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Report Number: 208S-TRC-03-007

Vehicle Safety Compliance Testing for FMVSS 208
for Occupant Crash Protection
Sled Test

General Motors of Canada LTD.

2003 Chevrolet Impala

NHTSA Number: C30109

TRC Inc. Test Number: S030606

Transportation Research Center Inc.

10820 State Route 347

East Liberty, OH 43319

Test Date: June 6, 2003

Report Date: June 26, 2003

Final Report

Prepared For:

U. S. Department of Transportation

National Highway Traffic Safety Administration

Office of Enforcement

Office of Vehicle Safety Compliance (NVS-220)

400 Seventh Street, S.W., Room No. 6115

Washington, DC 20590

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Report Approved By:

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Technical Report Documentation Page

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15. Supplemental Notes
None

16. Abstract

An FMVSS 208 Section 13 compliance sled test was conducted on a 2003 Chevrolet Impala 4-door sedan, NHTSA No.C30109, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208S-01 for the determination of FMVSS 208 compliance. Possible test failures identified were as follows:

None

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Purpose

This Federal Motor Vehicle safety Standard (FMVSS) 208 compliance sled test is part of the FMVSS compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center Inc. (TRC Inc.) under Contract No. DTNH22-98-D-01055. The purpose of this test was to determine if the subject vehicle, a 2003 Chevrolet Impala 4-door sedan, NHTSA No.C30109, meets the performance requirements of FMVSS 208, "Occupant Crash Protection," in the impact simulation sled test mode.

Test Procedure

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208S-01, dated January 15, 1998. Data was obtained relative to FMVSS 208, "Occupant Crash Protection," performance.

The sled test vehicle was instrumented with four (4) accelerometers to measure longitudinal accelerations. The sled was instrumented with one (1) longitudinal accelerometer, which is prefiltered with an analog filter to 200 Hz as an integral part of the sled firing circuit, and two (2) additional accelerometers: the primary accelerometer for pulse and integrated velocity determination and a backup accelerometer. In addition, the sled was instrumented with one (1) light trap to measure velocity and four (4) airbag firing timing circuits.

The sled test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedure specified in Appendix B of the Laboratory Test Procedure. The dummies were not restrained by seat belts.

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

The forty-two (42) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.7 through 11.9 of the Laboratory Test Procedure.

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

Test Results Summary

This FMVSS 208 compliance sled test was conducted by TRC Inc. on June 6, 2003.

The test vehicle, a 2003 Chevrolet Impala 4-door sedan, NHTSA No. C30109, does appear to comply with the performance requirements of FMVSS 208 in the impact simulation sled test mode as measured by Hybrid III 50th percentile male dummies.

	FMVSS 208 Max. Allowable Injury Assessment Values	Driver	Passenger
HIC	1000	98	196
Chest g	60 g	36.5	41.7
Chest Displacement	3 inches	0.8	0.4
Left Femur	2250 lbs	1260	1064
Right Femur	2250 lbs	1387	1172
Neck Extension	57 Nm	6.4	25.7
Neck Flexion	190 Nm	37.0	52.8
Neck Tension	3300 N	1038	1006
Neck Compression	4000 N	135	1059
Neck Shear	3100 N	697	1234

The subject vehicle, a 2003 Chevrolet Impala, NHTSA No. C30109, appears to meet the other FMVSS 208 requirements for which it was tested. These results are shown in the data sheets that are included in this report.

The sled test vehicle was equipped with air bags at the driver and passenger seating positions. The dummies were not restrained by seat belts. The sled carriage was accelerated to 17.9 g with an integrated velocity change of 30.1 mph. The primary stages of the airbags were triggered at 20.2 milliseconds after 0.5 g acceleration was measured by the firing circuit. The secondary stages of the airbags were triggered at 21.2 milliseconds after 0.5 g acceleration was measured by the firing circuit. Following subsequent digital data processing and filtering the acceleration signal to Channel Class 60, the primary stages airbag event trigger signal was 21.5 ms after the 0.5 g acceleration level was indicated and the secondary stages airbag event trigger signal was 22.5 ms after the 0.5 g acceleration level was indicated.

Data Acquisition Explanations

The sled buck's light trap X-axis velocity data channel, SLDXV, exhibited data spikes at approximately 220, 245, and 320 milliseconds. These spikes did not affect peak test velocity.

Sled Test Summary

NHTSA number:	C30109
Test type:	FMVSS 208 Alternate Sled Test
Test date:	06/06/03
Test time:	1141
Ambient temperature at impact area:	70.3° F
Vehicle year/make/ model/body style:	2003/Chevrolet/Impala/4-door sedan

Dummy Info:	Driver #314	Front Passenger #229
Type:	Hybrid III 50th male	Hybrid III 50th male
Location:	Left Front	Right Front
Restraint:	Airbag, dual stage	Airbag, dual stage
Number of data channels:	15	15

Number of Cameras:	
Real-time:	1
High-speed:	6

Door Opening Data:	
Left Front:	Easy
Right Front:	Easy

Front Seat Data:

Seat track failure:	None	None
Seat back failure	None	None

Visible Dummy Contact Points:

Head:	Airbag, sun visor, windshield	Airbag, sun visor, windshield
Chest:	Airbag	Airbag
Left knee:	Knee bolster	Glove box
Right knee:	Knee bolster	Glove box

General Test and Vehicle Parameter Data for the Sled Test Vehicle

Test Vehicle Information:

Vehicle year/make/ model/body style:	2003/Chevrolet/Impala/4-door sedan
Color:	White
VIN:	2G1WF52E439280622
NHTSA number:	C30109
Engine data:	
Placement:	Transverse
Cylinders:	6
Displacement:	3.4
Transmission data:	_4_ speed, __manual, _X_ automatic, _X_ overdrive
Final drive:	_X_ fwd, __rwd, __4wd
Date vehicle received:	4/16/2003
Odometer reading:	89
Dealer's name and address:	Jeff Wyler Chevrolet 1501 Hillcrest Ave. Springfield, Ohio 45504

Major Options:

Power steering	Yes	Other: Rear child seat LATCH system
Power brakes	Yes	
Power windows	Yes	
Air conditioning	Yes	
Power door locks	Yes	

Remarks:

General Test and Vehicle Parameter Data for the Sled Test Vehicle, Cont'd.

Data from Vehicle's Certification Label:

Vehicle manufactured by:		General Motors of Canada LTD.
Date of manufacture:		01/03
VIN:		2G1WF52E439280622
GVWR:		4560 lbs
GAWR:	Front:	2444 lbs
	Rear:	2116 lbs

Data from Vehicle's Tire Placard:

Tire pressure with maximum capacity vehicle load:	
Front:	44 psi
Rear:	44 psi
Recommended tire size:	P255/60R16
Load index/speed rating:	97S
Recommended cold tire pressure:	
Front:	30 psi
Rear:	30 psi
Size of tires on vehicle:	P255/60R16
Spare tire:	T125/70D16
Vehicle capacity data:	
Type of front seats:	Split bench
Number of occupants:	
Front	3
Rear	3
Total	6

Remarks: None

General Test and Vehicle Parameter Data for the Sled Test Vehicle, Cont'd.

Weight of test vehicle as received (with maximum fluids):

Right front	1057.1	lbs	Right rear	679.0 lbs
Left front	1051.6	lbs	Left rear	647.0 lbs
Total front weight	2108.7	lbs	(61.4% of total vehicle weight)	
Total rear weight	1326.0	lbs	(38.6% of total vehicle weight)	
Total delivered weight	3434.7	lbs		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (3434.7 lbs)

DSC = Designated Seating Capacity (6)

RCLW = 193 lbs

Target test weight = UDW + RCLW + (Number of Hybrid III dummies x 167 lbs per dummy)

Target test weight = 3434.7 + 193 + 334 = 3961.7 lbs

Weight of test vehicle with two dummies and 195.2 lbs of cargo weight:

Right front	1133.2	lbs	Right rear	862.0 lbs
Left front	1129.9	lbs	Left rear	838.8 lbs
Total front weight	2263.1	lbs	(57.1% of total vehicle weight)	
Total rear weight	1700.8	lbs	(42.9% of total vehicle weight)	
Total test weight	3963.9	lbs		

Remarks:

Weight of ballast secured in vehicle cargo area: None

Components removed to meet target test weight: N/A

General Test and Vehicle Parameter Data for the Sled Test Vehicle, Cont'd.

Test Vehicle Attitude:

As delivered door sill angle:	0.8° Nose down
As tested door sill angle:	0.5° Nose down
Fully loaded door sill angle:	0.3° Nose down
Vehicle Wheelbase:	109.8 inches

Fuel System Data:

Fuel system capacity from owner's manual:	17.0 gallons
Useable capacity figure furnished by COTR:	17.0 gallons

Remarks: The roll angle measurements were within 1 inch of each other.

The left and right side measurements were 15.1 inches and 15.1 inches respectively.

Post-Impact Data

Test number:	S030606
NHTSA number:	C30109
Test date:	06/06/03
Test time:	1141
Test type:	FMVSS 208 Alternate Sled Test
Impact angle:	0°
Ambient temperature at impact area:	70.3° F
Temperature in occupant compartment:	70.3° F

Sled carriage velocity:

Integrated velocity from the integration of the entire sled acceleration:	30.1 mph
Measured velocity from the light trap device attached to the sled (backup):	29.7 mph
Specified integrated velocity range:	28 to 30 mph

Sled carriage acceleration:

Acceleration:	17.9 g
Specified acceleration range:	16.0 g - 18.2 g

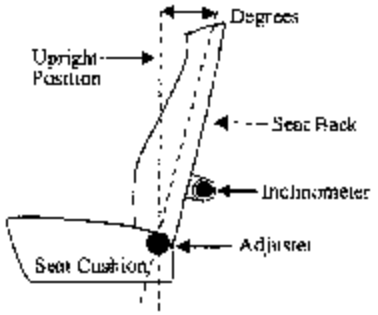
Sled carriage acceleration duration:

Time from T-0(-0.5 g) to 0.0 g:	122.3 ms
Specified acceleration duration:	120 - 130 ms

The sled acceleration curve was within the specified corridor.

Seat and Steering Column Positioning Data

Vehicle: 2003/Chevrolet/Impala/4-door sedan NHTSA No.: C30109



Front Seat Assembly
Left Side View

Nominal Design Riding Position:

Driver Seat: Seat Back Angle = 26.4° Manual seat back angle was measured on the outboard rear seat frame approximately 9-10 inches above the pivot.

Passenger Seat: Seat Back Angle = 26.3° Manual seat back angle was measured on the outboard rear seat frame approximately 9-10 inches above the pivot.

Seat Fore and Aft Positions:

Driver Seat: Mid position - power seat. The seat was moved full forward and full rearward marking the full length of travel. The seat was set in the center of travel.

Passenger: Mid position - manual adjustment. The seat was moved full forward and full rearward, marking each of 25 latch positions. The seat was set in the center (13th) latch position.

Steering Column Adjustments:

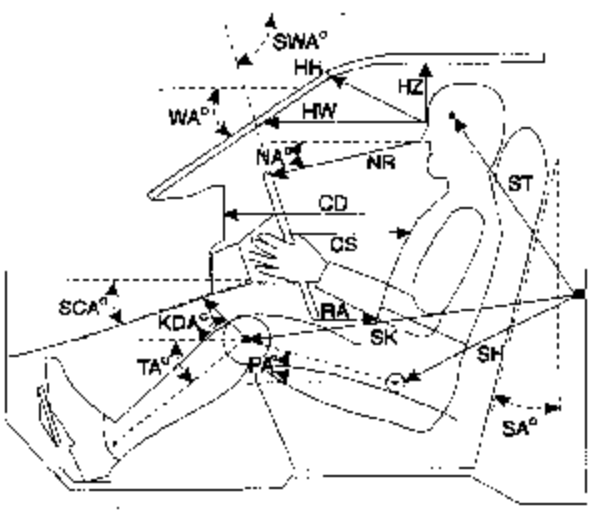
The steering column was set in the 3rd (center) detent of 5 detents.

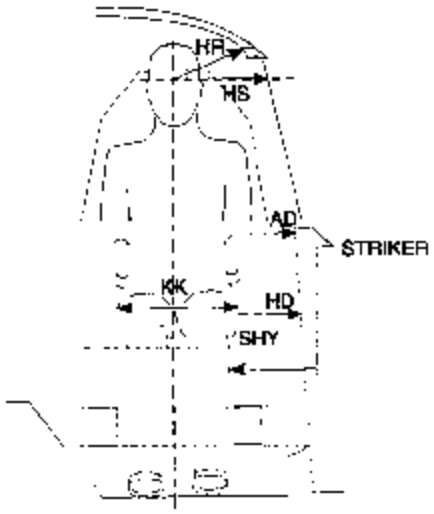
Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #314)	Passenger (Serial #229)
WA	Windshield angle	27.7°	N/A
SWA	Steering wheel angle	68.3°	N/A
SCA	Steering column angle	21.7°	N/A
SA	Seat back angle	26.4°	26.3°
HZ	Head to roof	8.3 in	7.5 in
HH	Head to header	13.1 in	13.5 in
HW	Head to windshield	24.4 in	24.3 in
HR	Head to side header	9.6 in	9.4 in
NR	Nose to rim	14.9 in	N/A
NA	Nose to rim angle	7.9°	N/A
CD	Chest to dash	20.6 in	20.9 in
CS	Steering wheel to chest	11.9 in	N/A
RA	Rim to abdomen	6.8 in	N/A
KDL	Left knee to dash	5.7 in	5.5 in
KDR	Right knee to dash	5.7 in	6.1 in
KDA	Outboard knee to dash angle	26.3°	24.9°
PA	Pelvis angle	24.2°	22.6°
TA	Tibia angle	46.9°	42.6°
KK	Knee to knee	13.7 in	10.6 in
ST[1]	Striker to head	20.6 in	21.9 in
	Striker to head angle	-80.9°	-81.0°
SK[1]	Striker to knee	23.2 in	23.0 in
	Striker to knee angle	-3.8°	-0.7°
SH[1]	Striker to H-point	10.0 in	9.3 in
	Striker to H-point angle	30.0°	26.6°
SHY	Striker to H-point (Y dir.)	8.7 in	9.4 in
HS	Head to side window	13.2 in	13.0 in
HD	H-point to door	4.7 in	4.9 in
AD	Arm to door	6.8 in	7.5 in

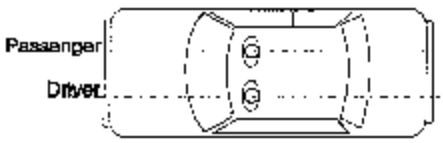
The seat back angle (SA°) is measured relative to vertical.
All other angles are measured relative to horizontal.
[1] A negative angle indicates the measurement point was located below the striker.

Dummy Measurement Locations for Front Seat Occupants

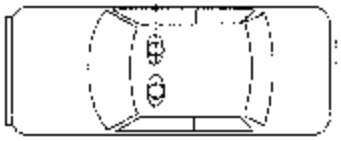




VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE



Descriptions of Dummy Measurements

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

The following measurements are to be made within a vertical longitudinal plane.

* HH Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header.

* HW Head to Windshield, taken from the point where the dummy's nose meets his forehead (between his eyes) to a point on the windshield. Use a level.

HZ Head to Roof, taken from the point where the dummy's nose meets his forehead (between his eyes) to the point on the roof directly above it. Use a level.

* CS Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level.

* CD Chest to Dash, place a tape measure on the tip of the dummy's chin and rotate five inches of it downward toward the dummy to the point of contact on the transverse center of the dummy's chest. Then measure from this point to the closest point on the dashboard either between the upper part of the steering wheel between the hub and the rim, or measure to the dashboard placing the tape measure above the rim, whichever is a shorter measurement. See diagram.

RA Steering Wheel Rim to Abdomen, taken from the bottommost point of the steering wheel rim horizontally rearward to the dummy. Use a level.

NR Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA).

* Measurement used in Data Tape Reference Guide

*[1] KDL, KDR Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard. Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA). See diagram.

SH, SK, ST Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z plane measured from the forward most center point on the striker to the center of the H-point, outer knee bolt, and head target. When taking this measurement a firm device that can be rigidly connected to the striker should be used. Use a level. The angles of these measurements with respect to the horizontal should also be recorded. The measurement in the Y (transverse) direction from the striker to the H-point should also be taken (SHY). See diagram.

The following measurements are to be made within a vertical transverse plane.

HS Head to Side Window, taken from the point where the dummy's nose meets his forehead (between his eyes) to the outside of the side window. In order to make this measurement, roll the window down to the exact height which allows a level measurement. Use a level. See diagram.

* AD Arm to Door, taken from the outer surface of the elbow pivot bolt on a Hybrid II dummy to the first point it hits on the door. In the case of a Hybrid III dummy, measure from the bolt on the outer biceps. When a SID is used make the measurement from the center of the bottom of the arm segment where it meets the dummy's torso.

* HD H-point to Door, taken from the H-point on the dummy to the closest point on the door. Use a level.

* HR Head to Side Header, measure the shortest distance from the point where the dummy's nose meets his forehead (between his eyes) to the side edge of the header just above the window frame, directly adjacent to the dummy.

* Measurement used in Data Tape Reference Guide
[1] Only outboard measurement is referenced in Data Tape Reference Guide

SHY Striker to H-point, taken from a rod rigidly connected to the forward most center point on the striker to the H-point. Use a level. See diagram.

KK Knee to Knee, for Hybrid II dummies measure the distance between knee pivot bolt head outer surfaces. For Hybrid III dummies measure the distance between the outboard knee clevis flange surfaces. (This measurement may not be exactly transverse.)

Angles

SA Seat Back Angle, find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR.

PA Pelvis or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the H-point hole and the outer knee pivot bolt hole on a Hybrid II dummy with respect to the horizontal, to find the femur angle.

SWA Steering Wheel Angle, find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.

SCA Steering Column Angle, measured with respect to the horizontal by placing an inclinometer on the center of the underside of the steering column.

NA Measure the angle made when taking the measurement NR with respect to the horizontal.

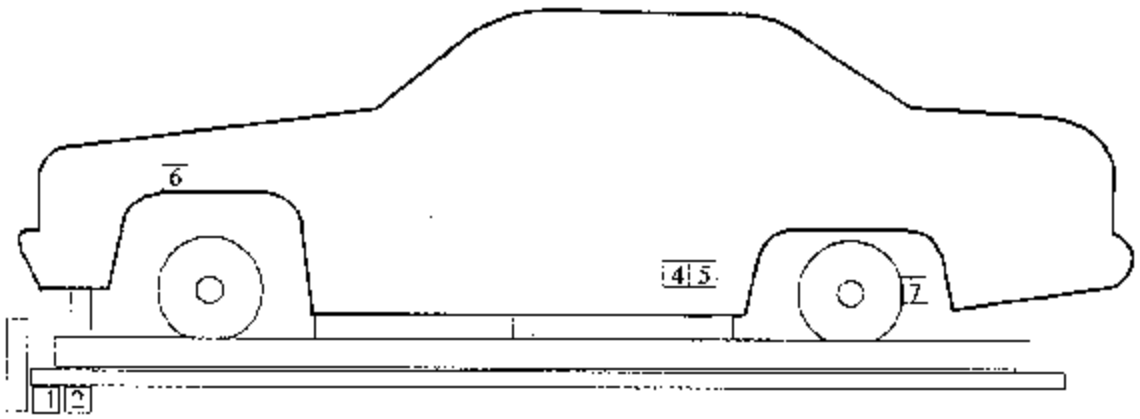
KDA Knee to Dash Angle, the angle that the measurement KD is taken at with respect to the horizontal. Only get this angle for the outboard knee. See diagram.

WA Windshield Angle, place an inclinometer along the transverse center of the windshield exterior (measurement is made with respect to horizontal).

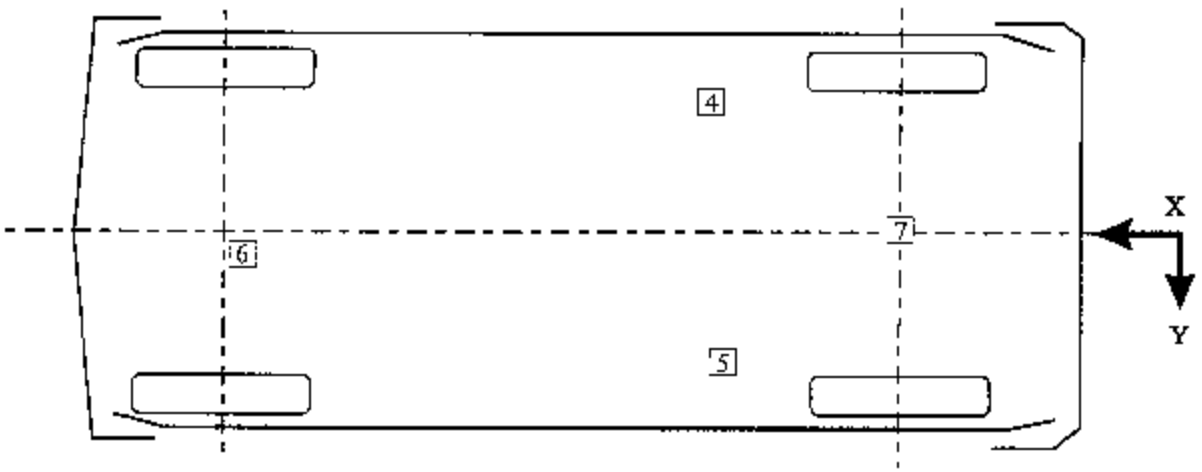
TA Tibia Angle, use a straight edge to connect the dummy's knee and ankle bolts. Then place an inclinometer on the straight edge and measure the angle with respect to the horizontal.

* Measurement used in Data Tape Reference Guide

Vehicle Accelerometer Placement



Side View



Bottom View

Vehicle Data Summary and Accelerometer Locations

TEST NUMBER: S030606 No. LOCATION	X	Y	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 SLED ACCELERATION PRIMARY	165.6 in	-1.0 in	0.6 g	@ 216.5 ms	17.9 g	@ 55.5 ms
2 SLED ACCELERATION BACKUP REDUNDANT	165.6 in	-1.0 in	0.6 g	@ 216.4 ms	18.0 g	@ 55.5 ms
3 SLED VELOCITY MEASURED INTEGRATED[2]			0.1 mph ---	@ 1.8 ms ---	29.7 mph 30.1 mph	@ 124.1 ms @ 122.2 ms
4 LEFT BODY AT REAR SEAT LONGITUDINAL	84.7 in	-15.0 in	1.5 g	@ 125.6 ms	18.0 g	@ 55.2 ms
5 RIGHT BODY AT REAR SEAT LONGITUDINAL	84.9 in	15.0 in	1.4 g	@ 125.9 ms	18.1 g	@ 53.5 ms
6 TOP ENGINE LONGITUDINAL	166.7 in	-0.2 in	5.6 g	@ 132.6 ms	21.5 g	@ 59.2 ms
7 REAR AXLE LONGITUDINAL	45.7 in	0.0 in	1.6 g	@ 125.2 ms	18.7 g	@ 53.2 ms
8 DRIVER PRIMARY AIRBAG EVENT			1.0 volt	@ 21.5 ms	---	---

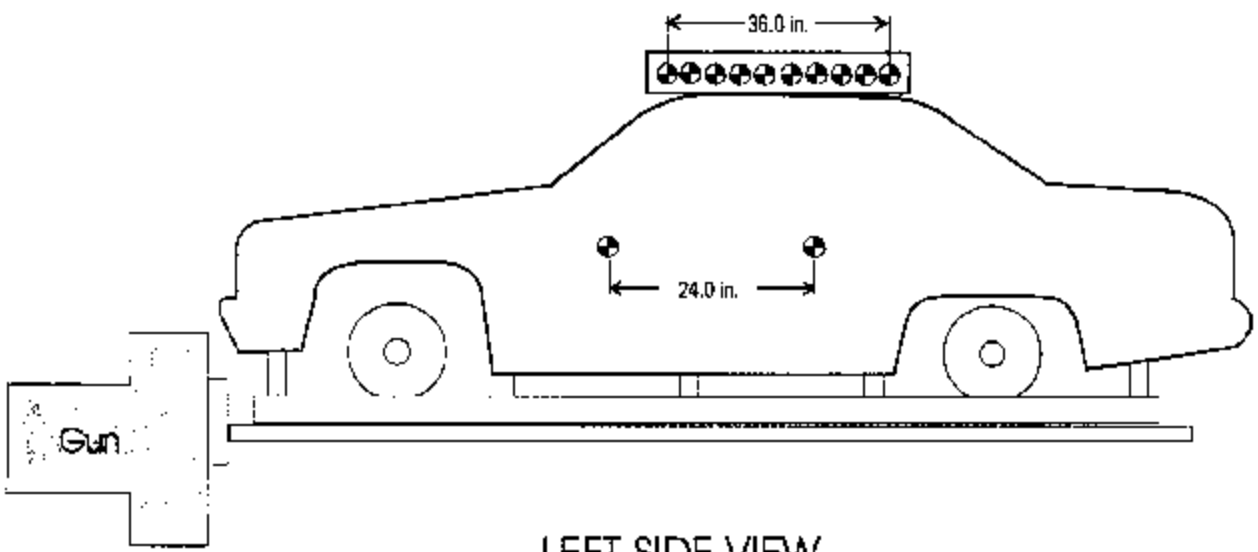
Vehicle Data Summary and Accelerometer Locations, Cont'd.

TEST NUMBER: S030606 No. LOCATION	X	Y	POSITIVE DIRECTION	NEGATIVE DIRECTION
9 DRIVER SECONDARY AIRBAG EVENT			1.0 volt @ 22.5 ms	---	---
10 PASSENGER PRIMARY AIRBAG EVENT			1.0 volt @ 21.5 ms	---	---
11 PASSENGER SECONDARY AIRBAG EVENT			1.0 volt @ 22.5 ms	---	---

REFERENCE: X: + FORWARD FROM VEHICLE REAR SURFACE
Y: + RIGHTWARD FROM SLED CARRIAGE CENTERLINE

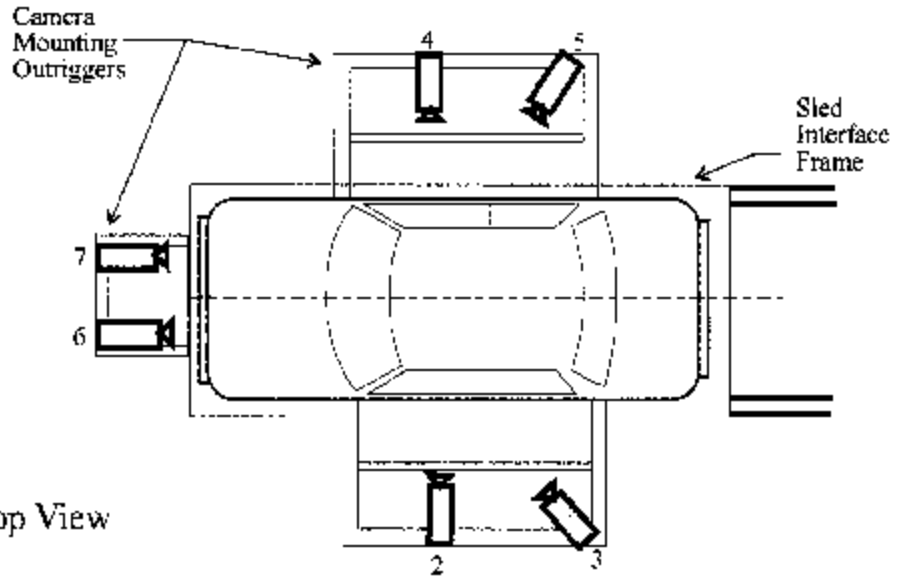
[1] Sign convention per SAEJ211 March 1995.
[2] See Data Acquisition Explanations on page 4.
[3] No positive data in time frame of interest.

REFERENCE PHOTO TARGETS



LEFT SIDE VIEW

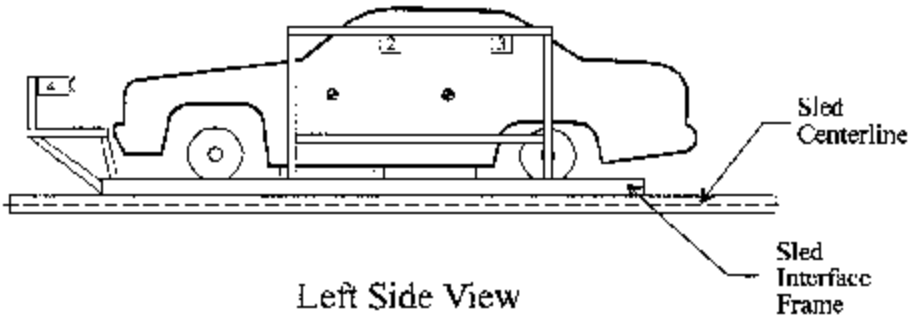
Camera Positions



Top View

Camera Frame Rates:
#1 = 24 fps
All Others = 1,000 fps

Real-Time
Camera



Left Side View

Motion Picture Camera Locations

Vehicle year/make/model/body style: 2003/Chevrolet/Impala/4-door sedan NHTSA No.: C30109 Test Number: S030606

Camera Number	View	Camera Positions[1] X	Y	Z	Camera Angle[2]	Film Plane to Head Target	Camera Lens	Film Speed
1	Real-time pre-doc./panning						Zoom	24 frames/s
2	Left side view wide	72.4 in	-73.1 in	51.9 in	2.6°	55.4 in	8 mm	1025 frames/s
3	Left side view over shoulder	98.2 in	-51.1 in	59.1 in	13.9°	36.8 in	8 mm	992 frames/s
4	Right side view wide	71.4 in	73.7 in	51.1 in	1.9°	57.7 in	8 mm	997 frames/s
5	Right side view over shoulder	100.2 in	49.4 in	58.3 in	12.6°	36.4 in	8 mm	995 frames/s
6	Left front	27.6 in	-16.0 in	52.6 in	4.7°	56.4 in	8 mm	910 frames/s
7	Right front	25.6 in	16.8 in	52.8 in	3.0°	57.5 in	8 mm	990 frames/s
8	Real-time post-doc./panning	93.4 in	-309.8 in	44.7 in	0.0°	292.3 in	10 mm	24 frames/s

[1] X: Film plane to front of sled
Y: Film plane to sled centerline
Z: Film plane to top of sled

[2] Angle: Film plane of camera downward from horizontal plane

FMVSS 208 Occupant Injury Data

Vehicle: 2003/Chevrolet/Impala/4-door sedan NHTSA No.: C30109 Date: 06/06/03

Maximum Acceleration Values: (g)[1]	Driver Dummy #314	Passenger Dummy #229
Head Channel X	-24.4	-36.2
Head Channel Y	-6.7	-9.0
Head Channel Z	12.3	31.1
HEAD RESULTANT	26.7	38.2
Chest Channel X	-36.8	-40.5
Chest Channel Y	-3.5	-4.9
Chest Channel Z	6.0	18.8
CHEST RESULTANT	37.1	42.8

Head Injury Criteria (HIC) Values:

HIC	98	196
t_1 = (ms)	83.44	89.28
t_2 = (ms)	119.44	125.28

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

Chest Injury Criteria (Clip) Values:

CLIP (g)	36.5	41.7
t_1 = (ms)	86.79	95.78
t_2 = (ms)	89.75	98.74
Chest Deflection (in)	0.8	0.4

[1] Sign convention per SAE J211, March 1995

FMVSS 208 Occupant Injury Data, Cont'd.

Vehicle: 2003/Chevrolet/Impala/4-door sedan NHTSA No.: C30109 Date: 06/06/03

Max. Compressive Femur Forces:	Driver Dummy #314	Passenger Dummy #229
Left Side (lbs)	1260	1064
Right Side (lbs)	1387	1172

Neck Injury Criteria:	Driver Dummy #314	Passenger Dummy #229
Peak Flexion Bending Moment (N-m)	37.0	52.8
Peak Extension Bending Moment (N-m)	6.4	25.7
Peak Axial Tension (N)	1038	1006
Peak Axial Compression (N)	135	1059
Peak Positive X-axis Shear (N)	697	1234
Peak Negative X-axis Shear (N)	189	313

FMVSS 208 Seat Belt Warning System Check

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

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 = seconds
(4 to 8 seconds)

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

A.2 S7.3(a)(2)
Time duration of audible warning signal = 6 seconds
(4 to 8 seconds) (see 49 USCS @ 30124)

Time duration of reminder light operation = 6 seconds
(4 to 8 seconds)

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

B.1 S7.3(a)(1)
Time duration of audible warning signal = seconds
(audible warning should not operate)

Time duration of reminder light operation = seconds
(reminder light does not operate)

B.2 S7.3(a)(2)
Time duration of audible warning signal = 0 seconds
(audible warning should not operate)

Time duration of reminder light operation = 6 seconds
(4 to 8 seconds)

C. Note wording of visual warning:
Fasten Seat Belt
Fasten Belt
Symbol 101 ☒

FMVSS 208 Readiness Indicator

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

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).

Is the system totally mechanical? ☐ Yes; ☒ No

Describe the location of the readiness indicator: Upper right corner of instrument panel

Is the readiness indicator clearly visible to the driver? ☒ Yes; ☐ No

Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided? ☒ Yes; ☐ No

FMVSS 208 Air Bag Labels

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

1. Air Bag Maintenance Label and Owner's Manual Instructions:

1.1 Does the manufacturer recommend periodic maintenance or replacement of the air bag?
☐ 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 inch 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: (S4.5.1 (f))

2.1 Include a description of the vehicle's air bag system in an easily understandable format? ☒ Yes ☐ **No-Fail**

2.2 Include a statement that the vehicle is equipped with an air bag and a lap/shoulder belt at the front outboard seating positions? ☒ Yes ☐ **No-Fail**

2.3 Include a statement that the air bag is a supplemental restraint at the front outboard seating positions? ☒ Yes ☐ **No-Fail**

2.4 Emphasize that all occupants, including the driver, should always wear their seat belts whether or not an air bag is also provided at their seating positions to minimize the risk of severe injury or death in the event of a crash?
☒ Yes ☐ **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? ☒ Yes ☐ **No-Fail**

2.6 Explain that no objects should be place 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?
☒ Yes ☐ **No-Fail**

3. Does the Vehicle:

3.1 Provide an automatic means to ensure that the air bag does not deploy when a child seat or child with a total mass of 30 kg or less is present on the front outboard seat? ☐ Yes ☒ 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 it might have an adverse effect on infants in rear-facing child seat, and unbelted or improperly belted children? ☐ Yes ☒ 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 ☒ No

If yes to 3.1, or 3.2, or 3.3, the vehicle is not required to have a Sun Visor Warning Label (S4.5.1(b)), an air bag alert label (S4.5.1(c)) or a label on the dash (S4.5.1(e)) and **this check sheet is complete. (S4.5.1) 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 sun visor at each front outboard seating position with an air bag?

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.")** (S4.5.1(b)(2)(v)) to the label shown in either Figure 6a or 6b as appropriate at each front outboard seating position with an air bag? (S4.5.1(b)(2))

4.2.1 Dual air bags

Driver side ☒ Yes-Pass ☐ **No-Fail**

Passenger side ☒ Yes-Pass ☐ **No-Fail**

4.2.2 Vehicles with driver air bag ONLY - either 4.2.1 or 4.2.2 is applicable, not both. (S4.5.1(b)(2)(iv))

4.2.2.1 Does the label conform on content to the label shown in either Figure 6a or 6b as appropriate?

☒ N/A

Driver side ☐ Yes-Pass ☐ **No-Fail**

4.2.2.2 Does the label conform in content to the label shown in Figure 6a where the label can be modified to omit the pictogram and the message may read:

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.

☒ N/A

Driver side ☐ Yes-Pass ☐ **No-Fail**

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

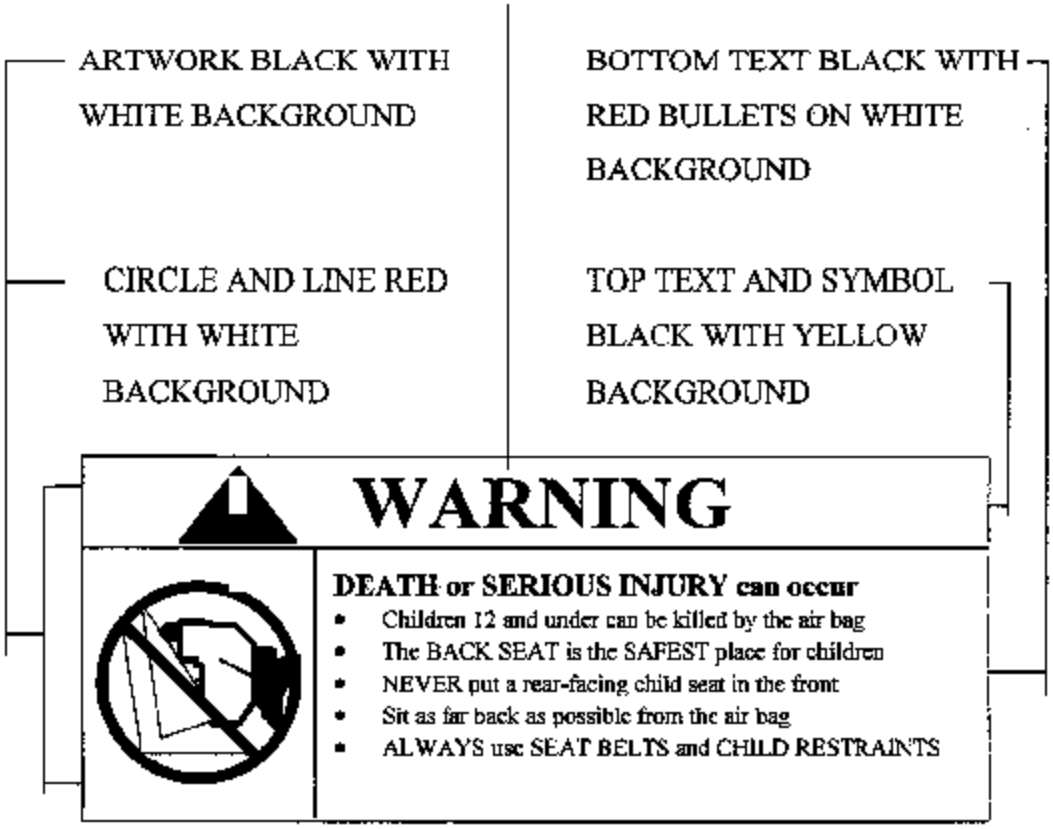


Figure 6a
(S4.5.1(b)(2))

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

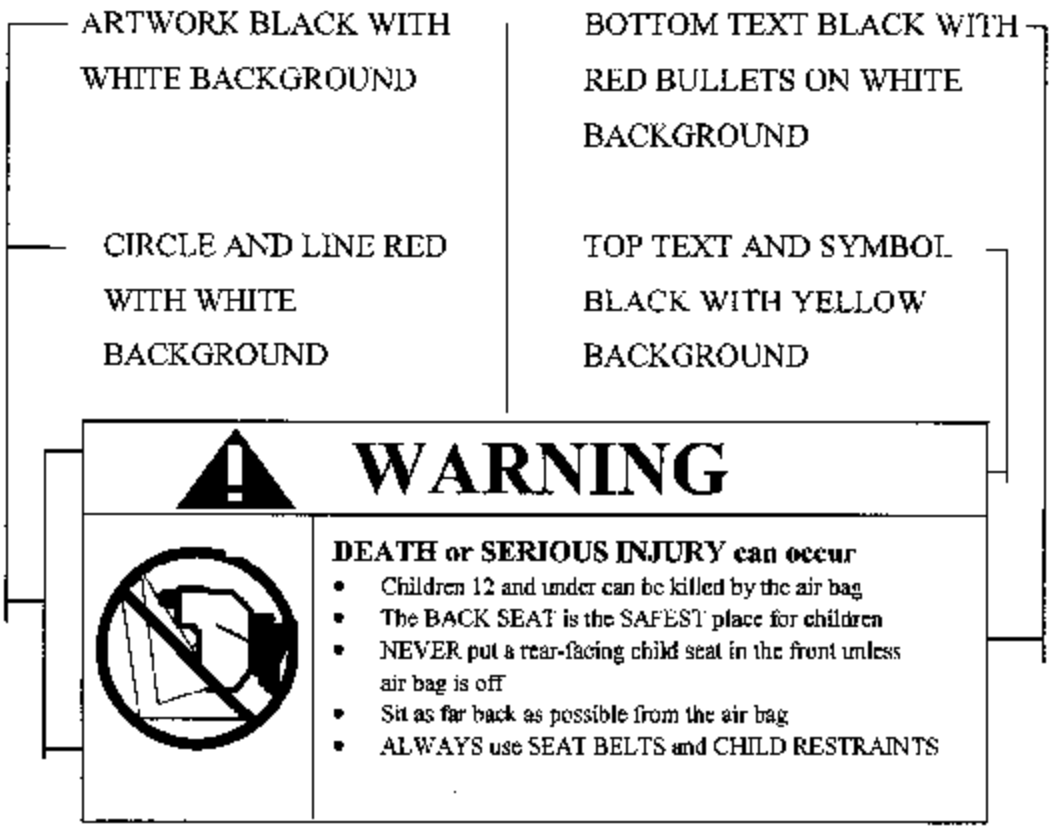


Figure 6b
(S4.5.1(b)(2))

4.3 Is the driver side label heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1.(b)(2)(i))

	Driver side	☒ Yes-Pass	☐ **No-Fail**
	Passenger side	☒ Yes-Pass	☐ **No-Fail**

4.4 Is the message white with black text? (S4.5.1 (b)(2)(ii))

	Driver side	☒ Yes-Pass	☐ **No-Fail**
Passenger side	☐ No air bag	☒ Yes-Pass	☐ **No-Fail**

4.5 Is the message area at least 30 cm^2? (S4.5.1(b)(2)(ii))

Actual message area, driver side **30** cm^2

Actual message area, passenger side **30** cm^2

	Driver side	☒ Yes-Pass	☐ **No-Fail**
Passenger side	☐ No air bag	☒ Yes-Pass	☐ **No-Fail**

FMVSS 208 Air Bag Labels. Cont'd.

4.6 Is the pictogram black with a red circle and slash on a white background? (S4.5.1(b)(2)(iii)) & (S4.5.1(b)(2)(iv))

For vehicles with driver side air bag ONLY			☐ N/A
Driver side		☒ Yes-Pass	☐ **No-Fail**
Passenger side	☐ No air bag	☒ Yes-Pass	☐ **No-Fail**

4.7 Is the pictogram at least 30 mm in diameter? (S4.5.1(b)(2)(iii))
Actual diameter, driver side **30** mm
Actual diameter, passenger side **30** mm

For vehicles with driver side air bag ONLY			☐ N/A
Driver side		☒ Yes-Pass	☐ **No-Fail**
Passenger side	☐ No air bag	☒ 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? (S4.5.1(b)(3)) and/or a rollover warning label specified in 49CFR Part 575 (S575.105)?

Driver side		☒ Yes-Pass	☐ **No-Fail**
Passenger side	☐ No air bag	☒ 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		☒ Yes-Pass	☐ **No-Fail**
Passenger side	☐ No air bag	☒ Yes-Pass	☐ **No-Fail**

5. Air Bag Alert Label

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

Driver	☒ Yes	☐ No
Passenger	☒ Yes	☐ No

If yes, go to 6

5.2 Does the label conform in content to the label shown in Figure 6c? (S4.5.1(c)(2)) ☐ Yes-Pass ☐ **No-Fail**

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN UP POSITION

Circle and Line Red with White Background

Artwork Black with White Background

Text Yellow with Black Background

Figure 6c
(S4.5.1(c)(2))

5.3 Is the message area black with yellow text? (S4.5.1(c)(2)(i))

☐ Yes-Pass ☐ **No-Fail**

5.4 Is the message area at least 20 cm^2? (S4.5.1(c)(2)(i))

Actual message area **N/A** cm^2 ☐ Yes-Pass ☐ **No-Fail**

5.5 Is the pictogram black with a red circle and slash on a white background? (S4.5.1(c)(2)(ii))

For vehicles with driver side air bag ONLY ☒ N/A

☐ Yes-Pass ☐ **No-Fail**

5.6 Is the pictogram at least 20 mm in diameter? (S4.5.1(c)(2)(ii))

Actual diameter is **N/A** mm

For vehicles with driver side air bag ONLY ☒ N/A

☐ Yes-Pass ☐ **No-Fail**

6. Label On the Dash

6.1 Does the vehicle have a passenger air bag?

☒ Yes ☐ No

If no, this checklist is complete.

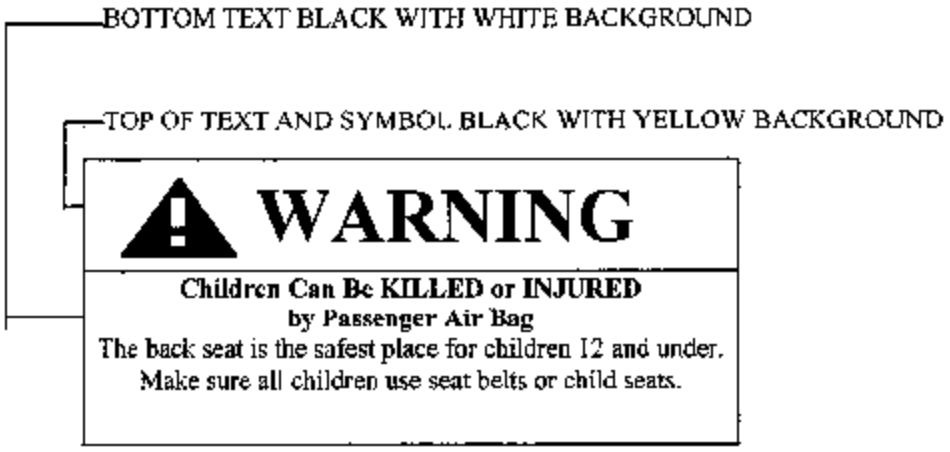
6.2 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e))

☒ 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.")** (S4.5.1(e)(iii)) to the label shown in Figure 7? (S4.5.1(e))

☒ Yes-Pass ☐ **No-Fail**

Figure 7
(S4.5.1(c))



FMVSS 208 Air Bag Labels, Cont'd.

6.4 Is the heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1(e)(i)) ☒ Yes-Pass ☐ **No-Fail**

6.5 Is the message white with black text? (S4.5.1(e)(ii)) ☒ Yes-Pass ☐ **No-Fail**

6.6 Is the message area at least 30 cm^2? (S4.5.1(e)(ii))

Actual message area **34.5** cm^2 ☒ Yes-Pass ☐ **No-Fail**

FMVSS 208 Rear Outboard Seating Position Seat Belts

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Ronald D. Stoner Date: 06/06/03

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

☒ Yes; ☐ No; ☐ N/A (No Back Seat)

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.

FMVSS 208 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 retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Right Front

☒1. Record test seat position: Mid
(S7.1.1.5(c)(1)) (Any position is acceptable.)

☒2. Buckle the seat belt. (S7.1.1.5(c)(1))

☒3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))

☒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 to the vehicle? (S7.1.1.5(a)) ☒ 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? (S7.1.1.5(a)) ☒ 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?

If yes, go to 6.1. If no, go to 7. ☒ Yes ☐ No

6.1 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. (S7.1.1.5(b)) ☒ Yes-Pass ☐ **No-Fail**

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Right Front

☒7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2)) Measured distance between A and B **50.2** 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. (S7.1.1.5(c)(3))

☒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 in figure 5. 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. (S7.1.1.5(c)(4)) Measured force application angle **10** degrees. (Spec. 5~15 degrees)

☒13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B **26.6** inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Right Front

☒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. (S7.1.1.5(c)(5))

Record onset rate **25** lbs/sec (spec. 10 ~50 lb/sec)

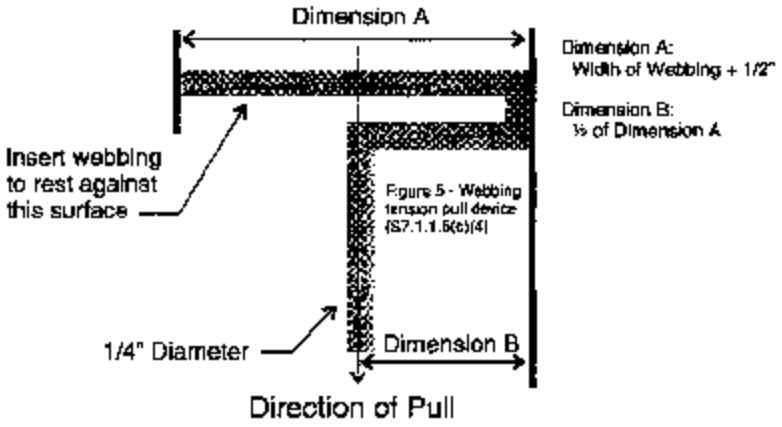
The measured distance between A and B is **27.0** inches (S7.1.1.5(c)(6))

☒15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

14-13= **0.4** inches ☒ Yes-Pass ☐ **No-Fail**

☒16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= **23.2** inches. ☒ Yes-Pass ☐ **No-Fail**



FMVSS 208 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 retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Middle Front; Does not apply - lap belt - no retractor

☐1. Record test seat position: Middle
(S7.1.1.5(c)(1)) (Any position is acceptable.)

☐2. Buckle the seat belt. (S7.1.1.5(c)(1))

☐3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))

☐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 to the vehicle? (S7.1.1.5(a)) ☐ 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? (S7.1.1.5(a)) ☐ 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?

If yes, go to 6.1. If no, go to 7. ☐ Yes ☐ No

6.1 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. (S7.1.1.5(b)) ☐ Yes-Pass ☐ **No-Fail**

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Middle Front

☐7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

☐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. (S7.1.1.5(c)(2))

☐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. (S7.1.1.5(c)(2))

☐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. (S7.1.1.5(c)(2)) Measured distance between A and B ___ 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. (S7.1.1.5(c)(3))

☐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 in figure 5. 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. (S7.1.1.5(c)(4)) Measured force application angle ___ degrees. (Spec. 5~15 degrees)

☐13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B ___ inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Middle Front

☐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. (S7.1.1.5(c)(5))

Record onset rate ___ lbs/sec (spec. 10 ~50 lb/sec)

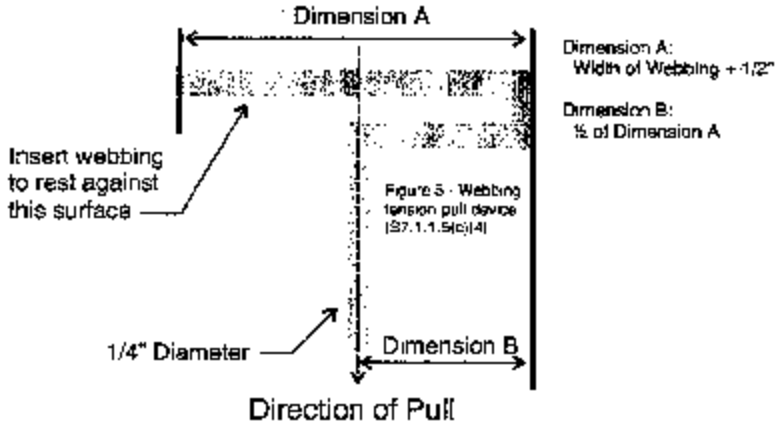
The measured distance between A and B is ___ inches (S7.1.1.5(c)(6))

☐15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

14-13= ___ inches ☐ Yes-Pass ☐ **No-Fail**

☐16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= ___ inches. ☐ Yes-Pass ☐ **No-Fail**



FMVSS 208 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 retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Left Rear

☒1. Record test seat position: Fixed
(S7.1.1.5(c)(1)) (Any position is acceptable.)

☒2. Buckle the seat belt. (S7.1.1.5(c)(1))

☒3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))

☒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 to the vehicle? (S7.1.1.5(a)) ☒ 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? (S7.1.1.5(a)) ☒ 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?

If yes, go to 6.1. If no, go to 7. ☒ Yes ☐ No

6.1 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. (S7.1.1.5(b)) ☒ Yes-Pass ☐ **No-Fail**

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Left Rear

☒7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2)) Measured distance between A and B **43.5** inches.

☒11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))

☒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 in figure 5. 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. (S7.1.1.5(c)(4)) Measured force application angle **10** degrees. (Spec. 5~15 degrees)

☒13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B **18.1** inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Left Rear

☒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. (S7.1.1.5(c)(5))

Record onset rate **25** lbs/sec (spec. 10 ~50 lb/sec)

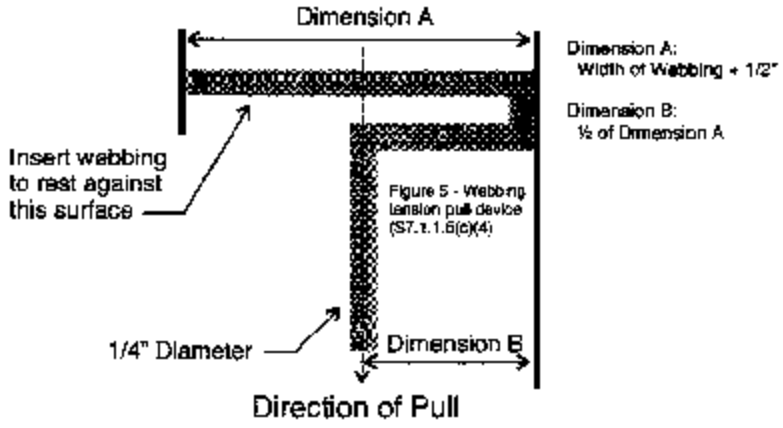
The measured distance between A and B is **18.5** inches (S7.1.1.5(c)(6))

☒15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

14-13= **0.4** inches ☒ Yes-Pass ☐ **No-Fail**

☒16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= **25.0** inches. ☒ Yes-Pass ☐ **No-Fail**



FMVSS 208 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 retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Center Rear

☒1. Record test seat position: Fixed (S7.1.1.5(c)(1)) (Any position is acceptable.)

☒2. Buckle the seat belt. (S7.1.1.5(c)(1))

☒3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))

☒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 to the vehicle? (S7.1.1.5(a)) ☒ 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? (S7.1.1.5(a)) ☒ 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?

If yes, go to 6.1. If no, go to 7. ☒ Yes ☐ No

6.1 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. (S7.1.1.5(b)) ☒ Yes-Pass ☐ **No-Fail**

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Center Rear

☒7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2)) Measured distance between A and B **41.9** 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. (S7.1.1.5(c)(3))

☒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 in figure 5. 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. (S7.1.1.5(c)(4)) Measured force application angle **10** degrees. (Spec. 5~15 degrees)

☒13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B **16.1** inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Center Rear

☒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. (S7.1.1.5(c)(5))

Record onset rate **25** lbs/sec (spec. 10 ~50 lb/sec)

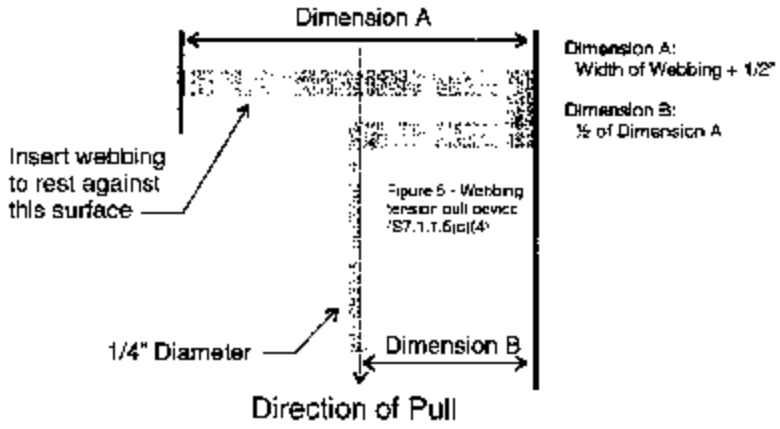
The measured distance between A and B is **16.9** inches (S7.1.1.5(c)(6))

☒15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

14-13= **0.8** inches ☒ Yes-Pass ☐ **No-Fail**

☒16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= **25.0** inches. ☒ Yes-Pass ☐ **No-Fail**



FMVSS 208 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 retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Right Rear

☒1. Record test seat position: Fixed
(S7.1.1.5(c)(1)) (Any position is acceptable.)

☒2. Buckle the seat belt. (S7.1.1.5(c)(1))

☒3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))

☒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 to the vehicle? (S7.1.1.5(a)) ☒ 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? (S7.1.1.5(a)) ☒ 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?

If yes, go to 6.1. If no, go to 7. ☒ Yes ☐ No

6.1 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. (S7.1.1.5(b)) ☒ Yes-Pass ☐ **No-Fail**

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Right Rear

☒7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2))

☒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. (S7.1.1.5(c)(2)) Measured distance between A and B **43.7** 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. (S7.1.1.5(c)(3))

☒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 in figure 5. 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. (S7.1.1.5(c)(4)) Measured force application angle **10** degrees. (Spec. 5~15 degrees)

☒13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B **18.9** inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan

NHTSA No.: C30109 Technician: Steve Bell Date: 05/08/2003

Designated Seating Position: Right Rear

☒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. (S7.1.1.5(c)(5))

Record onset rate **25** lbs/sec (spec. 10 ~50 lb/sec)

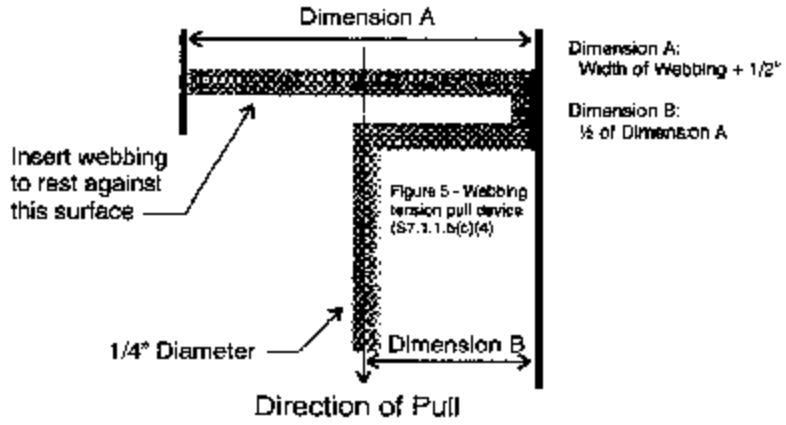
The measured distance between A and B is **19.3** inches (S7.1.1.5(c)(6))

☒15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

14-13= **0.4** inches ☒Yes-Pass ☐**No-Fail**

☒16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= **24.4** inches. ☒Yes-Pass ☐**No-Fail**



FMVSS 208 Seat Belt Comfort And Convenience Test

Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Left Rear
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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. Does the vehicle incorporate a webbing tension-relieving device?

   ☐ Yes-go to latchplate access
   ☒ No-continue with this check sheet

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
   ☒ N/A

3. If separately adjustable in a vertical direction, the seats are at the lowest position.

   ☐ Check
   ☒ N/A

4. Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.

   ☐ Check
   ☒ N/A

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

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Belt Contact Force (S7.4.3)

6. Place each adjustable head restraint in its highest adjustment position.

☐ Check
☒ N/A

7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)

☐ Check
☒ N/A

8. Position the test dummy according to the dummy position placement instructions in Appendix B of the Laboratory Test Procedure.

☒ Check

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 is **0.5** pounds.

☒ 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.

FMVSS 208 Seat Belt Comfort And Convenience Test

Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Center Rear
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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. Does the vehicle incorporate a webbing tension-relieving device?

   ☐ Yes-go to latchplate access
   ☒ No-continue with this check sheet

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
   ☒ N/A

3. If separately adjustable in a vertical direction, the seats are at the lowest position.

   ☐ Check
   ☒ N/A

4. Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.

   ☐ Check
   ☒ N/A

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

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Belt Contact Force (S7.4.3)

6. Place each adjustable head restraint in its highest adjustment position.

☐ Check
☒ N/A

7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)

☐ Check
☒ N/A

8. Position the test dummy according to the dummy position placement instructions in Appendix B of the Laboratory Test Procedure.

☒ Check

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 is **0.5** pounds.

☒ 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.

FMVSS 208 Seat Belt Comfort And Convenience Test

Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Right Rear
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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. Does the vehicle incorporate a webbing tension-relieving device?

   ☐ Yes-go to latchplate access
   ☒ No-continue with this check sheet

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
   ☒ N/A

3. If separately adjustable in a vertical direction, the seats are at the lowest position.

   ☐ Check
   ☒ N/A

4. Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.

   ☐ Check
   ☒ N/A

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

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Belt Contact Force (S7.4.3)

6. Place each adjustable head restraint in its highest adjustment position.

☐ Check
☒ N/A

7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)

☐ Check
☒ N/A

8. Position the test dummy according to the dummy position placement instructions in Appendix B of the Laboratory Test Procedure.

☒ Check

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 is **0.5** pounds.

☒ 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.

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Latchplate Access (S7.4.4)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Does not apply
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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.

