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REPORT NO. 208-MGA-2000-04
212-MGA-2000-04
301-MGA-2000-04

VEHICLE SAFETY COMPLIANCE TESTING
FOR
FMVSS 208, OCCUPANT CRASH PROTECTION
FMVSS 212, WINDSHIELD MOUNTING
FMVSS 219, WINDSHIELD INTRUSION (PARTIAL)
FMVSS 301, FUEL SYSTEM INTEGRITY

General Motors Corporation
2000 Chevrolet Astro Van
NHTSA NO. CY0108

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: April 11, 2000

Report Date: April 17, 2000

Final Report

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY ASSURANCE
OFFICE OF VEHICLE SAFETY COMPLIANCE

MAIL CODE: NSA-30
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8/10/00
Date of Report Acceptance

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TABLE OF CONTENTS

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	Purpose and Test Procedure	1-1
2	Summary of Frontal Barrier Impact Test	2-1
3	Summary of Results for FMVSS 208, 212, 219 (Partial), & 301	3-1
4	Occupant, Vehicle, and Camera Information	4-1
APPENDIX A	Photographs	
APPENDIX B	Data Plots	
APPENDIX C	Manufacturer's Vehicle Information	

LIST OF TABLES

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	Crash Test Summary	2-5
2	General Test and Vehicle Parameter Data	2-6
3	Post Impact Data	2-8
4	Accident Investigation Division Data	2-9
5	Post Test Airbag Data	2-10
6	Vehicle Accelerometer Location and Data Summary	2-11
7	Report of Vehicle Condition at the Completion of Testing	2-12
8	FMVSS 208 Occupant Injury Criteria	3-2
9	Dummy Kinematic Summary	3-4
10	FMVSS 208 Seat Belt Comfort and Convenience Test Summary	3-5
11	FMVSS 208 Equipment Data	3-31
12	Lap Belt Lockability	3-34
13	Air Bag Labels	3-45
14	FMVSS 212 "Windshield Mounting" Data Summary	3-53
15	FMVSS 219 "Windshield Zone Intrusion" Data Summary	3-54
16	Fuel System Data	3-55
17	FMVSS 301 Post Impact Test Data	3-56
18	FMVSS 301 Static Rollover Test Data	3-57
19	Seat and Steering Column Positioning Data	4-2
20	Dummy Measurement Data for Front Seat Occupants	4-4
21	Seat Belt Positioning Data	4-5
22	Camera Locations	4-8

LIST OF FIGURES

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	Dummy Measurement Locations for Front Seat Occupants	4-3
2	Vehicle Target Locations	4-6
3	Camera Positions	4-7
4	Temperature	4-9

SECTION 1
PURPOSE AND TEST PROCEDURE

PURPOSE

This 30 mph flat frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial), and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by MGA Research Corporation (MGA) under Contract No. DTNH22-98-D-11055. The purpose of this test was to determine whether the subject vehicle, a 2000 Chevrolet Astro Van, NHTSA No. CY0108, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," in the flat frontal barrier impact mode.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-10 dated January 15, 1998. Data was obtained relative to FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with seven (7) accelerometers to measure longitudinal axis accelerations and one (1) accelerometer to measure vertical axis acceleration. The vehicle's specified impact velocity range was 28.9 to 29.9 mph. The vehicle impacted a fixed flat barrier the face of which was covered with a sheet of 3/4 inch thick plywood.

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 C 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; neck and left/right femur load cells to measure axial forces.

The thirty eight (38) 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 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) 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, 212, 219 (partial) and 301 data are 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
SUMMARY OF FRONTAL BARRIER IMPACT TEST

TEST RESULTS SUMMARY

This flat frontal barrier test was conducted at MGA Research Corporation on April 11, 2000.

The test vehicle, a 2000 Chevrolet Astro Van, NHTSA No. CY0108, appeared to comply with the performance requirements of FMVSS 208, 212, 219 (partial), and 301 in the flat frontal barrier impact mode. 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. The vehicle's restraint system met the applicable comfort and convenience requirements. The windshield periphery retention on each side of the vehicle centerline was greater than 50 percent. There was no penetration into any portion of the windshield. No fluid spilled from the vehicle's fuel system following the impact or during the static rollover test.

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 by the seat belts and airbags during the test. The vehicle's test weight was 5218 pounds. The vehicle's impact speed was 29.8 mph. The vehicle's maximum static crush was 19.6 inches.

The driver's HIC was 296. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 53 g's. The driver's chest maximum deflection was 0.9 inches. The driver's left and right femur maximum compressive forces were 1138 pounds and 685 pounds, respectively.

The right front passenger's HIC was 387. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47 g's. The right front passenger's chest maximum deflection was 0.8 inches. The right front passenger's left and right femur maximum compressive forces were 1419 pounds and 1052 pounds, respectively.

There was no loss of windshield periphery retention and no penetration through the windshield.

Following the impact and during the static rollover test, no fluid spilled from the vehicle's fuel system.

TEST NOTES

TABLE 1 CRASH TEST SUMMARY

Vehicle Yr/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

Vehicle NHTSA No.: CY0108 Test Type: Frontal Barrier Impact

Test Date: April 11, 2000 Time: 5:39 p.m. Temp: 71 °F

Vehicle Test Weight: 5218 lbs. Vehicle/Barrier Impact Angle: 0°

Impact Velocity: 29.8 mph Maximum Static Crush: 19.6 inches

Vehicle Rebound: 12.4 inches

Dummies:	Driver	Passenger
Dummy Type	<u>Part 572E</u>	<u>Part 572E</u>
Serial Number	<u>312</u>	<u>340</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
14 High Speed

Door Opening Data: Left Front: yes Sliding: yes
Right Front: yes

Front Seat(s) Data:	Driver	Passenger
Seat Track Failure	<u>0 in.</u>	<u>0.1 in.</u>
Seat Back Failure	<u>none</u>	<u>none</u>

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

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATAVehicle Yr/Make/Model/Body Style: 2000/Chevrolet/Astro/VanNHTSA No: CY0108 VIN: 1GNDM19W3YB167236 Body Color: GrayEngine: 6 Cylinders; C.I.D.; 4.3 liters; CCX Gas; Diesel; TurbochargedX Longitudinal; TransverseTransmission: 4 Speed; Manual; X Automatic; OverdriveFinal Drive: Front Wheel; X Rear Wheel; Four WheelMajor Option: X A/C; X P/S; X P/B; X P/wdo; X P/door locks;X P/seats; X Tilt Wheel; Anti-skid Brakes; Cruise ControlDate Received: 2/24/00; Odometer Reading: 23 milesDealer's Name/Address: Hartnell Chevrolet Inc.
7800 Antioch Road, P.O. Box 68
Salem, WI 53168DATA FROM VEHICLE'S CERTIFICATION LABEL:Vehicle Manufactured By: General Motors CorporationDate of Manufacture: 2/00; VIN: 1GNDM19W3YB167236GVWR: 5950 lbs; GAWR Front: 2800 lbs. GAWR Rear: 3150 lbs.DATA FROM TIRE PLACARD:Tire Pressure with maximum capacity vehicle load: Front 35 psi Rear 35 psiRecommended Tire Size: P215/75R15Recommended Cold Tire Pressure: Front 35 psi; Rear 35 psiTires on Vehicle: P215/75R15; Manufacturer: UniroyalType of Spare Tire: SpacesaverNumber of Occupants: 2 Front; 2 Rear; 3 3rd Seat; 7 TOTALType of Front Seats: X Bucket; Bench; Split BenchType of Front Seat Back: Fixed; X Adj. With; Lever; Rot. Knob X Power

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER(WITH MAXIMUM FLUIDS) = UDW:Right Front = 1178 lbsRight Rear = 1091 lbsLeft Front = 1205 lbsLeft Rear = 1116 lbsTOTAL FRONT WEIGHT = 2383 lbs (51.9 % of Total Vehicle Weight)TOTAL REAR WEIGHT = 2207 lbs (48.1 % of Total Vehicle Weight)TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 4590 lbsCALCULATION FOR TARGET TEST WEIGHT:UDW (Unloaded Delivered Weight) = 4590 lbsDSC (Designated Seating Capacity) = 7RCLW*(Rated Cargo/Luggage Weight) = 300 lbs

Target Test Weight = UDW + RCLW + (2 Dummies x Dummy Weight)

Target Test Weight = 4590 + 300 + 344 = 5234 lbsWEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO WEIGHT:Right Front = 1340 lbs Right Rear = 1320 lbsLeft Front = 1241 lbs Left Rear = 1317 lbsTOTAL FRONT WEIGHT = 2581 lbs (49.5 % of Total Vehicle Weight)TOTAL REAR WEIGHT = 2637 lbs (50.5 % of Total Vehicle Weight)TOTAL TEST WEIGHT = 5218 lbsWeight of ballast secured in vehicle = 130 lbsVehicle components removed to meet target weight: Rear seatVEHICLE ATTITUDE (all dimensions in inches):Delivered Attitude: RF 29.9 LF 29.8 RR 30.5 LR 30.3Fully Loaded Attitude: RF 29.5 LF 29.3 RR 29.4 LR 29.1Test Attitude: RF 29.5 LF 29.4 RR 29.4 LR 29.4Wheel Base: 110.6 in; C.G. = 56 in rearward of front wheel centerline

*Cargo weight for multi-purpose passenger vehicles, truck, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 300 pounds, whichever is less.

TABLE 3 POST-IMPACT DATAType of Test: Frontal Barrier ImpactImpact Angle: 0°Test Date: April 11, 2000Time: 5:39 p.m.Temperature: 71° FVehicle NHTSA No.: CY0108VIN: 1GNDM19W3YB167236BARRIER IMPACT VELOCITYRequired Impact Velocity Range: 28.9 to 29.9 mphImpact Velocity: Primary = 29.8 mph; Secondary = 29.9 mph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 40 inchesExiting Speed Trap: 12 inchesVEHICLE STATIC CRUSH AND REBOUND (inches):Vehicle Length: Pre-test = R 174.2 C_L 184.3 L 174.1Post-test = R 161.1 C_L 164.5 L 162.1Crush = R 13.1 C_L 19.8 L 12.0Average = 15.0

Distance from front of test vehicle to point of impact (rebound):

R 12.6 inC_L 10.0 inL 14.6 in

TABLE 4 ACCIDENT INVESTIGATION DIVISION DATA

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

Veh. NHTSA No.: CY0108 ;

VIN: 1GNDM19W3YB167236

Build Date: 2/00 ;

Test Date: April 11, 2000

Veh. Size Category: MPV ;

Test Weight: 5218 lbs

Veh. Wheelbase: 110.6 in. ;

Front Overhang: 31.9 in.

Overall Width: 79.8 in

ACCELEROMETER DATA:

Location: As per measurements on page 2-11

Calibration Procedure: As per MGA Calibration Procedure

Linearity: >99.9% ; Integration Algorithm: Trapezoidal

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

Impact Mode: Frontal Barrier

Crush Depth C1 = 13.1 inches

Dimensions: C2 = 17.6 inches

C3 = 19.6 inches

C4 = 18.9 inches

C5 = 15.6 inches

C6 = 12.0 inches

Midpoint of Damage:

D = Vehicle Longitudinal Centerline

Length of Damaged Region:

L = 70.9 inches

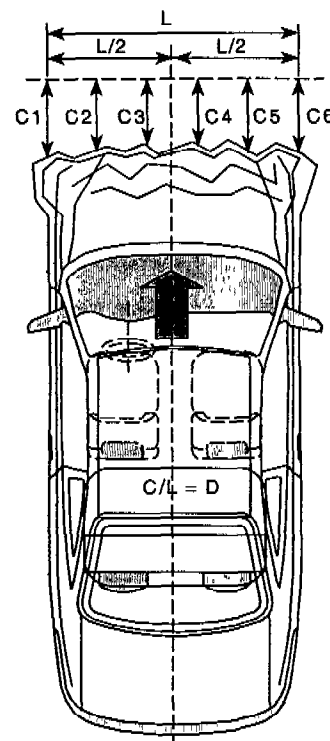
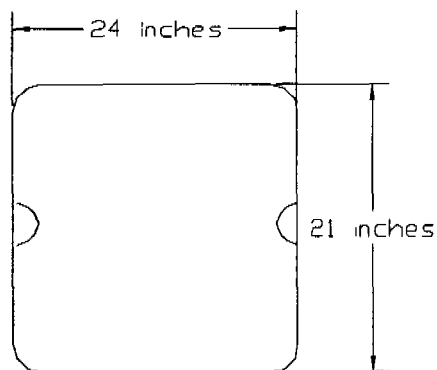


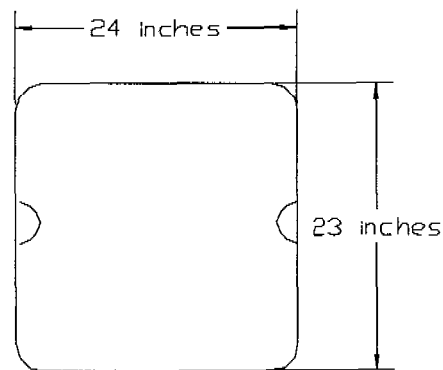
TABLE 5 POST TEST AIRBAG DATAVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanNHTSA No: CY0108 ; Test Date: April 11, 2000 ;Technician: Erik Nelson

- A. No of Vent Holes: Driver 2; Passenger 2
- B. Size of Vent Holes: Driver 1.5 in. dia.; Passenger 1.5 in. dia.
- C. Total Vent Area: Driver 3.5 in²; Passenger 3.5 in²
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
 Driver; Length 24 in.; Width 21 in.; Diameter N/A
 Passenger; Length 24 in.; Width 23 in.; Diameter N/A
- E. Is the Airbag Tethered?
 Driver; X Yes; ___ No; If yes, record length of tether 8 in.
 Passenger; ___ Yes; X No; If yes, record length of tether

Driver Airbag

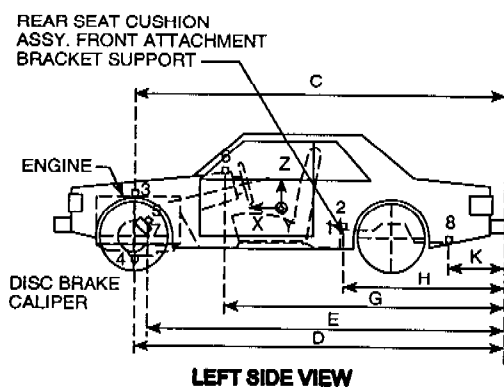
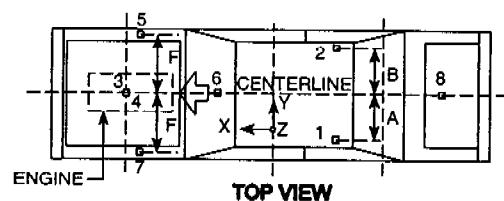


Passenger Airbag



- F. Part Numbers and Manufacture Name of Airbag and Gas Generator

Driver; Mfr N/A ; Airbag N/A ; Gen N/APassenger; Mfr N/A ; Airbag N/A ; Gen N/A

TABLE 6 VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARYVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 ; Test Date: April 11, 2000

ACCELEROMETER LOCATION (inches)		
	PRE-TEST	POST-TEST
A	23.5	23.5
B	21.5	21.5
C	160.0	153.7
D	142.7	137.6
E	146.5	141.7
F	28.0	26.8
G	133.7	132.9
H	81.7	81.3
K	11.1	10.7

ACCELEROMETER DATA SUMMARY					
No.	DESCRIPTION	MAXIMUM (g's)	TIME (msec)	MINIMUM (g's)	TIME (msec)
1	Left Rear Seat Crossmember	2.4	111	-36.5	57
2	Right Rear Seat Crossmember	3.1	119	-34.9	55
3	Top of Engine Block *	7.2	22	-16.2	19
4	Bottom of Engine	5.4	68	-43.6	48
5	Right Disc Brake Caliper **	23.2	27	-114.5	39
6	Instrument Panel	29.4	59	-61.2	80
7	Left Disc Brake Caliper	17.2	52	-60.6	36
8	Trunk	8.9	43	-13.3	21

* No valid data after 25 msec

** No valid data after 50 msec

TABLE 7 REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

Contract Number: DTNH22-98-D-11055

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

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

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

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

Vehicle NHTSA No.: CY0108 Body Color: Gray

VIN: 1GNDM19W3YB167236 Cost: \$23,332.00

Odometer: Arrival Date: 2/24/00 Reading: 23 miles

Completion Date: 4/11/00 Reading: 25 miles

Engine: 6 Cylinders; 4.3 Liters; X Gas; Diesel

Transmission: 4 Speed; Manual; X Automatic

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

Tire Size: P215/75R15; Manufacturer: Uniroyal

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

Equipment that is no longer on the vehicle as noted above: Rear Seat

Explanation:

Items removed to allow installation of data acquisition system.

Vehicle Condition:

The vehicle was subjected to a 30 mph frontal crash test. There is severe structural damage on the front body. 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. Stoddard solvent replaced the fuel in the fuel system and engine. **THE VEHICLE IS FOR SALVAGE ONLY AND IS NOT TO BE REPAIRED FOR HIGHWAY USE.**

SECTION 3
SUMMARY OF RESULTS FOR FMVSS 208
212, 219 (PARTIAL), AND 301

TABLE 8. FMVSS 208 OCCUPANT INJURY CRITERIA

Veh. Yr./Make/Model/Body Style: 2000/Chevrolet/Astro/VanVeh. NHTSA No.: CY0108 Test Date: April 11, 2000

MAXIMUM ACCELERATION VALUES: (g's)	DRIVER DUMMY #312	PASSENGER DUMMY #340
Head Channel X	-43.2	-51.4
Head Channel Y	11.3	23.3
Head Channel Z	15.6	20.3
HEAD RESULTANT	45.7	53.3
Chest Channel X	-55.7	-51.9
Chest Channel Y	-4.4	7.3
Chest Channel Z	8.6	13.0
CHEST RESULTANT	56.3	52.2

HEAD INJURY CRITERIA (HIC)
VALUES:

HIC	296	387
t_1 = (msec)	67.1	71.2
t_2 = (msec)	97.5	104.3

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

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

CLIP	53	47
t^1 = (msec)	86.6	80.0
t^2 = (msec)	89.7	83.1
CHEST DEFLECTION (in)	0.9	0.8

TABLE 8 FMVSS 208 OCCUPANT INJURY CRITERIA (CONTINUED)

Veh. Yr./Make/Model/Body Style: 2000/Chevrolet/Astro/VanVeh. NHTSA No.: CY0108 Test Date: April 11, 2000

MAX. COMPRESSIVE FEMUR FORCES:	Units (lbs)	
	DRIVER DUMMY #312	PASSENGER DUMMY #340
Left Side	1138	1419
Right Side	685	1052

NECK FORCES:

Neck Force X (N)	1179.1	622.3
Neck Force Y (N)	175.0	318.3
Neck Force Z (N)	1815.5	2168.2

NECK MOMENTS:

Neck Moment X (N·m)	-18.1	27.2
Neck Moment Y (N·m)	62.4	32.9
Neck Moment Z (N·m)	-17.4	-27.6

NECK INJURY CRITERIA:

Peak Flexion Bending Moment about the Occipital Condyle (N·m)	45.3	42.0
Peak Extension Bending Moment about the Occipital Condyle (N·m)	9.9	25.3
Peak Axial Tension (N)	1815	2168.2
Peak Axial Compression (N)	366.5	103.2
Peak Fore Shear (N)	1179.1	622.3
Peak Aft Shear (N)	353.5	541.8

TABLE 9 DUMMY KINEMATIC SUMMARYDRIVER DUMMY

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

RIGHT FRONT PASSENGER DUMMY

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

TABLE 10FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

NHTSA No.: CY0108 ; Date of Comfort/Convenience Check: 4/5/00

Technician Performing Check: David Winkelbauer

GVWR: 5950 lbs

Automatic seat belts installed in any vehicle, other than a walk-in van-type vehicle which has a gross vehicle weight rating of 10,000 pounds or less, and is manufactured on or after September 1, 1986, shall meet the requirements for convenience hooks, webbing tension relieving devices, and belt contact force.

Manual seat belts installed for compliance with this standard in front outboard designated seating positions of any vehicle, other than a walk-in van-type vehicle which has a gross vehicle rating of 10,000 pounds or less, and is manufactured on or after September 1, 1989, shall meet the requirements for belt contact force, plate access, retraction and seat belt guides, and hardware.

VEHICLE EQUIPMENT:

The vehicle's front outboard seating positions were equipped with manual Type 2 seat belts which must comply with the dynamic test requirements of S5.1; requirements for webbing tension-relieving devices (S7.4.2), belt contact force (S7.4.3), latchplate access (S7.4.4), retraction (S7.4.5), and seat belt guides and hardware (S7.4.6) apply.

CONVENIENCE HOOKS (S7.4.1):

Not applicable, the vehicle was not equipped with automatic seat belts.

WEBBING TENSION-RELIEVING DEVICE (S7.4.2)

The seat belt assembly on the front outboard seating positions did not have webbing tension-relieving devices.

TABLE 10 (Cont'd)

FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARYBELT CONTACT FORCE (S7.4.3)Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanNHTSA No.: CY0108 ; Technician: David Winkelbauer Date: 4/5/00Designated Seating Position Tested: Left Front

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)
(X) Check
() N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
(X) Check
() N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
(X) Check
() 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.
(X) Check
() N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
() Check
(X) N/A

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
 ☒ (X) Check
 ☐ () 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 Front

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 checklist
- 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)
 ☒ (X) Check
 ☐ () N/A

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
 ☐ Check
 ☒ N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
 ☒ Check
 ☐ 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
 ☐ N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
 ☐ Check
 ☒ N/A
- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
 ☐ Check
 ☒ N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
 ☒ 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. ☒ 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 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

BELT CONTACT FORCE (S7.4.3)

Designated Seating Position Tested: Left Mid

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
☒ 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
☐ N/A

- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
☐ Check
☒ N/A

- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
☒ Check
☐ 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
☒ N/A

- 1.6 Place each adjustable head restraint in its highest adjustment position.
☐ Check
☒ N/A

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
☐ Check
☒ N/A

- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
☒ Check

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 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.

BELT CONTACT FORCE (S7.4.3)

Designated Seating Position Tested: Right Mid

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)
 (X) Check
 () 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.
 (X) Check
 () N/A

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 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 0.4 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: Left Rear

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

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

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.

BELT CONTACT FORCE (S7.4.3)

Designated Seating Position Tested: Center Rear (Not Applicable Lap Belt)

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
☐ 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
☐ N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
☐ Check
☐ N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
☐ Check
☐ 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
☐ N/A

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 1.6 Place each adjustable head restraint in its highest adjustment position.
 () Check
 () N/A
- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
 () Check
 () N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
 () 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 _____ lb. () 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

- 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)
 (X) Check
 () N/A

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
 () Check
 (X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
 () Check
 (X) N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
 () Check
 (X) N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
 () Check
 (X) N/A
- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
 () Check
 (X) N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
 (X) Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.
 Contact Force 0.4 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.

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

LATCHPLATE ACCESS (S7.4.4)

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

NHTSA No.: CY0108; Technician: David Winkelbauer Date: 4/5/00

Designated Seating Position Tested: Left Front

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.

- 2.1 Position the seat in its forward most adjustment position.
(X) Check
- 2.2 Position the test dummy using the procedures in Appendix B. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.)
(X) Check
- 2.3 Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant.
(X) Check
- 2.4 Attach the inboard and outboard reach string following the instructions on Figure 1C.
(X) Check
- 2.5 Place the latch plate in the stowed position.
(X) Check
- 2.6 Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?
(X) Yes - Pass
() No - **FAIL**
- 2.7 Using the clearance test block, specified in Figure 2C, is there sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latch plate or buckle?
(X) Yes - Pass
() No - **FAIL**

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

LATCHPLATE ACCESS (S7.4.4)

Designated Seating Position Tested: Right Front

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.

- 2.1 Position the seat in its forward most adjustment position.
(X) Check
- 2.2 Position the test dummy using the procedures in Appendix B. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.)
(X) Check
- 2.3 Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant.
(X) Check
- 2.4 Attach the inboard and outboard reach string following the instructions on Figure 1C.
(X) Check
- 2.5 Place the latch plate in the stowed position.
(X) Check
- 2.6 Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?
(X) Yes - Pass
() No - FAIL
- 2.7 Using the clearance test block, specified in Figure 2C, is there sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latch plate or buckle?
(X) Yes - Pass
() No - FAIL

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

RETRACTION (S7.4.5):

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

NHTSA No.: CY0108; Technician: David Winkelbauer Date: 4/5/00

Designated Seating Position Tested: Left Front

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.

- 3.1 Is the vehicle a passenger car or walk-in van-type vehicle?
☐ Yes If yes, go to seat belt guides and hardware.
☒ No
- 3.2 Adjustable seats are in the 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
- 3.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
☒ Check
- 3.4 Place the adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
☒ Check
- 3.5 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
- 3.6 Place each adjustable head restraint in its highest adjustment position.
☐ Check
☒ N/A
- 3.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position (S8.1.3)
☒ Check

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 3.8 Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B.
(X) Check
- 3.9 Restrain the dummies using the belt systems for the position begin tested.
(X) Check
- 3.10 Stow outboard armrests which are capable of being stowed.
(X) Check
- 3.11 Check the statement that applies to this test vehicle:
- (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.
() Yes - Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released.
(X) Yes - Pass
- (C) Neither A or B apply.
() Yes - Pass
() **No - FAIL**
- 3.12 With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
(X) Yes - Pass
() **No - FAIL**
- 3.13 If this test vehicle has an open body (without doors) and has a seat belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated?
(X) N/A
() Yes - Pass
() **No - FAIL**

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

RETRACTION (S7.4.5):

Designated Seating Position Tested: Right Front

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.

- 3.1 Is the vehicle a passenger car or walk-in van-type vehicle?
 () Yes If yes, go to seat belt guides and hardware.
 (X) No
- 3.2 Adjustable seats are in the 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.)
 (X) Check
- 3.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
 () Check
 (X) N/A
- 3.4 Place the adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
 (X) Check
- 3.5 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.
 (X) Check
- 3.6 Place each adjustable head restraint in its highest adjustment position.
 () Check
 (X) N/A
- 3.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position (S8.1.3)
 () Check
 (X) N/A

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 3.8 Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B.
(X) Check
- 3.9 Restrain the dummies using the belt systems for the position begin tested.
(X) Check
- 3.10 Stow outboard armrests which are capable of being stowed.
(X) Check
- 3.11 Check the statement that applies to this test vehicle:
- (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.
() Yes - Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released.
(X) Yes - Pass
- (C) Neither A or B apply.
(X) Yes - Pass
() **No - FAIL**
- 3.12 With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
(X) Yes - Pass
() **No - FAIL**
- 3.13 If this test vehicle has an open body (without doors) and has a seat belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated?
(X) N/A
() Yes - Pass
() **No - FAIL**

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

NHTSA No.: CY0108; Technician: David Winkelbauer Date: 4/5/00

Designated Seating Position Tested: Left Front

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.
 (X) 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**

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 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

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Designated Seating Position Tested: Right Front

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

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 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**

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Designated Seating Position Tested: Left Mid

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 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

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

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
() Yes - Go to 4.2.
(X) 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 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Designated Seating Position Tested: Right Mid

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.
 - (X) 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 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

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

☐ Check

☐ Yes - Pass

☐ No - **FAIL**

- 4.5 Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?

☐ Yes - Pass

☐ No - **FAIL**

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Designated Seating Position Tested: Left Rear (**Not applicable Seat is Removable**)

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**

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 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**

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Designated Seating Position Tested: Center Rear (**Not Applicable Seat is Removable**)

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

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 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**

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Designated Seating Position Tested: Right Rear (Not Applicable Seat is Removable)

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))

TABLE 10 (Cont'd)
FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY

- 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
 - (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 11 FMVSS 208 EQUIPMENT DATA

FMVSS 208 SEAT BELT WARNING SYSTEM CHECK

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

NHTSA No.: CY0108; Technician: David Winkelbauer; Date: 4/5/00

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 = 6 seconds
(4 to 8 seconds)

Time duration of reminder light operation = 90 seconds
(no less than 60 seconds)

A.2 S7.3(a)(2)

Time duration of audible warning signal = seconds
(4 to 8 seconds)(see 49 USCS @ 30124)

Time duration of reminder light operation = seconds
(4 to 8 seconds)

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

B.1 S7.3(a)(1)

Time duration of audible warning signal = 0 seconds
(audible warning not required)

Time duration of reminder light operation = 0 seconds
(reminder light not required)

B.2 S7.3(a)(2)

Time duration of audible warning signal = seconds
(audible warning not required)

Time duration of reminder light operation = seconds
(4 to 8 seconds)

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

TABLE 11 FMVSS 208 EQUIPMENT DATA (Cont'd)FMVSS 208 READINESS INDICATOR (S4.5.2)Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanNHTSA No.: CY0108 ; Technician: David Winklelbauer; Date: 4/5/00

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement. (11/8/94 legal interpretation)

1. Is the system totally mechanical? ()Yes (X)No
(If YES this Data Sheet is complete.)
2. Describe the location of the readiness indicator: Upper left of instrument panel

3. Is the readiness indicator clearly visible to the driver?
(X)Yes-Pass ()No-FAIL
4. Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided?
(X)Yes-Pass ()No-FAIL

TABLE 11 FMVSS 208 EQUIPMENT DATA (Cont'd)FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTSVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanNHTSA No.: CY0108; Technician: David Winkelbauer; Date: 4/5/00

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 12 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: 2000/Chevrolet/Astro/Van

NHTSA No.: CY0108 ; Technician: David Winkelbauer ; Date: 4/5/00

Designated Seating Position Tested: Right Front

1. Record the seating position. Full rearward
(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 12 LAP BELT LOCKABILITY (Cont'd)

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 34 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.
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 26 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: 26.3 inches
15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? 14-13 = 0.3 inches (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? 10-14 = 7.7 inches (X)Yes-Pass () No-FAIL

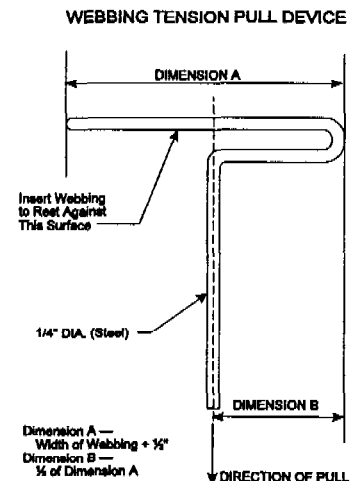


TABLE 12 LAP BELT LOCKABILITY (Cont'd)

Designated Seating Position Tested: Left Mid

1. Record the seating position. Full rearward
(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.
8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly.
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system.
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly.
Measured distance between A and B is 37 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.

TABLE 12 LAP BELT LOCKABILITY (Cont'd)

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.

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 30.5 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing.

Record onset rate: 20 lb/sec.

Record the distance between points A and B: 30.8 inches

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? $14-13 = \underline{0.2 \text{ inches}}$ (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? $10-14 = \underline{6.2 \text{ inches}}$ (X)Yes-Pass () No-FAIL

Designated Seating Position Tested: Right Mid

1. Record the seating position. Full rearward
(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

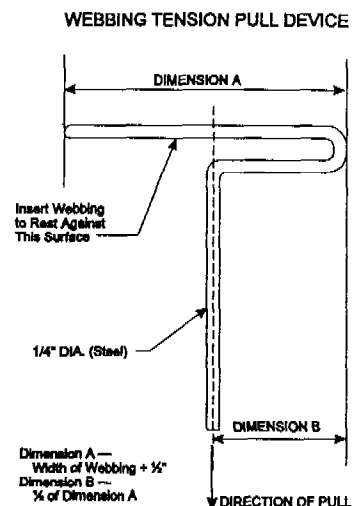


TABLE 12 LAP BELT LOCKABILITY (Cont'd)

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.
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 38 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.

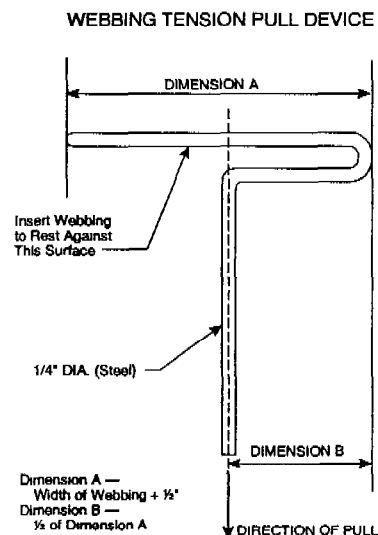


TABLE 12 LAP BELT LOCKABILITY (Cont'd)

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 30 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: 30.3 inches
15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? 14-13 = 0.3 inches (X) Yes-Pass () No-FAIL
16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? 10-14 = 7.7 inches (X) Yes-Pass () No-FAIL

Designated Seating Position Tested: Left Rear

1. Record the seating position. Full rearward
(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.

TABLE 12 LAP BELT LOCKABILITY (Cont'd)

- 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.
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 38 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.
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 26 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: 26.3 inches

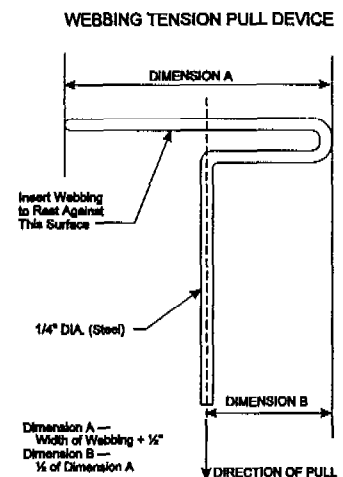


TABLE 12 LAP BELT LOCKABILITY (Cont'd)

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? 14-13 = 0.3 inches (X) Yes-Pass () No-FAIL
16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? 10-14 = 11.7 inches (X) Yes-Pass () No-FAIL

Designated Seating Position Tested: Center Rear

1. Record the seating position. Full rearward
(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 12 LAP BELT LOCKABILITY (Cont'd)

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 36 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.
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 28 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: 28.5 inches
15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? $14-13 = \underline{0.5 \text{ inches}}$ (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? $10-14 = \underline{7.5 \text{ inches}}$ (X)Yes-Pass () No-FAIL

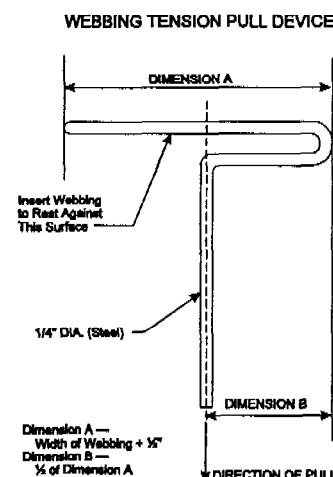


TABLE 12 LAP BELT LOCKABILITY (Cont'd)Designated Seating Position Tested: Right Rear

1. Record the seating position. Full rearward
(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.
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 38 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.

TABLE 12 LAP BELT LOCKABILITY (Cont'd)

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.

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 27 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: 27.3 inches

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? 14-13 = 0.3 inches (X)Yes-Pass () No-FAIL
16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? 10-14 = 10.7 inches (X)Yes-Pass () No-FAIL

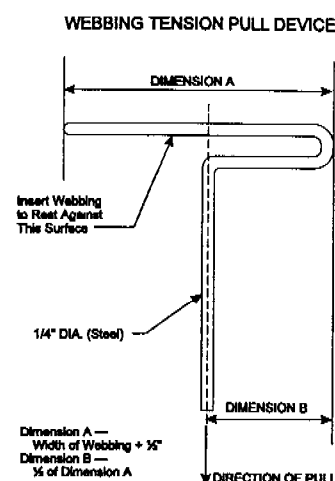


TABLE 13 AIR BAG LABELS

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanNHTSA No.: CY0108; Technician: David Winkelbauer; Date: 4/5/00

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 13 AIR BAG LABELS (Cont'd)

- 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 13 AIR BAG LABELS (Cont'd)

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

4. Sun Visor Warning Label

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

Driver Side - ☒ Yes-Pass ☐ No-FAIL

Passenger Side - ☒ Yes-Pass ☐ No-FAIL

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

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

Driver Side - ☒ Yes ☐ No-FAIL

Passenger Side - ☒ Yes ☐ No-FAIL

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

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

☒ Not Applicable

Driver Side - ☐ Yes-Pass ☐ No-FAIL

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

TABLE 13 AIR BAG LABELS (Cont'd)

DEATH or SERIOUS INJURY can occur.

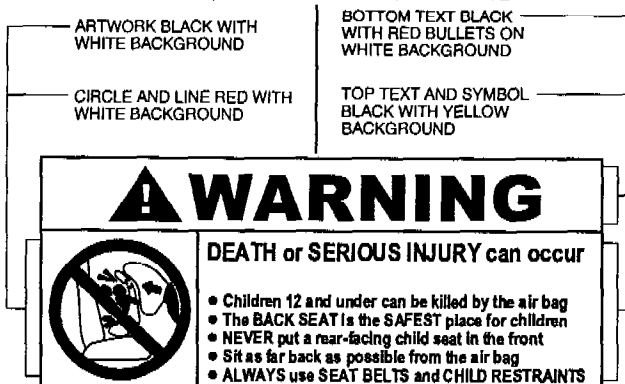
- Sit as far back as possible from the air bag.
- ALWAYS use SEAT BELTS and CHILD RESTRAINTS
- The BACK SEAT is the SAFEST place for children.

(X) Not Applicable

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

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK



SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

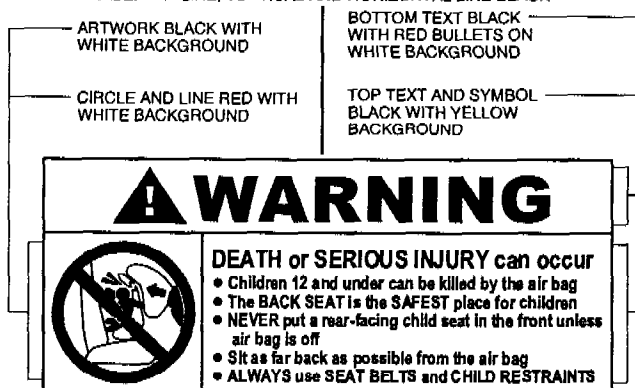


TABLE 13 AIR BAG LABELS (Cont'd)

- 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: 30 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 13 AIR BAG LABELS (Cont'd)

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 13 AIR BAG LABELS (Cont'd)

- 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 13 AIR BAG LABELS (Cont'd)

- 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: 30 cm²
(X)Yes-Pass () No-FAIL

REMOVABLE LABEL ON DASH

LABEL OUTLINE AND HORIZONTAL LINE BLACK

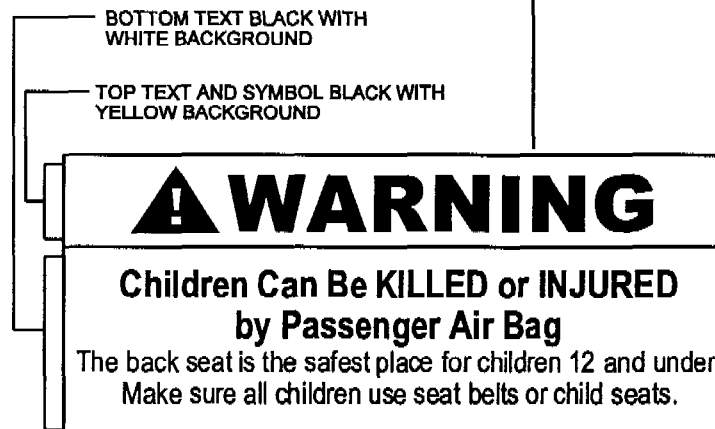


TABLE 14 FMVSS 212, "WINDSHIELD MOUNTING", DATA SUMMARYVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 Test Date: April 11, 2000DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Rubber trim with glue retention

CLIPS OR BRACKETS USED TO RETAIN WINDSHIELD: None

FMVSS 212 REQUIREMENTS: The post-test periphery retention amount must be at least 75% of the pre-test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY (inches)		PERCENT RETENTION
	PRE-TEST	POST-TEST	
RIGHT SIDE	89.9	89.9	100%
LEFT SIDE	89.9	89.9	100%
TOTAL	179.8	179.8	100%

Pre-Test Windshield Mounting Material
Temperature: 71° F

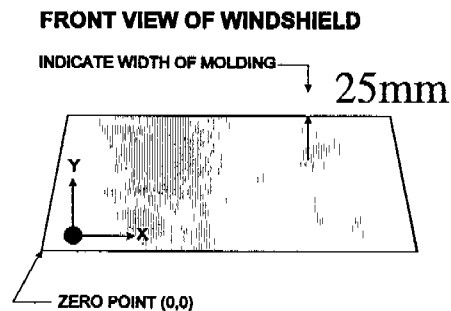
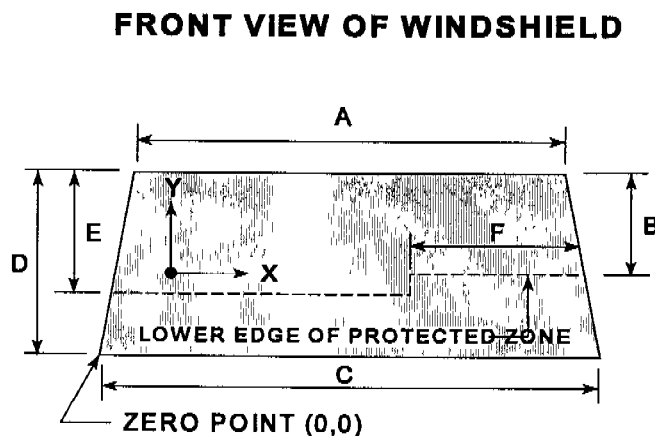
FAILURE DETAILS: None

TABLE 15 FMVSS 219, "WINDSHIELD ZONE INTRUSION", DATA SUMMARYVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 Test Date: April 11, 2000PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

WINDSHIELD MEASUREMENTS:A= 57.2 inB= 12.0 inC= 68.3 inD= 26.8 inE= 13.5 inF= 26.3 inAREAS OF WINDSHIELD TEMPLATE PENETRATION GREATER THAN 1/4 IN:

None

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE, THROUGH THE INNER SURFACE OF THE WINDSHIELD:

None

TABLE 16 FUEL SYSTEM DATA

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

Vehicle NHTSA No.: CY0108 Test Date: April 11, 2000

Fuel System Capacity from Owner's Manual = 27.0 gallons

Usable Capacity Figure Furnished by COTR = 27.0 gallons

Test Volume Range (92 to 94% of Usable Capacity)

= 24.8 to 25.4 gallons

Actual Test Volume = 25.2 gallons

Test Fluid Type: Stoddard Solvent; Spec. Grav. = 0.77

Kinematic Viscosity = 1.788 centistokes; Color = Purple

Type of Fuel Pump: X Electric; Mechanical

Does electric pump operate with ignition switch "On" and engine "Off"?

X Yes; No

Details of Fuel System:

Electronic fuel injection

TABLE 17 FMVSS 301 POST IMPACT TEST DATAVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 Test Date: April 11, 2000TEST REQUIREMENTS:

Test vehicle's fuel tank filled to 92 to 94% of manufacturer's usable capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572E test dummies located at each front designated seating position.

