

V2198

Report Number TRC-95-N05

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

Saab Automobile AB

1995 Saab 900S

5-door hatchback

NHTSA Number: MS0503

TRC Test Number: 941207

Prepared By:

Transportation Research Center Inc.

10820 State Route 347

East Liberty, Ohio 43319



January 5, 1995

Final Report

Prepared For:

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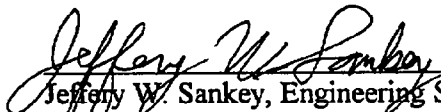
400 Seventh Street, S.W.

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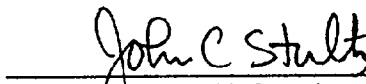
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Report prepared by:


Jeffery W. Sankey, Engineering Supervisor
Transportation Research Center Inc.

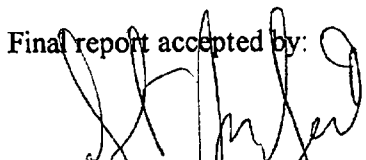
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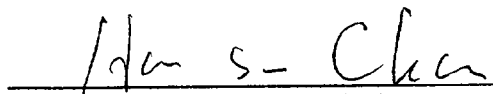

John C. Stultz, Chief Engineer
Transportation Research Center Inc.

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Final report accepted by:


Manager, New Car Assessment Program
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16. Abstract A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1995 Saab 900S 5-door hatchback, NHTSA No. MS0503, at Transportation Research Center Inc. on December 7, 1994. This test was conducted to obtain new car assessment and research data indicant of FMVSS 208, 212, 219 (partial), and 301 performance. The barrier impact velocity was 56.5 kph. The vehicle's maximum static crush was 569 millimeters. The ambient temperature was 21° C. The driver's Head Injury Criteria (HIC) was 640. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.1 g. The driver's chest maximum deflection was 48 millimeters. The driver's left and right femur maximum axial forces were 6206 N and 4669 N, respectively. The passenger's HIC was 578. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 49.0 g. The passenger's chest maximum deflection was 42 millimeters. The passenger's left and right femur maximum axial forces were 4022 N and 2852 N, respectively.			
17. Key Words 56 kph (35 mph) Frontal Barrier Impact Test: New Car Assessment Program (NCAP) FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Retention" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division Nassif Building, Room 5108 400 Seventh Street, S.W. Washington, DC 20590	
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Approximate Conversions from Metric Measures

When You Know	Multiply by	To Find	Symbol
LENGTH			
millimeters	0.04	inches	in
centimeters	0.4	inches	in
meters	3.3	feet	ft
kilometers	0.6	miles	mi
AREA			
square centimeters	0.16	square inches	in ²
square meters	1.2	square yards	yd ²
square kilometers	0.4	square miles	mi ²
hectares (10,000 m ²)	2.5	acres	ac
MASS (weight)			
grams	0.035	ounces	oz
kilograms	2.2	pounds	lb
tonnes (1000 kg)	1.1	short tons	
VOLUME			
milliliters	0.03	fluid ounces	fl oz
liters	2.1	pints	pt
liters	1.06	quarts	qt
liters	0.26	gallons	gal
cubic meters	35	cubic feet	ft ³
cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)			
Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

Approximate Conversions to Metric Measures

When You Know	Multiply by	To Find	Symbol
LENGTH			
inches	2.5	centimeters	cm
feet	30	centimeters	cm
yards	0.9	meters	m
miles	1.6	kilometers	km
AREA			
square inches	6.5	square centimeters	cm ²
square feet	0.09	square meters	m ²
square yards	0.8	square meters	m ²
square miles	2.6	square kilometers	km ²
acres	0.4	hectares	ha
MASS (weight)			
ounces	28	grams	g
pounds	0.45	kilograms	kg
short tons (2000 lb)	0.9	tonnes	t
VOLUME			
teaspoons	5	milliliters	ml
tablespoons	15	milliliters	ml
fluid ounces	30	milliliters	ml
cups	0.24	liters	l
pints	0.47	liters	l
quarts	0.95	liters	l
gallons	3.8	liters	l
cubic feet	0.03	cubic meters	m ³
cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)			
Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

* 1 inch = 2.54 centimeters. For other exact conversions and more detailed tables, see NBS Mon., Publ. 280, Guide to Weights and Measures, Page 2-25, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

* For other exact conversions and more detailed tables, see NIST Monograph 280, Tables of Weights and Measures, Page 25, 26, 27, and 28, U.S. GPO, 1976.



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Section 1.0

Purpose and Test Procedure

Purpose

This 56 kph (35 mph) frontal barrier impact test is part of the New Car Assessment Program (NCAP) conducted for the National Highway Traffic Safety Administration's (NHTSA) Office of Market Incentives by Transportation Research Center Inc. (TRC) under Contract Number DTNH22-90-D-22121.

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1995 Saab 900S 5-door hatchback, NHTSA Number MS0503, at an impact speed in excess of the current 48 kph (30 mph) FMVSS 208 requirements.

Test Procedure

This test was conducted in accordance with NHTSA's Laboratory Indicant Test Procedure, New Car Assessment Program, dated January 1, 1990. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations. The driver's and passenger's restraint systems were not instrumented due to the vehicle's restraints including crash-deployed pre-tensioner devices. The vehicle impacted a frontal load cell barrier instrumented with thirty-six (36) barrier face load cells. The vehicle's specified impact velocity range was 55.5 to 57.1 kph.

The test vehicle contained two (2) Part 572E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendices VII and VIII of the Laboratory Indicant Test Procedure. This test was the first use of the driver dummy and the second use of the passenger dummy.

Both dummies were instrumented with head, chest, and pelvis accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. Each Part 572E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection and a six-axis neck load cell to measure longitudinal, lateral, and vertical forces and moments.

The eighty-one (81) data channels were multiplexed and recorded on two (2) 14-track tape drives. The data was digitally sampled at 12,500 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle, occupant, and load cell barrier data are presented in Section 2.0. The occupant, camera, and vehicle measurements are presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the dummy, vehicle, and load cell barrier data plots. Appendix C contains the dummy certification data. Appendix D contains miscellaneous test information. Appendix E contains the restraint system instructions from the owner's manual.

Section 2.0

Frontal Barrier Impact Test Summary

Test Results Summary

This frontal load cell barrier test was conducted at TRC on December 7, 1994.

The test vehicle, a 1995 Saab 5-door hatchback, NHTSA Number MS0503, was equipped with a 2.3-liter transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 1601 kg. The vehicle's impact speed was 56.5 kph. The vehicle sustained 569 mm of static crush during the impact.

The driver's Head Injury Criteria (HIC) was 640. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.1 g. The driver's chest maximum deflection was 48 mm. The driver's left and right femur maximum axial forces were 6206 N and 4669 N, respectively.

The passenger's HIC was 578. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 49.0 g. The passenger's chest maximum deflection was 42 mm. The passenger's left and right femur maximum axial forces were 4022 N and 2852 N, respectively.

There was loss of windshield periphery retention along the lower edge of the windshield between 755 millimeters and 980 millimeters measured from the lower right corner.

There was no penetration through the windshield.

Following the impact, no fluid spilled from the vehicle's fuel system prior to the static rollover test or during any portion of the static rollover test.

Data Acquisition Explanations

The driver's pelvis Y-axis accelerometer, PEVYG1, did not return to zero following the crash event. This zero shift affected the driver's pelvis resultant acceleration calculation, PEVRG1.

The right front passenger's pelvis X-axis accelerometer, PEVXG2, did not return to zero following the crash event. The right front passenger's Z-axis accelerometer, PEVXG2, recorded questionable data throughout the event. These signals affected the right front passenger's pelvis resultant acceleration calculation, PEVRG2.

The instrument panel center X-axis accelerometer, DPCXG1, did not return to zero following the crash test event.

Table 1 Crash Test Summary

NHTSA number:	MS0503	
Test type:	Frontal Load Cell Barrier	
Test date:	12/07/94	
Test time:	1449	
Ambient temperature:	21° C	
Vehicle year/make/ model/body style:	1995/Saab/900S/5-door hatchback	
Vehicle test weight:	1601 kg	
Impact angle ¹ :	0°	
Impact velocity ² :	Primary = 56.5 kph Secondary = 56.5 kph	
Maximum static crush:	569 mm	
Average rebound:	841 mm	
Dummies:	Driver #142	Passenger #192
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag and 3-point unbelt	Airbag and 3-point unbelt
Number of data channels:	81	
Number of cameras:	High-speed 14 Real-time 2	

¹ With respect to tow track centerline.

² Speed trap measurement (± .08 kph accuracy)

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1995/Saab/900S/5-door hatchback
Color: Citrine Beige
VIN: YS3DD58B5S2004439
NHTSA number: MS0503
Engine data:
Placement: Transverse
Cylinders: 4
Displacement 2.3 liters
Transmission data: 4 speed, manual, X automatic, overdrive
 X FWD, RWD, 4WD
Date vehicle received: 11/18/94
Odometer reading: 60
Dealer's name West of Sweden, Inc.
and address: Just Saab
5449 Dixie Highway
Fairfield, OH 45014

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by: Saab Automobile AB
Date of manufacture: 08/94
VIN: YS3DD58B5S2004439
GVWR: 1825 kg
GAWR: Front: 1030 kg
Rear: 850 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires: P195/60R15

Tire pressure with maximum capacity vehicle load:

Front: 300 kPa

Rear: 300 kPa

Spare tire: Nokia Temp T115/70R15 90M

Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P195/60VR15

Recommended cold tire pressure:

Front: 240 kPa

Rear: 240 kPa

Designated seating capacity:

Front 2

Rear 3

Total 5

Vehicle capacity weight: 401 kg

Test vehicle attitude:

Delivered attitude: LF 674 mm; RF 679 mm; LR 676 mm; RR 682 mm

Pre-test attitude: LF 655 mm; RF 658 mm; LR 639 mm; RR 640 mm

Post-test attitude: LF 709 mm; RF 723 mm; LR 635 mm; RR 640 mm

Table 2 Test Vehicle Information Cont'd

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

Right front	428 kg	Right rear	249 kg
Left front	444 kg	Left rear	269 kg
Total front weight	872 kg	(62.7% of total vehicle weight)	
Total rear weight	518 kg	(37.7% of total vehicle weight)	
Total delivered weight	1390 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1390 kg)

VCW¹ = Vehicle capacity weight (401 kg)

DSC = Designated seating capacity (5)

RCLW = VCW - 68 (DSC) = 401 - 68(5) = 61 kg

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

Target test weight = 1390 + 61 + 152

Target test weight = 1603 kg

Weight of test vehicle with required dummies and 59 kg of cargo weight:

Right front	458 kg	Right rear	333 kg
Left front	469 kg	Left rear	341 kg
Total front weight	927 kg	(57.9% of total vehicle weight)	
Total rear weight	674 kg	(42.1% of total vehicle weight)	
Total test weight	1601 kg	(0.1 % under target test weight)	

Weight of ballast secured in vehicle: 23 kg of steel plate

Components removed to meet target test weight: None

CG rearward of front wheel centerline: 1096 mm

Vehicle wheelbase: 2604 mm

¹ From the vehicle's recommended tire pressure label.

Table 3 Post-Impact Data

Test number: 941207
NHTSA number: MS0503
Test date: 12/07/94
Test time: 1449
Test type: Frontal load cell barrier
Impact angle: 0°
Ambient temperature
at impact area: 21° C
Temperature in
occupant compartment: 21° C
Impact velocity:
Primary 56.5 kph
Secondary 56.5 kph
Specified range 55.5 to 57.1 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:

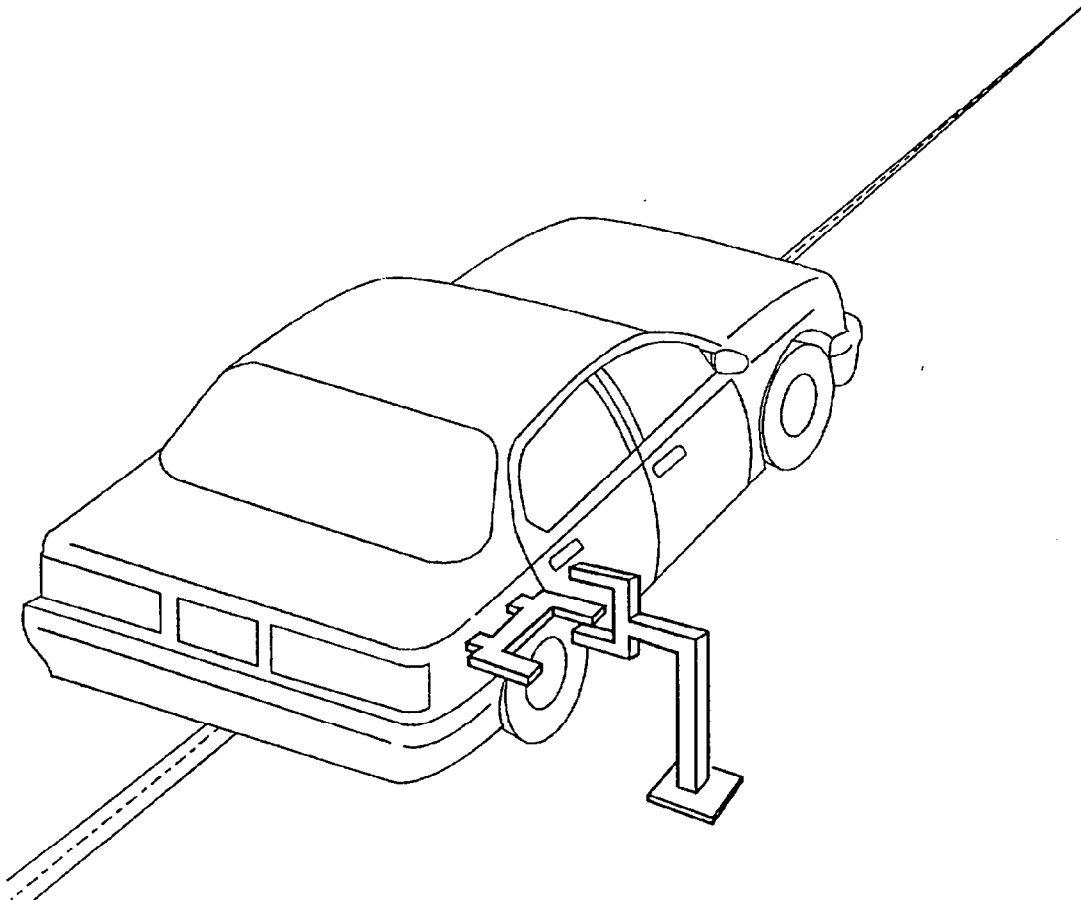
Pre-test: L 4419 mm; C 4615 mm; R 4421 mm
Post-test: L 3933 mm; C 4048 mm; R 3897 mm
Total crush: L 486 mm; C 567 mm; R 524 mm
Average crush: 526 mm

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test: L 891 mm; C 757 mm; R 874 mm
Average rebound 841 mm

Figure 1 Impact Velocity Measurement System



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

The vanes have 305-millimeter spacing.

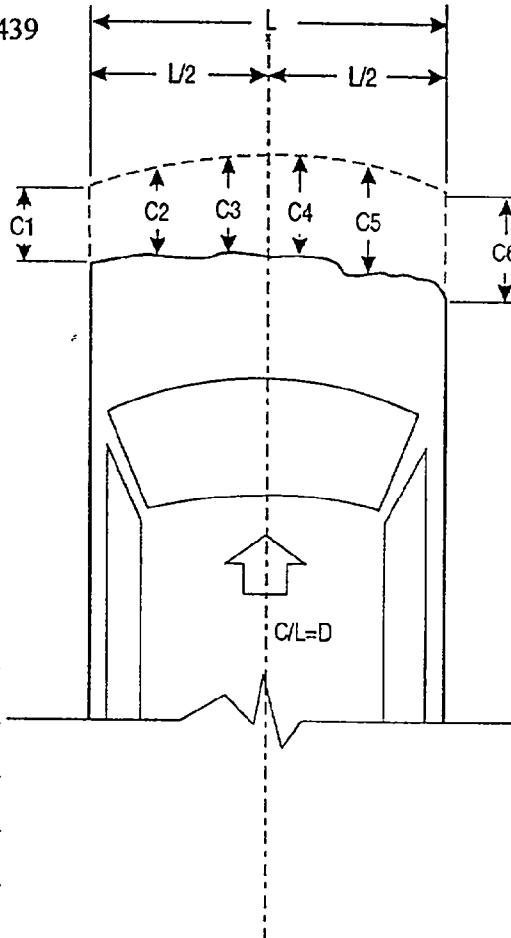
Figure 2 Accident Investigation Division Data
for 56 kph (35 mph) Frontal Barrier Impact

NHTSA number: MS0503
 Test date: 12/07/94
 Vehicle year/make/
 model/body style: 1995/Saab/900S/5-door hatchback
 Vehicle size category: Mid-size
 VIN: YS3DD58B5S200439
 Build date: 08/94
 Test weight: 1601 kg
 Vehicle wheelbase: 2604 mm
 Maximum width: 1724 mm
 Front overhang: 992 mm

Collision Deformation
 Classification (CDC) code: 12FDEW4

Crush depth
 measurements:

C1 = 486 mm
 C2 = 563 mm
 C3 = 569 mm
 C4 = 568 mm
 C5 = 551 mm
 C6 = 524 mm



Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged region: L: 1523 mm

Figure 3 Vehicle Accelerometer Placement

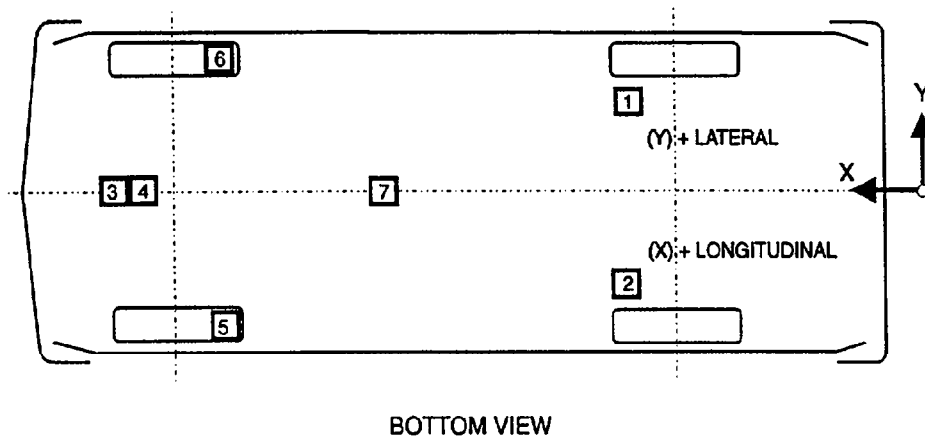
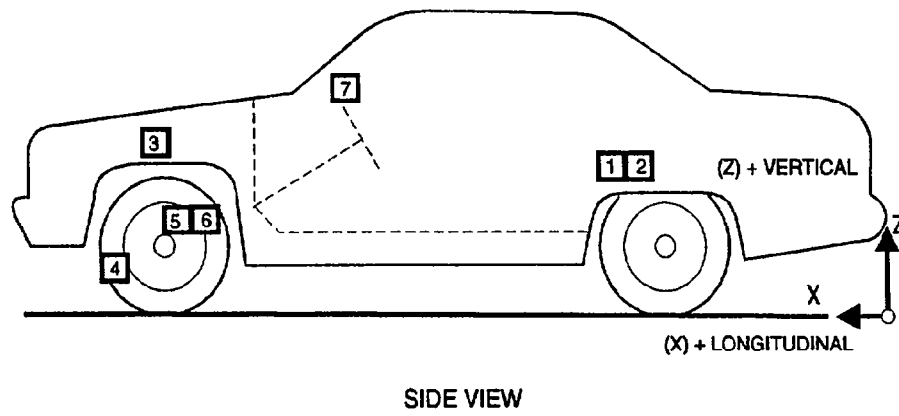


Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 941207 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	2749 mm	686 mm	315 mm	2.3 g @ 132.6 ms 2.5 g @ 135.0 ms	36.6 g @ 42.2 ms 36.7 g @ 42.2 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	2797 mm	-686 mm	329 mm	2.1 g @ 134.5 ms 2.1 g @ 133.8 ms	35.4 g @ 55.5 ms 35.0 g @ 55.5 ms
3 ENGINE TOP LONGITUDINAL	740 mm	-34 mm	795 mm	55.5 g @ 48.0 ms	178.3 g @ 35.4 ms
4 ENGINE BOTTOM LONGITUDINAL	852 mm	-209 mm	150 mm	59.8 g @ 44.6 ms	141.9 g @ 31.8 ms
5 RIGHT BRAKE CALIPER LONGITUDINAL	854 mm	-635 mm	270 mm	27.1 g @ 77.4 ms	65.8 g @ 51.5 ms
6 LEFT BRAKE CALIPER LONGITUDINAL	853 mm	635 mm	257 mm	58.5 g @ 69.8 ms	79.0 g @ 44.4 ms
7 INSTRUMENT PANEL CENTER LONGITUDINAL ¹	1537 mm	-8 mm	978 mm	36.1 g @ 25.4 ms	54.7 g @ 20.5 ms

* X-AXIS LOCATIONS ARE MEASURED REARWARD FROM THE FRONT BUMPER.

REFERENCE: X: + FORWARD ACCELERATION

Y: + LEFT FROM VEHICLE CENTERLINE

Z: + UP FROM GROUND LEVEL

¹ See DATA ACQUISITION EXPLANATIONS

Table 5 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver #142</u>	<u>Passenger #192</u>
Head	Airbag	Airbag
Chest	Airbag	Airbag
Abdomen	None	None
Left knee	Instrument panel	Instrument panel
Right knee	Instrument panel	Instrument panel

Door Opening:

	<u>Left</u>	<u>Right</u>
Front	Easy	Easy
Rear	Easy	Easy

Seat Movement:

	<u>Seat Back Failure</u>	<u>Seat Shift</u>
Front	None	None
Rear	NA	NA

Glazing Damage: The entire windshield cracked on impact.

Other Notable Impact Effects: None

Table 6 FMVSS 208 Data Summary

Vehicle year/make/
model/body style: 1995/Saab/900S/5-door hatchback
Vehicle NHTSA number: MS0503
Test date: 12/07/94

	Driver Dummy #142		Passenger Dummy #192	
<u>Maximum Accelerations:</u>				
Head X-axis	-66.4	g	-61.7	g
Head Y-axis	12.6	g	-9.1	g
Head Z-axis	-24.8	g	-30.3	g
Head resultant	70.6	g	63.8	g
Chest X-axis	-49.5	g	-50.2	g
Chest Y-axis	-5.0	g	4.3	g
Chest Z-axis	7.4	g	-7.9	g
Chest resultant ¹	48.1	g	49.0	g
Chest resultant time interval ¹	.003	sec	.003	sec
<u>Head Injury Criteria (HIC) Values:</u>				
HIC ²	640		578	
HIC starting time	.060	sec	.064	sec
HIC ending time	.094	sec	.100	sec
Avg. head resultant accel. during HIC time interval	51.6	g	48.1	g
<u>Maximum Chest Deflections:</u>				
Chest X-axis	48	mm	42	mm
Maximum chest deflection time	.074	sec	.079	sec
<u>Maximum Compressive Femur Forces:</u>				
Left femur	6206	N	4022	N
Right femur	4669	N	2852	N
<u>Maximum Seat Belt Forces:</u>				
Lap belt ³	NA		NA	
Shoulder belt ³	NA		NA	

Note: All values listed must be occurring during primary impact event.
(Head accelerations listed must be during hic time interval.)

¹ 0.003 Sec. Minimum duration.

² The maximum hic time interval is 36 milliseconds.

³ Seat belt instrumentation was not used since the vehicle's restraints were equipped with crash-deployed pre-tensioner devices.

Table 7 Hybrid III Neck Data Summary

Vehicle year/make/
model/body style: 1995/Saab/900S/5-door hatchback
Vehicle NHTSA number: MS0503
Test date: 12/07/94

	Driver Dummy #142	Passenger Dummy #192
<u>Maximum Values:</u>		
Neck X-axis force	-718 N	376 N
Neck Y-axis force	-99 N	216 N
Neck Z-axis force	1690 N	1704 N
Neck moment about X-axis	10 N-m	-16 N
Neck moment about Y-axis	58 N-m	-17 N
Neck moment about Z-axis	7 N-m	11 N

Note: All values listed must be occurring during primary impact event.

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest were restrained by the airbag as the dummy's torso was restrained by the three-point unbelt. The dummy rebounded into the seat back and head restraint. The driver dummy came to rest in the driver's seat, restrained by the three-point unbelt.

Right Front Passenger Dummy

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest were restrained by the passenger's airbag as the dummy's torso was restrained by the three-point unbelt. The dummy rebounded into the seat back and head restraint. The right front passenger dummy came to rest in the right front passenger's seat restrained by the three-point unbelt.

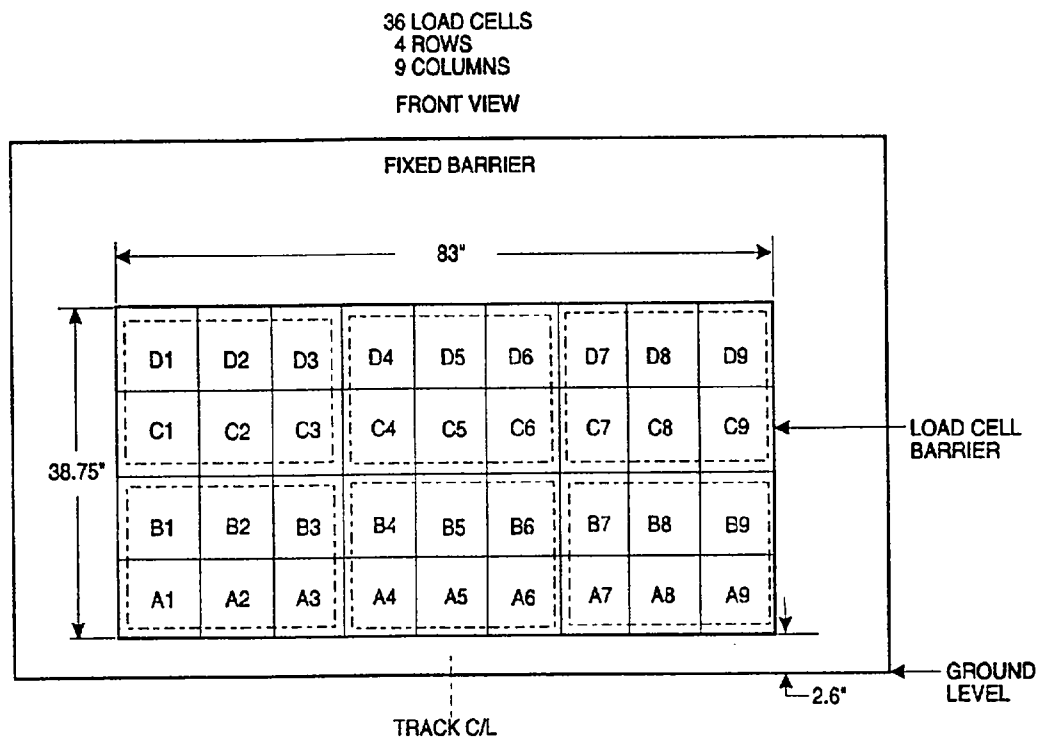
Table 8 Seat Belt Performance Assessment Test Data

	Driver	Passenger
<u>Belt length data:</u>		
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	2085 mm	2102 mm
Shoulder belt length as measured on Part 572 dummy.	850 mm	840 mm
Lap belt length as measured on Part 572 dummy.	605 mm	625 mm
<u>Shoulder belt spool-off length:</u>		
As determined by film analysis ¹	NA	NA
As determined mechanically ²	NA	NA
As determined electronically ²	NA	NA
<u>Belt stretch length:</u>		
As measured mechanically ²	NA	NA
As measured electronically ²	NA	NA
<u>Retractor lock-up time:</u>		
As determined by shoulder belt spool-off ¹	NA	NA

¹ Onboard cameras were not used to achieve the target test weight.

² Seat belt instrumentation was not used since the vehicle's restraints were equipped with crash-deployed pre-tensioner devices.

Figure 4 Load Cell Barrier Configuration



- Group 1: A1 through B3
- Group 2: A4 through B6
- Group 3: A7 through B9
- Group 4: C1 through D3
- Group 5: C4 through D6
- Group 6: C7 through D9

Table 9 Load Cell Barrier Data Summary

Location	Positive direction	Negative direction
Total group 1	2.4 kN @ 216.6 ms	111.2 kN @ 37.9 ms
Total group 2	0.2 kN @ 202.4 ms	308.7 kN @ 31.4 ms
Total group 3	0.5 kN @ 242.6 ms	135.3 kN @ 33.0 ms
Total group 4	0.9 kN @ 274.6 ms	39.2 kN @ 57.0 ms
Total group 5	1.2 kN @ 150.6 ms	85.6 kN @ 35.3 ms
Total group 6	1.3 kN @ 215.2 ms	30.3 kN @ 30.7 ms
Total load cell force	5.5 kN @ 215.7 ms	662.8 kN @ 32.2 ms

Tension is positive
Compression is negative

Section 3.0

FMVSS 212, 219 (partial), and 301 Data

Figure 5 FMVSS 212 Test Data

Details of windshield mounting such as retention method, trim type, etc.:

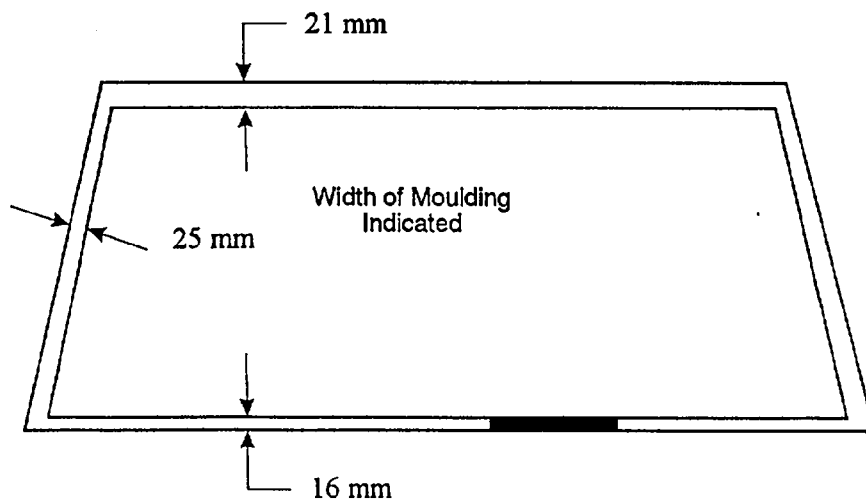
Plastic trim around outer perimeter, adhesive around inner perimeter.

FMVSS 212 requirements: The post-test periphery retention amount must be at least 75% of the pre-test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

Windshield periphery measurements:

	<u>Pre-test</u>	<u>Post-test</u>	<u>Percent retention</u>
Right side	1965 mm	1965 mm	100
Left side	1965 mm	1740 mm	88.5
Total	3930 mm	3705 mm	94.3

Pre-test windshield mounting material temperature: 21° C



Front view of windshield¹

Loss of windshield retention lengths: There was loss of windshield retention along the lower perimeter between 755 mm and 980 mm measuring from the lower right corner.

¹ Indicate areas of loss of retention, if any, on windshield diagram.

Figure 6 FMVSS 219 Test Data

Protected zone lower edge requirement:

The lower edge of the protected zone is determined by placing a 165-millimeter diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 13 millimeters from the locus line. The lower edge of the protected zone is the longitudinal projection onto the outer surface of the windshield of this line.

Windshield measurements:

A = 1169 mm

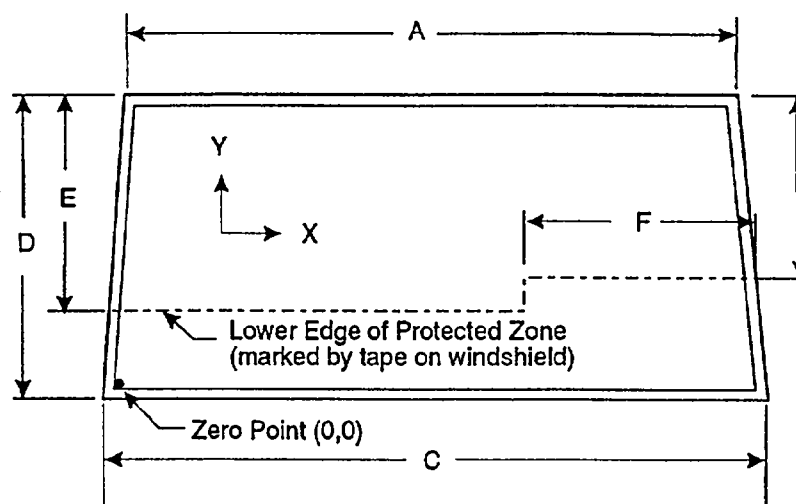
B = 396 mm

C = 1510 mm

D = 766 mm

E = 451 mm

F = NA mm



FRONT VIEW

Method of adhering protected zone template to windshield: NA

Areas of windshield template penetration greater than 6 mm: NA

Coordinates	
X	Y

- 1.
- 2.
- 3.

Areas of windshield penetration, below the protected zone, through the inner surface of the windshield: None

- 1.
- 2.
- 3.

Table 10 Fuel System Data

Vehicle year/make/ model/body style:	1995/Saab/900S/5-door hatchback
NHTSA number:	MS0503
Fuel system capacity:	68.1 liters (from owner's manual)
Usable capacity:	64.0 liters (furnished by COTR)
Test volume range:	58.9 liters to 60.2 liters (92-94% of usable)
Actual test volume:	59.4 liters (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	Purple

The electric fuel pump does not operate with ignition switch "on" and the engine not operating.

Details of fuel system: The fuel tank is located in front of the rear axle.
 The fuel filler neck is located on the right side and entered the
 right rear corner of the tank.
 The fuel lines run along the right side to the front.

Table 11 FMVSS 301 Post-Impact Test Data

NHTSA number: MS0503
Test date: 12/07/94
Vehicle year/make/
model/body style: 1995/Saab/900S/5-door hatchback

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 (56 kph)
☐ Oblique (48 kph) with ☐ ° barrier face first contacting ☐ (driver/pass.) side
☐ Rear moving barrier (48 kph)
☐ Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

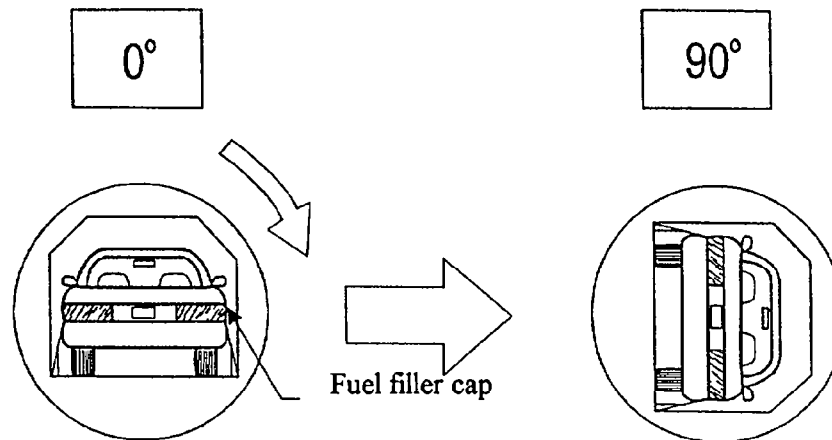
	Test Results	Maximum Allowable
1. From impact until vehicle motion ceases	0 g	28 g
2. 5-minute period after vehicle motion ceases	0 g	142 g
3. Next 25 minutes after 5-minute period	0 g	28 g/min

Fuel system fluid spillage location(s): None

Figure 7 FMVSS 301 Static Rollover Test Data

NHTSA number: MS0503

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

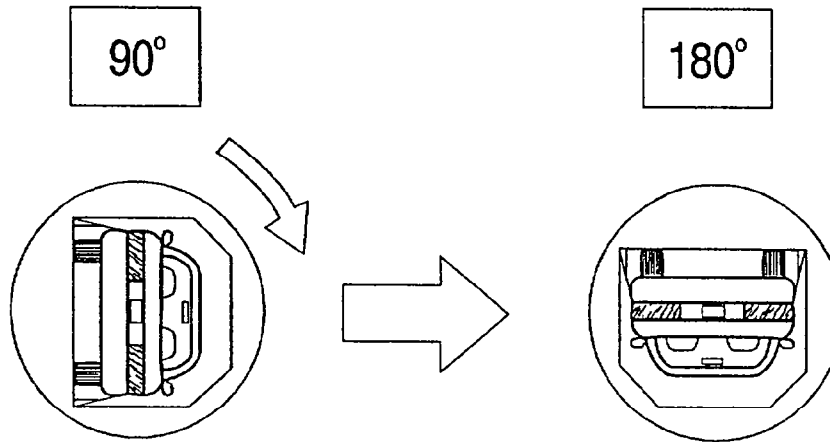
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>0° to 90° rotation (fuel filler cap down)</u>		
1. First 5 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 7 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	

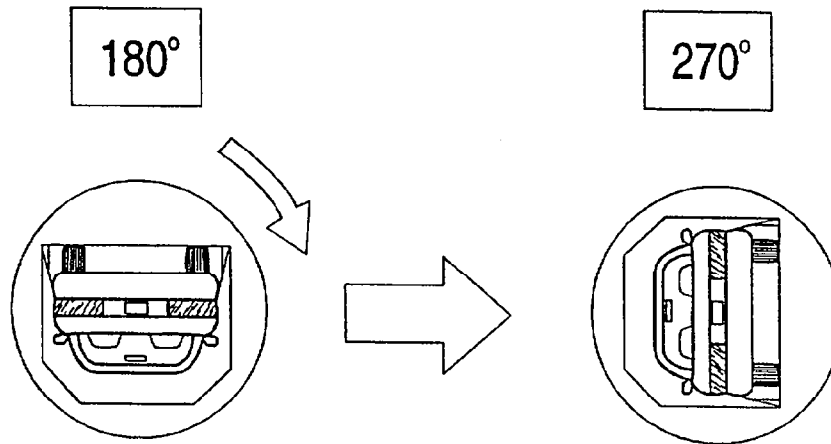
Fuel system fluid spillage measurements:

<u>90° to 180° rotation</u>		<u>Test Results</u>	<u>Maximum Allowable</u>
1.	First 5 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 7 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	

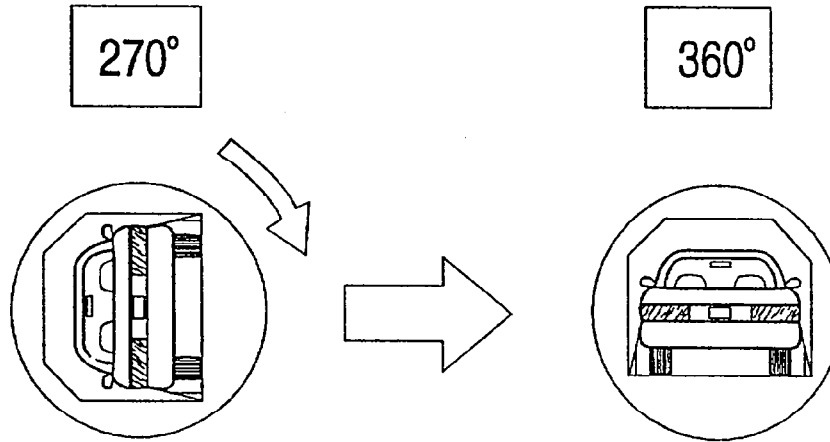
Fuel system fluid spillage measurements:

180° to 270° rotation		Test Results	Maximum Allowable
1.	First 5 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 7 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:

	Test Results	Maximum Allowable
<u>270° to 360° rotation</u>		
1. First 5 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, Occupant, and Camera Information

Figure 8 Dummy Measurement Locations for Front Seat Occupants

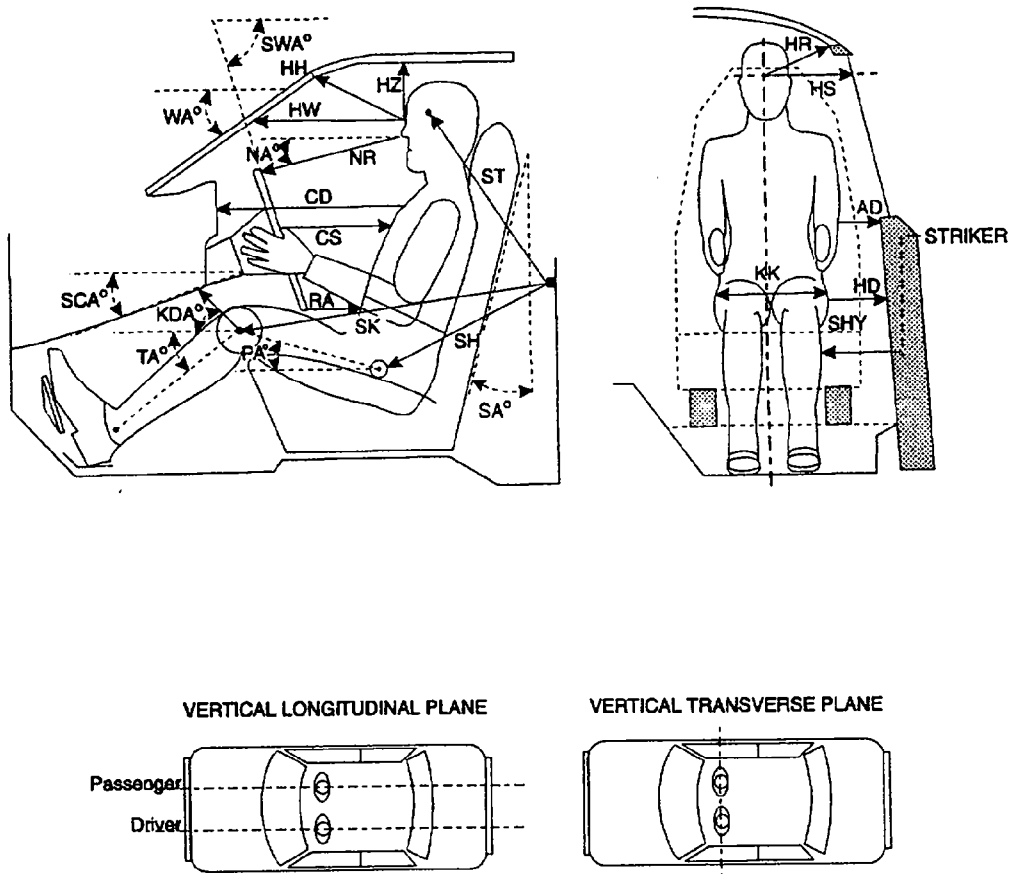


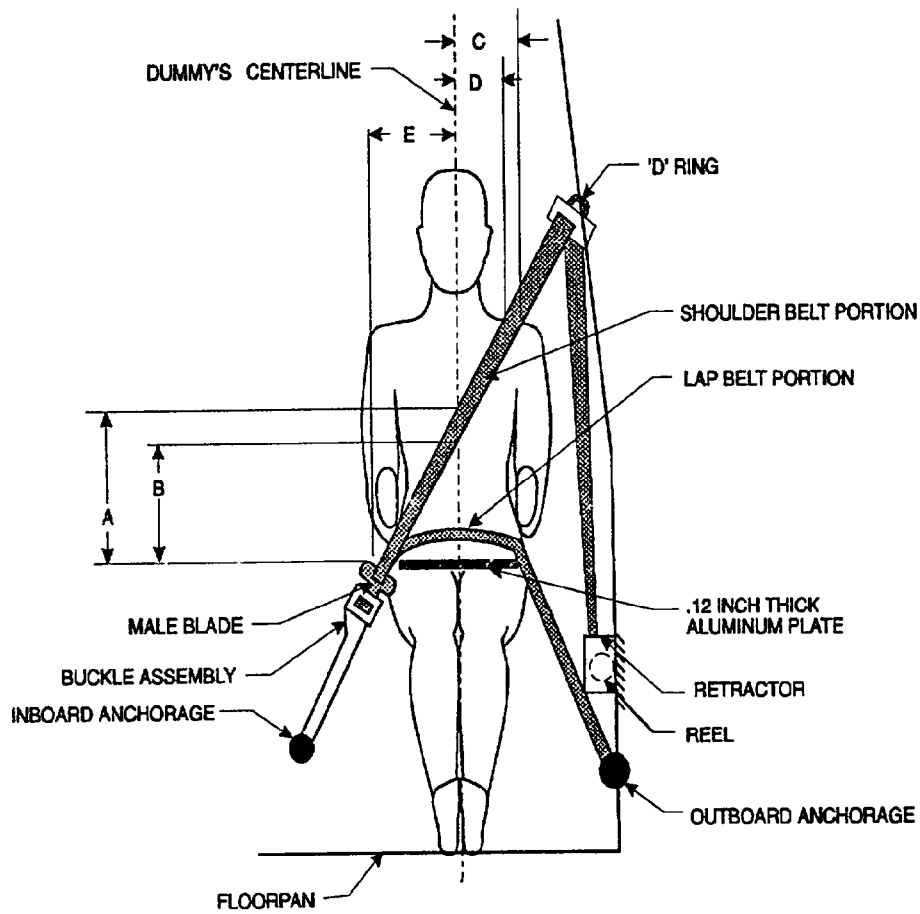
Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #142)	Passenger (Serial #192)
WA	Windshield angle	37°	NA
SWA	Steering wheel angle	68°	NA
SCA	Steering column angle	20°	NA
SA	Seat back angle	18°	17°
HZ	Head to roof	179 mm	162 mm
HH	Head to header	450 mm	461 mm
HW	Head to windshield	613 mm	604 mm
HR	Head to side header	222 mm	226 mm
NR	Nose to rim	433 mm	NA
NA	Nose to rim angle	9°	NA
CD	Chest to dash	576 mm	593 mm
CS	Steering wheel to chest	339 mm	NA
RA	Rim to abdomen	261 mm	NA
KDL	Left knee to dash	182 mm	142 mm
KDR	Right knee to dash	181 mm	175 mm
KDA	Outboard knee to dash angle	24°	33°
PA	Pelvic angle	22°	21°
TA	Tibial angle	37°	37°
KK	Knee to knee	278 mm	274 mm
ST ¹	Striker to head	490 mm	506 mm
	Striker to head angle	-88°	-87°
SK ¹	Striker to knee	541 mm	558 mm
	Striker to knee angle	5°	4°
SH ¹	Striker to H-point	218 mm	210 mm
	Striker to H-point angle	46°	36°
SHY	Striker to H-point (Y dir.)	222 mm	208 mm
HS	Head to side window	303 mm	312 mm
HD	H-point to door	132 mm	108 mm
AD	Arm to door	83 mm	53 mm

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

¹ Angle measured from head restraint support.

Figure 9 Seat Belt Positioning Data



	Driver	Passenger
A - Top surface of aluminum plate to belt upper edge	342 mm	335 mm
B - Top surface of aluminum plate to belt lower edge	254 mm	254 mm
C - Dummy centerline to outer edge of belt at chest flesh top	115 mm	140 mm
D - Dummy centerline to inner edge of belt at chest flesh top	56 mm	76 mm
Lap belt tension	16 N	16 N
Shoulder belt tension	16 N	16 N
Adjustable seat belt anchorage position	Third of five positions	Third of five positions

Figure 10 Camera Positions

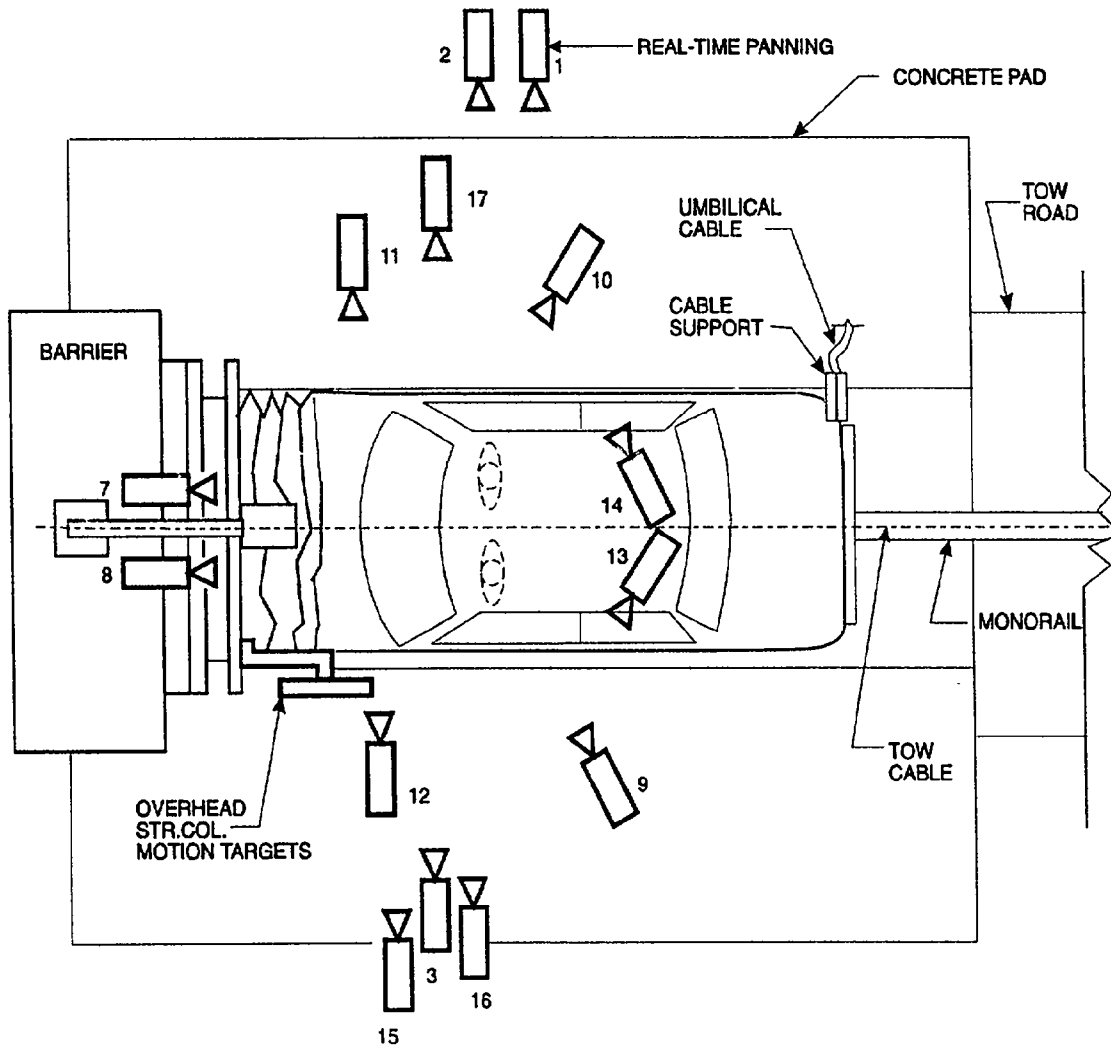


Figure 10 Camera Positions, Cont'd.

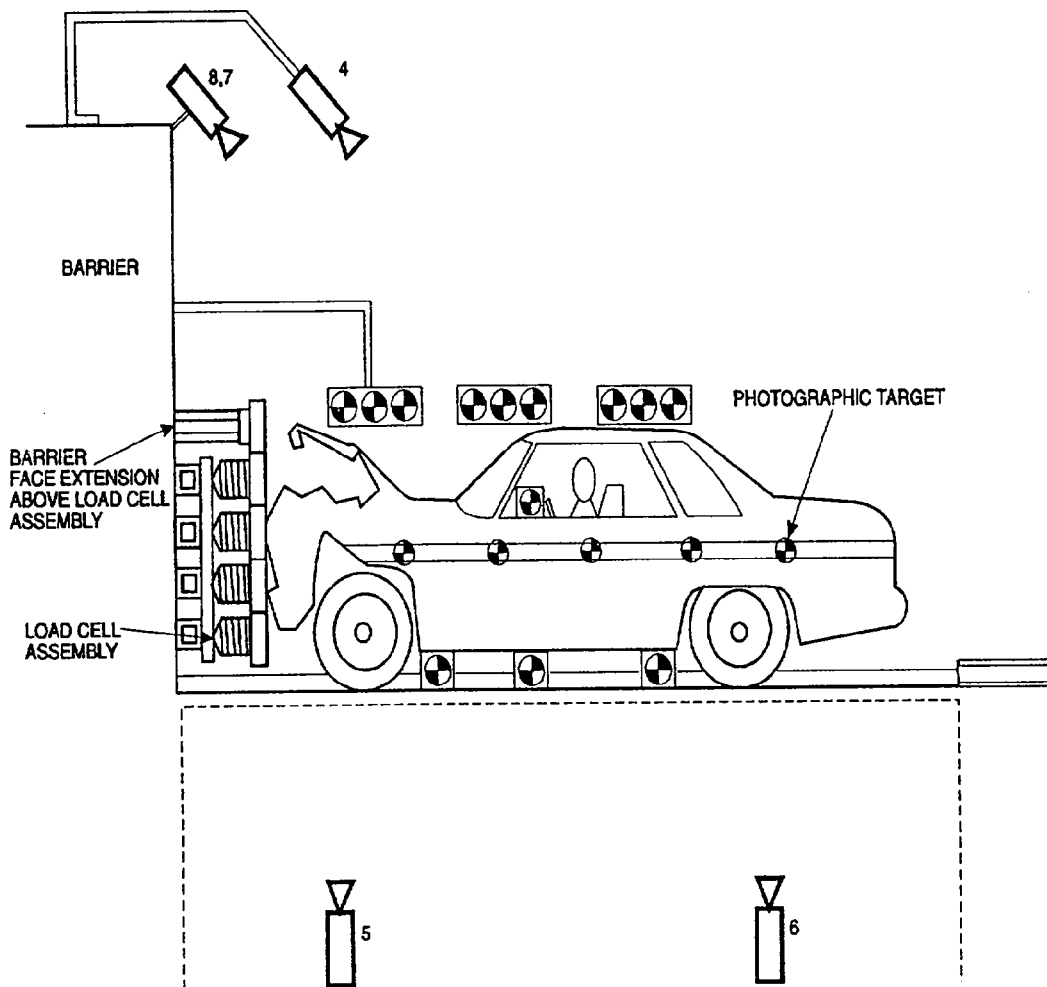


Table 13 Motion Picture Camera Locations

Test Number: 941207

Vehicle year/make/model/body style: 1995/Saab/900S/5-door hatchback

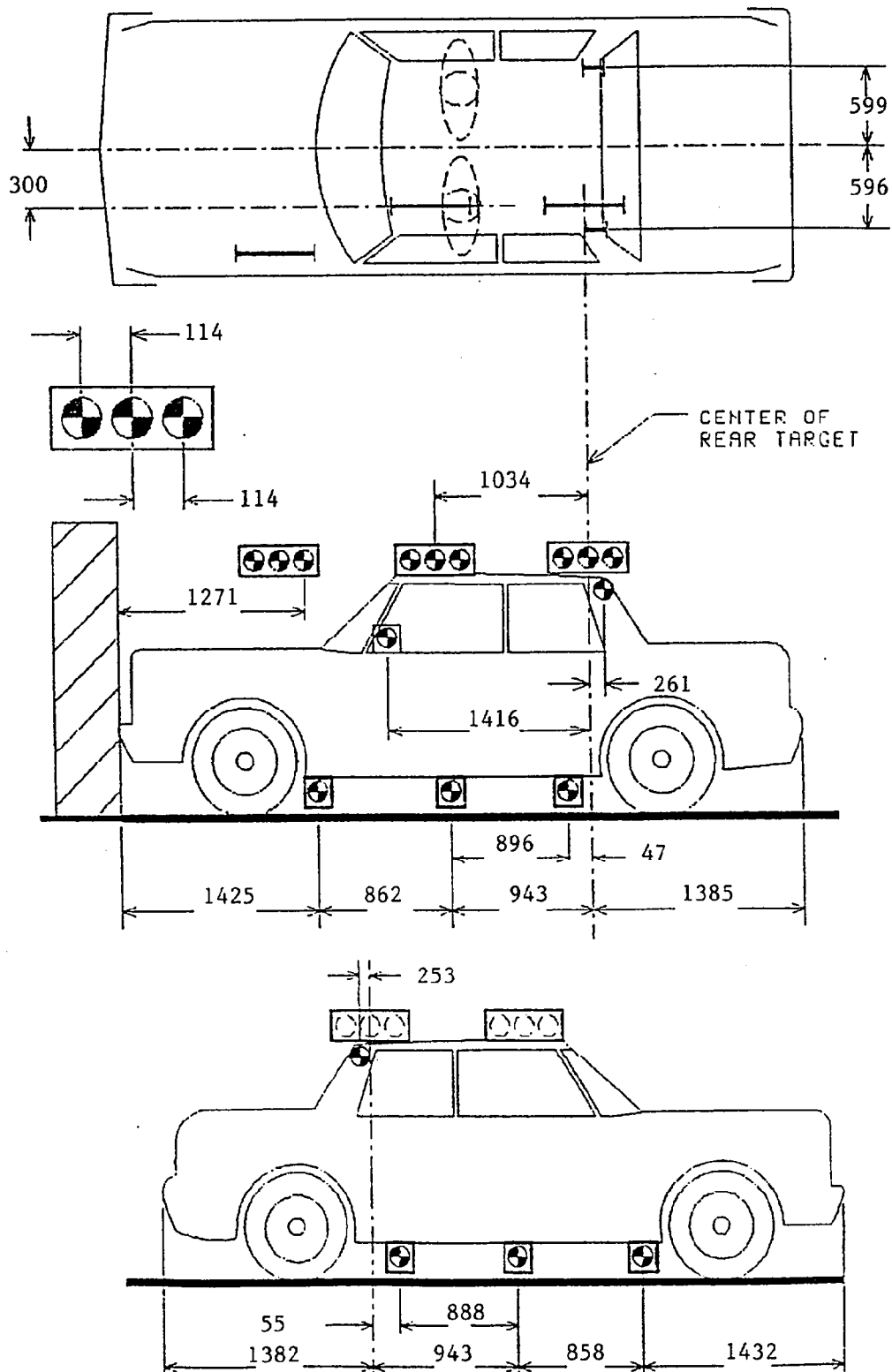
Camera Number	View	Camera Positions ¹			Angle ²	Film Plane to Head Target	Lens	Film Speed
		X	Y	Z				
1	Real-time panning	-3607 mm	-2802 mm	1549 mm	NA	NA mm	16 mm	24 frames/s
2	Vehicle crush	-2065 mm	-6767 mm	942 mm	-2°	NA mm	13 mm	498 frames/s
3	Dummy kinematics	-1054 mm	7493 mm	1118 mm	-12°	5537 mm	25 mm	1010 frames/s
4	Windshield damage	-925 mm	0 mm	2489 mm	-40°	NA mm	13 mm	502 frames/s
5	Crush & fluid spillage	-1283 mm	0 mm	-2347 mm	90°	NA mm	13 mm	1000 frames/s
6	Fluid spillage	-2522 mm	0 mm	-2515 mm	90°	NA mm	13 mm	1005 frames/s
7	Passenger kinematics	-114 mm	-351 mm	2159 mm	-40°	NA mm	17 mm	500 frames/s
8	Driver kinematics	-173 mm	368 mm	2159 mm	-41°	NA mm	17 mm	1002 frames/s
9	Driver kinematics	-4572 mm	1854 mm	2591 mm	-27°	2184 mm	25 mm	498 frames/s
10	Passenger kinematics	-4674 mm	-1880 mm	2540 mm	-26°	2362 mm	25 mm	492 frames/s
11	Windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA mm	50 mm	505 frames/s
12	Windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA mm	50 mm	NA ³ frames/s
13	Driver seat belt movement ⁴	NA	NA	NA	NA	NA mm	NA mm	NA frames/s
14	Passenger seat belt movement ⁴	NA	NA	NA	NA	NA mm	NA mm	NA frames/s
15	Column movement	-2134 mm	7264 mm	2616 mm	-14°	NA mm	25 mm	498 frames/s
16	Column movement	-2134 mm	7264 mm	1908 mm	-9°	NA mm	25 mm	508 frames/s
17	Passenger kinematics	-986 mm	-5354 mm	1151 mm	7°	5309 mm	25 mm	1005 frames/s

¹ +X = Film plane forward of barrier face² +Y = Film plane to left of monorail centerline³ +Z = Film plane above ground level⁴ +Angle = Film plane angled upward from horizontal plane

The camera broke its film during the impact event.

The onboard cameras were not used to achieve test weight.

Figure 11 Vehicle Target Locations



All measurements are in millimeters.

Figure 12 Pre-Test And Post-Test Measurement Points

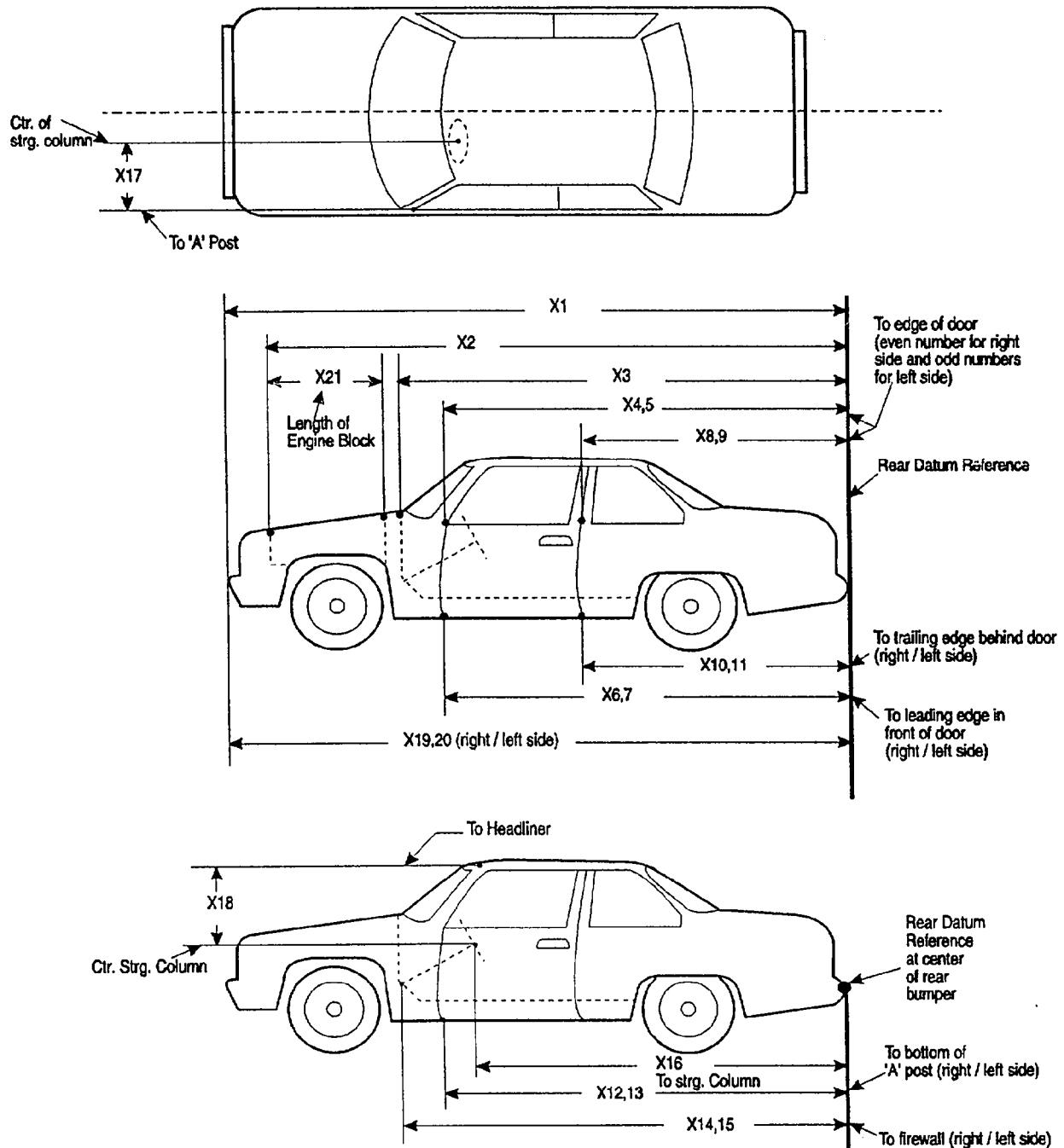


Table 14 Impacted Vehicle Measurements

Vehicle Make/Model: Saab/900S

Test Number: 941207

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	4615 mm	4048 mm	567 mm
X2	Rear surface of vehicle to front of engine block	3980 mm	3767 mm	213 mm
X3	Rear surface of vehicle to firewall	3418 mm	3304 mm	114 mm
X4	Rear surface of vehicle to upper leading edge of right door	3187 mm	3185 mm	2 mm
X5	Rear surface of vehicle to upper leading edge of left door	3182 mm	3183 mm	-1 mm
X6	Rear surface of vehicle to lower leading edge of right door	3175 mm	3157 mm	18 mm
X7	Rear surface of vehicle to lower leading edge of left door	3175 mm	3158 mm	17 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2099 mm	2099 mm	0 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2096 mm	2092 mm	4 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2098 mm	2081 mm	17 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2102 mm	2086 mm	16 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3095 mm	3068 mm	27 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3095 mm	3065 mm	30 mm
X14	Rear surface of vehicle to firewall - right side	3368 mm	3294 mm	74 mm
X15	Rear surface of vehicle to firewall - left side	3440 mm	3349 mm	91 mm
X16	Rear surface of vehicle to steering wheel center	2668 mm	2606 mm	62 mm
X17	Center of steering column to "A" post	313 mm	278 mm	35 mm
X18	Center of steering column to headliner	447 mm	394 mm	53 mm
X19	Rear surface of vehicle to right side of front bumper	4421 mm	3897 mm	524 mm
X20	Rear surface of vehicle to left side of front bumper	4419 mm	3933 mm	486 mm
X21	Length of engine block	540 mm	540 mm	0 mm