1. Position the seat in its forward most adjustment position. ☐ Check

2. Position the test dummy using the procedures in Appendix B of the Laboratory Test Procedure. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.) ☐ Check

3. Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant. ☐ Check

4. Attach the inboard and outboard reach string following the instructions on Figure 1C of the Laboratory Test Procedure. ☐ Check

5. Place the latch plate in the stowed position. ☐ Check

6. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. Is the latchplate within the reach envelope?

☐ Yes-Pass; ☐ **No-Fail**

7. Using the clearance test block, specified in Figure 2C of the Laboratory Test Procedure, determine if there is sufficient clearance between the vehicle seat and the side of vehicle to allow the test block to move unhindered to the latchplate or buckle.

☐ Yes-Pass; ☐ **No-Fail**

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Retraction (S7.4.5)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Does not apply
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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.

1. Is the vehicle a passenger car or walk-in van-type vehicle? ☐ Yes ☐ No

   If yes, go to seat belt guides and hardware.

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. If separately adjustable in a vertical direction, the seats are at the lowest position. ☐ Check

4. Place any adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer. ☐ Check

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

6. Place each adjustable head restraint in its highest adjustment position. ☐ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Retraction (S7.4.5)

7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3) ☐ Check

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 of the Laboratory Test Procedure. ☐ Check

9. Restrain the dummies using the belt systems for the position being tested. ☐ Check

10. Stow outboard armrests that are capable of being stowed. ☐ Check

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 latchplate is released. ☐ Pass

    (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latchplate is released. ☐ Pass

    (C) Neither A or B apply. ☐ **Fail**

12. With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?

    ☐ Yes-Pass; ☐ **No-Fail**

13. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated? ☐ N/A

    ☐ Yes-Pass; ☐ **No-Fail**

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Seat Belt Guides And Hardware (S7.4.6)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Left Rear
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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 that 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:

1. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
   ☒ Yes: go to 2.
   ☐ No: this form is complete.

2. Does one of the following three parts, the seat belt latchplate, 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**

3. Are the remaining two seat belt parts accessible under normal conditions?
   ☒ Yes-Pass; ☐ **No-Fail**

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Seat Belt Guides And Hardware (S7.4.6)

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

   (A) The belt is completely retracted or, if the belt is nonretractable, the belt is 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**

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**

   N/A, no armrest

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Seat Belt Guides And Hardware (S7.4.6)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Center Rear
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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 that 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:

1. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
   ☒ Yes: go to 2.
   ☐ No: this form is complete.

2. Does one of the following three parts, the seat belt latchplate, 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**

3. Are the remaining two seat belt parts accessible under normal conditions?
   ☒ Yes-Pass; ☐ **No-Fail**

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Seat Belt Guides And Hardware (S7.4.6)

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

   (A) The belt is completely retracted or, if the belt is nonretractable, the belt is 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**

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**

   N/A, no armrest

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Seat Belt Guides And Hardware (S7.4.6)

Test Vehicle NHTSA No.: C30109
Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Impala/4-door sedan
Designated Seating Position Tested: Right Rear
Date of Comfort and Convenience Check: 05/08/2003
Technician Performing Check: Steve Bell
GVWR: 4560 pounds

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 that 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:

1. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
   ☒ Yes: go to 2.
   ☐ No: this form is complete.

2. Does one of the following three parts, the seat belt latchplate, 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**

3. Are the remaining two seat belt parts accessible under normal conditions?
   ☒ Yes-Pass; ☐ **No-Fail**

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.

Seat Belt Guides And Hardware (S7.4.6)

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

   (A) The belt is completely retracted or, if the belt is nonretractable, the belt is 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**

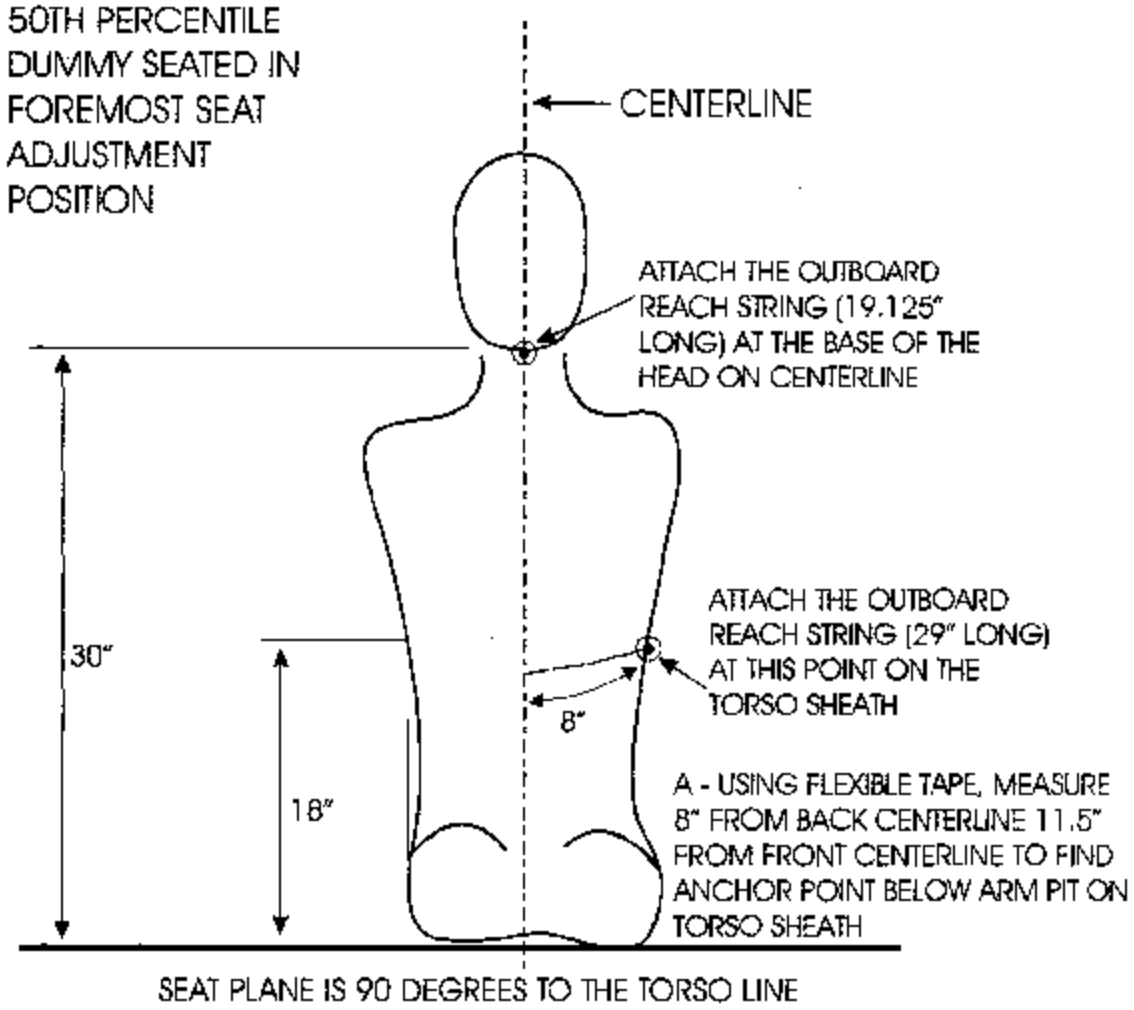
5. Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?