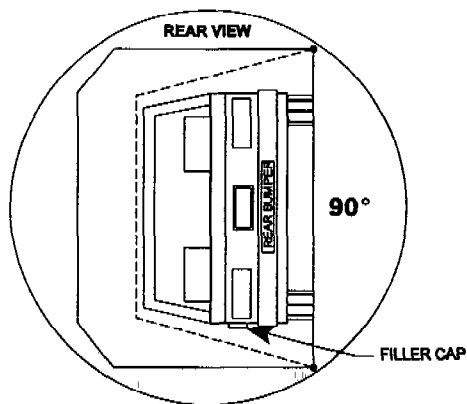
TEST VEHICLE IMPACT TYPE:

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

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0 oz	1 oz
2. For 5 minute period after vehicle motion ceases	0 oz	5 oz
3. For next 25 minutes	0 oz	1 oz./1 min

FUEL SPILLAGE LOCATION(S): None

TABLE 18 FMVSS 301 STATIC ROLLOVER TEST DATAVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 Test Date: April 11, 2000TEST PHASE: 0° - 90°DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:Rollover Fixture 90° Rotation Time = 2 minutes 44 seconds

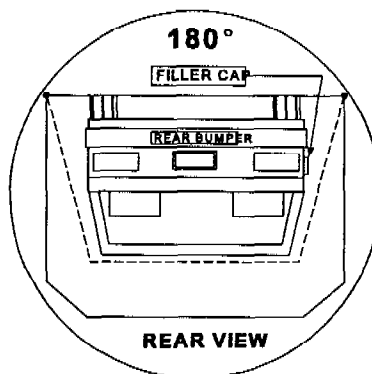
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 secondsTOTAL TIME = 7 minutes 44 secondsNext Whole Minute Interval = 8 minutesFUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz.	5 oz
2. Sixth Minute From Onset of Rotation	0 oz.	1 oz
3. Seventh Minute From Onset of Rotation	0 oz.	1 oz
4. Eighth Minute if Required	0 oz.	1 oz

FUEL SPILLAGE LOCATIONS(S): None

TABLE 18 FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

TEST PHASE: 90° - 180°DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 29 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 29 seconds

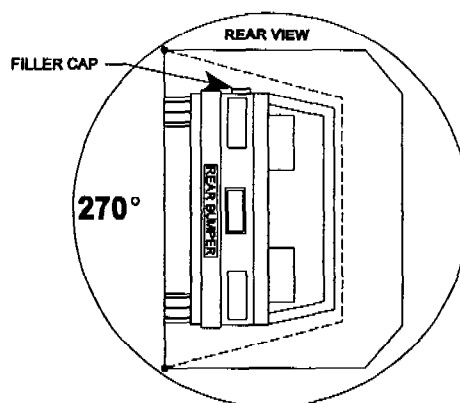
Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz.	5 oz
2. Sixth Minute From Onset of Rotation	0 oz.	1 oz
3. Seventh Minute From Onset of Rotation	0 oz.	1 oz
4. Eighth Minute if Required	0 oz.	1 oz

FUEL SPILLAGE LOCATIONS(S): None

TABLE 18 FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

TEST PHASE: 180° - 270°DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 14 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 14 seconds

Next Whole Minute Interval = 8 minutes

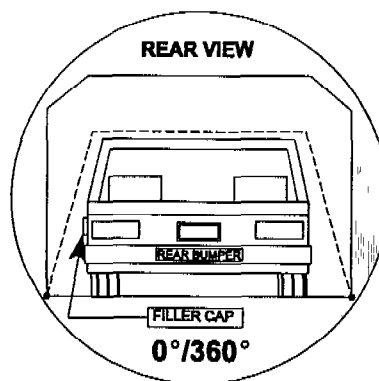
FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz.	5 oz
2. Sixth Minute From Onset of Rotation	0 oz.	1 oz
3. Seventh Minute From Onset of Rotation	0 oz.	1 oz
4. Eighth Minute if Required	0 oz.	1 oz

FUEL SPILLAGE LOCATIONS(S): None

TABLE 18 FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

TEST PHASE: 270° - 360°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:Rollover Fixture 90° Rotation Time = 2 minutes 45 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 secondsTOTAL TIME = 7 minutes 45 secondsNext Whole Minute Interval = 8 minutesFUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz.	5 oz
2. Sixth Minute From Onset of Rotation	0 oz.	1 oz
3. Seventh Minute From Onset of Rotation	0 oz.	1 oz
4. Eighth Minute if Required	0 oz.	1 oz

FUEL SPILLAGE LOCATIONS(S): None

SECTION 4
OCCUPANT, VEHICLE, AND CAMERA INFORMATION

TABLE 19 SEAT AND STEERING COLUMN POSITIONING DATA

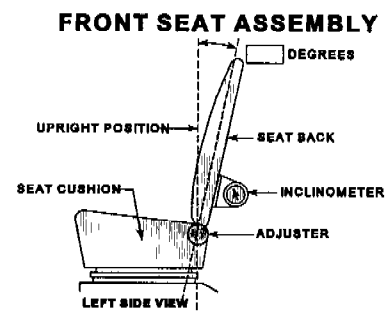
Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/Van

Vehicle NHTSA No.: CY0108 Test Date: April 11, 2000

NOMINAL DESIGN RIDING POSITION:

Driver Seat: Seat Back Angle = 22.5°

Passenger Seat: Seat Back Angle = 22.7°



SEAT FORE AND AFT POSITIONS:

Driver Seat: The seat track had a total length of 6.3 inches of travel and was positioned 3.2 inches from the forwardmost position.

Passenger Seat: The seat track had a total position movement of 7 notches and was positioned 4 notches rearward from the foremost position with the forwardmost locking position as zero.

STEERING COLUMN ADJUSTMENTS:

The steering column was positioned 3 notches downward from the full up position.

FIGURE 1. DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS

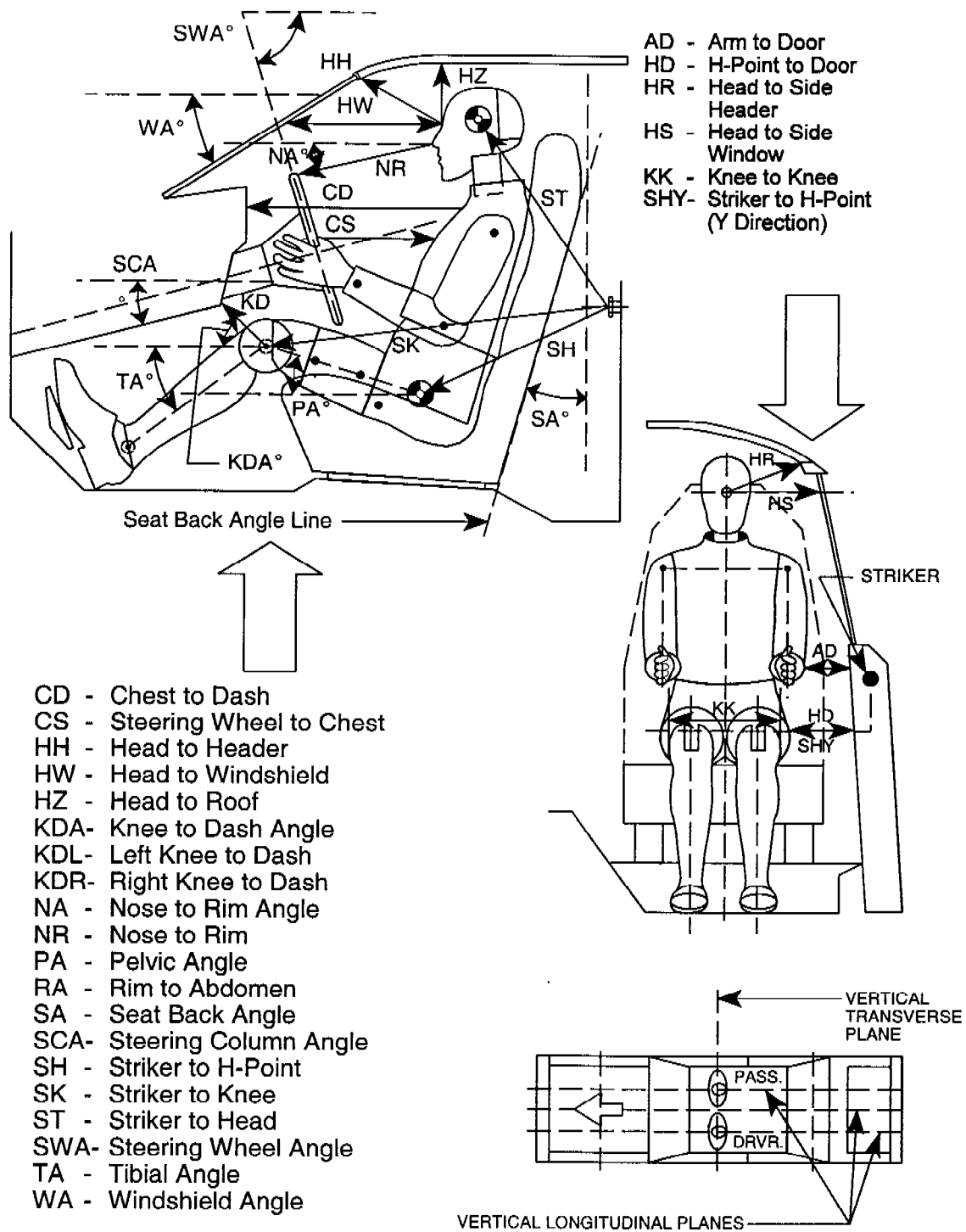
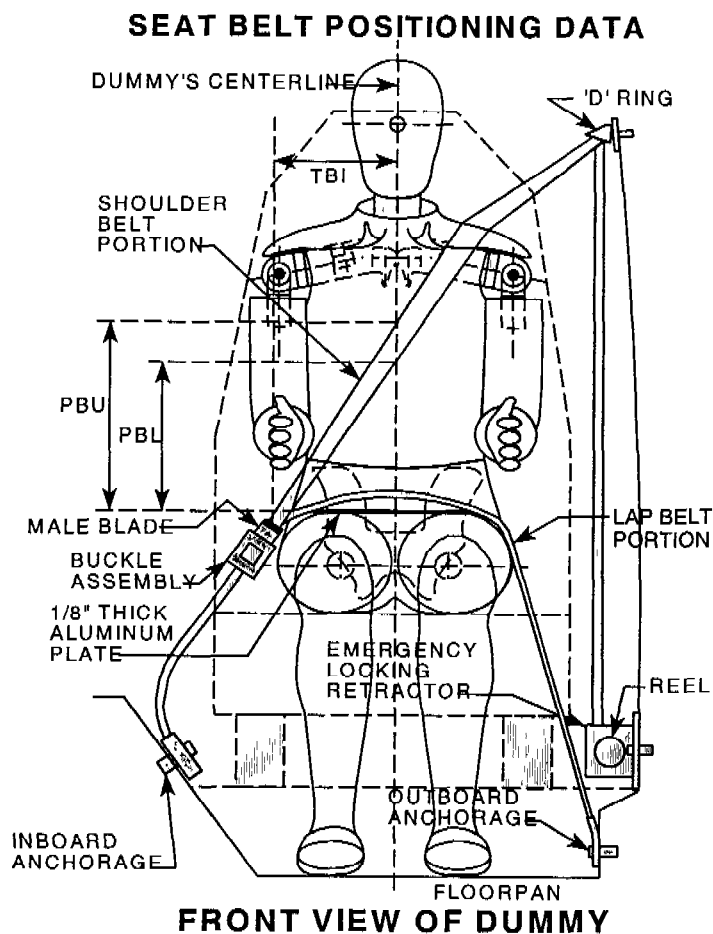


TABLE 20 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

Vehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 Test Date: April 11, 2000

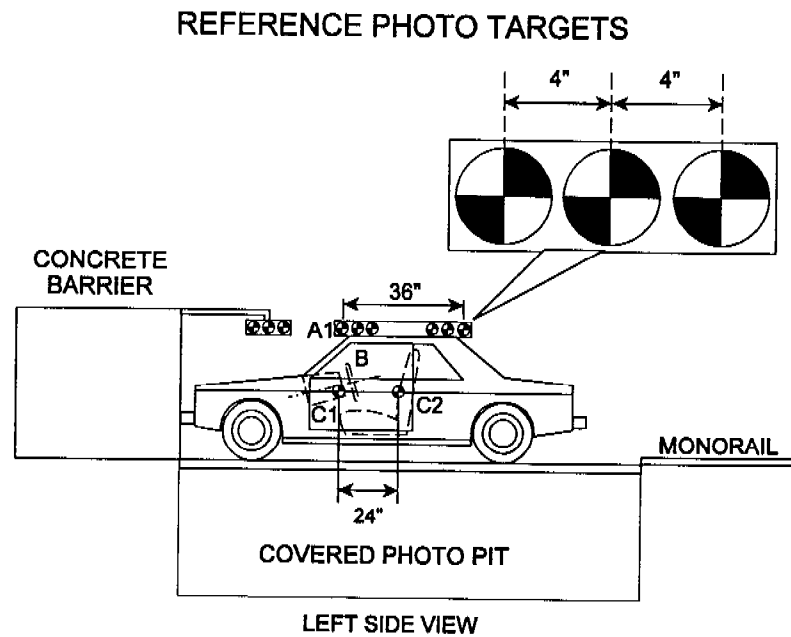
	DRIVER (Serial #312)	PASSENGER (Serial #340)
WA°	43.0°	
SWA°	67.7°	N/A
SCA°	22.1°	N/A
SA°	22.5°	22.7°
HZ	7.5	7.4
HH	17.8	18.4
HW	23.3	23.7
HR	10.9	10.6
NR	14.9 Angle 12.7°	N/A
CD	21.1	20.7
CS	12.3	N/A
RA	7.0	N/A
KDL	6.9 Angle 19.4°	6.6
KDR	7.2	6.6 Angle 22.7°
PA°	23.2°	23.5°
TA°	37.1°	47.5°
KK	9.4	9.1
ST*	24.9 Angle 15.3°	24.1 Angle 16.6°
SK*	27.5 Angle 92.1°	26.2 Angle 85.2°
SH*	11.5 Angle 99.8°	10.1 Angle 98.7°
SHY	9.5	10.0
HS	12.0	11.7
HD	5.8	5.8
AD	4.0	4.2

TABLE 21 SEAT BELT POSITIONING DATAVehicle Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 Test Date: April 11, 2000

(Illustration)

	Driver Dummy	Passenger Dummy
<u>TBI</u> —Vertical centerline of 50% dummy to intersection of upper torso belt to lap belt (in)	11.0	9.1
<u>PBU</u> —Top surface of aluminum plate to belt upper edge (in)	14.2	12.6
<u>PBL</u> —Top surface of aluminum plate to belt lower edge (in)	11.5	9.4

FIGURE 2 VEHICLE TARGET LOCATIONS



RESECTION PANEL TARGETING ALIGNMENT

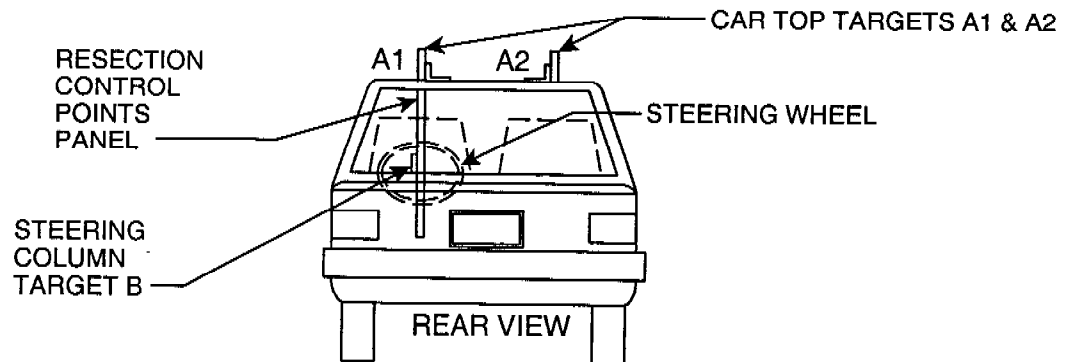
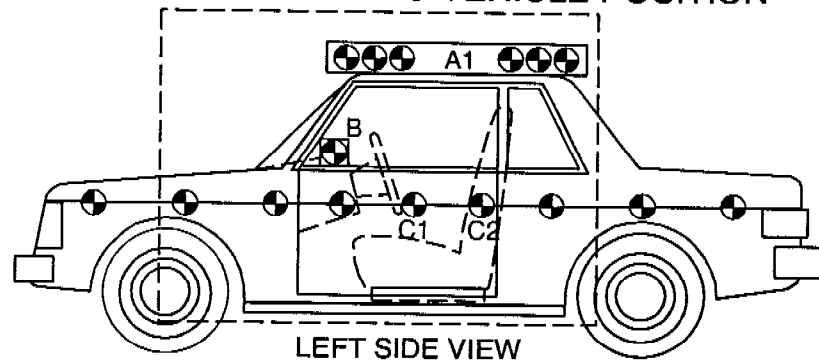
TEST RUN STEERING COLUMN CAMERA VIEW OF
TYPICAL TIME ZERO VEHICLE POSITION

FIGURE 6

FIGURE 3 CAMERA POSITIONS

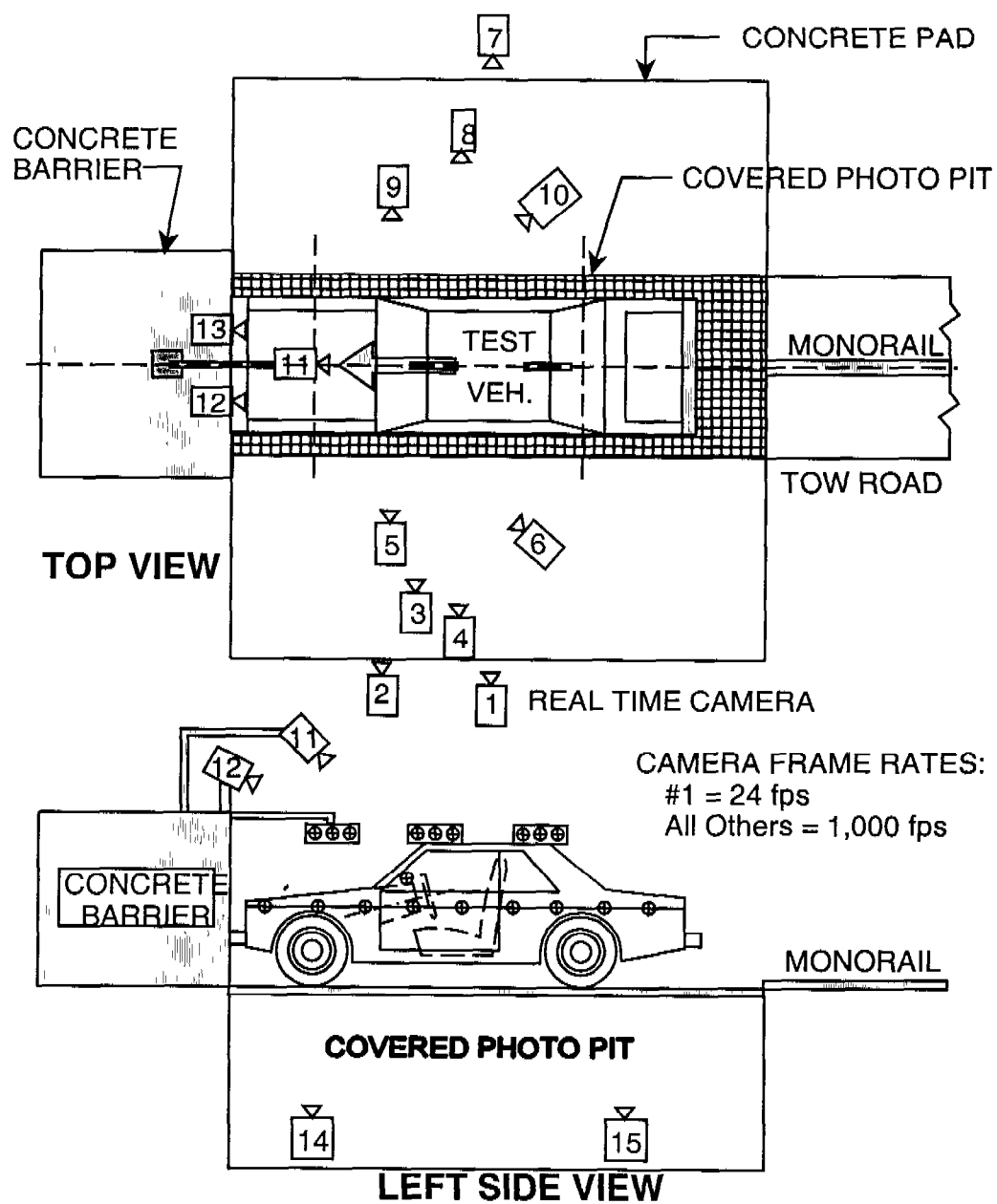


TABLE 22 CAMERA LOCATIONS

Veh. Year/Make/Model/Body Style: 2000/Chevrolet/Astro/VanVehicle NHTSA No.: CY0108 ; Test Date: April 11, 2000

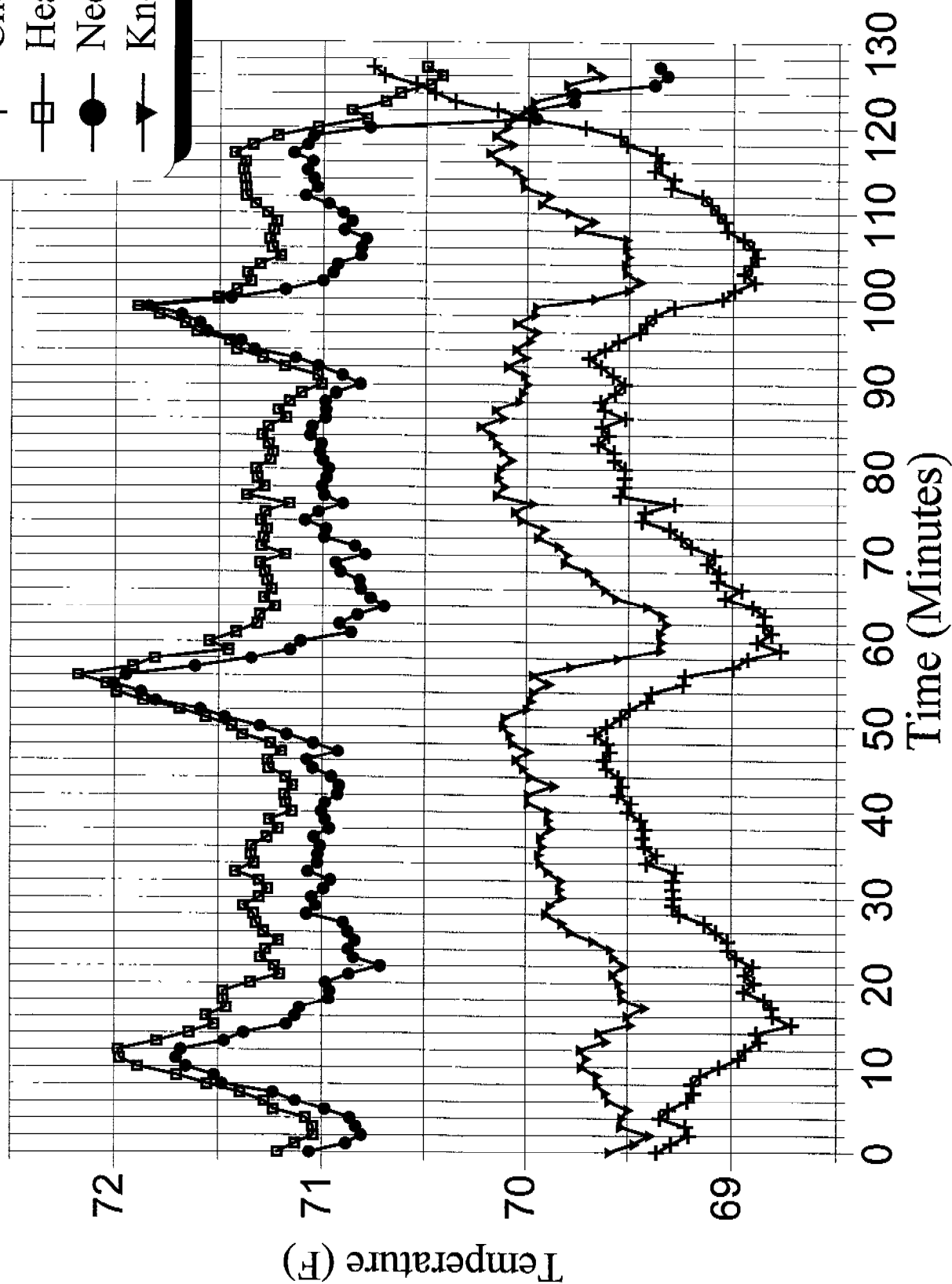
	VIEW	CAMERA POSITIONS (inches)*			ANGLE (deg)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Left Side View					10	24
2	Left Front	860	-8000	1620	90	75	1020
3	Driver Close-up	1220	-10480	1550	90	75	1117
4	Steering Column Bottom	1860	-8690	1030	90	25	858
5	Steering Column Top	1860	-8690	1580	90	25	1020
6	Driver Angle Motion	4560	-5080	2050		50	1130
7	Right Overall	2220	7000	1740	90	13	1005
8	Right Close-up	1480	10270	1630	90	75	1198
9	Right Passenger	1140	7900	1690	90	25	1000
10	Right Angle	5000	5630	2030		50	1042
11	Top Overall	1470	0	2700		13	1111
12	Top Driver	870	-440	1790		13	985
13	Top Passenger	870	480	1780		13	**
14	Pit Front	1020	0	-3140		13	980
15	Pit Rear View	2585	0	-3140		13	**

- * +X = Film plane rearward of barrier
 +Y = Film plane to left of monorail centerline
 +Z = Film plane to above ground level

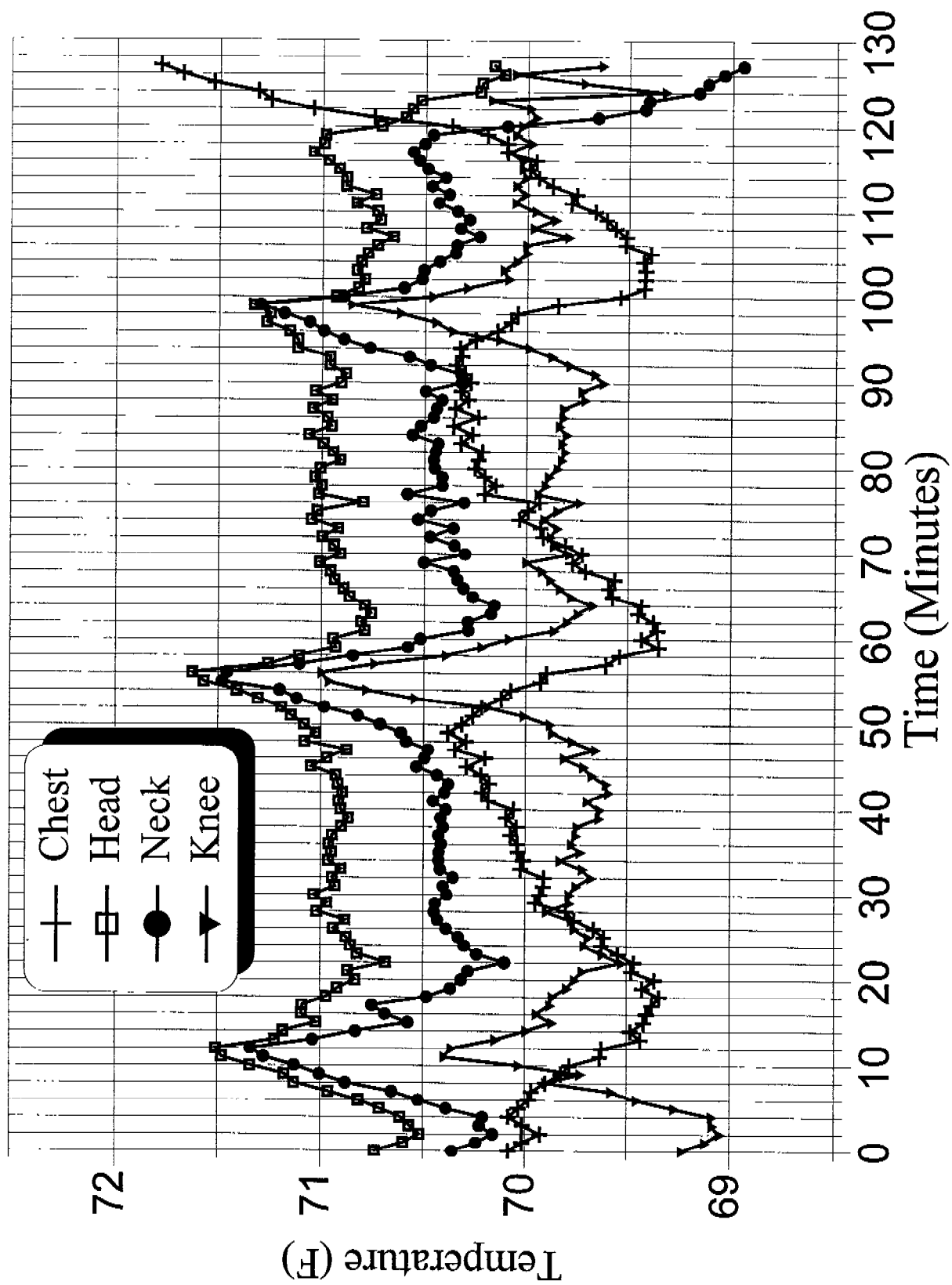
** Camera did not run.

Driver Dummy

—+— Chest
—□— Head
—●— Neck
—▼— Knee



Passenger Dummy



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

<u>Description</u>	<u>Page No.</u>
Photo No. A-1 - Pre-Test Front View	A-1
Photo No. A-2 - Post-Test Front View	A-2
Photo No. A-3 - Pre-Test Left Front Side View	A-3
Photo No. A-4 - Pre-Test Left Rear Side View	A-4
Photo No. A-5 - Post-Test Left Front Side View	A-5
Photo No. A-6 - Post-Test Left Rear Side View	A-6
Photo No. A-7 - Pre-Test Right Front Side View	A-7
Photo No. A-8 - Pre-Test Right Rear Side View	A-8
Photo No. A-9 - Post-Test Right Front Side View	A-9
Photo No. A-10 - Post-Test Right Rear Side View	A-10
Photo No. A-11 - Pre-Test 3/4 Left Rear View	A-11
Photo No. A-12 - Post-Test 3/4 Left Rear View	A-12
Photo No. A-13 - Pre-Test 3/4 Right Front View	A-13
Photo No. A-14 - Post-Test 3/4 Right Front View	A-14
Photo No. A-15 - Pre-Test Rear View	A-15
Photo No. A-16 - Post-Test Rear View	A-16
Photo No. A-17- Pre-Test Front Underbody View	A-17
Photo No. A-18 - Post-Test Front Underbody View	A-18
Photo No. A-19 - Pre-Test Rear Underbody View	A-19
Photo No. A-20 - Post-Test Rear Underbody View	A-20
Photo No. A-21 - Pre-Test Engine Compartment View	A-21
Photo No. A-22 - Post-Test Engine Compartment View	A-22
Photo No. A-23 - Pre-Test Fuel Filler Cap View	A-23
Photo No. A-24 - Pre-Test Windshield View	A-24
Photo No. A-25 - Post-Test Windshield View	A-25
Photo No. A-26 - Pre-Test Driver Dummy Position View	A-26
Photo No. A-27 - Post-Test Driver Dummy Position View	A-27
Photo No. A-28 - Pre-Test Driver Dummy Position View (Door Open)	A-28
Photo No. A-29 - Post-Test Driver Dummy Position View (Door Open)	A-29
Photo No. A-30 - Pre-Test Driver Windshield View	A-30
Photo No. A-31 - Post-Test Driver Windshield View	A-31

TABLE OF PHOTOGRAPHS

<u>Description</u>	<u>Page No.</u>
Photo No. A-32 - Pre-Test Driver Seat Position View	A-32
Photo No. A-33 - Post-Test Driver Seat Position View	A-33
Photo No. A-34 - Pre-Test Driver Knee Position View	A-34
Photo No. A-35 - Post-Test Driver Knee Position View	A-35
Photo No. A-36 - Post-Test Driver Airbag View	A-36
Photo No. A-37 - Post-Test Driver Head Contact View (headrest)	A-37
Photo No. A-38 - Post-Test Driver Knee Contact View (left side)	A-38
Photo No. A-39 - Pre-Test Passenger Dummy Position View	A-39
Photo No. A-40 - Post-Test Passenger Dummy Position View	A-40
Photo No. A-41 - Pre-Test Passenger Dummy Position View (Door Open)	A-41
Photo No. A-42 - Post-Test Passenger Dummy Position View (Door Open)	A-42
Photo No. A-43 - Pre-Test Passenger Windshield View	A-43
Photo No. A-44 - Post-Test Passenger Windshield View	A-44
Photo No. A-45 - Pre-Test Passenger Seat Position View	A-45
Photo No. A-46 - Post-Test Passenger Seat Position View	A-46
Photo No. A-47 - Pre-Test Passenger Dummy Knee Position View	A-47
Photo No. A-48 - Post-Test Passenger Dummy Knee Position View	A-48
Photo No. A-49 - Post-Test Passenger Dummy Airbag View	A-49
Photo No. A-50 - Post-Test Passenger Dummy Head Contact View (headrest)	A-50
Photo No. A-51 - Vehicle Certification Label and Tire Placard	A-51
Photo No. A-52 - Rollover 90°	A-52
Photo No. A-53 - Rollover 180°	A-53
Photo No. A-54 - Rollover 270°	A-54
Photo No. A-55 - Rollover 360°	A-55
Photo No. A-56 - Ballast in Vehicle	A-56



