

V2438

Report Numbers: TRC-95-V007

Rear Impact Full-Scale Crash Testing
for Upgrade of
FMVSS 301 Test Procedure

Deformable Impactor into Rear of
1996 Chevrolet Blazer
at 80 kph with 70% Left Side Overlap
TRC Test Number: 960408

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May 13, 1996

Final Report

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16. Abstract An 80 kph deformable impactor rear crash test with 70% left side overlap was conducted on a 1996 Chevrolet Blazer 2-door mpv at Transportation Research Center Inc. on April 8, 1996. This test was conducted to determine vehicle and occupant response in the rear 70% left side overlap test mode. The test vehicle's weight was 1906 kg. The impactor's velocity was 81.8 kph. The impactor's weight was 1343 kg. The vehicle's maximum crush was 579 millimeters. The ambient temperature was 11° C. The driver's Head Injury Criteria (HIC) was 783. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 22.6 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum axial forces were 1409 N and 1033 N, respectively. The passenger's HIC was 2552. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 18.9 g. The passenger's chest maximum deflection was 2 mm. The passenger's left and right femur maximum axial forces were 525 N and 378 N, respectively.			
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METRIC CONVERSION FACTORS

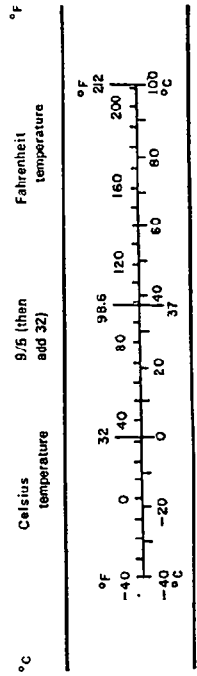
Approximate Conversions to Metric Measures

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
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)



* 1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. 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 crash test was conducted to determine vehicle and occupant response in the 80 kph rear impact with 70% left side overlap test mode. The test was performed on a 1996 Chevrolet Blazer 2-door mpv.

Test Procedure

This test was conducted per Contract No. DTRS57-95-C-00011, Technical Task Directive No. 1, "Rear Impact Full-Scale Crash Testing for Upgrade of FMVSS 301 Test Procedure."

The test vehicle was instrumented with nine (9) 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 C of the Laboratory Test Procedure TP-208-09. Each dummy was restrained by a three-point unbelt.

The deformable impactor was instrumented with five (5) force load cells to measure longitudinal axis forces on the barrier face. The deformable barrier face was positioned 229 mm from ground level.

The impactor's specified velocity range was 80.1 to 81.8 kph.

Both dummies were instrumented with head center of gravity and Position 1, 2, and 3 accelerometers to measure longitudinal, lateral, and vertical accelerations; neck upper and lower 6-axis load cells to measure longitudinal, lateral, and vertical force and moments; chest and pelvis accelerometers to measure longitudinal, lateral, and vertical axis accelerations; and with left and right femur load cells to measure axial forces. Each Part 572 E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection. The driver dummy's lap and shoulder belt were each instrumented with a load cell.

The seventy-six (76) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure TP-208-09.

The crash event was recorded by thirteen (13) high-speed motion picture cameras.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 301 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 dummy calibration information. Appendix D contains miscellaneous test information

Section 2.0

Rear Deformable Barrier Impact Test Summary

Test Results Summary

This 80 kph rear crash test with 70% left side overlap was conducted at TRC on April 8, 1996.

The test vehicle, a 1996 Chevrolet Blazer 2-door mpv, was equipped with airbags and three-point unibelts at the driver's and right front passenger's seating positions. The vehicle's test weight was 1906 kg. The vehicle's maximum static crush was 579 mm.

The driver's HIC was 783. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 22.6 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum compressive forces were 1409 N and 1033 N, respectively.

The right front passenger's HIC was 2552. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 18.9 g. The right front passenger's chest maximum deflection was 2 mm. The right front passenger's left and right femur maximum compressive forces were 525 N and 378 N, respectively.

A trace amount of fuel system fluid spilled during the impact event. No fuel system fluid spillage occurred during the static rollover test.

Data Acquisition Explanations

The right front passenger's head Position 3 X-axis accelerometer, HD3XG2, exceeded the data channels full scale limit at 131 milliseconds.

The left rear wheel axle X-axis accelerometer, RAXXG1, lost data at 71 milliseconds as a result of the accelerometers cable being cut by the vehicle's crush on impact.

The right rear wheel axle X-axis accelerometer, RAXXG2, lost data at 47 milliseconds as a result of the accelerometers cable being cut by the vehicle's crush on impact.

The rear package shelf X-axis accelerometer, TCRXG, exceeded the data channel full scale limit at 30 milliseconds.

Table 1 Crash Test Summary

Test type:	80 kph rear impact with 70% left side overlap
Test date:	04/08/96
Test time:	1548
Ambient temperature at impact area:	11° C
Vehicle year/make/ model/body style:	1996/Chevrolet/Blazer/2-door mpv
Vehicle test weight:	1906 kg
Impact angle ¹ :	180°
Impact velocity ² :	
Primary:	81.8 kph
Secondary:	81.6 kph
Maximum static crush:	579 mm
Number of cameras:	
High-speed:	13
Door opening data:	
Left-front:	Easy
Right-front:	Easy

¹ With respect to tow track centerline.

² Speed trap measurement ($\pm .08$ kph accuracy)

Table 1 Crash Test Summary, Cont'd.

Dummies:	<u>Driver #35</u>	<u>Passenger #34</u>
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag/3-point unbelt	Airbag/3-point unbelt
Number of data channels:	30	30
Front seat data:		
Seat track failure:	None	None
Seat back failure: ¹	Seat back deformed	Seat back deformed
Visible dummy contact points:		
Head:	Left rear side trim panel	Rear floorpan and head restraint
Chest:	None	None
Abdomen:	None	None
Left knee:	Steering wheel	None
Right knee:	Steering wheel	None

¹Floorpan deformed at seat anchor locations.

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1996/Chevrolet/Blazer/2-door mpv

Color: Black

VIN: 1GCC518W2TK168995

Engine data:

Placement: Longitudinal/Inline

Cylinders: 6

Displacement: 4.3 liters

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

Final drive: fwd, X rwd, 4wd

Date vehicle received: 03/25/96

Odometer reading: 194

Dealer's name
and address: Quality Chevrolet
Columbus, Ohio

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	No
Power seats	No	Tilting steering wheel	No
Power windows	No	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	Yes
Clock	Yes	Rear window defroster	No
Power door locks	No		

Certification data from vehicle's label:

Vehicle manufactured by: General Motors Corporation

Date of manufacture: 01/96

VIN: 1GCC518W2TK168995

GVWR: 2018 kg

GAWR: Front: 998 kg

Rear: 1179 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P205/75R15
Spare tire: P205/75R15
Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P205/75R15

Recommended cold tire pressure:

Front: 240 kPa

Rear: 240 kPa

Designated Seating Capacity:

Front NA

Rear NA

Total NA

Cargo Load: 374 kg

Test vehicle attitudes:

Delivered attitude: LF: 815 mm RF: 825 mm LR: 842 mm RR: 845 mm

Fully loaded attitude: LF: 787 mm RF: 784 mm LR: 824 mm RR: 827 mm

Pre-test attitude: LF: 780 mm RF: 765 mm LR: 1046 mm RR: 934 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	425	kg	Right rear	371	kg
Left front	453	kg	Left rear	373	kg
Total front weight	878	kg	(54.1% of total vehicle weight)		
Total rear weight	744	kg	(45.9% of total vehicle weight)		
Total delivered weight	1622	kg			

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1622 kg)

VCW¹ = Vehicle Capacity Weight = NA

DSC = Designated Seating Capacity (NA)

RCLW = VCW - 68 (DSC) = 136

Target test weight = UDW + RCLW¹ + (Number of Hybrid III dummies x 76 kg per dummy)

Target test weight = 1622 + 136 + 152 = 1910 kg

Weight of test vehicle with required dummies and 68 kg of cargo weight:

Right front	535	kg	Right rear	407	kg
Left front	542	kg	Left rear	422	kg
Total front weight	1077	kg	(56.5% of total vehicle weight)		
Total rear weight	829	kg	(43.5% of total vehicle weight)		
Total test weight	1906	kg	(0.2% under target test weight)		

Weight of ballast secured in vehicle cargo area: 0

Components removed to meet target test weight: Front bumper, grill, head lights, and ABS unit..

CG rearward of front wheel centerline: 1111 mm

Vehicle Wheelbase: 2555 mm

¹ From vehicle's tire load label.

Table 3 Post-Impact Data

Test number: 960408
Test date: 04/08/96
Test time: 1548
Test type: 80 kph rear impact with 70% left side overlap
Impact angle: 180°
Ambient temperature
at impact area: 11° C
Temperature in
occupant compartment: 21° C
Impact velocity:
Primary: 81.8 kph
Secondary: 81.6 kph
Specified range: 78.5 to 81.5 kph

Distance from vehicle to barrier:

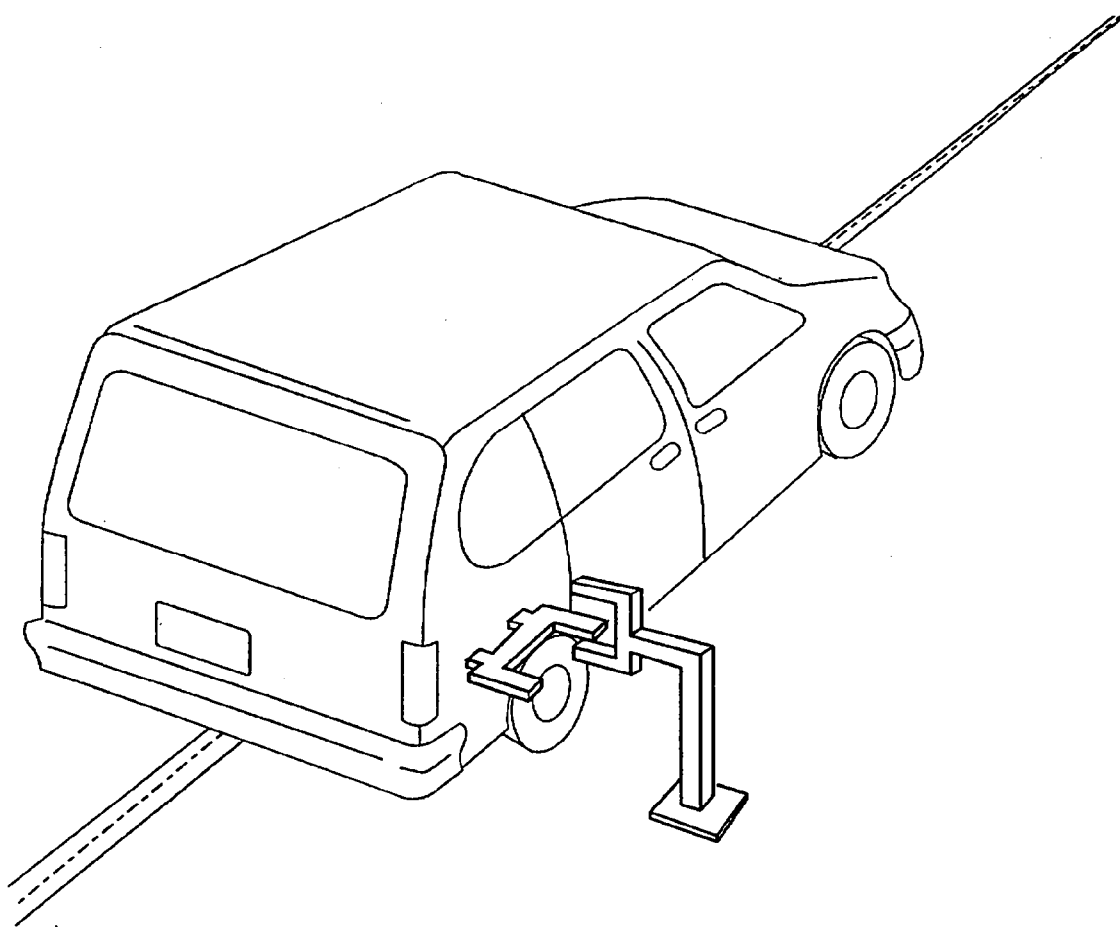
Entering velocity trap: 356 mm
Exiting velocity trap: 51 mm

Test vehicle static crush:

Overall length of test vehicle:

Pre-test:	L:	4455 mm	C:	4455 mm	R:	4455 mm
Post-test:	L:	3981 mm	C:	3760 mm	R:	4290 mm
Total crush:	L:	474 mm	C:	695 mm	R:	165 mm
Average crush:		445 mm				

Figure 1 Impact Velocity Measurement System



The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

Figure 2 Accident Investigation Division Data

Test date: 03/14/96
Vehicle year/make/
model/body style: 1996/Chevrolet/Blazer/2-door mpv
VIN: 1GCC518W2TK168995
Build date: 01/96
Test weight: 1628 kg
Vehicle wheelbase: 2555 mm
Maximum width: 1715 mm
Front overhang: 984 mm

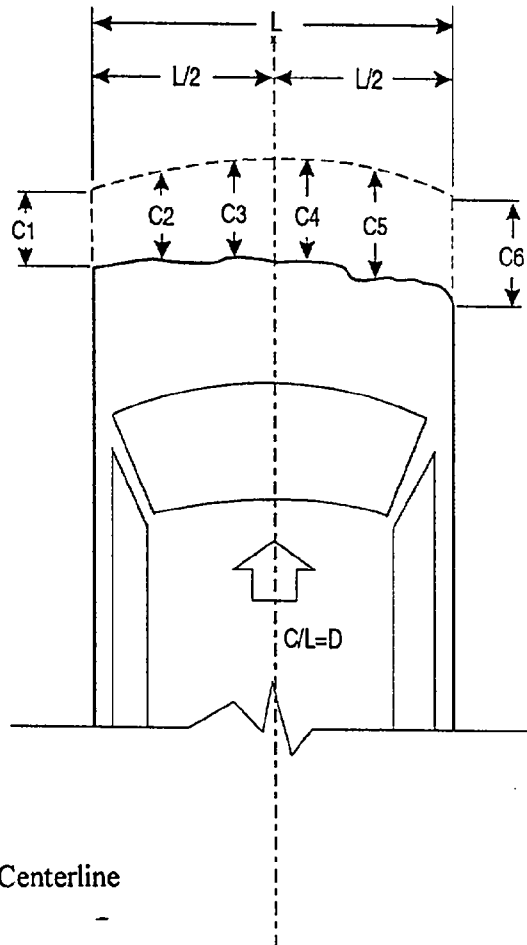
Collision Deformation

Classification (CDC) Code: 06BDEW3

Crush depth
measurements: C1: 477 mm
C2: 453 mm
C3: 539 mm
C4: 579 mm
C5: 396 mm
C6: 178 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged
region: L: 1715 mm



Section 3.0

FMVSS 301 Data

Table 4 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	113.0 g	-25.3 g	-27.7 g	117.8 g	22.6 g	-5.3 g	-10.4 g
Passenger	233.9 g	-34.1 g	-108.6 g	257.9 g	18.9 g	-4.1 g	-16.4 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	1409 N	1033 N
Passenger	525 N	378 N

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	783	112.880 ms	121.680 ms
Passenger	2552	129.920 ms	134.880 ms

Head Maximum Resultant Acceleration

	Acceleration	Time t ₁	Time t ₂
Driver	109.4 g	115.2 ms	118.1 ms
Passenger	175.2 g	130.2 ms	133.2 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	22.6 g	125.0 ms	127.9 ms
Passenger	18.9 g	135.4 ms	138.3 ms

Maximum Chest Deflection

Driver	3 mm
Passenger	2 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

Table 5 Fuel System Data

Vehicle year/make/model/body style:	1996 Chevrolet/Blazer/2-door mpv
Fuel system capacity:	19.0 (from owner's manual)
Usable capacity:	18.6 gal (furnished by COTR)
Test volume range:	17.1 gal to 17.5 gal (92-94% of usable)
Actual test volume:	17.5 gal (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	purple
Type of fuel pump:	electric
Does the electric fuel pump operate with ignition switch "on" and the engine not operating.	No
Details of fuel system:	The fuel tank is located behind the rear axle. The fuel filler neck is located on the left side. The fuel lines run along the left side to the front.

Table 6 FMVSS 301 Post-Impact Test Data

Test date: 04/08/96

Vehicle year/make/model/body style: 1996/Chevrolet/Blazer/2-door mpv

Test requirements:

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

Test vehicle impact type:

___ Frontal (48 kph)

___ Oblique (48 kph) with ___° barrier face first contacting (driver's/passenger's) side

X Rear moving barrier (80 kph)

___ Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

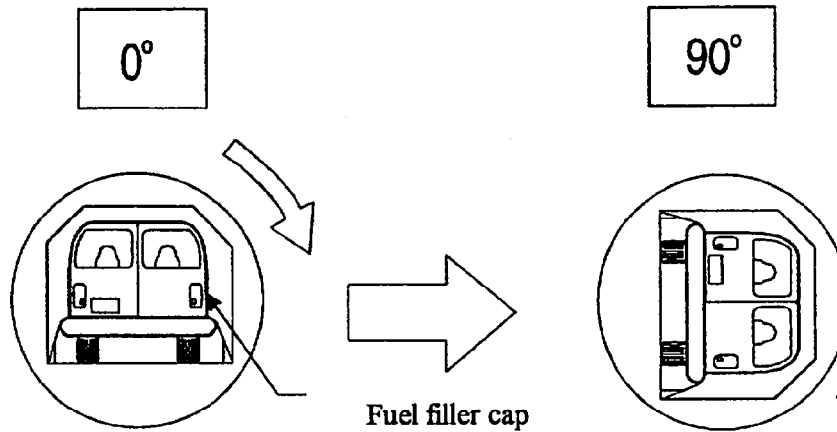
	Test <u>Results</u>	Maximum <u>Allowable</u>
1. From impact until vehicle motion ceases	Trace	28 g
2. 5-Minute period after vehicle motion ceases	0 g	140 g
3. Next 25 minutes after 5-minute period	0 g	28 g/1 min

Fuel system fluid spillage location(s): Trace fuel system fluid spillage from tubing running to the carbon canister located at the left rear of the vehicle. There were two lines connected to the canister, both were severed during the impact.

Figure 3 FMVSS 301 Static Rollover Test Data

NHTSA number: RT0219

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 7 minutes

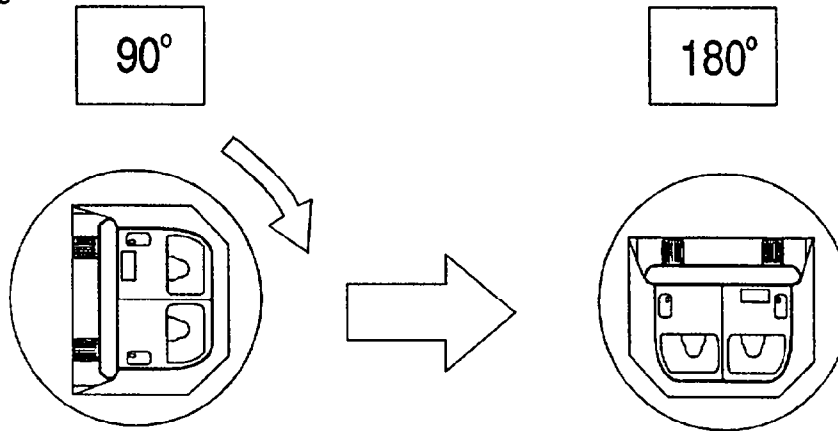
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>0° to 90° rotation (fuel filler cap down)</u>		
1. First five minutes from onset of rotation	0 g	142 g
2. Sixth minute from onset of rotation	- 0 g	28 g
3. Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Figure 3 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90°	=	2 minutes,	0 seconds
FMVSS 301 position hold time	=	5 minutes,	0 seconds
Total	=	7 minutes,	0 seconds
Next whole minute interval	=	14 minutes	

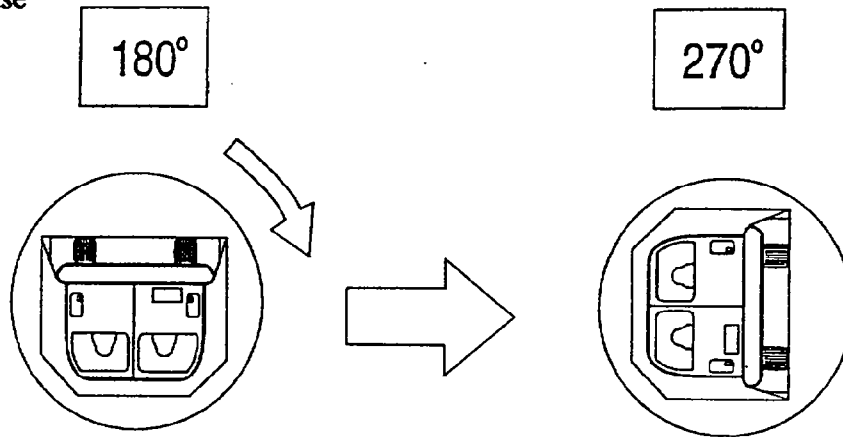
Fuel system fluid spillage measurements:

<u>90° to 180° rotation</u>		<u>Test Results</u>	<u>Maximum Allowable</u>
1.	First five minutes from onset of rotation	0 g	142 g
2.	Sixth minute from onset of rotation	0 g	28 g
3.	Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Figure 3 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds
 FMVSS 301 position hold time = 5 minutes, 0 seconds
 Total = 7 minutes, 0 seconds
 Next whole minute interval = 21 minutes

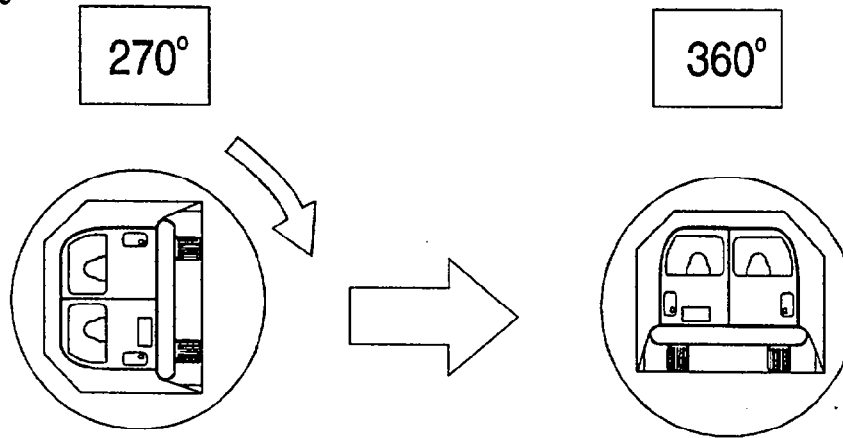
Fuel system fluid spillage measurements:

<u>180° to 270° rotation</u>		Test Results	Maximum Allowable
1.	First five minutes from onset of rotation	0 g	142 g
2.	Sixth minute from onset of rotation	0 g	28 g
3.	Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Figure 3 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds
 FMVSS 301 position hold time = 5 minutes, 0 seconds
 Total = 7 minutes, 0 seconds
 Next whole minute interval = 28 minutes

Fuel system fluid spillage measurements:

<u>270° to 360° rotation</u>		Test Results	Maximum Allowable
1.	First five minutes from onset of rotation	0 g	142 g
2.	Sixth minute from onset of rotation	- 0 g	28 g
3.	Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Section 4.0

Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

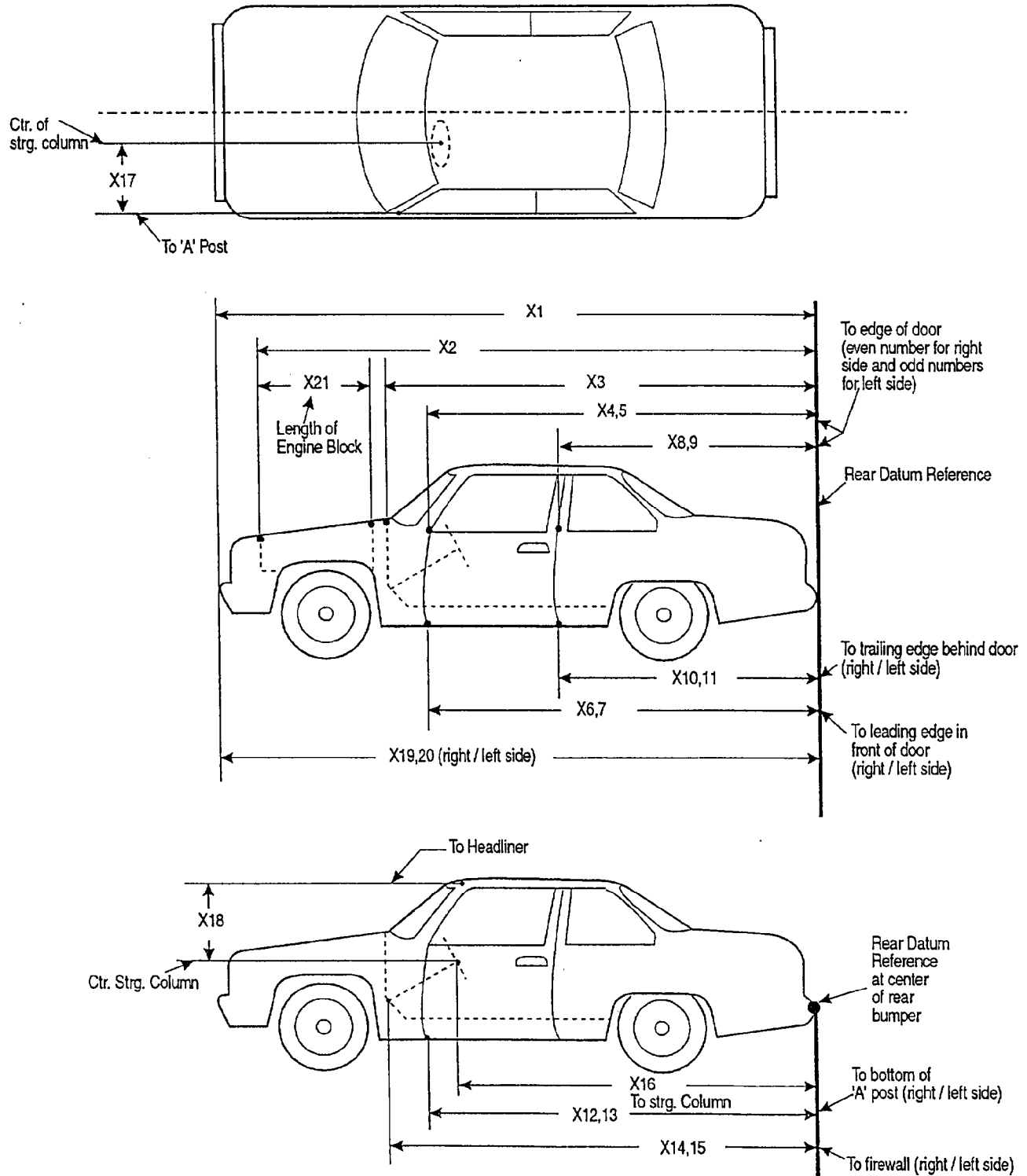


Table 7 Impacted Vehicle Measurements

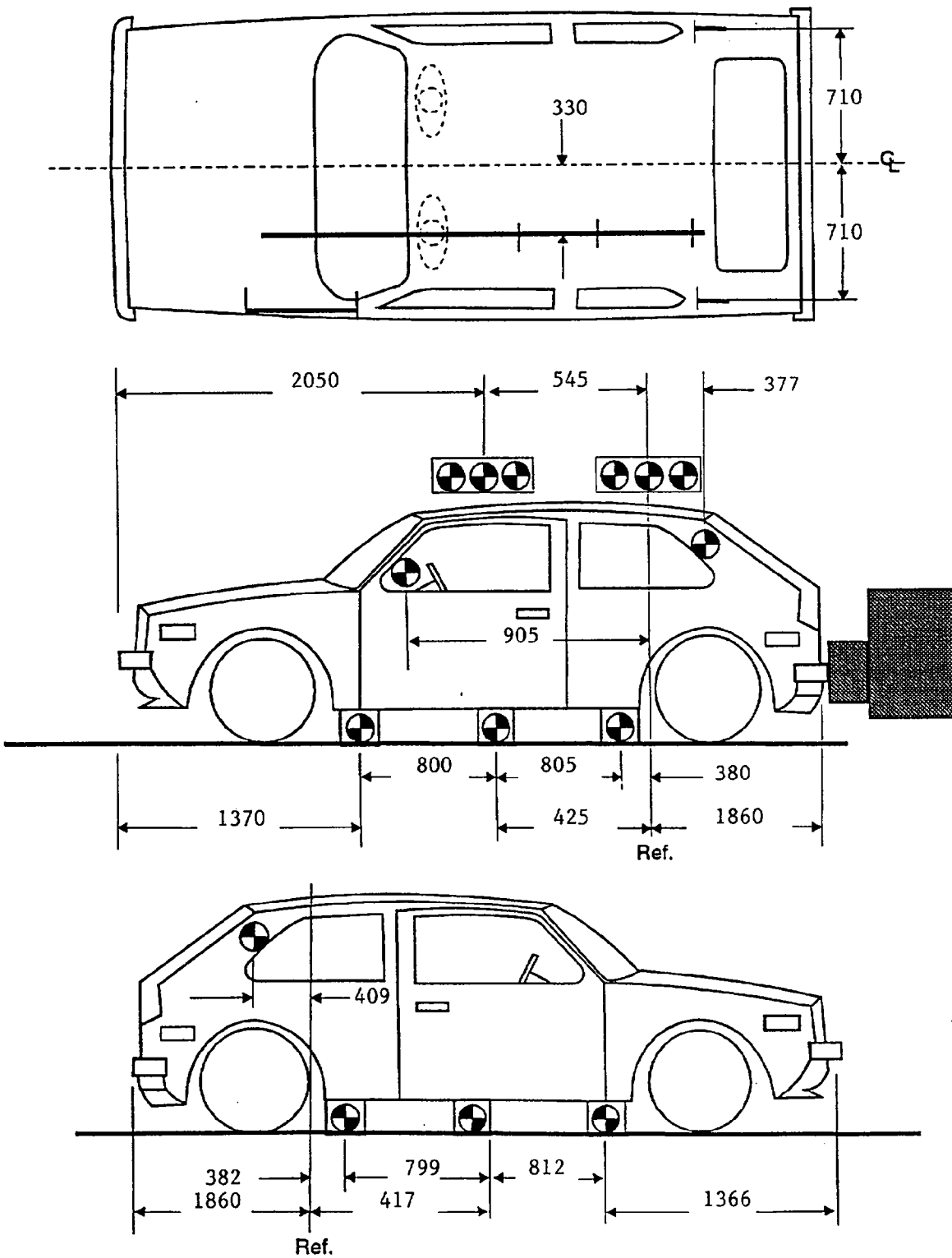
Vehicle year/make/model/body style: 1996/Chevrolet/Blazer/2-door mpv Test Number: 960408

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	4455 mm	3760 mm	695 mm
X2	Rear surface of vehicle to front of engine block	636 mm	605 mm	31 mm
X3	Rear surface of vehicle to firewall	1156 mm	1249 mm	-93 mm
X4	Rear surface of vehicle to upper leading edge of right door	1590 mm	1384 mm	206 mm
X5	Rear surface of vehicle to upper leading edge of left door	1388 mm	1368 mm	20 mm
X6	Rear surface of vehicle to lower leading edge of right door	1410 mm	1415 mm	-5 mm
X7	Rear surface of vehicle to lower leading edge of left door	1425 mm	1422 mm	3 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2535 mm	2527 mm	8 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2535 mm	2516 mm	19 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2545 mm	2549 mm	-4 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2545 mm	2553 mm	-8 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	1480 mm	1458 mm	22 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	1485 mm	1453 mm	32 mm
X14	Rear surface of vehicle to firewall - right side	1198 mm	1190 mm	8 mm
X15	Rear surface of vehicle to firewall - left side	1166 mm	1155 mm	11 mm
X16	Rear surface of vehicle to steering wheel center	1880 mm	1807 mm	73 mm
X17	Center of steering column to "A" post	279 mm	293 mm	-14 mm
X18	Center of steering column to headliner	480 mm	493 mm	-13 mm
X19	Rear surface of vehicle to right side of front bumper	4455 mm	4290 mm	165 mm
X20	Rear surface of vehicle to left side of front bumper	4455 mm	3981 mm	474 mm
X21	Length of engine block	460 mm	460 mm	0 mm

Table 8 Vehicle Measurements

No.	Description of Measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4455	3760	695
X2	Front Surface of Vehicle to Bottom of "A" Post of Right Side	1480	1458	22
X3	Front Surface of Vehicle to Bottom of "A" Post of Left Side	1485	1453	32
X4	Front Surface of Vehicle to Right Side of Rear Bumper	4455	4290	165
X5	Front Surface of Vehicle to Left Side of Rear Bumper	4455	3981	474
X6	Right Front Sill to Ground Plane	337	374	-37
X7	Left Front Sill to Ground Plane	334	396	-62
X8	Right Rear Sill to Ground Plane	370	490	-120
X9	Left Rear Sill to Ground Plane	367	535	-168
X10	Wheelbase of Vehicle - Left Side	2555	2410	145
X11	Width of Vehicle at Maximum Width Point	1715	2129	-414
X12	Front Surface of Vehicle to Engine Target	636	605	31
X13	Front Surface of Vehicle to Compartment Target	2050	2005	45
X14	Front Surface of Vehicle to Rear Bumper Target	4383	3856	527
X15	Wheelbase of Vehicle - Right Side	2555	2566	-11

Figure 5 Vehicle Target Locations



(Dimensions in Millimeters)

Table 9 Test Vehicle Rear Profile Data

X-axis measurements referenced to a plane 430 millimeters forward of the front bumper support brackets. Y-axis measurements are left and right of the original vehicle centerline. Y-axis measurements (6 points) should divide the width of the car and be clearly indicated on the form. Z-axis (height) measurements are from the ground.

		Pre-Test Profile					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	4830	4840	4793	4794	4824	4809
	Y	666	450	172	-105	-410	-656
	Z	506	500	457	472	481	484
Top of rear bumper	X	4845	4851	4859	4858	4844	4830
	Y	660	432	151	-123	-418	-665
	Z	634	633	632	637	635	636
Center of trunk	X	4766	4782	4788	4794	4779	4757
	Y	665	440	155	-114	-412	-660
	Z	895	897	897	894	902	900

		Post-Test Profile					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	4288	4353	4221	4225	4409	4612
	Y	600	444	172	-104	-345	-577
	Z	642	628	619	624	568	528
Top of rear bumper	X	4368	4398	4320	4279	4448	4652
	Y	649	430	151	-80	-345	-545
	Z	730	762	784	795	730	669
Center of trunk	X	4476	4465	4499	4524	4546	4674
	Y	650	440	158	-111	-406	-614
	Z	971	995	971	961	969	902

Table 9 Test Vehicle Rear Profile Data, Cont'd.

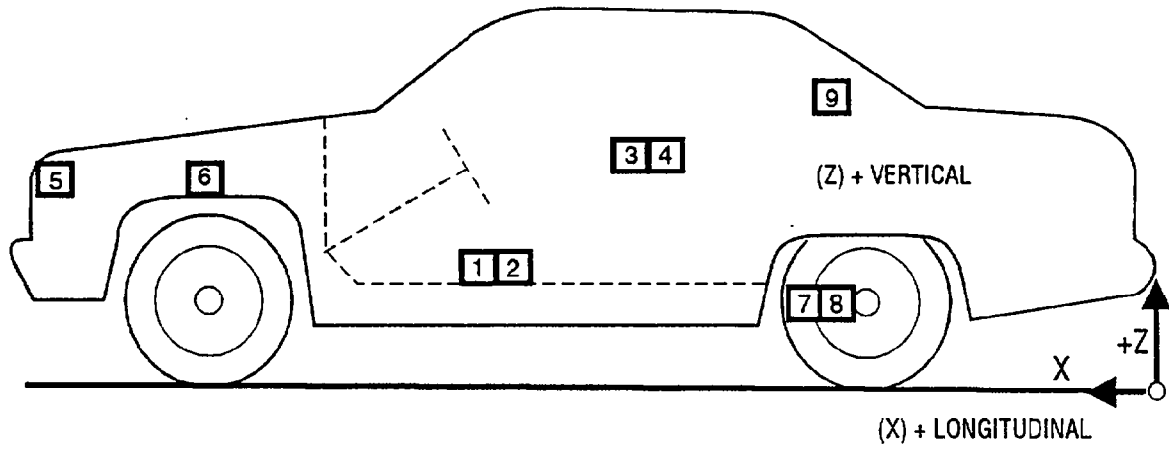
		Change					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	542	487	572	569	415	197
	Y	-66	-6	0	1	65	79
	Z	136	128	162	152	87	-128
Top of rear bumper	X	477	453	539	579	396	178
	Y	-11	-2	0	43	73	120
	Z	96	134	152	158	95	33
Center of trunk	X	290	317	289	270	233	83
	Y	-15	0	3	3	6	46
	Z	76	98	74	67	67	2

+X: Rearward from a reference plane 430 mm forward of the vehicle front bumper

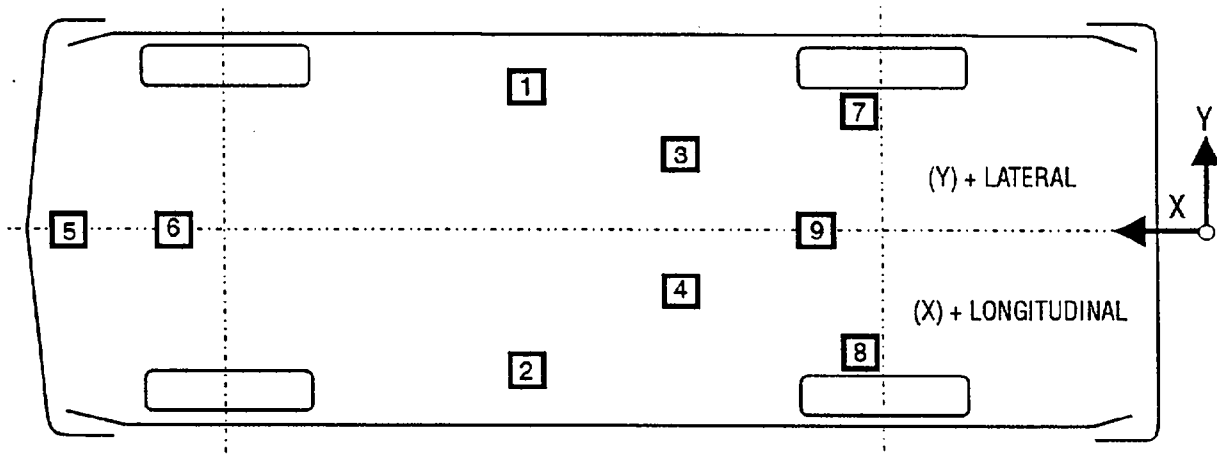
+Y: Left from vehicle longitudinal centerline

+Z: Up from ground

Figure 6 Vehicle Accelerometer Mounting Locations



SIDE VIEW



BOTTOM VIEW

Table 10 Pre- and Post-Test Position of Vehicle Accelerometer Mounting Locations

Accelerometer Description		X, Y, Z Location ¹		
		X	Y	Z
Left front seat outboard mounting rail	Pre	1985 mm	550 mm	489 mm
	Post	2040 mm	550 mm	530 mm
	Change	-55 mm	0 mm	41 mm
Right front seat outboard mounting rail	Pre	1985 mm	-550 mm	530 mm
	Post	2050 mm	-550 mm	541 mm
	Change	-65 mm	0 mm	11 mm
Left front seat back (mid-point of seat)	Pre	2520 mm	362 mm	1145 mm
	Post	2718 mm	351 mm	990 mm
	Change	-198 mm	-11 mm	-155 mm
Right front seat back (mid-point of seat)	Pre	2520 mm	-362 mm	1172 mm
	Post	2850 mm	-350 mm	969 mm
	Change	-330 mm	12 mm	-203 mm
Radiator support	Pre	300 mm	-100 mm	890 mm
	Post	290 mm	-100 mm	940 mm
	Change	10 mm	0 mm	50 mm
Top of engine	Pre	980 mm	146 mm	740 mm
	Post	985 mm	146 mm	771 mm
	Change	-5 mm	0 mm	31 mm
Left rear wheel axle	Pre	3420 mm	414 mm	327 mm
	Post	3410 mm	414 mm	311 mm
	Change	10 mm	0 mm	-16 mm
Right rear wheel axle	Pre	3420 mm	-414 mm	327 mm
	Post	3412 mm	-414 mm	320 mm
	Change	8 mm	0 mm	-7 mm
Rear package shelf (top of rear seat back)	Pre	4145 mm	0 mm	766 mm
	Post	3791 mm	-16 mm	911 mm
	Change	354 mm	-16 mm	145 mm

¹ Reference Point: X - vertical plane at front bumper
Y - vehicle centerline
Z - ground

Table 11 Moving Deformable Barrier Face Static Crush

[illegible]Post-test profile (distance in millimeters from reference plane²)

	762	330	327	330	335	335	369	645	639	646	648	634	603	578	559	562	592	706
Top of face																		
Mid-face	508	311	317	317	320	321	345	366	414	643	600	535	485	444	440	445	460	498
Bumper	381	152	147	161	178	191	208	224	250	276	289	284	290	293	294	296	300	315

Static crush (mm)

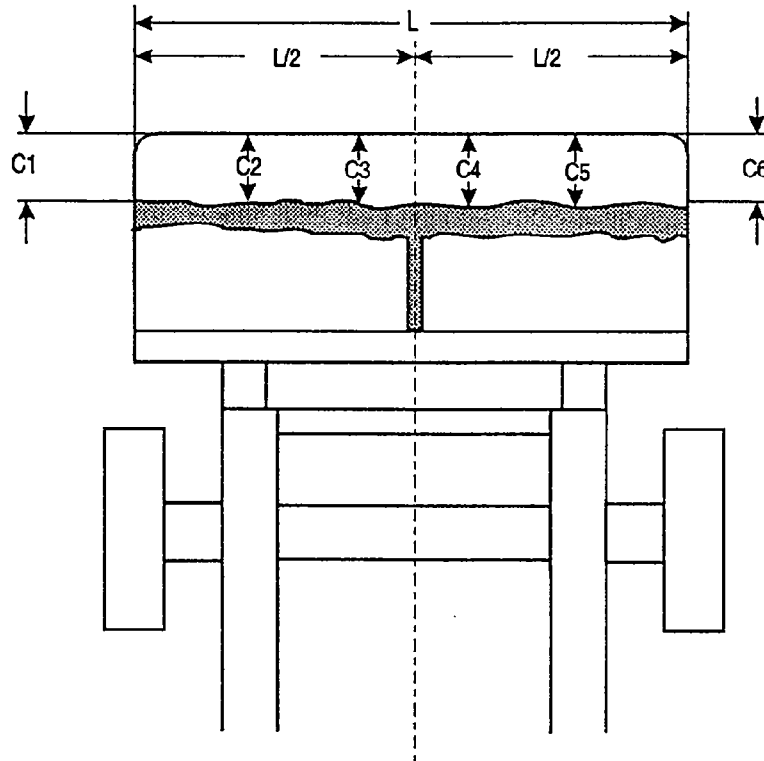
	762	-15	-19	-15	-10	-10	24	300	298	302	304	290	259	233	215	219	249	363
Top of face																		
Mid-face	508	-29	-23	-24	-21	-20	4	25	73	302	259	194	143	102	98	103	118	158
Bumper	381	-104	-89	-75	-58	-46	-29	-13	13	39	52	47	53	56	57	59	63	65

¹ Column readings are left to right across barrier face from left to right.

² Reference plane is the rear surface of the deformable barrier face.

All measurements are in millimeters.

Figure 7 Moving Deformable Barrier Face Crush



Notes: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is moving barrier centerline.

	Pre-test	Post-test	Crush
L	1621 mm		
C1	256 mm	152 mm	-104 mm
C2	236 mm	178 mm	-58 mm
C3	237 mm	224 mm	-13 mm
C4	237 mm	284 mm	47 mm
C5	237 mm	294 mm	57 mm
C6	250 mm	315 mm	65 mm
CL	237 mm	276 mm	39 mm

Figure 8 Dummy Measurement Locations for Front Seat Occupants

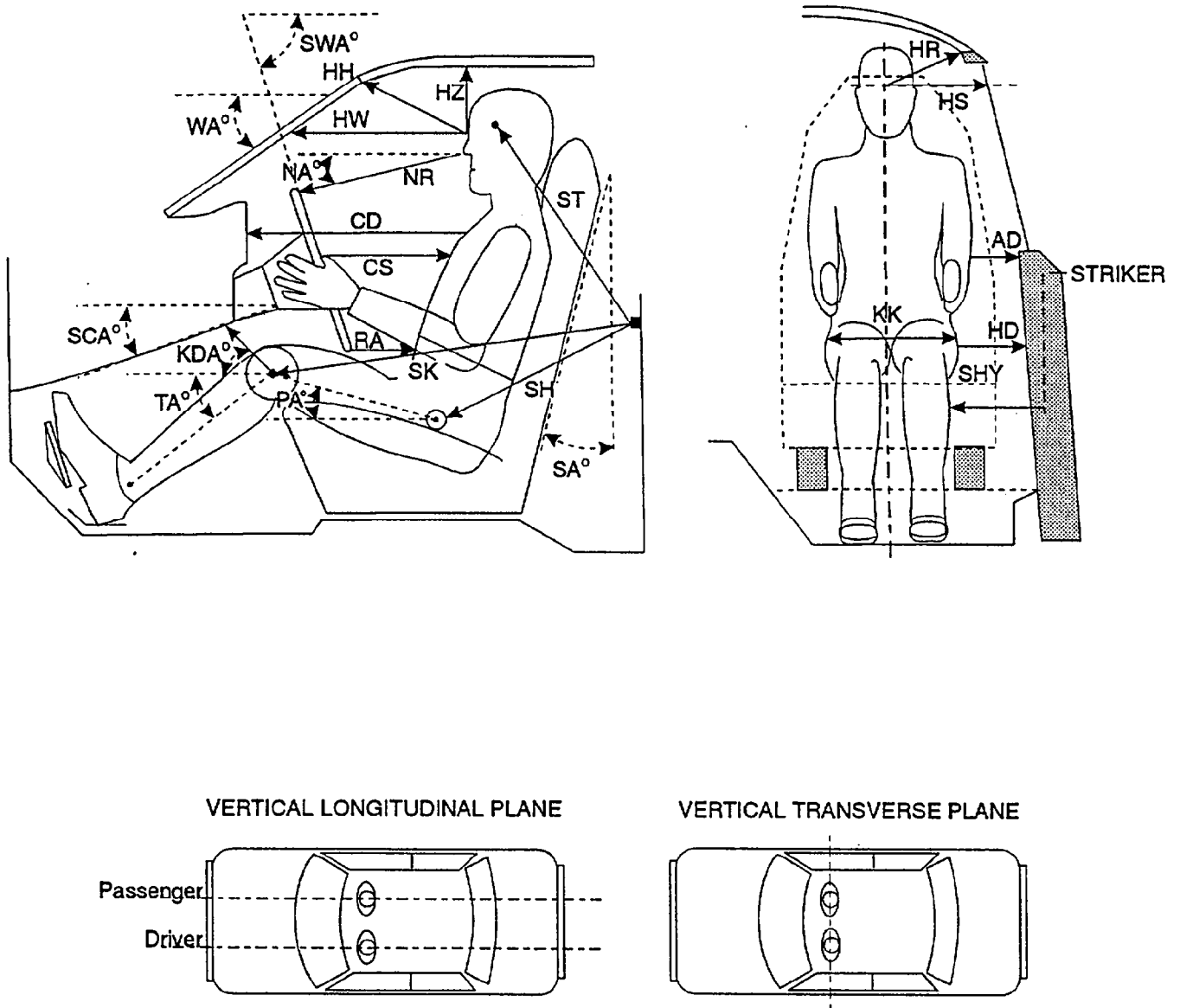
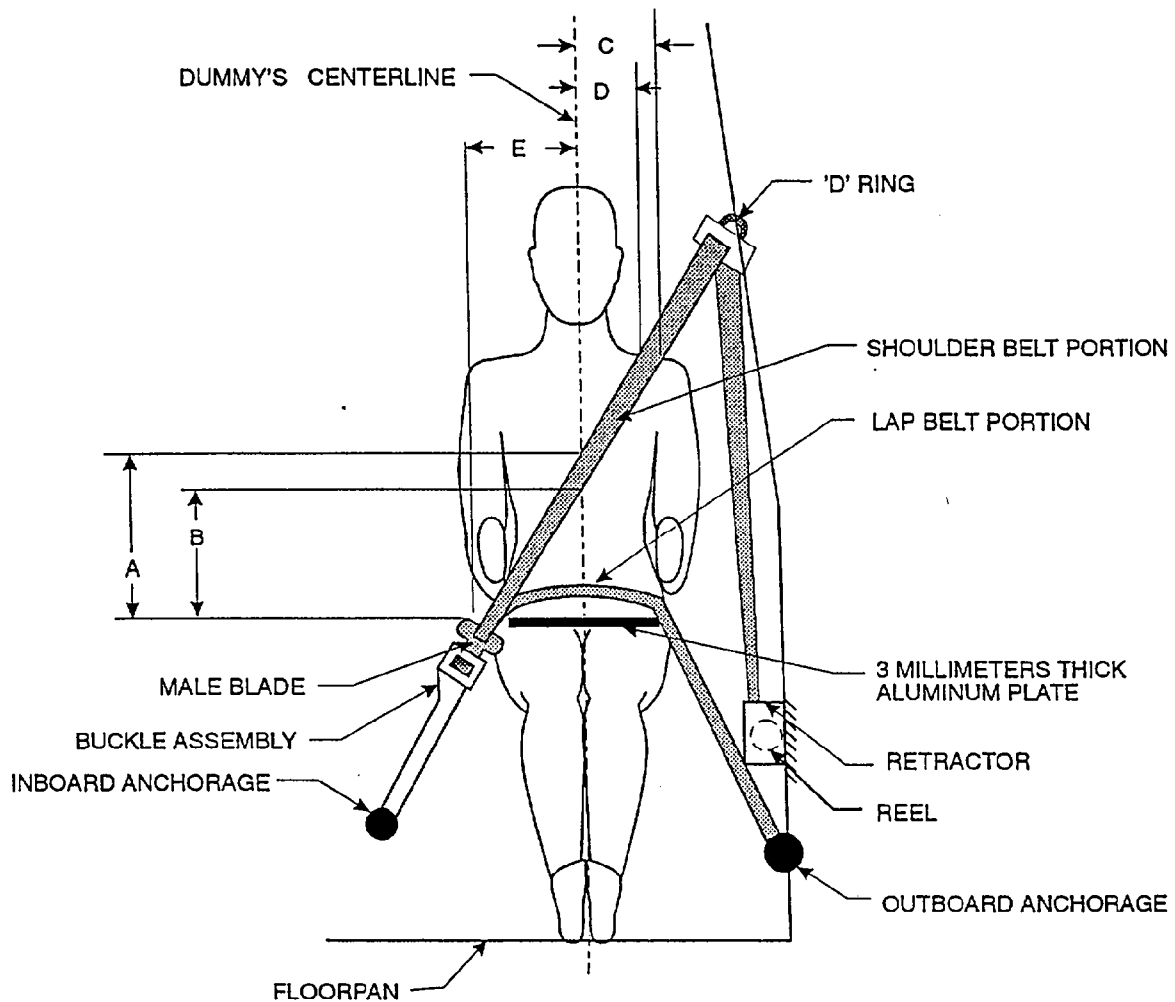


Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #35)	Passenger (Serial #34)
WA	Windshield angle	37°	NA
SWA	Steering wheel angle	67°	NA
SCA	Steering column angle	23°	NA
SA	Seat back angle	23°	23°
HZ	Head to roof	233 mm	212 mm
HH	Head to header	460 mm	461 mm
HW	Head to windshield	650 mm	594 mm
HR	Head to side header	270 mm	268 mm
NR	Nose to rim	368 mm	NA
NA	Nose to rim angle	14°	NA
CD	Chest to dash	514 mm	546 mm
CS	Steering wheel to chest	319 mm	NA
RA	Rim to abdomen	163 mm	NA
KDL	Left knee to dash	160 mm	188 mm
KDR	Right knee to dash	137 mm	204 mm
KDA	Outboard knee to dash angle	32°	26°
PA	Pelvic angle	24°	23°
TA	Tibial angle	45°	43°
KK	Knee to knee	270 mm	276 mm
ST ¹	Striker to head	588 mm	607 mm
	Striker to head angle	-63°	-77°
SK ¹	Striker to knee	700 mm	683 mm
	Striker to knee angle	-2°	-2°
SH ¹	Striker to H-point	317 mm	331 mm
	Striker to H-point angle	20°	10°
SHY	Striker to H-point (Y dir.)	235 mm	254 mm
HS	Head to side window	380 mm	356 mm
HD	H-point to door	155 mm	138 mm
AD	Arm to door	132 mm	127 mm

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

Figure 9 Seat Belt Positioning Data



		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	345 mm	332 mm
B	Top surface of aluminum plate to belt lower edge	260 mm	250 mm
C	Dummy centerline to outer edge of belt at chest flesh top	133 mm	157 mm
D	Dummy centerline to inner edge of belt at chest flesh top	74 mm	94 mm
E	Dummy centerline to intersection of upper torso belt and lap belt	206 mm	210 mm

Figure 10 Camera Positions

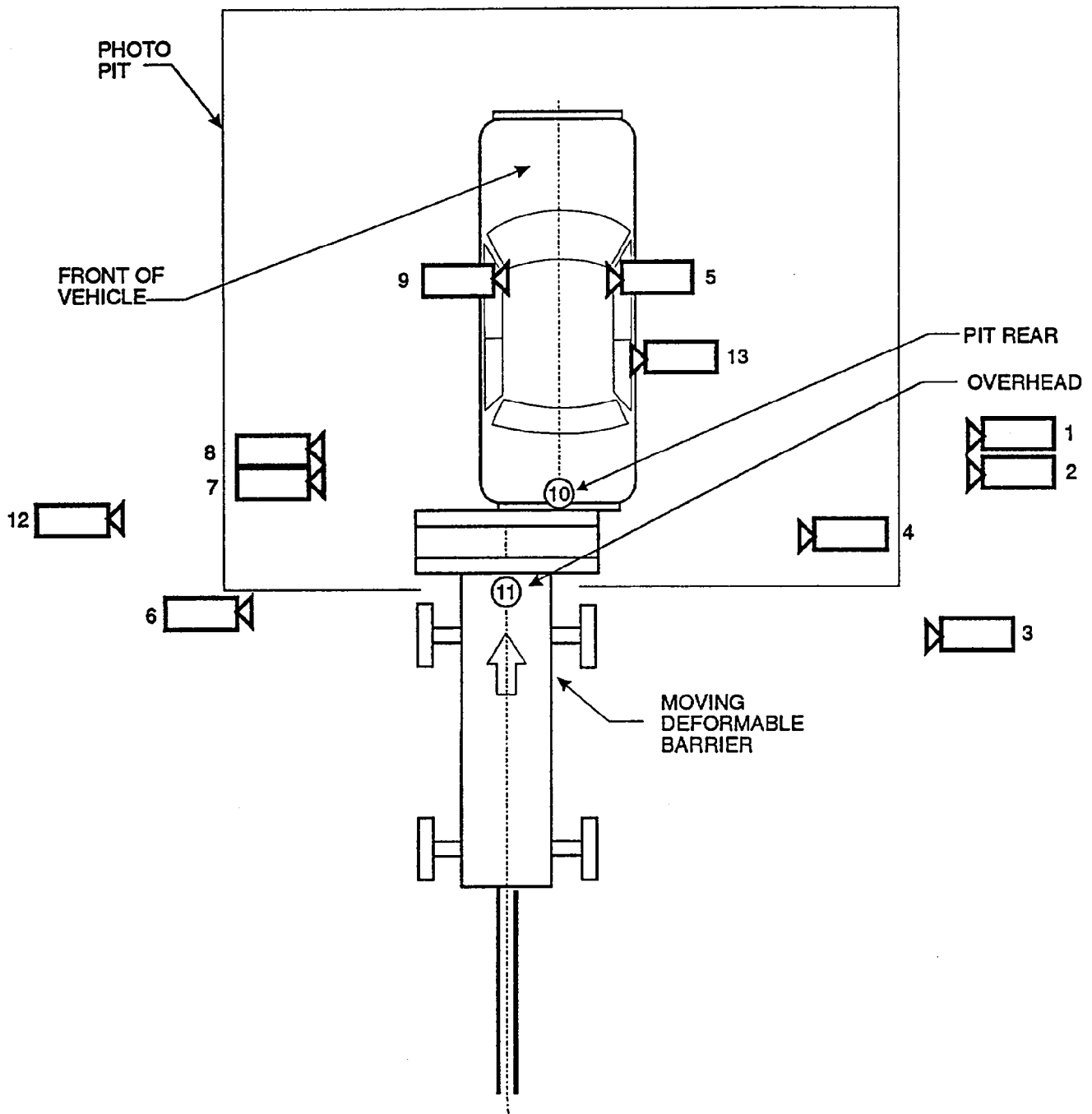


Table 13 Motion Picture Camera Locations

Test number: 960408

Vehicle year/make/model/body style: 1996/Chevrolet/Blazer/2-door mpv

Camera Number	View	Camera Positions ¹			Angle of Inclination ²	Angle of Rotation ³	Camera Lens	Film Speed
		X	Y	Z				
1	Right side vehicle	2134	12725	1168	0°	0°	25 mm	975 frames/s
2	Right side overall	-356	13970	1123	0°	0°	13 mm	992 frames/s
3	Right MDB	NA	NA	NA	0°	0°	25 mm	345 frames/s
4	Right close-up	737	5867	826	-3°	0°	13 mm	1002 frames/s
5	Right front passenger onboard	NA	NA	NA	NA	NA	8 mm	800 frames/s
6	Left side MDB	1245	-13411	826	0°	0°	25 mm	975 frames/s
7	Left side close-up	737	-6629	851	-3°	0°	17 mm	655 frames/s
8	Left side vehicle	2438	-15646	1201	-2°	0°	25 mm	800 frames/s
9	Driver onboard	NA	NA	NA	NA	NA	8 mm	800 frames/s
10	Underbody vehicle	NA	NA	NA	90°	0°	17 mm	995 frames/s
11	Overhead	NA	NA	NA	90°	0°	13 mm	NA ⁴ frames/s
12	Left side overall	1219	-14122	1147	0°	0°	13 mm	410 frames/s
13	Seat back view	NA	NA	NA	NA	NA	8 mm	805 frames/s

¹ +X: Forward from impact point MDB face

+Y: Rightward from monorail centerline

+Z: Upward from ground level

² +Angle of Inclination: Camera lens (upward from horizontal)³ +Angle of Rotation: Camera lens toward barrier from line perpendicular to monorail centerline⁴ Camera did not run during test

