

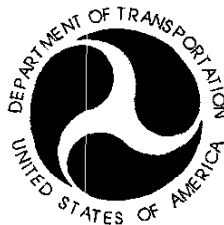
Report Numbers: 208S-TRC-98-005

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Vehicle Safety Compliance Sled Testing
for Occupant Crash Protection

General Motors Corporation
1998 Chevrolet Blazer 4-Door
NHTSA Number: CW0118
TRC Test Number: 980213S

Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319



March 5, 1998

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. DTNH22-93-D-01089.

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Report Prepared By:

Virginia L. Watters Date 3/4/98
Virginia L. Watters, Engineering Technician
Transportation Research Center Inc.

Report Approved By:

Jeffery W. Sankey Date 3/4/98
Jeffery W. Sankey, Manager, Project Operations
Transportation Research Center Inc.

Final Report Accepted By:

Charles R. Case Date 6/15/98
Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Vehicle Safety Compliance

RECEIVED
MAR 10 1998
10:07

1. Report No. 208S-TRC-98-005	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS No. 208 Compliance Sled Testing of a 1998 Chevrolet Blazer 4-Door NHTSA No. CW0118		5. Report Date March 4, 1998	
		6. Performing Organization Code TRC	
7. Author(s) Virginia L. Watters, Engineering Technician Transportation Research Center Inc.		8. Performing Organization Report No. 208S-TRC-98-005	
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No. DTNH22-93-D-01089	
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 January - February 1998	
		14. Sponsoring Agency Code NSA-30	
15. Supplemental Notes None			
16. Abstract An FMVSS 208 compliance sled test was conducted on a 1998 Chevrolet Blazer 4-door, NHTSA No. CW0118, at Transportation Research Center Inc. on February 13, 1998. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standards (FMVSS): 208, "Occupant Crash Protection". The Hybrid III dummies installed for this test were not restrained by seat belts. The ambient temperature was 70° F. The sled carriage was accelerated to 17.1 g with an integrated velocity change of 29.0 mph. The driver's Head Injury Criteria (HIC) was 133. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 37.0 g. The driver's chest deflection was 1.8 inches. The driver's left and right femur maximum axial forces were 1423 pounds and 1394 pounds, respectively. The driver's maximum neck flexion about the occipital condyle was 43.8 Newton-meters. The driver's maximum neck extension about the occipital condyle was 5.7 Newton-meters. The driver's maximum axial neck tension was 963 Newtons. The driver's maximum axial neck compression was 132 Newtons. The driver's maximum fore and aft neck shear was 830 Newtons. The passenger's HIC was 192. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 35.8 g. The passenger's chest deflection was 0.3 inch. The passenger's left and right femur maximum axial forces were 1262 pounds and 1120 pounds, respectively. The passenger's maximum neck flexion about the occipital condyle was 42.0 Newton-meters. The passenger's maximum neck extension about the occipital condyle was 18.7 Newton-meters. The passenger's maximum axial neck tension was 852 Newtons. The passenger's maximum axial neck compression was 176 Newtons. The passenger's maximum fore and aft neck shear was 1045 Newtons.			
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 153	22. Price

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
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LENGTH

in	inches	2.5	cm
ft	feet	30	m
yd	yards	0.9	m
mi	miles	1.6	km

AREA

in ²	square inches	6.5	cm ²
ft ²	square feet	0.09	m ²
yd ²	square yards	0.8	m ²
mi ²	square miles	2.6	km ²
	acres	0.4	ha

MASS (weight)

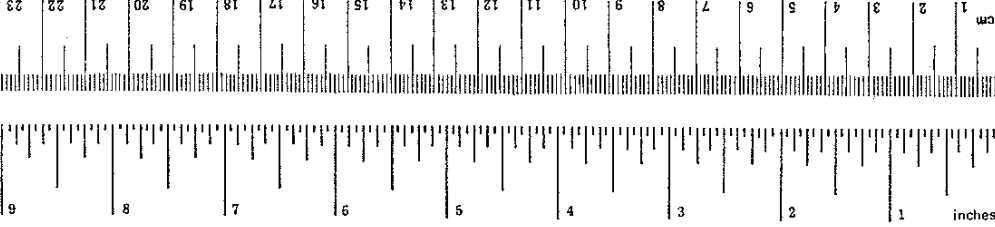
oz	ounces	28	g
lb	pounds	0.45	kg
	short tons (2000 lb)	0.9	t

VOLUME

tsp	teaspoons	5	ml
Tbsp	tablespoons	15	ml
fl oz	fluid ounces	30	ml
c	cups	0.24	l
pt	pints	0.47	l
qt	quarts	0.95	l
gal	gallons	3.8	l
ft ³	cubic feet	0.03	m ³
yd ³	cubic yards	0.76	m ³

TEMPERATURE (exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
--------	---------------	-------------	---------	--------

LENGTH

mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

AREA

cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	

MASS (weight)

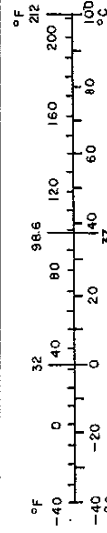
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	

VOLUME

ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
----	---------------------	-------------------	------------------------	----



*1 in = 2.54 (exact). For other exact conversions and more detailed tables, see NBS Mon. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.102/86.

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Purpose

This FMVSS 208 compliance sled test is part of the Federal Motor Vehicle Safety Standards (FMVSS) 208 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center Inc. (TRC) under Contract No. DTNH22-93-D-01089. The purpose of this test was to determine if the subject vehicle, a 1998 Chevrolet Blazer, NHTSA No. CW0118, meets the performance requirements of FMVSS 208, "Occupant Crash Protection," in the impact simulation sled test mode. This test was conducted to determine if the front outboard dummies and restraint systems meets aforementioned performance requirements.

Test Procedure

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

The test vehicle was instrumented with six (6) accelerometers to measure longitudinal axis accelerations.

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 (40) 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.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the manufacturer's vehicle information.

Section 2.0

FMVSS 208 Compliance Sled Test Summary

Test Results Summary

This FMVSS 208 compliance sled test was conducted at TRC on February 13, 1998

The test vehicle, a 1998 Chevrolet Blazer, NHTSA No. CW0118, appeared to comply with the performance requirements of FMVSS 208 in the impact simulation sled test mode. The Head Injury Criteria (HIC) calculations were less than 1000, the chest resultant accelerations did not exceed 60 g's, the chest deflections did not exceed 3.0 inches, and the compressive forces transmitted through the upper legs did not exceed 2,250 pounds as measured by the Part 572 E dummies. The neck flexion moments about the occipital condyles did not exceed 190 N·m, the neck extension moments about the occipital condyle did not exceed 57 N·m, the neck tensions did not exceed 3300 N, the neck compressions did not exceed 4000 N, and the neck fore and aft shear forces did not exceed 3100 N as measured by the Part 572 E dummies.

The test vehicle was equipped with airbags at the driver and passenger seating positions. The Hybrid III dummies were not restrained by seat belts. The sled carriage was accelerated to 17.1 g with an integrated velocity change of 29.0 mph. The airbags were triggered at 20.2 milliseconds after 0.5 g acceleration was measured by the firing circuit. Following subsequent digital data processing and filtering the acceleration signal to Channel Class 60, the airbag event trigger signal was 20.2 ms after the 0.5 g acceleration level was indicated.

The driver's HIC was 133. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 37.0 g. The driver's chest deflection was 1.8 inches. The driver's left and right femur maximum compressive forces were 1423 pounds and 1394 pounds, respectively. The driver's maximum neck moments were 5.7 N·m extension and 43.8 N·m flexion. The driver's maximum neck forces were 963 N tension, 132 N compression and 830 N fore and aft shear.

Test Results Summary, Cont'd

The right front passenger's HIC was 192. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 35.8 g. The right front passenger's chest deflection was 0.3 inch. The right front passenger's left and right femur maximum compressive forces were 1262 pounds and 1120 pounds, respectively. The right front passenger's maximum neck moments about the occipital condyle were 18.7 N·m extension and 42.0 N·m flexion. The right front passenger's maximum neck forces were 852 N axial tension, 176 N axial compression and 1045 N fore and aft shear.

The vehicle's seat belt warning system met all of the applicable seat belt warning system requirements. Option (S7.3(a)(1)) was chosen by the manufacturer.

The vehicle's labeling and driver's manual information met all applicable requirements.

The vehicle's air bag readiness indicator met all applicable requirements.

The vehicle's rear outboard seating position seat belt type met all applicable requirements.

The vehicle's seat belts met the applicable lap belt lockability requirements.

The vehicle's permanently attached air bag labels met the applicable requirements.

The vehicle's label on the dash met the applicable requirements (S4.5.1(e)).

The seat belt comfort and convenience check for front outboard designated seating positions indicated the vehicle met all applicable requirements.

Data Acquisition Explanations

Questionable data spikes were recorded on the sled accelerometer and all six vehicle accelerometers for at least part of the time period 43 to 96 milliseconds. Post-test examination of the vehicle indicates less than optimal door fit which may be due to body deformation. The front grill also broke loose. Refer to photographs A-29 to A-31 in Appendix A. The affected accelerometers were:

- Sled acceleration, SLDXG;
- Rear axle X-axis acceleration, RAXG;
- Left body X-axis acceleration, LBXG;
- Right body X-axis acceleration, RBXG;
- Left frame X-axis acceleration, LFXG;
- Right frame X-axis acceleration, RFXG;
- Bottom engine X-axis acceleration, BEXG.

The driver dummy's chest displacement accelerometer, CSTXD1, had questionable spikes at 92 and 132 milliseconds. The large spike at 92 milliseconds was disregarded for dummy injury assessment.

Table 1 Sled Test Summary

NHTSA number: CW0118
 Test type: FMVSS 208 Compliance Sled Test
 Test date: 02/13/98
 Test time: 4:29 p.m.
 Ambient temperature at impact area: 70° F
 Vehicle year/make/ model/body style: 1998/Chevrolet/Blazer/4-door
 Vehicle test weight: 4420 lb

Sled carriage:

Integrated velocity from the integration of the entire sled acceleration: 29.0 mph
 Measured velocity from the light trap device attached to the sled: 29.7 mph
 Acceleration: 17.1 g
 Time from T-0(-0.5 g) to 0.0 g: 124.9 msec
 Acceleration corridor achieved: Yes

Number of cameras:

Real-time: 1
 High-speed: 6

Dummies:

	<u>Driver #229</u>	<u>Passenger #230</u>
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag	Airbag
Number of data channels:	15	15

Front seat data:

Seat track failure:	No apparent failure	Seat shifted rearward approximately 1.5 inches
Seat back failure:	No apparent failure	No apparent failure

Visible dummy contact points:

Head:	Airbag, left side header,	Airbag
Chest:	Airbag	Airbag
Abdomen:	Airbag	Airbag
Left knee:	Knee bolster	Glove box
Right knee:	Knee bolster	Glove box

Table 2 Dummy Kinematics Summary

Left Front Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel's knee bolster. The dummy's head and chest were restrained by the airbag. The dummy's head contacted the side header. The dummy rebounded into the seatback. The dummy came to rest leaning slightly forward in the driver's seat.

Right Front Passenger Dummy

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel's glove box. The dummy's head and chest were restrained by the airbag. The dummy rebounded into the seatback. The dummy came to rest leaning forward in the passenger's seat.

Table 3 Test Vehicle Information

Vehicle year/make/ model/body style:	1998/Chevrolet/Blazer/4-door		
Color:	Emerald Green Metallic		
VIN:	1GNCS13W7W2147790		
NHTSA number:	CW0118		
Engine data:			
Placement:	Longitudinal, V-6		
Cylinders:	6		
Displacement:	4.3 liters		
Transmission data:	<u> 4 </u> speed,	<u> </u> manual,	<u> X </u> automatic, <u> X </u> overdrive
Final drive:	<u> </u> fwd,	<u> X </u> rwd,	<u> </u> 4wd
Date vehicle received:	01/23/98		
Odometer reading:	191		
Dealer's name and address:	Jeff Wyler Chevrolet Inc. 1117 St. Route 32, P. O. Box 345, Batavia, OH 45103		
<u>Accessories:</u>			
Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	No	Tilting steering wheel	Yes
Power windows	No	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-lock brake	Yes
Clock	Yes	Rear window defroster	No
Power door locks	No	Other:	None

Certification data from vehicle's label:

Vehicle manufactured by:	General Motors Corporation, in U.S.A.
Date of manufacture:	10/97
VIN:	1GNCS13W7W2147790
GVWR:	5000 lb
GAWR: Front:	2500 lb
Rear:	2700 lb

Table 3 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P205/75R15
Spare tire: P205/75R15
Type of front seats: 60/40 reclining split bench

Tire & capacity data from vehicle's label:

Recommended tire size: P205/75R15
Recommended cold tire pressure:
Front: 35 psi
Rear: 35 psi

Designated Seating Capacity:

Front 3
Rear 3
Total 6
Vehicle Capacity Weight: 1160 lbs.

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

Right front	1050	lb	Right rear	830	lb
Left front	1030	lb	Left rear	920	lb
Total front weight	2080	lb	(54.2% of total vehicle weight)		
Total rear weight	1750	lb	(45.8% of total vehicle weight)		
Total delivered weight	3840	lb			

Table 3 Test Vehicle Information, Cont'd.

Calculation of test vehicle's target loaded test weight:

RCLW¹ = Rated Cargo and Luggage Weight

GVWR = Gross Vehicle Weight Rating (5000 lb)

UDW = Unloaded Delivered Weight (3840 lb)

VCW = Vehicle Capacity Weight = 5000 - 3840 = 1160 lb

DSC² = Designated Seating Capacity (6)

RCLW¹ = GVWR - UDW - 150 (6) = 5000 - 3840 - (900) = 260 lb

Target loaded test weight: = UDW + RCLW¹ + (No. of Hybrid III dummies x 167 lb per dummy)

Target loaded test weight: = 3840 + 260 + 334 = 4434 lb

Weight of test vehicle with required dummies and 246 lb of cargo weight:

Right front	1140 lb	Right rear	1040 lb
Left front	1110 lb	Left rear	1130 lb
Total front weight	2250 lb	(50.9% of total vehicle weight)	
Total rear weight	2170 lb	(49.1% of total vehicle weight)	
Total test weight	4420 lb	(14 lb. under target loaded test weight)	

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: None

¹ Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's calculated cargo and luggage weight or 300 pounds, whichever is less.

² The designated seating capacity is determined by counting the number of seat belts installed in the vehicle.

Table 3 Test Vehicle Information, Cont'd.

Test Vehicle Attitude:

As delivered door sill angle: 1.0°
As tested door sill angle: 1.0°
Fully loaded door sill angle: 0.9°
Vehicle Wheelbase: 107 inches

Seat Data:

Front seats: 60/40 reclining split bench
Seat track settings: Mid. Manual seat adjustment.
Seat back settings: Seat back angles are measured relative to rocker sill.
Driver: 23.8°. Measure up from seat hinge point 9 inches and place angle finder on seat back frame.
Passenger: 23.5°. Measure up from seat hinge point 9 inches and place angle finder on seat back frame.

Fuel System Data:

Fuel system capacity from owner's manual: 18.0 gallons
Useable capacity figure furnished by COTR: 18.2 gallons

Steering Column Adjustments

Full up is position #1. Moved the column downward 3 notches to position #4.

Table 4 Post-Impact Data

Test number: 980213S
NHTSA number: CW0118
Test date: 02/13/98
Test time: 4:29 p.m.
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: 29.0 mph
Measured velocity from the light trap device attached to the sled (backup): 29.7 mph

Sled carriage acceleration:

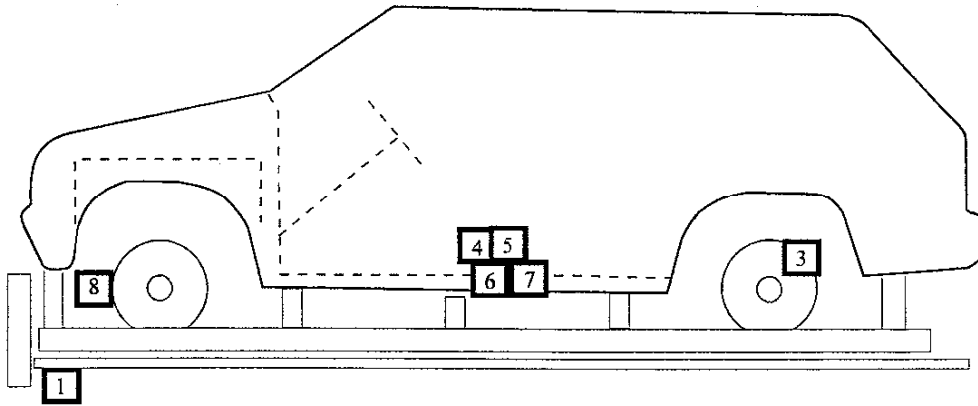
Acceleration: 17.1 g

Sled carriage acceleration duration:

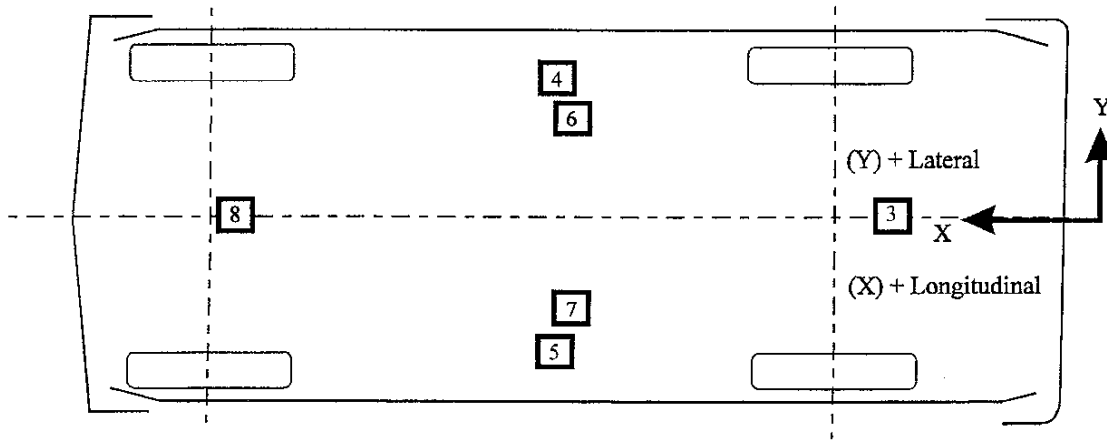
Time from T-0(-0.5 g) to 0.0 g: 124.9 msec

The sled acceleration curve was within the specified corridor.

Figure 1 Vehicle Accelerometer Placement



Side View



Bottom View

Table 5 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 980213S No. LOCATION	X	Y	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 SLED ACCELERATION PRIMARY REDUNDANT	162.4 in	-1.0 in	0.8 g @ 128.2 ms 1.2 g @ 128.9 ms	17.1 g @ 60.4 ms 18.0 g @ 48.1 ms
2 SLED VELOCITY MEASURED INTEGRATED			0.1 mph @ 5.7 ms -0.1 mph @ 5.7 ms	29.7 mph @ 156.8 ms 29.0 mph @ 125.0 ms
3 REAR AXLE LONGITUDINAL	35.0 in	0.0 in	2.2 g @ 167.8 ms	20.9 g @ 52.0 ms
4 LEFT BODY LONGITUDINAL	86.8 in	-23.5 in	1.9 g @ 131.8 ms	19.5 g @ 54.2 ms
5 RIGHT BODY LONGITUDINAL	86.8 in	23.5 in	2.2 g @ 131.5 ms	19.9 g @ 53.5 ms
6 LEFT FRAME LONGITUDINAL	87.0 in	-20.0 in	1.8 g @ 130.4 ms	20.3 g @ 53.1 ms
7 RIGHT FRAME LONGITUDINAL	87.0 in	20.0 in	1.9 g @ 157.8 ms	21.1 g @ 51.3 ms
8 BOTTOM ENGINE LONGITUDINAL	139.6 in	-0.4 in	3.4 g @ 133.0 ms	20.7 g @ 60.4 ms
9 AIRBAG EVENT			7.0 volt @ 20.2 ms	---

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

Table 6 Dummy Injury Criteria
Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-32.0 g	4.8 g	14.9 g	35.0 g	-37.5 g	2.8 g	7.6 g
Passenger	-41.7 g	18.7 g	27.4 g	42.6 g	-34.7 g	3.2 g	13.7 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	1423 lbf	1394 lbf
Passenger	1262 lbf	1120 lbf

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	133	85.3 ms	118.9 ms
Passenger	192	100.6 ms	136.6 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	37.0 g	99.7 ms	102.7 ms
Passenger	35.8 g	104.4 ms	107.4 ms

Maximum Chest Deflection

Driver	1.8 in ³
Passenger	0.3 in

Neck Injury Criteria

	Flexion Moment	Extension Moment	Axial Tension Force	Axial Compression Force	Maximum Fore/Aft Shear Force
Driver	43.8 N·m	5.7 N·m	963 N	132 N	830 N ⁴
Passenger	42.0 N·m	18.7 N·m	852 N	176 N	1045 N ⁴

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

³ See Data Acquisition Explanations

⁴ Maximum output of channel is positive (head rearward, chest forward)

Table 7
FMVSS 208 SEAT BELT WARNING SYSTEM CHECK

NHTSA NO.: CW0118

Technician: M. Tonneman

Date: 02/13/98

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 = 70 seconds
(no less than 60 seconds)

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

Time duration of audible warning signal = 6 seconds
(4 to 8 seconds) (see 49 USCS @ 30124)

Time duration of reminder light operation = 70 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 = 0 seconds
(audible warning should not operate)

Time duration of reminder light operation = 0 seconds
(4 to 8 seconds)

- C. Note wording of visual warning:

Fasten Seat Belt _____

Fasten Belt _____

Symbol 101 ☒

Table 8
FMVSS 208 LABELING AND DRIVERS MANUAL INFORMATION

NHTSA NO.: CW0118

Technician: M. Tonneman

Date: 02/13/98

Locate label which describes manufacturer's maintenance or replacement schedule for crash deployed occupant protection system.

Describe location: N/A

The manufacturer's recommended schedule is to replace ☐ or repair ☐ this system.

A. By _____ month, _____ year

B. By _____ miles

C. Or after a time interval of _____ months or _____ years.

Note: There was no label describing the manufacturer's maintenance or replacement schedule.

Were appropriate instructions concerning maintenance and/or replacement of this system provided?

Yes-☐; No-☐

Was a description of the functional operation of the system provided?

Yes-☐; No-☐

Is there a reference to the instructions and description of the system on the label?

Yes-☐; No-☐

Was an owner's manual provided?

Yes-☒; No-☐

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the system?

Yes-☒; No-☐

Note: The manufacturer's owner's manual states that routine maintenance of the air bag is not required (Page 1-28).

Table 9
FMVSS 208 READINESS INDICATOR

NHTSA NO.: CW0118

Technician: M. Tonneman

Date: 02/13/98

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: Left lower 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-☐;

Table 10
FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTS

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.

Table 11
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))

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

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

Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

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 65.5 inches.
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing
(S7.1.1.5(c)(3))
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
Measured force application angle 10 degrees. (Spec. 5~15 degrees)
- ☒ 13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
Measured distance between A and B 33.75 inches.

Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

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 34.5 inches (7.1.1.5(c)(6))

- ☒ 15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less?

14-13=0.75 inches

☒ Yes-Pass ☐ No-Fail

- ☒ 16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (7.1.1.5(c)(7))

10-14=31.0 inches.

☒ Yes-Pass ☐ No-Fail

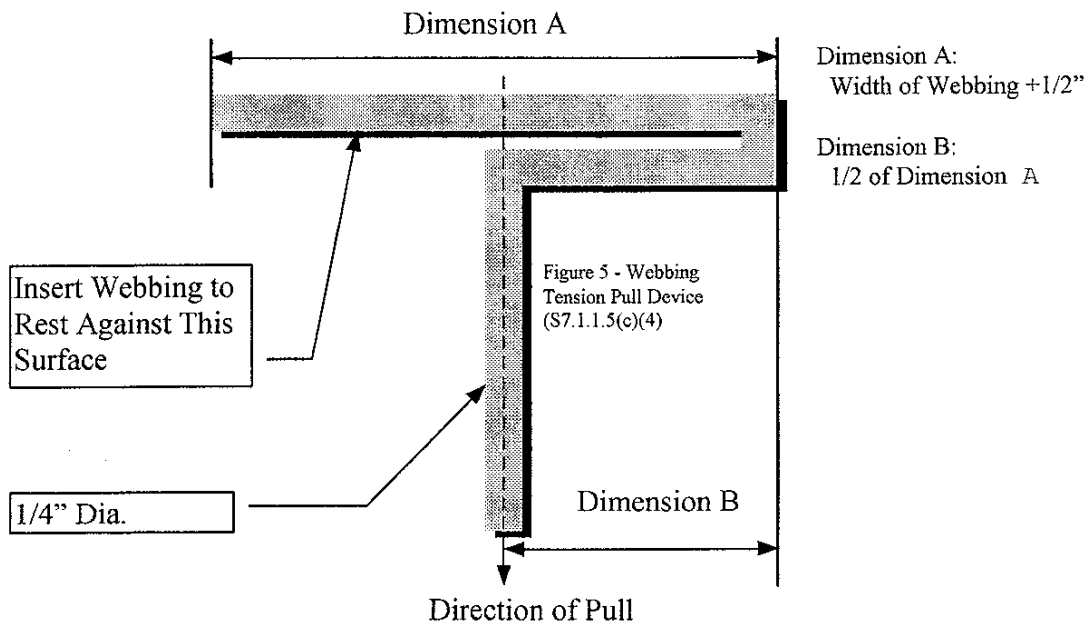


Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

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))

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

DESIGNATED SEATING POSITION: Right rear passenger seat

- ☒ 1. Record test seat position. Normal
(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

Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

DESIGNATED SEATING POSITION: Right rear 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 61.75 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 28.25 inches.

Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

DESIGNATED SEATING POSITION: Right rear 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 29.0 inches (7.1.1.5(c)(6))

- ☒ 15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less?

14-13=0.75 inches

☒ Yes-Pass ☐ No-Fail

- ☒ 16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (7.1.1.5(c)(7))

10-14=32.75 inches.

☒ Yes-Pass ☐ No-Fail

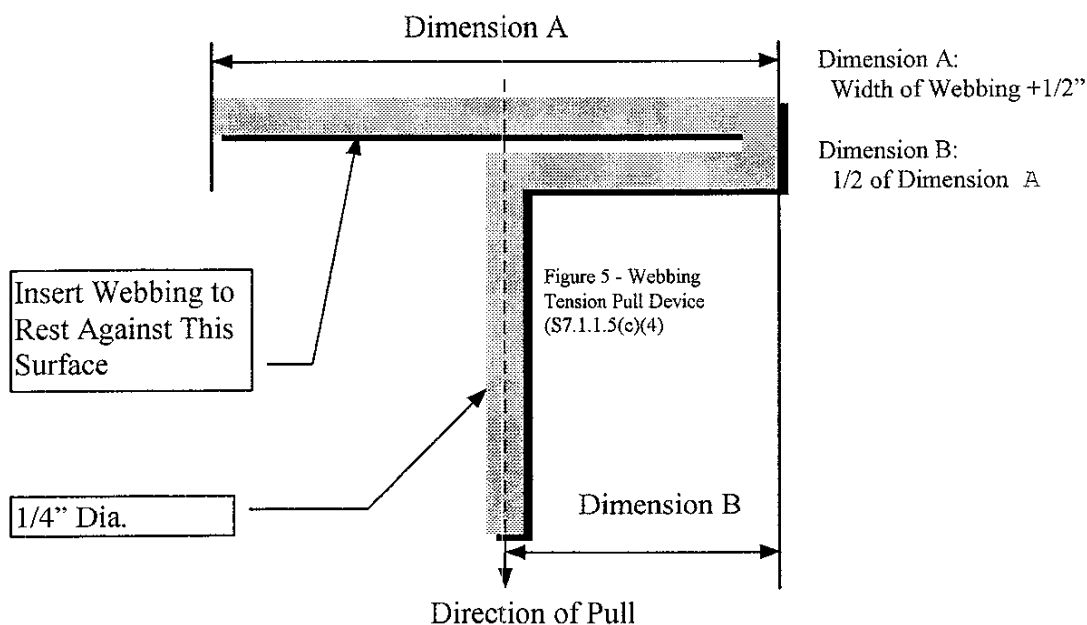


Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

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))

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

DESIGNATED SEATING POSITION: Left rear passenger seat

- ☒ 1. Record test seat position. Normal
(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

Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

DESIGNATED SEATING POSITION: Left rear 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 61.5 inches.
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing
(S7.1.1.5(c)(3))
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
Measured force application angle 10 degrees. (Spec. 5~15 degrees)
- ☒ 13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
Measured distance between A and B 27.25 inches.

Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

NHTSA NO.: CW0118 Technician: M. Tonneman & G. Watters Date: 02/13/98

DESIGNATED SEATING POSITION: Left rear 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 28.75 inches (7.1.1.5(c)(6))

- ☒ 15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less?

14-13=1.5 inches

☒ Yes-Pass ☐ No-Fail

- ☒ 16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (7.1.1.5(c)(7))

10-14=32.75 inches.

☒ Yes-Pass ☐ No-Fail

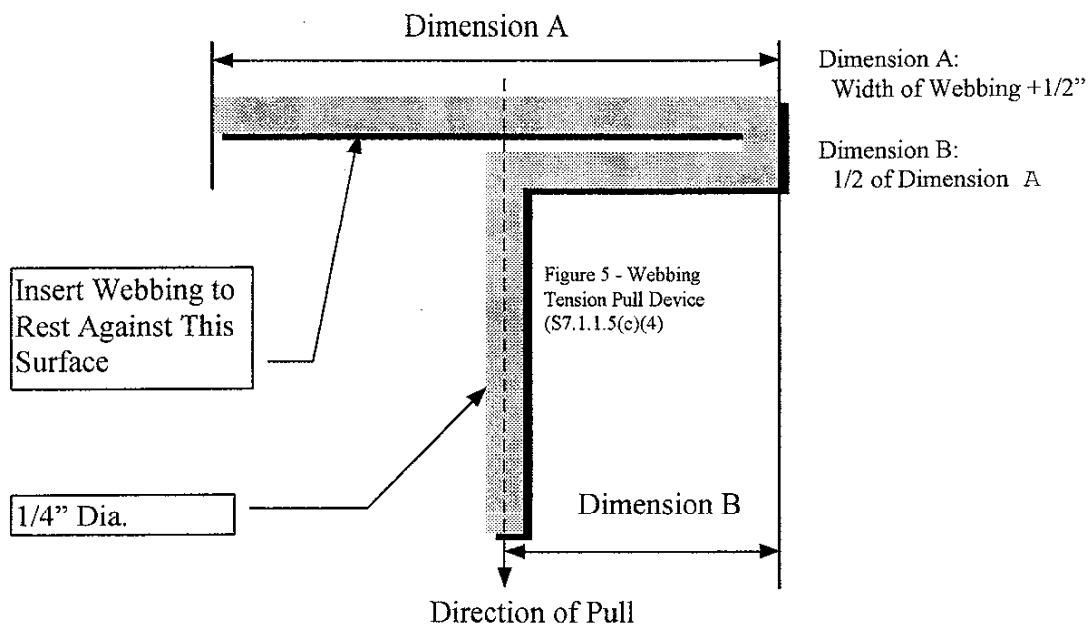


Table 12
FMVSS 208 Air Bag Labels

NHTSA NO.: CW0118

Technician: M. Tonneman

Date: 02/13/98

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 Vehicle:
- 2.1 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

Table 12
Air Bag Labels, Cont'd.

- 2.2 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

- 2.3 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 2.1, or 2.2, or 2.3, 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 2.1, 2.2, and 2.3, go to 3.

3. Sun Visor Warning Label

- 3.1 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 ☐ N/A ☒ Yes-Pass ☐ No-Fail

- 3.2 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))

- 3.2.1 Dual air bags

☐ N/A

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☒ Yes-Pass ☐ No-Fail

Table 12
Air Bag Labels, Cont'd.

3.2.1 Vehicles with driver air bag ONLY - either 3.2.1 or 3.2.2 is applicable, not both. (S4.5.1(b)(2)(iv))

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

☒ N/A

Driver side ☐ Yes-Pass ☐ No-Fail

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

DEATH or SERIOUS INJURY can occur.

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

☒ N/A

Driver side ☐ Yes-Pass ☐ No-Fail

Table 12
Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

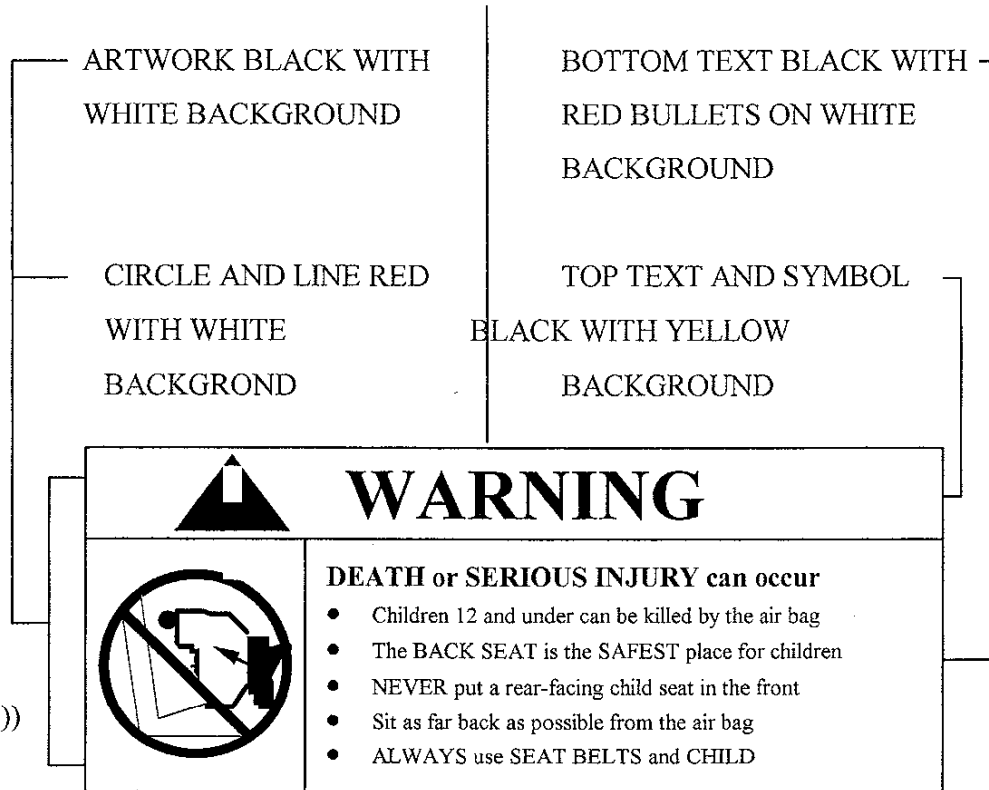


Figure 6a
(S4.5.1(b)(2))

Table 12
Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

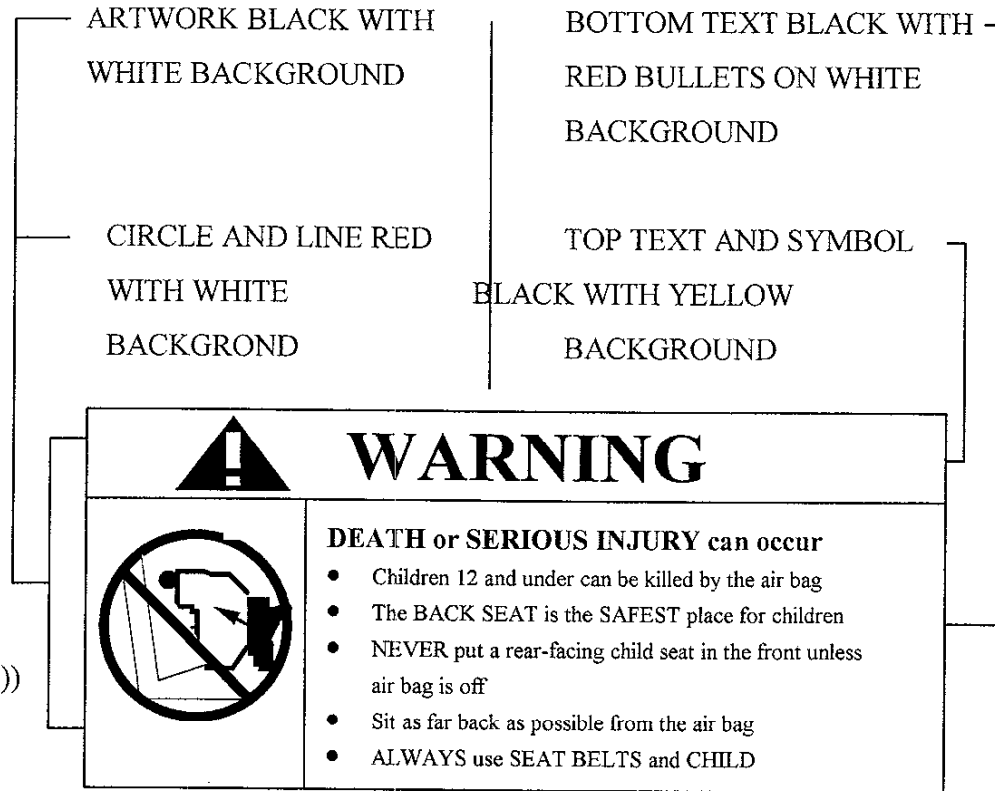


Figure 6b
(S4.5.1(b)(2))

3.3 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

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

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☒ Yes-Pass ☐ No-Fail

3.5 Is the message area at least 30 cm²? (S4.5.1(b)(2)(ii))

Actual message area 52 cm²

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☒ Yes-Pass ☐ No-Fail

Table 12
Air Bag Labels, Cont'd.