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

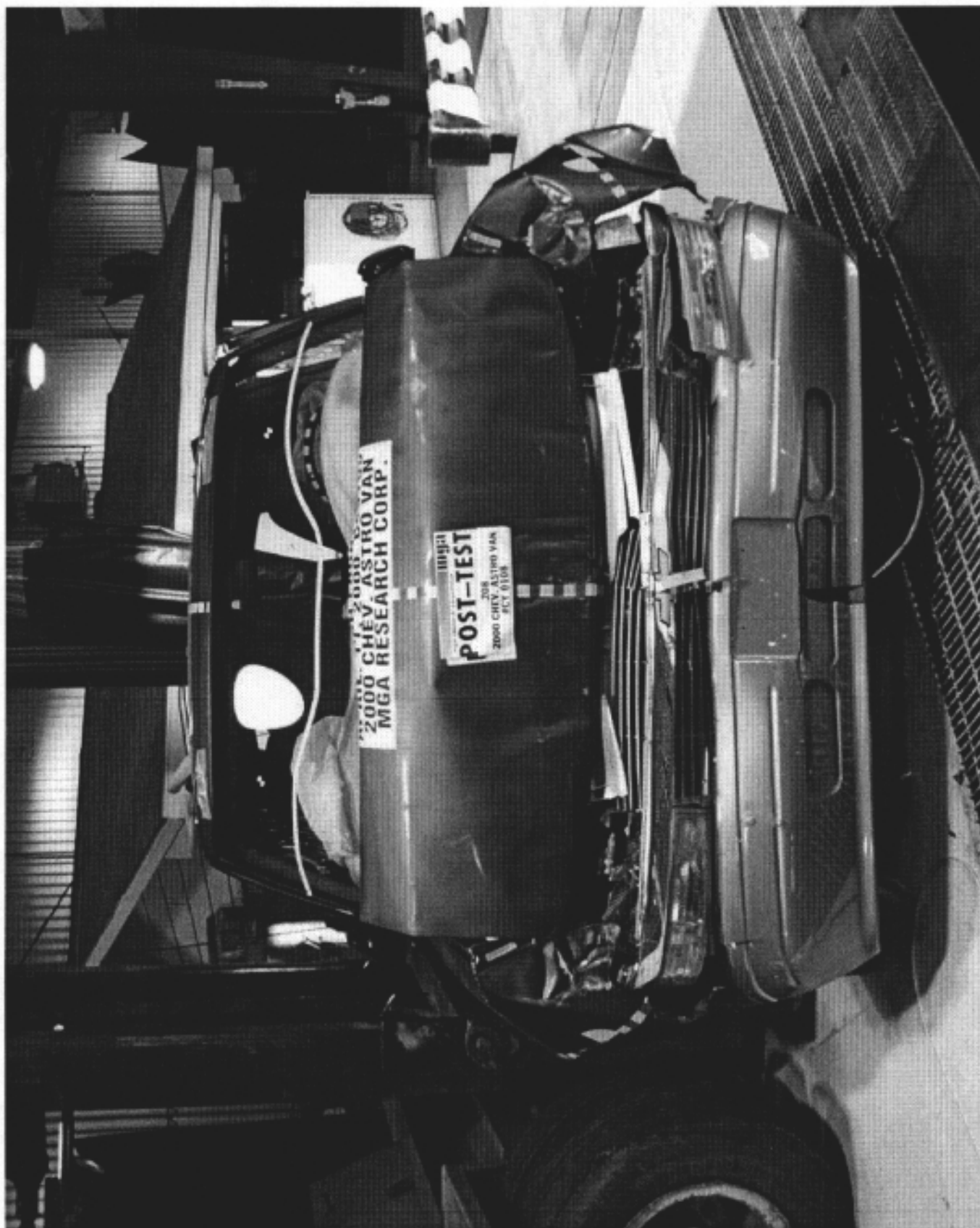


Photo No. A-2 - Post-Test Front View



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



Photo No. A-4 - Pre-Test Left Rear Side View

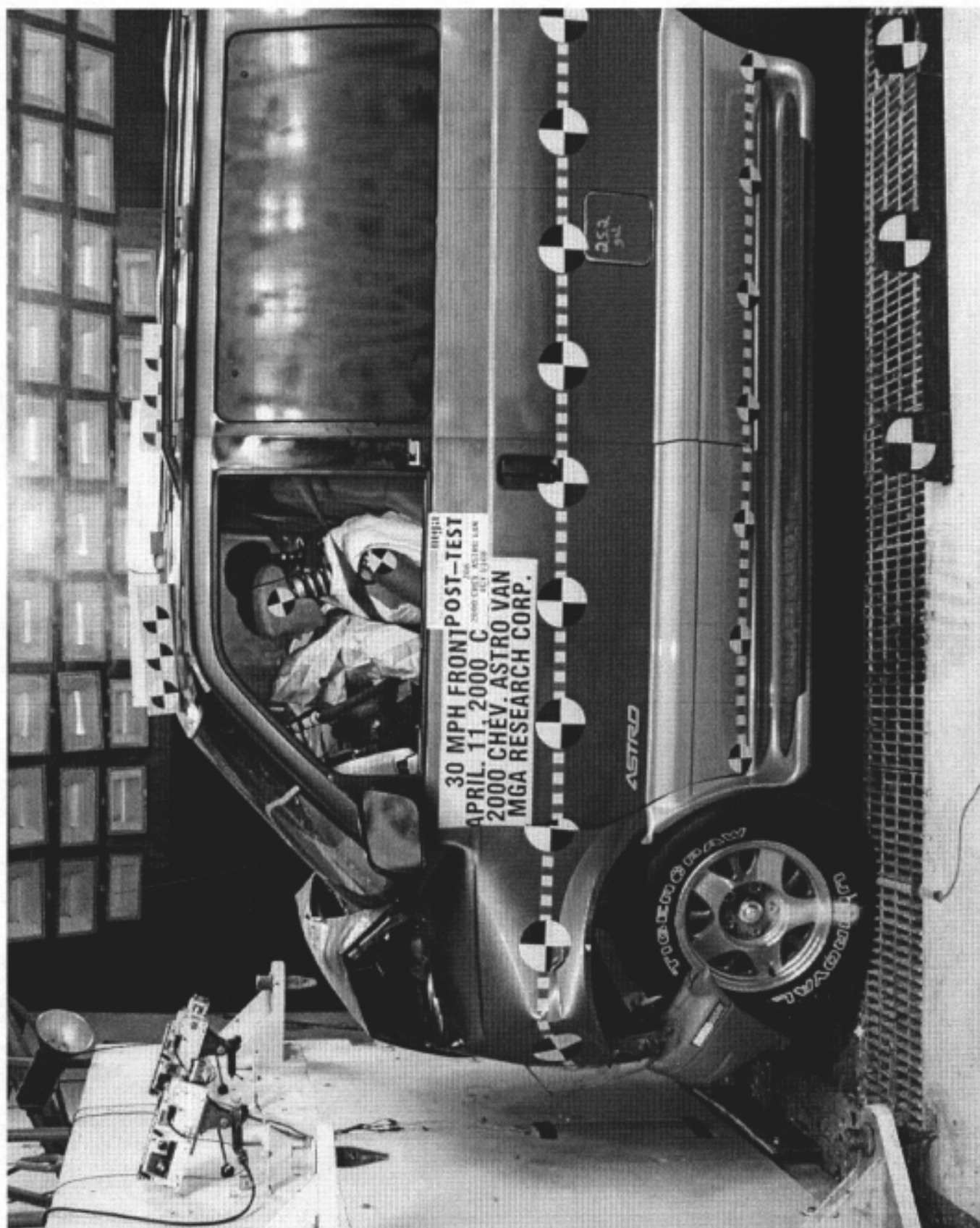


Photo No. A-5 - Post-Test Left Front Side View

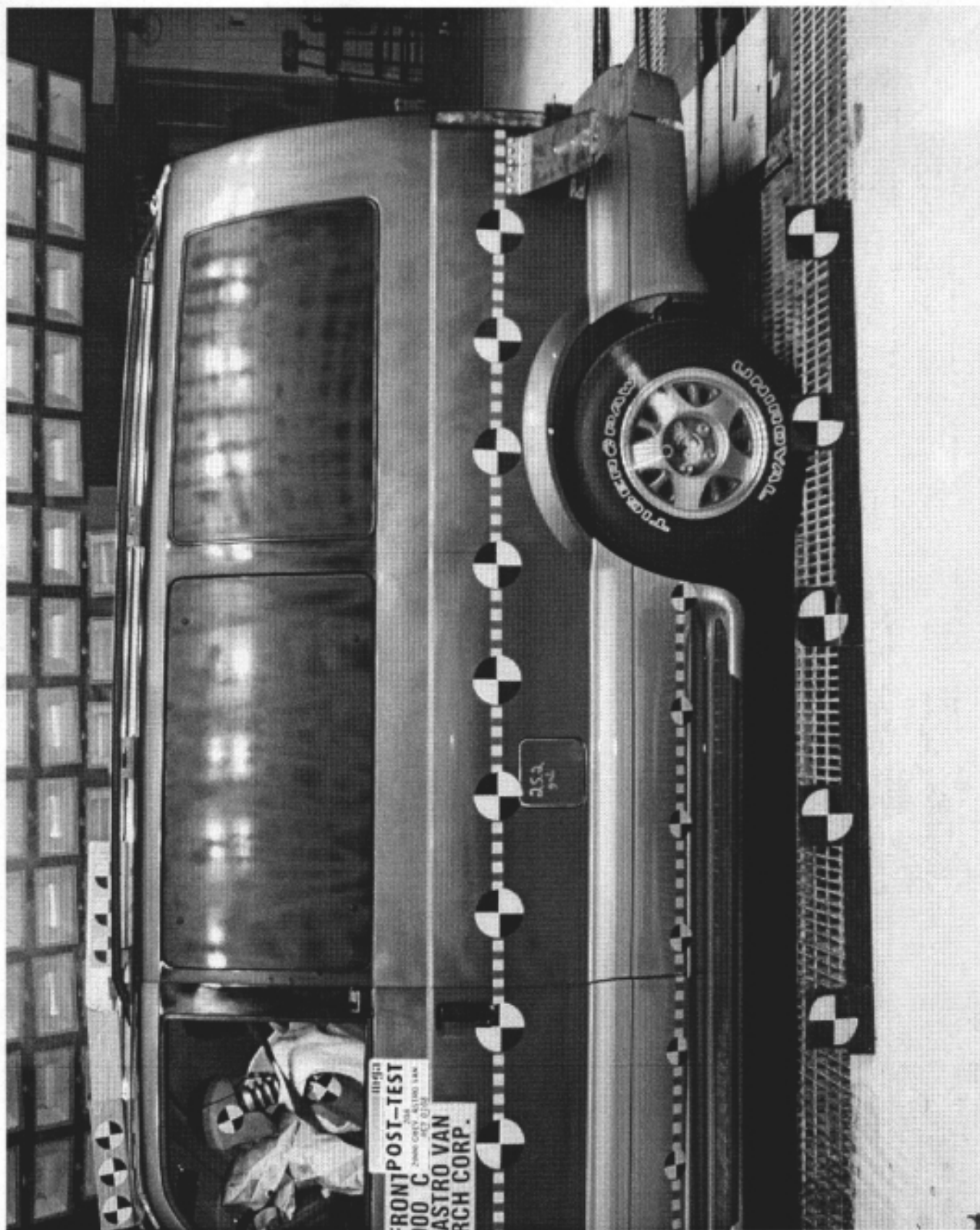


Photo No. A-6 - Post-Test Left Rear Side View



Photo No. A-7 - Pre-Test Right Front Side View

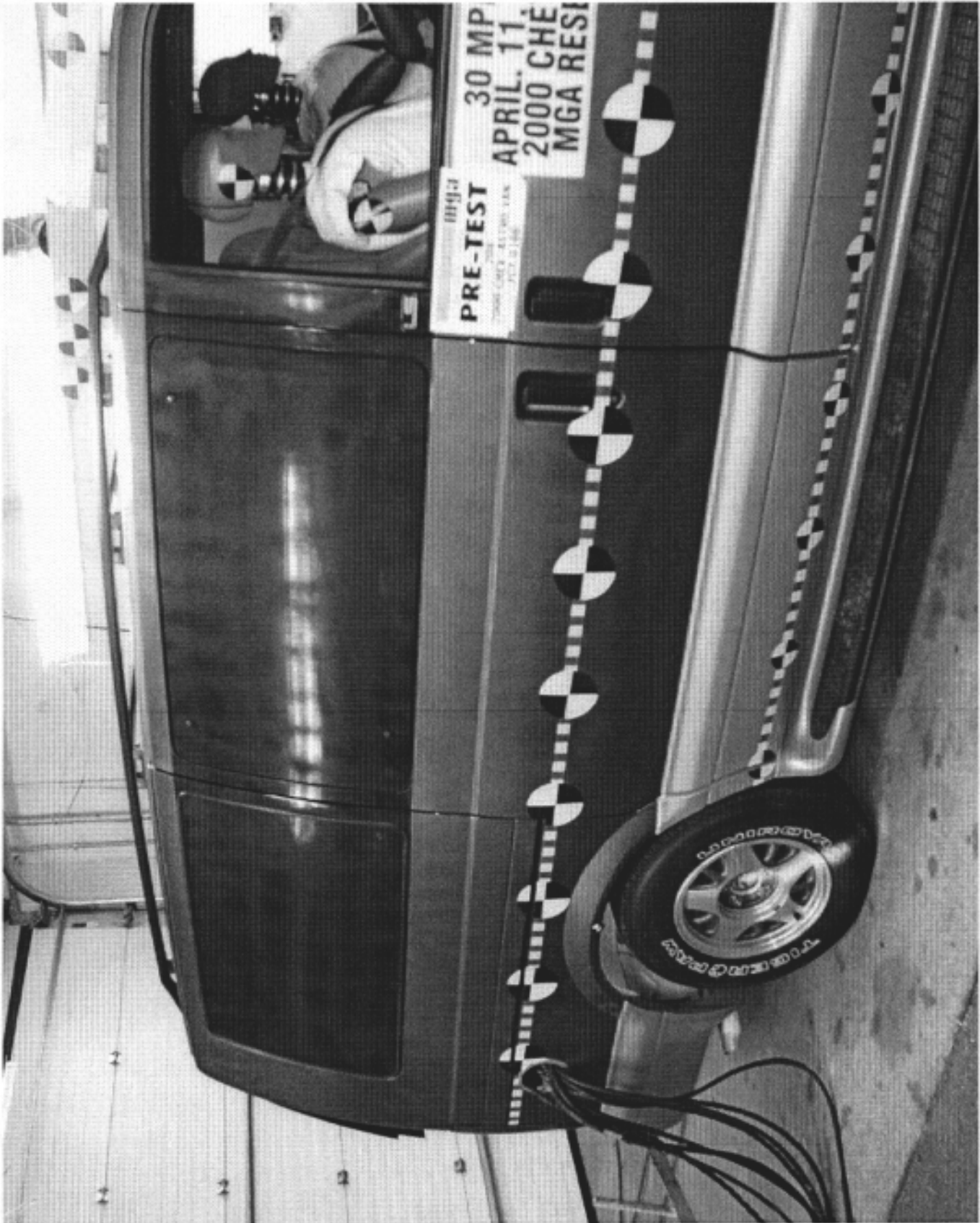


Photo No. A-8 - Pre-Test Right Rear Side View

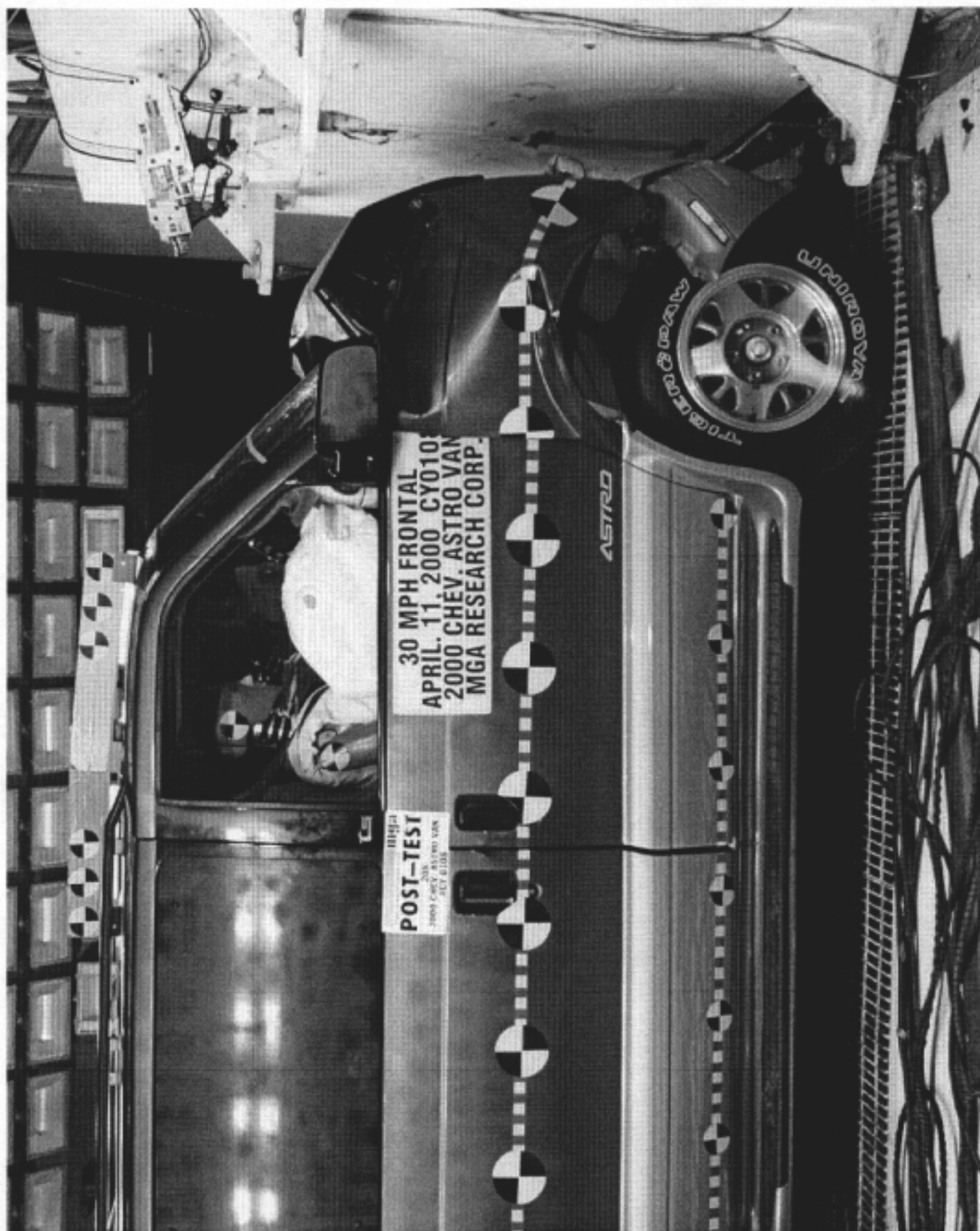


Photo No. A-9 - Post-Test Right Front Side View

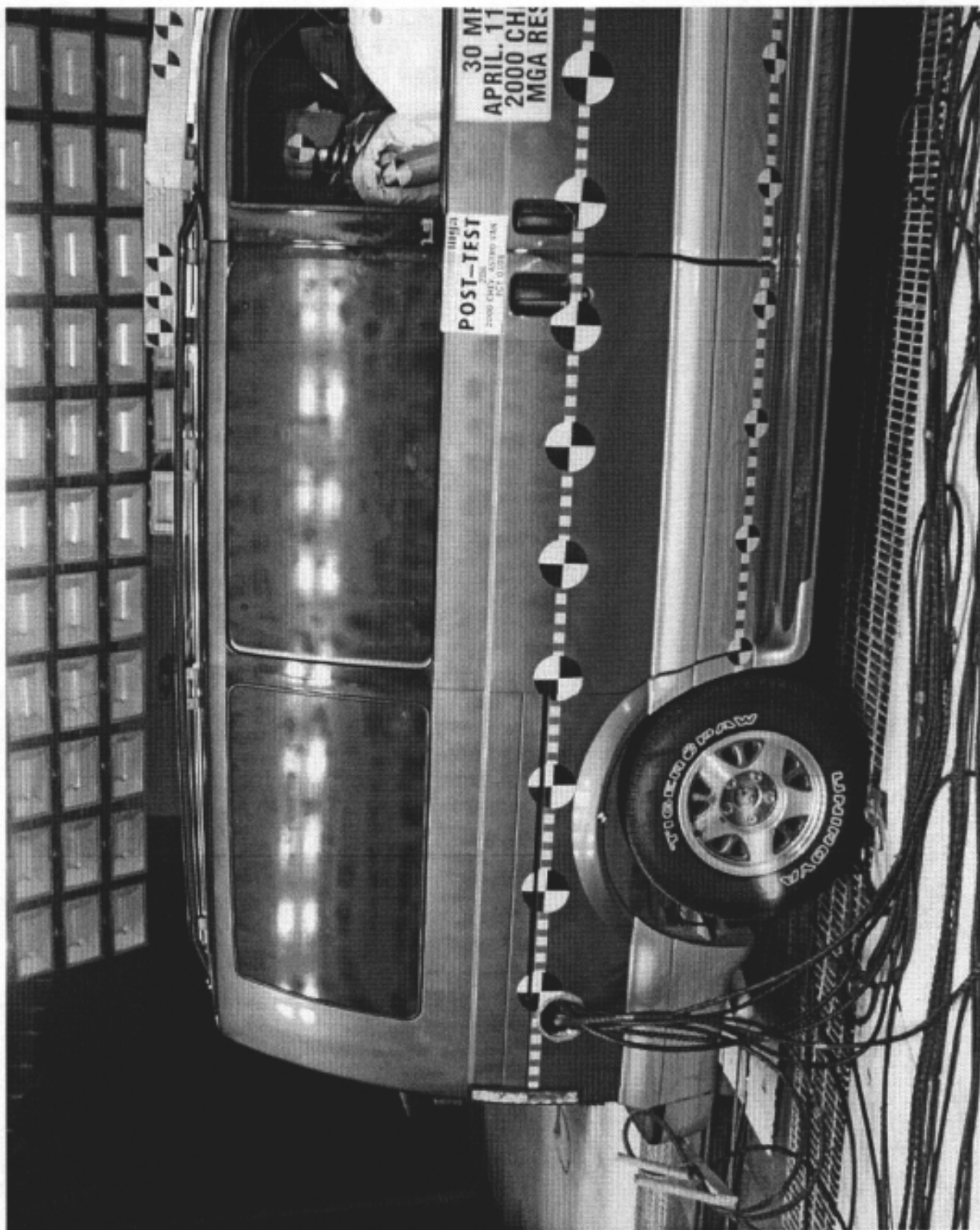


Photo No. A-10 - Post-Test Right Rear Side View



Photo No. A-11 - Pre-Test 3/4 Left Rear View



Photo No. A-12 - Post-Test 3/4 Left Rear View



Photo No. A-13 - Pre-Test 3/4 Right Front View



Photo No. A-14 - Post-Test 3/4 Right Front View



Photo No. A-15 - Pre-Test Rear View



Photo No. A-16 - Post-Test Rear View

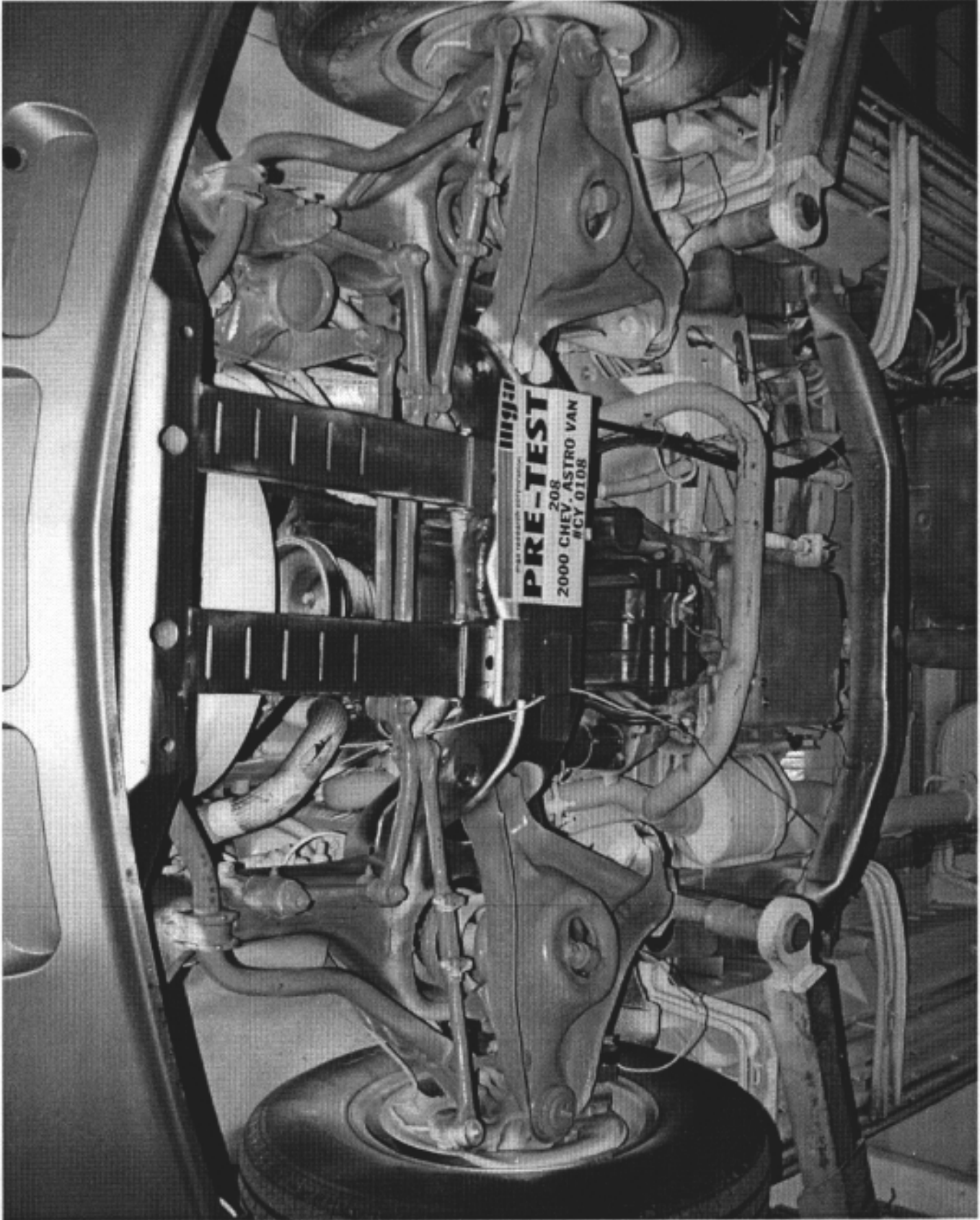


Photo No. A-17- Pre-Test Front Underbody View

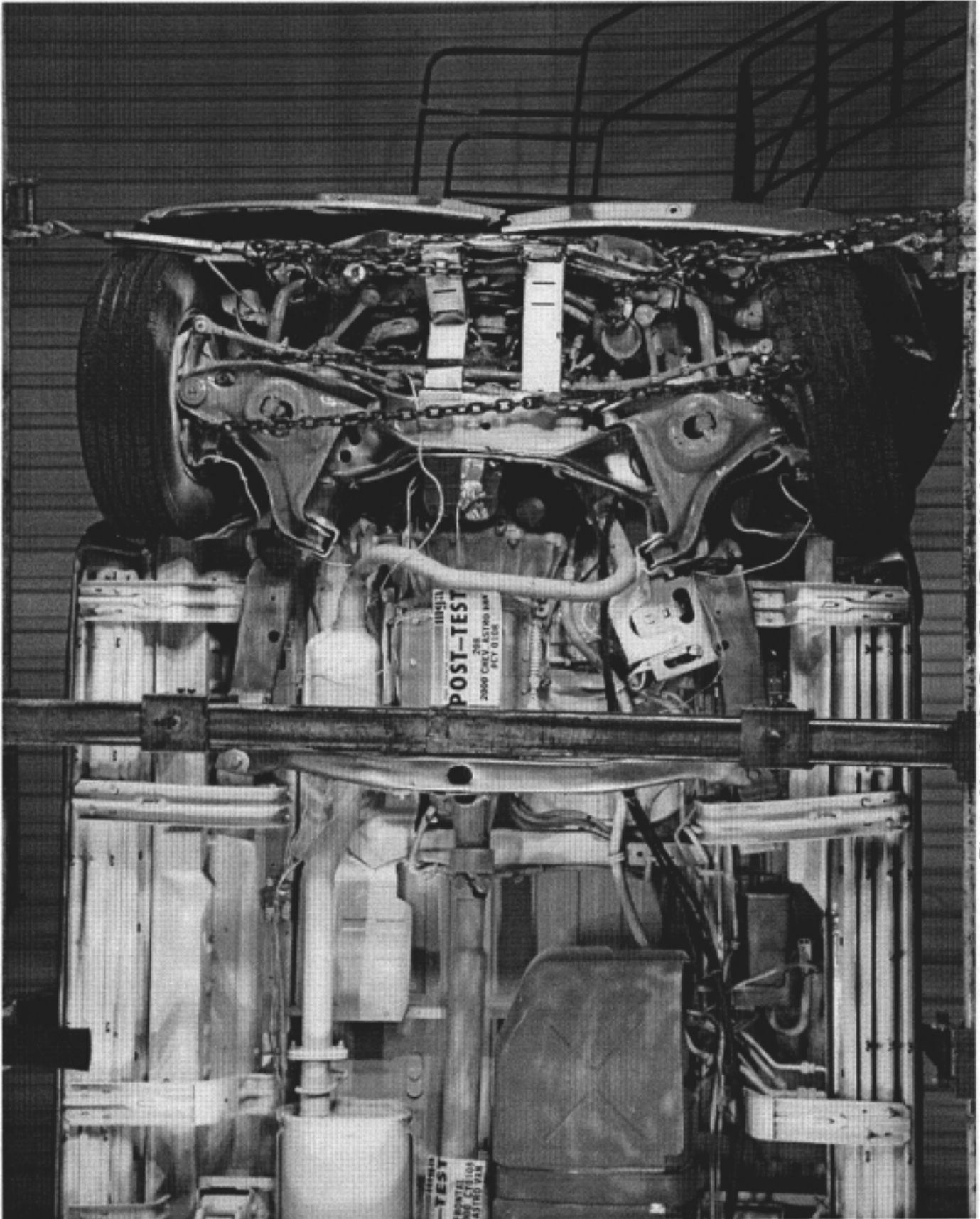


Photo No. A-18 - Post-Test Front Underbody View

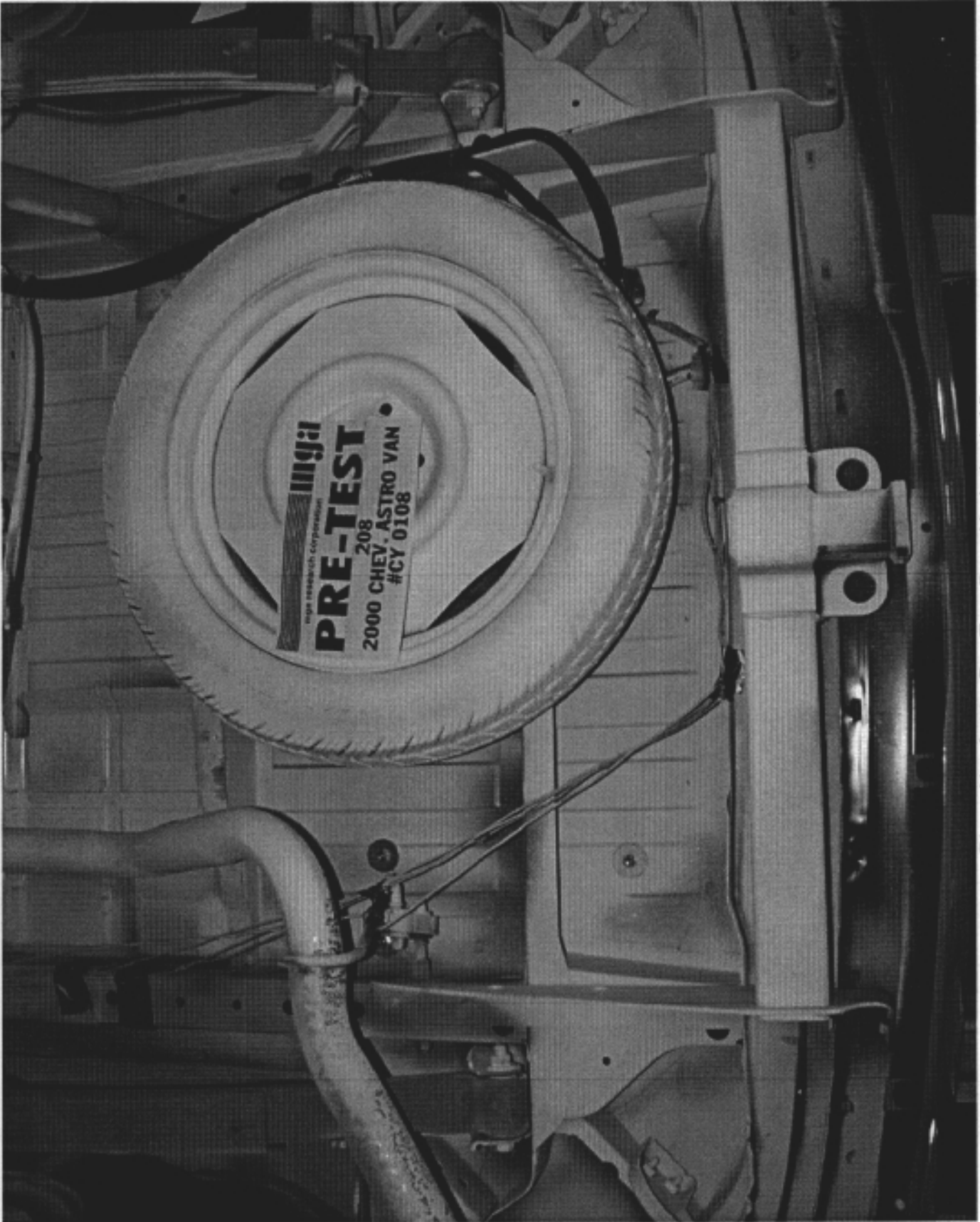


Photo No. A-19 - Pre-Test Rear Underbody View

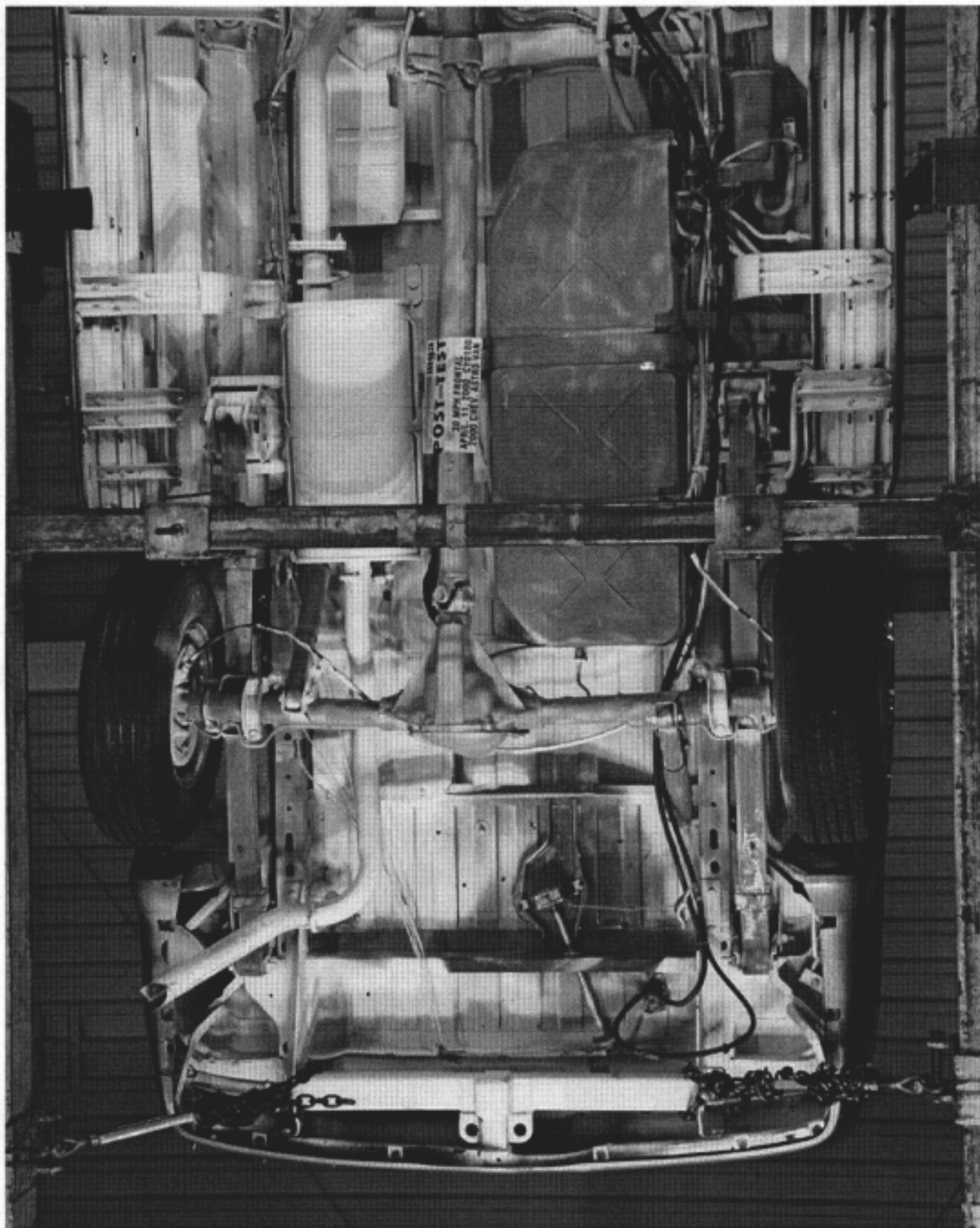


Photo No. A-20 - Post-Test Rear Underbody View

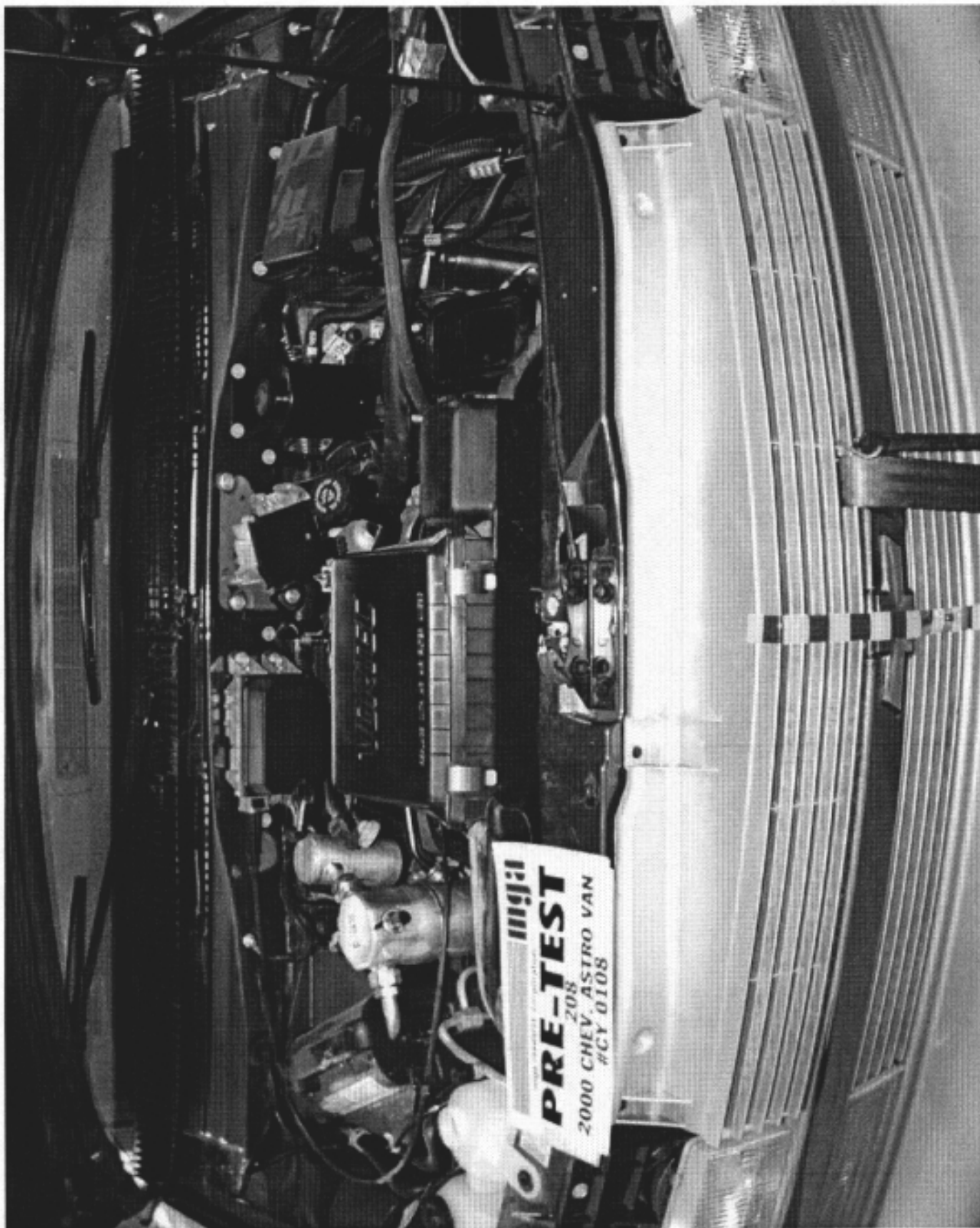


Photo No. A-21 - Pre-Test Engine Compartment View



Photo No. A-22 - Post-Test Engine Compartment View

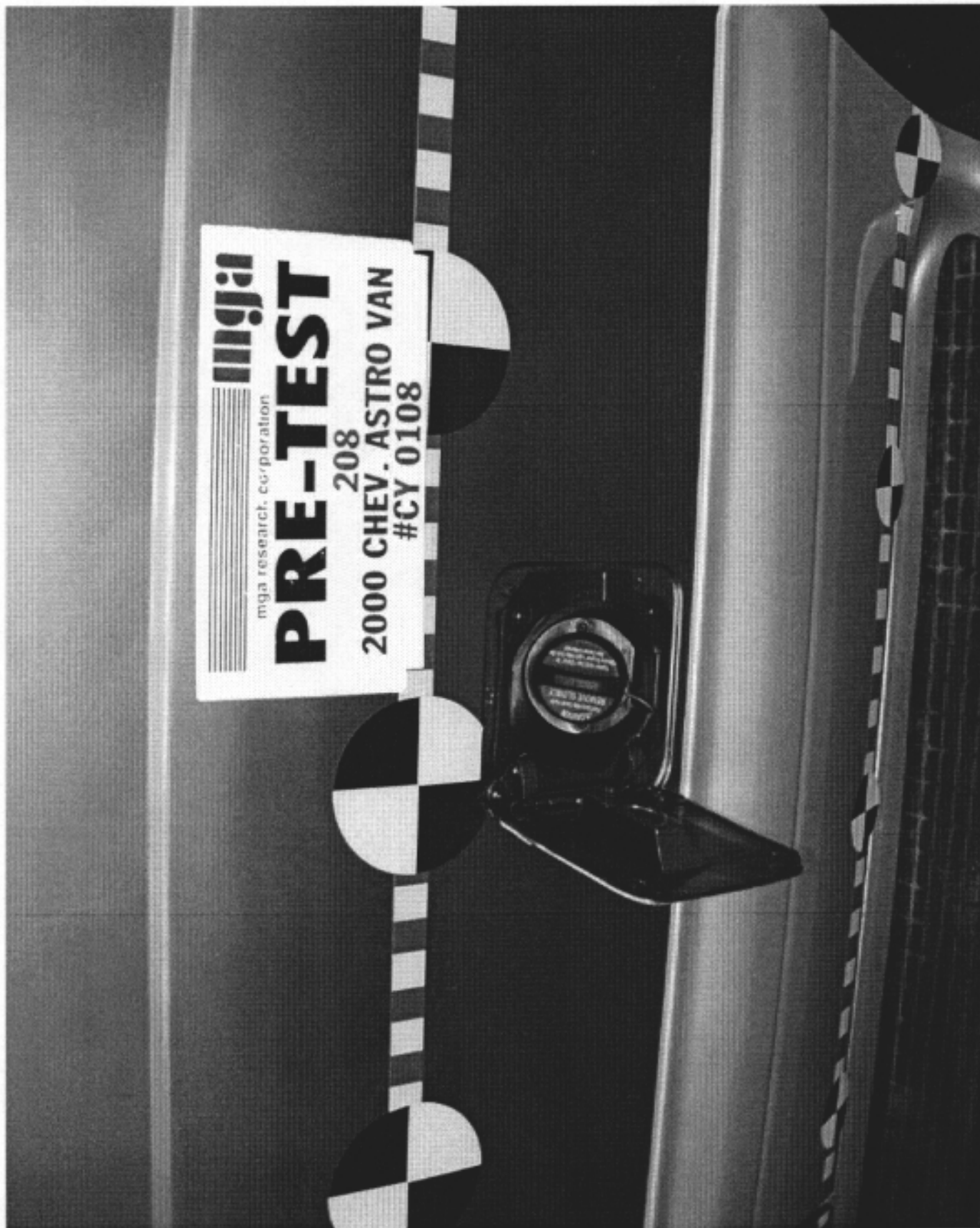


Photo No. A-23 - Pre-Test Fuel Filler Cap View



Photo No. A-24 - Pre-Test Windshield View

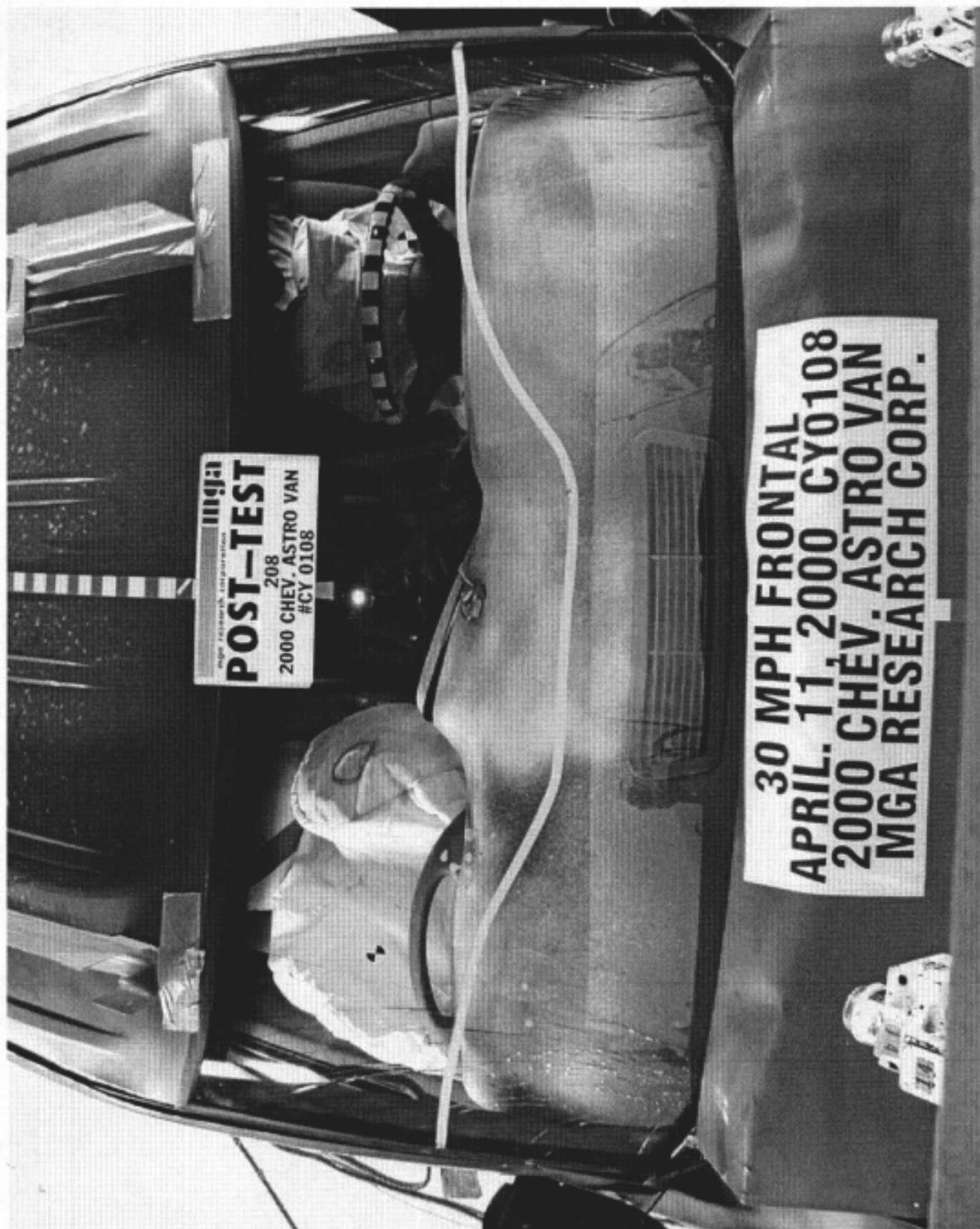


Photo No. A-25 - Post-Test Windshield View

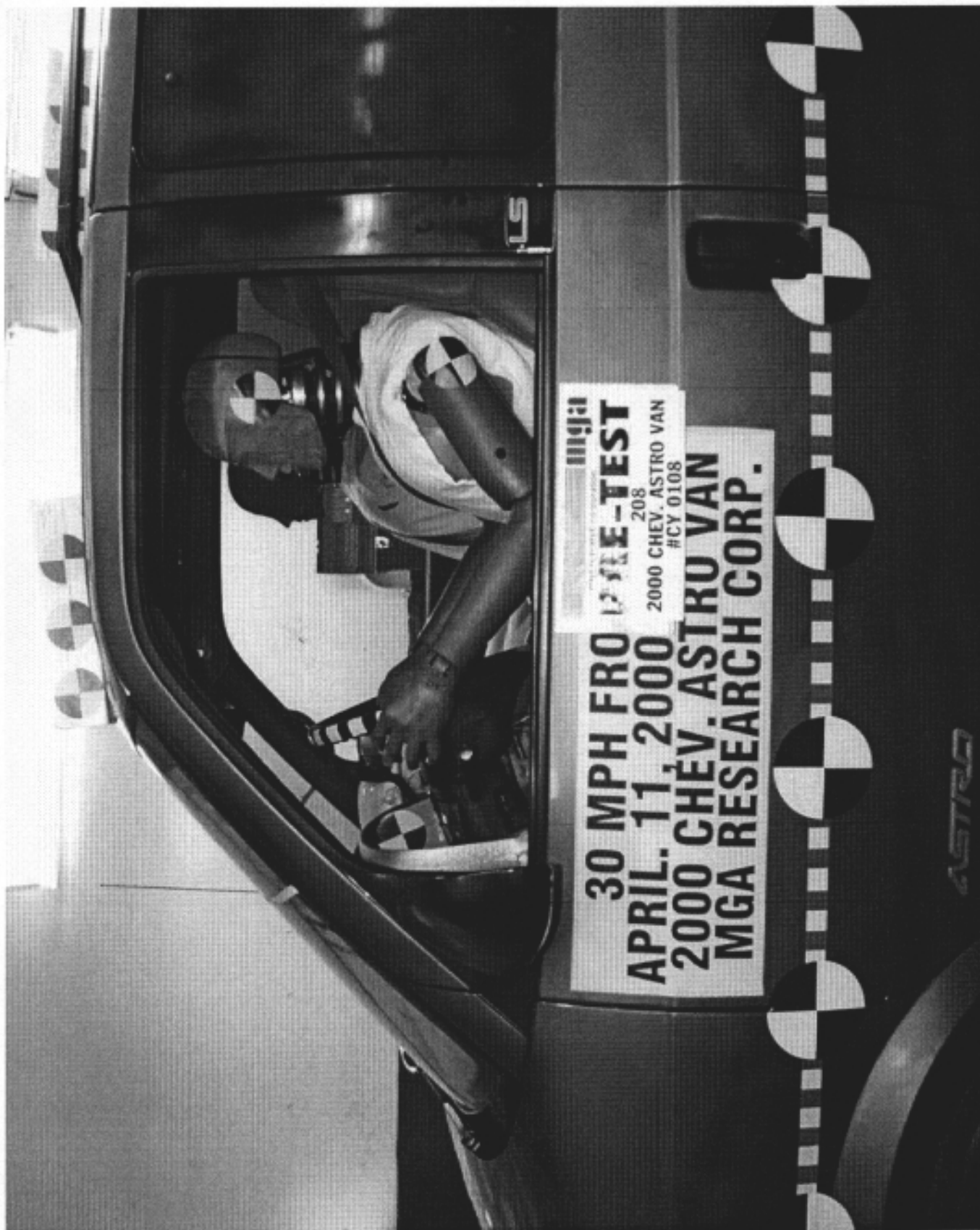


Photo No. A-26 - Pre-Test Driver Dummy Position View



Photo No. A-27 - Post-Test Driver Dummy Position View



Photo No. A-28 - Pre-Test Driver Dummy Position View (Door Open)

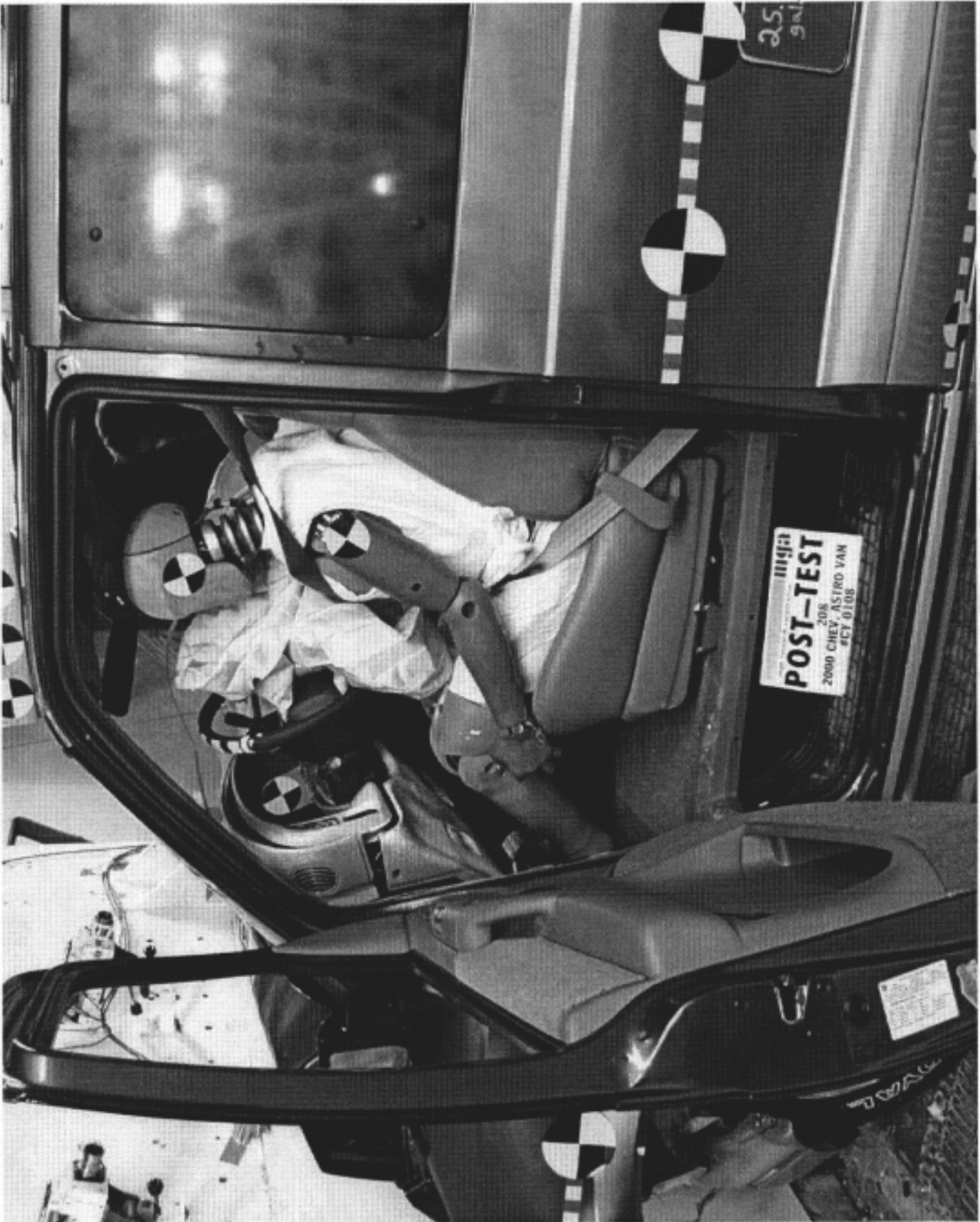


Photo No. A-29 - Post-Test Driver Dummy Position View (Door Open)