Appendix A

Photographs

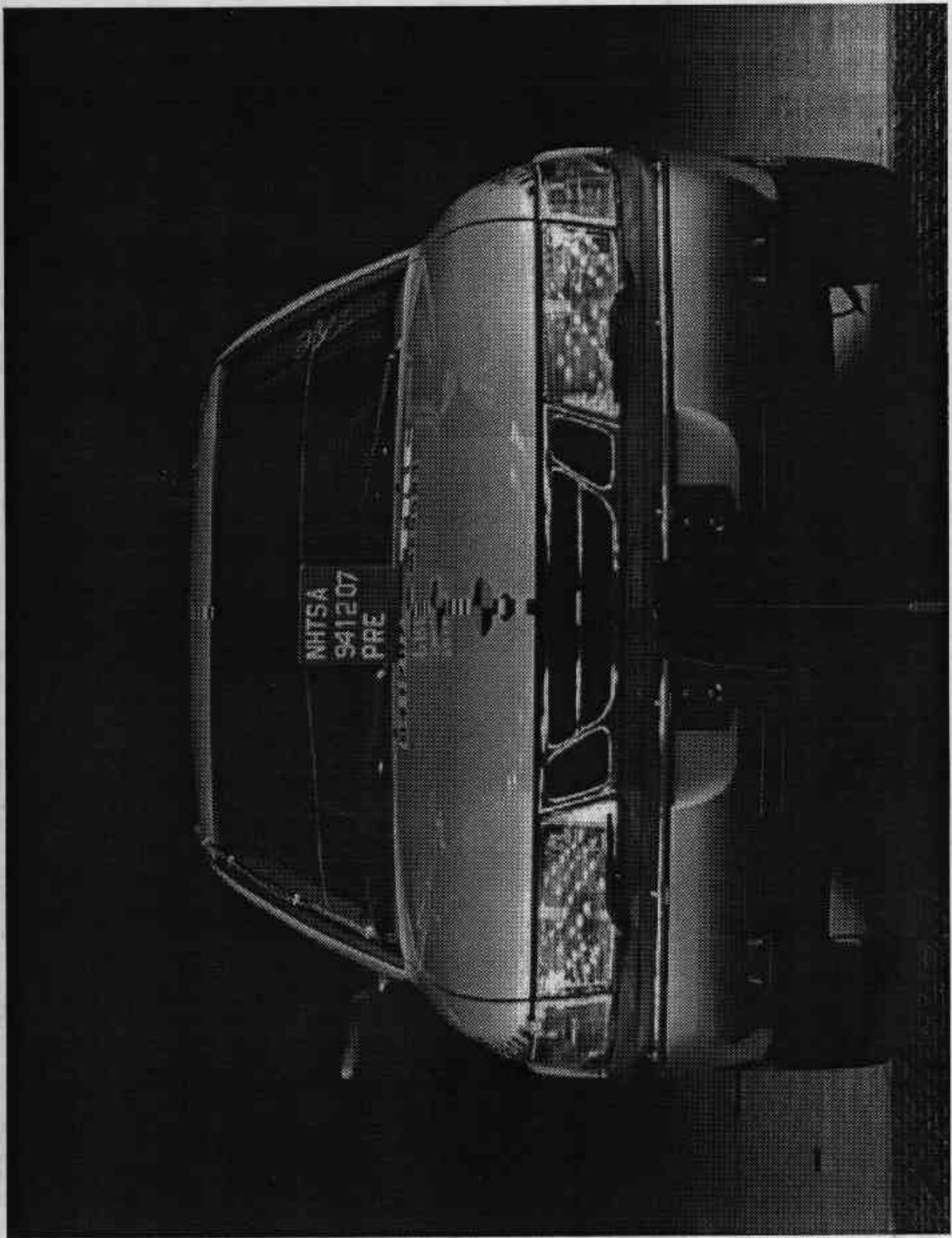


Figure A-1. Pre-Test Front View

A-2

941207

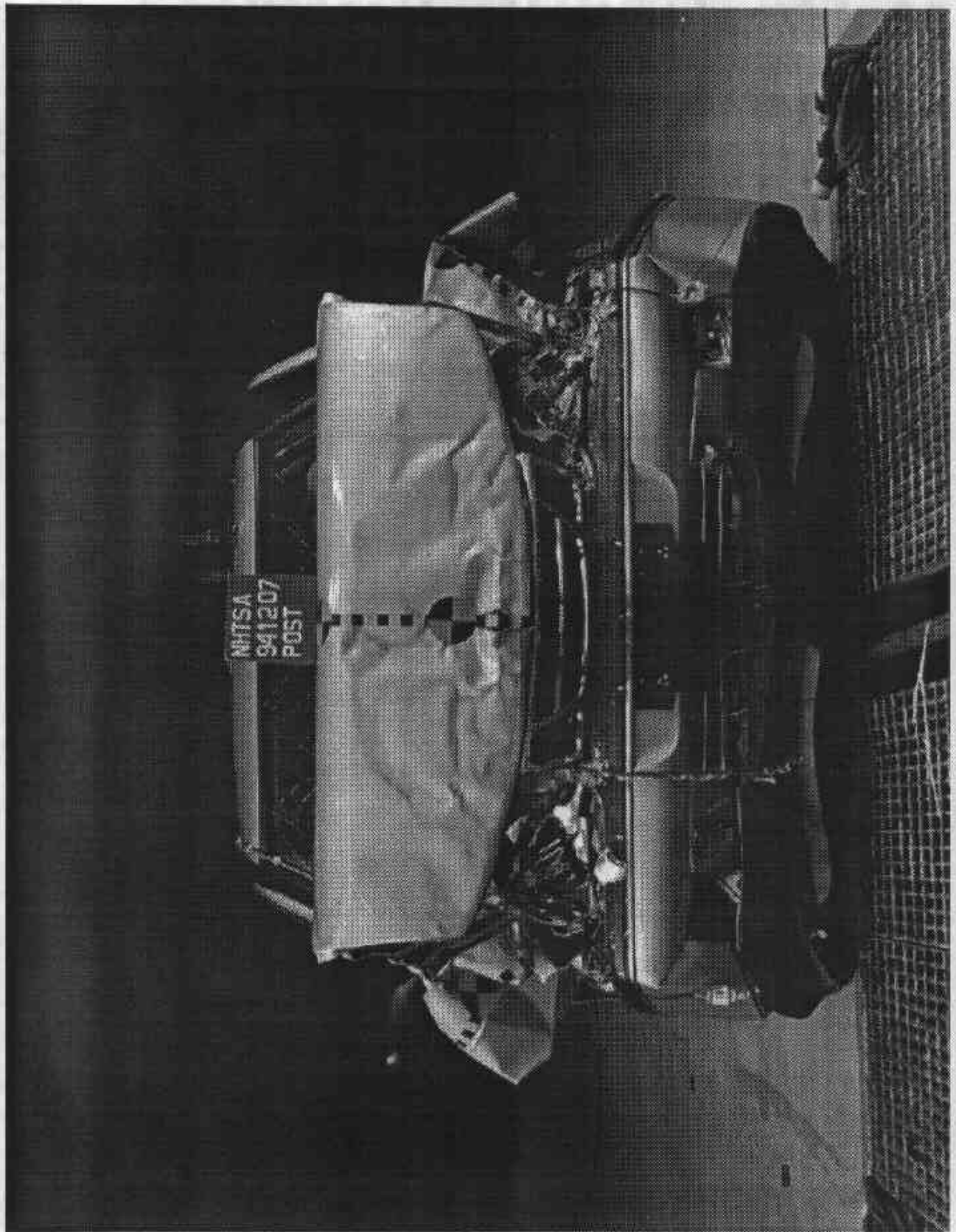


Figure A-2. Post-Test Front View
A-3

941207

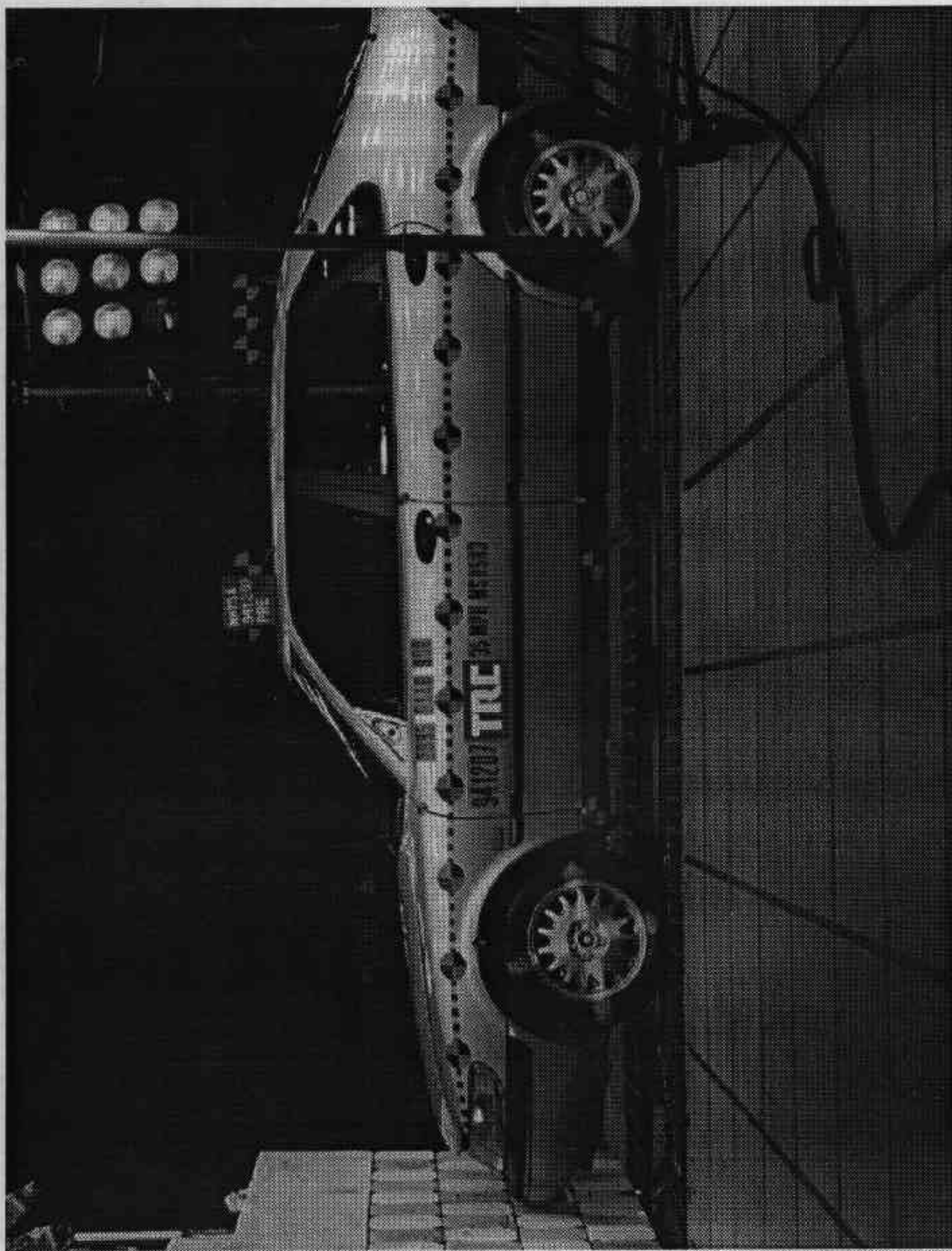


Figure A-3. Pre-Test Left Side View
A-4

941207

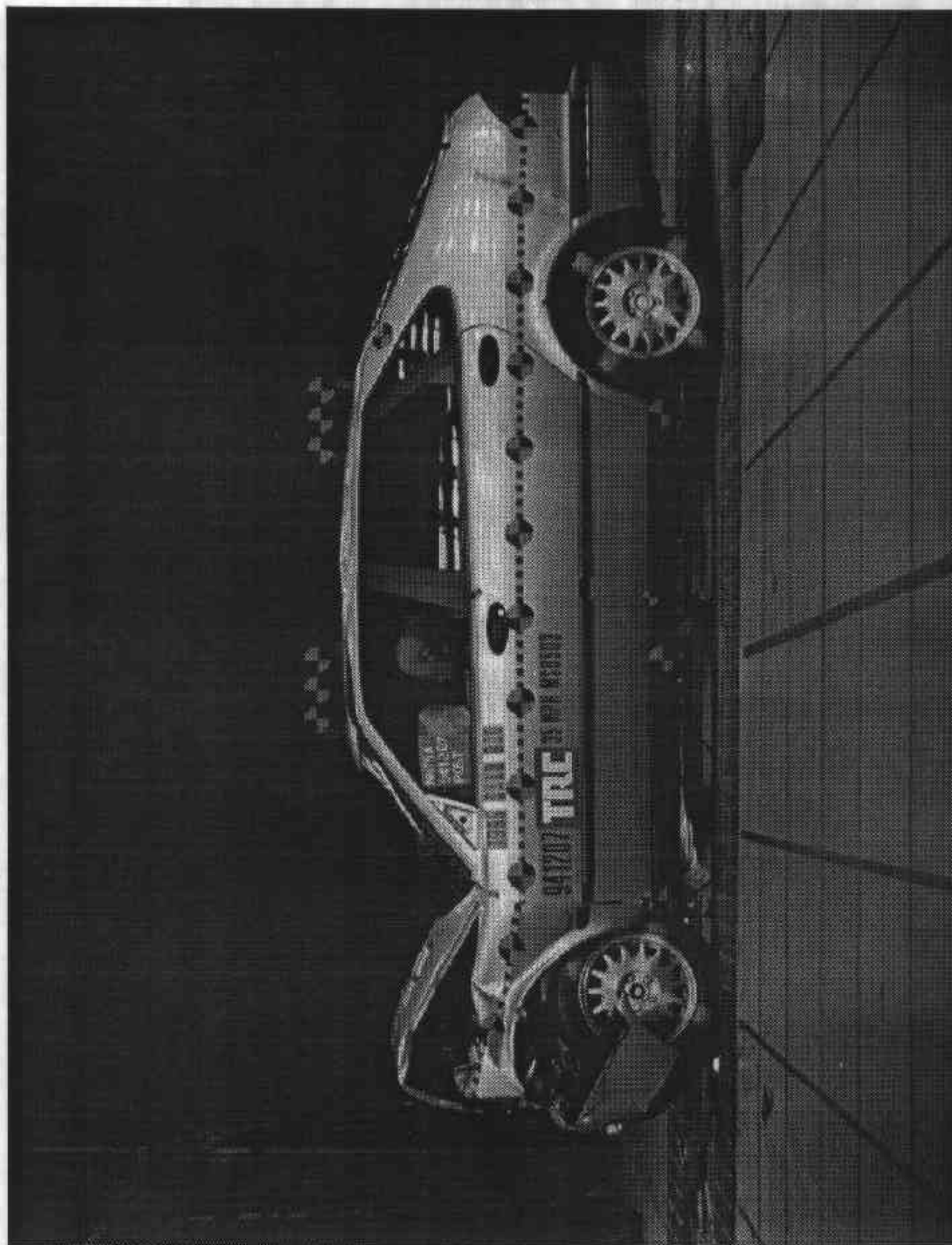


Figure A-4. Post-Test Left Side View
A-5

941207

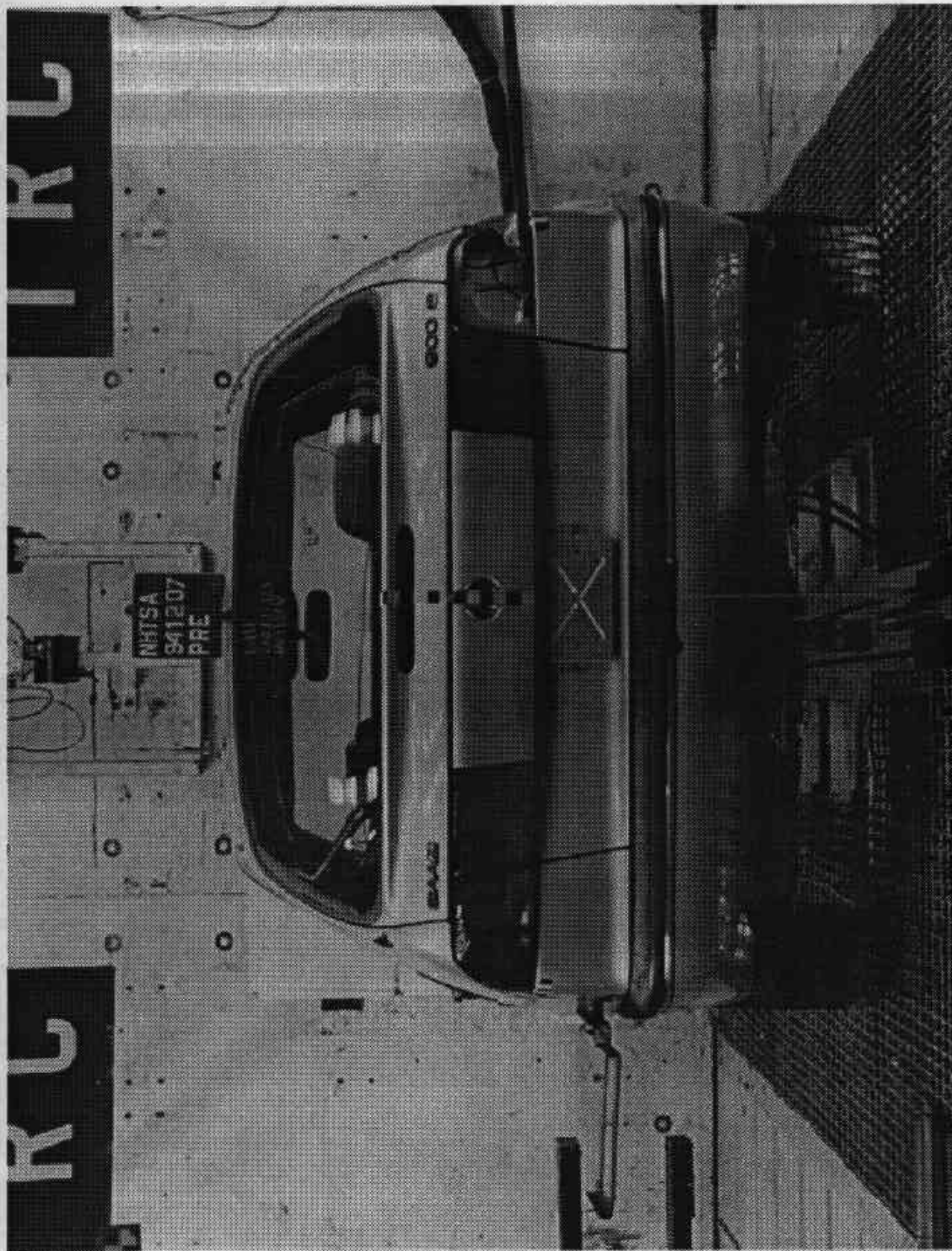


Figure A-5. Pre-Test Rear View
A-6

941207

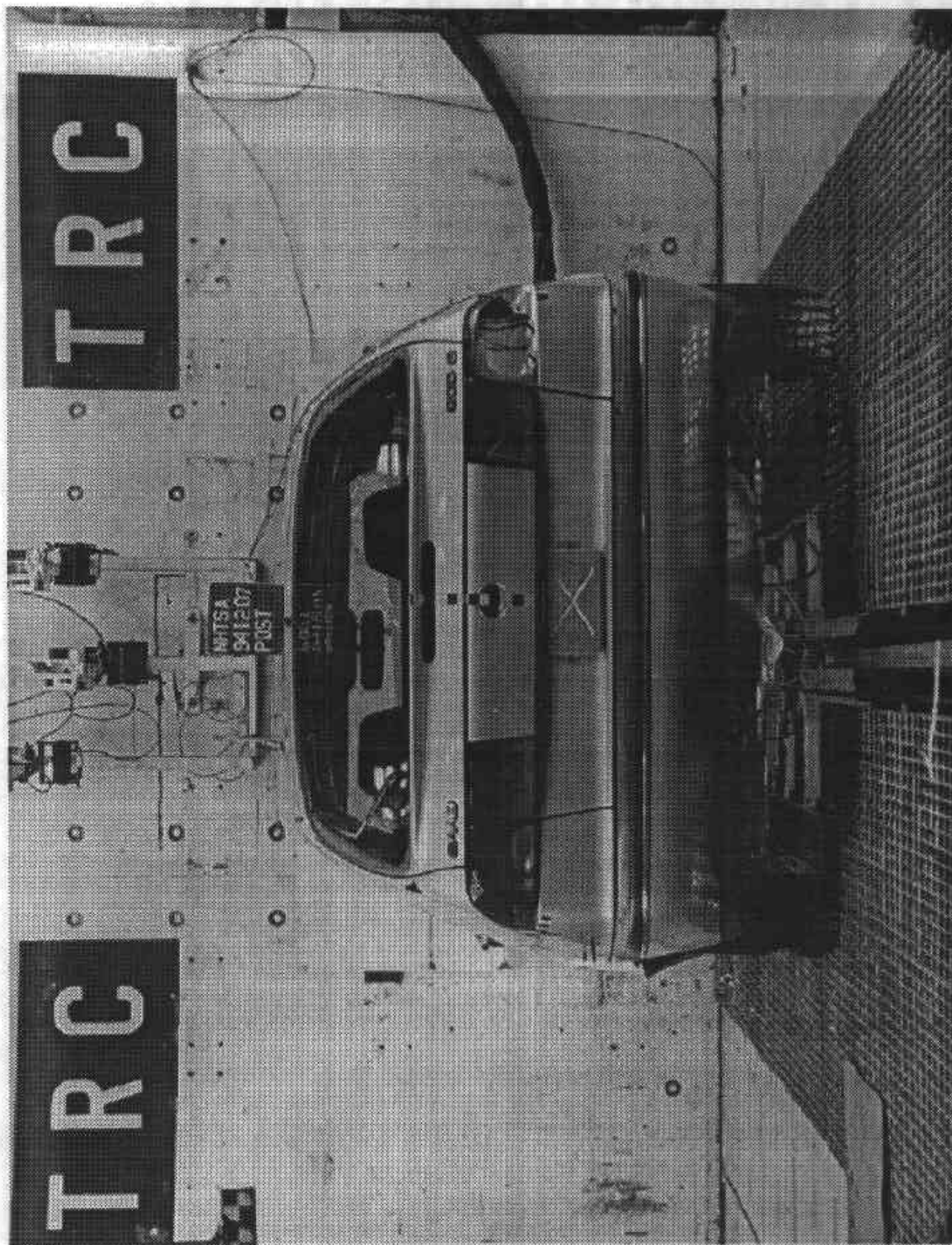


Figure A-6. Post-Test Rear View
A-7

941207

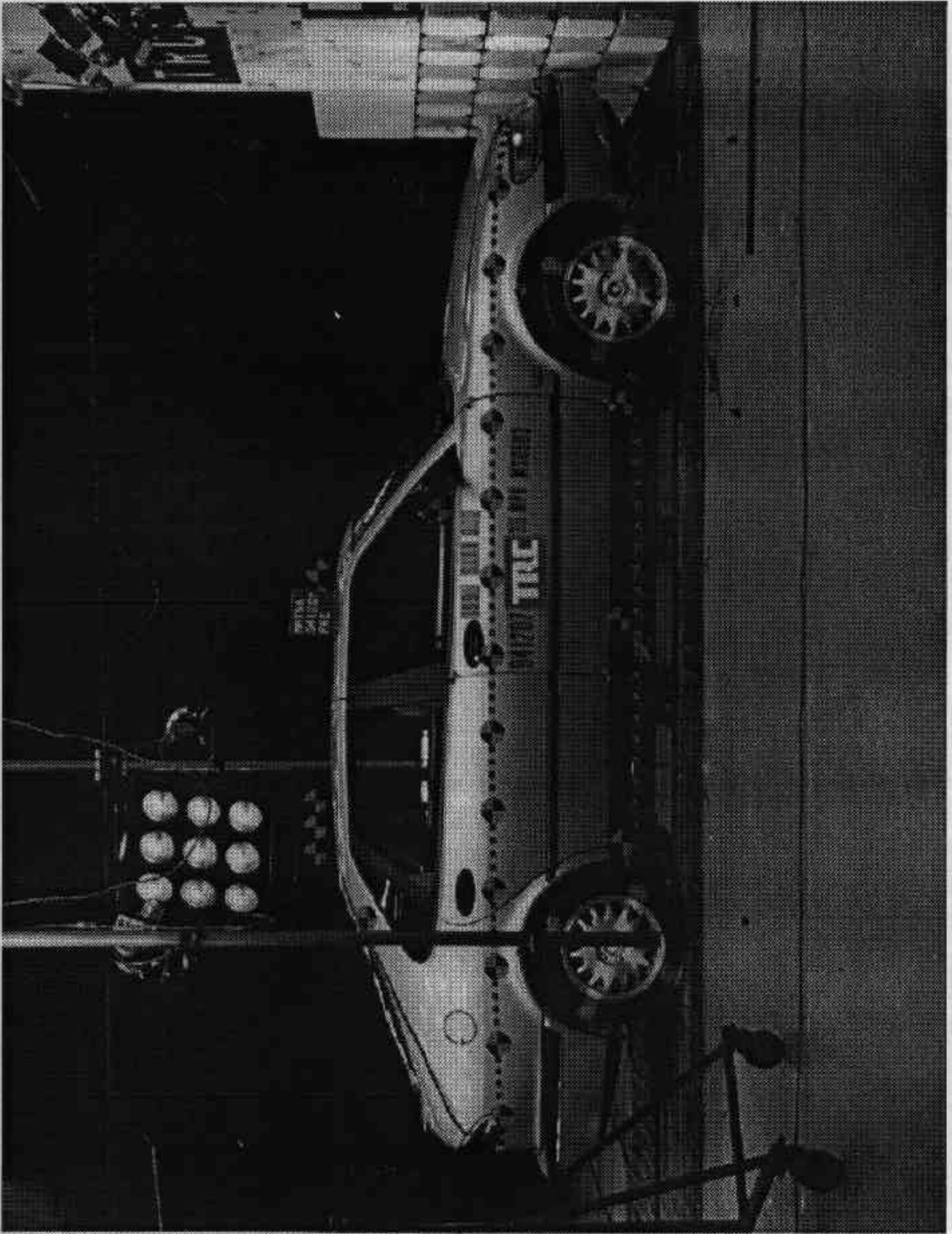


Figure A-7. Pre-Test Right Side View

A-8

941207

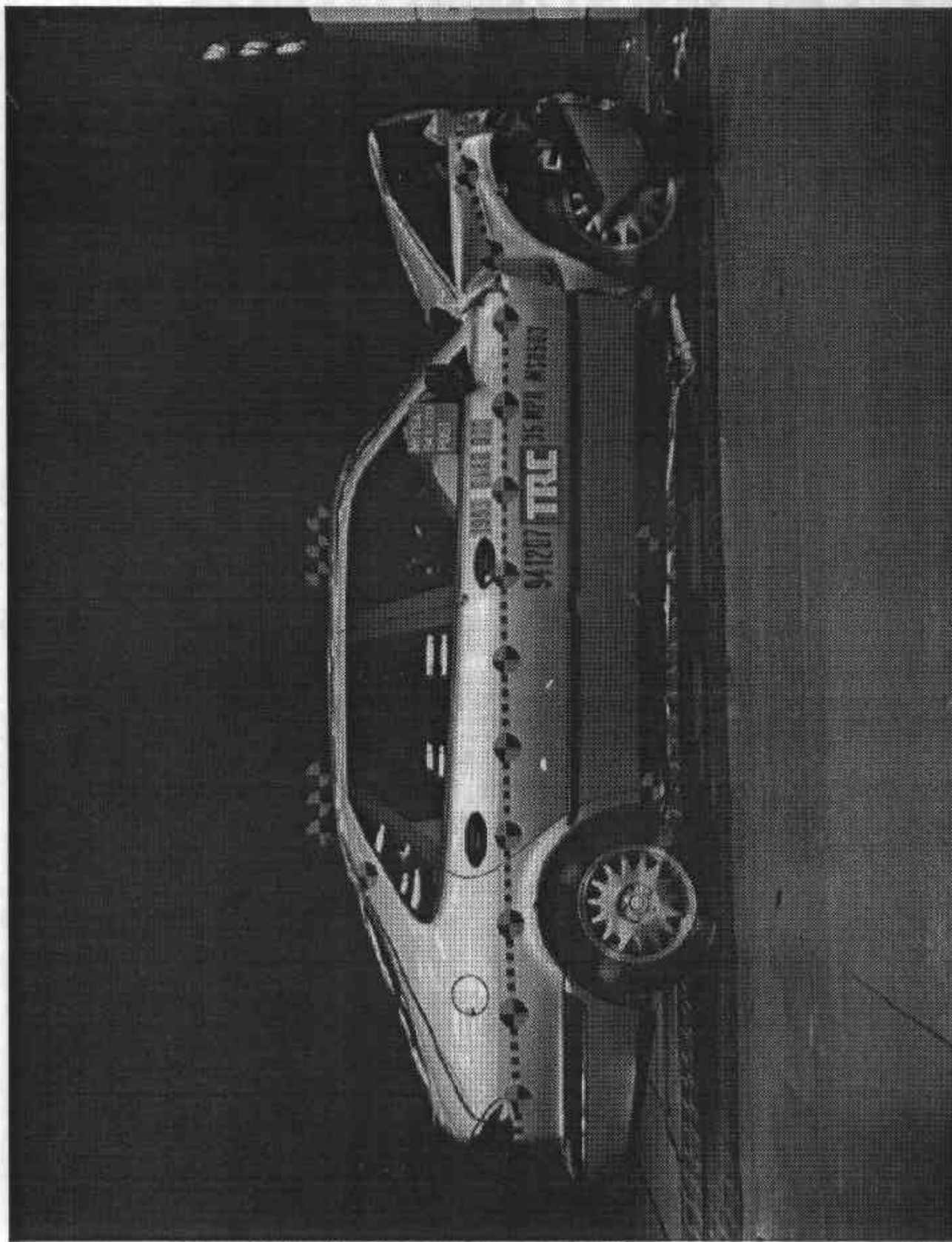


Figure A-8. Post-Test Right Side View

A-9

941207

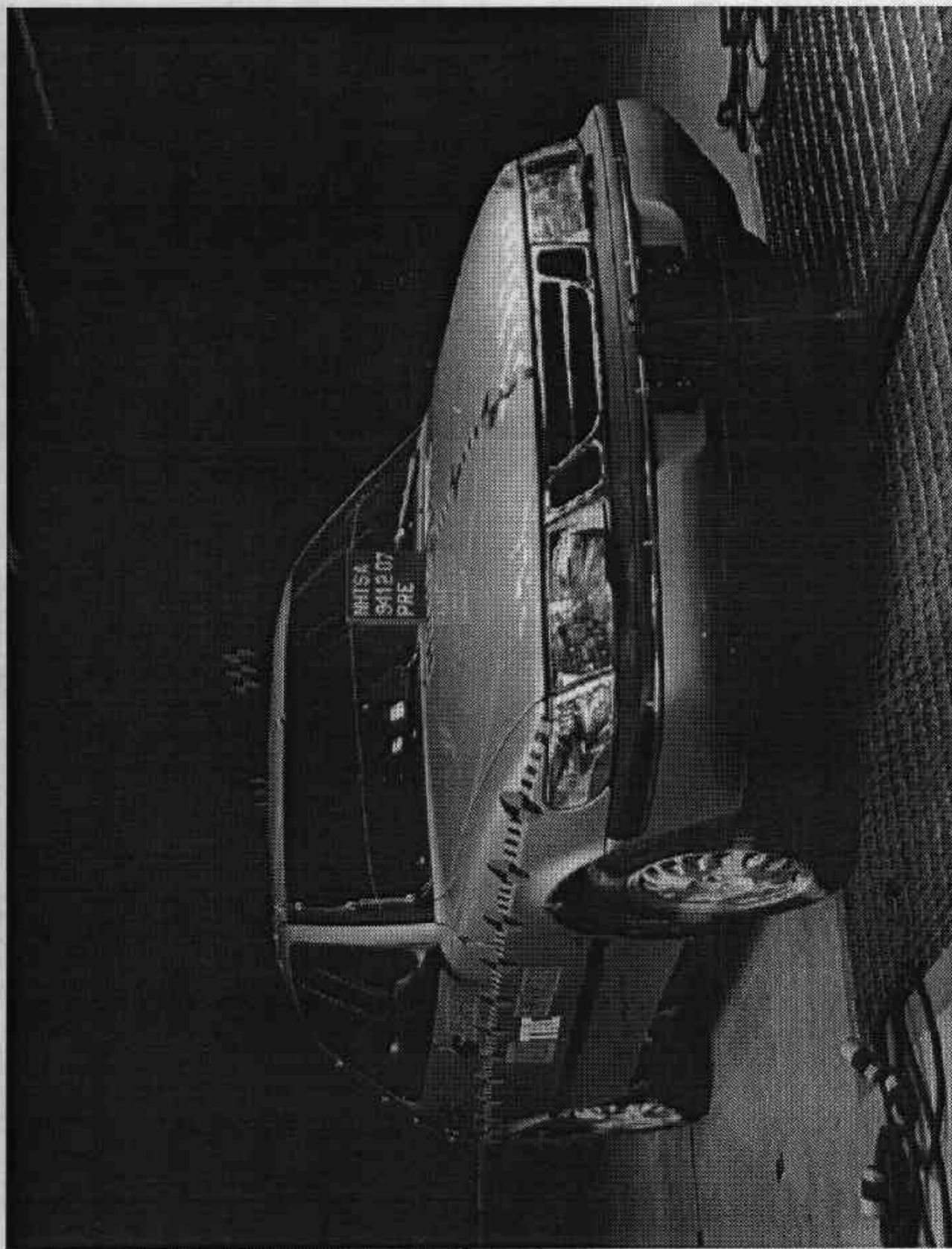


Figure A-9. Pre-Test Right Front Three-Quarter View
A-10

941207

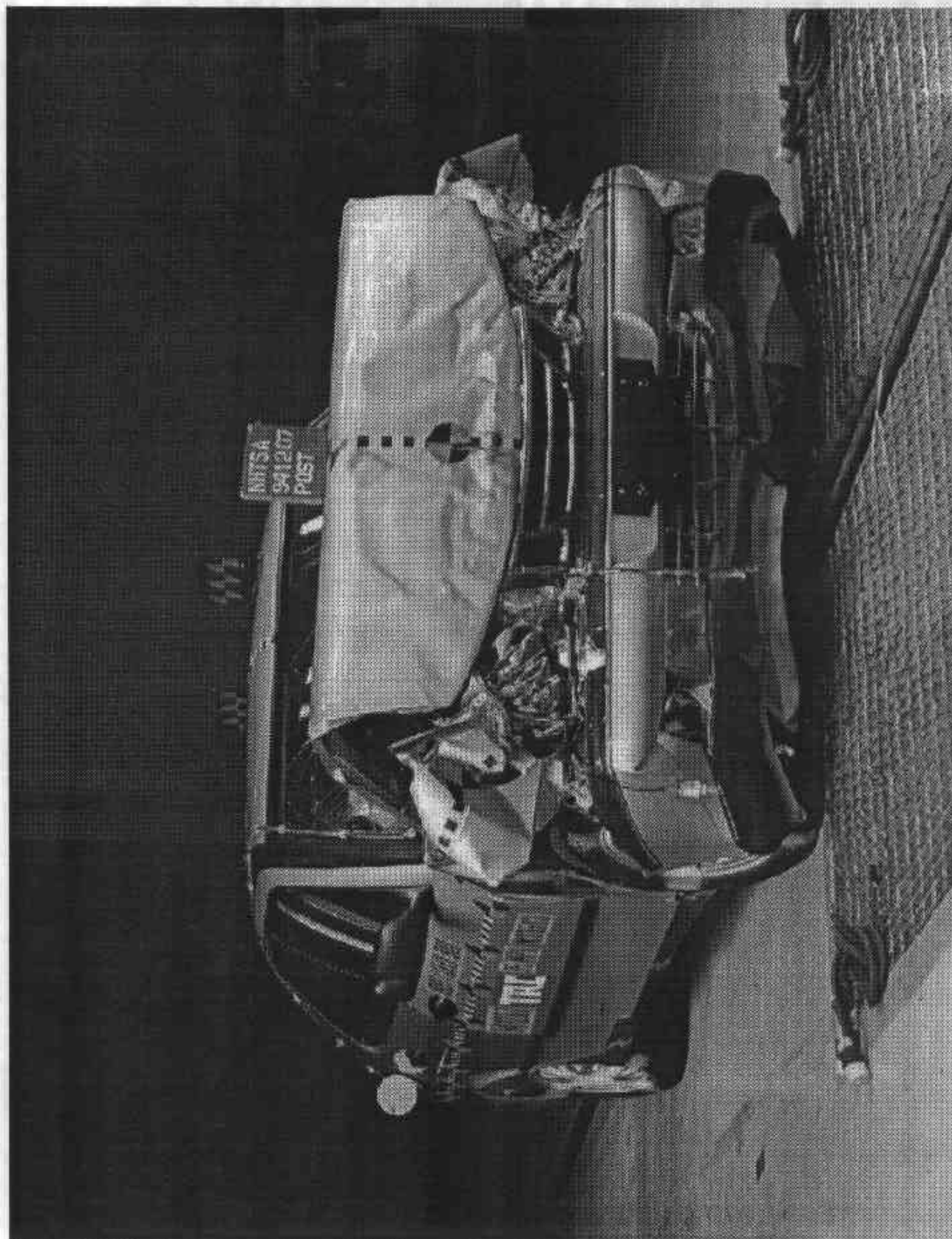


Figure A-10. Post-Test Right Front Three-Quarter View
A-11

941207

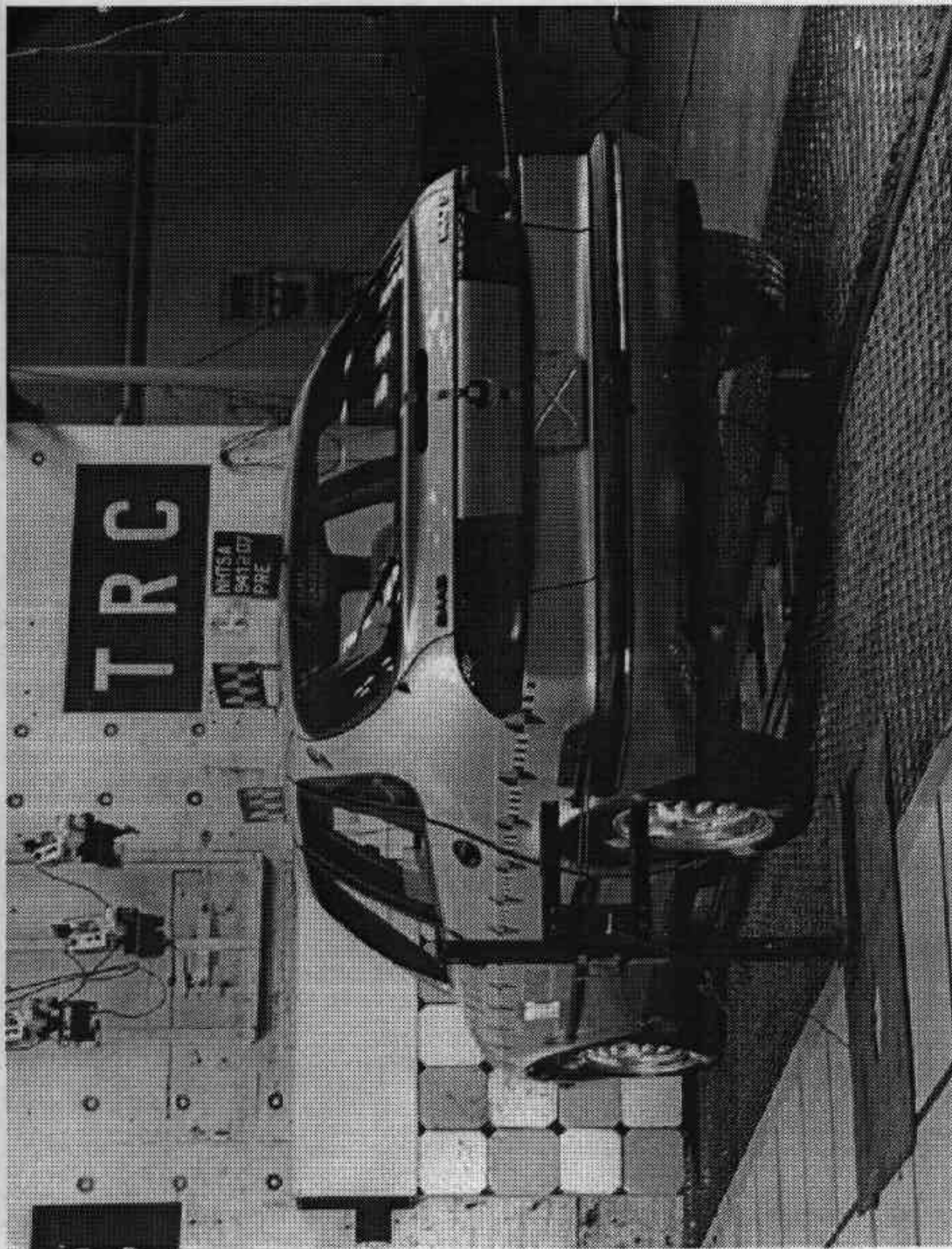


Figure A-11. Pre-Test Left Rear Three-Quarter View
A-12

941207

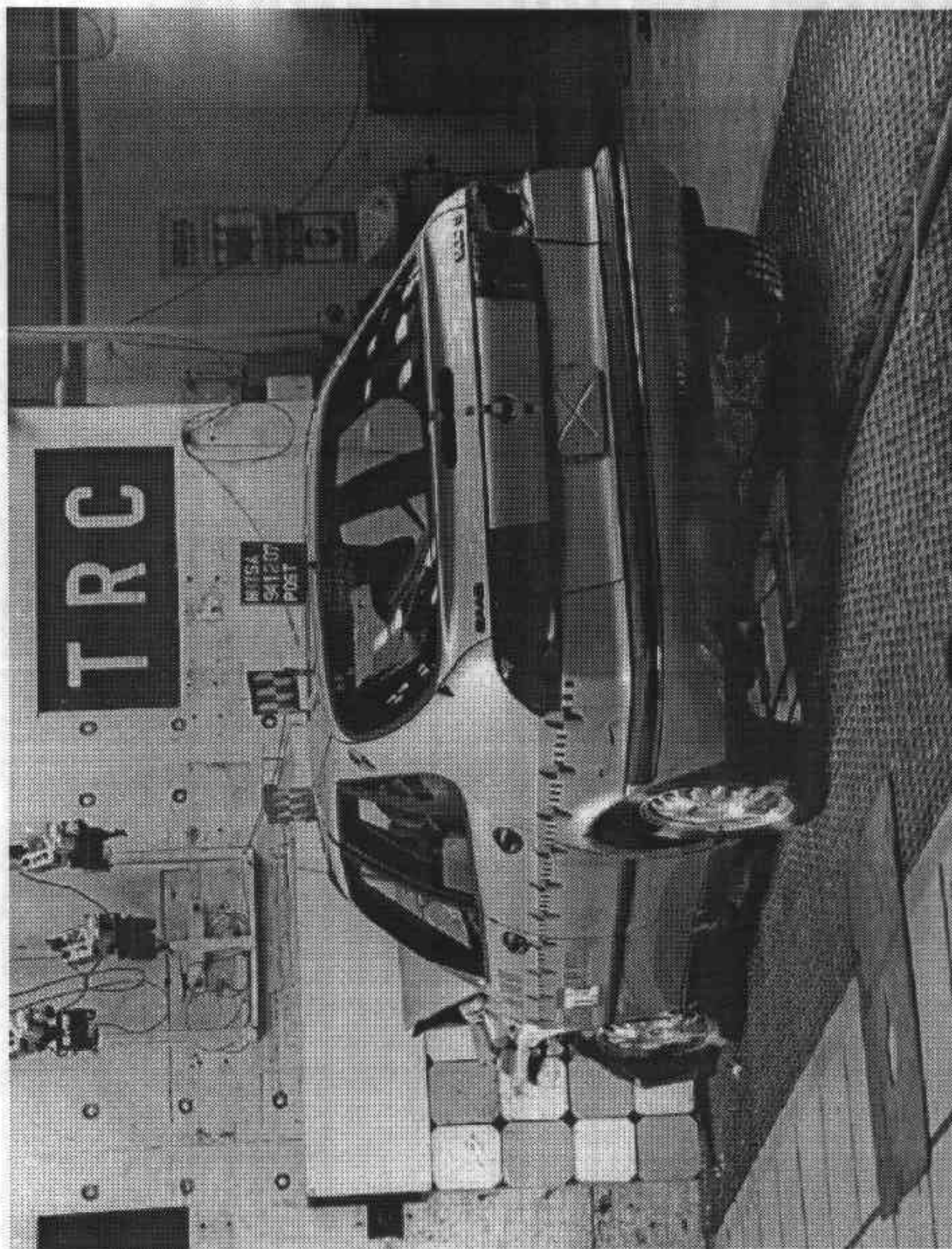


Figure A-12. Post-Test Left Rear Three-Quarter View
A-13

941207

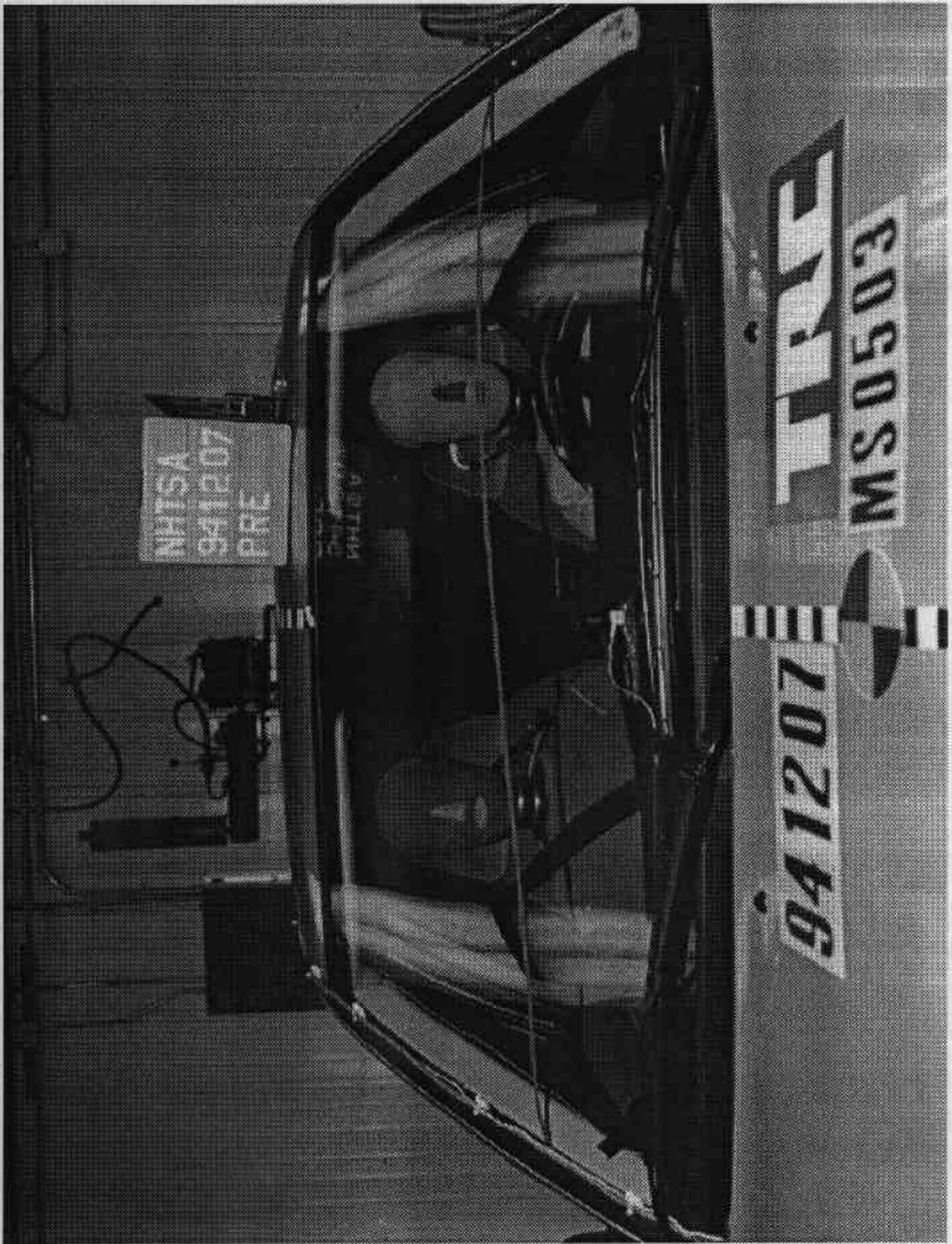


Figure A-13. Pre-Test Windshield View
A-14

941207

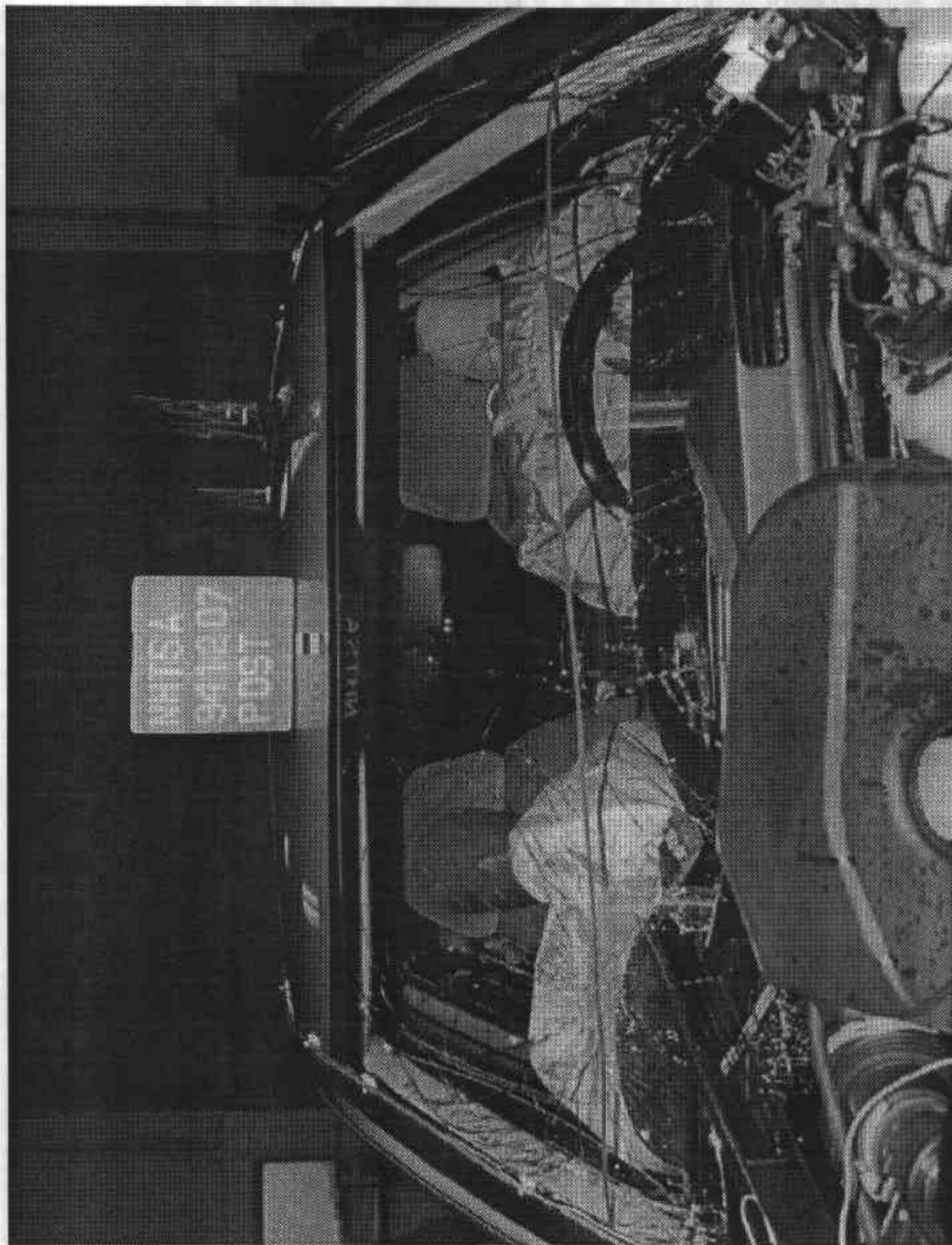


Figure A-14. Post-Test Windshield View
A-15

941207

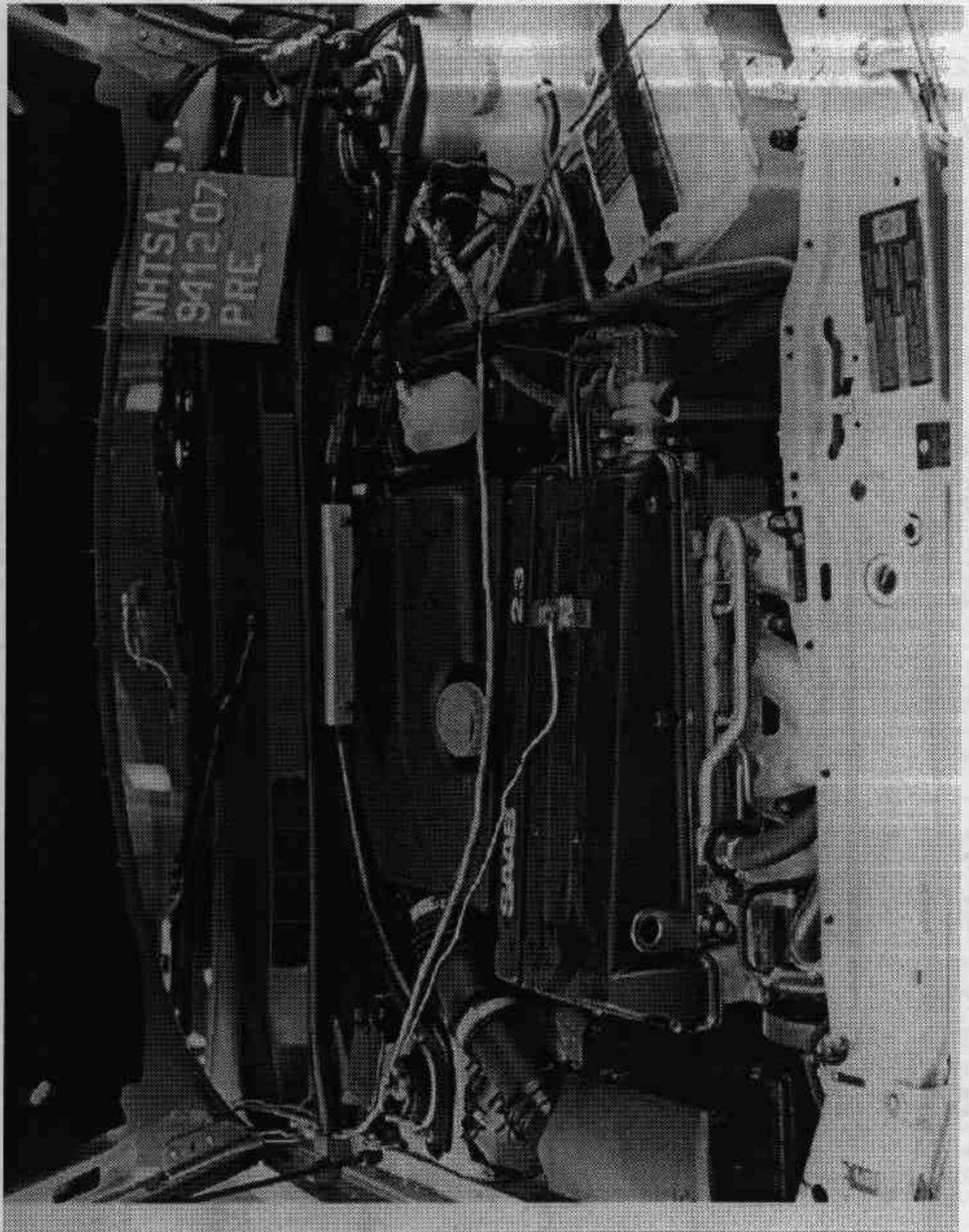


Figure A-15. Pre-Test Engine Compartment View
A-16

941207

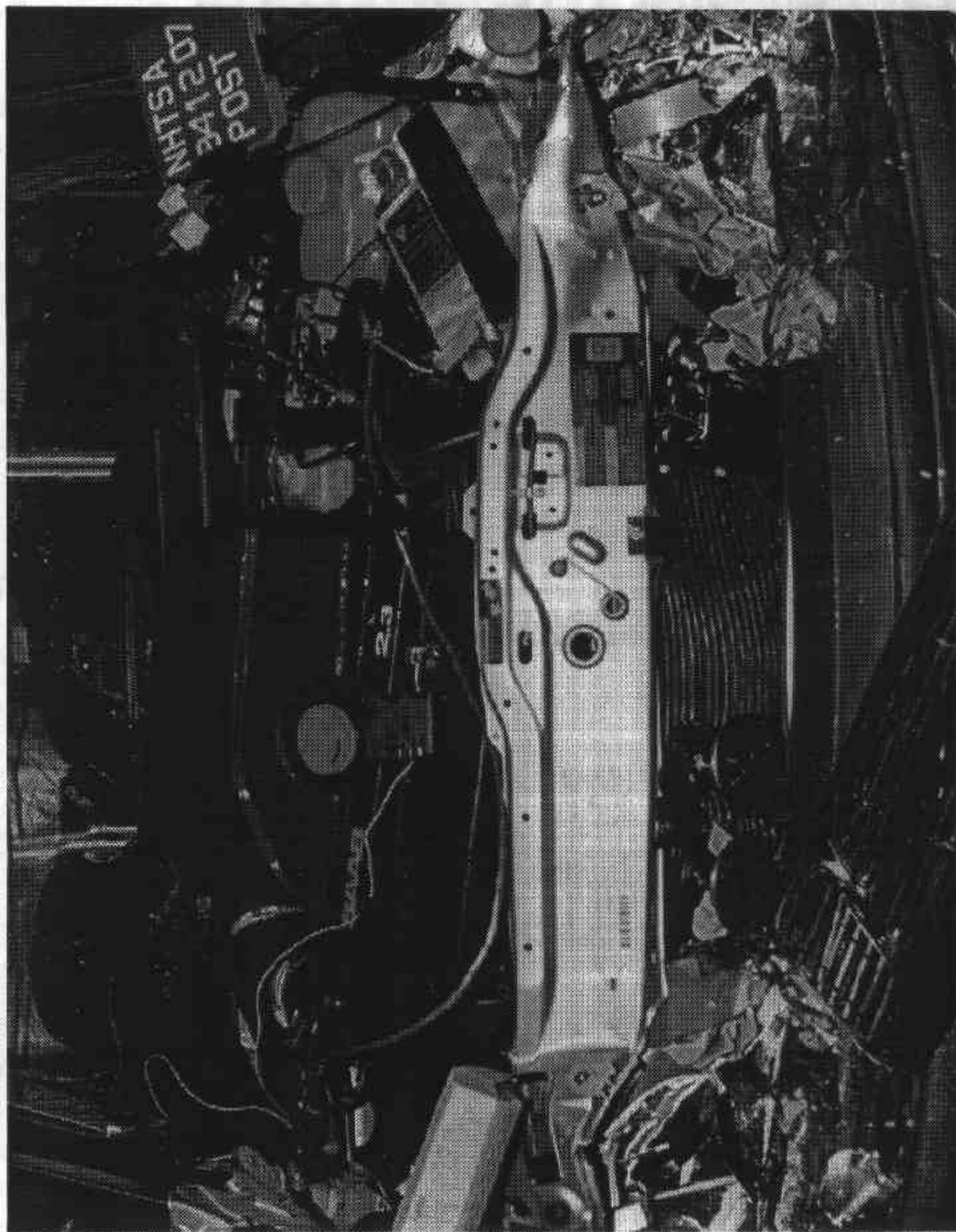


Figure A-16. Post-Test Engine Compartment View
A-17

941207



Figure A-17. Pre-Test Fuel Filler Cap View

A-18

941207



Figure A-18. Post-Test Fuel Filler Cap View
A-19

941207



Figure A-19. Pre-Test Fuel Filler Neck View

A-20

941207



Figure A-20. Post-Test Fuel Filler Neck View
A-21

941207

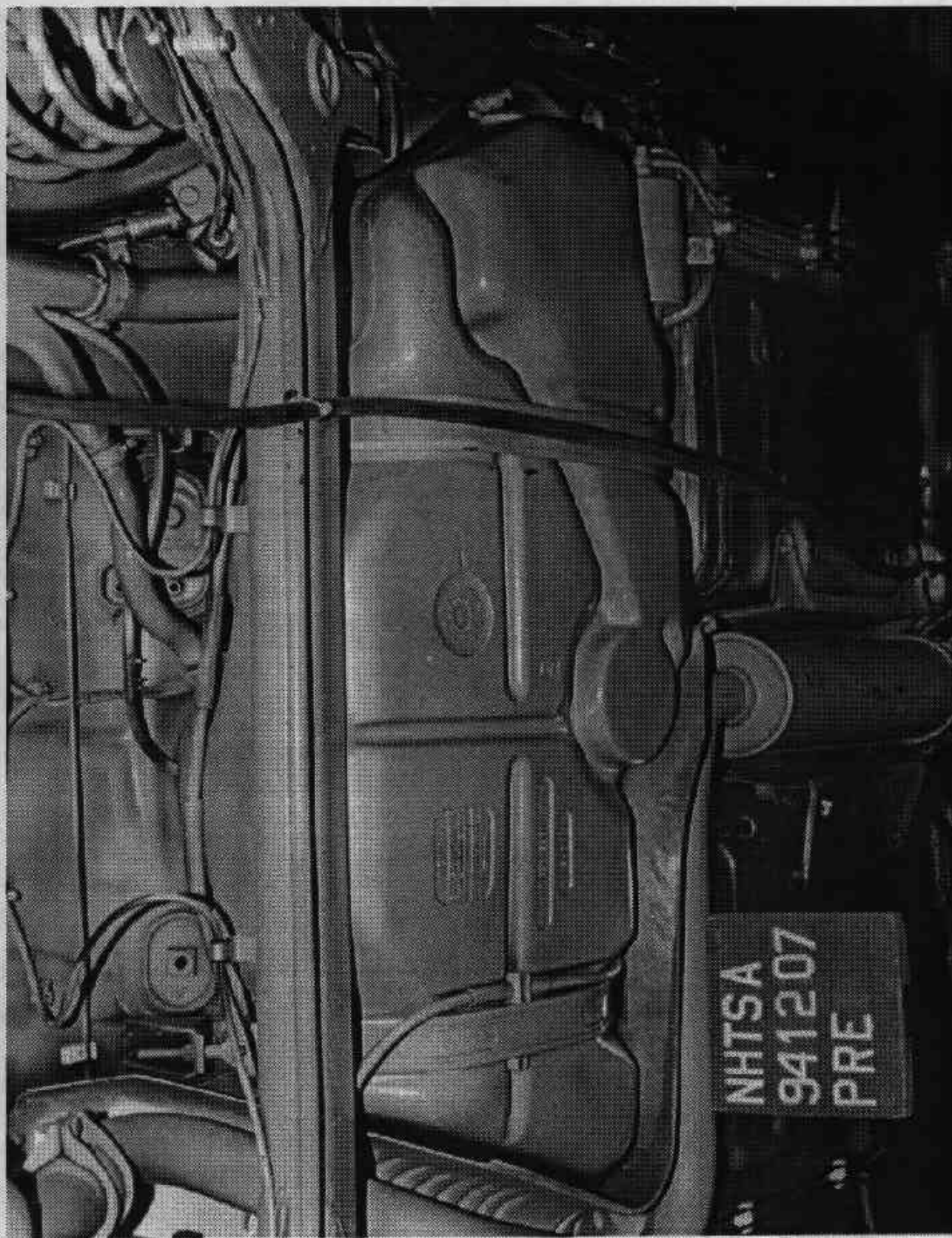


Figure A-21. Pre-Test Fuel Tank View
A-22

941207

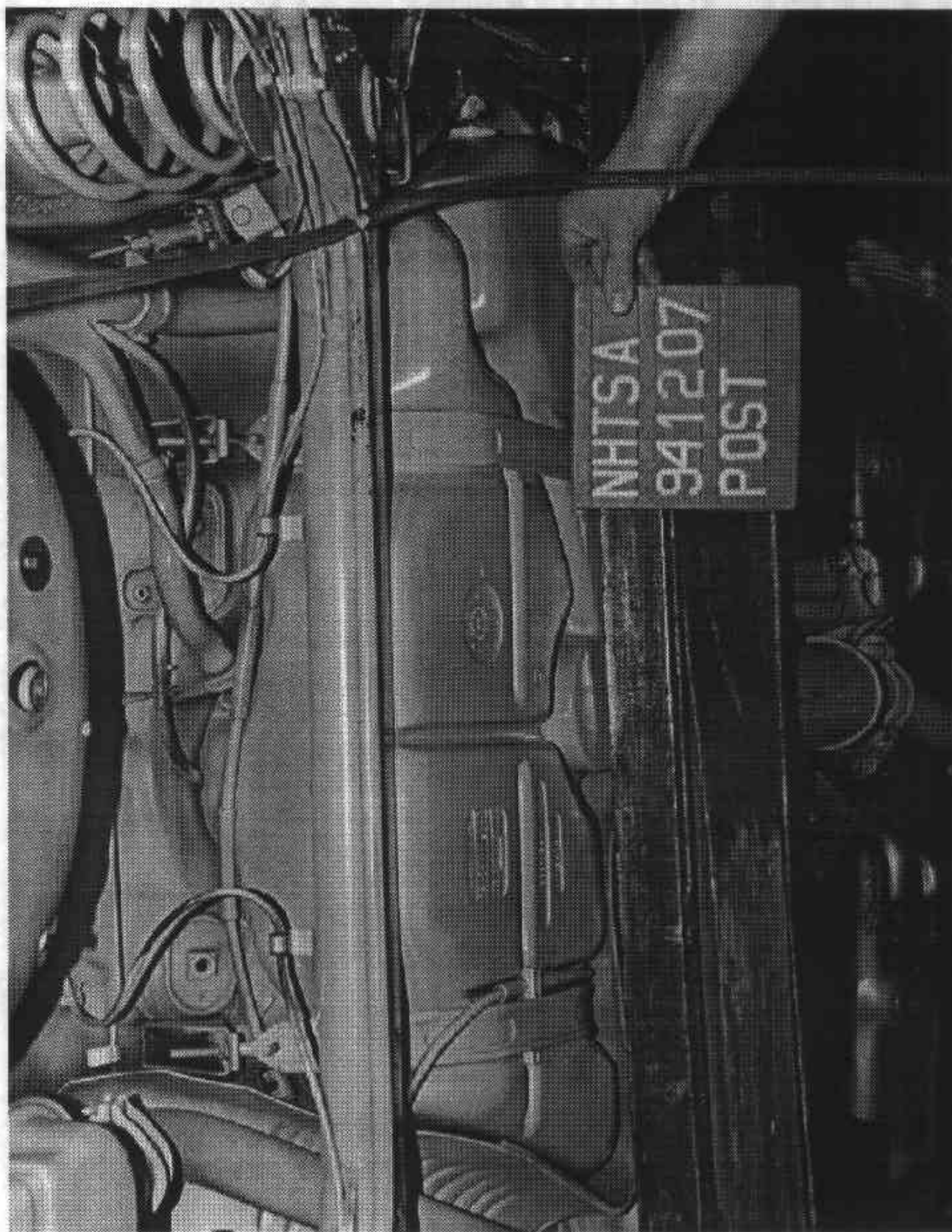


Figure A-22. Post-Test Fuel Tank View
A-23

941207

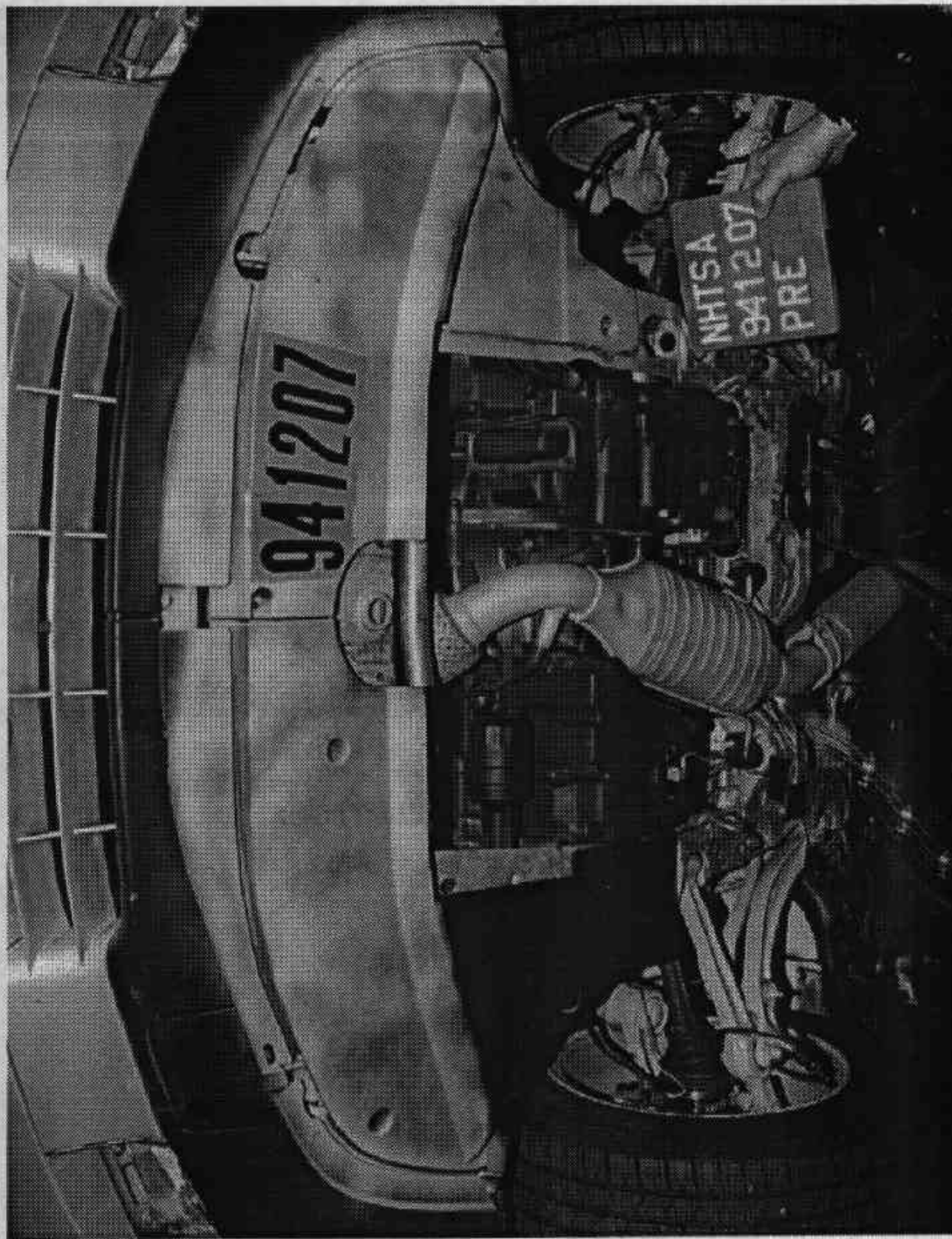


Figure A-23. Pre-Test Front Underbody View

A-24

941207

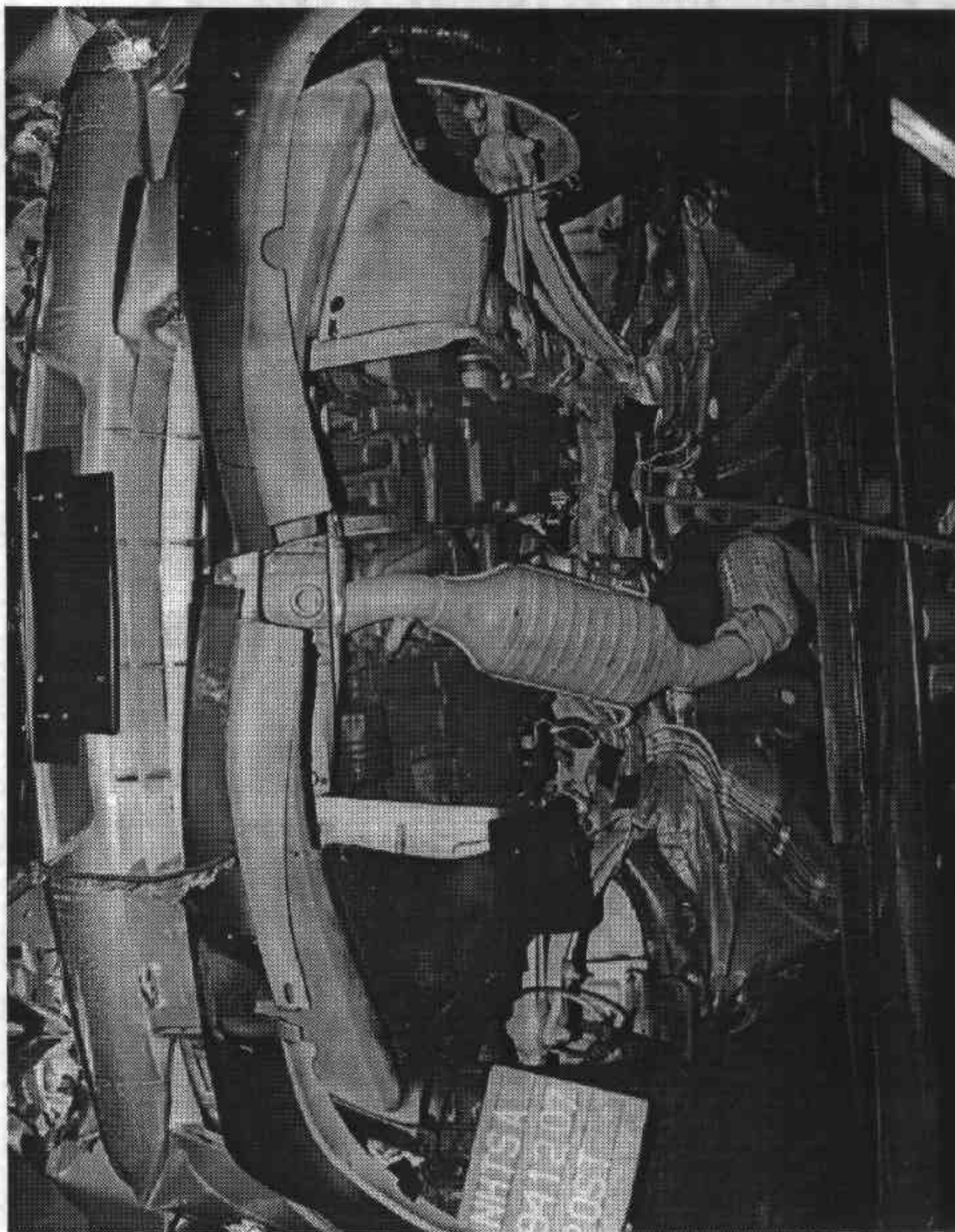


Figure A-24. Post-Test Front Underbody View
A-25

941207

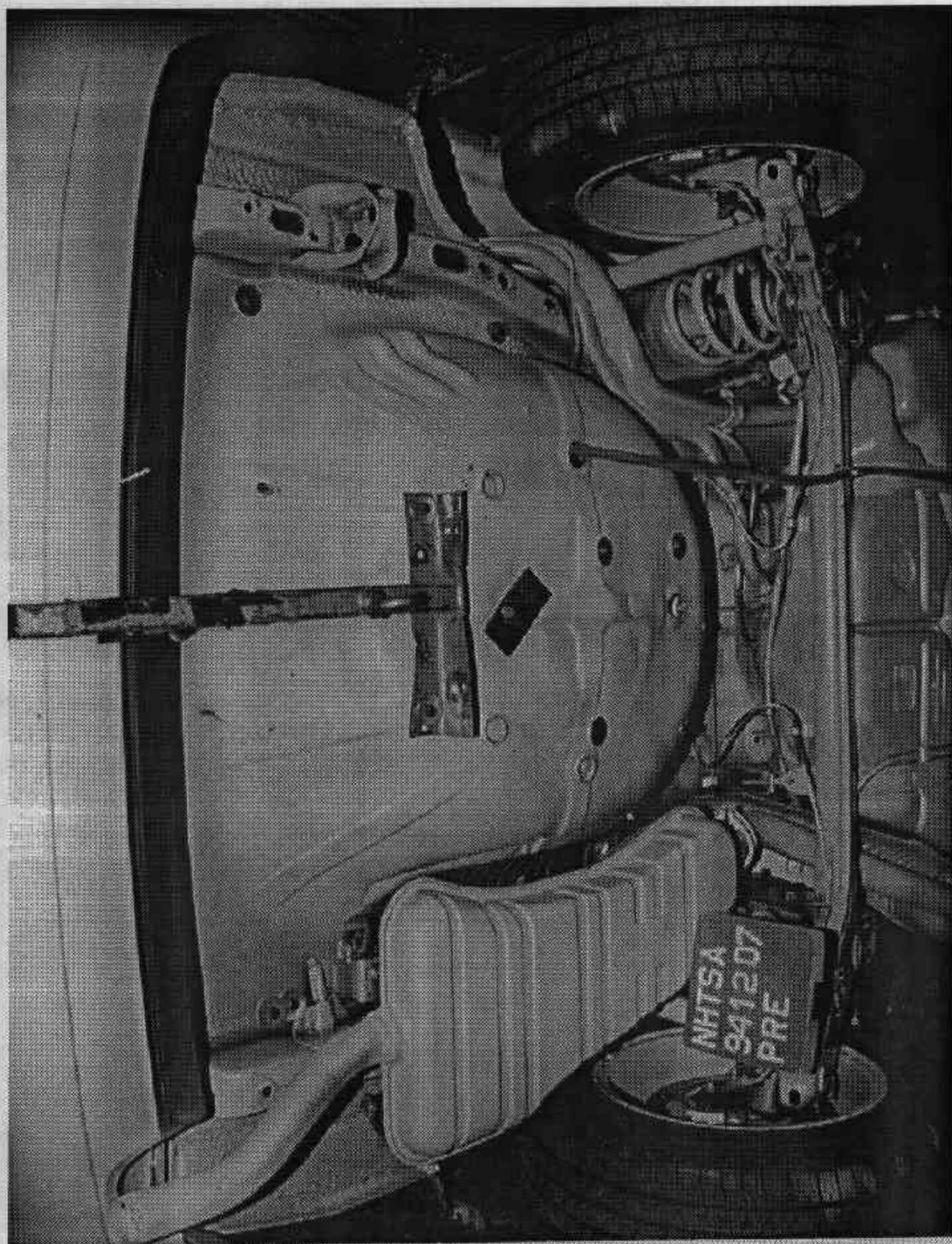


Figure A-25. Pre-Test Rear Underbody View
A-26

941207

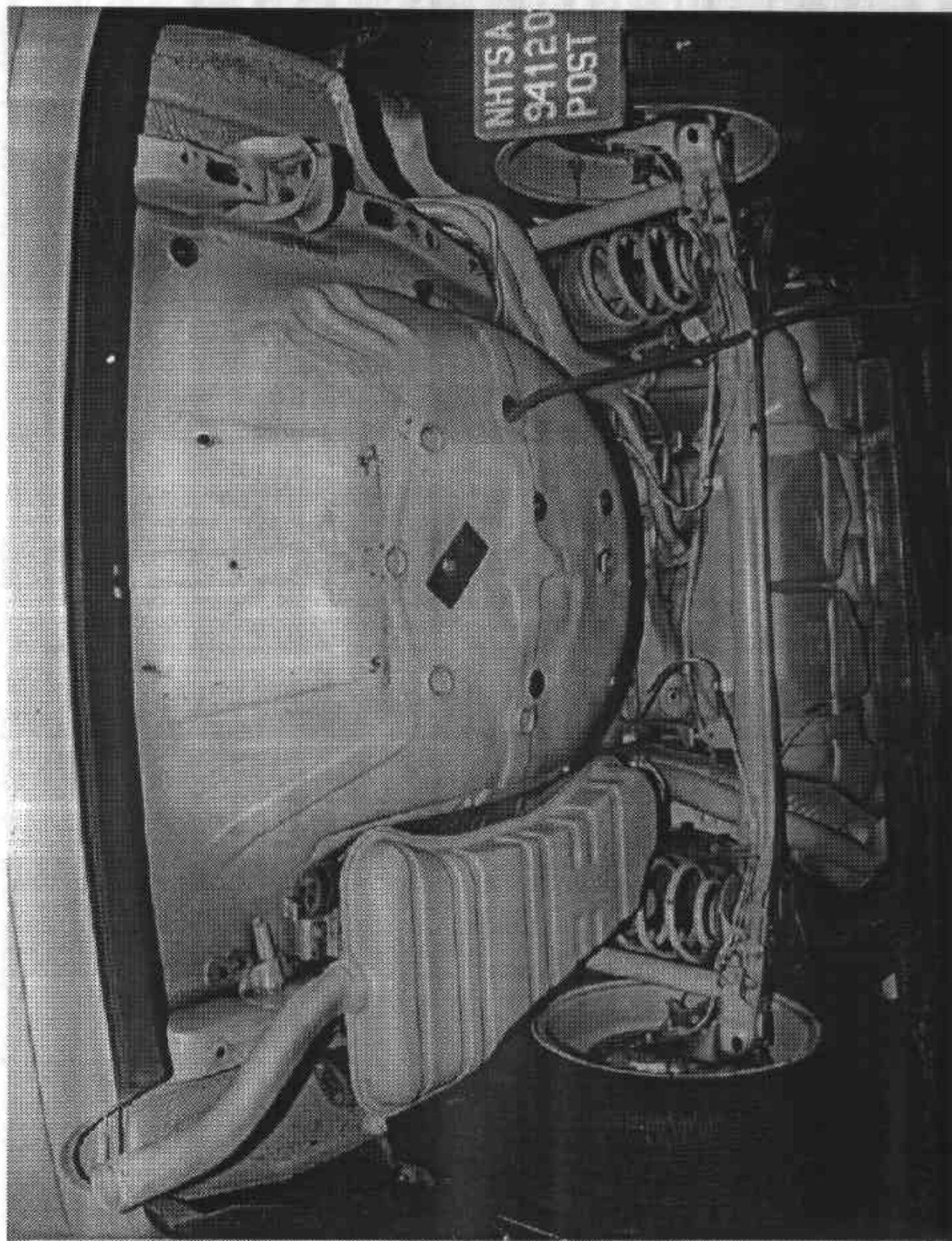


Figure A-26. Post-Test Rear Underbody View
A-27

941207

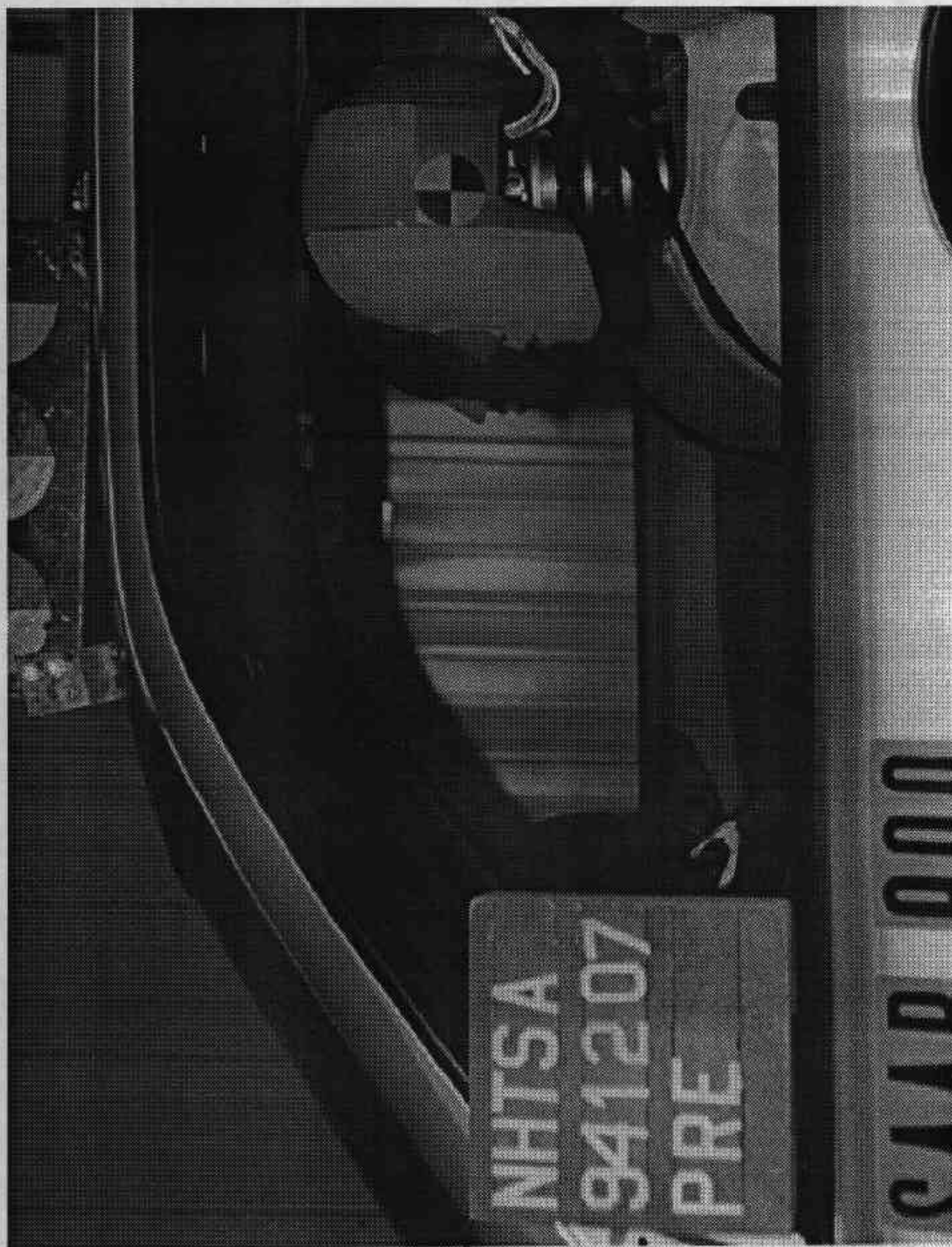


Figure A-27. Pre-Test Driver Dummy Position View
A-28

941207

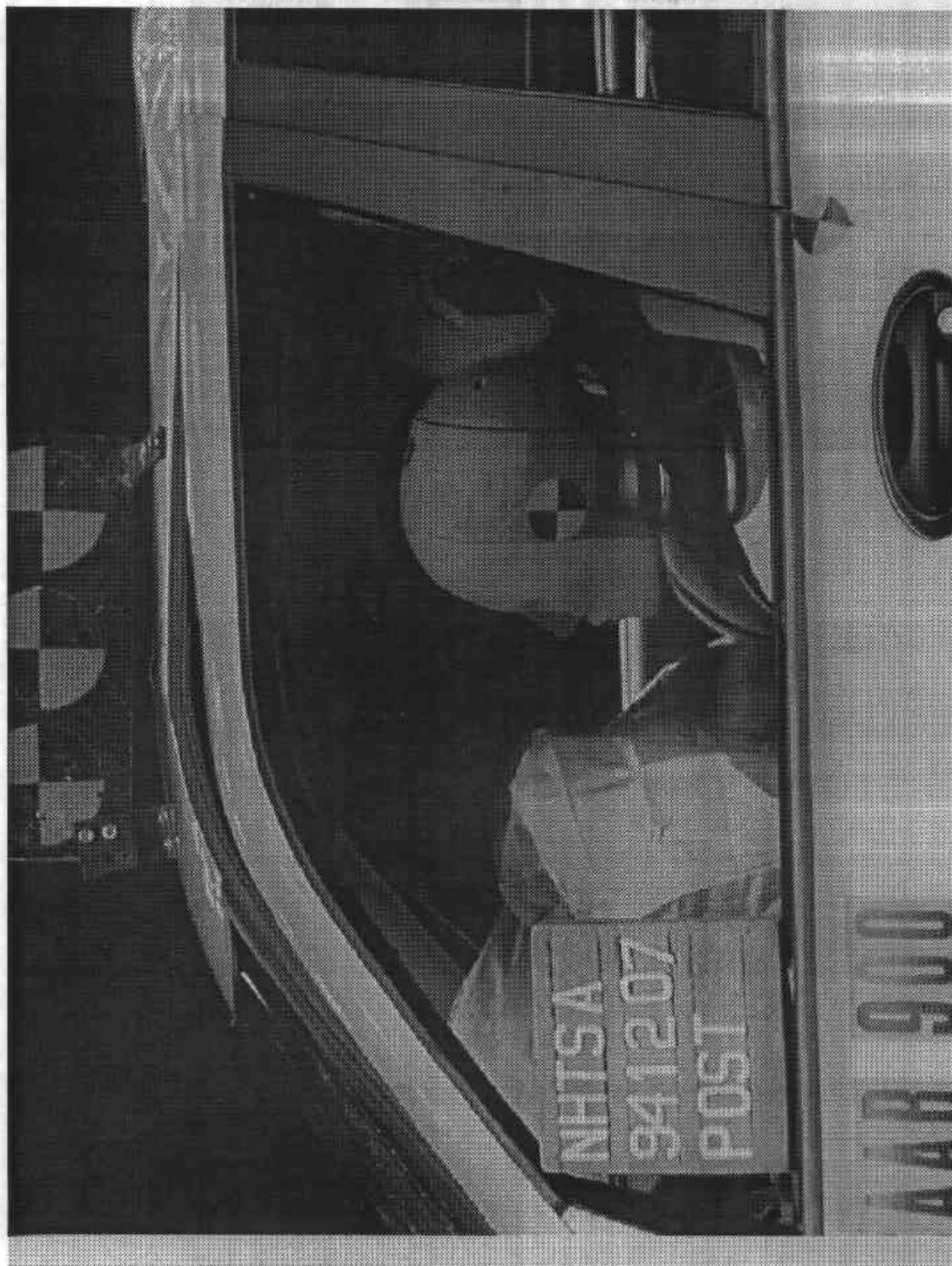


Figure A-28. Post-Test Driver Dummy Position View

A-29

941207



Figure A-29. Pre-Test Passenger Dummy Position View

A-30

941207

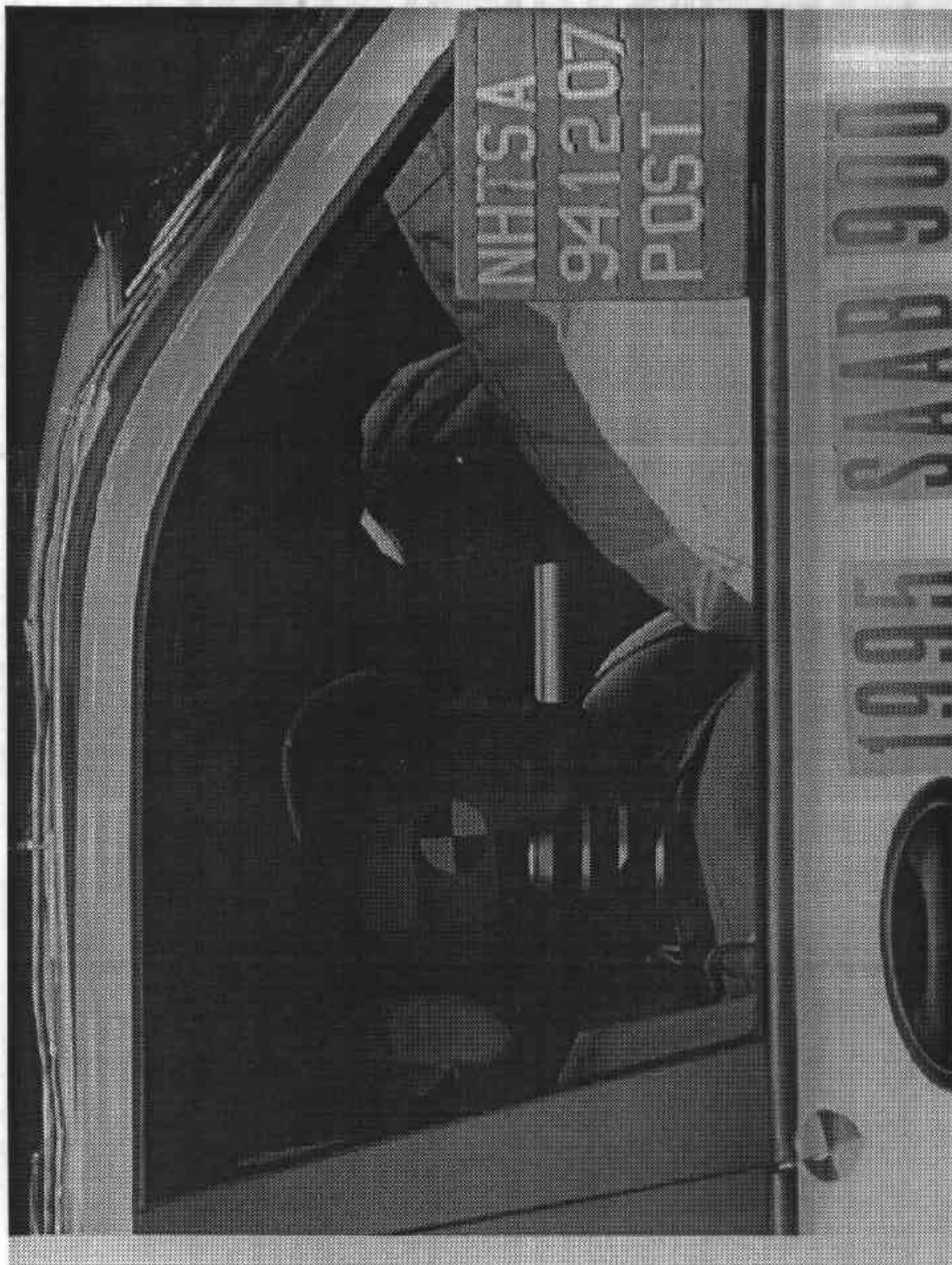


Figure A-30. Post-Test Passenger Dummy Position View
A-31

941207

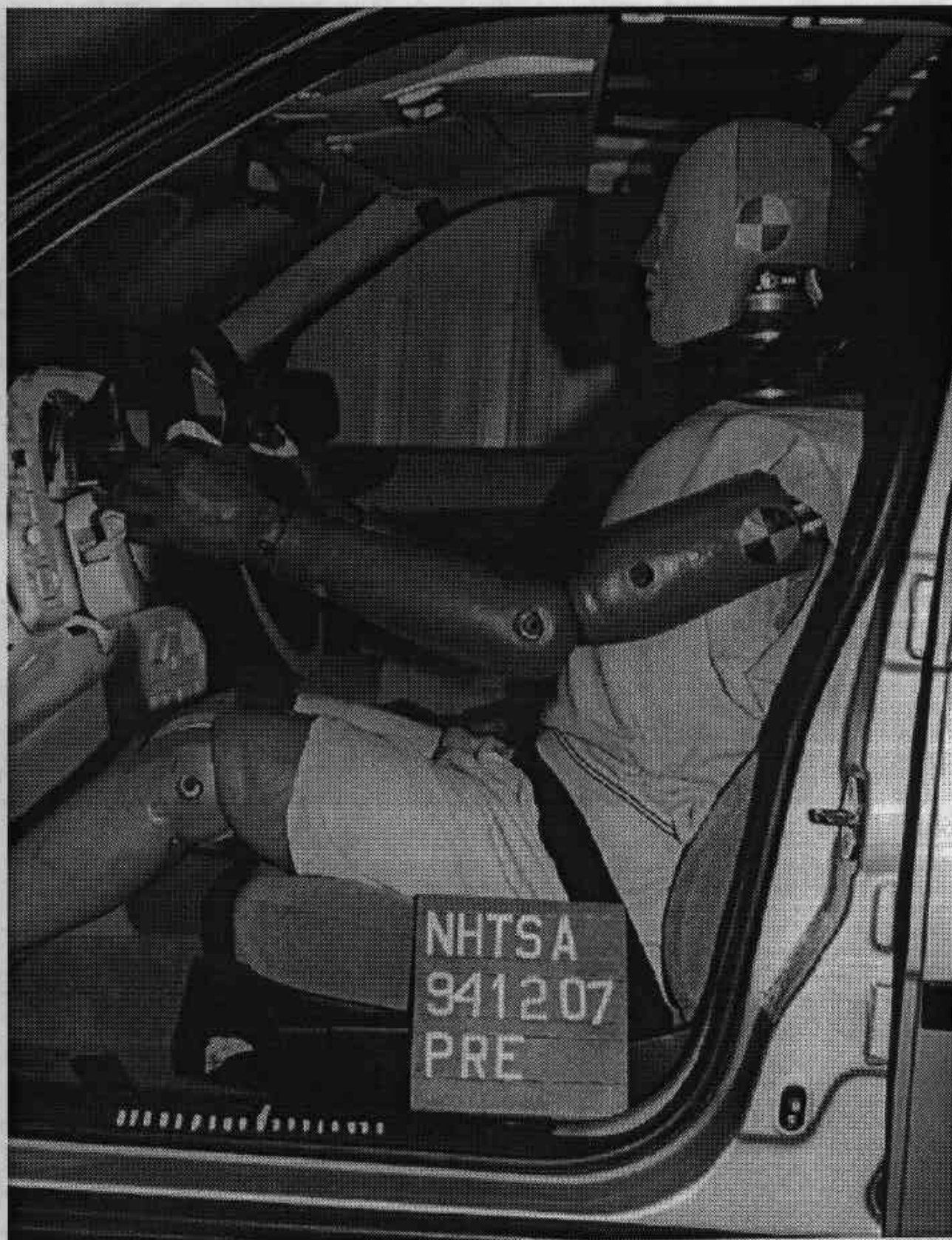


Figure A-31. Pre-Test Driver Dummy & Vehicle Interior - View 1
A-32

941207

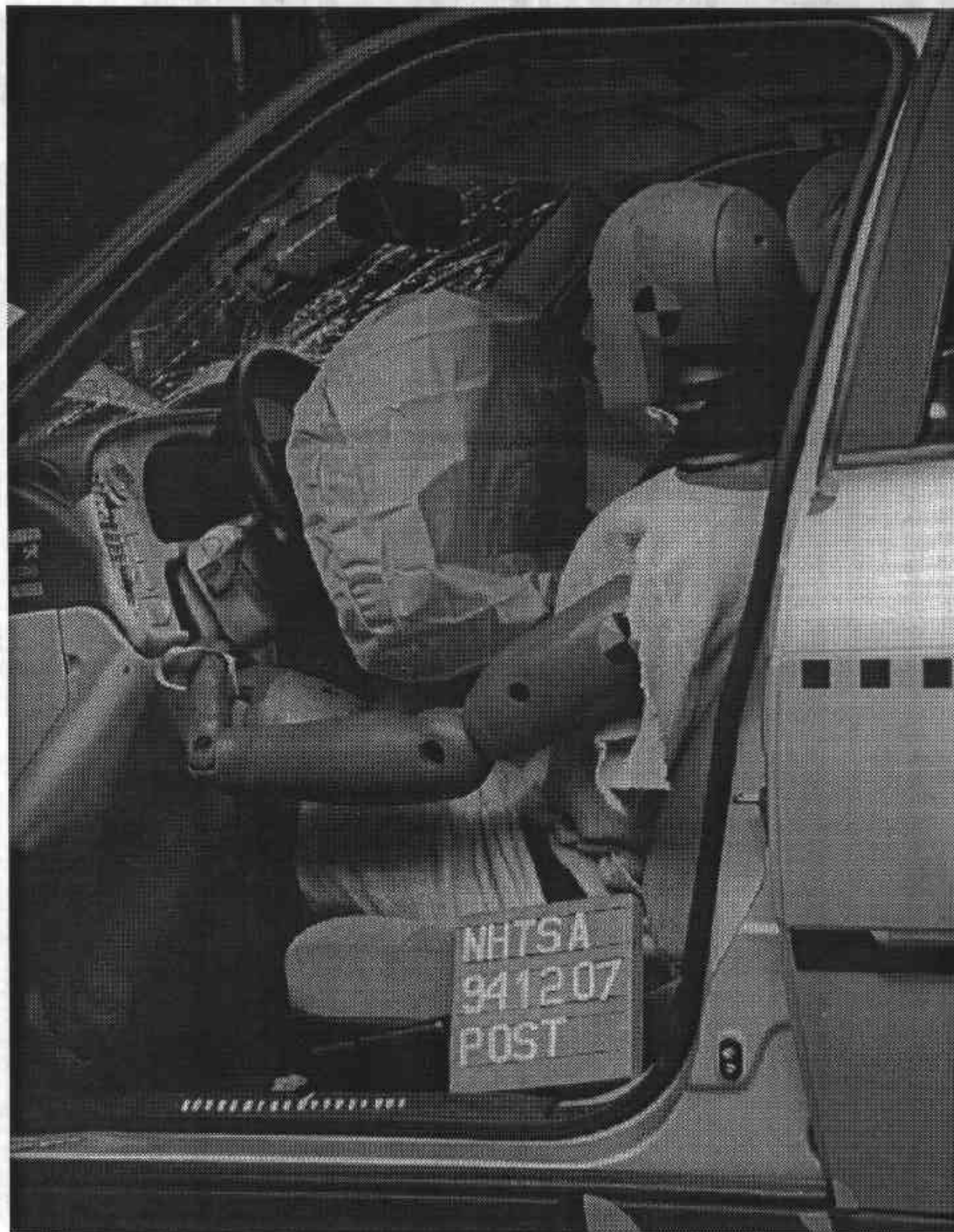


Figure A-32. Post-Test Driver Dummy & Vehicle Interior - View 1

A-33

941207



Figure A-33. Pre-Test Driver Dummy & Vehicle Interior - View 2

A-34

941207



Figure A-34. Post-Test Driver Dummy & Vehicle Interior - View 2
A-35

941207

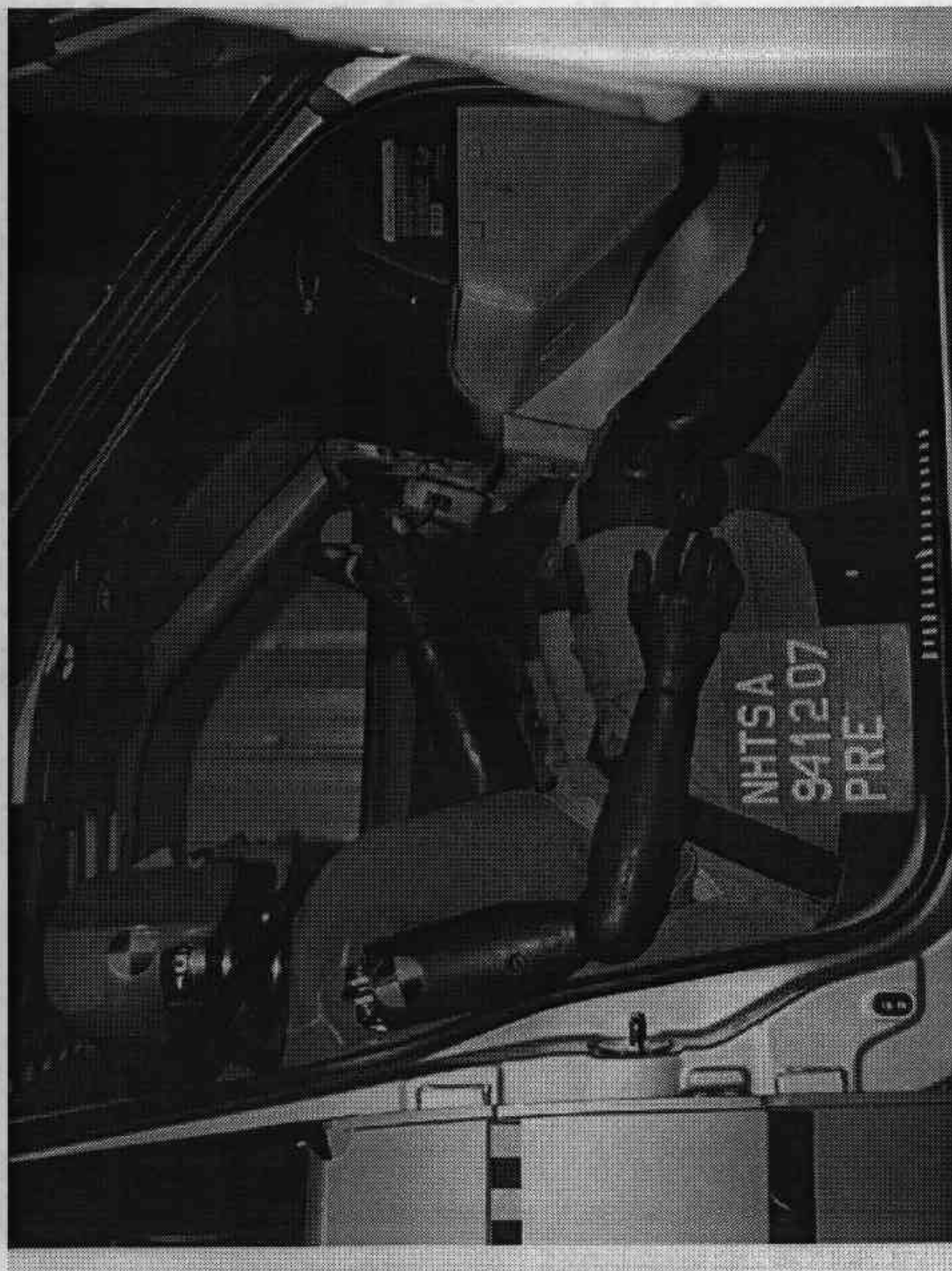


Figure A-35. Pre-Test Passenger Dummy & Vehicle Interior - View I

A-36

941207

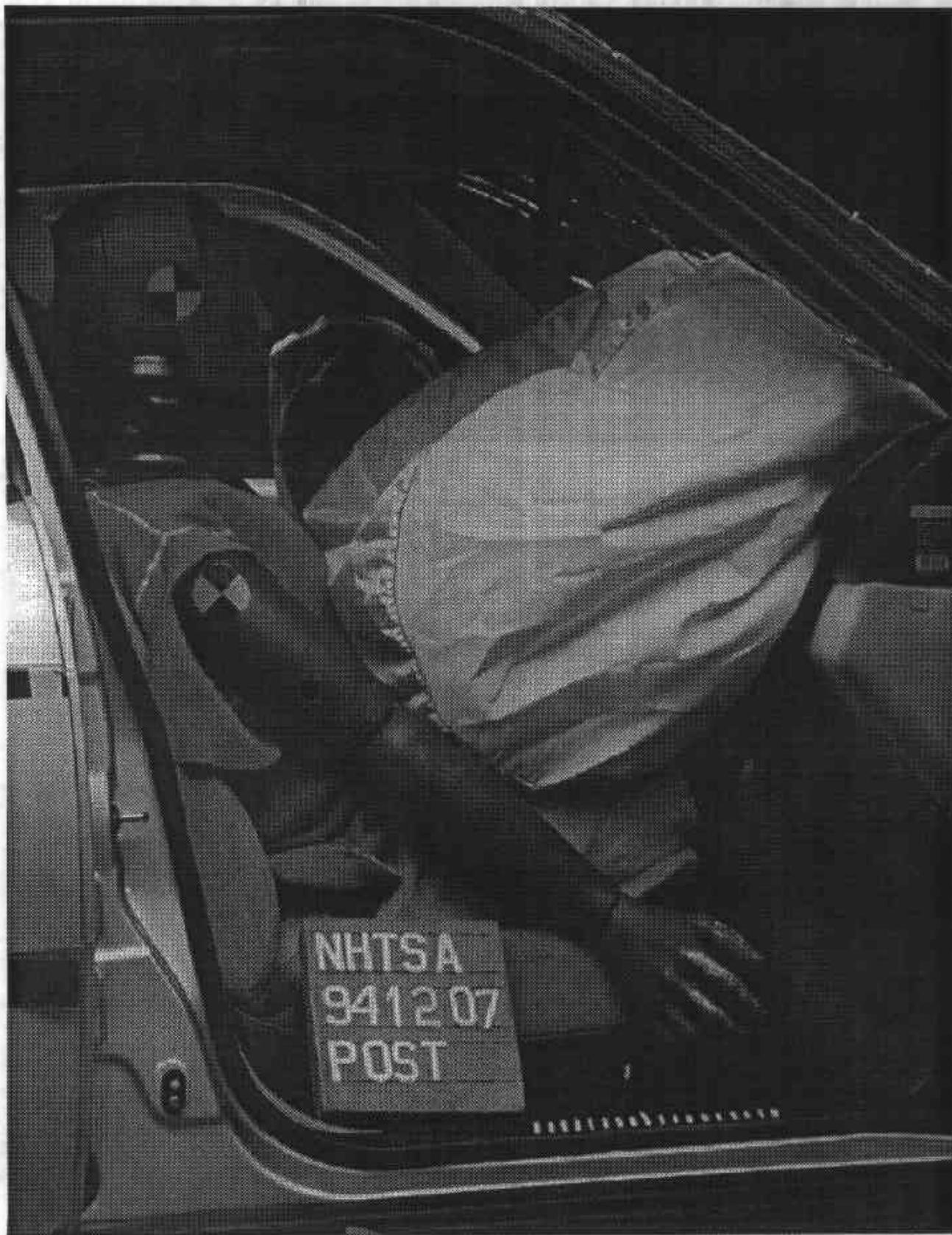


Figure A-36. Post-Test Passenger Dummy & Vehicle Interior - View 1

A-37

941207

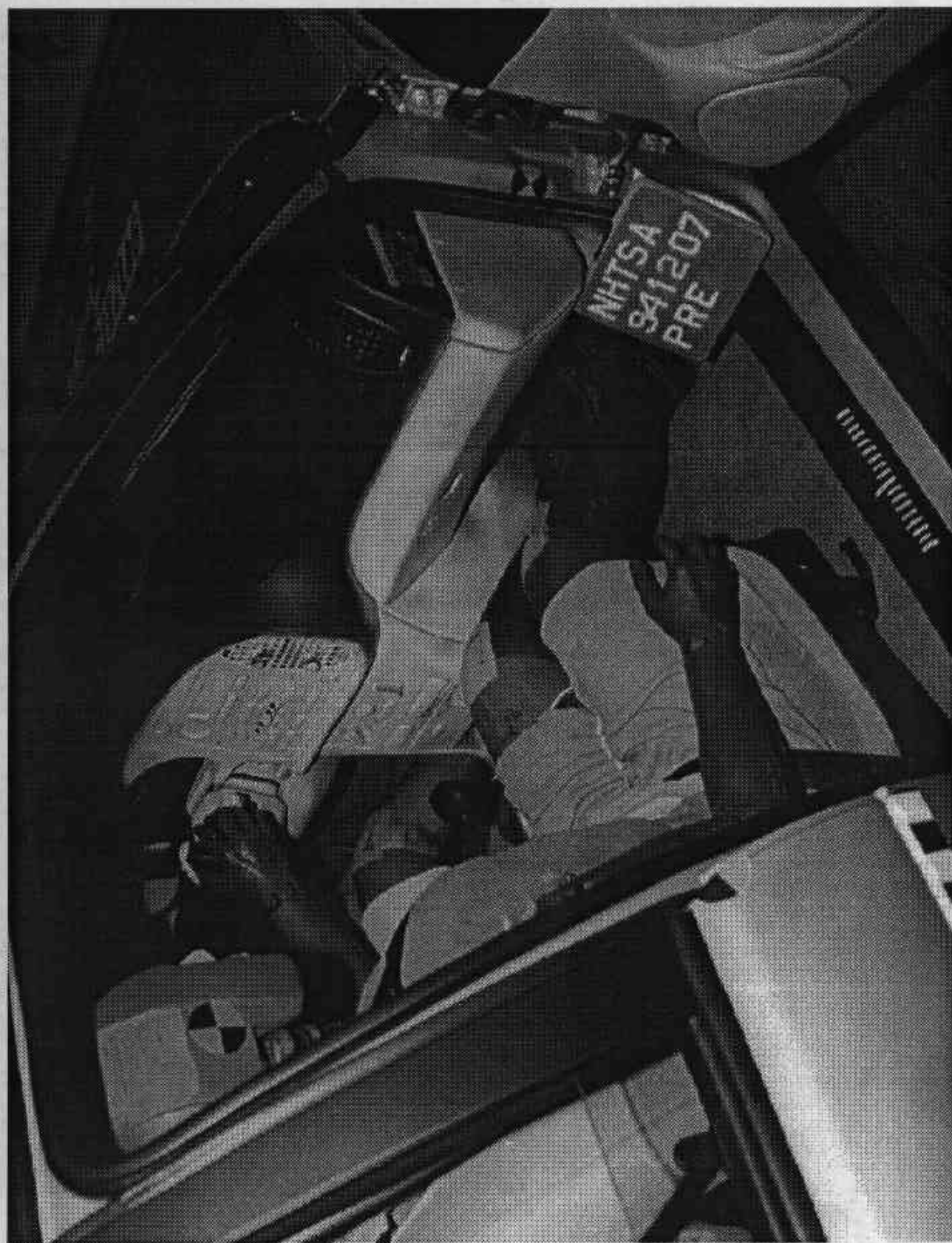


Figure A-37. Pre-Test Passenger Dummy & Vehicle Interior - View 2

A-38

941207



Figure A-38. Post-Test Passenger Dummy & Vehicle Interior - View 2

A-39

941207



Figure A-39. Post-Test Driver Dummy Head Contact - View 1

A-40

941207

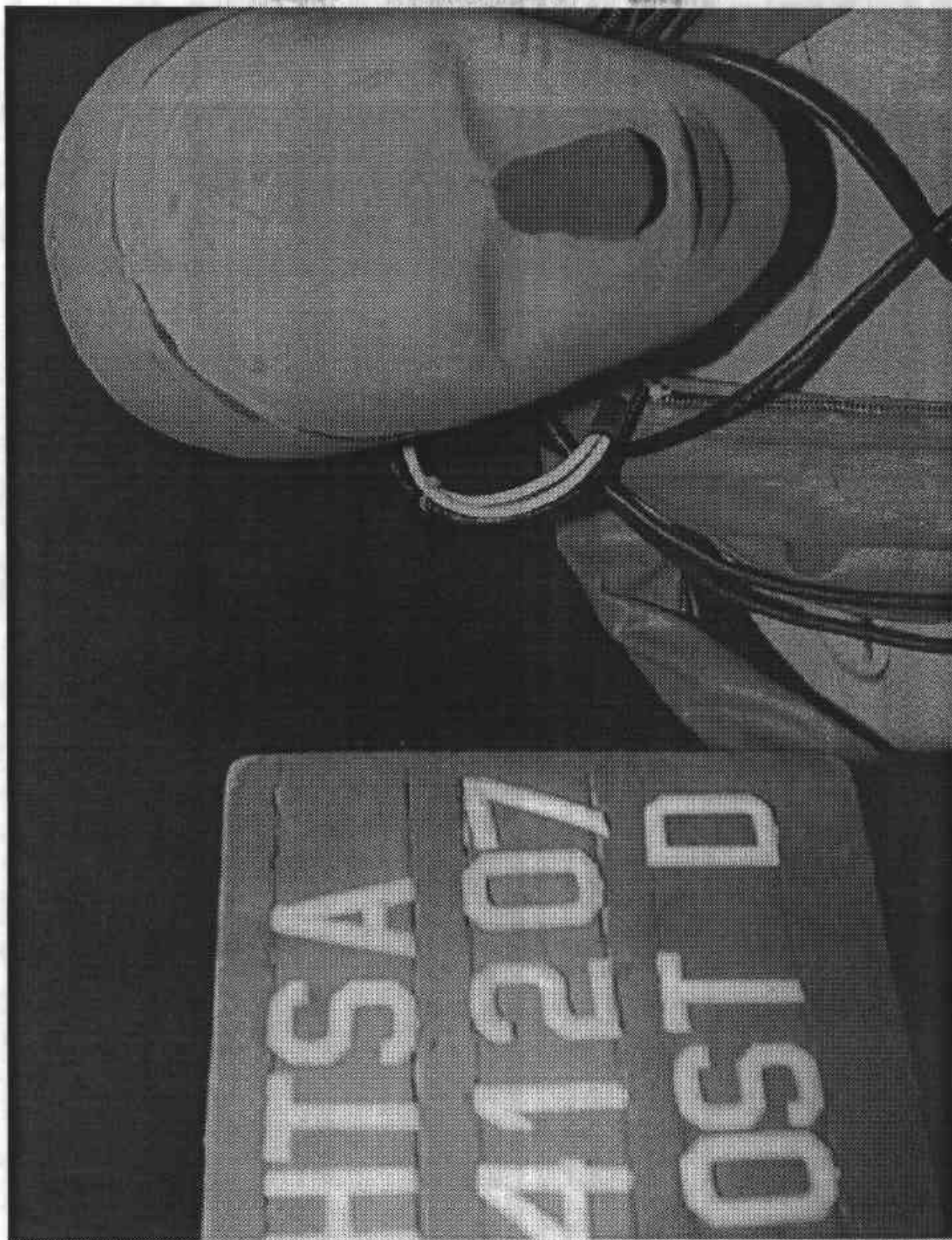


Figure A-40. Post-Test Driver Dummy Head Contact - View 2

A-41

941207

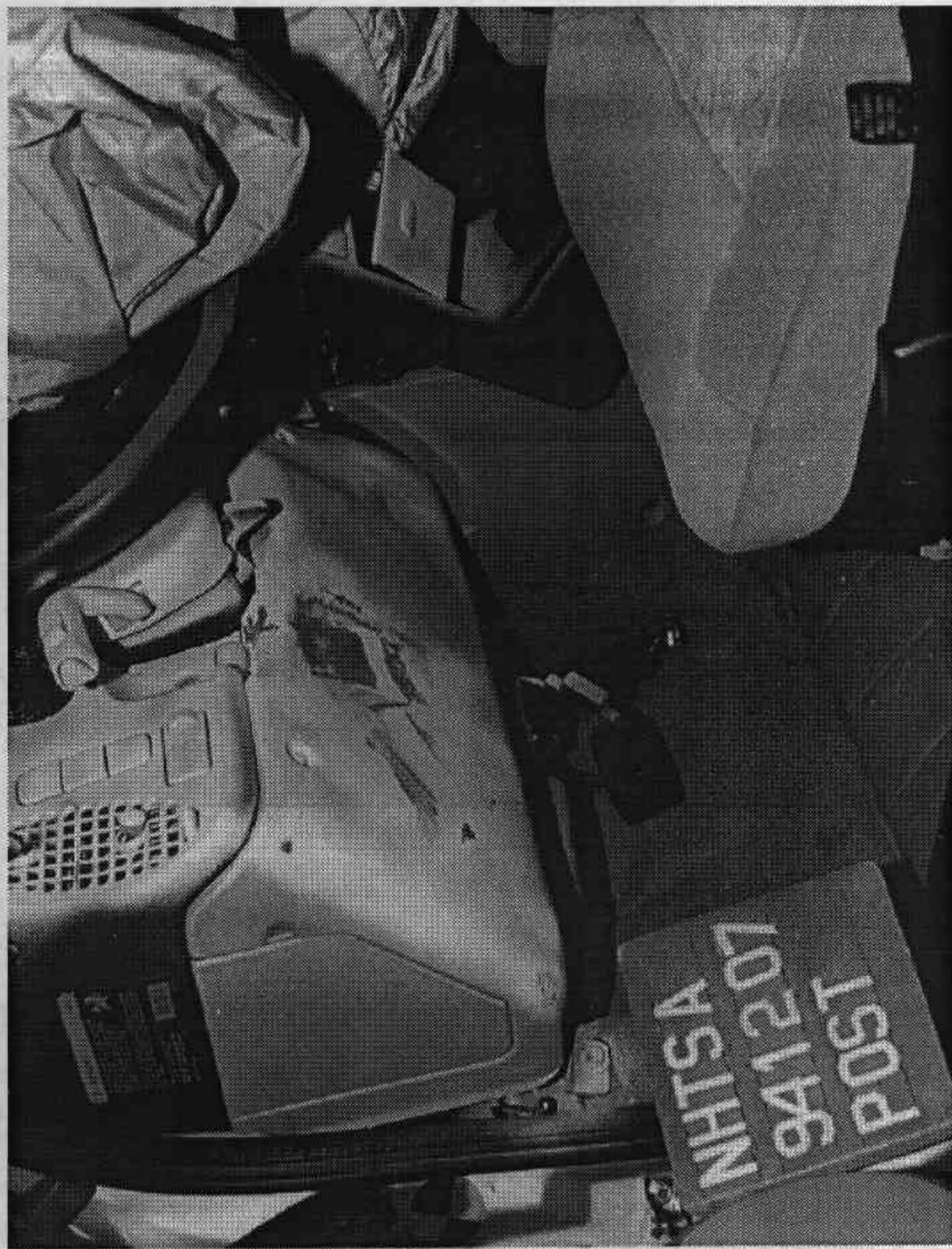


Figure A-41. Post-Test Driver Dummy Knee Contact - View 1

A-42

941207

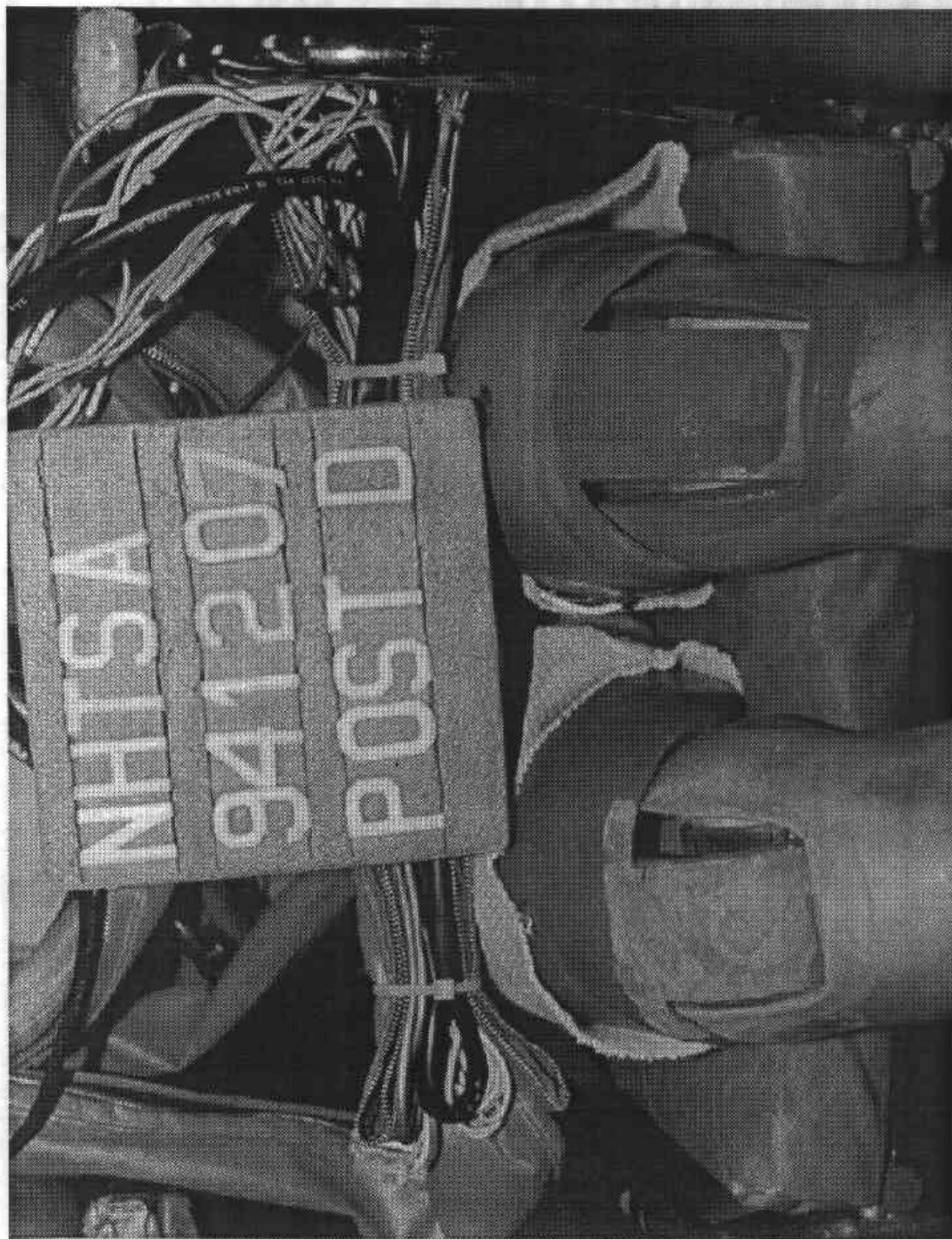


Figure A-42. Post-Test Driver Dummy Knee Contact - View 2

A-43

941207



Figure A-43. Post-Test Passenger Dummy Head Contact - View 1

A-44

941207

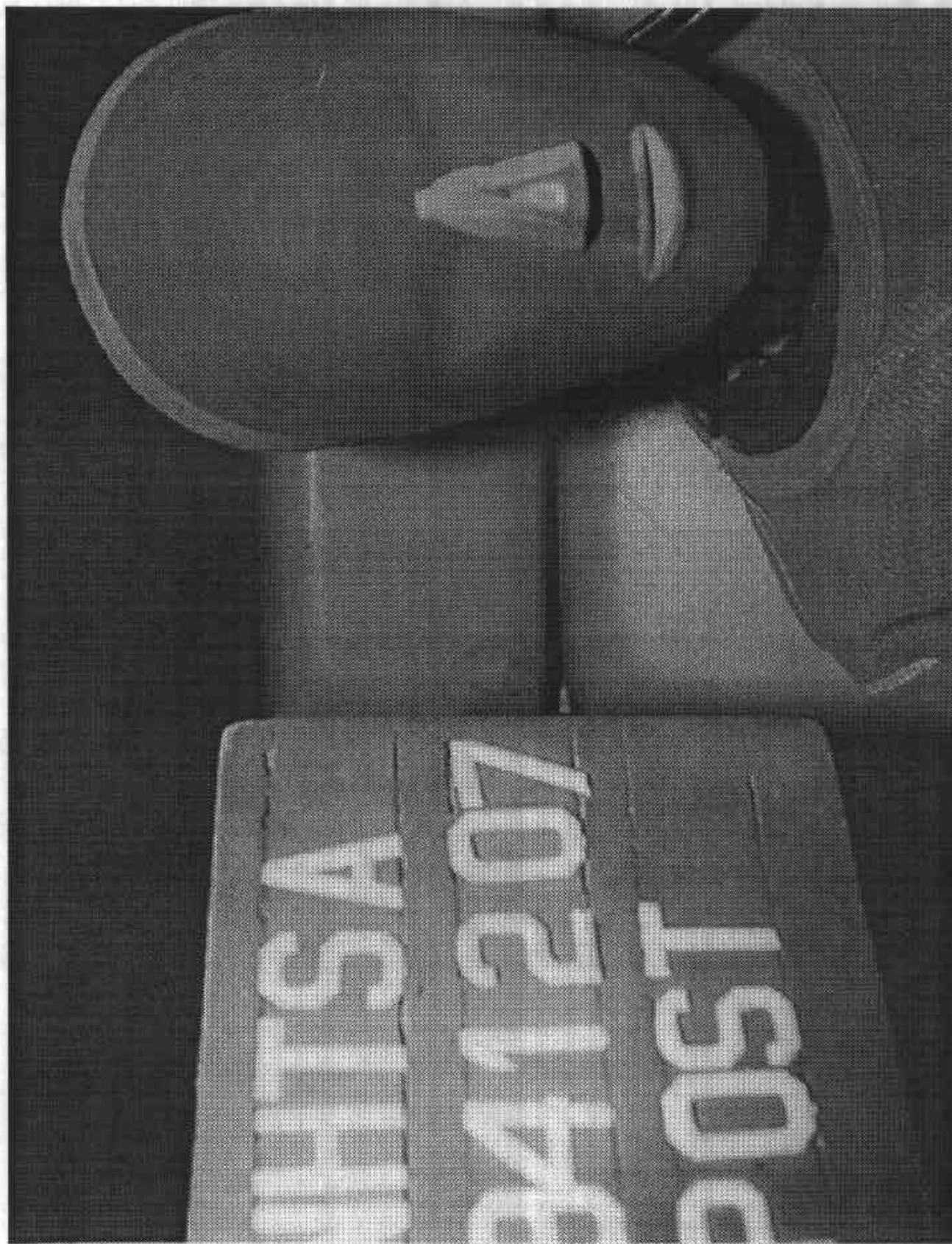


Figure A-44. Post-Test Passenger Dummy Head Contact - View 2

A-45

941207



Figure A-45. Post-Test Passenger Dummy Knee Contact - View 1

A-46

941207

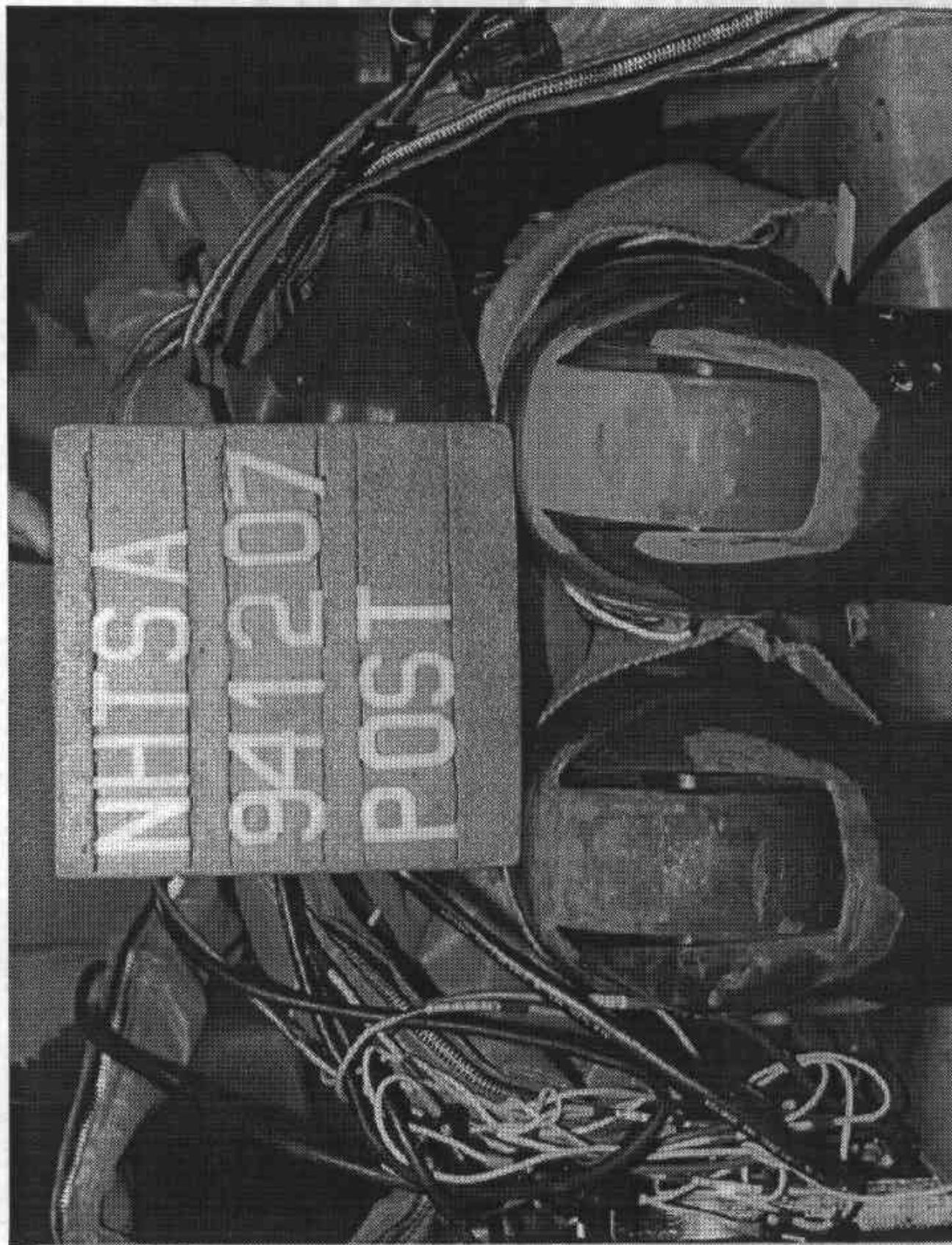


Figure A-46. Post-Test Passenger Dummy Knee Contact - View 2

A-47

941207



Figure A-47. Pre-Test Vehicle Certification Label View

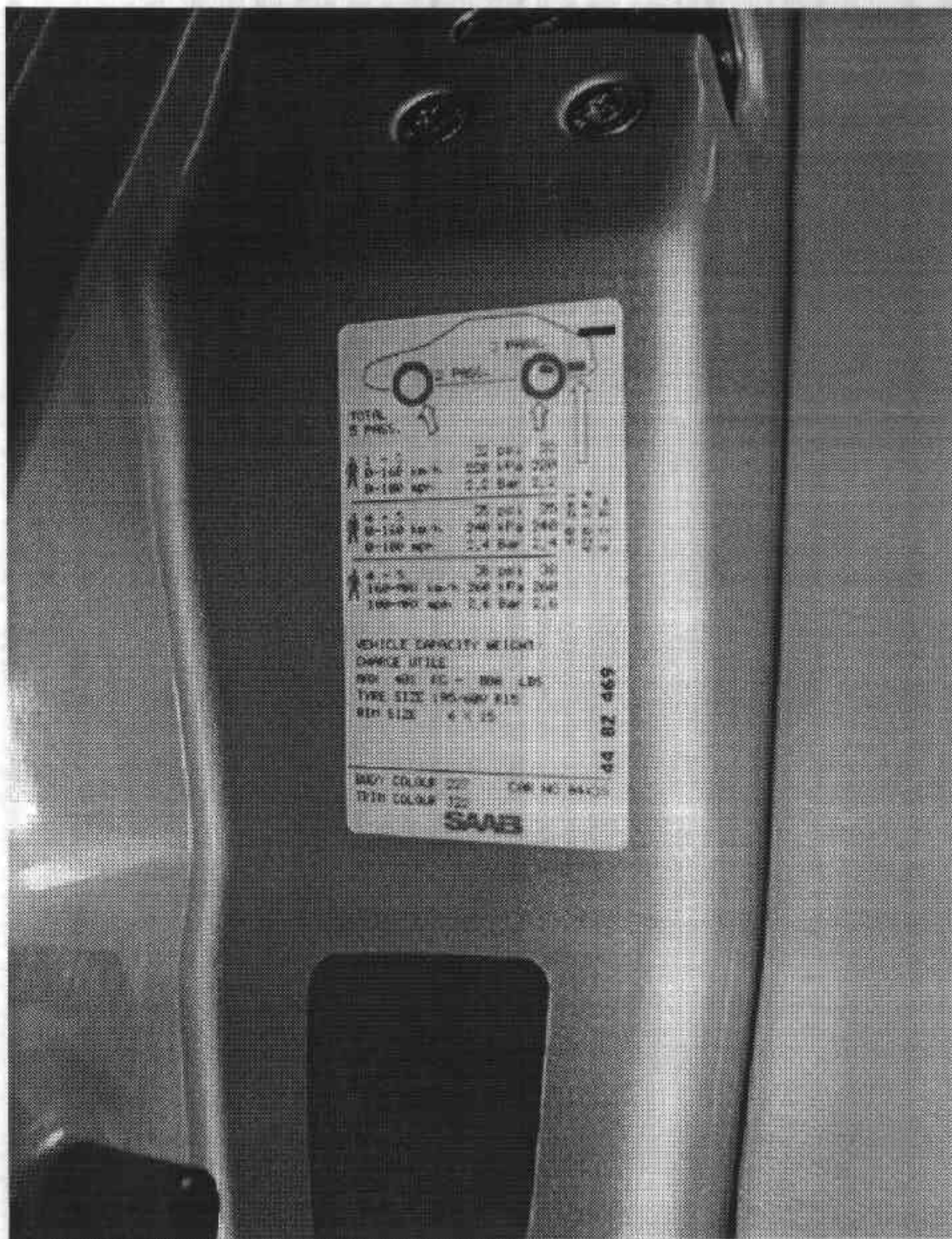


