

Report Number: 208S-TRC-99-003

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

3030

General Motors Corporation

1999 Chevrolet Tahoe

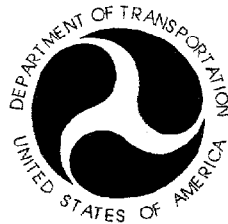
NHTSA Number: CX0107

TRC Test Number: 990202S

Transportation Research Center Inc.

10820 State Route 347

East Liberty, OH 43319



Test Date: February 2, 1999

Report Date: March 31, 1999

Final Report

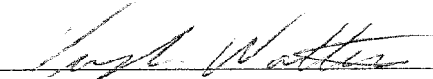
Prepared For:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance (NSA-30)
400 Seventh Street, S.W., Room No. 6115
Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-98-D-01055.

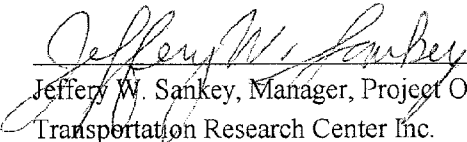
This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Report Prepared By:



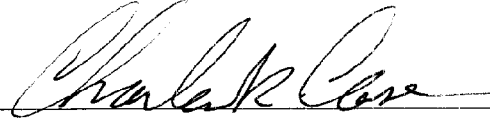
Date 4/12/99
Virginia L. Watters, Engineering Technician
Transportation Research Center Inc.

Report Approved By:



Date 4/12/99
Jeffery W. Sankey, Manager, Project Operations
Transportation Research Center Inc.

Final Report Accepted By:



Date 4/22/99
Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Vehicle Safety Compliance

1. Report No. 208S-TRC-99-003	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS No. 208 Compliance Sled Testing of a 1999 Chevrolet Tahoe MPV NHTSA No. CX0107		5. Report Date March 31, 1999	
		6. Performing Organization Code TRC	
7. Author(s) Virginia L. Watters, Engineering Technician Transportation Research Center Inc.		8. Performing Organization Report No. 208S-TRC-99-003	
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-98-D-01055	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Safety Assurance Office of Vehicle Safety Compliance (NSA-30) 400 Seventh Street, S.W., Room 6115 Washington, DC 20590		13. Type of Report and Period Covered Final Report February - March 1999	
		14. Sponsoring Agency Code NSA-30	
15. Supplemental Notes None			
16. Abstract An FMVSS 208 compliance sled test was conducted on a 1999 Chevrolet Tahoe MPV, NHTSA No. CX0107, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208S-01 for the determination of FMVSS 208 compliance. Apparent test failures identified were as follows: Front passenger neck extension moment exceeded the allowable injury criteria.			
17. Key Words Safety Engineering Compliance Sled Testing: FMVSS 208, "Occupant Crash Protection"		18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division Room 5108 400 Seventh Street, S.W., NAD-52 Washington, DC 20590	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. Number of Pages 165	22. Price

List of Photographs

<u>Figure</u>	<u>Photograph Title</u>	<u>Page</u>
A-1.	Pre-Test Front View Of Test Vehicle Mounted To Sled	A-2
A-2.	Pre-Test Left Side View Of Test Vehicle Mounted To Sled	A-3
A-3.	Pre-Test Right Side View Of Test Vehicle Mounted To Sled	A-4
A-4.	Pre-Test Windshield View	A-5
A-5.	Post-Test Windshield View	A-6
A-6.	Pre-Test Driver Dummy Position View With Door Open	A-7
A-7.	Post-Test Driver Dummy Position View With Door Open	A-8
A-8.	Pre-Test Driver Seat Track Position View	A-9
A-9.	Post-Test Driver Seat Track Position View	A-10
A-10.	Pre-Test Driver Dummy Position Front View	A-11
A-11.	Post-Test Driver Dummy Position Front View	A-12
A-12.	Pre-Test Passenger Dummy Position View With Door Open	A-13
A-13.	Post-Test Passenger Dummy Position View With Door Open	A-14
A-14.	Pre-Test Passenger Seat Track Position View	A-15
A-15.	Post-Test Passenger Seat Track Position View	A-16
A-16.	Pre-Test Passenger Dummy Position Front View	A-17
A-17.	Post-Test Passenger Dummy Position Front View	A-18
A-18.	Post-Test Driver Airbag View	A-19
A-19.	Post-Test Driver Head Contact - View 1	A-20
A-20.	Post-Test Driver Head Contact - View 2	A-21
A-21.	Post-Test Passenger Airbag View	A-22
A-22.	Post-Test Passenger Head Contact View	A-23
A-23.	Pre-Test Driver Knee Bolster View	A-24
A-24.	Post-Test Driver Knee Bolster - View 1	A-25
A-25.	Post-Test Driver Knee Bolster - View 2	A-26
A-26.	Pre-Test Passenger Glove Box View	A-27
A-27.	Post-Test Passenger Glove Box - View 1	A-28
A-28.	Post-Test Passenger Glove Box - View 2	A-29

List of Photographs

<u>Figure</u>	<u>Photograph Title</u>	<u>Page</u>
A-29.	Pre-Test Steering Column Linkage in Engine Compartment View	A-30
A-30.	Post-Test Steering Column Linkage in Engine Compartment View	A-31
A-31.	Pre-Test Vehicle Certification Label View	A-32

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) under Contract No. DTNH22-98-D-01055. The purpose of this test was to determine if the subject vehicle, a 1999 Chevrolet Tahoe MPV, NHTSA No. CX0107, 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 test vehicle was instrumented with six (6) accelerometers to measure longitudinal axis accelerations and one (1) inductive pickup sensor to measure the vehicle's airbag firing system.

The 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 at TRC on February 2, 1999.

The test vehicle, a 1999 Chevrolet Tahoe MPV, NHTSA No. CX0107, did not appear to comply with the passenger neck extension requirement 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	141.6	197.4
Chest g	60 g	37.7	39.0
Chest Displacement	3 inches	1.5	0.2
Left Femur	2250 lb	1636.9	1218.8
Right Femur	2250 lb	1449.1	1274.7
Neck Extension	57 Nm	7.6	66.8
Neck Flexion	190 Nm	52.2	48.1
Neck Tension	3300 N	923.0	953.7
Neck Compression	4000 N	275.9	1156.5
Neck Shear	3100 N	812.6	994.0

The vehicle 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 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 16.9 g with an integrated velocity change of 28.7 mph. The air bags were triggered at 20.1 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 air bag event trigger signal was 21.2 ms after the 0.5 g acceleration level was indicated.

Sled Test Summary

NHTSA number: CX0107
Test type: FMVSS 208 Compliance Sled Test
Test date: 02/02/99
Test time: 15:55
Ambient temperature at impact area: 70° F
Vehicle year/make/ model/body style: 1999/Chevrolet/Tahoe/MPV

<u>Dummy Info:</u>	<u>Driver #314</u>	<u>Passenger #230</u>
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag 2 nd generation	Airbag 2 nd generation
Number of data channels:	15	15

Number of Cameras:

Real-time:	1
High-speed:	6

Door Opening Data:

Left Front:	Normal
Right Front:	Normal

Front Seat Data:

Seat track failure:	No apparent failure	No apparent failure
Seat back failure:	No apparent failure	No apparent failure

Visible Dummy Contact Points:

Head:	Airbag, Side header, Sunvisor	Airbag, Head restraint
Chest:	Airbag	Airbag
Left knee:	Knee bolster	Knee bolster/Glove box
Right knee:	Knee bolster	Knee bolster/Glove box

General Test and Vehicle Parameter Data

Test Vehicle Information:

Vehicle year/make/
model/body style: 1999/Chevrolet/Tahoe/MPV

Color: Red Metallic

VIN: 1GNEC13R8XJ407668

NHTSA number: CX0107

Engine data:

Placement: Longitudinal

Cylinders: 8

Displacement: 5.7 liters

Transmission data: 4 speed, manual, X automatic, X overdrive

Final drive: fwd, X rwd, 4wd

Date vehicle received: 12/11/98

Odometer reading: 196

Dealer's name
and address: Superior Chevrolet
260 W. Mitchell Ave.
Cincinnati, Ohio 45223

Major Options:

Power steering	Yes	Other: Heavy duty trailering equipment,
Power brakes	Yes	electric rear window defogger, Tilt wheel.
Power windows	Yes	
Air conditioning	Yes	
Power door locks	Yes	

Remarks: None

General Test and Vehicle Parameter Data, Cont'd.

Data from Vehicle's Certification Label:

Vehicle manufactured by:	General Motors Corporation
Date of manufacture:	10/98
VIN:	1GNEC13R8XJ407668
GVWR:	6300 lb
GAWR: Front:	3526 lb
Rear:	3686 lb

Data from Vehicle's Tire Placard:

Tire pressure with maximum capacity vehicle load:

Front:	35 psi
--------	--------

Rear:	35 psi
-------	--------

Recommended tire size:	P235/75R15
------------------------	------------

Load range:	1620 lbs
-------------	----------

Recommended cold tire pressure:

Front:	32 psi
--------	--------

Rear:	35 psi
-------	--------

Size of tires on vehicle:	P235/75R15
---------------------------	------------

Spare tire:	P235/75R15
-------------	------------

Vehicle capacity data:

Type of front seats:	Split bench
----------------------	-------------

Number of occupants:

Front	3
-------	---

Rear	3
------	---

Total	6
-------	---

Remarks:

General Test and Vehicle Parameter Data, Cont'd.

Vehicle Capacity Weight

Vehicle Capacity Weight (VCW) = 1465 lbs

Number of occupants x 150 lbs = 900 lbs

Rated cargo/luggage weight (RCLW) = 565 lbs

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

Right front	1203	lb	Right rear	1167	lb
Left front	1250	lb	Left rear	1215	lb
Total front weight	2453	lb	(51% of total vehicle weight)		
Total rear weight	2382	lb	(49% of total vehicle weight)		
Total delivered weight	4835	lb			

Weight of test vehicle with two dummies and 300 lb of cargo weight:

Right front	1290	lb	Right rear	1455	lb
Left front	1330	lb	Left rear	1394	lb
Total front weight	2620	lb	(48% of total vehicle weight)		
Total rear weight	2849	lb	(52% of total vehicle weight)		
Total test weight	5469	lb			

Remarks:

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: None

General Test and Vehicle Parameter Data, Cont'd.

Test Vehicle Attitude:

As delivered door sill angle: 0.2° Nose down

As tested door sill angle: 0.1° Nose down

Fully loaded door sill angle: 0.0°

Vehicle Wheelbase: 118 inches

Fuel System Data:

Fuel system capacity from owner's manual: 30 gallons

Useable capacity figure furnished by COTR: 28.5 gallons

Remarks: None

Post-Impact Data

Test number: 990202S
NHTSA number: CX0107
Test date: 02/02/99
Test time: 15:55
Test type: FMVSS 208 Compliance Sled Test
Impact angle: 0°
Ambient temperature
at impact area: 70° F
Temperature in
occupant compartment: 70° F

Sled carriage velocity:

Integrated velocity from the integration of the entire sled acceleration: 28.7 mph
Measured velocity from the light trap device attached to the sled (backup): 29.5 mph
Specified integrated velocity range: 28 to 30 mph

Sled carriage acceleration:

Acceleration: 16.9 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: 122.7 msec
Specified acceleration duration: 120.0 - 130.0 msec

Seat and Steering Column Positioning Data

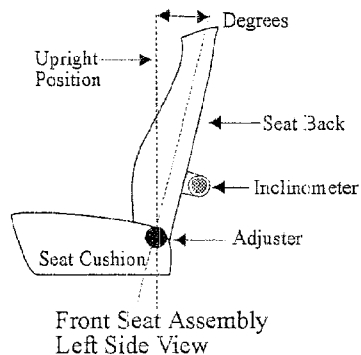
Vehicle: 1999 Chevrolet Tahoe MPV

NHTSA No.: CX0107

Nominal Design Riding Position:

Driver Seat: Seat Back Angle = 23.0°

Passenger Seat: Seat Back Angle = 23.0°



Seat Fore and Aft Positions:

Driver Seat: Power seat adjusted to mid-point of fore-aft travel.

Passenger: The seat track had a total position movement of 11 notches and was positioned 6 notches rearward from the foremost position with the forward most locking position as one.

Steering Column Adjustments:

The steering column was adjusted to the second position from the full down position with full down position being zero.

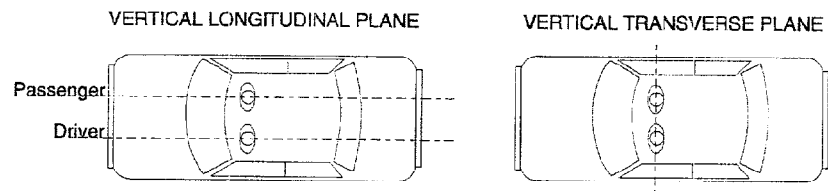
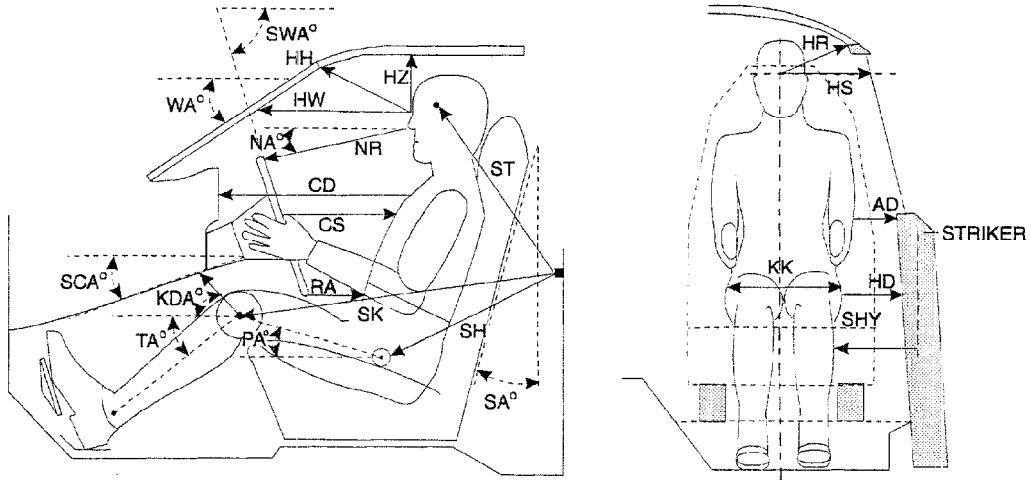
Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #314)	Passenger (Serial #230)
WA	Windshield angle	39.6°	N/A
SWA	Steering wheel angle	26.0°	N/A
SCA	Steering column angle	25.0°	N/A
SA	Seat back angle	23.6°	23.4°
HZ	Head to roof	8.9 in	8.5 in
HH	Head to header	20.3 in	20.9 in
HW	Head to windshield	26.4 in	26.0 in
HR	Head to side header	9.8 in	9.6 in
NR	Nose to rim	15.6 in	N/A
NA	Nose to rim angle	10.0°	N/A
CD	Chest to dash	22.7 in	22.6 in
CS	Steering wheel to chest	11.5 in	N/A
RA	Rim to abdomen	6.9 in	N/A
KDL	Left knee to dash	6.3 in	8.2 in
KDR	Right knee to dash	6.9 in	8.1 in
KDA	Outboard knee to dash angle	22°	25°
PA	Pelvic angle	23.5°	23.6°
TA	Tibial angle	40.6°	40.2°
KK	Knee to knee	12.5 in	10.6 in
ST ¹	Striker to head	25.1 in	25.6 in
	Striker to head angle	71.2°	71.8°
SK ¹	Striker to knee	28.2 in	26.0 in
	Striker to knee angle	2.4°	2.4°
SH ¹	Striker to H-point	13.5 in	13.6 in
	Striker to H-point angle	-9.7°	-9.1°
SHY	Striker to H-point (Y dir.)	9.6 in	9.7 in
HS	Head to side window	13.5 in	13.4 in
HD	H-point to door	5.7 in	5.8 in
AD	Arm to door	5.5 in	5.5 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



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 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).
- *¹ KDL, Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's
KDR 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, Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z
SK, plane measured from the forward most center point on the striker to the center of
ST 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

* Measurement used in Data Tape Reference Guide

¹ Only outboard measurement is referenced in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd.

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.
- 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

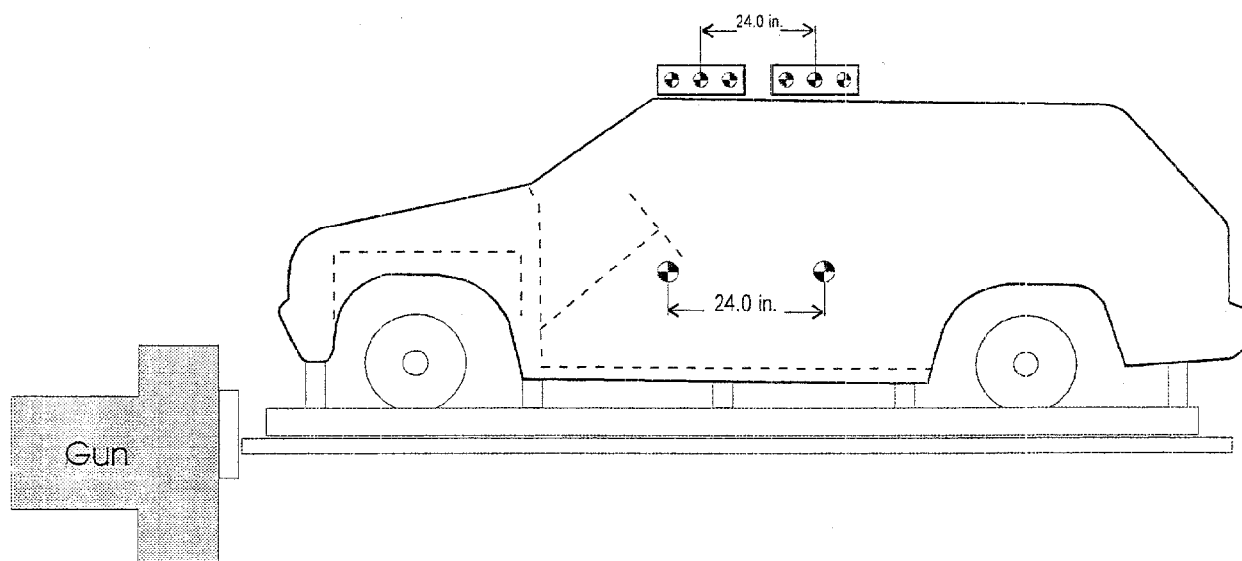
- SA Seat Back Angle, find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR.
- PA Pelvic or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies 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.

* Measurement used in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd.

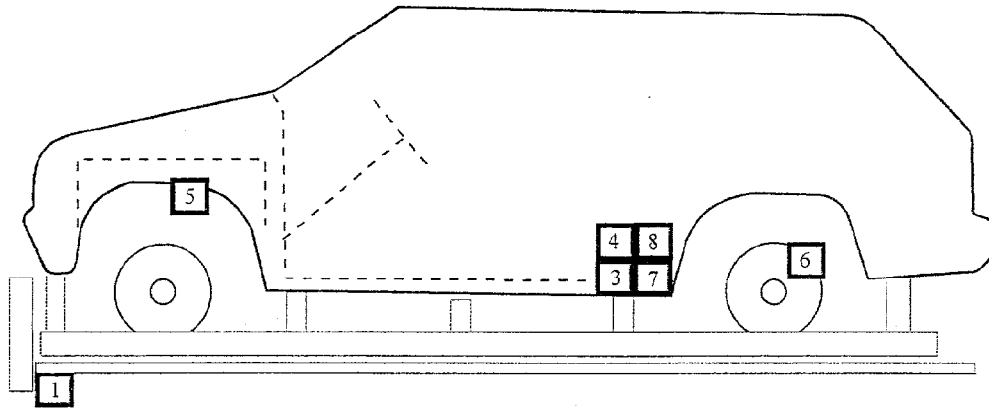
- SWA Steering Wheel Angle, find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.
- SCA Steering Column Angle, measured with respect to the horizontal by placing an inclinometer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

REFERENCE PHOTO TARGETS

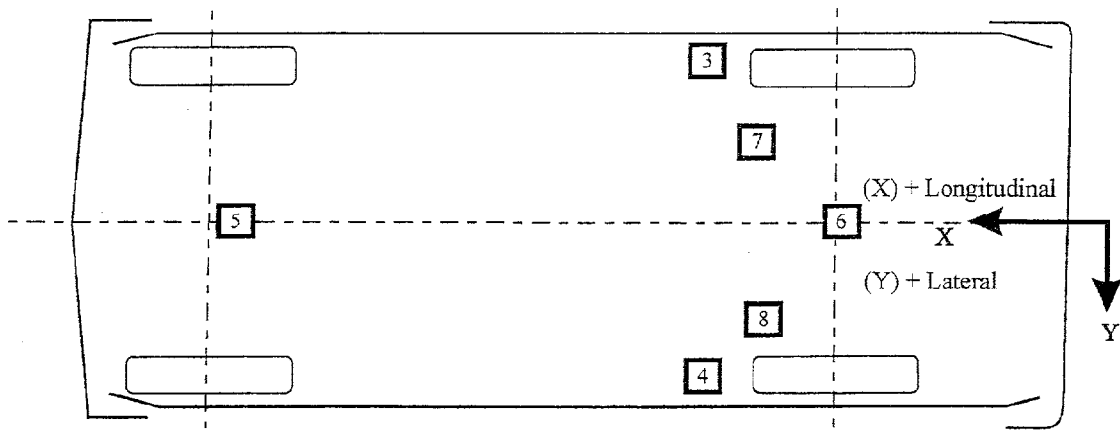


LEFT SIDE VIEW

Vehicle Accelerometer Placement



Side View



Bottom View

Vehicle Data Summary and Accelerometer Locations

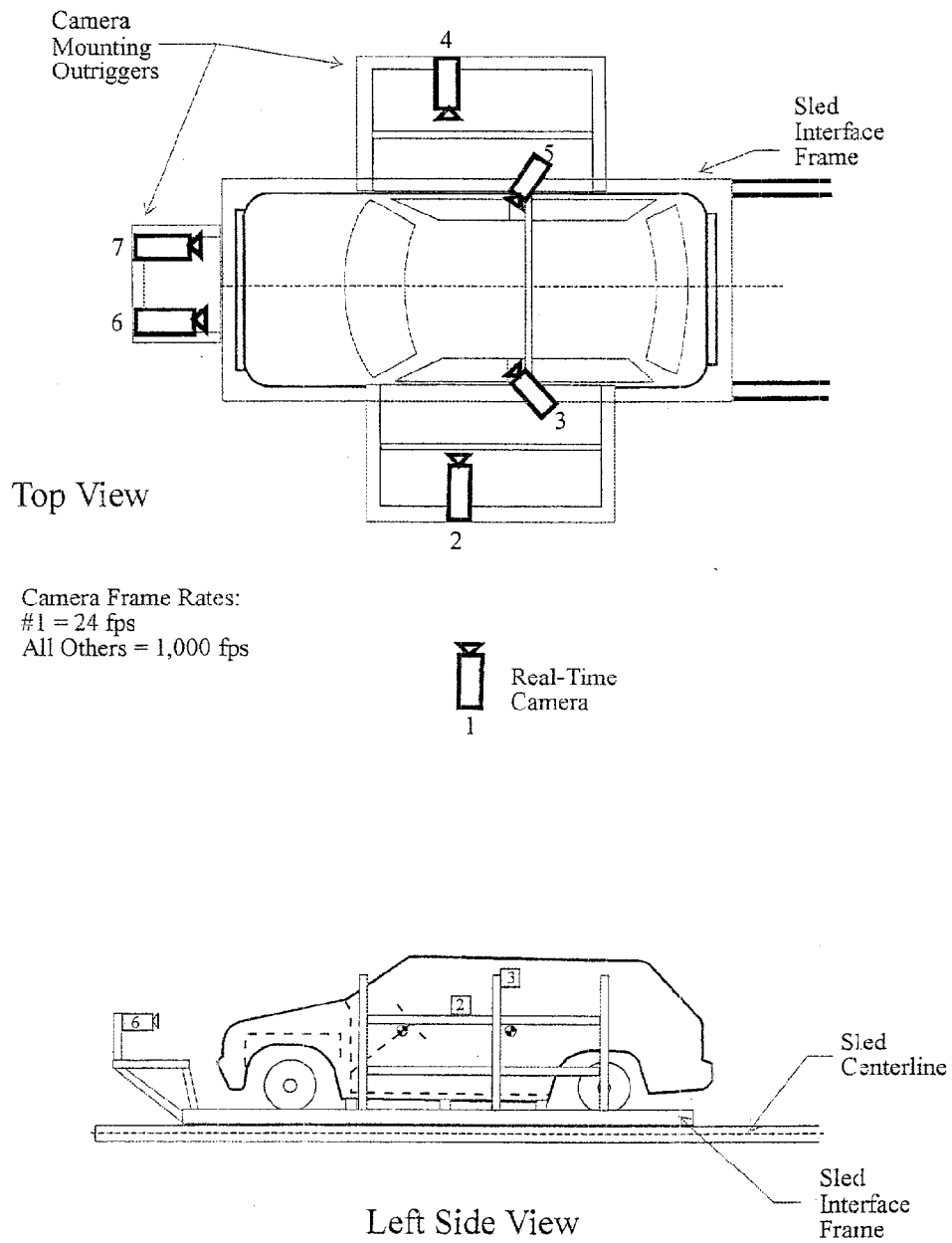
TEST NUMBER: 990202S				POSITIVE		NEGATIVE	
No. LOCATION	X	Y	Z	DIRECTION		DIRECTION	
1 SLED ACCELERATION	200.6 in	-1.0 in					
PRIMARY				1.5 g	@ 127.4 ms	16.9 g	@ 57.4 ms
REDUNDANT				1.6 g	@ 128.4 ms	17.2 g	@ 56.9 ms
2 SLED VELOCITY							
MEASURED				0.2 mph	@ 3.1 ms	29.5 mph	@ 123.8 ms
INTEGRATED				-0.1 mph	@ 3.1 ms	28.7 mph	@ 122.8 ms
3 LEFT REAR SEAT	65.3 in	-27.3 in					
CROSSMEMBER				2.2 g	@ 157.8 ms	20.9 g	@ 47.0 ms
LONGITUDINAL							
4 RIGHT REAR SEAT	65.5 in	27.0 in					
CROSSMEMBER				2.4 g	@ 157.1 ms	21.1 g	@ 47.5 ms
LONGITUDINAL							
5 BOTTOM ENGINE	152.6 in	0.8 in					
LONGITUDINAL				3.3 g	@ 131.6 ms	18.1 g	@ 50.5 ms
6 REAR AXLE	41.4 in	-1.4 in					
LONGITUDINAL				2.3 g	@ 128.8 ms	18.5 g	@ 52.1 ms
7 LEFT VEHICLE FRAME	61.7 in	-21.5 in					
LONGITUDINAL				2.1 g	@ 129.3 ms	18.1 g	@ 52.3 ms

Vehicle Data Summary and Accelerometer Locations, Cont'd.

TEST NUMBER: 990202S No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
8 RIGHT VEHICLE FRAME LONGITUDINAL	62.2 in	12.3 in		1.7 g @ 129.2 ms	29.1 g @ 31.5 ms
9 AIRBAG EVENT				7.0 volt @ 21.2 ms	--- --
10 DRIVER AIRBAG INDUCTIVE PICKUP EVENT				7.6 volt @ 49.4 ms	0.8 volt @ 59.4 ms

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

Camera Positions



Motion Picture Camera Locations

Vehicle year/make/model/body style: 1999/Chevrolet/Tahoe/MPV NIHTSA No. CX0107 Test Number: 990202S

Camera Number	View	Camera Positions ¹			Camera Angle ²	Film Plane to Head Target	Camera Lens	Film Speed
		X	Y	Z				
1	Left side view offboard	87.0 in	-307.9 in	43.3 in	0	285.0 in	10 mm	24 frames/s
2	Left side view wide	80.5 in	-70.6 in	50.8 in	1.1°	53.3 in	8 mm	1008 frames/s
3	Left side view over shoulder	98.9 in	-48.9 in	68.2 in	12.4°	30.4 in	8 mm	1002 frames/s
4	Right side view wide	77.9 in	91.8 in	50.9 in	3.8°	72.6 in	8 mm	1000 frames/s
5	Right side view over shoulder	100.5 in	49.3 in	69.2 in	10.8°	31.2 in	8 mm	975 frames/s
6	Front view - driver	27.8 in	-17.9 in	60.1 in	7.6°	60.1 in	8 mm	1012 frames/s
7	Front view - passenger	27.0 in	16.1 in	60.1 in	8.3°	61.6 in	8 mm	998 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: 1999 Chevrolet Tahoe MPV

NHTSA NO.: CX0107

Date: 02/02/99

Maximum Acceleration Values: (g's)	Driver Dummy #314	Passenger Dummy #230
Head Channel X	-28.7	-35.0
Head Channel Y	10.1	9.0
Head Channel Z	18.2	-41.6
HEAD RESULTANT	33.4	53.5
Chest Channel X	-38.6	-36.0
Chest Channel Y	-5.1	-4.1
Chest Channel Z	8.6	20.3
CHEST RESULTANT	39.2	41.2

Head Injury Criteria (HIC) Values:

HIC	141.6	197.4
$t_1 = (\text{msec})$	107.7	107.5
$t_2 = (\text{msec})$	143.7	143.5

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

Chest Injury Criteria (Clip) Values: (g's)

CLIP	37.7	39.0
$t^1 = (\text{msec})$	92.3	114.3
$t^2 = (\text{msec})$	95.3	117.3
Chest Deflection (in)	1.5	0.2

FMVSS 208 Occupant Injury Data, Cont'd.

Vehicle: 1999 Chevrolet Tahoe MPV

NHTSA NO.: CX0107 Date: 02/02/99

Max. Compressive Femur Forces:	Units (lbs)	
	Driver Dummy #314	Passenger Dummy #230
Left Side (lbs)	1637	1219
Right Side (lbs)	1449	1275

Neck Injury Criteria:	Driver Dummy #314	Passenger Dummy #230
Peak Flexion Bending Moment (N-m)	52.2	48.1
Peak Extension Bending Moment (N-m)	7.6	66.8
Peak Axial Tension (N)	923.0	953.7
Peak Axial Compression (N)	275.9	1156.5
Peak Fore Shear (N)	812.6	994.0
Peak Aft Shear (N)	112.2	840.3

FMVSS 208 SEAT BELT WARNING SYSTEM CHECK

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 01/29/99

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

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

A.1 S7.3(a)(1)

Time duration of audible warning signal = 6 seconds
(4 to 8 seconds)

Time duration of reminder light operation = 71 seconds
(no less than 60 seconds)

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

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

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

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

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

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

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

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

Time duration of audible warning signal = _____ seconds
(audible warning should not operate)

Time duration of reminder light operation = _____ 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 01/29/99

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 of the readiness indicator: Upper left side of the instrument cluster.

Is the readiness indicator clearly visible to the driver?

Yes-☒; No-☐

Is a list of the element 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 01/29/99

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 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
- 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

Air Bag Labels, Cont'd.

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

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.

Air Bag Labels, Cont'd.

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?

Driver side ☐ Yes-Pass ☒ N/A ☐ 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.

Driver side ☐ Yes-Pass ☒ N/A ☐ No-Fail

Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

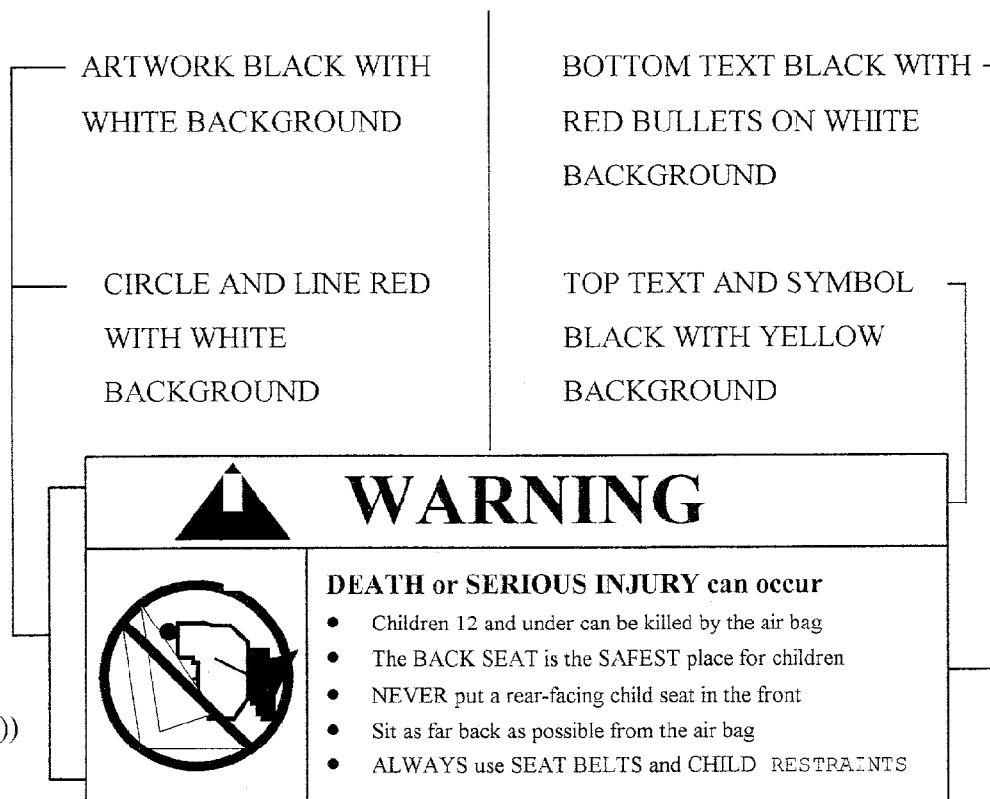


Figure 6a
(S4.5.1(b)(2))

Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

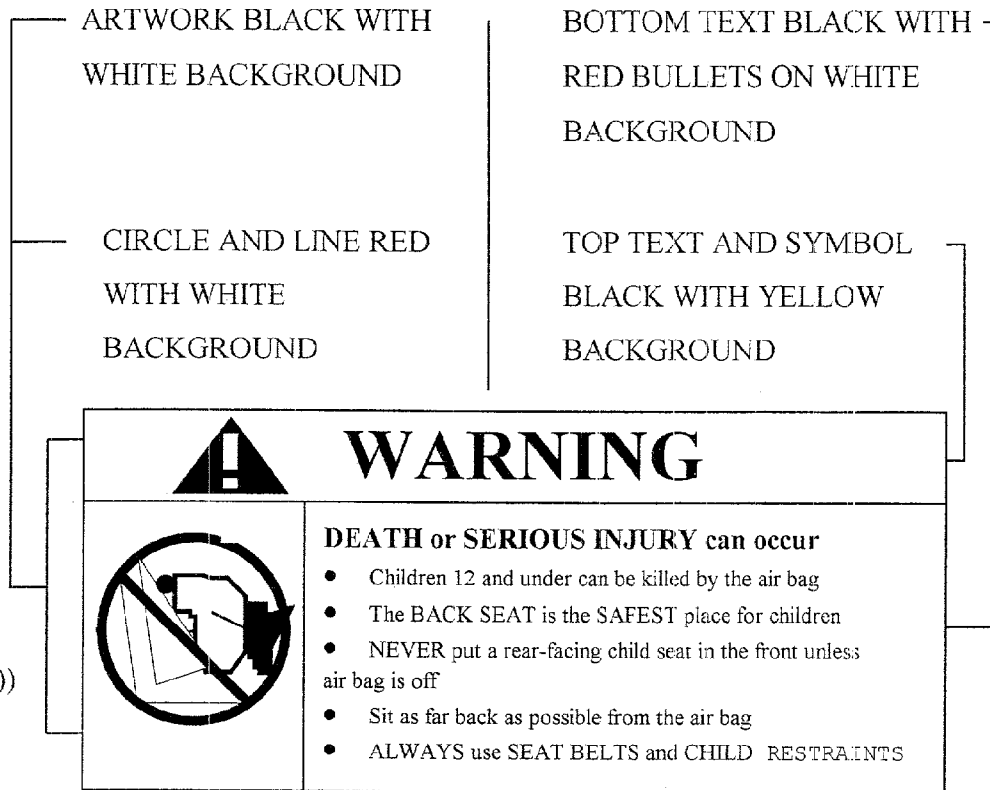


Figure 6b
(S4.5.1(b)(2))

- 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 cm²? (S4.5.1(b)(2)(ii))

Actual message area 33 cm²

Driver side ☒ Yes-Pass ☐ No-Fail

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

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 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))

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 side ☒ Yes ☐ No Passenger side ☒ 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

Circle and Line Red
with White
Background

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN UP POSITION

Artwork Black with
White Background

Text Yellow with
Black Background

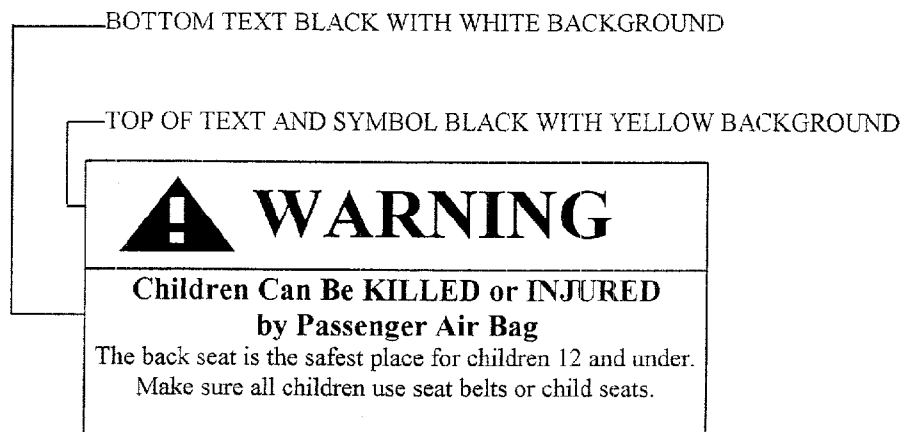
Figure 6c
(S4.5.1(c)(2))



Air Bag Labels, Cont'd.

- 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 cm²? (S4.5.1(c)(2)(i))
Actual message area ___ cm² ☐ 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 ___ 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 check list 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(e))



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 cm²? (S4.5.1(e)(ii))
Actual message area 32 cm² ☒ Yes-Pass ☐ No-Fail

FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTS

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 01/29/99

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

Yes-☒; No-☐;

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

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 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Right front passenger seat

- ☒ 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 the 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Right front passenger seat.

- ☒ 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 50.7 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 33 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Right front passenger seat.

- ☒ 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 20 lb/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 33.5 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))

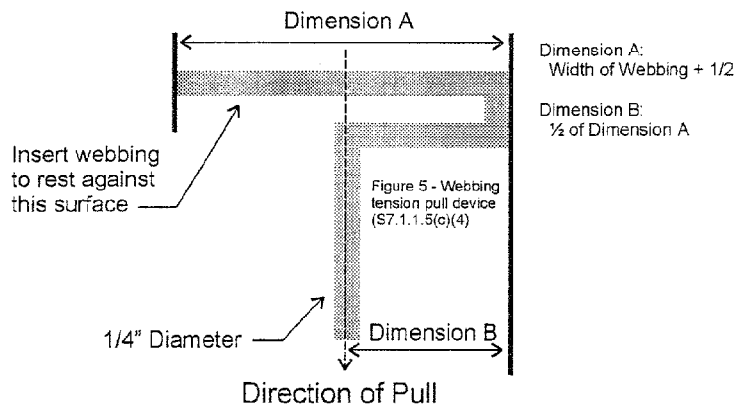
14-13=0.5 inches

☒ 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=17.2 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 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Left Rear Passenger

- ☒ 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 the 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Left Rear Passenger

- ☒ 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 **60.1** 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 **27.2** inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Left Rear Passenger.

- ☒ 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 20 lb/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 27.5 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))

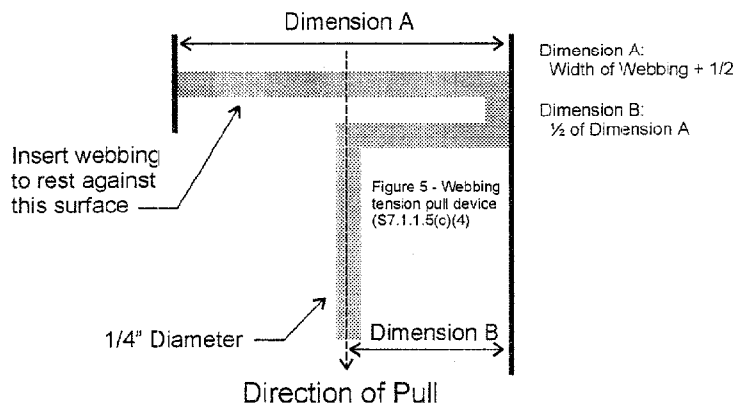
14-13=0.3 inches

☒ 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=32.6 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 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Right Rear Passenger

- ☒ 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 the 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: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Right Rear Passenger

- ☒ 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 **58.6** 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 **23.8** inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

NHTSA NO.: CX0107

Technician: R. Stoner & V. Watters

Date: 02/01/99

DESIGNATED SEATING POSITION: Right Rear Passenger

- ☒ 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 20 lb/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 24.2 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))

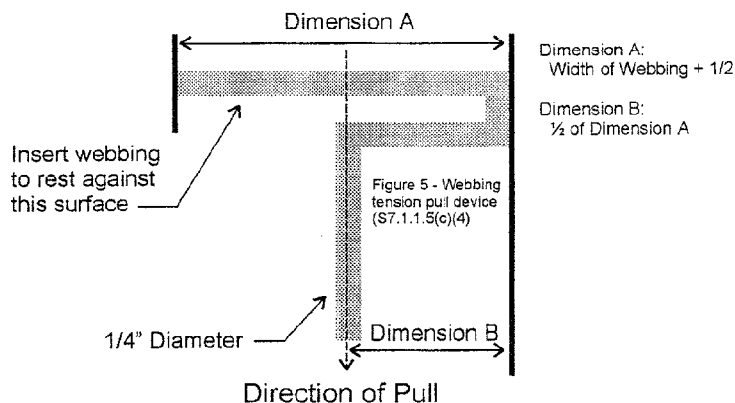
14-13=0.4 inches

☒ 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=34.8 inches.

