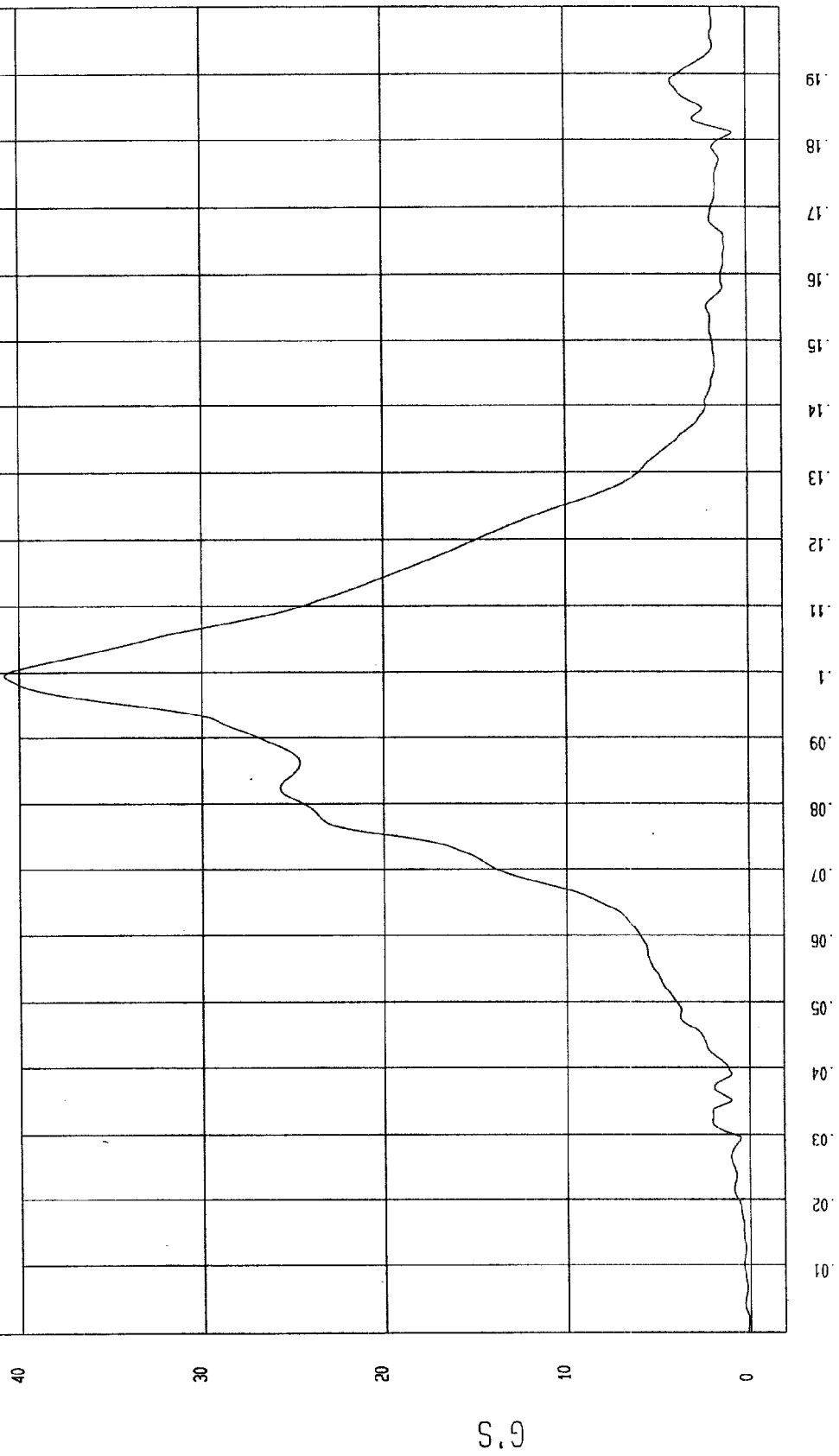
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN= .1164476 G'S at 1.8 msec

YMAX= 40.80669 G'S at 99. msec

DRIVER CHEST RESULTANT ACCELERATION

1 H9311AV.A04 Filterclass (180)



MSA Research
05-05-1998 11:35

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

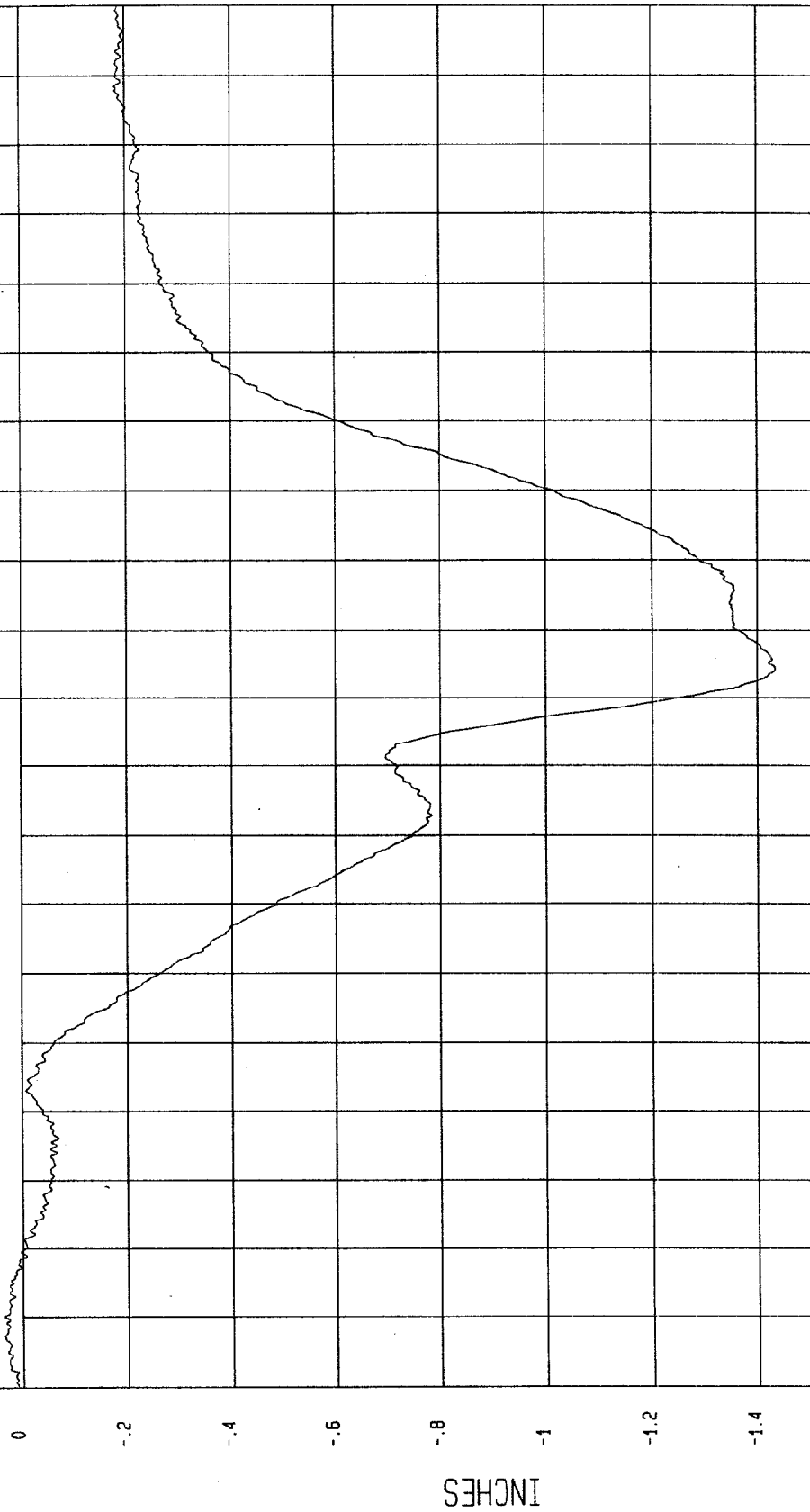
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-1.433454 INCHES at 104 msec

YMAX= 3.593116E-02 INCHES at 10. msec

DRIVER CHEST COMPRESSION

1 H981110F.D38 Filterclass (600)



MGA Research
05-05-1998 11:35

TIME SECONDS

INCHES

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

COMPONENT: 1998 SATURN SL2 (CW0106)

YMAX= 51.80046 LBS at 195 msec

YMIN=-1101.942 LBS at 76 msec

DRIVER LEFT FEMUR FORCE

1 HGB11FF.F15 Filterclass (600)



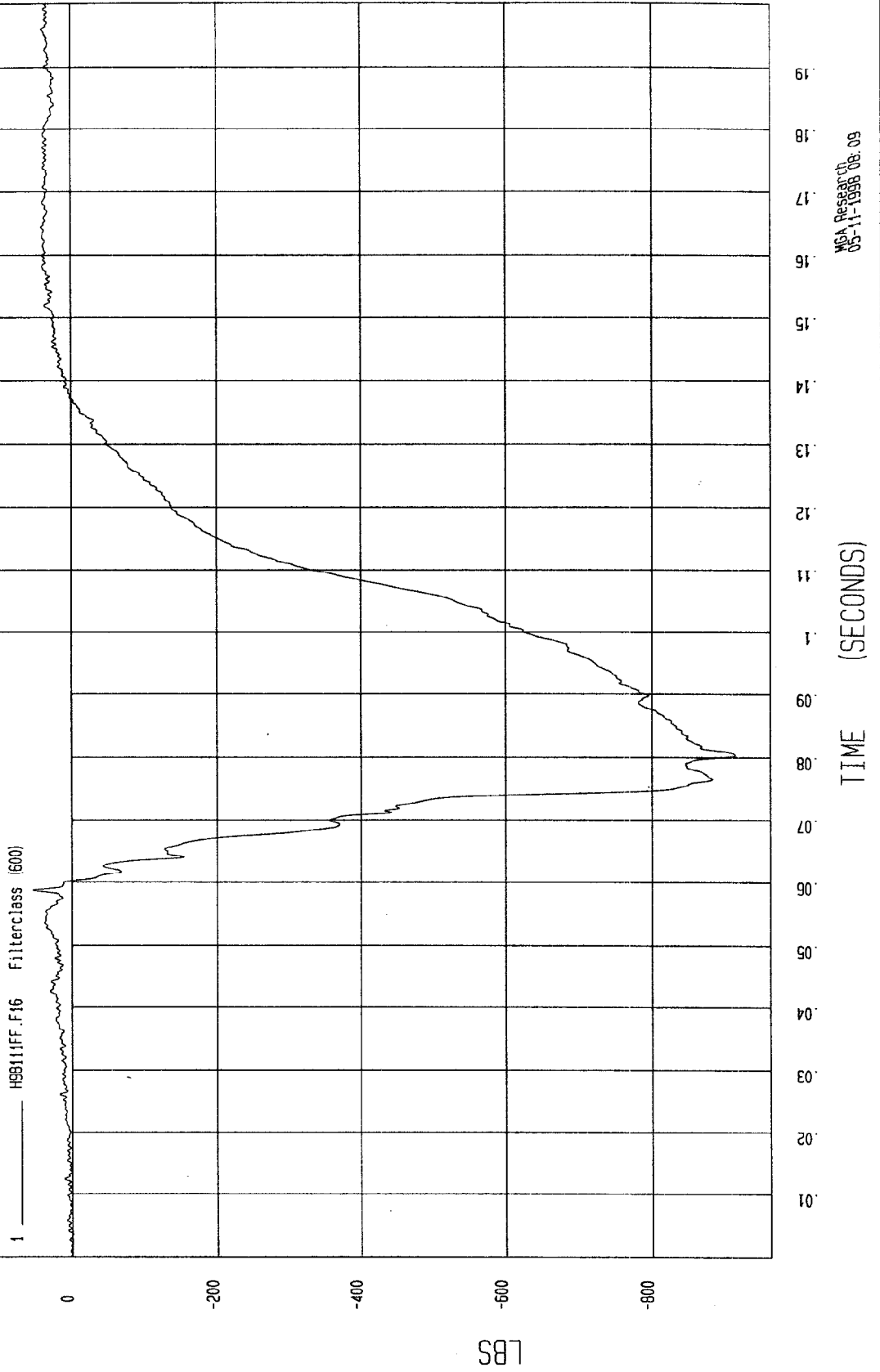
MSA Research
05-11-1998 08:09

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

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-914.3403 LBS at 80. msec YMAX= 52.54234 LBS at 58. msec

DRIVER RIGHT FEMUR FORCE



TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

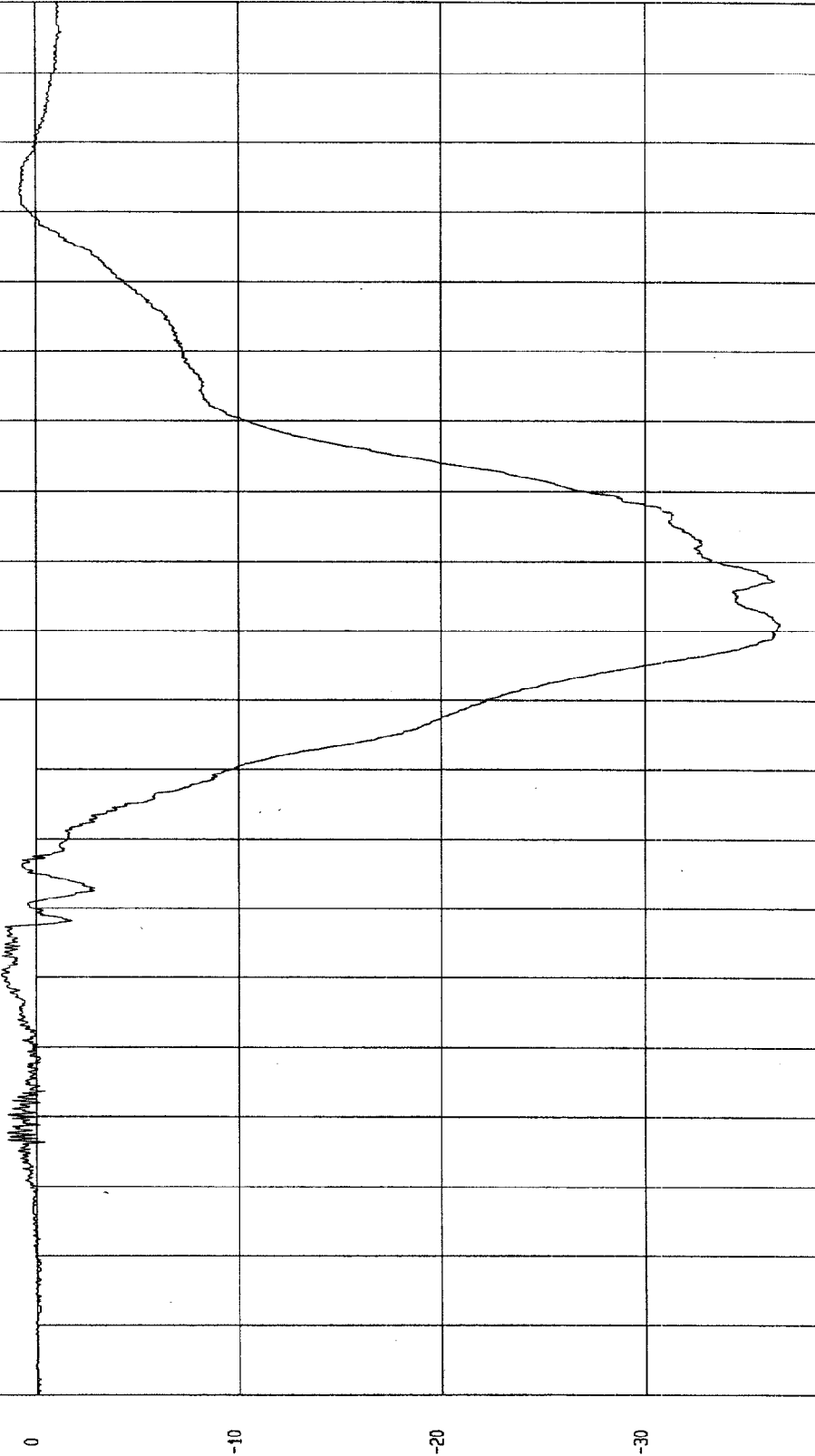
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-36.58564 G'S at 110 msec

YMAX= 1.656943 G'S at 60. msec

PASSENGER HEAD X ACCELERATION

1 ——— H99111AT.A27 Filterclass (1000)



TIME (SECONDS)

MSA Research
05-05-1998 11:36

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

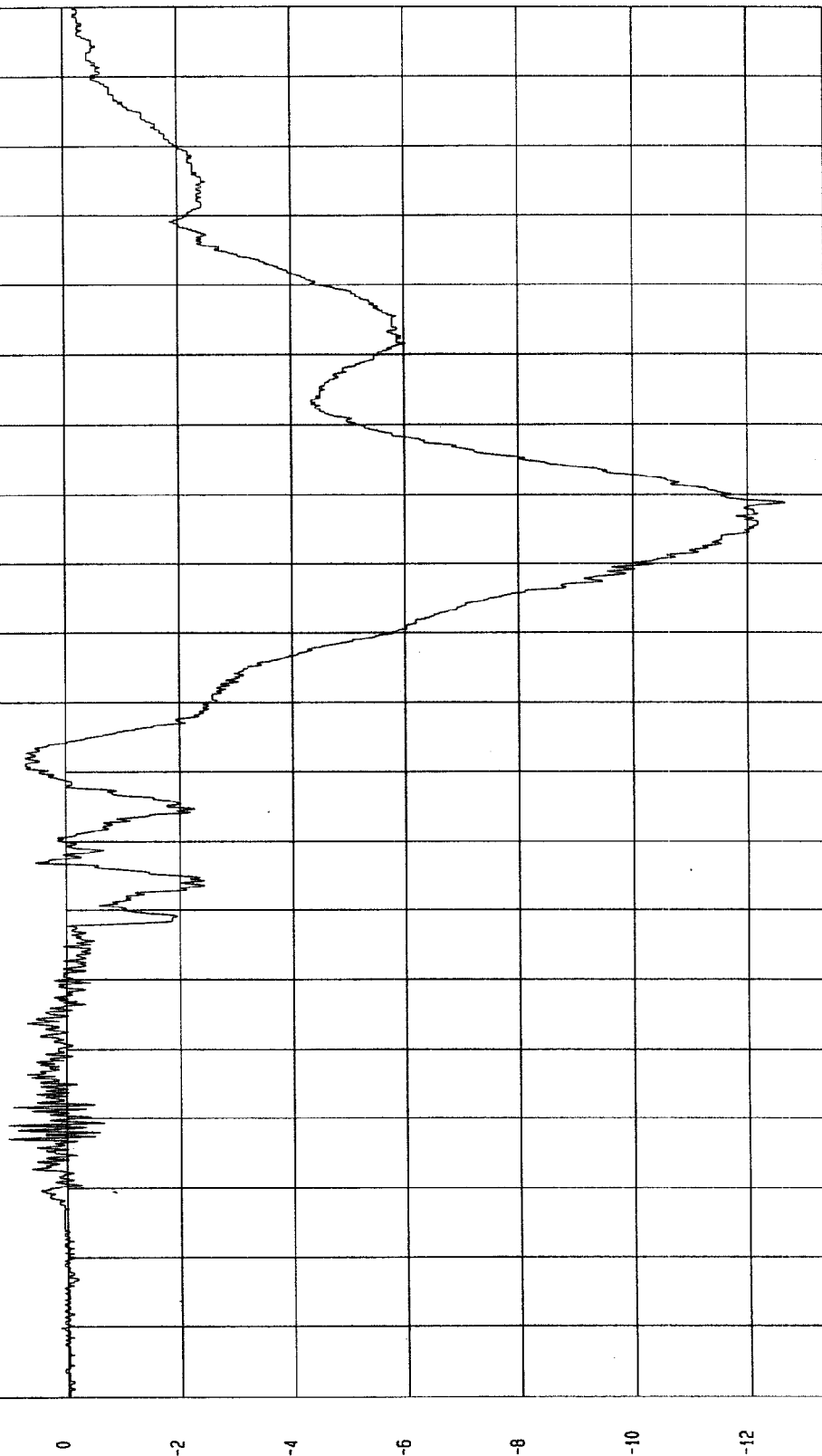
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-12.67038 G'S at 128 msec

