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Vehicle Safety Compliance Sled Testing
for Occupant Crash Protection

Chrysler Corporation
1998 Jeep Grand Cherokee Laredo 4WD
NHTSA Number: CW0303
TRC Test Number: 980123S

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



February 13, 1998

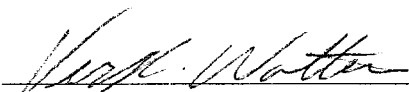
Final Report

Prepared For:
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National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance (NSA-30)
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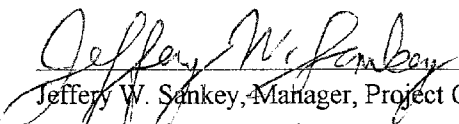
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16. Abstract An FMVSS 208 compliance sled test was conducted on a 1998 Jeep Grand Cherokee Laredo, NHTSA No. CW0303, at Transportation Research Center Inc. on January 23, 1998. This test was conducted to determine compliance with Federal Motor Vehicle 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 17.3 g with an integrated velocity change of 29.1 mph. The driver's Head Injury Criteria (HIC) was 133. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 23.0 g. The driver's chest deflection was 1.5 inches. The driver's left and right femur maximum axial forces were 1388 pounds and 1298 pounds, respectively. The driver's maximum neck flexion about the occipital condyle was 31.4 Newton-meters. The driver's maximum neck extension about the occipital condyle was 7.0 Newton-meters. The driver's maximum axial neck tension was 1107 Newtons. The driver's maximum axial neck compression was 185 Newtons. The driver's maximum fore and aft neck shear was 867 Newtons. The passenger's HIC was 121. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 29.8 g. The passenger's chest deflection was questionable (see Data Acquisition Explanations). The passenger's left and right femur maximum axial forces were 1225 pounds and 1409 pounds, respectively. The passenger's maximum neck flexion about the occipital condyle was 46.4 Newton-meters. The passenger's maximum neck extension about the occipital condyle was 11.2 Newton-meters. The passenger's maximum axial neck tension was 512 Newtons. The passenger's maximum axial neck compression was 410 Newtons. The passenger's maximum fore and aft neck shear was 854 Newtons.			
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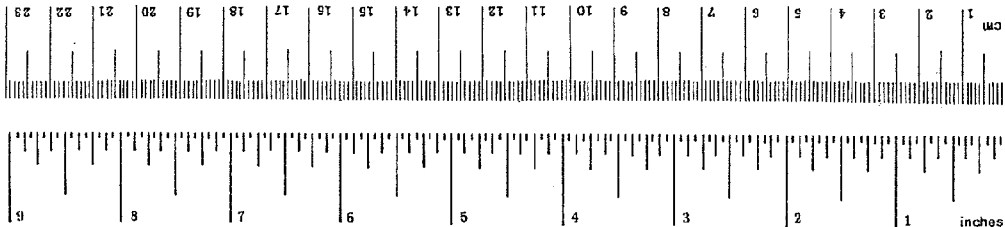
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	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
km	kilometers	1.1	yards	yd
		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 (exactly). For other exact conversions and more detailed tables, see NBS Mon. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-286.

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Section 1.0

Purpose and Test Procedure

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 Jeep Grand Cherokee Laredo, NHTSA No. CW0303, 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 left front driver dummy and restraint systems meets aforementioned performance requirements. The right front passenger dummy was placed in the test vehicle for informational purposes only and was not intended to be compliance related.

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 January 23, 1998

The test vehicle, a 1998 Jeep Grand Cherokee Laredo, NHTSA No. CW0303, appeared to comply with the performance requirements of FMVSS 208 for the left front driver compartment 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 occipitals 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 17.3 g with an integrated velocity change of 29.1 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 23.0 g. The driver's chest deflection was 1.5 inches. The driver's left and right femur maximum compressive forces were 1388 pounds and 1298 pounds, respectively. The driver's maximum neck moments were 7.0 N·m extension and 31.4 N·m flexion. The driver's maximum neck forces were 1107 N tension, 185 N compression and 867 N fore and aft shear.

Test Results Summary, Cont'd

The right front passenger's HIC was 121. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 29.8 g. The right front passenger's chest deflection was questionable (see Data Acquisition Explanations). The right front passenger's left and right femur maximum compressive forces were 1225 pounds and 1409 pounds, respectively. The right front passenger's maximum neck moments about the occipital condyle were 11.2 N·m extension and 46.4 N·m flexion. The right front passenger's maximum neck forces were 512 N axial tension, 410 N axial compression and 854 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)(2)) 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 met the applicable seat belt type 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

The passenger dummy's chest displacement potentiometer, CSTXD2, recorded questionable data between 44 and 65 milliseconds, the time of peak deflection.

Table 1 Sled Test Summary

NHTSA number: CW0303
 Test type: FMVSS 208 Compliance Sled Test
 Test date: 01/23/98
 Test time: 3:49 p.m.
 Ambient temperature at impact area: 70° F
 Vehicle year/make/ model/body style: 1998/Jeep/Grand Cherokee/Laredo/4WD
 Vehicle test weight: 4500 lb

Sled carriage:

Integrated velocity from the integration of the entire sled acceleration: 29.1 mph
 Measured velocity from the light trap device attached to the sled: 29.8 mph
 Acceleration: 17.3 g
 Time from T-0(-0.5 g) to 0.0 g: 124.3 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	No apparent failure
Seat back failure:	No apparent failure	No apparent failure

Visible dummy contact points:

Head:	Airbag, A-pillar, left corner of sun visor & header, side header	Airbag, headrest
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 A-pillar, the left corner of the header, and the sun visor and 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 and the dummy head contacted the headrest. The dummy came to rest sitting upright in the seat.

Table 3 Test Vehicle Information

Vehicle year/make/
model/body style: 1998/Jeep/Grand Cherokee/Laredo/4WD

Color: Bright Platinum Metallic

VIN: 1J4GZ58S1WC102061

NHTSA number: CW0303

Engine data:

Placement: Longitudinal

Cylinders: 6

Displacement: 4.0 liters

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

Final drive: ___ fwd, ___ rwd, X 4wd

Date vehicle received: 12/16/97

Odometer reading: 125

Dealer's name
and address: Dan Hemm Chrysler-Plymouth-Dodge-Jeep-Eagle
1090 Wapakoneta Avenur, Sidney, OH 45365

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	No	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-lock brake	Yes
Clock	Yes	Rear window defroster	Yes
Power door locks	Yes	Other: Console, illuminated visor mirror	

Certification data from vehicle's label:

Vehicle manufactured by: Chrysler Corporation

Date of manufacture: 08/97

VIN: 1J4GZ58S1WC102061

GVWR: 5300 lb

GAWR: Front: 2750 lb

Rear: 2950 lb

Table 3 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P225/75R15 OWL All-Season
Spare tire:	Space saver
Type of front seats:	Bucket

Tire & capacity data from vehicle's label:

Recommended tire size:	P215/75R15
Recommended cold tire pressure:	
Front:	36 psi
Rear:	36 psi

Designated Seating Capacity:

Front	2
Rear	3
Total	5
Vehicle Capacity Weight:	1450 lbs.

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

Right front	1080	lb	Right rear	850	lb
Left front	1070	lb	Left rear	850	lb
Total front weight	2150	lb	(55.8% of total vehicle weight)		
Total rear weight	1700	lb	(44.2% of total vehicle weight)		
Total delivered weight	3850	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 (5300 lb)

UDW = Unloaded Delivered Weight (3850 lb)

VCW = Vehicle Capacity Weight = 5300 - 3850 = 1450 lb

DSC² = Designated Seating Capacity (5)

RCLW¹ = GVWR - UDW - 150 (5) = 5300 - 3850 - (750) = 700 lb

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

Target loaded test weight: = 3850 + 300 + 334 = 4484 lb

Weight of test vehicle with required dummies and 316 lb of cargo weight:

Right front	1180	lb	Right rear	1090	lb
Left front	1150	lb	Left rear	1080	lb
Total front weight	2330	lb	(51.8% of total vehicle weight)		
Total rear weight	2170	lb	(48.2% of total vehicle weight)		
Total test weight	4500	lb	(16 lb. over 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: 0.8°
As tested door sill angle: 0.5°
Fully loaded door sill angle: 0.2°
Vehicle Wheelbase: 105.2 inches

Seat Data:

Front seats: Bucket
Seat track settings: Mid. Manual seat adjustment for mid of seat travel.
(10th detent)
Seat back settings: Seat back angles are set relative to the full forward position.
Driver: 24°. Measure 8 degrees rearward of the seat back's full forward position.
Passenger: 24°. Measure 8 degrees rearward of the seat back's full forward position.

Fuel System Data:

Fuel system capacity from owner's manual: 23.0 gallons
Useable capacity figure furnished by COTR: 22.5 gallons

Steering Column Adjustments

5 positions available. Set in 3rd (mid) position.

Table 4 Post-Impact Data

Test number: 980123S
NHTSA number: CW0303
Test date: 01/23/98
Test time: 3:49 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: 29.1 mph
Measured velocity from the light trap device attached to the sled (backup): 29.8 mph

Sled carriage acceleration:

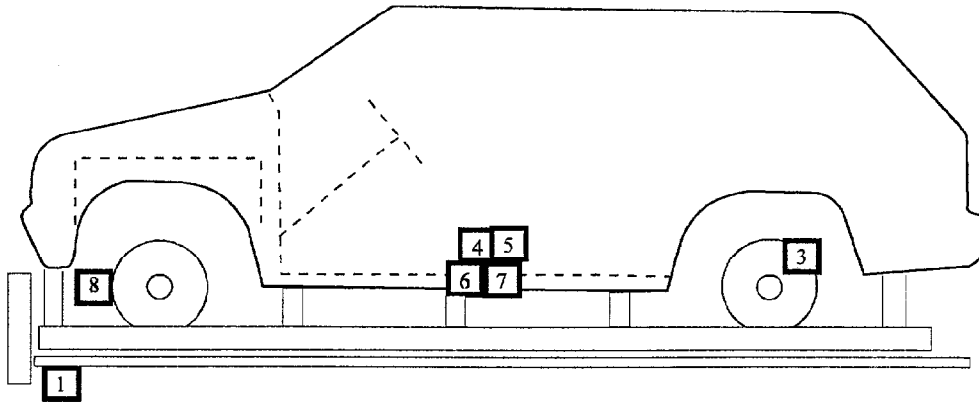
Acceleration: 17.3 g

Sled carriage acceleration duration:

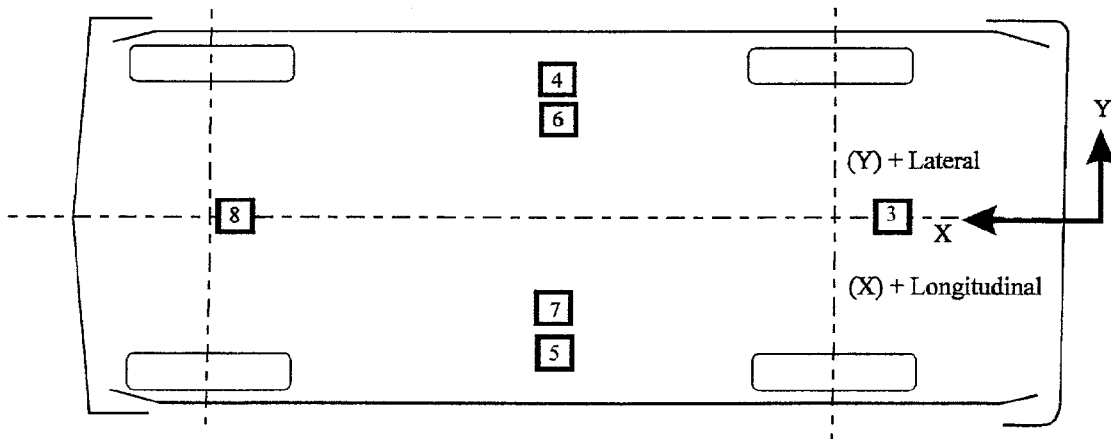
Time from T-0(-0.5 g) to 0.0 g: 124.3 msec

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: 980123S No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 SLED ACCELERATION PRIMARY REDUNDANT	139.4 in	-1.0 in		0.7 g @ 127.4 ms 1.4 g @ 129.0 ms	17.3 g @ 58.2 ms 18.0 g @ 57.6 ms
2 SLED VELOCITY MEASURED INTEGRATED				0.1 mph @ 5.8 ms -0.1 mph @ 5.8 ms	29.8 mph @ 145.8 ms 29.1 mph @ 142.8 ms
3 REAR AXLE LONGITUDINAL	24.4 in	0.0 in		2.3 g @ 130.7 ms	18.3 g @ 57.1 ms
4 LEFT BODY LONGITUDINAL	76.2 in	-25.2 in		2.2 g @ 131.3 ms	18.8 g @ 58.6 ms
5 RIGHT BODY LONGITUDINAL	76.2 in	25.2 in		2.3 g @ 130.7 ms	18.7 g @ 47.3 ms
6 LEFT FRAME LONGITUDINAL	76.4 in	-19.3 in		2.1 g @ 131.4 ms	19.0 g @ 54.0 ms
7 RIGHT FRAME LONGITUDINAL	76.4 in	19.3 in		2.1 g @ 131.0 ms	18.8 g @ 60.7 ms
8 BOTTOM ENGINE LONGITUDINAL	128.9 in	1.9 in		4.2 g @ 138.1 ms	19.9 g @ 48.2 ms
9 AIRBAG EVENT				7.0 volt @ 20.2 ms	---

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

Section 3.0

FMVSS 208 Sled Test Data

Table 6 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	66.8 g	10.9 g	13.3 g	68.0 g	-21.4 g	-3.1 g	9.4 g
Passenger	-26.8 g	-15.6 g	16.3 g	29.6 g	-33.2 g	4.0 g	7.5 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	1388 lbf	1298 lbf
Passenger	1225 lbf	1409 lbf

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	133	94.6 ms	130.6 ms
Passenger	121	91.4 ms	127.4 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	23.0 g	103.8 ms	106.9 ms
Passenger	29.8 g	98.8 ms	101.8 ms

Maximum Chest Deflection

Driver	1.5 in
Passenger	N/A ⁴

Neck Injury Criteria

	Flexion Moment	Extension Moment	Axial Tension Force	Axial Compression Force	Maximum Fore/Aft Shear Force
Driver	31.4 N·m	7.0 N·m	1107 N	185 N	867 N ³
Passenger	46.4 N·m	11.2 N·m	512 N	410 N	854 N ³

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

³ Maximum output of channel is positive (head rearward, chest forward)

⁴ See Data Acquisition Explanations

Table 7
FMVSS 208 SEAT BELT WARNING SYSTEM CHECK

NHTSA NO.: CW0303

Technician: T. Macy

Date: 01/23/98

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 = 8 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 = 8 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 = 8 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 = 8 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.: CW0303

Technician: T. Macy

Date: 01/23/98

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 the airbag system is designed to be maintenance-free (page 30).

Table 9
FMVSS 208 READINESS INDICATOR

NHTSA NO.: CW0303

Technician: T. Macy

Date: 01/23/98

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: Bottom center of 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.: CW0303 Technician: T. Macy & V. Watters Date: 01/23/98

DESIGNATED SEATING POSITION: Right front passenger seat

- ☒ 1. Record test seat position. Full rear
(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.: CW0303

Technician: T. Macy & V. Watters

Date: 01/23/98

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 58.2 inches.
- ☒11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing
- ☒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 25.8 inches.

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

NHTSA NO.: CW0303

Technician: T. Macy & V. Watters

Date: 01/23/98

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 27.2 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=1.4 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

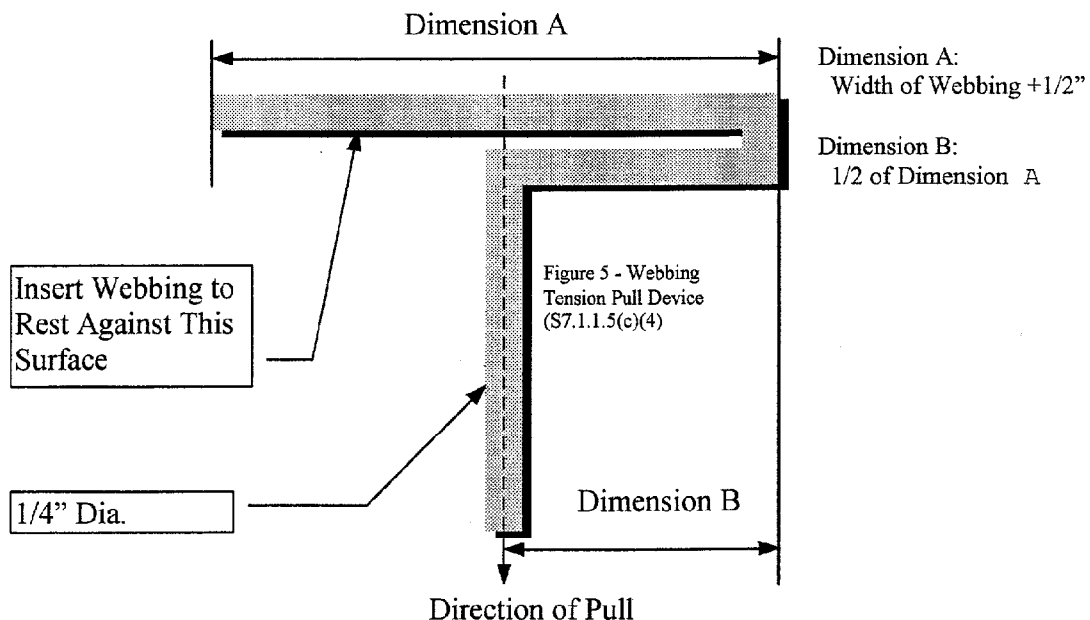


Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

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.: CW0303 Technician: V. Watters & M. Tonneman Date: 02/18/98¹

DESIGNATED SEATING POSITION: Left rear

- ☒ 1. Record test seat position. N/A
(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)) None
- ☒ 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

¹ This test was performed after the 208 sled test performance.

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

NHTSA NO.: CW0303 Technician: V. Watters and M. Tonneman Date: 02/18/98

DESIGNATED SEATING POSITION: Left rear

- ☒ 7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
- ☒ 8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒ 9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
- ☒ 10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2)) Measured distance between A and B 66.8 inches.
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing :
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device 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 22.3 inches.

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

NHTSA NO.: CW0303 Technician: V. Watters & M. Tonneman Date: 02/18/98

DESIGNATED SEATING POSITION: Left rear

- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate 20 lb/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 22.6 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=0.3 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=44.2 inches.

☒ Yes-Pass ☐ No-Fail

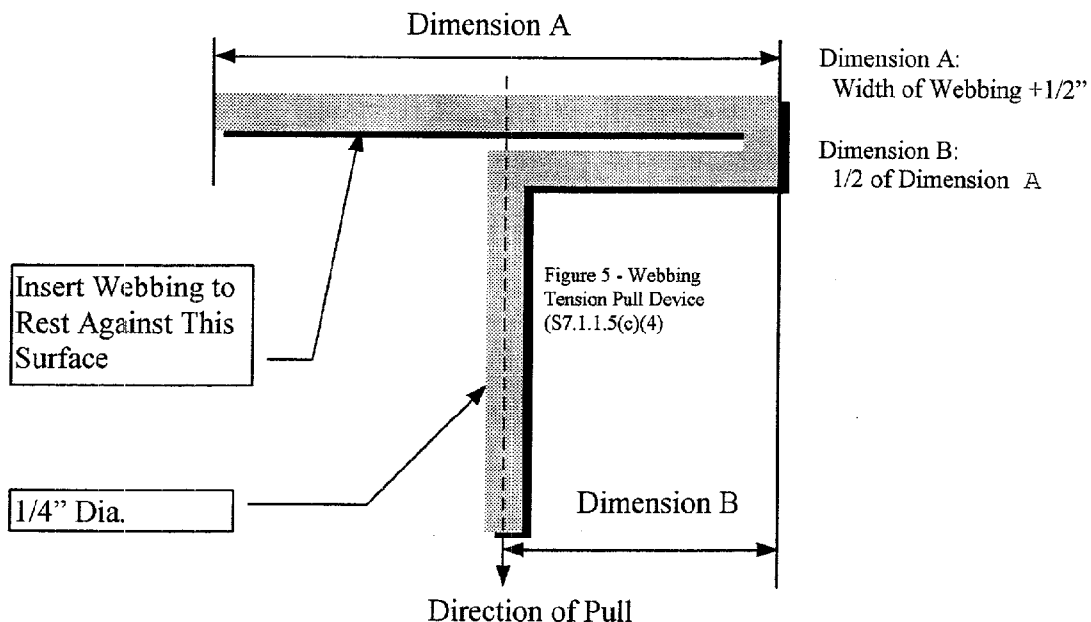


Table 11
FMVSS 208 Lap Belt Lockability, Cont'd.

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.: CW0303 Technician: V. Watters & M. Tonneman Date: 02/18/98¹

DESIGNATED SEATING POSITION: Right rear

- ☒ 1. Record test seat position. N/A
(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)) None
- ☒ 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

¹ This test was performed after the 208 sled test performance.

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

NHTSA NO.: CW0303 Technician: V. Watters and M. Tonneman Date: 02/18/98

DESIGNATED SEATING POSITION: Right rear

- ☒7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
- ☒8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
- ☒10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2)) Measured distance between A and B 56.5 inches.
- ☒11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing :
- ☒12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device 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 22.8 inches.

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

NHTSA NO.: CW0303 Technician: V. Watters & M. Tonneman Date: 02/18/98

DESIGNATED SEATING POSITION: Right rear

- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate 20 lb/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 23.1 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=0.3 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=33.4 inches.

☒ Yes-Pass ☐ No-Fail

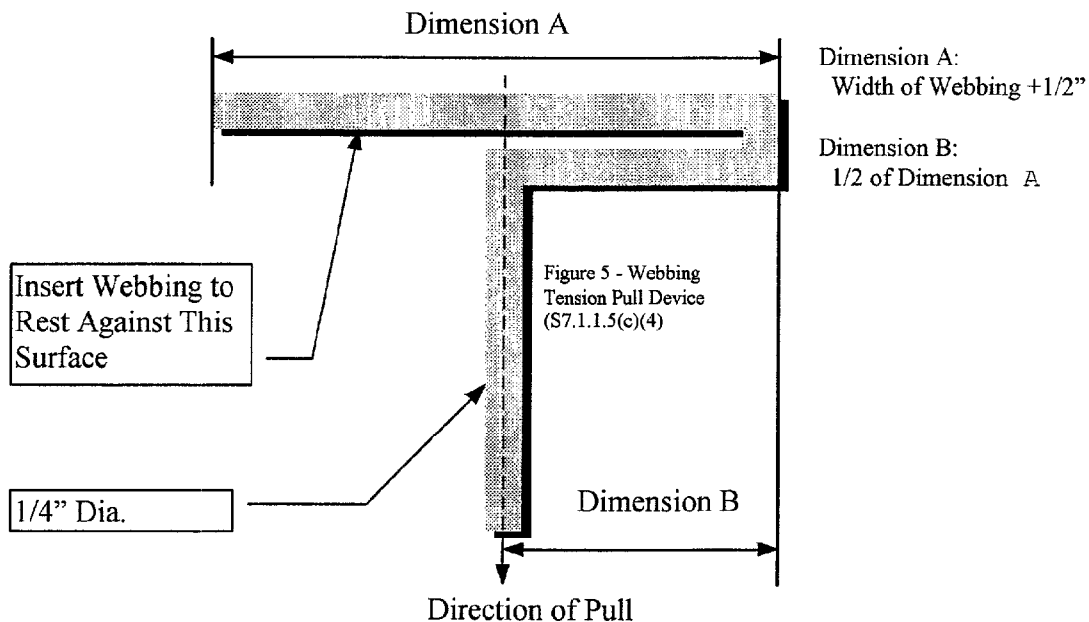


Table 12
FMVSS 208 Air Bag Labels

NHTSA NO.: CW0303

Technician: M. Tonneman

Date: 02/18/98

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

- 1.1 Does the manufacturer recommend periodic maintenance or replacement of the airbag?

☐ Yes (Go to 1.2)

☒ No (Go to 2)

- 1.2 Does the Vehicle have a maintenance or replacement label?

☐ Yes-Pass ☐ No-Fail

- 1.3 Does the label contain one of the following?

☐ Yes-Pass ☐ No-Fail

☐ Schedule on label specifies month and year

☐ Schedule on label specifies vehicle mileage

☐ Schedule on label specifies interval measured from date on certification label

- 1.4 Is the label permanently affixed within the passenger compartment?

☐ Yes-Pass ☐ No-Fail

- 1.5 Is the label lettered in English?

☐ Yes-Pass ☐ No-Fail

- 1.6 Is the label in block capitals and numerals?

☐ Yes-Pass ☐ No-Fail

- 1.7 Are the letters and numerals at 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(c)) 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

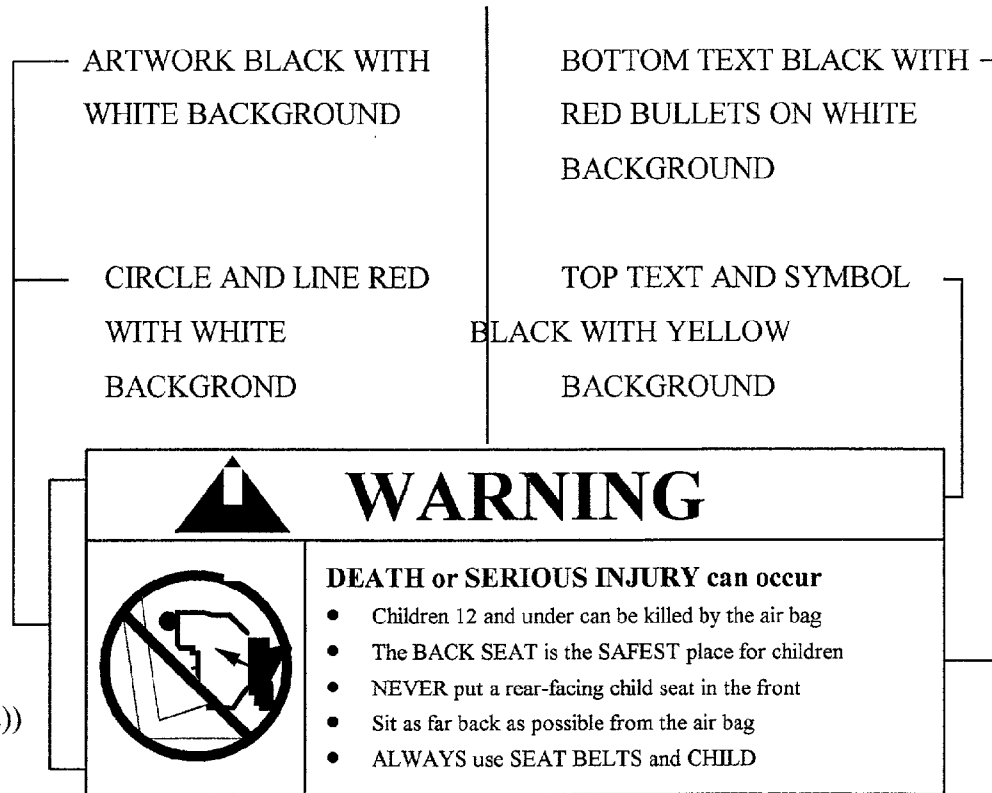
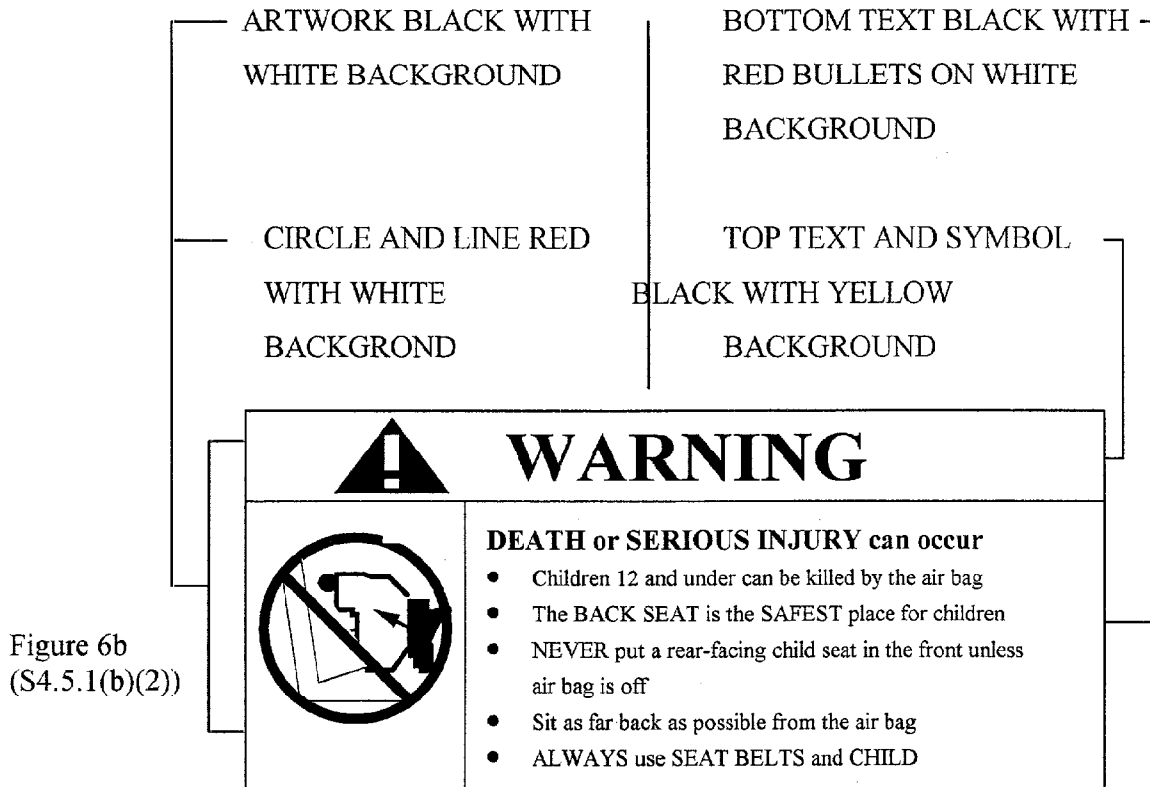


Figure 6a
(S4.5.1(b)(2))

Table 12
Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK



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 **46** 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 31 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 28.7 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 31.0 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))

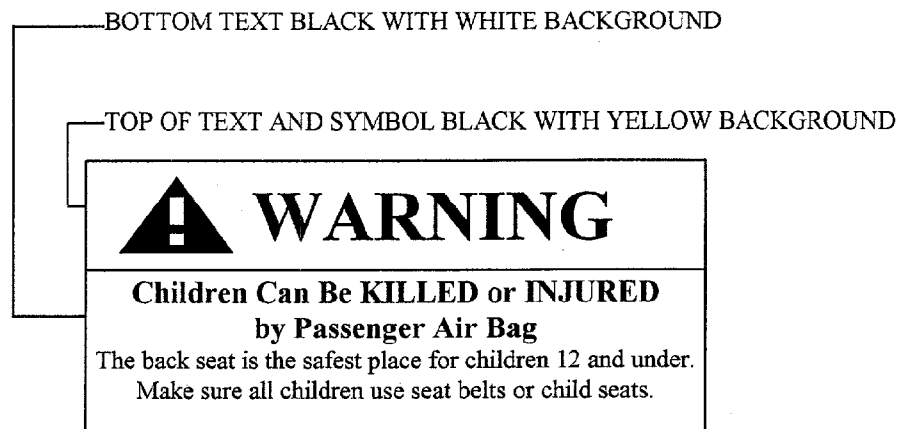


Table 12
Air Bag Labels, Cont'd.

- 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 34.2 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.: CW0303

Vehicle Model Year/Make/Model/Body Style: 1998/Jeep/Grand Cherokee/Laredo/4WD

Date of Comfort and Convenience Check: 02/18/98¹

Technician Performing Check: V. Watters and M. Tonneman

GVWR: 5300 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 CARS²**

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.

¹ This test was performed after the 208 sled test performance.

² 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 0.3 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 0.6 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 N/A

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-☐

Note: No part of belt assembly passes through cushion.

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

FRONT OUTBOARD PASSENGER N/A

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-☐

Note: No part of belt assembly passes through cushion.