☒ Yes-Pass ☐ No-Fail



FMVSS 208 Seat Belt Comfort And Convenience Test
Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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 dummies according to dummy position placement instructions in Appendix B.

☒ 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 0.6 pounds.

☒ 0.0 to 0.7 pounds - Pass
☐ greater than 0.7 pounds - **FAIL***

FMVSS 208 Seat Belt Comfort And Convenience Test, Cont'd.
Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Front Passenger

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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 dummies according to dummy position placement instructions in Appendix B.

☒ 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 0.6 pounds.

☒ 0.0 to 0.7 pounds - Pass
☐ **greater than 0.7 pounds - FAIL***

FMVSS 208 Seat Belt Comfort And Convenience Test, Cont'd.
Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Left Rear Passenger

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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 dummies according to dummy position placement instructions in Appendix B.

☒ 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***

FMVSS 208 Seat Belt Comfort And Convenience Test. Cont'd.
Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Right Rear Passenger

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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 dummies according to dummy position placement instructions in Appendix B.

☒ 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 0.7 pounds.

☒ 0.0 to 0.7 pounds - Pass
☐ **greater than 0.7 pounds - FAIL***

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

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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. (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. ☒ 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 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.
Latchplate Access (S7.4.4)

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Right Front Passenger

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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. (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
5. Attach the inboard and outboard reach string following the instructions on Figure 1C. ☒ 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 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.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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

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.

☒ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

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.
Retraction (S7.4.5)

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Right Front Passenger

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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
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. ☒ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

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
13. 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**
14. 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.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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
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

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

(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

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

Test Vehicle NHTSA No.: CX0107

Vehicle Model Year/Make/Model/Body Style: 1999/Chevrolet/Tahoe/MPV

Designated Seating Position Tested: Right Front Passenger

Date of Comfort and Convenience Check: 02/01/99

Technician Performing Check: R. Stoner & V. Watters

GVWR: 6300 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
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

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

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

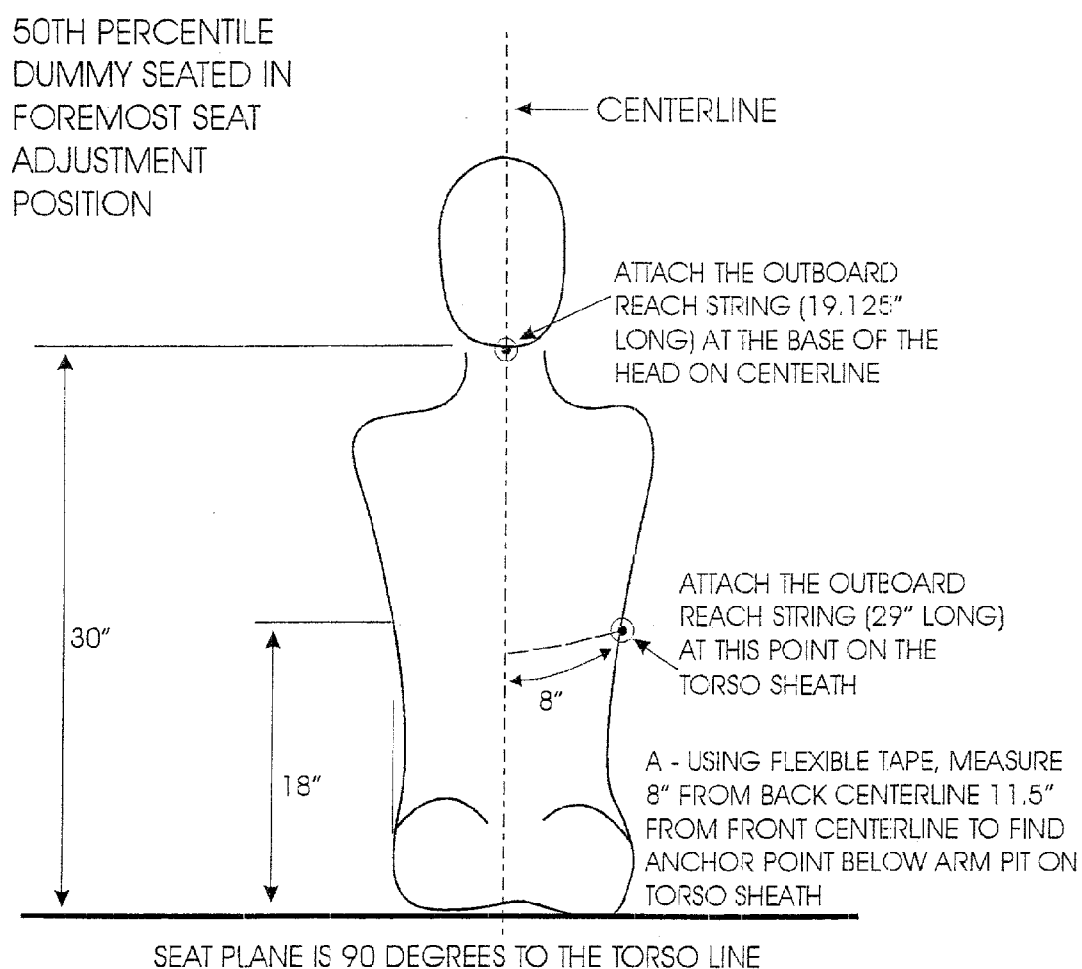
(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check

