V2342

Report Number TRC-96-N06

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

Toyota Motor Corporation

1996 Lexus ES300

4-door sedan

NHTSA Number: MT5100

TRC Test Number: 951129

Prepared By:

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10820 State Route 347

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December 26, 1995

Final Report

Prepared For:

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16. Abstract

A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1996 Lexus ES300 4-door sedan, NHTSA No. MT5100, at Transportation Research Center Inc. on November 29, 1995. 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 609 millimeters. The ambient temperature was 21° C.

The driver's Head Injury Criteria (HIC) was 432. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 43.1 g. The driver's maximum chest deflection was 28 mm. The driver's left and right femur maximum axial forces were 3251 N and 2575 N, respectively.

The passenger's HIC was 902. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 49.3 g. The passenger's maximum chest deflection was 29 mm. The passenger's left and right femur maximum axial forces were 3956 N and 4247 N, respectively.

17. Key Words	18. Distribution Statement
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"	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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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 1996 Lexus ES300 4-door sedan, NHTSA Number MT5100, 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 instrumented with load cells to measure lap and shoulder belt forces and potentiometers to measure shoulder belt stretch and spoolout. 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 passenger dummy.

Both dummies were instrumented with primary and redundant head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. The dummies were also instrumented with neck moment and force load cells, chest deflection potentiometers, and foot accelerometers to measure longitudinal and vertical axis accelerations. In addition, the driver dummy's lower legs were instrumented with upper and lower tibia load cells to measure forces and moments.

The one-hundred-ten (110) data channels were digitally sampled and recorded 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 sixteen (16) 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 November 29, 1995.

The test vehicle, a 1996 Lexus ES300 4-door sedan, NHTSA Number MT5100, was equipped with a 3.0-liter transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 1759 kg. The vehicle's impact speed was 56.5 kph. The vehicle sustained 609 mm of static crush during the impact.

The driver's Head Injury Criteria (HIC) was 432. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 43.1 g. The driver's maximum chest deflection was 28 mm. The driver's left and right femur maximum axial forces were 3251 N and 2575 N, respectively.

The right front passenger's HIC was 902. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 49.3 g. The passenger's maximum chest deflection was 29 mm. The passenger's left and right femur maximum axial forces were 3956 N and 4247 N, respectively.

There was no loss of windshield periphery retention.

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 vehicle's left brake caliper X-axis acceleration data channel, BCLXG1, exceeded its full scale output at approximately 22 milliseconds.

Table 1 Crash Test Summary

NHTSA number:	MT5100	
Test type:	Frontal Load Cell Barrier	
Test date:	11/29/95	
Test time:	1511	
Ambient temperature:	21° C	
Vehicle year/make/ model/body style:	1996/Lexus/ES300/4-door sedan	
Vehicle test weight:	1759 kg	
Impact angle[1]:	0°	
Impact velocity[2]:	Primary = 56.5 kph Secondary = 56.5 kph	
Maximum static crush:	609 mm	
Average rebound:	491 mm	
Dummies:	Driver #192	Passenger #142
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag and 3-point unibelt	Airbag and 3-point unibelt
Number of data channels:	110	
Number of cameras:	High-speed 16 Real-time 2	

[1] With respect to tow track centerline.
[2] Speed trap measurement (± .08 kph accuracy)
[3] The secondary light trap failed.

Table 2 Test Vehicle Information

Vehicle year/make/ model/body style:	1996/Lexus/ES300/4-door sedan
Color:	Gray
VIN:	JT8BF12G5T0136294
NHTSA number:	MT5100
Engine data:	
Placement:	transverse
Cylinders:	6
Displacement	3.0 liters
Transmission data:	_4_ speed, __ manual, _X_ automatic, __ overdrive
	_X_ FWD, __ RWD, __ 4WD
Date vehicle received:	11/24/95
Odometer reading:	42
Dealer's name and address:	Lexus of Columbus 3885 W. Dublin-Granville Rd. Columbus, OH 43017

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	Yes	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	Yes
Clock	Yes	Rear window defroster	Yes
Other	None		

Certification data from vehicle's label:

Vehicle manufactured by:	Toyota Motor Corporation
Date of manufacture:	09/95
VIN:	JT8BF12G5T0136294
GVWR:	4465 lbs.
GAWR: Front:	2665 lbs.
Rear:	2665 lbs.