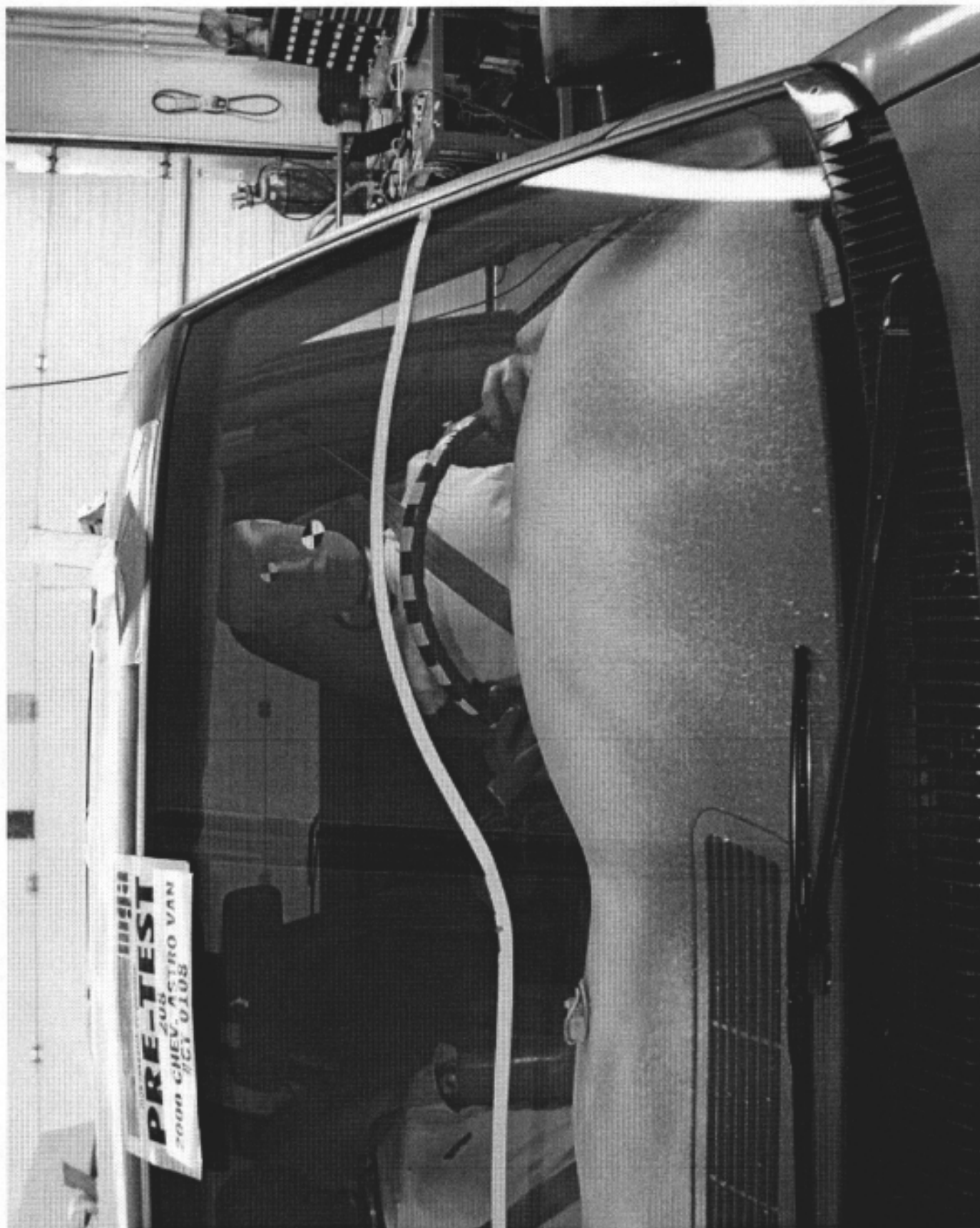


Photo No. A-30 - Pre-Test Driver Windshield View



Photo No. A-31 - Post-Test Driver Windshield



Photo No. A-32 - Pre-Test Driver Seat Position View



Photo No. A-33 - Post-Test Driver Seat Position View



Photo No. A-34 - Pre-Test Driver Knee Position View



Photo No. A-35 - Post-Test Driver Knee Position View



Photo No. A-36 - Post-Test Driver Airbag View



Photo No. A-37 - Post-Test Driver Head Contact View (headrest)

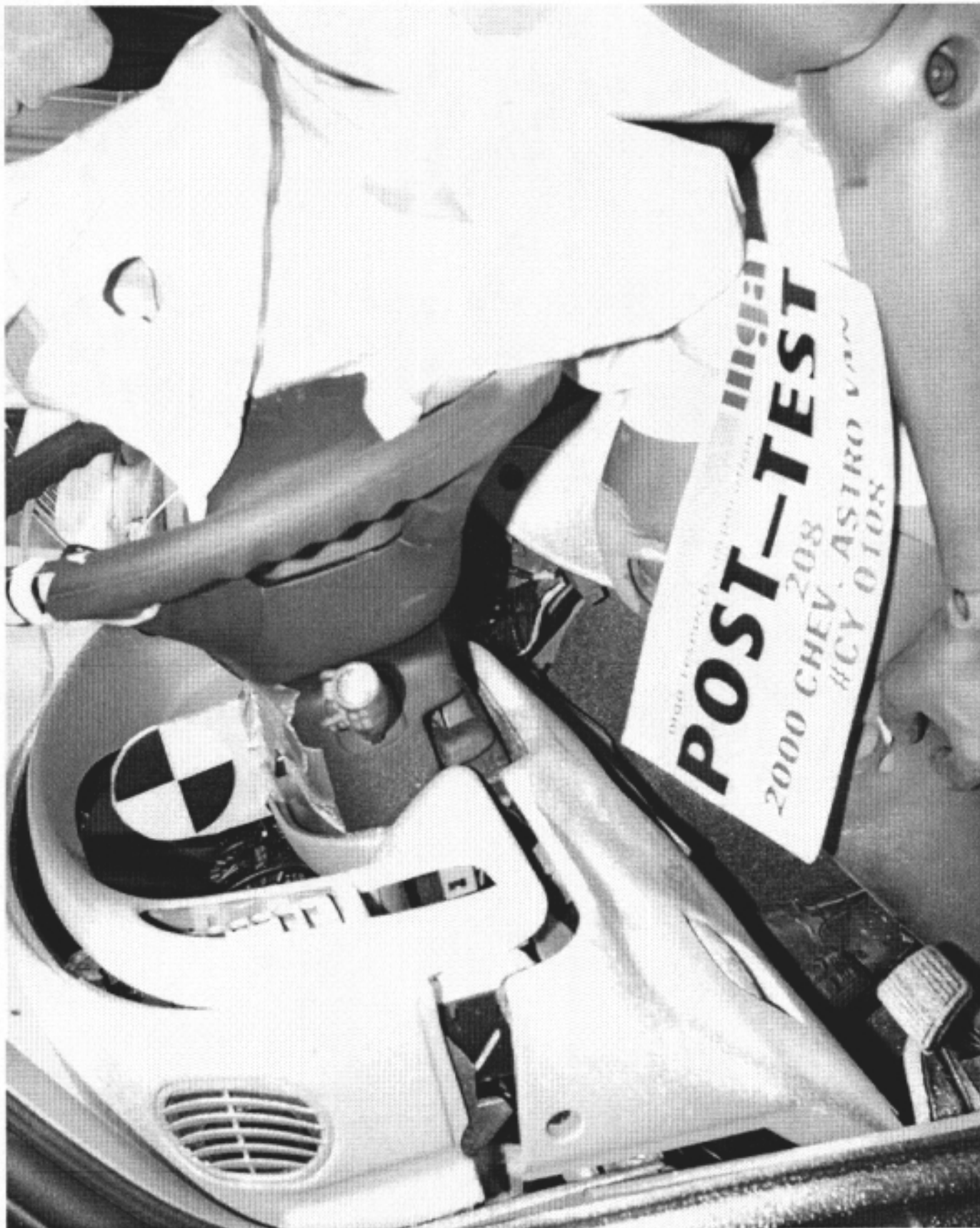


Photo No. A-38 - Post-Test Driver Knee Contact View (left side)

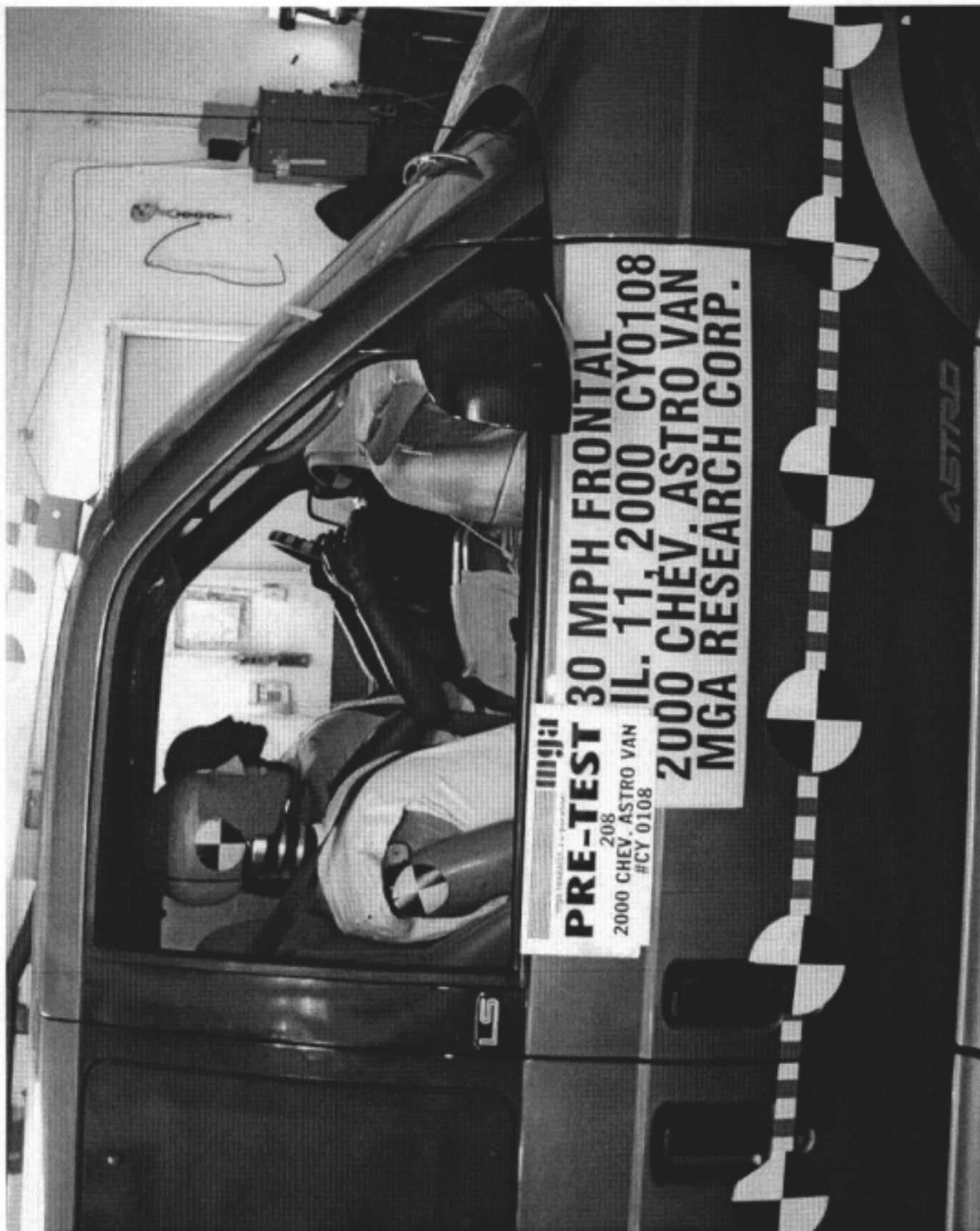


Photo No. A-39 - Pre-Test Passenger Dummy Position View

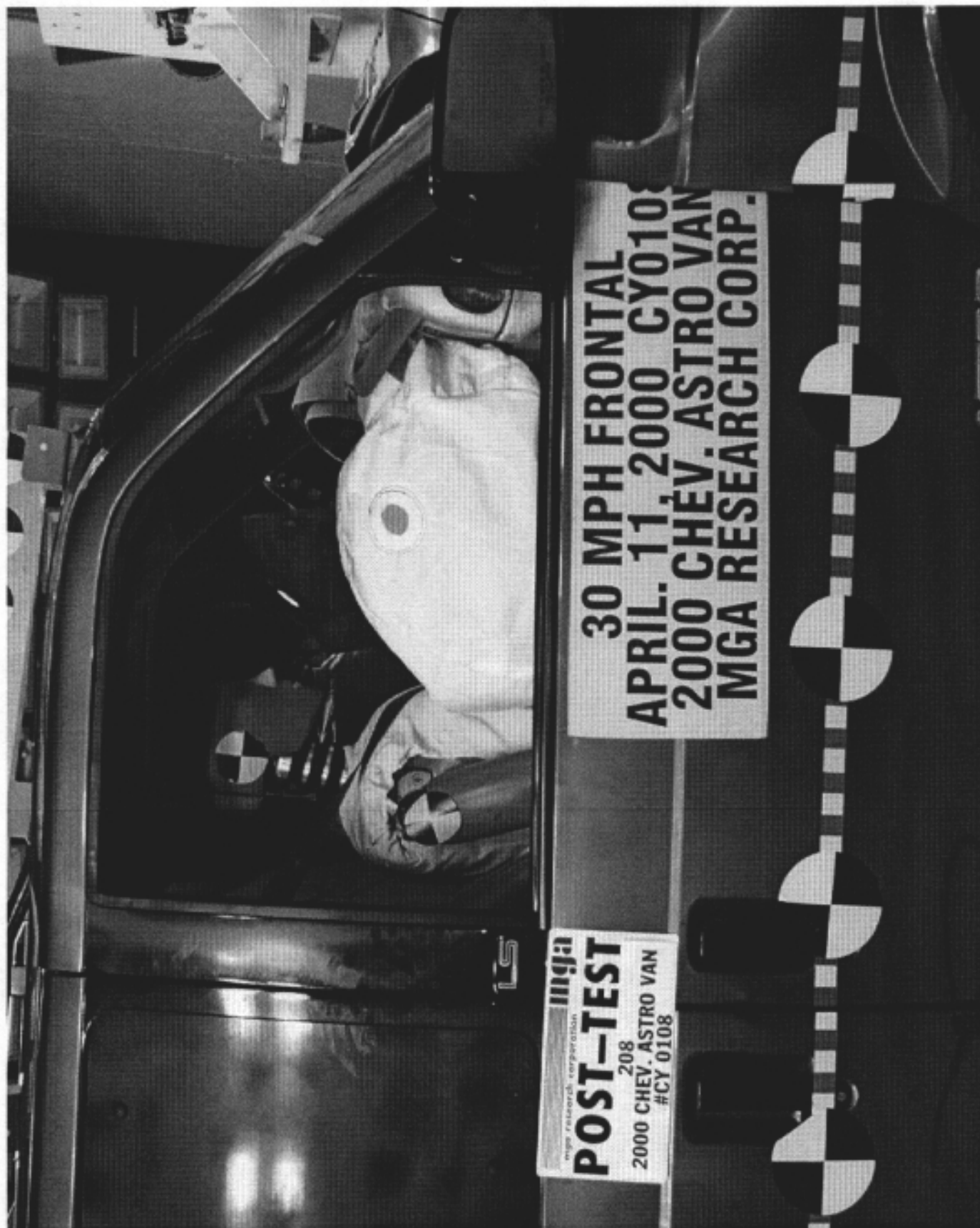


Photo No. A-40 - Post-Test Passenger Dummy Position View



Photo No. A-41 - Pre-Test Passenger Dummy Position View (Door Open)



Photo No. A-42 - Post-Test Passenger Dummy Position View (Door Open)



Photo No. A-43 - Pre-Test Passenger Windshield View

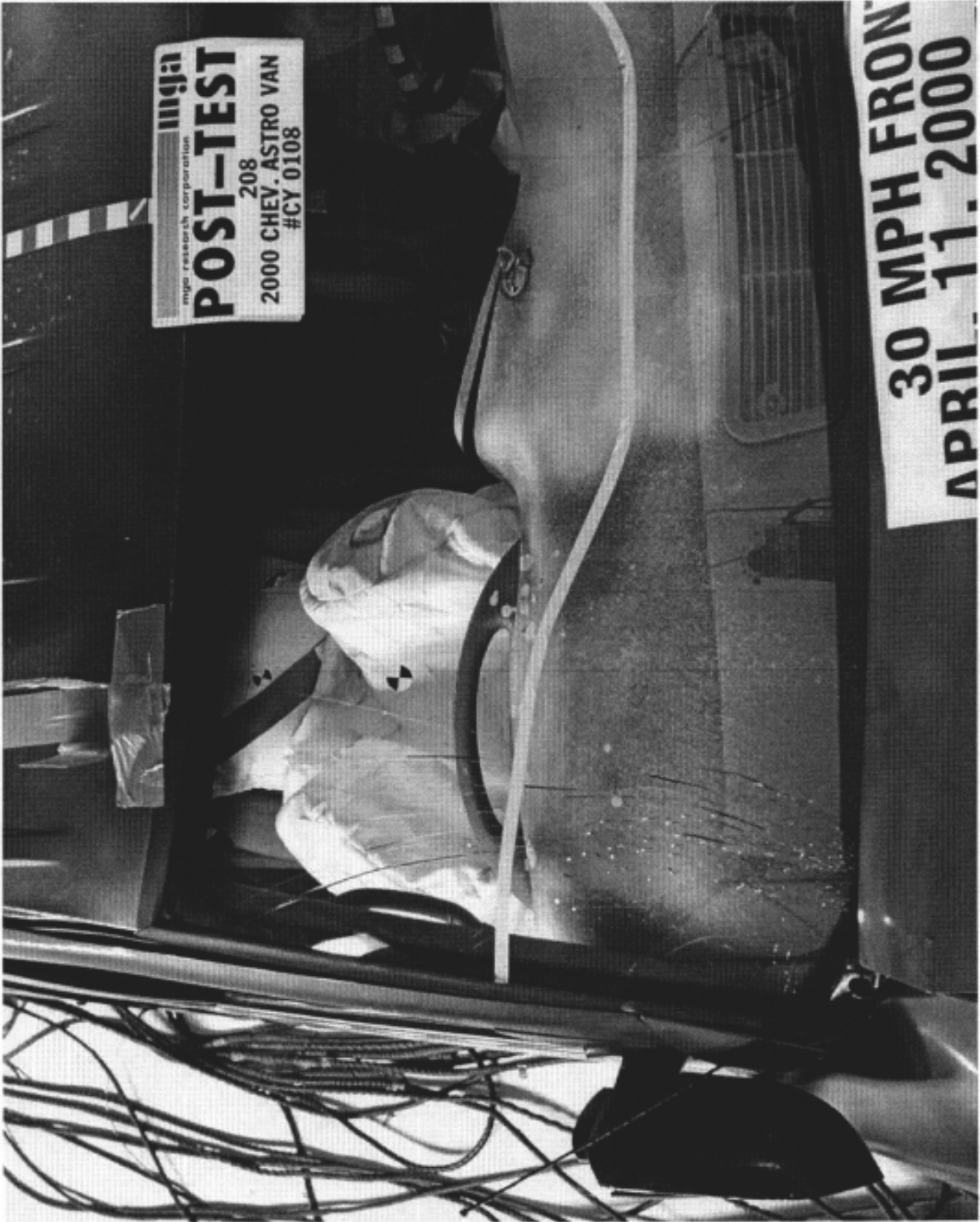


Photo No. A-44 - Post-Test Passenger Windshield View



Photo No. A-45 - Pre-Test Passenger Seat Position View



Photo No. A-46 - Post-Test Passenger Seat Position View



Photo No. A-47 - Pre-Test Passenger Dummy Knee Position View



Photo No. A-48 - Post-Test Passenger Dummy Knee Position View



Photo No. A-49 - Post-Test Passenger Dummy Airbag View



Photo No. A-50 - Post-Test Passenger Dummy Head Contact View (headrest)

		MFD BY GENERAL MOTORS CORP		02/00
GVWR	2699KG(5950LB)	GAWR FRT	1270KG(2800LB)	GAWR RR
				1429KG(3150LB)
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.				
1GNDM19W3YB167236			TYPE: M.P.V.	
MODEL: M11006		PAYLOAD = 585KG(1290LB)		
MPAN	TIRE SIZE	SPEED RTG	RIM	COLD TIRE PRESSURE
FRT	P215/75R15	S	15X6 1/2J	240KPA(35PSI)
RR	P215/75R15	S	15X6 1/2J	240KPA(35PSI)
SPA	T155/80D18	M	18X4T	420KPA(60PSI)
SEE OWNER'S MANUAL FOR MORE INFORMATION.				

Photo No. A-51 - Vehicle Certification Label and Tire Placard

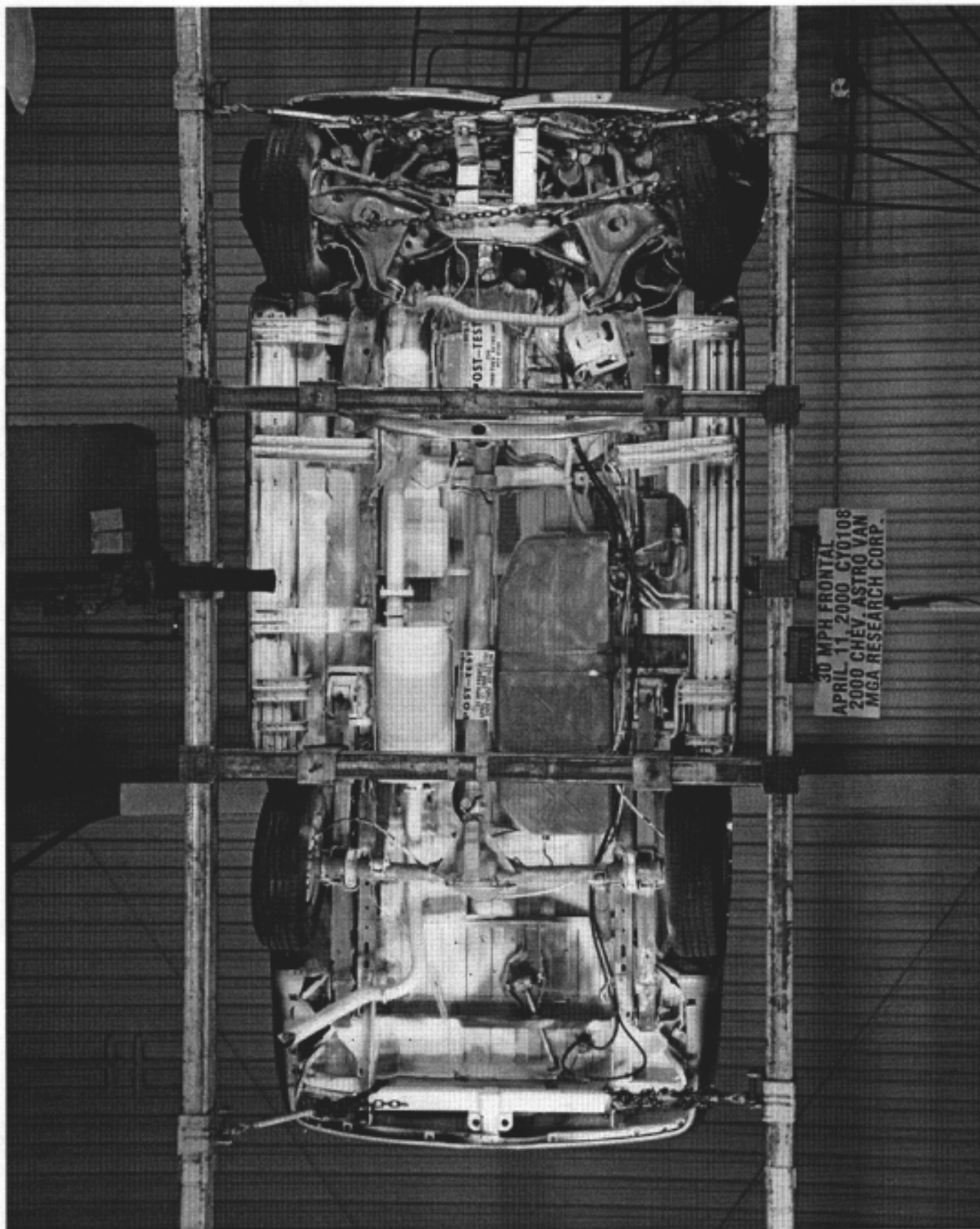


Photo No. A-52 - Rollover 90°

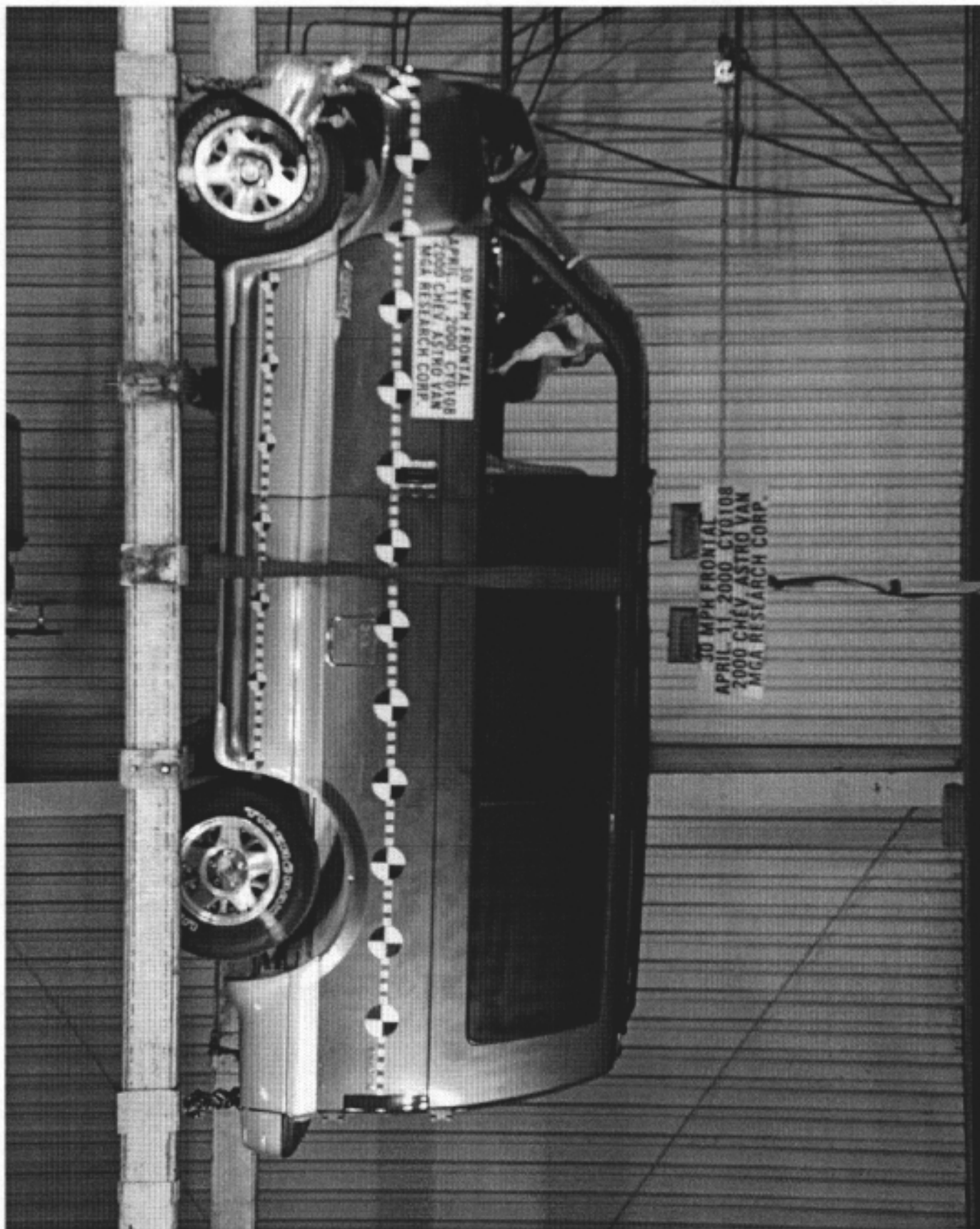


Photo No. A-53 - Rollover 180°

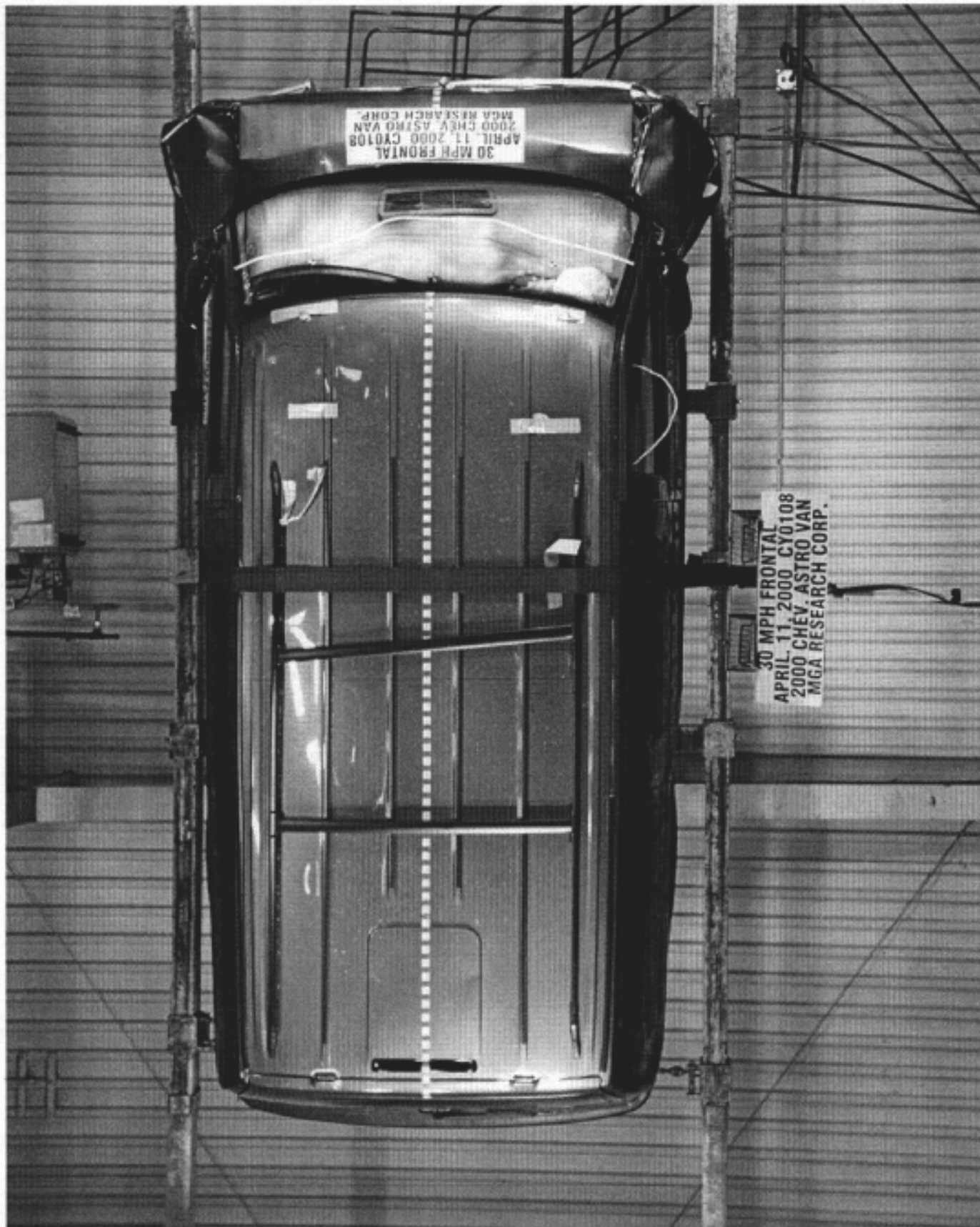


Photo No. A-54 - Rollover 270°

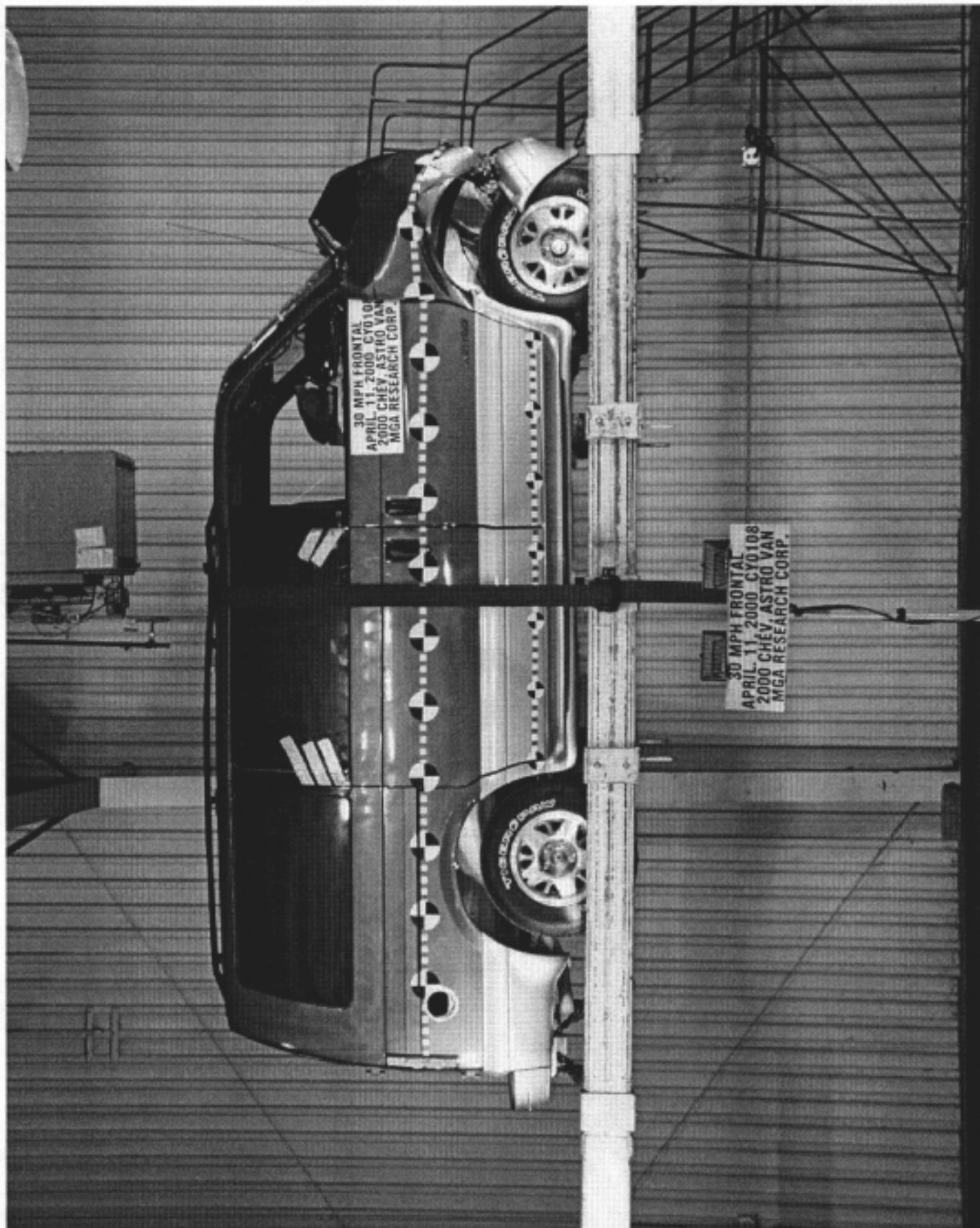


Photo No. A-55 - Rollover 360°



Photo No. A-56 - Ballast in Vehicle

APPENDIX B
DATA PLOTS

TABLE OF DATA PLOTS

<u>Description</u>	<u>Page No.</u>
Figure B-1 - Driver Head X Acceleration vs. Time	B-1
Figure B-2 - Driver Head Y Acceleration vs. Time	B-2
Figure B-3 - Driver Head Z Acceleration vs. Time	B-3
Figure B-4 - Driver Head Resultant Acceleration vs. Time	B-4
Figure B-5 - Driver Chest X Acceleration vs. Time	B-5
Figure B-6 - Driver Chest Y Acceleration vs. Time	B-6
Figure B-7 - Driver Chest Z Acceleration vs. Time	B-7
Figure B-8 - Driver Chest Resultant Acceleration vs. Time	B-8
Figure B-9 - Driver Chest Compression vs. Time	B-9
Figure B-10 - Driver Left Femur Force vs. Time	B-10
Figure B-11 - Driver Right Femur Force vs. Time	B-11
Figure B-12 - Driver Neck Force X vs. Time	B-12
Figure B-13 - Driver Neck Force Y vs. Time	B-13
Figure B-14 - Driver Neck Force Z vs. Time	B-14
Figure B-15 - Driver Neck Moment X vs. Time	B-15
Figure B-16 - Driver Neck Moment Y vs. Time	B-16
Figure B-17 - Driver Neck Moment Z vs. Time	B-17
Figure B-18 - Driver Occipital Condyle Moment Y vs. Time	B-18
Figure B-19 - Passenger Head X Acceleration vs. Time	B-19
Figure B-20 - Passenger Head Y Acceleration vs. Time	B-20
Figure B-21 - Passenger Head Z Acceleration vs. Time	B-21
Figure B-22 - Passenger Head Resultant Acceleration vs. Time	B-22
Figure B-23 - Passenger Chest X Acceleration vs. Time	B-23
Figure B-24 - Passenger Chest Y Acceleration vs. Time	B-24
Figure B-25 - Passenger Chest Z Acceleration vs. Time	B-25
Figure B-26 - Passenger Chest Resultant Acceleration vs. Time	B-26
Figure B-27 - Passenger Chest Compression vs. Time	B-27

TABLE OF DATA PLOTS (CONTINUED)

<u>Description</u>	<u>Page No.</u>
Figure B-28 - Passenger Left Femur Force vs. Time	B-28
Figure B-29 - Passenger Right Femur Force vs. Time	B-29
Figure B-30 - Passenger Neck Force X vs. Time	B-30
Figure B-31 - Passenger Neck Force Y vs. Time	B-31
Figure B-32 - Passenger Neck Force Z vs. Time	B-32
Figure B-33 - Passenger Neck Moment X vs. Time	B-33
Figure B-34 - Passenger Neck Moment Y vs. Time	B-34
Figure B-35 - Passenger Neck Moment Z vs. Time	B-35
Figure B-36 - Passenger Occipital Condyle Moment Y vs. Time	B-36
Figure B-37 - Left Rear Seat Crossmember X Acceleration vs. Time	B-37
Figure B-38 - Right Rear Seat Crossmember X Acceleration vs. Time	B-38
Figure B-39 - Top of Engine X Acceleration vs. Time*	B-39
Figure B-40 - Bottom of Engine X Acceleration vs. Time	B-40
Figure B-41 - Instrument Panel X Acceleration vs. Time	B-41
Figure B-42 - Left Front Brake Caliper X Acceleration vs. Time	B-42
Figure B-43 - Right Front Brake Caliper X Acceleration vs. Time**	B-43
Figure B-44 - Trunk Z Acceleration vs. Time	B-44

* No Valid Data After 25 msec.

** No Valid Data After 50 msec.

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

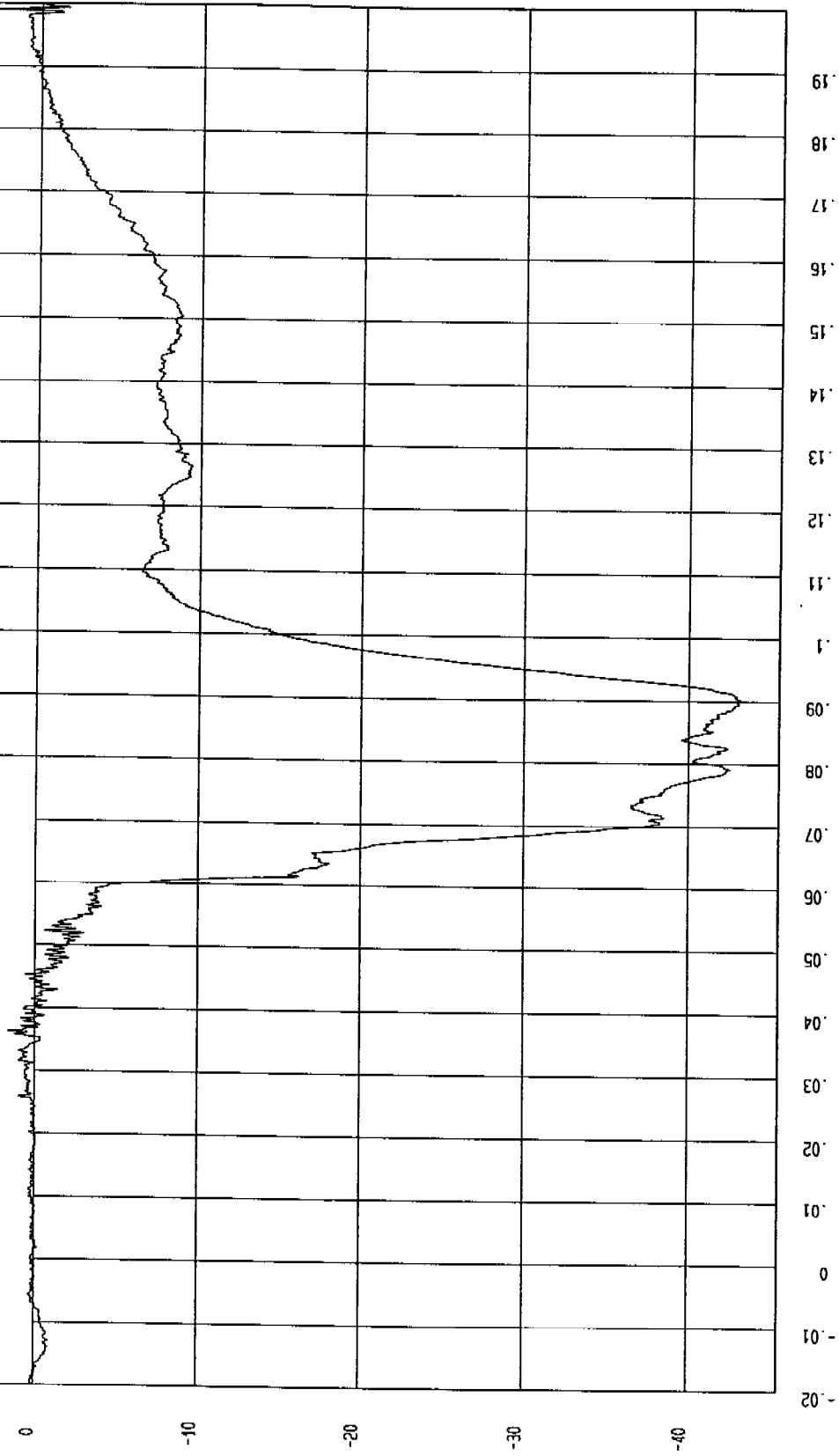
Speed: 29.8 MPH 48 KPH

Minimum = -43.17 G'S at 90 msec

Maximum = 2.97 G'S at 199 msec

DRIVER HEAD X ACCELERATION

1 ——— 800028AT.A12 FilterClass (1000)



MCA Research
04-09-2000 18:53

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

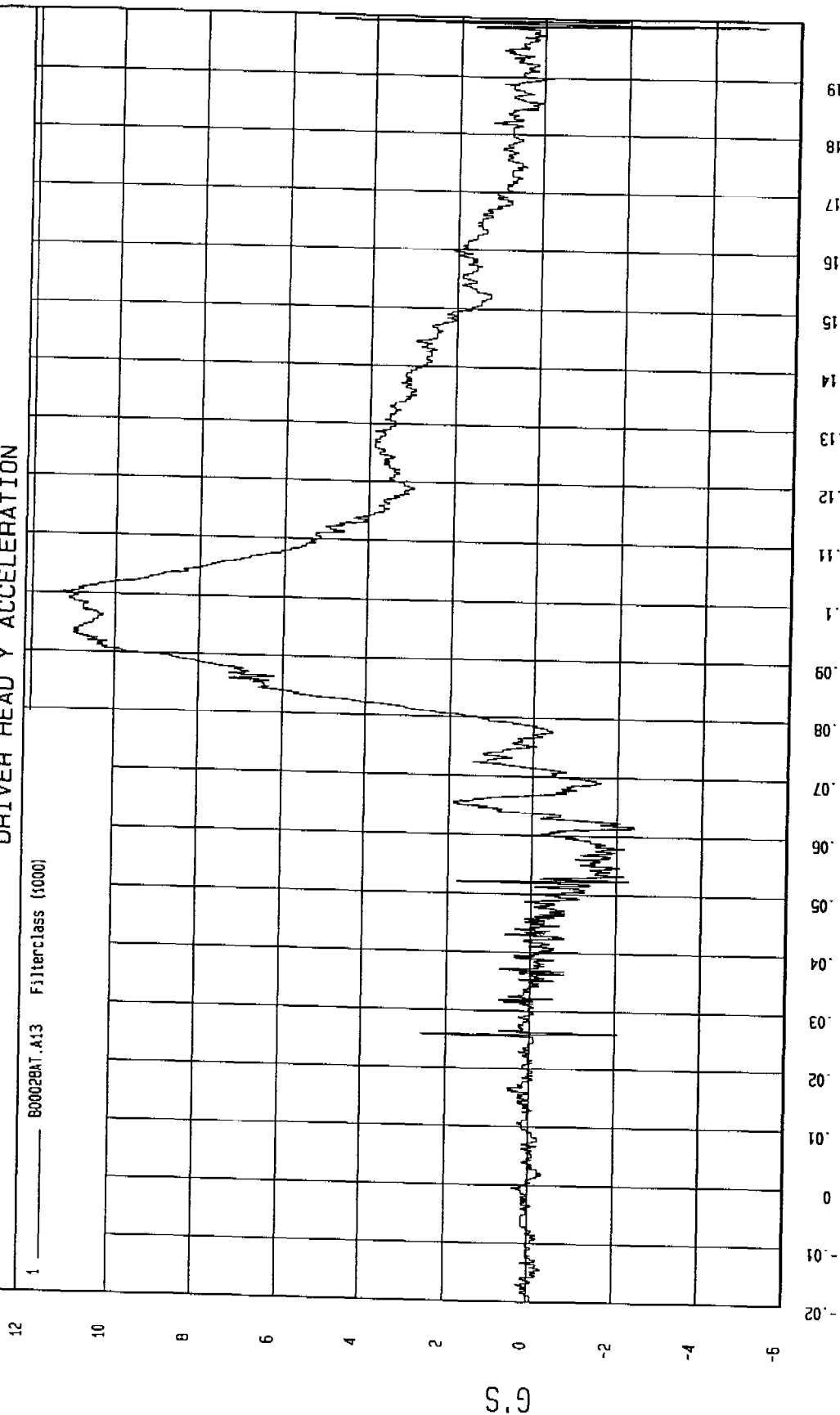
Speed: 29.8 MPH 48 KPH

Minimum = -5.21 G'S at 199 msec

Maximum = 11.33 G'S at 100 msec

DRIVER HEAD Y ACCELERATION

1 ——— 800028AT.A13 Filterclass (1000)