YMAX= 1.016249 G'S at 37. msec

PASSENGER HEAD Y ACCELERATION

1 H96111AT.A28 Filterclass (1000)



NSA Research
05-05-1998 11:36

TIME (SECONDS)

G's

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

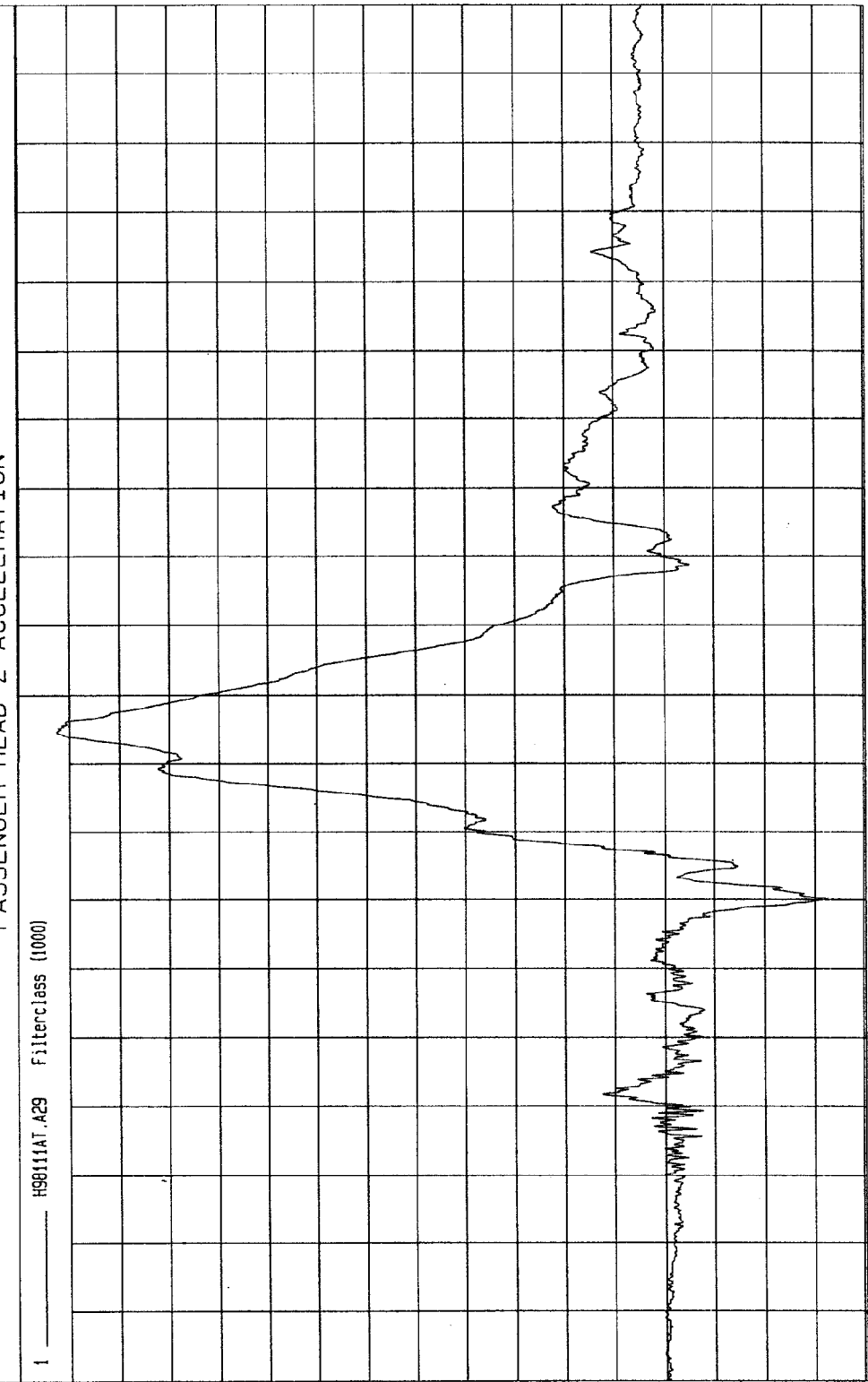
YMIN=-6.538168 G'S at 70. msec

YMAX= 24.49814 G'S at 94. msec

PASSENGER HEAD Z ACCELERATION

1 H98111AT.A29 Filterclass (1000)

G's



NSA Research
05-05-1998 11:37

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

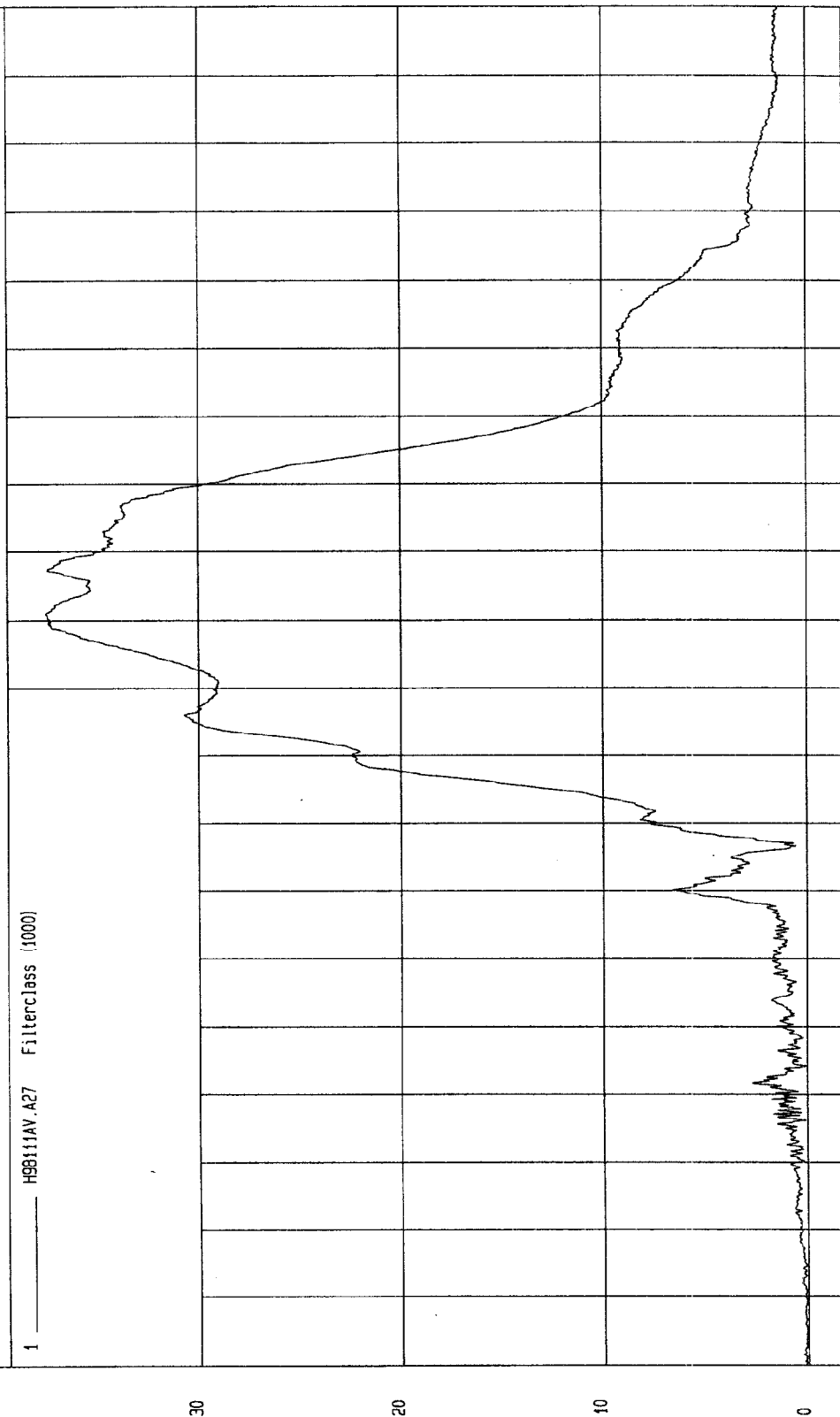
YMIN= 7.084109E-02 G'S at 4.2 msec

YMAX= 37.53879 G'S at 110 msec

PASSENGER HEAD RESULTANT ACCELERATION

1 ——— H98111AV.A27 Filterclass (1000)

G.S.



NCA Research
05-05-1998 11:37

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

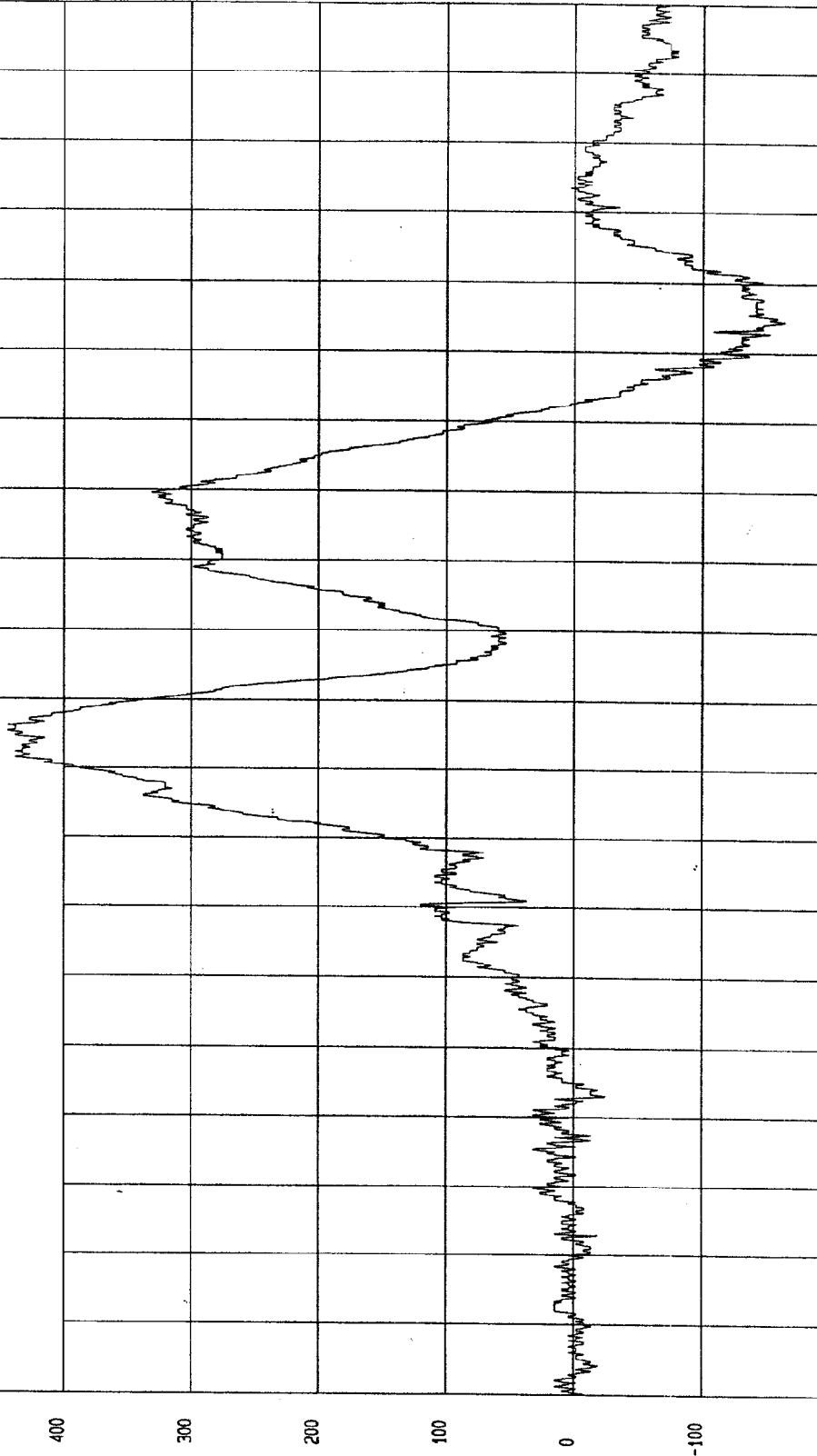
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-163.6046 N at 154 msec

YMAX= 442.6649 N at 95. msec

PASSENGER NECK FORCE X

1 ——— HSB111FT.F48 Filterclass (1000)



NSA Research
01-02-1998 15:20

TIME (SECONDS)

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

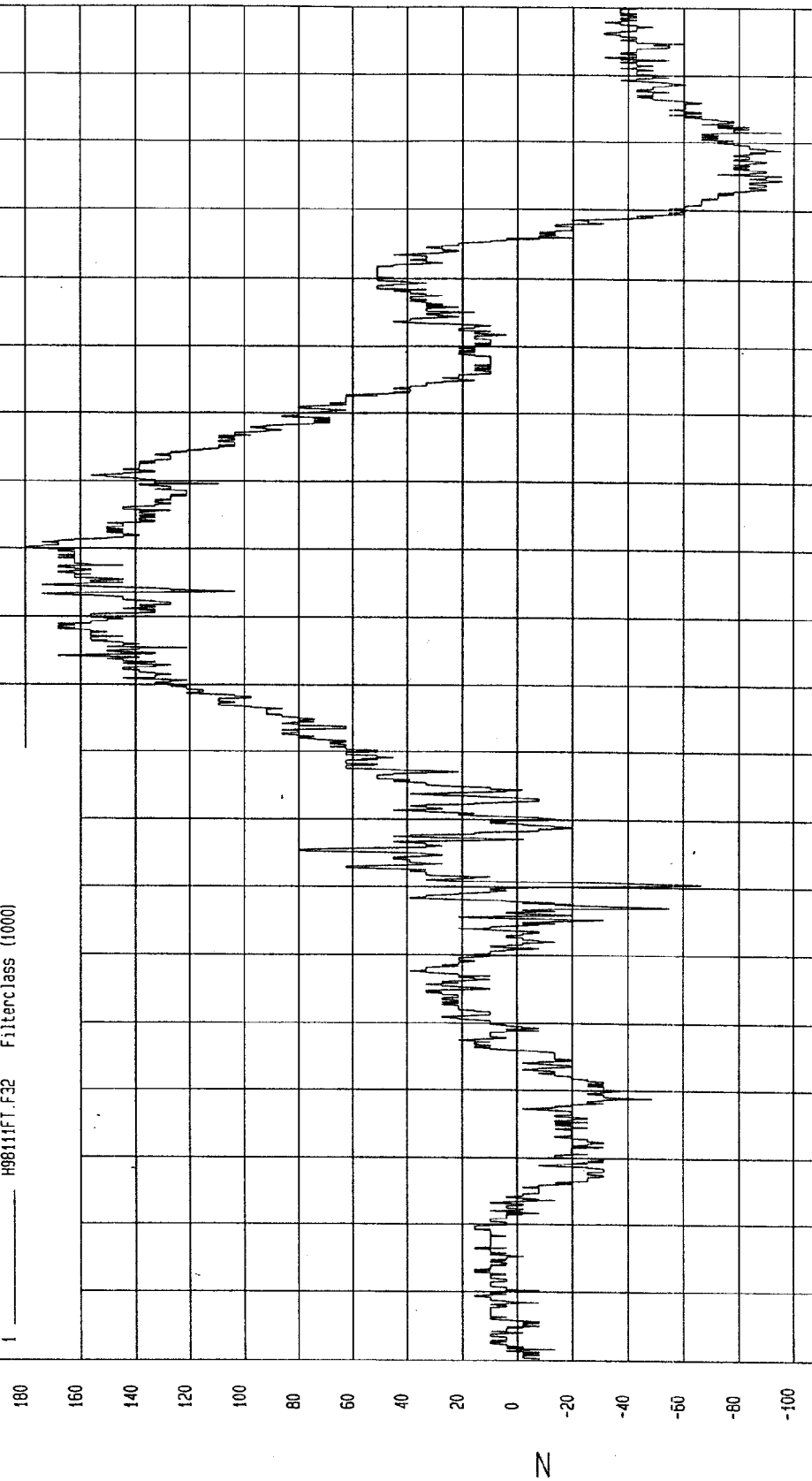
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-95.60825 N at 174 msec

YMAX= 179.6796 N at 120 msec

PASSENGER NECK FORCE Y

1 ——— H98111FT.F32 Filterclass (1000)



MGA Research
01-02-1998 15:20

TIME (SECONDS)