- 3.6 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 ☒ Yes-Pass ☐ No-Fail

- 3.7 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 ☒ Yes-Pass ☐ No-Fail

- 3.8 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 ☒ Yes-Pass ☐ No-Fail

- 3.9 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 ☒ Yes-Pass ☐ No-Fail

4. Air Bag Alert Label

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

☒ Yes ☐ No If yes, go to 5

- 4.2 does the label conform in content to the label shown in Figure 6c?
(S4.5.1(c)(2))

☐ Yes-Pass ☐ No-Fail



Table 12
Air Bag Labels, Cont'd.

- 4.3 Is the message area black with yellow text? (S4.5.1(c)(2)(i))
☐ Yes-Pass ☐ No-Fail
- 4.4 Is the message area at least 20 cm²? (S4.5.1(c)(2)(i))
Actual message area _____ cm² ☐ Yes-Pass ☐ No-Fail
- 4.5 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
- 4.6 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
5. Label On the Dash
- 5.1 Does the vehicle have a passenger air bag?
☒ Yes ☐ No
- If no, this check list is complete.**
- 5.2 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e))
☒ Yes-Pass ☐ No-Fail
- 5.3 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))

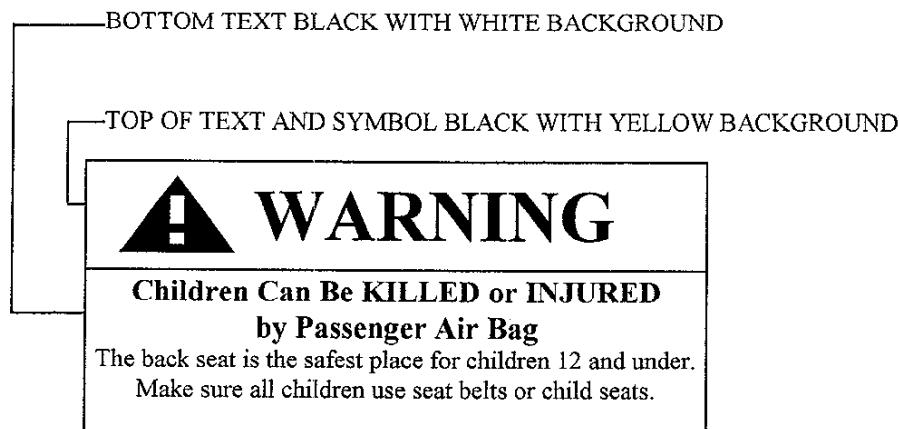


Table 12
Air Bag Labels, Cont'd.

- 5.4 Is the heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1(e)(i)) ☒ Yes-Pass ☐ No-Fail
- 5.5 Is the message white with black text? (S4.5.1(e)(ii)) ☒ Yes-Pass ☐ No-Fail
- 5.6 Is the message area at least 30 cm²? (S4.5.1(e)(ii))
Actual message area 52.0 cm² ☒ Yes-Pass ☐ No-Fail

Table 13
FMVSS 208 Seat Belt Comfort And Convenience Test Summary
Front Outboard Designated Seating Positions

Test Vehicle NHTSA No.: CW0118

Vehicle Model Year/Make/Model/Body Style: 1998/Chevrolet/Blazer/4-door

Date of Comfort and Convenience Check: 02/13/98

Technician Performing Check: M. Tonneman/G. Watters

GVWR: 5000 pounds

- Automatic seat belts installed in any vehicle other than walk-in van-type vehicles, which has a gross vehicle weight rating of 10,000 pounds or less, and is manufactured on or after September 1, 1986, shall meet the requirements for convenience hooks, webbing tension-relieving devices, and belt contact force.
- Manual seat belts installed for compliance with this standard in front outboard designated seating positions of any vehicle, other than walk-in van-type vehicles, which has a gross vehicle rating of 10,000 pounds or less, and is manufactured after September 1, 1989, shall meet the requirements for belt contact force, latch plate access, retraction and seat belt guides and hardware.

1. Was vehicle equipped with: (S7.4)

AUTOMATIC SEAT BELTS

Yes-☐; No-☒

If yes, go to requirements for Convenience Hooks (S7.4.1), Webbing Tension-Relieving Devices (S7.4.2), Belt Contact Force (S7.4.3)

**MANUAL SEAT BELTS IN OUTBOARD FRONT SEATS EXCLUDING TYPE 2
MANUAL BELTS IN PASSENGER CARS***

Yes-☒; No-☐

If yes, go to requirements for Belt Contact Force (S7.4.3), Latchplate Access (S7.4.4), Retraction (S7.4.5)

If any problems are encountered while checking the vehicle to ascertain that it meets the comfort and convenience requirements of FMVSS No. 208 contact the COTR immediately.

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

Table 13
FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Belt Contact Force (S7.4.3)

FRONT OUTBOARD DRIVER

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in the vehicle incorporate a webbing tension-relieving device. ☒ Check
2. Seats are adjusted according to instructions in S8, "Test conditions" of FMVSS 208. ☒ Check
3. The test dummies are positioned according to dummy position placement instructions in Appendix B or C. ☒ Check
4. Fasten the seat belt latch. Close the vehicle's adjacent door, 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. The contact force is 0.4 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

FRONT OUTBOARD PASSENGER

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in the vehicle incorporate a webbing tension-relieving device. ☒ Check
2. Seats are adjusted according to instructions in S8, "Test conditions" of FMVSS 208. ☒ Check
3. The test dummies are positioned according to dummy position placement instructions in Appendix B or C. ☒ Check
4. Fasten the seat belt latch. Close the vehicle's adjacent door, 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. The contact force is 0.3 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Table 13
FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Latchplate Access (S7.4.4)

FRONT OUTBOARD DRIVER

1. Position latch plate in its normal stowed position. ☒ Check
2. Position adjustable anchorages, if any, to manufactures nominal design position for a 50th percentile dummy. ☒ Check
3. Position the test dummy in the right front passenger seat in its forward most adjustment position and with its arms removed. ☒ Check
4. Attach the inboard and outboard reach string following the instructions on Figure 2C for Part 572E test device outlined in the test procedure. 1 inch forward of true mid. ☒ Check
5. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. With the latchplate in the normal stowed position check to assure that the latchplate is within the reach envelope. ☒ Check
6. Close the vehicle door. Using the clearance test block, specified in Figure 3C 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. ☒ Check
7. Was the latch plate accessible? Yes-☒ Pass; No- ☐ Fail
In board and head reach strings did not reach latch plate

FRONT OUTBOARD PASSENGER

1. Position latch plate in its normal stowed position. ☒ Check
2. Position adjustable anchorages, if any, to manufactures nominal design position for a 50th percentile dummy. ☒ Check
3. Position the test dummy in the left front driver seat in its forward most adjustment position and with its arms removed. 3 notches back from full forward. ☒ Check
4. Attach the inboard and outboard reach string following the instructions on Figure 2C for Part 572E test device outlined in the test procedure. ☒ Check
5. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. With the latchplate in the normal stowed position check to assure that the latchplate is within the reach envelope. ☒ Check
6. Close the vehicle door. Using the clearance test block, specified in Figure 3C 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. ☒ Check
7. Was the latch plate accessible? Yes-☒ Pass No- ☐ Fail

Table 13
FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

FRONT OUTBOARD DRIVER

1. Seat and seat back are adjusted according to instructions in S8.1.2 and S8.1.3 ☒ Check
2. 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 (P572E) and restrain the dummies using the belt systems for the positions being tested. ☒ Check
3. Outboard armrests which are capable of being stowed on vehicle seats shall be placed in their stowed position. ☒ Check
4. Check the option which applies to this test vehicle:
 - (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released. ☒ Check
 - (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released. ☒ Check
5. With the webbing and hardware in the stowed position close the door to assure that the webbing and hardware are prevented from being pinched. ☒ Check
6. If this test vehicle has an open body (without doors)) and has a belt system with a tension-relieving device, check to assure that the belt system fully retracts when the tension relieving device is manually deactivated. N/A
7. Notes: No outboard armrests installed. Not an open body. No tension-relieving device.

Table 13
FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

FRONT OUTBOARD PASSENGER

1. Seat and seat back are adjusted according to instructions in S8.1.2 and S8.1.3 ☒ Check
2. 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 (P572E) and restrain the dummies using the belt systems for the positions being tested. ☒ Check
3. Outboard armrests which are capable of being stowed on vehicle seats shall be placed in their stowed position. ☒ Check
4. Check the option which applies to this test vehicle:
 - (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released. ☒ Check
 - (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released. ☒ Check
5. With the webbing and hardware in the stowed position close the door to assure that the webbing and hardware are prevented from being pinched. ☒ Check
6. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, check to assure that the belt system fully retracts when the tension relieving device is manually deactivated. ☒ Check
7. Notes: No outboard armrests installed. Not an open body. No tension-relieving device.

Table 13
FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

FRONT OUTBOARD DRIVER

The requirements for accessibility **DO NOT APPLY** to: Seat belt webbing is not designed to pass through the seat cushion or between the seat cushion and seat back.

1. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b)).
2. Seat that are removable.
3. 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 if:

1. Each manual seat belt assembly in a front designated seating position whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back has one of the following three parts (the seat belt latchplate, the buckle, or the seat belt webbing) 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.). ☒ Check
2. The remaining two seat belt parts are accessible under normal conditions. ☒ Check
3. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following occur in order:
 - (A) The belt is completely retracted or, if the belt is non retractable, the belt is unlatched. ☒ Check
 - (B) The seat is moved to any position to which it is designed to be adjusted. ☒ Check
 - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☒ Check
4. 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 arm rest)? Yes-☒; No-☐, N/A-☐

Table 13
FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

FRONT OUTBOARD PASSENGER

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

1. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b)).
2. Seat that are removable.
3. 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 if:

1. Each manual seat belt assembly in a front designated seating position whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back has one of the following three parts (the seat belt latchplate, the buckle, or the seat belt webbing) 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.). ☒ Check
2. The remaining two seat belt parts are accessible under normal conditions. ☒ Check
3. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following occur in order:
 - (A) The belt is completely retracted or, if the belt is non retractable, the belt is unlatched. ☒ Check
 - (B) The seat is moved to any position to which it is designed to be adjusted. ☒ Check
 - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☒ Check
4. 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 arm rest)? Yes-☒; No-☐; N/A-☐

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 2 Vehicle Target Locations

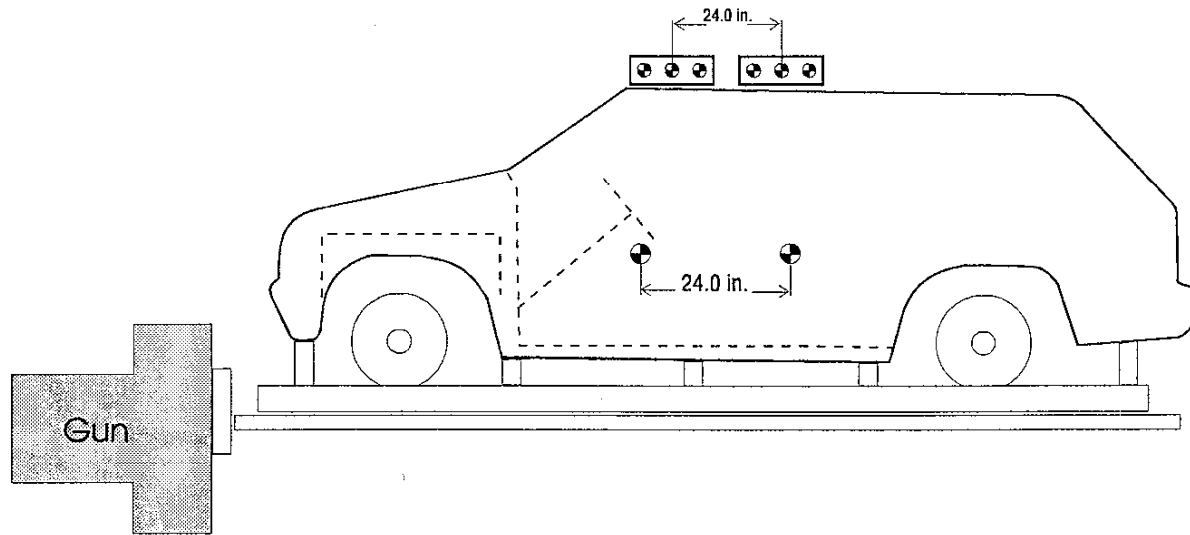


Figure 3 Dummy Measurement Locations for Front Seat Occupants

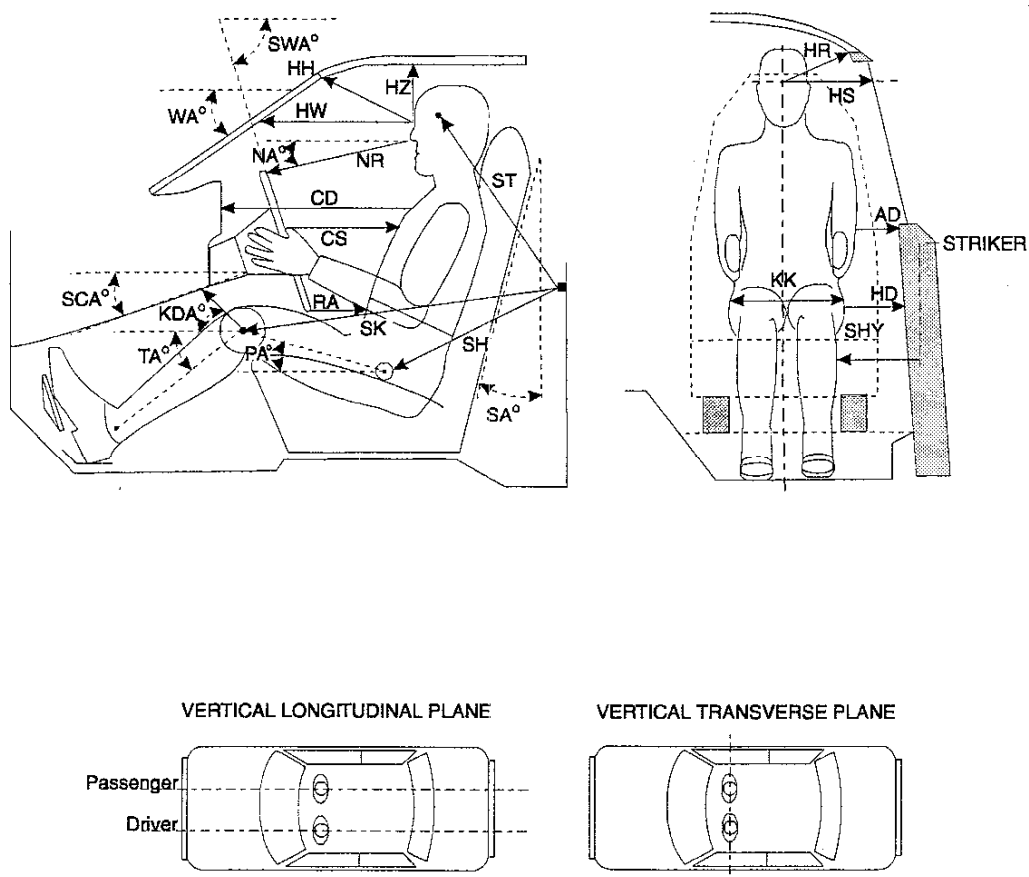


Table 14 Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #229)	Passenger (Serial #230)
WA	Windshield angle	37.1°	N/A
SWA	Steering wheel angle	67.3°	N/A
SCA	Steering column angle	22.0°	N/A
SA	Seat back angle	23.8°	23.5°
HZ	Head to roof	8.1 in	8.0 in
HH	Head to header	18.3 in	18.7 in
HW	Head to windshield	25.1 in	24.0 in
HR	Head to side header	9.9 in	9.6 in
NR	Nose to rim	14.6 in	N/A
NA	Nose to rim angle	N/A	N/A
CD	Chest to dash	21.4 in	18.7 in
CS	Steering wheel to chest	11.7 in	NA
RA	Rim to abdomen	6.4 in	NA
KDL	Left knee to dash	7.2 in	7.1 in
KDR	Right knee to dash	7.3 in	7.2 in
KDA	Outboard knee to dash angle	21°	30°
PA	Pelvic angle	20.5°	22.1°
TA	Tibial angle	39.6°	40.3°
KK	Knee to knee	10.8 in	10.8 in
ST ¹	Striker to head	23.4 in	23.4 in
	Striker to head angle	-74.1°	-75.2°
SK ¹	Striker to knee	26.4 in	26.4 in
	Striker to knee angle	-4.1°	-3.8°
SH ¹	Striker to H-point	12.0 in	12.0 in
	Striker to H-point angle	11.1°	18.5°
SHY	Striker to H-point (Y dir.)	8.2 in	9.0 in
HS	Head to side window	14.6 in	14.0 in
HD	H-point to door	6.0 in	6.6 in
AD	Arm to door	5.0 in	5.4 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 above the striker.

Figure 4 Camera Positions

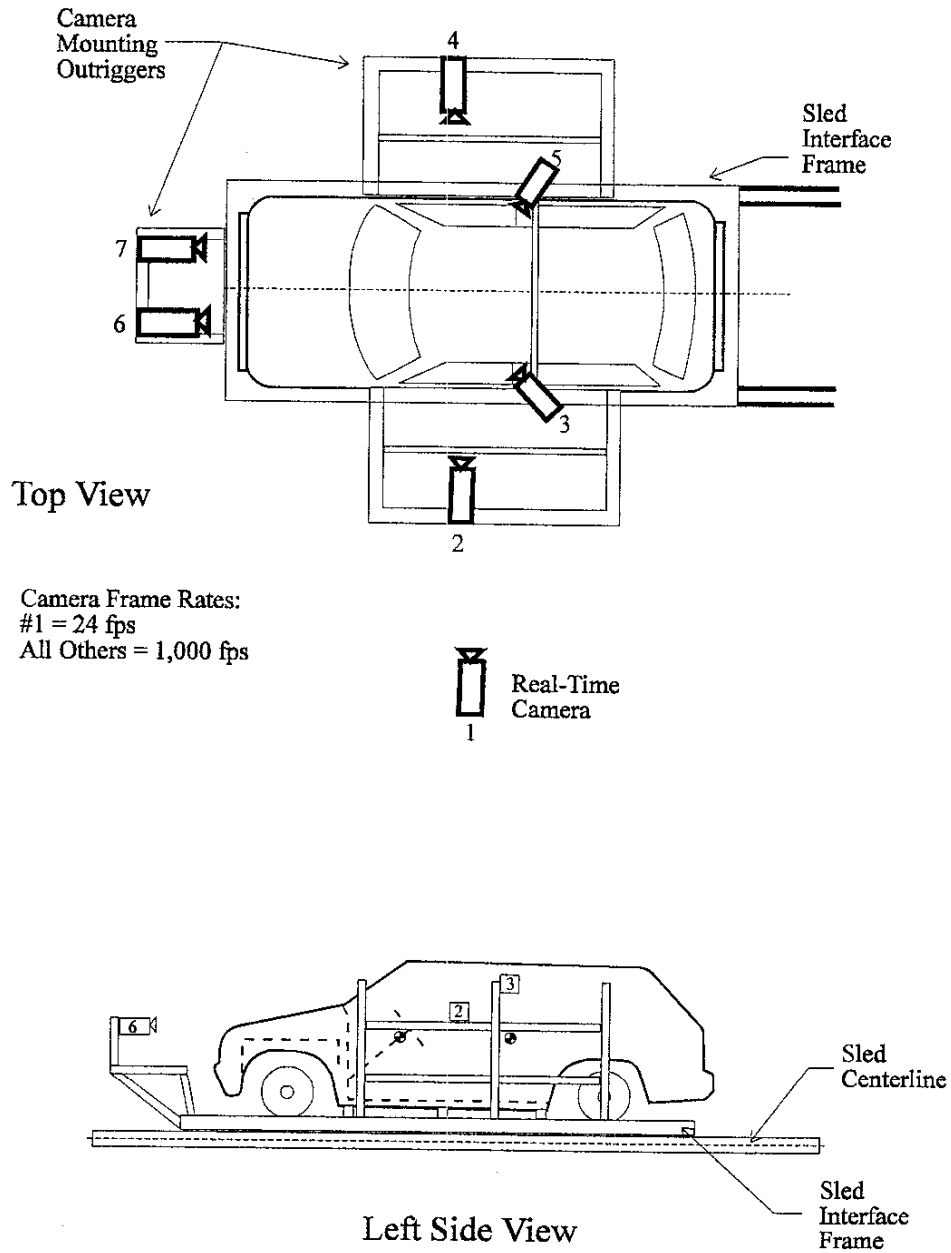


Table 15 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1998/Chevrolet/Blazer/4-door

Test number: 980213S

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	115.0 in	310.0 in	52.0 in	N/A	292.0 in	N/A	24 frames/s
2	Left side view wide	78.0 in	72.0 in	49.3 in	1.1°	57.0 in.	5 mm	1000 frames/s
3	Left side view over shoulder	102.0 in	49.0 in	54.5 in	-12.3°	35.0 in.	8 mm	1005 frames/s
4	Right side view	77.5 in	91.5 in	48.8 in	0.9°	76.0 in	13 mm	1010 frames/s
5	Right side view over shoulder	98.0 in	49.0 in	54.8 in	-9.9°	35.0 in.	8 mm	1000 frames/s
6	Front view - driver	28.0 in	13.0 in	60.5 in	-8.1°	58.0 in	8 mm	1000 frames/s
7	Front view - passenger	28.0 in	16.5 in	60.5 in	-9.0°	58.0 in	8 mm	1005 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 upward from horizontal plane

Appendix A

Photographs

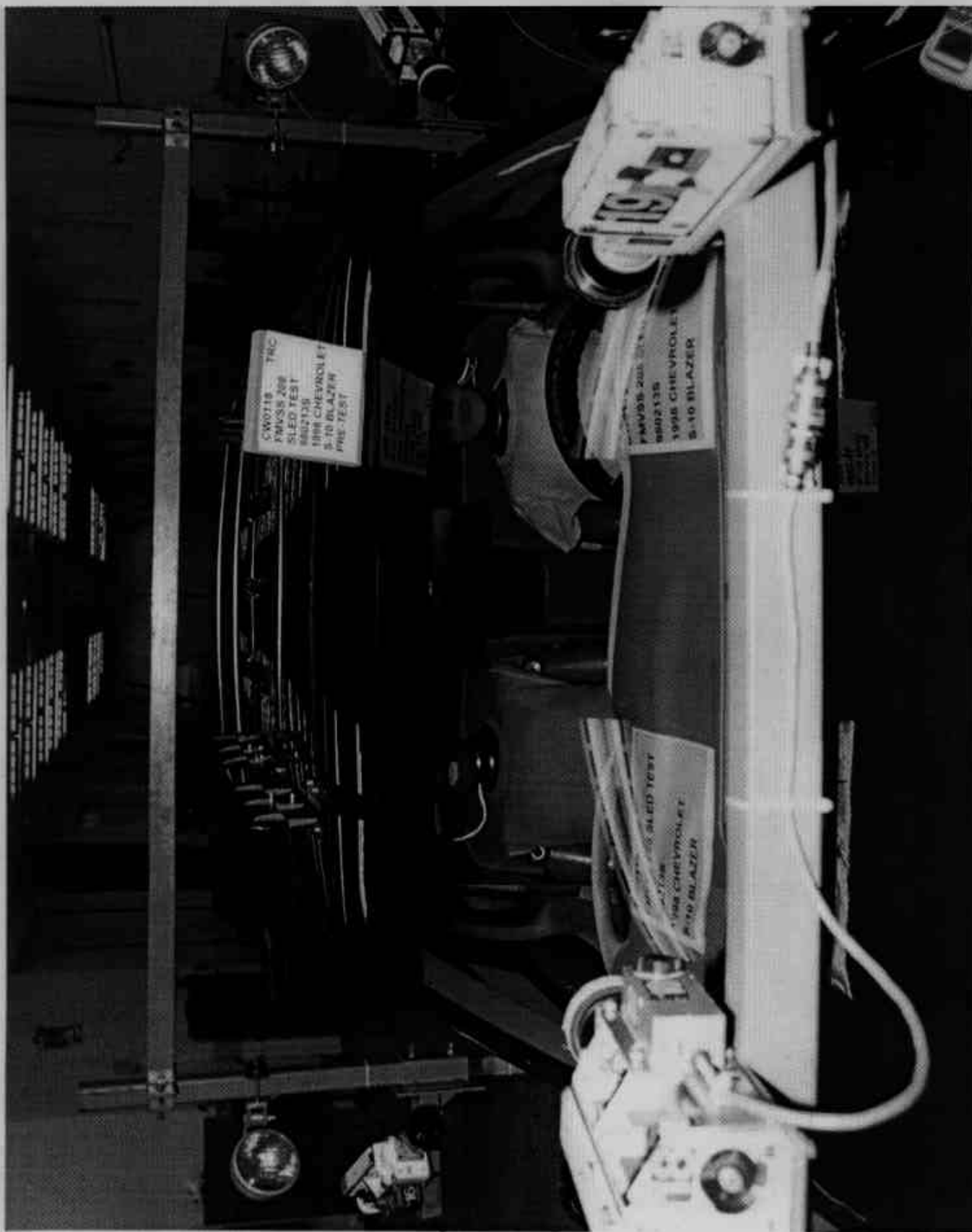


Figure A-1 Pre-Test Windshield View
A-2

980213



Figure A-2 Pre-Test Driver Dummy Position View With Door Open - View 1
A-3 980213



Figure A-3 Post-Test Driver Dummy Position View With Door Open - View 1
A-4 980213

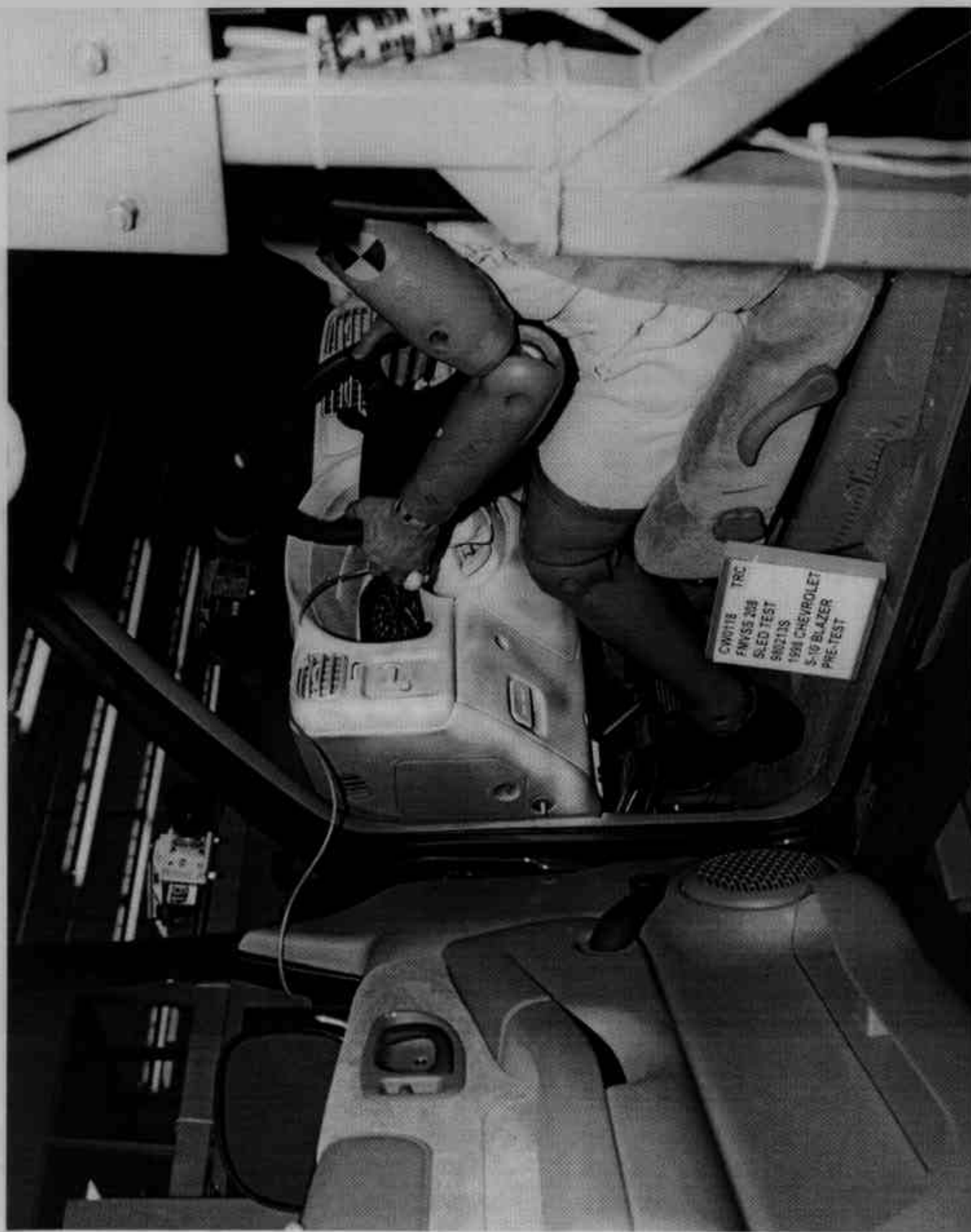


Figure A-4 Pre-Test Driver Dummy Position View With Door Open - View 2
A-5 980213



Figure A-5 Post-Test Driver Dummy Position View With Door Open - View 2
A-6 980213