Appendix A

Photographs

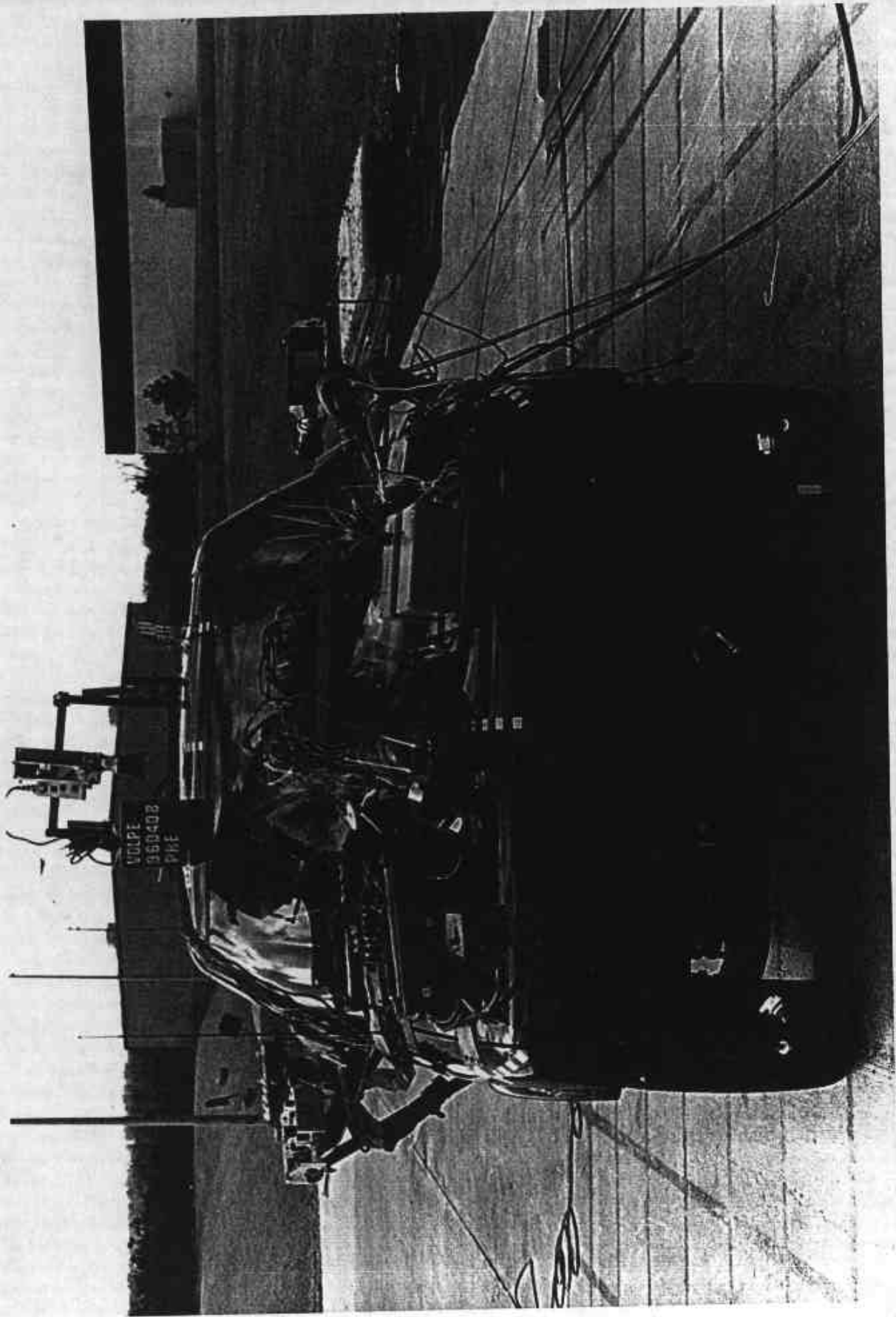


Figure A-1 Pre-Test Front View

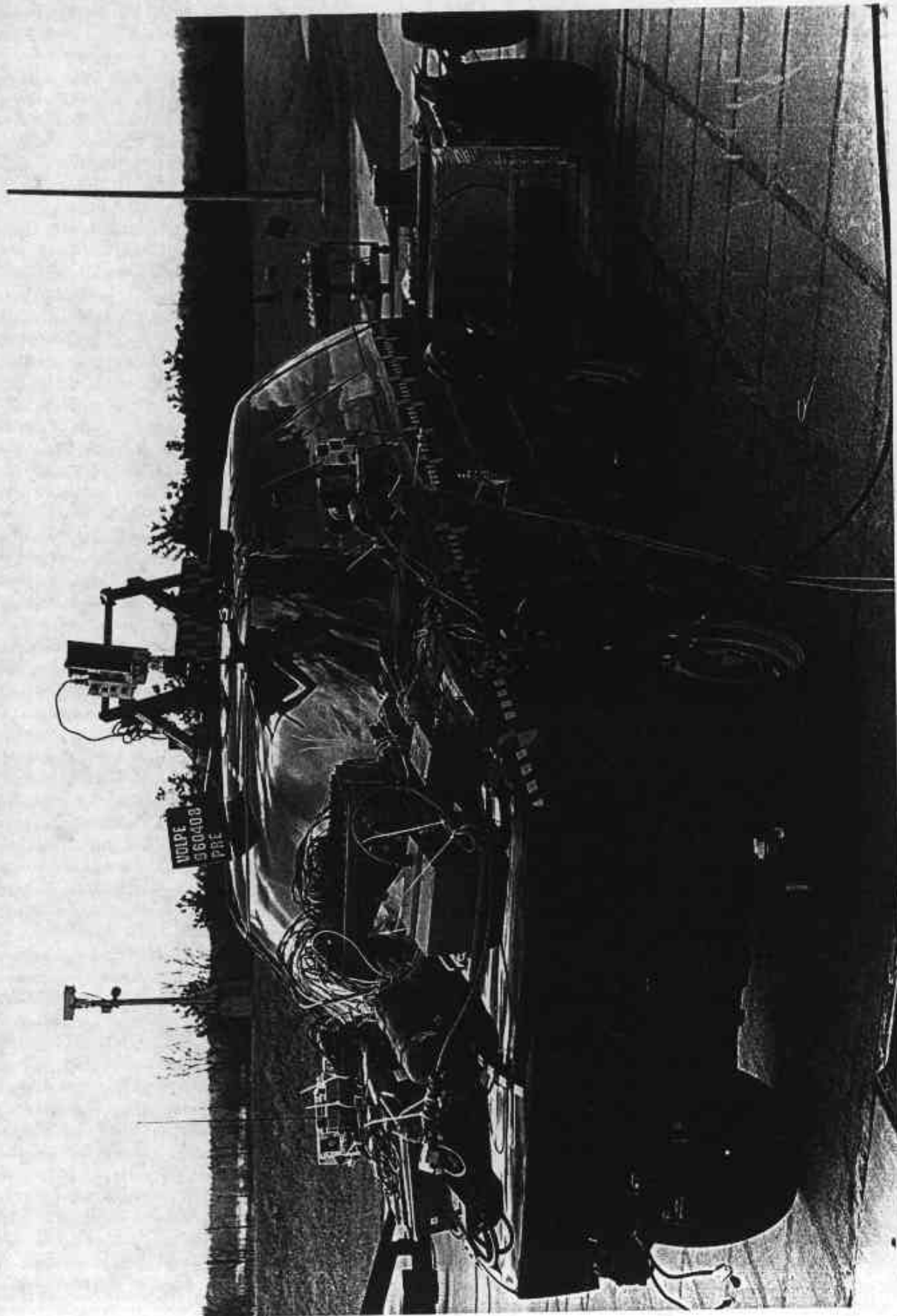


Figure A-2 Pre-Test Left Front Three-Quarter View



Figure A-3 Post-Test Left Front Three-Quarter View

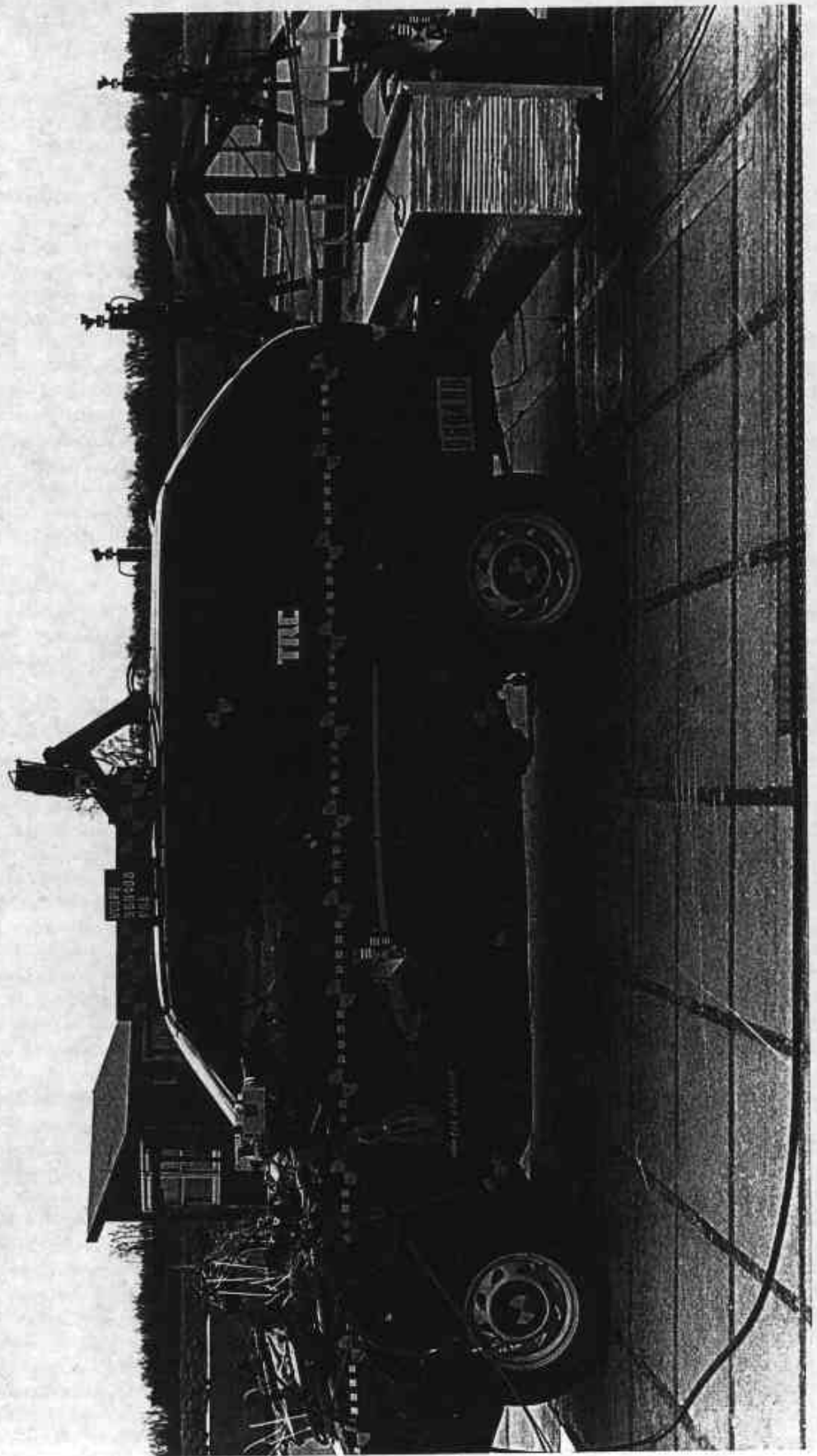


Figure A-4 Pre-Test Left Side View

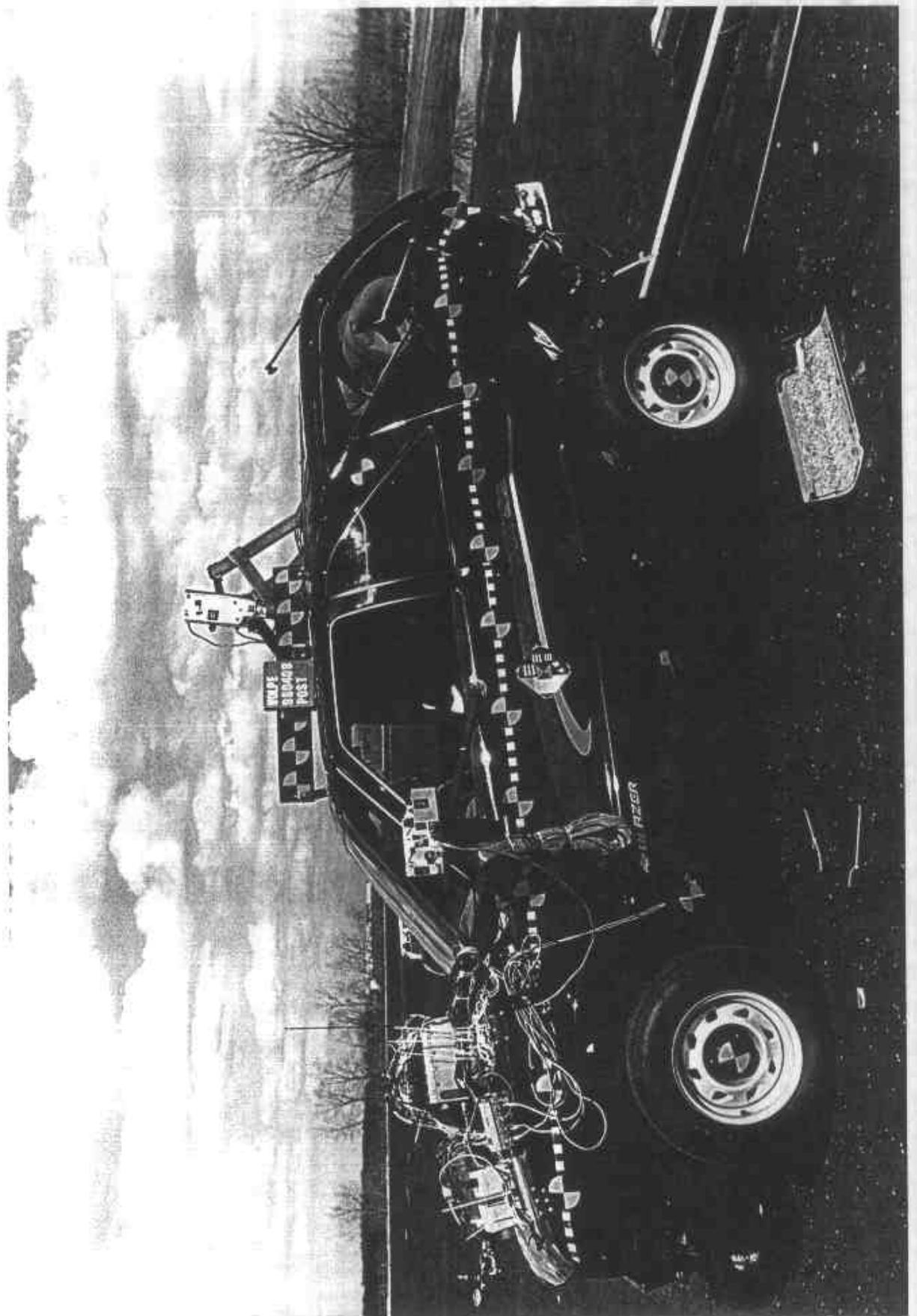


Figure A-5 Post-Test Left Side View

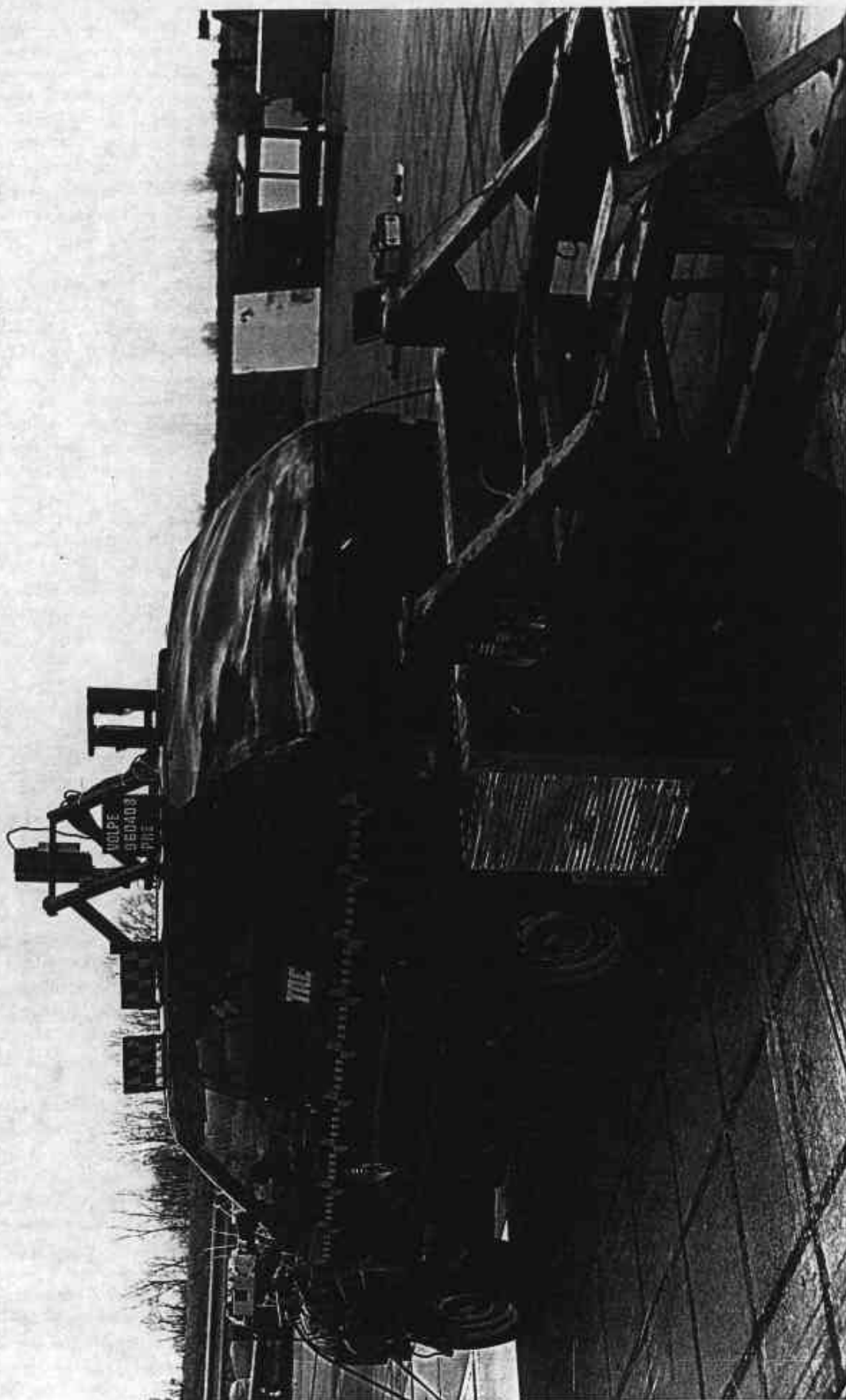


Figure A-6 Pre-Test Left Rear Three-Quarter View

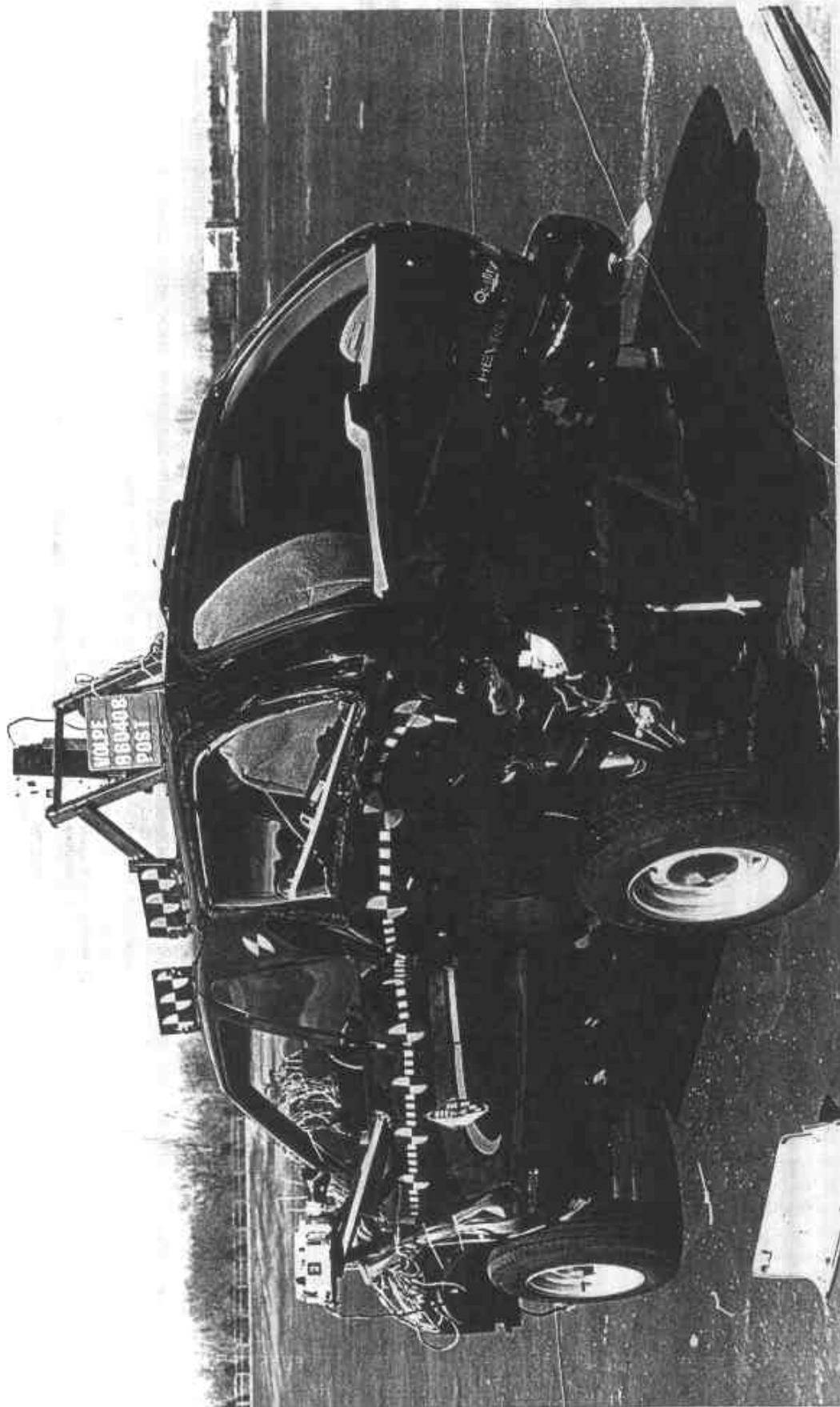


Figure A-7 Post-Test Left Rear Three-Quarter View

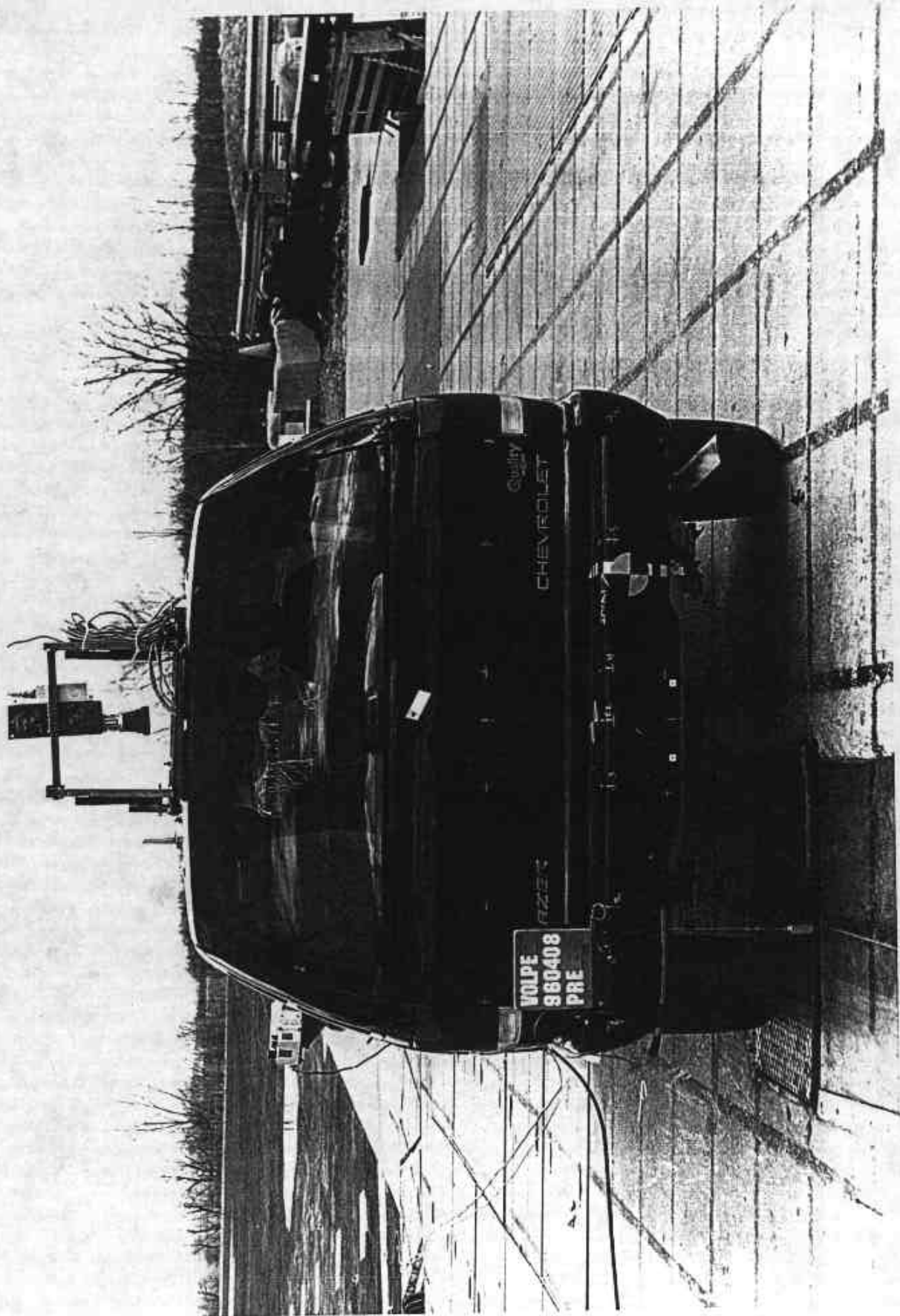


Figure A-8 Pre-Test Rear View

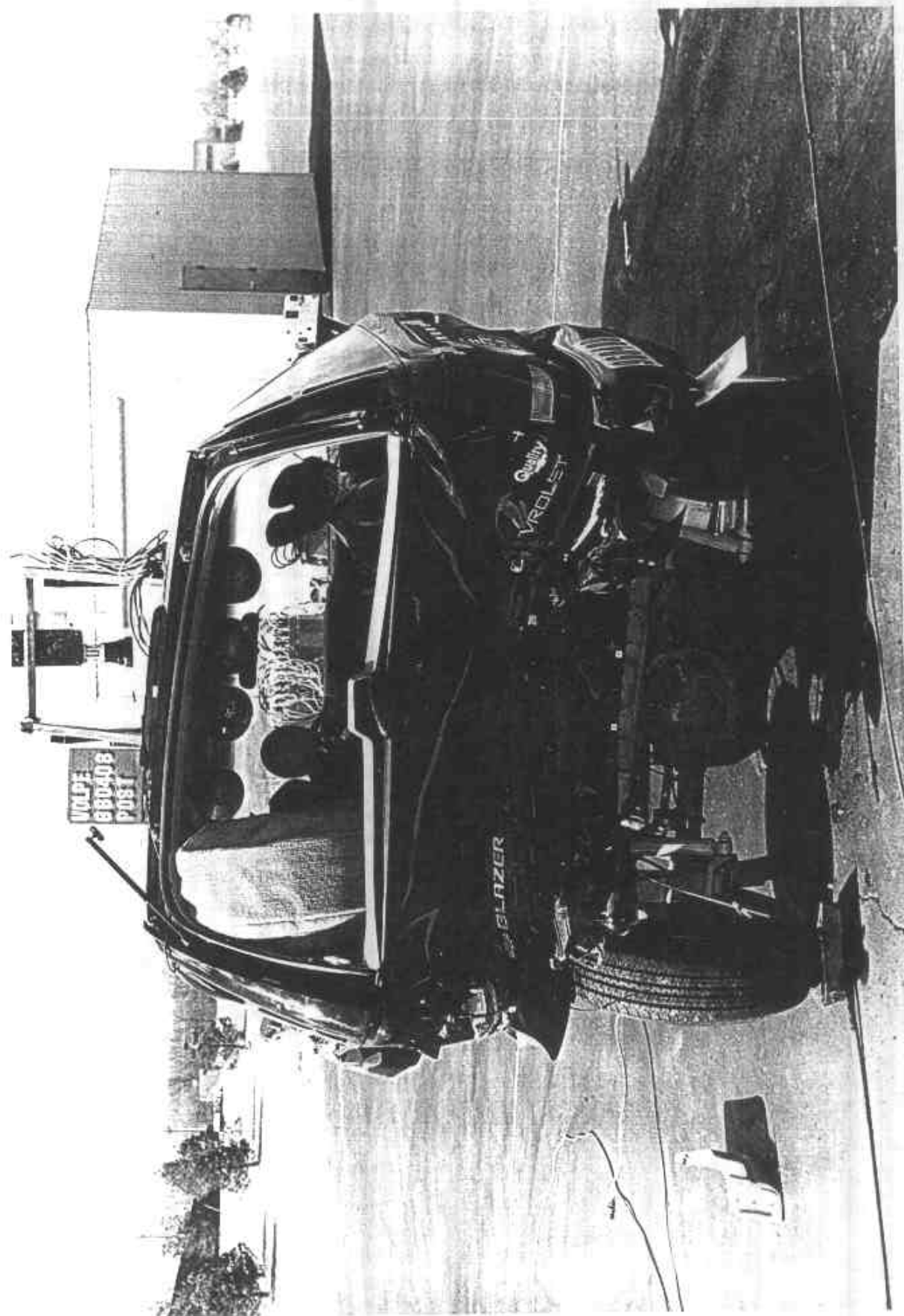


Figure A-9 Post-Test Rear View

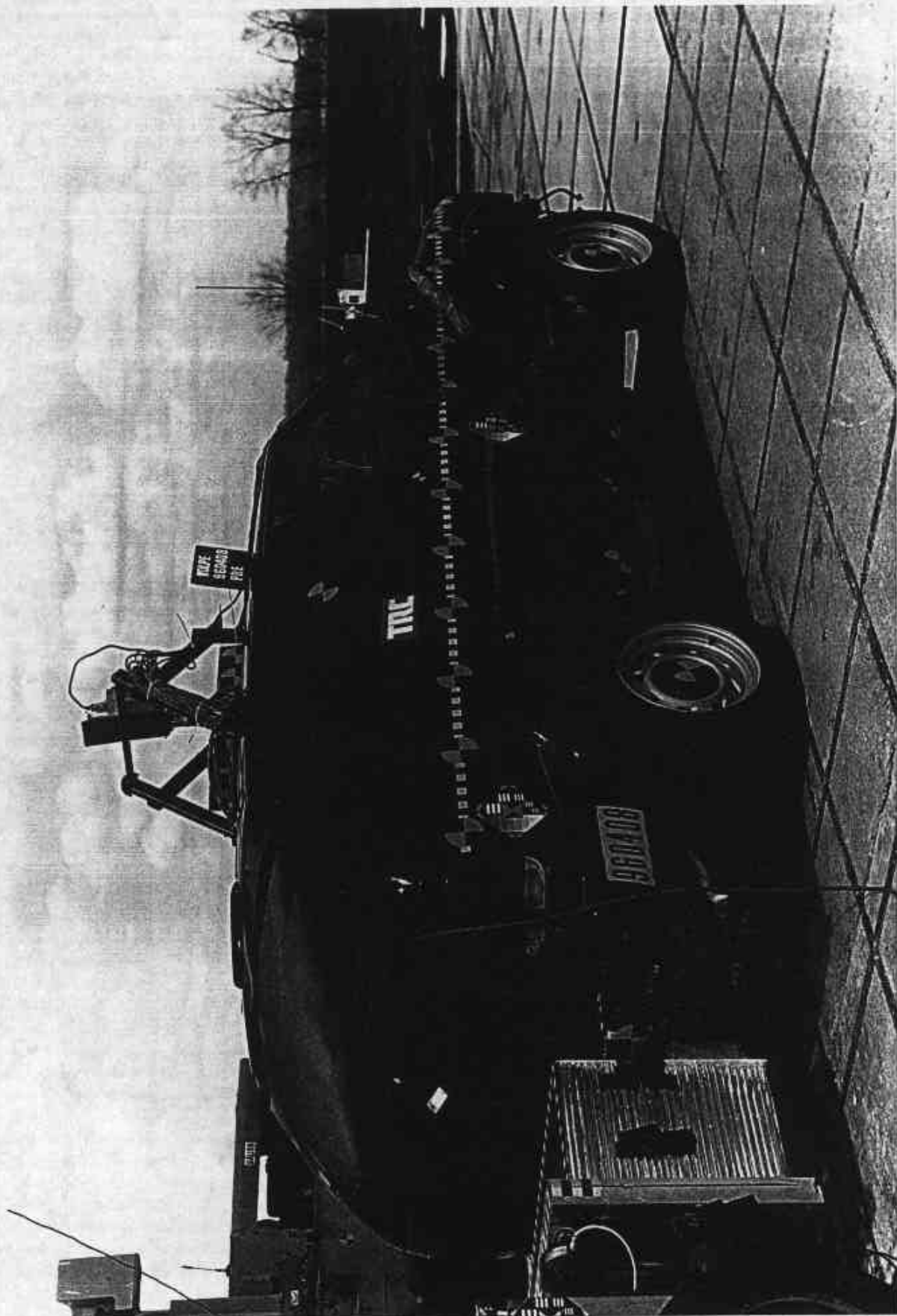


Figure A-10 Pre-Test Right Rear Three-Quarter View

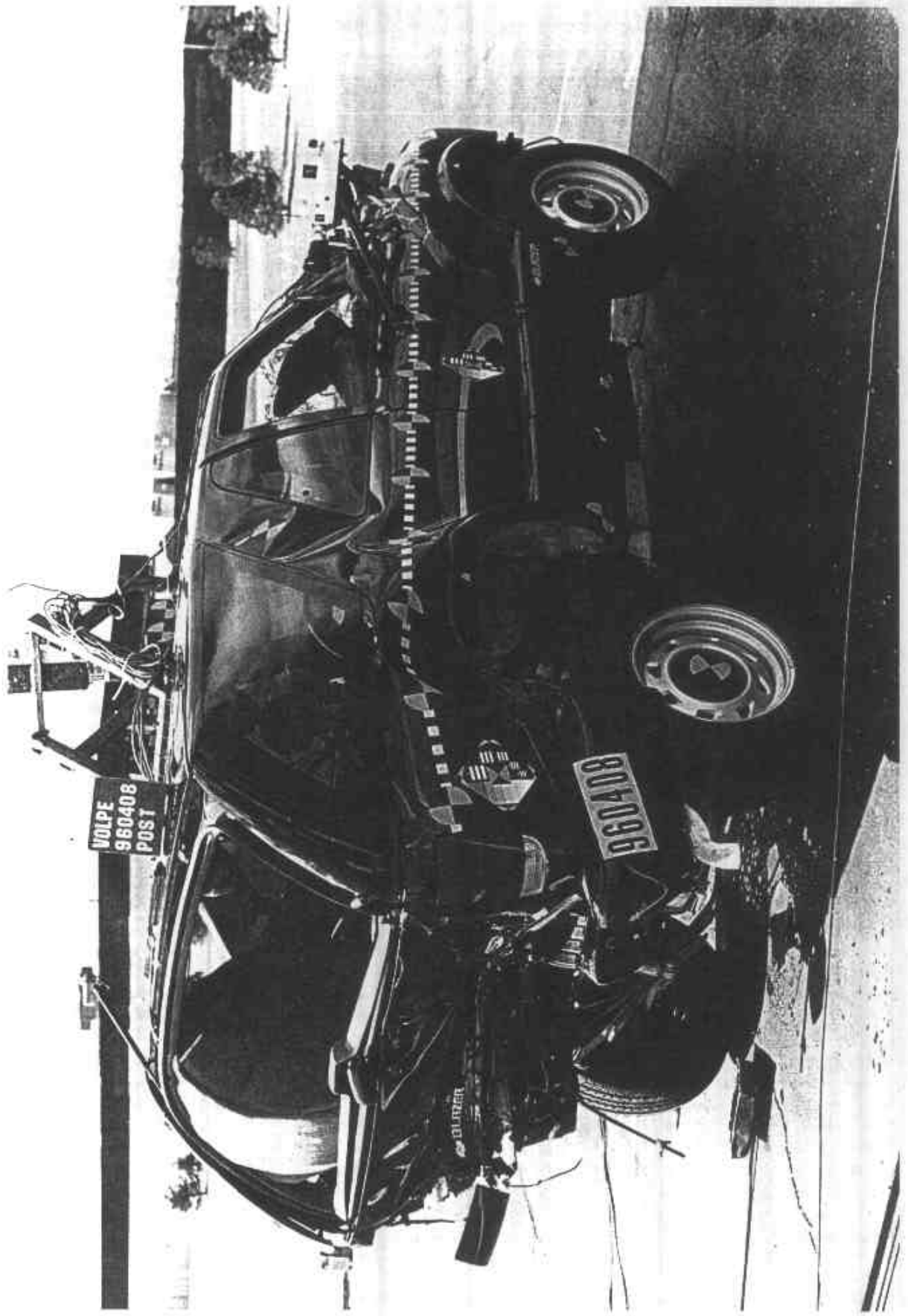


Figure A-11 Post-Test Right Rear Three-Quarter View



Figure A-12 Pre-Test Right Side View

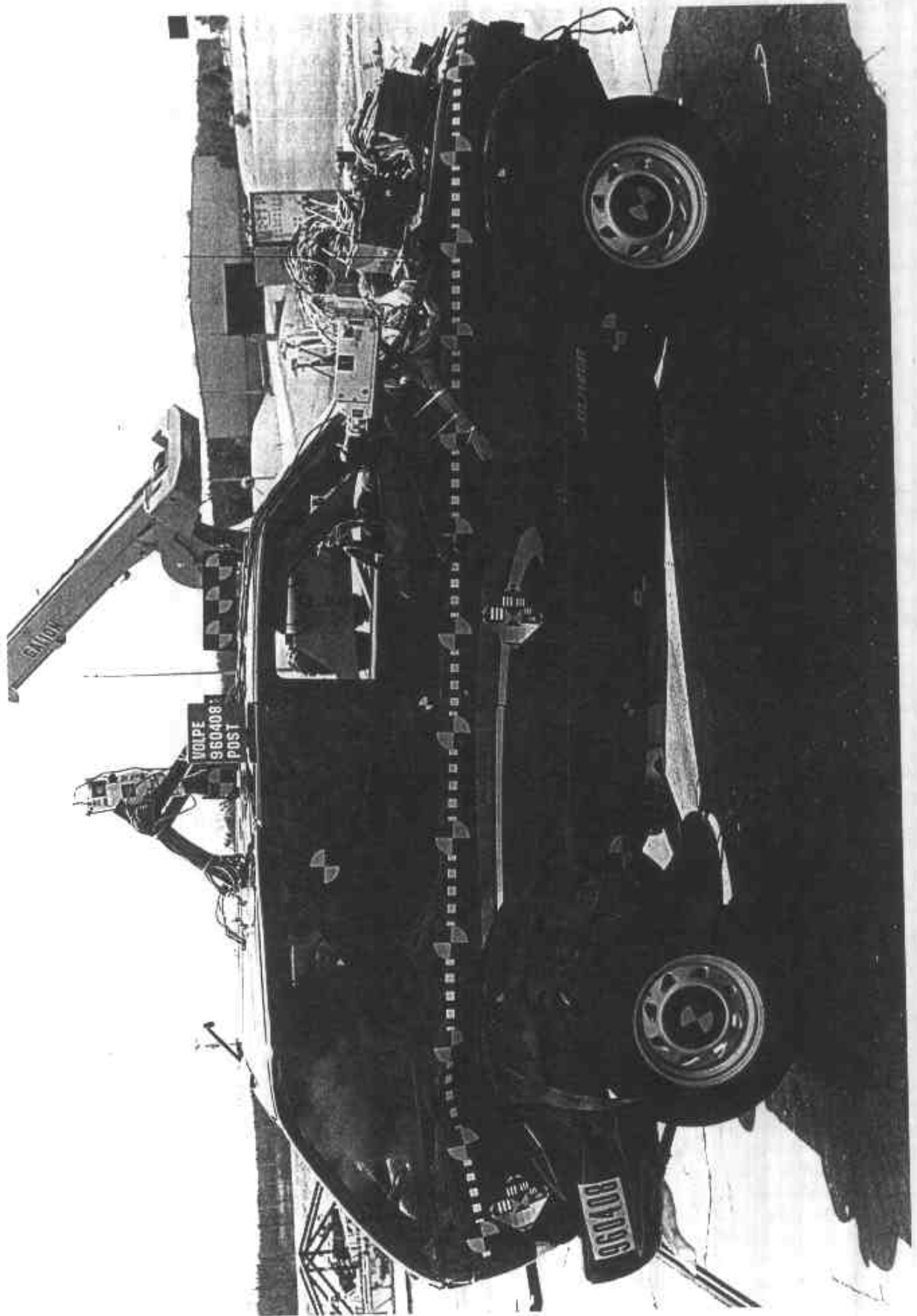


Figure A-13 Post-Test Right Side View

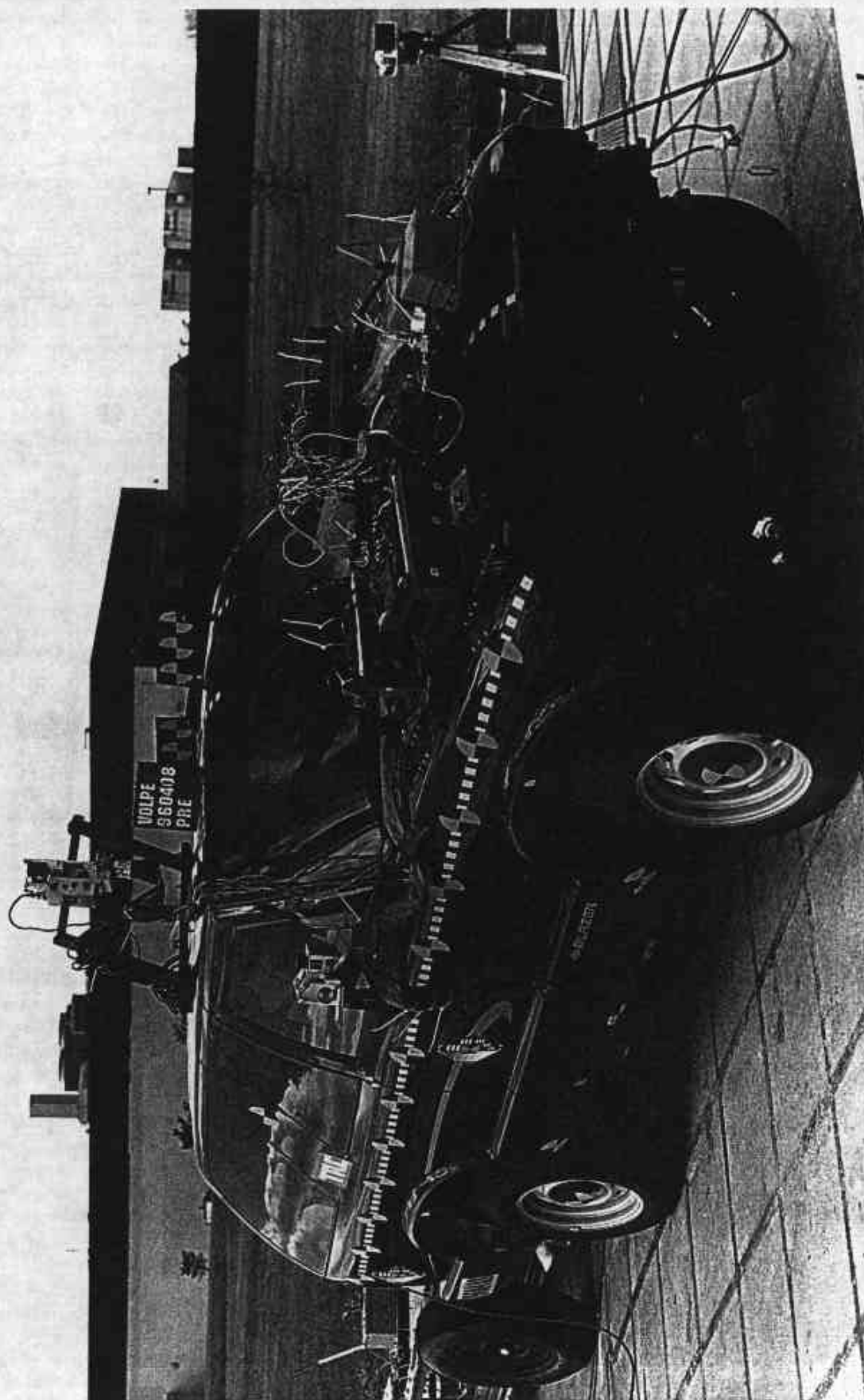


Figure A-14 Pre-Test Right Front Three-Quarter View

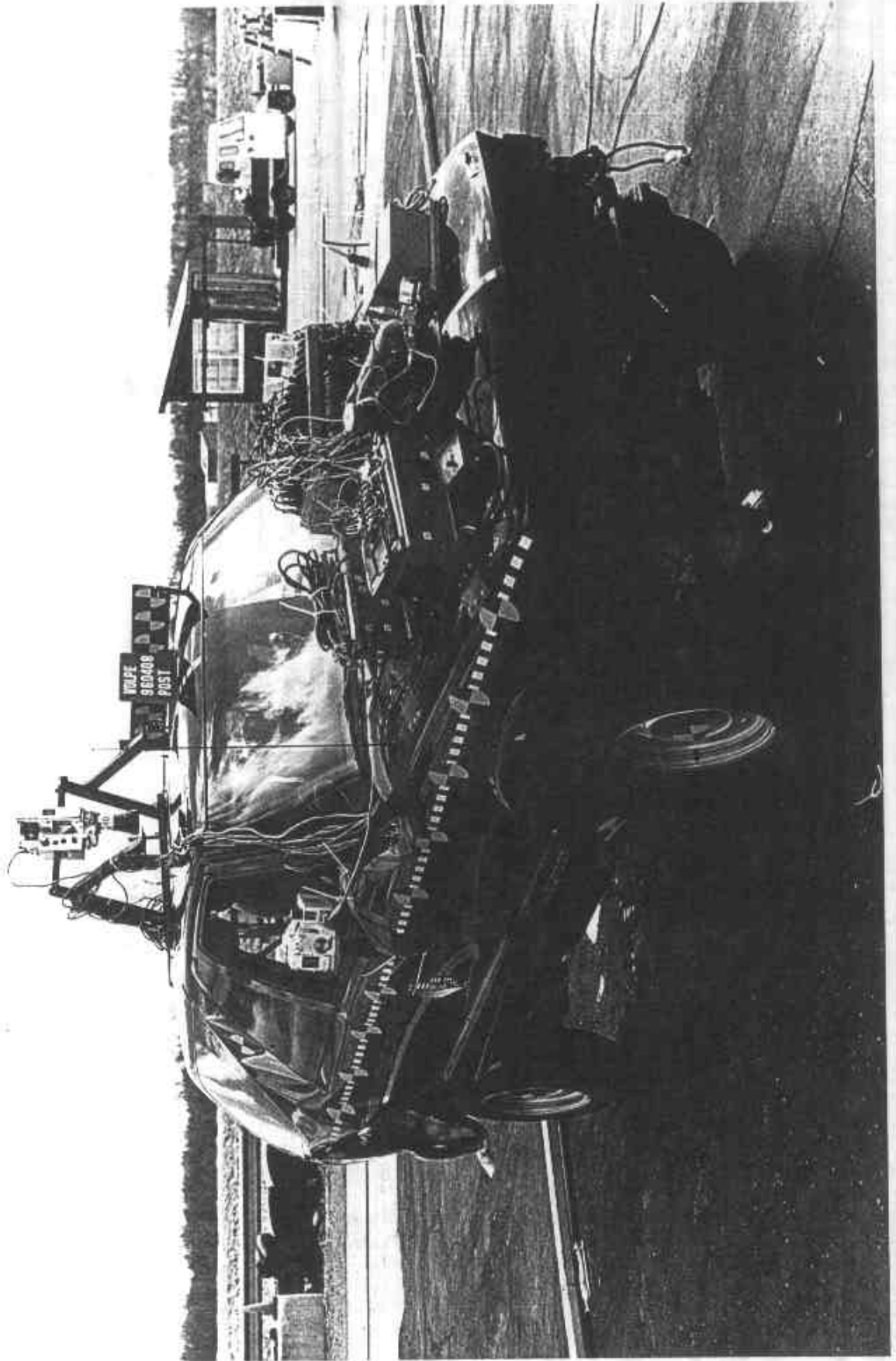


Figure A-15 Post-Test Right Front Three-Quarter View

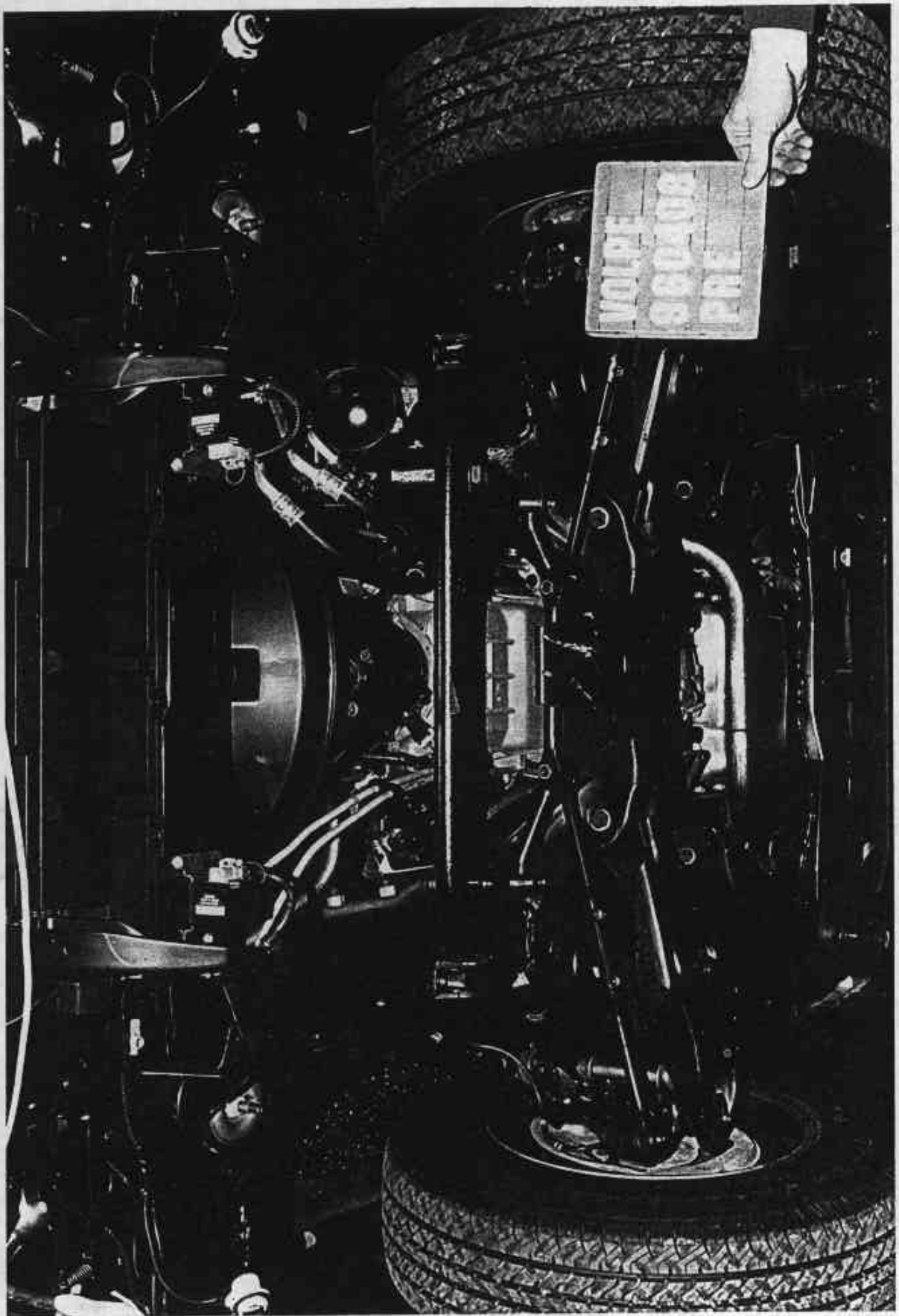


Figure A-16 Pre-Test Front Underbody View

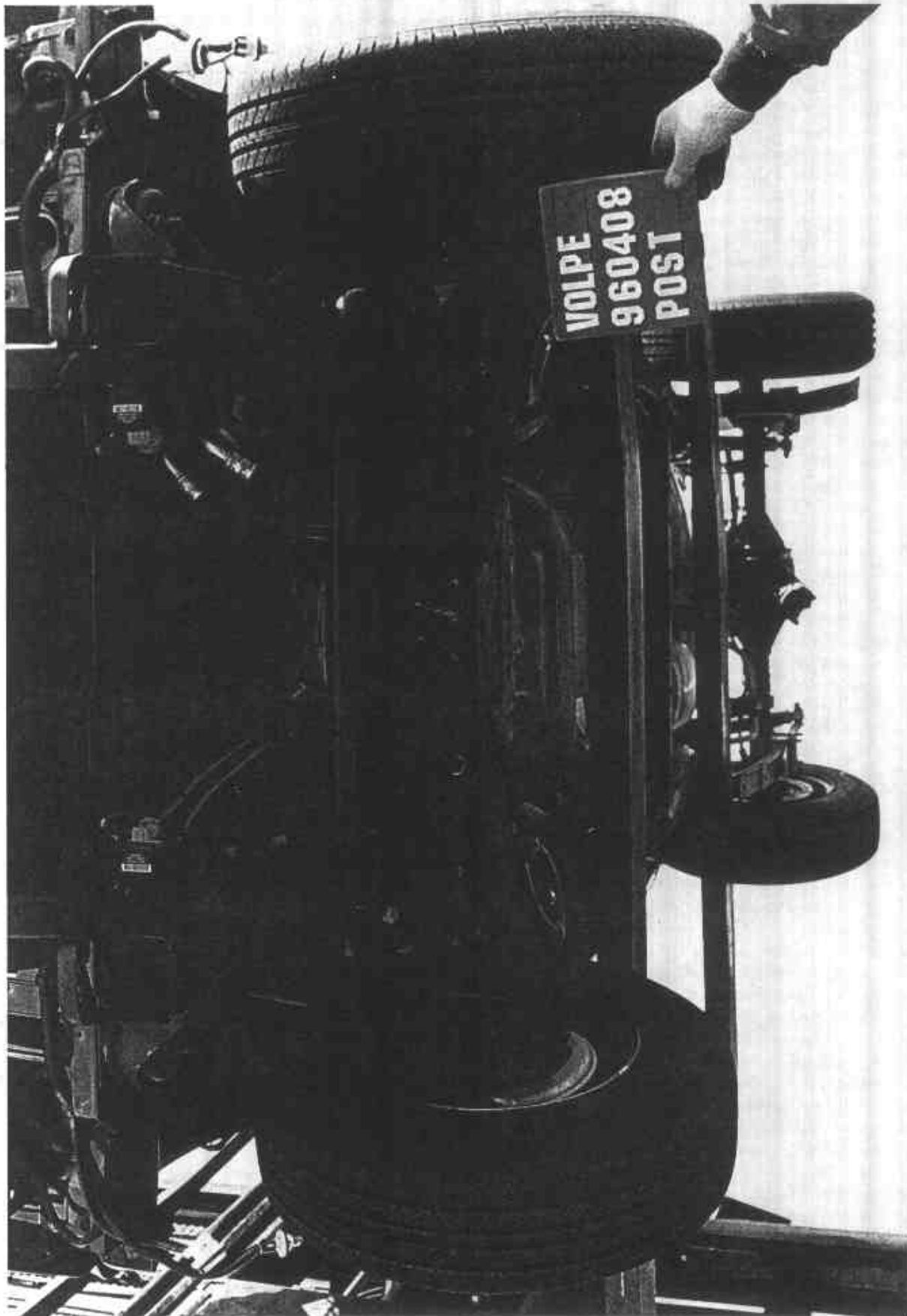


Figure A-17 Post-Test Front Underbody View

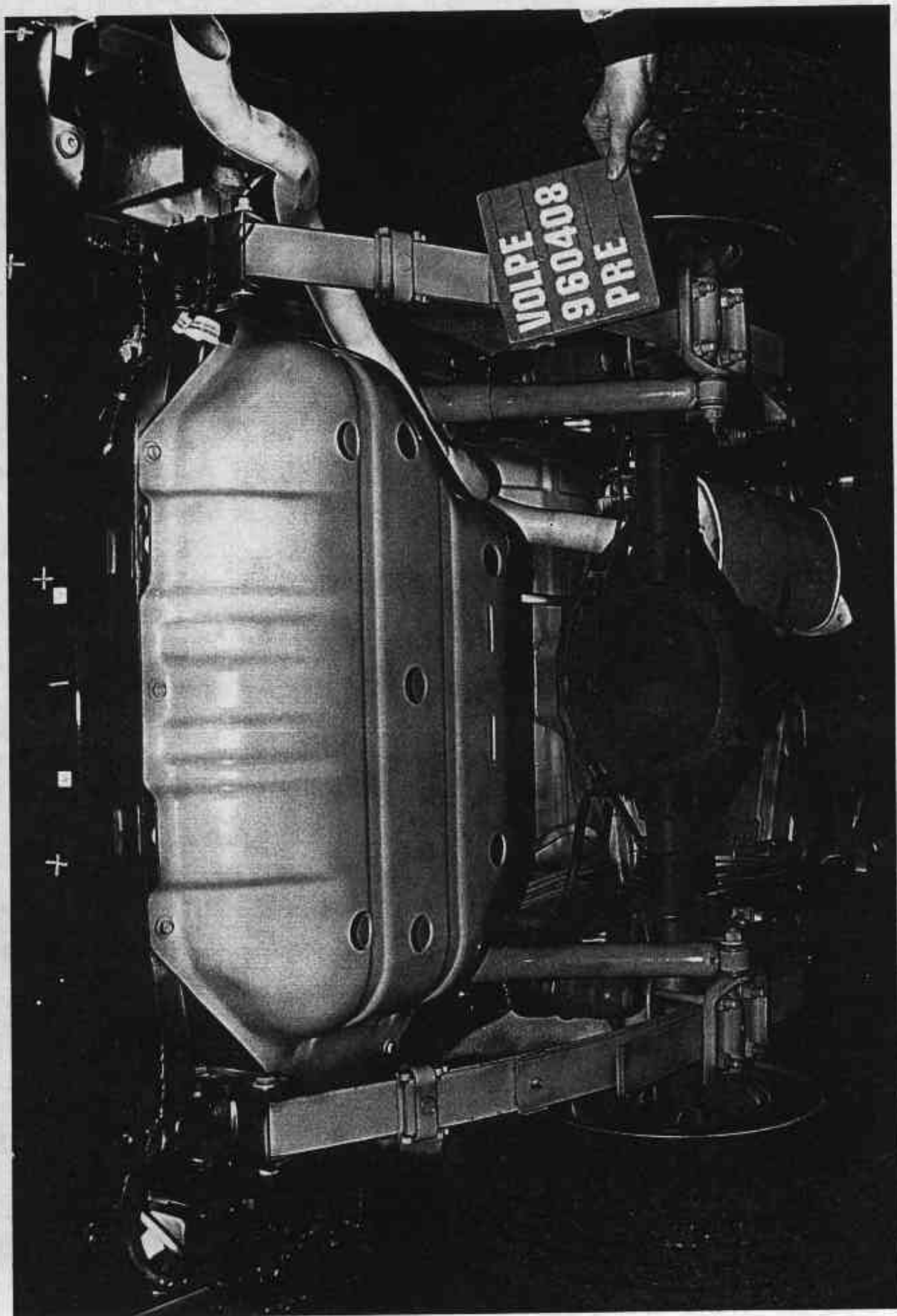


Figure A-18 Pre-Test Rear Underbody View

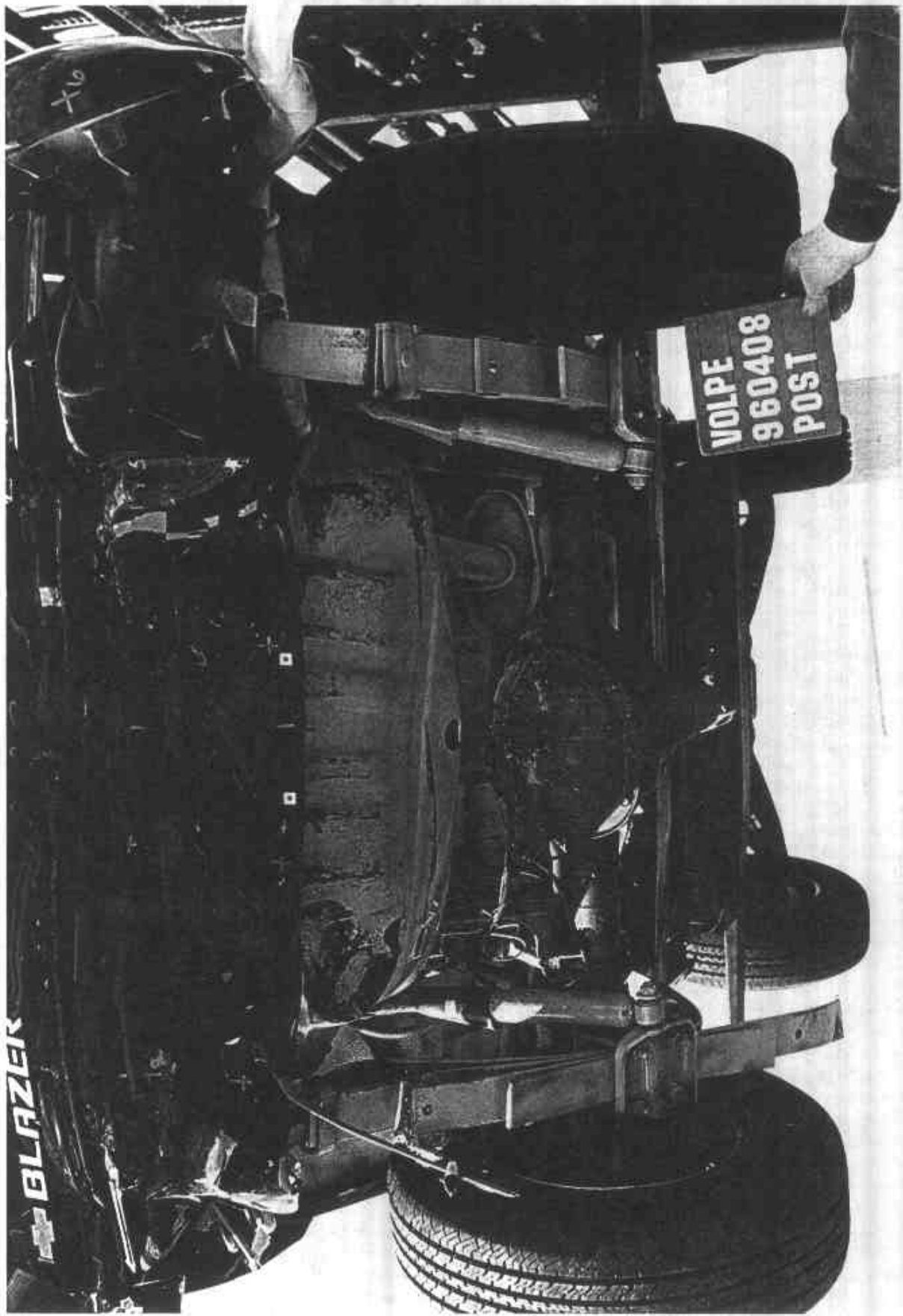


Figure A-19 Post-Test Rear Underbody View

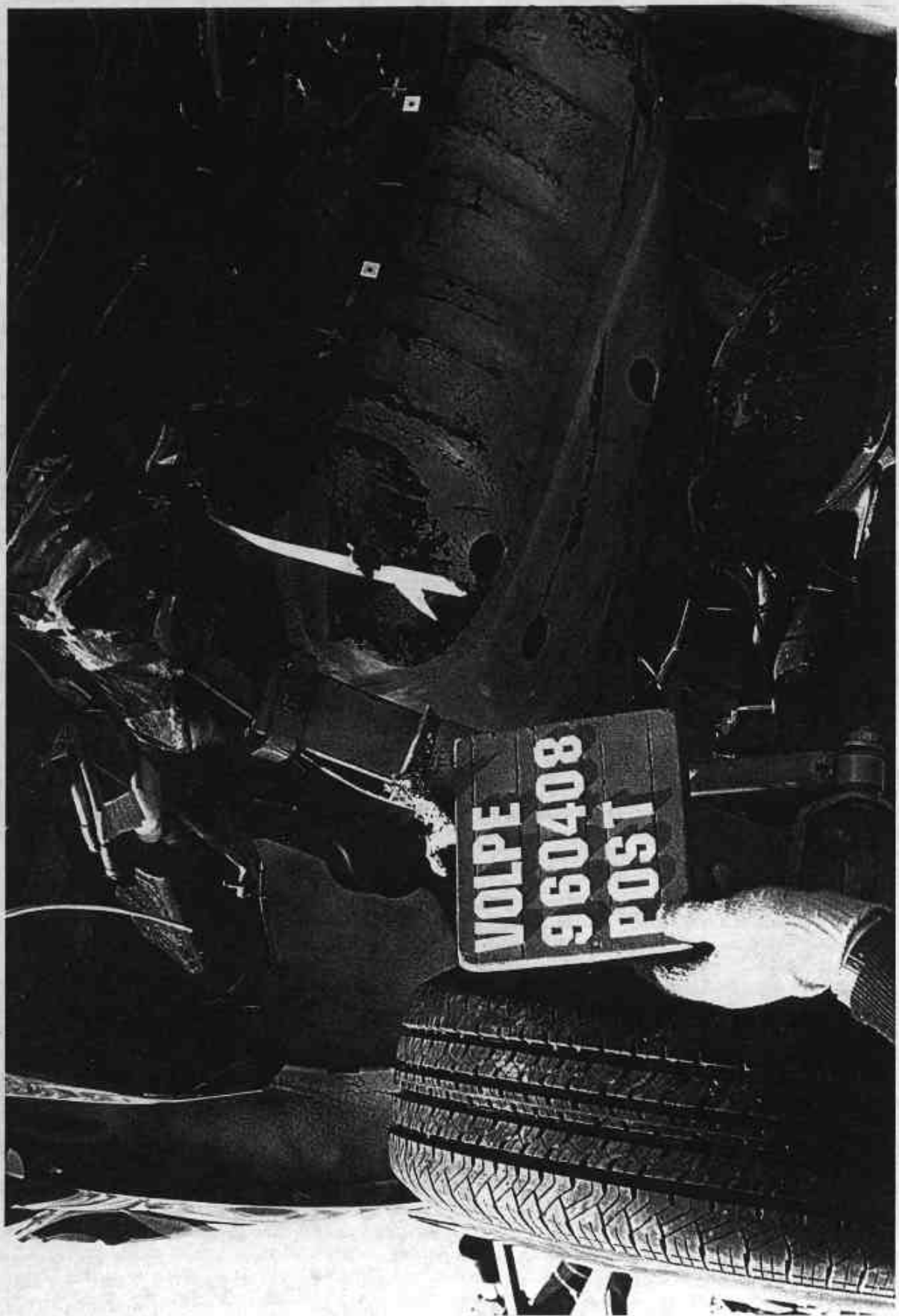


Figure A-20 Post-Test Rear Underbody/Carbon Canister Close-up View

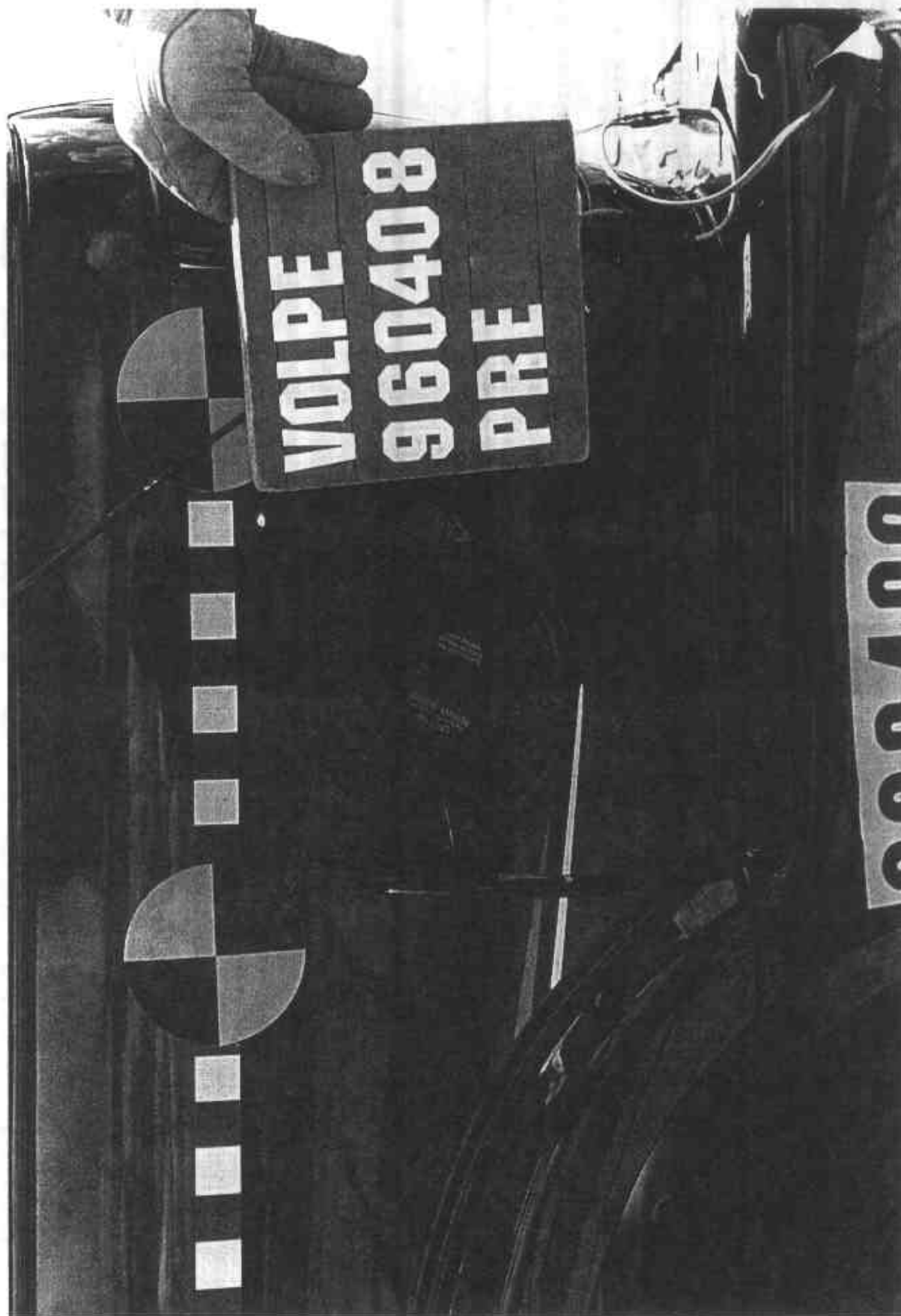


Figure A-21 Pre-Test Fuel Cap View

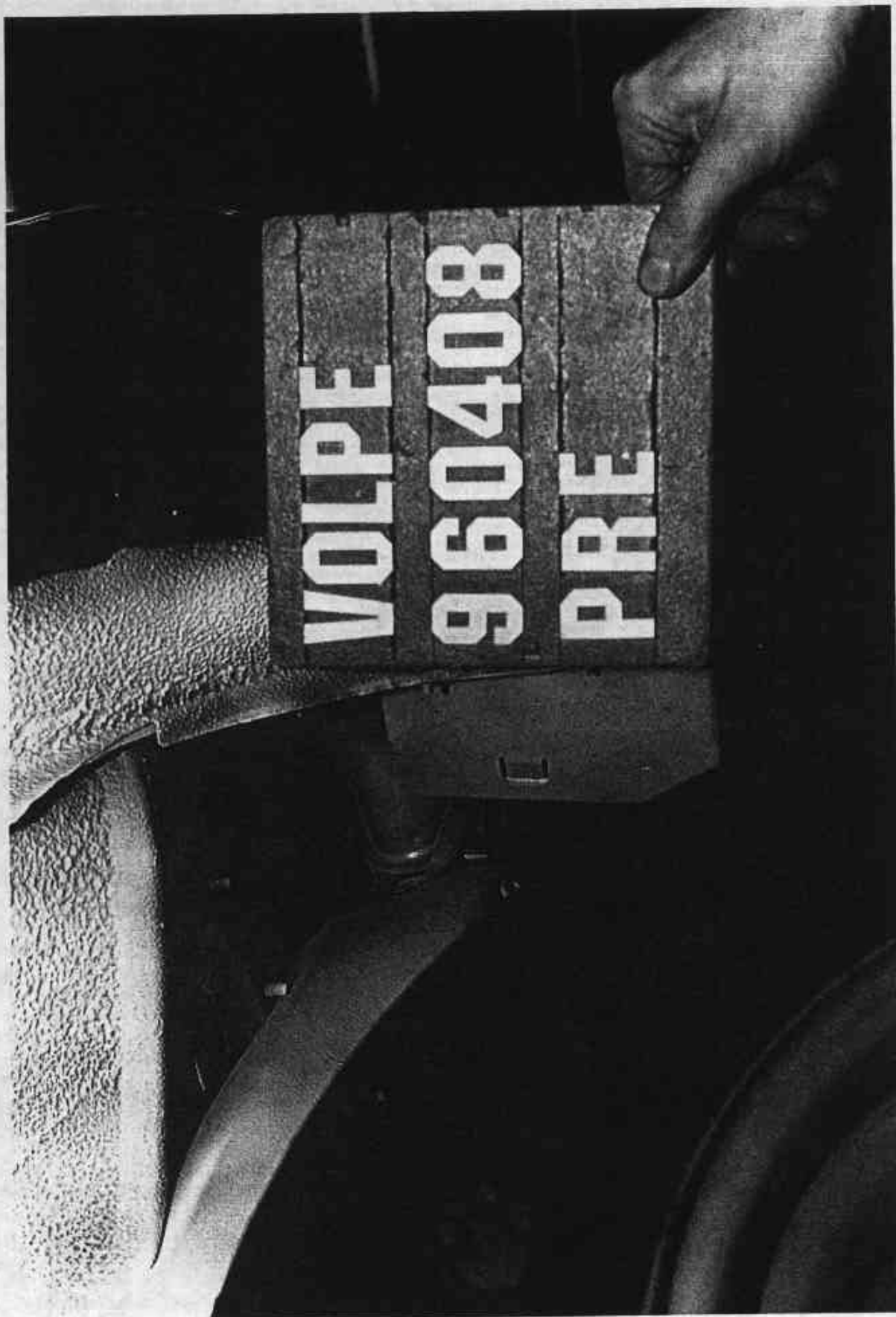


Figure A-22 Pre-Test Fuel Filler Neck View

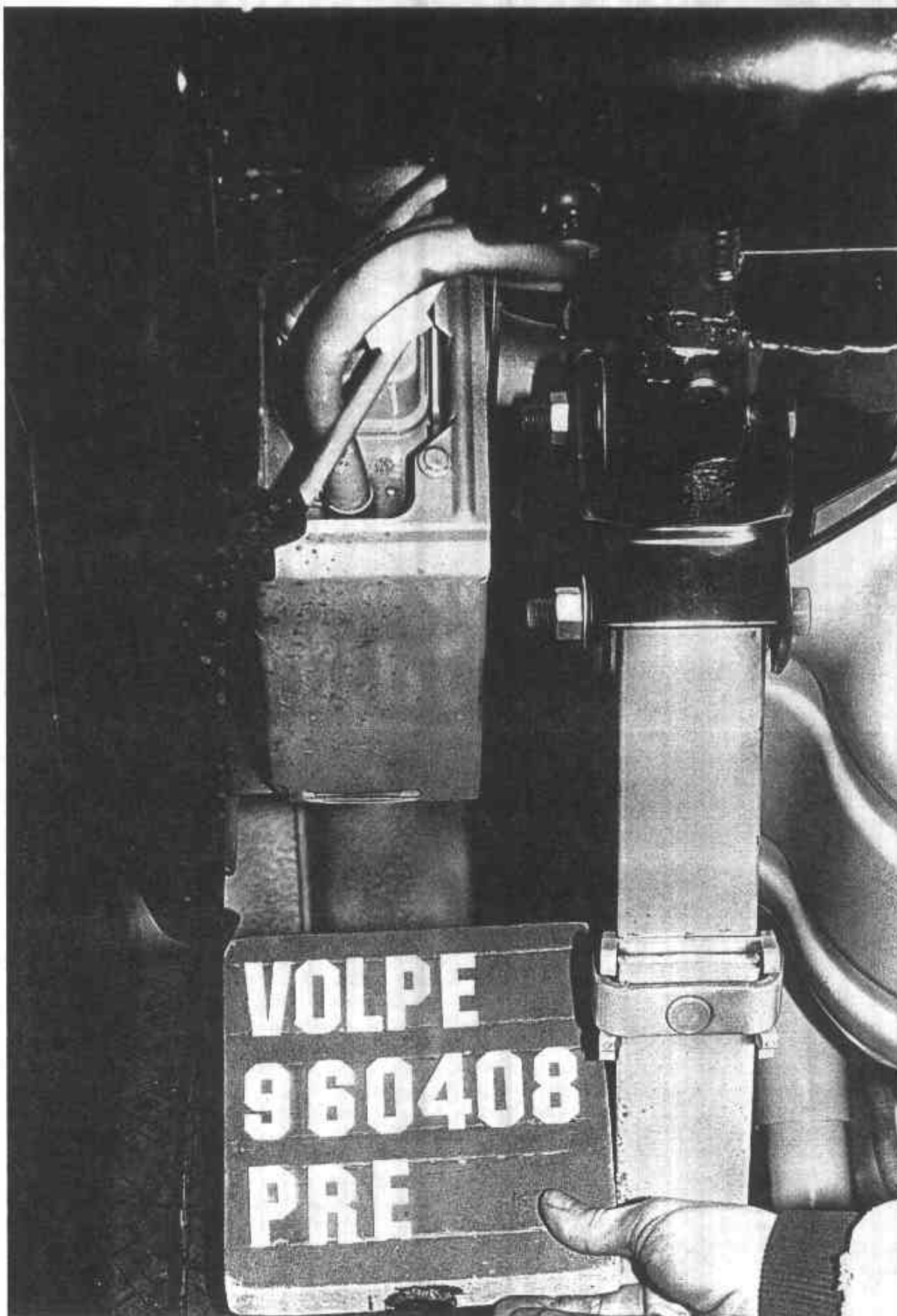


Figure A-23 Pre-Test Carbon Canister View

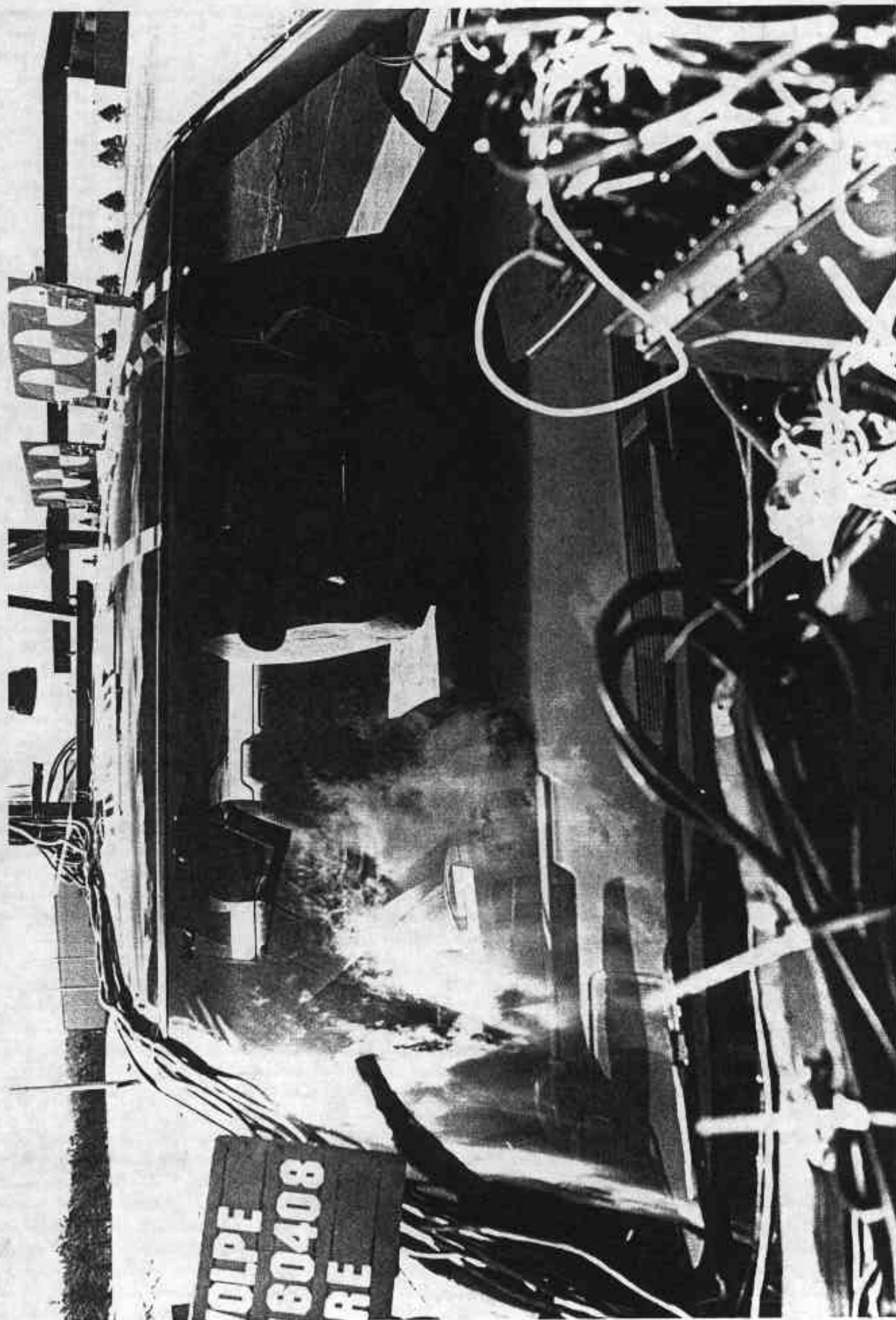


Figure A-24 Pre-Test Windshield View

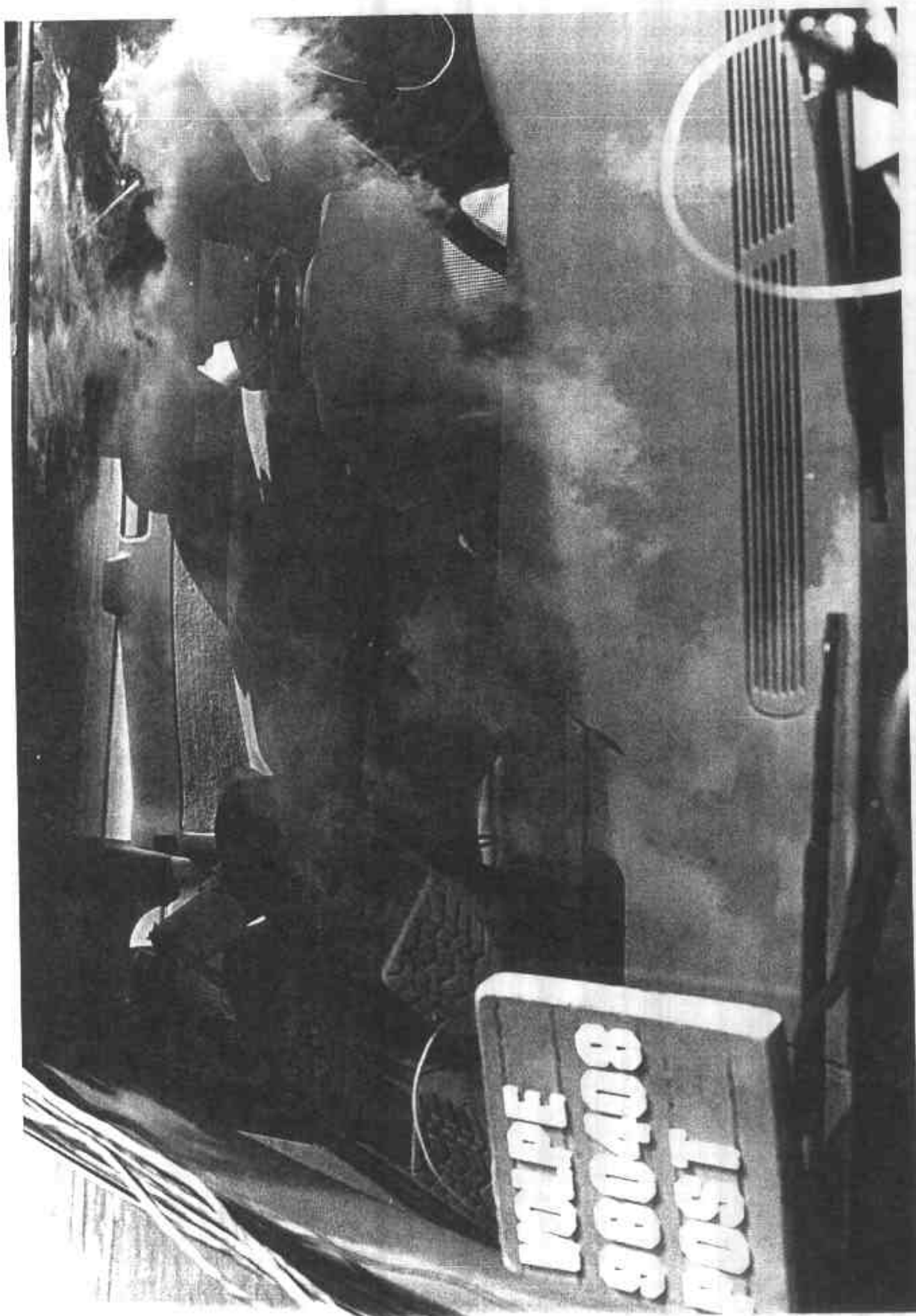


Figure A-25 Post-Test Windshield View

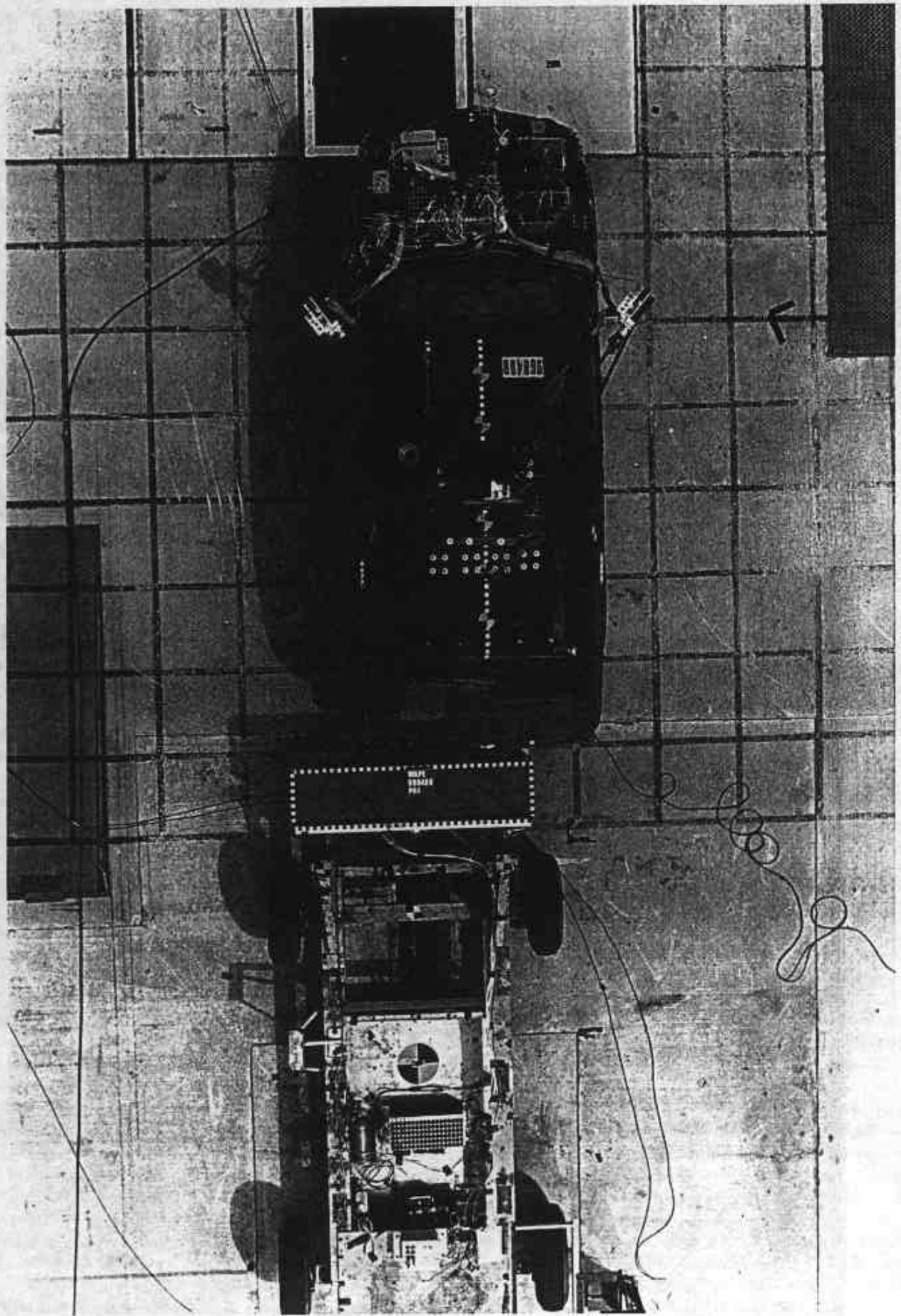


Figure A-26 Pre-Test Barrier to Vehicle Alignment View - Overhead

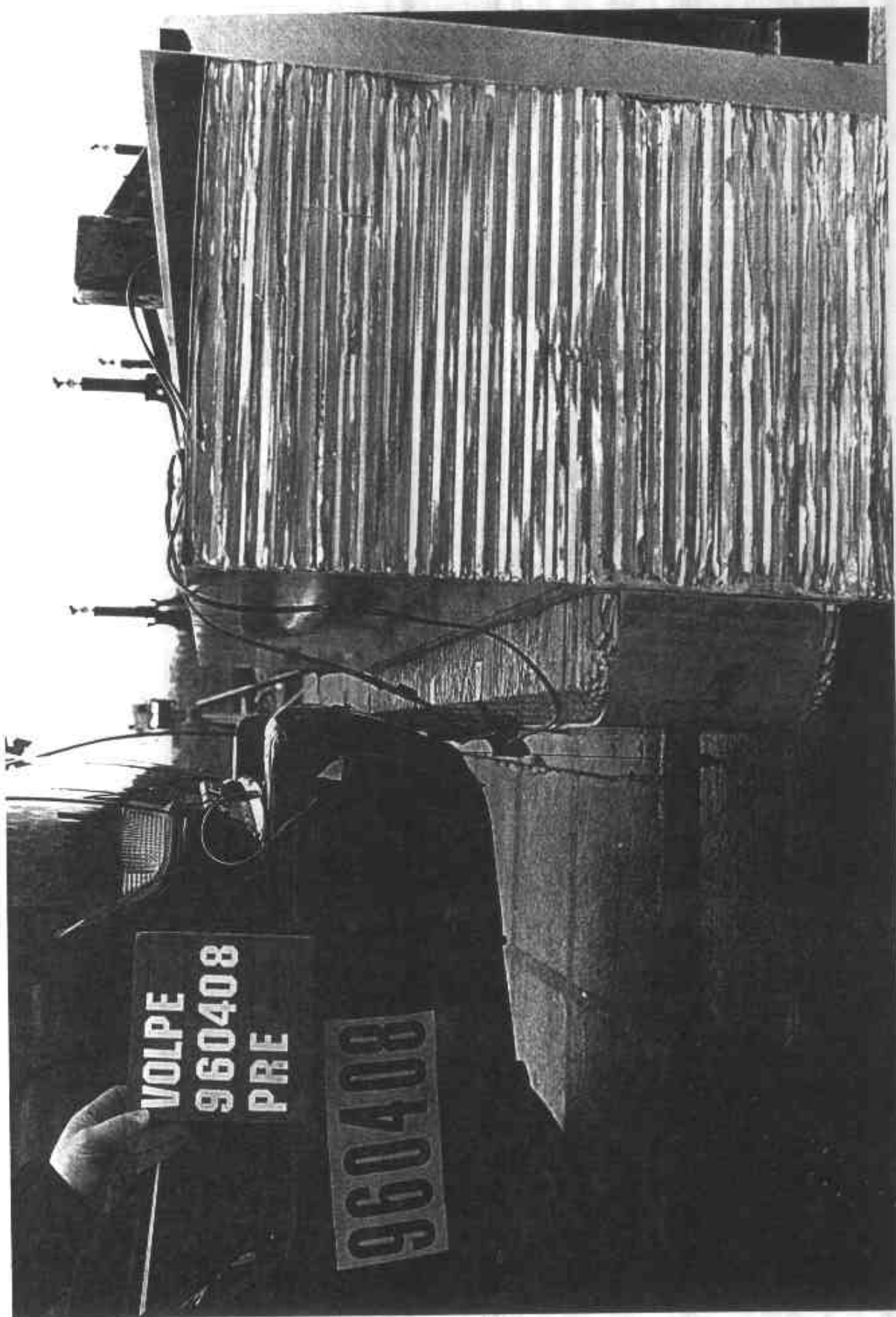


Figure A-27 Pre-Test Barrier to Vehicle Alignment View - Left Side



Figure A-28 Post-Test Deformable Impactor Face Right Side View

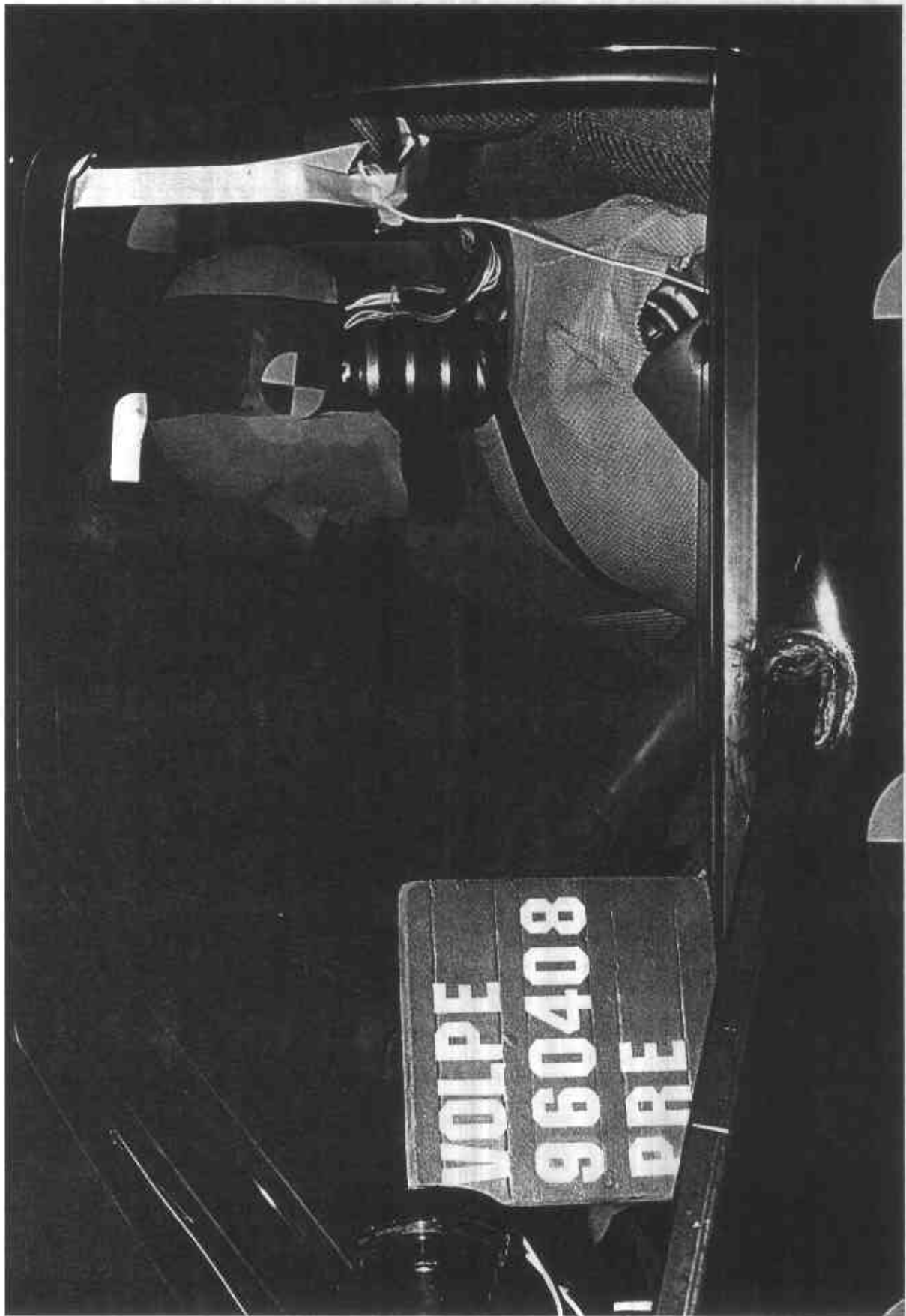


Figure A-29 Pre-Test Driver Dummy Position View

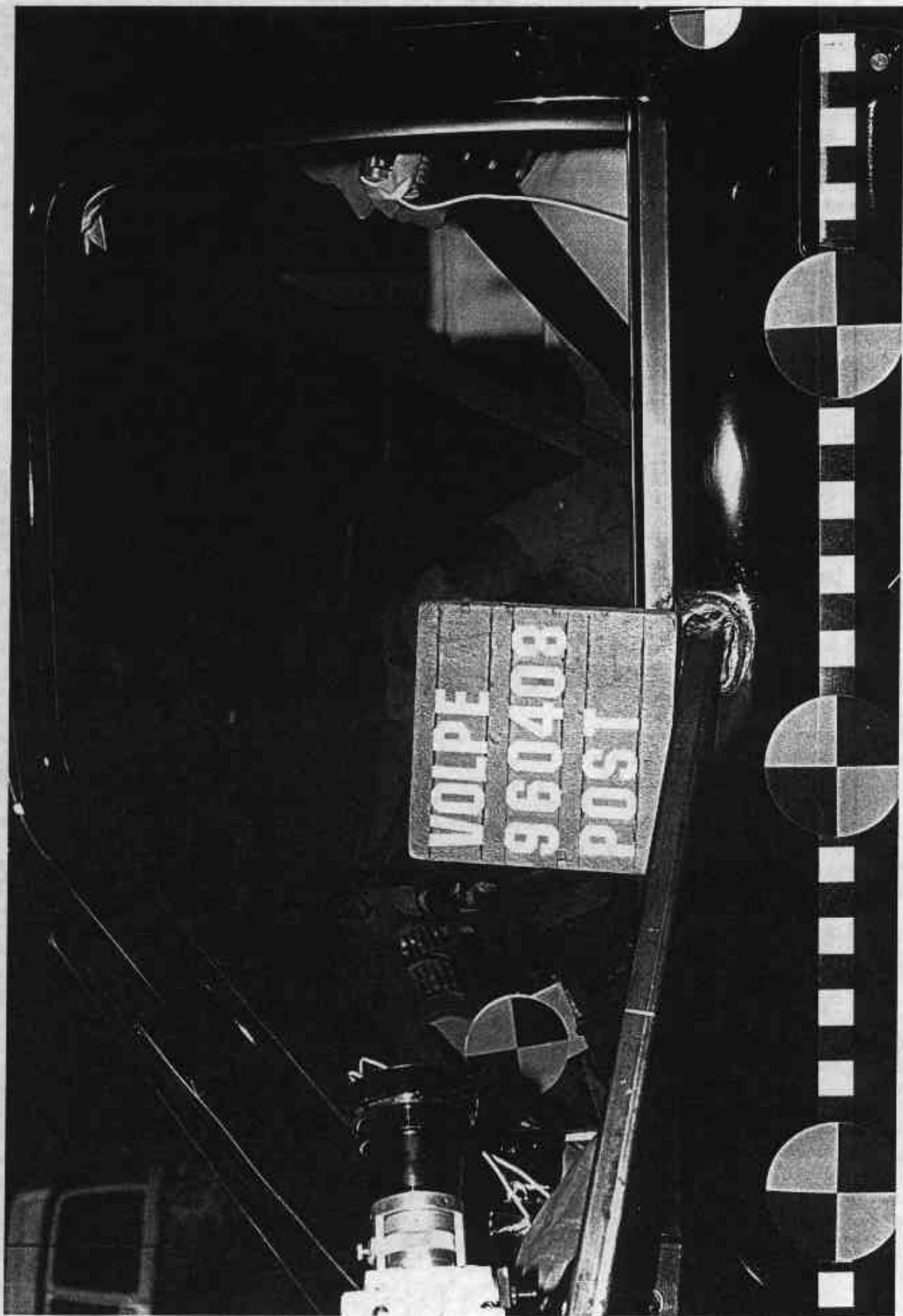


Figure A-30 Post-Test Driver Dummy Position View

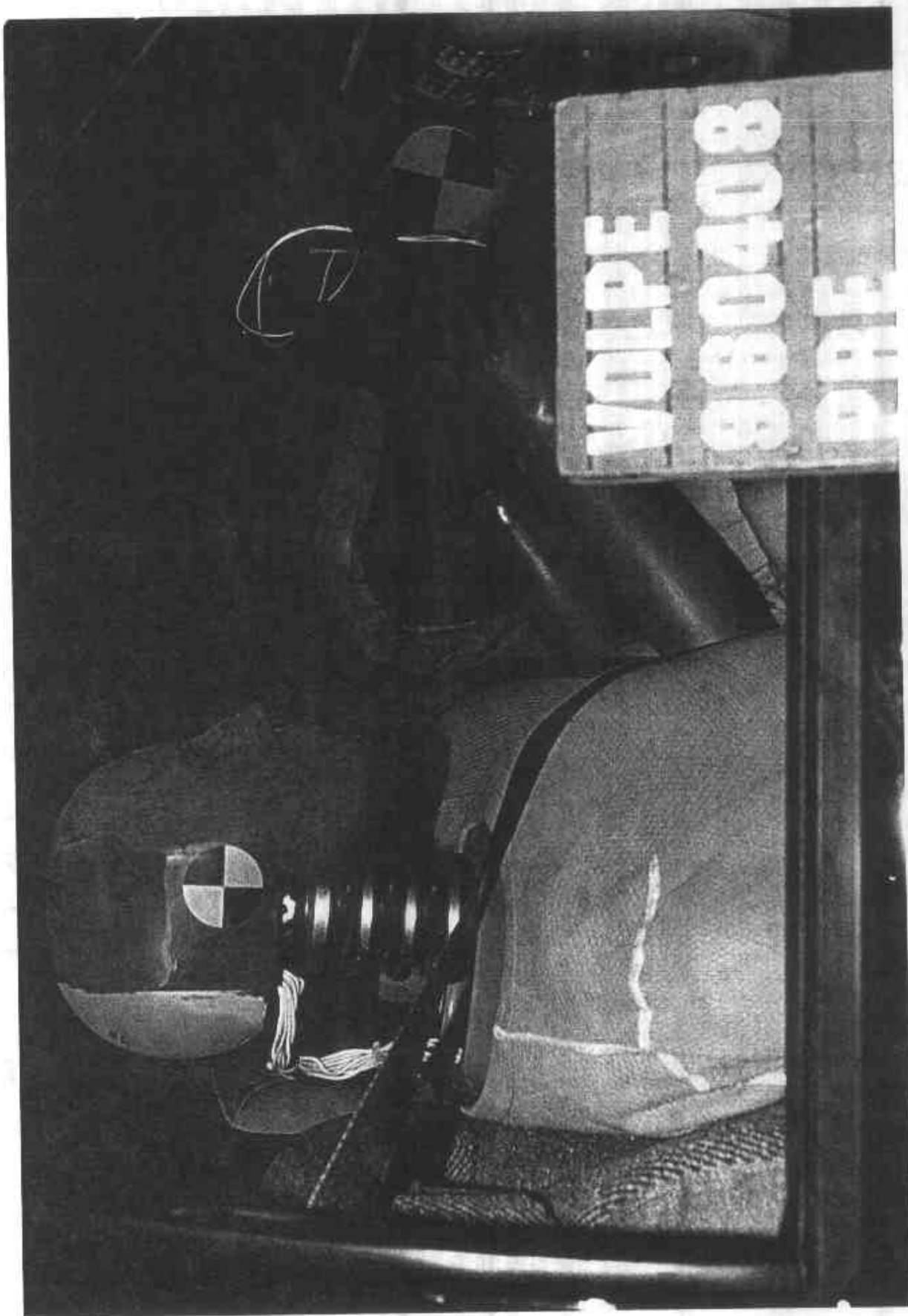


Figure A-31 Pre-Test Passenger Dummy Position View

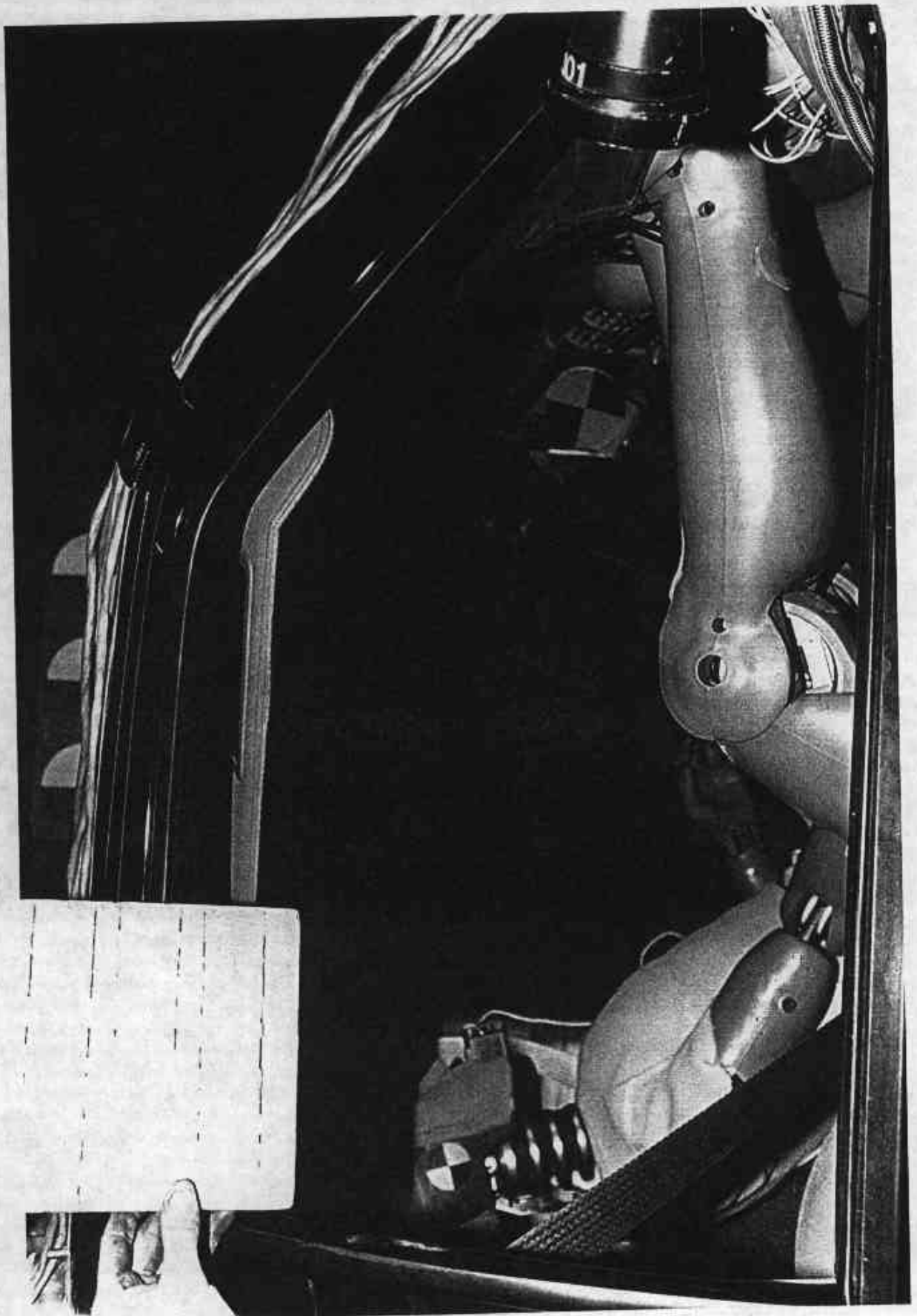


Figure A-32 Post-Test Passenger Dummy Position View

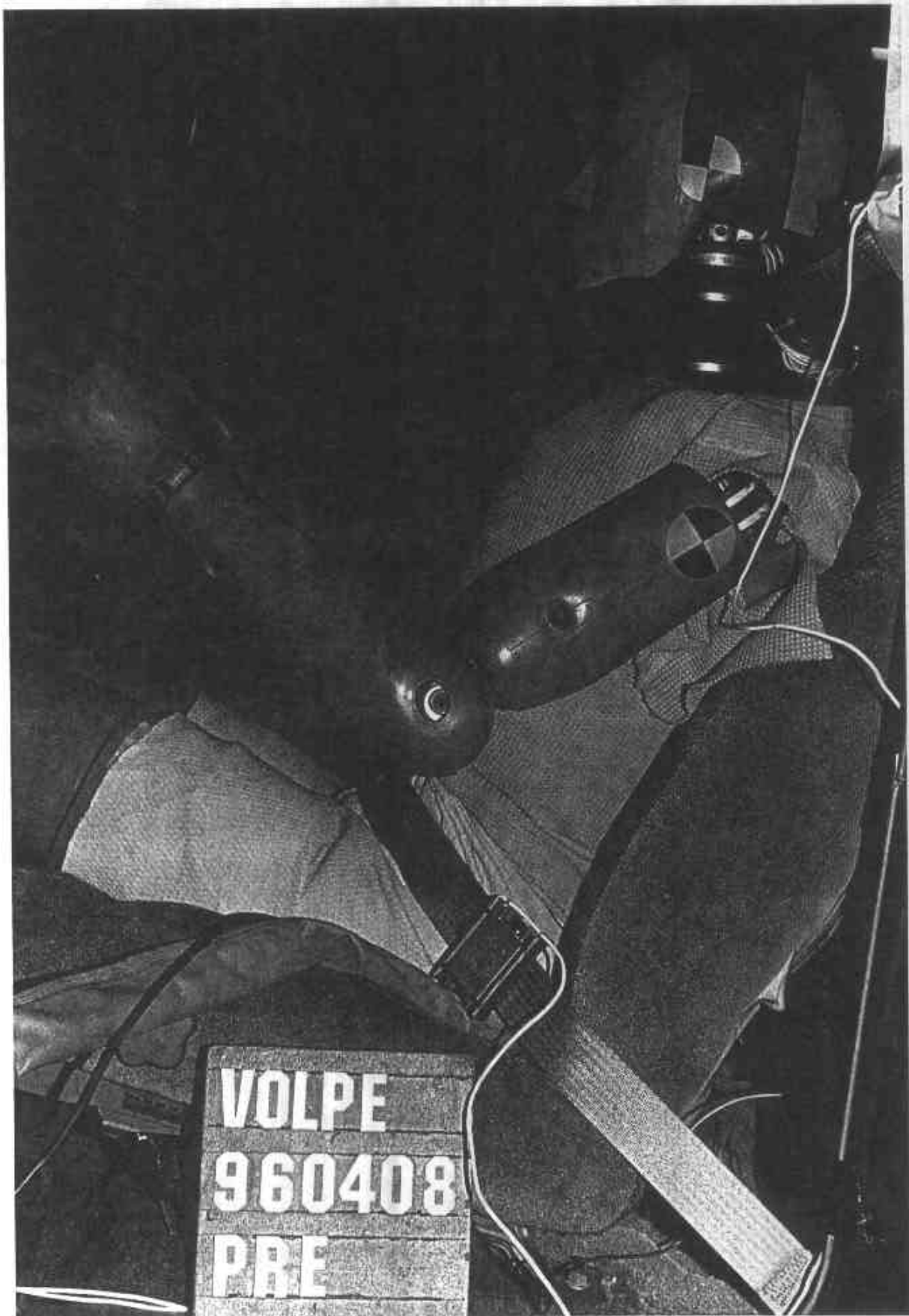


Figure A-33 Pre-Test Driver Dummy & Vehicle Interior - View 1



Figure A-34 Post-Test Driver Dummy & Vehicle Interior - View 1

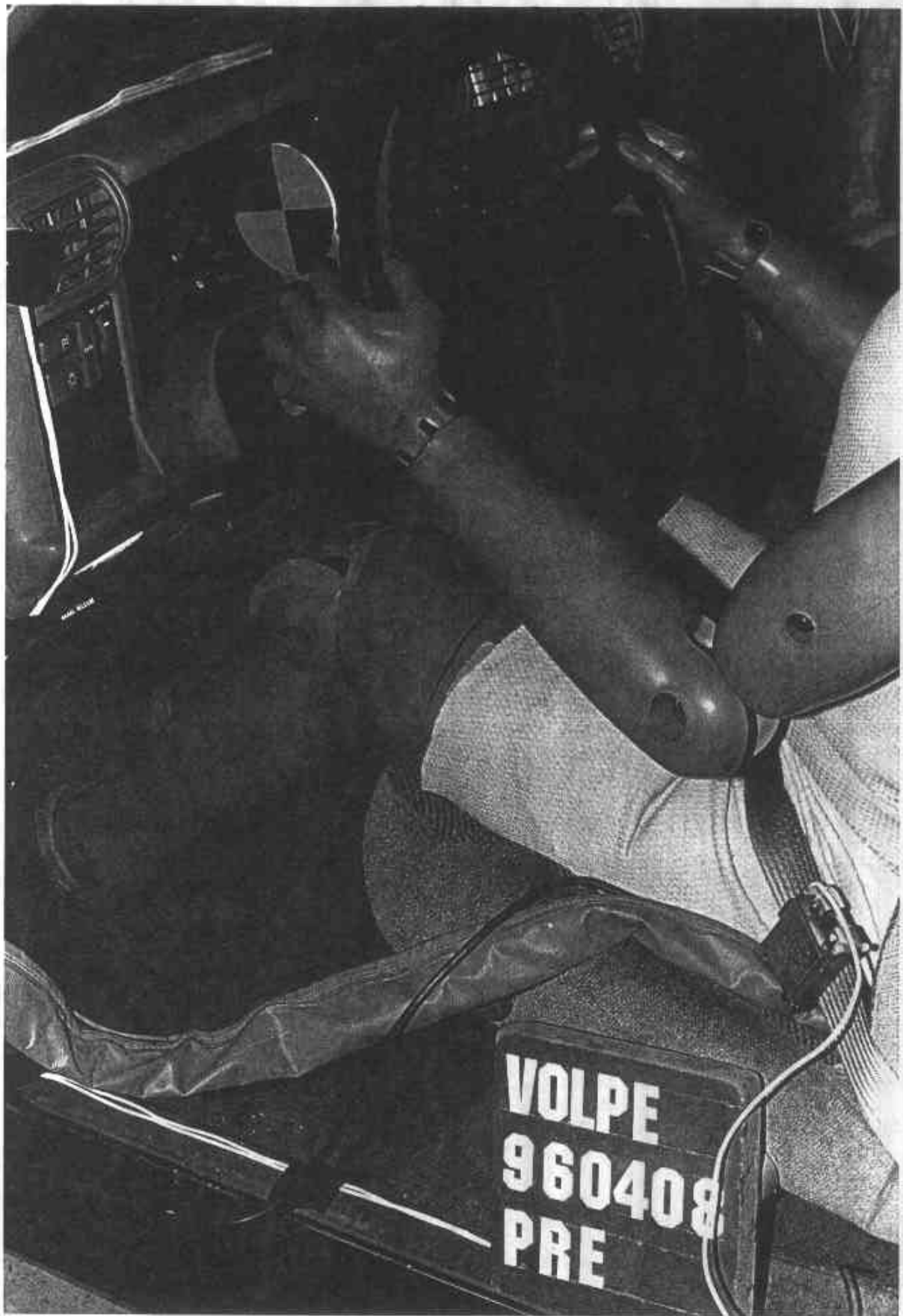


Figure A-35 Pre-Test Driver Dummy & Vehicle Interior - View 2

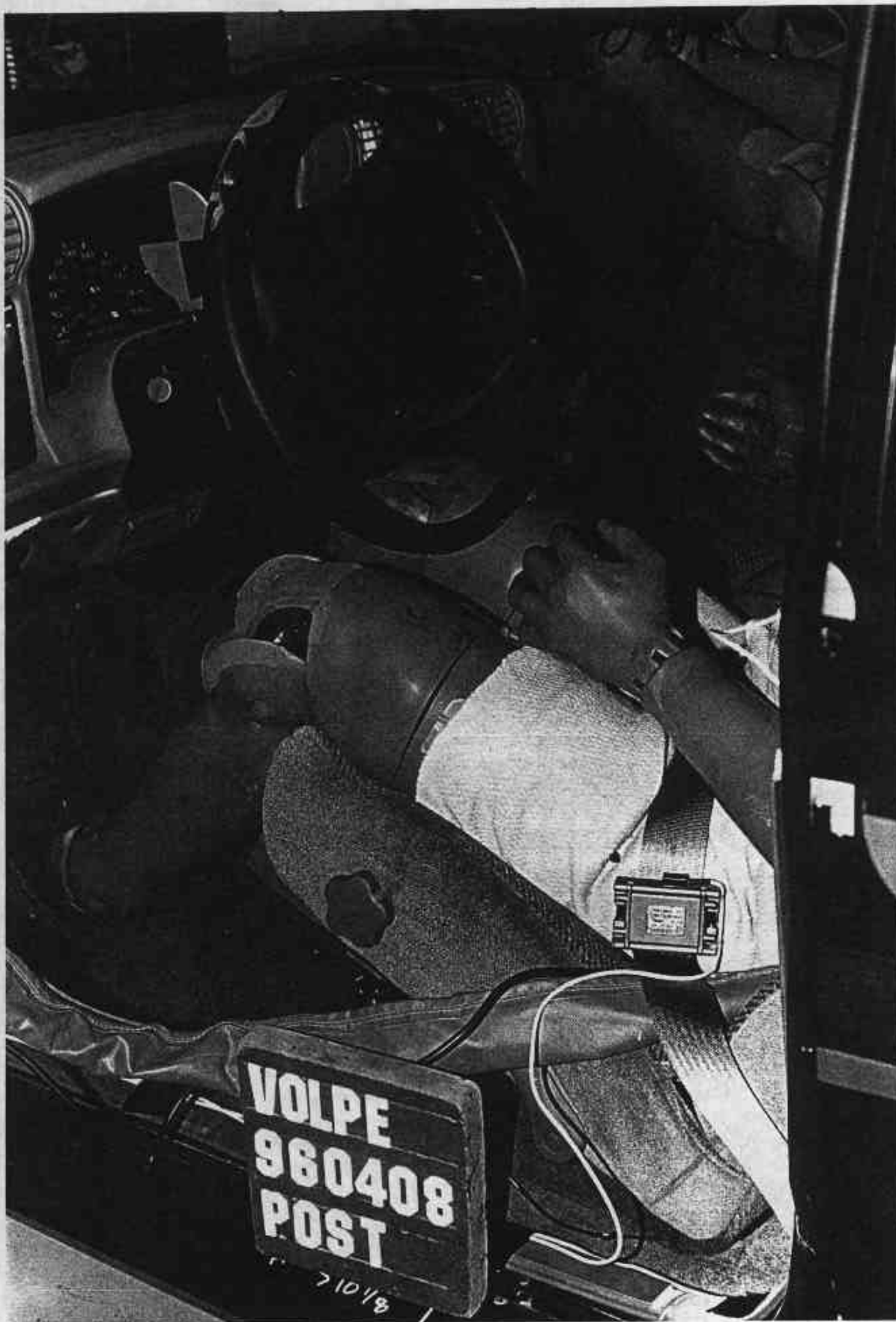


Figure A-36 Post-Test Driver Dummy & Vehicle Interior - View 2

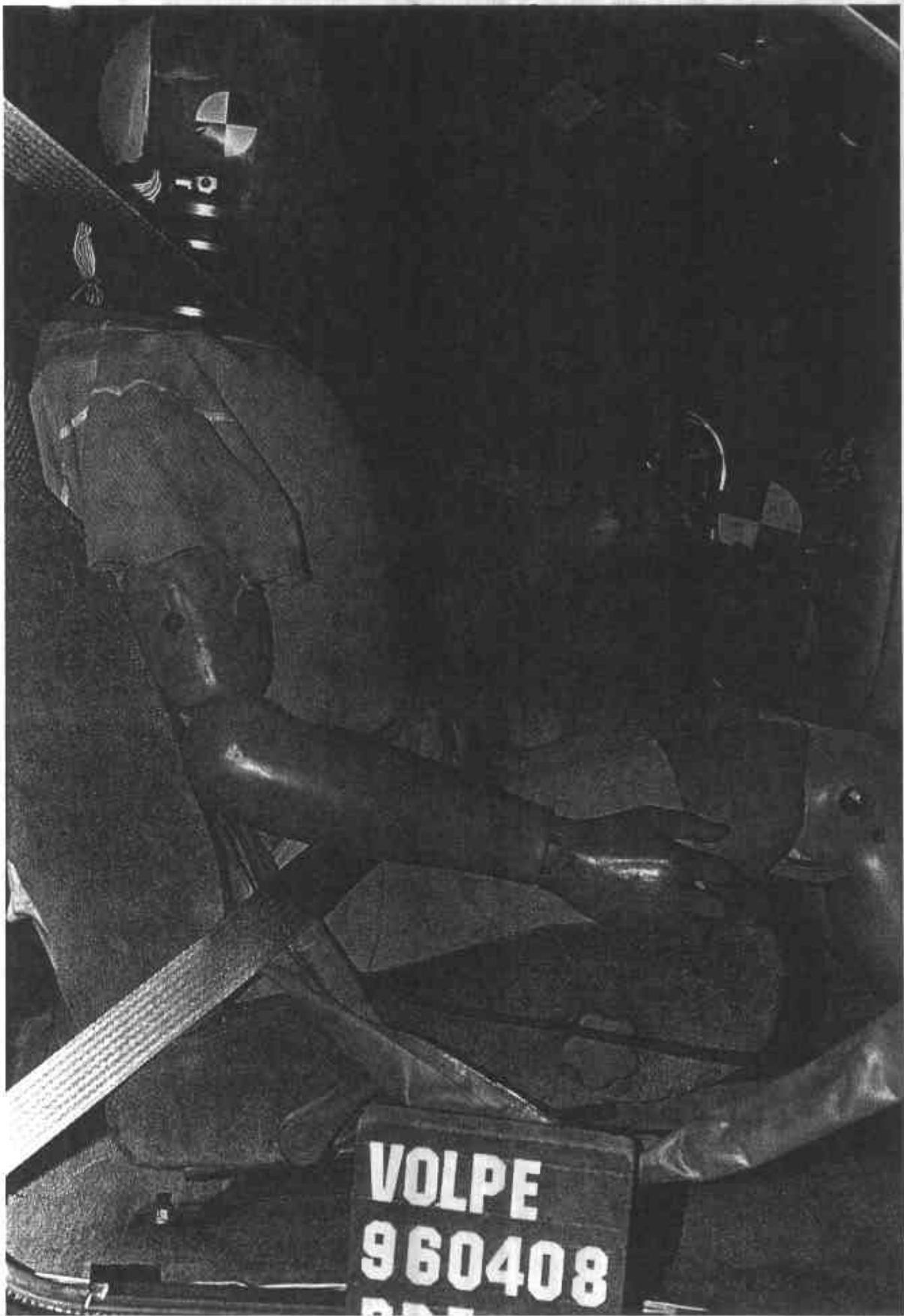


Figure A-37 Pre-Test Passenger Dummy & Vehicle Interior - View 1

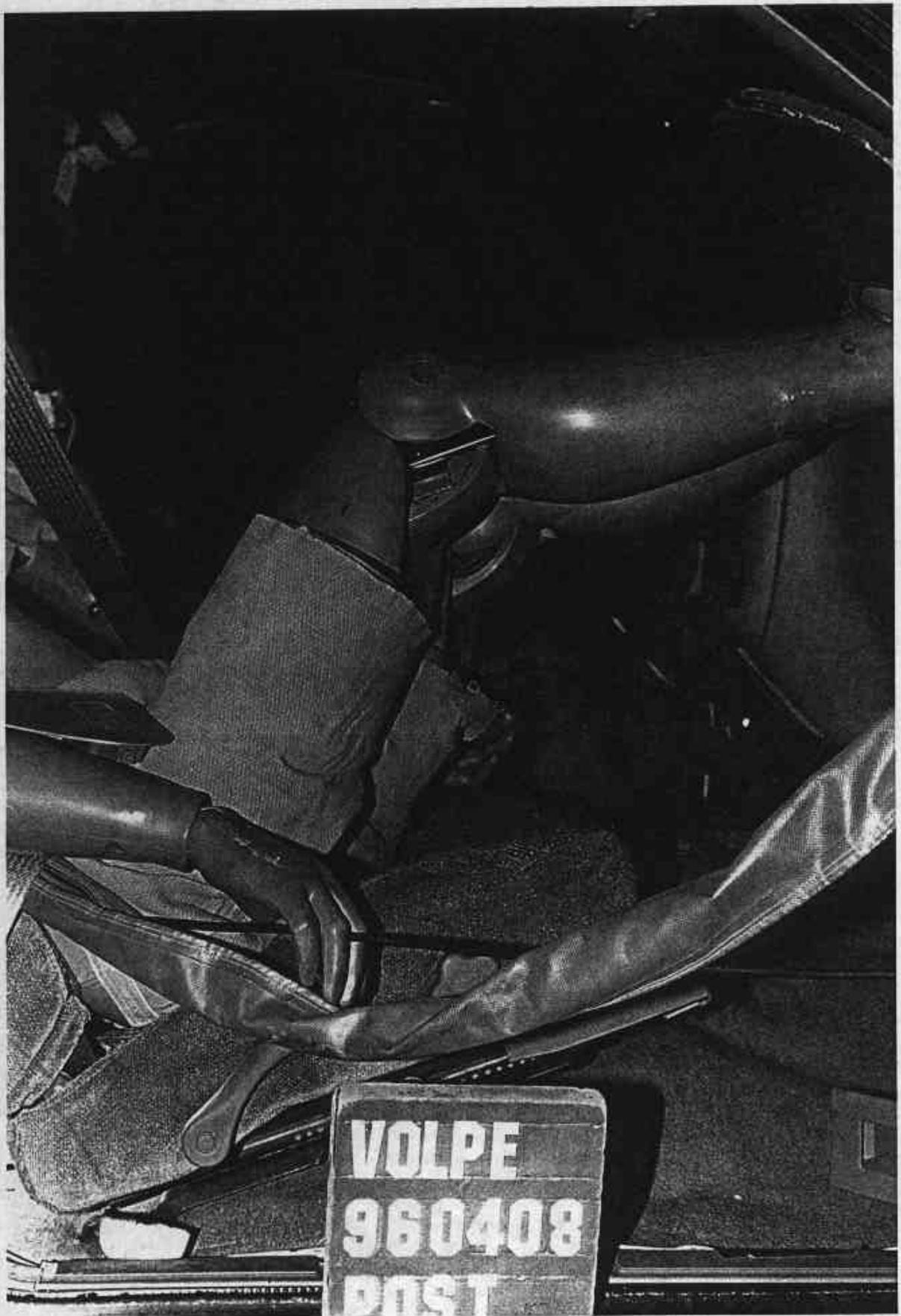


Figure A-38 Post-Test Passenger Dummy & Vehicle Interior - View 1



Figure A-39 Pre-Test Passenger Dummy & Vehicle Interior - View 2

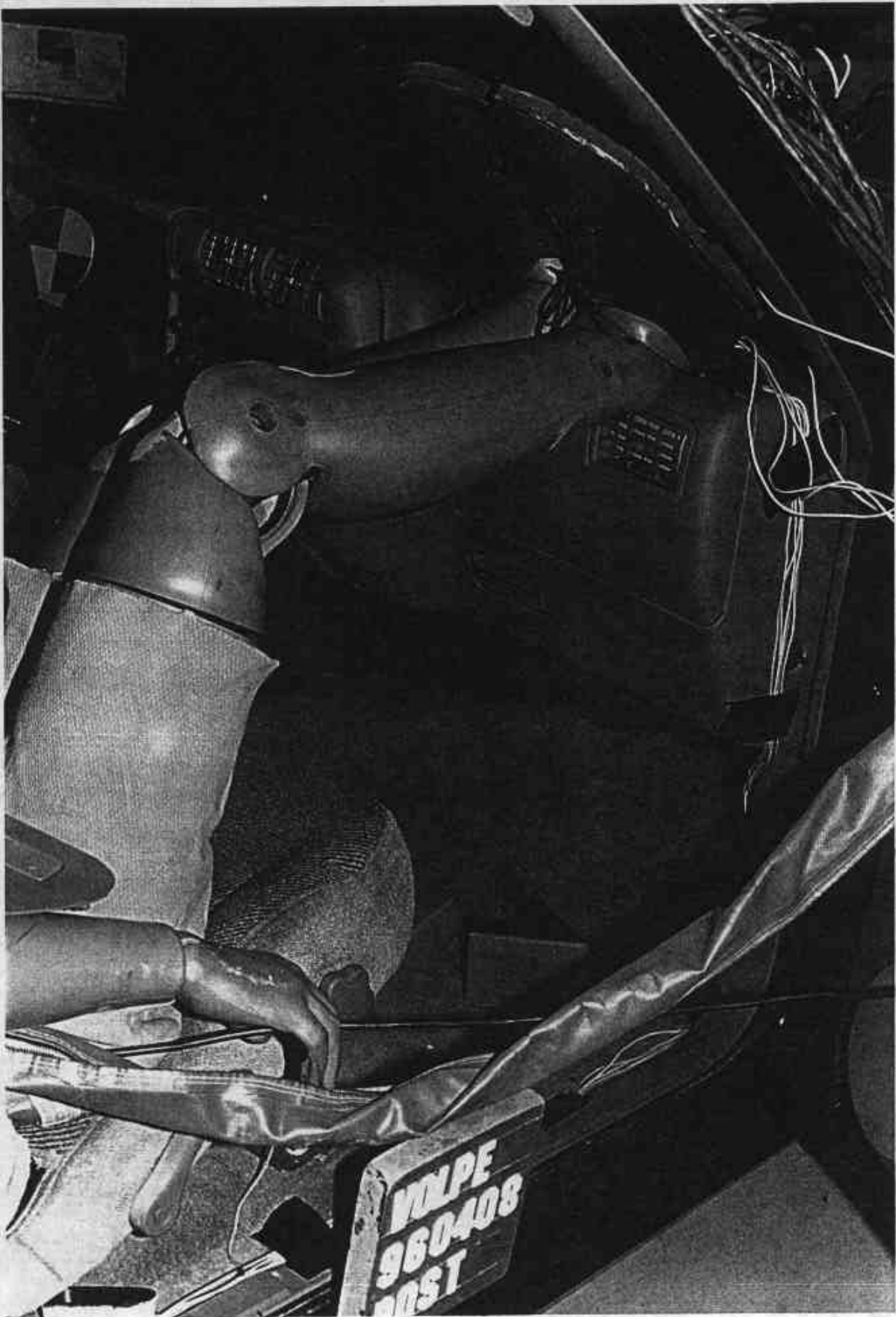


Figure A-40 Post-Test Passenger Dummy & Vehicle Interior - View 2

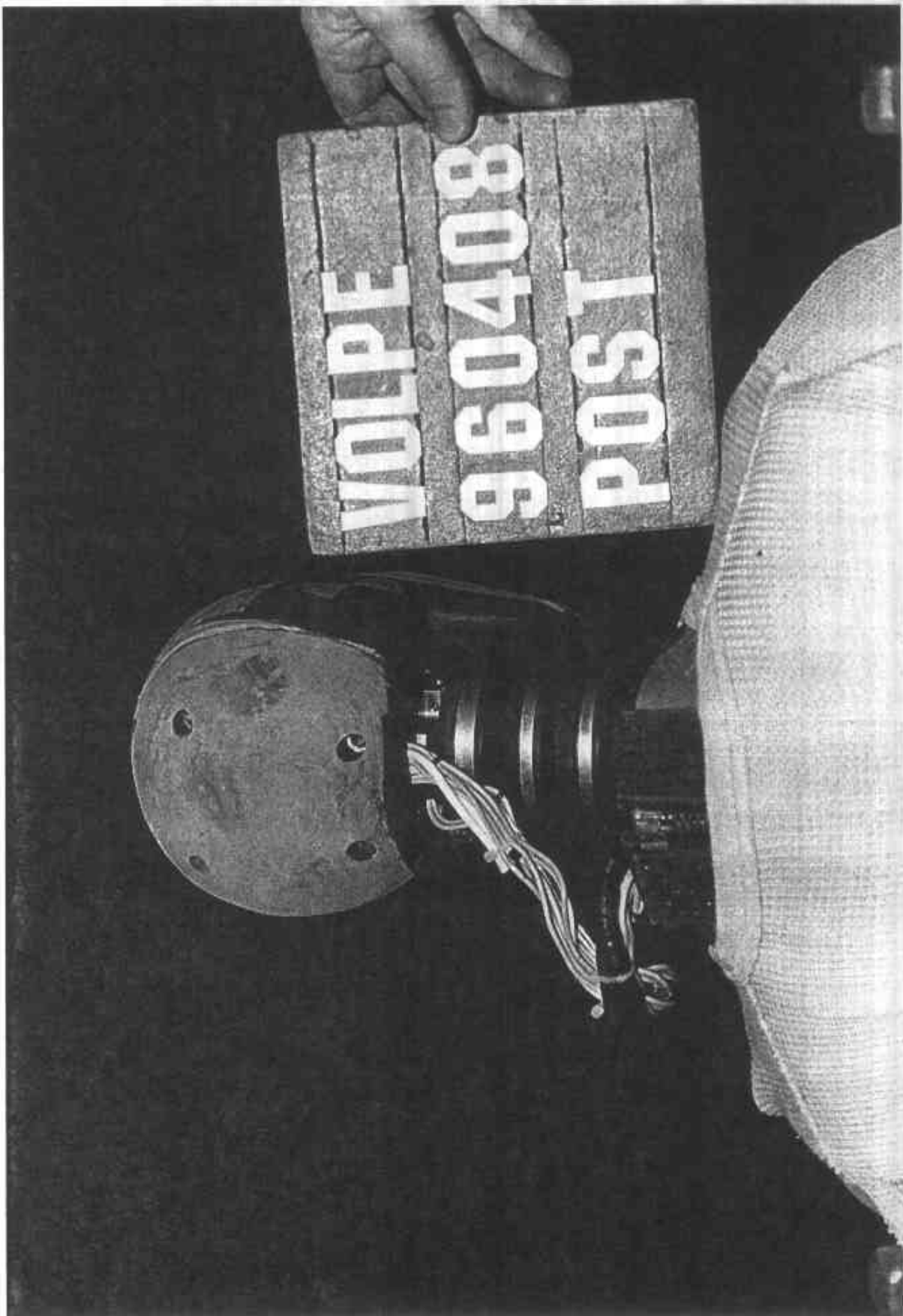


Figure A-41 Post-Test Driver Dummy Head Contact - View 1