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

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

PART 572E DUMMY



REAR VIEW

Figure 1C

USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS

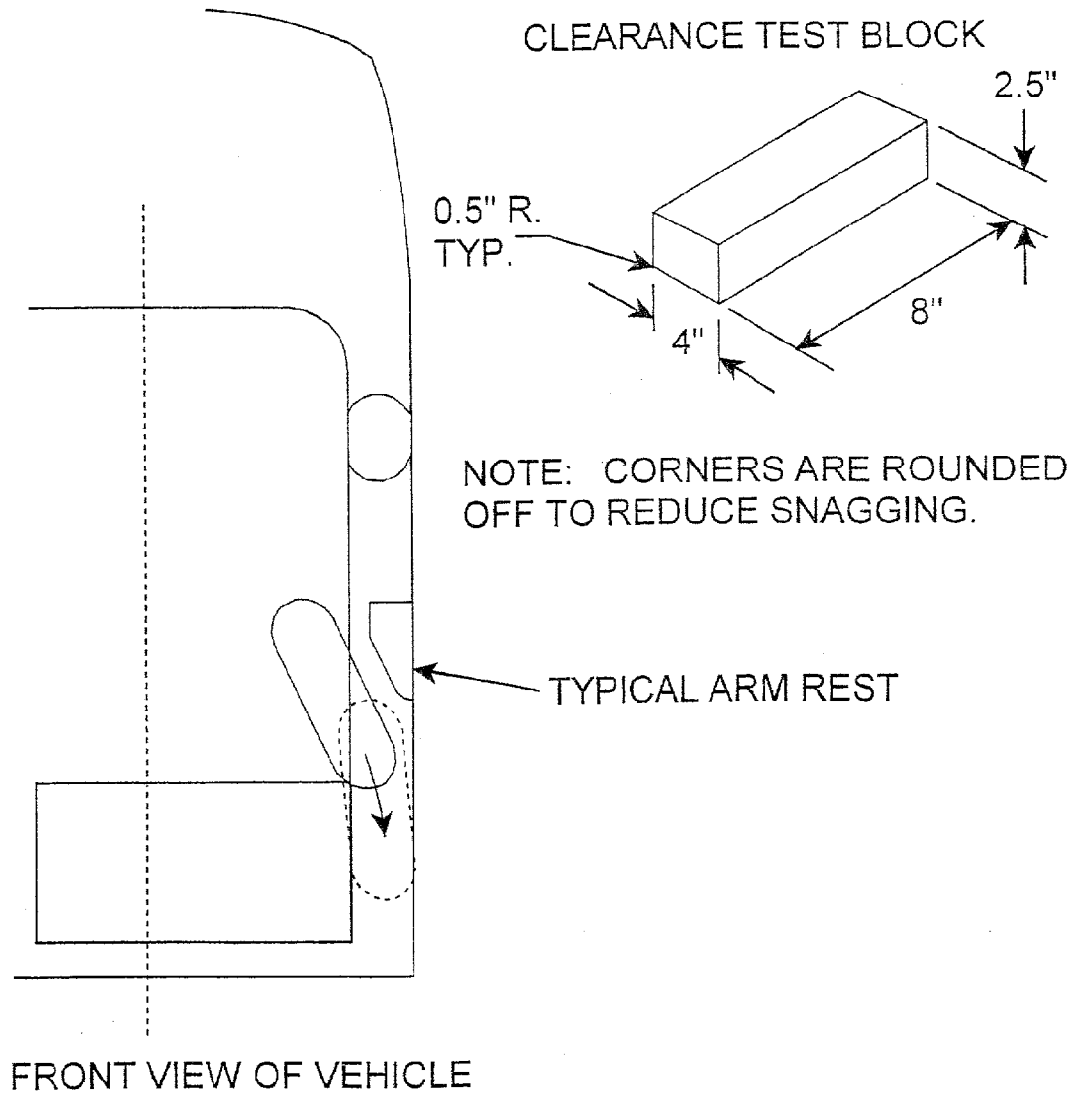


Figure 2C

Appendix A

Photographs

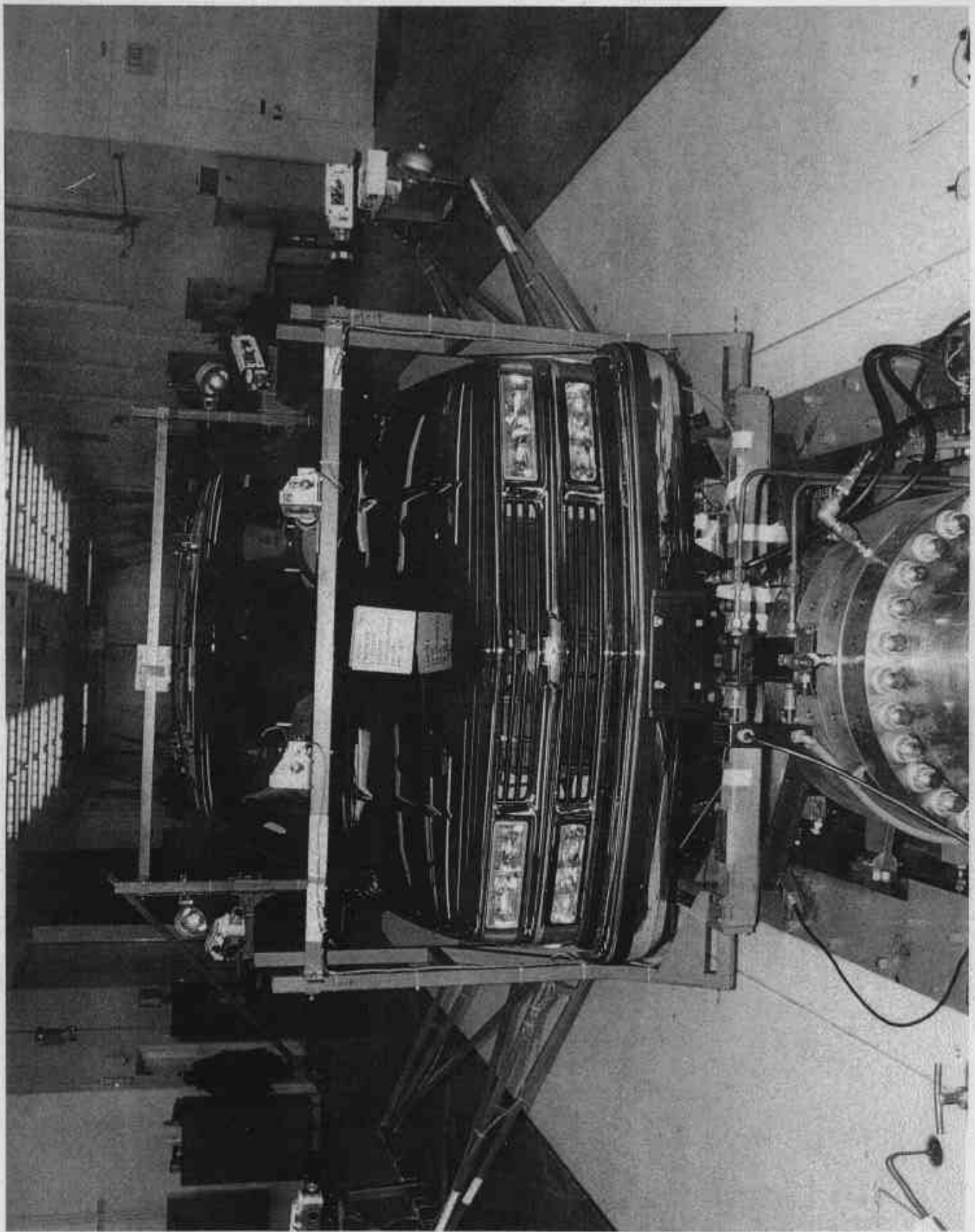


Figure A-1 Pre-Test Front View of Test Vehicle Mounted to Sled

A-2

990202S

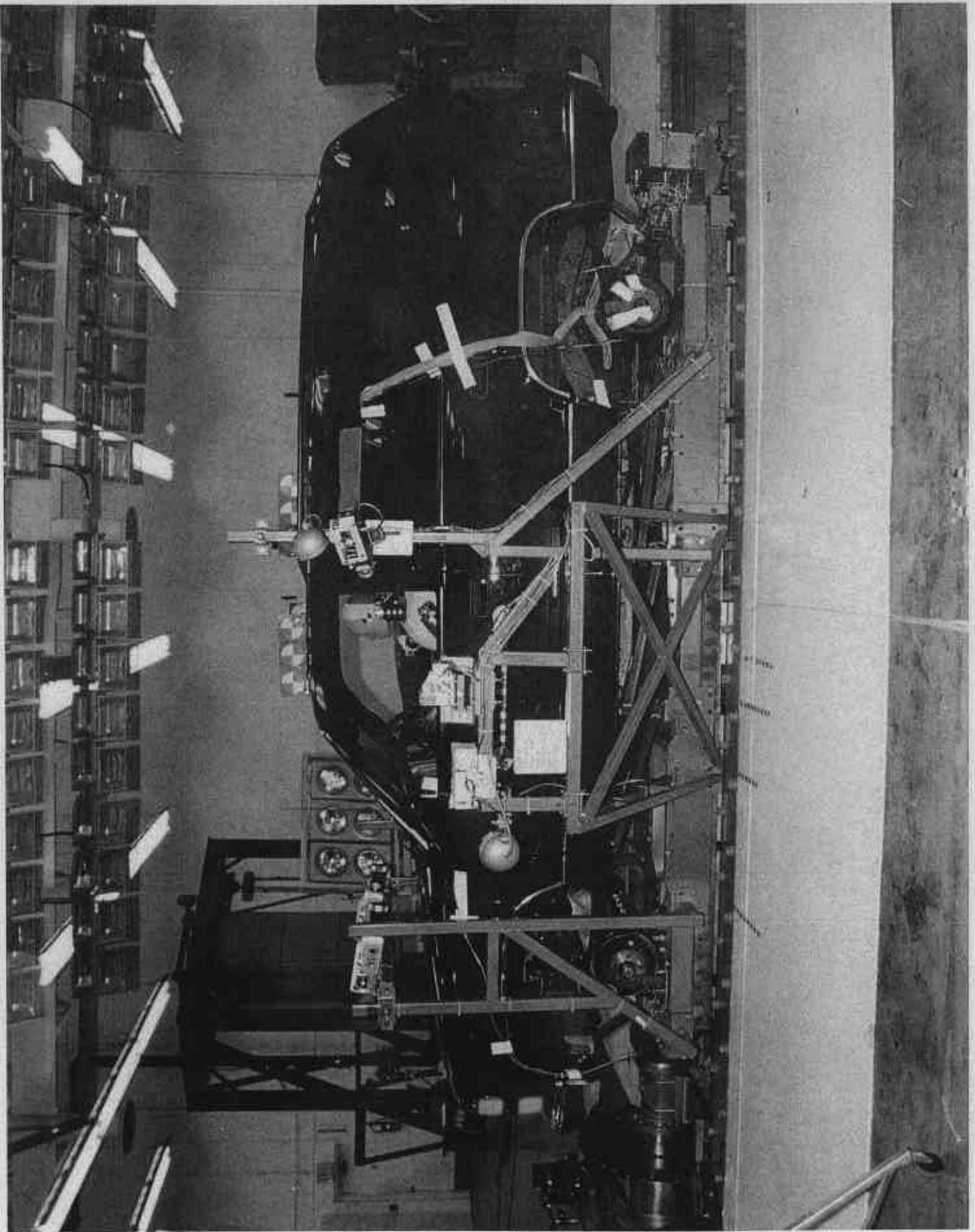


Figure A-2 Pre-Test Left Side View of Test Vehicle Mounted to Sled

A-3

990202S

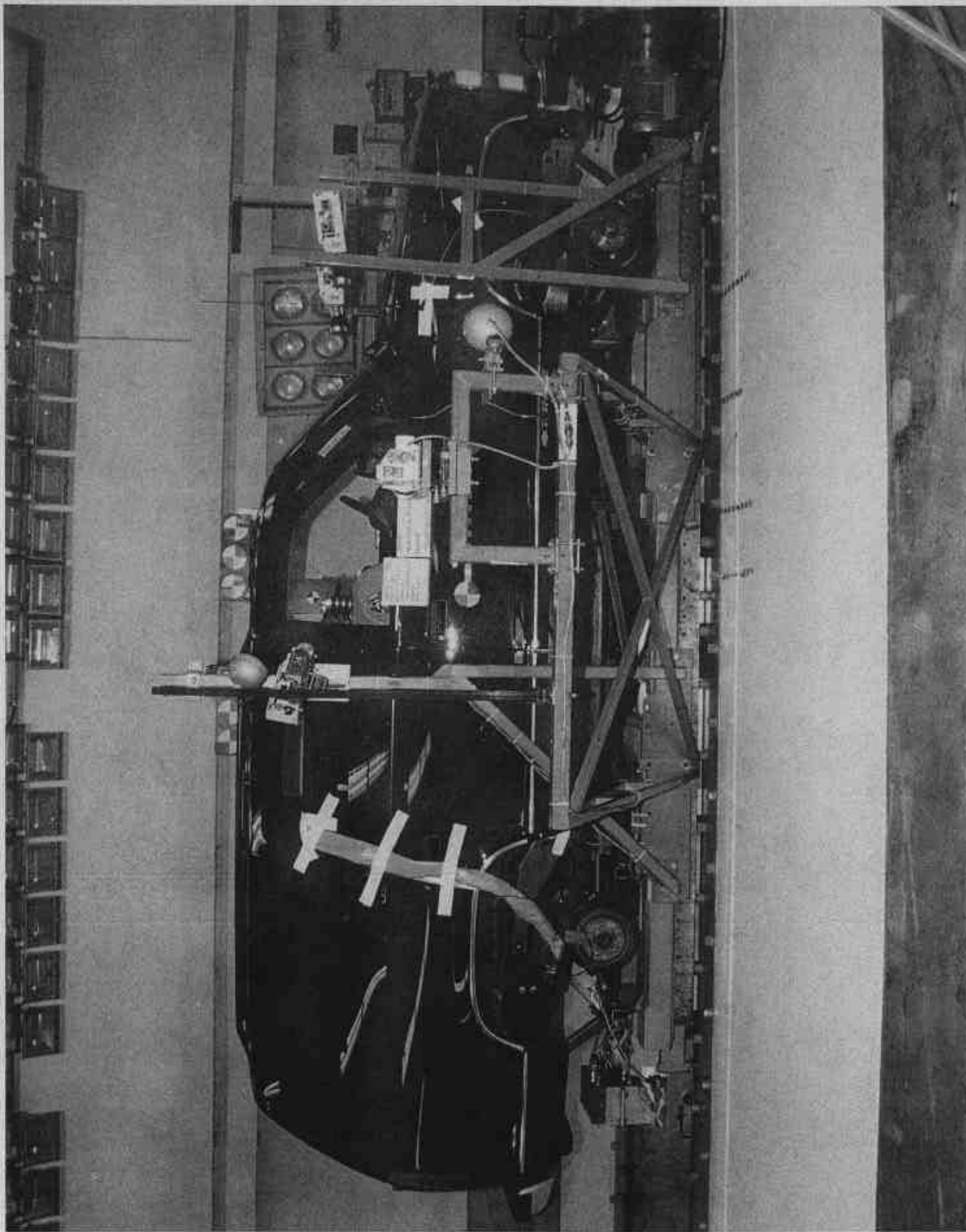


Figure A-3 Pre-Test Right Side View of Test Vehicle Mounted to Sled

A-4

990202S

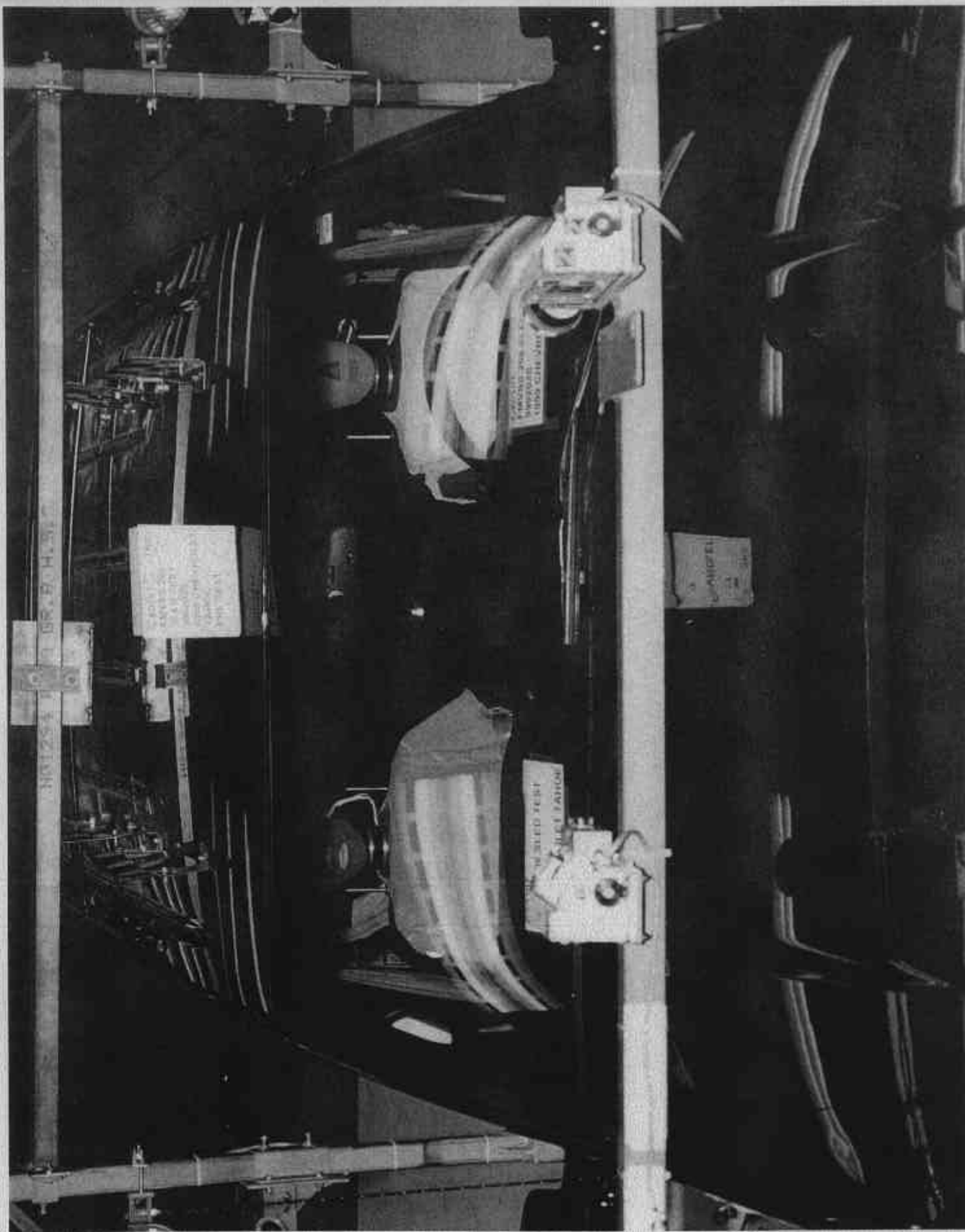


Figure A-4 Pre-Test Windshield View
A-5

990202S

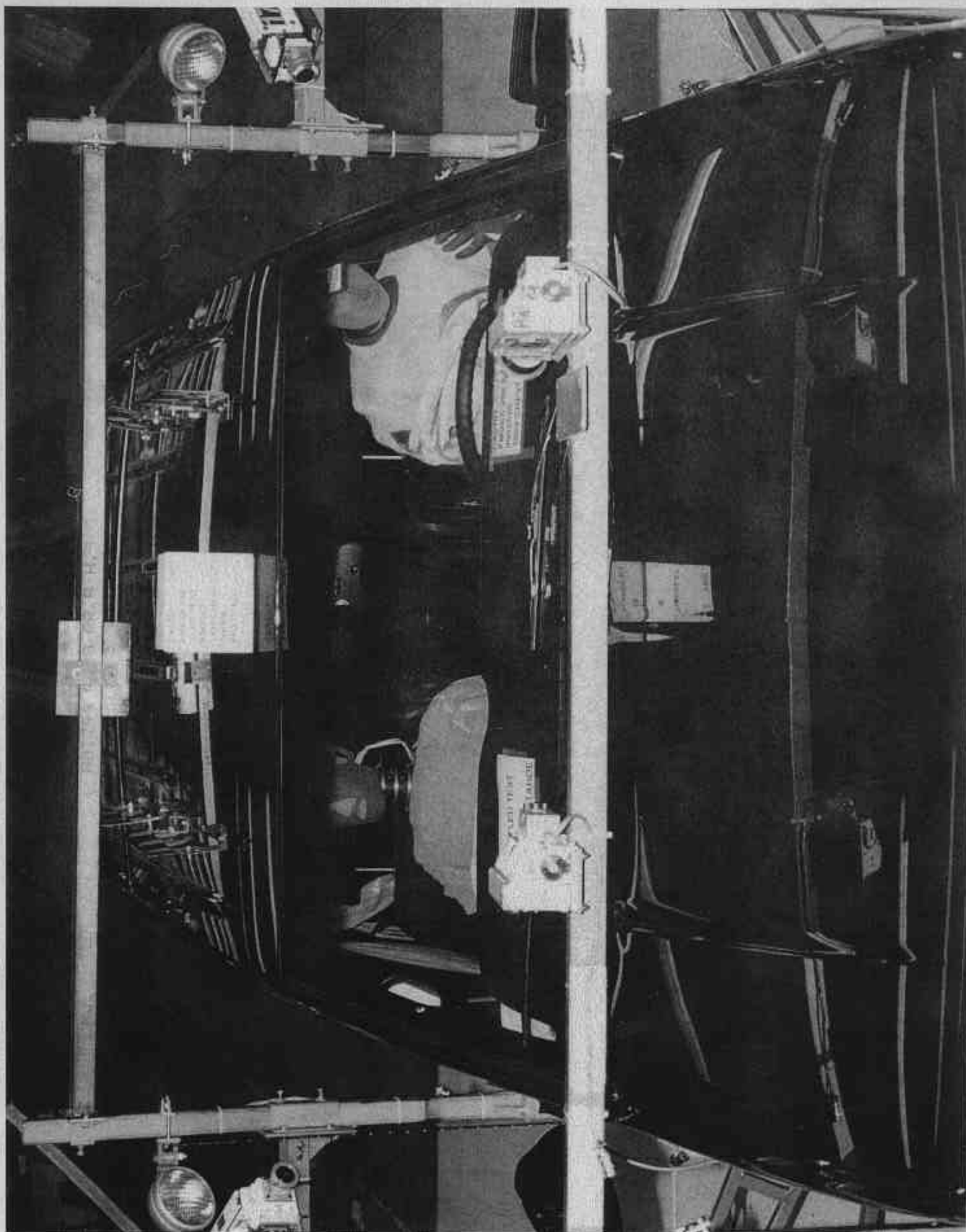


Figure A-5 Post-Test Windshield View
A-6

990202S

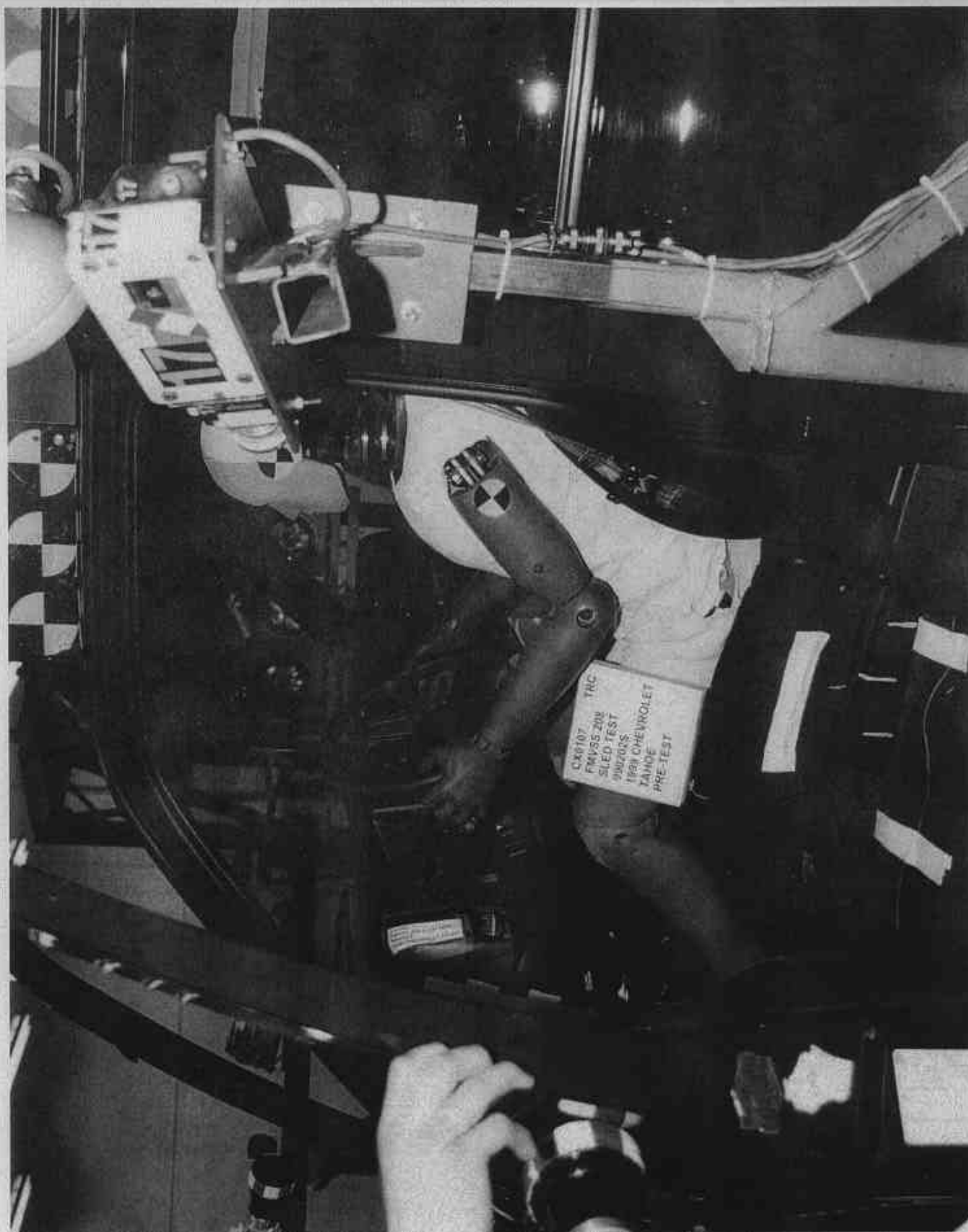


Figure A-6 Pre-Test Driver Dummy Position View With Door Open

A-7

990202S

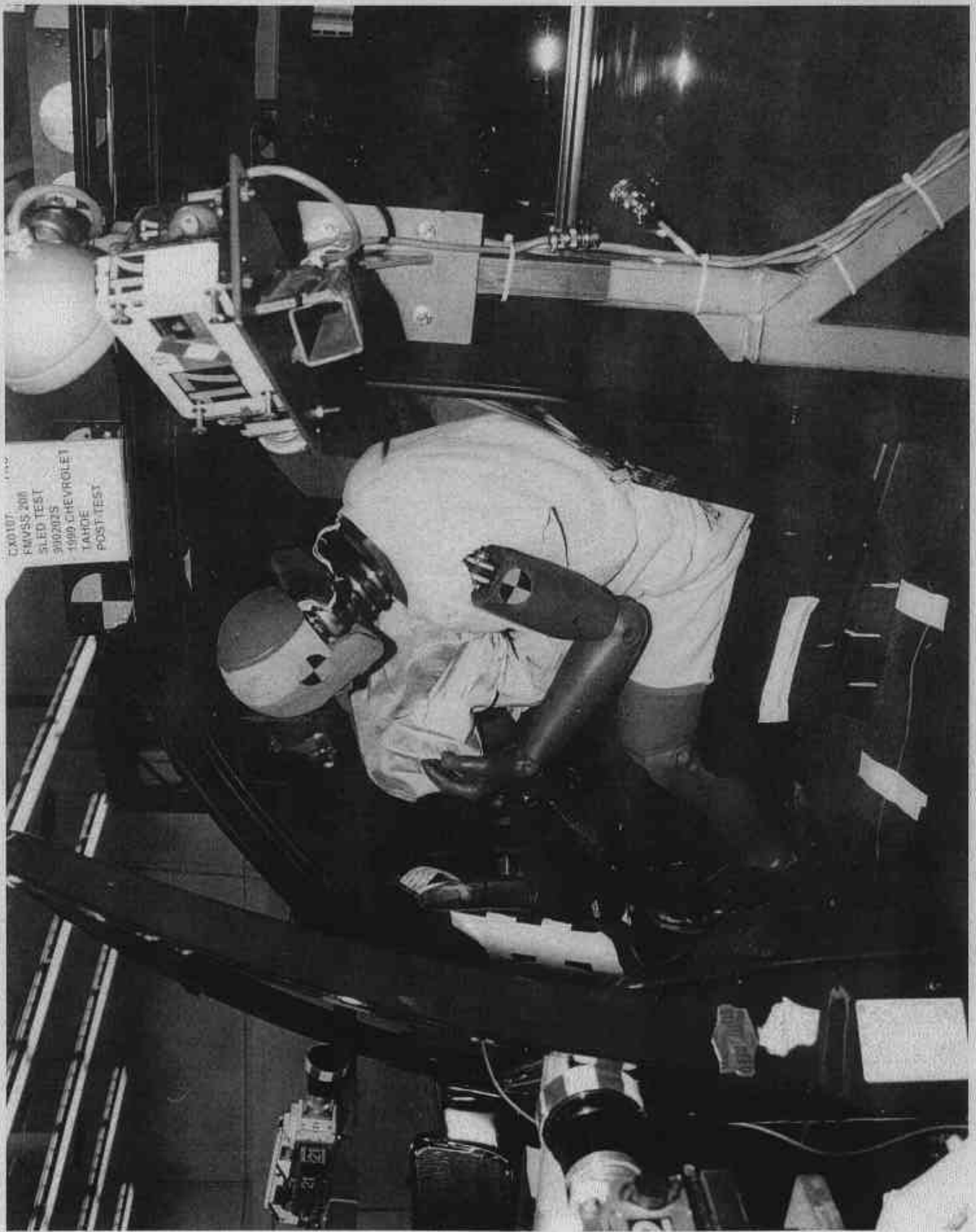


Figure A-7 Post-Test Driver Dummy Position View With Door Open

A-8

990202S

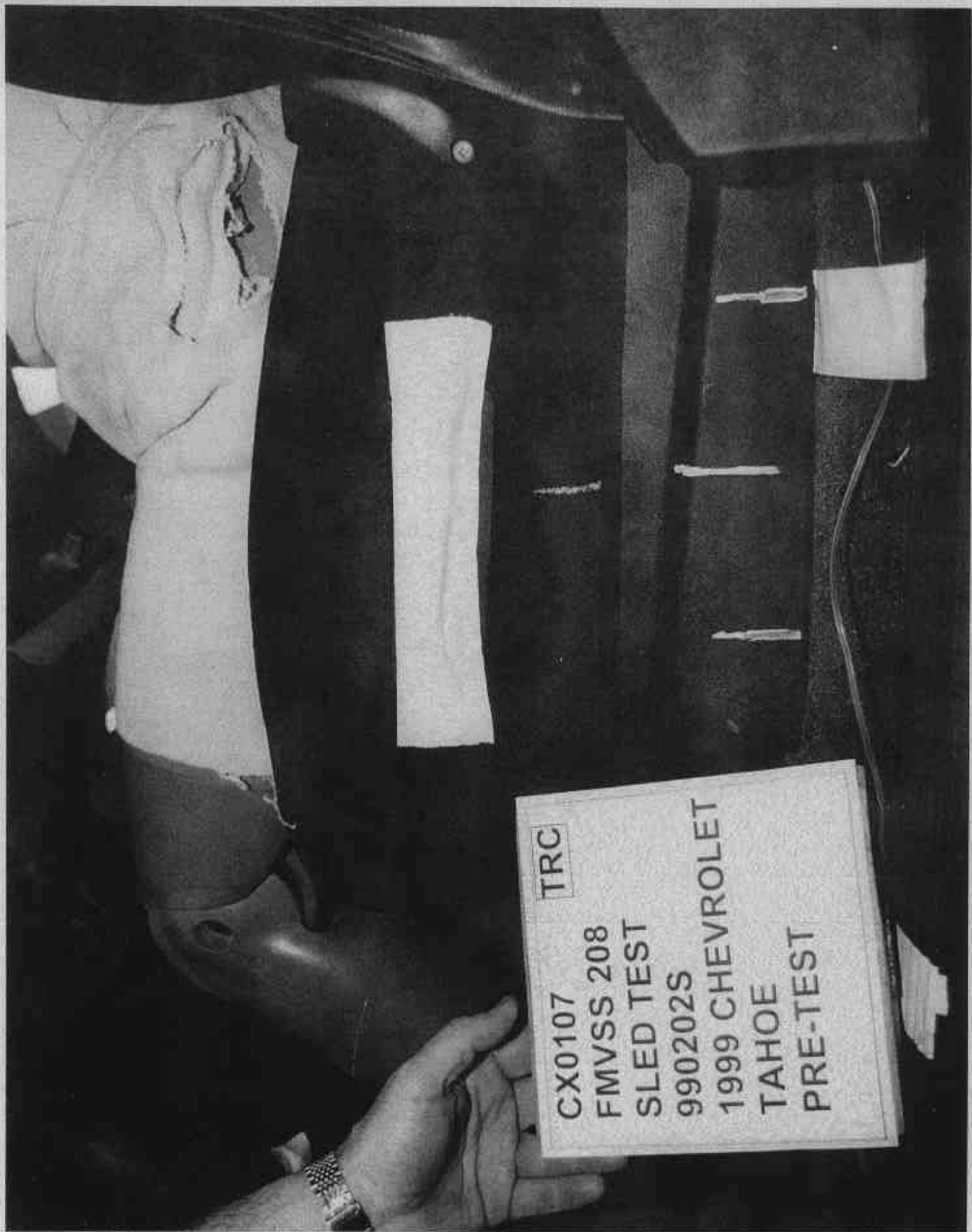


Figure A-8 Pre-Test Driver Seat Track Position View
A-9

990202S

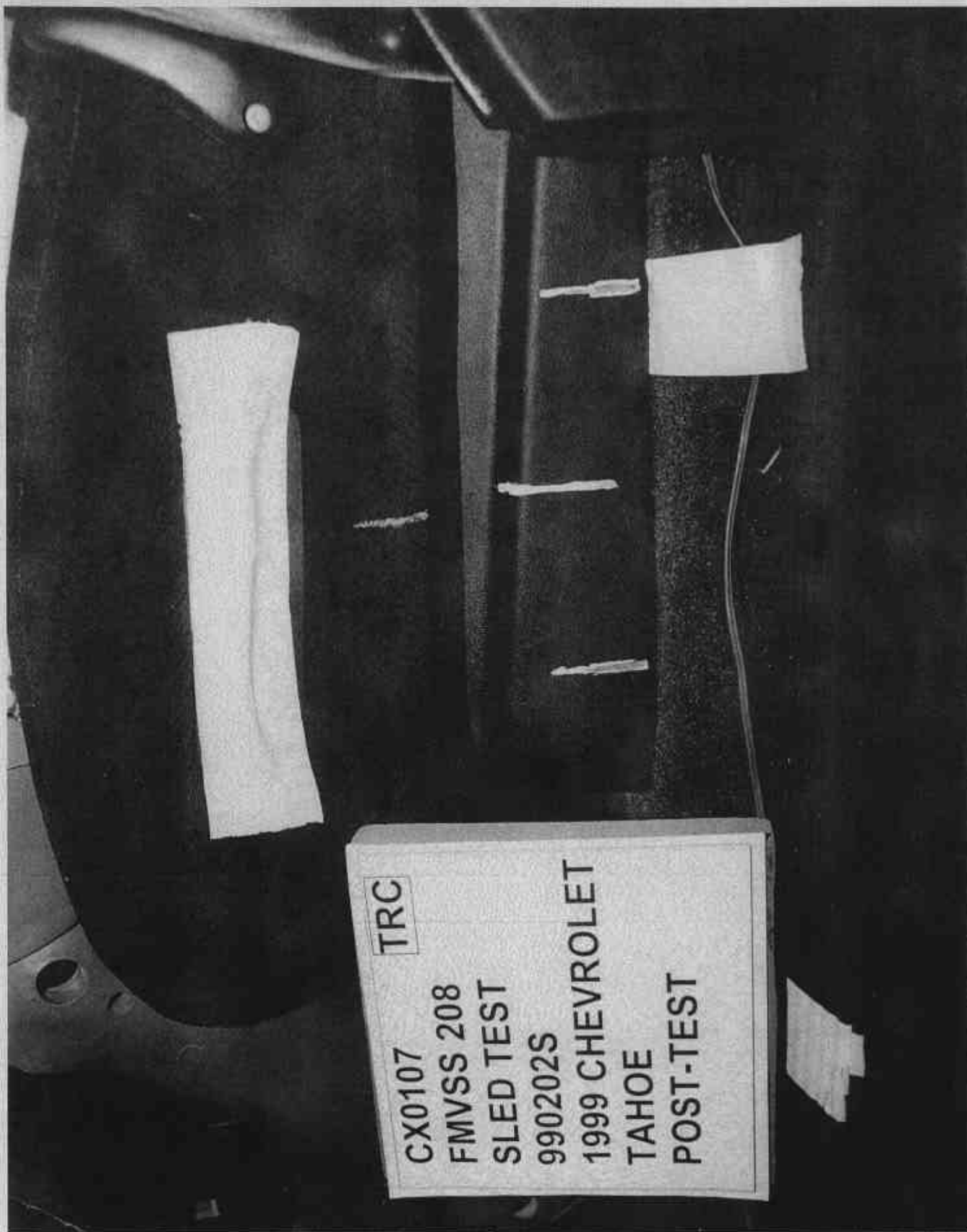


Figure A-9 Post-Test Driver Seat Track Position View
A-10

990202S



Figure A-10 Pre-Test Driver Dummy Position Front View
A-11

990202S

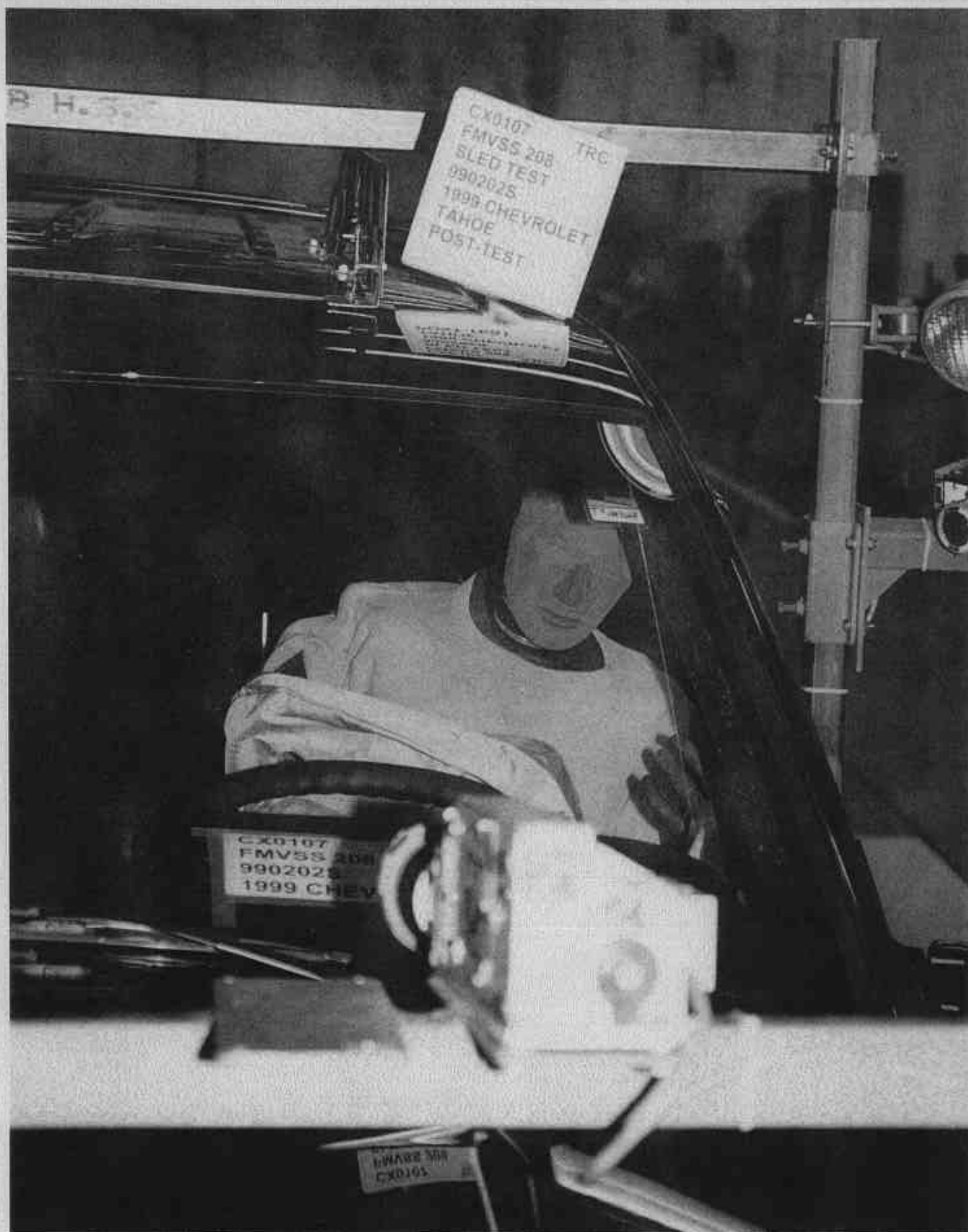


Figure A-11 Post-Test Driver Dummy Position Front View
A-12

990202S

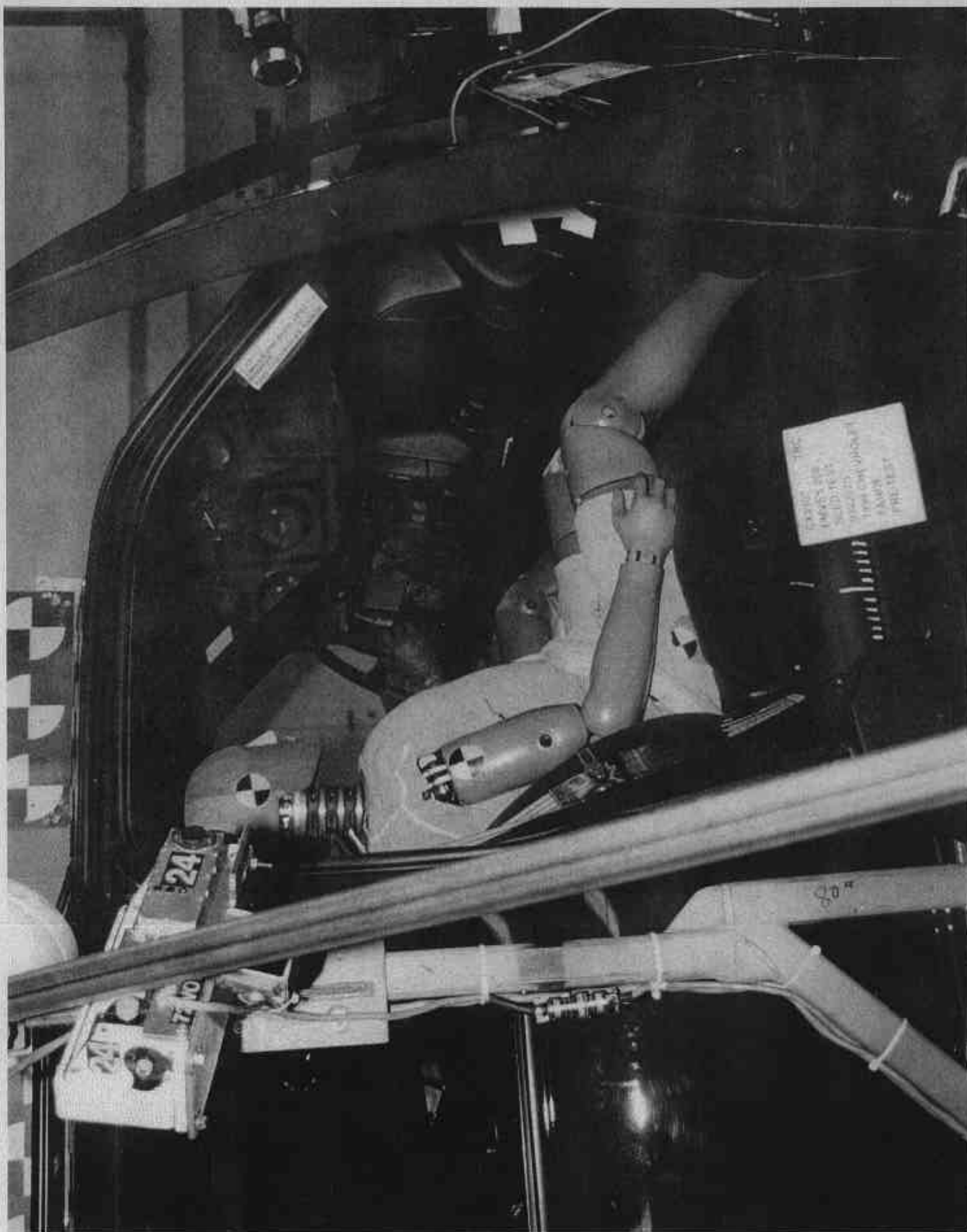


Figure A-12 Pre-Test Passenger Dummy Position View With Door Open

A-13

990202S



Figure A-13 Post-Test Passenger Dummy Position View With Door Open
A-14

990202S



Figure A-14 Pre-Test Passenger Seat Track Position View
A-15

990202S

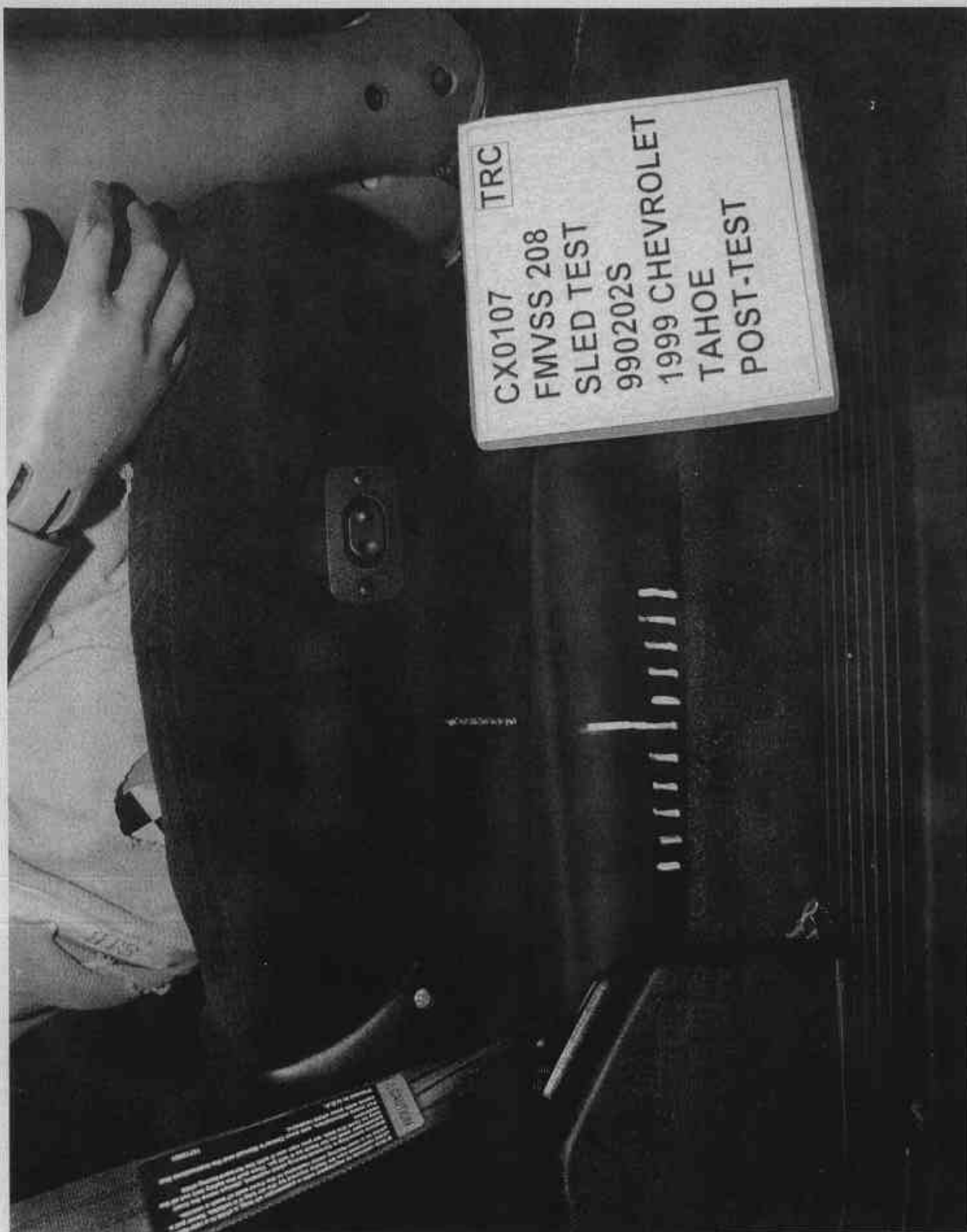


Figure A-15 Post-Test Passenger Seat Track Position View
A-16

990202S



Figure A-16 Pre-Test Passenger Dummy Position Front View
A-17

990202S



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

A-18

990202S



Figure A-18 Post-Test Driver Airbag View
A-19

990202S

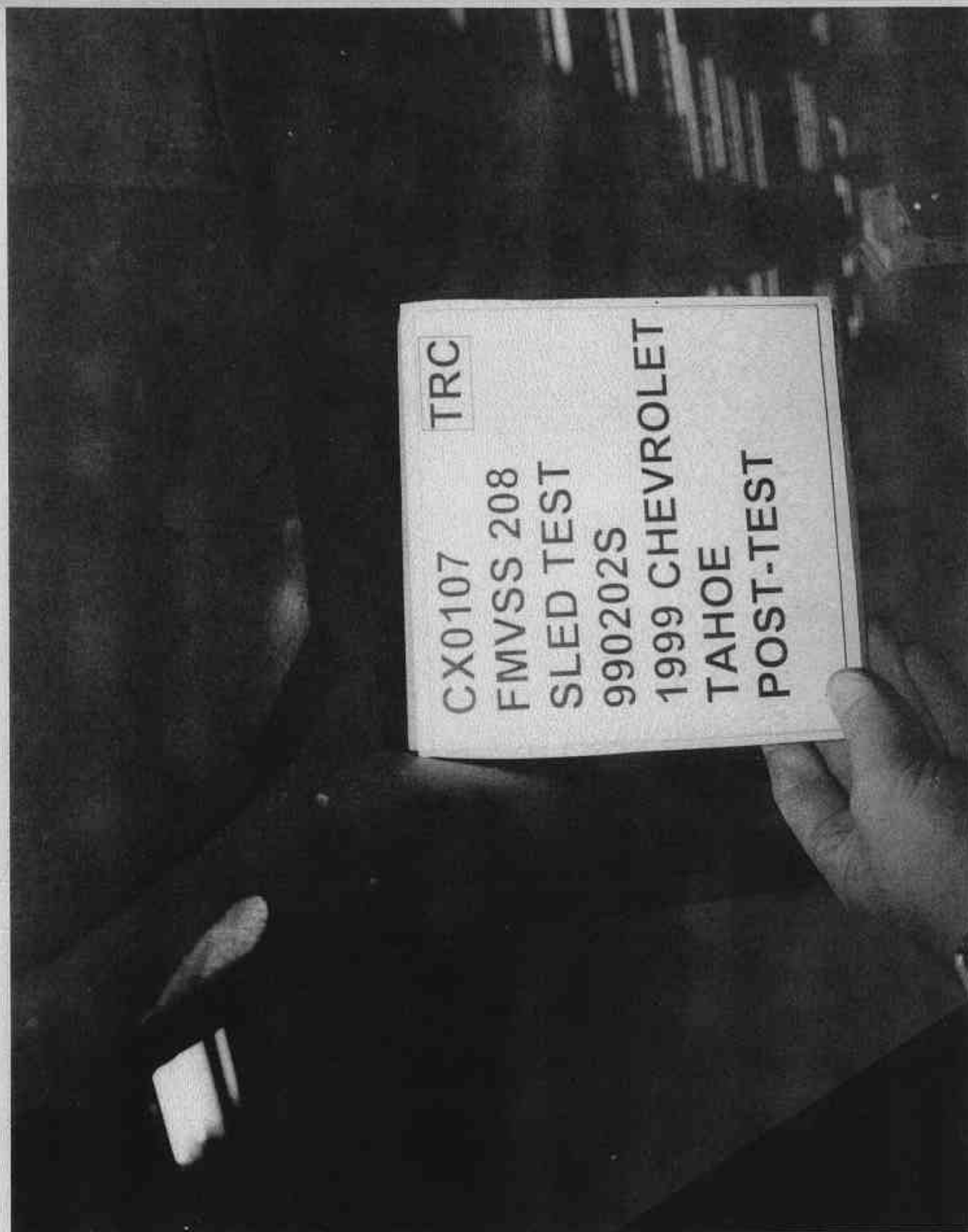


Figure A-19 Post-Test Driver Head Contact - View 1

A-20

990202S

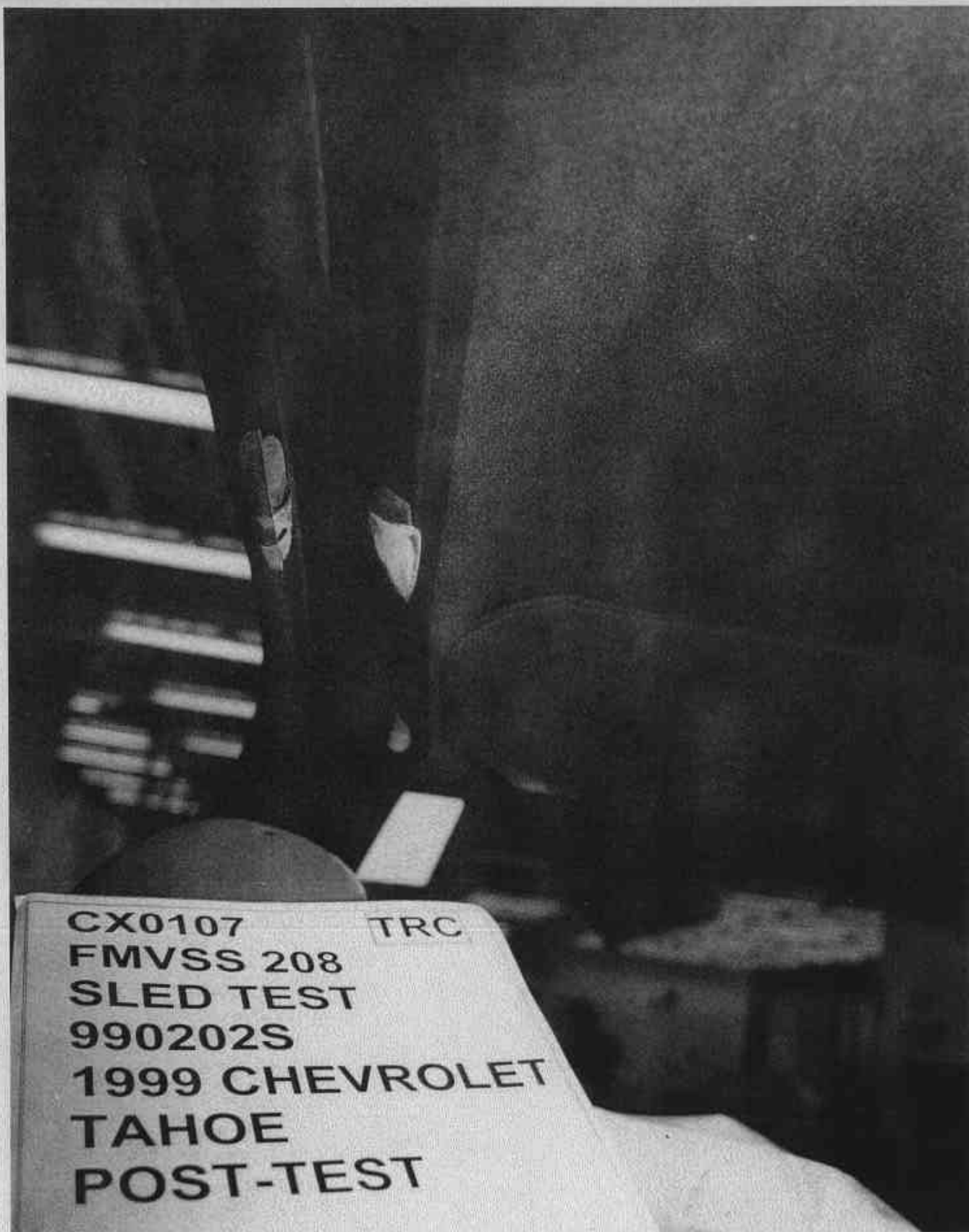


Figure A-20 Post-Test Driver Head Contact - View 2
A-21

990202S



Figure A-21 Post-Test Passenger Airbag View
A-22

990202S

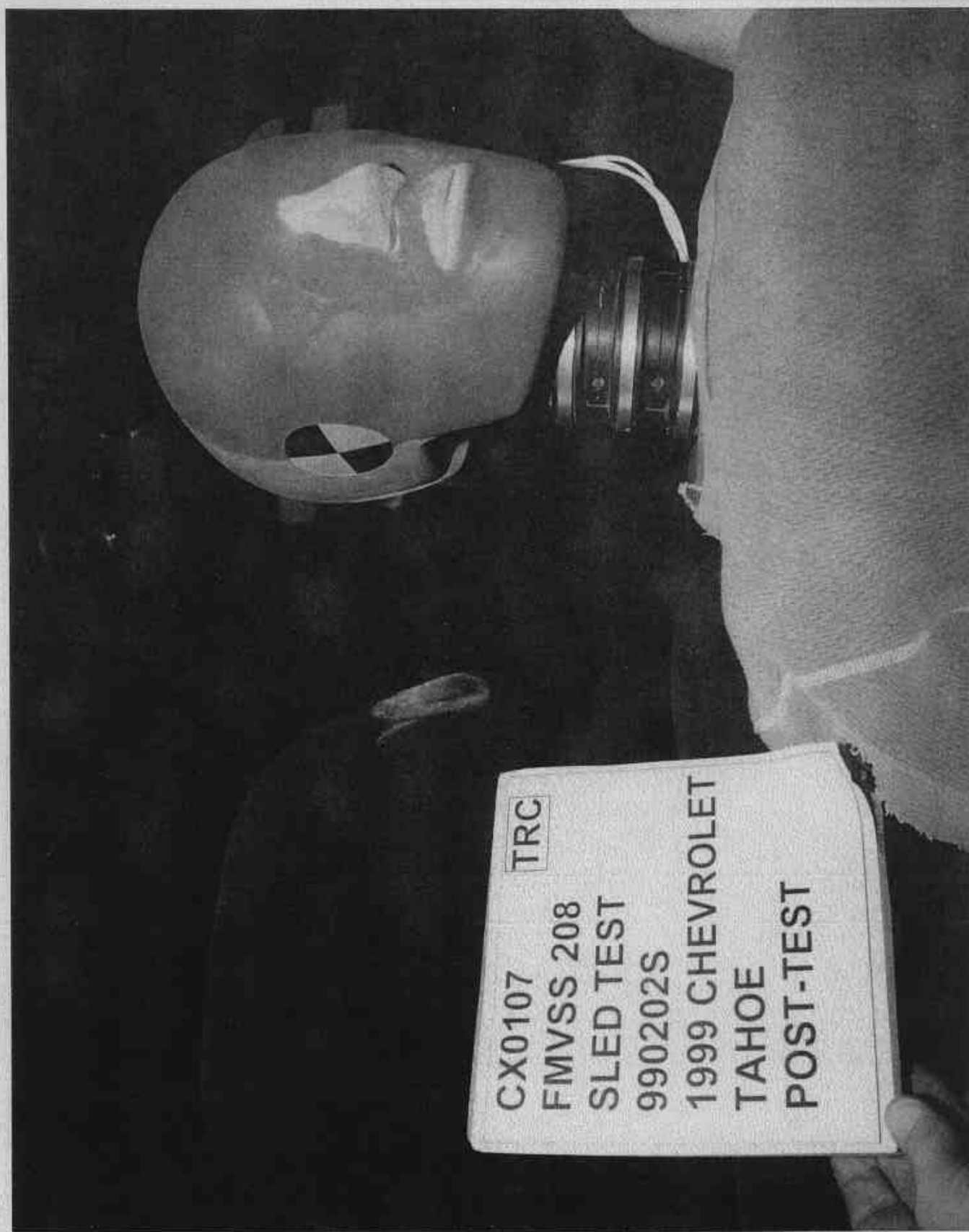


Figure A-22 Post-Test Passenger Head Contact View
A-23

990202S



Figure A-23 Pre-Test Driver Knee Bolster View
A-24

990202S

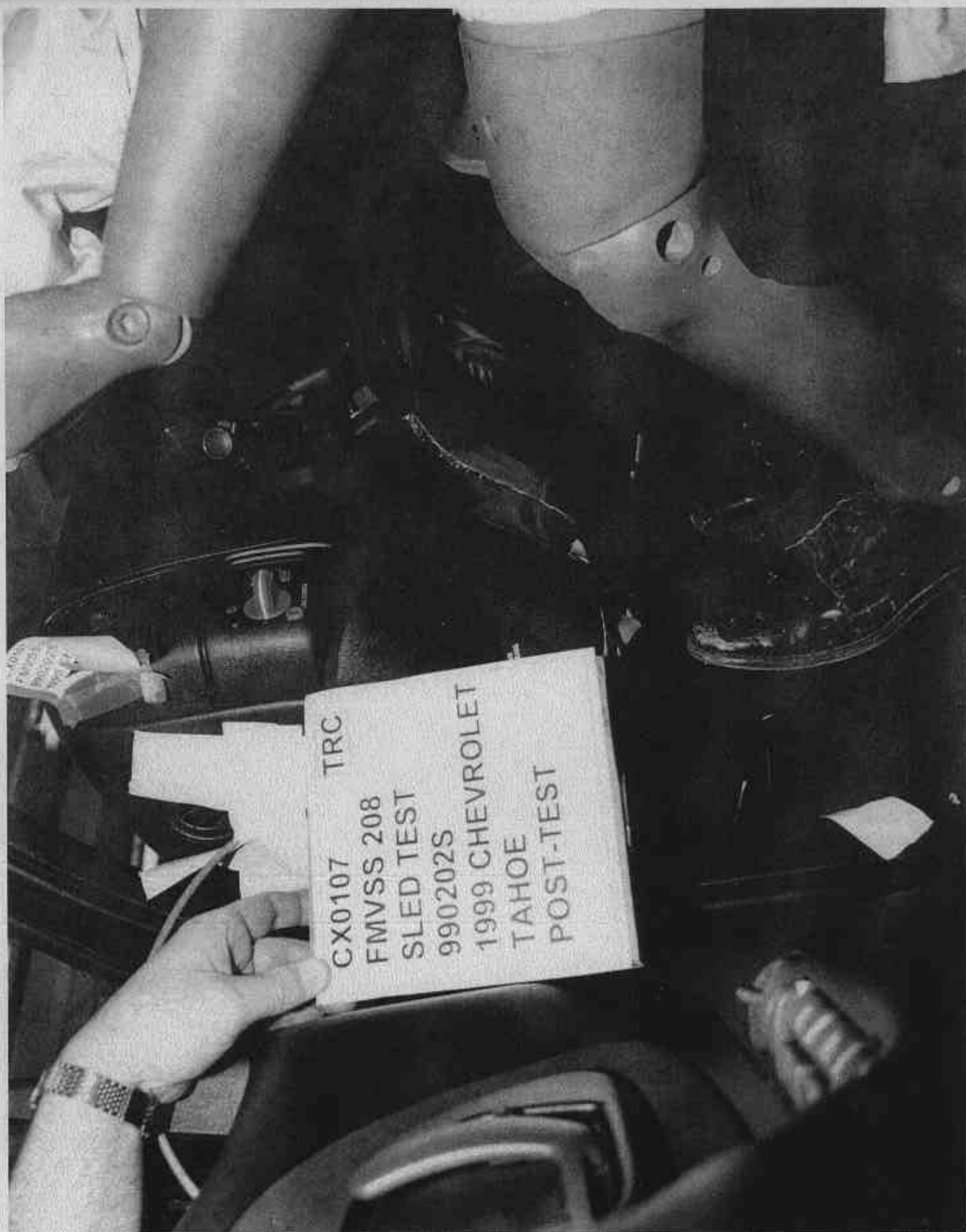


Figure A-24 Post-Test Driver Knee Bolster - View 1
A-25

990202S



Figure A-25 Post-Test Driver Knee Bolster - View 2
A-26

990202S

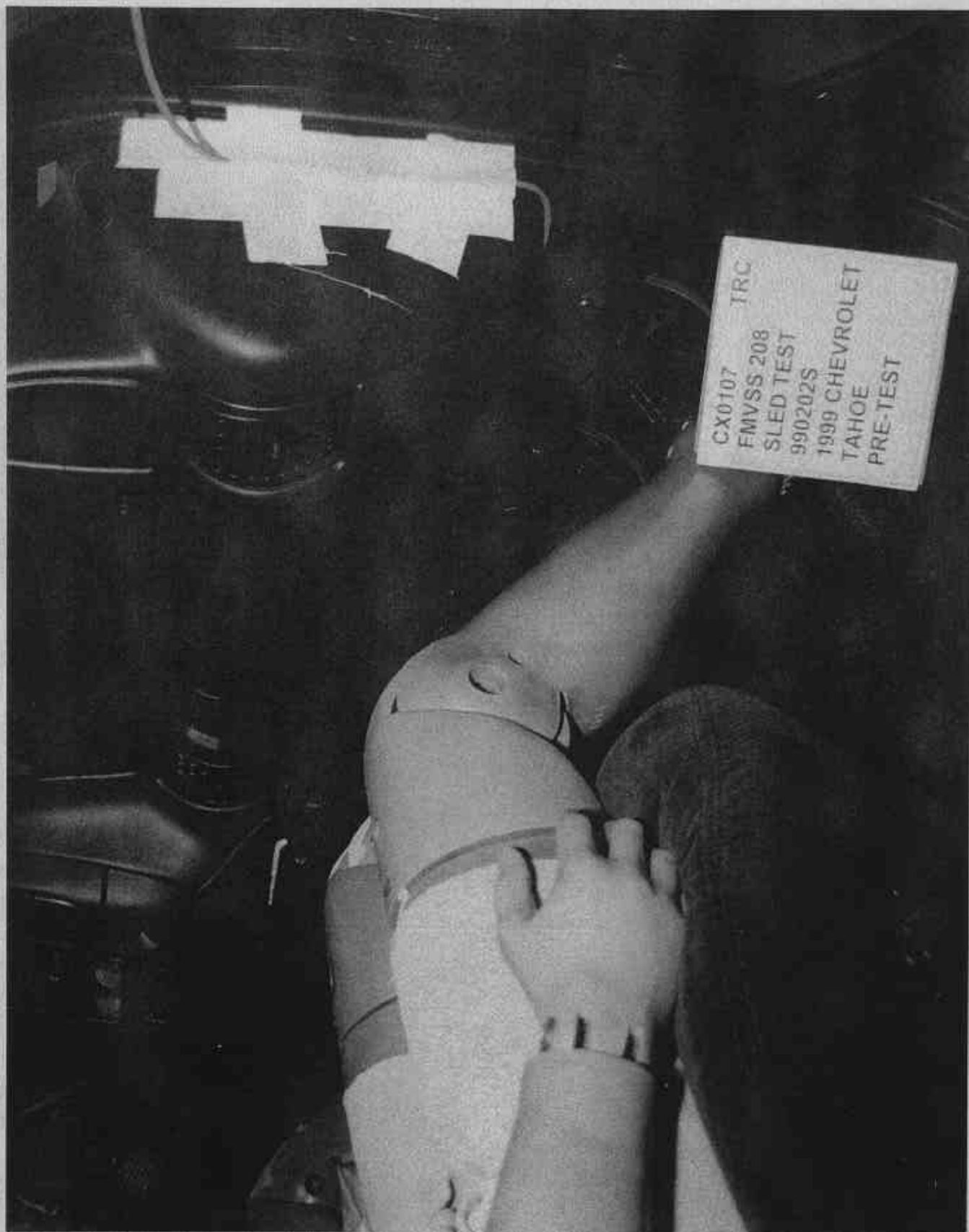


Figure A-26 Pre-Test Passenger Glove Box View
A-27

990202S

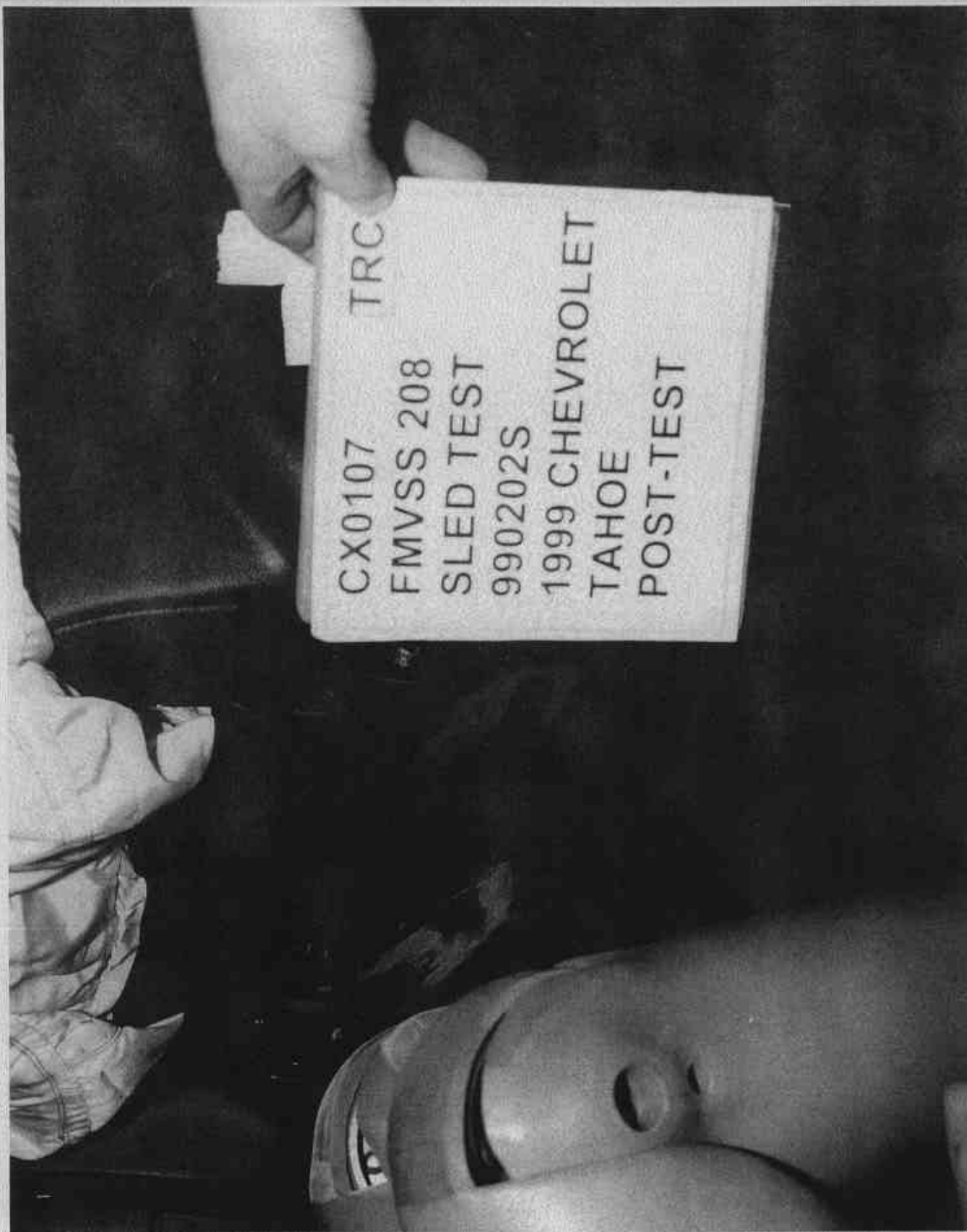


Figure A-27 Post-Test Passenger Glove Box - View 1

A-28

990202S

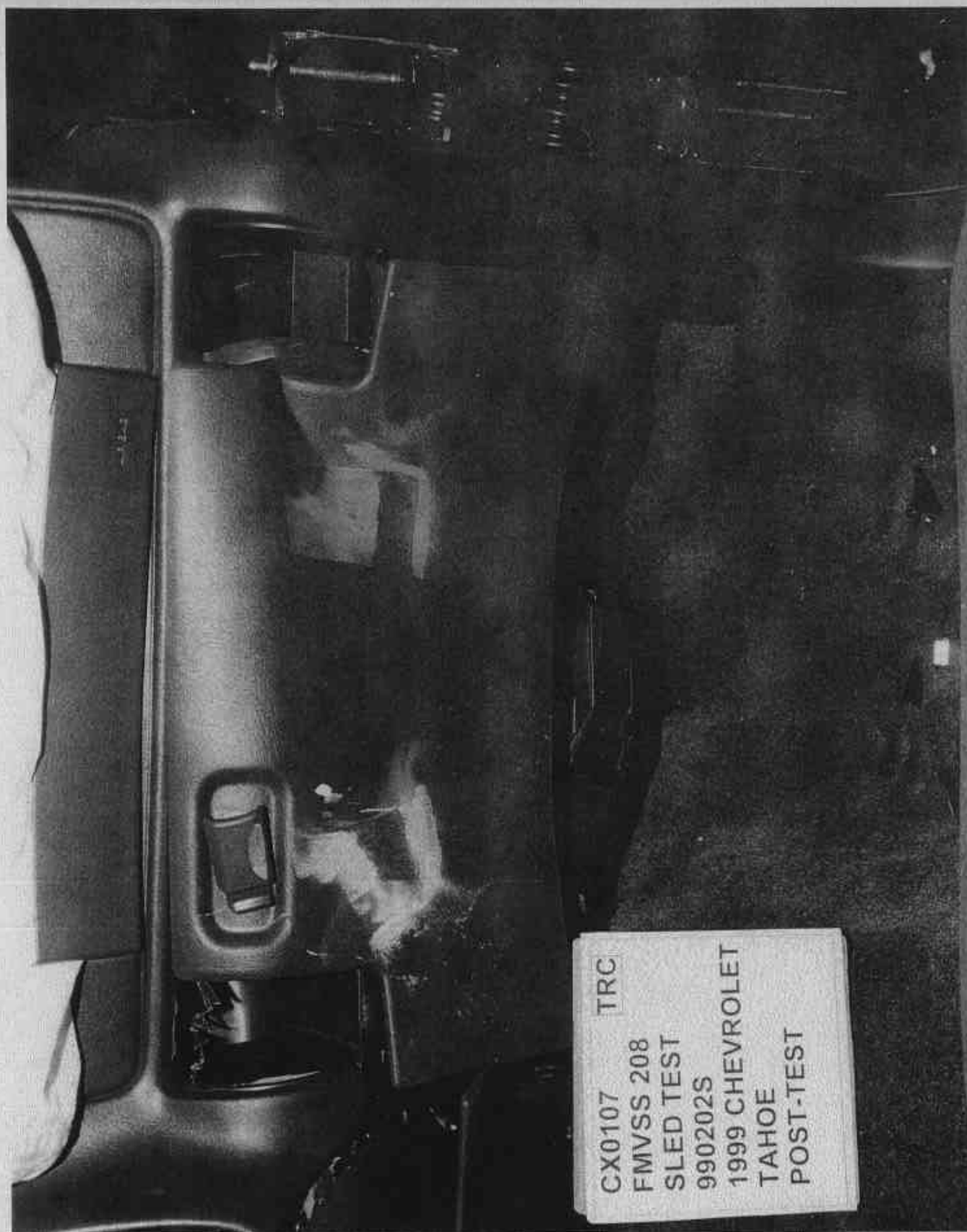


Figure A-28 Post-Test Passenger Glove Box - View 2
A-29

990202S

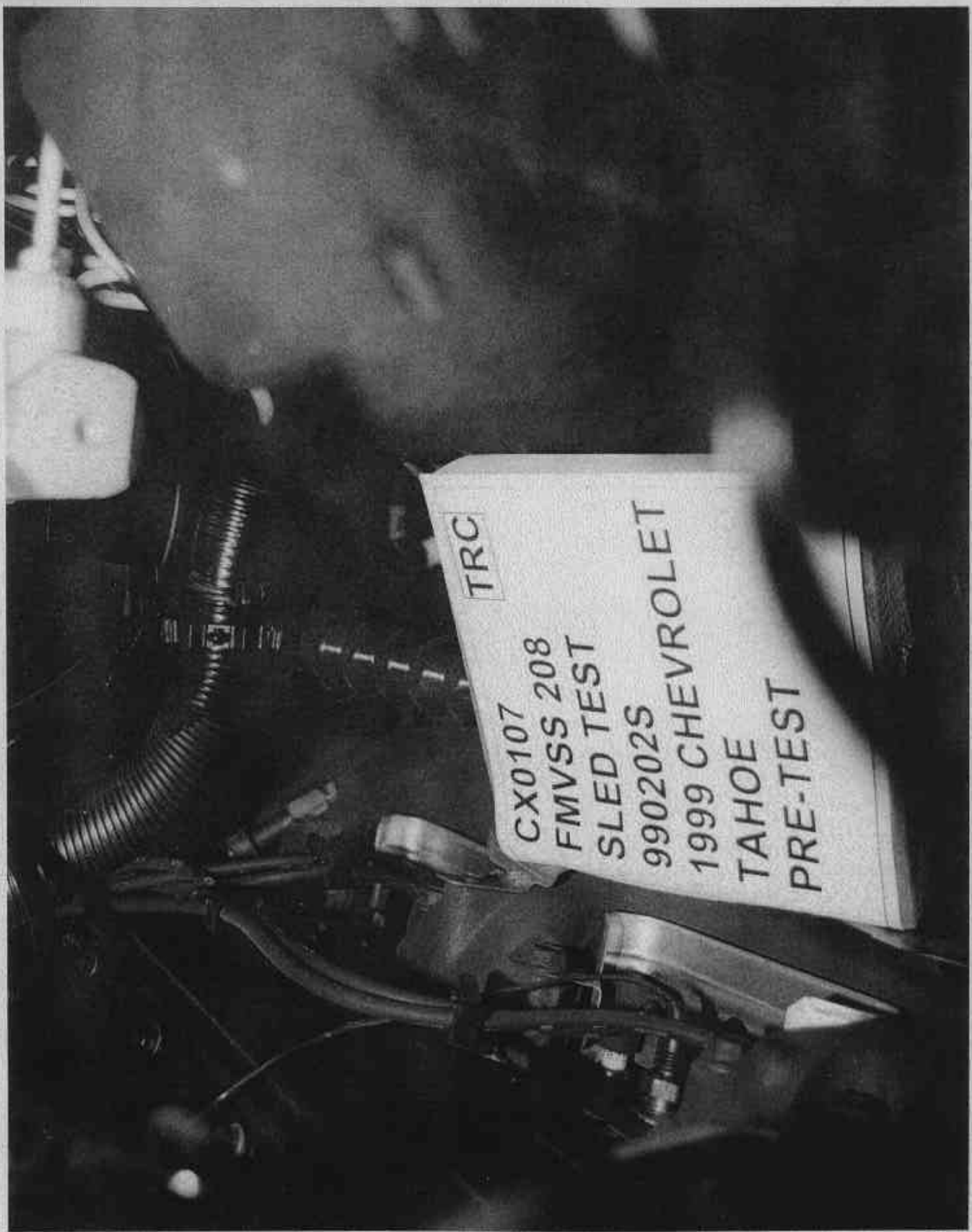


Figure A-29 Pre-Test Steering Column Linkage in Engine Compartment View
A-30 990202S