   ☐ Yes-Pass; ☐ **No-Fail**

   N/A, no armrest

LOCATION OF ANCHORING POINTS FOR LATCHPLATE REACH LIMITING CHAINS OR STRINGS TO TEST FOR LATCHPLATE ACCESSIBILITY

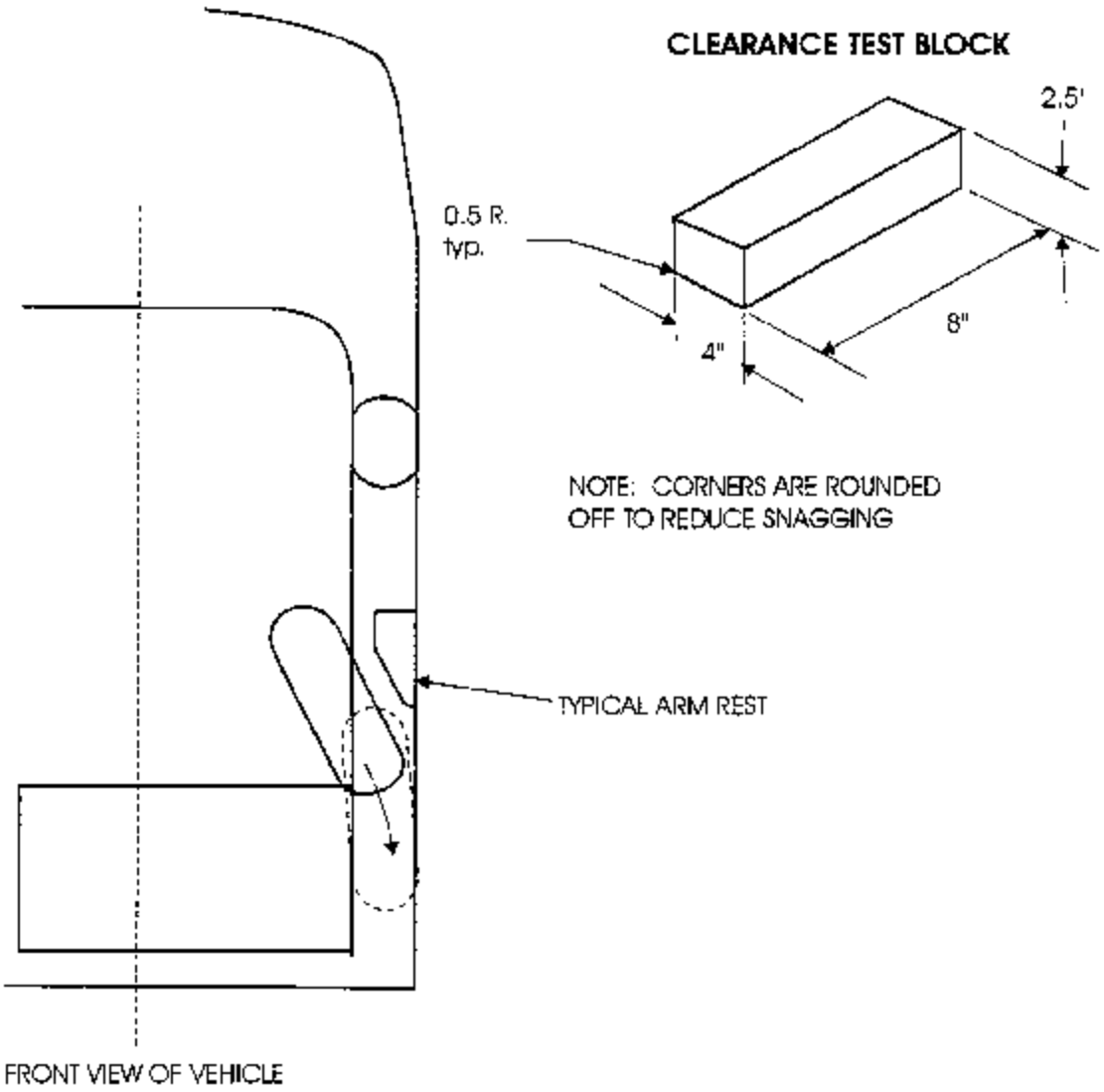
PART 572E DUMMY



REAR VIEW

Laboratory Test Procedure Figure 1C

USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS



Laboratory Test Procedure Figure 2C

Appendix A

Photographs

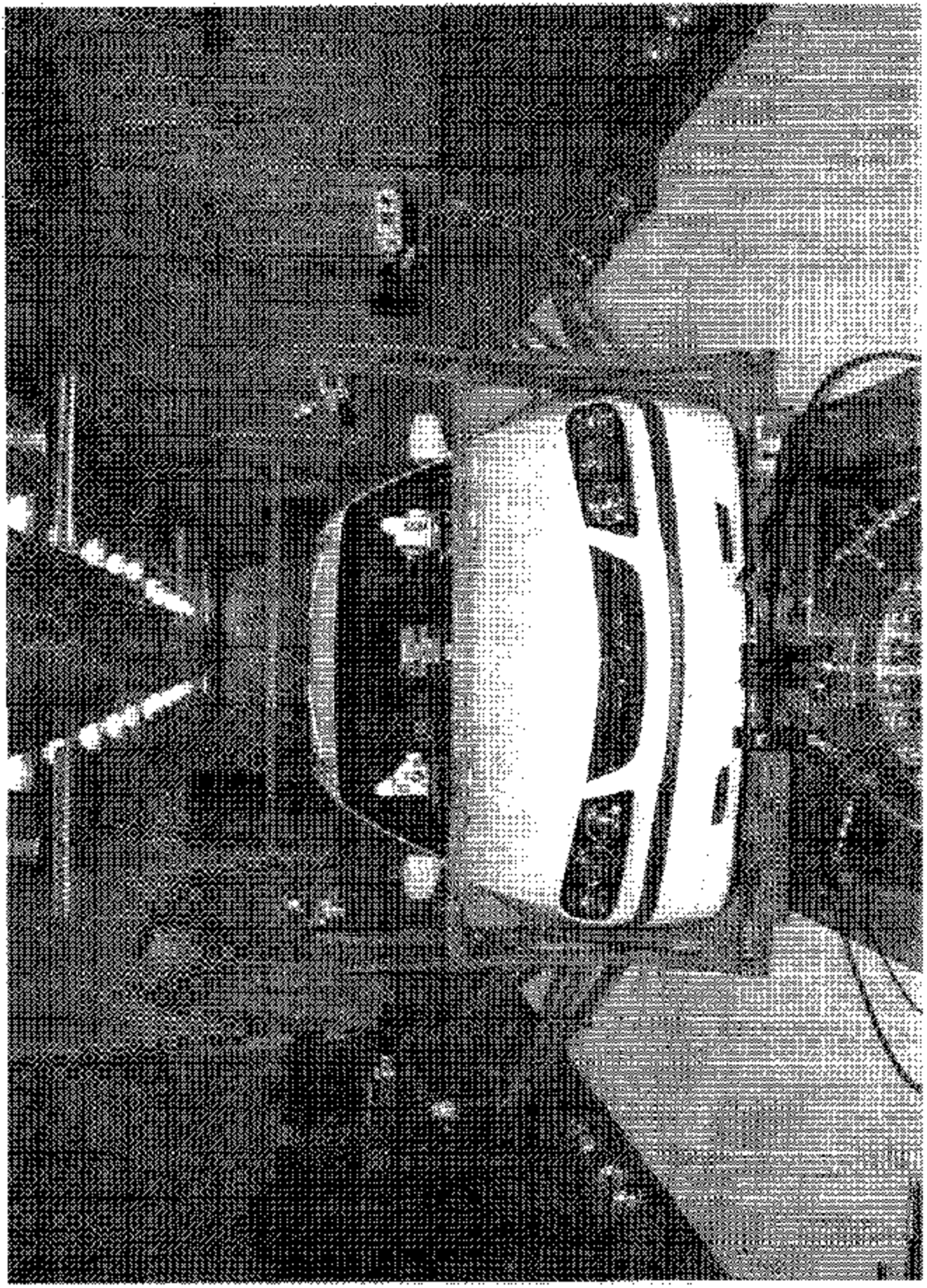


Figure A-1 Pre-Test Front View of Test Vehicle Mounted to Sled

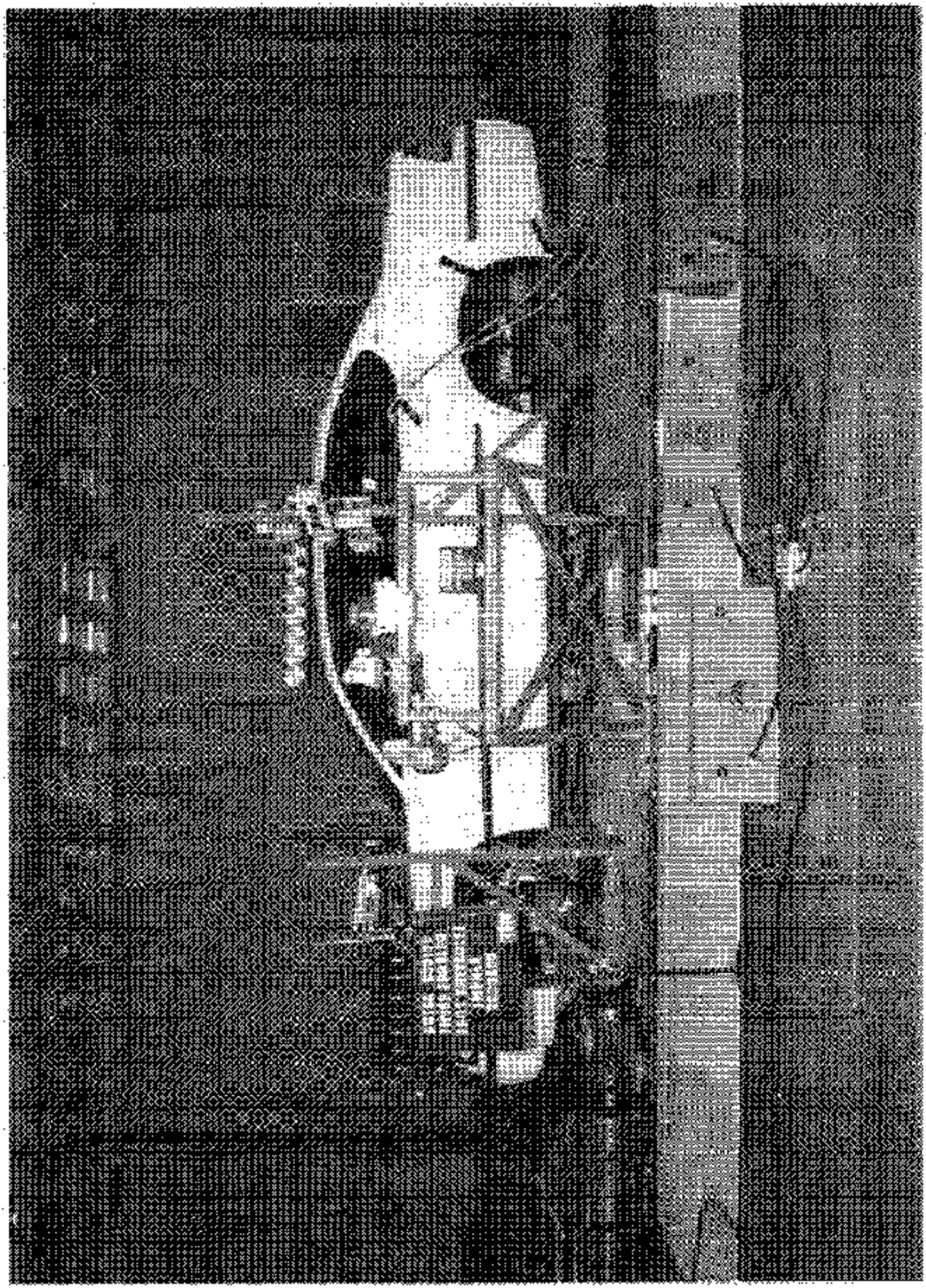


Figure A-2 Pre-Test Left Side View of Test Vehicle Mounted to Sled

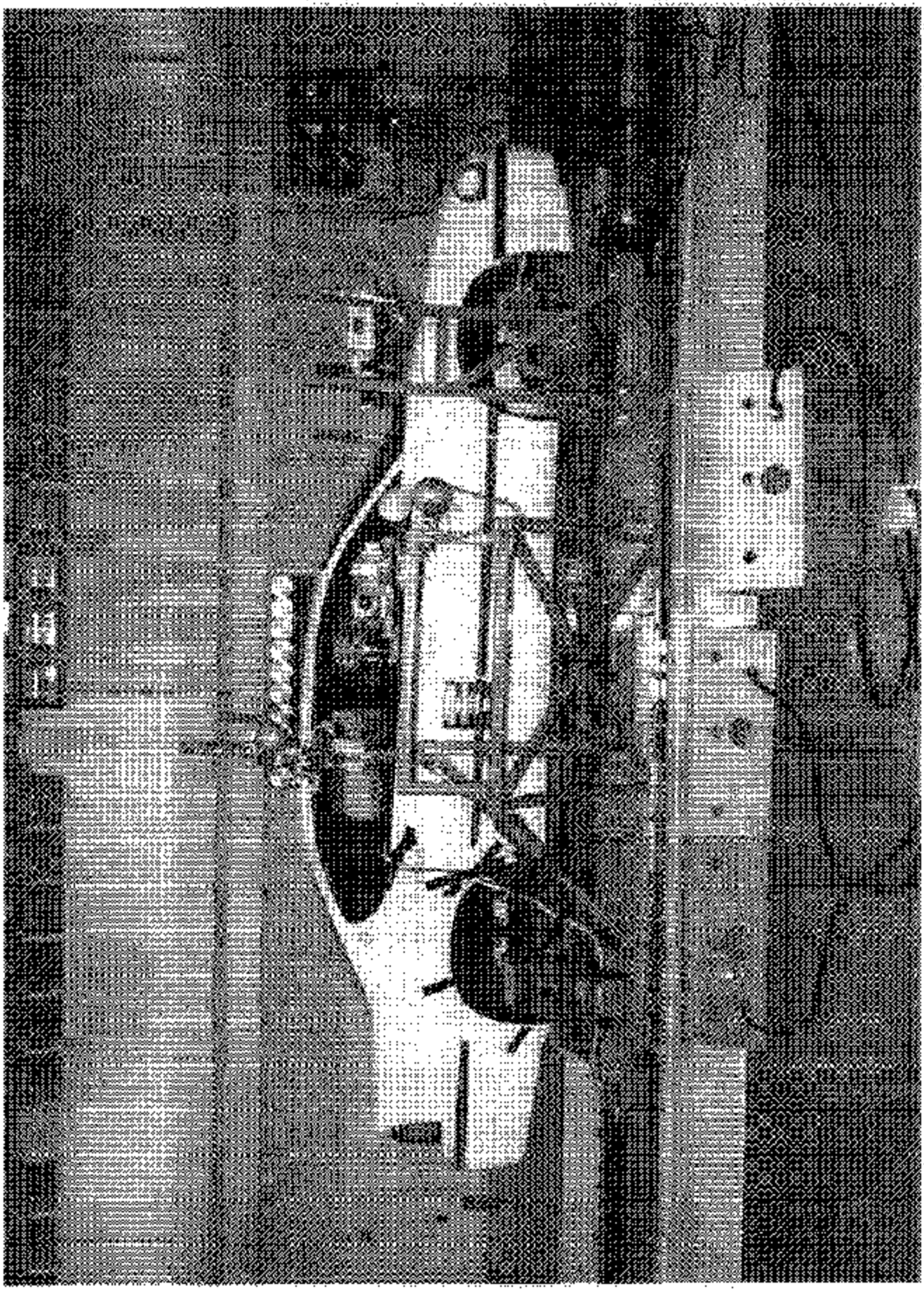


Figure A-3 Pre-Test Right Side View of Test Vehicle Mounted to Sled

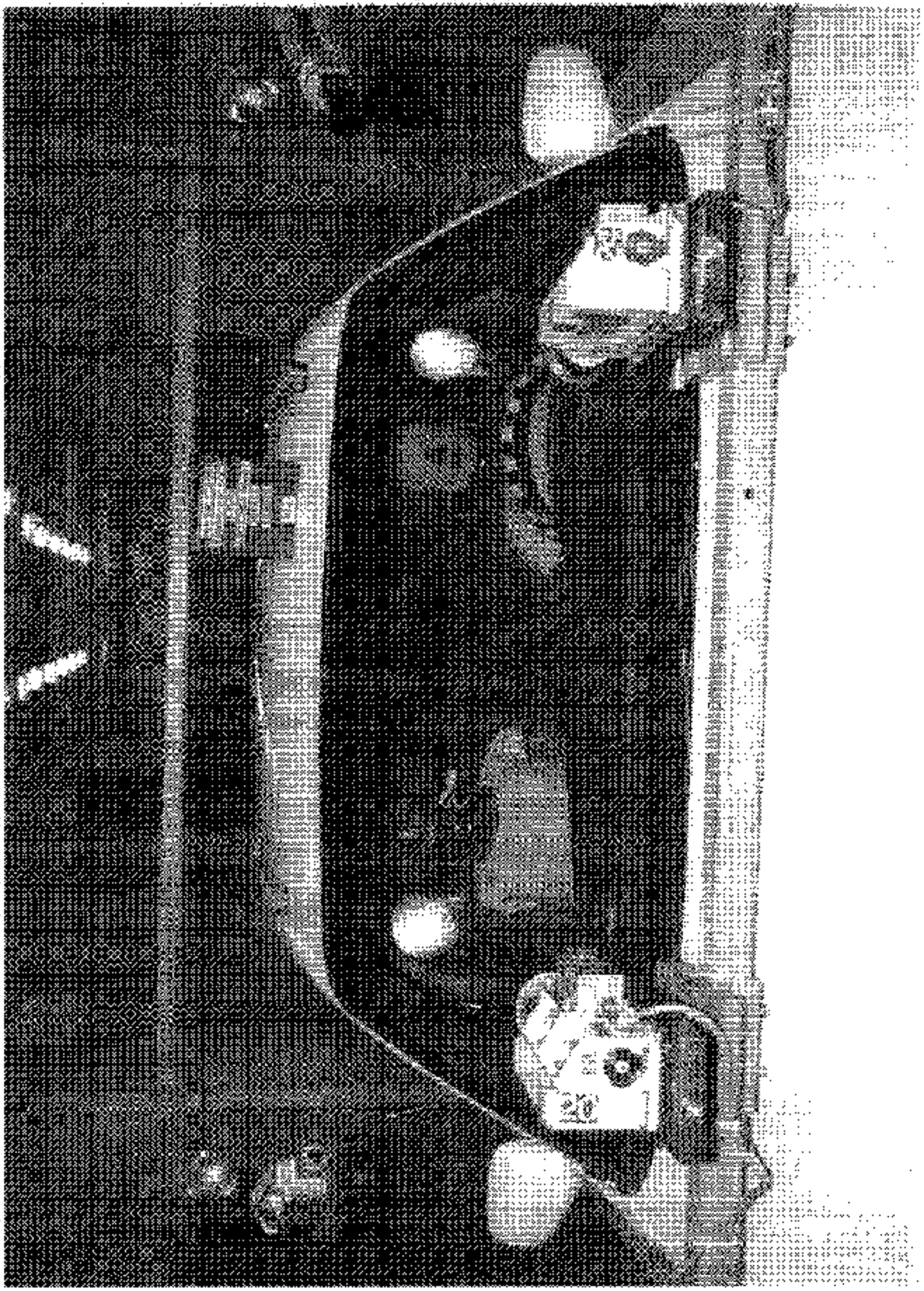


Figure A-4 Pre-Test Windshield View

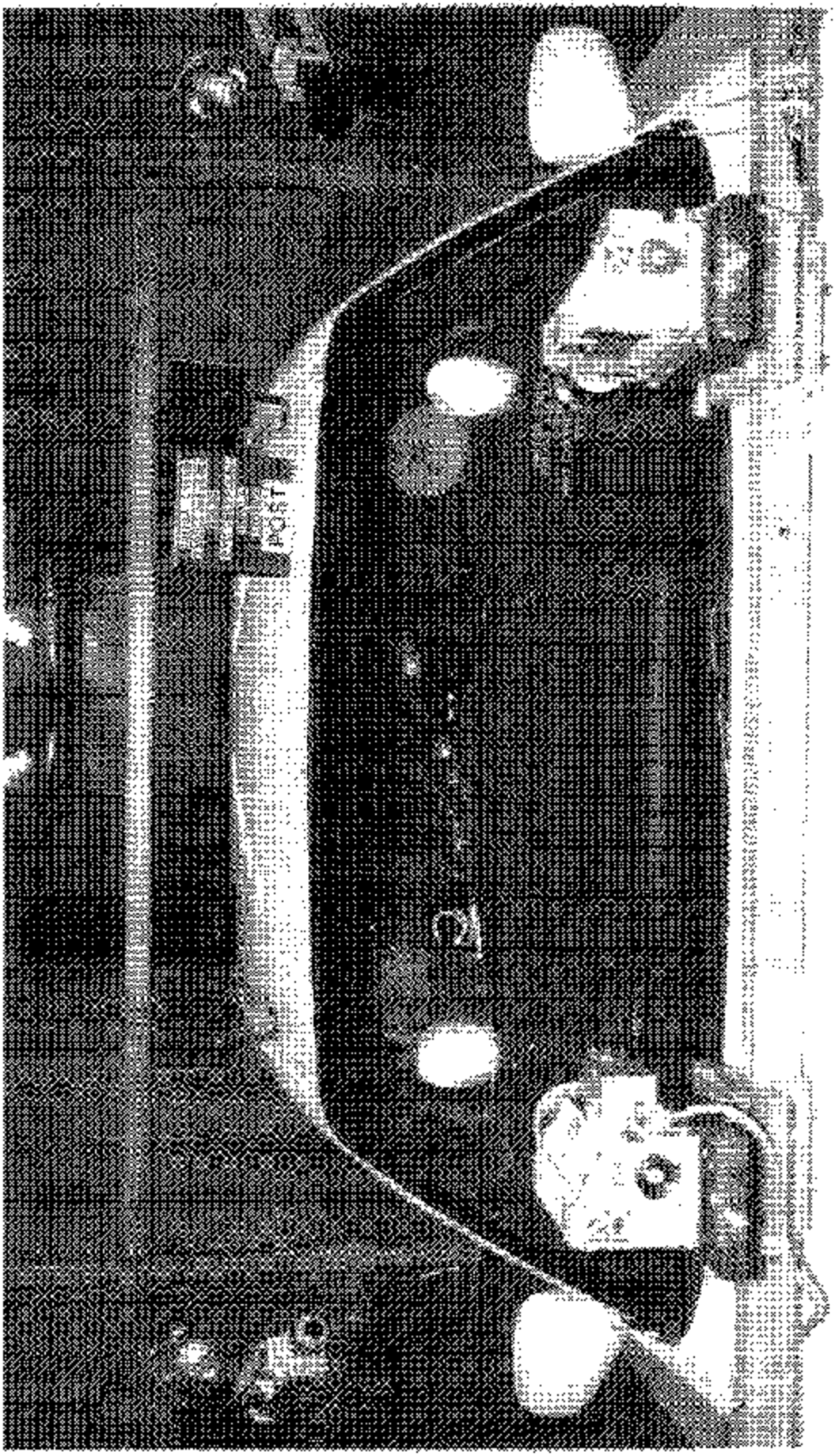


Figure A-5 Post-Test Windshield View

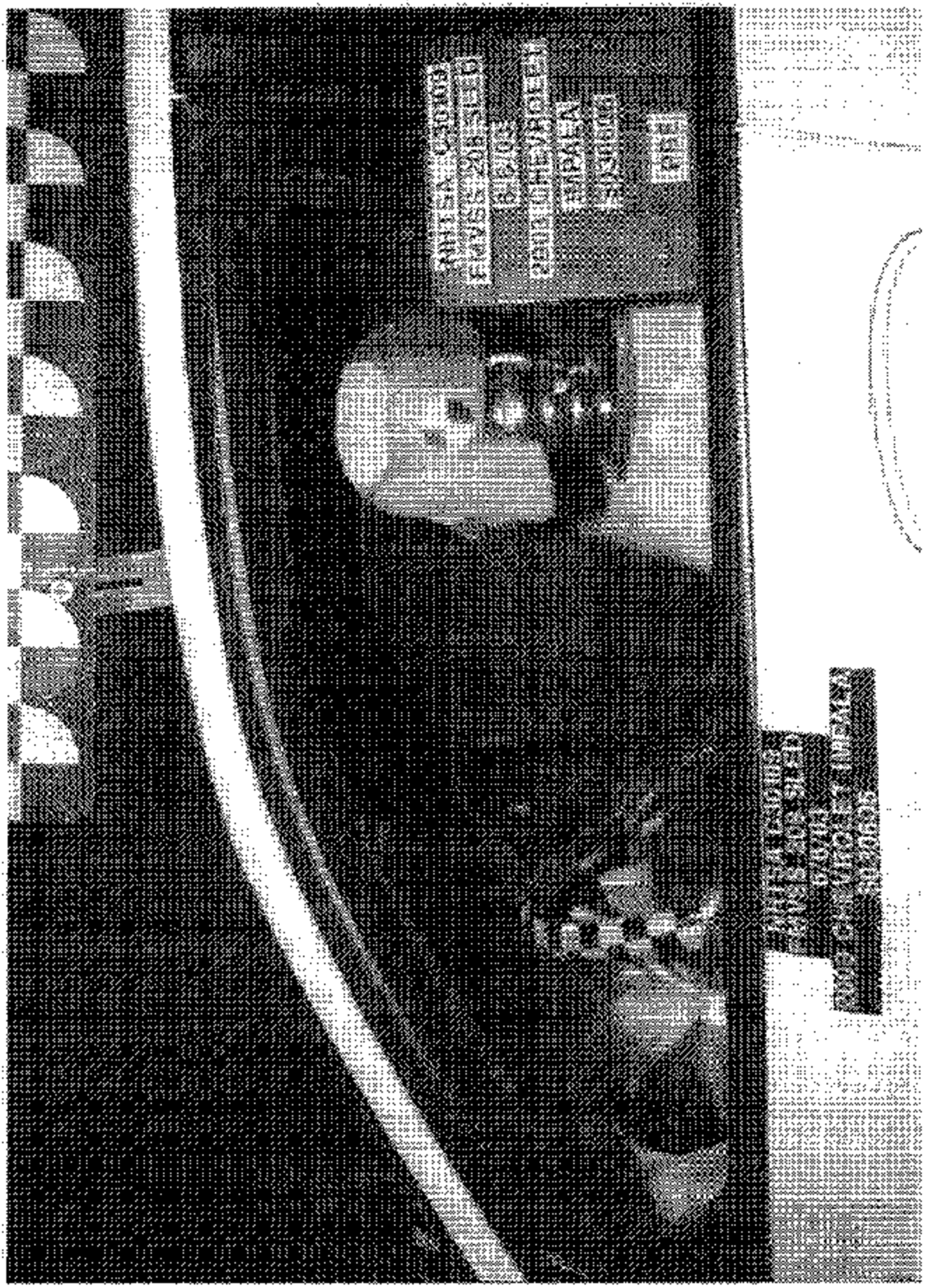


Figure A-6 Pre-Test Driver Dummy Position - View 1

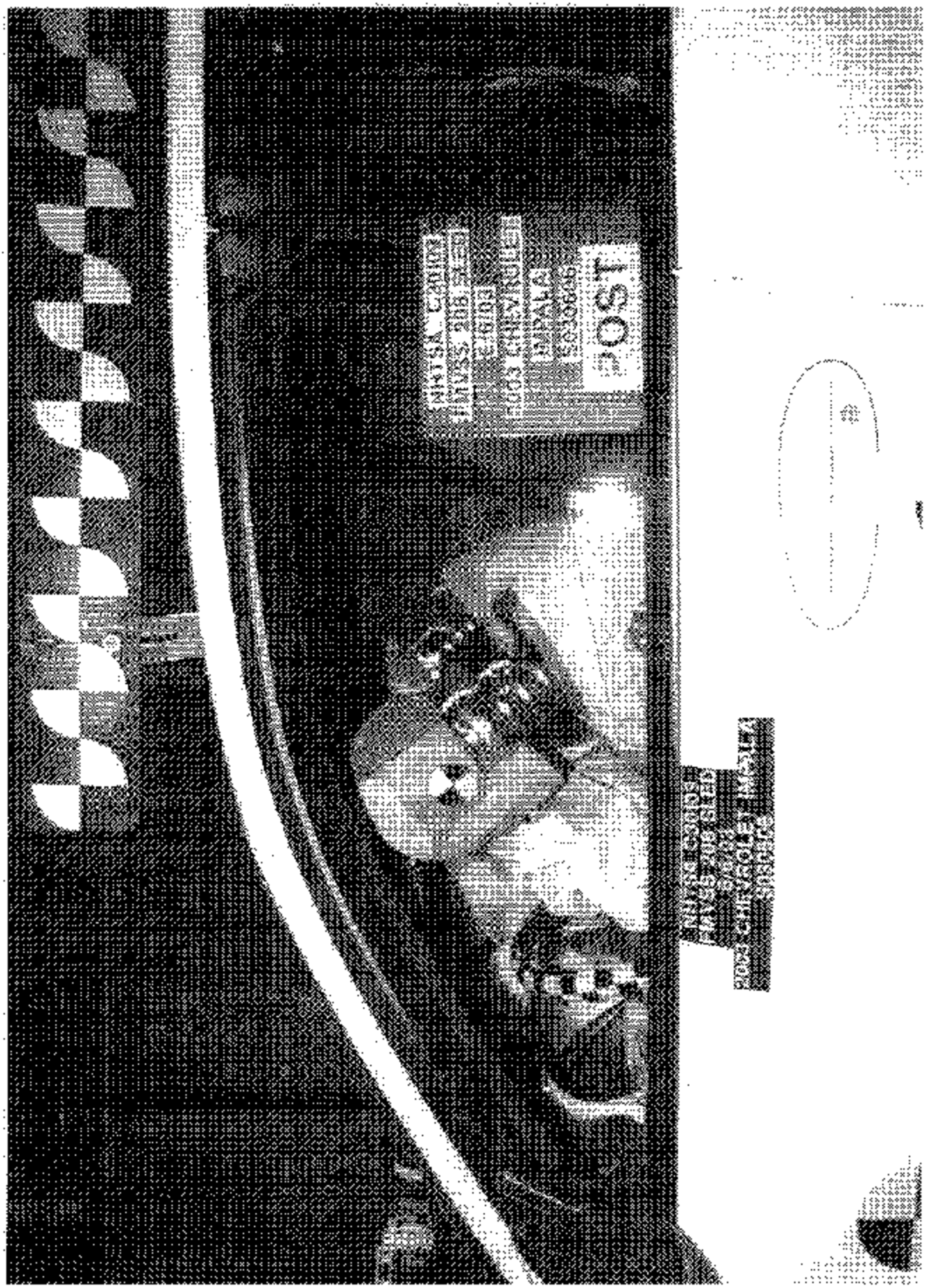


Figure A-7 Post-Test Driver Dummy Position - View 1

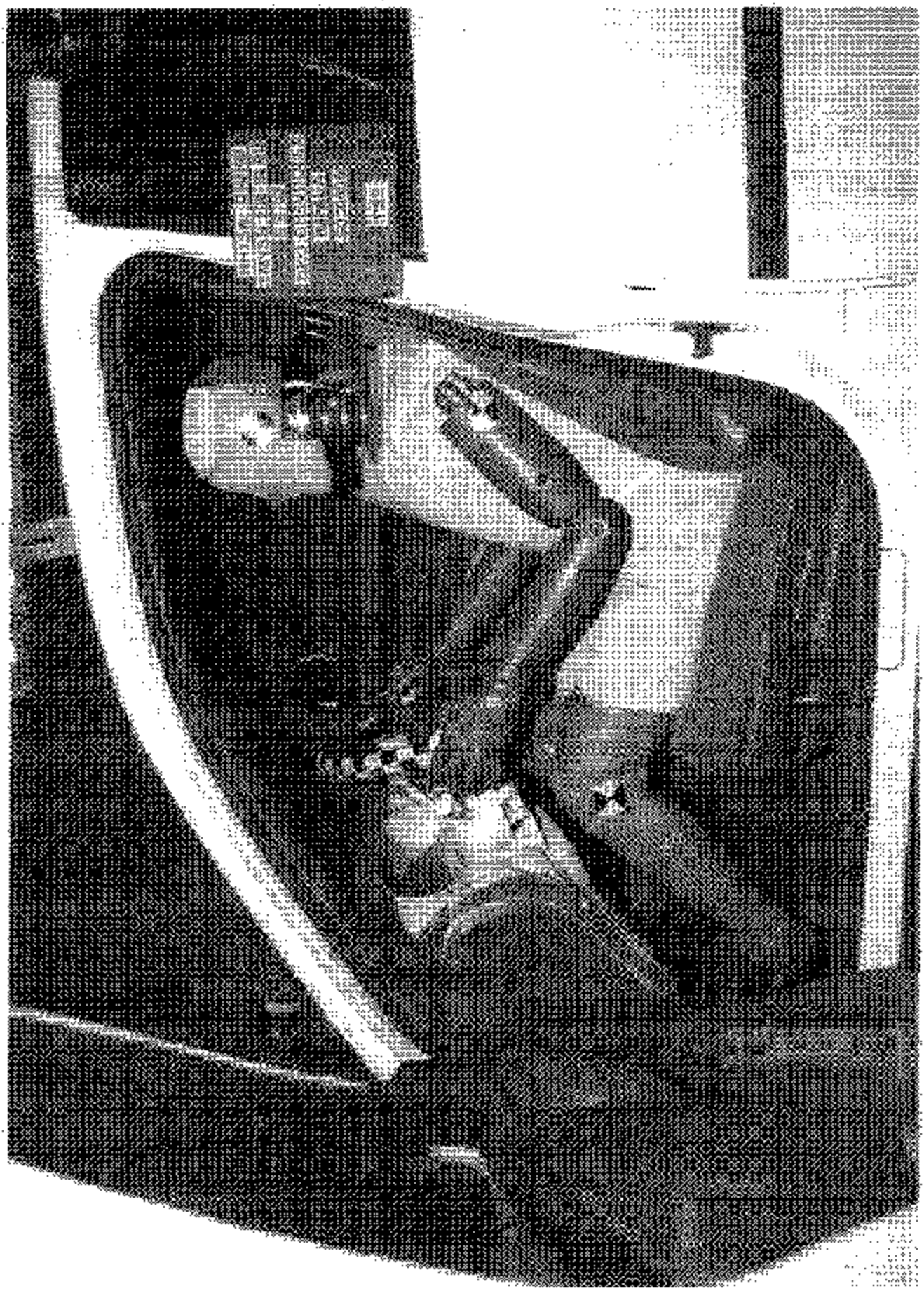


Figure A-8 Pre-Test Driver Dummy Position - View 2

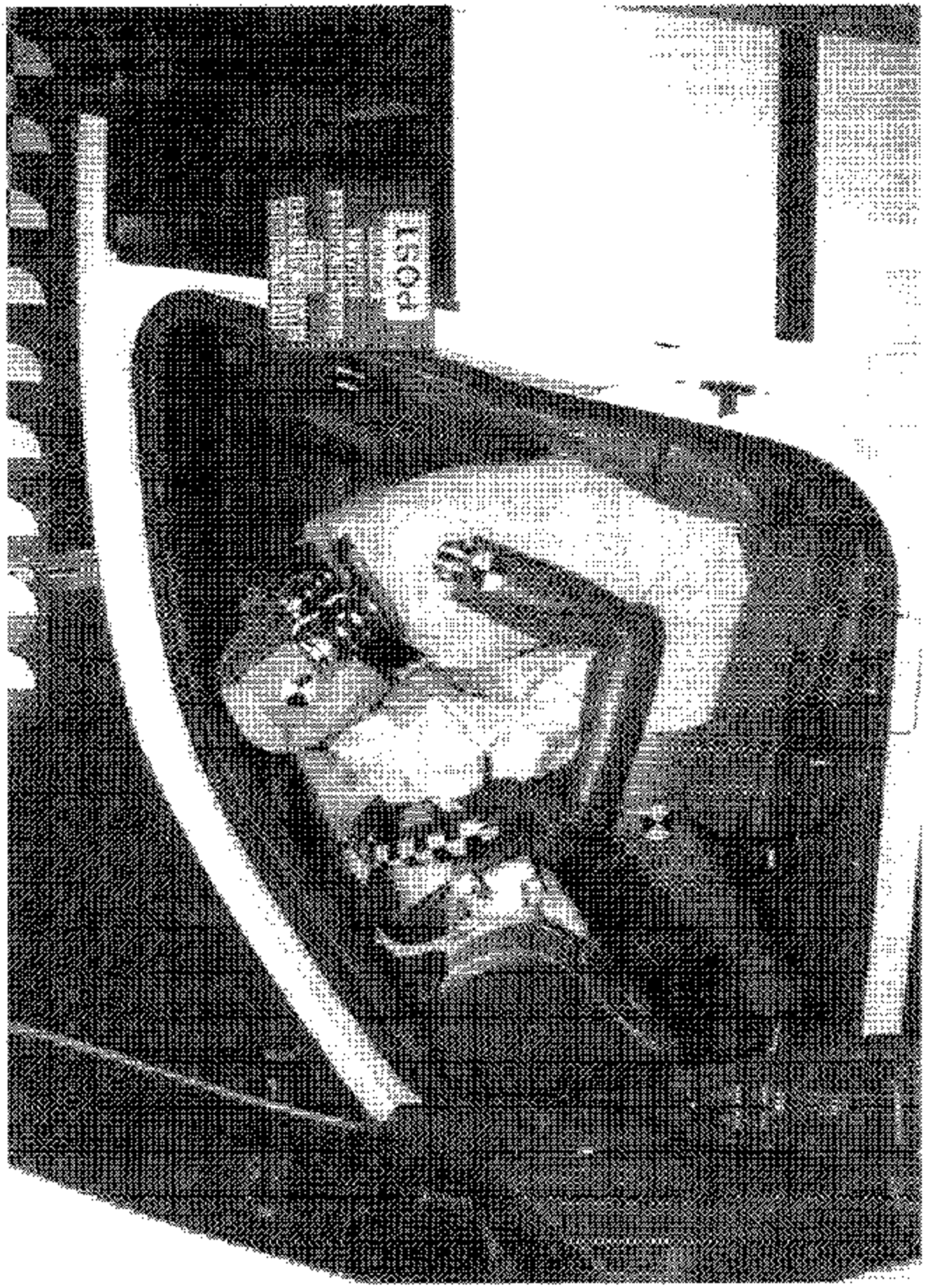


Figure A-9 Post-Test Driver Dummy Position – View 2

Figure A-10 Pre-Test Driver Dummy Position - View 3

Figure A-11 Post-Test Driver Dummy Position - View 3

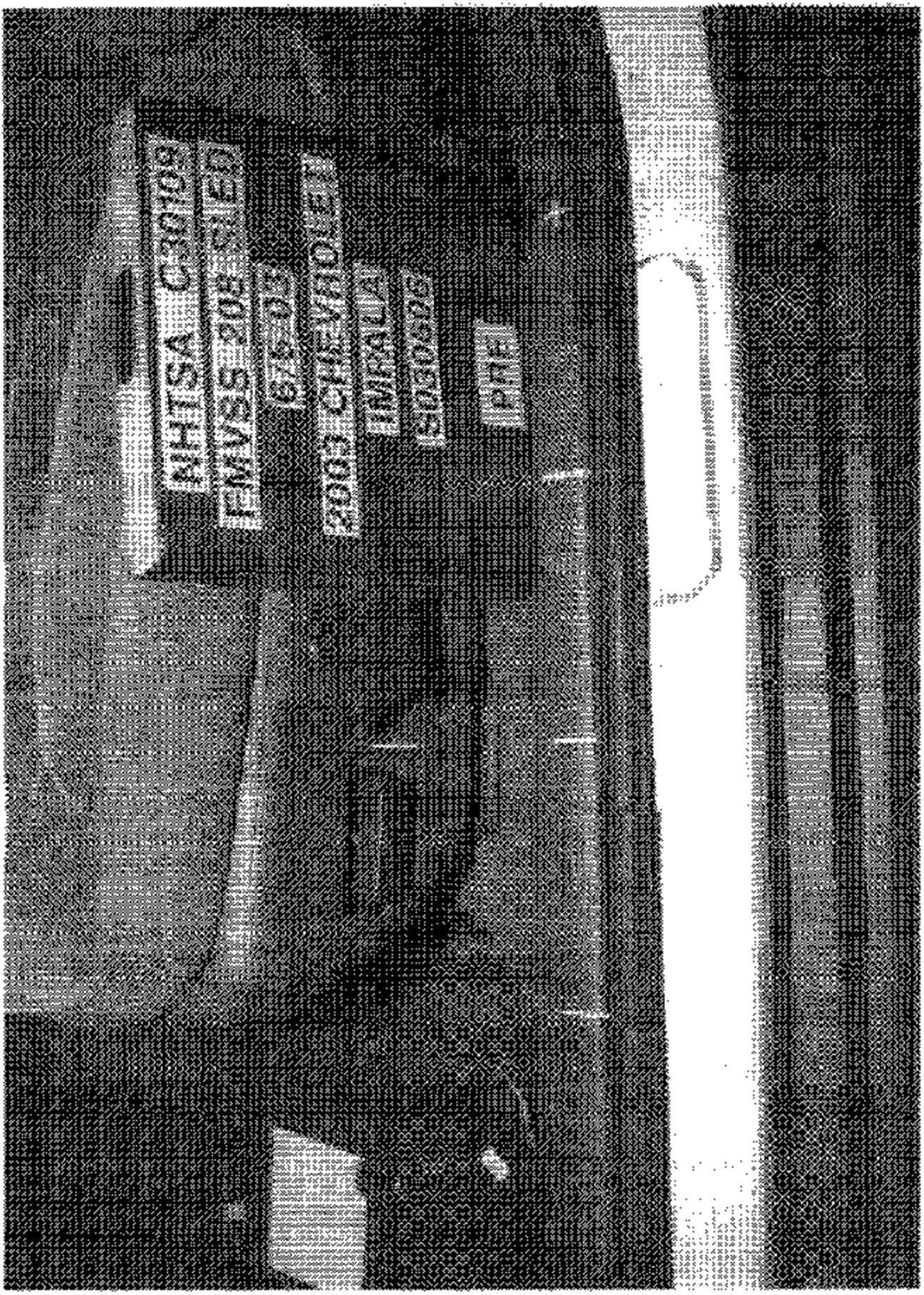


Figure A-12 Pre-Test Driver Seat Track Position View

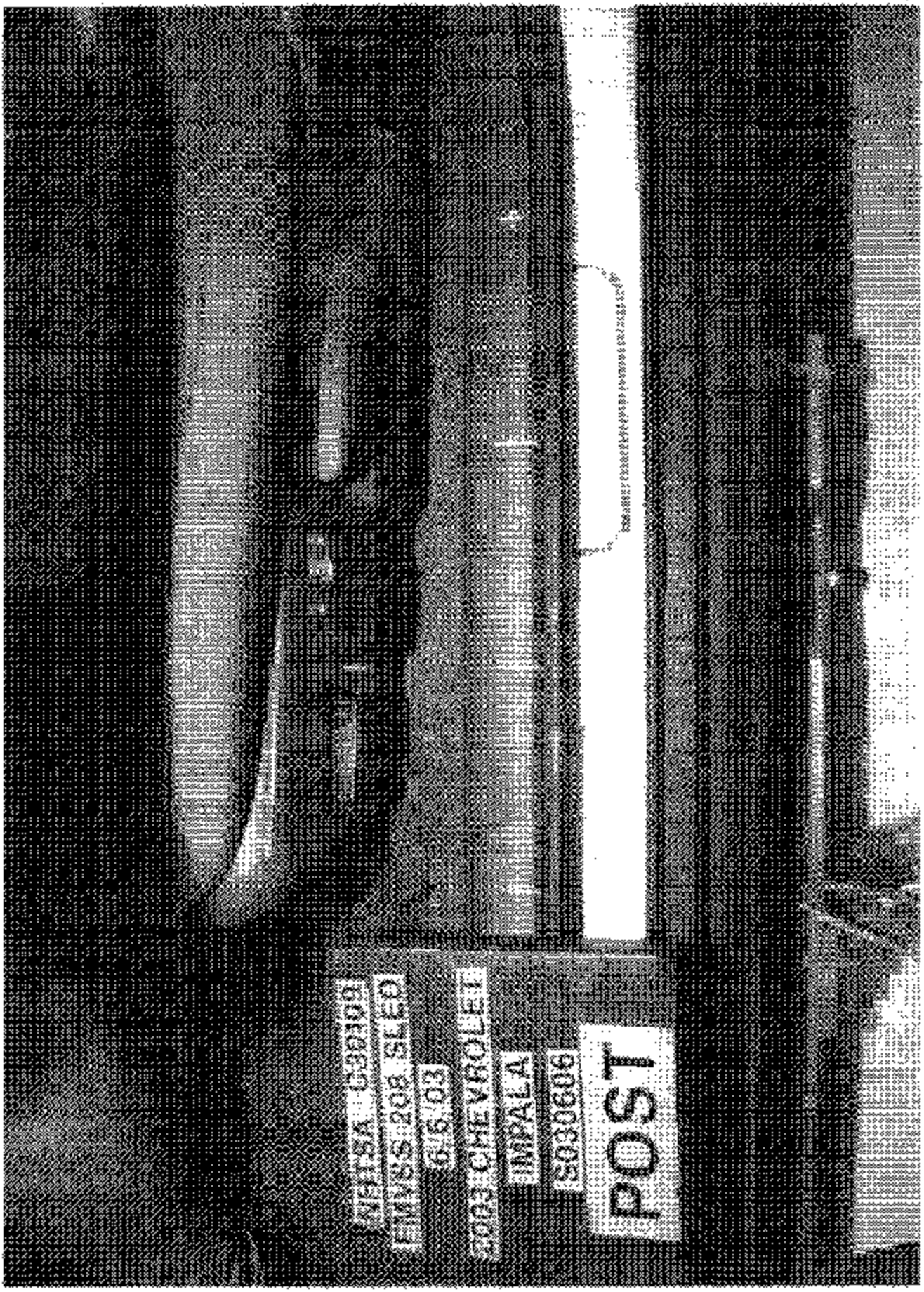


Figure A-13 Post-Test Driver Seat Track Position View

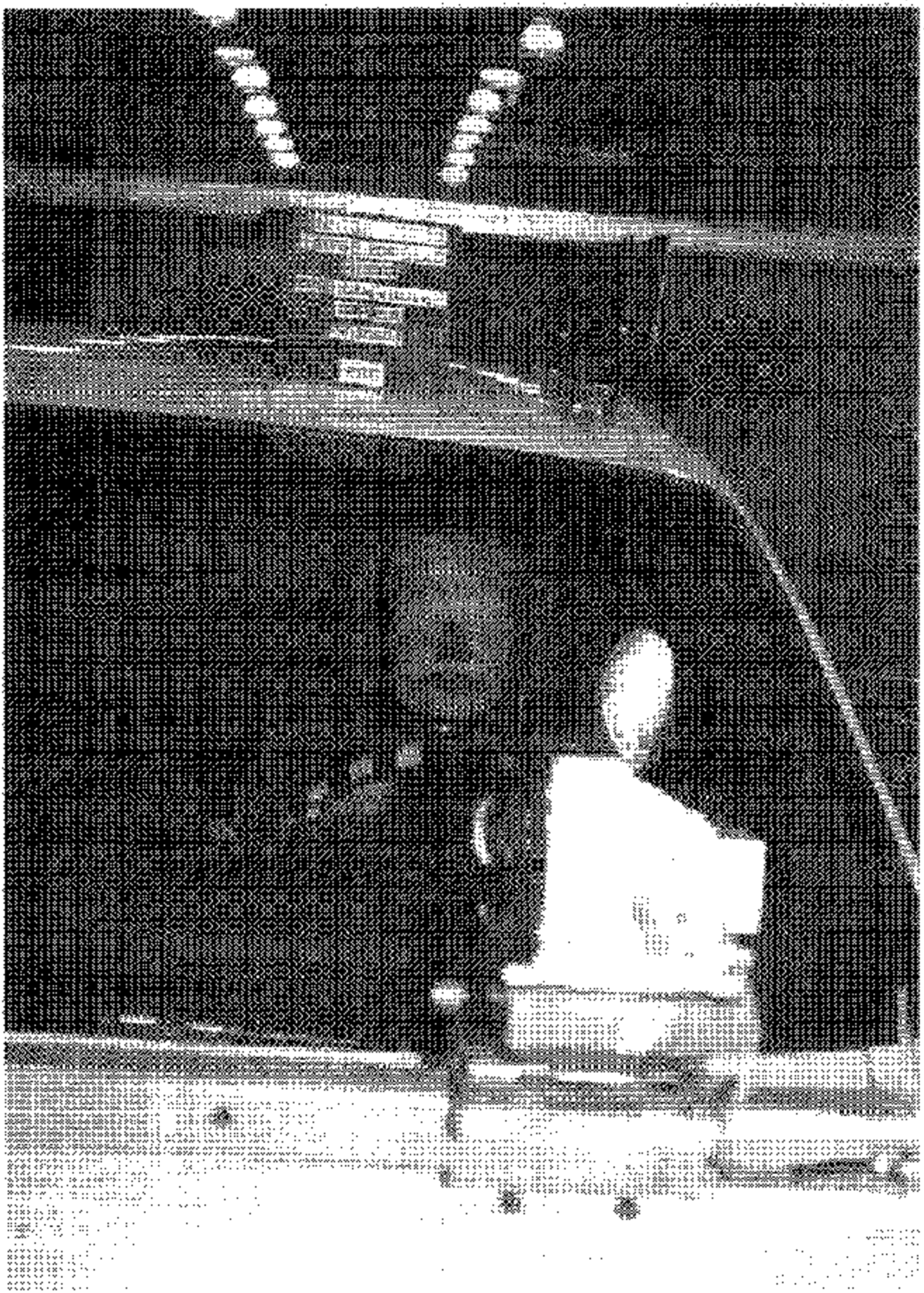


Figure A-14 Pre-Test Driver Dummy Position Front View

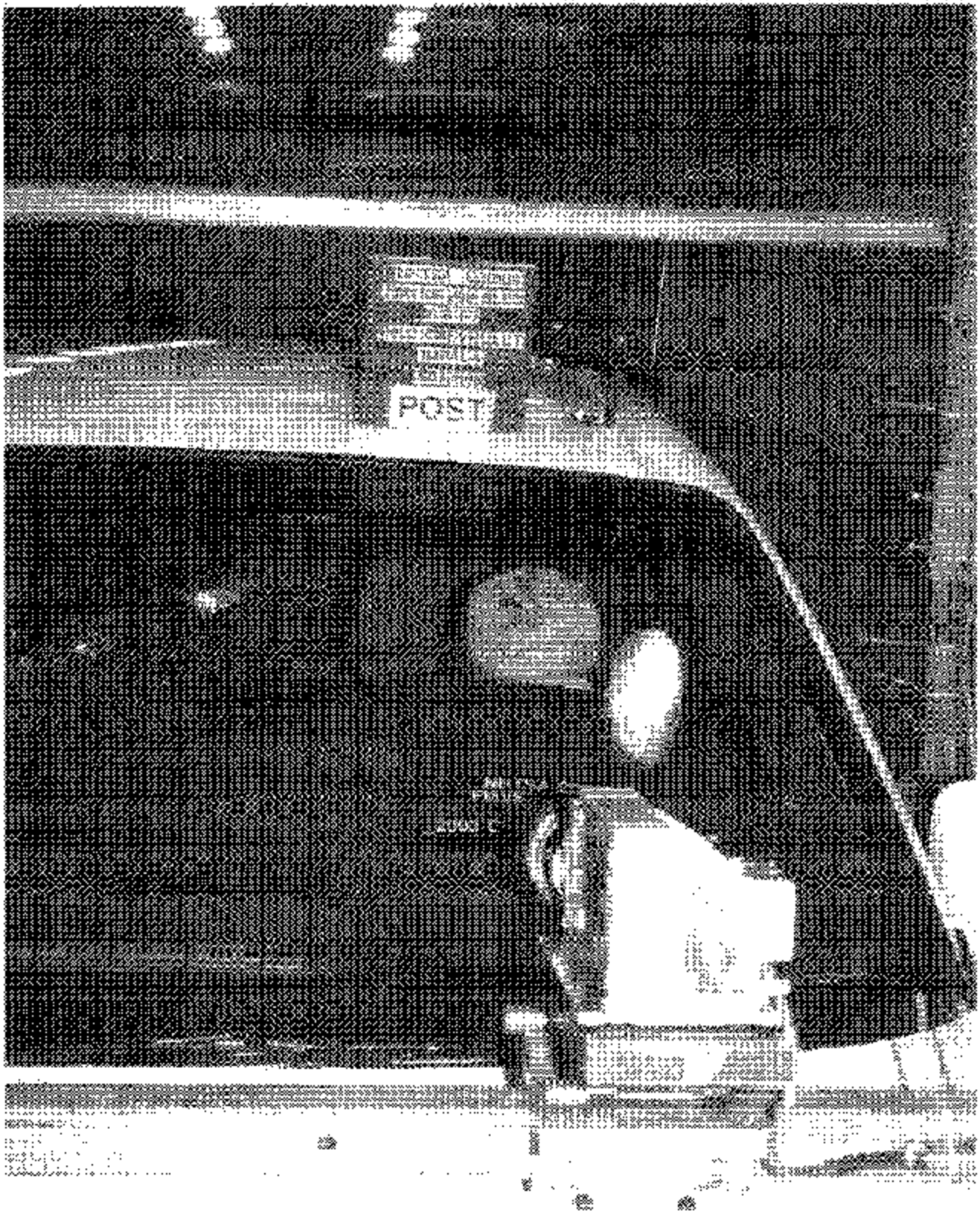


Figure A-15 Post-Test Driver Dummy Position Front View

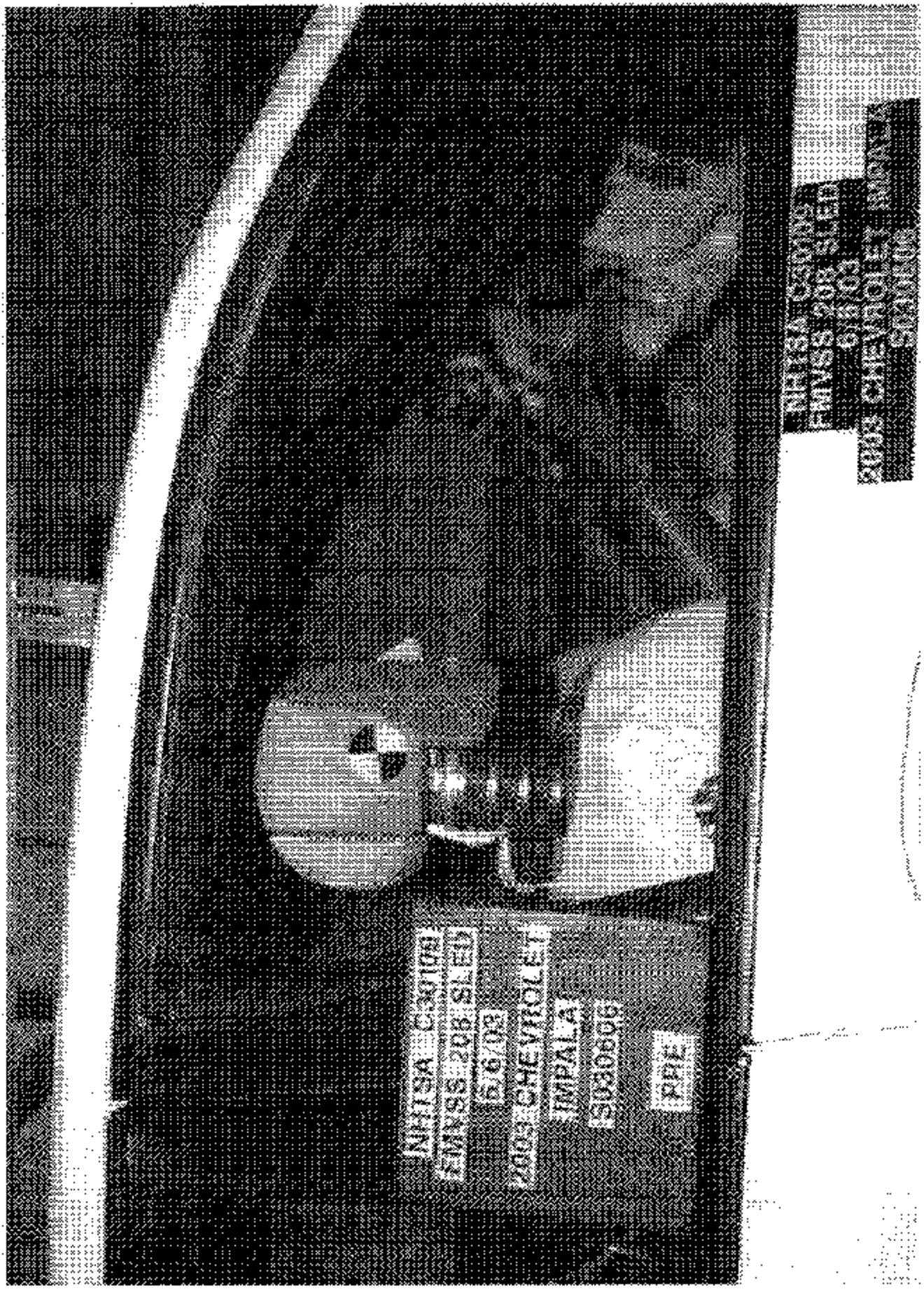


Figure A-16 Pre-Test Passenger Dummy Position - View 1

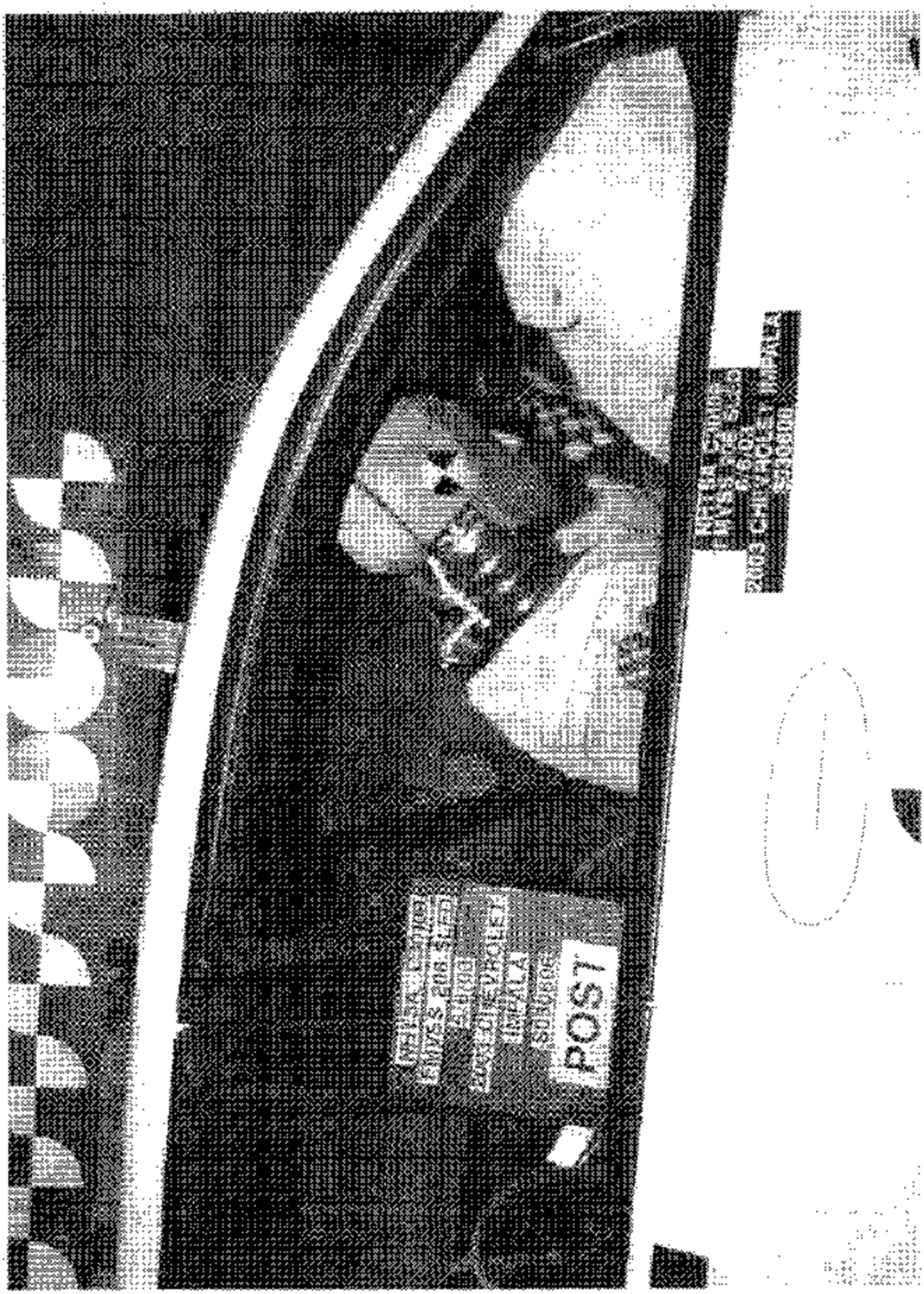


Figure A-17 Post-Test Passenger Dummy Position - View 1

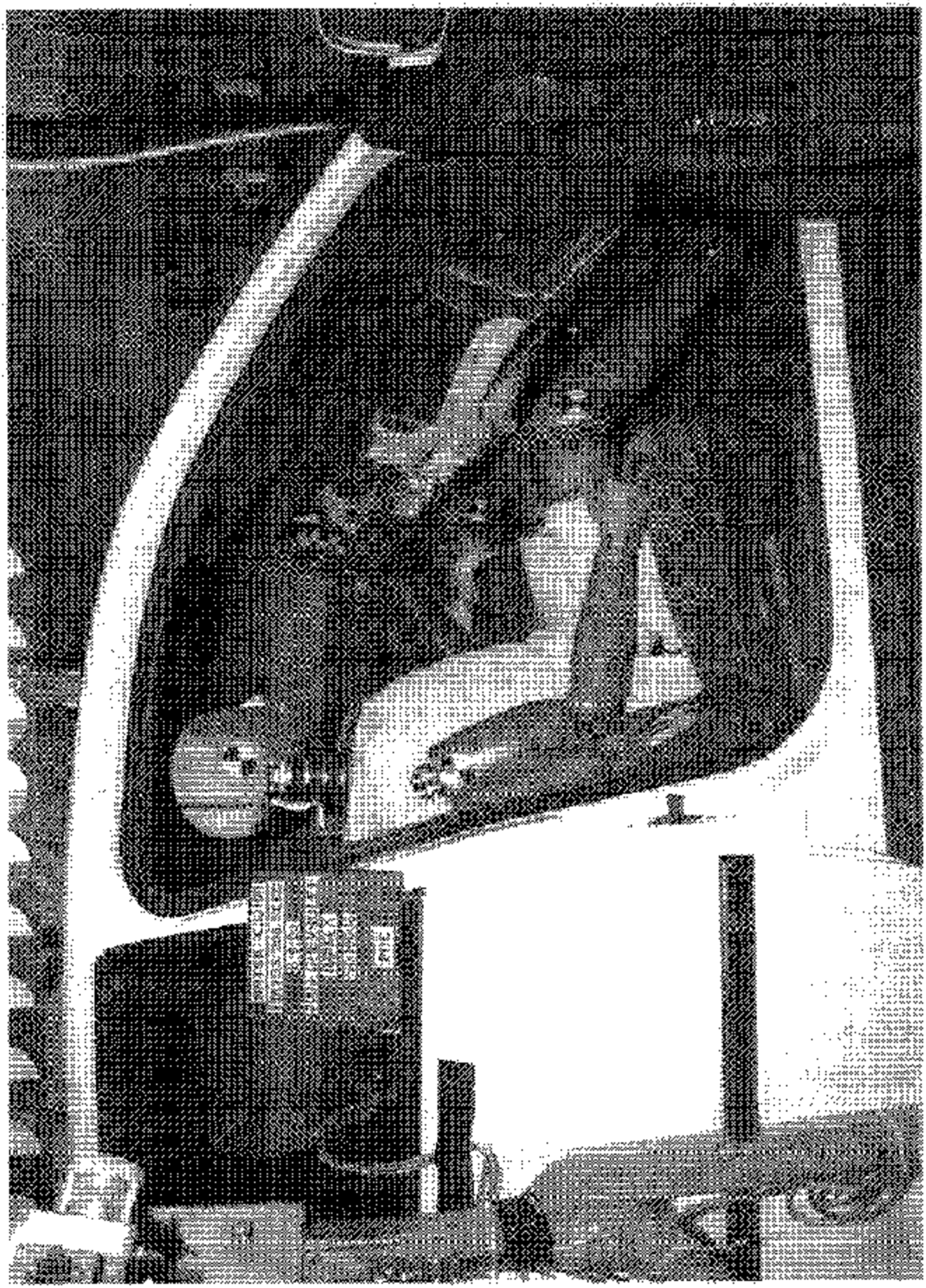


Figure A-18 Pre-Test Driver Dummy Position – View 2

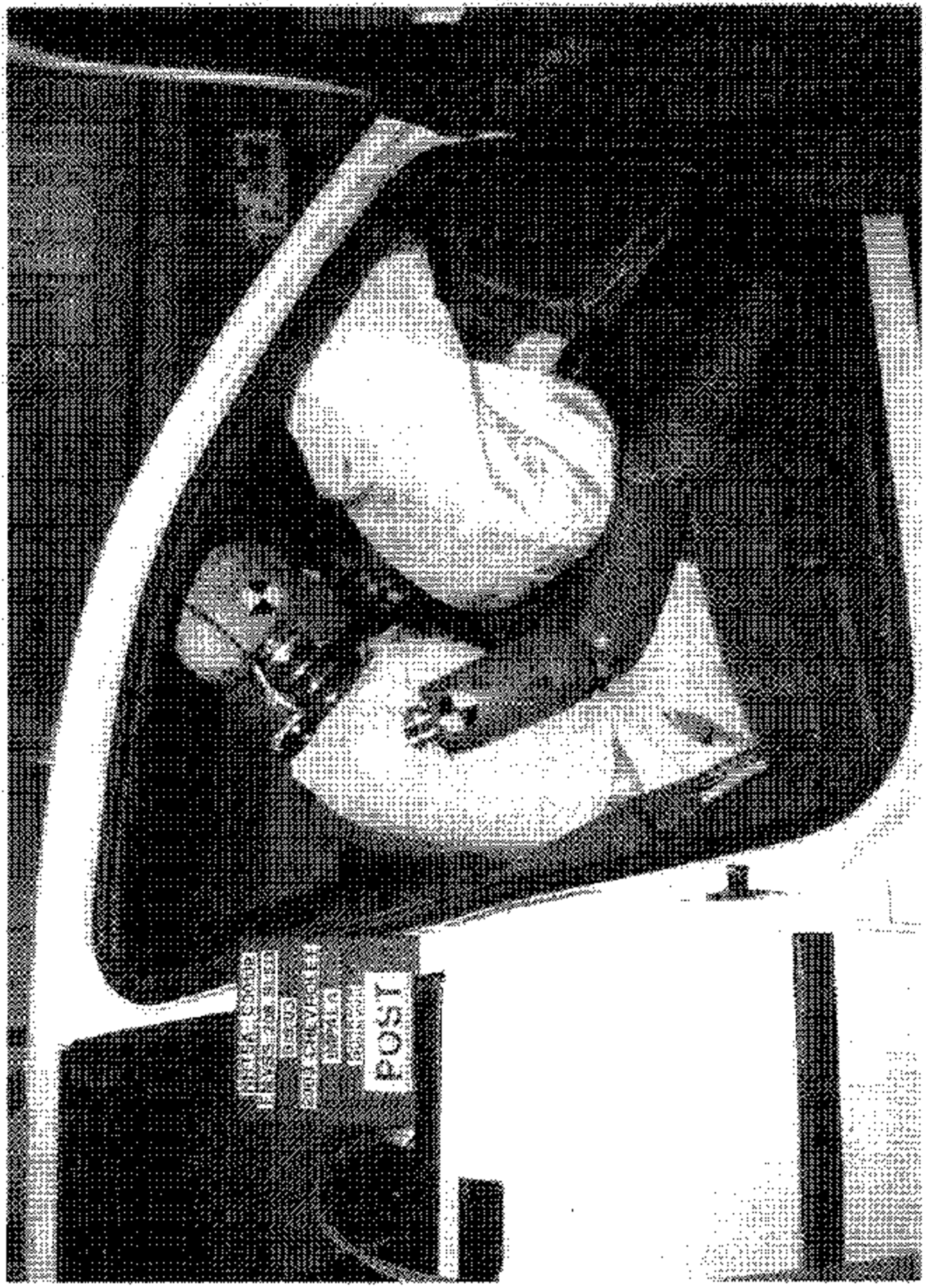


Figure A-19 Post-Test Driver Dummy Position – View 2

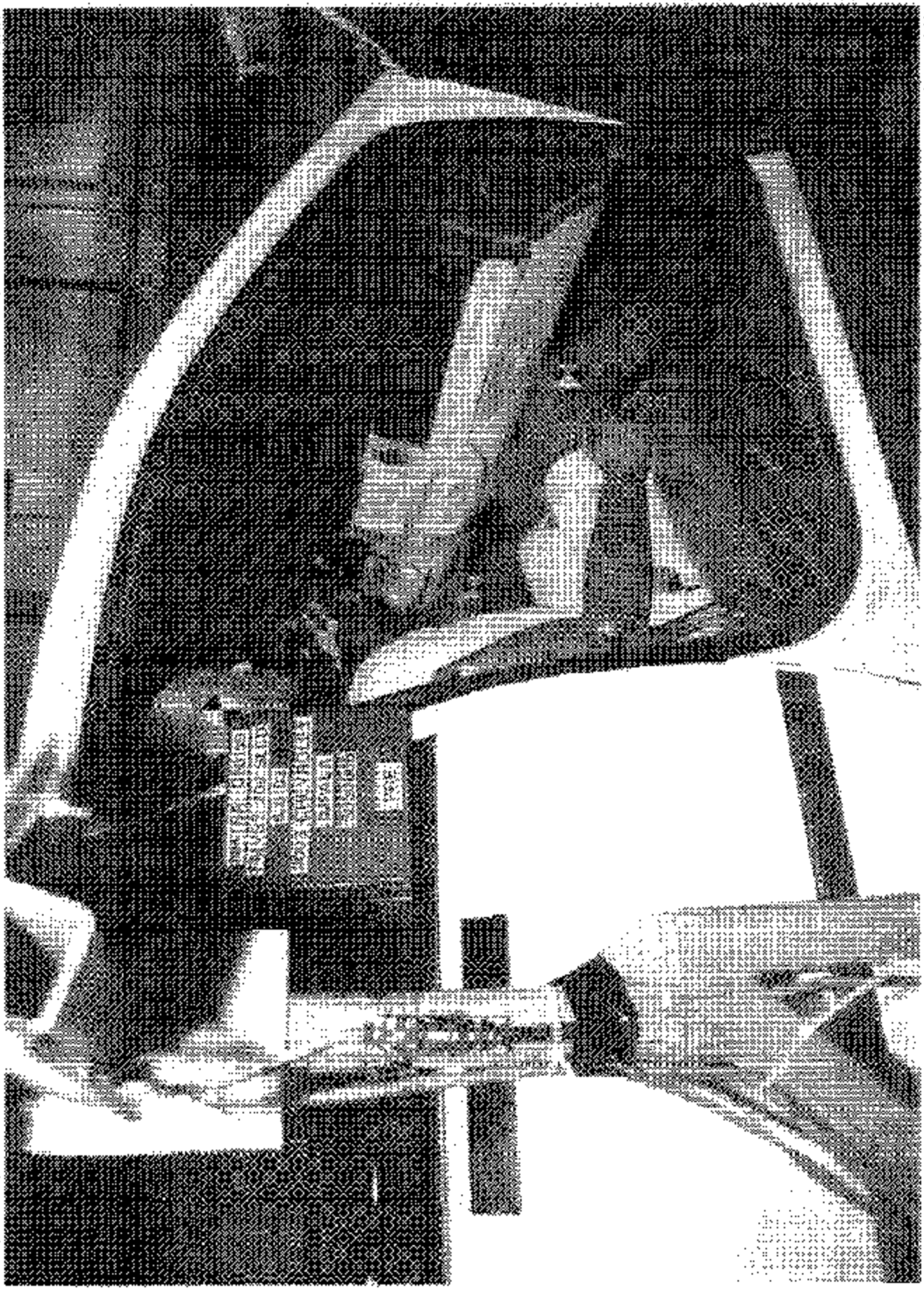


Figure A-20 Pre-Test Driver Dummy Position – View 3

Figure A-21 Post-Test Driver Dummy Position – View 3

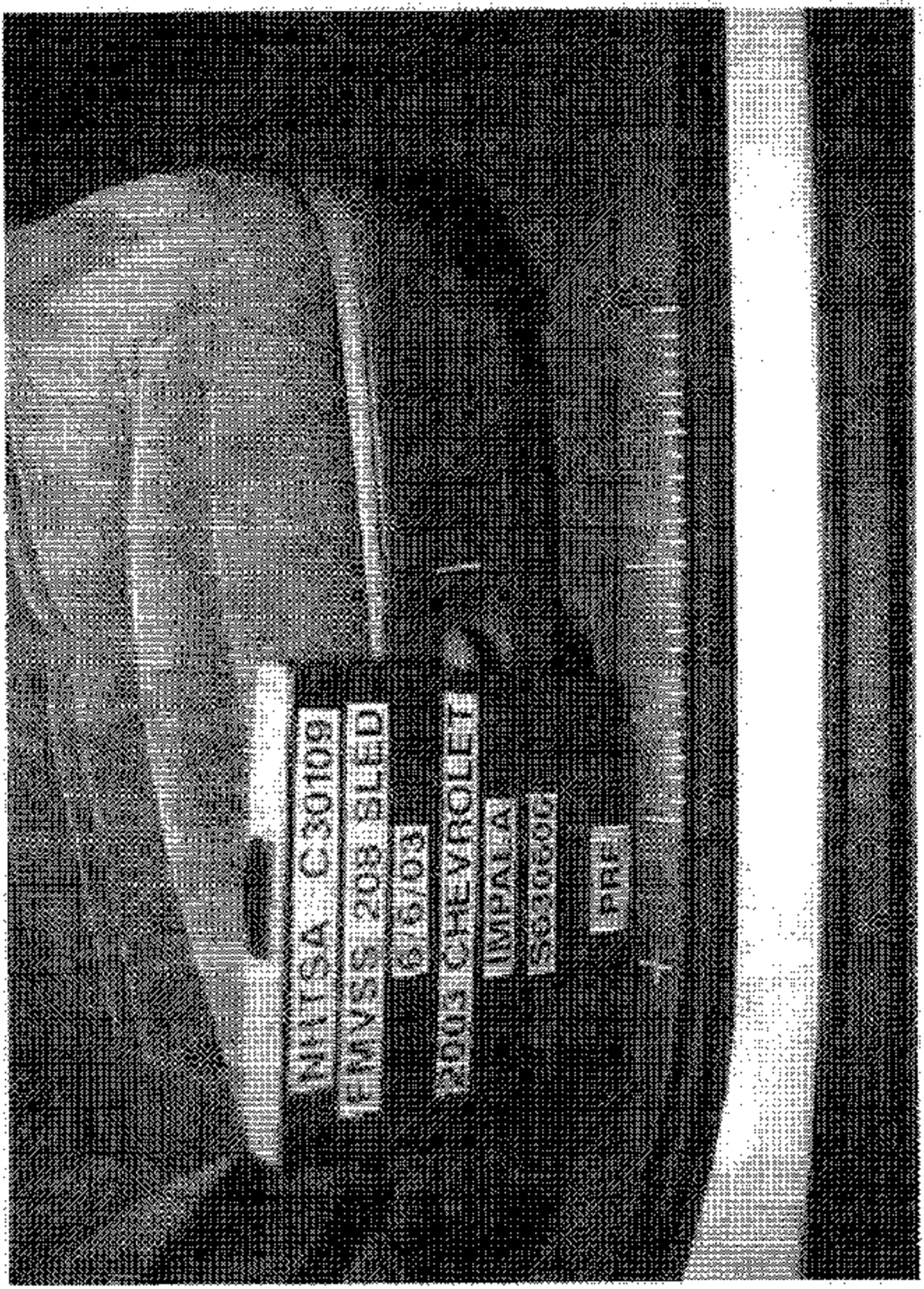


Figure A-22 Pre-Test Passenger Seat Track Position View

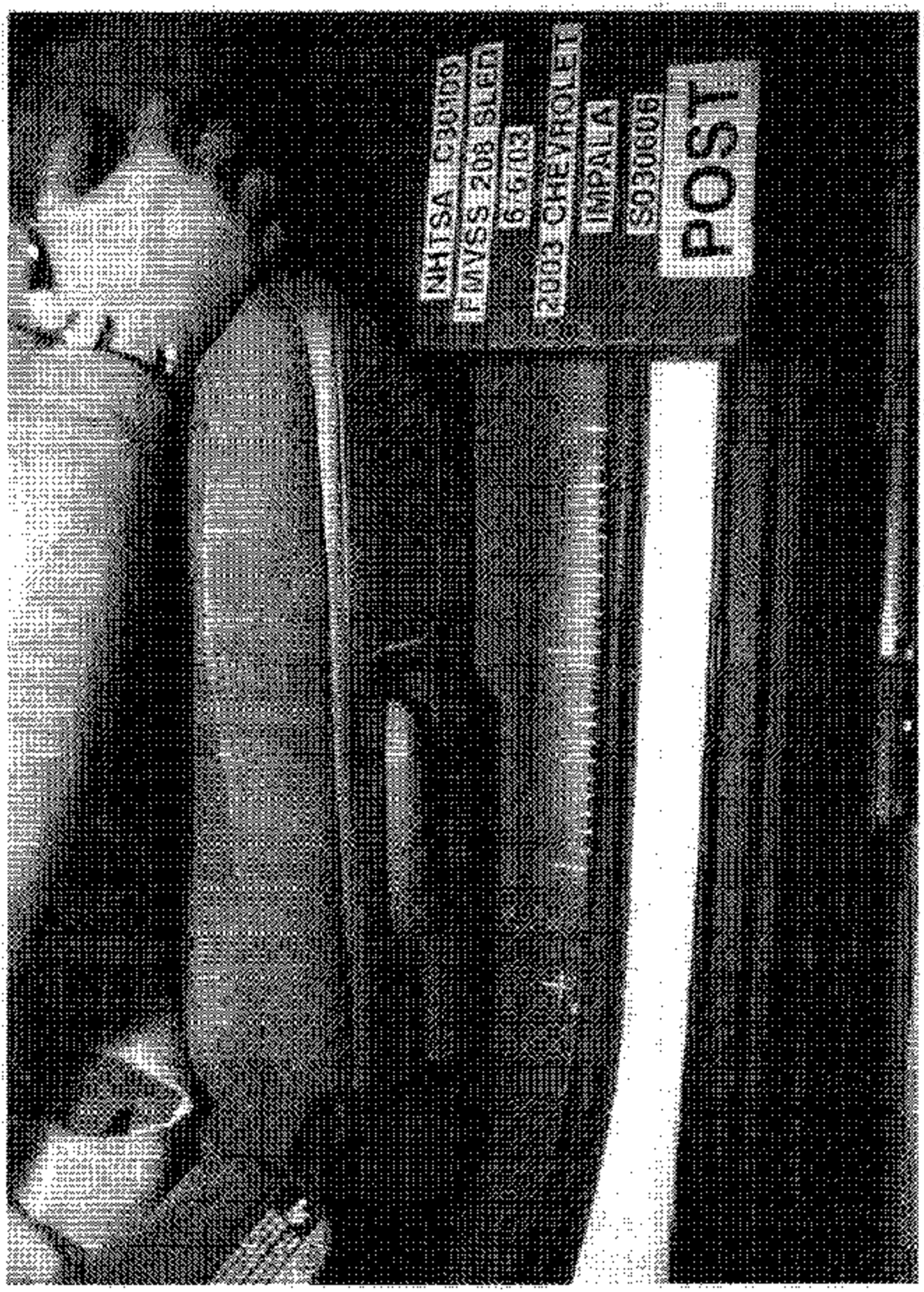


Figure A-23 Post-Test Passenger Seat Track Position View

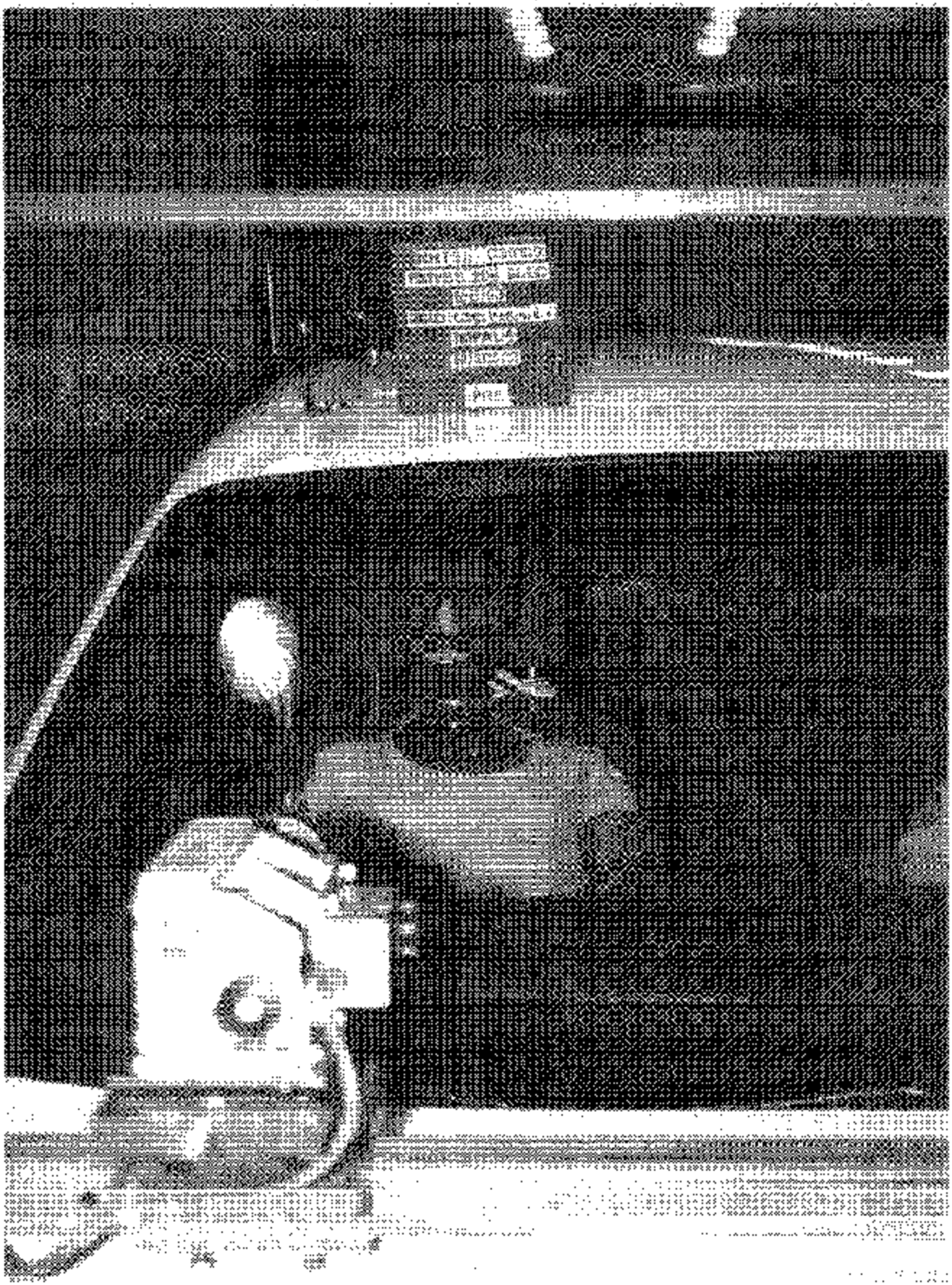


Figure A-24 Pre-Test Passenger Dummy Position Front View

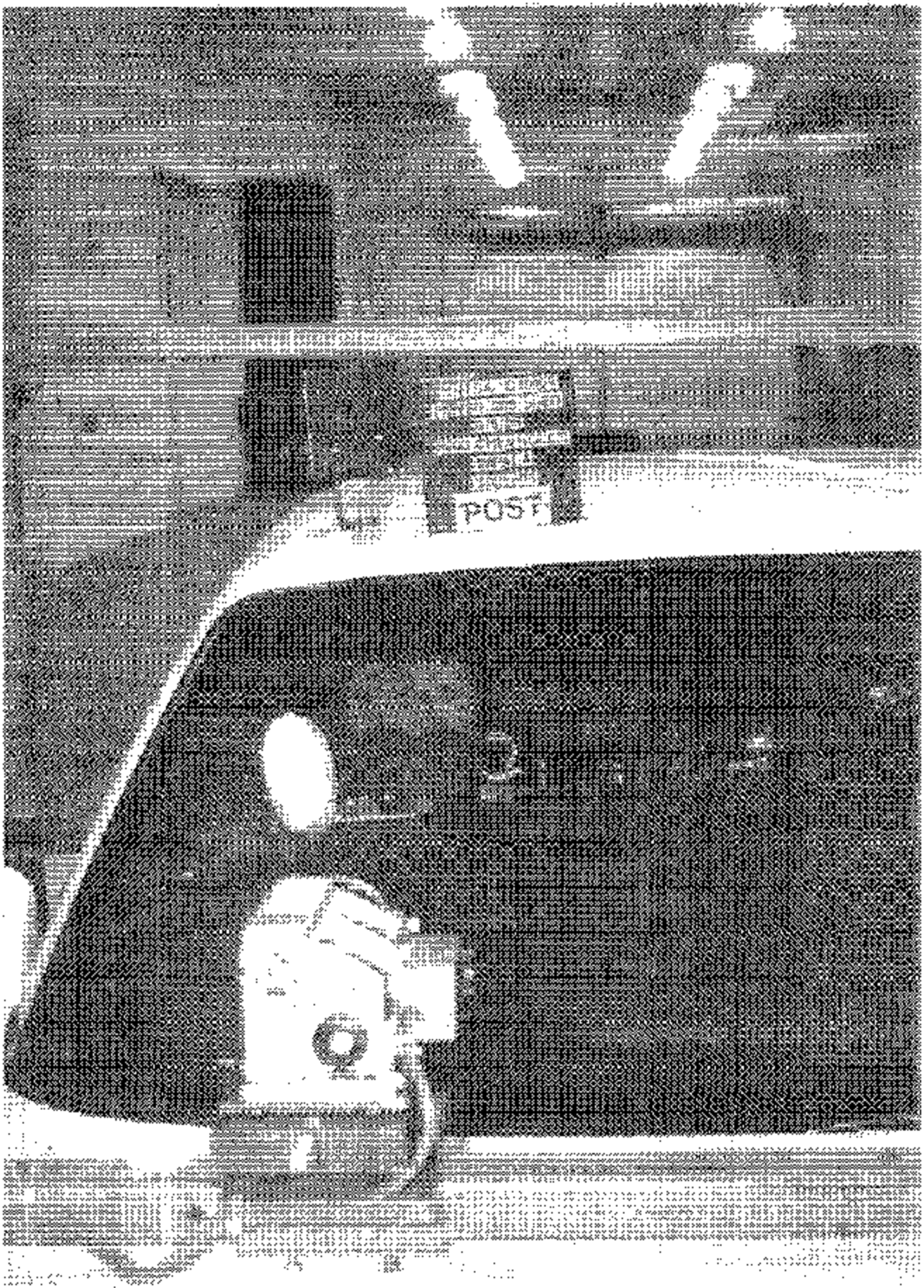