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 2 Vehicle Target Locations

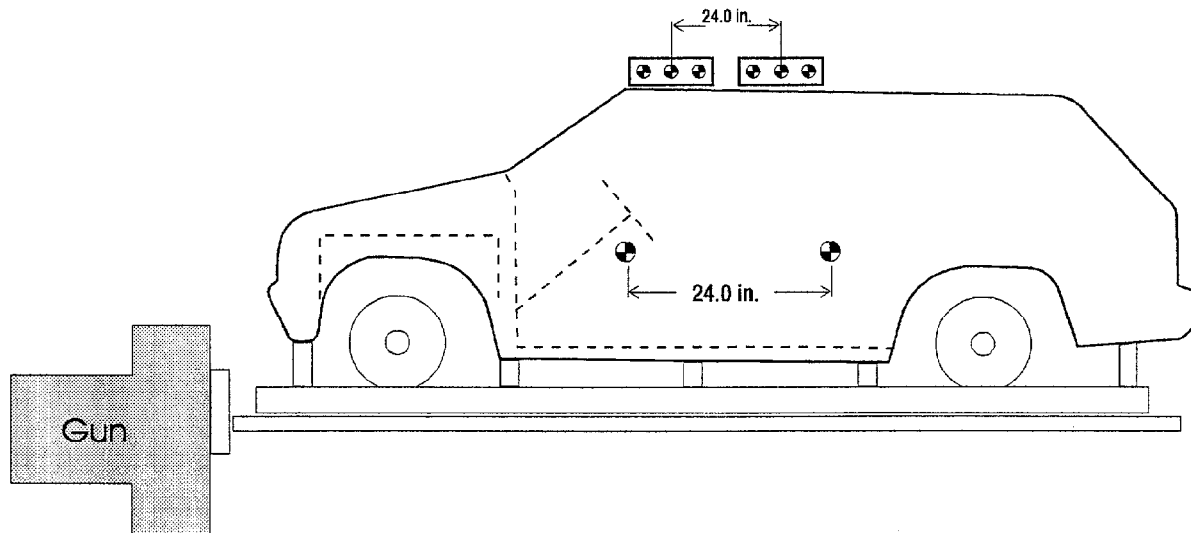


Figure 3 Dummy Measurement Locations for Front Seat Occupants

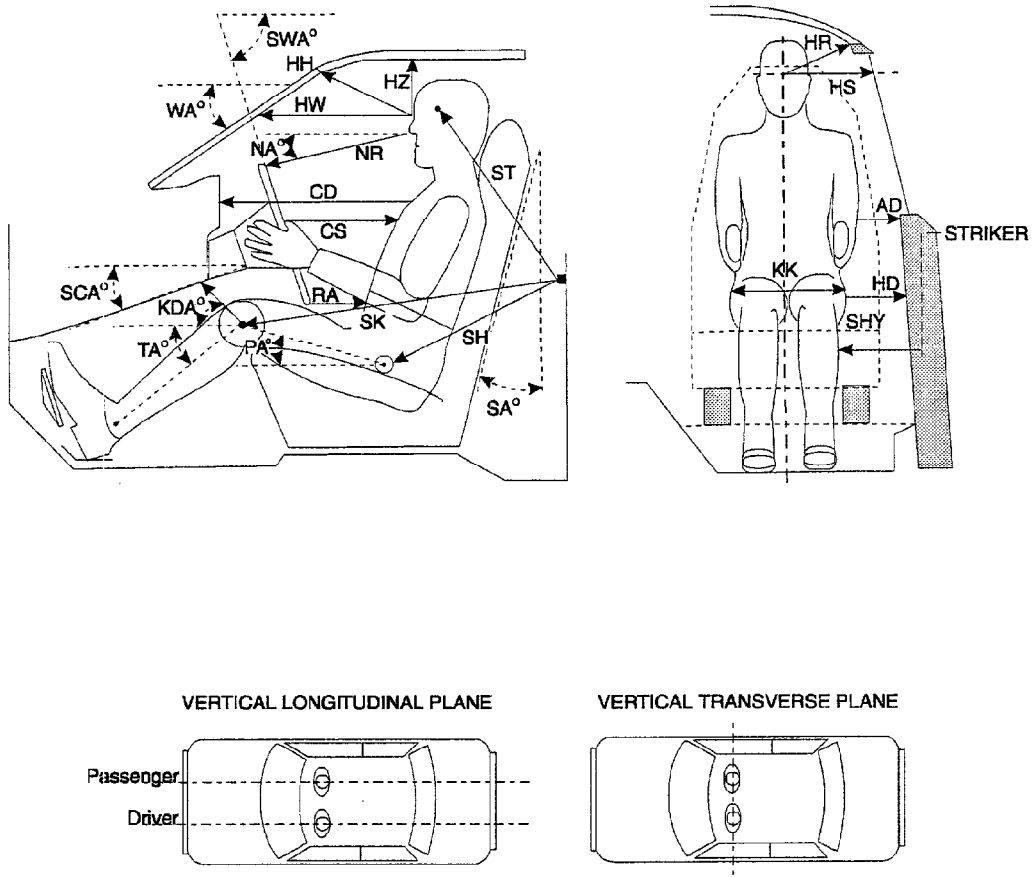


Table 14 Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #229)	Passenger (Serial #230)
WA	Windshield angle	33.4°	N/A
SWA	Steering wheel angle	66.5°	N/A
SCA	Steering column angle	23.2°	N/A
SA	Seat back angle	24.0°	24°
HZ	Head to roof	7.5 in	6.9 in
HH	Head to header	14.3 in	15.2 in
HW	Head to windshield	20.9 in	21.3 in
HR	Head to side header	8.6 in	8.5 in
NR	Nose to rim	14.3 in	N/A
NA	Nose to rim angle	N/A	N/A
CD	Chest to dash	20.6 in	22.1 in
CS	Steering wheel to chest	11.8 in	NA
RA	Rim to abdomen	6.3 in	NA
KDL	Left knee to dash	6.5 in	5.6 in
KDR	Right knee to dash	4.2 in	5.7 in
KDA	Outboard knee to dash angle	26°	23°
PA	Pelvic angle	23.7°	23.0°
TA	Tibial angle	41.5°	43.3°
KK	Knee to knee	13.1 in	10.4 in
ST ¹	Striker to head	23.0 in	23.1 in
	Striker to head angle	-82.6°	-83.7°
SK ¹	Striker to knee	23.6 in	25.2 in
	Striker to knee angle	-2.3°	-2.3°
SH ¹	Striker to H-point	9.1 in	9.7 in
	Striker to H-point angle	12.4°	11.6°
SHY	Striker to H-point (Y dir.)	8.3 in	8.3 in
HS	Head to side window	12.1 in	12.0 in
HD	H-point to door	5.4 in	5.8 in
AD	Arm to door	3.7 in	4.0 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

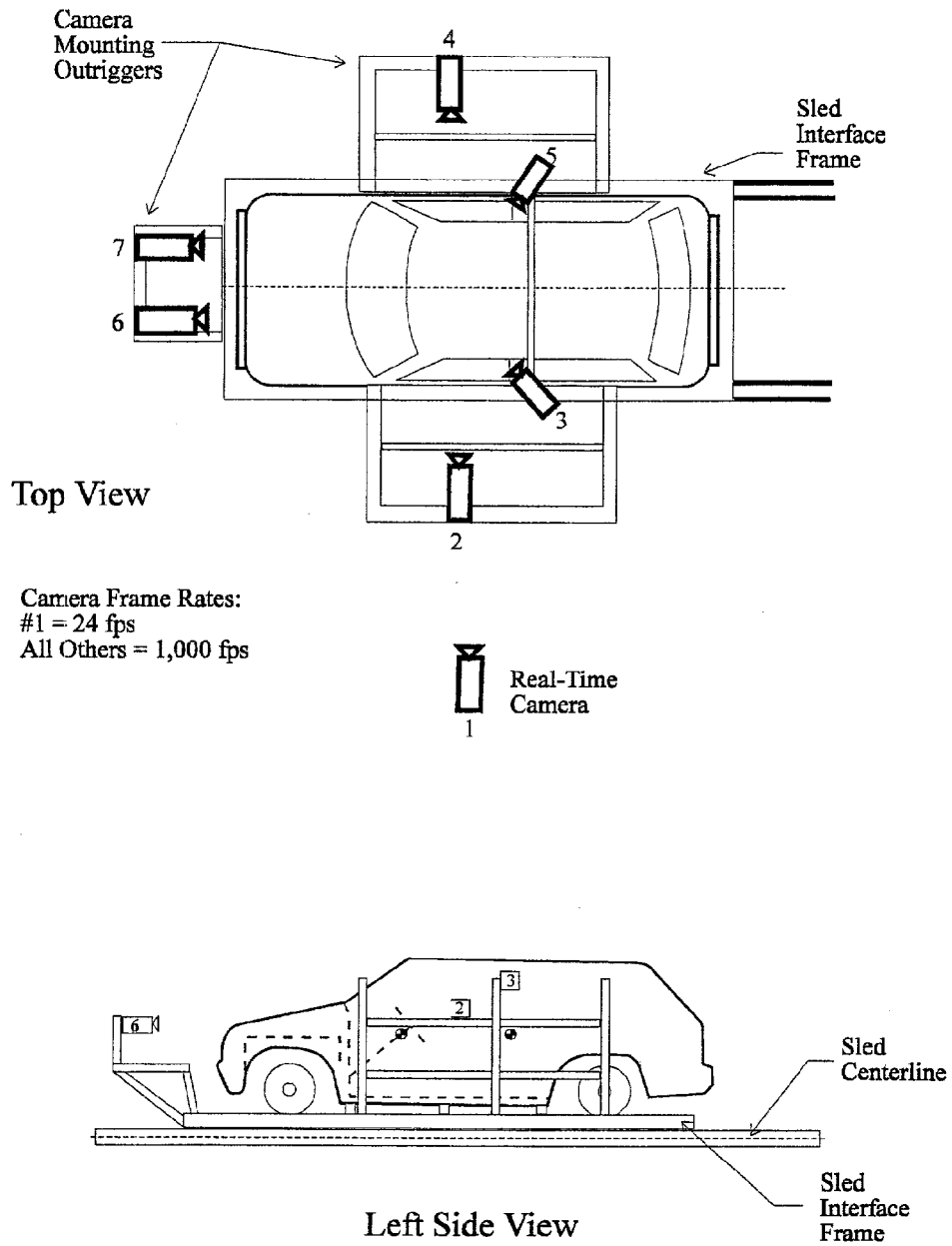


Table 15 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1998/Jeep/Grand Cherokee/Laredo/4WD

Test number: 980123S

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	110.0 in	310.0 in	54.0 in	0°	290.0 in	N/A	24 frames/s
2	Left side view wide	77.5 in	72.0 in	51.0 in	2°	N/A	5 mm	1015 frames/s
3	Left side view over shoulder	101.0 in	49.0 in	55.5 in	-11°	N/A	8 mm	998 frames/s
4	Right side view	78.0 in	93.0 in	50.5 in	2°	N/A	13 mm	1000 frames/s
5	Right side view over shoulder	101.0 in	49.0 in	55.0 in	-11°	N/A	8 mm	998 frames/s
6	Front view - driver	27.0 in	12.5 in	62.0 in	-9°	N/A	8 mm	995 frames/s
7	Front view - passenger	27.0 in	17.0 in	62.0 in	-9°	N/A	8 mm	1002 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