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

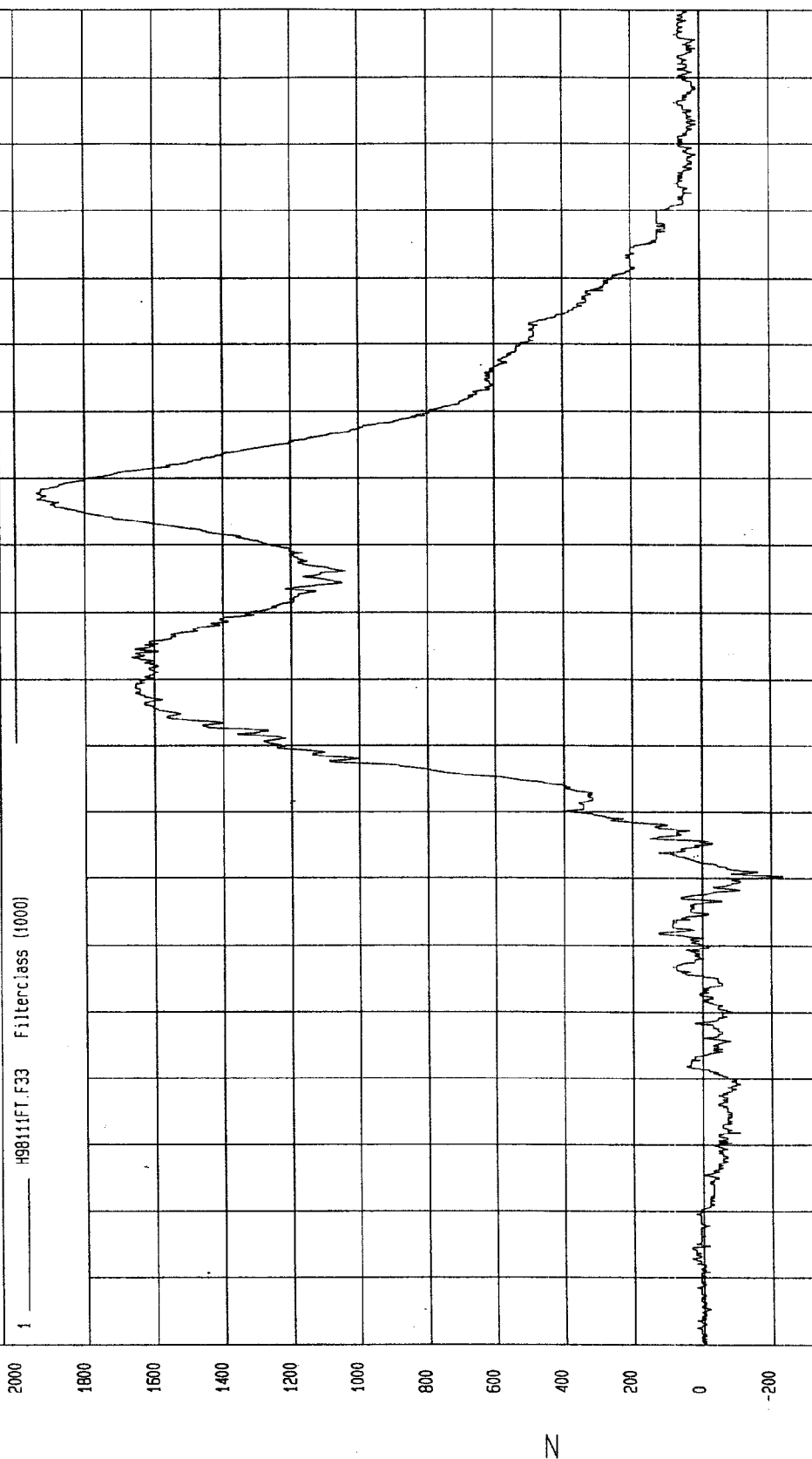
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-235.8929 N at 70. msec

YMAX= 1937.413 N at 126 msec

PASSENGER NECK FORCE Z

1 ——— H98111FT.F33 Filterclass (1000)



MGA Research
07-02-1998 15.21

TEST: FMVSS 208 SLED TEST

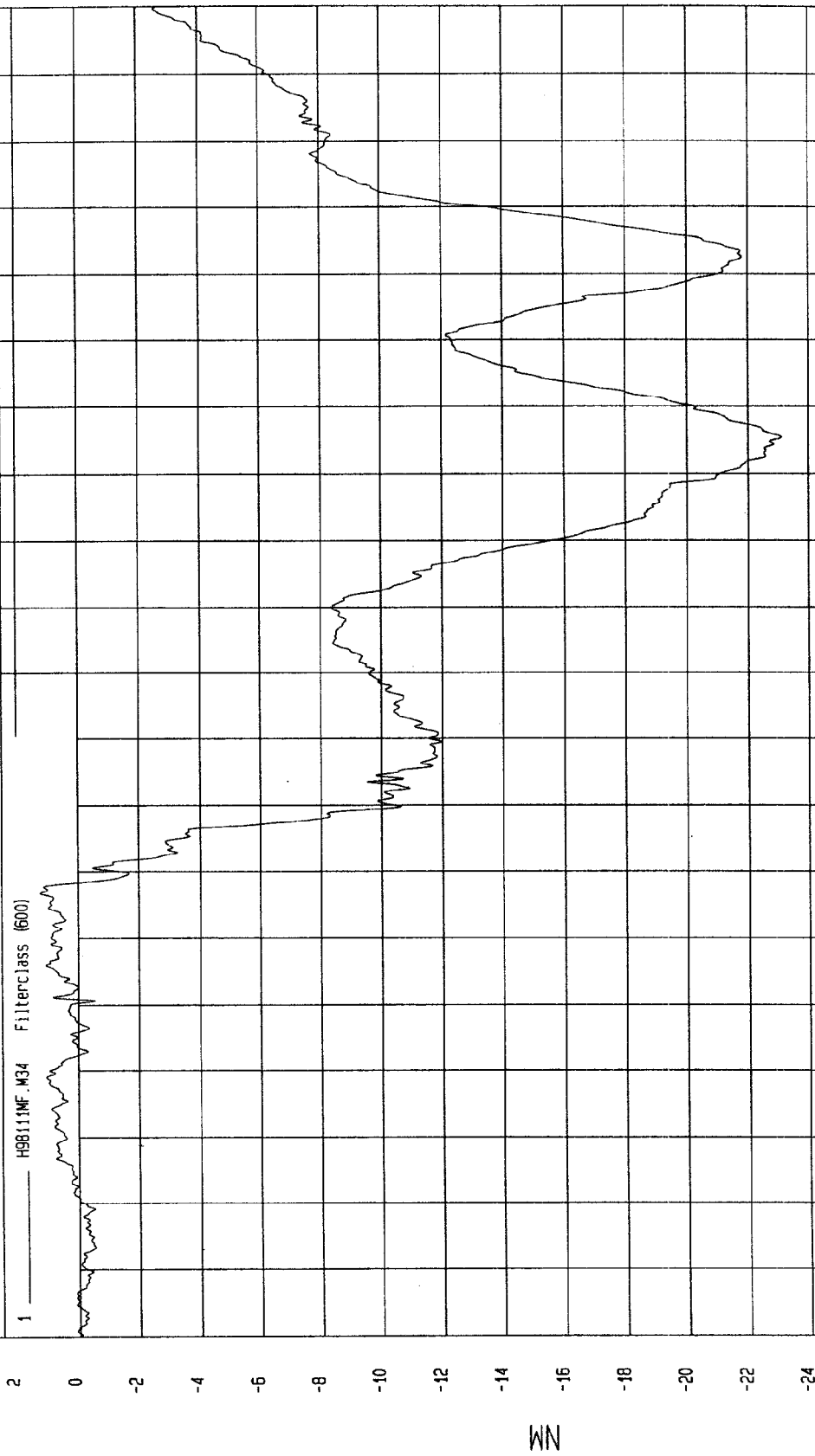
TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-23.10953 NM at 135 msec

YMAX= 1.244349 NM at 66. msec

PASSENGER NECK MOMENT X



TIME (SECONDS)

MCA Research
05-05-1998 11:39

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

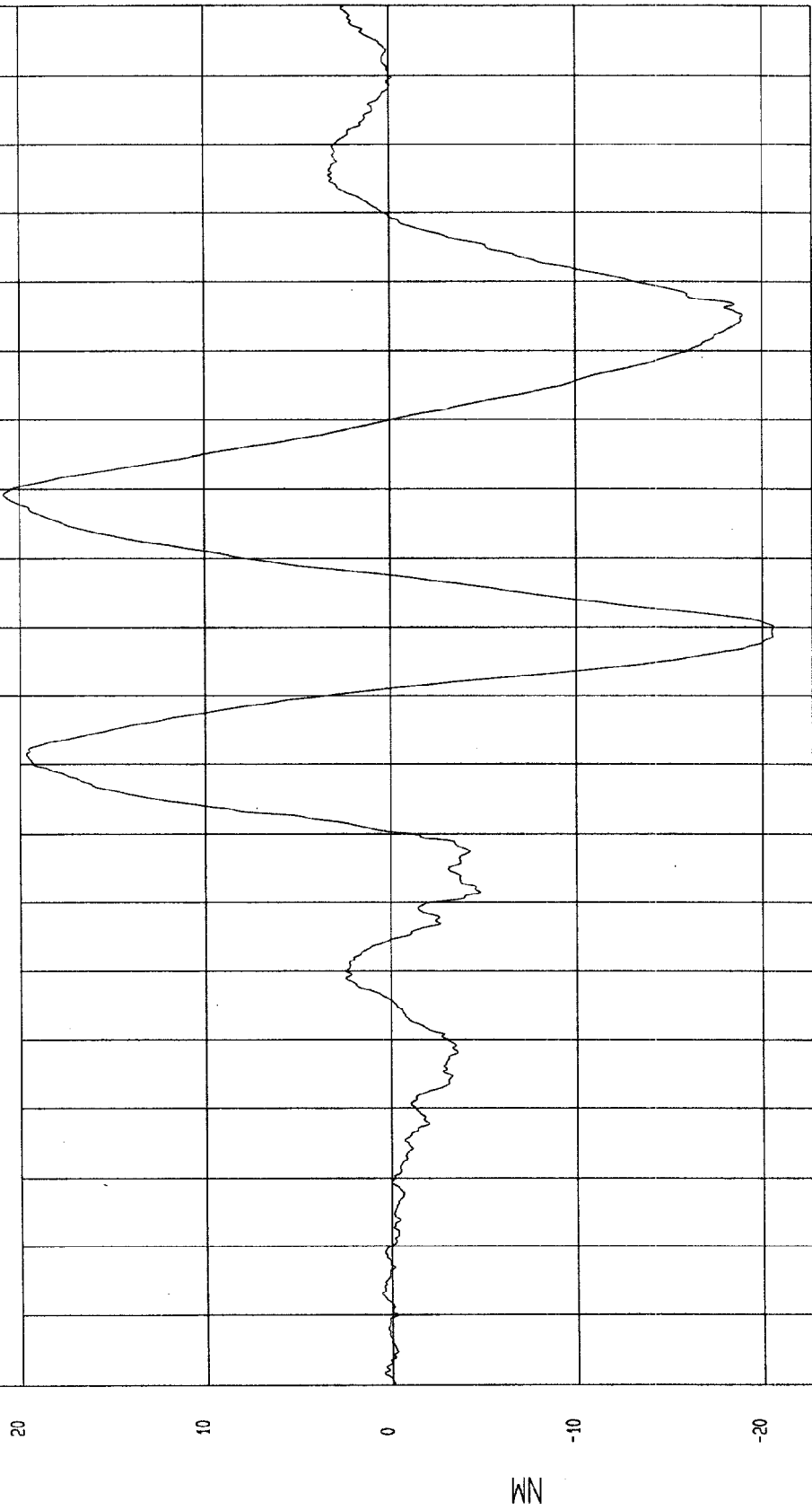
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-20.62673 NM at 110 msec

YMAX= 20.86568 NM at 129 msec

PASSENGER NECK MOMENT Y

1 H9811MF.M35 Filterclass (600)



TIME (SECONDS)

MCA Research
05-05-1998 11:39

TEST: FMVSS 208 SLED TEST

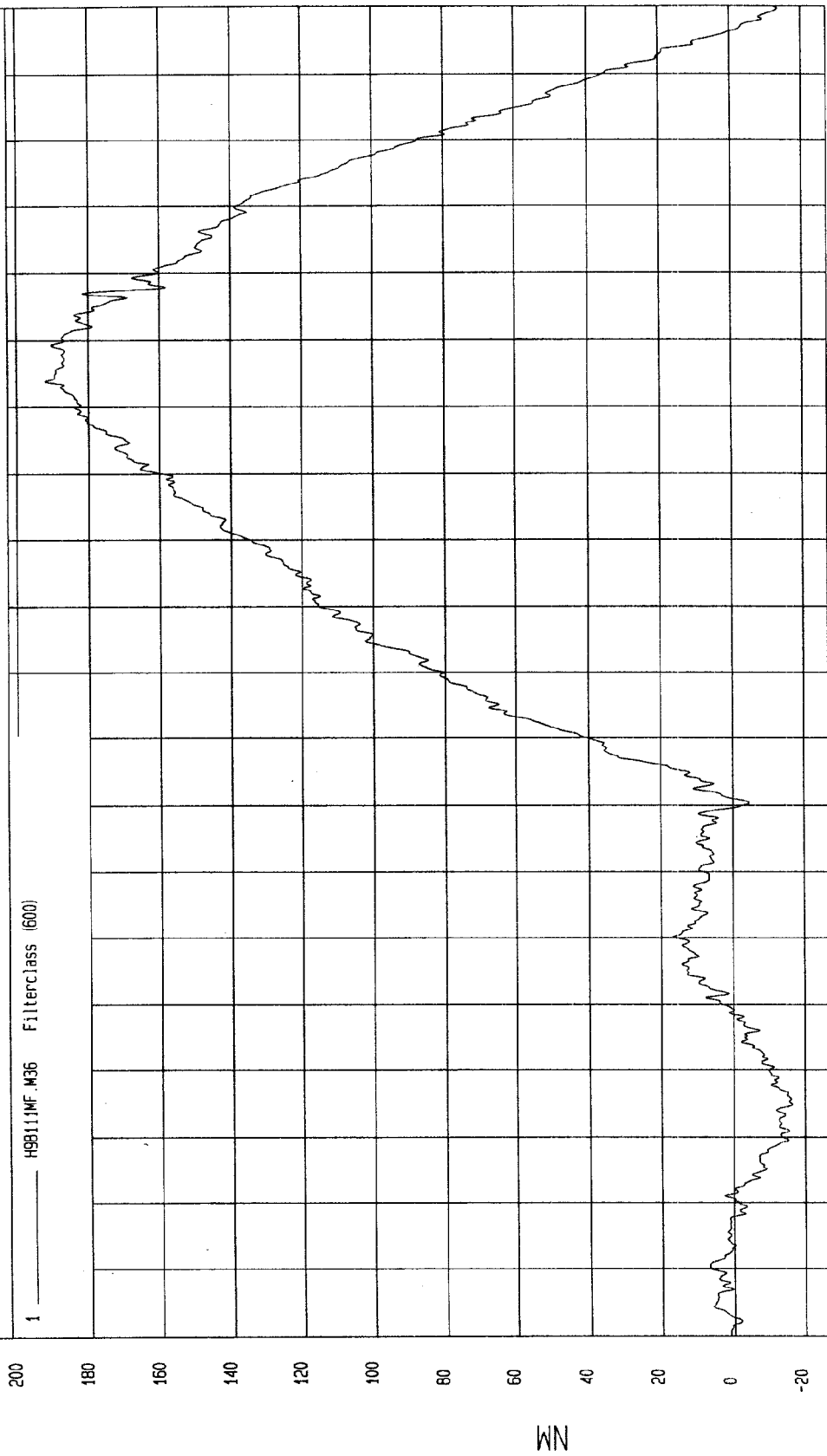
TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-16.50907 NM at 34. msec

YMAX= 192.0294 NM at 143 msec

PASSENGER NECK MOMENT Z



MCA Research
05-05-1998 11:40

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

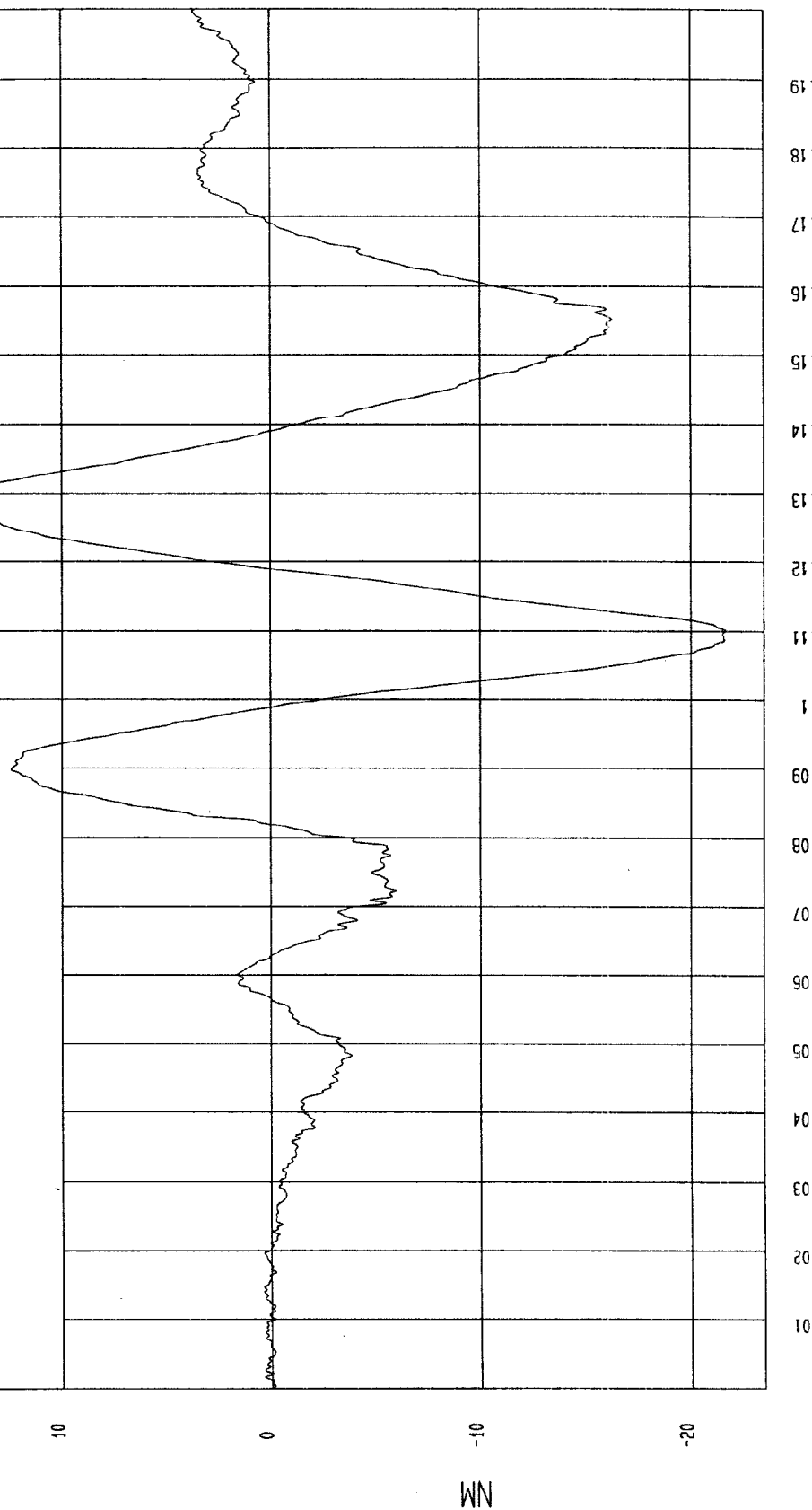
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-21.67241 NM at 110 msec

YMAX= 15.17428 NM at 129 msec

PASSENGER OCCIPITAL CONDYLE MOMENT Y

1 ——— H98111M0.M35 Filterclass (600)