Figure A-6 Pre-Test Driver Seat Track Position View
A-7

980213

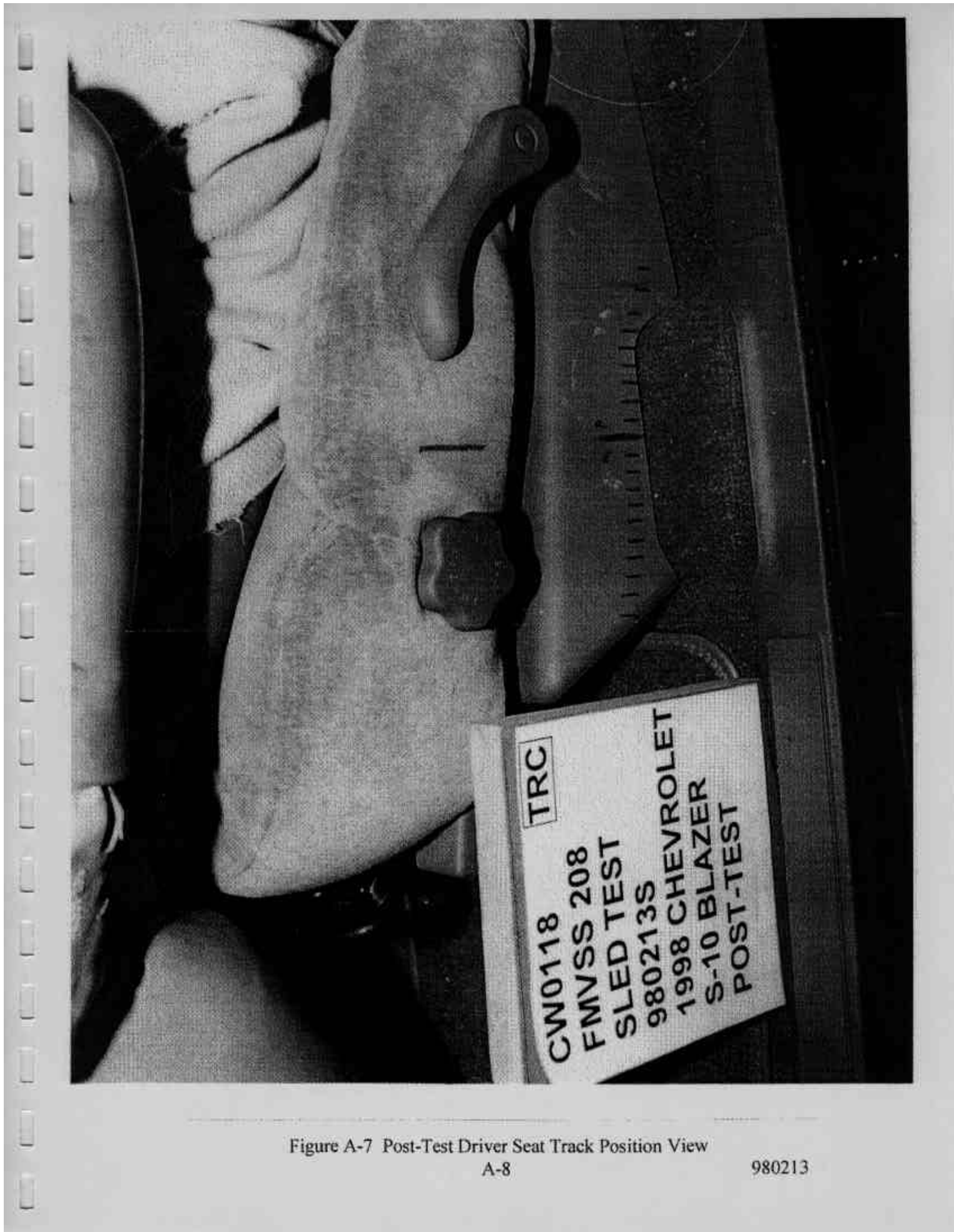


Figure A-7 Post-Test Driver Seat Track Position View
A-8

980213

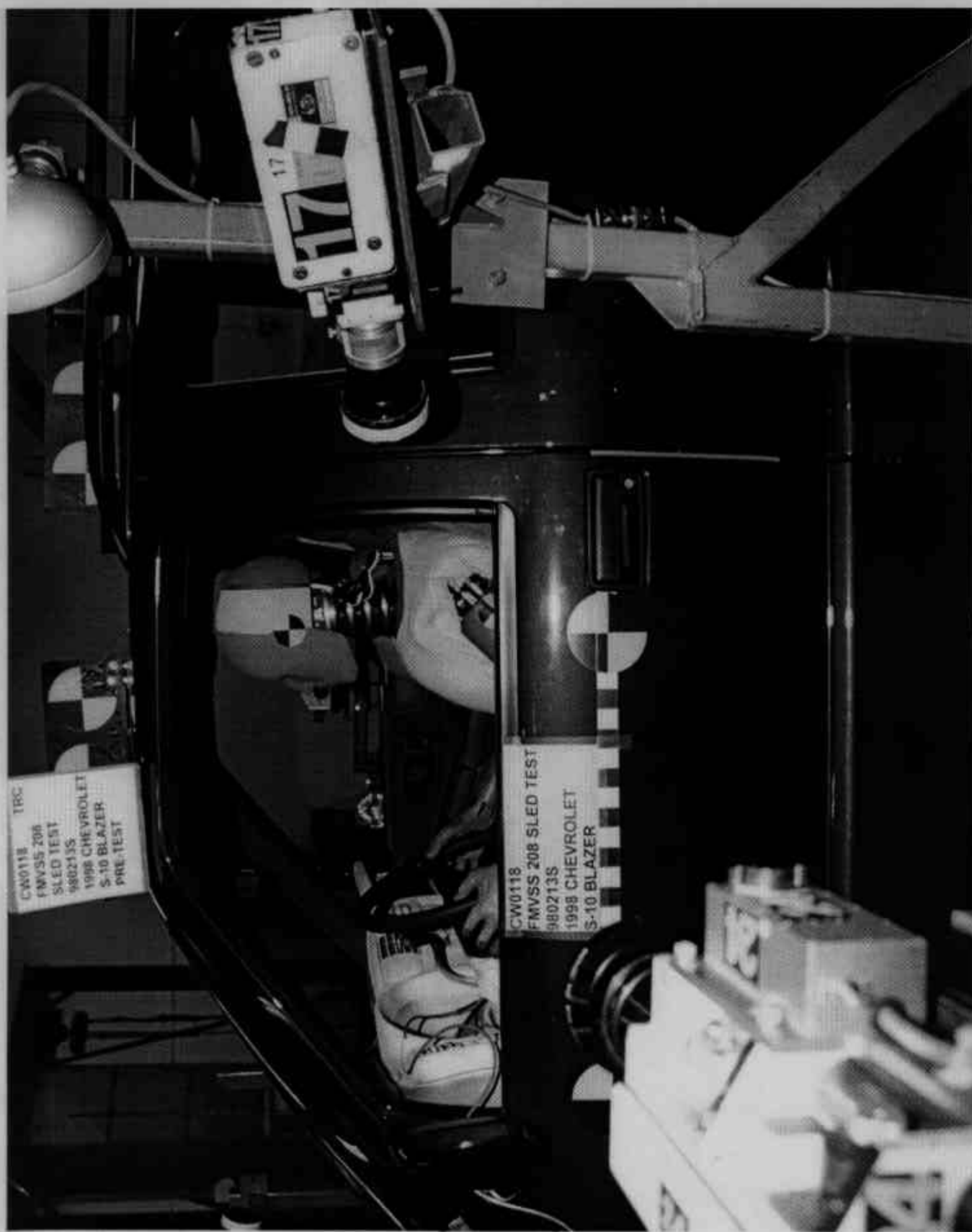


Figure A-8 Pre-Test Driver Dummy Position View With Door Closed

A-9

980213



Figure A-9 Post-Test Driver Dummy Position View With Door Closed

A-10

980213



Figure A-10 Post-Test Driver Knee Bolster View
A-11

980213

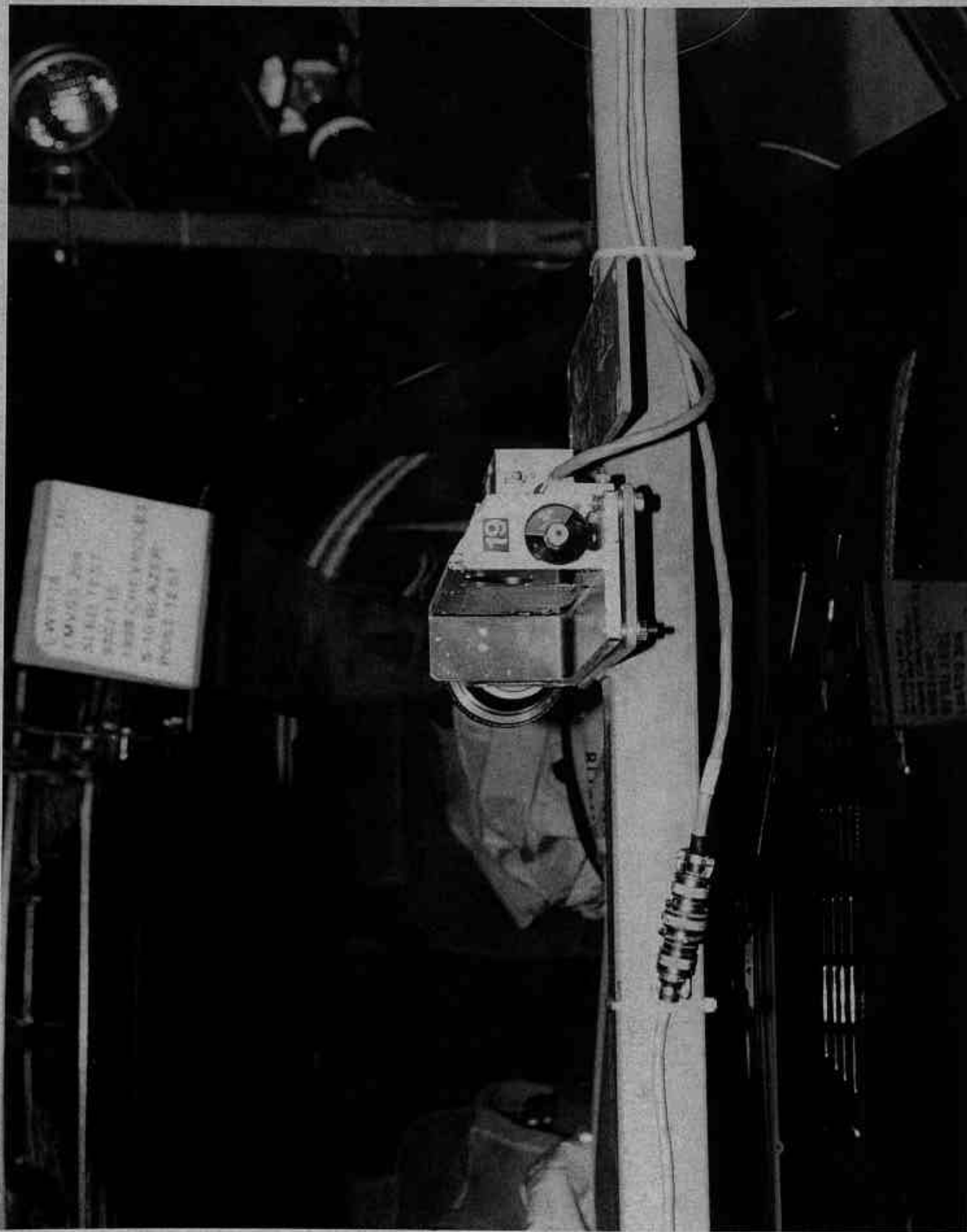


Figure A-11 Post-Test Driver Dummy Position Front View
A-12

980213



Figure A-12 Post-Test Driver Airbag View
A-13

980213

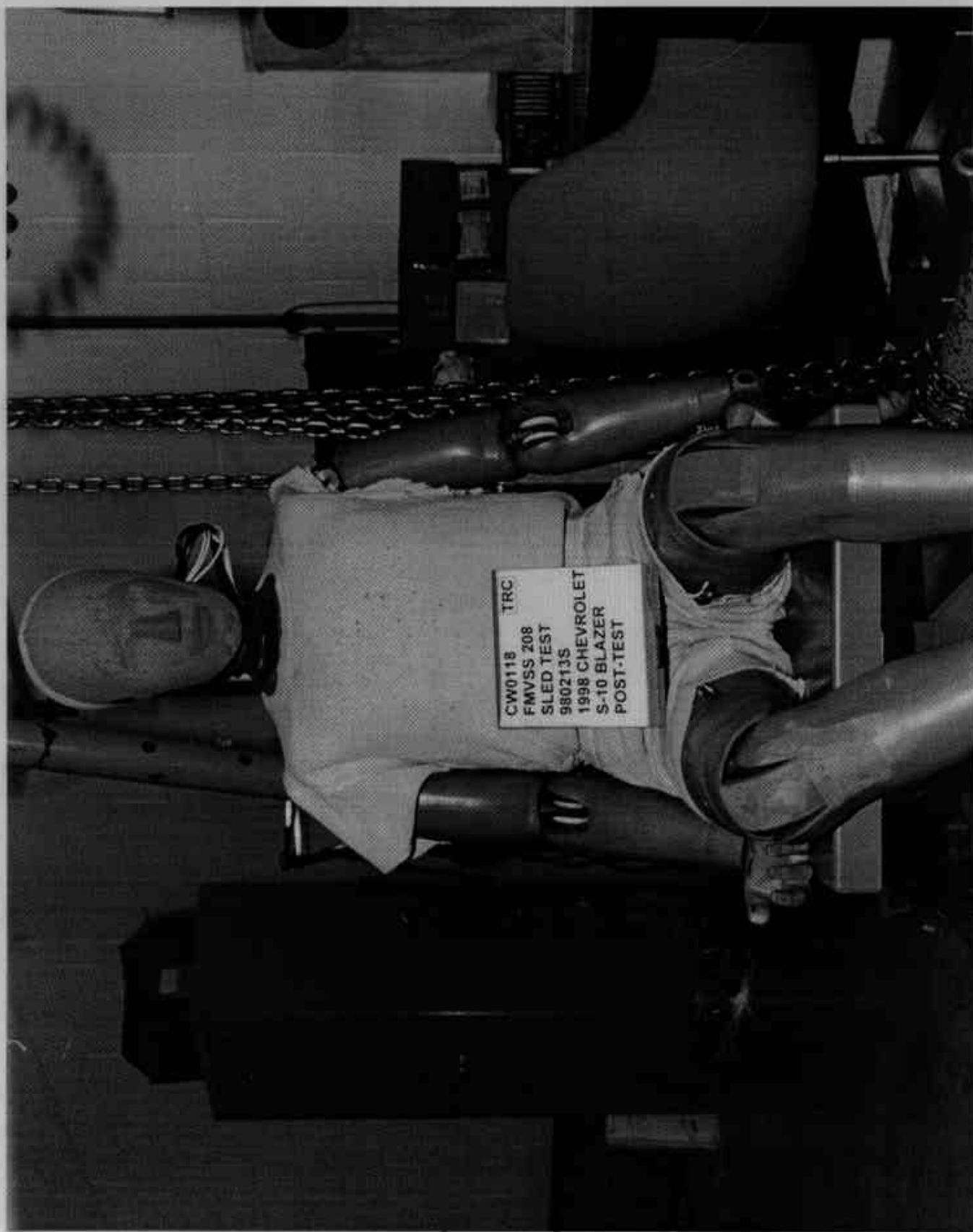


Figure A-13 Post-Test Driver Dummy Removed From Vehicle Overall View

A-14

980213

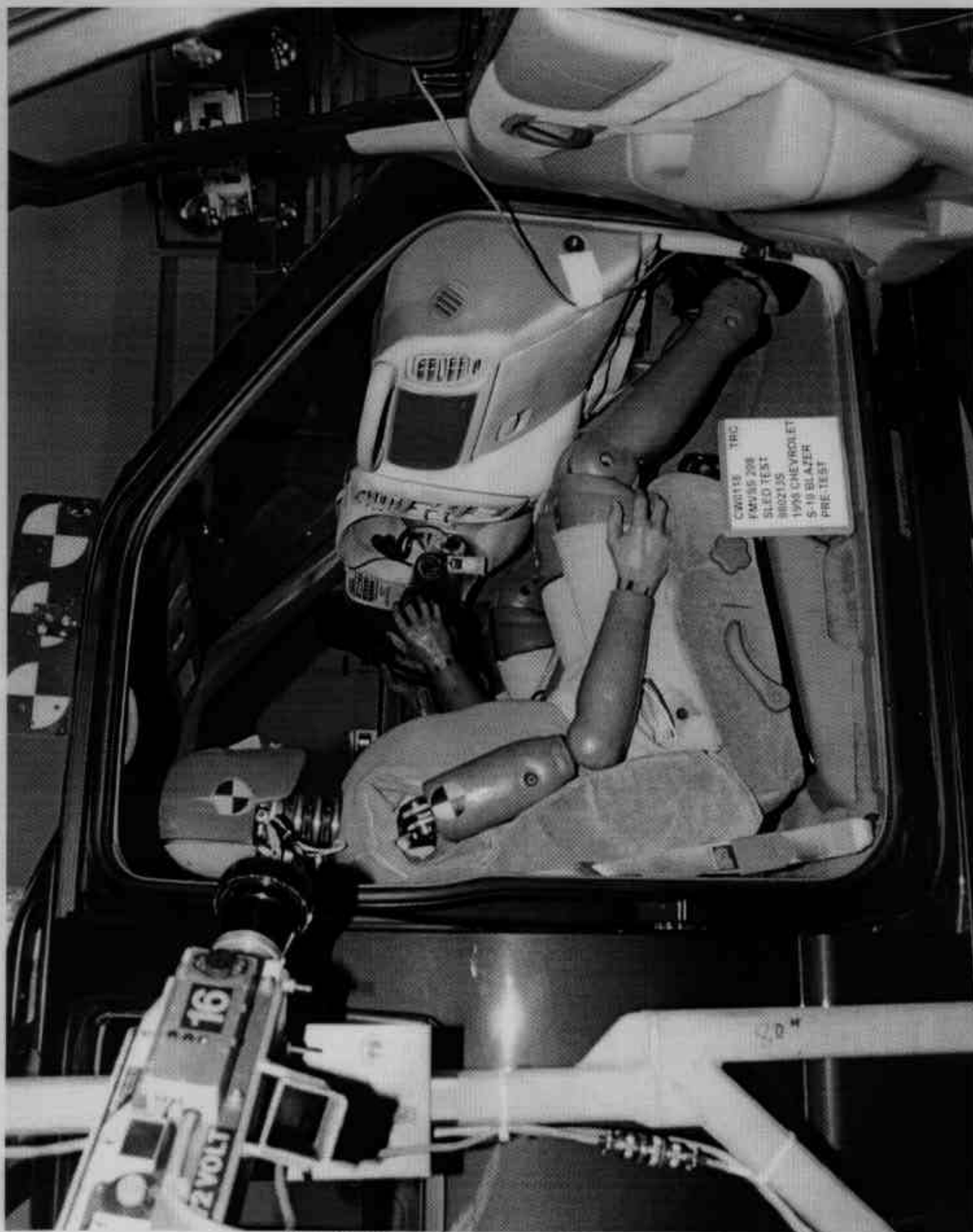


Figure A-14 Pre-Test Passenger Dummy Position View With Door Open - View 1
A-15 980213



Figure A-15 Post-Test Passenger Dummy Position View With Door Open - View 1
A-16 980213



Figure A-16 Pre-Test Passenger Dummy Position View With Door Open - View 2
A-17 980213



Figure A-17 Post-Test Passenger Dummy Position View With Door Open - View 2
A-18 980213



Figure A-18 Pre-Test Passenger Seat Track Position View
A-19

980213

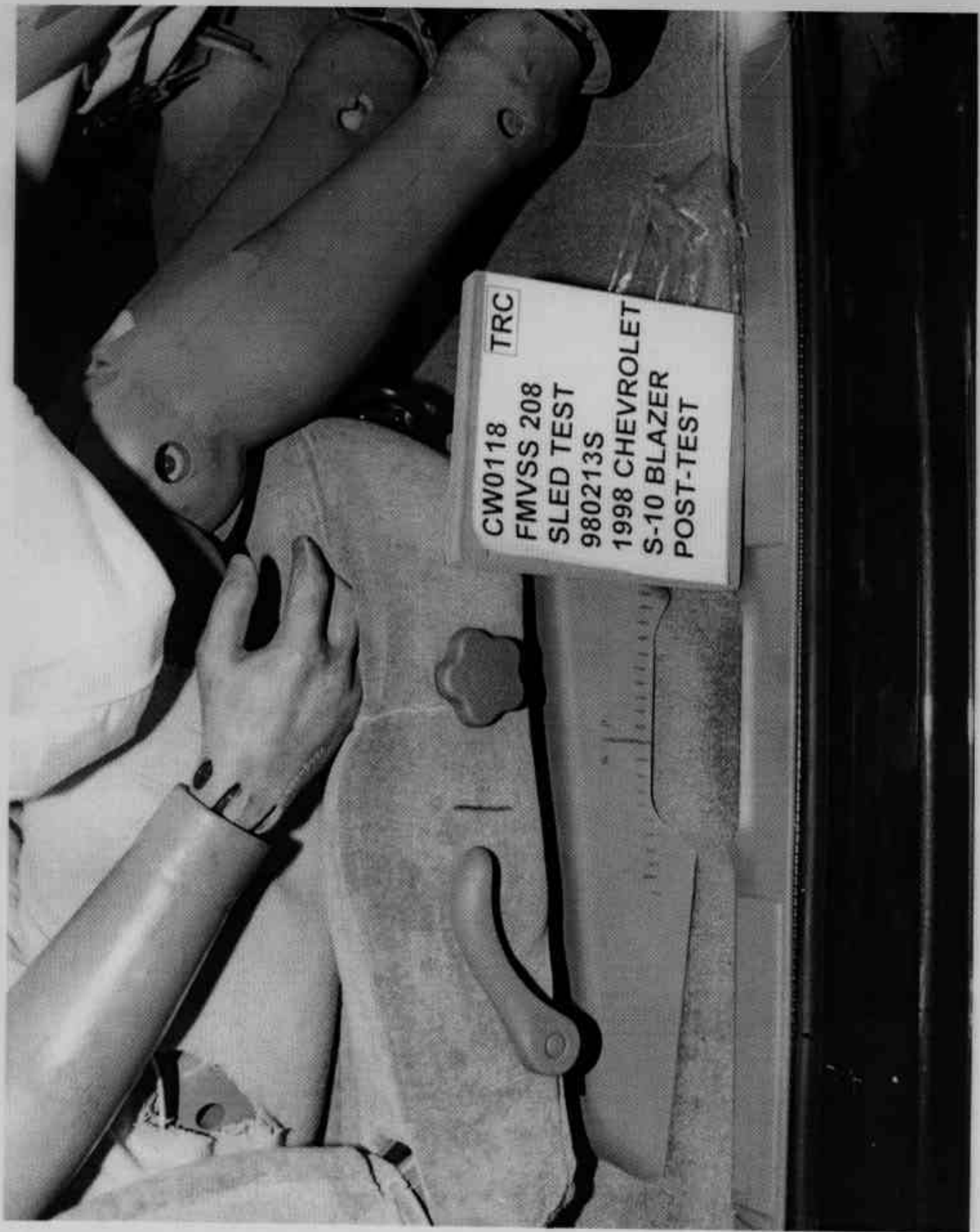


Figure A-19 Post-Test Passenger Seat Track Position View
A-20

980213



Figure A-20 Pre-Test Passenger Dummy Position View With Door Closed
A-21 980213



Figure A-21 Post-Test Passenger Dummy Position View With Door Closed

A-22

980213



Figure A-22 Post-Test Passenger Glove Box View
A-23

980213



Figure A-23 Post-Test Passenger Dummy Position Front View
A-24

980213

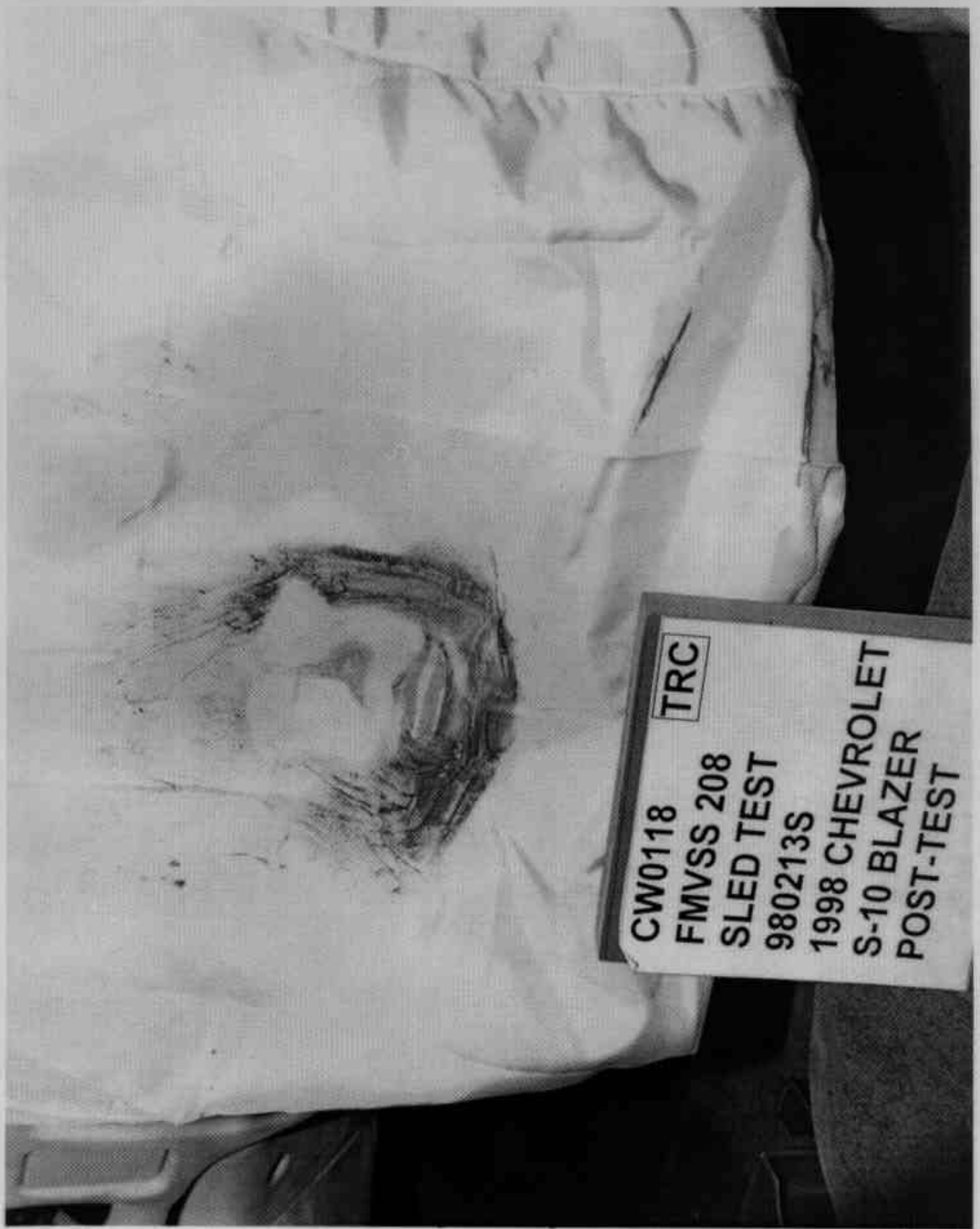


Figure A-24 Post-Test Passenger Airbag View
A-25

980213

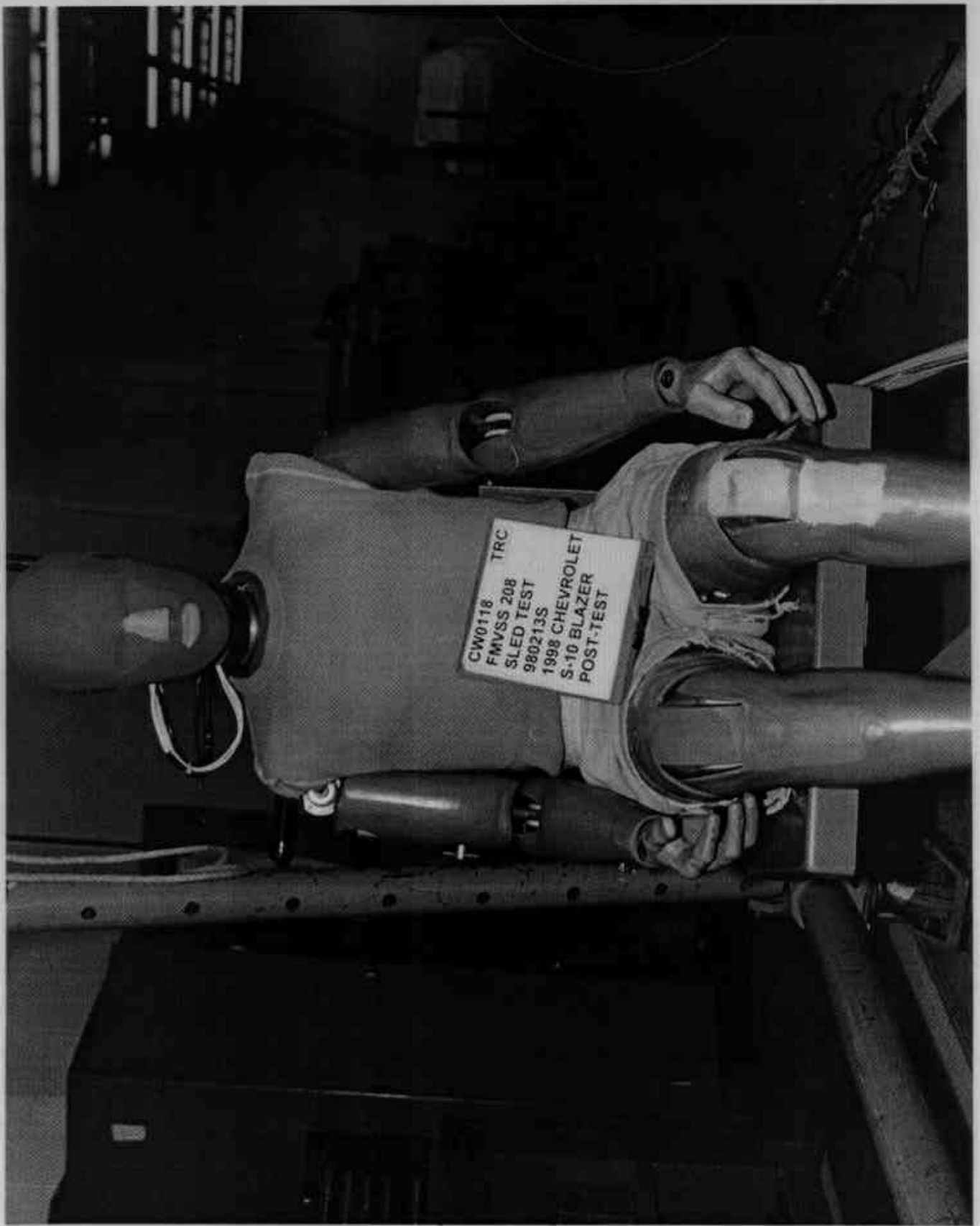


Figure A-25 Post-Test Passenger Dummy Removed From Vehicle Overall View
A-26 980213

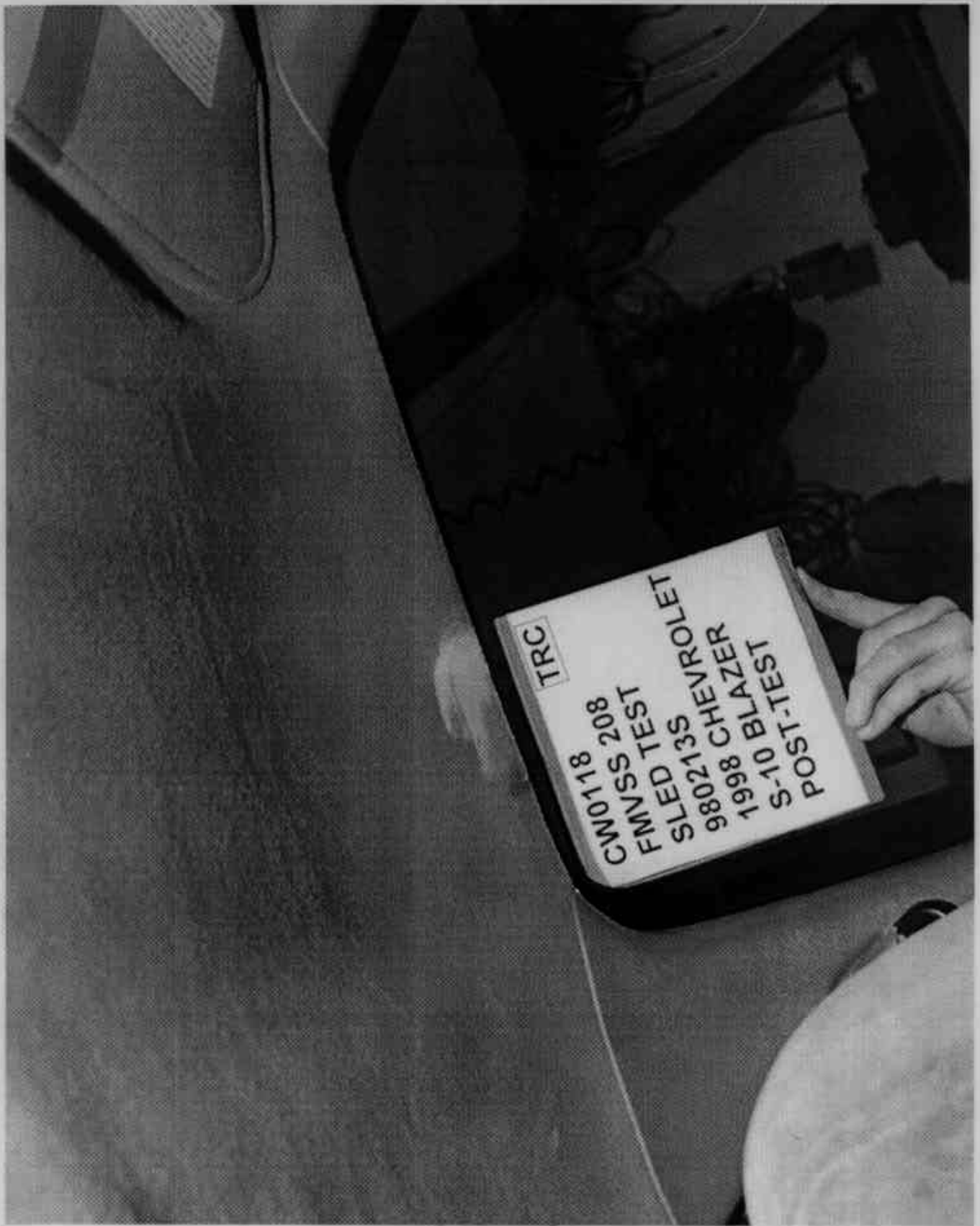


Figure A-26 Post-Test Driver Head Contact View
A-27

980213

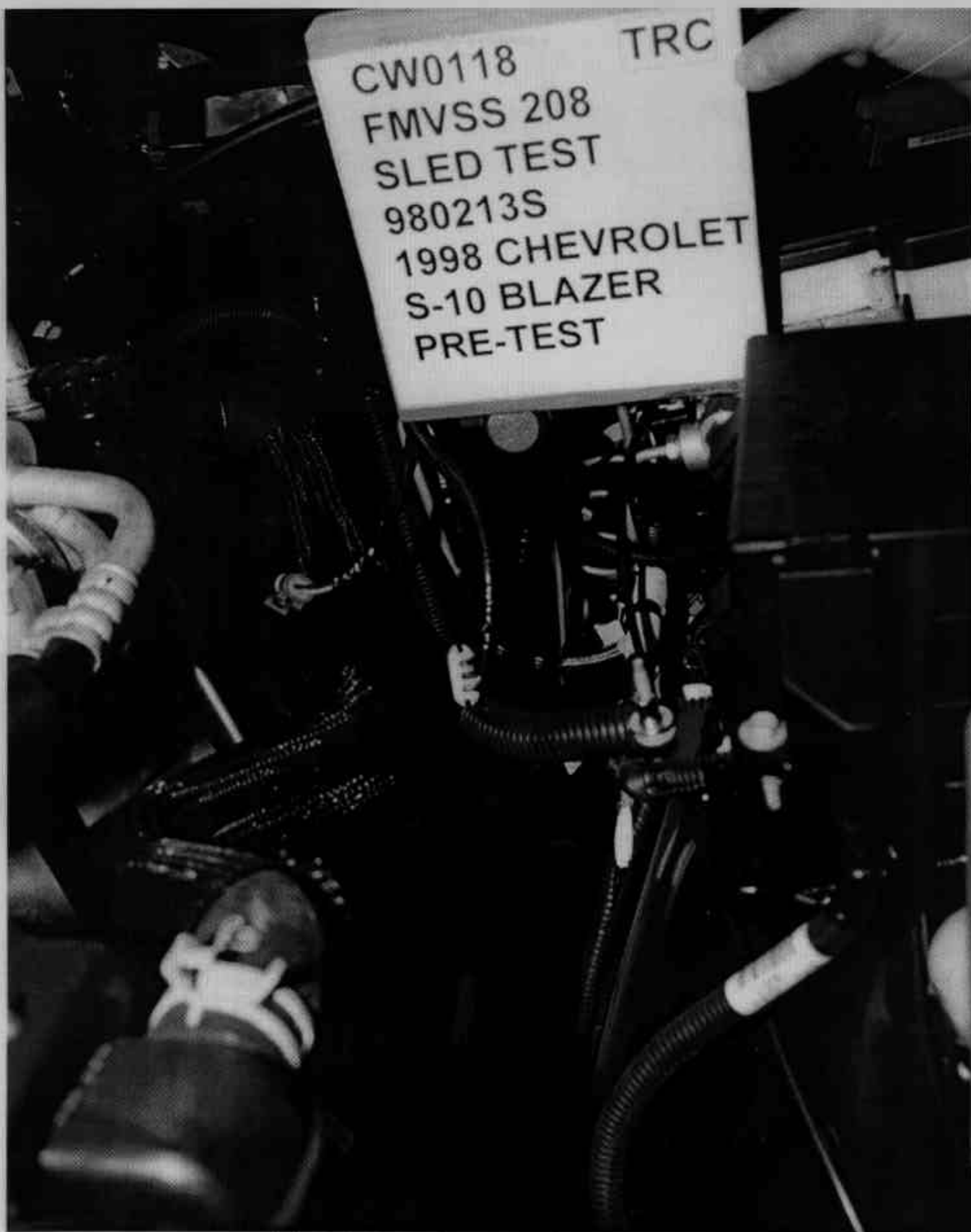


Figure A-27 Pre-Test Steering Column Linkage In Engine Compartment View

A-28

980213



Figure A-28 Post-Test Steering Column Linkage In Engine Compartment View
A-29 980213

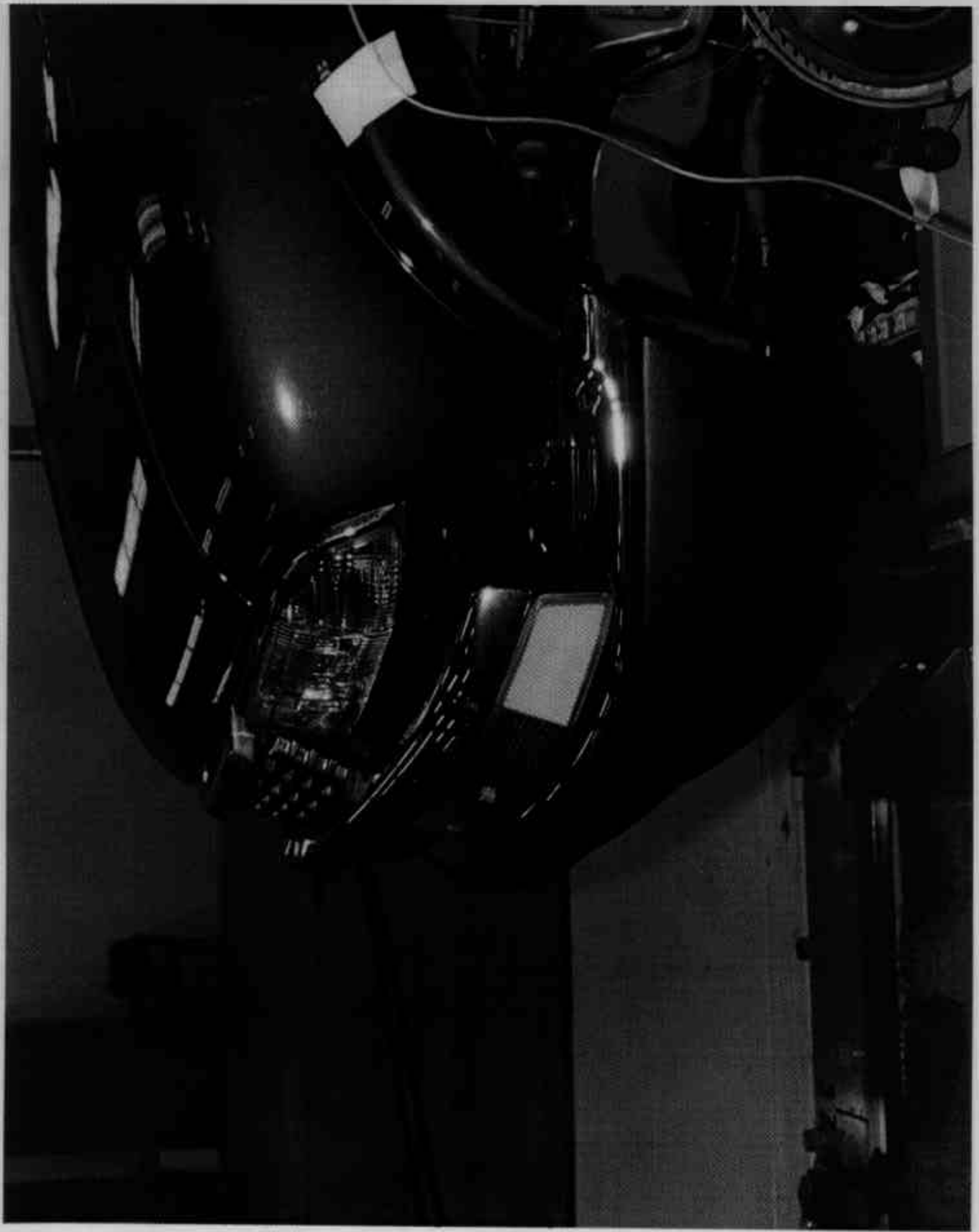


Figure A-29 Post-Test Vehicle Damage - View 1
A-30

980213



Figure A-30 Post-Test Vehicle Damage - View 2
A-31

980213



Figure A-31 Post-Test Vehicle Damage - View 3
A-32

980213



Figure A-32 Pre-Test Vehicle Certification Label View

Appendix B

Data Plots

CW0118 / 1998 CHEVROLET BLAZER

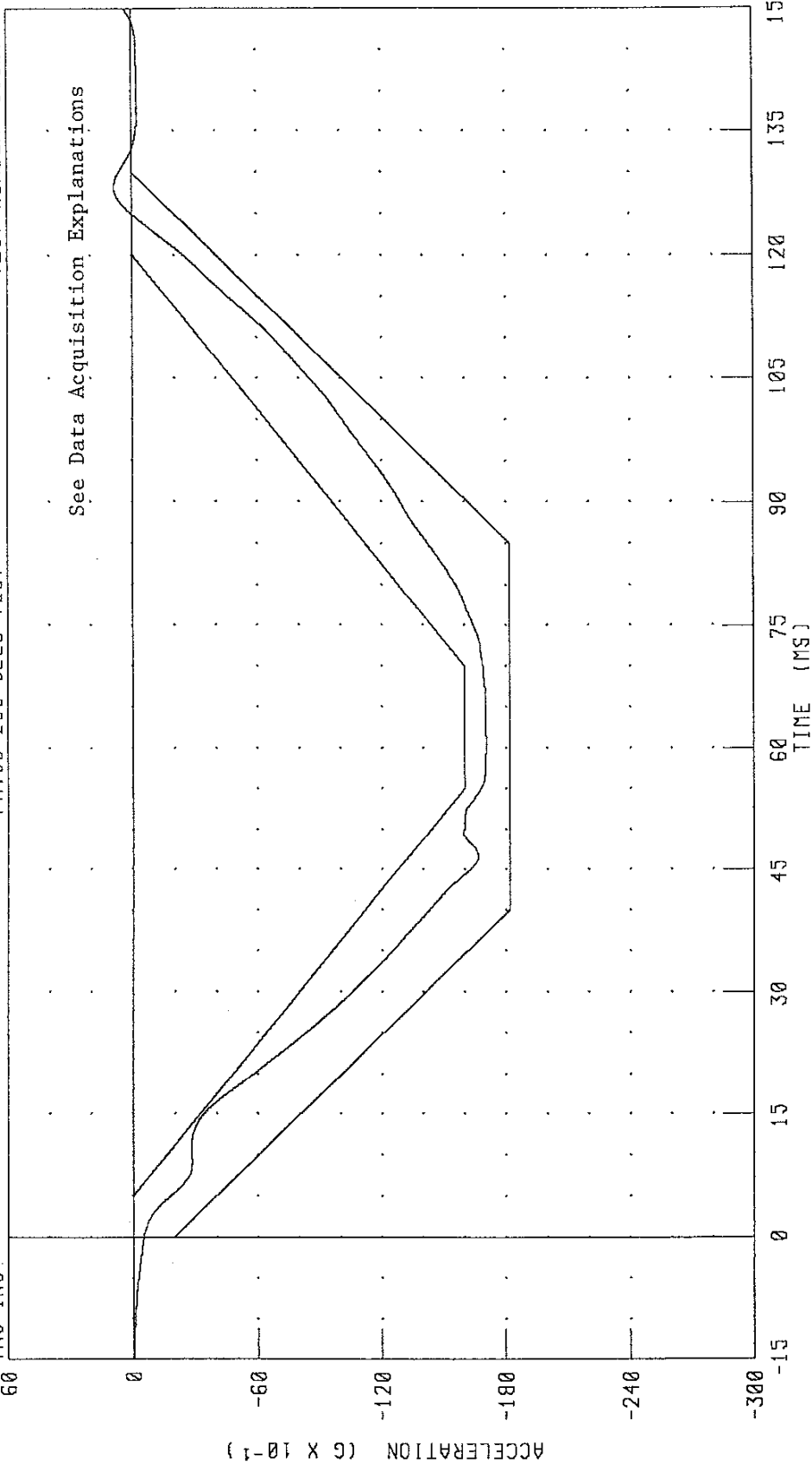
SLED ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: S80213S

TRC INC.