Figure A-48. Pre-Test Vehicle Recommended Tire Pressure Label View

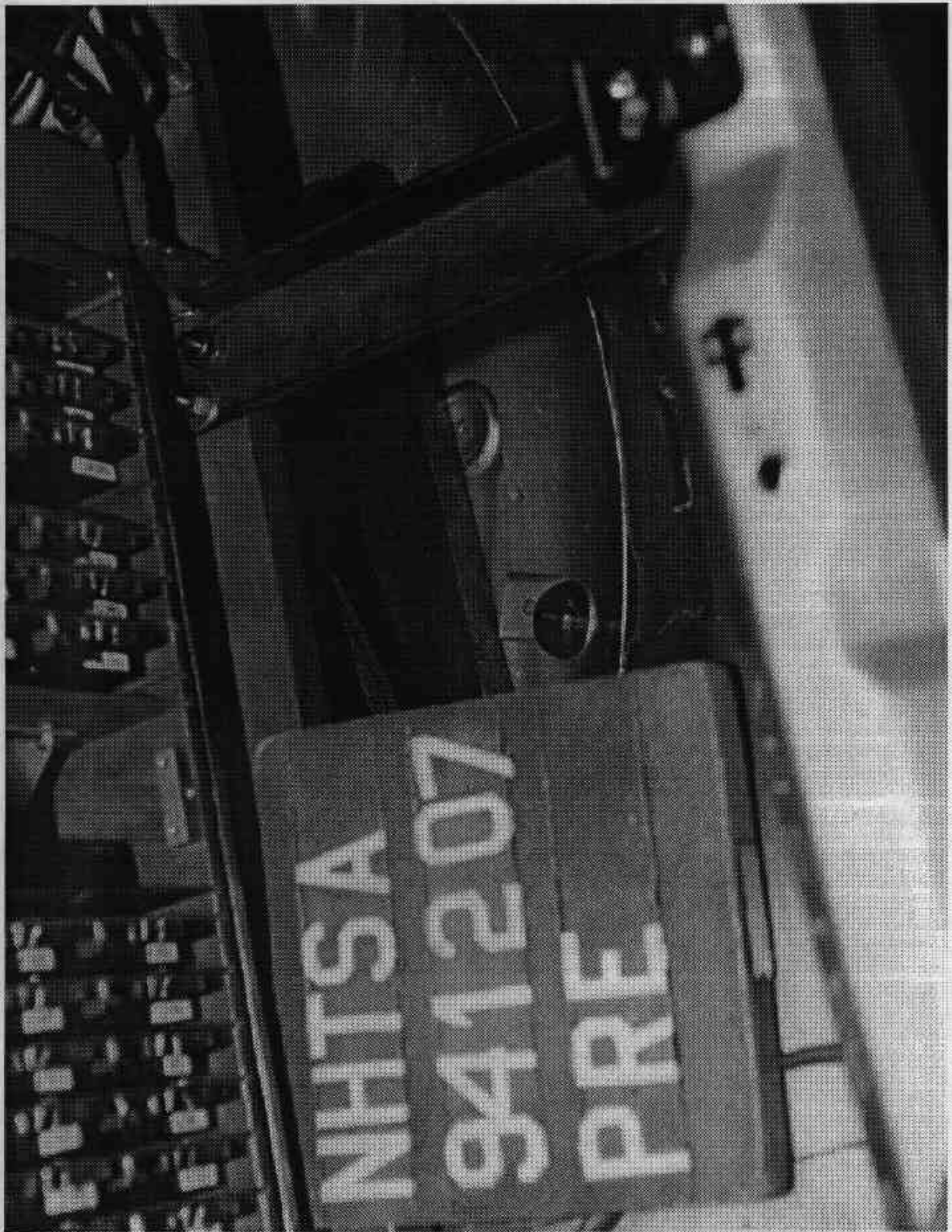


Figure A-49. Pre-Test Ballast View
A-50

941207

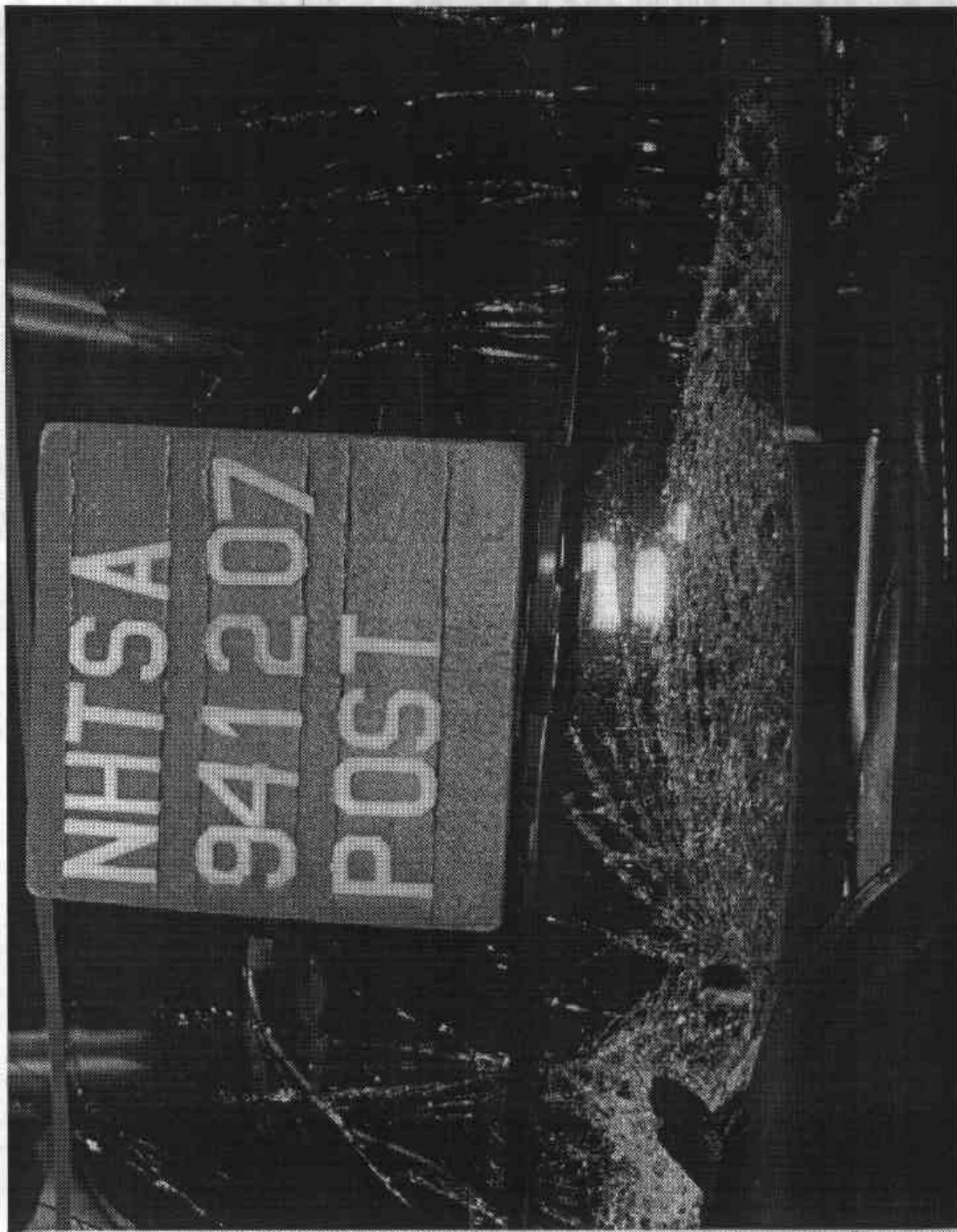


Figure A-50. Post-Test Windshield Retention View
A-51

941207

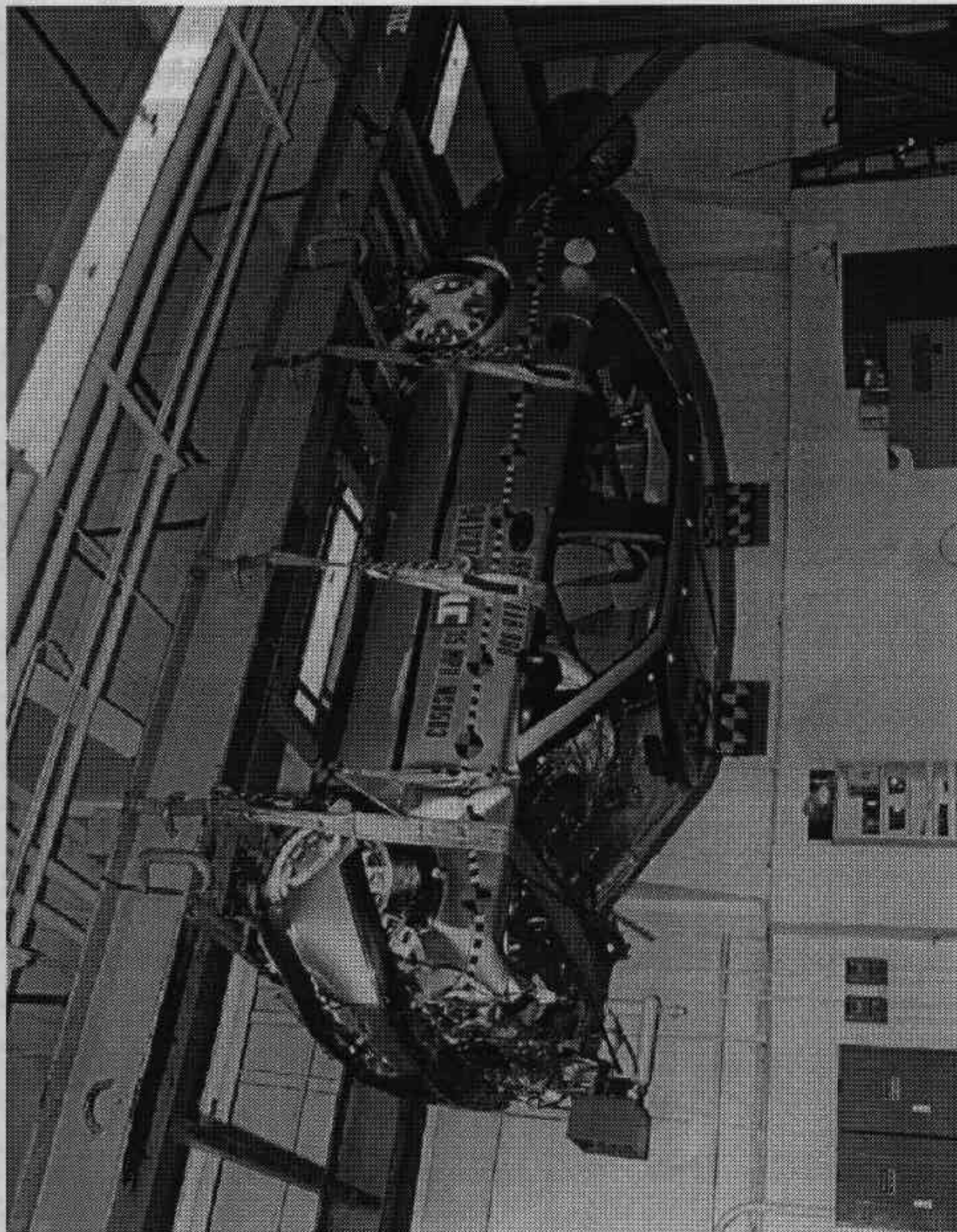


Figure A-51. Post-Test Vehicle on Static Rollover Machine View

A-52

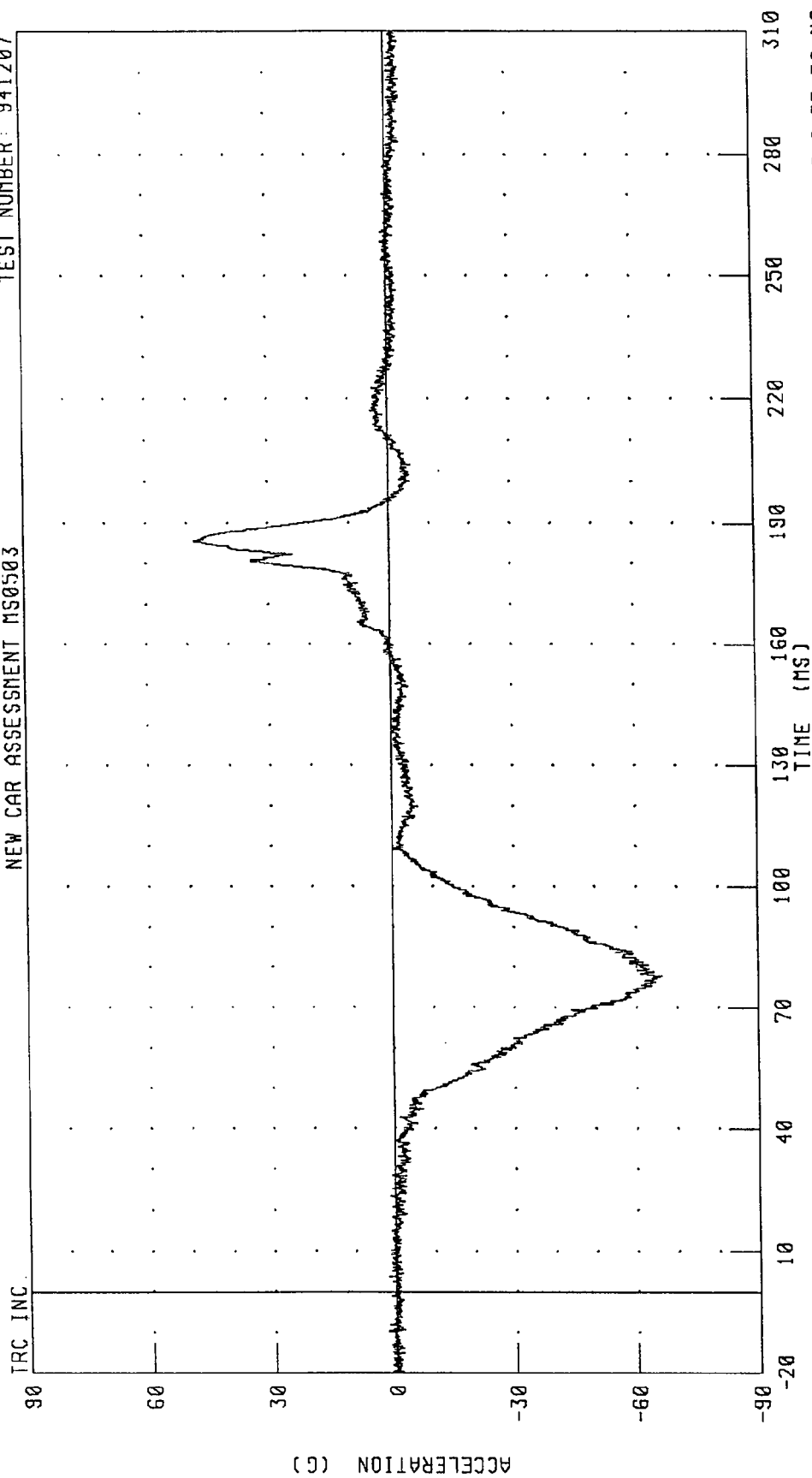
941207

Appendix B

Data Plots

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0503

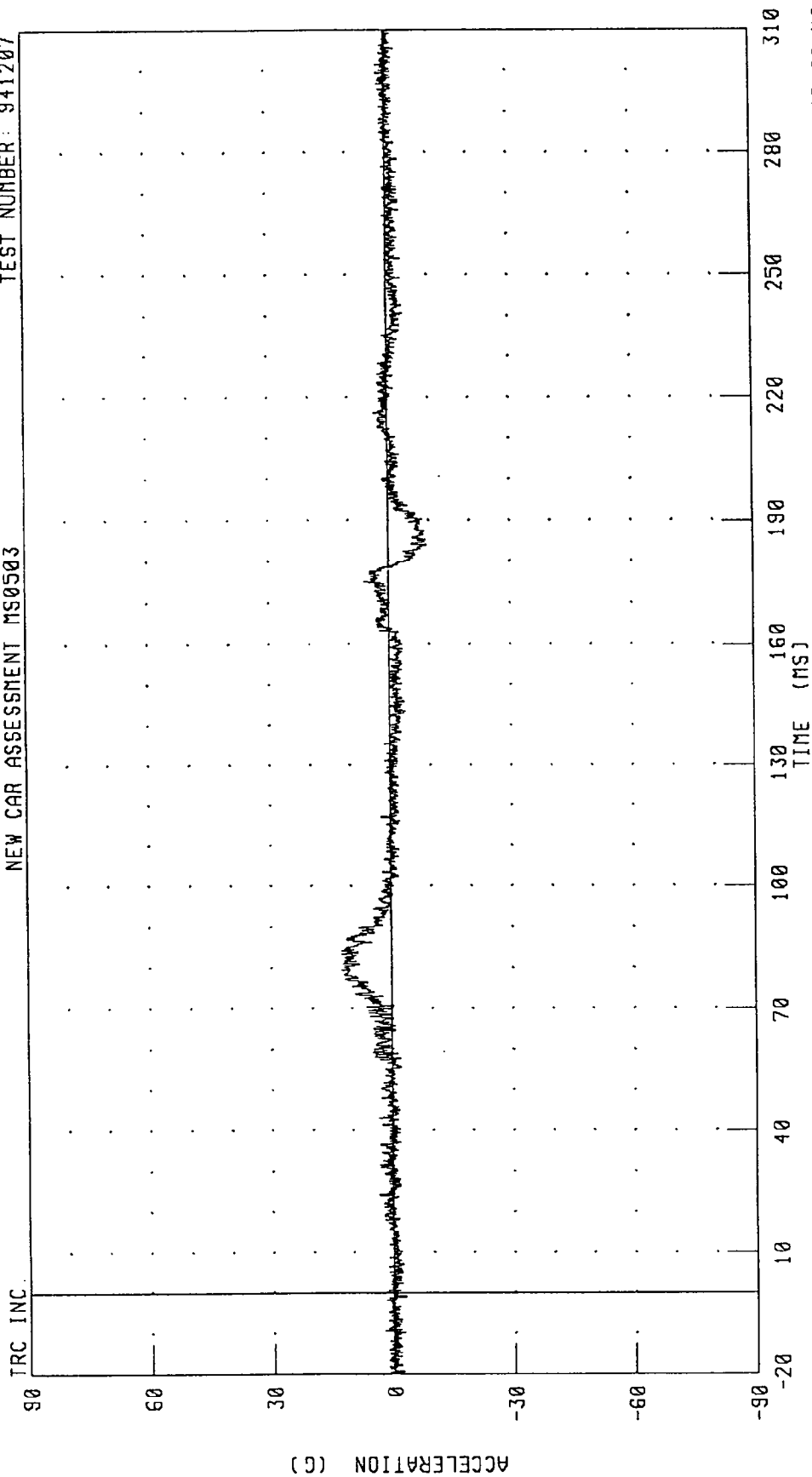
TEST NUMBER: 941207



CHANNEL: HEDXC1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

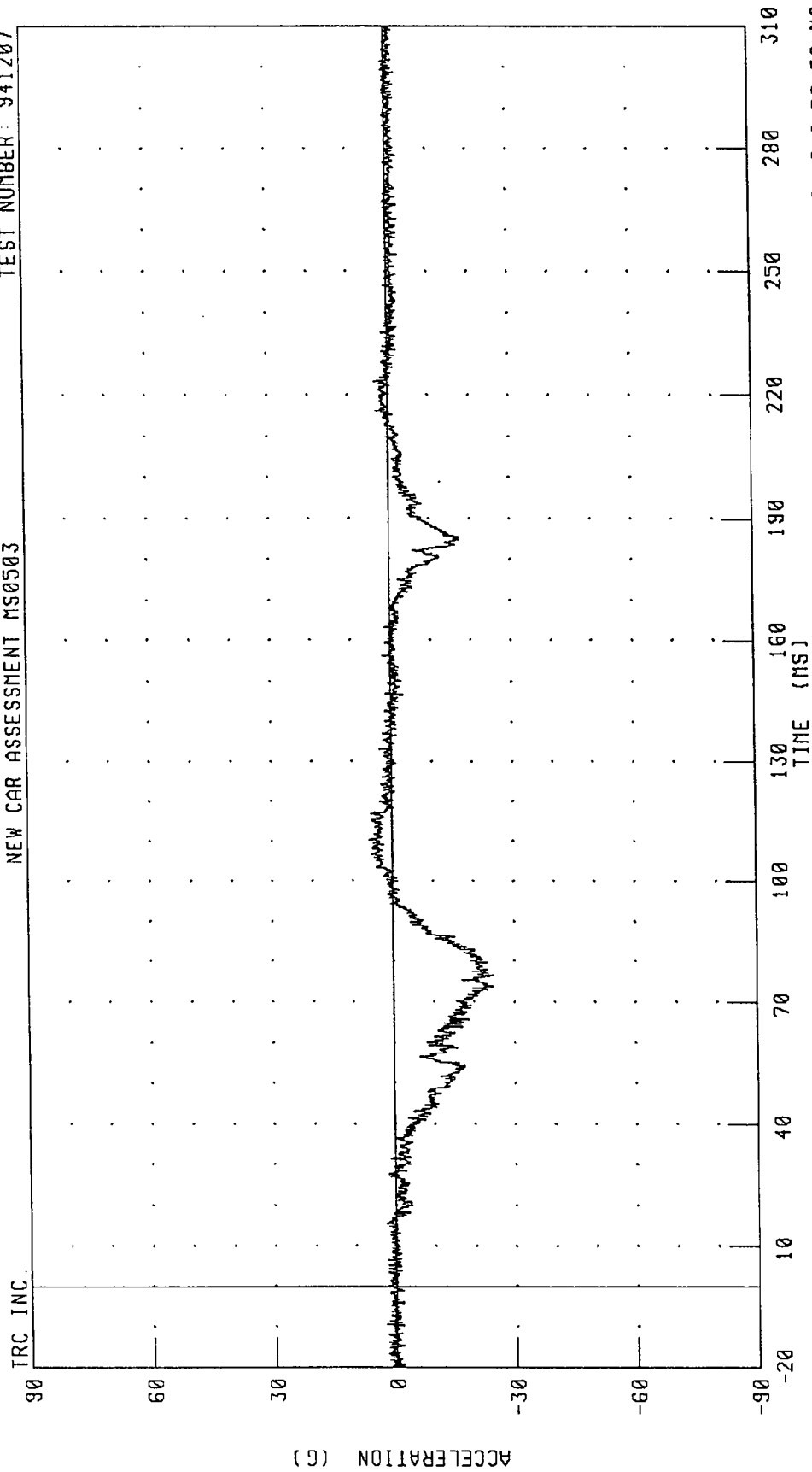


PEAK DATA: 12.58 G @ 83.44 MS; -9.35 G @ 183.92 MS

CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

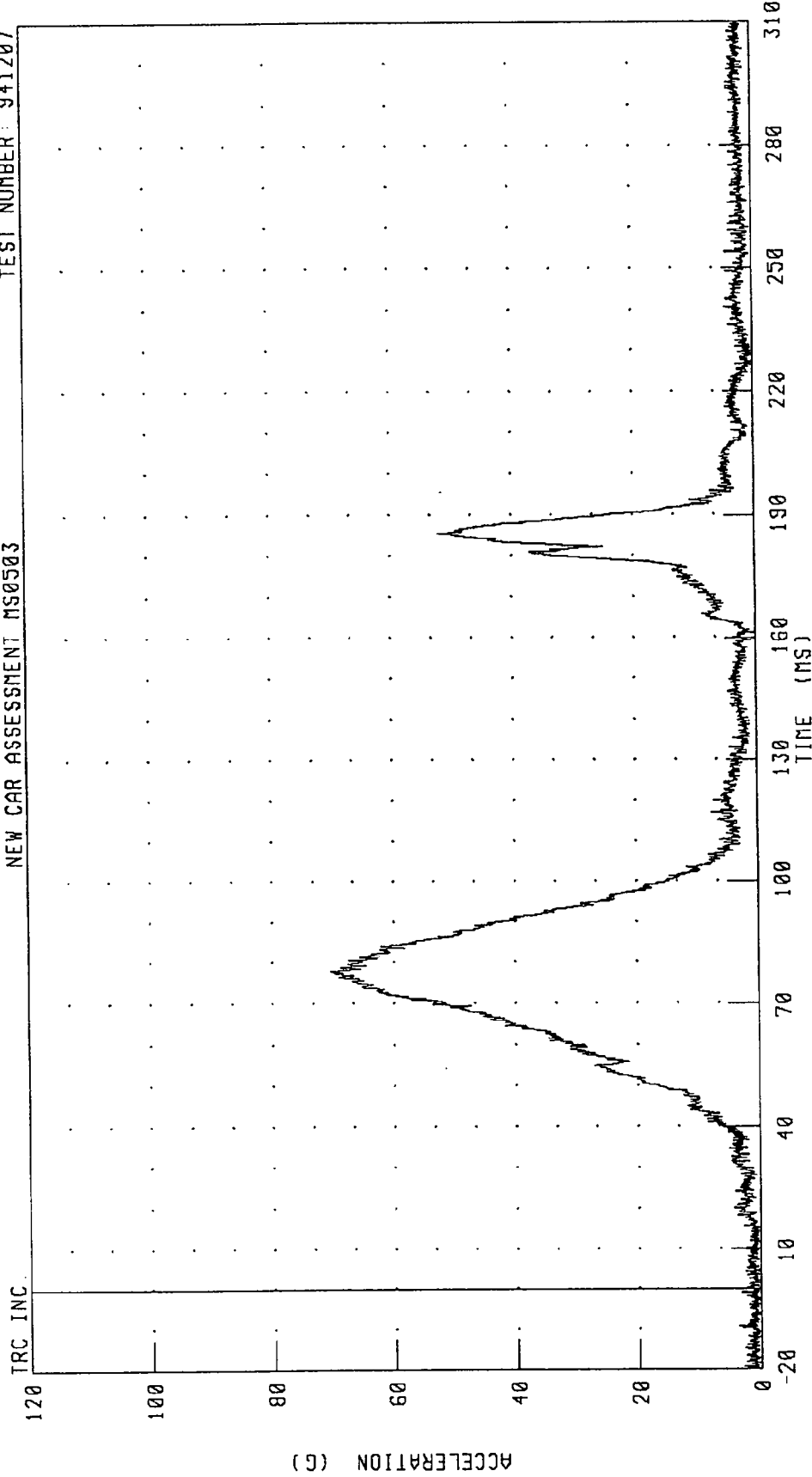
TEST NUMBER: 941207



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

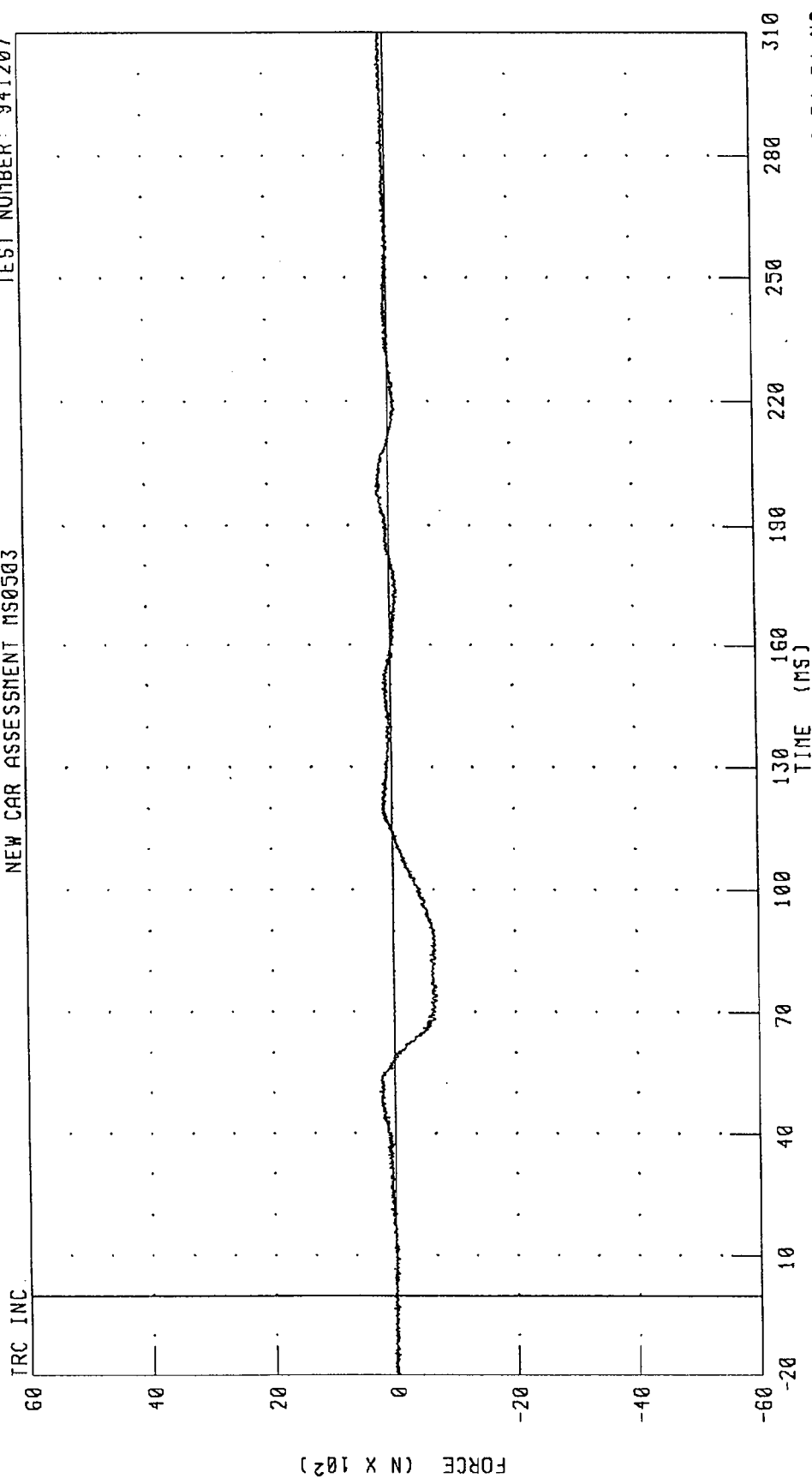


PEAK DATA: 70.55 G @ 77.76 MS; 0.09 G @ -6.00 MS

CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK X-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

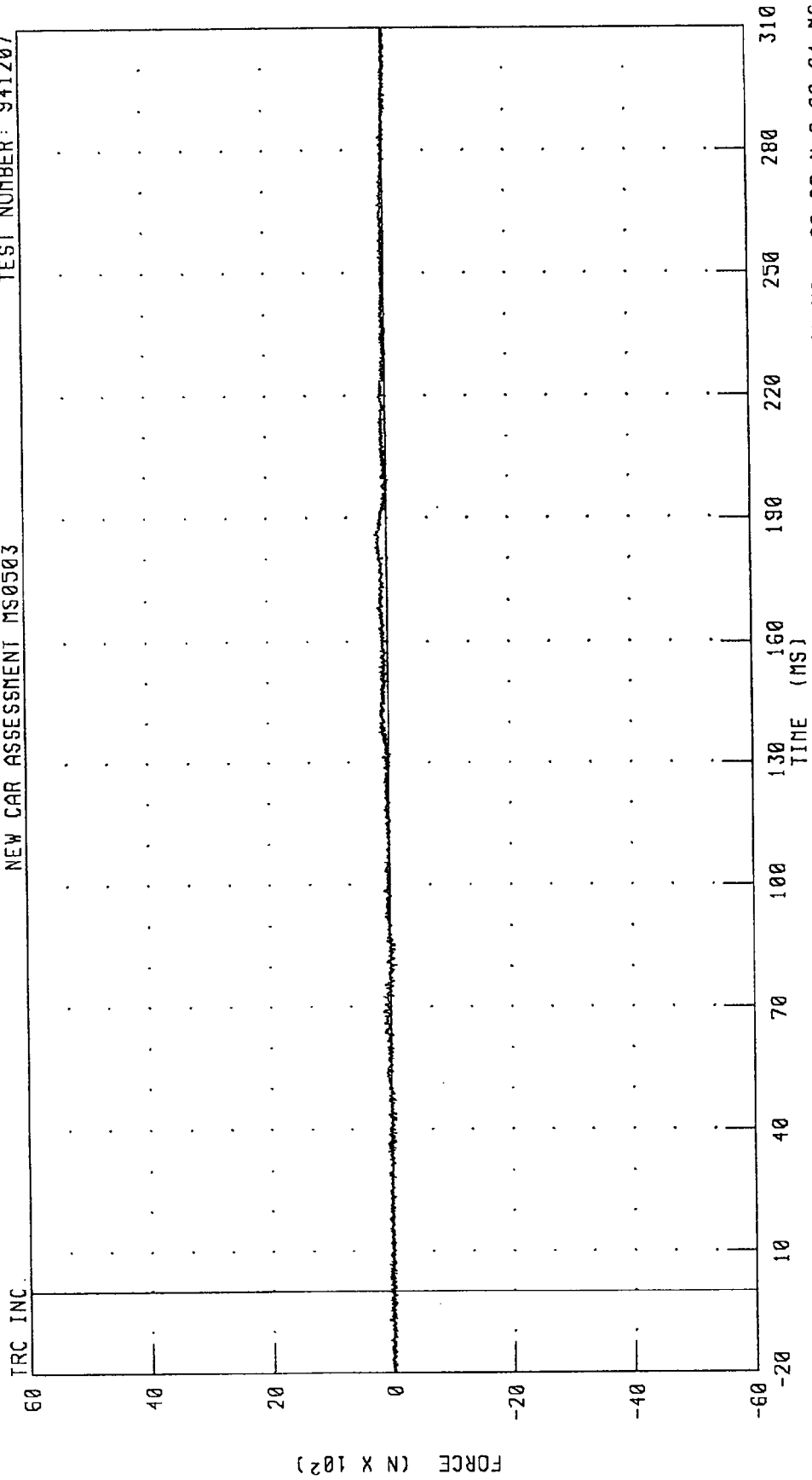


PEAK DATA: 251.26 N @ 50.24 MS; -717.92 N @ 74.24 MS

CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Y-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 208.17 N @ 186.00 MS; -99.26 N @ 80.64 MS

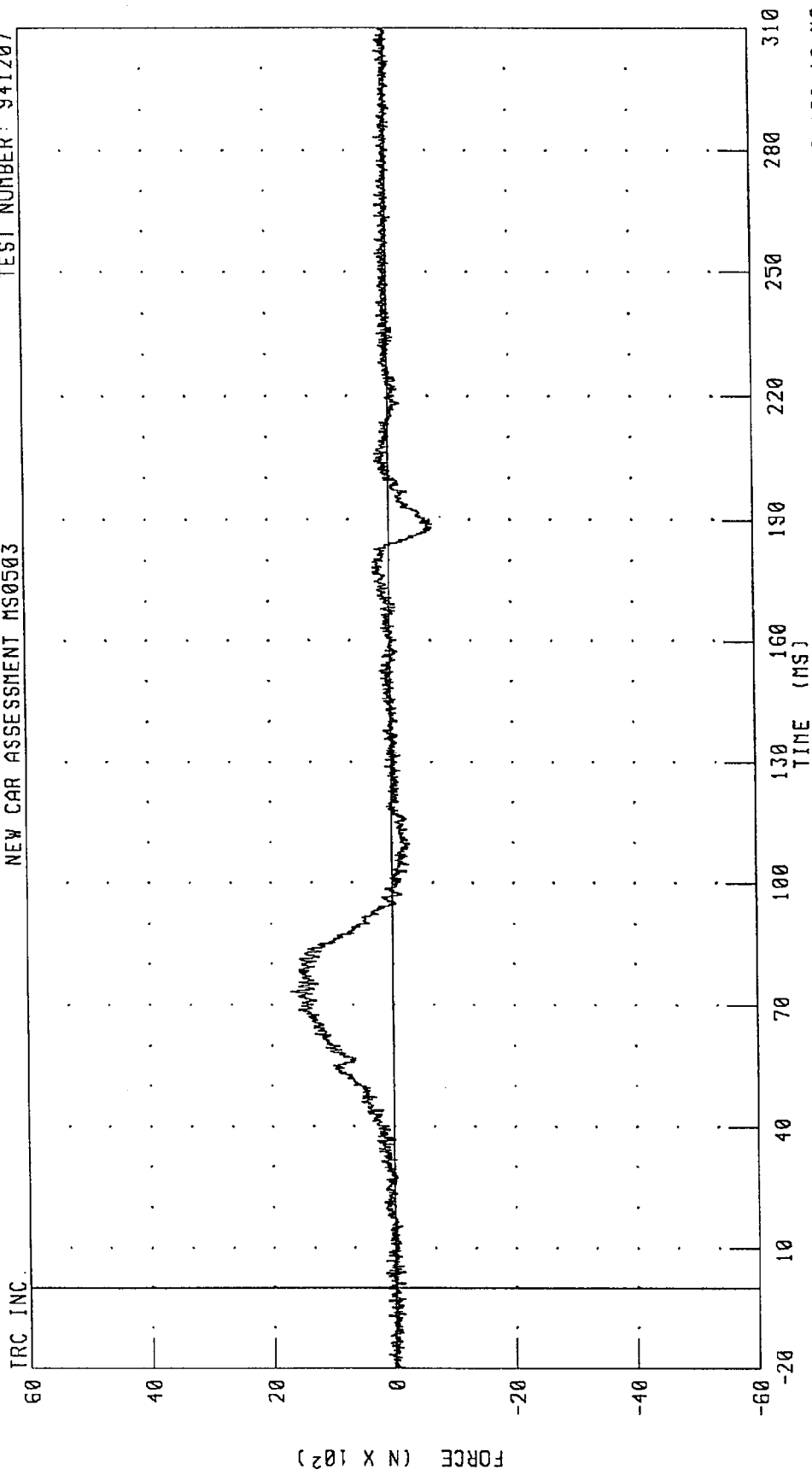
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER

DRIVER NECK Z-AXIS AXIAL FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

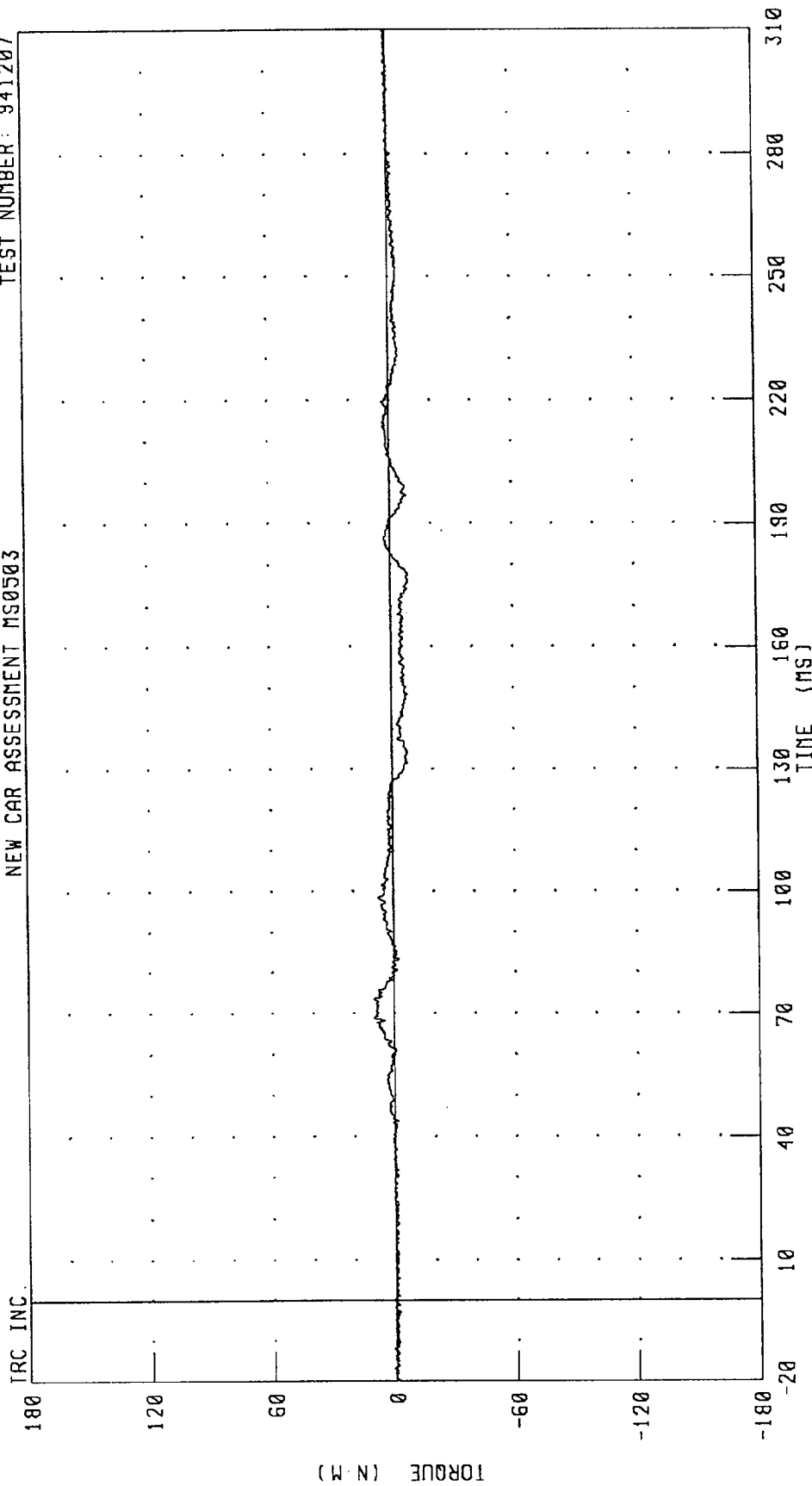


PEAK DATA: 1689.55 N @ 73.20 MS; -702.59 N @ 189.12 MS

CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS
NEW CAR ASSESSMENT MS0503

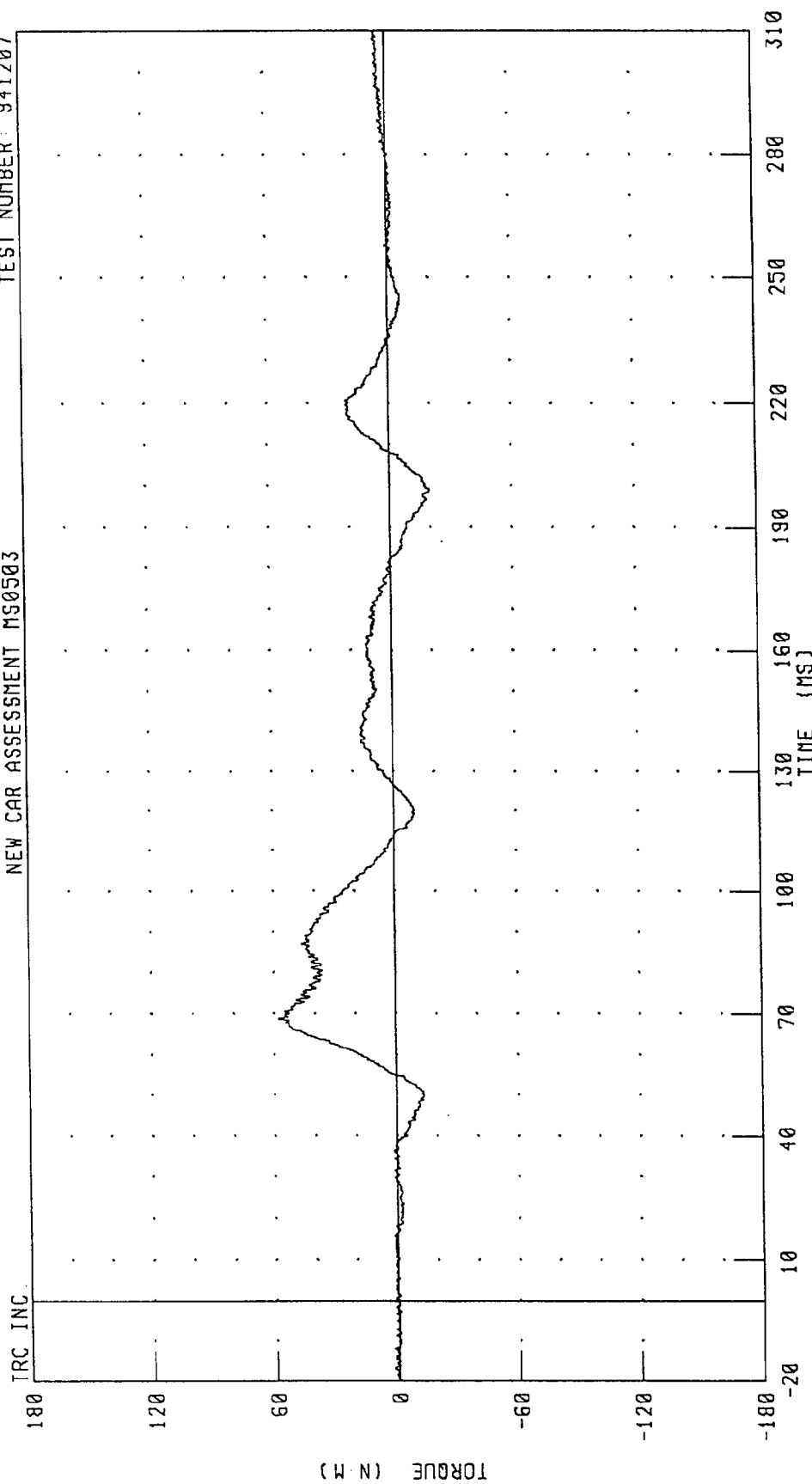
TEST NUMBER: 941207



CHANNEL: NEKXM1 FILTER: CH. CLASS 600

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Y AXIS
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

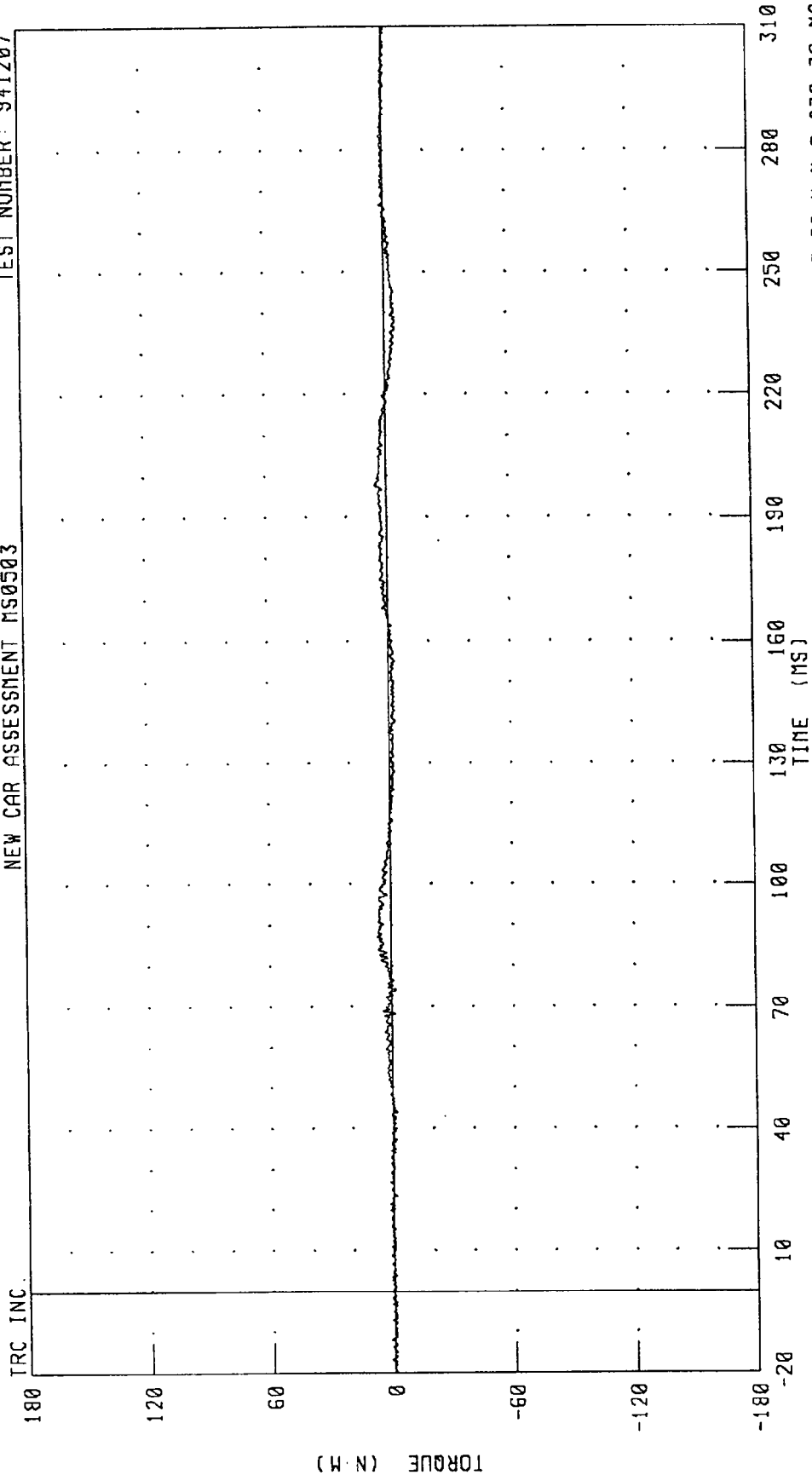


PEAK DATA: 57.74 N·m @ 68.80 ms; -19.76 N·m @ 199.20 ms

CHANNEL: NEKYM1 FILTER: CH. CLASS 600

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Z AXIS
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

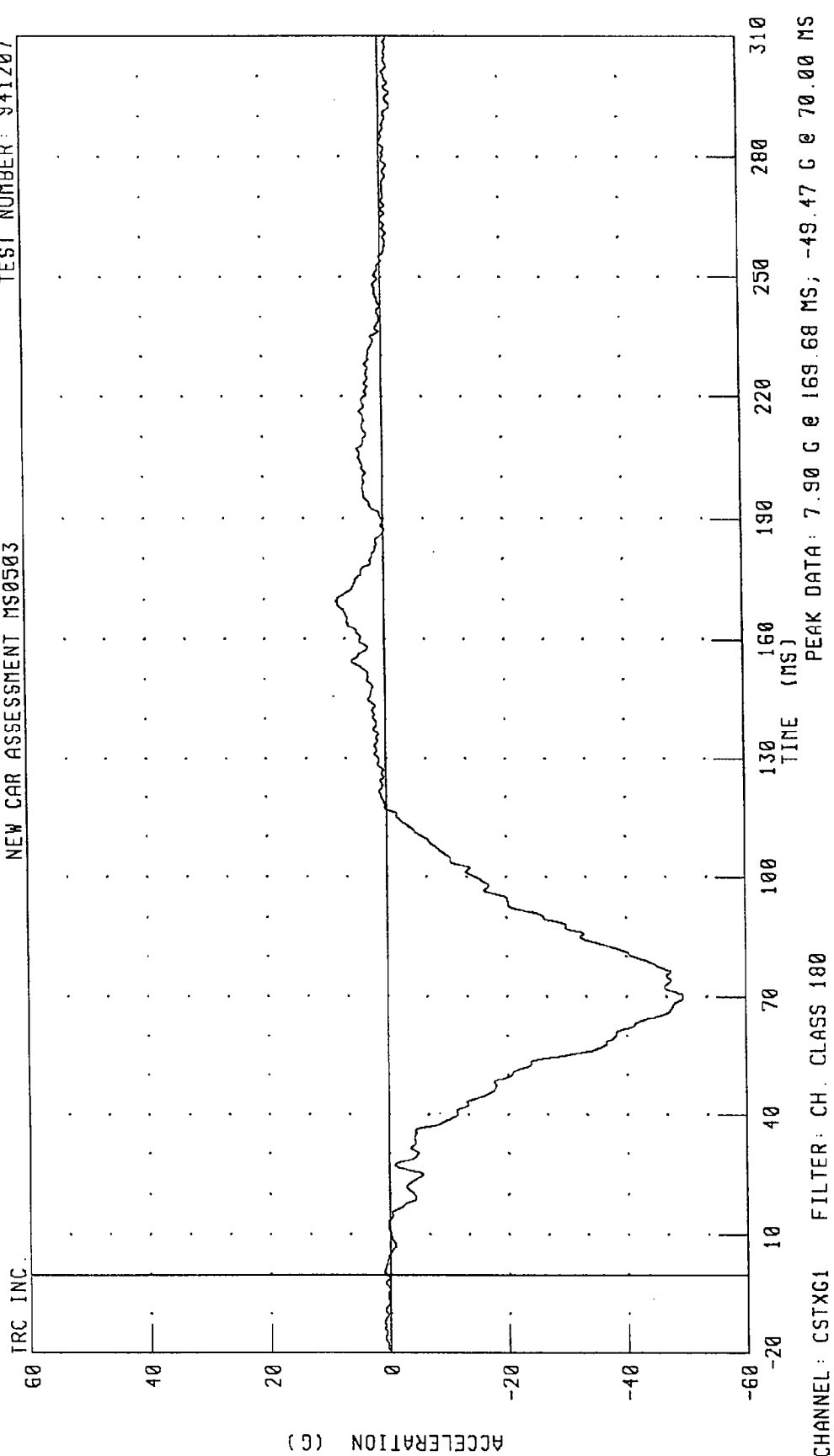


CHANNEL: NEKZM1 FILTER: CH. CLASS 600

PEAK DATA: 7.22 N.M @ 87.20 MS; -5.22 N.M @ 236.32 MS

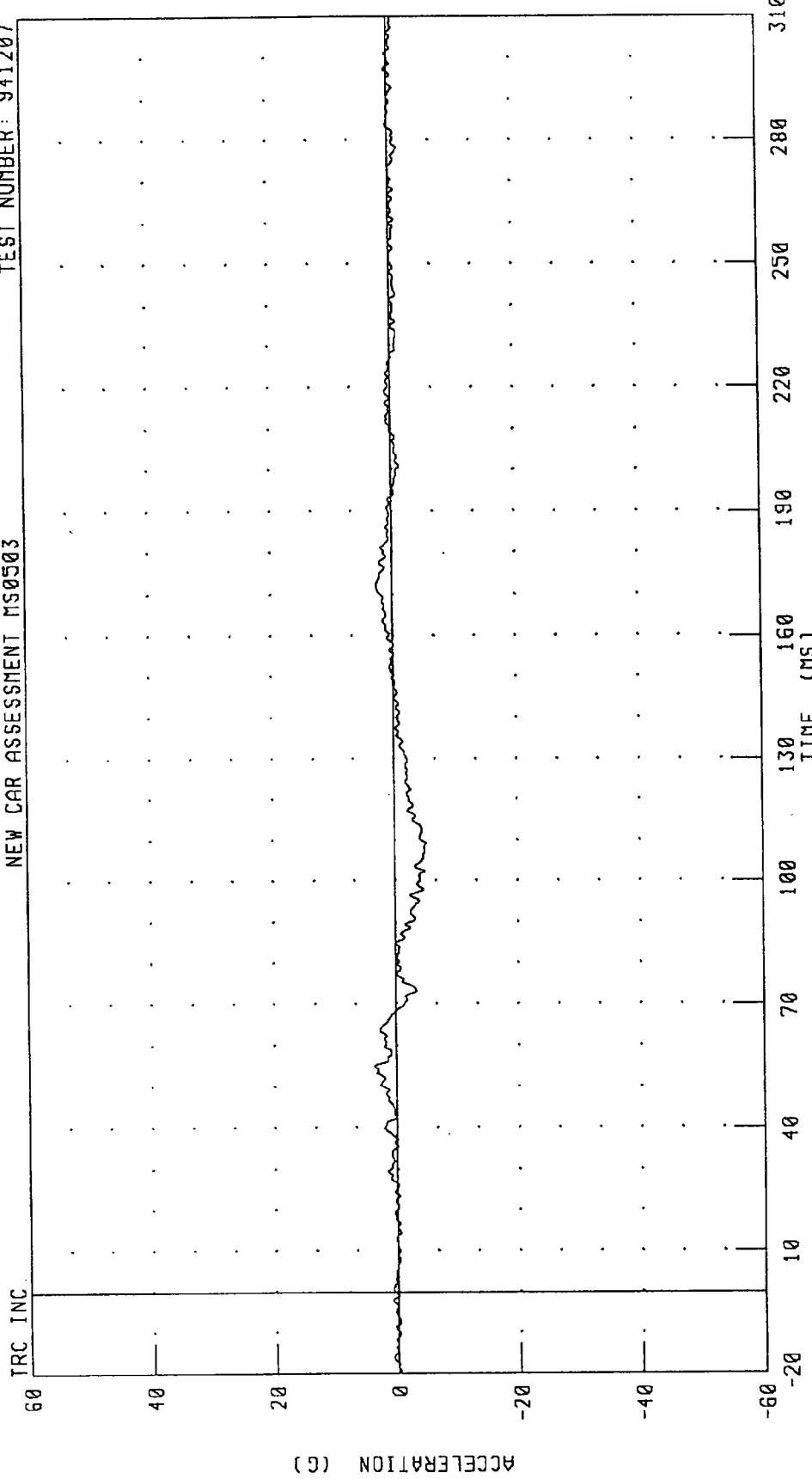
1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

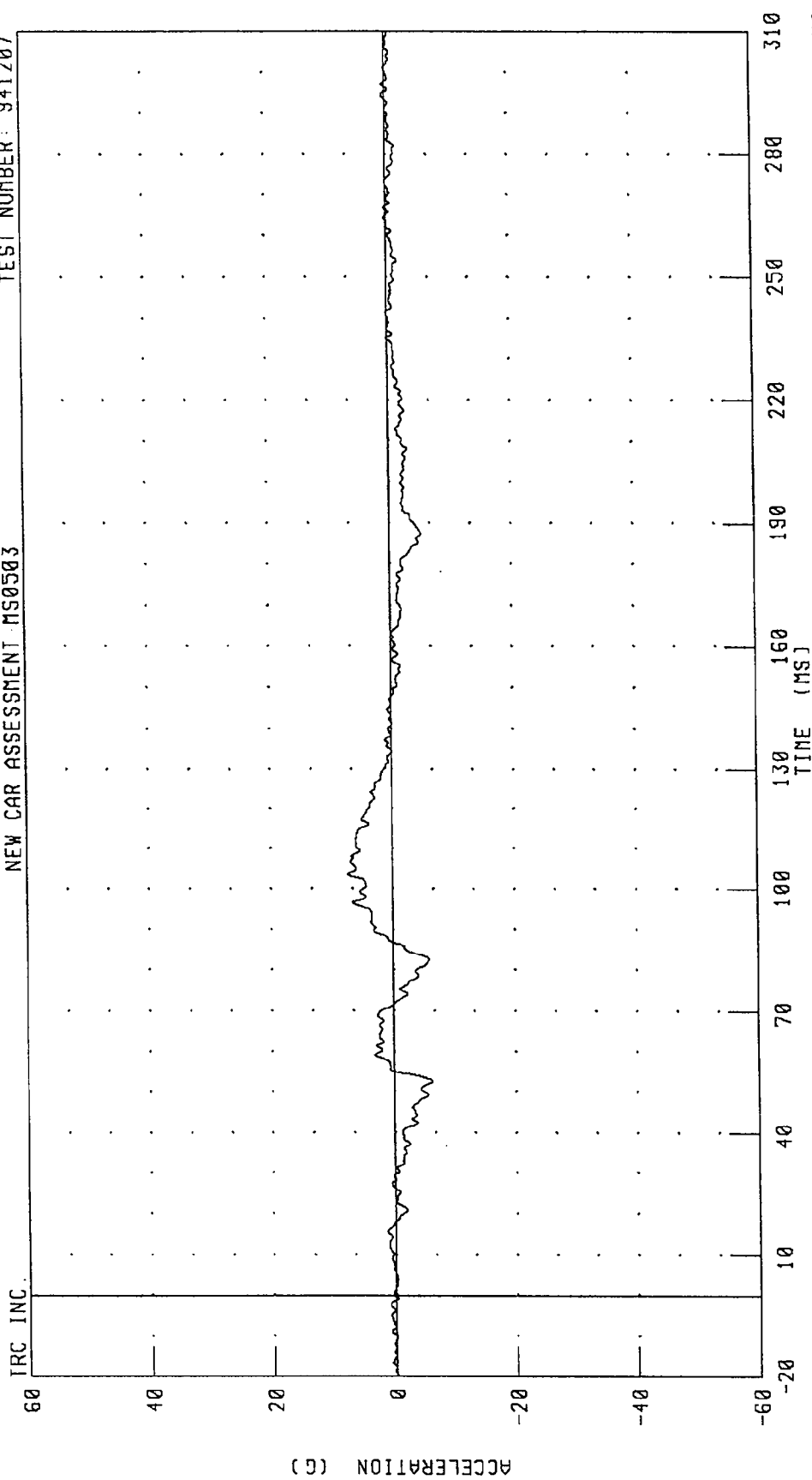


PEAK DATA: 3.58 G @ 55.04 MS; -5.05 G @ 109.20 MS

CHANNEL: CSTYG1 FILTER: CH. CLASS 180

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

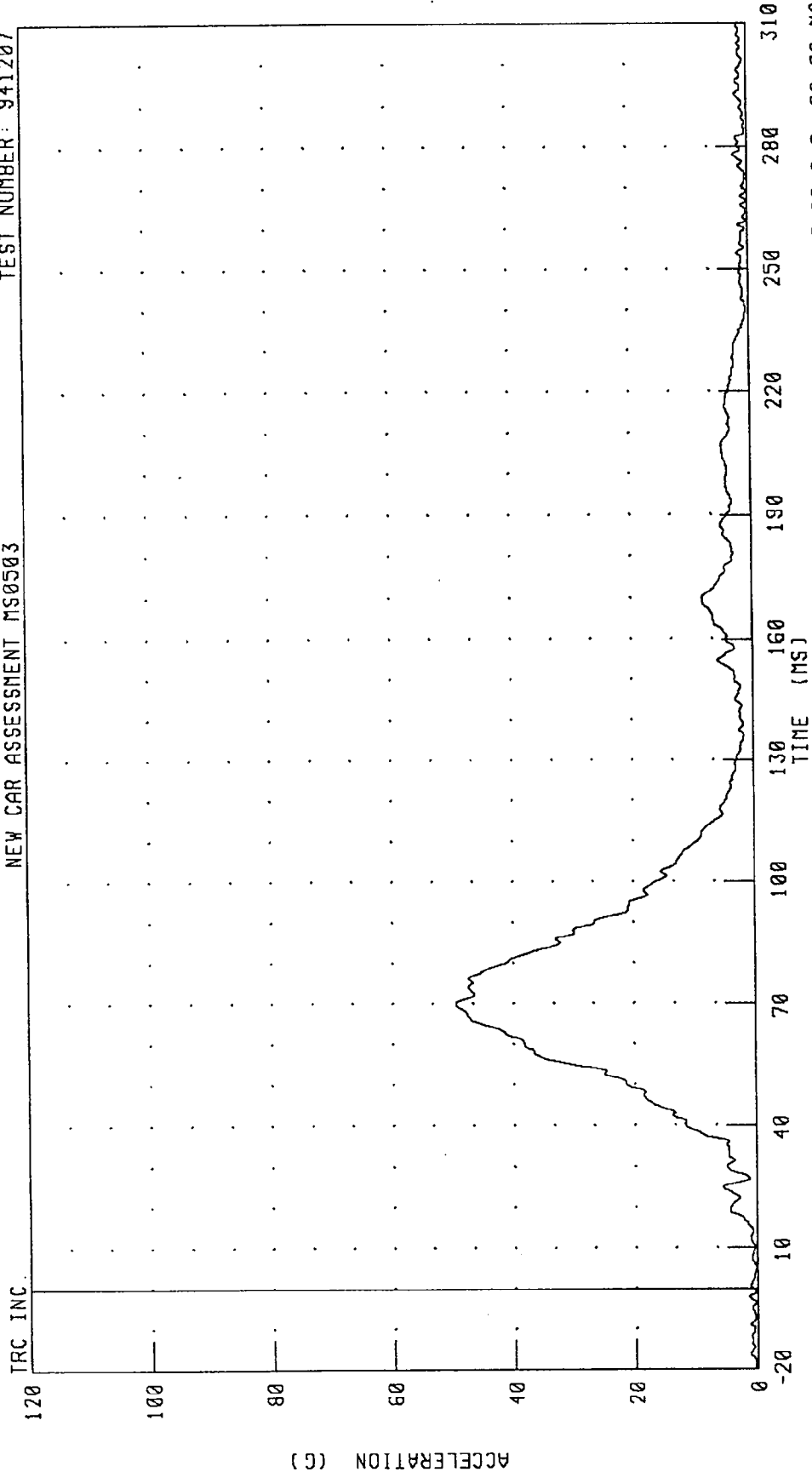


CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 7.39 G @ 103.52 MS; -6.32 G @ 52.48 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

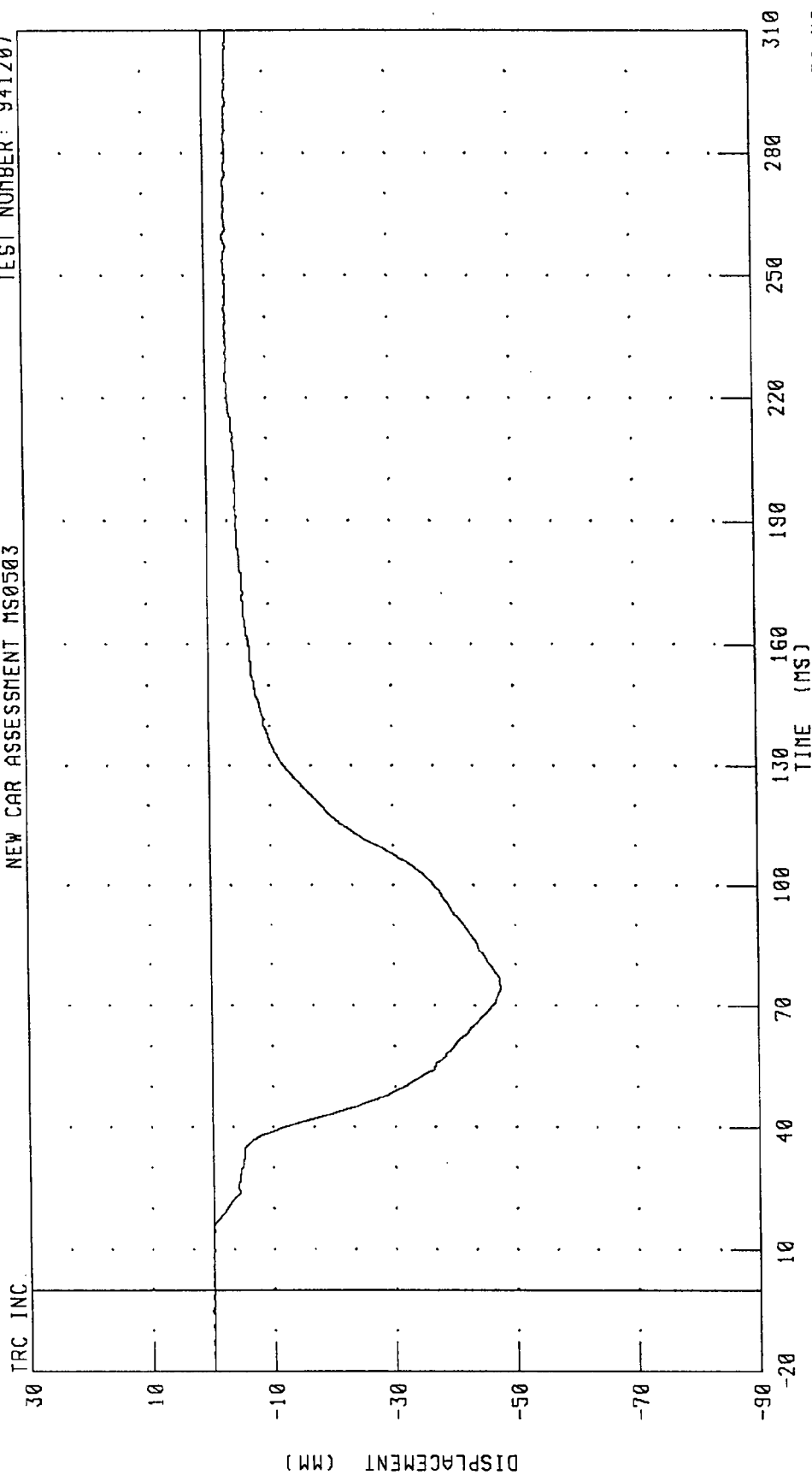
PEAK DATA: 49.54 G @ 70.00 MS; 0.08 G @ -20.00 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER

DRIVER CHEST DEFLECTION

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

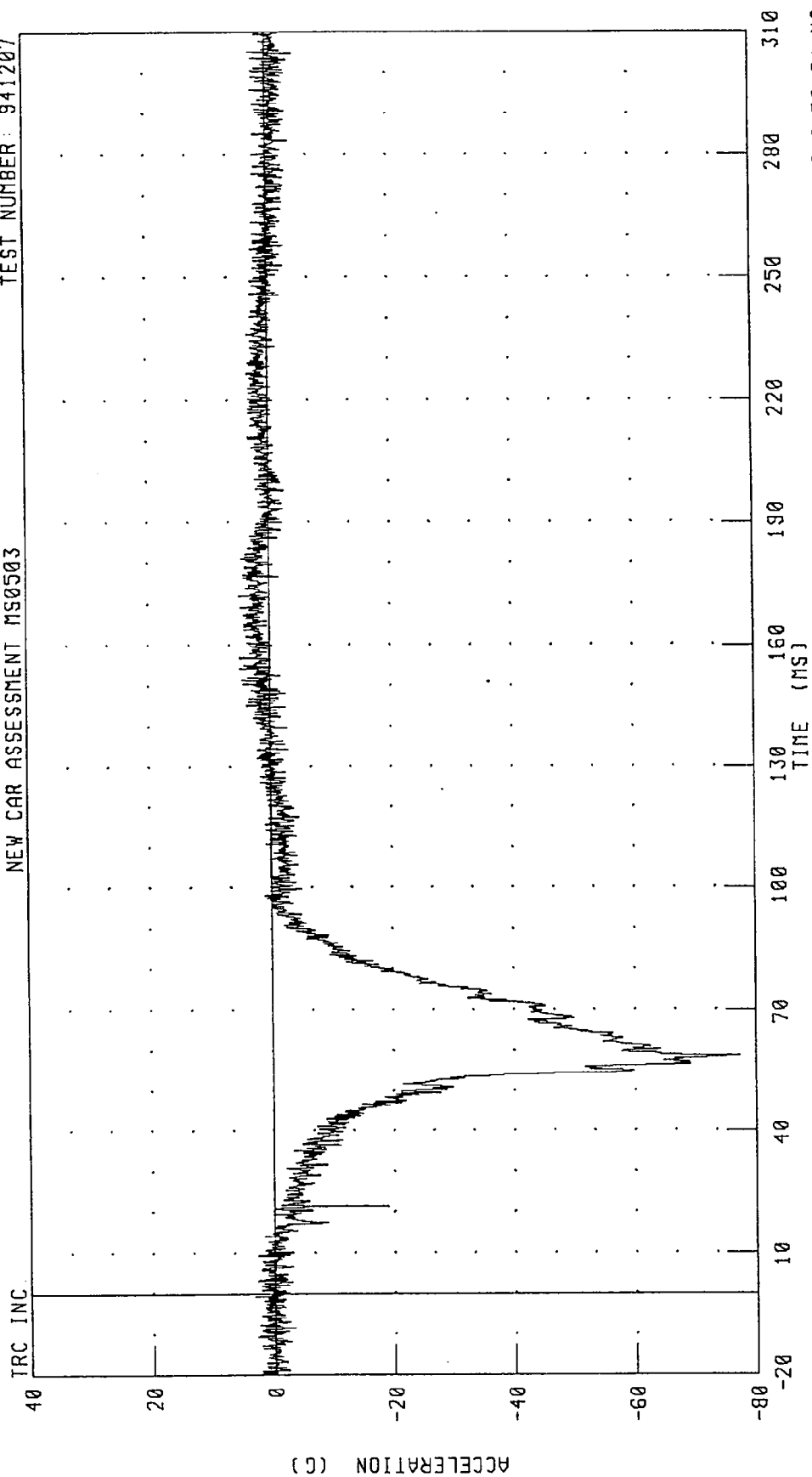


PEAK DATA: 0.26 MM @ -5.12 MS; -47.58 MM @ 74.32 MS

CHANNEL: CSTXD1 FILTER: CH. CLASS 180

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

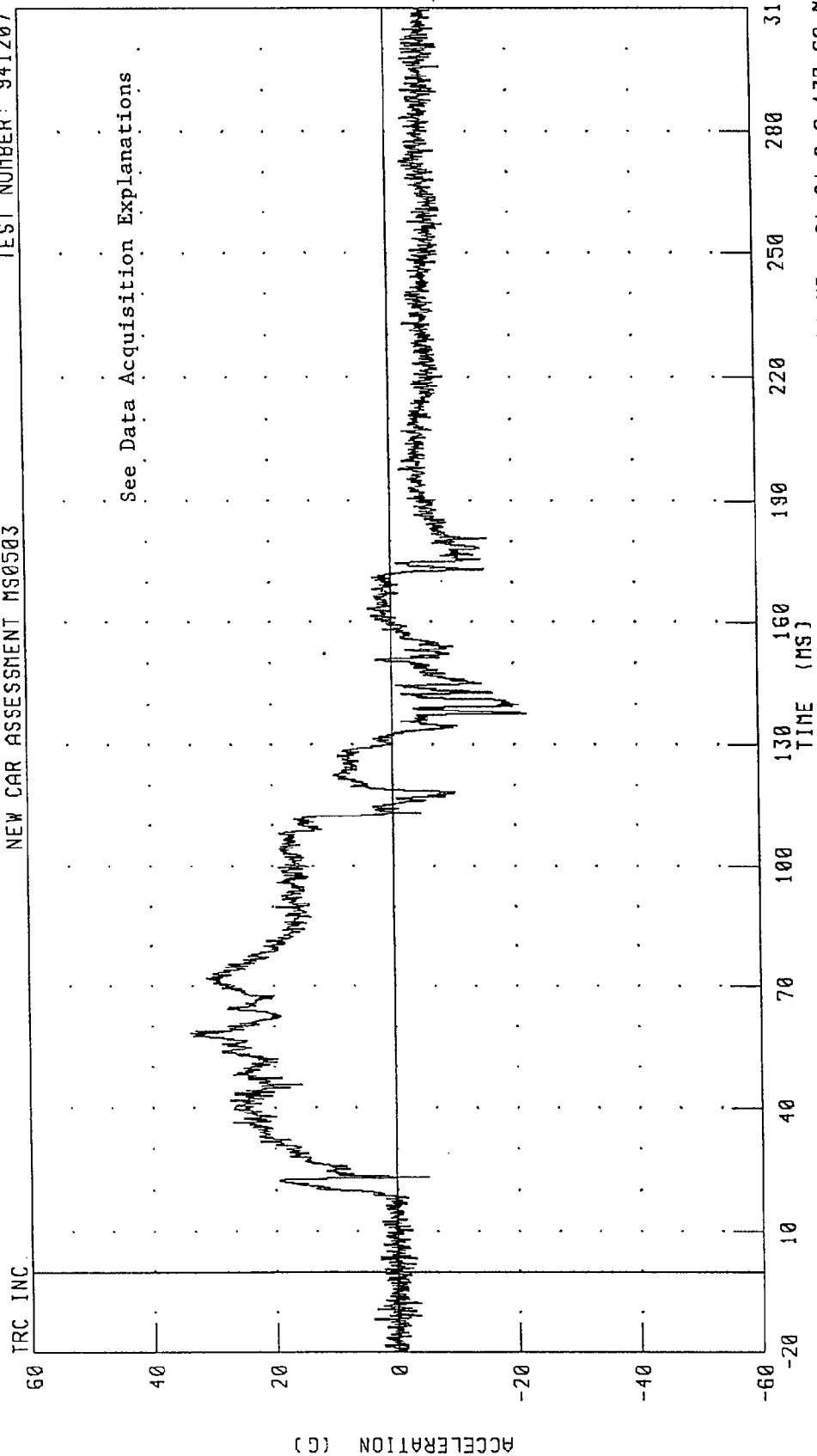


CHANNEL: PEVXG1 FILTER: CH CLASS 1000

PEAK DATA: 5.04 G @ 172.00 MS; -77.15 G @ 58.64 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT M80503

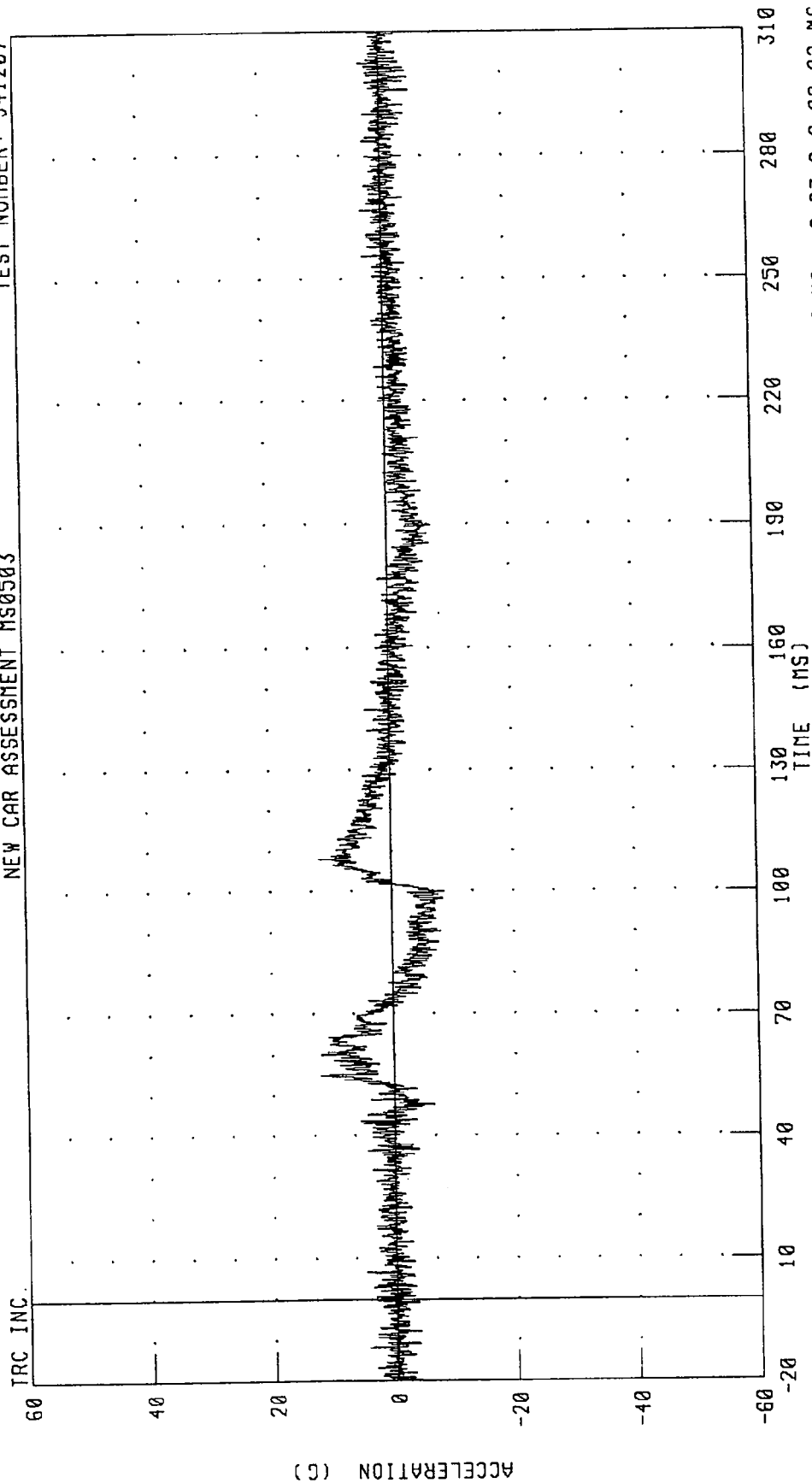
TEST NUMBER: 941207



CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

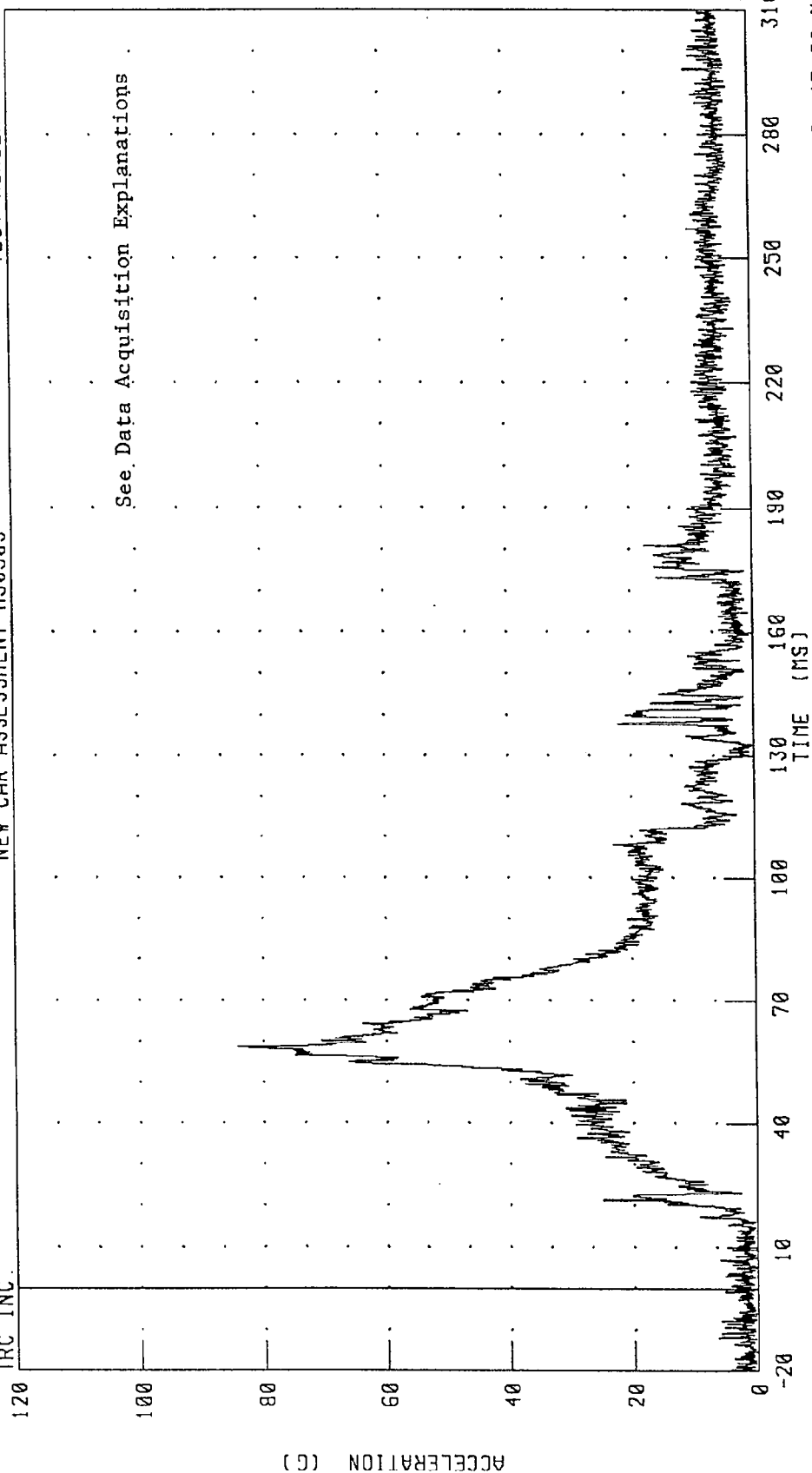


CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS RESULTANT ACCELERATION
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

TRC INC.



CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

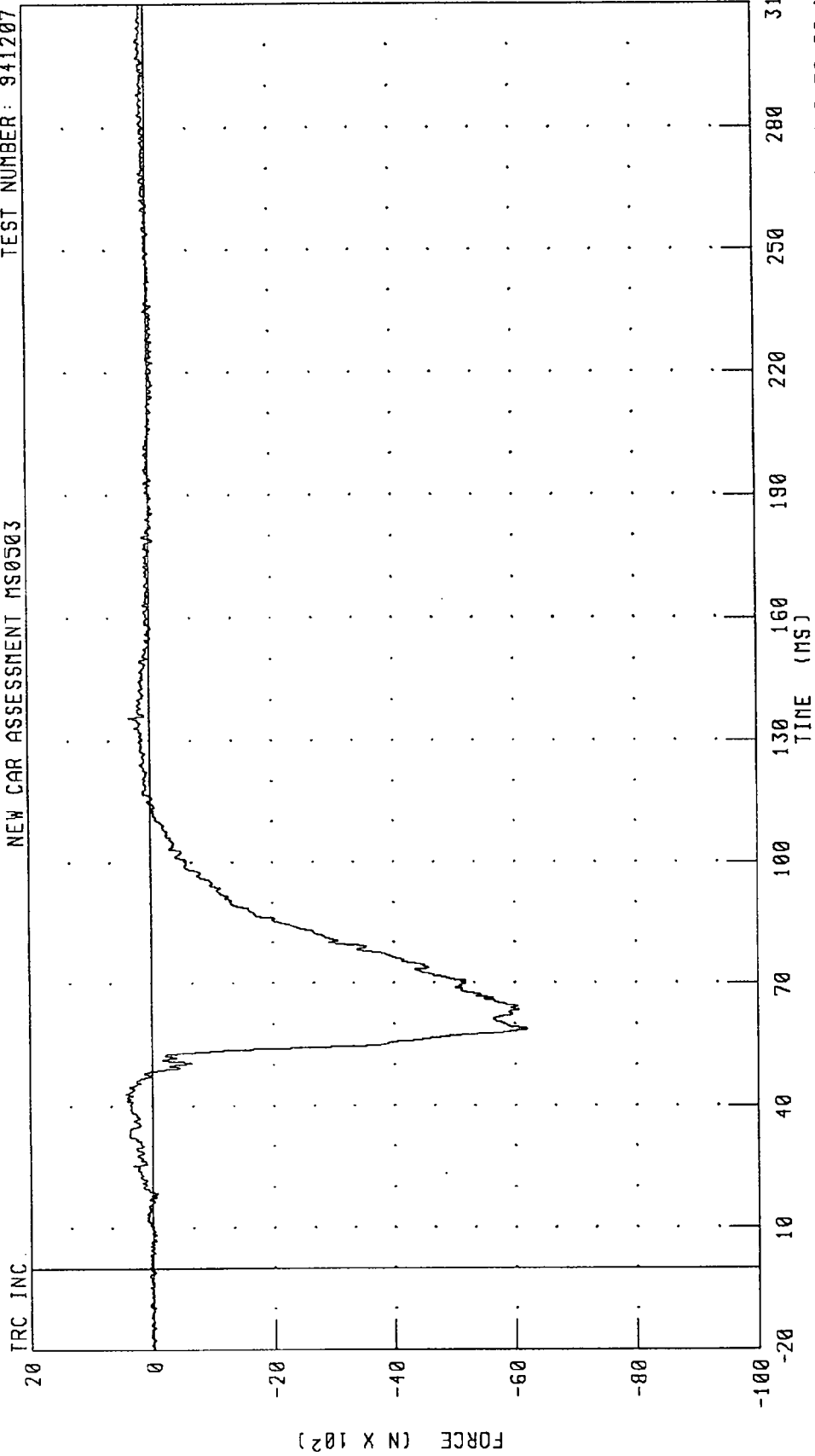
PEAK DATA: 84.22 G @ 58.72 MS; 0.06 G @ -15.20 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER

DRIVER LEFT FEMUR FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

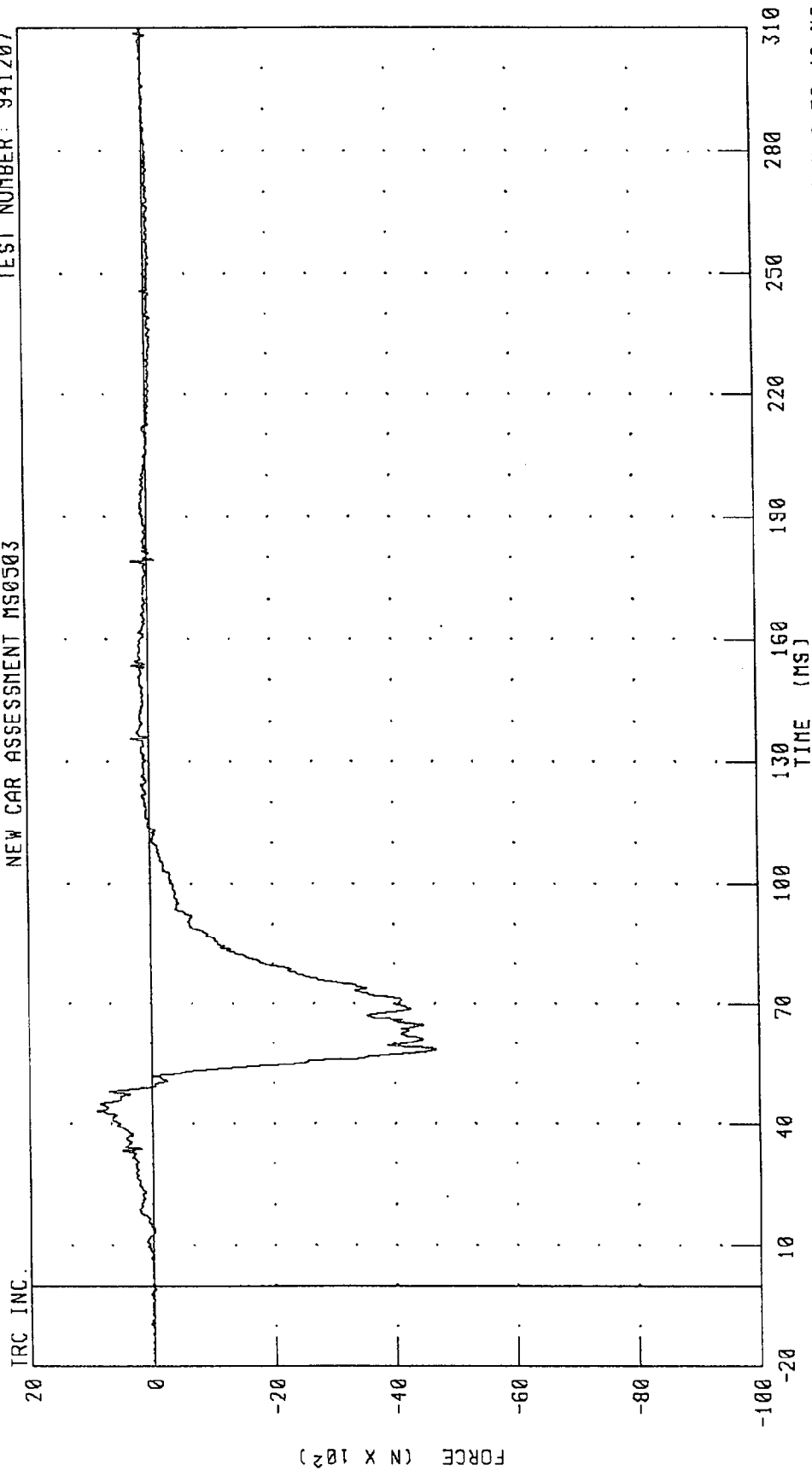


CHANNEL: LFMF1 FILTER: CH CLASS 600

PEAK DATA: 433.99 N @ 43.12 MS; -6205.81 N @ 58.80 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 DRIVER RIGHT FEMUR FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

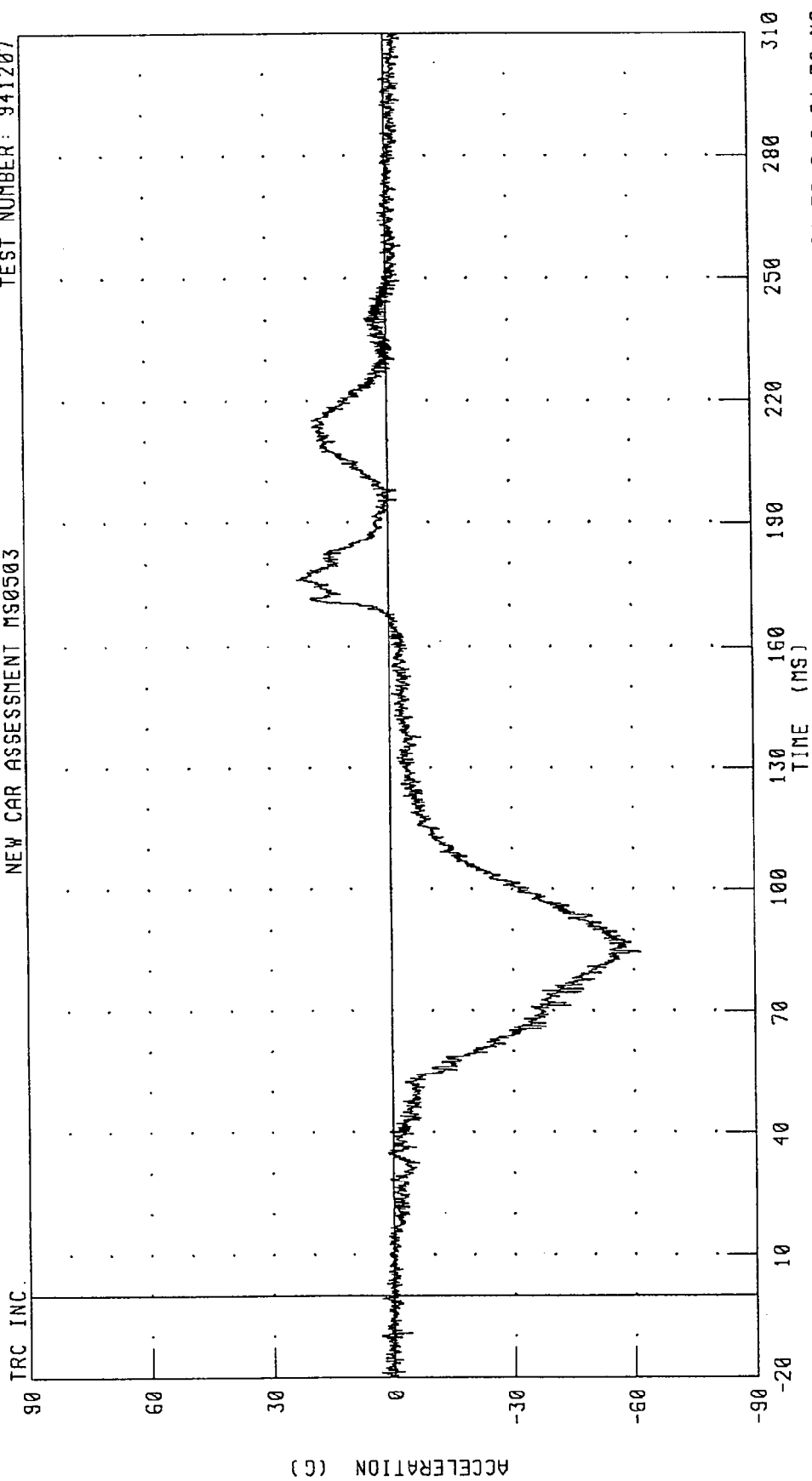


CHANNEL: RFMFI FILTER: CH. CLASS 600

PEAK DATA: 901.22 N @ 43.20 MS; -4669.41 N @ 58.40 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 22.75 G @ 176.16 MS; -61.70 G @ 84.72 MS

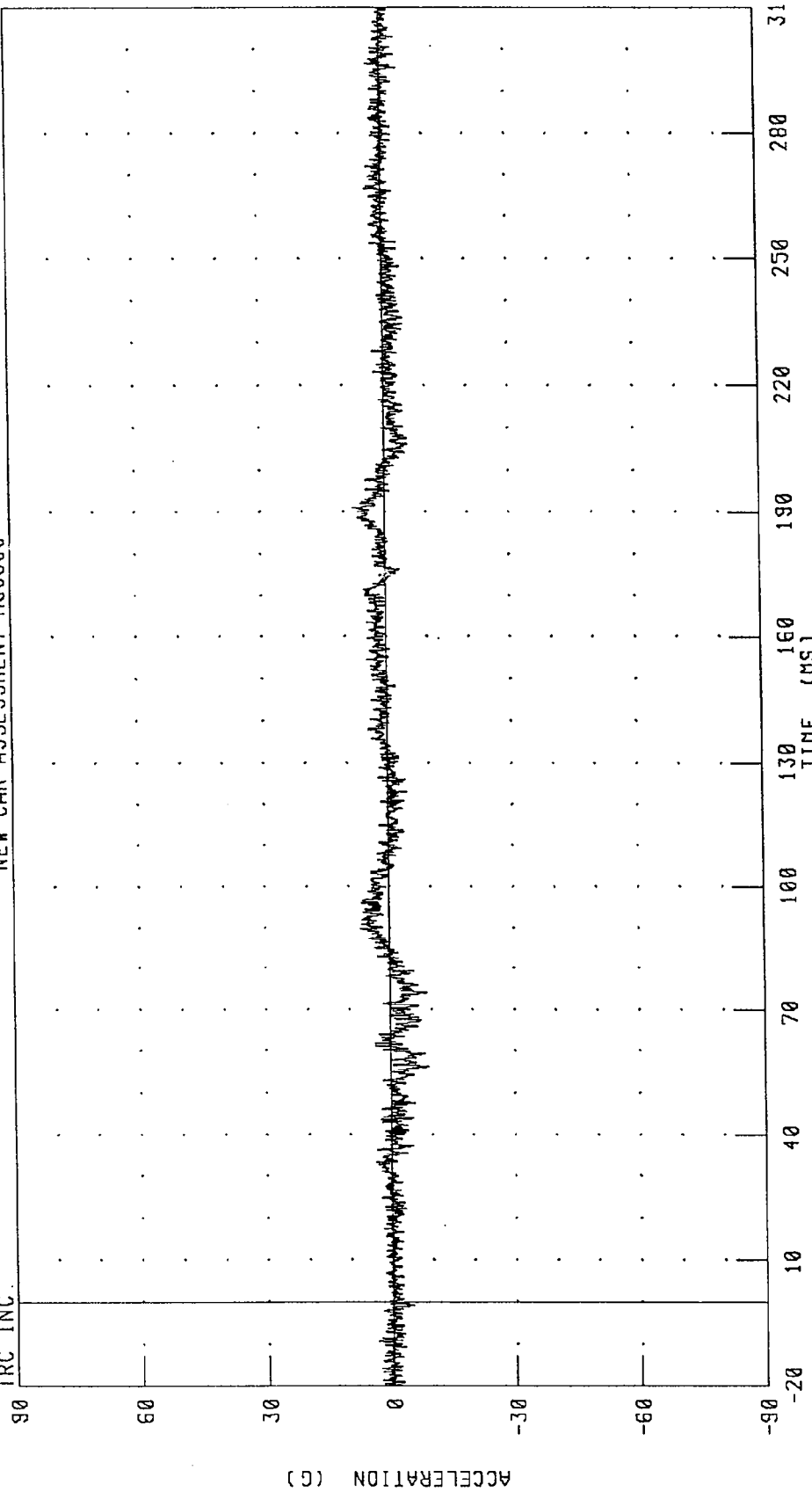
CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.