WCA Research
04-09-2000 18:53

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

Speed: 29.8 MPH 48 KPH

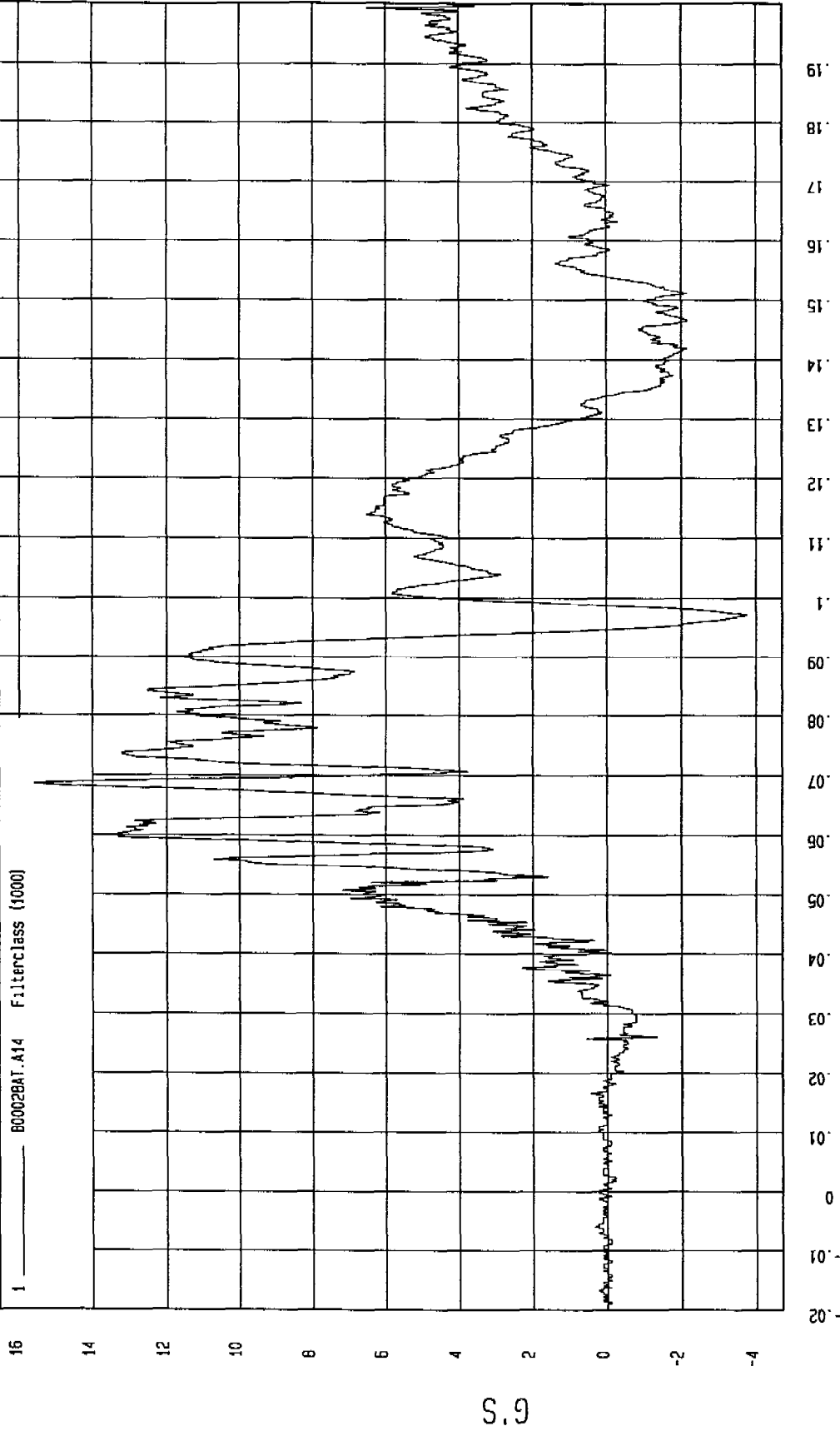
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Maximum = 15.6 G'S at 69 msec

Minimum = -3.74 G'S at 97 msec

DRIVER HEAD Z ACCELERATION

1 B00028AT.A14 Filterclass (1000)



MCA Research
04-09-2000 18:53

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

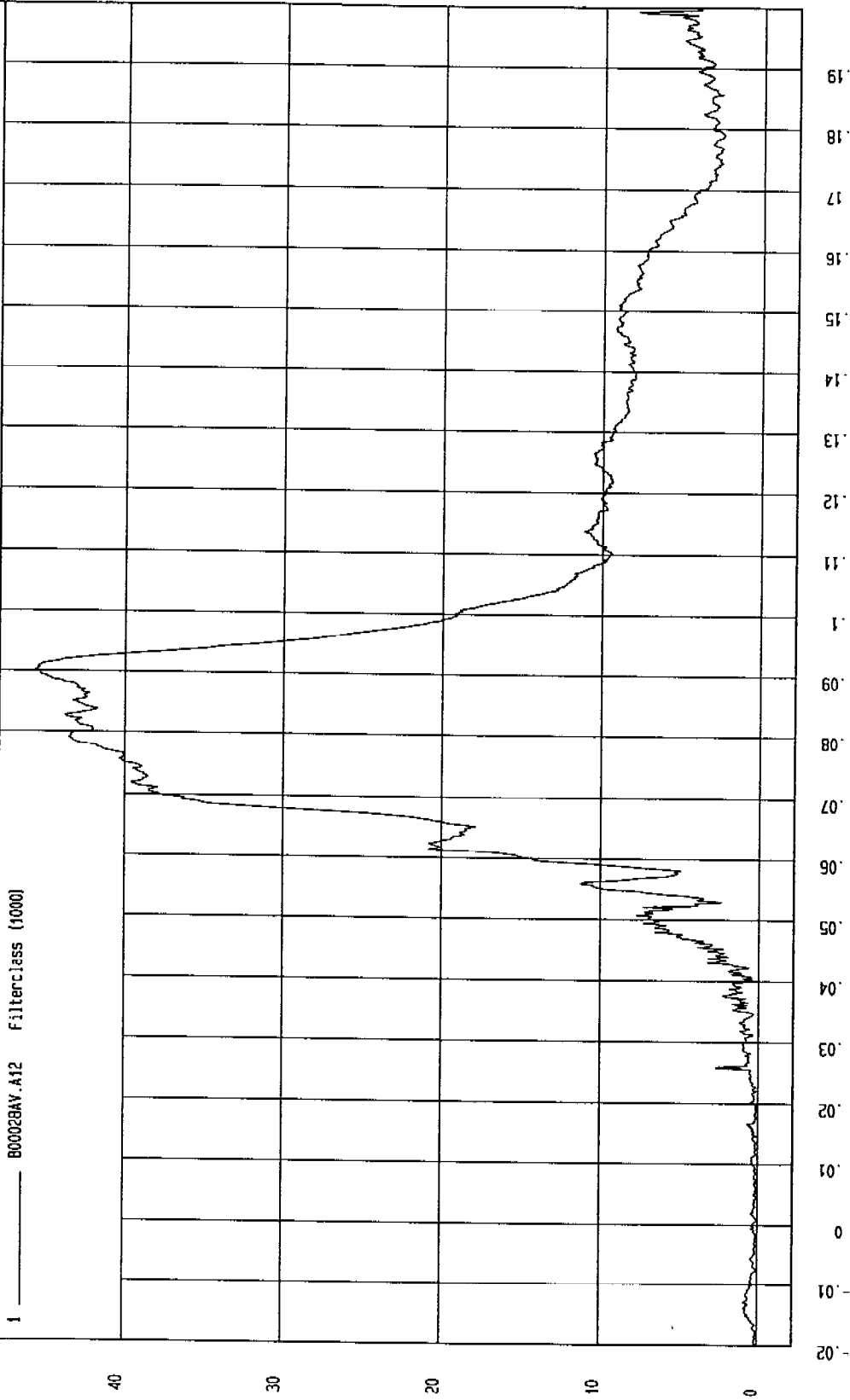
Speed: 29.8 MPH 48 KPH

Minimum = 5.44E-02 G'S at -20 msec

Maximum = 45.66 G'S at 90 msec

DRIVER HEAD RESULTANT ACCELERATION

1 ——— B00029AV.A12 Filterclass (1000)



MCA Research
04-09-2000 18:53

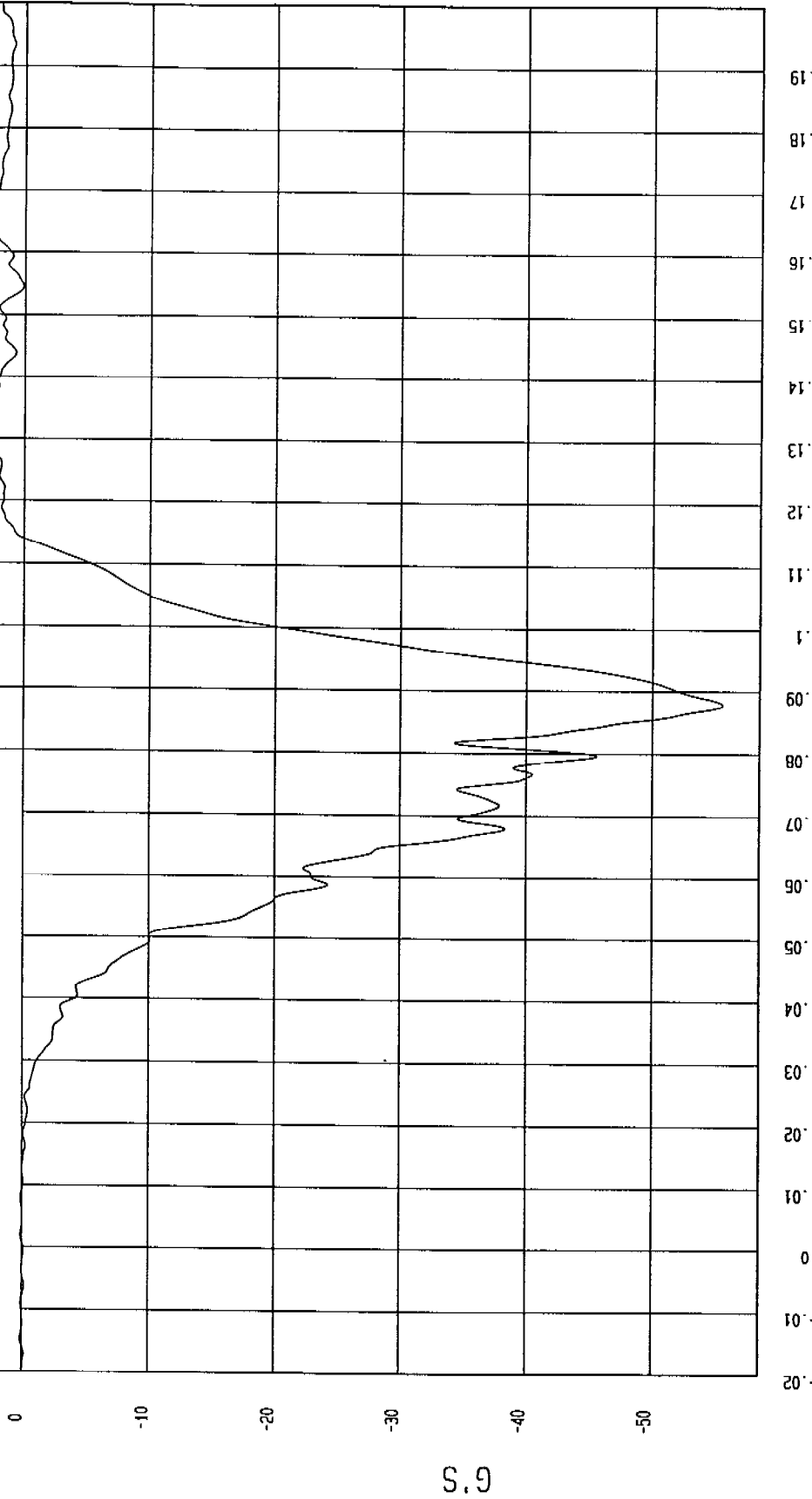
TEST: FMVSS 208 BARRIER TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108) Speed: 29.8 MPH 48 KPH

Minimum = -55.66 G'S at 88 msec Maximum = 3.72 G'S at 131 msec

DRIVER CHEST X ACCELERATION

1 800028AF.A15 Filterclass (100)



MCA Research
04-09-2000 18:53

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

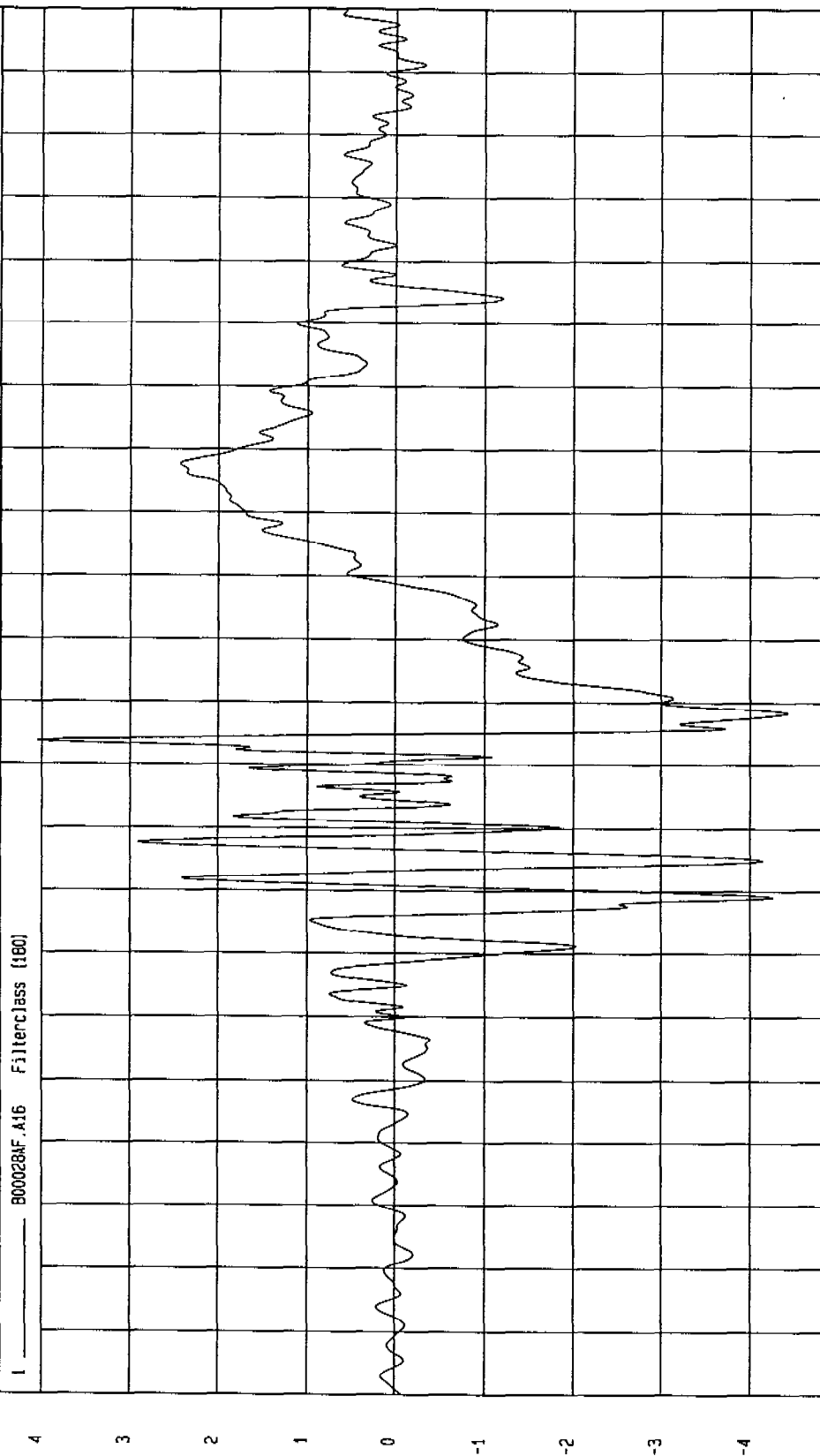
Speed: 29.8 MPH 48 KPH

Minimum = -4.43 G'S at 88 msec

Maximum = 4.05 G'S at 84 msec

DRIVER CHEST Y ACCELERATION

1 B00028AF.A16 FilterClass (160)



WCA Research
04-09-2000 18:53

TIME (SECONDS)

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

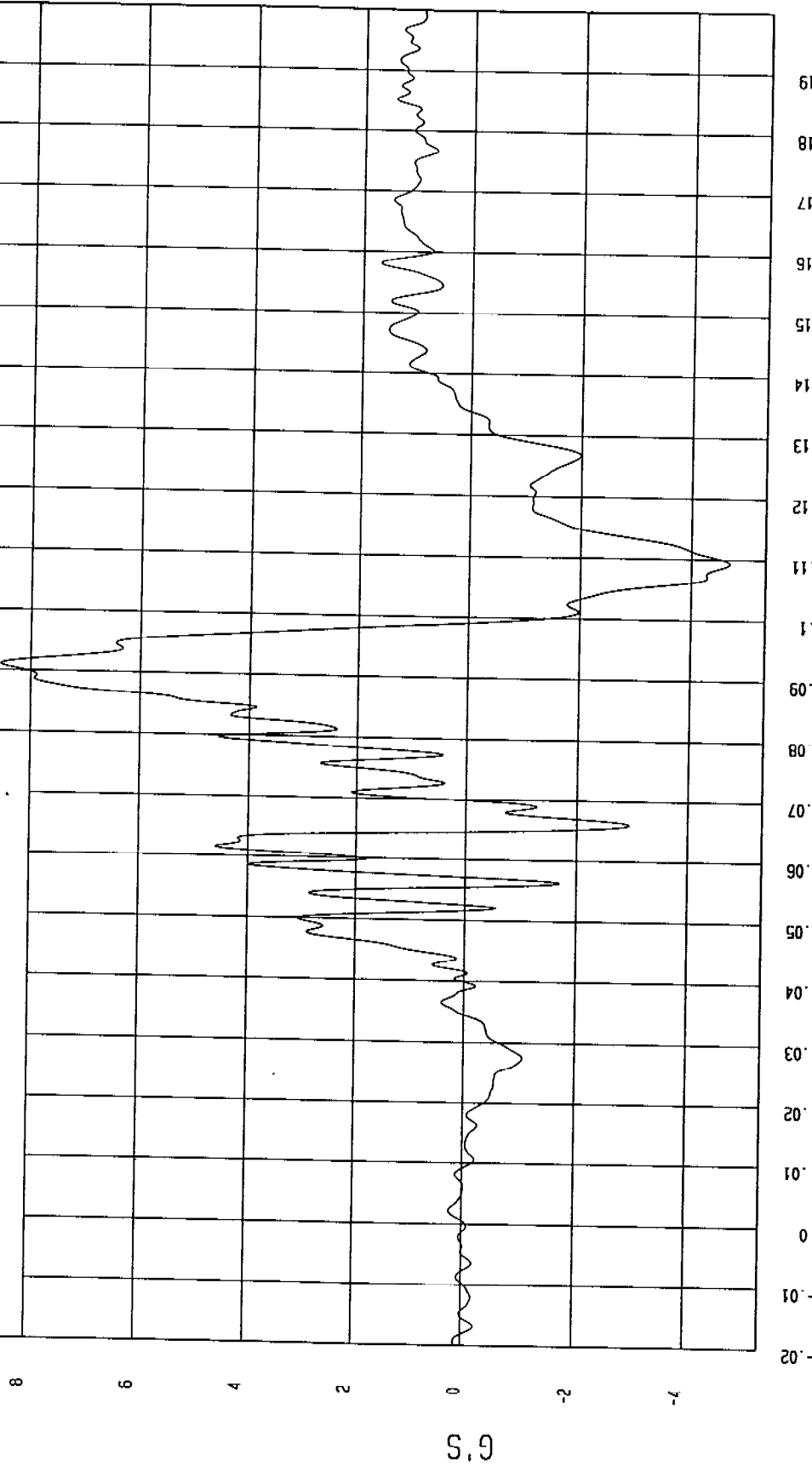
Speed: 29.8 MPH 48 KPH

Minimum = -4.7 G'S at 109 msec

Maximum = 8.56 G'S at 91 msec

DRIVER CHEST Z ACCELERATION

1 — 8000284F.A17 Filterclass (180)



MCA Research
04-09-2000 18:53

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

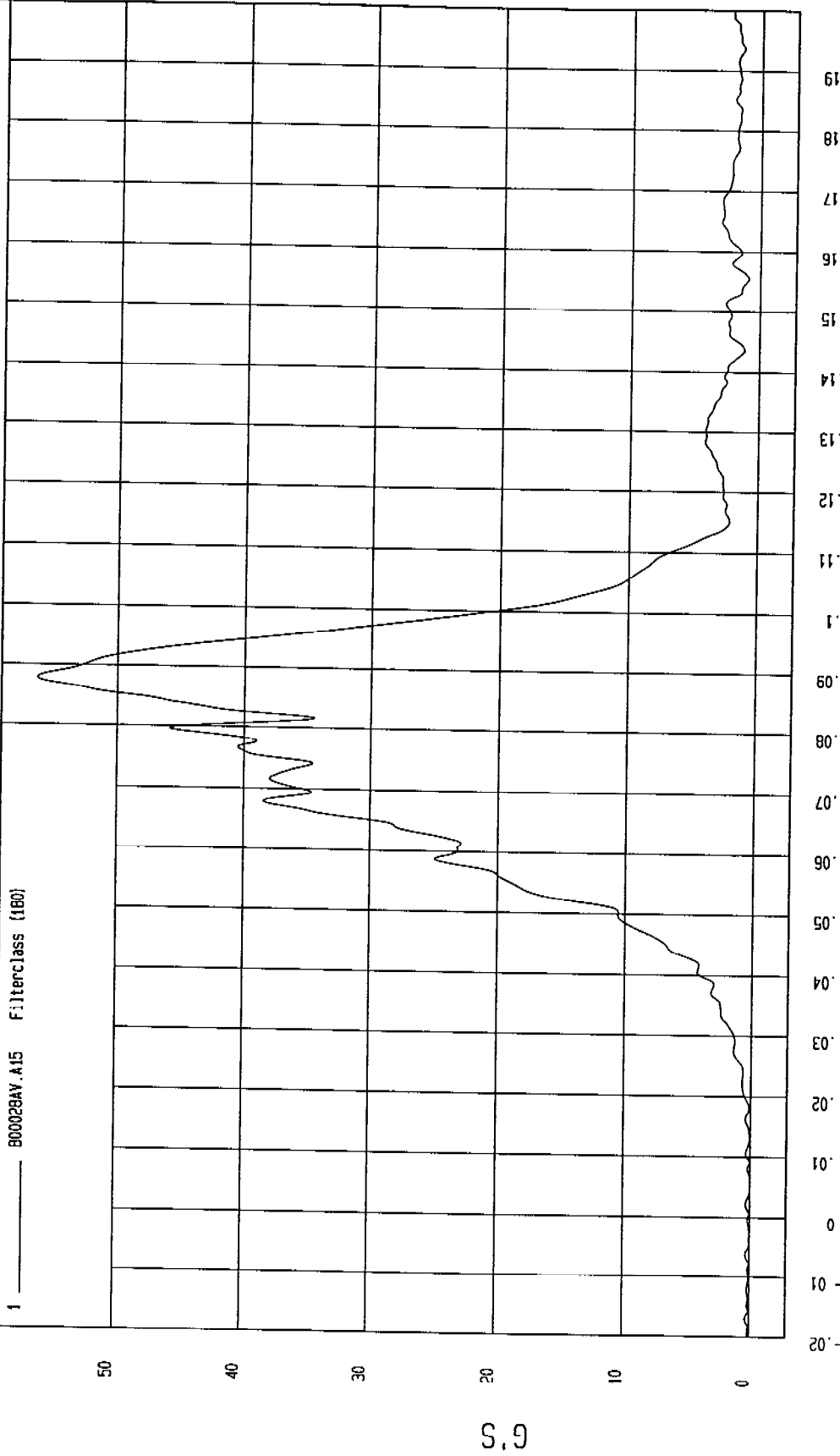
Speed: 29.8 MPH 48 KPH

Minimum = 1.49E-02 G'S at 5 msec

Maximum = 56.32 G'S at 88 msec

DRIVER CHEST RESULTANT ACCELERATION

1 — 800029AV.A15 Filterclass (100)



WGA Research
04-09-2000 18:53

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

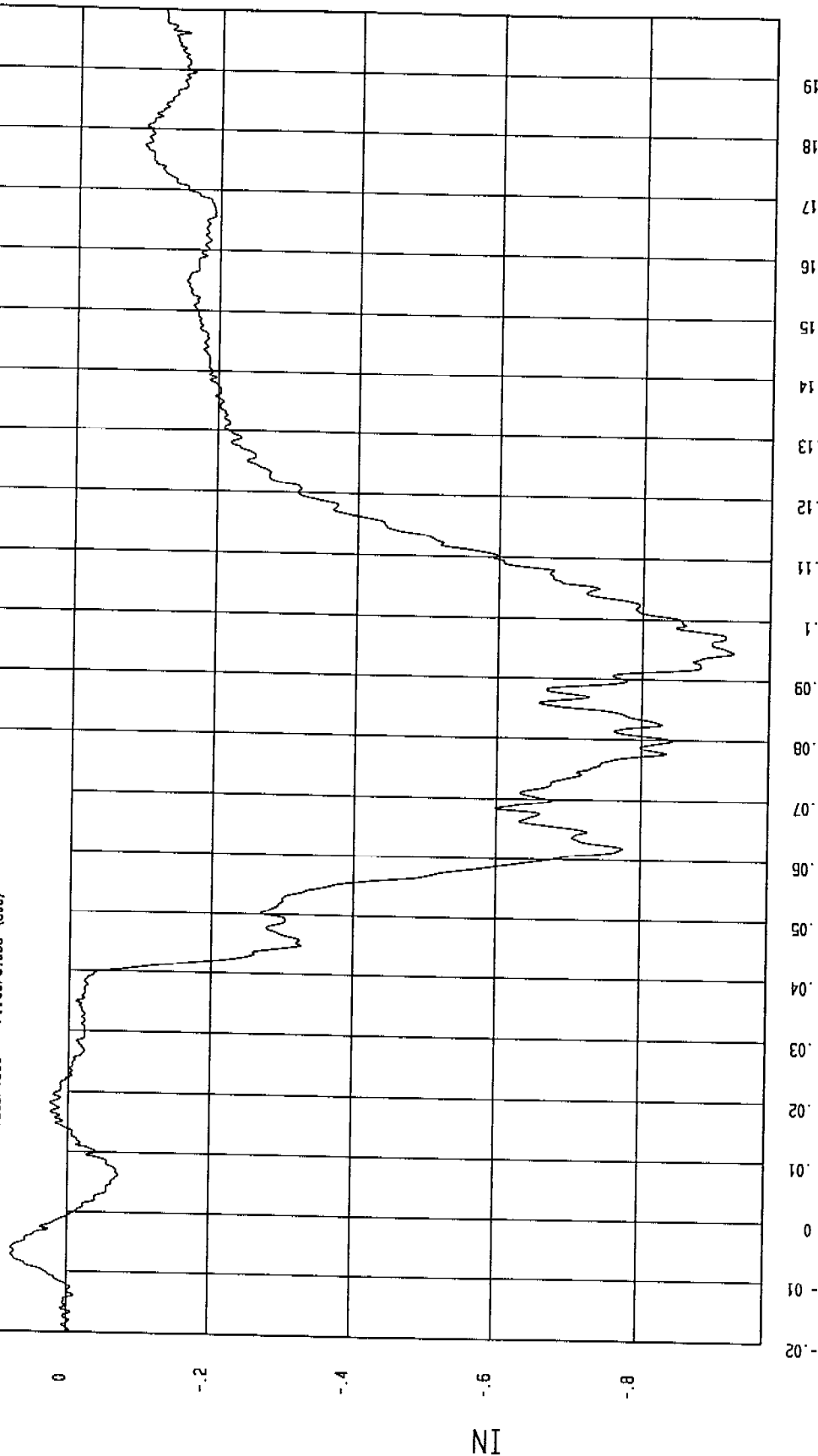
Speed: 29.8 MPH 48 KPH

Minimum = -.93 IN at 94 msec

Maximum = 7.95E-02 IN at -6 msec

DRIVER CHEST COMPRESSION

1 — 8000280F.058 Filterclass (600)

MGA Research
04-09-2000 19:10

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

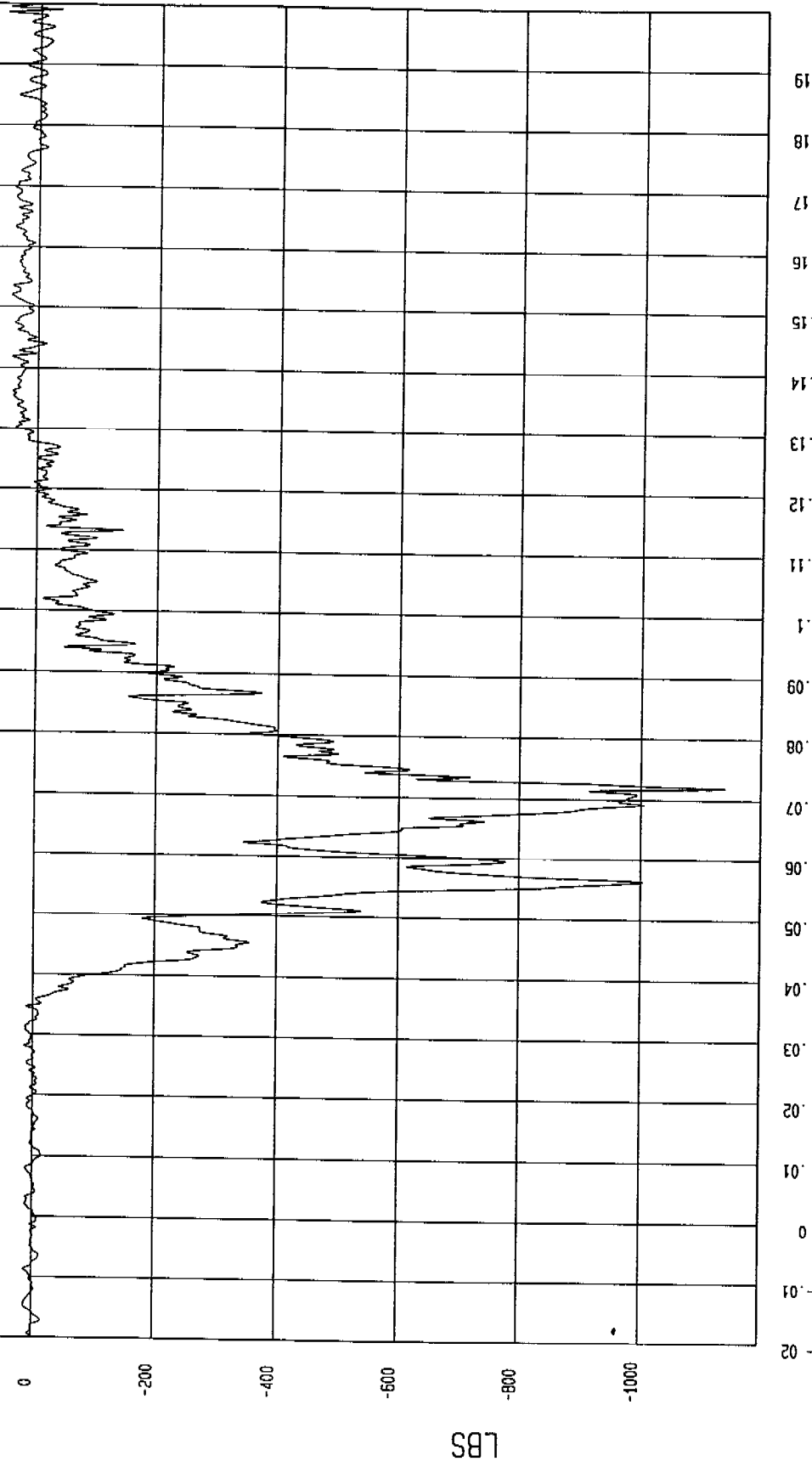
Speed: 29.8 MPH 48 KPH

Minimum = -1138.08 LBS at 72 msec

Maximum = 55.23 LBS at 199 msec

DRIVER LEFT FEMUR FORCE

1 — B00028FF.F19 Filterclass (600)



NSA Research
04-05-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

Speed: 29.8 MPH 48 KPH

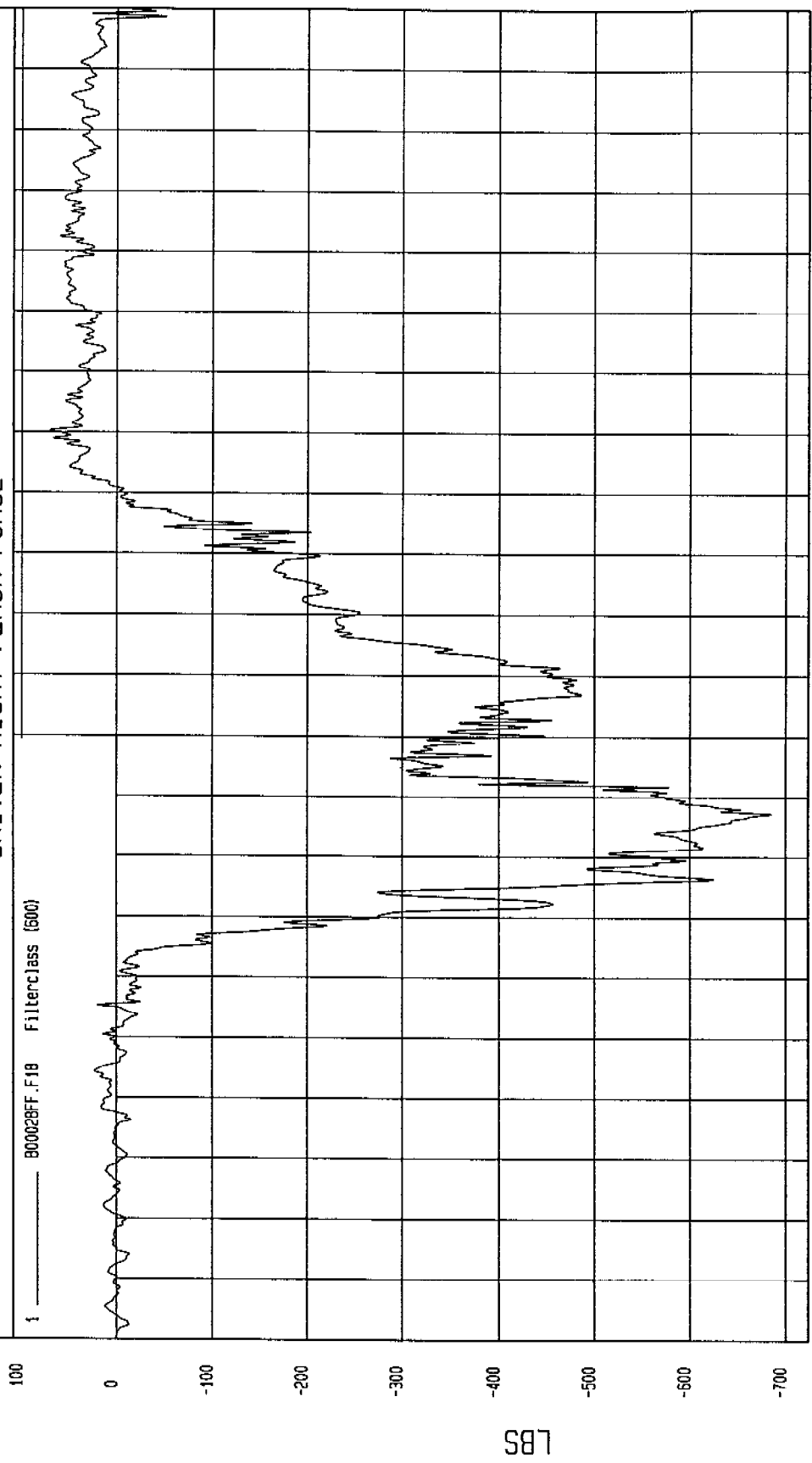
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Minimum = -685.17 LBS at 67 msec

Maximum = 71.08 LBS at 130 msec

DRIVER RIGHT FEMUR FORCE

1 800028FF.F18 Filterclass (500)



NCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

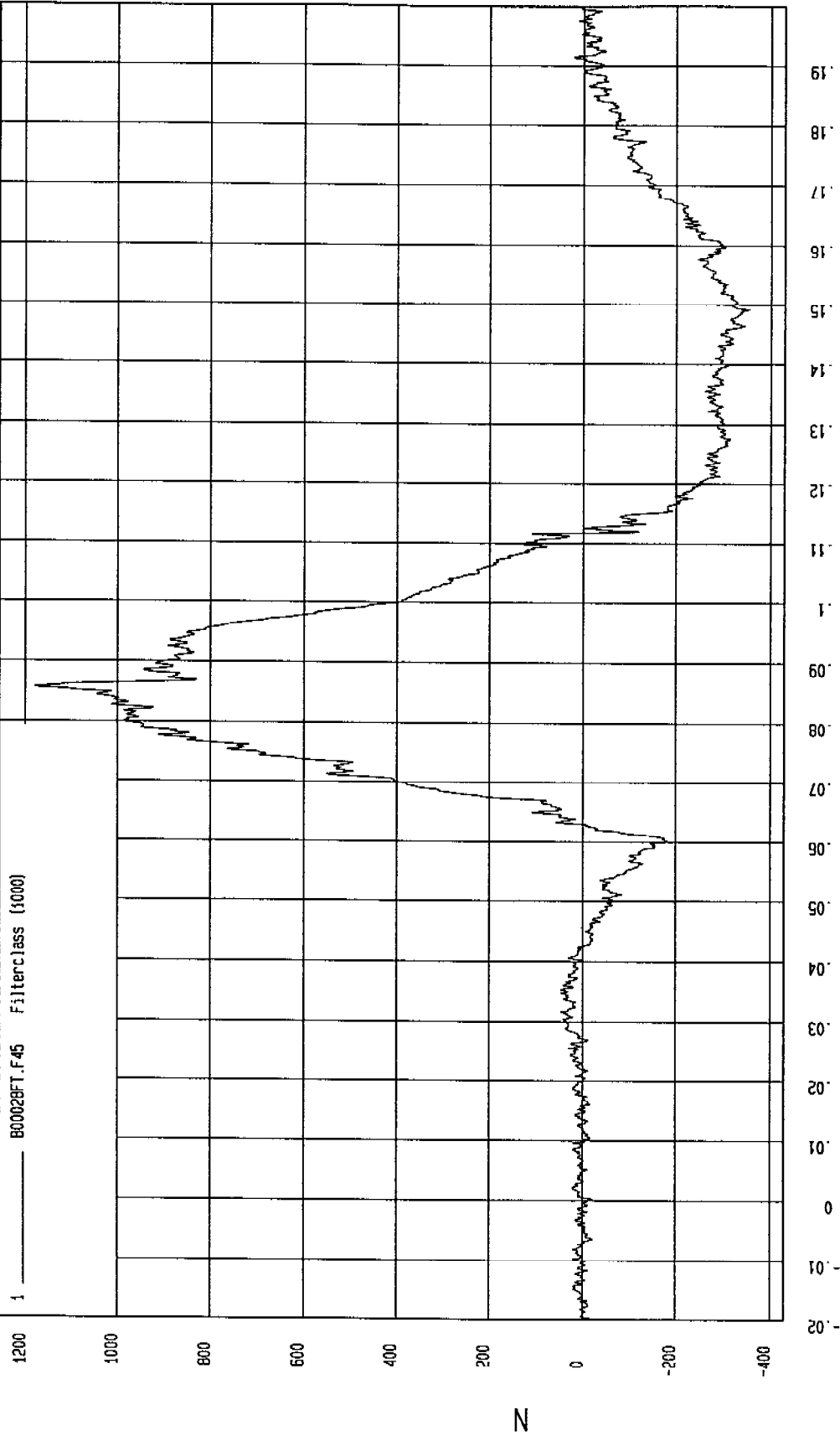
Speed: 29.8 MPH 48 KPH

Minimum = -353.47 N at 149 msec

Maximum = 1179.12 N at 86 msec

DRIVER NECK FORCE X

1 ——— B00028FT.F45 Filterclass (1000)

WCA Research
04-09-2000 18:54

TIME (SECONDS)

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

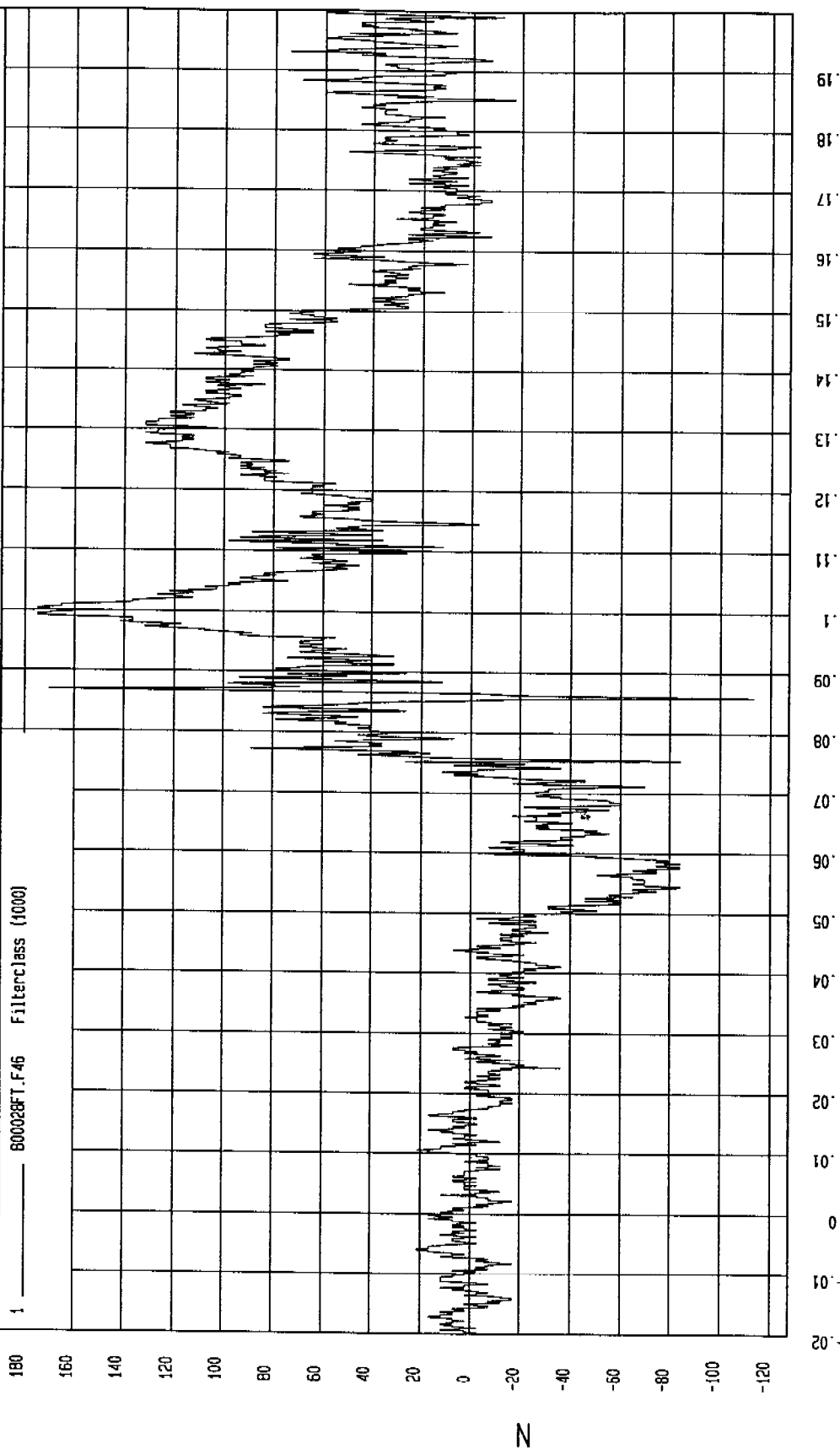
Speed: 29.8 MPH 48 KPH

Minimum = -113.01 N at 86 msec

Maximum = 174.99 N at 99 msec

DRIVER NECK FORCE Y

1 — 800028FT.F46 FilterClass (1000)