See Data Acquisition Explanations



CHANNEL: SLDXG FILTER: CH. CLASS 60

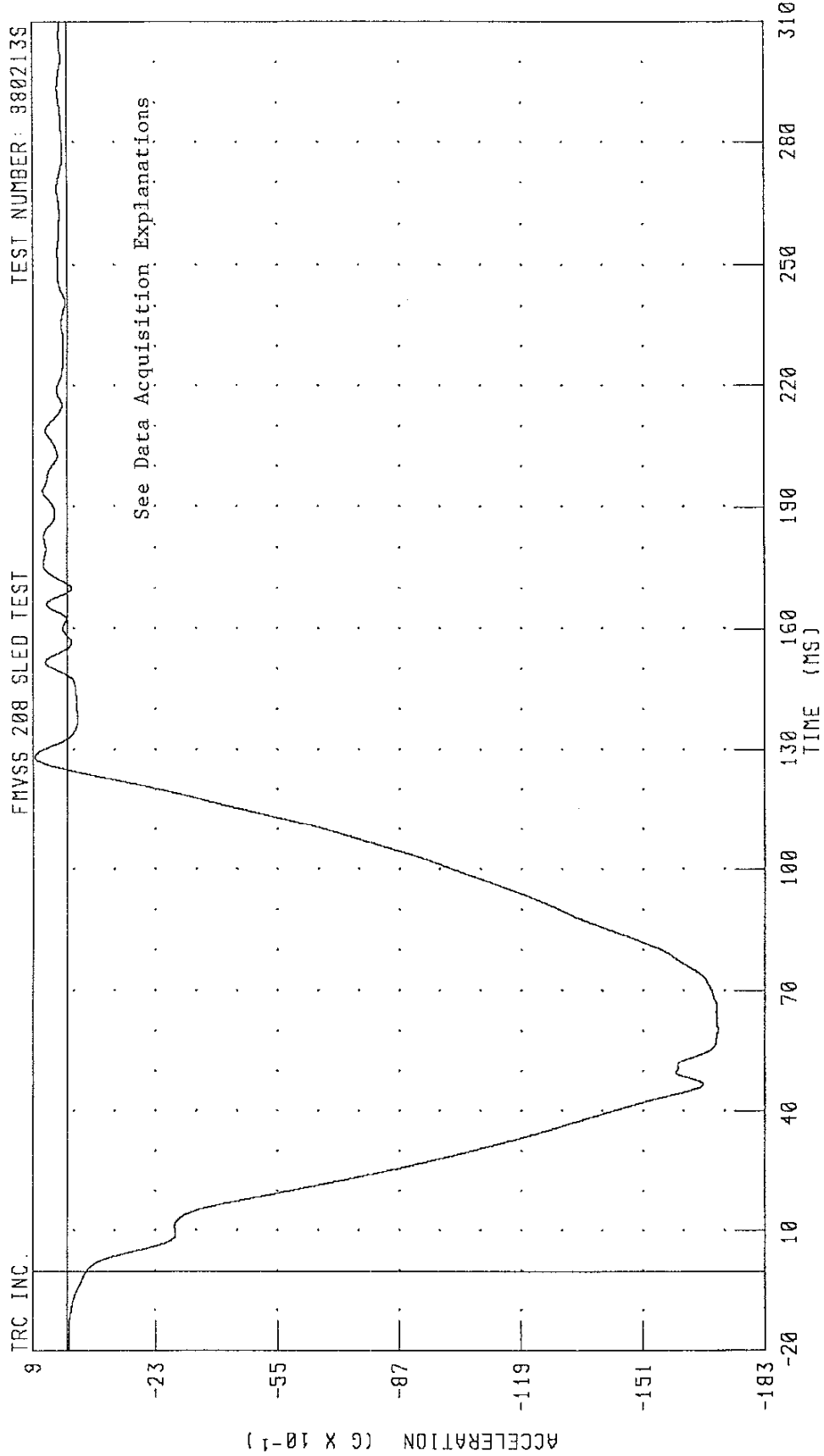
PEAK DATA: 0.85 G @ 128.24 MS; -17.07 G @ 60.40 MS

CW0118 / 1998 CHEVROLET BLAZER

SLED ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 380213S



CHANNEL: SLDXG FILTER: CH. CLASS 60

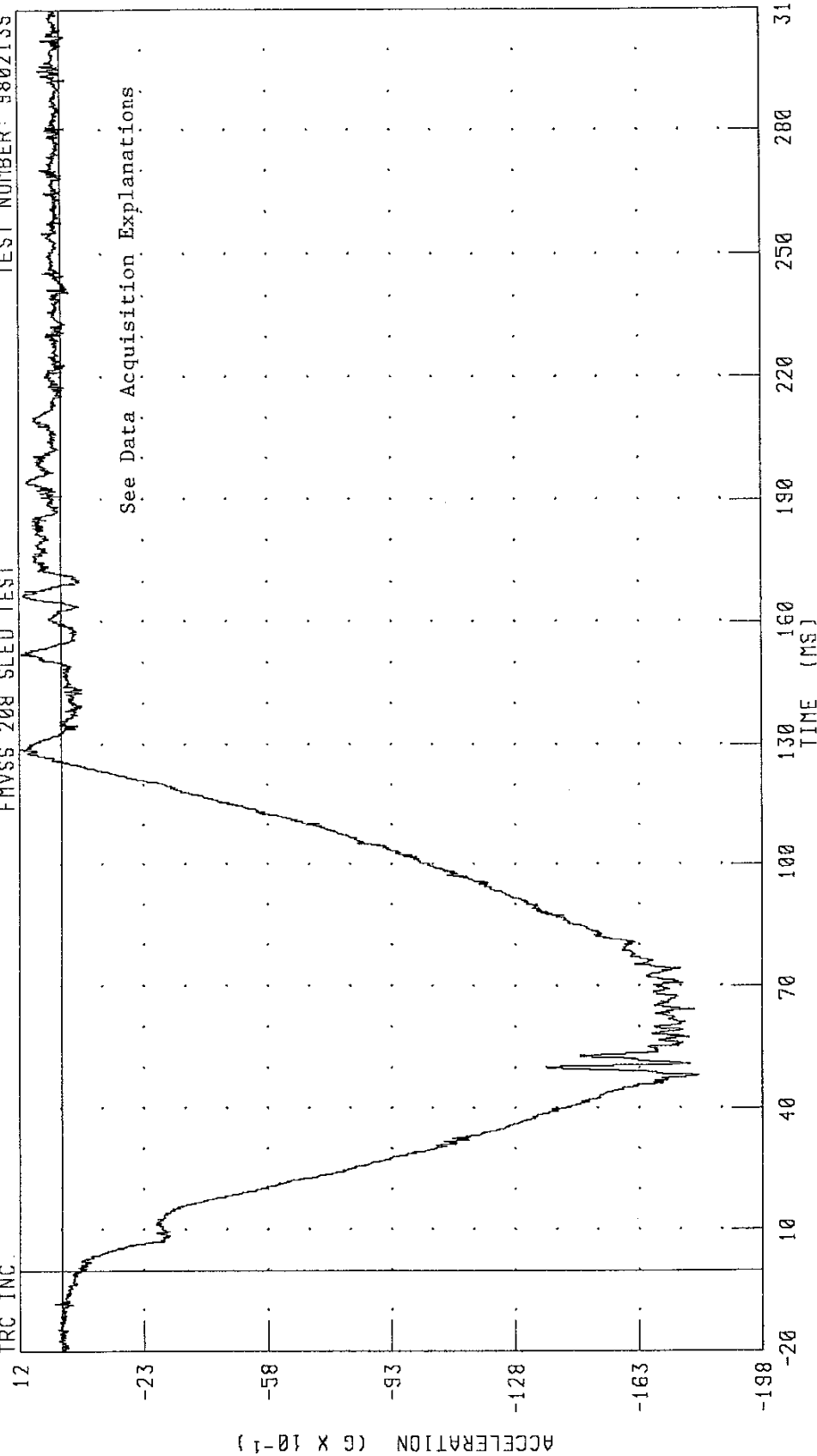
PEAK DATA: 0.85 G @ 128.24 MS; -17.07 G @ 60.40 MS

CW0118 / 1998 CHEVROLET BLAZER
SLED ACCELERATION REDUNDANT

TEST NUMBER: 380213S

FMVSS 208 SLED TEST

TRC INC.



CHANNEL: SLDXGA FILTER: CH. CLASS 1000

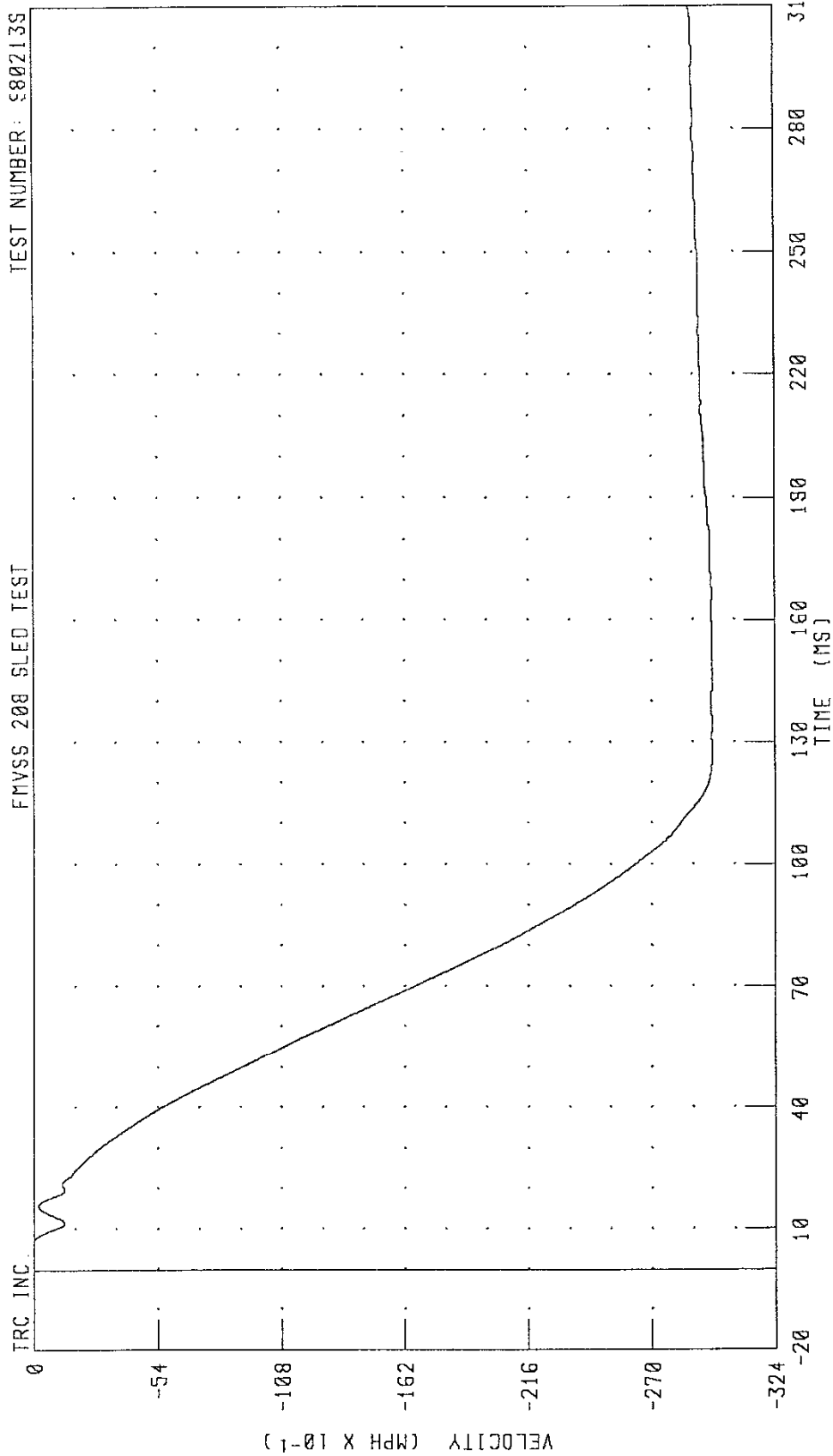
PEAK DATA: 1.18 G @ 128.88 MS; -17.99 G @ 48.08 MS

CW0118 / 1998 CHEVROLET BLAZER

MEASURED VELOCITY TRAP

FMVSS 208 SLED TEST

TEST NUMBER: 880213S

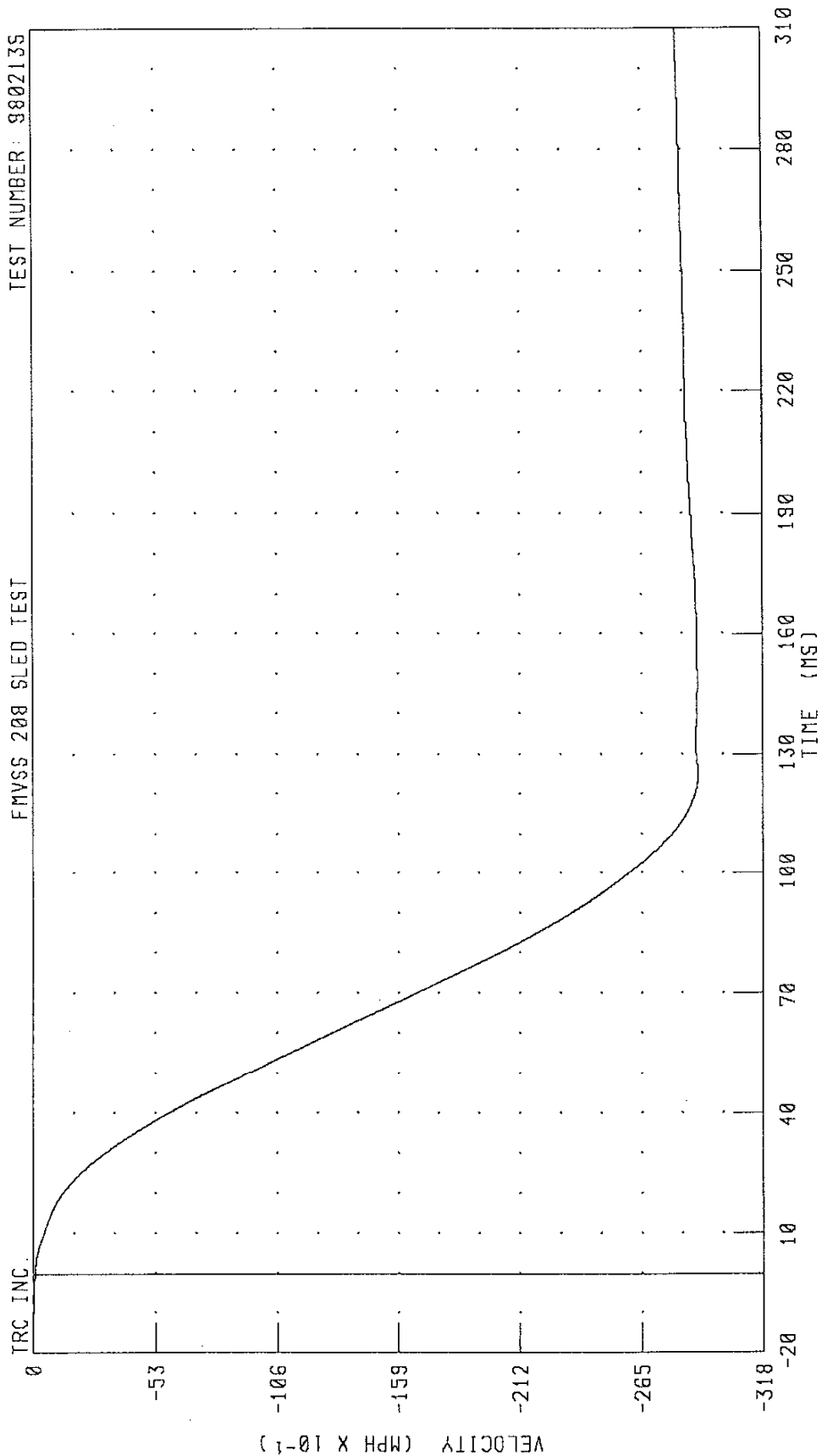


CHANNEL: SLOXY FILTER: CH. CLASS 60

PEAK DATA: 0.06 MPH @ 5.68 MS; -29.66 MPH @ 156.80 MS

CW0118 / 1998 CHEVROLET BLAZER
 SLED VELOCITY (INTEGRATED)
 FMVSS 208 SLED TEST

TEST NUMBER: 9802135



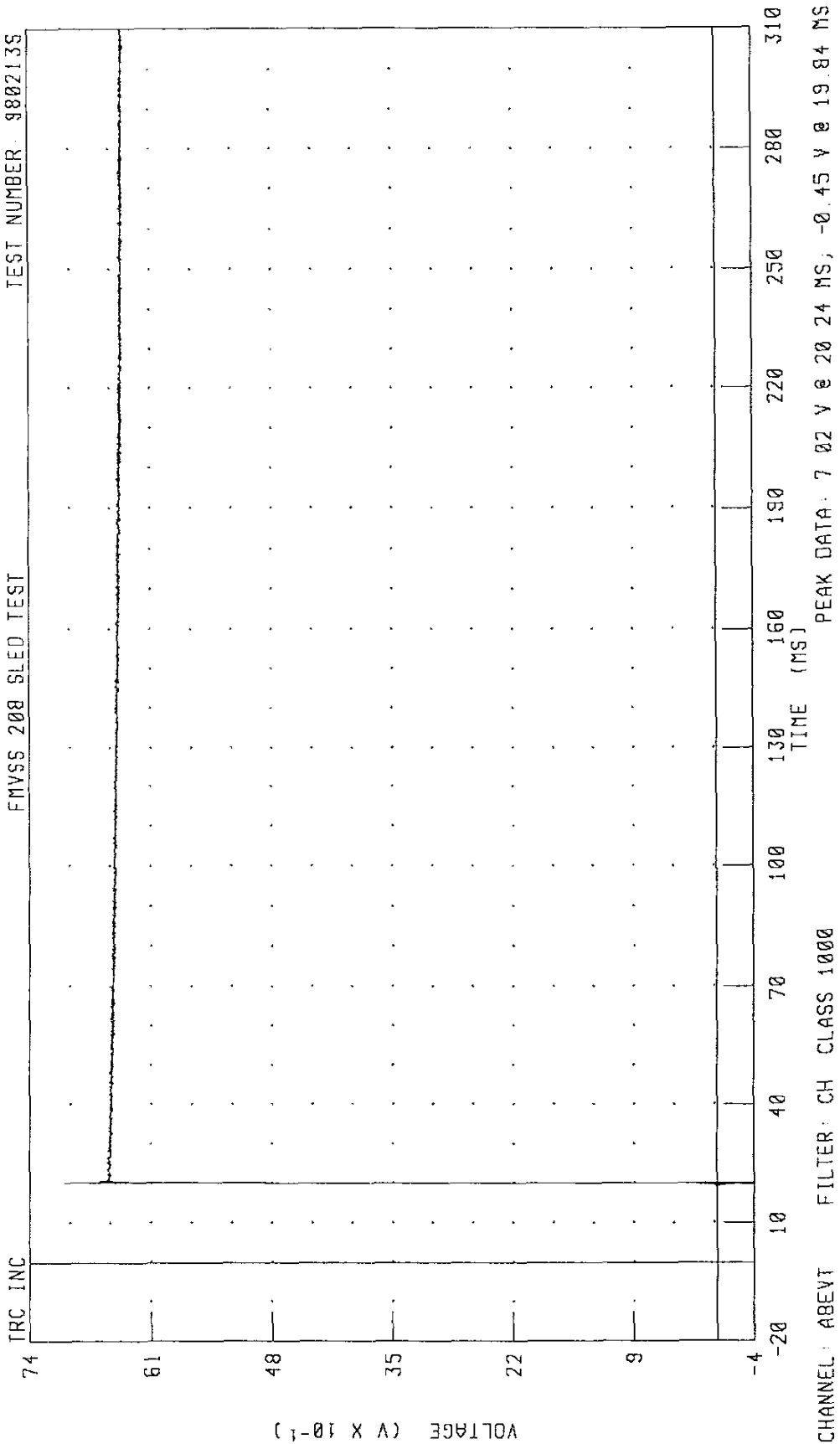
CHANNEL: SLDXVI FILTER: CH. CLASS 180

CW0118 / 1998 CHEVROLET BLAZER

AIRBAG EVENT

FMVSS 208 SLED TEST

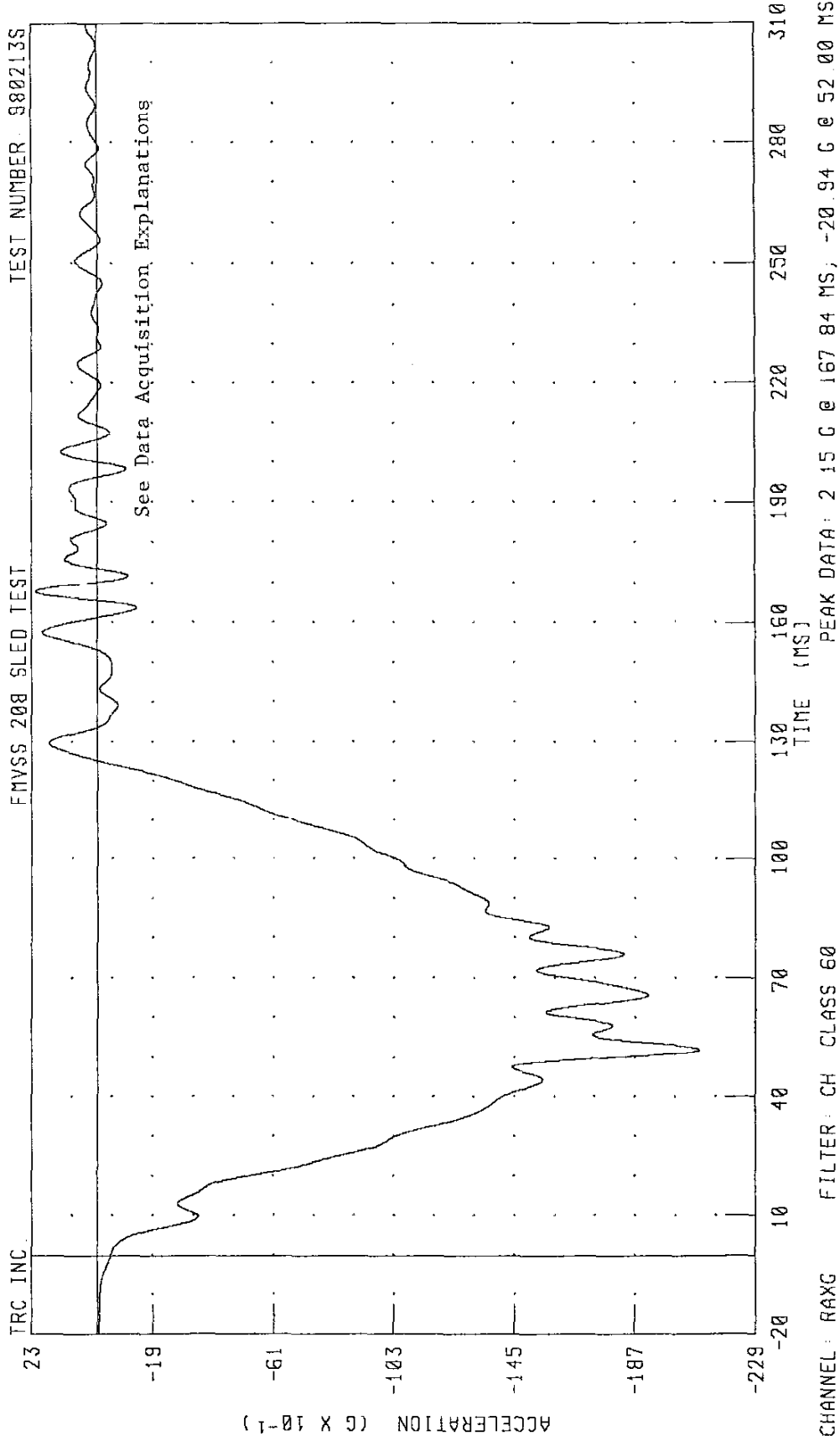
TEST NUMBER 980213S



CW0118 / 1998 CHEVROLET BLAZER
REAR AXLE X-AXIS ACCELERATION

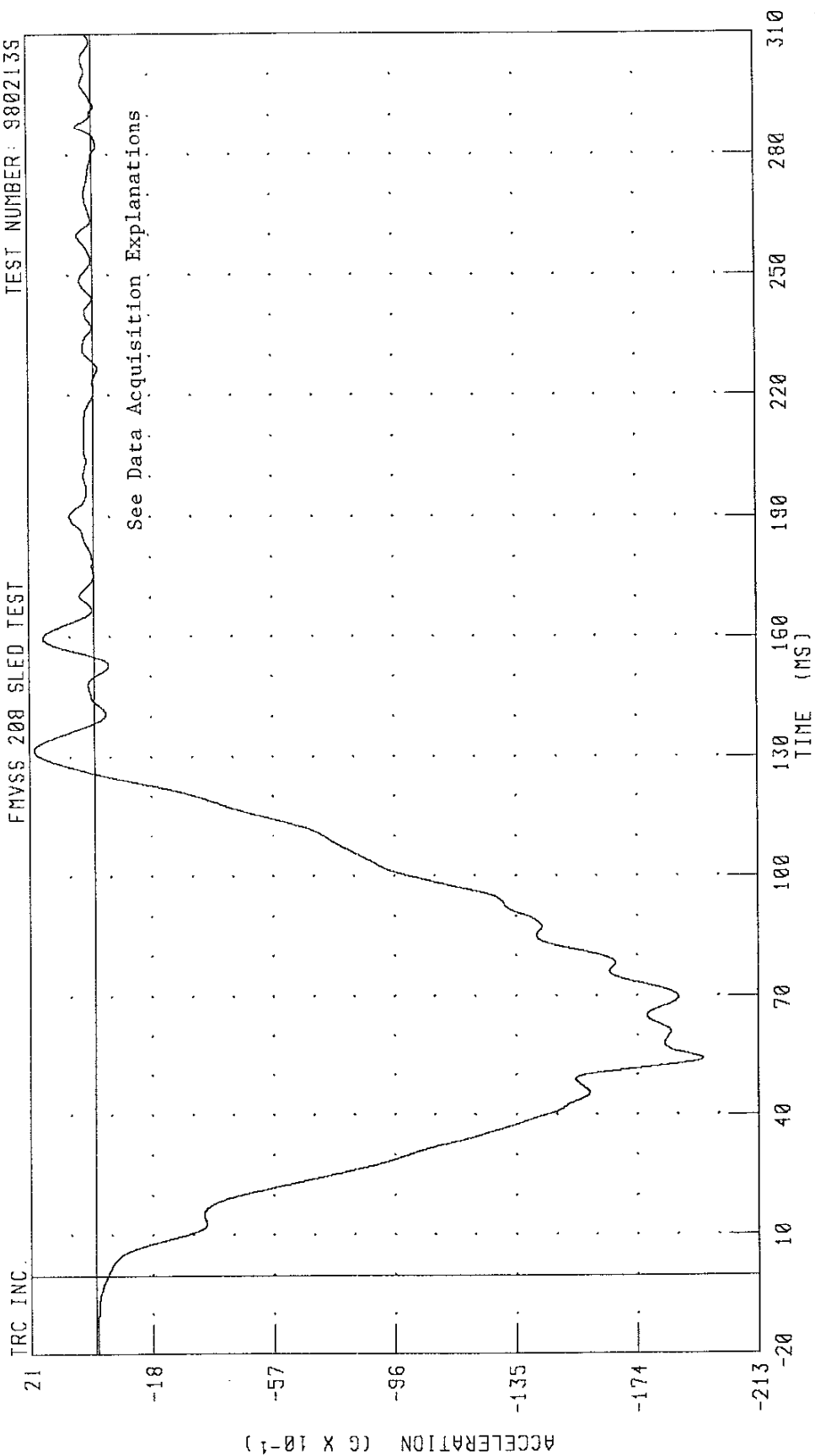
FMVSS 208 SLED TEST

TEST NUMBER: 980213S



CW0118 / 1998 CHEVROLET BLAZER
 LEFT BODY X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 9802135



PEAK DATA: 1.93 G @ 131.76 MS; -19.51 G @ 54.16 MS

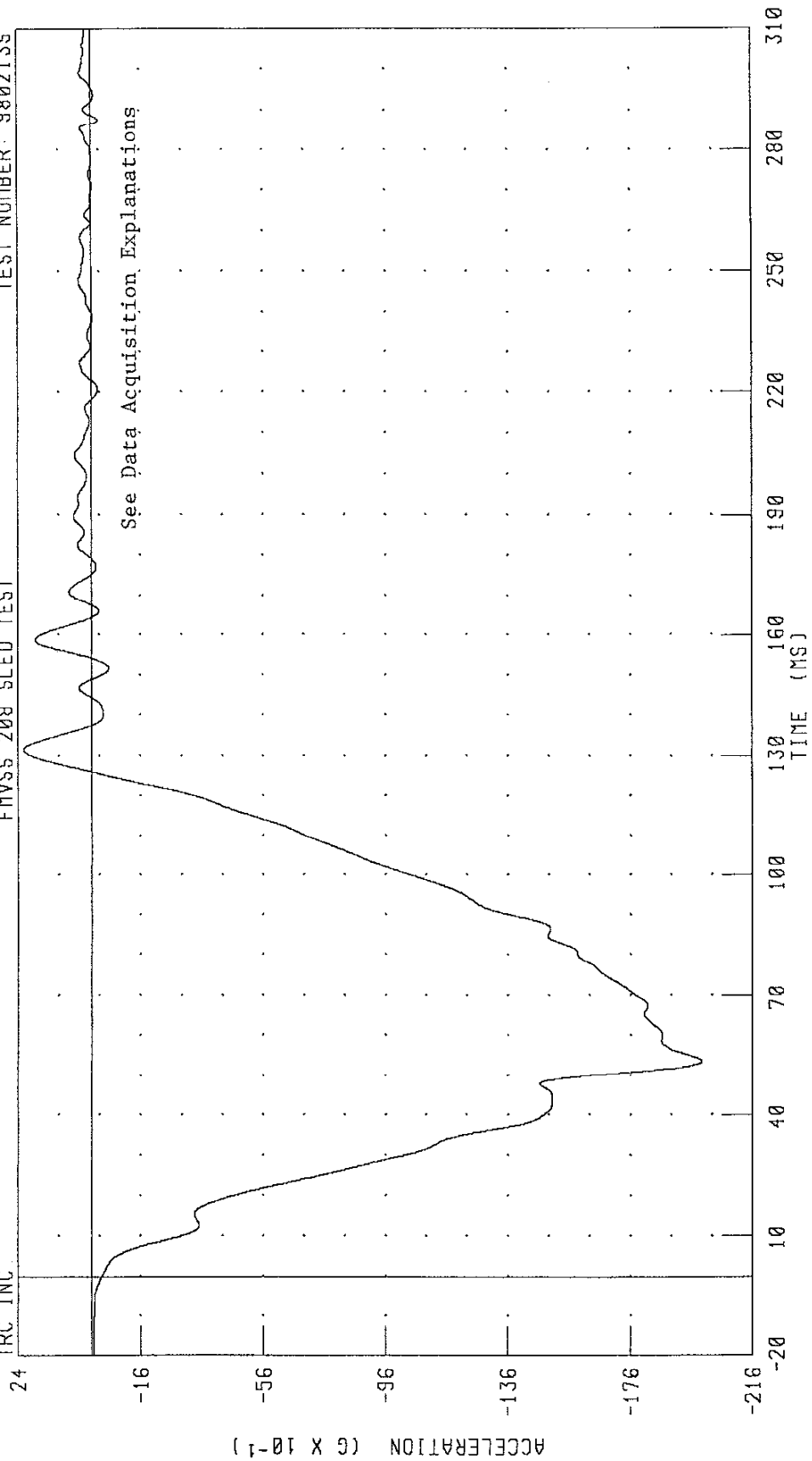
CHANNEL: LBOXG FILTER: CH. CLASS 60

CW0118 / 1998 CHEVROLET BLAZER
RIGHT BODY X-AXIS ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC.