MGA Research
05-05-1998 11:57

TIME (SECONDS)

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

COMPONENT: 1998 SATURN SL2 (CW0106)

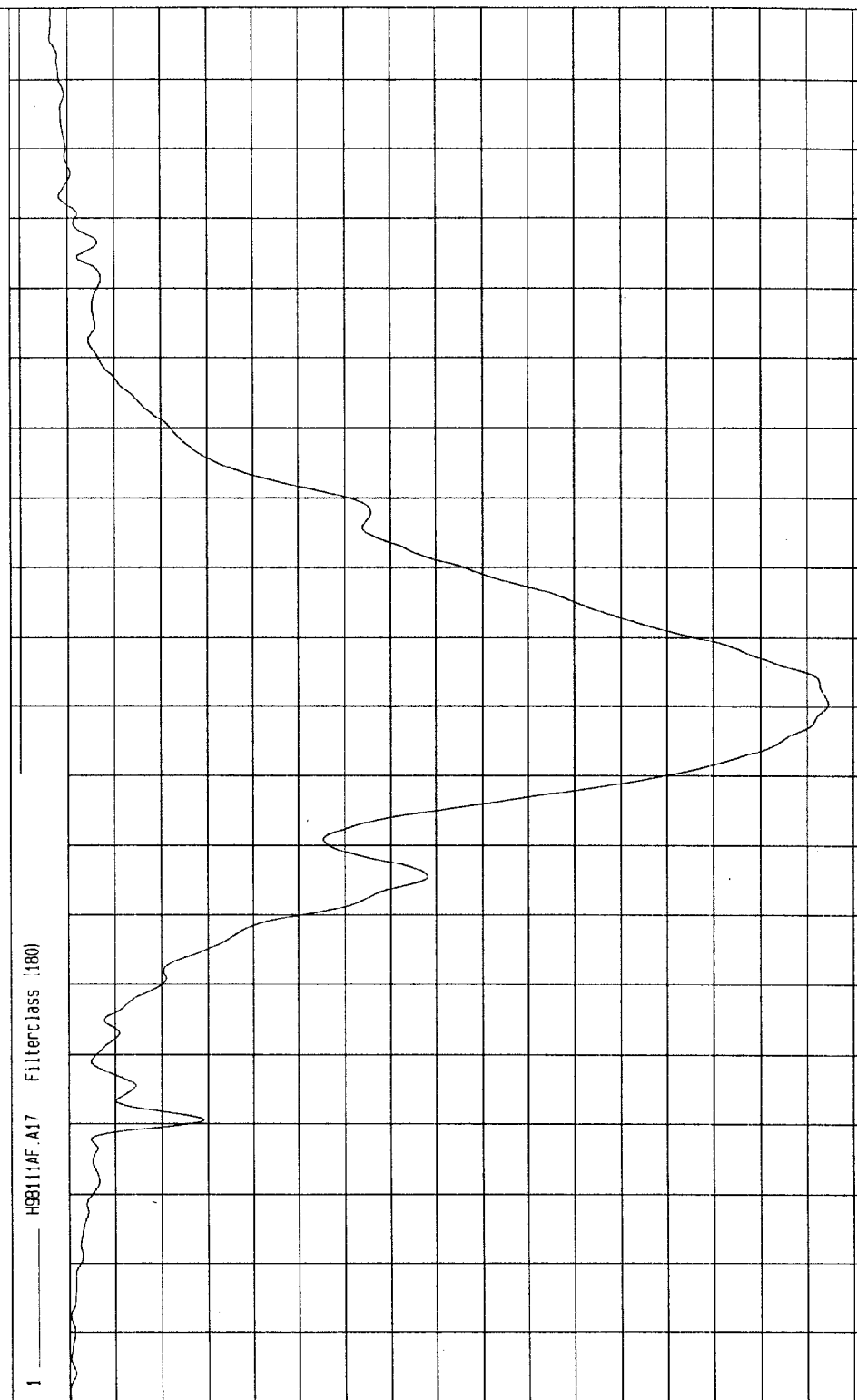
YMAX= 7419914 G'S at 195 msec

YMIN= 32 93745 G'S at 100 msec

PASSENGER CHEST X ACCELERATION

1 ——— H98111AF.A17 FilterClass 180

S.G



MGA Research
05-05-1998 11:40

TIME (SECONDS)

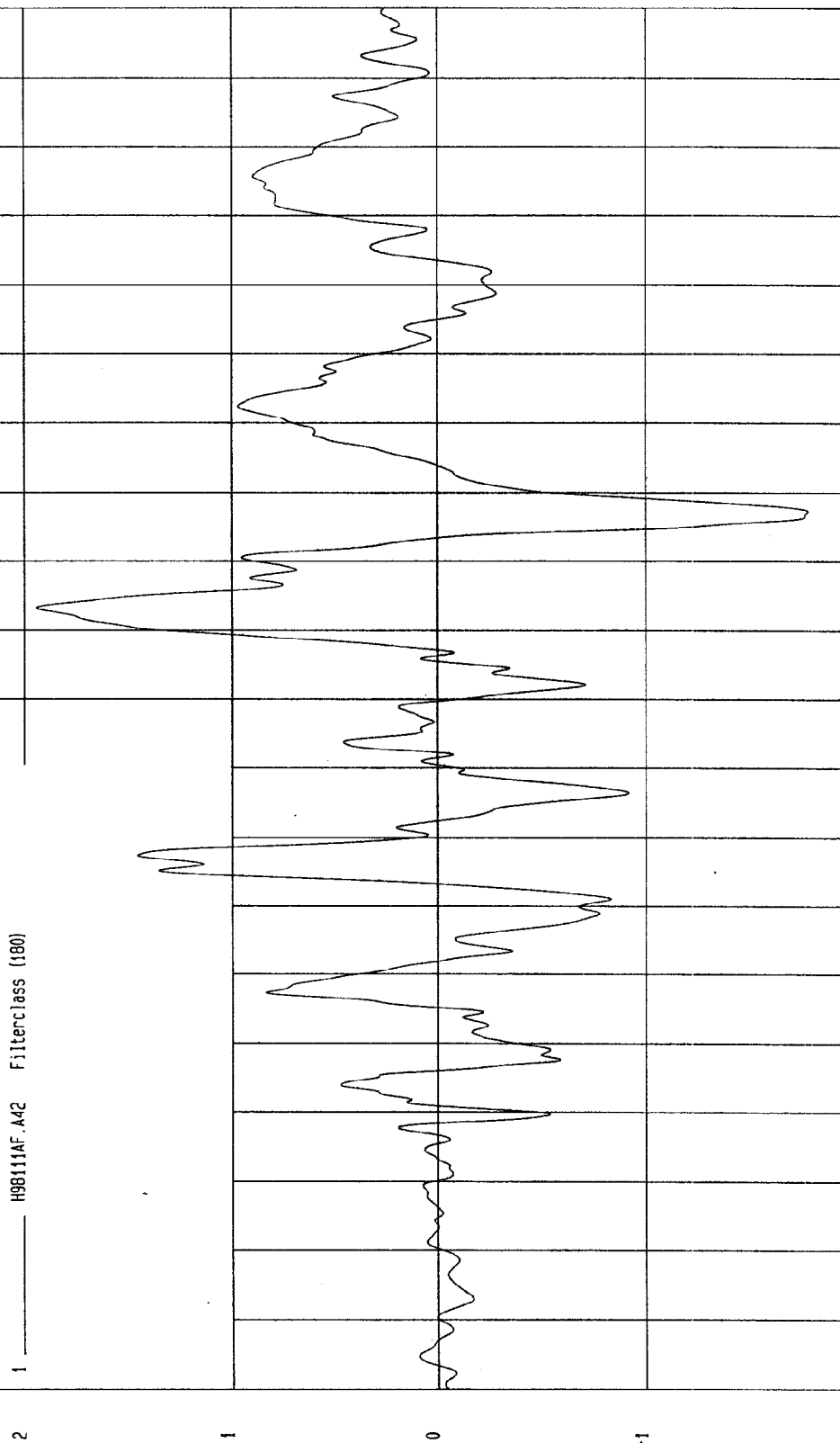
TEST: FMVSS 208 SLED TEST TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-1.779666 G'S at 127 msec YMAX= 1.943651 G'S at 113 msec

PASSENGER CHEST Y ACCELERATION

1 H98111AF.A42 Filterclass (180)



NSA Research
05-05-1998 11:40

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

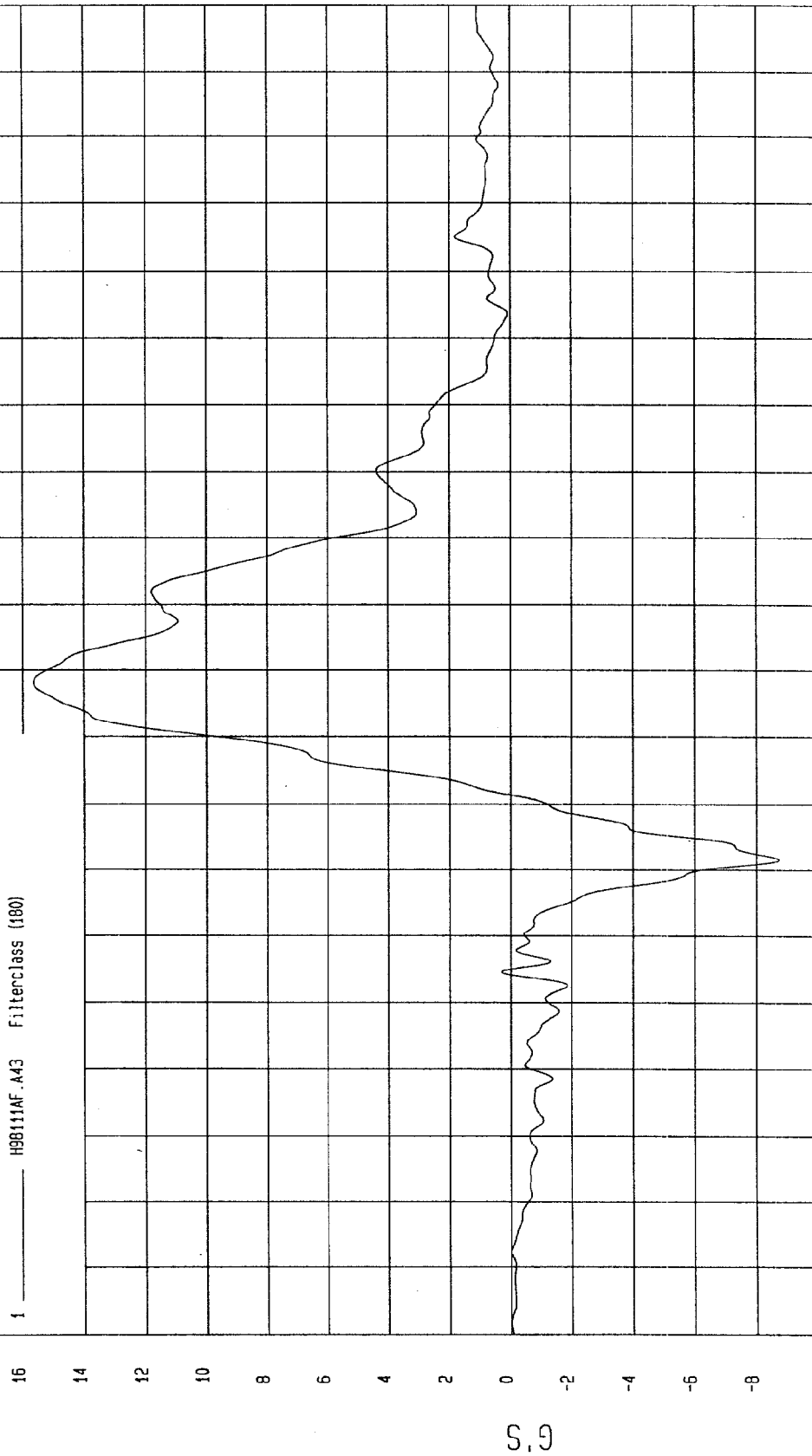
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-8.753918 G'S at 71. msec

YMAX= 15.6361 G'S at 98. msec

PASSENGER CHEST Z ACCELERATION

1 H98111AF.A43 Filterclass (180)



WGA Research
05-05-1998 11:41

TEST DATE: 05-05-1998

TEST: FMVSS 208 SLED TEST

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN= 4.969751E-02 G'S at 1.2 msec

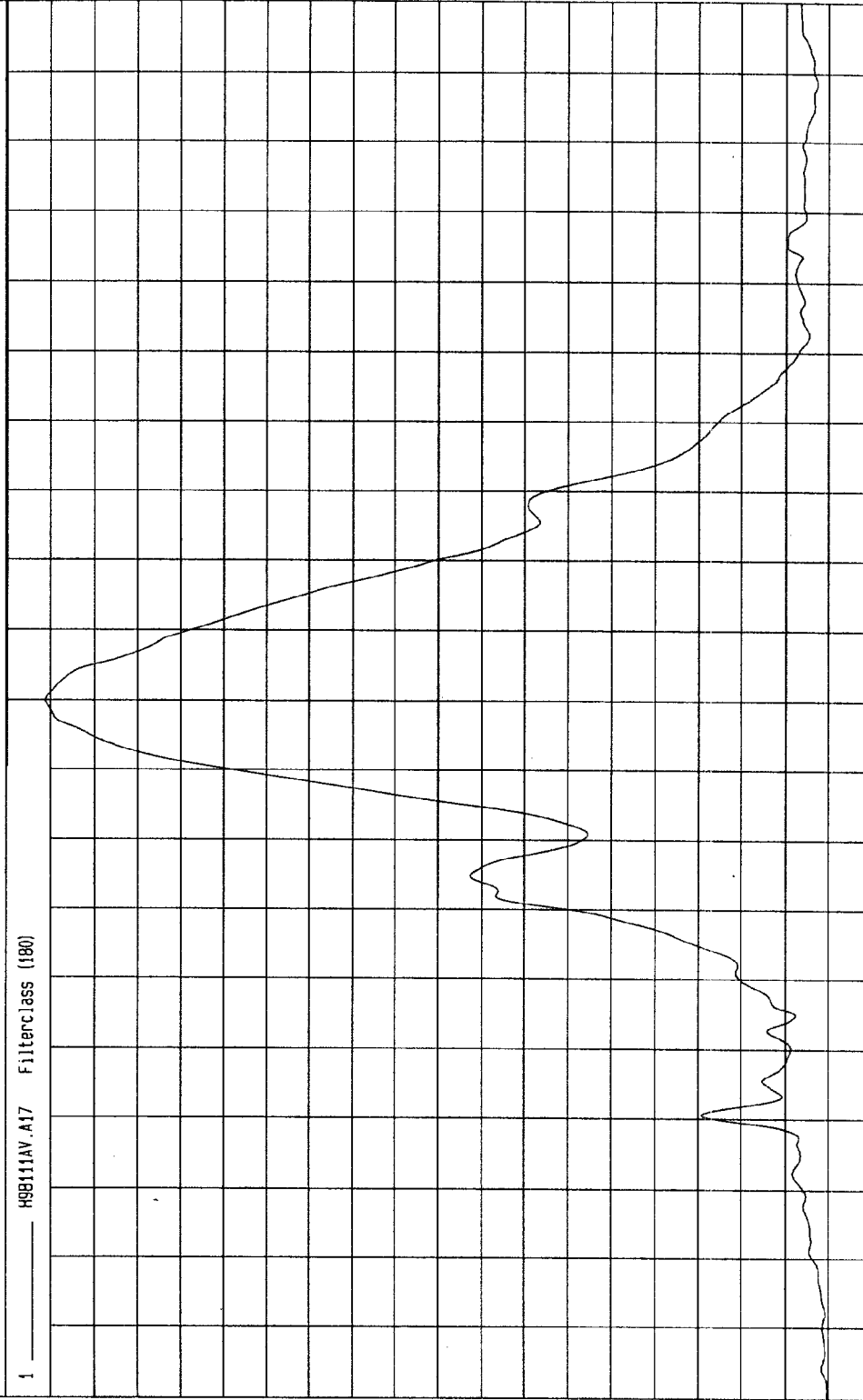
YMAX= 36.24686 G'S at 100 msec

PASSENGER CHEST RESULTANT ACCELERATION

1 ——— H98111AV.A17 Filterclass (180)

S.G

38
36
34
32
30
28
26
24
22
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16
14
12
10
8
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4
2
0



MSA Research
05-05-1998 11:41

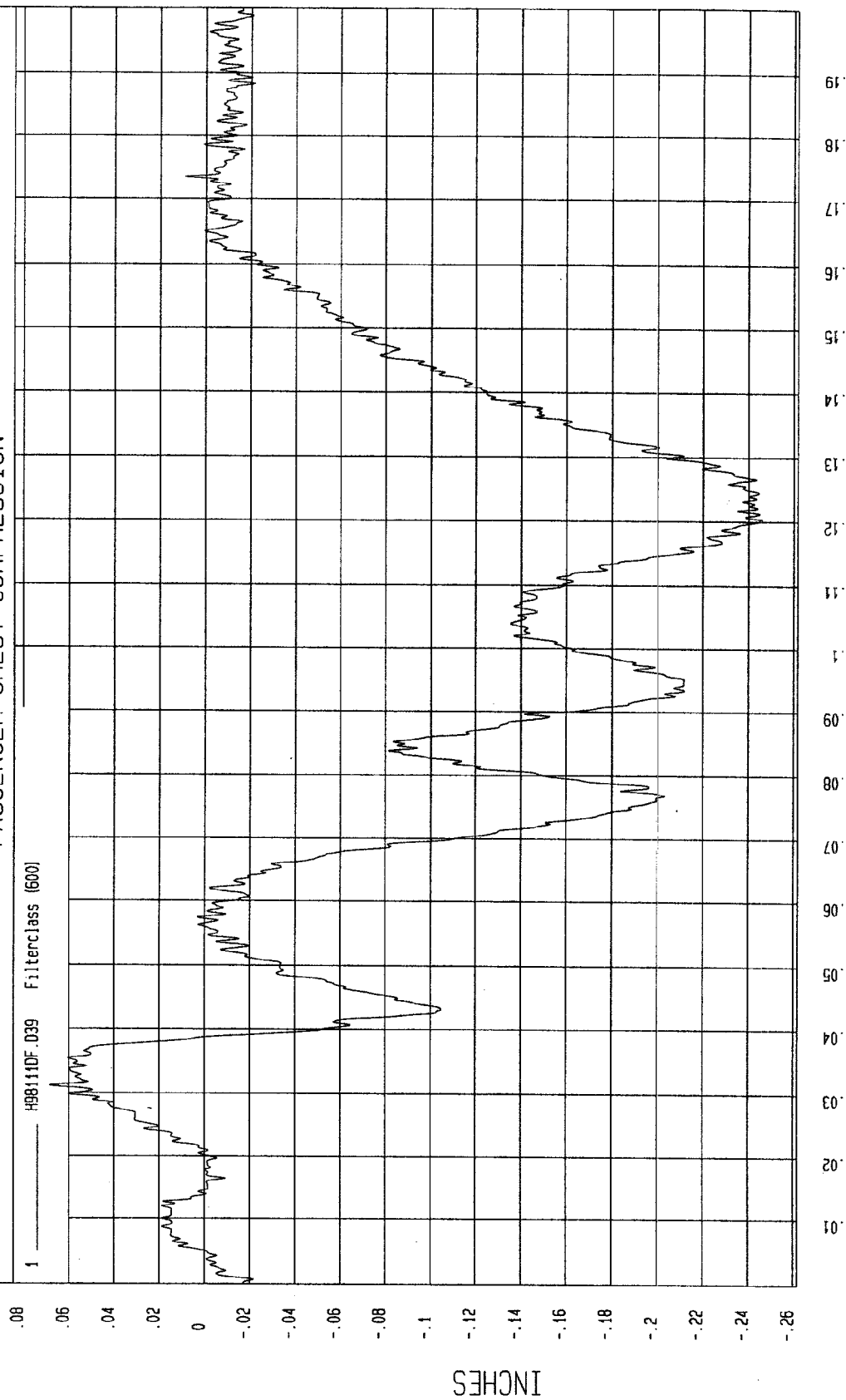
TIME (SECONDS)