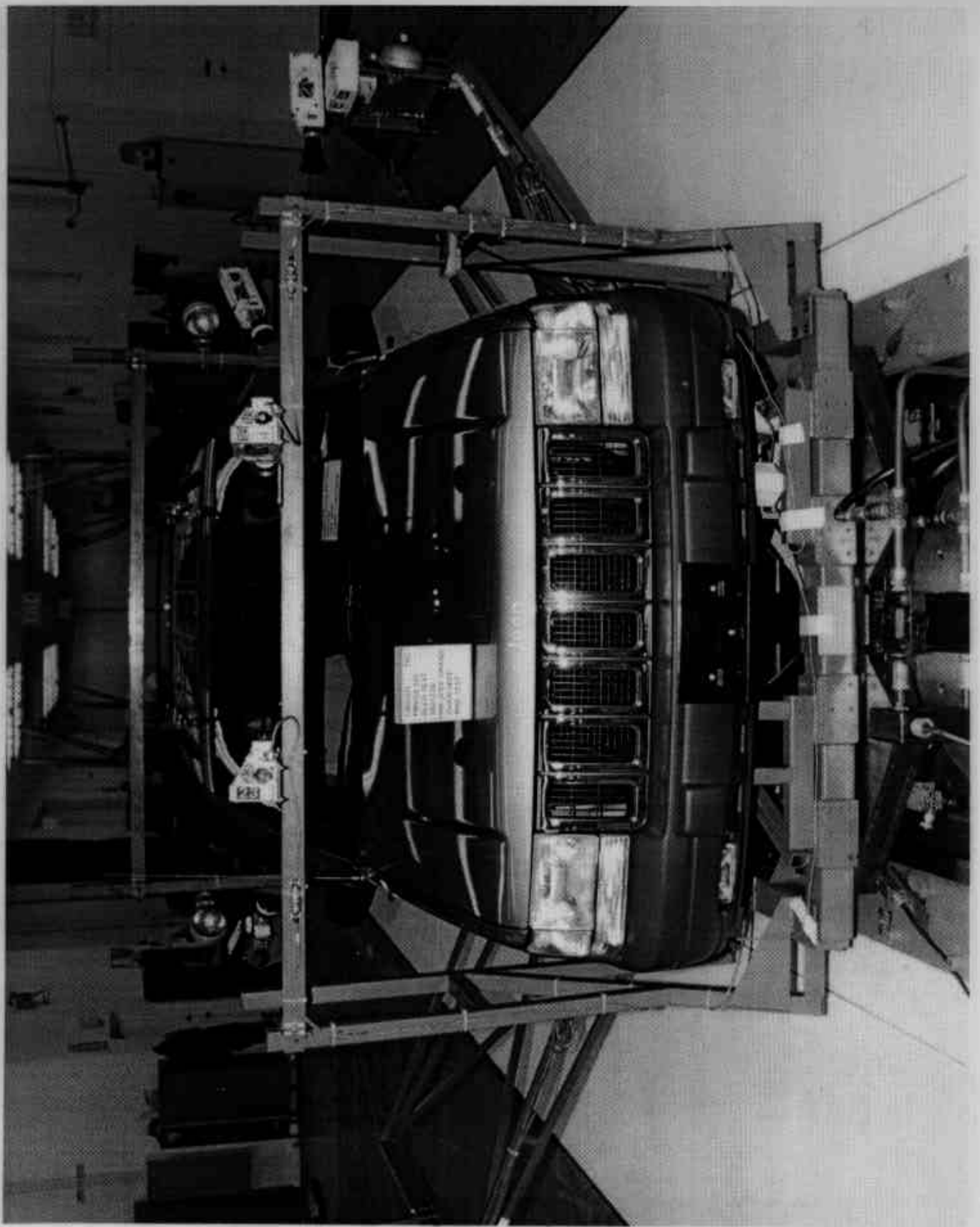


Figure A-1 Pre-Test Front View Of Test Vehicle Mounted To Sled
A-2

980123

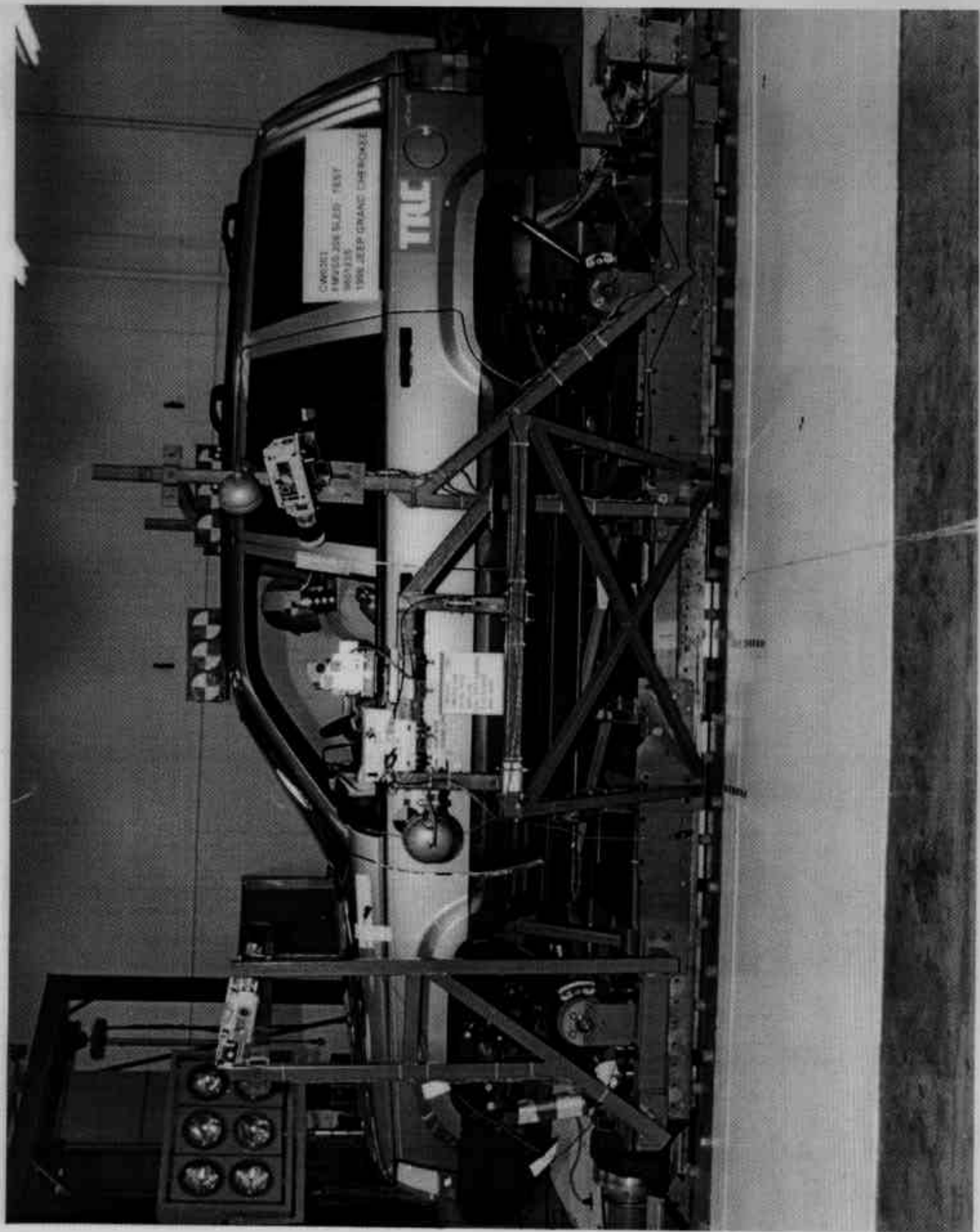


Figure A-2 Pre-Test Left Side View Of Test Vehicle Mounted To Sled

A-3

980123

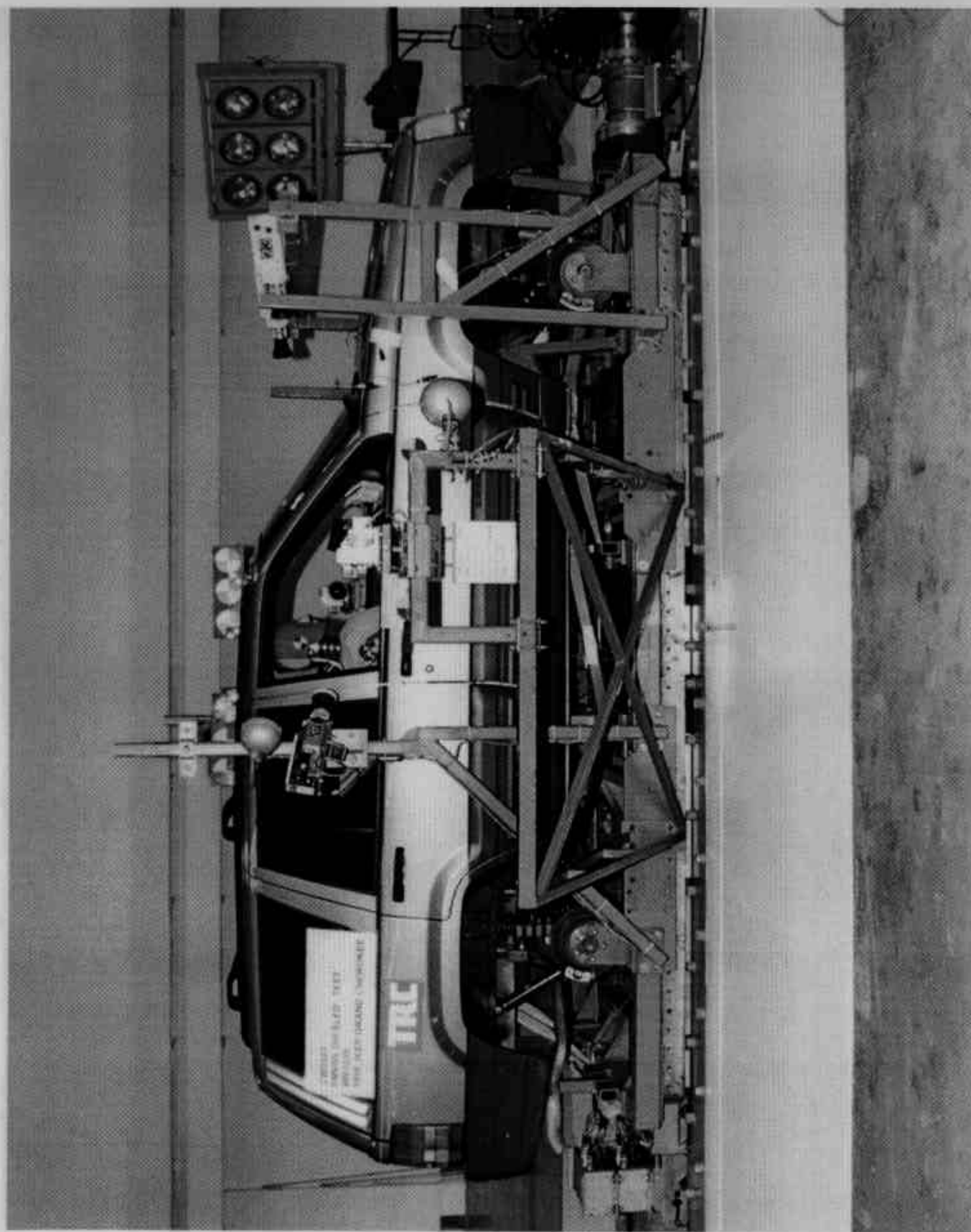


Figure A-3 Pre-Test Right Side View Of Test Vehicle Mounted To Sled

A-4

980123

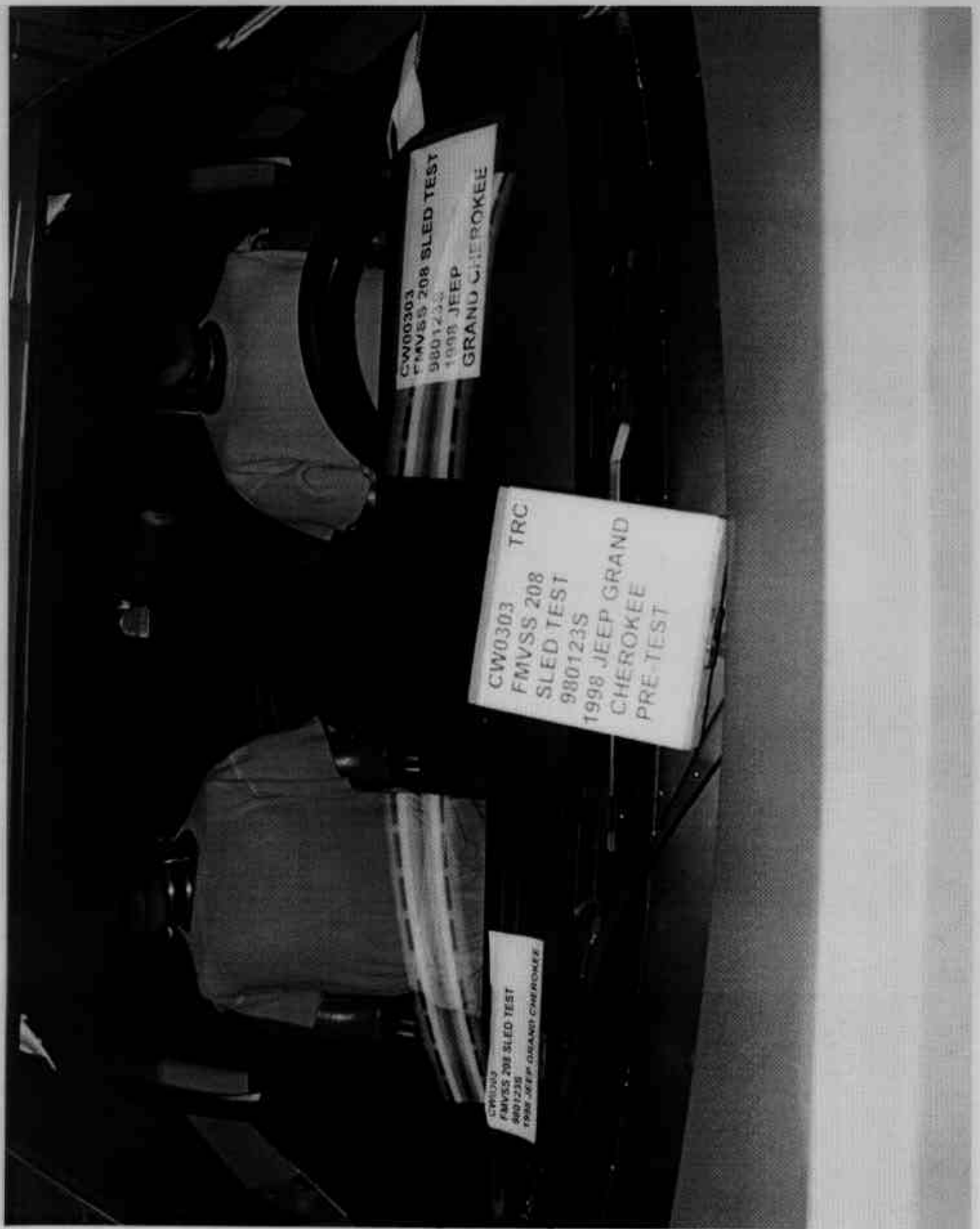


Figure A-4 Pre-Test Windshield View
A-5

980123



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

980123



Figure A-6 Pre-Test Driver Dummy Position View With Door Open
A-7

980123



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

A-8

980123

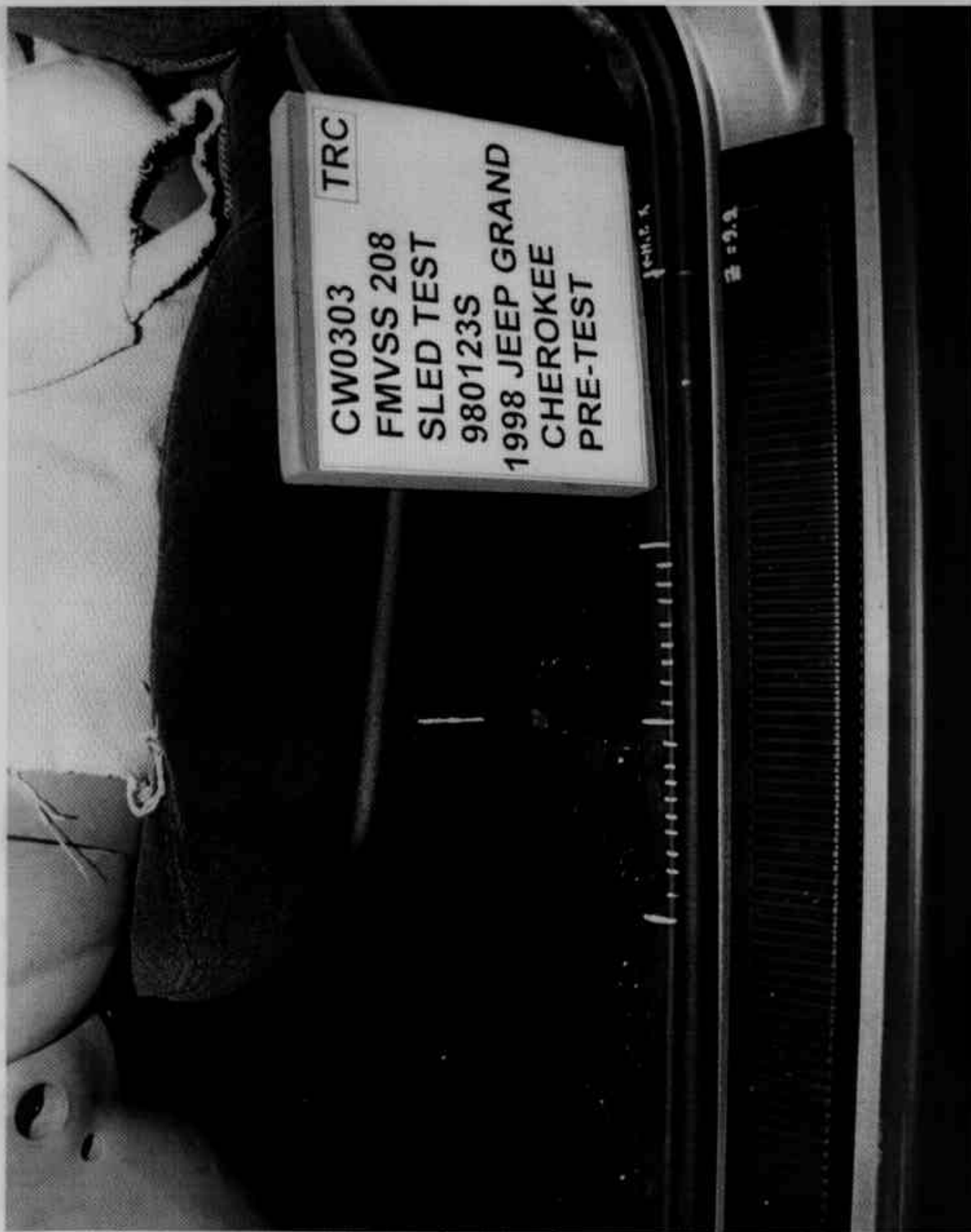


Figure A-8 Pre-Test Driver Seat Track Position View
A-9

980123

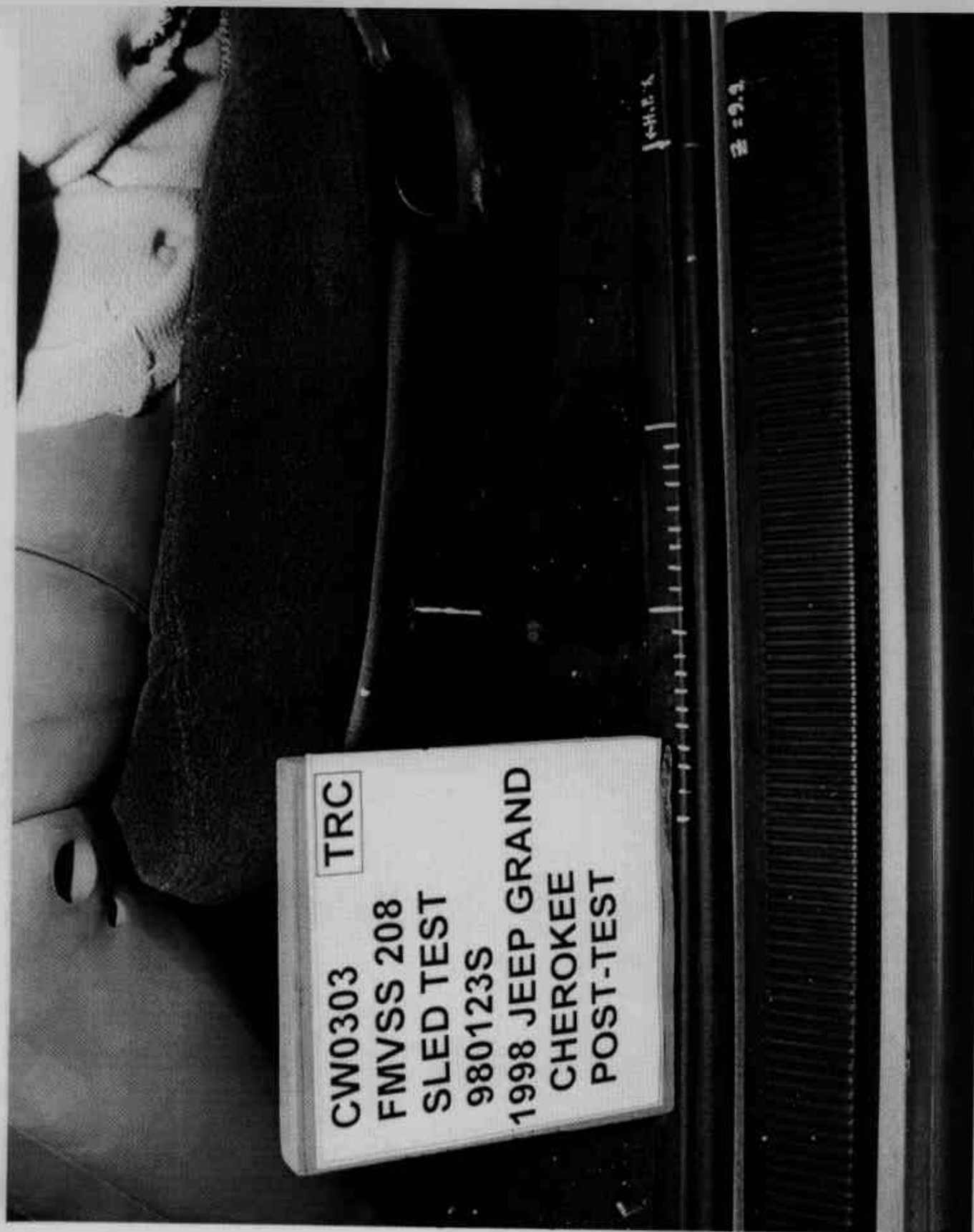


Figure A-9 Post-Test Driver Seat Track Position View
A-10

980123



Figure A-10 Pre-Test Driver Dummy Position View With Door Closed

A-11

980123



Figure A-11 Post-Test Driver Dummy Position View With Door Closed

A-12

980123



Figure A-12 Pre-Test Driver Knee Bolster View
A-13

980123



Figure A-13 Post-Test Driver Knee Bolster - View 1
A-14

980123

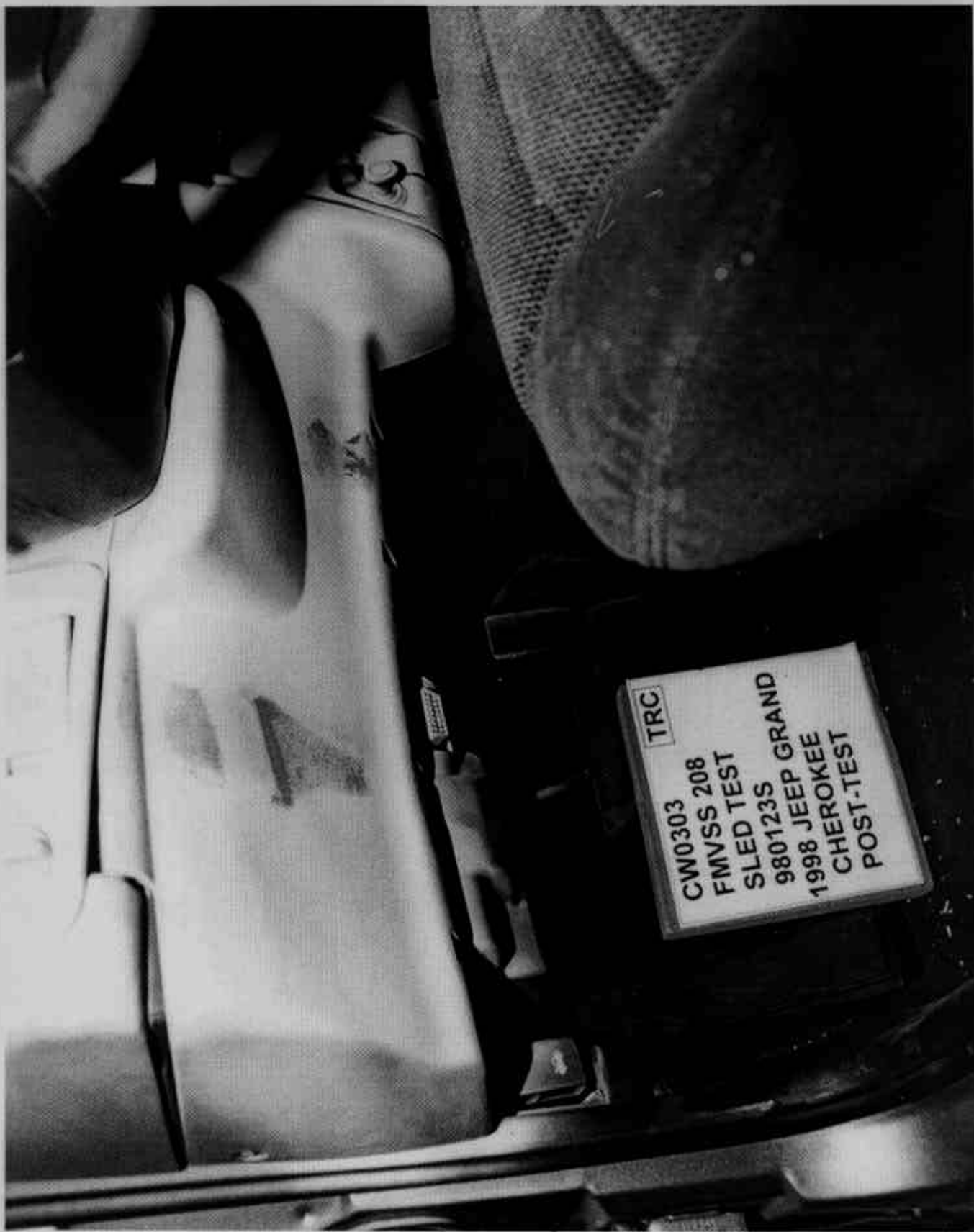


Figure A-14 Post-Test Driver Knee Bolster - View 2
A-15

980123

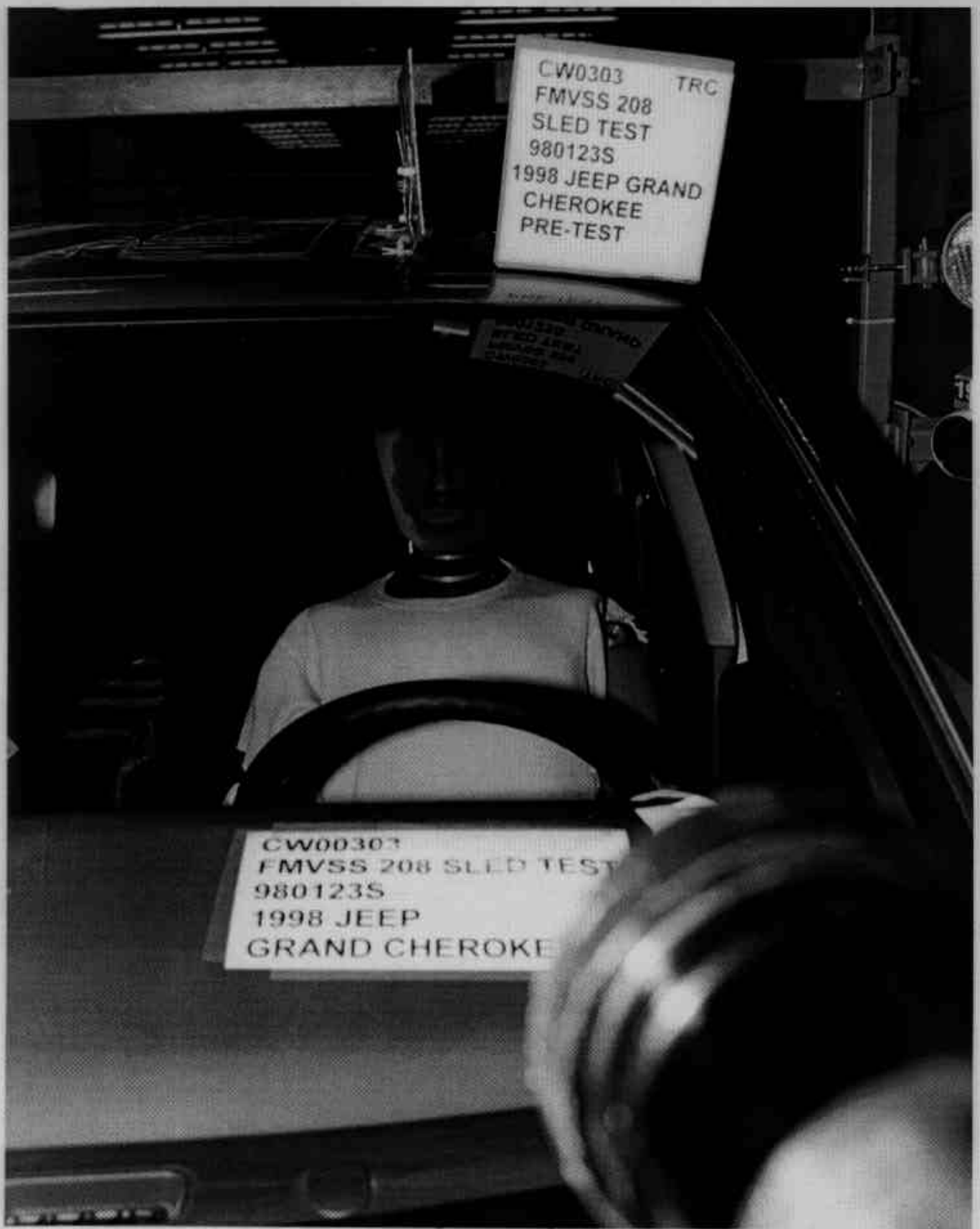


Figure A-15 Pre-Test Driver Dummy Position Front View
A-16

980123

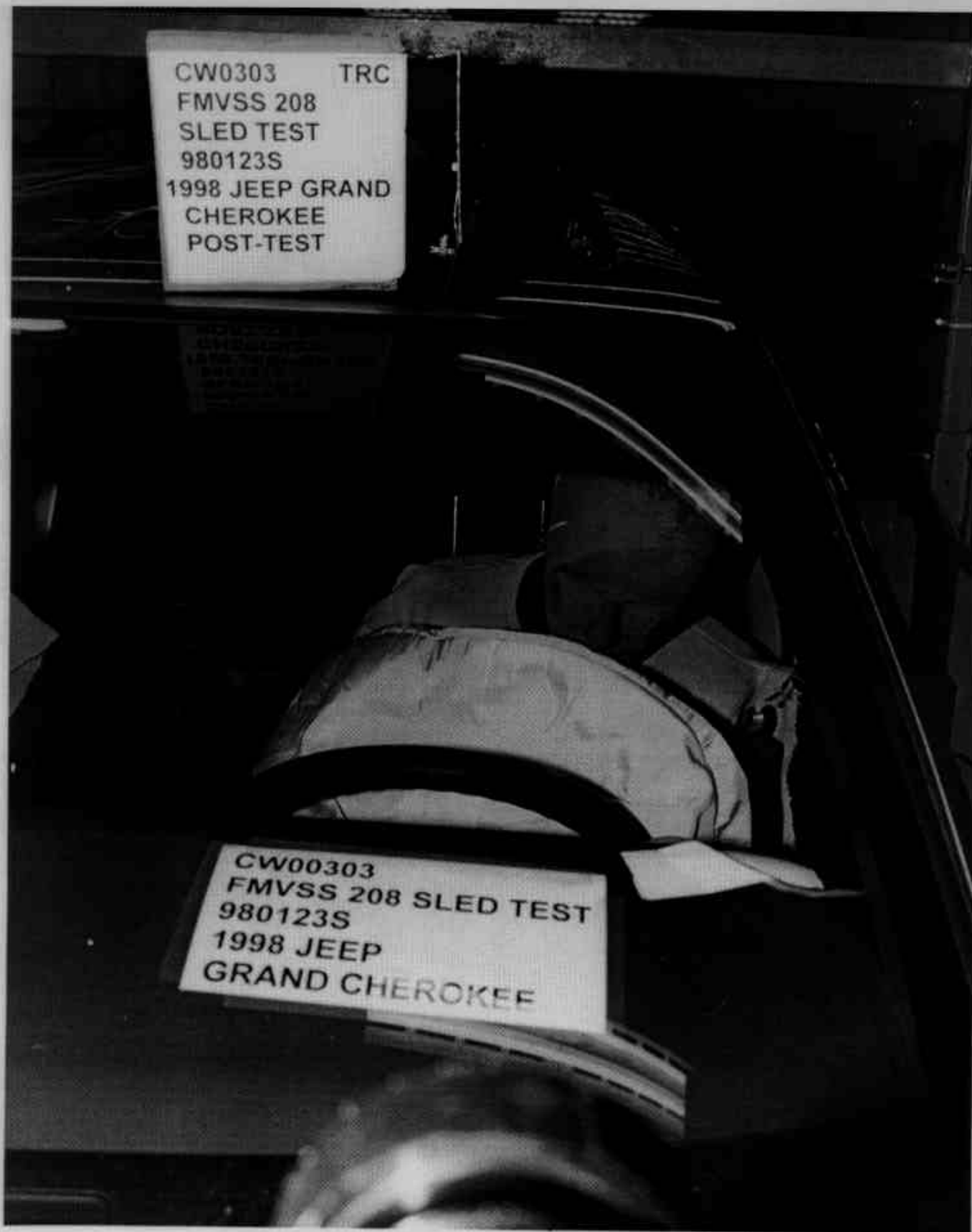


Figure A-16 Post-Test Driver Dummy Position Front View
A-17

980123



Figure A-17 Post-Test Driver Airbag View
A-18

980123



Figure A-18 Post-Test Driver Dummy Removed From Vehicle Overall View
A-19 980123



Figure A-19 Pre-Test Passenger Dummy Position View With Door Open

A-20

980123



Figure A-20 Post-Test Passenger Dummy Position View With Door Open
A-21 980123

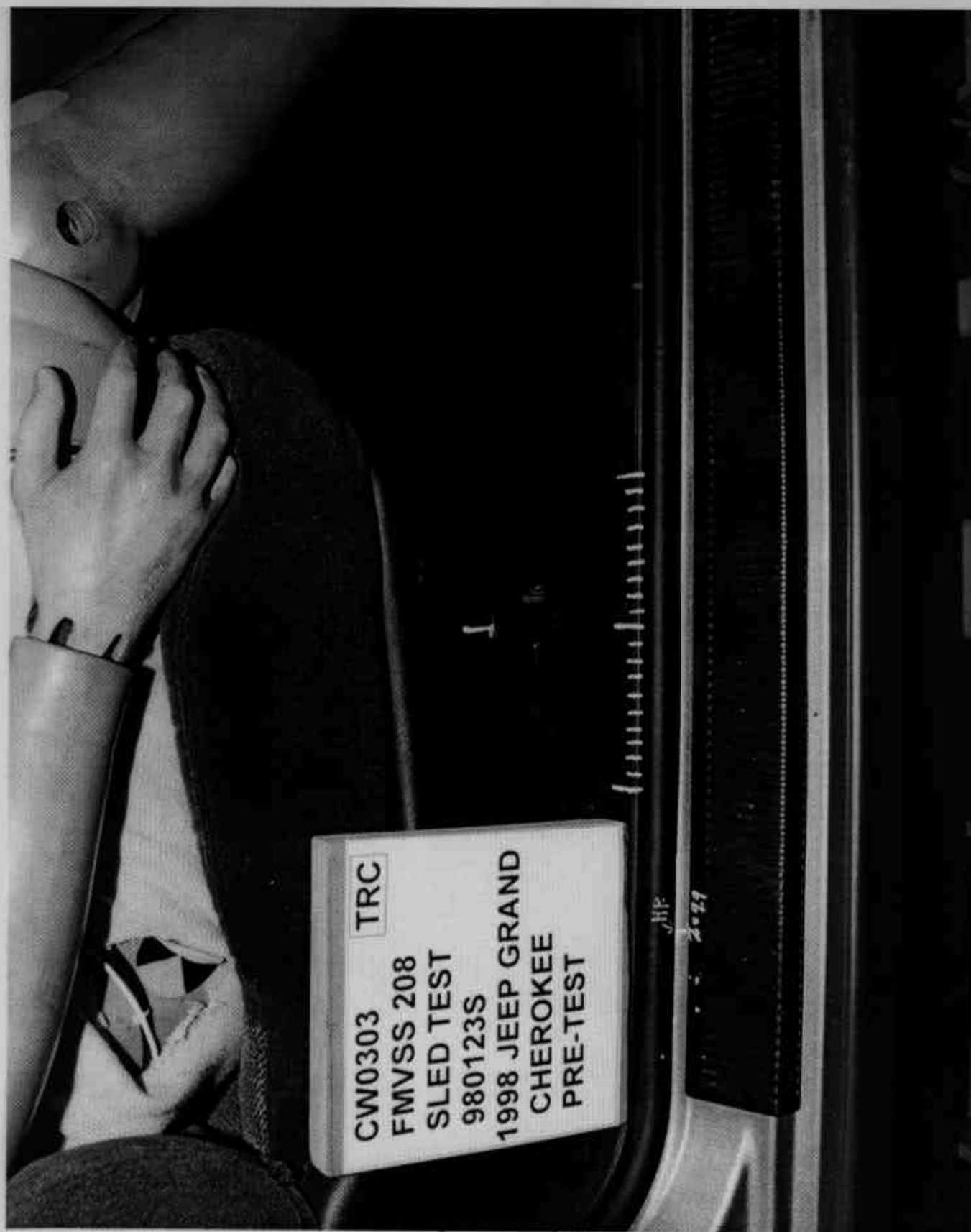


Figure A-21 Pre-Test Passenger Seat Track Position View
A-22

980123

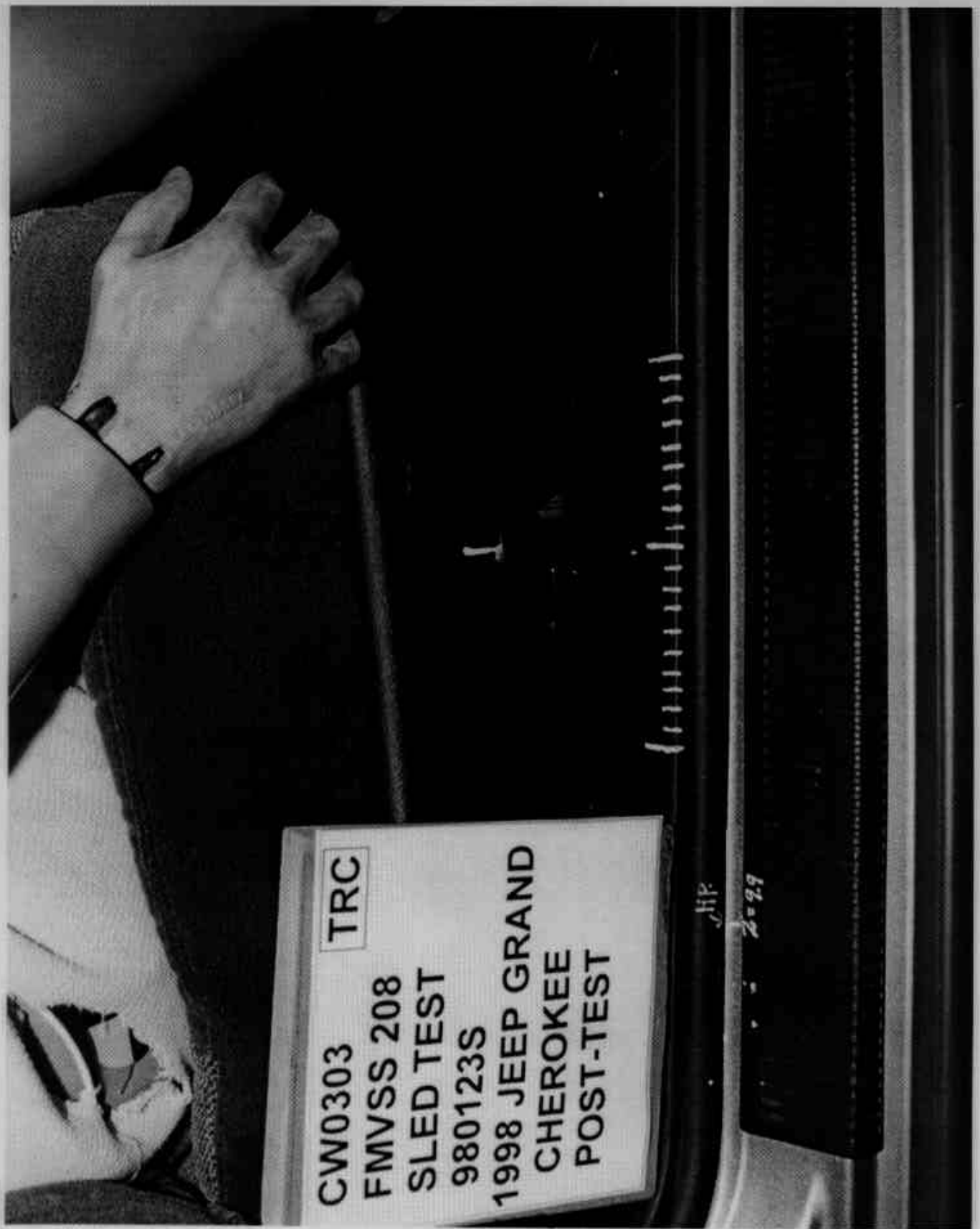


Figure A-22 Post-Test Passenger Seat Track Position View
A-23

980123

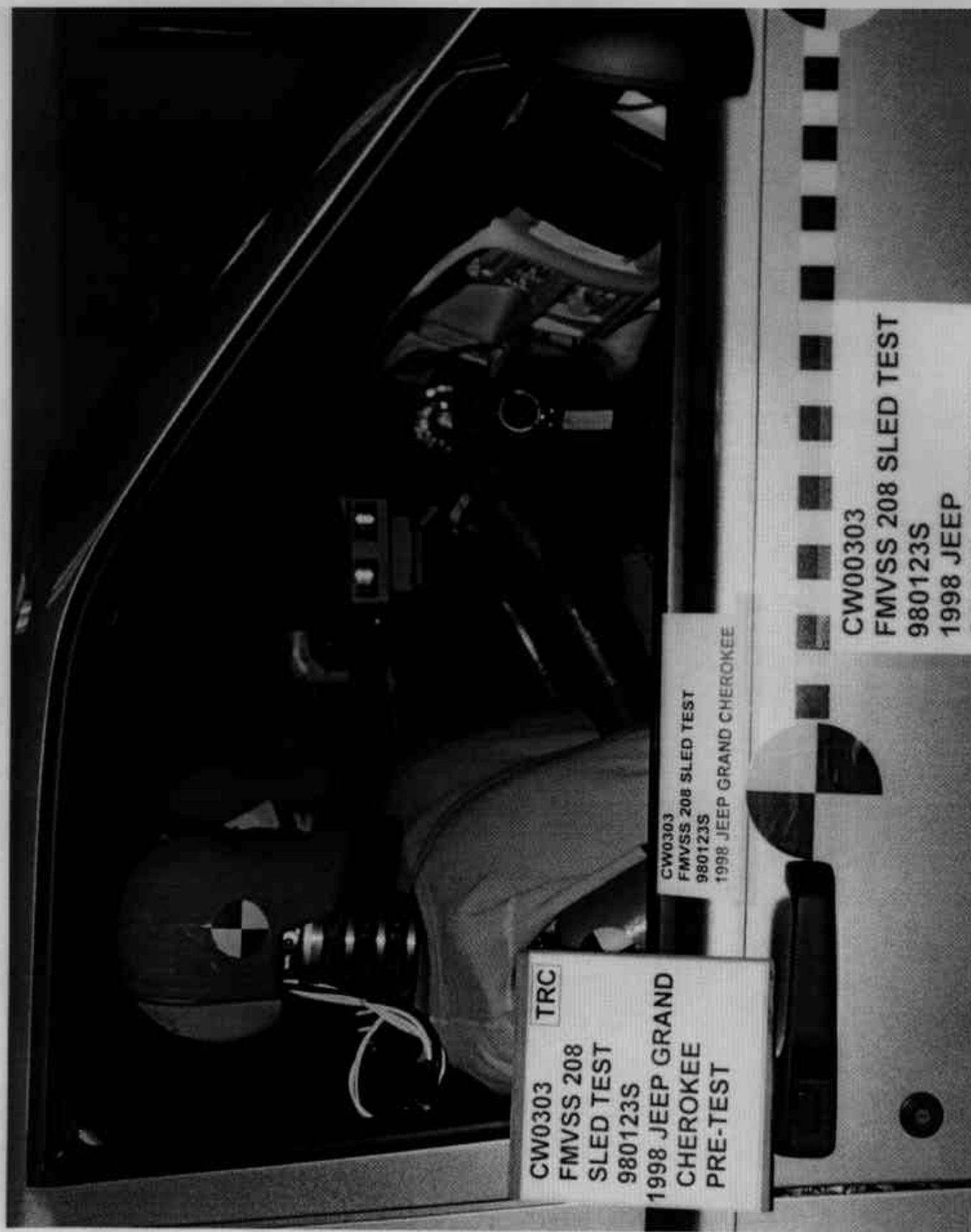


Figure A-23 Pre-Test Passenger Dummy Position View With Door Closed



Figure A-24 Post-Test Passenger Dummy Position View With Door Closed

A-25

980123



Figure A-25 Pre-Test Passenger Glove Box View
A-26

980123

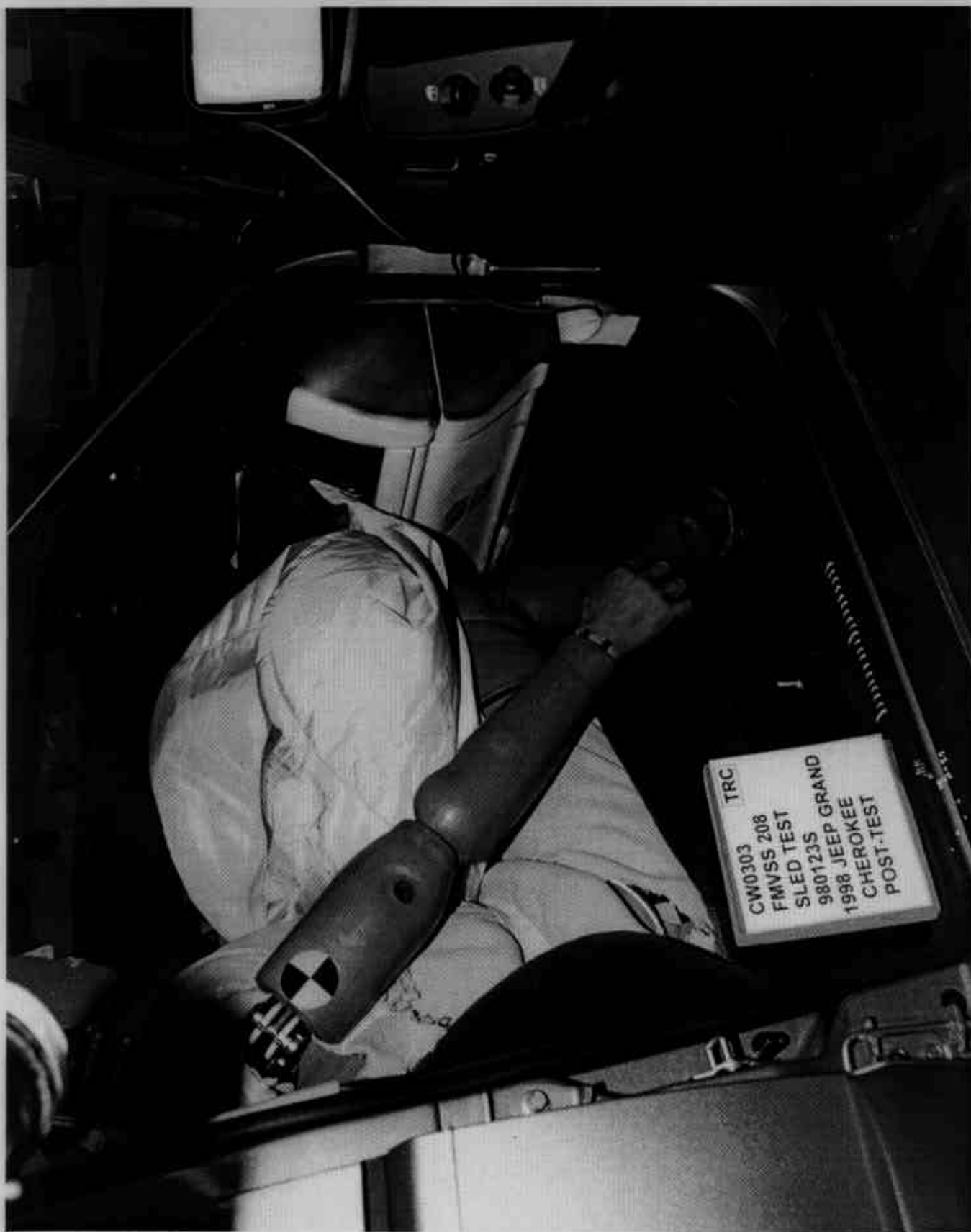


Figure A-26 Post-Test Passenger Glove Box - View 1
A-27

980123



Figure A-27 Post-Test Passenger Glove Box - View 2
A-28

980123

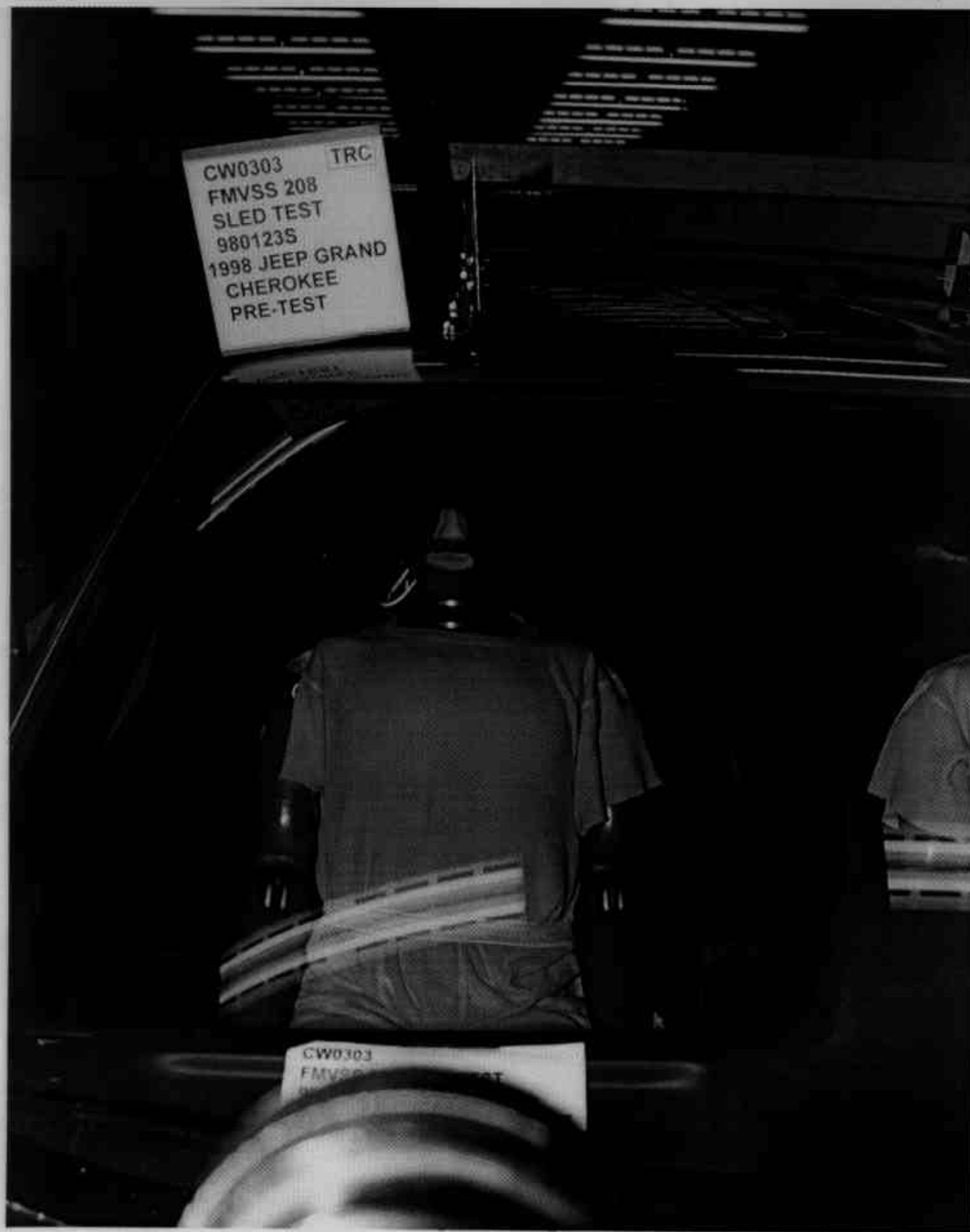


Figure A-28 Pre-Test Passenger Dummy Position Front View
A-29

980123

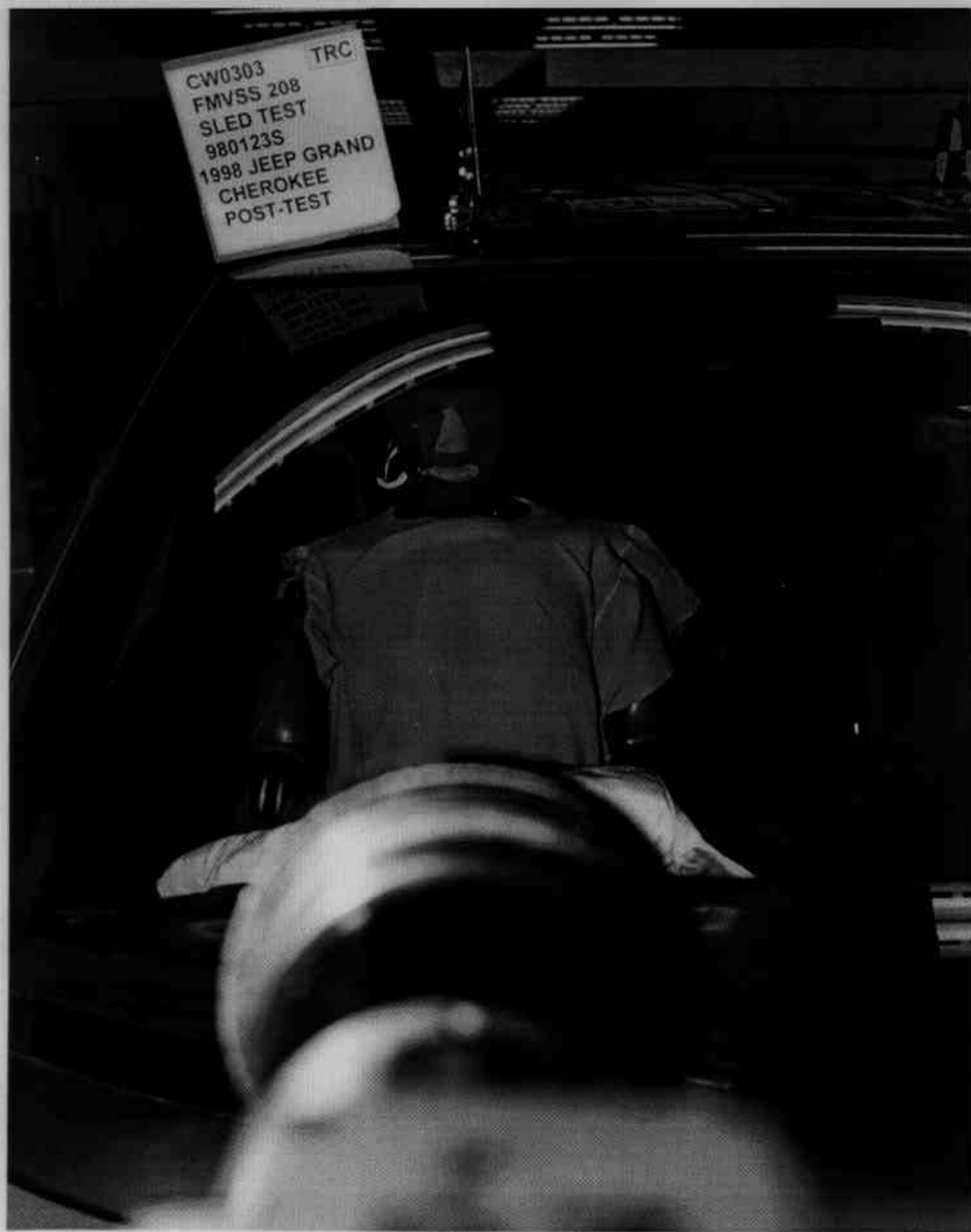


Figure A-29 Post-Test Passenger Dummy Position Front View
A-30

980123



Figure A-30 Post-Test Passenger Airbag View
A-31

980123

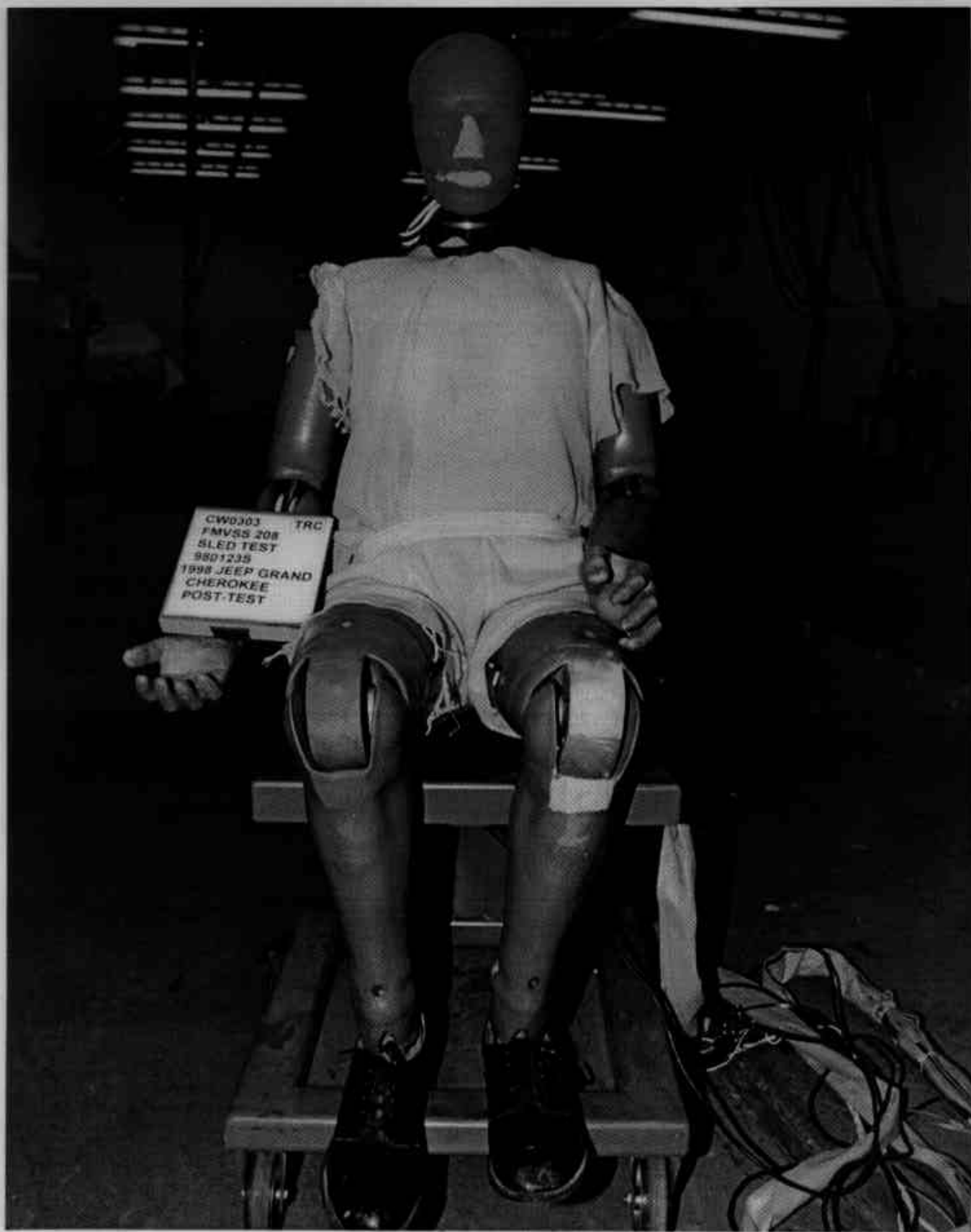


Figure A-31 Post-Test Passenger Dummy Removed From Vehicle Overall View
A-32 980123

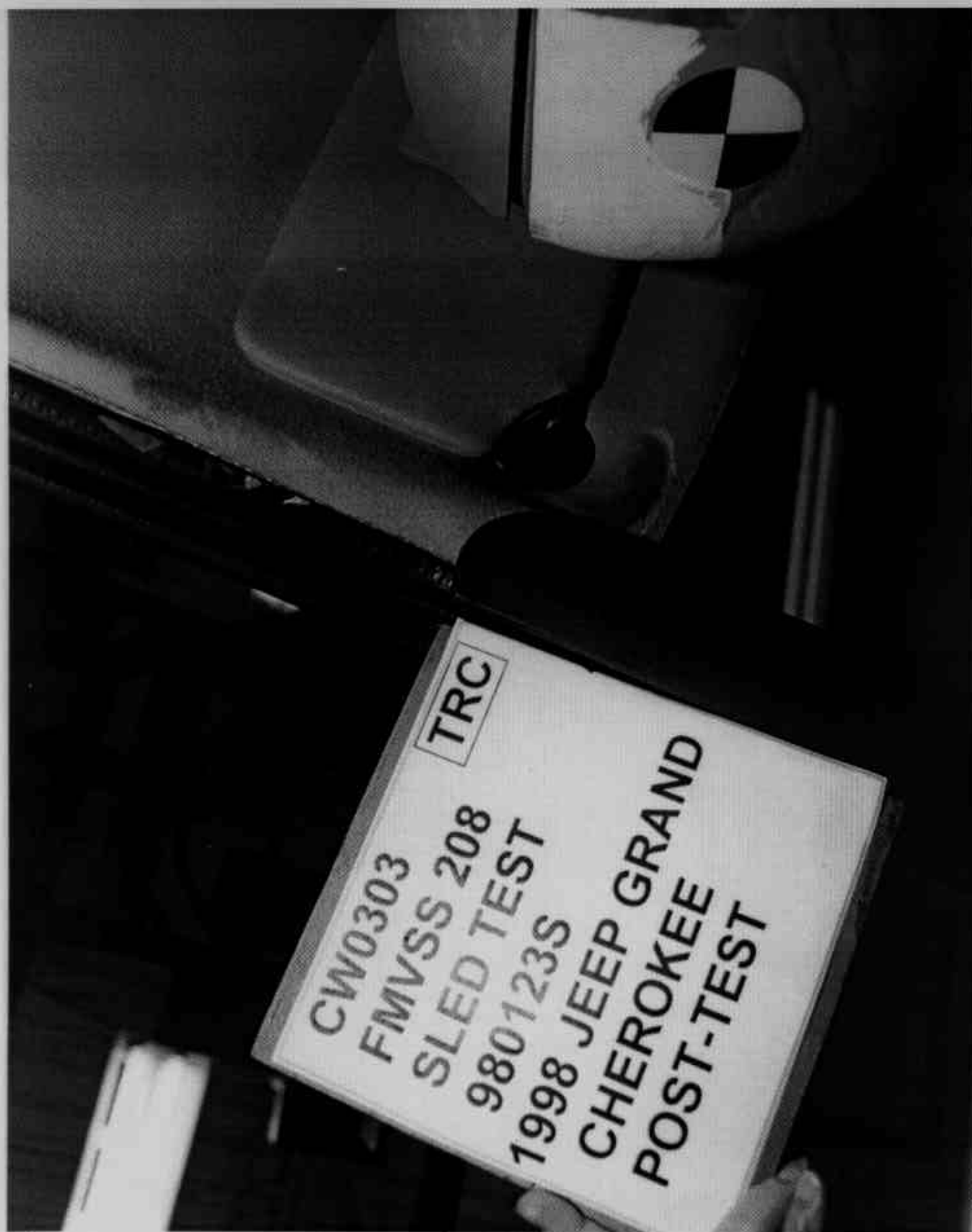


Figure A-32 Post-Test Driver Dummy Head Contact View
A-33

980123



Figure A-33 Post-Test Passenger Head Contact View
A-34

980123

MFD BY	CHRYSLER CORPORATION	DATE OF MFR	8-97	GWR	2405 KG (5300 LB)
GAWR FRONT	1240 KG (2750 LB)	WITH TIRES	P215/75R15	RIMS AT	15X7.0
GAWR REAR	1339 KG (2950 LB)	WITH TIRES	P215/75R15	RIMS AT	15X7.0
				COLD	248 KPA (36 PSI)
				COLD	248 KPA (36 PSI)

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN: 1J4GZ58S1WC102061 TYPE: MPV SINGLE X DUAL