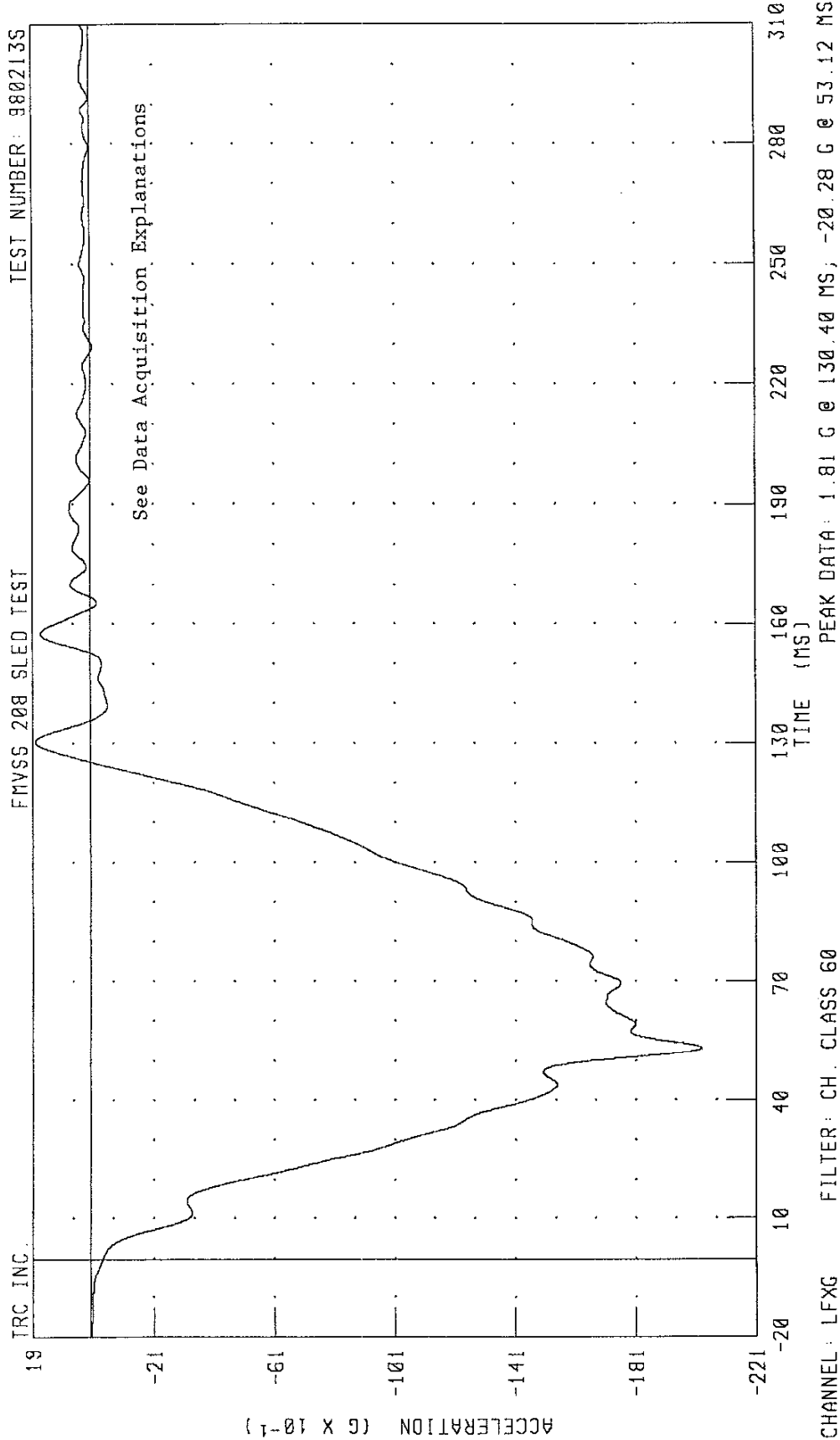
CHANNEL: RBXG FILTER: CH. CLASS 60

PEAK DATA: 2.20 G @ 131.52 MS; -19.94 G @ 53.52 MS

CW0118 / 1998 CHEVROLET BLAZER
LEFT FRAME X-AXIS ACCELERATION

FMVSS 208 SLED TEST

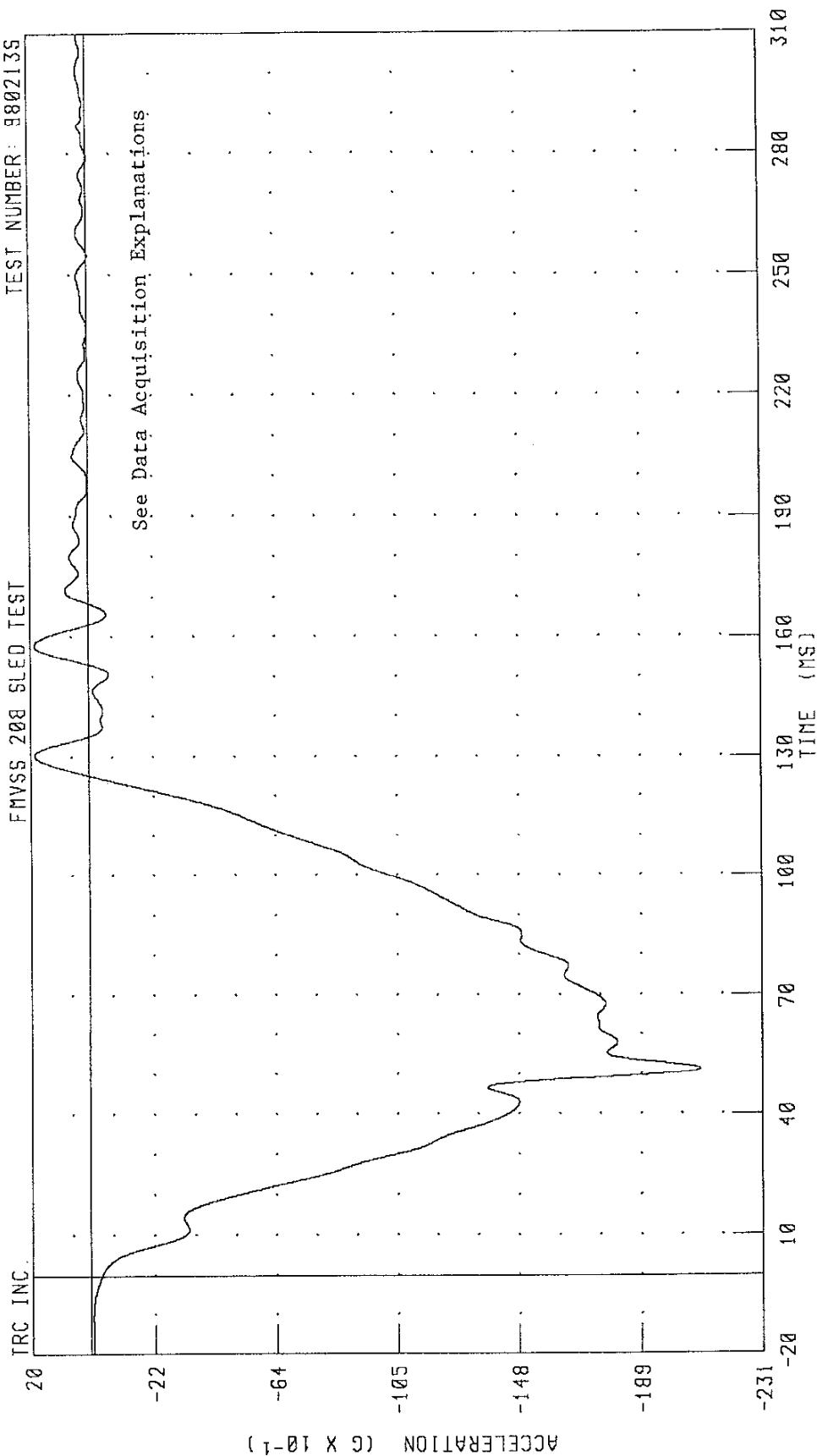
TEST NUMBER: 980213S



CHANNEL: LFXG FILTER: CH. CLASS 60

CV0118 / 1998 CHEVROLET BLAZER
 RIGHT FRAME X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

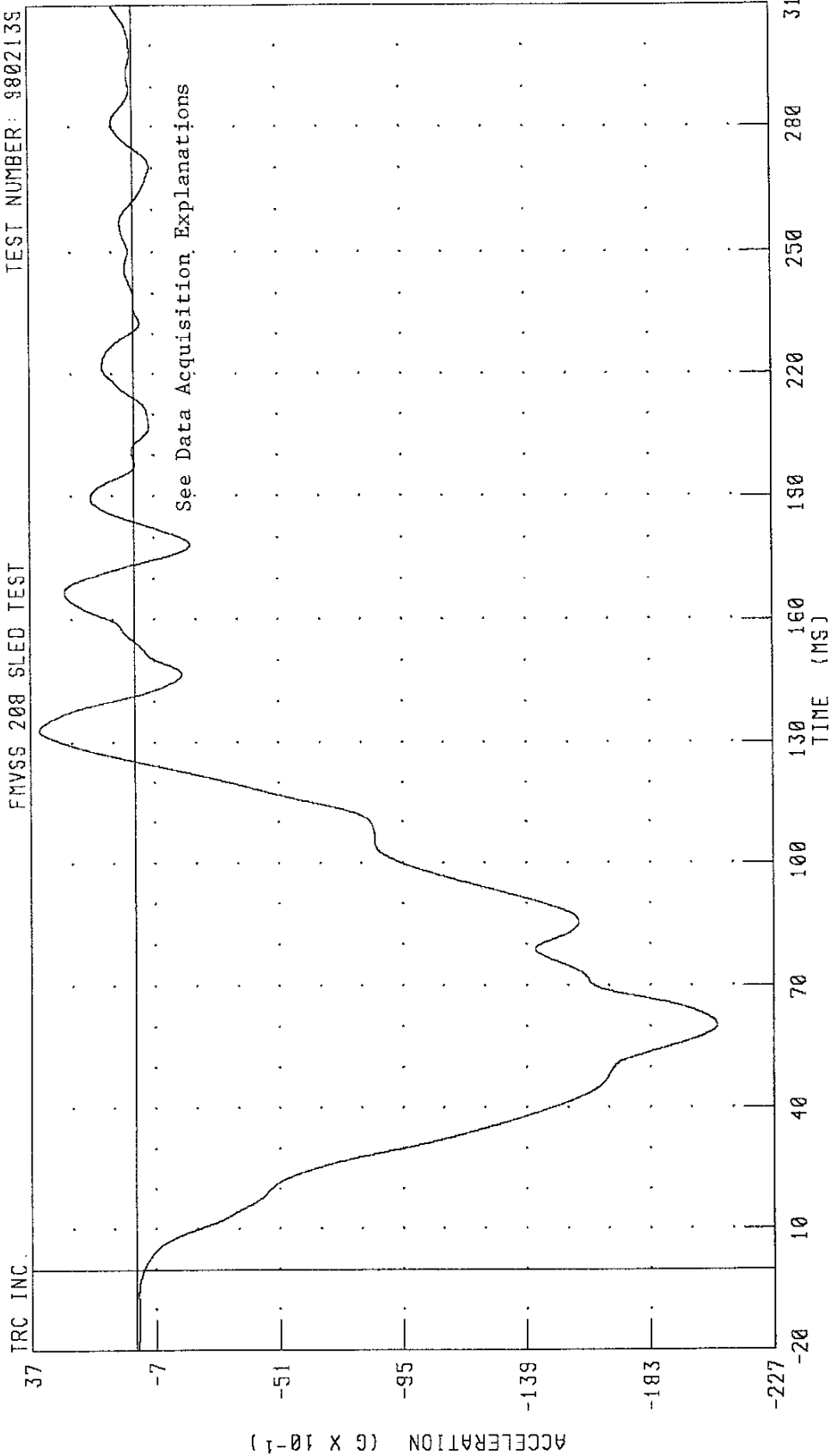


PEAK DATA: 1.86 G @ 157.84 MS; -21.07 G @ 51.28 MS

CHANNEL: RFXG FILTER: CH. CLASS 60

CW0118 / 1998 CHEVROLET BLAZER
 BOTTOM ENGINE X-AXIS ACCELERATION
 FHVSS 200 SLED TEST

TEST NUMBER: 9802139

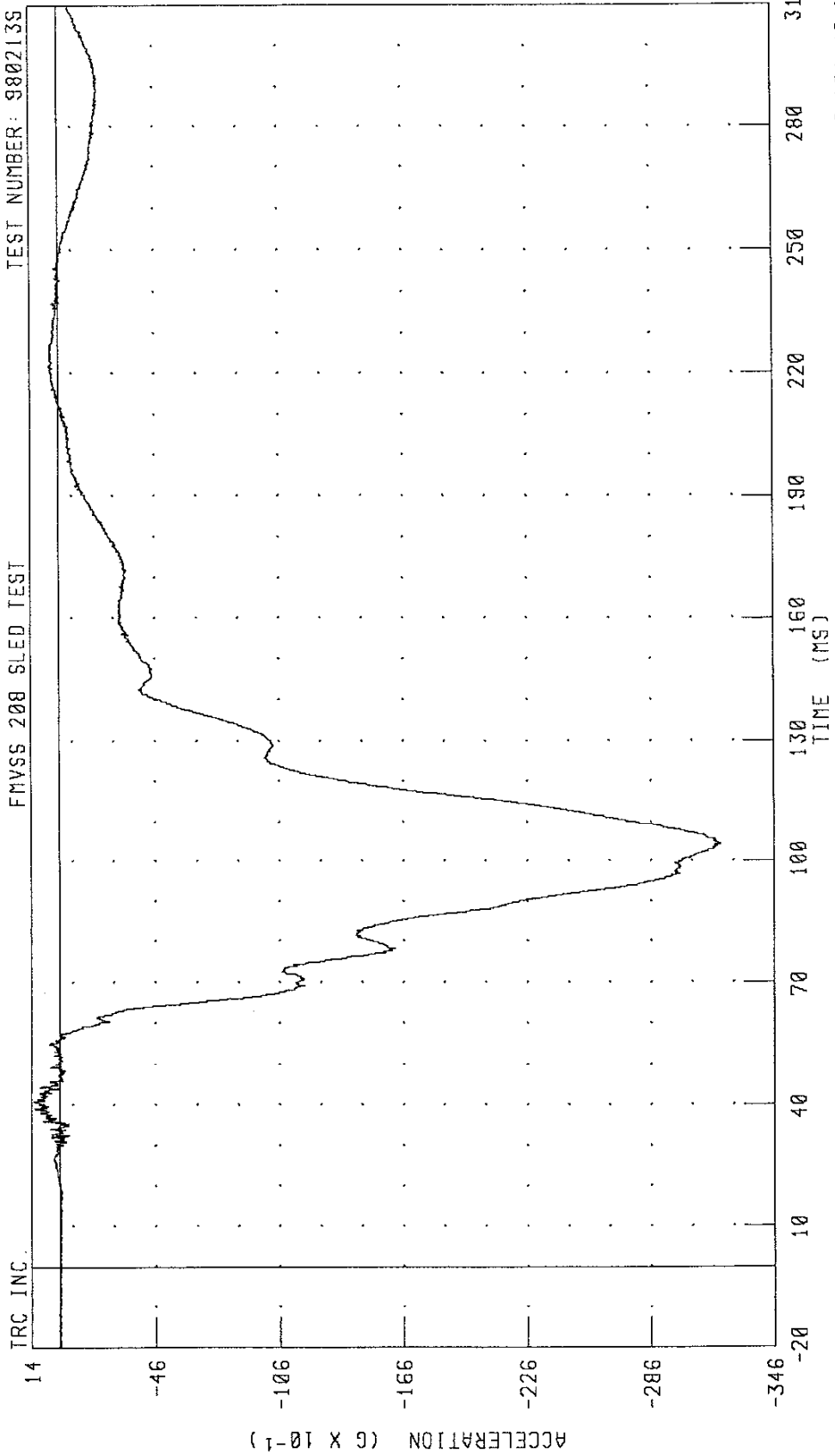


CHANNEL: BEXG FILTER: CH. CLASS 60

PEAK DATA: 3.38 G @ 133.04 MS; -20.68 G @ 60.40 MS

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER HEAD X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

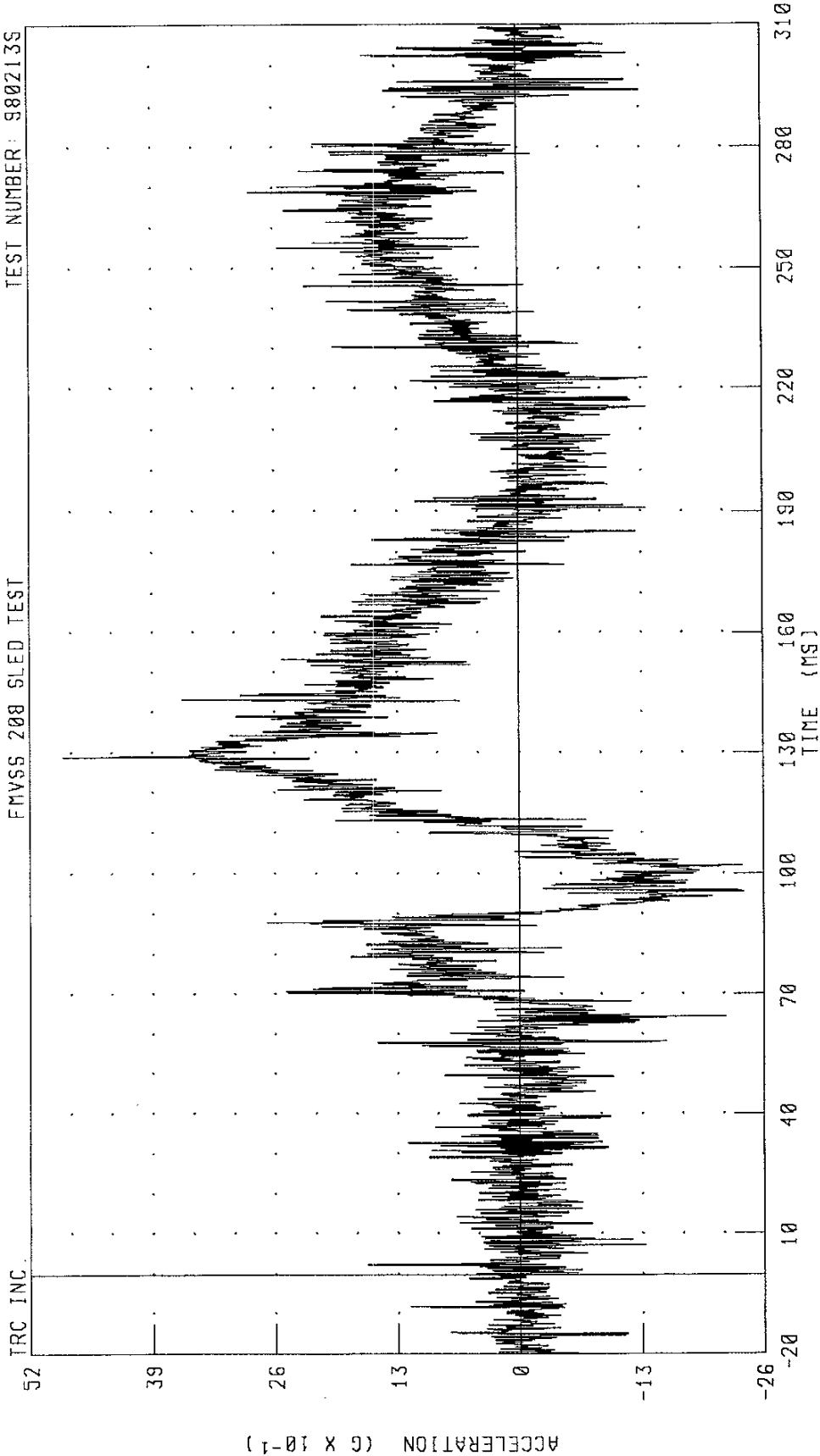
TEST NUMBER: 980213S



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER HEAD Y-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: S80213S



PEAK DATA: 4.84 G @ 128.96 MS; -2.38 G @ 95.28 MS

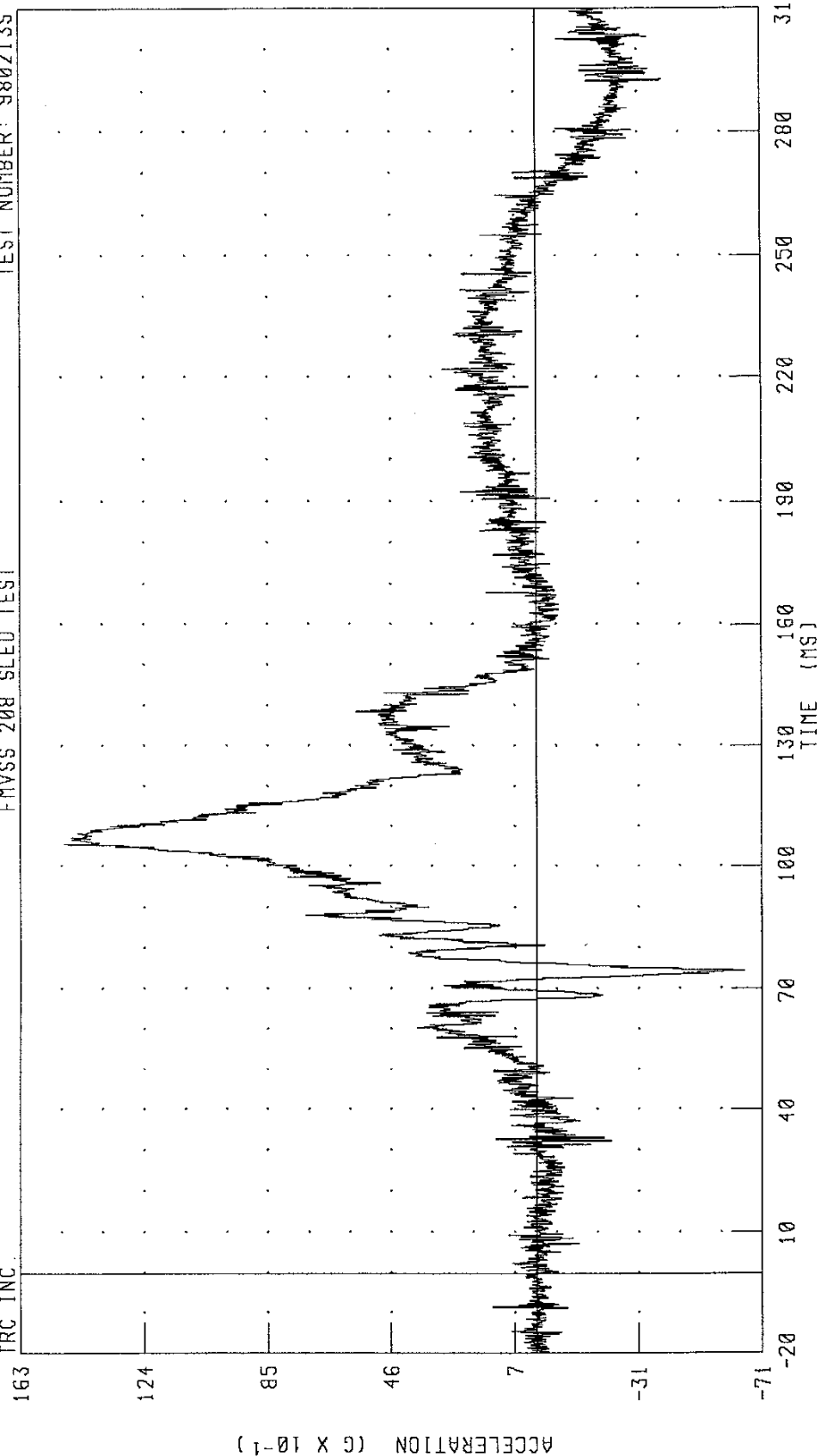
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 980213S

FMVSS 208 SLED TEST

TRC INC.



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

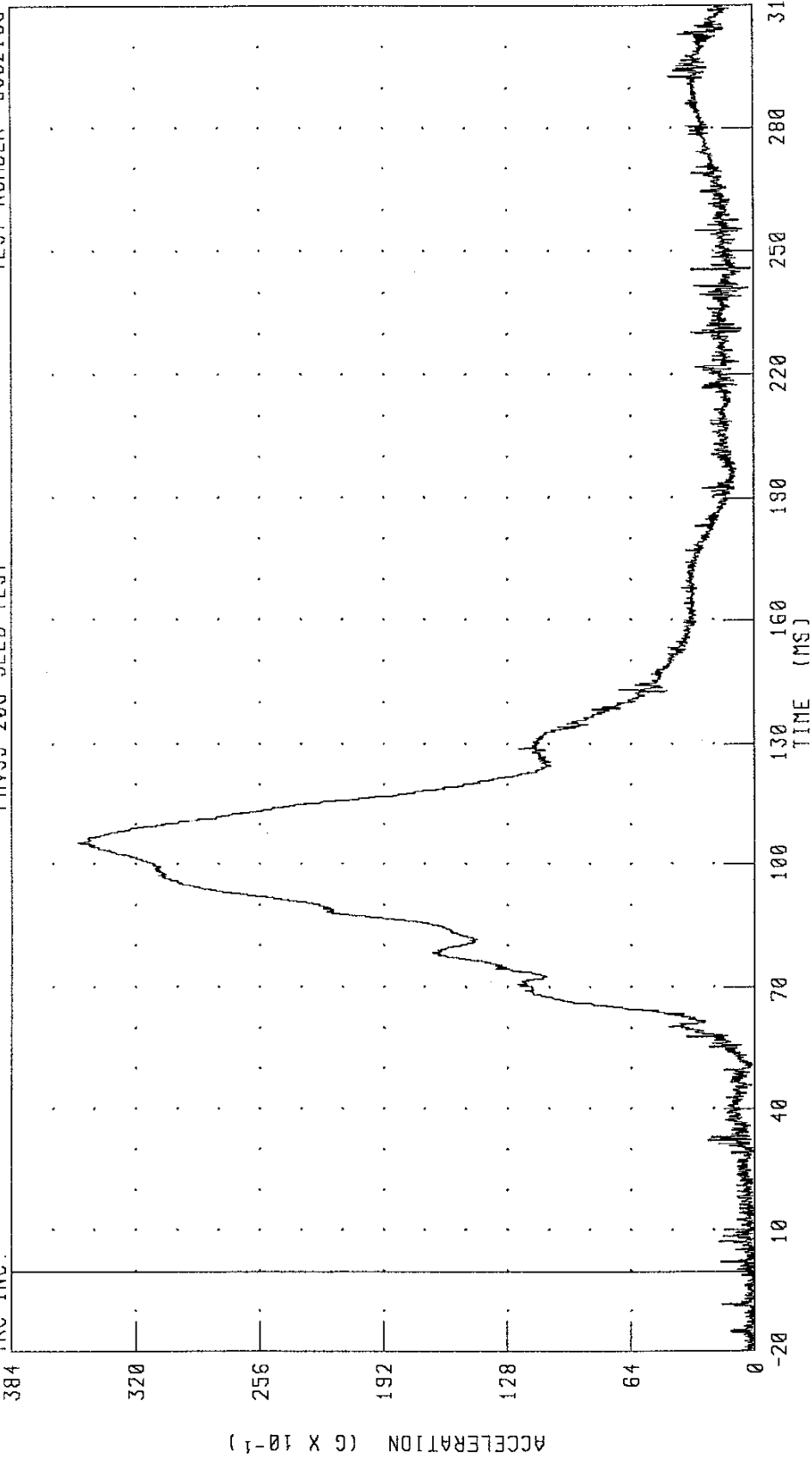
PEAK DATA: 14.91 G @ 105.44 MS; -6.54 G @ 74.32 MS

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER HEAD RESULTANT ACCELERATION

FMVSS 208 SLED TEST

TRC INC.

TEST NUMBER: 380213S



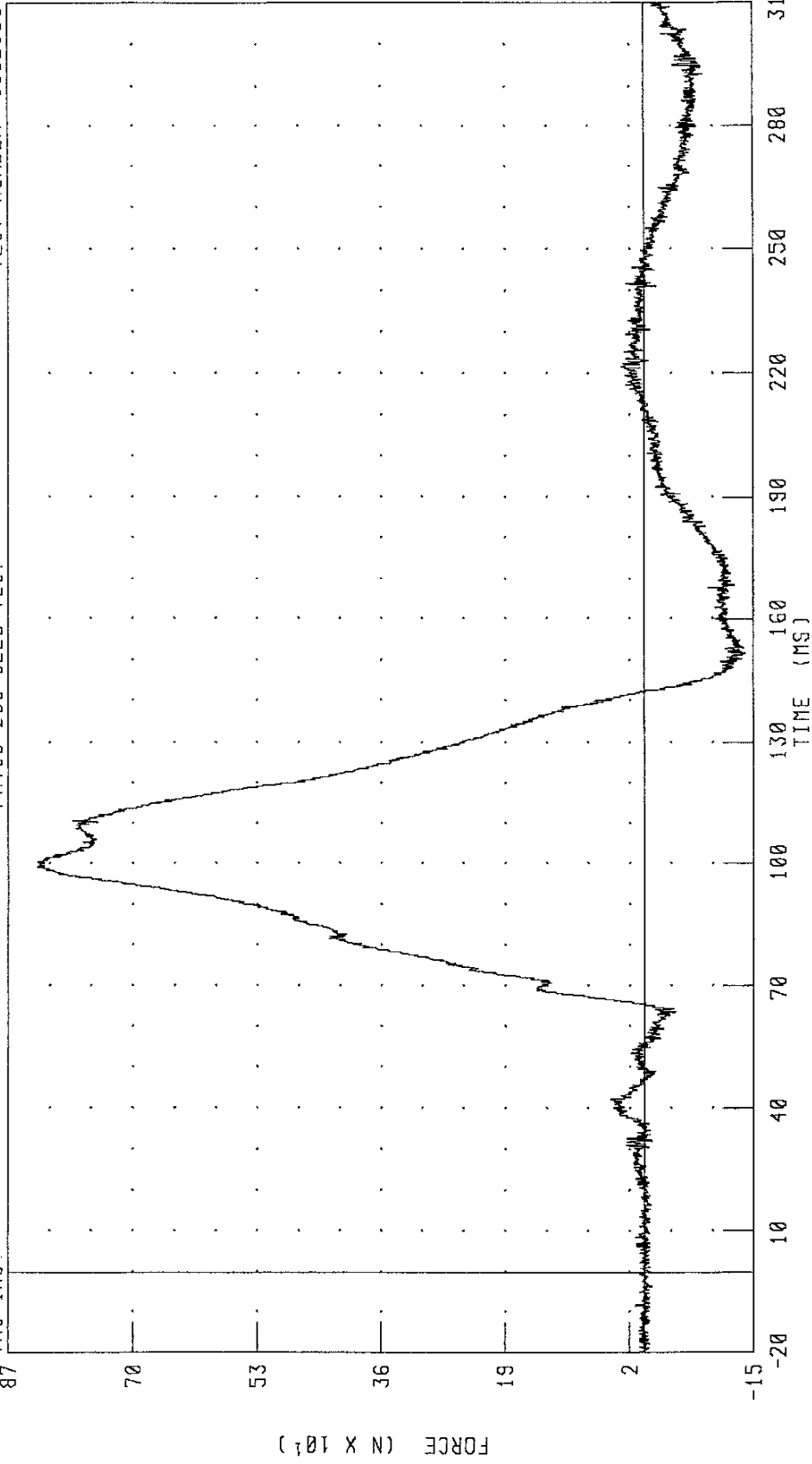
PEAK DATA: 34.99 G @ 105.44 MS; 0.02 G @ -13.12 MS

CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
DRIVER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 380213S

TRC INC.



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 830.01 N @ 100.32 MS; -137.65 N @ 151.60 MS

CW0118 / 1998 CHEVROLET BLAZER
DRIVER NECK Y-AXIS SHEAR FORCE

FMVSS 208 SLED TEST

TRC INC.

113

78

43

8

-27

-62

-97

10

40

70

100

130

160

190

220

250

280

310

TIME (MS)

PEAK DATA: 107.20 N @ 77.44 MS; -88.95 N @ 111.76 MS

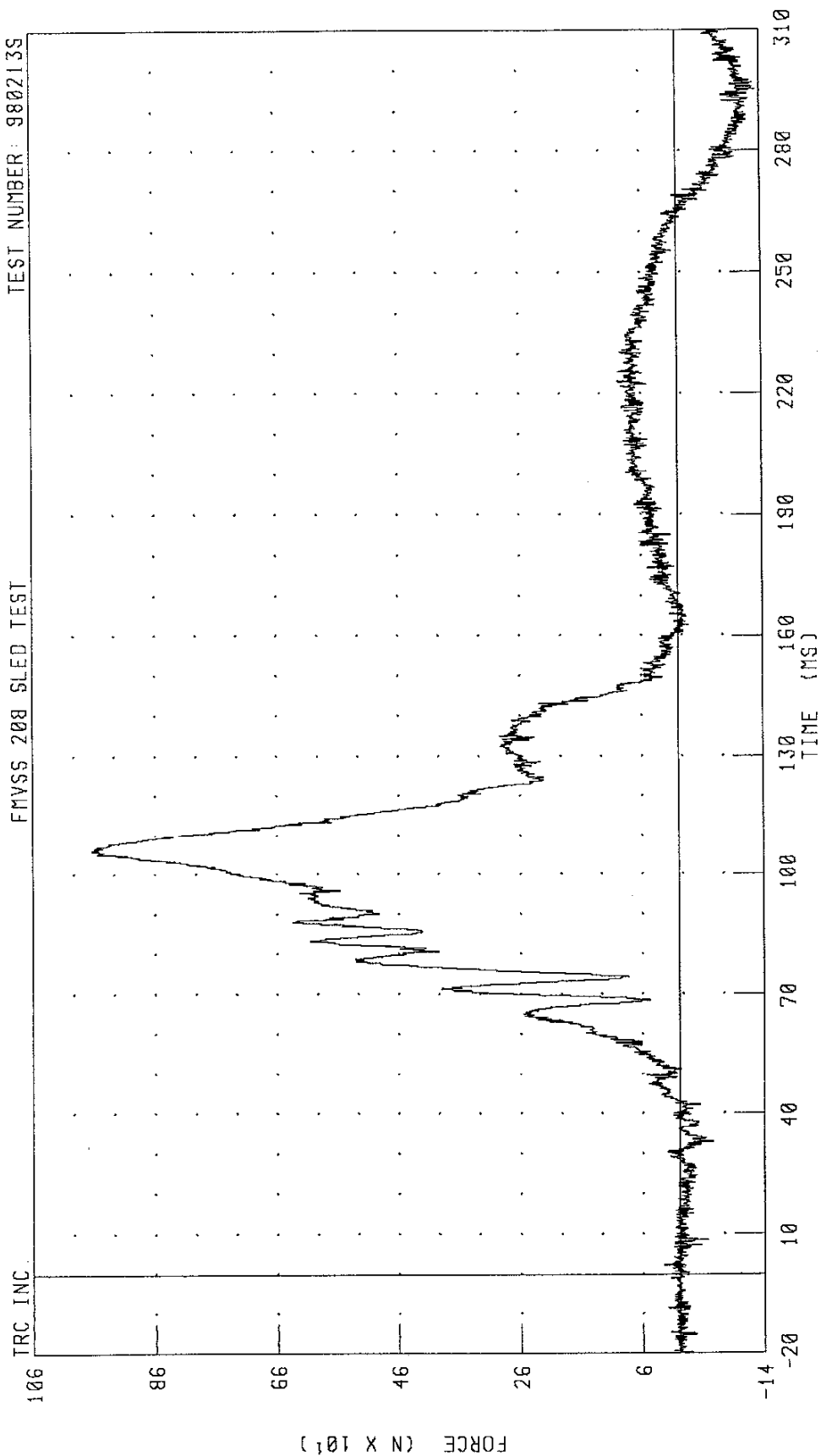
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

TEST NUMBER: 380213S

FORCE (N)

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER NECK Z-AXIS AXIAL FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