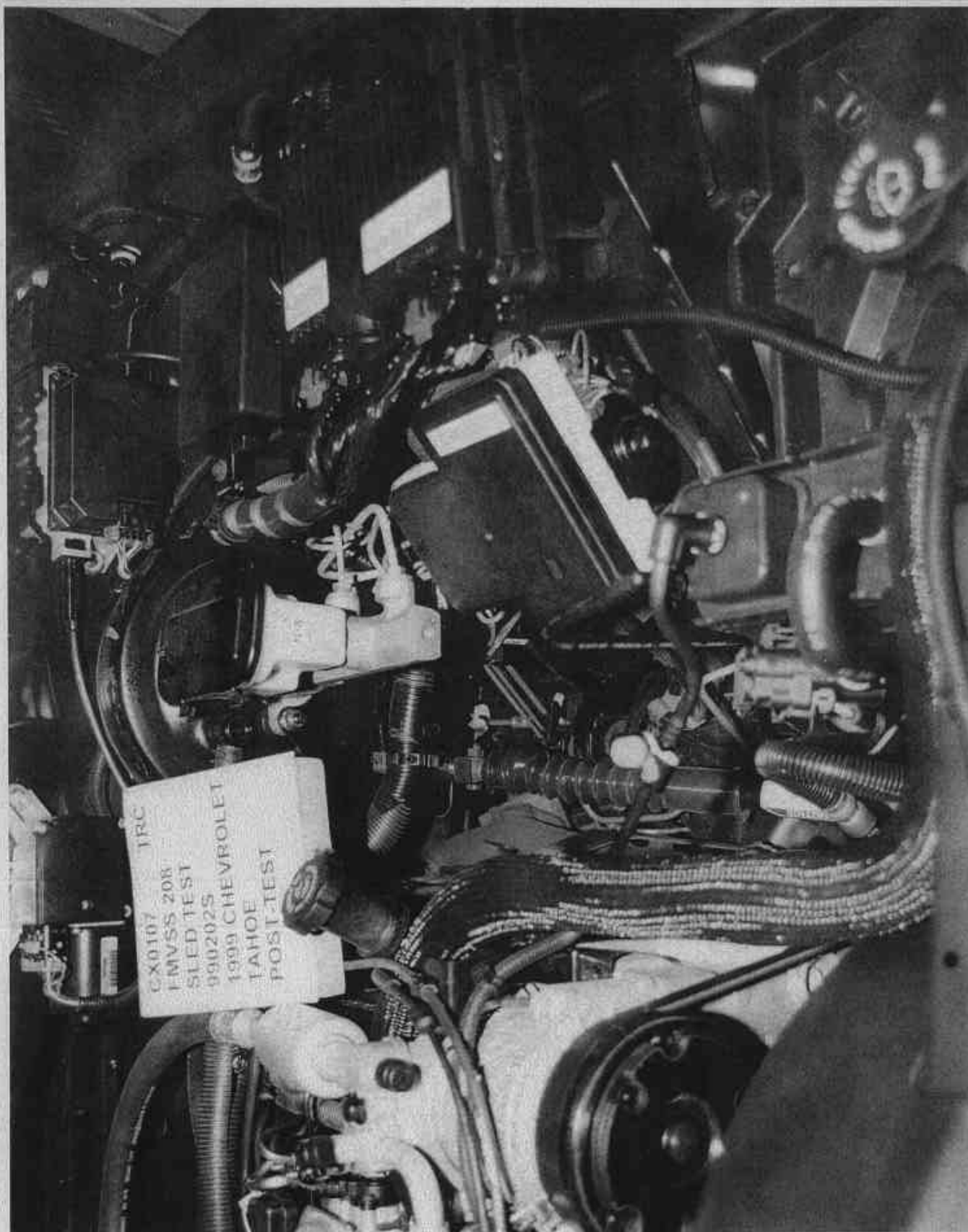


Figure A-30 Post-Test Steering column Linkage in Engine Compartment View
A-31 990202S

IKC

FMVSS 208
SLED TEST
990202S
1999 CHEVROLET
TAHOE
PRE-TEST

INFO BY GENERAL MOTORS CORP.
DATE: 01/01/00
TEST: 01/01/00
TESTER: J. L. HARRIS
VEHICLE: 1999 CHEVROLET TAHOE
VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF
MANUFACTURE SHOWN ABOVE
TYPE: N.P.V.
MODEL: C1500
VIN: 1GNEC108XKJ407668
GROSS WEIGHT: 6000 LBS
GROSS TIRE PRESSURE: 35 PSI
FRONT: 2200 LBS
REAR: 2200 LBS
SEE OWNER'S MANUAL FOR MORE INFORMATION

Figure A-31 Pre-Test Vehicle Certification Label View
A-32

990202S

Appendix B

Data Plots

CX0107 / 1999 CHEVROLET TAHOE 2WD

SLED ACCELERATION

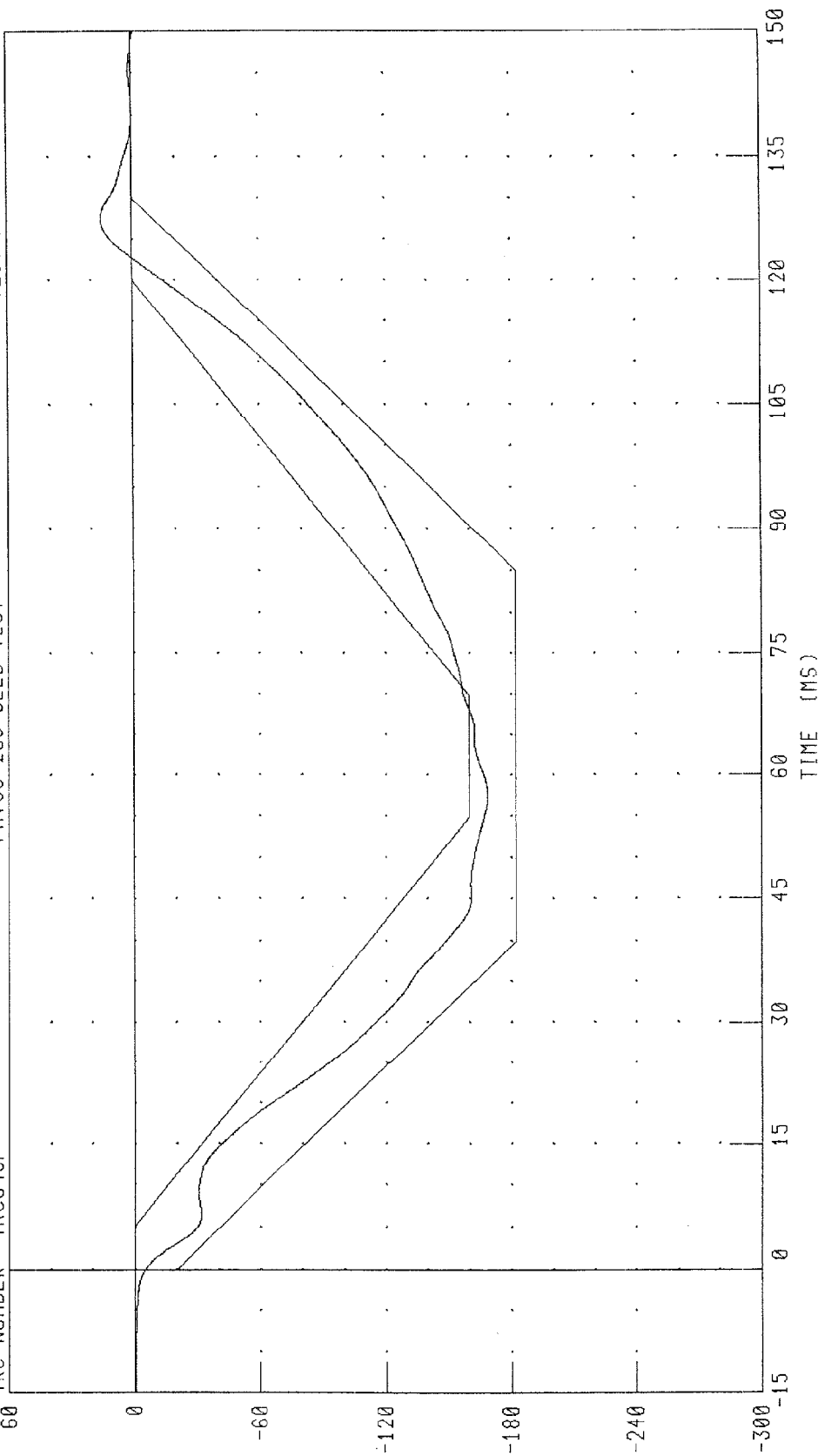
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

60

ACCELERATION ($G \times 10^{-1}$)



PEAK DATA: 1.50 G @ 127.44 MS, -16.86 G @ 57.44 MS

CHANNEL: SLDXC FILTER: CH. CLASS 60

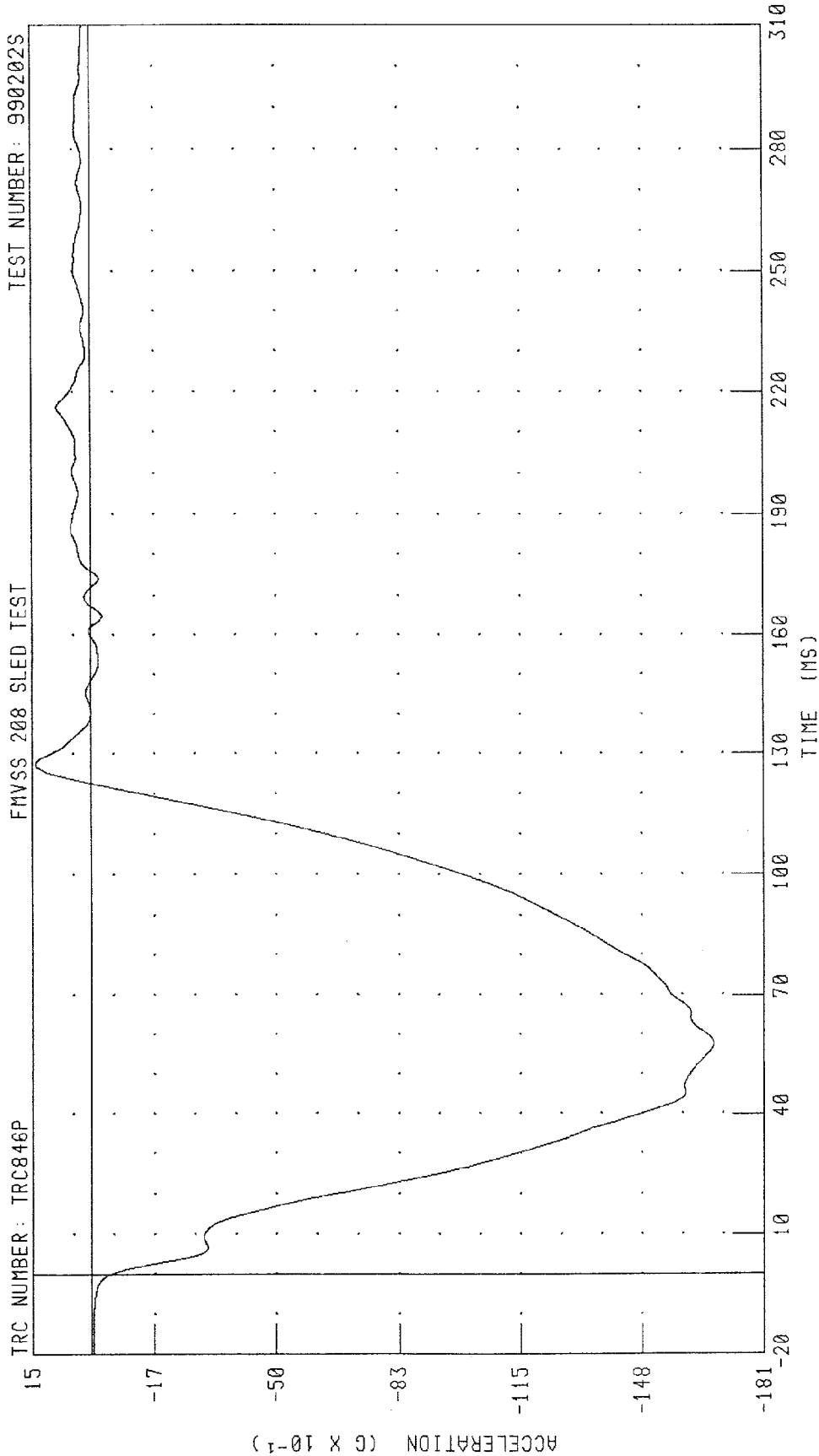
CX0107 / 1999 CHEVROLET TAHOE 2WD

SLED ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



CHANNEL: SLDXC FILTER: CH. CLASS 60

PEAK DATA: 1.50 G @ 127.44 MS; -16.86 G @ 57.44 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD

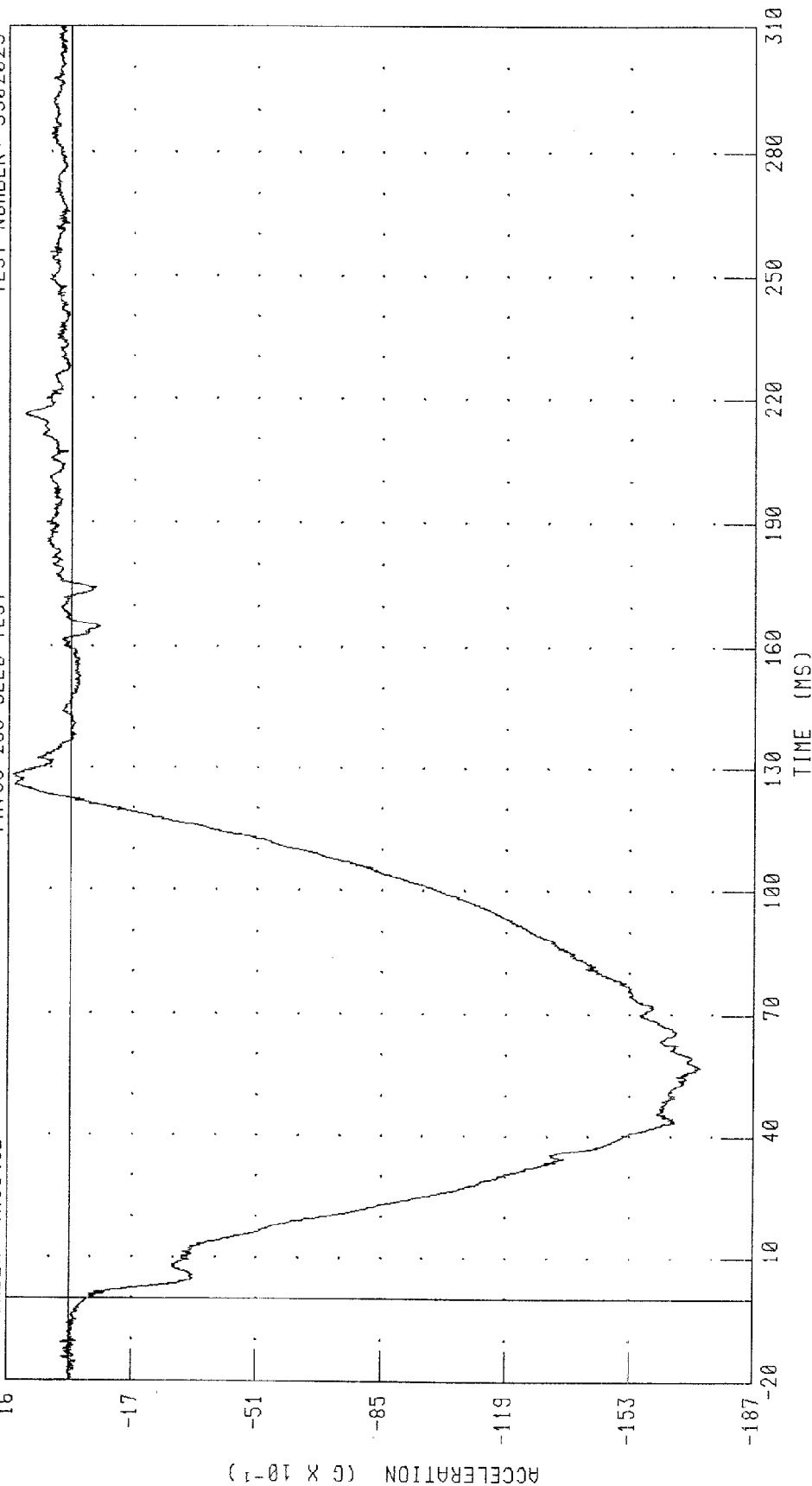
SLED ACCELERATION REDUNDANT

FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846Z

16



CHANNEL: SLDXGA FILTER: CH. CLASS 1000

PEAK DATA: 1.59 G @ 128.40 MS, -17.23 G @ 56.88 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD

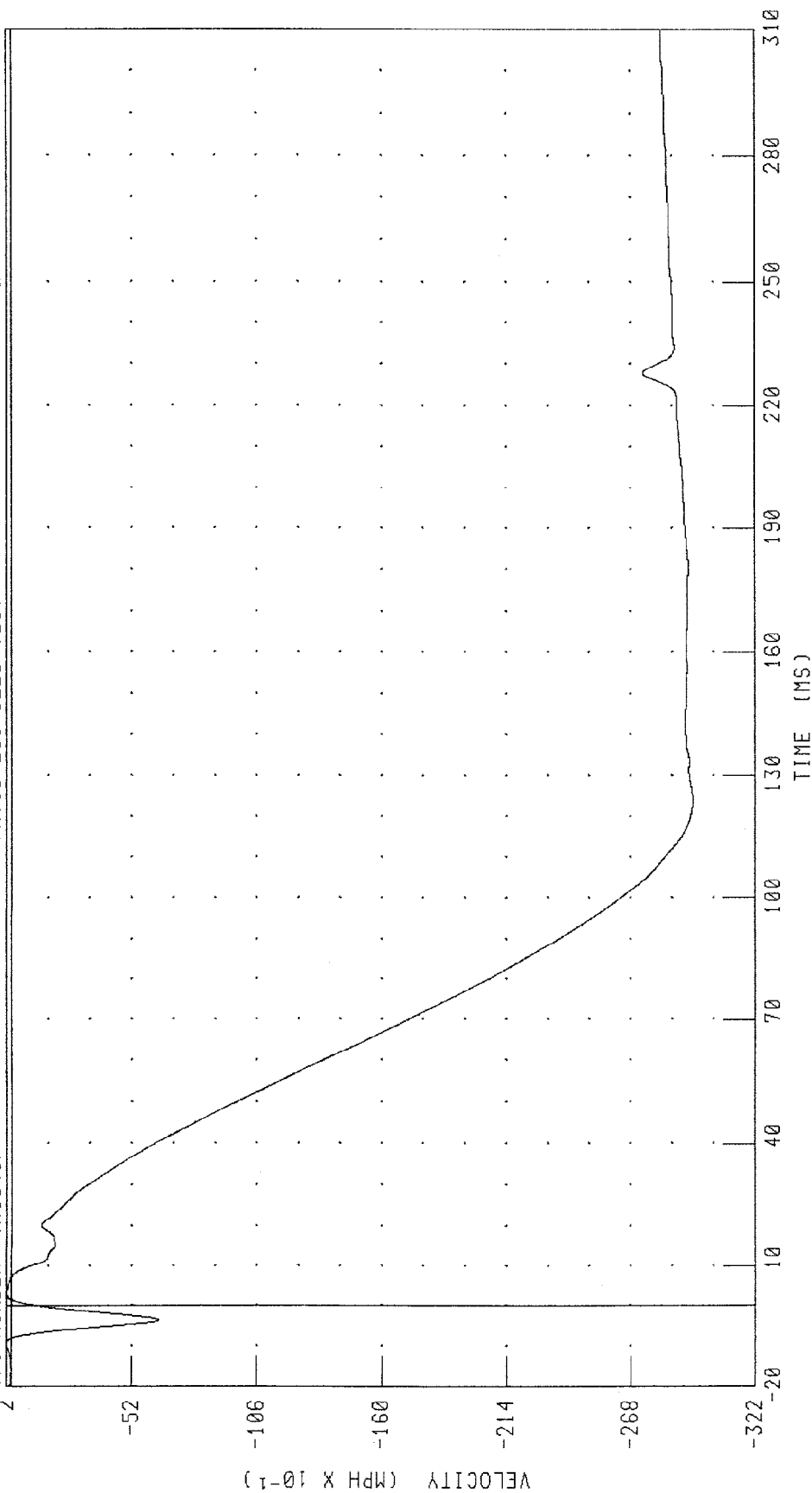
MEASURED VELOCITY TRAP

FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

2



CHANNEL: SLOXY

FILTER: CH. CLASS 60

PEAK DATA: 0.23 MPH @ -9.44 MS, -29.50 MPH @ 123.84 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD

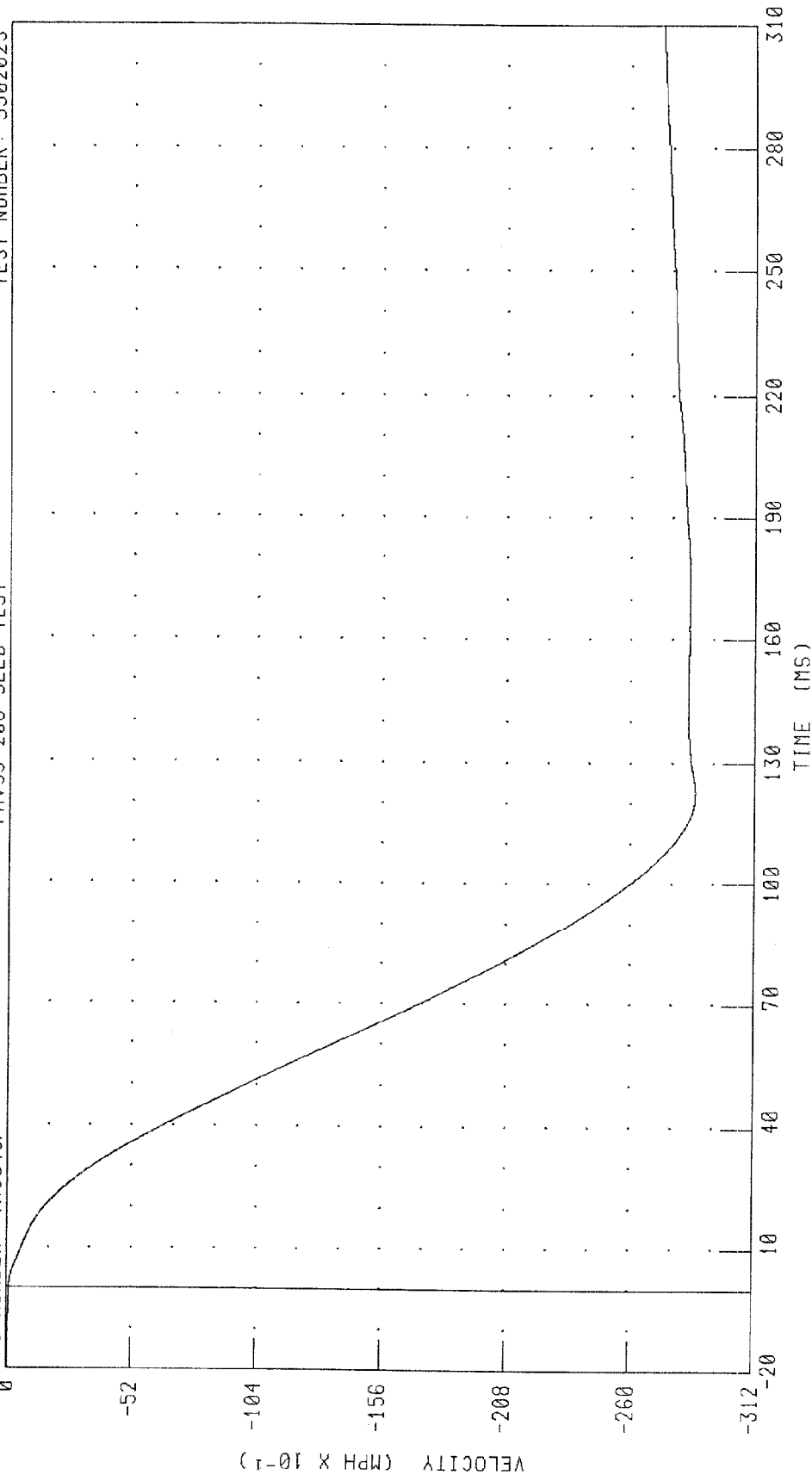
SLED VELOCITY (INTEGRATED)

FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

0



PEAK DATA: -0.04 MPH @ -20.00 MS; -28.72 MPH @ 122.80 MS

CHANNEL: SLOXVI FILTER: CH. CLASS 180

CX0107 / 1999 CHEVROLET TAHOE 2WD

AIRBAG EVENT

FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

74

61

48

35

22

9

-4

VOLTAGE (V X 10⁻¹)

-20

CHANNEL: ABEVT

FILTER: CH. CLASS 1000

TIME (MS)

310

280

250

220

190

160

130

100

70

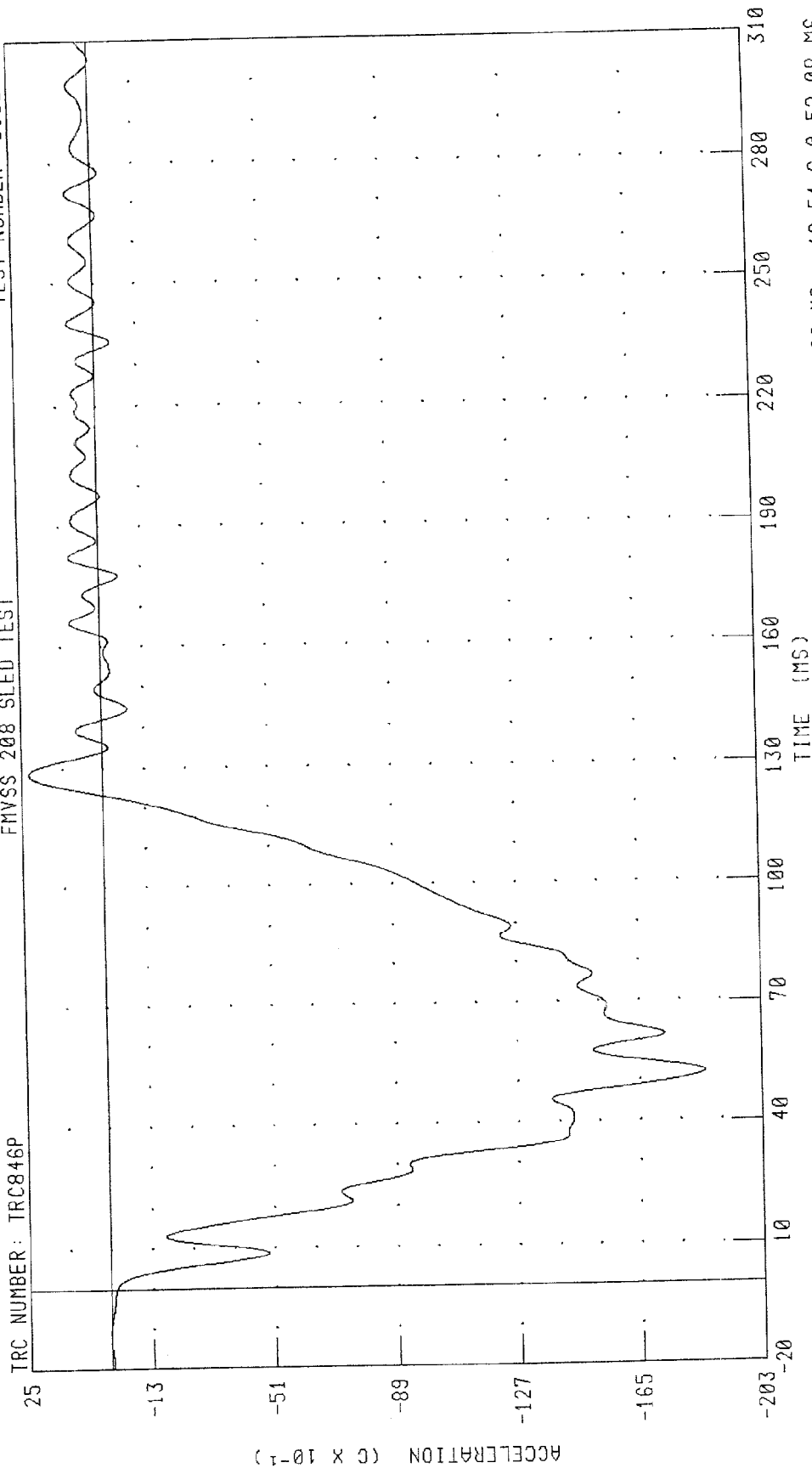
40

10

PEAK DATA: 7.03 V @ 21.20 MS, -0.45 V @ 20.80 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
REAR AXLE X-AXIS ACCELERATION
FMVSS 208 SLED TEST

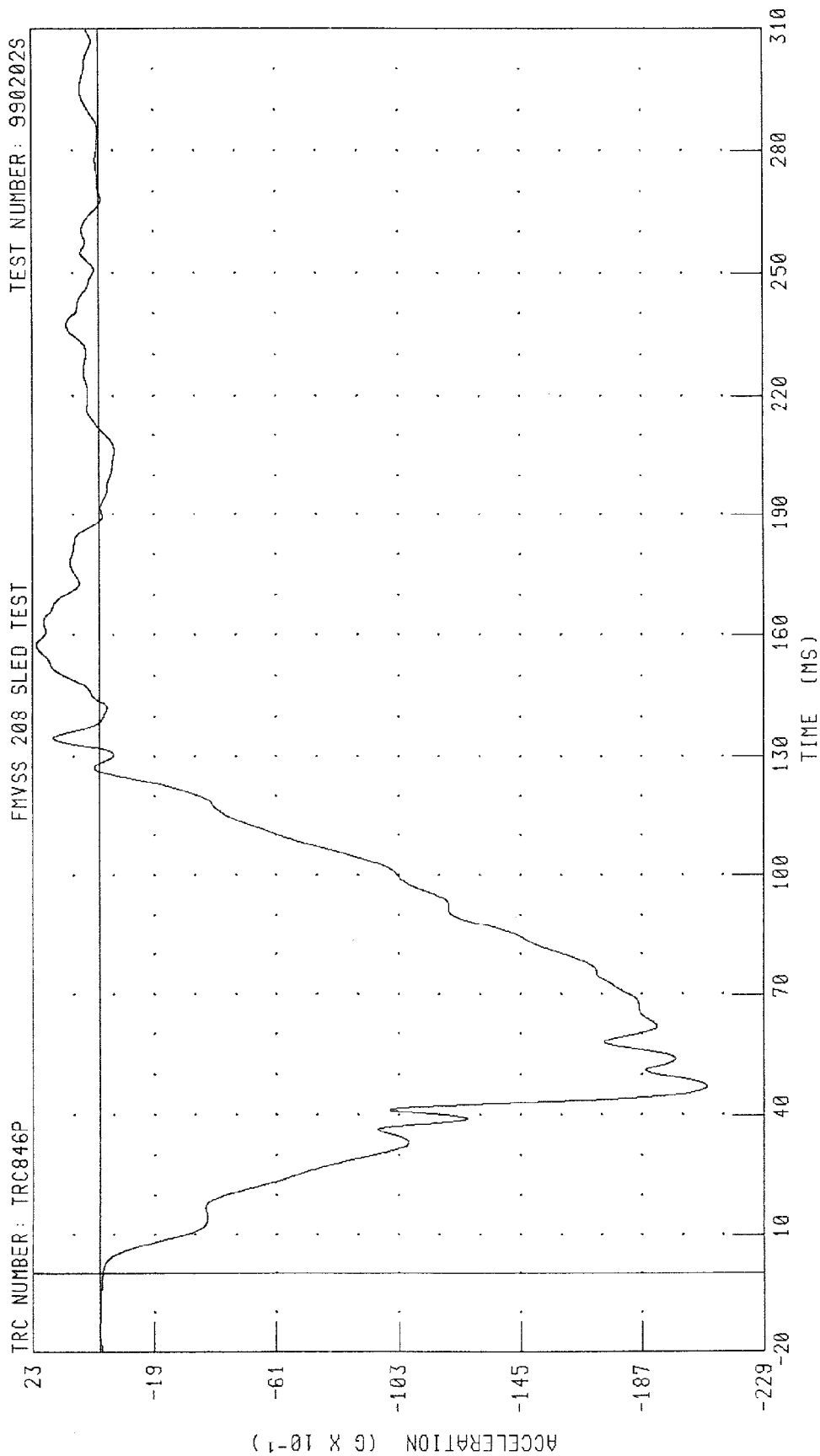
TEST NUMBER: 990202S



CHANNEL: RAXC

FILTER: CH. CLASS 60

CX0107 / 1999 CHEVROLET TAHOE 2WD
LEFT BODY X-AXIS ACCELERATION
FMVSS 208 SLED TEST



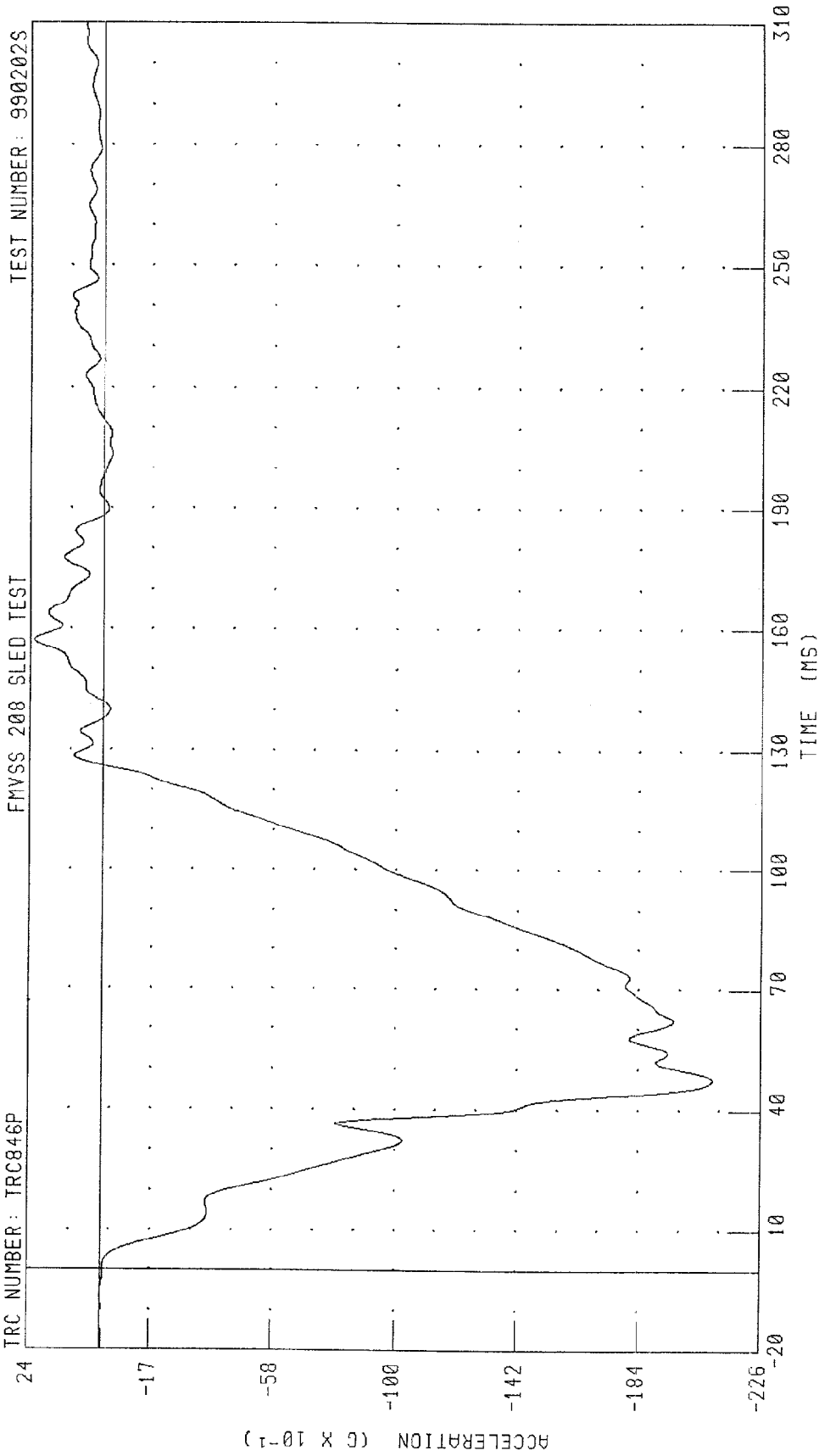
CHANNEL: LBXC FILTER: CH. CLASS 60

PEAK DATA: 2.17 G @ 157.76 MS, -20.94 G @ 47.04 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT BODY X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