Figure A-25 Post-Test Passenger Dummy Position Front View

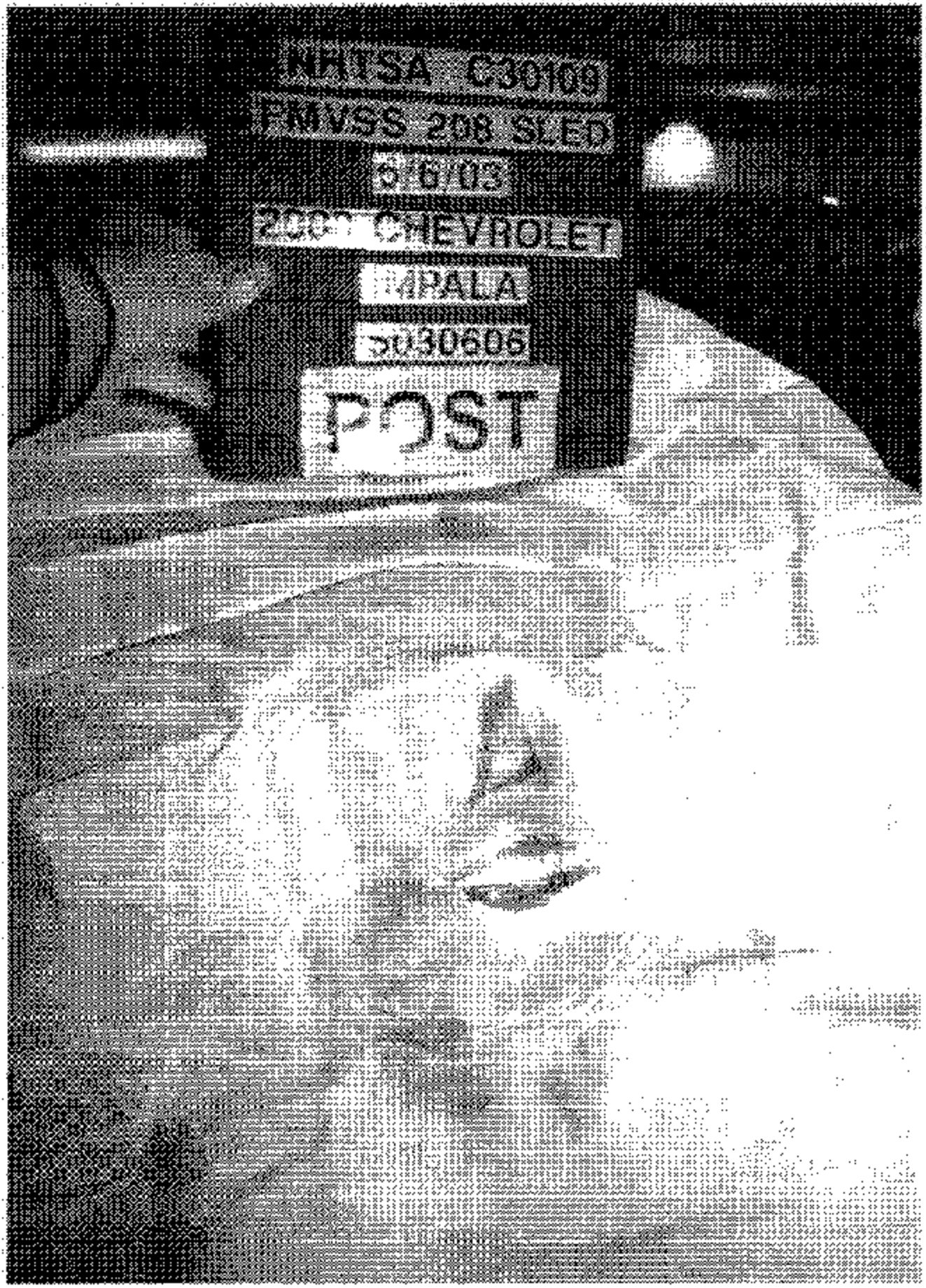


Figure A-26 Post-Test Driver Airbag View

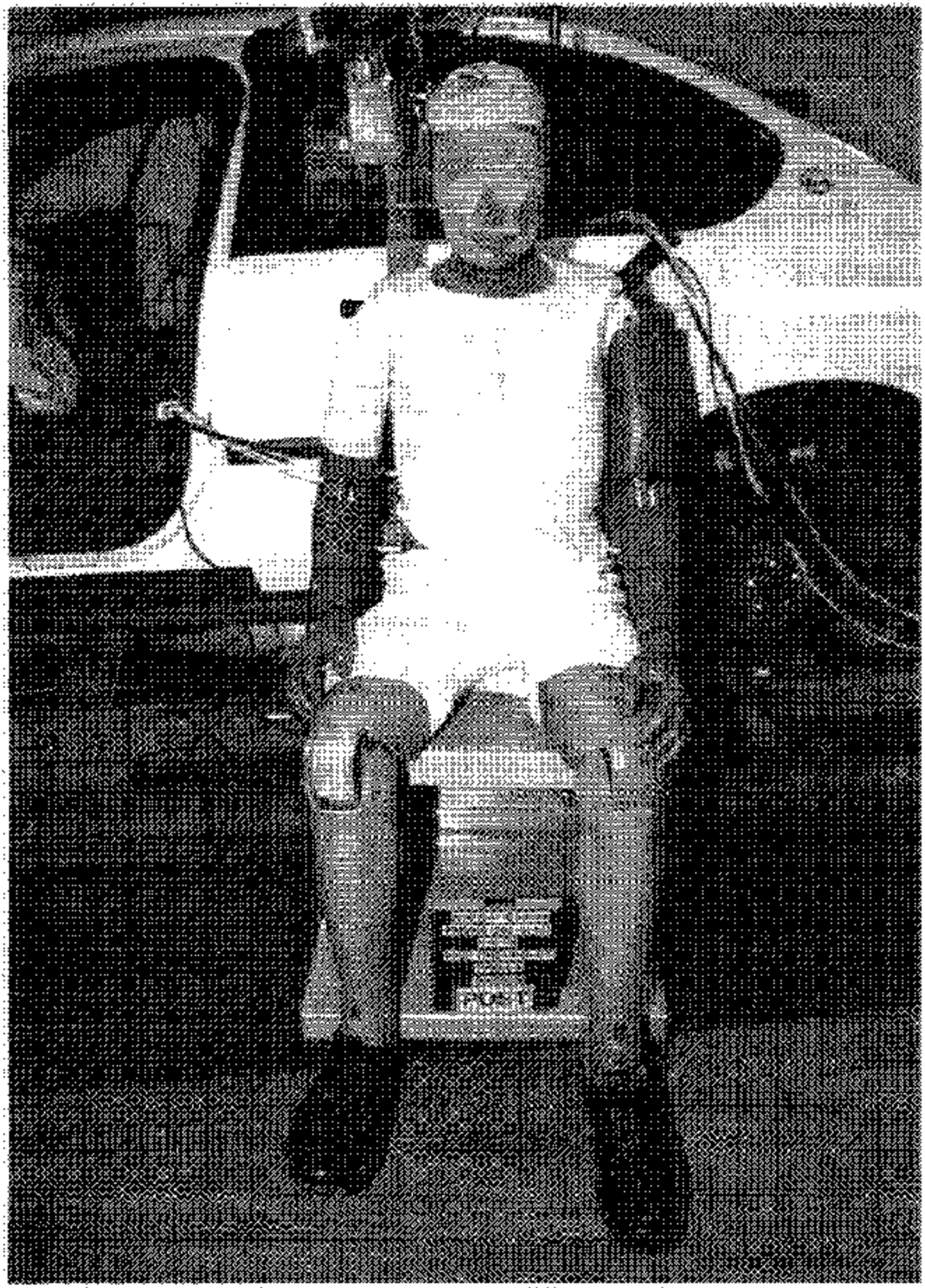


Figure A-27 Post-Test Driver Dummy Removed from Vehicle Overall View

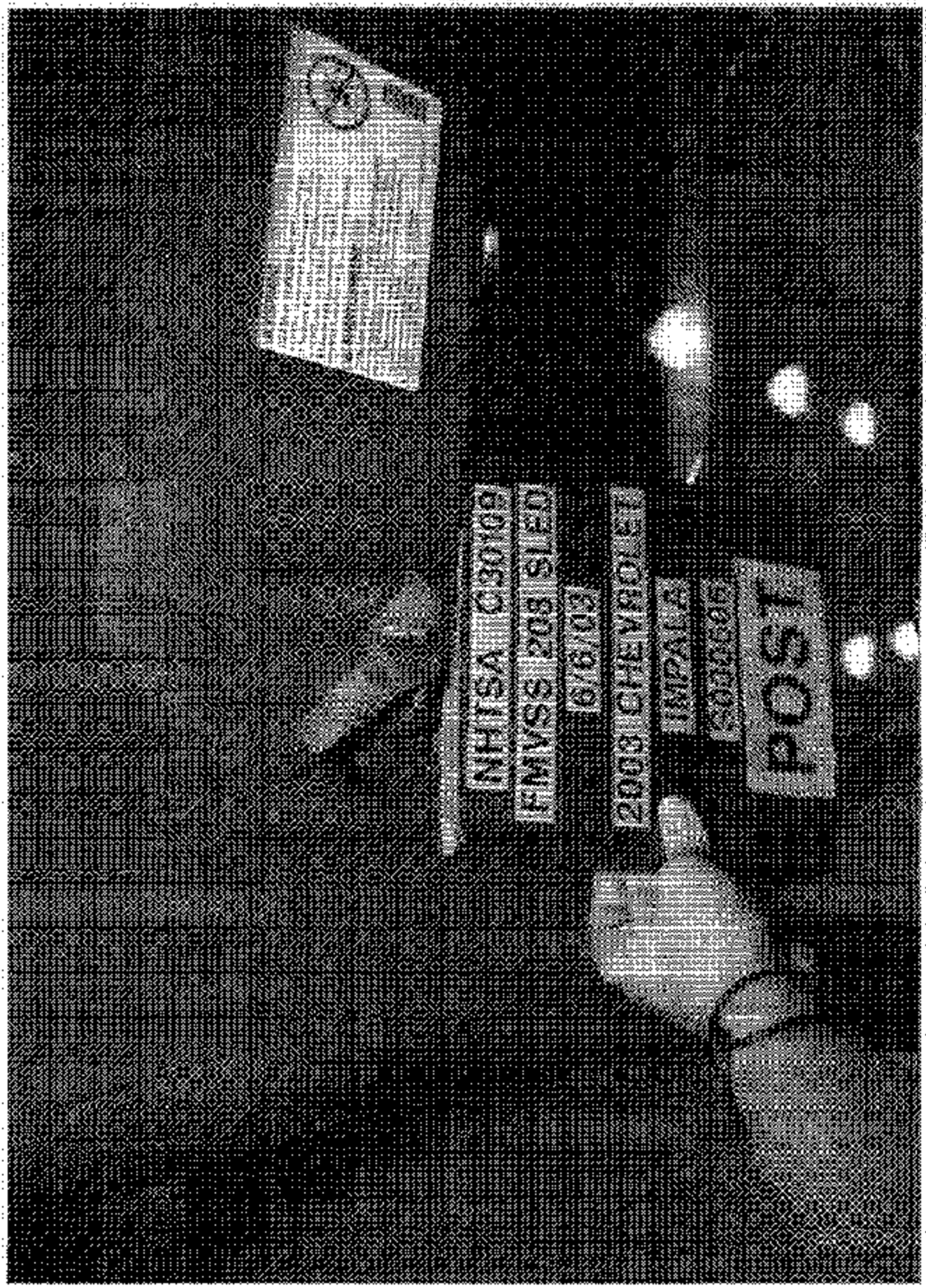


Figure A-28 Post-Test Driver Head Contact - View 1

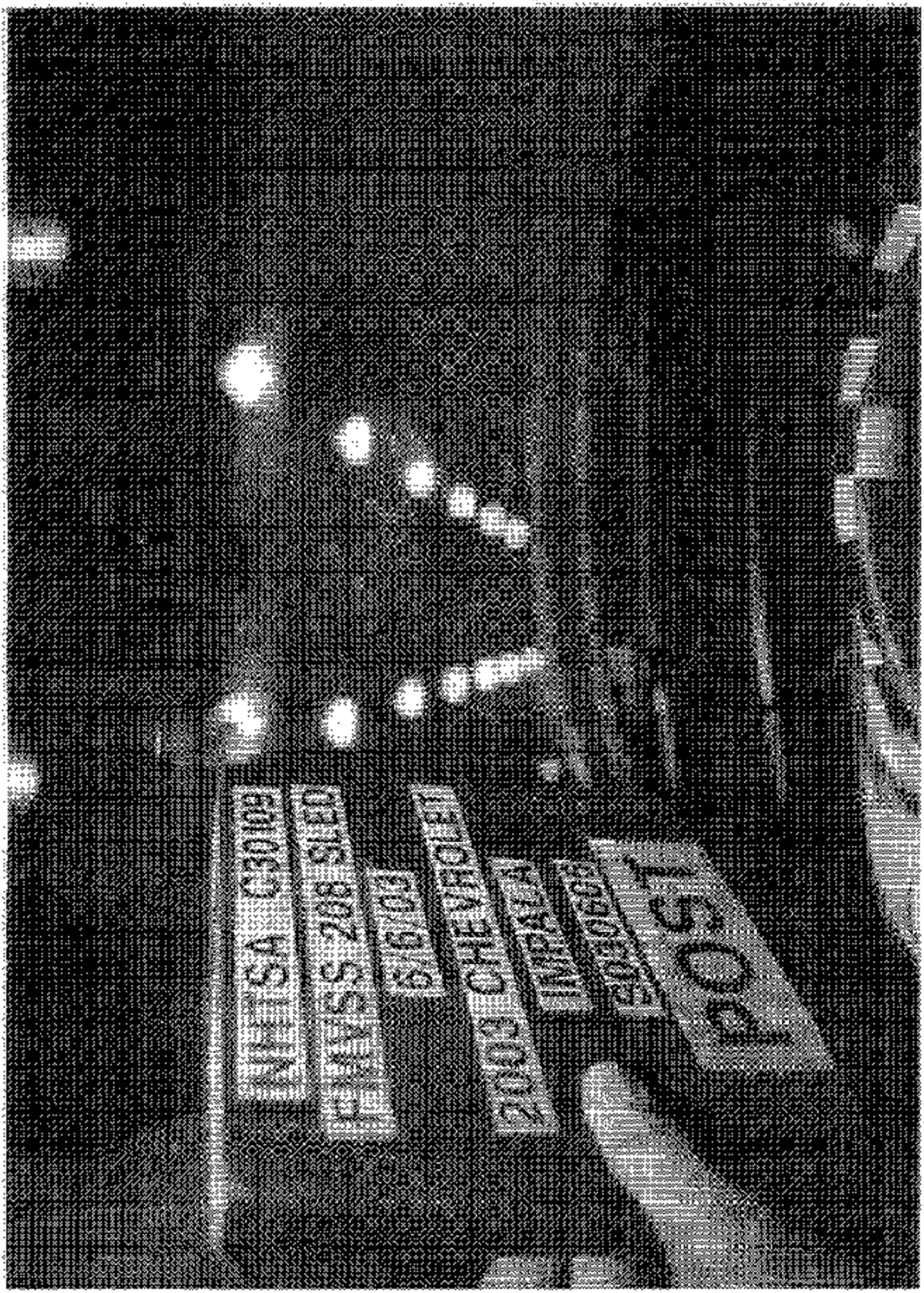


Figure A-29 Post-Test Driver Head Contact - View 2

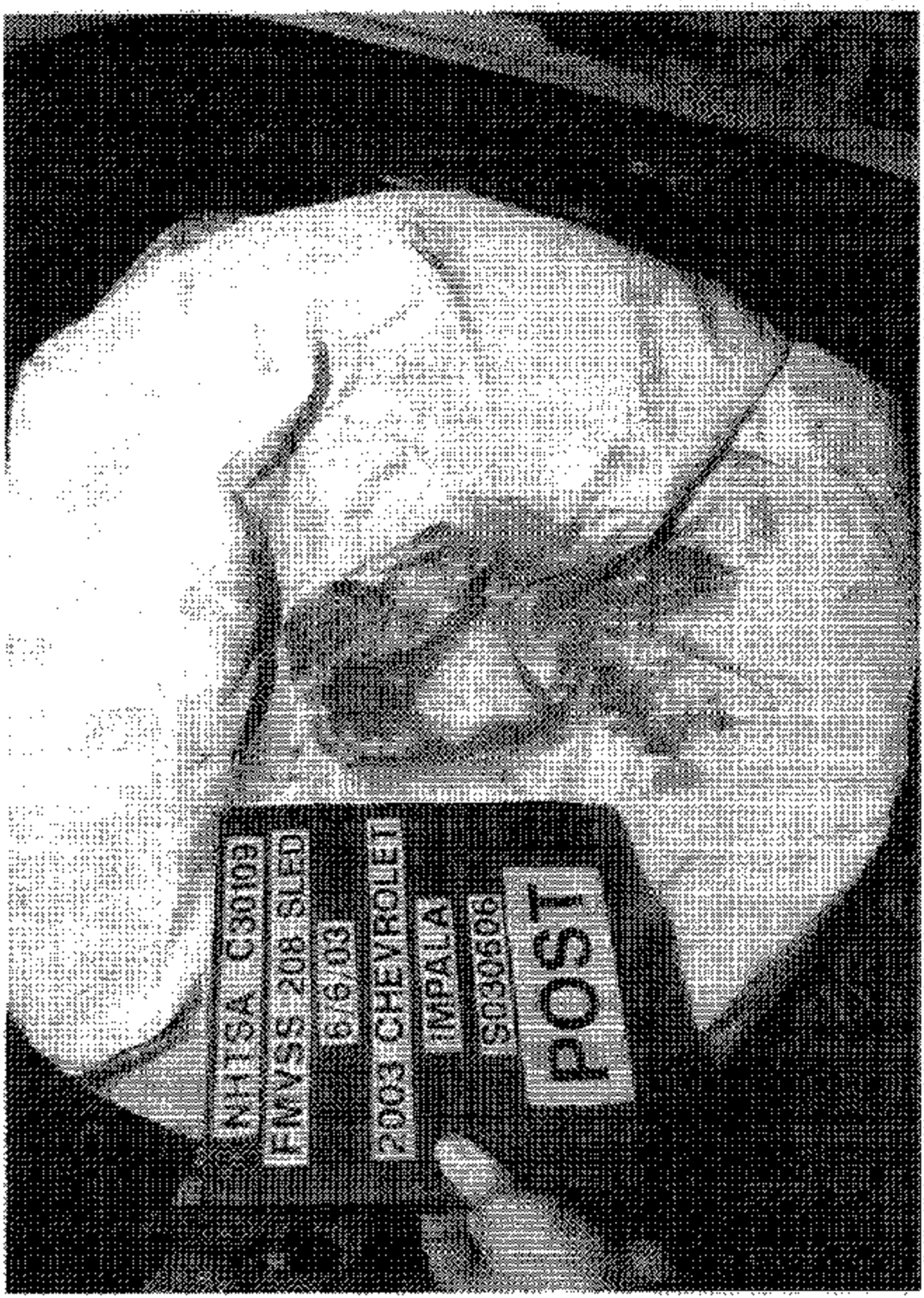


Figure A-30 Post-Test Passenger Airbag View

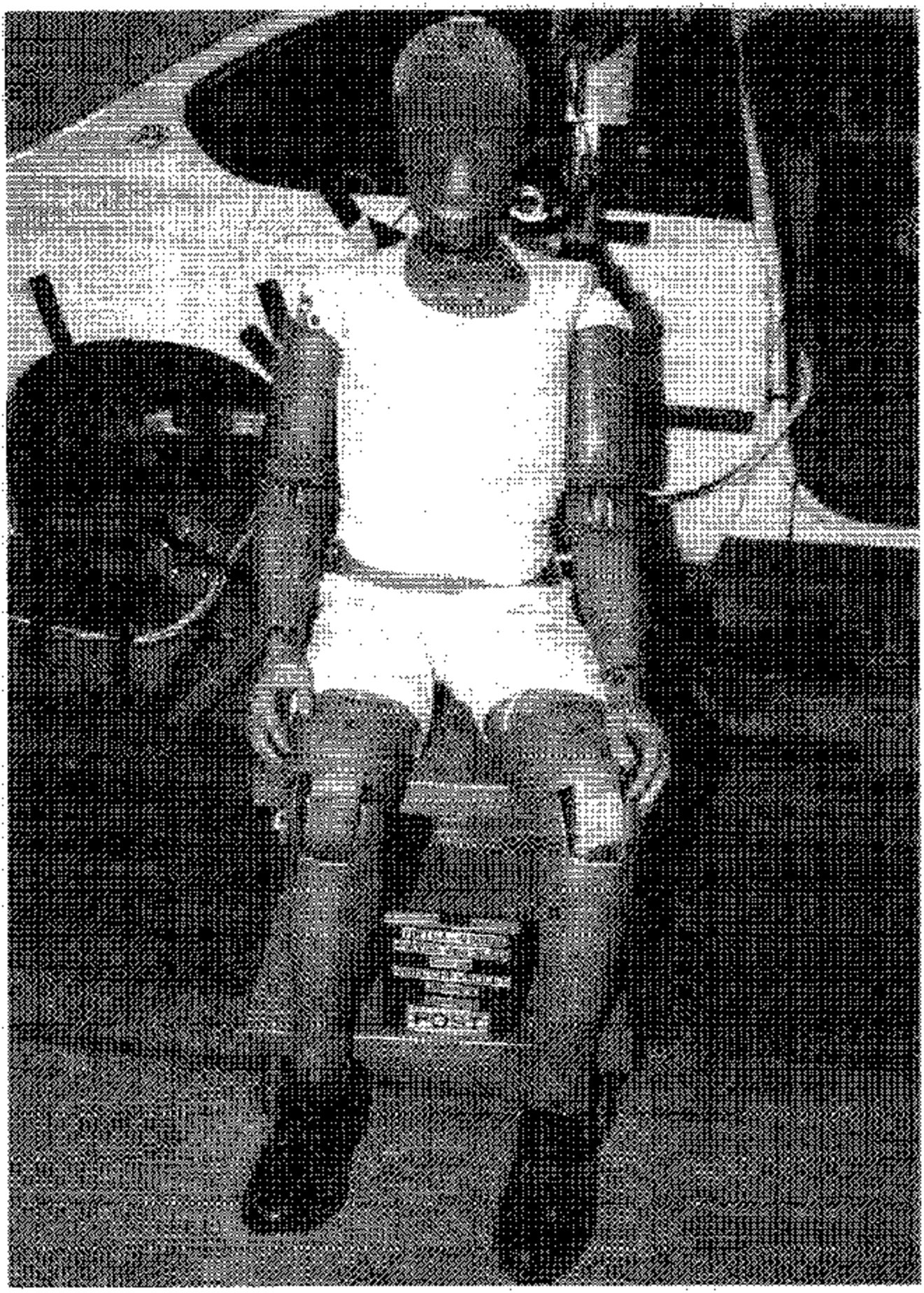


Figure A-31 Post-Test Passenger Dummy Removed from Vehicle Overall View

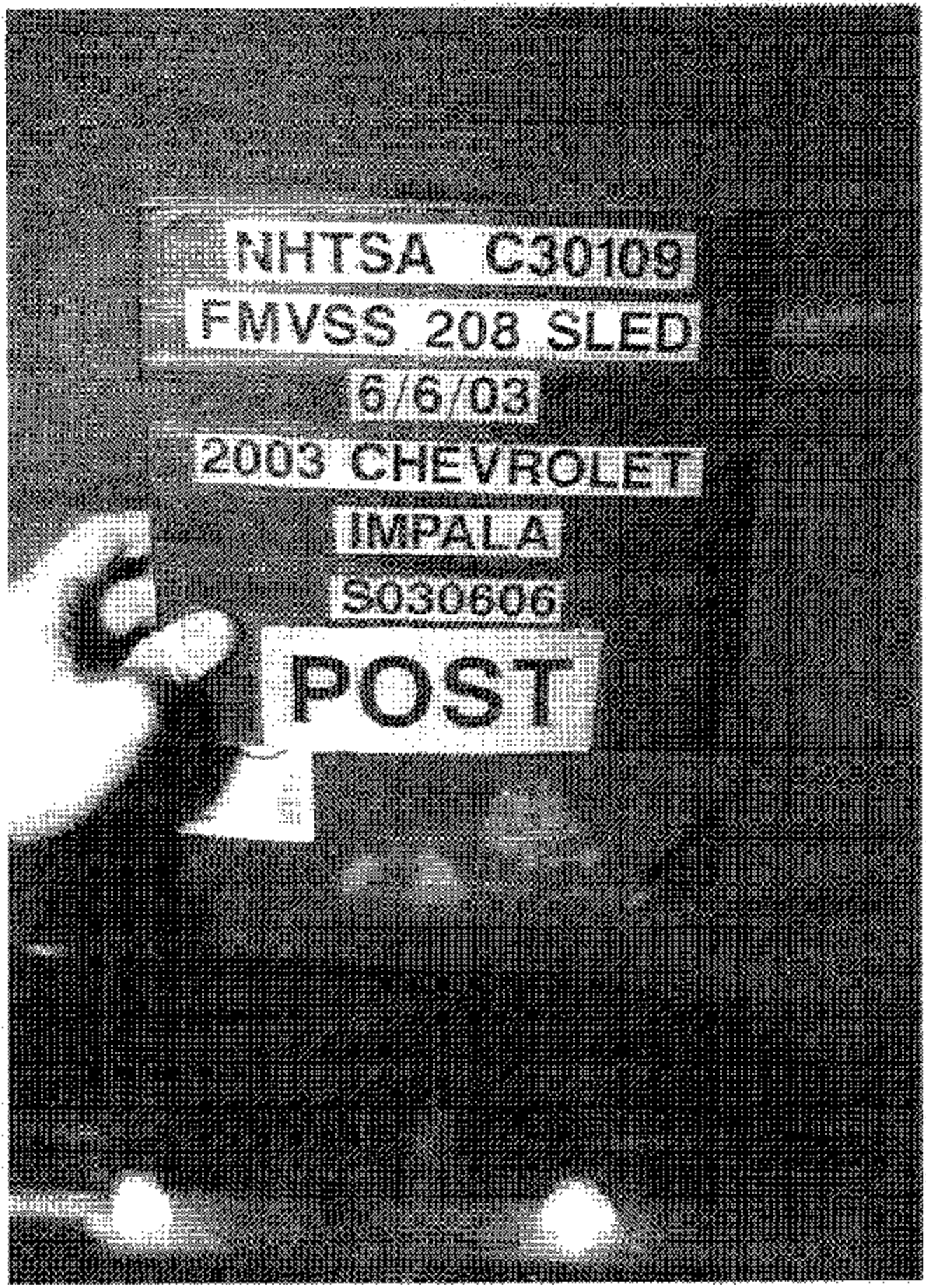


Figure A-32 Post-Test Passenger Dummy Head Contact – View 1

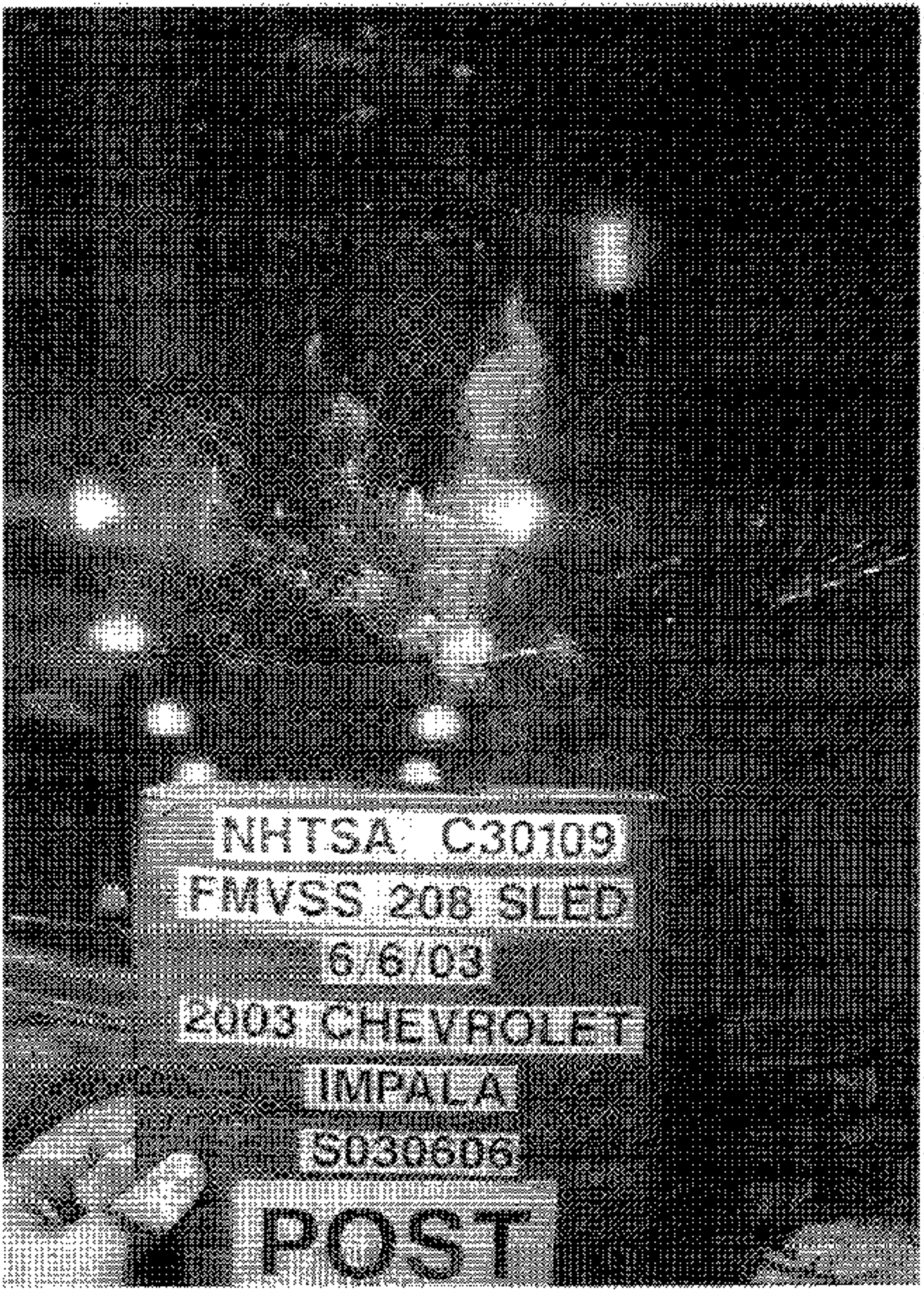


Figure A-33 Post-Test Passenger Dummy Head Contact – View 2

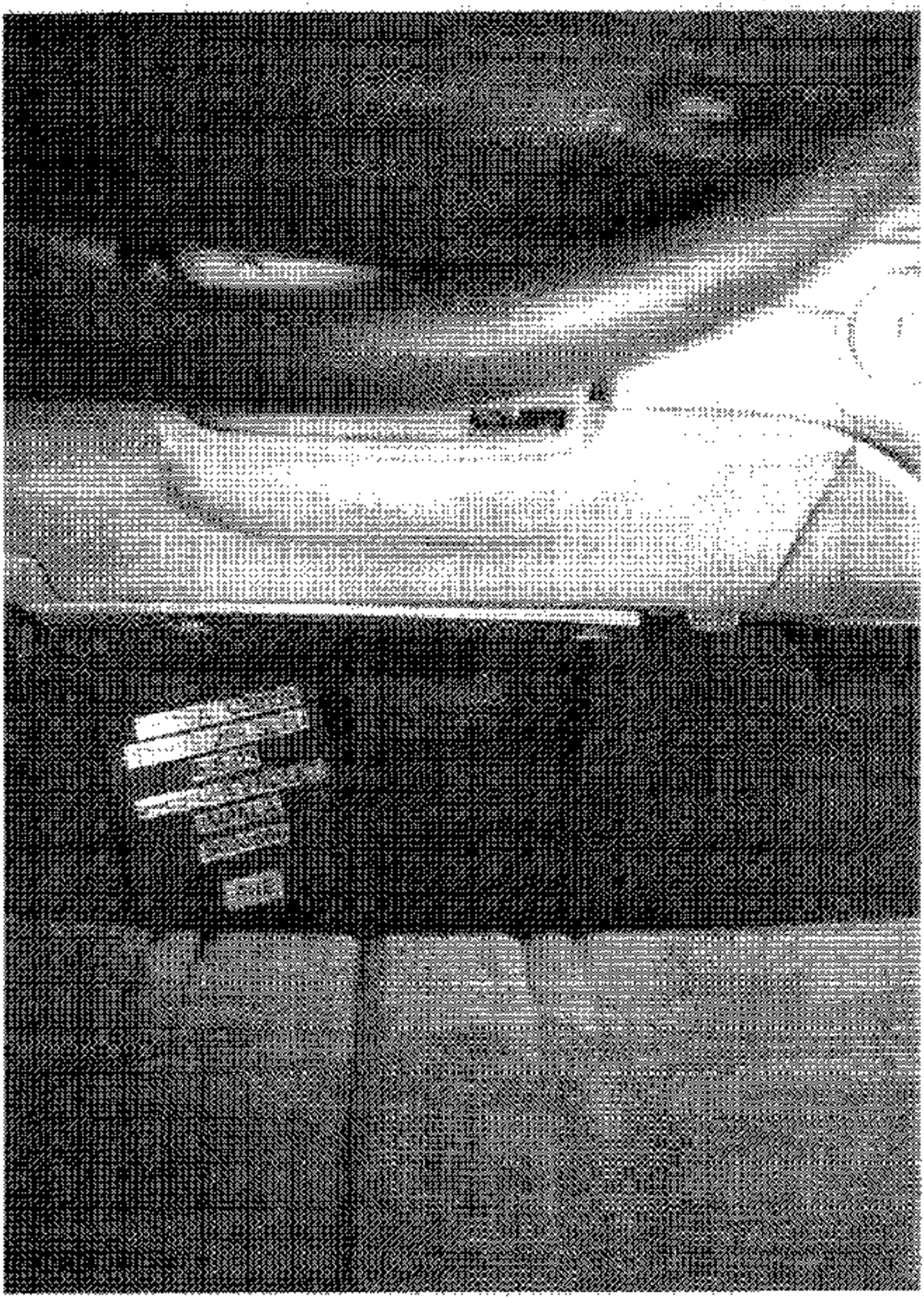


Figure A-34 Pre-Test Driver Knee Bolster View

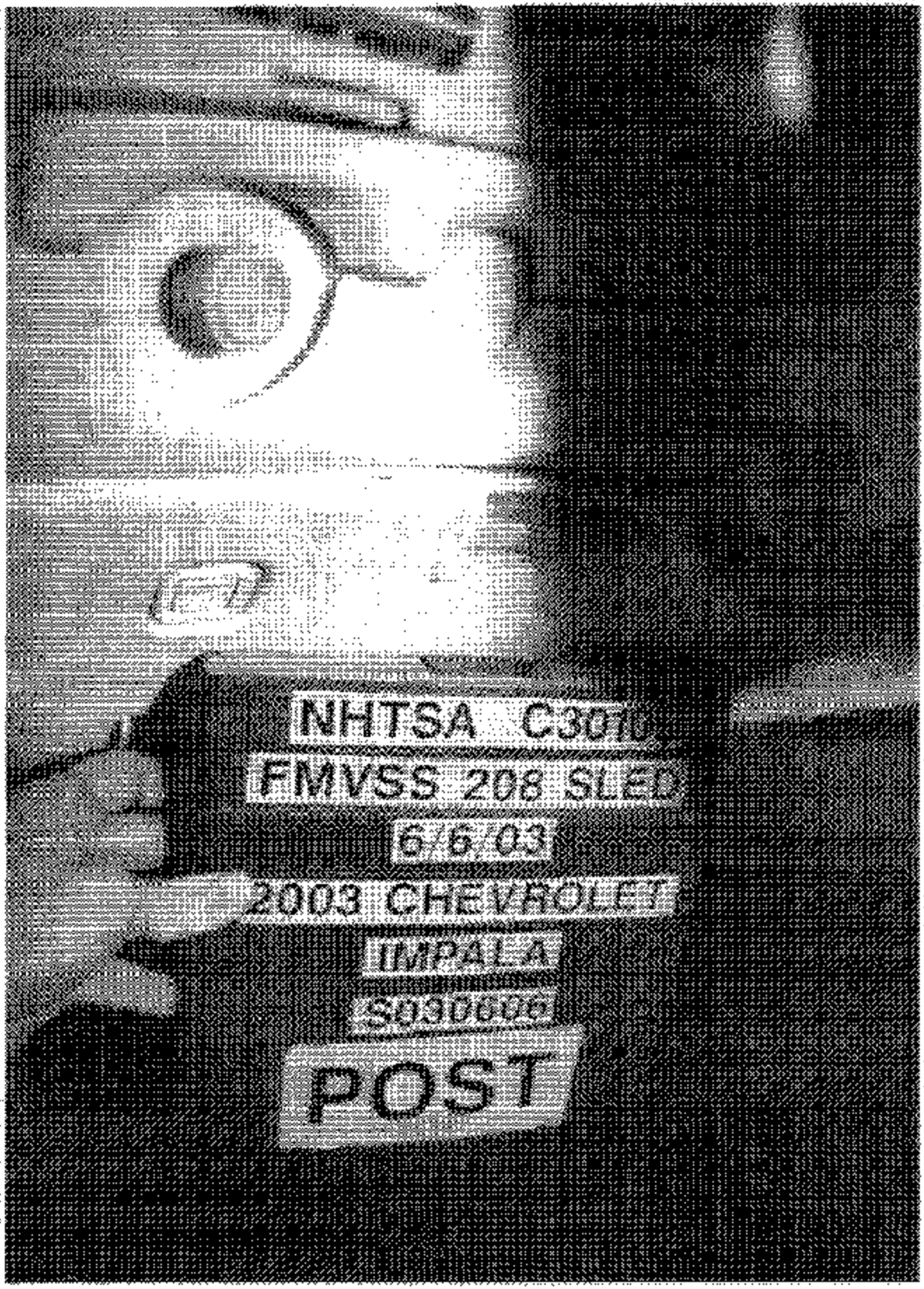


Figure A-35 Post-Test Driver Knee Bolster – View 1

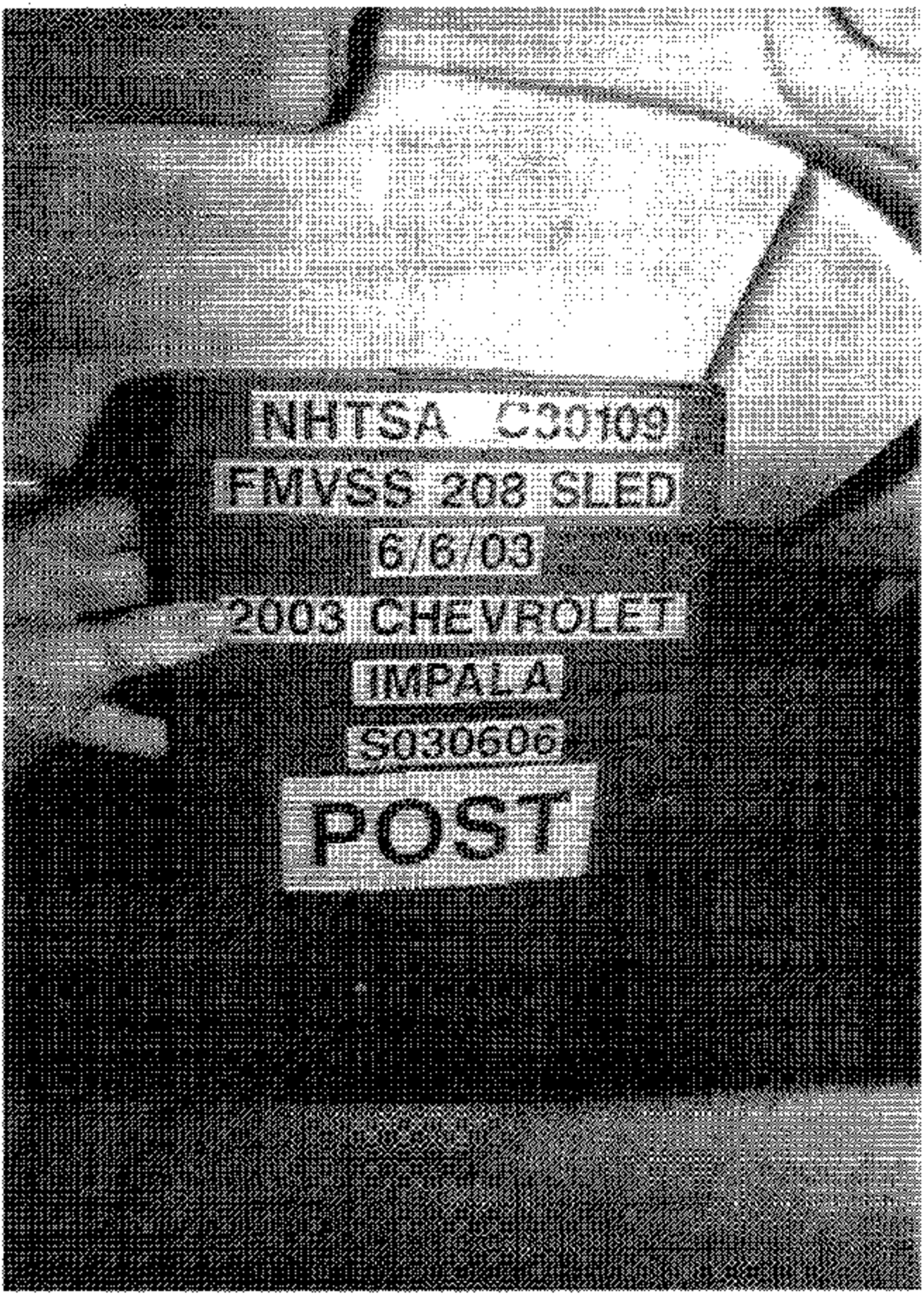


Figure A-36 Post-Test Driver Knee Bolster – View 2

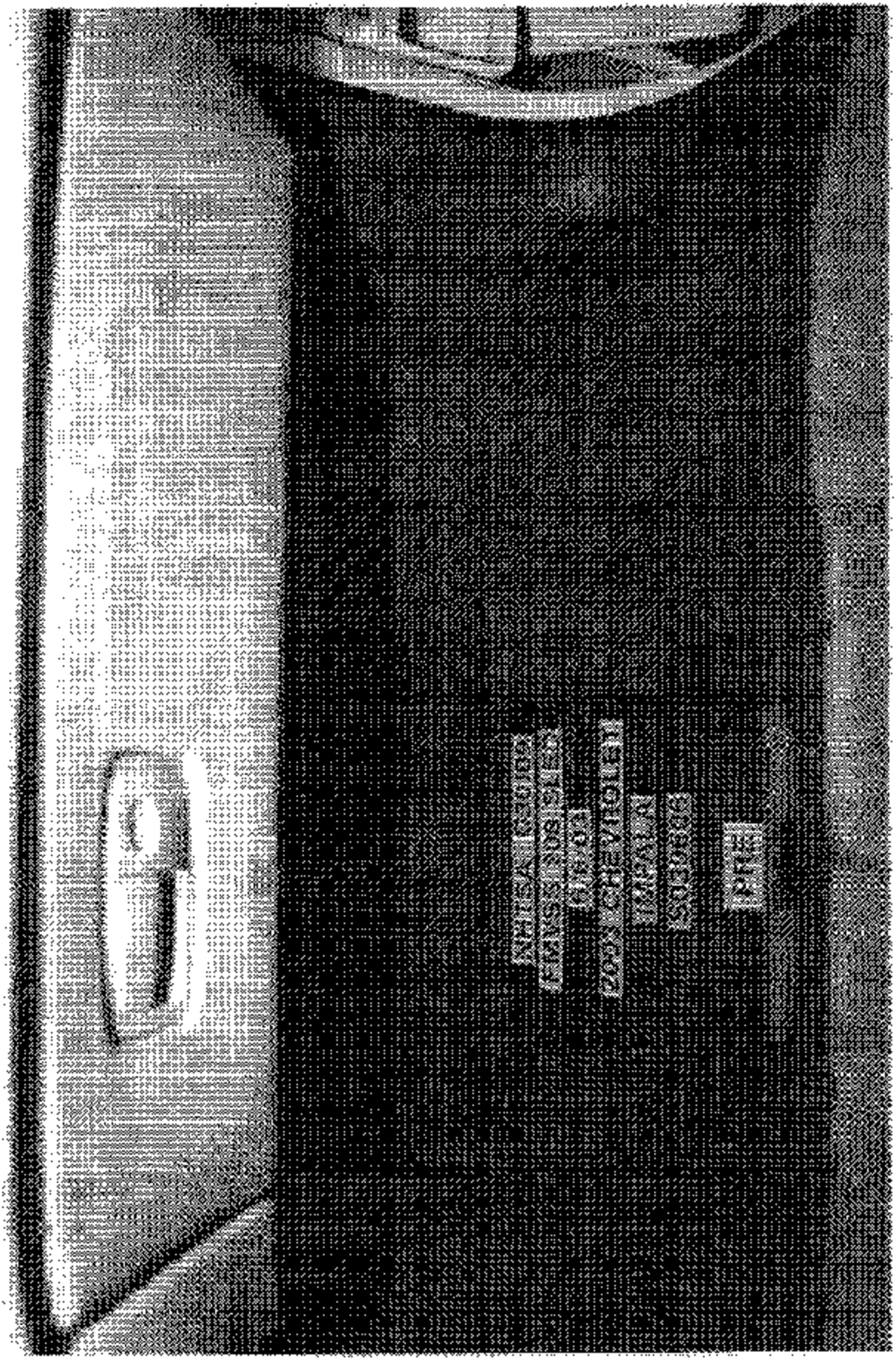


Figure A-37 Pre-Test Passenger Glove Box View

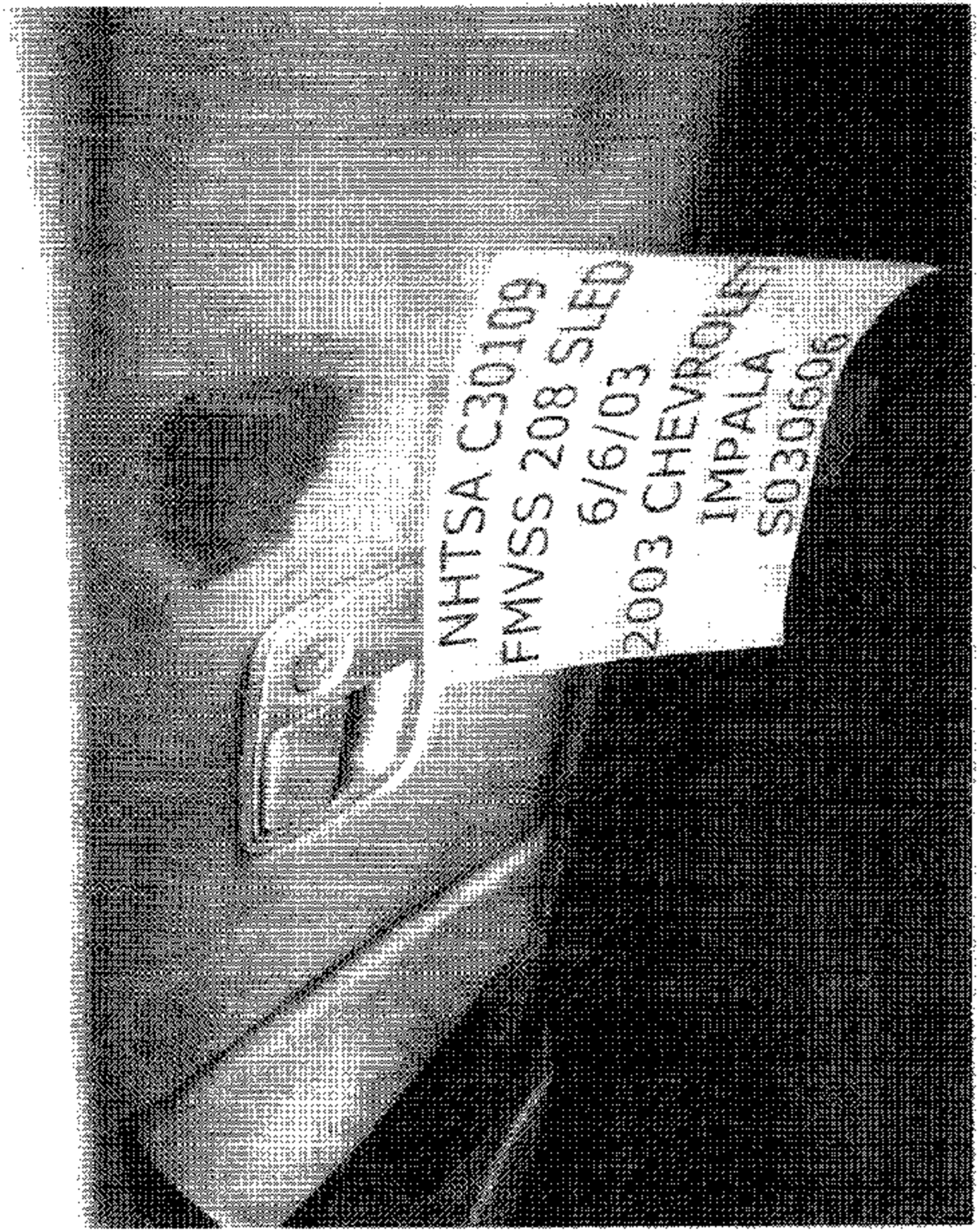


Figure A-38 Post-Test Passenger Glove Box View

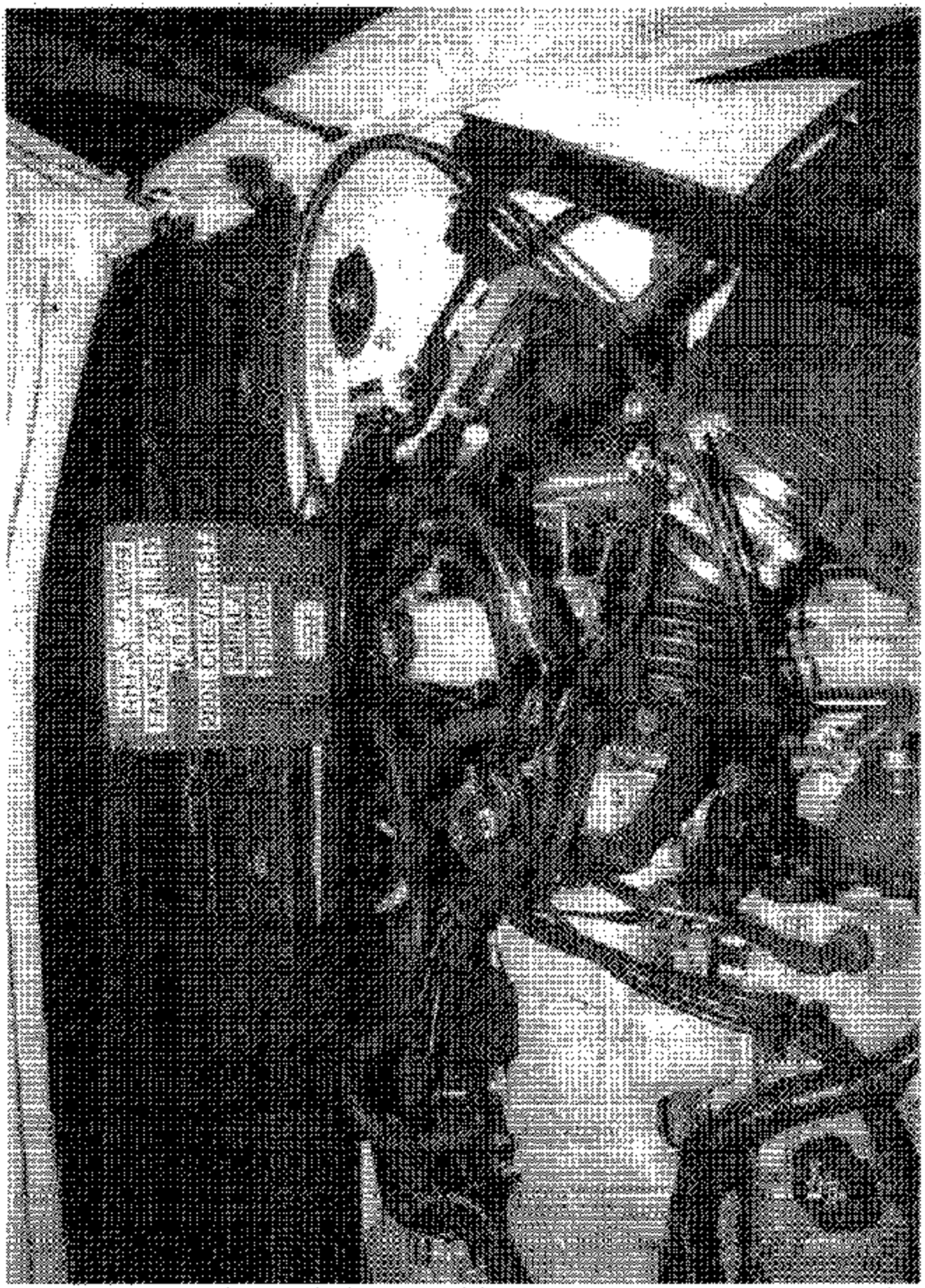


Figure A-39 Pre-Test Steering Column Linkage in Engine Compartment View

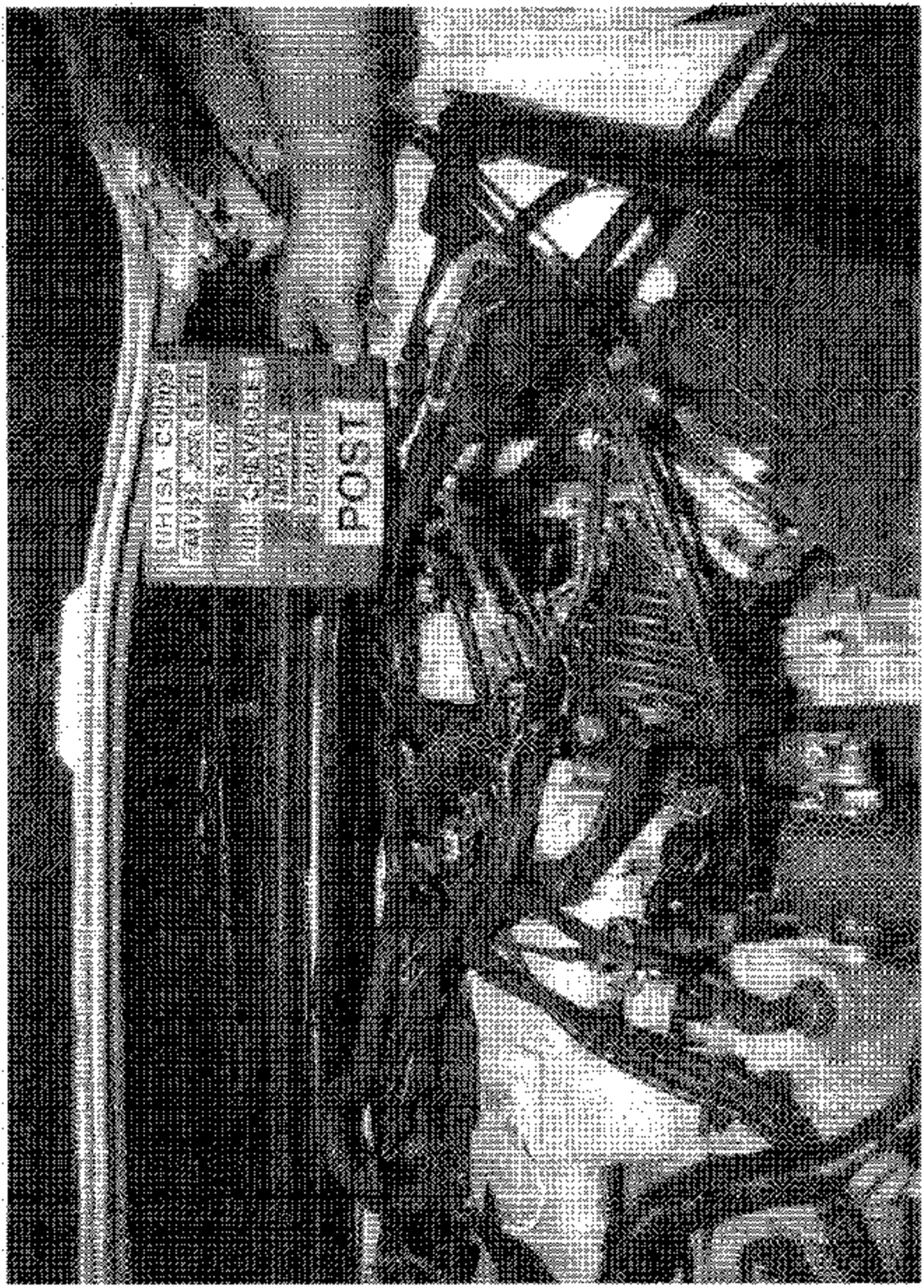


Figure A-40 Post-Test Steering Column Linkage in Engine Compartment View

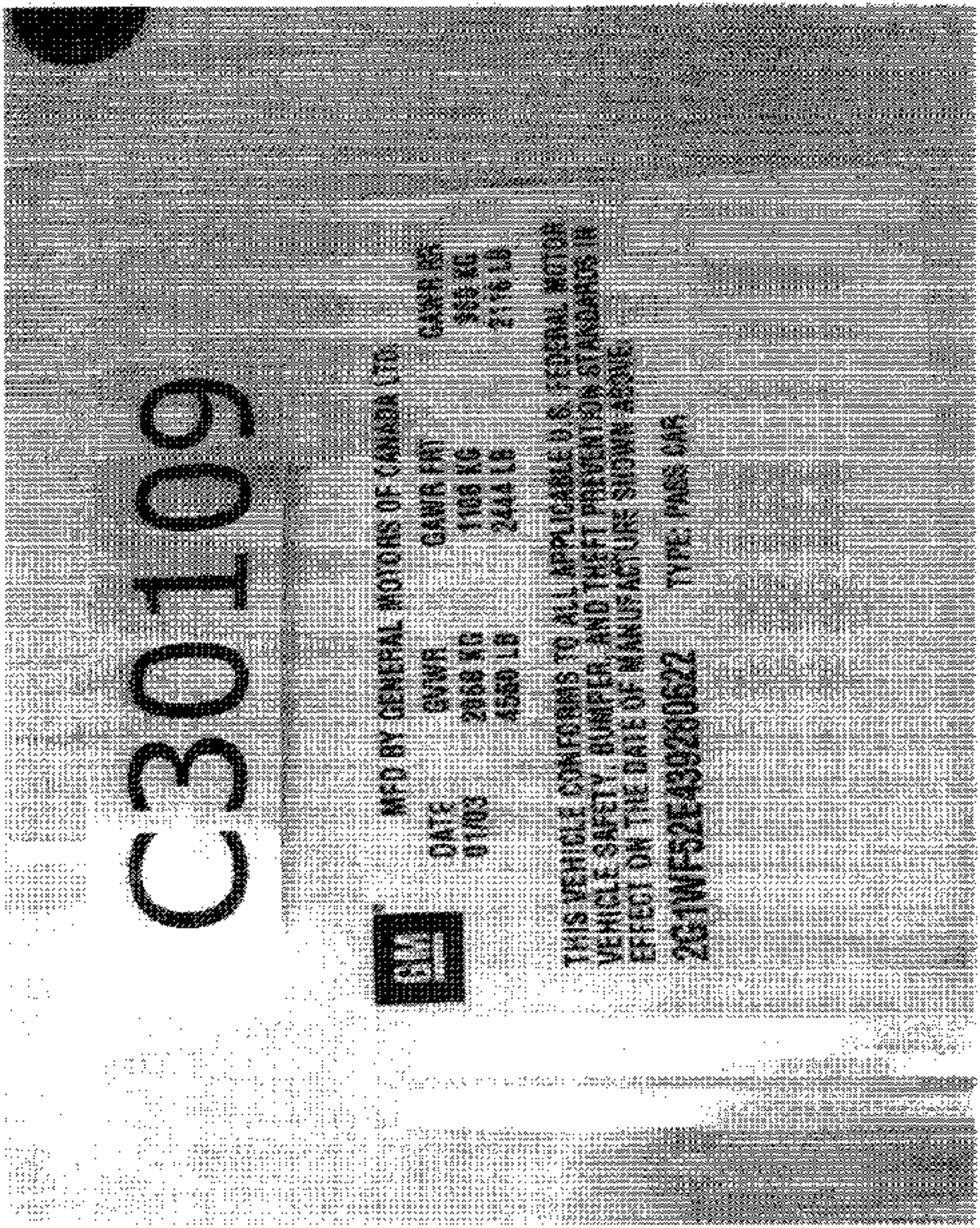


Figure A-41 Pre-Test Vehicle Certification Label View

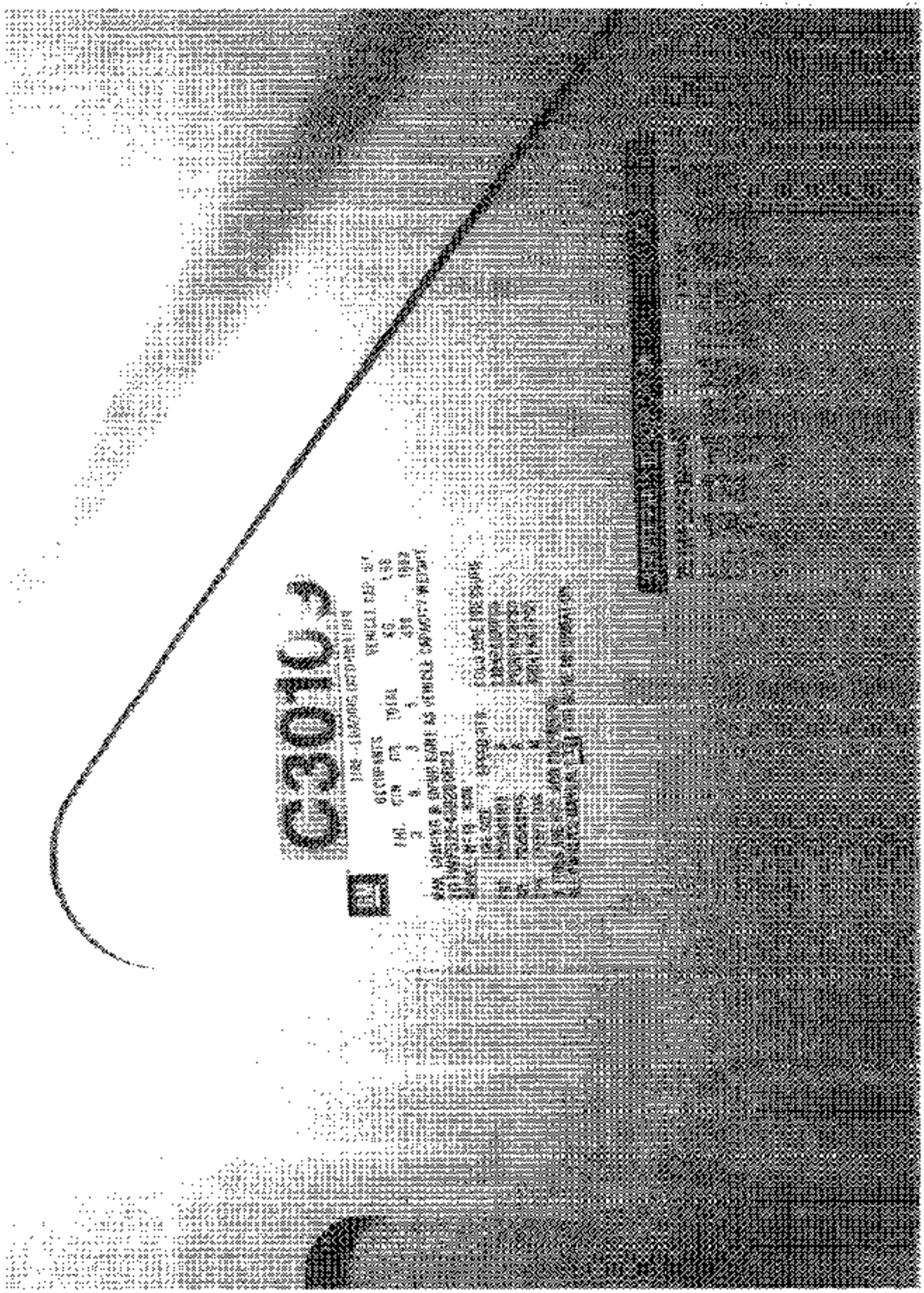


Figure A-42 Pre-Test Tire Information Label View

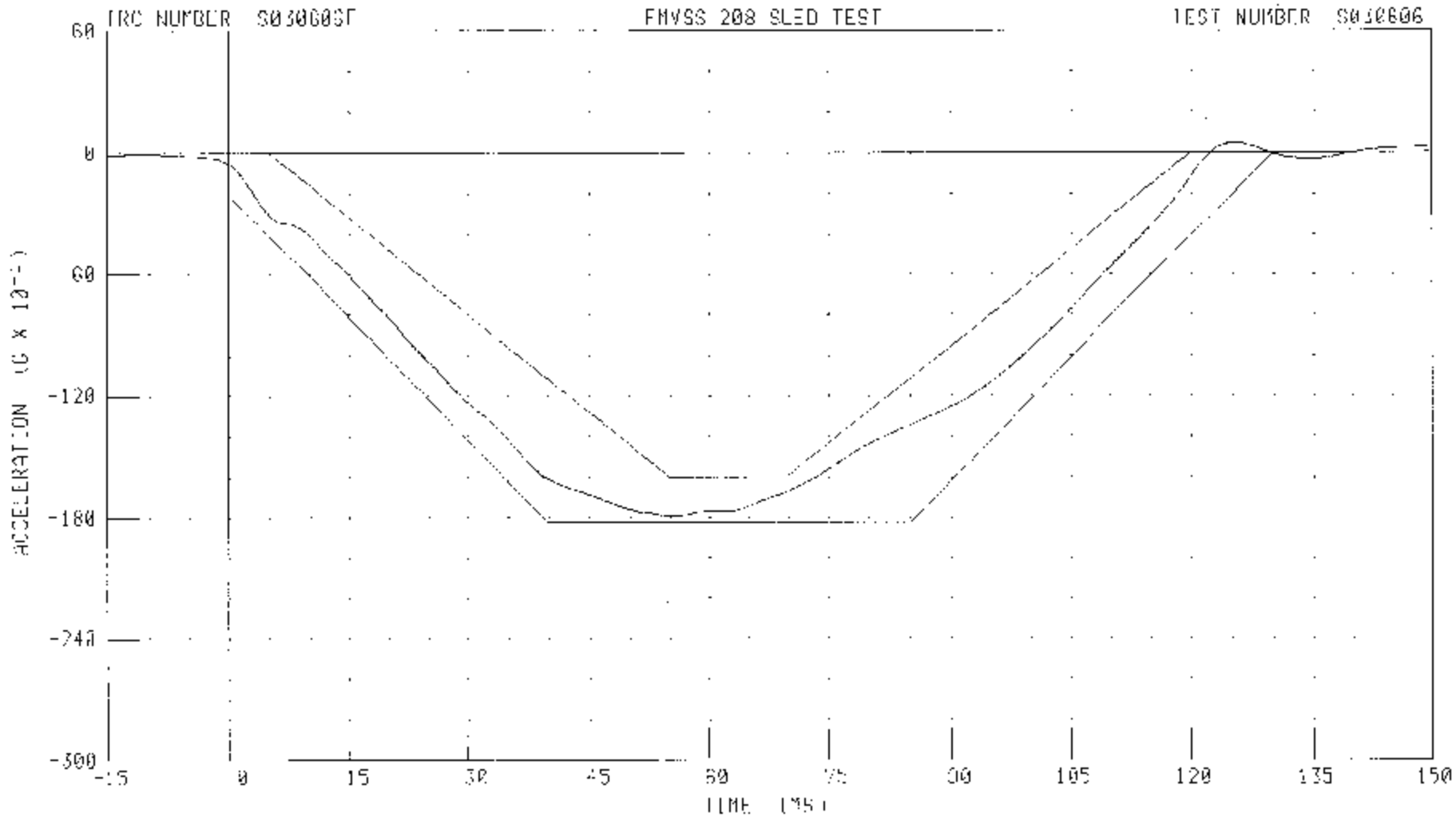
Appendix B

Data Plots

C30109 / 2003 CHEVROLET IMPALA

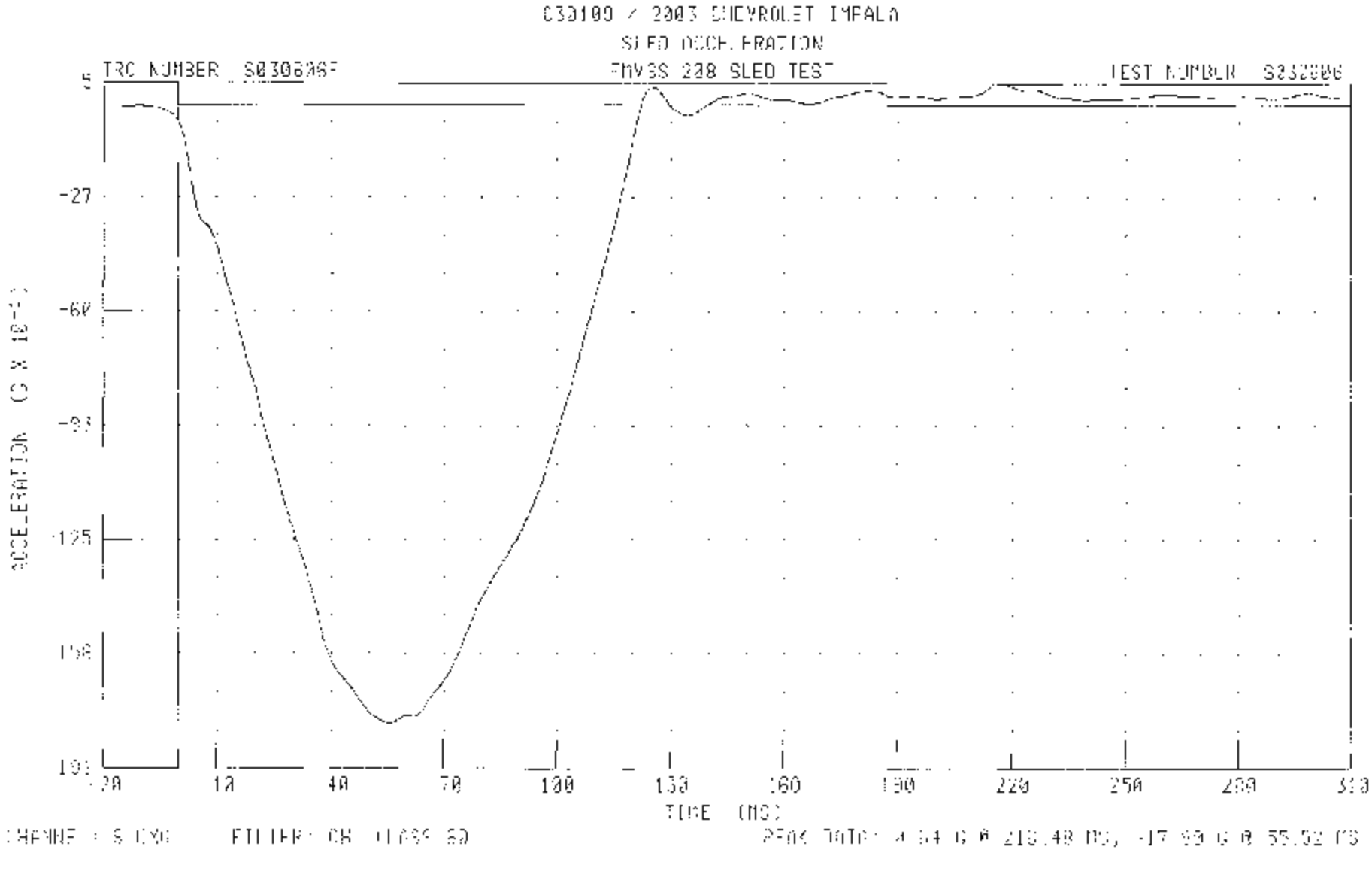
SLED ACCELERATION

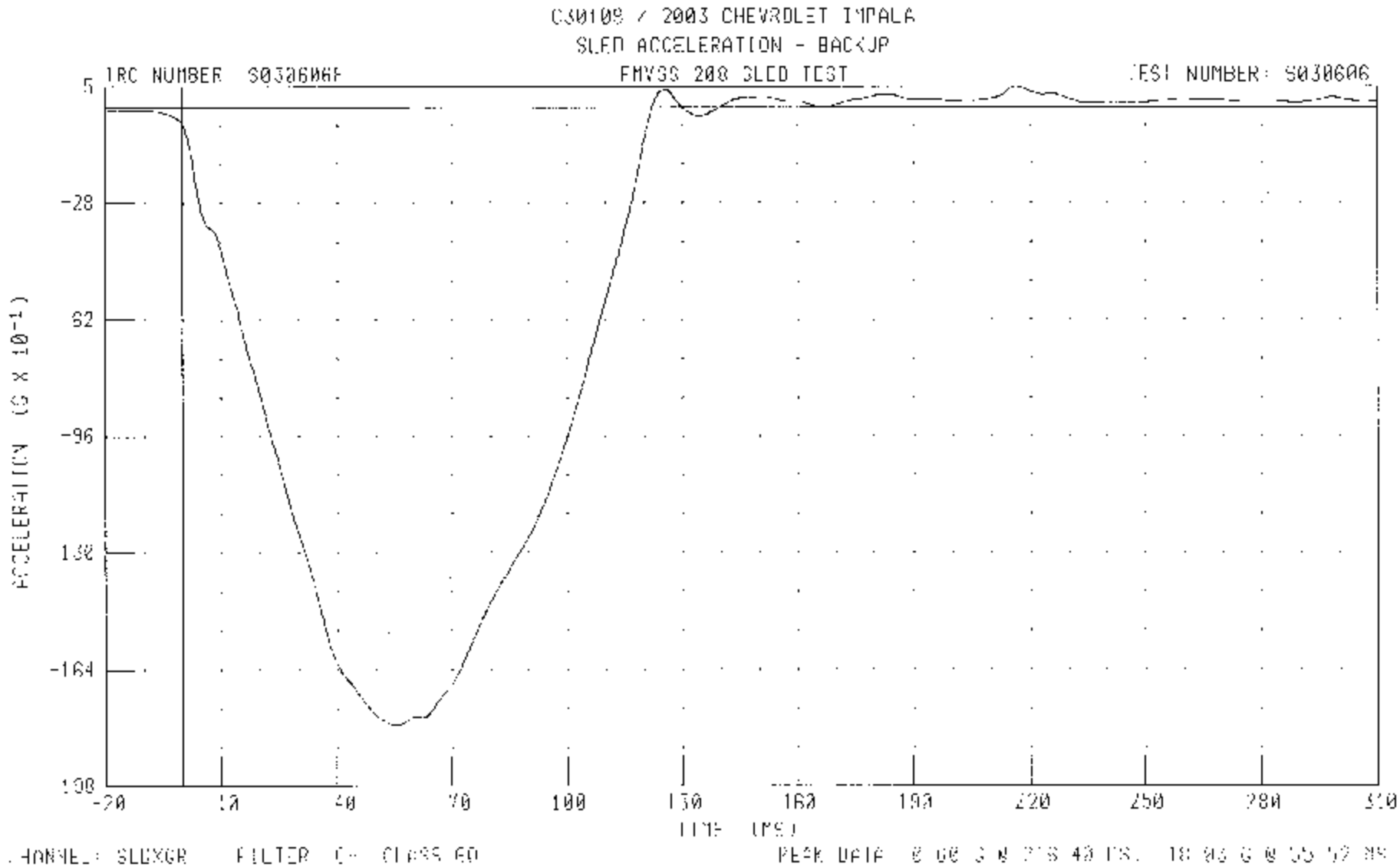
FMVSS 208 SLED TEST

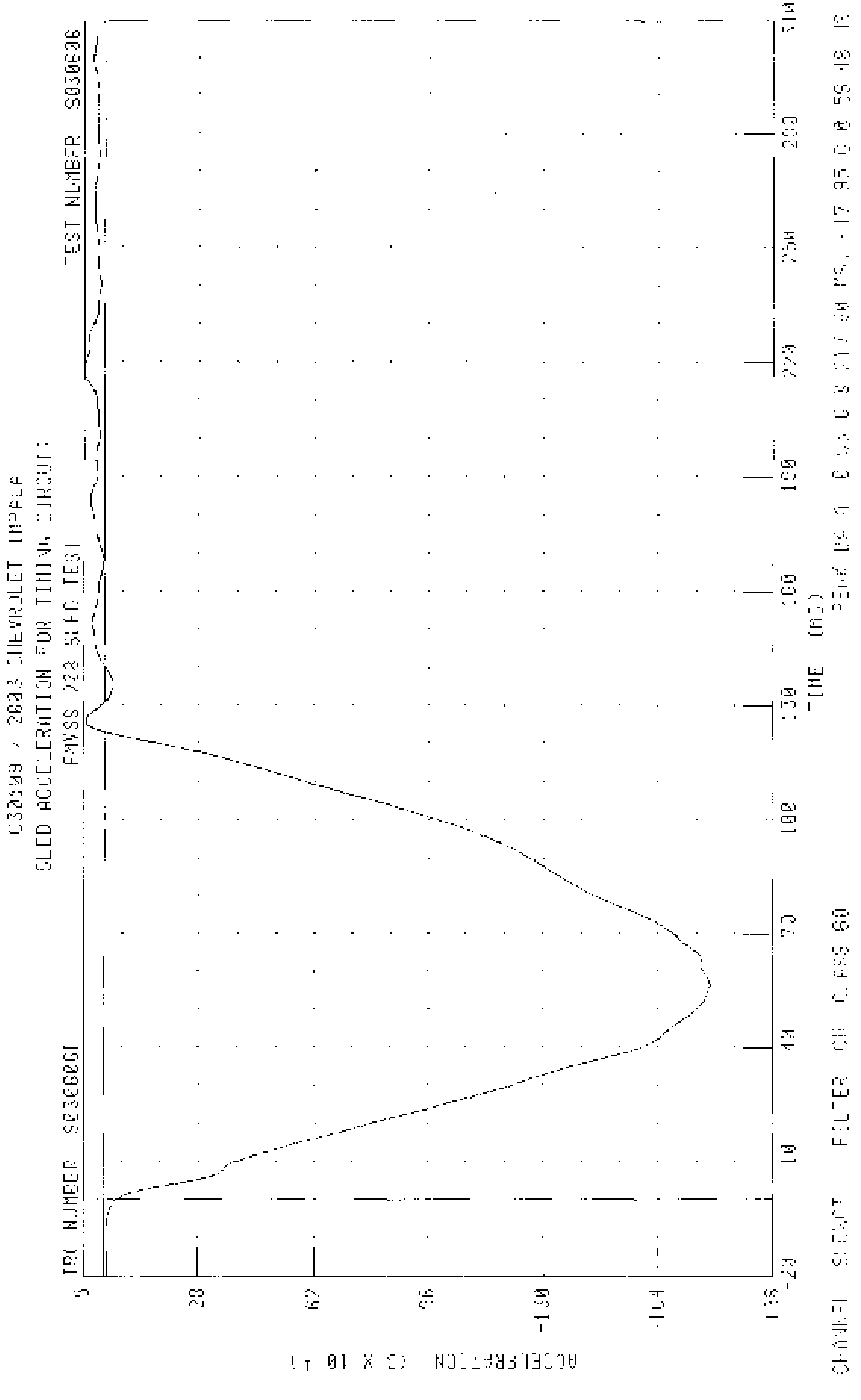


B-2

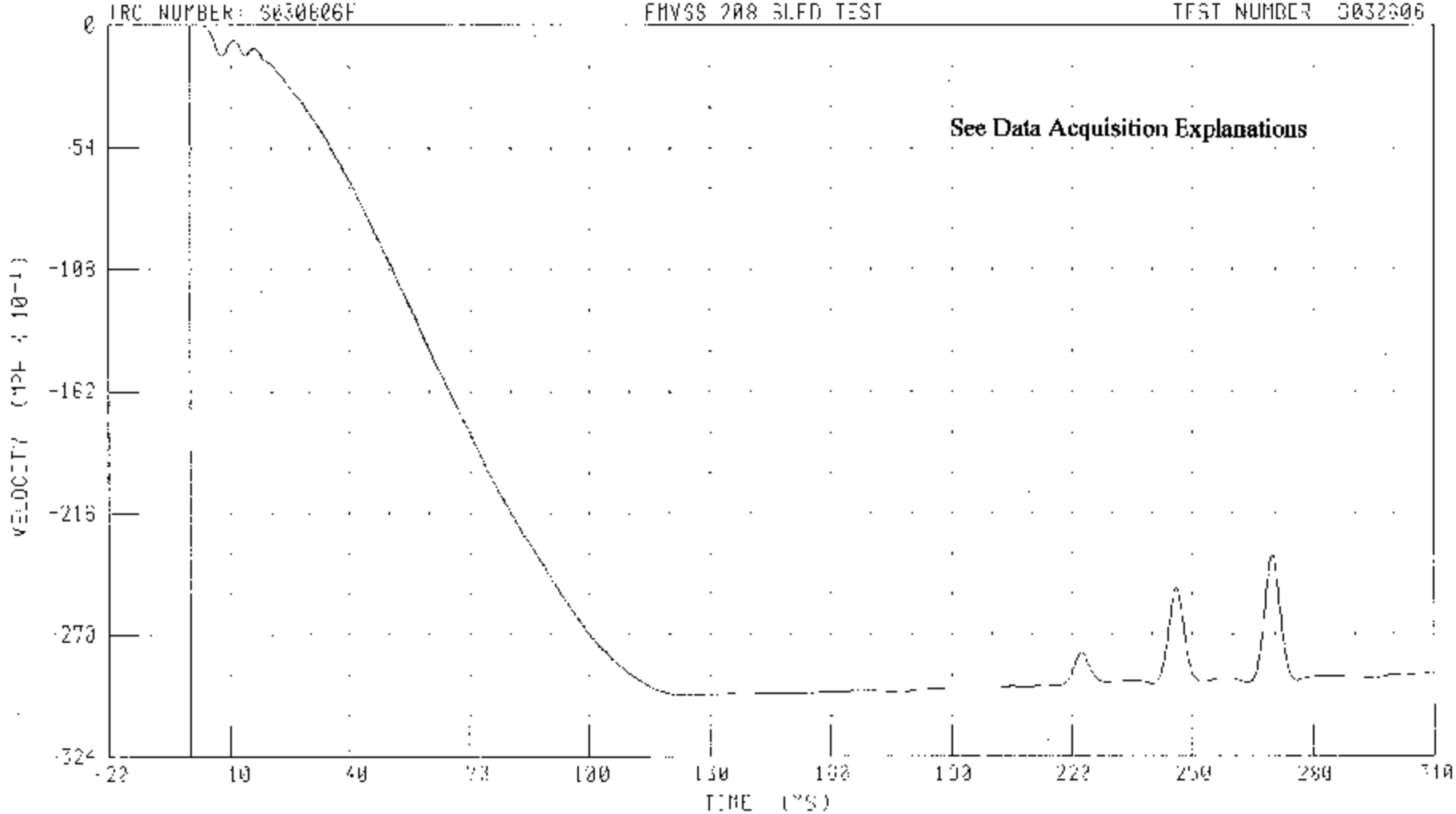
S030606


C30100 / 2003 CHEVROLET IMPALA
SLED DECELERATION
FMVSS 208 SLED TEST
TEST NUMBER S030606
-27
-60
-93
-125
-158
-191
20
40
70
100
130
160
190
220
250
280
310
TIME (MS)


C30109 / 2003 CHEVROLET IMPALA
SLED ACCELERATION - BACKUP
IRC NUMBER S030606F
FMVSS 208 SLED TEST
TEST NUMBER: S030606
5
-28
62
-96
130
-164
198
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: SLEDXGR FILTER C= CLASS 60
PEAK DATA @ 66.3 MS 40 MS, 18.06 G @ 55.52 MS


2003 CHEVROLET IMPALA
SLED ACCELERATION FOR TIMING CIRCUIT
FMVSS 208 SLED TEST
TEST NUMBER S030606
ACCELERATION (G X 10 1)
TIME (MS)