Table 2 Test Vehicle Information, Cont'd.

Size of tires:	P205/65R15
Tire pressure with maximum capacity vehicle load:	
Front:	300 kPa
Rear:	300 kPa
Spare tire:	P205/65R15
Type of front seats:	Bucket

Tire & capacity data from vehicle's label:

Recommended tire size:	P205/65R15
Recommended cold tire pressure:	
Front:	220 kPa
Rear:	220 kPa
Designated seating capacity:	
Front	2
Rear	3
Total	5
Vehicle capacity weight:	400 kg
Luggage weight:	NA

Test vehicle attitude:

Delivered attitude:	LF 707 mm;	RF 705 mm;	LR 694 mm;	RR 691 mm
Pre-test attitude:	LF 689 mm;	RF 684 mm;	LR 664 mm;	RR 664 mm
Post-test attitude:	LF 795 mm;	RF 789 mm;	LR 655 mm;	RR 629 mm

Table 2 Test Vehicle Information Cont'd

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

Right front	478.5 kg	Right rear	295.0 kg
Left front	481.5 kg	Left rear	284.0 kg
Total front weight	960.0 kg	(62.4% of total vehicle weight)	
Total rear weight	579.0 kg	(37.6% of total vehicle weight)	
Total delivered weight	1539.0 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1539.0 kg)

VCW[1] = Vehicle capacity weight (410.5 kg)

DSC = Designated seating capacity (5)

RCLW[2] = VCW - 68 (DSC) = 410.5 - 68(5) = 70.5 kg

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

Target test weight = 1539.0 + 70.5 + 2(76)

Target test weight = 1761.5 kg

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

Right front	525.0 kg	Right rear	352.5 kg
Left front	537.0 kg	Left rear	344.5 kg
Total front weight	1062.0 kg	(60.4% of total vehicle weight)	
Total rear weight	697.0 kg	(39.6% of total vehicle weight)	
Total test weight	1759.0 kg	(0.1% under target test weight)	

Weight of ballast secured in vehicle: 0 kg

Components removed to meet target test weight Trunk lid and muffler

CG rearward of front wheel centerline: 1038 mm

Vehicle wheelbase: 2620 mm

[1] Vehicle capacity weight provided by Toyota Motor Corporation

[2] Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 300 pounds, whichever is less.

Table 3 Post-Impact Data

Test number:	951129
NHTSA number:	MT5100
Test date:	11/29/95
Test time:	1511
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:

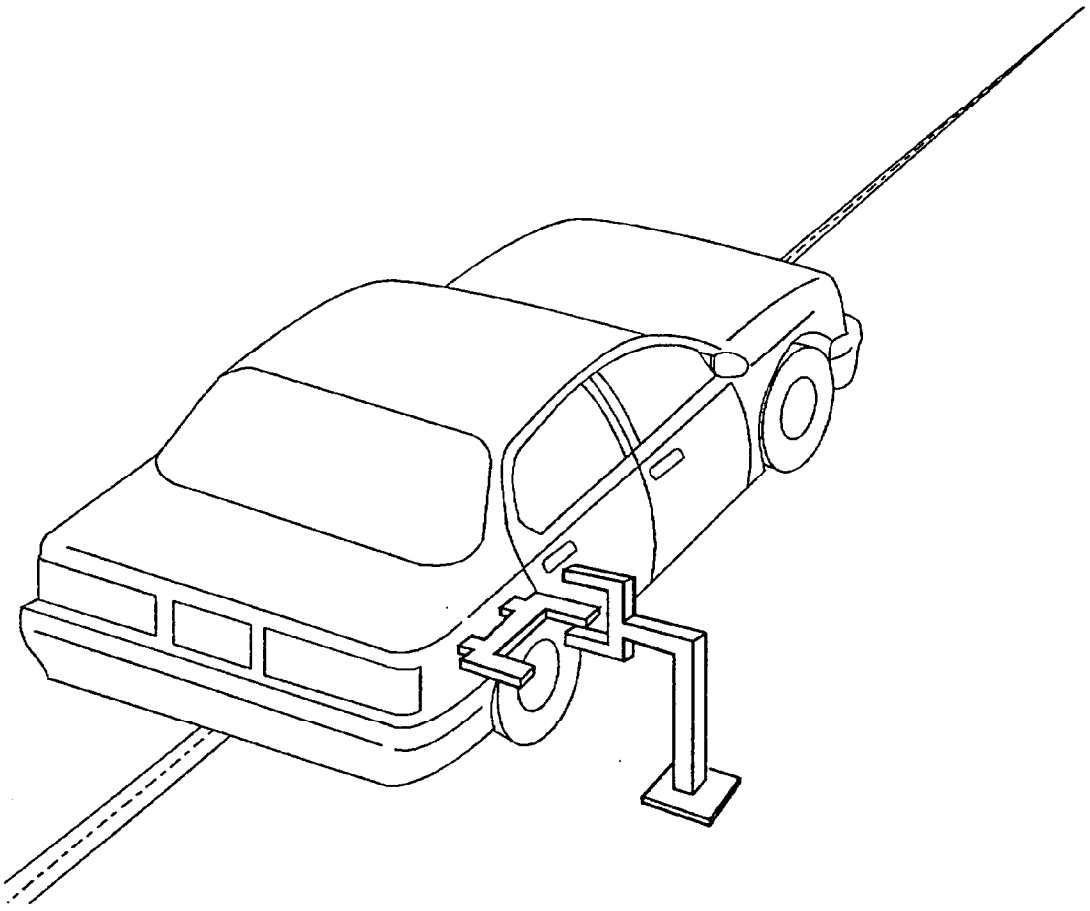
Pre-test:	L	4645 mm;	C	4740 mm;	R	4640 mm
Post-test:	L	4165 mm;	C	4154 mm;	R	4097 mm
Total crush:	L	480 mm;	C	586 mm;	R	543 mm
Average crush:	536 mm					

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L	507 mm;	C	487 mm;	R	478 mm
Average rebound	491 mm					

Figure 1 Impact Velocity Measurement System

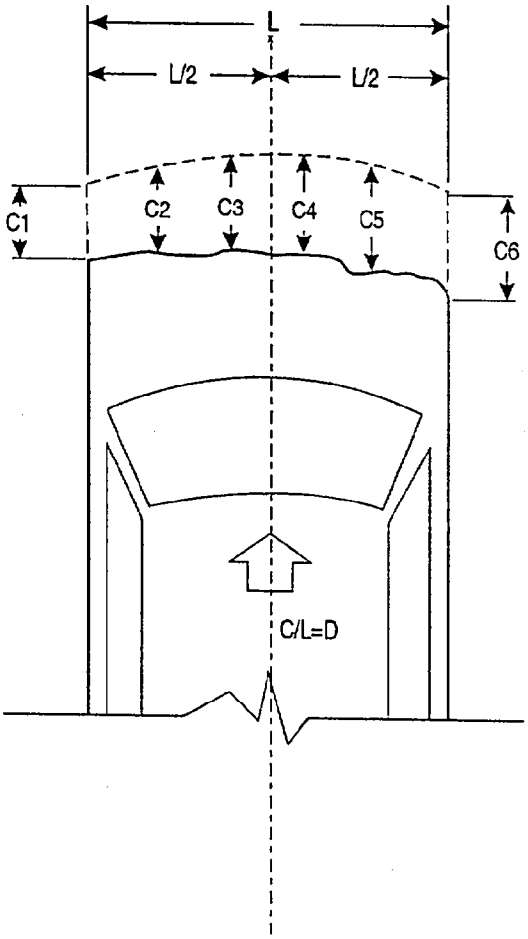


The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

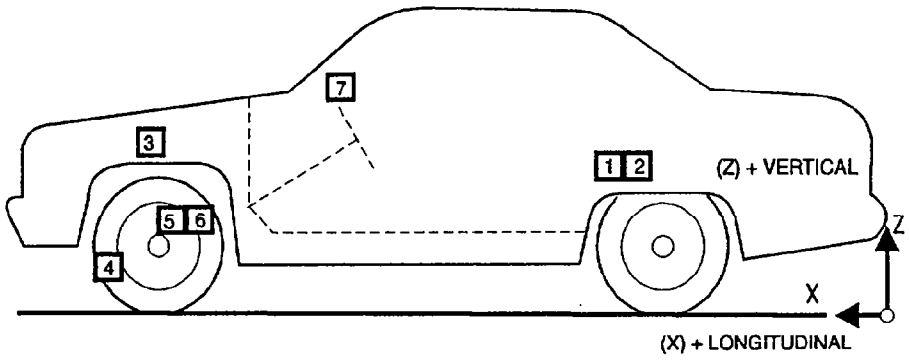
Figure 2 Accident Investigation Division Data
for 56 kph (35 mph) Frontal Barrier Impact