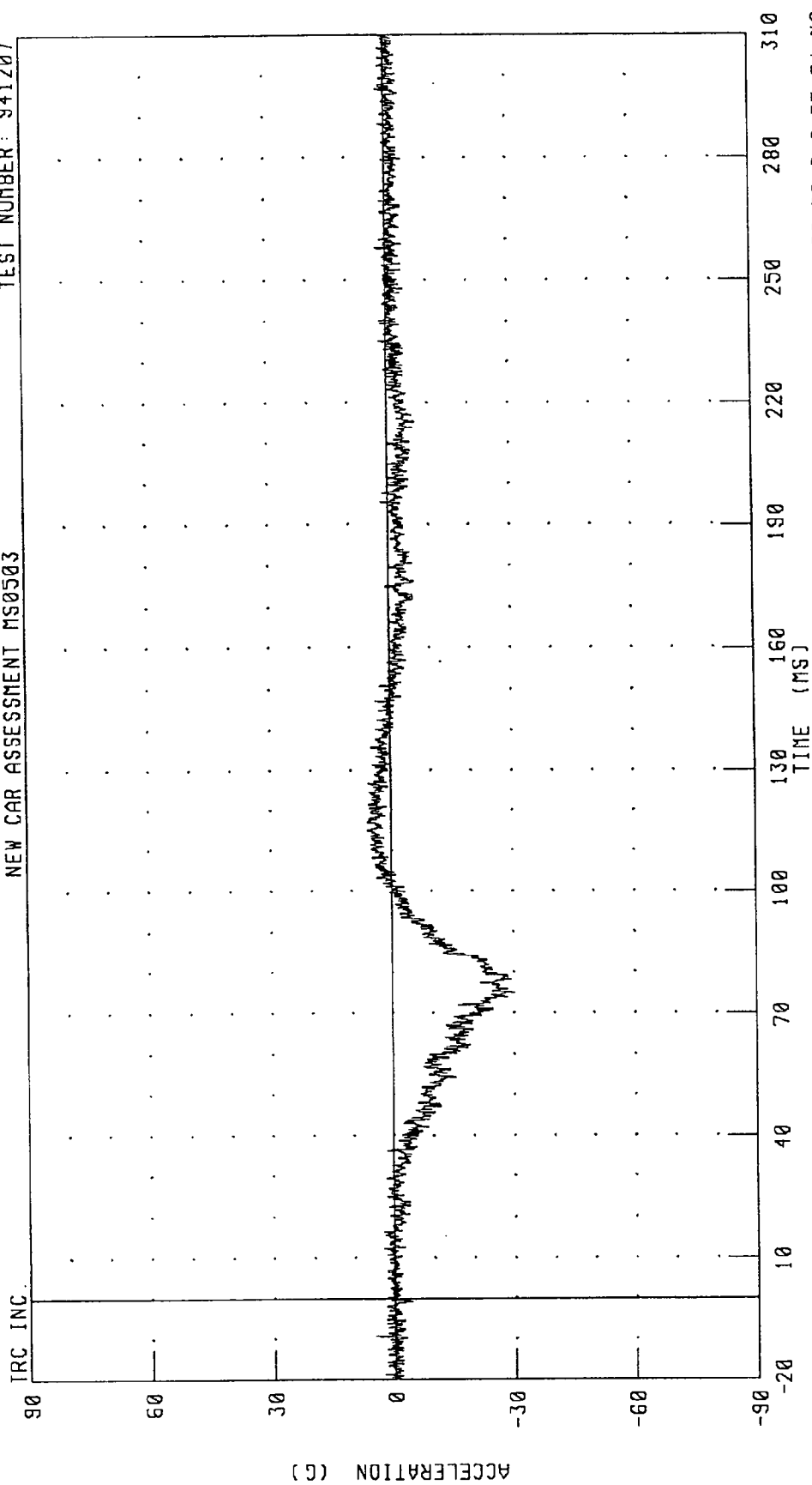


CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

PEAK DATA: 7.86 G @ 191.12 MS; -9.06 G @ 56.24 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

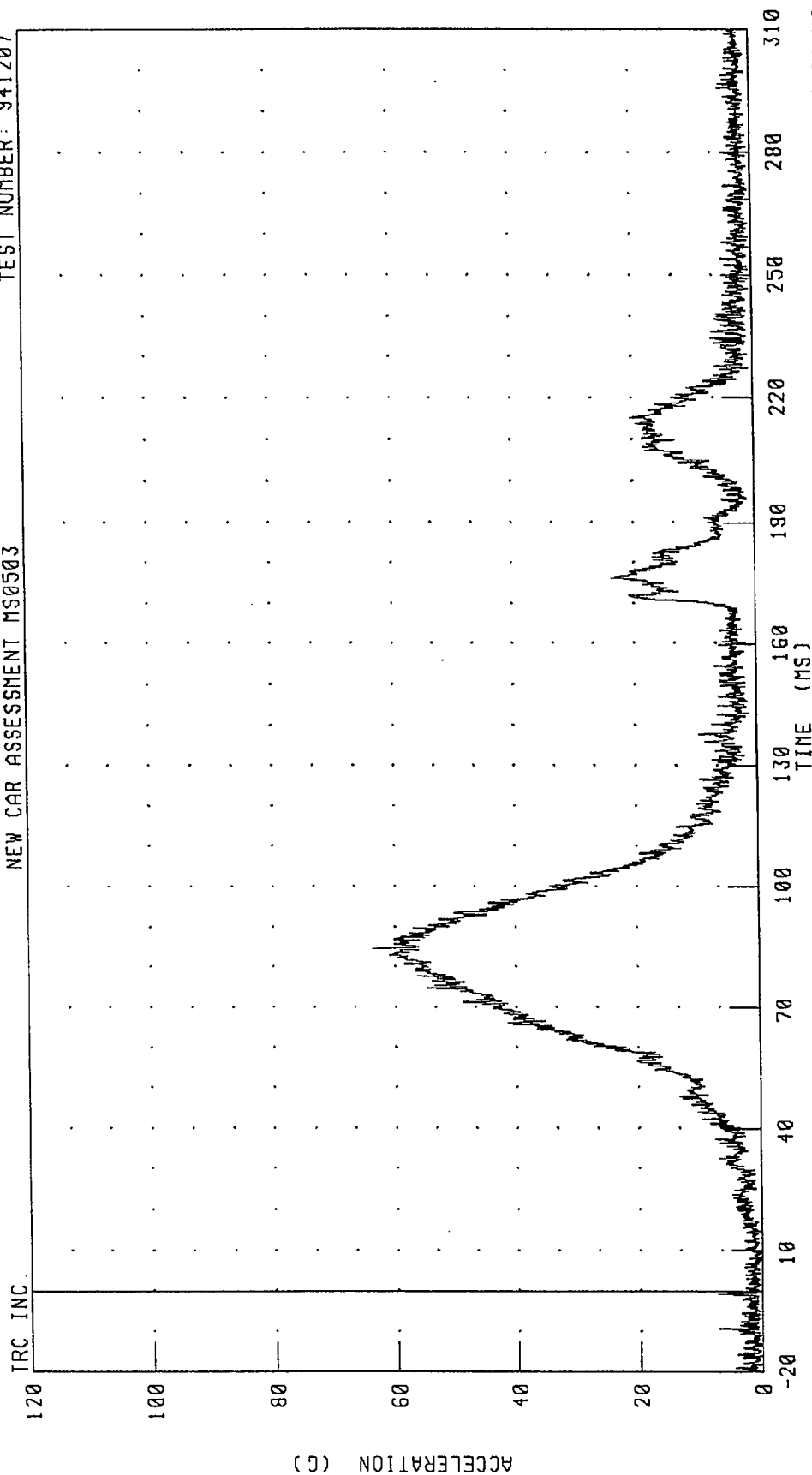


PEAK DATA: 5.90 G @ 114.88 MS; -30.30 G @ 75.04 MS

CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

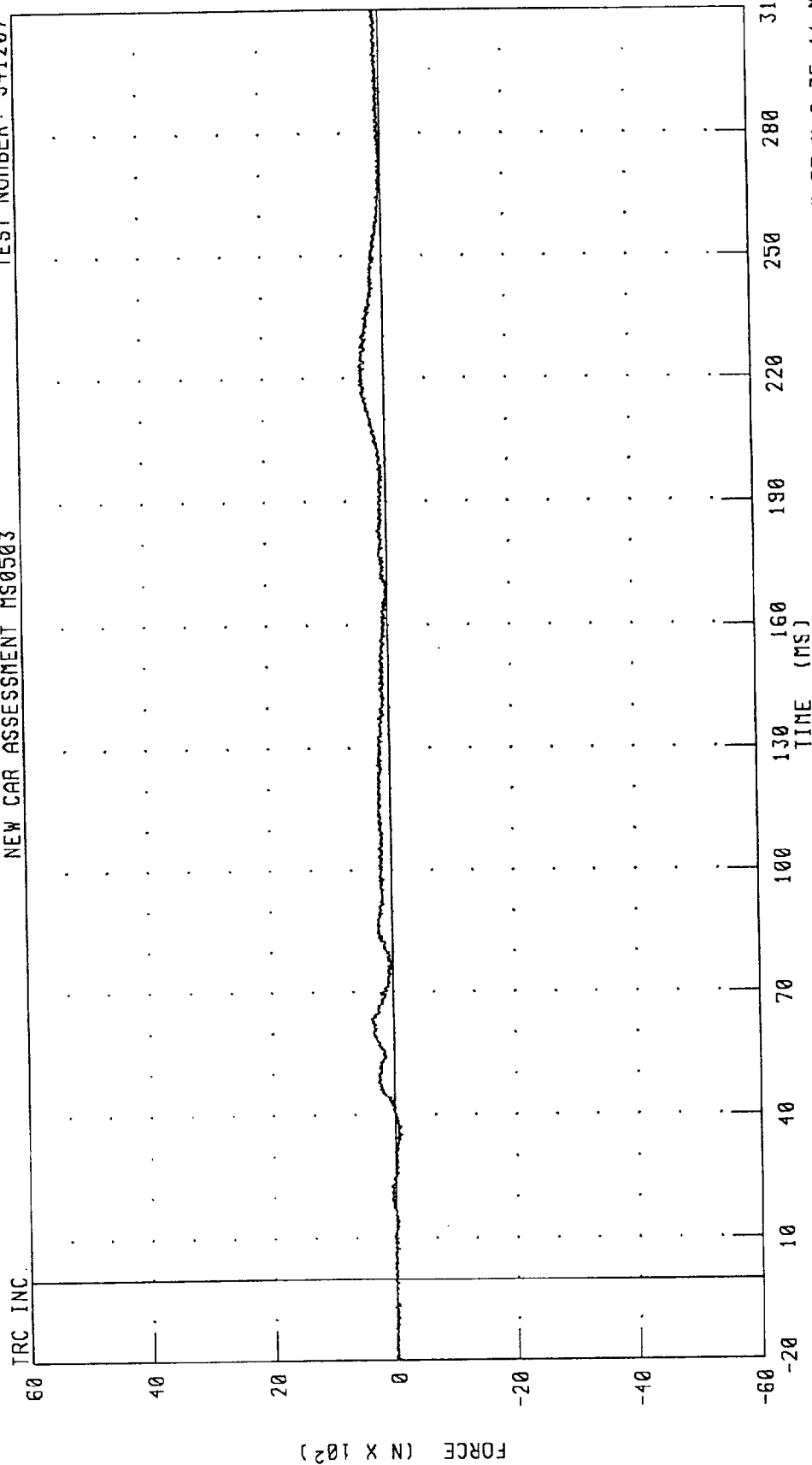


PEAK DATA: 63.80 G @ 84.72 MS; 0.10 G @ -15.84 MS

CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK X-AXIS SHEAR FORCE
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

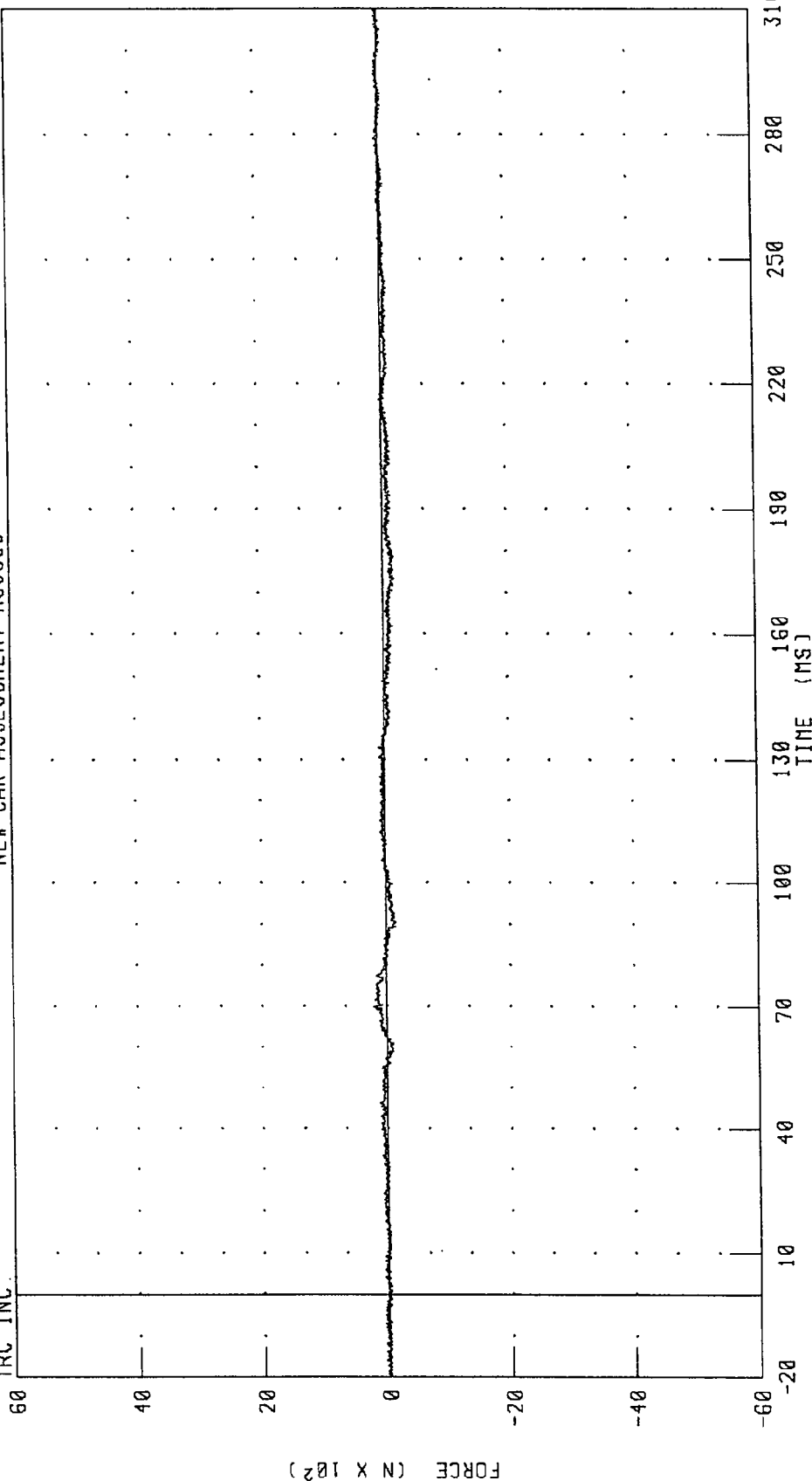


CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

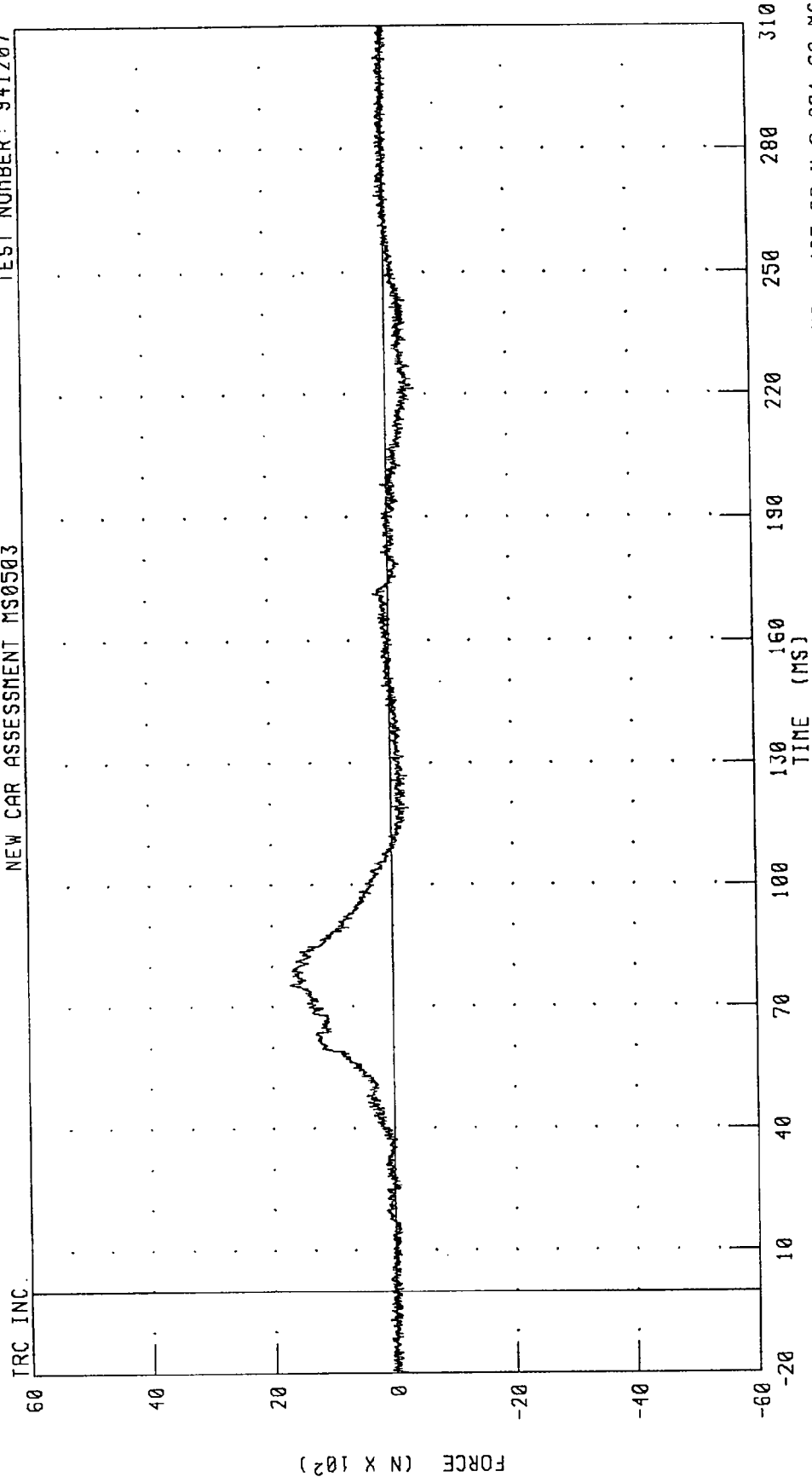
TRC INC.



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

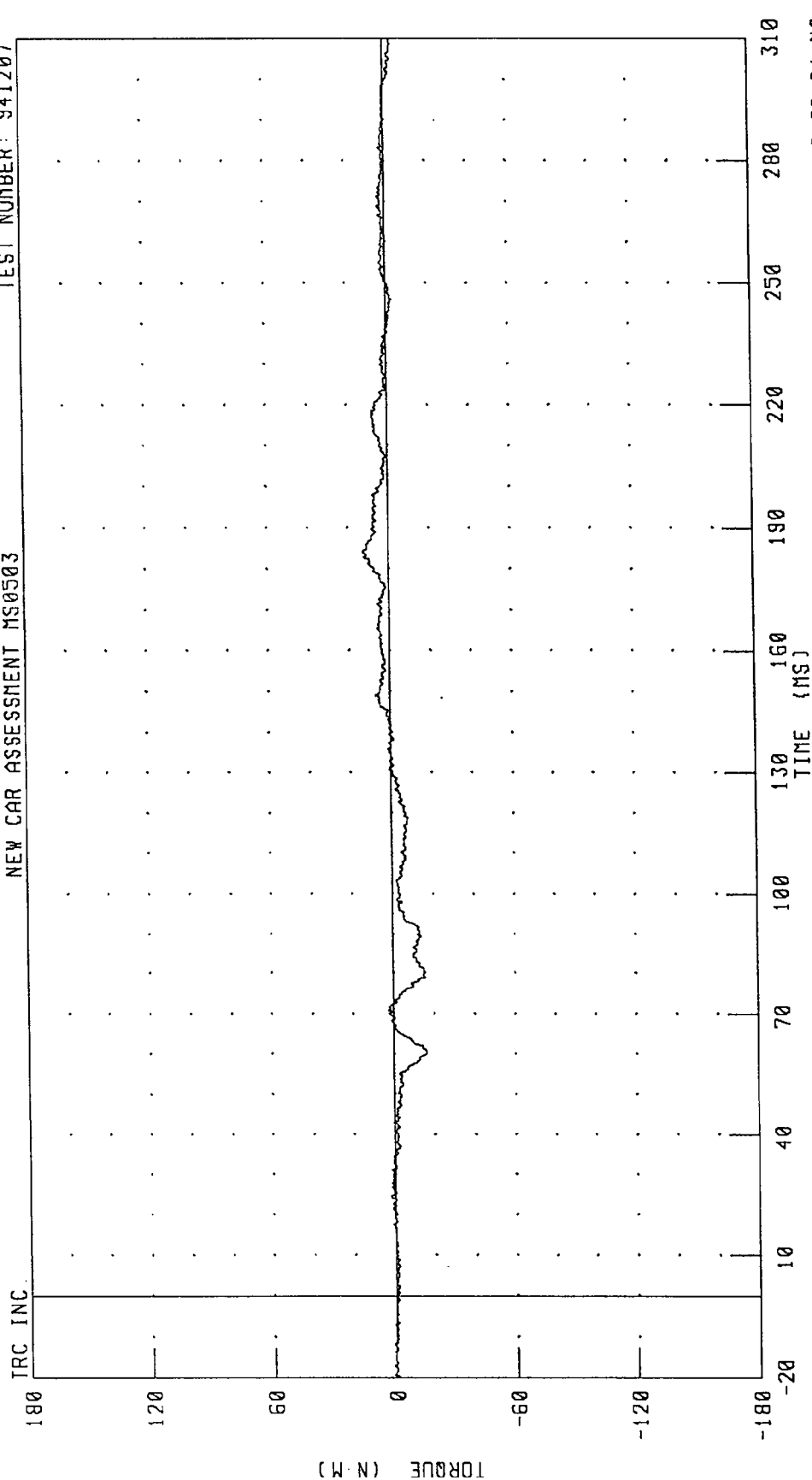


PEAK DATA: 1703.92 N @ 75.36 MS; -467.29 N @ 221.68 MS

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS
NEW CAR ASSESSMENT MS0503

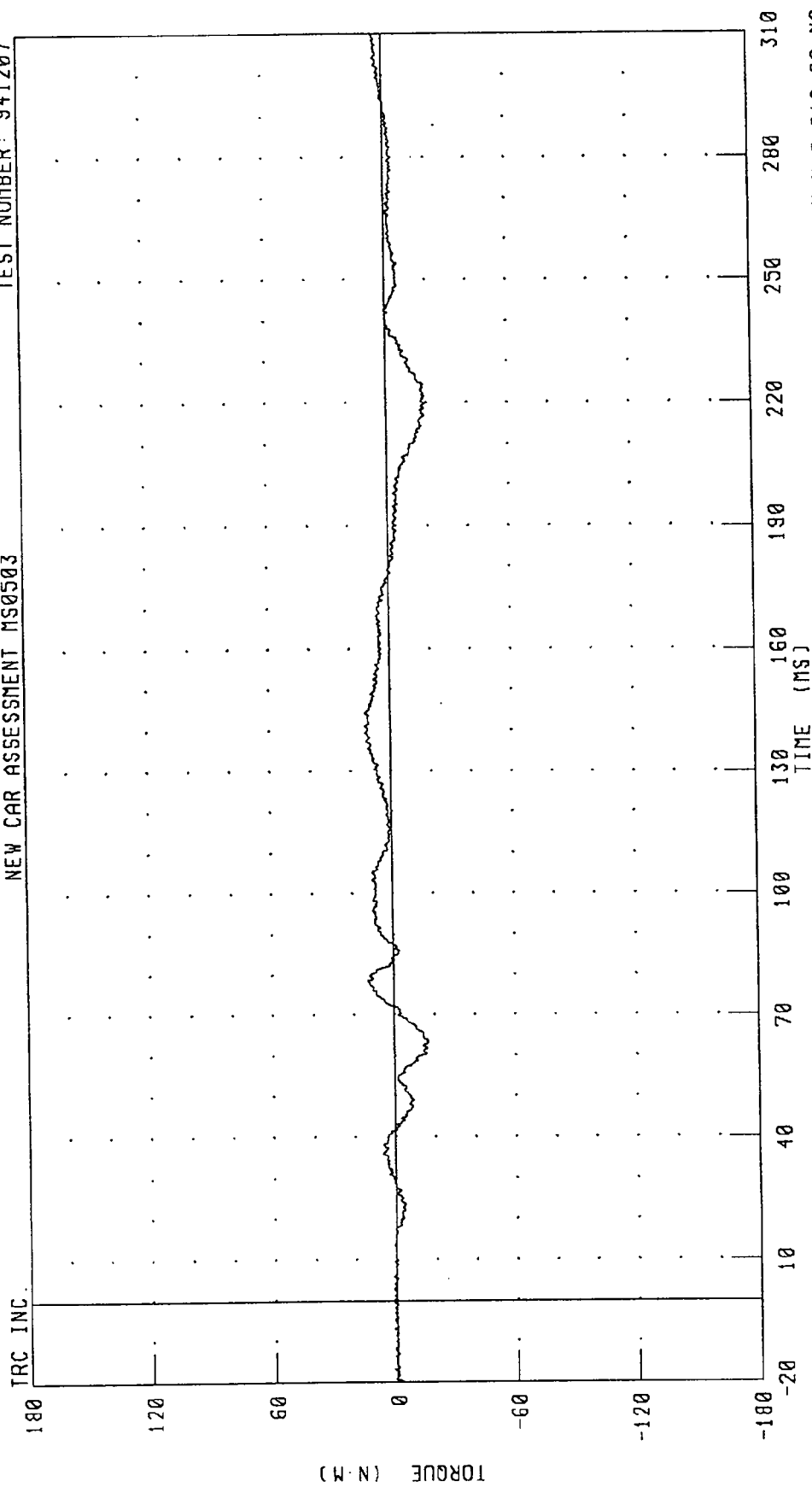
TEST NUMBER: 941207



CHANNEL: NEKX12 FILTER: CH. CLASS 600

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS
NEW CAR ASSESSMENT MS0503

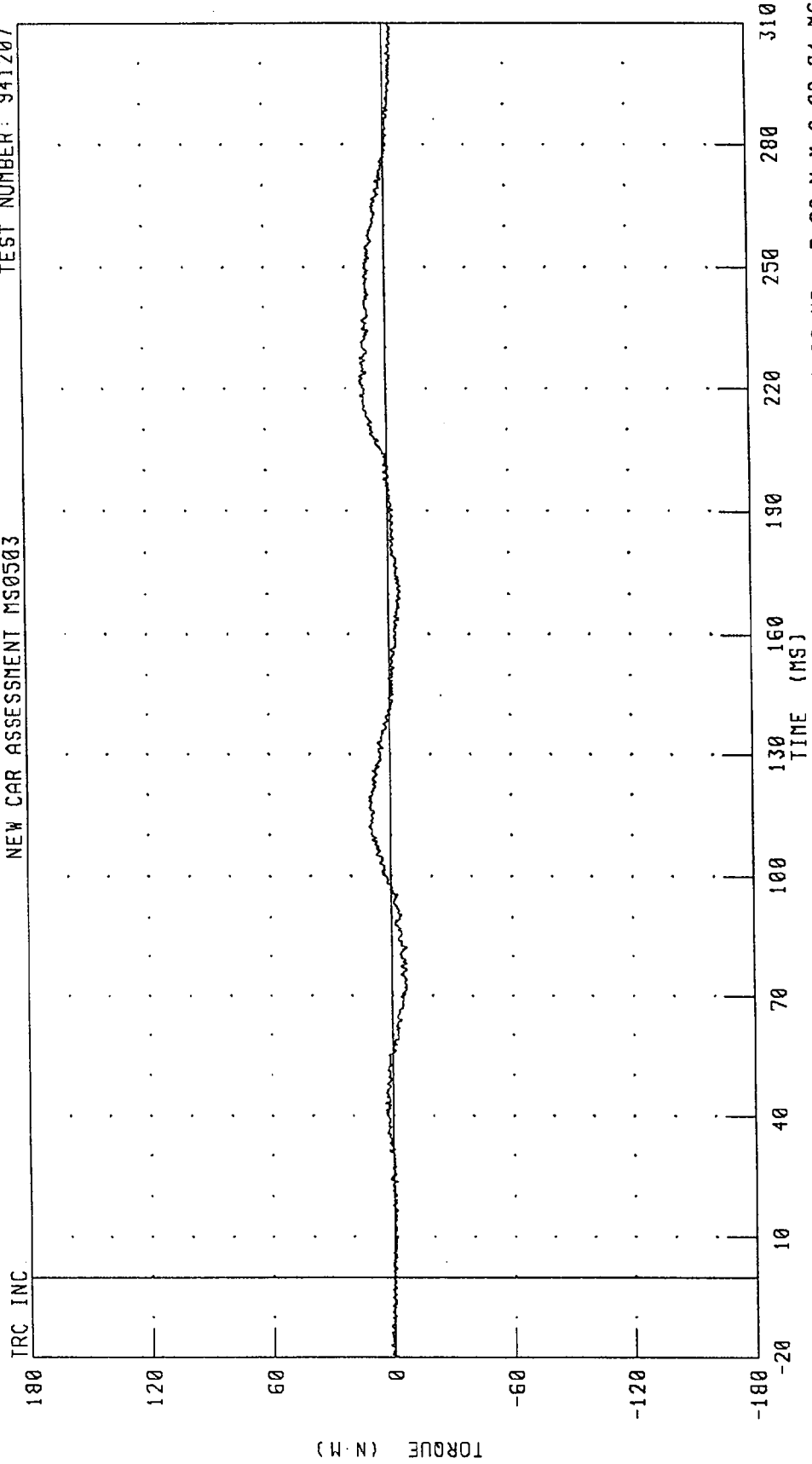
TEST NUMBER: 941207



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS
NEW CAR ASSESSMENT MS0503

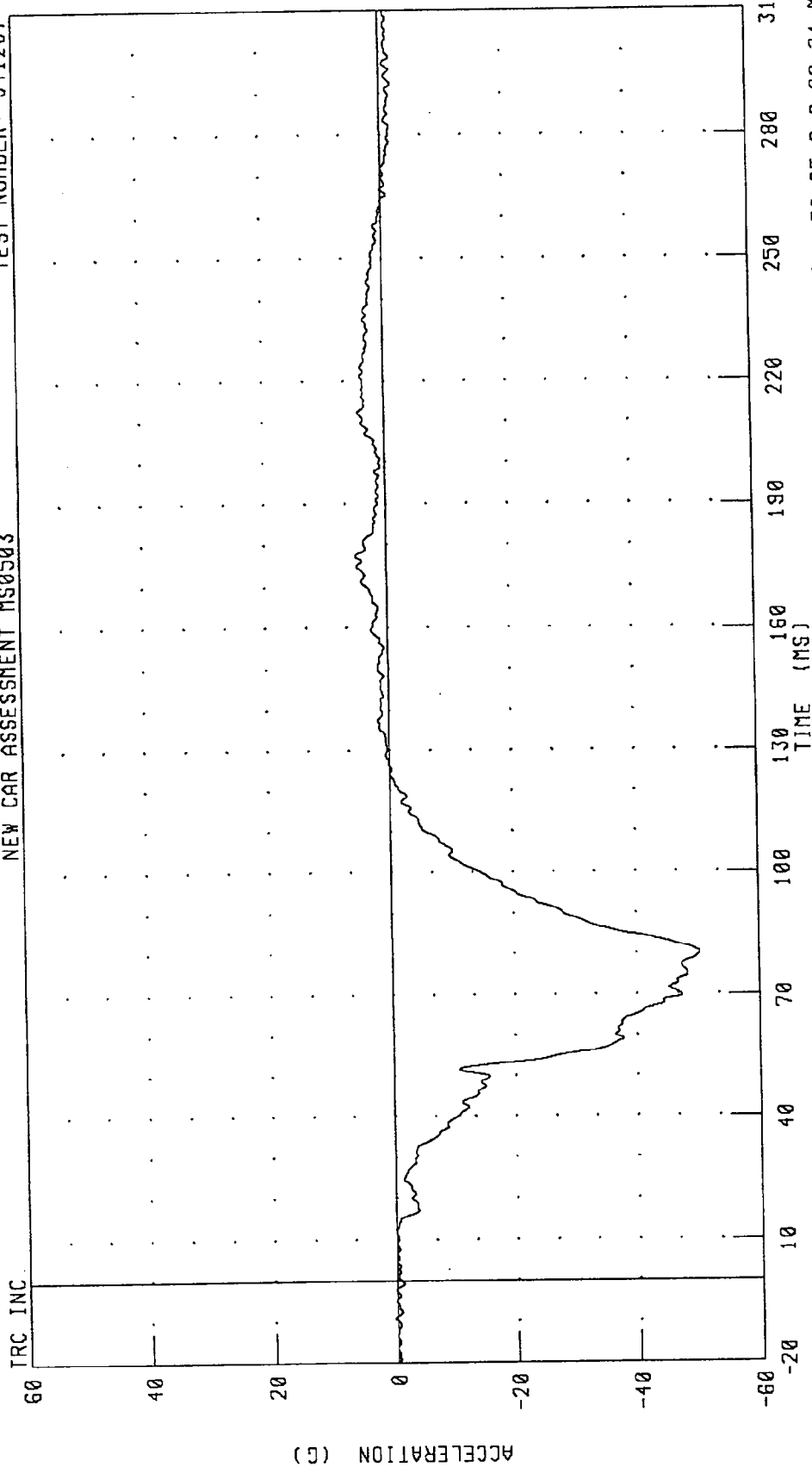
TEST NUMBER: 941207



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

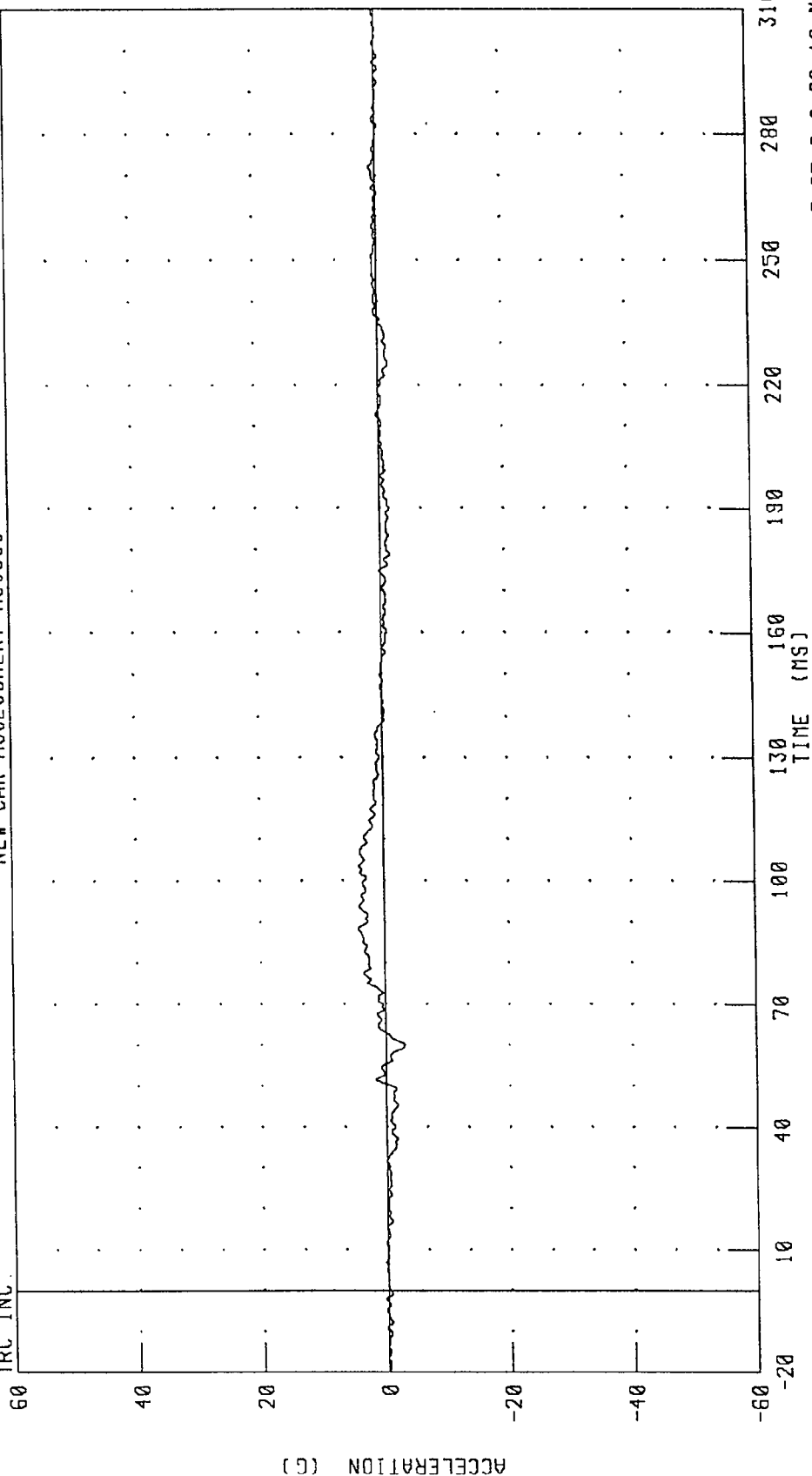


CHANNEL: CSTXG2 FILTER: CH. CLASS 180

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

TRC INC.

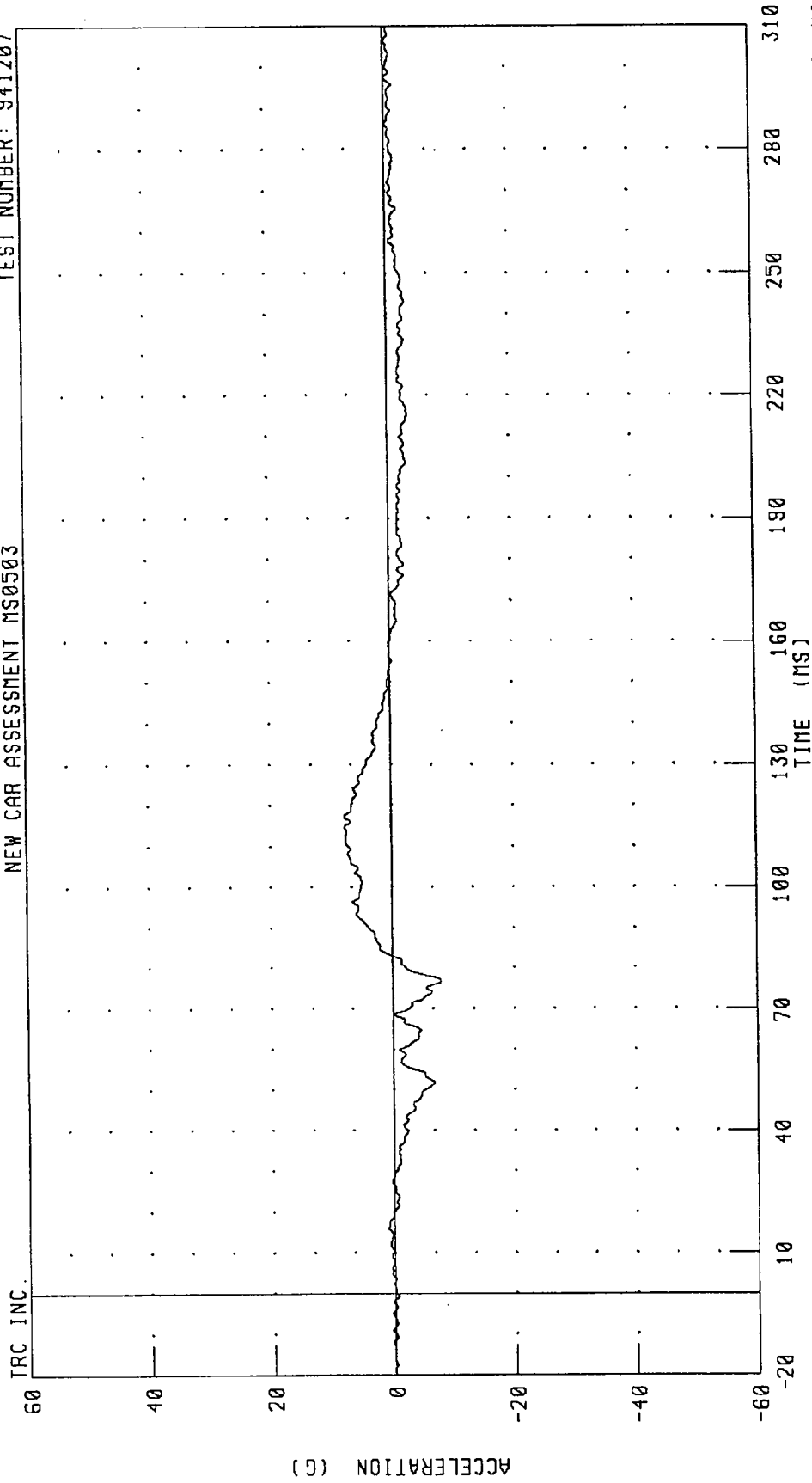


CHANNEL: CSTYG2 FILTER: CH. CLASS 180

PEAK DATA: 4.27 G @ 88.40 MS; -3.05 G @ 60.16 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



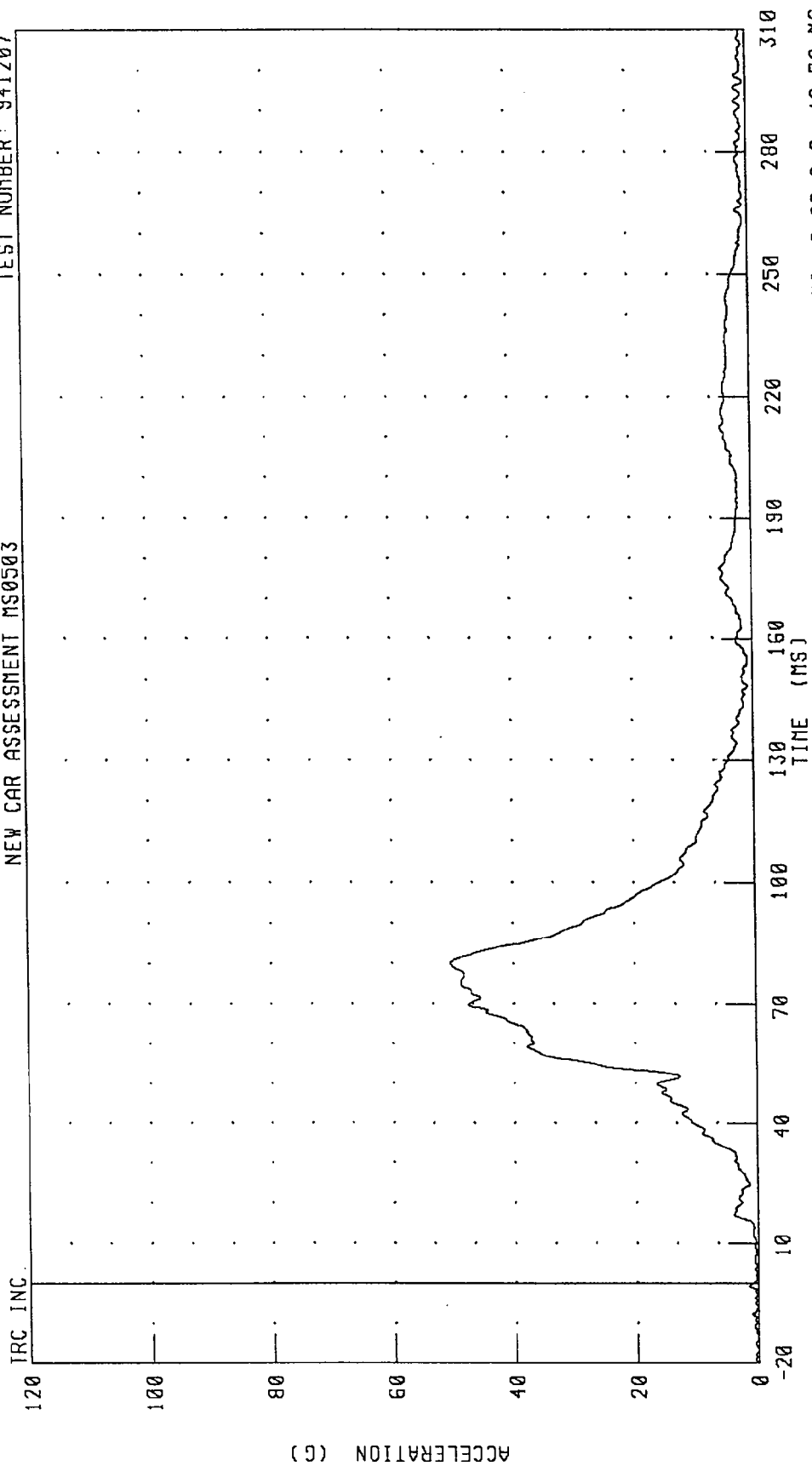
CHANNEL: CST2G2 FILTER: CH. CLASS 180

PEAK DATA: 7.87 G @ 114.88 MS; -7.90 G @ 76.80 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

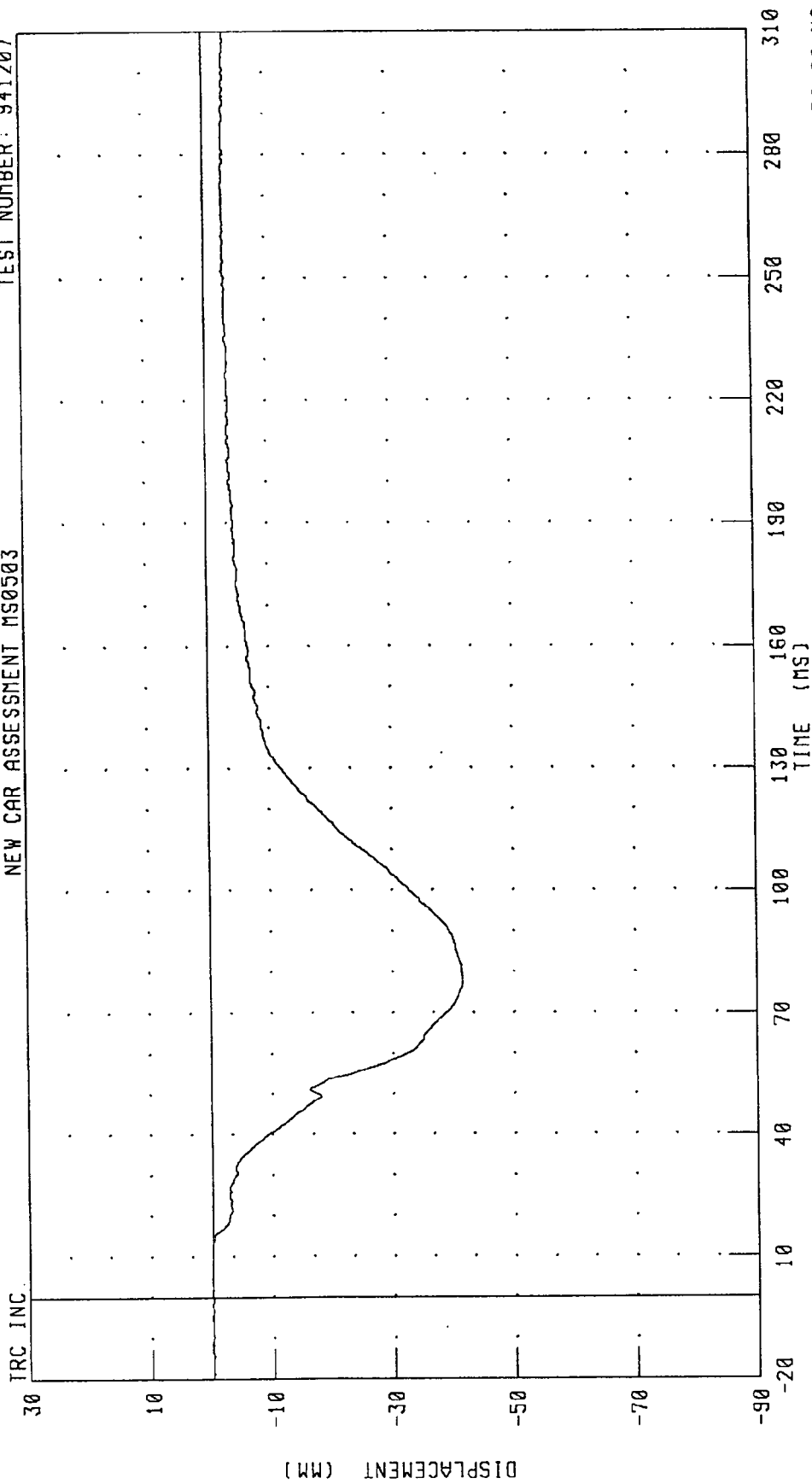


CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA: 50.36 G @ 50.36 MS; 16.72 G @ 16.72 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DEFLECTION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

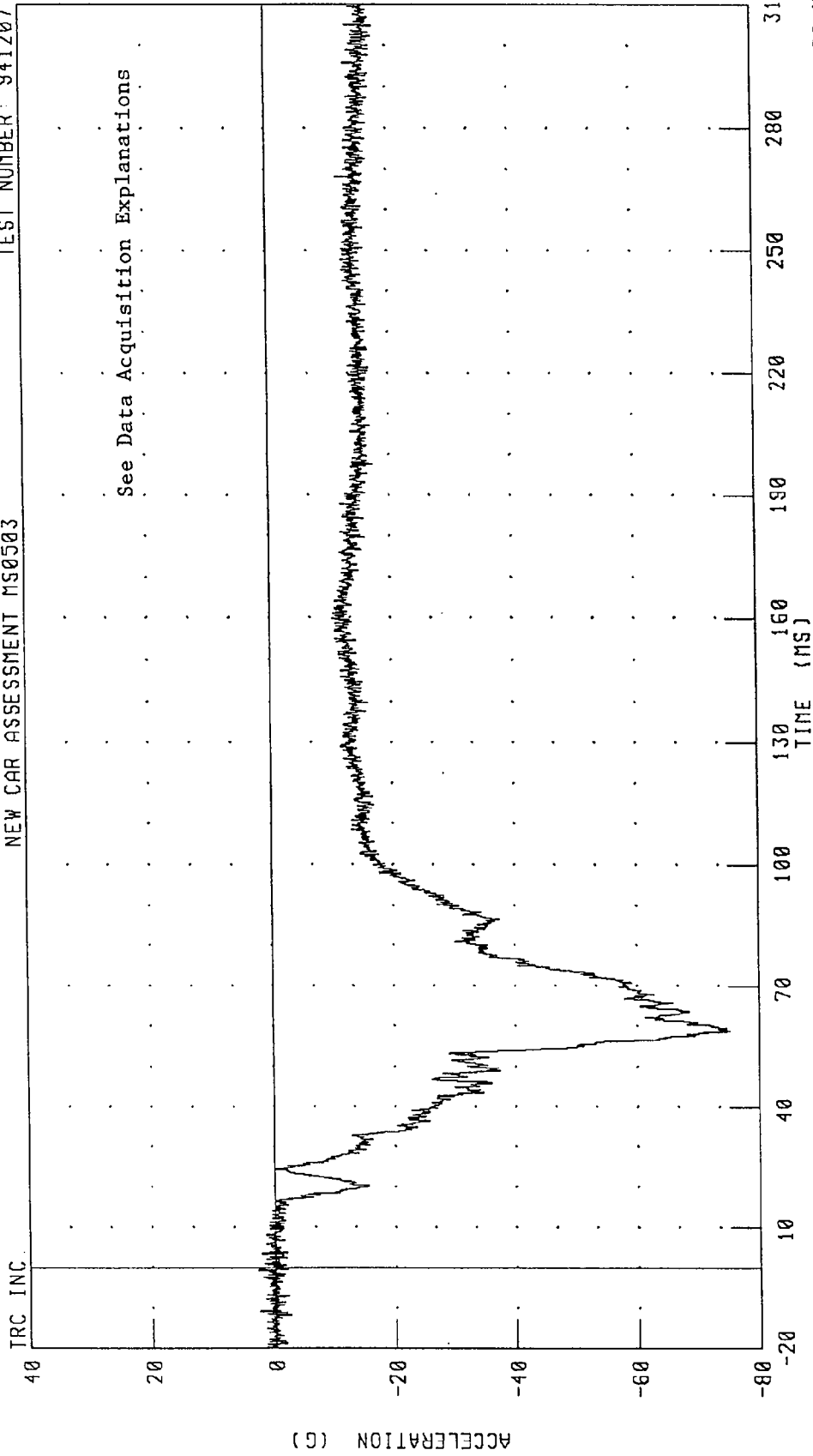


CHANNEL: CSTX02 FILTER: CH. CLASS 180

PEAK DATA: 0.17 MM @ -2.08 MS; -41.57 MM @ 78.88 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

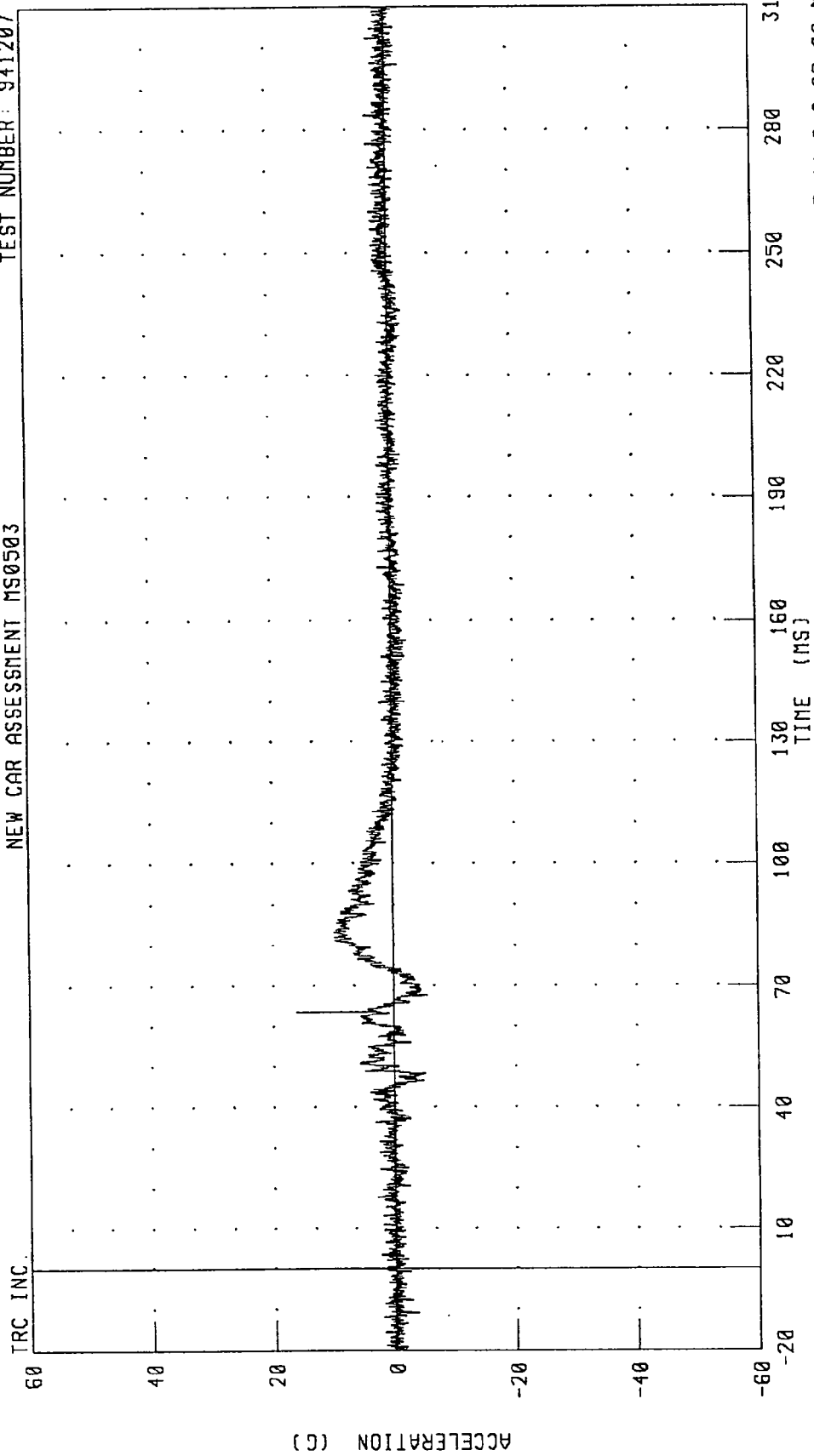


CHANNEL: PEVXG2 FILTER: CH. CLASS 1000

PEAK DATA: 2.94 G @ -0.80 MS; -75.19 G @ 58.72 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Y-AXIS ACCELERATION

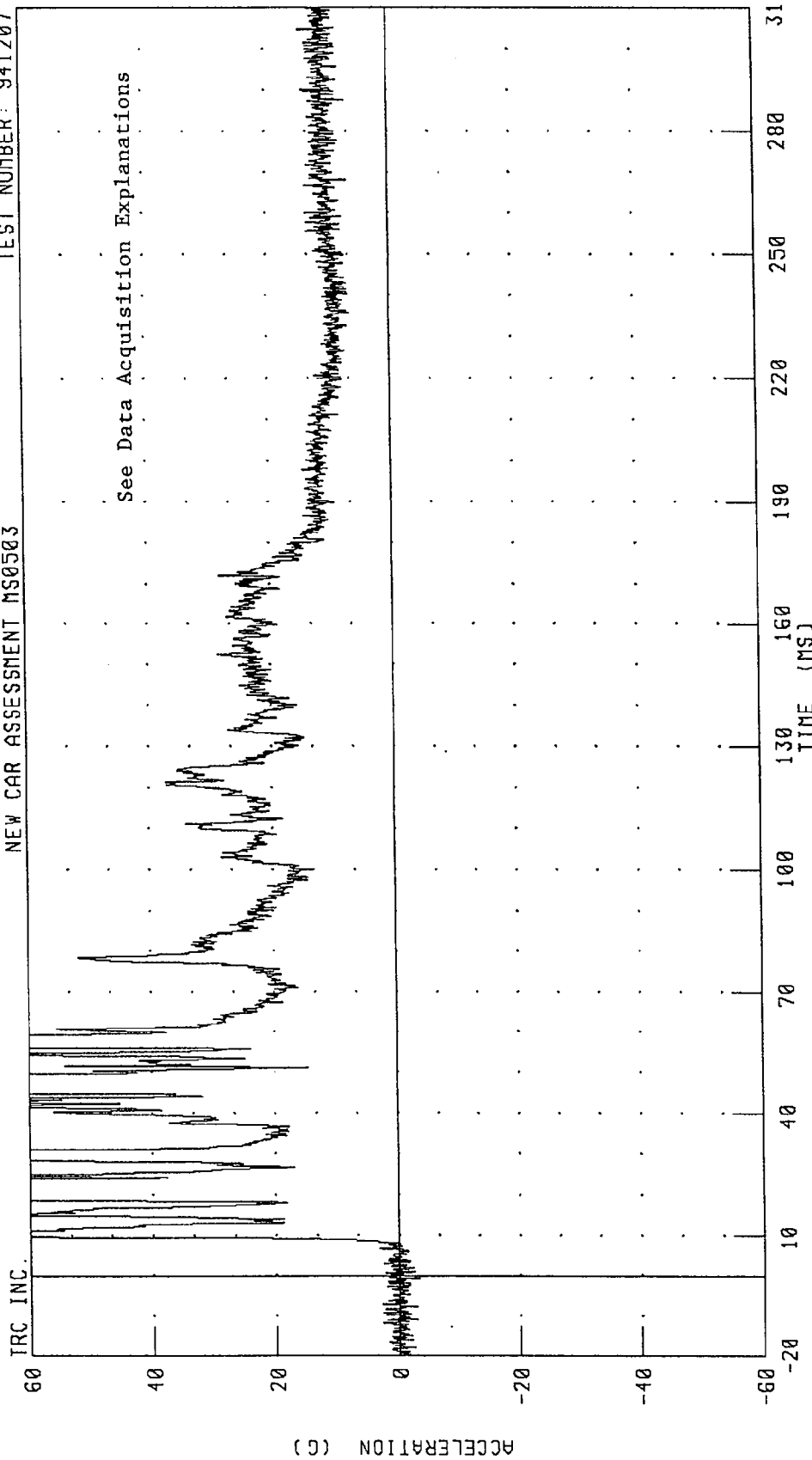
NEW CAR ASSESSMENT MS0503 TEST NUMBER: 941207



CHANNEL: PEVYG2 FILTER: CH. CLASS 1000 PEAK DATA: 16.22 G @ 63.60 MS; -5.44 G @ 67.60 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Z-AXIS ACCELERATION
NEW CAR ASSESSMENT NS0503

TEST NUMBER: 941207



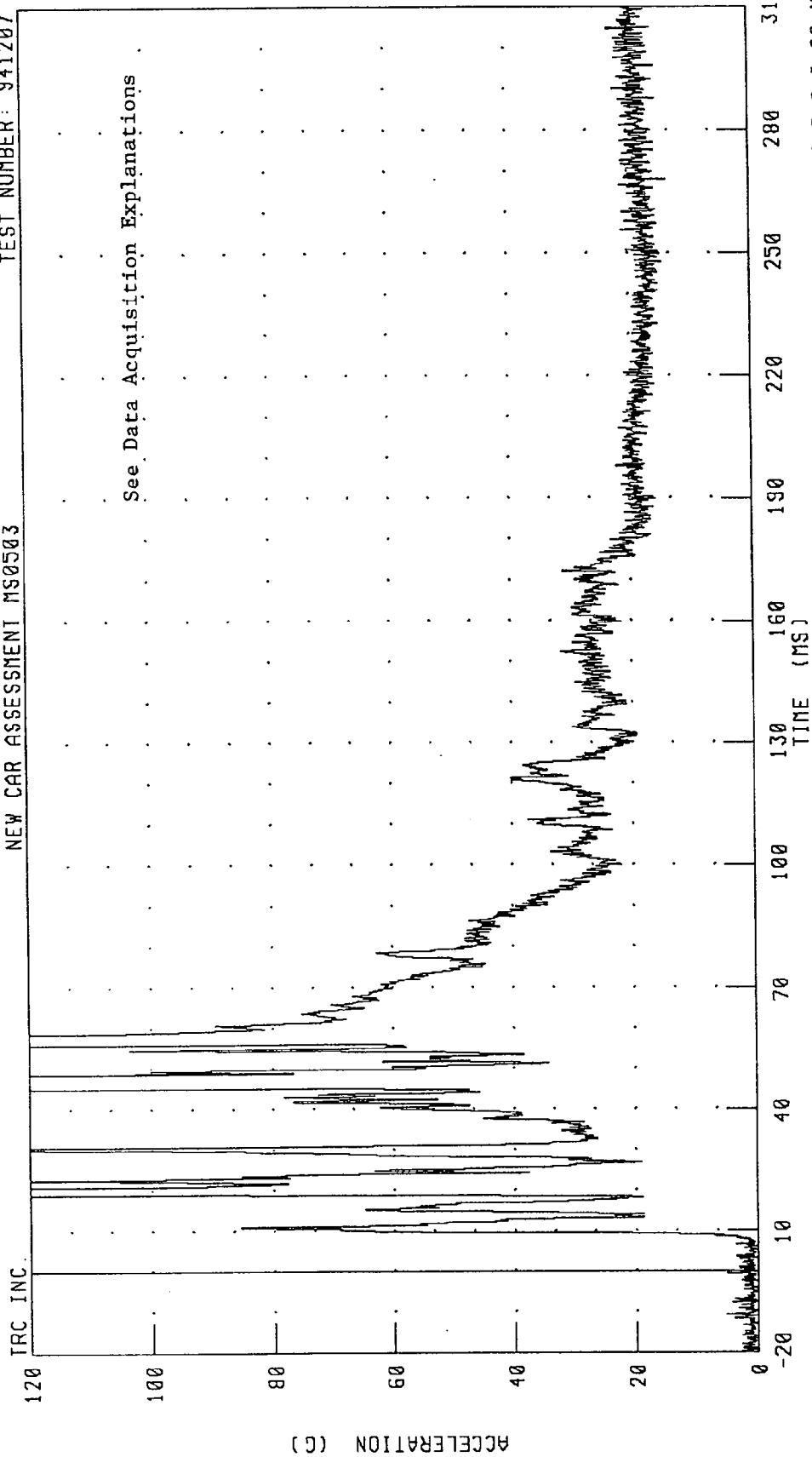
CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

PEAK DATA: 436.26 G @ 45.36 MS; -3.36 G @ -0.80 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS RESULTANT ACCELERATION

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

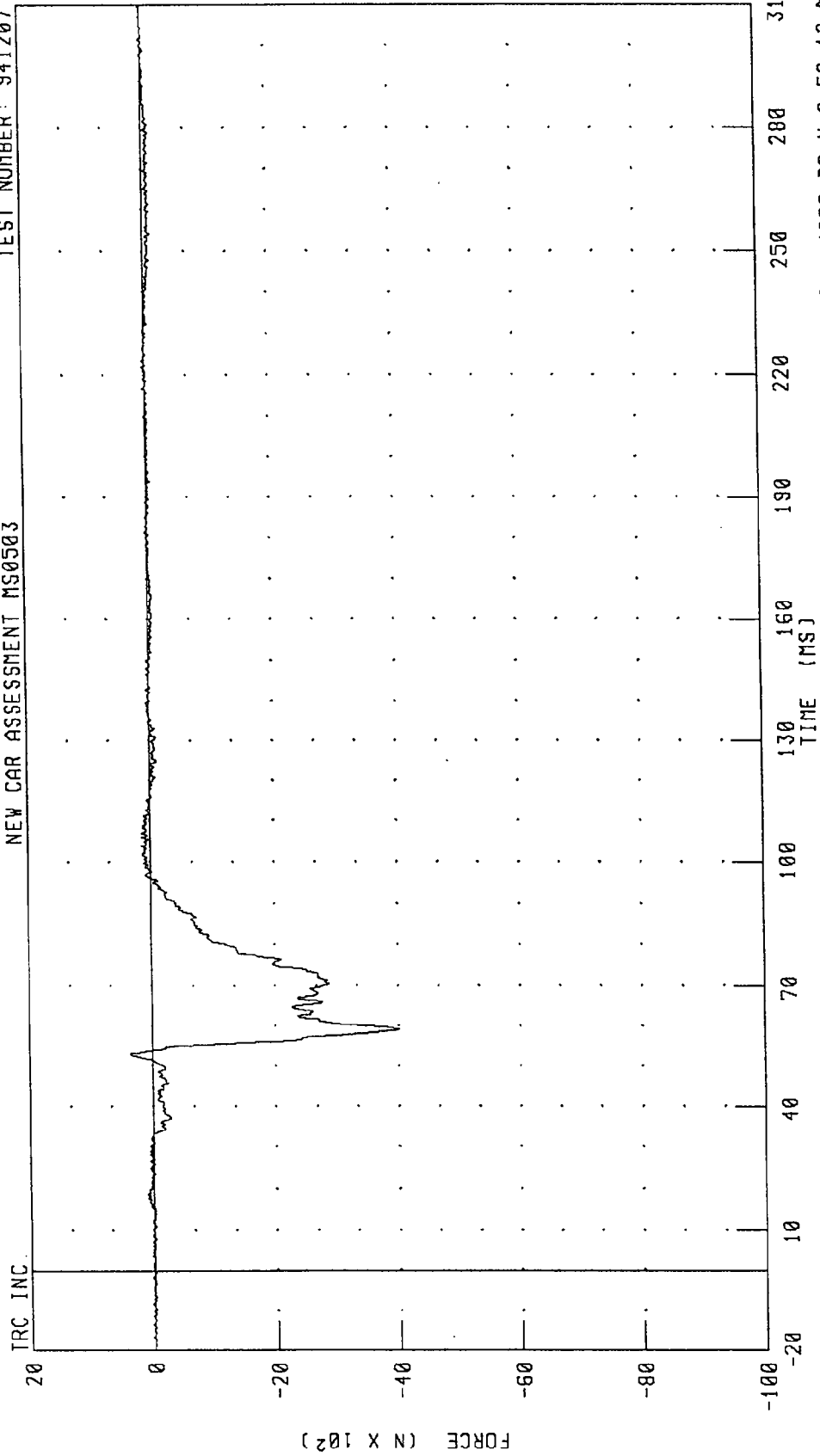


PEAK DATA: 440.89 G @ 56.64 MS; 0.09 G @ 6.00 MS

CHANNEL: PEVRG2 FILTER: CH. CLASS 1000

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

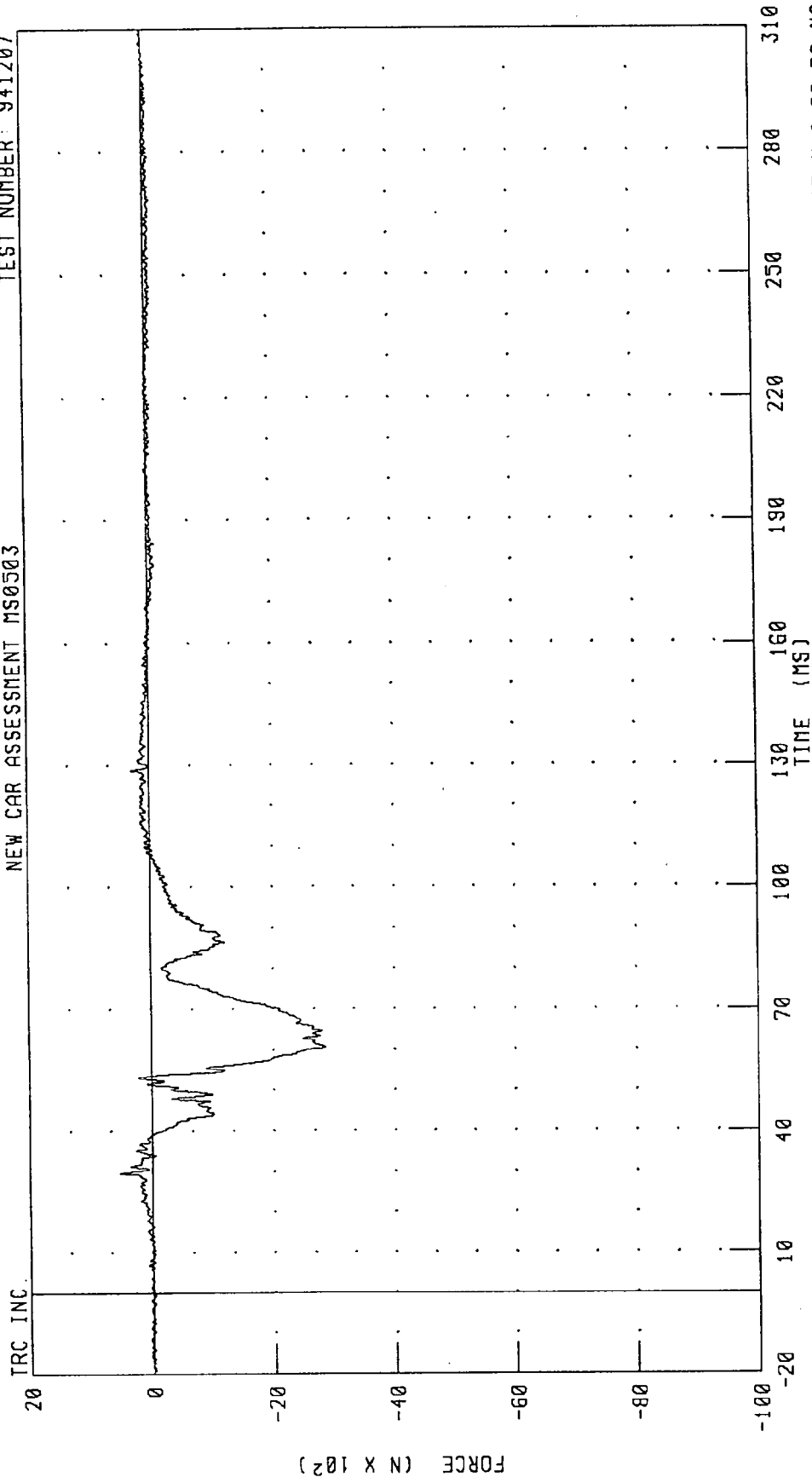


CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 356.99 N @ 52.96 MS; -4022.39 N @ 59.12 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 PASSENGER RIGHT FEMUR FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

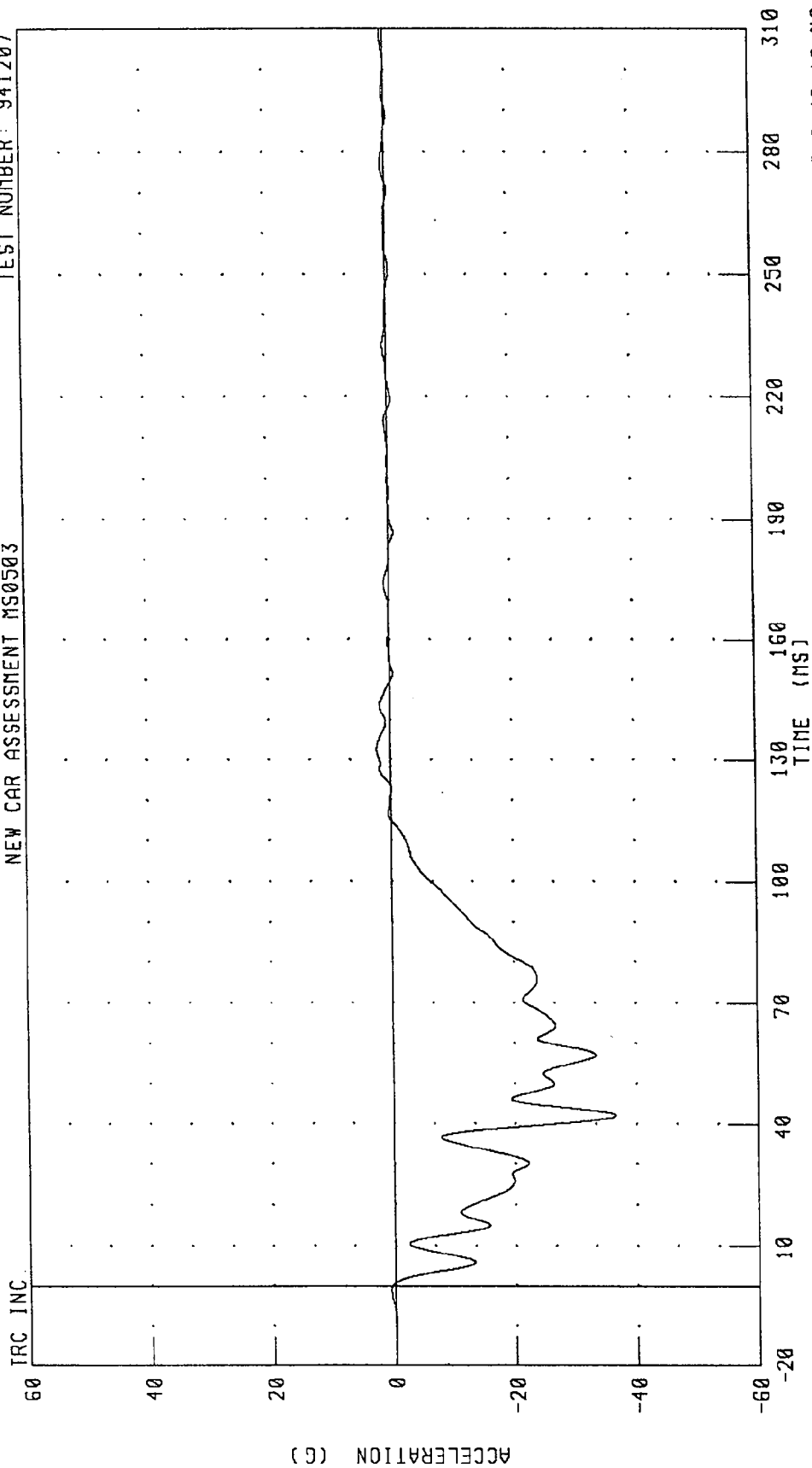


PEAK DATA: 528.01 N @ 29.84 MS, -2851.65 N @ 60.72 MS

CHANNEL: RFMF2 FILTER: CH. CLASS 600

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



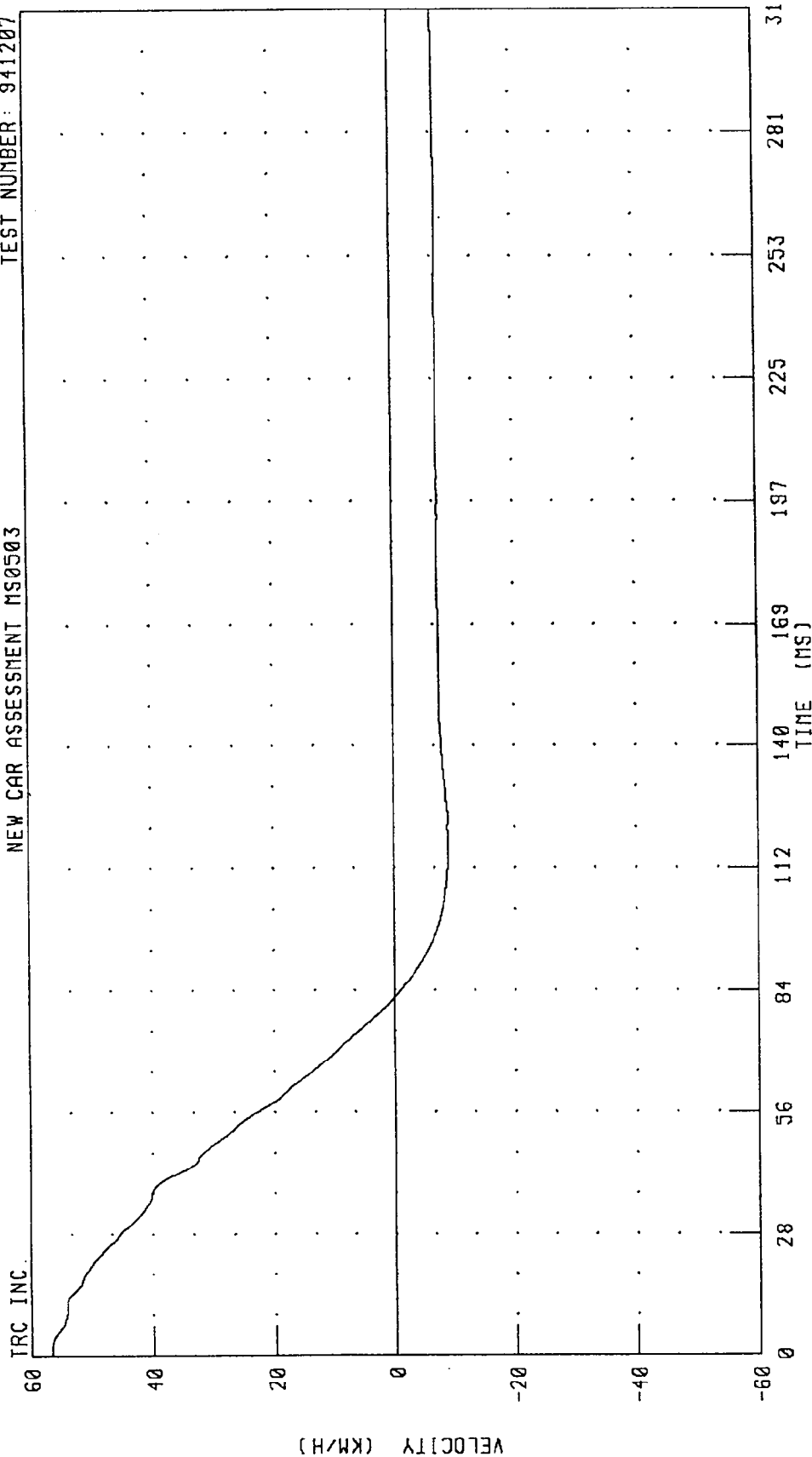
CHANNEL: TLRXG1 FILTER: CH CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER

LEFT REAR SEAT X-AXIS VELOCITY

NEW CAR ASSESSMENT MS0503

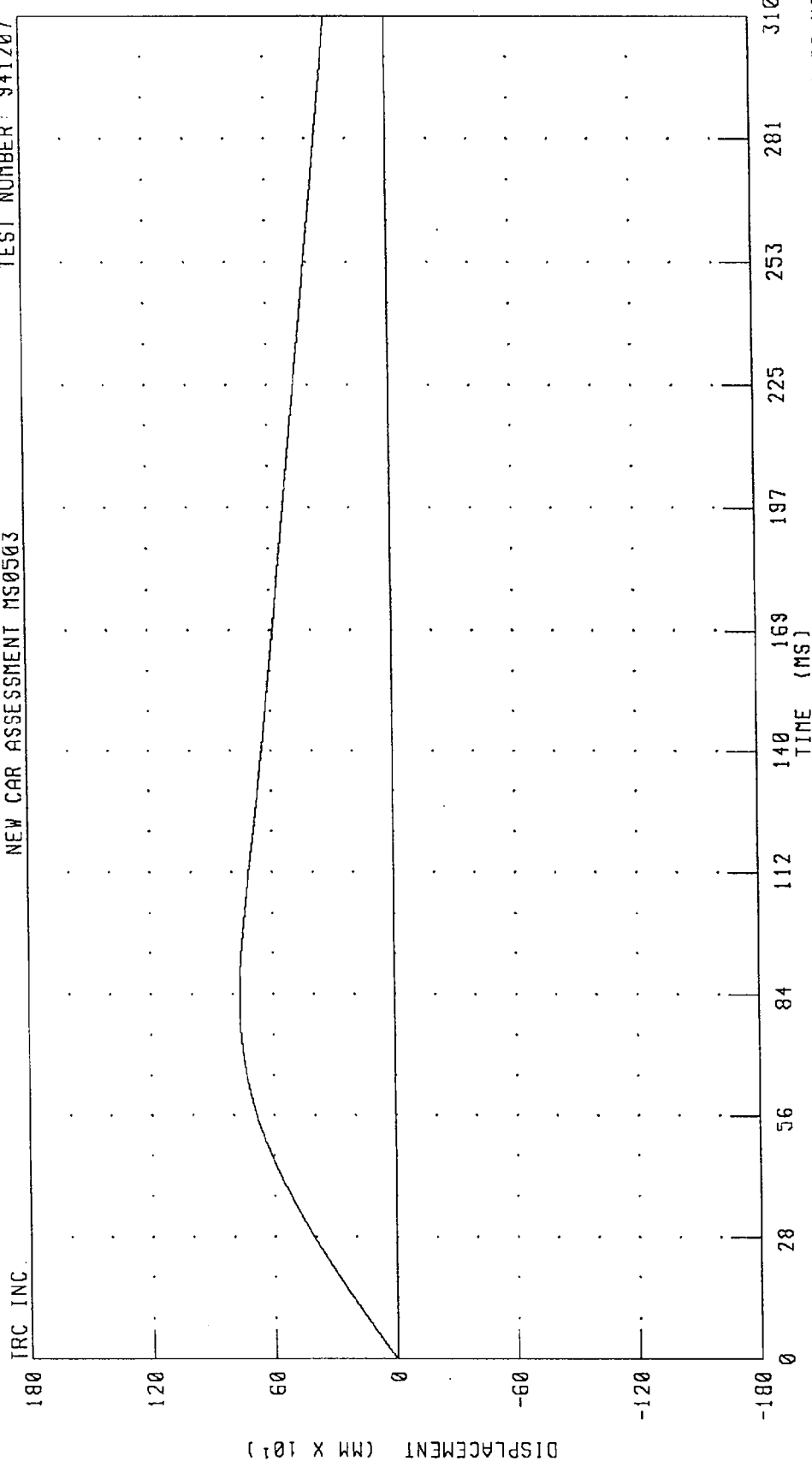
TEST NUMBER: 941207



CHANNEL: TLRXV1 FILTER: CH. CLASS 180

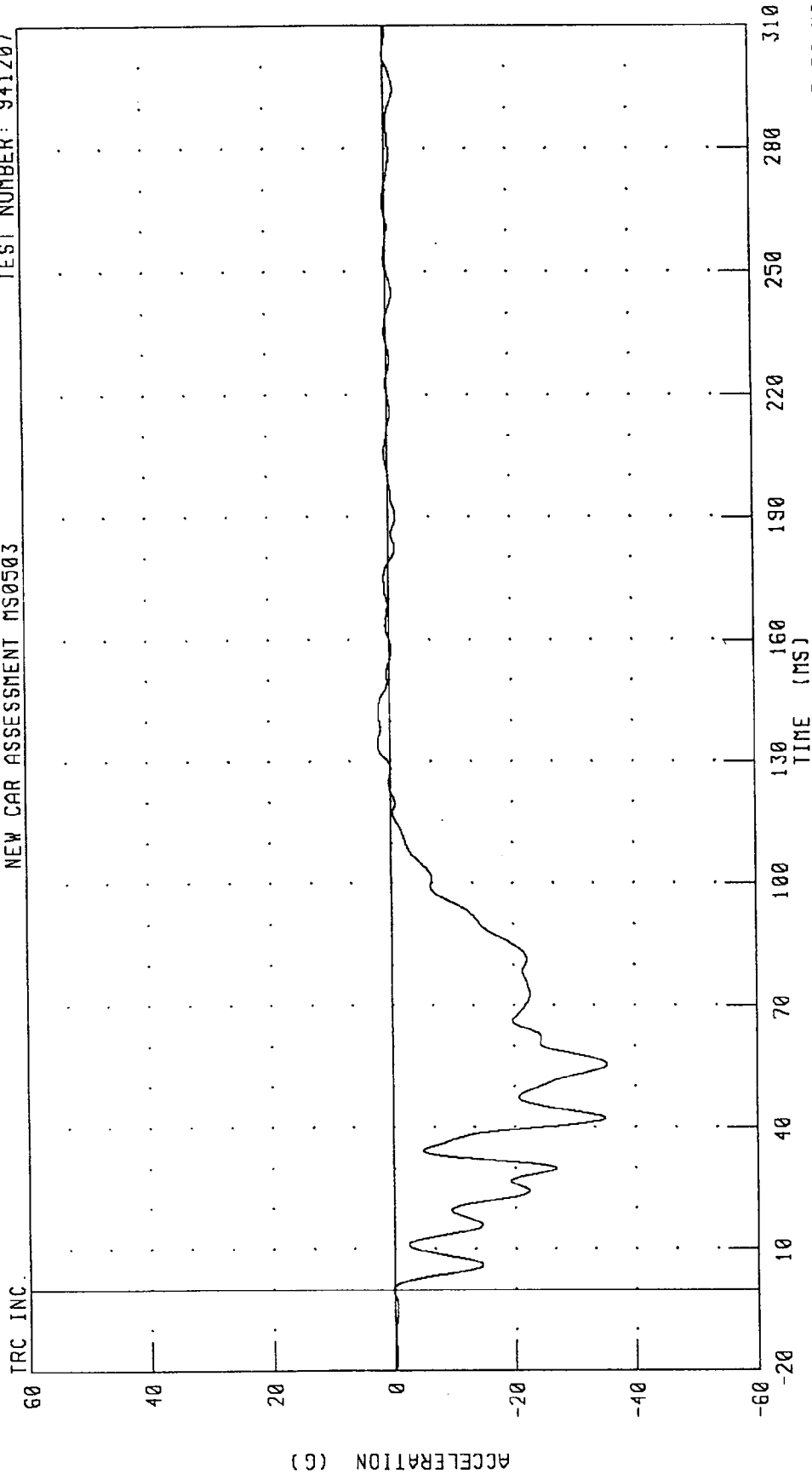
1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0503

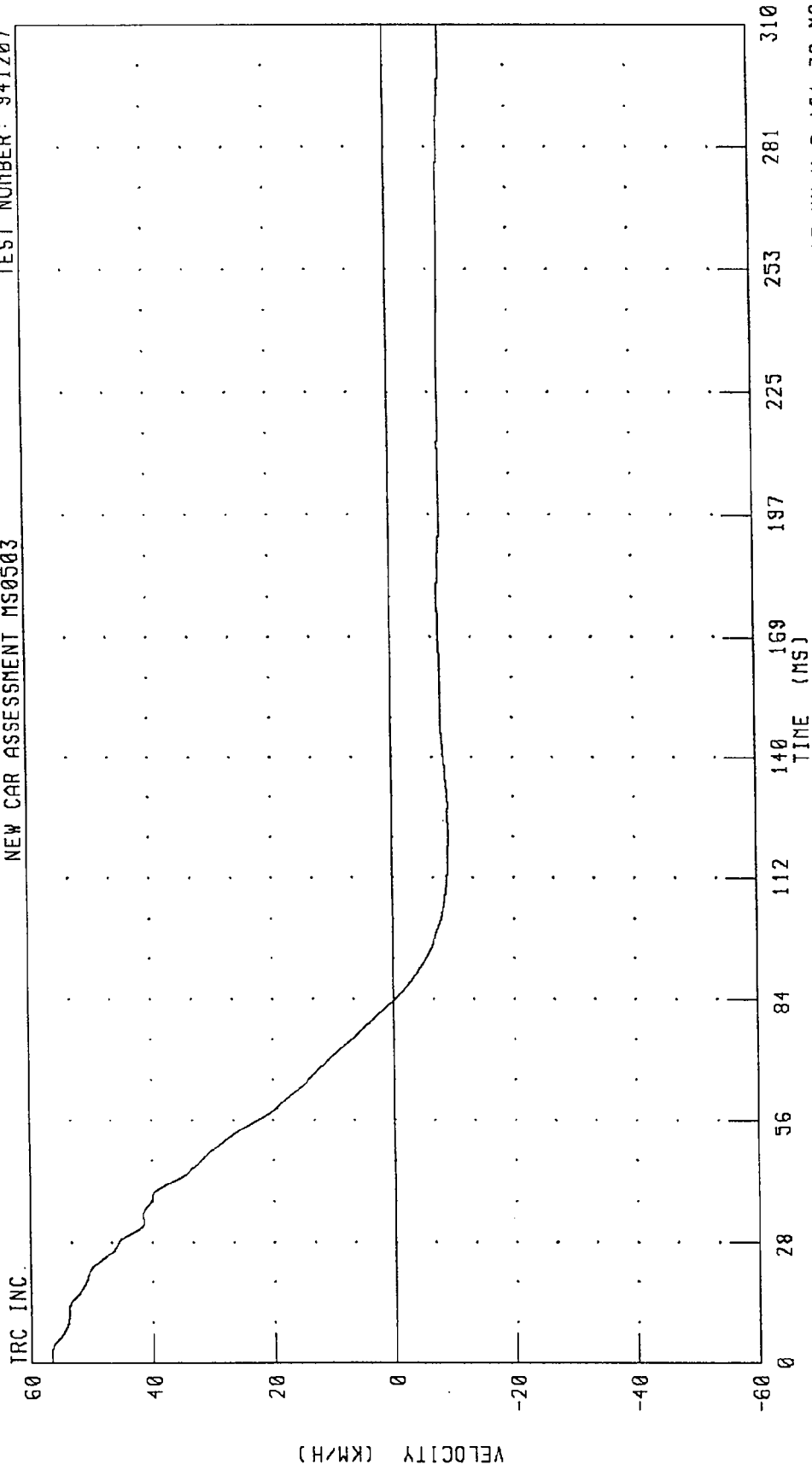
TEST NUMBER: 941207



CHANNEL: TRRXG1 FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS VELOCITY
NEW CAR ASSESSMENT MS0503

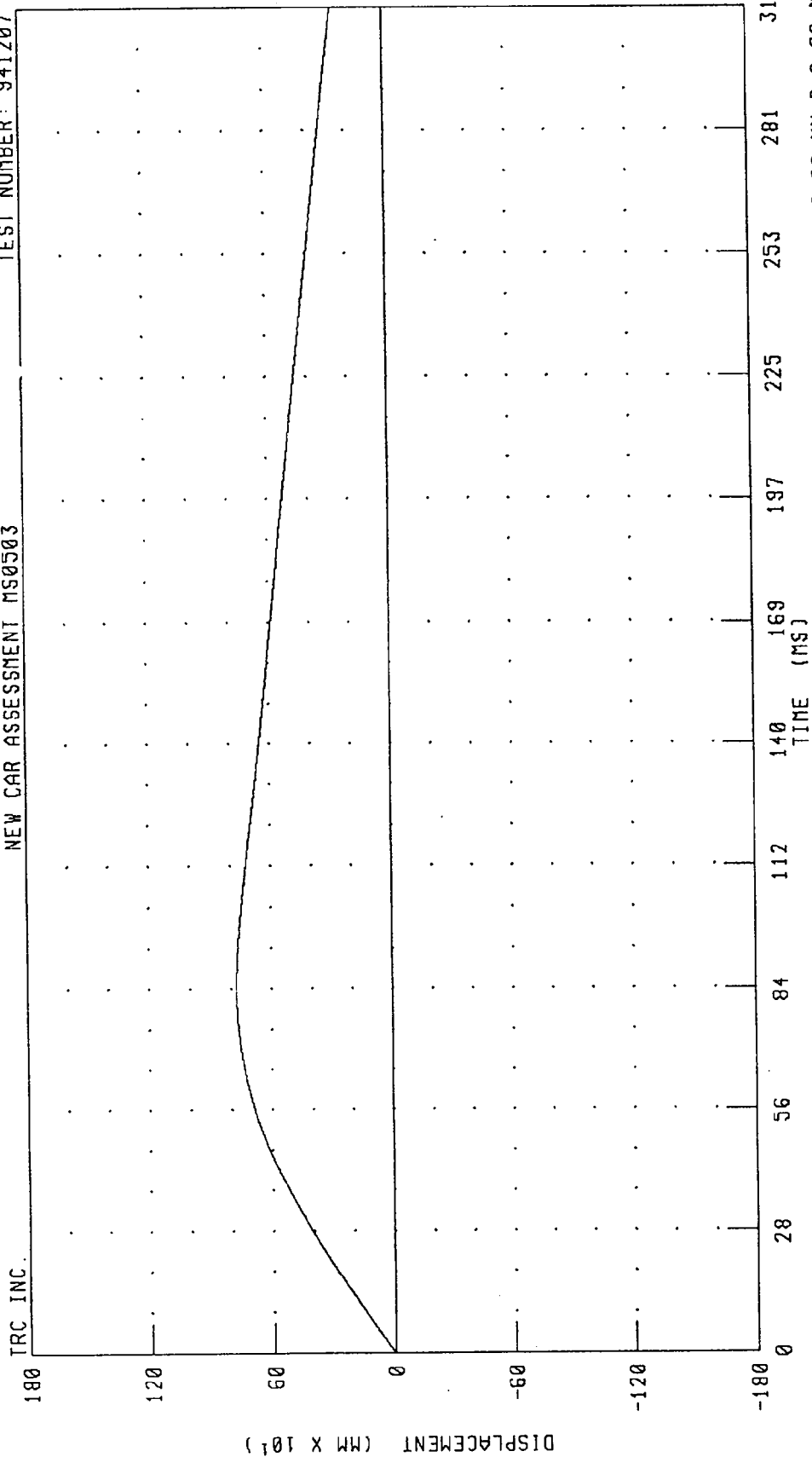
TEST NUMBER: 941207



CHANNEL: TRRXV1 FILTER: CH. CLASS 180

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

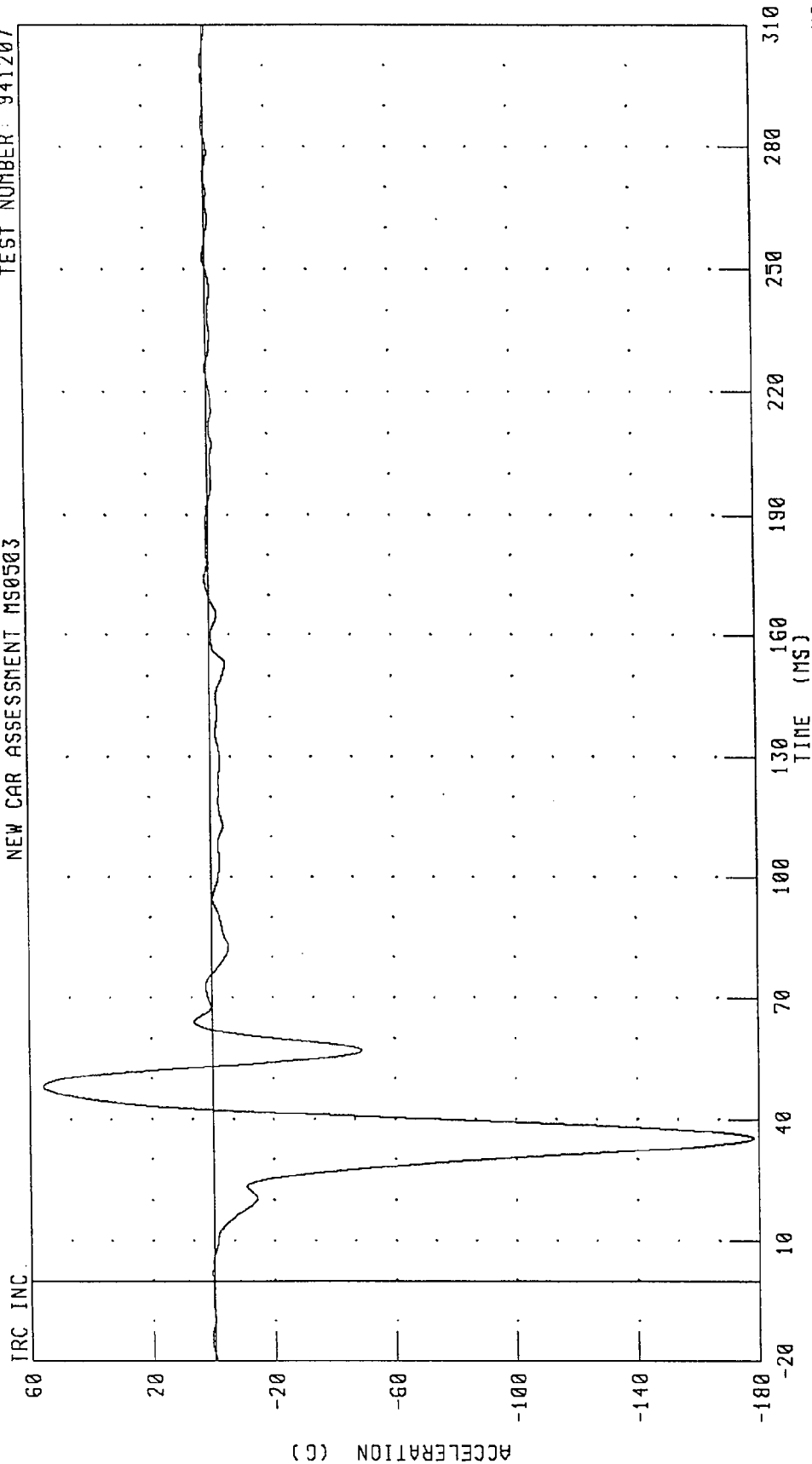


PEAK DATA: 771.60 MM @ 84.24 MS; 0.00 MM @ 0.00 MS

CHANNEL: TRRXD1 FILTER: CH. CLASS 180

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

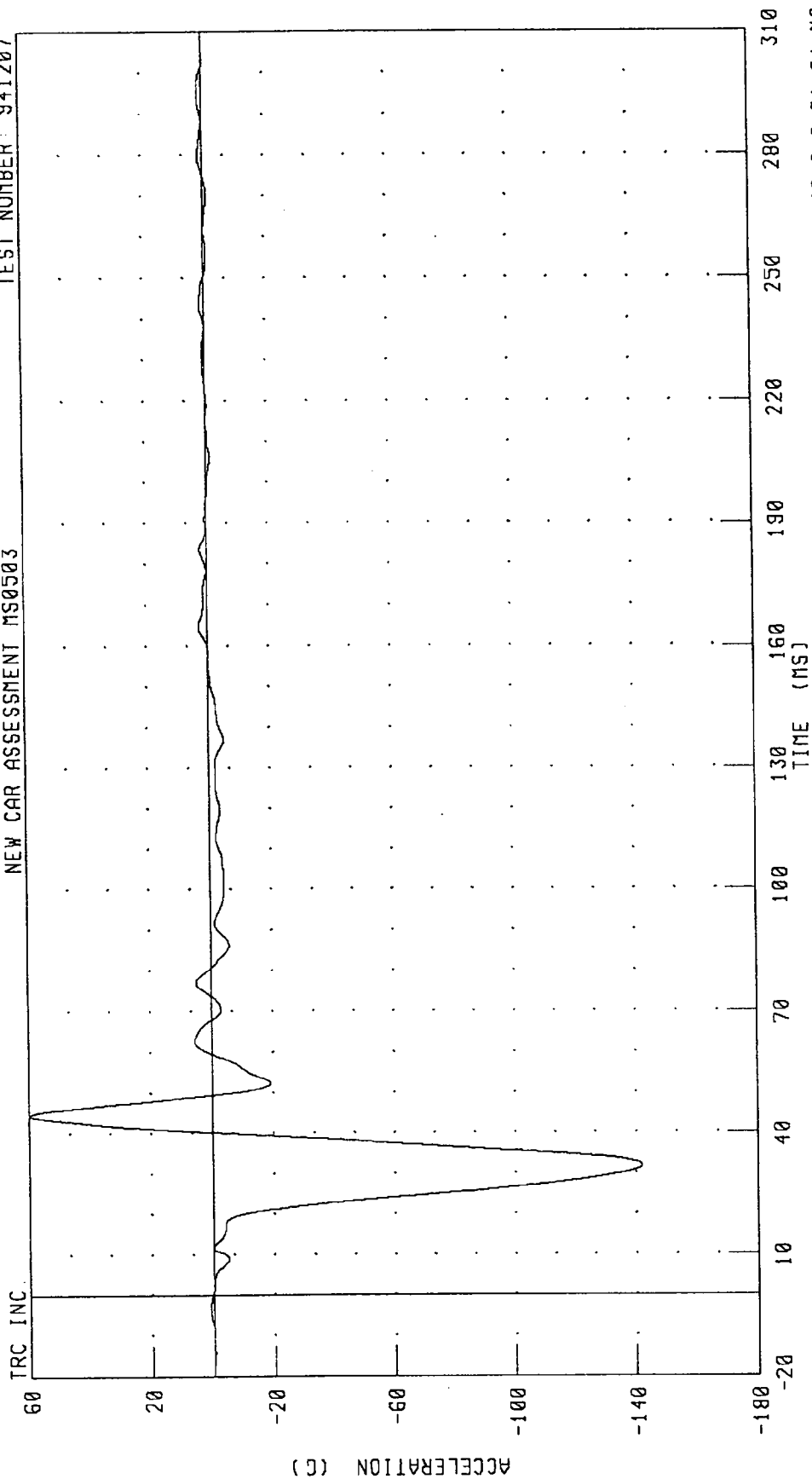


CHANNEL: ENGXG1 FILTER: CH. CLASS 60

PEAK DATA: 55.54 G @ 48.00 MS; -178.31 G @ 35.44 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 59.81 G @ 44.56 MS; -141.90 G @ 31.84 MS

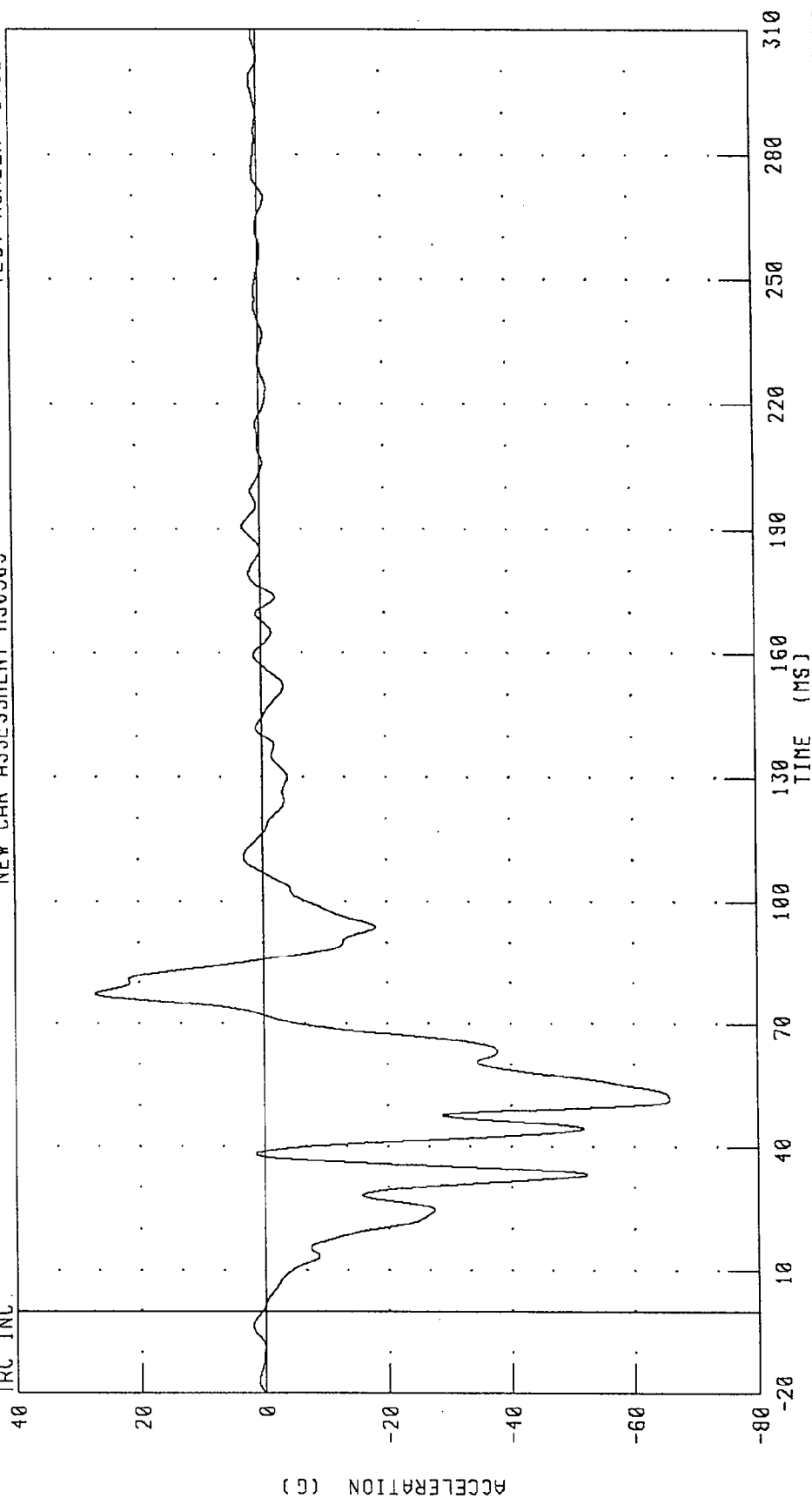
CHANNEL: ENGXC2 FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

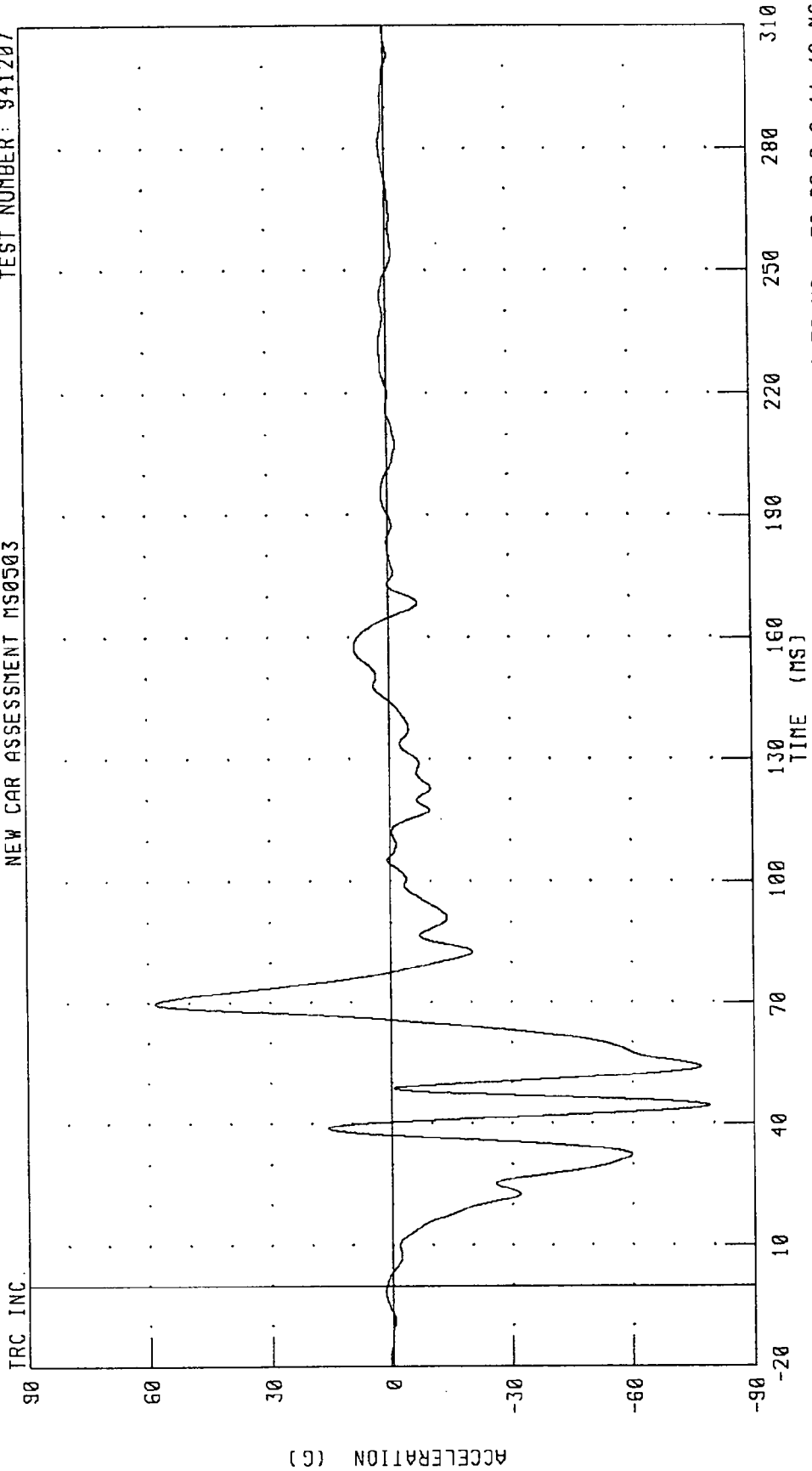
TRC INC.