C30109 / 2003 CHEVROLET IMPALA
MEASURED VELOCITY TRAP
IRC NUMBER: S030606F FMVSS 208 SLED TEST TEST NUMBER S032306



CHANNEL SLDXV FILTER CL CLASS 60 PEAK DATA 2.05 MS= 0 1.94 MS, 29.70 MPH 0 24.02 MS

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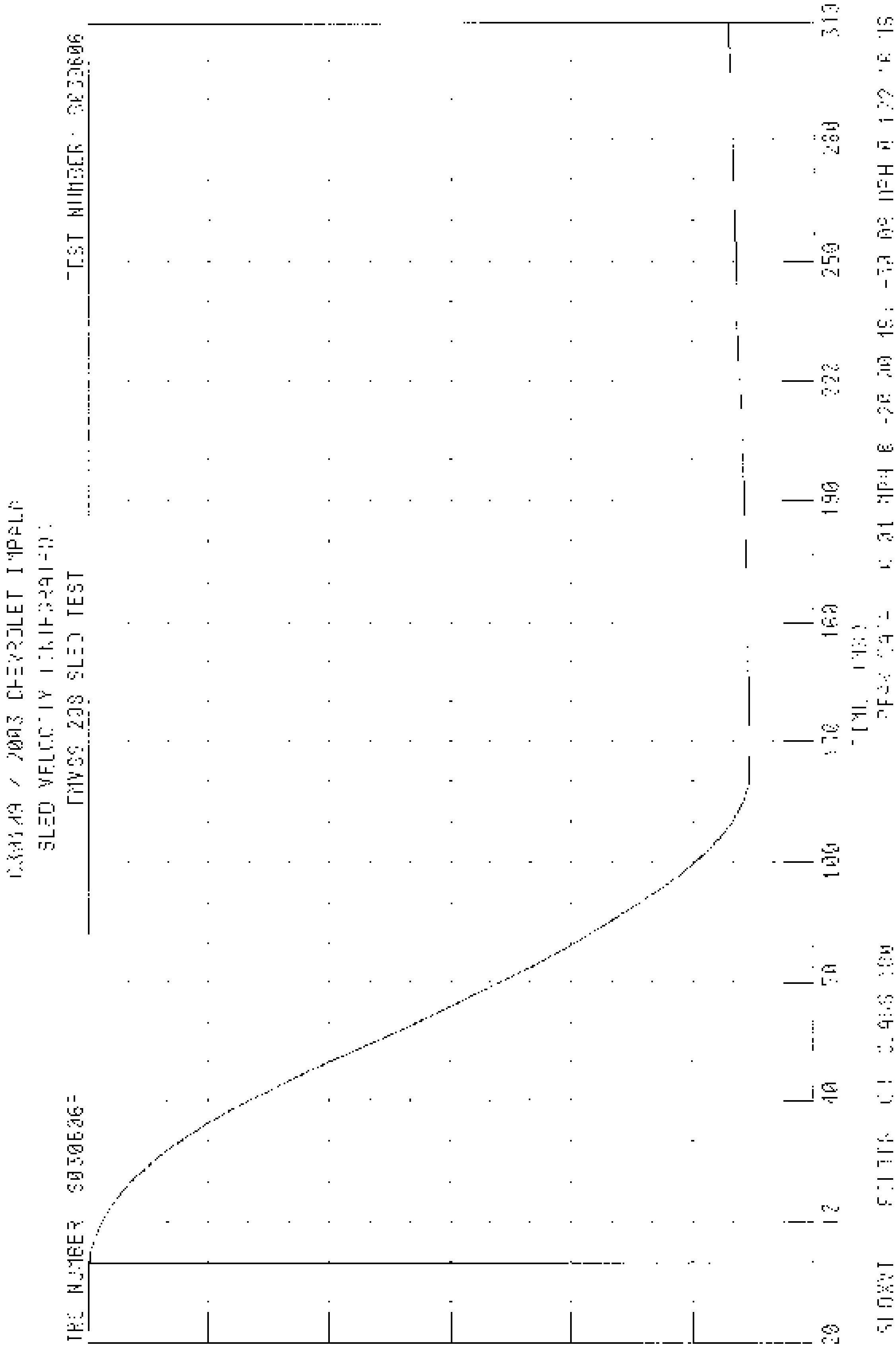
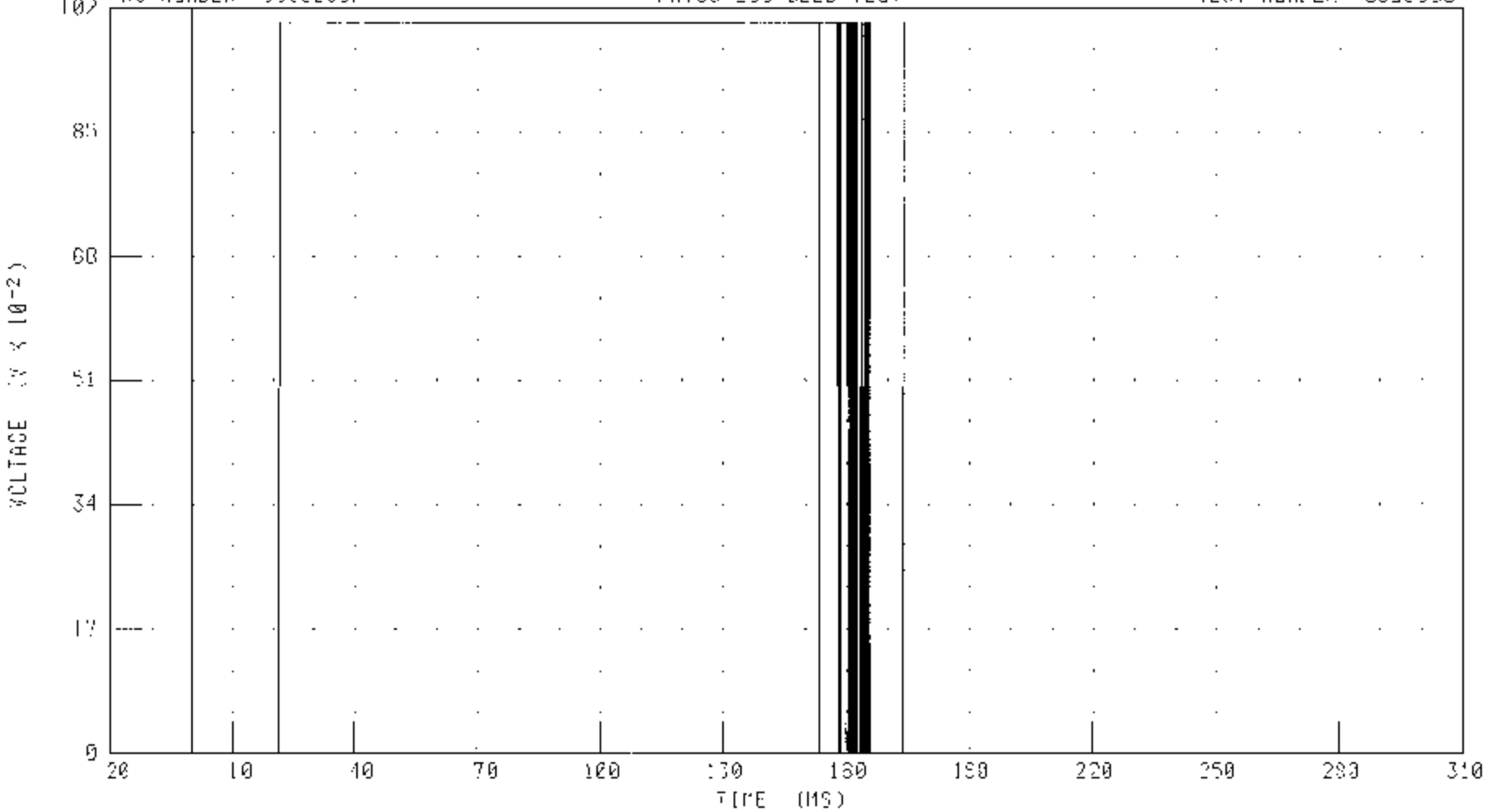
S030606


2003 CHEVROLET IMPALA
SLED VELOCITY
FMVSS 208 SLED TEST
TEST NUMBER
S030606
0
-55
-110
-220
-275
100
190
250
280
310

C30109 / 2003 CHEVROLET IMPALA
DRIVER PRIMARY AIRBAG EVENT
FMVSS 208 SLED TEST

TRC NUMBER: S030606F

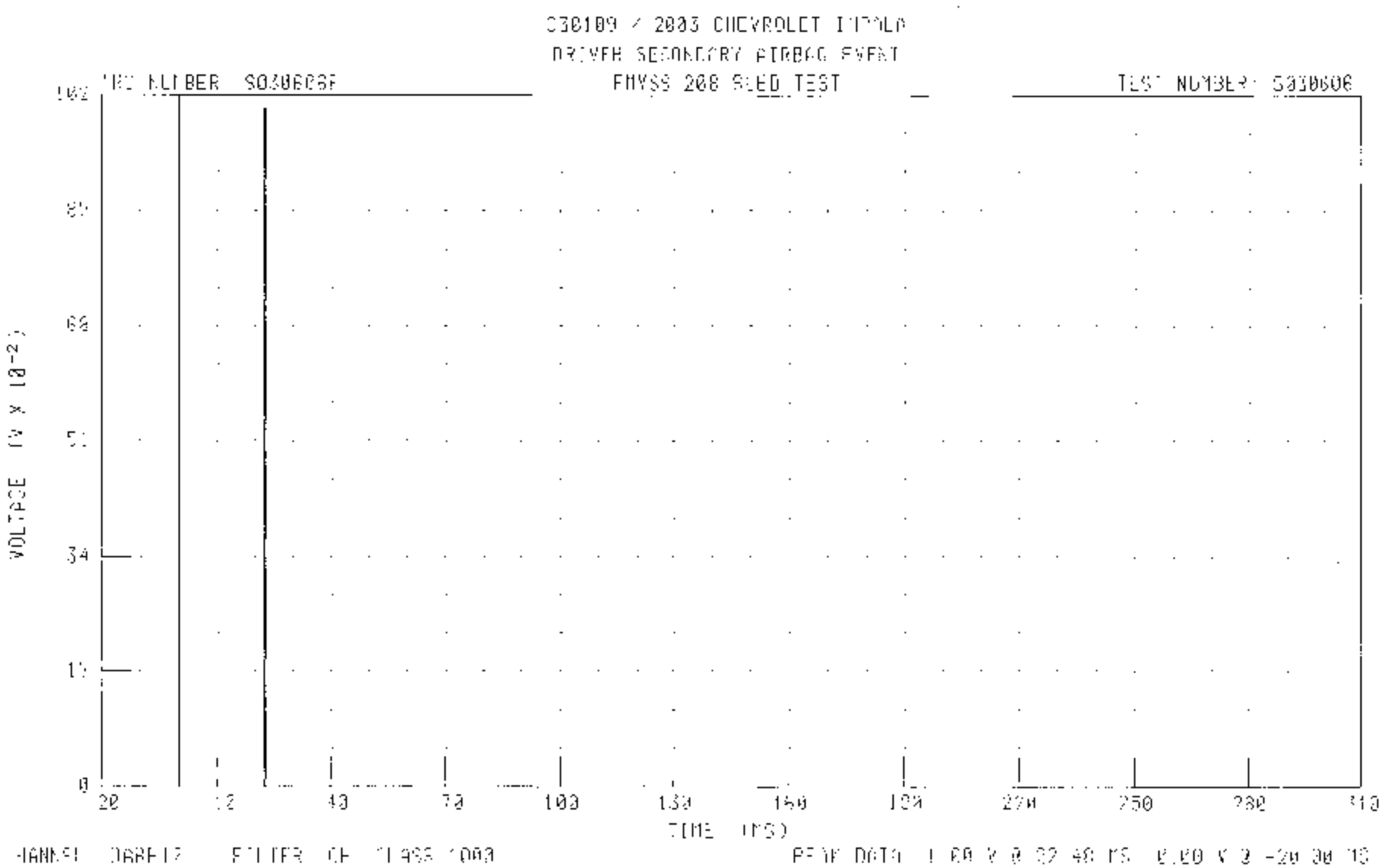
TEST NUMBER: S030606



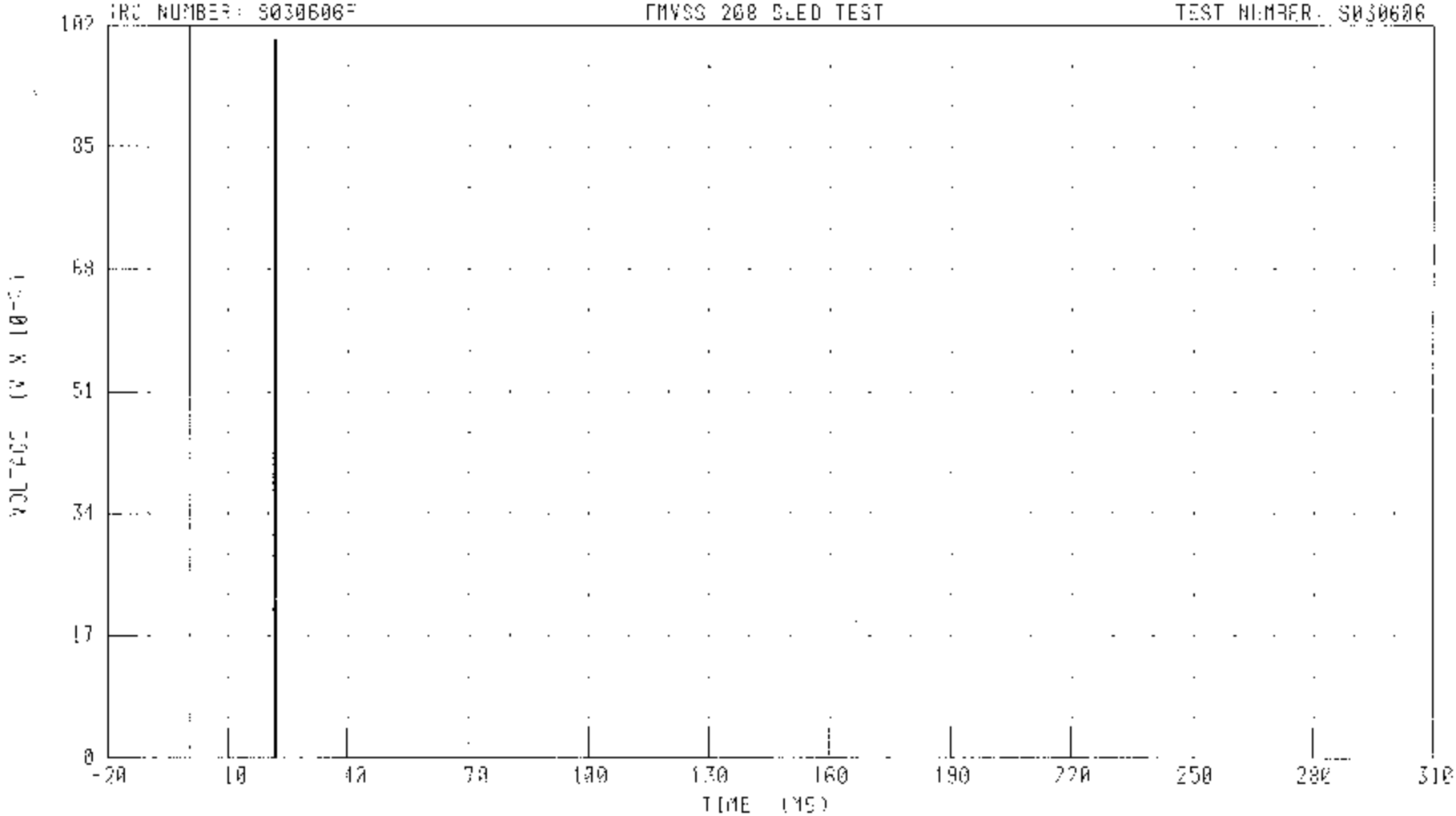
CHANNEL: DOBFT1 FILTER: CH CLASS 1000 PEAK DATA: 1.00 V @ 21.52 MS; -0.00 V @ -20.00 MS

B-8

S030606


C30109 / 2003 CHEVROLET IMPALA
DRIVER SECONDARY AIRBAG EVENT
FMVSS 208 SLED TEST
TEST NUMBER: S030606
VOLTAGE (V X 10-2)
TIME (MS)

C30109 / 2003 CHEVROLET IMPALA
PASSENGER PRIMARY AIRBAG EVENT
FMVSS 208 SLED TEST



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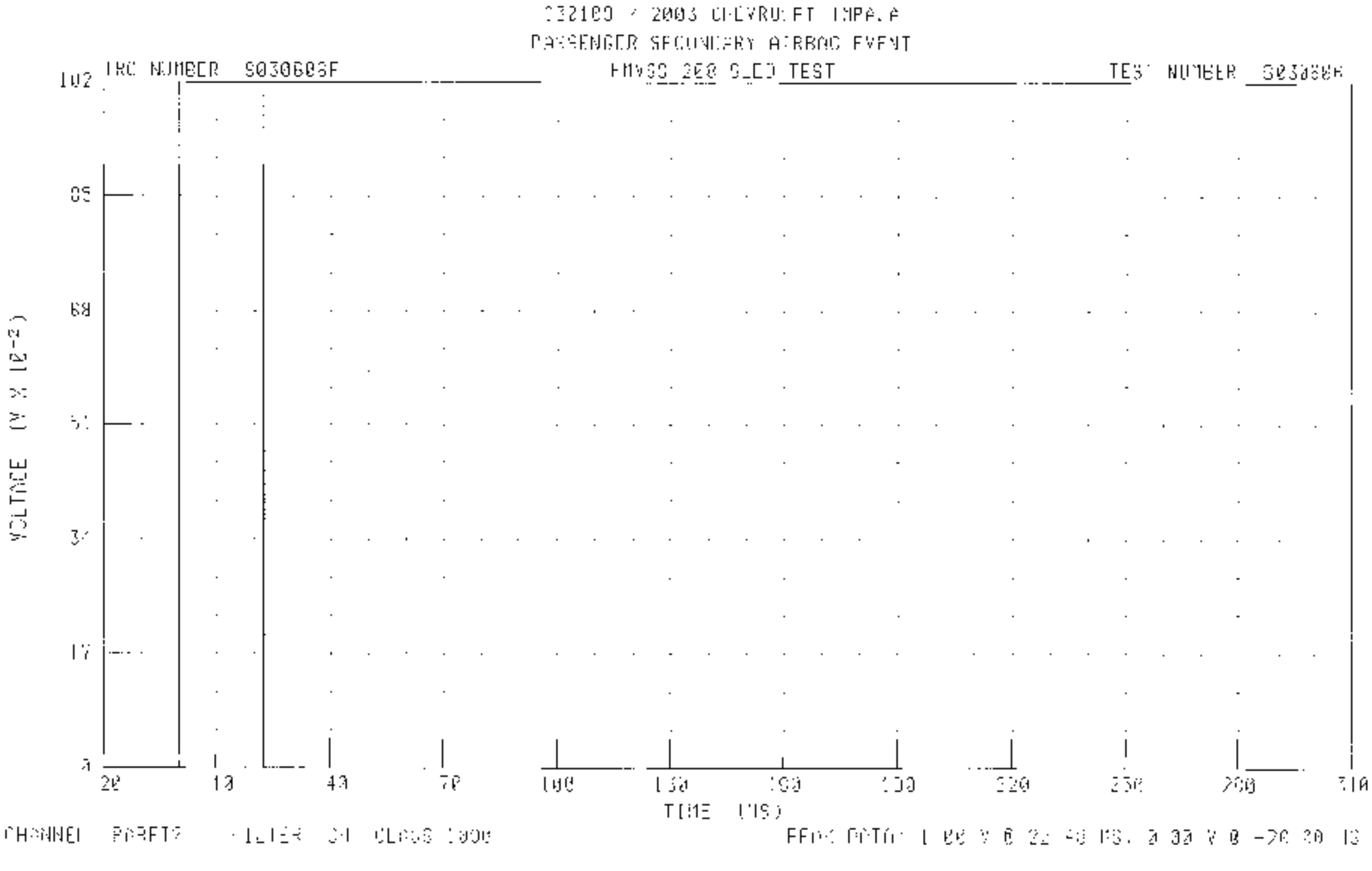
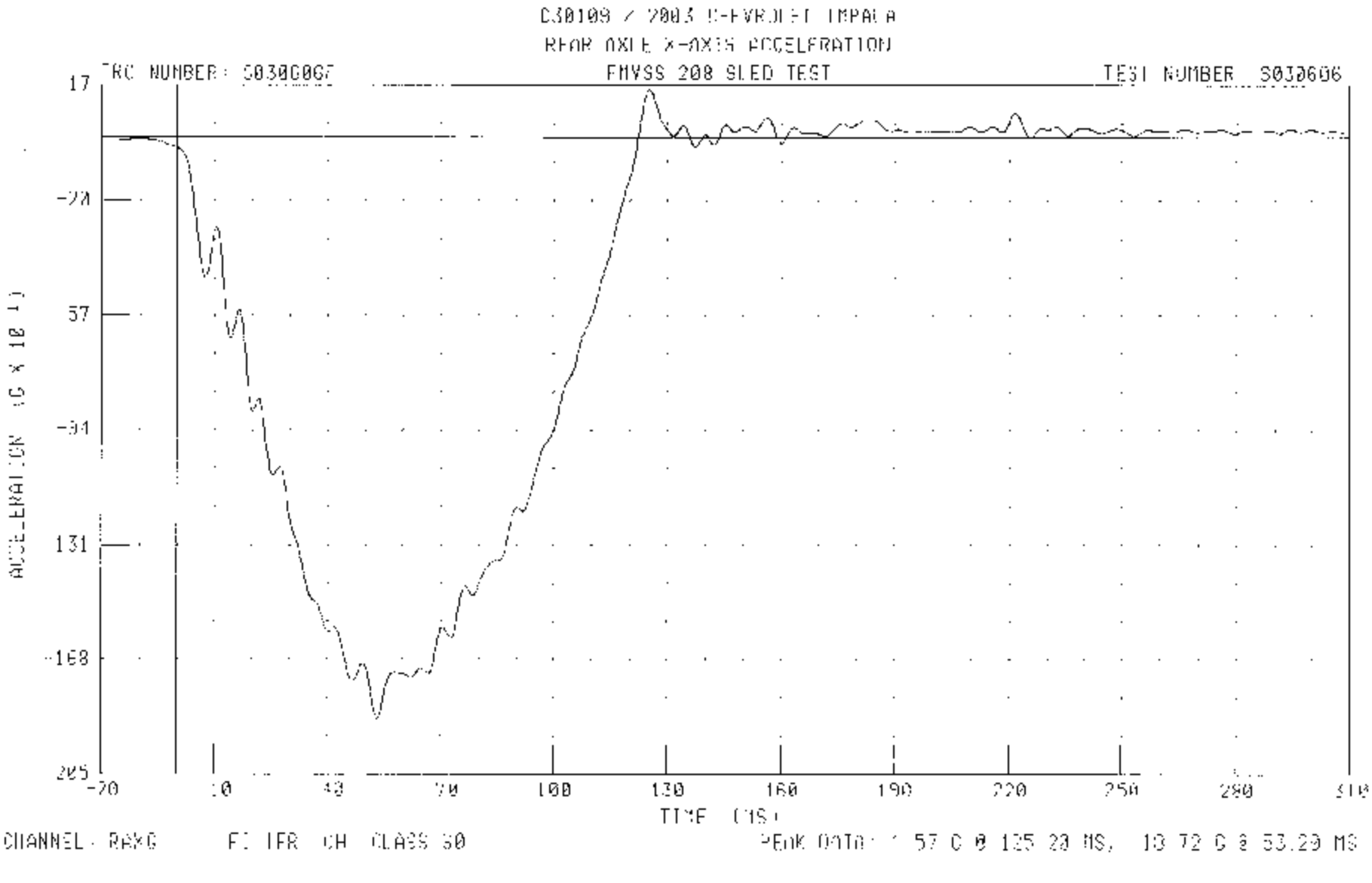
S030606


032100 / 2003 CHEVROLET IMPALA
PASSENGER SECONDARY AIRBAG EVENT
IRC NUMBER S030603F
FMVSS 208 S_ED TEST
TEST NUMBER S03060
102
85
68
51
34
17
0
VOLTAGE (V X 10-2)
20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL PORT2 FILTER 24 CLASS 1000
FRAME DATA: 1.00 V @ 22.40 MS, 0.00 V @ -20.20 MS

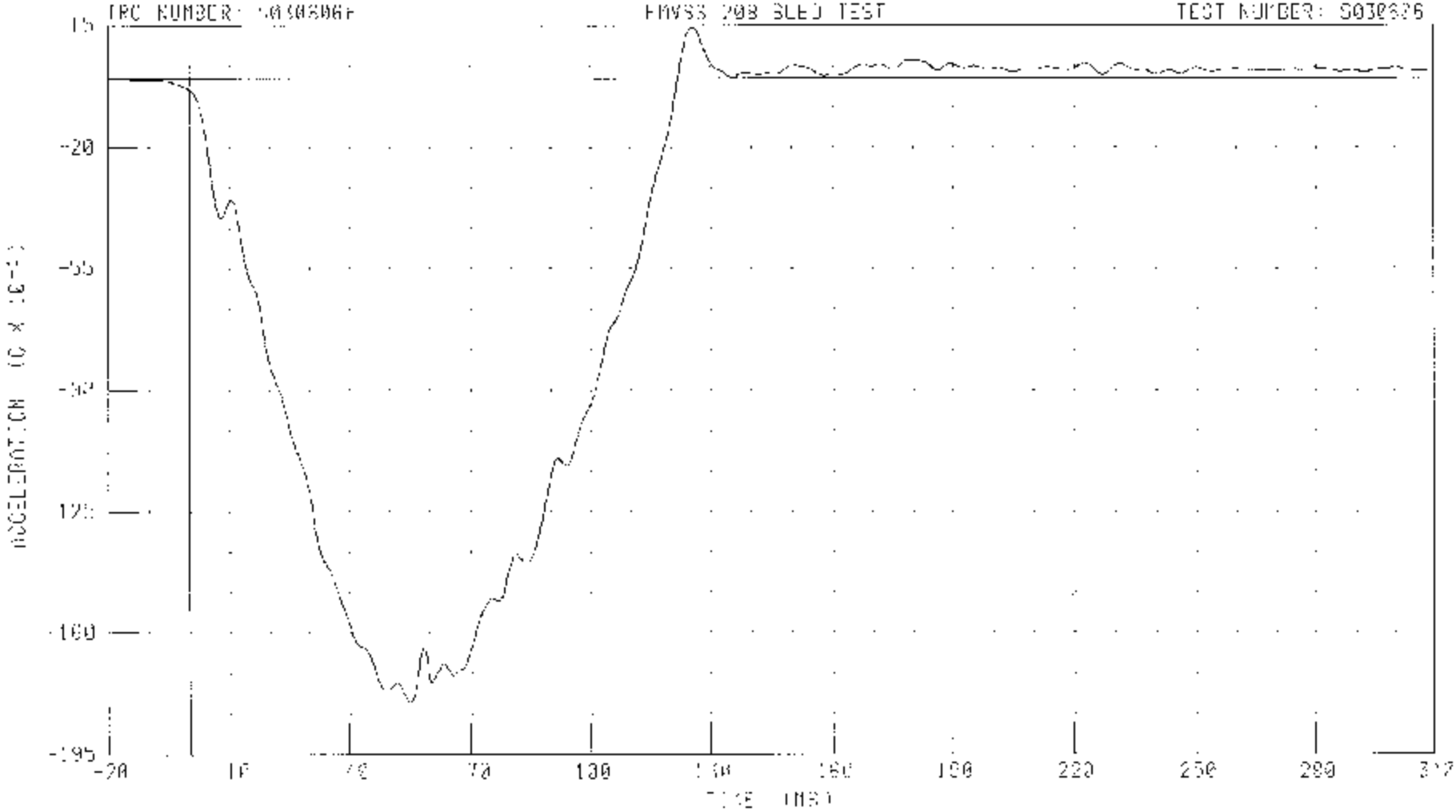

C30109 / 2003 C-EVROLET IMPALA
REAR AXLE X-AXIS ACCELERATION
FMVSS 208 SLED TEST
TRC NUMBER: S030606Z
TEST NUMBER S030606
17
-77
57
-94
131
-168
205
ACCELERATION (G X 10 1)
-70
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RAXG
FILTER CH CLASS 60
PEAK DATA: -57.0 @ 125.20 MS, 10.72 G @ 53.20 MS

S030606

C30109 / 2003 CHEVROLET IMPALA

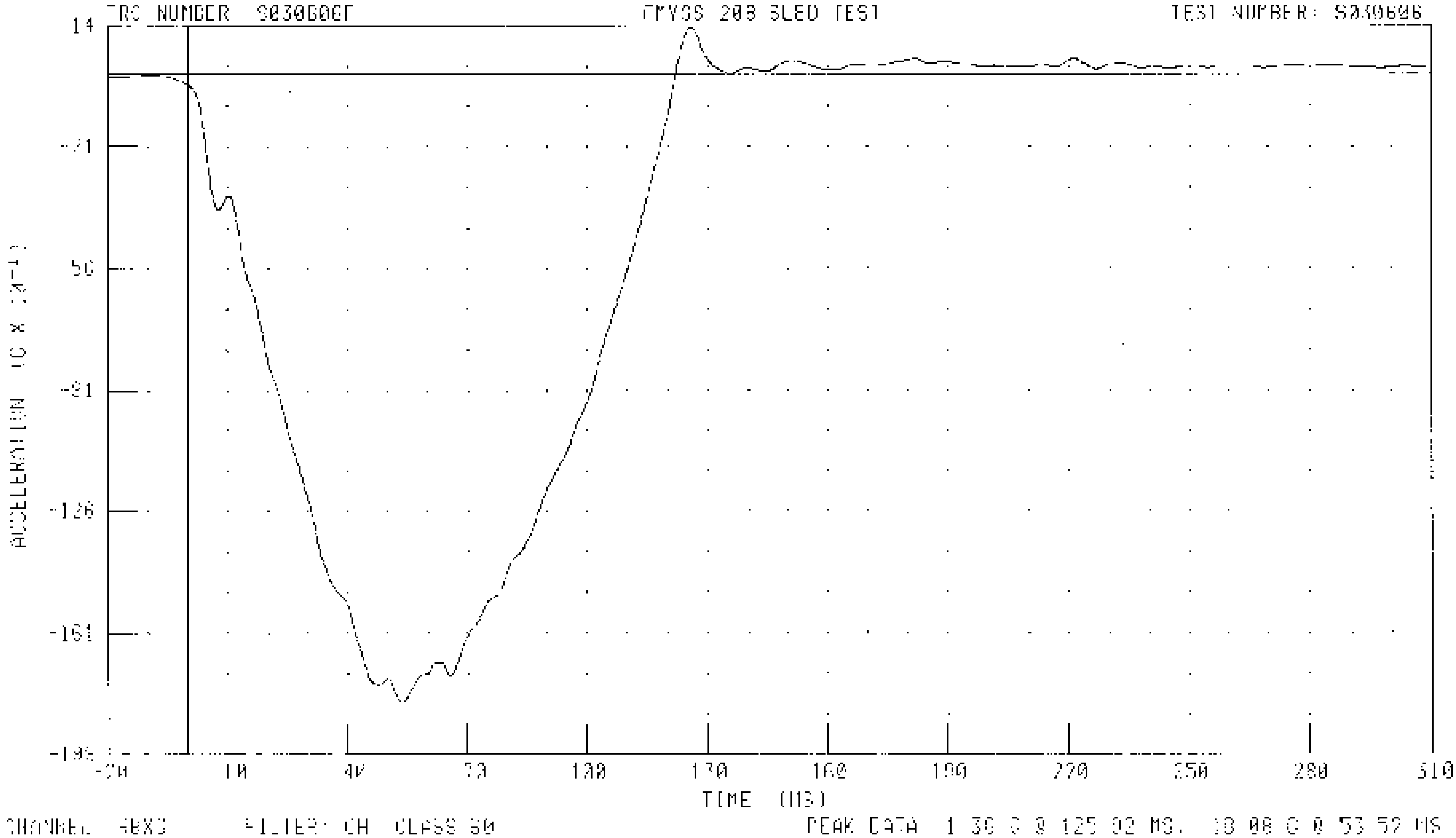
LEFT BODY AT REAR SEAT X-AXIS ACCELERATION

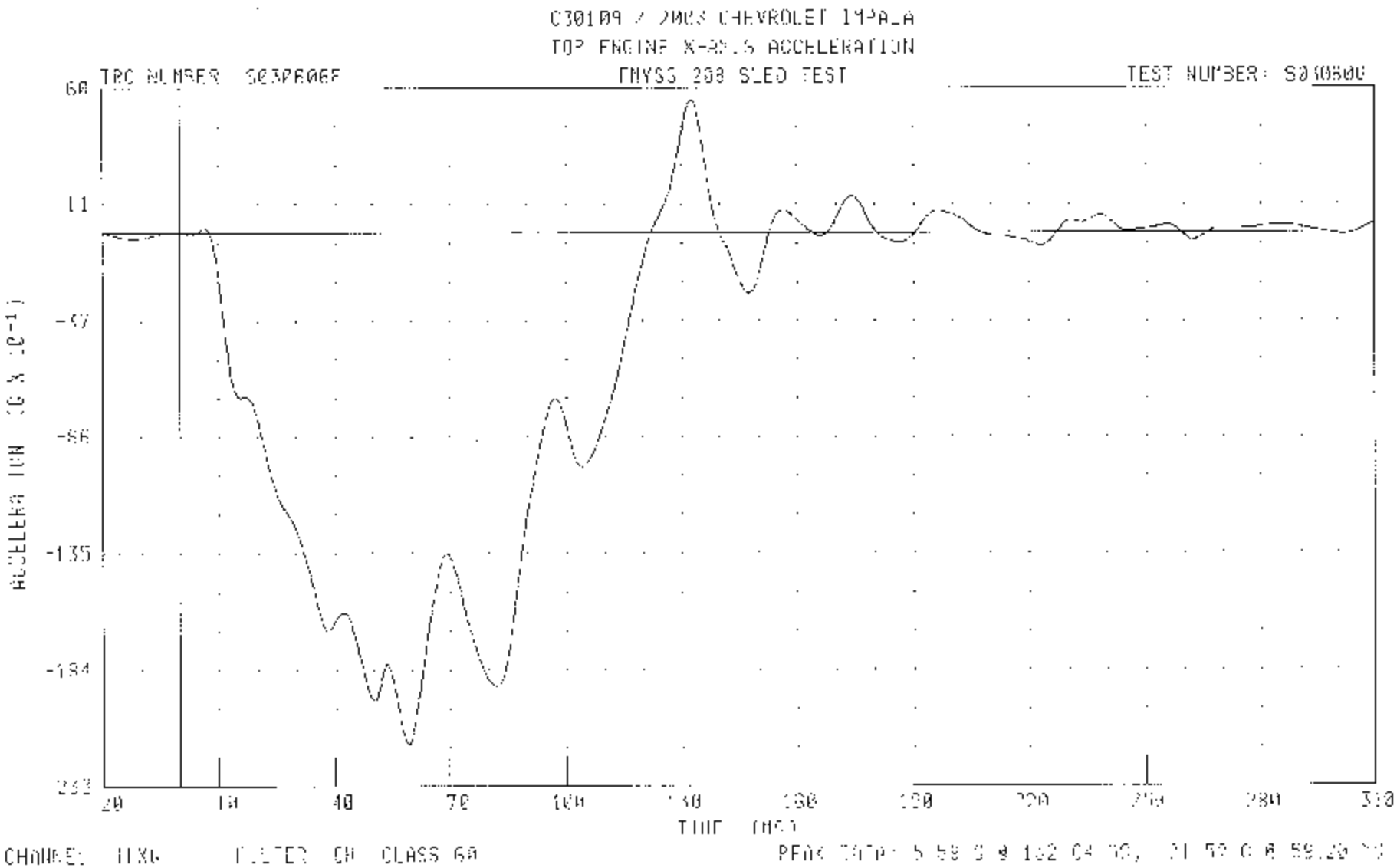
IRC NUMBER: S030606F FMVSS 208 SLED TEST TEST NUMBER: S030606

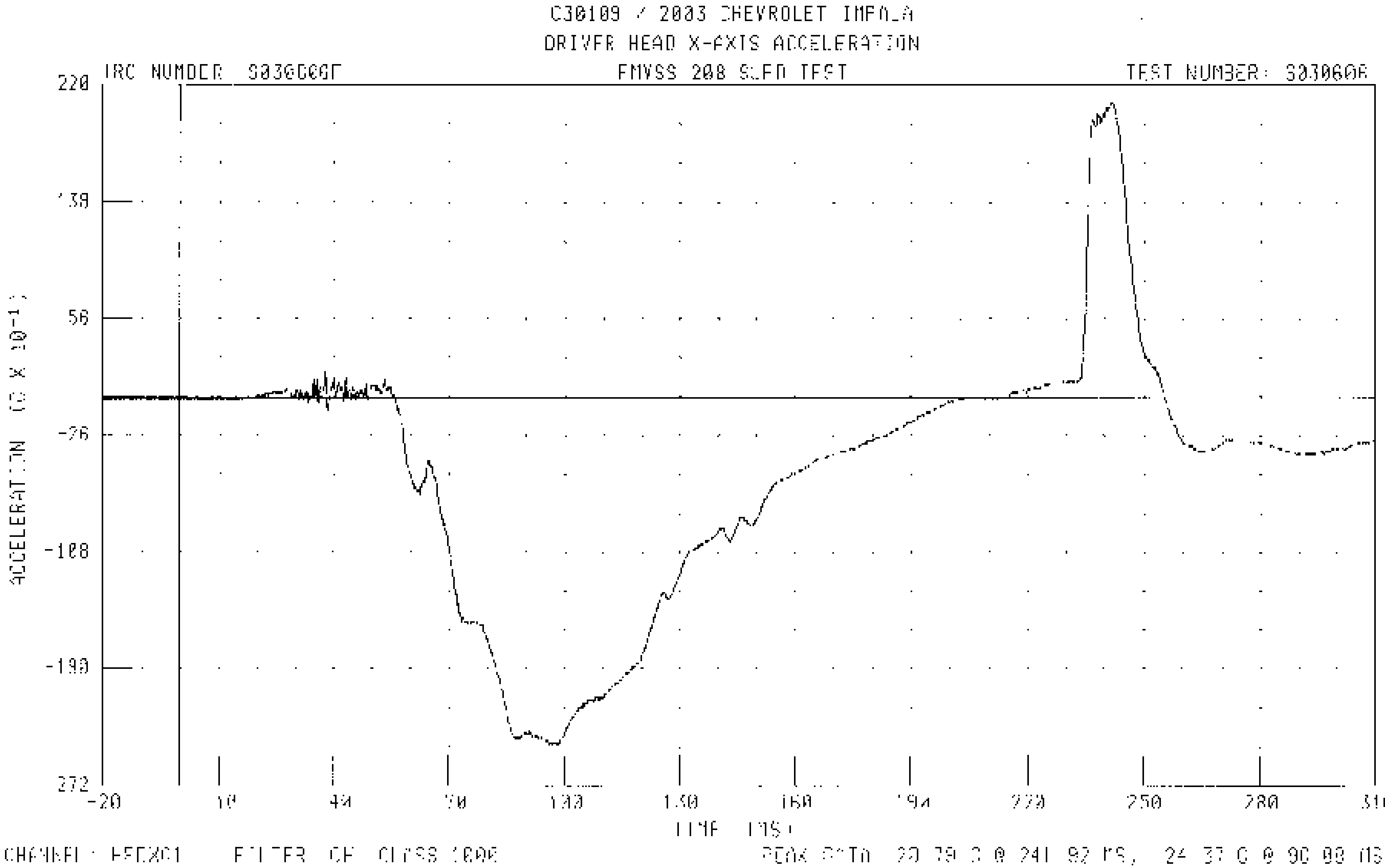


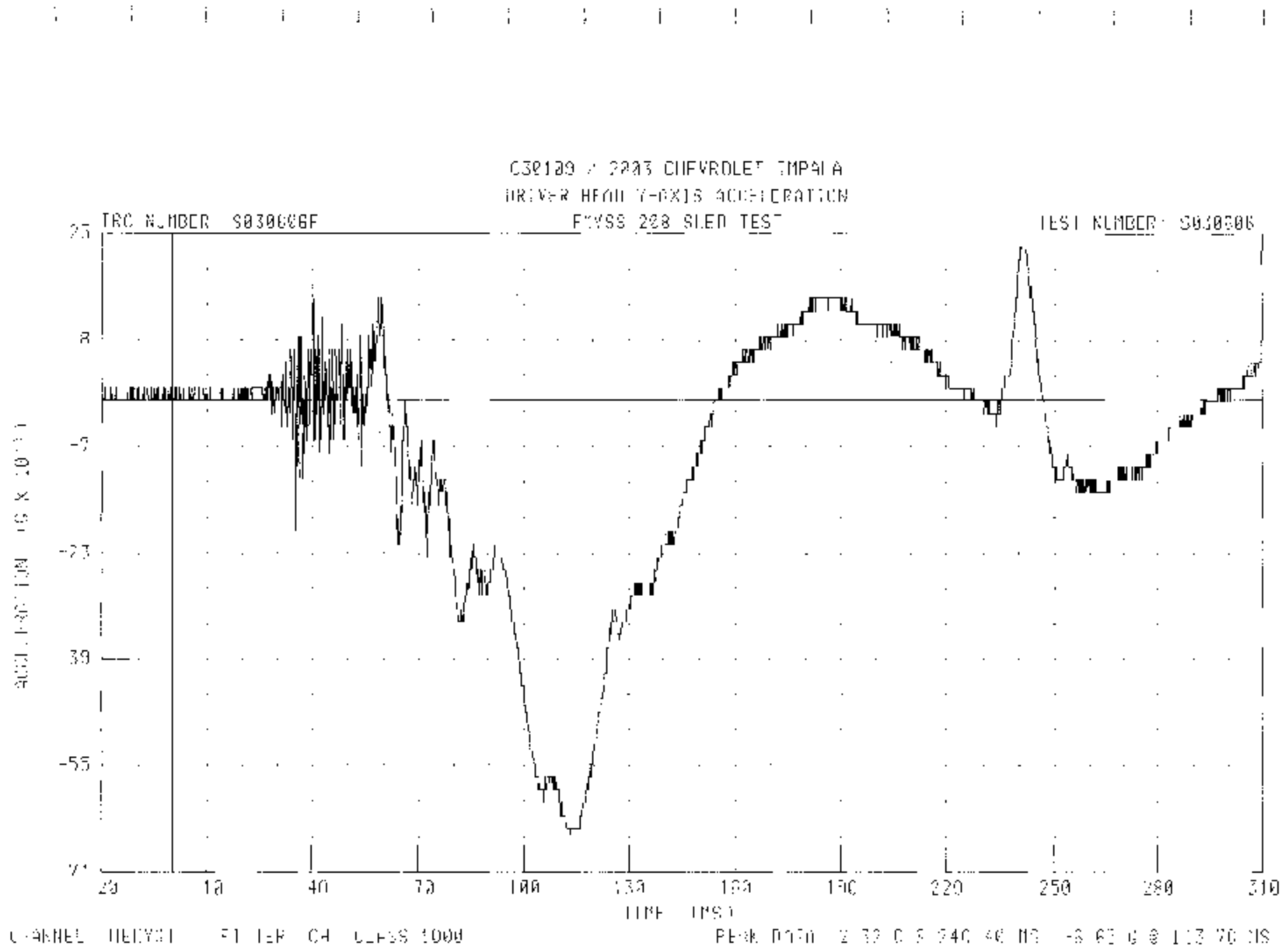
CHANNEL: LBXD FILTER: CFC CLASS 60 PEAK DATA: 1.45 G @ 105.00 MS, -19.31 G @ 55.20 MS

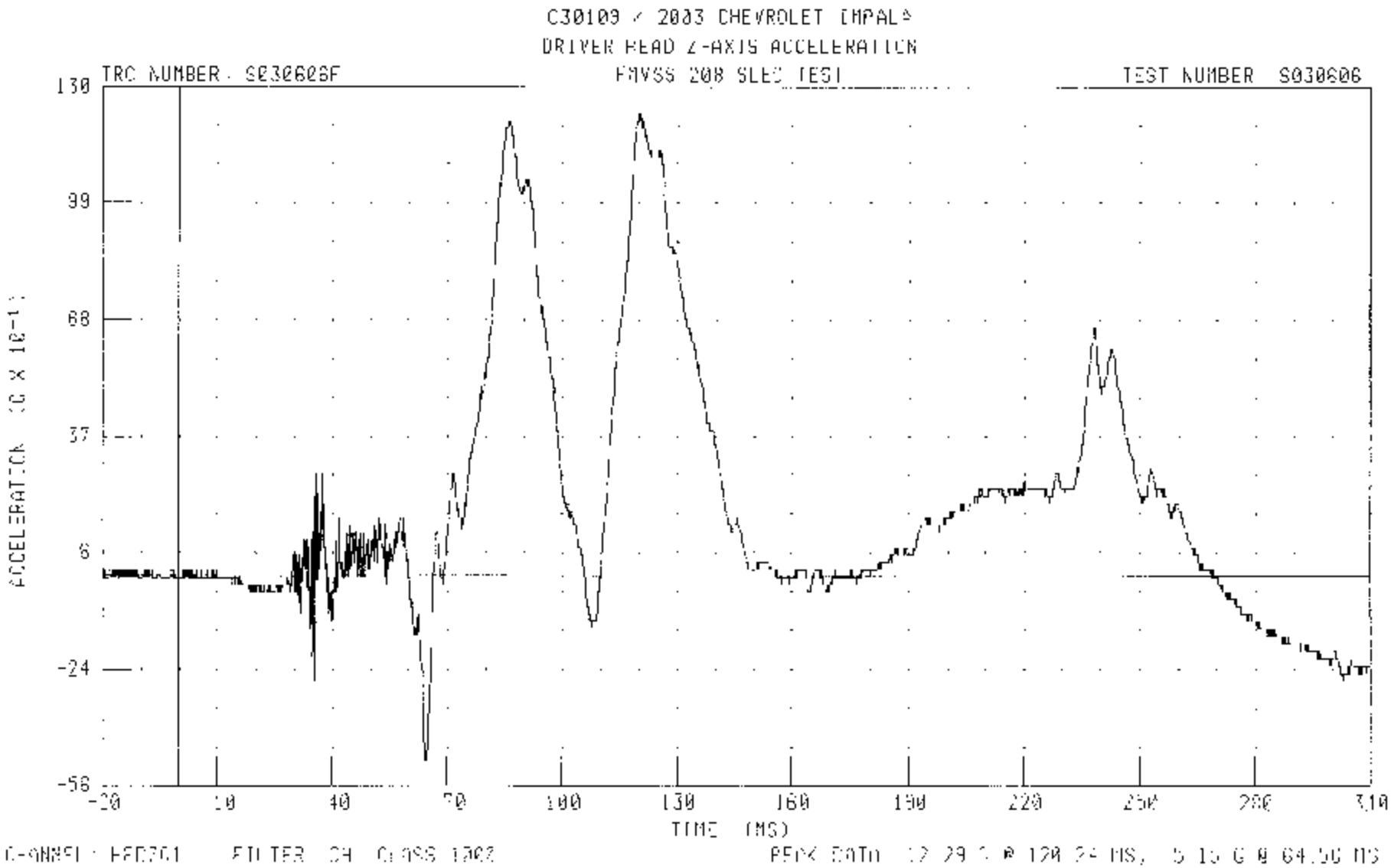
C30109 / 2003 CHEVROLET IMPALA
RIGHT BODY AT REAR SEAT X-AXIS ACCELERATION



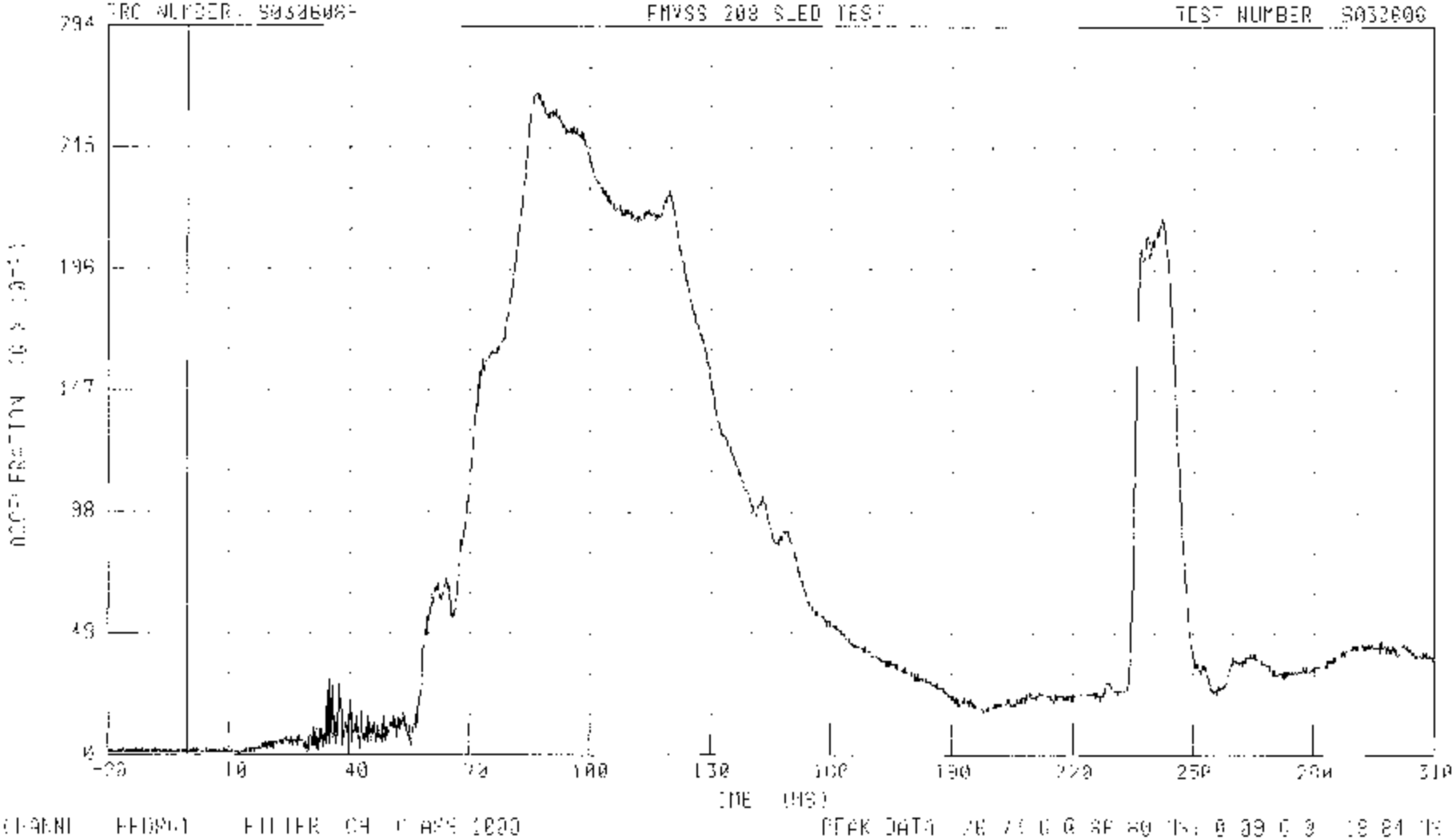

C30109 / 2005 CHEVROLET IMPALA
TOP ENGINE X-AXIS ACCELERATION
TNYSS 208 SLED TEST
TRC NUMBER: S030606F
TEST NUMBER: S030500
60
11
-37
-86
-135
-184
-233
ACCELERATION (G'S X 10-1)
20
40
70
100
130
190
220
250
280
310
TIME (MS)
CHANNEL: 11X6
FILTER CH CLASS 60


C30109 / 2003 CHEVROLET IMPALA
DRIVER HEAD X-AXIS ACCELERATION
FMVSS 208 SLED TEST
IRC NUMBER S0306DGF
TEST NUMBER: S030606
ACCELERATION (G X 10-1)
220
139
56
-26
-108
-190
-272
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL HFDX01
FILTER CF CLASS 1000


C30109 / 2003 CHEVROLET IMPALA
DRIVER HEAD Y-AXIS ACCELERATION
FMVSS 208 SLED TEST
TRC NUMBER S030606F
TEST NUMBER S030606
TIME (MS)
CHANNEL DESCRIPTION FILTER CH CLASS 1000
PEAK DATA 2.32 G @ 240.40 MS -6.63 G @ 113.70 MS


C30109 / 2003 CHEVROLET IMPALA
DRIVER HEAD Z-AXIS ACCELERATION
FMVSS 208 SLED TEST
TRC NUMBER: S030606F
TEST NUMBER S030606
130
99
68
37
6
-24
-56
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
ACCELERATION (G X 10-1)
CHANNEL: HEAD01
FILTER CH CLASS 1000
PEAK DATA

C30109 / 2003 CHEVROLET IMPALA
DRIVER HEAD RESULTANT ACCELERATION
FMVSS 208 SLED TEST



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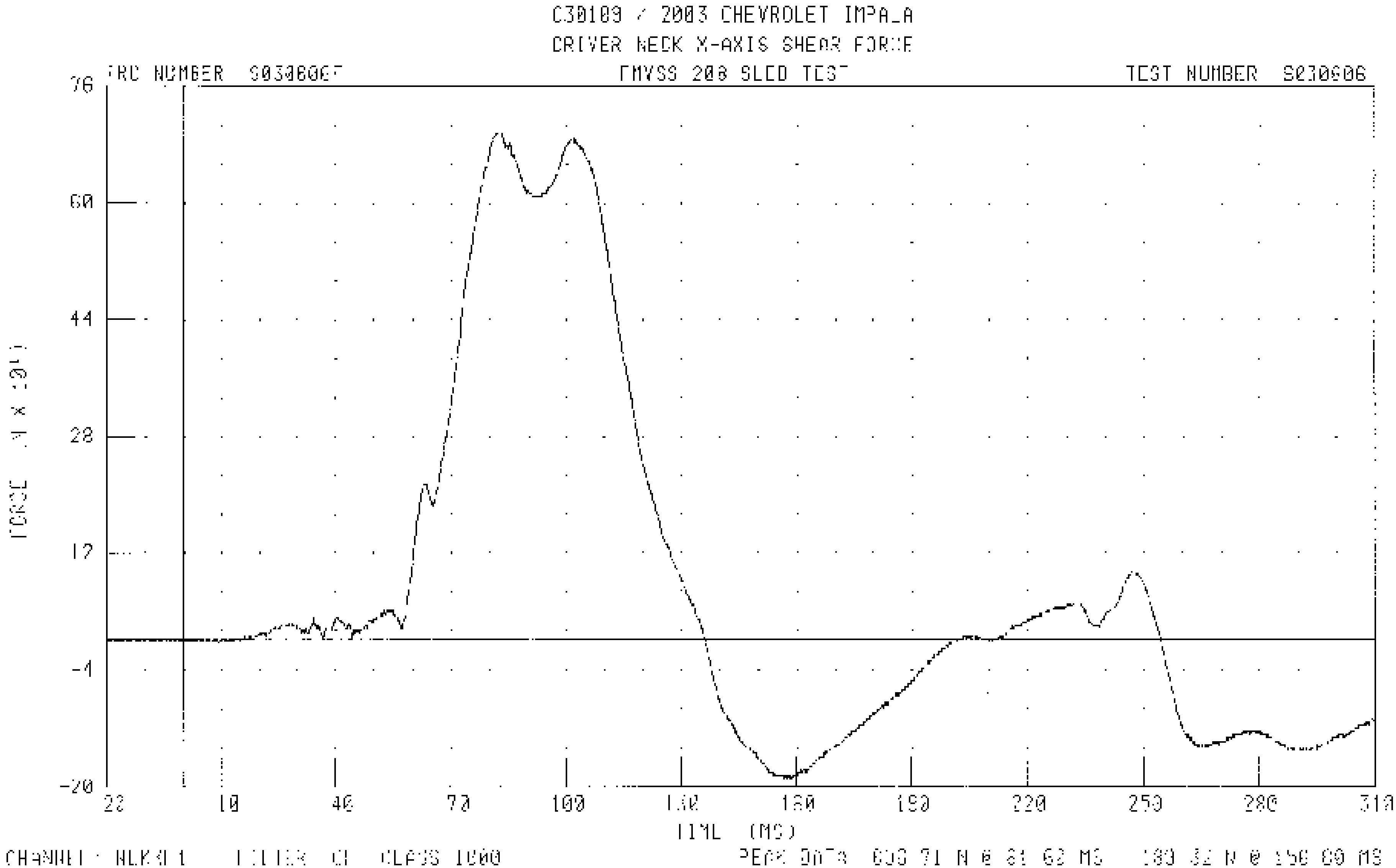
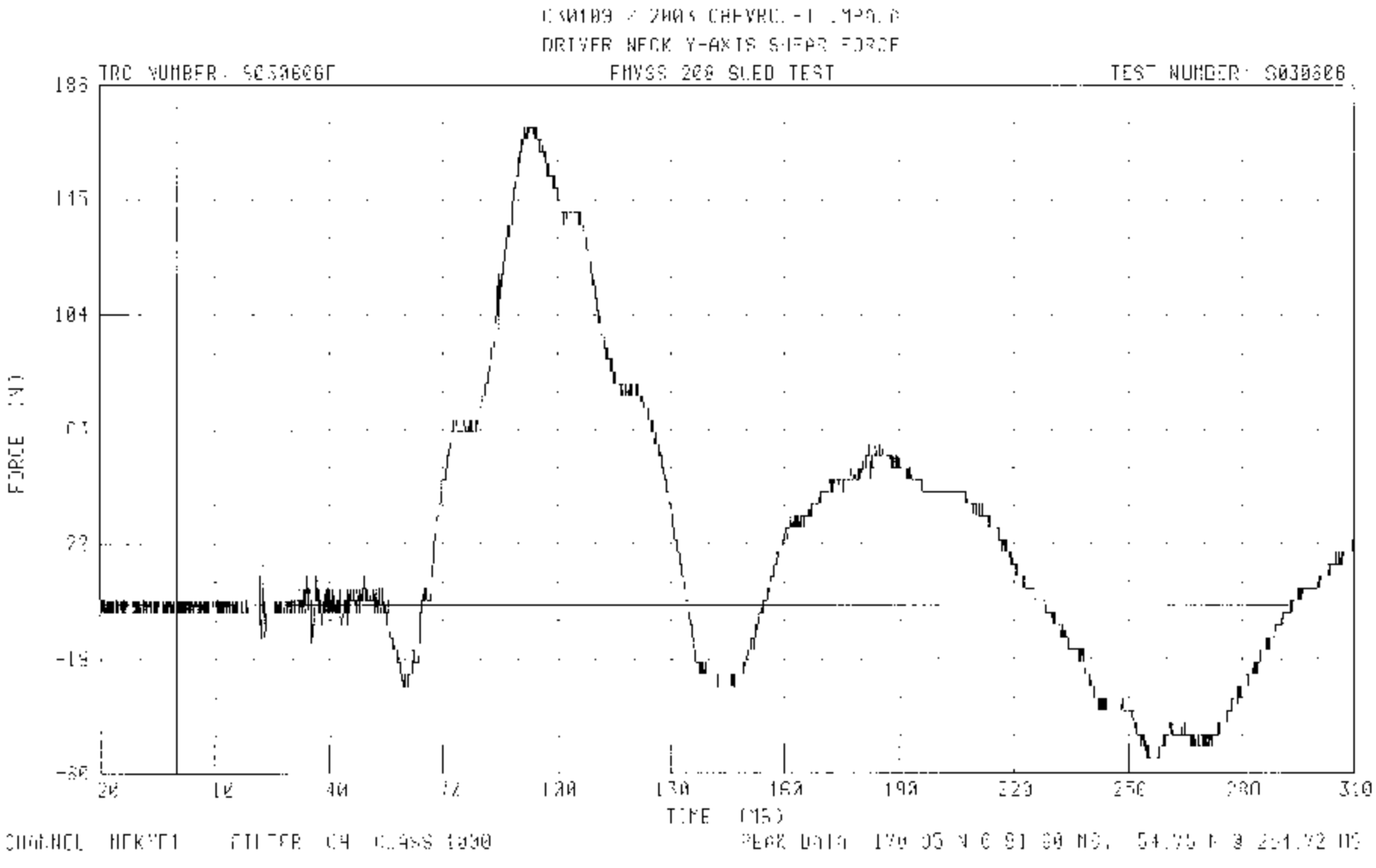
S030606


C30109 / 2003 CHEVROLET IMPALA
DRIVER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST
TEST NUMBER S030606
76
60
44
28
12
-4
-20
10
40
70
100
160
190
220
250
280
310
TIME (MS)
CLASS 1000


DRIVER NECK Y-AXIS SHEAR FORCE
TRC NUMBER: SC330606
FMVSS 208 SLED TEST
TEST NUMBER: S030606
FORCE (N)
TIME (MS)
CHANNEL NECKY1 FILTER CFC CLASS 1000