MDM: 080205 807AA PNT:PSA VEHICLE MADE IN U.S.A. TRN:F50Z 4548503

Figure A-34 Pre-Test Vehicle Certification Label View

Appendix B

Data Plots

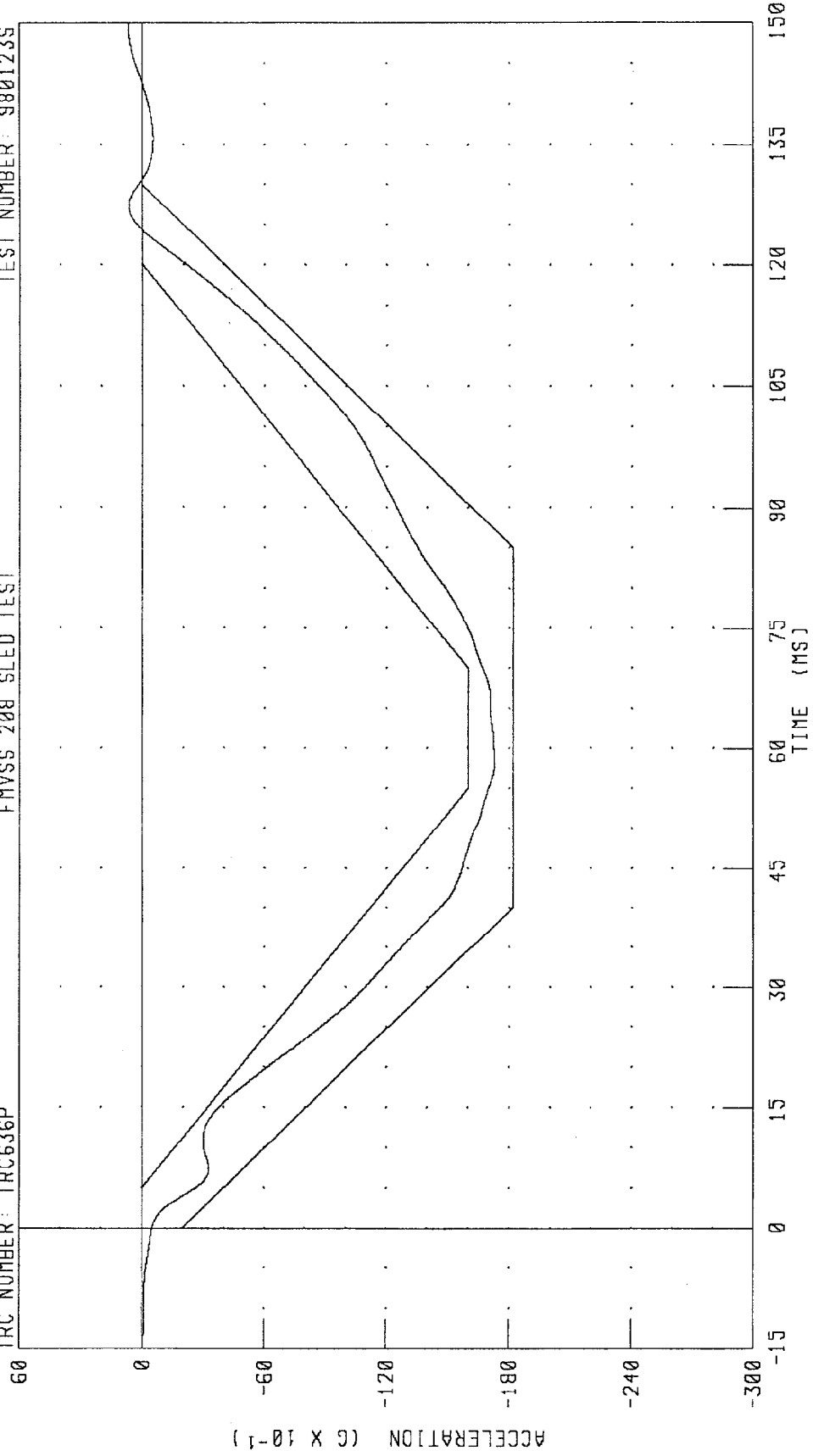
CW0303 / 1998 JEEP GRAND CHEROKEE

SLED ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



CHANNEL: SLDXG FILTER: CH. CLASS 60

PEAK DATA: 0.67 G @ 127.36 MS; -17.28 G @ 58.16 MS

CW0303 / 1998 JEEP GRAND CHEROKEE

SLED ACCELERATION

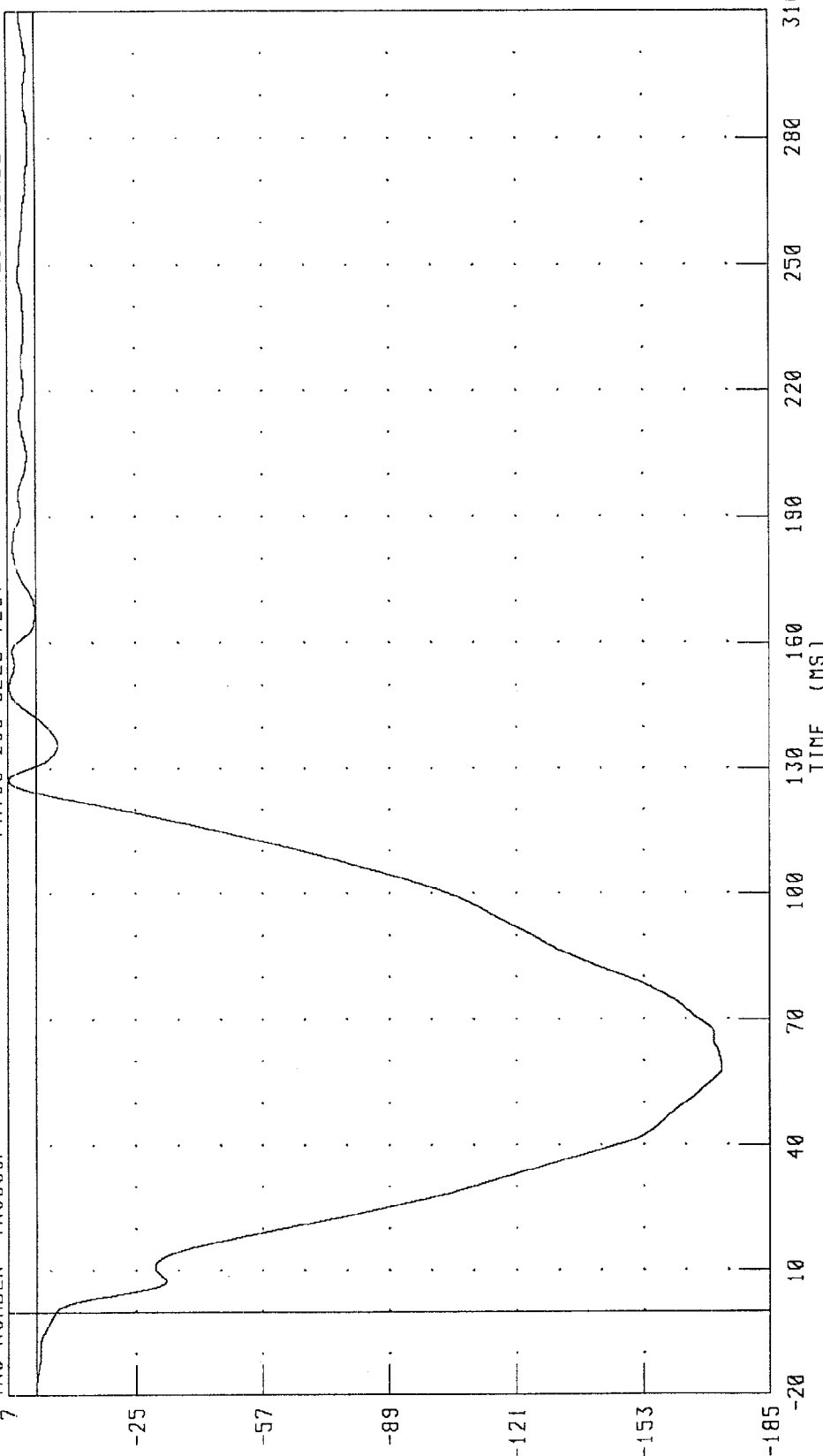
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P

7

ACCELERATION (G X 10⁻¹)

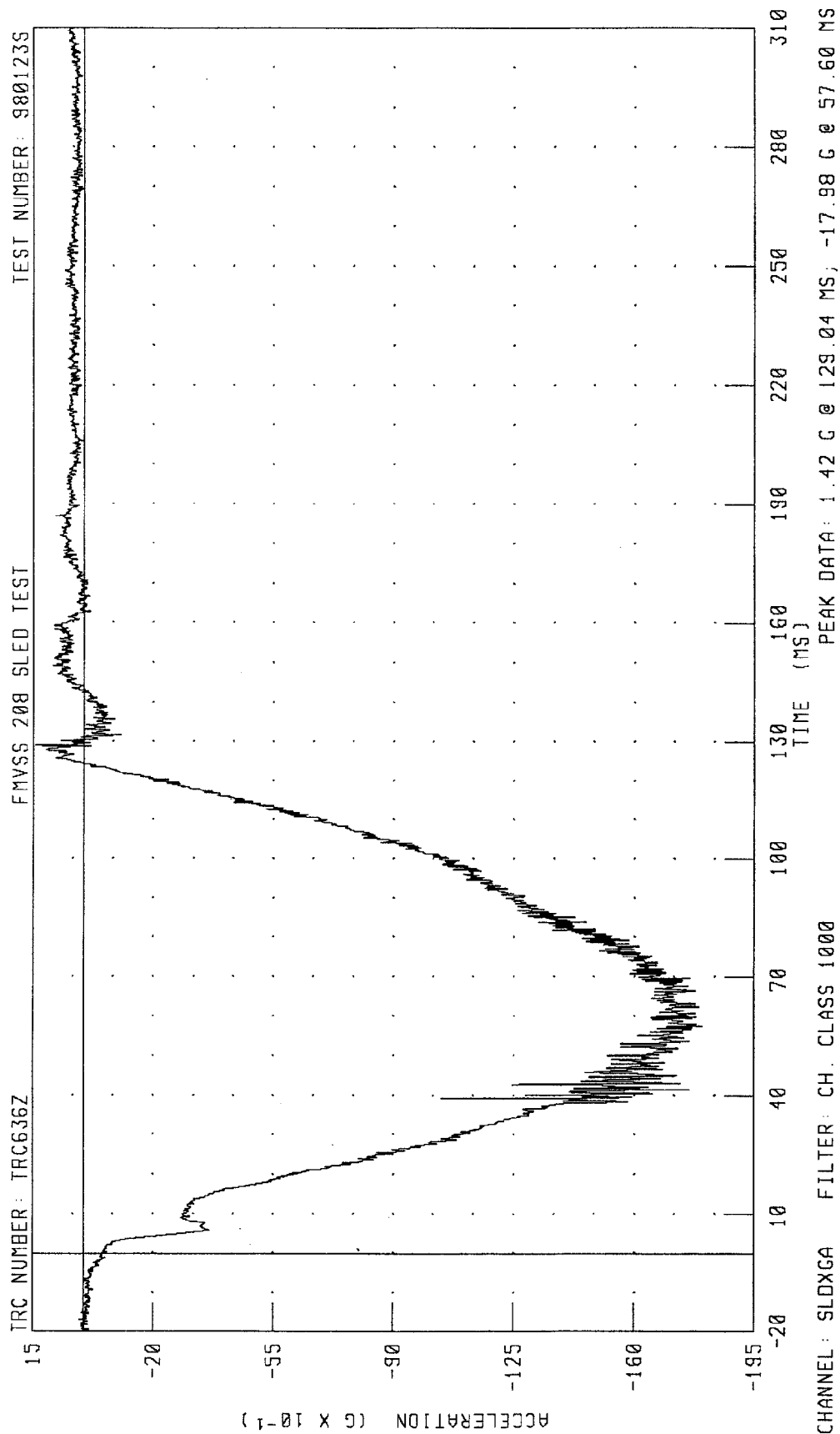


PEAK DATA: 0.67 G @ 127.36 MS, -17.28 G @ 58.16 MS

FILTER: CH. CLASS 60

CHANNEL: SLDXG

CW0303 / 1998 JEEP GRAND CHEROKEE
SLED ACCELERATION REDUNDANT



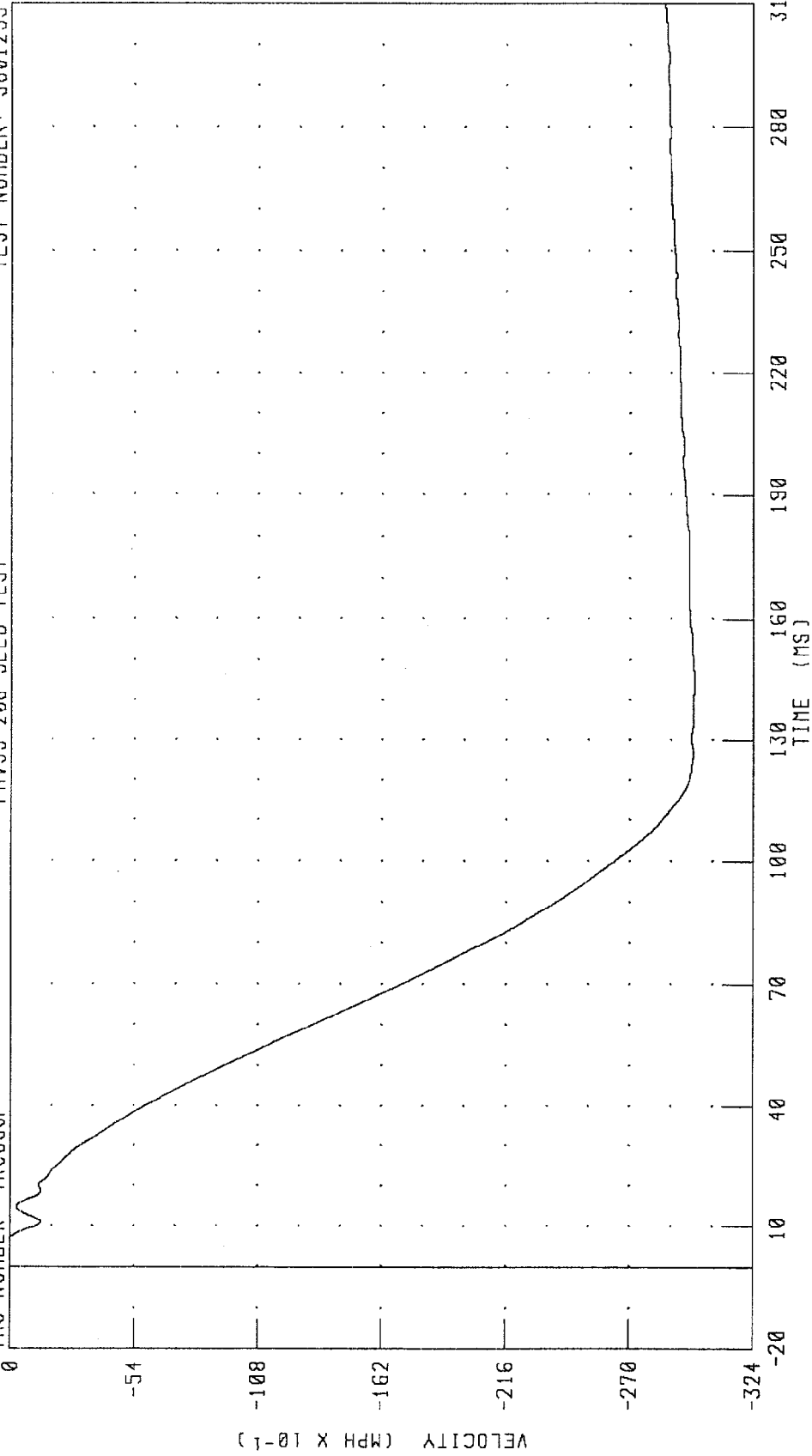
CW0303 / 1998 JEEP GRAND CHEROKEE

MEASURED VELOCITY TRAP

FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



PEAK DATA: 0.06 MPH @ 5.84 MS; -29.81 MPH @ 145.76 MS

FILTER: CH. CLASS 60

CHANNEL: SLDXV

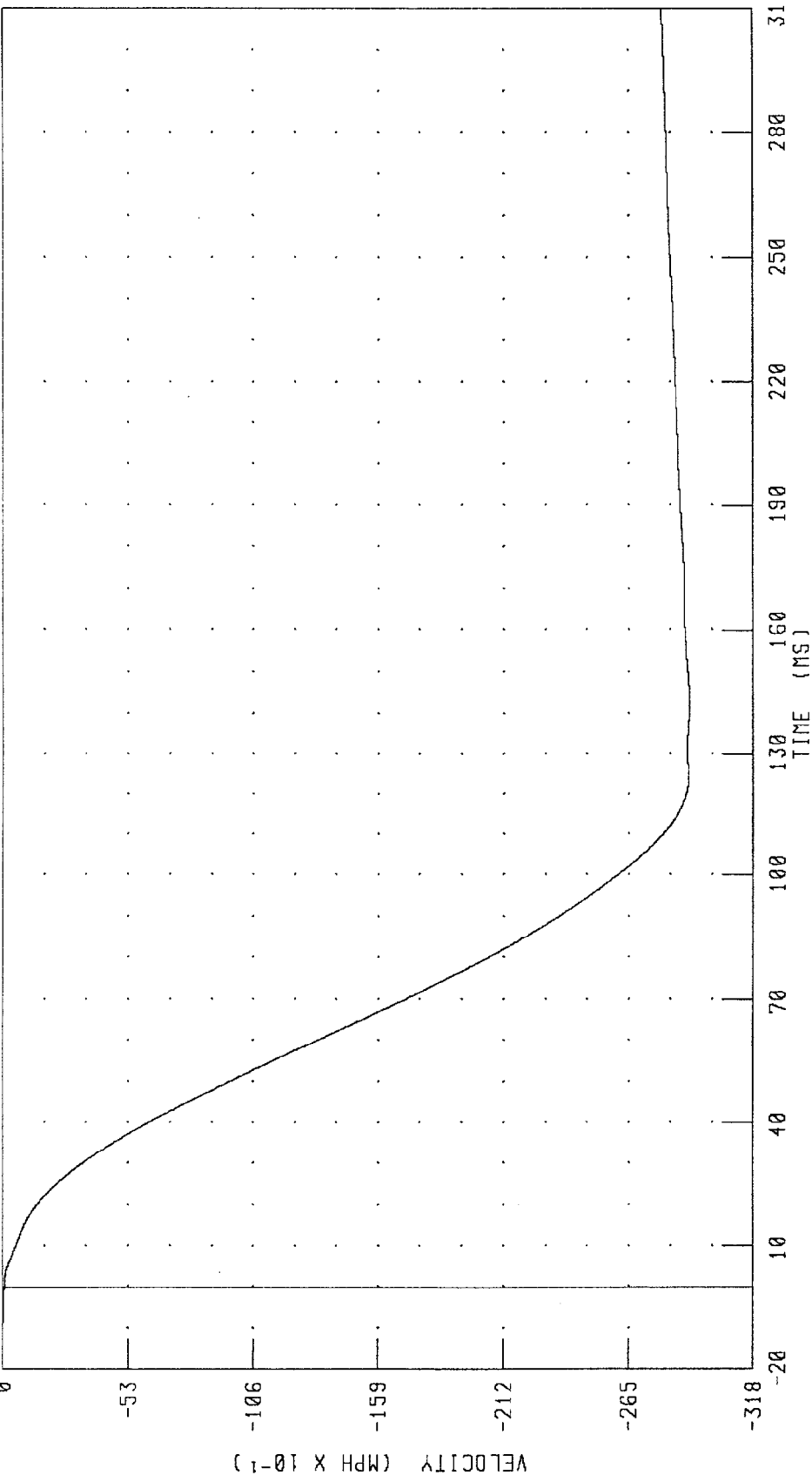
CW0303 / 1998 JEEP GRAND CHEROKEE

SLED VELOCITY (INTEGRATED)

FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



CHANNEL: SLDXVI FILTER: CH. CLASS 180

PEAK DATA: -0.02 MPH @ -20.00 MS, -29.09 MPH @ 142.80 MS

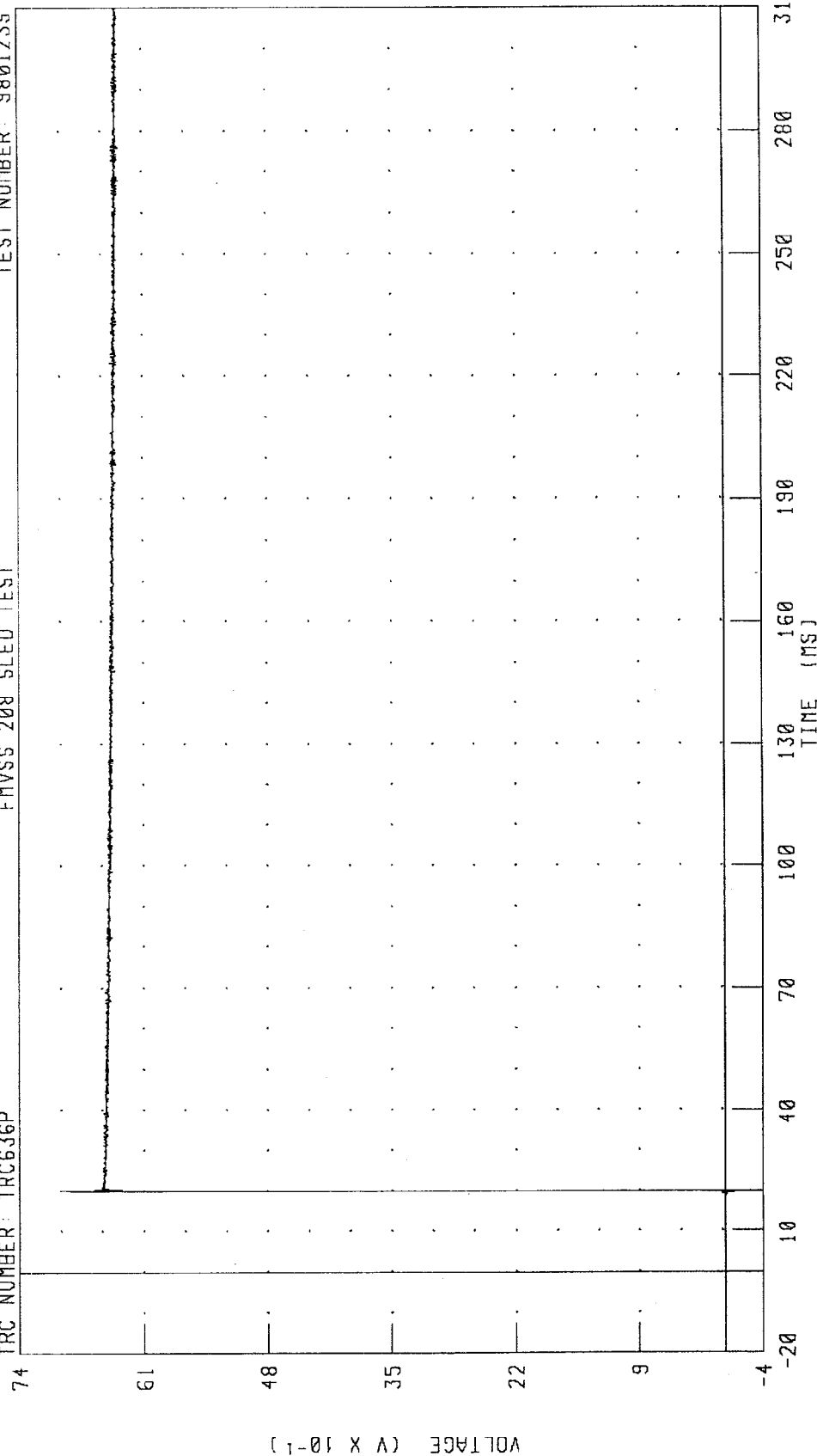
CW0303 / 1998 JEEP GRAND CHEROKEE

AIRBAG EVENT

FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



PEAK DATA: 6.98 V @ 20.16 MS, -0.44 V @ 19.76 MS

CHANNEL: ABEVT FILTER: CH. CLASS 1000

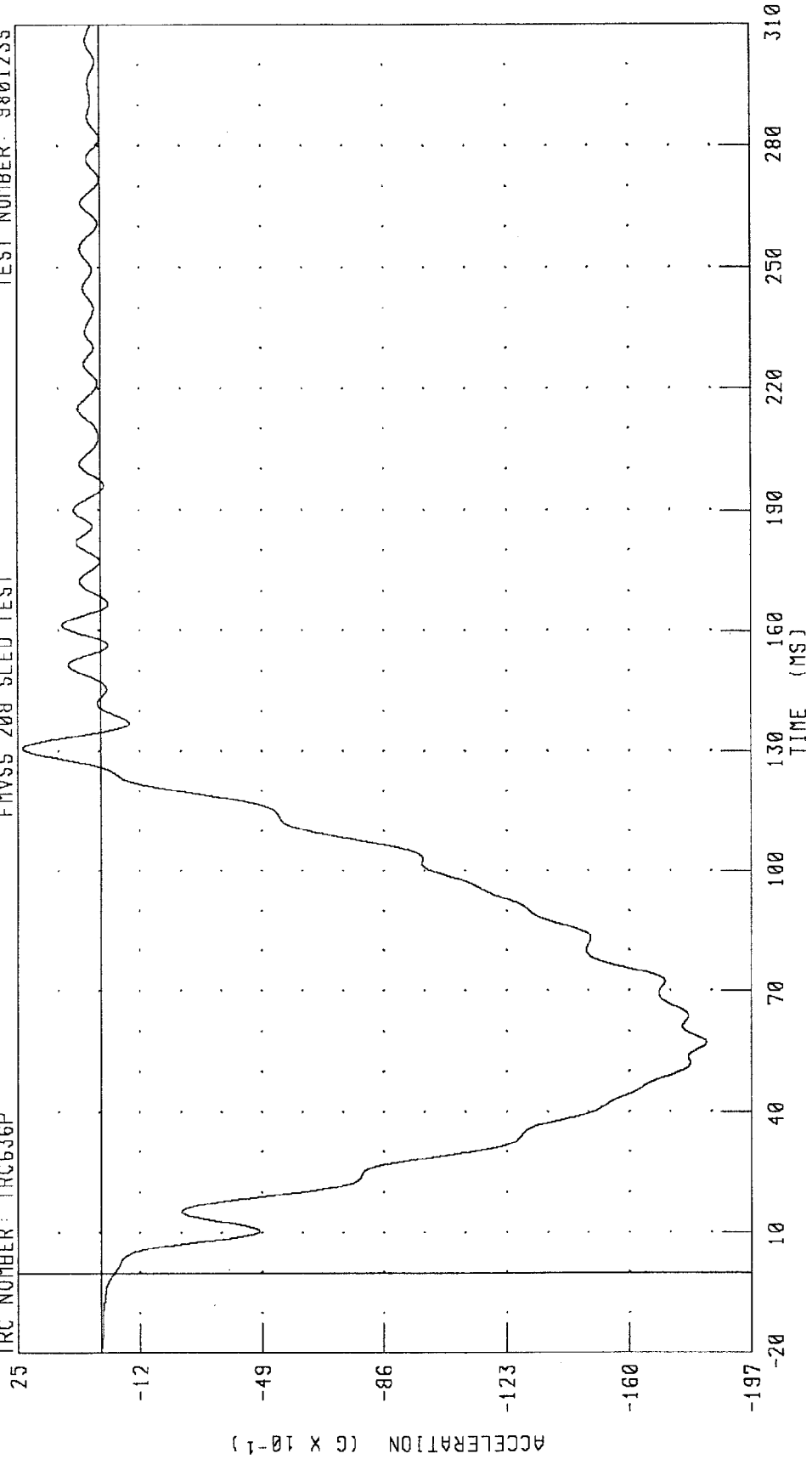
CW0303 / 1998 JEEP GRAND CHEROKEE

REAR AXLE X-AXIS ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



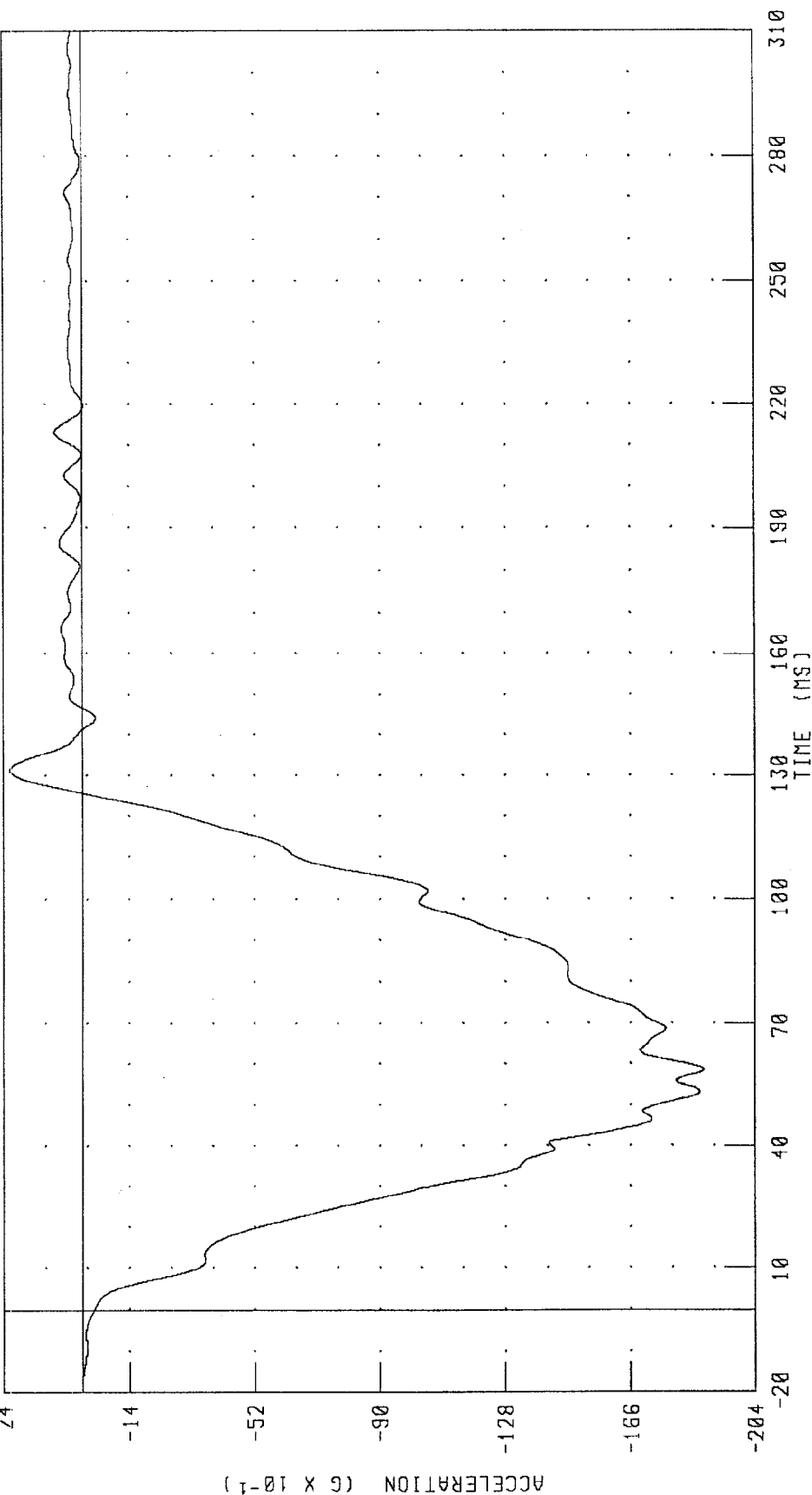
CHANNEL: RAXG FILTER: CH. CLASS 60

CW0303 / 1998 JEEP GRAND CHEROKEE
LEFT BODY X-AXIS ACCELERATION

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

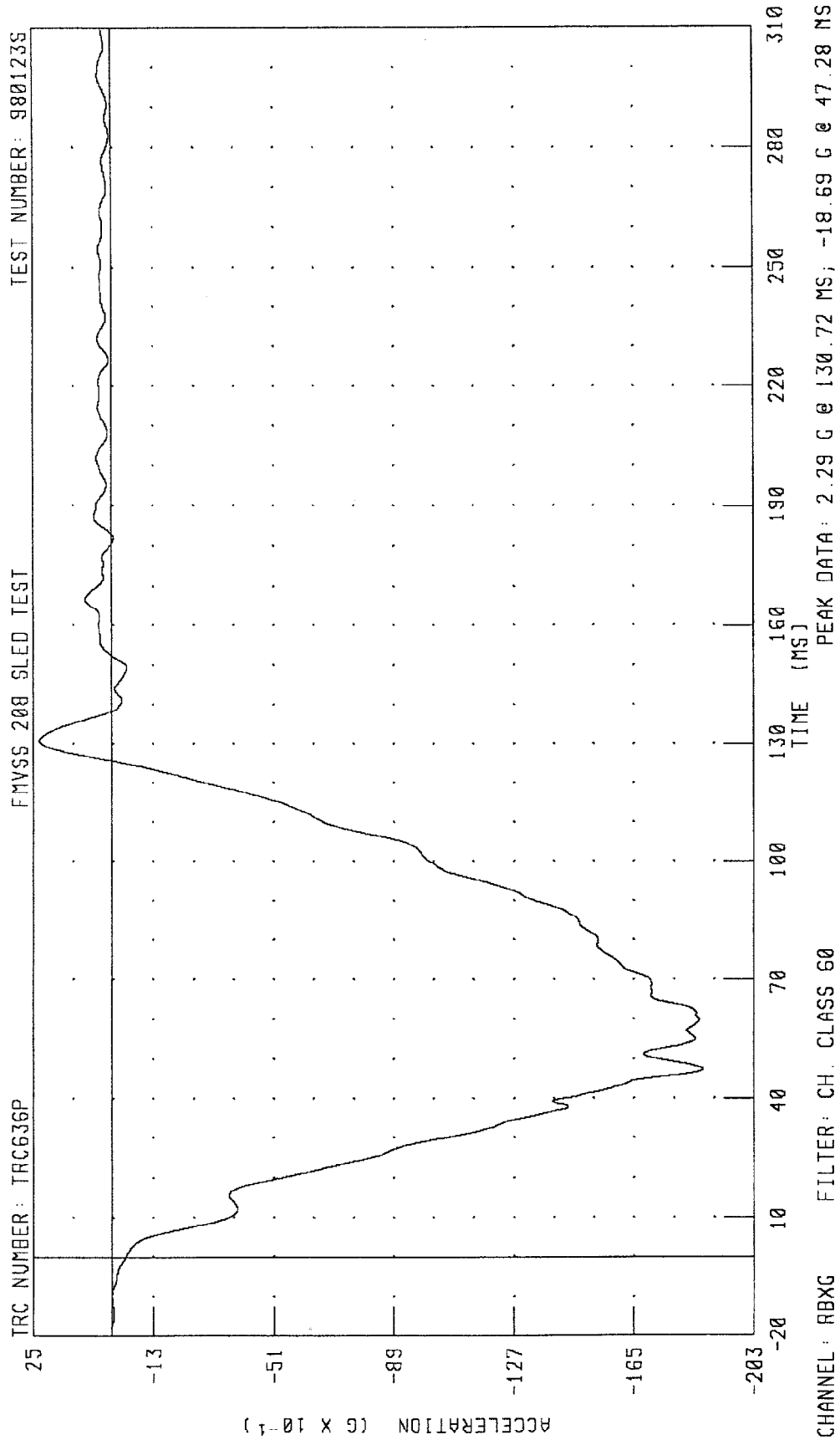
TEST NUMBER: 980123S



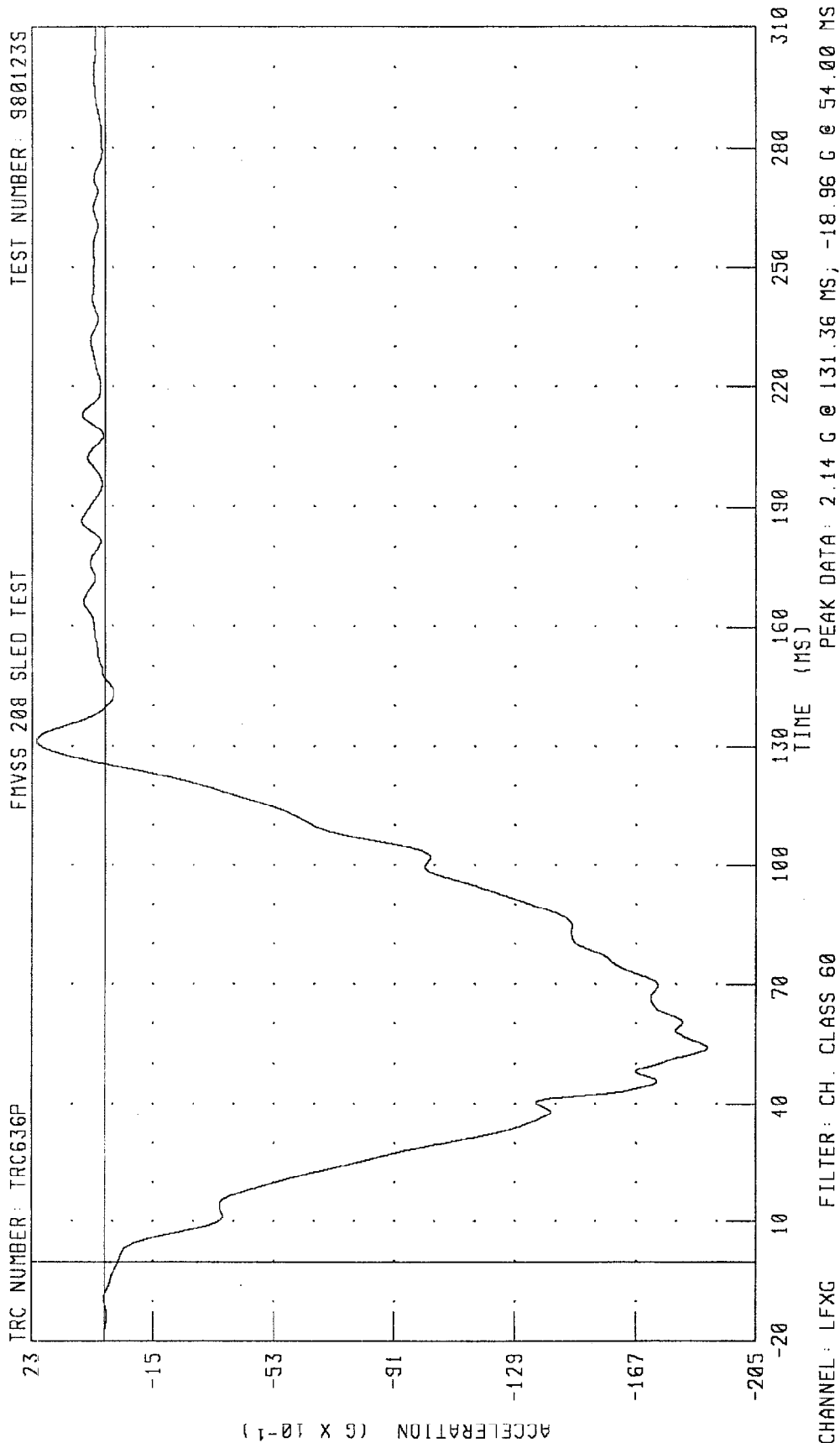
CHANNEL: LBXG FILTER: CH. CLASS 60

PEAK DATA: 2.19 G @ 131.28 MS; -18.83 G @ 58.56 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT BODY X-AXIS ACCELERATION
 FMVSS 200 SLED TEST