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

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-.245955 INCHES at 120 msec YMAX= 6.837828E-02 INCHES at 31. msec

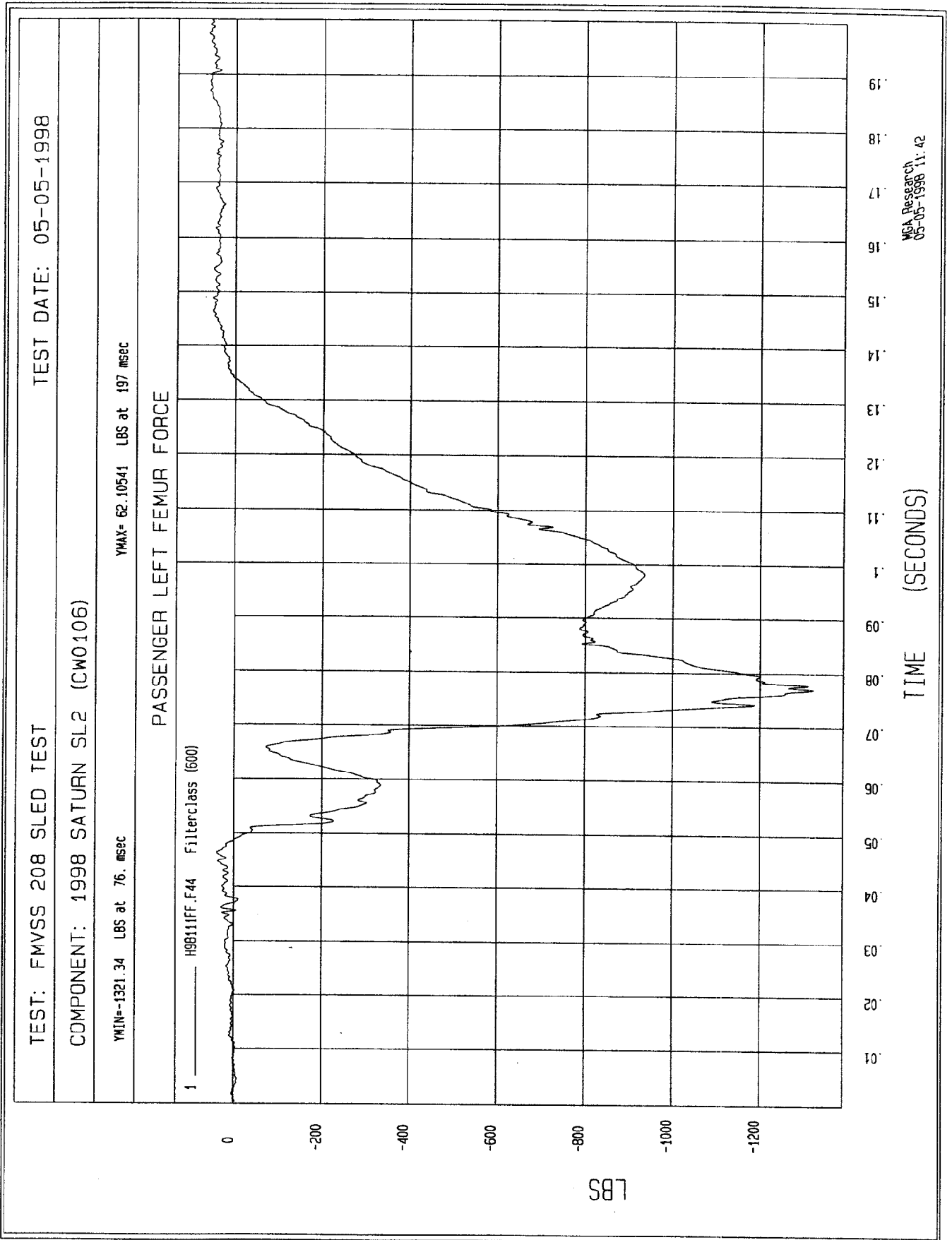
PASSENGER CHEST COMPRESSION



MOA Research
05-06-1998 11:36

TIME SECONDS

INCHES



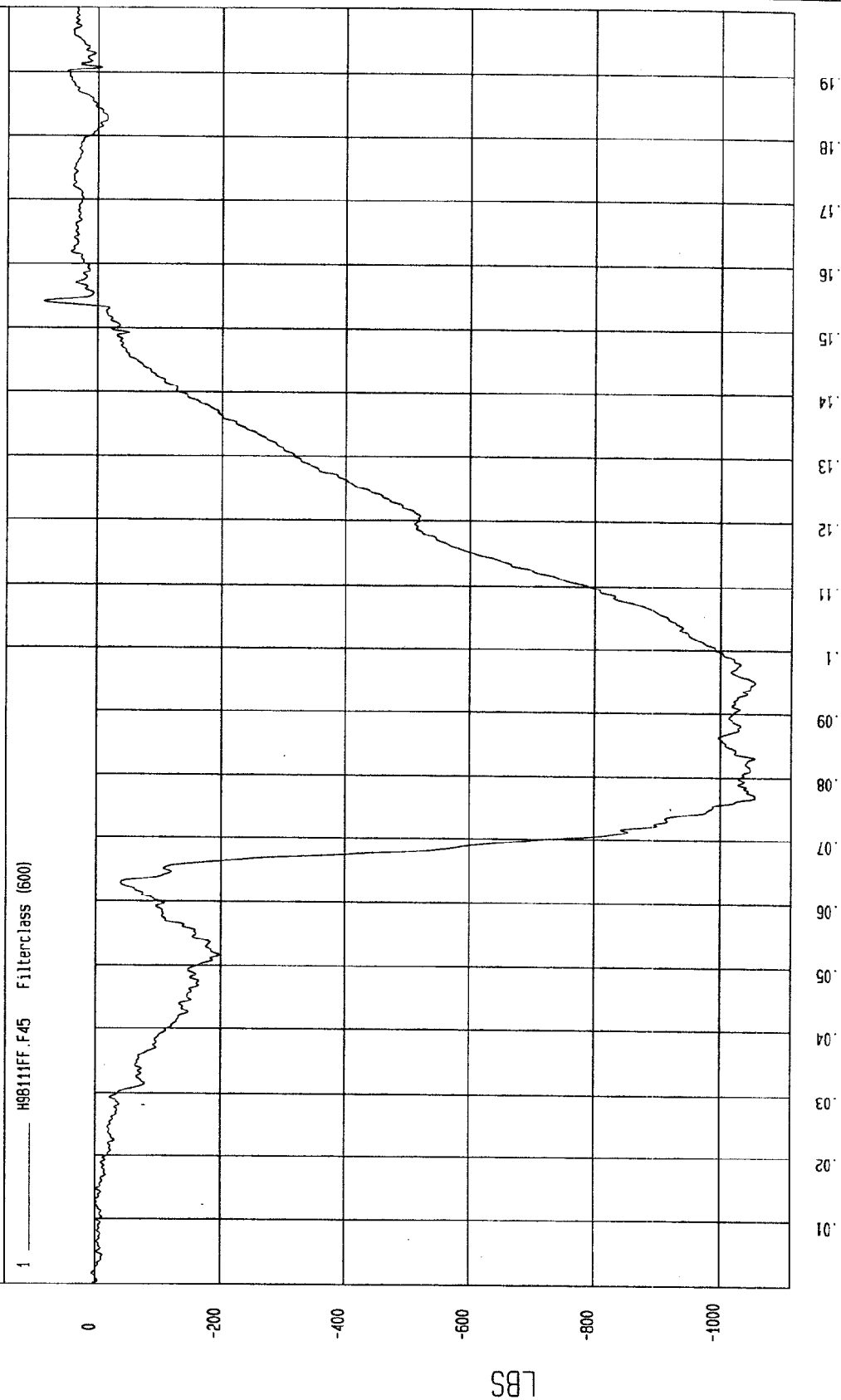
TEST: FMVSS 208 SLED TEST TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-1056.21 LBS at 76. msec YMAX= 64.77648 LBS at 154 msec

PASSENGER RIGHT FEMUR FORCE

1 _____ H98111FF.F45 Filterclass (600)



NGA Research
05-05-1998 11:42

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

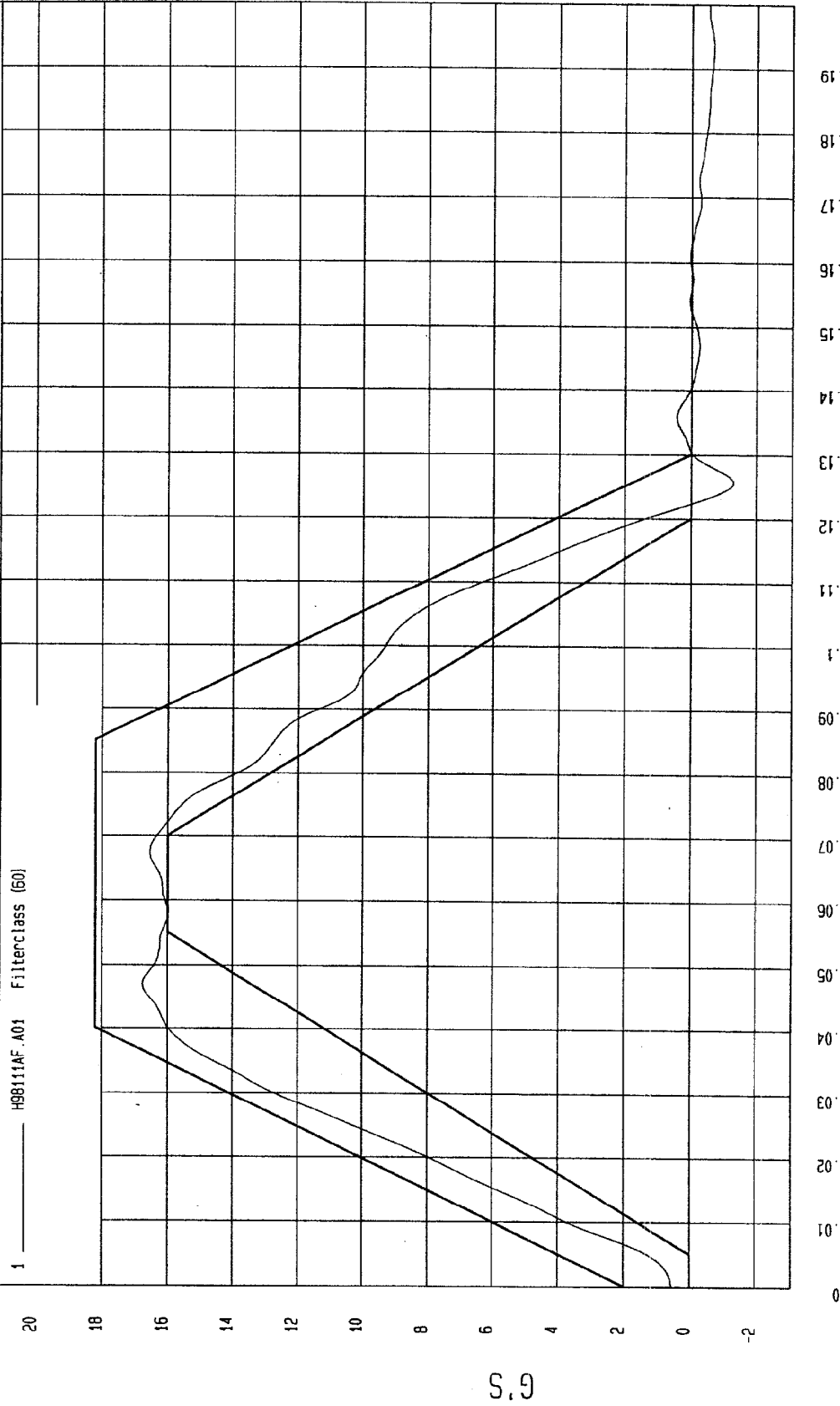
COMPONENT: 1998 SATURN SL2 (CW0106)

Minimum = -1.27 G'S at 125.7 msec

Maximum = 16.75 G'S at 47 msec

SLED ACCELERATION

1 ——— H08111AF.A01 Filterclass (50)



NSA Research
05-05-1998 11:54

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN= 0 MPH at 9.9 msec

YMAX= 28.88274 MPH at 122 msec

SLED X VELOCITY

30

28

26

24

22

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18

16

14

12

10

8

6

4

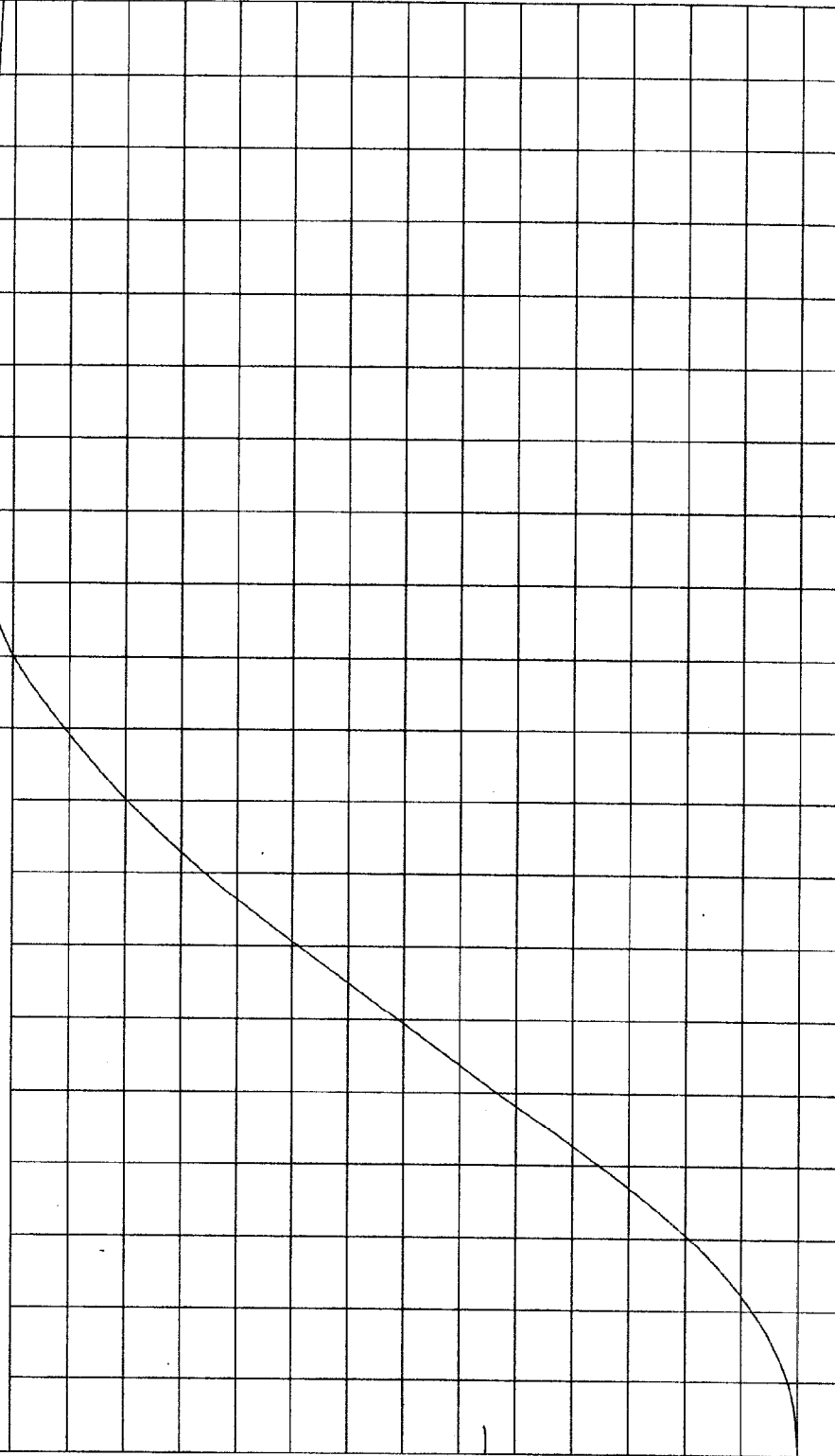
2

0

MPH

1

H98111A1.V01 Filterclass (180)