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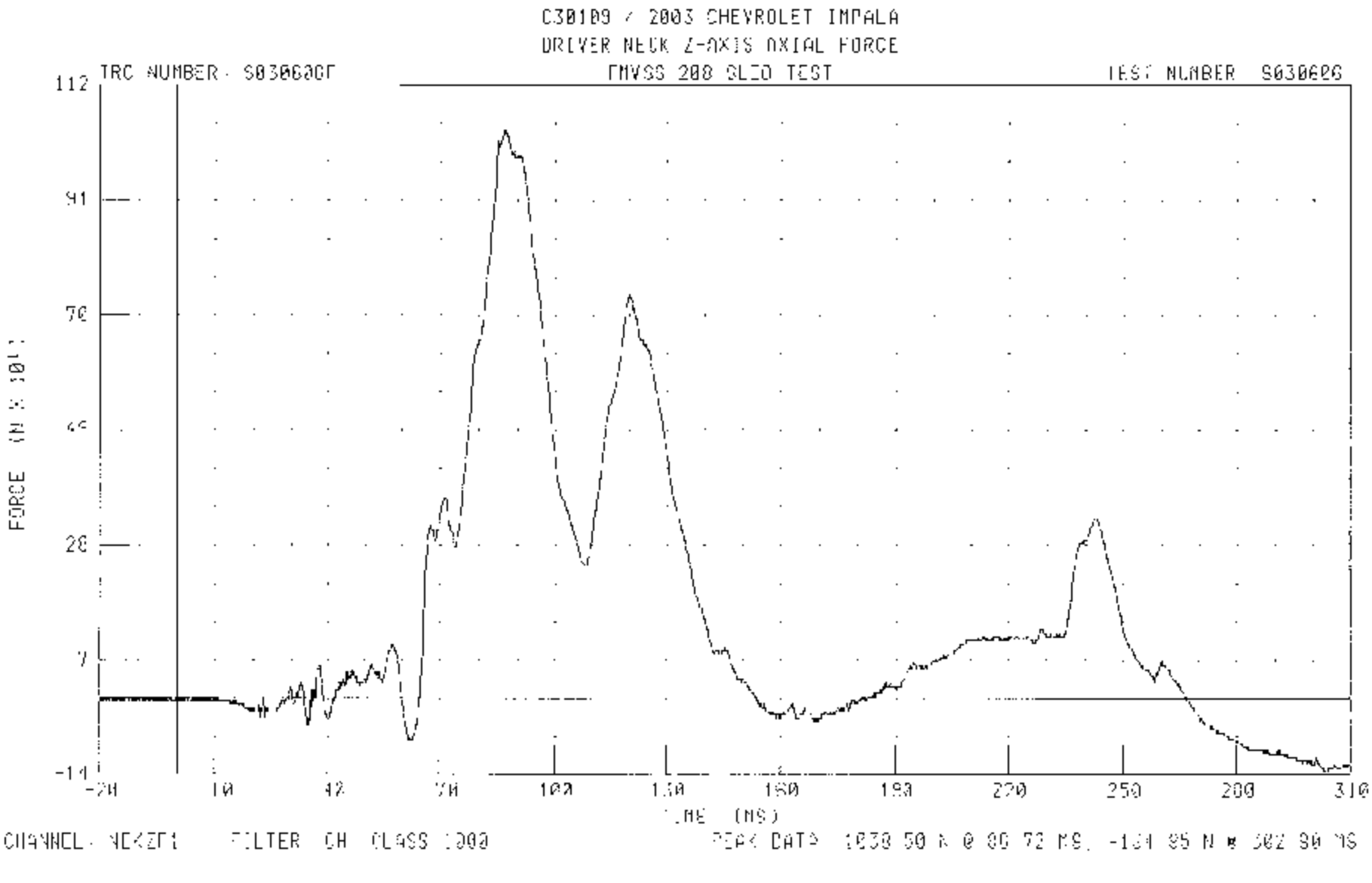
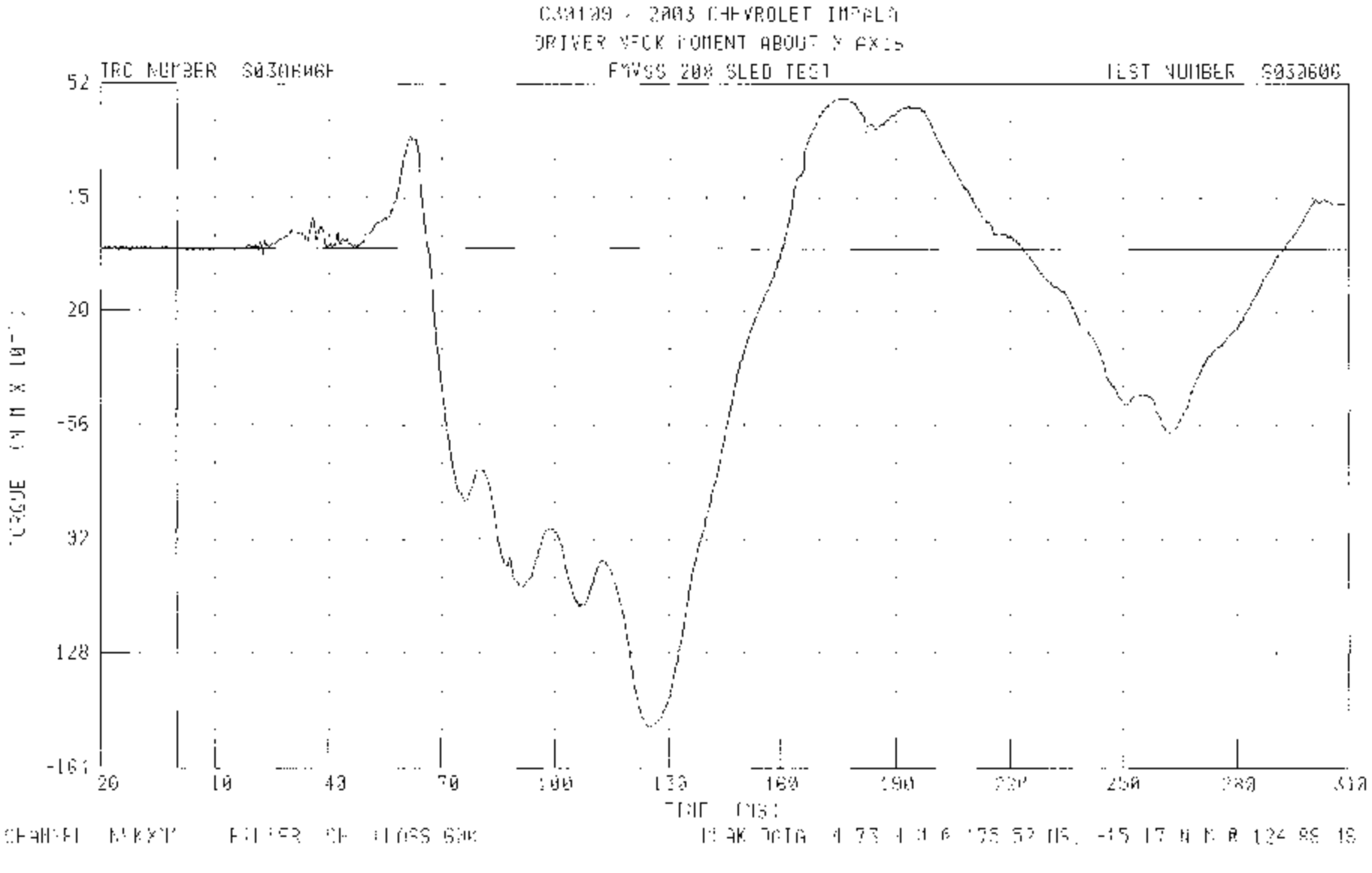
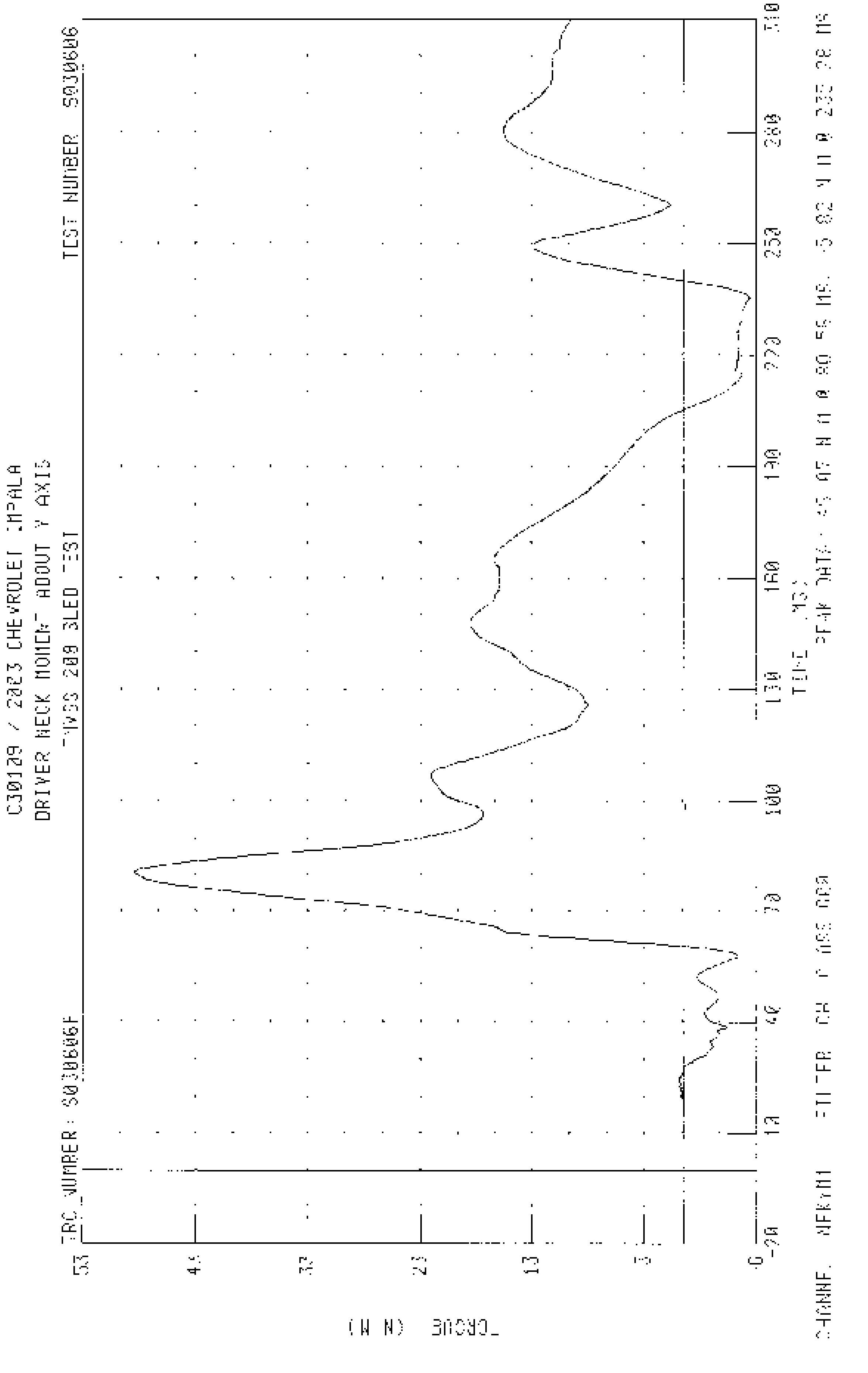
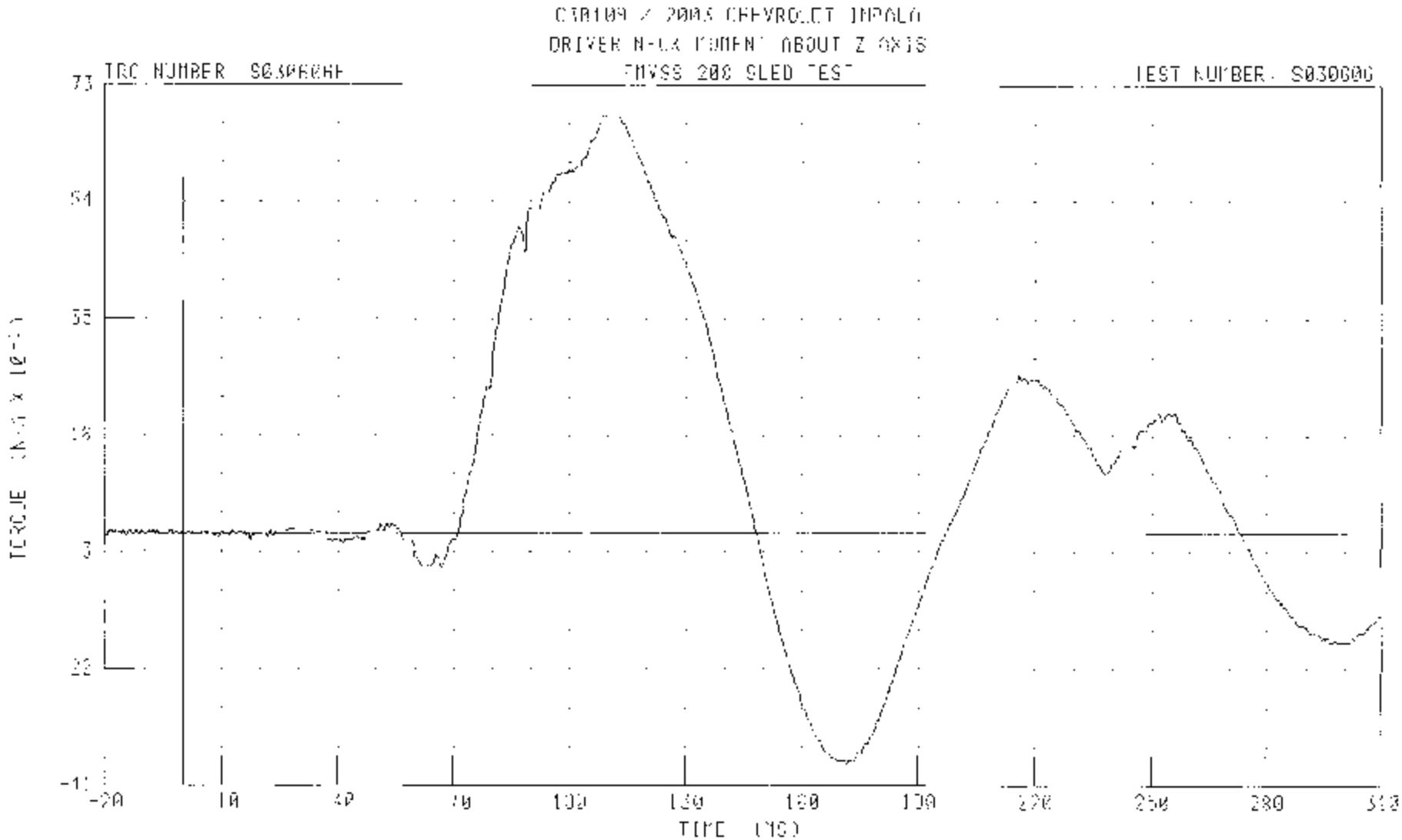
S030606

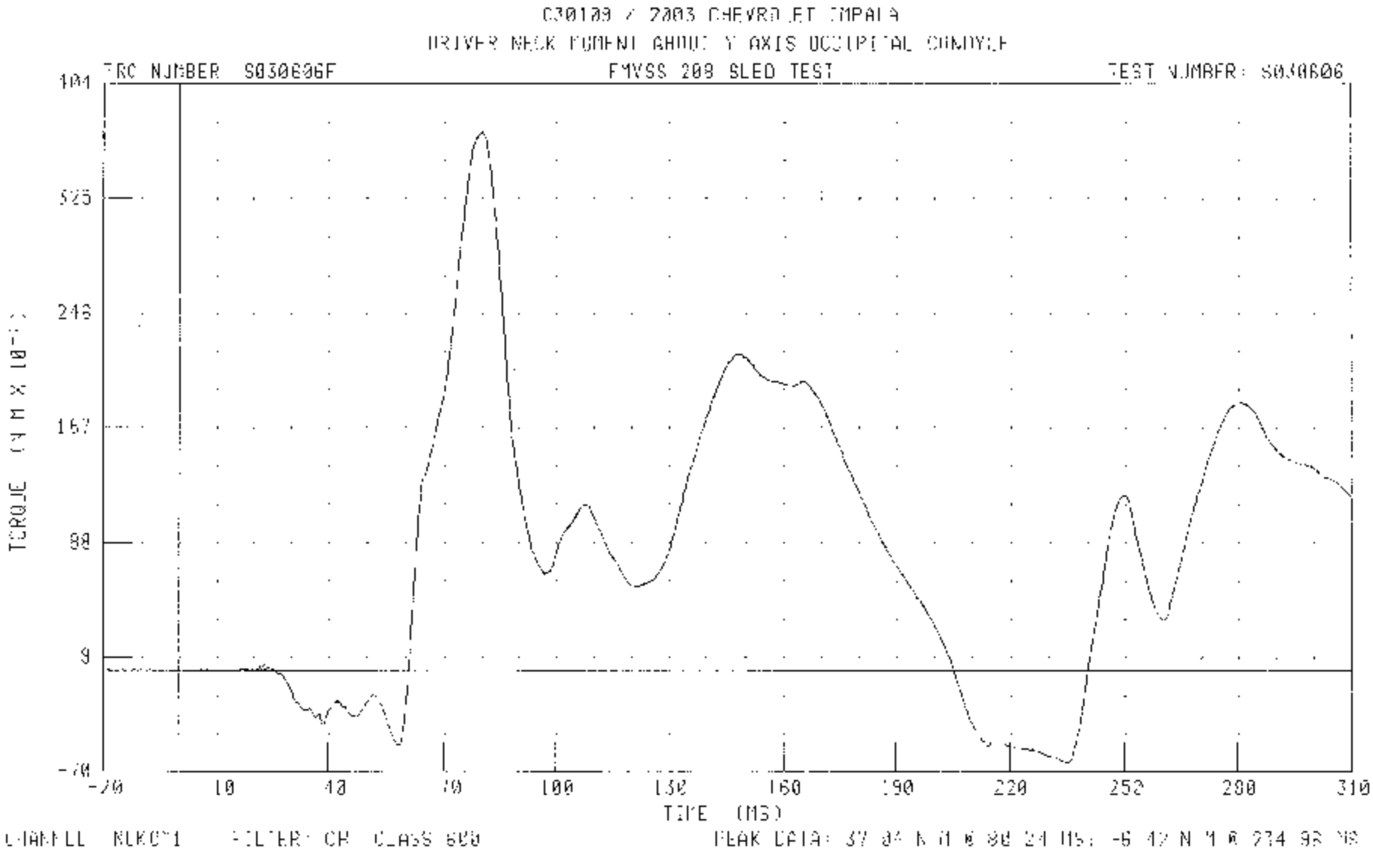

C30109 / 2003 CHEVROLET IMPALA
DRIVER NECK Z-AXIS AXIAL FORCE
FMVSS 208 SLED TEST
TRC NUMBER: S030606C
TEST NUMBER: S030606
112
91
70
28
7
-14
FORCE (N x 10^1)
-20
10
42
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NECKZF1
FILTER CH CLASS 1000
PEAK DATA: 1030.50 N @ 80.72 MS, -134.85 N @ 302.90 MS

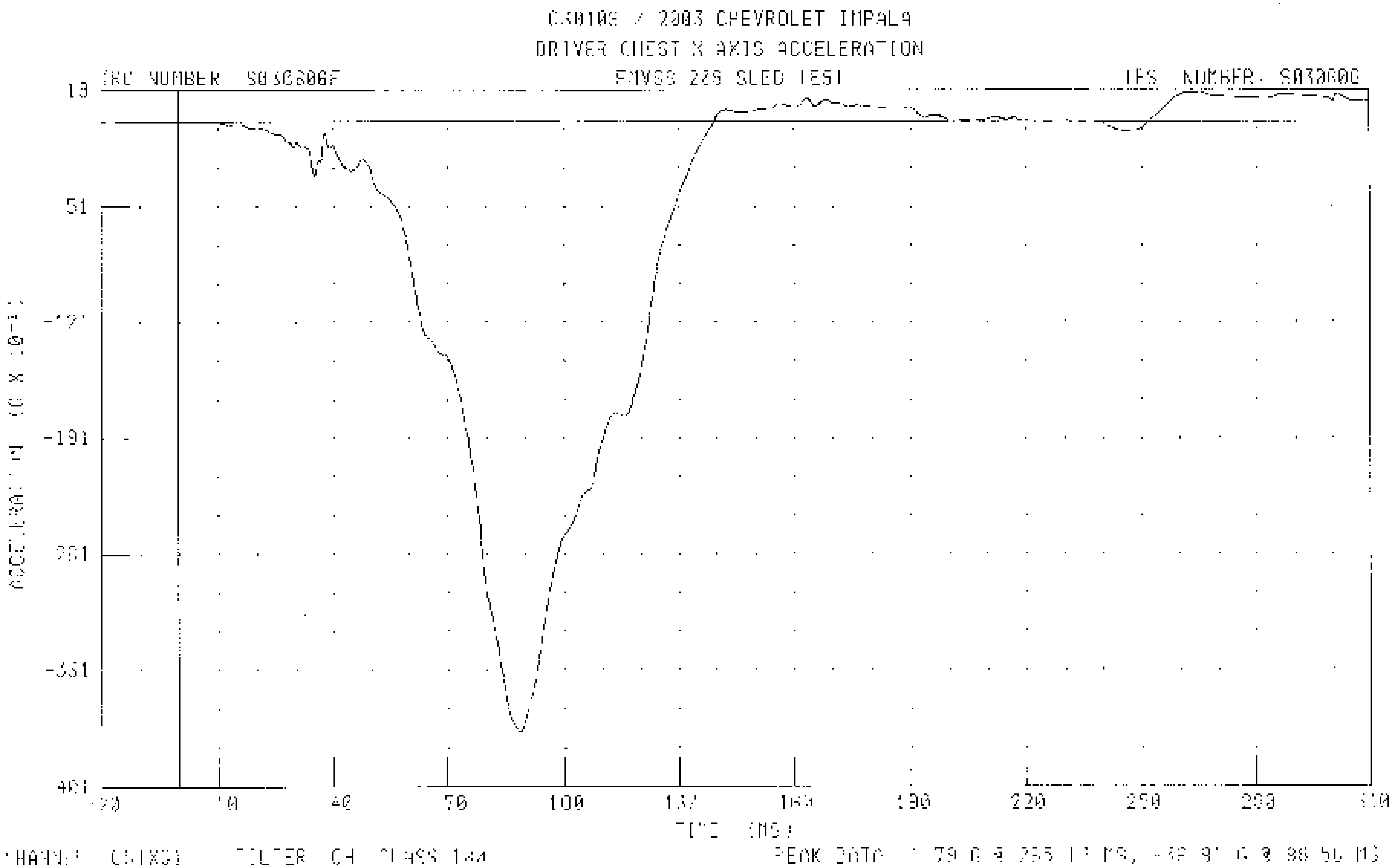

C30109 - 2003 CHEVROLET IMPALA
DRIVER NECK MOMENT ABOUT Y AXIS
TRC NUMBER S030606F
FMVSS 208 SLED TEST
TEST NUMBER S030606
52
15
20
-56
92
128
-164
20
40
70
100
130
160
190
220
250
280
310
TIME (MS)


C30129 / 2003 CHEVROLET IMPALA
DRIVER NECK MOMENT ABOUT Y AXIS
FMVSS 208 SLED TEST
TRC NUMBER: S030606F
TEST NUMBER S030606
TORQUE (N M)
TIME (MS)
CHANNEL NFKYM1
-20
10
40
70
100
130
160
190
220
250
280
310
53
43
33
23
13
3
-6

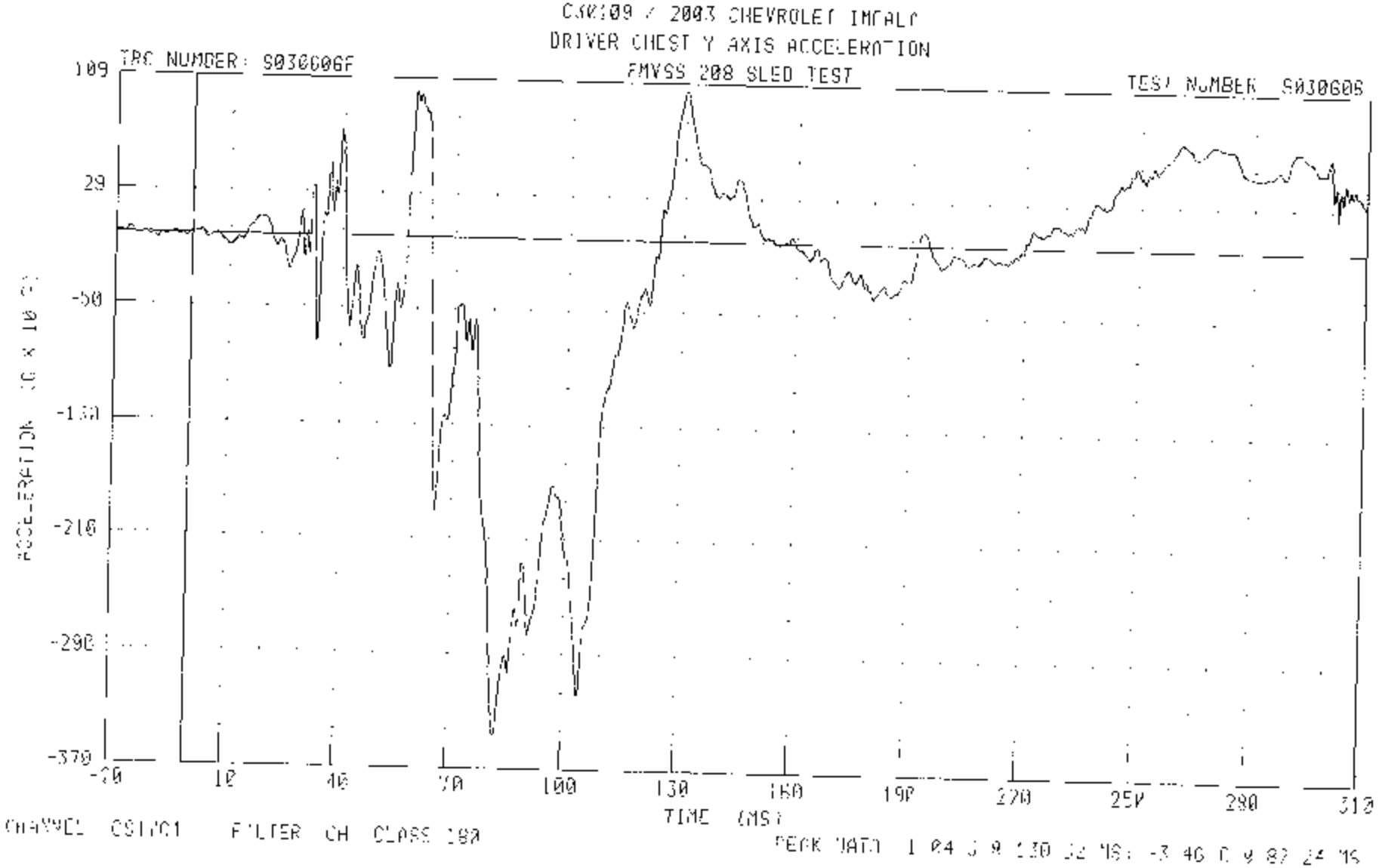

CTR109 / 2005 CHEVROLET IMPALA
DRIVER N-CM MOMENT ABOUT Z AXIS
FMVSS 208 SLED TEST
TRC NUMBER: S030606HF
TEST NUMBER: S030606
TORQUE (N-m x 10**1)
TIME (MS)
-20
10
40
70
100
130
160
190
220
250
280
310

S030606

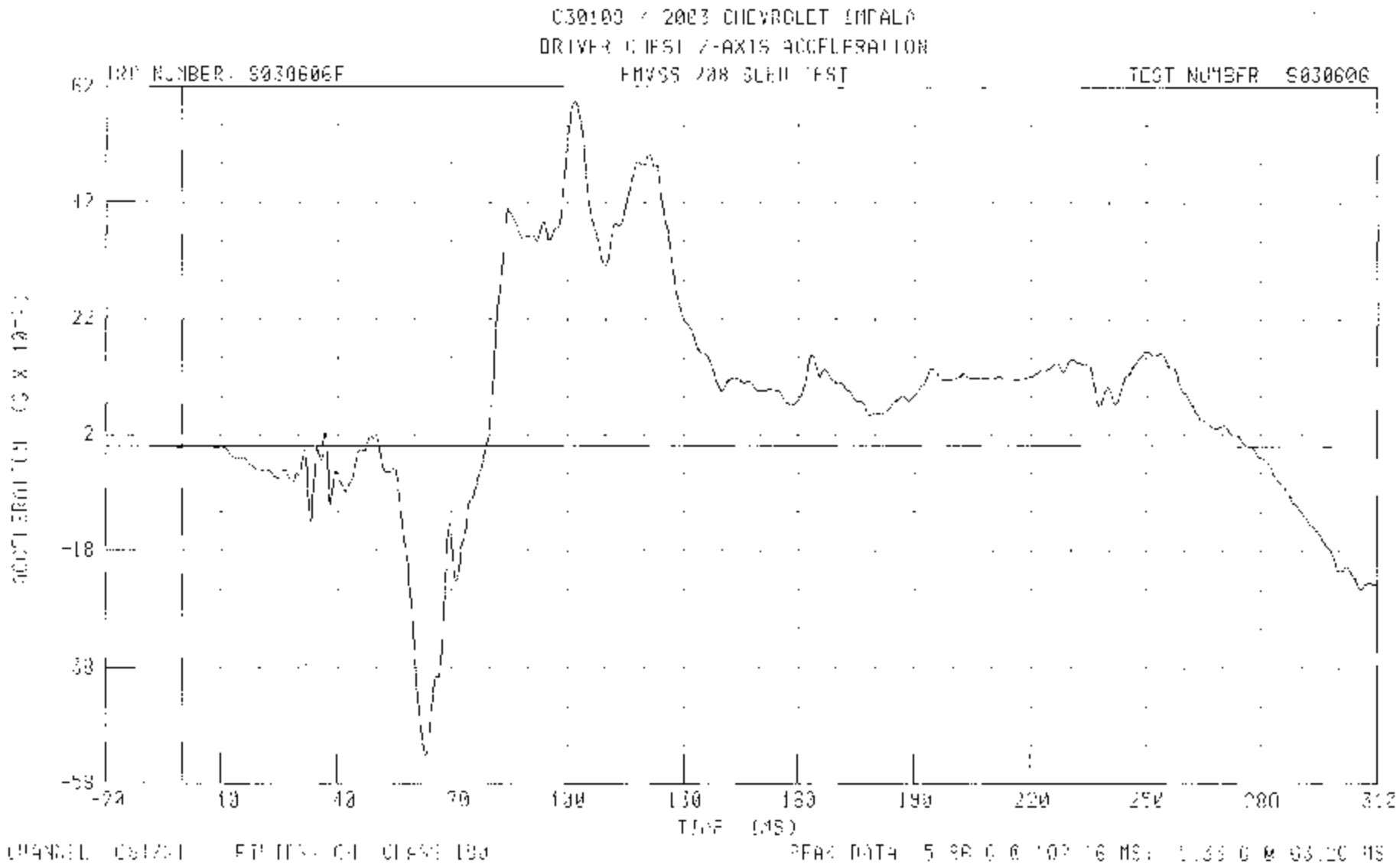

C30109 / 2003 CHEVROLET IMPALA
DRIVER NECK MOMENT ABOUT Y AXIS OCCIPITAL CONDYLE
TRC NUMBER S030606F
FMVSS 208 SLED TEST
TEST NUMBER: S030606
104
525
248
157
98
9
-70
TORQUE (N M X 10-1)
-70
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL NUMBER: FILTER: CFC CLASS 600
PEAK DATA: 37.04 N M @ 80.24 MS; -6.47 N M @ 234.98 MS


2003 CHEVROLET IMPALA
DRIVER CHEST X AXIS ACCELERATION
FMVSS 208 SLED TEST
TIME (MS)
PEAK DATA

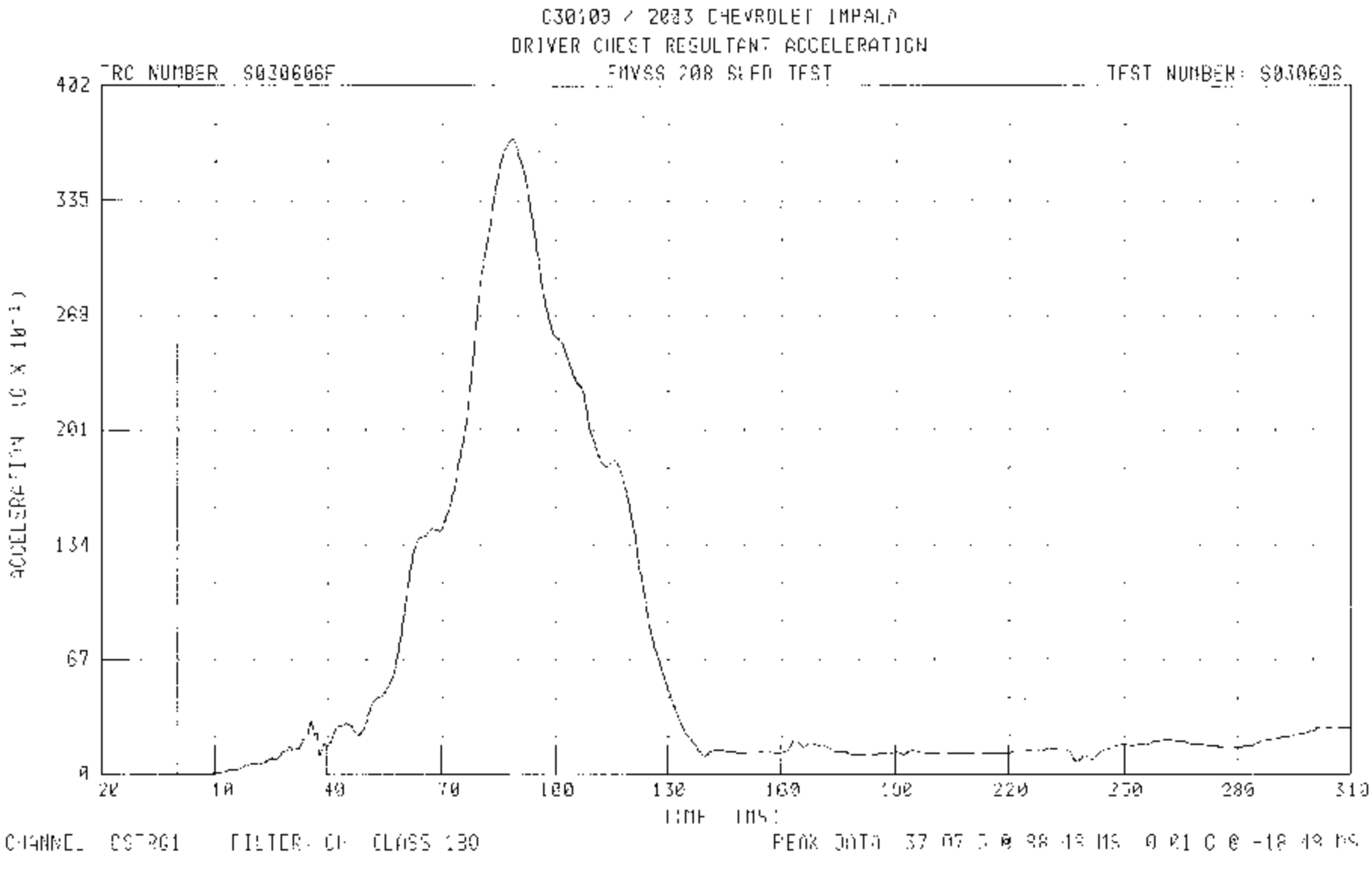
S030606


C5R109 / 2003 CHEVROLET IMPALA
DRIVER CHEST Y AXIS ACCELERATION
FMVSS 208 SLED TEST
TRC NUMBER: S030606F
TEST NUMBER S030606
109
29
-50
-130
-210
-290
-370
ACCELERATION (G X 10 G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL C5IYC1 FILTER CH CLASS 180
PEAK DATA 1 04 3 9 130 32 MS: -3 46 0 9 87 24 MS

S030606


C30100 / 2003 CHEVROLET IMPALA
DRIVER CHEST Z-AXIS ACCELERATION
FMVSS 208 SLED TEST
TEST NUMBER S030606
TIME (MS)

S030606


C30103 / 2003 CHEVROLET IMPALA
DRIVER CHEST RESULTANT ACCELERATION
TRC NUMBER S030606F
FMVSS 208 SLED TEST
TEST NUMBER: S030606
402
335
268
201
134
67
0
ACCELERATION (G X 10**-1)
20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG1
FILTER: CFC CLASS 180
PEAK DATA: 37.07 G @ 98.19 MS 0.01 G @ -18.49 MS

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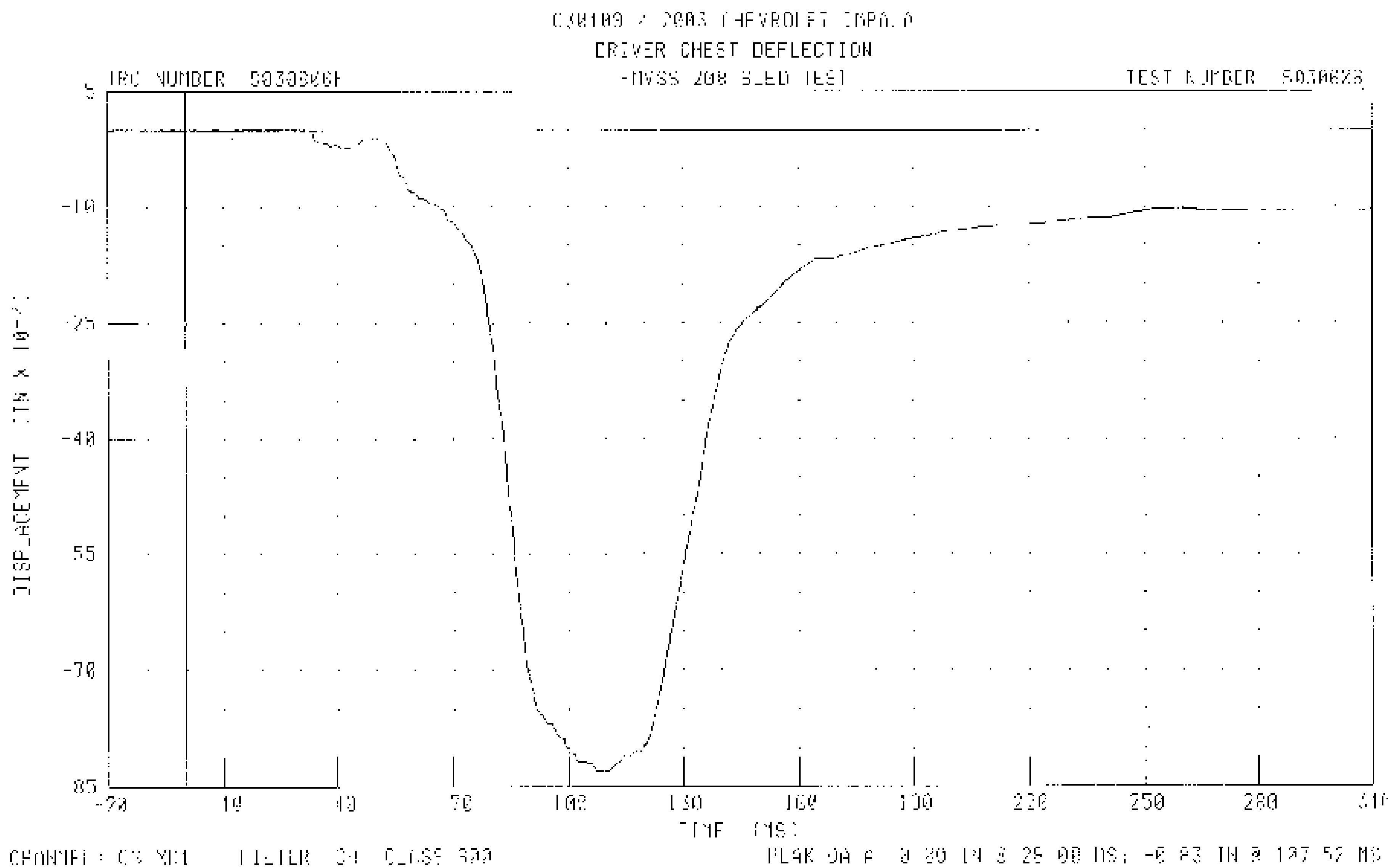
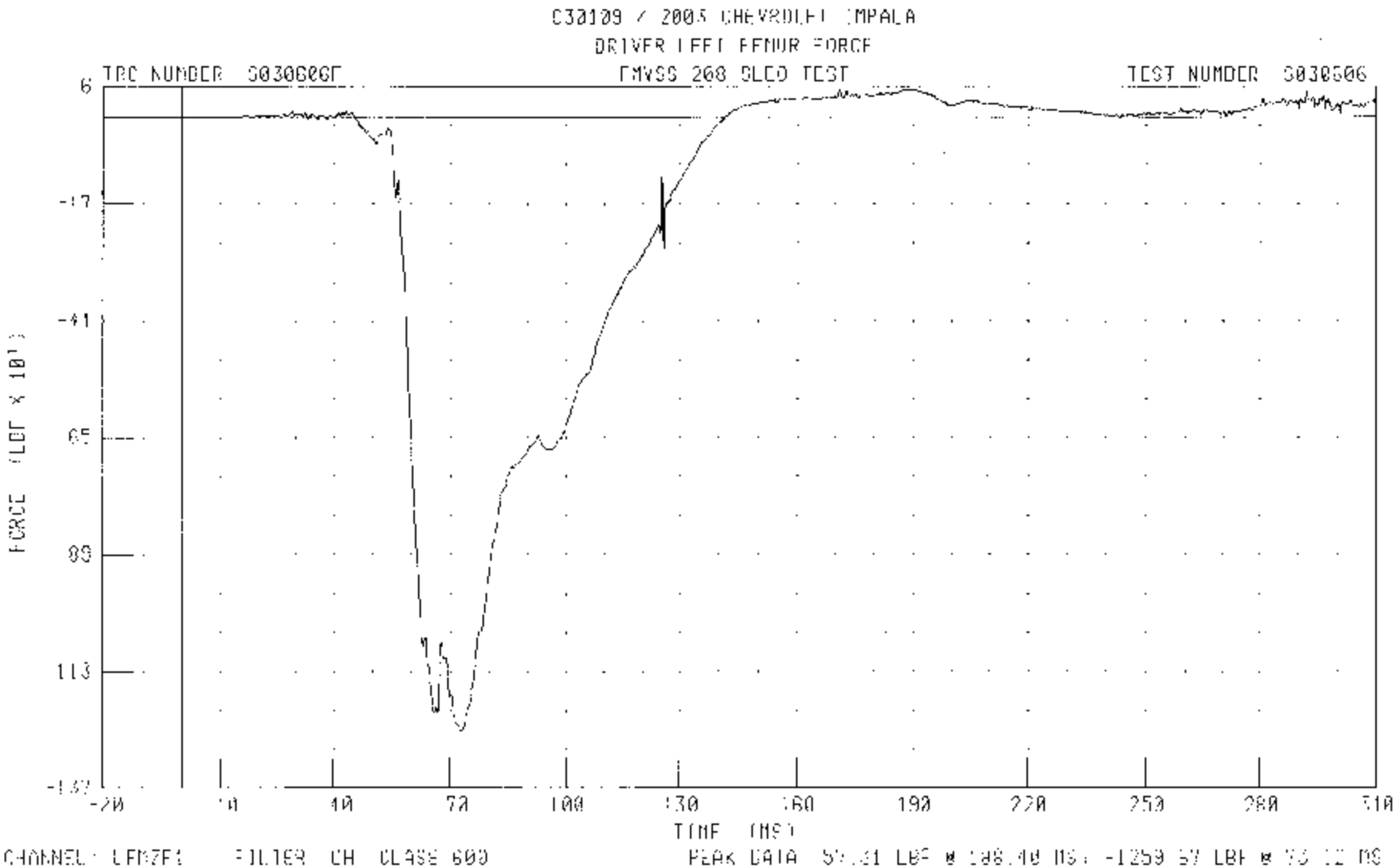
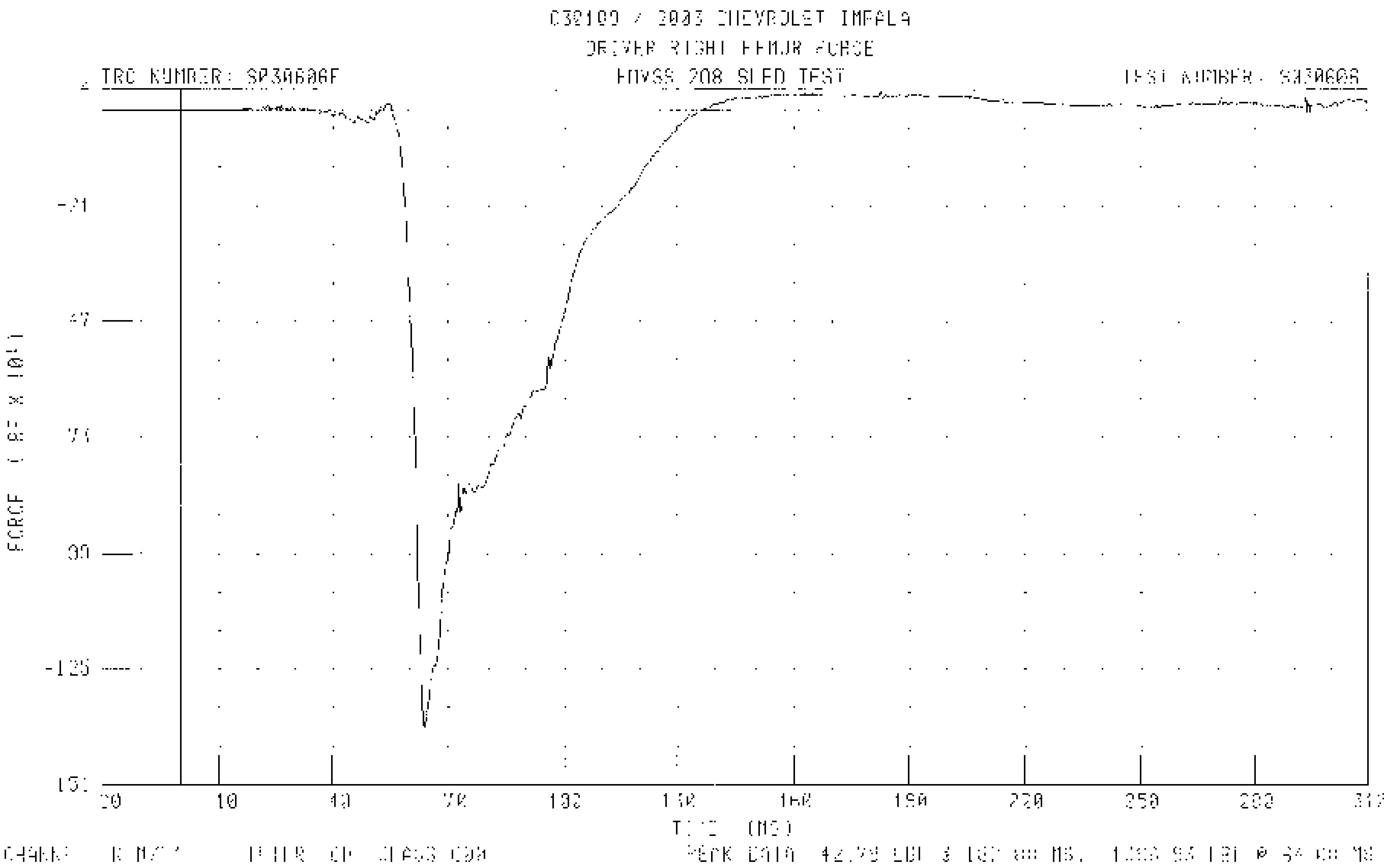
S030606

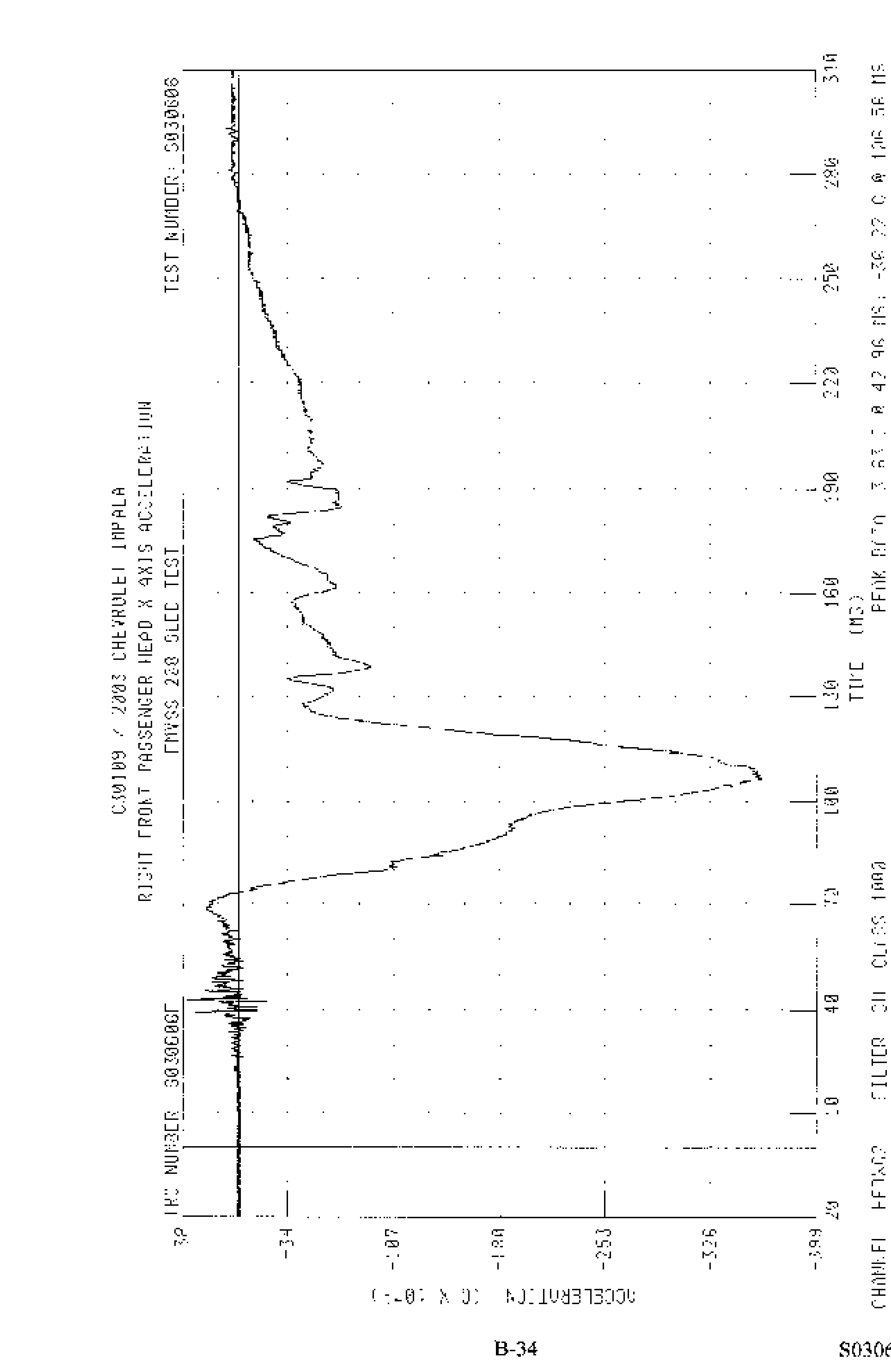

DRIVER CHEST DEFLECTION
TIME (MS)
DISPLACEMENT (IN x 10^-2)
-20
10
40
70
100
130
160
190
220
250
280
310
5
-10
-25
-40
-55
-70
-85

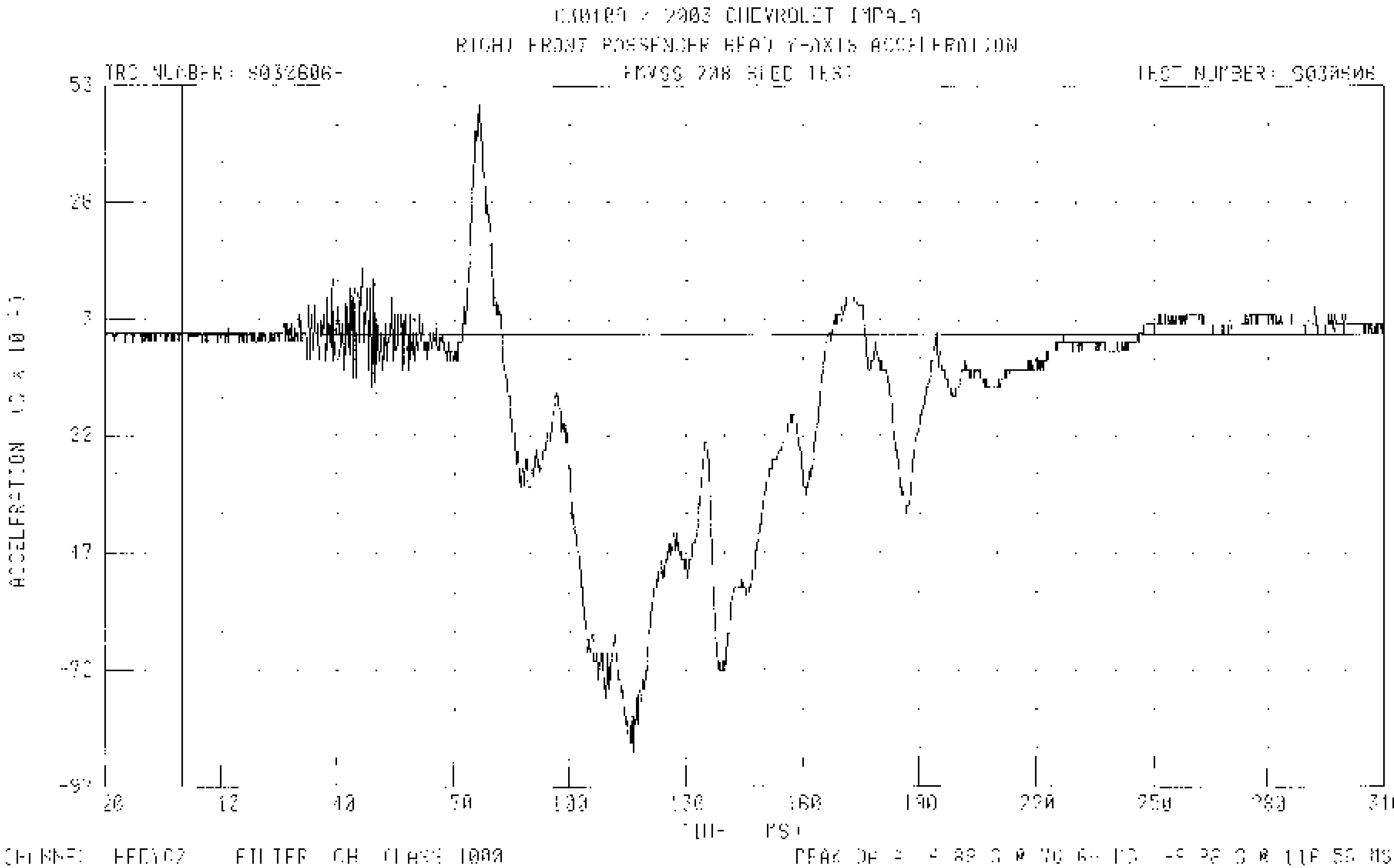
S030606


C30109 / 2005 CHEVROLET IMPALA
DRIVER LEFT FEMUR FORCE
FMVSS 208 SLED TEST
TRC NUMBER S030606C
TEST NUMBER S030606
6
-17
-41
65
89
113
-137
FORCE (LBF X 10^1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMZF1
FILTER CH CLASS 600
PEAK DATA 57.31 LBF @ 108.40 MS; -1259.57 LBF @ 76.12 MS

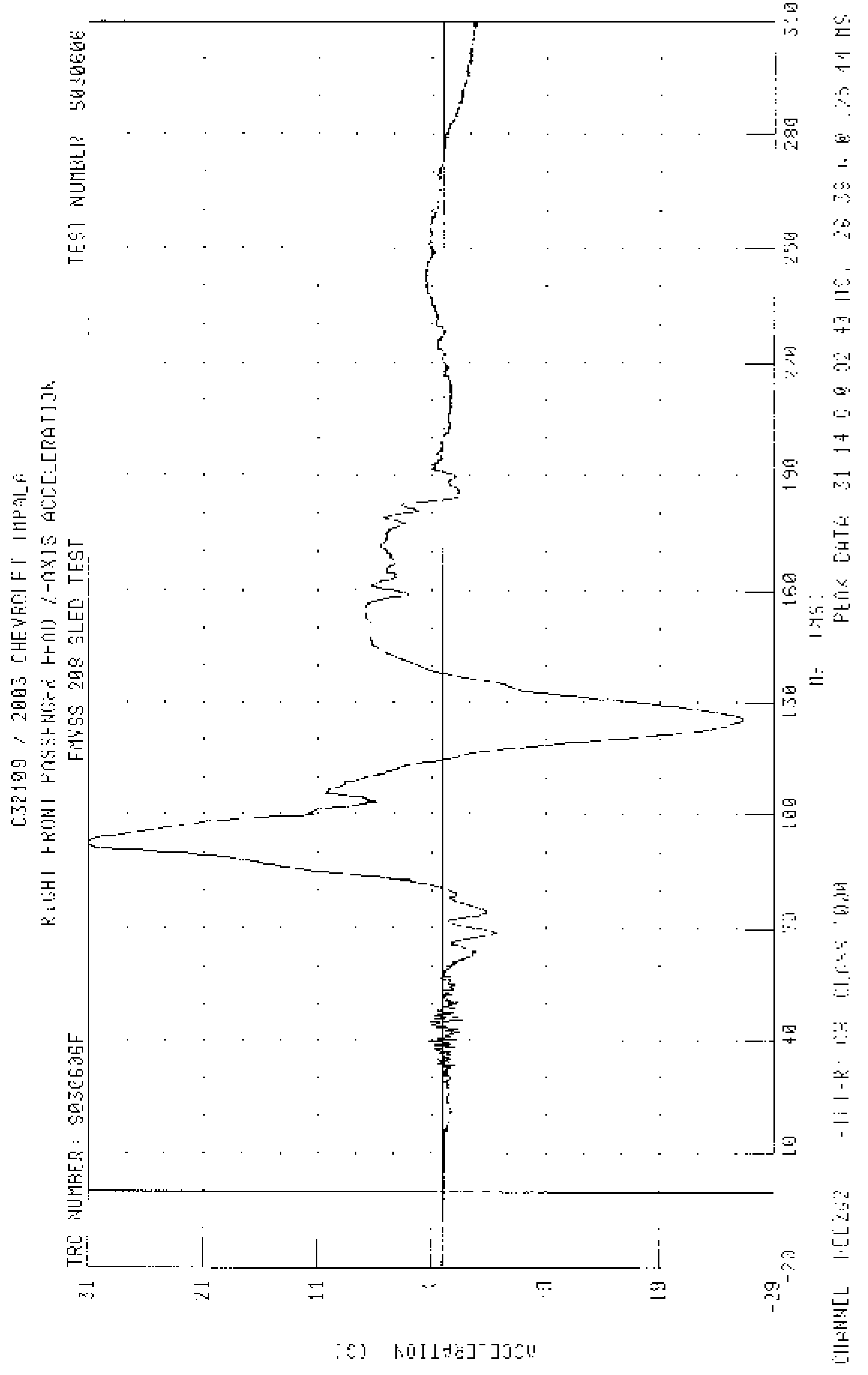
S030606

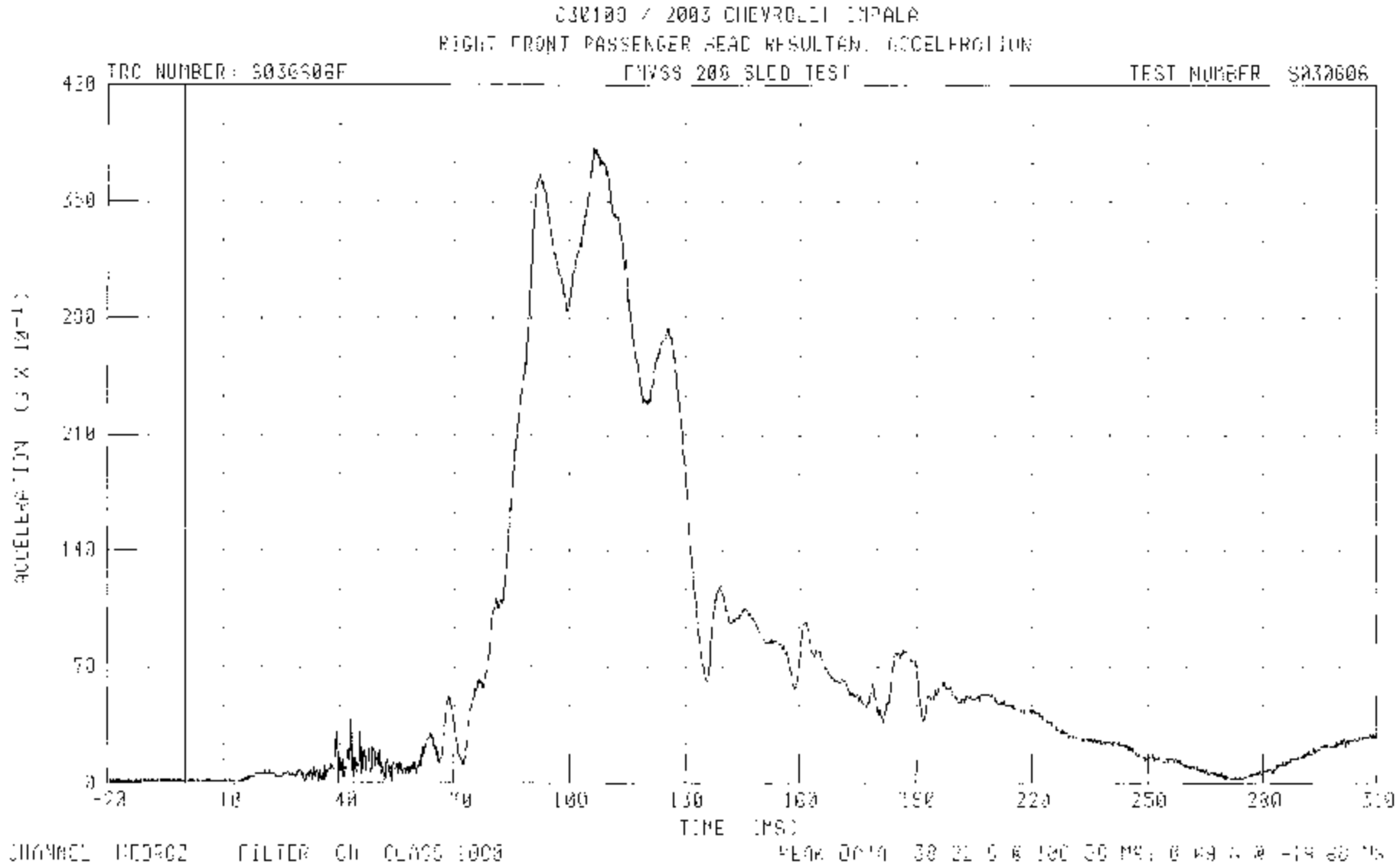

C32100 / 2003 CHEVROLET IMPALA
DRIVER RIGHT FEMUR FORCE
FMVSS 208 SLED TEST
TIME (MS)