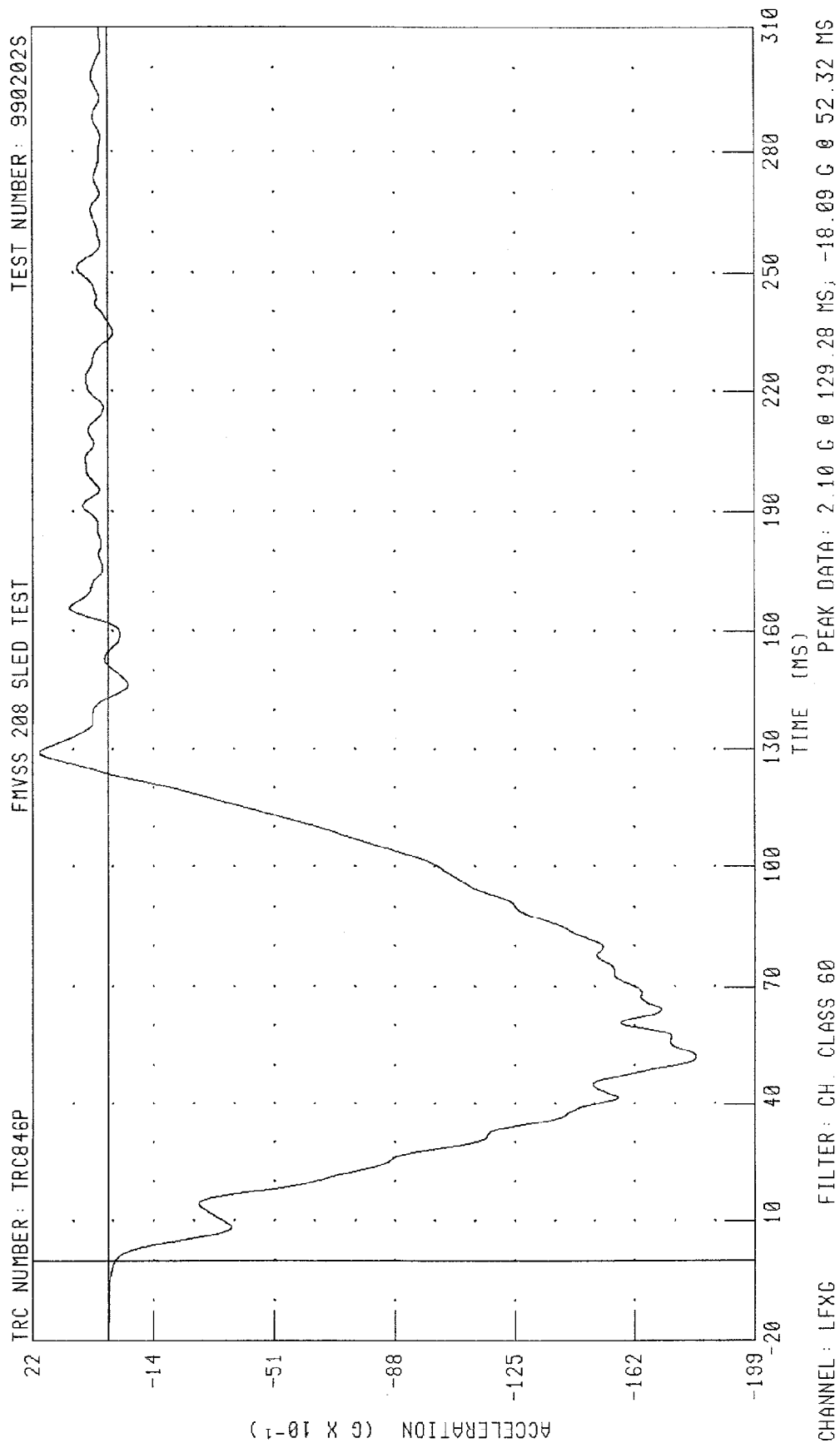


PEAK DATA: 2.36 G @ 157.12 MS; -21.06 G @ 47.52 MS

FILTER: CH. CLASS 60

CHANNEL: RBXC

CX0107 / 1999 CHEVROLET TAHOE 2WD
LEFT FRAME X-AXIS ACCELERATION

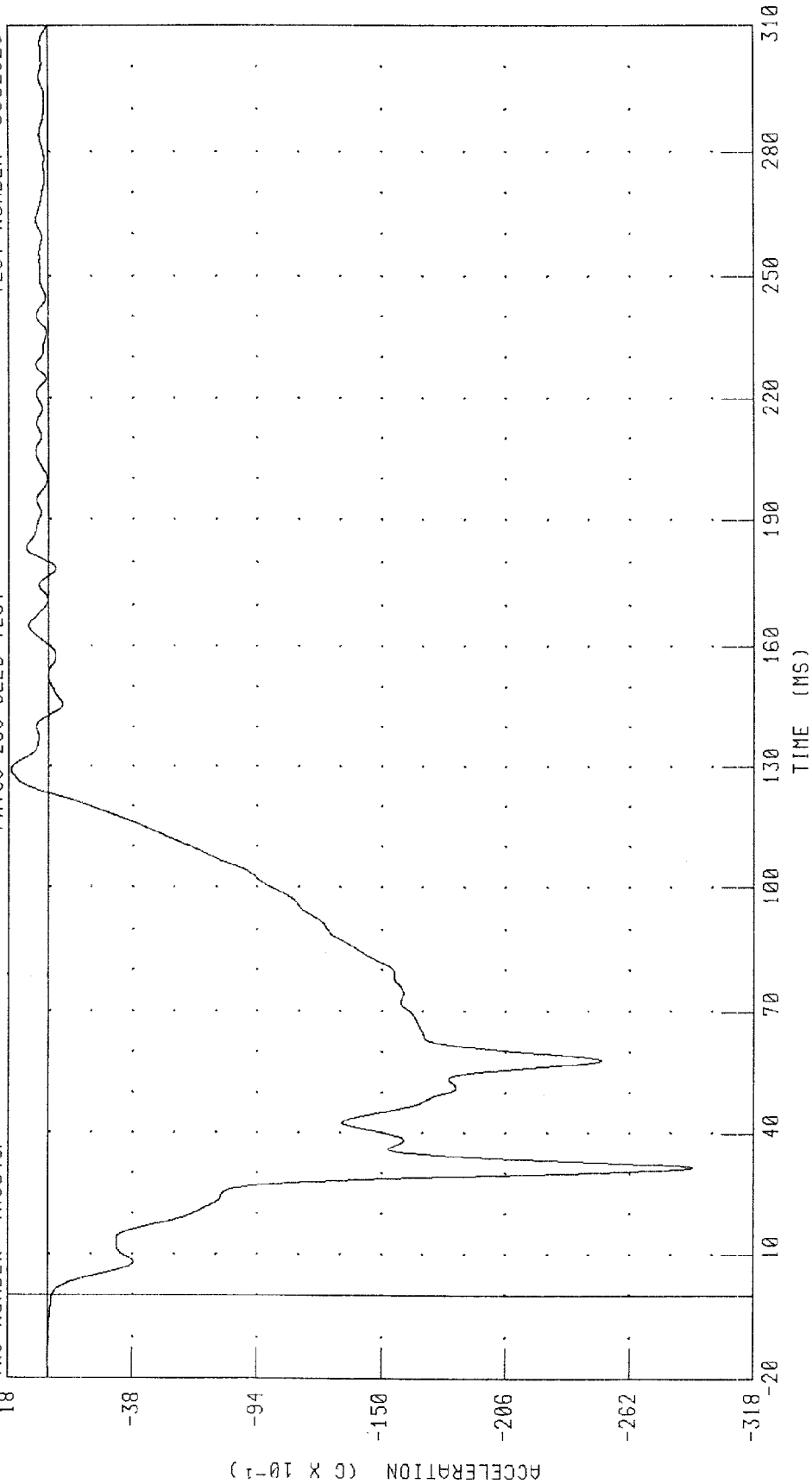


CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRAME X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

18

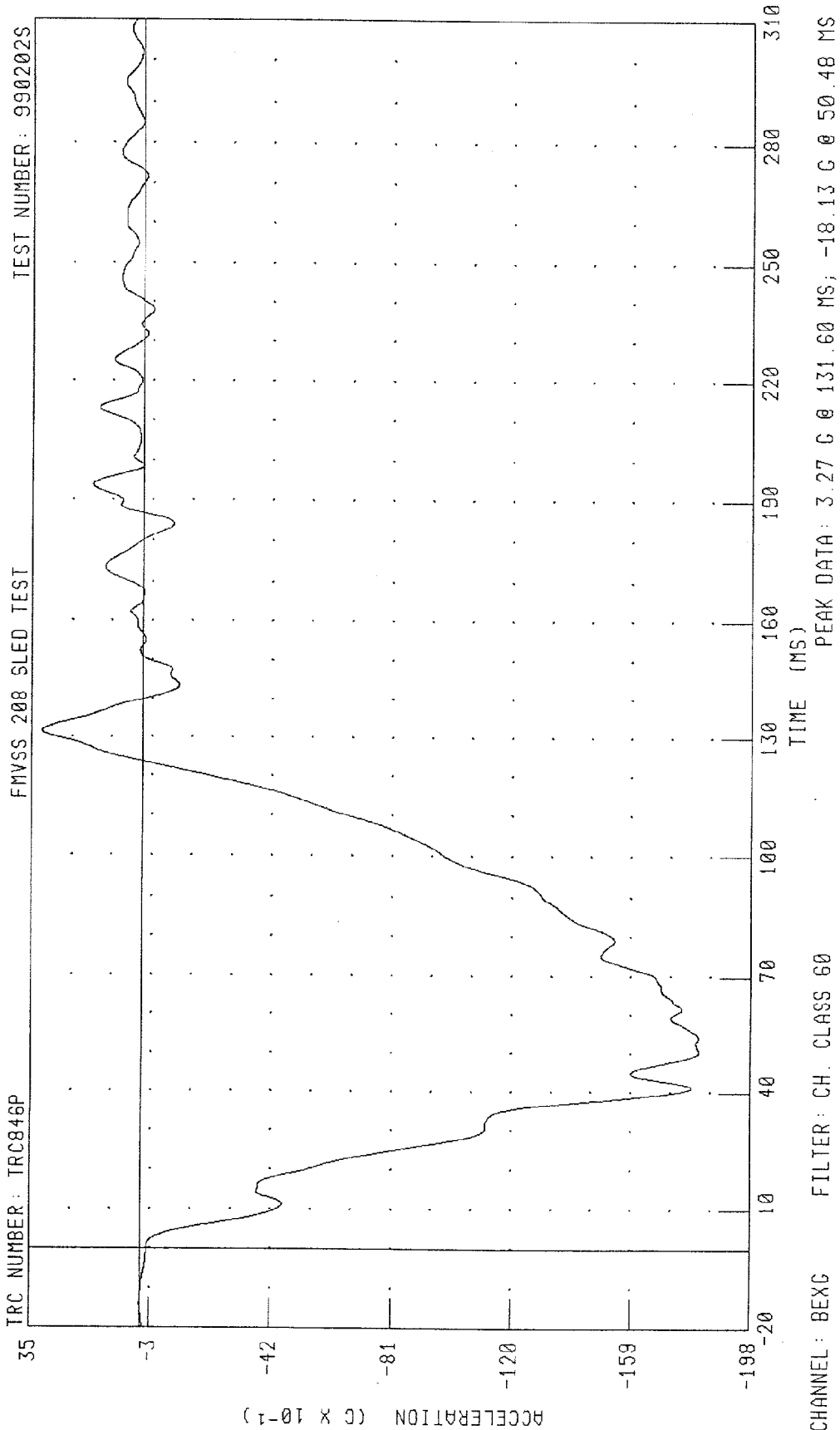


CHANNEL: RFXG

FILTER: CH. CLASS 60

PEAK DATA: 1.68 G @ 129.20 MS; -29.07 G @ 31.52 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
BOTTOM ENGINE X-AXIS ACCELERATION



CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER AIRBAG INDUCTIVE PICKUP

TEST NUMBER: 990202S

FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

99

66

33

VOLTAGE (V X 10⁻²)

-33

-66

-100

TIME (MS)

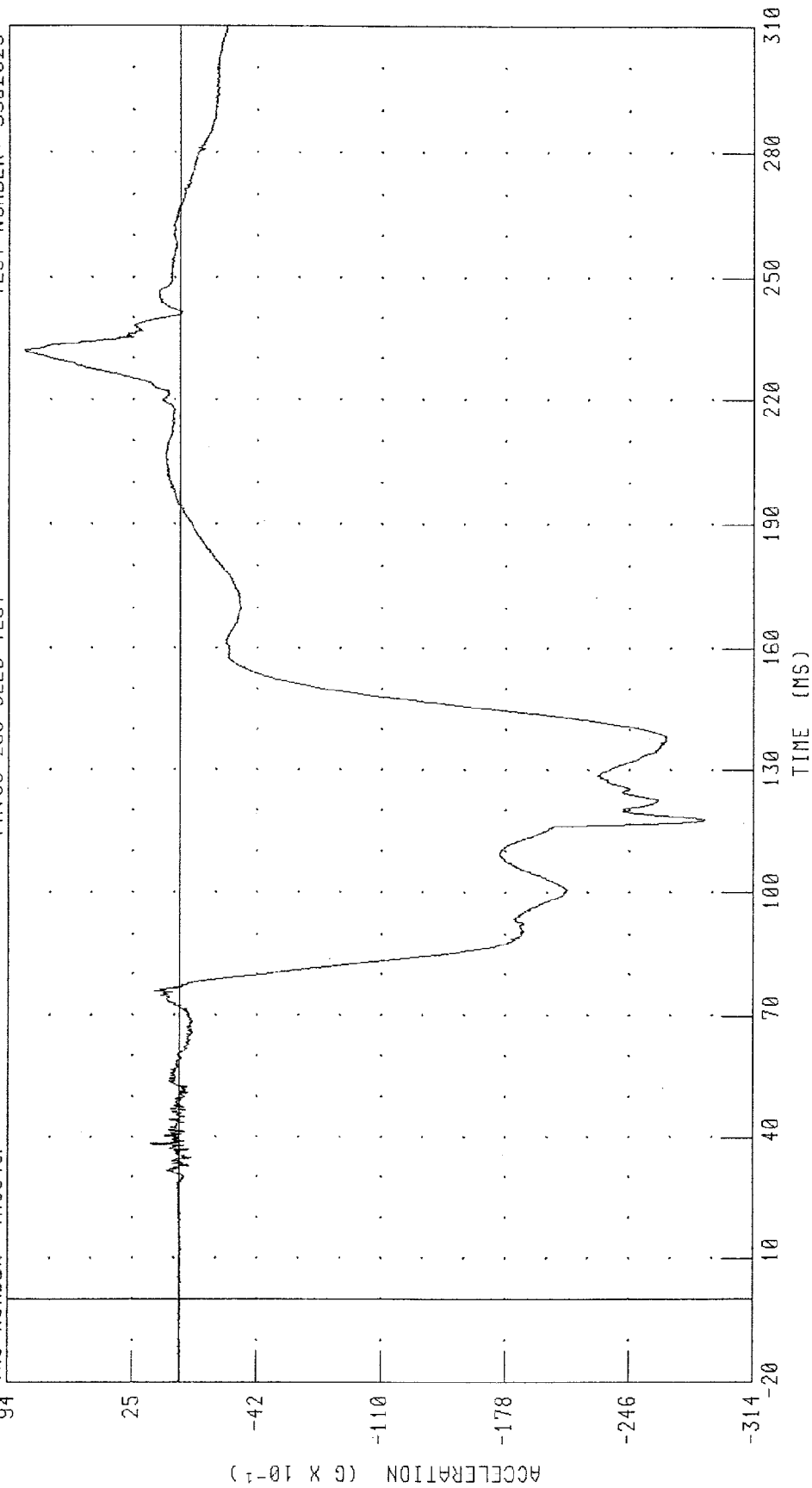
CHANNEL: ABSQB1 FILTER: CH. CLASS 1000

PEAK DATA: 7.63 V @ 49.36 MS, -0.76 V @ 59.36 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER HEAD X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



CHANNEL: HEDXC1 FILTER: CH. CLASS 1000

PEAK DATA: 8.58 G @ 232.00 MS, -28.74 G @ 117.84 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD

DRIVER HEAD Y-AXIS ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

107

87

ACCELERATION ($G \times 10^{-1}$)

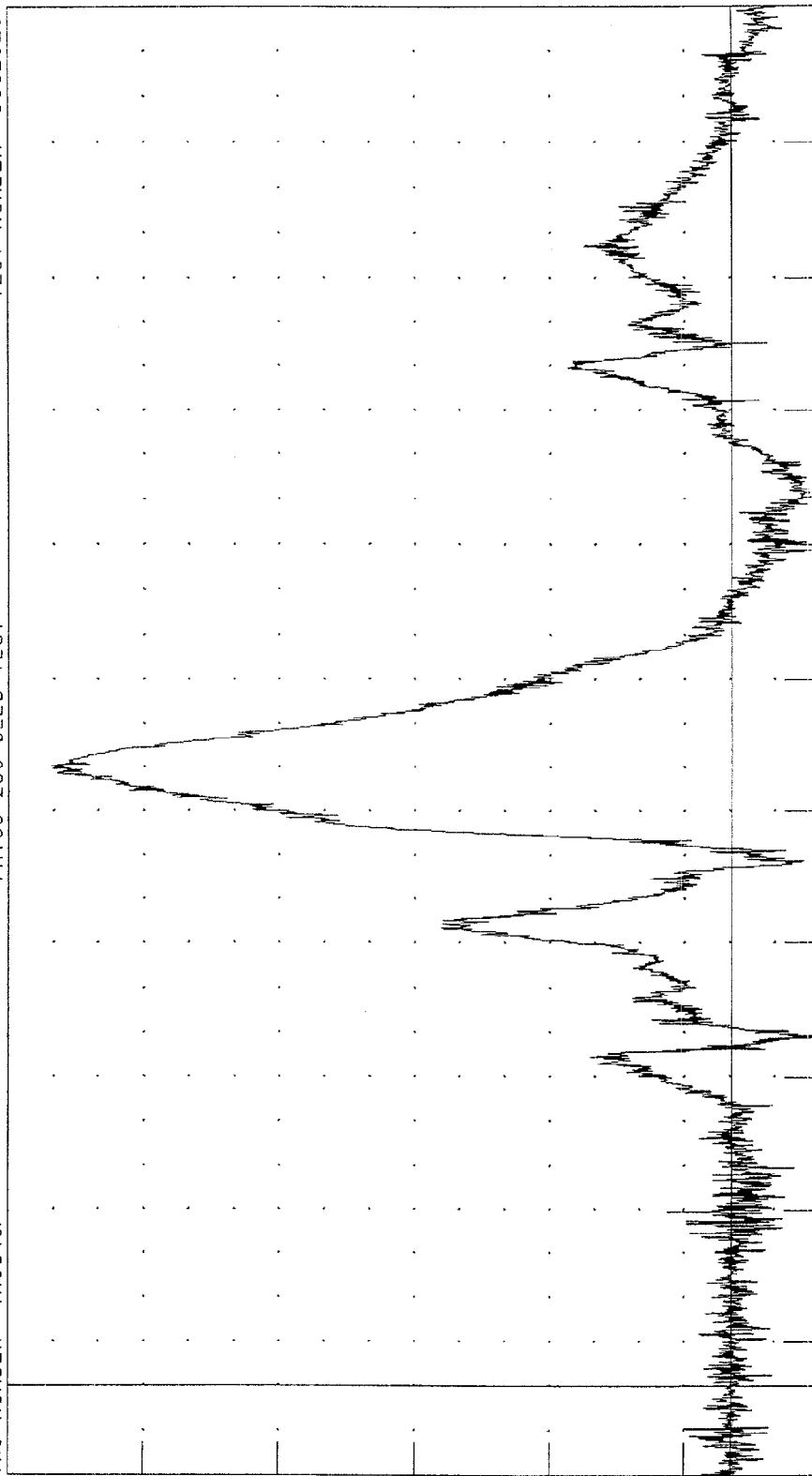
67

47

27

7

-13

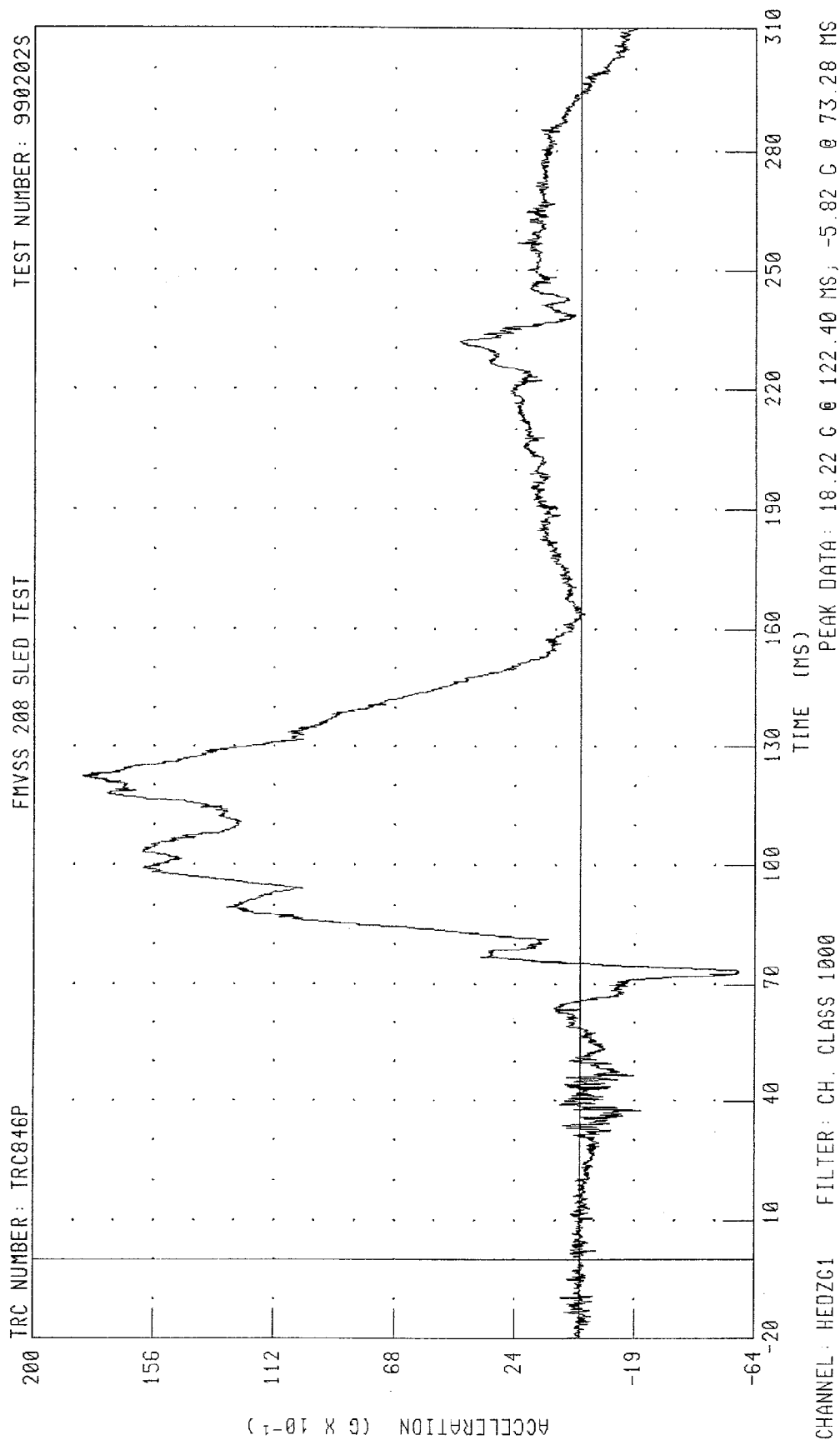


TIME (MS)

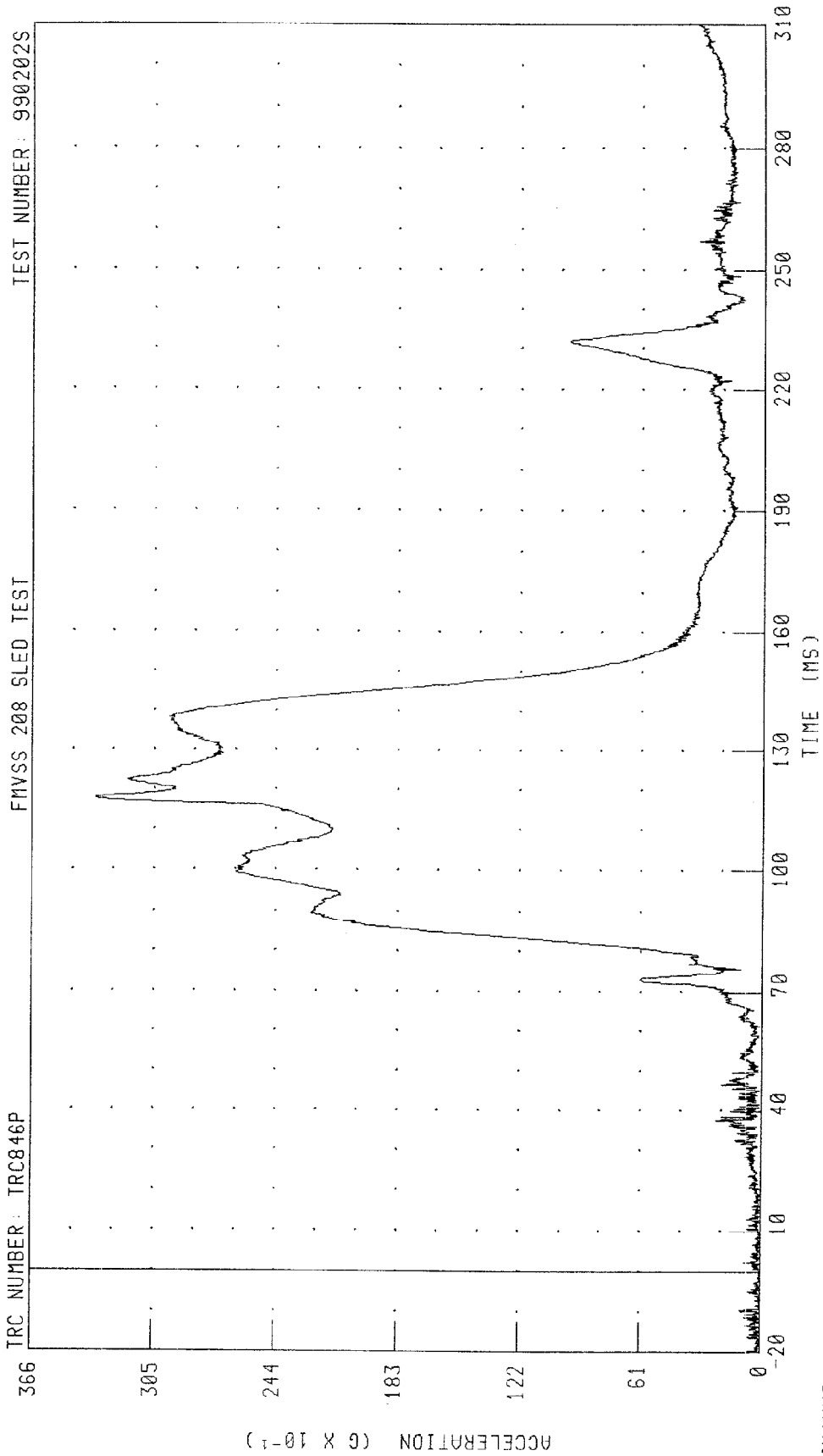
PEAK DATA: 10.05 G @ 140.56 MS, -1.22 G @ 78.96 MS

CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER HEAD Z-AXIS ACCELERATION



CX0107 / 1999 CHEVROLET TAHOE 2WD
 DRIVER HEAD RESULTANT ACCELERATION



PEAK DATA: 33.43 G @ 117.84 MS, 0.01 G @ 6.80 MS

CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

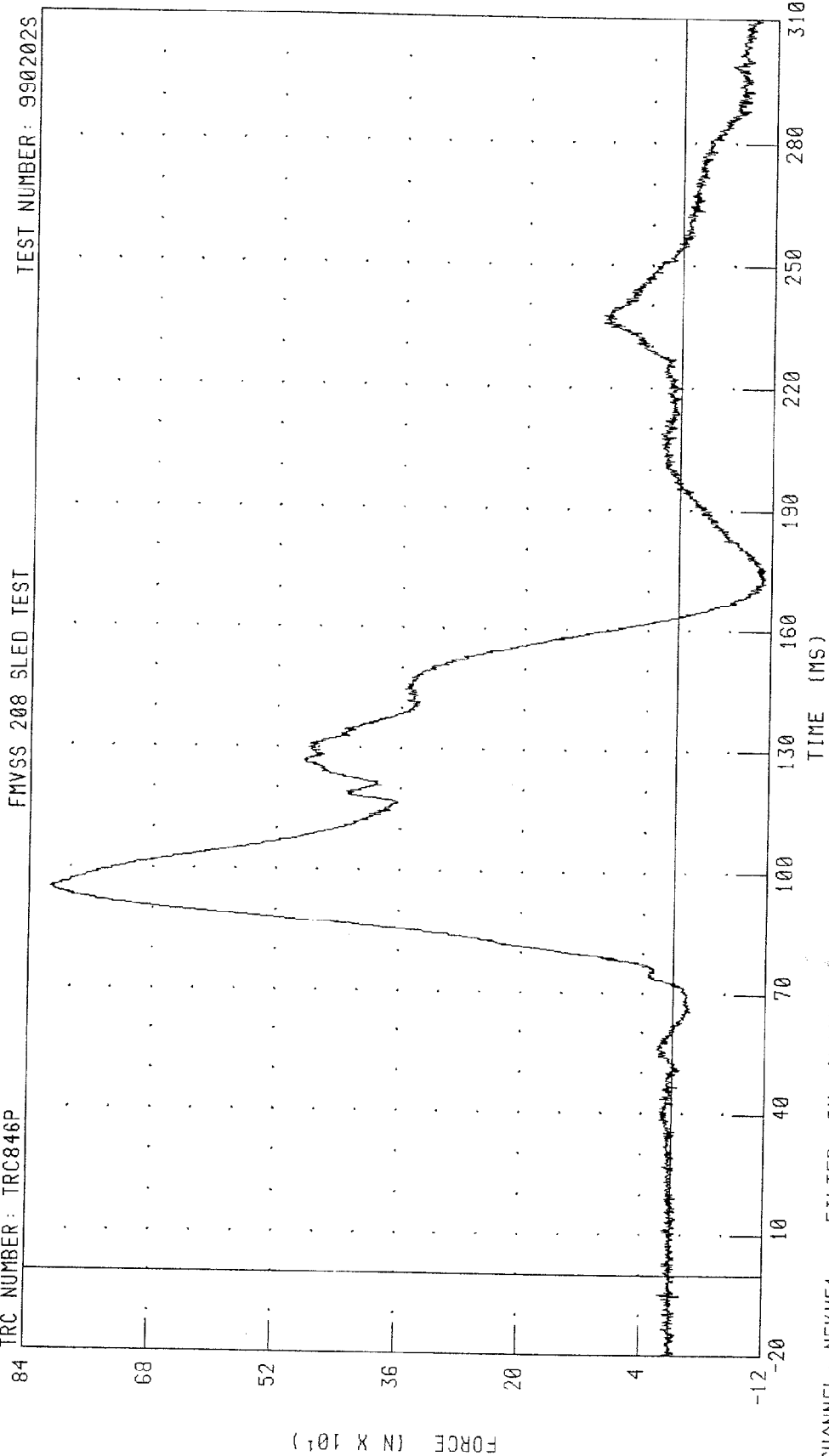
CX0107 / 1999 CHEVROLET TAHOE 2WD

DRIVER NECK X-AXIS SHEAR FORCE

FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



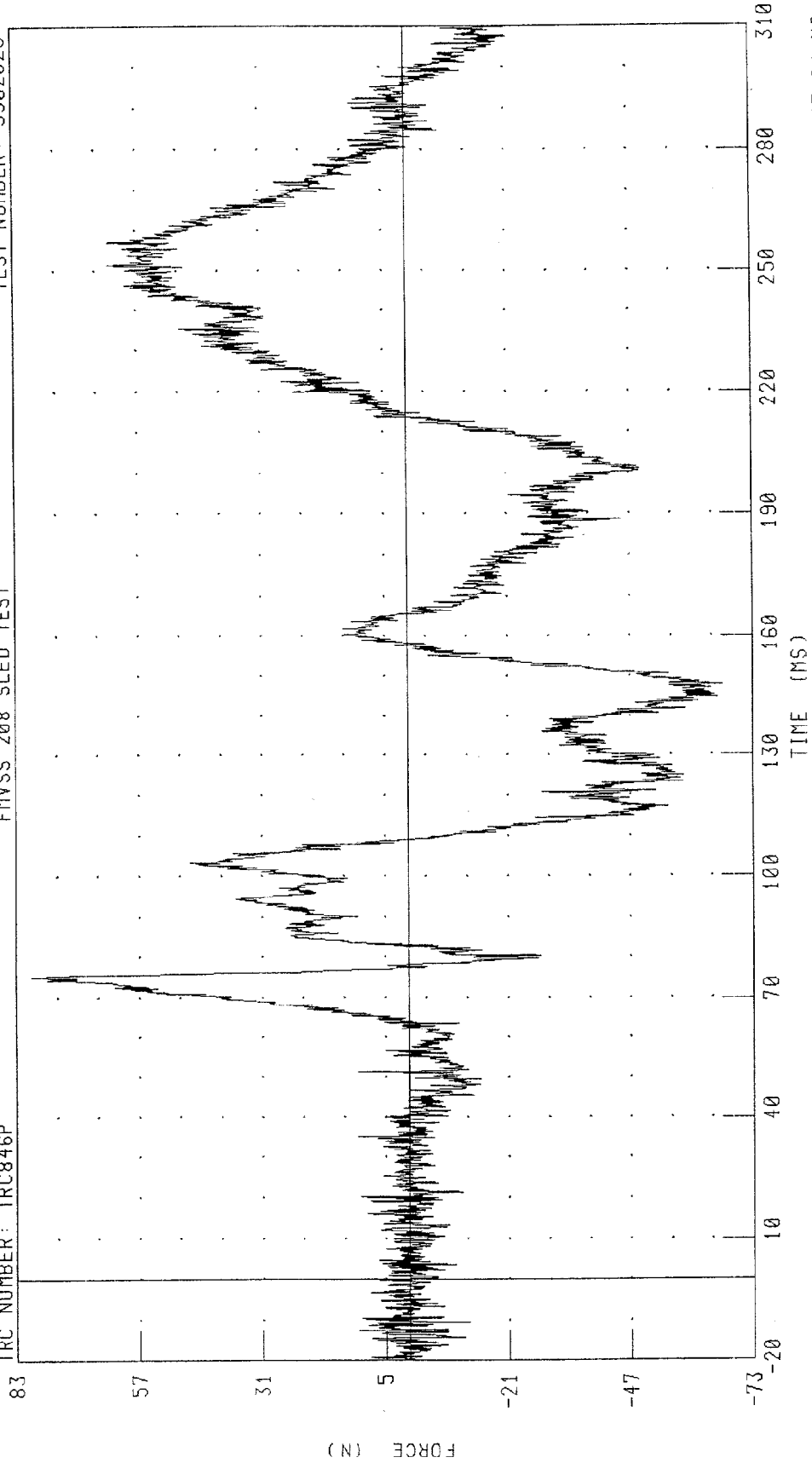
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 812.56 N @ 95.36 MS; -112.23 N @ 173.36 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER NECK Y-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



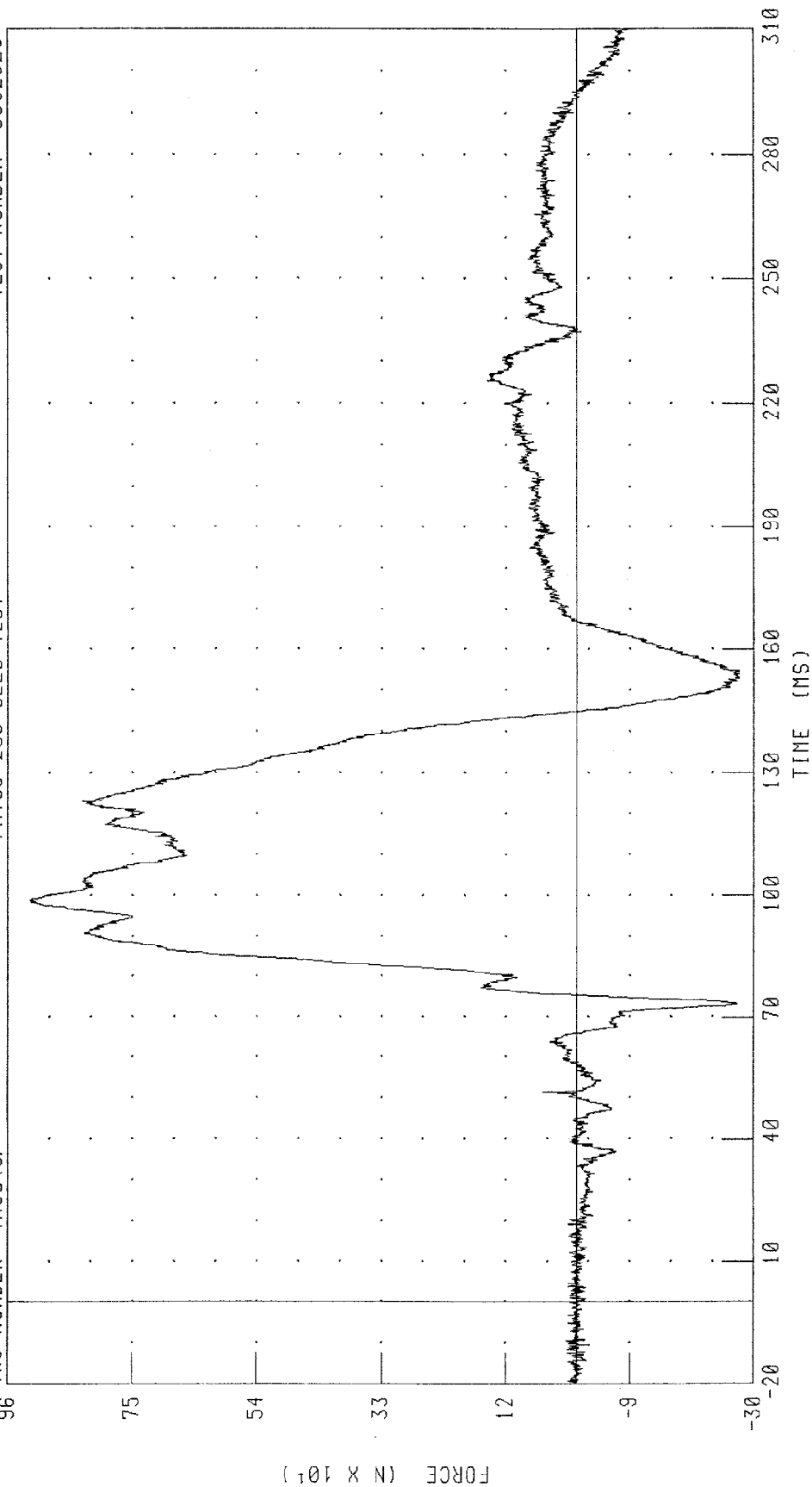
PEAK DATA: 79.76 N @ 75.20 MS, -66.68 N @ 147.84 MS

CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

CX0107 / 1999 CHEVROLET TAHOE 2ND
DRIVER NECK Z-AXIS AXIAL FORCE
FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 922.99 N @ 98.72 MS; -275.92 N @ 154.56 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER NECK MOMENT ABOUT X AXIS
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

206

145

84

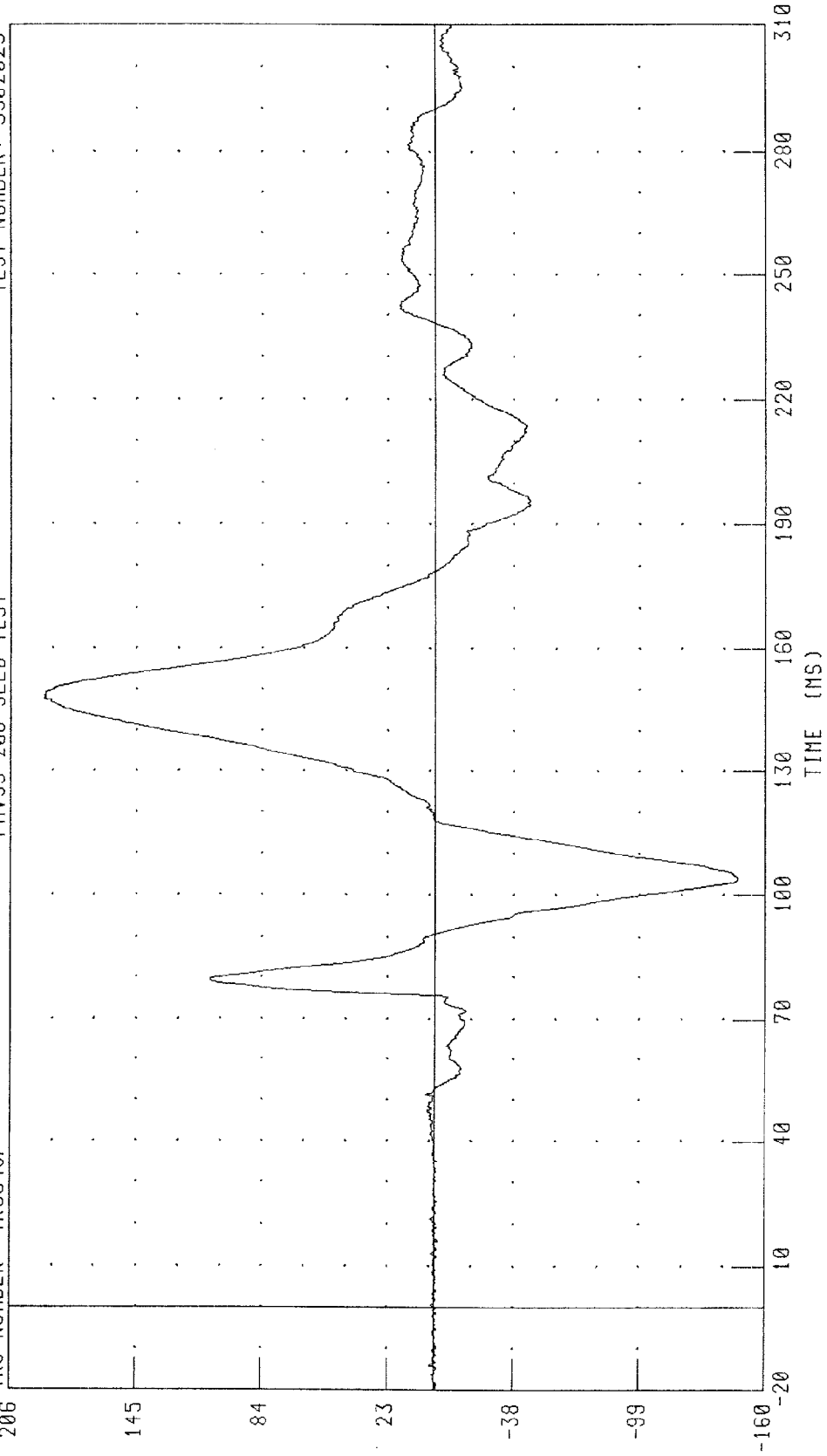
23

-38

-99

-160

TORQUE (N·M X 10⁻¹)



TIME (MS)