NHTSA number:	MT5100
Test date:	11/29/95
Vehicle year/make/ model/body style:	1996/Lexus/ES300/4-door sedan
Vehicle size category:	Compact
VIN:	JT8BF12G5T0136294
Build date:	09/95
Test weight:	1759 kg
Vehicle wheelbase:	2620 mm
Maximum width:	1780 mm
Front overhang:	1006 mm

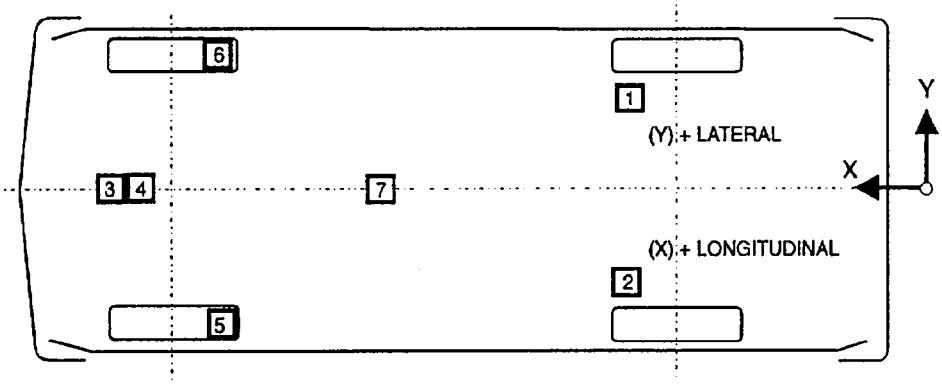


Collision Deformation Classification (CDC) code:	12FDEW3
Crush depth measurements:	C1 = 480 mm
	C2 = 565 mm
	C3 = 590 mm
	C4 = 609 mm
	C5 = 591 mm
	C6 = 543 mm
Midpoint of damage:	D: Vehicle Longitudinal Centerline
Length of damaged region:	L: 1220 mm

Figure 3 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 951129 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT REAR SEAT CROSSMEMBER	1868 mm	355 mm	404 mm				
LONGITUDINAL				2.8 g	@ 121.2 ms	28.5 g	@ 39.8 ms
REDUNDANT				2.8 g	@ 121.1 ms	28.6 g	@ 40.0 ms
2 RIGHT REAR SEAT CROSSMEMBER	1880 mm	-340 mm	418 mm				
LONGITUDINAL				3.1 g	@ 134.7 ms	27.9 g	@ 40.6 ms
REDUNDANT				3.2 g	@ 134.7 ms	27.9 g	@ 40.7 ms
3 ENGINE TOP LONGITUDINAL	4113 mm	-62 mm	750 mm 40.1 g	@ 48.0 ms		149.8 g	@ 34.6 ms
4 ENGINE BOTTOM LONGITUDINAL	4013 mm	-391 mm	160 mm 21.2 g	@ 40.6 ms		122.1 g	@ 33.5 ms
5 RIGHT BRAKE CALIPER LONGITUDINAL	3830 mm	-660 mm	273 mm 65.9 g	@ 68.1 ms		124.3 g	@ 48.1 ms
6 LEFT BRAKE CALIPER LONGITUDINAL[1]	3830 mm	660 mm	267 mm 42.6 g	@ 67.4 ms		140.2 g	@ 46.7 ms
7 INSTRUMENT PANEL CENTER	3150 mm	20 mm	932 mm				
LONGITUDINAL				42.3 g	@ 57.1 ms	67.4 g	@ 47.6 ms

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS. 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:

	Driver #192	Passenger #142
Head	Airbag/head restraint	Airbag/head restraint
Chest	Airbag	Airbag
Abdomen	None	None
Left knee	Instrument panel/ steering column cover	Instrument panel
Right knee	Instrument panel/ steering column cover	Instrument panel

Door Opening:

	Left	Right
Front	Easy	Easy
Rear	Easy	Easy

Seat Movement:

	Seat Back Failure	Seat Shift
Front	None	None
Rear	NA	NA

Glazing Damage: The windshield was cracked from the lower passenger side edge.