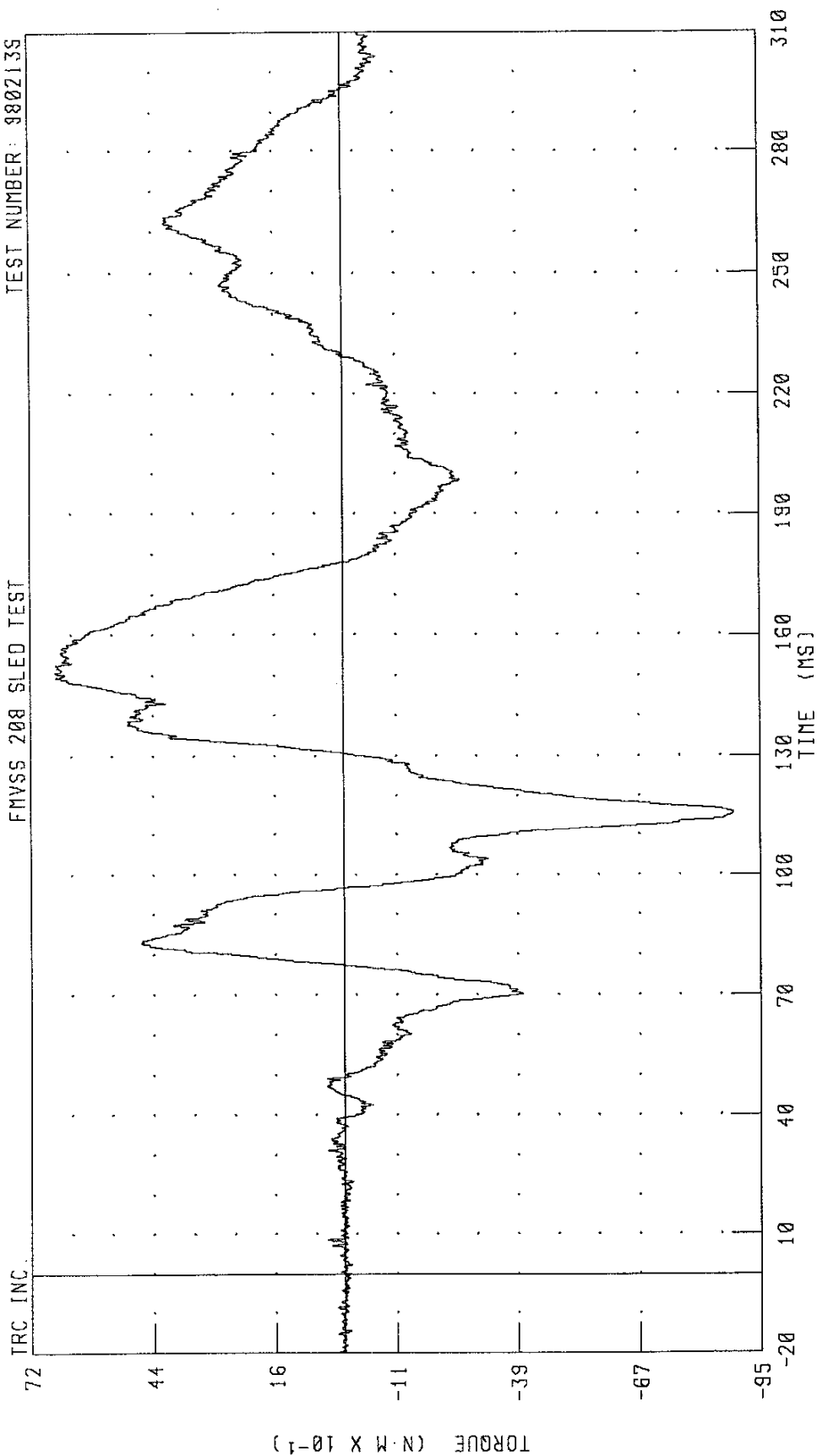


CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 963.49 N @ 106.24 MS; -131.87 N @ 295.44 MS

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER NECK MOMENT ABOUT X AXIS
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S



CHANNEL: NEKXM1 FILTER: CH. CLASS 600

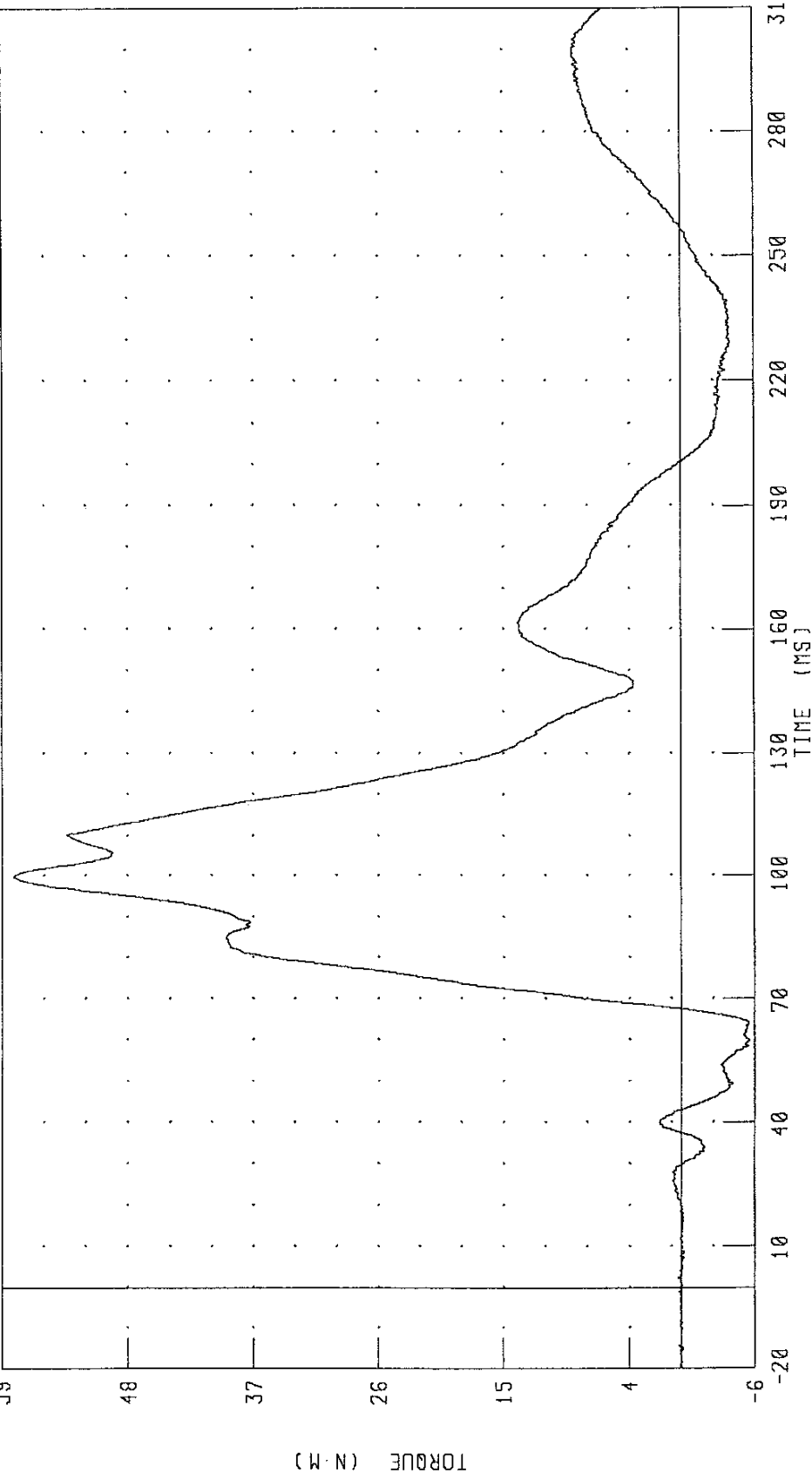
PEAK DATA: 6.64 N·M @ 150.80 MS; -8.98 N·M @ 115.44 MS

CW0118 / 1998 CHEVROLET BLAZER
DRIVER NECK MOMENT ABOUT Y AXIS

FMVSS 208 SLED TEST

TRC INC.

TEST NUMBER: 980213S



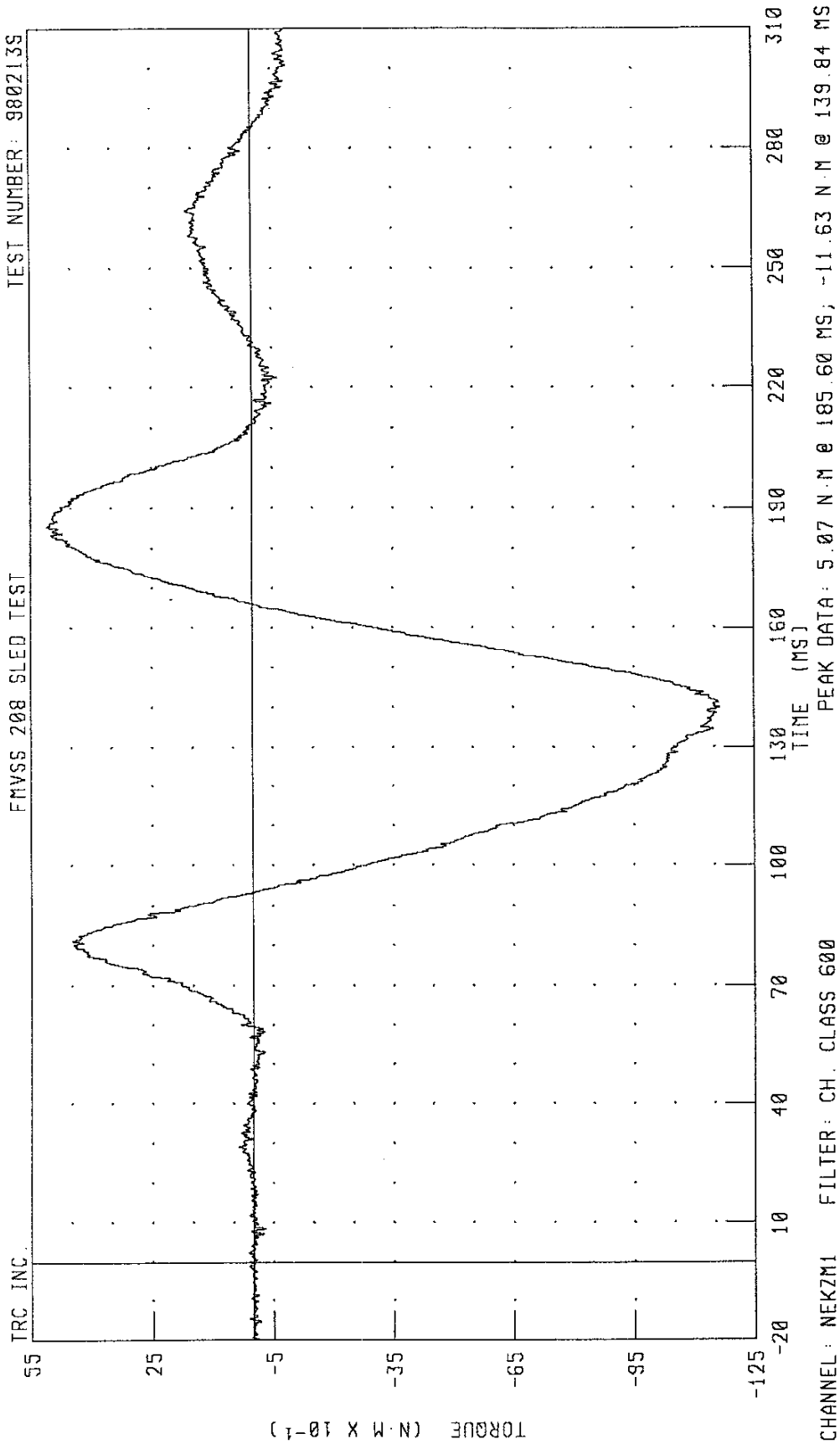
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 58.43 N·m @ 99.68 ms; -5.99 N·m @ 59.76 ms

CW0118 / 1998 CHEVROLET BLAZER
DRIVER NECK MOMENT ABOUT Z AXIS

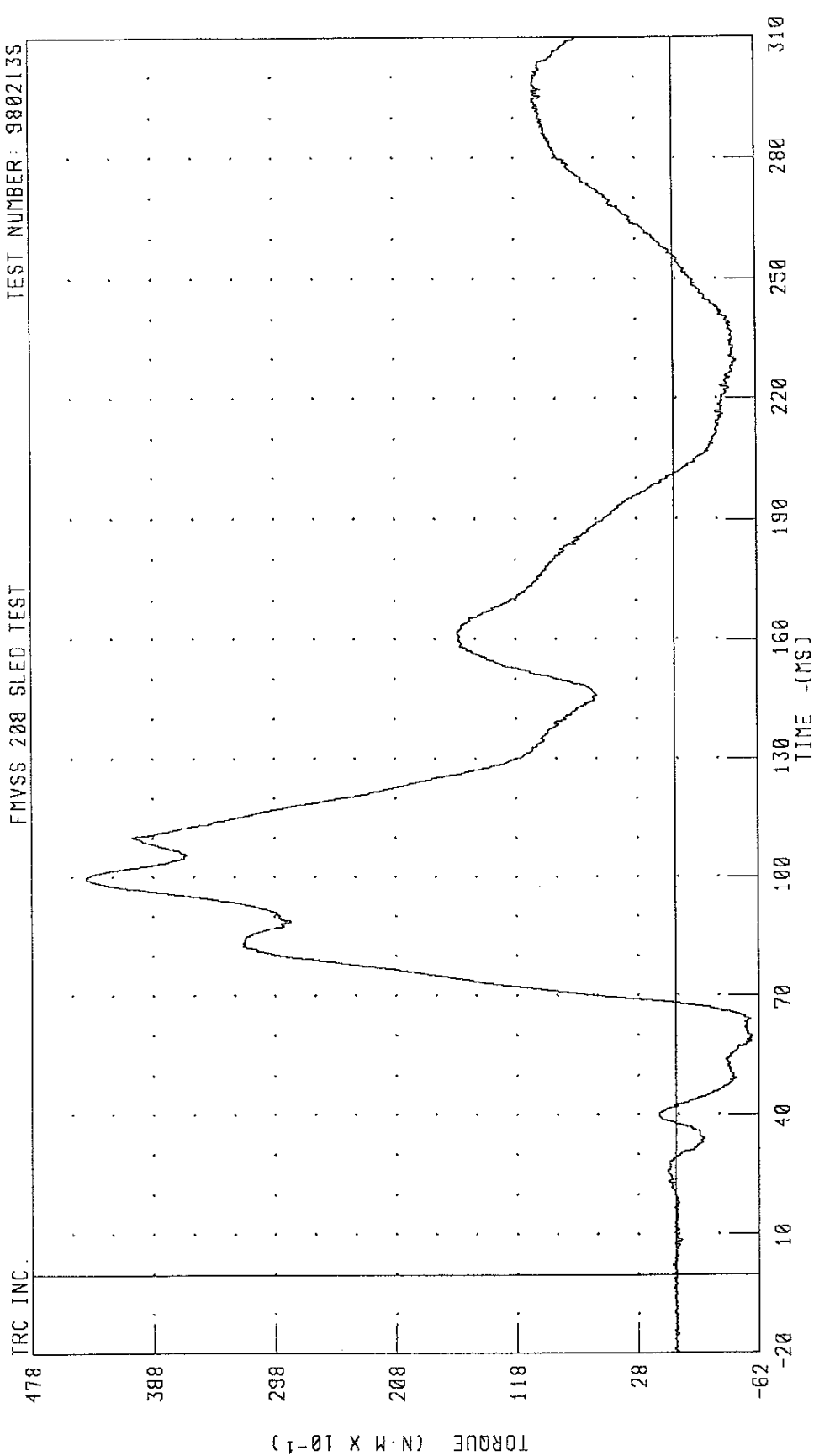
TEST NUMBER: 980213S

FMVSS 208 SLED TEST



CW0118 / 1998 CHEVROLET BLAZER
DRIVER NECK OCCIPITAL CONDYLE ABOUT Y AXIS
FMVSS 208 SLED TEST

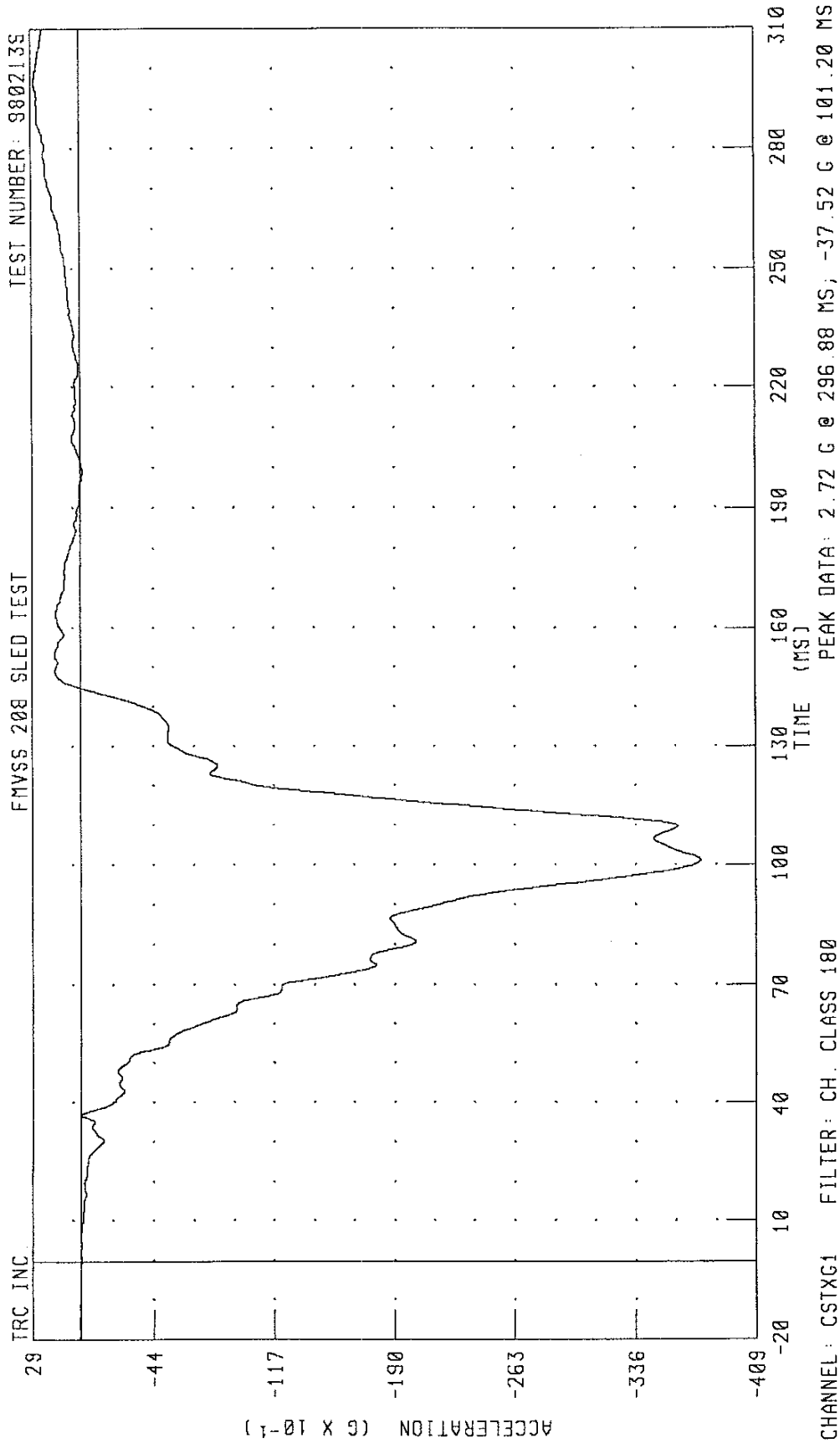
TEST NUMBER: 9802135



PEAK DATA: 43.76 N·M @ 99.68 MS; -5.72 N·M @ 59.76 MS

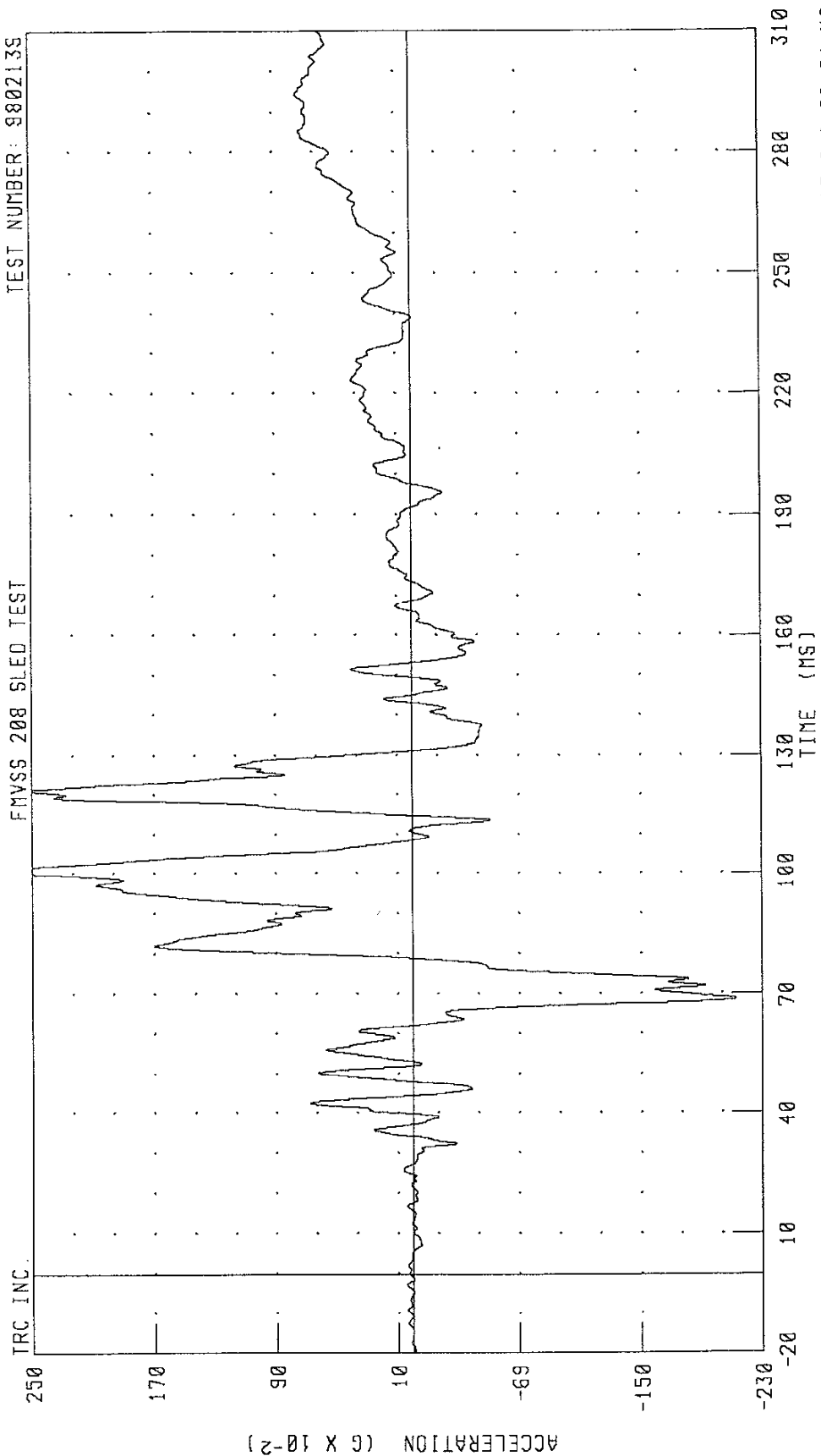
CHANNEL: NEKOM1 FILTER: CH. CLASS 600

CW0118 / 1988 CHEVROLET BLAZER
 DRIVER CHEST X-AXIS ACCELERATION
 FMVSS 208 SLED TEST



CW0118 / 1998 CHEVROLET BLAZER
 DRIVER CHEST Y-AXIS ACCELERATION

FMVSS 208 SLED TEST TEST NUMBER: 980213S



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

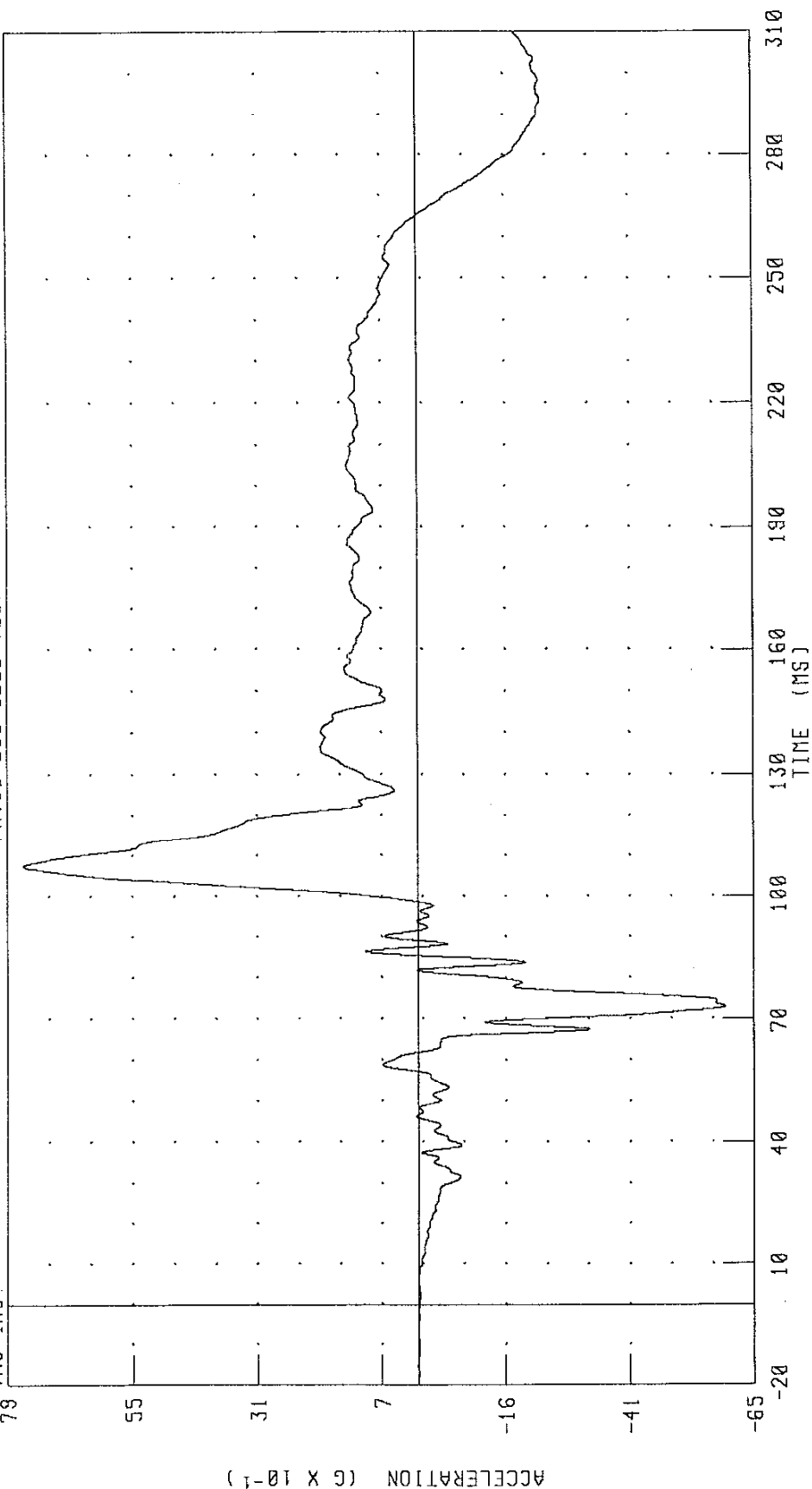
PEAK DATA: 2.77 G @ 100.80 MS; -2.13 G @ 68.64 MS

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER CHEST Z-AXIS ACCELERATION

FMVSS 208 SLED TEST

TRC INC.

TEST NUMBER: 980213S



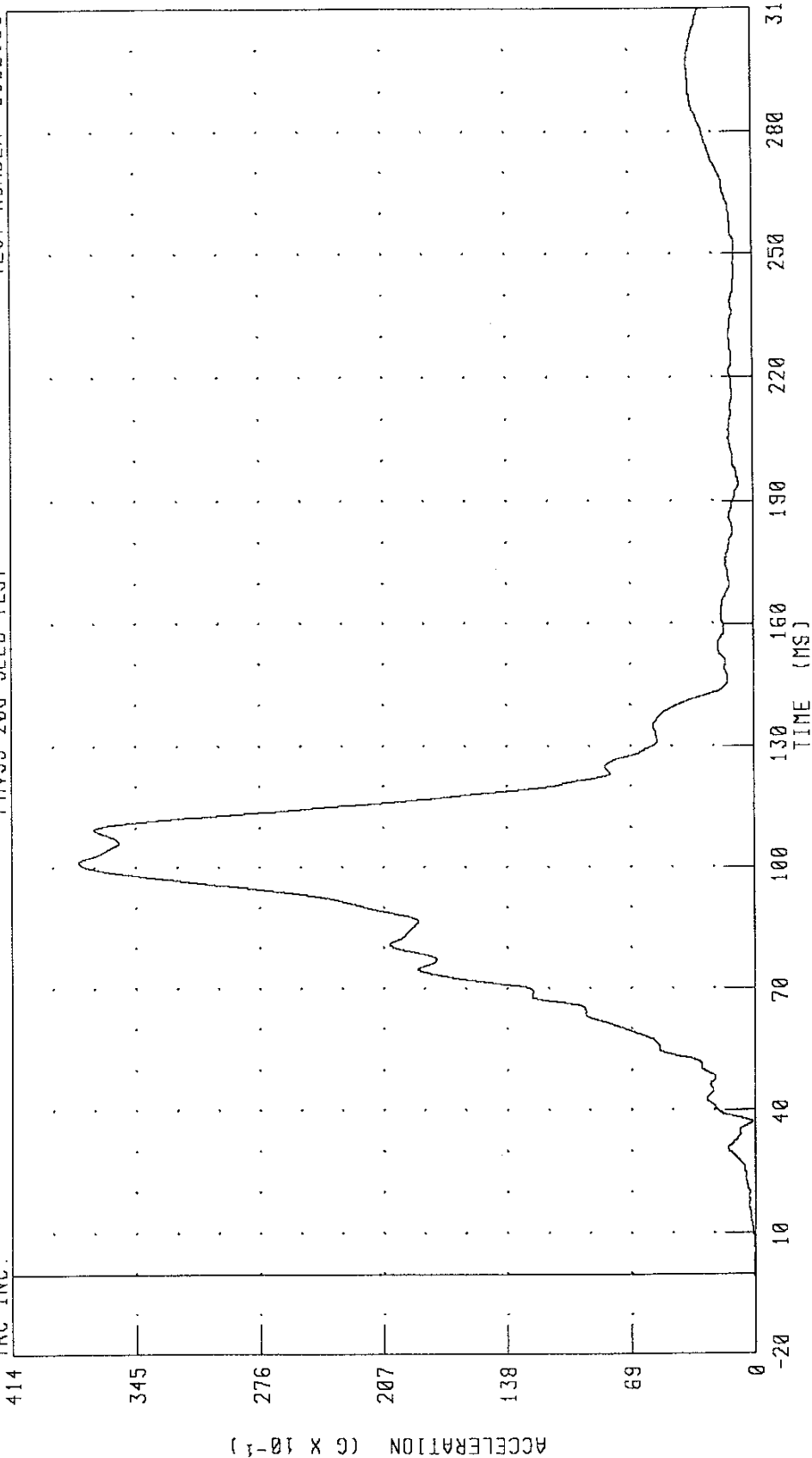
PEAK DATA: 7.59 G @ 107.52 MS; -5.94 G @ 72.96 MS

CHANNEL: CST701 FILTER: CH. CLASS 180

CW0118 / 1988 CHEVROLET BLAZER
 DRIVER CHEST RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC.



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

CW0118 / 1998 CHEVROLET BLAZER

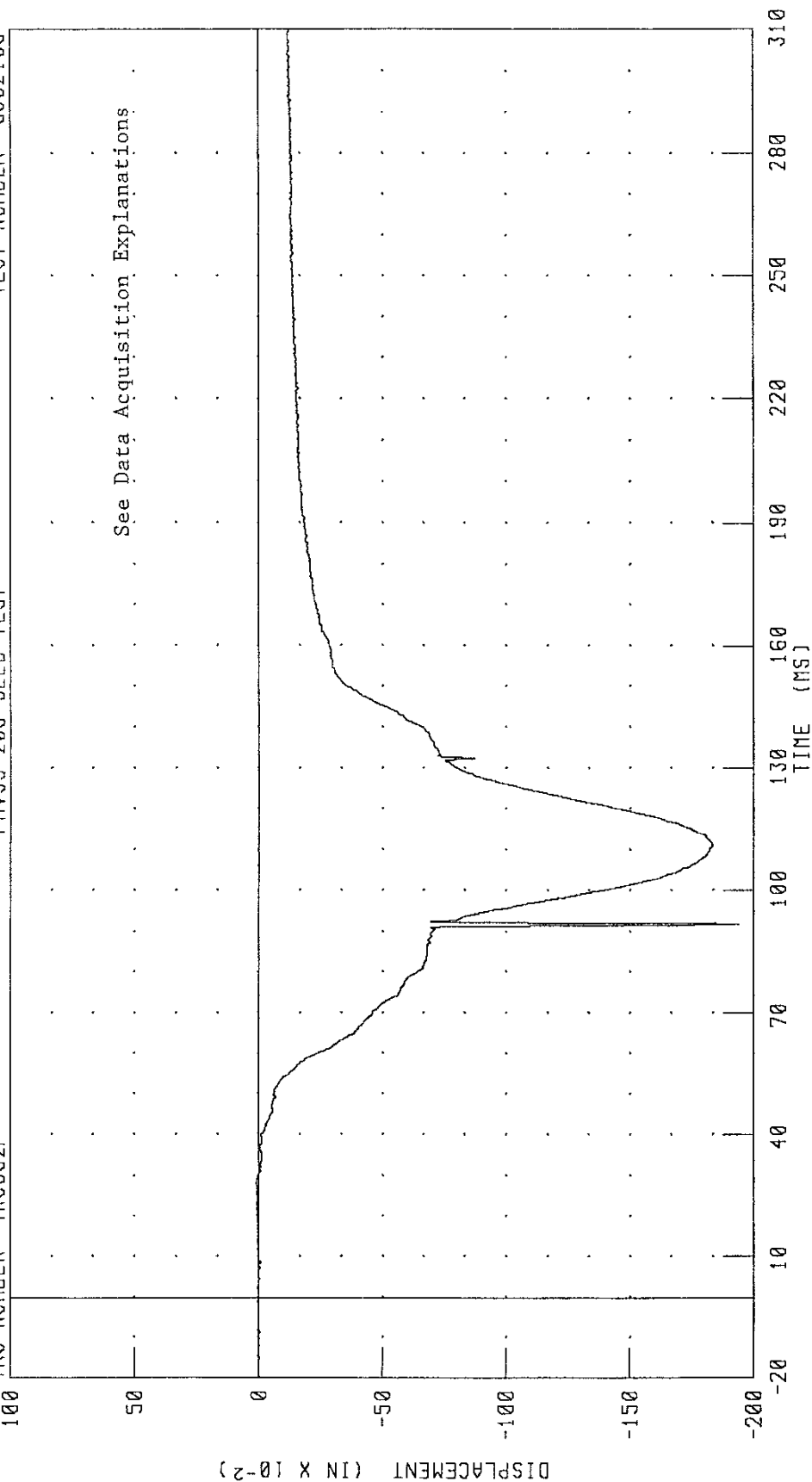
DRIVER CHEST DEFLECTION

FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC NUMBER: TRC652P

See Data Acquisition Explanations

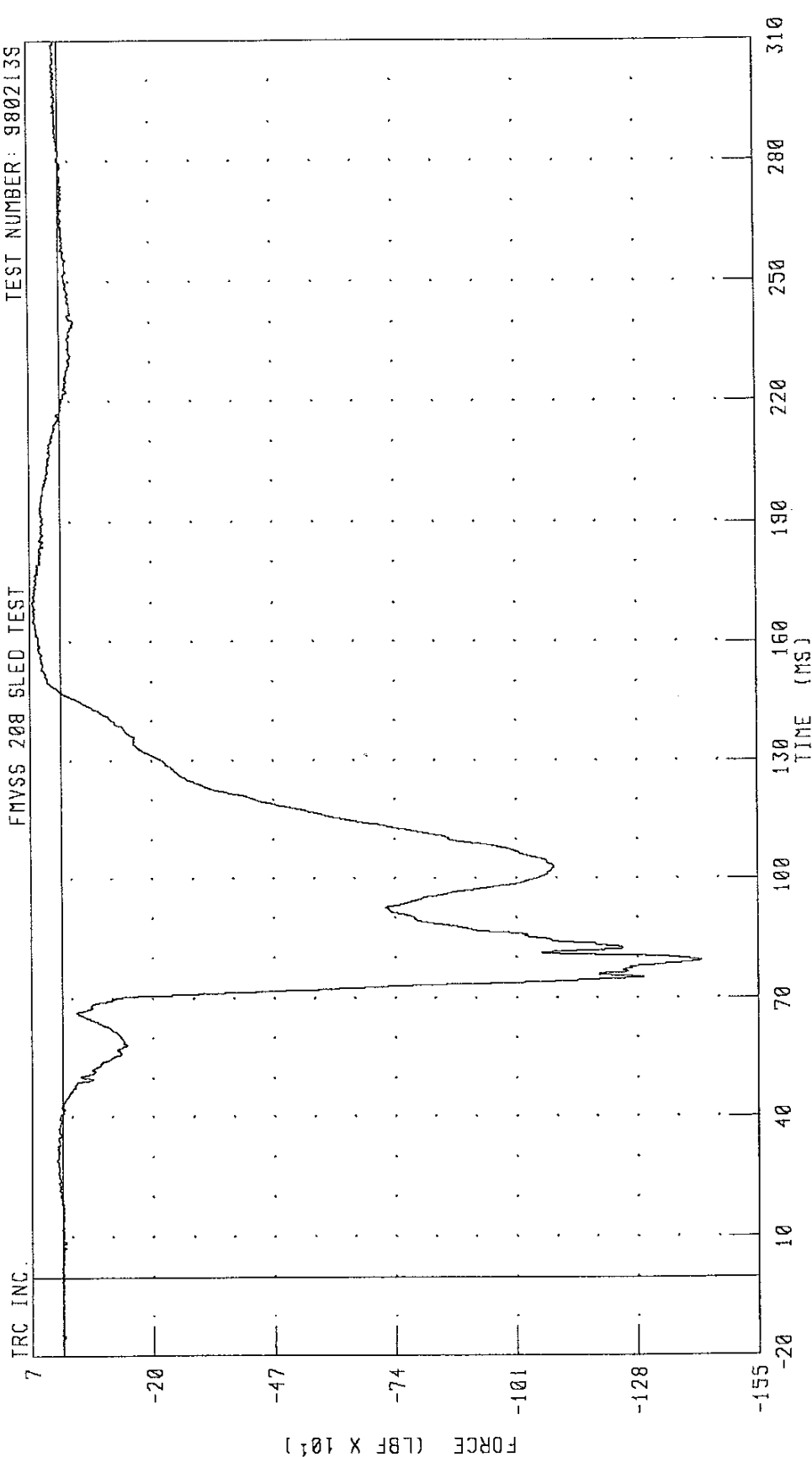


PEAK DATA: 0.01 IN @ 29.12 MS; -1.94 IN @ 31.84 MS

CHANNEL: CSTXD1 FILTER: CH. CLASS 600

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER LEFT FEMUR FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S



CHANNEL: LFMF1 FILTER: CH. CLASS 600

CW0118 / 1998 CHEVROLET BLAZER
 DRIVER RIGHT FEMUR FORCE

FMVSS 208 SLED TEST

TRC INC.