CW0303 / 1998 JEEP GRAND CHEROKEE
LEFT FRAME X-AXIS ACCELERATION

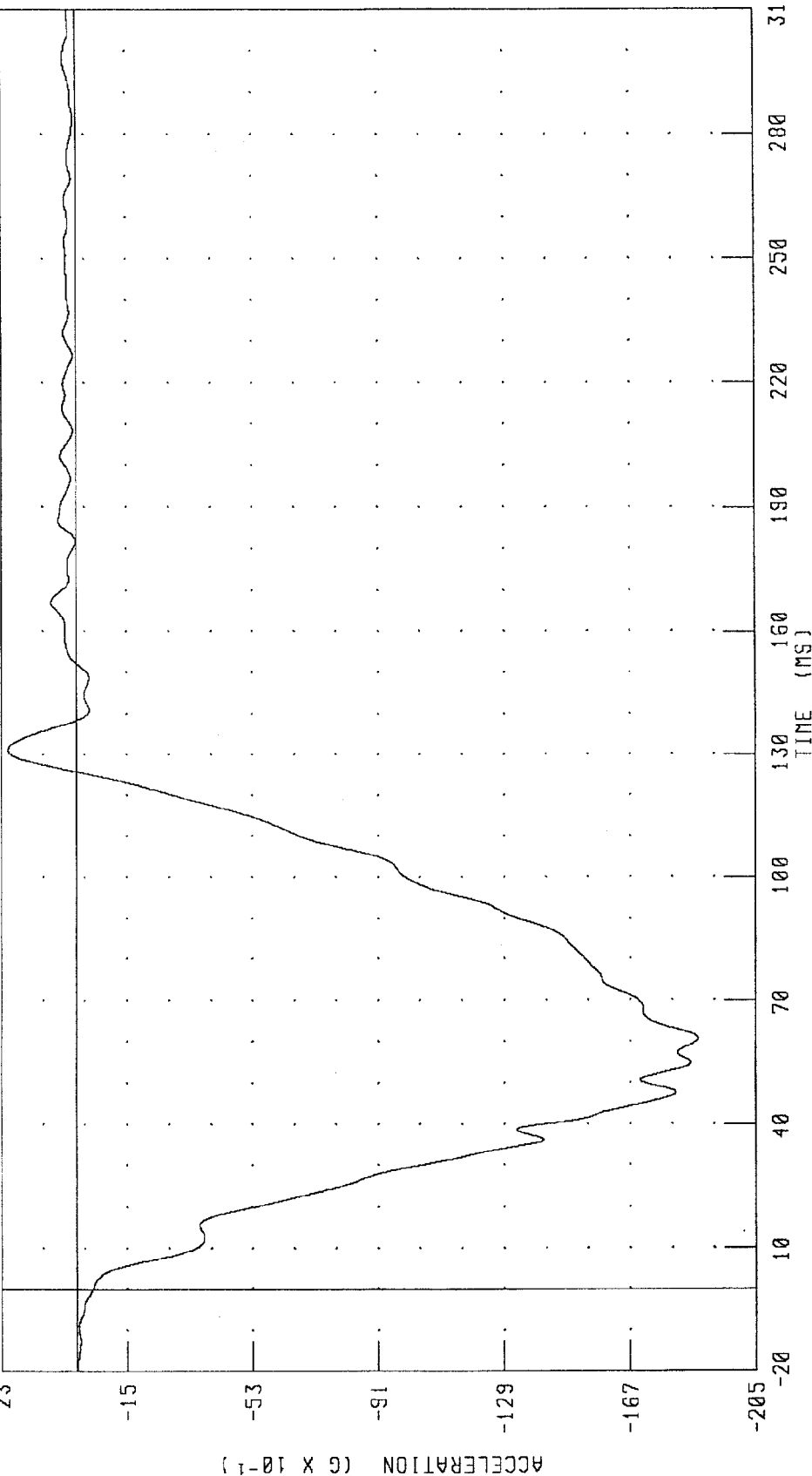


CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRAME X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 9801235

TRC NUMBER: TRC636P

23



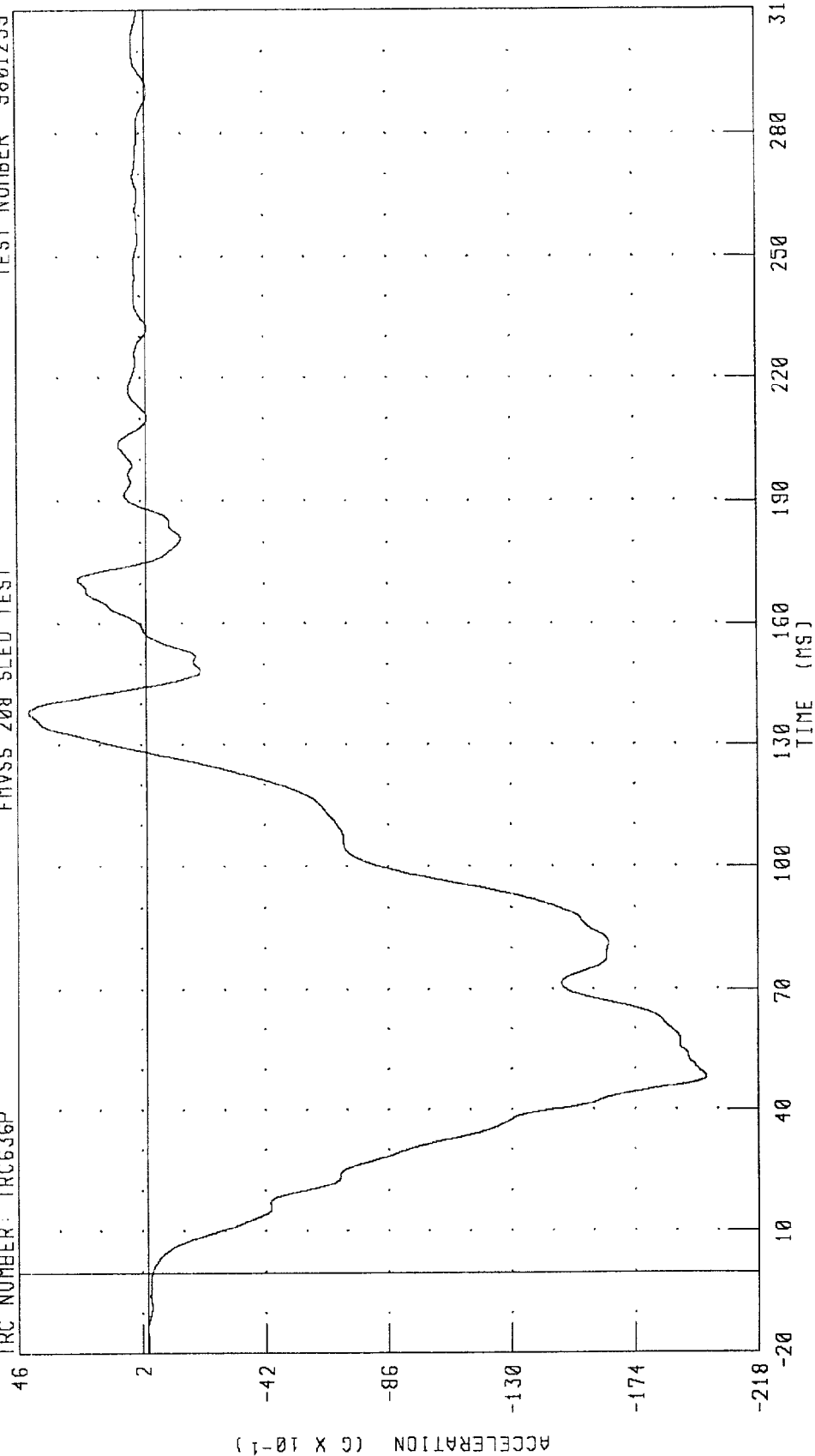
PEAK DATA: 2.10 G @ 131.04 MS; -18.75 G @ 60.72 MS

CHANNEL: RFXG FILTER: CH. CLASS 60

CW0303 / 1998 JEEP GRAND CHEROKEE
 BOTTOM ENGINE X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER 9801235

TRC NUMBER: TRC636P

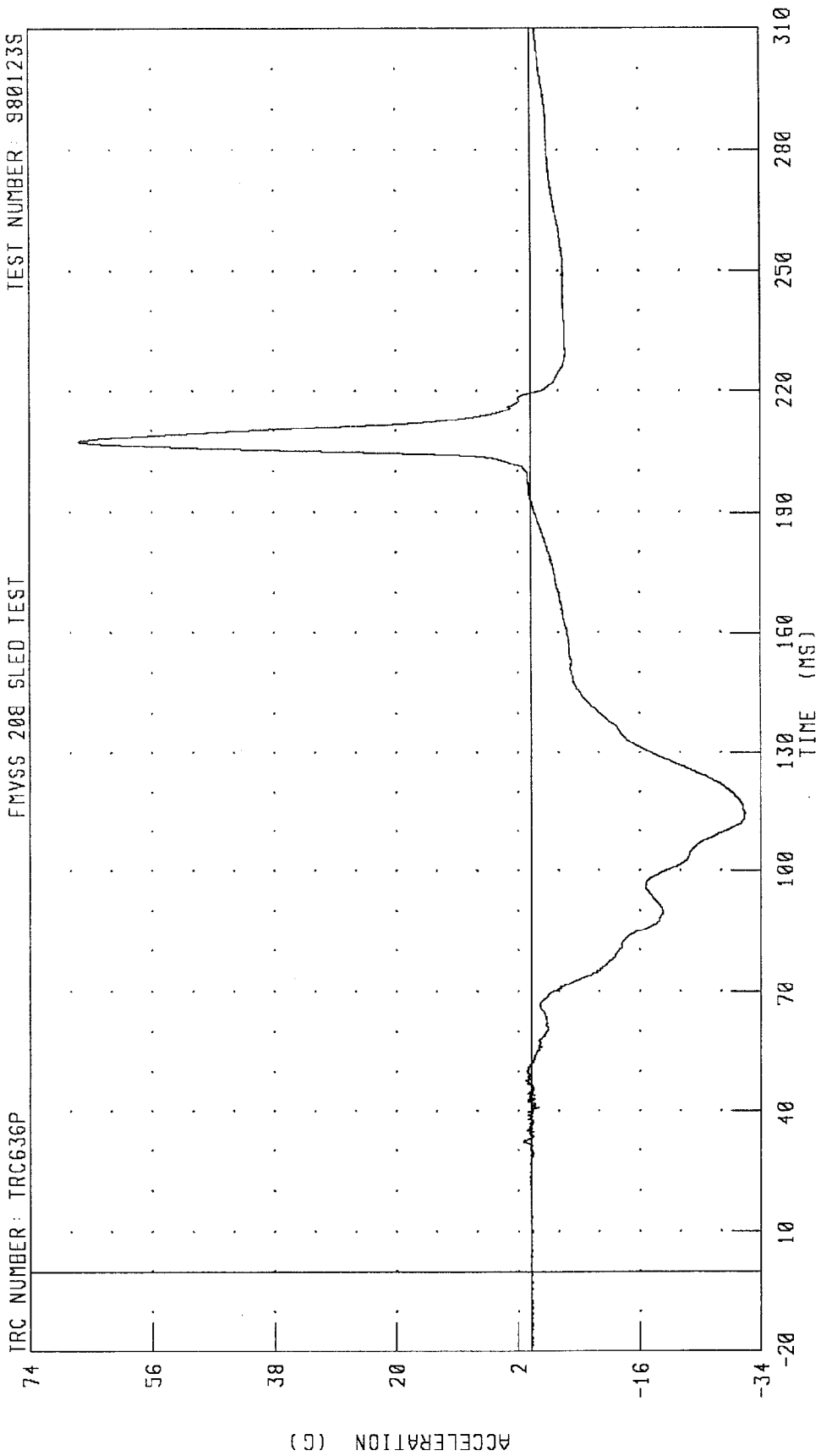


CHANNEL: BEXG FILTER: CH. CLASS 60

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER HEAD X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

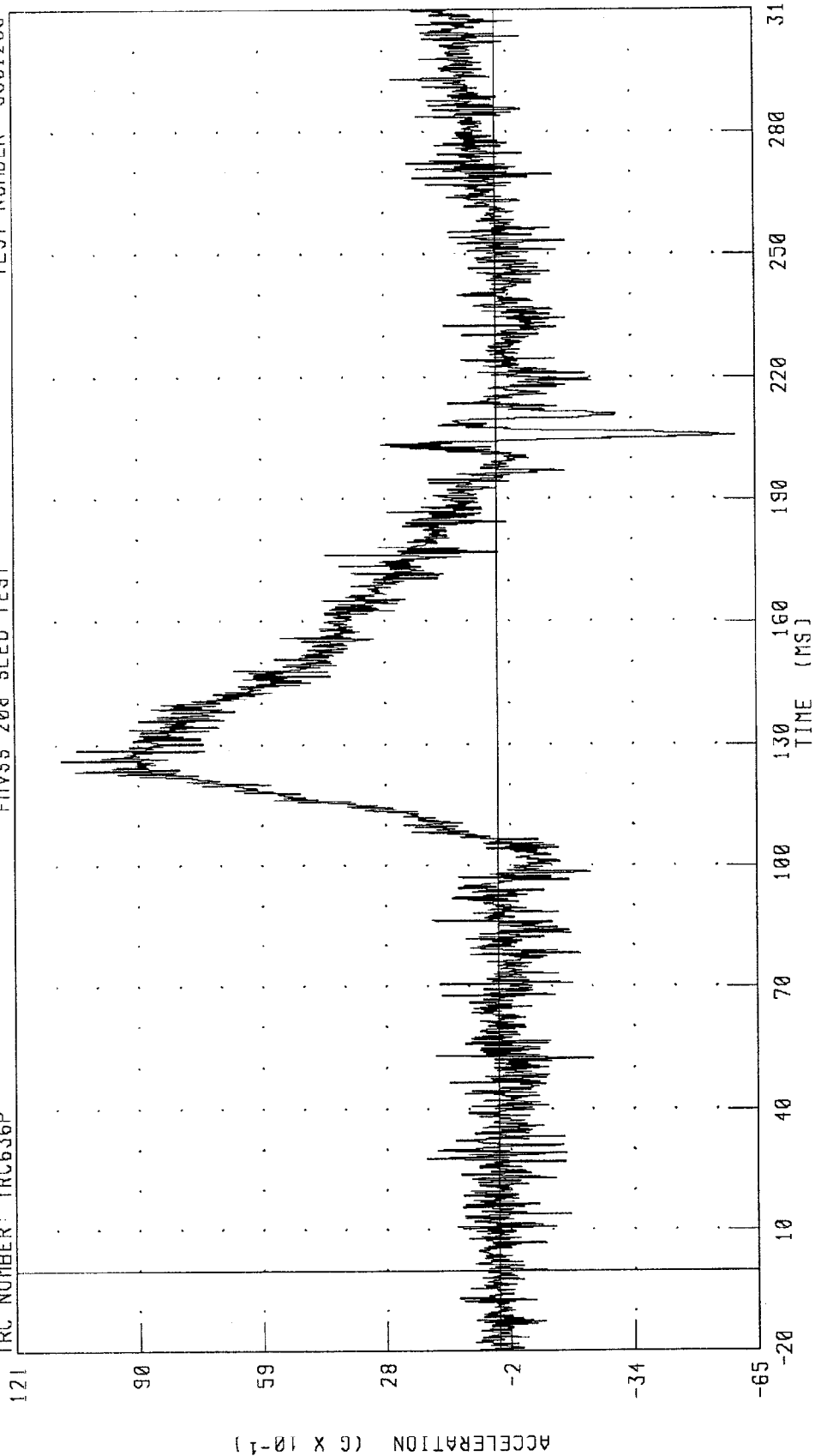
PEAK DATA: 66.75 G @ 207.36 MS, -31.59 G @ 114.64 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 980123S

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P



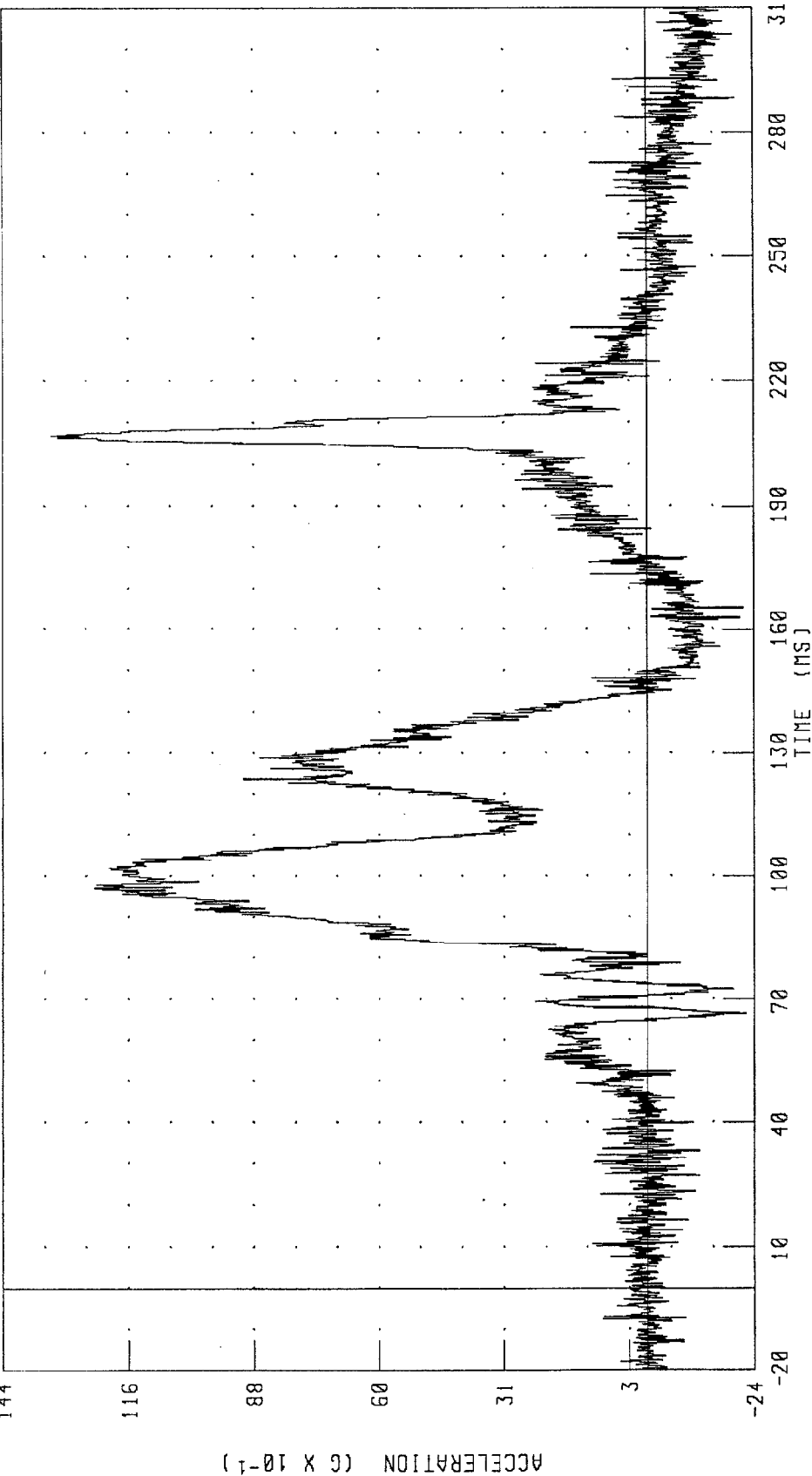
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER HEAD Z-AXIS ACCELERATION

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

TEST NUMBER: 980123S



PEAK DATA: 13.29 G @ 206.88 MS; -2.19 G @ 66.48 MS

CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
 DRIVER HEAD RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P

72

60

48

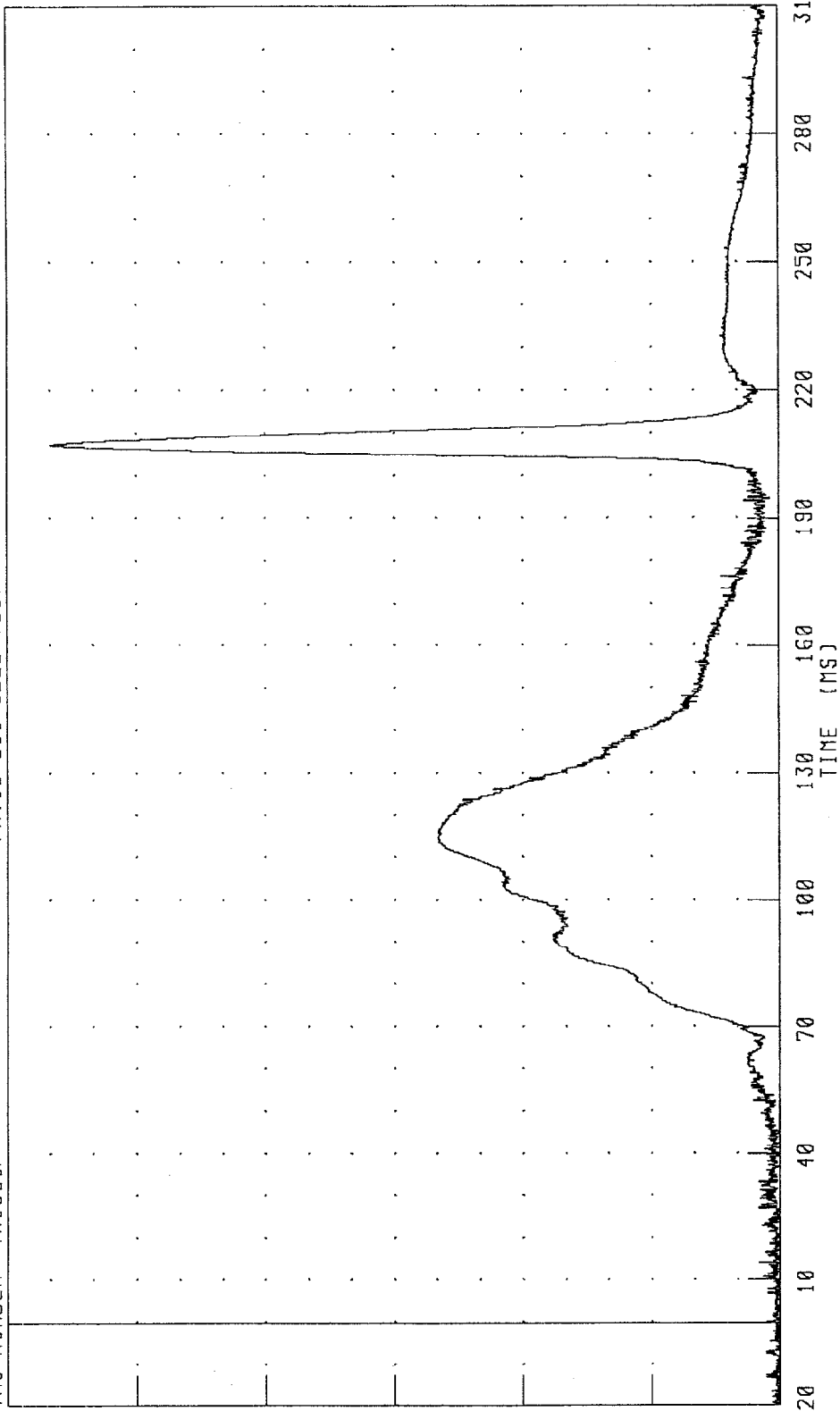
36

24

12

0

ACCELERATION (G)



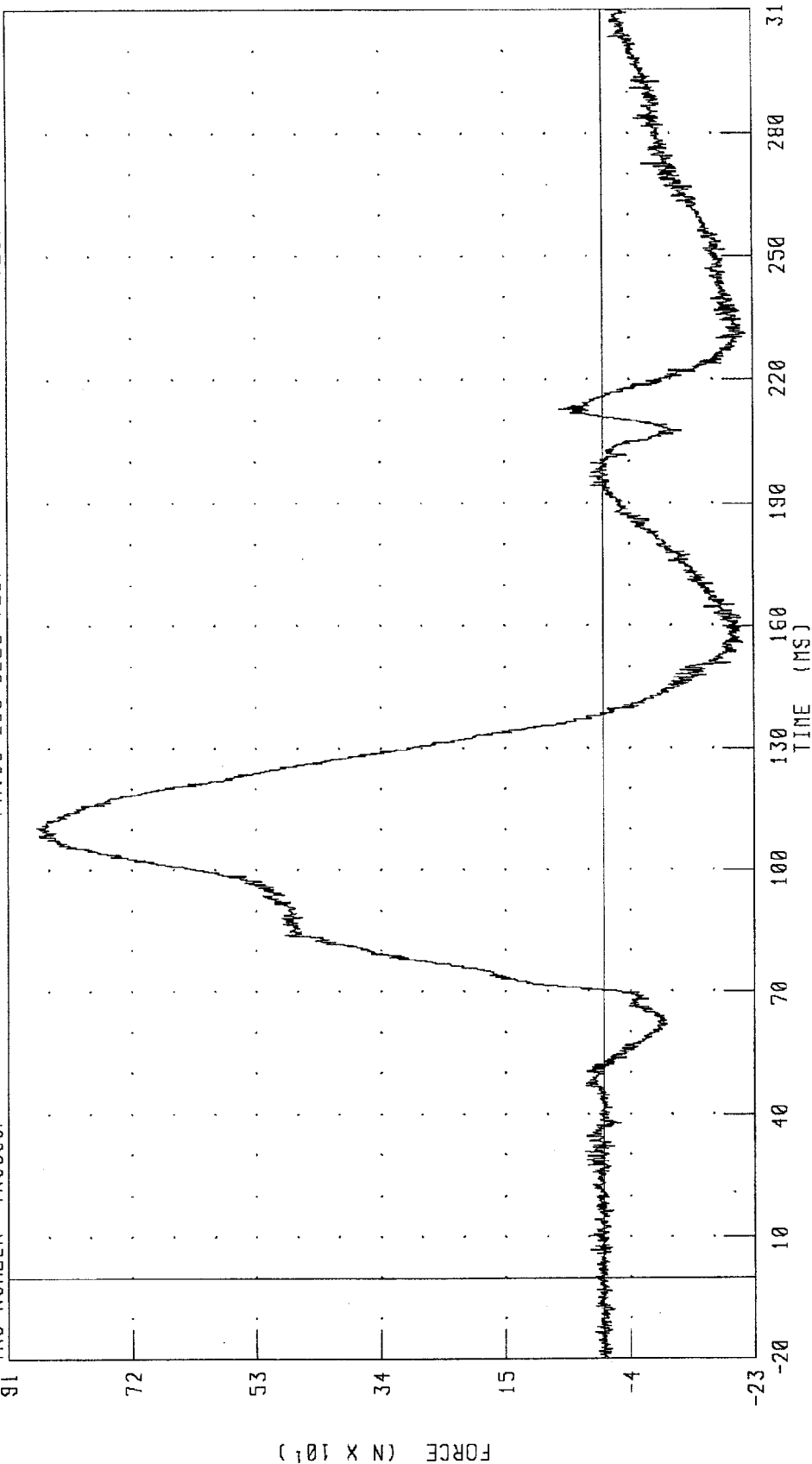
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA: 68.01 G @ 207.36 MS; 0.02 G @ -8.72 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



PEAK DATA: 866.51 N @ 110.56 MS; -217.95 N @ 231.04 MS

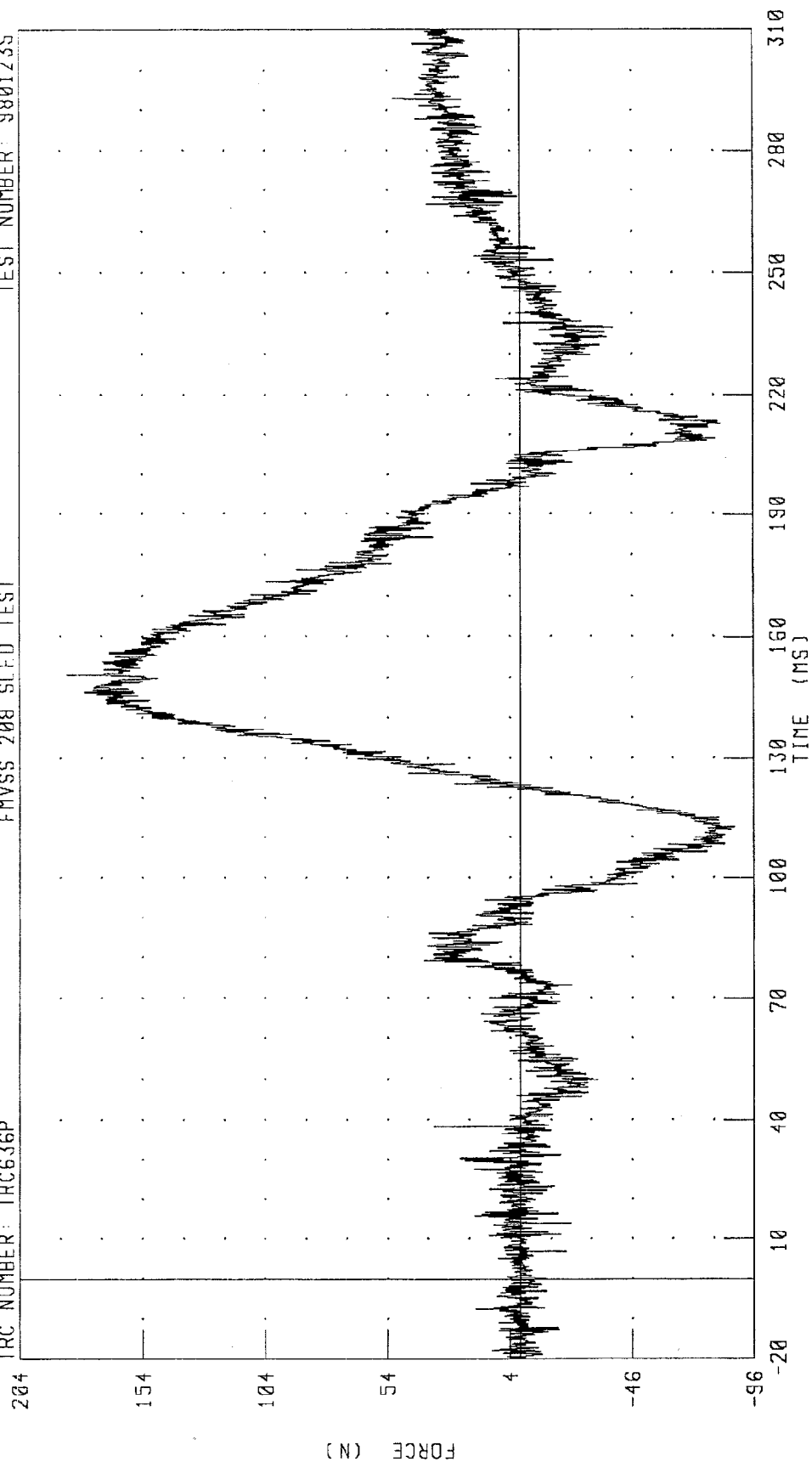
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 980123S

FMVSS 208 SLID TEST

TRC NUMBER: TRC636P



PEAK DATA: 185.03 N @ 150.96 MS; -88.13 N @ 112.56 MS

CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER NECK Z-AXIS AXIAL FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P

118

95

72

49

26

3

-20

FORCE (N X 10¹)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

PEAK DATA: 1107.41 N @ 97.12 MS; -185.11 N @ 209.12 MS

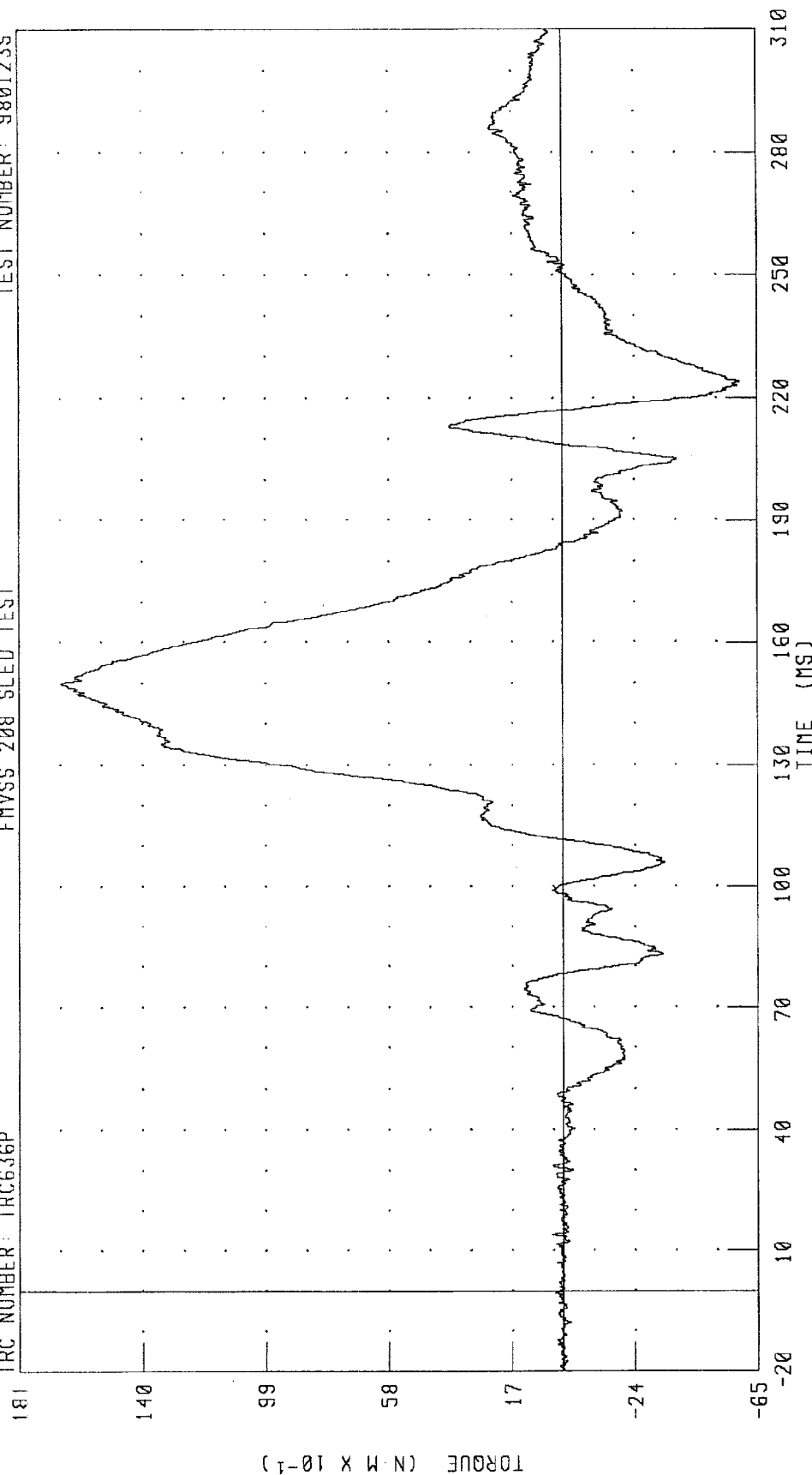
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 980123S