PEAK DATA: 18.97 N·M @ 148.00 MS; -14.67 N·M @ 104.08 MS

CHANNEL: NEKXM1 FILTER: CH. CLASS 600

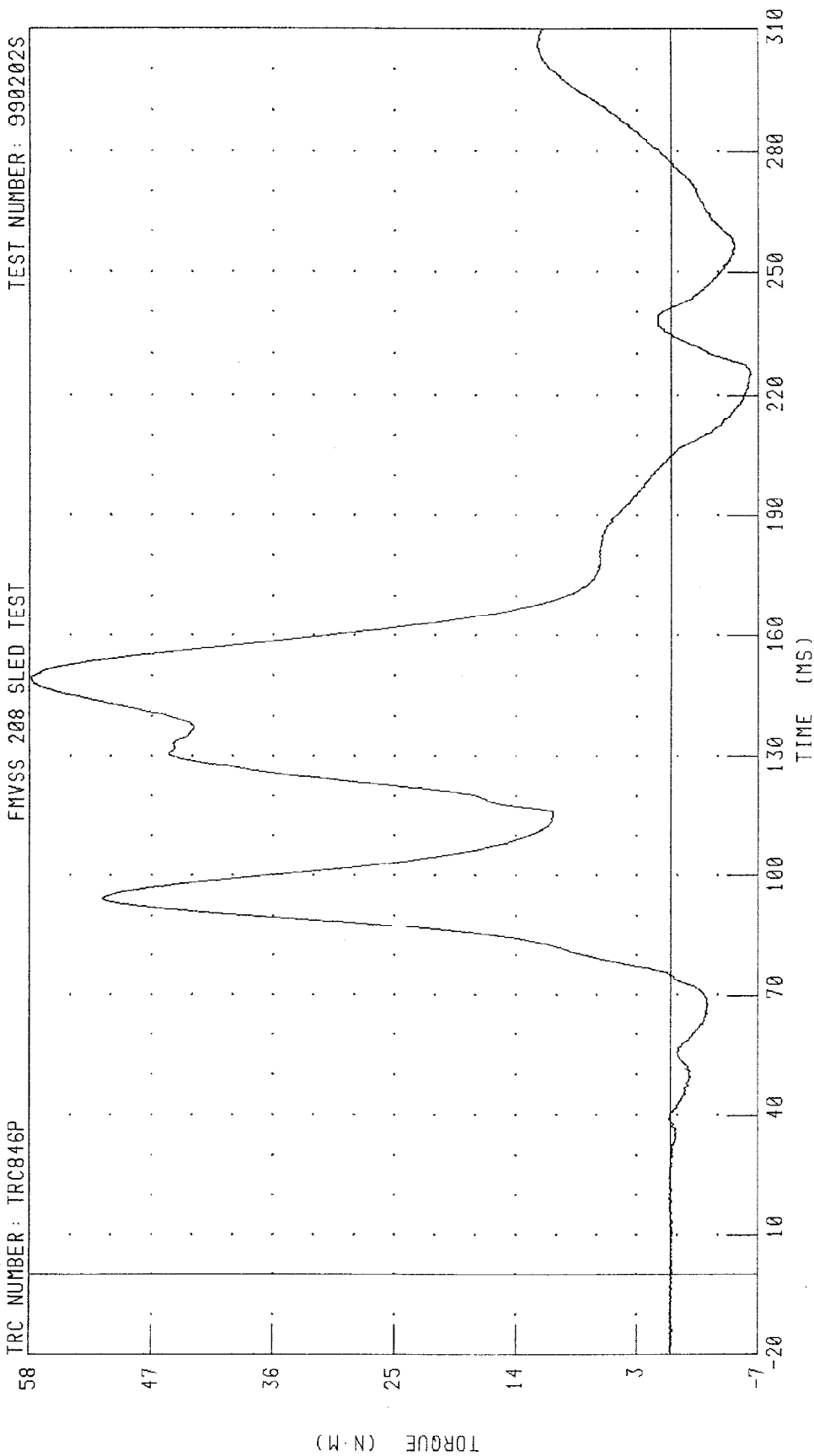
CX0107 / 1999 CHEVROLET TAHOE 2WD

DRIVER NECK MOMENT ABOUT Y AXIS

FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



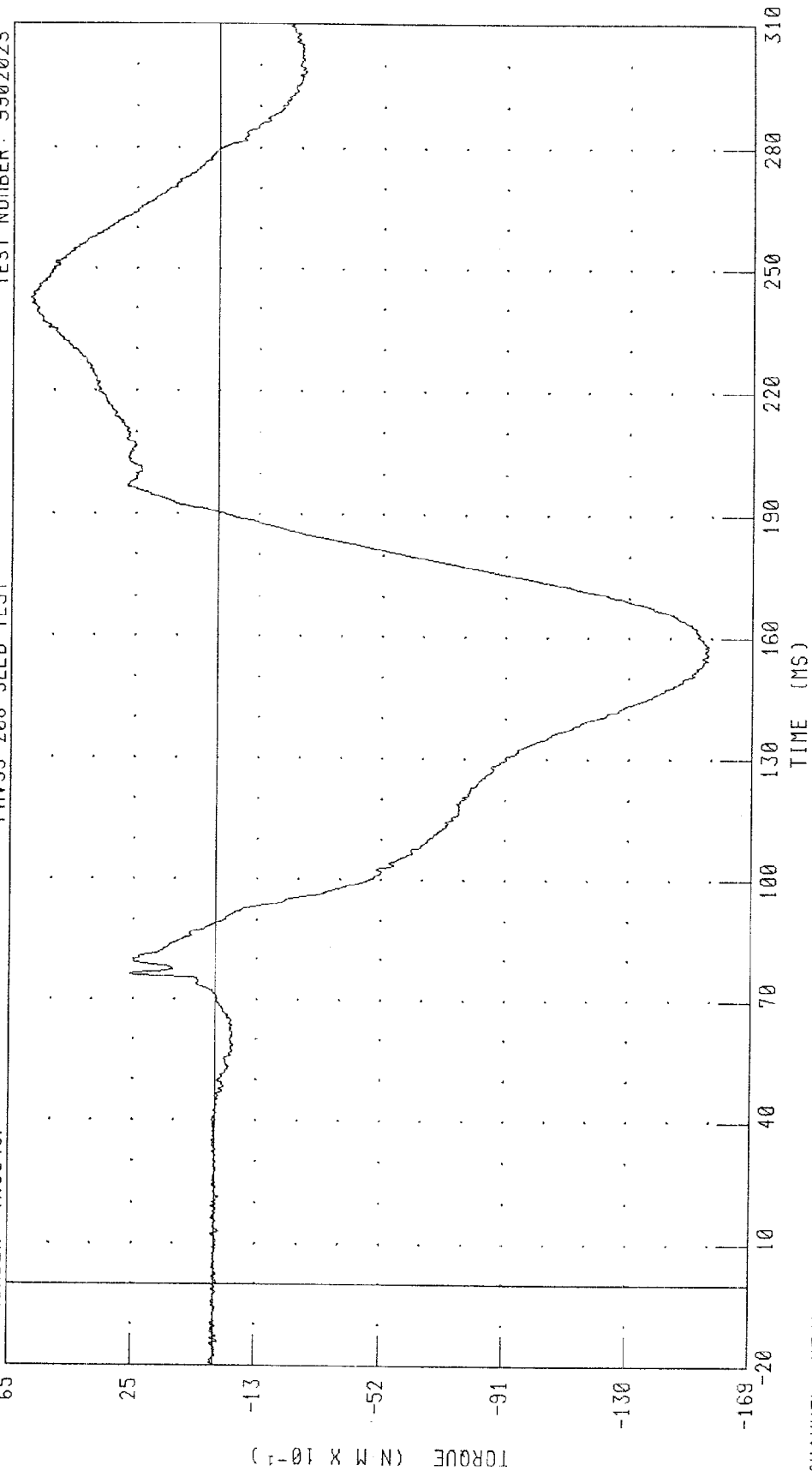
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 57.96 N·M @ 149.76 MS; -7.23 N·M @ 225.12 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER NECK MOMENT ABOUT Z AXIS
FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



CHANNEL: NEKZM1 FILTER: CH. CLASS 600

PEAK DATA: 5.96 N·m @ 242.72 ms, -15.53 N·m @ 157.36 ms

CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER NECK OCCIPITAL CONDYLE ABOUT Y AXIS

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

FMVSS 208 SLED TEST

51

41

31

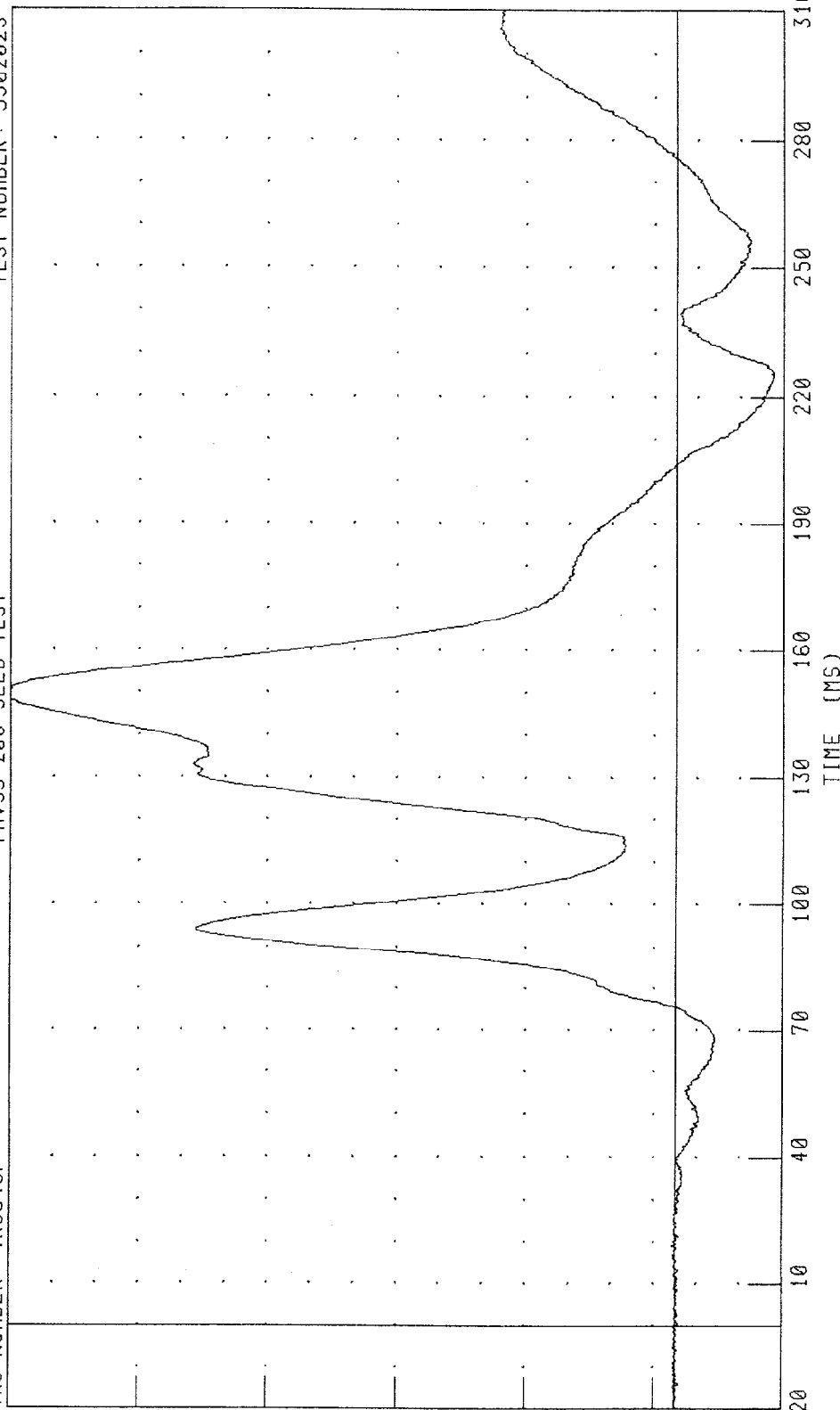
21

11

1

-8

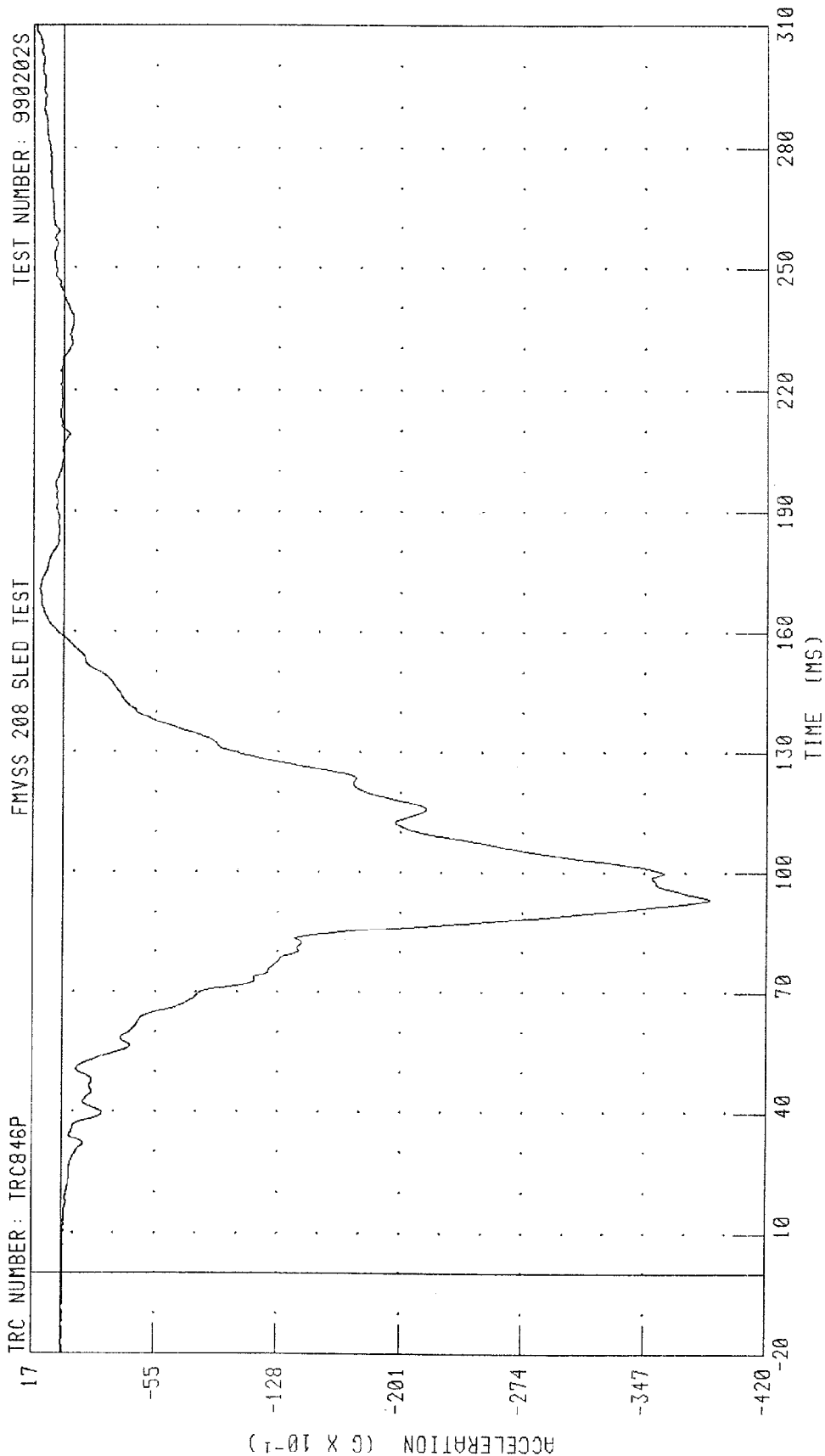
TORQUE (N·M)



CHANNEL: NEKOM1 FILTER: CH. CLASS 600

PEAK DATA: 52.22 N·M @ 149.92 MS, -7.57 N·M @ 225.04 MS

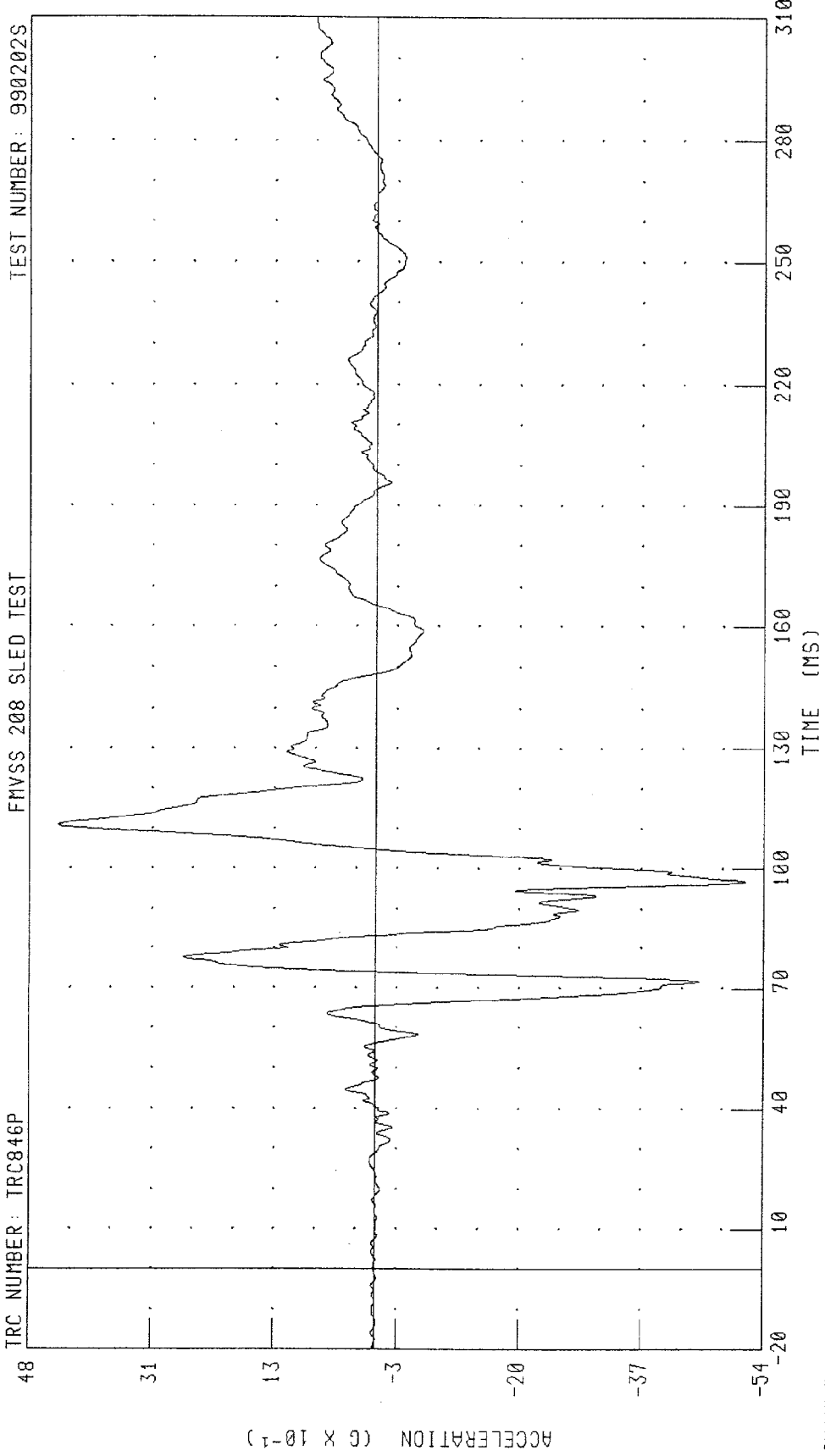
CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER CHEST X-AXIS ACCELERATION



CHANNEL: CSTXC1 FILTER: CH. CLASS 180

PEAK DATA: 1.65 G @ 308.88 MS, -38.59 G @ 93.36 MS

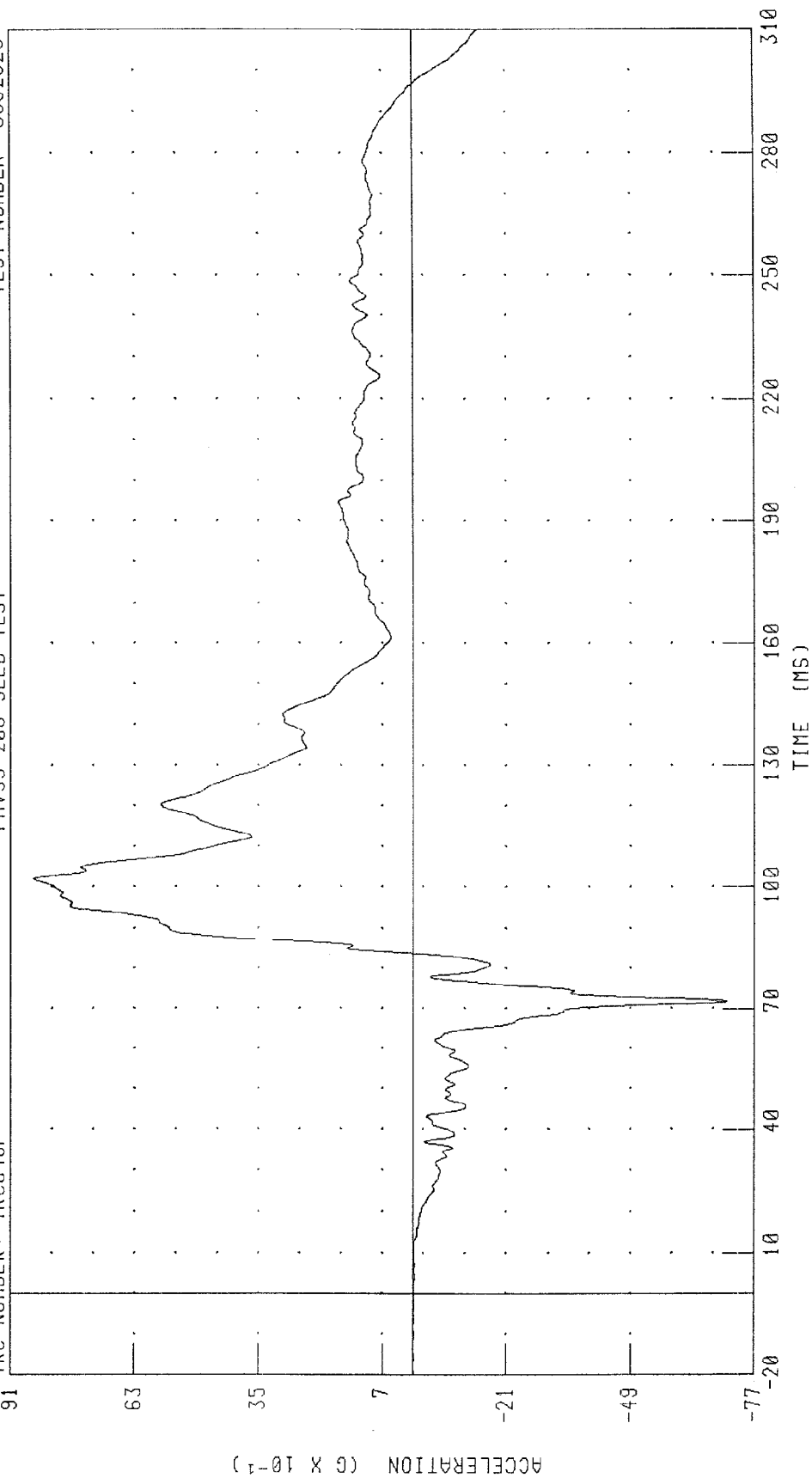
CX0107 / 1999 CHEVROLET TAHOE 2ND
DRIVER CHEST Y-AXIS ACCELERATION



CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER CHEST Z-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

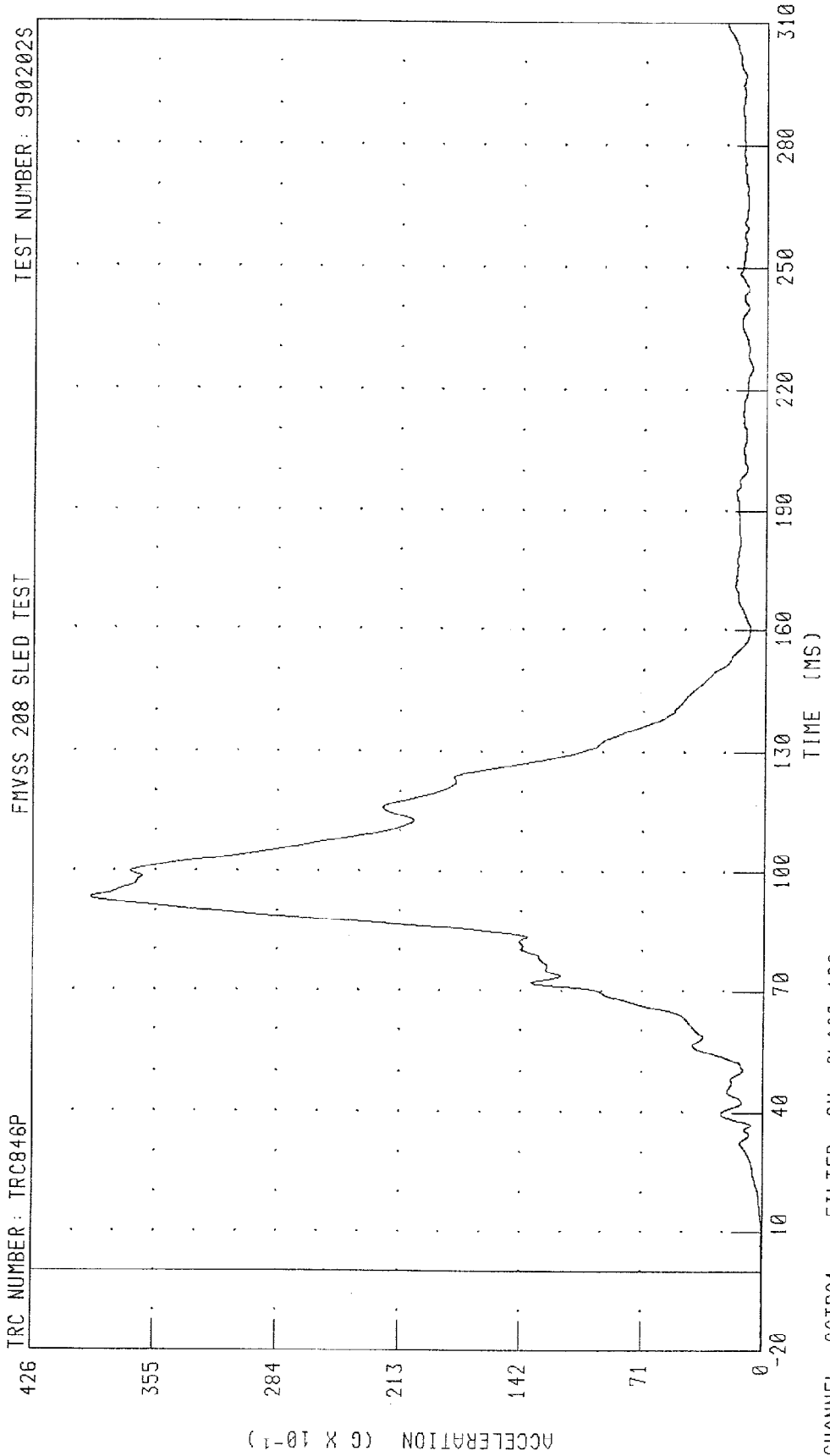
TRC NUMBER: TRC846P



CHANNEL: CSTZC1 FILTER: CH. CLASS 180

PEAK DATA: 8.57 G @ 102.08 MS, -7.09 G @ 71.84 MS

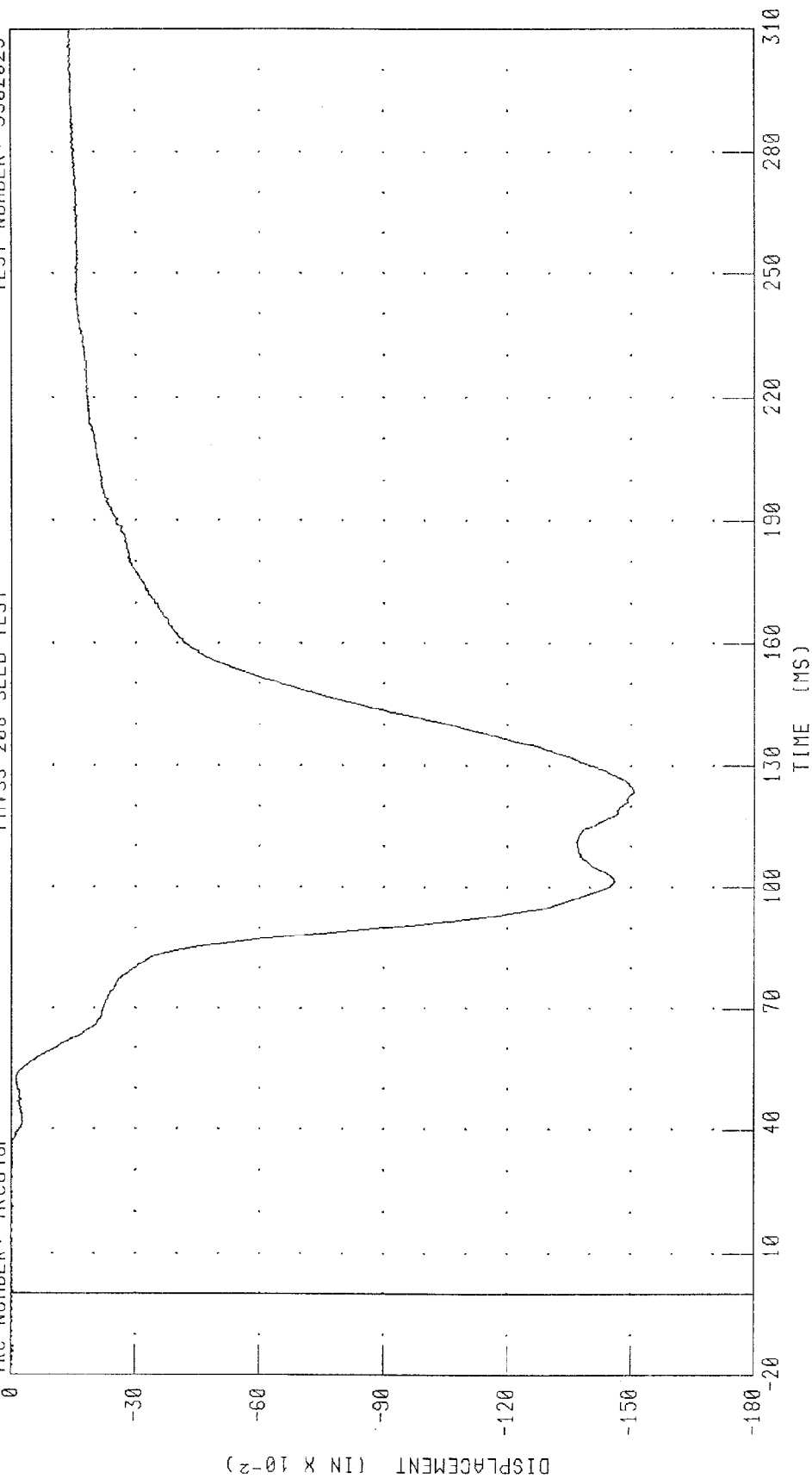
CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER CHEST RESULTANT ACCELERATION
FMVSS 208 SLED TEST



CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER CHEST DEFLECTION
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



CHANNEL: CSTXD1 FILTER: CH. CLASS 600

PEAK DATA: 0.00 IN @ -11.76 MS; -1.51 IN @ 123.60 MS

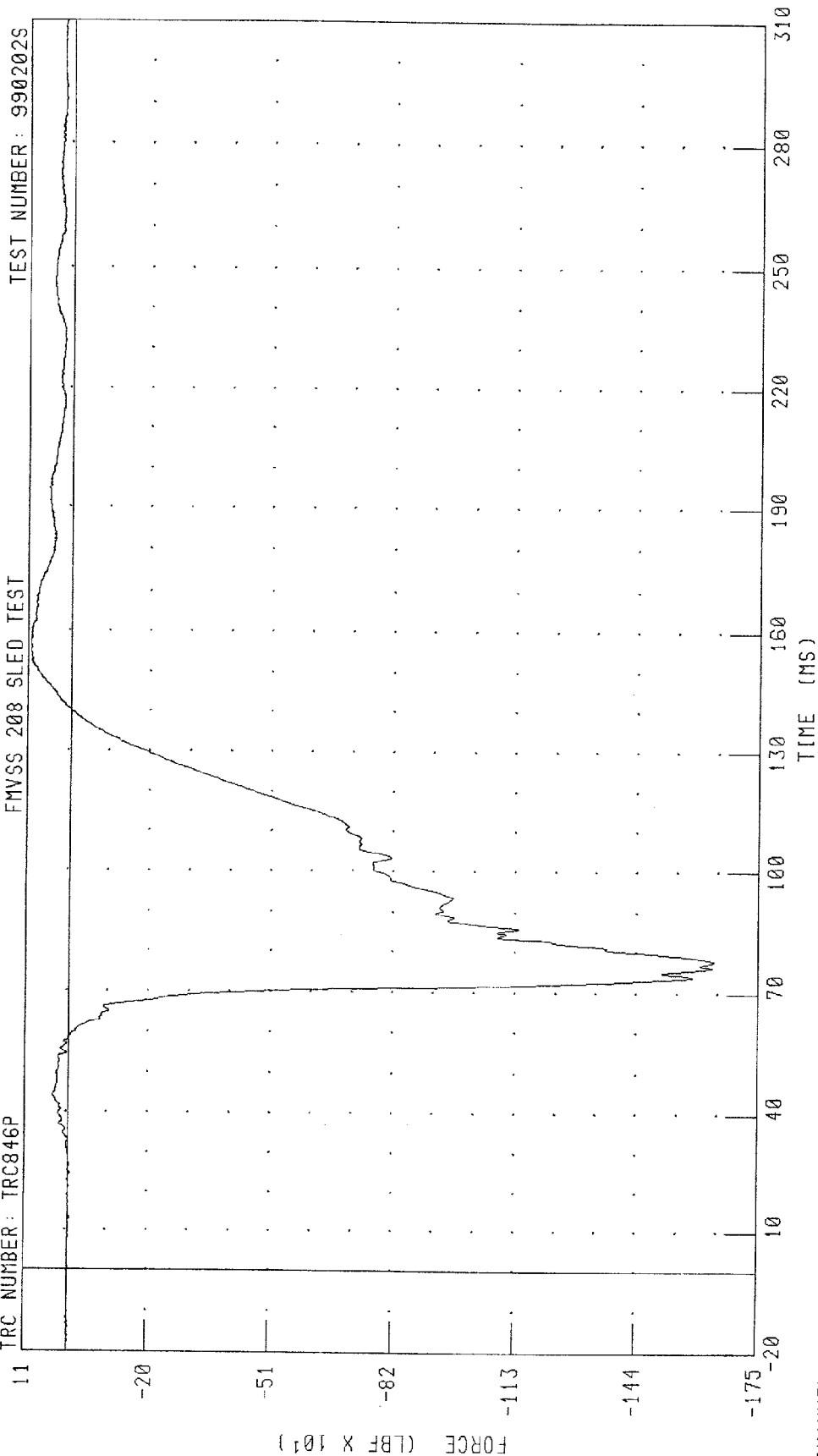
CX0107 / 1999 CHEVROLET TAHOE 2WD

DRIVER LEFT FEMUR FORCE

TRC NUMBER: TRC846P

FIVSS 208 SLED TEST

TEST NUMBER: 990202S



CHANNEL: LFMF1 FILTER: CH. CLASS 600

TIME (MS)

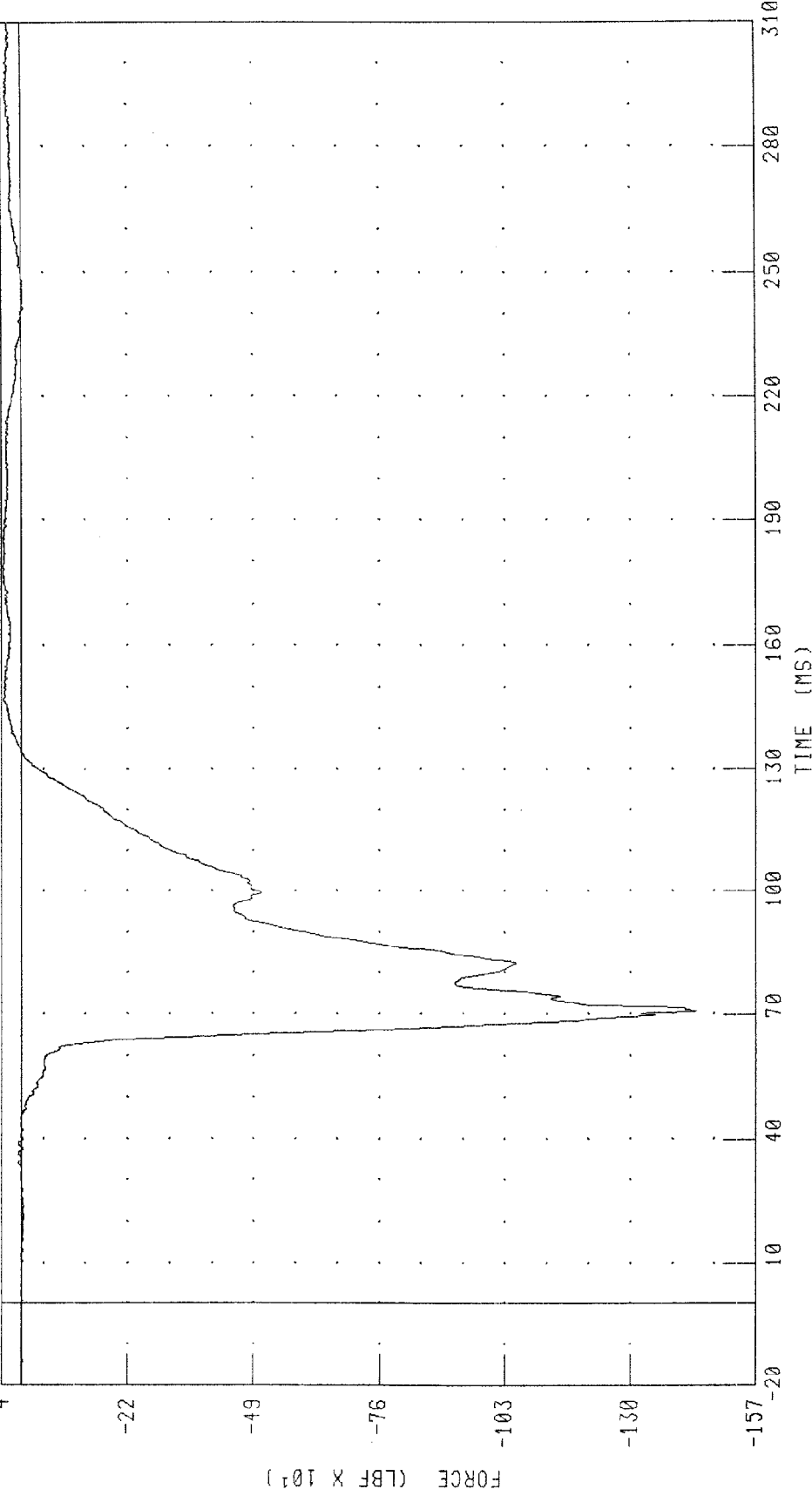
PEAK DATA: 103.13 LBF @ 155.12 MS; -1636.89 LBF @ 77.84 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
DRIVER RIGHT FEMUR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

4



PEAK DATA: 38.75 LBF @ 185.04 MS; -1449.09 LBF @ 70.80 MS

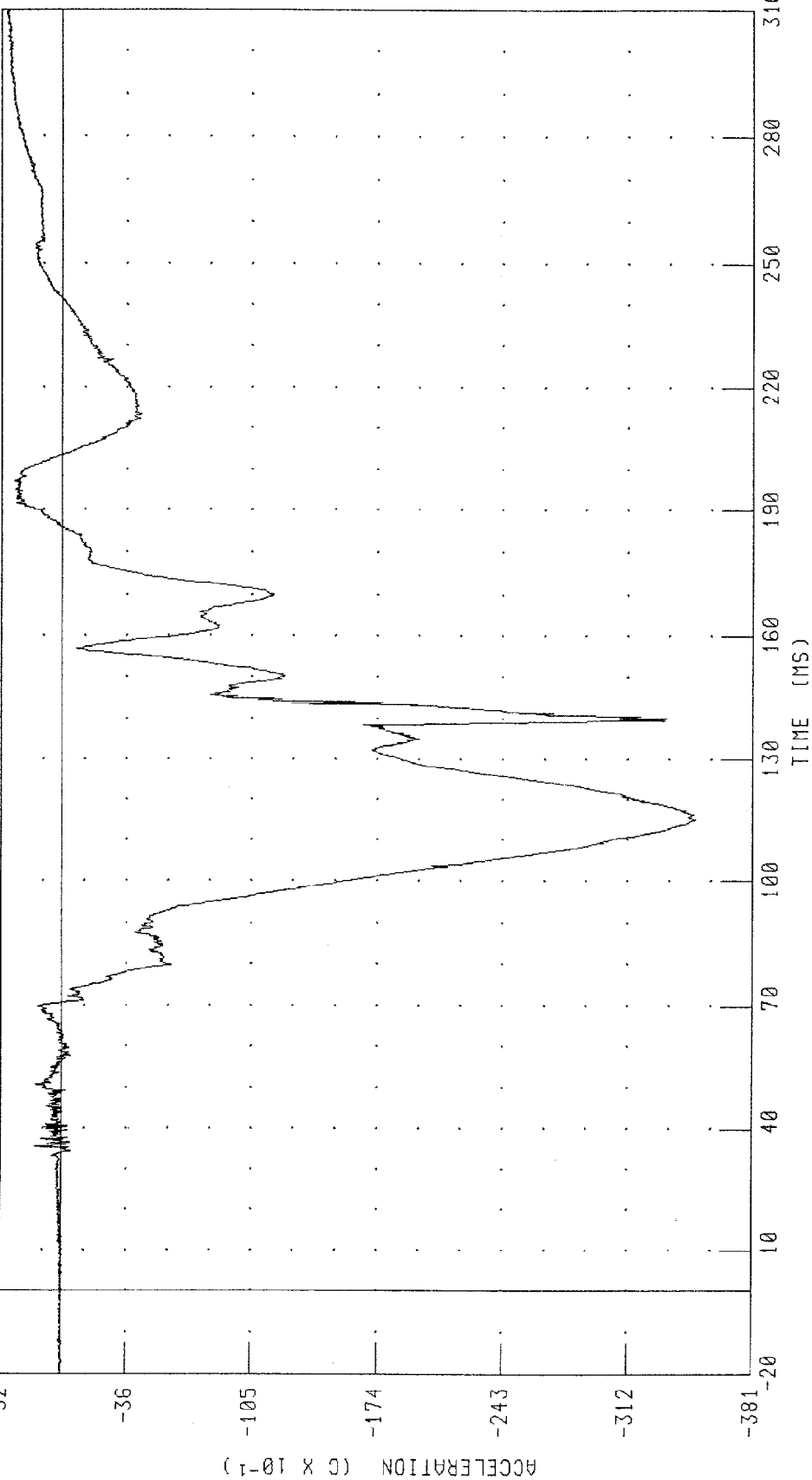
CHANNEL: RFMF1 FILTER: CH. CLASS 600

CX0107 / 1999 CHEVROLET TAHOE 2WD
 RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