MSA Research
05-05-1998 11:29

TIME Seconds

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN= 0 IN at 9.9 msec

YMAX= 70.20754 IN at 200 msec

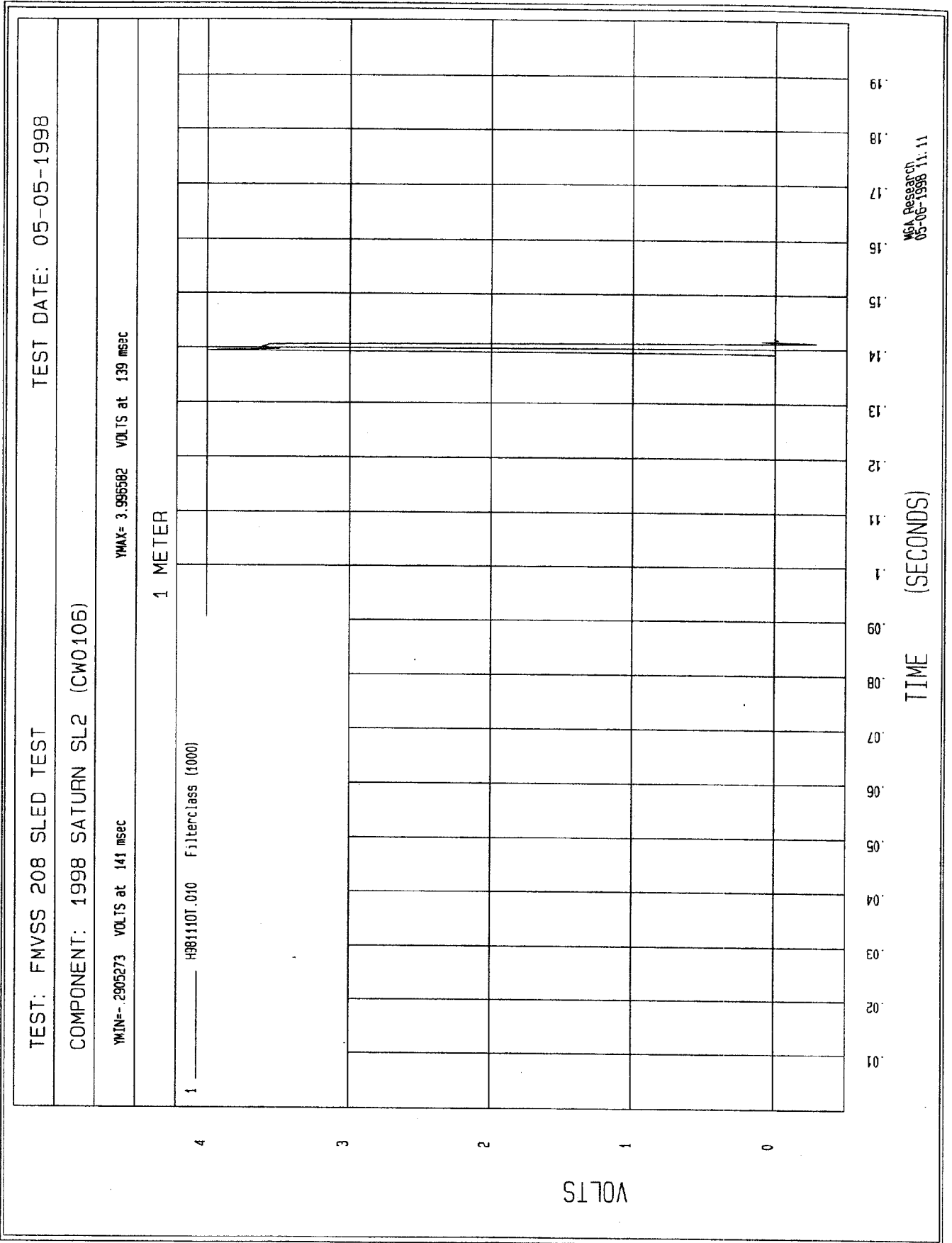
SLED X DISPLACEMENT

1. H98111A1.001 Filterclass (180)

70
60
50
40
30
20
10
0

NI

TIME Seconds
0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.1 0.11 0.12 0.13 0.14 0.15 0.16 0.17 0.18 0.19
MGA Research
05-05-1998 11:29



TEST: FMVSS 208 SLED TEST

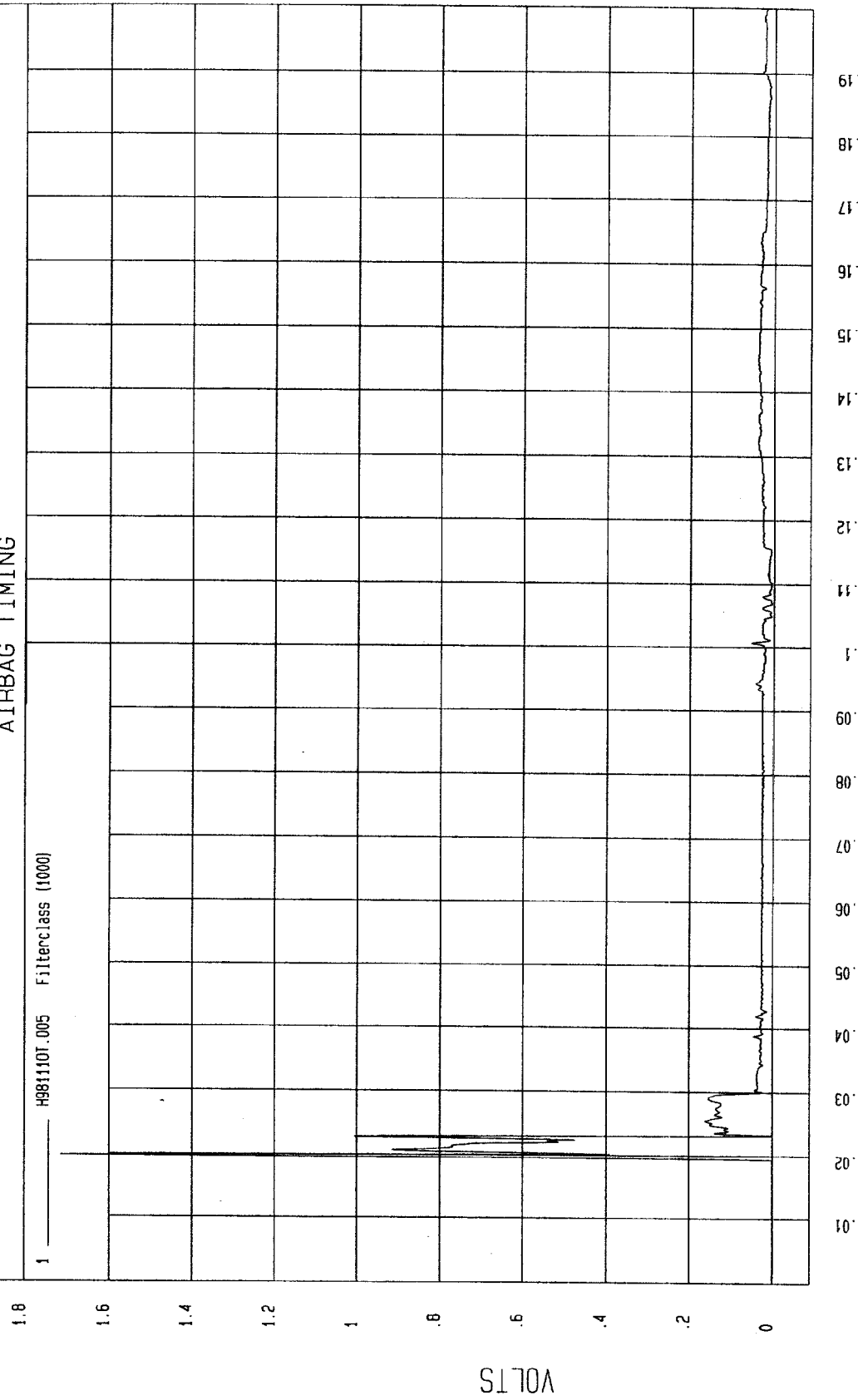
TEST DATE: 05-05-1998

COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-3.20589E-03 VOLTS at 1.8 msec

YMAX= 1.715545 VOLTS at 19. msec

AIRBAG TIMING



MGA Research
05-05-1998 11:44

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

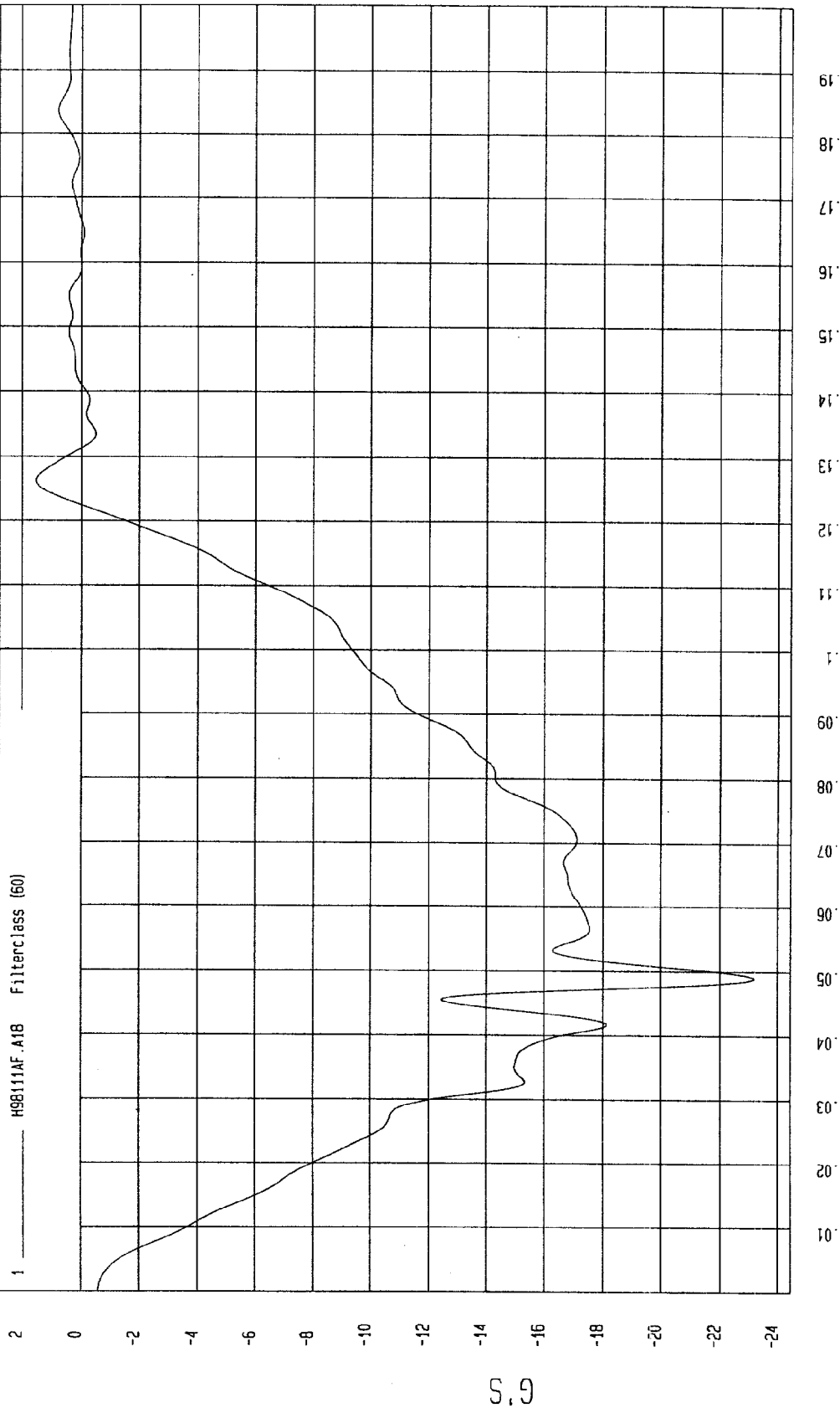
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-23.19108 G'S at 49 msec

YMAX= 1.529842 G'S at 126 msec

LEFT B POST X ACCELERATION

1 _____ H98111AF.A18 Filterclass (60)



NSA Research
05-05-1998 11:43

TIME (SECONDS)

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

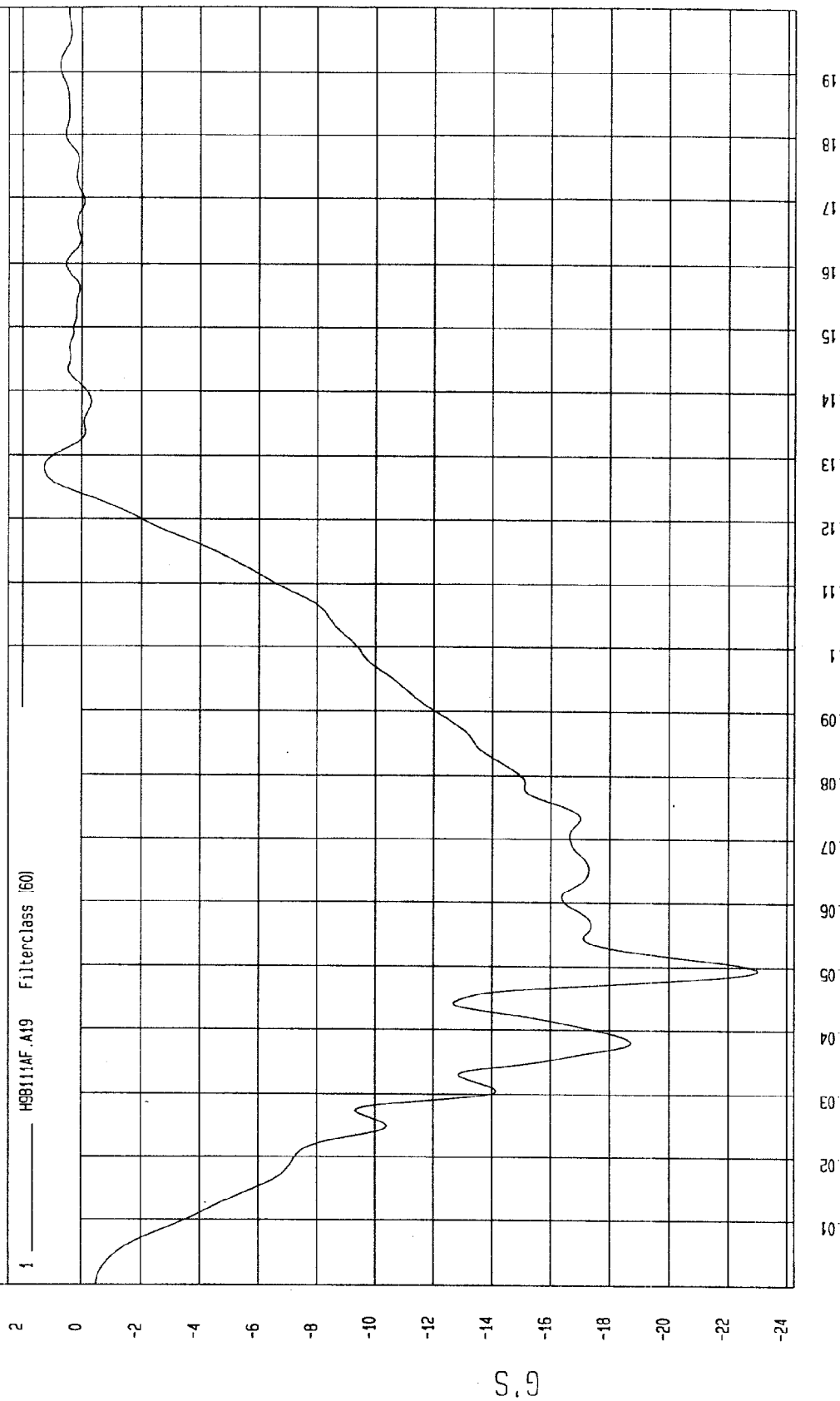
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-23.0182 G'S at 49. msec

YMAX= 1.260098 G'S at 128 msec

RIGHT B POST X ACCELERATION

1 ——— H9B111AF.A19 Filterclass (60)



MSA Research
05-05-1998 11:44

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

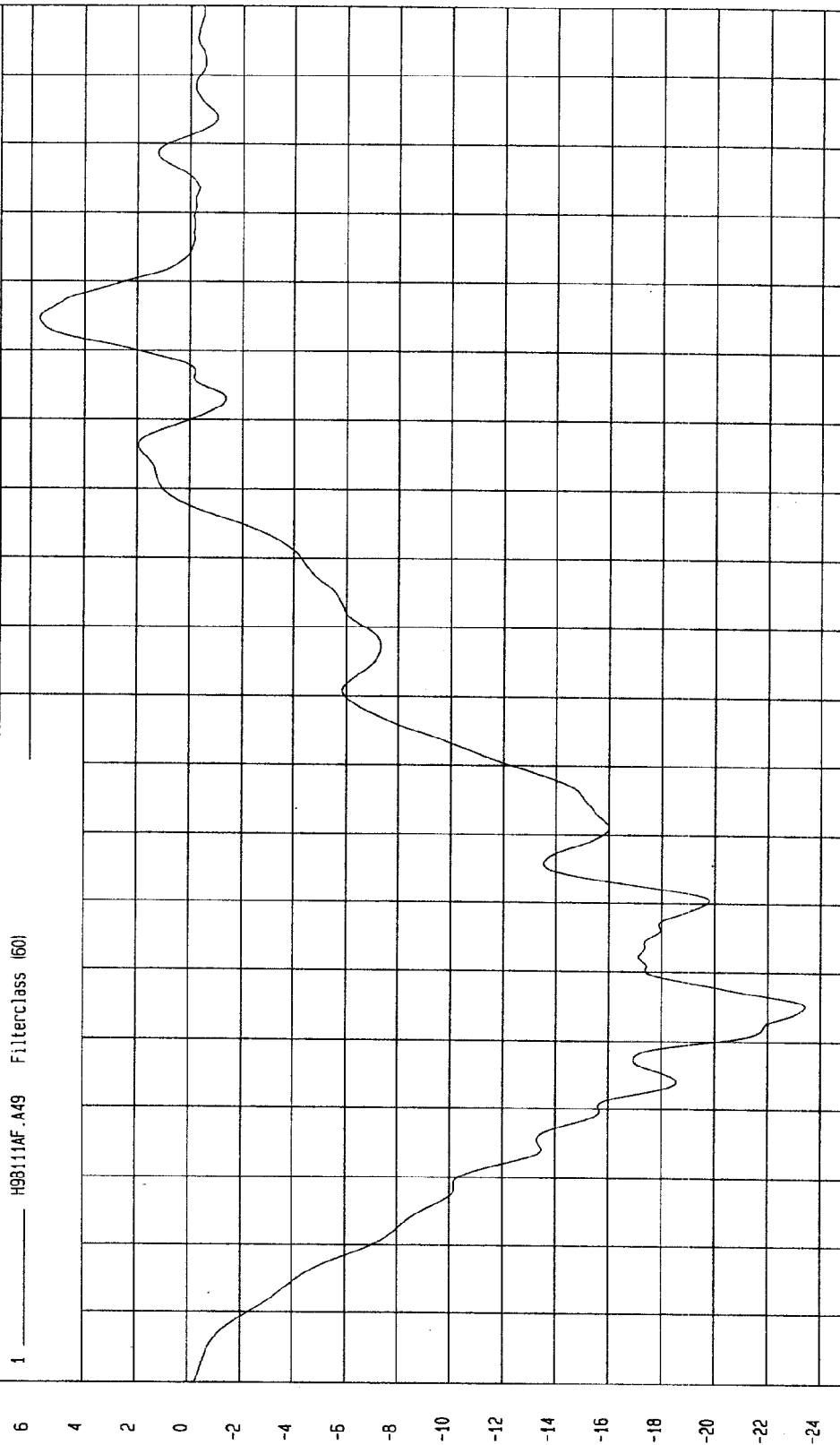
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-23.42314 G'S at 55. msec

YMAX= 5.667171 G'S at 154 msec

ENGINE X ACCELERATION

1 ——— H98111AF.A49 Filterclass (60)