5

FORCE (LBF X 10¹)

-20

-46

-72

-98

-124

-150

-20

40

70

100

130

160

190

220

250

280

310

TIME (MS)

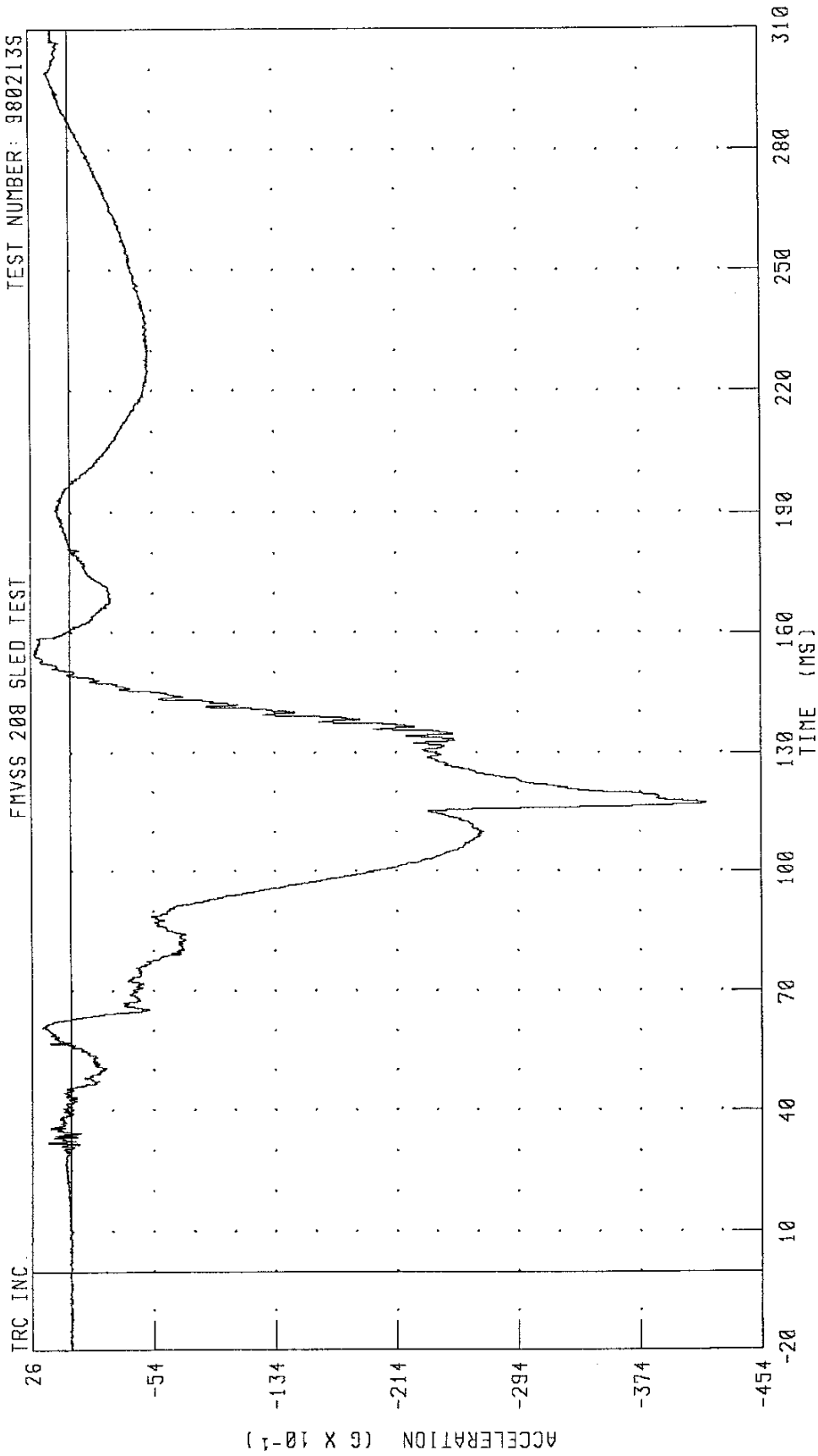
TEST NUMBER: S80213S

CHANNEL: RFMFI FILTER: CH. CLASS 600

PEAK DATA: 49.46 LBF @ 147.68 MS; -1394.33 LBF @ 73.68 MS

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

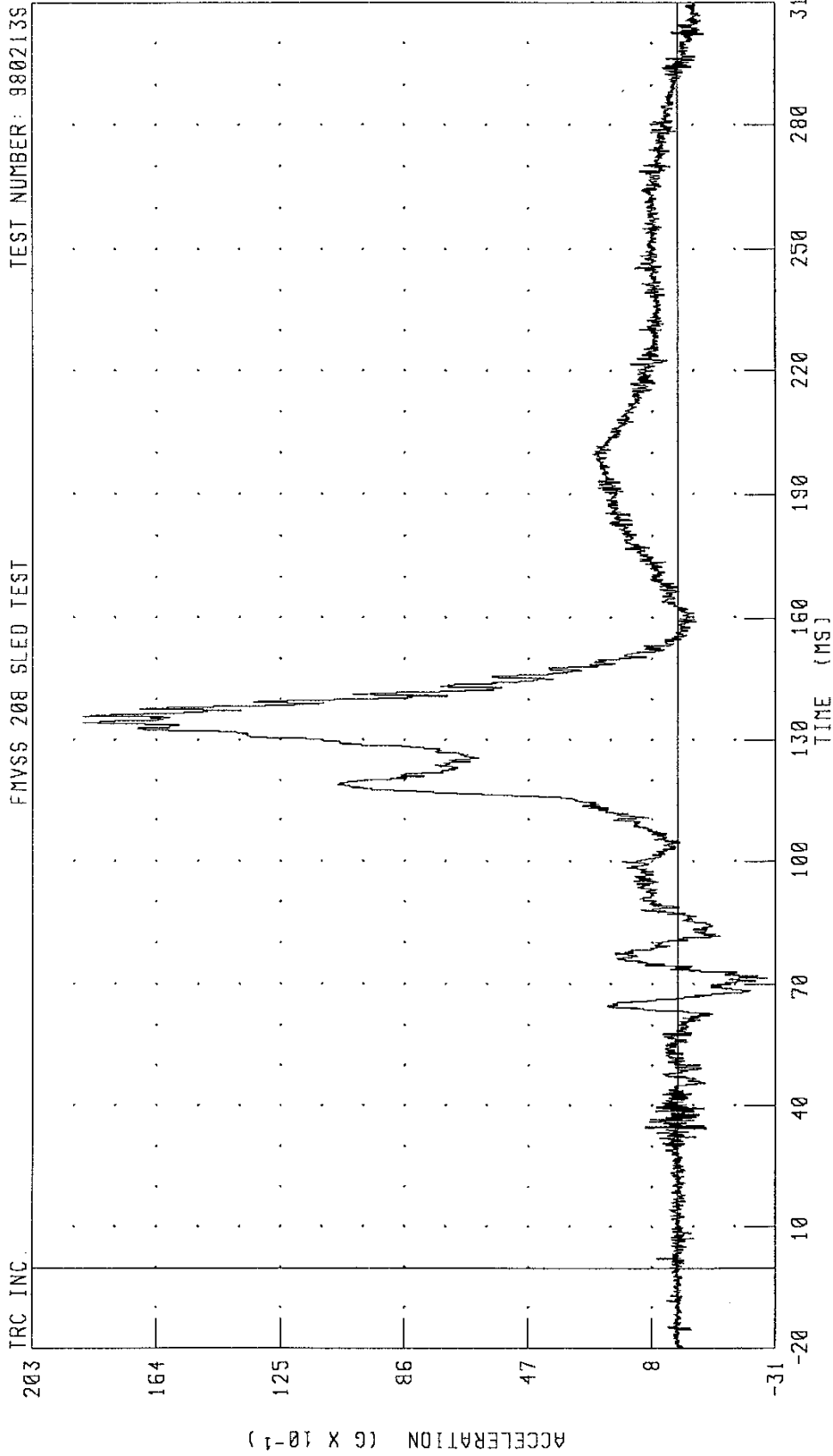


PEAK DATA: 2.40 G @ 154.88 MS, -41.70 G @ 117.36 MS

CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S



PEAK DATA: 18.72 G @ 135.84 MS; -2.82 G @ 71.52 MS

CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC.

304

230

156

82

8

-65

-140

ACCELERATION (G X 10⁻¹)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

PEAK DATA: 27.37 G @ 105.44 MS; -13.16 G @ 134.72 MS

CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC.

468

390

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

312

234

156

78

0

-20

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

360

370

380

390

400

410

420

430

440

450

460

470

480

490

500

510

520

530

540

550

560

570

580

590

600

610

620

630

640

650

660

670

680

690

700

710

720

730

740

750

760

770

780

790

800

810

820

830

840

850

860

870

880

890

900

910

920

930

940

950

960

970

980

990

1000

1010

1020

1030

1040

1050

1060

1070

1080

1090

1100

1110

1120

1130

1140

1150

1160

1170

1180

1190

1200

1210

1220

1230

1240

1250

1260

1270

1280

1290

1300

1310

1320

1330

1340

1350

1360

1370

1380

1390

1400

1410

1420

1430

1440

1450

1460

1470

1480

1490

1500

1510

1520

1530

1540

1550

1560

1570

1580

1590

1600

1610

1620

1630

1640

1650

1660

1670

1680

1690

1700

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1800

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1870

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1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

2010

2020

2030

2040

2050

2060

2070

2080

2090

2100

2110

2120

2130

2140

2150

2160

2170

2180

2190

2200

2210

2220

2230

2240

2250

2260

2270

2280

2290

2300

2310

2320

2330

2340

2350

2360

2370

2380

2390

2400

2410

2420

2430

2440

2450

2460

2470

2480

2490

2500

2510

2520

2530

2540

2550

2560

2570

2580

2590

2600

2610

2620

2630

2640

2650

2660

2670

2680

2690

2700

2710

2720

2730

2740

2750

2760

2770

2780

2790

2800

2810

2820

2830

2840

2850

2860

2870

2880

2890

2900

2910

2920

2930

2940

2950

2960

2970

2980

2990

3000

3010

3020

3030

3040

3050

3060

3070

3080

3090

3100

3110

3120

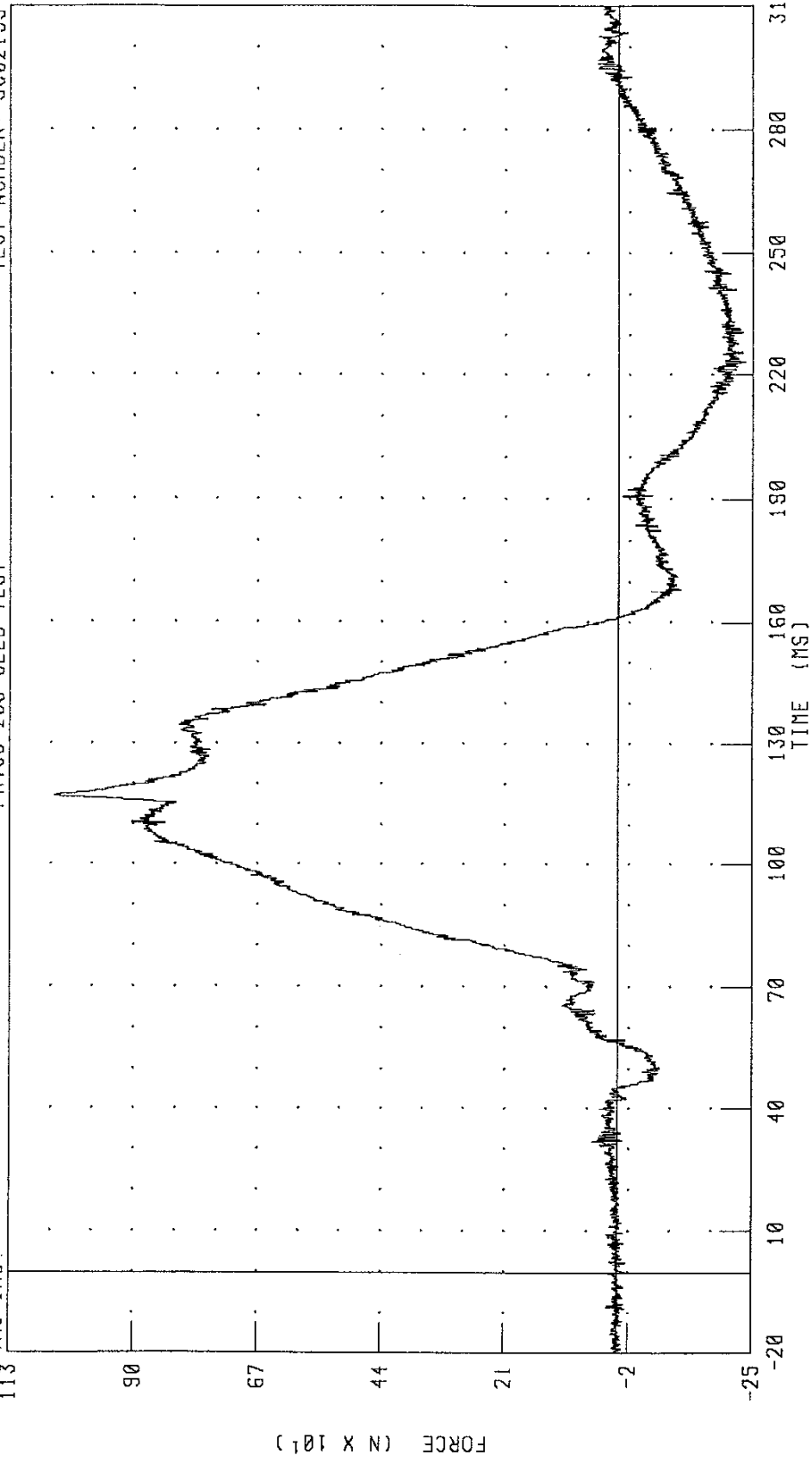
3130

3140

CW0118 / 1998 CHEVROLET BLAZER
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC.



PEAK DATA: 1044.99 N @ 117.28 MS; -234.84 N @ 223.20 MS

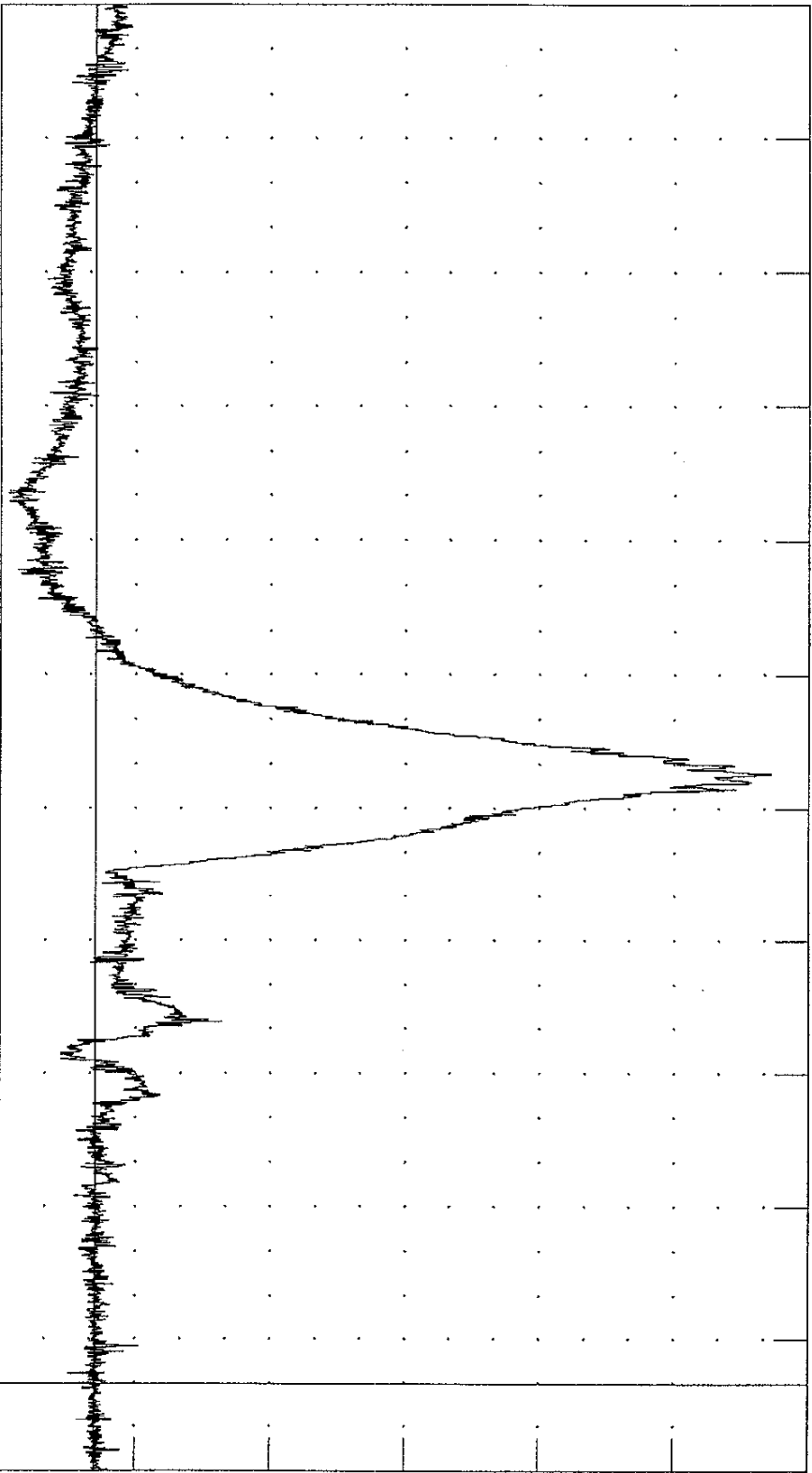
CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC.

8



FORCE (N X 10¹)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

-51

-39

-27

-15

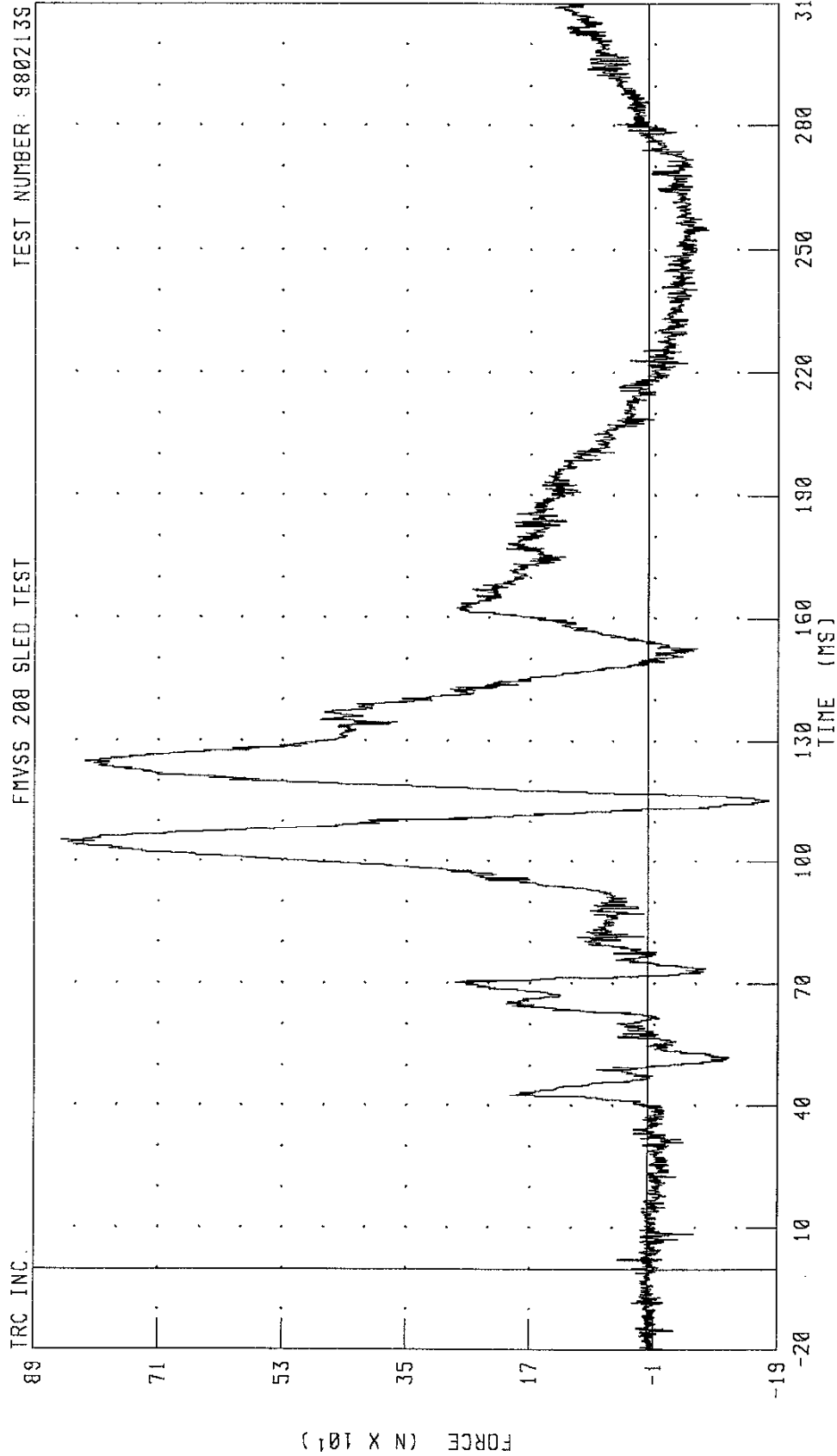
-3

CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

PEAK DATA: 77.70 N @ 200.56 MS; -601.23 N @ 137.92 MS

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

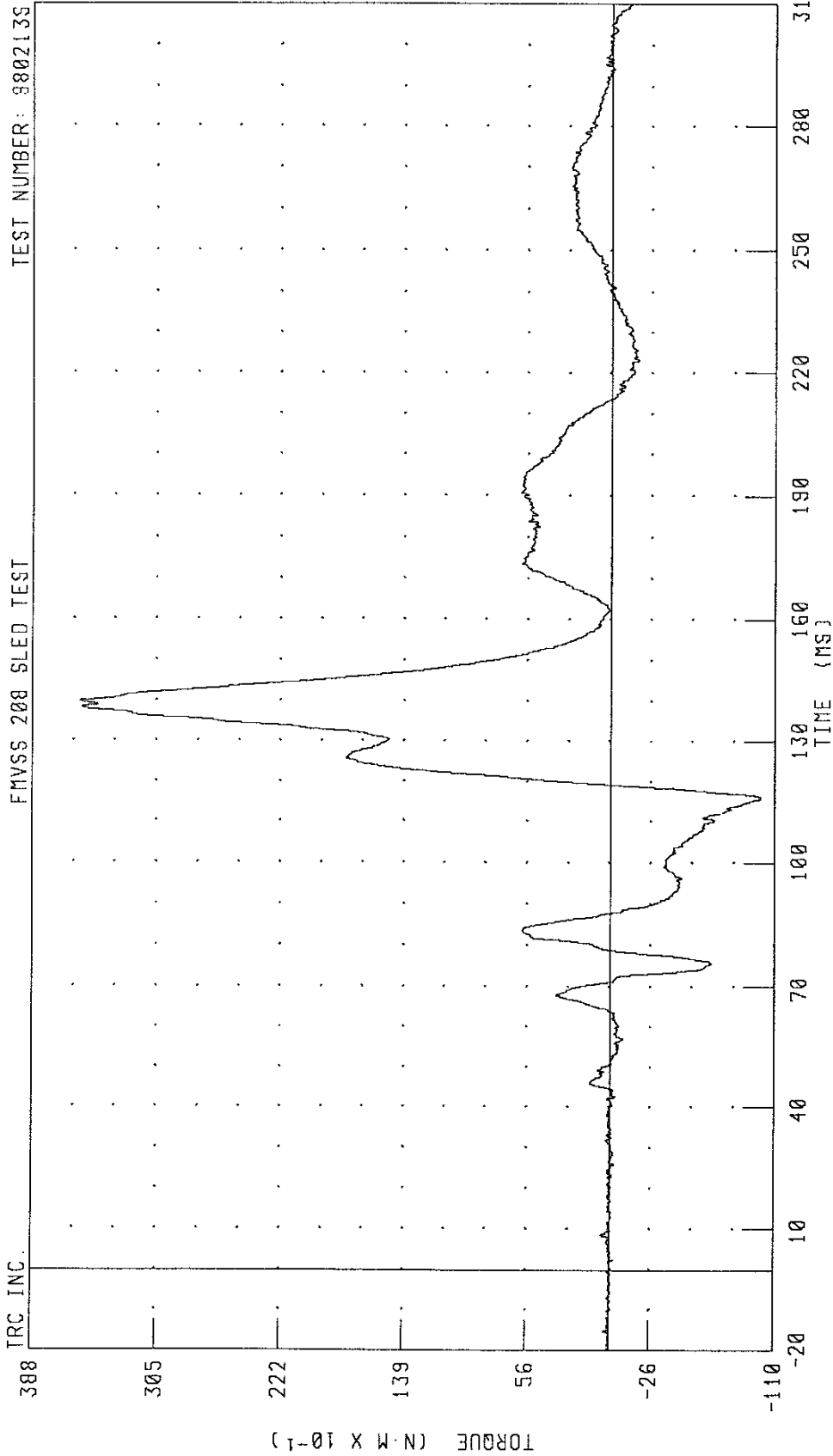


PEAK DATA: 851.75 N @ 105.20 MS, -175.50 N @ 115.28 MS

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S



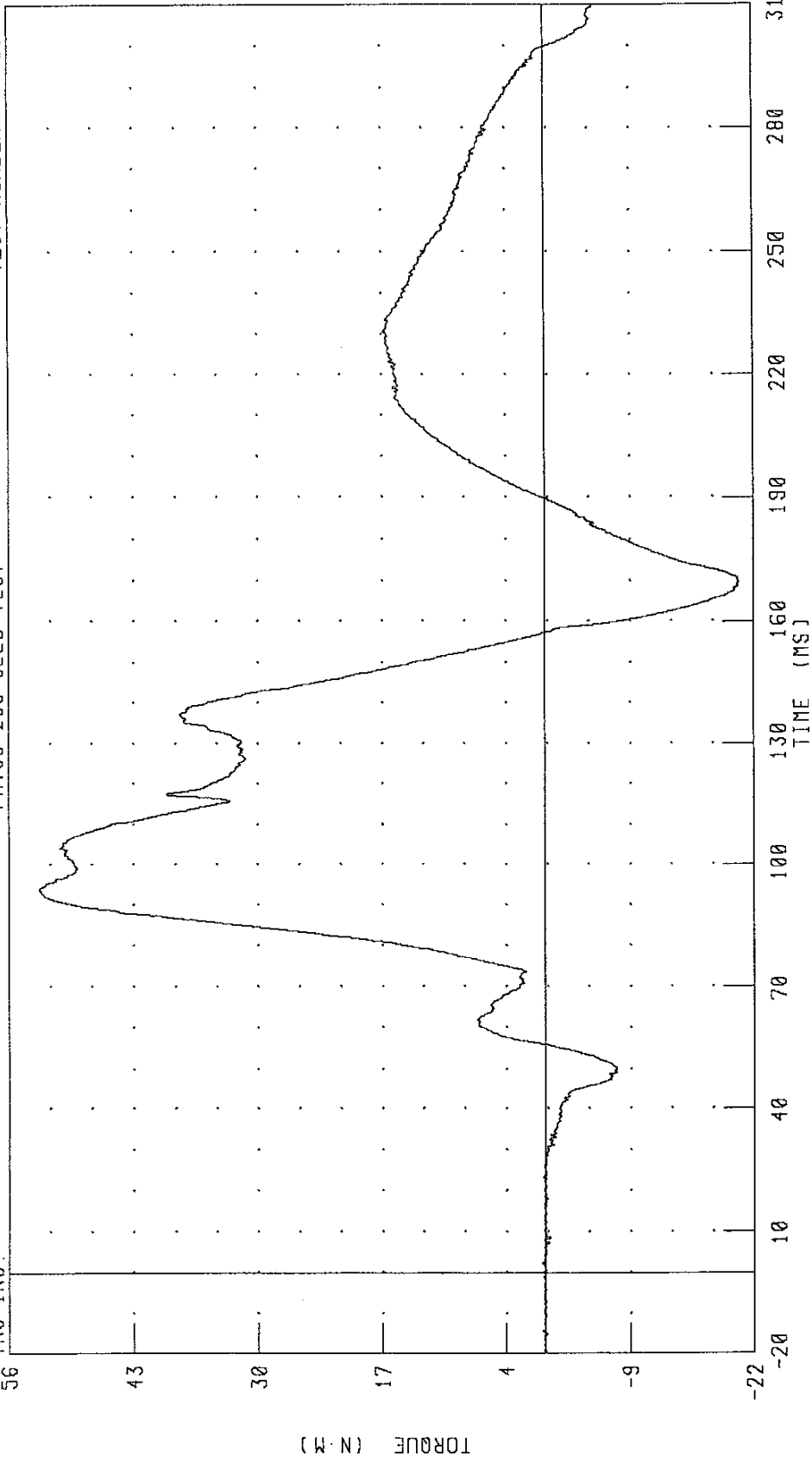
CHANNEL: NEKXM2 FILTER: CH. CLASS 600

PEAK DATA: 35.62 N·m @ 139.84 ms; -10.06 N·m @ 116.00 ms

CW0118 / 1998 CHEVROLET BLAZER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS
FMVSS 208 SLED TEST

TEST NUMBER: 980213S

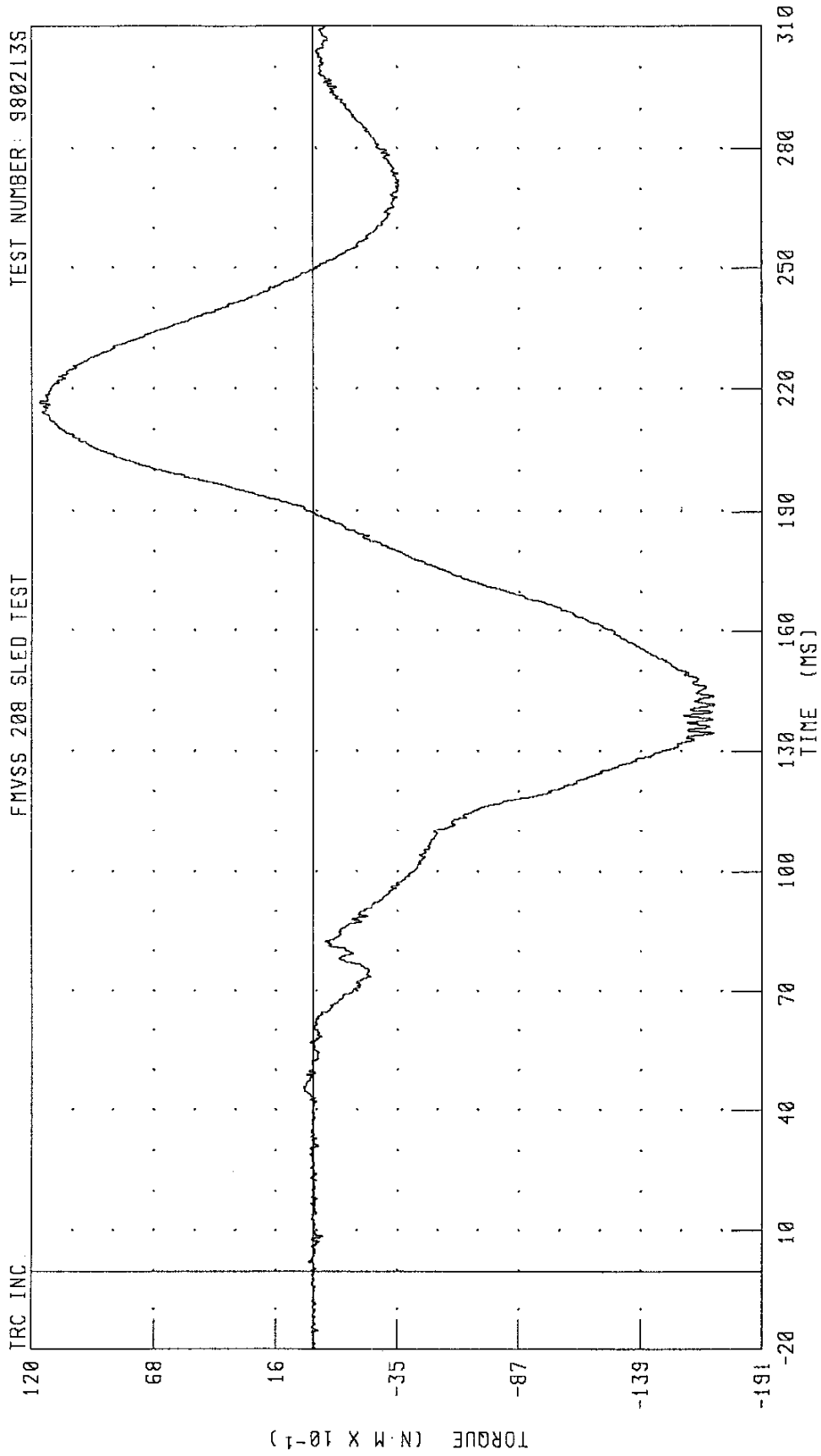
TRC INC.