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P



PEAK DATA: 16.69 N·M @ 149.92 MS, -5.94 N·M @ 224.00 MS

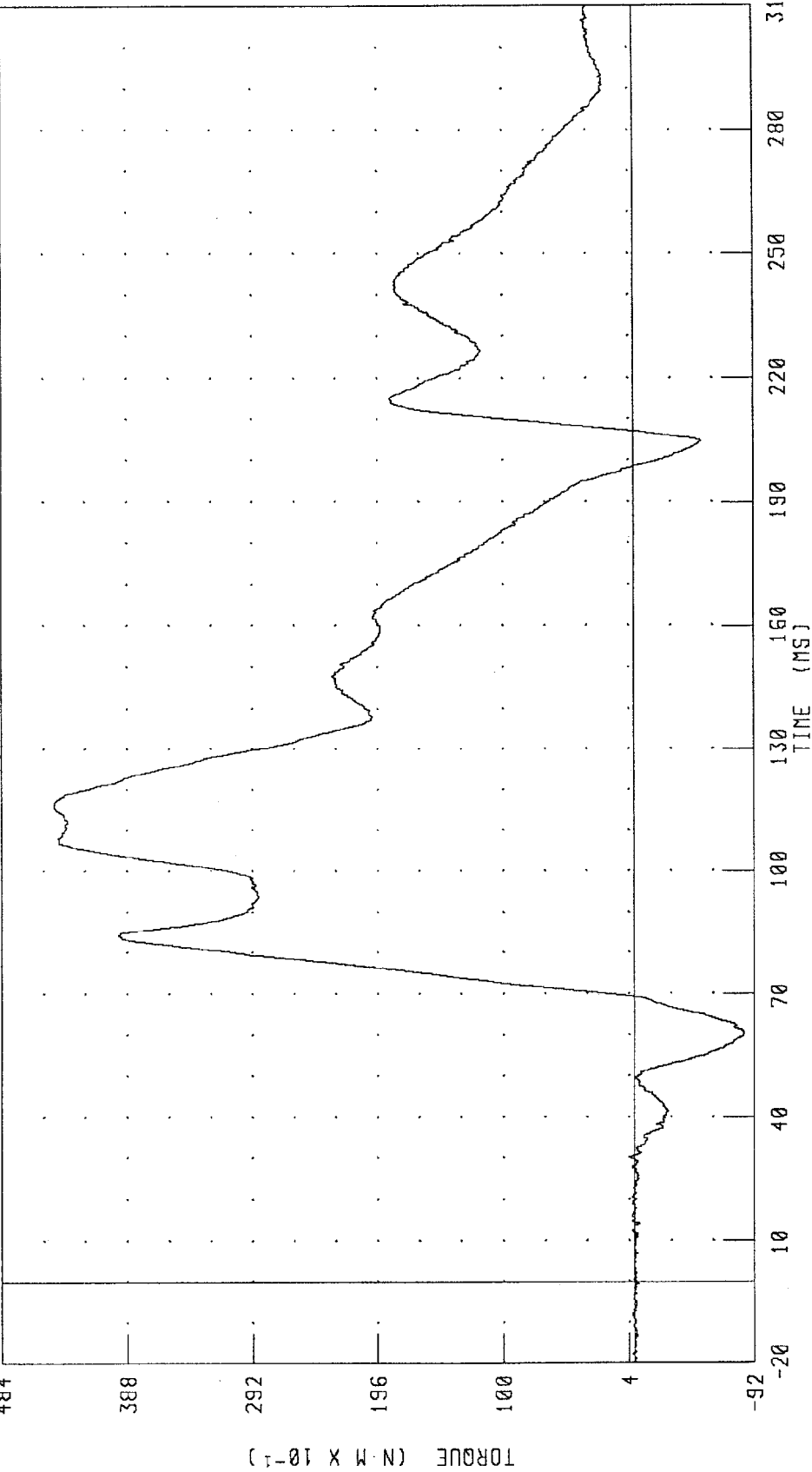
CHANNEL: NEKXMI FILTER: CH. CLASS 600

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER NECK MOMENT ABOUT Y AXIS

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

TEST NUMBER: 980123S



PEAK DATA: 44.41 N·m @ 116.24 ms; -8.37 N·m @ 60.40 ms

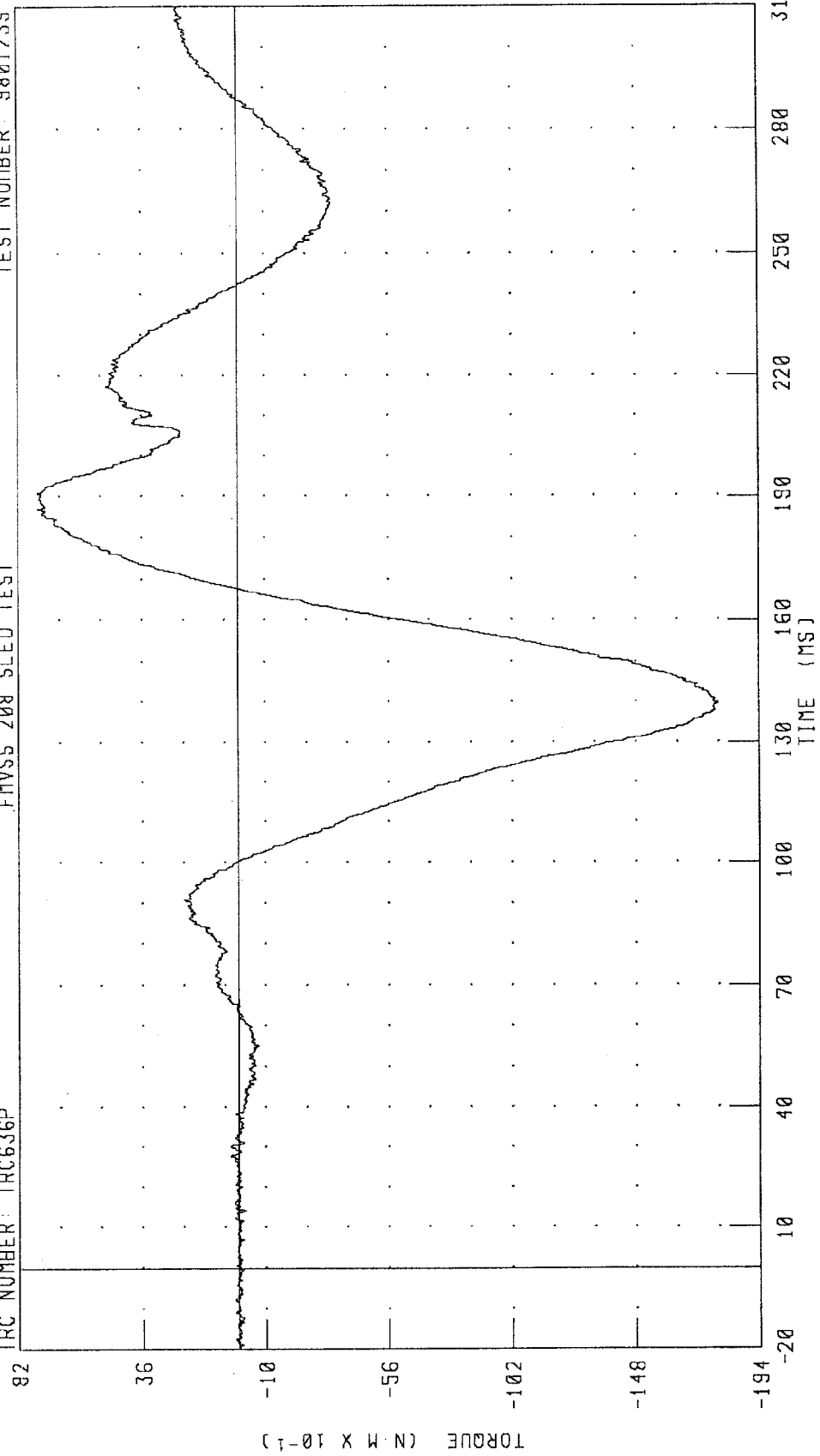
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 980123S

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P



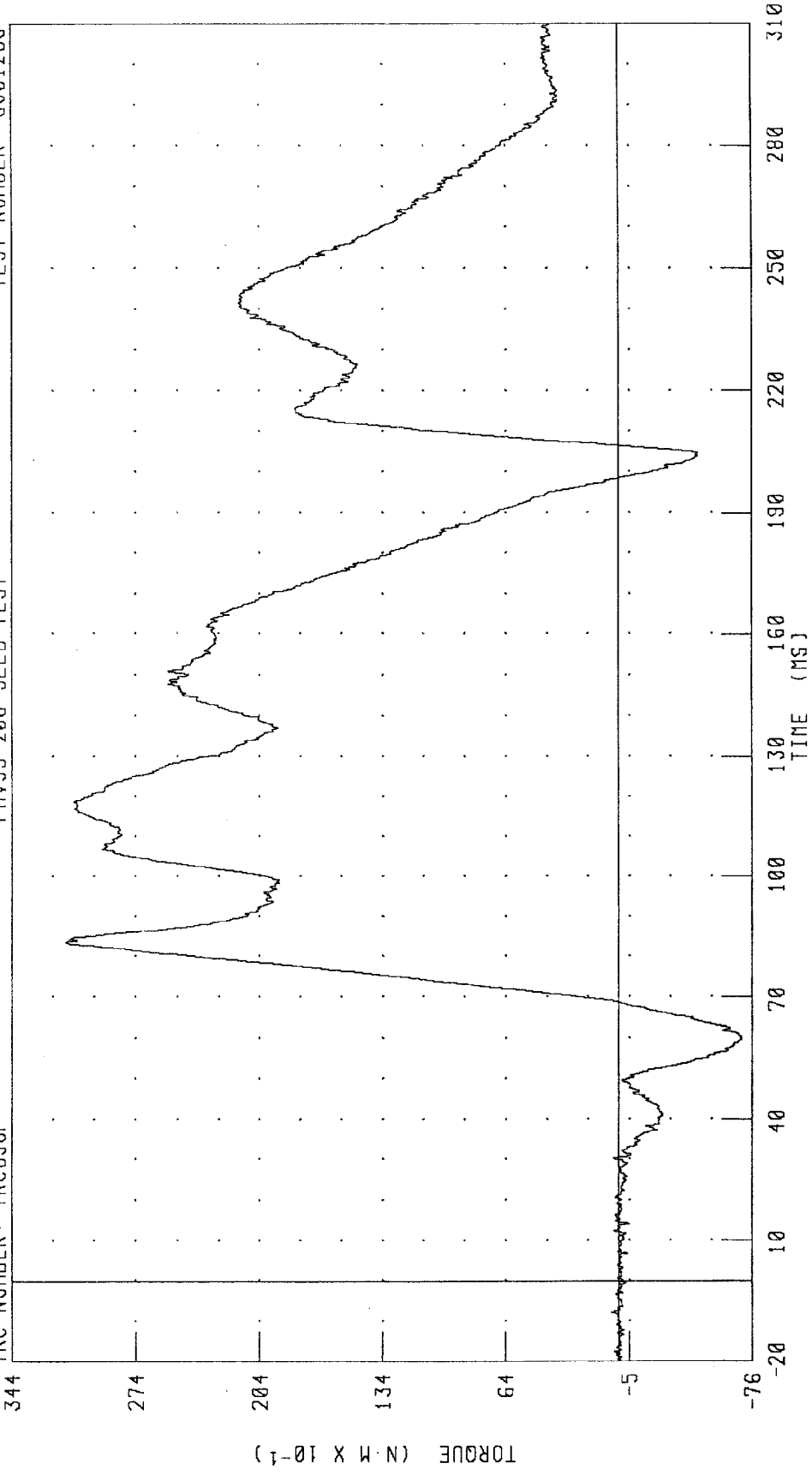
PEAK DATA: 7.47 N·m @ 186.88 ms; -17.86 N·m @ 139.60 ms

CHANNEL: NEKZM1 FILTER: CH. CLASS 600

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER NECK OCCIPITAL CONDYLE ABOUT Y AXIS
FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

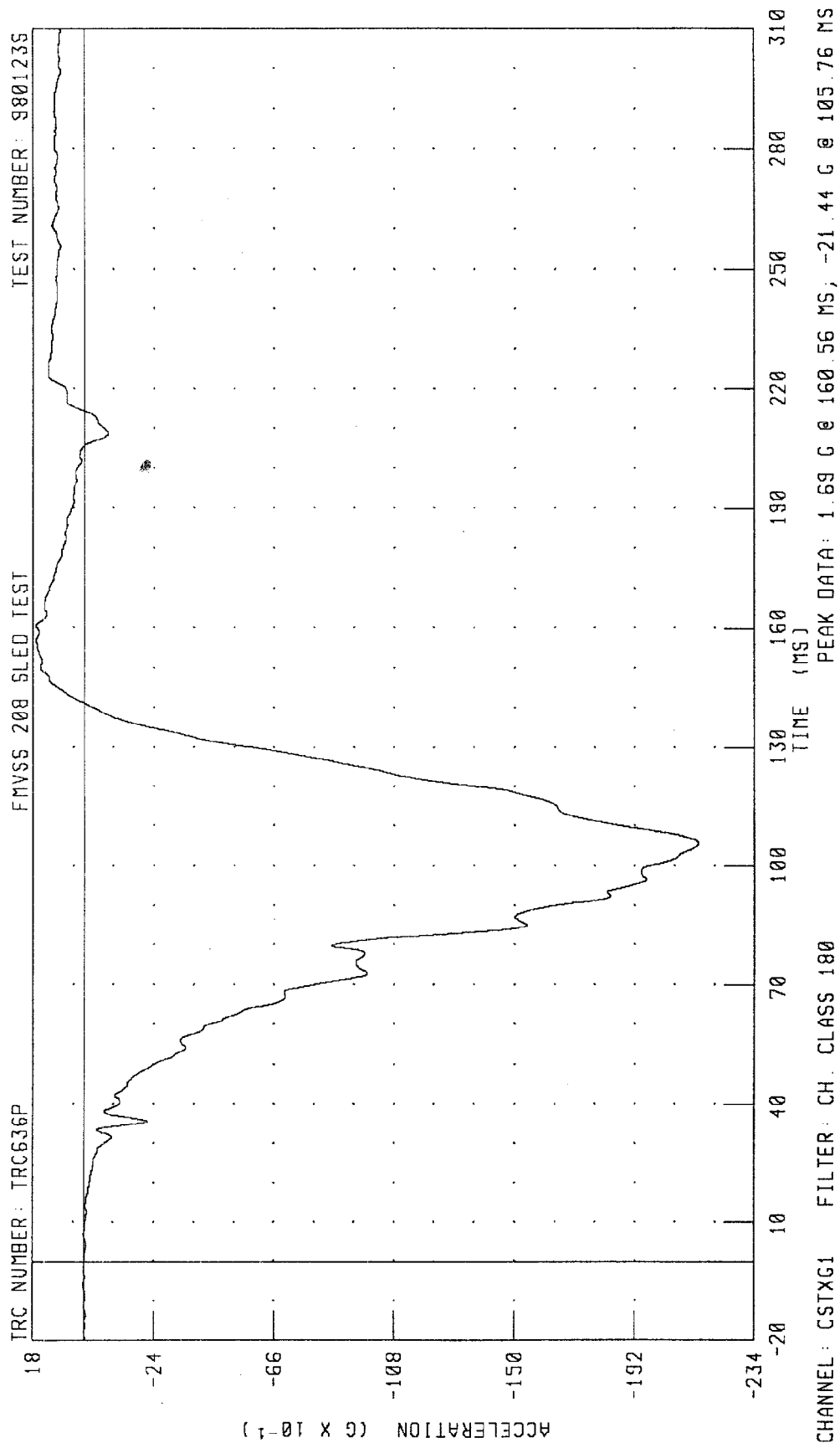
TEST NUMBER: 980123S



PEAK DATA: 31.35 N·M @ 83.36 MS; -6.99 N·M @ 59.76 MS

CHANNEL: NEKOM1 FILTER: CH. CLASS 600

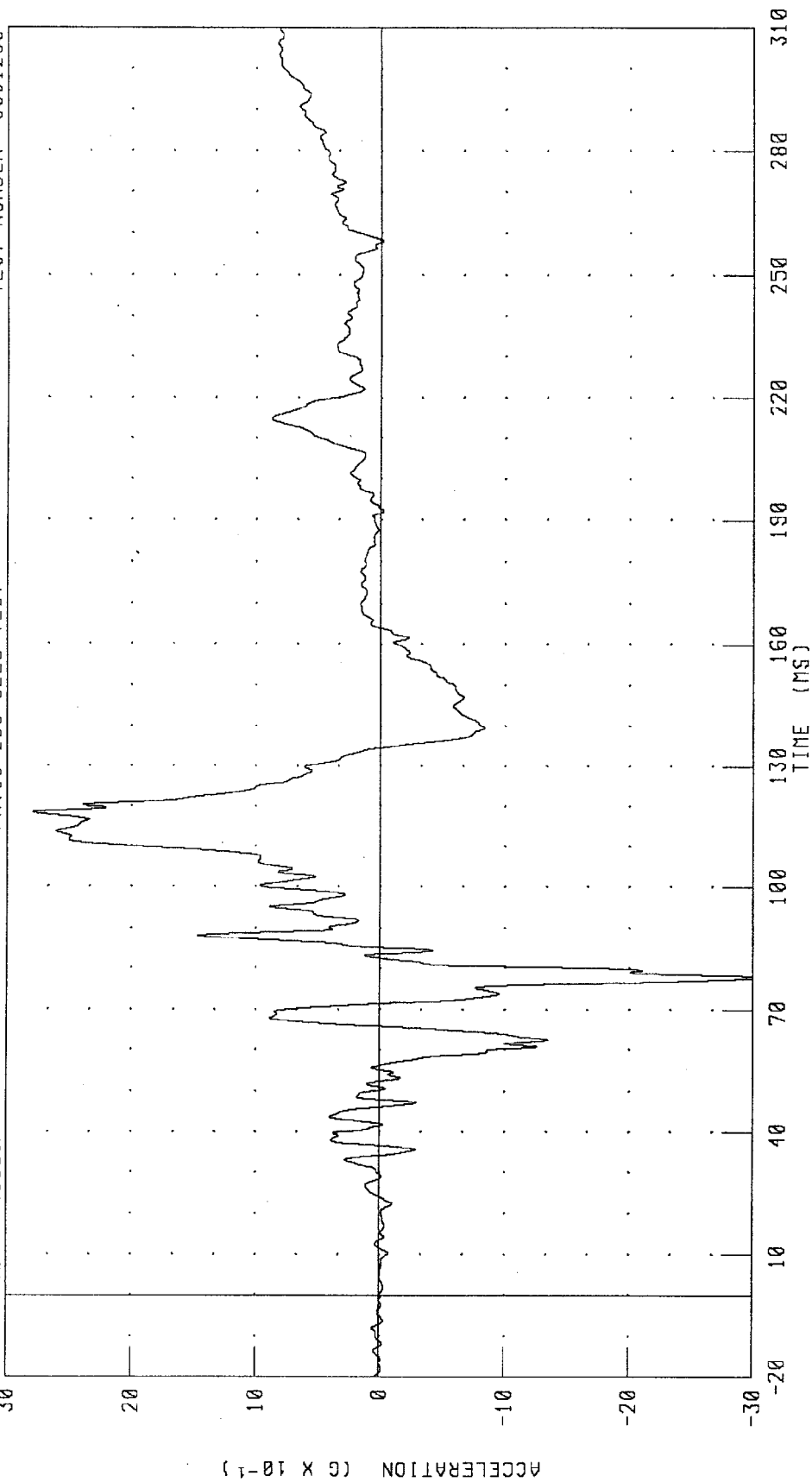
CW0303 / 1988 JEEP GRAND CHEROKEE
DRIVER CHEST X-AXIS ACCELERATION



CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER CHEST Y-AXIS ACCELERATION
FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

TEST NUMBER: 980123S



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

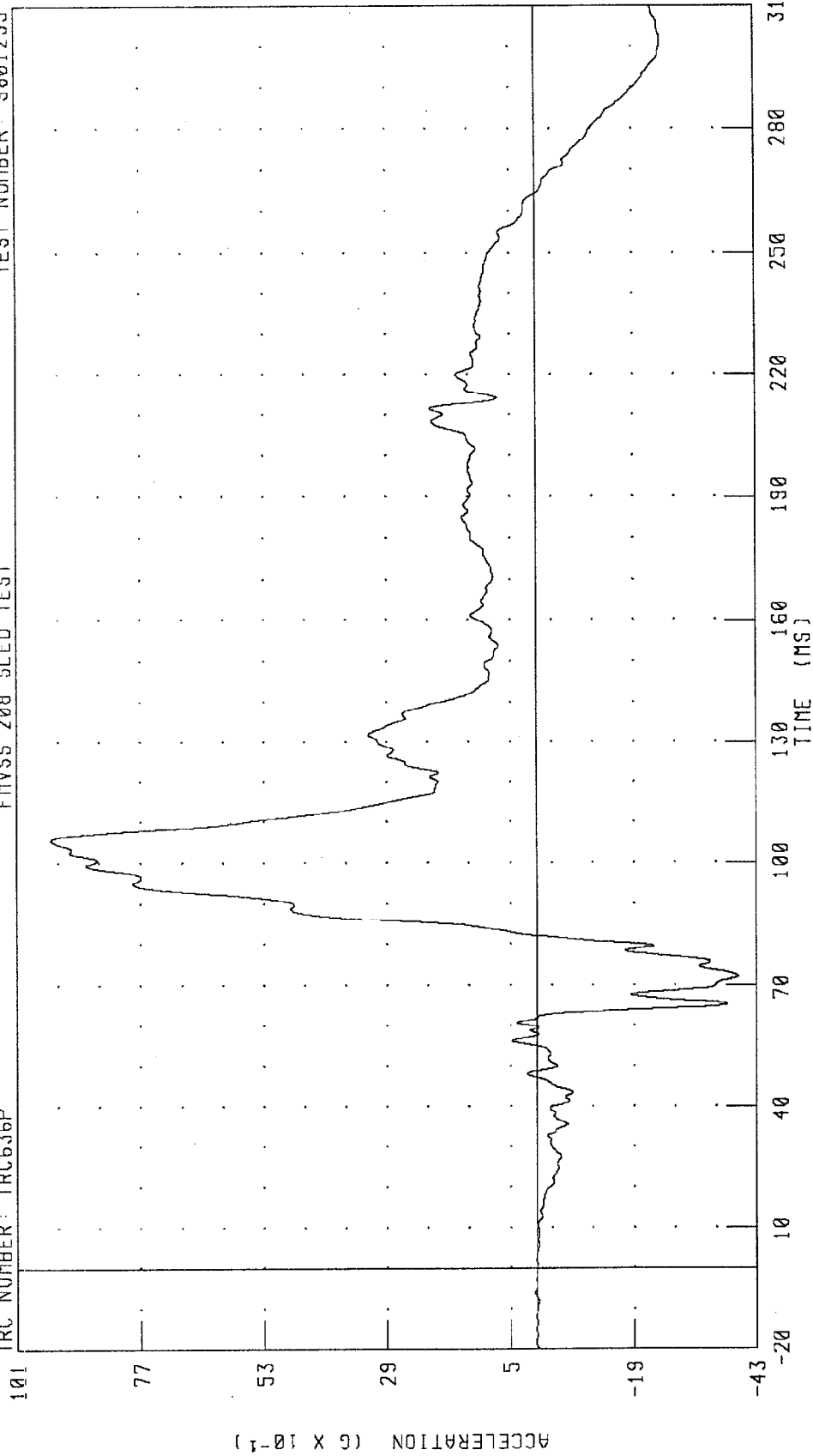
PEAK DATA: 2.79 G @ 118.56 MS, -3.11 G @ 77.92 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 980123S

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P



PEAK DATA: 9.43 G @ 105.60 MS, -3.94 G @ 72.24 MS

CHANNEL: CSTZG1 FILTER: CH. CLASS 180

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 980123S

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

251

209

167

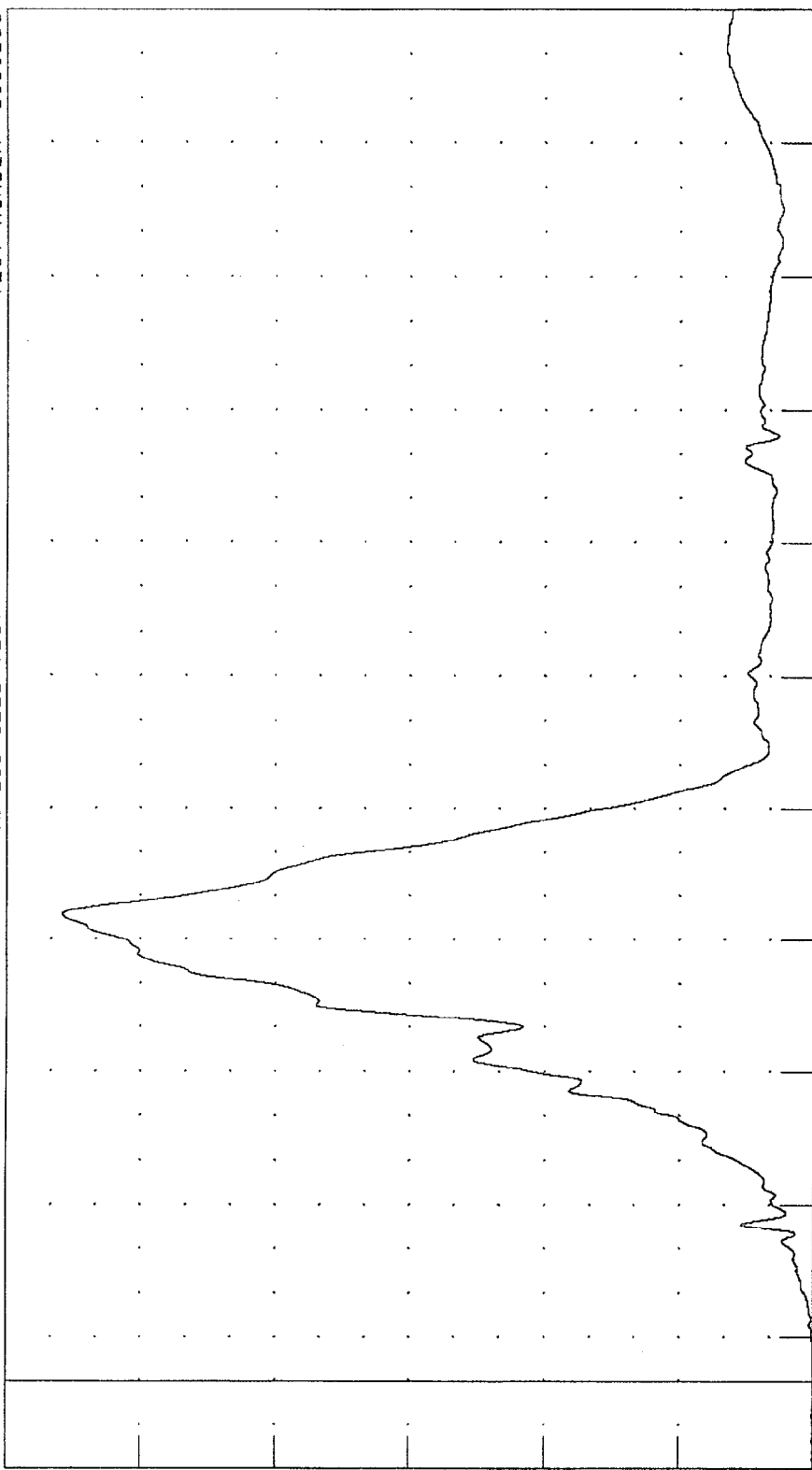
125

83

41

0

ACCELERATION (G X 10⁻¹)



TIME (MS) 310 280 250 220 190 160 130

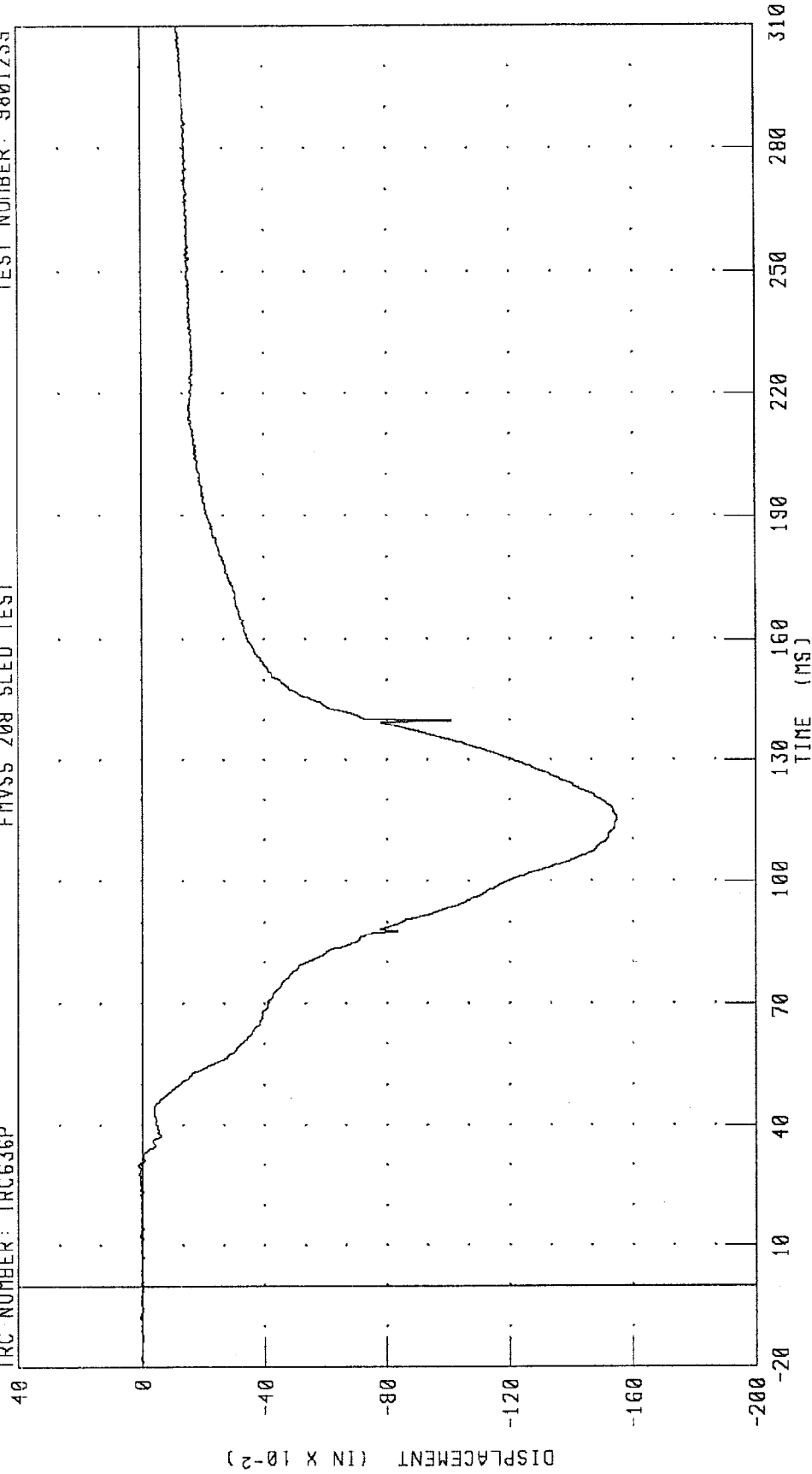
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 23.45 G @ 105.76 MS; 0.00 G @ -18.96 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER CHEST DEFLECTION
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



PEAK DATA: 0.01 IN @ 30.00 MS; -1.55 IN @ 115.68 MS

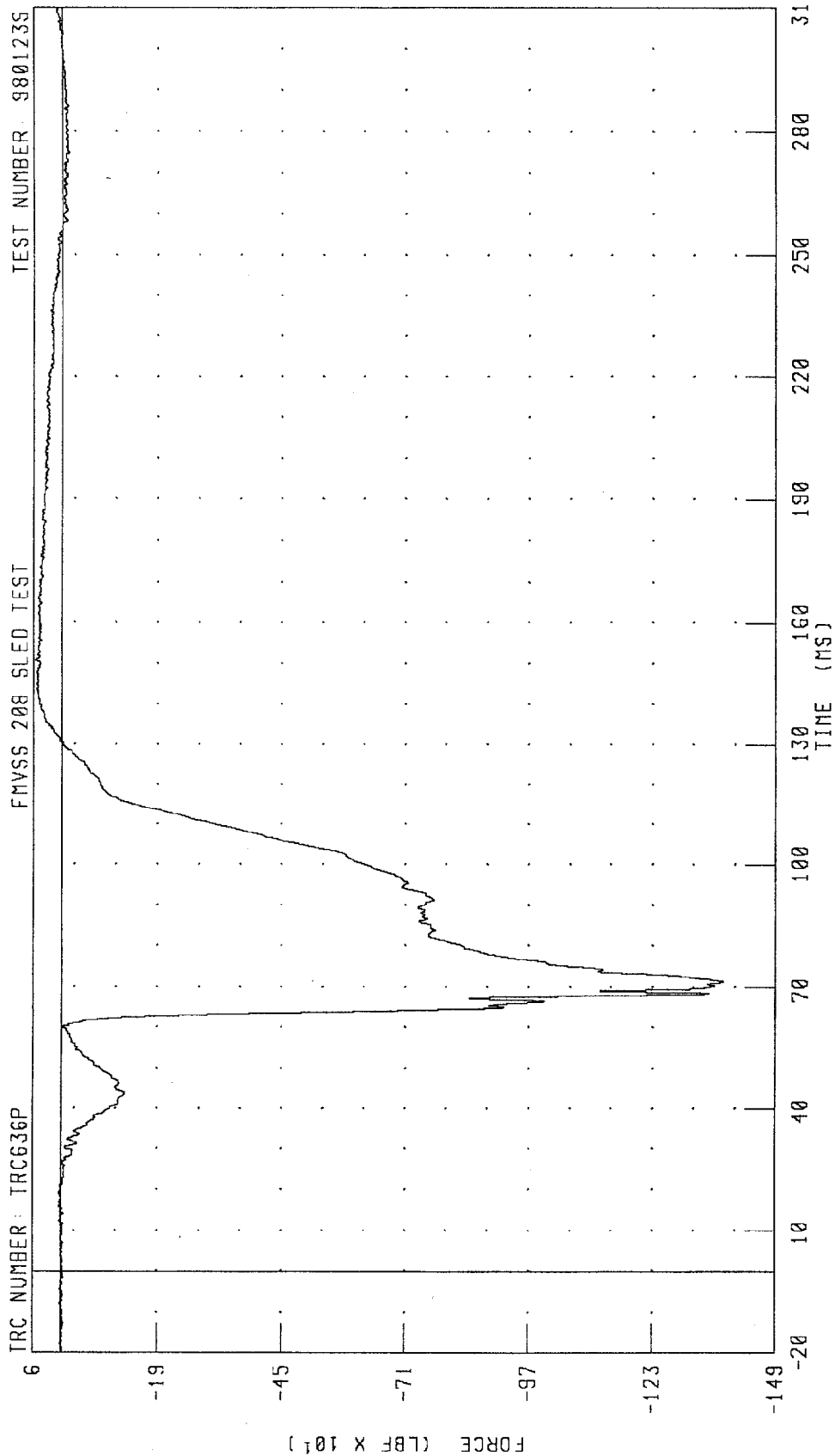
CHANNEL: CSTXD1 FILTER: CH. CLASS 600

CW0303 / 1998 JEEP GRAND CHEROKEE

DRIVER LEFT FEMUR FORCE

FMVSS 208 SLED TEST

TEST NUMBER: 980123S

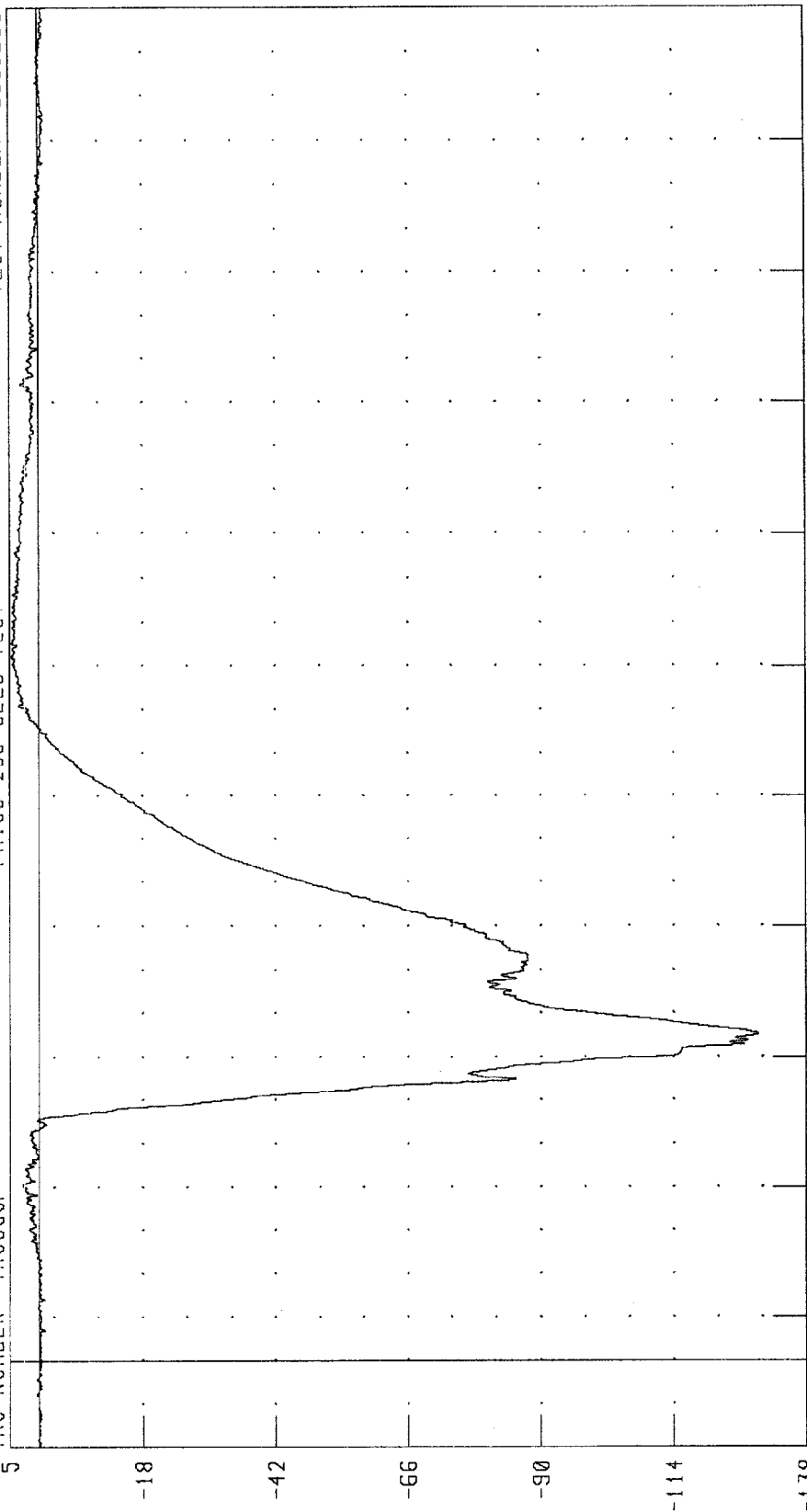


CW0303 / 1998 JEEP GRAND CHEROKEE
DRIVER RIGHT FEMUR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P

5

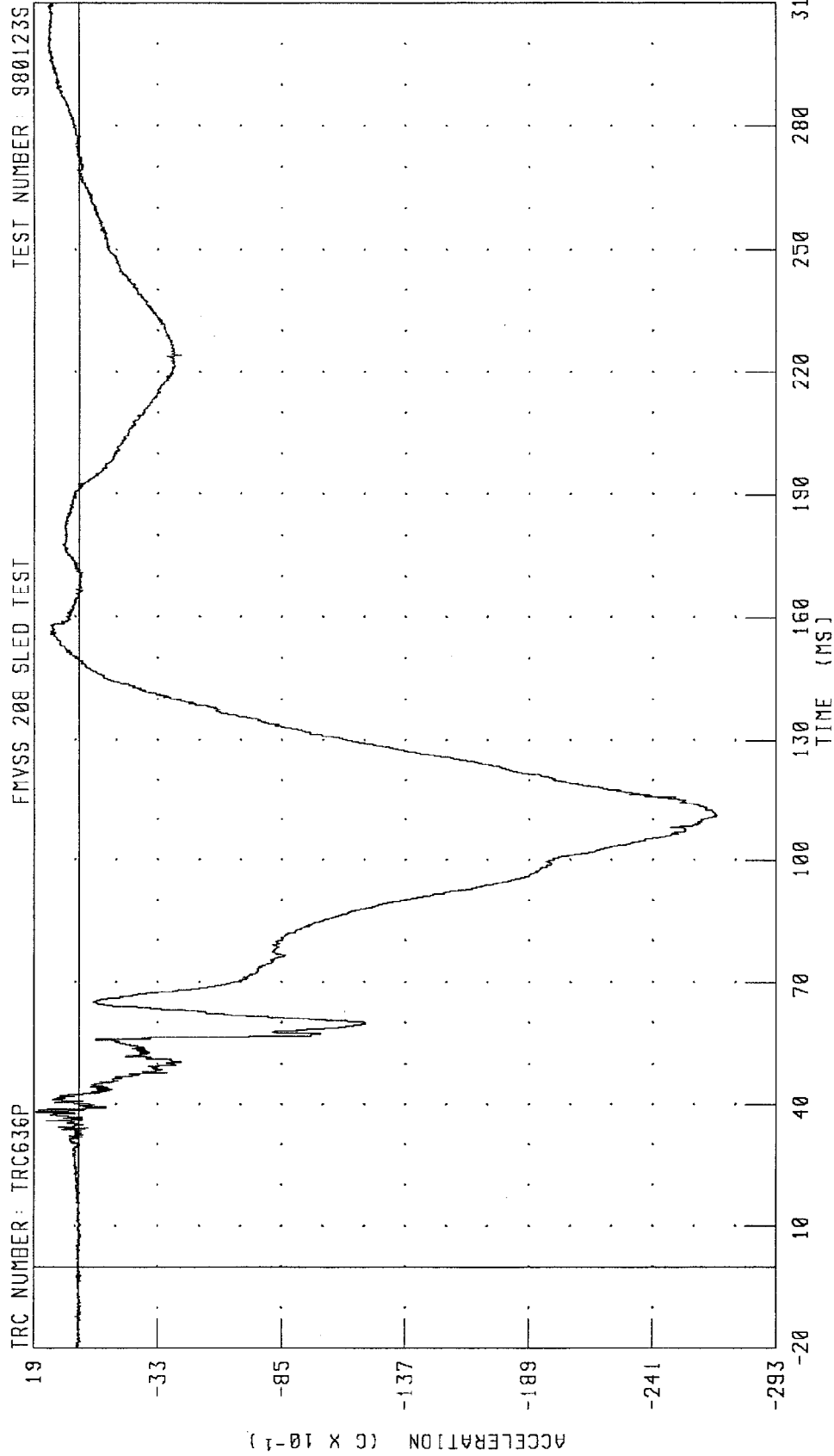


TIME (MS)