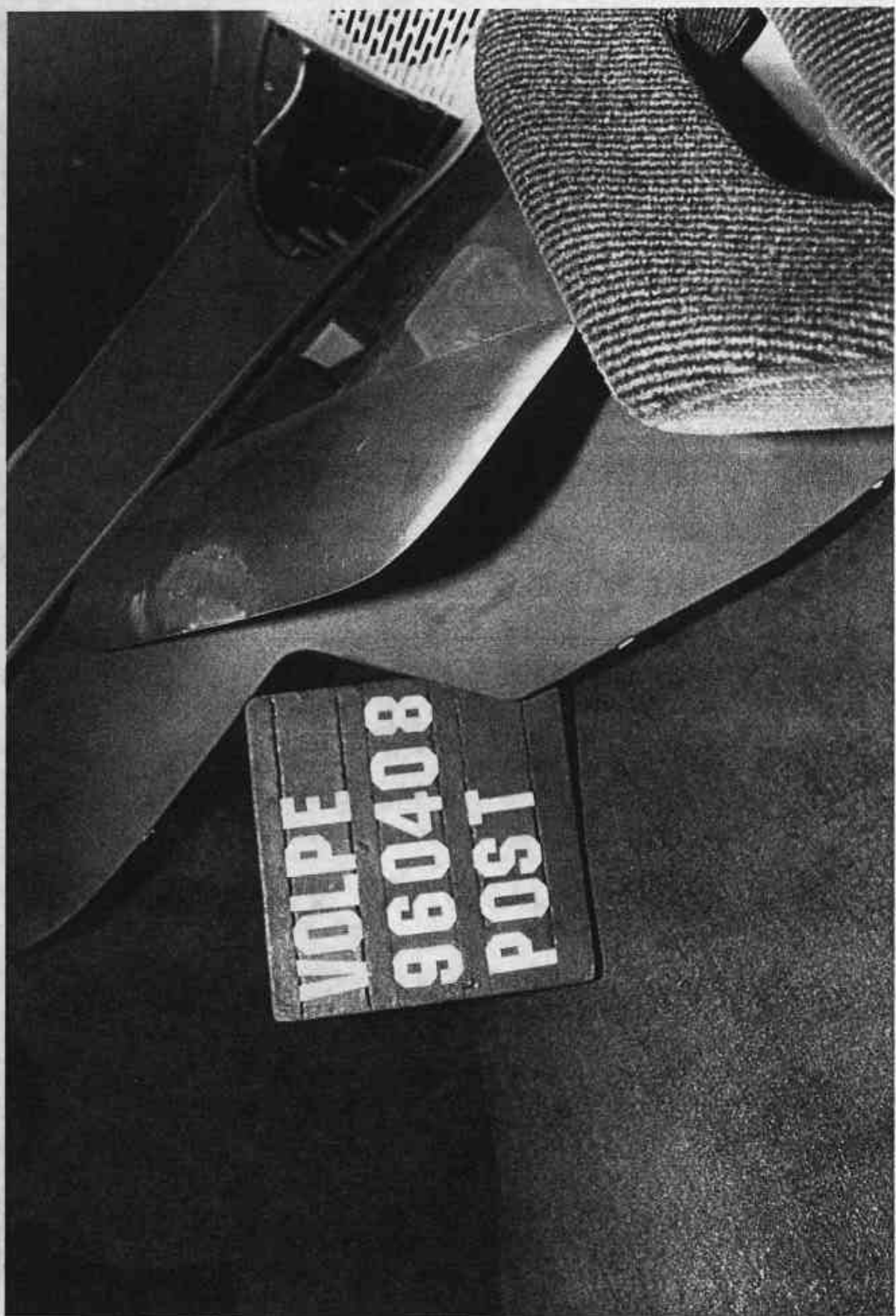


Figure A-42 Post-Test Driver Dummy Head Contact - View 2



Figure A-43 Post-Test Driver Dummy Head Contact - View 3



Figure A-44 Post-Test Driver Dummy Knee Contact - View 1



Figure A-45 Post-Test Driver Dummy Knee Contact - View 2

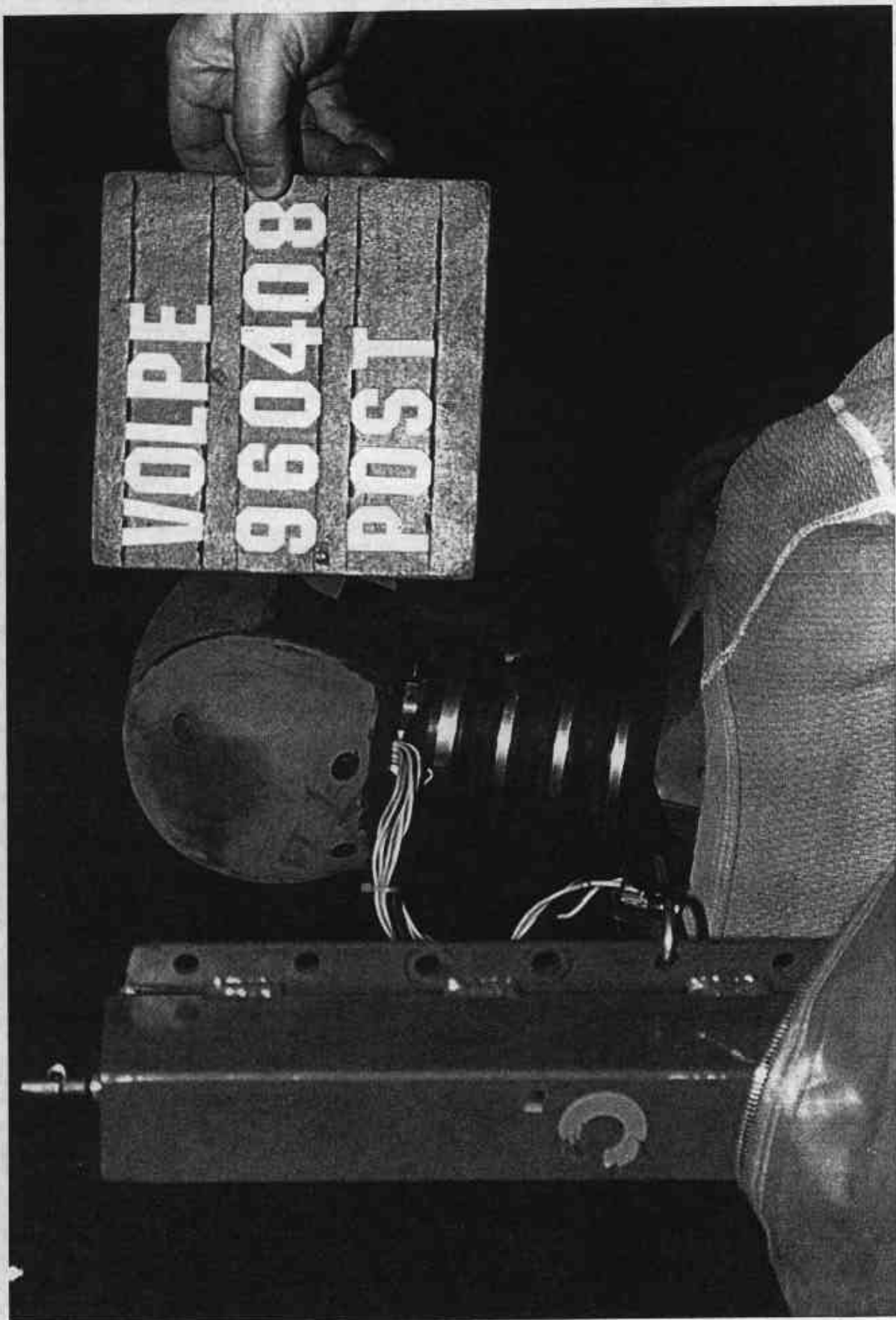


Figure A-46 Post-Test Passenger Dummy Head Contact - View 1

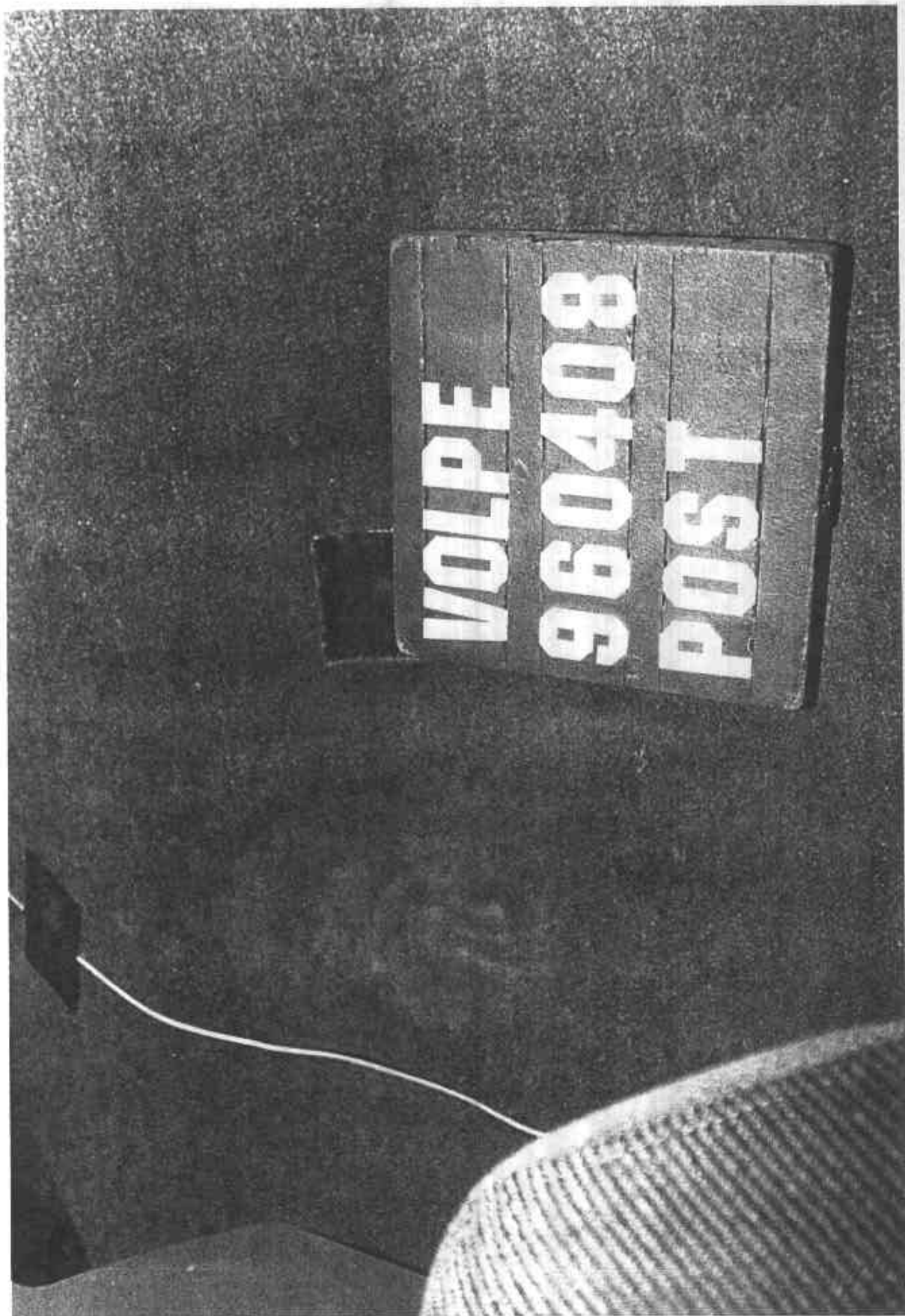


Figure A-47 Post-Test Passenger Dummy Head Contact - View 2

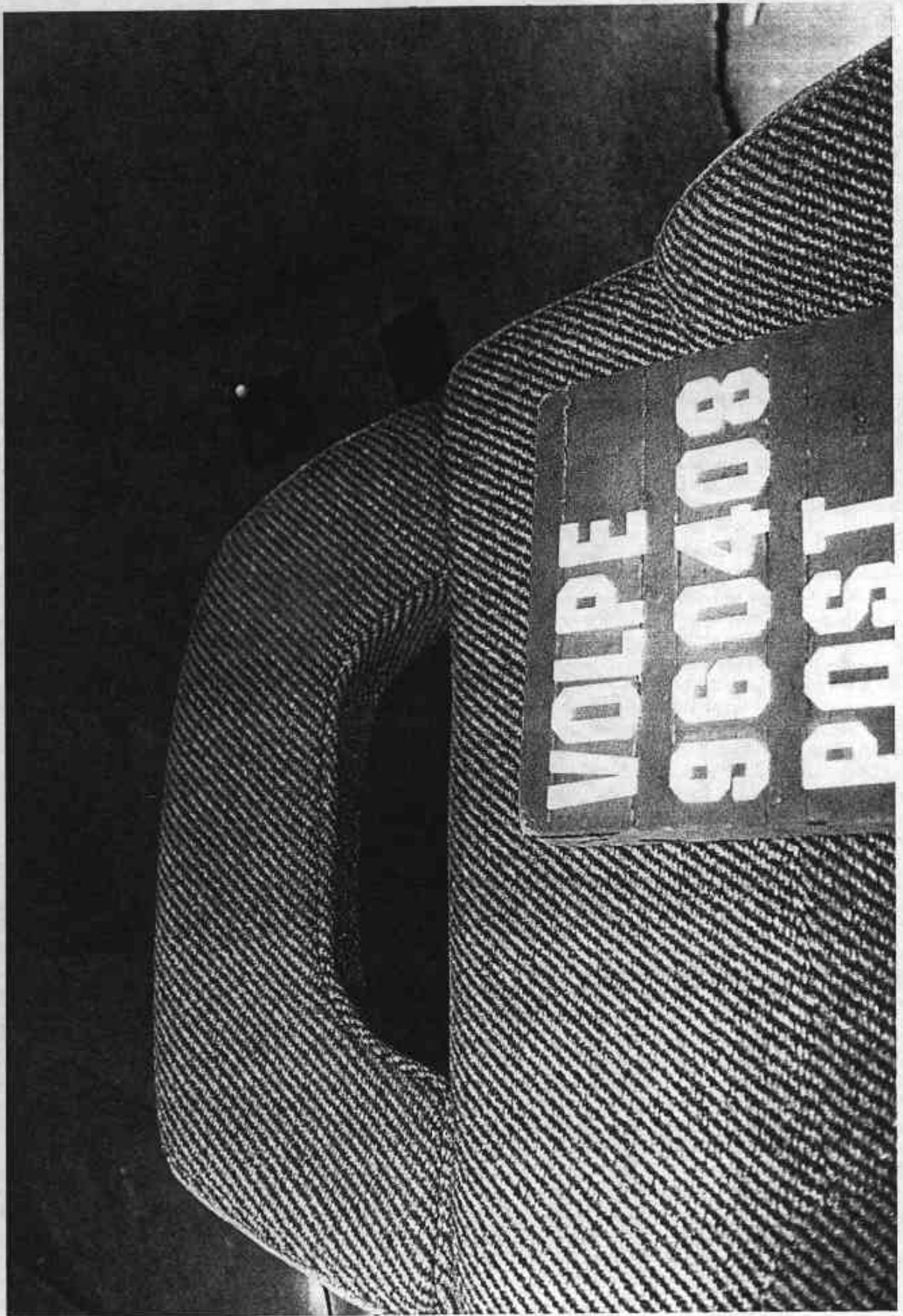


Figure A-48 Post-Test Passenger Dummy Head Contact - View 3

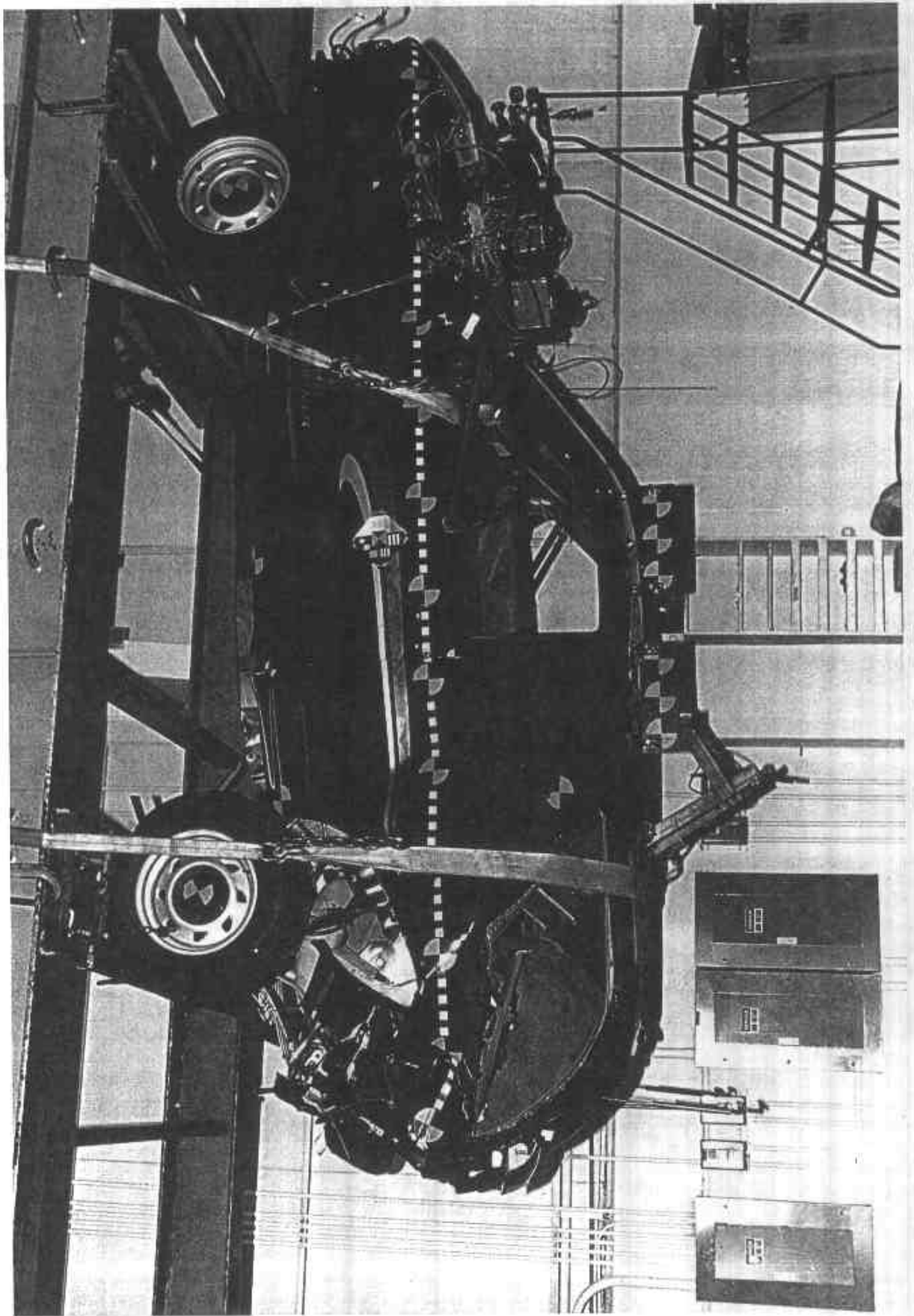


Figure A-49 Post-Test Vehicle on Static Rollover Device

Appendix B

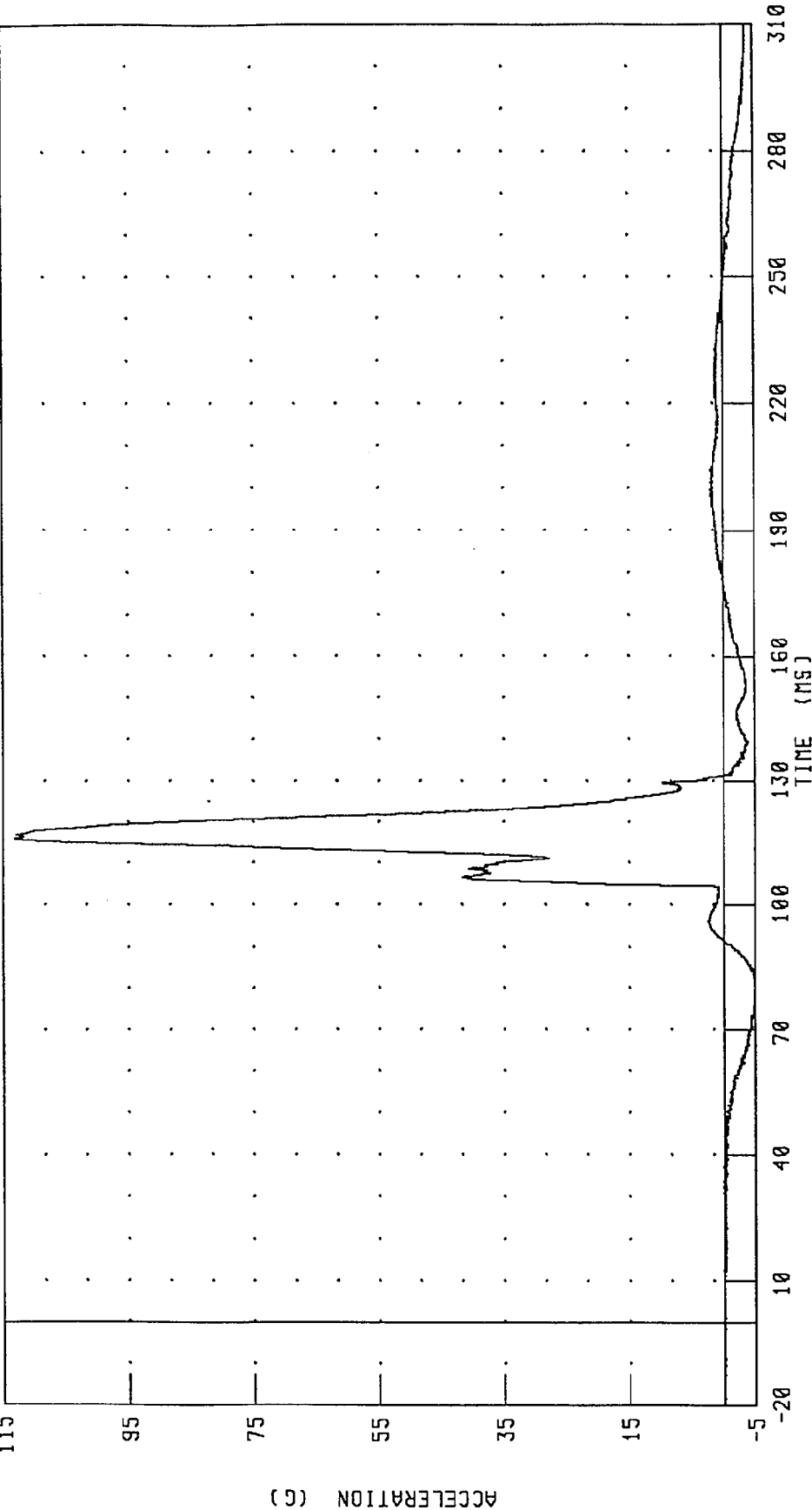
Data Plots

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



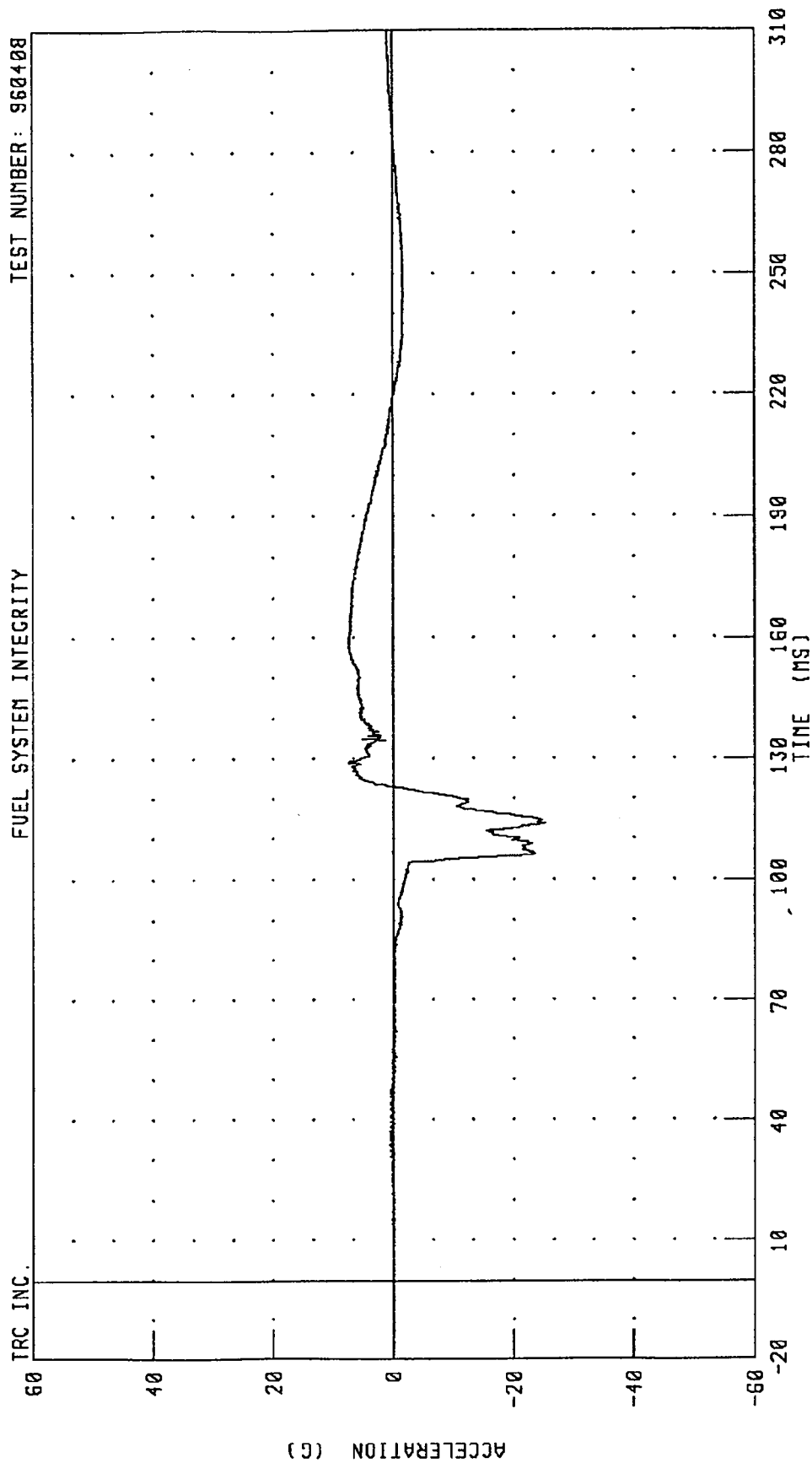
CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

PEAK DATA: 113.04 G @ 116.08 MS; -4.93 G @ 75.28 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 960408

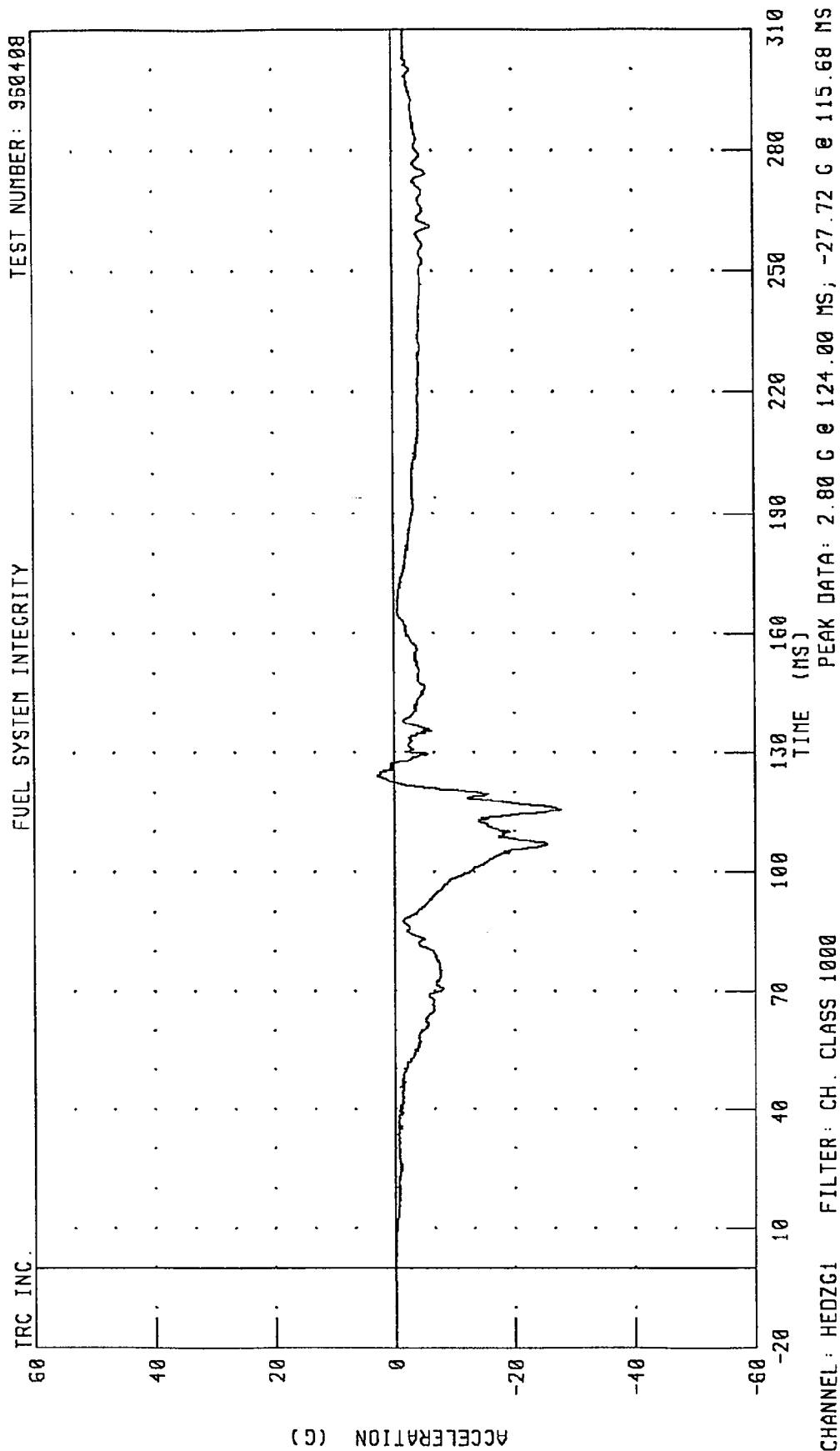
FUEL SYSTEM INTEGRITY



PEAK DATA: 7.54 G @ 129.04 MS; -25.30 G @ 113.84 MS

CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER HEAD Z-AXIS ACCELERATION

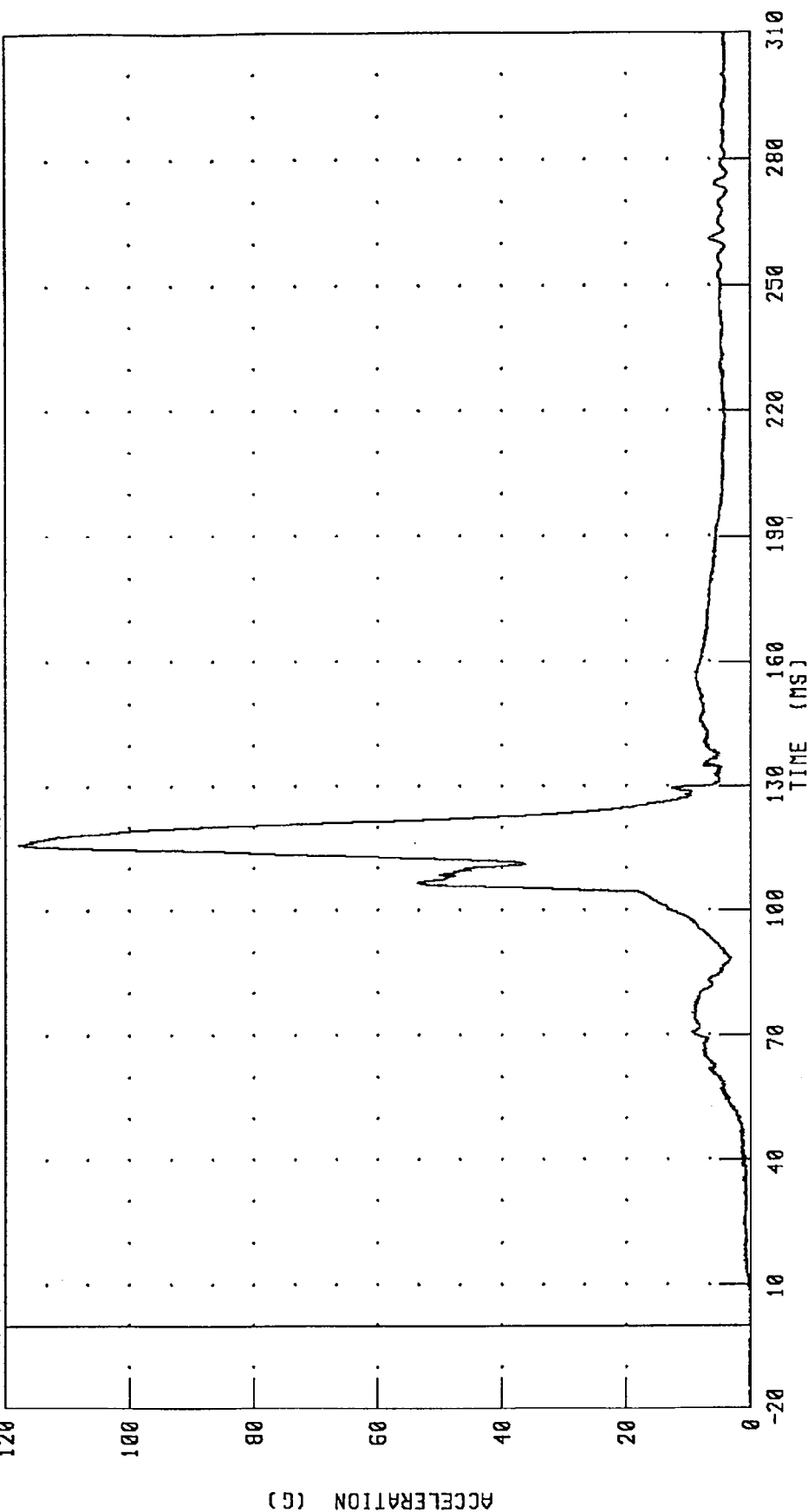


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

IRC INC.



PEAK DATA: 117.82 G @ 116.08 MS; 0.09 G @ -19.84 MS

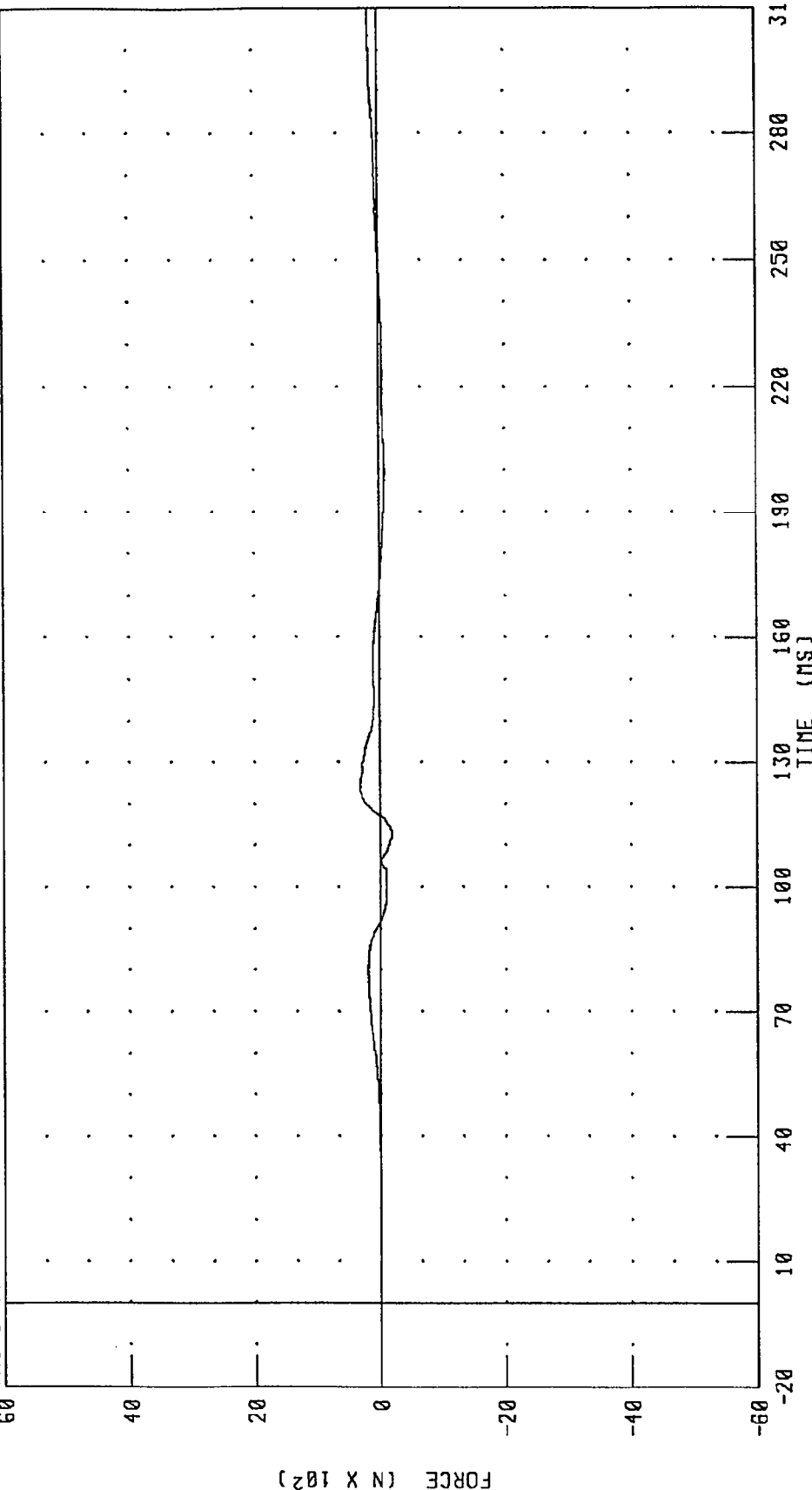
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER UPPER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 326.49 N @ 123.52 MS; -190.68 N @ 112.88 MS

CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER UPPER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

0

-20

-40

-60

FORCE (N X 10²)

TIME (MS) 10 40 70 100 130 160 190 220 250 280 310

PEAK DATA: 192.65 N @ 115.36 MS; -315.84 N @ 158.40 MS

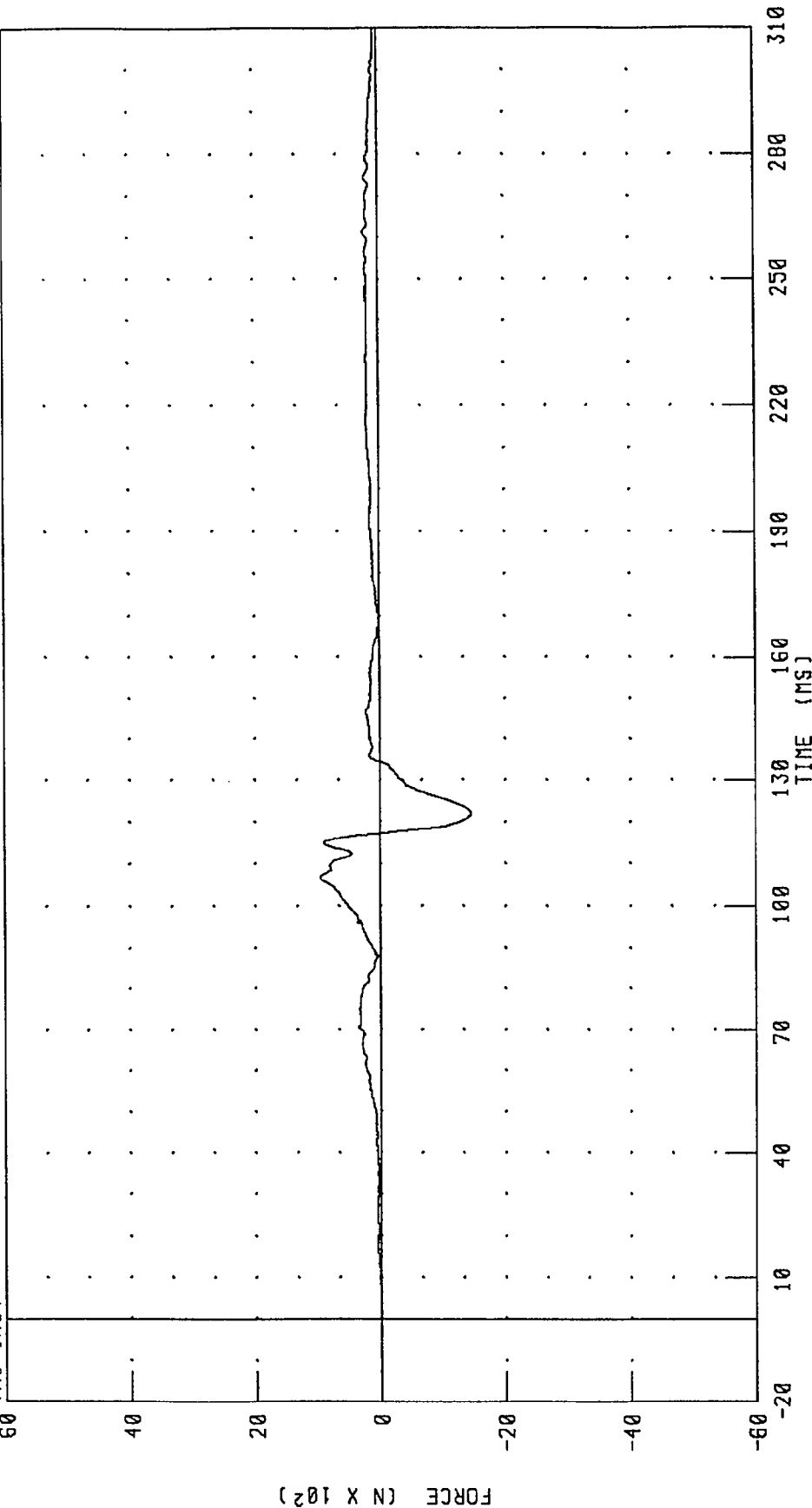
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 968.78 N @ 106.56 MS; -1455.02 N @ 121.84 MS

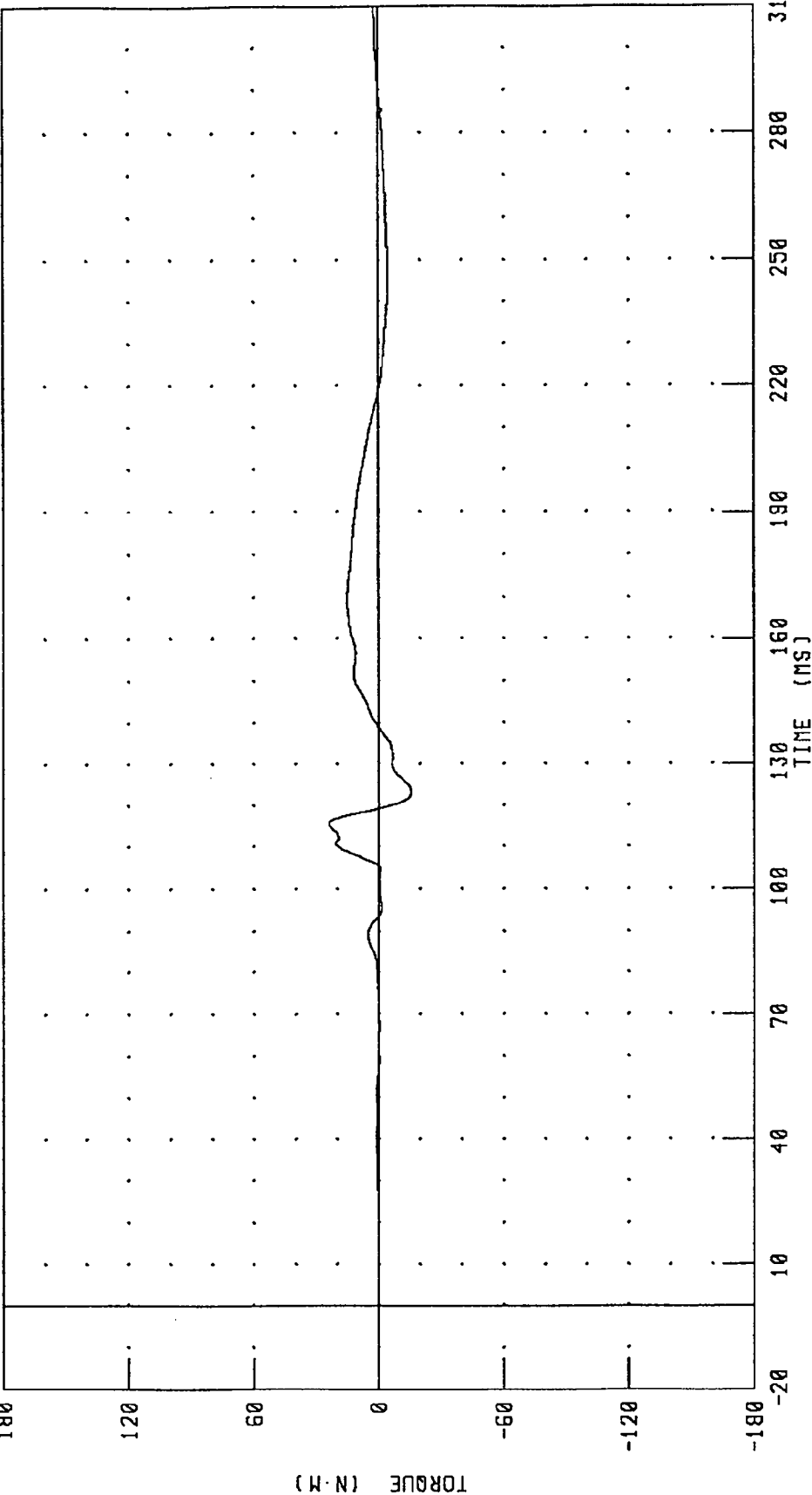
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

IRC INC.



PEAK DATA: 24.09 N·m @ 115.60 MS; -15.62 N·m @ 123.20 MS

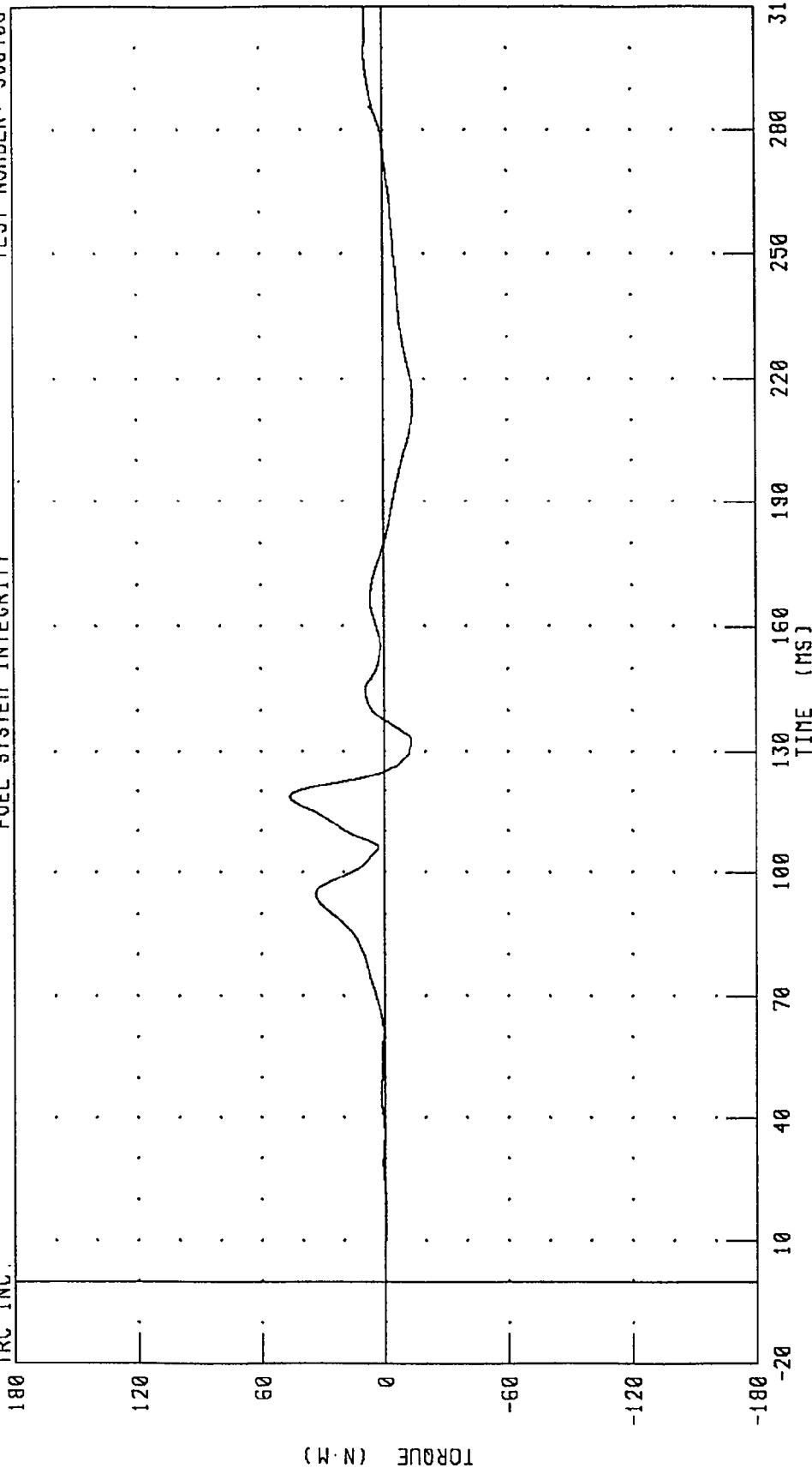
CHANNEL: NEKXM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER UPPER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NEKYMI FILTER: CH. CLASS 600

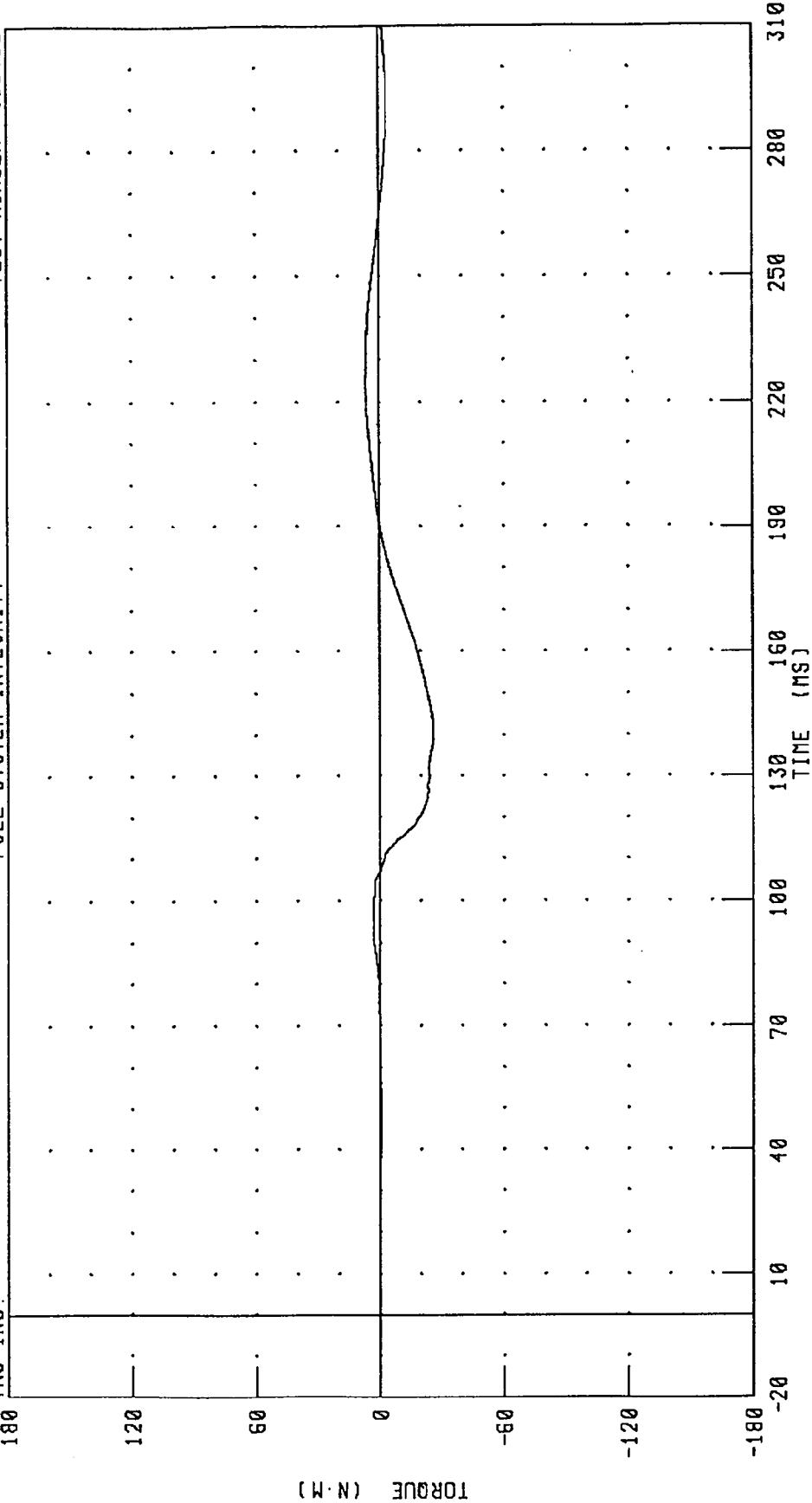
PEAK DATA: 46.05 N·M @ 118.48 MS; -14.34 N·M @ 213.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



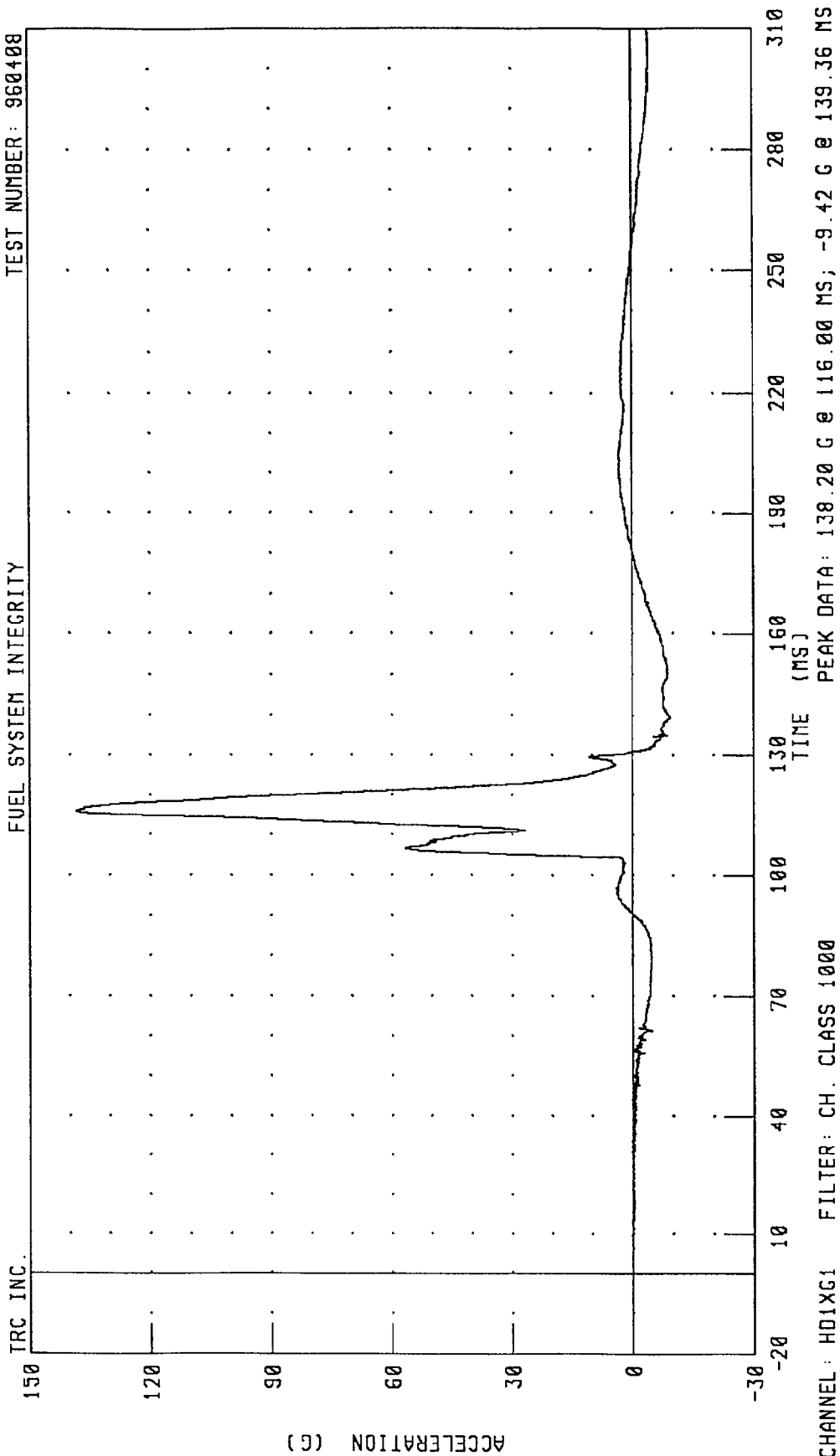
PEAK DATA: 6.48 N.M @ 223.84 MS; -26.05 N.M @ 141.12 MS

CHANNEL: NEKZM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER HEAD POSITION 1 X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

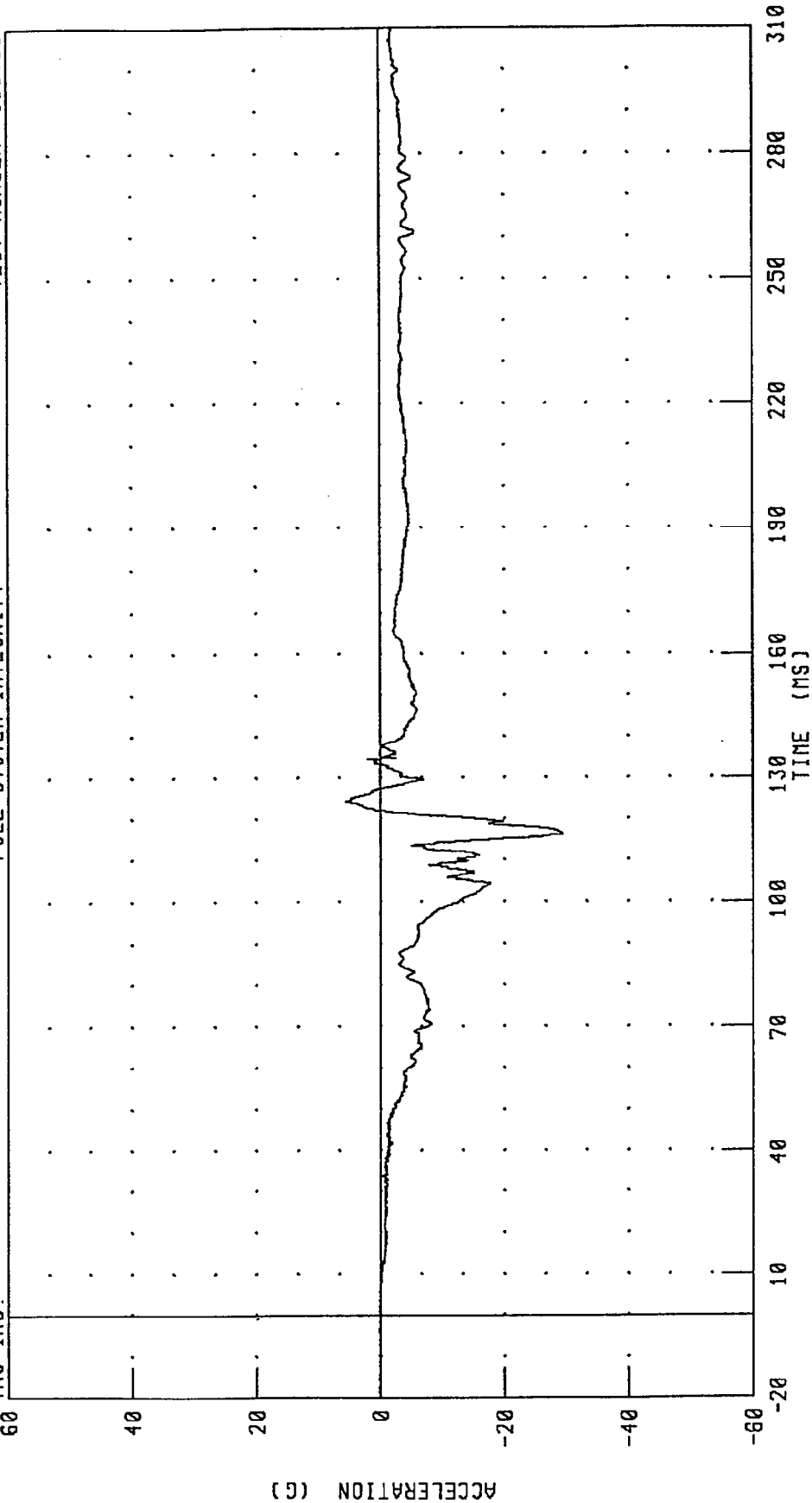


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER HEAD POSITION 1 Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD1ZG1 FILTER: CH. CLASS 1000

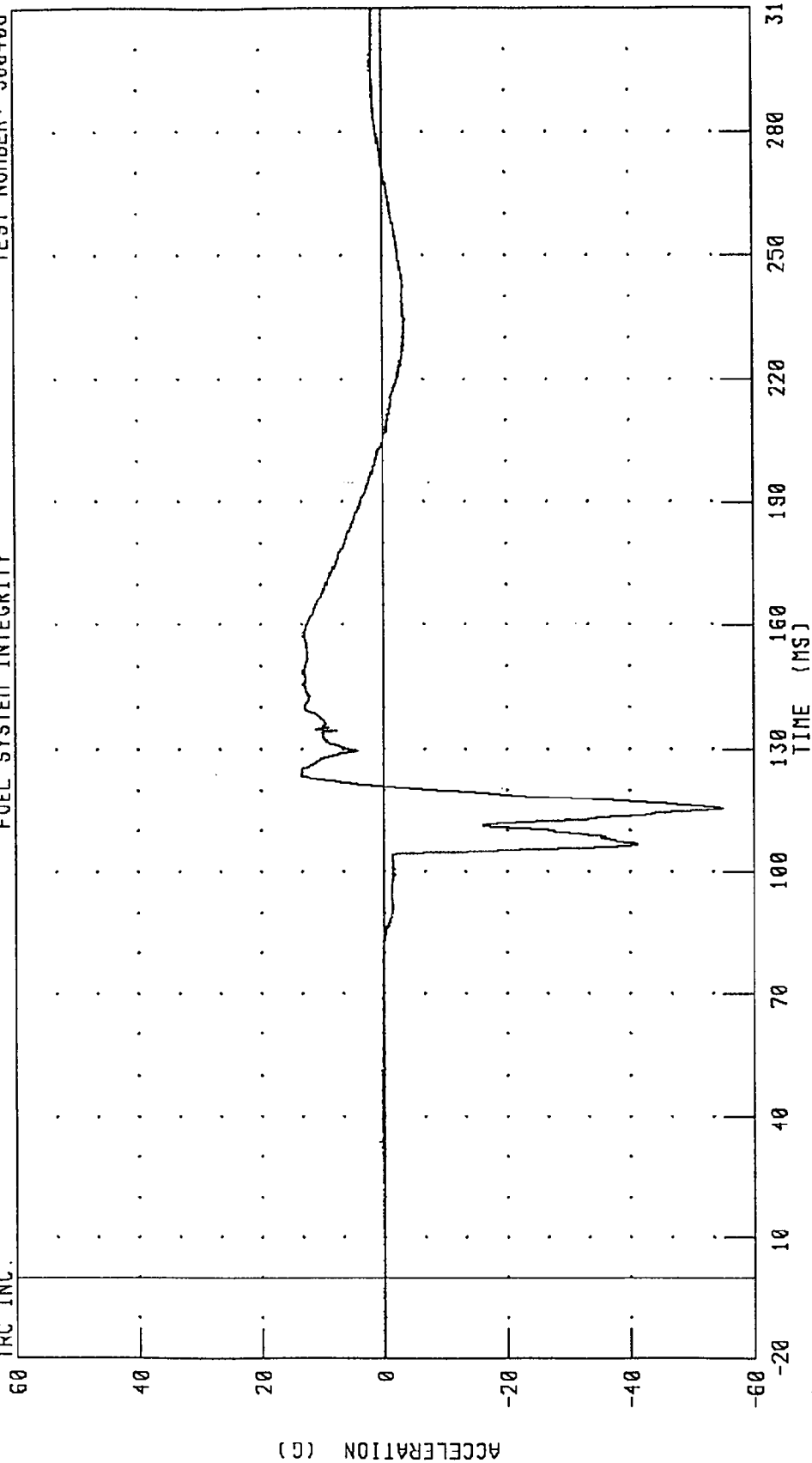
PEAK DATA: 5.52 G @ 124.16 MS; -29.45 G @ 116.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 2 Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD2YG1 FILTER: CH. CLASS 1000

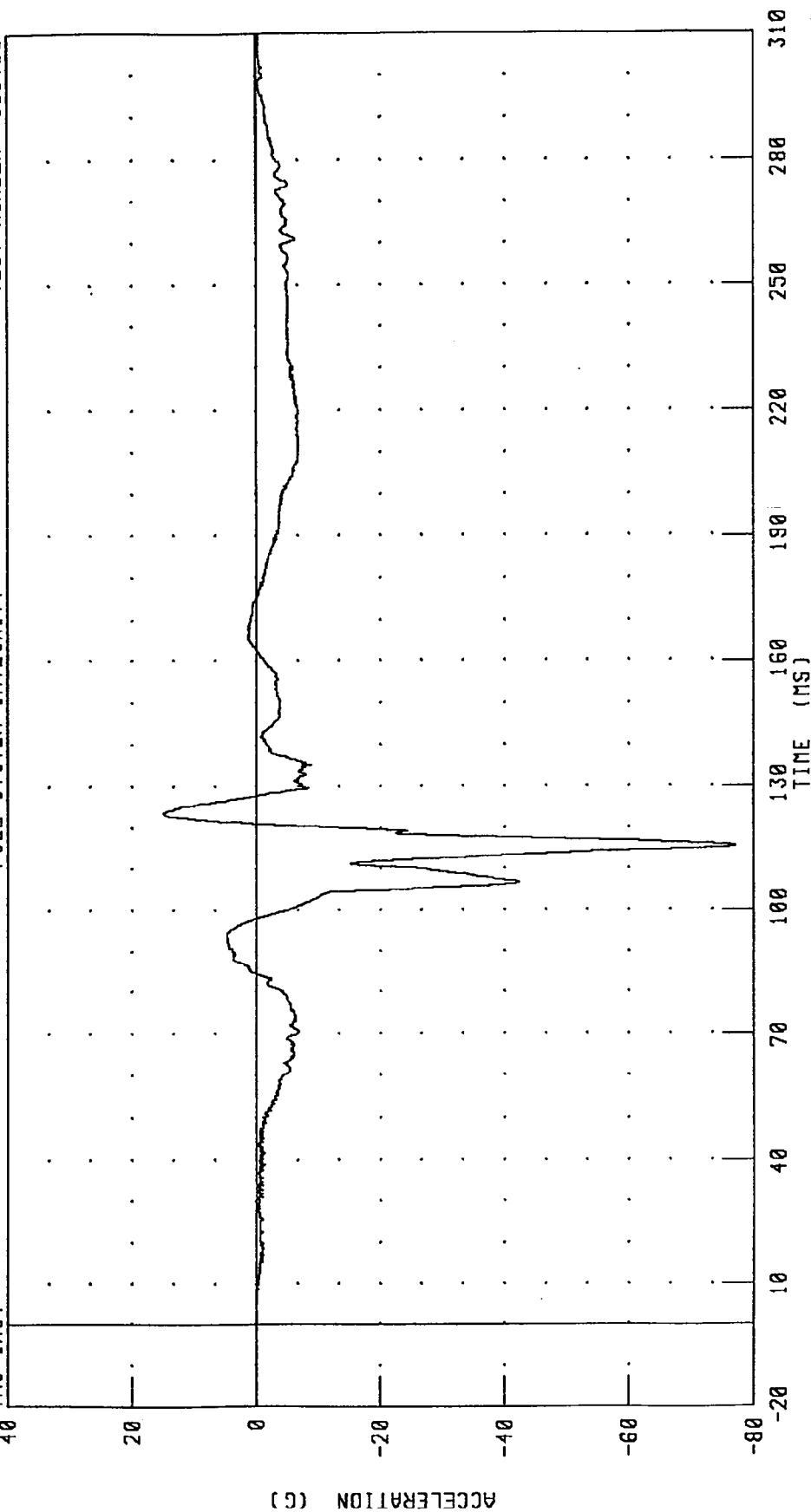
PEAK DATA: 13.55 G @ 123.84 MS; -55.06 G @ 115.44 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 2 Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 14.97 G @ 123.60 MS; -77.14 G @ 115.52 MS

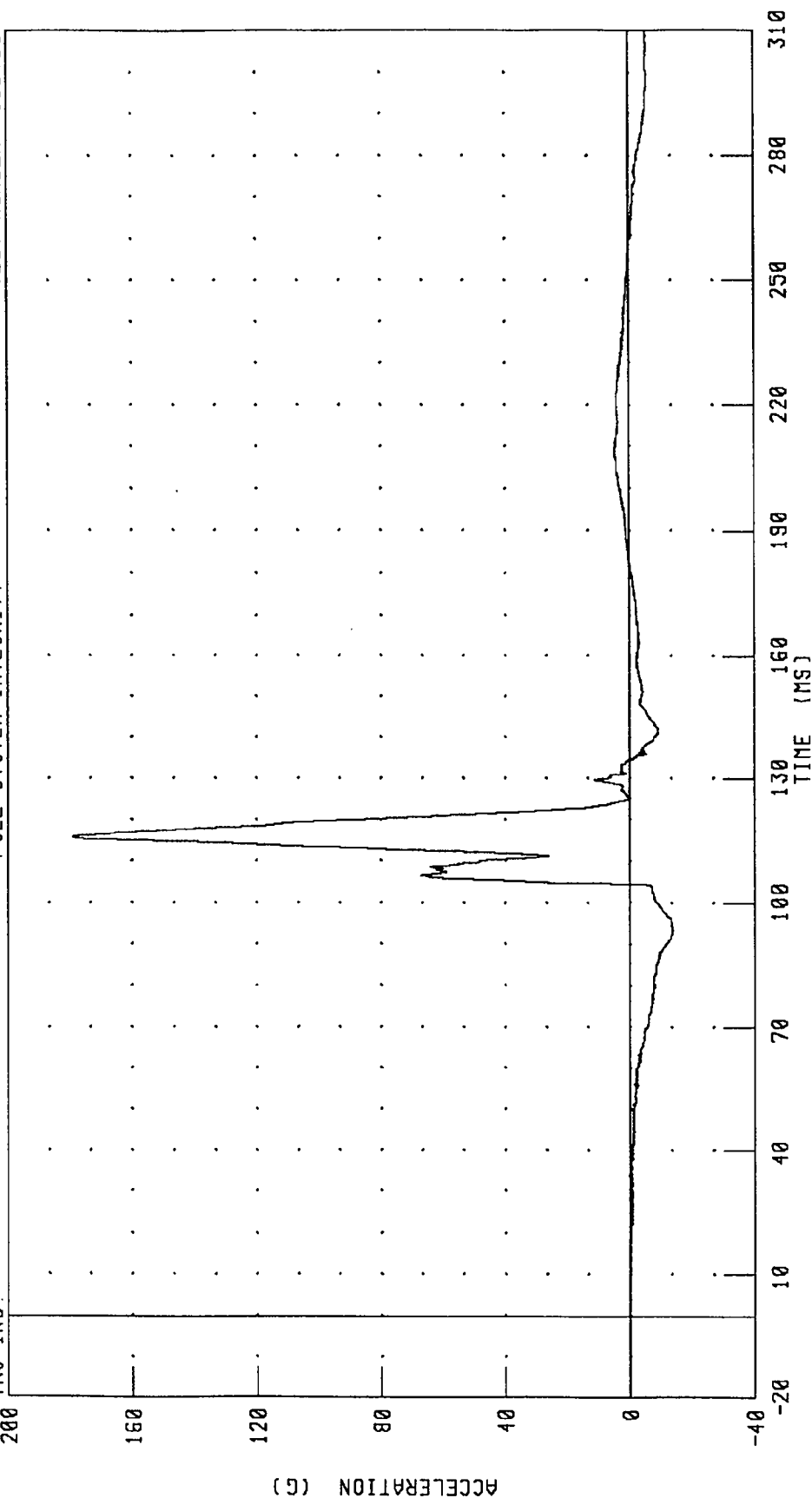
CHANNEL: HD22G1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 3 X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: H03XG1 FILTER: CH. CLASS 1000