32



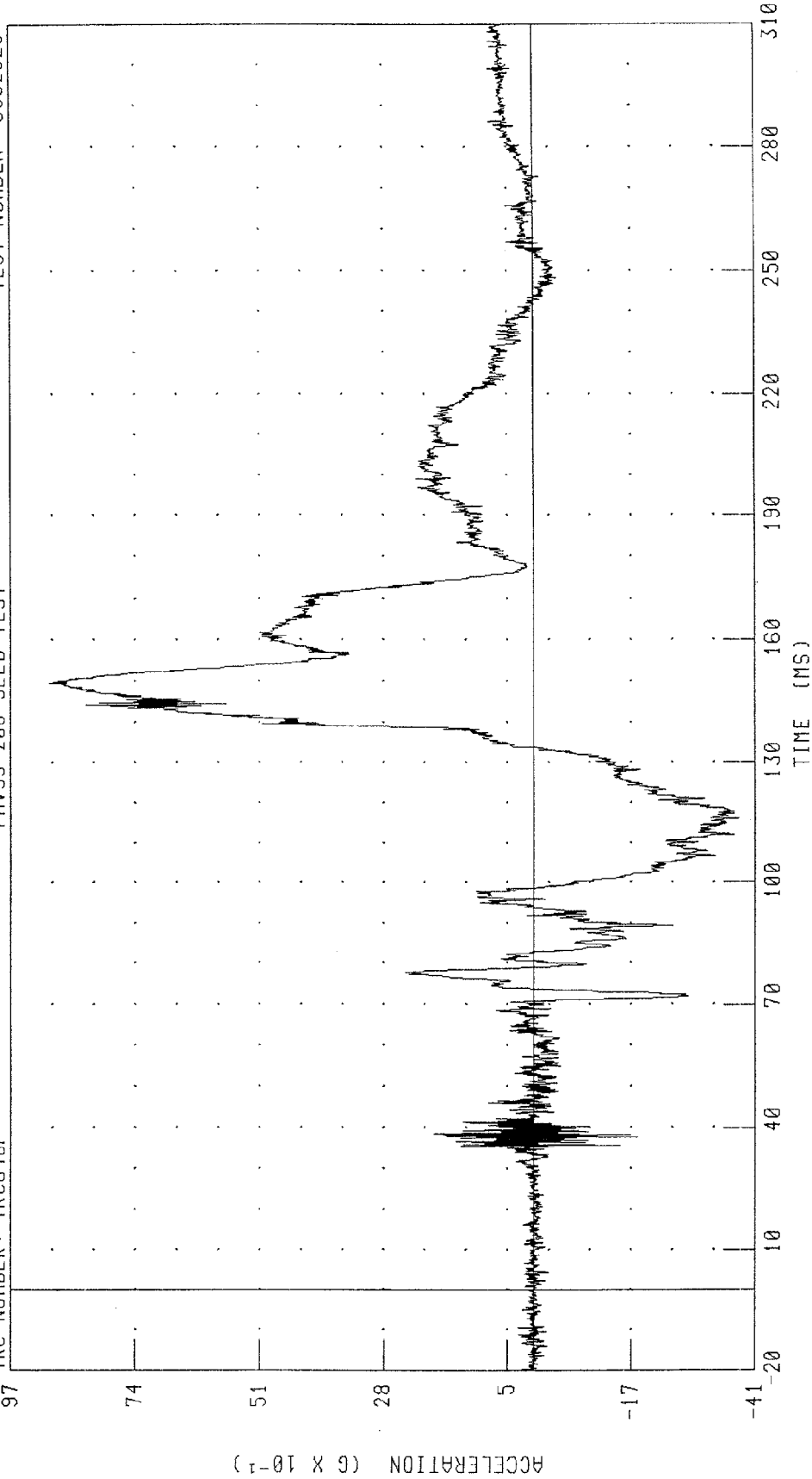
CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

PEAK DATA: 3.03 G @ 308.72 MS, -34.96 G @ 115.28 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
 RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



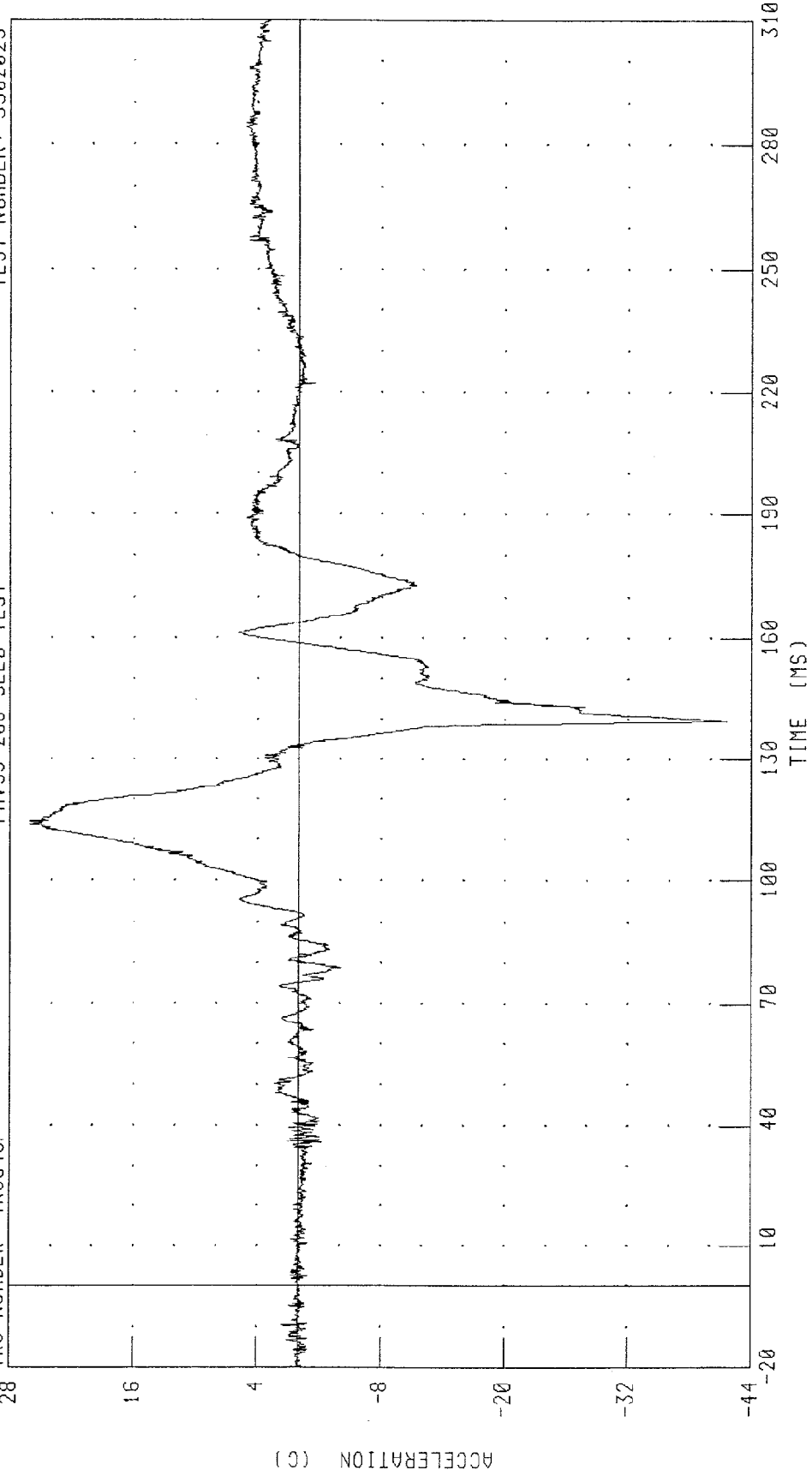
CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

PEAK DATA: 8.99 G @ 149.76 MS, -3.81 G @ 116.24 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
 RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



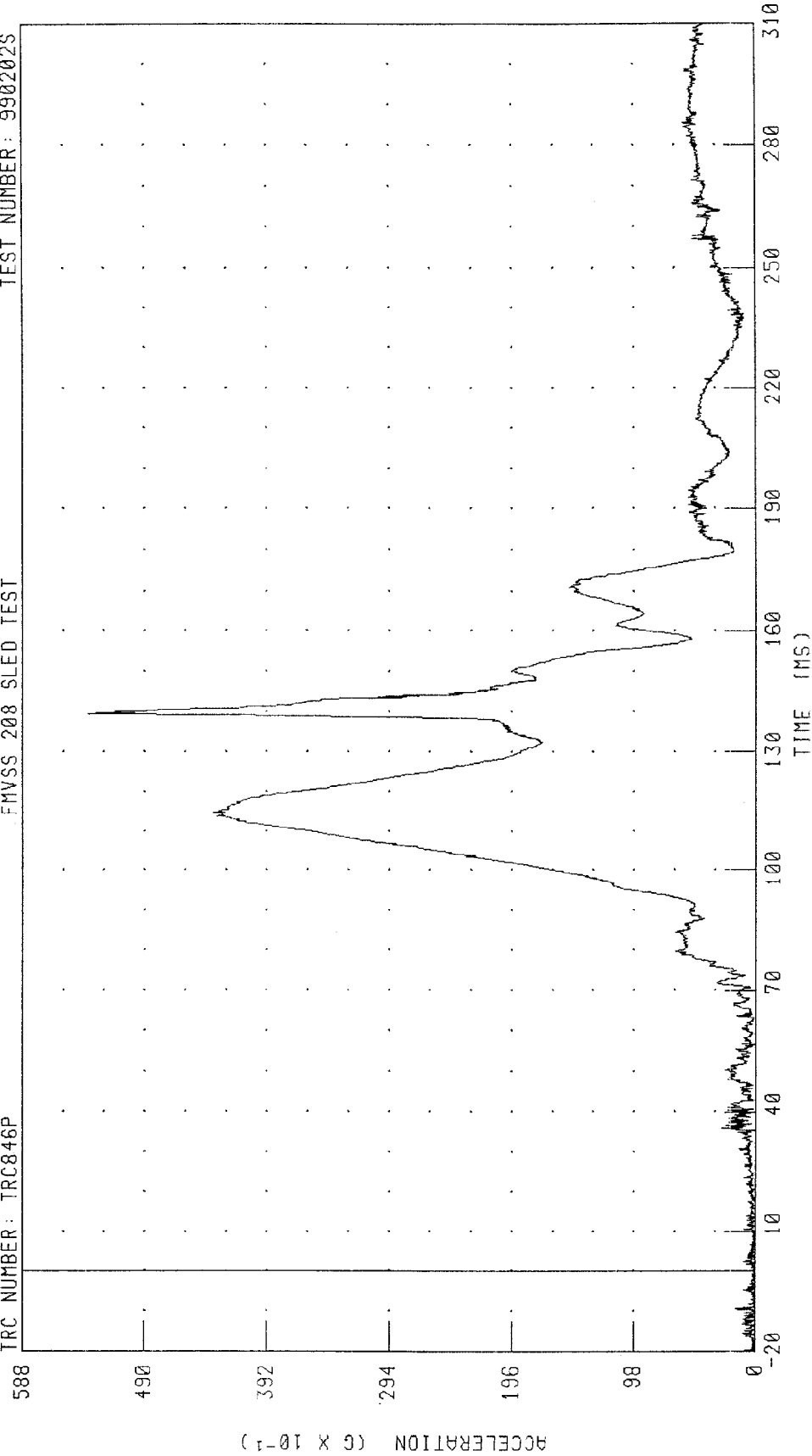
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 26.14 G @ 114.72 MS; -41.57 G @ 139.52 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
 RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

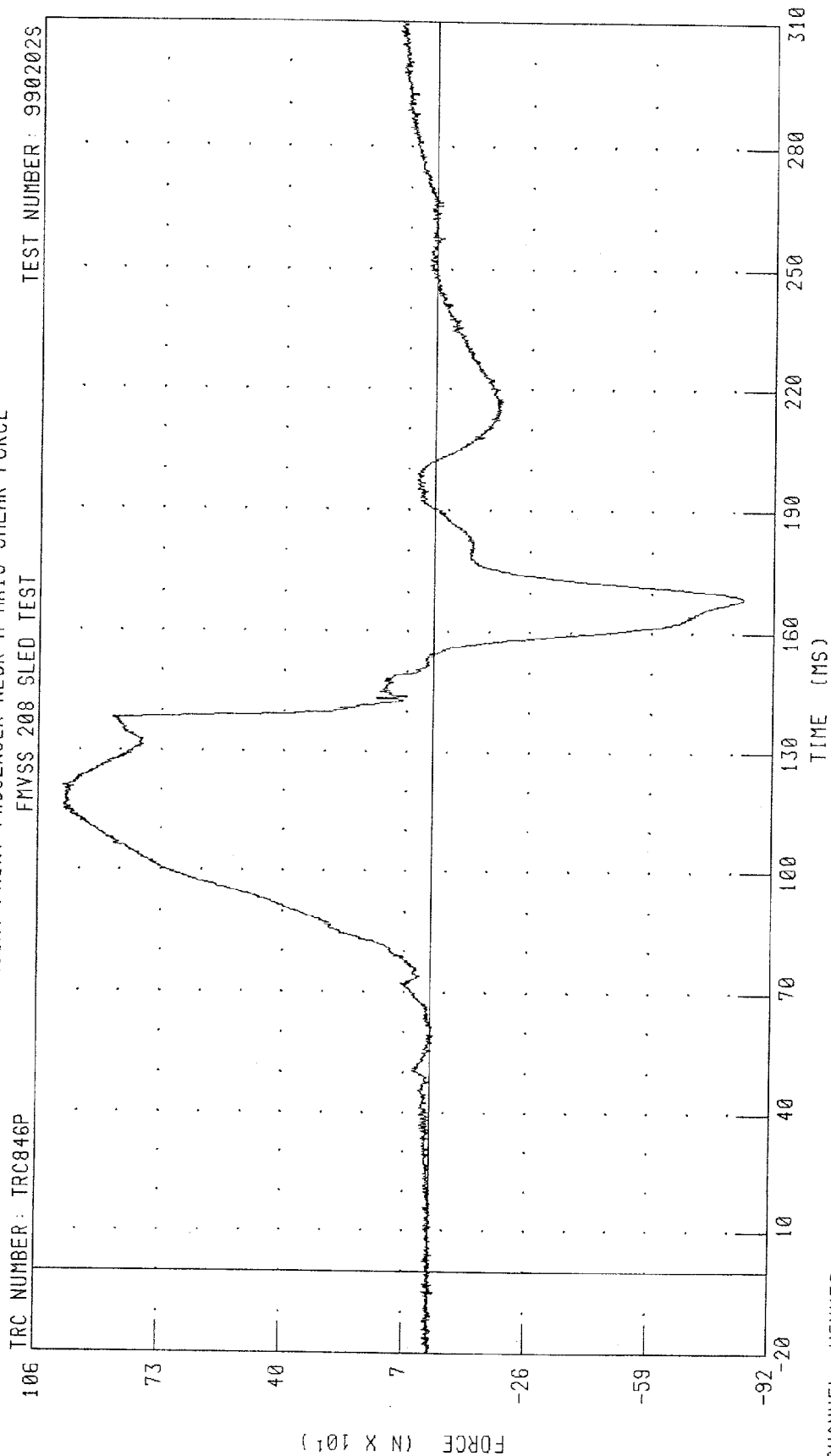


PEAK DATA: 53.49 G @ 139.52 MS; 0.02 G @ -6.24 MS

CHANNEL: HEDRC2 FILTER: CH. CLASS 1000

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TRC NUMBER: TRC846P
TEST NUMBER: 990202S



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000
PEAK DATA: 994.04 N @ 121.20 MS, -840.26 N @ 168.56 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

306

235

164

93

22

-49

-120

FORCE (N X 10⁻¹)

TIME (MS)

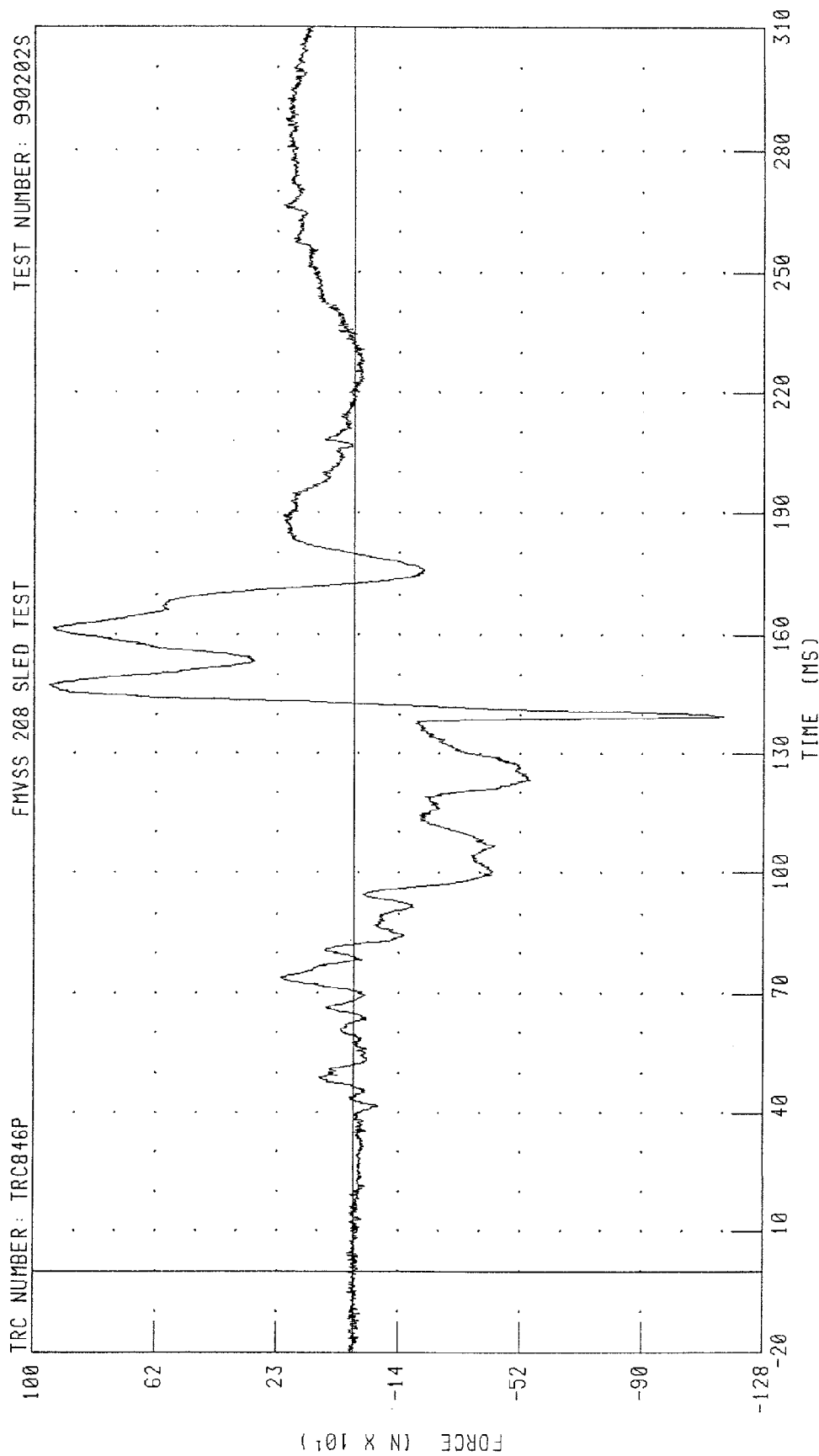
PEAK DATA: 27.17 N @ 51.36 MS; -11.75 N @ 106.72 MS

CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

CX0107 / 1999 CHEVROLET TAHOE 2ND
 RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



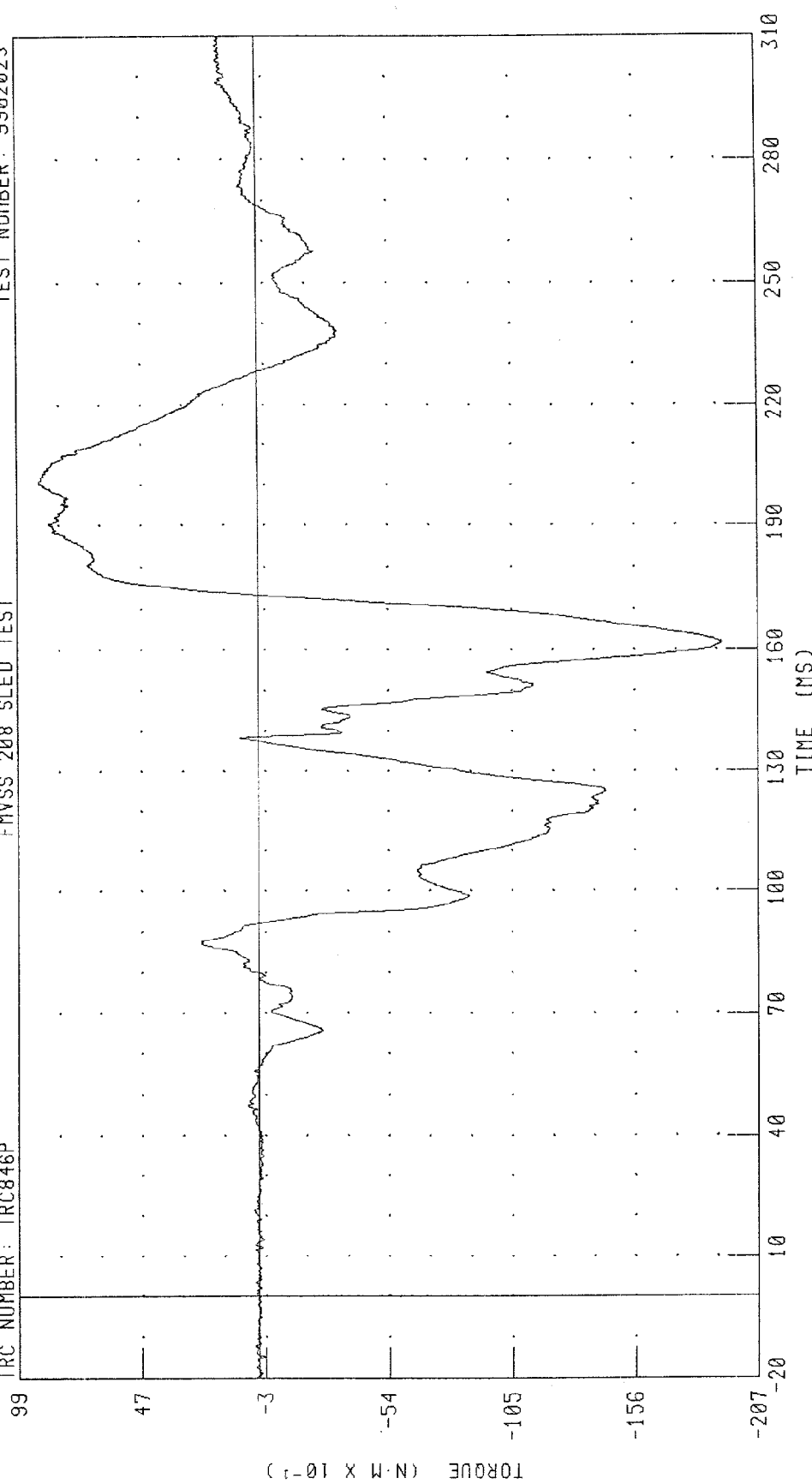
PEAK DATA: 953.68 N @ 147.52 MS; -1156.51 N @ 139.68 MS

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS
FMYSS 200 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



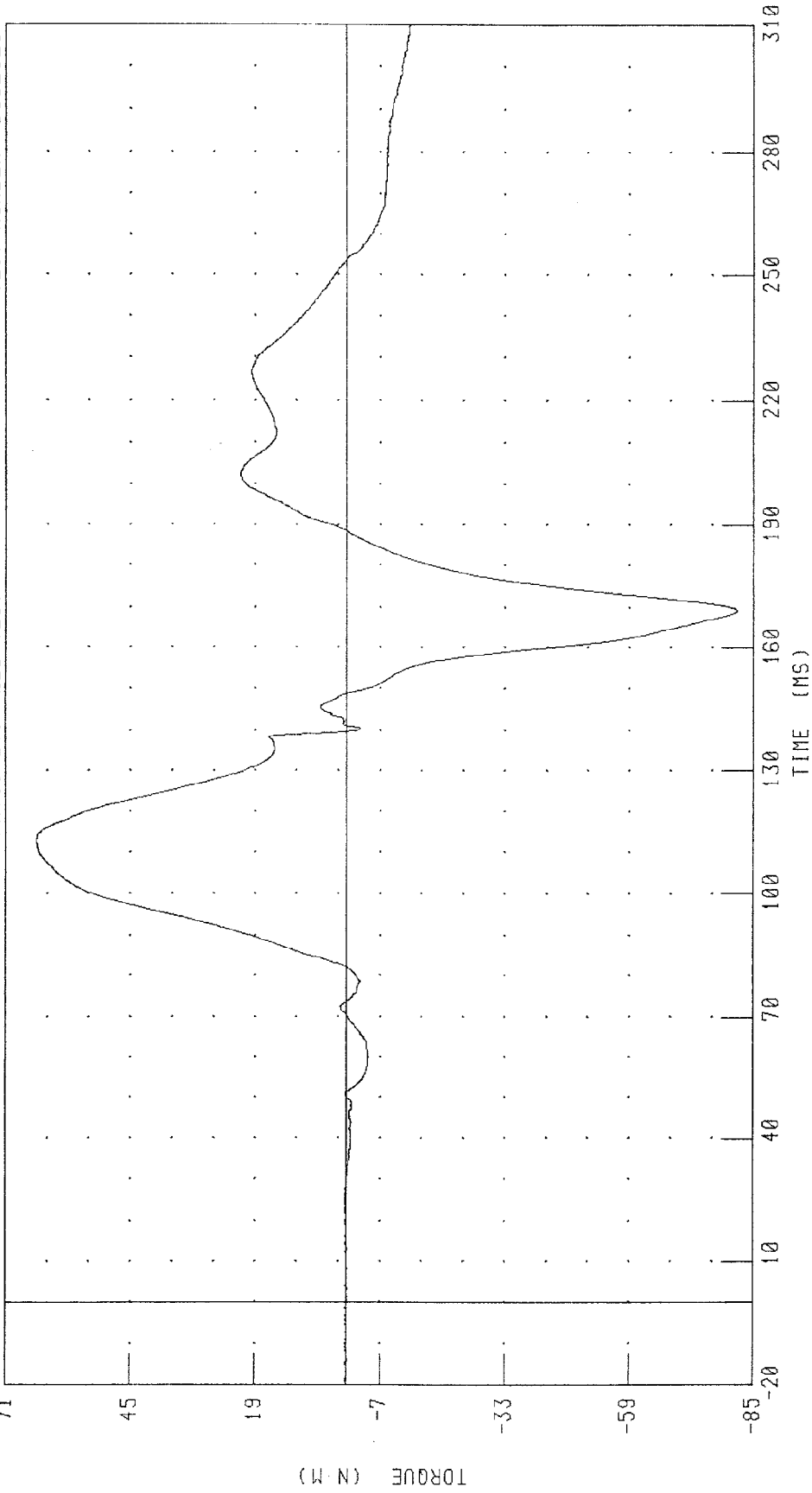
CHANNEL: NEKXM2 FILTER: CH. CLASS 600
PEAK DATA: 9.01 N-M @ 200.72 MS; -19.22 N-M @ 161.84 MS

CX0107 / 1999 CHEVROLET TAHOE 2ND
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P

71



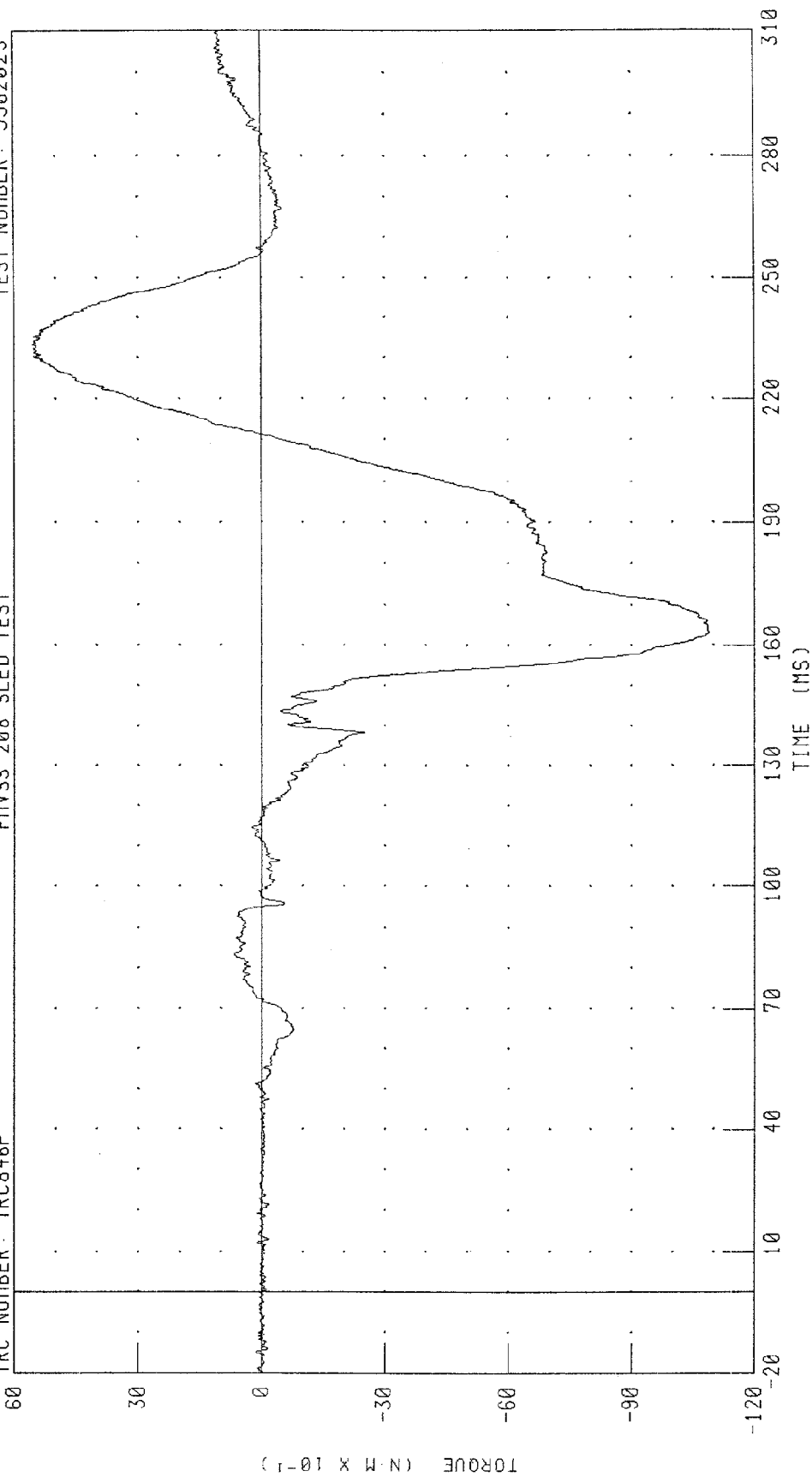
CHANNEL: NEKYM2 FILTER: CH. CLASS 600

PEAK DATA: 64.73 N-M @ 113.04 MS, -81.57 N-M @ 169.20 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



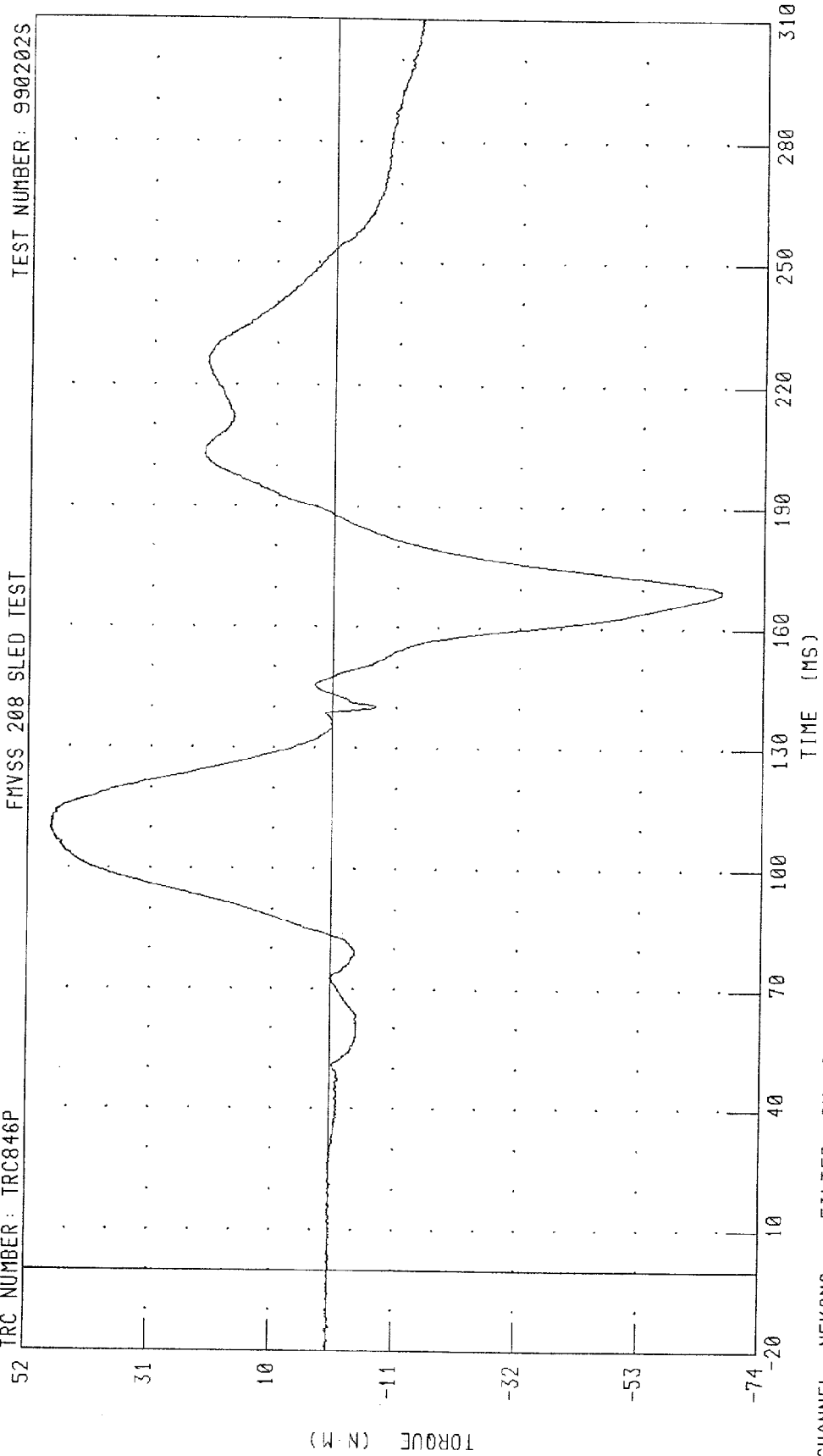
PEAK DATA: 5.54 N-M @ 233.44 MS; -10.92 N-M @ 163.28 MS

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE ABOUT Y AXIS
FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



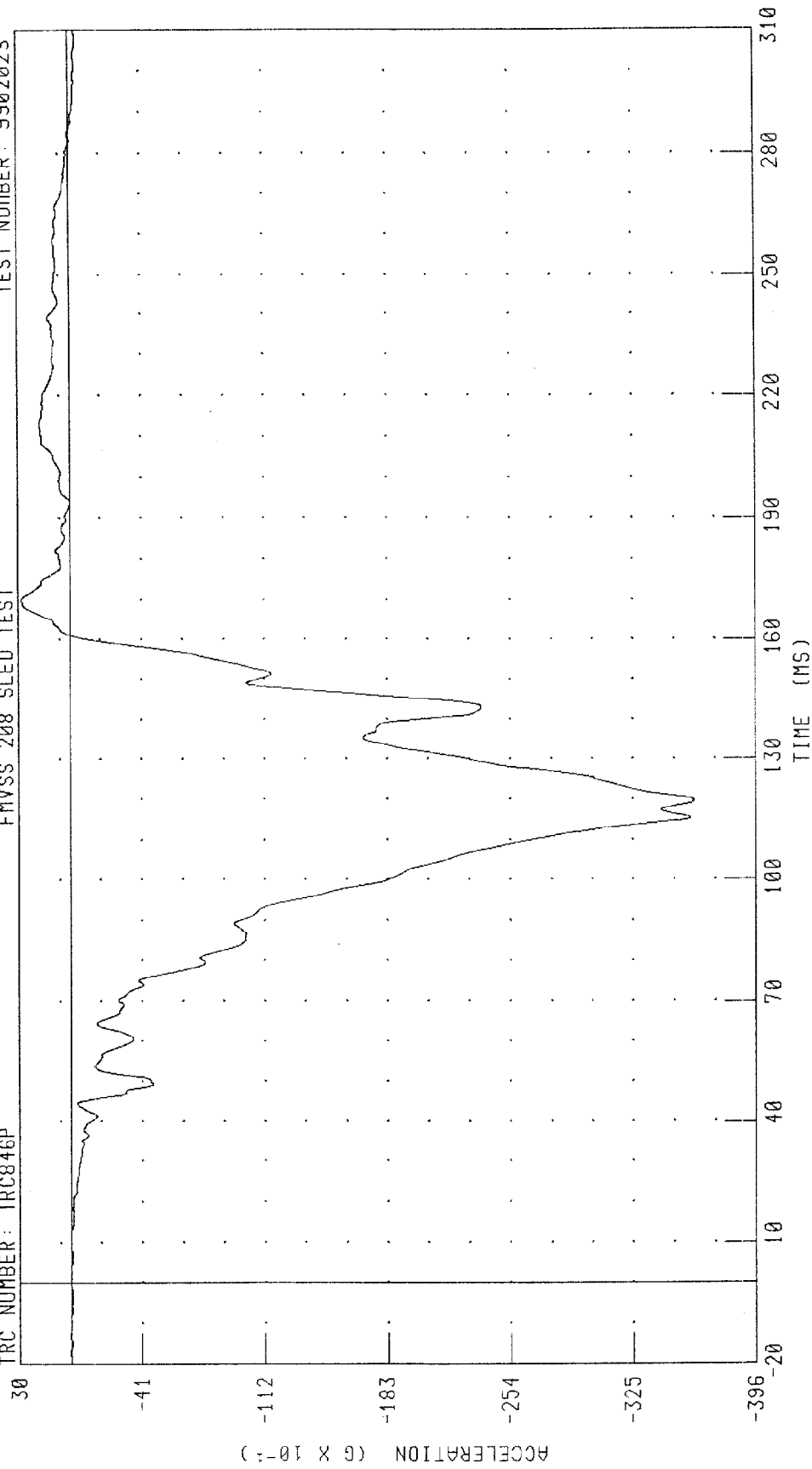
CHANNEL: NEKD02 FILTER: CH. CLASS 600

PEAK DATA: 48.07 N-M @ 110.00 MS, -66.79 N-M @ 169.68 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 990202S