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

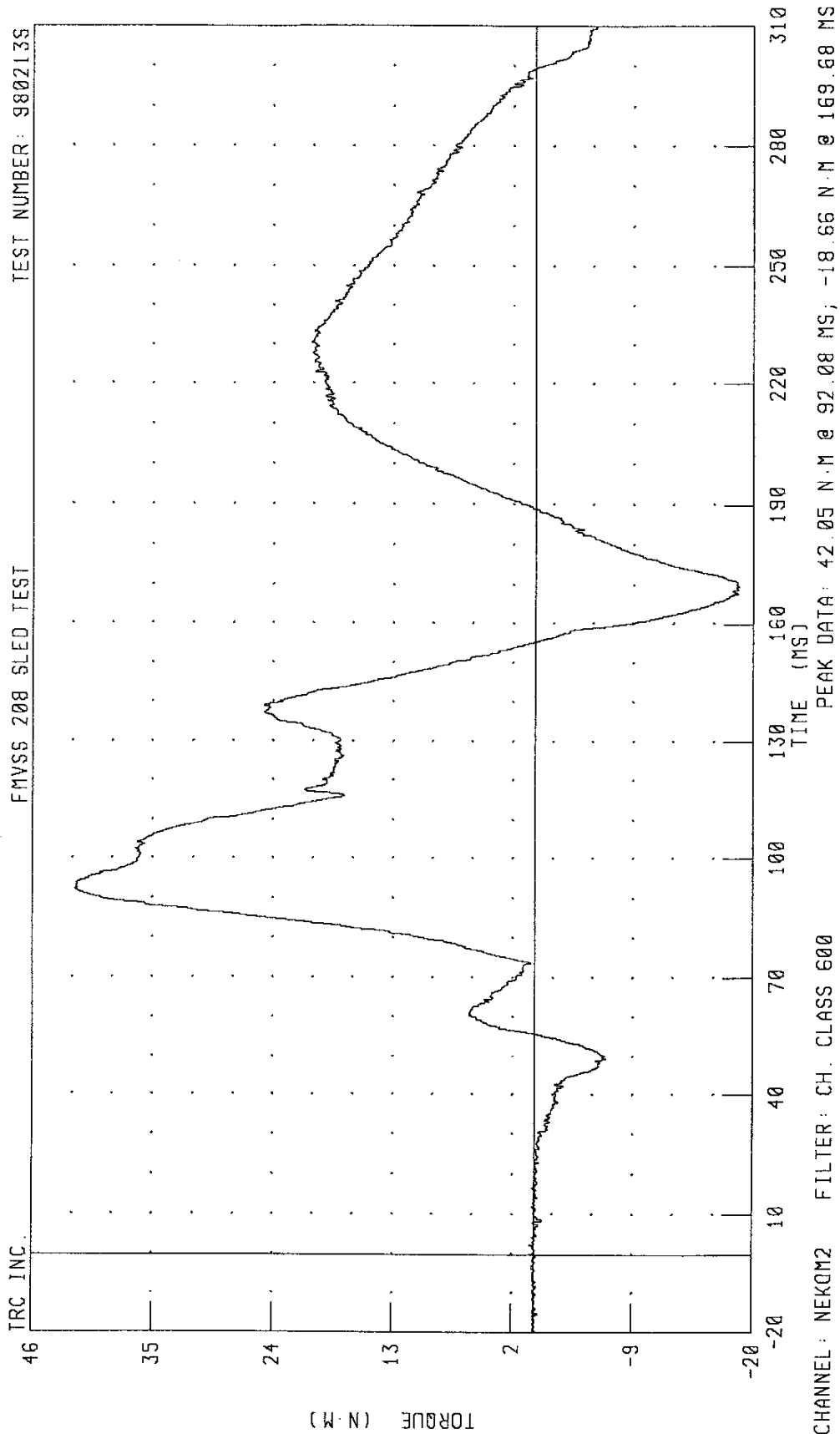
PEAK DATA: 52.79 N·M @ 93.52 MS; -20.37 N·M @ 169.76 MS

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS
 FMVSS 208 SLED TEST



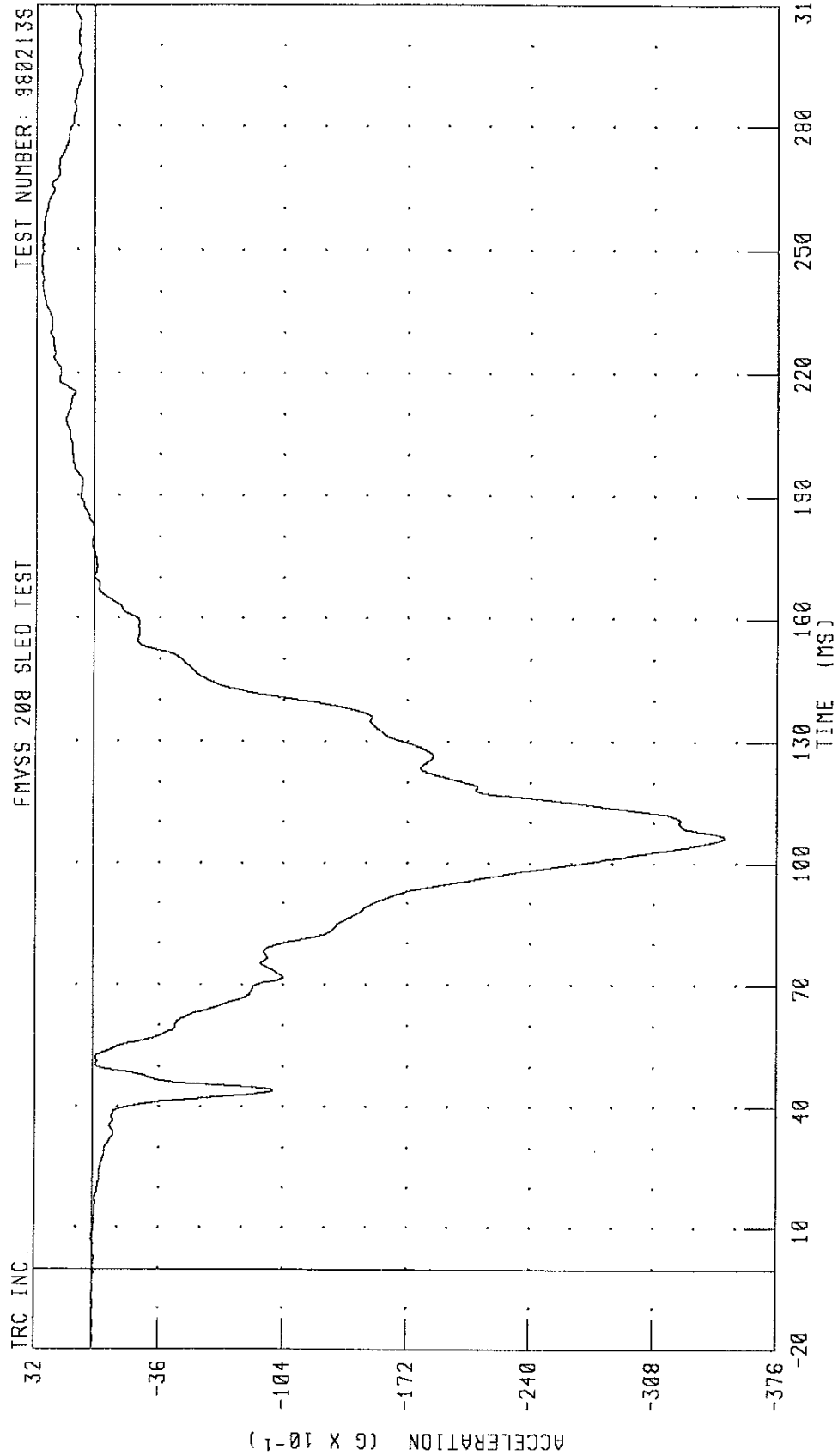
TEST NUMBER: 9802135
 CHANNEL: NEKZM2 FILTER: CH. CLASS 600
 PEAK DATA: 11.65 N·m @ 216.80 ms; -17.17 N·m @ 141.60 ms

CW0118 / 1998 CHEVROLET BLAZER
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE ABOUT Y AXIS



CW0118 / 1998 CHEVROLET BLAZER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 980213S



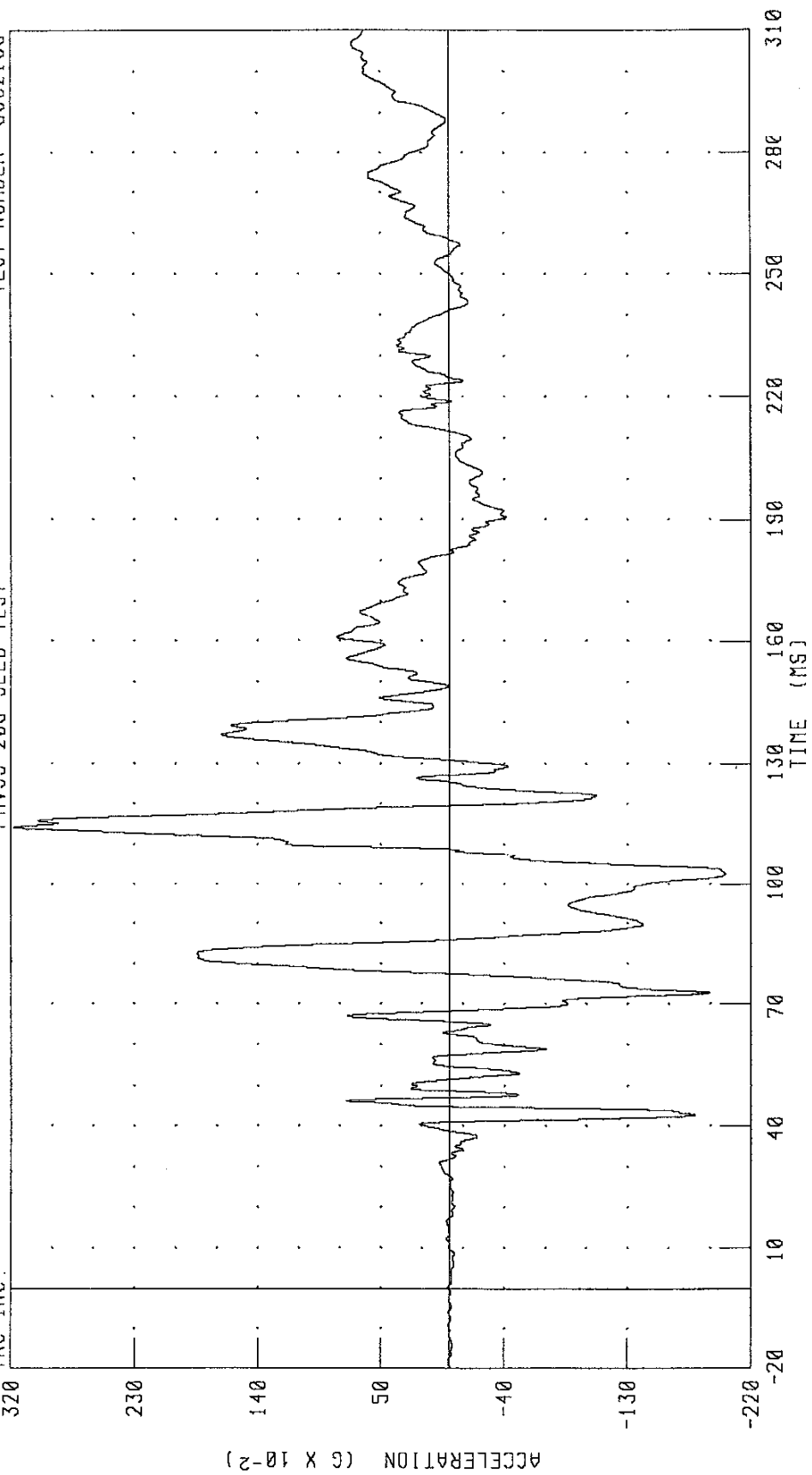
CHANNEL: CSTXG2 FILTER: CH. CLASS 180

PEAK DATA: 2.91 G @ 247.84 MS, -34.70 G @ 106.32 MS

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: S80213S

TRC INC.



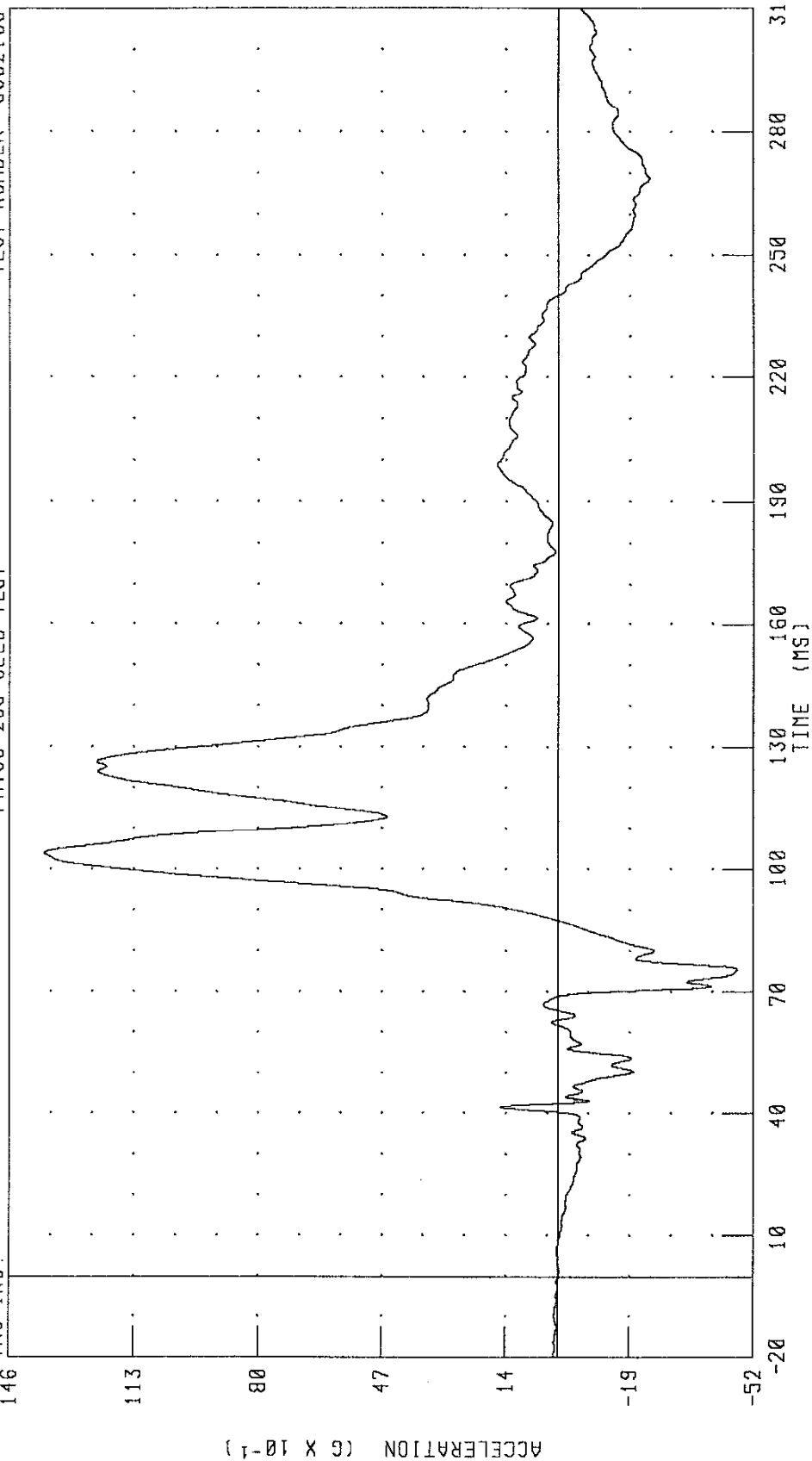
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

PEAK DATA: 3.17 G @ 114.32 MS; -2.02 G @ 102.56 MS

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC.



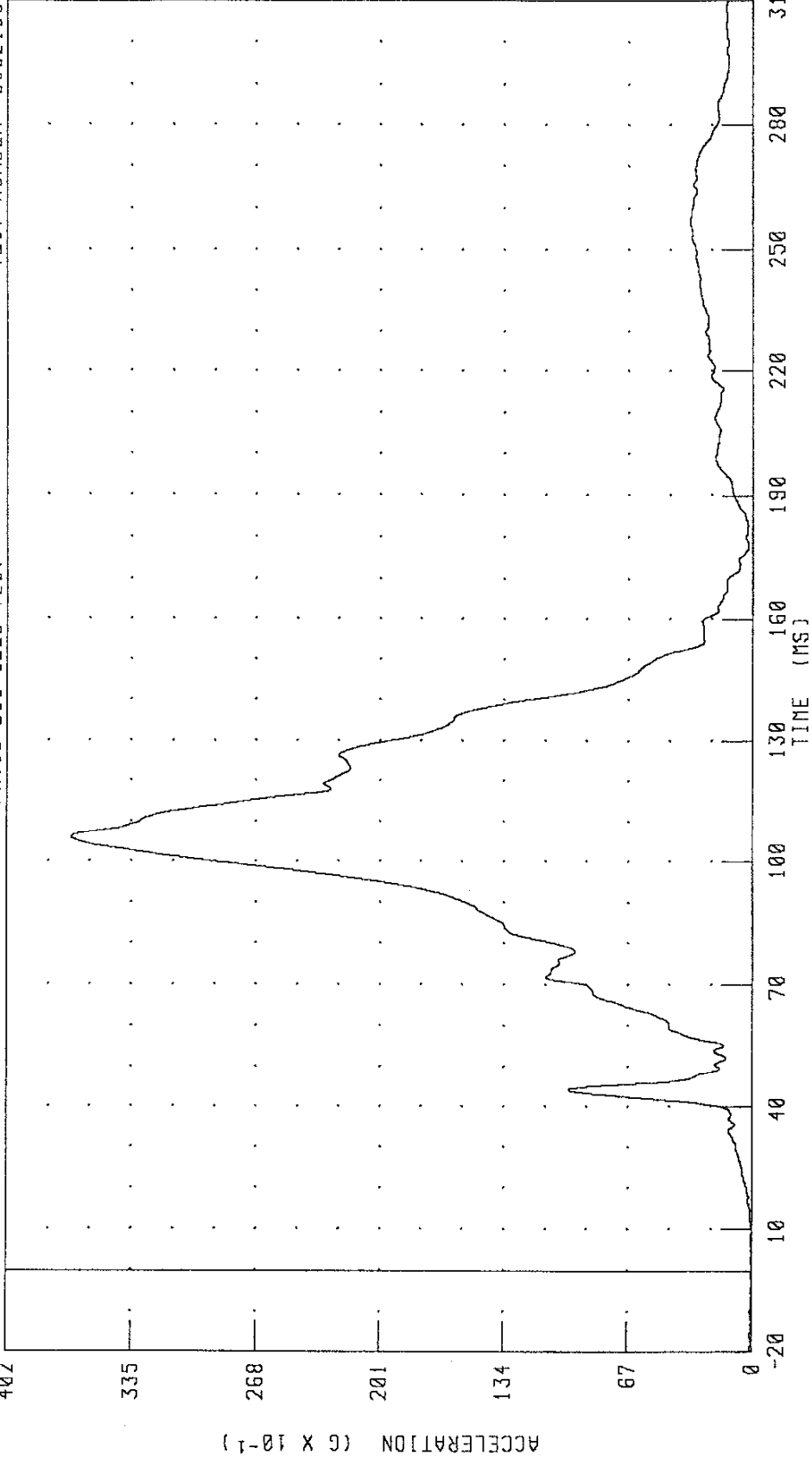
CHANNEL: CSTZG2 FILTER: CH. CLASS 180

PEAK DATA: 13.66 G @ 103.92 MS; -4.78 G @ 75.52 MS

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980213S

TRC INC



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

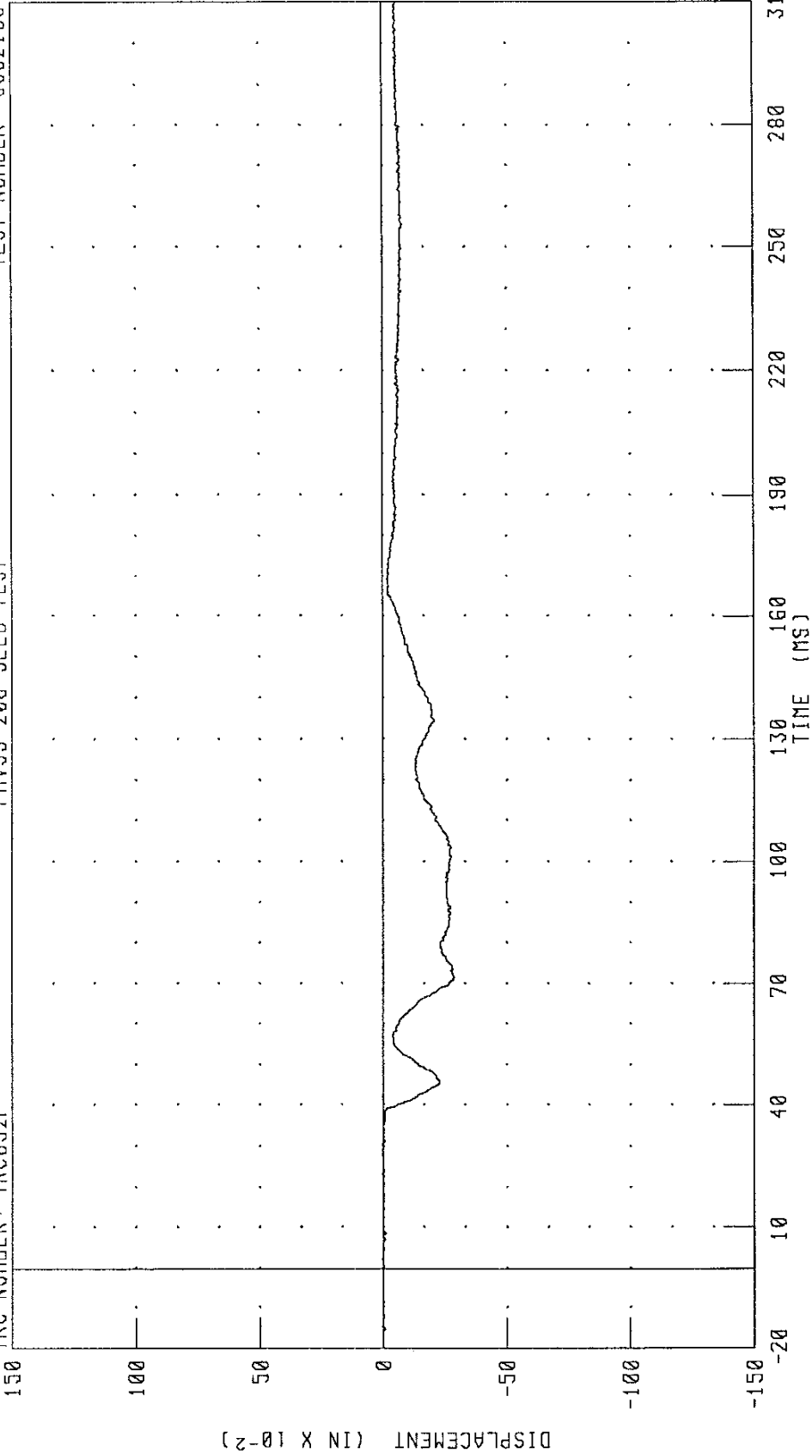
PEAK DATA: 36.74 G @ 106.08 MS; 0.01 G @ -2.80 MS

CW0118 / 1998 CHEVROLET BLAZER
RIGHT FRONT PASSENGER CHEST DEFLECTION

TRC NUMBER: TRC652P

FMVSS 208 SLED TEST

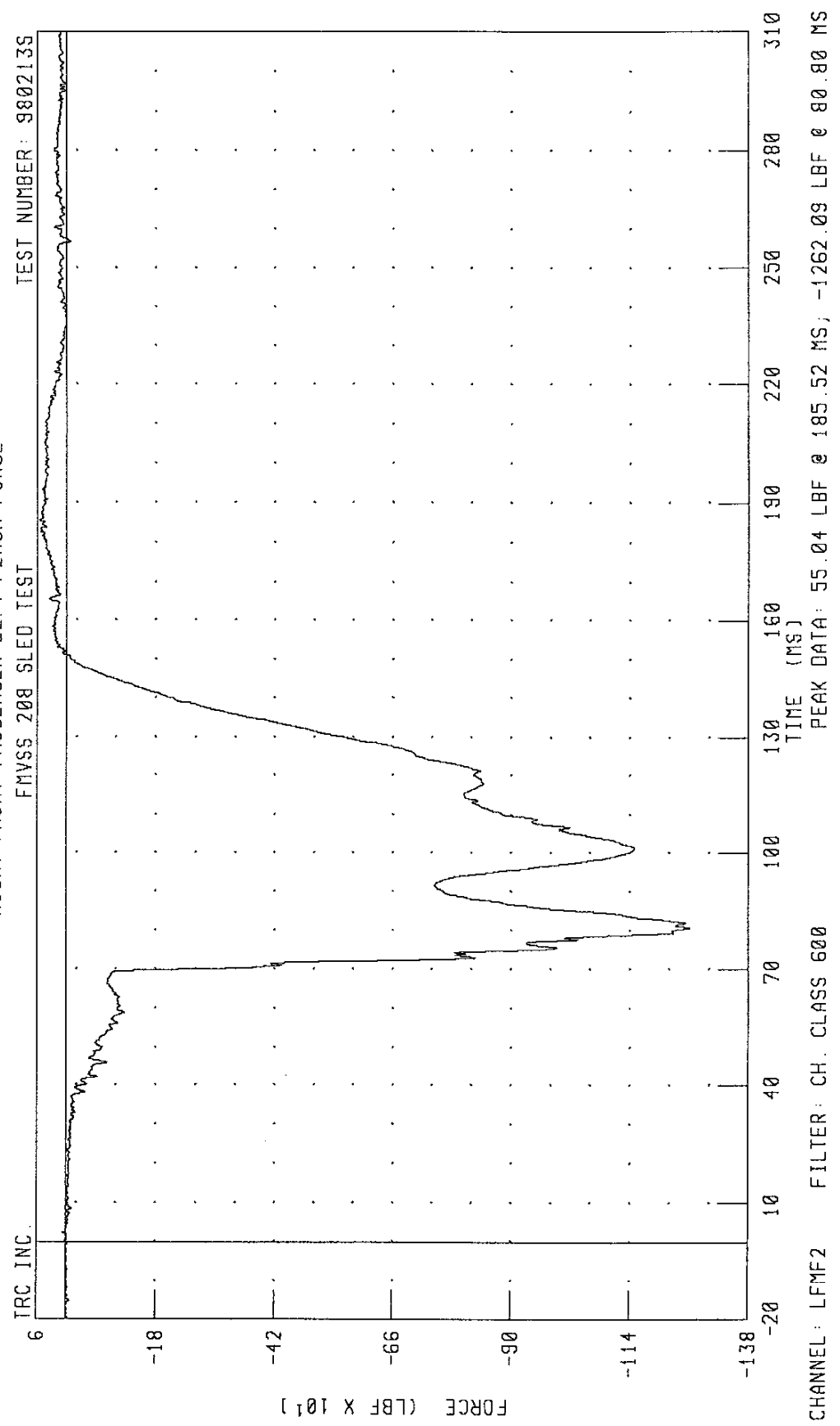
TEST NUMBER: 980213S



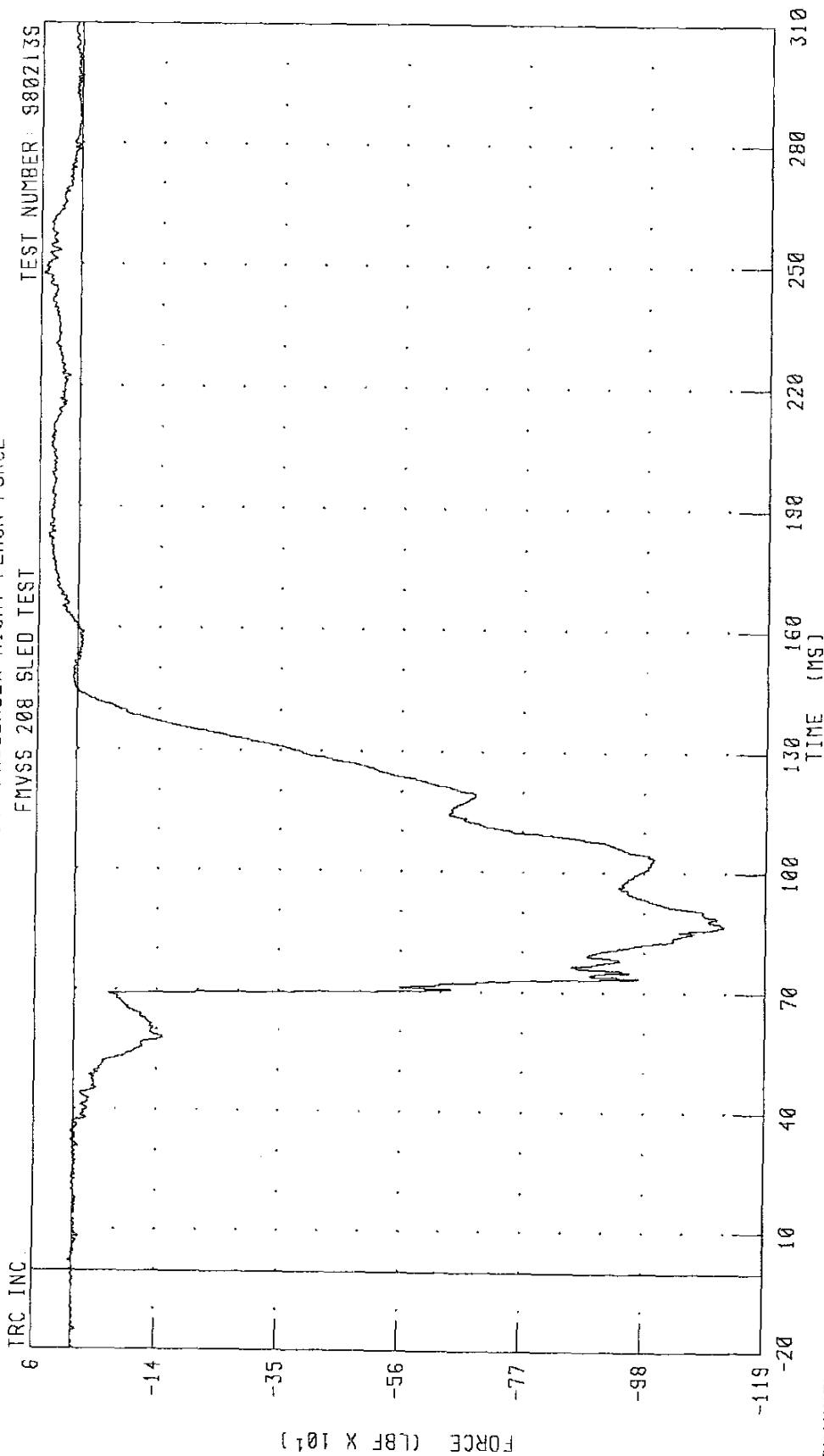
CHANNEL: CSTX02 FILTER: CH. CLASS 600

PEAK DATA: 0.01 IN @ 2.32 MS; -0.29 IN @ 71.68 MS

CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER LEFT FEMUR FORCE
 FMVSS 208 SLED TEST



CW0118 / 1998 CHEVROLET BLAZER
 RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
 FMVSS 208 SLED TEST



CHANNEL: RFMF2 FILTER: CH CLASS 600

PEAK DATA: 61 86 LBF @ 247.76 MS, -1120.14 LBF @ 86.72 MS

Appendix C

Manufacturer's Vehicle Information

OVSC QUESTIONS & GM RESPONSES
REGARDING FMVSS 208 INFORMATION REQUEST
1998 Chevrolet S10 Blazer
NSA-31CCA / OA:208970811Y

Item 1

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

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

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

GM Response

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

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

Attachment A includes those portions of the frontal barrier and sled test reports pertinent to the requirements of FMVSS 208.

Item 2

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

GM Response

The reduced force Driver's Side SIR system on all GM 1998 S/T Blazer models includes the following features as compared to the 1997 system.

FEATURE	1998	1997
Lower output inflator	335-12 KPa	440-24 KPa
Vent hole size	2 @ 30 mm dia.	2 @ 20 mm dia.

The Passenger Side SIR system was released new for 1998 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 S/T Blazers have depowered driver and passenger 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 S/T Blazers, 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 S/T Blazers were fully open. S/T Blazer 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.

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

S/T Blazer Models are not equipped with upper adjustable anchorages.

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

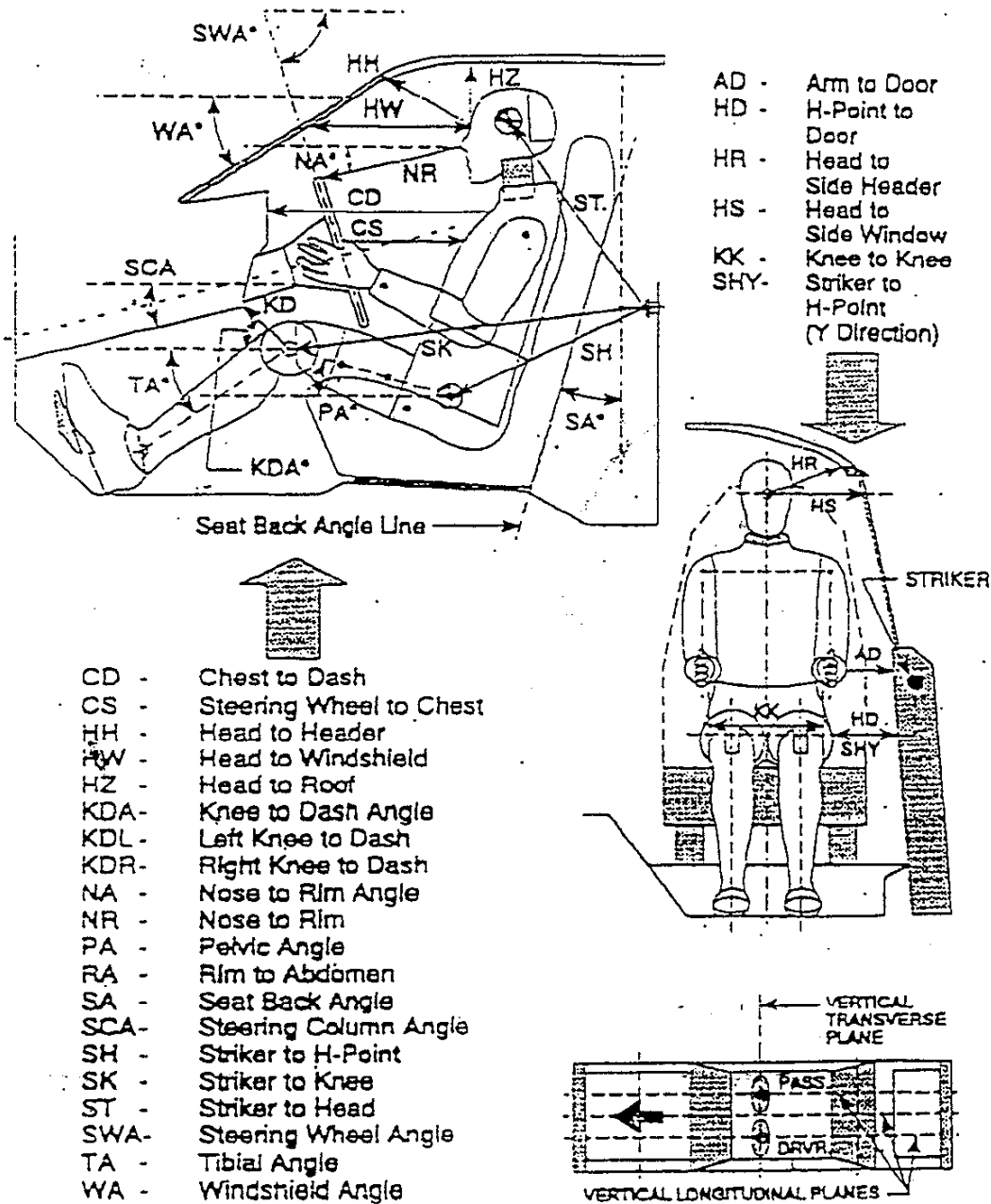
The air bags installed in the subject vehicle do not incorporate an explosive device to inflate the system.

Attachment B

USG 3376

**3 pages
(including this cover)**

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



DUMMY POSITIONING IN VEHICLE
FRONT SEAT MEASUREMENT TABLE

	DRIVER	PASS.
WA°	36°	
SWA°	69°	
SCA°	21°	
SA°	23°	23°
HZ	8.4"	8.5"
HH	18.5"	17.8"
HW	25.5"	24.8"
HR	10.6"	10.3"
NR	14" ANGLE (NA°)	N/A
CD	20.5"	20.5"
CS	11.5"	N/A
RA	6.25"	N/A
KDL	ANGLE (KDA°)	6.1"
KDR		8.4" ANGLE (KDA°) 34°
PA°	23°	23°
TA°	47°	47°
KK	8.0" C-C	7.5" C-C
ST	27.3" ANGLE 62°	27.3" ANGLE 62°
SK	29.0" ANGLE 4°	28.8" ANGLE 6°
SH	16.0" ANGLE -5°	15.5" ANGLE -4°
SHY	9.25"	9.0"
HS	14.5"	13.8"
HD	5.8"	5.4"
AD	2.0"	2.0"

Attachment C

USG 3376

**2 pages
(including this cover)**



NHTSA IR: NSA-31CCa
OA:208970811Y
1998 S/T Utility

ATTACHMENT C

Seat Positioning (Driver and Passenger seats are adjusted identically)

Seat Back Angle (Nominal Design Riding Position).

Seat back angle is approximately 23 degrees. Seat back can be placed at the correct, nominal design angle as follows;

- Place inclinometer on seat back frame approximately 9 inches above seat hinge point. This can be accomplished by cutting away the seat trim material and foam to expose the metal seatback structure.

Seat Track Mid Position.

Manual Seat Adjuster;

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

Power Seat Adjuster;

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

Power Lumbar adjustment;

- Power Lumbar bladder should be empty.

Fuel Tank Data

MODEL	CONFIGURATION	USABLE LITERS	UNUSABLE LITERS	95% TEST VOLUME LITERS
S/T	2 Door Utility	70.8	0.4	67.3
	4 Door Utility	69.0	0.4	65.6

Fuel Pump Information

All S/T 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 up is position #1, move the steering column downward 3 notches to position #4.