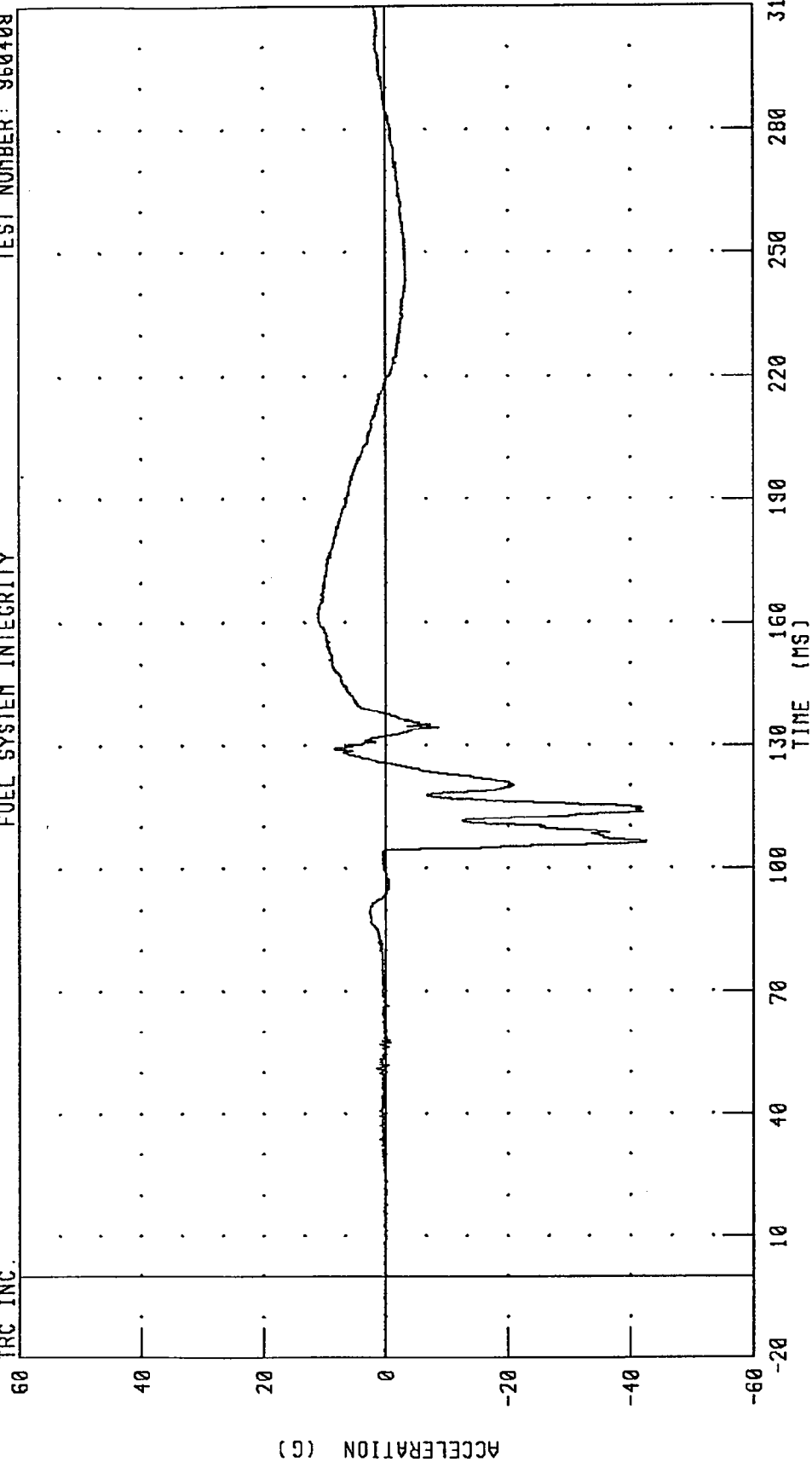
PEAK DATA: 178.77 G @ 115.76 MS; -13.64 G @ 92.72 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 3 Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD3Y61 FILTER: CH. CLASS 1000

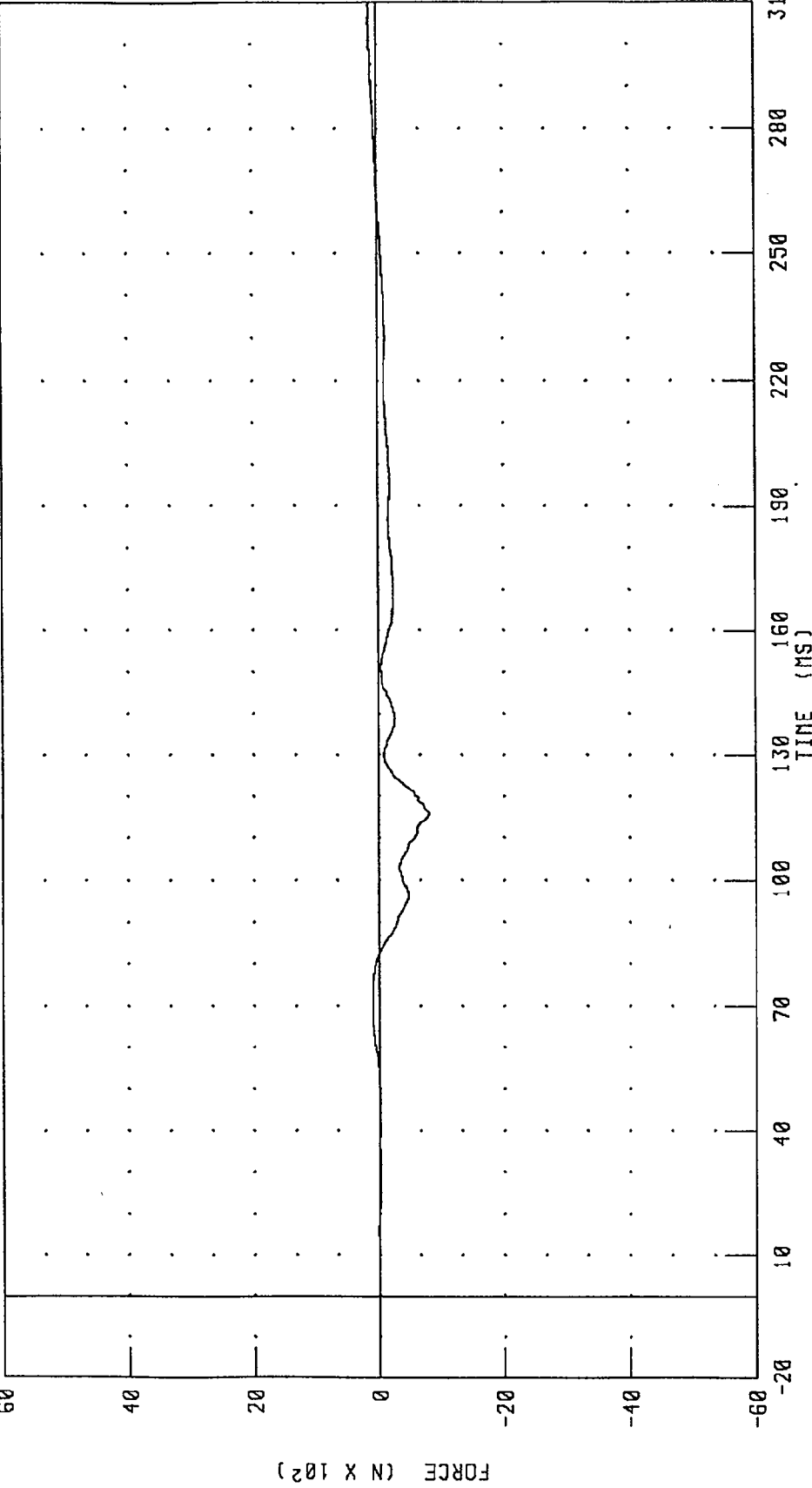
PEAK DATA: 11.21 G @ 161.28 MS; -42.62 G @ 106.48 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER LOWER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



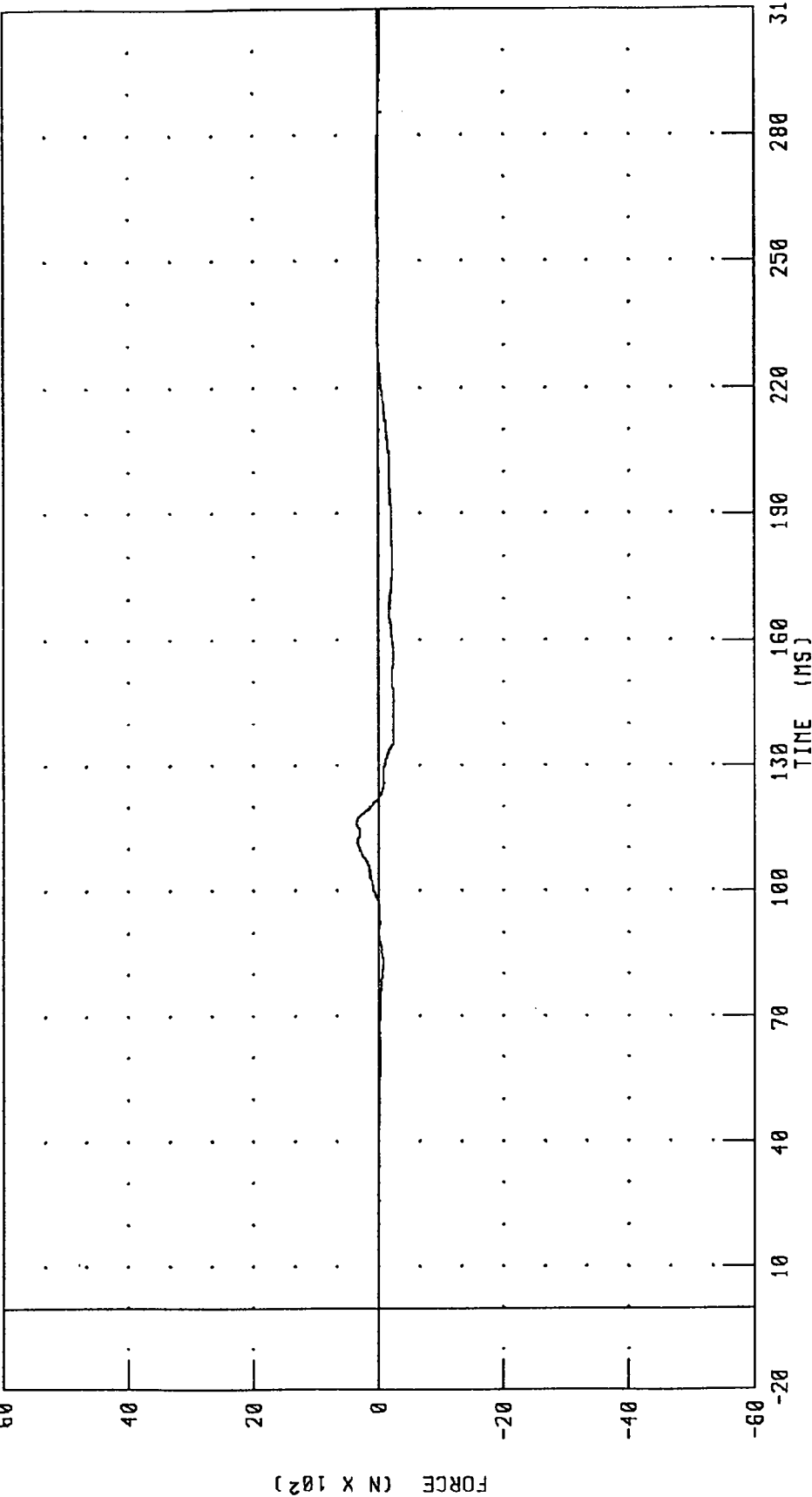
CHANNEL: NKLXF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER LOWER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



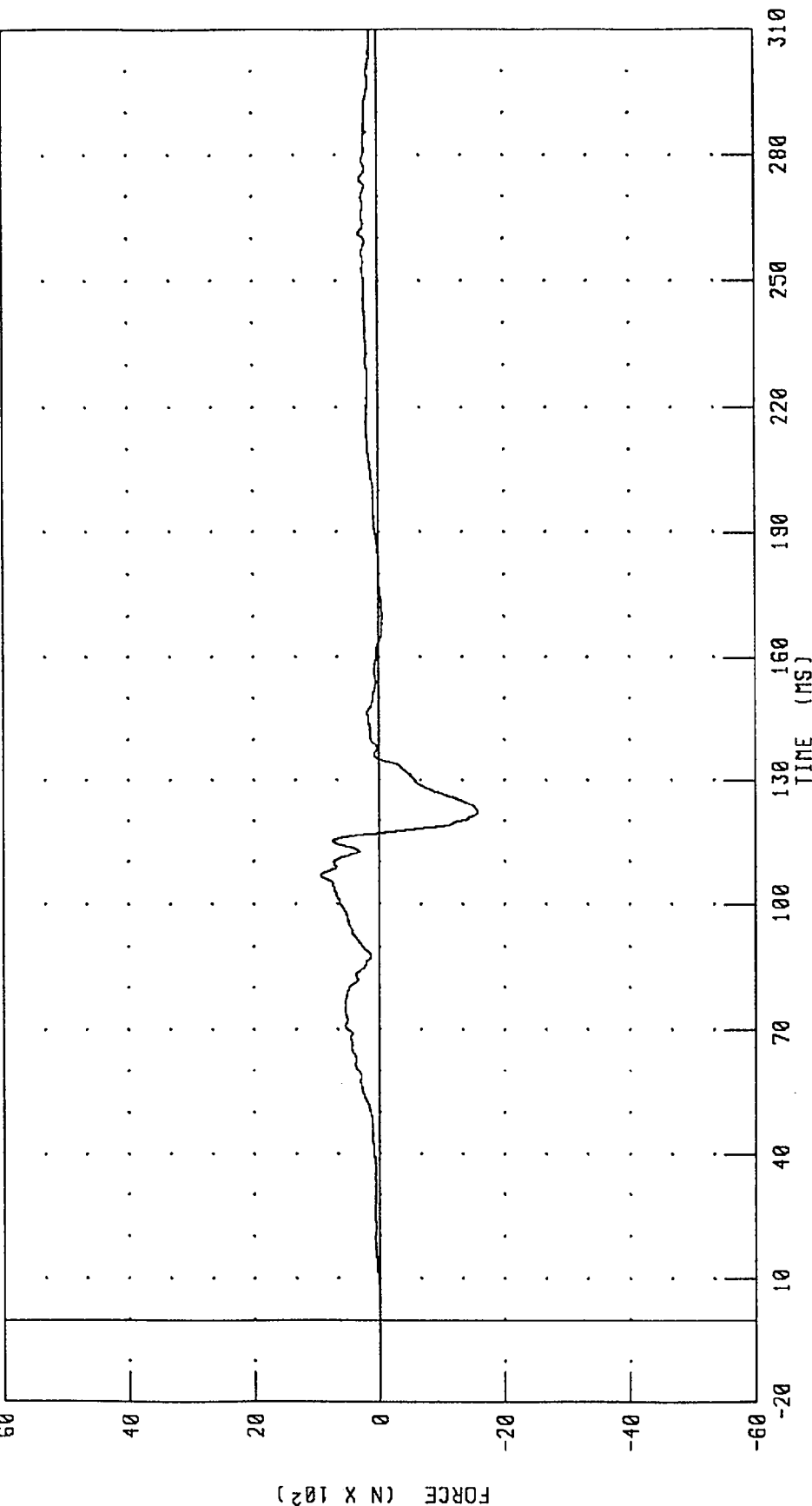
CHANNEL: NKLYF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 940.33 N @ 106.64 MS; -1580.06 N @ 122.64 MS

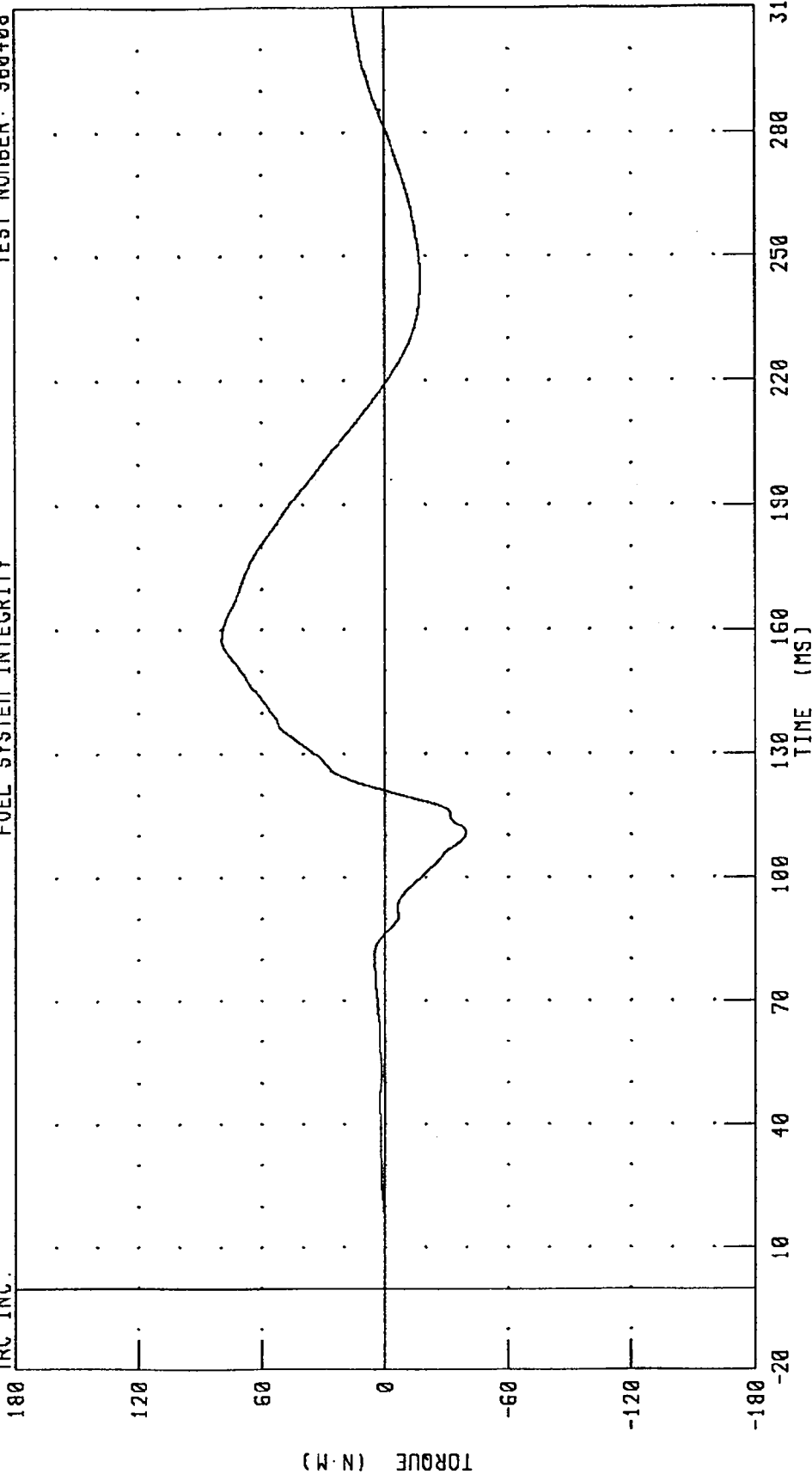
CHANNEL: NKLZF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NKLXM1 FILTER: CH. CLASS 600

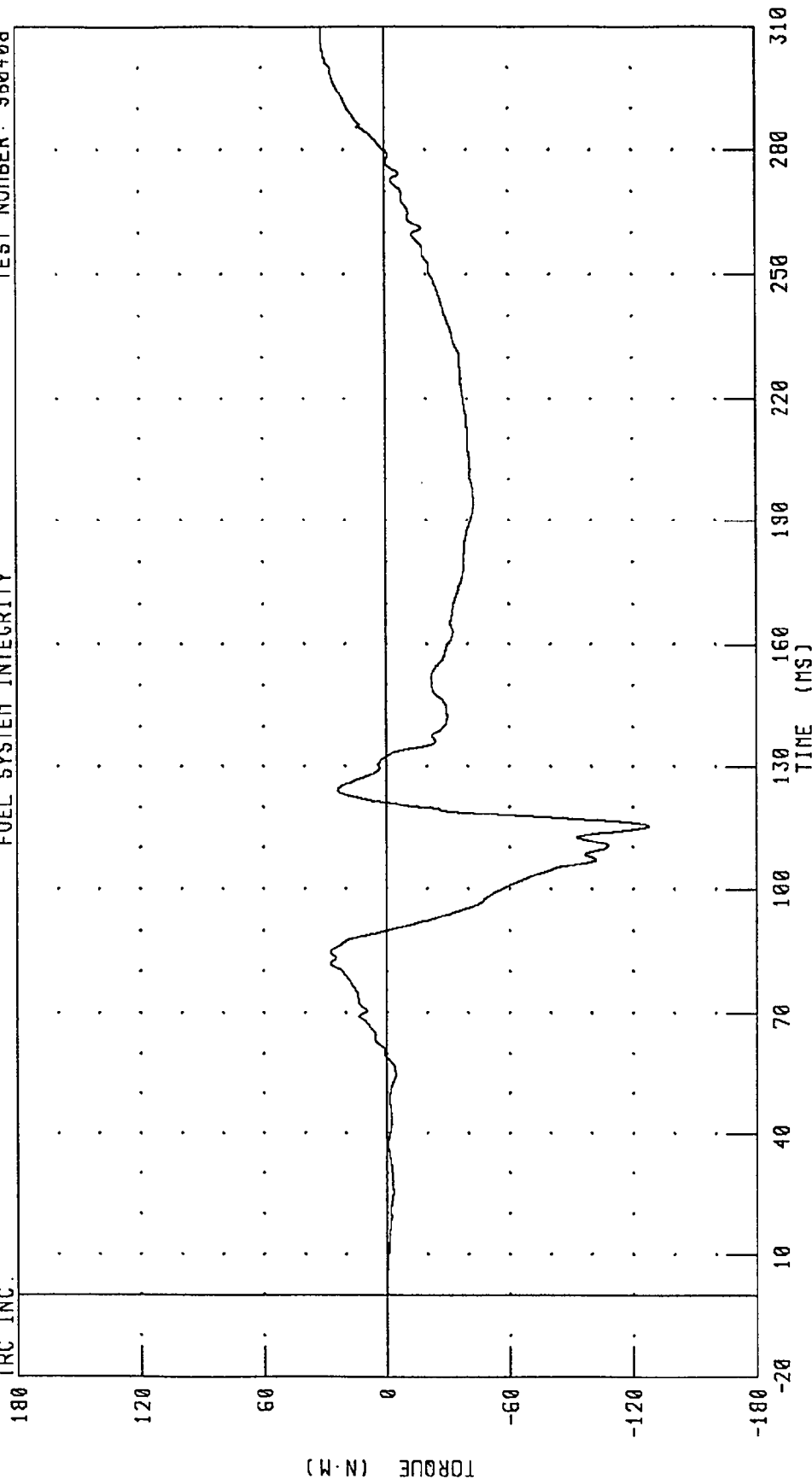
PEAK DATA: 79.75 N·M @ 157.60 MS; -39.47 N·M @ 110.80 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER LOWER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 31.16 N.M @ 307.44 MS; -127.89 N.M @ 115.44 MS

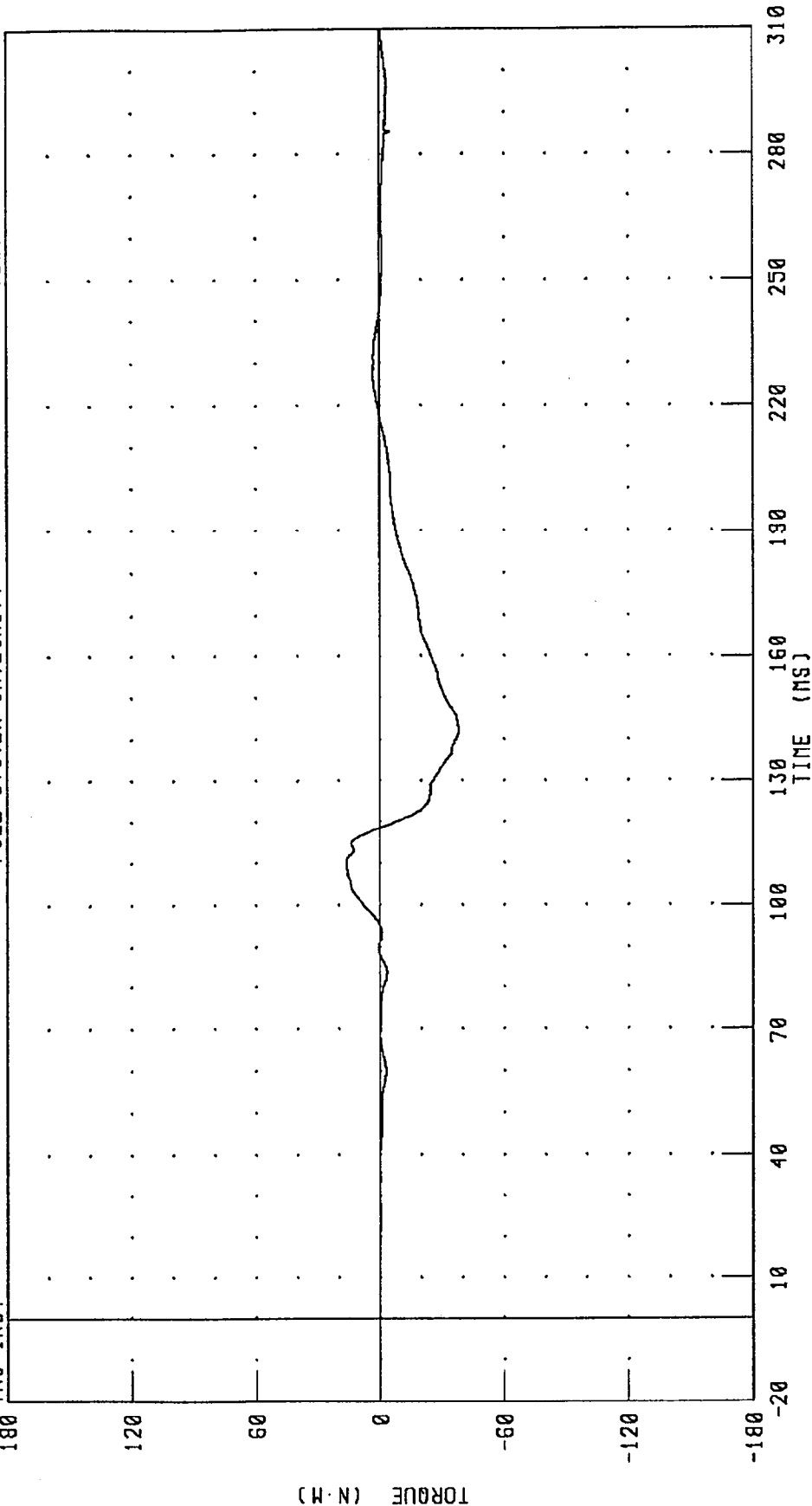
CHANNEL: NKLYM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT Z-AXIS

FUEL SYSTEM INTEGRITY

TRC INC.

TEST NUMBER: 960408



PEAK DATA: 16.46 N-M @ 109.44 MS; -38.10 N-M @ 142.24 MS

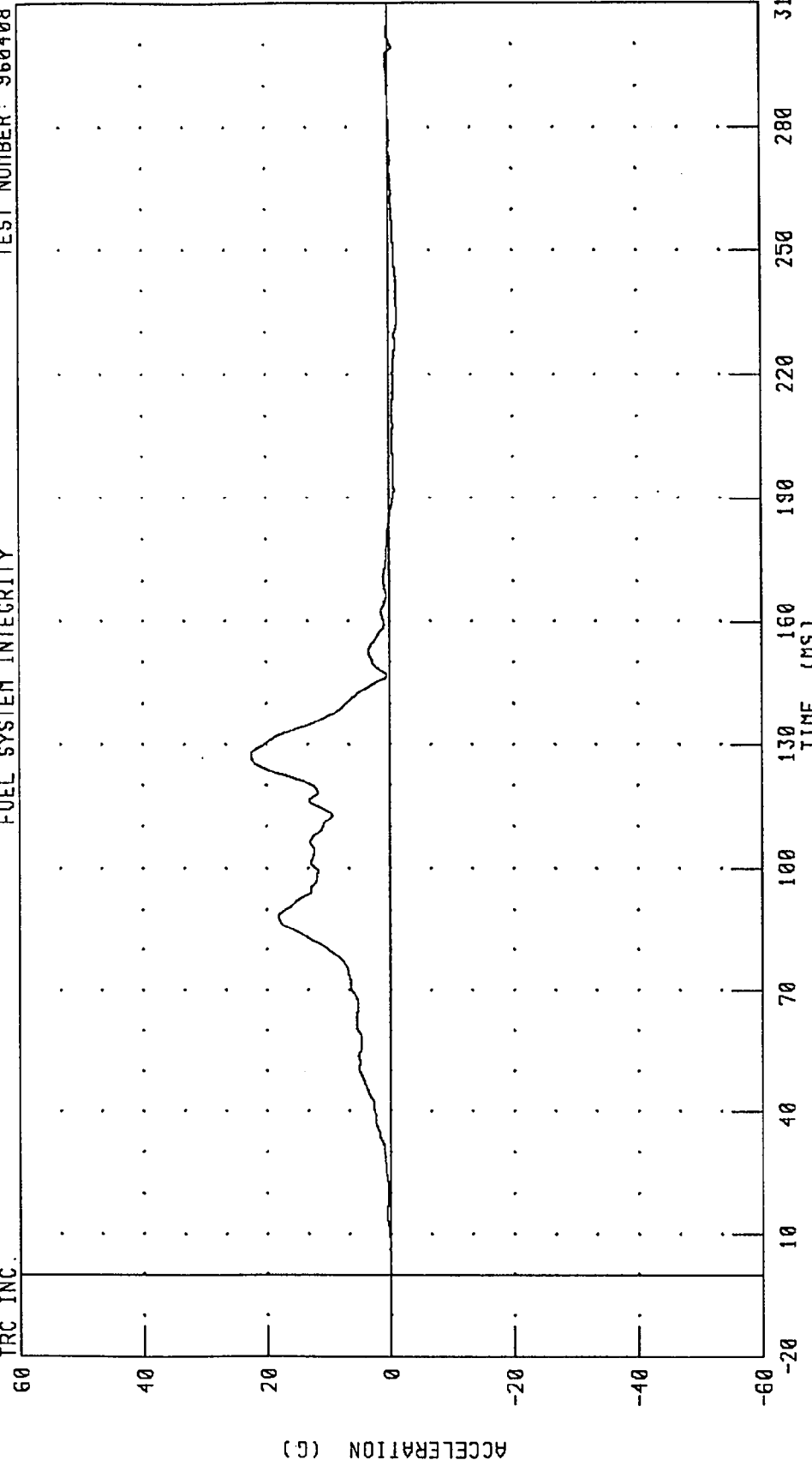
CHANNEL: NKLZM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

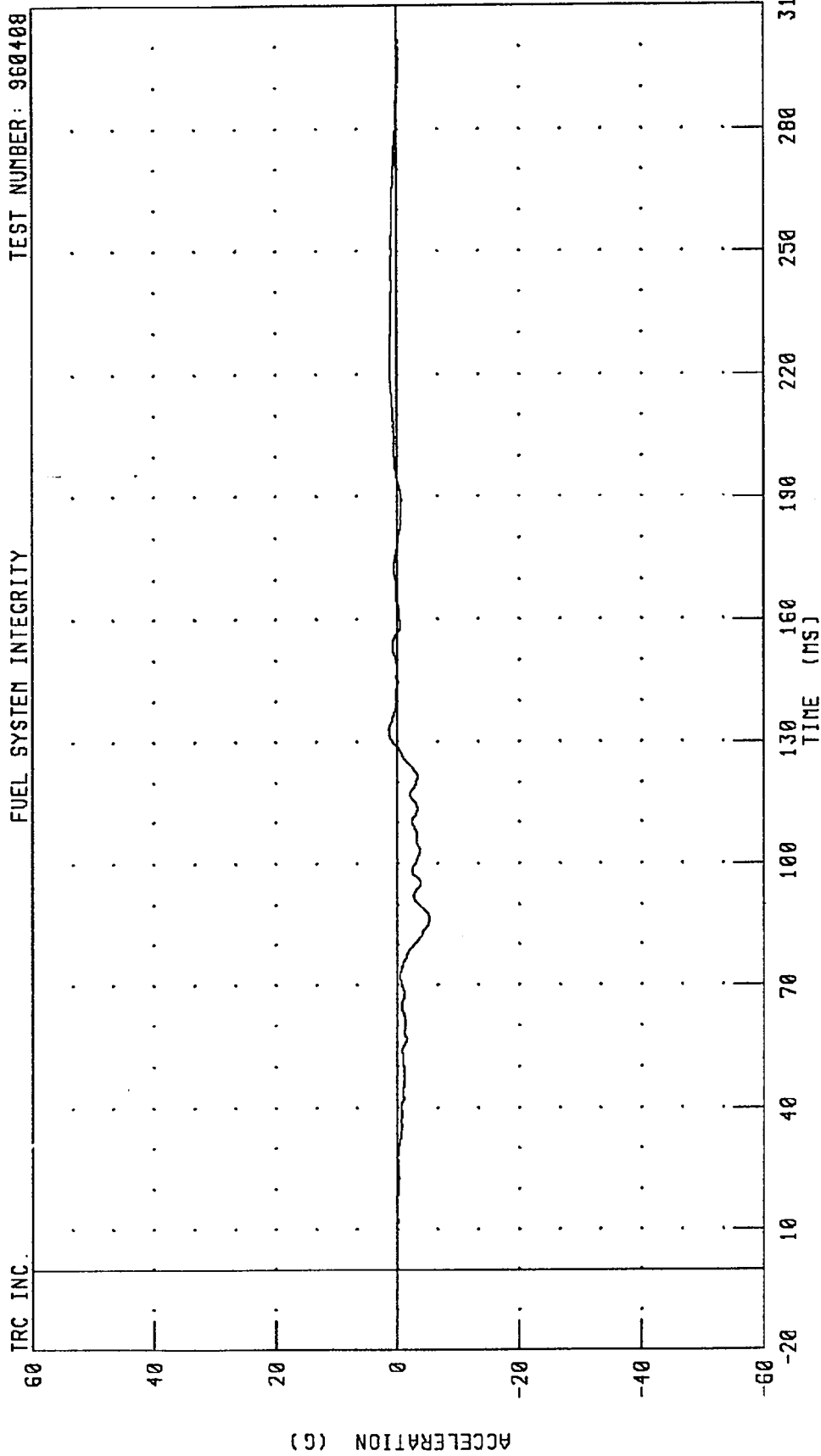
TRC INC.



CHANNEL: CSTXG1 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER CHEST Y-AXIS ACCELERATION

FUEL SYSTEM INTEGRITY TEST NUMBER: 960408



PEAK DATA: 1.44 G @ 132.08 MS; -5.30 G @ 86.24 MS

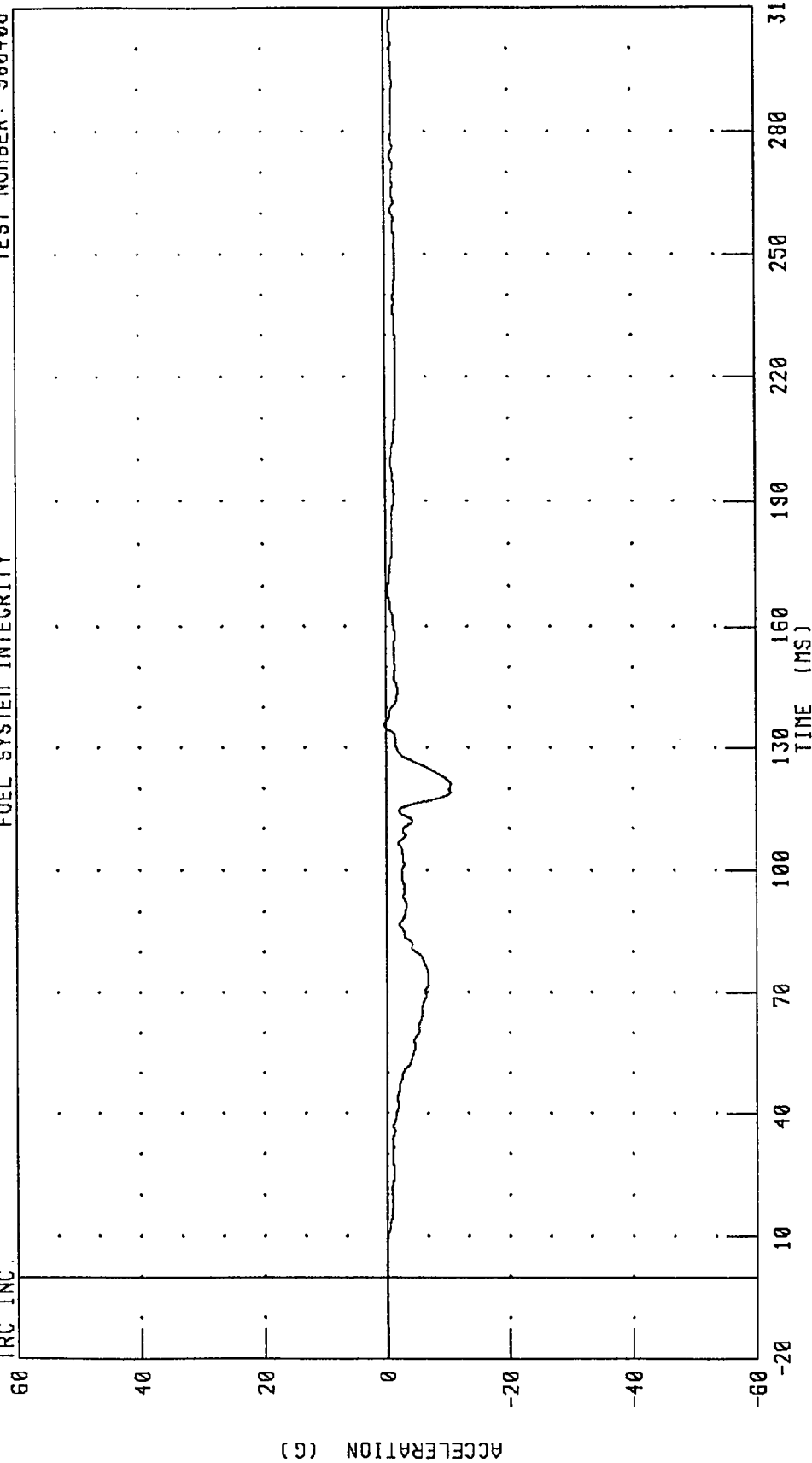
CHANNEL: CSTYG1 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

IRC INC.



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

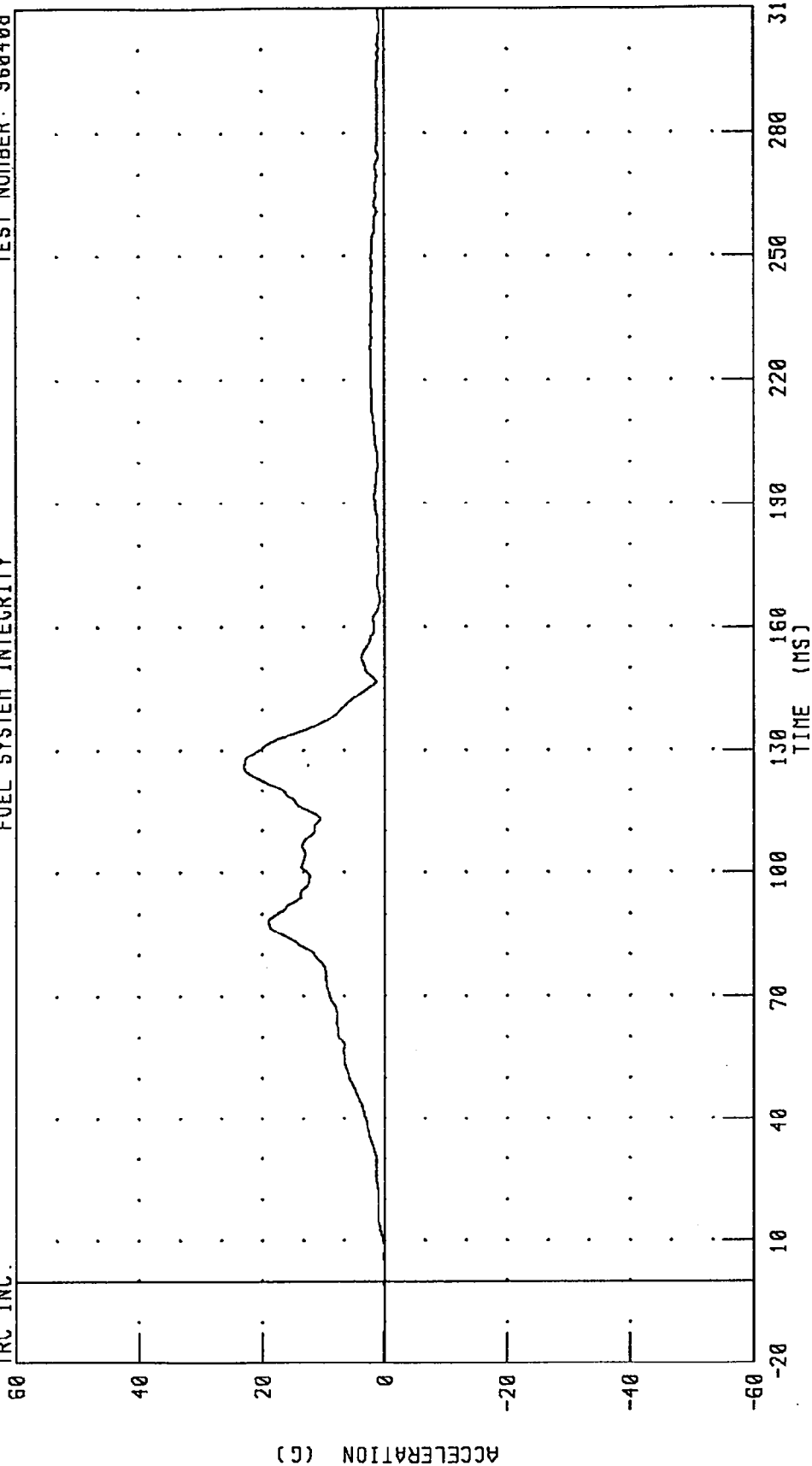
PEAK DATA: 0.34 G @ 135.52 MS; -10.43 G @ 121.28 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

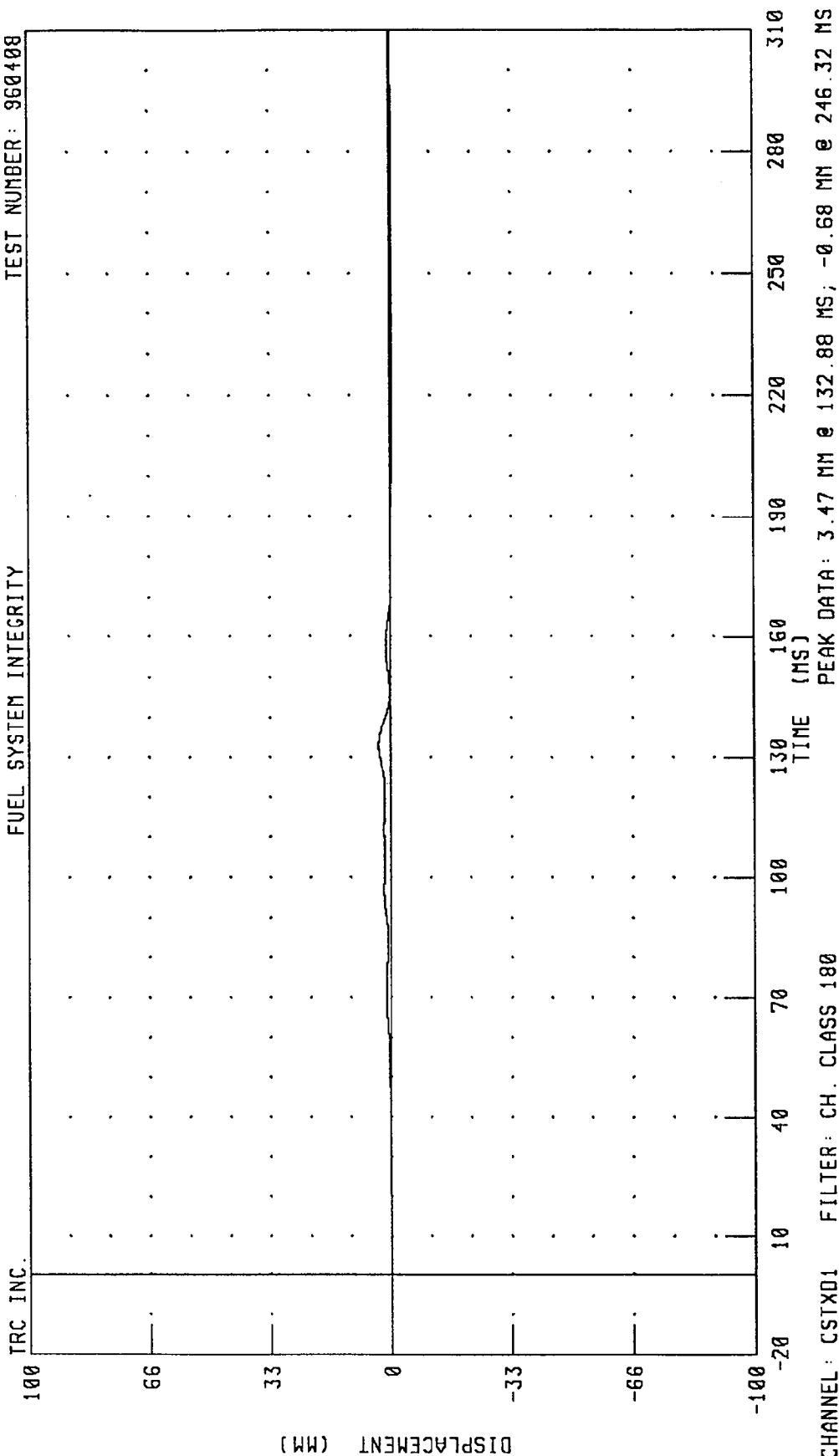
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP

DRIVER CHEST DEFLECTION

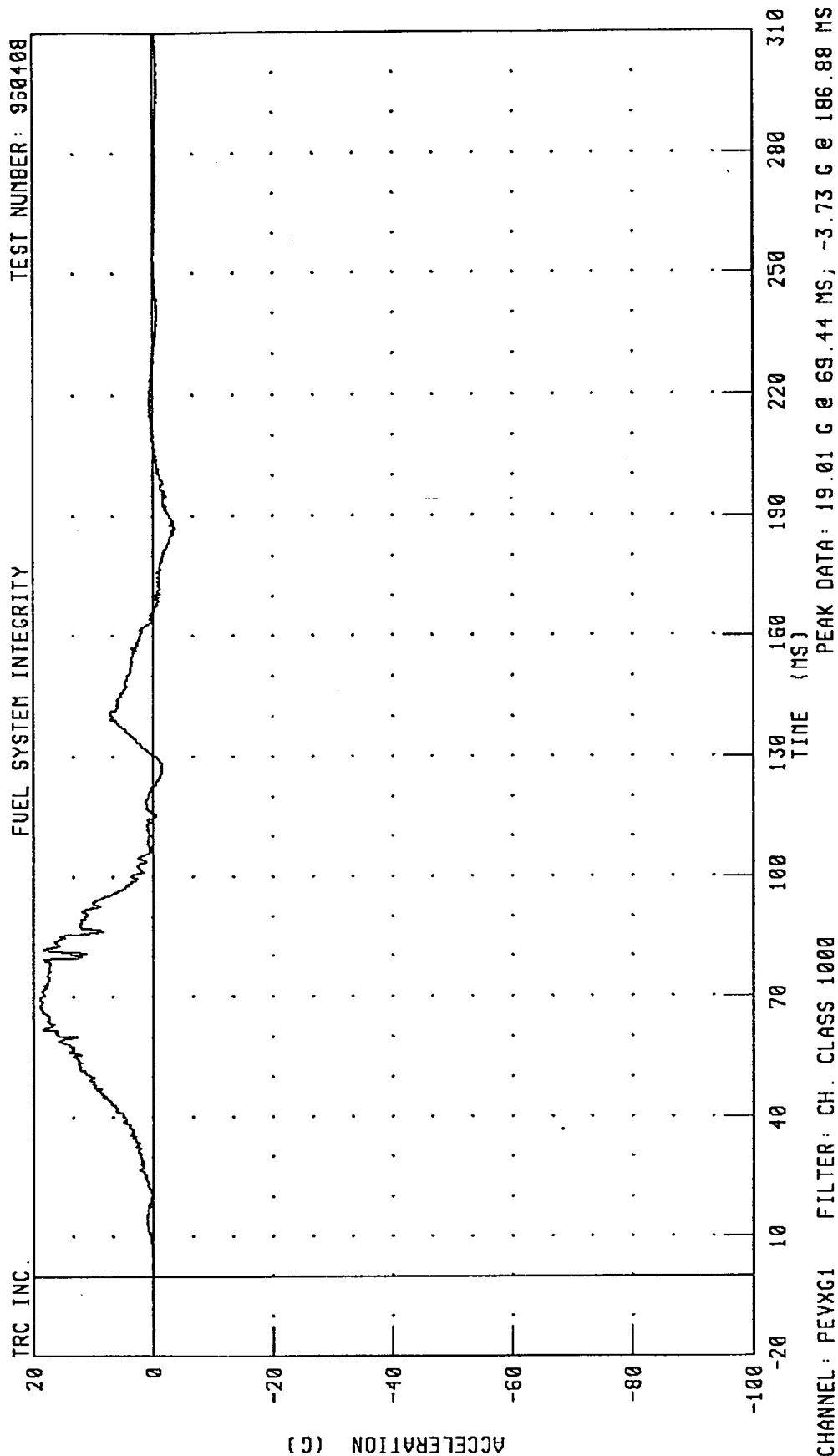
FUEL SYSTEM INTEGRITY

TRC INC.

TEST NUMBER: 960408



MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER PELVIS X-AXIS ACCELERATION

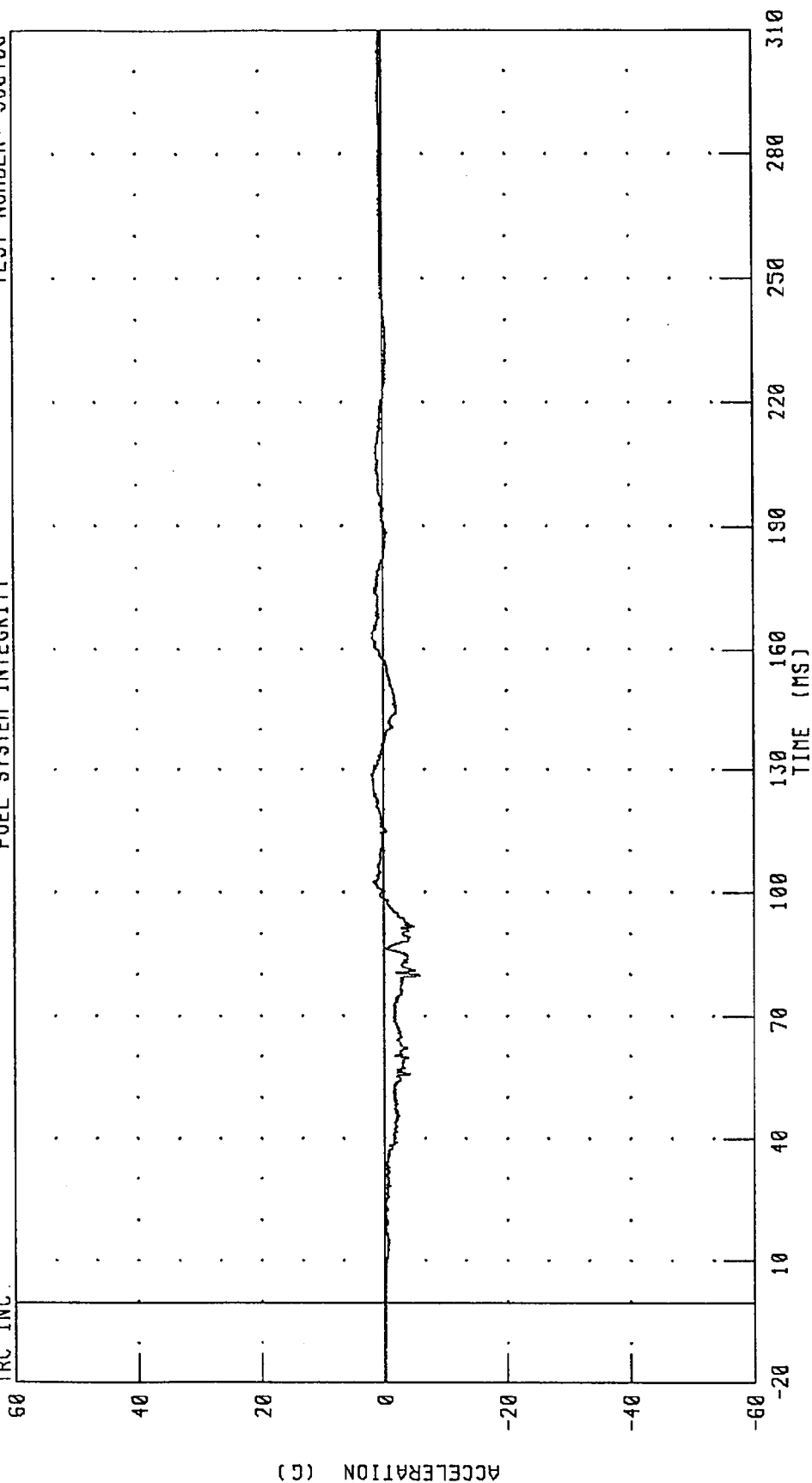


MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER PELVIS Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

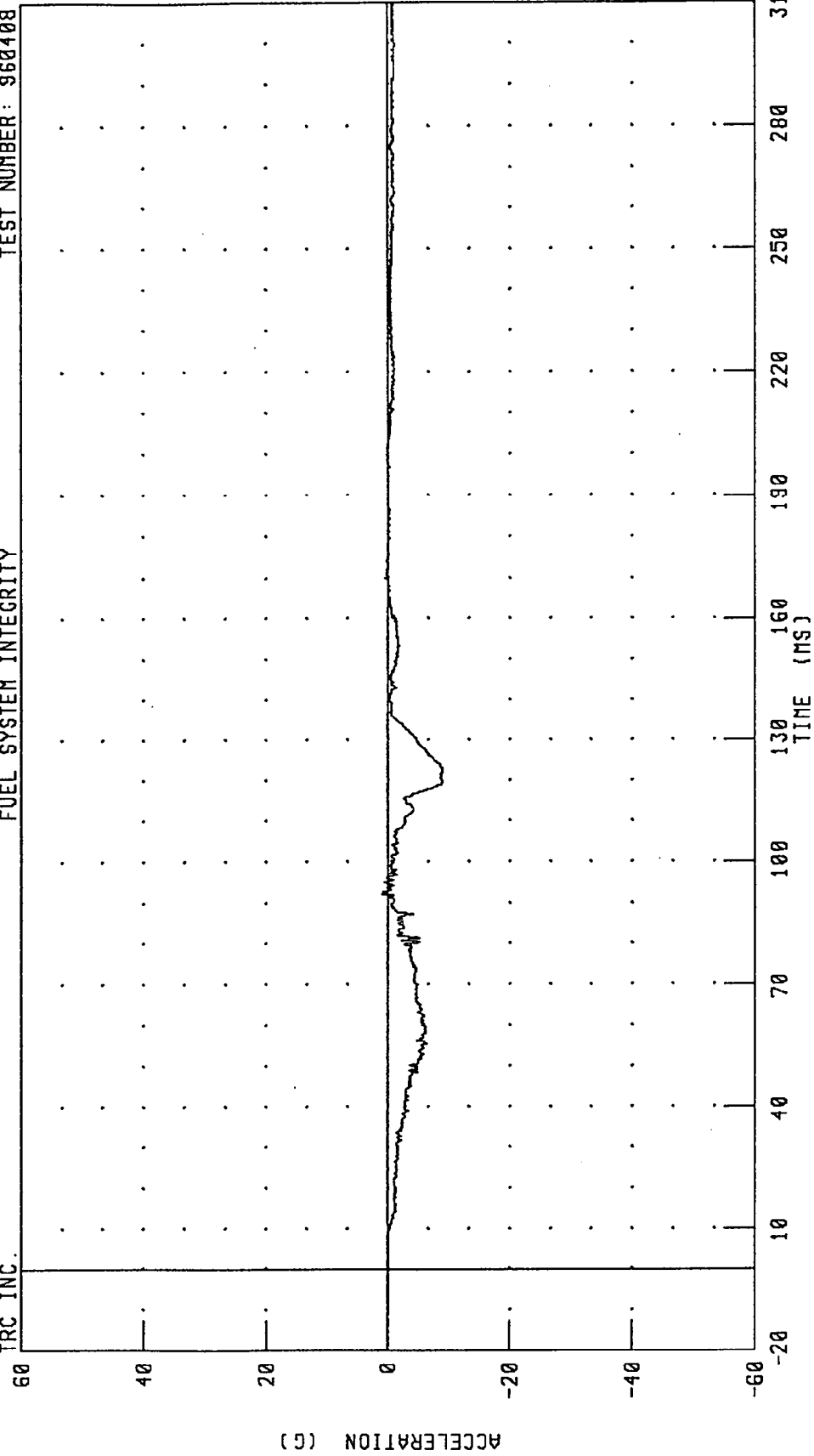
PEAK DATA: 2.05 G @ 128.56 MS; -6.00 G @ 79.92 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

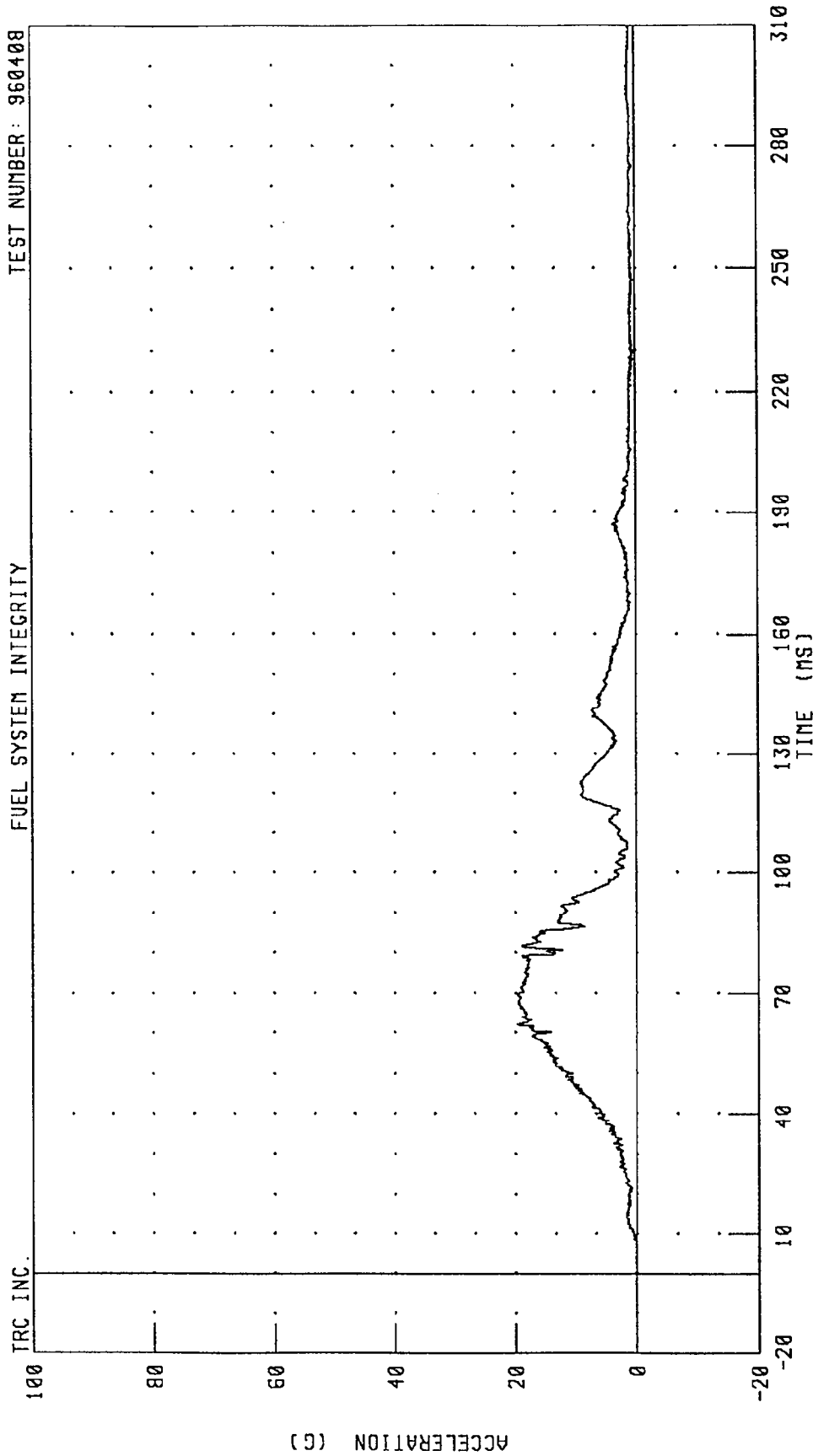
TRC INC.



CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

PEAK DATA: 1.02 G @ 92.16 MS; -9.18 G @ 119.68 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER PELVIS RESULTANT ACCELERATION



CHANNEL: PEVRG1 FILTER: CH. CLASS 1000 PEAK DATA: 19.67 G @ 62.08 MS; 0.09 G @ -19.92 MS

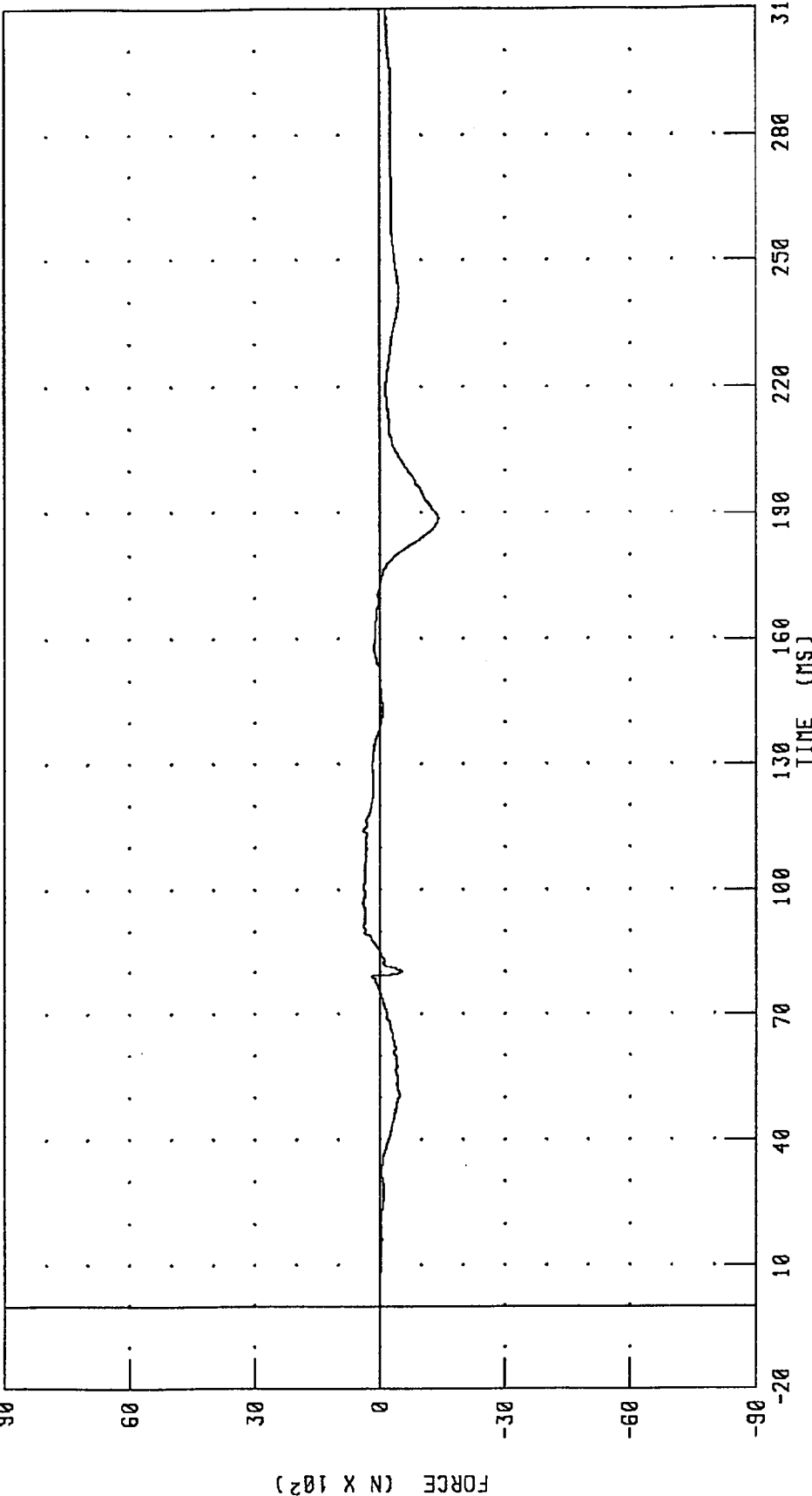
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP

DRIVER LEFT FEMUR FORCE

FUEL SYSTEM INTEGRITY

TEST NUMBER: 960408

TRC INC.



PEAK DATA: 399.04 N @ 114.24 MS; -1408.95 N @ 188.80 MS

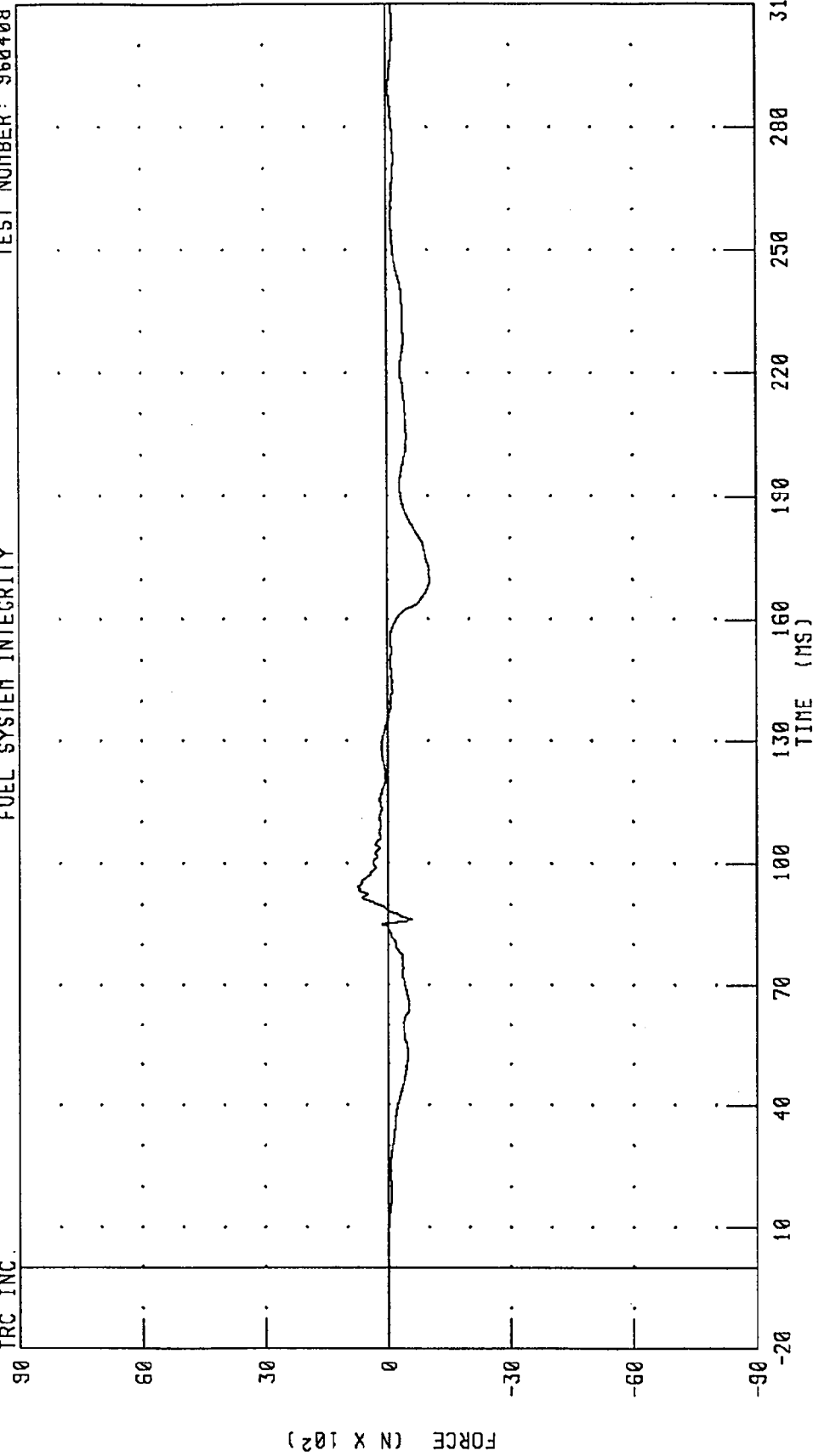
CHANNEL: LFMF1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
DRIVER RIGHT FEMUR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

IRC INC.



CHANNEL: RFMF1 FILTER: CH. CLASS 600

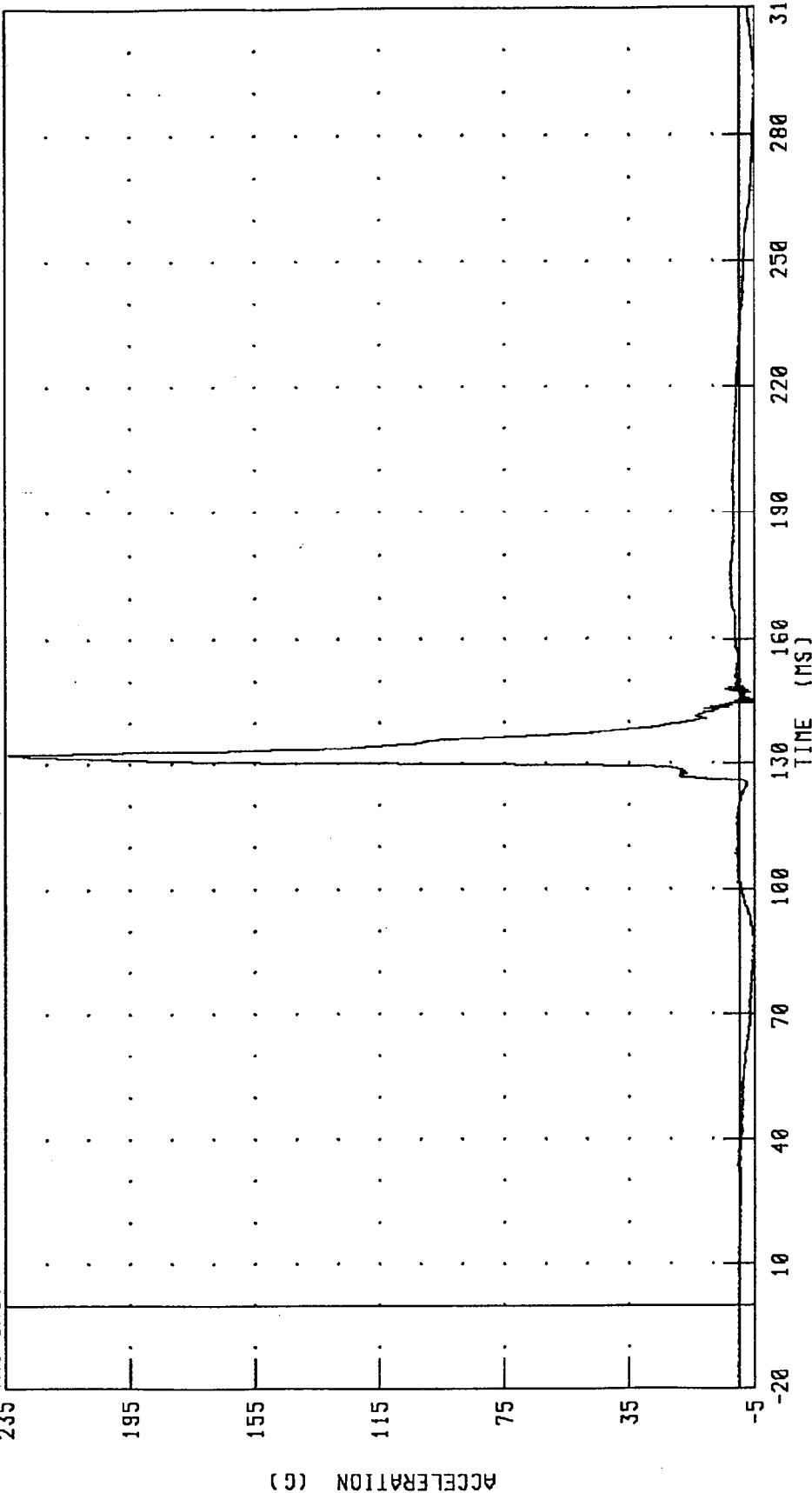
PEAK DATA: 733.44 N @ 94.32 MS; -1032.71 N @ 169.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 233.87 G @ 132.40 MS; -4.91 G @ 289.04 MS

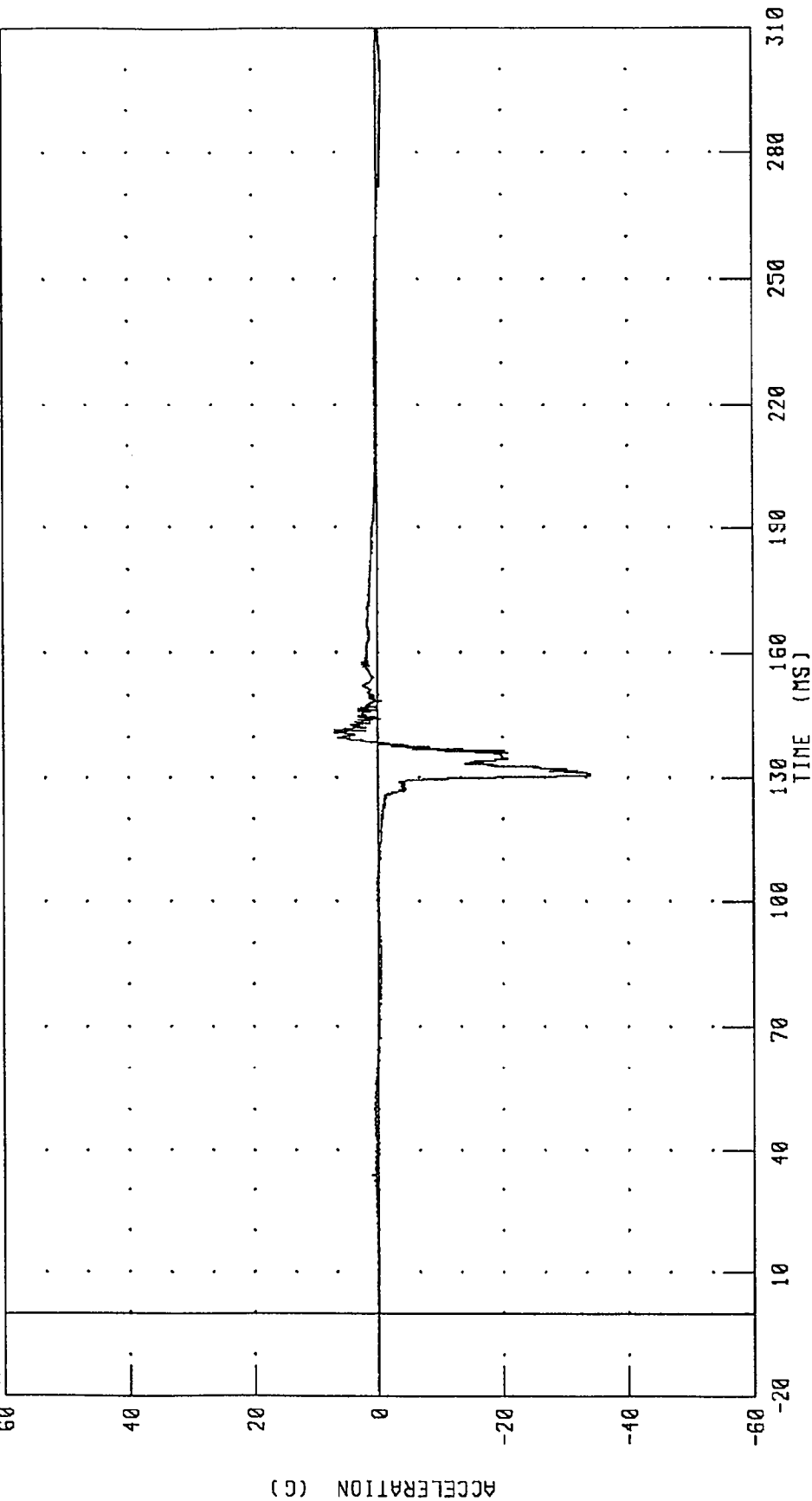
CHANNEL: HEDXG2 FILTER: CH: CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

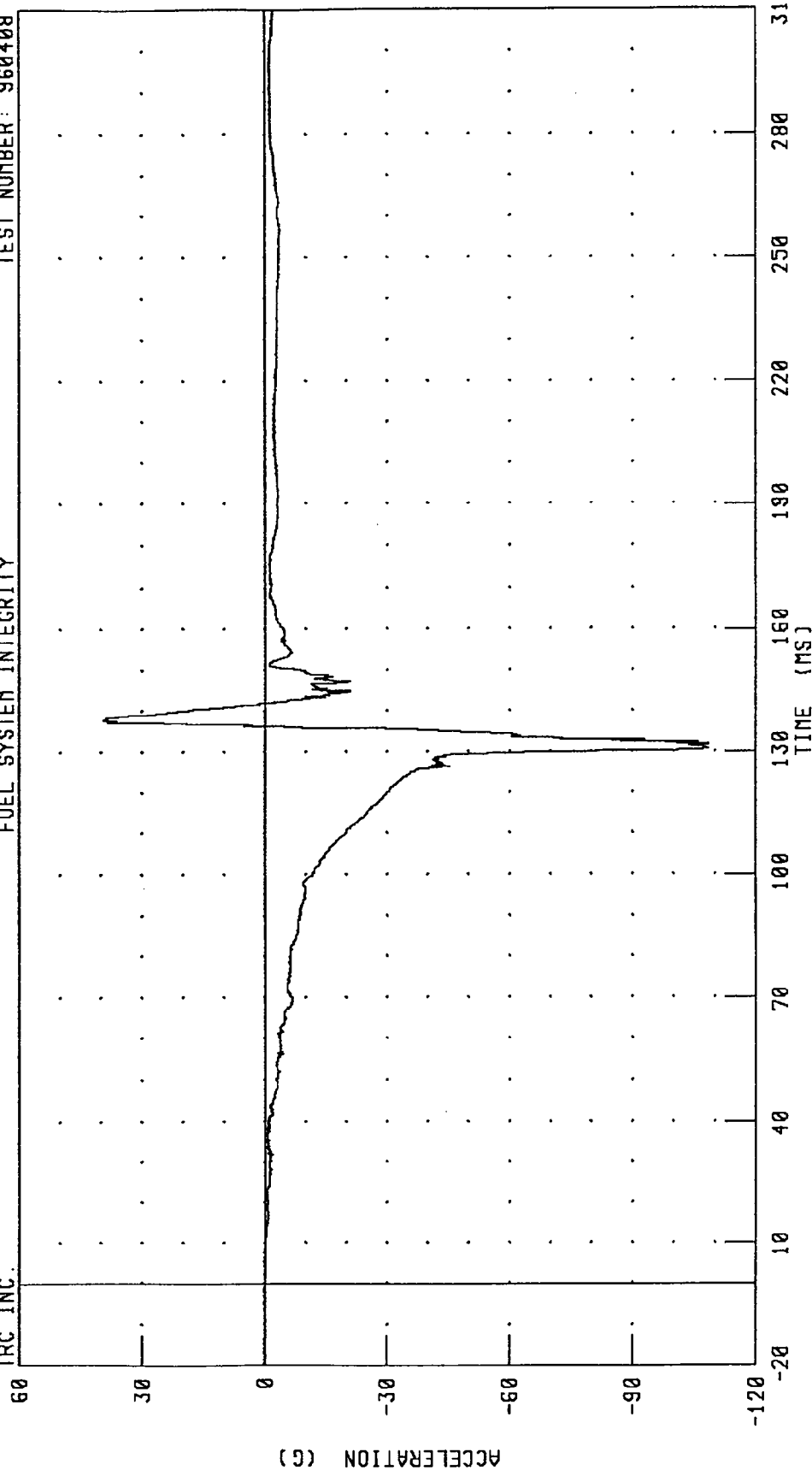
PEAK DATA: 7.01 G @ 141.20 MS; -34.07 G @ 130.56 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

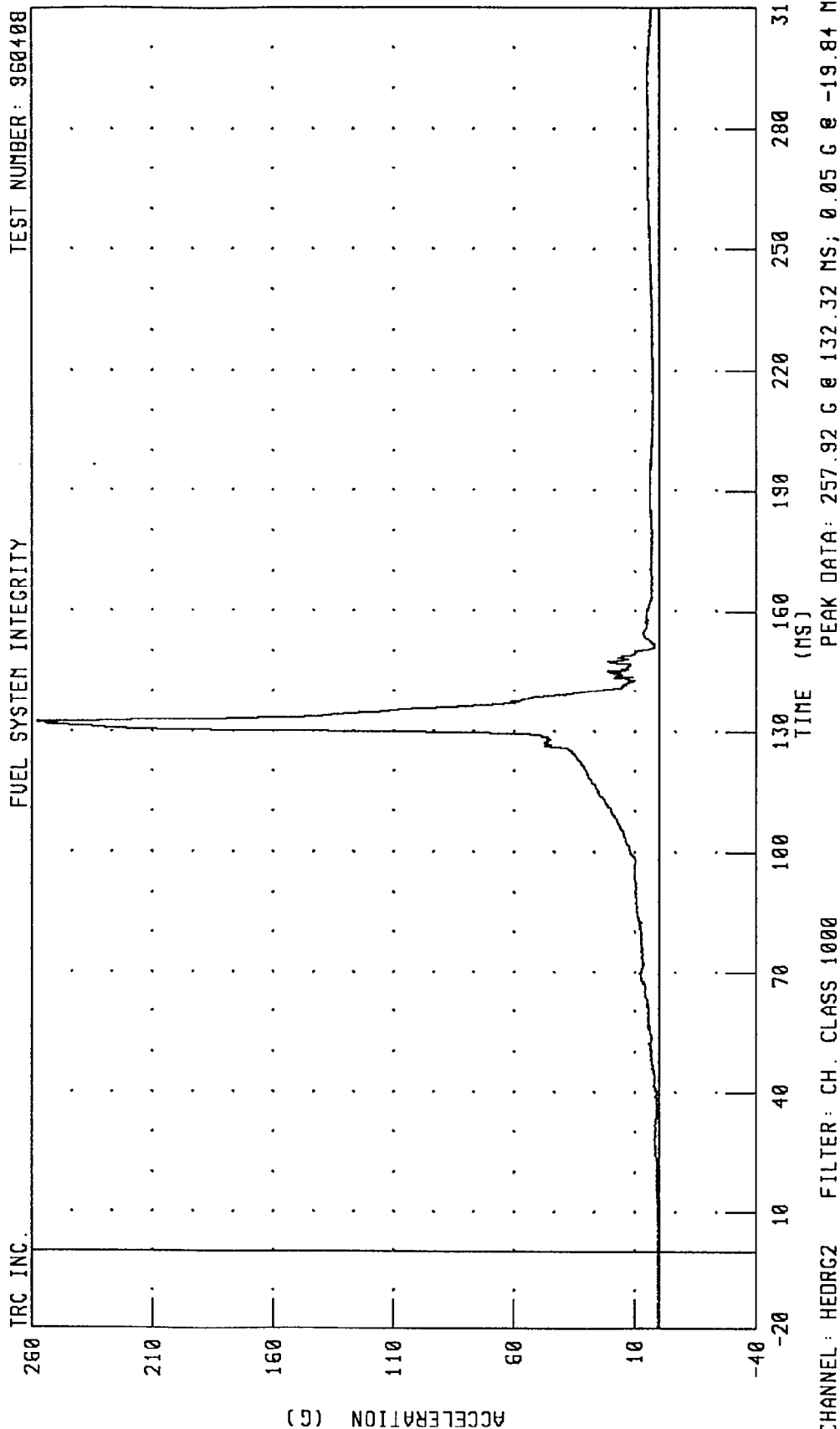
TRC INC.