Other Notable Impact Effects: None

Table 6 FMVSS 208 Data Summary

Vehicle year/make/
model/body style: 1996/Lexus/ES300/4-door sedan

Vehicle NHTSA number: MT5100

Test date: 11/29/95

	Driver Dummy #192		Passenger Dummy #142	
Maximum Accelerations:				
Head X-axis	-53.8	g	-75.2	g
Head Y-axis	3.6	g	15.9	g
Head Z-axis	-16.5	g	24.0	g
Head resultant	54.6	g	76.6	g
Chest X-axis	-43.8	g	-50.7	g
Chest Y-axis	-6.8	g	6.8	g
Chest Z-axis	17.8	g	13.1	g
Chest resultant[1]	43.1	g	49.3	g
Chest resultant time interval[1]	.003	sec	.003	sec
Head Injury Criteria (HIC) Values:				
HIC[2]	432		902	
HIC starting time	.0490	sec	.0619	sec
HIC ending time	.0850	sec	.0910	sec
Average head resultant acceleration during HIC time interval	42.8	g	62.5	g
Maximum Chest Deflections:				
Chest X-axis	28	mm	29	mm
Maximum chest deflection time	.0725	sec	.0778	sec
Maximum Compressive Femur Forces:				
Left femur	3251	N	3956	N
Right femur	2575	N	4247	N
Maximum Seat Belt Forces:				
Lap belt	4773	N	5415	N
Shoulder belt	4959	N	5281	N

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.

Table 7 Hybrid III Data Summary

Vehicle year/make/
model/body style: 1996/Lexus/ES300/4-door sedan

Vehicle NHTSA number: MT5100

Test date: 11/29/95

	Driver Dummy #192		Passenger Dummy #142	
Maximum Forces				
Neck X-axis shear force	-426	N	-618	N
Neck Y-axis shear force	-141	N	285	N
Neck Z-axis axial force	1412	N	1095	N
Maximum Moments				
Neck moment about X-axis	-10.3	N·m	25.6	N·m
Neck moment about Y-axis	43.5	N·m	-32.8	N·m
Neck moment about Z-axis[1]	-4.4	N·m	-10.9	N·m
Maximum Accelerations:				
Pelvis X-axis	-45.2	g	-60.2	g
Pelvis Y-axis	-5.5	g	-8.0	g
Pelvis Z-axis	32.6	g	27.5	g
Pelvis resultant	50.3	g	63.0	g

[1] See data acquisition explanations.

Table 7 Hybrid III Data Summary, Cont'd.

Vehicle year/make/
model/body style: 1996/Lexus/ES300/4-door sedan

Vehicle NHTSA number: MT5100

Test date: 11/29/95

	Driver Dummy #192	Passenger Dummy #142
Left upper tibia moment about X-axis	58.7 N·m	NA
Left upper tibia moment about Y-axis	86.8 N·m	NA
Right upper tibia moment about X-axis	-93.5 N·m	NA
Right upper tibia moment about Y-axis	155.6 N·m	NA
Left lower tibia X-axis force	-601 N	NA
Left lower tibia Z-axis force	-1581 N	NA
Left lower tibia moment about Y-axis	-32.1 N·m	NA
Right lower tibia X-axis force	-1175 N	NA
Right lower tibia Z-axis force	-4613 N	NA
Right lower tibia moment about Y-axis	-129.9 N·m	NA
Left foot X-axis acceleration	-37.6 g	-112.0 g
Left foot Z-axis acceleration at heel	47.1 g	-146.8 g
Left foot Z-axis acceleration at toe	58.7 g	-280.9 g
Right foot X-axis acceleration	-128.2 g	-139.6 g
Right foot Z-axis acceleration at heel	105.1 g	-117.2 g
Right foot Z-axis acceleration at toe	172.5 g	-318.4 g

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 impacted the airbag. The dummy was restrained by the airbag and three-point unibelt. The dummy rebounded rearward into the seat back with the dummy's head rotating rearward contacting the head restraint. The driver dummy came to rest seated in the driver's seat, restrained by the three-point unibelt.