CHANNEL: BCRXG1 FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



CHANNEL: BCLXG1 FILTER: CH. CLASS 60

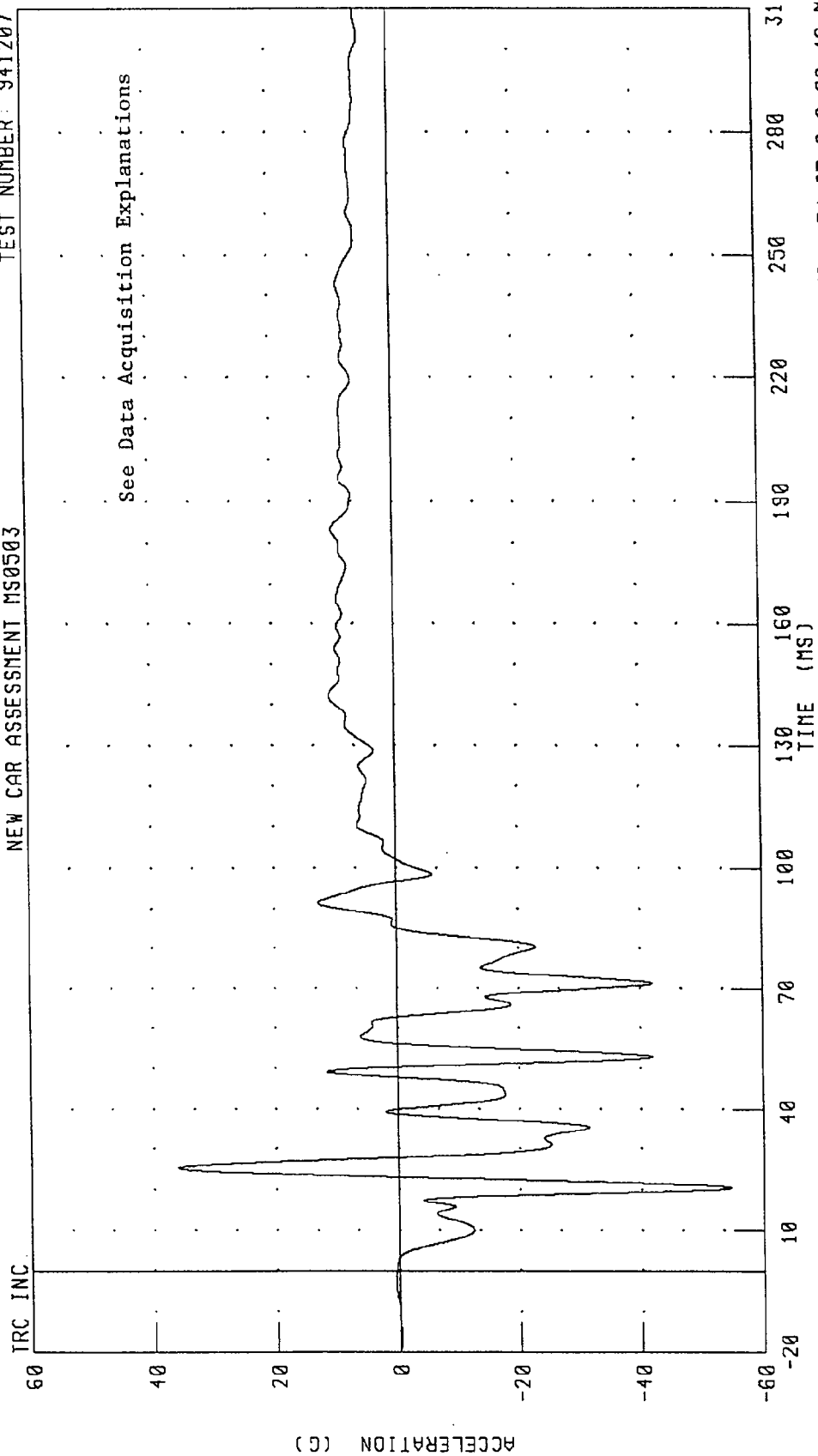
PEAK DATA: 58.48 G @ 69.76 MS; -78.99 G @ 44.40 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



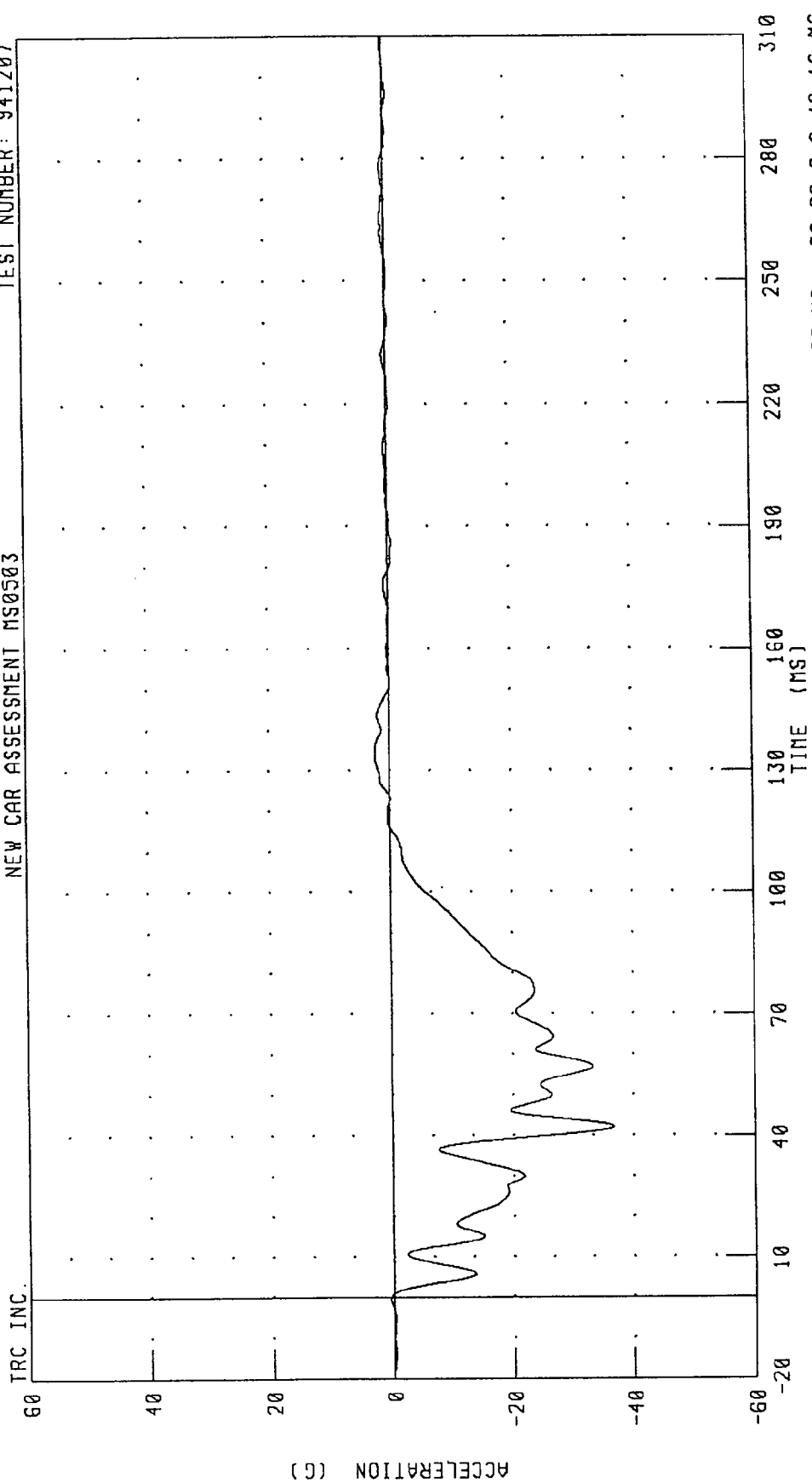
CHANNEL: DPCXG1 FILTER: CH. CLASS 60

PEAK DATA: 36.08 G @ 25.36 MS; -54.67 G @ 20.48 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

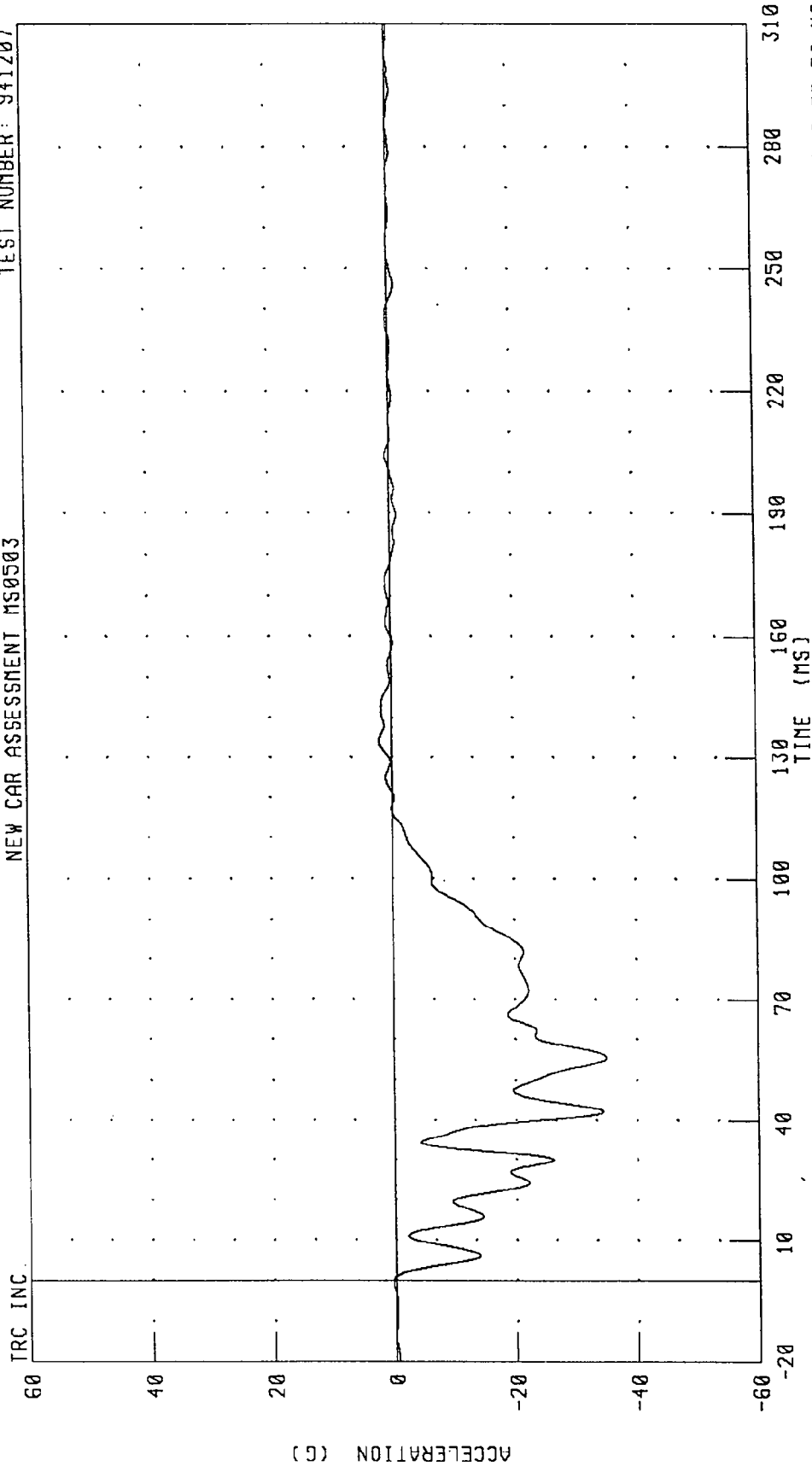


CHANNEL: TLRXGA FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

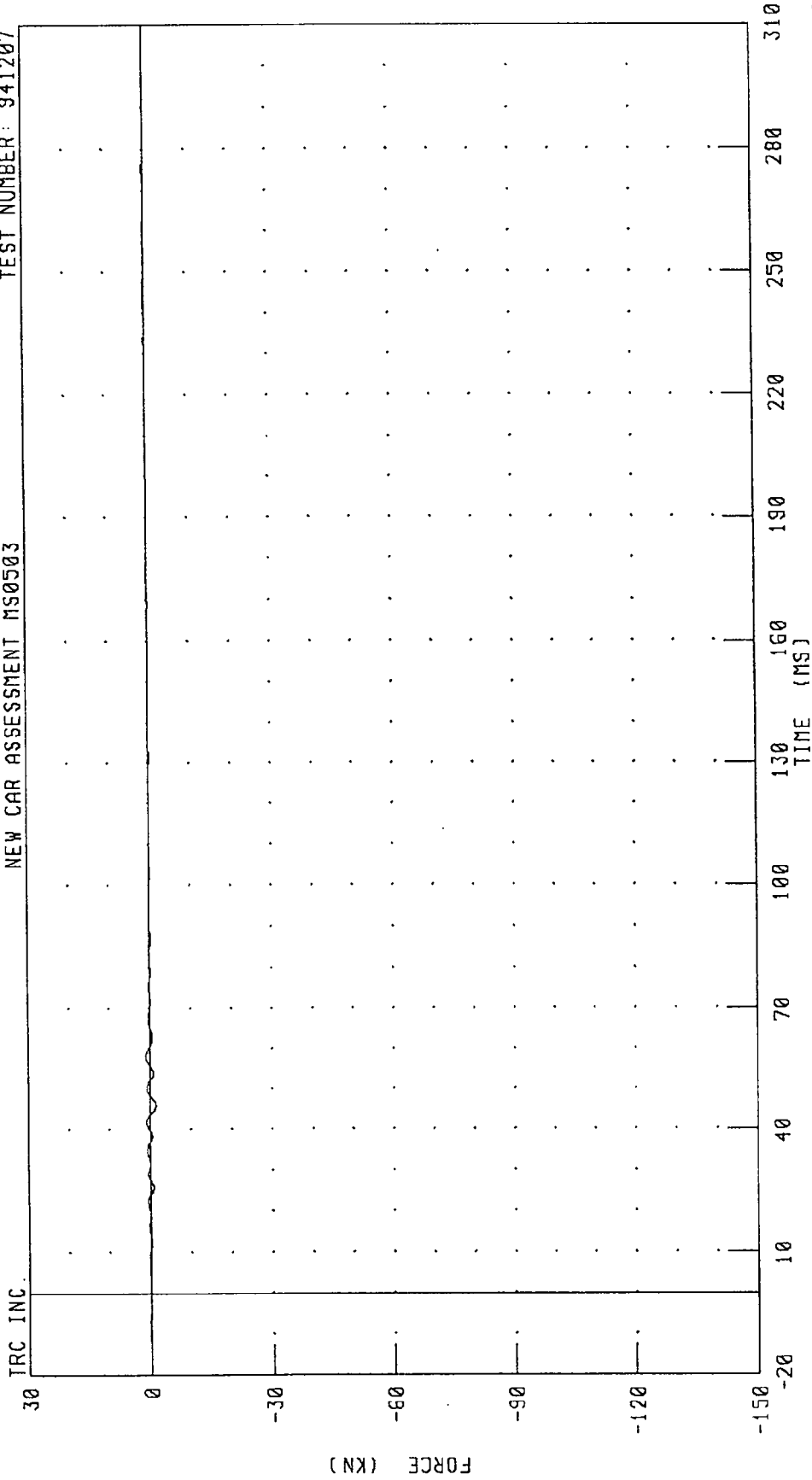


CHANNEL: TRRXGA FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A1 FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

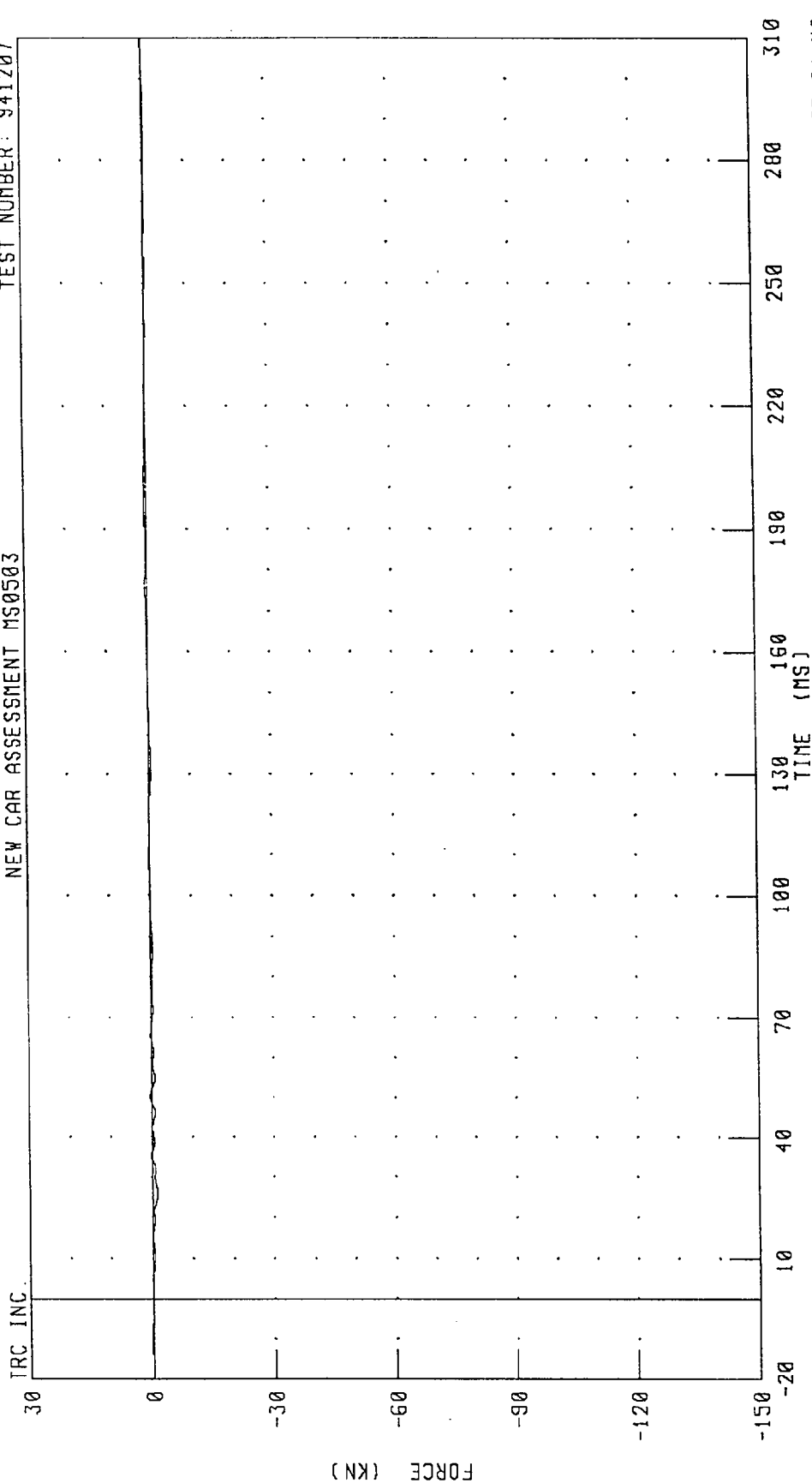


CHANNEL: BA1F FILTER: CH. CLASS 60

PEAK DATA: 1.03 KN @ 58.24 MS; -1.44 KN @ 45.84 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A2 FORCE
 NEW CAR ASSESSMENT MS0503

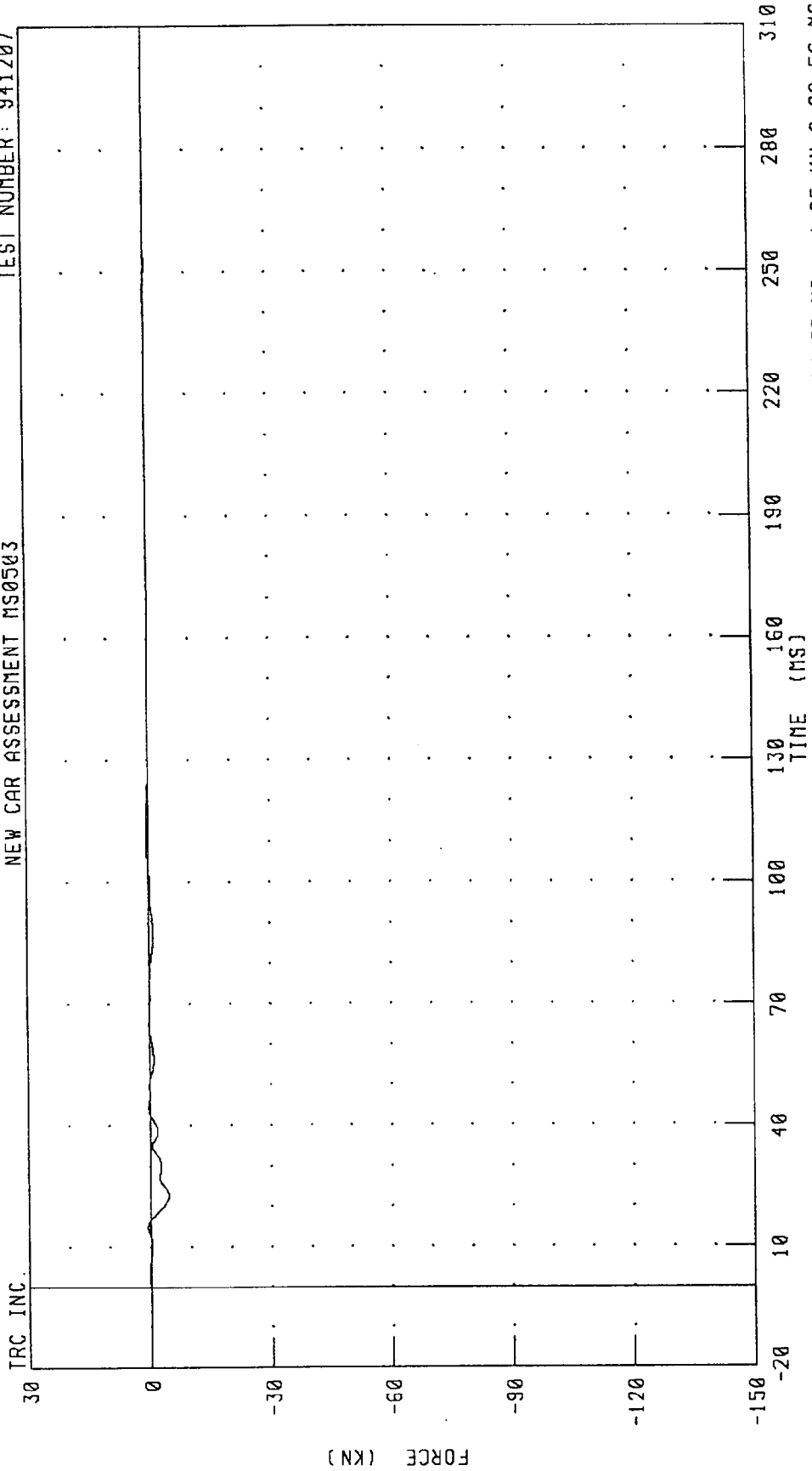
TEST NUMBER: 941207



1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A3 FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 0.63 KN @ 14.88 MS, -4.65 KN @ 22.56 MS

FILTER: CH. CLASS 60

CHANNEL: BA3F

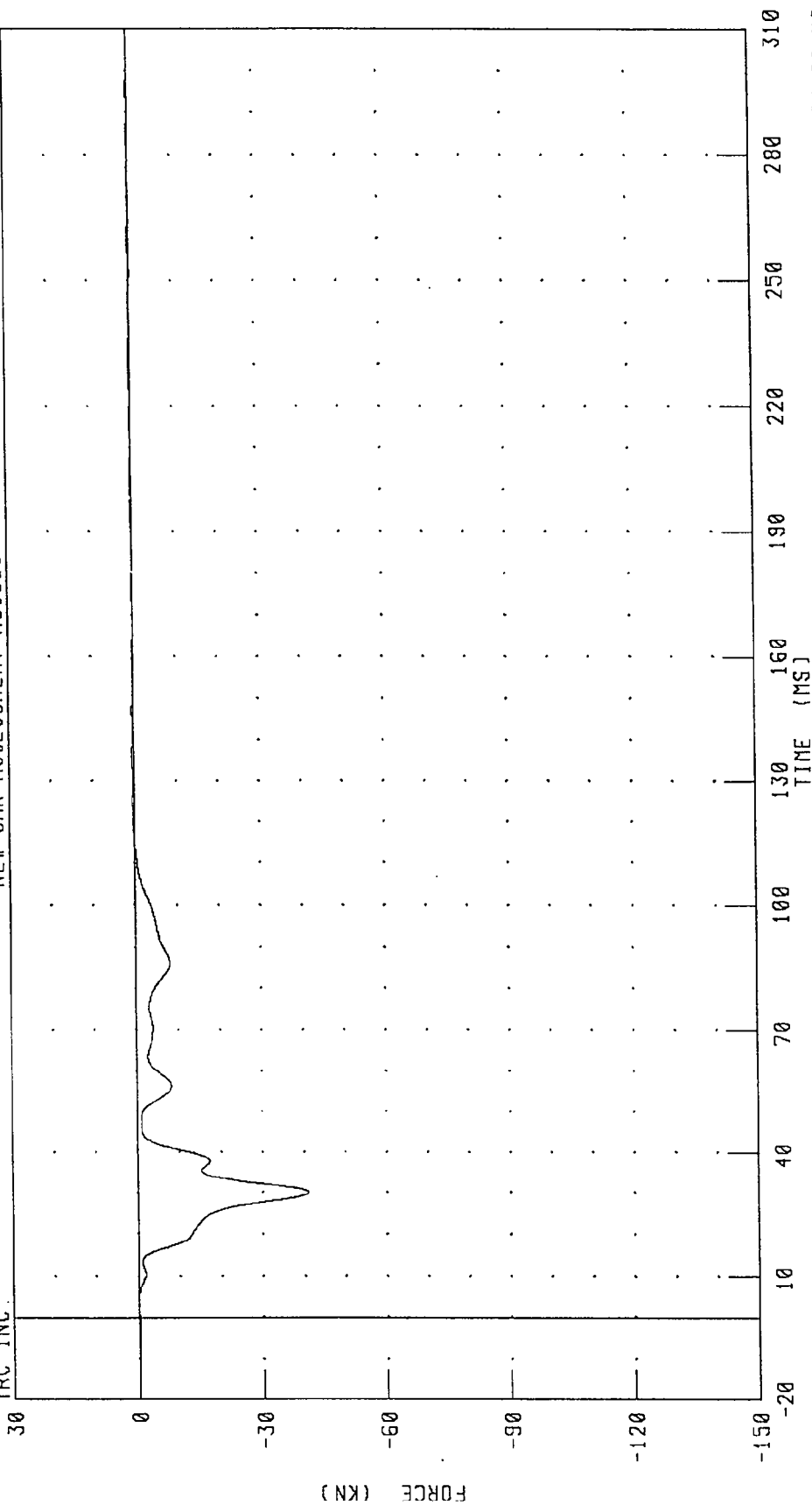
FORCE (KN)

TIME (MS)

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A4 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

IRC INC.



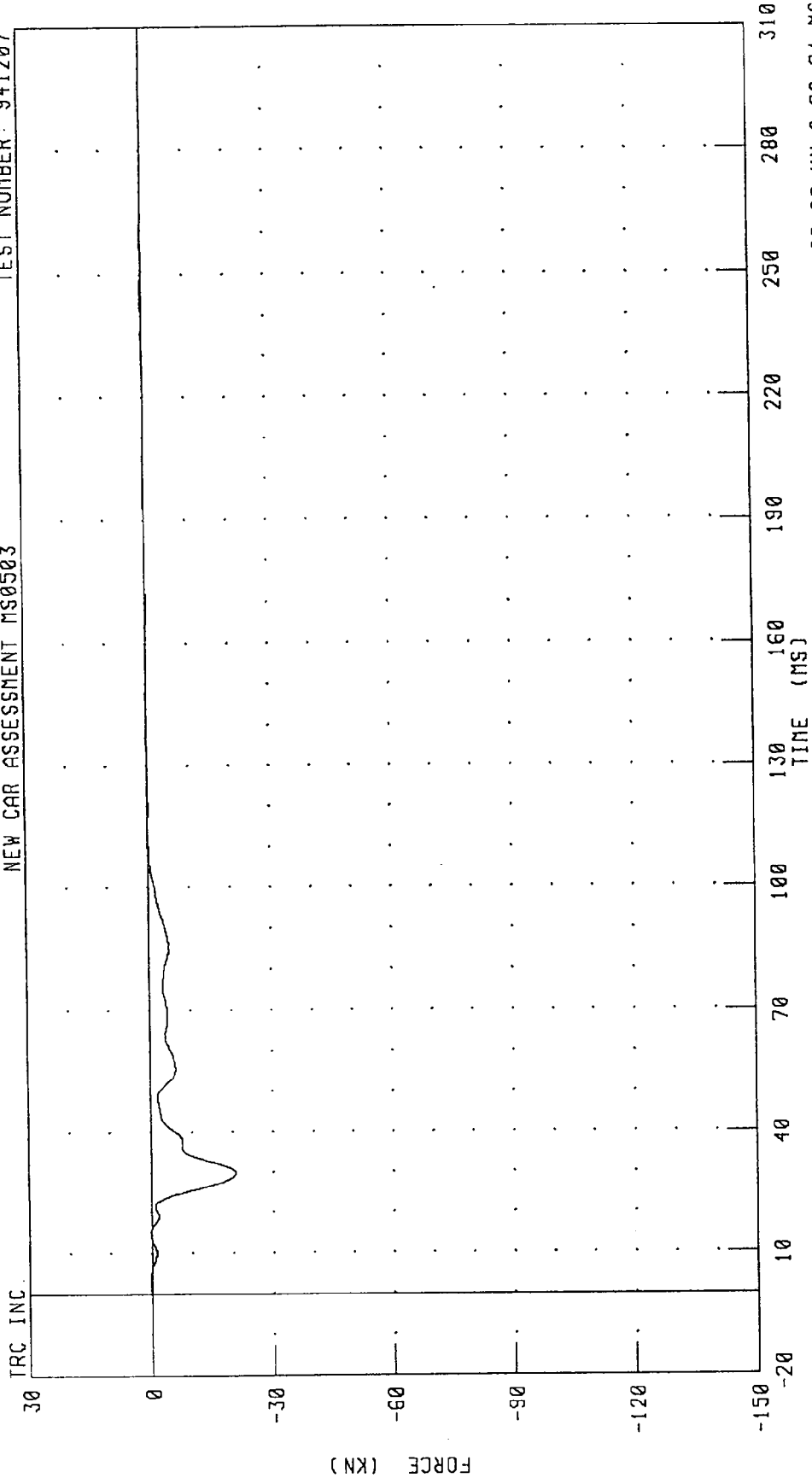
CHANNEL: BA4F FILTER: CH. CLASS 60

PEAK DATA: 0.43 KN @ 135.68 MS; -41.02 KN @ 30.08 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION AS FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

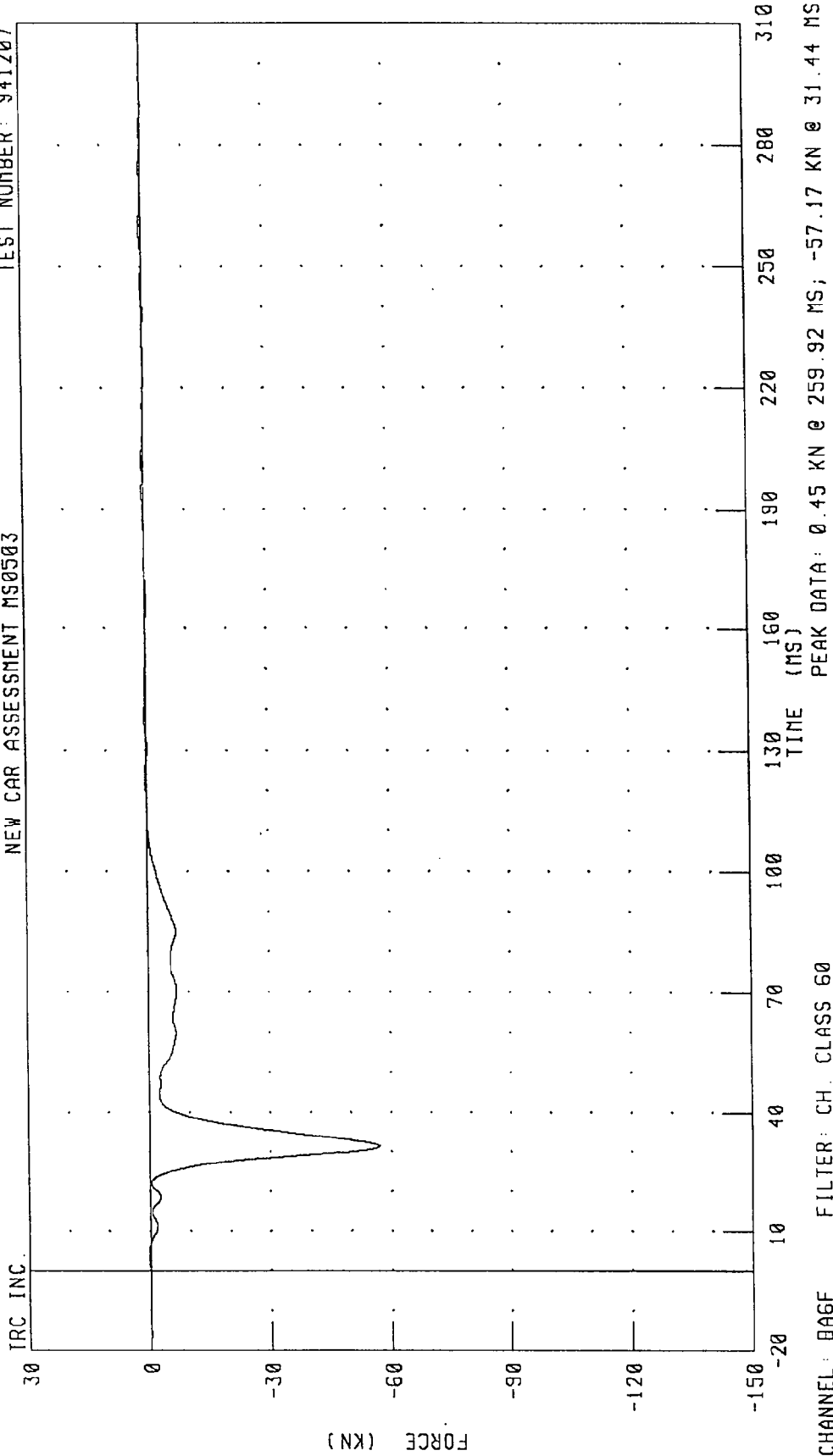


CHANNEL: BASF FILTER: CH. CLASS 60

PEAK DATA: 0.29 KN @ 3.20 MS; -20.82 KN @ 29.84 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A6 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



CHANNEL: BAGF FILTER: CH. CLASS 60

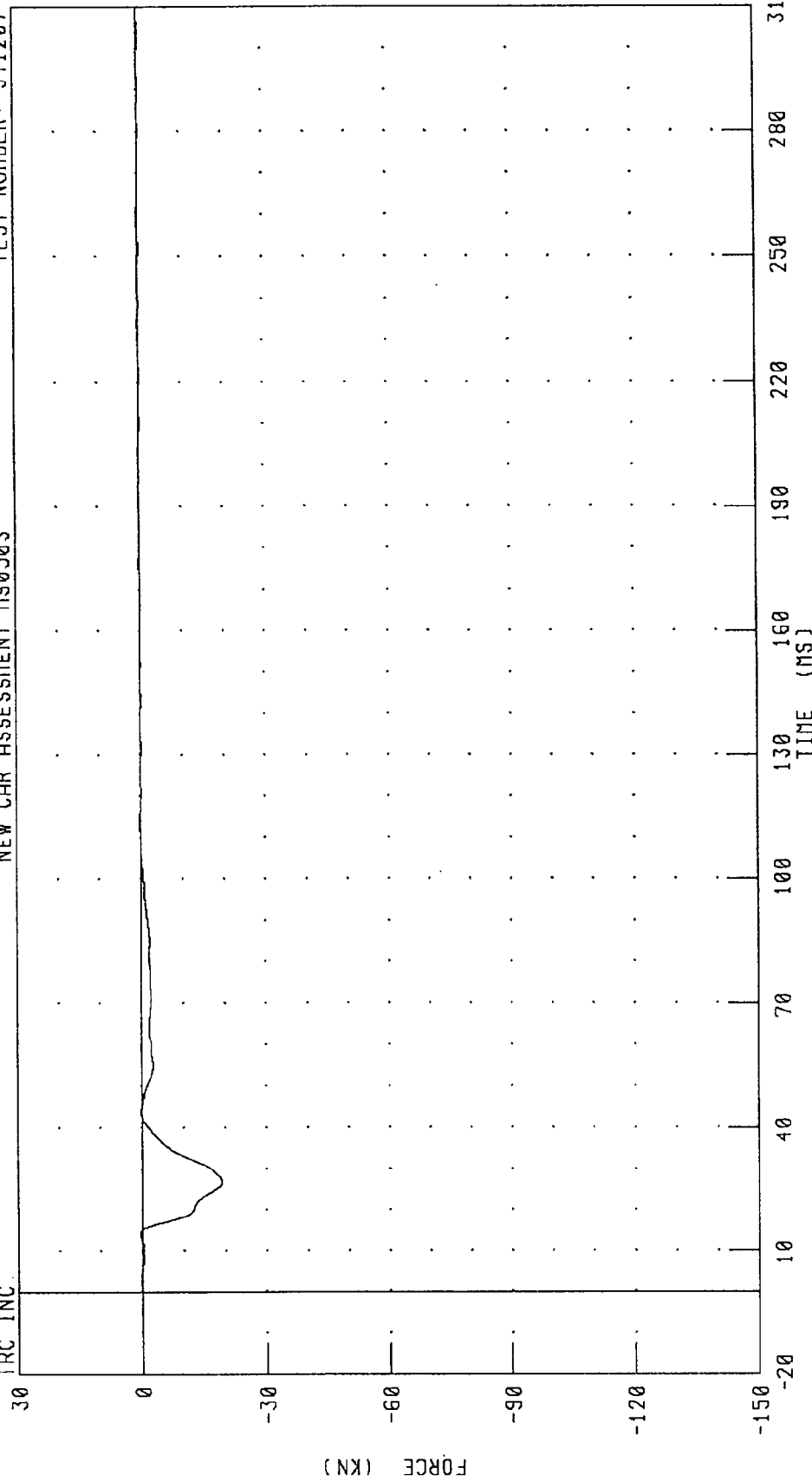
PEAK DATA: 0.45 KN @ 259.92 MS; -57.17 KN @ 31.44 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



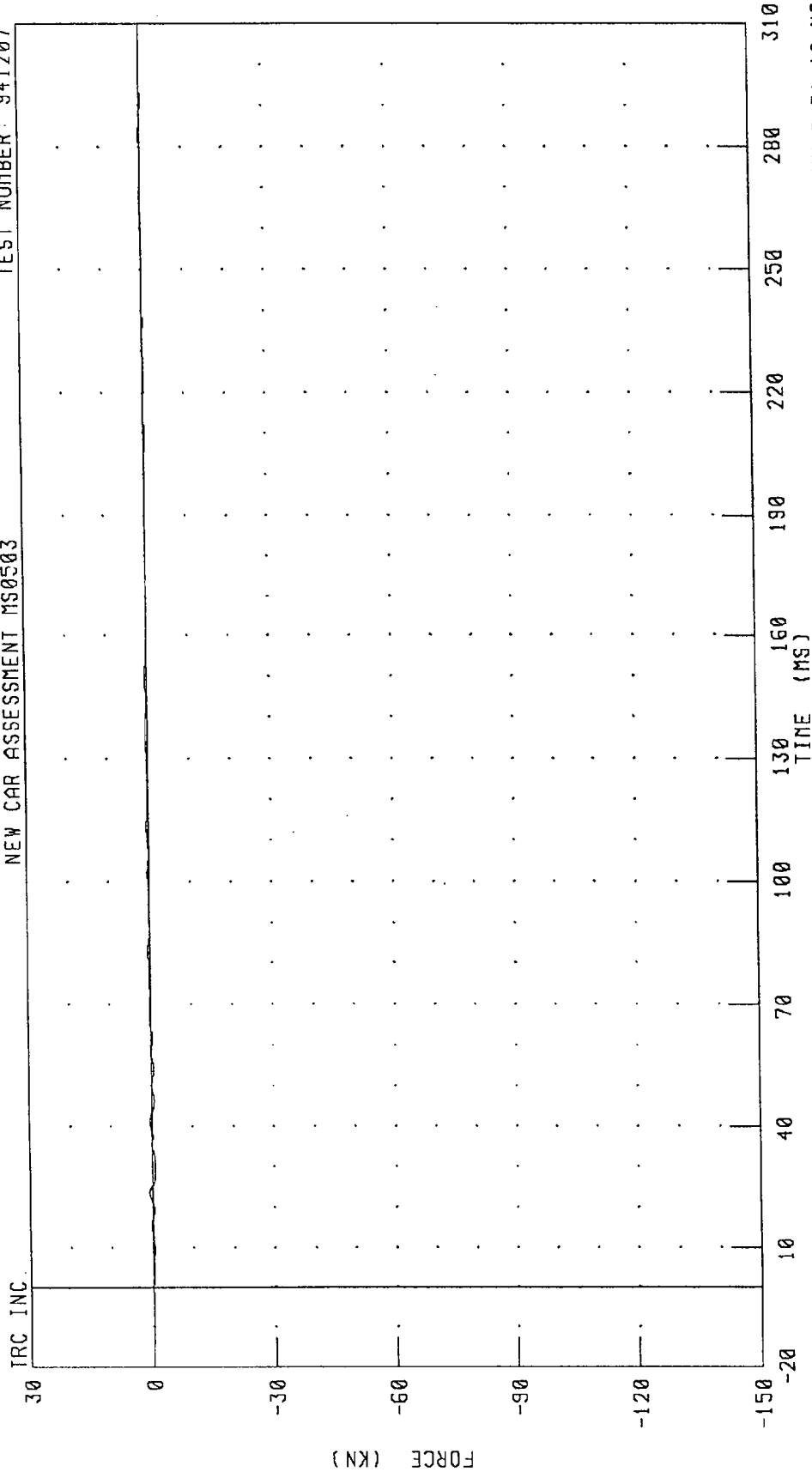
PEAK DATA: 0.55 KN @ 14.16 MS; -19.16 KN @ 26.88 MS

FILTER: CH. CLASS 60

CHANNEL: BA7F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A8 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 0.69 KN @ 23.60 MS; -0.90 KN @ 31.12 MS

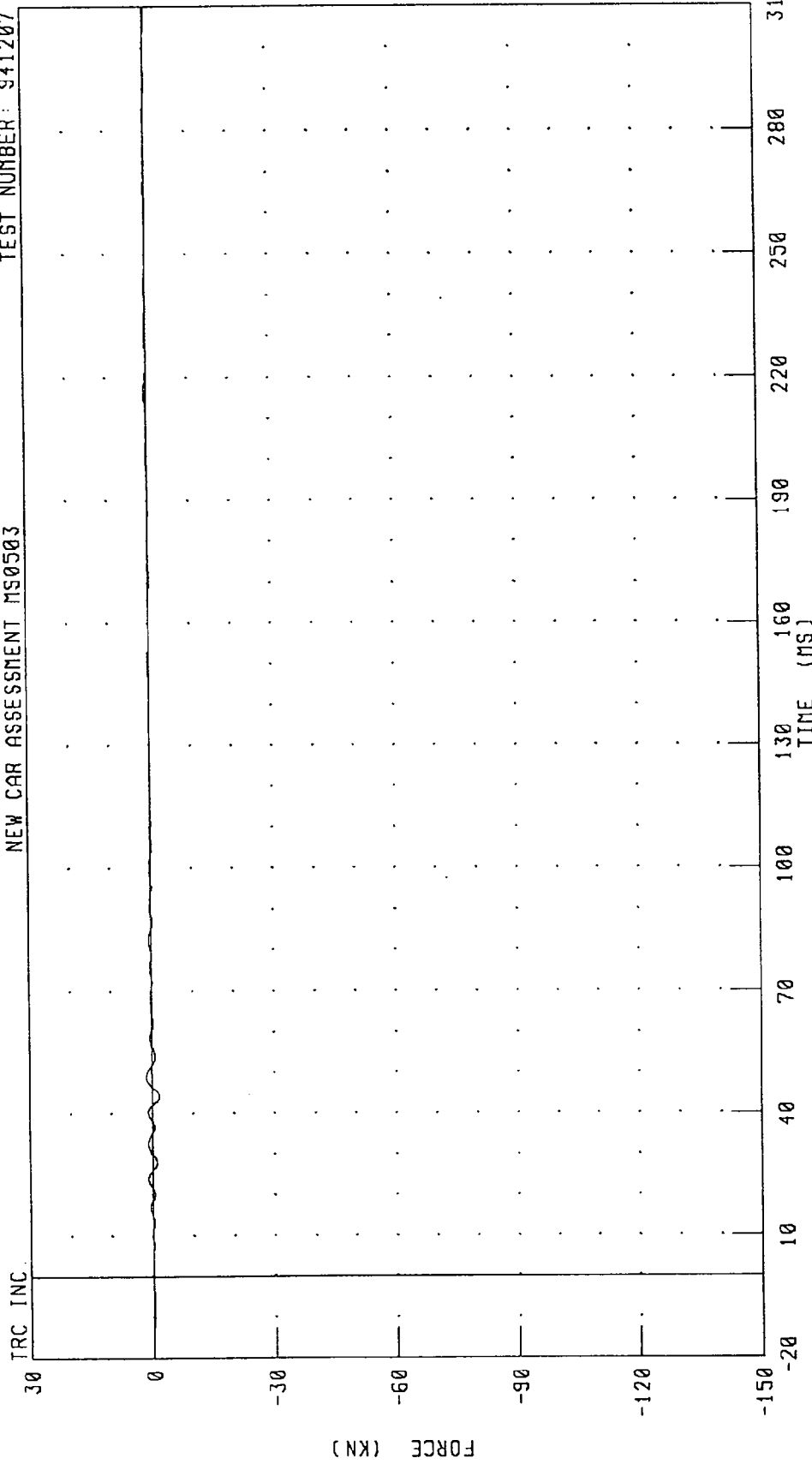
FILTER: CH. CLASS 60

CHANNEL: BA8F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A9 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503



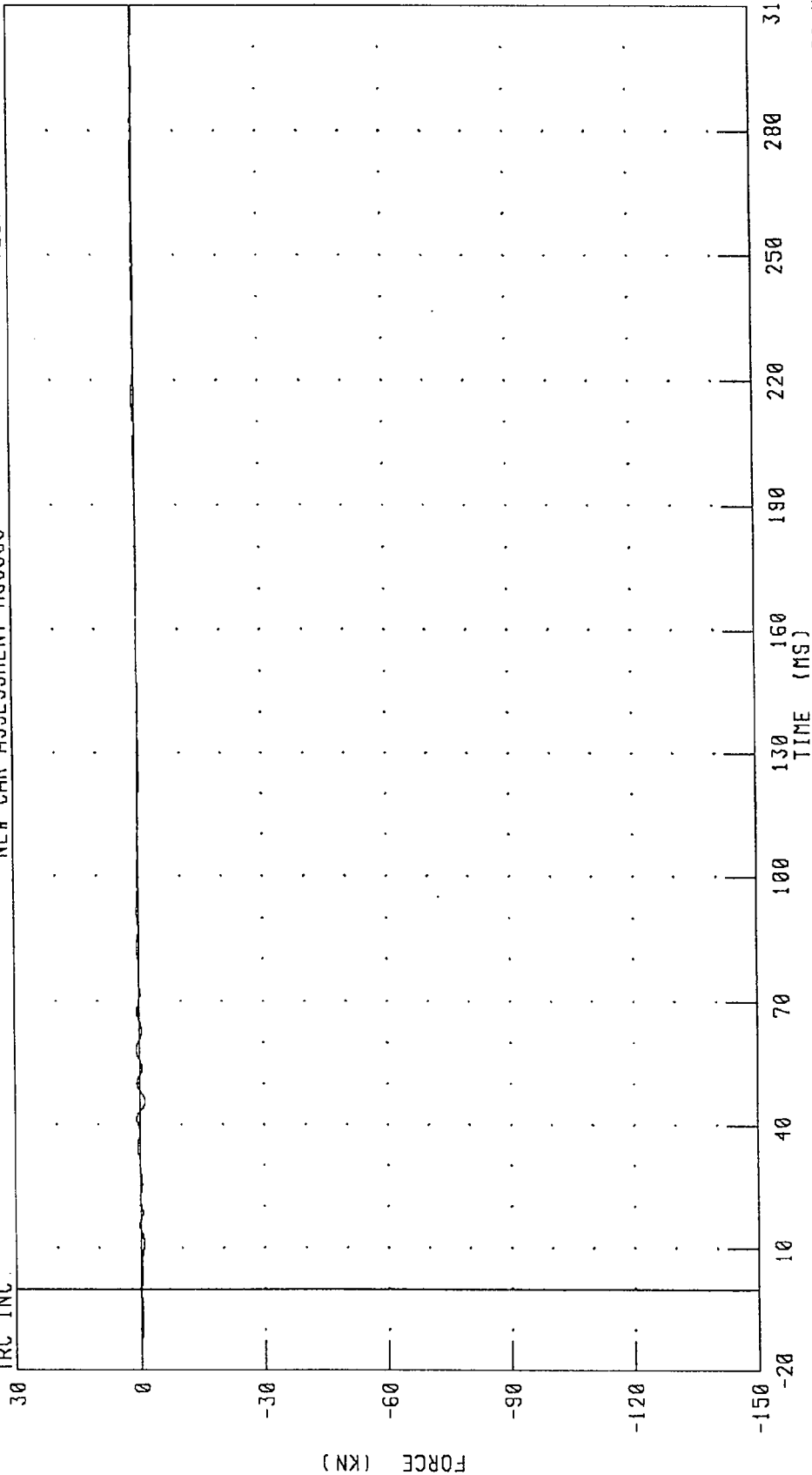
PEAK DATA: 1.40 KN @ 48.96 MS; -1.78 KN @ 44.32 MS

CHANNEL: BA9F FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B1 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

TRC INC.



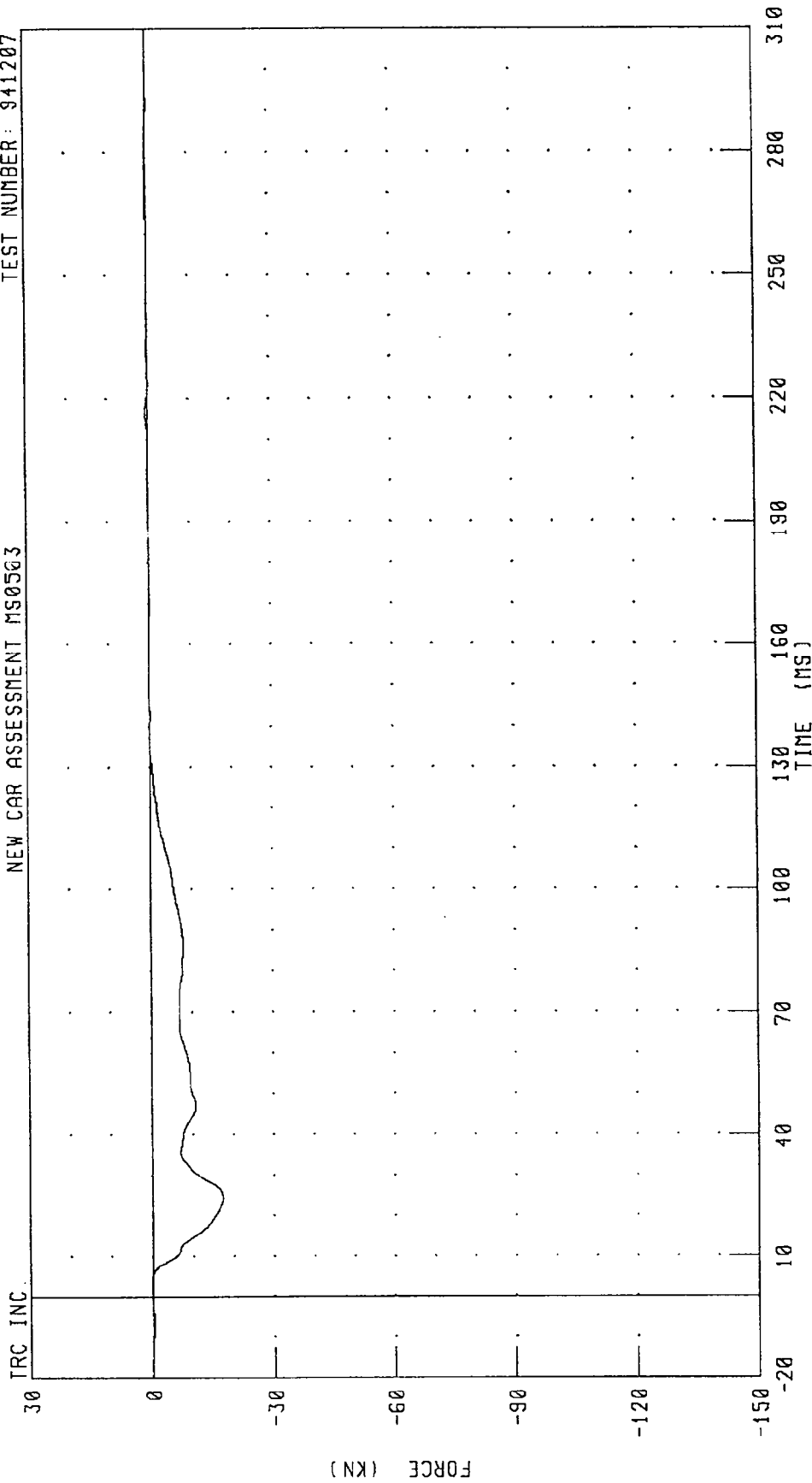
PEAK DATA: 0.71 KN @ 58.08 MS, -1.27 KN @ 45.68 MS

CHANNEL: BBIF FILTER: CH CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B2 FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 0.38 KN @ 216.88 MS, -17.29 KN @ 24.40 MS

FILTER: CH. CLASS 60

CHANNEL: BB2F

FORCE (KN)

310

280

250

220

190

160

130

100

70

40

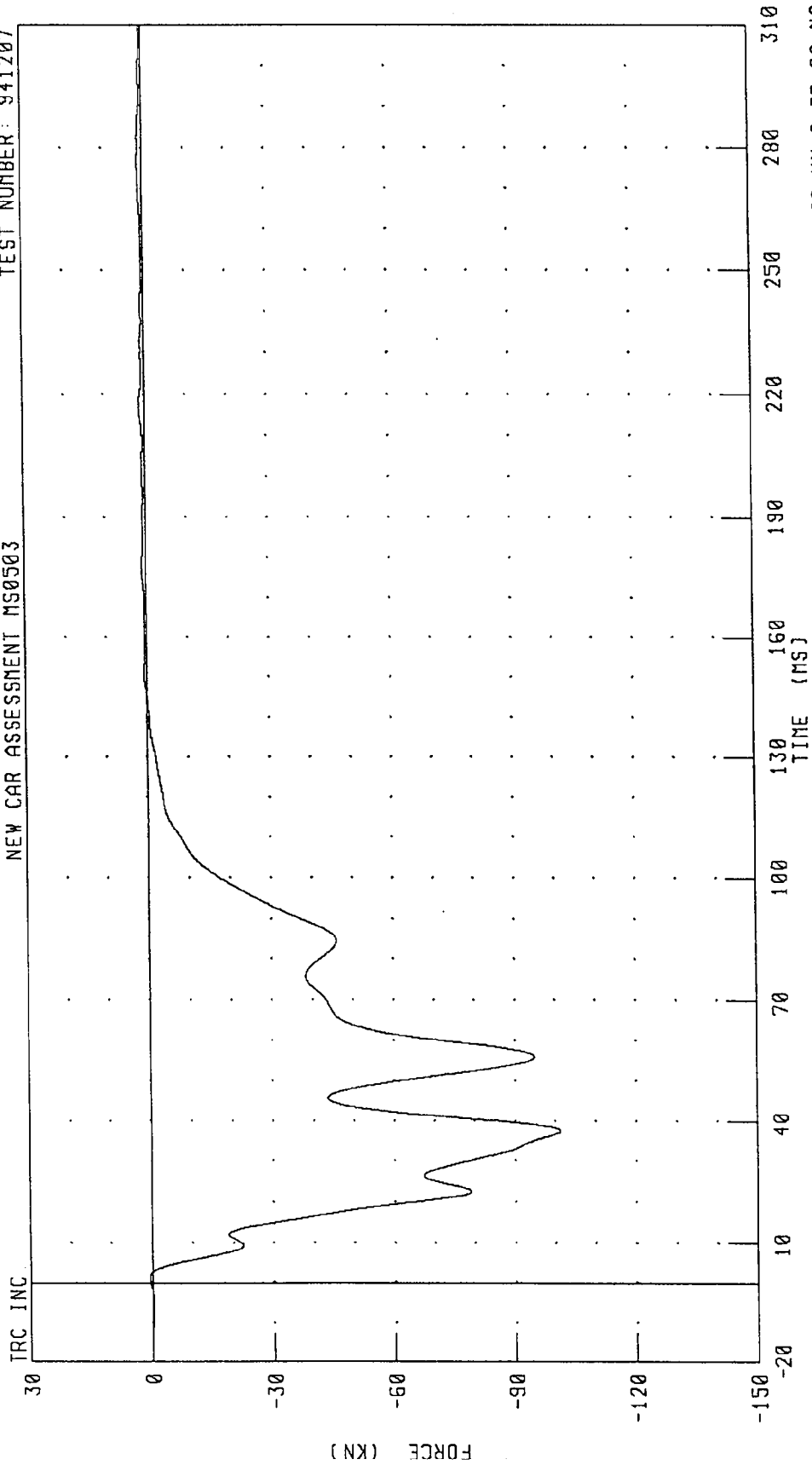
10

-20

-50

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B3 FORCE
 NEW CAR ASSESSMENT MS0503

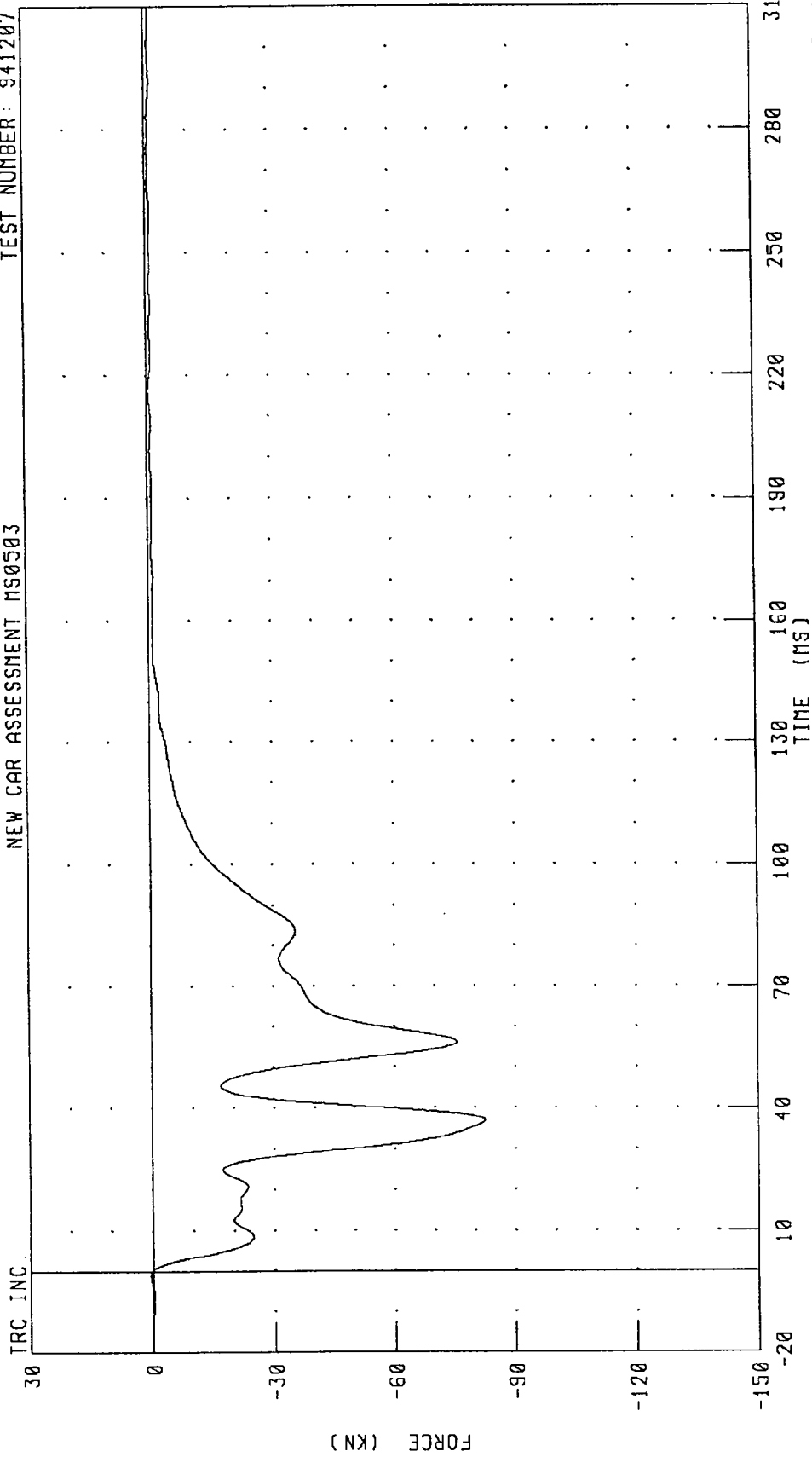
TEST NUMBER: 941207



1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 0.60 KN @ -1.20 MS; -82.51 KN @ 37.04 MS

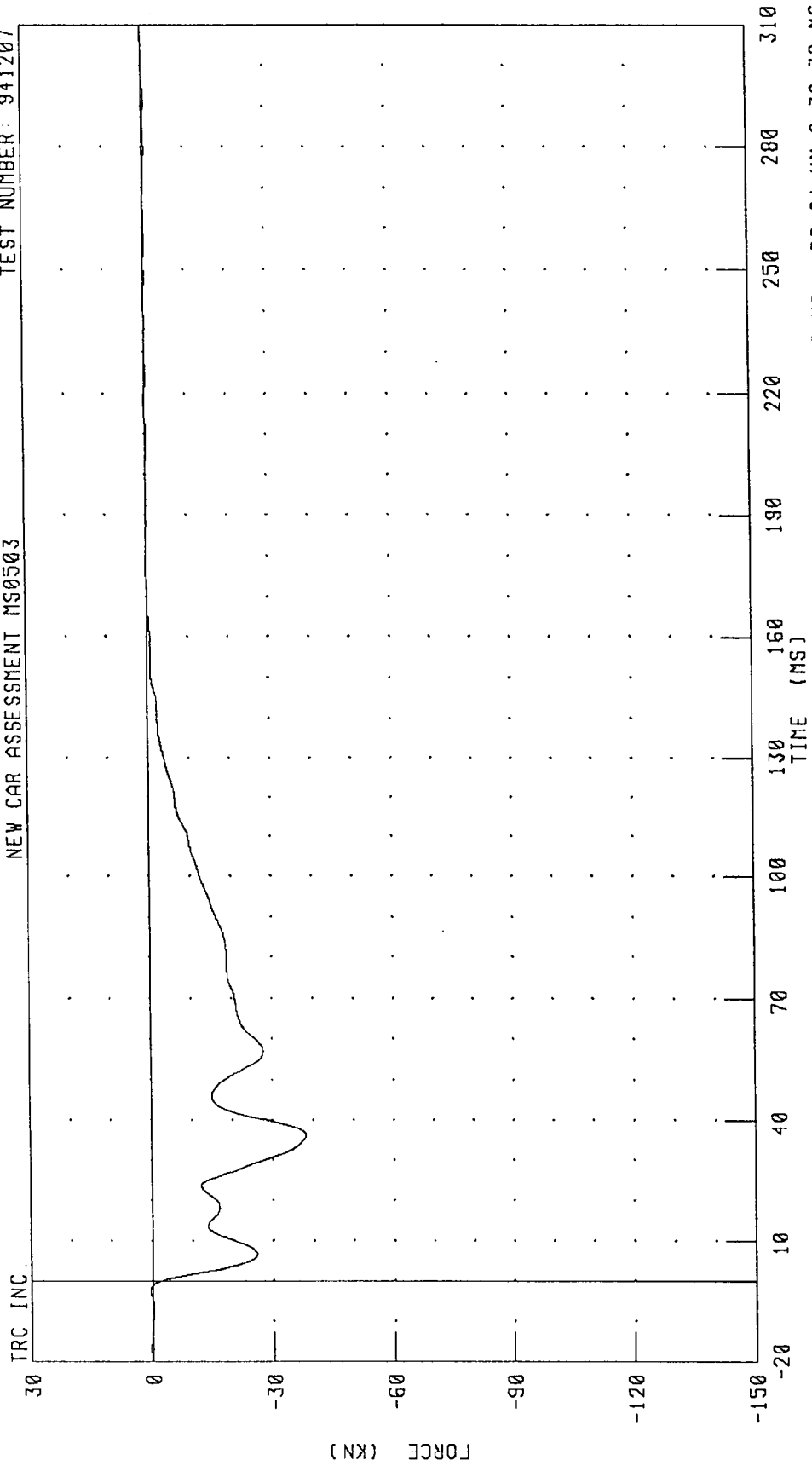
FILTER: CH. CLASS 60

CHANNEL: BB4F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503



CHANNEL: BB5F

FILTER: CH. CLASS 60

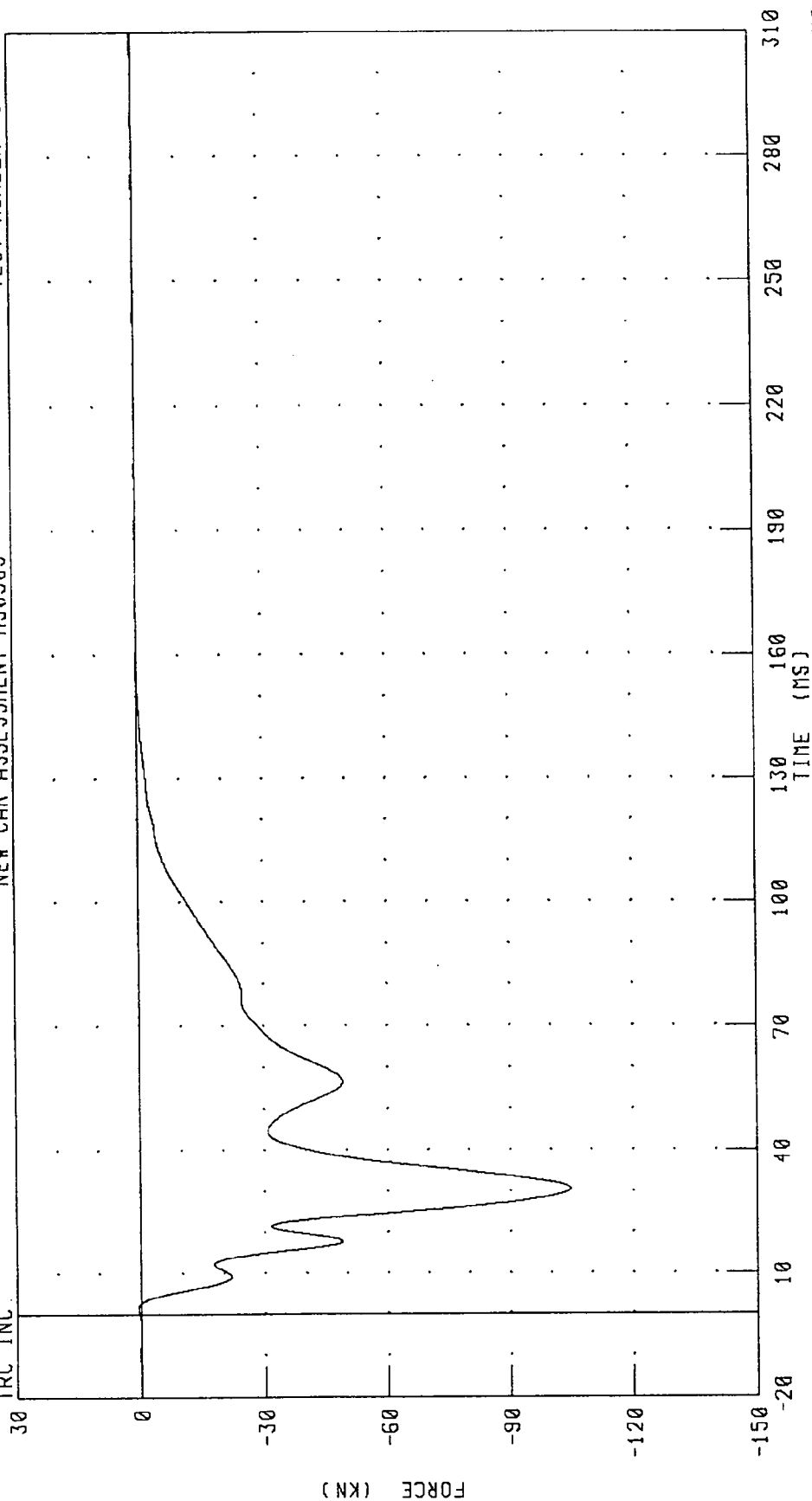
PEAK DATA: 0.59 KN @ -2.48 MS; -38.24 KN @ 36.32 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B6 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



PEAK DATA: 0.54 KN @ 1.12 MS; -104.87 KN @ 30.72 MS

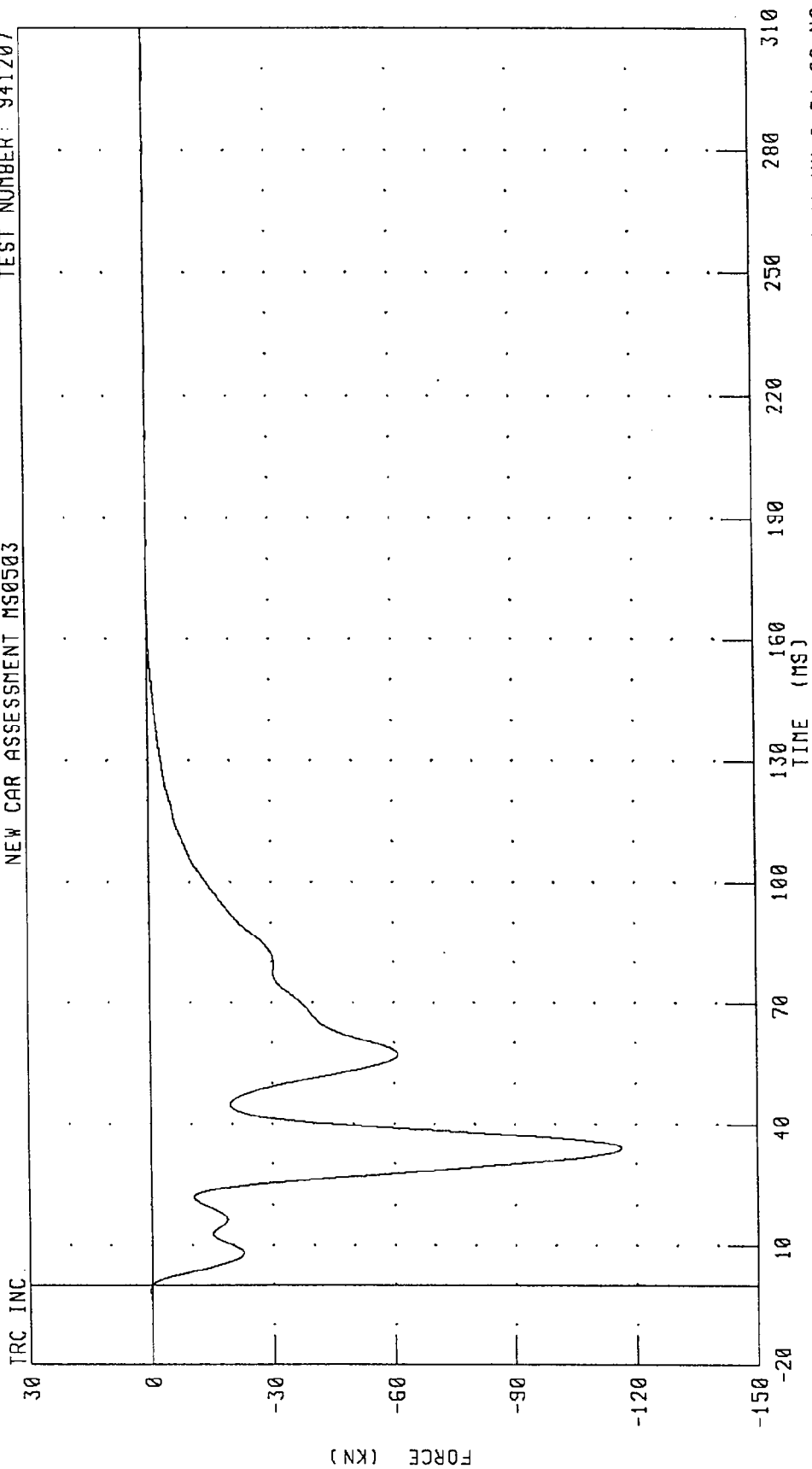
FILTER: CH. CLASS 60

CHANNEL: BB6F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B7 FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



CHANNEL: BB7F FILTER: CH. CLASS 60

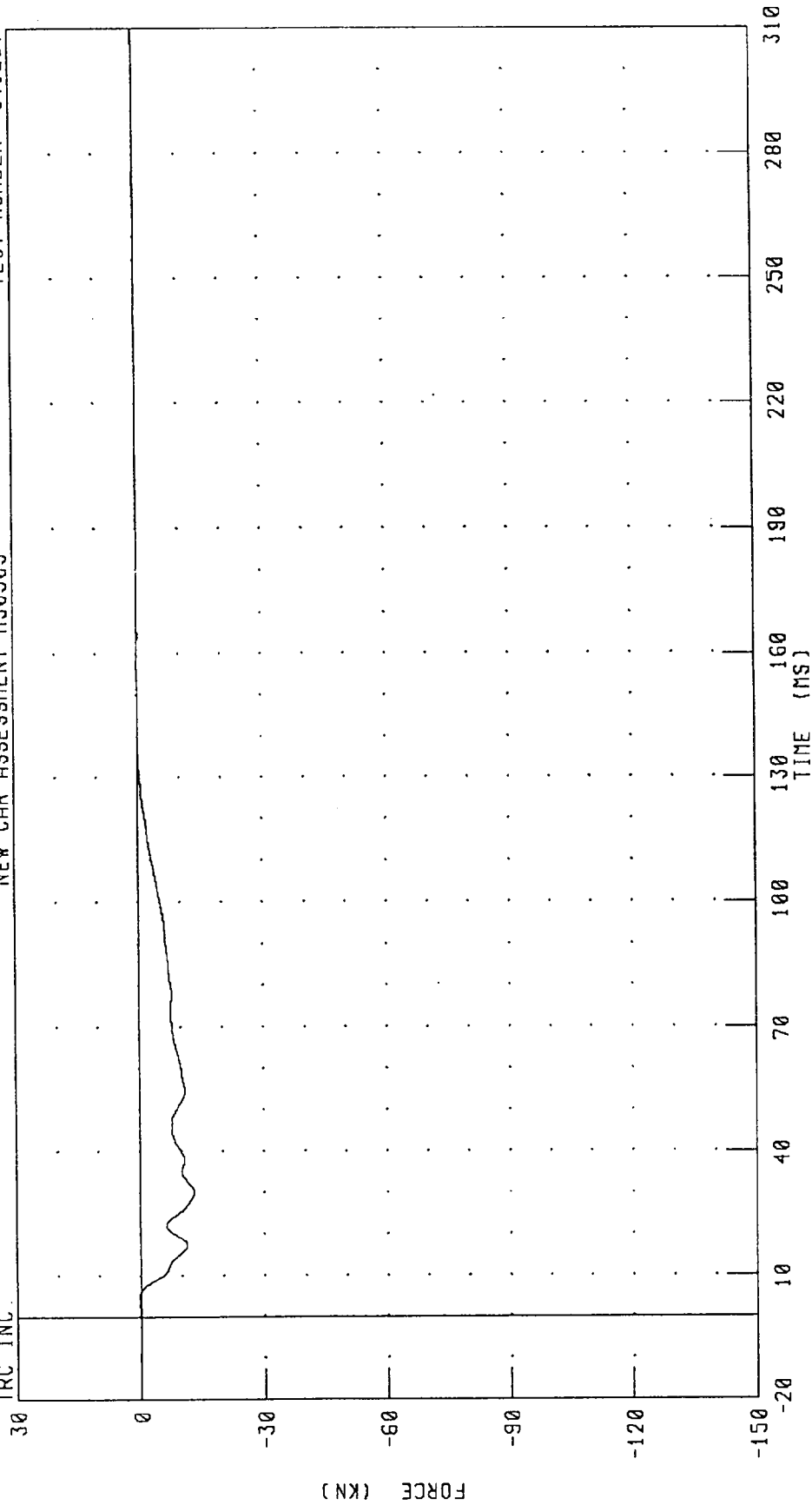
PEAK DATA: 0.38 KN @ -1.60 MS; -116.41 KN @ 34.08 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



PEAK DATA: 0.27 KN @ 4.32 MS; -13.08 KN @ 30.24 MS

FILTER: CH. CLASS 60

CHANNEL: BB8F

FORCE (KN)

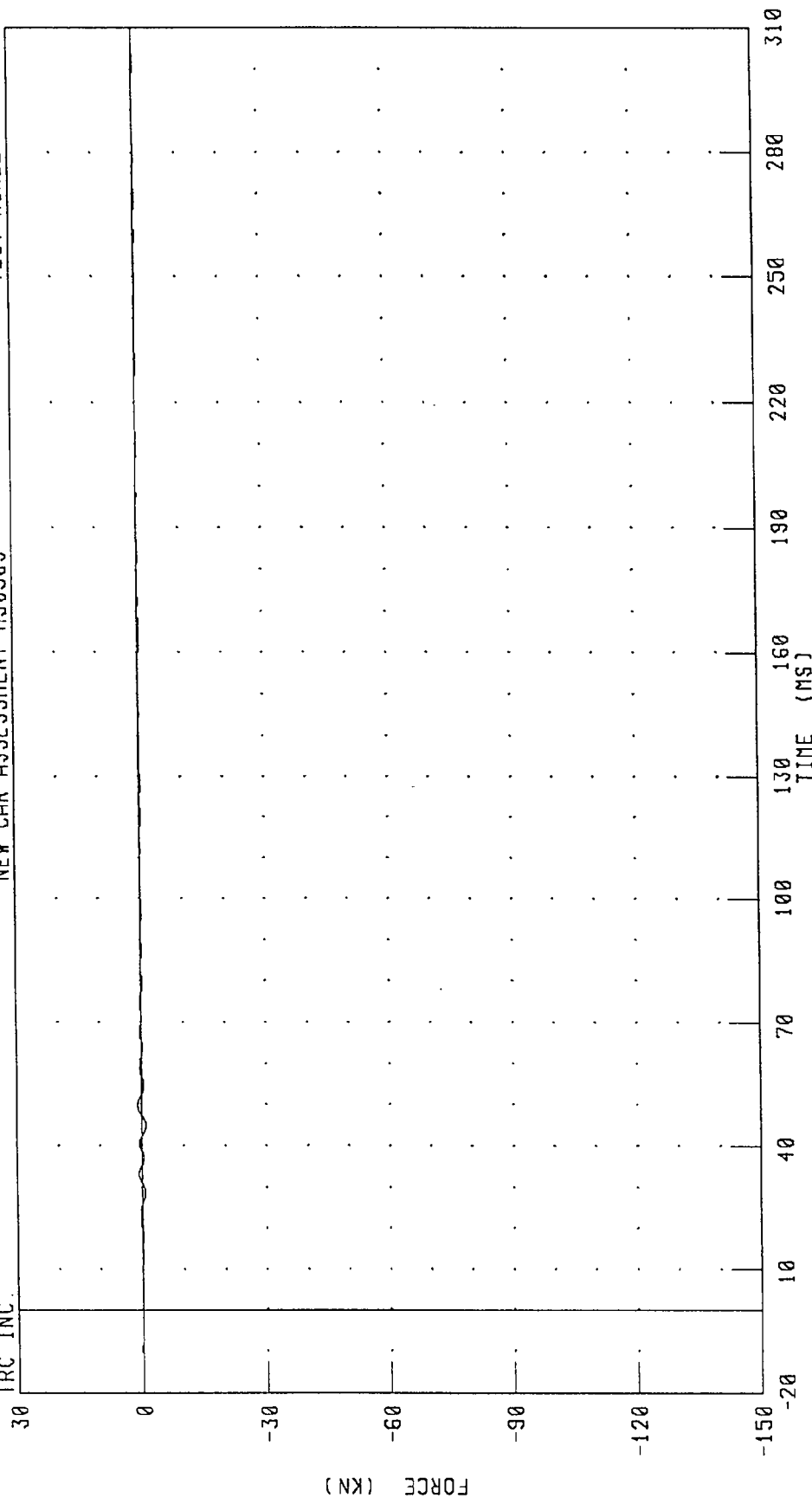
TIME (MS)

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B9 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



PEAK DATA: 0.87 KN @ 49.76 MS; -1.09 KN @ 44.88 MS

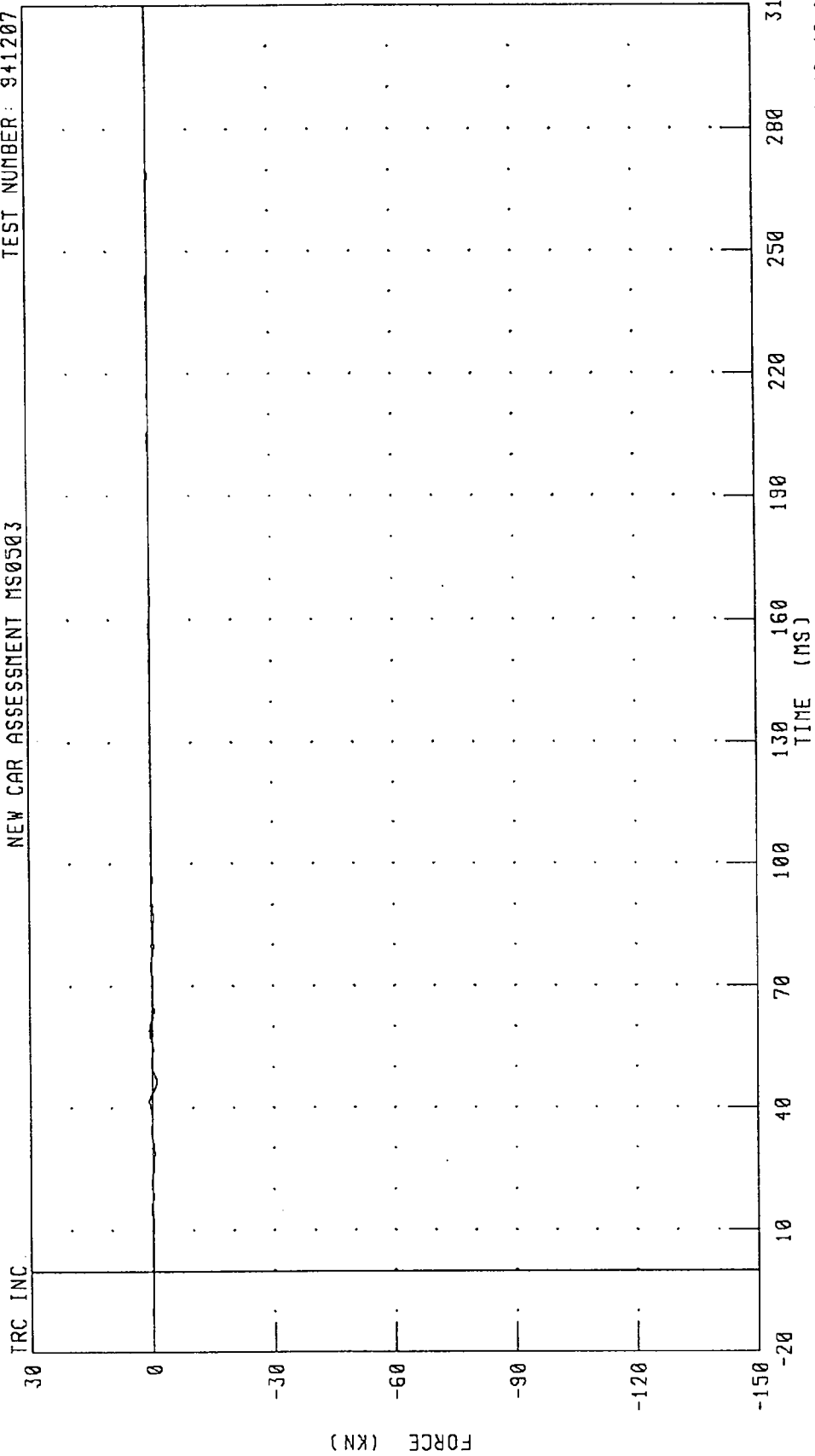
FILTER: CH. CLASS 60

CHANNEL: BB9F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C1 FORCE

TEST NUMBER: 941207

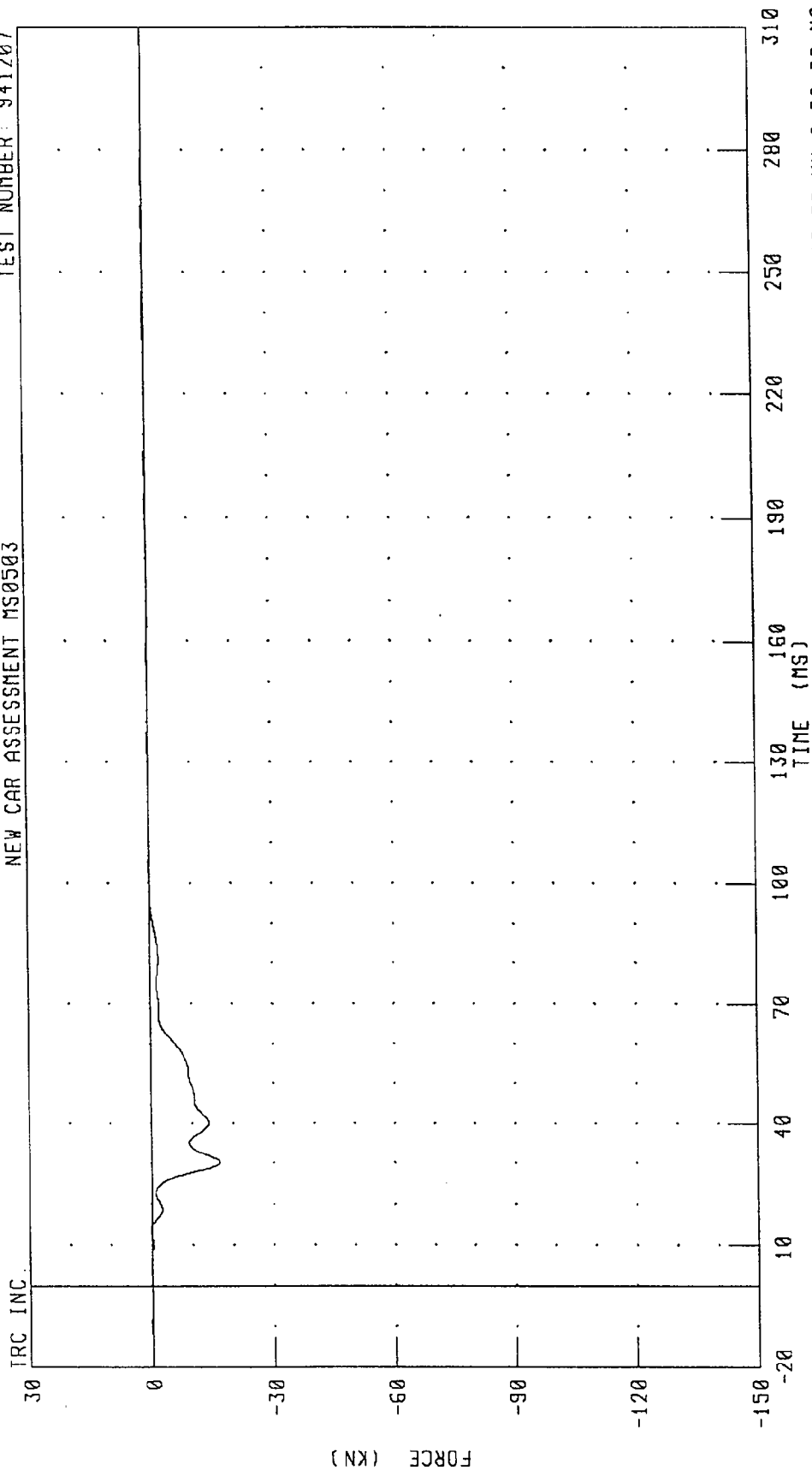
NEW CAR ASSESSMENT MS0503



CHANNEL: BC1F FILTER: CH CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C2 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

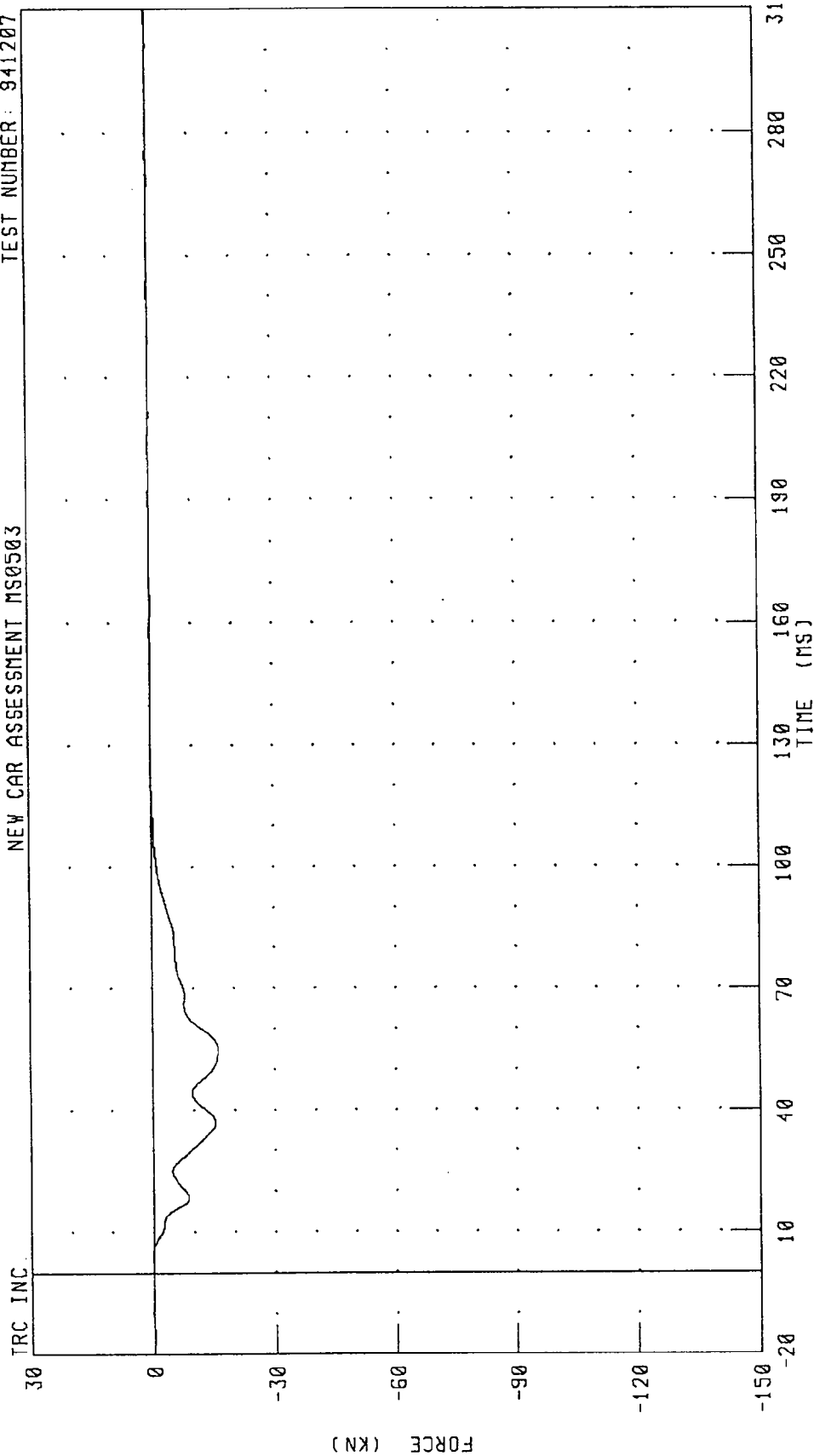


PEAK DATA: 0.24 KN @ 274.72 MS; -16.70 KN @ 30.32 MS

CHANNEL: BC2F FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C3 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

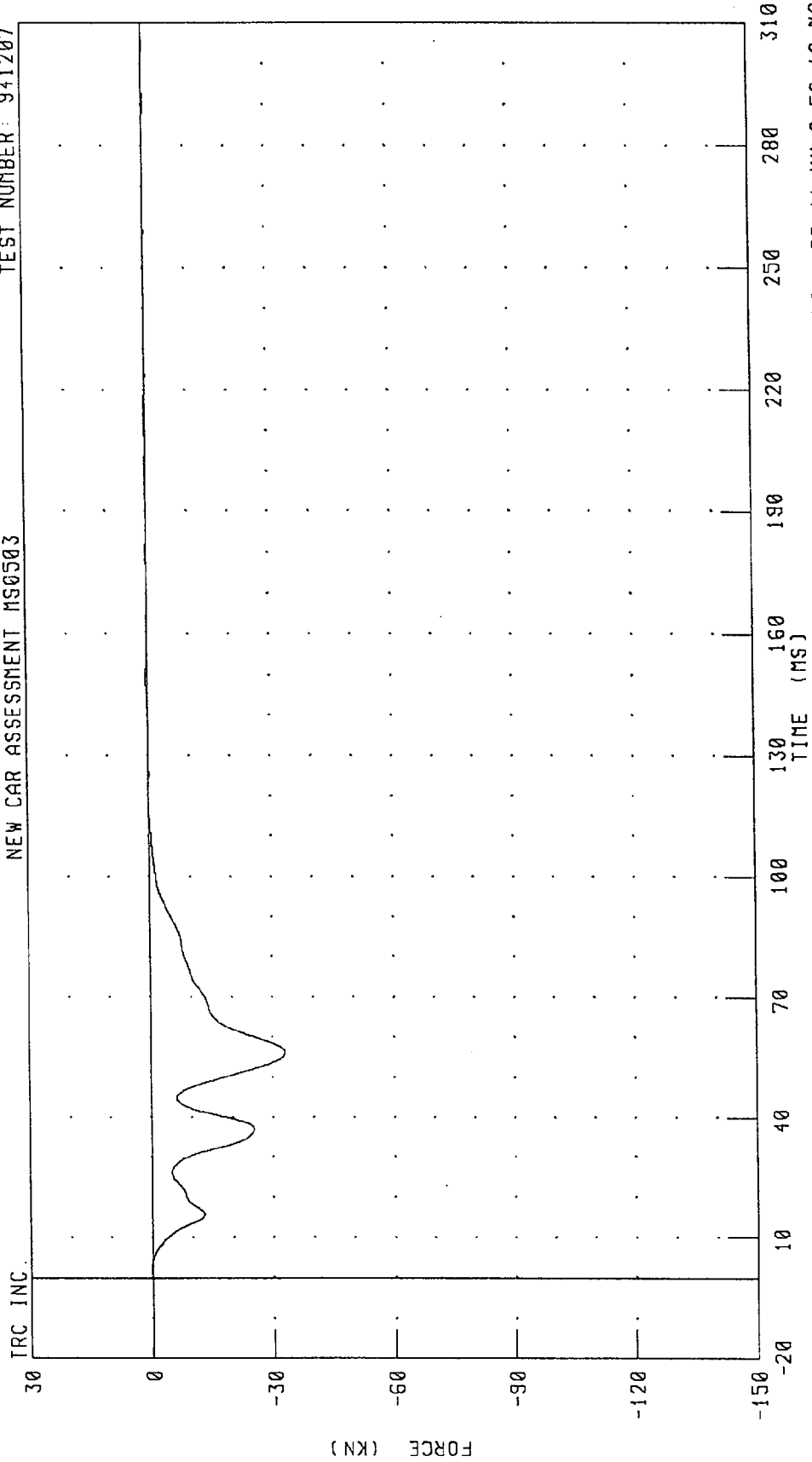


PEAK DATA: 0.19 KN @ 203.84 MS; -16.02 KN @ 54.64 MS

CHANNEL: BC3F FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C4 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



CHANNEL: BC4F FILTER: CH. CLASS 60

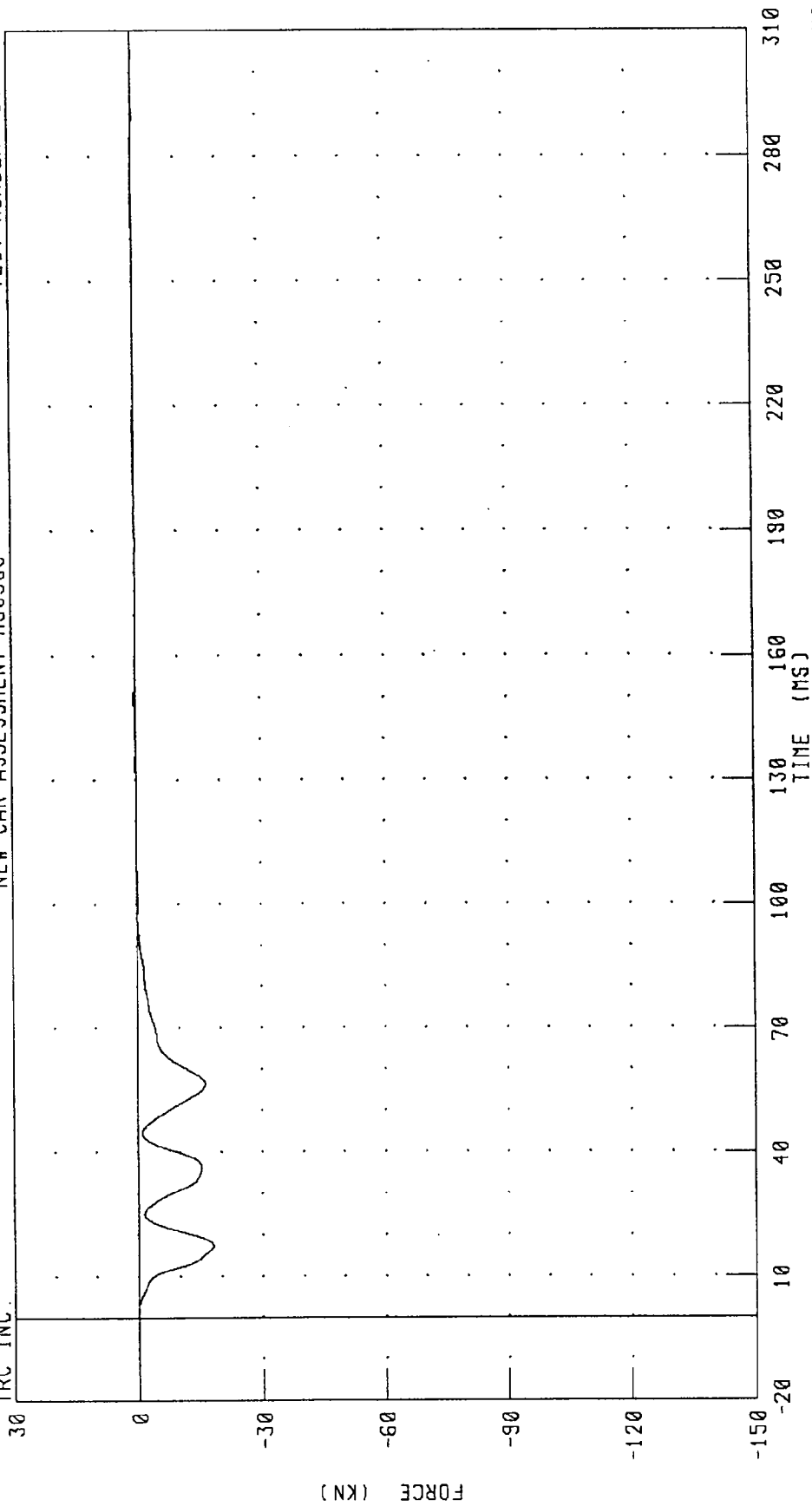
PEAK DATA: 0.38 KN @ 149.68 MS; -33.11 KN @ 56.16 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C5 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



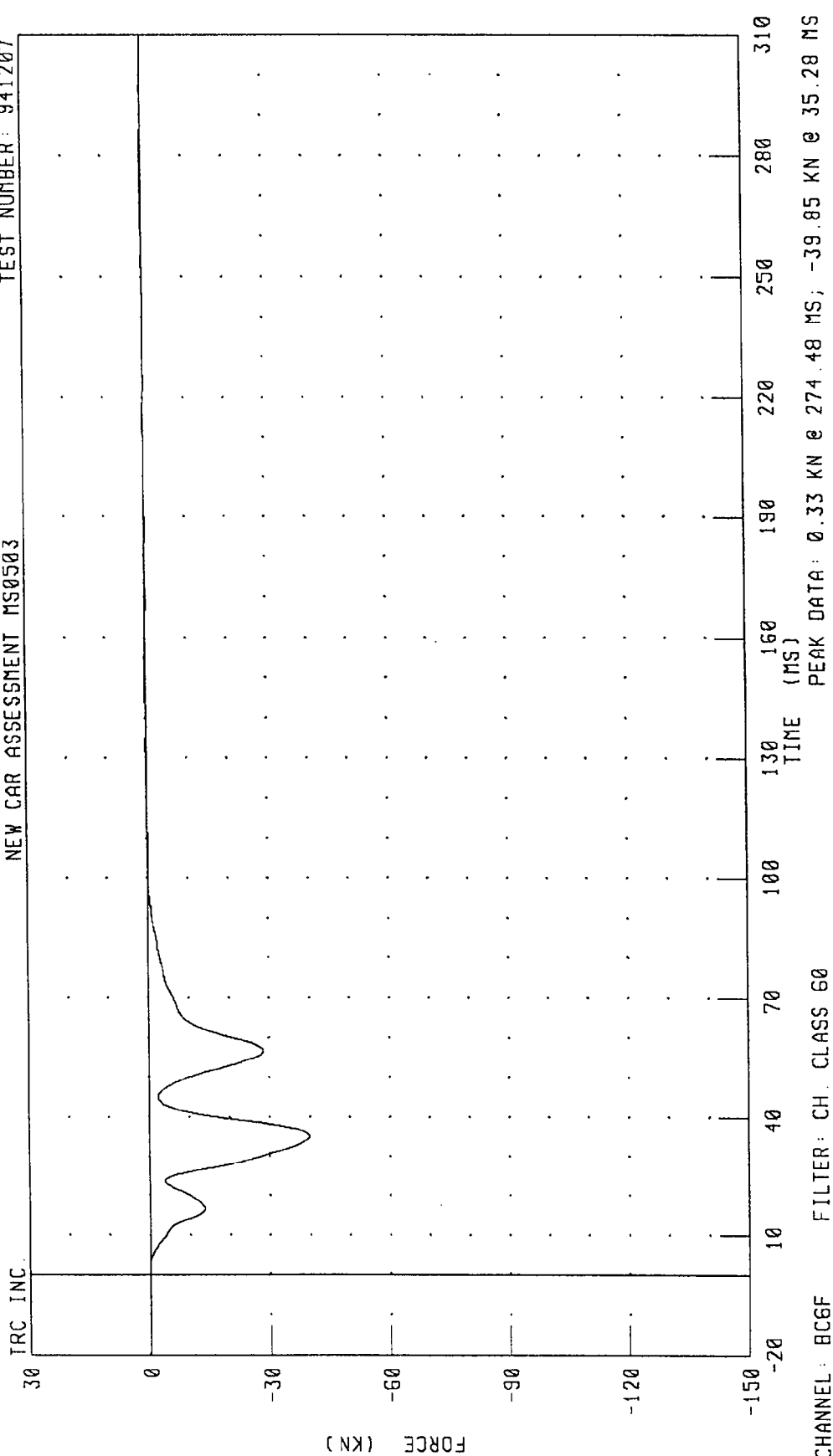
PEAK DATA: 0.36 KN @ 150.00 MS, -17.98 KN @ 17.44 MS