CHANNEL: RFMF1 FILTER: CH. CLASS 600

PEAK DATA: 49.77 LBF @ 161.92 MS; -1297.60 LBF @ 75.20 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
 FMVSS 208 SLED TEST



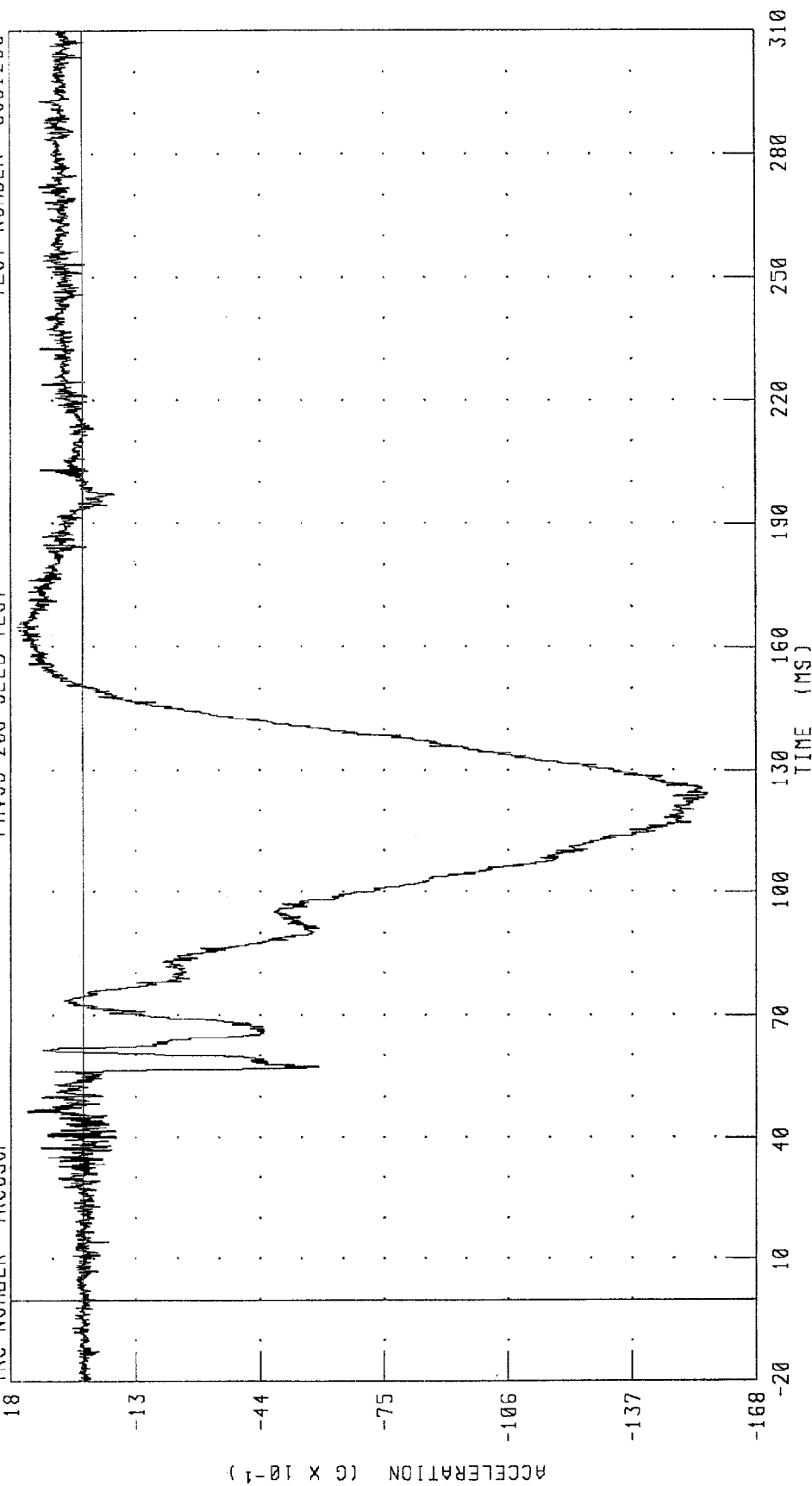
PEAK DATA: 1.79 G @ 38.08 MS; -26.79 G @ 110.96 MS

CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



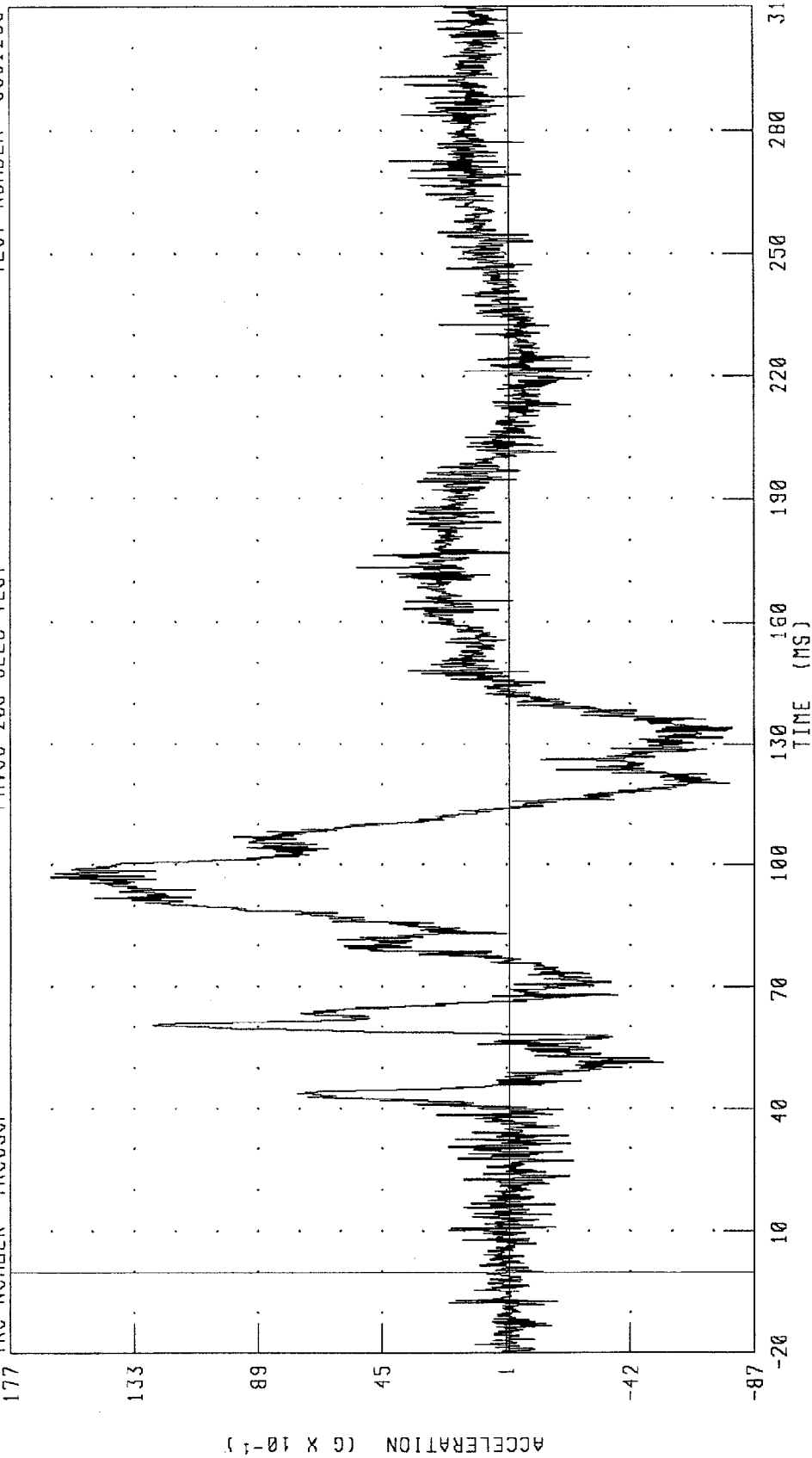
PEAK DATA: 1.65 G @ 165.20 MS; -15.59 G @ 124.16 MS

CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

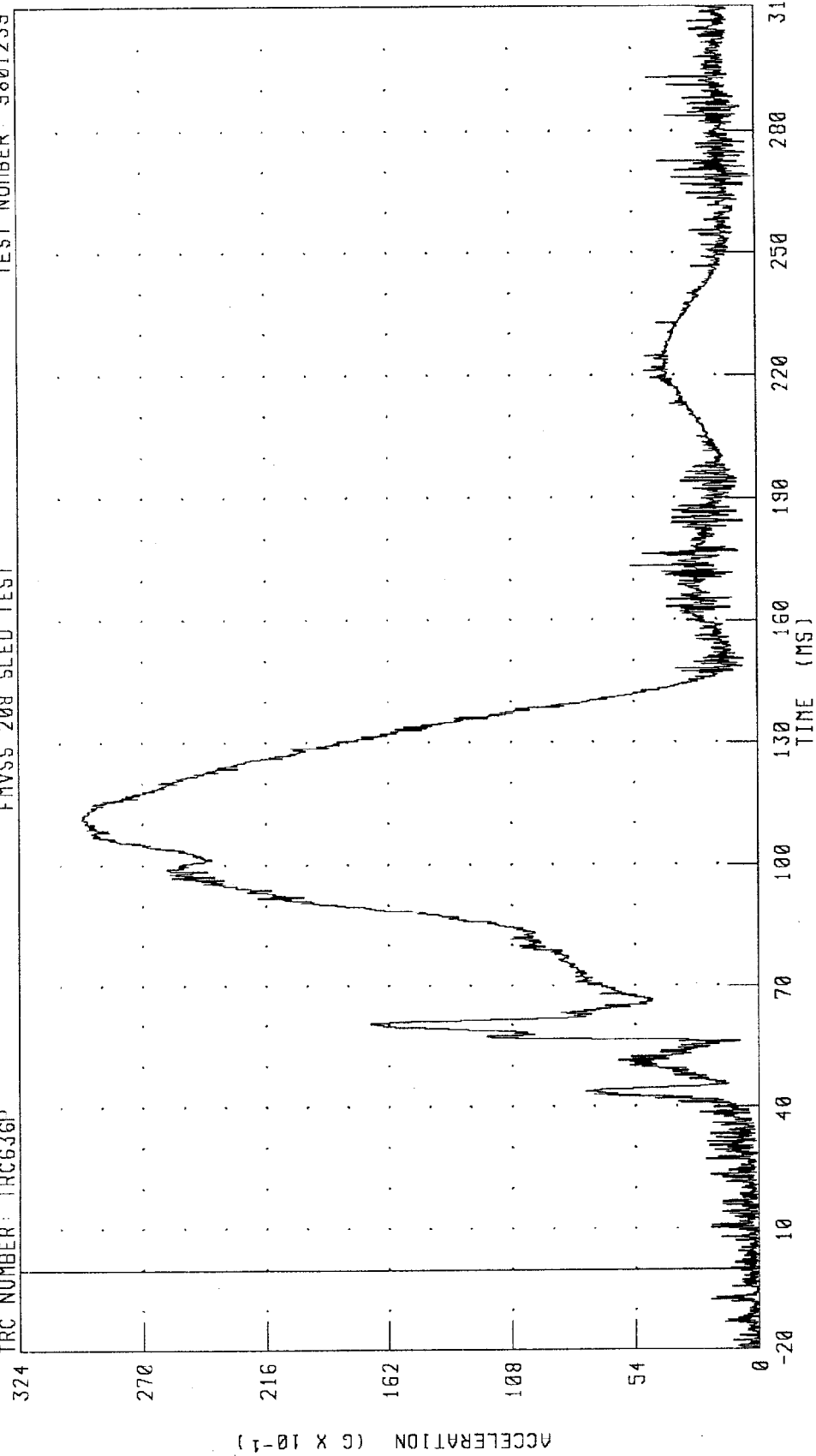
PEAK DATA: 16.29 G @ 97.04 MS; -7.92 G @ 133.84 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 980123S

FNVS 208 SLED TEST

TRC NUMBER: TRC636P



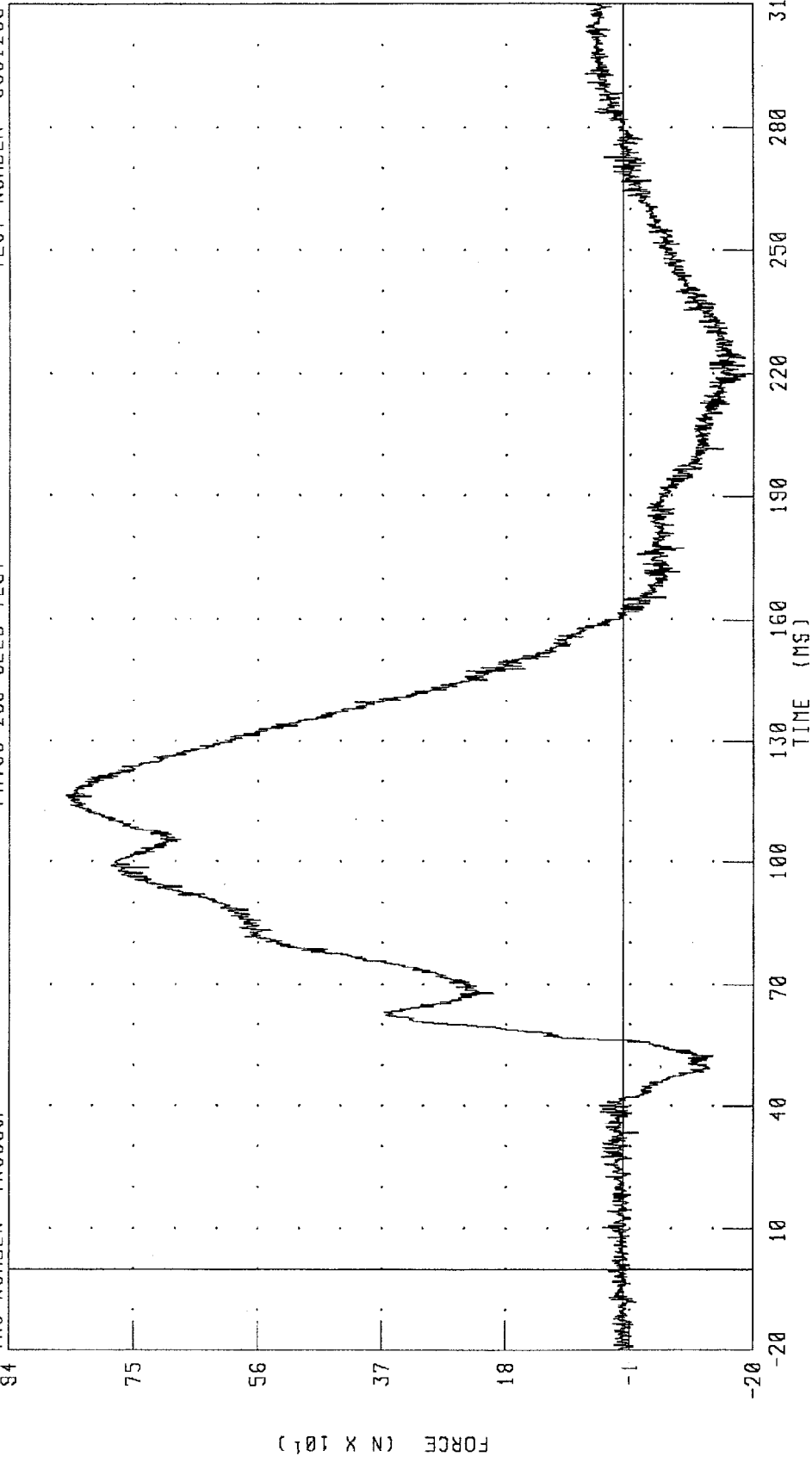
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

PEAK DATA: 29.63 G @ 111.28 MS; 0.03 G @ -1.12 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



PEAK DATA: 853.85 N @ 116.48 MS; -187.16 N @ 219.44 MS

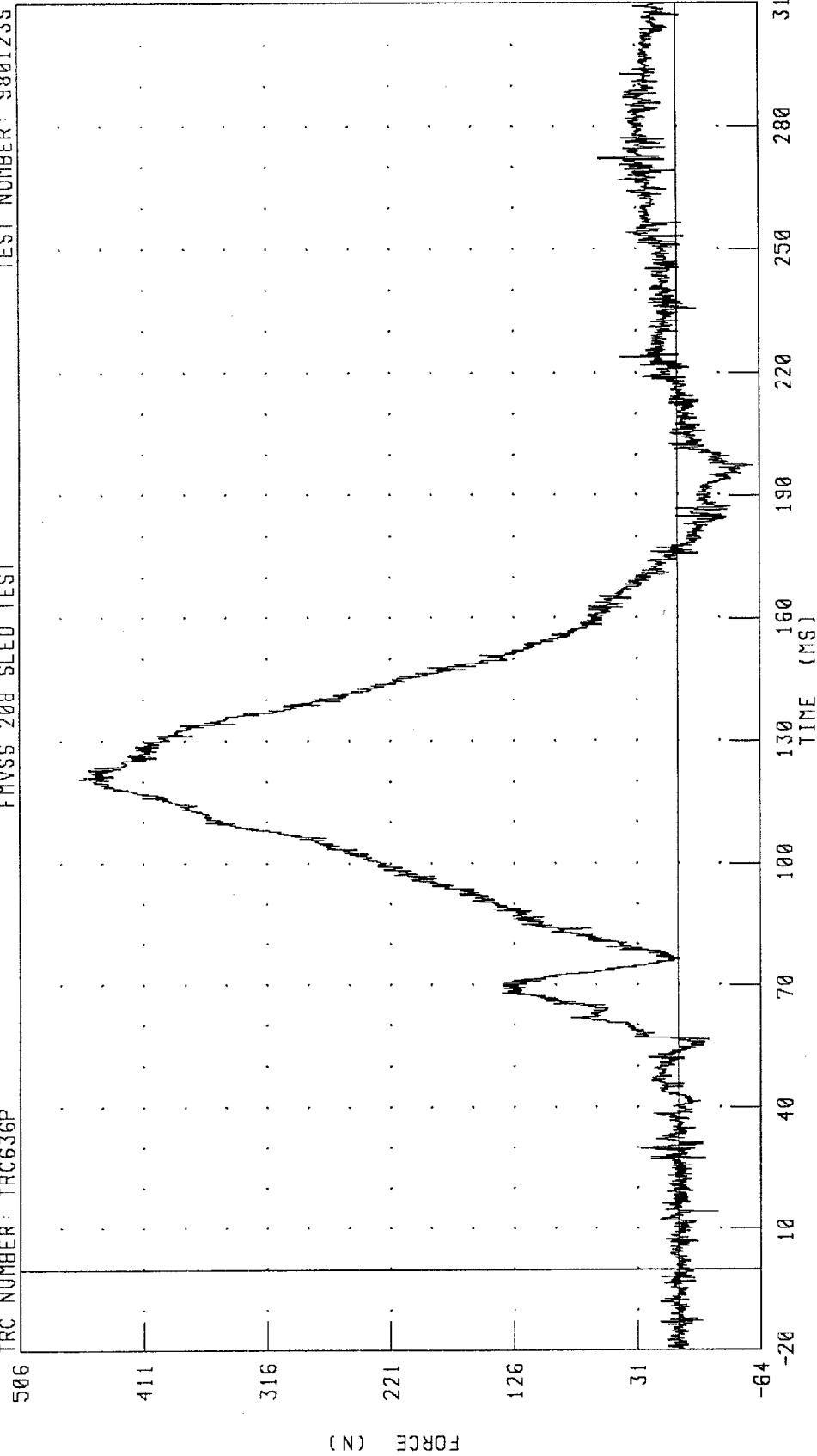
CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: S80123S

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P



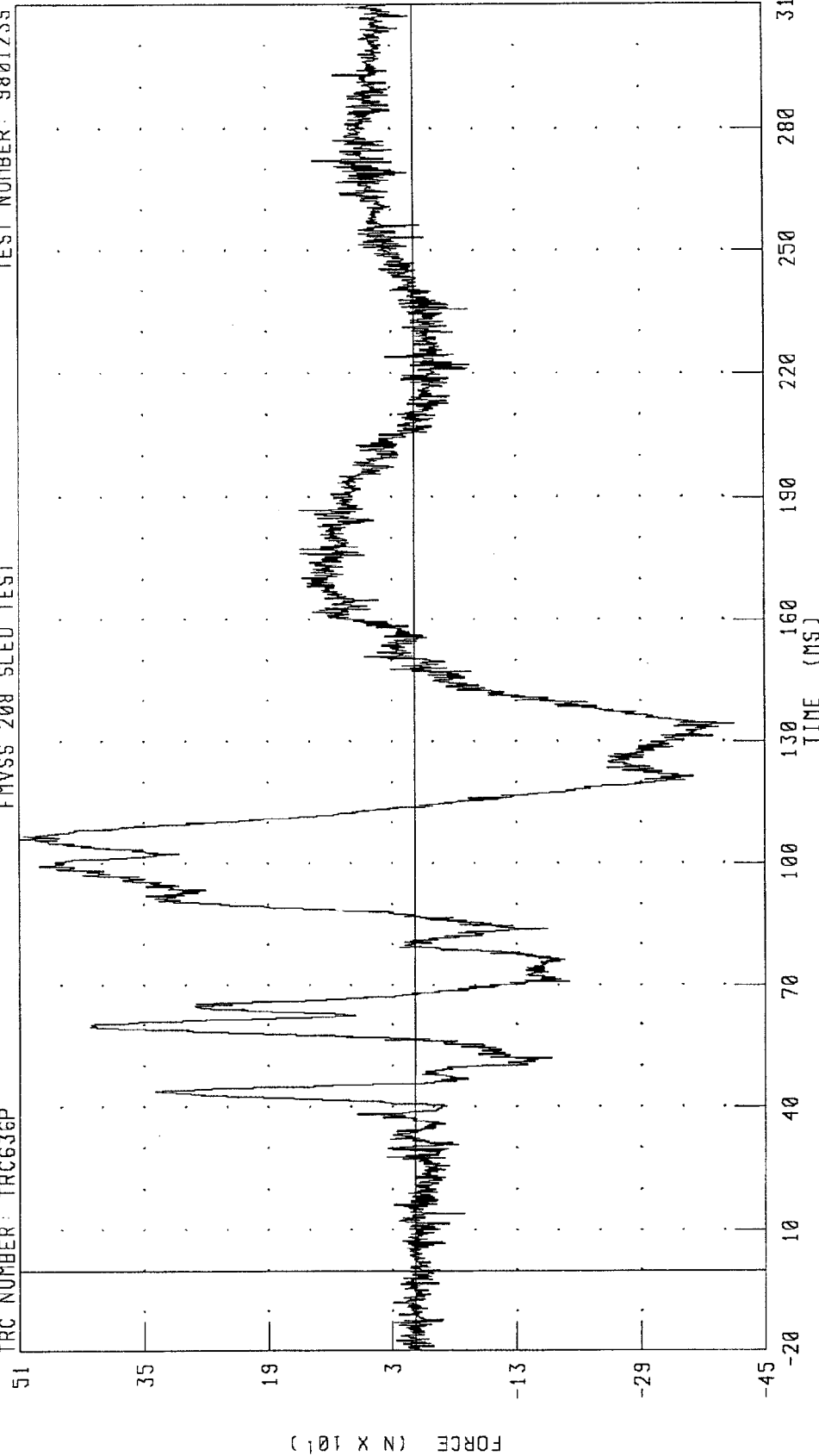
PEAK DATA: 460.34 N @ 120.80 MS; -58.64 N @ 197.52 MS

CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 980123S

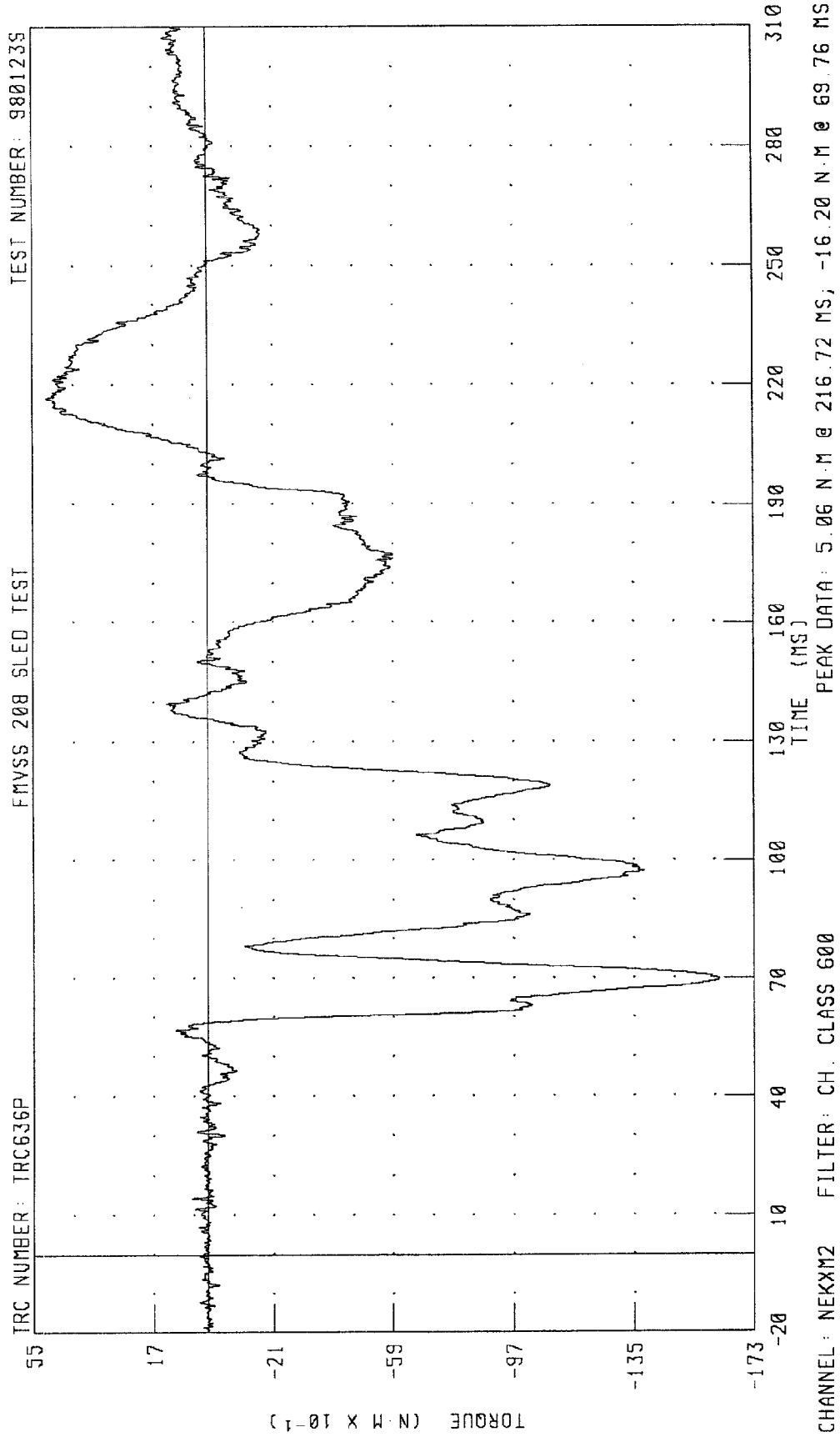
TRC NUMBER: TRC636P



PEAK DATA: 511.96 N @ 106.08 MS, -410.35 N @ 134.24 MS

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

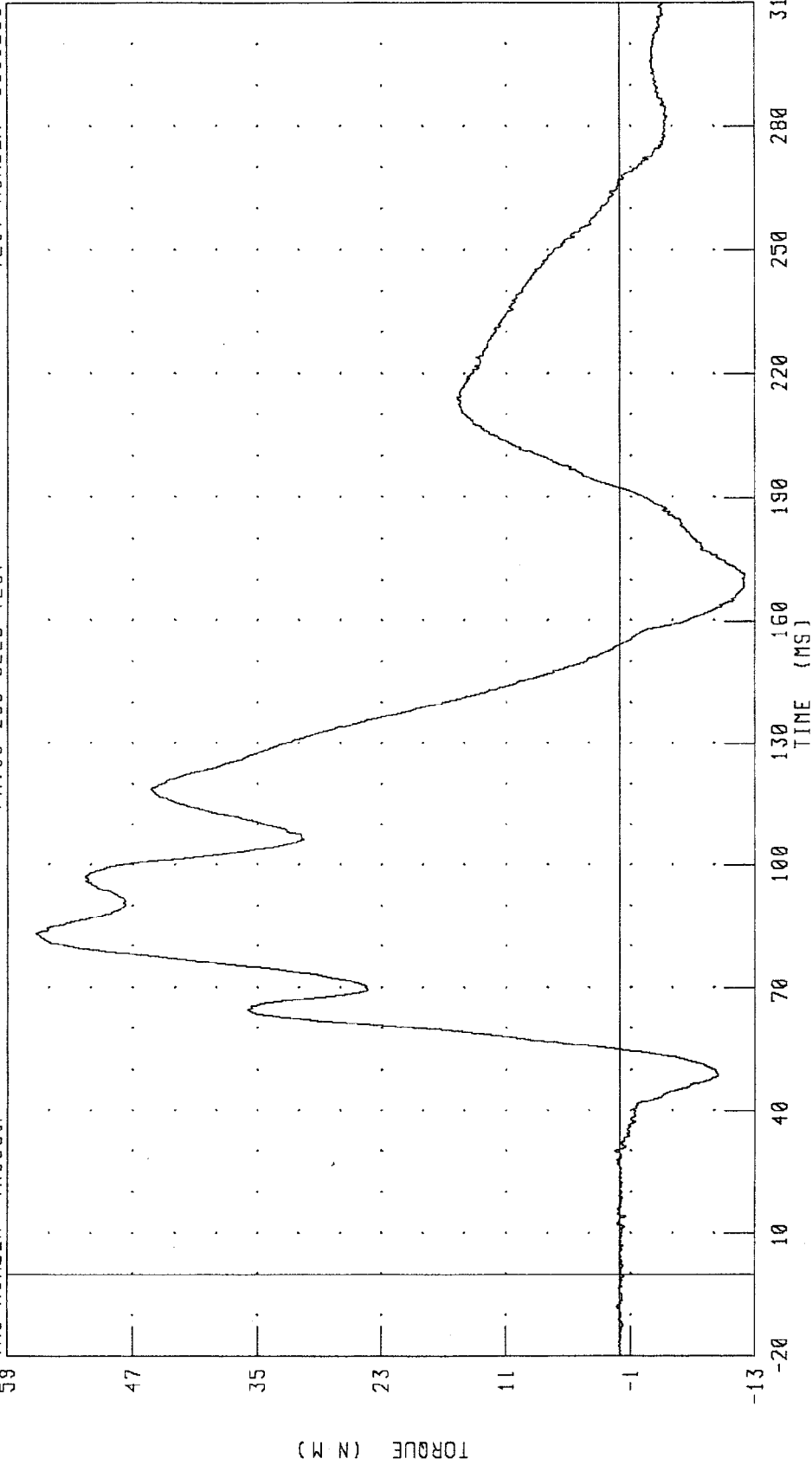


CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS
FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P

59



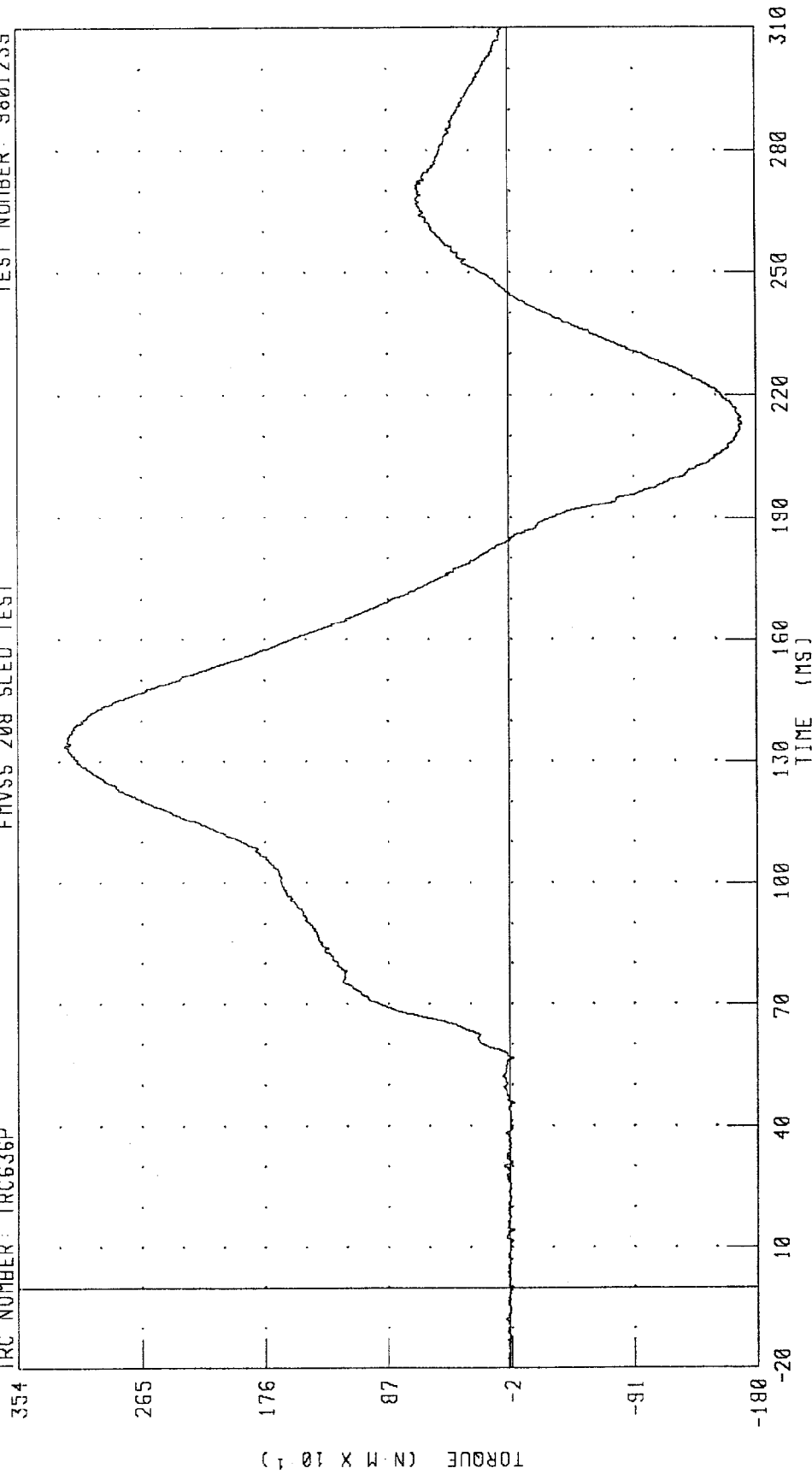
PEAK DATA: 56.21 N.M @ 82.96 MS; -12.04 N.M @ 171.36 MS