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 39.46 G @ 138.00 MS; -108.58 G @ 130.72 MS

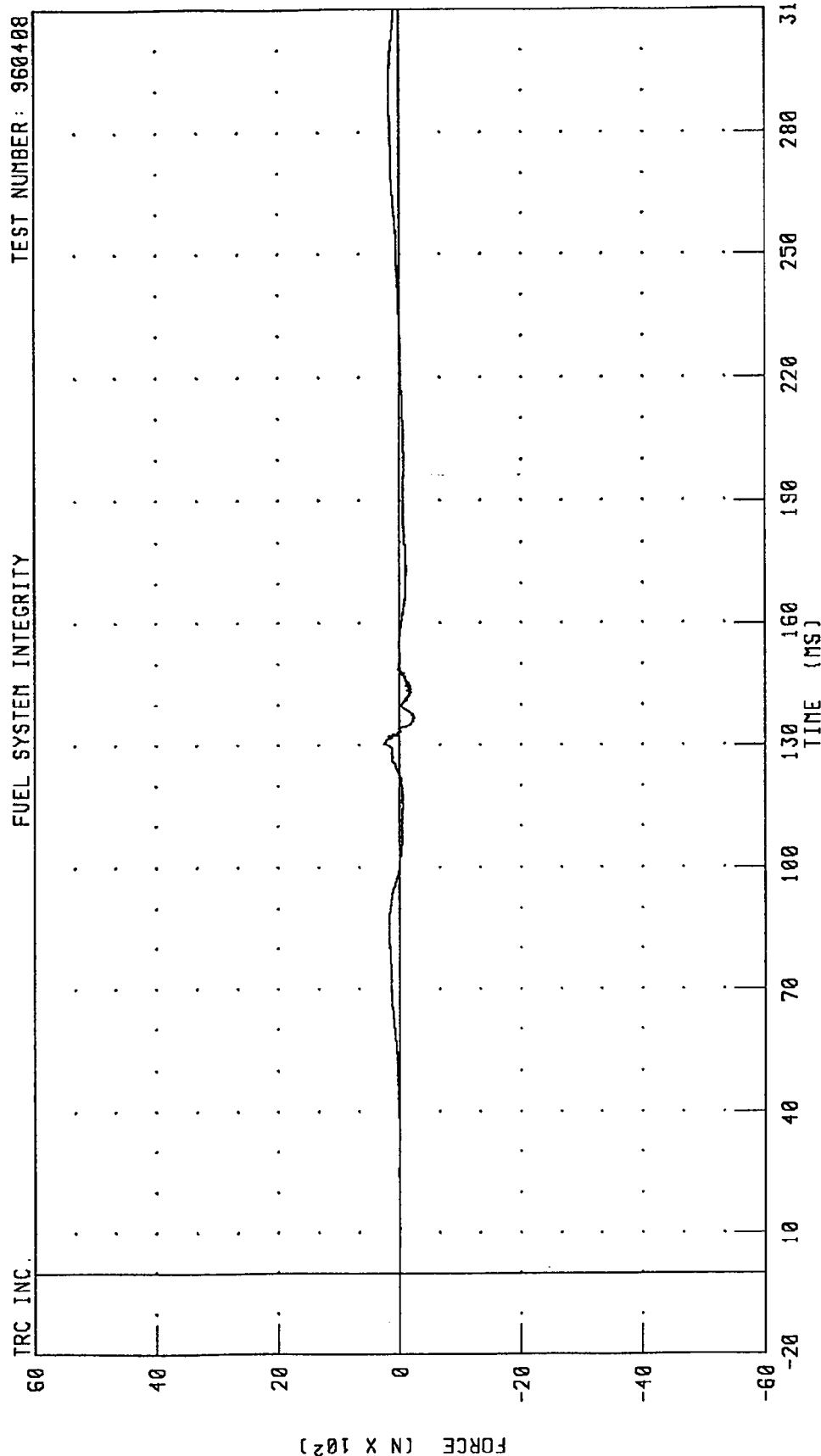
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



PEAK DATA: 252.24 N @ 130.24 MS; -247.32 N @ 136.64 MS

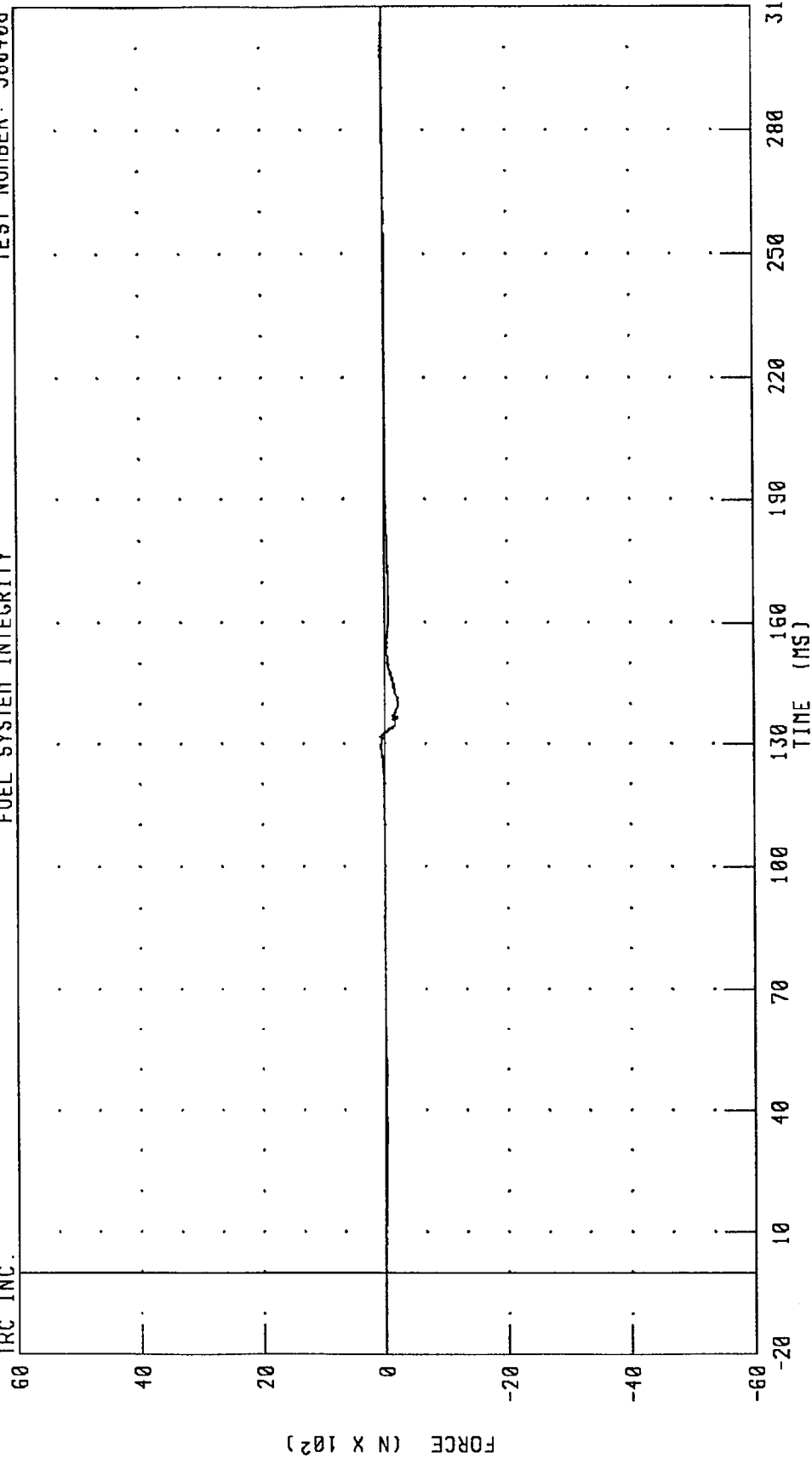
CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 78.14 N @ 131.68 MS; -226.35 N @ 139.92 MS

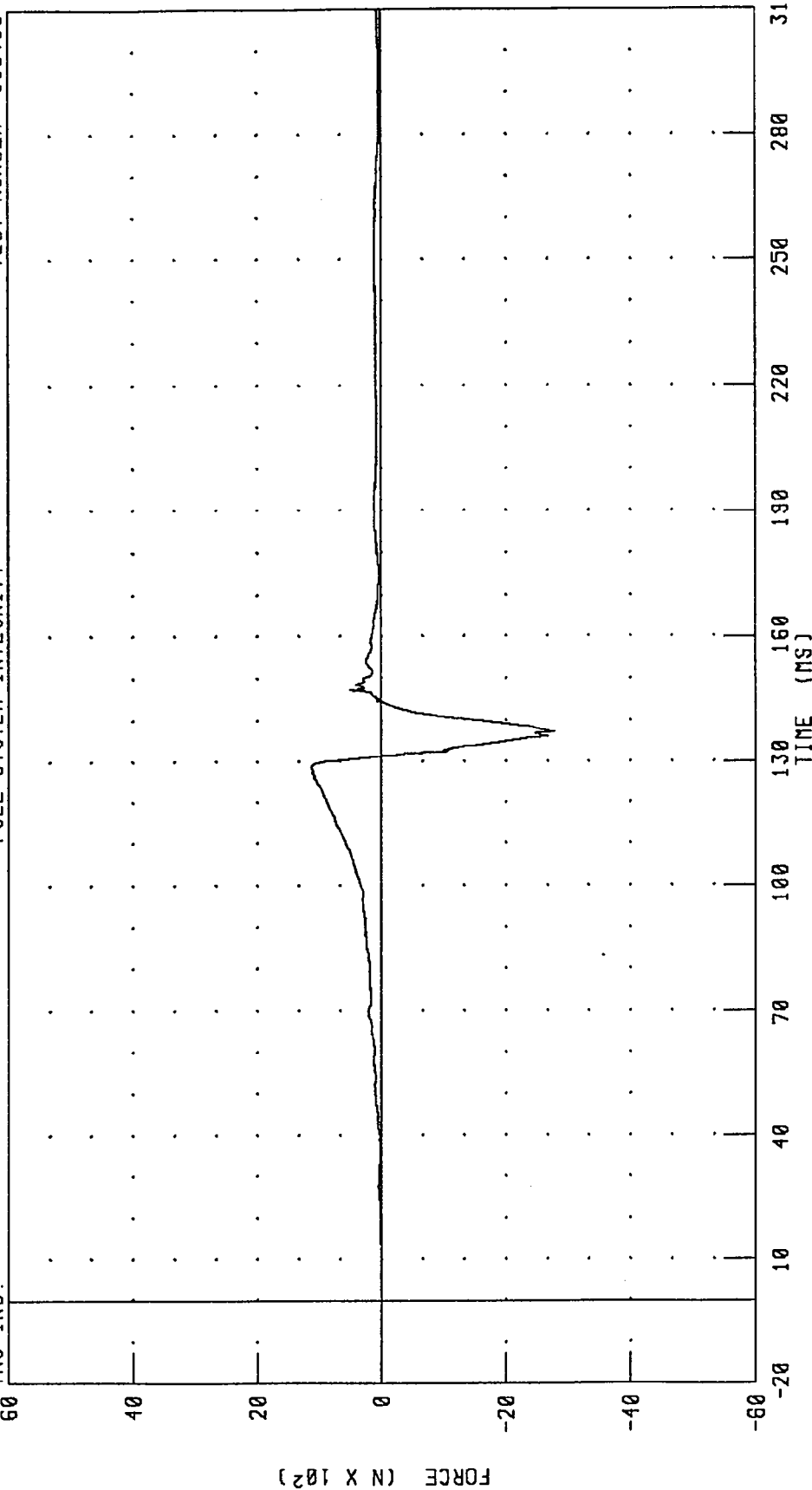
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

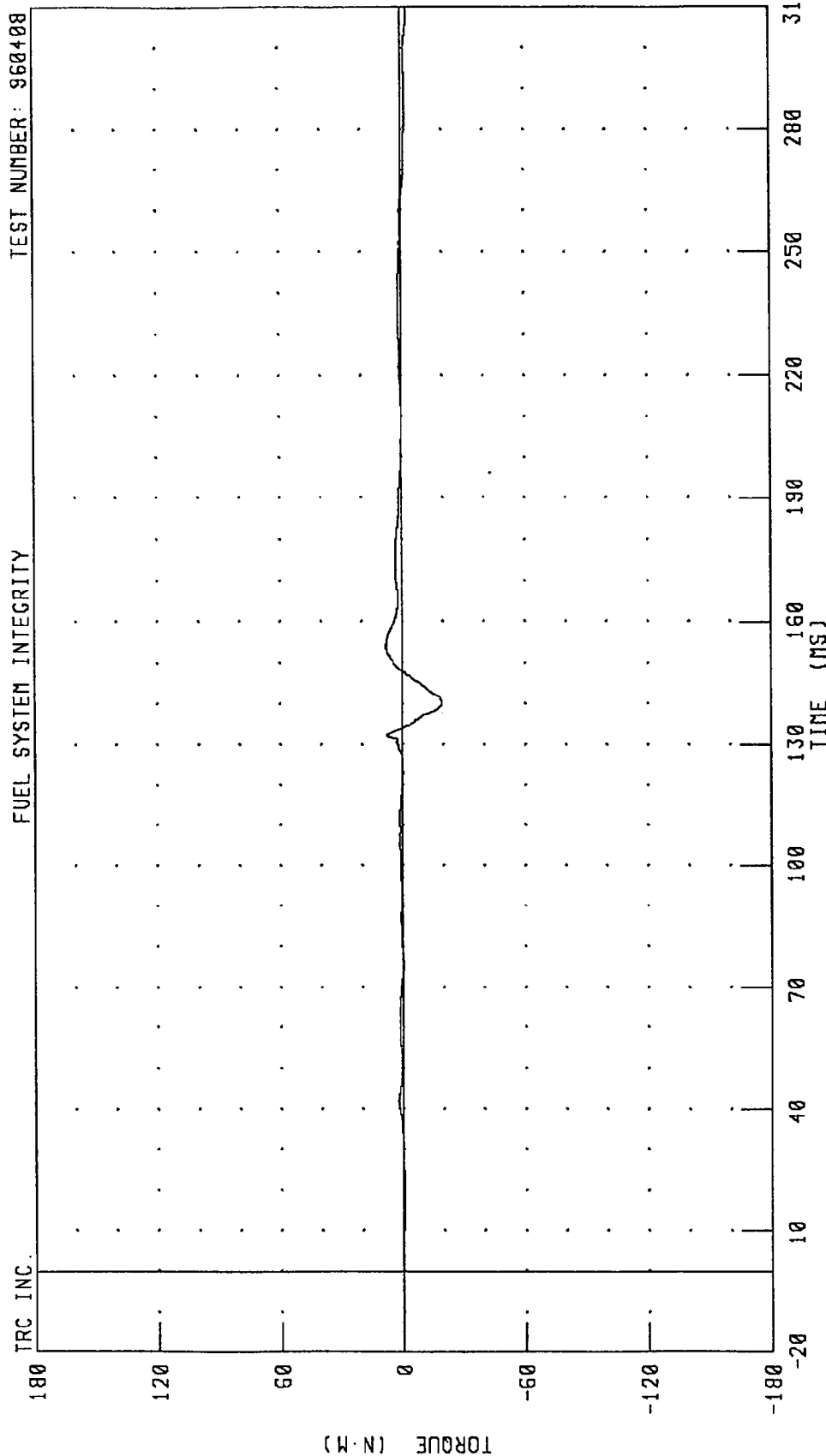
TRC INC.



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

PEAK DATA: 1129.77 N @ 128.64 MS; -2768.37 N @ 137.28 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT X-AXIS



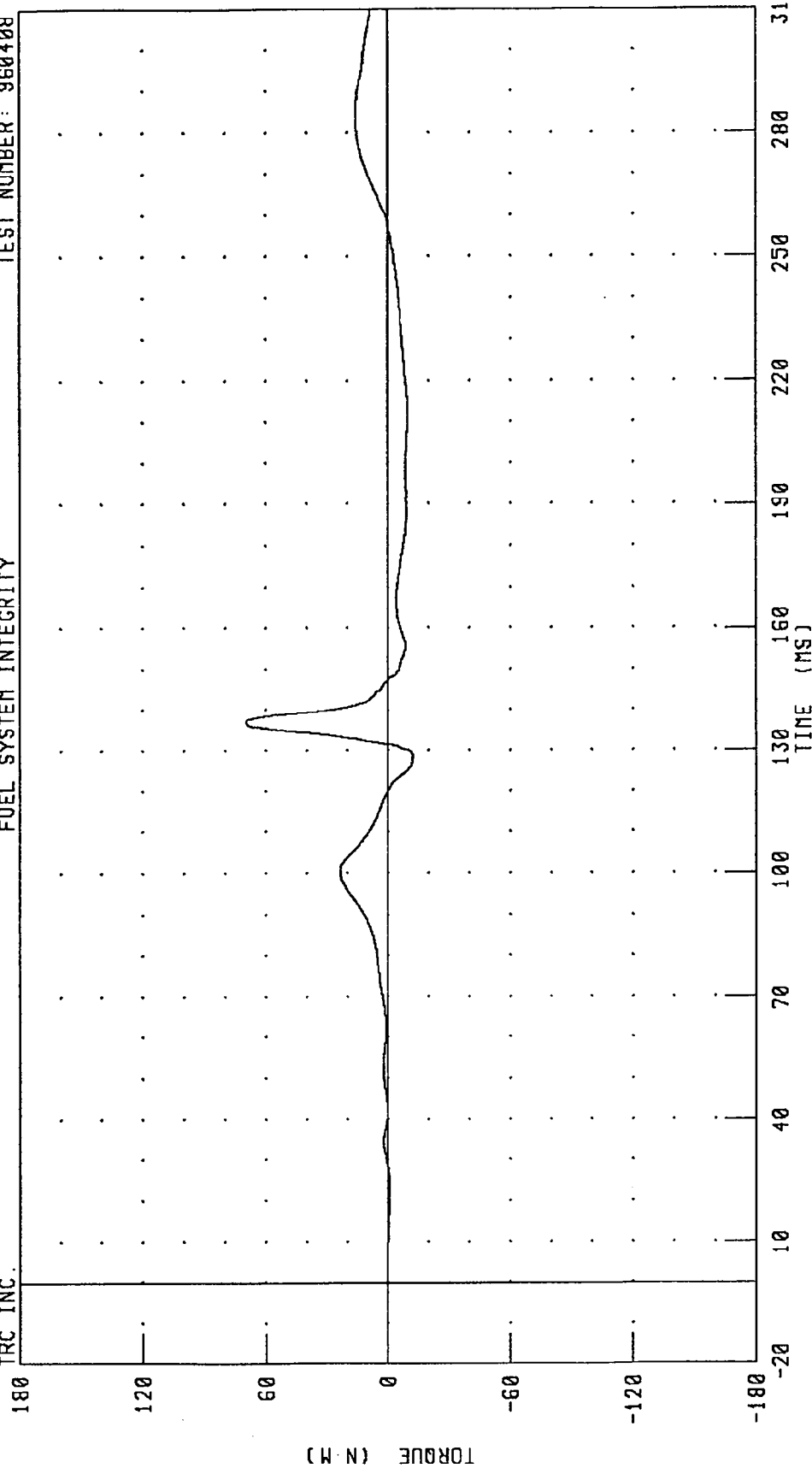
CHANNEL: NEKXM2 FILTER: CH. CLASS 600 PEAK DATA: 7.93 N.M @ 153.76 MS; -19.35 N.M @ 140.08 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 69.47 N.M @ 137.04 MS, -12.35 N.M @ 128.00 MS

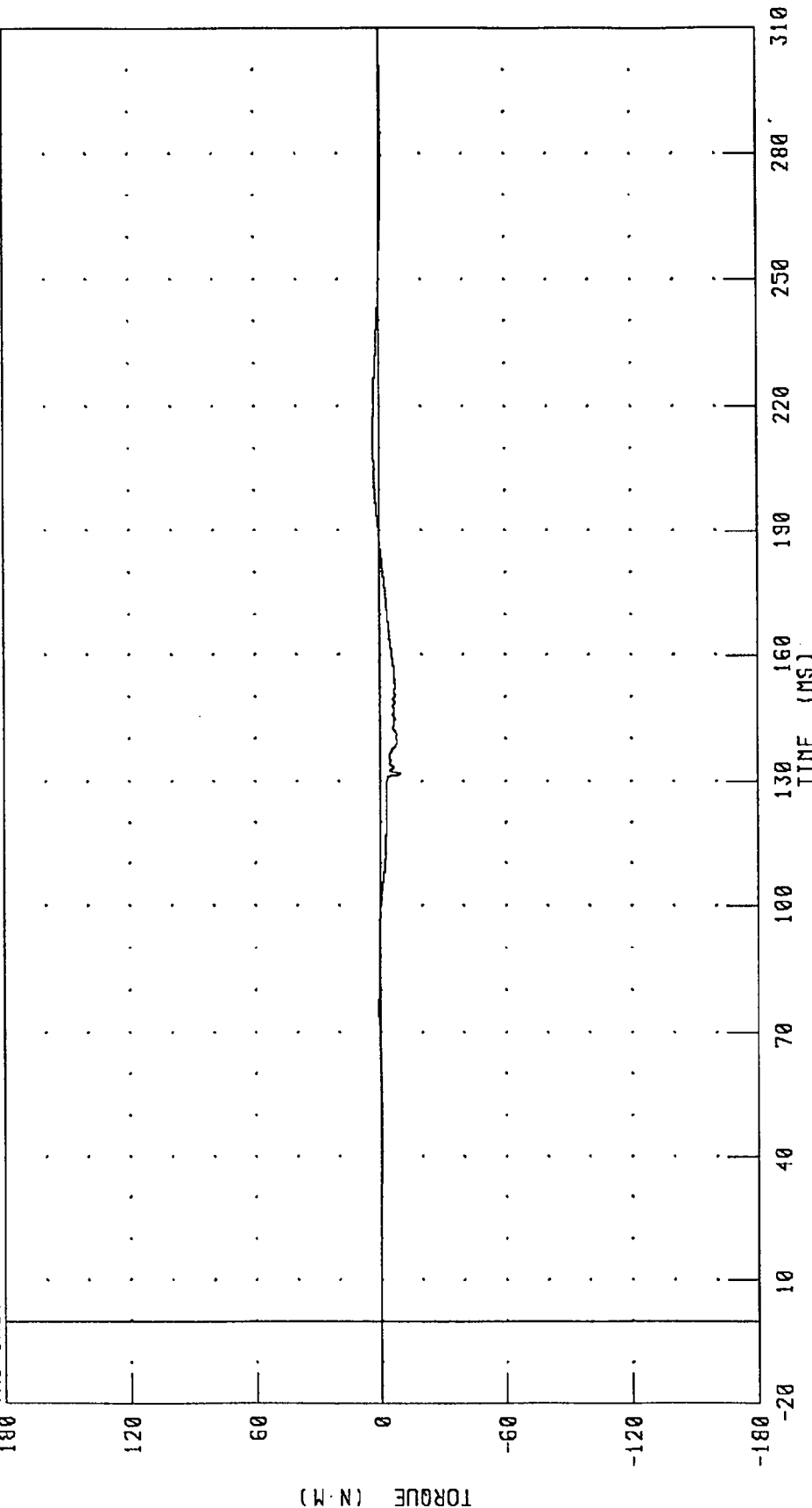
CHANNEL: NEKYM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

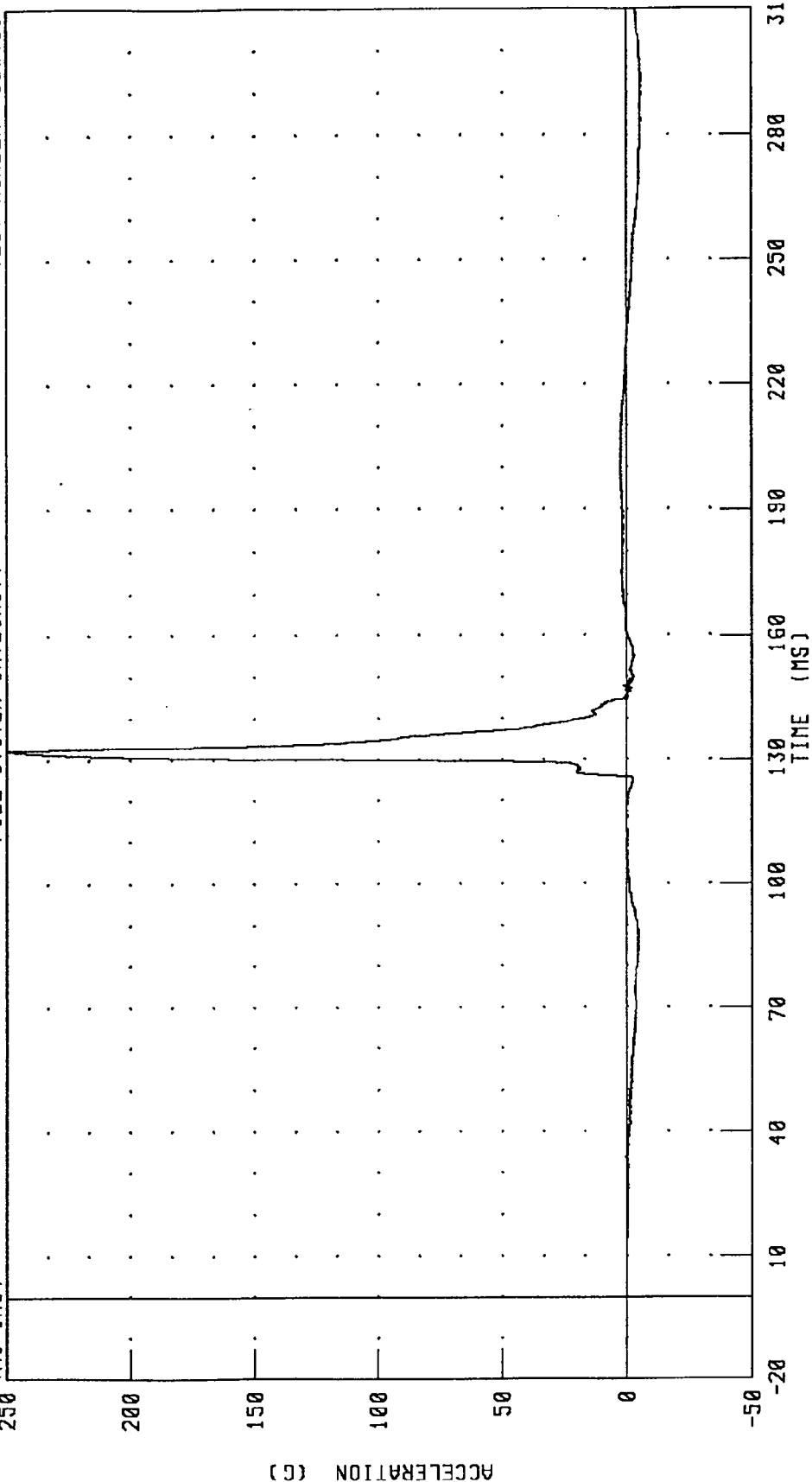
PEAK DATA: 3.01 N.M @ 211.28 MS; -9.51 N.M @ 131.76 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER HEAD POSITION 1 X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



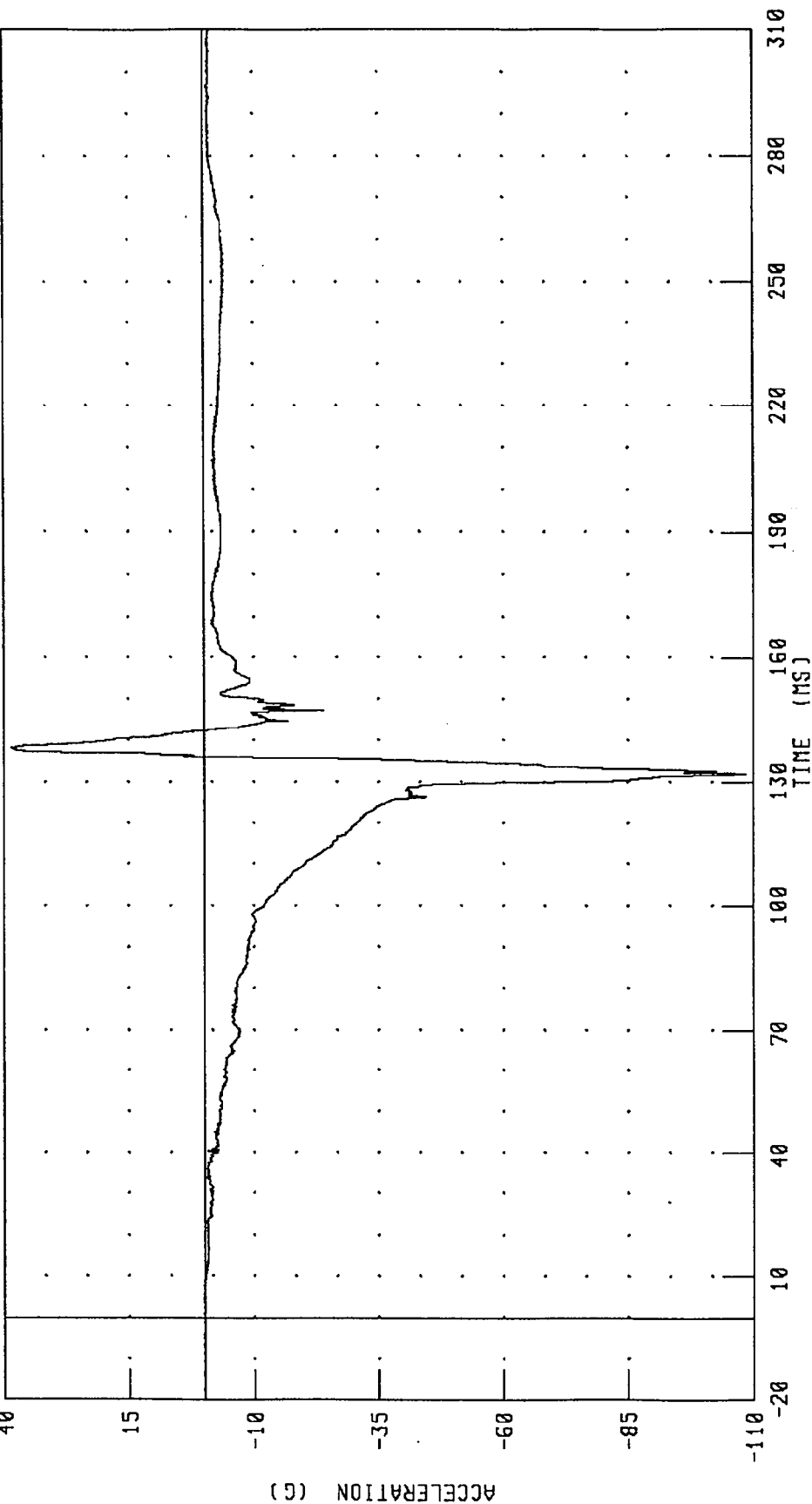
CHANNEL: HD1XG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 1 Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD1ZG2 FILTER: CH. CLASS 1000

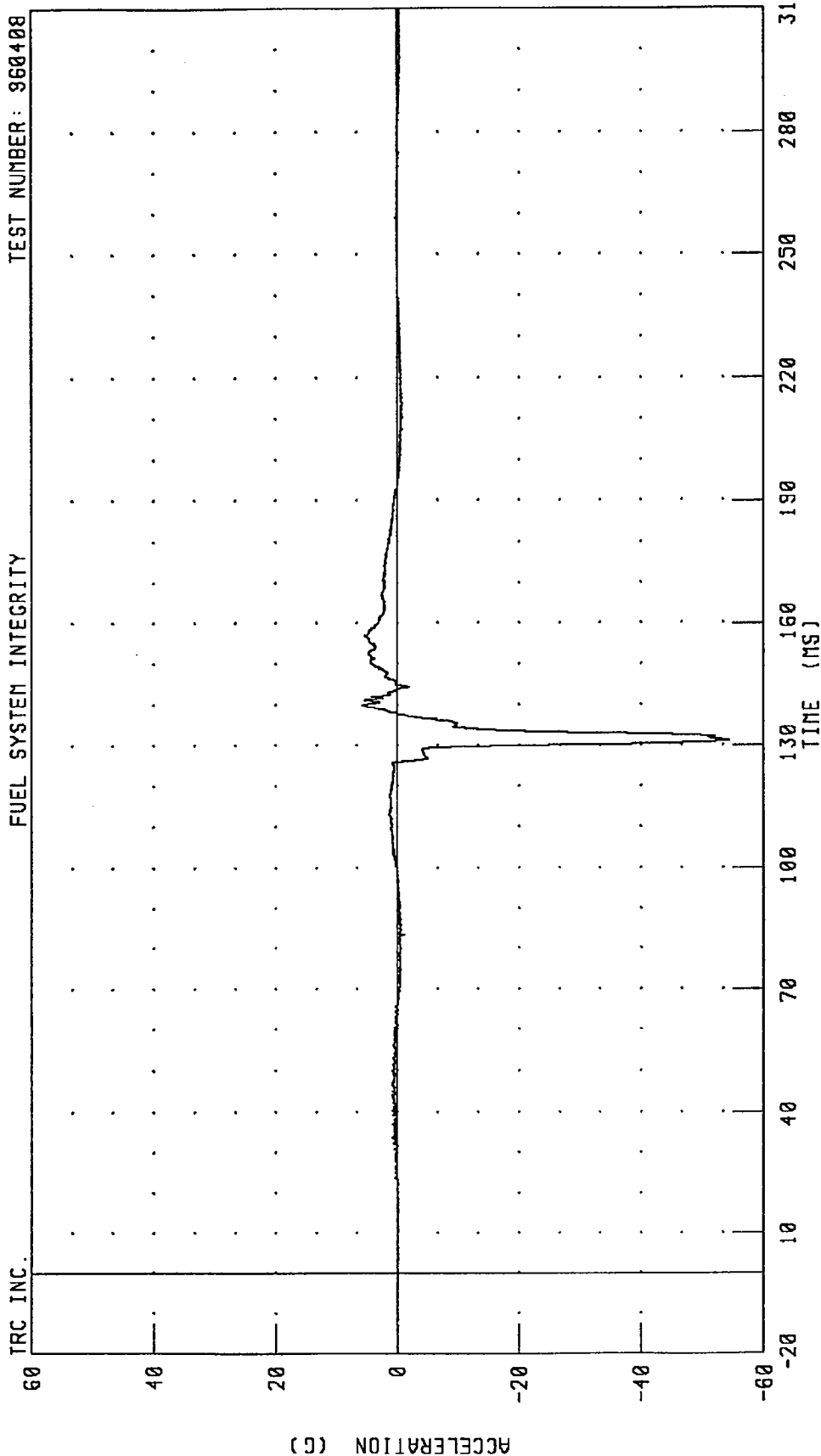
PEAK DATA: 38.40 G @ 138.16 MS; -108.51 G @ 132.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 2 Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD2Y62 FILTER: CH. CLASS 1000

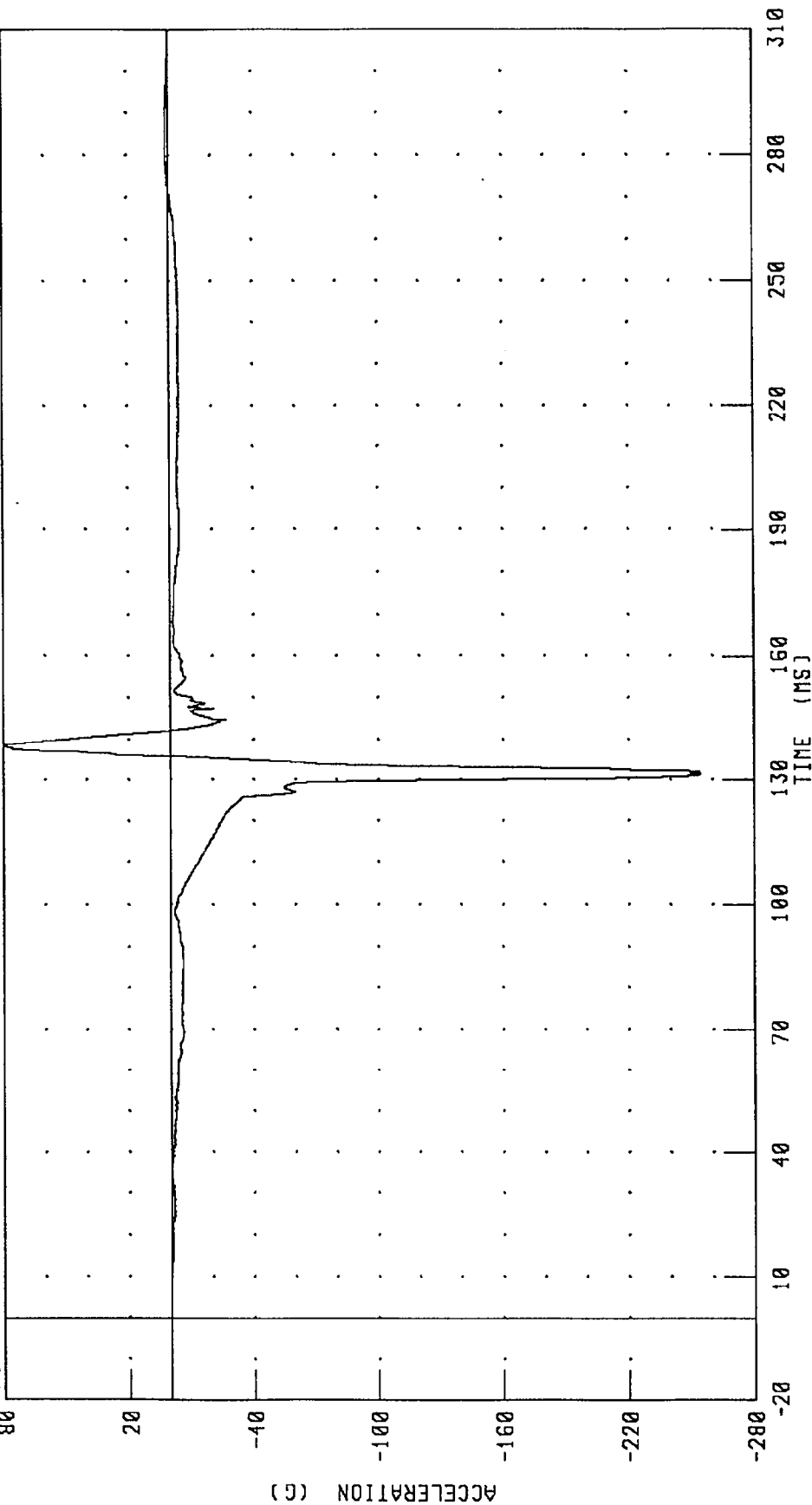
PEAK DATA: 5.77 G @ 139.92 MS; -54.30 G @ 131.04 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER HEAD POSITION 2 Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



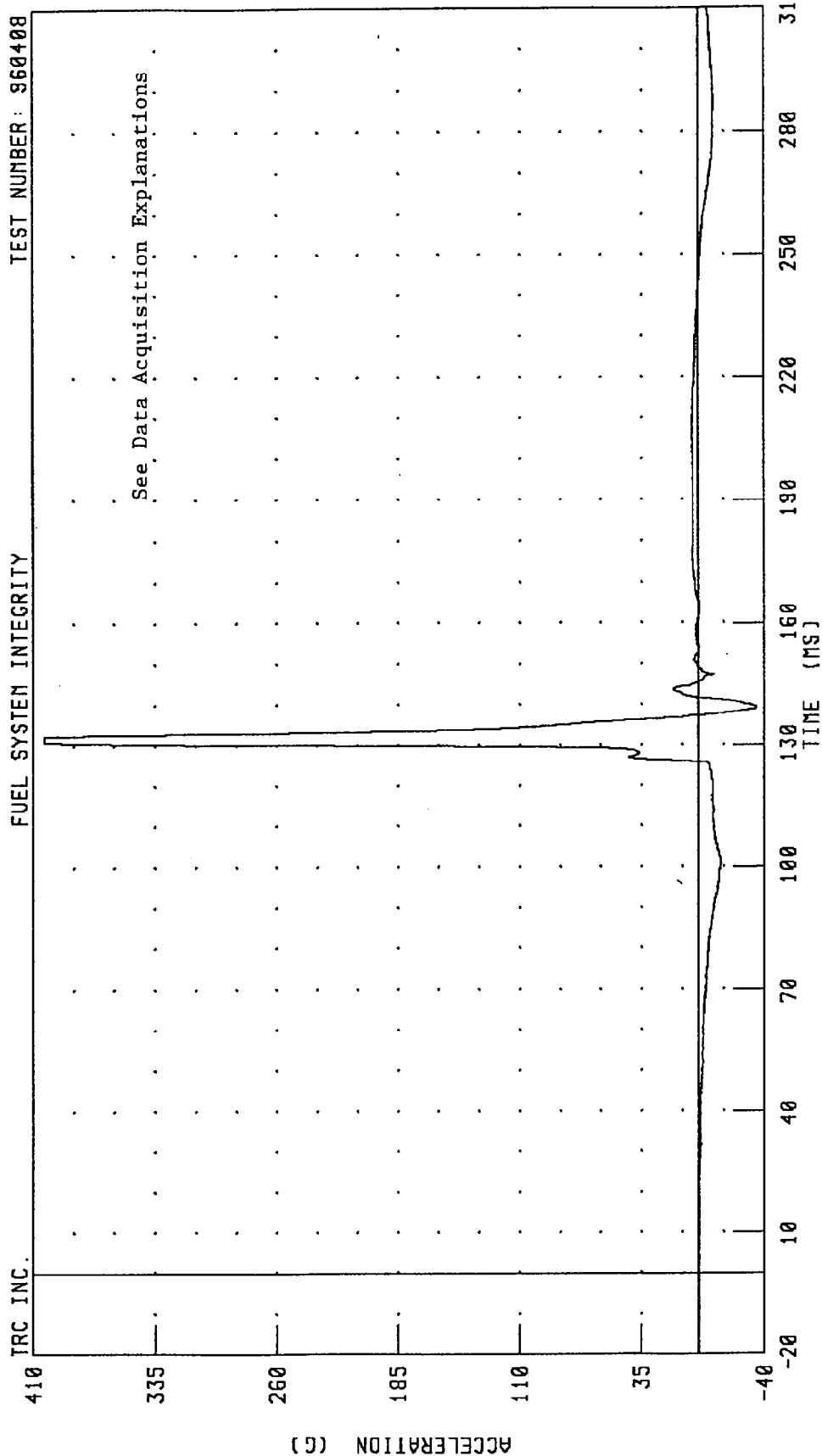
CHANNEL: HD2ZG2 FILTER: CH. CLASS 1000

PEAK DATA: 79.52 G @ 138.32 MS; -254.41 G @ 131.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 3 X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



PEAK DATA: 403.02 G @ 130.96 MS; -35.39 G @ 139.20 MS

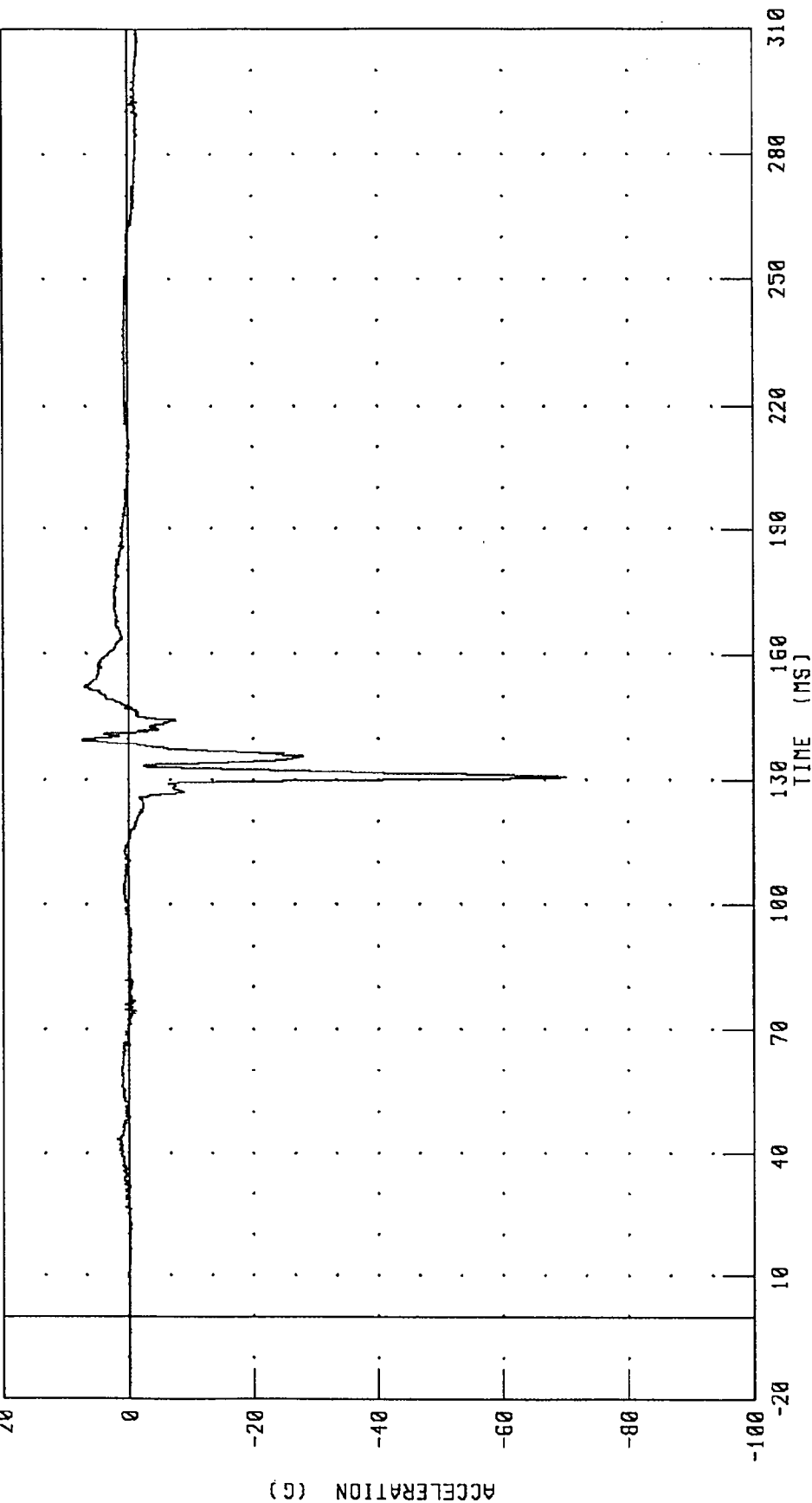
CHANNEL: HD3XG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 3 Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



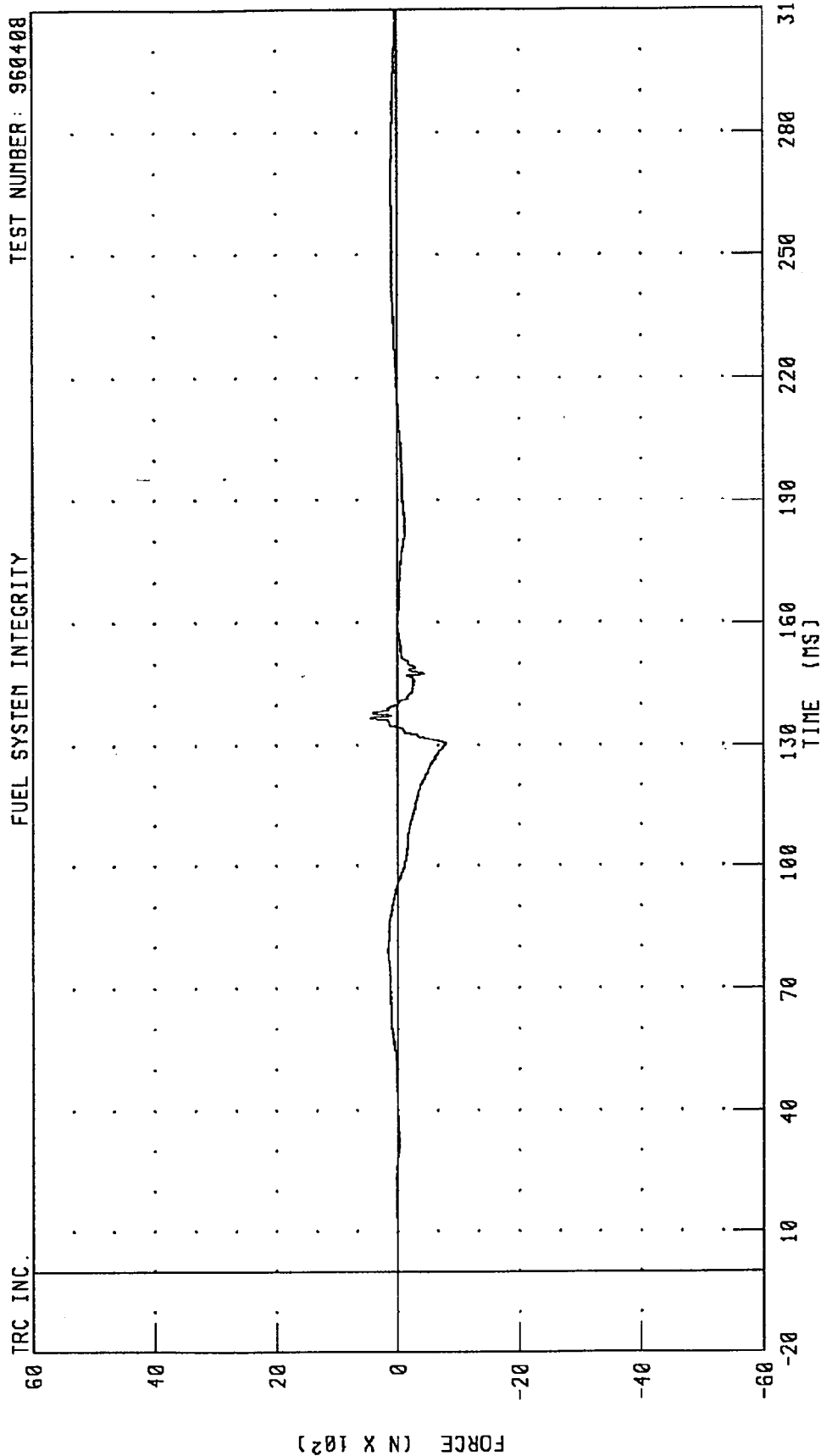
CHANNEL: HD3YG2 FILTER: CH. CLASS 1000

PEAK DATA: 7.47 G @ 139.76 MS; -70.12 G @ 130.64 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



PEAK DATA: 443.33 N @ 136.64 MS; -795.00 N @ 130.48 MS

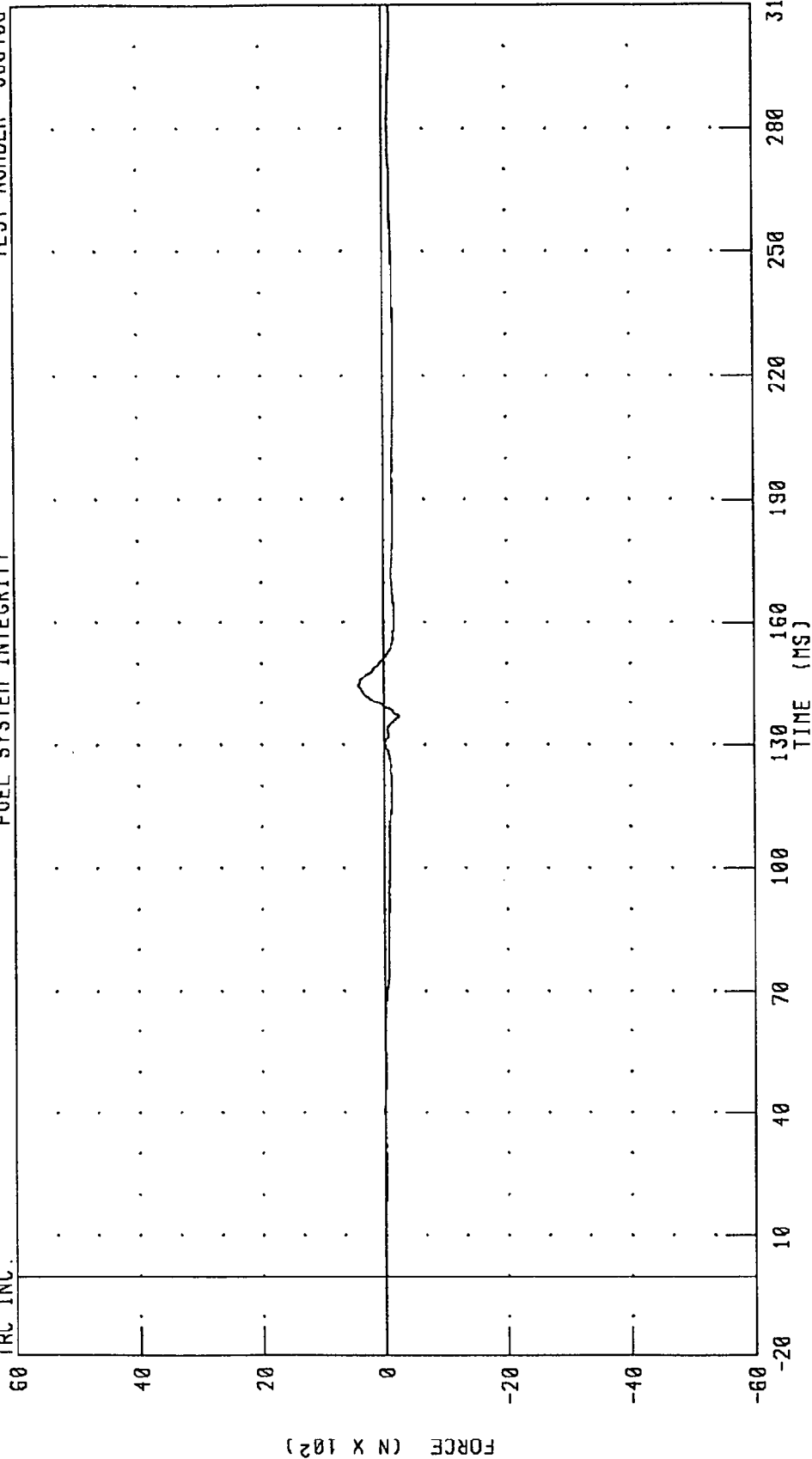
CHANNEL: NKLXF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 417.69 N @ 144.24 MS; -234.68 N @ 136.72 MS

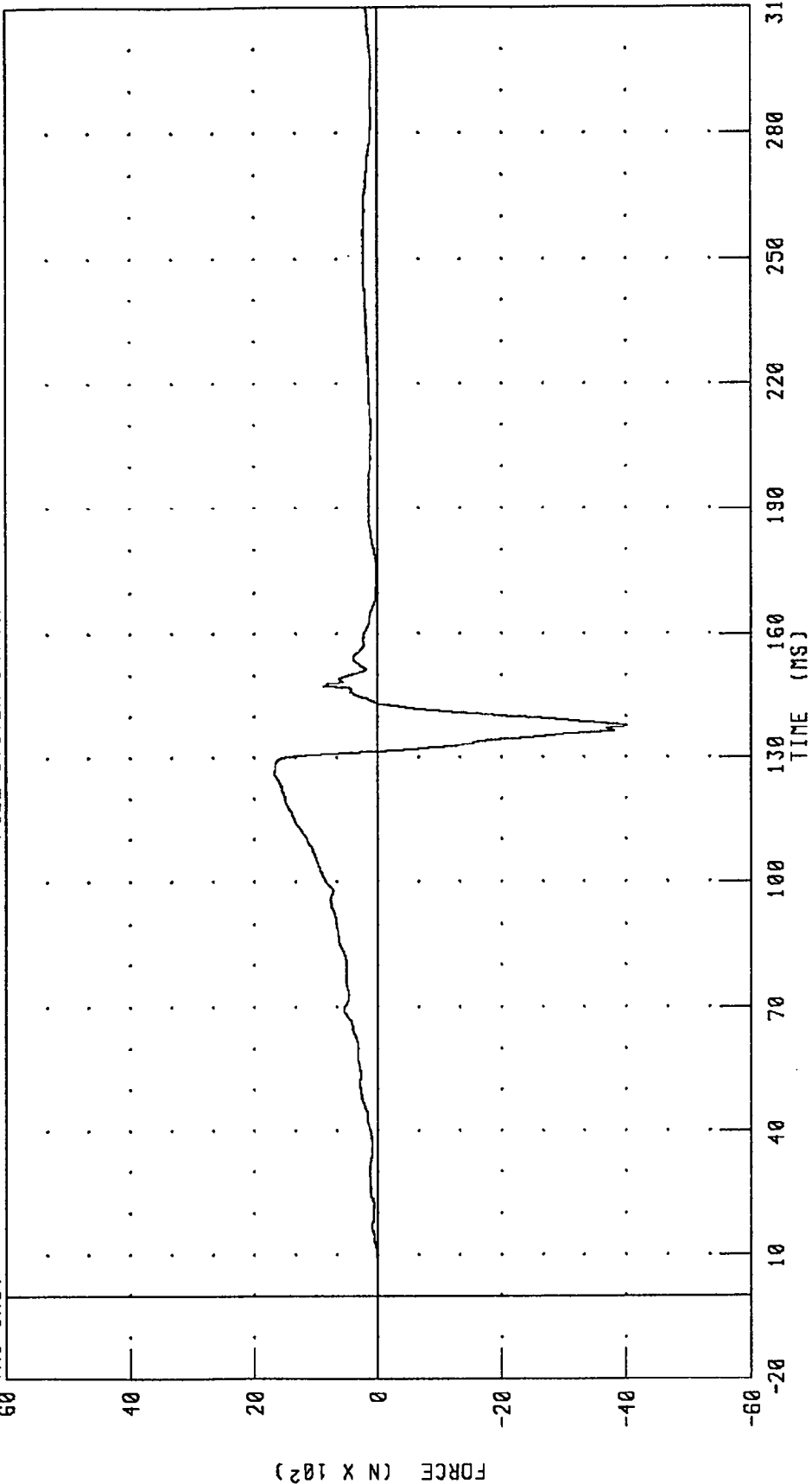
CHANNEL: NKLYF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NKLZF2 FILTER: CH. CLASS 1000

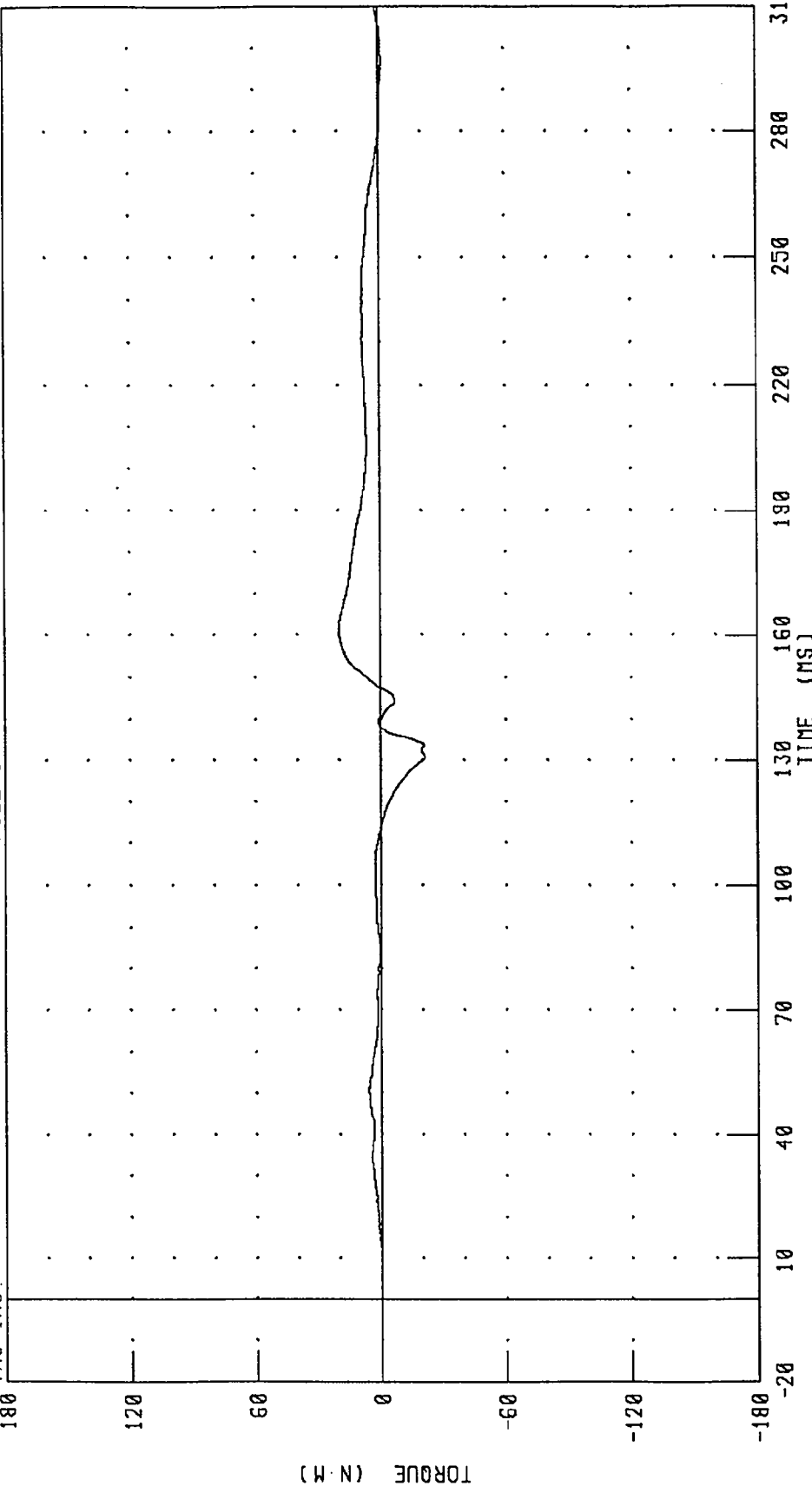
PEAK DATA: 1682.72 N @ 126.24 MS; -4030.96 N @ 137.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



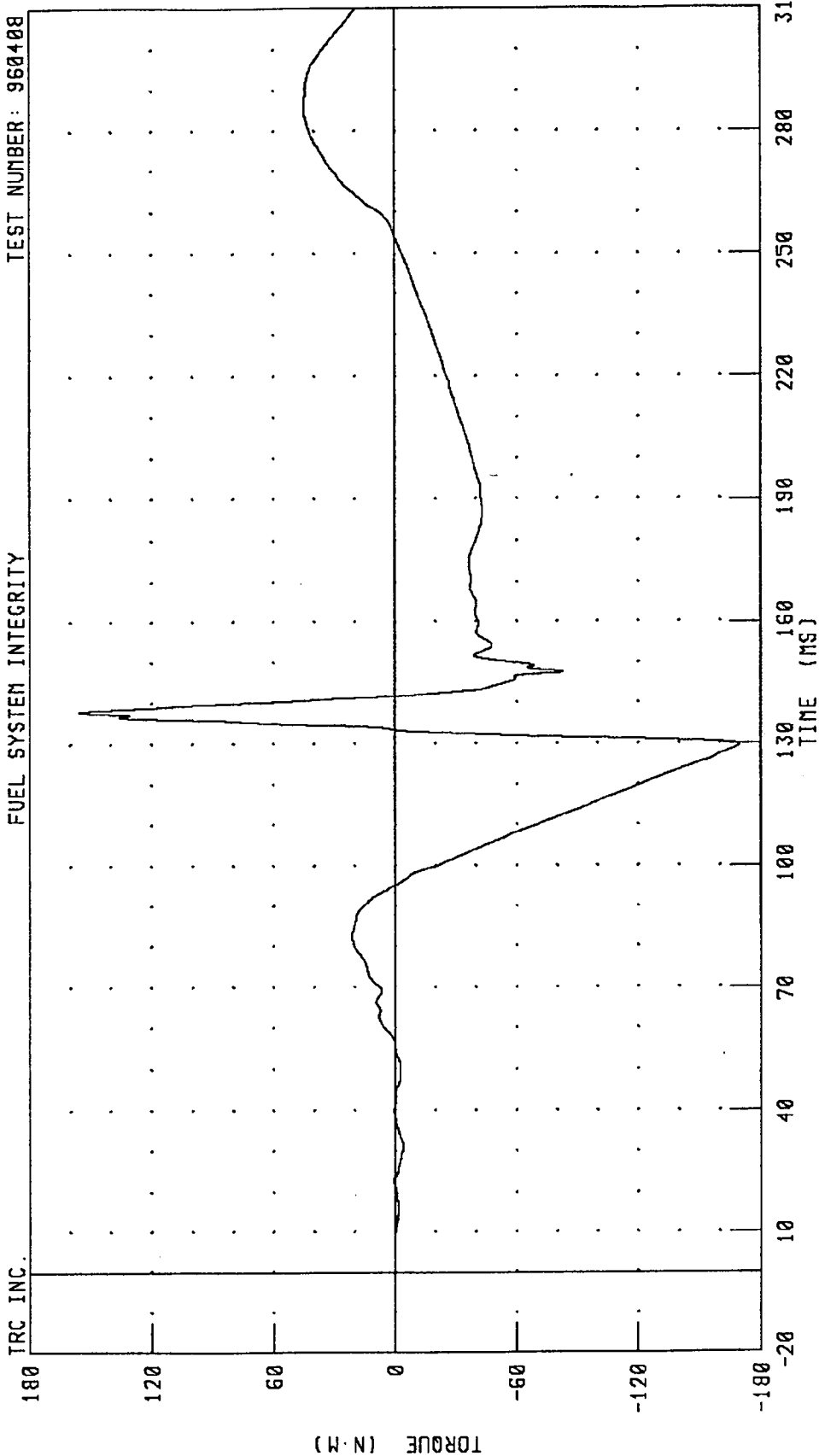
PEAK DATA: 20.03 N·M @ 161.28 MS; -21.31 N·M @ 130.80 MS

CHANNEL: NKLXM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



CHANNEL: NKLYM2 FILTER: CH. CLASS 600

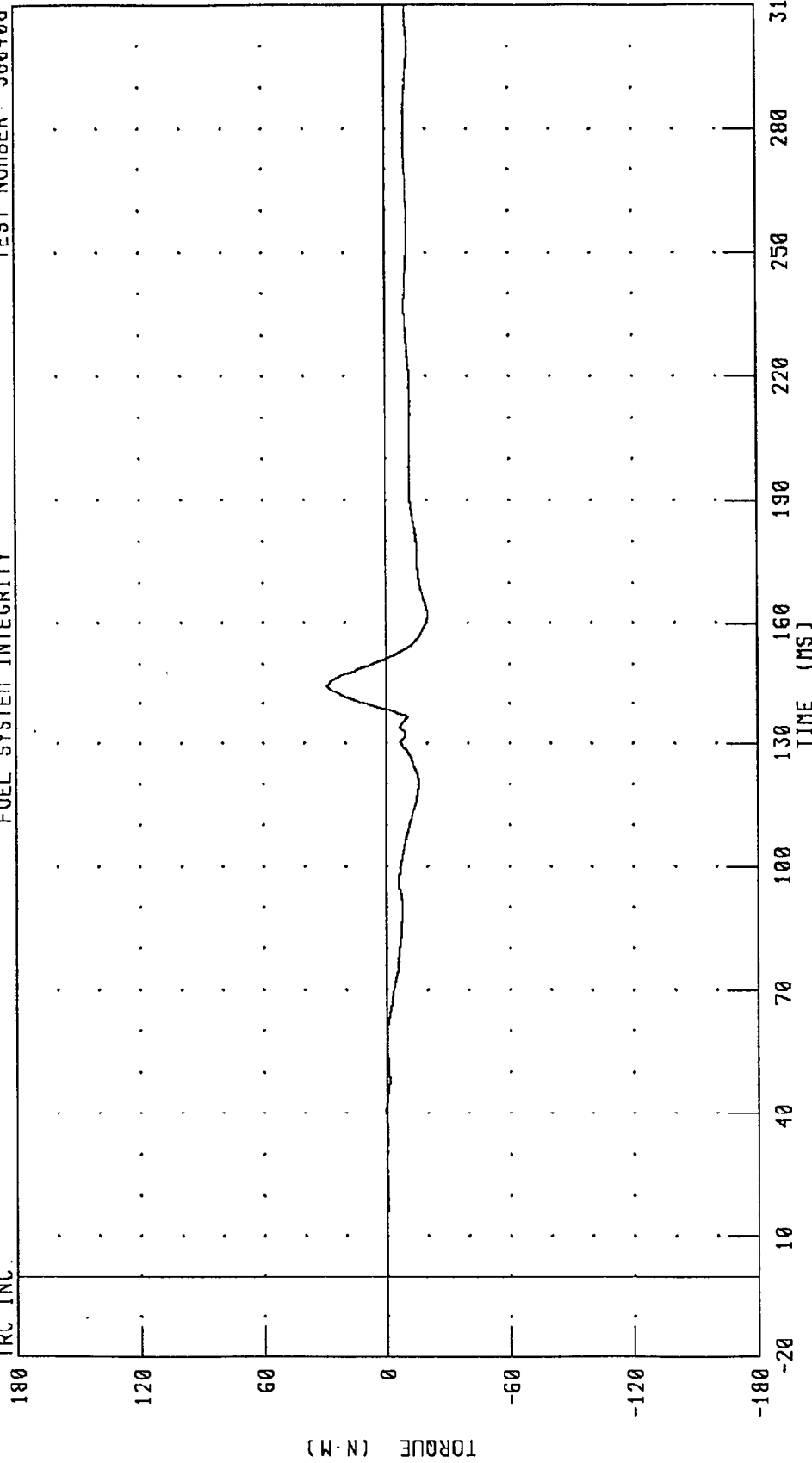
PEAK DATA: 155.35 N.M @ 137.92 MS; -169.69 N.M @ 129.60 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 28.83 N·M @ 144.40 MS; -20.16 N·M @ 162.80 MS

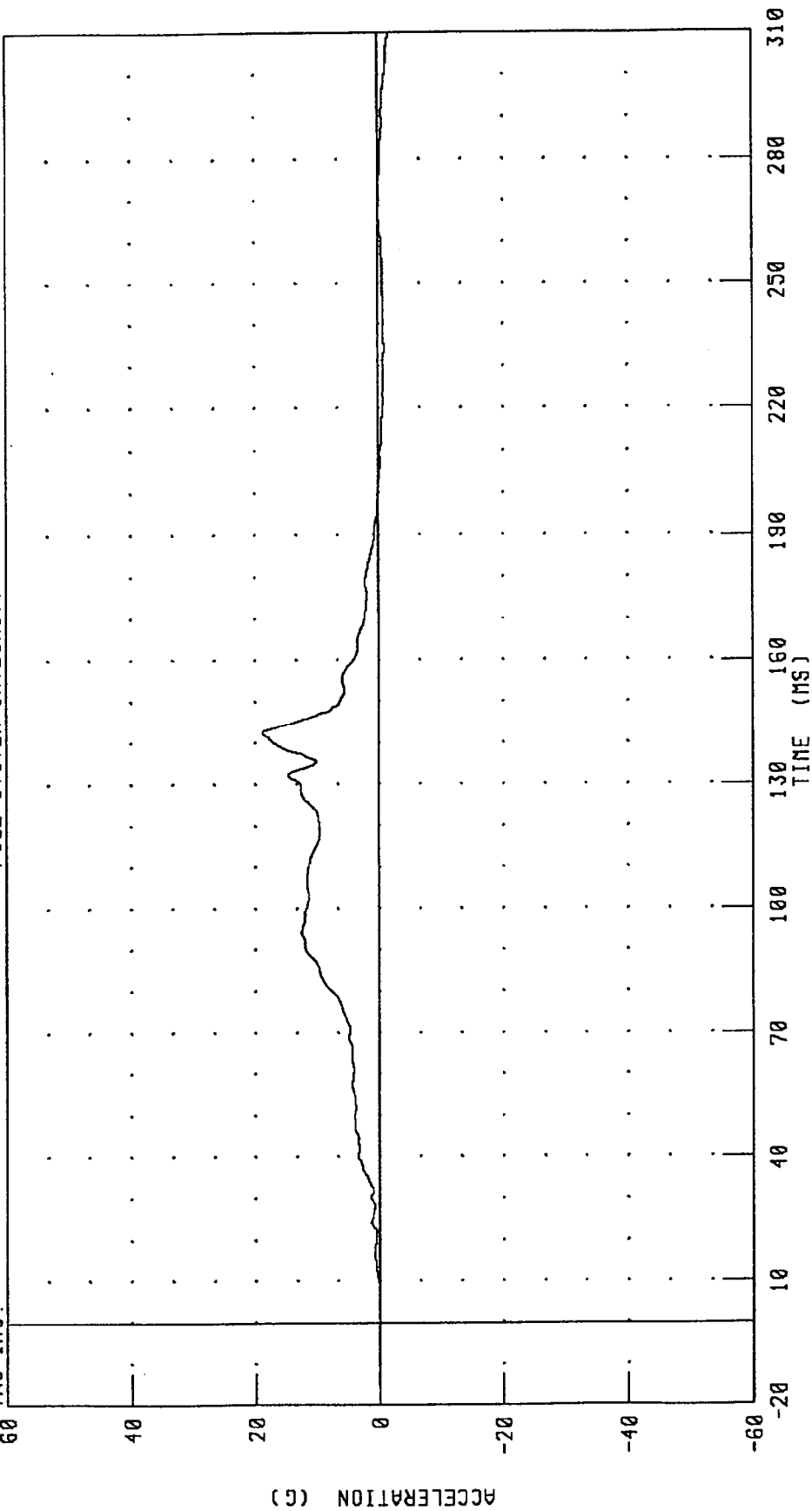
CHANNEL: NKLZM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 18.86 G @ 142.56 MS; -1.66 G @ 309.44 MS

CHANNEL: CSTXG2 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

PEAK DATA: 0.66 G @ 208.40 MS; -4.10 G @ 140.48 MS

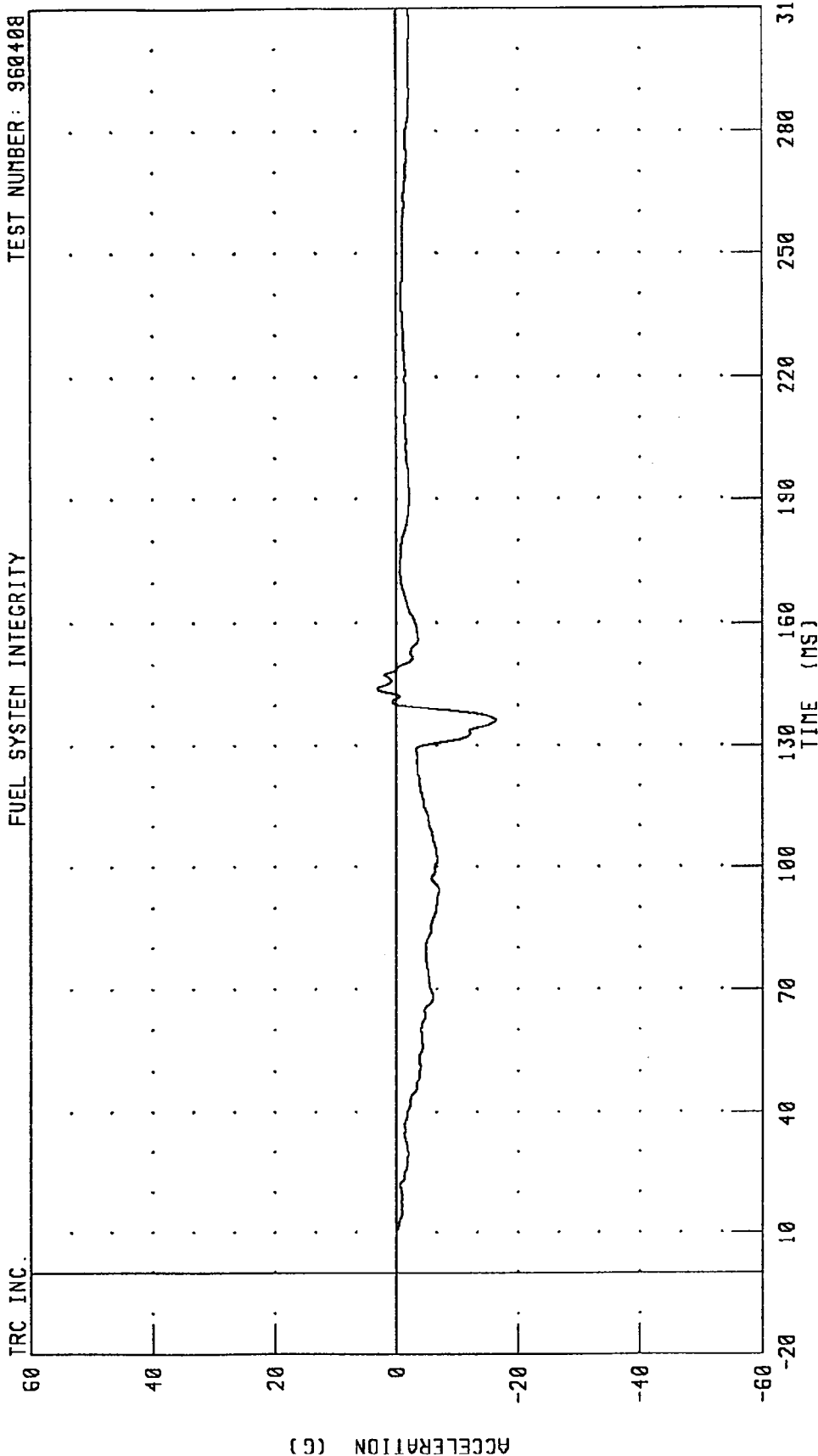
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: CST7G2 FILTER: CH. CLASS 180

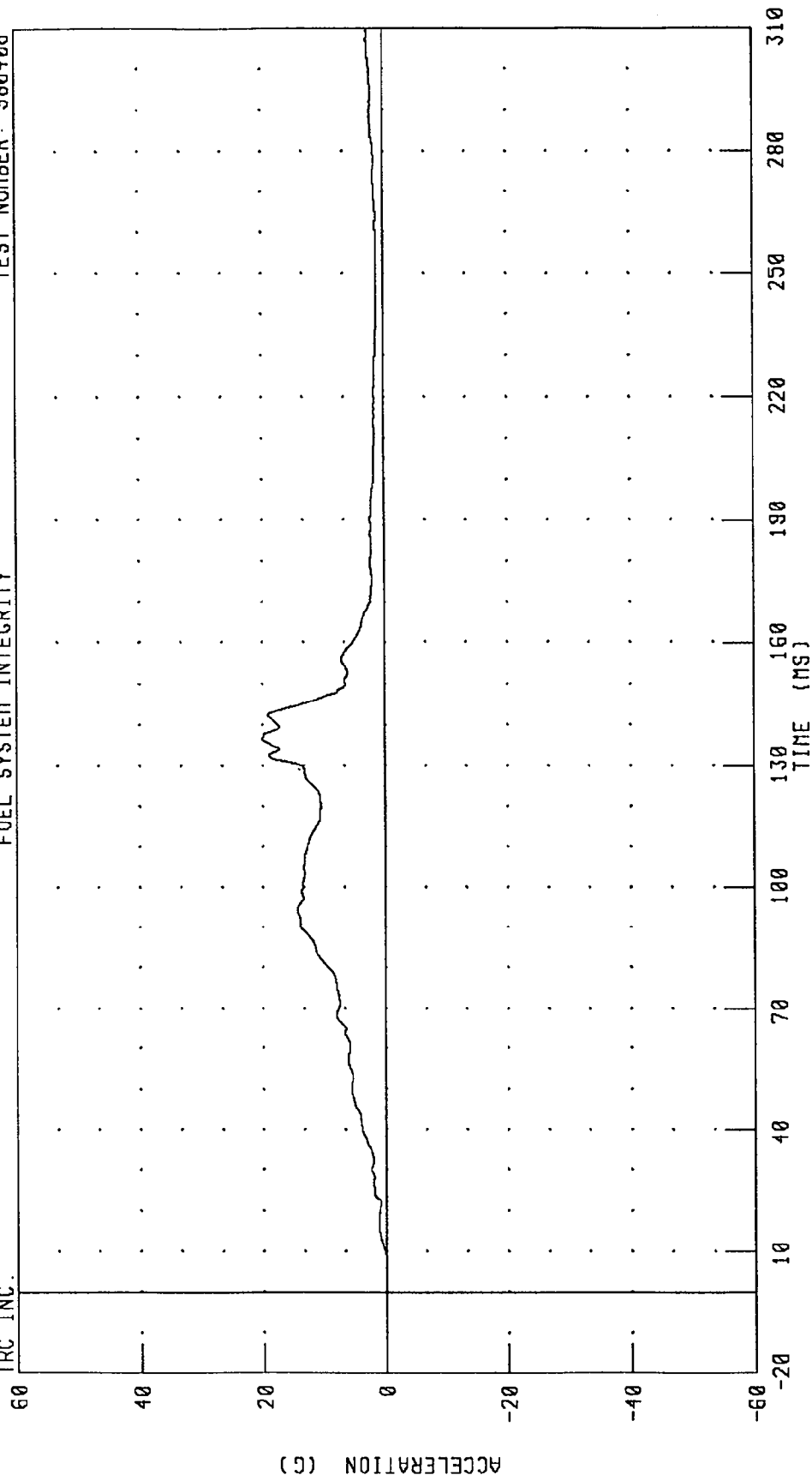
PEAK DATA: 3.06 G @ 144.08 MS; -16.43 G @ 136.24 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



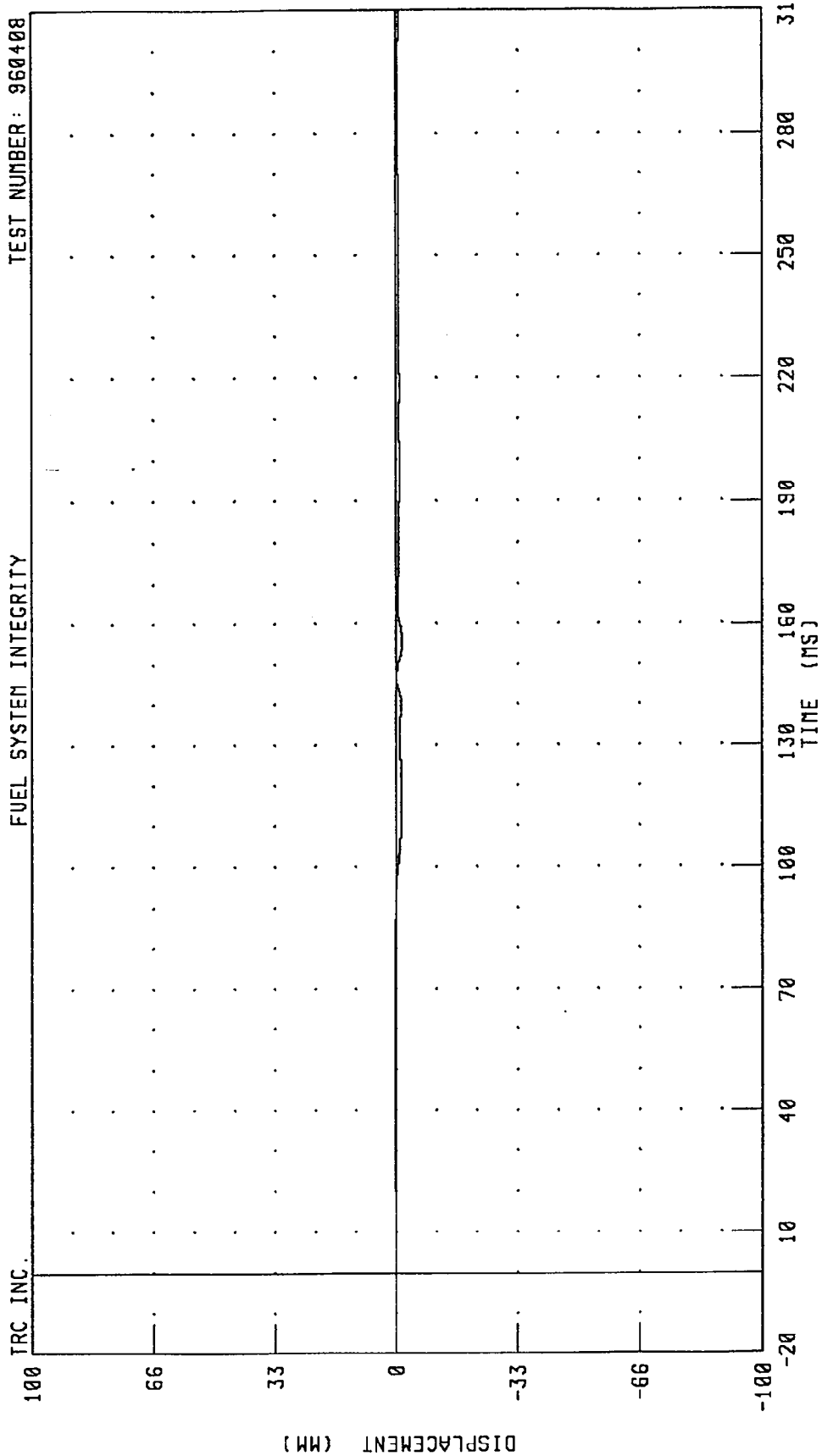
PEAK DATA: 20.20 G @ 136.56 MS, 0.00 G @ -17.36 MS

CHANNEL: CSTRG2 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



PEAK DATA: 0.43 MM @ 66.16 MS; -1.64 MM @ 156.24 MS

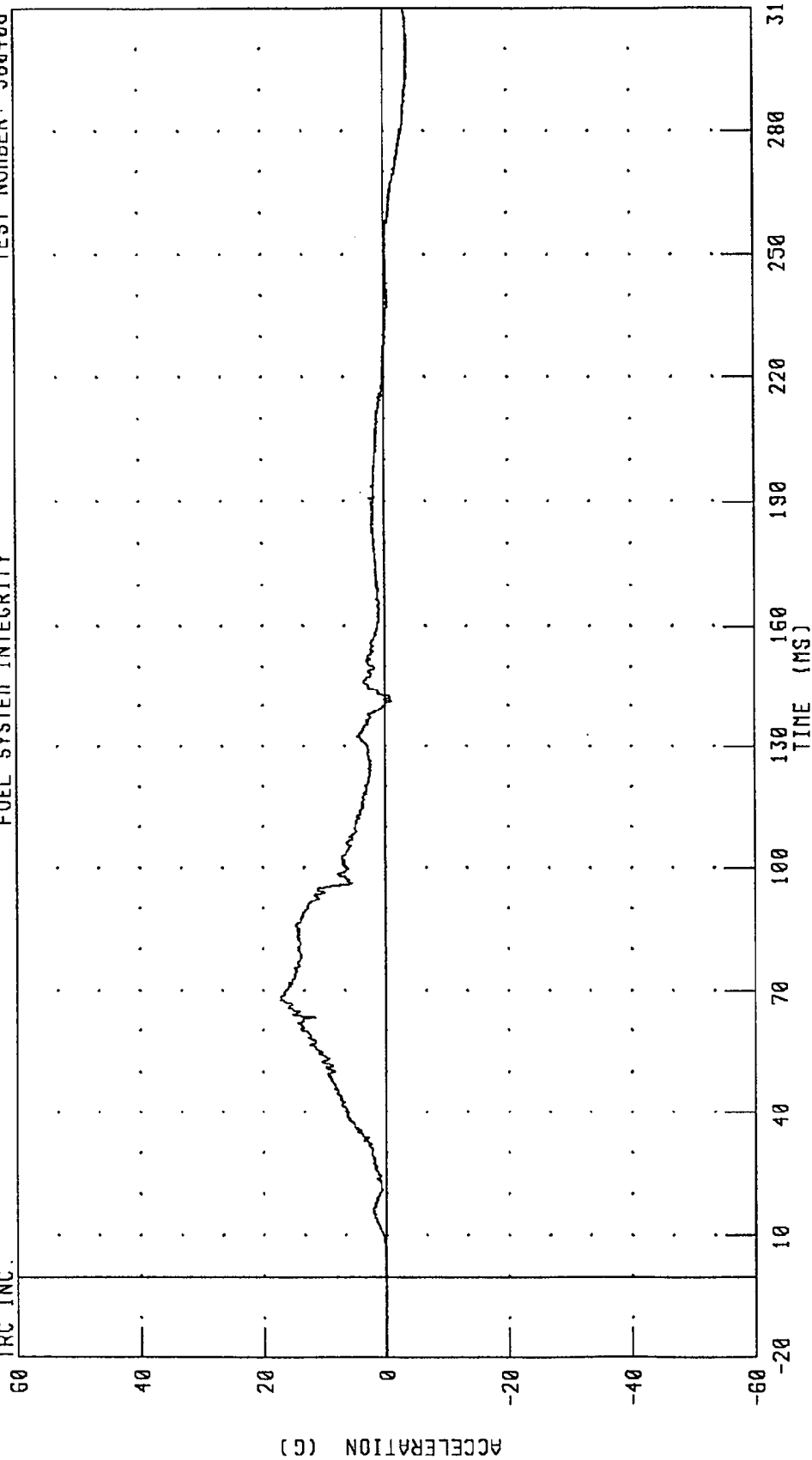
CHANNEL: CSTXD2 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: PEVXG2 FILTER: CH. CLASS 1000

PEAK DATA: 17.27 G @ 67.76 MS; -3.94 G @ 292.80 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

IRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

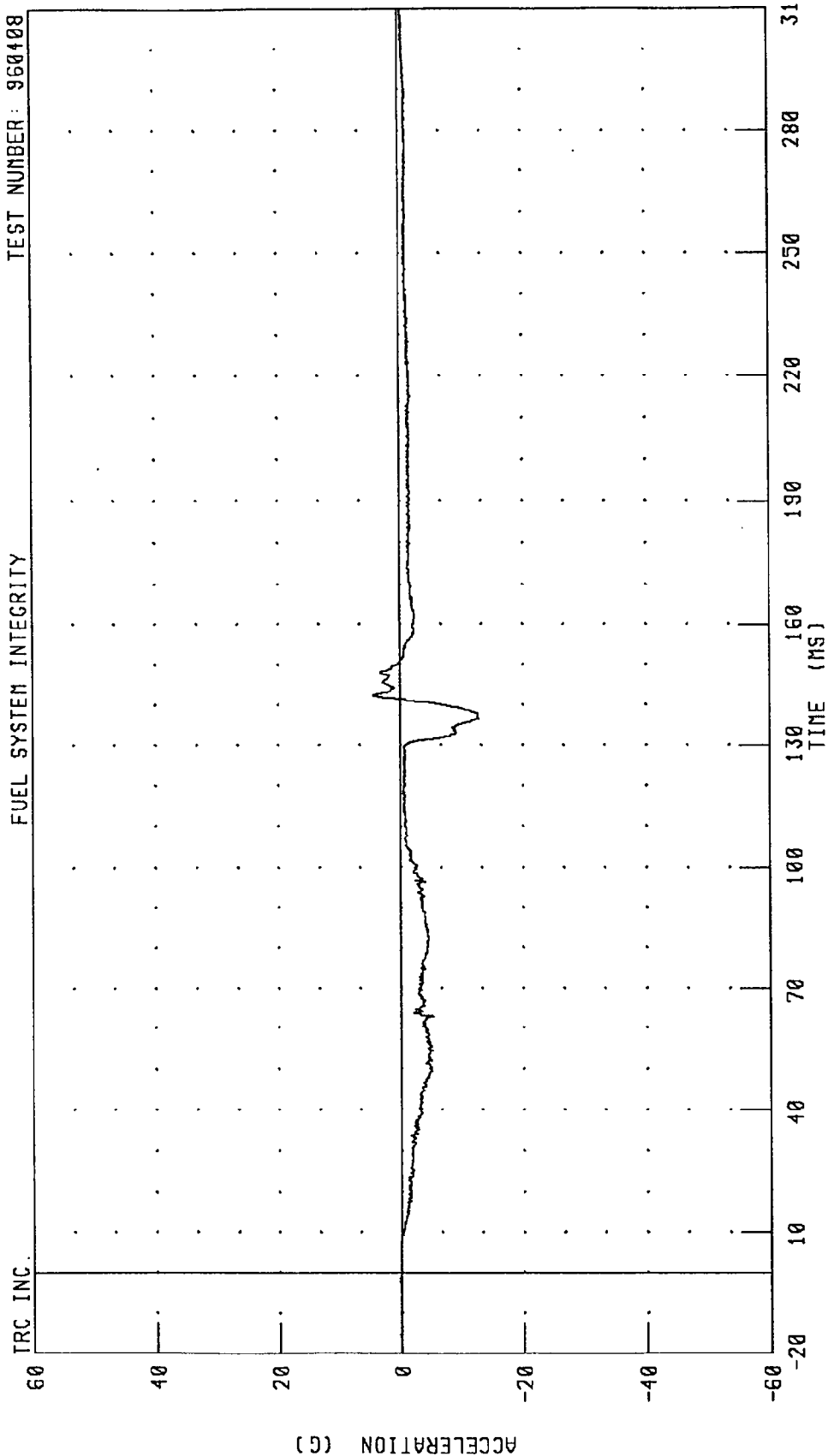
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

PEAK DATA: 1.95 G @ 148.56 MS; -4.69 G @ 83.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



PEAK DATA: 4.45 G @ 142.48 MS; -12.85 G @ 136.64 MS

CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS RESULTANT ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.