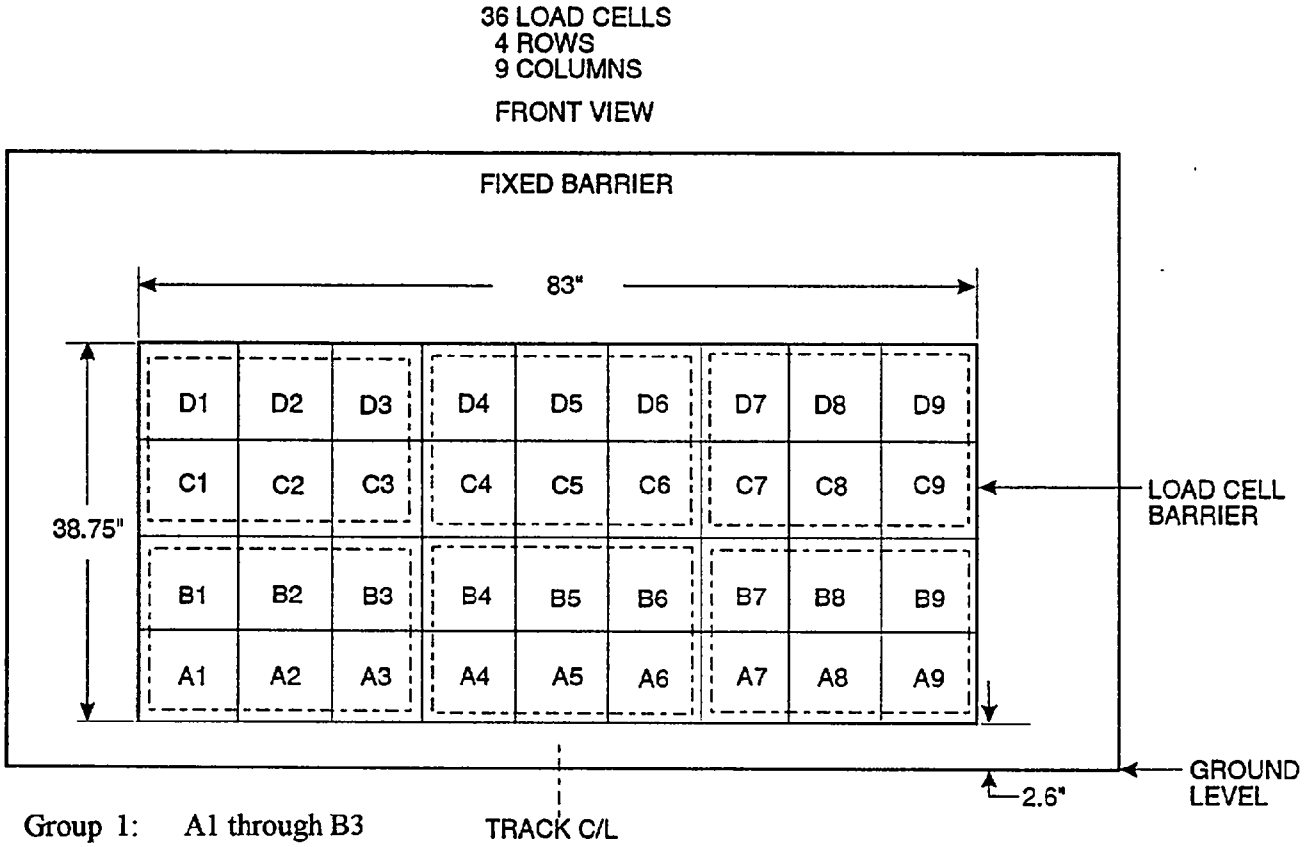
Right Front Passenger Dummy

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 impacted the airbag as the dummy's head rotated forward. The dummy was restrained by the passenger's airbag and the three-point unibelt. The dummy rebounded rearward into the seat back as the dummy's head rotated rearward and contacted the head restraint. The right front passenger dummy came to rest in the right front passenger's seat restrained by the three-point unibelt.