TIME (SECONDS)

VCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

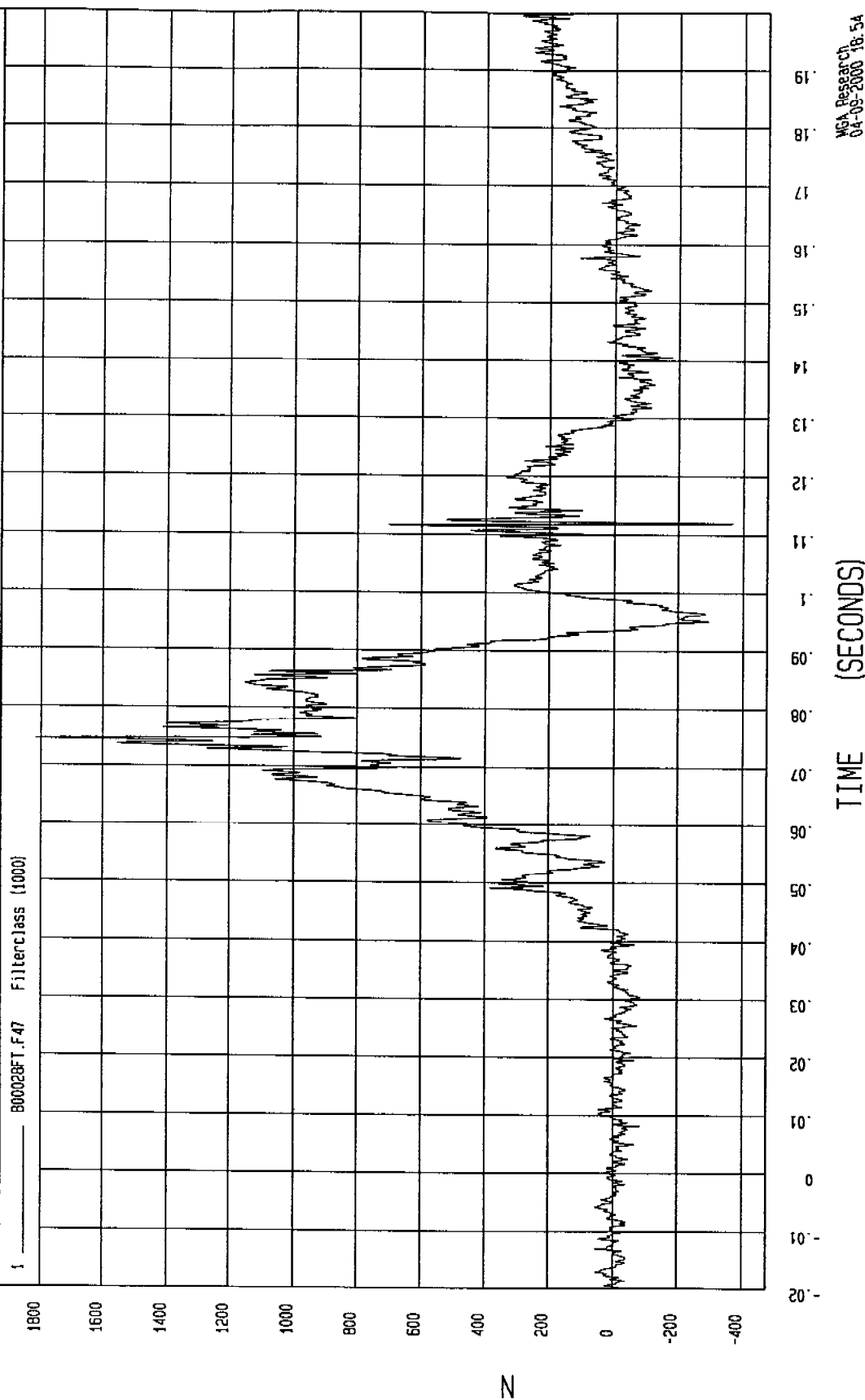
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Speed: 29.8 MPH 48 KPH

Minimum = -366.53 N at 112 msec

Maximum = 1816.52 N at 74 msec

DRIVER NECK FORCE Z



TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

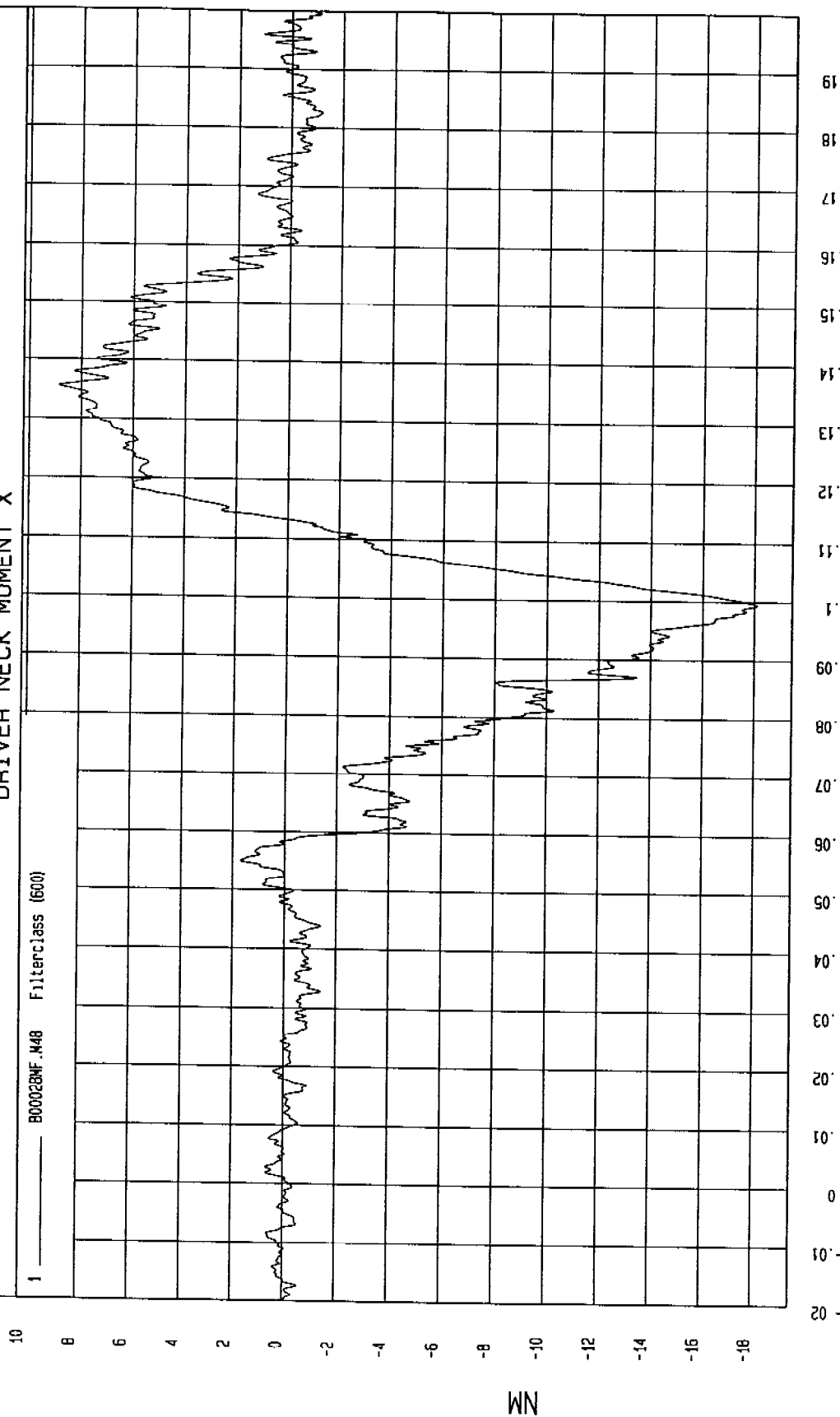
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Speed: 29.8 MPH 48 KPH

Minimum = -18.11 NM at 99 msec

Maximum = 8.87 NM at 136 msec

DRIVER NECK MOMENT X



MGA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

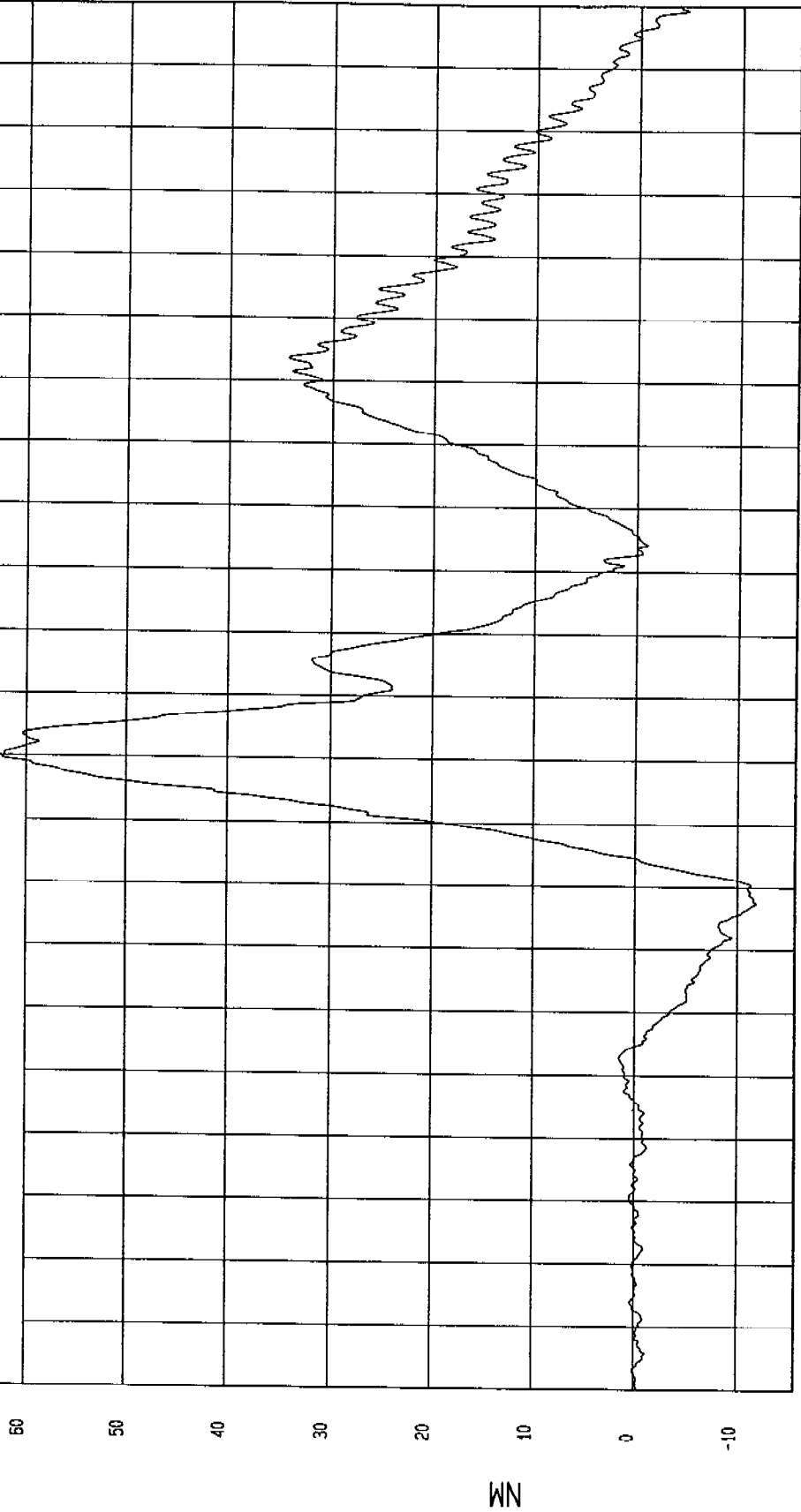
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Minimum = -11.83 NM at 57 msec

Maximum = 62.35 NM at 60 msec

DRIVER NECK MOMENT Y

1 ——— B00029MF.M49 Filterclass (600)



MCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

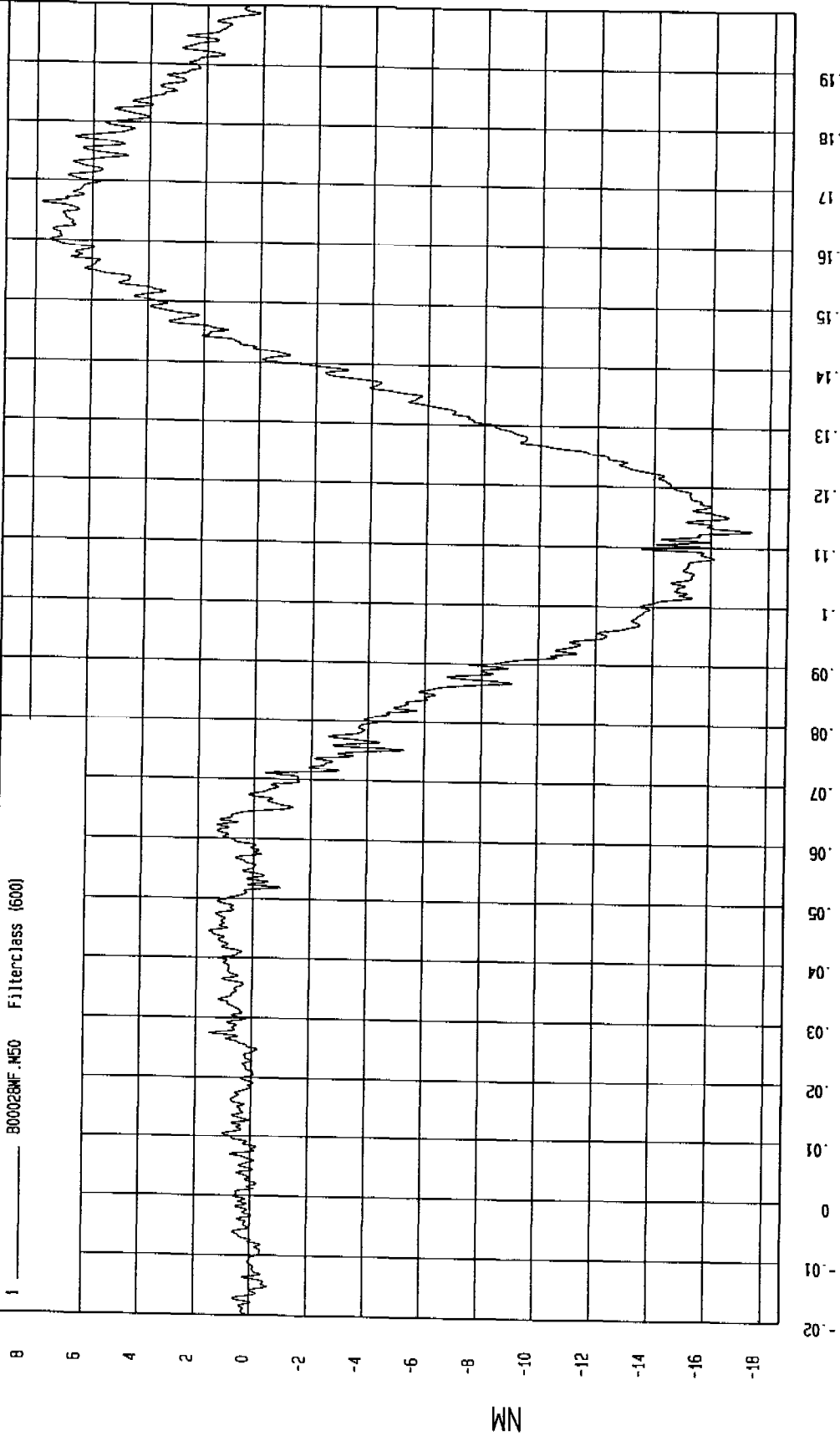
Speed: 29.8 MPH 48 KPH

Minimum = -17.41 NM at 113 msec

Maximum = 7.8 NM at 166 msec

DRIVER NECK MOMENT Z

1 ——— B00028NF.M50 FilterClass (600)



MSA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

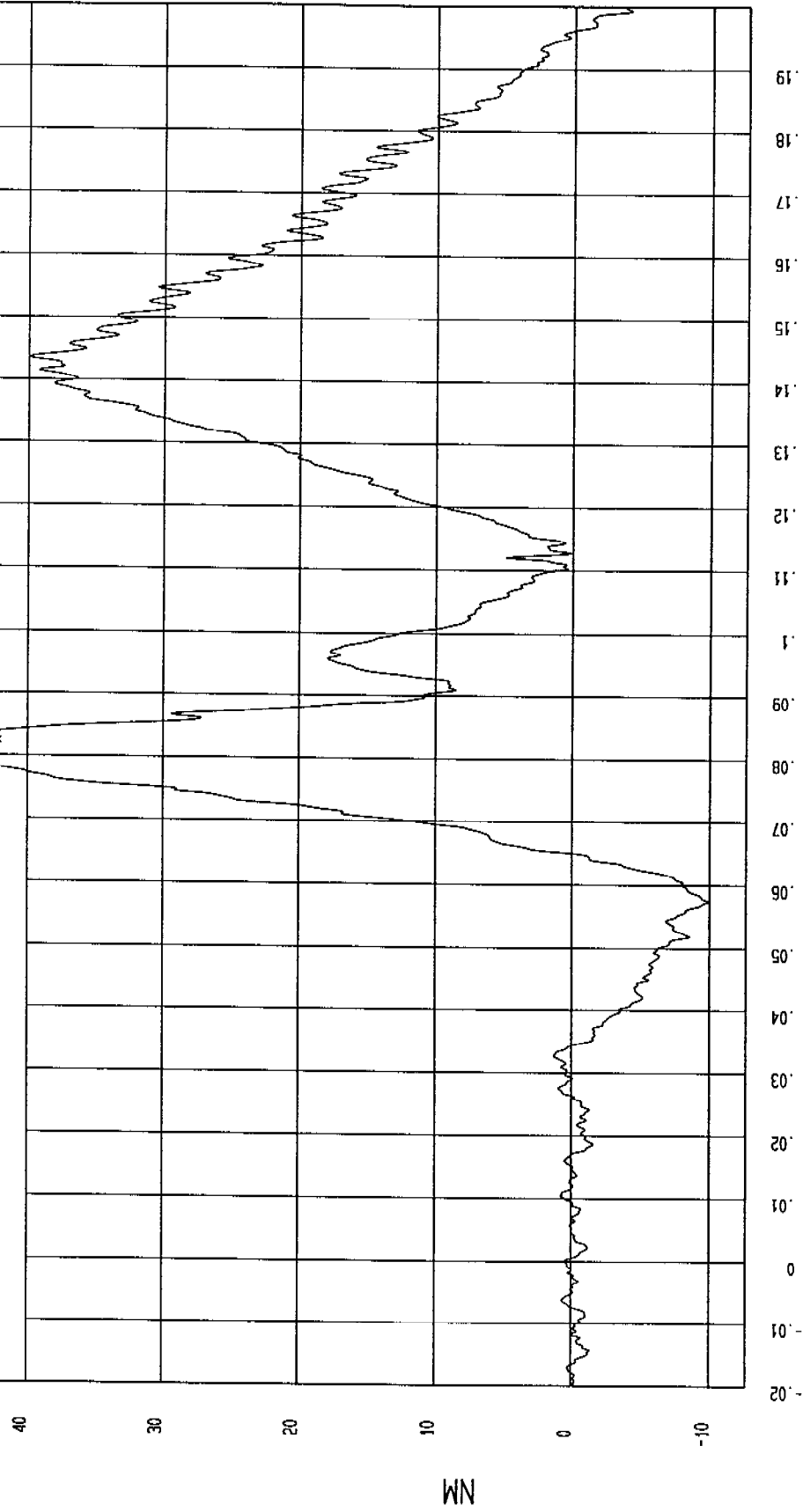
Speed: 29.8 MPH 48 KPH

Minimum = -9.86 NM at 58 msec

Maximum = 45.27 NM at 80 msec

DRIVER OCCIPITAL CONDYLE MOMENT Y

1 — 800028NC.M49 Filterclass (500)



HGA Research
04-09-2000 18:54

TIME (SECONDS)

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

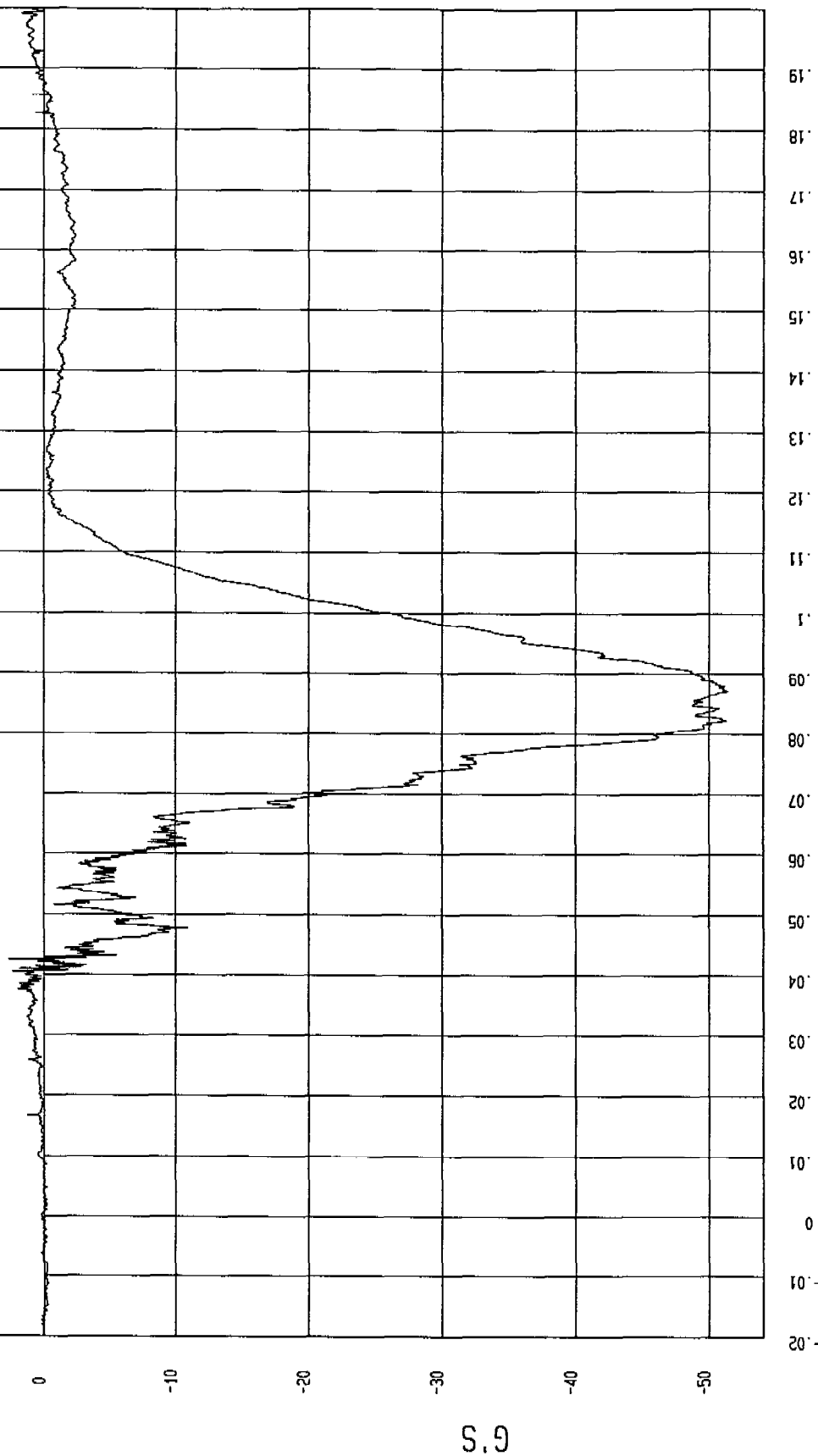
Speed: 29.8 MPH 48 KPH

Minimum = -51.41 G's at 87 msec

Maximum = 2.64 G's at 42 msec

PASSENGER HEAD X ACCELERATION

1 ——— B00028AT.A22 FilterClass (1000)

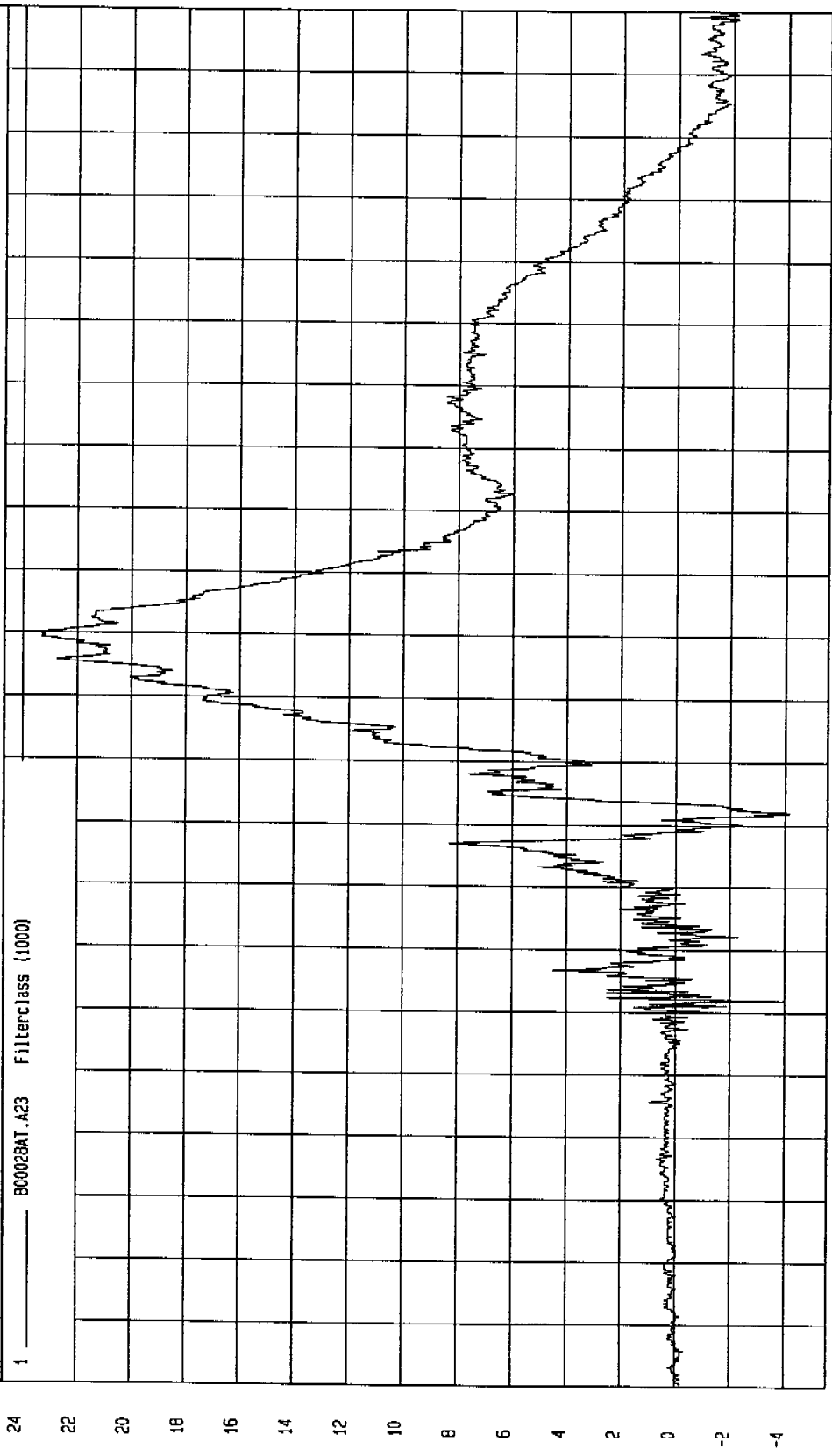


TIME (SECONDS)

MCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER
TEST DATE: 04-11-2000
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)
Speed: 29.8 MPH 48 KPH
Minimum = -4.15 G'S at 72 msec
Maximum = 23.31 G'S at 99 msec

PASSENGER HEAD Y ACCELERATION



MCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY010B)

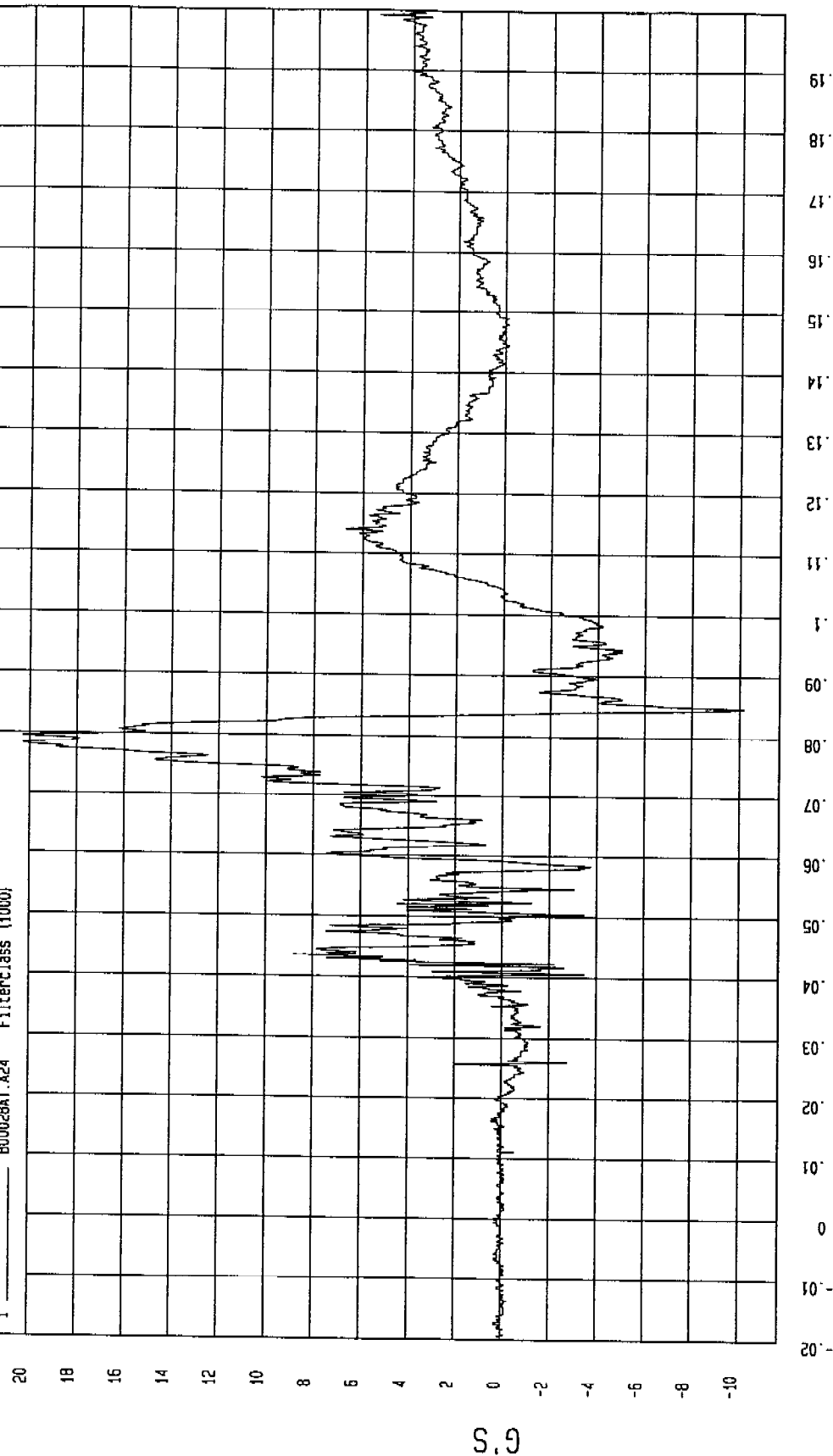
Speed: 29.8 MPH 48 KPH

Minimum = -10.19 G'S at 85 msec

Maximum = 20.28 G'S at 78 msec

PASSENGER HEAD Z ACCELERATION

1 B00028AT.A24 Filterclass (1000)



TIME (SECONDS)

MCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

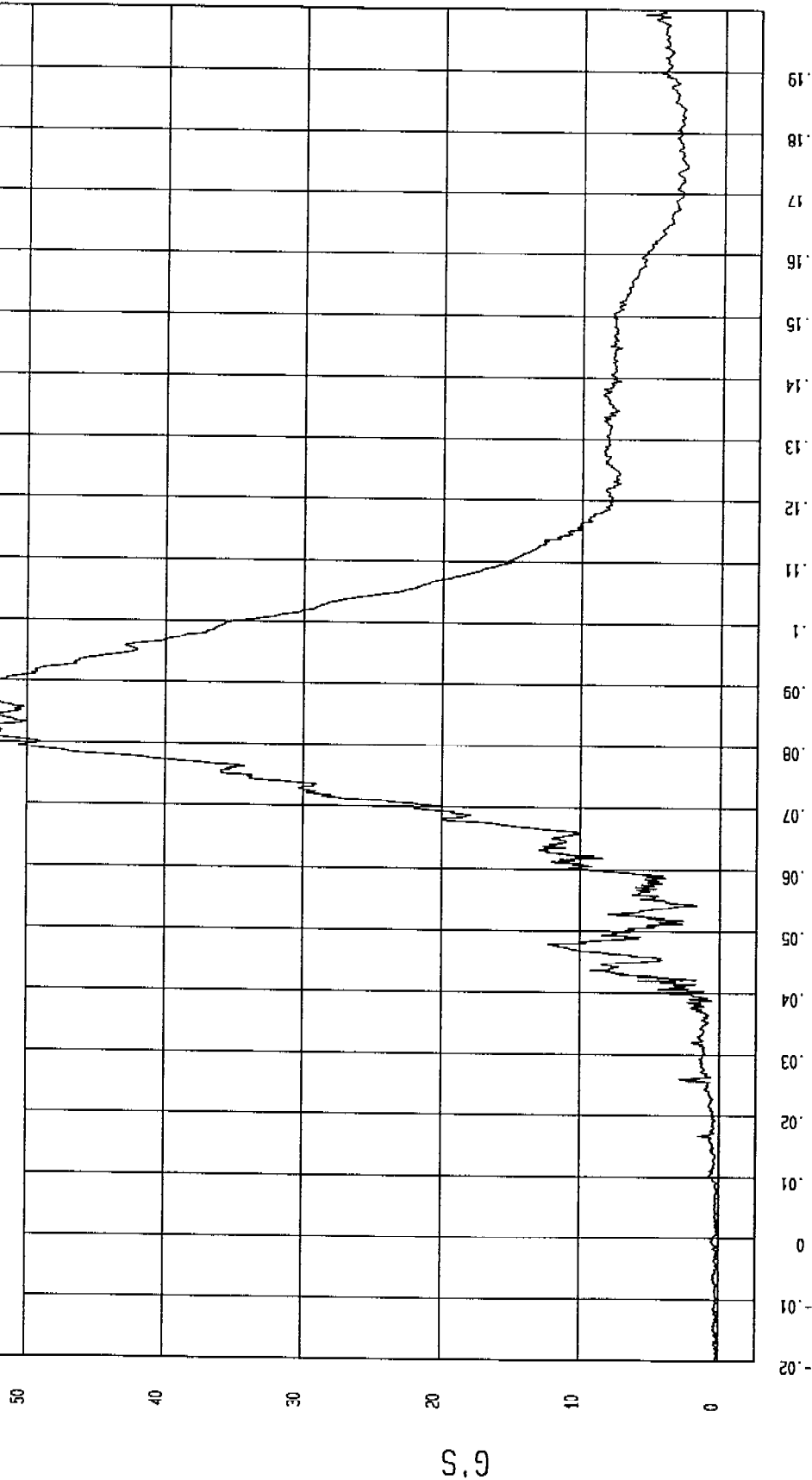
Speed: 29.8 MPH 48 KPH

Minimum = 7.56E-02 G'S at -19 msec

Maximum = 53.26 G'S at 87 msec

PASSENGER HEAD RESULTANT ACCELERATION

1 — 800028AV.A22 Filterclass (1000)



TIME (SECONDS)

WCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Speed: 29.8 MPH 48 KPH

Minimum = -51.85 G'S at 82 msec

Maximum = 2.42 G'S at 141 msec

PASSENGER CHEST X ACCELERATION

1 80002BAF.A25 Filterclass (180)

0

-10

-20

-30

-40

-50

G.S

TIME (SECONDS)

MGA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

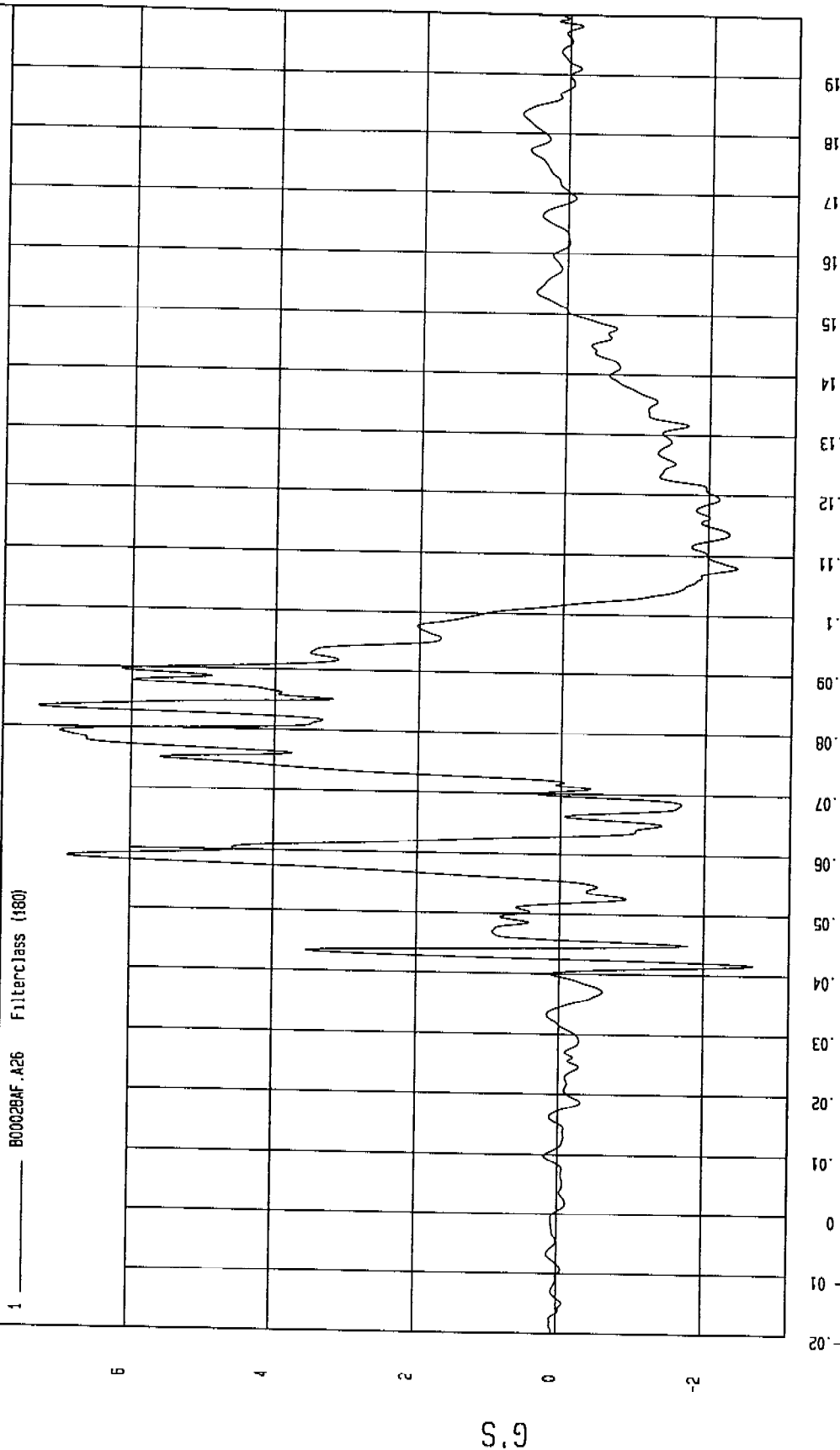
Speed: 29.8 MPH 48 KPH

Minimum = -2.68 G'S at 42 msec

Maximum = 7.3 G'S at 83 msec

PASSENGER CHEST Y ACCELERATION

1 B0002BAF.A26 FilterClass (180)

WCA Research
04-09-2000 18:54

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

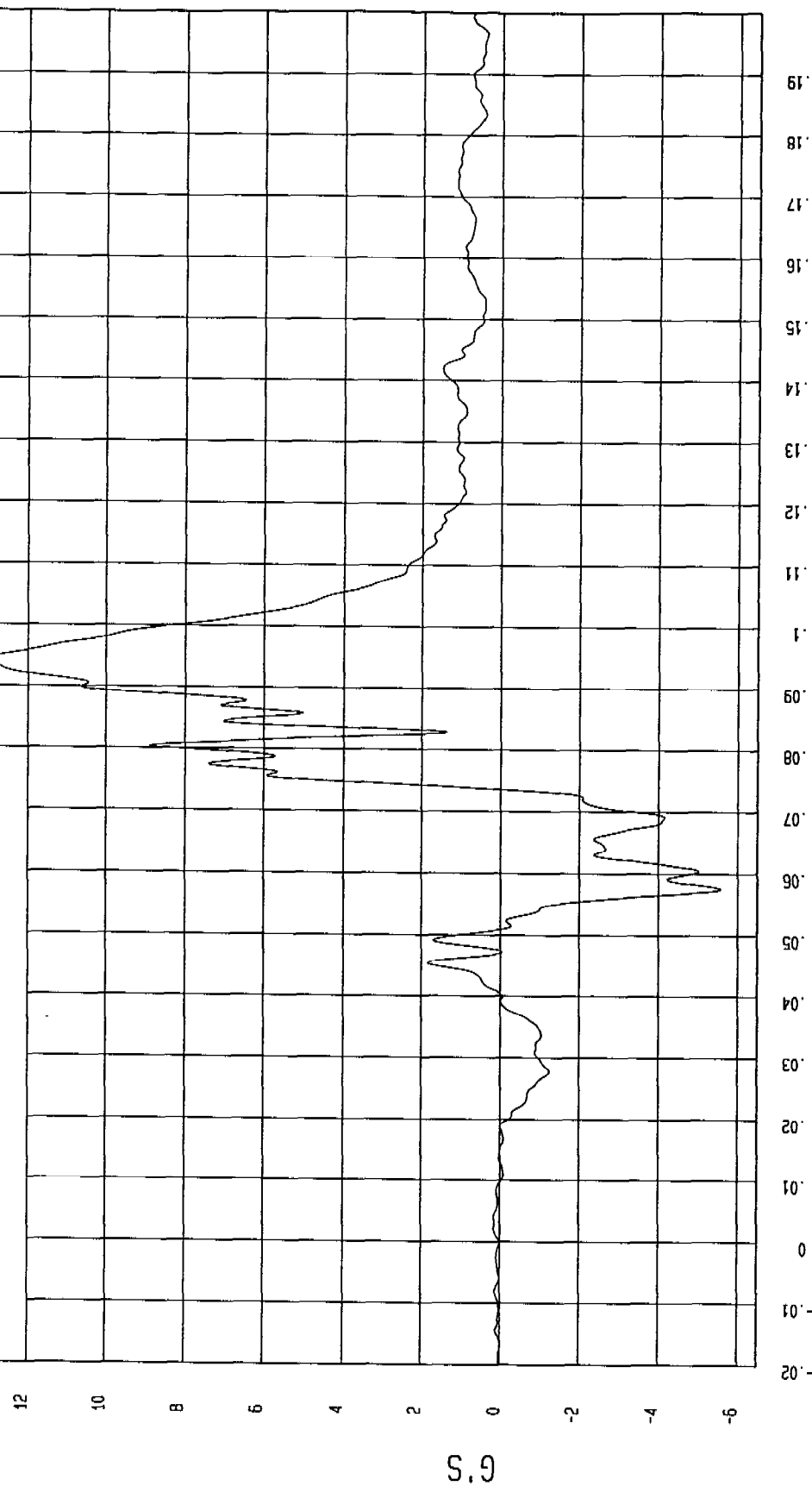
Speed: 29.8 MPH 48 KPH

Minimum = -5.57 G'S at 58 msec

Maximum = 12.99 G'S at 94 msec

PASSENGER CHEST Z ACCELERATION

1 800028AF.A27 FilterClass (180)



TIME (SECONDS)