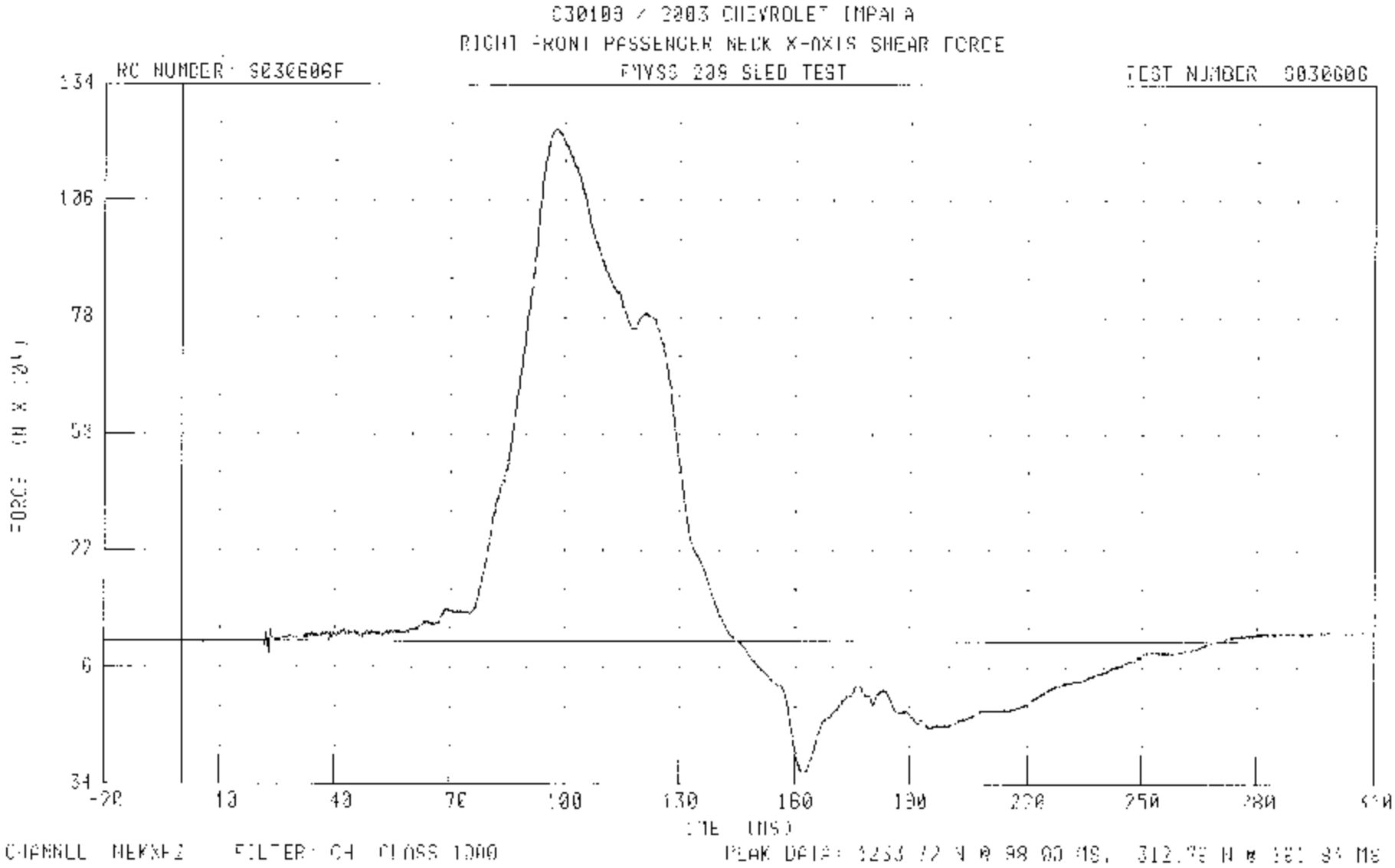

C30109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER HEAD X AXIS ACCELERATION
FMVSS 208 SLED TEST
TEST NUMBER: S030606
ACCELERATION (G X 10**-1)
30
-34
-107
-180
-253
-326
-399
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
FILTER CLASS 1000
CHANNEL


2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
FMVSS 208 SLED TEST
ACCELERATION
TIME

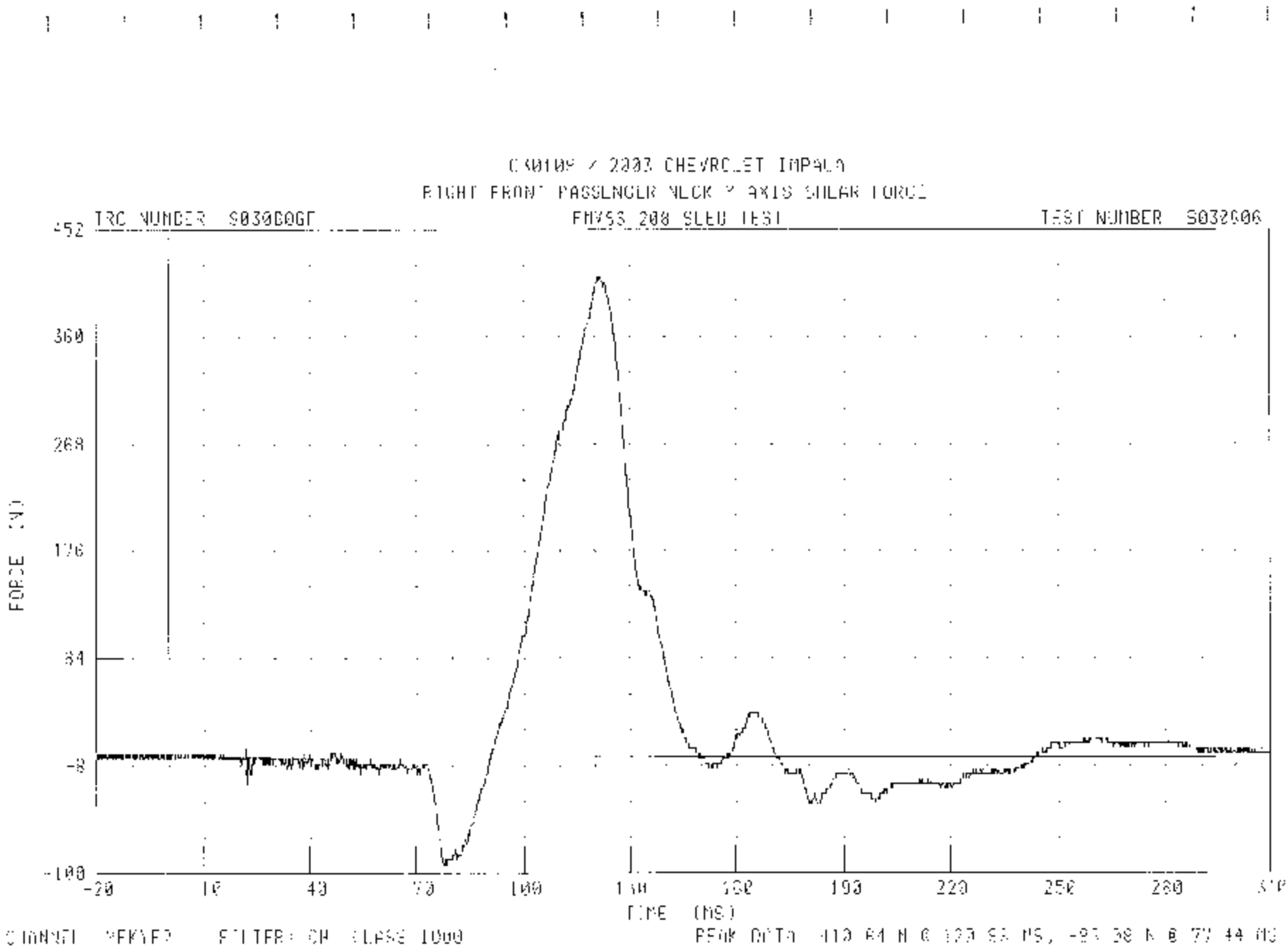
S030606


C32100 / 2003 CHEVROLET IMPALA
FMVSS 208 SLED TEST
TEST NUMBER: S030606
TRC NUMBER: S030606F
ACCELERATION (G)

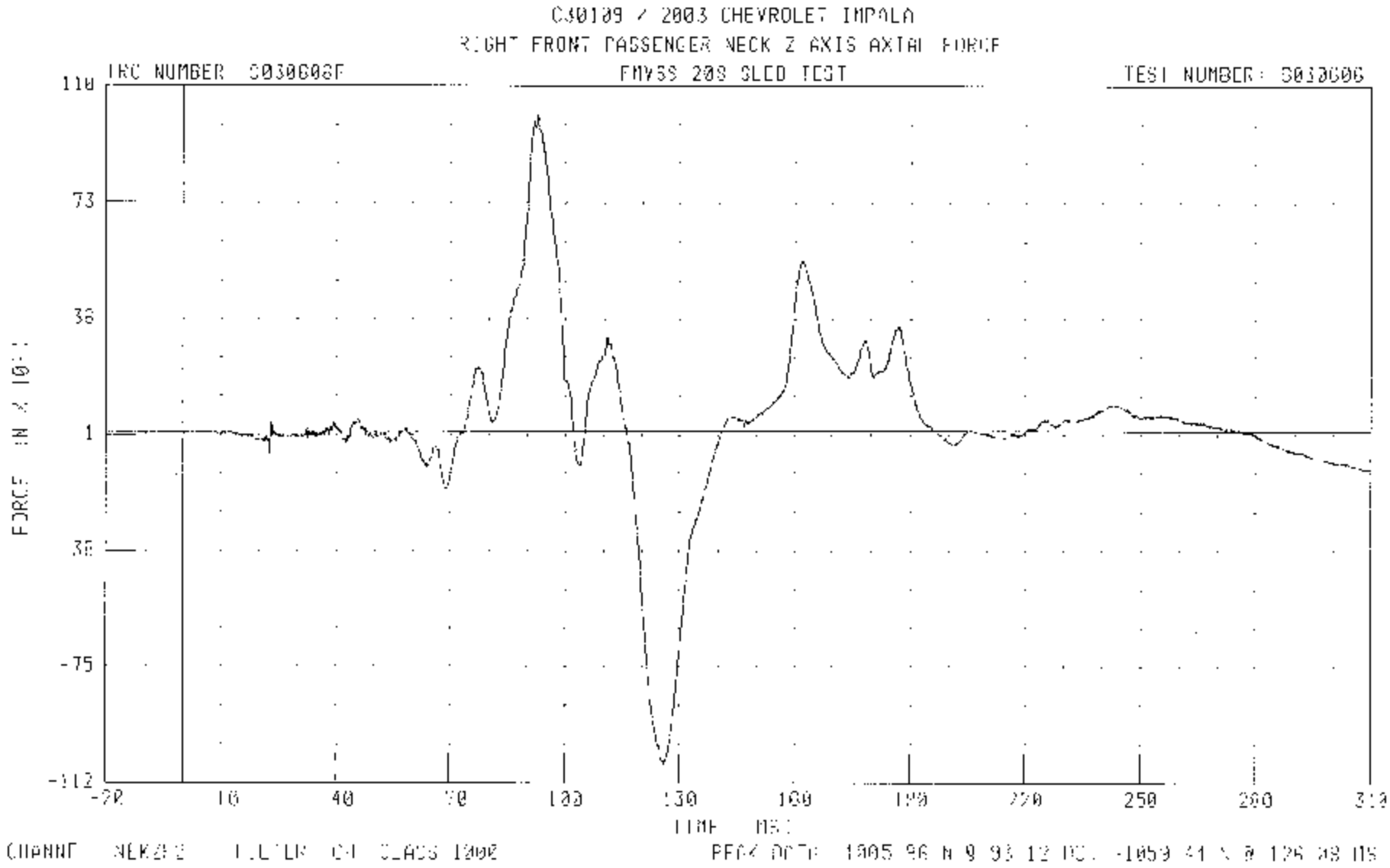

030100 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER HEAD RESULTAN. ACCELERATION
TRC NUMBER: S030606F
FMVSS 208 SLED TEST
TEST NUMBER S030606
420
350
280
210
140
70
0
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL NUMBER2
FILTER CH CLASS 1000
PEAK DATA 30.21 G @ 100.00 MS; 0 MS @ -19.60 MS


C30103 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST
RC NUMBER: S030606F
TEST NUMBER: S030606
134
106
78
50
22
-6
-34
FORCE (N x 10^1)
-20
10
40
70
100
130
160
190
220
250
280
TIME (MS)
CHANNEL NUMBER: FILTER: CH CLASS 1000
PEAK DATA: 1253.72 N @ 98.00 MS, 312.78 N @ 181.84 MS

S030606

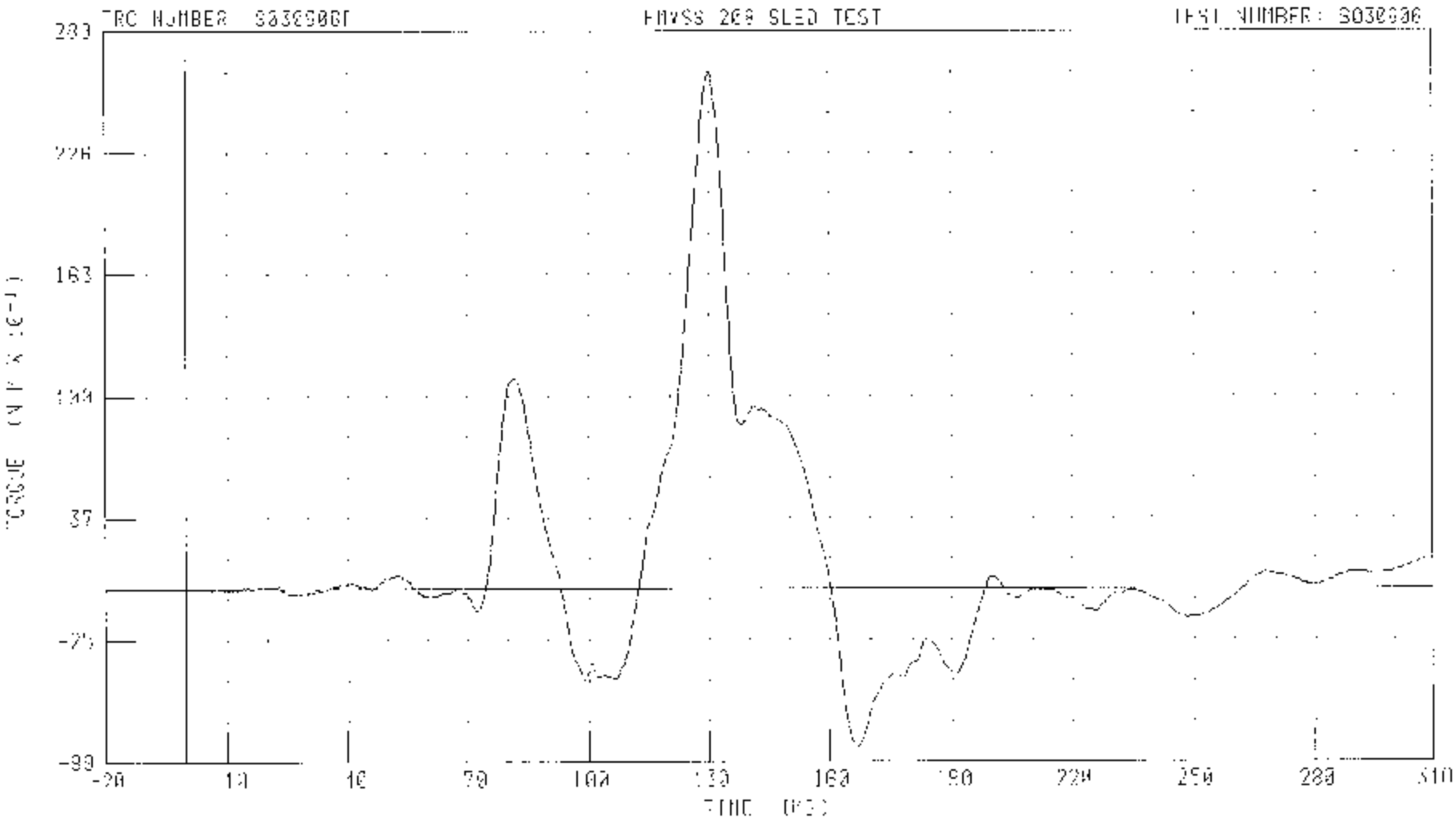

C00109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER MLOK Y AXIS SHEAR FORCE
TRC NUMBER S030606T
FMVSS 208 SLED TEST
TEST NUMBER S032606
452
360
268
176
84
-8
-100
FORCE (N)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL MEANS FILTER: CH CLASS 1000
PEAK DATA 410.84 N @ 103.56 MS, -97.38 N @ 77.44 MS

S030606


C30109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER NECK Z AXIS AXIAL FORCE
FMVSS 208 SLED TEST
TEST NUMBER: S030606
110
73
36
1
-75
-112
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)

S030606

C30100 / 2006 CHEVROLET IMPA A
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS
FMVSS 208 SLED TEST

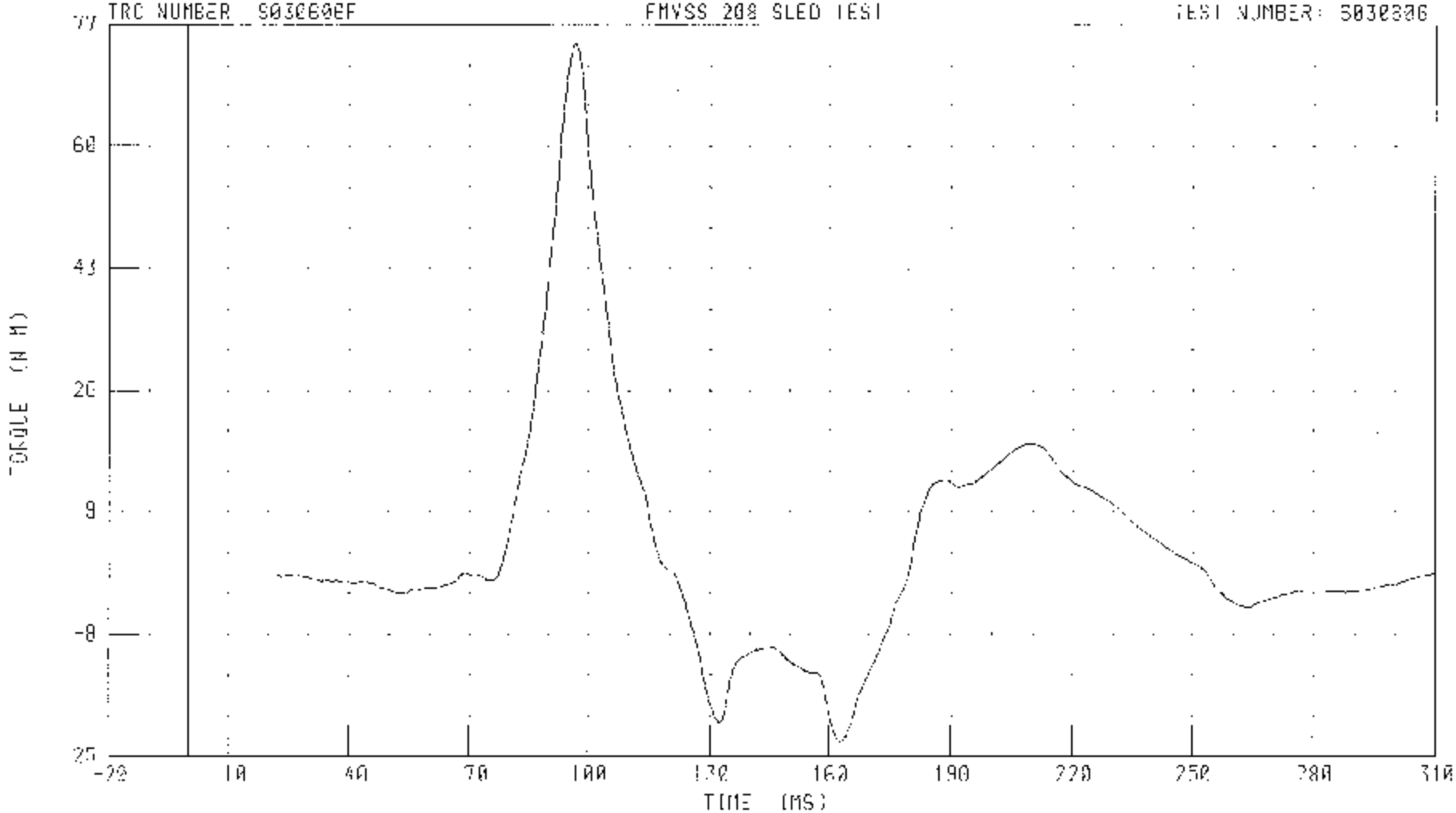


CHANNEL NE/XM2 FILTER CFC CLASS 600 PEAK DATA 28.72 N-M @ 120.16 MS, 0.0 N-M @ 136.49 MS

B-41

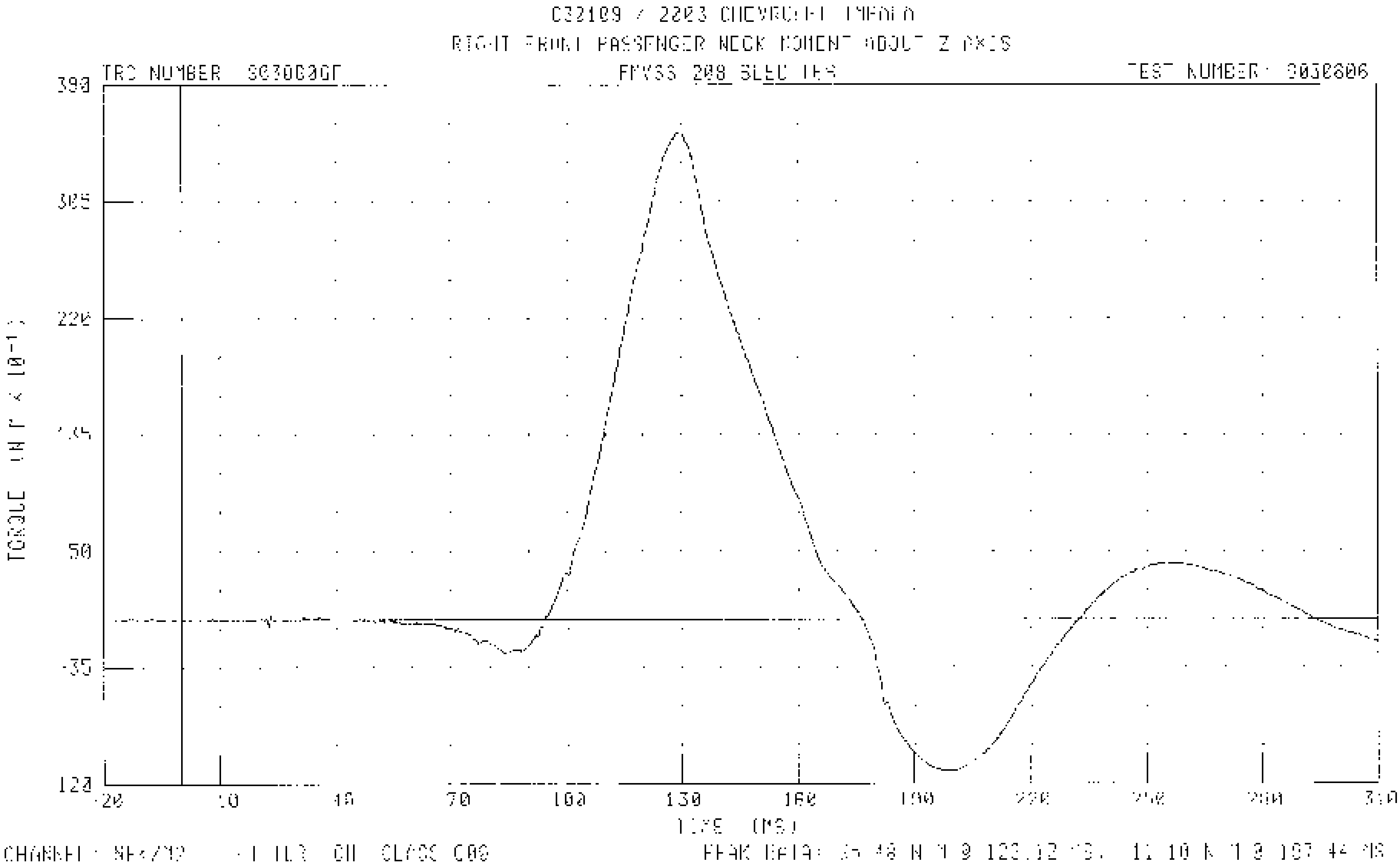
S030606

C30109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS
TRC NUMBER S03C60EF FMVSS 208 SLED TEST TEST NUMBER: S030306

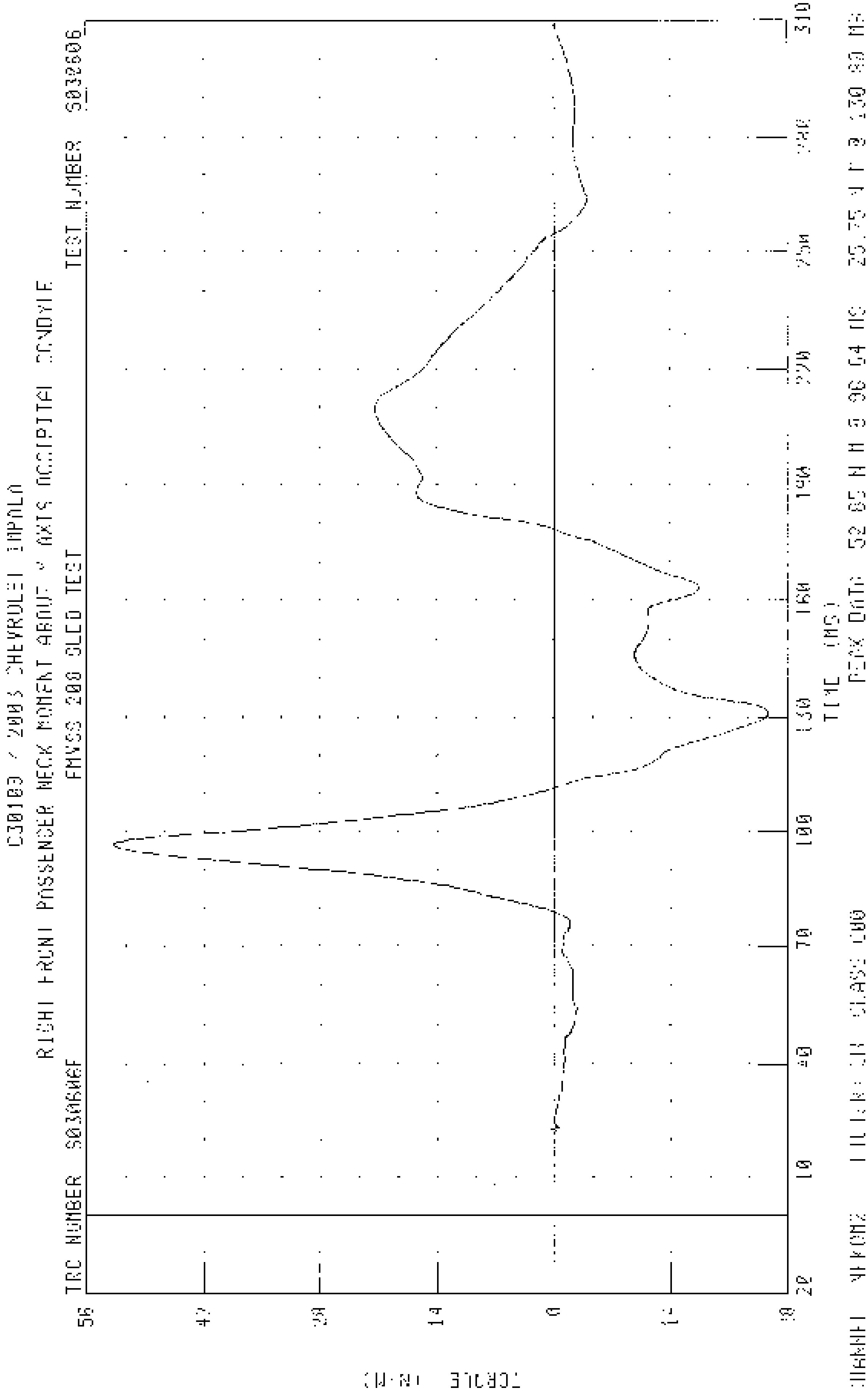


CHANNEL NEKYM2 FILTER: CH CLASS 600 PEAK DATA: 71.41 N M @ 99.00 MS, -22.96 N M @ 163.01 MS

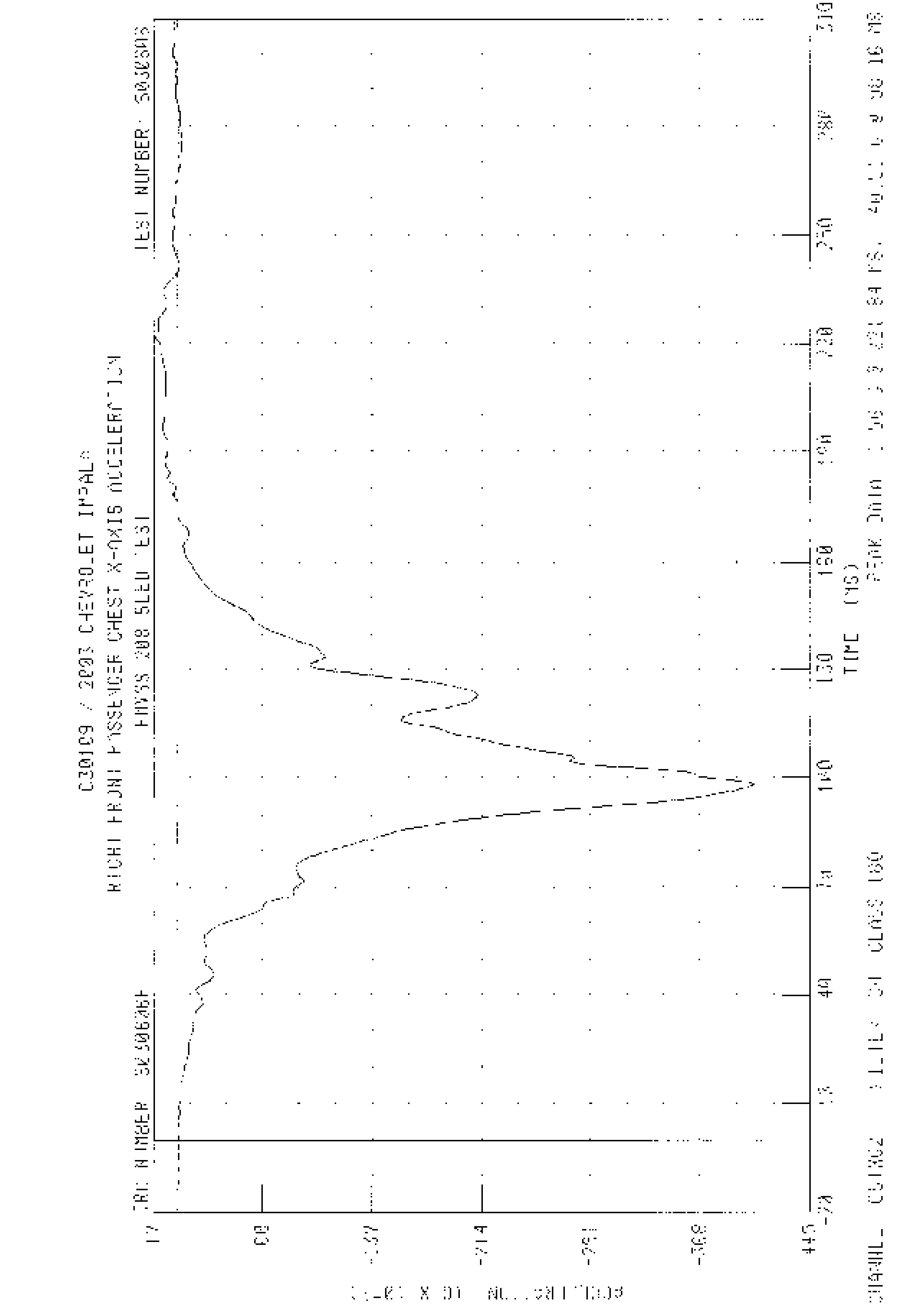
S030606


RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS
FMVSS 208 SLED TES
TEST NUMBER: S030606
390
305
220
50
-35
120
-20
10
40
70
100
130
160
190
130
TIME (MS)
CHANNEL
CLASS C00

S030606


C30103 / 2003 CHEVROLET IMPALA
FMVSS 208 SLED TEST
TEST NUMBER S030606
TIME (MS)
PEAK DATA

S030606



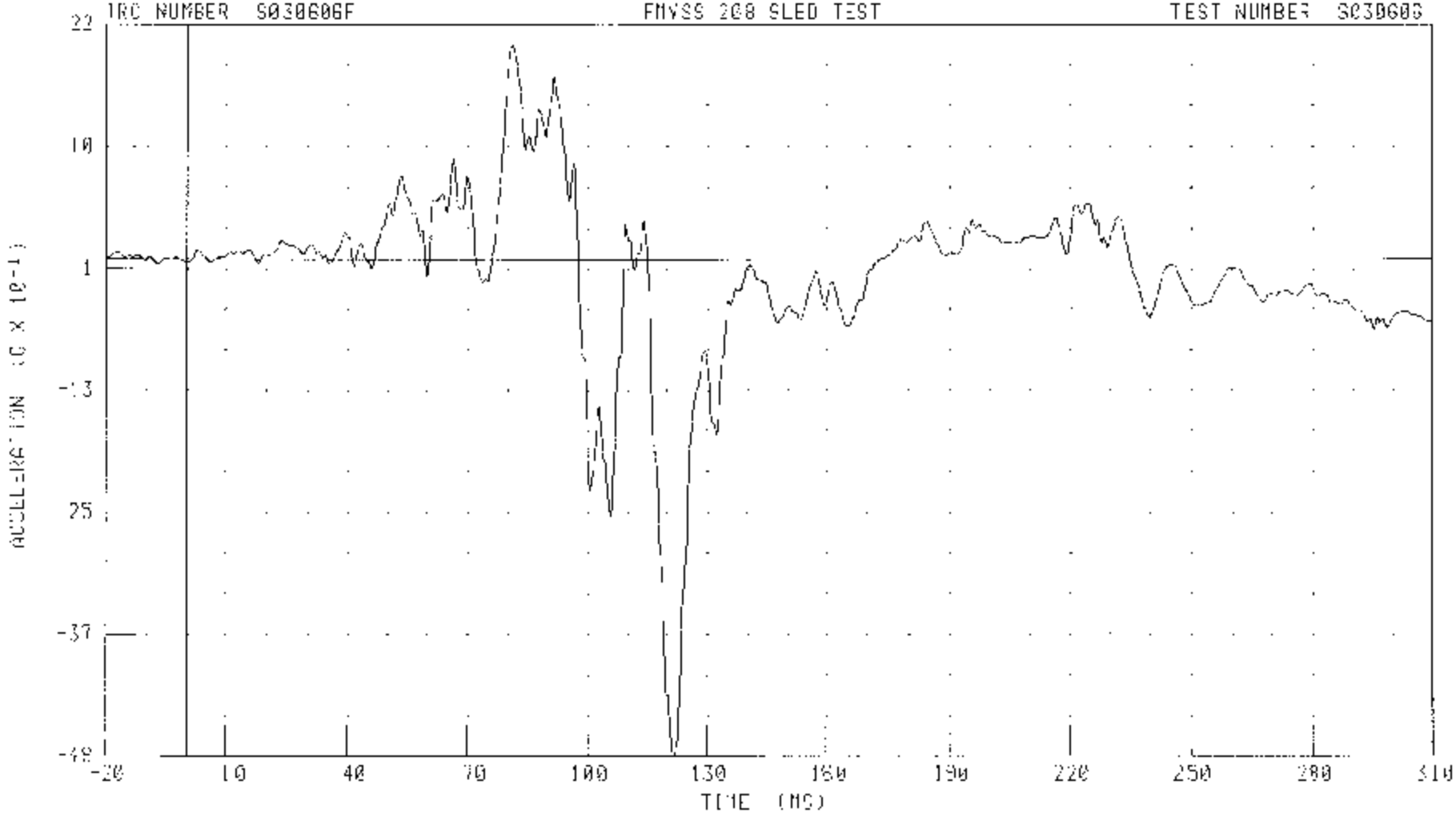
C30109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
FMVSS 208 SLED TEST
TEST NUMBER: S030606
17
60
-137
-214
-291
-368
-445
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)

S030606

C30109 / 2003 CHEVROLET IMPALA

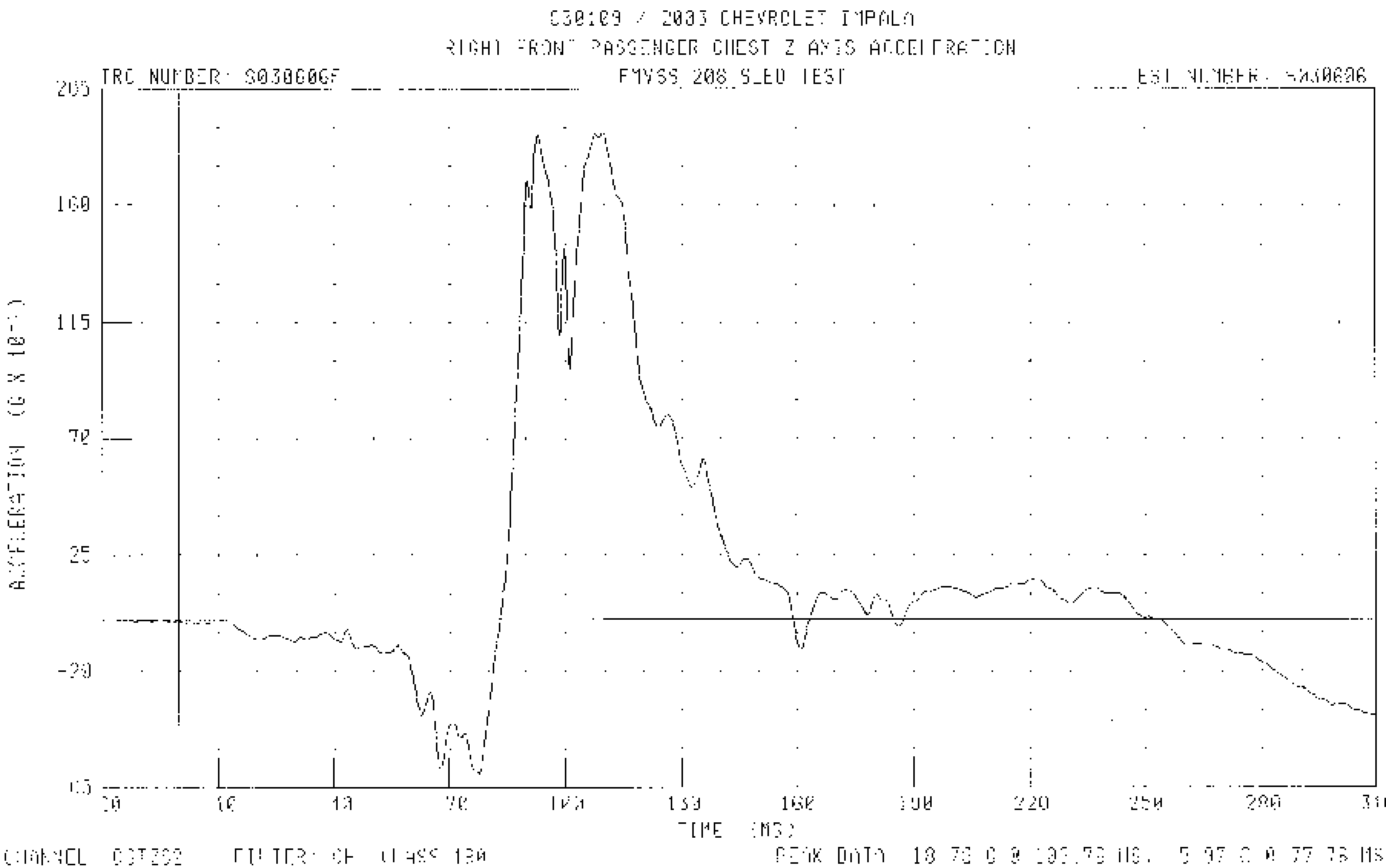
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCEL-ROTATION

TRC NUMBER S030606F — FMVSS 208 SLED TEST — TEST NUMBER S030606



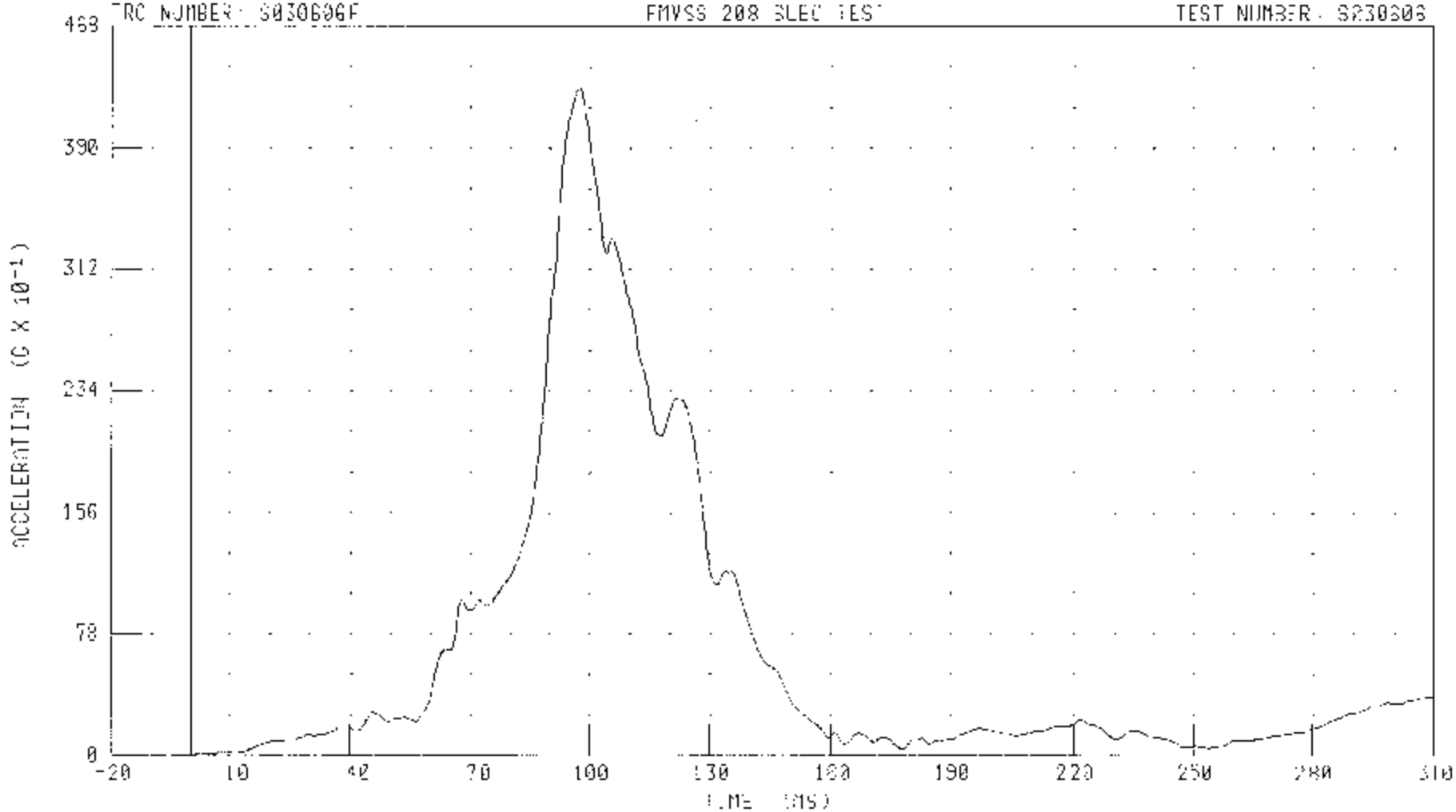
CHANNEL CST-02 FILTER CFC CLASS 180 — PEAK DATA 2.13 G @ 81.60 MS, -4.95 G @ 121.69 MS

S030606


S30109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER CHEST Z AXIS ACCELERATION
FMVSS 208 SLED TEST
TRC NUMBER: S030606F
205
160
115
70
25
-20
TIME (MS)

S030606

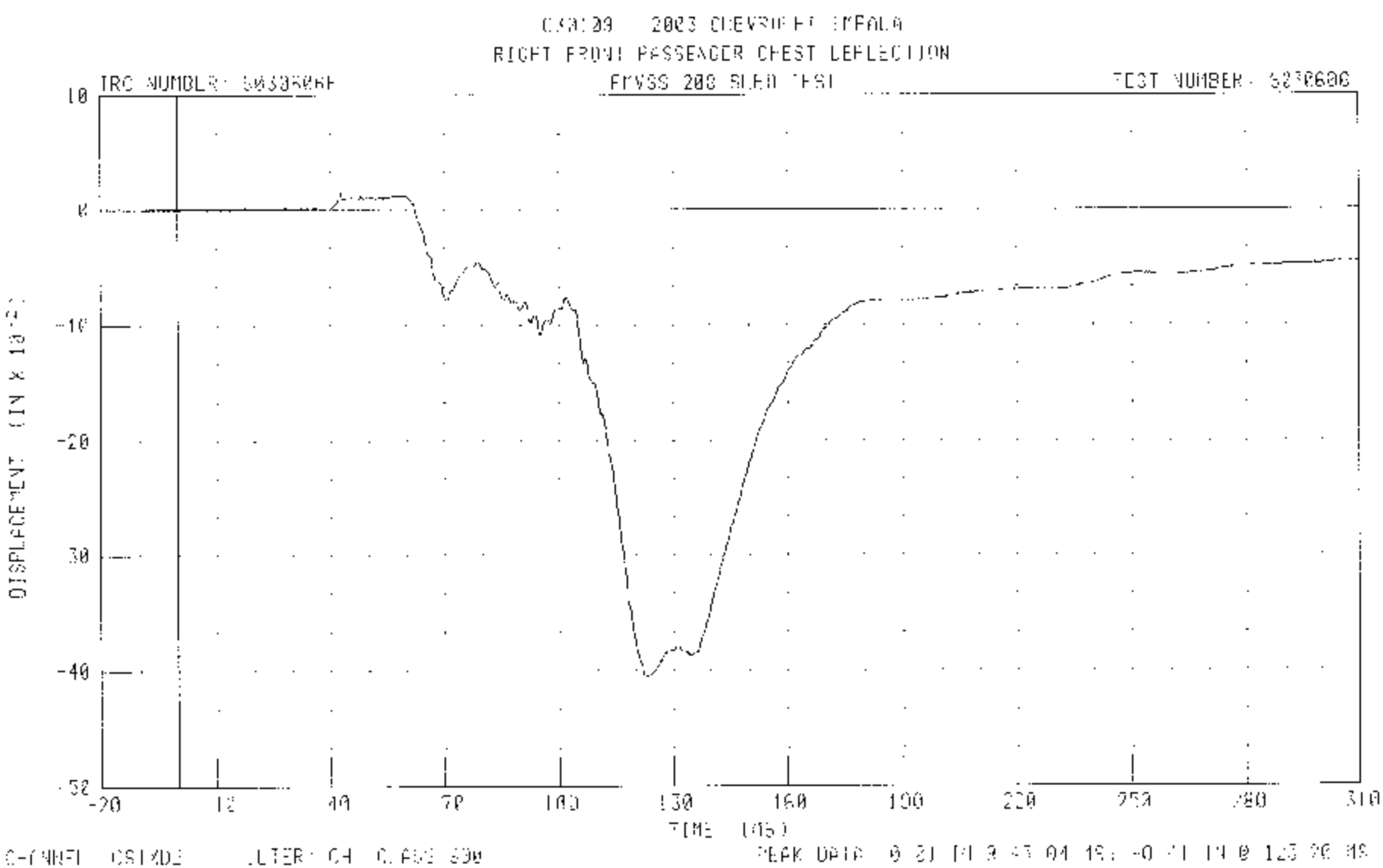
C30109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
TRC NUMBER: S030606F FMVSS 208 SLED TEST TEST NUMBER: S230306



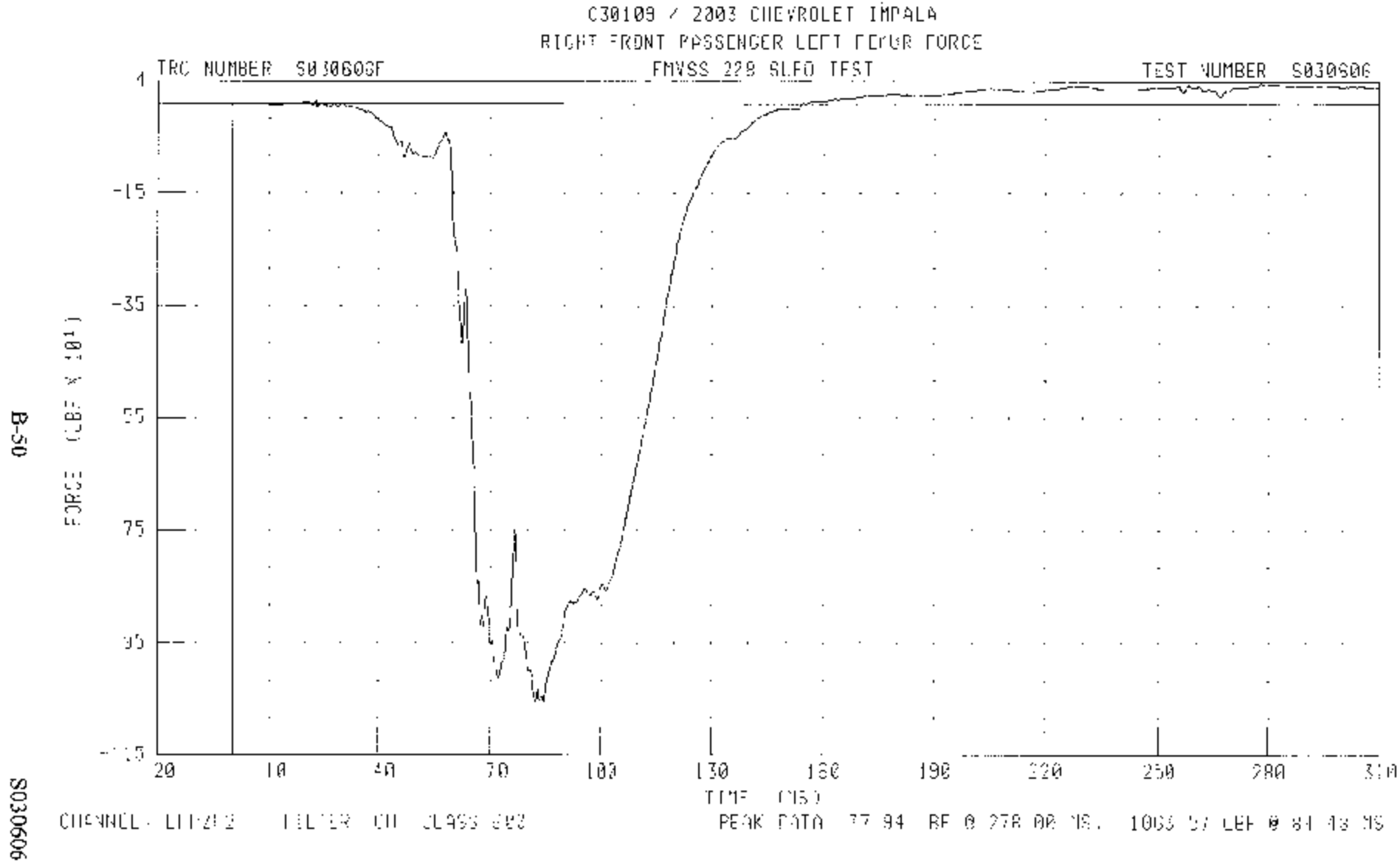
CHANNEL: CSTRS2 FILTER CF CLASS 180 PEAK DATA 42.81 G @ 97.52 MS; 0.00 G @ -5.00 MS

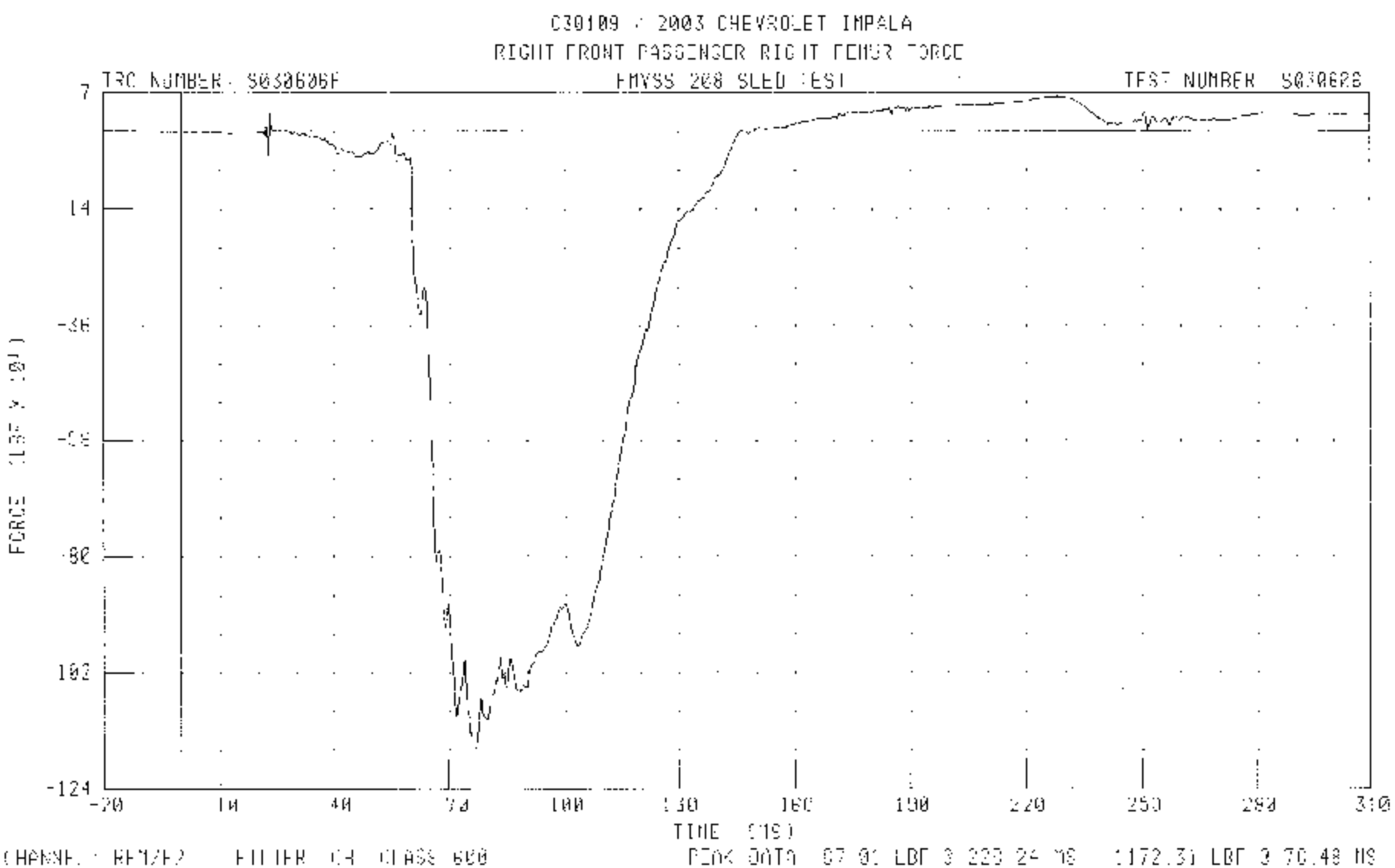
B-48

S030606


2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER CHEST DEFLECTION
FMVSS 208 SLED TEST
TEST NUMBER: S030606
10
0
-10
-20
-30
-40
-50
DISPLACEMENT (IN X 10**-2)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)

S030606


C30109 / 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER LEFT DOOR FORCE
TRC NUMBER S030603F
FMVSS 229 SLED TEST
TEST NUMBER S030606
1
-15
-35
55
75
95
-115
FORCE (LBF X 101)
20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LTPZ12
FILTER CFC CLASS 060
PEAK DATA 77.94 AT 0.278.00 MS. 1003.57 AT 0.84.43 MS
B-50
S030606


C30109 - 2003 CHEVROLET IMPALA
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
TRC NUMBER: S030606F
FMVSS 208 SLED TEST
TEST NUMBER S030628
7
14
-36
-58
-80
102
-124
FORCE (LBF X 10^1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMZFO FILTER CH CLASS 600
PEAK DATA 67.01 LBF @ 223.24 MS -172.31 LBF @ 70.48 MS

Appendix C

Manufacturer's Vehicle Information

Your vehicle has a light that comes on as a reminder to buckle up. See *Safety Belt Reminder Light on page 3-31.*

In most states and in all Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

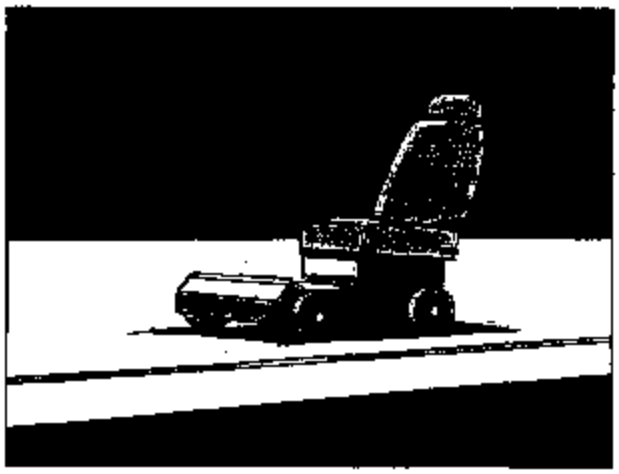
You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are mild, and some crashes can be so serious that even buckled up, a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

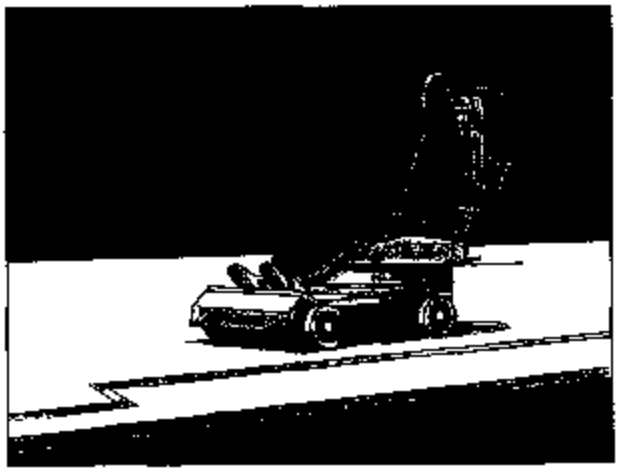
After more than 30 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter... a lot!

Why Safety Belts Work

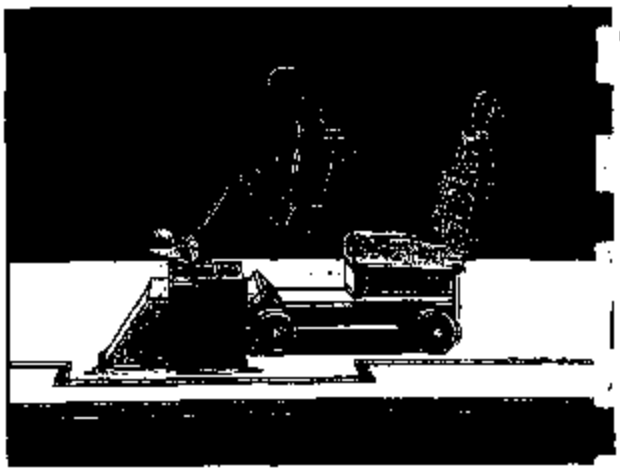
When you ride in or on anything, you go as fast as it goes.



Take the simplest vehicle. Suppose it's just a seat on wheels.



Put someone on it.



Get it up to speed. Then stop the vehicle. The rider doesn't stop.

The person keeps going until stopped by something. In a real vehicle, it could be the windshield...

or the instrument panel...

or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Questions and Answers About Safety Belts

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You *could* be – whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: If my vehicle has air bags, why should I have to wear safety belts?