FILTER: CH. CLASS 60

CHANNEL: BC5F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C6 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

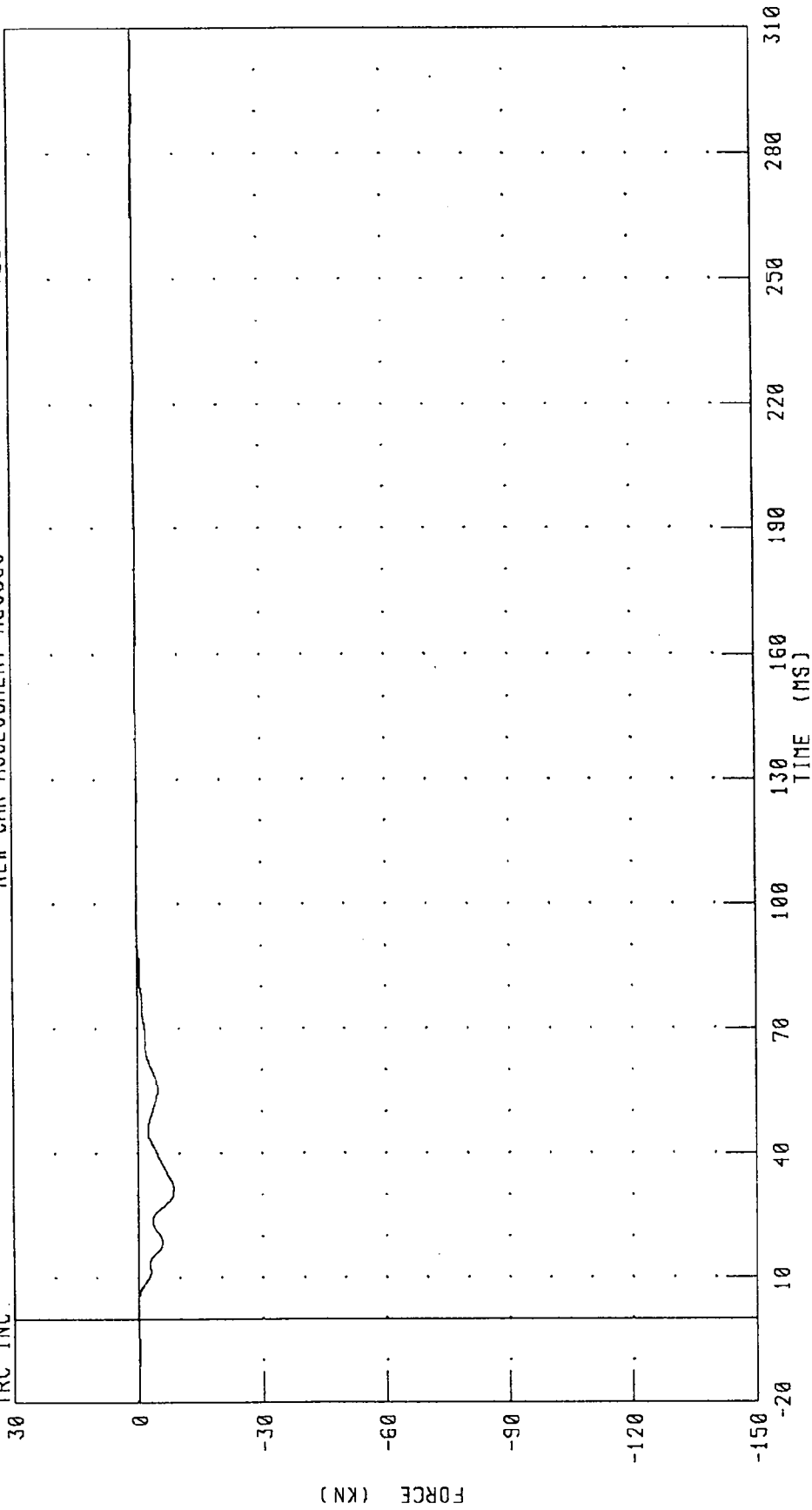


1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C7 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



PEAK DATA: 0.31 KN @ 215.28 MS; -8.55 KN @ 31.76 MS

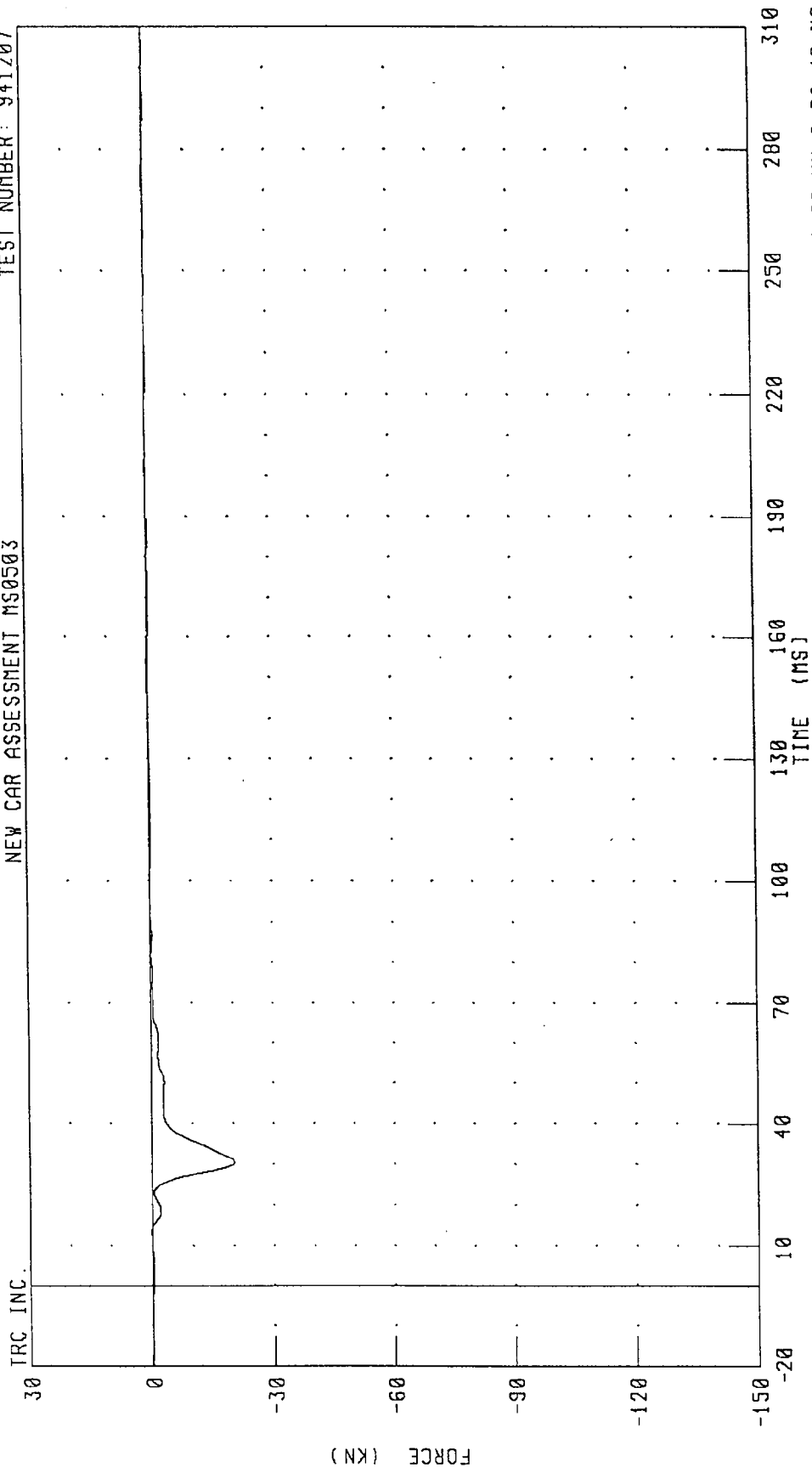
FILTER: CH. CLASS 60

CHANNEL: BC7F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C8 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

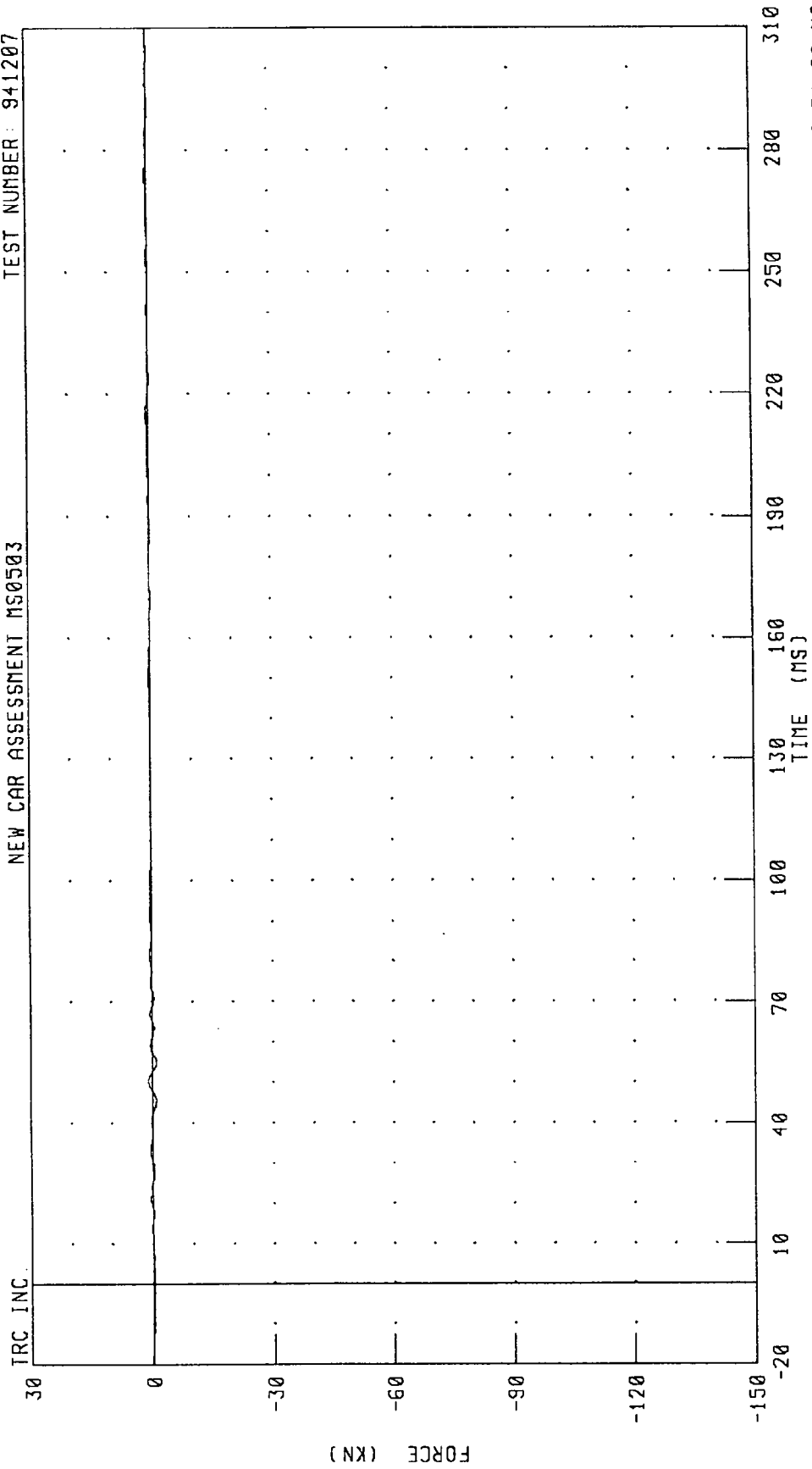


CHANNEL: BC8F FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C9 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503



PEAK DATA: 0.91 KN @ 50.32 MS; -1.03 KN @ 54.96 MS

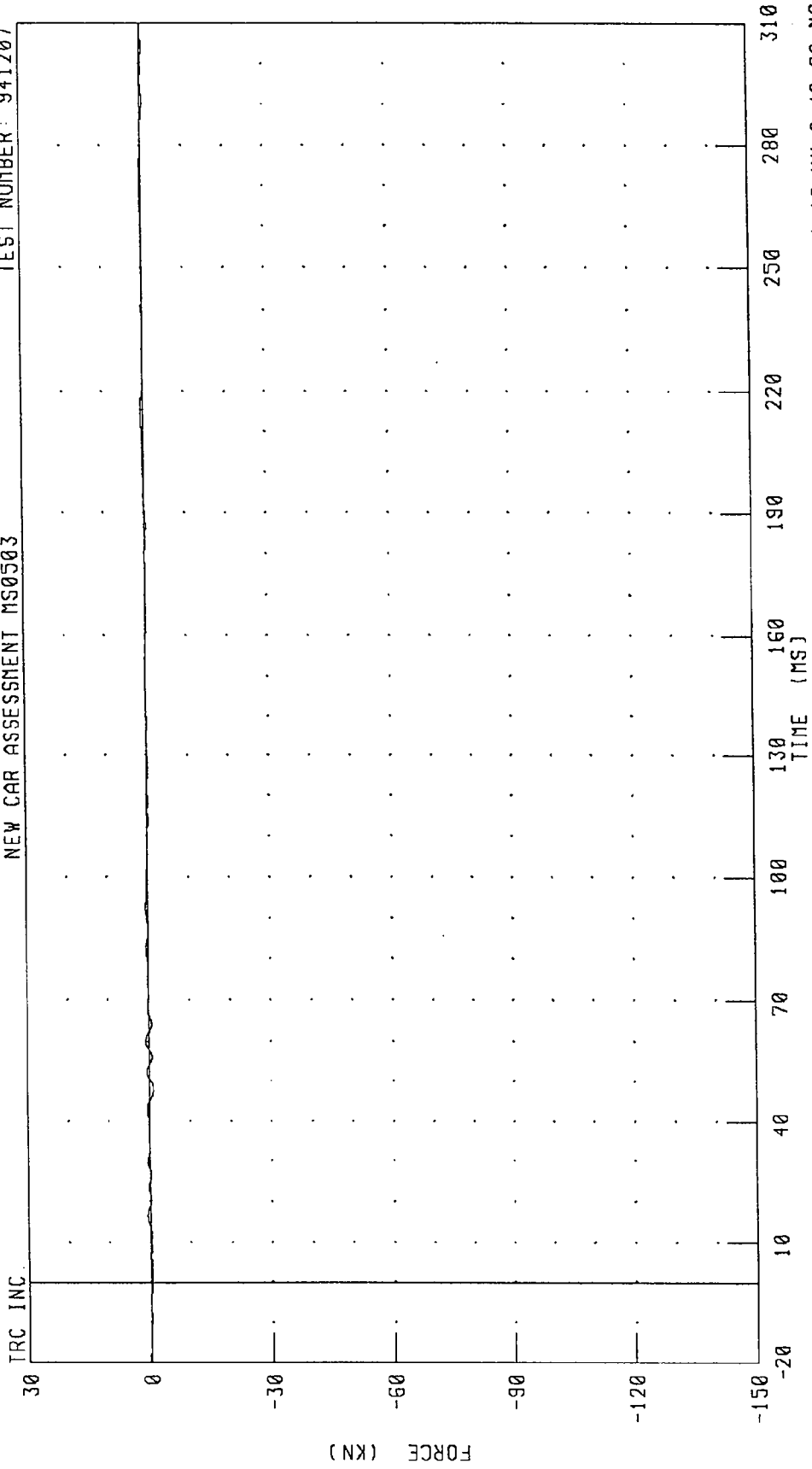
FILTER: CH. CLASS 60

CHANNEL: BC9F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D1 FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



PEAK DATA: 0.77 KN @ 60.00 MS; -1.12 KN @ 48.00 MS

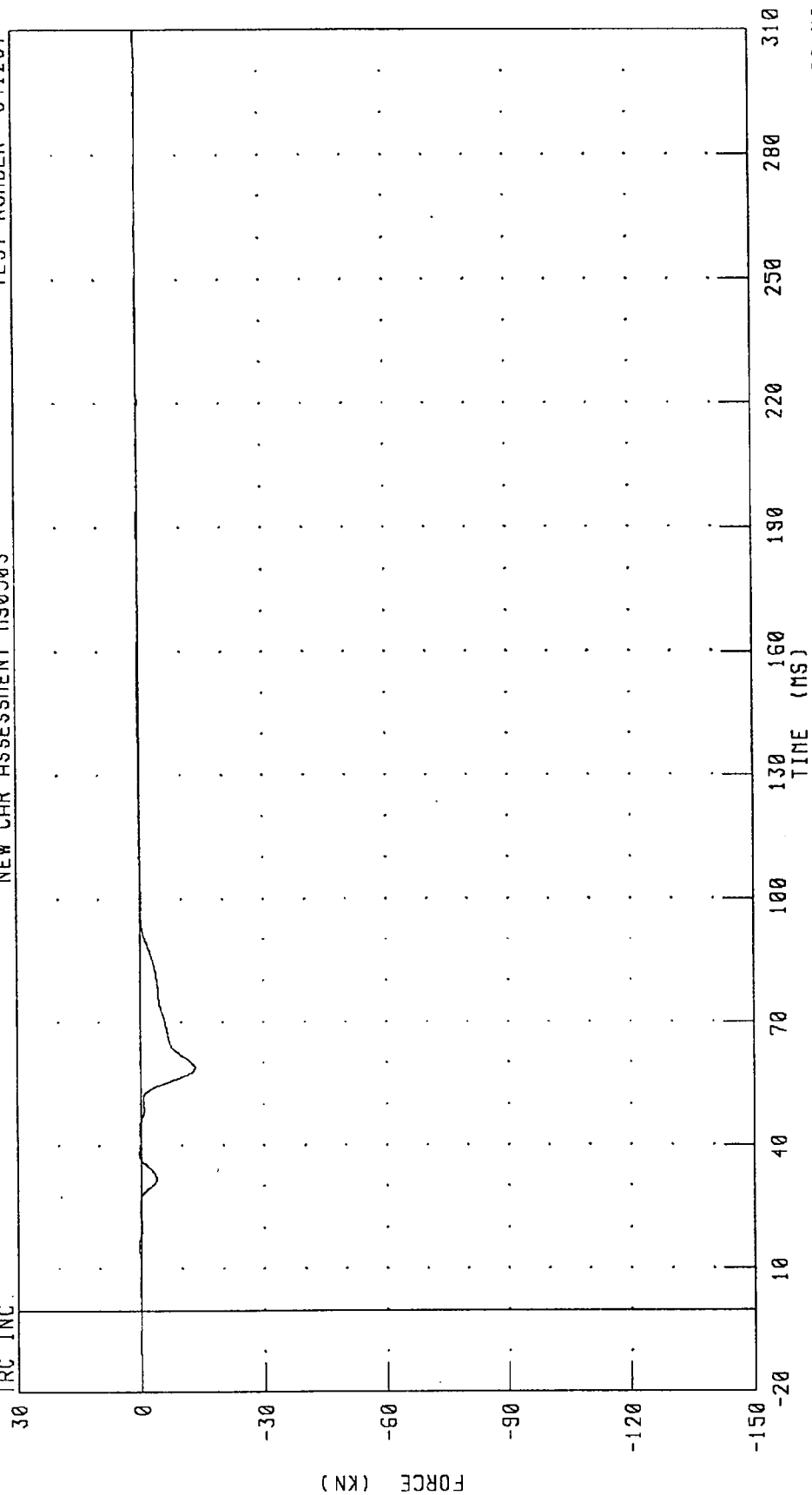
CHANNEL: BD1F FILTER: CH CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.

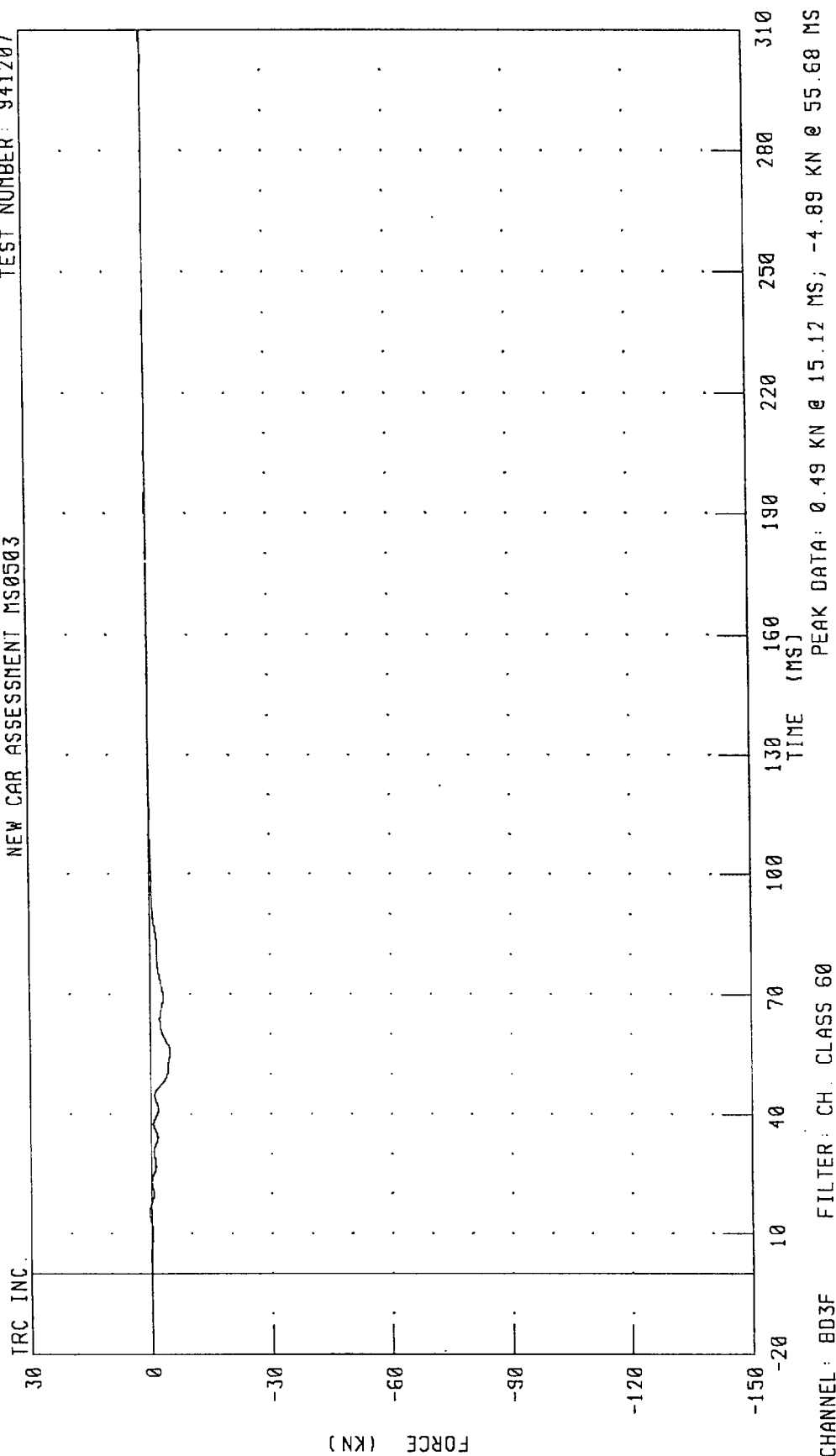


CHANNEL: B02F FILTER: CH. CLASS 60

PEAK DATA: 0.56 KN @ 15.52 MS; -13.20 KN @ 58.80 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D3 FORCE
NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

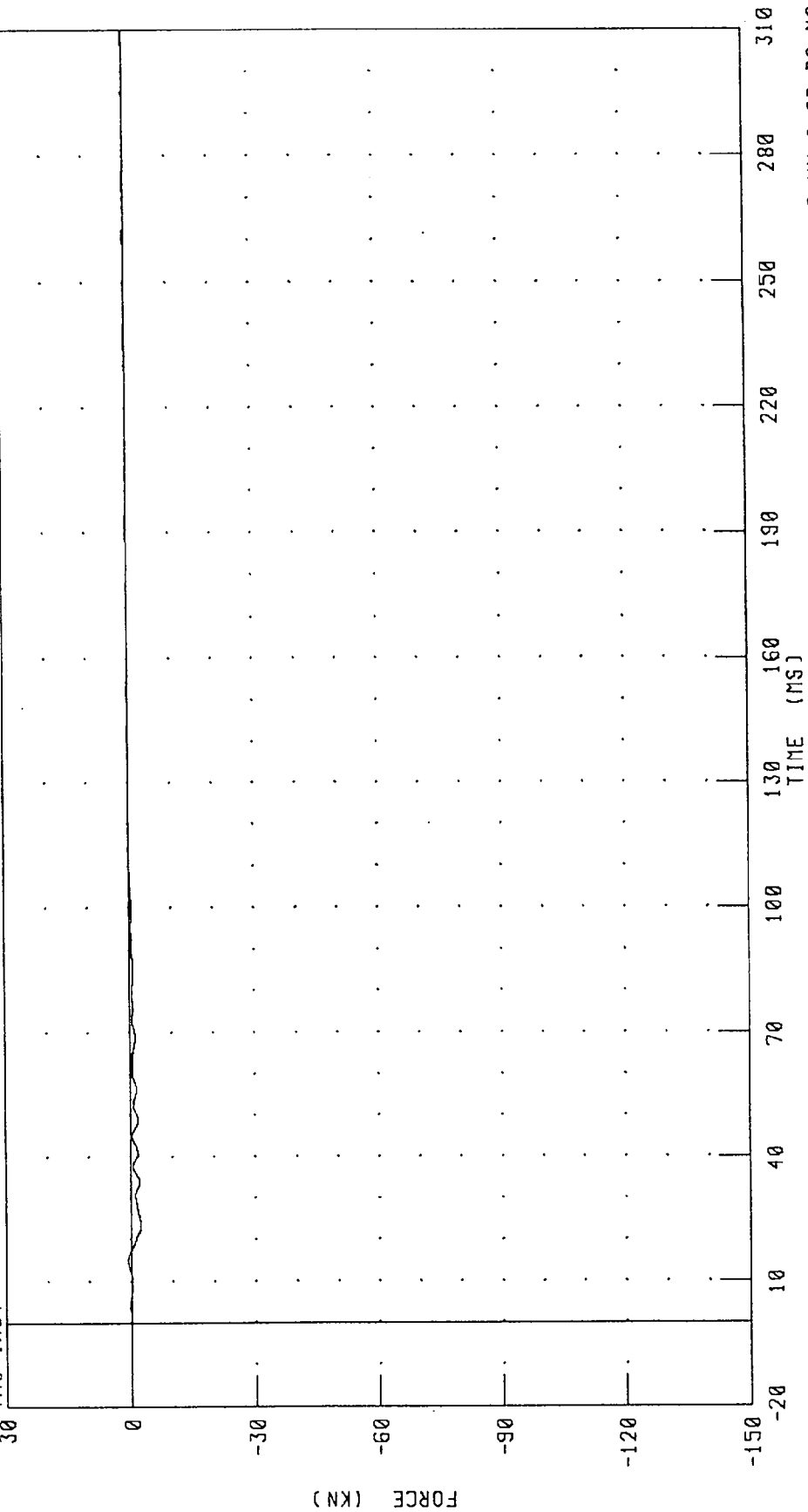


1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D4 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



PEAK DATA: 0.63 KN @ 14.96 MS; -2.42 KN @ 23.36 MS

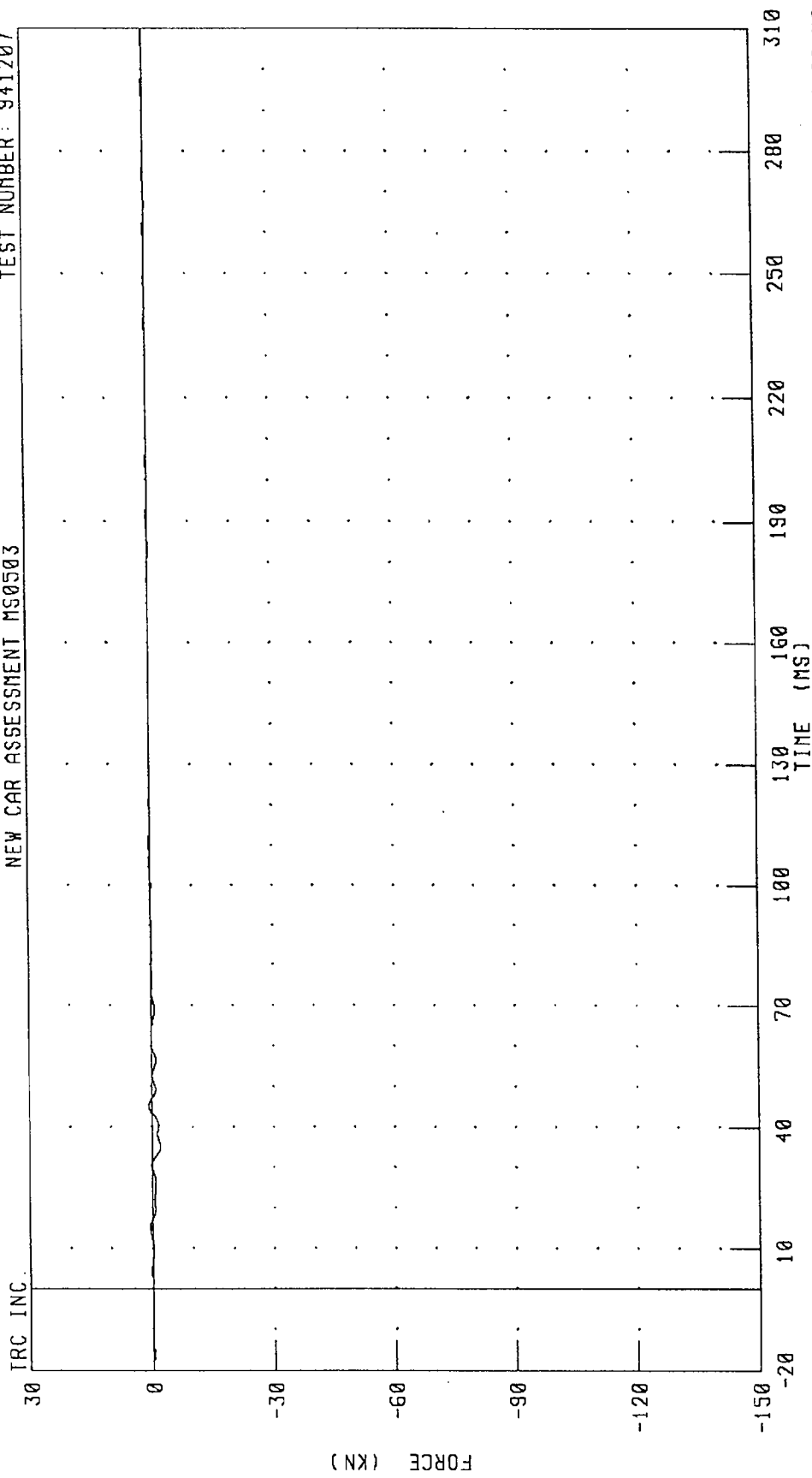
FILTER: CH. CLASS 60

CHANNEL: BD4F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D5 FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



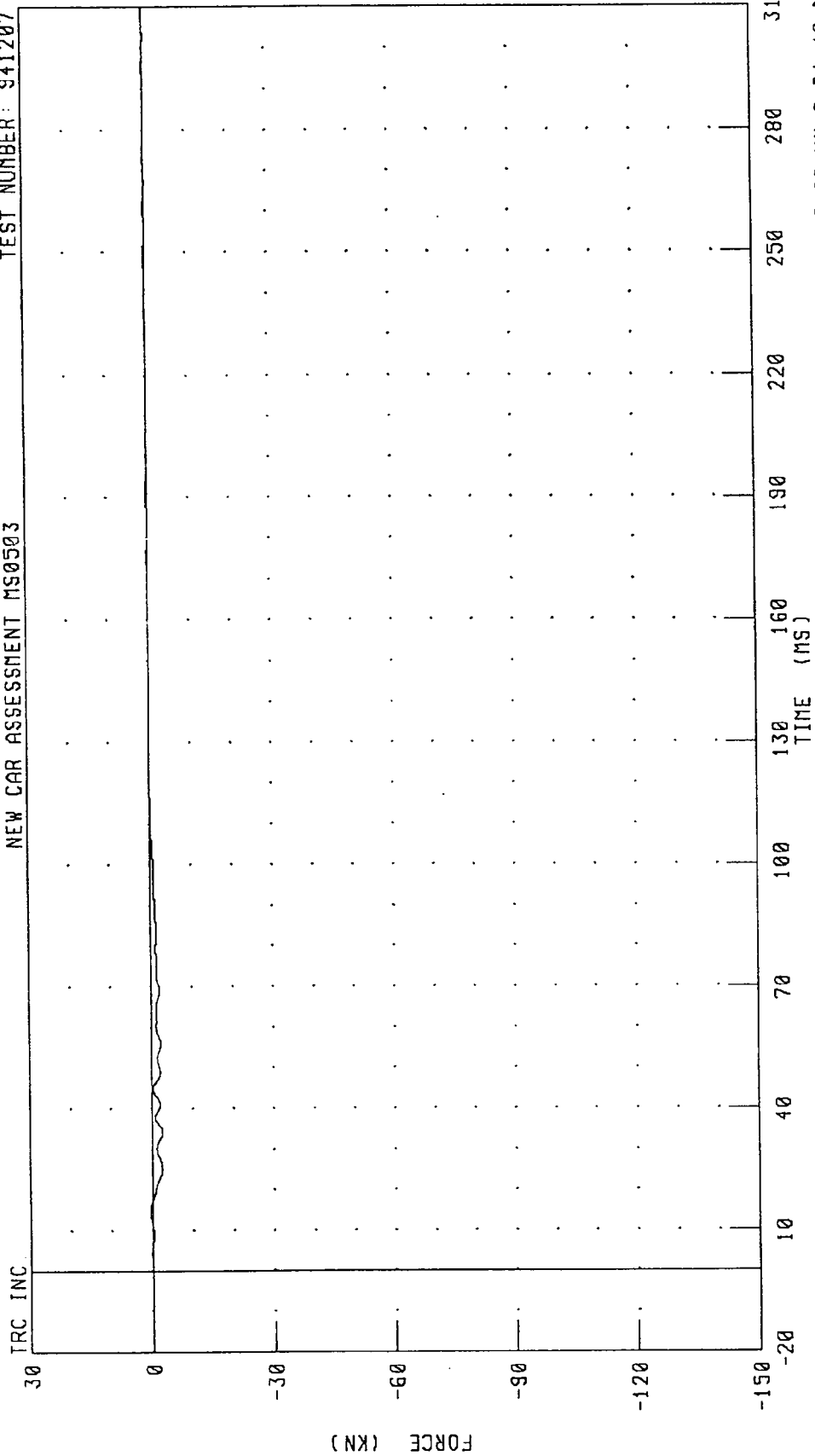
CHANNEL: BD5F FILTER: CH. CLASS 60

PEAK DATA: 0.67 KN @ 45.20 MS; -2.14 KN @ 35.28 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D6 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503



PEAK DATA: 0.54 KN @ 14.72 MS; -2.69 KN @ 34.40 MS

FILTER: CH. CLASS 60

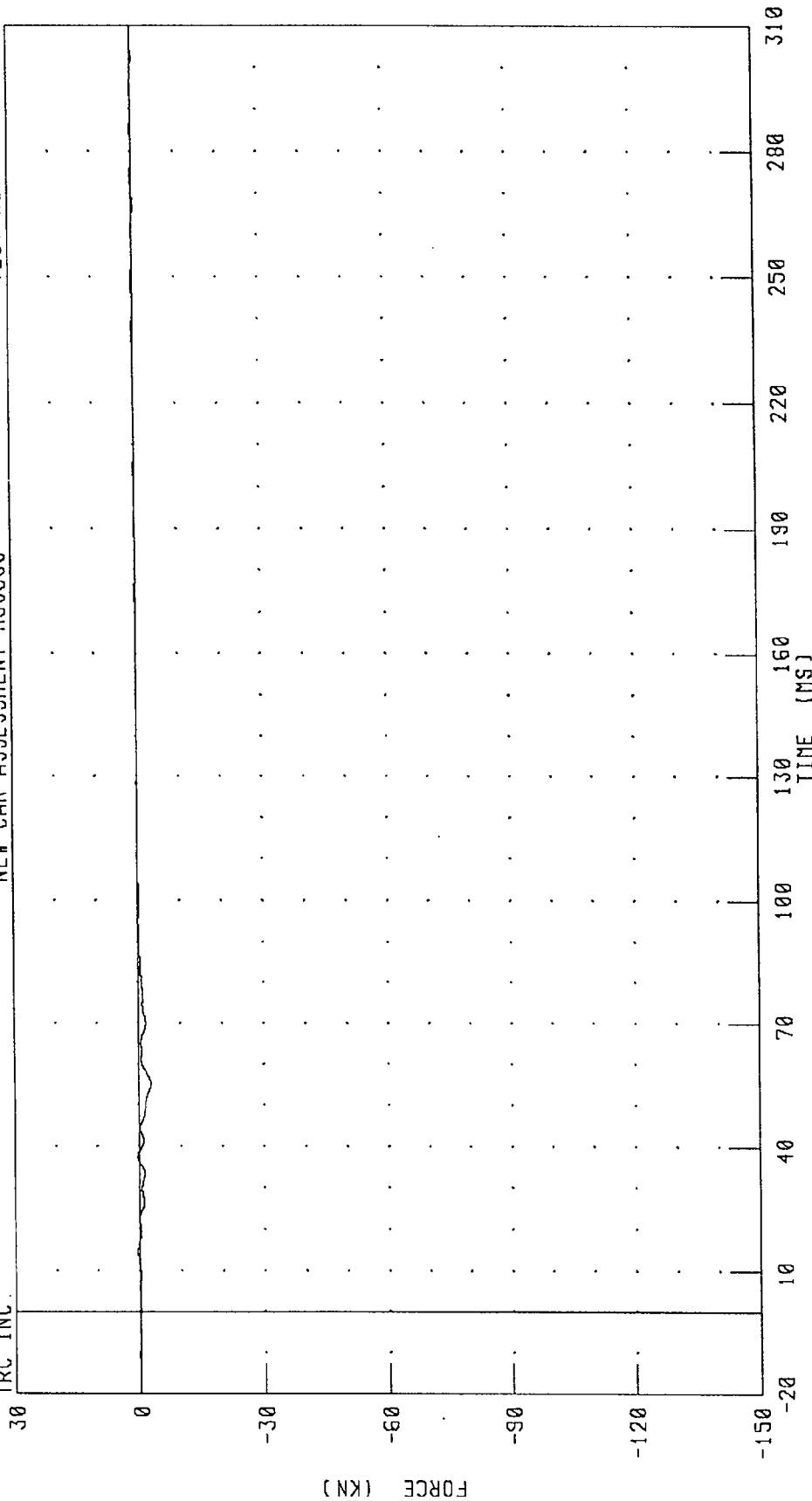
CHANNEL: BD6F

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D7 FORCE

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



PEAK DATA: 0.39 KN @ 14.56 MS; -2.96 KN @ 55.04 MS

FILTER: CH. CLASS 60

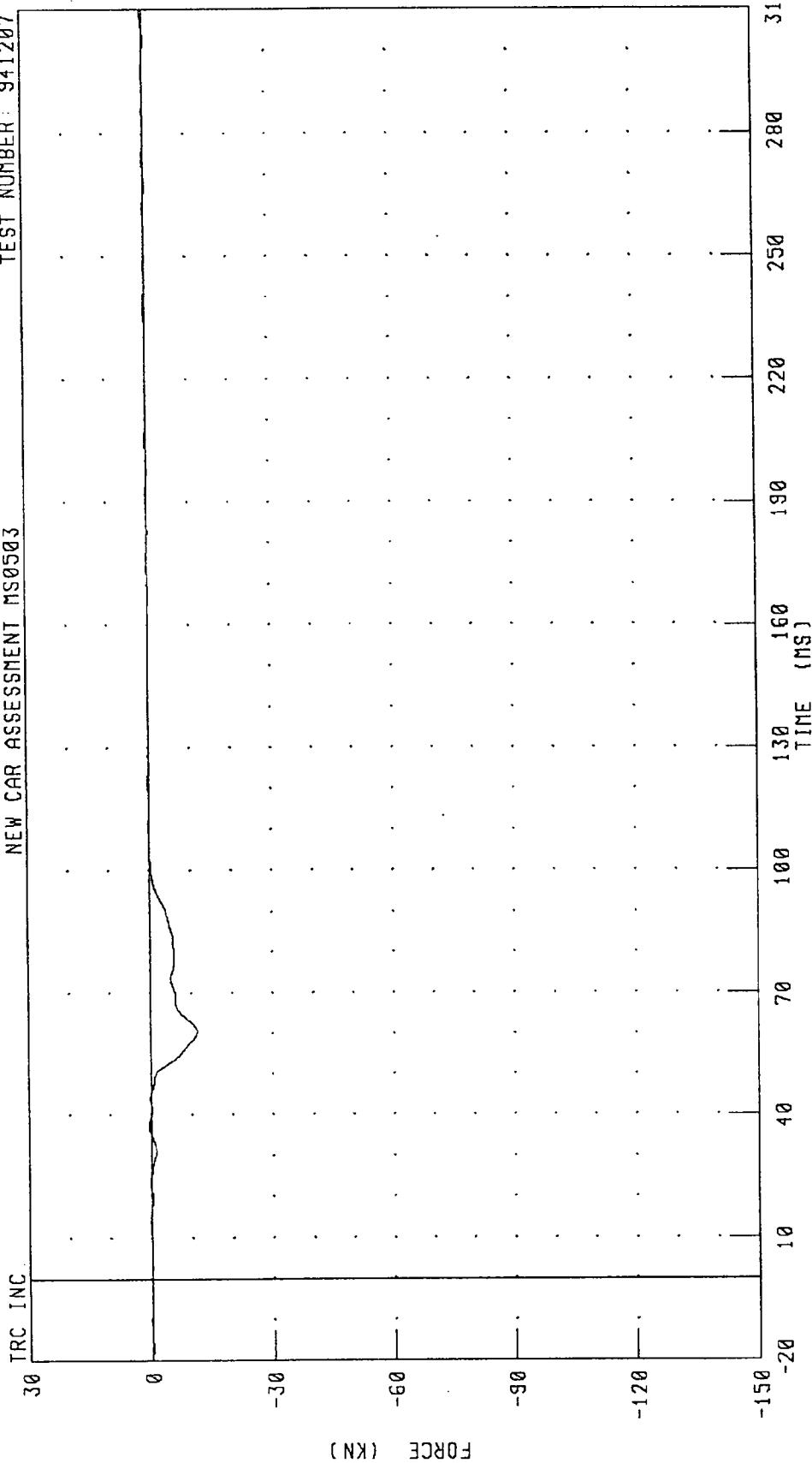
CHANNEL: B07F

FORCE (KN)

TIME (MS)

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D8 FORCE
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

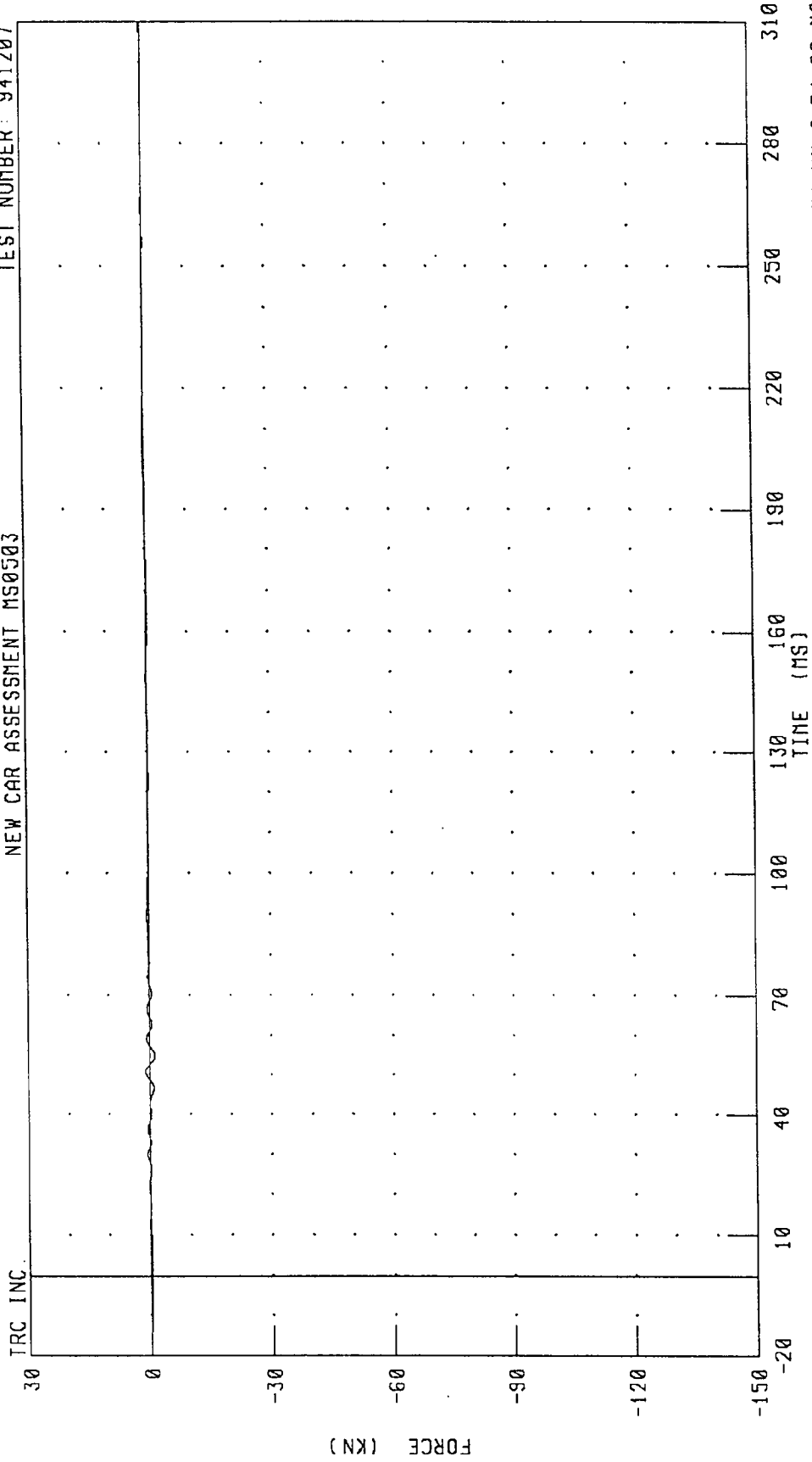


PEAK DATA: 0.48 KN @ 37.28 MS; -11.39 KN @ 60.56 MS

CHANNEL: B08F FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D9 FORCE
 NEW CAR ASSESSMENT MS0503

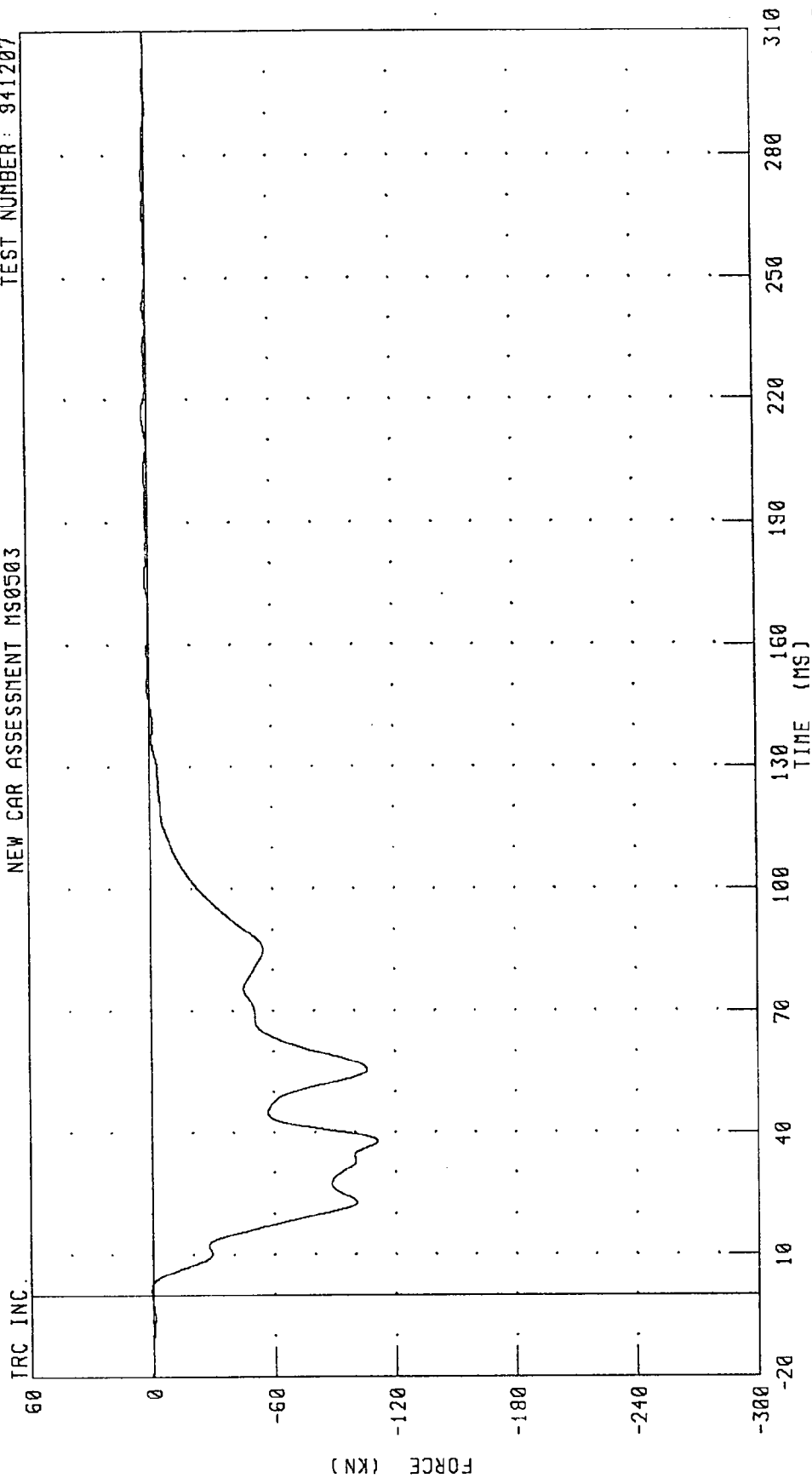
TEST NUMBER: 941207



CHANNEL: B09F FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 1 FORCE TOTAL
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



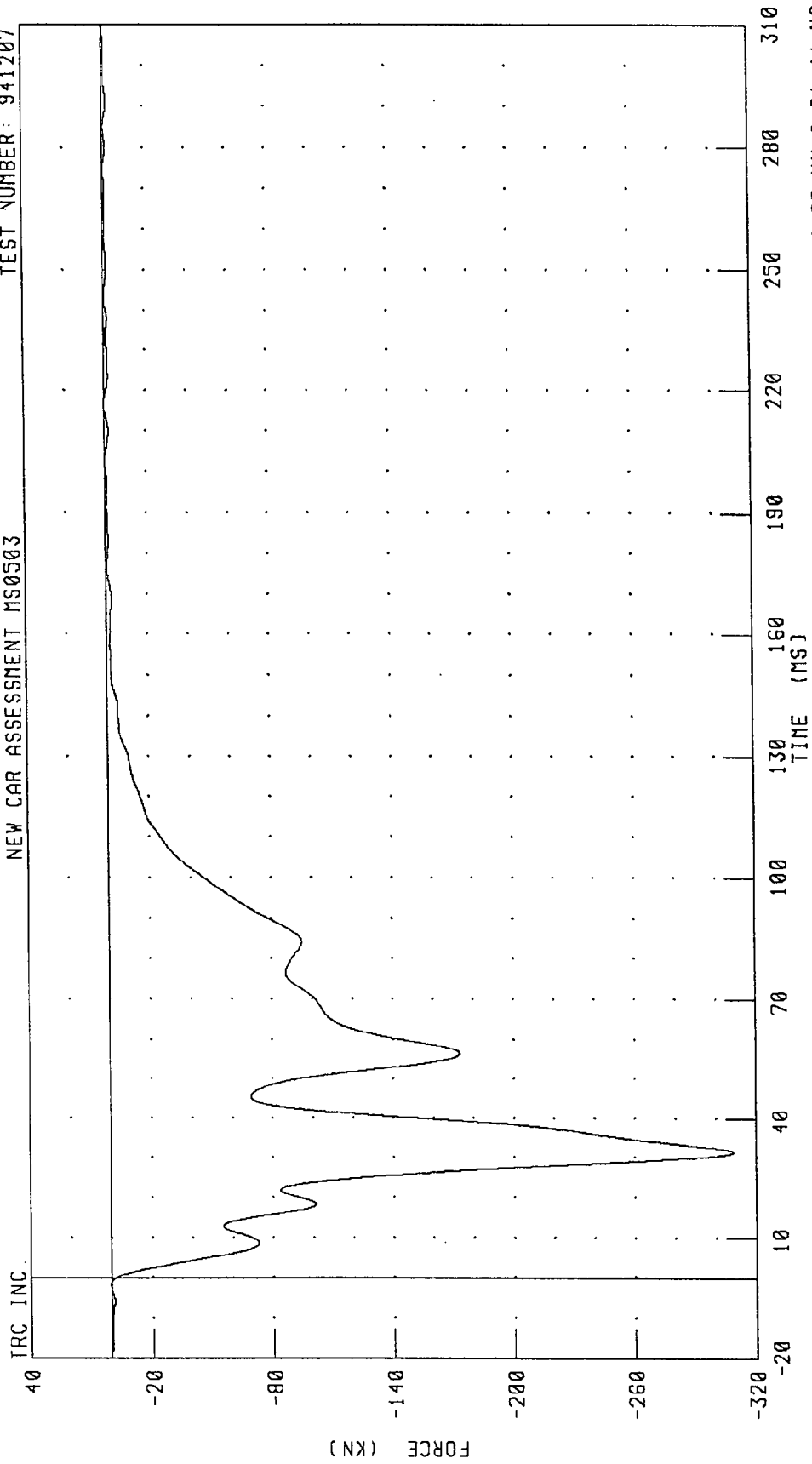
PEAK DATA: 2.38 KN @ 216.64 MS; -111.24 KN @ 37.92 MS

CHANNEL: LCBGIF FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

NEW CAR ASSESSMENT MS0503

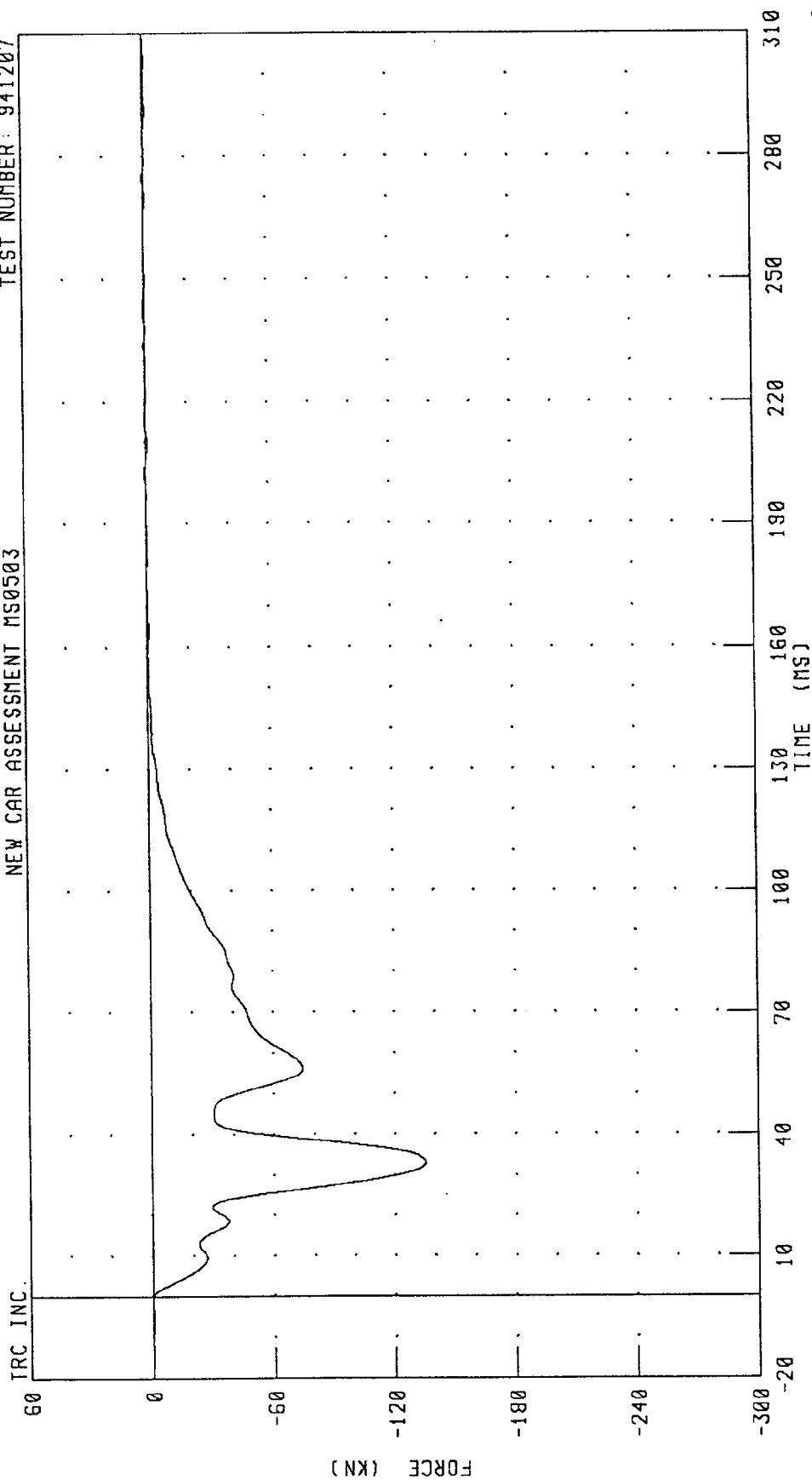
TEST NUMBER: 941207



CHANNEL: LCBG2F FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 3 FORCE TOTAL
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

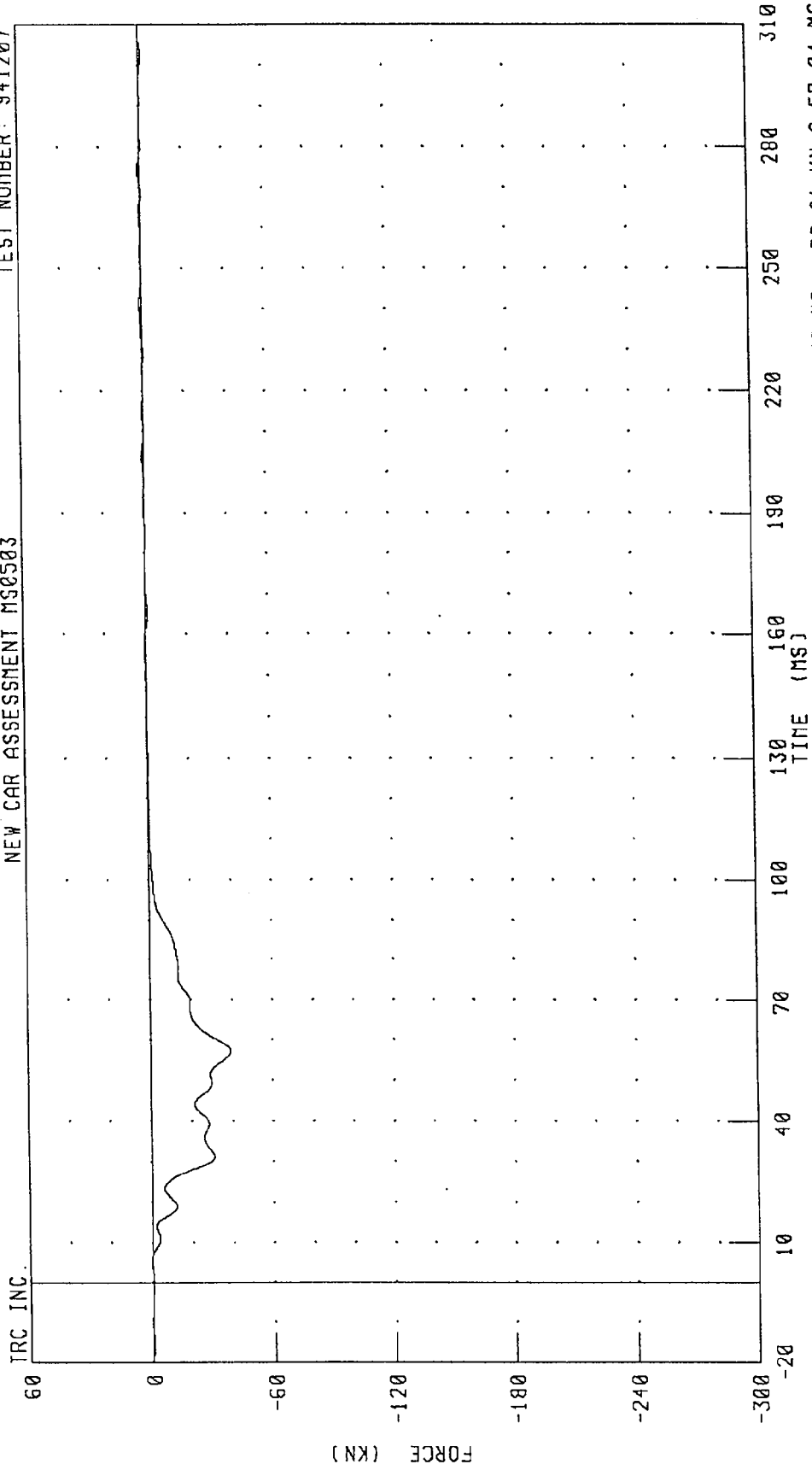


CHANNEL: LCBG3F FILTER: CH. CLASS 60

PEAK DATA: 0.51 KN @ 242.64 MS; -135.27 KN @ 33.04 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 4 FORCE TOTAL
 NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

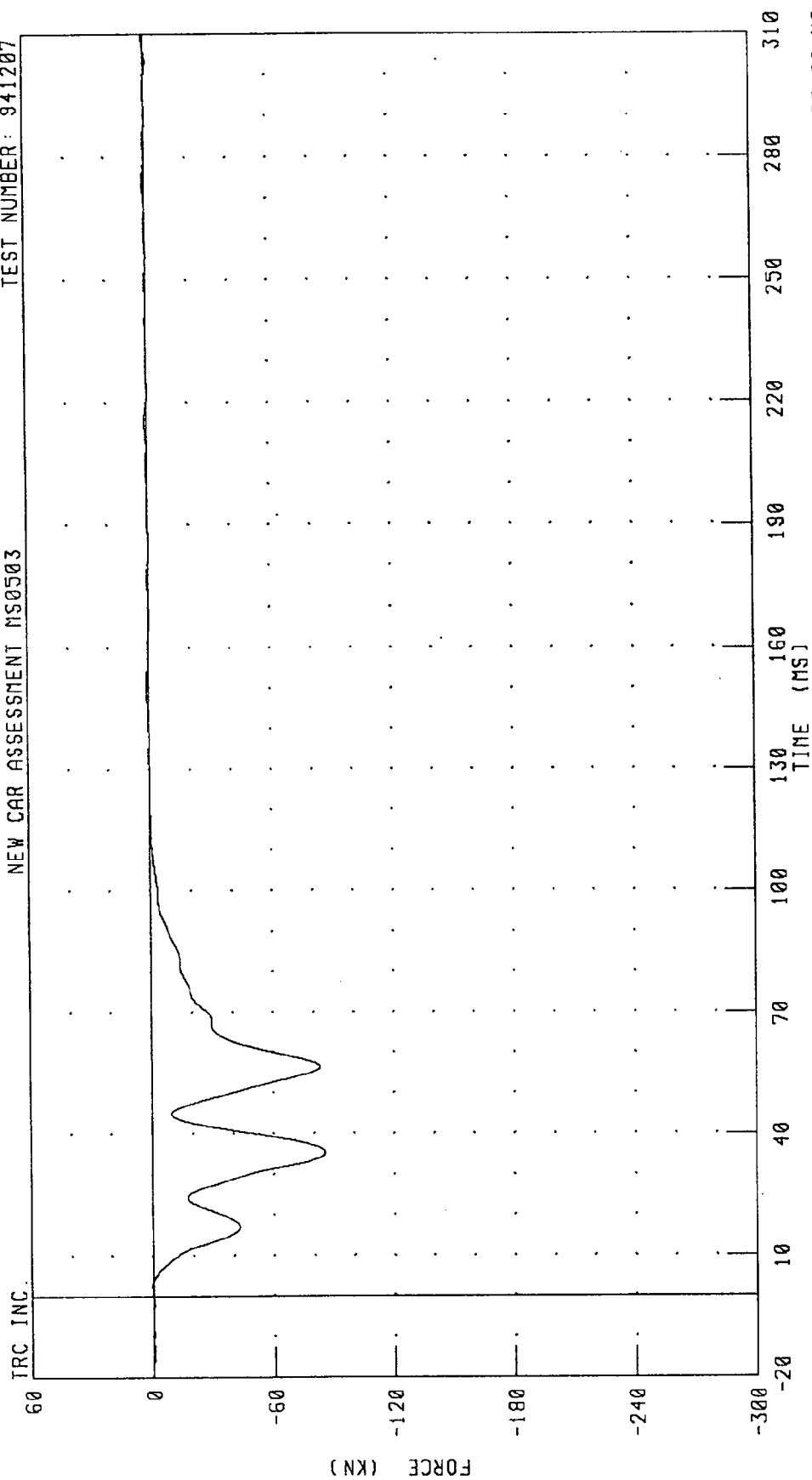


CHANNEL: LCBG4F FILTER: CH. CLASS 60

PEAK DATA: 0.92 KN @ 274.56 MS; -39.21 KN @ 274.56 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 5 FORCE TOTAL
 NEW CAR ASSESSMENT NS0503

TEST NUMBER: 941207



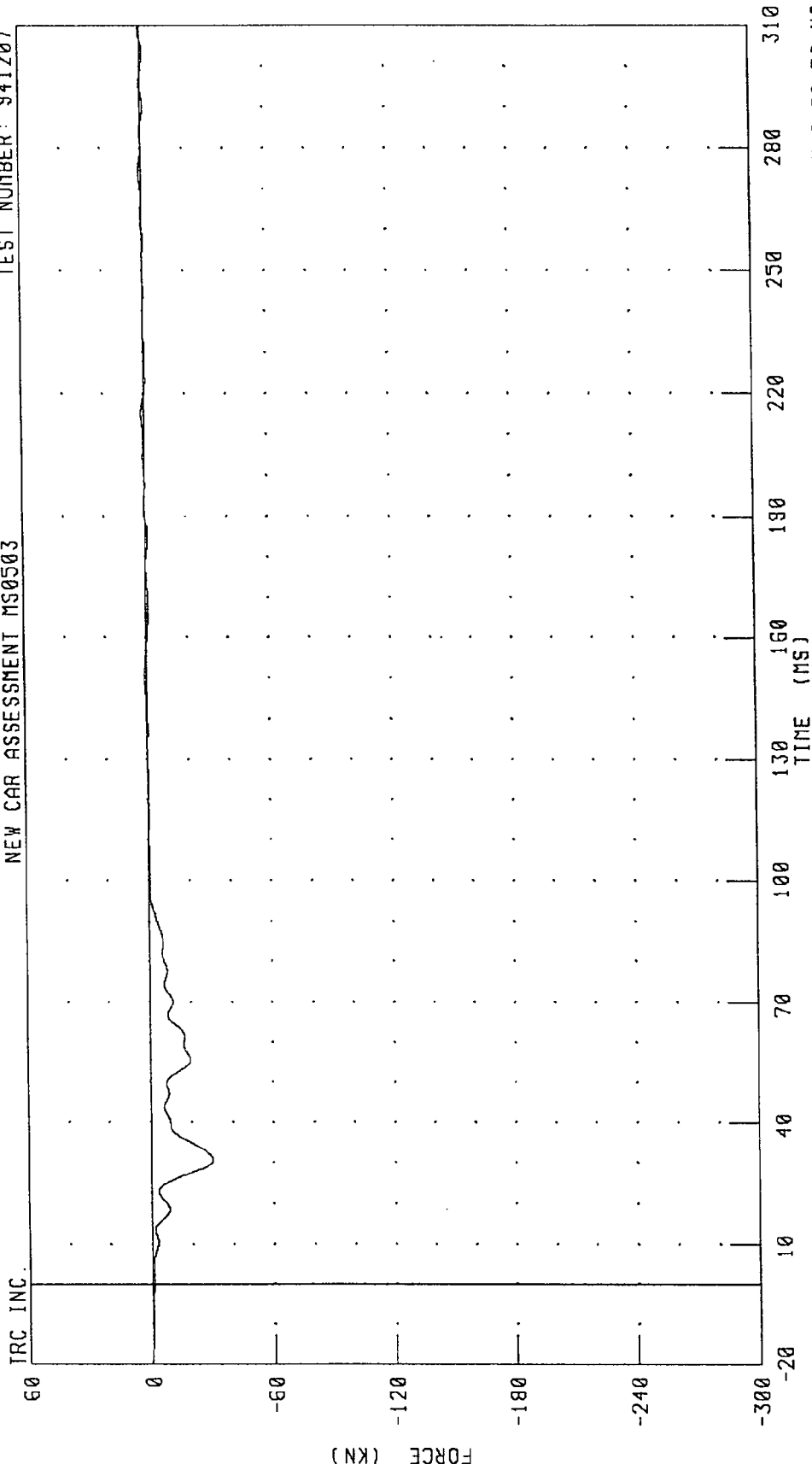
CHANNEL: LCBG5F FILTER: CH CLASS 60

PEAK DATA: 1.18 KN @ 150.64 MS; -85.56 KN @ 35.28 MS

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207



CHANNEL: LCBG6F FILTER: CH. CLASS 60

PEAK DATA: 1.28 KN @ 215.20 MS; -30.27 KN @ 30.72 MS

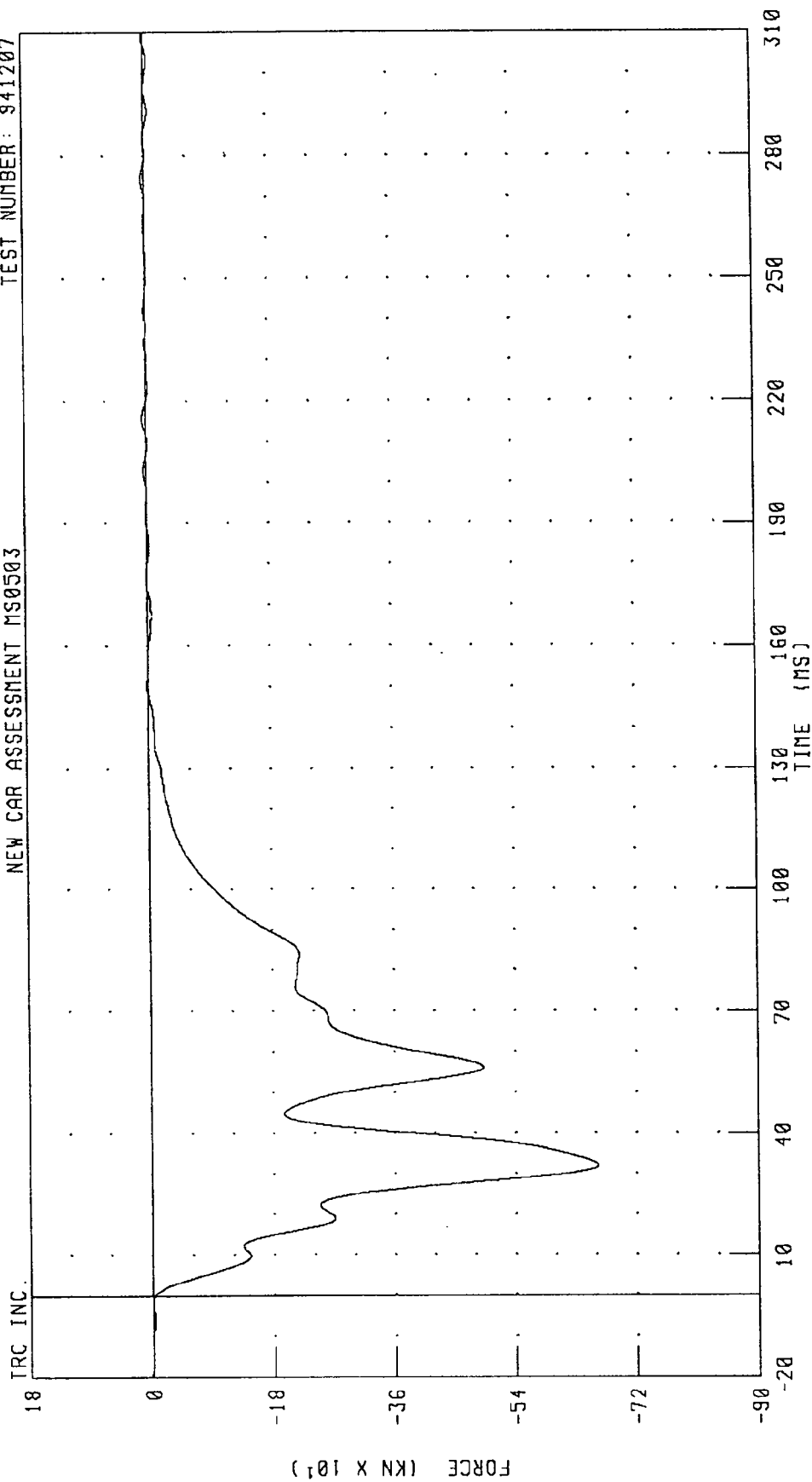
1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER

TOTAL LOAD CELL BARRIER FORCE

NEW CAR ASSESSMENT MS0503

TEST NUMBER: 941207

TRC INC.



PEAK DATA: 5.51 KN @ 215.68 MS; -662.82 KN @ 32.16 MS

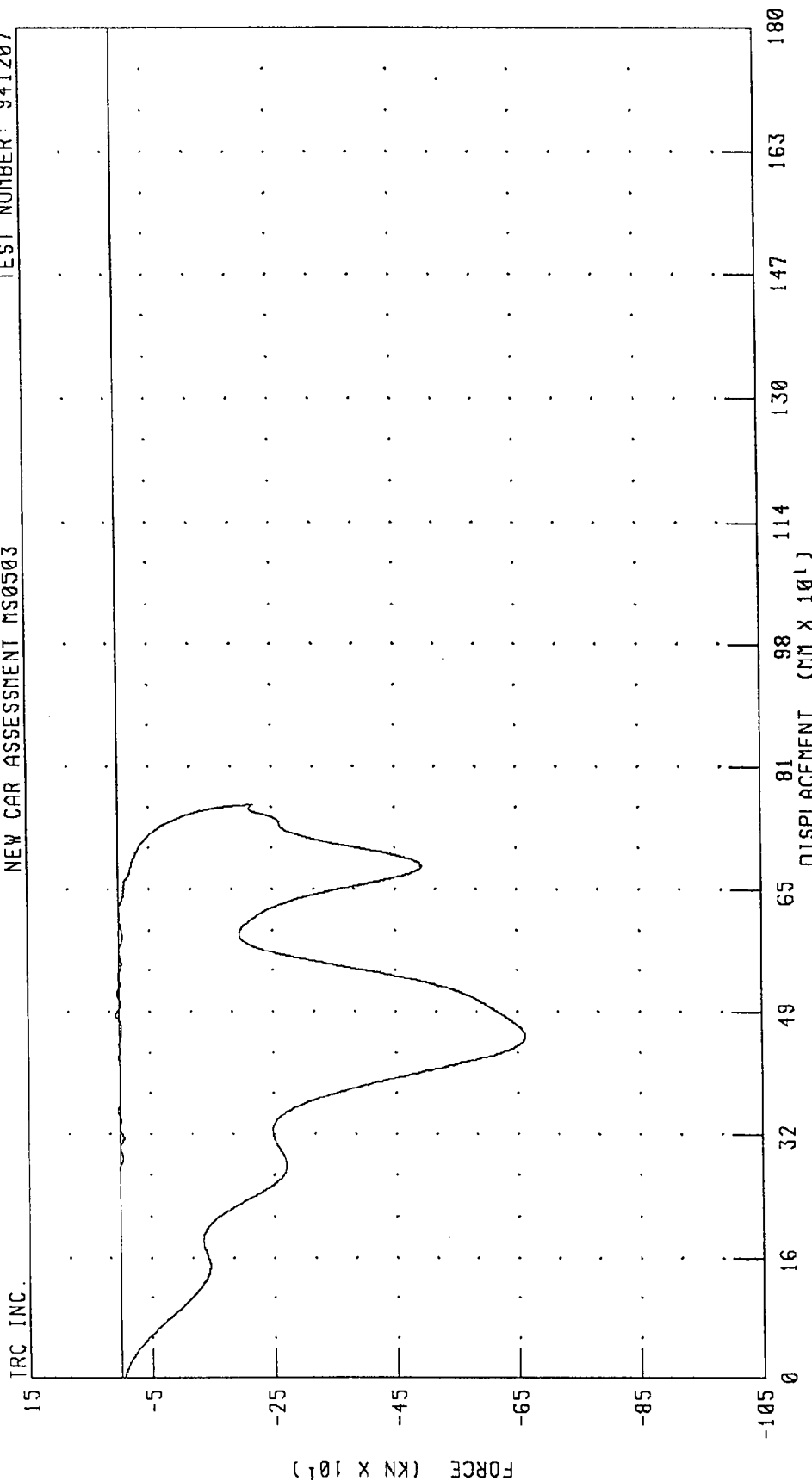
CHANNEL: LCBGT FILTER: CH. CLASS 60

1995 SAAB 900S INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT

TEST NUMBER: 941207

NEW CAR ASSESSMENT MS0503

TRC INC.



CHANNEL: 0THXD
LCBGT

FILTER: CH. CLASS 180
CH. CLASS 60

DISPLACEMENT (MM X 10¹)

Appendix C

Dummy Certification Data

Pre-test Certification Data

Driver Dummy S/N: 142

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
142 HUMANOID

05-DEC-94

TRC INC. TEST NO: 142C25ED1 572E SN142 EXT.DIMENSION CAL25

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	986. MM
WAIST CIRCUMFERENCE (Z)	836 - 866 MM	848. MM
CHEST DEPTH (O)	213 - 229 MM	221. MM
H-POINT HEIGHT (C)	84 - 89 MM	84. 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	879. MM
THIGH CLEARANCE (F)	140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH (K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH (N)	452 - 478 MM	470. MM
POPLITEAL HEIGHT (L)	429 - 455 MM	445. MM
KNEE PIVOT HEIGHT (M)	485 - 500 MM	488. MM
FOOT LENGTH (P)	252 - 267 MM	257. 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	429. MM
SHOULDER PIVOT HEIGHT (B)	506 - 521 MM	508. MM
ELBOW REST HEIGHT (J)	191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH (I)	330 - 345 MM	345. MM
BACK OF ELBOW TO WRIST PIVOT (G)	290 - 305 MM	292. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Pete F. J.

RUN NUMBER: 120694.0840

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

05-DEC-94

TRC INC.

TEST NO: 142C25HD1

572E SN142 HEAD DROP CAL 25

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	232.40 G
PEAK LATERAL ACCELERATION	15 G MAX	3.09 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete F. J.

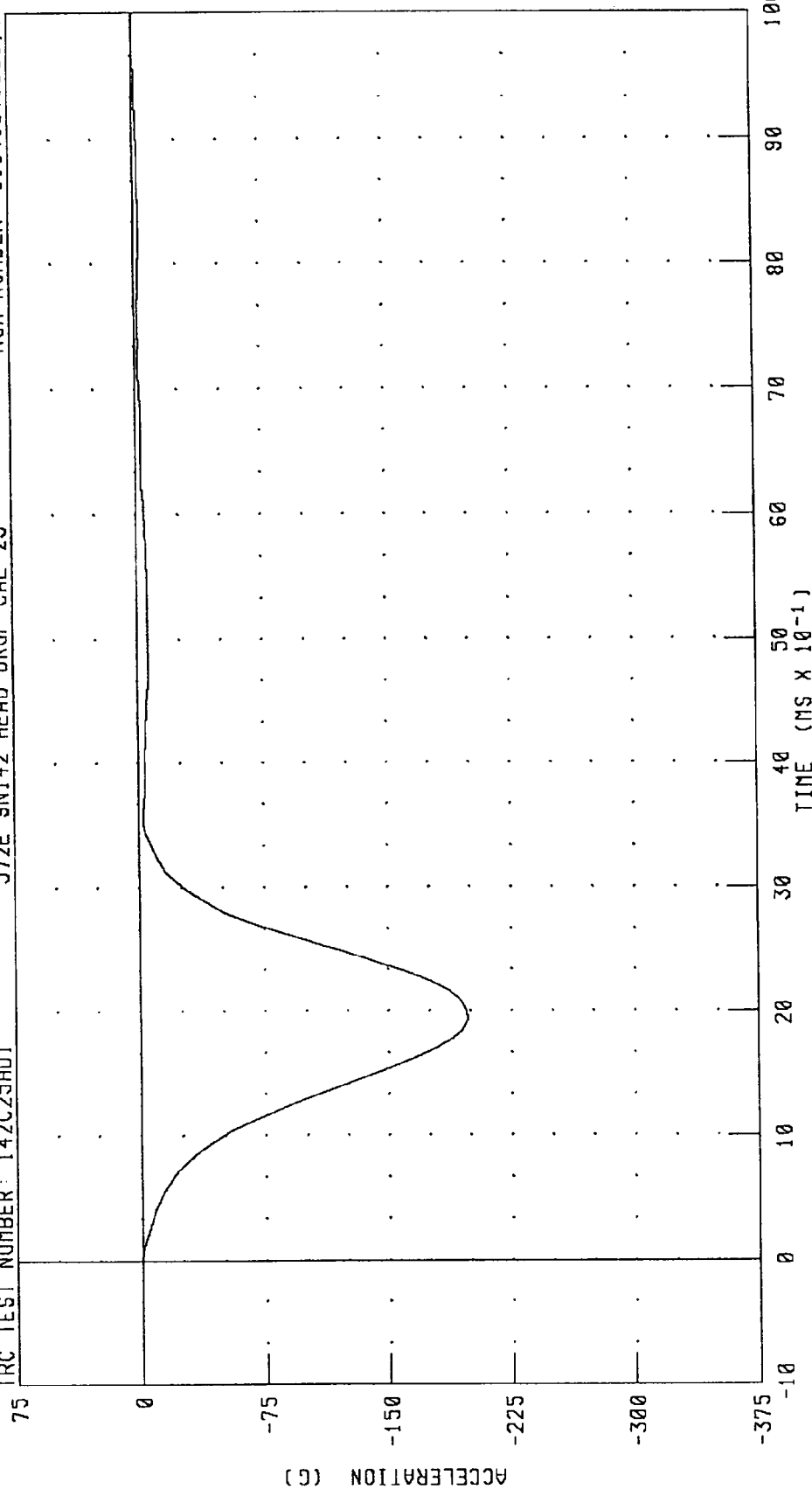
RUN NUMBER: 120594.1342;1

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN142 HEAD DROP CAL 25 RUN NUMBER: 010495.1353.1

IRC TEST NUMBER: 142C25H01



PEAK DATA: 0.03 G @ -0.08 MS; -198.26 G @ 1.92 MS

CHANNEL: HEDXG FILTER: CH. CLASS 1000

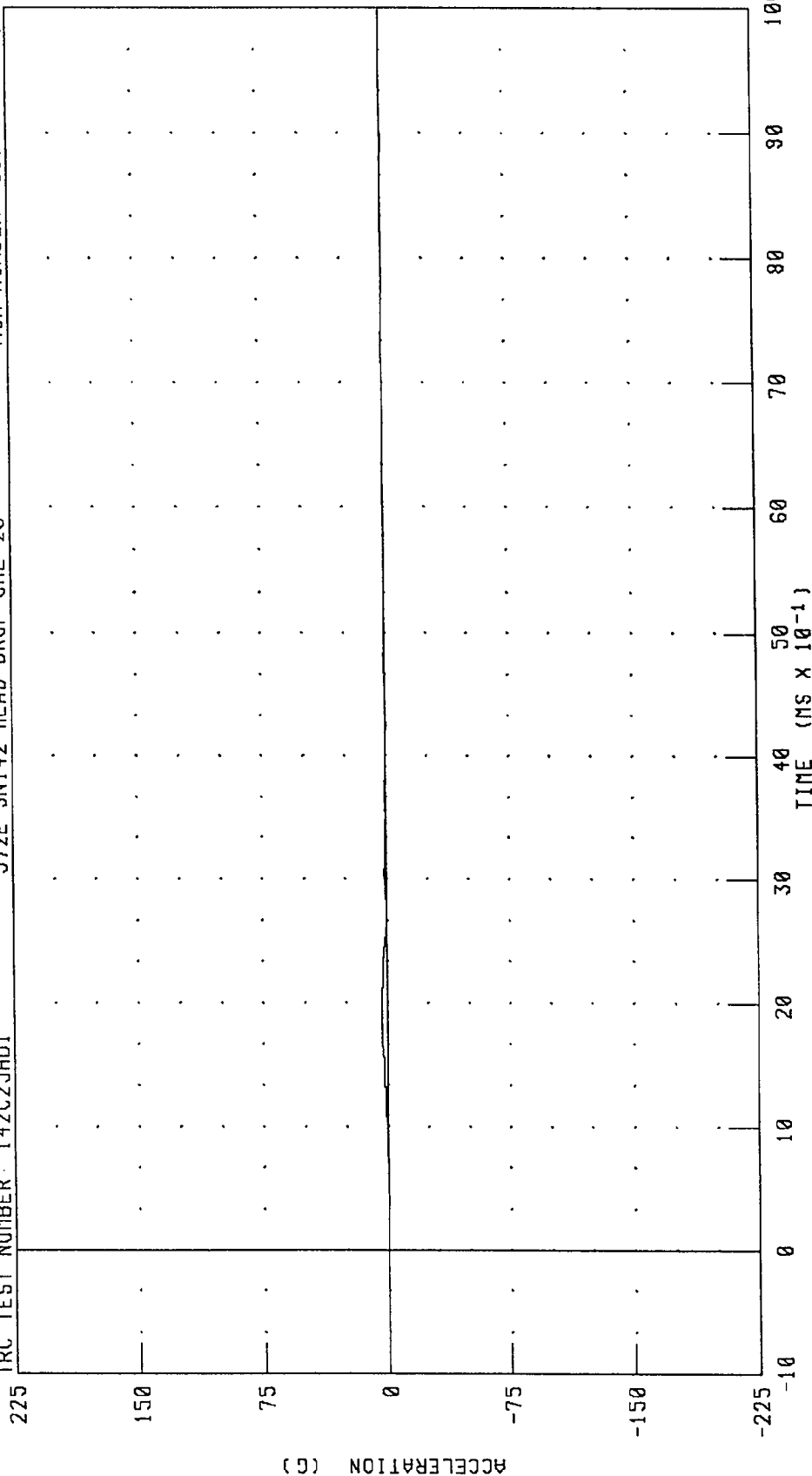
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572E SN142 HEAD DROP CAL 25

RUN NUMBER: 010495.1353,1

TRC TEST NUMBER: 142C25HD1



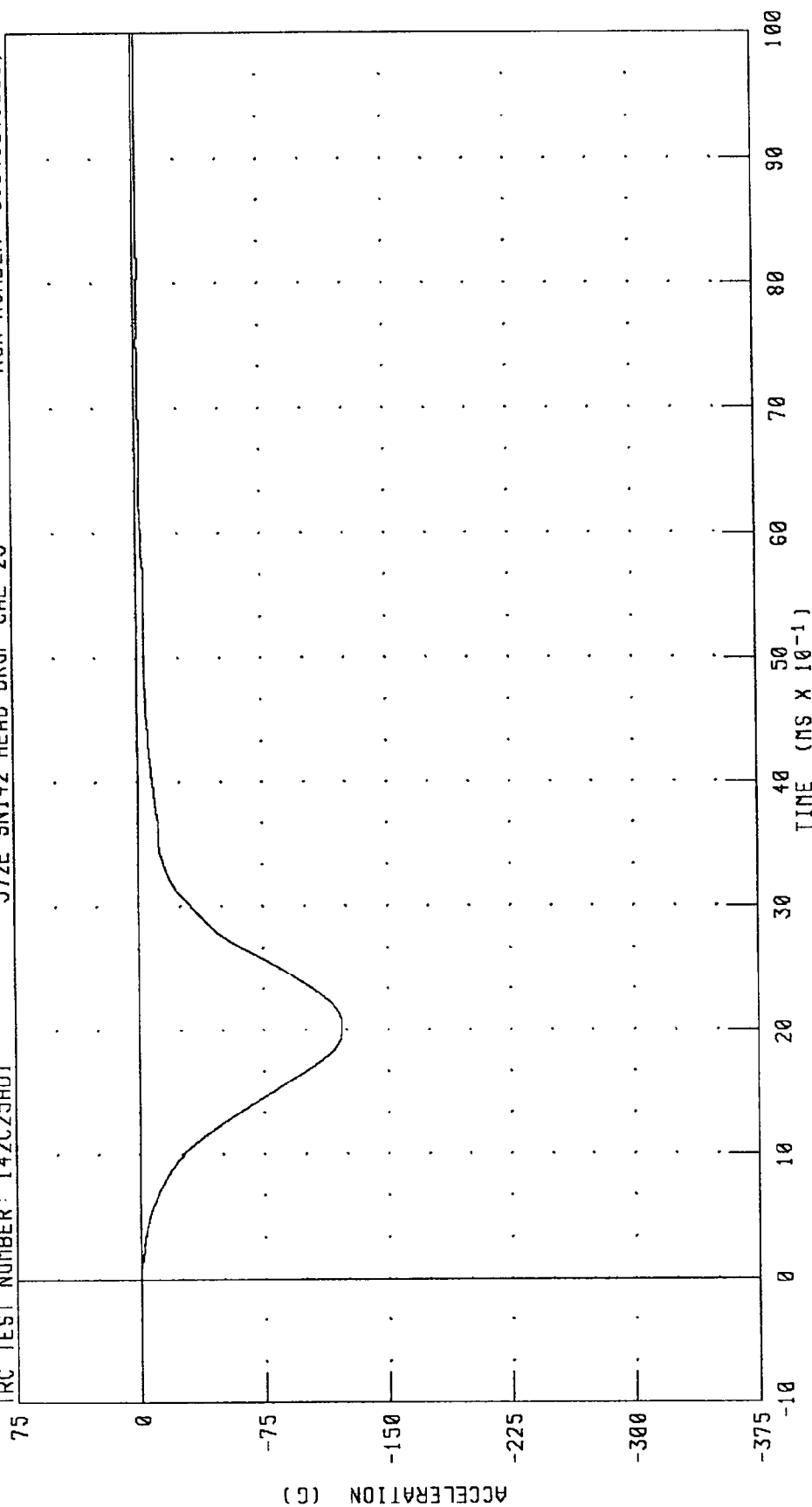
CHANNEL: HEDYG FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 142C25HD1

572E SN142 HEAD DROP CAL 25

RUN NUMBER: 010495.1353,1



PEAK DATA: 0.02 G @ -0.08 MS; -122.20 G @ 2.00 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

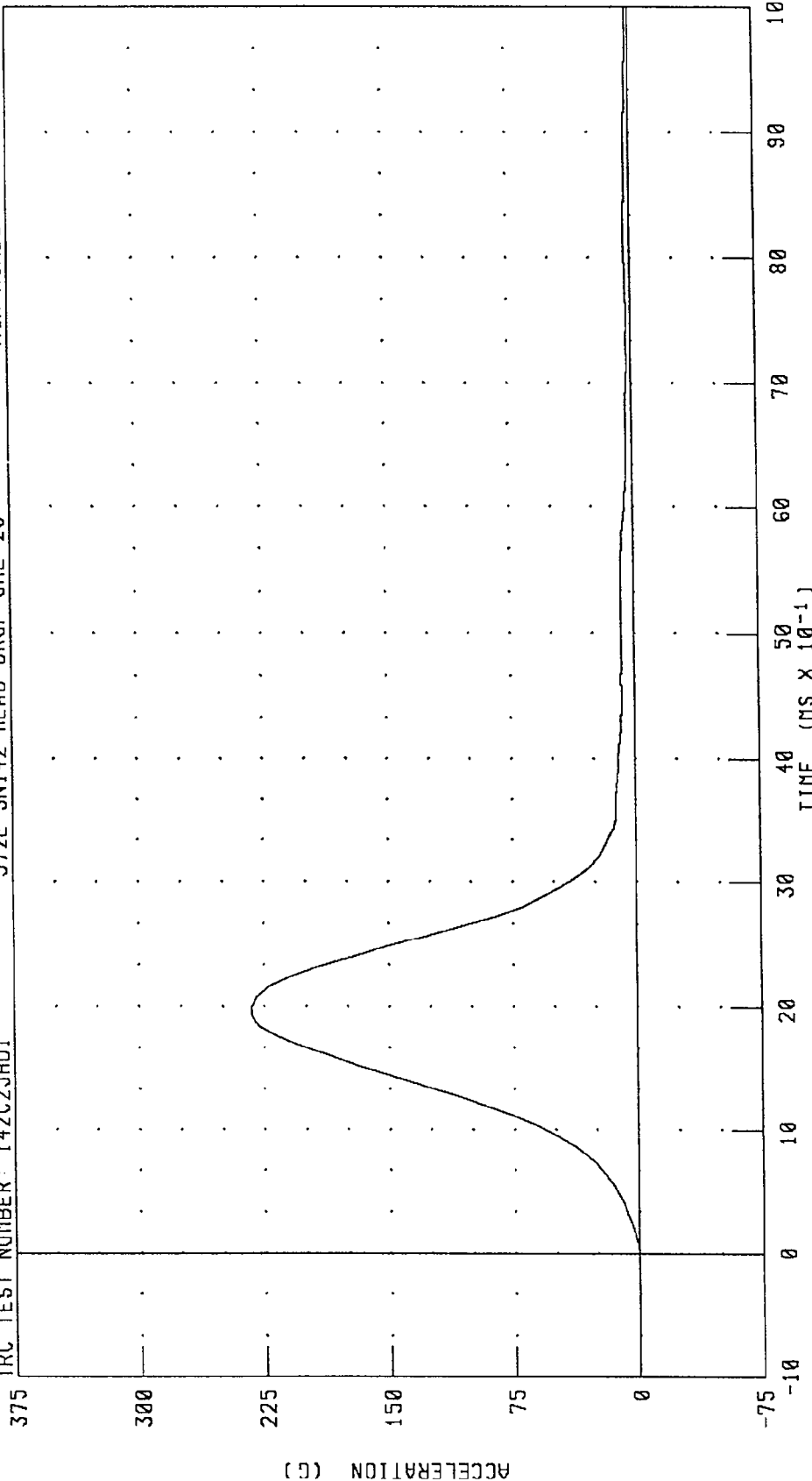
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN142 HEAD DROP CAL 25

RUN NUMBER: 010495.1353;1

TRC TEST NUMBER: 142C25HD1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 232.41 G @ 1.92 MS; 0.05 G @ -0.40 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

05-DEC-94

TRC INC. TEST NO: 142C25NF1 572E SN142 NECK FLEXION CAL25

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	56.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.01 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.69 G
	20 MS	17.60 - 22.60 G	20.73 G
	30 MS	12.50 - 18.50 G	16.47 G
MAX PENDULUM G		29 G MAX	25.47 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.42 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.40 MS
D PLANE	MAX	64 - 78 DEG.	72.85 DEG.
ROTATION	TIME	57 - 64 MS	57.52 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	91.85 NM
	TIME	47 - 58 MS	50.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.72 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.96 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete F. S.