100

80

60

40

20

0

-20

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

PEAK DATA: 17.99 G @ 68.40 MS; 0.07 G @ -20.00 MS

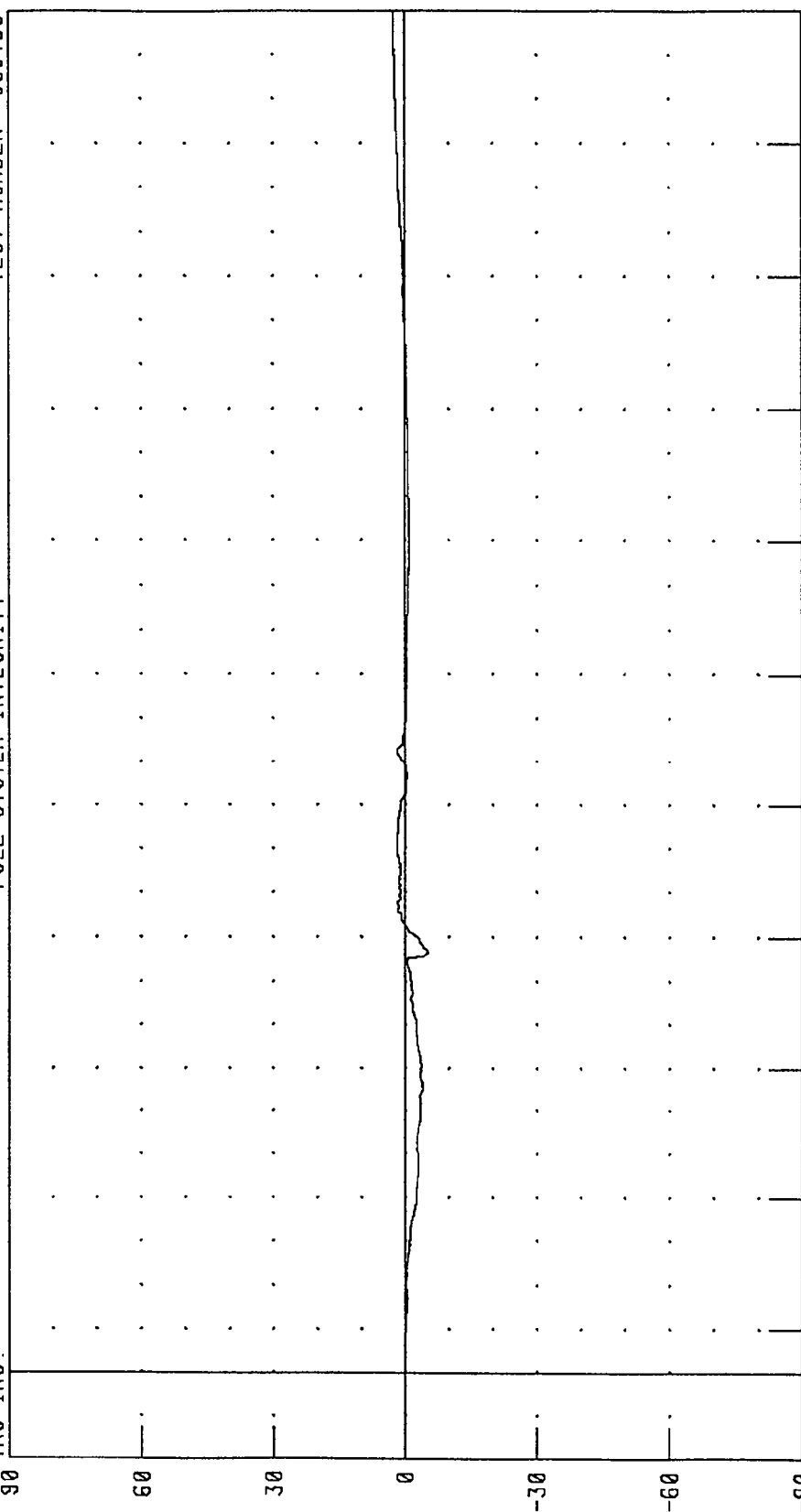
CHANNEL: PEVRC2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 256.90 N @ 307.60 MS; -524.77 N @ 96.56 MS

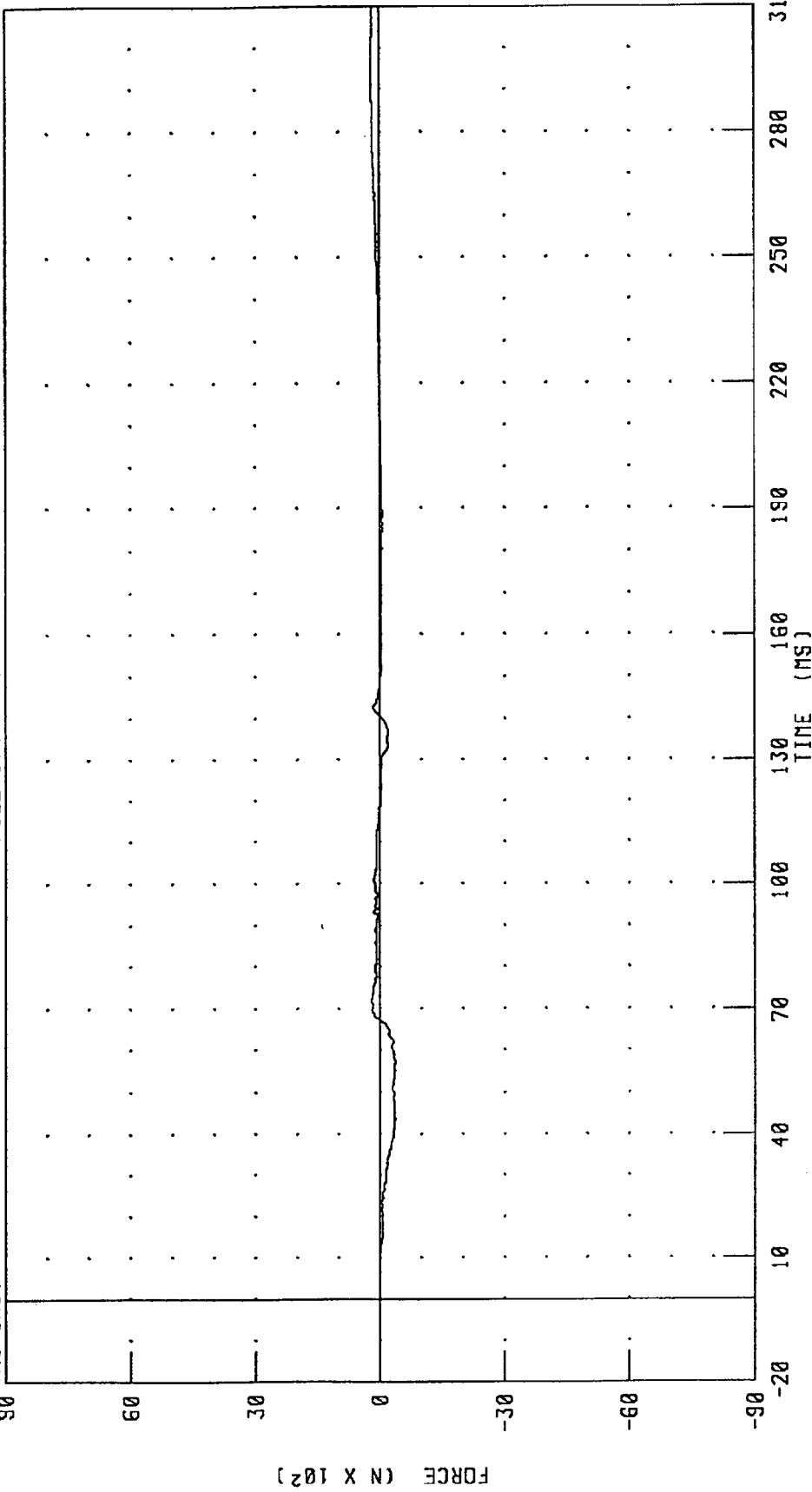
CHANNEL: LFMF2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



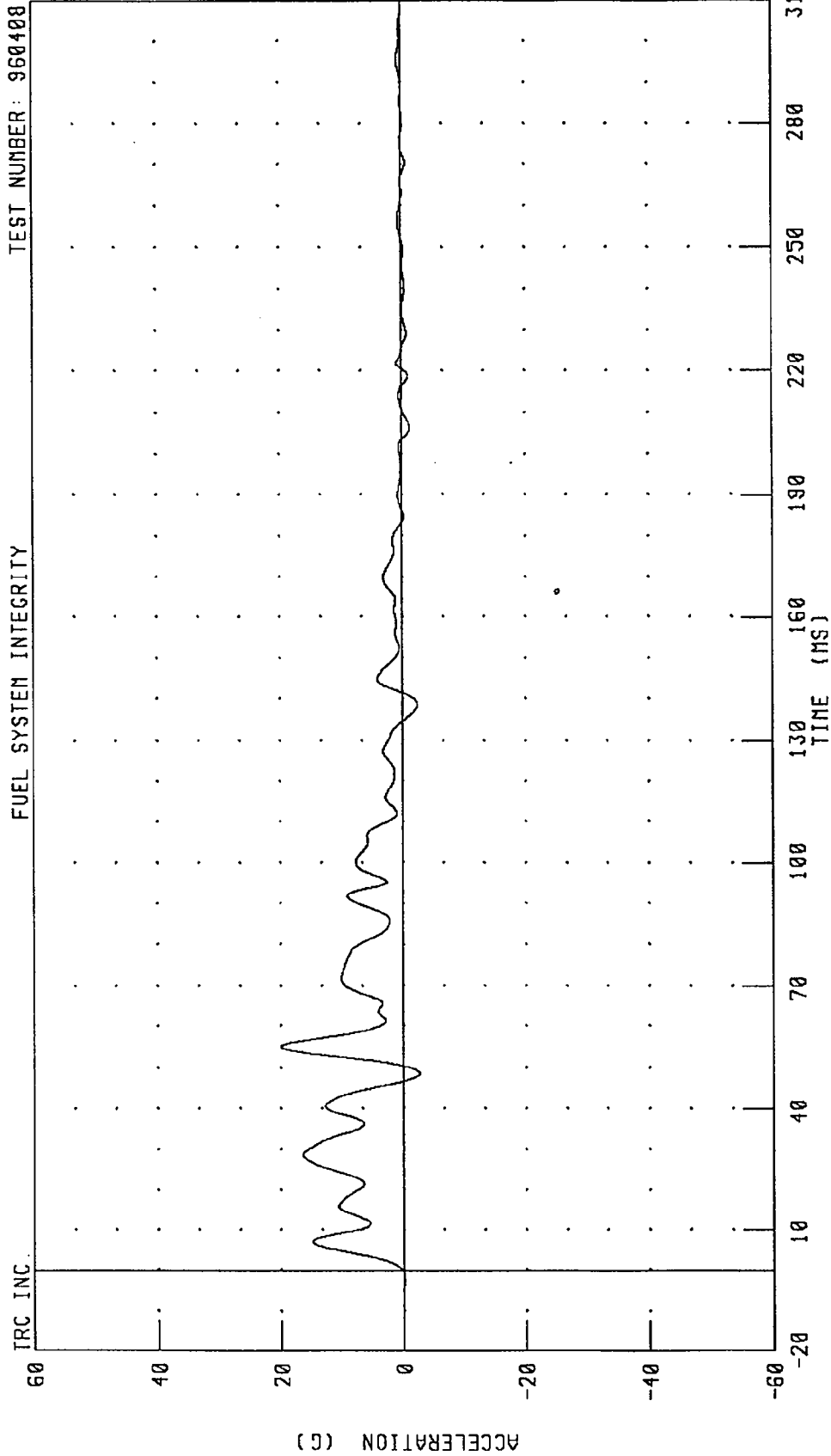
PEAK DATA: 207.41 N @ 71.92 MS; -378.23 N @ 57.12 MS

CHANNEL: RFMF2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



PEAK DATA: 19.98 G @ 54.96 MS; -2.64 G @ 48.64 MS

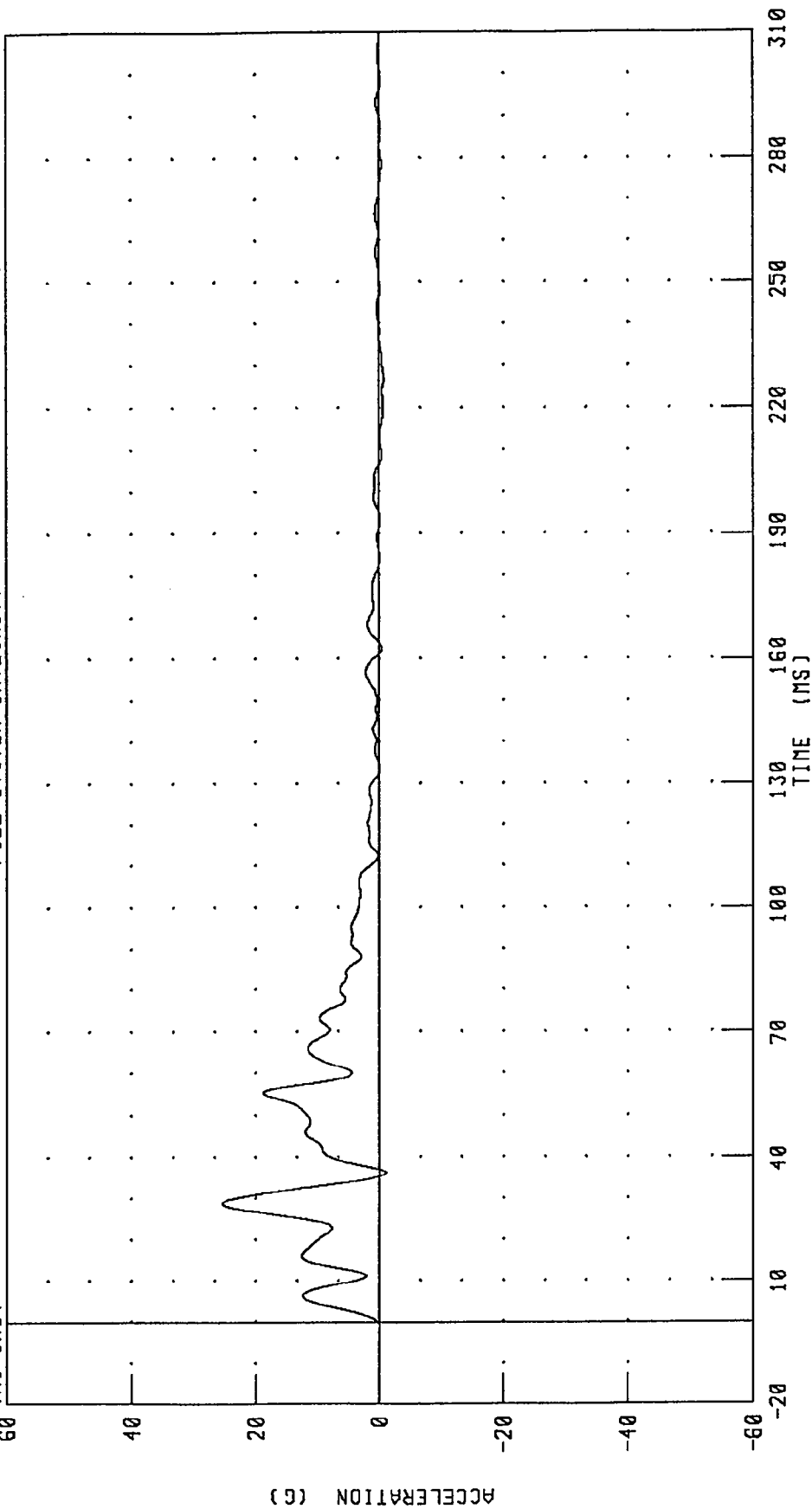
CHANNEL: TLFXG1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



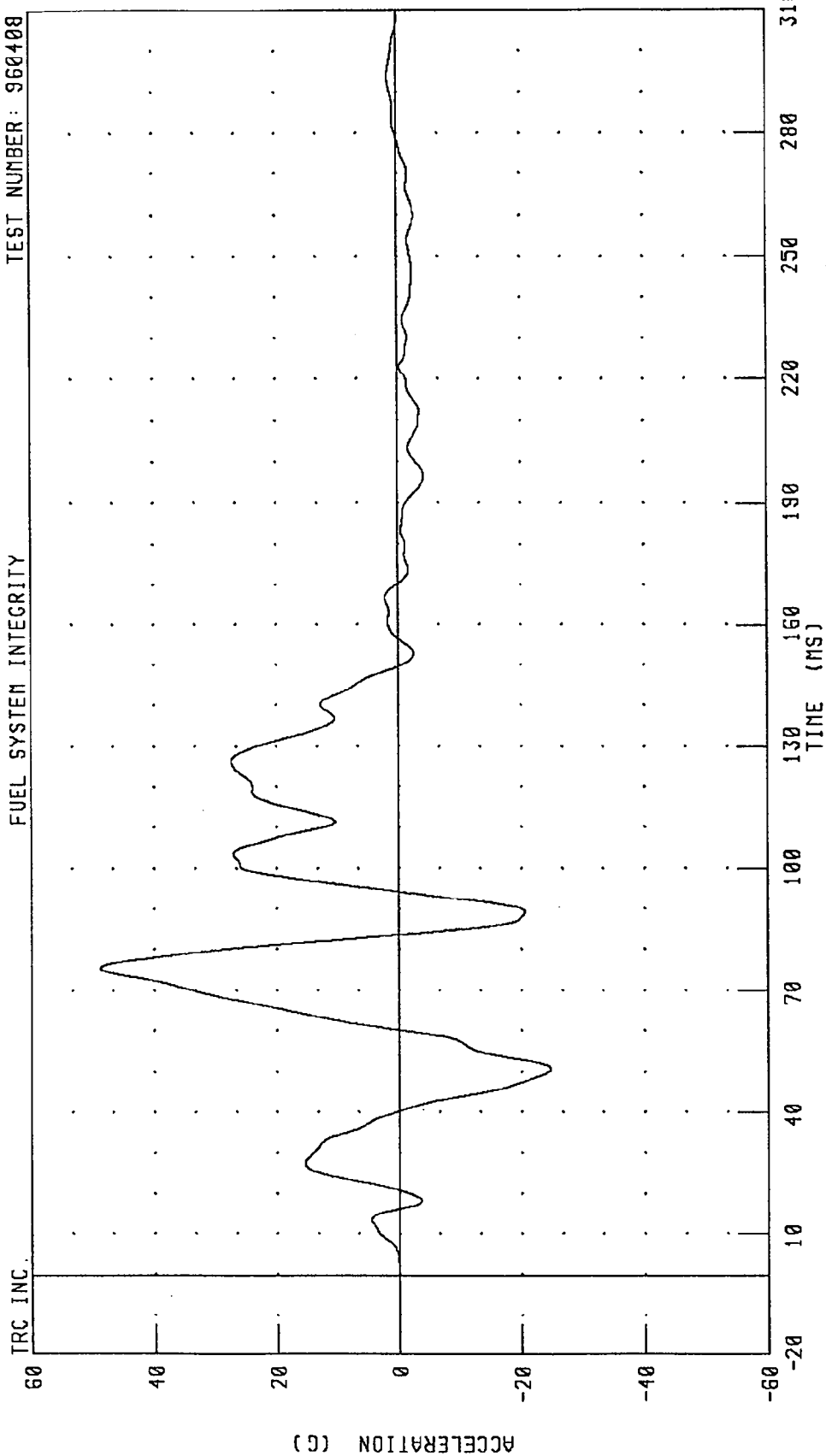
PEAK DATA: 25.44 G @ 28.80 MS; -1.11 G @ 36.24 MS

CHANNEL: TRFXG1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
FRONT SEAT BACK MID X-AXIS ACCELERATION

TEST NUMBER: 960408

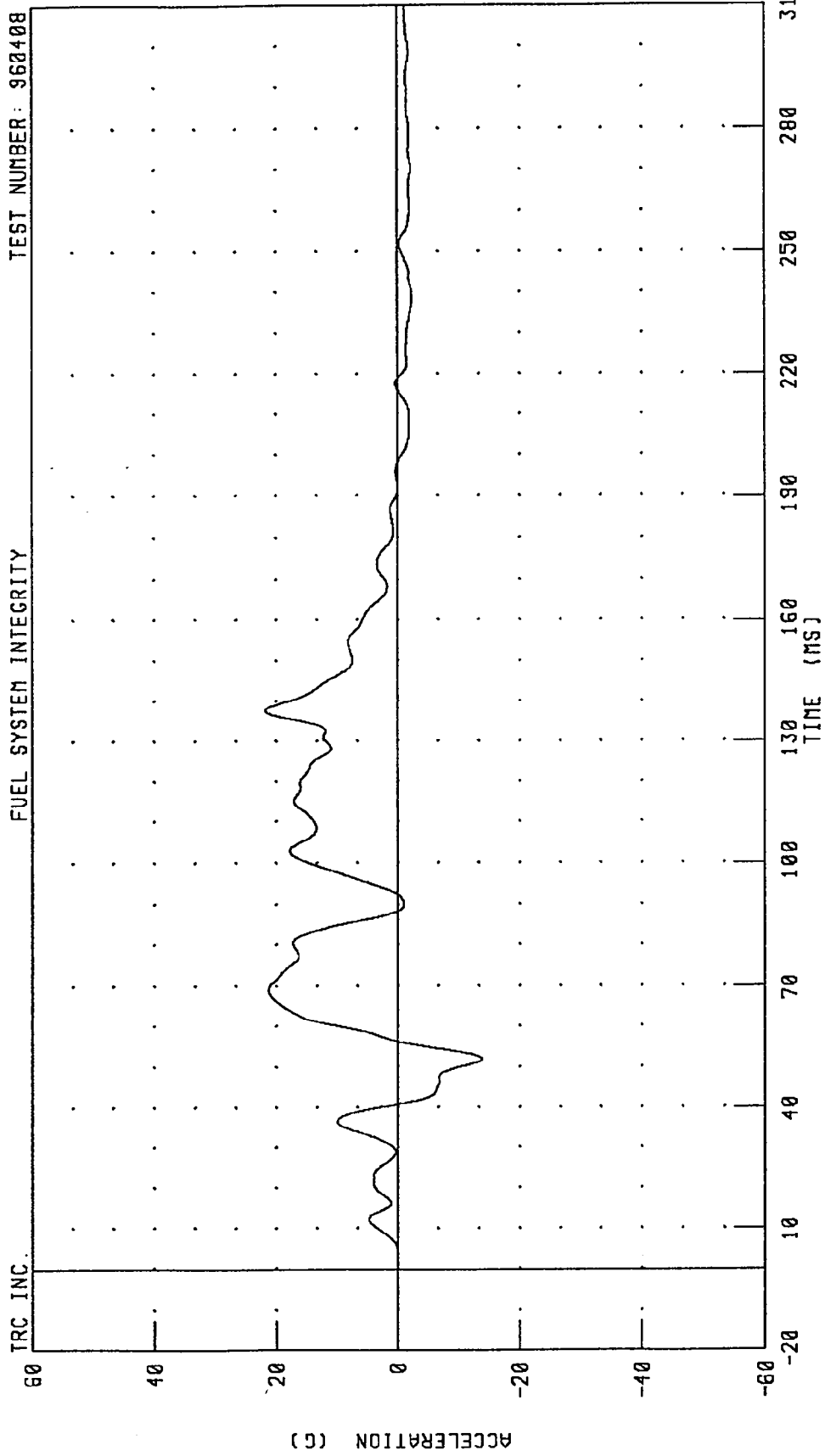
FUEL SYSTEM INTEGRITY



MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
FRONT SEAT BACK MID X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



CHANNEL: TRFXG2 FILTER: CH. CLASS 60

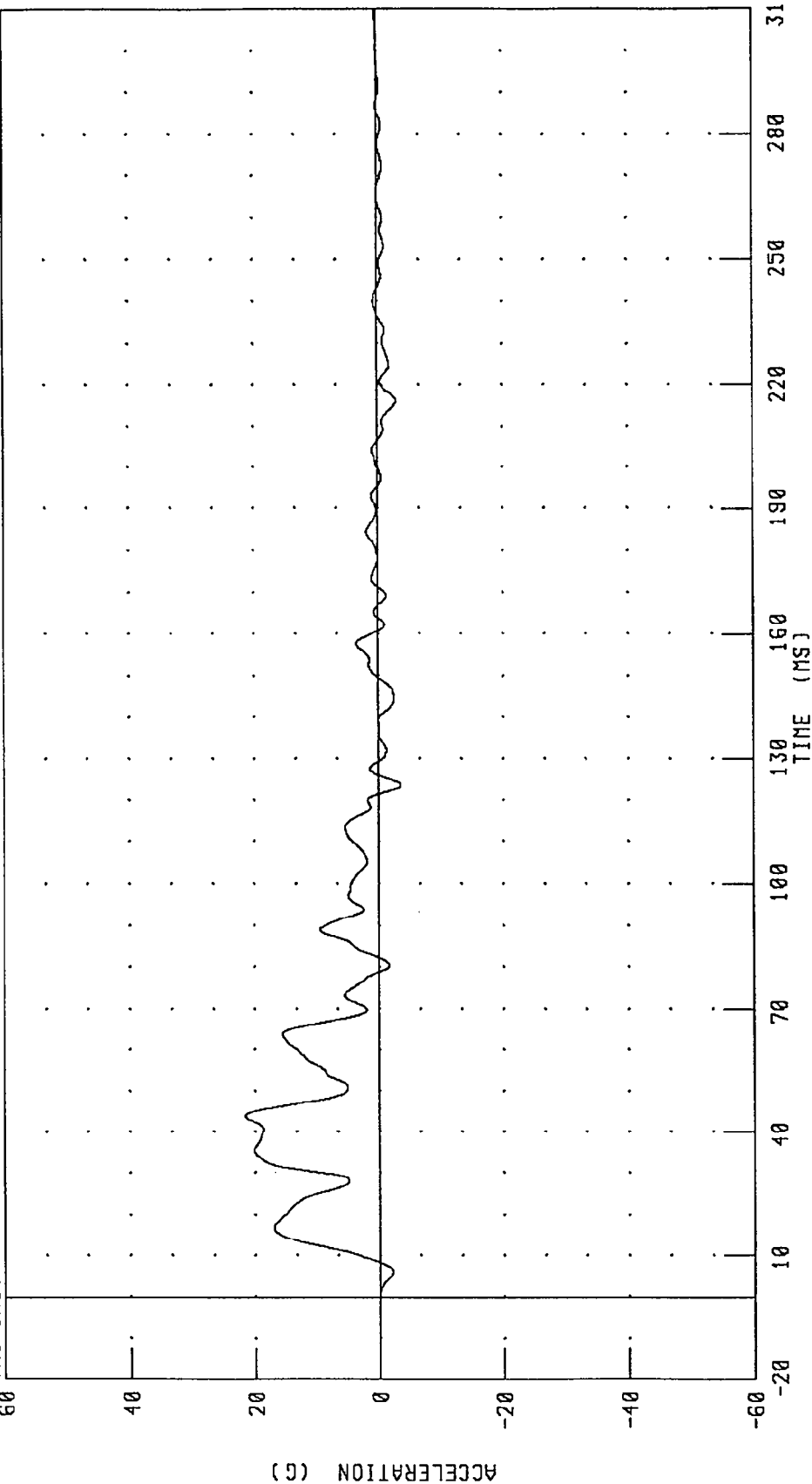
PEAK DATA: 21.85 G @ 137.76 MS; -13.87 G @ 51.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
RADIATOR SUPPORT X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: FFCXG FILTER: CH. CLASS 60

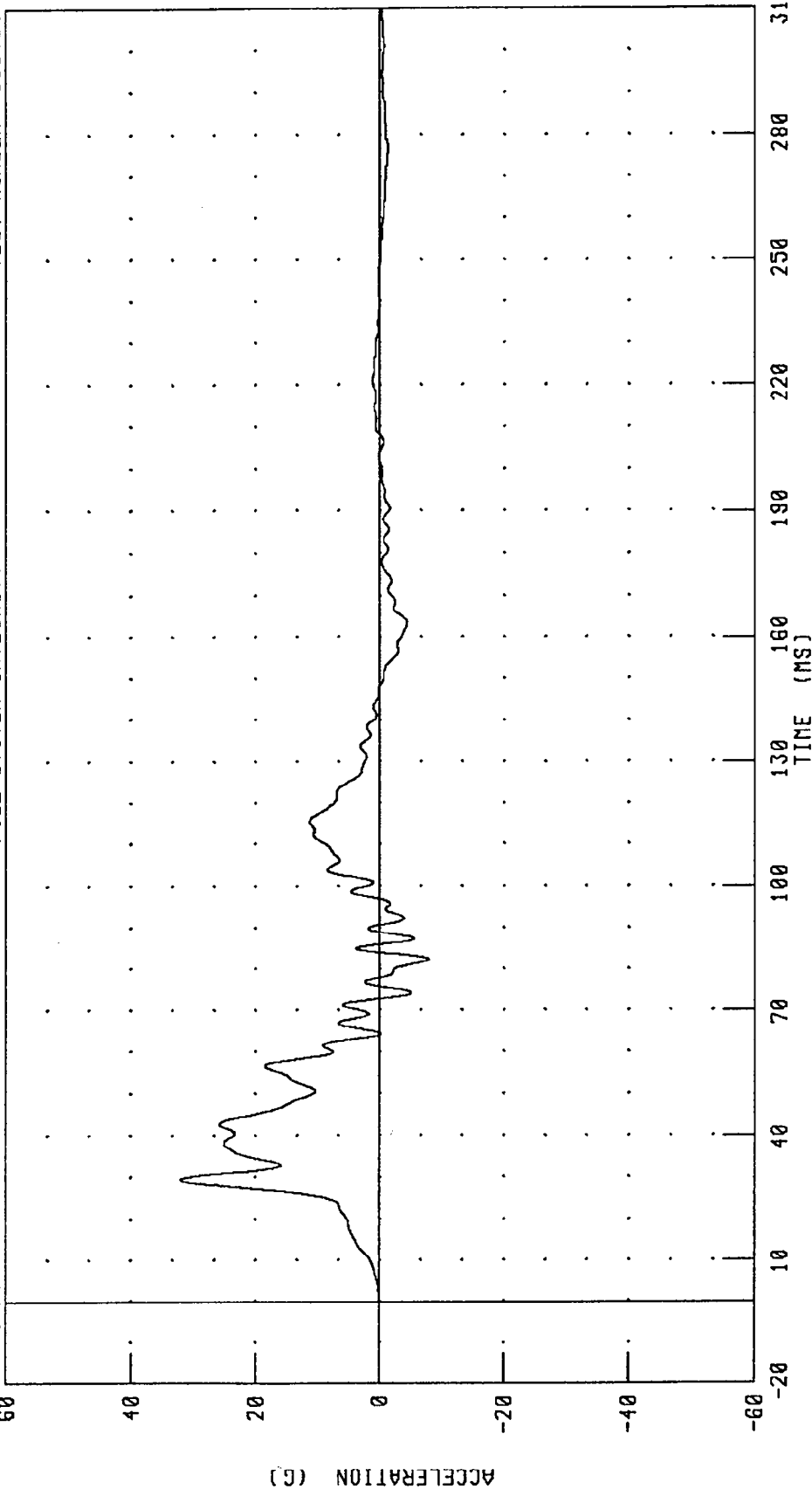
PEAK DATA: 21.63 G @ 43.92 MS, -3.58 G @ 123.68 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



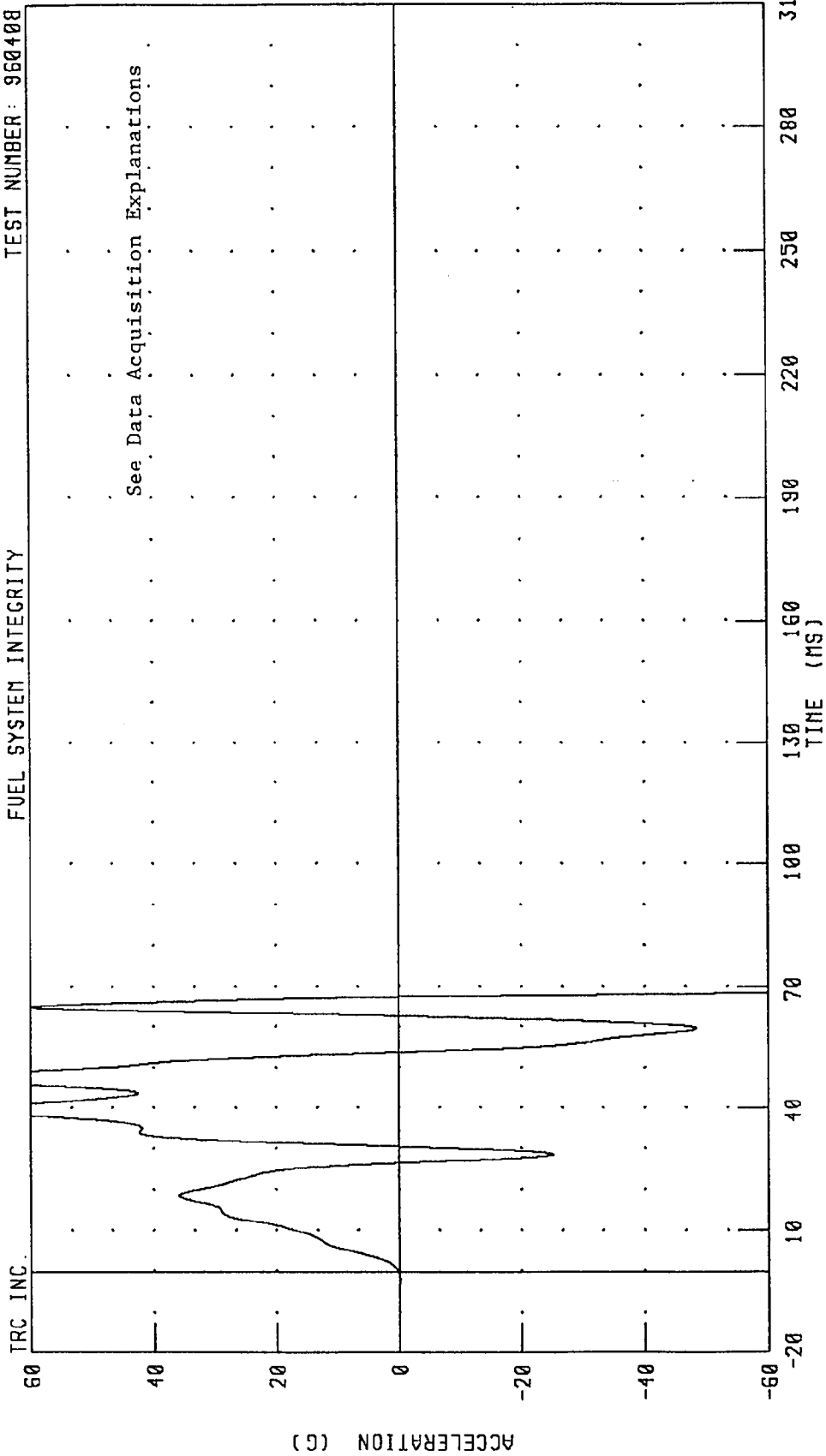
PEAK DATA: 32.07 G @ 29.52 MS; -7.96 G @ 82.32 MS

CHANNEL: ENGXC FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 REAR WHEEL AXLE X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY



PEAK DATA: 83.12 G @ 47.52 MS; -1042.89 G @ 75.04 MS

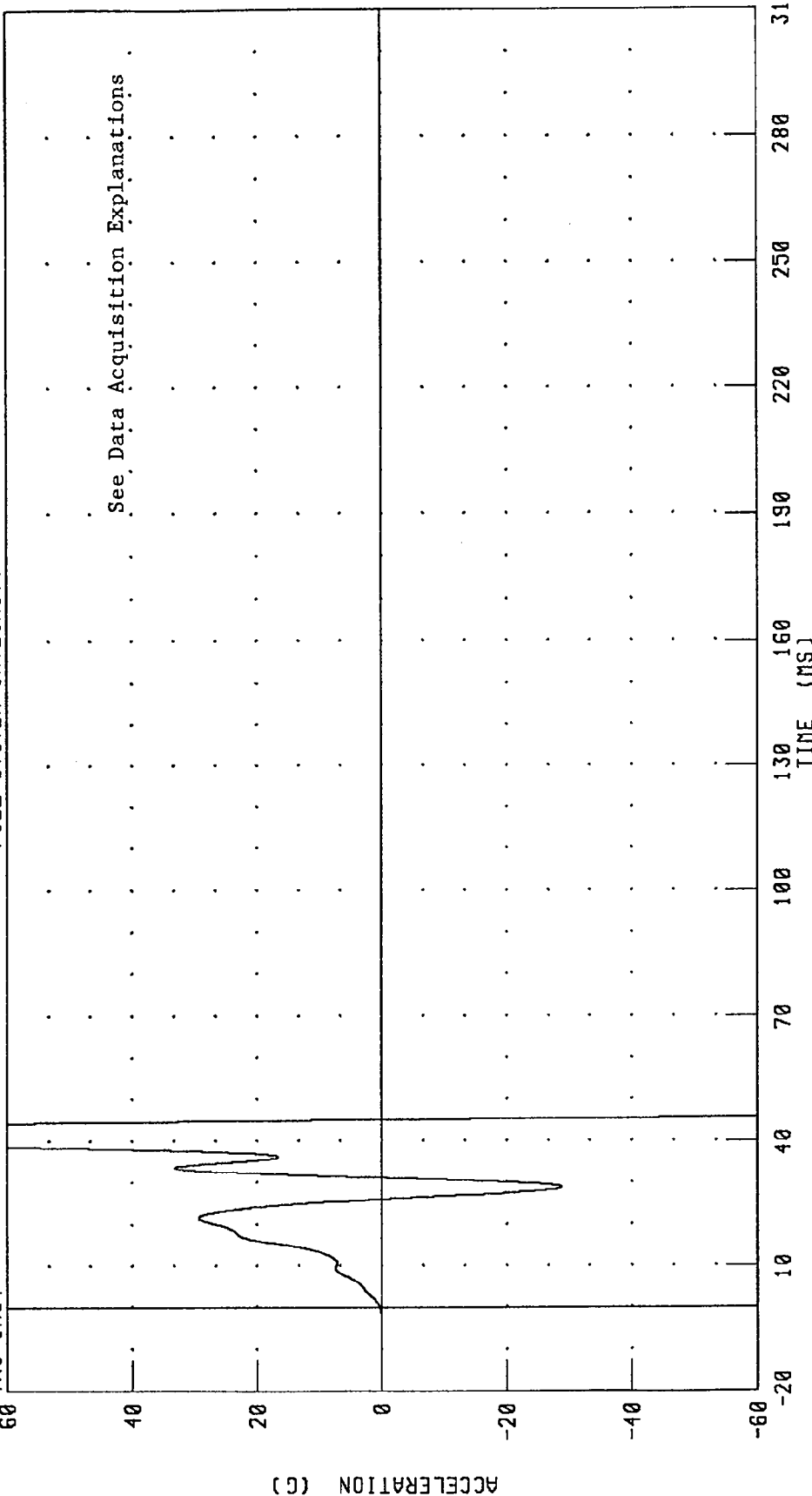
CHANNEL: RAXXG1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 REAR WHEEL AXLE X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

60 IRC INC.



PEAK DATA: 140.95 G @ 41.20 MS; -1038.66 G @ 51.60 MS

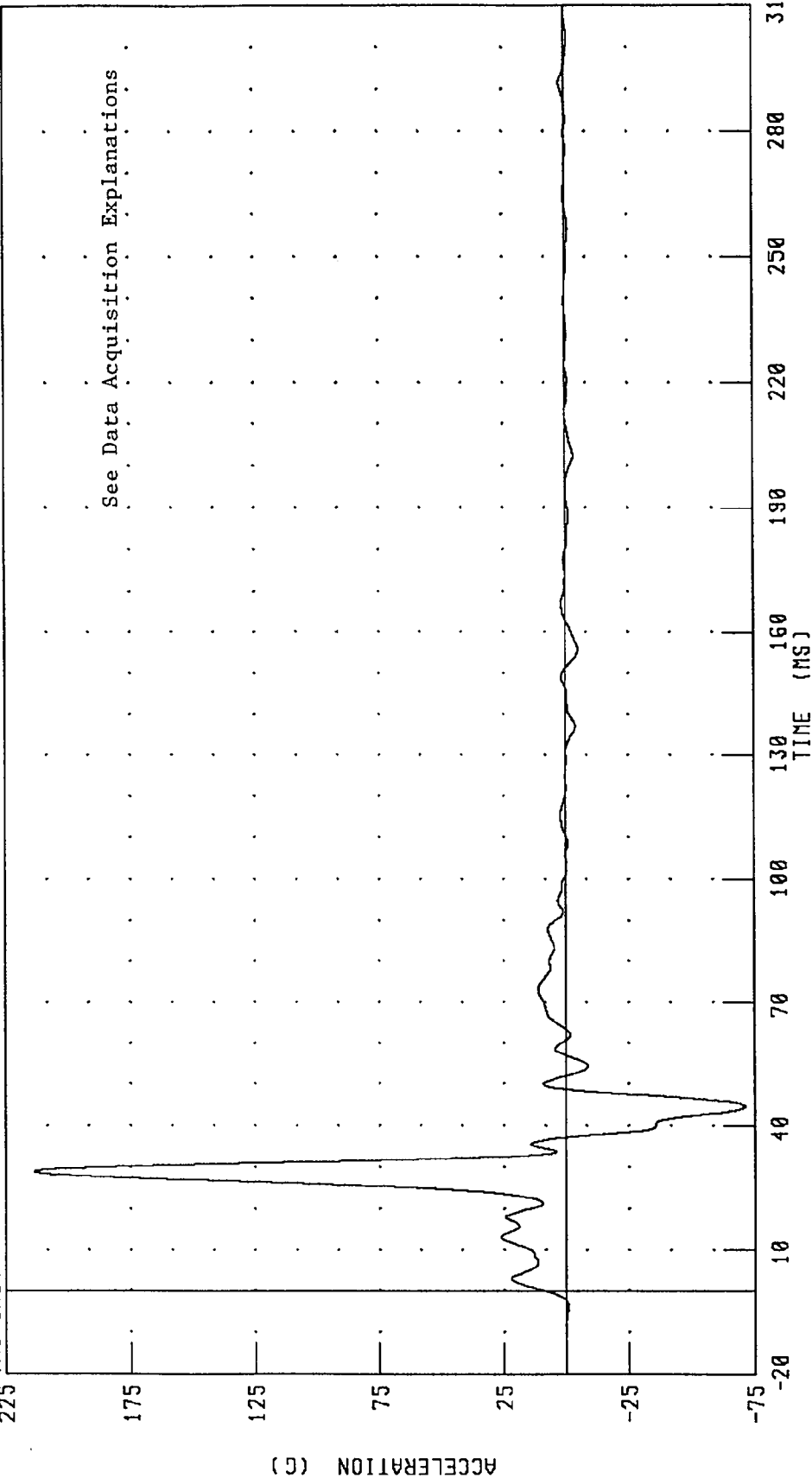
CHANNEL: RAXXG2 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
PACKAGE SHELF X-AXIS ACCELERATION

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: TCRXC FILTER: CH. CLASS 60

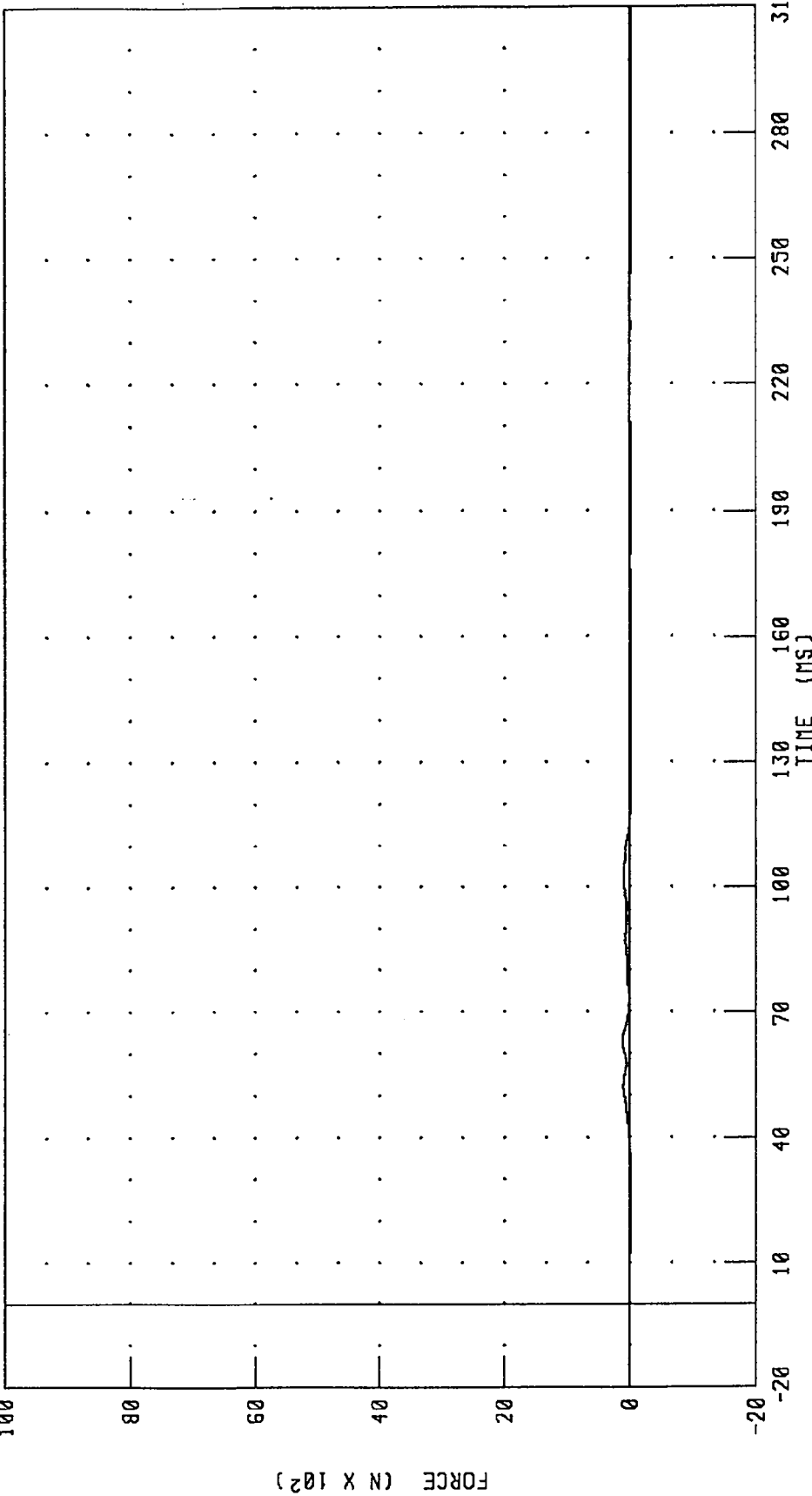
PEAK DATA: 213.54 G @ 29.04 MS; -71.06 G @ 44.56 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER SHOULDER BELT FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 113.63 N @ 62.96 MS; -16.78 N @ 126.08 MS

FILTER: CH. CLASS 60

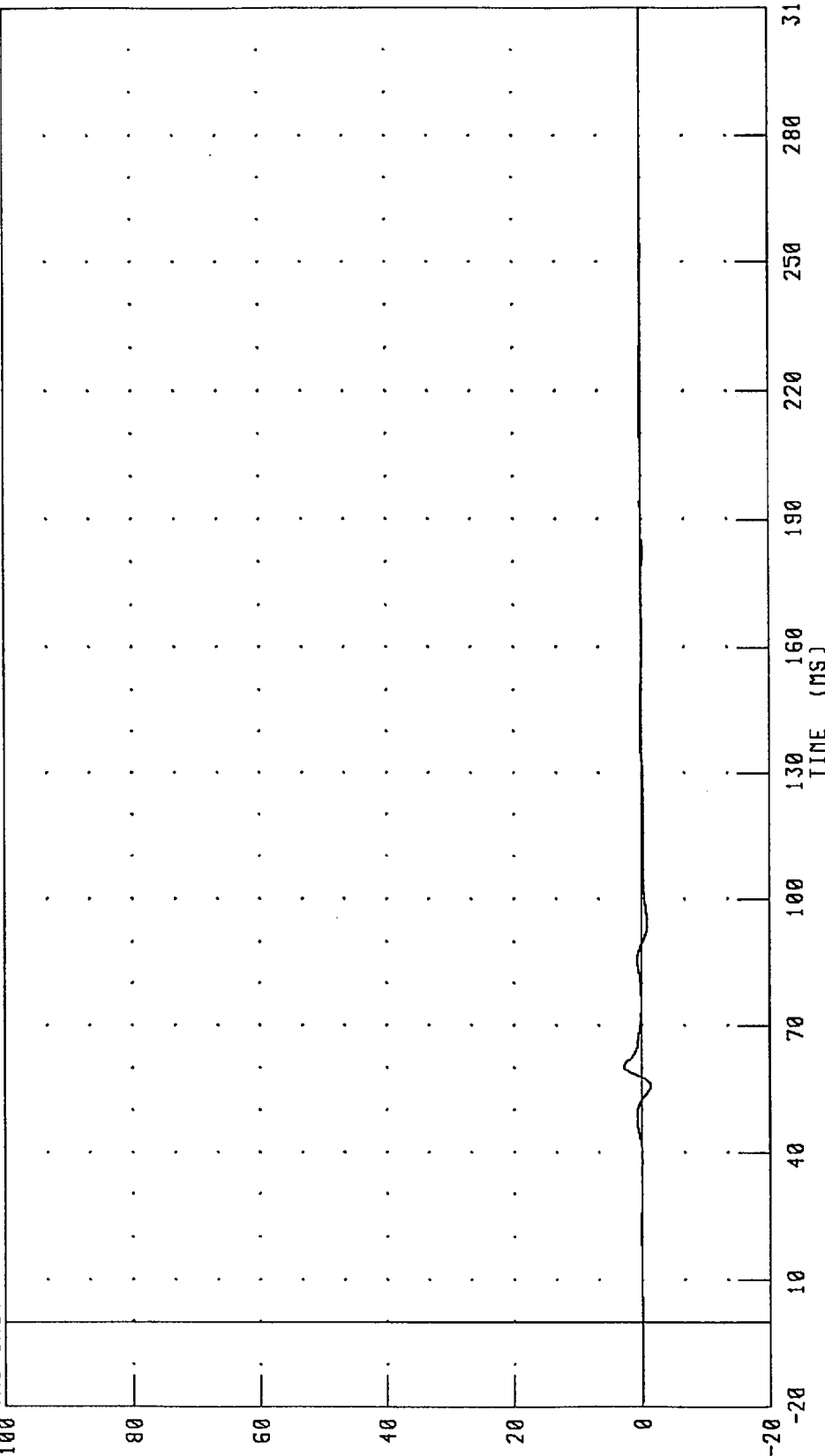
CHANNEL: SHBFI

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 DRIVER LAP BELT OUTBOARD FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 282.04 N @ 60.40 MS; -131.55 N @ 55.60 MS

FILTER: CH. CLASS 60

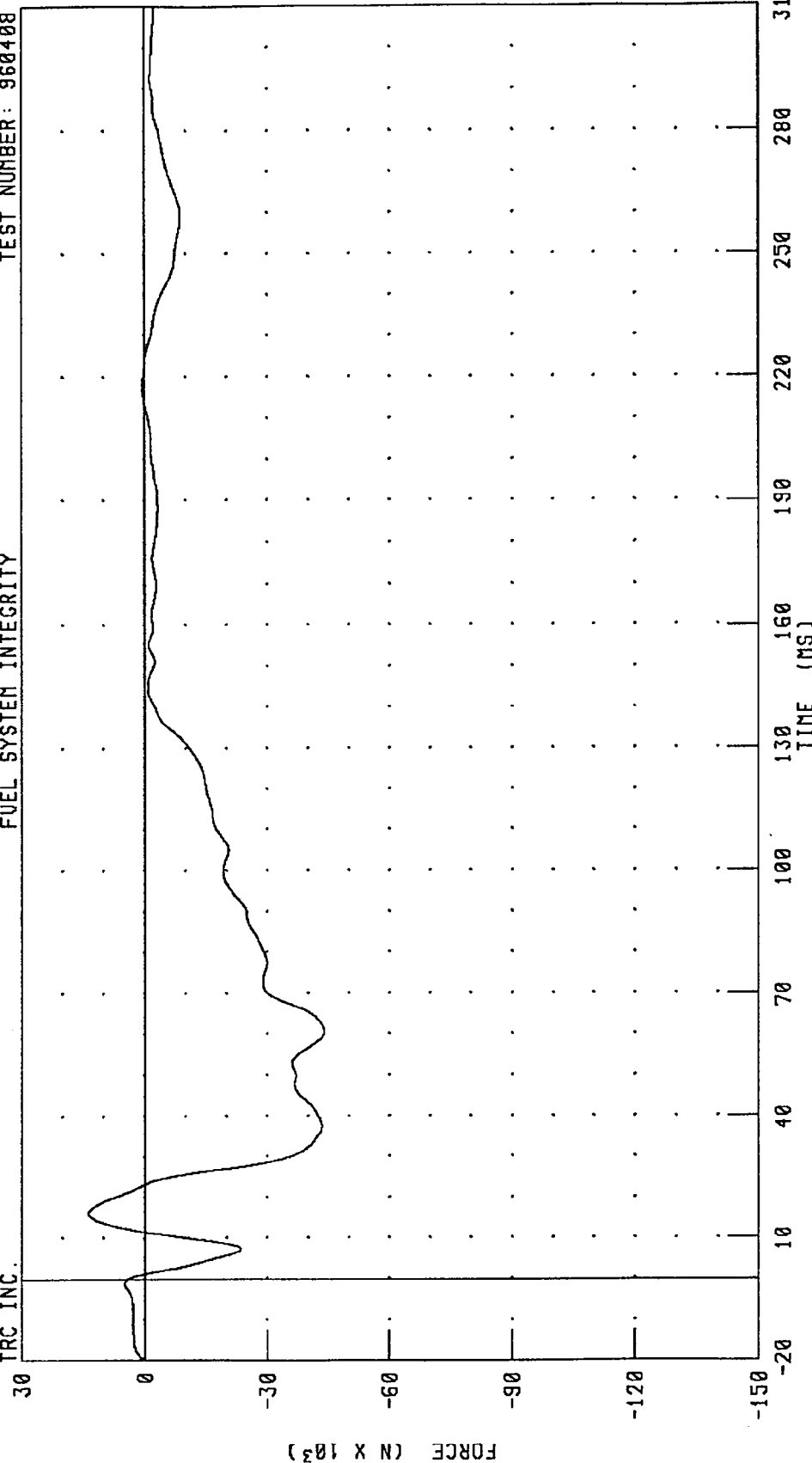
CHANNEL: LBOF1

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
BARRIER FRONT TOP LEFT FORCE

FUEL SYSTEM INTEGRITY

TEST NUMBER: 960408

TRC INC.



PEAK DATA: 13656.05 N @ 16.24 MS; -44015.22 N @ 60.64 MS

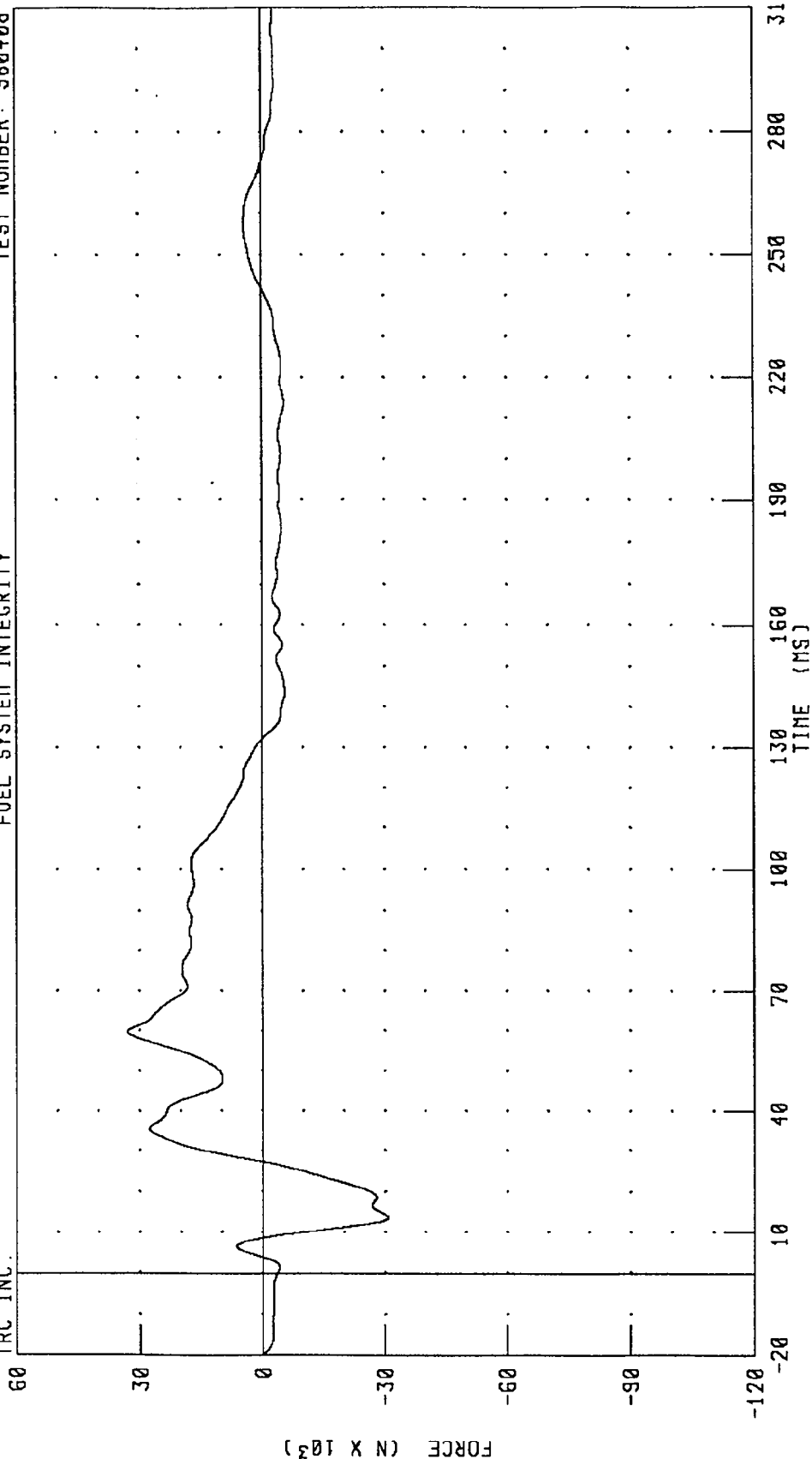
CHANNEL: BFFXF1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 BARRIER FRONT BOTTOM LEFT FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 32894.22 N @ 59.76 MS; -30757.60 N @ 13.68 MS

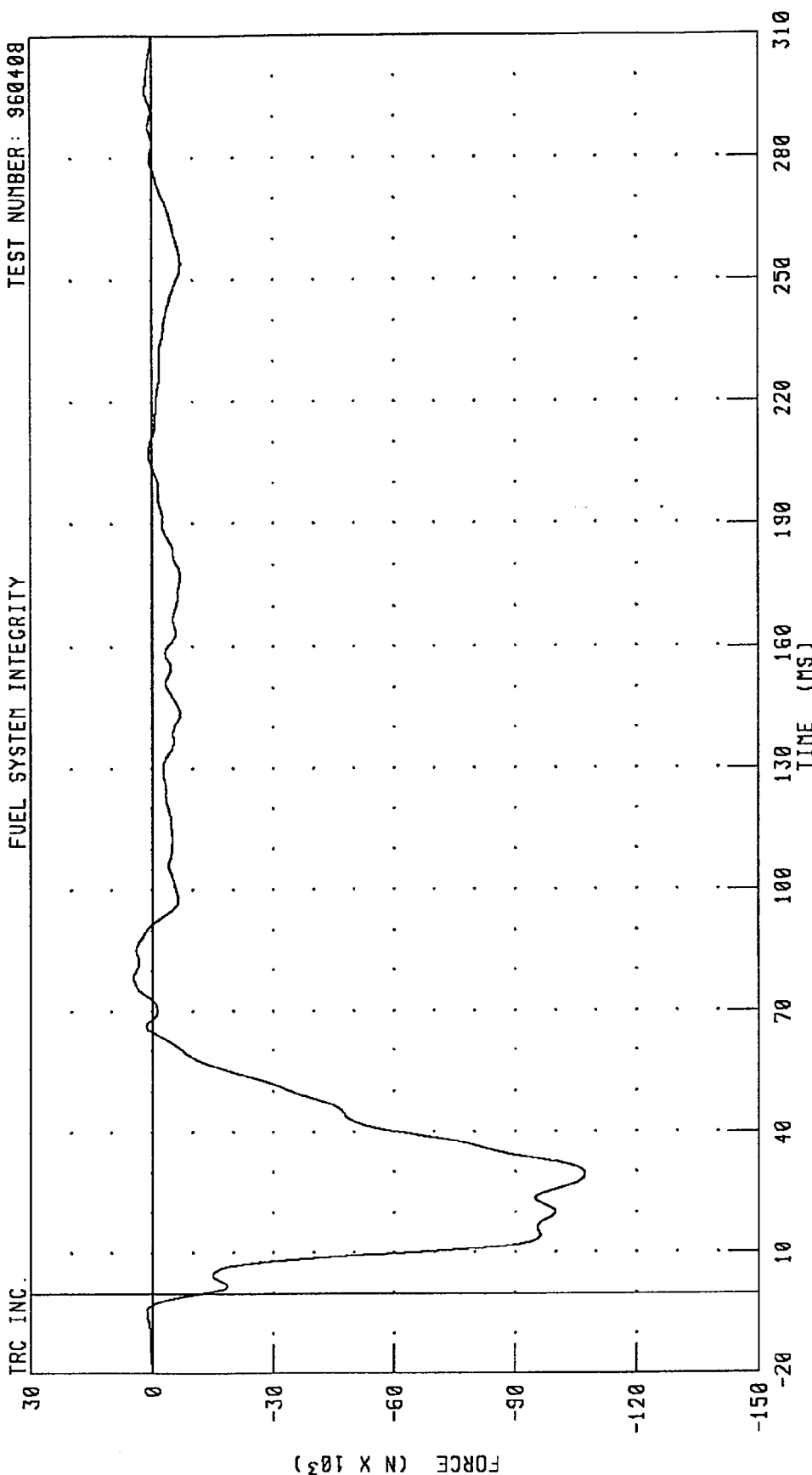
CHANNEL: BFFXF2 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 BARRIER FRONT BOTTOM RIGHT FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

TRC INC.



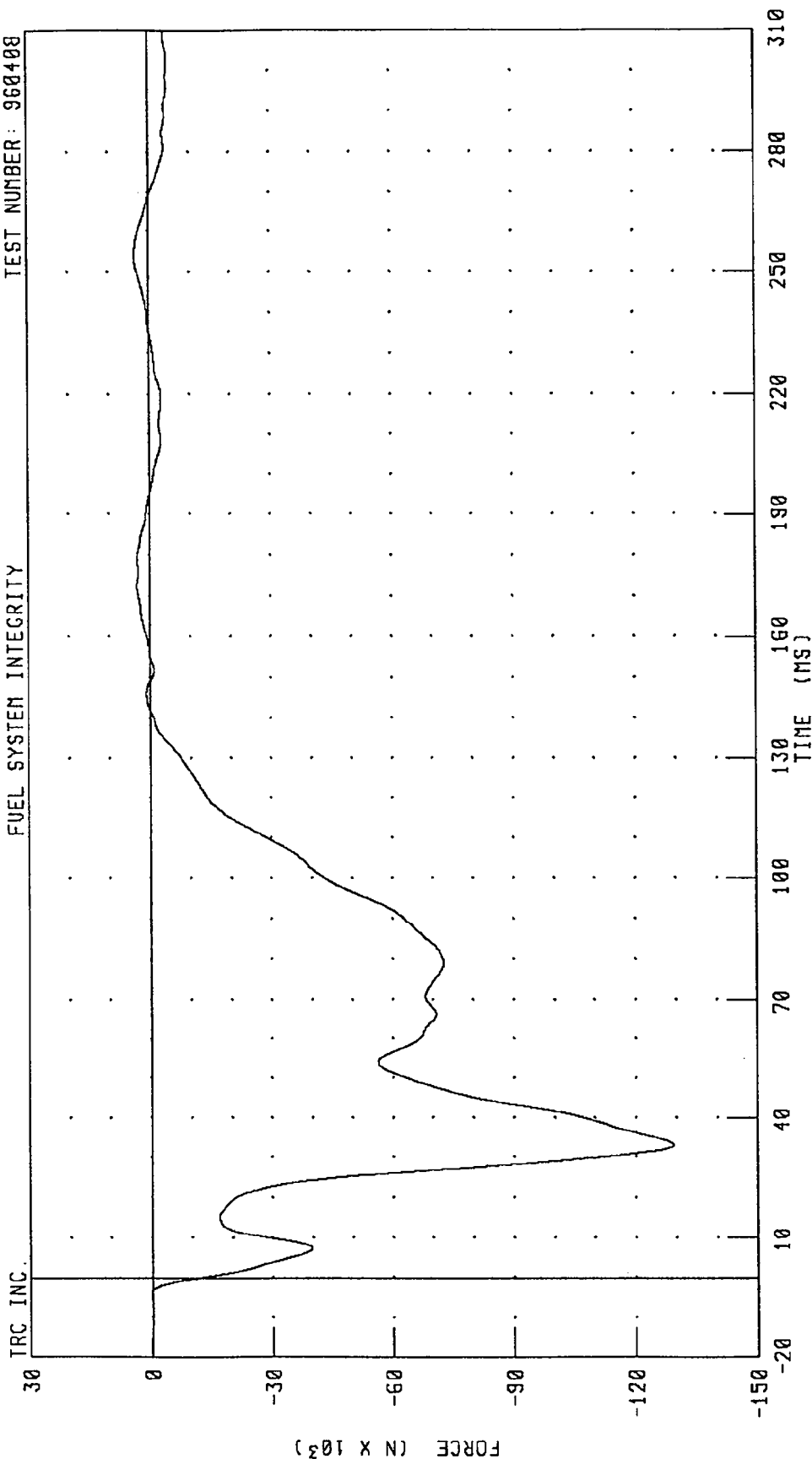
PEAK DATA: 4552.51 N @ 78.40 MS; -107319.75 N @ 29.44 MS

CHANNEL: BFFXF3 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
BARRIER FRONT TOP RIGHT FORCE

TEST NUMBER: 960408

FUEL SYSTEM INTEGRITY

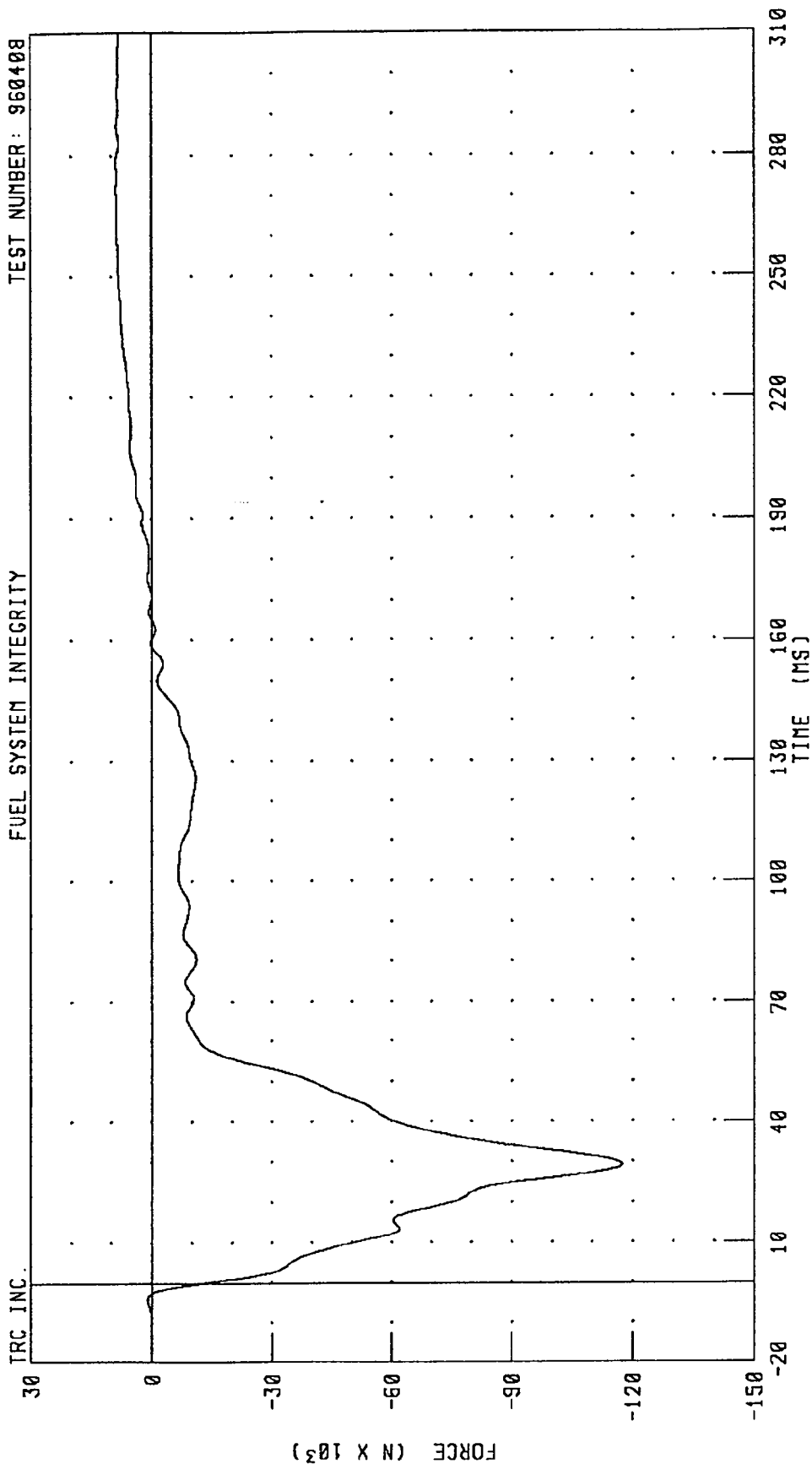


PEAK DATA: 3522.00 N @ 253.68 MS, -129309.83 N @ 33.04 MS

CHANNEL: BFFXF4 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 CHEVROLET BLAZER AT 80 KPH AND 70% OVERLAP
 BARRIER FRONT CENTER FORCE

FUEL SYSTEM INTEGRITY TEST NUMBER: 960408



PEAK DATA: 8850.49 N @ 278.64 MS, -117415.47 N @ 29.28 MS

CHANNEL: BFFXF5 FILTER: CH. CLASS 60

Appendix C

Dummy Calibration Information

Pre-Test Calibration

Serial Number 35

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III EXTERNAL DIMENSIONS

35 VECTOR

11-JUL-95

TRC INC.

TEST NO: 35C1ED1

572E SN35 EXT.DIMENSION CAL01

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE	(Y)	970 -1001 MM	988. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	848. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	86. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	137. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	886. MM
THIGH CLEARANCE	(F)	140 - 155 MM	152. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	475. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	442. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	500. MM
FOOT LENGTH	(P)	252 - 267 MM	254. MM
FOOT BREADTH	(W)	91 - 107 MM	94. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	91. MM
SHOULDER BREADTH	(V)	422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	511. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	297. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Richard LeVan

RUN NUMBER: 071295.1437

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

02-APR-96

TRC INC.

TEST NO: 35C1HD7

572E SN35 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	31.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	253.49 G
PEAK LATERAL ACCELERATION	15 G MAX	-5.42 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Richard L. Van

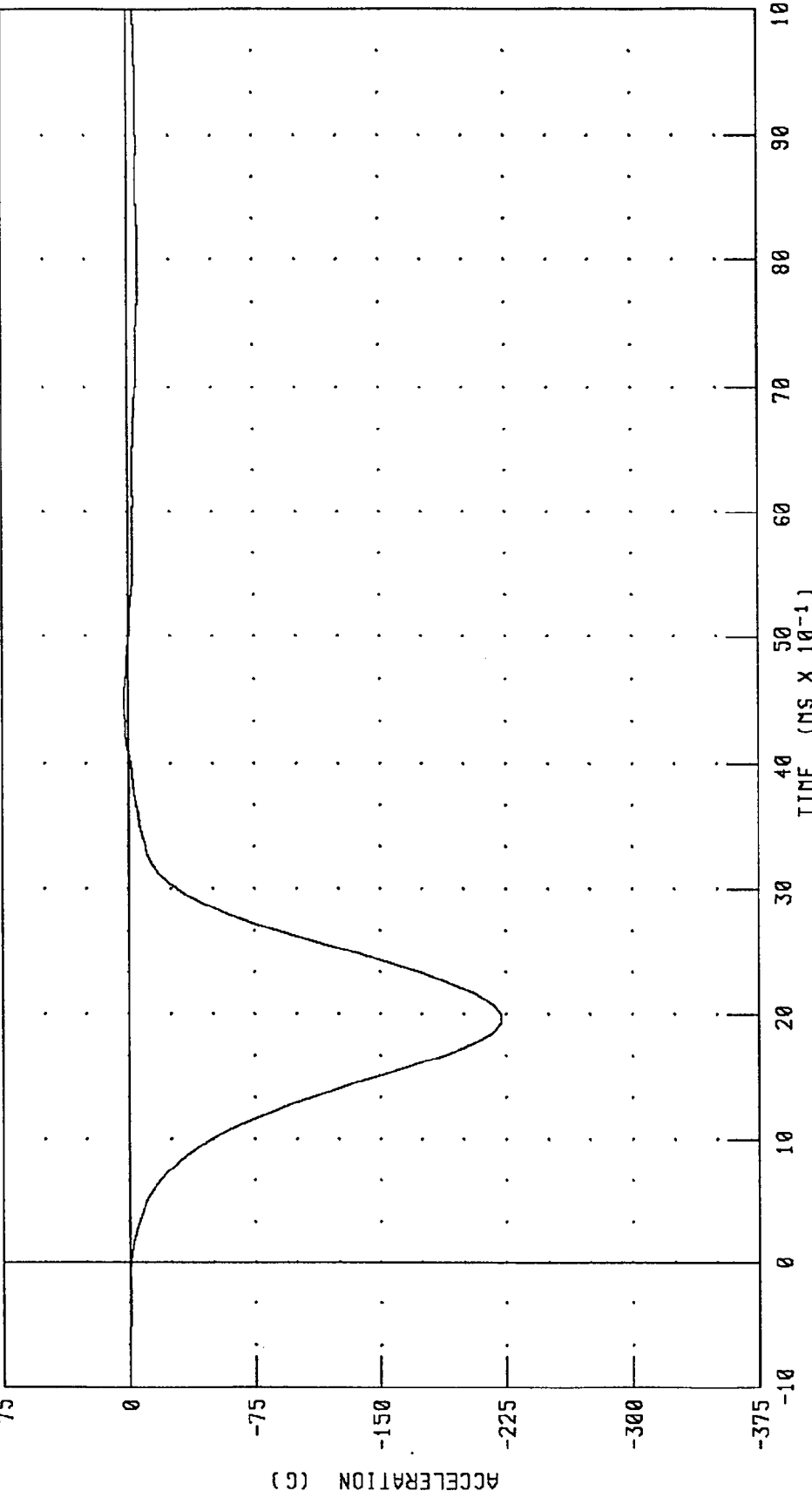
RUN NUMBER: 040296.0843;1

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 35C1H07

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 043096.1059;1



PEAK DATA: 2.32 G @ 4.48 MS; -222.27 G @ 2.00 MS

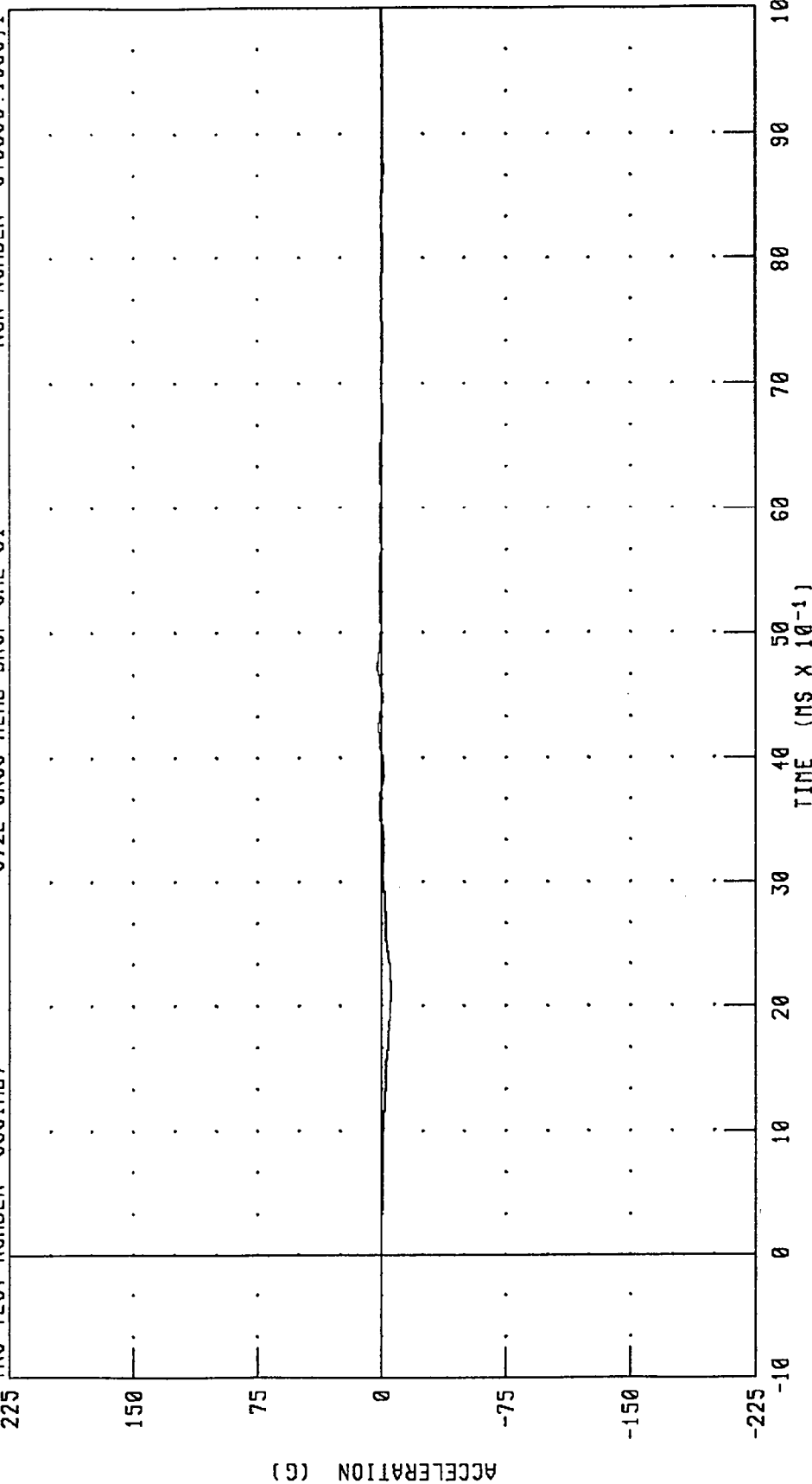
CHANNEL: HEDXG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 35C1H07

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 043096.1059;1



PEAK DATA: 2.44 G @ 4.72 MS; -5.43 G @ 2.16 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

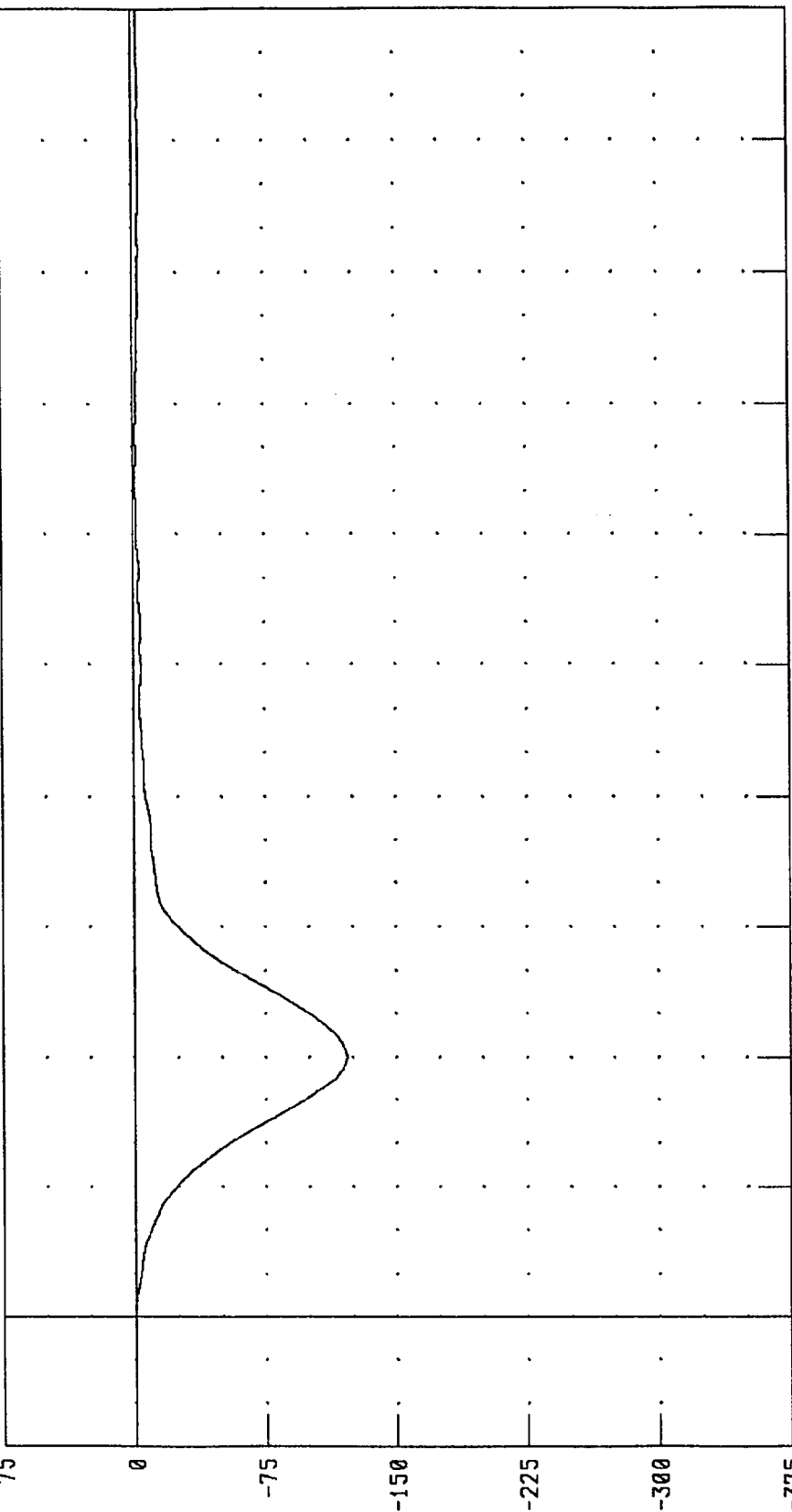
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 35C1HD7

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 043096.1059,1

75



ACCELERATION (G)

-375

-10

0

10

20

30

40

50

60

70

80

90

100

TIME (MS X 10⁻¹)

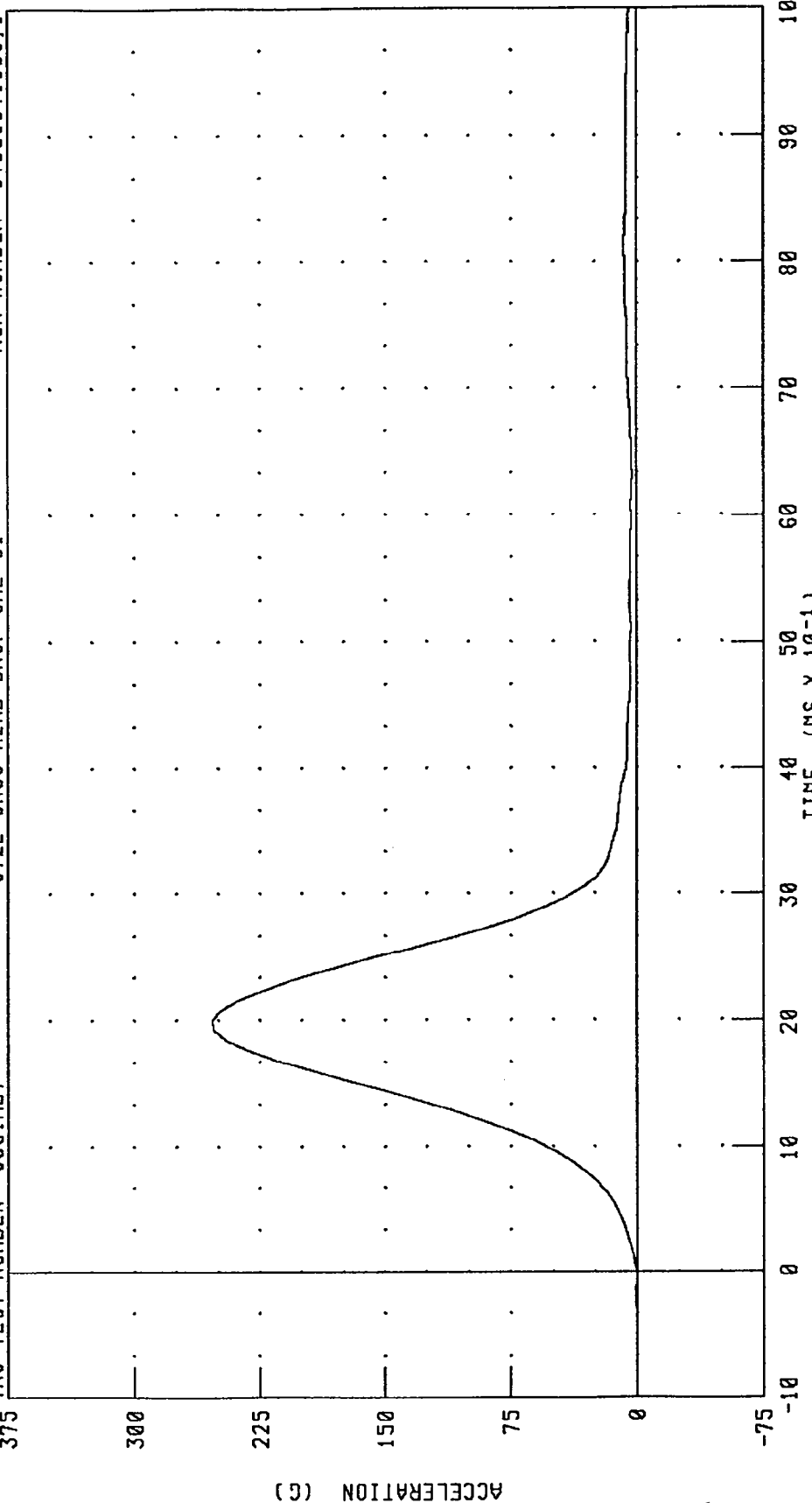
PEAK DATA: 0.03 G @ -0.88 MS; -121.78 G @ 2.00 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

572E SN35 HEAD DROP CAL 01 RUN NUMBER: 043096.1059;1

IRC TEST NUMBER: 35C1HD07



PEAK DATA: 253.50 G @ 2.00 MS; 0.23 G @ -0.96 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 35C1NF1 572E SN35 NECK FLEXION CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.98 G
	20 MS	17.60 - 22.60 G	20.12 G
	30 MS	12.50 - 18.50 G	15.08 G
MAX PENDULUM G		29 G MAX	23.77 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.03 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.36 MS
D PLANE	MAX	64 - 78 DEG.	70.37 DEG.
ROTATION	TIME	57 - 64 MS	58.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	96.89 NM
	TIME	47 - 58 MS	50.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	99.60 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard L. Van

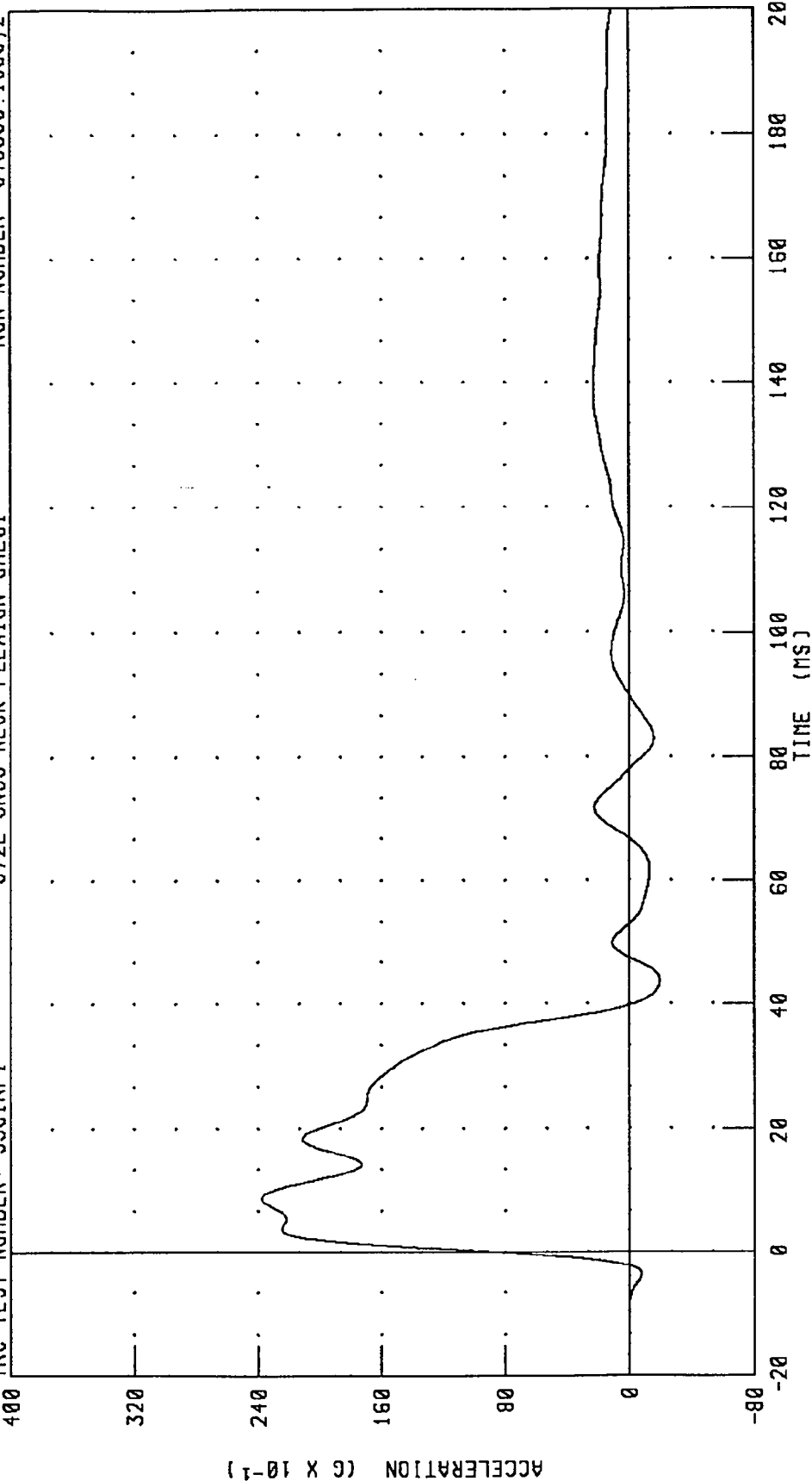
RUN NUMBER: 071195.0843;2

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 35C1NF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 043096.1059;2



CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 23.78 G @ 8.64 MS; -1.97 G @ 43.76 MS