WGA Research
05-05-1998 11:43

TEST: FMVSS 208 SLED TEST

TEST DATE: 05-05-1998

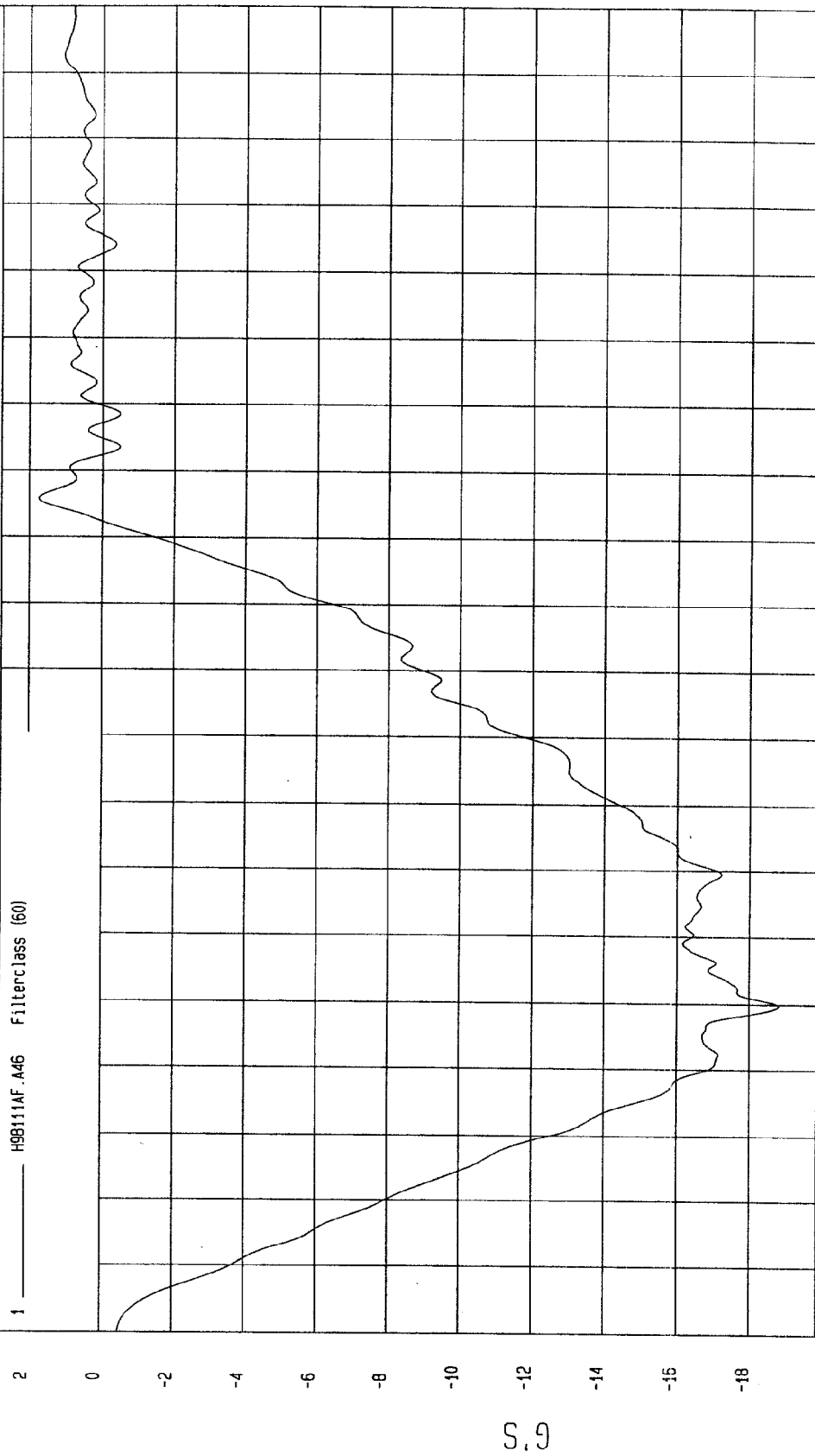
COMPONENT: 1998 SATURN SL2 (CW0106)

YMIN=-18.82714 G'S at 49. msec

YMAX= 1.738746 G'S at 125 msec

VEHICLE REAR AXLE X ACCELERATION

1 _____ H9B111AF.A46 Filterclass (60)



WGA Research
05-05-1998 11:44

TIME (SECONDS)

APPENDIX C
MANUFACTURER'S VEHICLE INFORMATION

**OVSC QUESTIONS & GM RESPONSES
REGARDING FMVSS 208 INFORMATION REQUEST**

1998 Saturn Sedan

NSA-31CCa / OA:208970811W

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.

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 in all 1998 Saturn models were depowered from the previous year. This was accomplished by reducing the amount of propellant in the inflator. This resulted in a reduction of peak pressure for both the driver and passenger air bags. Testing of depowered and non-depowered inflators (pressure generated into a 60 liter tank) shows an approximate reduction in

peak pressure from 150 kPa to 130 kPa, (with negligible change in onset rate) for the driver air bag. The passenger bag inflator showed an approximate reduction in peak pressure from 380 kPa to 320 kPa, with a reduction in onset rate from 8 to 7 (kPa/msec). The reduction in onset rate for the passenger bag was due to a change to the propellant surface area.

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 Saturn vehicles 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. Attachment B includes a section from the 1998 Saturn service manual, showing location, attachment, and proper disabling of the SIR system. [NOTE: This is only a section of the service manual and is not meant to include all steps and precautions used in providing full service of the SIR system.]

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 was no side glass present in any of the sled tests. In full scale tests C11564 and C11565, all windows were in the up position. In test C11601, both left and right side windows were left down to facilitate camera coverage. The movable vents were left open for all tests.

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 C.

1998 Saturn domestic vehicles do 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 D 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 Saturn sedan (SL, SL1, and SL2) and wagon (SW1 and SW2) are equipped with an height-adjustable shoulder belt guide. The nominal design position for a 50th percentile male occupant is the middle position. The 1998 Saturn coupe (SC1 and SC2) incorporates a fixed anchor.

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 E 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

The air bags installed in the subject vehicle do not incorporate a pressure vessel to inflate the system.

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

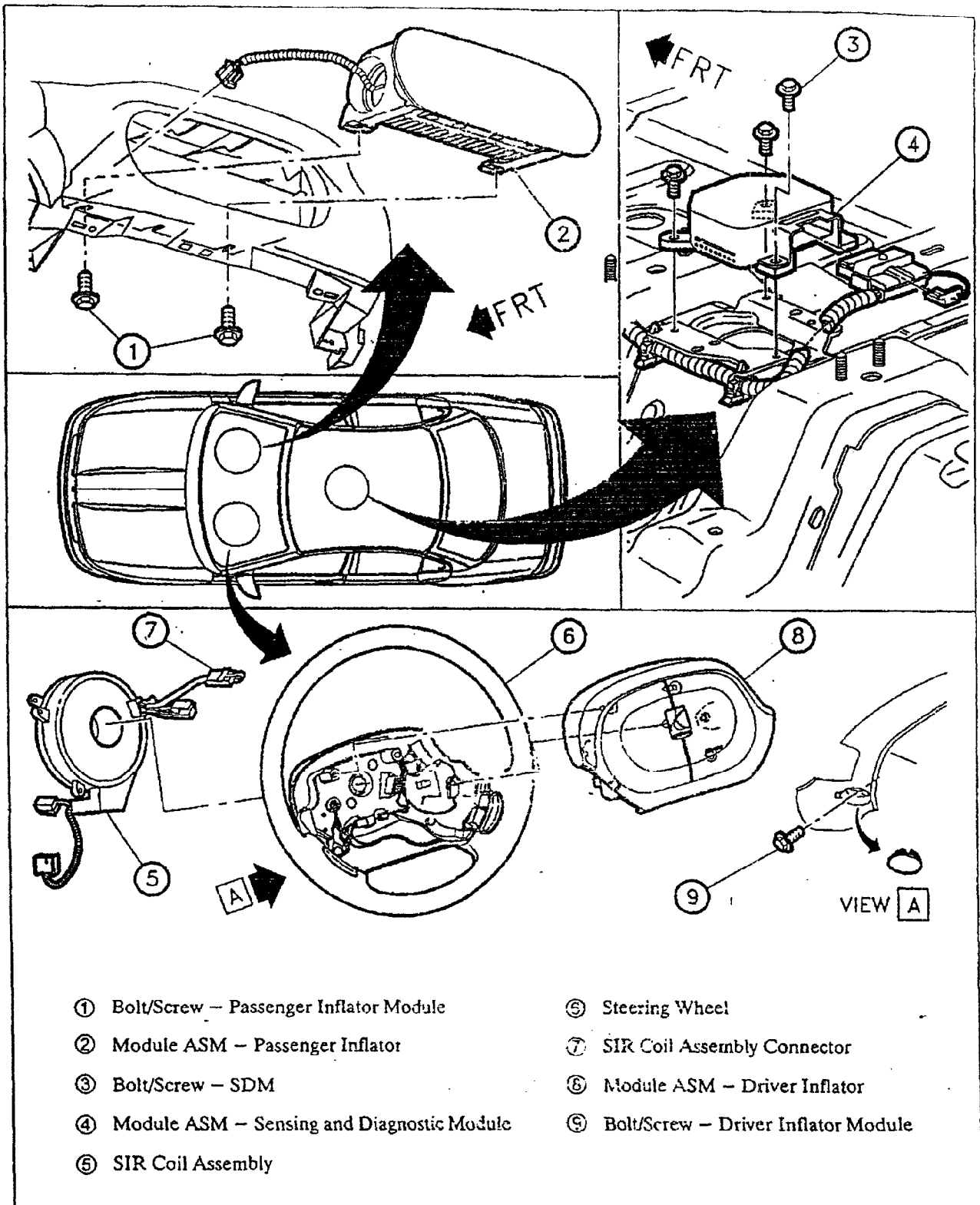
The air bags installed in the subject vehicle do not incorporate an explosive device to inflate the system.

Attachment B

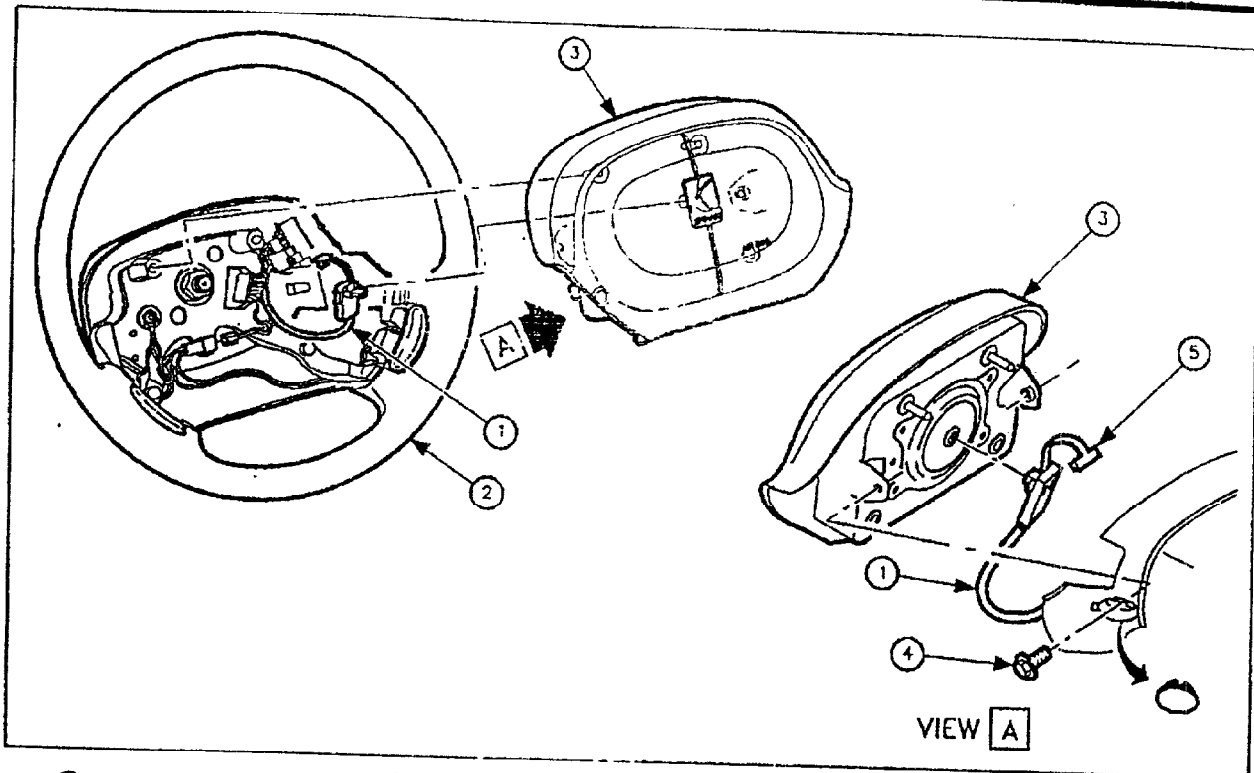
USG 3356

7 pages
(including this cover)

SIR COMPONENT LOCATION AND WIRING VIEW



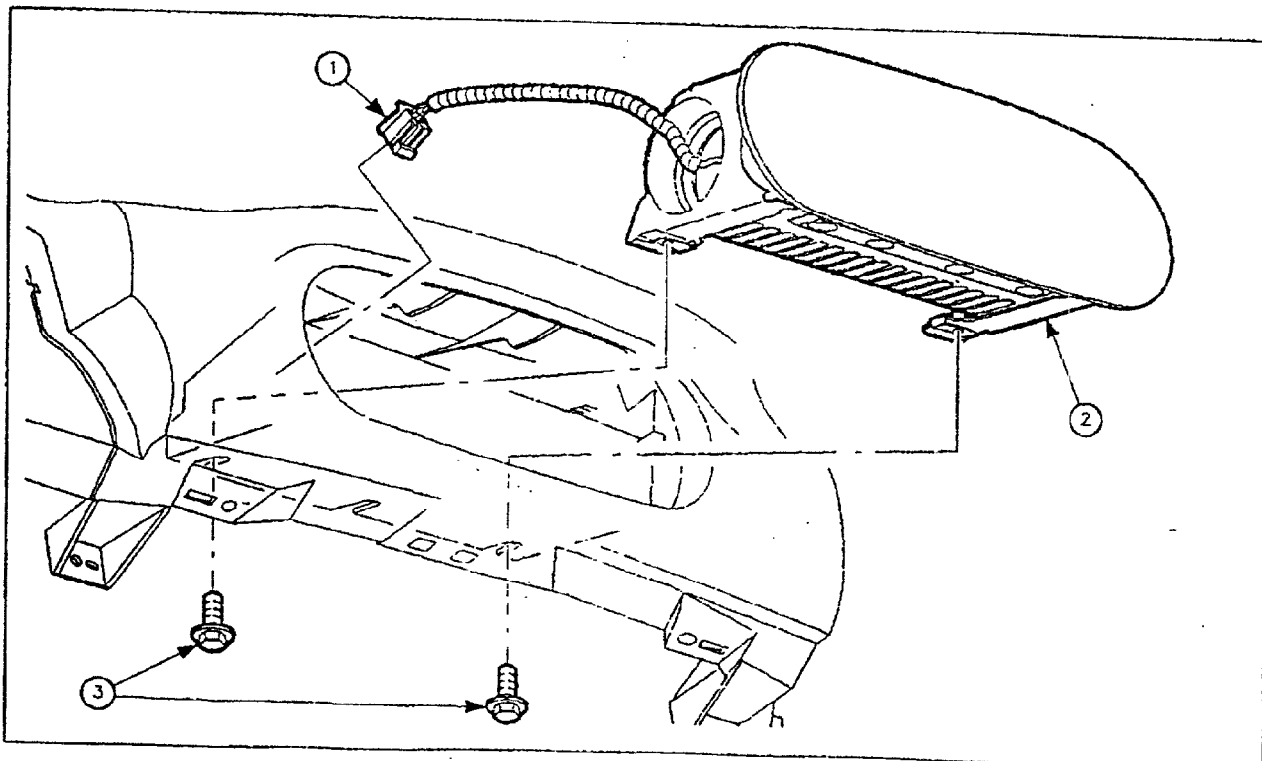
SMELC61351AE



- ① SIR Coil Connector to Inflator Module
- ② Steering Wheel
- ③ Driver Inflator Module

- ④ Hex Head Screw
- ⑤ Driver Inflator Module Connector with Integral Connector Lock Device

SMELC61349AB



- ① Connector - Passenger Inflator Module

- ② Passenger Inflator Module

- ③ Hex Head Screws

SUFI C61426AC

ON VEHICLE SERVICE

SERVICE PRECAUTIONS

CAUTION: WHEN YOU ARE PERFORMING SERVICE ON OR NEAR THE SIR COMPONENTS OR THE SIR WIRING, YOU MUST DISABLE THE SIR SYSTEM. USE THE FOLLOWING PROCEDURE TO TEMPORARILY DISABLE THE SIR SYSTEM. FAILURE TO FOLLOW THE CORRECT PROCEDURE COULD CAUSE AIR BAG DEPLOYMENT, PERSONAL INJURY, OR UNNECESSARY SIR SYSTEM REPAIRS.

THE INFLATABLE RESTRAINT SENSING AND DIAGNOSTIC MODULE MAINTAINS A RESERVE ENERGY SUPPLY WHEN THE VEHICLE POWER IS INSUFFICIENT TO CAUSE DEPLOYMENT OF THE AIR BAGS, THE RESERVE ENERGY SUPPLY PROVIDES THE DEPLOYMENT POWER. DEPLOYMENT POWER IS AVAILABLE FOR AS MUCH AS TEN MINUTES AFTER DISCONNECTING THE VEHICLE BATTERY FROM THE VEHICLE ELECTRICAL SYSTEM.

- YOU TURN OFF THE IGNITION SWITCH.
- YOU REMOVE THE FUSE THAT PROVIDES POWER TO THE INFLATABLE RESTRAINT SENSING AND DIAGNOSTIC MODULE.
- YOU DISCONNECT THE VEHICLE BATTERY FROM THE VEHICLE ELECTRICAL SYSTEM.

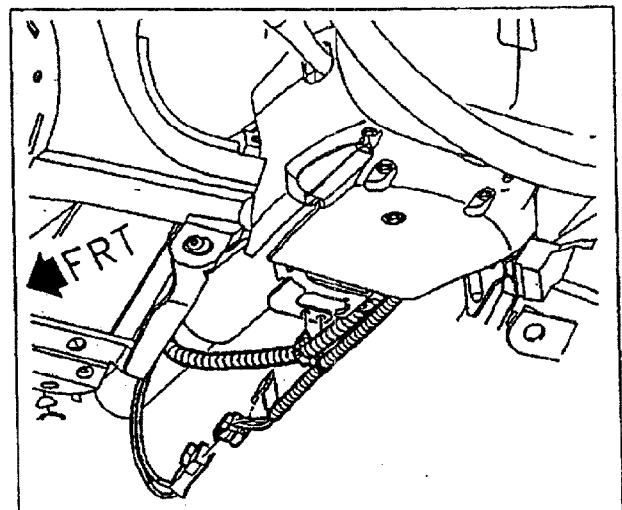
PERFORMING THE FOLLOWING PROCEDURES PREVENTS DEPLOYING OF THE AIR BAGS FROM THE RESERVE ENERGY SUPPLY POWER.