RUN NUMBER: 120594.1442;1

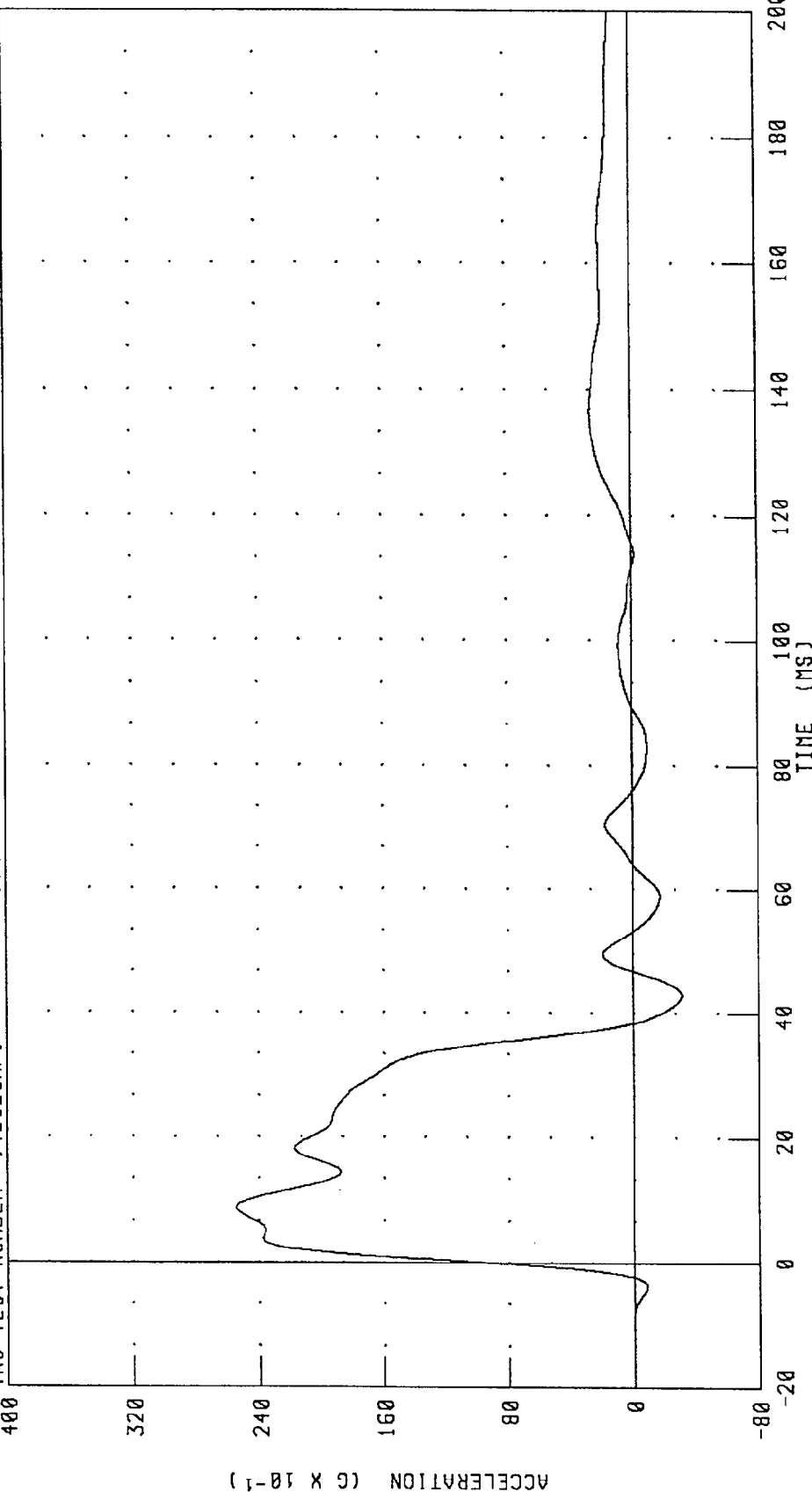
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 142C25NF1

572E SN142 NECK FLEXION CAL25

RUN NUMBER: 010495.1353,1



PEAK DATA: 25.47 G @ 8.72 MS; -3.08 G @ 42.96 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

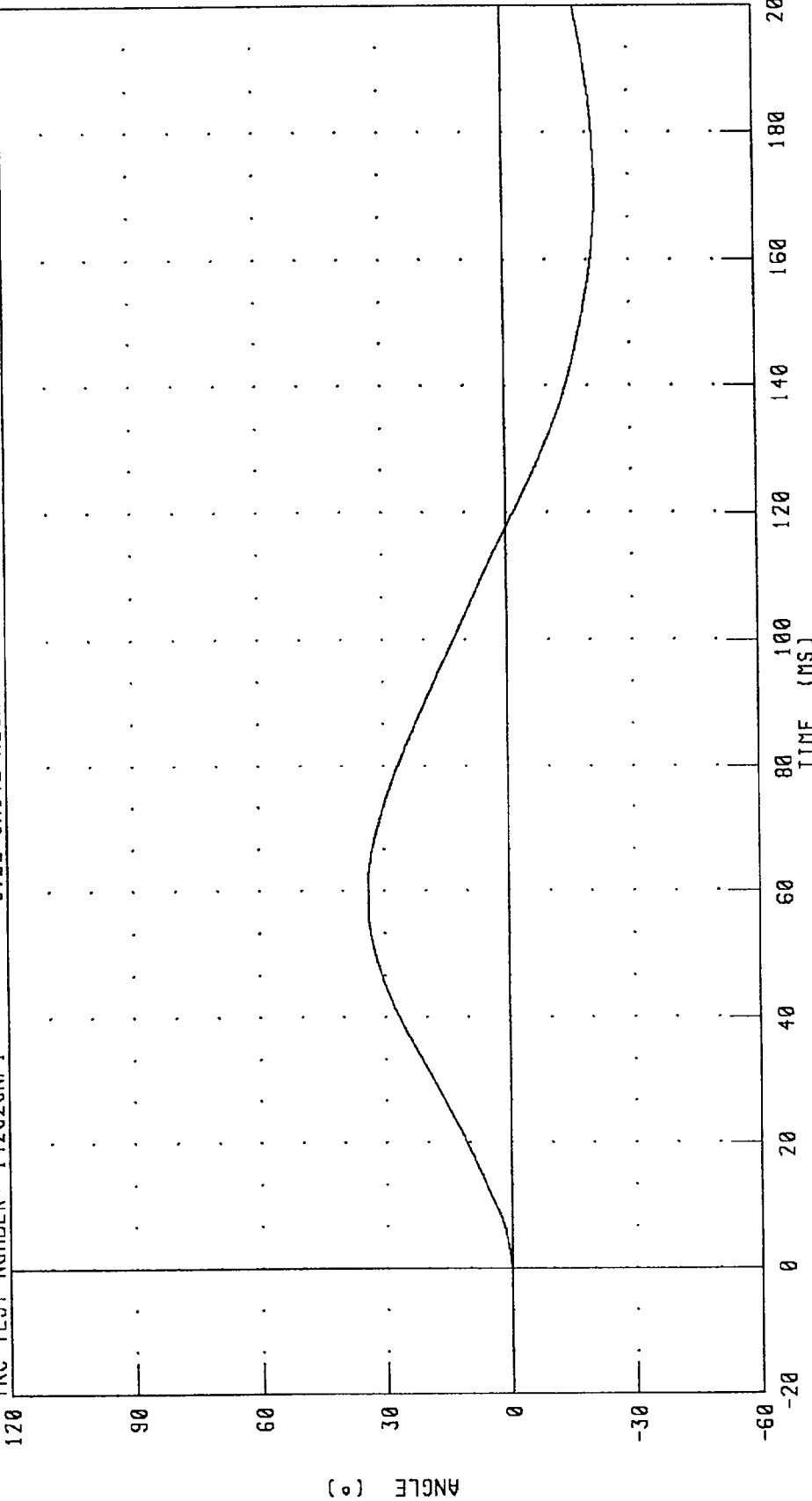
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

RUN NUMBER: 010495.1353.1

572E SN142 NECK FLEXION CAL25

TRC TEST NUMBER: 142025NF1



PEAK DATA: 33.95 ° @ 58.88 MS; -22.06 ° @ 170.80 MS

FILTER: CH. CLASS 60

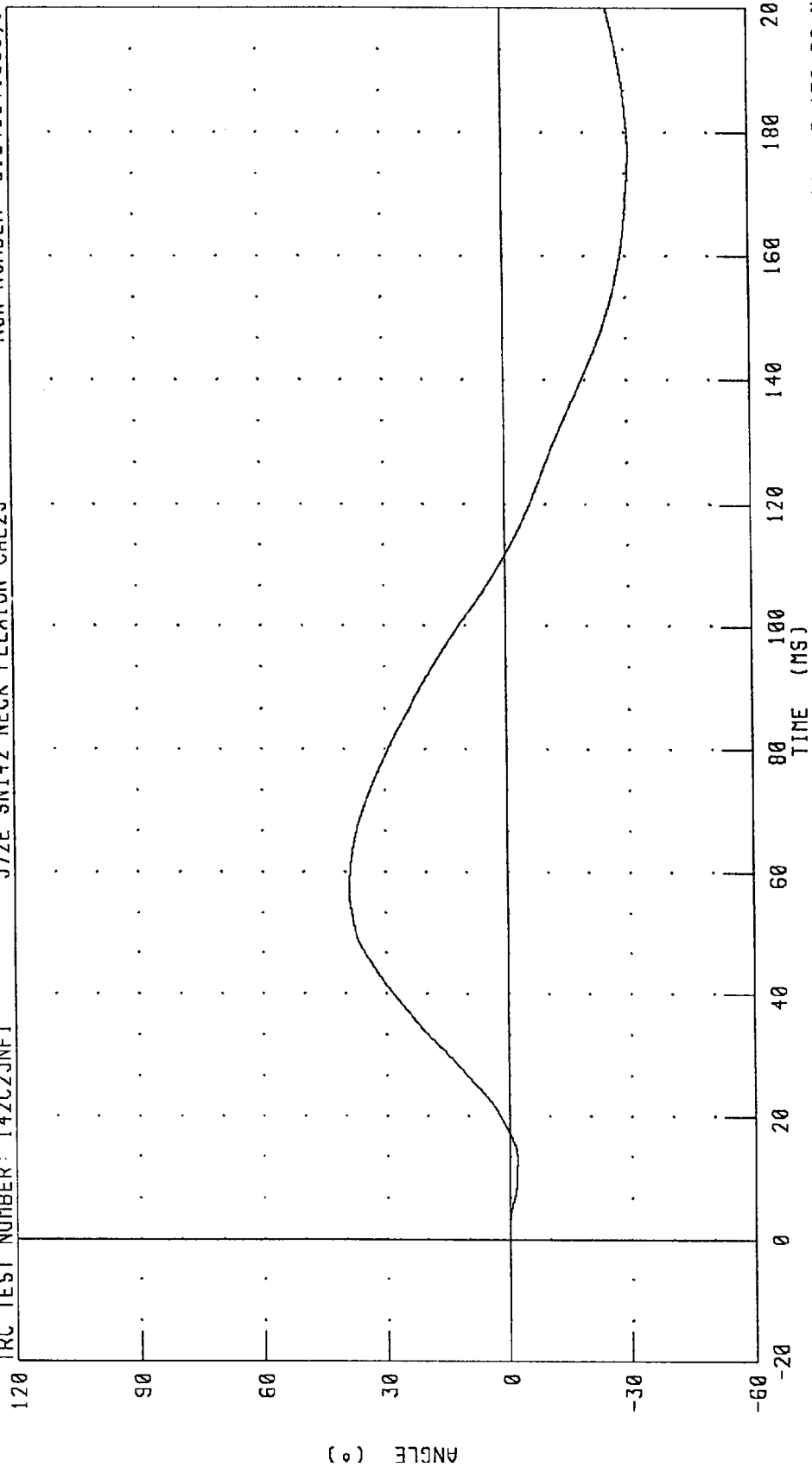
CHANNEL: BETA

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

TRC TEST NUMBER: 142C25NF1

572E SN142 NECK FLEXION CAL25

RUN NUMBER: 010495.1353;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 38.93 ° @ 57.04 MS; -30.84 ° @ 176.80 MS

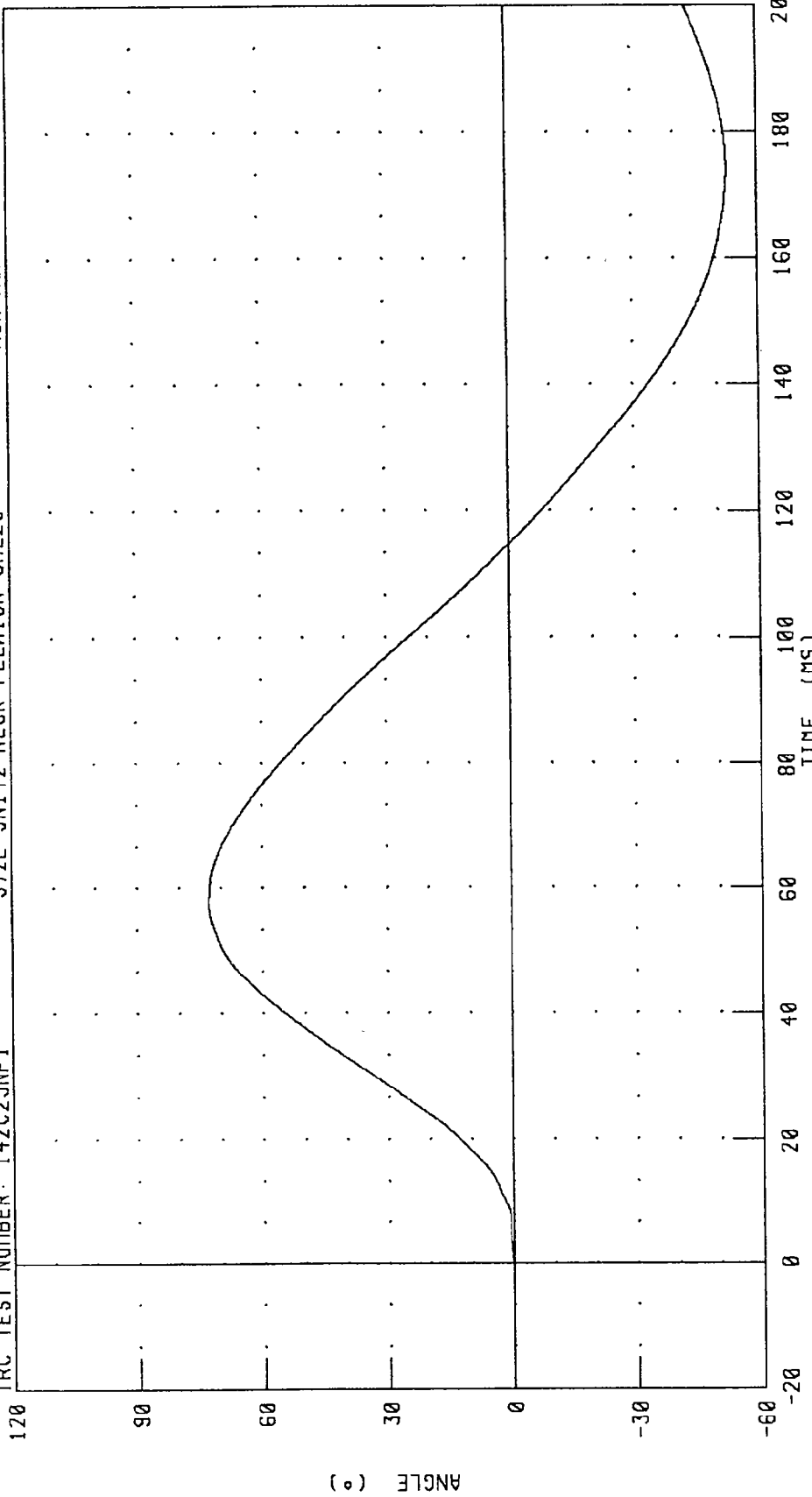
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 142C25NF1

572E SN142 NECK FLEXION CAL25

RUN NUMBER: 010495.1353.1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 72.86 ° @ 57.52 MS; -52.70 ° @ 174.16 MS

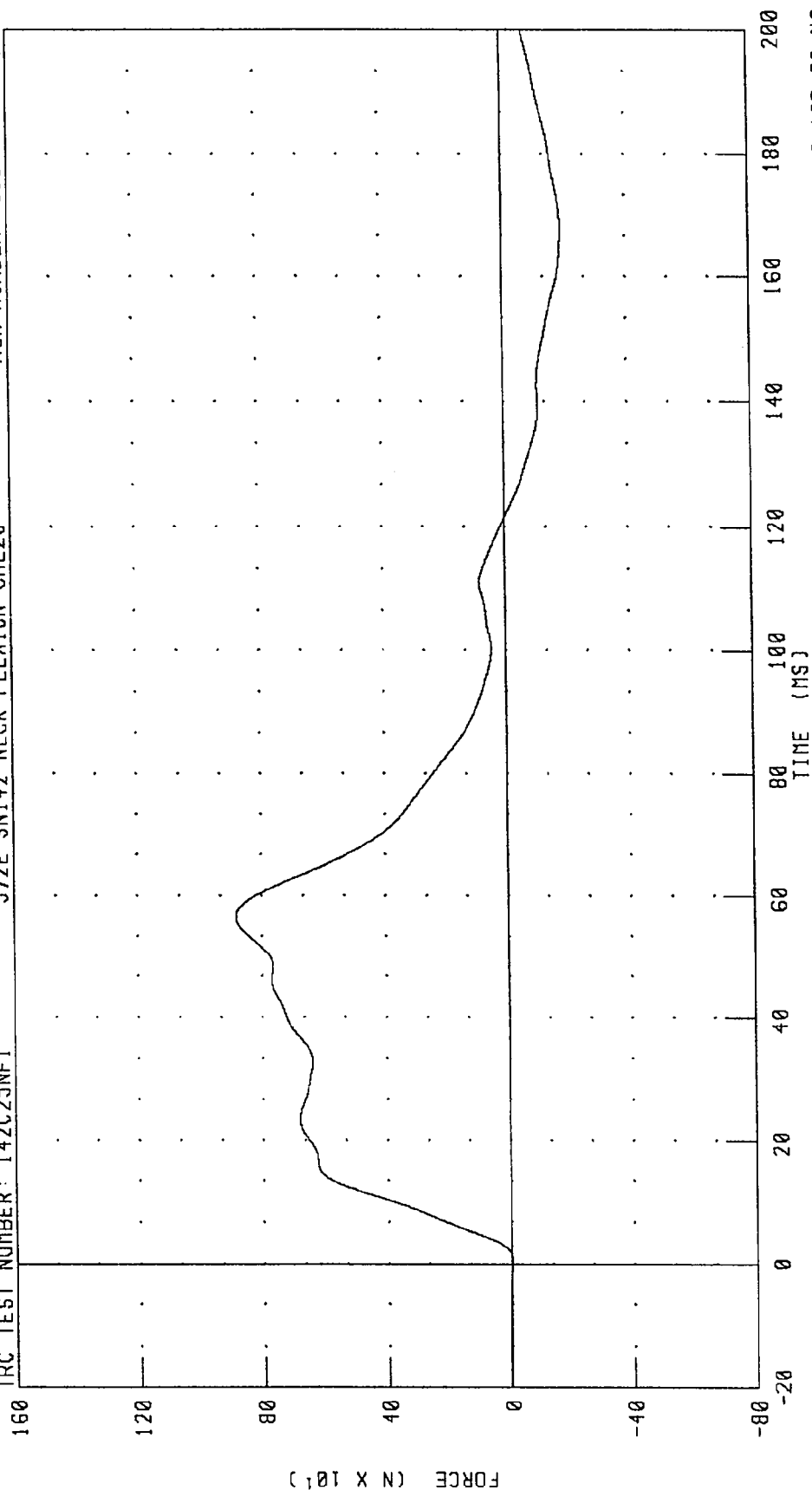
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 010495.1353;1

TRC TEST NUMBER: 142C25NF1

572E SN142 NECK FLEXION CAL25



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 882.72 N @ 56.48 MS; -191.75 N @ 167.60 MS

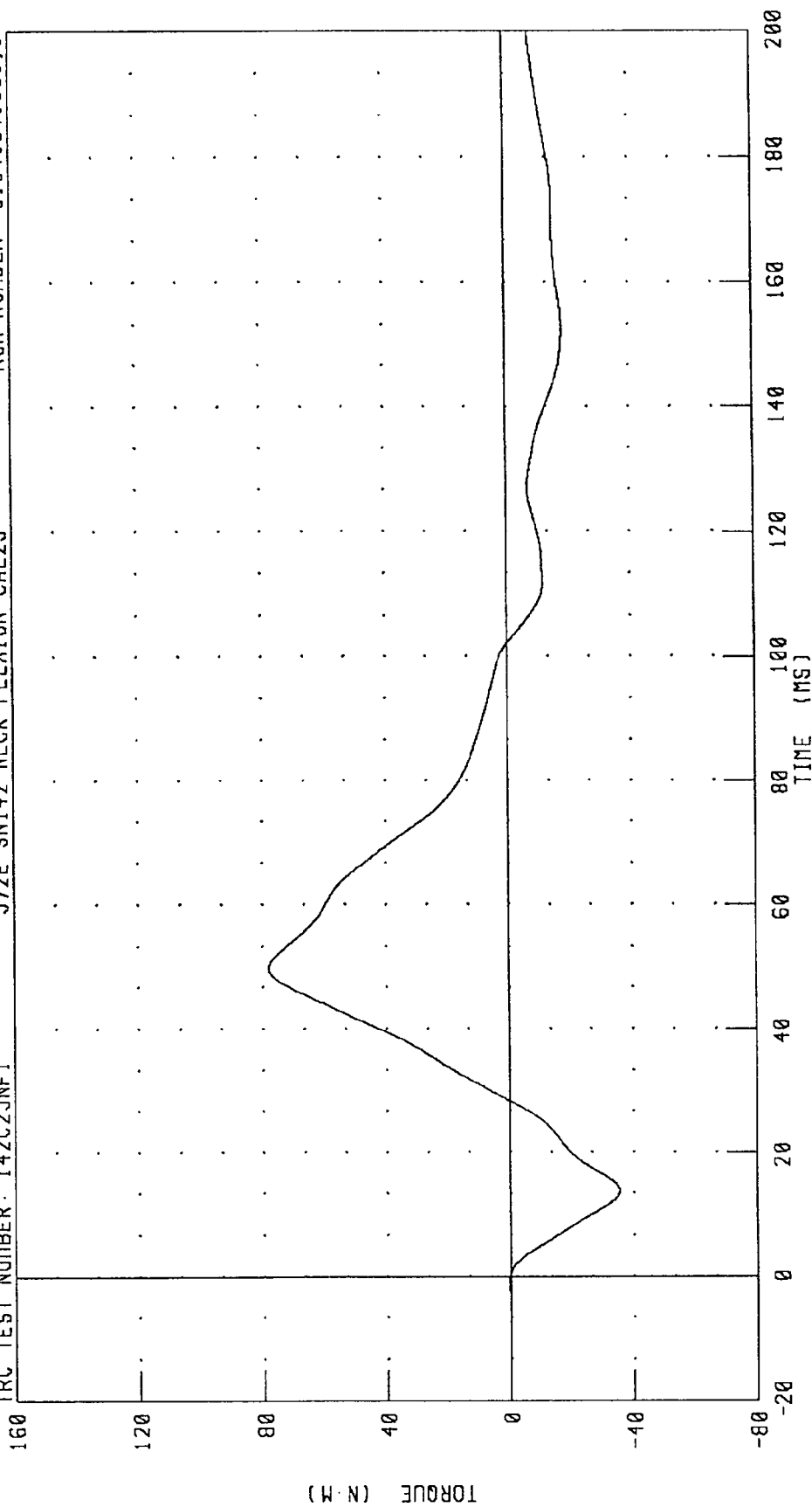
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 142025NF1

572E SN142 NECK FLEXION CAL25

RUN NUMBER: 010495.1353.1



PEAK DATA: 78.07 N.M @ 49.84 MS; -35.52 N.M @ 13.76 MS

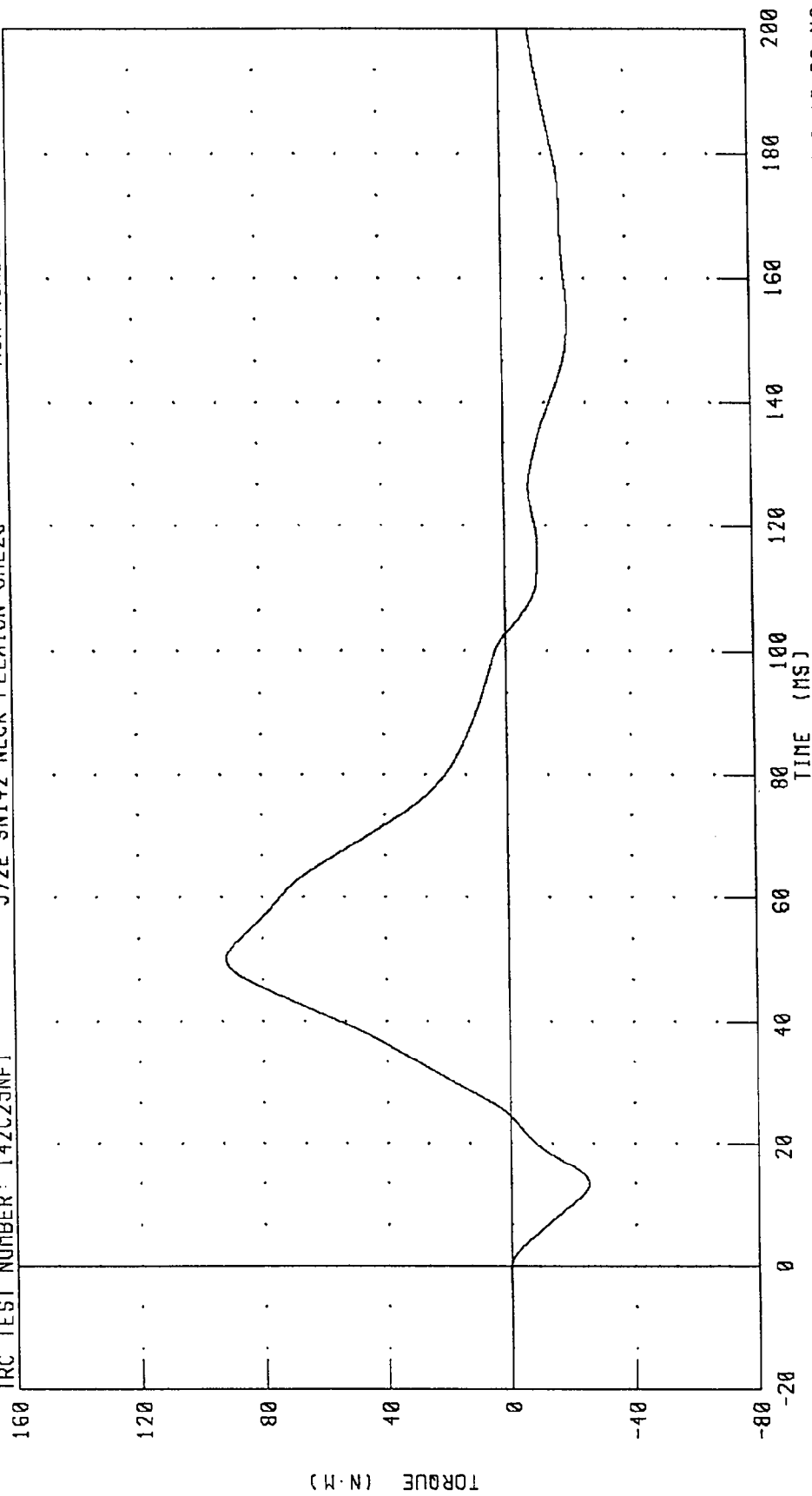
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

RUN NUMBER: 010495.1353.1

572E SN142 NECK FLEXION CAL25

TRC TEST NUMBER: 142C25NF1



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 91.85 N·M @ 50.00 MS; -25.08 N·M @ 13.36 MS

TRANSPORTATION RESEARCH CENTER INC.
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

05-DEC-94

TRC INC. TEST NO: 142C25NE1 572E SN142 NECK EXT. CAL25

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	56.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.02 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.29 G
	20 MS	14.00 - 19.00 G	16.44 G
	30 MS	11.00 - 16.00 G	13.14 G
MAX PENDULUM G		22 G MAX	18.56 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.22 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.40 MS
D PLANE	MAX	81 - 106 DEG.	96.99 DEG.
ROTATION	TIME	72 - 82 MS	73.68 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-72.98 NM
	TIME	65 - 79 MS	69.60 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	152.24 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	138.24 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Foster

RUN NUMBER: 120594.1452;1

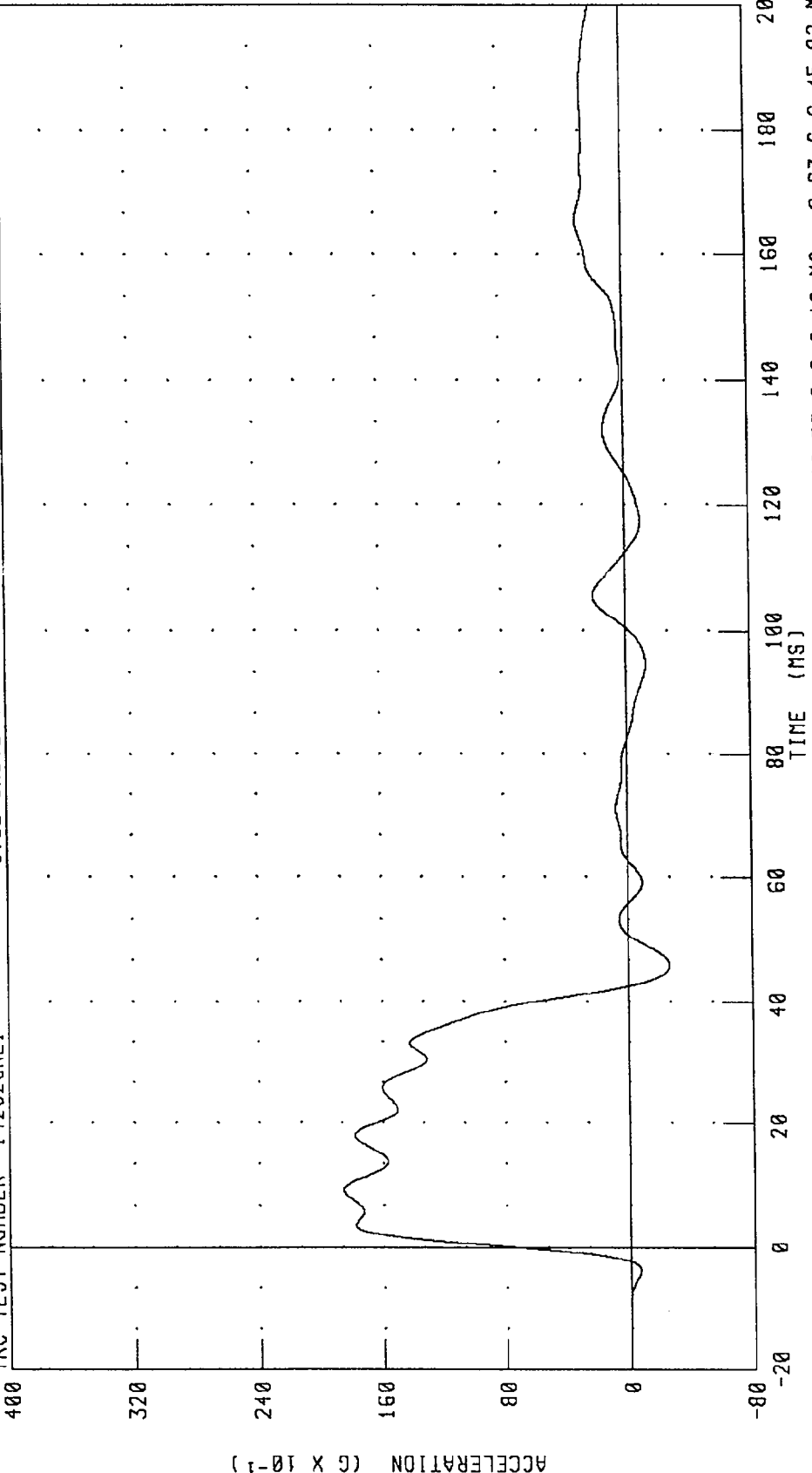
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

RUN NUMBER: 010495.1353.1

572E SN142 NECK EXT. CAL25

TRC TEST NUMBER: 142C25NE1



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 18.57 G @ 9.12 MS; -2.63 G @ 45.92 MS

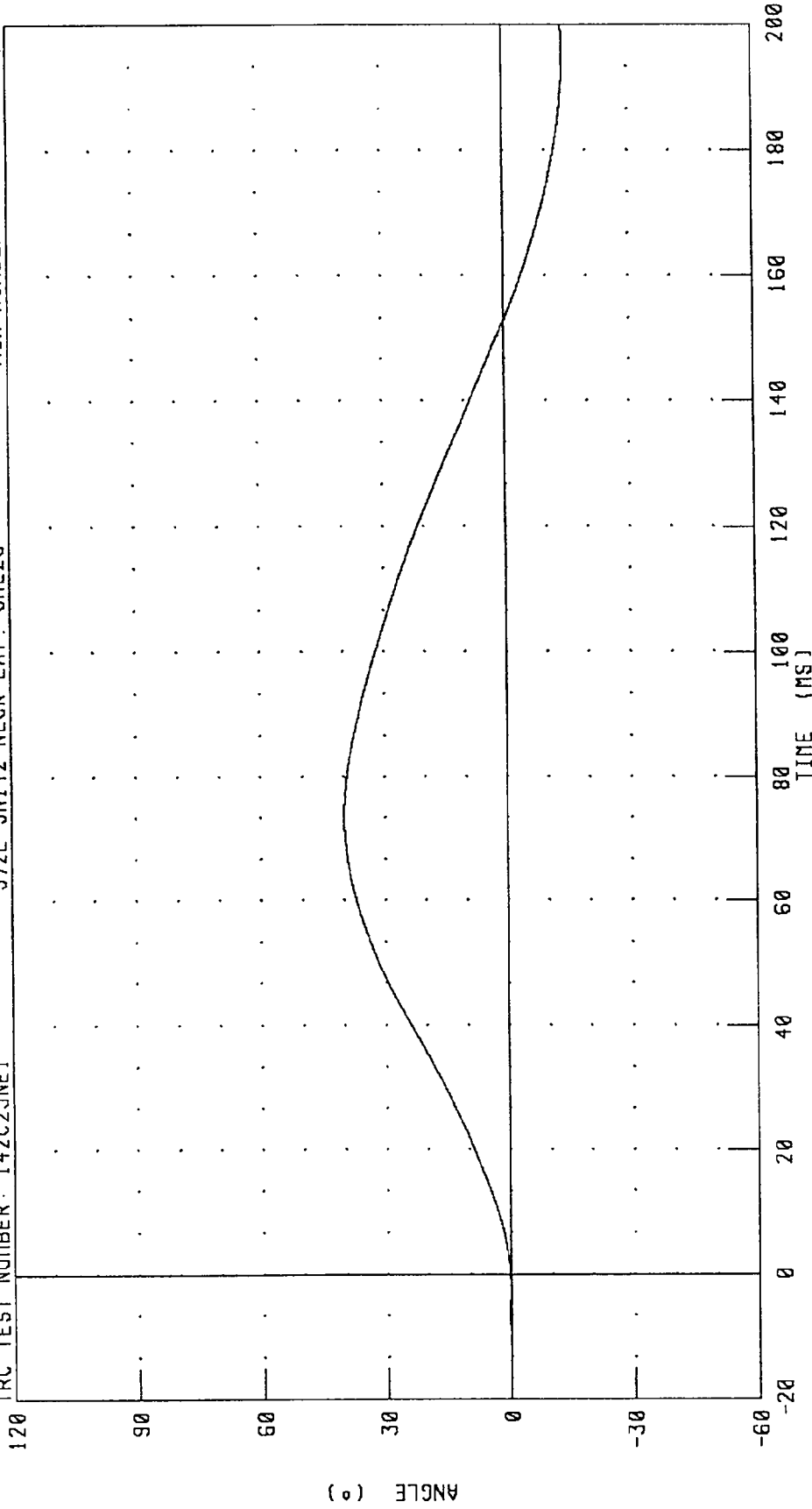
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN142 NECK EXT. CAL25

TRC TEST NUMBER: 142C25NE1

RUN NUMBER: 010495.1353;1



PEAK DATA: 39.97 ° @ 73.44 MS; -14.53 ° @ 195.28 MS

CHANNEL: BETA FILTER: CH. CLASS 60

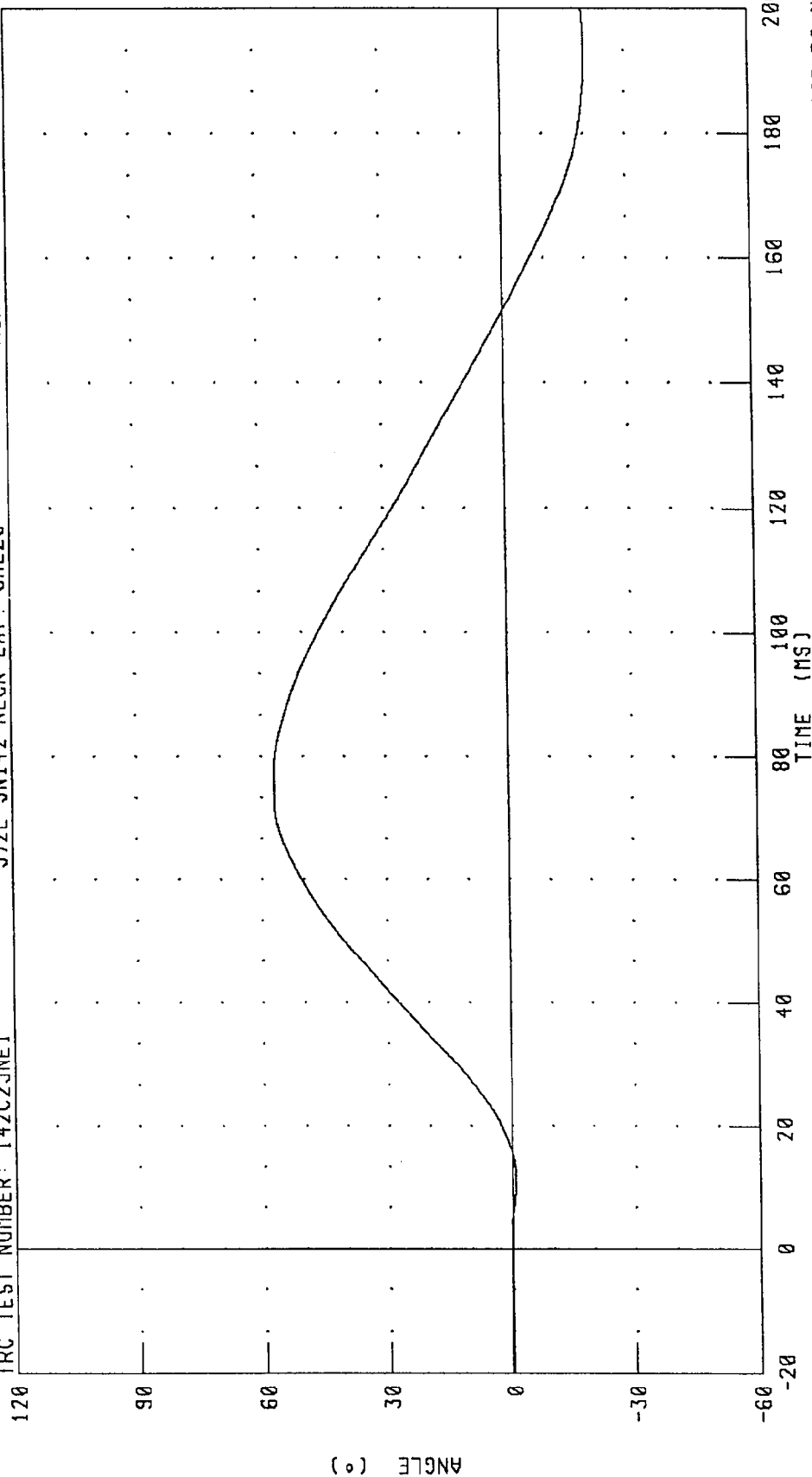
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 010495.1353,1

IRC TEST NUMBER: 142C25NE1

572E SN142 NECK EXT. CAL25



PEAK DATA: 57.03 ° @ 74.88 MS; -20.34 ° @ 193.76 MS

CHANNEL: THETA FILTER: CH. CLASS 60

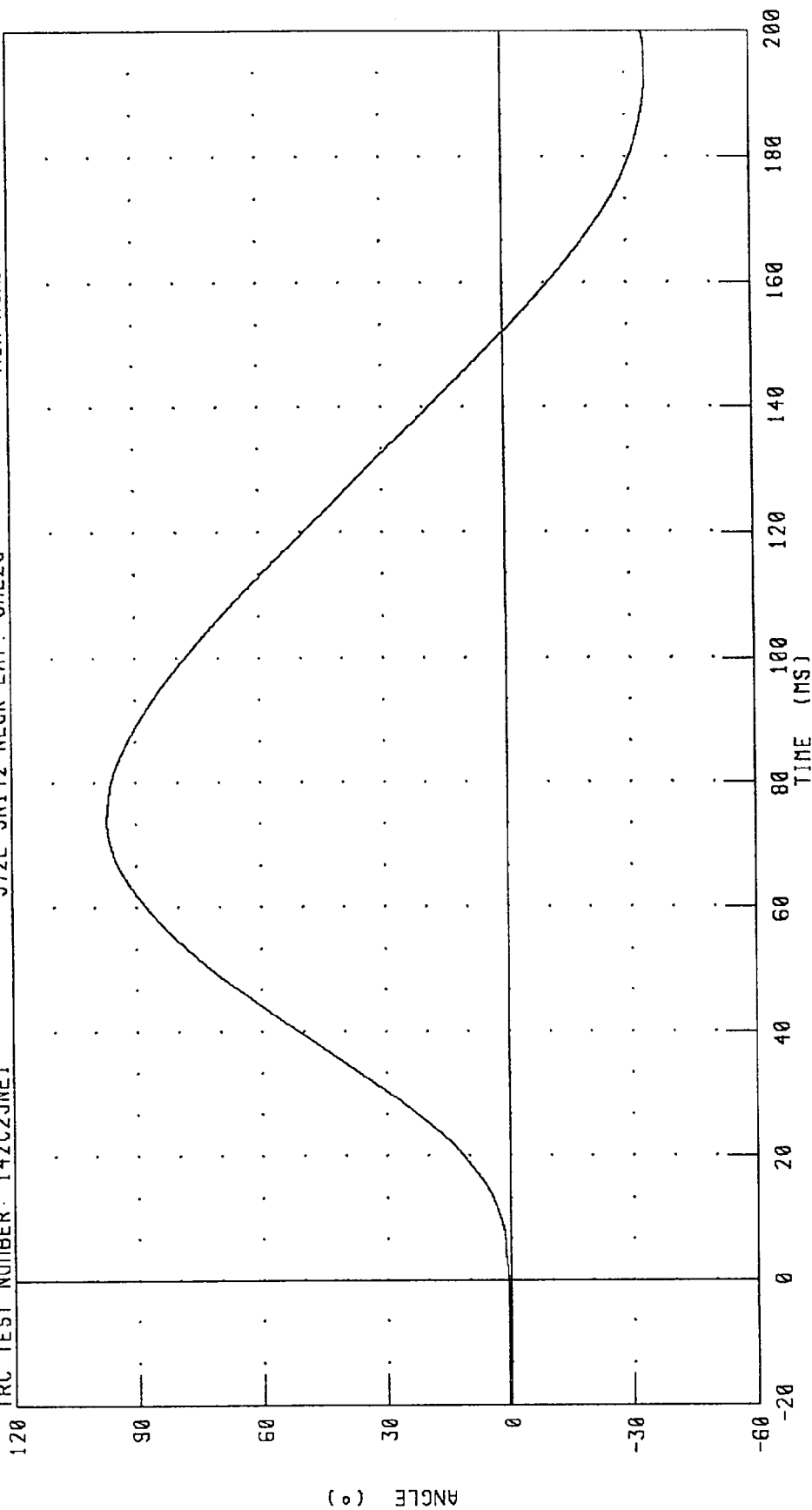
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 142025NE1

572E SN142 NECK EXT. CAL25

RUN NUMBER: 010495.1353.1



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 96.99 ° @ 73.68 MS; -34.87 ° @ 194.80 MS

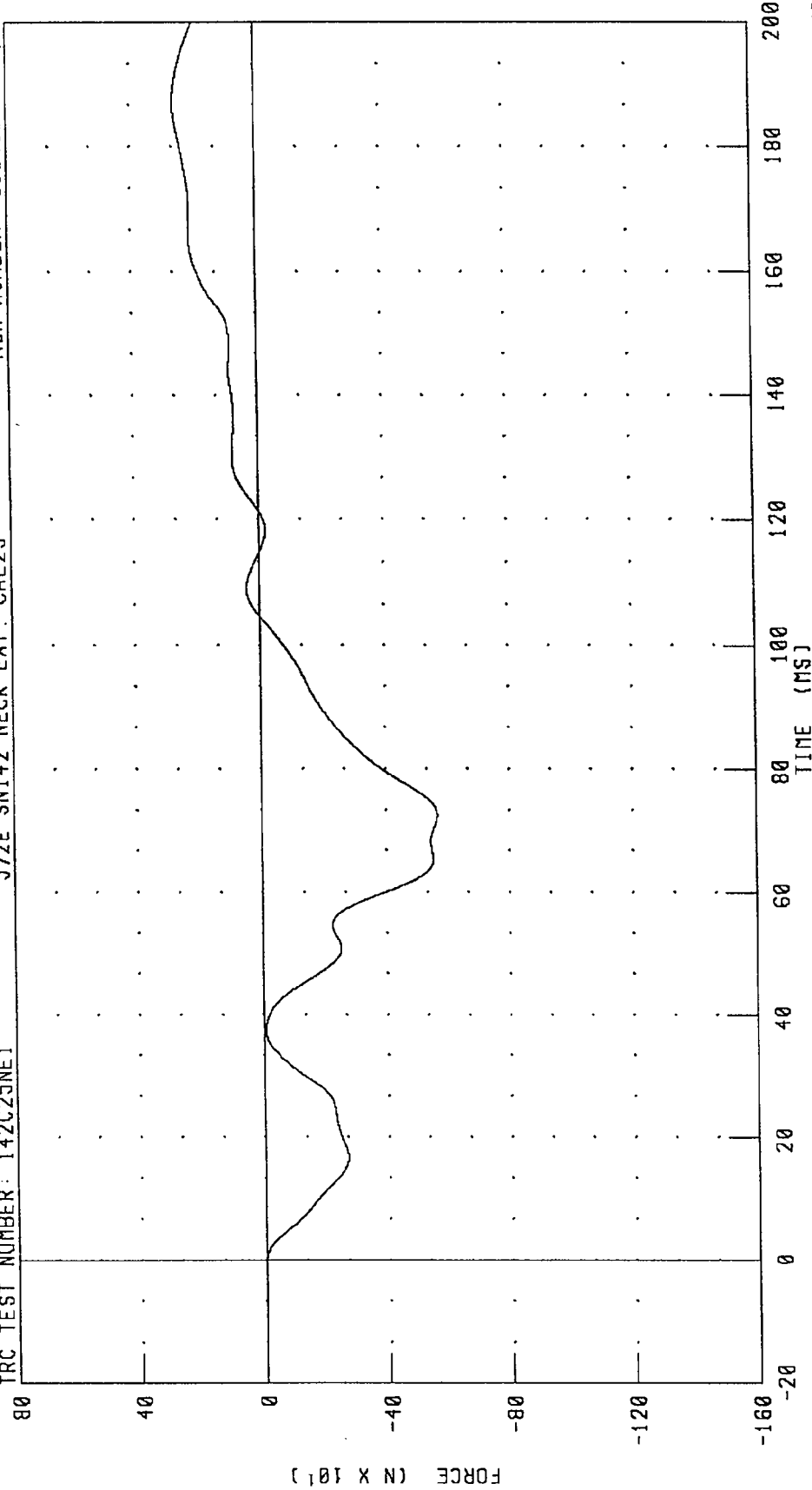
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 010495.1353;1

TRC TEST NUMBER: 142C25NE1

572E SN142 NECK EXT. CAL25



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 260.19 N @ 187.04 MS; -567.47 N @ 72.56 MS

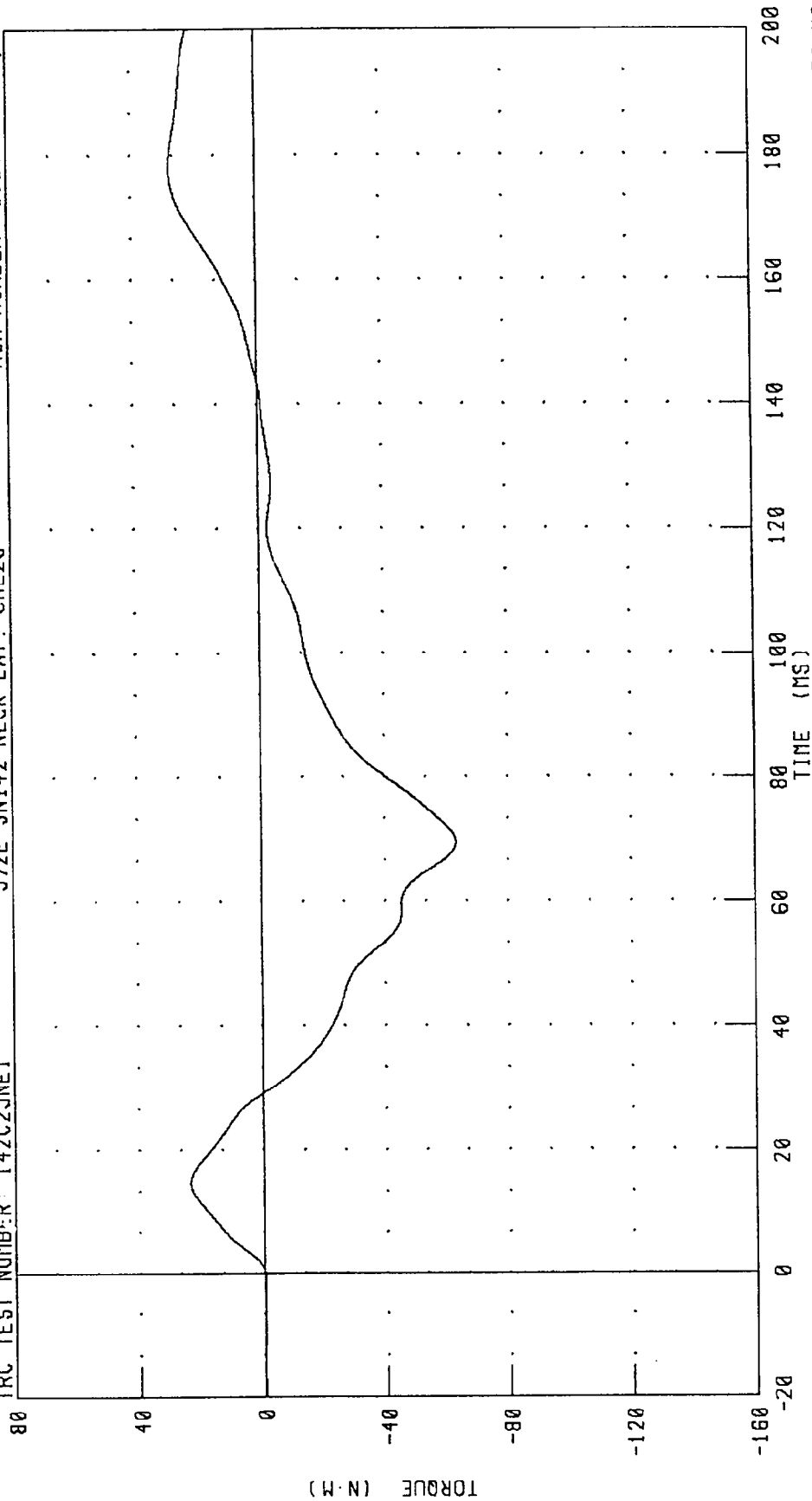
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 142C25NE1

572E SN142 NECK EXT. CAL25

RUN NUMBER: 010495.1353,1



PEAK DATA: 27.76 N.M @ 178.16 MS; -63.20 N.M @ 69.52 MS

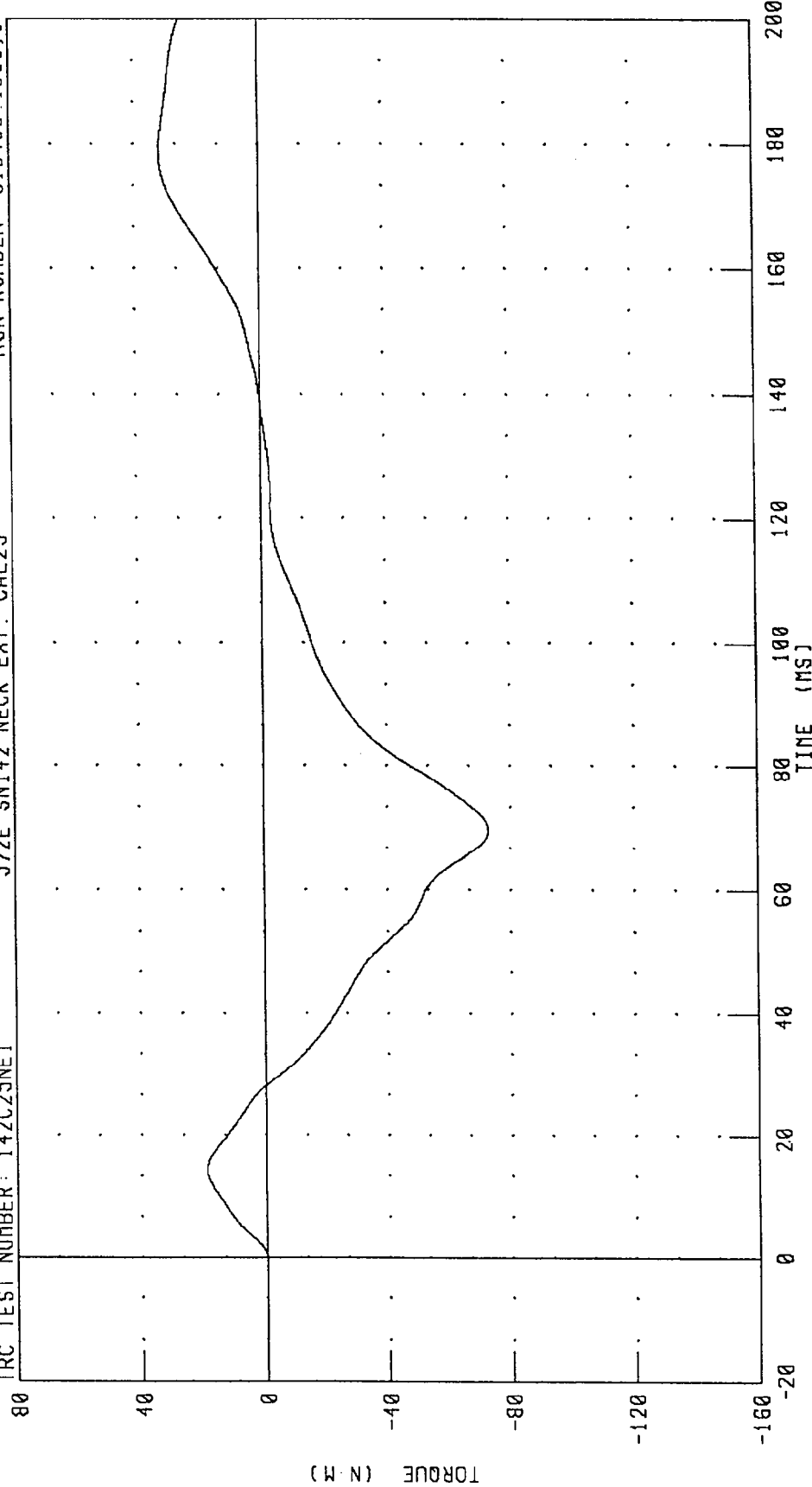
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 142C25NE1

572E SN142 NECK EXT. CAL25

RUN NUMBER: 010495.1353.1



PEAK DATA: 31.90 N-M @ 178.72 MS; -72.98 N-M @ 69.60 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

06-DEC-94

TRC INC.

TEST NO: 142C25TH1

572E SN142 H.S.THORAX CAL25

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	58.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.65 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	70.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5498. N
INTERNAL HYSTERESIS	69% - 85%	73.2%

TEST MEETS SPECIFICATIONS

TECHNICIAN P. J. F. S.

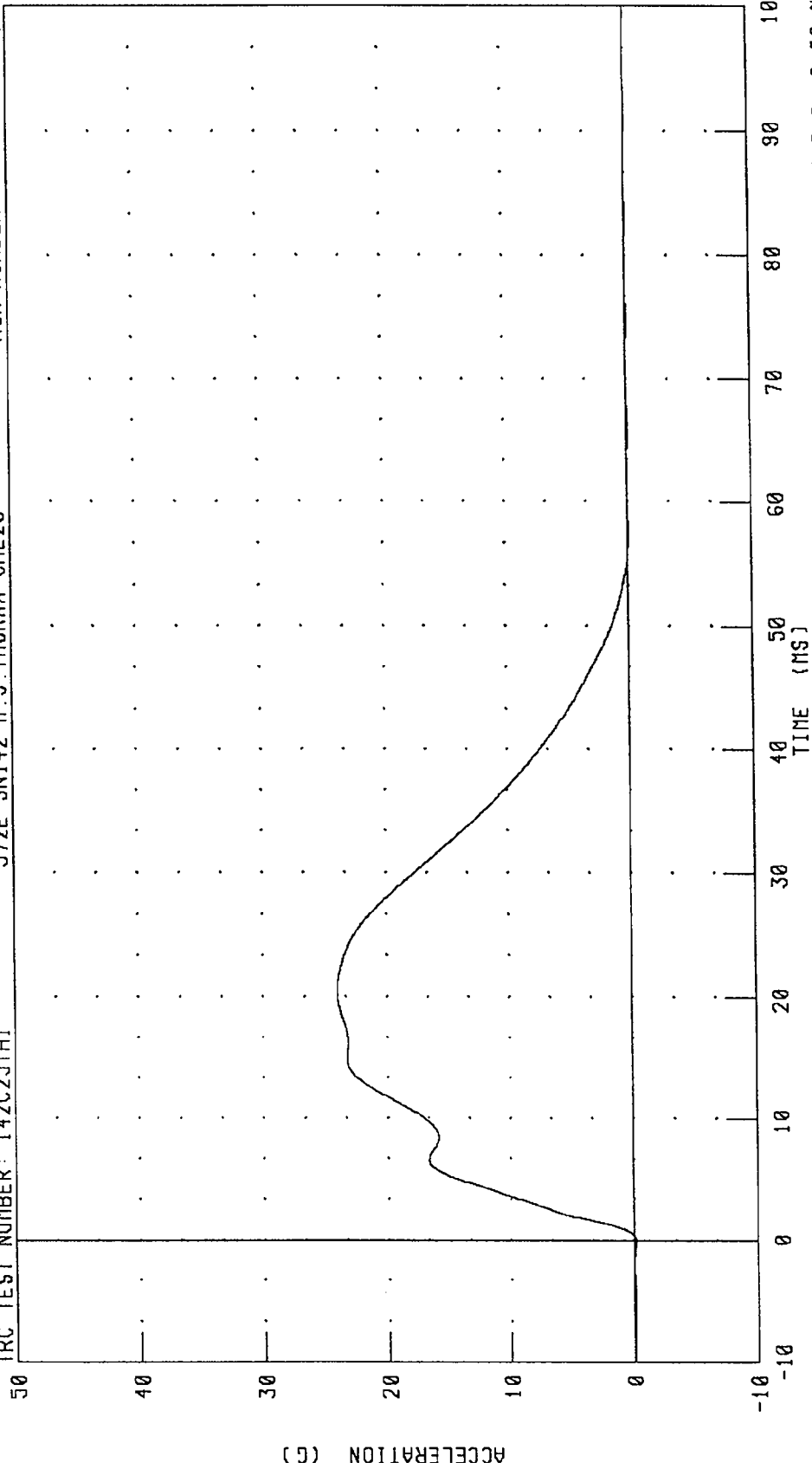
RUN NUMBER: 120694.0838;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

IRC TEST NUMBER: 142C25TH1

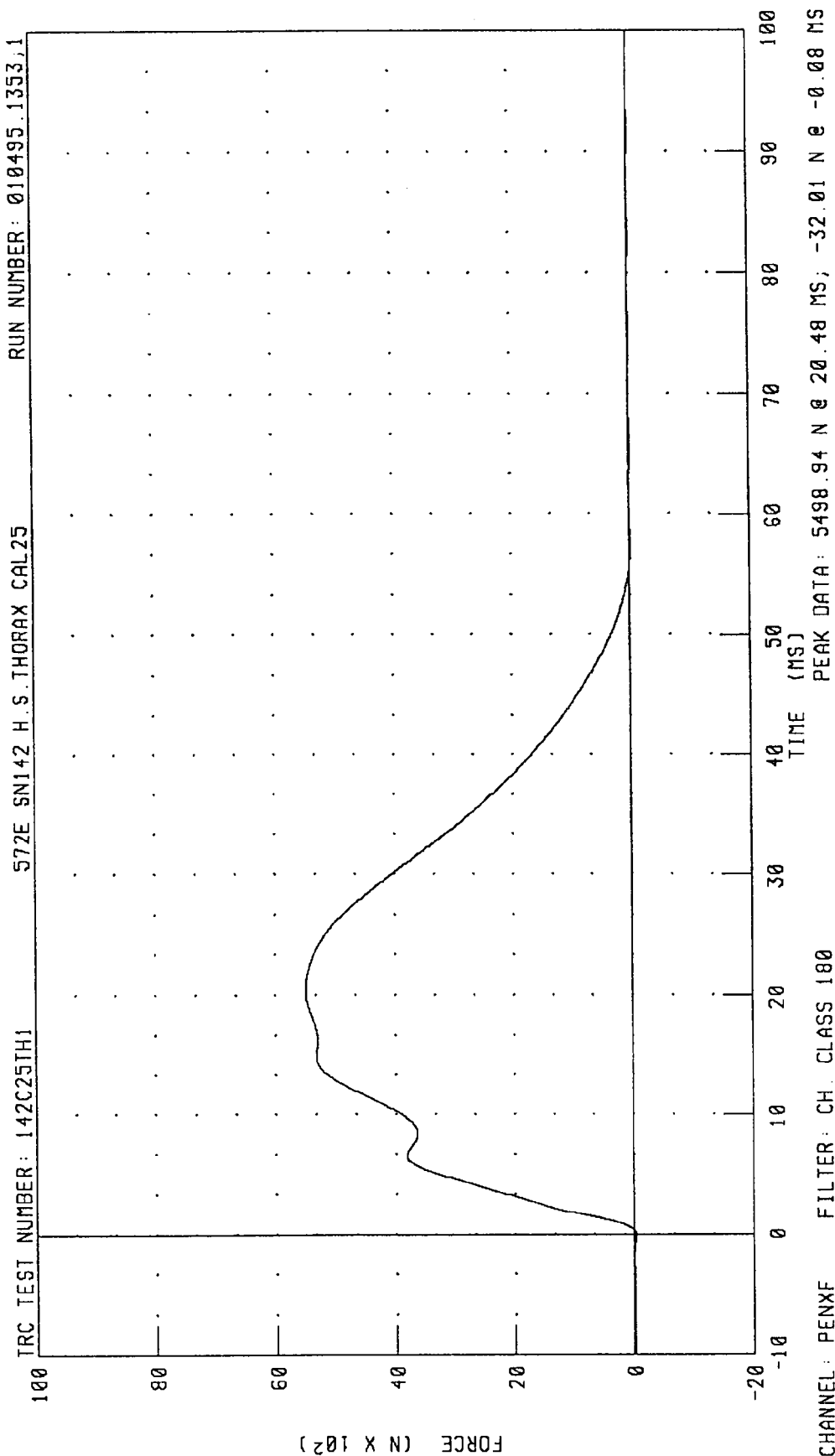
572E SN142 H.S. THORAX CAL25

RUN NUMBER: 010495.1353;1



CHANNEL: PENXG FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

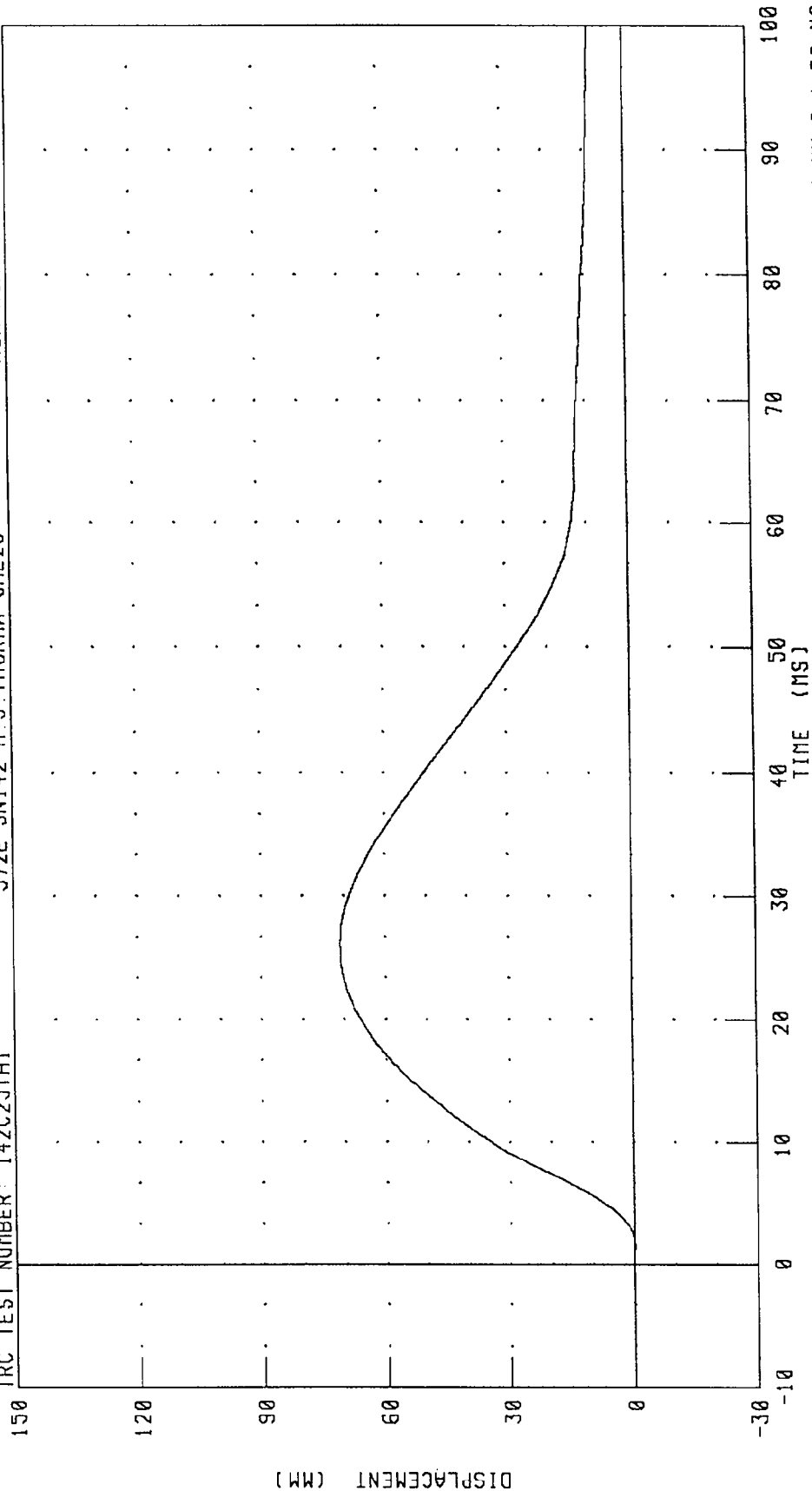


PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 142C25TH1

572E SN142 H. S. THORAX CAL25

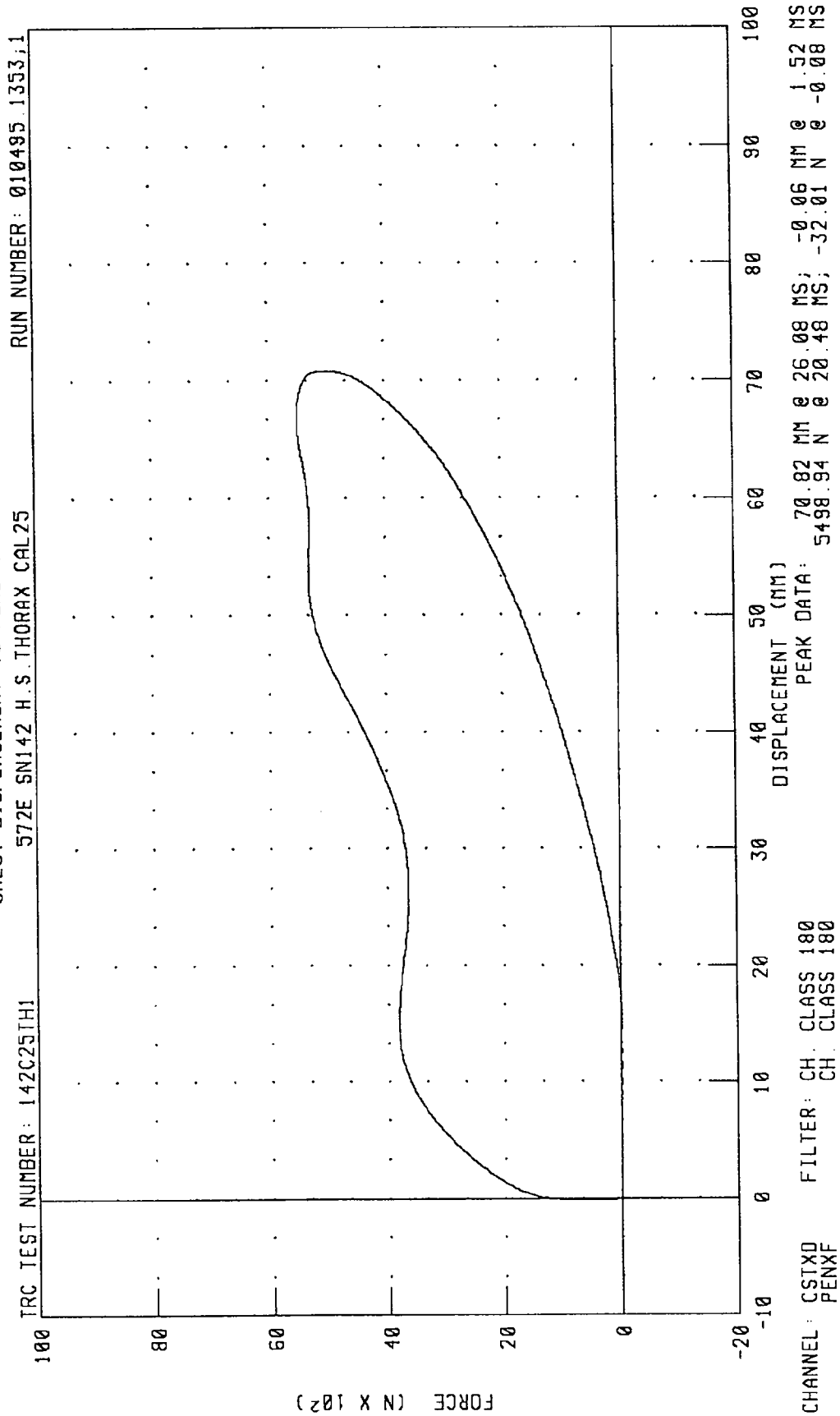
RUN NUMBER: 010495.1353.1



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 70.82 MM @ 26.08 MS; -0.06 MM @ 1.52 MS

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



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

05-DEC-94

TRC INC.

TEST NO: 142C25RK1

572E SN142 RIGHT KNEE CAL 25

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	5549.3 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete Ford

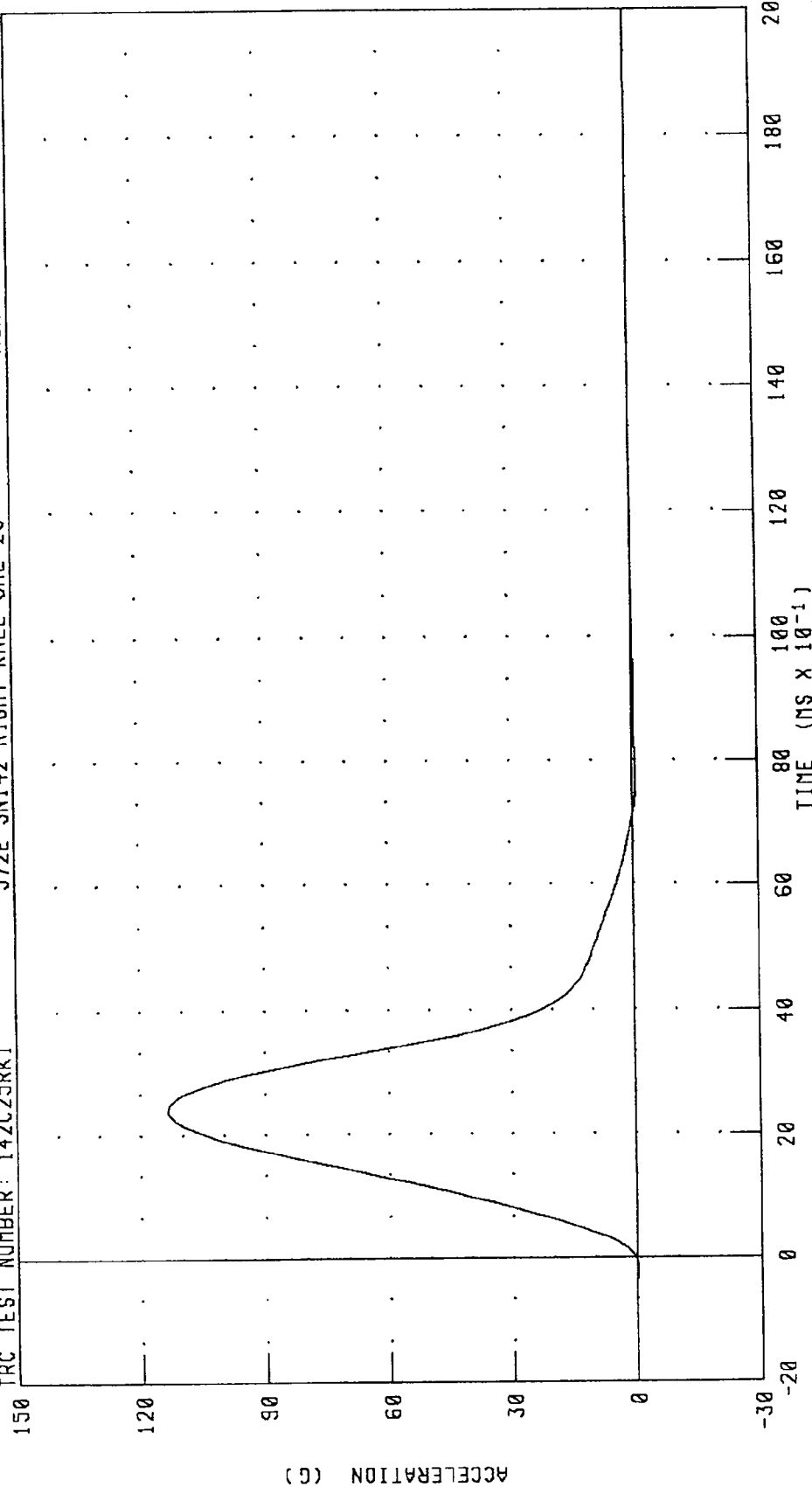
RUN NUMBER: 120594.1401;1

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

RUN NUMBER: 010495.1353;1

572E SN142 RIGHT KNEE CAL 25

TRC TEST NUMBER: 142C25RK1



PEAK DATA: 113.42 G @ 2.40 MS, -0.80 G @ 7.76 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

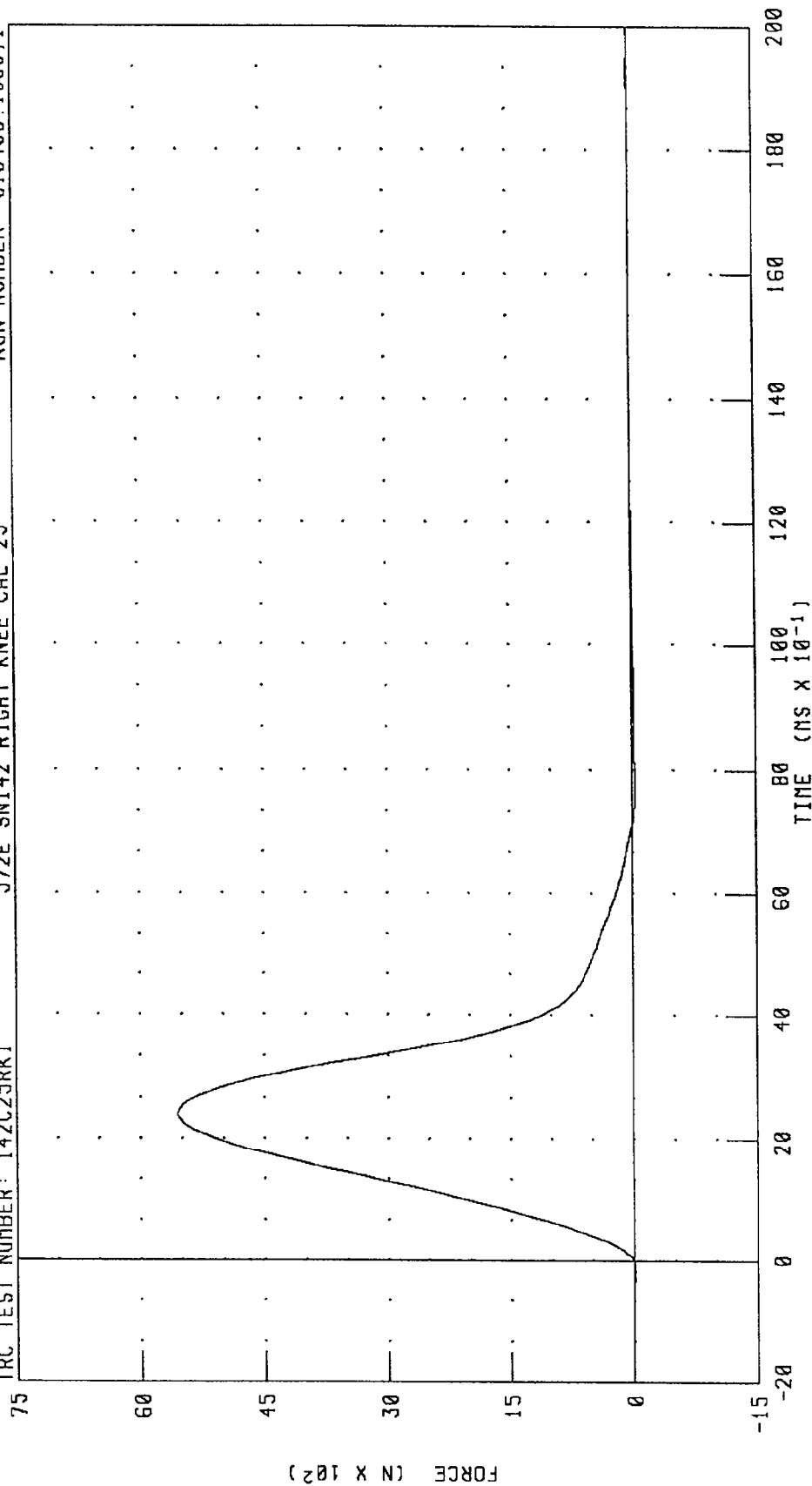
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN142 RIGHT KNEE CAL 25

RUN NUMBER: 010495.1353;1

TRC TEST NUMBER: 142C25RK1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5549.35 N @ 2.40 MS; -39.20 N @ 7.76 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

05-DEC-94

TRC INC.

TEST NO: 142C25LK1

572E SN142 LEFT KNEE CAL 25

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	5563.0 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete R. W.

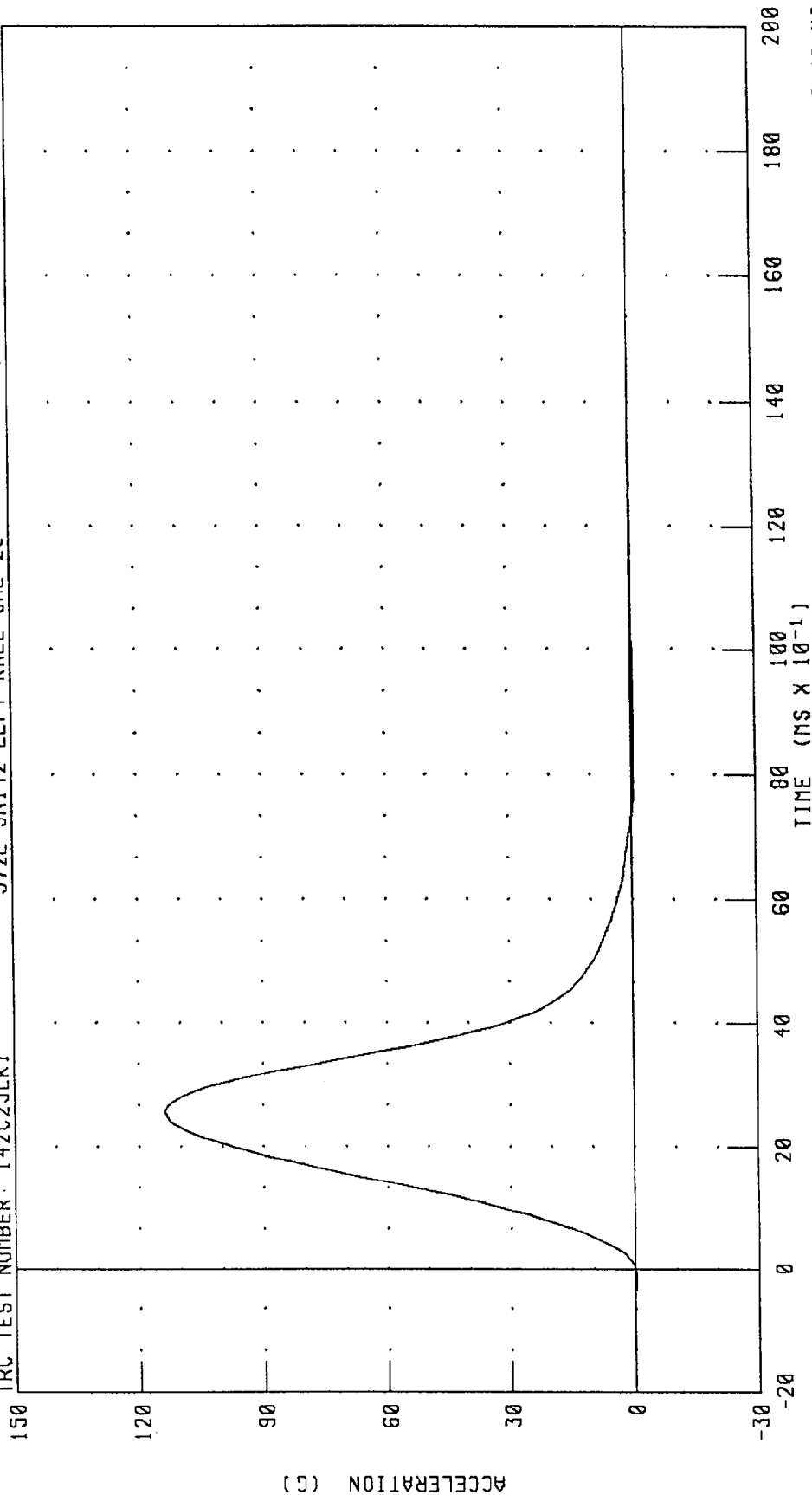
RUN NUMBER: 120594.1351;1

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

RUN NUMBER: 010495.1353;1

TRC TEST NUMBER: 142C25LK1

572E SN142 LEFT KNEE CAL 25



PEAK DATA: 113.70 G @ 2.56 MS; -0.52 G @ 8.40 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

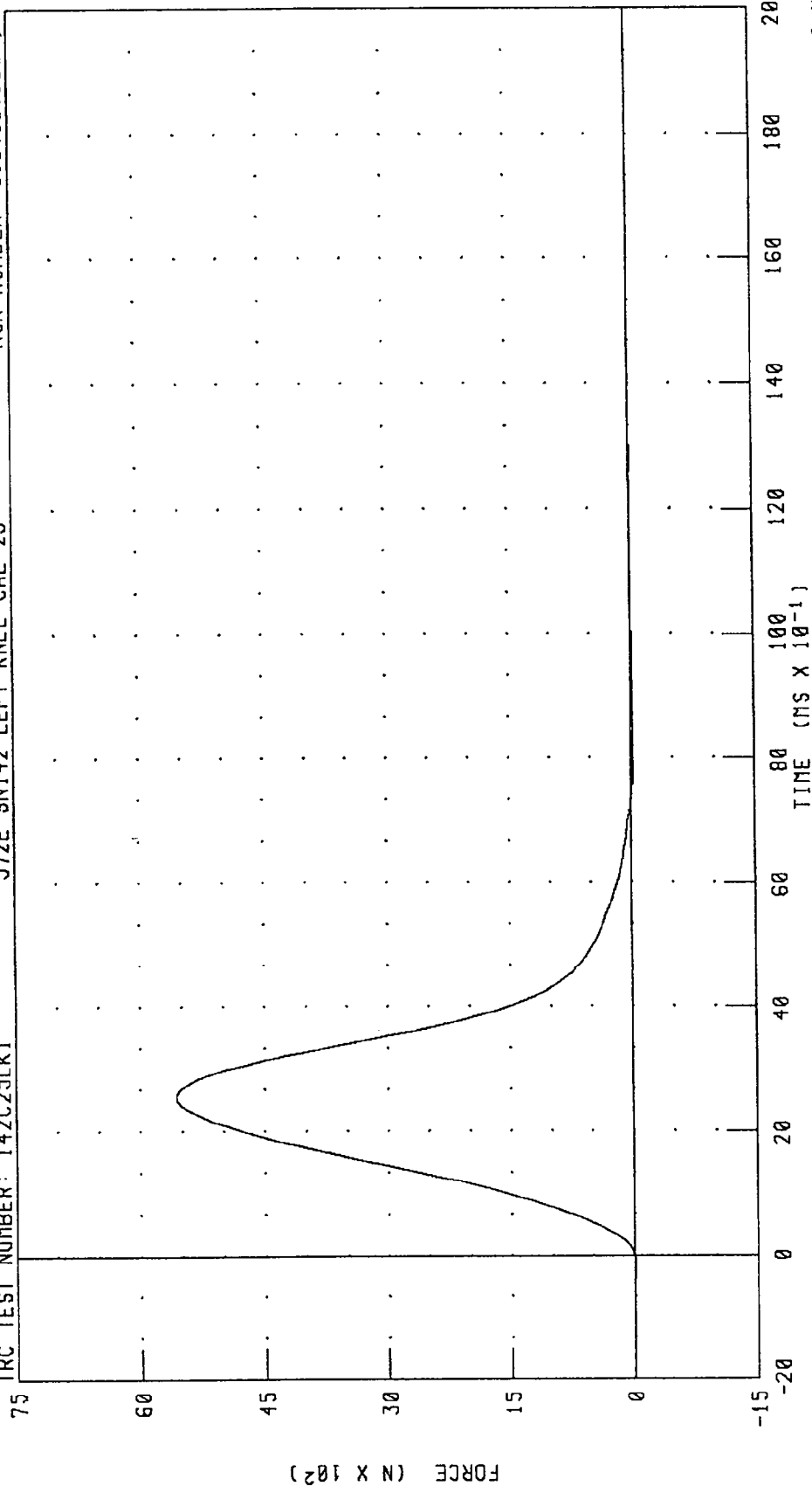
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 142C25LK1

572E SN142 LEFT KNEE CAL 25

RUN NUMBER: 010495.1353;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5563.08 N @ 2.56 MS; -25.66 N @ 8.40 MS

Pre-test Certification Data

Passenger Dummy S/N: 192

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III EXTERNAL DIMENSIONS

192 ALDERSON

21-NOV-94

TRC INC.

TEST NO: 192C23ED1

572E SN192 EXT.DIMENSION CAL23

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	980. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	851. MM
CHEST DEPTH (O)		213 - 229 MM	218. MM
H-POINT HEIGHT (C)		84 - 89 MM	84. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	135. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	889. MM
THIGH CLEARANCE (F)		140 - 155 MM	150. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	470. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	447. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	493. MM
FOOT LENGTH (P)		252 - 267 MM	259. MM
FOOT BREADTH (W)		91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	94. MM
SHOULDER BREADTH (V)		422 - 437 MM	429. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	516. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	211. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	345. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	290. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Pete Kato

RUN NUMBER: 112394.1253

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

22-NOV-94

TRC INC.

TEST NO: 192C23HD1

572E SN192 HEAD DROP CAL 23

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	226.11 G
PEAK LATERAL ACCELERATION	15 G MAX	2.99 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete Fera

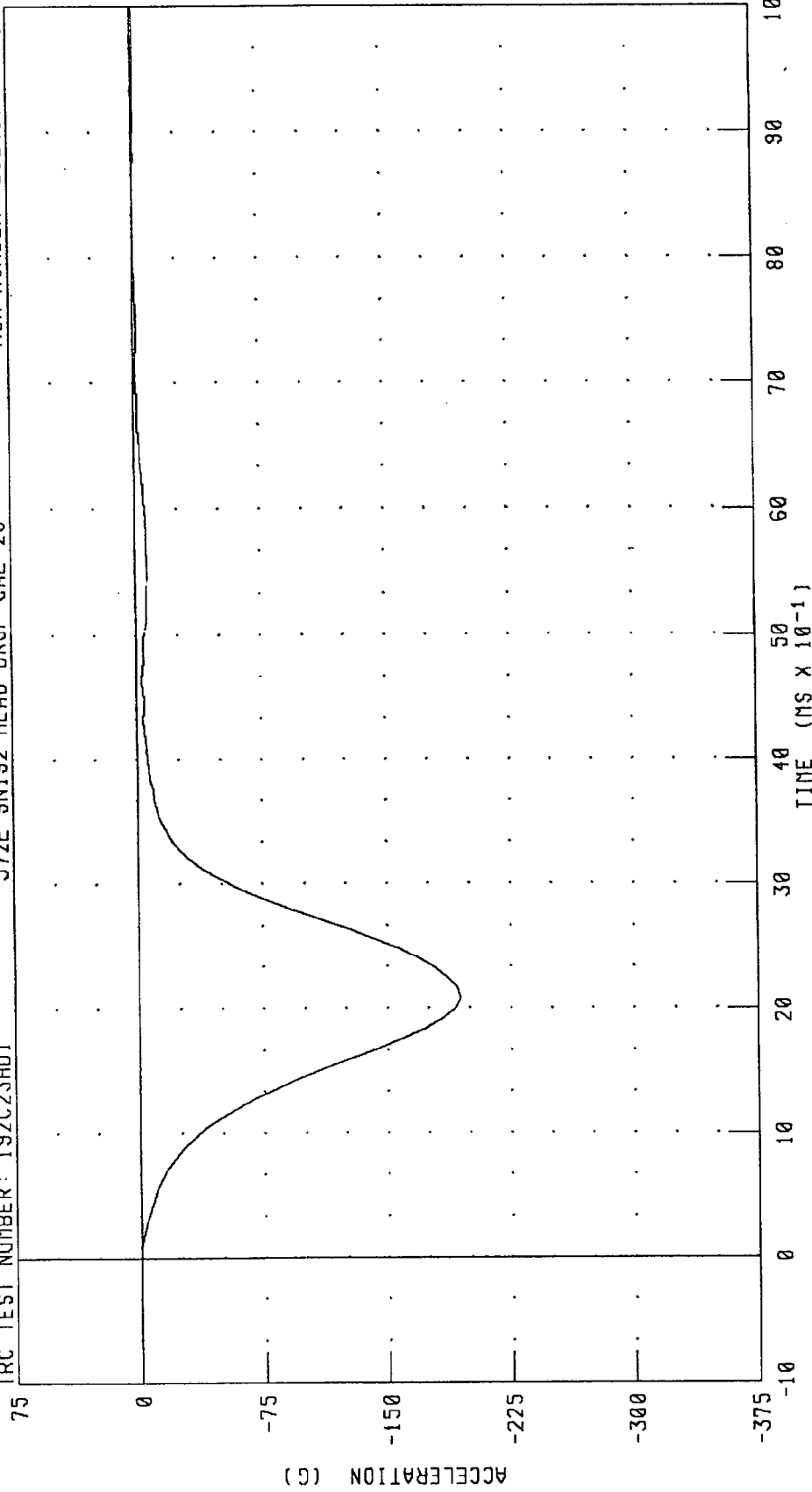
RUN NUMBER: 112294.1443;1

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

TRC TEST NUMBER: 192C23HD1

572E SN192 HEAD DROP CAL 23

RUN NUMBER: 010495.1407.1



PEAK DATA: 0.05 G @ 0.00 MS; -194.19 G @ 2.08 MS

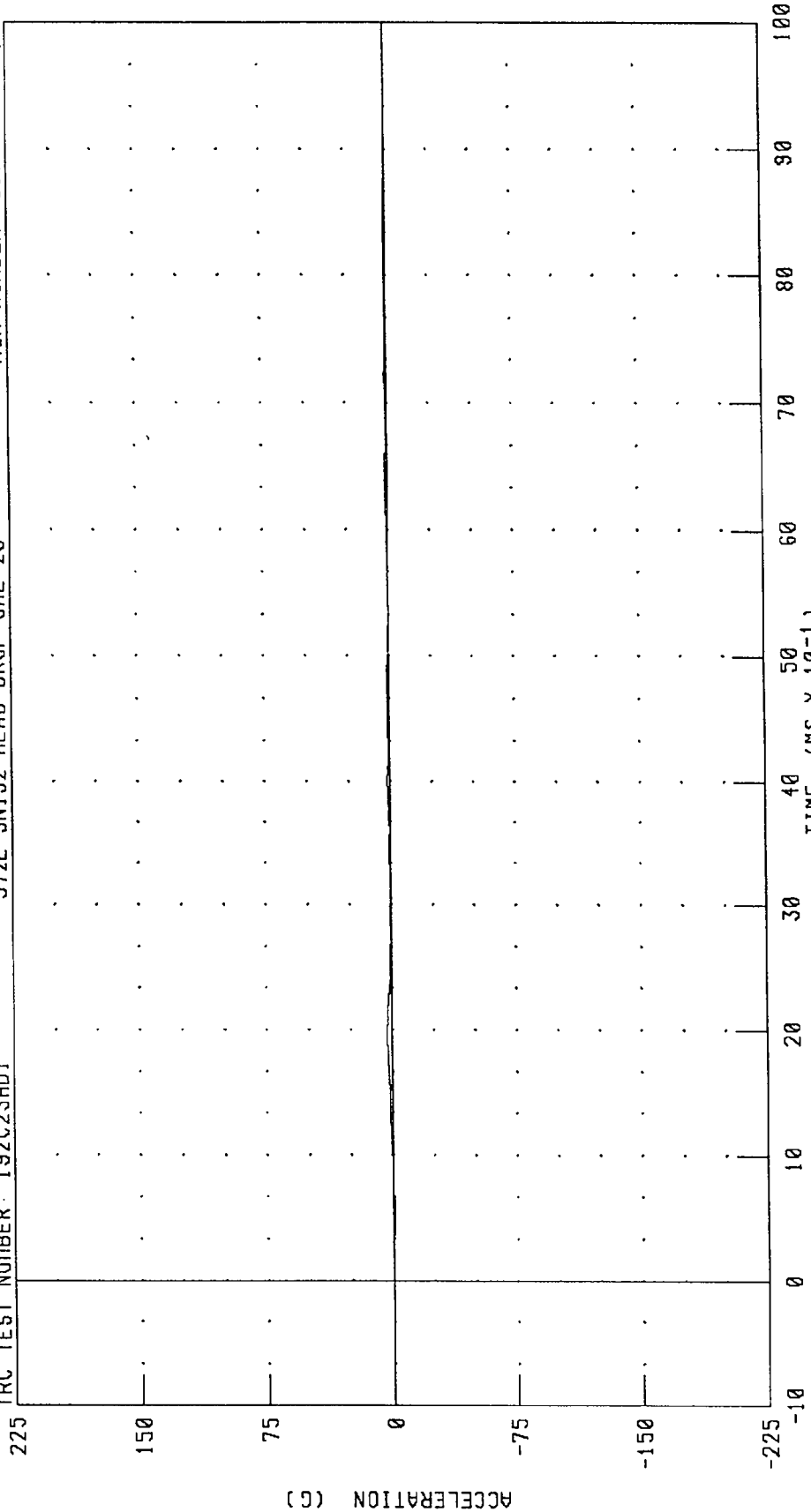
CHANNEL: HEDXG FILTER: CH CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572E SN192 HEAD DROP CAL 23 RUN NUMBER: 010495.1407,1

TRC TEST NUMBER: 192C23HD1

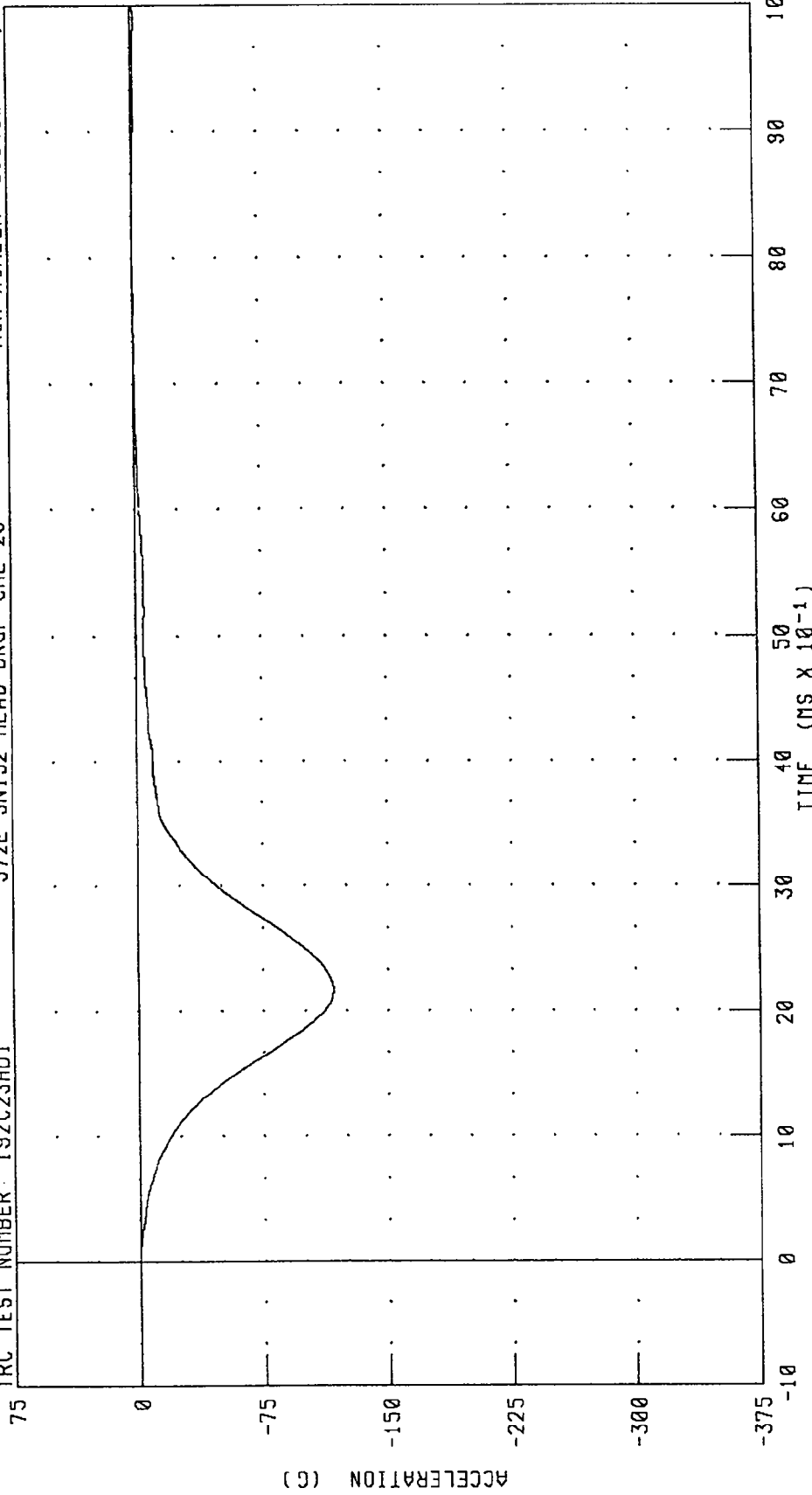


PEAK DATA: 2.99 G @ 2.00 MS; -0.39 G @ 0.48 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 192C23HD1 572E SNI92 HEAD DROP CAL 23 RUN NUMBER: 010495.1407.1



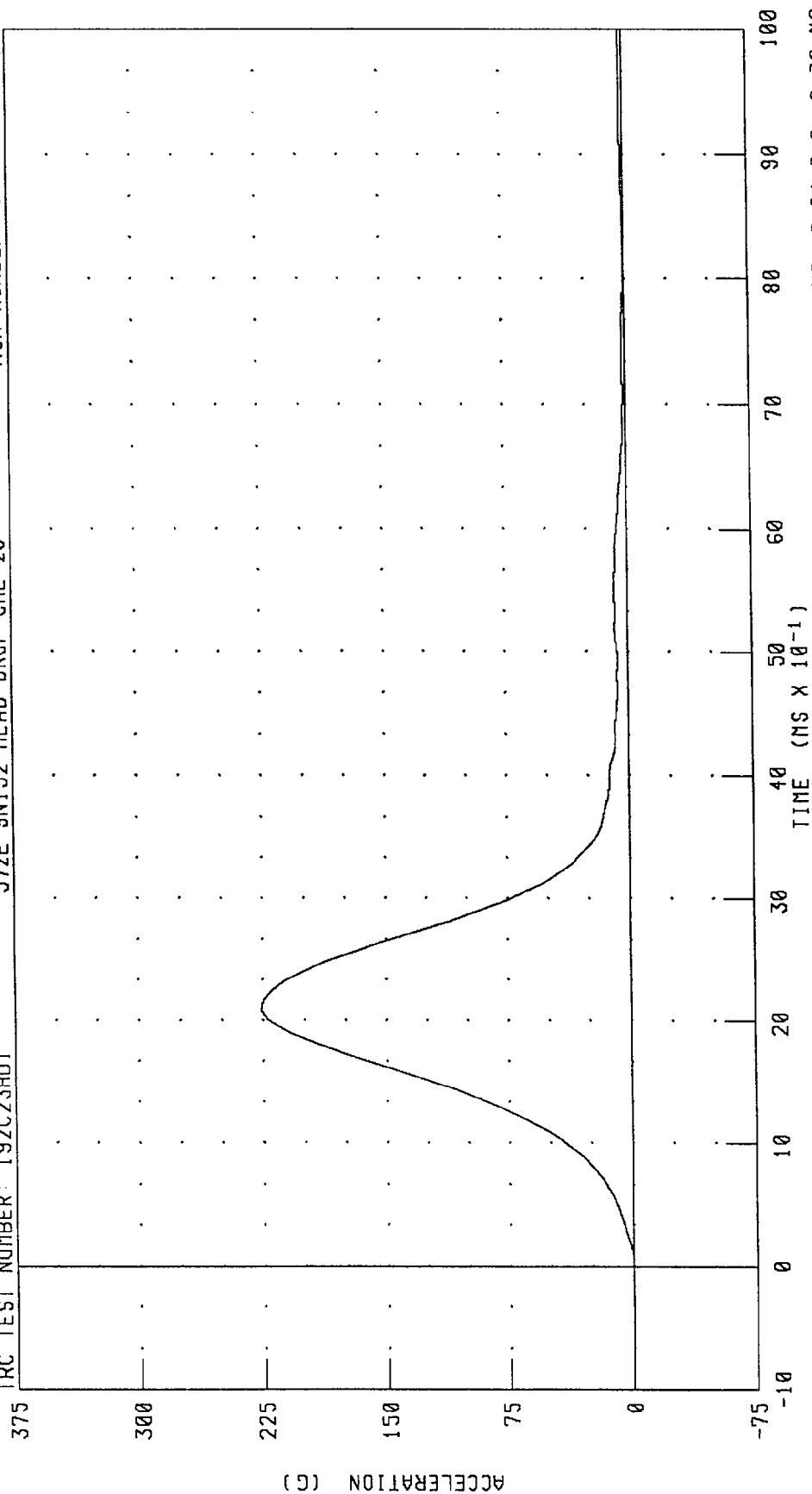
PEAK DATA: 0.00 G @ 00 MS; -117.01 G @ 2.16 MS

CHANNEL: HEDZG FILTER: CH CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
 HEAD RESULTANT ACCELERATION
 572E SN192 HEAD DROP CAL 23

RUN NUMBER: 010495.1407.1

IRC TEST NUMBER: 192C23HD1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 226.11 G @ 2.08 MS; 0.04 G @ -0.32 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

23-NOV-94

TRC INC. TEST NO: 192C23NF1 572E SN192 NECK FLEXION CAL23

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	30.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.53 G
	20 MS	17.60 - 22.60 G	20.48 G
	30 MS	12.50 - 18.50 G	17.48 G
MAX PENDULUM G		29 G MAX	23.33 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.45 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.08 MS
D PLANE	MAX	64 - 78 DEG.	66.05 DEG.
ROTATION	TIME	57 - 64 MS	58.24 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	93.79 NM
	TIME	47 - 58 MS	50.56 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	113.76 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.96 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN *Pete Ford*

RUN NUMBER: 112394.0858;2

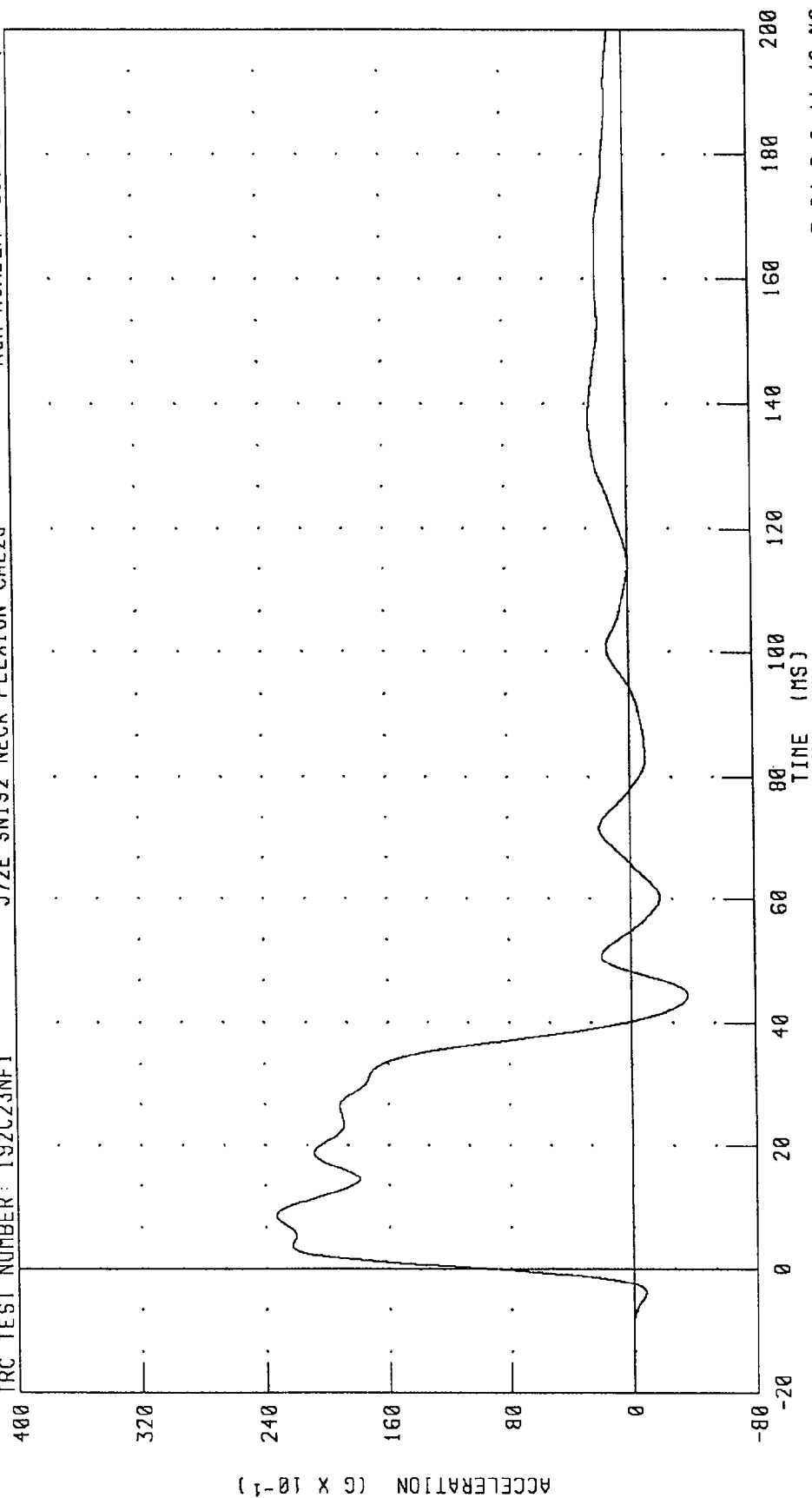
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 192C23NF1