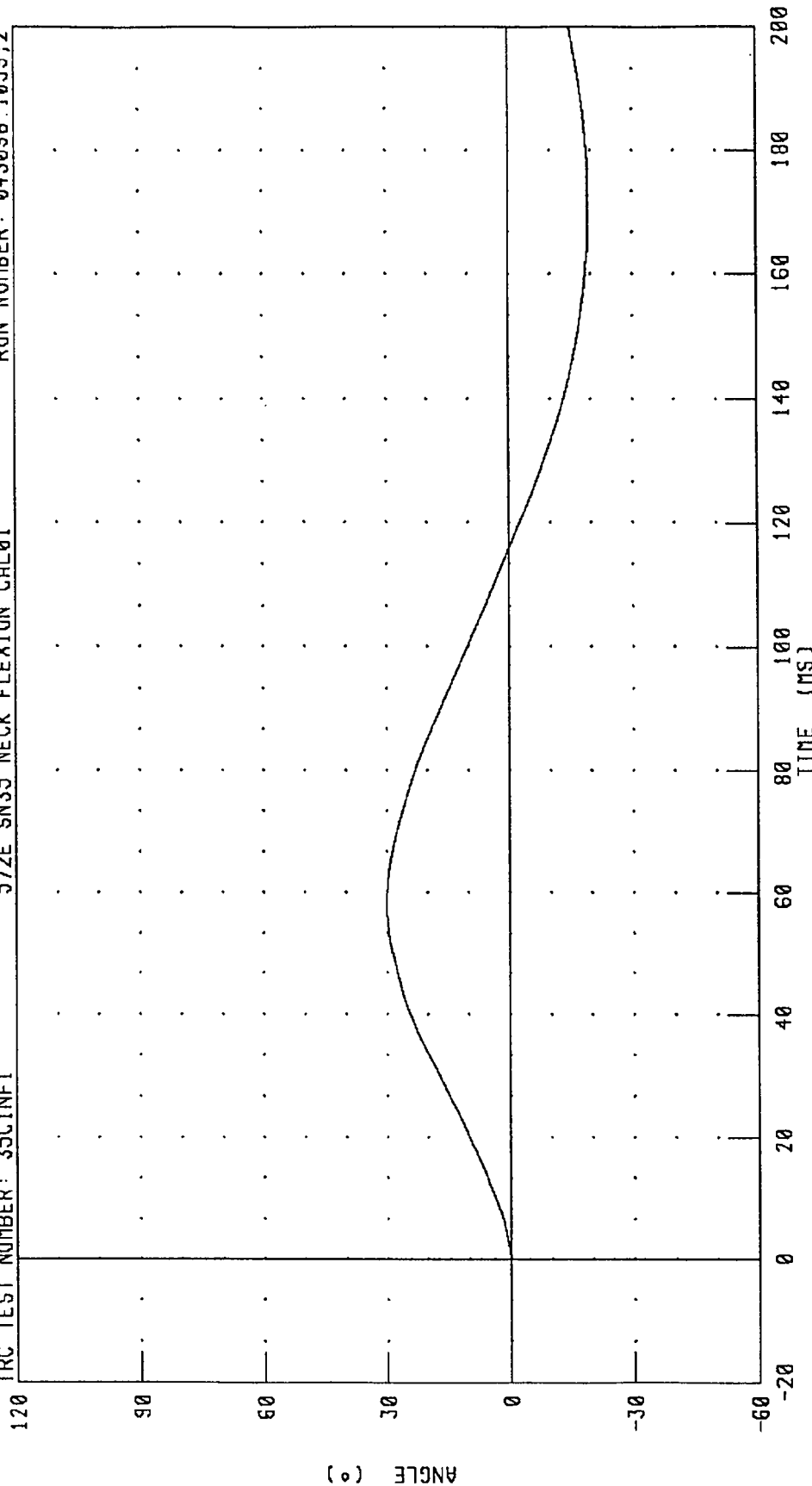
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN35 NECK FLEXION CAL01

TRC TEST NUMBER: 35CINF1

RUN NUMBER: 043096.1059;2



PEAK DATA: 30.01 ° @ 58.24 MS; -19.33 ° @ 167.52 MS

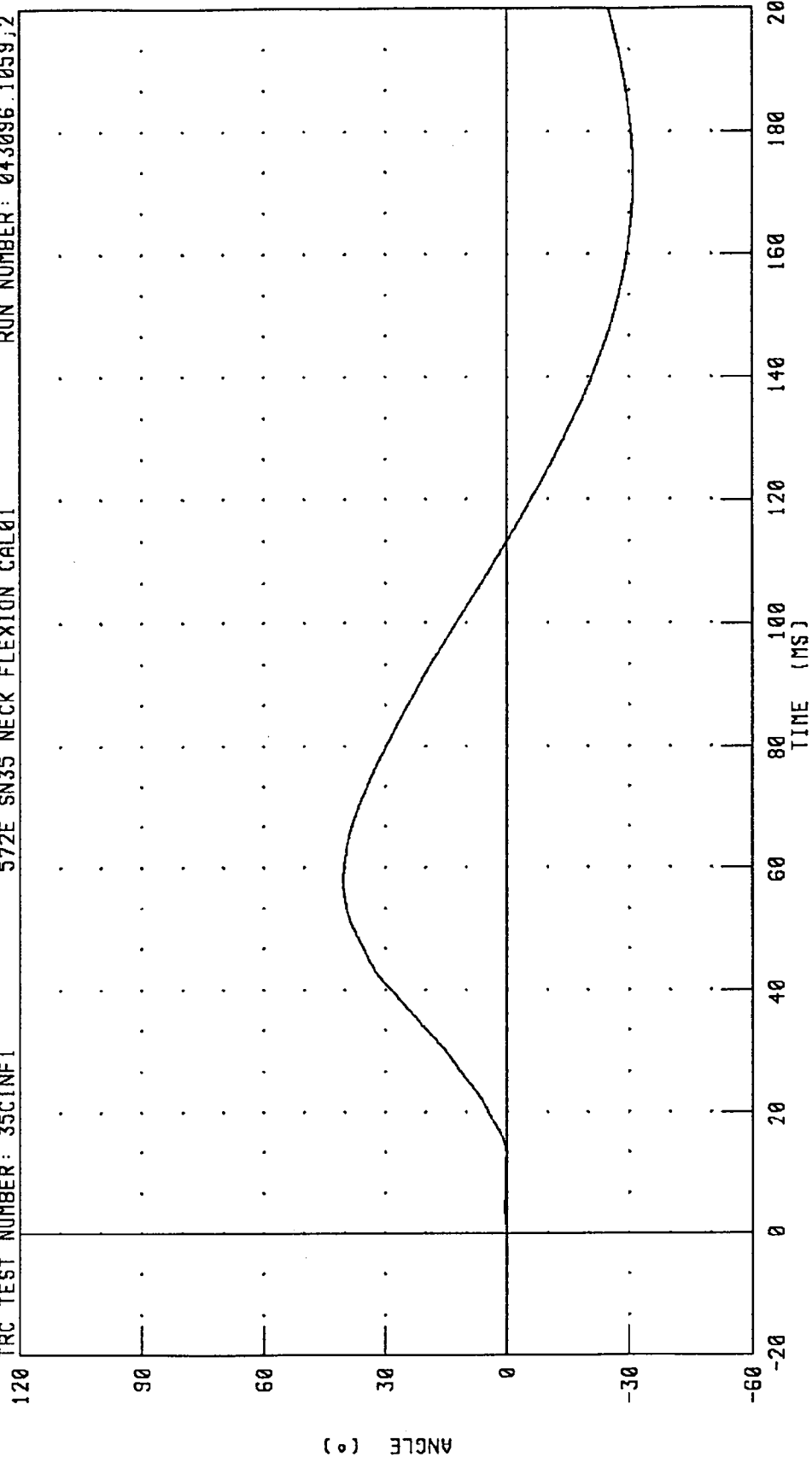
CHANNEL: BETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 043096.1059;2



PEAK DATA: 40.37 ° @ 57.76 MS; -30.85 ° @ 169.84 MS

CHANNEL: THETA FILTER: CH. CLASS 60

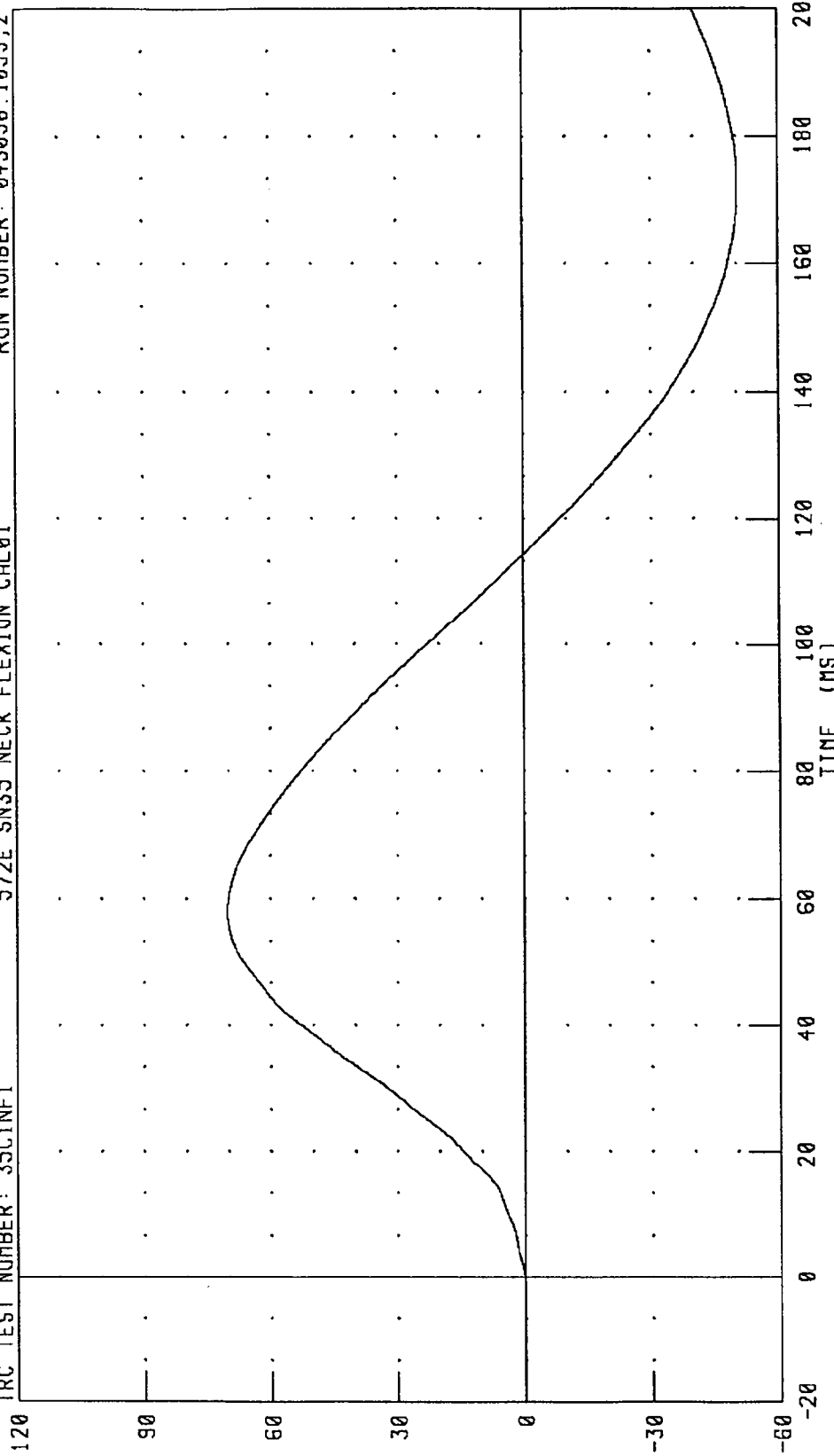
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 35C1NF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 043096.1059;2

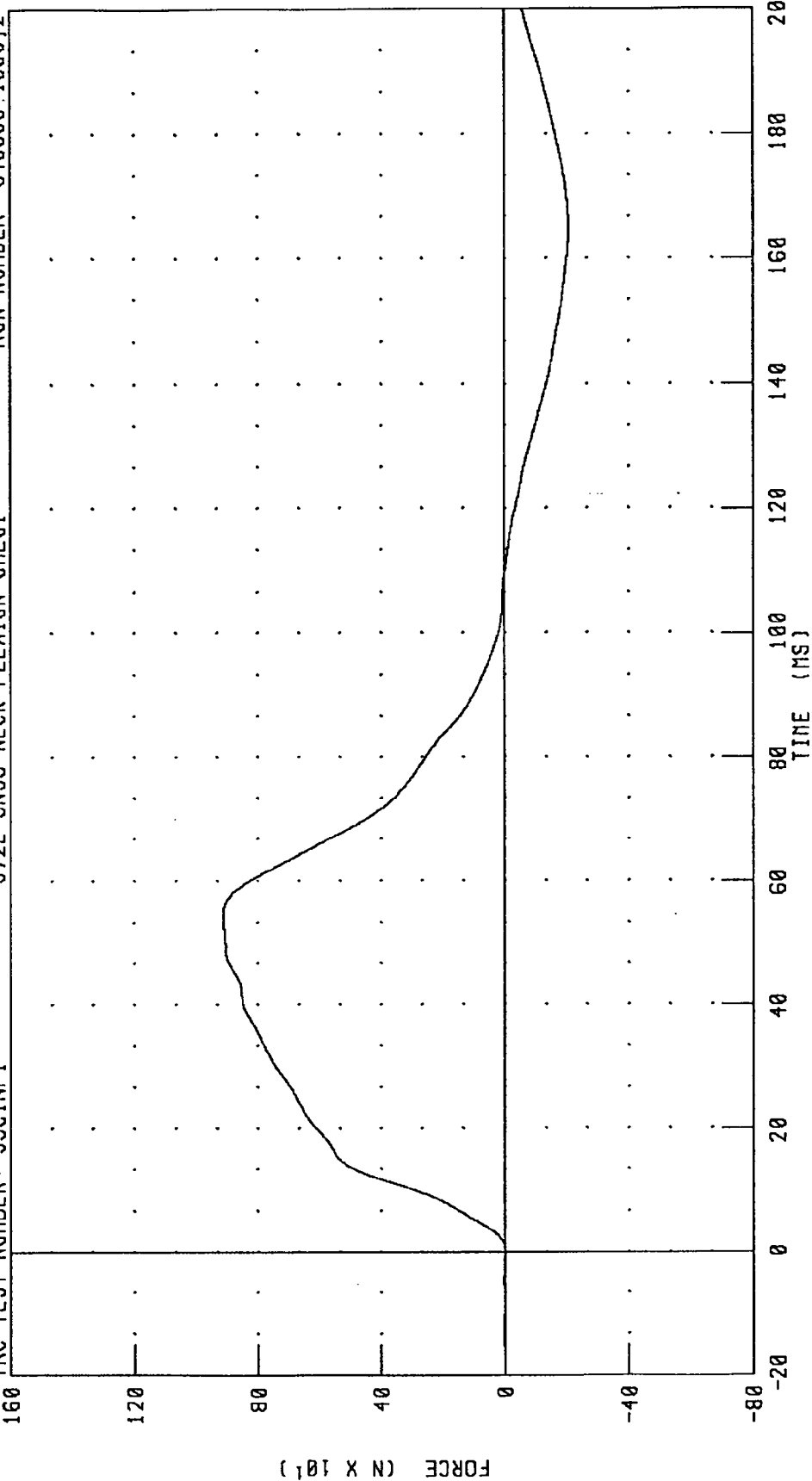


PEAK DATA: 70.38 ° @ 58.00 MS; -50.17 ° @ 169.52 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION NECK FORCE X AXIS

TRC TEST NUMBER: 35CINF1 572E SN35 NECK FLEXION CAL01 RUN NUMBER: 043096.1059;2



PEAK DATA: 912.76 N @ 54.56 MS; -205.59 N @ 164.80 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

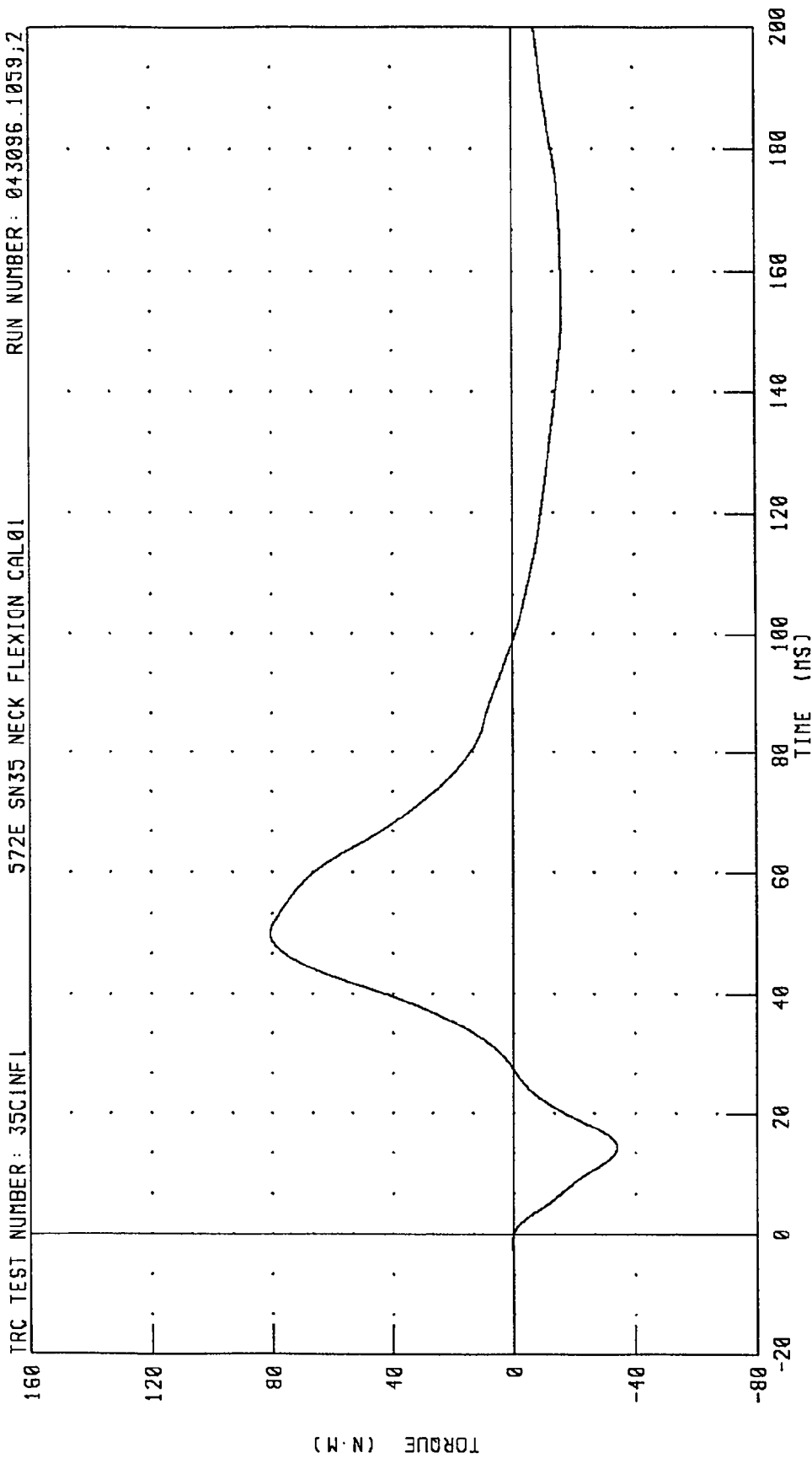
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 35C1NF1

572E SN35 NECK FLEXION CAL01

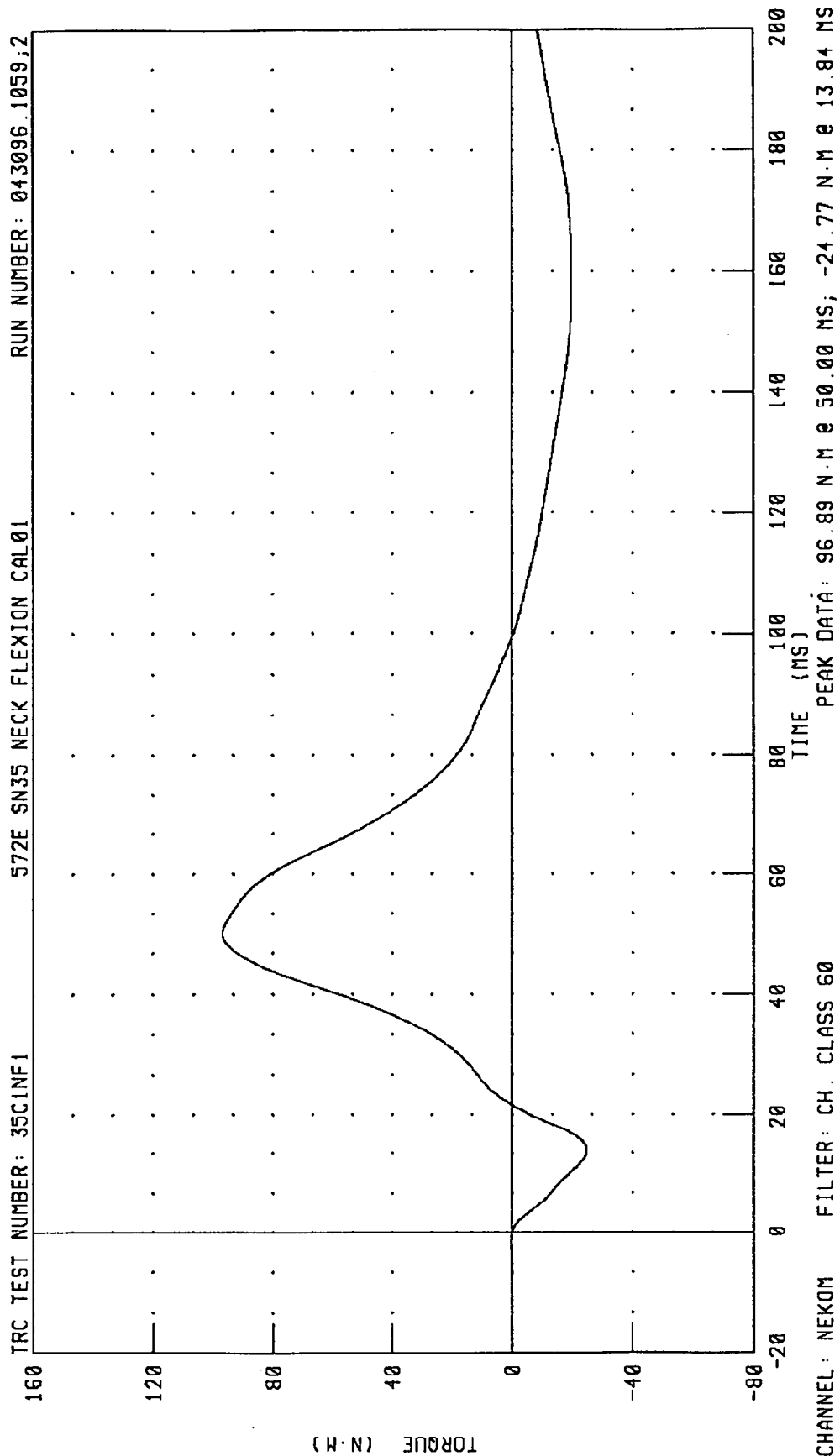
RUN NUMBER: 043096.1059,2



PEAK DATA: 80.78 N.M @ 50.00 MS; -33.90 N.M @ 14.24 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 35C1NE1 572E SN35 NECK EXT. CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.48 G
	20 MS	14.00 - 19.00 G	15.59 G
	30 MS	11.00 - 16.00 G	14.31 G
MAX PENDULUM G		22 G MAX	18.20 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.27 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.04 MS
D PLANE	MAX	81 - 106 DEG.	96.12 DEG.
ROTATION	TIME	72 - 82 MS	74.08 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-65.59 NM
	TIME	65 - 79 MS	69.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	134.80 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Richard L. Loman

RUN NUMBER: 071195.0855;1

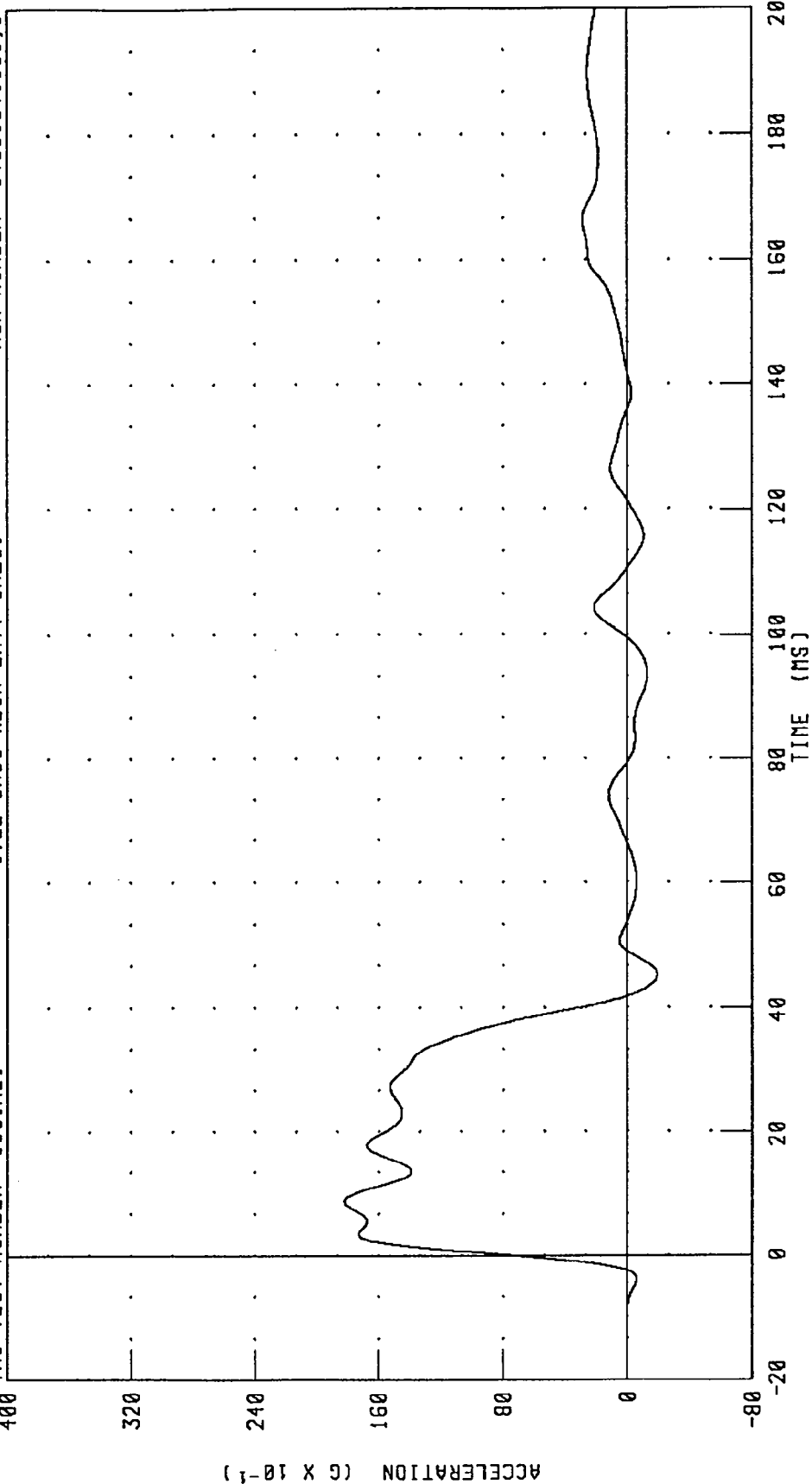
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 043096.1059;1



PEAK DATA: 18.21 G @ 8.64 MS; -1.91 G @ 45.20 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN35 NECK EXT. CAL01

TRC TEST NUMBER: 35CINE1

120

90

60

30

0

-30

-60

ANGLE (°)

TIME (MS)

80

100

120

140

160

180

200

PEAK DATA: 35.65 ° @ 72.64 MS; -12.75 ° @ 197.84 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

960408

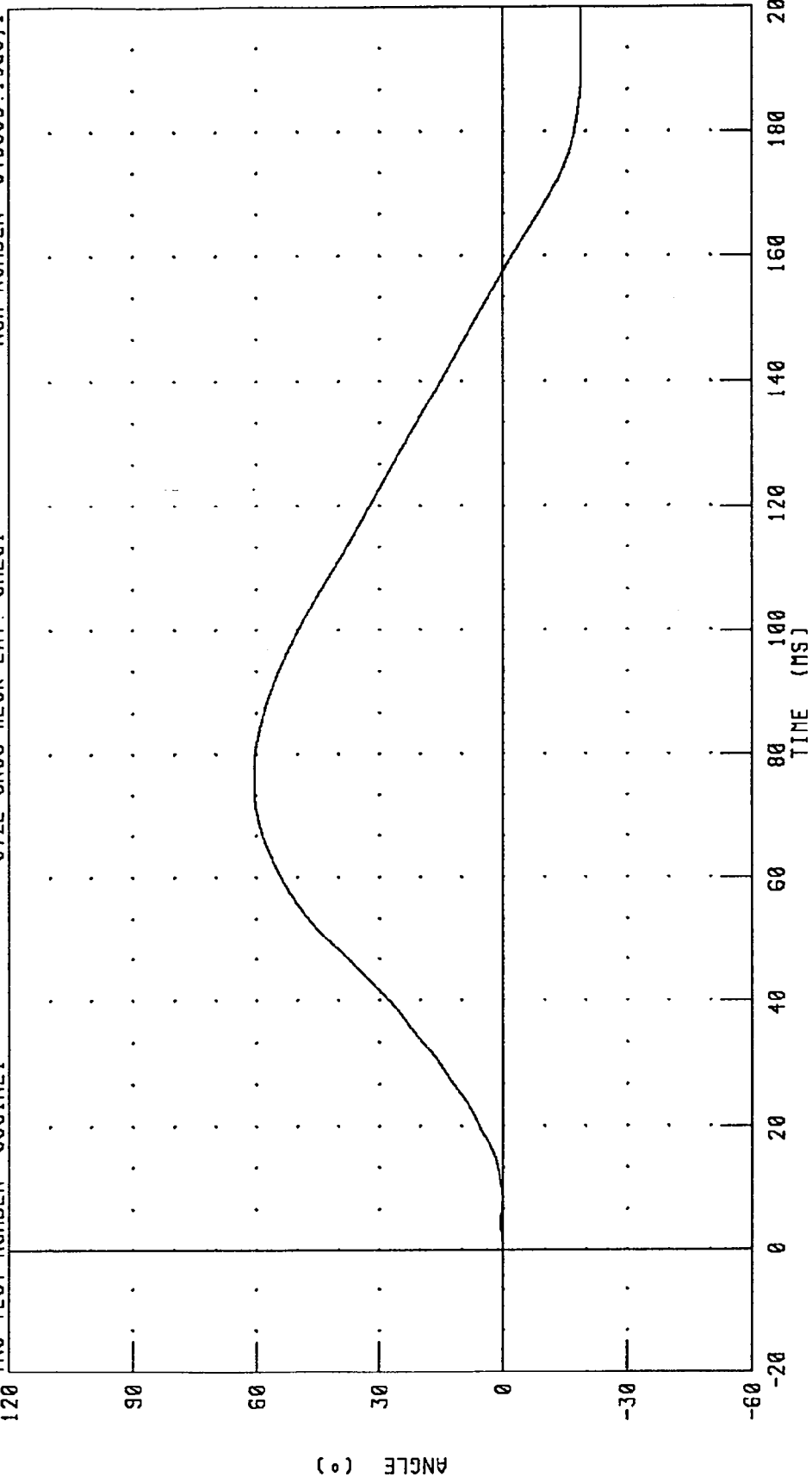
C-19

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 043096.1059;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 60.59 ° @ 76.32 MS; -19.87 ° @ 194.56 MS

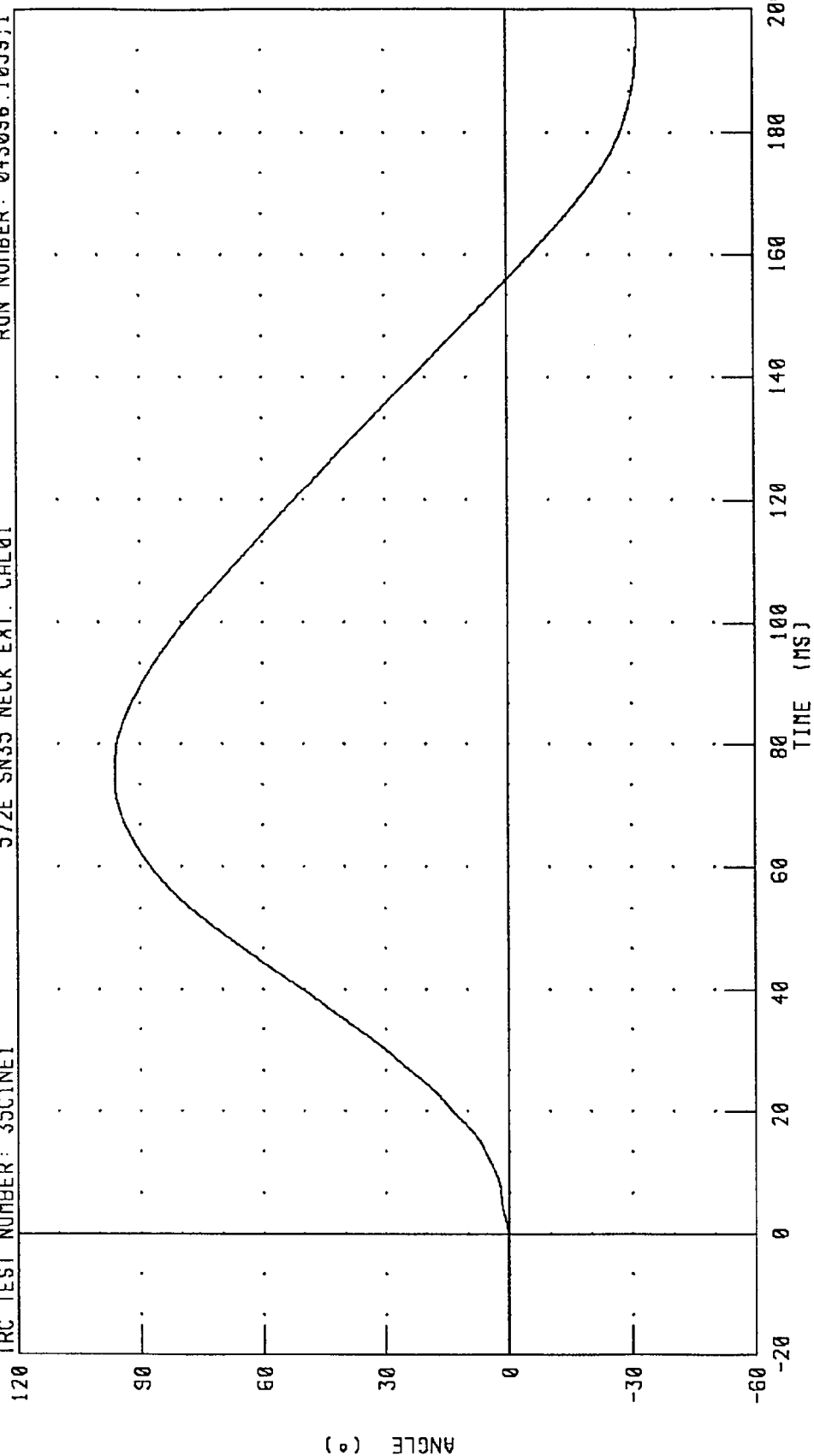
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 043096.1059,1



PEAK DATA: 96.13 ° @ 74.08 MS; -31.61 ° @ 195.20 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

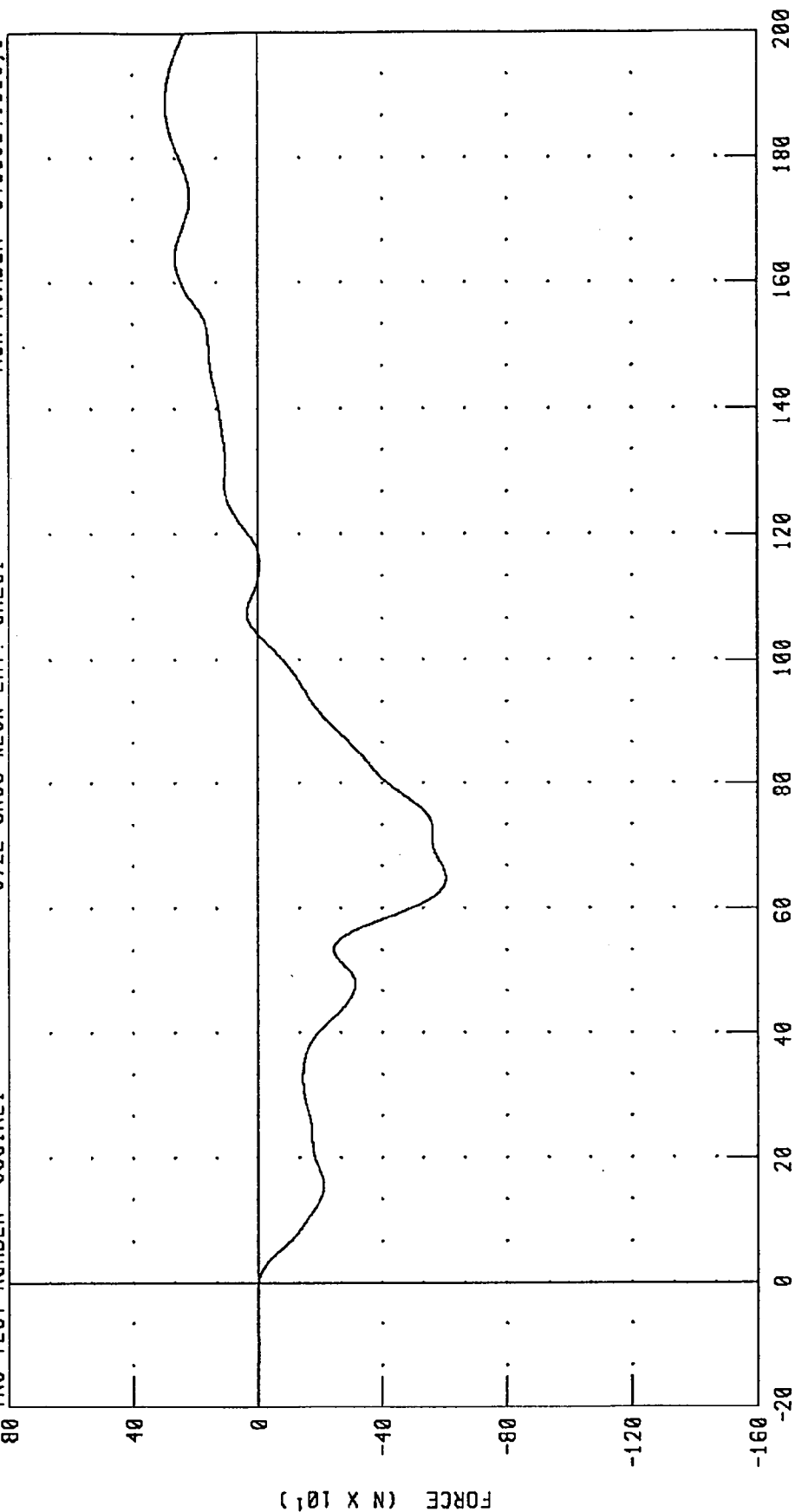
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 043096.1059;1



PEAK DATA: 294.85 N @ 188.88 MS; -605.24 N @ 64.72 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

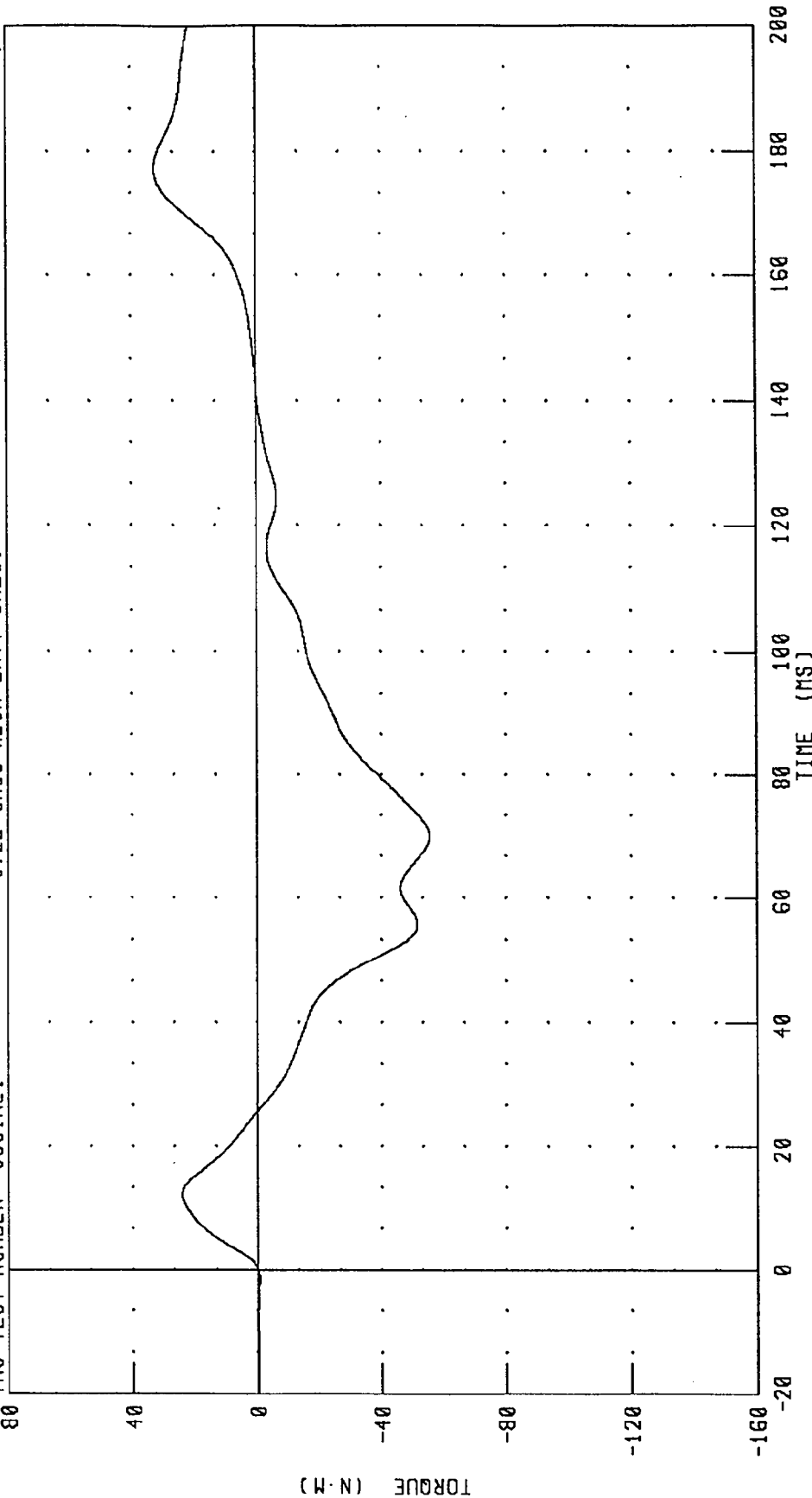
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 043096.1059,1

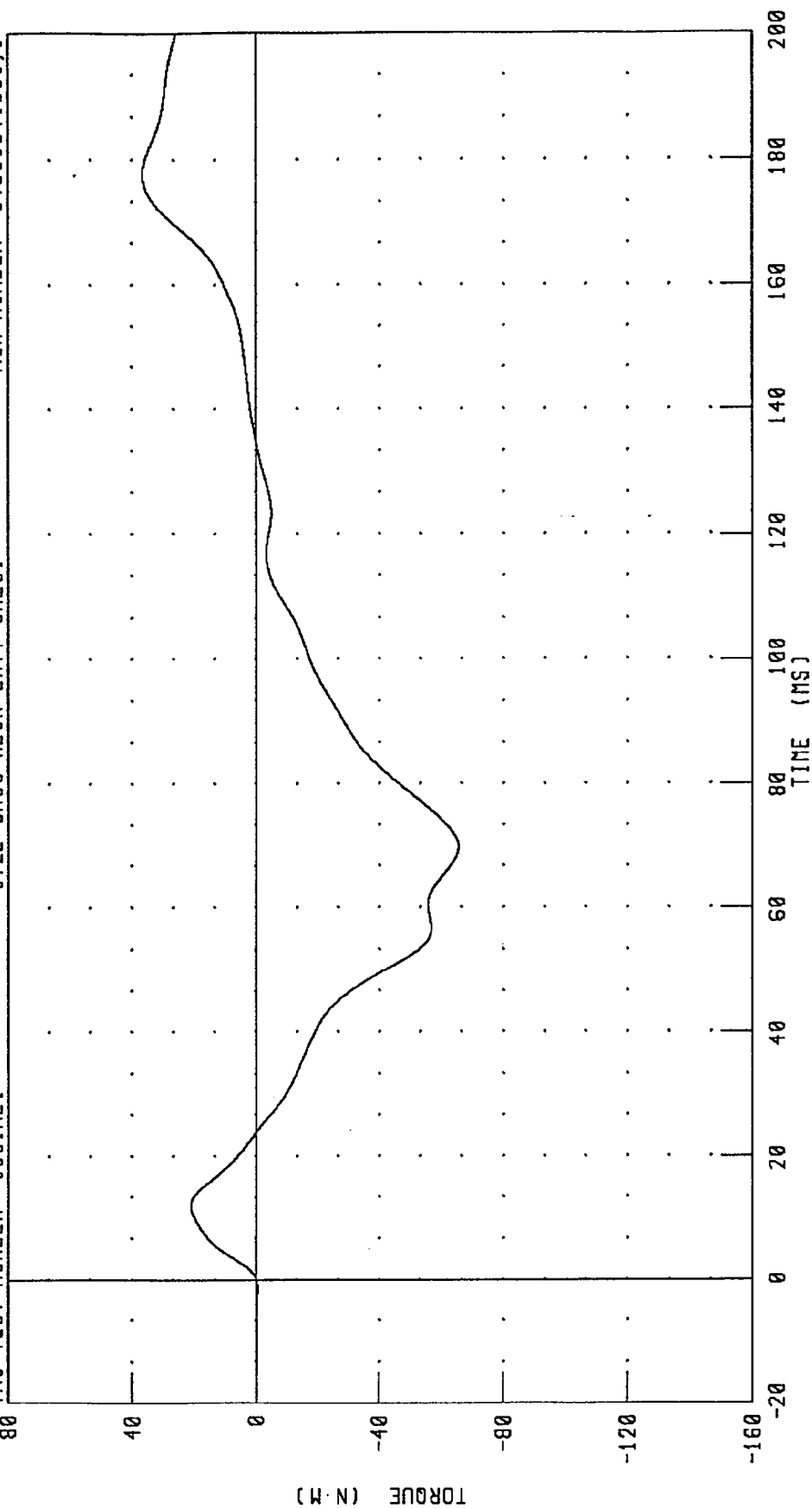


PEAK DATA: 32.44 N·M @ 177.28 MS; -55.54 N·M @ 69.92 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

IRC TEST NUMBER: 35C1NE1 572E SN35 NECK EXT. CAL01 RUN NUMBER: 043096.1059;1



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 36.57 N.M @ 177.68 MS; -65.59 N.M @ 69.76 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1TH1

572E SN35 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.4 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5608. N
INTERNAL HYSTERESIS	69% - 85%	73.6%

TEST MEETS SPECIFICATIONS

TECHNICIAN

Richard Le Van

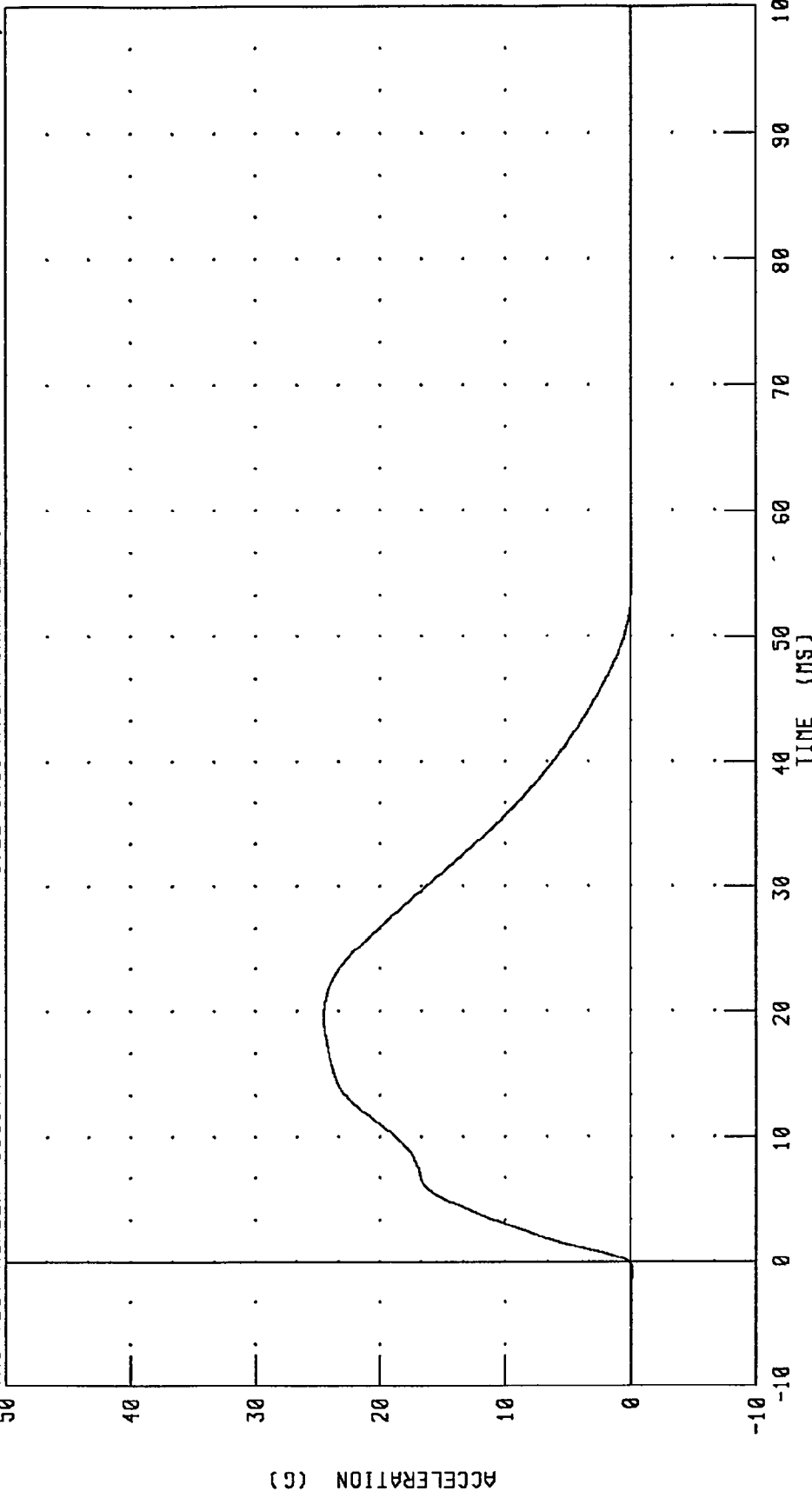
RUN NUMBER: 071195.1433;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

572E SN35 H.S. THORAX CAL01

IRC TEST NUMBER: 35C1TH1

RUN NUMBER: 043096.1059;1



PEAK DATA: 24.48 G @ 19.52 MS; -0.19 G @ -0.64 MS

CHANNEL: PENXG FILTER: CH. CLASS 180

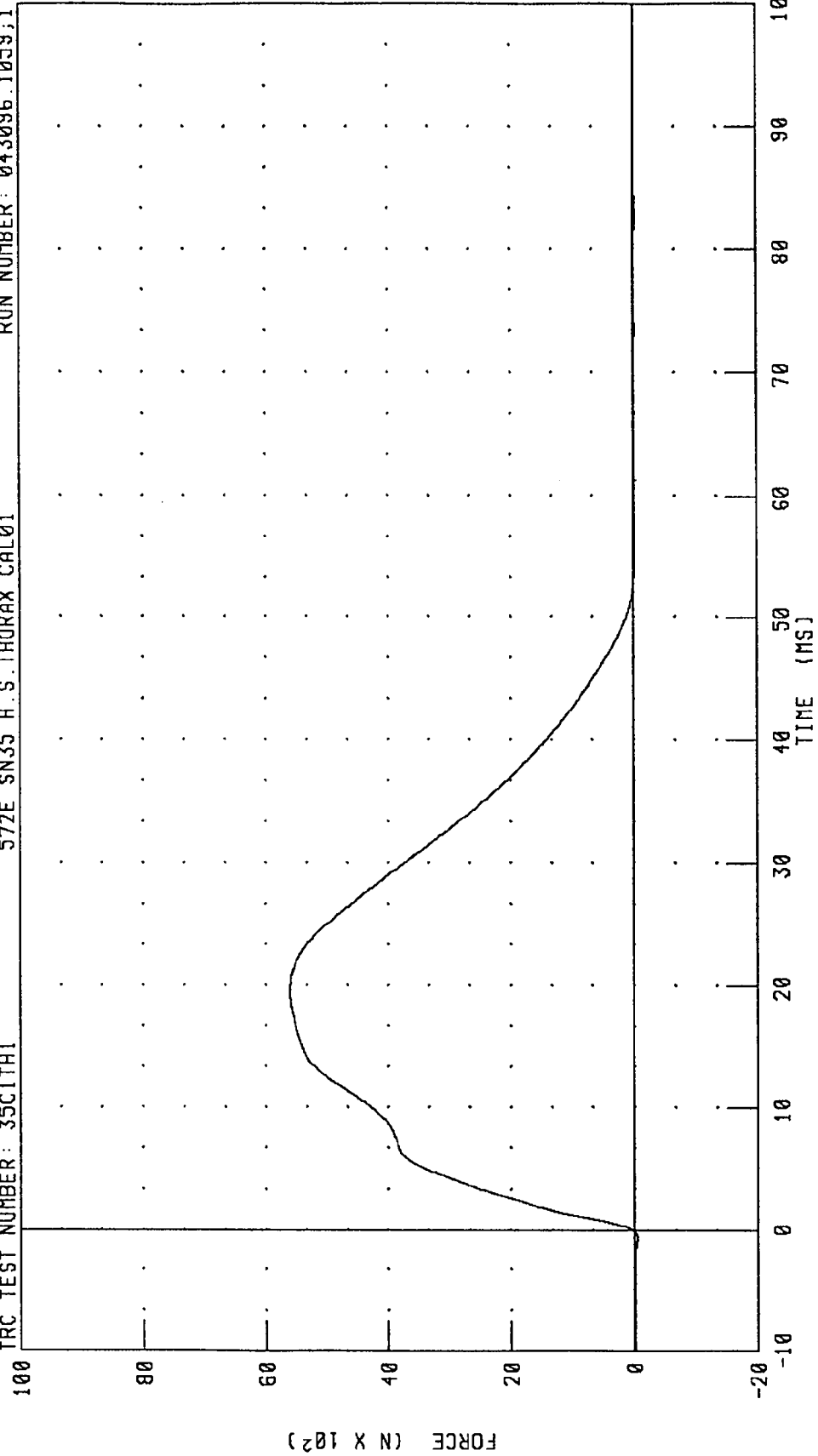
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 35C1TH1

572E SN35 H.S. THORAX CAL01

RUN NUMBER: 043096.1059;1

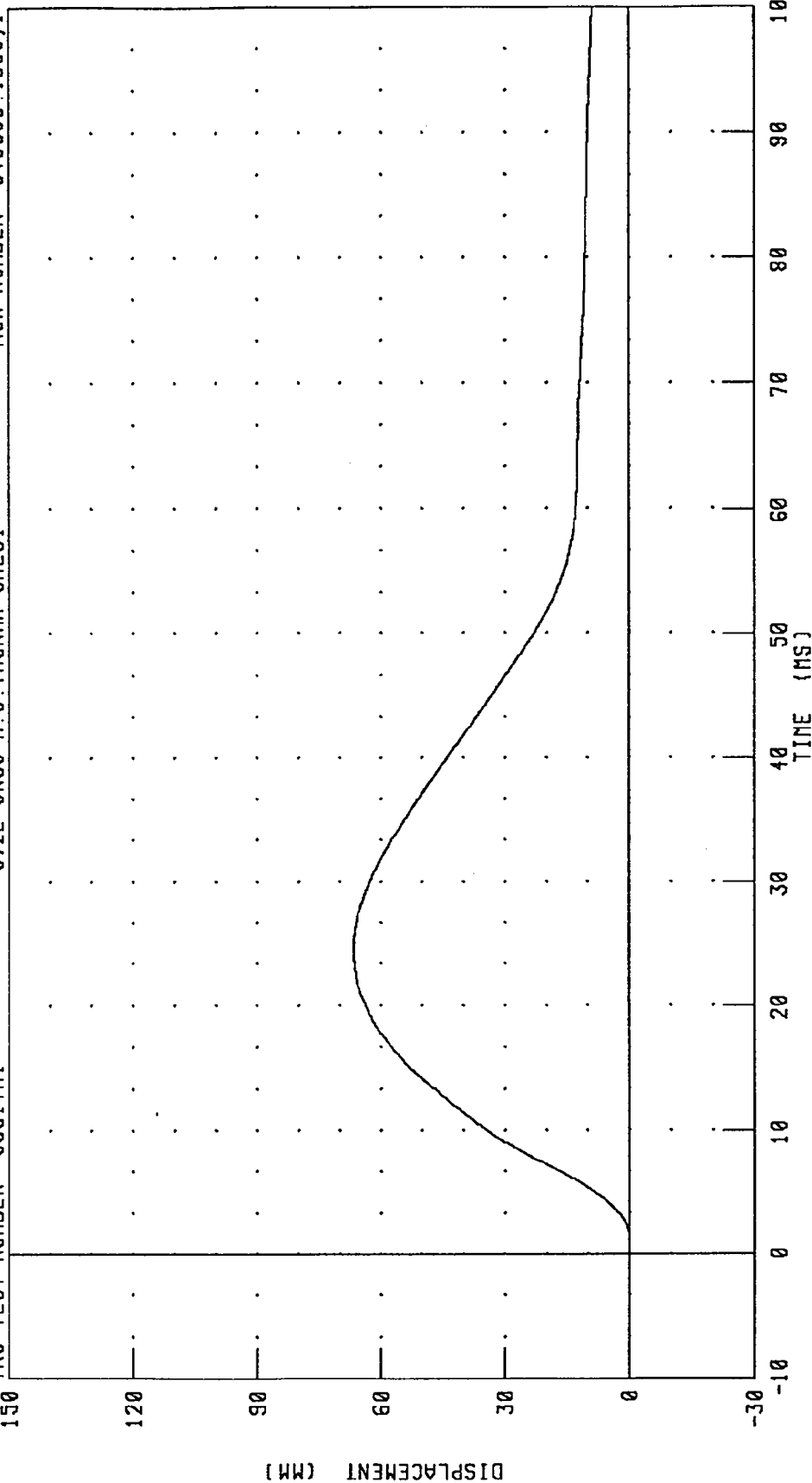


CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5608.25 N @ 19.52 MS; -42.97 N @ -0.64 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 35C1TH1 572E SN35 H.S.THORAX CAL01 RUN NUMBER: 043096.1059;1



PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS

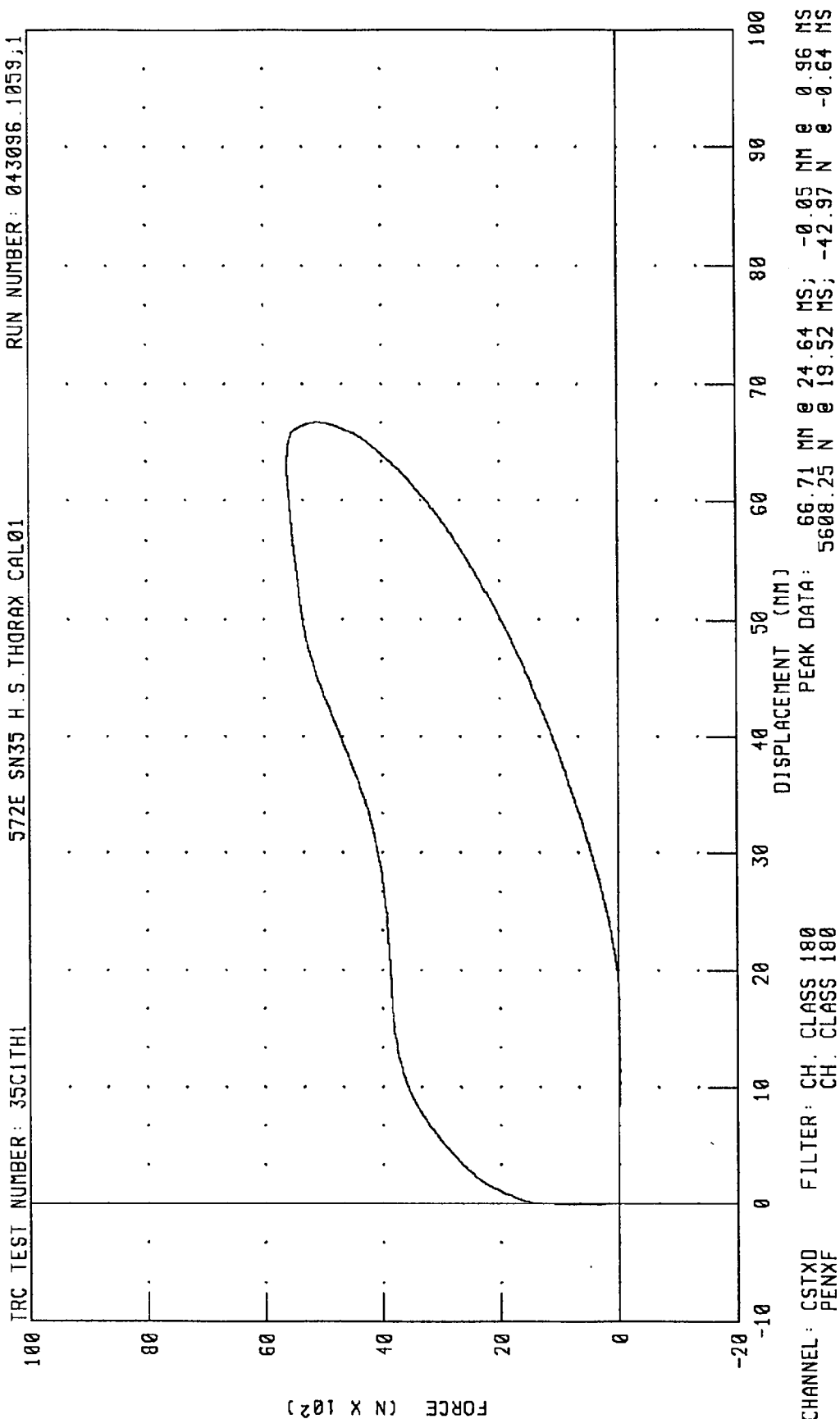
CHANNEL: CSTXD FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

IRC TEST NUMBER: 35C1TH1

572E SN35 H.S. THORAX CAL01

RUN NUMBER: 043096.1059.1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1RK1

572E SN35 RIGHT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4893.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Richard LeVan

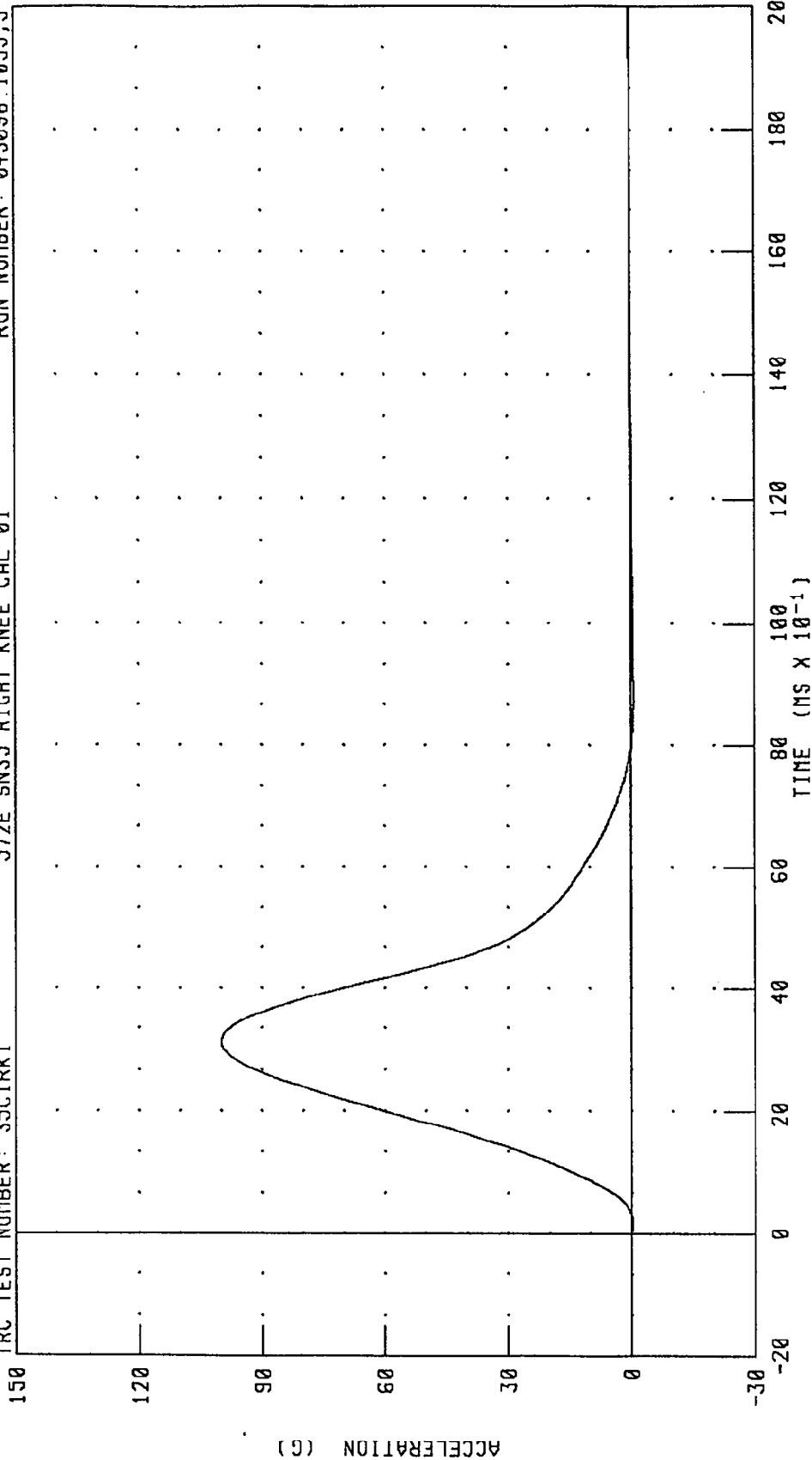
RUN NUMBER: 071195.1336;3

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 35CIRK1

572E SN35 RIGHT KNEE CAL 01

RUN NUMBER: 043096.1059;3



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 100.02 G @ 3.12 MS; -0.64 G @ 8.88 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 35C1RK1

572E SN35 RIGHT KNEE CAL 01

RUN NUMBER: 043096.1059;3

75

60

45

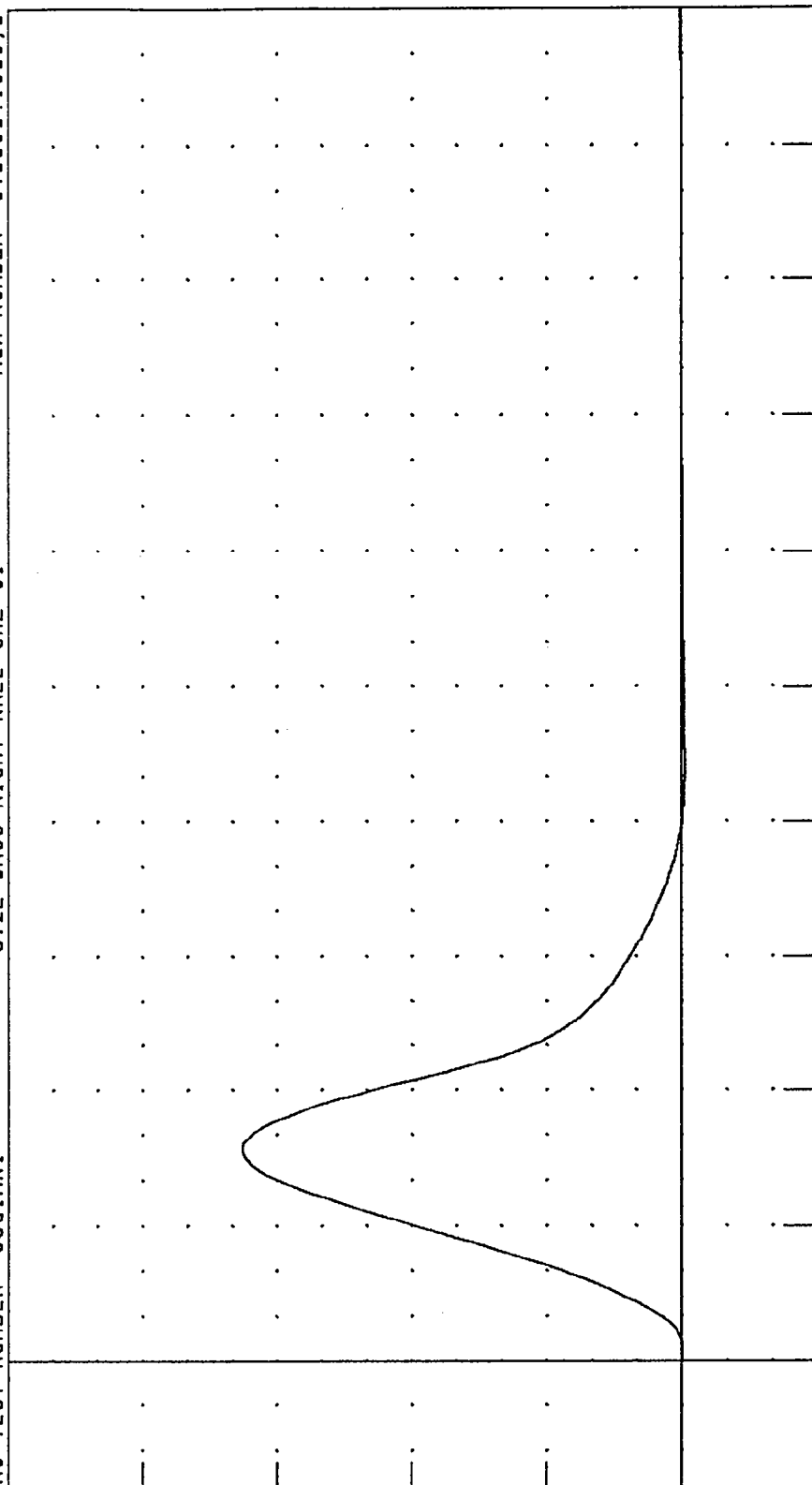
30

15

0

-15

FORCE (N X 10²)



TIME (MS X 10⁻¹)

PEAK DATA: 4893.61 N @ 3.12 MS; -31.34 N @ 8.88 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1LK1

572E SN35 LEFT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4747.9 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Richard L. Van

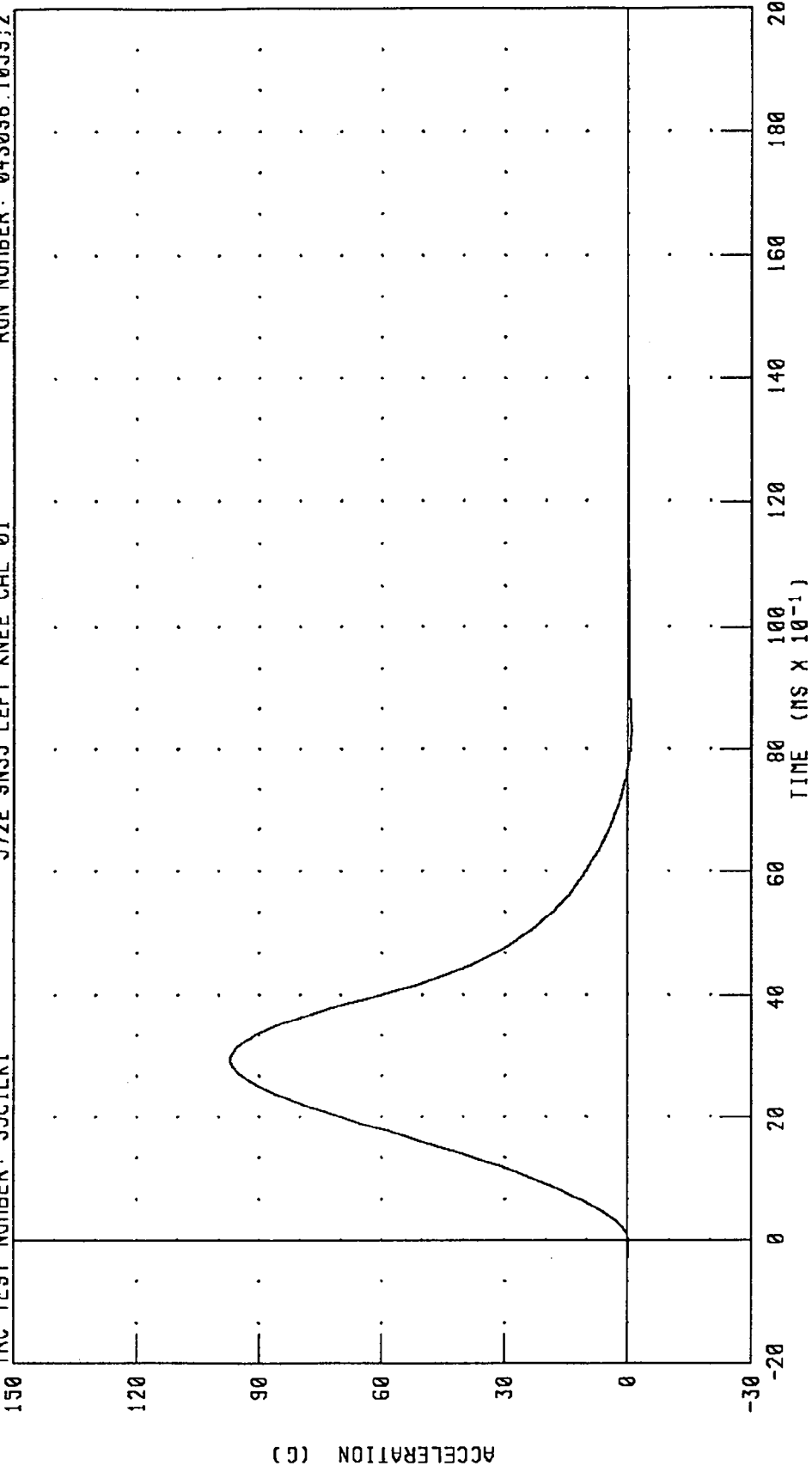
RUN NUMBER: 071195.1251;2

PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 35C1LK1

572E SN35 LEFT KNEE CAL 01

RUN NUMBER: 043096.1059;2



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 97.04 G @ 2.96 MS; -0.87 G @ 8.32 MS

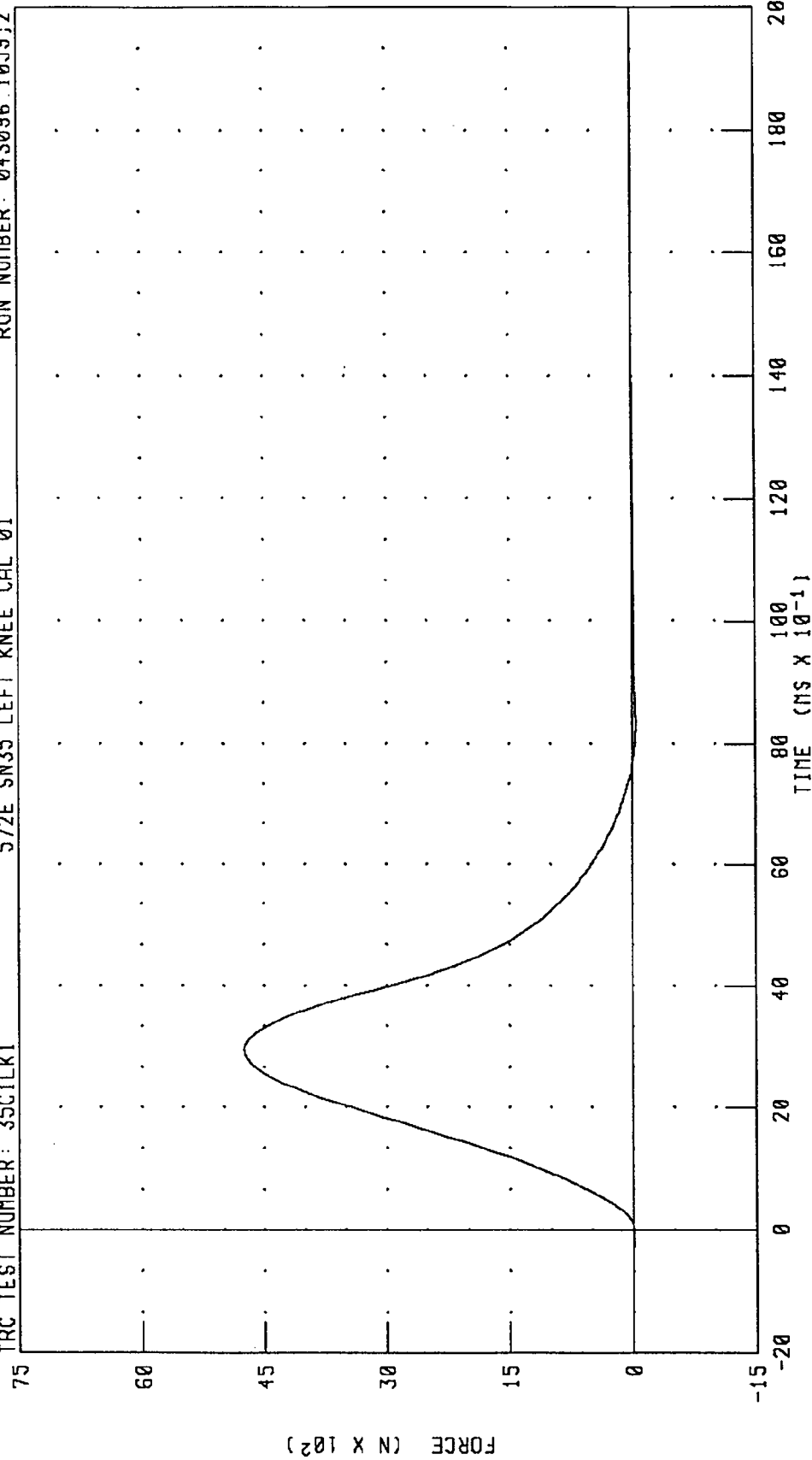
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 35C1LK1

572E SN35 LEFT KNEE CAL 01

RUN NUMBER: 043096.1059;2



PEAK DATA: 4747.92 N @ 2.96 MS; -42.49 N @ 8.32 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Pre-Test Calibration

Serial Number 34

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

34 VECTOR

11-JUL-95

TRC INC.

TEST NO: 34C1ED1

572E SN34 EXT.DIMENSION CAL01

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 -1001 MM	991. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	856. MM
CHEST DEPTH (O)		213 - 229 MM	218. MM
H-POINT HEIGHT (C)		84 - 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	884. MM
THIGH CLEARANCE (F)		140 - 155 MM	155. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	472. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	439. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	498. MM
FOOT LENGTH (P)		252 - 267 MM	254. MM
FOOT BREADTH (W)		91 - 107 MM	97. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	91. MM
SHOULDER BREADTH (V)		422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	513. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	208. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	295. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Richard L. Van

RUN NUMBER: 071295.1424

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

06-MAR-96

TRC INC.