Table 8 Seat Belt Performance Assessment Test Data

	Driver	Passenger
Belt length data:		
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	2551 mm	2575 mm
Shoulder belt length as measured on Part 572 dummy.	843 mm	880 mm
Lap belt length as measured on Part 572 dummy.	822 mm	809 mm
Shoulder belt spool-off length:		
As determined by film analysis	71 mm	89 mm
As determined mechanically	83 mm	92 mm
As determined electronically	98 mm	104 mm
Belt stretch length:		
As measured mechanically	10 mm/m	15 mm/m
As measured electronically	11 mm/m	27 mm/m
Retractor lock-up time:		
As determined by shoulder belt spool-off	53 msec	61 msec

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	2.1	kN	@	2.4	ms	118.8	kN	@	21.5	ms
Total group 2	0.1	kN	@	218.7	ms	217.6	kN	@	35.2	ms
Total group 3	1.7	kN	@	1.7	ms	180.2	kN	@	34.0	ms
Total group 4	2.6	kN	@	167.4	ms	82.0	kN	@	41.4	ms
Total group 5	0.9	kN	@	1.3	ms	42.1	kN	@	33.0	ms
Total group 6	0.3	kN	@	2.8	ms	47.2	kN	@	32.2	ms
Total load cell force	2.2	kN	@	166.2	ms	643.4	kN	@	33.8	ms

Tension is positive
Compression is negative

Section 3.0

FMVSS 212, 219 (partial), and 301 Data

Figure 5 FMVSS 212 Test Data

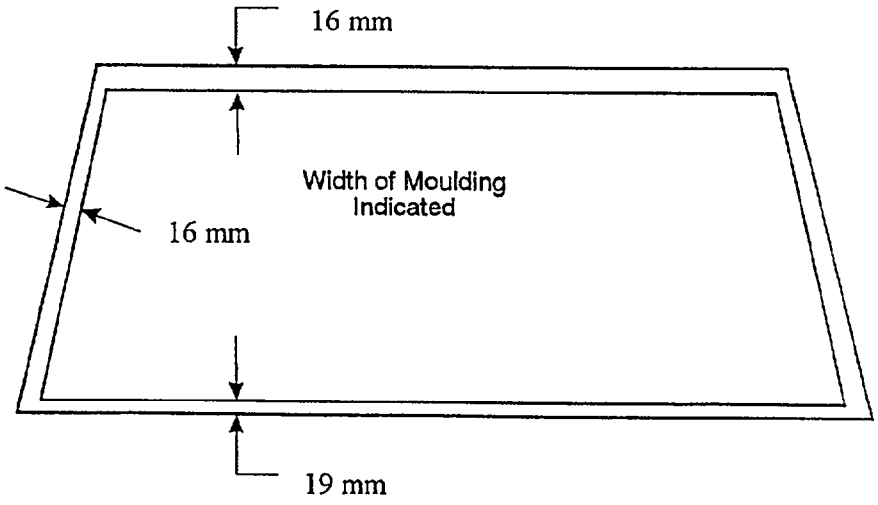
Details of windshield mounting such as retention method, trim type, etc.:
Plastic trim around outer perimeter, adhesive around inner perimeter.

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:

	Pre-test	Post-test	Percent retention
Right side	2032 mm	2032 mm	100
Left side	2032 mm	2032 mm	100
Total	4064 mm	4064 mm	100

Pre-test windshield mounting material temperature: 21° C



Front view of windshield[1]

Loss of windshield retention lengths: There was no loss of windshield retention.