572E SN192 NECK FLEXION CAL23

RUN NUMBER: 010495.1407;2



CHANNEL: PENXC FILTER: CH. CLASS 60

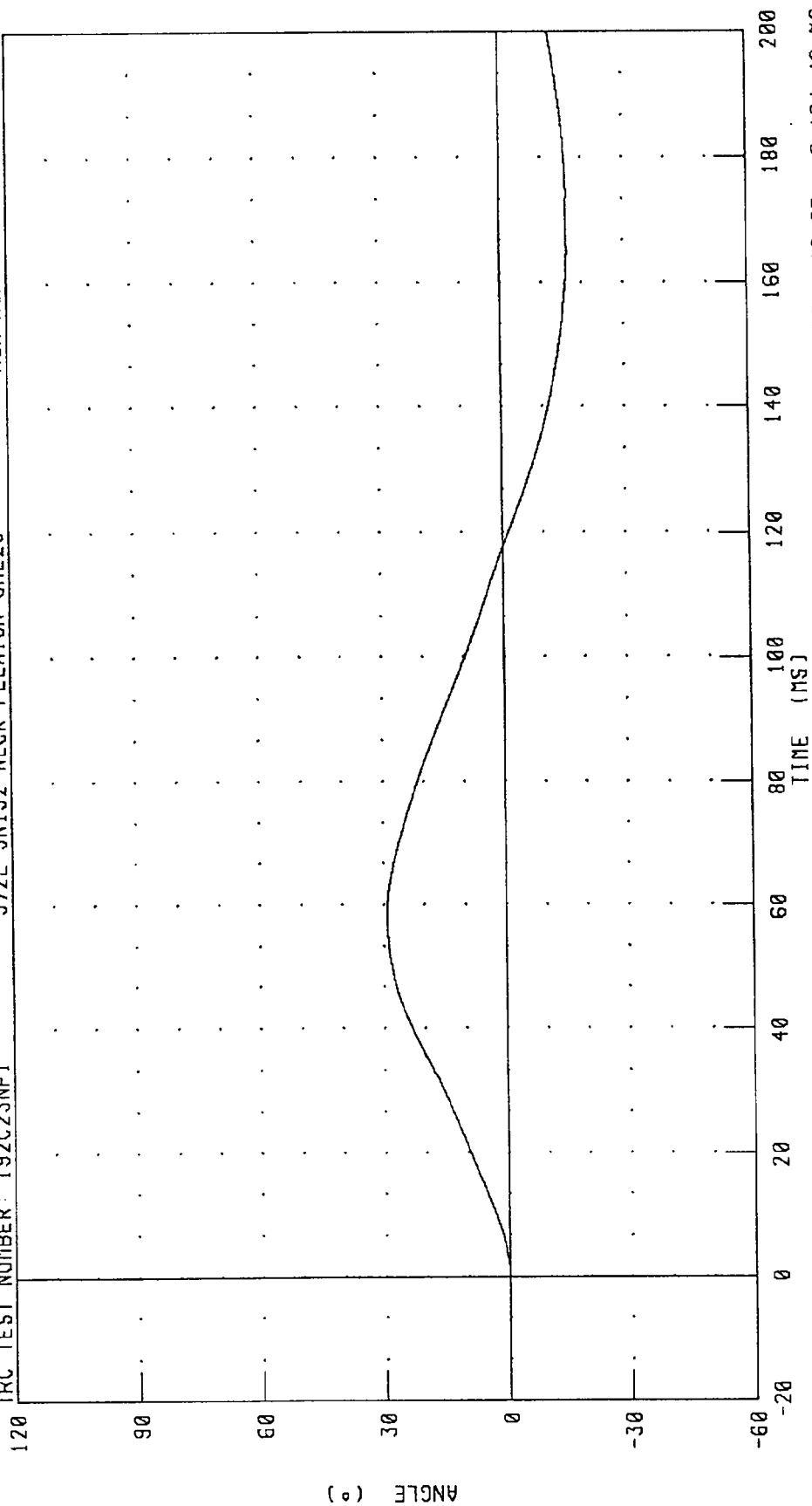
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN192 NECK FLEXION CAL23

IRC TEST NUMBER: 192C23NF1

RUN NUMBER: 010495.1407.2



PEAK DATA: 28.98 ° @ 57.92 MS; -16.35 ° @ 174.40 MS

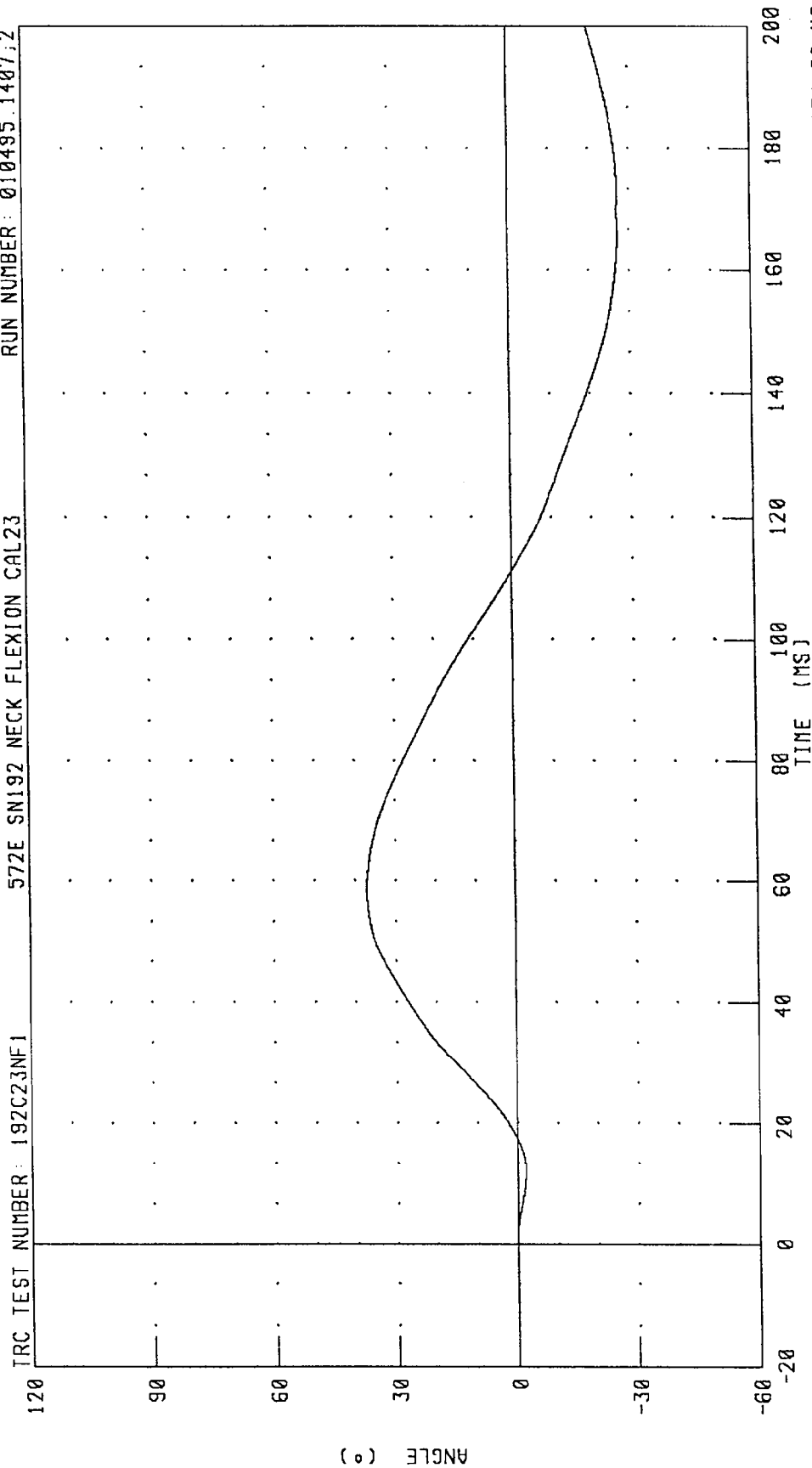
CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 192C23NF1

572E SN192 NECK FLEXION CAL23

RUN NUMBER: 010495.1407.2



PEAK DATA: 37.08 ° @ 58.32 MS; -27.03 ° @ 174.08 MS

CHANNEL: THETA FILTER: CH. CLASS 60

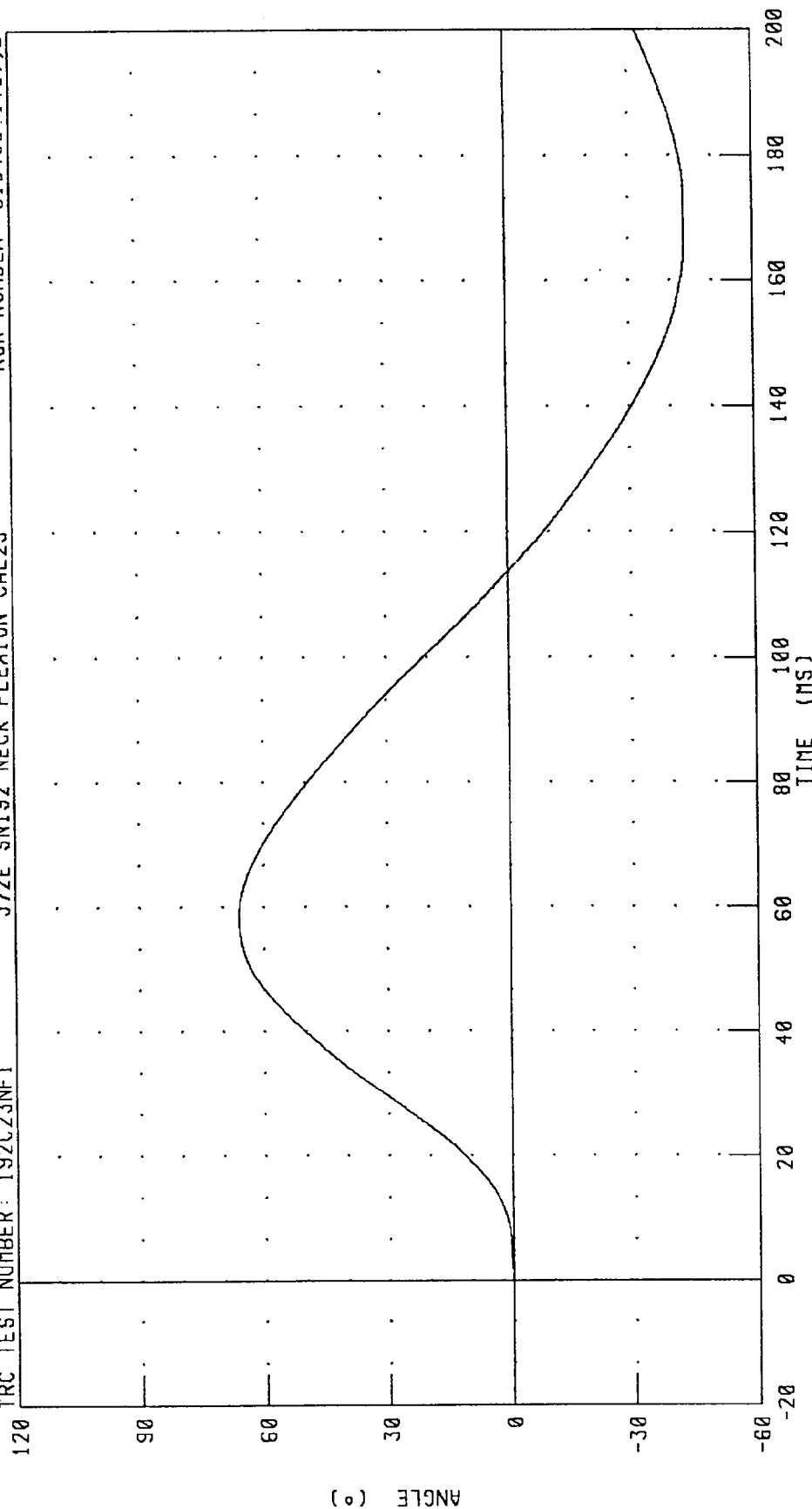
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C23NF1

572E SN192 NECK FLEXION CAL23

RUN NUMBER: 010495.1407;2



PEAK DATA: 66.06 ° @ 58.24 MS; -43.37 ° @ 174.16 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

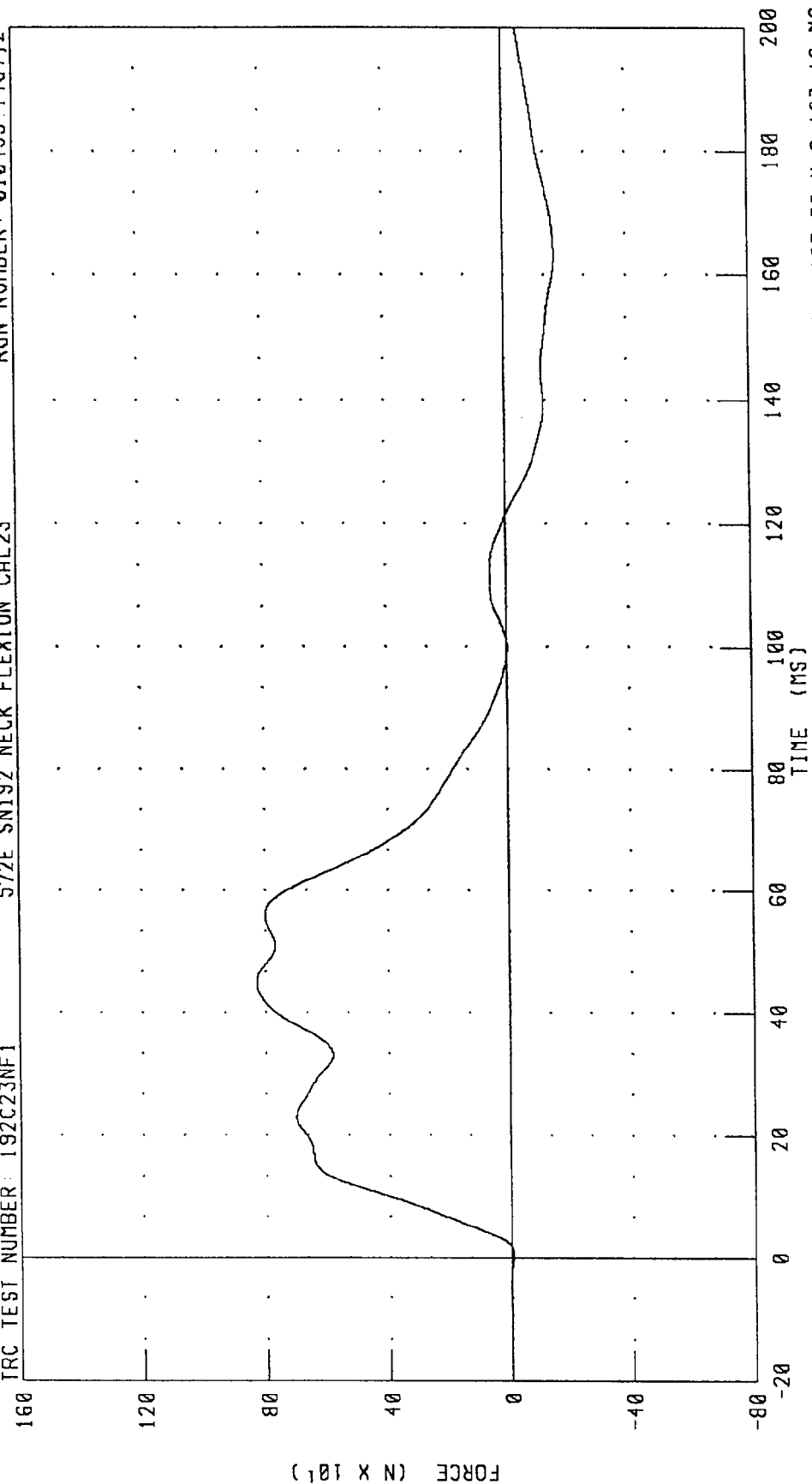
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C23NF1

572E SN192 NECK FLEXION CAL23

RUN NUMBER: 010495.1407;2



PEAK DATA: 828.49 N @ 44.88 MS; -167.52 N @ 163.12 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

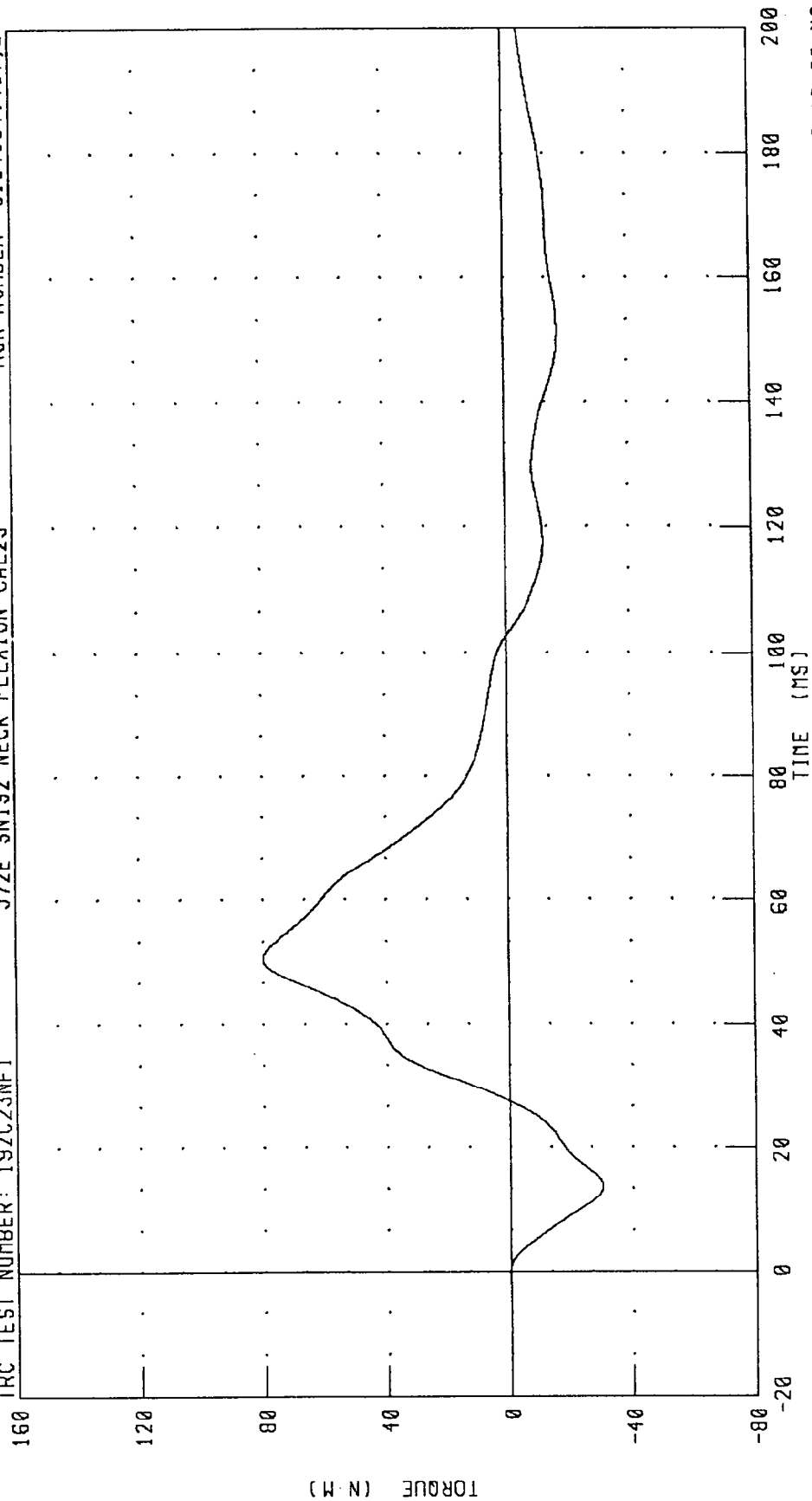
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 192C23NF1

572E SN192 NECK FLEXION CAL23

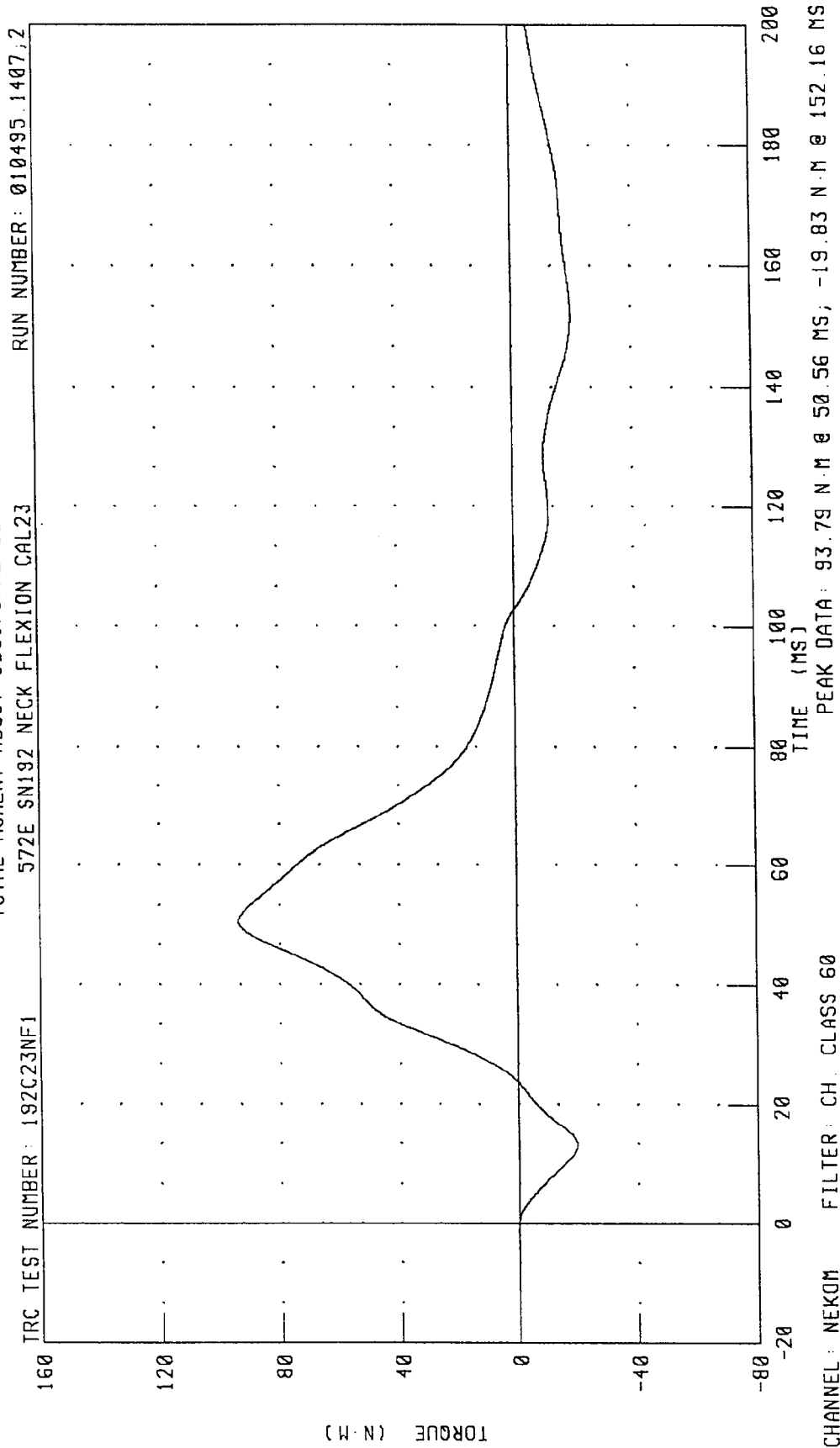
RUN NUMBER: 010495.1407;2



PEAK DATA: 80.13 N.M @ 50.64 MS; -30.24 N.M @ 13.68 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

23-NOV-94

TRC INC. TEST NO: 192C23NE1 572E SN192 NECK EXT. CAL23

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	30.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.92 G
	20 MS	14.00 - 19.00 G	15.89 G
	30 MS	11.00 - 16.00 G	14.55 G
MAX PENDULUM G		22 G MAX	18.88 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.51 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.16 MS
D PLANE	MAX	81 - 106 DEG.	92.72 DEG.
ROTATION	TIME	72 - 82 MS	75.28 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-58.55 NM
	TIME	65 - 79 MS	70.40 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.16 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	138.48 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fort

RUN NUMBER: 112394.0906;1

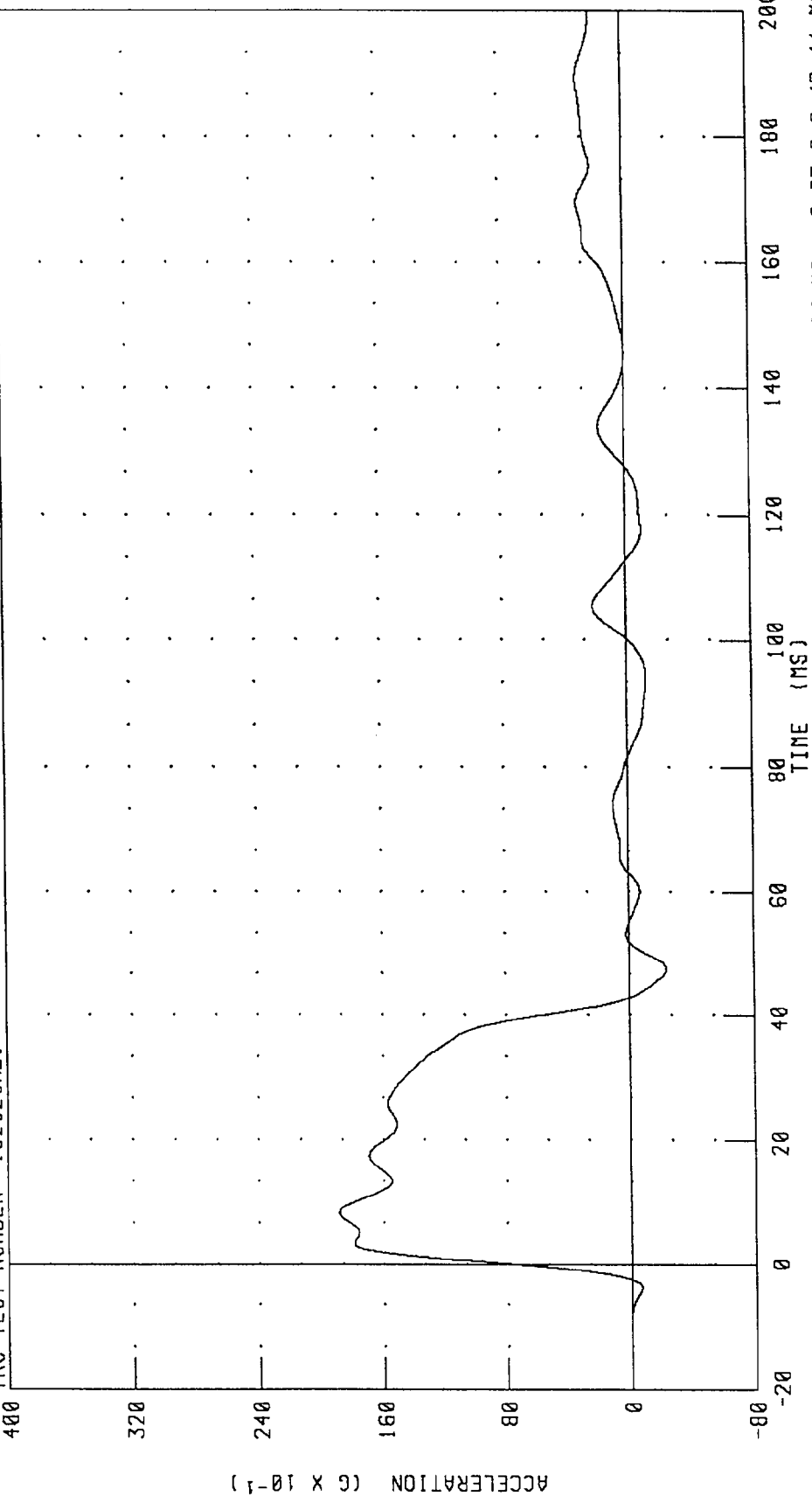
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 192C23NE1

572E SN192 NECK EXT. CAL23

RUN NUMBER: 010495.1407;1



PEAK DATA: 18.88 G @ 8.32 MS; -2.37 G @ 47.44 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

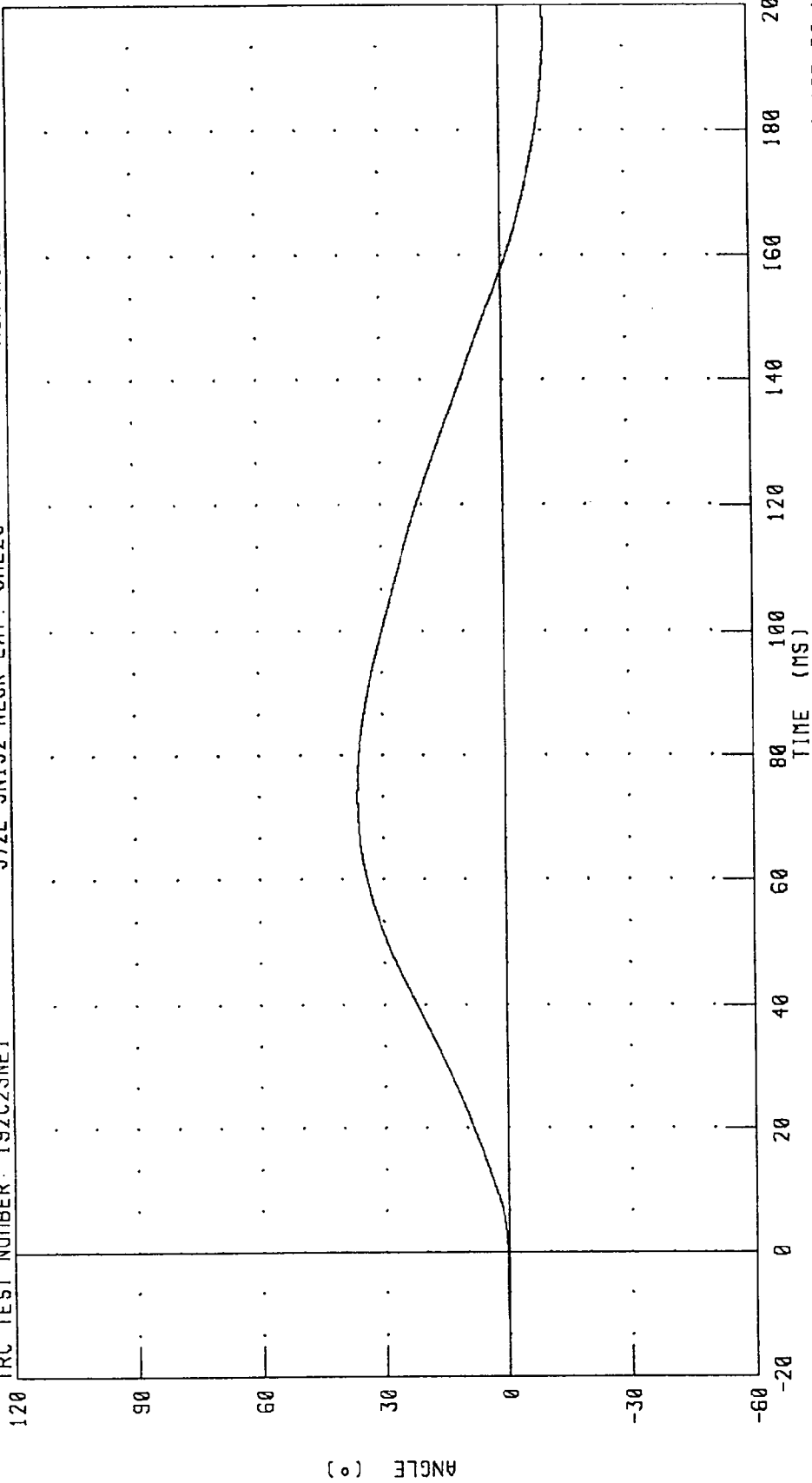
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN192 NECK EXT. CAL23

RUN NUMBER: 010495 1407;1

TRC TEST NUMBER: 192C23NE1



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 36.25 ° @ 73.28 MS; -10.83 ° @ 195.36 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

572E SN192 NECK EXT. CAL23

TRC TEST NUMBER: 192C23NE1

120

90

60

30

0

-30

-60

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

PEAK DATA: 56.54 ° @ 77.20 MS; -17.47 ° @ 194.48 MS

CHANNEL: THETA

FILTER: CH. CLASS 60

ANGLE (°)

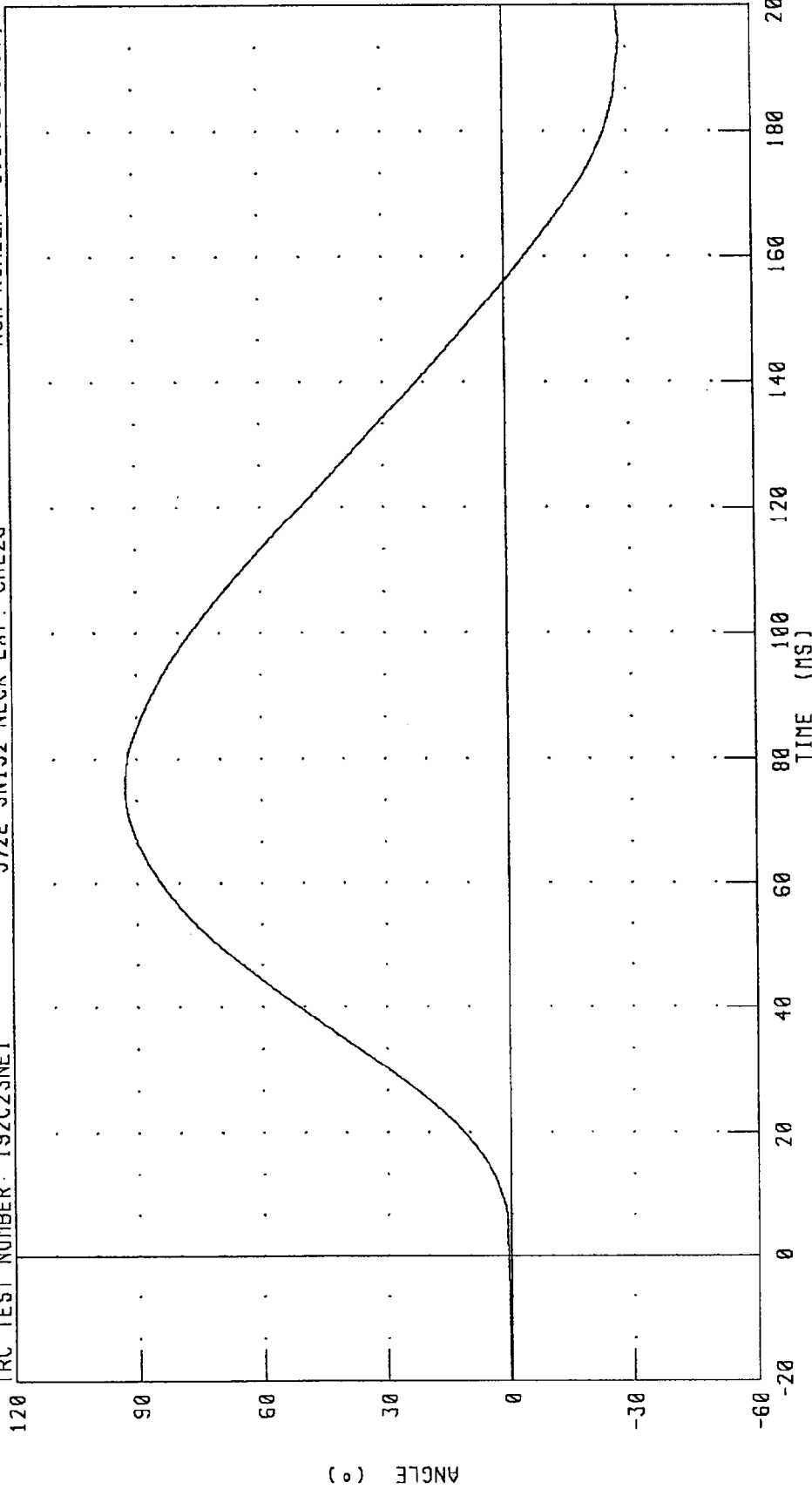
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C23NE1

572E SN192 NECK EXT. CAL23

RUN NUMBER: 010495.1407.1



PEAK DATA: 92.73 ° @ 75.28 MS, -28.29 ° @ 194.64 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

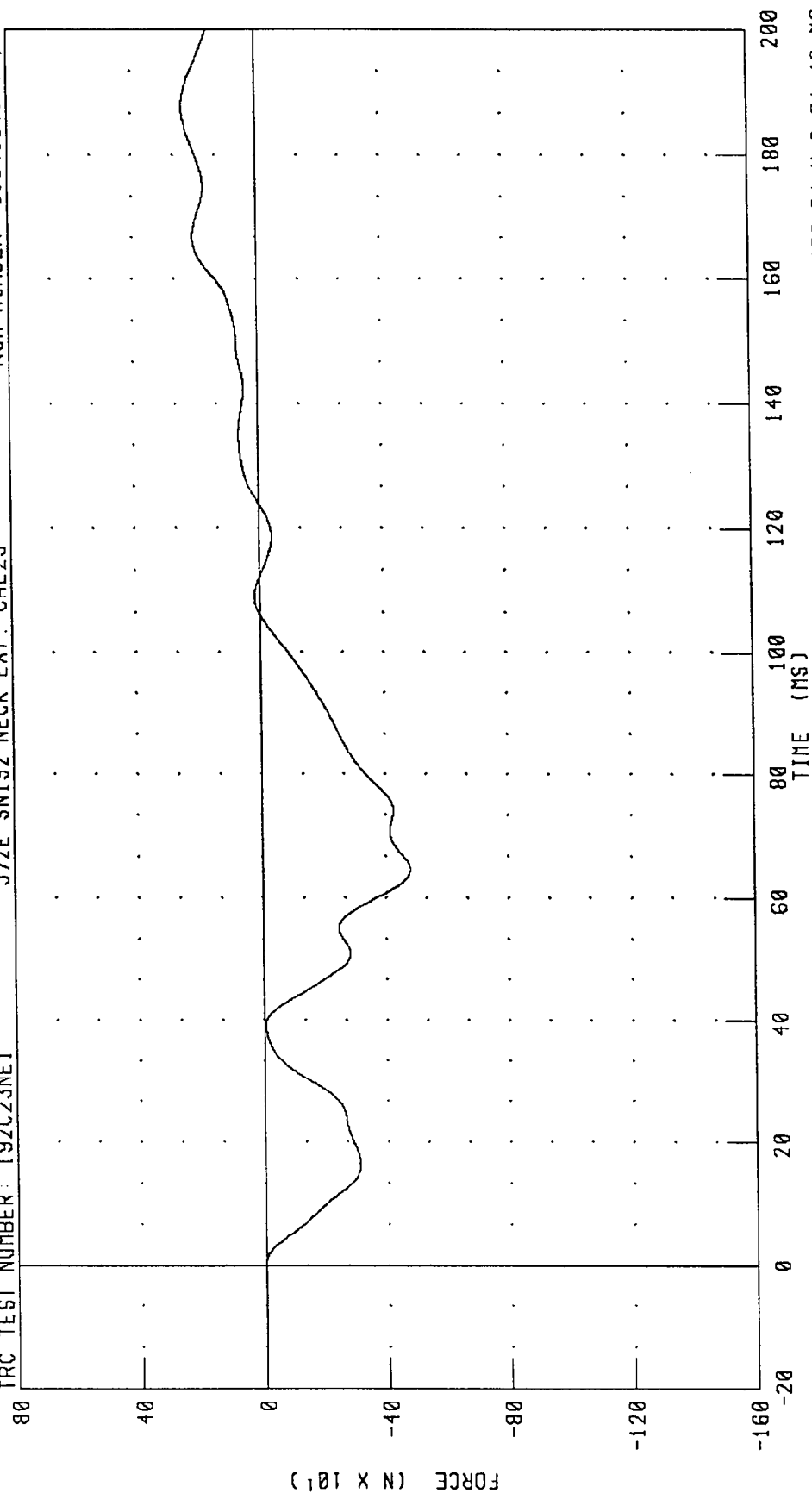
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C23NE1

572E SN192 NECK EXT. CAL23

RUN NUMBER: 010495.1407;1



PEAK DATA: 236.23 N @ 187.76 MS; -480.04 N @ 64.48 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

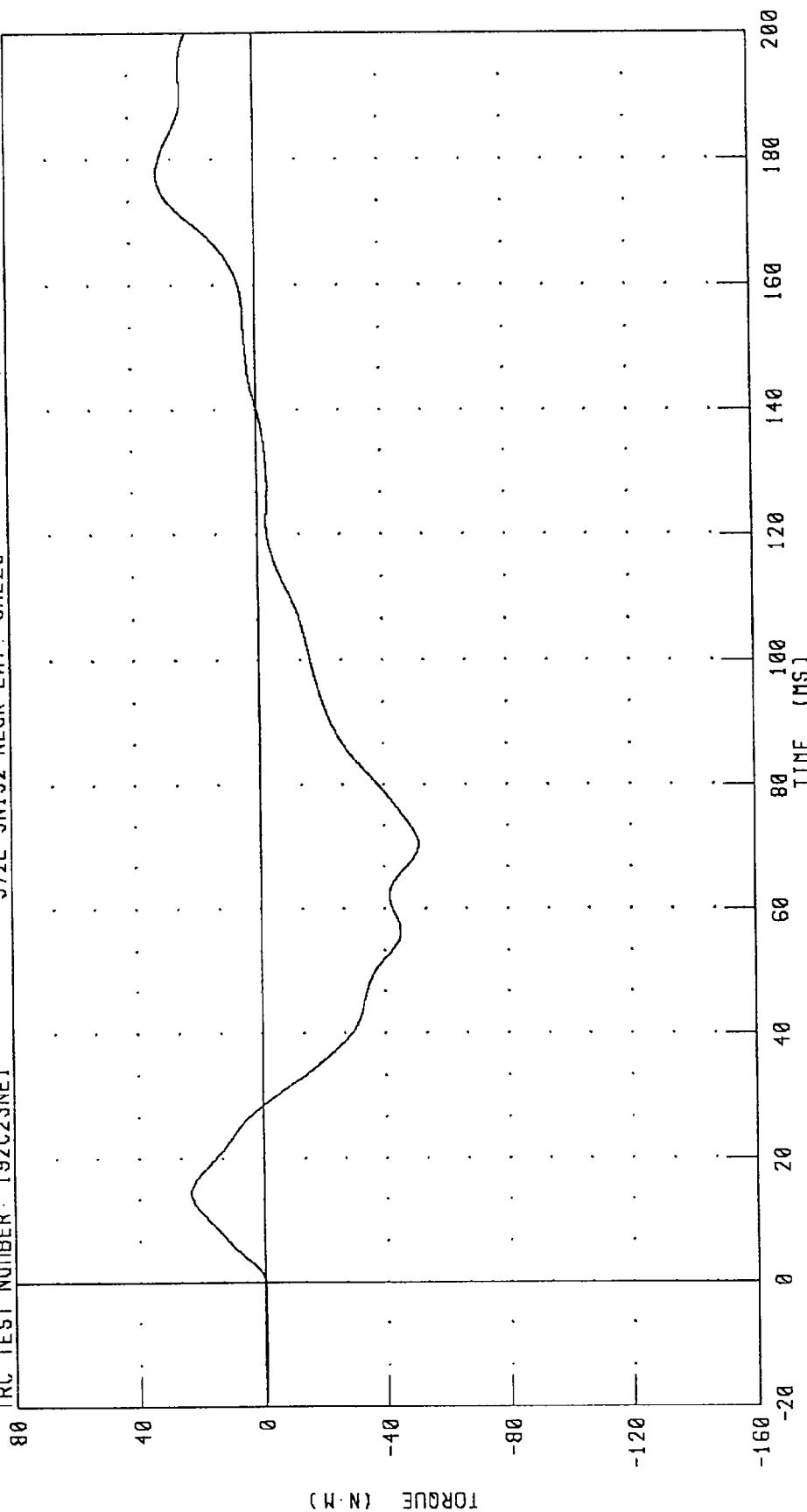
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

572E SN192 NECK EXT. CAL23

TRC TEST NUMBER: 192C23NE1

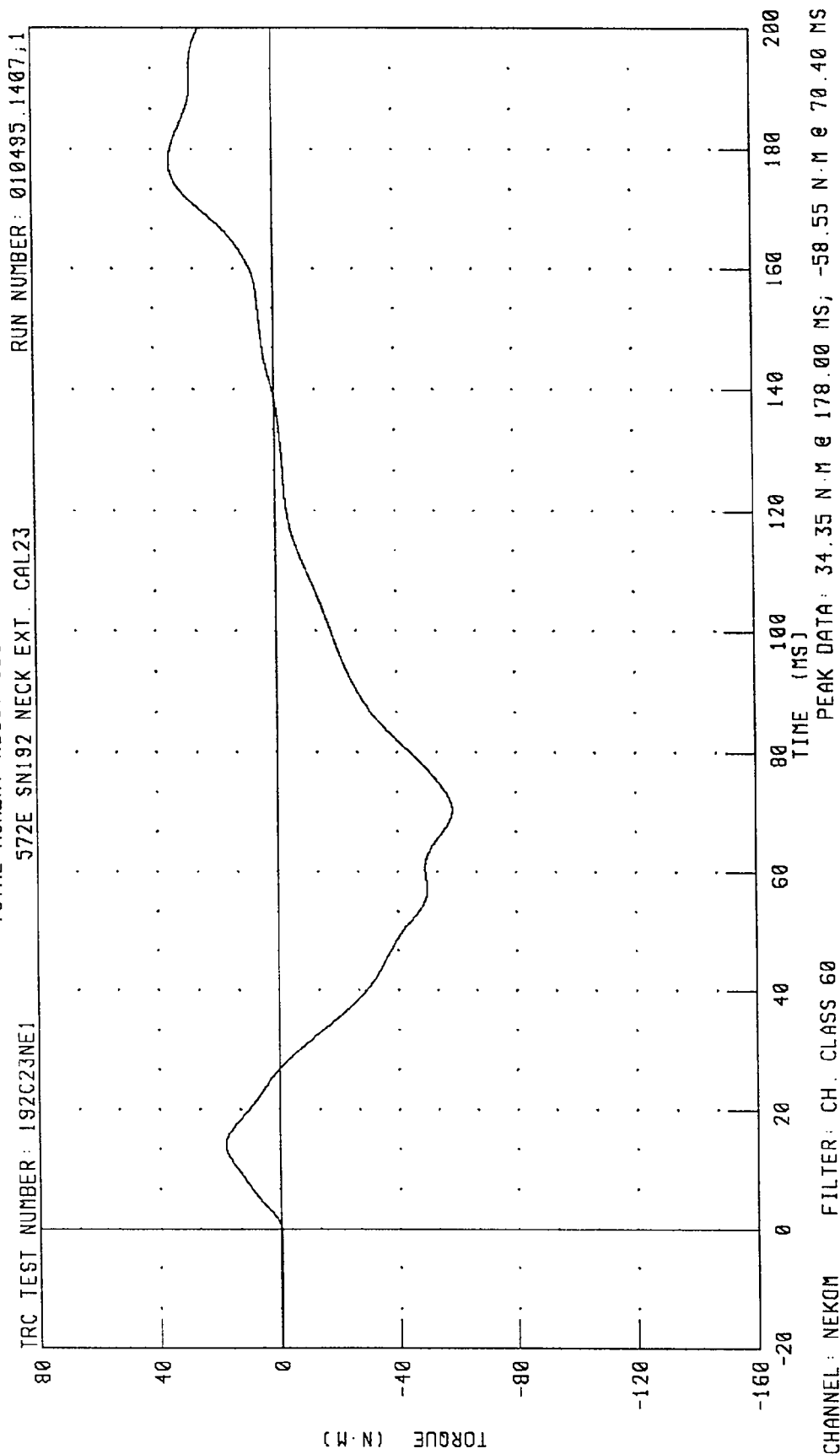
RUN NUMBER: 010495.1407.1



PEAK DATA: 31.15 N-M @ 177.60 MS; -51.15 N-M @ 70.40 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

23-NOV-94

TRC INC.

TEST NO: 192C23TH1

572E SN192 H.S.THORAX CAL23

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	30.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	63.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5677. N
INTERNAL HYSTERESIS	69% - 85%	73.3%

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fouts

RUN NUMBER: 112394.1031;1

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

572E SN192 H.S. THORAX CAL23

TRC TEST NUMBER: 192C23TH1

50

40

30

20

10

0

-10

ACCELERATION (G)

TIME (MS)

40

50

60

70

80

90

100

PEAK DATA: 24.78 G @ 19.68 MS; -0.22 G @ -0.24 MS

CHANNEL: PENXG

FILTER: CH. CLASS 180

0

10

20

30

40

50

60

70

80

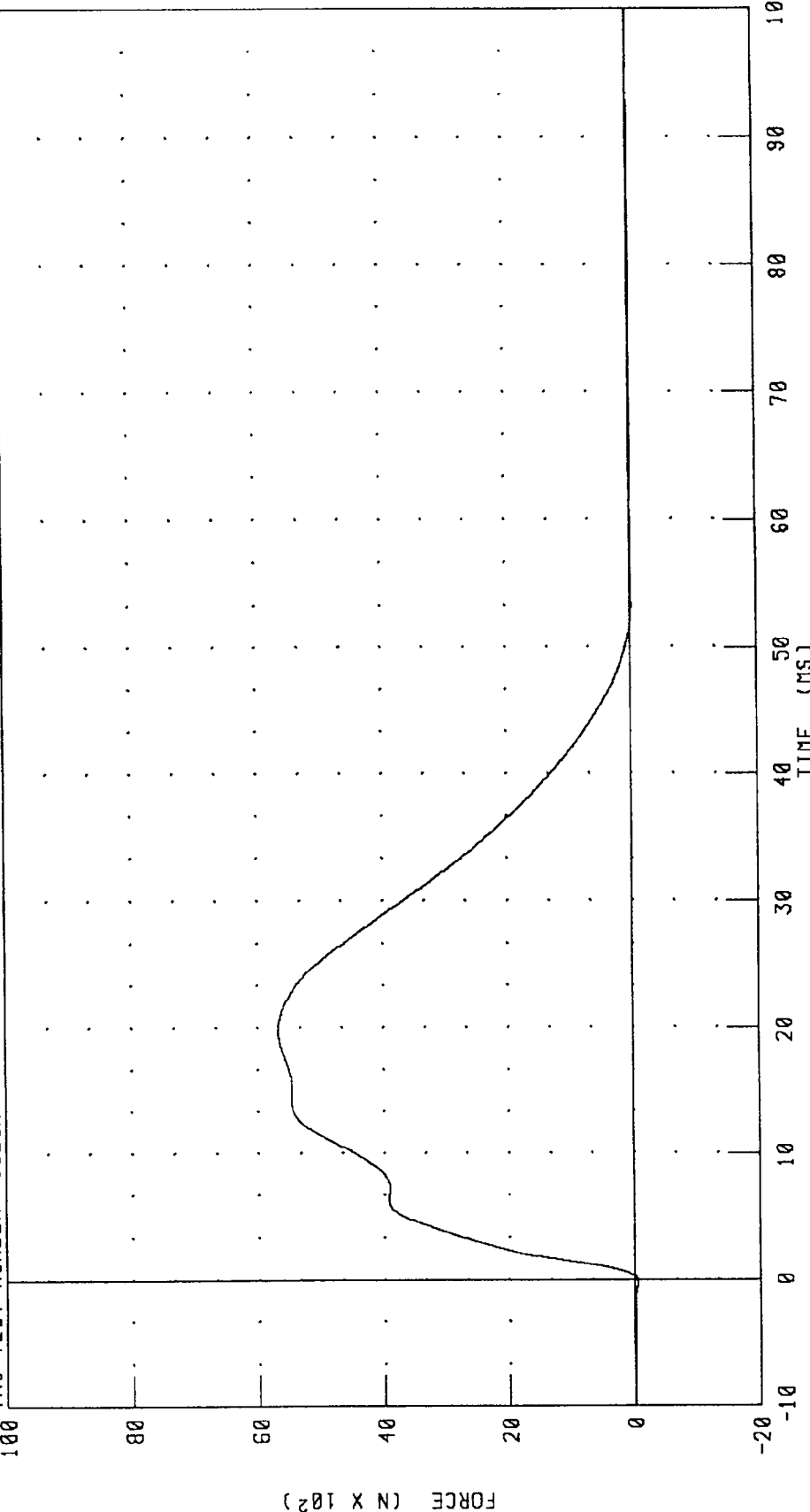
90

PART 572-E HYBRID III THORAX CALIBRATION PENDULUM FORCE

IRC TEST NUMBER: 192C23TH1

572E SN192 H.S. THORAX CAL23

RUN NUMBER: 010495.1407;1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5677.05 N @ 19.68 MS; -51.32 N @ -0.24 MS

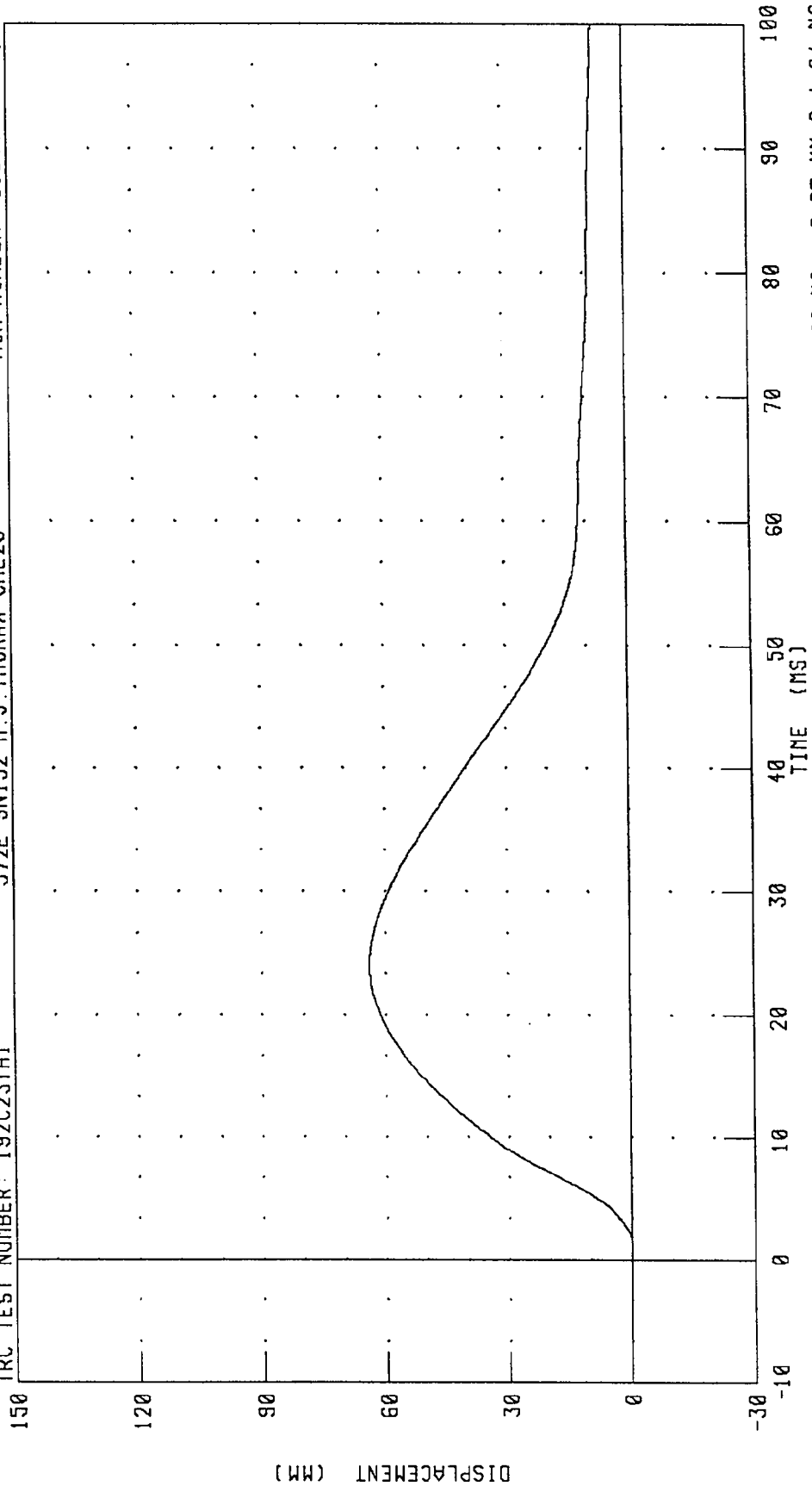
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 192C23TH1

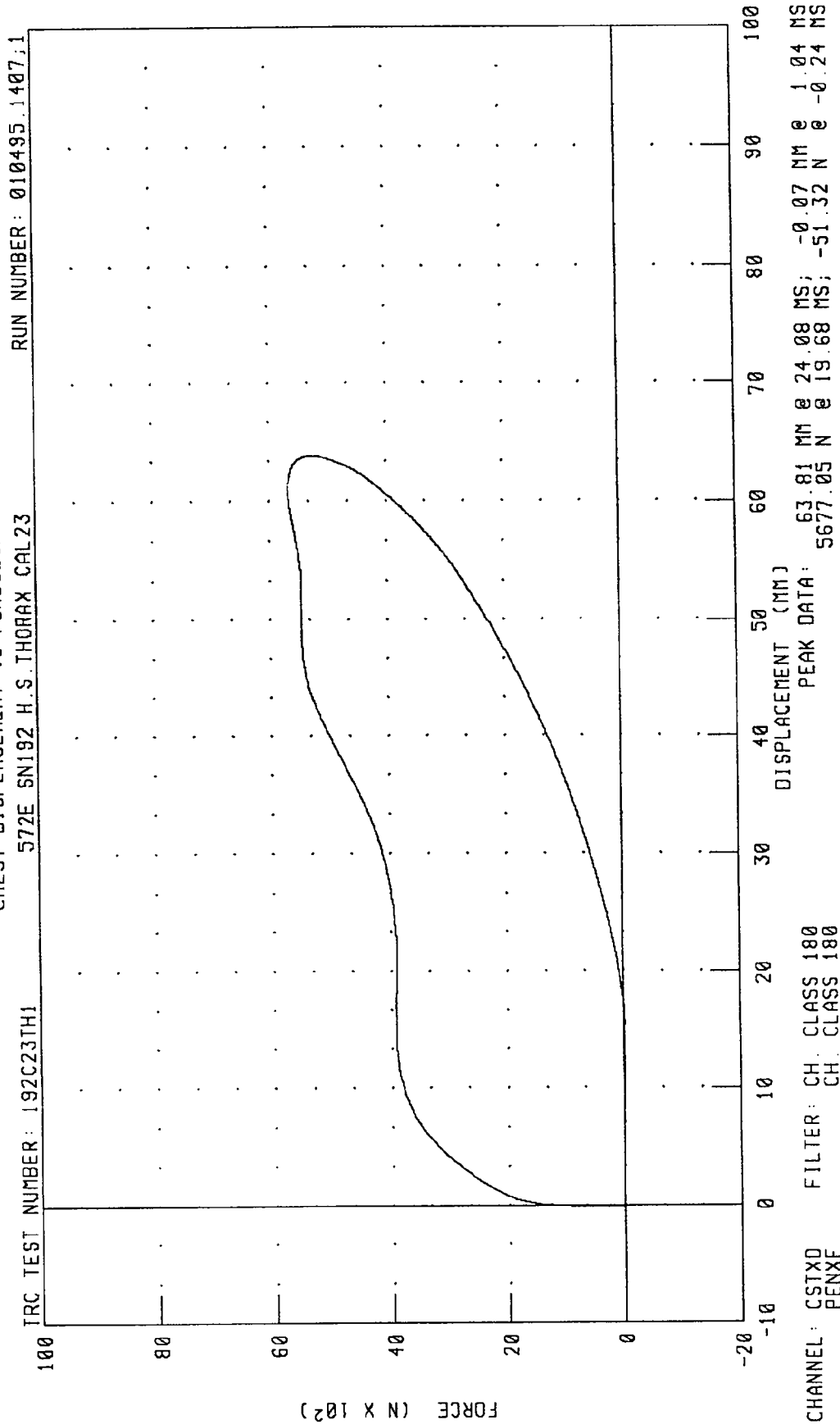
572E SN192 H.S. THORAX CAL23

RUN NUMBER: 010495.1407;1



CHANNEL: CSTXD FILTER: CH. CLASS 180

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



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

22-NOV-94

TRC INC.

TEST NO: 192C23RK1

572E SN192 RIGHT KNEE CAL 23

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.08 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	5127.9 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete Foster

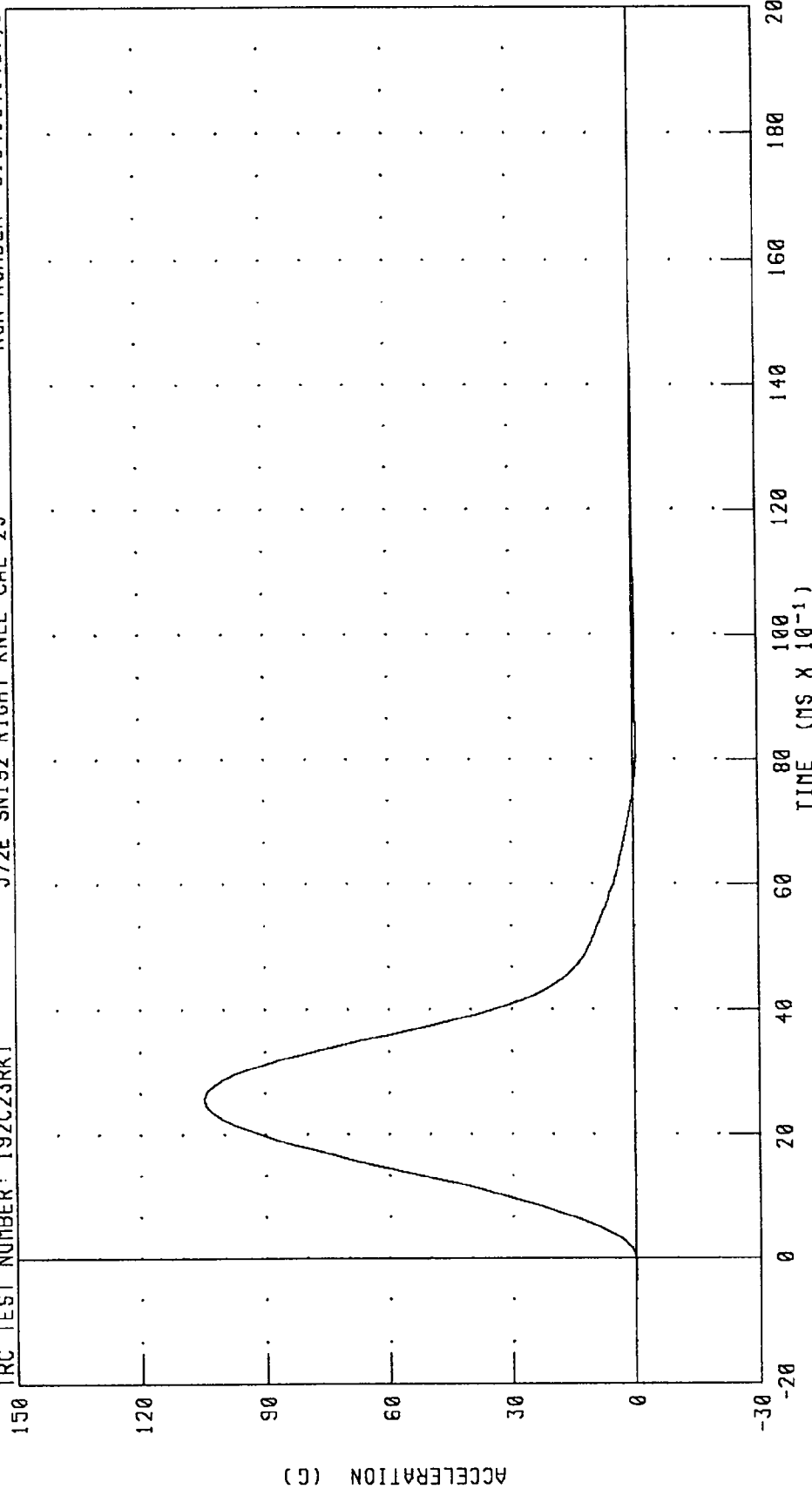
RUN NUMBER: 112294.1457;1

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

RUN NUMBER: 010495.1407.1

572E SN192 RIGHT KNEE CAL 23

TRC TEST NUMBER: 192C23RK1



PEAK DATA: 104.81 G @ 2.56 MS; -0.69 G @ 8.24 MS

CHANNEL: PENXC FILTER: CH. CLASS 600

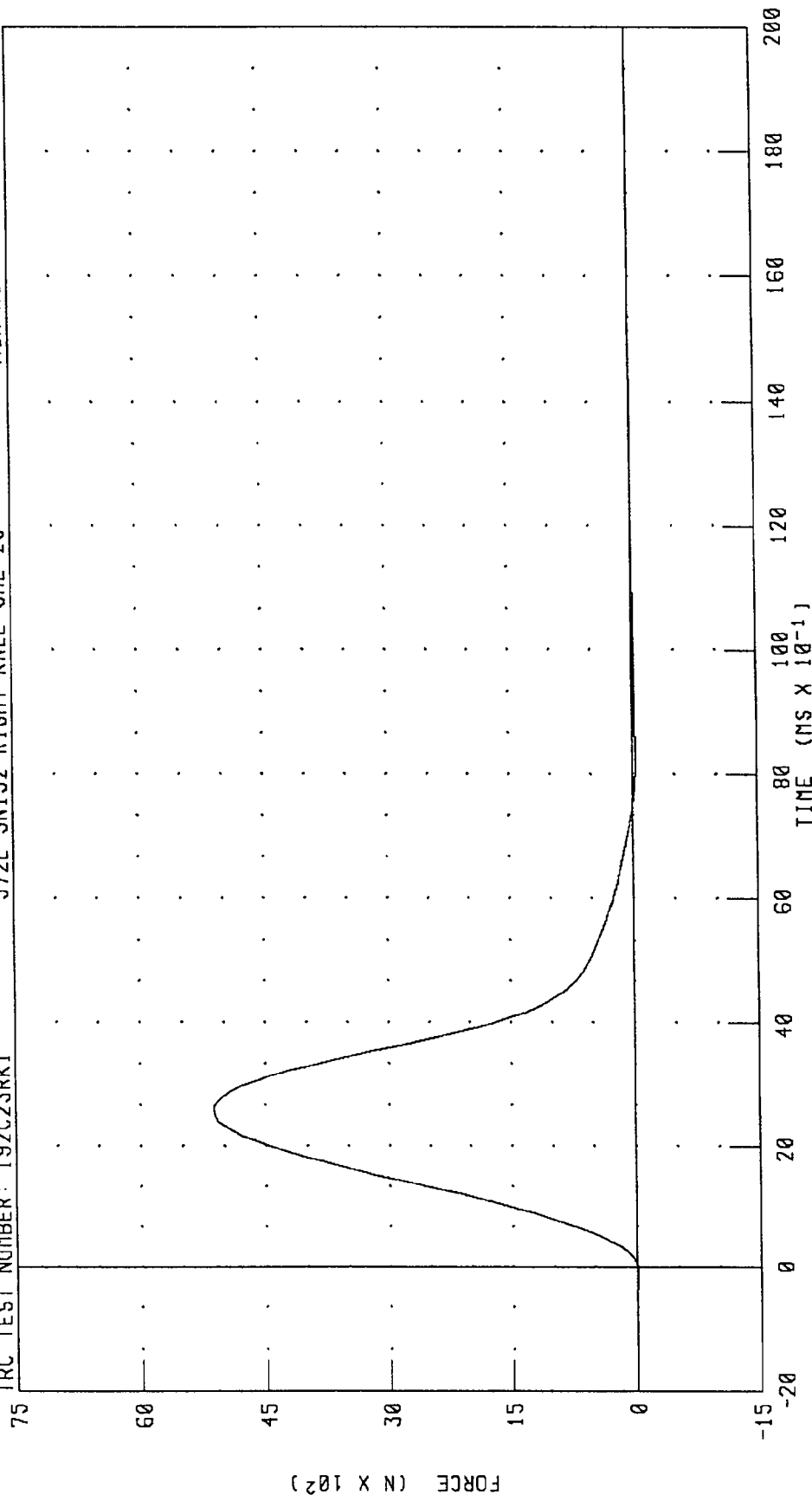
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN192 RIGHT KNEE CAL 23

RUN NUMBER: 010495.1407.1

TRC TEST NUMBER: 192C23RK1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5128.00 N @ 2.56 MS; -33.61 N @ 8.24 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

22-NOV-94

TRC INC.

TEST NO: 192C23LK1

572E SN192 LEFT KNEE CAL 23

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.08 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	4990.2 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Rita To wit

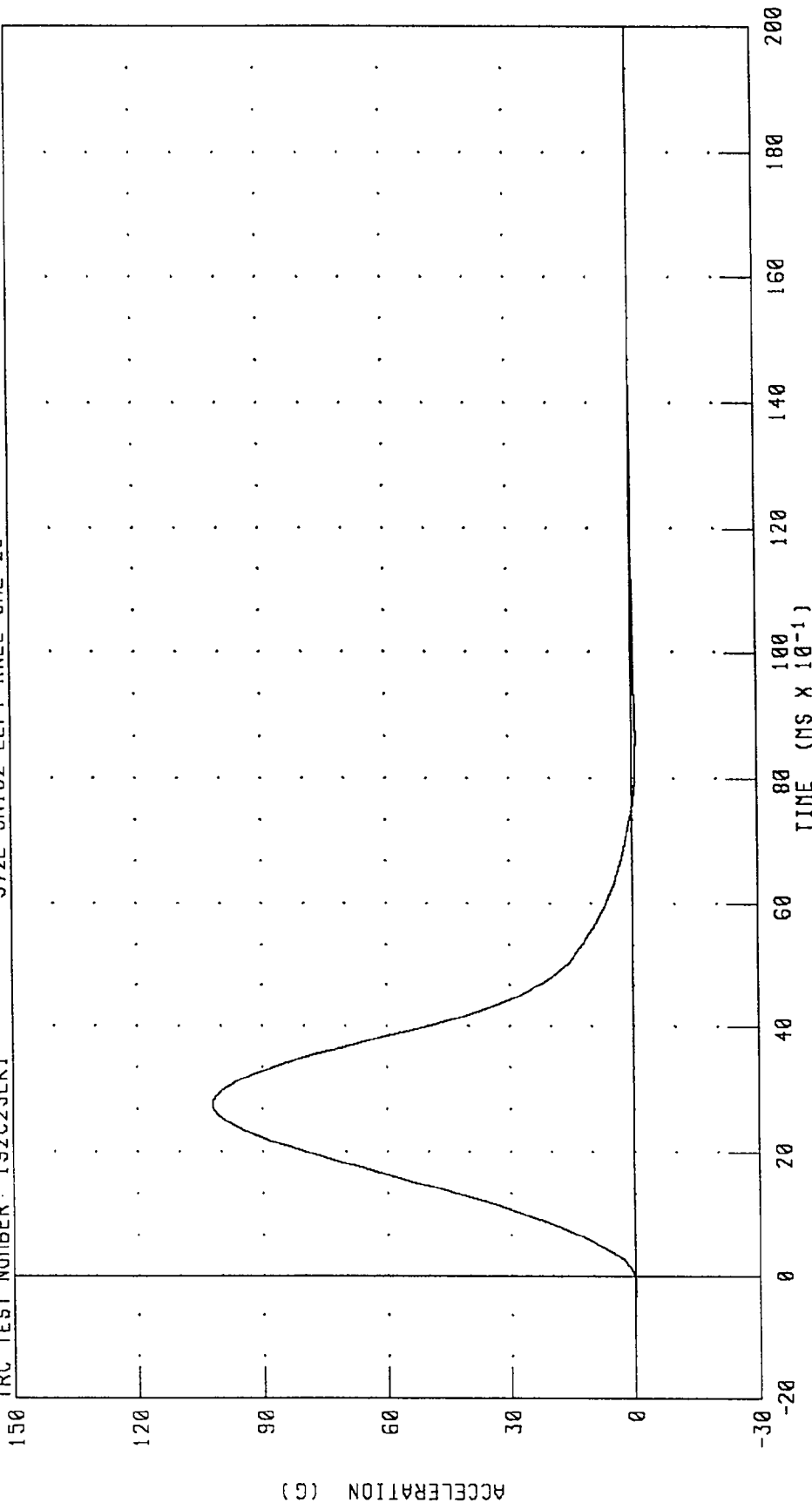
RUN NUMBER: 112294.1454;1

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

RUN NUMBER: 010495.1407;1

TRC TEST NUMBER: 192C23LK1

572E SN192 LEFT KNEE CAL 23



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 101.99 G @ 2.72 MS; -0.82 G @ 8.64 MS

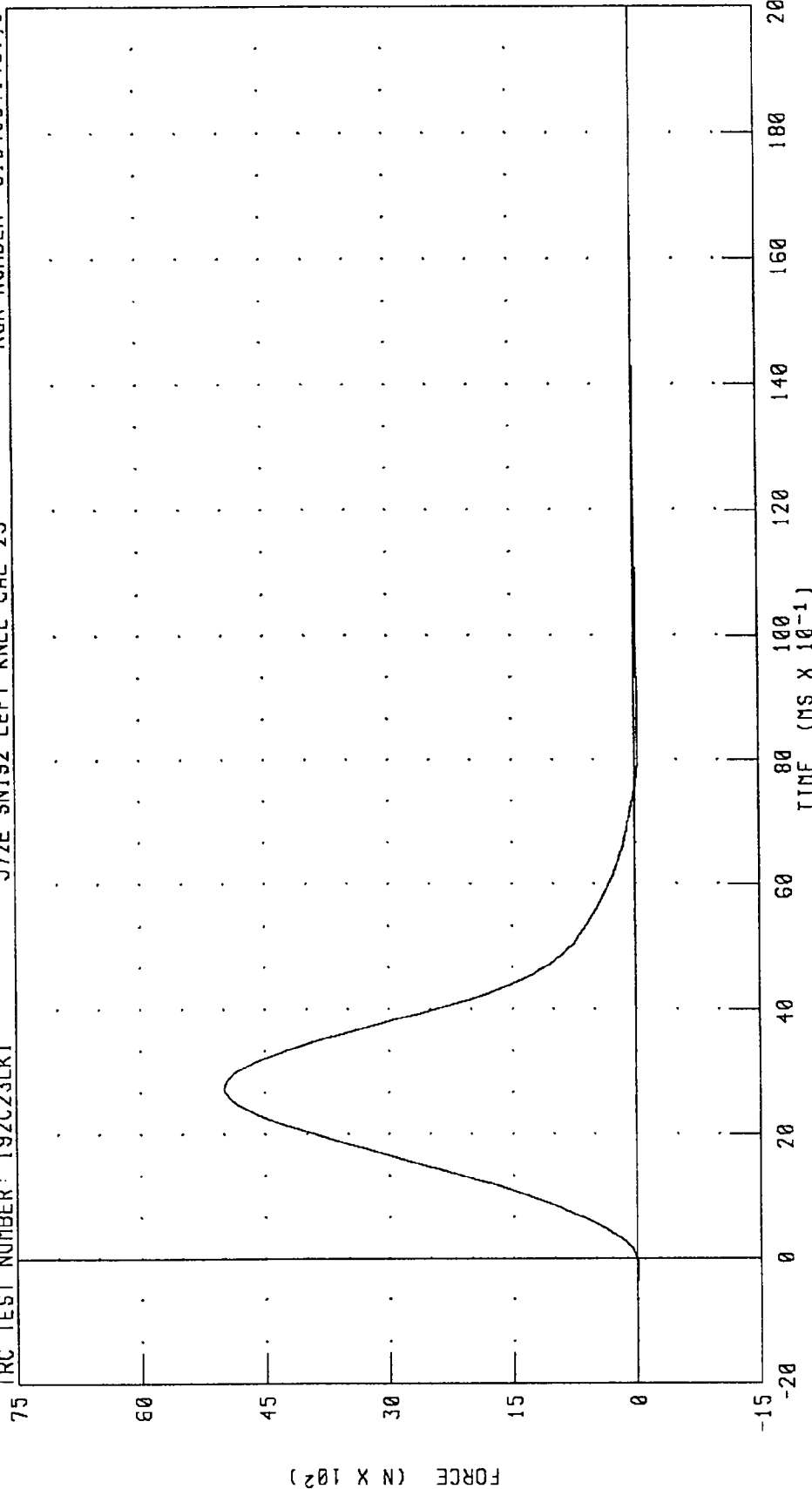
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 192C23LK1

572E SN192 LEFT KNEE CAL 23

RUN NUMBER: 010495.1407,1



PEAK DATA: 4990.29 N @ 2.72 MS; -40.34 N @ 8.64 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Appendix D

Miscellaneous Test Information

Dummy Instrument Calibrations

Driver Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Head X-axis accelerometer	FH25J	7264	Endevco	08/29/94	02/29/95
Head Y-axis accelerometer	CY32H	7264	Endevco	08/29/94	02/29/95
Head Z-axis accelerometer	DB81H	7264	Endevco	08/29/94	02/29/95
Chest X-axis accelerometer	A79GJ	7264	Endevco	08/25/94	02/25/95
Chest Y-axis accelerometer	AC8W6	7264	Endevco	08/29/94	02/29/95
Chest Z-axis accelerometer	CW42H	7264	Endevco	08/29/94	02/29/95
Left femur force load cell	901	2430	GSE	08/30/94	02/30/95
Right femur force load cell	902	2430	GSE	08/30/94	02/30/95
Neck X-axis force load cell ¹	0280	1716	Denton	08/30/94	02/30/95
Neck Y-axis force load cell ¹	0280	1716	Denton	08/30/94	02/30/95
Neck Z-axis force load cell ¹	0280	1716	Denton	08/30/94	02/30/95
Neck Moment about X-axis load cell ¹	0280	1716	Denton	08/30/94	02/30/95
Neck Moment about Y-axis load cell ¹	0280	1716	Denton	08/30/94	02/30/95
Neck Moment about Z-axis load cell ¹	0280	1716	Denton	08/30/94	02/30/95
Pelvis X-axis accelerometer ¹	AJ8A6	7264	Endevco	10/11/94	04/11/95
Pelvis Y-axis accelerometer ¹	AJ8J7	7264	Endevco	10/11/94	04/11/95
Pelvis Z-axis accelerometer ¹	AJ789	7264	Endevco	10/11/94	04/11/95
Chest deflection potentiometer ¹	14CB1-2981	81422A	Vernitech	08/29/94	02/29/95

¹ Hybrid III use only.

Dummy Instrument Calibrations

Right Front Passenger Dummy #192

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Head X-axis accelerometer	AAL82	7264	Endevco	08/30/94	02/30/95
Head Y-axis accelerometer	A84JJ	7264	Endevco	08/30/94	02/30/95
Head Z-axis accelerometer	DW04J	7264	Endevco	08/30/94	02/30/95
Chest X-axis accelerometer	CT22H	7264	Endevco	08/30/94	02/30/95
Chest Y-axis accelerometer	AC708	7264	Endevco	08/30/94	02/30/95
Chest Z-axis accelerometer	CW59H	7264	Endevco	08/30/94	02/30/95
Left femur force load cell	986	2430	GSE	08/30/94	02/30/95
Right femur force load cell	987	2430	GSE	08/30/94	02/30/95
Neck X-axis force load cell ¹	085	1716	Denton	08/30/94	02/30/95
Neck Y-axis force load cell ¹	085	1716	Denton	08/30/94	02/30/95
Neck Z-axis force load cell ¹	085	1716	Denton	08/30/94	02/30/95
Neck Moment about X-axis load cell ¹	085	1716	Denton	08/30/94	02/30/95
Neck Moment about Y-axis load cell ¹	085	1716	Denton	08/30/94	02/30/95
Neck Moment about Z-axis load cell ¹	085	1716	Denton	08/30/94	02/30/95
Pelvis X-axis accelerometer ¹	AJ694	7264	Endevco	10/11/94	04/11/95
Pelvis Y-axis accelerometer ¹	AJ656	7264	Endevco	10/11/94	04/11/95
Pelvis Z-axis accelerometer ¹	AJ788	7264	Endevco	10/11/94	04/11/95
Chest deflection potentiometer ¹	87313-96	81422A	Vernitech	08/30/94	02/30/95

¹Hybrid III use only.

Vehicle and Calibration Laboratory Instrument Calibrations

Vehicle Accelerometers

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Left rear seat crossmember X-axis	AGR75	7264	Endevco	09/13/94	03/13/95
Left rear seat crossmember X-axis redundant	AGRF4	7264	Endevco	11/22/94	05/22/95
Right rear seat crossmember X-axis	AHRK5	7264	Endevco	09/13/94	03/13/95
Right rear seat crossmember X-axis redundant	AHR06	7264	Endevco	10/07/94	04/07/95
Engine top X-axis	CR59H	7264	Endevco	08/04/94	02/04/95
Engine bottom X-axis	CC71H	7264	Endevco	08/09/94	02/09/95
Right brake caliper X-axis	AGRF7	7264	Endevco	08/09/94	02/09/95
Left brake caliper X-axis	DT96JT	7264	Endevco	11/07/94	05/07/95
Instrument panel center X-axis	CW87H	7264	Endevco	09/08/94	03/08/95

Calibration Laboratory Instruments

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Neck bending pendulum accelerometer	CB27	7232	Endevco	09/26/94	03/26/95
Neck bending rotary potentiometer	NA	35435-1-102	Bournes	Mfr. Specification	
Neck bending linear potentiometer	NA	5184-2051846003	Bournes	09/26/94	03/26/95
Thorax/Hybrid II femur pendulum accelerometer	CC64	7232	Endevco	09/26/94	03/26/95
Lumbar flexion force gauge	NA	DPPH-50	Chatillon	05/03/89	repaired
Lumbar flexion rotation gauge	CP17-0601-1	7020	Humphrey	Mfr. Specification	
Abdomen compression displacement gauge	4075-175	80294-2051941504	Bournes	09/26/94	03/26/95
Abdomen compression force gauge	3443	3167	Lebow	09/26/94	03/26/95
Hybrid III femur pendulum accelerometer	CG83	7232	Endevco	09/26/94	03/26/95

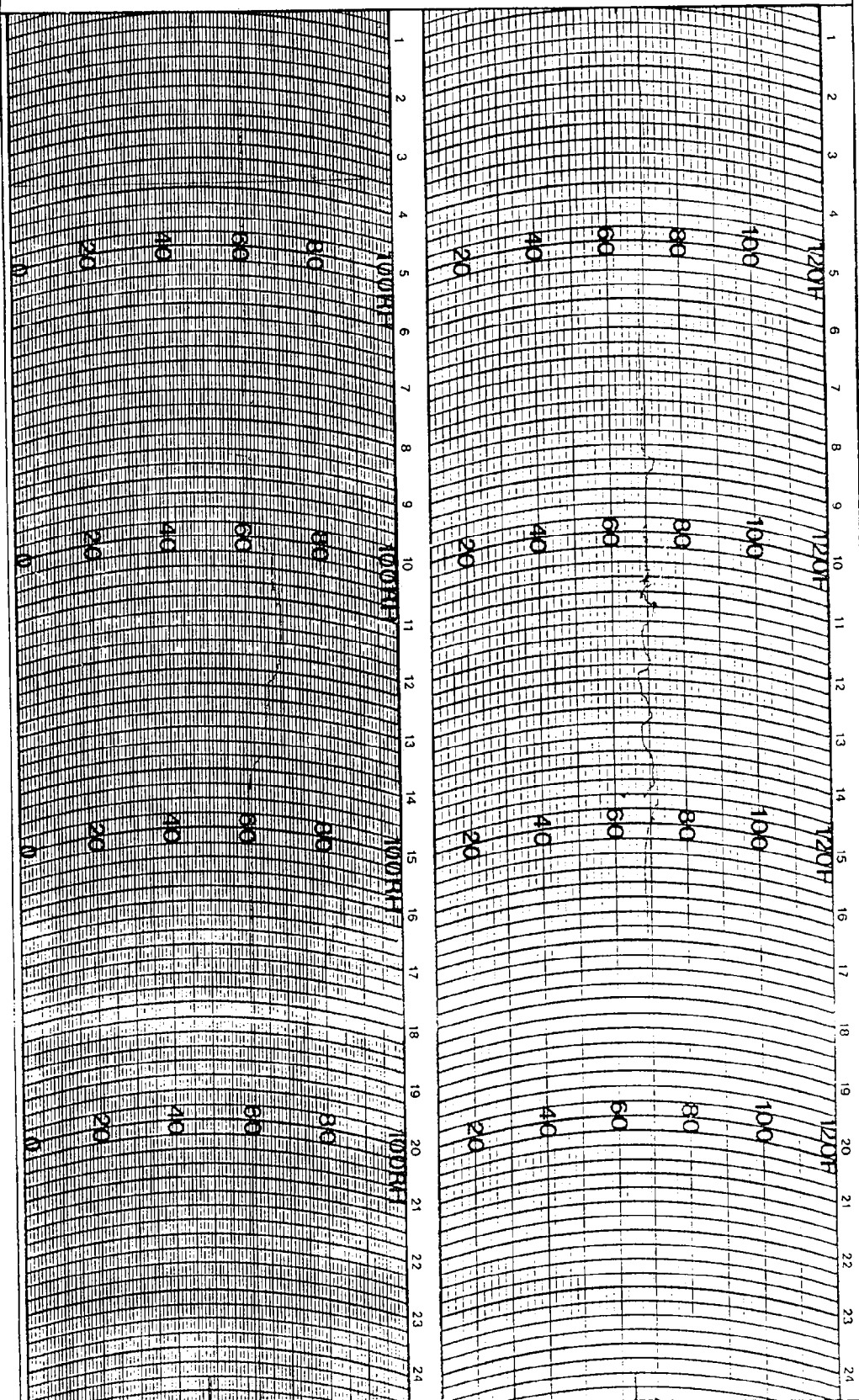
Sign Convention
NHTSA Data Tape Reference Guide

<u>Accelerometers:</u>	+X: Forward	
	+Y: Leftward	
	+Z: Upward	
<u>Potentiometers:</u>	+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)
<u>Load cells:</u>	+Femur force:	Tension
	+Seat belt force:	Tension
	+Barrier force:	Tension
<u>Neck load cells:</u>	+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
<u>Tibia load cells:</u>	+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 _____

Appendix E

Restraint System Instructions from Owner's Manual

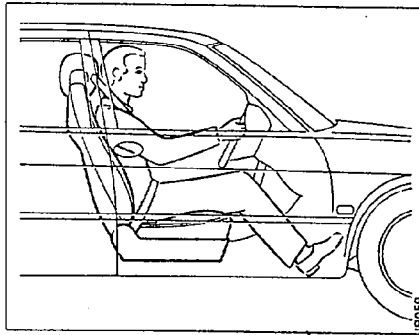
Safety belt system

WARNING

The safety belts are the single most effective safety device in your car.

Don't let anyone ride in your car without wearing their safety belt properly. If you are in a crash and you are not wearing a safety belt, or, if you are wearing it improperly, your injuries can be much worse than if you were properly belted.

This is equally true for front and rear seat passengers. If not properly belted during a crash, you or a passenger, can impact things or other people inside the vehicle or be ejected from it, resulting in serious injury or death. Before driving your car, always fasten your safety belt and also check that your passengers' belts are fastened and positioned properly.



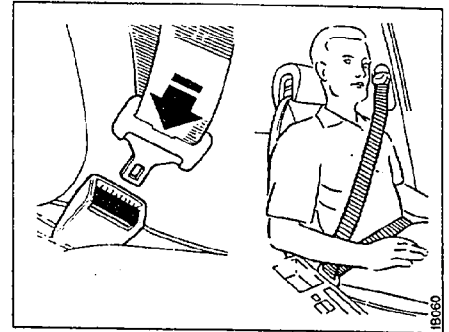
Correct seated posture before putting on the belt

Buckling Up For Safety

The following are guidelines to help you make sure the safety belts are worn properly by you and your passengers and that they are securely latched. Remember, safety belts work for everyone, including children and pregnant women.

First, position yourself comfortably in the seat, facing forward. For outboard seating positions, adjust the head restraint so that its center is at ear height.

Remove heavy clothing such as winter overcoats prior to fastening a safety belt.

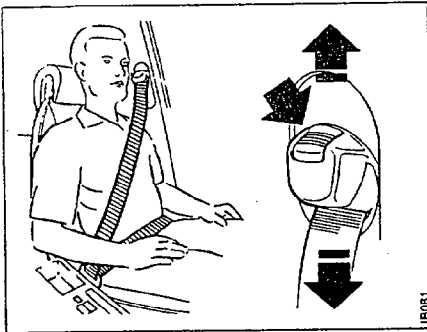


Securing a safety belt

Then, pull the safety belt across your chest and hips. Make sure that the belt is not twisted or crossing over against any sharp edges.

Push the latch tongue on the safety belt into the proper buckle until it clicks. Pull on the latch tongue to make sure it has latched.

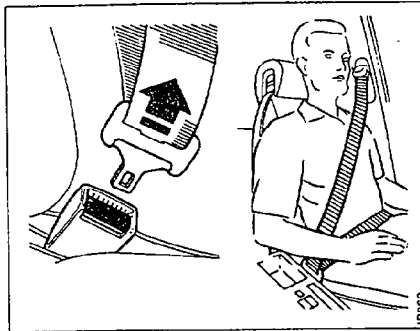
52 Interior equipment



Belt guide on the door pillar

In the front seats, adjust the safety belt height adjustment on the door pillar to a height that is comfortable for you. This adjustment is provided to make the belt more comfortable to wear, as well as to enable the belt to be adjusted to the safest position on the upper part of your body.

The shoulder or upper portion of the belt should be on your shoulder, away from your face and neck. Tall people should move the height adjustment to a higher position and shorter people should use a lower position so that the upper portion of the safety belt does not fit too close to the neck.

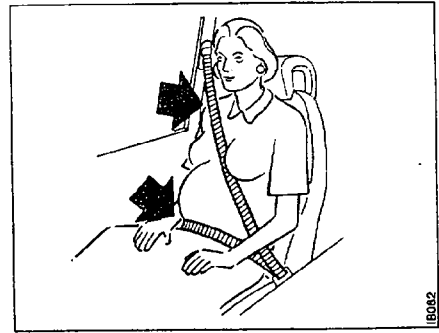


*Press the button marked **PRESS** to release the belt.*

To raise the belt height adjustment in the guide, you push it upward to the desired position. To lower the belt guide, you must press in the release button. Check that the height adjustment is locked in position after adjusting.

For all seating positions, the lower portion of the belt should be worn low across your hips or pelvis, not the waist, and just touching the thighs. The upper portion of the safety belt should be worn over the shoulder and across the chest.

Pull upward on the upper portion of the belt to remove any slack. This will tighten the upper and lower portions of the belt across your chest and pelvis.



A pregnant woman should wear a safety belt and the lap or lower portion should be worn as low as possible on the hips throughout pregnancy.

The upper portion should be worn above, and not below, the fetus. The best way to protect the fetus is to protect the mother. When a safety belt is worn properly by the mother, it is much less likely that she and the fetus will be hurt in a crash.

To unlatch the safety belt, just depress the red button on the belt buckle.

Lap and Shoulder Safety Belts

All the designated seating positions in the car are equipped with combination lap and shoulder safety belts with inertia reel emergency locking retractors. These safety belts are designed to permit freedom of movement under most normal driving conditions and will temporarily lock, preventing belt spool out, in response to hard braking or a crash. Also, the belt will lock when pulled rapidly or if the vehicle is on a very steep incline. The front belts are also equipped with automatic tensioners, integrated with the locking retractors, which will tension the belt in certain frontal collisions (see section on the Supplementary Restraint System for further details on this feature).

The lower anchorage points for the front safety belts are attached to the seats and therefore move with the seat when the seat is adjusted for leg room.

WARNING

The safety belts, belt tensioners and other associated components must be checked after every collision. Saab recommends that all component parts of the safety belts be replaced after a collision. This is not necessary, however, after a minor collision if it did not cause any damage that could be detected by your Saab dealer and the dealer considered the belts free of faults.

Even safety belts and their components that were not in use when a collision took place must be checked and replaced if there is any evidence of damage or malfunctioning.

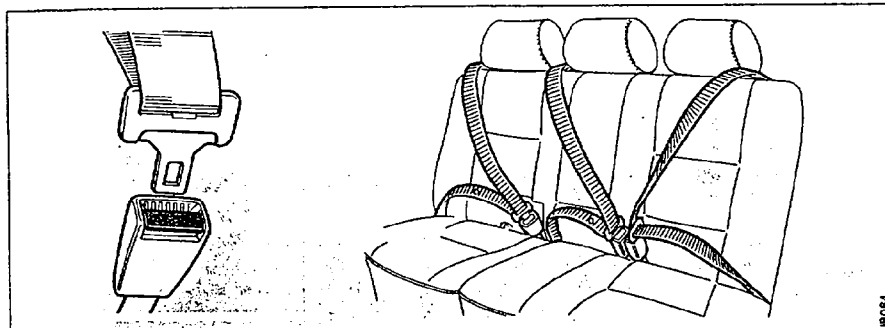
Safety Belt Reminder System

This vehicle is equipped with a safety belt reminder system which is required by Federal law. The purpose of this system is to remind people to wear their safety belts, and to reduce the number of traffic accident deaths and severe injuries.

A safety belt warning light on the instrument panel will light for about eight seconds immediately after starting the car, and a warning chime will sound until this light goes out, or until the front occupants' safety belts are fastened, whichever occurs first.

WARNING

- No alterations should be made to any of the safety belts in your car. If the safety belt provided with your car is not long enough to wear comfortably, see your Saab dealer and he will order a special replacement safety belt with extended webbing.
- The safety belt material should not be bleached or redyed.
- Each safety belt is meant for one person only.
- Fully reclining the seatback on either of the front seats while driving increases the risk of sliding under the safety belts in a crash. Do not ride in a seat with the seatback overly reclined: you could be seriously injured or killed in the event of a crash.



Rear safety belts (head restraint in center is not standard)

⚠ WARNING

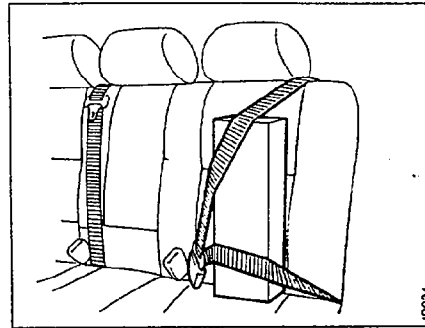
At outboard seating positions, use the shoulder belt portion of the safety belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Be sure the lap portion of the belt fits snugly and as low as possible around the hips, not on the waist. Remove heavy overcoats prior to fastening the shoulder and lap belt portion. Failure to follow these precautions could increase the chance and/or severity of injury in an accident.

Safety belt, rear seat

The car has three point seat belts with automatic rollers on all seats.

⚠ WARNING

Make certain that the safety belts are not pinched when a rear seat backrest is lowered or raised.



Securing load in the rear seat

⚠ WARNING

Rear seat

Always carefully secure loads in the rear seat using one of the seat belts. This reduces the risk of the load being thrown around in the event of a collision and causing personal injury.

Supplementary Restraint System

The Supplementary Restraint System, SRS, is commonly referred to as an airbag. Actually, the complete System on your Saab car consists of an automatic safety belt tensioner and an airbag at both the driver and front seat passenger positions.

The driver airbag is in the middle of the steering wheel and the passenger airbag is on top of the dashboard in front of the passenger. The safety belt tensioners are inside the door center pillars, integrated with the safety belt retractors. The SRS is referred to as supplemental because it works together with safety belts to protect you, not instead of them in front collisions.

WARNING

ALWAYS WEAR YOUR SAFETY BELT, EVEN THOUGH YOUR CAR HAS AIRBAGS. Even with airbags or the other components of this System, your injuries may be much worse if you are not wearing your safety belt and you are in a crash. The airbags and safety belt tensioners are not designed to work in rear or side impacts, rollovers, or in minor frontal or near-frontal crashes. The SRS would provide no occupant protection benefit in these types of accidents. Also, once the airbags have activated and provided protection in the first impact, they will not protect you if you hit something else in the course of the accident. To lower the risk of injury in any accident, you need to wear your safety belt to reduce the chance of impacting things or other people inside the vehicle or being ejected from it.

WARNING

Airbags inflate with great force in less time than it takes to blink your eye. If you are too close to an inflating airbag, it could seriously injure you. Safety belts, when worn properly, and their automatic tensioners help keep you in position for an airbag inflation in a crash. Always wear your safety belt and sit as far back as you can while still maintaining control of your vehicle.

When adjusting the telescopic feature of the steering wheel, adjust the wheel to a point as far away from you as possible while still maintaining comfortable steering capability.

WARNING

If the SRS light does not come on when you start your car, or stays on, or comes on while you are driving your car, the SRS may not activate properly in an accident. Have your car serviced immediately at an authorized Saab dealer.

SRS Technical Description

The SRS is designed to activate in moderate to severe frontal crashes within a certain angle to the left and right of center. Both airbags will activate simultaneously with the automatic safety belt tensioners.

The SRS will only be activated if the crash energy of the impact is above the threshold level required for deployment.

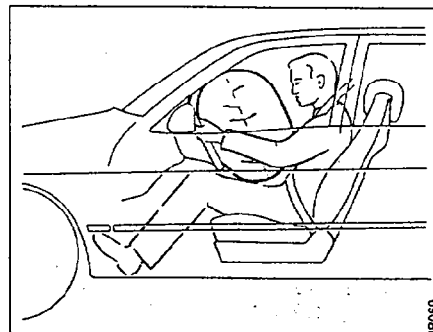
There are many factors that affect the amount of crash energy and, therefore, whether or not the SRS will be activated. The primary determinants of whether the SRS should activate are the angle of impact and the rate of deceleration of your car in the crash. Some of the other factors are the type and structure of the object that hits the front of your car, the motion of the other object, and the speed of your car just before the crash.

The front structure of your Saab is designed to absorb as much of the crash energy as possible, thereby cushioning the occupants from the force of the impact.

If your vehicle were to crash straight into a wall or other solid object that does not move or deform, the threshold level for activation of the SRS is lower than if your car crashes into a parked car which will move and deform on impact. Your car stops quicker when hitting the wall, stopping (or decelerating) at a higher rate, than if you hit something that is deformable.

In any particular crash, the determination of whether the SRS airbags should have activated cannot be based solely on the level of damage or the cost to repair the damage on your car or the other object(s) it impacted. In a frontal impact of sufficient severity, a sensor in the SRS will detect a sudden decrease in speed, or deceleration, as a result of the crash. This sensor will complete an electrical circuit, which initiates a very rapid reaction of a chemical called sodium azide inside a sealed container in the airbag inflator. The reaction produces nitrogen gas which is vented out of the inflator to inflate the cloth airbags.

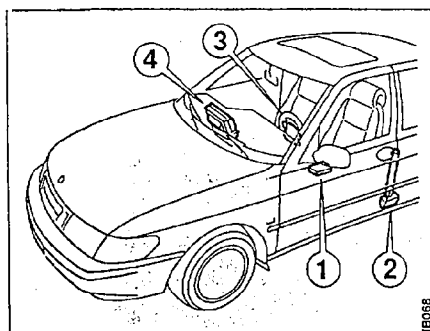
When the airbags inflate, you will hear a loud noise, and you might see some smoke. This is normal. It is caused by the inflation of the airbags. Simultaneously, both automatic safety belt tensioners activate and tighten the safety belt across the driver and front passenger chest and pelvis.



Airbag being inflated (driver's side)

When the airbag inflates, it will not interfere with the driver's vision or ability to steer the vehicle. After the airbags have inflated, they deflate in less than one second by releasing the nitrogen gas, which in itself is harmless, through vent holes in the back of the airbag.

This gas is hot and, in rare cases, can cause minor skin burns or irritation. It is also possible that minor skin bruises and abrasions may occur due to contact with the airbags during its rapid inflation.



Airbag system and belt tensioner

- 1 Electronic unit with sensor
- 2 Belt tensioner (both front seats)
- 3 Steering wheel with airbag
- 4 Cover for passenger-side airbag

Although the airbags are designed to distribute the force of an impact more evenly over the occupants upper body and to stop the body more gradually, they are not designed to prevent minor muscle, neck or back pain which may result from any car accident.

WARNING

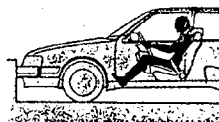
When driving, you should adopt a position with your entire back resting against the seat backrest and not sit hunched over the steering wheel. You could be seriously injured if you are sitting too close to an airbag when it inflates in a crash. Never attach any objects to the steering wheel or on the dashboard in front of the passenger as they could be propelled inside the car when the airbags are inflated and cause injury.

WARNING

The SRS installed in your car is designed to activate only once. After it activates, you will need to have new SRS parts including both airbags, the pretensioner safety belt assemblies and control module installed in your car. If you don't do this, the SRS will not protect the driver and front passenger in another crash. Only qualified Saab technicians should be allowed to work on your SRS system. Improper service can mean that your SRS will not activate properly.

The airbag during front-end collision

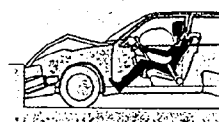
Start of collision.



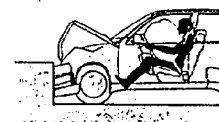
The sensor has registered the decrease in speed and sends a signal to a gas generator, via the control module, which inflates the airbag.



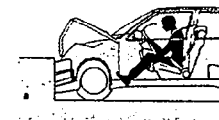
The airbag reaches the driver.



The airbag is completely inflated.



The steering column collapses to absorb energy and the airbag starts to empty.



Flat spot

When driving all tires become warm, especially after long and hard driving. When the car is parked after this type of driving and the tires cool, they can get a so called "flat spot". This means that the surface of the tire against the ground is somewhat flattened which can give steering wheel vibration similar to unbalanced tires. The flat spot disappears when the tires warm up after 12-15 miles (20-25) km driving at highway speed.

Safety belts

A check should be made periodically to ensure that the safety belts are working properly. A sharp tug on the strap should cause the inertia reel to lock. Check the floor anchorage points to ensure that they have not been weakened by corrosion. If a belt is worn or has any fraying edges it should be replaced.

Safety belts must not come into contact with substances such as polishes, oil or chemicals. If the straps get dirty, wash them with soap and warm water or have them replaced.

WARNING

Belts and belt tensioners that have been exposed to heavy loads, in a collision for example, must be replaced regardless of whether they are visibly damaged or not.

Never repair a belt yourself, and never attempt to modify the function of a belt.

Upholstery and trim

To remove lint or hairs from the seats, door armrests and ceiling, use a vacuum cleaner, a moist lint-free cloth or a special lint-removing roller. Remove any dirty marks using a cloth moistened with luke-warm soapy water.

If you need to use a stain remover, always work from the outside towards the center to avoid leaving a ring. If, in spite of this, a dirty ring or a spot of dirt should remain, it can usually be removed later using warm soapy water or water alone.

Wet patches caused by a spilt soft drink or thin oil must be wiped off immediately using an absorbent material such as a paper towel and then treated with stain remover.

Methyl alcohol is recommended for removing grease or oil stains. Plastic trim may be washed with warm water and a mild detergent. A semi-stiff brush may also be used.