A: Air bags are in many vehicles today and will be in most of them in the future. But they are supplemental systems only; so they work *with* safety belts – not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident – even one that isn't your fault – you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How to Wear Safety Belts Properly

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see *Older Children on page 1-31* or *Infants and Young Children on page 1-33*. Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

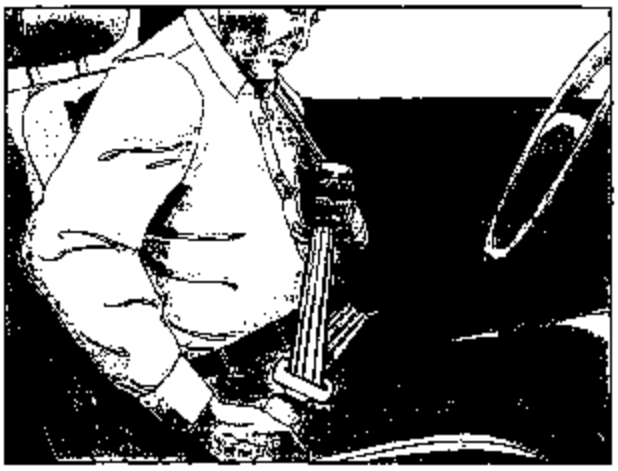
1. Close and lock the door.
2. Adjust the seat so you can sit up straight. To see how, see "Seats" in the Index.

3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

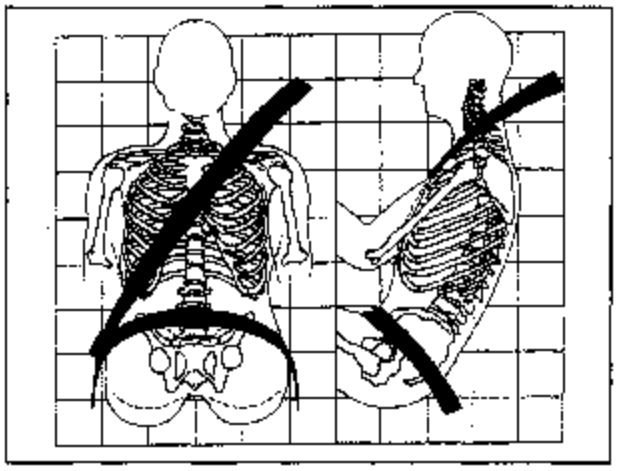
   The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.
4. Push the latch plate into the buckle until it clicks.

   Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see *Safety Belt Extender on page 1-30*.

   Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.

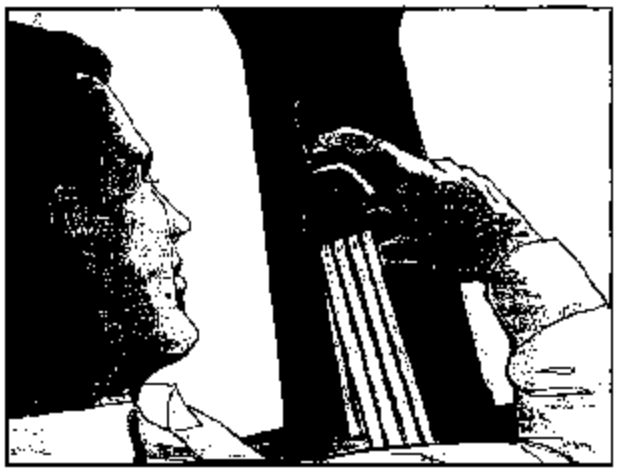


The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

Shoulder Belt Height Adjuster

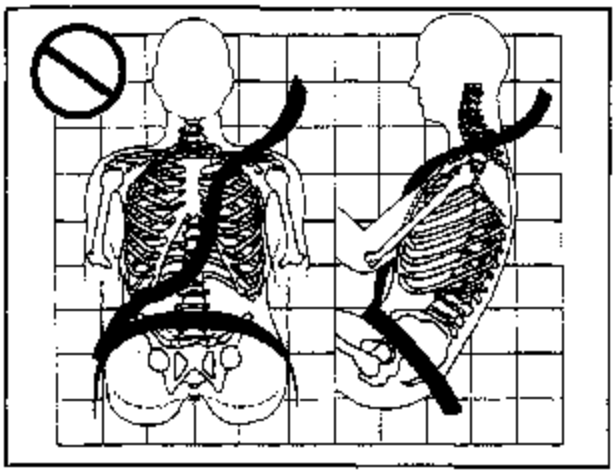
Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.



To move it down, squeeze the release lever and the shoulder belt guide as shown and move the height adjuster to the desired position. You can move the adjuster up just by pushing up on the shoulder belt guide. After you move the adjuster to where you want it, try to move it down without squeezing the release lever to make sure it has locked into position.

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.

Q: What's wrong with this?



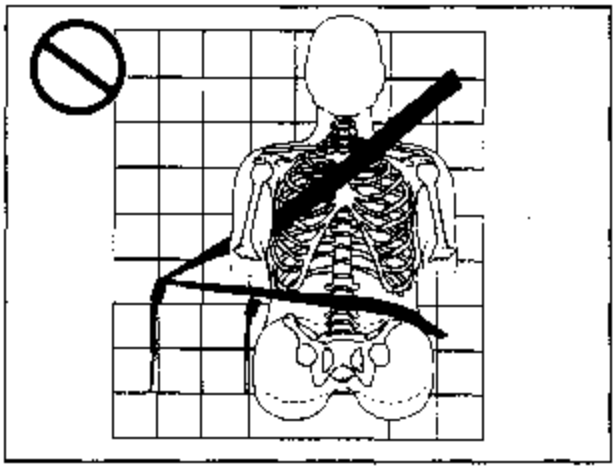
A: The shoulder belt is too loose. It won't give nearly as much protection this way.

⚠ CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

1-18

Q: What's wrong with this?



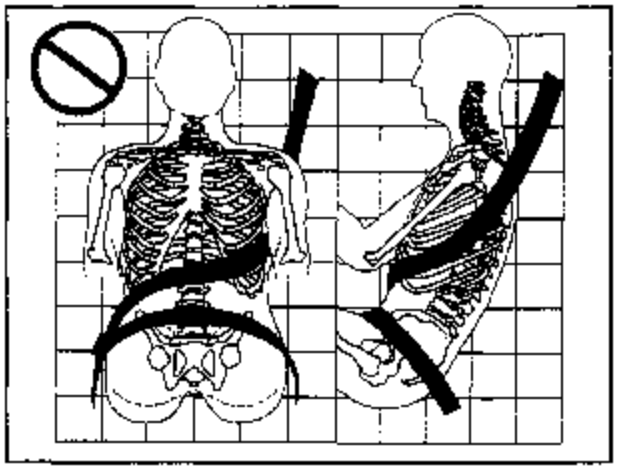
A: The belt is buckled in the wrong place.

⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

1-

Q: What's wrong with this?

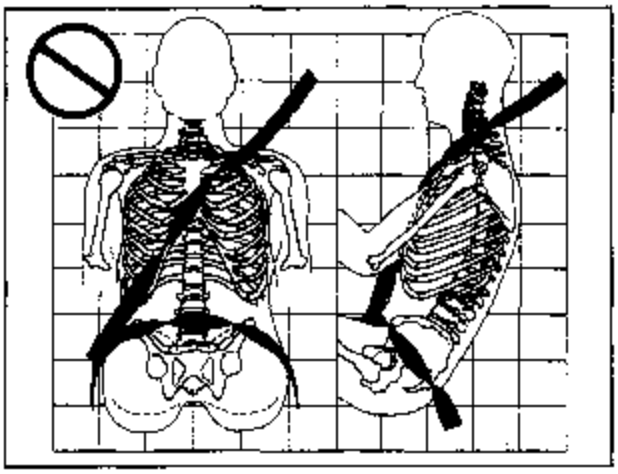


A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

Q: What's wrong with this?



A: The belt is twisted across the body.

⚠ CAUTION:

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.

To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.

A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

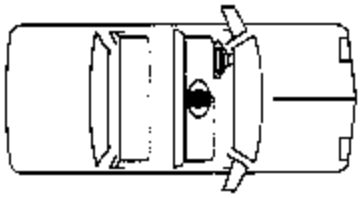
Right Front Passenger Position

To learn how to wear the right front passenger's safety belt properly, see *Driver Position on page 1-15.*

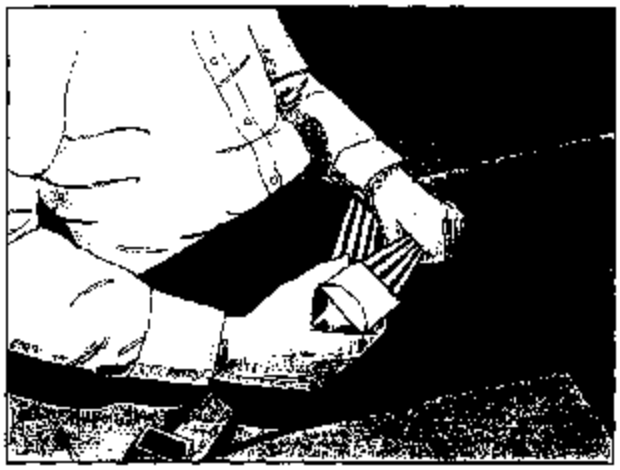
The right front passenger's safety belt works the same way as the driver's safety belt — except for one thing. If you ever pull the shoulder portion of the belt out all the way, you will engage the child restraint locking feature. If this happens, just let the belt go back all the way and start again.

Center Front Passenger Position

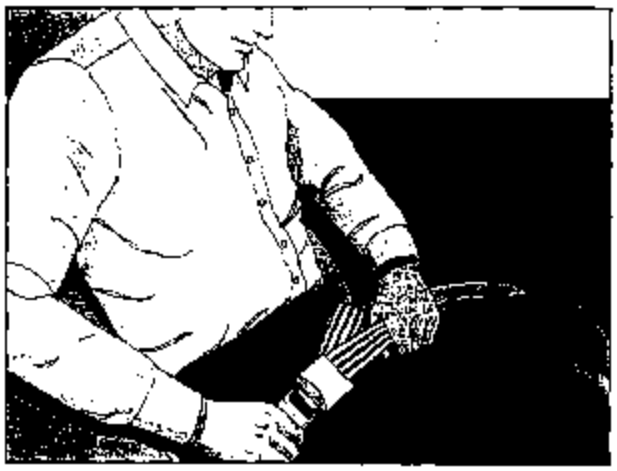
Lap Belt



If your vehicle has a front bench seat, someone can sit in the center position.



When you sit in the center front seating position, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.



To make the belt shorter, pull its free end as shown until the belt is snug.

Buckle, position and release it the same way as the lap part of a lap-shoulder belt. If the belt isn't long enough, see *Safety Belt Extender on page 1-30.*

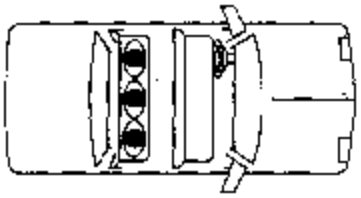
Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

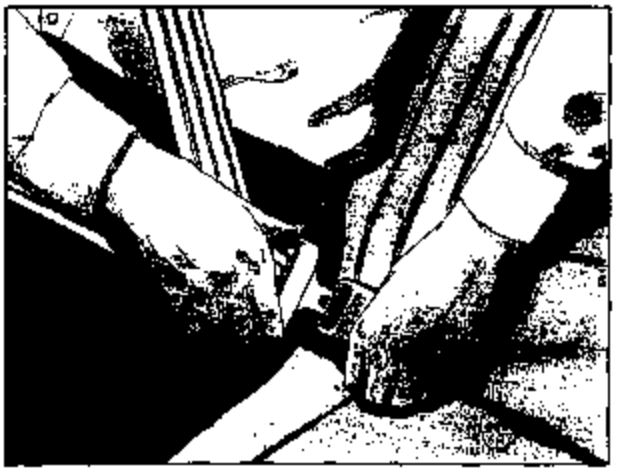
Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Rear Seat Passenger Positions



Lap-Shoulder Belt

All rear seating positions have lap-shoulder belts. Here's how to wear one properly.



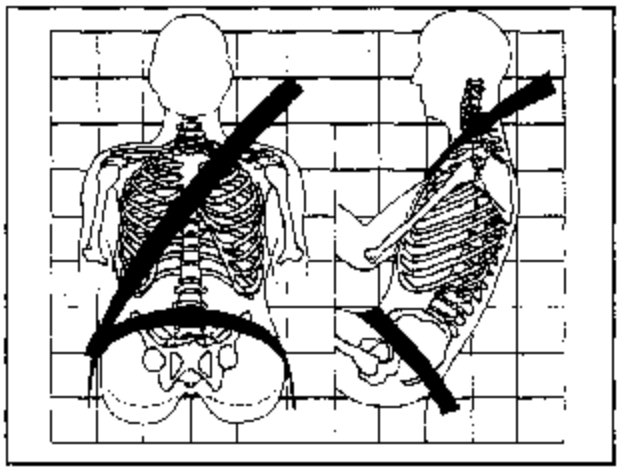
1. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

   The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

2. Push the latch plate into the buckle until it clicks. Pull up on the latch plate to make sure it is secure.

When the shoulder belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again. If the belt is not long enough, see *Safety Belt Extender on page 1-30.* Make sure the release button on the buckle is positioned so that you would be able to unbuckle the safety belt quickly if you ever had to.

3. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder part.

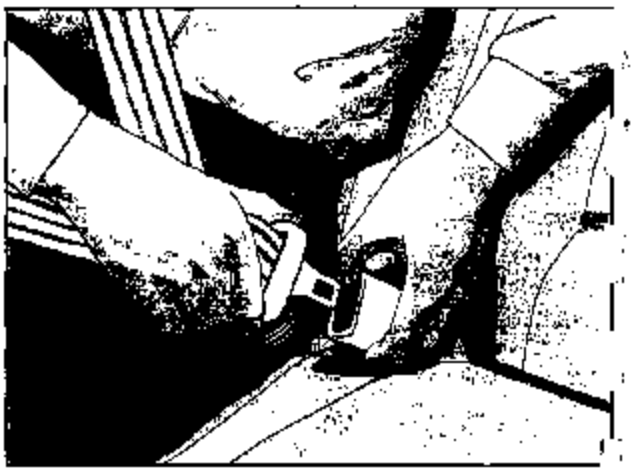


The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or a crash, or if you pull the belt very quickly out of the retractor.

⚠ CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.



To unlatch the belt, just push the button on the buckle.

Rear Safety Belt Comfort Guides for Children and Small Adults

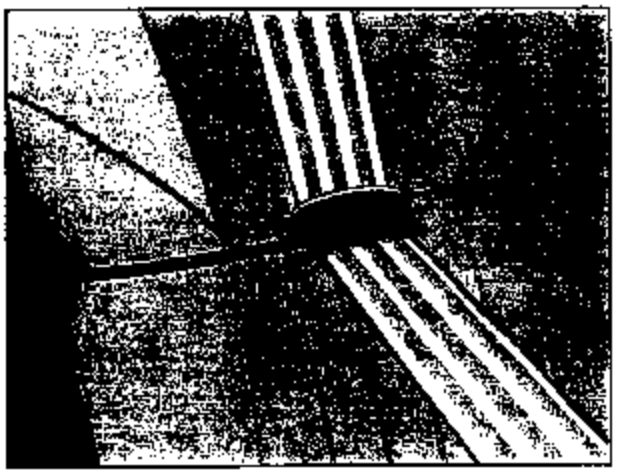
Your vehicle may have this feature already. If it doesn't, you can get it from any GM dealer.

Rear shoulder belt comfort guides will provide added safety belt comfort for older children who have outgrown booster seats and for small adults. When installed on a shoulder belt, the comfort guide better positions the belt away from the neck and head.

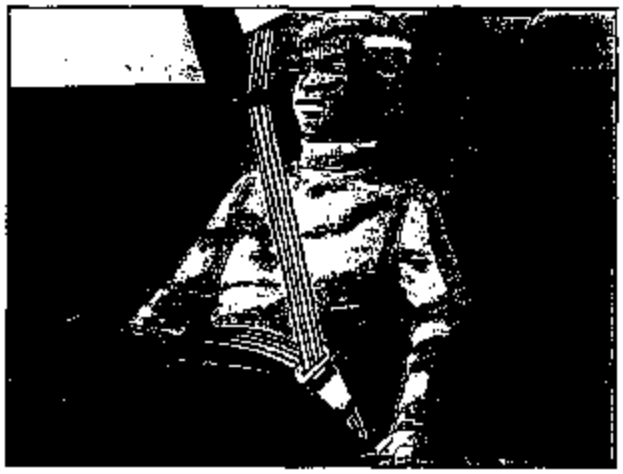
There is one comfort guide available for each outside passenger position in the rear seat. To provide added safety belt comfort for children who have outgrown child restraints and booster seats and for smaller adults, the comfort guides may be installed on the shoulder belts. Here's how to install a comfort guide and use the safety belt:

1. Pull the elastic cord out from between the edge of the seatback and the interior body to remove the guide from its storage clip.

2. Slide the guide under and past the belt. The elastic cord must be under the belt. Then, place the guide over the belt, and insert the two edges of the belt into the slots of the guide.



3. Be sure that the belt is not twisted and it lies flat. The elastic cord must be under the belt and the guide on top.



4. Buckle, position and release the safety belt as described in *Rear Seat Passengers on page 1-25*. Make sure that the shoulder belt crosses the shoulder.

To remove and store the comfort guides, squeeze the belt edges together so that you can take them out of the guides. Pull the guide upward to expose its storage clip, and then slide the guide into the clip. Turn the guide and clip inward and in between the seatback and the interior body, leaving only the loop of elastic cord exposed.

Safety Belt Extender

If the vehicle's safety belt will fasten around you, you should use it.

But if a safety belt isn't long enough to fasten, your dealer will order you an extender. It's free. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Don't let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.

Child Restraints

Older Children

Older children who have outgrown booster seats should wear the vehicle's safety belts.

Q: What is the proper way to wear safety belts?

A: If possible, an older child should wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide. The shoulder belt should not cross the face or neck. The lap belt should fit snugly below the hips, just touching the top of the thighs. It should never be worn over the abdomen, which could cause severe or even fatal internal injuries in a crash.

Accident statistics show that children are safer if they are restrained in the rear seat.

In a crash, children who are not buckled up can strike other people who are buckled up, or can be thrown out of the vehicle. Older children need to use safety belts properly.

Q: What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?

A: If the child is sitting in a seat next to a window, move the child toward the center of the vehicle. If the child is sitting in the center rear seat passenger position, move the child toward the safety belt buckle. In either case, be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that the belts provide.

If the child is sitting in a rear seat outside position, see *Rear Safety Belt Comfort Guides for Children and Small Adults on page 1-28*.

⚠ CAUTION:

Never do this.

Here two children are wearing the same belt. The belt can't properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

⚠ CAUTION:

Never do this.

Here a child is sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in

CAUTION: (Continued)

CAUTION: (Continued)

this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low and snug on the hips, just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

Infants and Young Children

Everyone in a vehicle needs protection! This includes infants and all other children. Neither the distance traveled nor the age and size of the traveler changes the need, for everyone, to use safety restraints. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

Every time infants and young children ride in vehicles, they should have the protection provided by appropriate restraints. Young children should not use the vehicle's adult safety belts alone, unless there is no other choice. Instead, they need to use a child restraint.

⚠ CAUTION:

People should never hold a baby in their arms while riding in a vehicle. A baby doesn't weigh much – until a crash. During a crash a baby will become so heavy it is not possible to hold it. For example, in a crash at only 25 mph (40 km/h), a 12-lb. (5.5 kg) baby will suddenly become a 240-lb. (110 kg) force on a person's arms. A baby should be secured in an appropriate restraint.

1-34

⚠ CAUTION:

Children who are up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer outstanding protection for adults and older children, but not for young children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide.

1-

Q: What are the different types of add-on child restraints?

A: Add-on child restraints, which are purchased by the vehicle's owner, are available in four basic types. Selection of a particular restraint should take into consideration not only the child's weight, height and age but also whether or not the restraint will be compatible with the motor vehicle in which it will be used.

For most basic types of child restraints, there are many different models available. When purchasing a child restraint, be sure it is designed to be used in a motor vehicle. If it is, the restraint will have a label saying that it meets federal motor vehicle safety standards.

The restraint manufacturer's instructions that come with the restraint state the weight and height limitations for a particular child restraint. In addition, there are many kinds of restraints available for children with special needs.

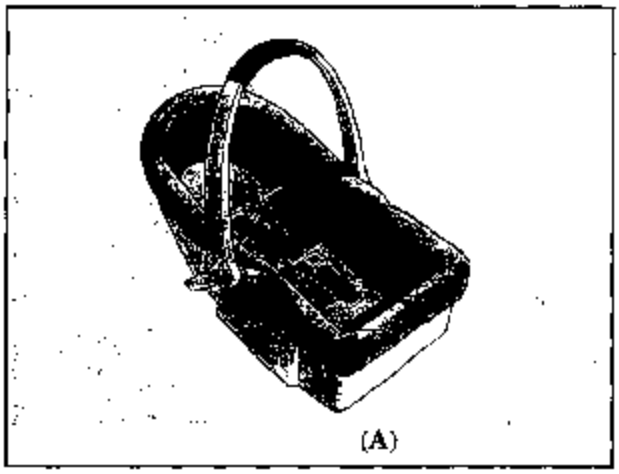
⚠ CAUTION:

Newborn infants need complete support, including support for the head and neck. This is necessary because a newborn infant's neck is weak and its head weighs so much compared with the rest of its body. In a crash, an infant in a rear-facing seat settles into the restraint, so the crash forces can be distributed across the strongest part of an infant's body, the back and shoulders. Infants always should be secured in appropriate infant restraints.

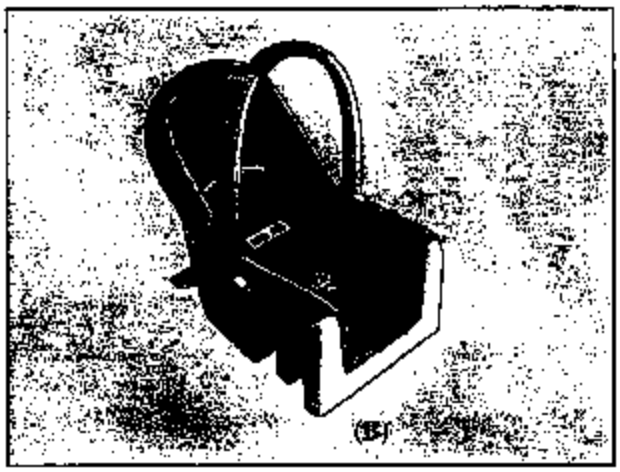
⚠ CAUTION:

The body structure of a young child is quite unlike that of an adult or older child, for whom the safety belts are designed. A young child's hip bones are still so small that the vehicle's regular safety belt may not remain low on the hip bones, as it should. Instead, it may settle up around the child's abdomen. In a crash, the belt would apply force on a body area that's unprotected by any bony structure. This alone could cause serious or fatal injuries. Young children always should be secured in appropriate child restraints.

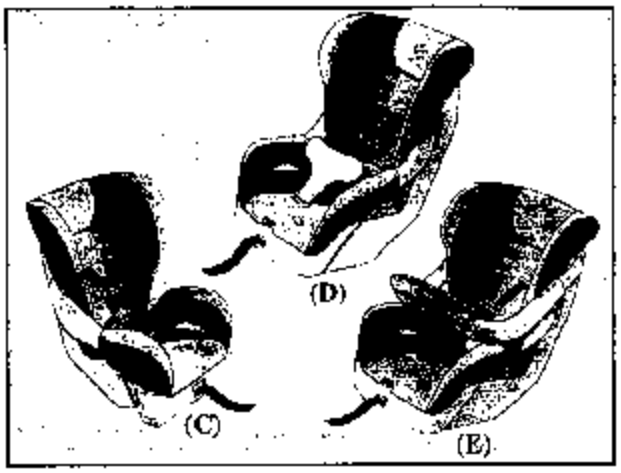
Child Restraint Systems



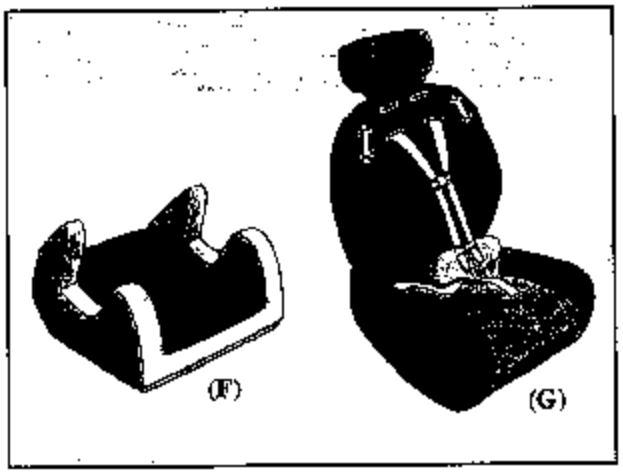
An infant car bed (A), a special bed made for use in a motor vehicle, is an infant restraint system designed to restrain or position a child on a continuous flat surface. Make sure that the infant's head rests toward the center of the vehicle.



A rear-facing infant seat (B) provides restraint with the seating surface against the back of the infant. The harness system holds the infant in place and, in a crash, acts to keep the infant positioned in the restraint.



A forward-facing child seat (C-E) provides restraint for the child's body with the harness and also sometimes with surfaces such as T-shaped or shelf-like shields.



A booster seat (F-G) is a child restraint designed to improve the fit of the vehicle's safety belt system. Some booster seats have a shoulder belt positioner, and some high-back booster seats have a five-point harness. A booster seat can also help a child to see out the window.

Q: How do child restraints work?

A: A child restraint system is any device designed for use in a motor vehicle to restrain, seat, or position children. A built-in child restraint system is a permanent part of the motor vehicle. An add-on child restraint system is a portable one, which is purchased by the vehicle's owner.

For many years, add-on child restraints have used the adult belt system in the vehicle. To help reduce the chance of injury, the child also has to be secured within the restraint. The vehicle's belt system secures the add-on child restraint in the vehicle, and the add-on child restraint's harness system holds the child in place within the restraint.

One system, the three-point harness, has straps that come down over each of the infant's shoulders and buckle together at the crotch. The five-point harness system has two shoulder straps, two hip straps and a crotch strap. A shield may take the place of hip straps. A T-shaped shield has shoulder straps that are attached to a flat pad which rests low against the child's body. A shelf- or armrest-type shield has straps that are attached to a wide, shelf-like shield that swings up or to the side.

When choosing a child restraint, be sure the child restraint is designed to be used in a vehicle. If it is, it will have a label saying that it meets federal motor vehicle safety standards.

Then follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both. These restraints use the belt system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. When securing an add-on child restraint, refer to the instructions that come with the restraint which may be on the restraint itself or in a booklet, or both, and to this manual. The child restraint instructions are important, so if they are not available, obtain a replacement copy from the manufacturer.

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. General Motors, therefore, recommends that child restraints be secured in a rear seat, including an infant riding in a rear-facing infant seat, a child riding in a forward-facing child seat and an older child riding in a booster seat. *Never* put a rear-facing child restraint in the front passenger seat. Here's why:

⚠ CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's air bag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating air bag. Always secure a rear-facing child restraint in a rear seat.

You may secure a forward-facing child restraint in the right front seat, but before you do, always move the front passenger seat as far back as it will go. It's better to secure the child restraint in a rear seat.

⚠ CAUTION:

A child in a child restraint in the center front seat can be badly injured or killed by the right front passenger's air bag if it inflates. Never secure a child restraint in the center front seat. It's always better to secure a child restraint in the rear seat. You may secure a forward-facing child restraint in the right front passenger seat, but before you do, always move the front passenger seat as far back as it will go. It's better to secure the child restraint in a rear seat.

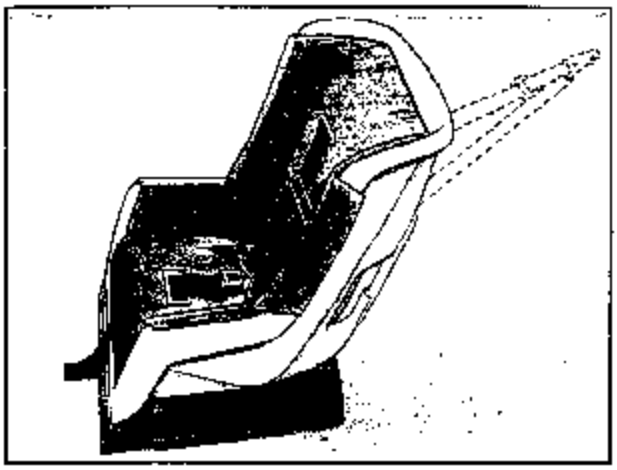
Wherever you install it, be sure to secure the child restraint properly.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle – even when no child is in it.

Top Strap

Some child restraints have a top strap, or "top tether". It can help restrain the child restraint during a collision. For it to work, a top strap must be properly anchored to the vehicle. Some top strap-equipped child restraints are designed for use with or without the top strap being anchored. Others require the top strap always to be anchored. Be sure to read and follow the instructions for your child restraint. If yours requires that the top strap be anchored, don't use the restraint unless it is anchored properly.

If the child restraint does not have a top strap, one can be obtained, in kit form, for many child restraints. Ask the child restraint manufacturer whether or not a kit is available.



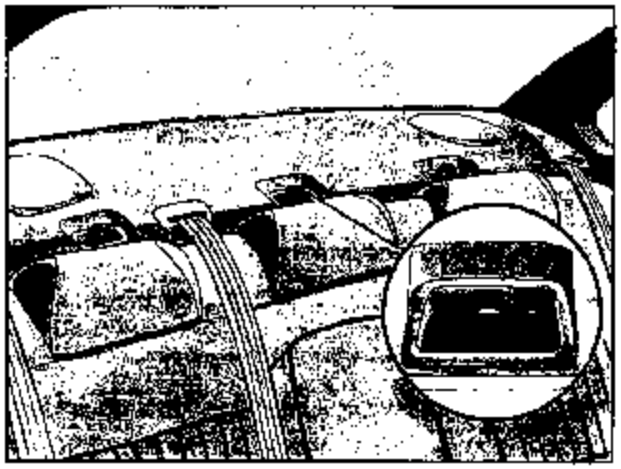
In Canada, the law requires that forward-facing child restraints have a top strap, and that the strap be anchored. In the United States, some child restraints also have a top strap. If your child restraint has a top strap, it should be anchored.

Anchor the top strap to one of the following anchor points. Be sure to use an anchor point located on the same side of the vehicle as the seating position where the child restraint will be placed.

Once you have the top strap anchored, you'll be ready to secure the child restraint itself. Tighten the top strap when and as the child restraint manufacturer's instructions say.

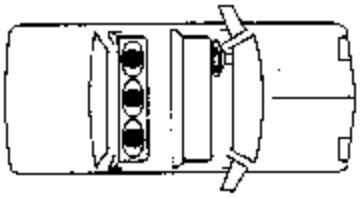
Top Strap Anchor Location

Your vehicle has top strap anchors already installed for the rear seating positions. You'll find them behind the rear seat on the filler panel.



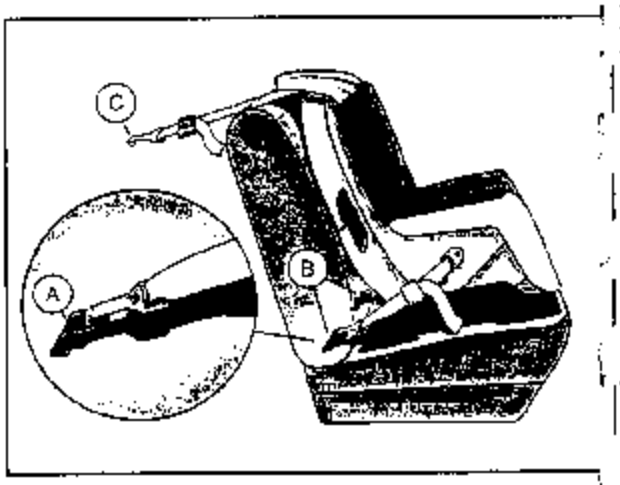
Lower Anchorages and Top Tethers for Children (LATCH System)

Your vehicle has the LATCH system. You'll find anchors (A) in all three rear seating positions.

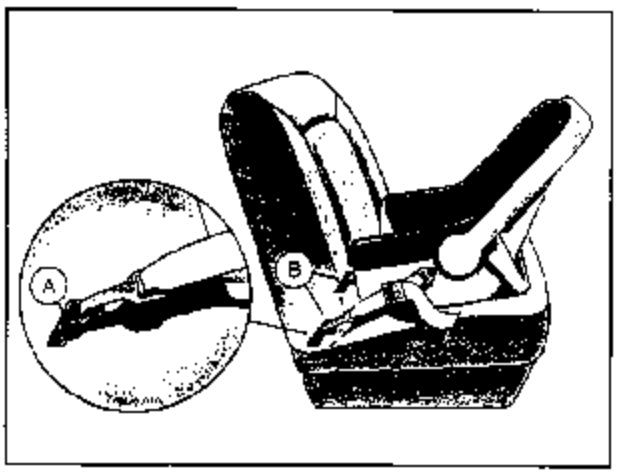


To assist you in locating the lower anchors for this child restraint system, each seating position with the LATCH system will have a dot on the seatback directly above the anchor.

In order to use the system, you need either a forward-facing child restraint that has attaching points (B) at its base and a top tether anchor (C), or a rear-facing child restraint that has attaching points (B), as shown here.



A. Vehicle anchor
B. LATCH system attachment points
C. Top strap



A. Vehicle anchor
B. LATCH system attachment points

With this system, use the LATCH system instead of the vehicle's safety belts to secure a child restraint.

⚠ CAUTION:

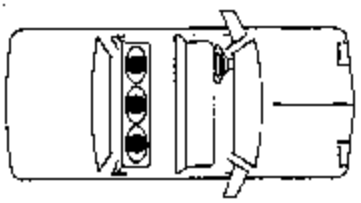
If a LATCH-type child restraint isn't attached to its anchorage points, the restraint won't be able to protect a child sitting there. In a crash, the child could be seriously injured or killed. Make sure that a LATCH-type child restraint is properly installed using the anchorage points, or use the vehicle's safety belts to secure the restraint. See "Securing a Child Restraint Designed for the LATCH System", "Securing a Child Restraint in a Rear Outside Seat Position" or "Securing a Child Restraint in a Center Rear Seat Position" in the Index for information on how to secure a child restraint in your vehicle.

Securing a Child Restraint Designed for the LATCH System

1. Find the anchors for the seating position you want to use, where the bottom of the seatback meets the back of the seat cushion.
2. Put the child restraint on the seat.
3. Attach the anchor points on the child restraint to the anchors in the vehicle. The child restraint instructions will show you how.
4. If the child restraint is forward-facing, attach the top strap to the top strap anchor. See *Top Strap on page 1-41*. Tighten the top strap according to the child restraint instructions.
5. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, simply unhook the top strap from the top tether anchor and then disconnect the anchor points.

Securing a Child Restraint in a Rear Seat Position



If your child restraint is equipped with the LATCH system, see *Lower Anchorages and Top Tethers for Children (LATCH System) on page 1-43*.

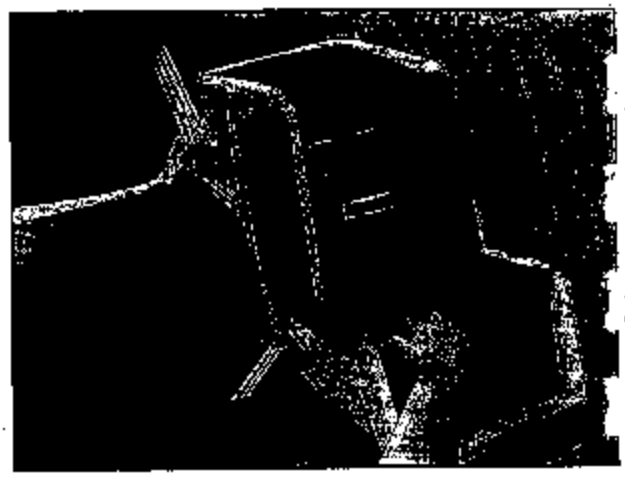
⚠ CAUTION:

A child in a child restraint in the center front seat can be badly injured or killed by the right front passenger's air bag if it inflates. Never secure a child restraint in the center front seat. It's always better to secure a child restraint in the rear seat. You may secure a forward-facing child restraint in the right front passenger seat, but before you do, always move the front passenger seat as far back as it will go. It's better to secure the child restraint in a rear seat.

You'll be using the lap-shoulder belt. See *Top Strap on page 1-41* if the child restraint has one. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

1. Put the restraint on the seat.
2. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.
3. Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

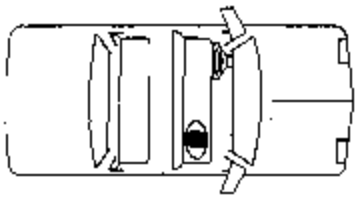
4. Pull the rest of the shoulder belt all the way out of the retractor to set the lock.



5. To tighten the belt, feed the shoulder belt back into the retractor while you push down on the child restraint. If you're using a forward-facing child restraint, you may find it helpful to use your knee to push down on the child restraint as you tighten the belt.
6. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

Securing a Child Restraint in the Right Front Seat Position



If your child restraint is equipped with the LATCH system, see *Lower Anchorages and Top Tethers for Children (LATCH System) on page 1-43.*

Your vehicle has a right front passenger air bag. *Never* put a rear-facing child restraint in this seat. Here's why:

⚠ CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's air bag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating air bag. Always secure a rear-facing child restraint in a rear seat.

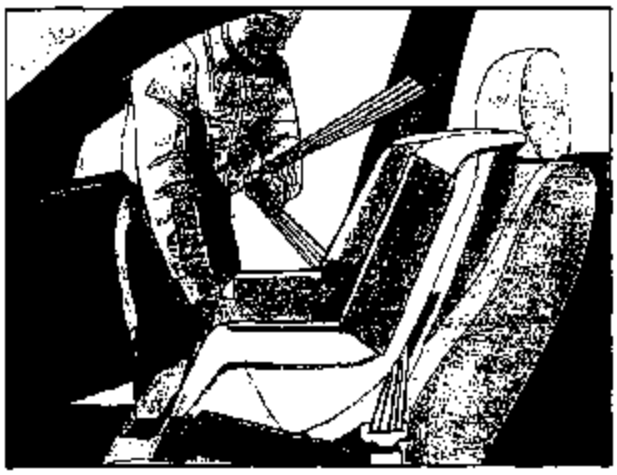
Although a rear seat is a safer place, you can secure a forward-facing child restraint in the right front seat.

You'll be using the lap-shoulder belt. See the earlier part about the *Top Strap on page 1-41*, if the child restraint has one. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

1. Because your vehicle has a right front passenger air bag, always move the seat as far back as it will go before securing a forward-facing child restraint. See *Seats on page 1-2.*
2. Put the restraint on the seat.

3. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.

4. Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



5. Pull the rest of the shoulder belt all the way out of the retractor to set the lock.

6. To tighten the belt, feed the shoulder belt back into the retractor while you push down on the child restraint. You may find it helpful to use your knee to push down on the child restraint as you tighten the belt.
7. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

Air Bag Systems

This part explains the frontal and side impact air bag systems.

Your vehicle has air bags – a frontal air bag for the driver and another frontal air bag for the right front passenger. Your vehicle may also have a side impact air bag for the driver.

If your vehicle has a side impact air bag for the driver it will say AIR BAG on the air bag covering on the side of the driver's seatback closest to the door.

Frontal air bags are designed to help reduce the risk of injury from the force of an inflating frontal air bag. But these air bags must inflate very quickly to do their job and comply with federal regulations.

Here are the most important things to know about the air bag systems:

⚠ CAUTION:

You can be severely injured or killed in a crash if you aren't wearing your safety belt, even if you have air bags. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Air bags are designed to work with safety belts but don't replace them.

Frontal air bags for the driver and right front passenger are designed to deploy only in moderate to severe frontal and near frontal crashes. They aren't designed to inflate at all

CAUTION: (Continued)

CAUTION: (Continued)

in rollover, rear or low-speed frontal crashes, or in many side crashes. And, for some unrestrained occupants, frontal air bags may provide less protection in frontal crashes than more forceful air bags have provided in the past.

The side impact air bag for the driver is designed to inflate only in moderate to severe crashes where something hits the driver's side of your vehicle. It isn't designed to inflate in frontal, in rollover or in rear crashes.

Everyone in your vehicle should wear a safety belt properly, whether or not there's an air bag for that person.

⚠ CAUTION:

Both frontal and side impact air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, as you would be if you were leaning forward, it could seriously injure you. Safety belts help keep you in position for air bag inflation before and during a crash. Always wear your safety belt, even with frontal air bags. The driver should sit as far back as possible while still maintaining control of the vehicle, and should not lean on the door.

⚠ CAUTION:

Anyone who is up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer the best protection for adults, but

CAUTION: (Continued)

CAUTION: (Continued)

not for young children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide. Always secure children properly in your vehicle. To read how, see the part of this manual called "Older Children" or "Infants and Young Children".

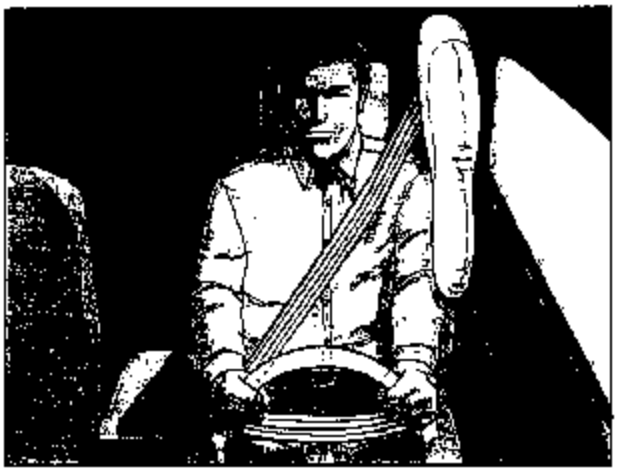
There is a air bag readiness light on the instrument panel, which shows the air bag symbol.

The system checks the air bag electrical system for malfunctions. The light tells you if there is an electrical problem. See *Air Bag Readiness Light on page 3-32* for more information.

Where Are the Air Bags?

The driver's frontal air bag is in the middle of the steering wheel.

The right front passenger's frontal air bag is in the instrument panel on the passenger's side.



If your vehicle has one, the driver's side impact air bag is in the side of the driver's seatback closest to the door.

⚠ CAUTION:

If something is between an occupant and an air bag, the bag might not inflate properly or it might force the object into that person causing severe injury or even death. The path of an inflating air bag must be kept clear. Don't put anything between an occupant and an air bag, and don't attach or put anything on the steering wheel hub or on or near any other air bag covering. Don't let seat covers block the inflation path of a side impact air bag.

When Should an Air Bag Inflate?

The driver's and right front passenger's frontal air bags are designed to inflate in moderate to severe frontal or near-frontal crashes. But they are designed to inflate only if the impact speed is above the system's designed "threshold level".

In addition, your vehicle has "dual stage" frontal air bags, which adjust the amount of restraint according to crash severity. For moderate frontal impacts, these air bags inflate at a level less than full deployment. For more severe frontal impacts, full deployment occurs. If the front of your vehicle goes straight into a wall that doesn't move or deform, the threshold level for the reduced deployment is about 12 to 18 mph (19 to 29 km/h), and the threshold level for a full deployment is about 18 to 24 mph (29 to 38.5 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range.

If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher. The driver's and right front passenger's frontal air bags are not designed to inflate in rollovers, rear impacts, or in many side impacts because inflation would not help the occupant.

Your vehicle may or may not have a driver side air bag. See Air Bag Systems in the Index. A driver 's side impact air bag is designed to inflate in moderate to severe side crashes involving the driver's door. A side impact air bag will inflate if the crash severity is above the system's designed "threshold level." The threshold level can vary with specific vehicle design. A driver's side impact air bag is not designed to inflate in frontal or near-frontal impacts, rollovers or rear impacts, because inflation would not help the occupant.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. For frontal air bags, inflation is determined by the angle of the impact and how quickly the vehicle slows down in frontal and near-frontal impacts. For side impact air bags, inflation is determined by the location and severity of the impact.

What Makes an Air Bag Inflate?

In an impact of sufficient severity, the air bag sensing system detects that the vehicle is in a crash. For both the frontal and side impact air bags, the sensing system triggers a release of gas from the inflator, which inflates the air bag. The inflator, air bag and related hardware are all part of the air bag modules. Frontal air bag modules are located inside the steering wheel and instrument panel. For vehicles with a driver's side impact air bag, the air bag modules are located in the seatback closest to the driver's door.

How Does an Air Bag Restrain?

In moderate to severe frontal or near frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. In moderate to severe side collisions, even belted occupants can contact the inside of the vehicle. The air bag supplements the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But the frontal air bags would not help you in many types of collisions, including rollovers, rear impacts, and many side impacts, primarily because an occupant's motion is not toward the air bag. A side impact air bag would not help you in many types of collisions, including frontal or near frontal collisions, rollovers, and rear impacts, primarily because an occupant's motion is not toward that air bag. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions for the driver's and right front passenger's frontal air bags, and only in moderate to severe side collisions for vehicles with a driver's side impact air bag.

What Will You See After an Air Bag Inflates?

After the air bag inflates, it quickly deflates, so quickly that some people may not even realize the air bag inflated. Some components of the air bag module will be hot for a short time. These components include the steering wheel hub for the driver's frontal air bag and the instrument panel for the right front passenger's frontal air bag. For vehicle's with a driver's side impact air bag, the side of the seatback closest to the driver's door will be hot. The parts of the bag that come into contact with you may be warm, but not too hot to touch. There will be some smoke and dust coming from the vents in the deflated air bags. Air bag inflation doesn't prevent the driver from seeing or being able to steer the vehicle, nor does it stop people from leaving the vehicle.

⚠ CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or a door. If you experience breathing problems following an air bag deployment, you should seek medical attention.

Your vehicle has a feature that will automatically unlock the doors and turn the interior lamps on when the air bags inflate (if battery power is available). You can lock the doors again and turn the interior lamps off by using the door lock and interior lamp controls.

In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the right front passenger air bag.

- Air bags are designed to inflate only once. After an air bag inflates, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.
- Your vehicle is equipped with an electronic frontal sensor, which helps the sensing system distinguish between a moderate frontal impact and a more severe frontal impact. Your vehicle is also equipped with a crash sensing and diagnostic module, which records information about the frontal air bag system. The module records information about the readiness of the system, when the system commands air bag inflation and driver's safety belt usage at deployment. The module also records speed, engine RPM, brake and throttle data.
- Let only qualified technicians work on your air bag systems. Improper service can mean that an air bag system won't work properly. See your dealer for service.

Notice: **If you damage the covering for the driver's or the right front passenger's air bag, or the air bag covering on the driver's seatback, the bag may not work properly. You may have to replace the air bag module in the steering wheel, both the air bag module and the instrument panel for the right front passenger's air bag, or the air bag module and seatback for the driver's side impact air bag. Do not open or break the air bag coverings.**

Servicing Your Air Bag-Equipped Vehicle

Air bags affect how your vehicle should be serviced. There are parts of the air bag systems in several places around your vehicle. Your dealer and the service manual have information about servicing your vehicle and the air bag systems. To purchase a service manual, see *Service Publications Ordering Information on page 7-9.*

⚠ CAUTION:

For up to 10 seconds after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid yellow connectors. They are probably part of the air bag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

The air bag systems do not need regular maintenance.

Restraint System Check

Checking Your Restraint Systems

Now and then, make sure the safety belt reminder light and all your belts, buckles, latch plates, retractors and anchorages are working properly. Look for any other loose or damaged safety belt system parts. If you see anything that might keep a safety belt system from doing its job, have it repaired.

Torn or frayed safety belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

Also look for any opened or broken air bag covers, and have them repaired or replaced. (The air bag system does not need regular maintenance.)

Replacing Restraint System Parts After a Crash

⚠ CAUTION:

A crash can damage the restraint systems in your vehicle. A damaged restraint system may not properly protect the person using it, resulting in serious injury or even death in a crash. To help make sure your restraint systems are working properly after a crash, have them inspected and any necessary replacements made as soon as possible.

If you've had a crash, do you need new belts or LATCH system parts?

After a very minor collision, nothing may be necessary. But if the belts were stretched, as they would be if worn during a more severe crash, then you need new parts.

If the LATCH system was being used during a more severe crash, you may need new LATCH system parts.

If belts are cut or damaged, replace them. Collision damage also may mean you will need to have LATCH system, safety belt or seat parts repaired or replaced. New parts and repairs may be necessary even if the belt or LATCH system wasn't being used at the time of the collision.

If an air bag inflates, you'll need to replace air bag system parts. See the part on the air bag system earlier in this section.

Air Bag Readiness Light

There is an air bag readiness light on the instrument panel, which shows the air bag symbol. The system checks the air bag's electrical system for malfunctions. The light tells you if there is an electrical problem. The system check includes the air bag sensors, the air bag modules, the wiring and the crash sensing and diagnostic module. For more information on the air bag system, see *Air Bag Systems on page 1-51*.

This light will come on when you start your vehicle, and it will flash for a few seconds. Then the light should go out. This means the system is ready.

If the air bag readiness light stays on after you start the vehicle or comes on when you are driving, your air bag system may not work properly. Have your vehicle serviced right away.

⚠ CAUTION:

If the air bag readiness light stays on after you start your vehicle, it means the air bag system may not be working properly. The air bags in your vehicle may not inflate in a crash, or they could even inflate without a crash. To help avoid injury to yourself or others, have your vehicle serviced right away if the air bag readiness light stays on after you start your vehicle.

The air bag readiness light should flash for a few seconds when you turn the ignition key to ON. If the light doesn't come on then, have it fixed so it will be ready to warn you if there is a problem.

Appendix D

Miscellaneous Test Information

Channel Report

06/05/2003 1:40:51 PM

Name of Test 030606-1 **System** K3600 **Name of DAU** DAU3

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range		Pol.	Cal.		Group	Mfg.	Model
3000	EVENT	EVENT	T- 0		10.24	V	+	10/15/2002	OK	SLED	TRC	Event
3001	C15351	SLDXG	Sled X - axis Acceleration	Rear	199.88288	g	-	01/09/2003	OK	SLED	Endevco	7231C
3002	C15519	SLDXGR	Sled X - axis Acceleration	Rear	200.27772	g	-	01/09/2003	OK	SLED	Endevco	7231C
3003	SLDXV	SLDXV	Measured Velocity		164.59317	km/h	-	04/08/2003	OK	SLED	TRC	SLDXV
3004	SLDXGT	SLDXGT	Sled X - axis acceleration for	Rear	195.51312	g	-	01/09/2003	OK	SLED	Endevco	7231C
3005	APDJ3	HEDXG1	Head X - axis acceleration	Rwd	400.34717	g	-	12/26/2002	OK	314n	Endevco	7231C
3006	AGHP8	HEDYG1	Head Y - axis acceleration	Left	399.25763	g	-	12/26/2002	OK	314n	Endevco	7231C
3007	APD60	HEDZG1	Head Z - axis acceleration	Up	401.21461	g	-	12/26/2002	OK	314n	Endevco	7231C
3008	1716A-1221-FX	NEKXF1	Neck X - axis Shear Force	Hd	8895.0621	N	-	12/26/2002	OK	314n	Denton	1716A
3009	1716A-1221-FY	NEKYF1	Neck Y - axis Shear Force	Hd	8889.3007	N	+	12/26/2002	OK	314n	Denton	1716A
3010	1716A-1221-FZ	NEKZF1	Neck Z - axis Shear Force	Hd	13350.072	N	+	12/26/2002	OK	314n	Denton	1716A
3011	1716A-1221-MX	NEKXM1	Neck Moment about X - axis	Rt Ear	282.90290	N·m	-	12/26/2002	OK	314n	Denton	1716A
3012	1716A-1221-MY	NEKYM1	Neck Moment about Y - axis	Chn	283.08496	N·m	+	12/26/2002	OK	314n	Denton	1716A
3013	1716A-1221-MZ	NEKZM1	Neck Moment about Z - axis	Chn	282.79480	N·m	+	12/26/2002	OK	314n	Denton	1716A
3014	C13010	CSTXG1	Chest X - axis acceleration	Fwd	398.44668	g	+	12/26/2002	OK	314n	Endevco	7231C
3015	C14563	CSTYG1	Chest Y - axis acceleration	Left	399.42894	g	-	12/26/2002	OK	314n	Endevco	7231C
3016	AD343	CSTZG1	Chest Z - axis acceleration	Down	398.84708	g	+	12/26/2002	OK	314n	Endevco	7231C
3017	14CB1-2847-041	CSTXD1	Chest Deflection	Stmm	100.51928	mm	+	01/06/2003	OK	314n	Servo	14CB1-2847
3018	2430-962	LFMZF1	Left Femur Force 91	Knee	13347.405	N	+	12/26/2002	OK	314n	GSE	2430
3019	2430-982	RFMZF1	Right Femur Force 98	Knee	13345.590	N	+	12/26/2002	OK	314n	GSE	2430
3020	GB86	HEDXG2	Head X - axis acceleration	Rwd	400.04688	g	-	11/14/2002	OK	229n	Endevco	7231C
3021	GB77	HEDYG2	Head Y - axis acceleration	Lft	399.75327	g	-	11/14/2002	OK	229n	Endevco	7231C
3022	A54F	HEDZG2	Head Z - axis acceleration	Up	400.70593	g	-	11/14/2002	OK	229n	Endevco	7231C
3023	1716A-1222-FX	NEKXF2	Neck X - axis Shear Force	Hd	8896.5711	N	-	05/12/2003	OK	229n	Denton	1716A
3024	1716A-1222-FY	NEKYF2	Neck Y - axis Shear Force	Hd	8893.2861	N	+	05/12/2003	OK	229n	Denton	1716A
3025	1716A-1222-FZ	NEKZF2	Neck Z - axis Shear Force	Hd	13343.616	N	+	05/12/2003	OK	229n	Denton	1716A
3026	1716A-1222-MX	NEKXM2	Neck Moment about X - axis	Rt Ear	283.16264	N·m	-	05/12/2003	OK	229n	Denton	1716A
3027	1716A-1222-MY	NEKYM2	Neck Moment about Y - axis	Chn	282.78069	N·m	+	05/12/2003	OK	229n	Denton	1716A
3028	1716A-1222-MZ	NEKZM2	Neck Moment about Z - axis	Chn	282.80771	N·m	+	05/12/2003	OK	229n	Denton	1716A
3029	C14135	CSTXG2	Chest X - axis acceleration	Fwd	401.70567	g	+	11/14/2002	OK	229n	Endevco	7231C
3030	A35D	CSTYG2	Chest Y - axis acceleration	Lft	400.49436	g	-	01/24/2003	OK	229n	Endevco	7231C
3031	AH5G8	CSTZG2	Chest Z - axis acceleration	Down	401.06690	g	+	01/24/2003	OK	229n	Endevco	7231C

Channel Report

06/05/2003 1:40:51 PM

3032	14CB1-2847-229	CSTXD2	Chest Deflection	Stmm	100.27124	mm	+	05/12/2003	OK	229n	Servo	14CB1-2847
3033	2430-901	LFMZF2	Left Femur Force 603	Knee	13339.224	N	+	05/12/2003	OK	229n	GSE	2430
3034	2430-902	RFMZF2	Right Femur Force 744	Knee	13352.861	N	+	05/12/2003	OK	229n	GSE	2430
3035	P27190	LBXG	Left Body @ Rear Seat (front	Fwd	199.58212	g	+	05/07/2003	OK	-1	Endevco	7264C-2K-2-180
3036	P23362	RBXG	Right Body @ Rear Seat (front	Fwd	199.94220	g	+	03/03/2003	OK	-1	Endevco	7264C-2K-2-180
3037	03D03C27-N14	TEXG	Top of Engine Block	Fwd	200.26793	g	+	06/04/2003	OK	-1	Entran	EGE-73B6Q-200
3038	P27914	RAXG	Rear Axle	Fwd	199.73316	g	+	05/06/2003	OK	-1	Endevco	7264C-2K-2-180

D-3

S030606

Digital and System Channel Report

2003-06-05 13:40:40

Name of Test 030606-1 **System** K3600 **Name of DAU** DAU3

enabled	Channel	Short Name	Type	Data File	Module Type
Yes	3500		dig0	DAT33500	KM3650 Sequencer

bit position	bit selector	short name	long name	description	
MSB = bit 15	1	Switch	Backup Switch		
bit 14	1	ABEVT1	AIRBAG EVENT DP	20 mS	1
bit 13	1	ABEVT2	AIRBAG EVENT DS	21 mS	2
bit 12	1	ABEVT3	AIRBAG EVENT PP	20 mS	3
bit 11	1	ABEVT4	AIRBAG EVENT PS	21 mS	4
bit 10	0				
bit 09	0				
bit 08	0				
bit 07	0				
bit 06	0				
bit 05	0				
bit 04	0				
bit 03	0				
bit 02	0				
bit 01	0				
LSB = bit 00	0				

Dummy 314n **Type** HYBRID III 50TH **Descriptio** NHTSA - 314n HYBRID III 50TH. CAL DUE 6-26-03(DKS 12-31-02)J211

Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/		Fullscal	Caldat	Pos Output	Flip
HEDXG	Head Accel X	7231C	AP103	Endevco	0.02014	g	750	12/26/2002	Rwd	1
HEDYG	Head Accel Y	7231C	AG118	Endevco	0.01914	g	750	12/26/2002	Left	1
HEDZG	Head Accel Y	7231C	AP060	Endevco	0.02075	g	750	12/26/2002	Up	1
NEKXF	Neck Force X	1716A	1716A-1221-FX	Denton	0.00019545	N	8896.4	12/26/2002	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716A	1716A-1221-FY	Denton	0.000186098	N	8896.4	12/26/2002	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716A	1716A-1221-FZ	Denton	0.000099486	N	13344.6	12/26/2002	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716A	1716A-1221-MX	Denton	0.006063009	N-m	282.5	12/26/2002	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716A	1716A-1221-MY	Denton	0.00588177	N-m	282.5	12/26/2002	Chn to Strnm	0
NEKZM	Neck Moment Z	1716A	1716A-1221-MZ	Denton	0.00852	N-m	282.5	12/26/2002	Chn to Lt Shld	0
CSTXG	Chest Accel X	7231C	C13010	Endevco	0.02954	g	750	12/26/2002	Fwd	0
CSTYG	Chest Accel Y	7231C	C14563	Endevco	0.02981	g	750	12/26/2002	Left	1
CSTZG	Chest Accel Z	7231C	AD343	Endevco	0.01945	g	750	12/26/2002	Down	0
CSTXD	Chest Deflection X	14CB1-2847	14CB1-2847-041	Servo	1.1319	m	100	1/6/2003	Strnm Away Frm Spn	0
LFMZF	Left Femur Force Z 91	2430	2430-962	GSE	0.000069241	N	13344.7	12/26/2002	Knee Fd,Pel Rr	0
RFMZF	Right Femur Force Z 98	2430	2430-982	GSE	0.000068754	N	13344.7	12/26/2002	Knee Fd,Pel Rr	0

Dummy 229n **Type** HYBRID III 50TH **Descriptio** NHTSA - 229n HYBRID III 50TH. CAL. DUE 11-14-03 (DKS 6-2-03)J211

Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/		Fullscal	Caldat	Pos Output	Flip
HEDXG	Head Accel X	7231C	GB86	Endevco	0.01969	g	750	11/14/2002	Rwd	1
HEDYG	Head Accel Y	7231C	GB77	Endevco	0.01926	g	750	11/14/2002	Lft	1
HEDZG	Head Accel Z	7231C	A54F	Endevco	0.01981	g	750	11/14/2002	Up	1
NEKXF	Neck Force X	1716A	1716A-1222-FX	Denton	0.000197428	N	8896.4	5/12/2003	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716A	1716A-1222-FY	Denton	0.00018938	N	8896.4	5/12/2003	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716A	1716A-1222-FZ	Denton	0.000099793	N	13344.6	5/12/2003	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716A	1716A-1222-MX	Denton	0.006067611	N·	282.5	5/12/2003	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716A	1716A-1222-MY	Denton	0.006086018	N·	282.5	5/12/2003	Chn to Strnm	0
NEKZM	Neck Moment Z	1716A	1716A-1222-MZ	Denton	0.008580177	N·	282.5	5/12/2003	Chn to Lt Shld	0
CSTXG	Chest Accel X	7231C	CI4135	Endevco	0.02741	g	750	11/14/2002	Fwd	0
CSTYG	Chest Accel Y	7231C	A35D	Endevco	0.01937	g	750	1/24/2003	Lft	1
CSTZG	Chest Accel Z	7231C	AH5G8	Endevco	0.01949	g	750	1/24/2003	Down	0
CSTXD	Chest Deflection X	14CB1-2847	14CB1-2847-229	Servo	1.1347	m	100	5/12/2003	Strnm Away Frm Spn	0
LFMZF	Left Femur Force Z 603	2430	2430-901	GSE	0.000071744	N	13344.7	5/12/2003	Knee Fd,Pel Rr	0
RFMZF	Right Femur Force Z 744	2430	2430-902	GSE	0.000070485	N	13344.7	5/12/2003	Knee Fd,Pel Rr	0

C30109 / TEMPERATURE AND HUMIDITY CHART