TEST NO: 34C1HD3

572E SN34 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	39.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	263.60 G
PEAK LATERAL ACCELERATION	15 G MAX	-8.63 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

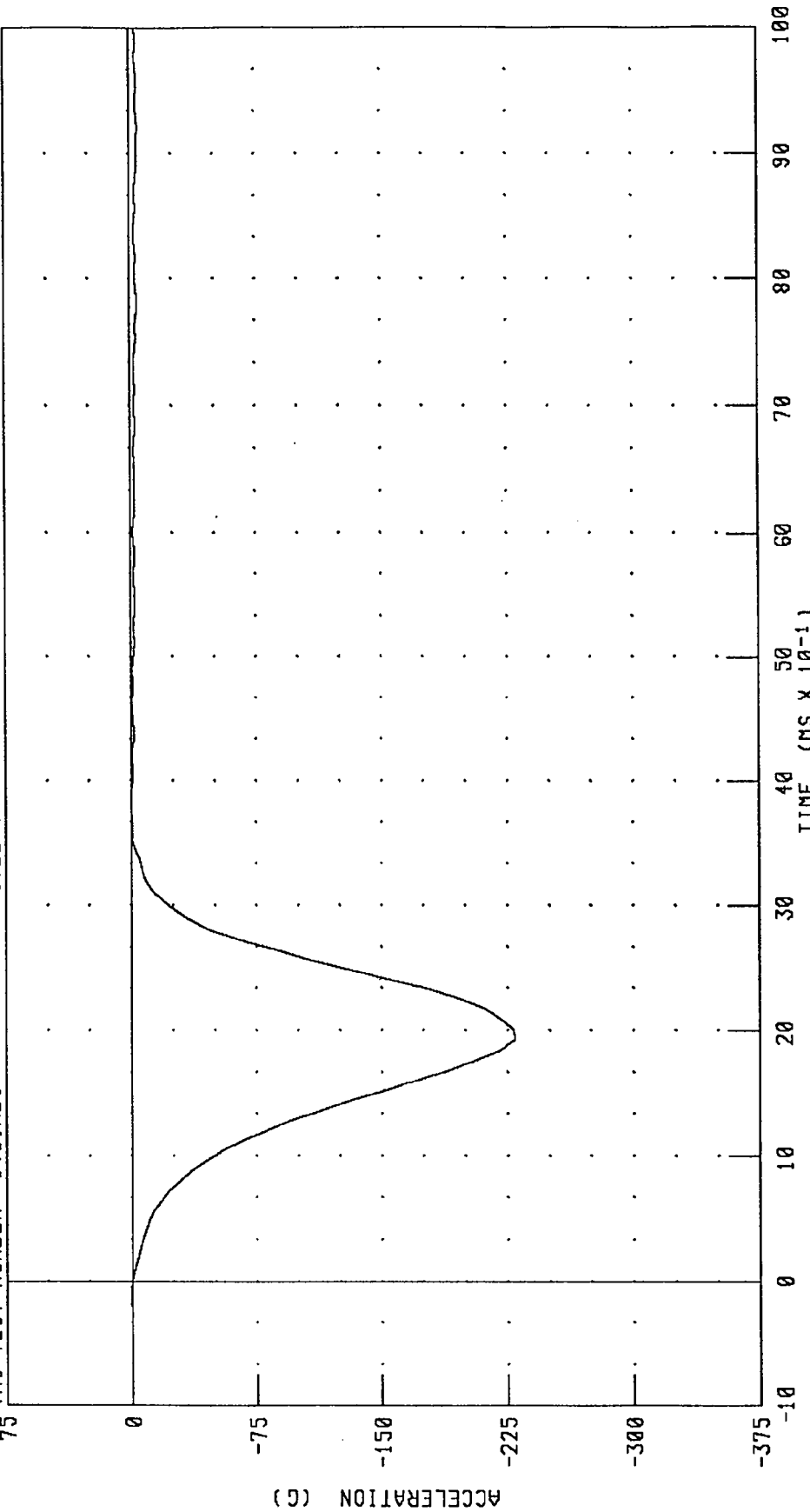
Richard L. Van

RUN NUMBER: 030696.1057;1

PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION X AXIS
 572E SN34 HEAD DROP CAL 01

RUN NUMBER: 043096.1223.1

TRC TEST NUMBER: 34CIHD3



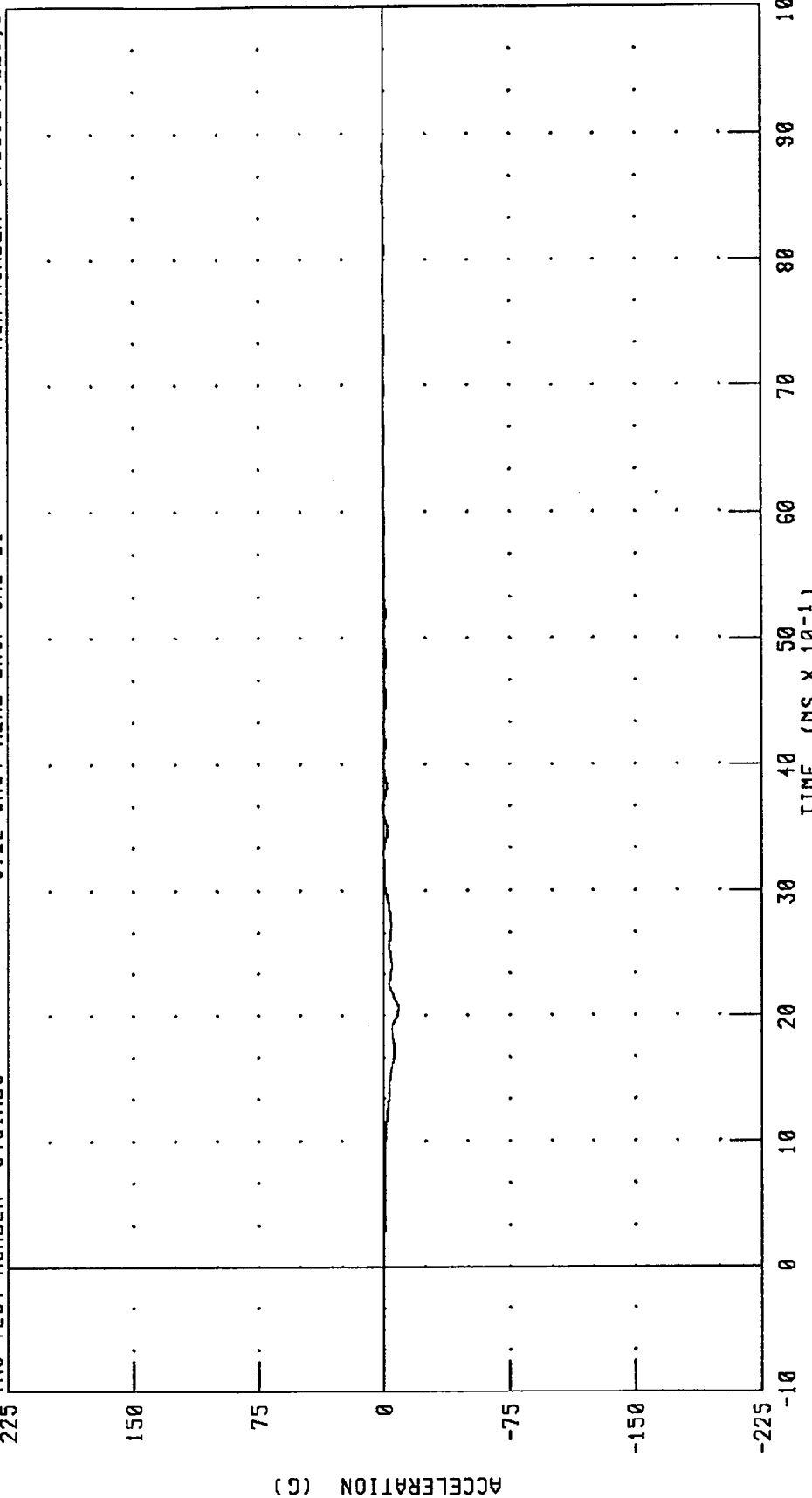
PEAK DATA: 0.34 G @ -0.08 MS; -229.24 G @ 1.92 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS

572E SN34 HEAD DROP CAL 01 RUN NUMBER: 043096.1223;1

TRC TEST NUMBER: 34C1H03

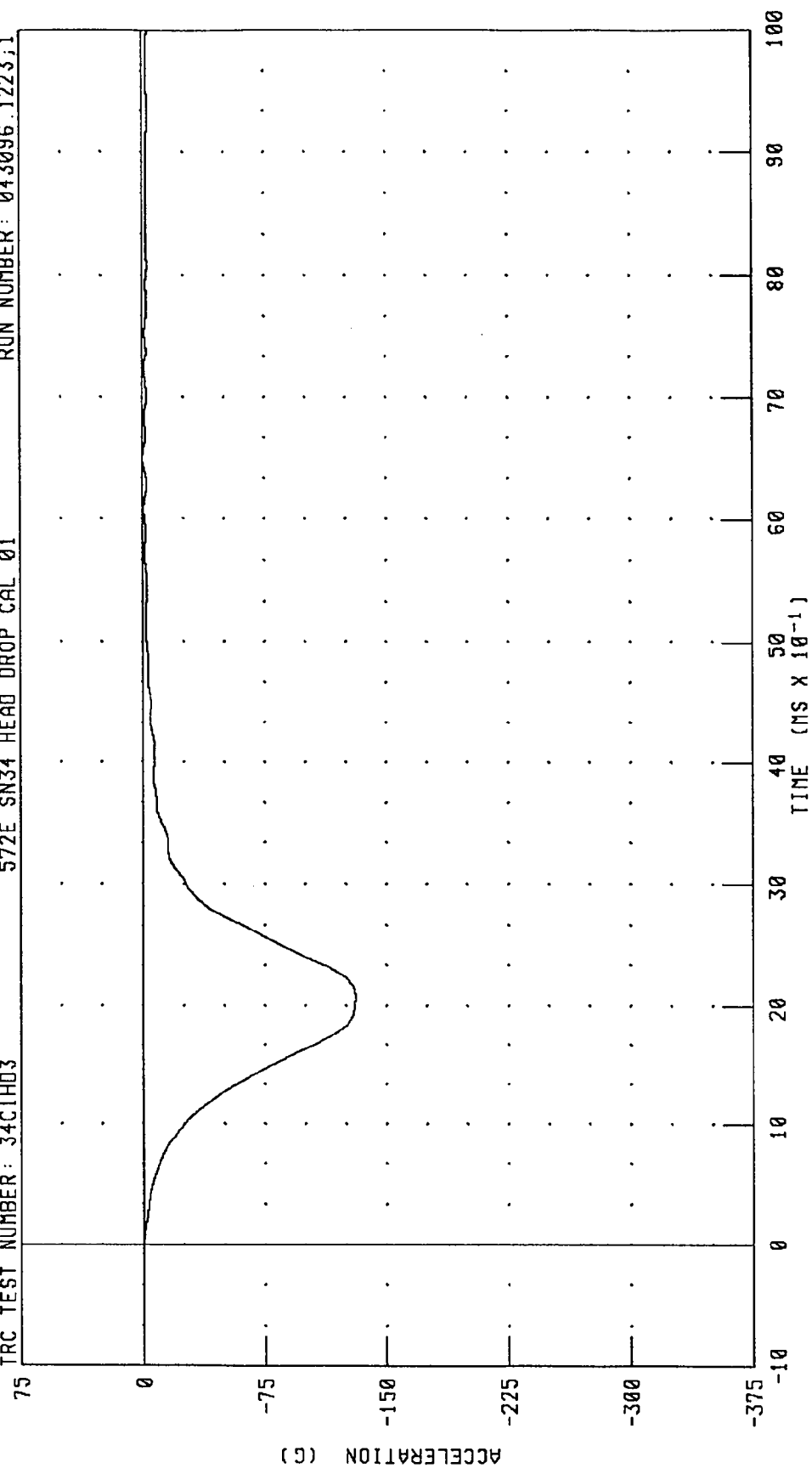


PEAK DATA: 0.67 G @ 7.76 MS; -8.63 G @ 2.08 MS

CHANNEL: HEDYC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 34C1HD3 572E SN34 HEAD DROP CAL 01 RUN NUMBER: 043096.1223,1



PEAK DATA: 0.00 G @ -0.32 MS; -130.81 G @ 2.08 MS

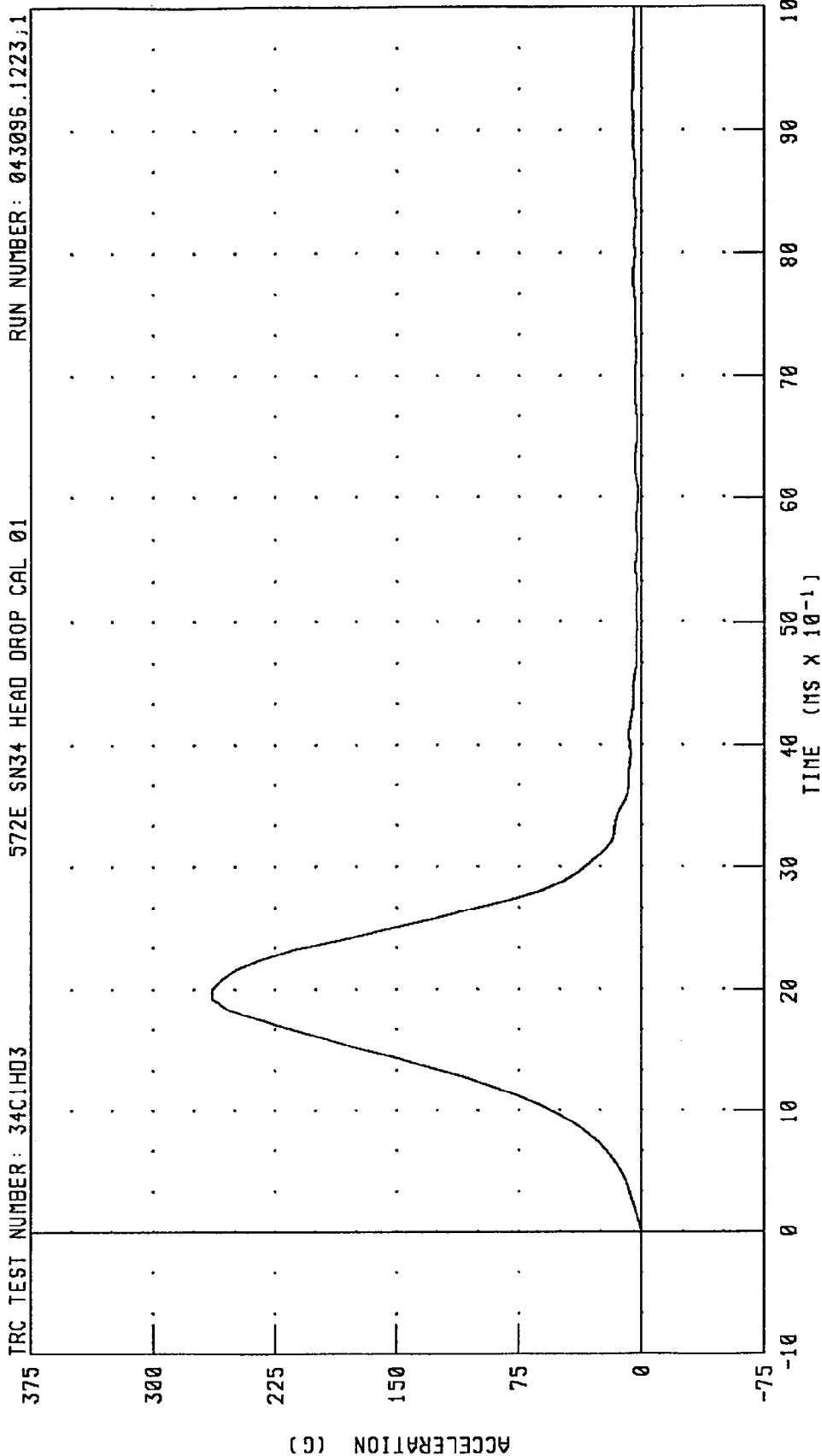
CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 34C1HD3

572E SN34 HEAD DROP CAL 01

RUN NUMBER: 043096.1223.1



PEAK DATA: 263.61 G @ 2.00 MS; 0.02 G @ -0.24 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 34C1NF1 572E SN34 NECK FLEXION CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.98 G
	20 MS	17.60 - 22.60 G	19.34 G
	30 MS	12.50 - 18.50 G	14.91 G
MAX PENDULUM G		29 G MAX	23.79 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	14.89 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.16 MS
D PLANE	MAX	64 - 78 DEG.	72.72 DEG.
ROTATION	TIME	57 - 64 MS	60.24 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	90.00 NM
	TIME	47 - 58 MS	51.60 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.76 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.44 MS

TEST MEETS SPECIFICATIONS

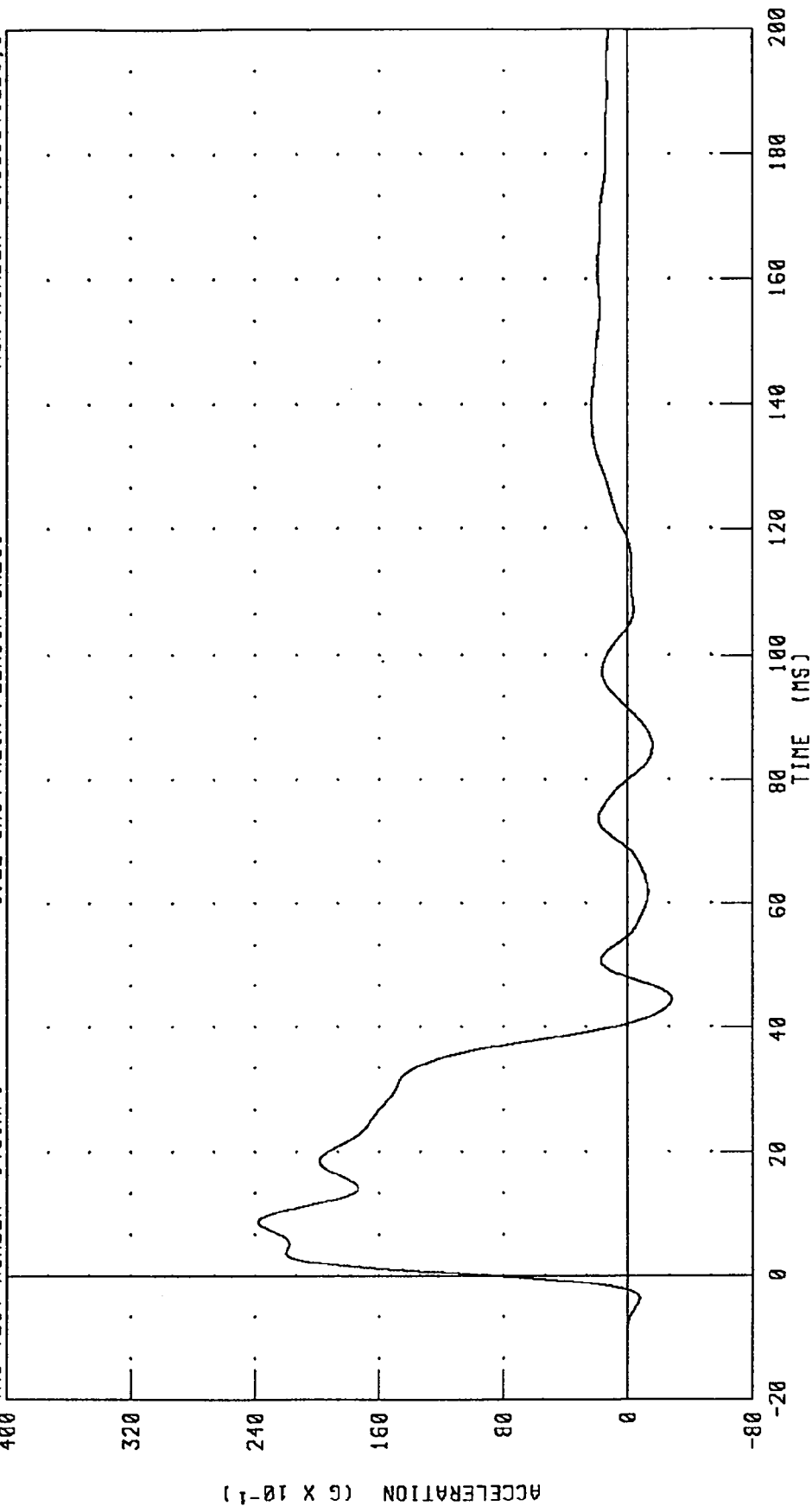
TECHNICIAN Richard L. Van

RUN NUMBER: 071195.1004;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 34CINF1 572E SN34 NECK FLEXION CAL01 RUN NUMBER: 043096.1223;1



CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 23.79 G @ 8.80 MS; -2.85 G @ 44.48 MS

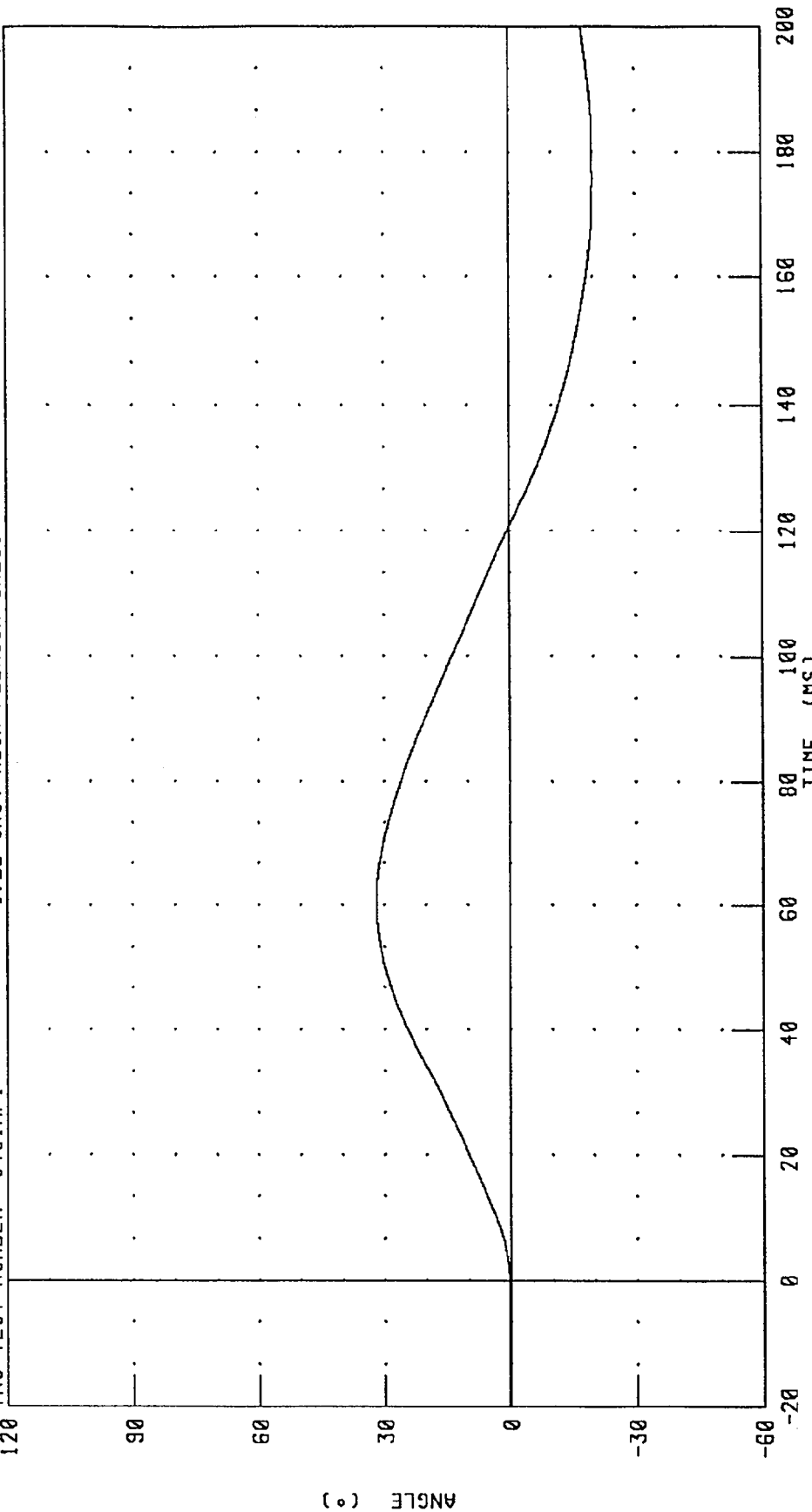
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN34 NECK FLEXION CAL01

IRC TEST NUMBER: 34CINF1

RUN NUMBER: 043096.1223;1



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 31.85 ° @ 61.52 MS; -19.92 ° @ 175.76 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 043096.1223;1

120

90

60

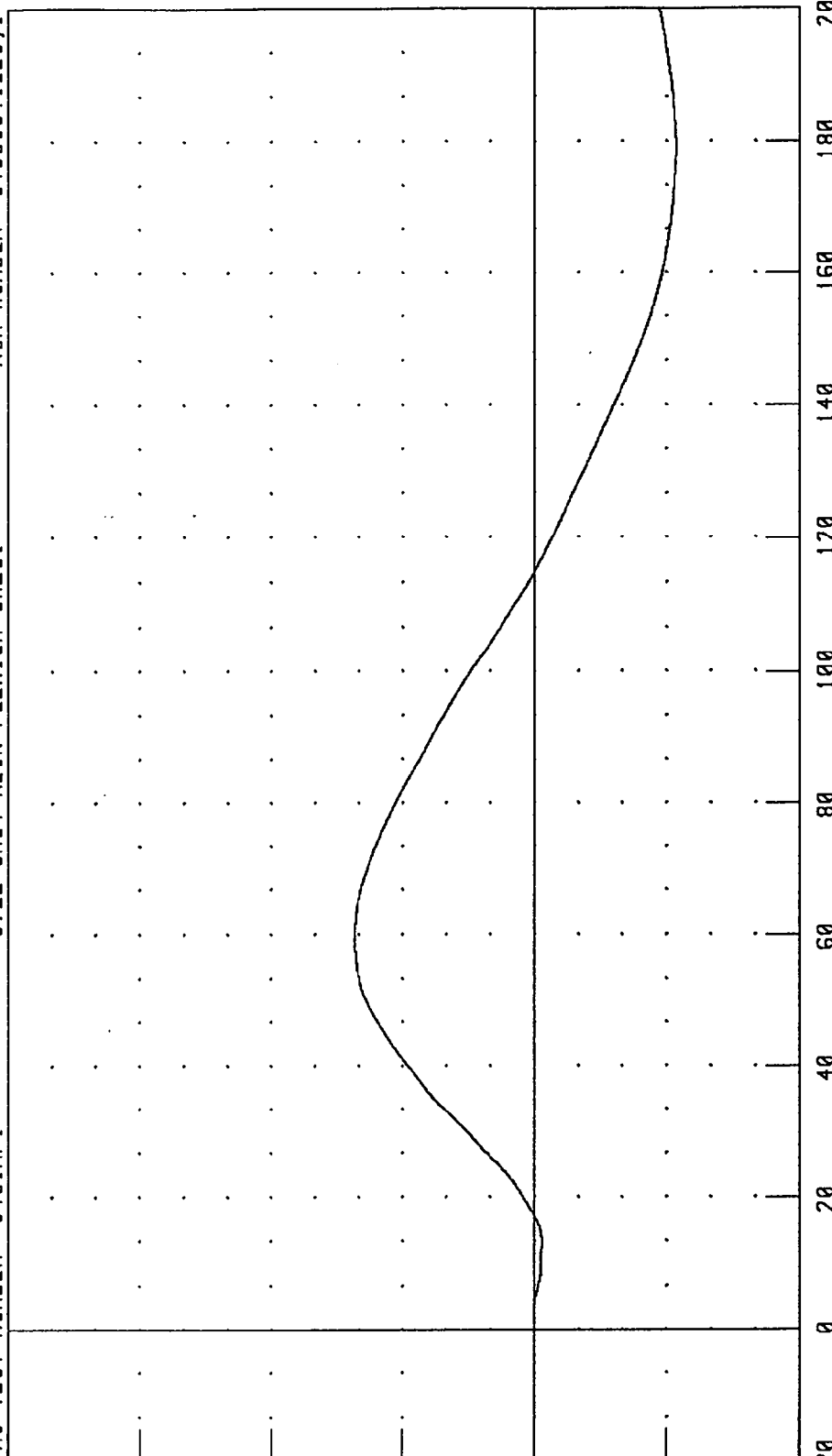
30

0

-30

-60

ANGLE (°)



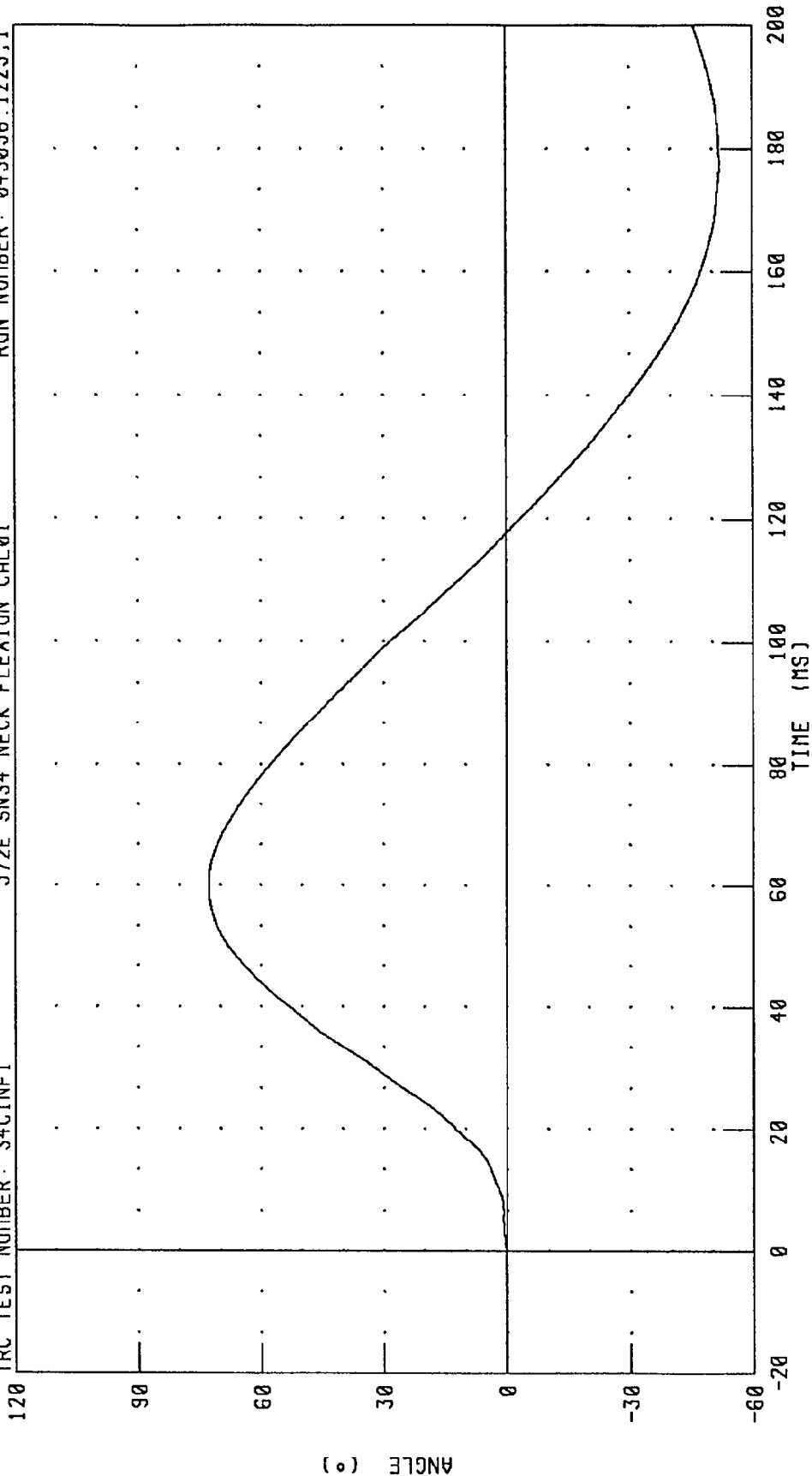
PEAK DATA: 40.90 ° @ 59.60 MS; -32.12 ° @ 179.12 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 34C1NF1 572E SN34 NECK FLEXION CAL01 RUN NUMBER: 043096.1223.1



PEAK DATA: 72.73 ° @ 60.24 MS; -51.93 ° @ 177.44 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 34C1NF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 043096.1223;1

160

120

80

40

0

-40

-80

FORCE (N X 10¹)

TIME (MS)

80 100 120 140 160 180 200

PEAK DATA: 832.72 N @ 46.80 MS; -192.96 N @ 169.52 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

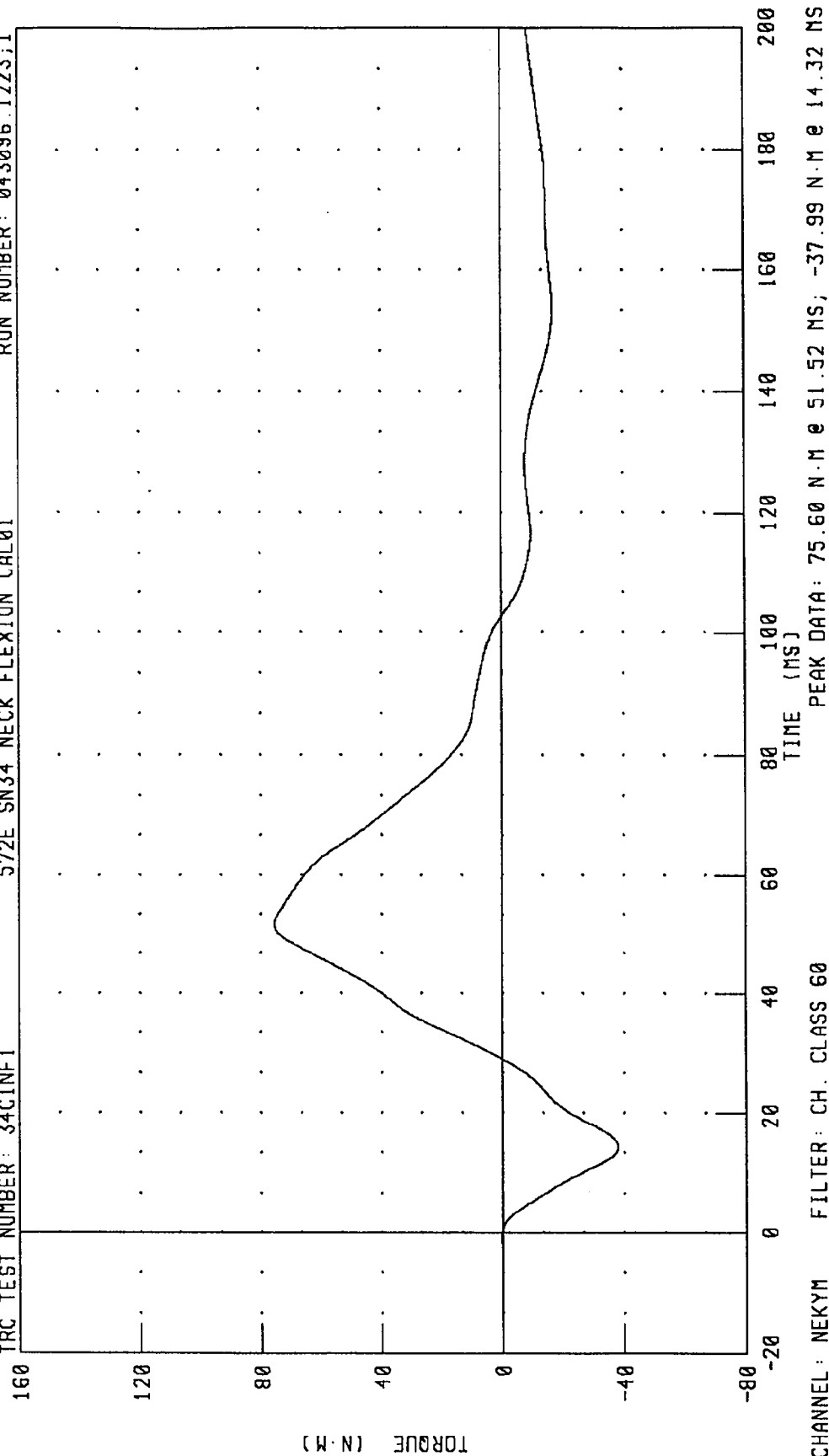
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 34GINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 043096.1223,1

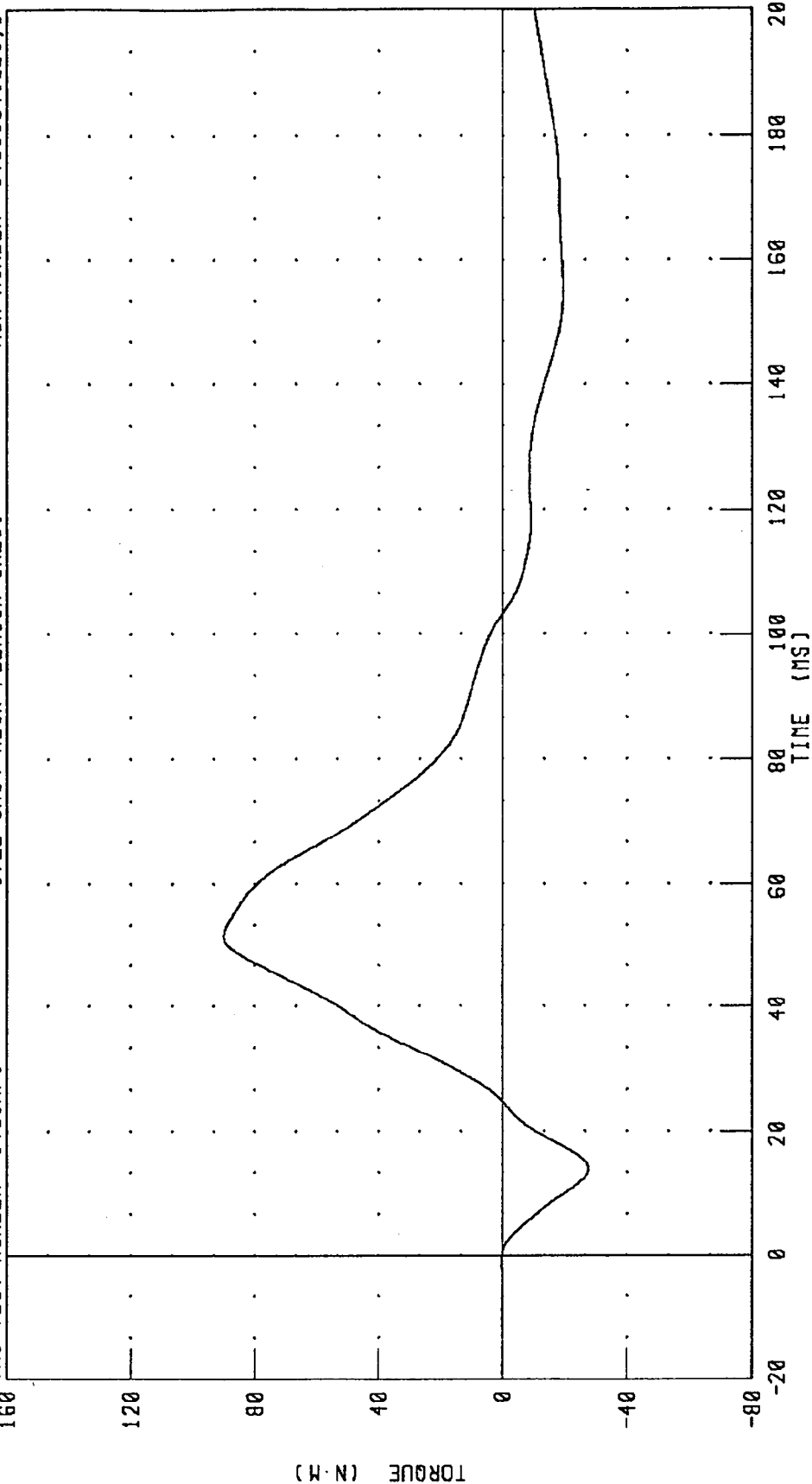


PART 572-E HYBRID III NECK FLEXION CALIBRATION
 TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

IRC TEST NUMBER: 34C1NF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 043096.1223;1



PEAK DATA: 90.00 N.M @ 51.60 MS; -27.68 N.M @ 14.00 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 34C1NE1 572E SN34 NECK EXT. CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.10 G
	20 MS	14.00 - 19.00 G	16.16 G
	30 MS	11.00 - 16.00 G	12.32 G
MAX PENDULUM G		22 G MAX	18.73 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	12.28 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.36 MS
D PLANE	MAX	81 - 106 DEG.	97.53 DEG.
ROTATION	TIME	72 - 82 MS	74.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-71.59 NM
	TIME	65 - 79 MS	69.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	154.56 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	142.80 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Richard L. Van

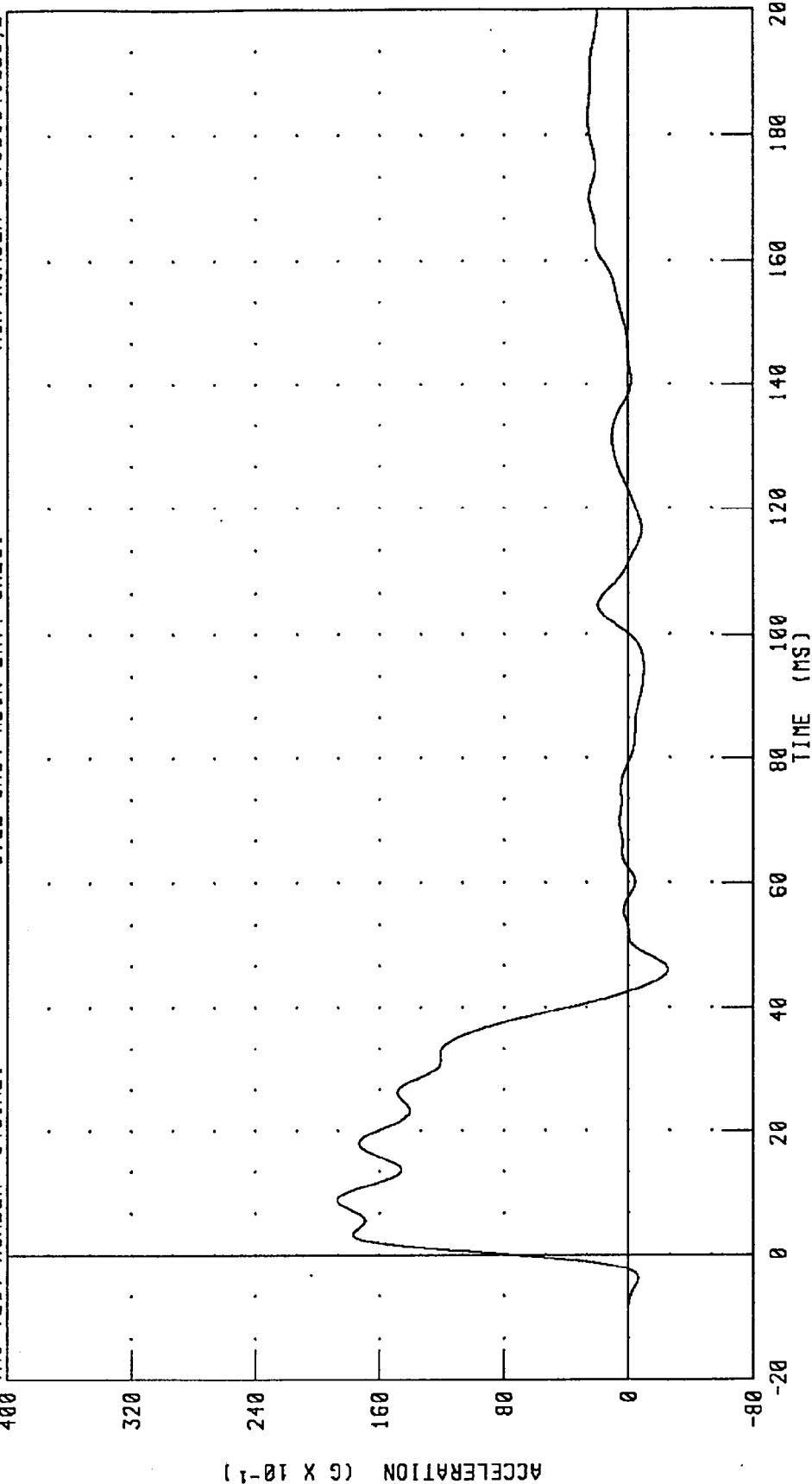
RUN NUMBER: 071195.1058;2

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 043096.1223;2



PEAK DATA: 18.74 G @ 8.80 MS; -2.54 G @ 46.08 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN34 NECK EXT. CAL01

TRC TEST NUMBER: 34CINE1

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

PEAK DATA: 36.08 ° @ 73.76 MS; -14.89 ° @ 200.00 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

960408

C-53

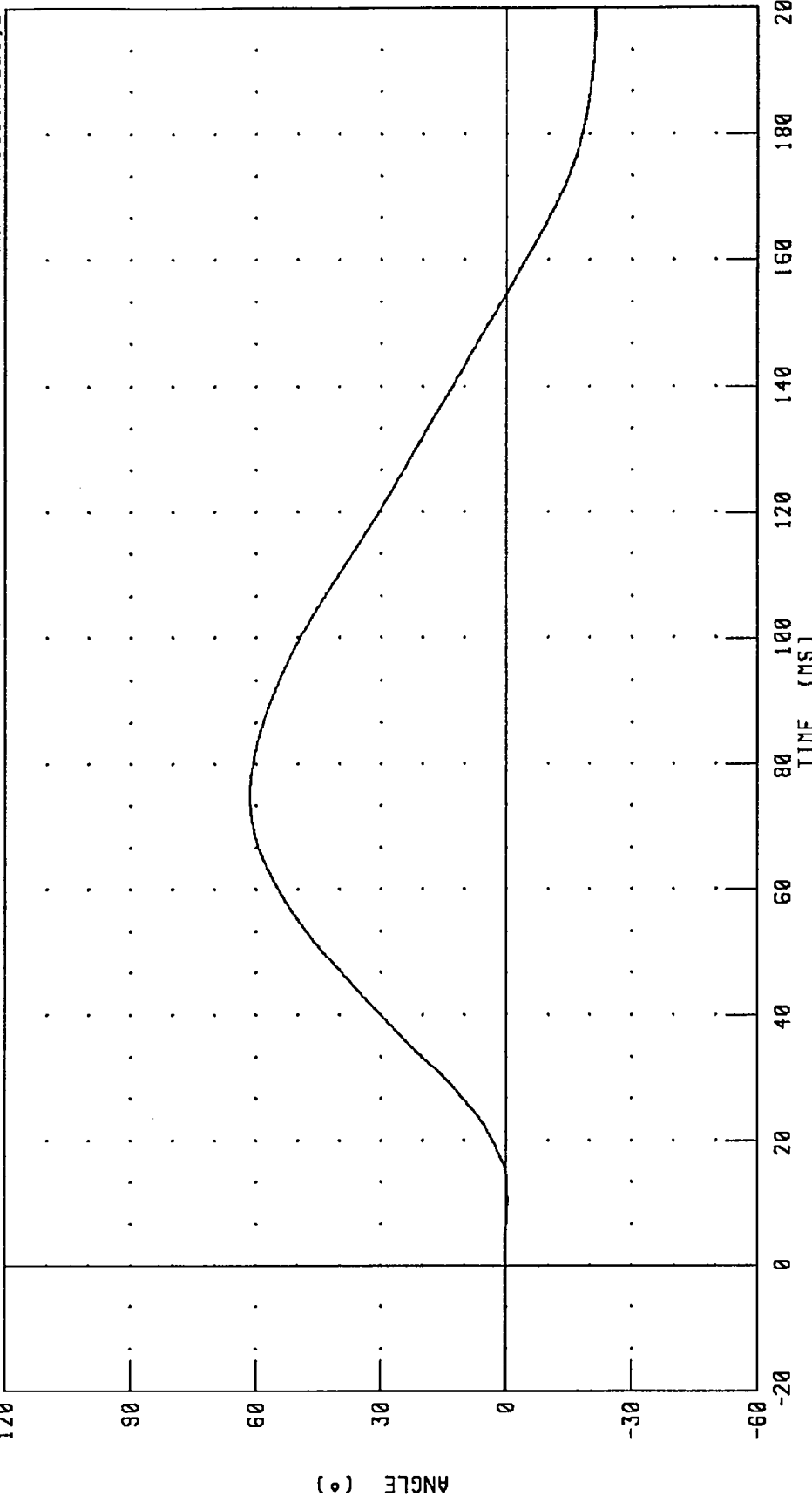
960408

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 043096.1223.2



PEAK DATA: 61.46 ° @ 75.04 MS; -21.34 ° @ 198.96 MS

CHANNEL: THETA FILTER: CH. CLASS 60

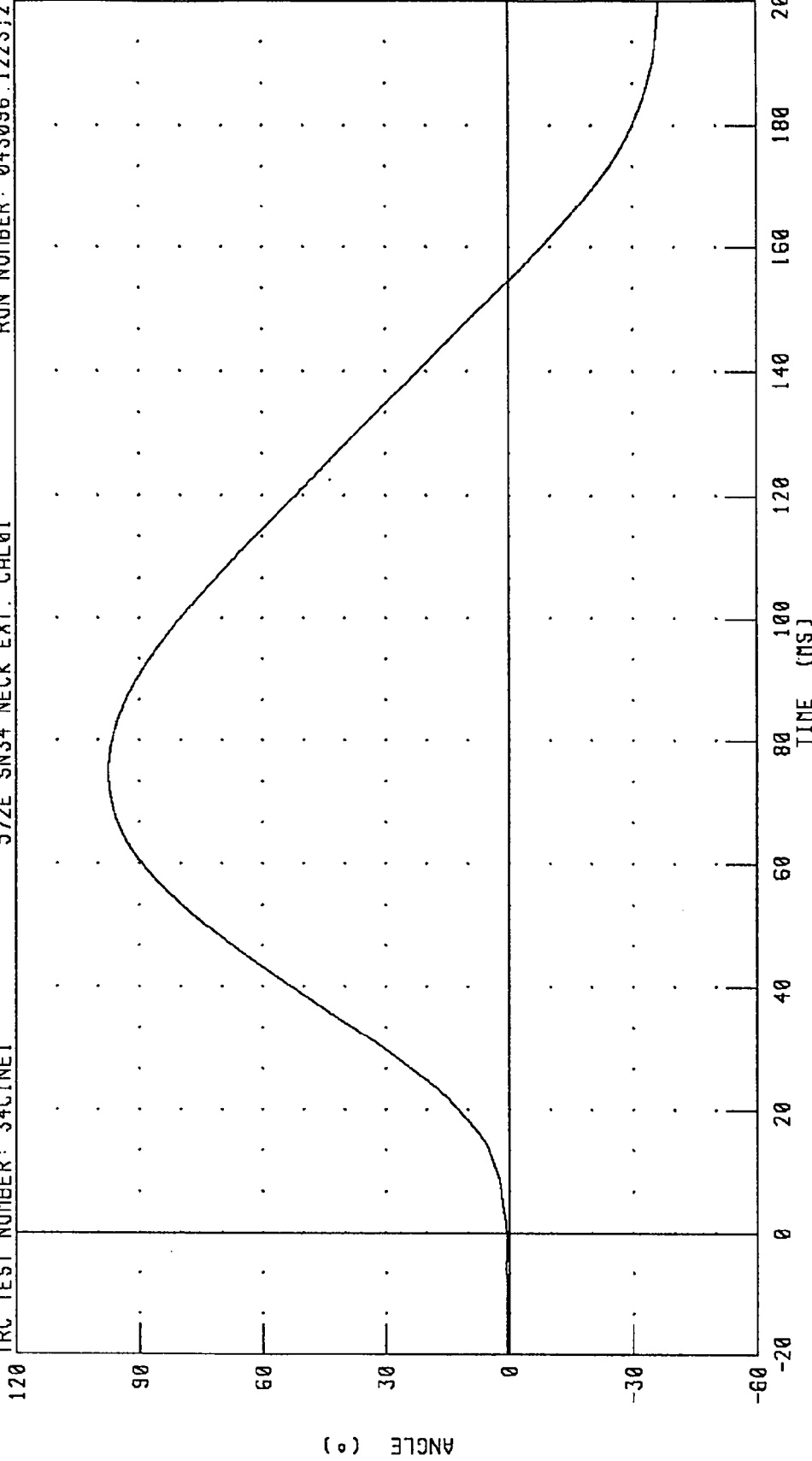
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 043096.1223,2



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 97.53 ° @ 74.80 MS; -36.22 ° @ 199.60 MS

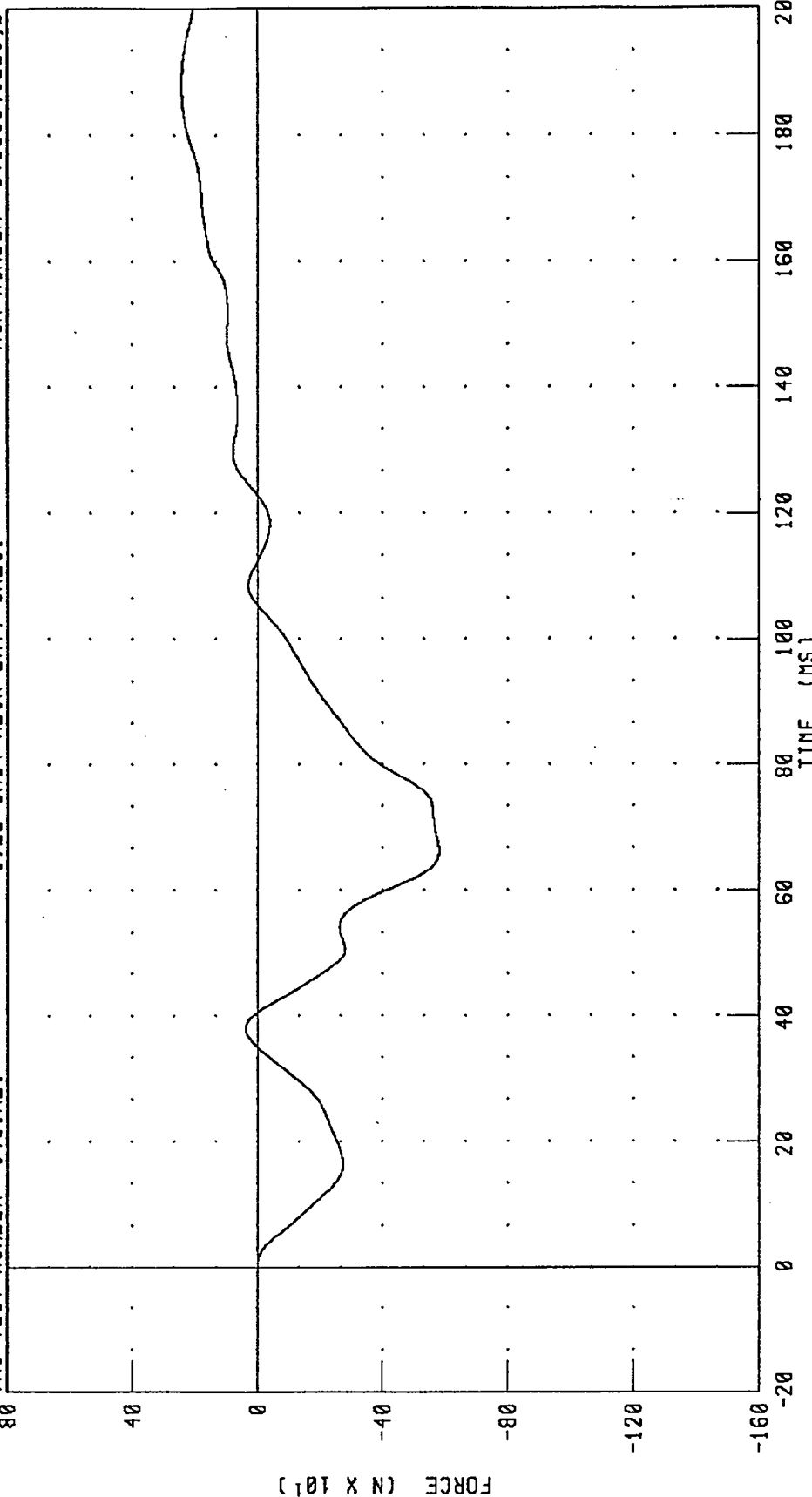
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 043096.1223;2



PEAK DATA: 242.60 N @ 188.08 MS; -581.96 N @ 66.08 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

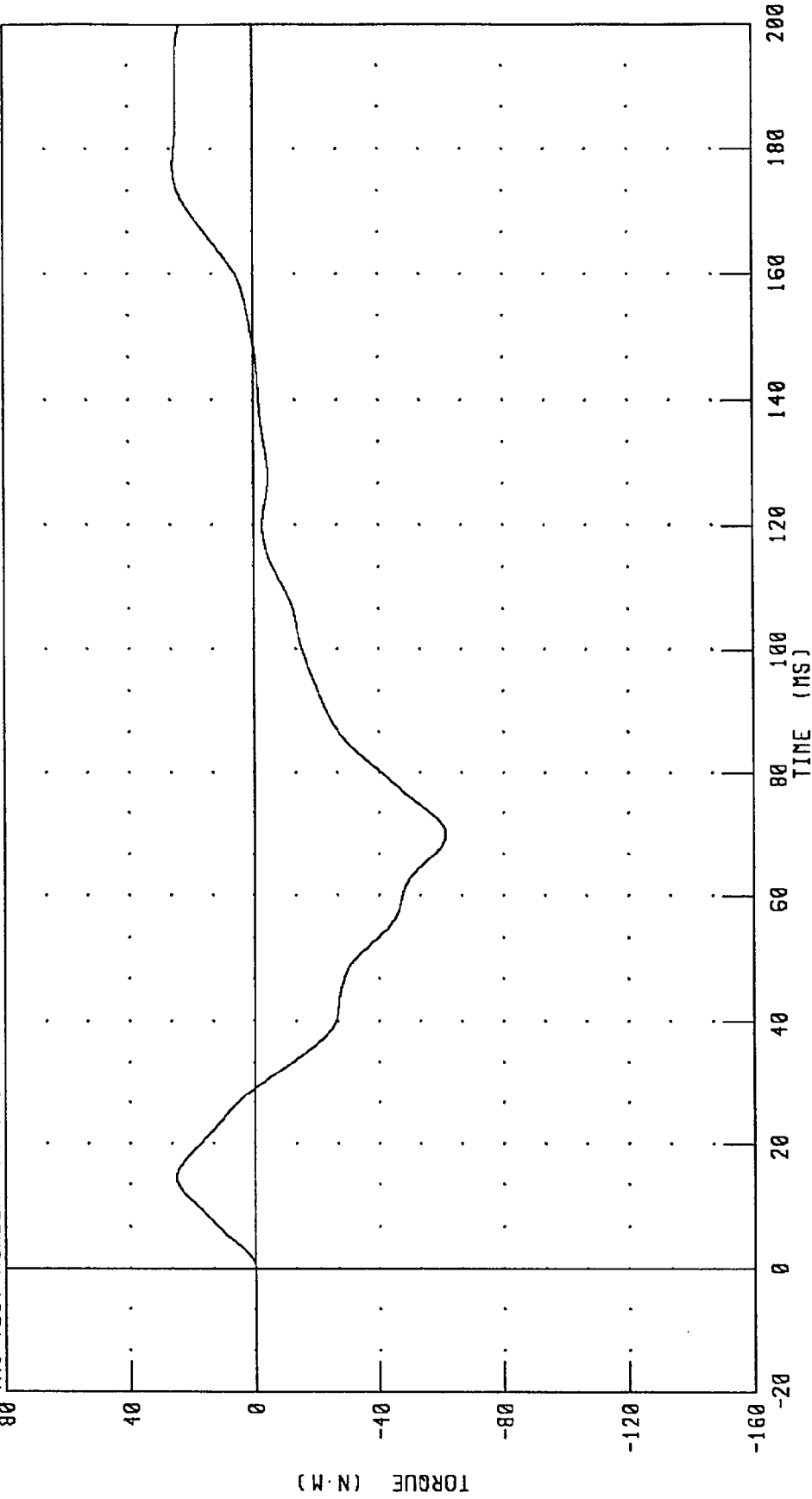
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

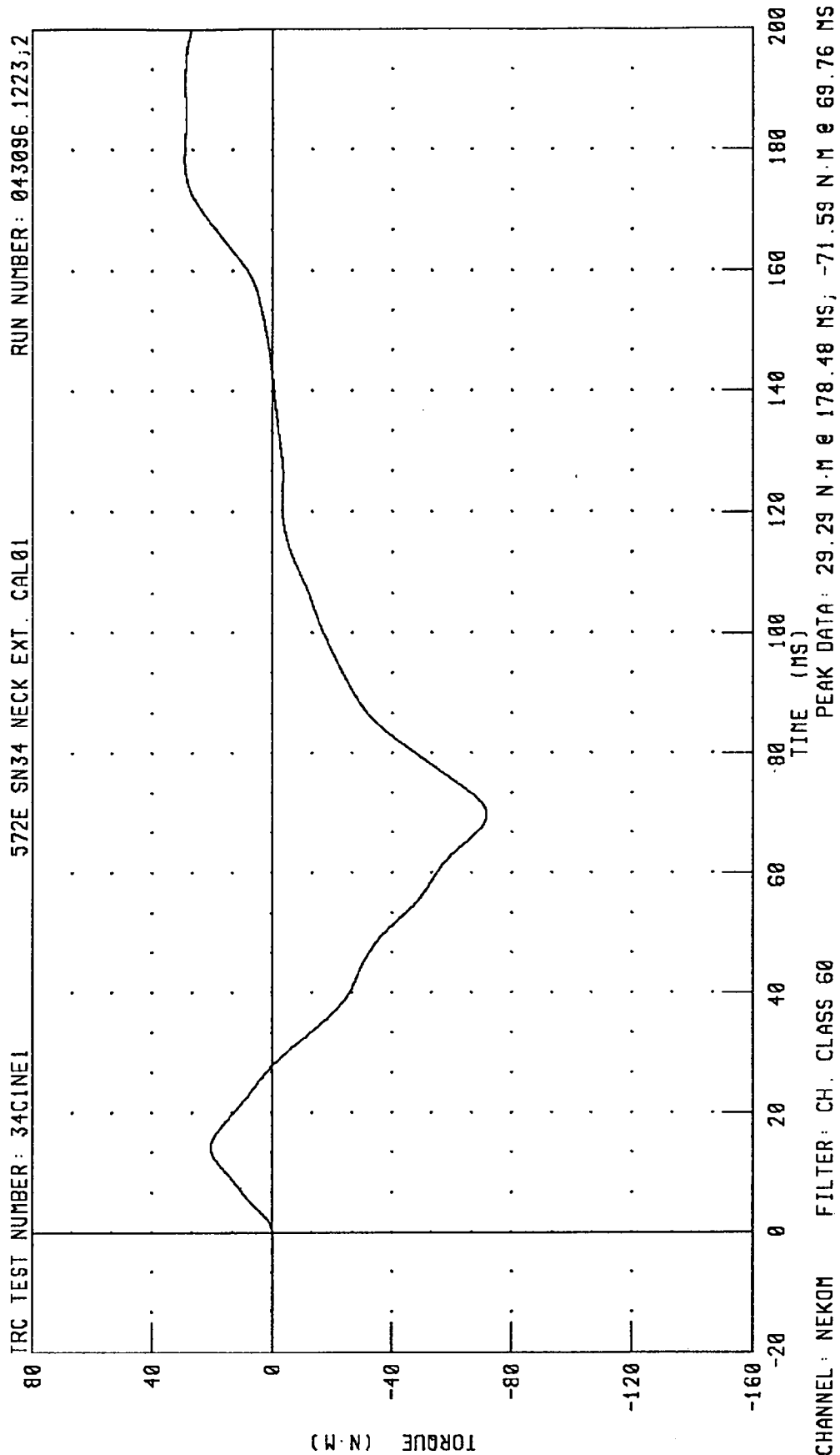
RUN NUMBER: 043096.1223.2



PEAK DATA: 25.59 N·M @ 177.36 MS; -61.48 N·M @ 69.84 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

16-FEB-96

TRC INC.

TEST NO: 34C1TH2

572E SN34 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	20.8 DEG. C
RELATIVE HUMIDITY	10 - 70 %	26.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.65 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	68.3 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5757. N
INTERNAL HYSTERESIS	69% - 85%	71.1%

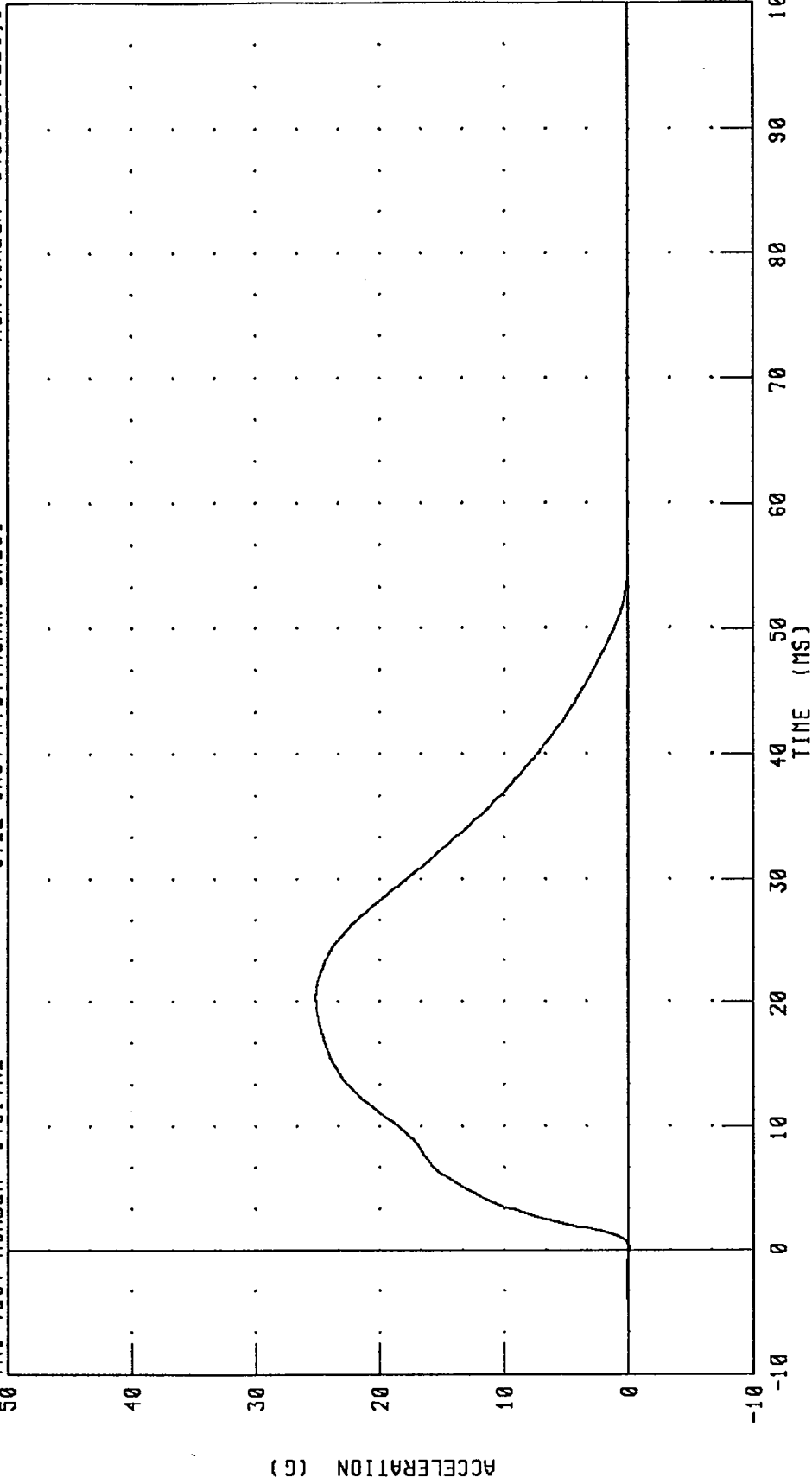
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard Le Van

RUN NUMBER: 021696.1507;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 34C1TH2 572E SN34 H.S.THORAX CAL01 RUN NUMBER: 043096.1223;1



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 25.13 G @ 20.24 MS; -0.03 G @ 0.08 MS

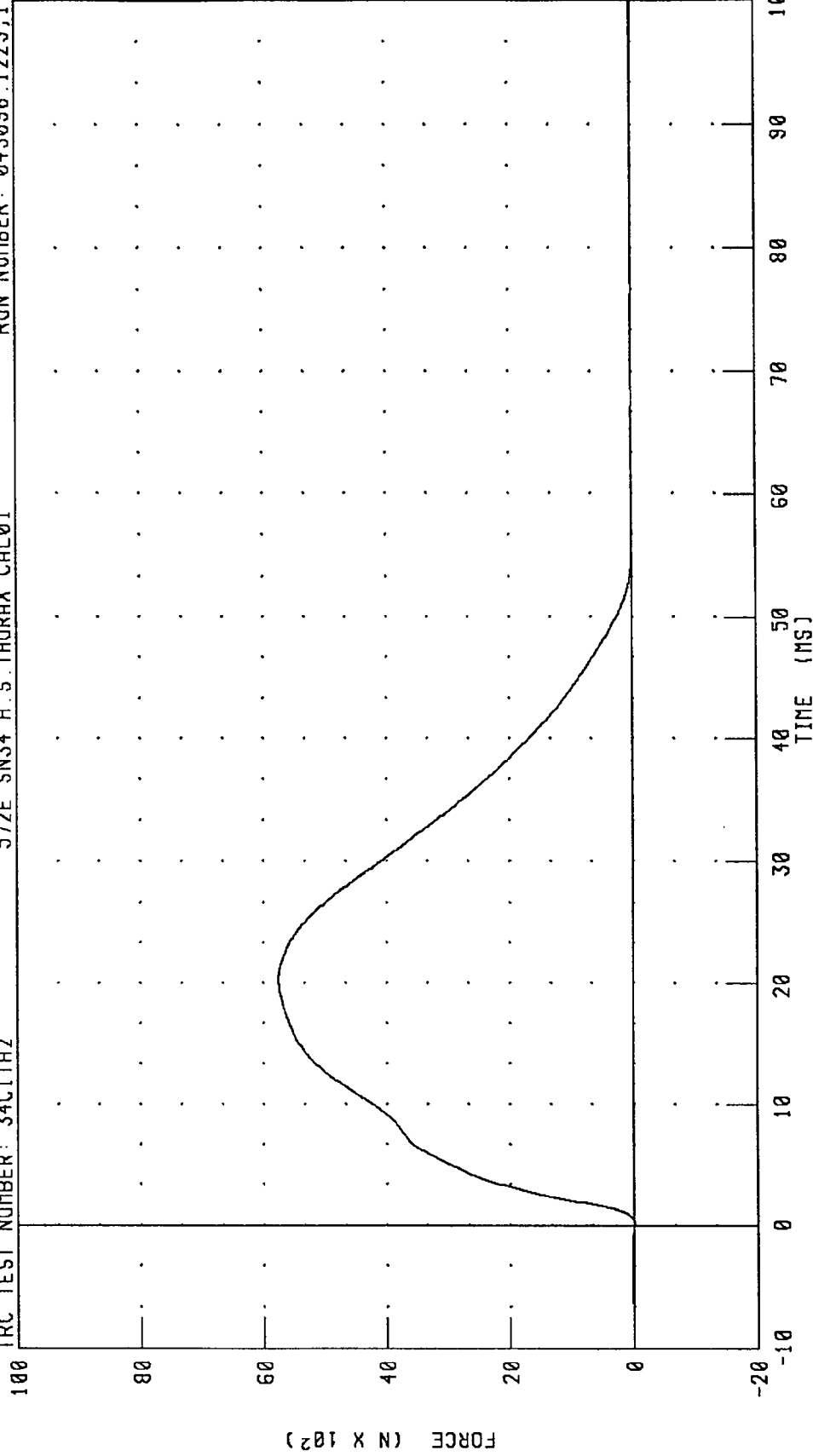
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 34C1TH2

572E SN34 H.S. THORAX CAL01

RUN NUMBER: 043096.1223,1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS

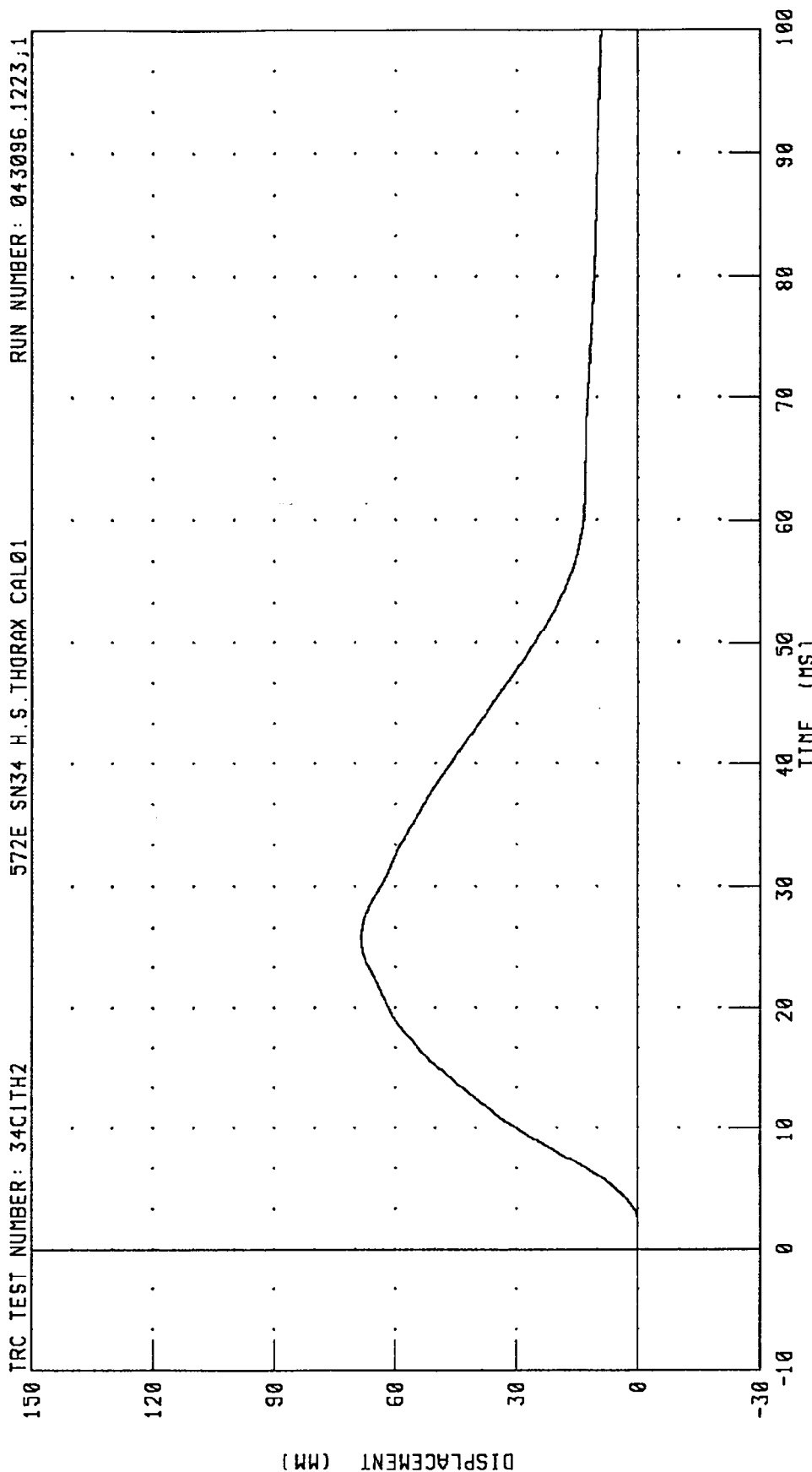
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 34C1TH2

572E SN34 H.S.THORAX CAL01

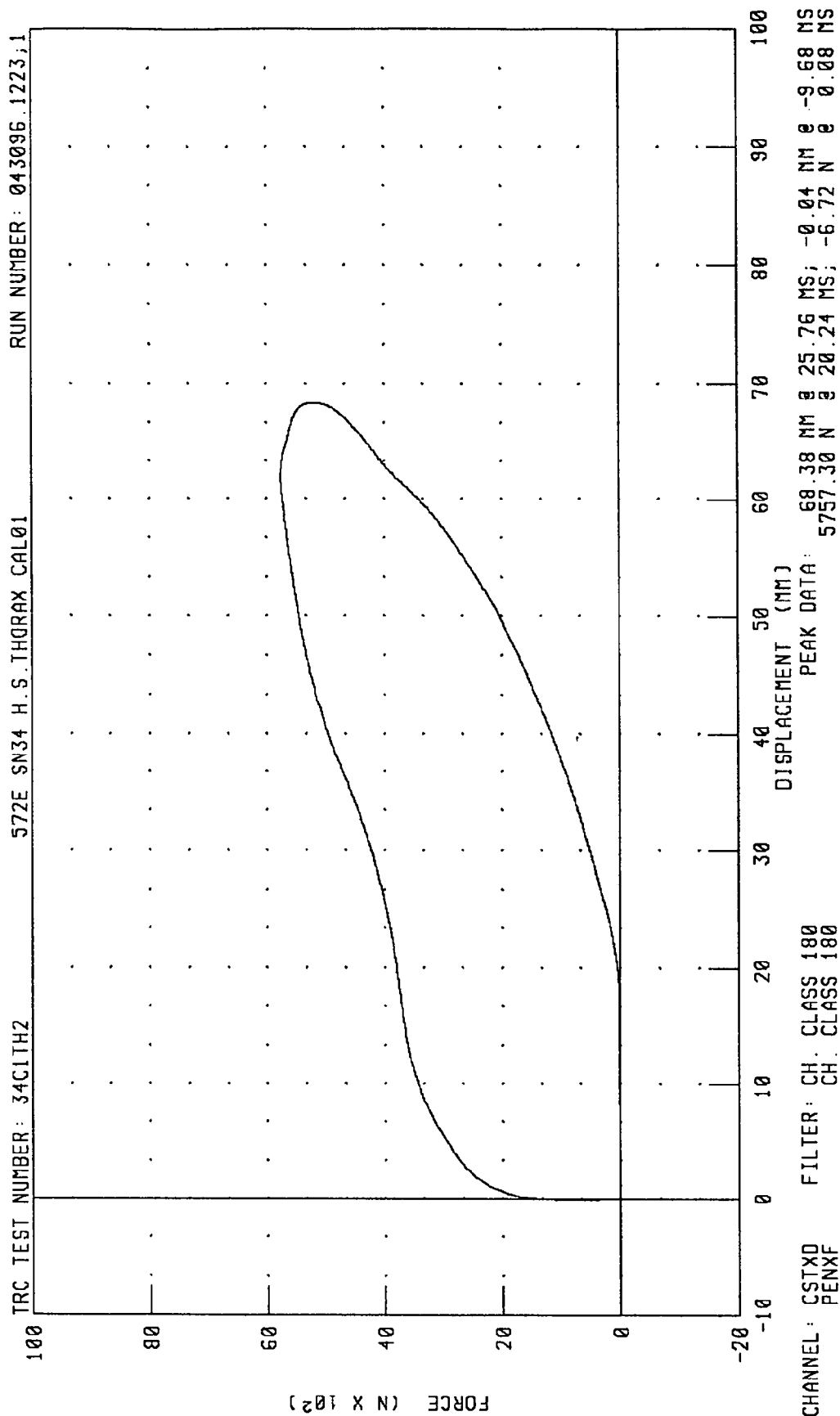
RUN NUMBER: 043096.1223,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 68.38 MM @ 25.76 MS; -0.04 MM @ -9.68 MS

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1RK1

572E SN34 RIGHT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5589.1 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Richard L. Van

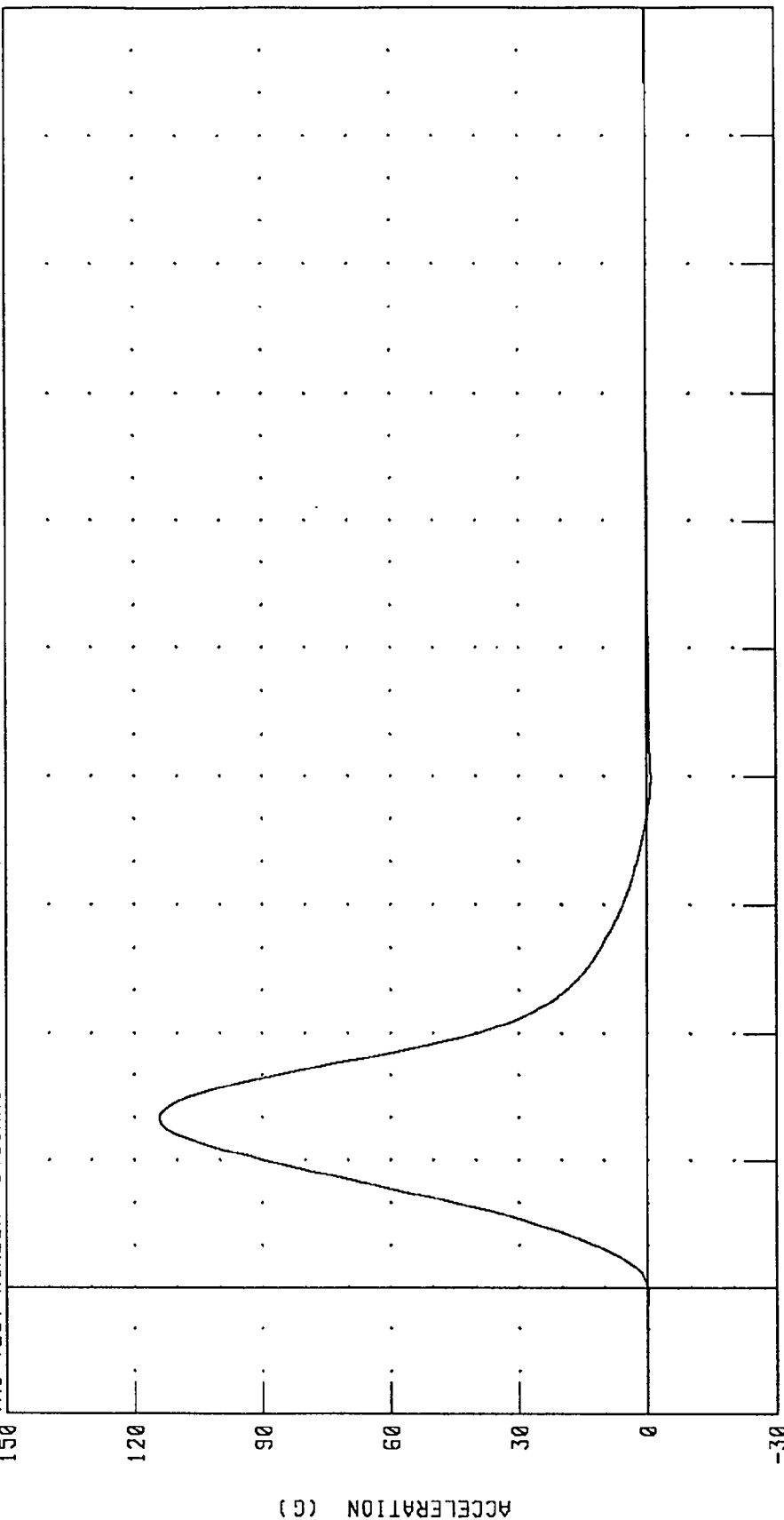
RUN NUMBER: 071195.1244;1

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 34CIRK1

572E SN34 RIGHT KNEE CAL 01

RUN NUMBER: 043096.1223.1



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 114.23 G @ 2.64 MS; -0.86 G @ 7.92 MS

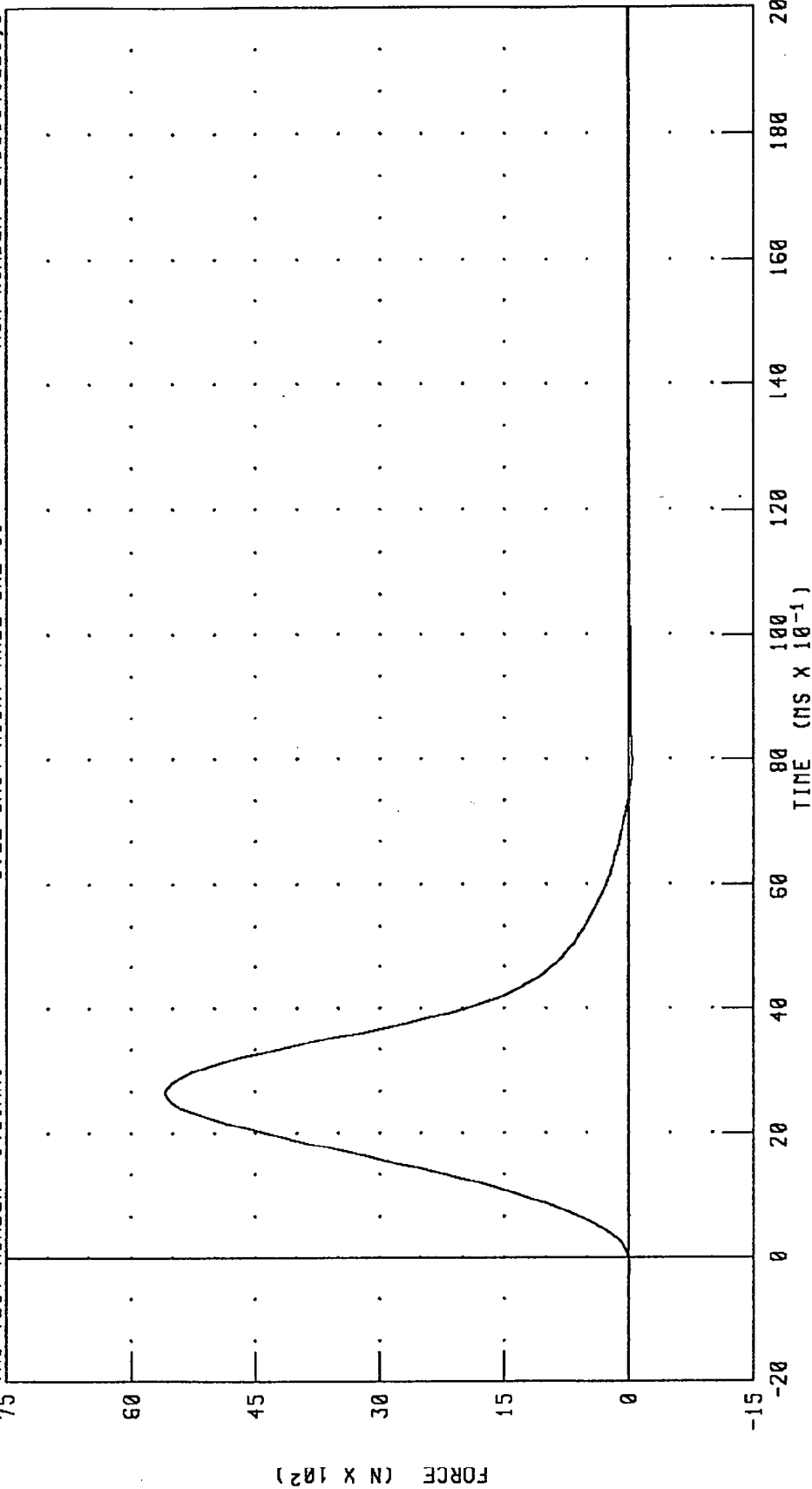
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 34CIRK1

572E SN34 RIGHT KNEE CAL 01

RUN NUMBER: 043096.1223;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5589.18 N @ 2.64 MS; -42.00 N @ 7.92 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1LK1

572E SN34 LEFT KNEE CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5684.2 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard L. Van

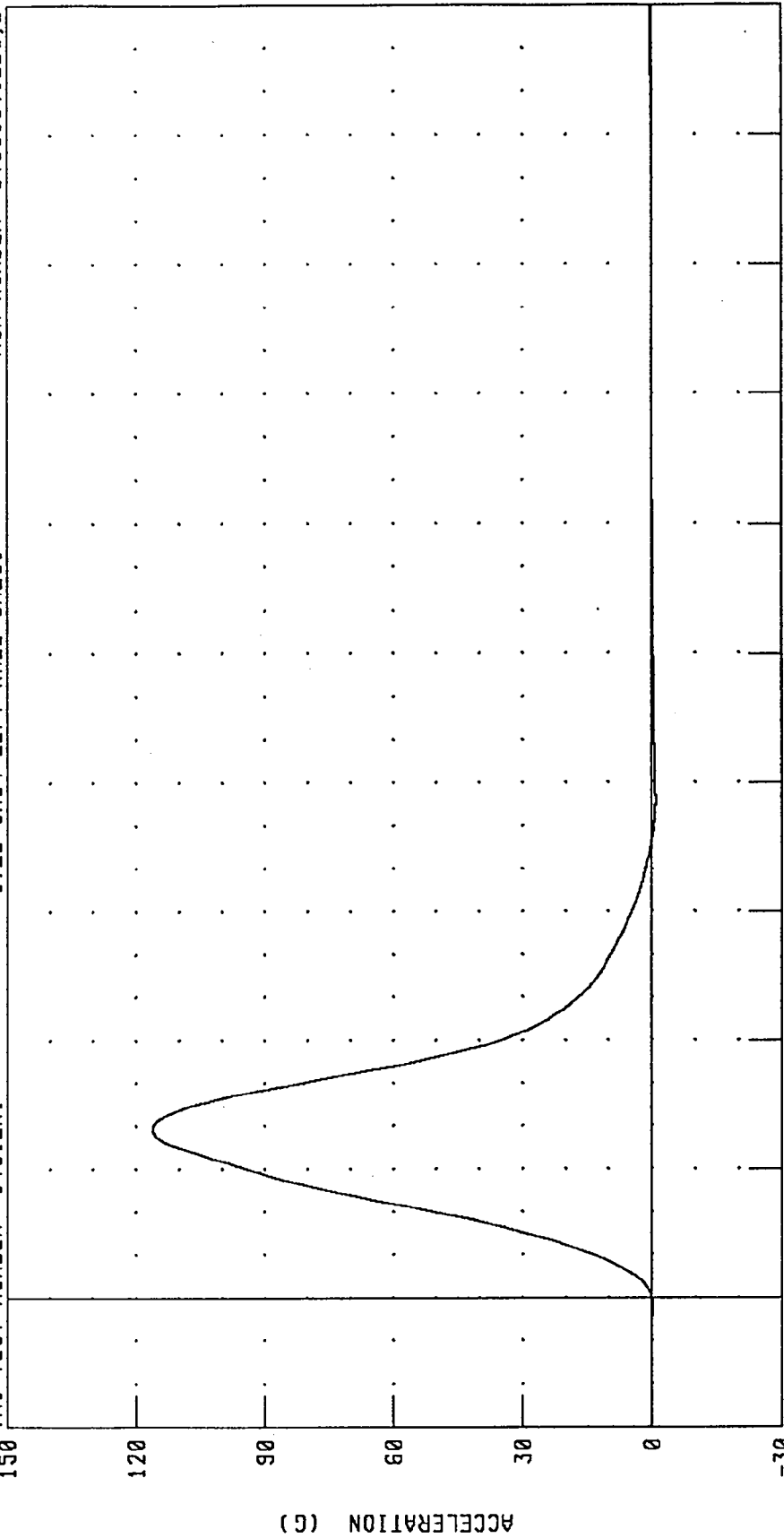
RUN NUMBER: 071195.1240;2

PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KC PEND.)

TRC TEST NUMBER: 34C1LK1

572E SN34 LEFT KNEE CAL01

RUN NUMBER: 043096.122312



PEAK DATA: 116.17 G @ 2.64 MS; -0.84 G @ 7.68 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

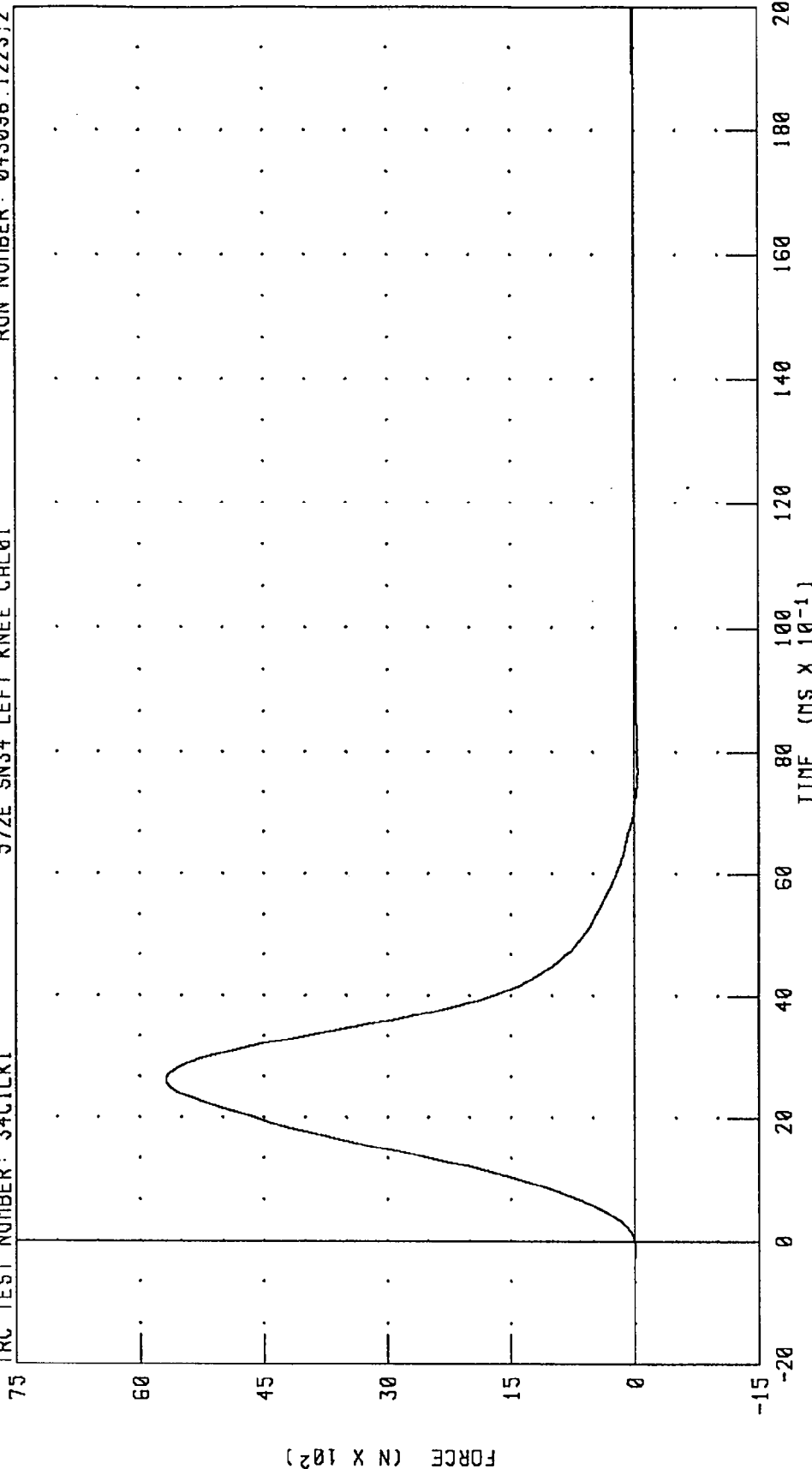
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 34C1LK1

572E SN34 LEFT KNEE CAL01

RUN NUMBER: 043096.1223,2



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5684.20 N @ 2.64 MS; -41.11 N @ 7.68 MS

Appendix D

Miscellaneous Test Information

Sign Convention
NHTSA Data Tape Reference Guide

Accelerometers:

+X: Forward
+Y: Leftward
+Z: Upward

Potentiometers:

+Chest longitudinal deflection: Outward
+Chest lateral deflection: Leftward
+Seat belt displacement: Outward
+Seat belt extension: Elongation
+Knee slider displacement: Distance between femur and tibia

increased

(in relation to a seated dummy)

Load cells:

+Femur force: Tension
+Seat belt force: Tension
+Barrier force: Tension

Neck load cells:

+X force: Head pushed forward
+y force: Head pushed leftward
+Z force: Head pulled upward (tension on neck)
+X moment: Right ear rotating toward right shoulder
+Y moment: Chin rotating toward chest
+Z moment: Chin rotating toward left shoulder

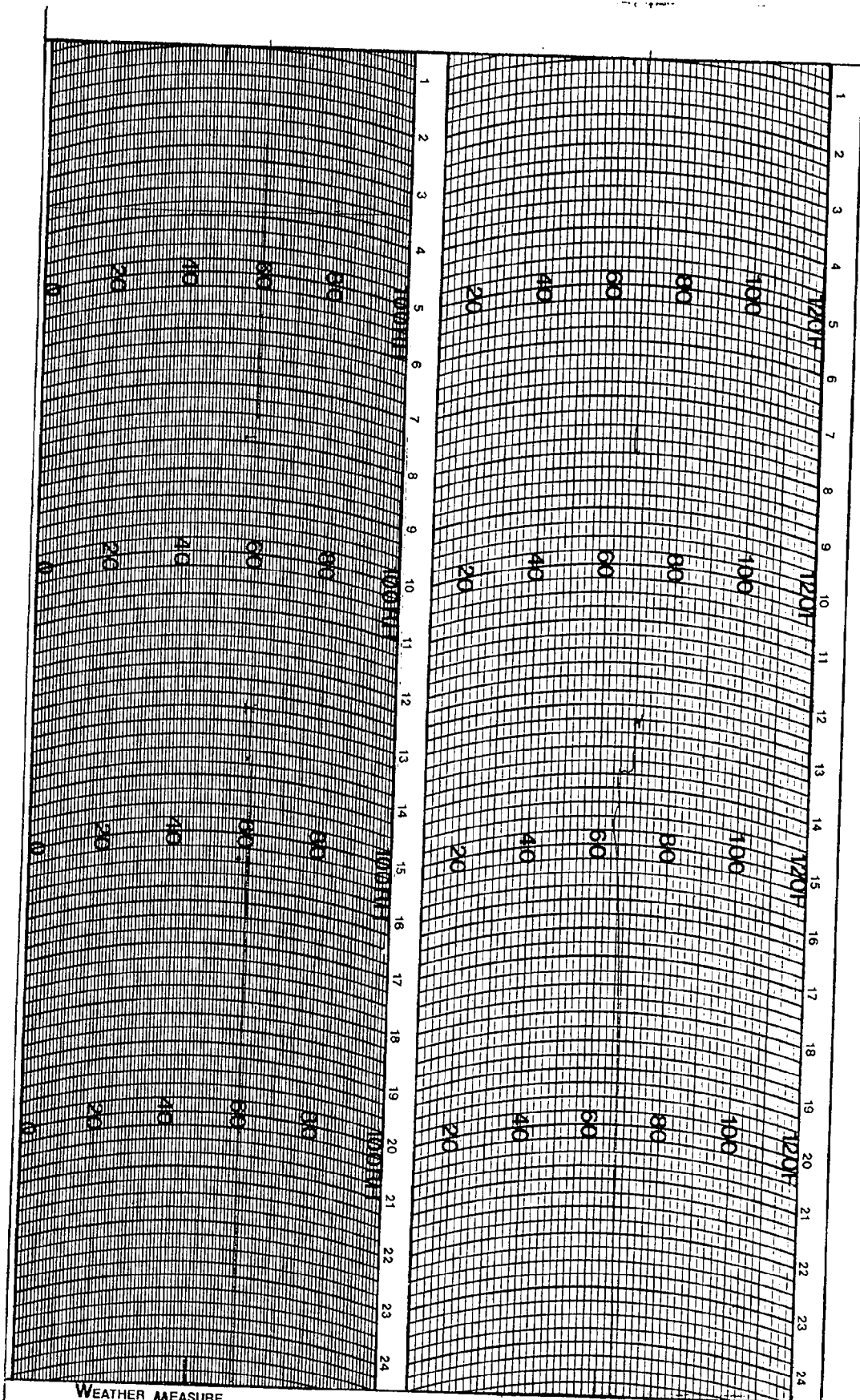
Tibia load cells:

+X force: Tension
+Y force: Tension
+Z force: Tension
+X moment: Bottom of tibia moving leftward
+Y moment: Bottom of tibia moving rearward

Frequency Response Classes

SAE J211 OCT88

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Vehicle Structural Accelerations for use in:	
Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	180
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Head form Accelerations	1000



WEATHER MEASURE
P.O. BOX 41257
SACRAMENTO, CA. 95841
PHONE (916) 481-7565

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION _____ DATE ON _____ DATE OFF _____