MGA Research
04-09-2000 18:54

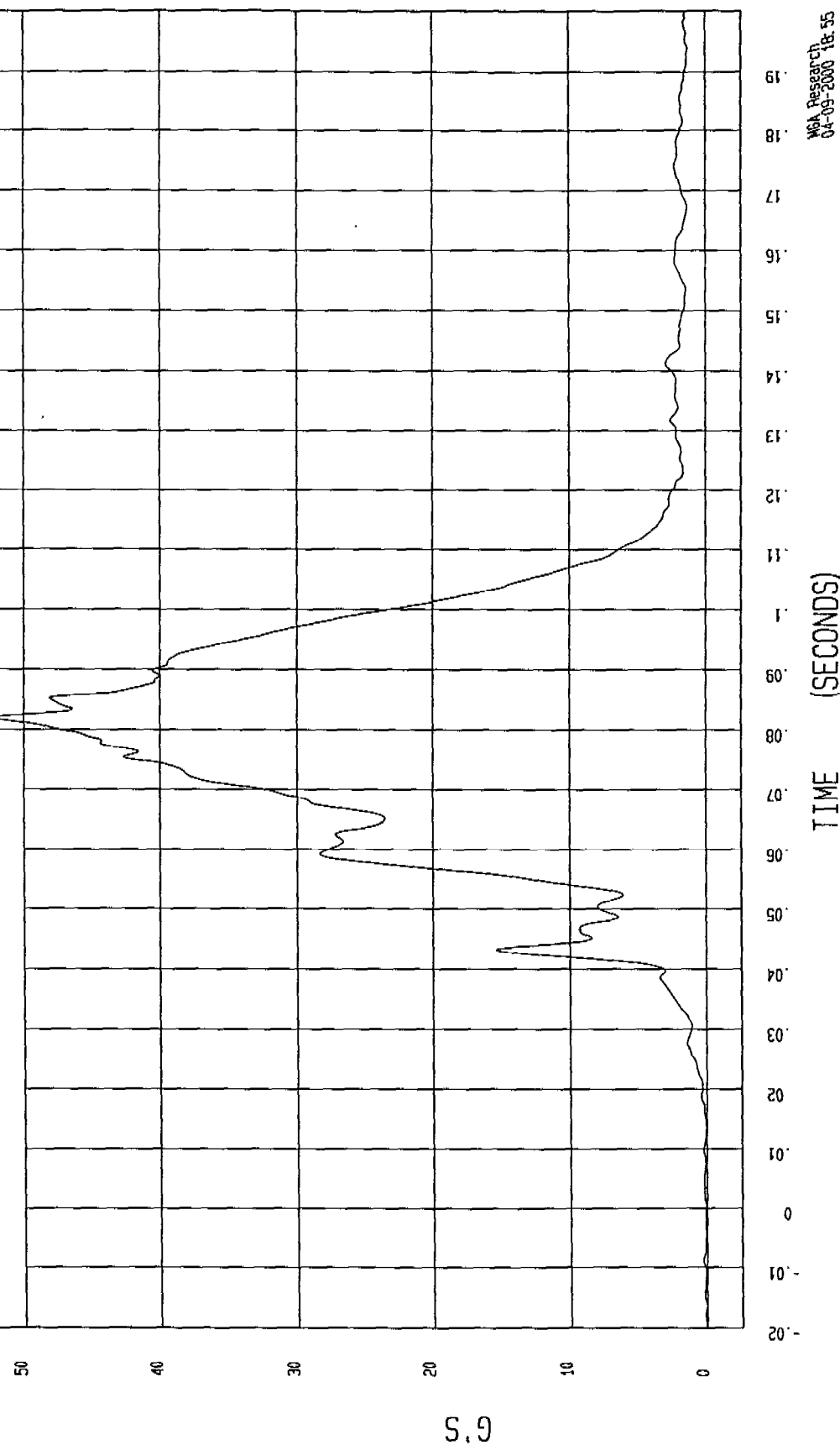
TEST: FMVSS 208 BARRIER TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108) Speed: 29.8 MPH 48 KPH

Minimum = 2.27E-02 G'S at -16 msec Maximum = 52.21 G'S at 82 msec

PASSENGER CHEST RESULTANT ACCELERATION

1 _____ 800028AV.A25 FilterClass (180)

WCA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY010B)

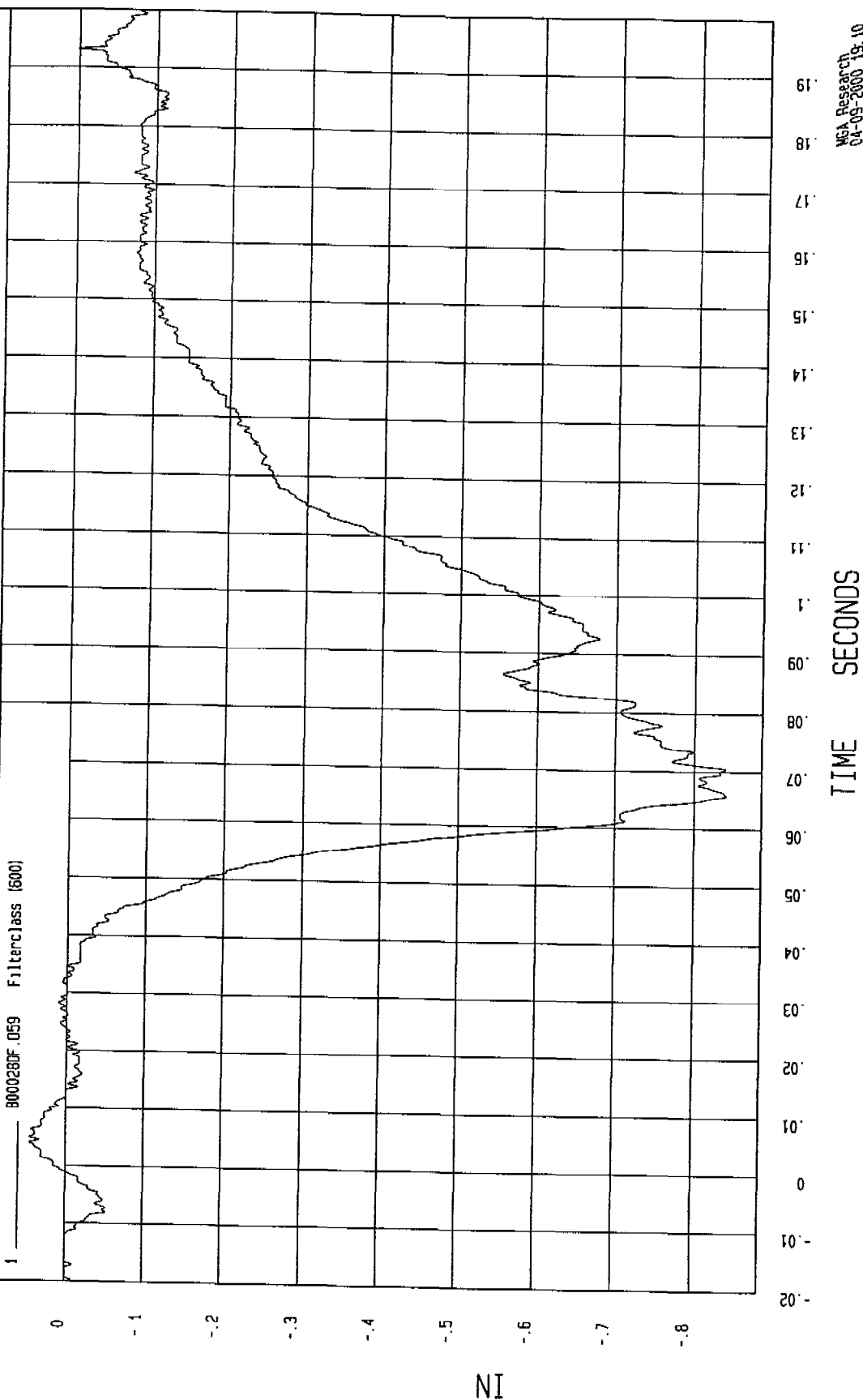
Speed: 29.8 MPH 48 KPH

Minimum = -.84 IN at 56 msec

Maximum = 4.68E-02 IN at 5 msec

PASSENGER CHEST COMPRESSION

1 8000280F.059 Filterclass (500)

MCA Research
04-09-2000 19:10

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

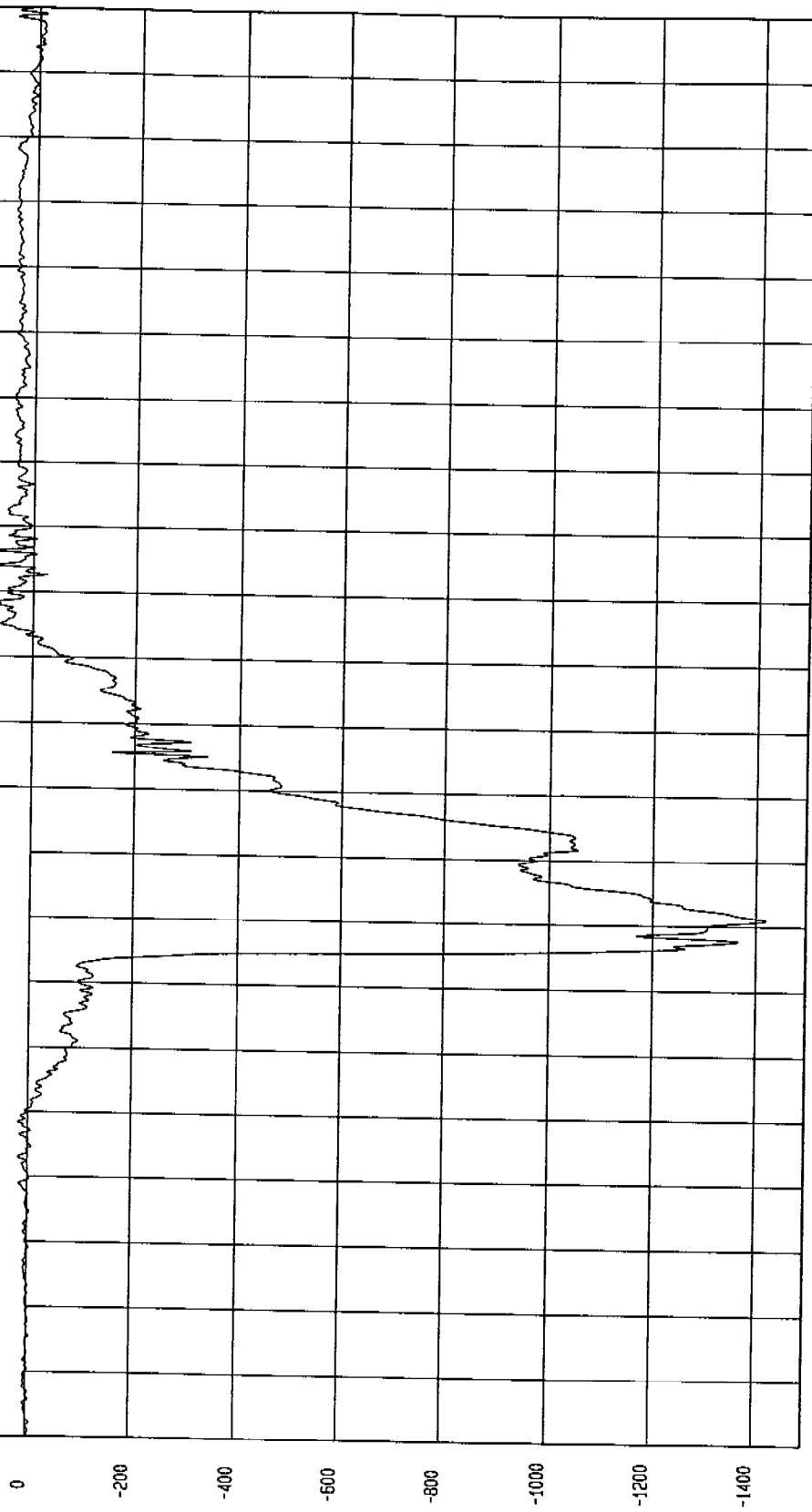
Speed: 29.8 MPH 48 KPH

Minimum = -1419.03 LBS at 61 msec

Maximum = 80.89 LBS at 114 msec

PASSENGER LEFT FEMUR FORCE

1 800029FF.F29 Filterclass (600)



MCA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

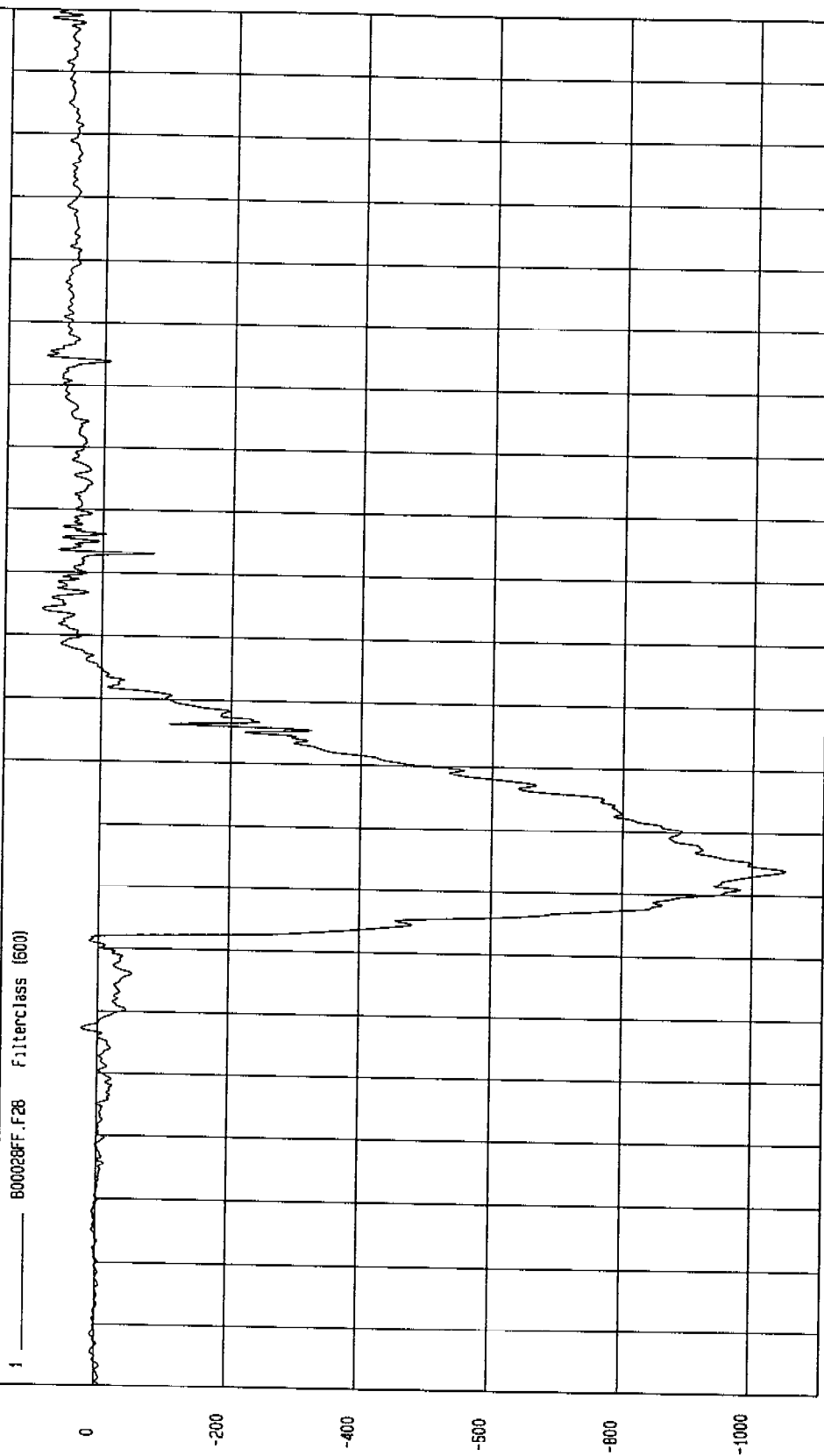
Speed: 29.8 MPH 48 KPH

Minimum = -1051.56 LBS at 64 msec

Maximum = 92.25 LBS at 104 msec

PASSENGER RIGHT FEMUR FORCE

1 — 600028FF.F28 Filterclass (500)



MCA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

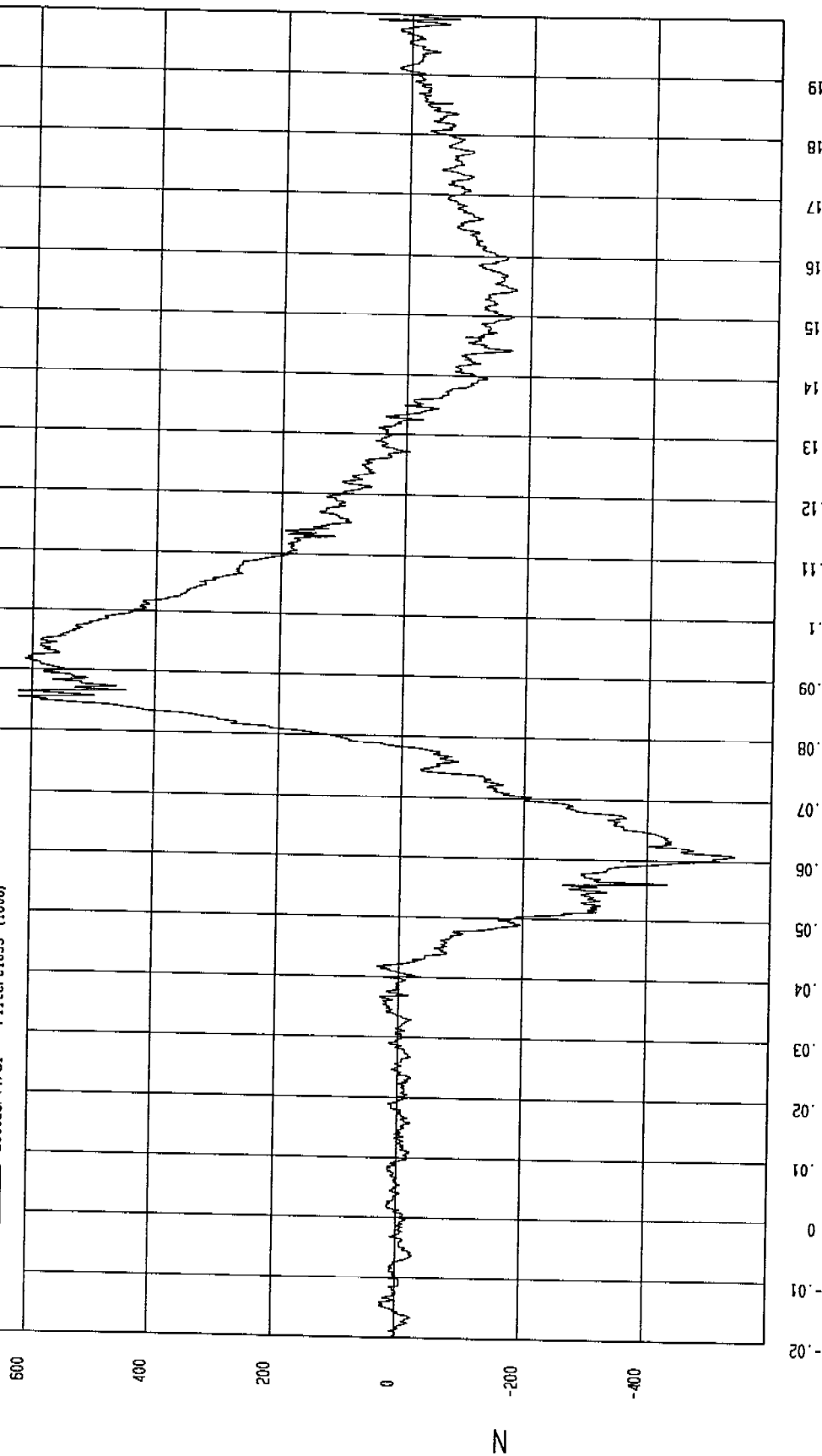
Speed: 29.8 MPH 48 KPH

Minimum = -541.75 N at 61 msec

Maximum = 622.31 N at 85 msec

PASSENGER NECK FORCE X

1 — B00029FT.F51 Filterclass (1000)

WCA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

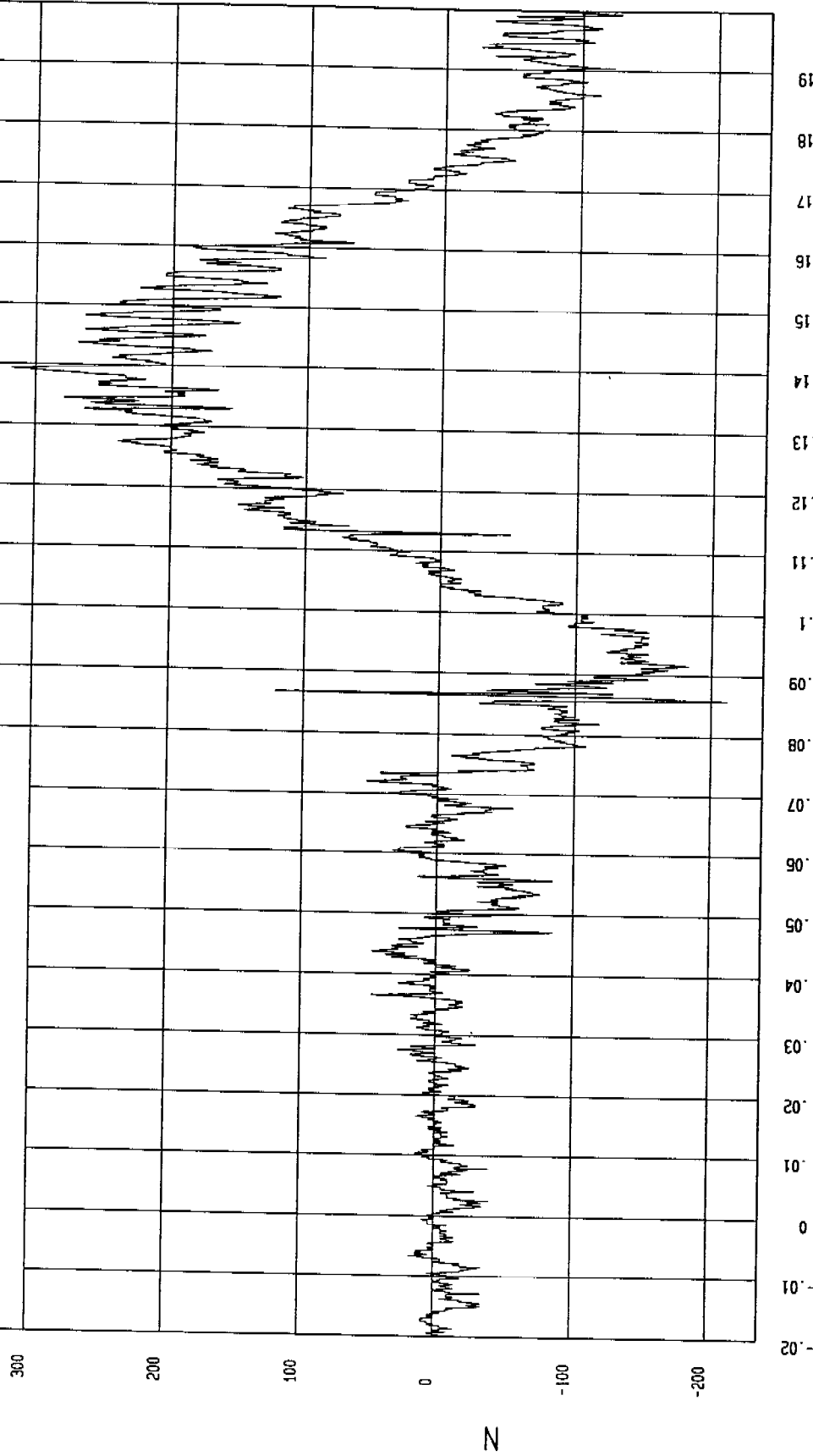
Speed: 29.8 MPH 48 KPH

Minimum = -211.71 N at 86 msec

Maximum = 318.25 N at 139 msec

PASSENGER NECK FORCE Y

1 ——— B00028FT.F52 Filterclass (1000)



NCA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

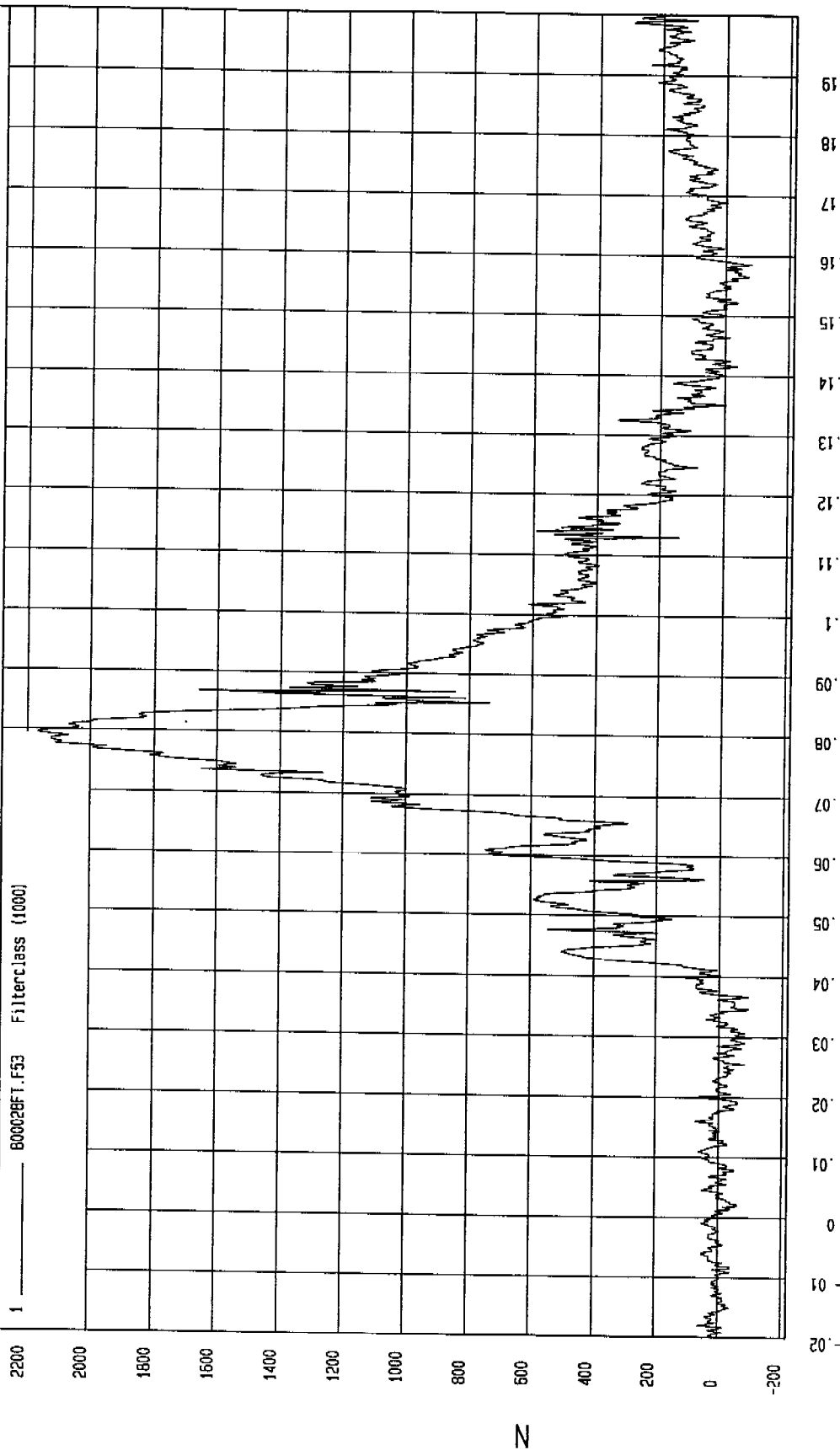
Speed: 29.8 MPH 48 KPH

Minimum = -103.17 N at 30 msec

Maximum = 2169.18 N at 80 msec

PASSENGER NECK FORCE Z

1 — 800028FT.F53 Filterclass (1000)

WCA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

Speed: 29.8 MPH 48 KPH

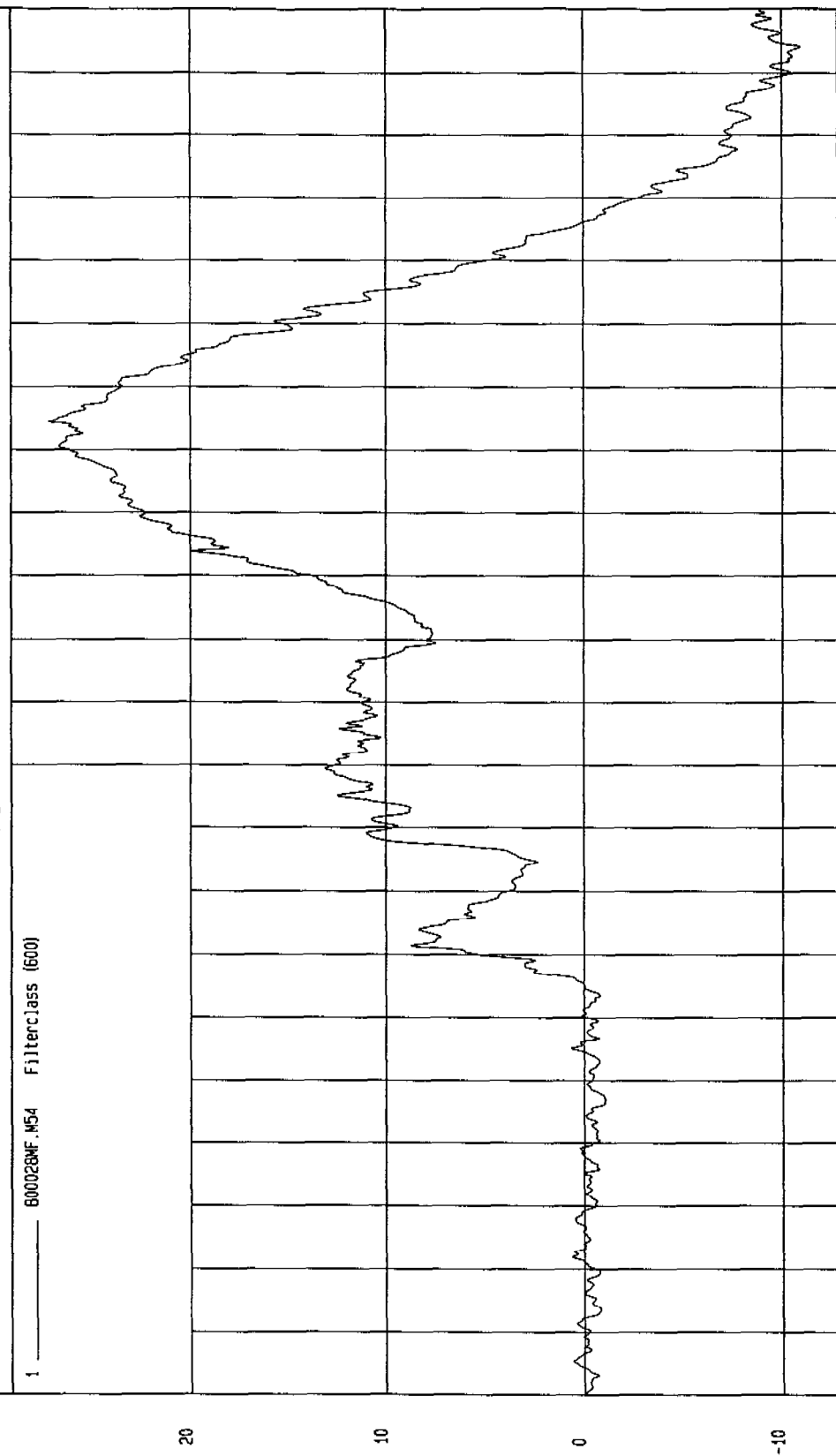
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Maximum = 27.21 NM at 134 msec

Minimum = -10.94 NM at 194 msec

PASSENGER NECK MOMENT X

1 — 600028NF.M54 Filterclass (600)



MCA Research
04-09-2000 18:55

TIME (SECONDS)

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

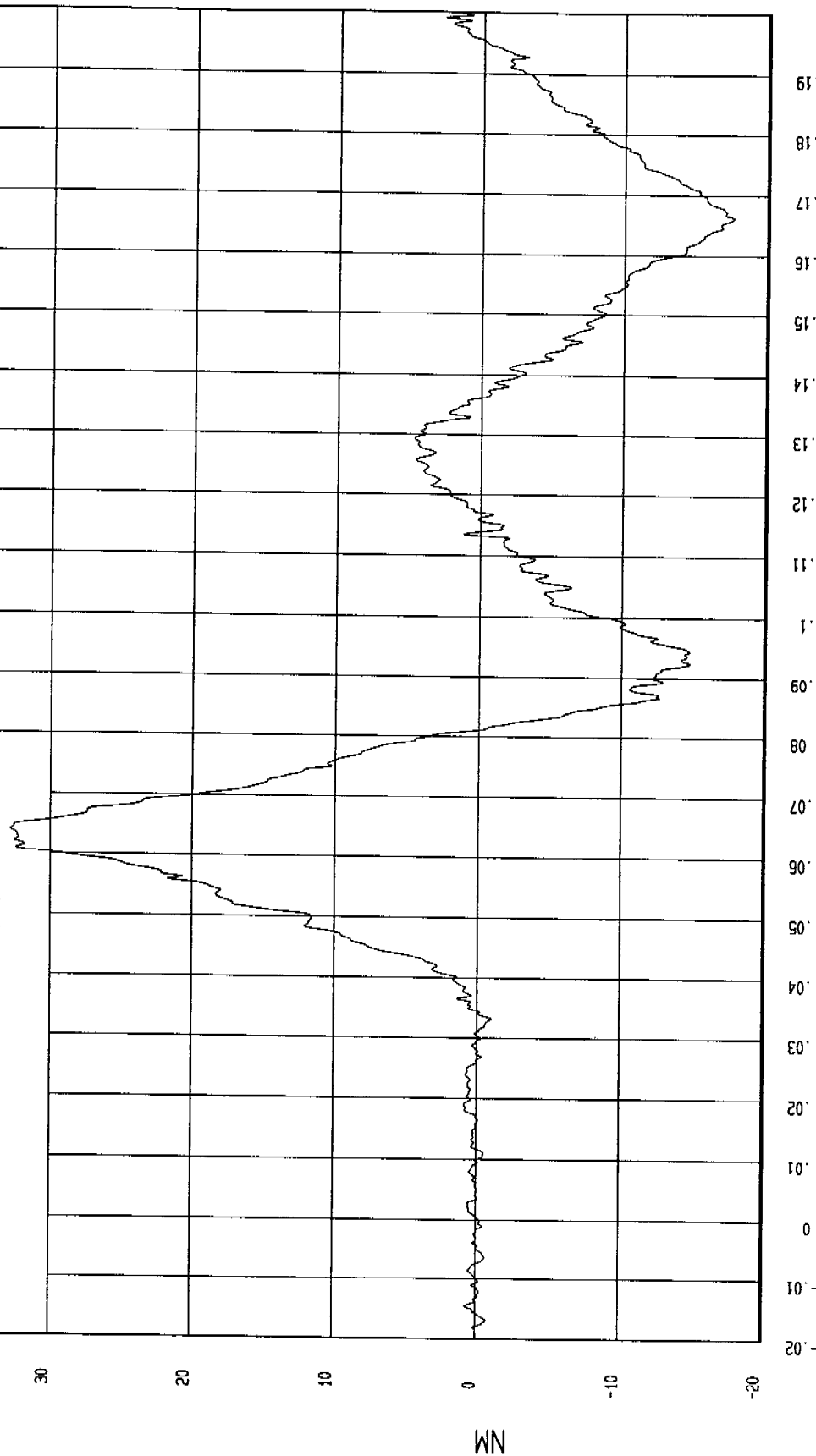
Speed: 29.8 MPH 48 KPH

Minimum = -17.64 NM at 166 msec

Maximum = 32.68 NM at 54 msec

PASSENGER NECK MOMENT Y

1 80002DMF.M65 Filterclass (500)



TIME (SECONDS)

MGA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

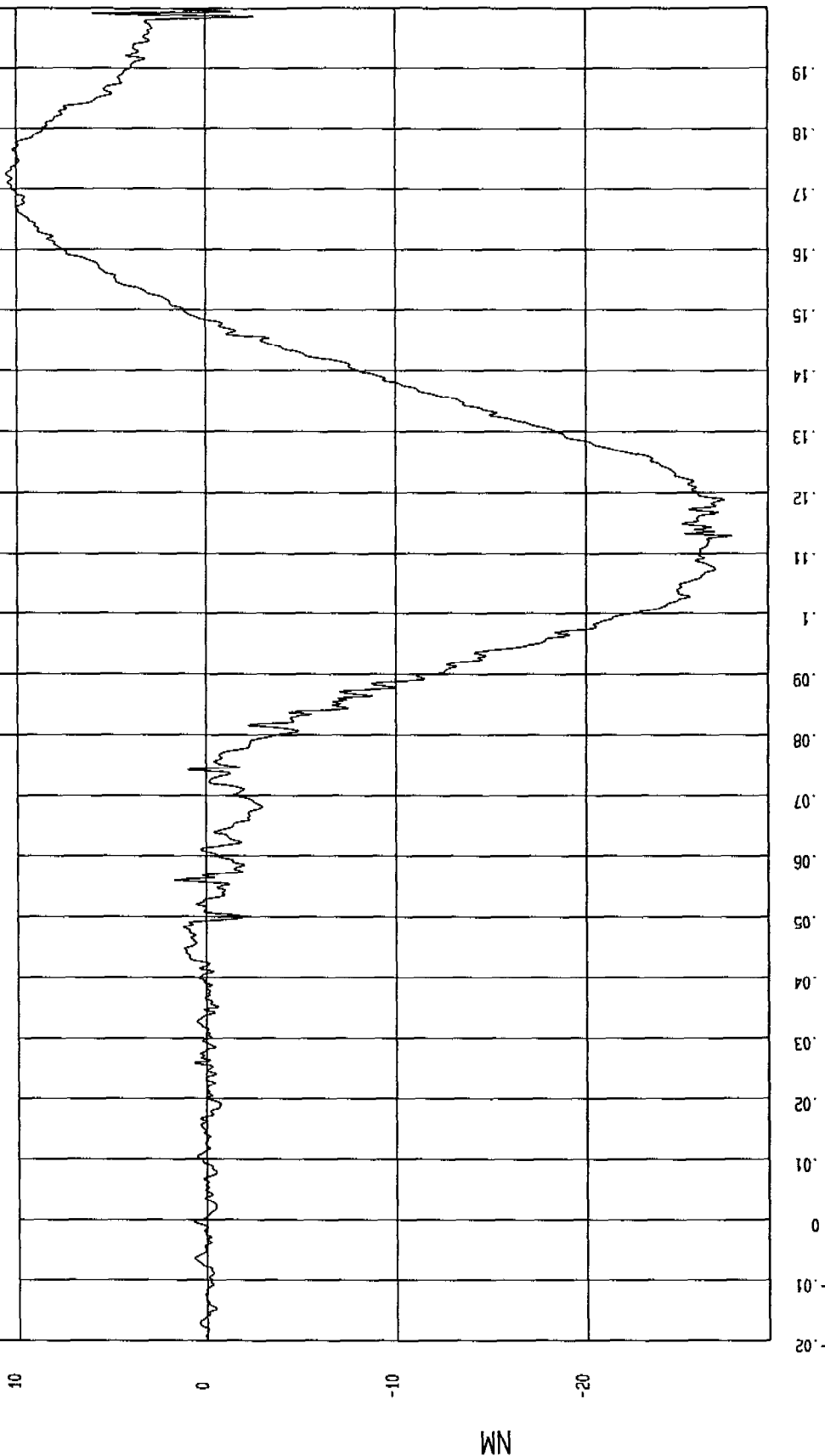
Speed: 29.8 MPH 48 KPH

Minimum = -27.55 NM at 113 msec

Maximum = 10.55 NM at 173 msec

PASSENGER NECK MOMENT Z

1 — 800028NF.M56 Filterclass (600)



MGA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

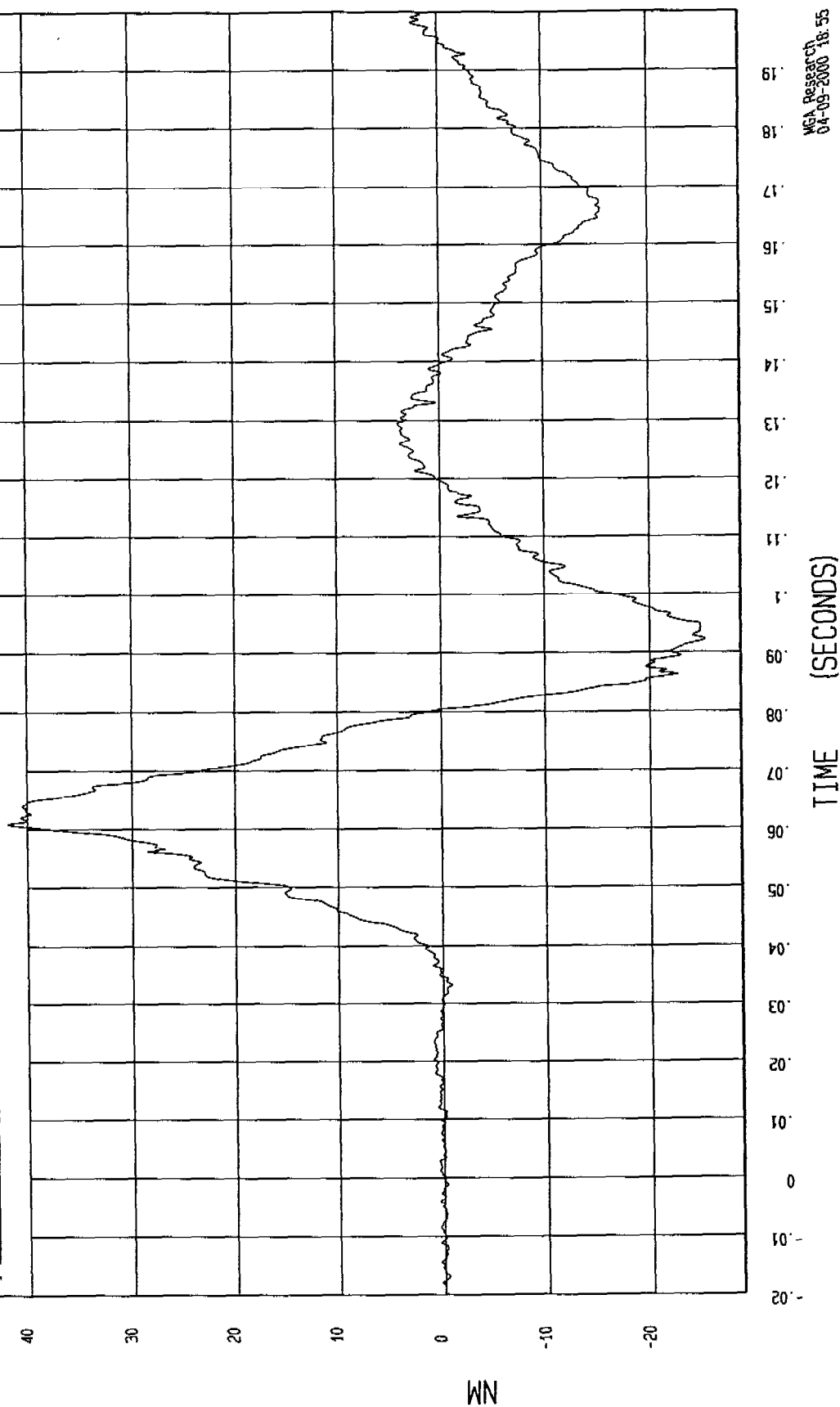
Speed: 29.8 MPH 48 KPH

Minimum = -25.32 NM at 92 msec

Maximum = 42 NM at 61 msec

PASSENGER OCCIPITAL CONDYLE MOMENT Y

1 _____ B00028ND.M55 Filterclass (500)