TRC NUMBER: TRC846P



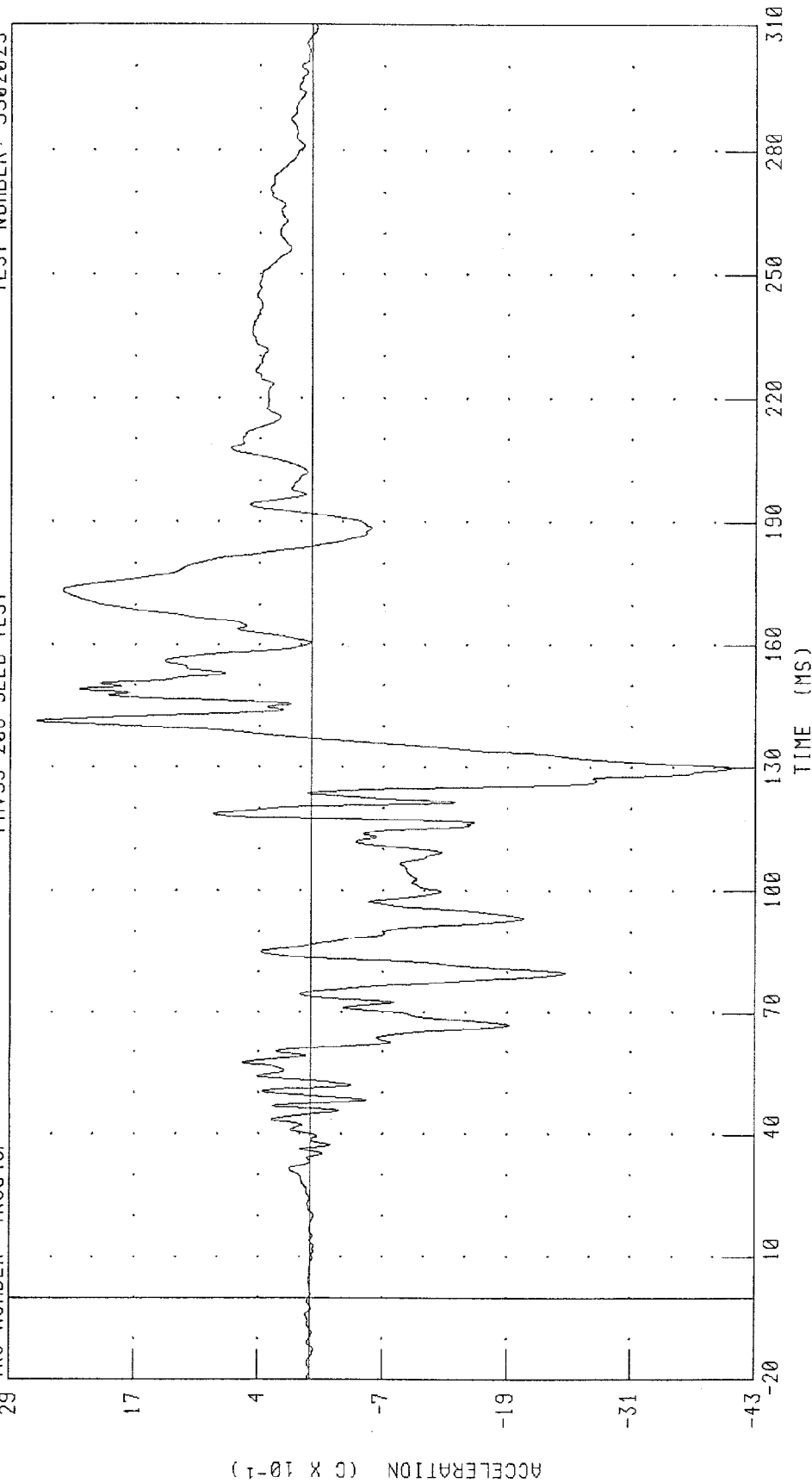
CHANNEL: CSTXG2 FILTER: CH. CLASS 180

PEAK DATA: 2.81 G @ 170.00 MS; -36.03 G @ 119.84 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

TEST NUMBER: 990202S



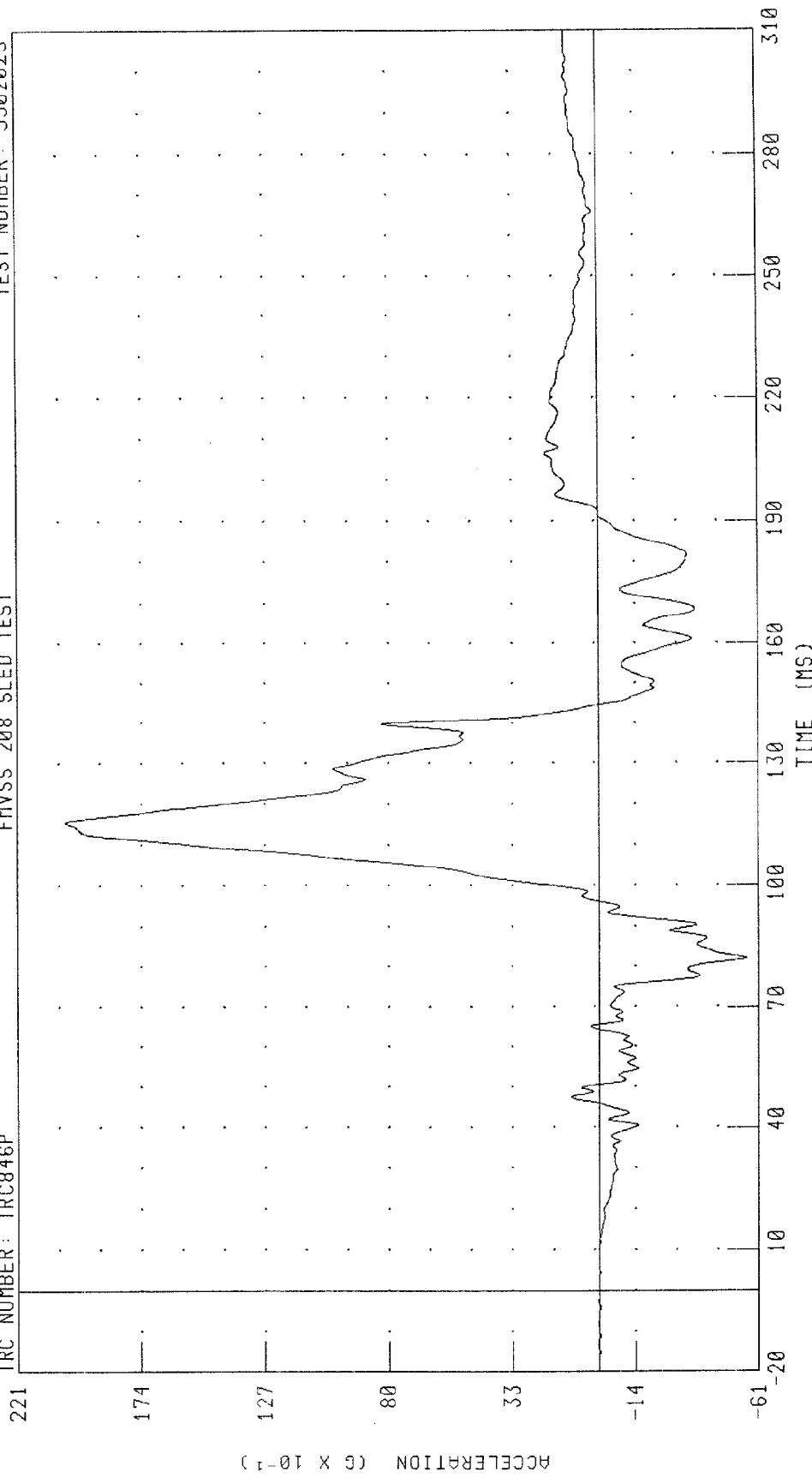
CHANNEL: CSTYC2 FILTER: CH CLASS 180

PEAK DATA: 2.65 C @ 141.44 MS; -4.07 C @ 130.00 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
FMVSS 208 SLED TEST

TRC NUMBER: TRC846P

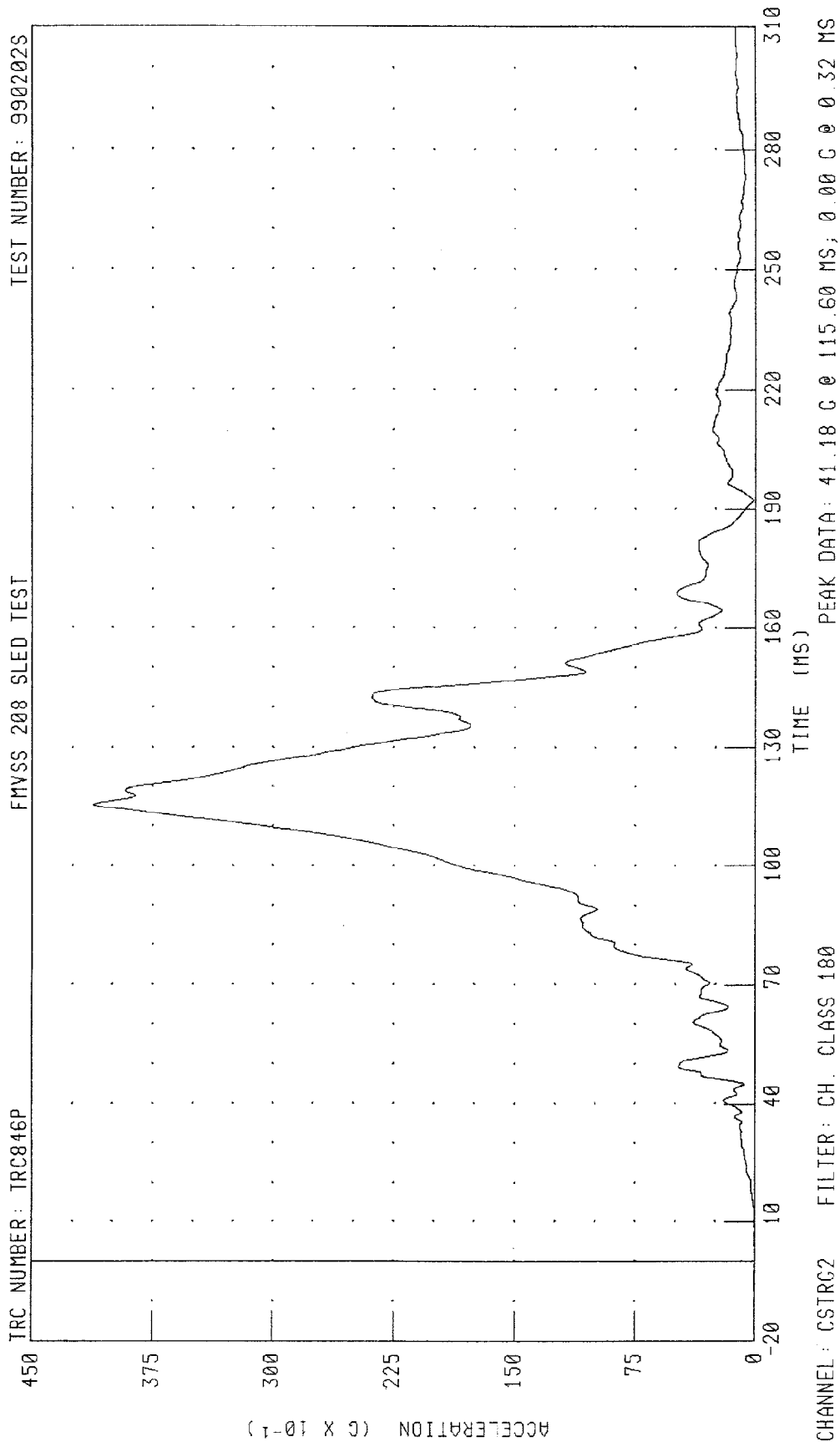
TEST NUMBER: 990202S



CHANNEL: CSTZC2 FILTER: CH. CLASS 180

PEAK DATA: 20.26 G @ 115.76 MS; -5.61 G @ 81.92 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
 RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

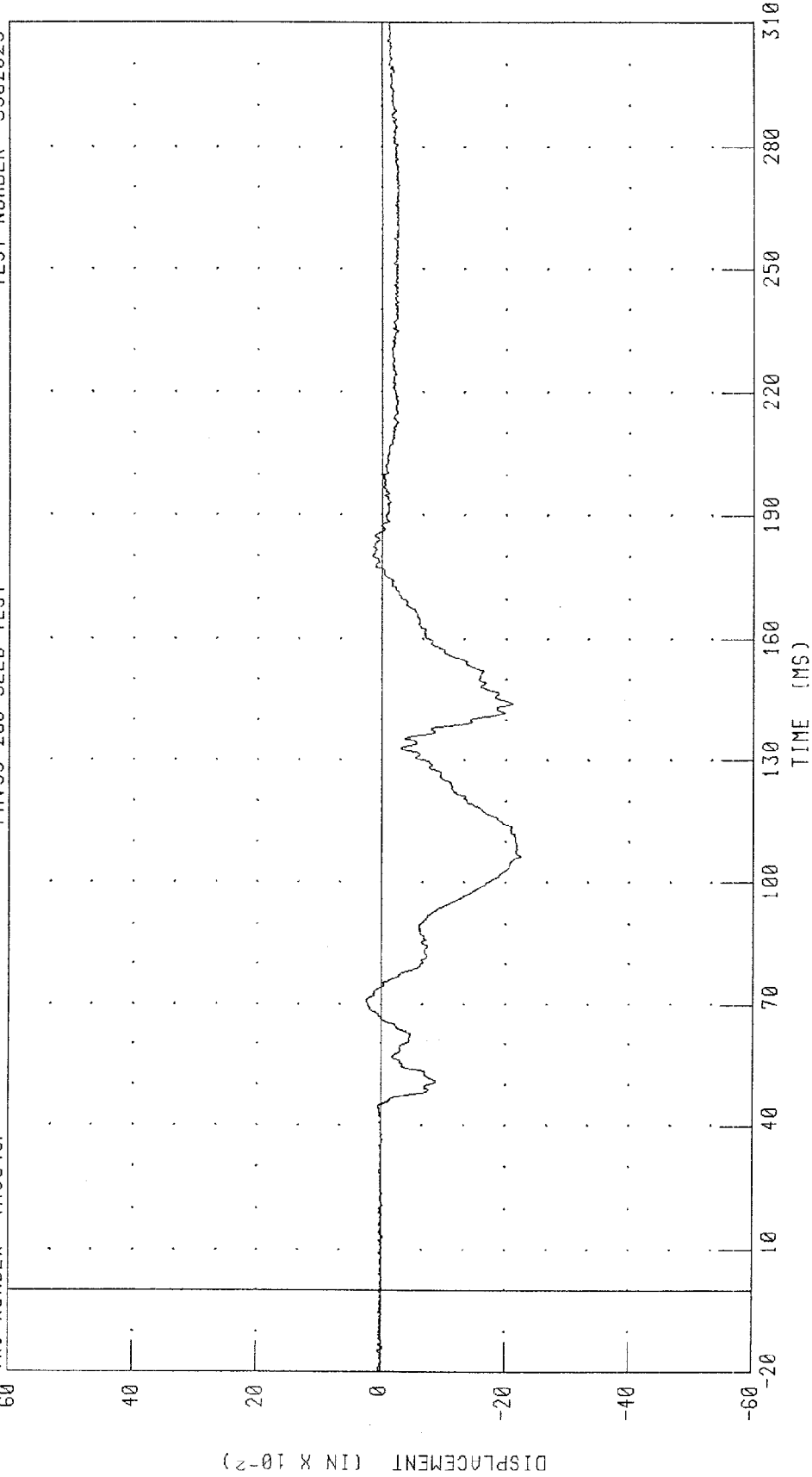


CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER CHEST DEFLECTION

TRC NUMBER: TRC846P

FMVSS 208 SLED TEST

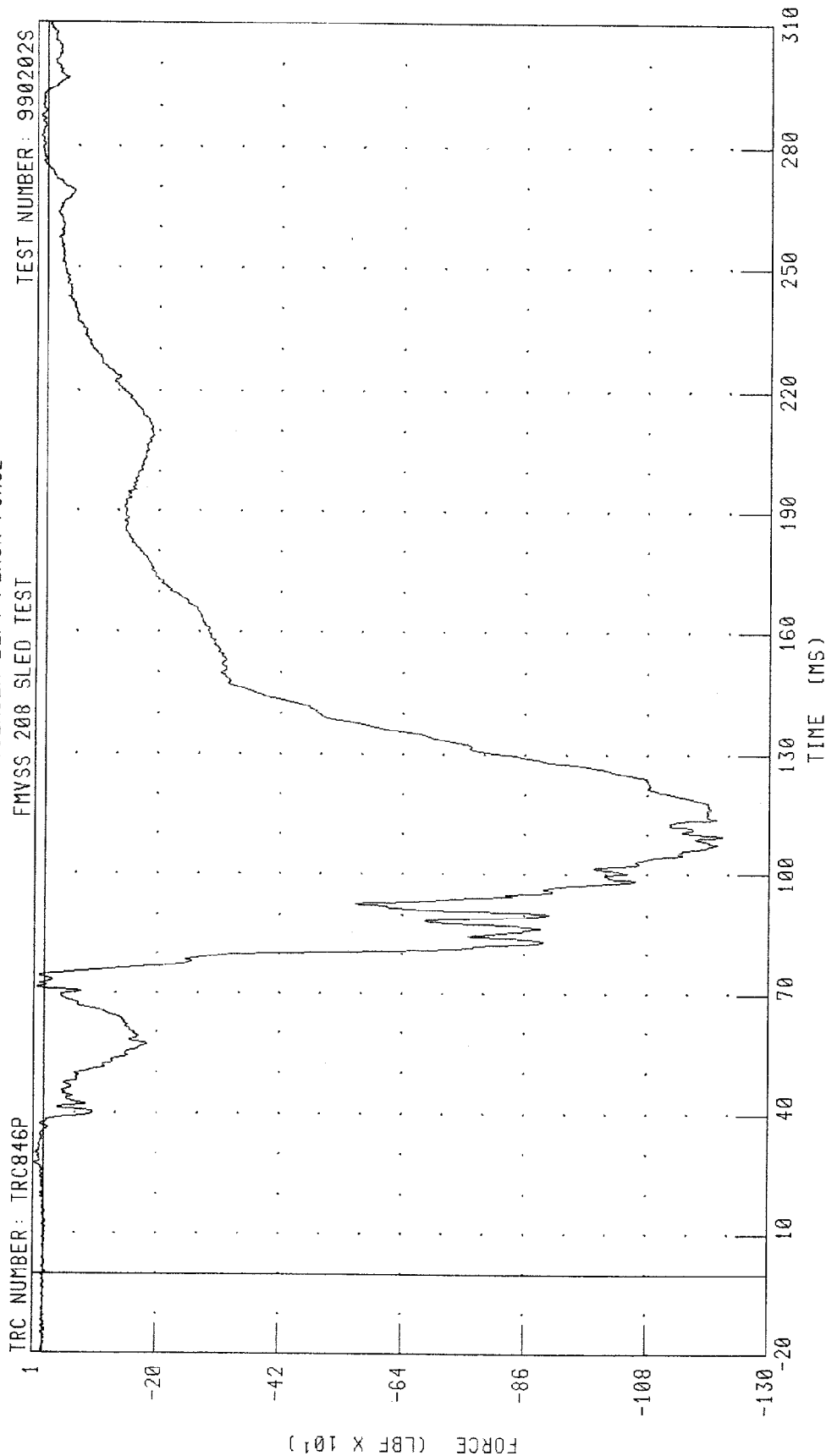
TEST NUMBER: 990202S



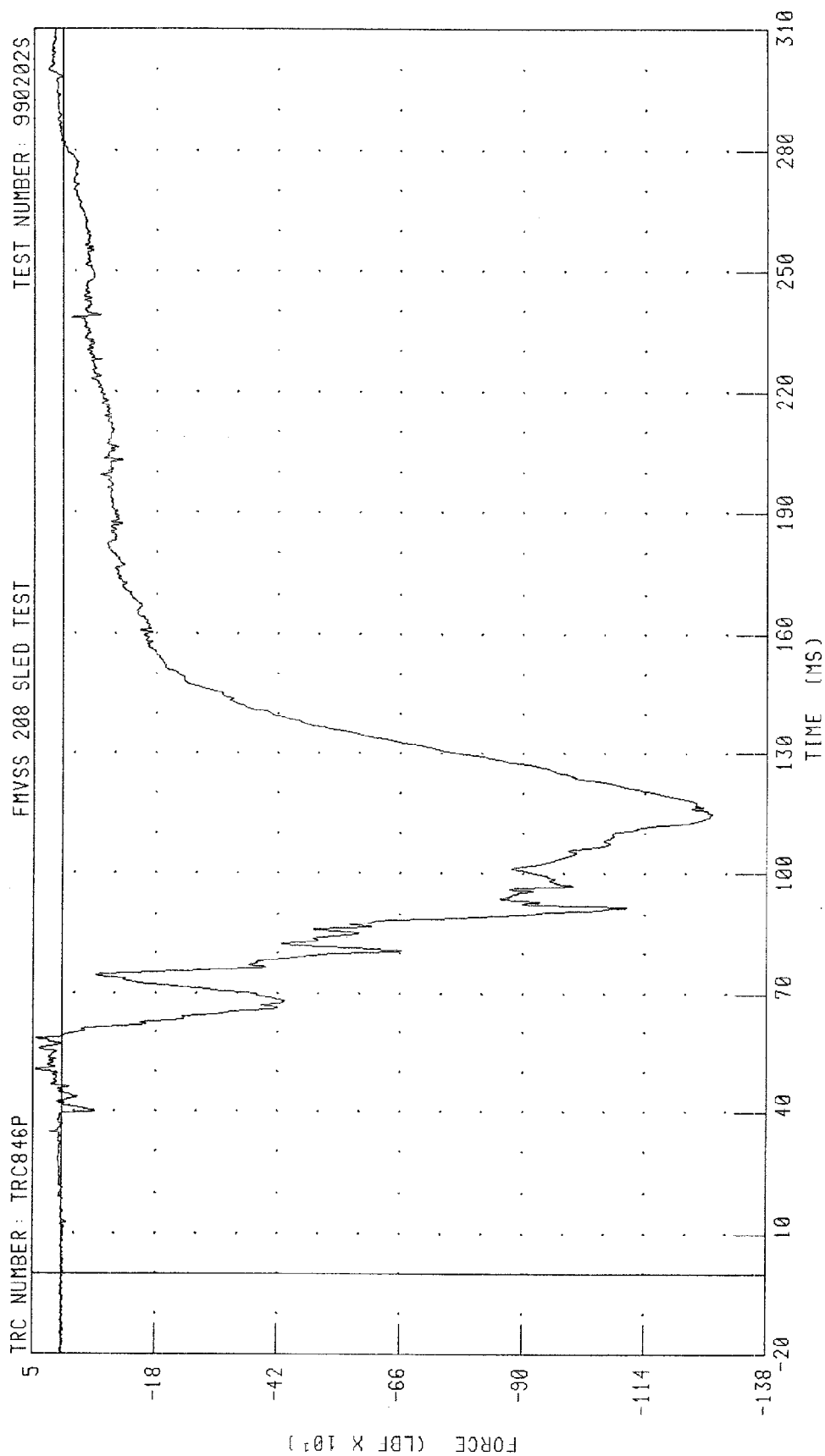
CHANNEL: CSTXD2 FILTER: CH. CLASS 600

PEAK DATA: 0.02 IN @ 70.72 MS, -0.22 IN @ 106.64 MS

CX0107 / 1999 CHEVROLET TAHOE 2WD
 RIGHT FRONT PASSENGER LEFT FEMUR FORCE
 FMVSS 208 SLED TEST



CX0107 / 1999 CHEVROLET TAHOE 2WD
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
FMVSS 208 SLED TEST



CHANNEL: RFMF2 FILTER: CH. CLASS 600 PEAK DATA: 52.28 LBF @ 50.48 MS; -1274.70 LBF @ 115.12 MS

Appendix C

Manufacturer's Vehicle Information



Safety Center
NORTH AMERICAN OPERATIONS

October 22, 1998
USG 3433

Mr. Harry Thompson, Division Chief
Office of Vehicle Safety Compliance
Safety Assurance
National Highway Traffic Safety
Administration
400 Seventh St., S.W.
Washington, D.C. 20590

Subject: Information Request NSA-31CCa/OA:208980925G

Dear Mr. Thompson:

This is in response to your letter received September 29, 1998, requesting information for proposed FMVSS 208 enforcement testing of the 1999 Chevrolet Tahoe. Specifically, the letter requested certain information on the alternative requirements that the automatic restraint in this vehicle meets, if tension-relief devices were incorporated into the restraint system and certain test set-up information.

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

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

Sincerely,


for C. Thomas Terry, Director
Safety Affairs & Regulations
Safety Center

cc: C. Case, NHTSA

Safety Affairs & Regulations
Mail Code 480-111-S56 • 30200 Mound Road • Warren, Michigan 48090-9010
FAX: (810) 986-8018





NHTSA IR: NSA-31CCa
OA:208980925G
1999 C/K Tahoe

The 1999 C/K Chevrolet Tahoe is identical to the 1998 C/K Chevrolet Tahoe. Except as reported below, responses to this information request are identical to that provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

QUESTION 1

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

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

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

Question 2

State when the air bag was depowered. Explain what other restraint changes have been made and what other vehicle changes have been made that might have effected FMVSS 208 performance since the last FMVSS 208 compliance test.

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

The following changes have been made for 1999 that could effect performance to the requirements of FMVSS 208 as compared to the 1998 system.

FEATURE	1998	1999
Air bag tether length	4 @ 280mm	4 @ 203mm
Air bag fold pattern	Reverse Pyramid	827

Note; ATTACHMENT A includes a sketch of the "827" fold pattern.

Question 3

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

GM Response



**NHTSA IR: NSA-31CCa
OA:208980925G
1999 C/K Tahoe**

The 1999 Chevrolet Tahoe is equipped with a crash event recorder. No special procedures are required for the sled or barrier crash event to be recorded. Data retrieval currently requires utilization of a proprietary diagnostic tool. However, consistent with discussion at a June 15, 1998 meeting involving GM, a representative from NHTSA Research, and potential tool suppliers, GM expects a vendor to begin selling systems which will enable the downloading of EDR data into a laptop computer early in 1999.

Question 4

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

Question 5

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

Question 6

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

Question 7

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

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.



**NHTSA IR: NSA-31CCa
OA:208980925G
1999 C/K Tahoe**

Question 8

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

ATTACHMENT B is a copy of NHTSA FORM 4, SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA FOR FMVSS 201, 202, 203, 207 & 210. Note that only relevant front seat SgRP information has been provided.

Question 9

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

Question 10

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C. See ATTACHMENT C.

Question 11

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

GM Response

Identical to the response provided on October 23, 1997, under USG 3375, NHTSA IR; NSA-31CCA / OA:208970812C.

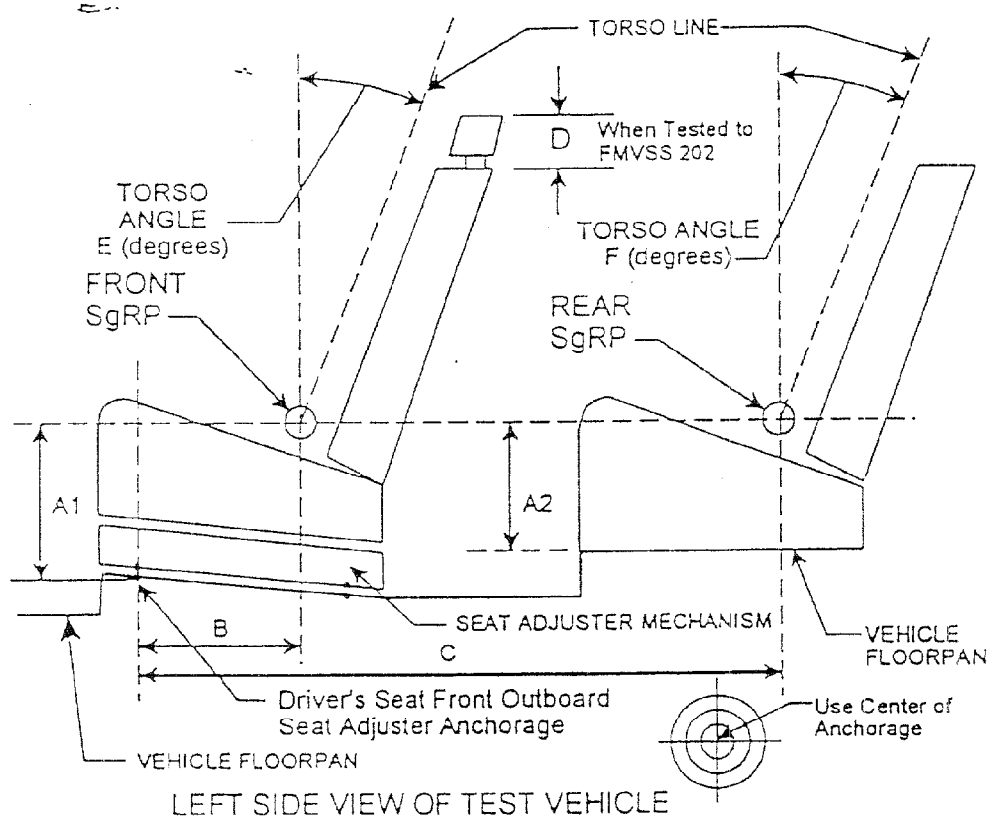
Question 12

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

GM Response

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in ^{mm} inches)

Model Year: 1999; Make: Chev/GMC; Model: Tahoe/Yukon
Body Style: 4 Dr Utility; Seat Style: Bucket / Split Bench



DIMENSION	FRONT, A1	REAR, A2
A	308.5 mm	_____
B	230.5 mm	_____
C	_____	_____
D	_____	_____
E	23 °	_____ °
F	_____ °	_____ °

The reduced force Driver's Side SIR system on all GM 1998 C/K Tahoe models includes the following features as compared to the 1997 system.

FEATURE	1998	1997
Smaller design	30% smaller than 1997	
Lower output inflator	330-12 KPa	440-24 KPa
Bag coating material	Neoprene	Silicone
Bag fold	Reverse Pyramid	Revised Standard
Vent hole size	2 @ 40 mm dia.	2 @ 20 mm dia.
Tethers	2 @ 11 inches	4 @ 11 inches
Tear seam geometry	"I"	"I"
Bag volume	60 liters	60 liters

The Passenger Side SIR system was released in 1997 as a reduced force system which uses the lowest output passenger air bag inflator that Morton/Autoliv currently produces.

Item 3

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

GM Response

All 1998 model C/K Tahoes, equipped with driver and passenger air bags, have depowered air bags. A 1998 model year vehicle can be verified by confirming that the 10th digit of the vehicle identification number (VIN) is the letter W.

Item 4

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

GM Response

Sled tests used to meet the requirements of S13 were performed on a sled buck in which the air bags were never connected to vehicle sensors. Air bags for full scale tests can be electrically disconnected from the vehicle harness and a separate electrical harness can be attached directly to the air bags, specifically for test deployment. For the 1998 Chevrolet C/K Tahoes, the battery should be disconnected for at least one hour before the air bag module harness is disconnected.

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

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

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

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

Item 5

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

GM Response

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

Item 6

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

GM Response

Moveable windows on all FMVSS 208 certification barrier tests for 1998 C/K Tahoes were fully open. C/K Tahoe models are not equipped with moveable vents.

Item 7

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

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

GM Response

Attachment B includes all dummy placement measurements. In addition, the modified NHTSA diagram shows how the driver knee placement measurements were established.

The subject vehicle does not incorporate a driver foot rest.

Item 8

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

GM Response

Attachment C includes the requested information.

Item 9

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

GM Response

All C/K Tahoe Models are equipped with upper adjustable anchorages. These anchorages can be placed in the nominal design position for a 50th percentile male occupant by moving this anchorage upward two (2) notches from the full down (lowest notch) position. With the lowest notch being position 1, place anchorage in notch 3.

Item 10

For barrier tests, provide the speed at impact, vehicle test weight, and resulting injury criteria (i.e., HIC, chest acceleration, chest compression, and femur loads) recorded for all certification

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

GM Response

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

Item 11

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

GM Response

GM does not typically prioritize which components are to be removed from a test vehicle to accommodate test weight. However, components that have been removed during our testing include the rear bumper and spare tire. Additional components that could be removed, if necessary, include interior trim components behind the "B" pillar, including rear seats, carpeting and trim panels.

Item 12

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

GM Response

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

Item 13

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

GM Response

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



Truck Group

NHTSA IR: NSA-31CCa
OA:208970812C
1998 C/K Utility

ATTACHMENT B

Dummy Measurements for Front Seat Passengers (Based on NHTSA Diagram)

Measurement	Description	Driver	Passenger
HH	Head to Header	500mm	540mm
NR	Nose to Rim	410mm	N/A
CS	Steering Wheel to Chest	300mm to module face	N/A
KDL/KDR*	Knee to Dash - L/R	120mm/110mm	160mm/160mm
SH	Striker to H-Point	320mm	320mm
SHY	Striker to H-Point, Y Direction	250mm	255mm
HS	Head to Side Window	not measured	not measured

* Knee to Dash measurement is more horizontal than depicted in the NHTSA diagram.

Additional Measurements taken by GM

Driver - Knee centerline to knee centerline spacing: 240mm
Driver left knee centerline to left rocker pinch weld: 270mm



NHTSA IR: NSA-31CCa
OA:208970812C
1998 C/K Utility

ATTACHMENT C

Seat Positioning (Driver and Passenger seats are adjusted identically)

Seat Back Angle (Nominal Design Riding Position).

Seat back angle is approximately 22 degrees. Seat back can be placed at the correct, nominal design angle as follows; Note, base, non-split bench seat, seat back angle is not adjustable.

From full upright position (seat back full forward)

- If seat is equipped with the E-Z Entry feature (available on the C/K Extended Cab Pickup and the C/K 2 Door Utility models, only), move the seat back rearward five notches.
- All other C/K Truck Models are not equipped with the E-Z Entry feature. Seat back angle position is four notches rearward.

Seat Track Mid Position.

Manual Seat Adjuster;

- With seat adjusted to full forward position, seat adjuster will engage notches 1 and 2 on the seat track on each side of the seat. Adjust seat rearward until adjuster engages notches 6 and 7 on each side of the seat.

Power Seat Adjuster;

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

Power Lumbar adjustment;

- Power Lumbar bladder should be empty.

Adjustable Upper Anchorages

Full down is position #1, move adjustable anchorage upward 2 notches to position #3.

Fuel Tank Data

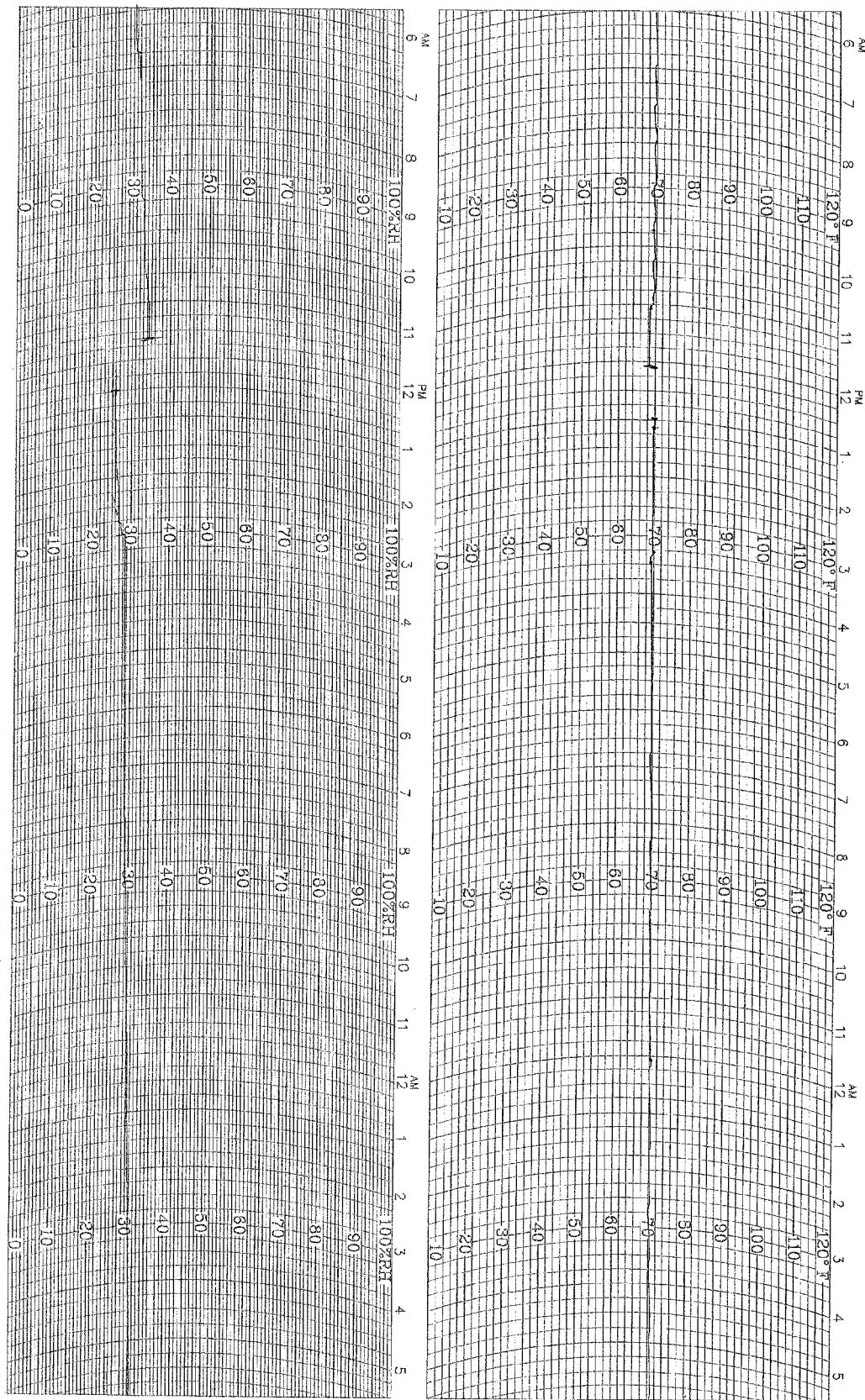
MODEL	CONFIGURATION	USABLE LITERS	UNUSABLE LITERS	95% TEST VOLUME LITERS
C/K 10516	2 Door Utility	113.6	1.5	107.9
C/K 10706	4 Door Utility	108.0	5.0	102.6

Fuel Pump Information

All C/K Truck Models are equipped with electric fuel pumps. The fuel pump is activated when the ignition system is turned to the "ON" position. If the engine is not started, the fuel pump will run until the fuel system is pressurized to operating pressure. Fuel pump will shut off within 1 to 2 seconds if the engine is not started.

Tilt Steering Column Positioning Data

Full down is position #1, move the steering column upward two notches to position #3.



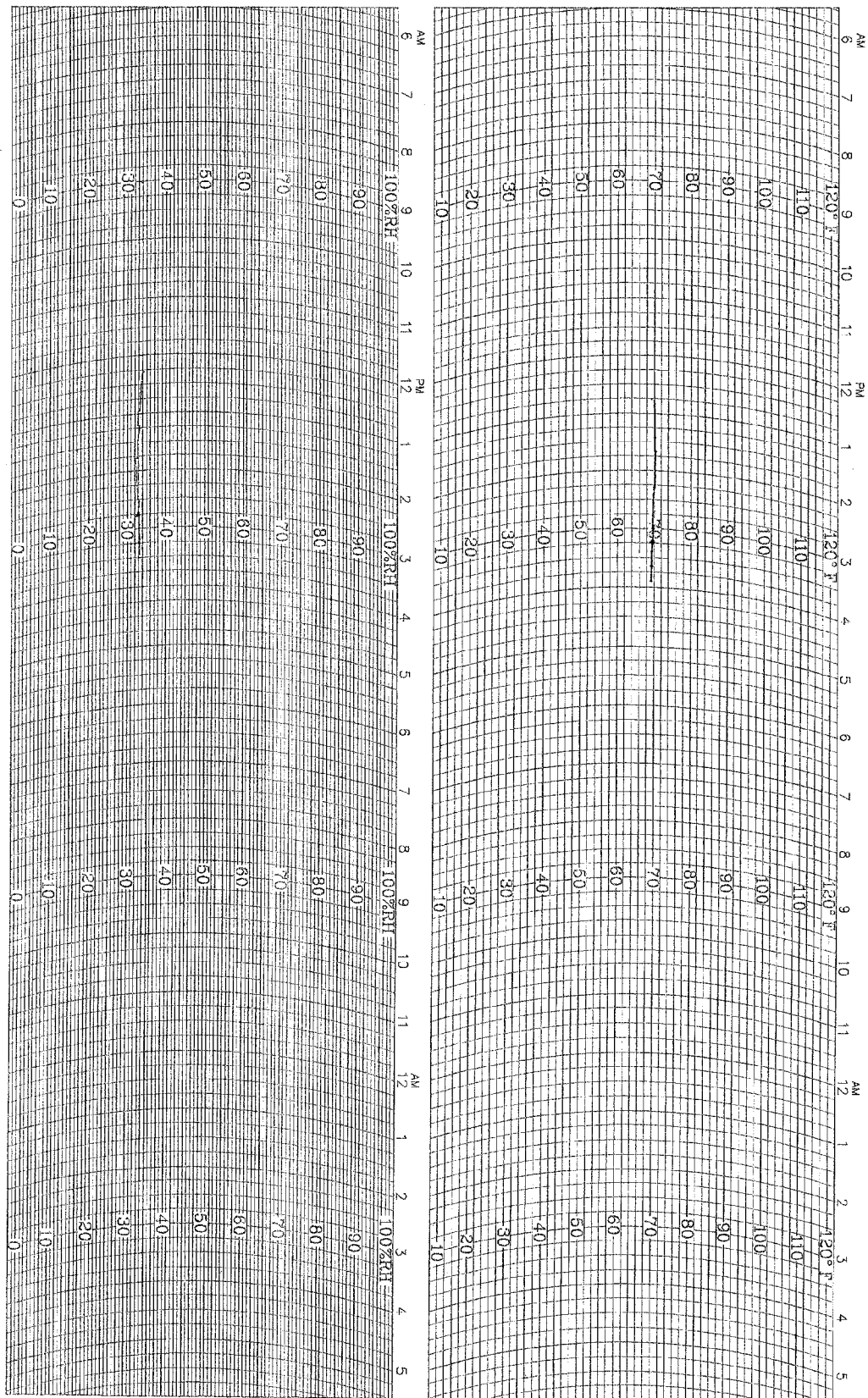
Weather Measure
WEATHERtronics
Division of QUALMETRICS, Inc.

P.O. BOX 41039
SACRAMENTO, CA 95841
PHONE: (916) 923-0055

HYGROTHERMOGRAPH
1 DAY

CHART NO. M699123
C311-D-HF
ECN 2717
6-9-87

STATION _____ DATE ON 2-1-99 DATE OFF 2-2-99



WeatherMeasure
WEATHERtronics
 Division of QUALIMETRICS, Inc.

P.O. BOX 41039
 SACRAMENTO, CA 95841
 PHONE: (916) 923-0055

HYGROTHERMOGRAPH
 1 DAY

CHART NO. M699123
 C311-D-HF
 ECN 2717
 6-9-87

STATION _____

DATE ON _____

DATE OFF _____