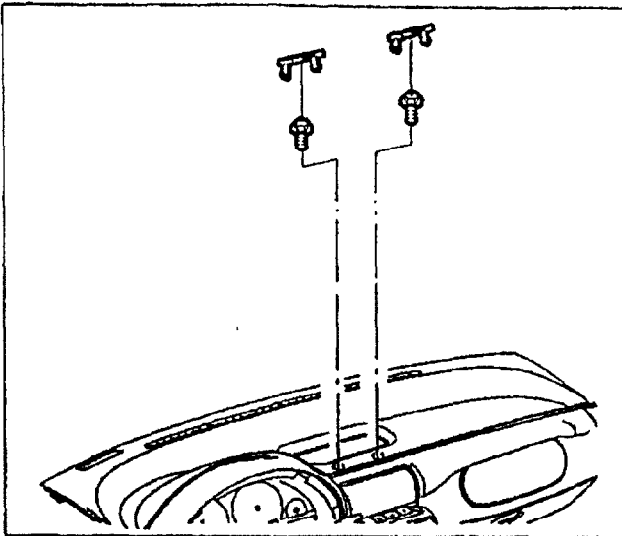
DISABLING THE SIR SYSTEM

1. Turn the steering wheel so that the vehicle's wheels are pointing straight ahead.
2. Turn ignition switch to the LOCK position and remove key.
3. Remove AIR BAG fuse from I/P junction block.

IMPORTANT: With the AIR BAG fuse removed and ignition switch On, the AIR BAG warning lamp will be On. This is normal operation and does not indicate an SIR system malfunction.

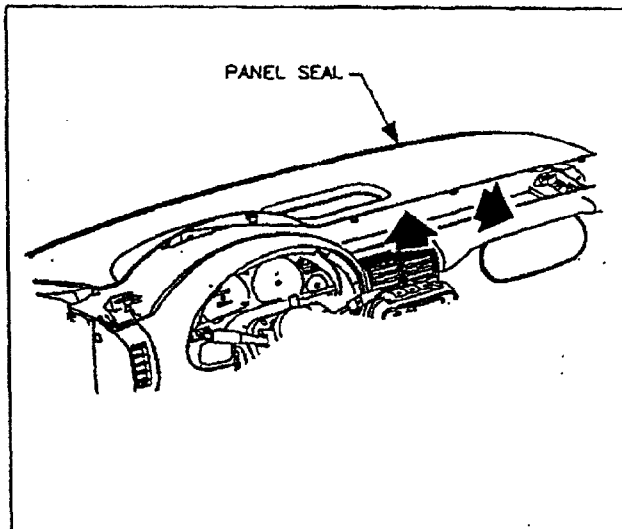
4. Remove connector position assurance (CPA) device and disconnect yellow two-way connector located near the base of the steering column.





SMELC81359AC

5. Remove upper trim panel screw caps by carefully prying with a small flat head screwdriver.
6. Remove upper trim panel screws.



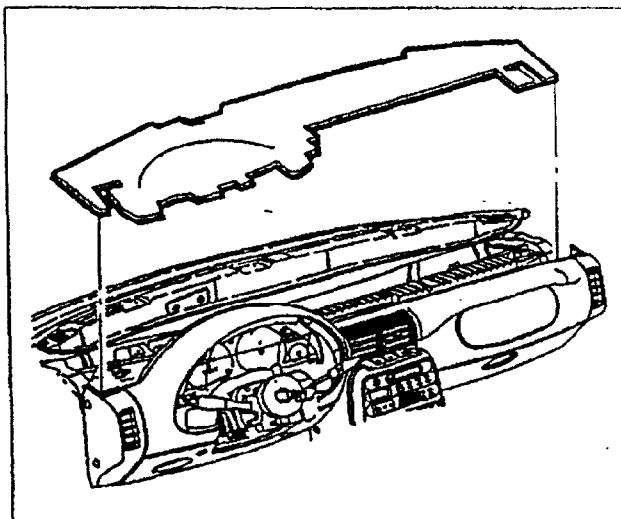
SNM551444AB

7. Lift upper trim panel at clip locations on rear edge to disengage clips.
8. Disengage forward edge of upper trim panel by lifting upward at each outer corner, then pull rearward.

IMPORTANT: Be careful not to damage VIN plate when removing upper trim panel.

IMPORTANT: Be careful, when removing upper trim panel, not to damage the upper trim panel seal.

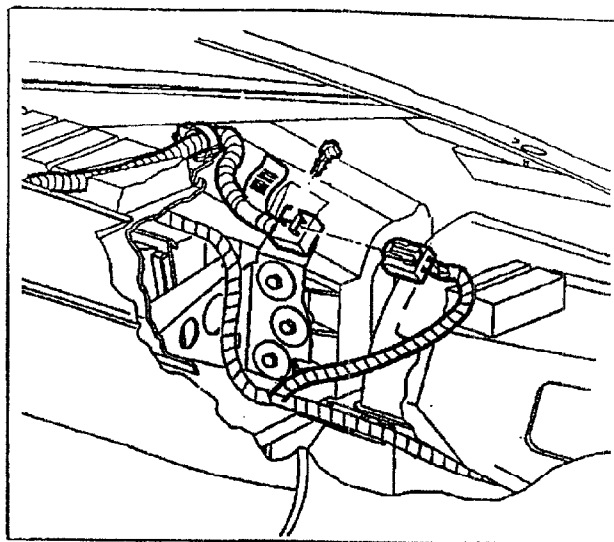
9. Remove upper trim panel.



SNM551440AB

10. Remove upper trim panel insulator.

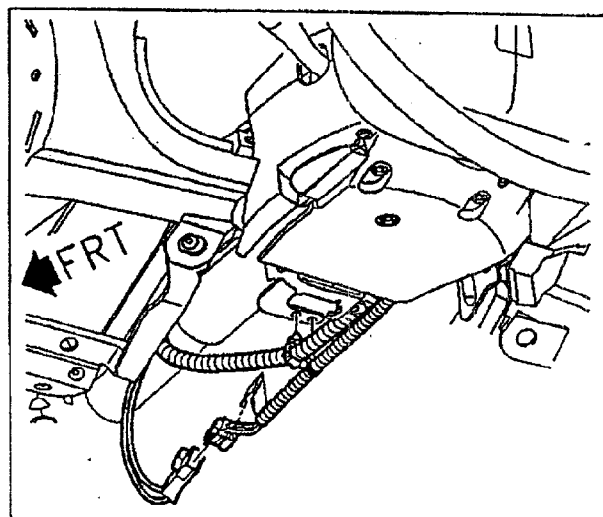
11. Remove connector position assurance (CPA) device and disconnect yellow two-way connector located on pigtail from passenger inflator module.



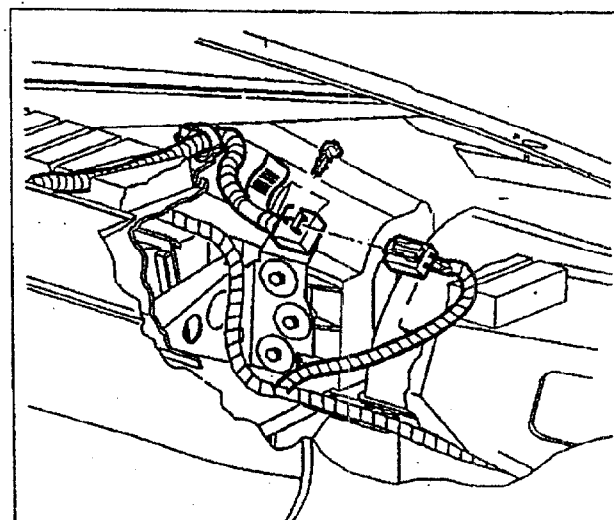
SMELC61362AB

ENABLING THE SIR SYSTEM

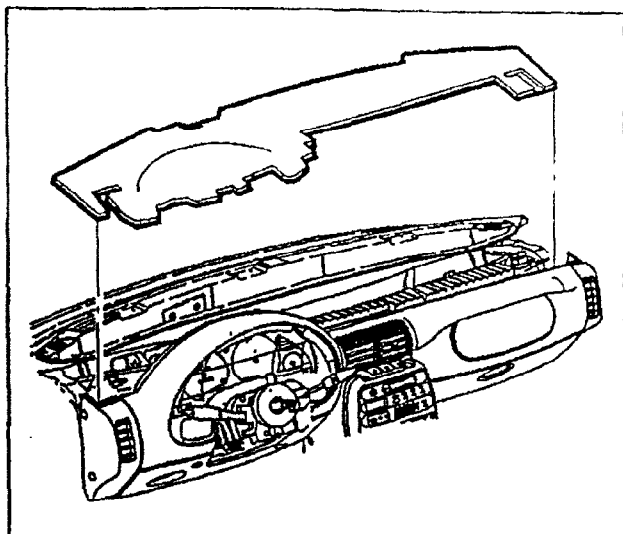
1. Turn ignition switch to LOCK position and remove key.
2. Connect yellow two-way SIR connector at the base of steering column and install connector position assurance (CPA) device to connector.
3. Connect yellow two-way passenger inflator module pigtail and install connector position assurance (CPA) device to connector.



SMELC61358AC



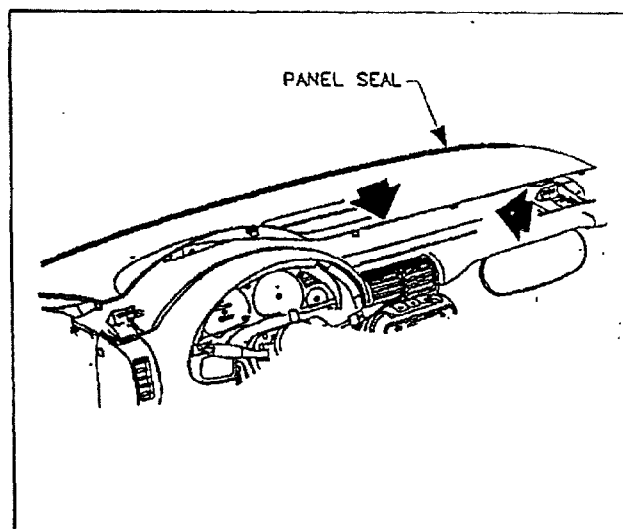
SMELC61362AB



SMVSS1440AB

4. Install upper trim panel insulator.

IMPORTANT: Make sure to tuck in all flaps.

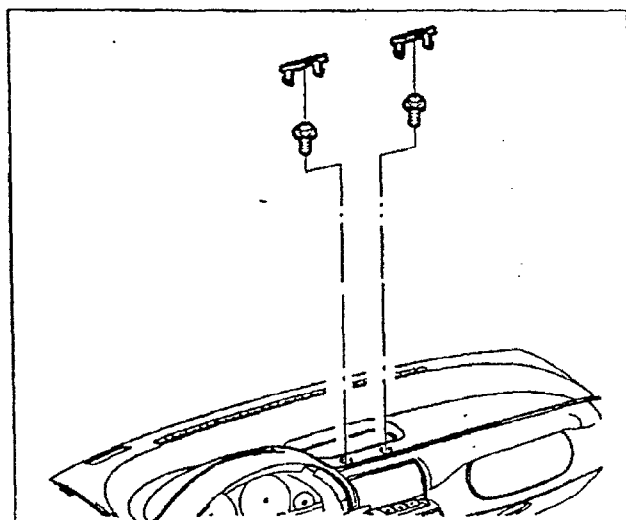


SMVSS1445AB

IMPORTANT: Be sure upper trim panel seal is correctly seated on forward edge before installing upper trim panel.

IMPORTANT: Be careful not to damage VIN plate when replacing upper trim panel.

5. Lower panel, making sure upper trim panel alignment tabs interlock with windshield garnish slots.
6. Push down at clip locations to secure.
7. Press down firmly at forward corners to fully engage retainers.



SMELC61359AC

8. Install and tighten screws.

9. Install screw caps.

Torque: 2.3 N•m (20 in-lbs)

10. Install AIR BAG fuse to I/P junction block.
11. Turn ignition switch to the RUN position and verify that the AIR BAG warning lamp flashes seven times and then turns Off. If it does not operate as described, perform the "SIR Diagnostic System Check."

Attachment C

USG 3356

2 pages
(including this cover)

ATD CLEARANCE DIMENSIONS
for 1998 Saturn (all models)
(all measurements in mm)

DIMENSION	SEDAN & WAGON (all models)		COUPE (all models)	
	Driver	Passenger	Driver	Passenger
HH - Head to Header	340	340	370	270
NR - Nose to Rim	not	N/A	448	N/A
CS - Chest to Steering	290	N/A	370	N/A
CD - Chest to Dash	485	460	not	465
KDL - Left Knee to Dash	115	120	140	105
KDR - Right Knee to Dash	130	112	150	110
SH - Striker to H-Point	235	235	459	480
SHY - Striker to H-Point (Y)	not	not	198	198
HS - Head to Side	not	not	320	not
HR - Head to Side Roof	159	187	not	not
AD - Arm to Door	120	137	not	not

Attachment D

USG 3356

3 pages
(including this cover)

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 1998 SATURN
 Vehicle Model & Body Style: SL*, SLI*, SC2, SW1*, SW2, SC1*, SC2

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"?).

Seat back angle for driver's seat = 26°

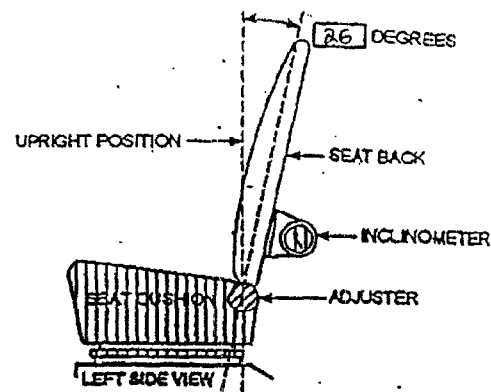
Measurement Instructions:

PLACE HEADREST IN FULL UP POSITION. USE A LEVEL TO STAND OFF FROM HEAD REST SUPPORT ADDS. ANGLE SHOULD BE 9.5° *

Seat back angle for passenger's seat = 26°

Measurement Instructions:

SAME



FRONT SEAT ASSEMBLY

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, provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat:

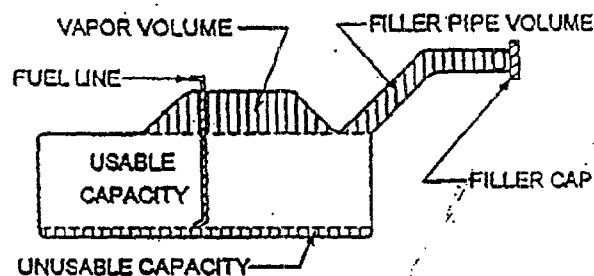
POSITION SEAT SO NINE (9) NOTCHES ARE SHOWING AHEAD AND BEHIND LOCKING PAWL ON IN-BOARD AND OUTBOARD TRACKS. SEAT CUSHION HEIGHT ADJUSTER (UPLEVEL DRIVER SEAT'S ONLY) SHOULD BE IN THE DOWN POSITION.

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

SAME

3. FUEL TANK CAPACITY DATA --

- 3.1 A. "Usable Capacity" of standard equipment fuel tank = 18.46 gallons.
- 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 = 18.46 gallons.



VEHICLE FUEL TANK ASSEMBLY

Operational Instructions:

REMOVE ALL FUEL (USABLE AND UNUSABLE) FROM THE TANK. FILL TANK WITH UNUSABLE (1.9 GALLONS) AND 95% OF USABLE (11.84 GALLONS)

*SUPPLEMENTAL INFO: POSITION CAN BE SET BY PLACING SEAT BACK IN THE MOST UPRIGHT POSITION, THEN MOVING IT REARWARD THREE (3) ADDITIONAL NOTCHES. SC1, SL, SLI, AND SW1 ALL UTILIZE INTEGRAL HEAD RESTRAINTS, SO THIS METHOD MUST BE USED TO SET SEAT BACK ANGLE.

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 11.84 gallons
(PLUS .19 GALLONS UNUSABLE)

3.3 Is vehicle equipped with electric fuel pump?

Yes- X

No-

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

SEE BELOW

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.

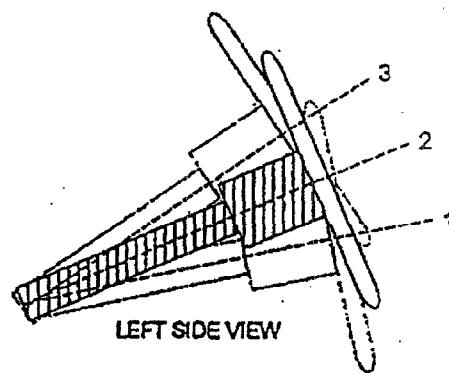
Operational Instructions:

LOCATE COLUMN IN MID-POSITION

(MEASURED BY MARKING HIGHEST AND

LOWEST POINT OF SHAFT TRAVEL RELATIVE

TO IP AND BISECTING THE DISTANCE)



LEFT SIDE VIEW

STEERING COLUMN ASSEMBLY

FUEL PUMP ELECTRICAL CIRCUIT

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.

Attachment E

USG 3356

2 pages
(including this cover)

FMVSS 208 - TEST DATA SUMMARY
for 1998 Saturn (all models)

TEST CONFIGURATION	TEST CONDITIONS			ATD INJURY CRITERIA				
	Weight (lb.) less ATD's	Speed (mph)	Test No.	OCCUPANT POSITION	HIC	CHEST ACCEL. (g)	CHEST DISPL. (in.)	FEMUR LOAD L / R (lb.)
Zero Degree Frontal Impact w/o Safety Belts (tested on Coupe)	does not apply	30.4	S14509	driver	240	41	1.7	1035 / 981
				passenger	200	35	0.3	1267 / 1092
Zero Degree Frontal Impact w/ Safety Belts (tested on Coupe)	2857	35.0	C11601	driver	290	45	1.6	439 / 741
				passenger	580	60	1.2	920 / 709
30 Degree Left Oblique Impact w/ Safety Belts (tested on Coupe)	2654	30.7	C11564	driver	220	30	1.2	138 / 352
				passenger	150	33	1.1	84 / 769
30 Degree Right Oblique Impact w/ Safety Belts (tested on Sedan)	2890	30.6	C11565	driver	310	41	1.7	883 / 924
				passenger	280	36	1.2	1061 / 757

NECK LOADS		Flexion (Nm)	Extension (Nm)	Tension (N)	Compression (N)	Forward Shear (N)	Rearward Shear (N)
Sled Test S14509 Zero Degree Frontal w/o Safety Belts (tested on Coupe)	driver	71	12	600	3210	830	280
	passenger	26	15	1550	170	830	100