CHANNEL: NEKYM2 FILTER: CH. CLASS 600

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS
 FMVSS 208 SLED TEST

TEST NUMBER: 980123S

TRC NUMBER: TRC636P



PEAK DATA: 32.05 N·M @ 133.76 MS; -16.95 N·M @ 212.88 MS

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE ABOUT Y AXIS
FMVSS 208 SLED TEST

TEST NUMBER: 380123S

TRC NUMBER: TRC636P

48

38

28

18

8

-2

-12

TORQUE (N·M)

TIME (MS)

310 280 250 220 190 160 130 100 70 40 10 -20

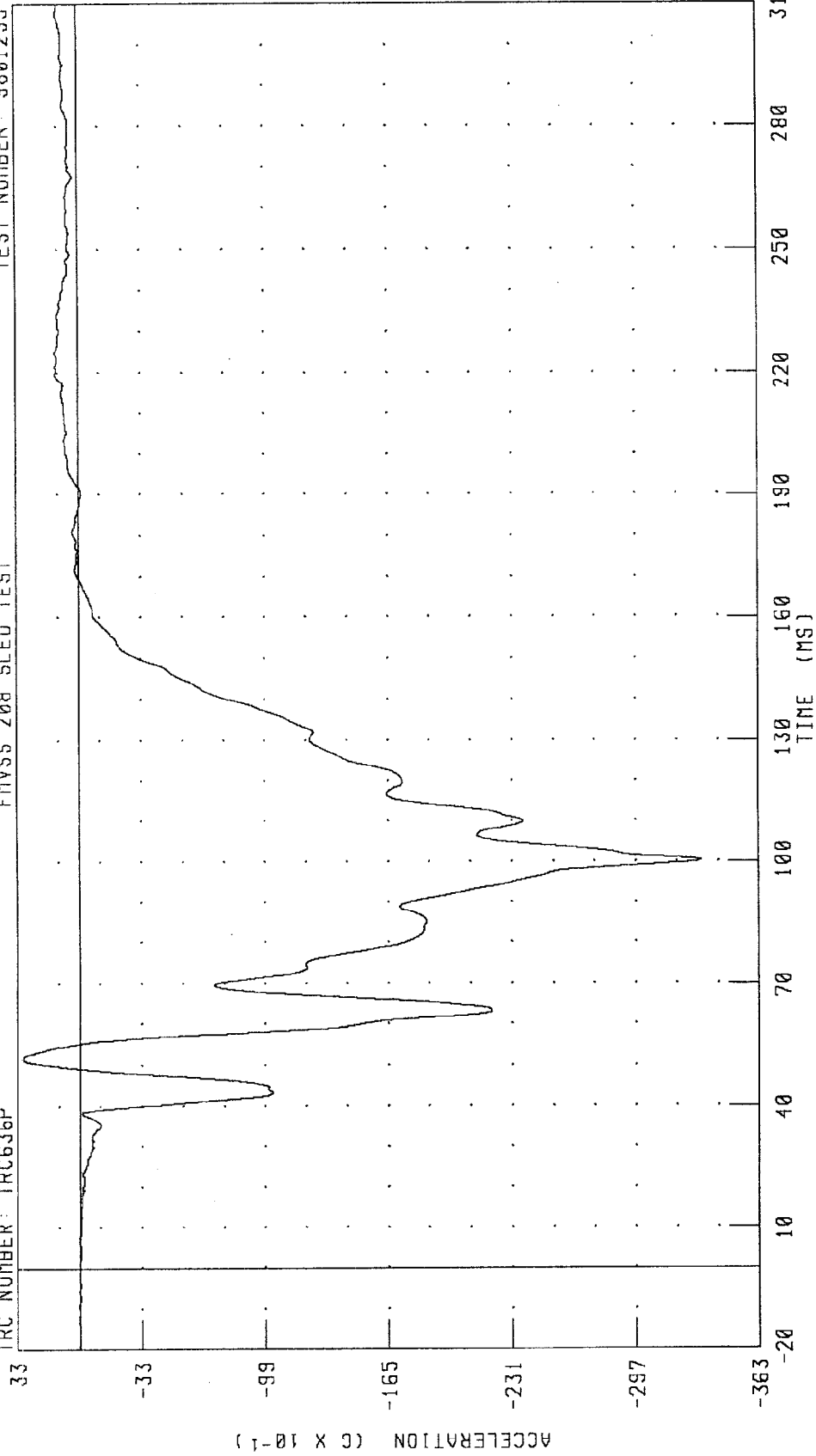
CHANNEL: NEKOM2 FILTER: CH. CLASS 600

PEAK DATA: 46.41 N·M @ 83.12 MS, -11.20 N·M @ 171.36 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER 980123S

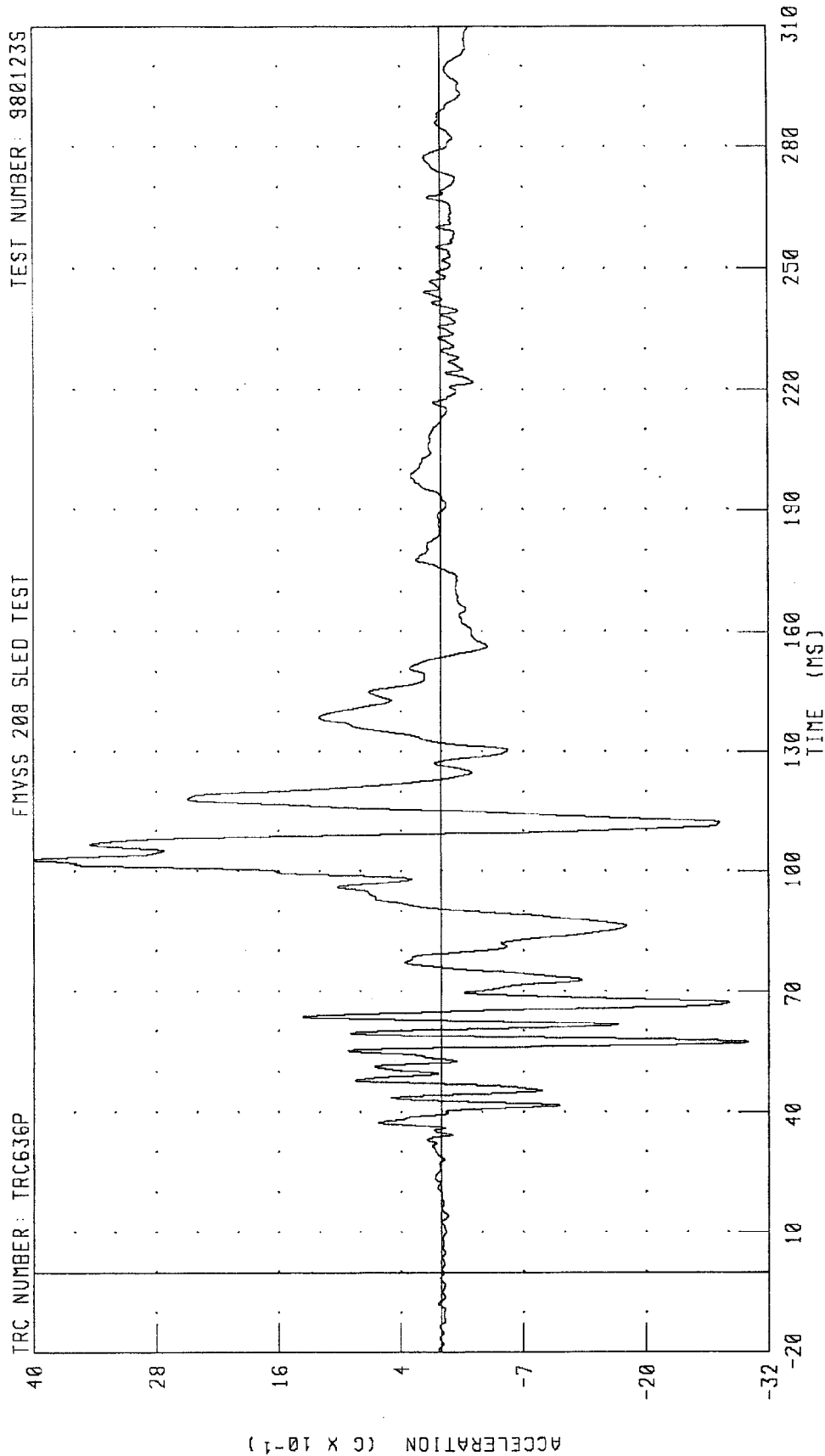
TRC NUMBER: TRC636P



CHANNEL: CSTXG2 FILTER: CH: CLASS 180

PEAK DATA: 3.02 G @ 51.60 MS; -33.19 G @ 100.24 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

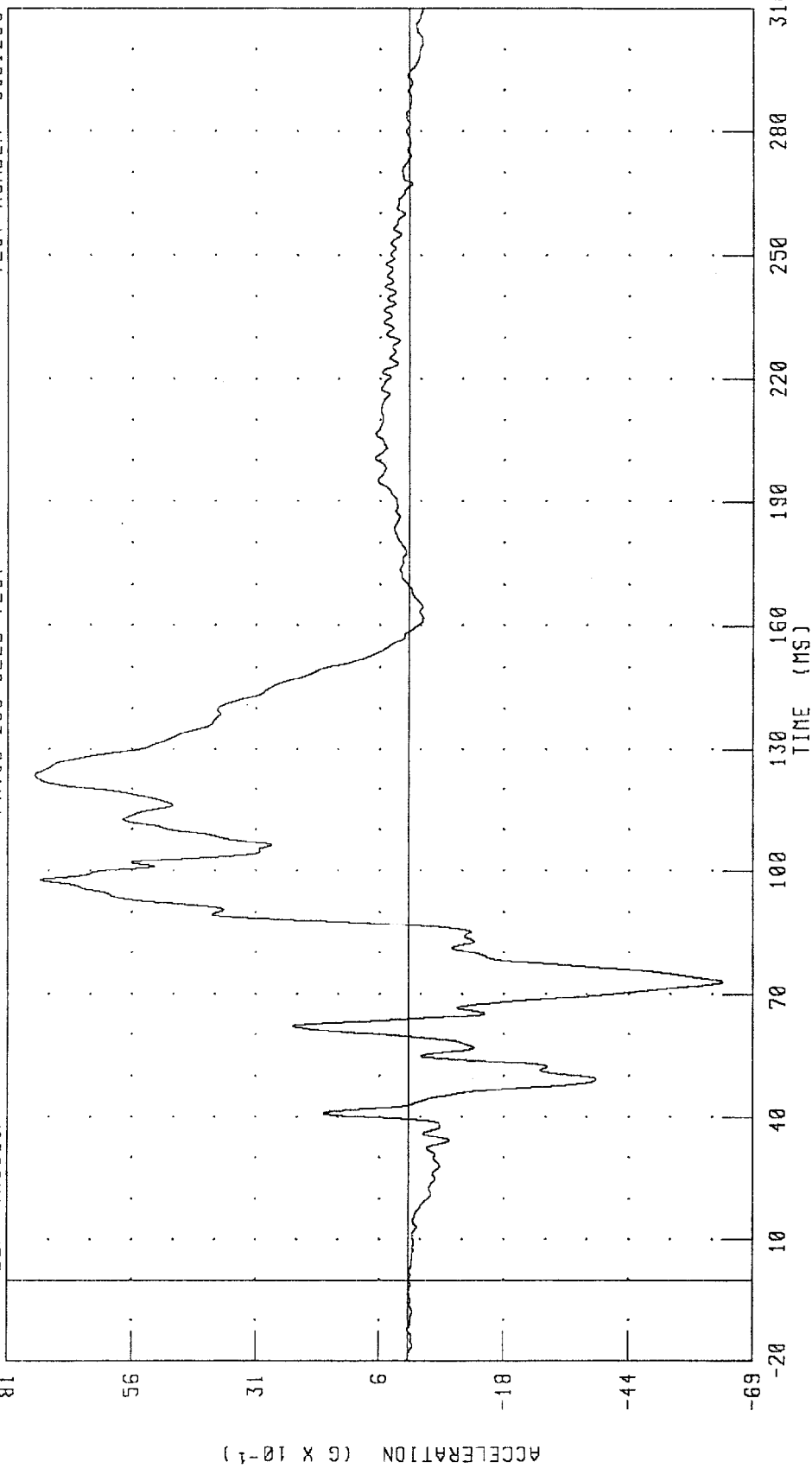


CHANNEL: CSTYG2 FILTER: CH. CLASS 180

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

TEST NUMBER: 980123S



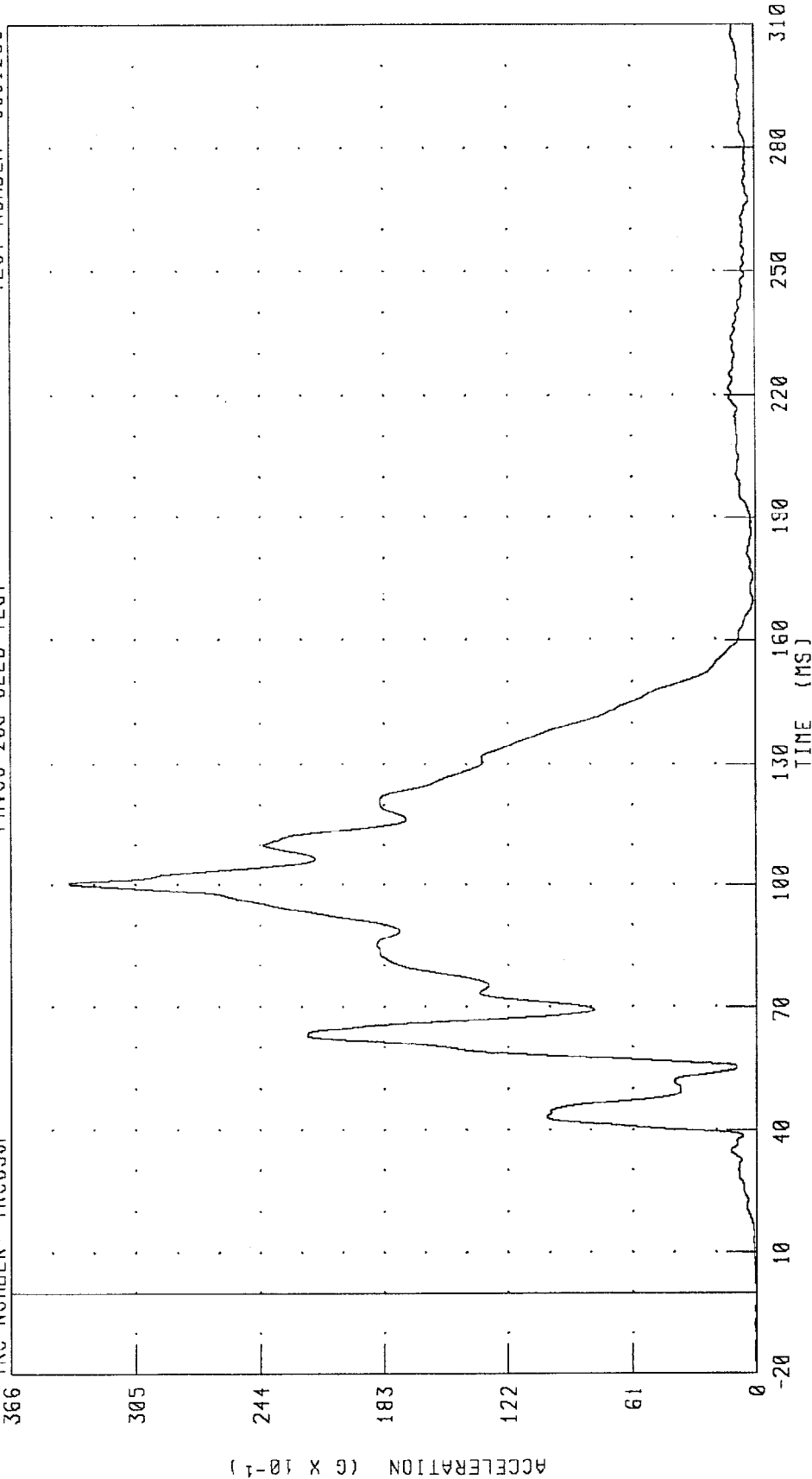
CHANNEL: CSTZG2 FILTER: CH. CLASS 180

PEAK DATA: 7.54 G @ 123.52 MS; -6.27 G @ 72.96 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER 980123S

TRC NUMBER: TRC636P



PEAK DATA: 33.76 G @ 100.24 MS; 0.02 G @ -18.72 MS

CHANNEL: CSTRG2 FILTER: CH. CLASS 180

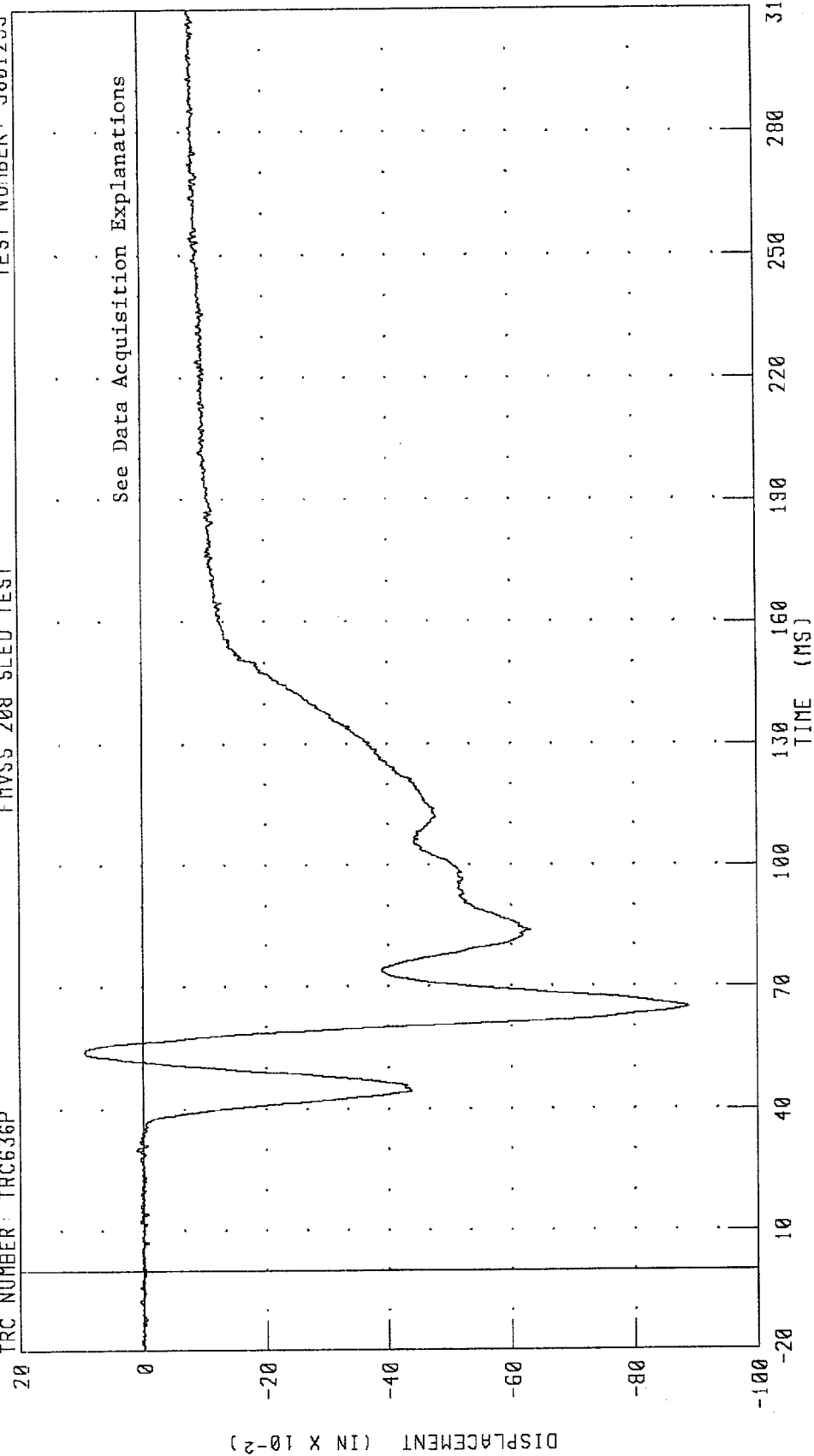
CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 980123S

FMVSS 208 SLED TEST

TRC NUMBER: TRC636P

See Data Acquisition Explanations



PEAK DATA: 0.09 IN @ 54.08 MS; -0.89 IN @ 64.96 MS

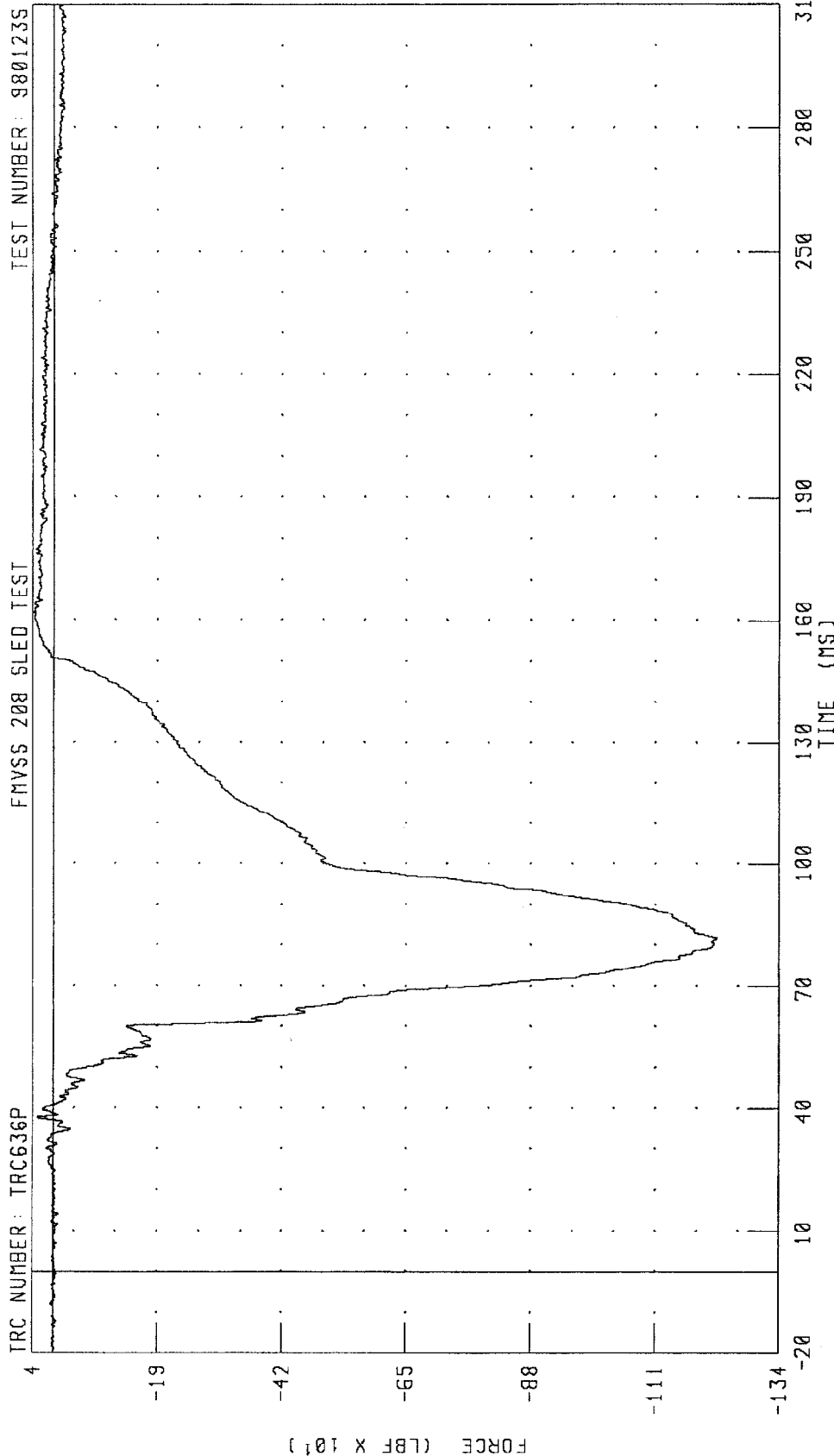
CHANNEL: CSTXD2 FILTER: CH CLASS 600

CW0303 / 1998 JEEP GRAND CHEROKEE
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TRC NUMBER: TRC636P

FMVSS 208 SLED TEST

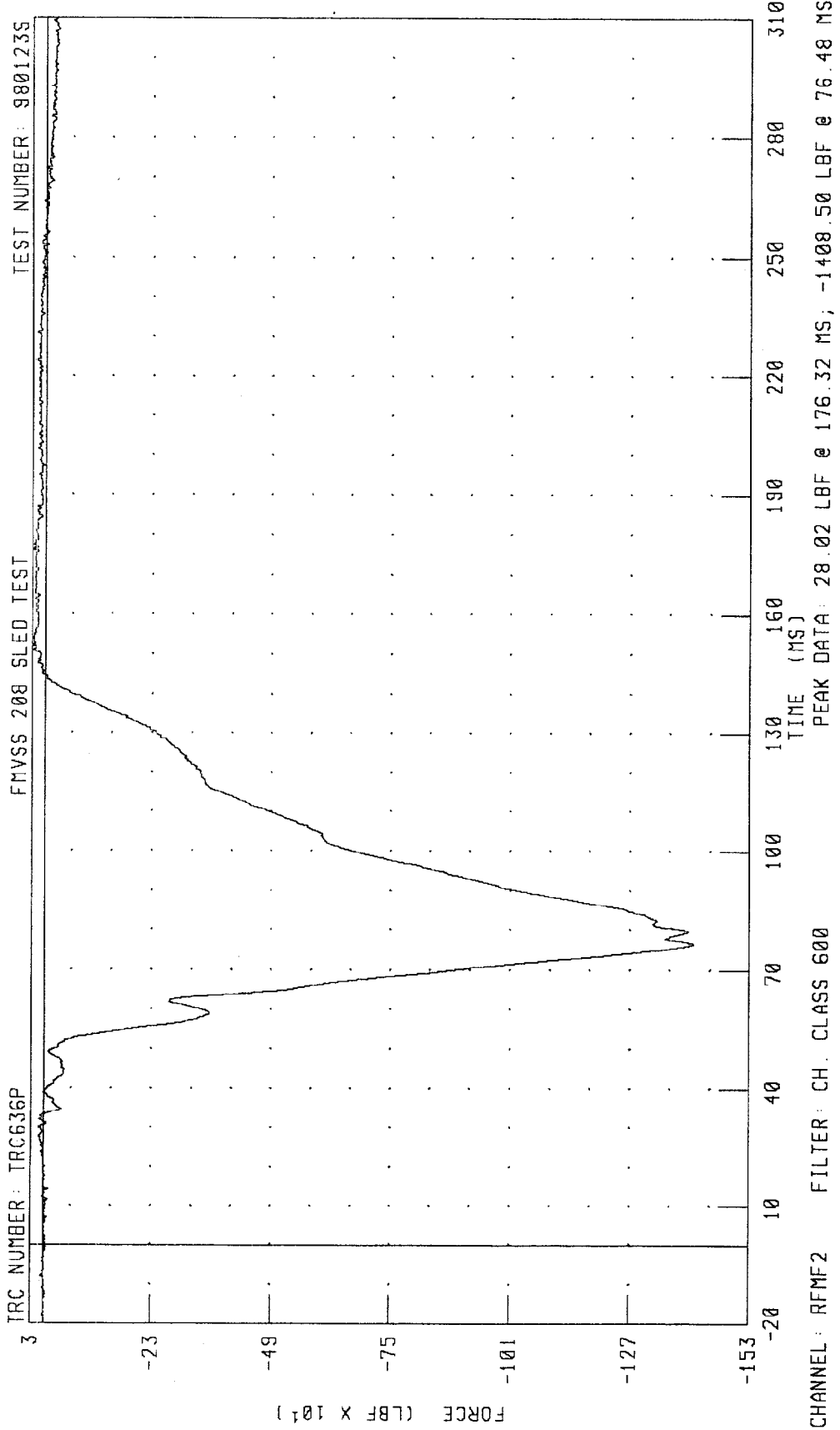
TEST NUMBER: 980123S



CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 37.24 LBF @ 161.84 MS; -1224.99 LBF @ 81.68 MS

CW0303 / 1998 JEEP GRAND CHEROKEE
 RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



Appendix C

Manufacturer's Vehicle Information



Susan M Cischke
Executive Director
Vehicle Certification Compliance & Safety Affairs

September 18, 1997

Mr. Harry Thompson, Chief
Office of Vehicle Safety Compliance
National Highway Traffic Safety Administration
U.S. Department of Transportation
400 Seventh Street, S.W.
Washington, D.C. 20590

RECEIVED NSA-30
SEP 19 P 1:12

Dear Mr. Thompson:

Reference: NSA-31CCA OA:208970811B; FMVSS 208 - 1998 Jeep Grand Cherokee

The following is provided in response to your August 18, 1997 information request.

Q1. 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.

A 1. The 1998 Jeep Grand Cherokee is certified to meet the requirements of FMVSS 208 S13. A copy of the Compliance Report is provided in **Attachment 1**.

Q2. If the air bags are or will be depowered or changed from the previous model year, explain the changes.

A 2. For the 1998 model year Grand Cherokee, both the driver and passenger airbags remain unchanged from 1997 model year. However the driver air bag was depowered in 1996 from the 1994 level.

Q3. 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.

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A 3. For the 1998 model year Grand Cherokee, the part number for the driver air bag assembly have been changed because the airbag has new horn wiring even though the basic airbag is unchanged from 1997 model year. The Monroney label will read "Airbag-Next Generation*" and include the footnote "**Certified to the new Federal Regulations that allow less forceful airbags."

Q4. 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.

A 4. Disconnect the battery and wait at least two minutes. Remove the driver air bag module from the steering wheel and unplug the connector; unplug the passenger air bag pigtail from the vehicle body wiring harness underneath the instrument panel. Once the air bags have been disconnected, cut the wires on the body wiring harness. Use the cut wires to construct an overlay harness which will be used to deploy the air bags during the impact simulator test. Using the overlay harness, the air bags are wired in parallel to a 12 volt power supply controlled by an "air bag timer delay box" which is used to trigger the air bags 20 milliseconds following a 1/2 G carriage acceleration event.

Q5. 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.

A 5. The safety belts are not equipped with tension-relieving devices.

Q6. 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.

A 6. All tests were performed with the front windows in the fully down position and the rear moveable windows in the fully closed position.

Q7. 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.

A 7. Dummy placement measurements, where available, are provided in **Attachment 1**.
A driver foot rest is provided on the 1998 Grand Cherokee.

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Q8. 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.

A 8. No optional fuel tank or optional seats that would change the dummy placement are available on the Grand Cherokee. The requested set up information is provided in **Attachment 2.**

Q9. If the vehicle is equipped with adjustable seatbelt anchorages, provide the manufacturer's nominal design position for a 50th percentile adult male occupant.

A 9. The adjustable seat belt anchorages for both front seat occupants should be placed in the 3rd position (notches) up from the full down position. This is also the 4th position down from the full up. There should be three empty positions above and two empty positions below the anchorage when properly positioned. This is the nominal design position for a 50th percentile male occupant.

Q10. 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.

A 10. The requested information is in the Compliance Report provided in **Attachment 1.**

Q11. 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?

A 11. If vehicle components are removed, this is the recommended order; spare tire, rear quarter interior trim, rear seat, rear door trim, and rear bumper.

Q12. 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.

A 12. A pressure vessel is used to inflate the passenger side air bag. See **Attachment 4** for the requested information.

Q13. If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test report or engineering analysis to demonstrate that it meets all the requirements of S9.2.

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A 13. A explosive device is used to deploy the driver air bag. See **Attachment 4** for the requested information.

If you have any questions regarding the information provided, please contact Mr. Archie J. Rock of my staff at (248) 576-7324.

Sincerely,



S. M. Cischke

Attachments

FMVSS 208

1998 JEEP GRAND CHEROKEE

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ATTACHMENT 2

RESPONSE TO QUESTION #8

GENERAL SETUP CONDITIONS

FORM NO. 1

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 1998 Jeep
 Vehicle Model & Body Style: Grand Cherokee, 4-Door

1. NOMINAL DESIGN RIDING POSITION --

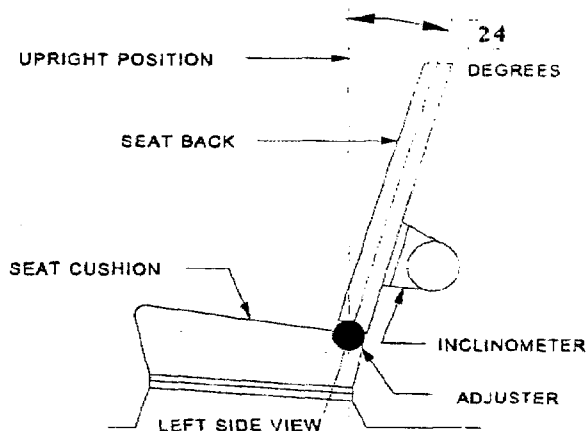
For adjustable driver and passenger seat backs.
 Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable. Indicate, if applicable, how the detents are numbered (Is the first detent "0" or "1"?). Indicate if the seat back angle is measured with the dummy in the seat.

Seat back angle for driver's seat = 24 degrees.

Measurement Instructions:

1) Adjust seat back to full forward position.

2) Using inclinometer, move seat back rearward 8 degrees from the full forward position.



Seat back angle for passenger's seat = 24 degrees.

Measurement Instructions:

Same as driver

2. SEAT FORE & AFT POSITIONS --

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, indicate how the detents are numbered (Is the first detent "0" or "1"?). Provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat:

Both power and manual seats are set to the midtrack positions. Manual seat tracks have 19 detents. Placing the seat in the 10th detent rearward will leave 9 open detents forward and 9 open detents rearward. Power seats have 190 mm of travel. Midtrack is to be found 95 mm rearward of full forward. Power seats are set to the full down position.

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

Same as driver

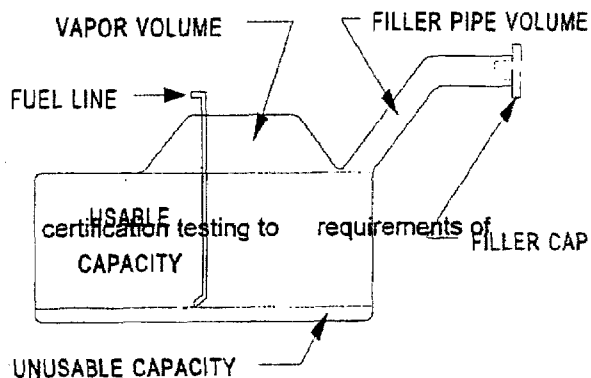
3. FUEL TANK CAPACITY DATA --

3.1 A. "Usable Capacity" of standard equipment fuel tank = 22.5 gallons.

B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.

C. "Usable Capacity" of vehicle(s) used for FMVSS 301 = 22.5 gallons.

Operational Instructions:



VEHICLE FUEL TANK ASSEMBLY

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 21.5 gallons

FORM NO. 1 Continued

TEST VEHICLE INFORMATION

3.3 Is vehicle equipped with electric fuel pump? ☒ YES ☐ NOIf YES, does pump normally operate when vehicle's electrical system is activated? ☒ YES ☐ NO

4. ADJUSTABLE UPPER ANCHORAGE POSITION:

ATL is to be placed so 2 locking positions are below it and 3 locking positions are above it.

5. STEERING COLUMN ADJUSTMENTS --

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

Steering wheel and column are set at to the mid range of motion. The mid point is two notches down and two notches up. This places the column at the mid point of the five possible positions.