MCA Research
04-09-2000 18:55

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

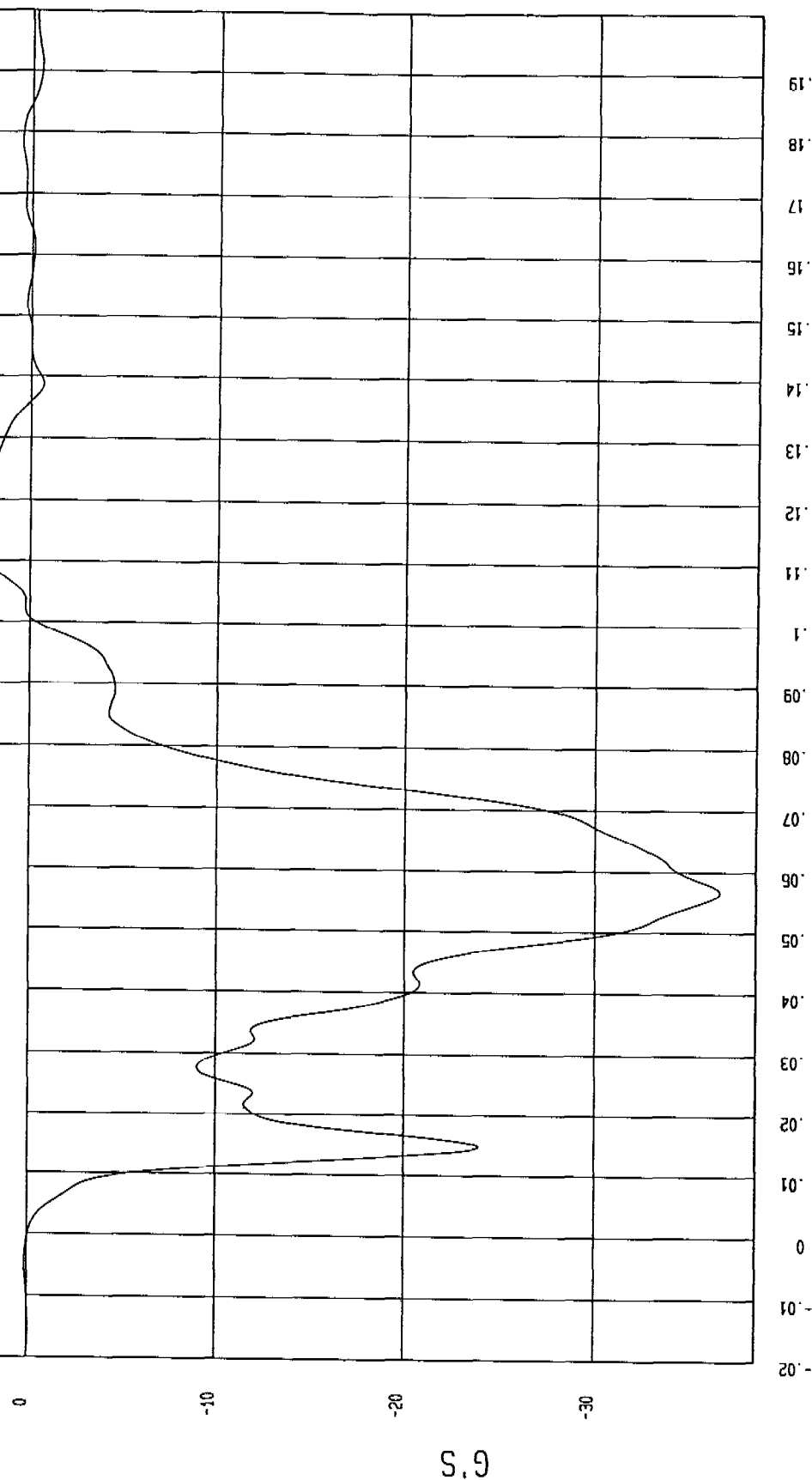
Speed: 29.8 MPH 48 KPH

Minimum = -36.5 G'S at 57 msec

Maximum = 2.35 G'S at 111 msec

LEFT REAR SEAT CROSSMEMBER X ACCELERATION

1 ——— 800028AF.A30 Filterclass (60)

WGA Research
04-09-2000 18:43

TIME (SECONDS)

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

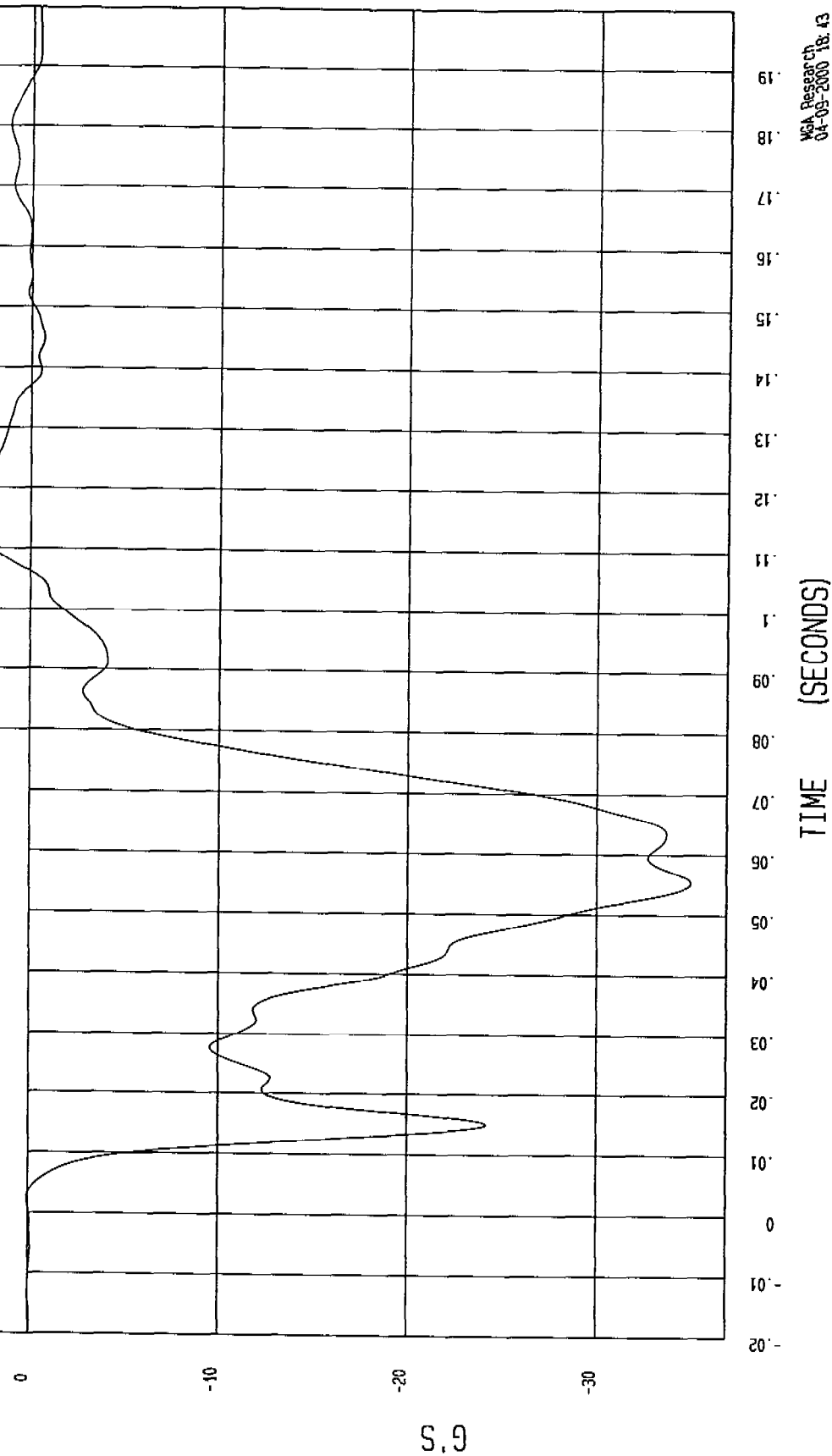
Speed: 29.8 MPH 48 KPH

Minimum = -34.89 G'S at 55 msec

Maximum = 3.05 G'S at 119 msec

RIGHT REAR SEAT CROSSMEMBER X ACCELERATION

1 ——— B00020MF.A20 Filterclass (60)

MGA Research
04-09-2000 18:43

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

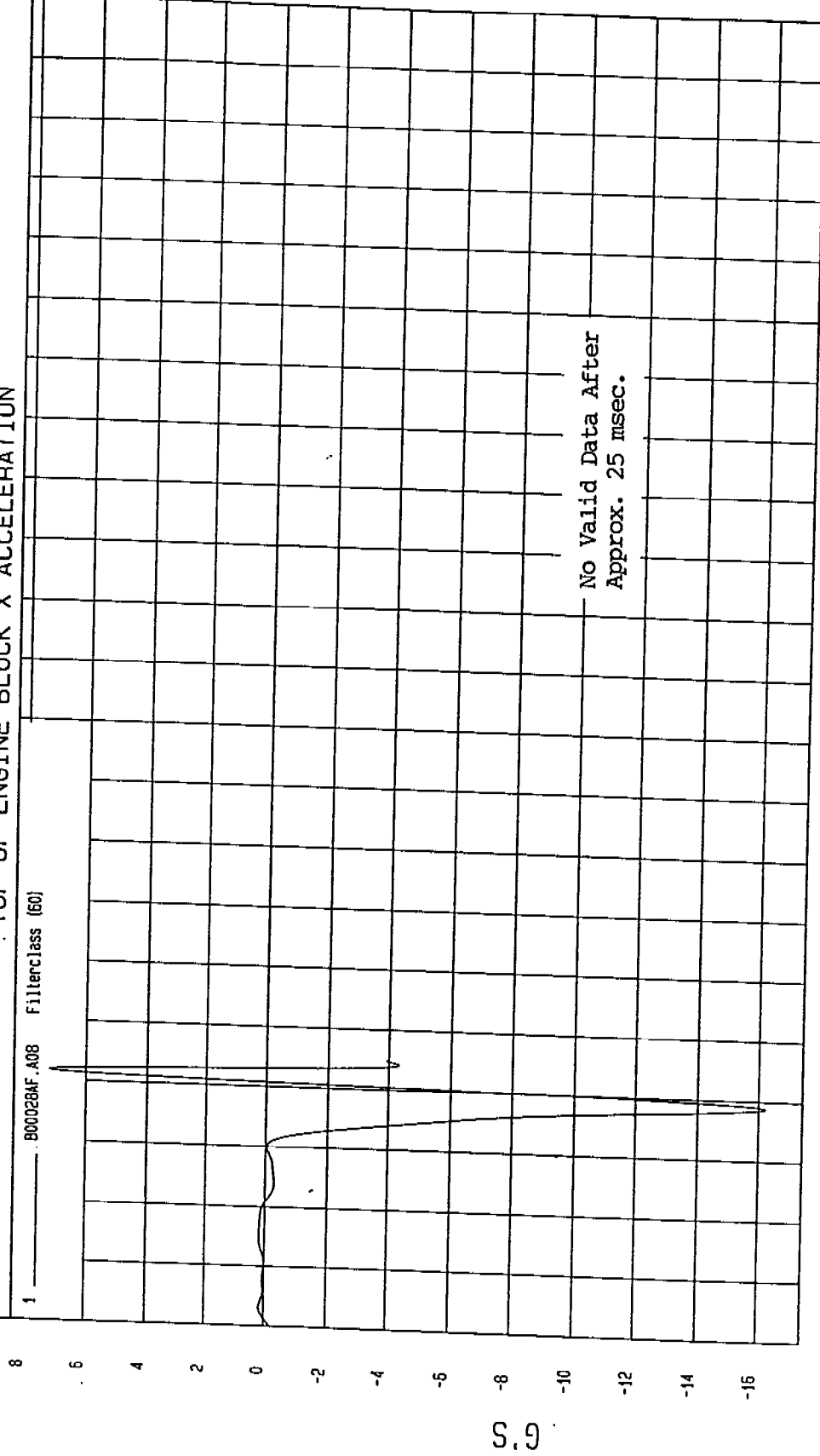
Speed: 29.8 MPH 48 KPH

Minimum = -16.24 G'S at 19 msec

Maximum = 7.21 G'S at 22 msec

TOP OF ENGINE BLOCK X ACCELERATION

1 B00028AF.A08 Filterclass (60)



TIME (SECONDS)

MGA Research
04-09-2000 18:51

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

Speed: 29.8 MPH 48 KPH

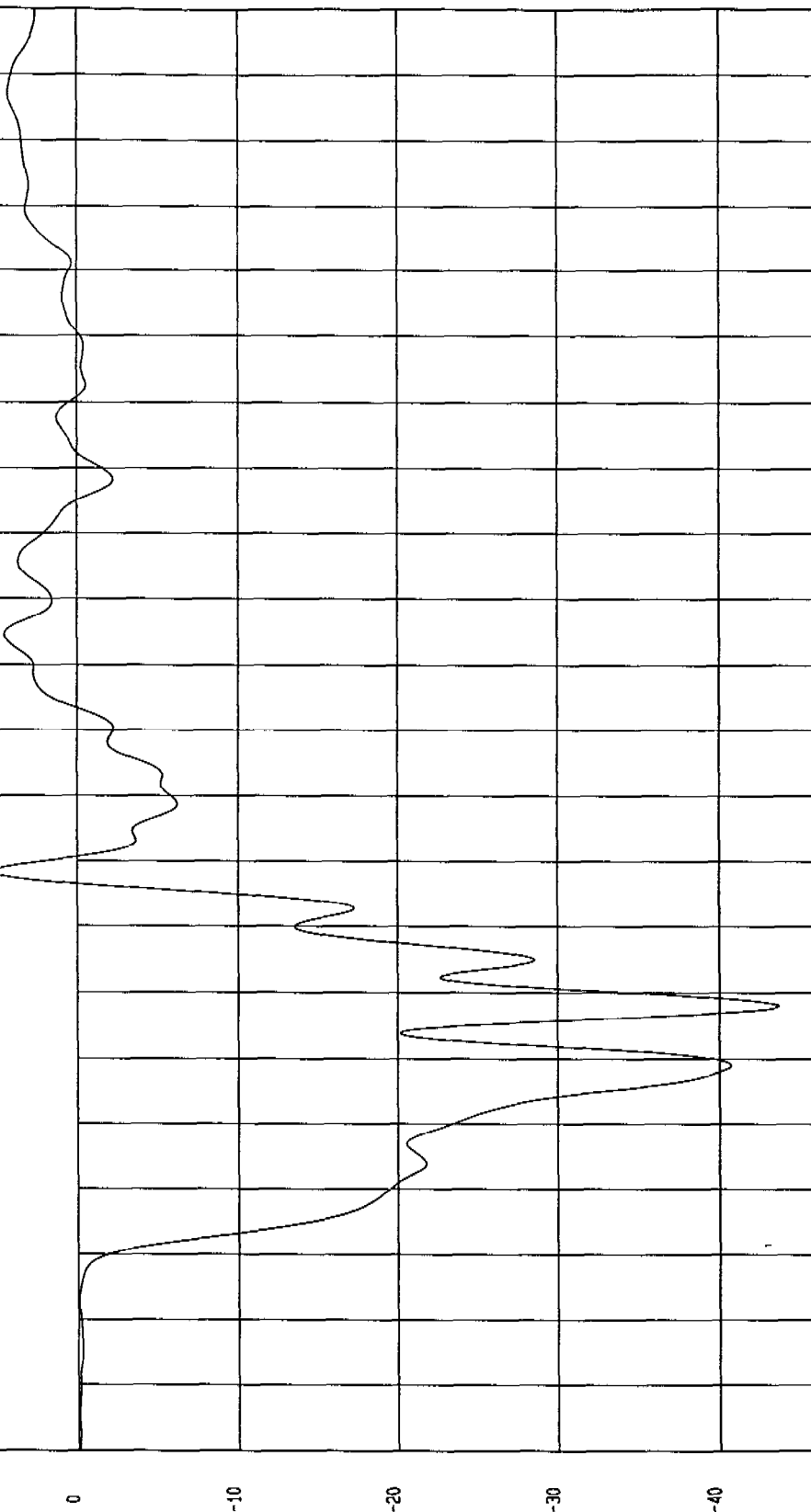
COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

Maximum = 5.35 G'S at 68 msec

Minimum = -43.58 G'S at 48 msec

BOTTOM OF ENGINE X ACCELERATION

1. 800029AF.A09 Filterclass (60)



MCA Research
04-09-2000 18:43

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

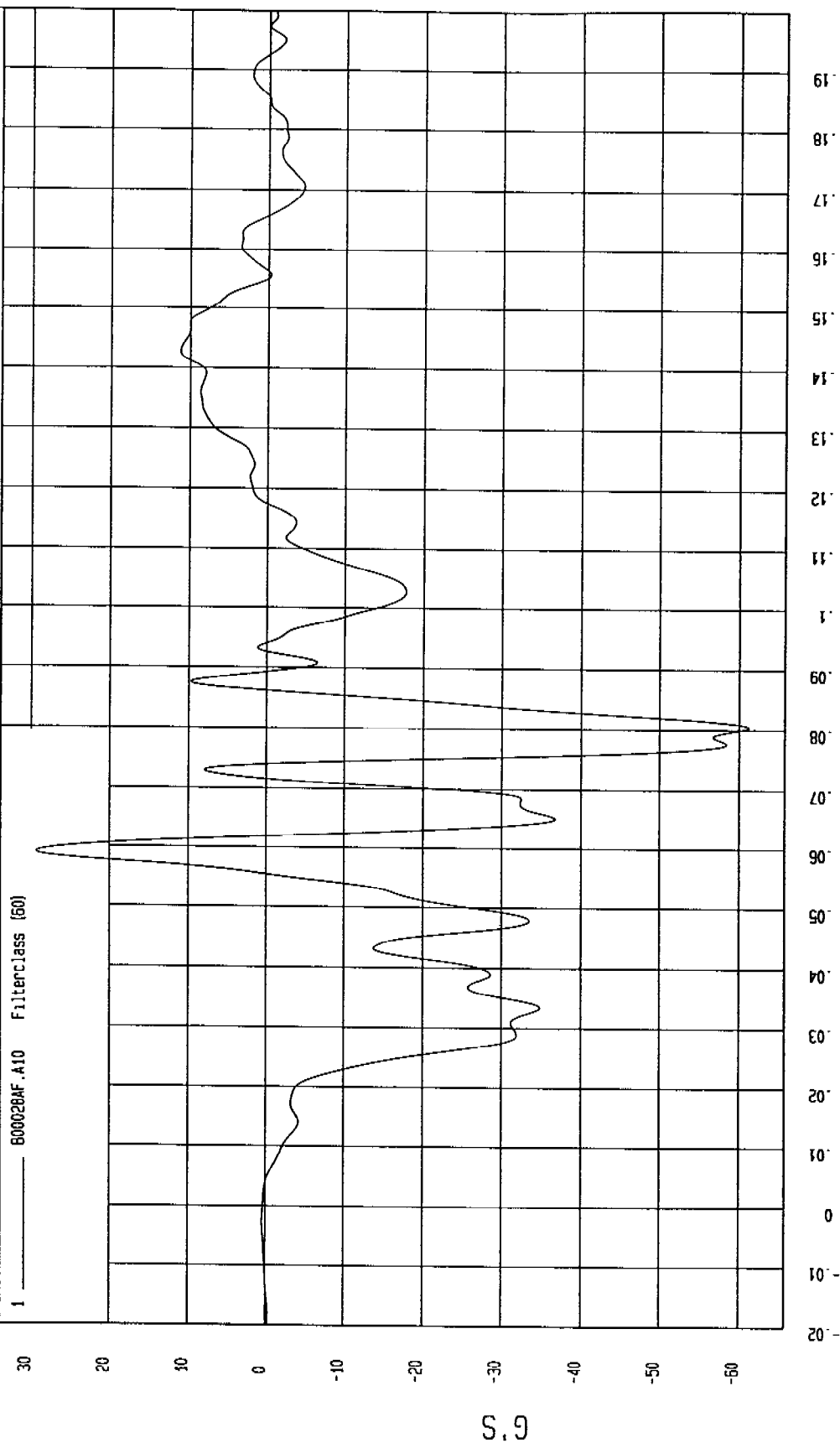
Speed: 29.8 MPH 48 KPH

Minimum = -61.24 G'S at 80 msec

Maximum = 29.37 G'S at 59 msec

INSTRUMENT PANEL X ACCELERATION

1 — 800028AF.A10 Filterclass (50)

MSA Research
04-09-2000 16:43

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

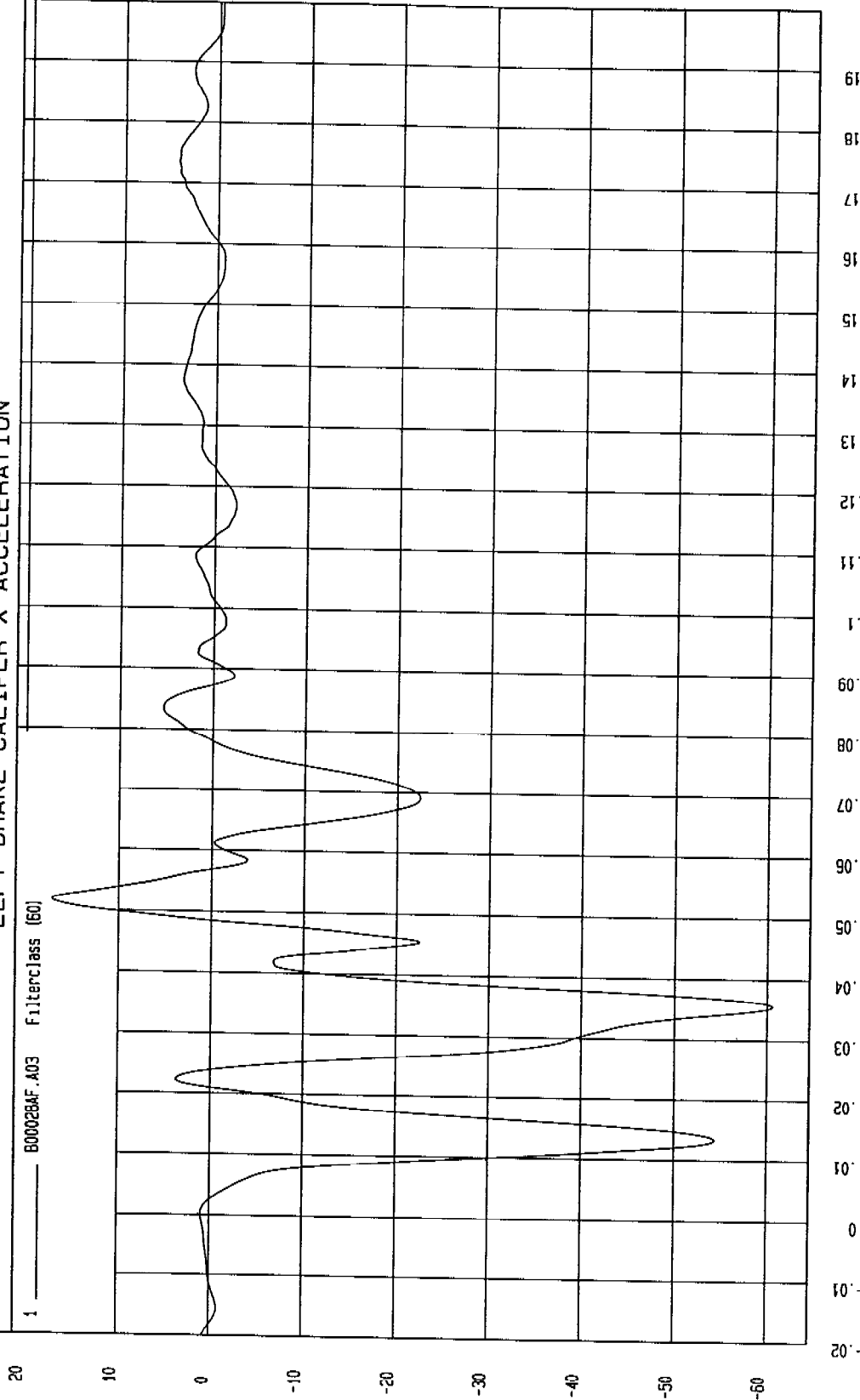
Speed: 29.8 MPH 48 KPH

Minimum = -60.56 G'S at 36 msec

Maximum = 17.22 G'S at 52 msec

LEFT BRAKE CALIPER X ACCELERATION

1 B000284F.A03 Filterclass (60)



TIME (SECONDS)

NCA Research
04-09-2000 18:44

TEST DATE: 04-11-2000

Speed: 29.8 MPH 48 KPH

TEST: FMVSS 208 BARRIER

Maximum = 23.23 G'S at 27 msec

Minimum = -114.54 G'S at 39 msec

RIGHT BRAKE CALIPER X ACCELERATION

1 ——— B00020AF.A02 Filterclass (50)

20

0

-20

-40

-60

-80

-100

-120

G'S

No Valid Data After
Approx. 50 msec.

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-01

-02

TIME (SECONDS)

MSA Research
04-09-2000 18:52

TEST: FMVSS 208 BARRIER

TEST DATE: 04-11-2000

COMPONENT: 2000 CHEVROLET ASTRO (CY0108)

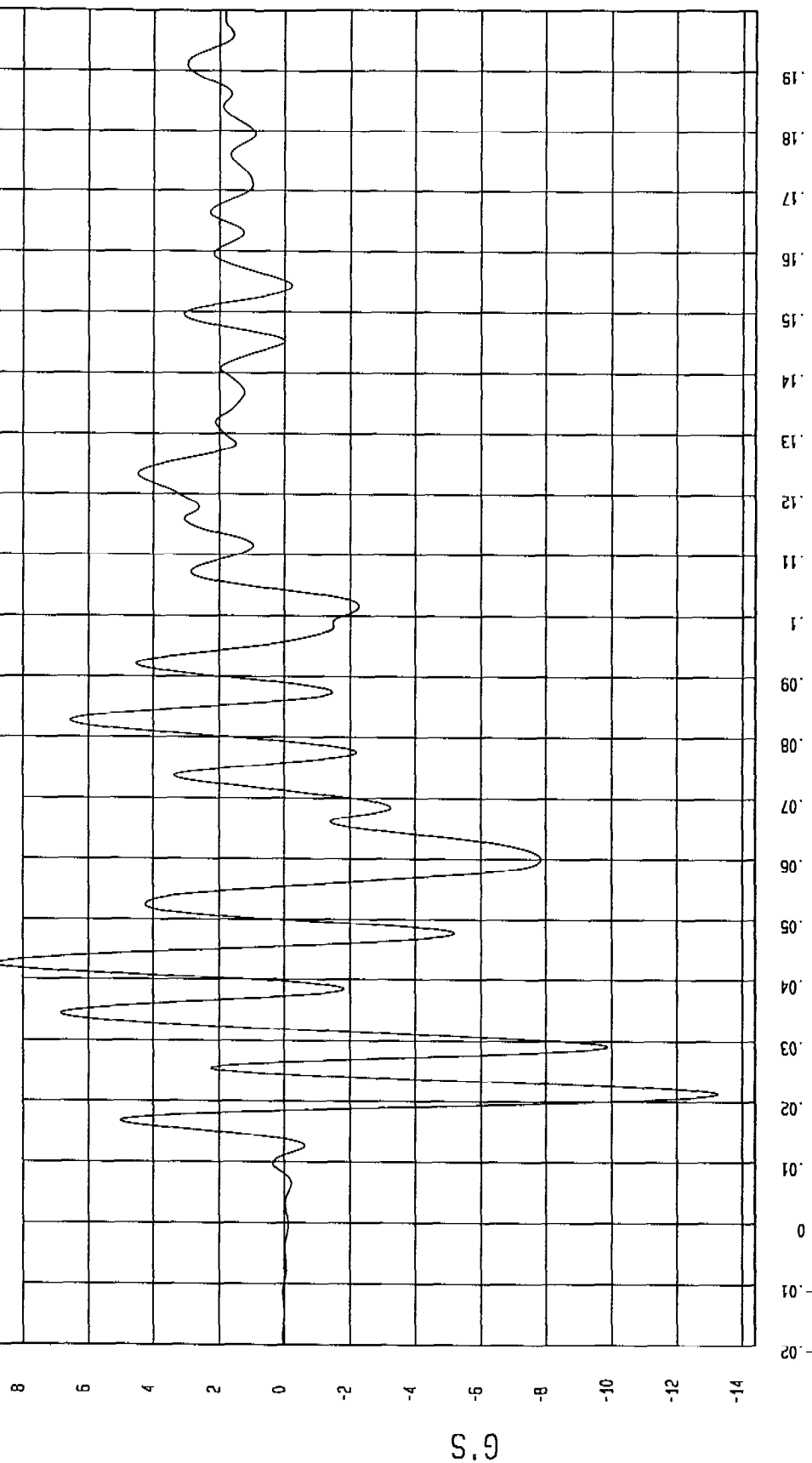
Speed: 29.8 MPH 48 KPH

Minimum = -13.27 G's at 21 msec

Maximum = 8.86 G's at 43 msec

TRUNK Z ACCELERATION

1 _____ B00028AF.A04 Filterclass (60)



TIME (SECONDS)

MCA Research
04-09-2000 18:44

APPENDIX C
MANUFACTURER'S VEHICLE INFORMATION



GENERAL MOTORS NORTH AMERICA
Safety Center

C-1

December 7, 1999
USG 3527

Ms. Marilynne Jacobs, Director
Office of Vehicle Safety Compliance
National Highway Traffic Safety Administration
400 seventh Street, SW.
Washington, DC. 20590

Re: OA208991029M

Dear Ms. Jacobs:

This is in response to your referenced letter received November 11, 1999, requesting information for proposed FMVSS 208 enforcement testing of the 2000 Chevrolet Astro. The letter requested certain information on the alternative requirements that the automatic restraints in this vehicle meet, if tension-relief devices were incorporated into the restraint system, certain data and test set-up information, and whether any leaks were encountered from a fuel system pressure relief valve during GM development and certification testing.

The specific OVSC questions and the General Motors Corporation responses are included in Enclosure 1.

We trust this information is responsive to your request. We welcome the opportunity to discuss any aspects of our response with you or members of your staff. If there are any questions, please do not hesitate to contact Mr. John E. Kromrei (810-947-1735) of my staff, or Mr. Richard F. Humphrey (202-775-5071) of GM's Washington, D.C. office.

Sincerely,

Paul T. Eichbrecht, Manager
Safety Standards

cc: C. Case, Office of Vehicle Safety Compliance

Mail Code 480-111-556 • 30200 Mound Road • Warren, Michigan 48090-9010
Phone (810) 947-1733 FAX (810) 988-8018
USG3527.DOC



USG 3527
Enclosure 1

NHTSA IR: NSA-31CCa
OA:208991029M
2000 Chevrolet Astro

Question 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 S 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 using only the automatic restraint system.

GM Response

The air bag restraint system provided at the driver's and passenger's 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 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's and passenger's 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 test reports and sled tests pertinent to the requirements of FMVSS 208.

Question 2

If this is a new design vehicle/model, describe any features that might affect performance with respect to children and out of position occupants.

If this is not a new design vehicle/model provide the following: (1) state when the air bag was depowered, (2) describe the difference between the MY 2000 air bag system and the MY 1999 air bag system, (3) explain what other restraint changes have been made, and (4) explain what other vehicle changes have been made that might have affected FMVSS 208 performance. Explain which changes might affect performance with respect to children and out of position occupants.

GM Response

The subject vehicle is not a new design vehicle/model.

The reduced force driver and passenger side SIR system was released on all GM 1998 interim M/L Vans (approx. March 1998). The 2000 M/L Van is carryover from the 1999 M/L Van and the 1999 is carryover from 1998 interim. There were no air bag changes made to the 2000 M/L van. The following chart gives details concerning the 2000 M/L van air bags.

Driver

FEATURE	2000
Air bag inflator	330/12
Air bag tether length	203mm
Air bag fold pattern	reverse pyramid
Steering wheel	Magnesium
Module/Rim offset	25mm
Steering Column Build Load	550lbs
LF Belt Assembly EA Loop	100mm, 21 row graduated burst load

Passenger

FEATURE	2000
Air bag inflator	2A19-24 (10 pill)
Cushion volume	85 liters
Cushion shape	Elliptical
Vents	2 x 40mm
Fold Pattern	accordion-bottom/top
RF Belt Asm EA Loop	100mm, 21row graduated burst load

The front air bag sensing system was changed for the MY 2000 M/L van. The sensing system includes an Auxiliary Discriminating Sensor (ADS), and Sensing Diagnostic Module (SDM-G). The ADS was changed for the 2000 MY from a Breed to a Hamlin, which improves sensing. The SDM was changed from a SDM-R to a class II SDM-G, which provides the capability to communicate more effectively with other class II modules. The change may affect performance with respect to children and out of position occupants. No other changes were made to the 2000 M/L van that would affect occupant crash protection performance in regards to FMVSS 208.

Question 3

State if these vehicles have crash event recorders. If yes, explain any procedures needed for sled or barrier crash event to be recorded. In addition, explain how to retrieve the crash event data from the recorder.

GM Response

The 2000 Chevrolet Astro is equipped with a crash event recorder. No special procedures are required for the sled or barrier crash event to be recorded. Data retrieval currently requires utilization of a proprietary diagnostic tool. GM expects a vendor to begin selling systems that will enable the downloading of EDR data into a laptop computer in late 2000.

Question 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 airbag.

For more advanced air bag systems, explain how the triggering of the air bag system in the sled test is different from the triggering of the air bag in a crash. For example, if a multi-stage inflator is used, explain whether the stages are fired simultaneously in the sled test but fired in a staggered sequence in a similar crash situation.

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 electronically disconnected from the vehicle harness and a separate electrical harness can be attached directly to the air bags, specifically for test deployment.

The air bag system should be disabled prior to performing the following actions. Disablement can be accomplished by disconnecting the battery negative cable from the battery. Wait approximately one hour following disconnection to ensure stored energy is dissipated.

On the driver's side, remove the air bag module from the steering wheel by inserting a flat head screwdriver into each of the slots located behind the steering wheel shroud. Press the screwdriver point towards the center of the steering wheel to disengage each spring latch on the air bag module. Slowly lift the air bag module from the steering column and disconnect the yellow air bag connector from the back of the air bag module. A spare connector is used to connect the module to the sled triggering system. However, the leads could be cut-off from the top of the steering column and then wired into the triggering mechanism. Reinstall the air bag module, ensuring that it is properly aligned with the snap features, allowing the leads, or connector, to hang on the outside of the shroud.

On the passenger side, remove the glove box door to access the yellow air bag wire located at the left knee bolster bracket. Disconnect the yellow air bag connector and attach to the sled triggering mechanism.

For GM's sled testing, the air bags are powered and activated by remote system whether a full vehicle or 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 $20 \text{ ms} \pm 2 \text{ ms}$ 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 g 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.

Question 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

M/L Van models are not equipped with tension relieving devices.

Question 6

FMVSS No. 208, 58.1.5 allows the manufacturer the option of having moveable vehicle windows and vents placed in the closed position. State whether the vehicle's moveable windows and vents were opened or closed for the certification tests.

GM Response

Moveable windows on FMVSS 208 certification barrier tests for 2000 M/L models were positioned as follows; C11688 were closed, C11451, LF was open, RF was closed, C11749, LF open, RF closed, C12001, LF was open, RF was closed, C12113 were open.

Question 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 footrest for the driver.

GM Response

Attachment B includes all dummy placement measurements.

This vehicle is not equipped with a footrest.

Question 8

Provide the seat positioning, steering column positioning, and fuel tank data on the enclosed form. If more than one front seating, steering column or fuel tank configuration are available on this vehicle, provide separate information for each. In addition, provide the seating reference point for each seat for the lockable seat belt requirement in S7.1.1.5.

GM Response

Attachment C includes all vehicle test information required on the NHTSA form. Also included is a copy of NHTSA form 4, Seat Reference Point (SRP) and Torso Angle Data for FMVSS 201, 202, 203, 207 & 210. Note that only relevant front seat SgRP information has been provided.

Question 9

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

GM Response

M/L Van Models are equipped with upper adjustable seat belt anchorage's. The upper most (top) position is the nominal design position. Anchorages should be adjusted to this position.

Question 10

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

GM Response

Attachment D provides the requested barrier and sled test information.

Question 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 the rear bumper and spare tire. In addition, interior trim components behind the "B" pillar, including rear seats, carpeting and trim panels could be removed if necessary.

Question 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 bag restraints installed in this vehicle do not incorporate a pressure vessel to inflate the system. Therefore, no further response is required.

Question 13

If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test report or engineering analysis to demonstrate that it meets all the requirements of S9.2.

GM Response

The air bag restraints installed in this vehicle do not incorporate an explosive device to inflate the system. Therefore, no further response is required.

Question 14

Explain any leakage that has occurred from the onboard vapor recovery system pressure relief valve during any frontal impact development or certification testing performed by or for General Motors Corporation. If any leakage occurred, include the amount. Describe the

method used to collect fluid from the onboard vapor recovery system pressure relief valve for the period from impact until motion of the vehicle has ceased.

GM Response

The 2000 MY M/L Van is not equipped with an onboard vapor recovery system. Therefore, no further response is required.

USG 3527
Enclosure 1
Attachment C

NSA-31CCa
OA:208991029M
2000 M/L Van

TEST INFORMATION & NHTSA FORM 4
5 pages
(Including this cover)

NHTSA IR: NSA-31CCa
 OA:208991029M
 2000 M/L Van
 ATTACHMENT C TEST INFORMATION

Seat positioning (Driver and Passenger seats adjusted identically)

Seat Back Angle (Nominal Design Riding Position)

Seat back angle is approximately 22.5 degrees. Seat back can be placed at the correct, nominal design angle as follows;

Place inclinometer on seat back frame where it is connected to the seat bottom. This section of the seat back frame is straight. This can be accomplished by cutting away the seat trim material and foam to expose the metal seatback structure.

Seat track Mid Position

Manual Seat Adjuster;

Adjust seat to first notch rearward of the measured fore/aft travel mid position. Push seat forward and backward to ensure seat track is fully latched on both sides of the seat.

Power Seat Adjuster;

Adjust seat to full down position. Adjust seat to mid-point of fore-aft seat travel.

Power Lumbar Adjustment;

Power Lumbar bladder should be empty.

Fuel Tank Data

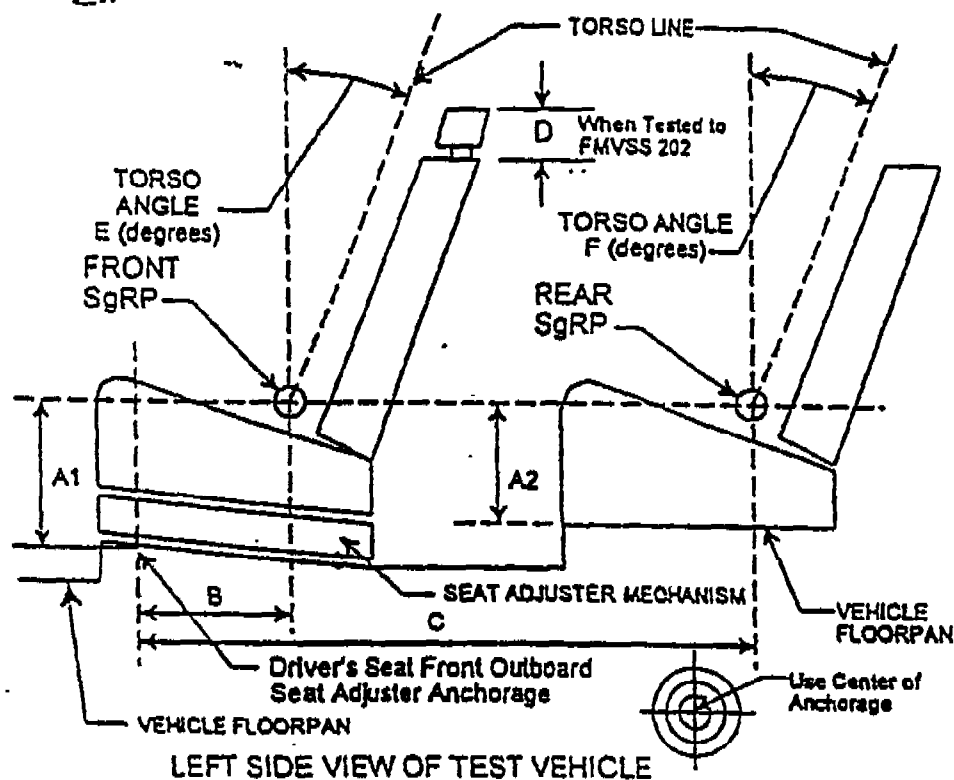
MODEL	CONFIGURATION	USABLE LITERS	UNUSABLE LITERS	95% TEST VOLUME LITERS
M/L Van	ALL	102.2	0.76	97

Fuel Pump Information

All M/L Van models are equipped with electronic fuel pumps. The SDM activates the fuel pump when the ignition system is turned to the "ON" position. It will remain on as long as the engine is cranking or running, and the VCM is receiving distributor reference pulses. If there are no reference pulses the VCM will shut off the fuel pump within 2 seconds after ignition "on" or the engine stops.

Tilt Steering Column Positioning Data

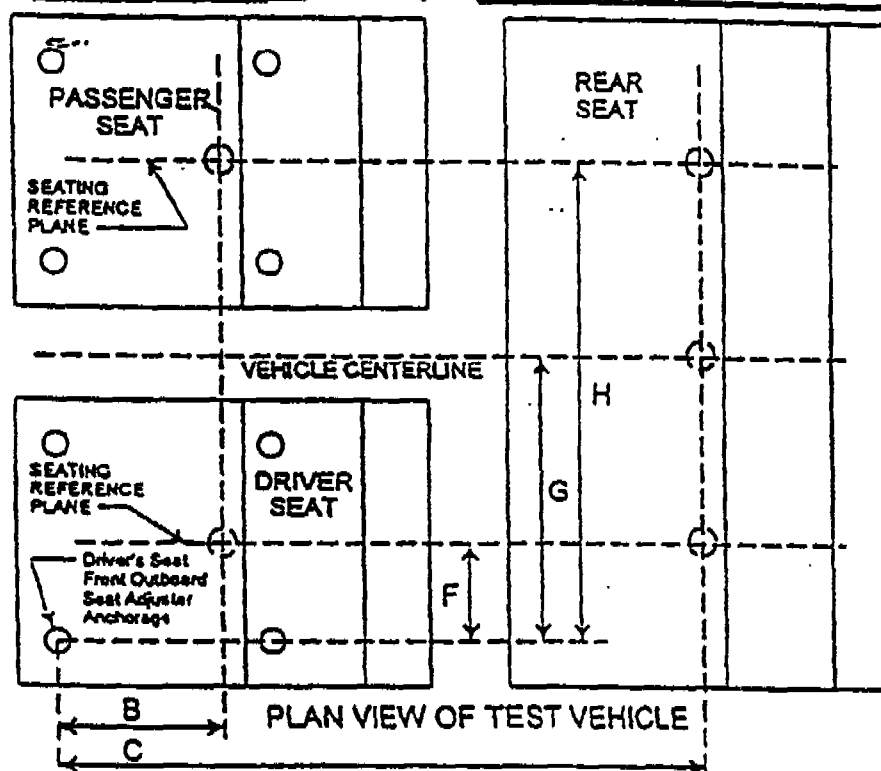
Pull up is position #1, move the steering column downward 3 notches to position #4.

FORM 4
Page 1 of 3SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in inches)Model Year: 2000; Make: CHEVROLET; Model: ASTRO
Body Style: VAN; Seat Style: ALL

DIMENSION	FRONT, A1	REAR, A2
A	358.5 mm	
B	165.5 mm	
C	—	
D	—	
E	23 °	
F		

SEATING REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in inches)

Model Year: 2000; Make: CHEVROLET; Model: ASTRO
Body Style: VAN; Seat Style: ALL

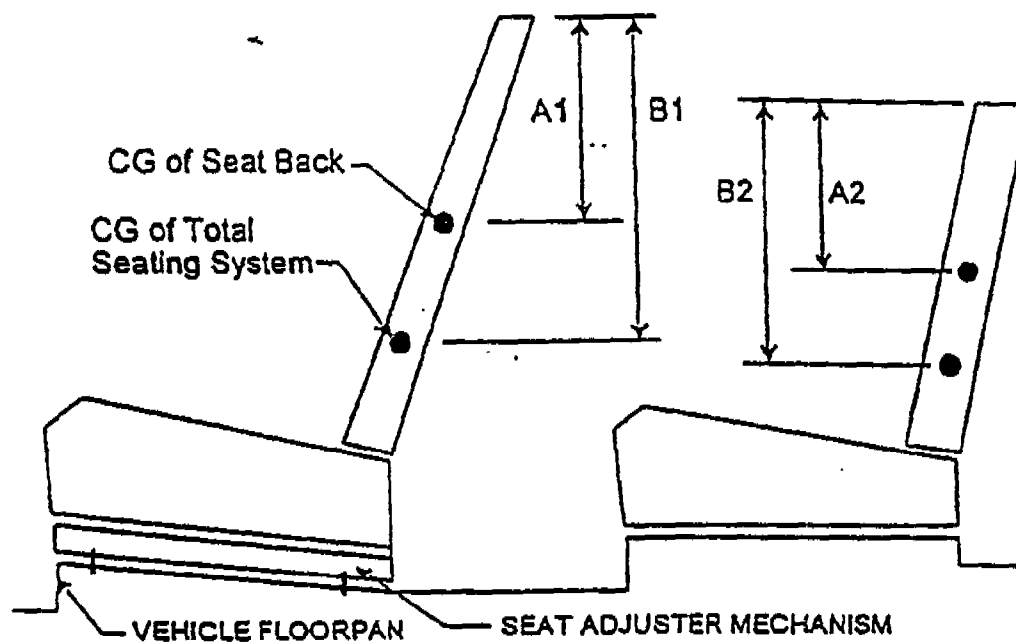


B	165.5 mm
C	-
F*	168.0 mm
G	619.0 mm
H*	1,075.0 mm

* Provide all dimensions needed to locate SRP.

TEST VEHICLE SEAT INFORMATION
(All dimensions in inches)

Model Year: _____; Make: _____; Model: _____
 Body Style: _____; Seat Style: _____



Note: Angle of Seat Back is a measured angle between a line perpendicular to the floor and the centerline of the seat back.

A1			FRONT	BACK
B1		Weight of Hinged or Folding portion of seat		
A2		Weight of Total Seat System		
B2		Angle of Seat Back		