[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 = 1155 mm

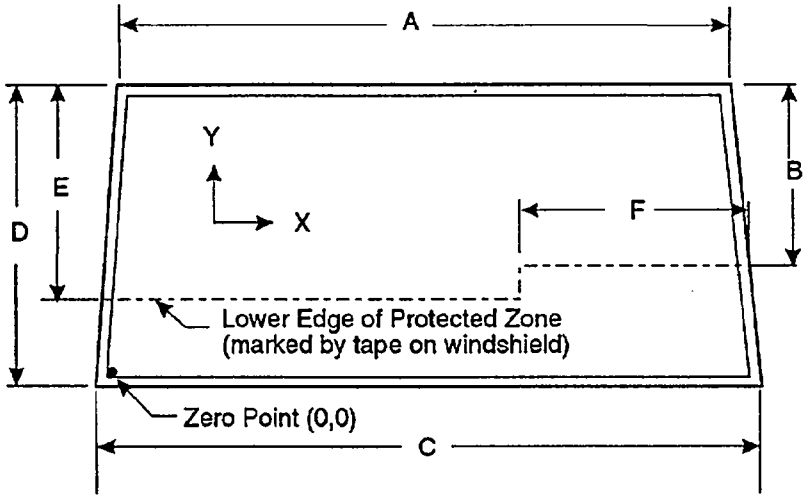
B = 435 mm

C = 1568 mm

D = 729 mm

E = 496 mm

F = 620 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:	1996/Lexus/ES300/4-door sedan
NHTSA number:	MT5100
Fuel system capacity:	70.0 liters (from owner's manual)
Usable capacity:	70.0 liters (furnished by COTR)
Test volume range:	64.4 liters to 65.8 liters (92-94% of usable)
Actual test volume:	65.1 liters (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	Purple
Did electric fuel pump operate with ignition switch "on" and the engine not operating.	No
Details of fuel system:	The fuel filler cap is located on the vehicle's left rear quarter panel. The fuel filler neck goes into the left rear corner of the fuel tank which is in front of the rear axle. Fuel lines run along the inboard side of the vehicle's left frame member to the engine compartment.

Table 11 FMVSS 301 Post-Impact Test Data

NHTSA number: MT5100

Test date: 11/29/95

Vehicle year/make/
model/body style: 1996/Lexus/ES300/4-door sedan

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:

_x_ Frontal (_56_ kph)

___ Oblique (48 kph) with __° barrier face first contacting ___ (driver/pass.) side

___ Rear moving barrier (48 kph)

___ Lateral moving barrier (32 kph)

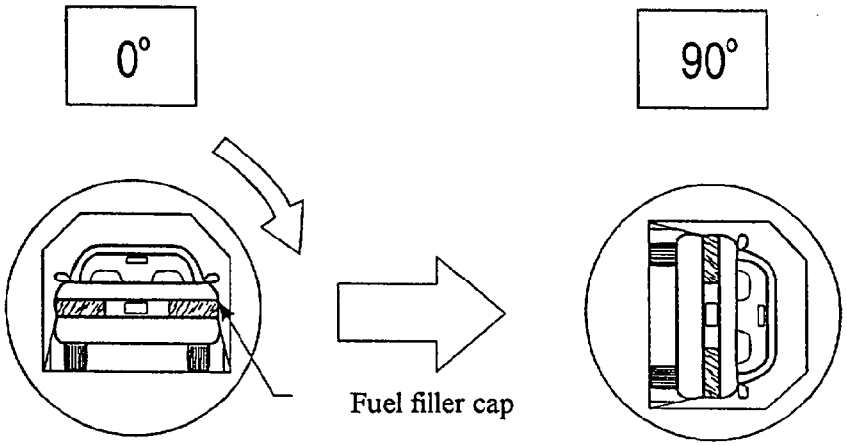
Fuel system fluid spillage measurements:

	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: MT5100
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		

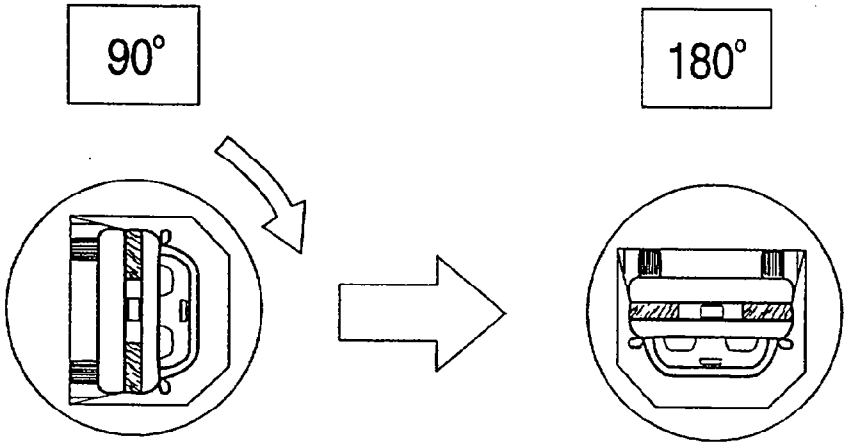
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 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		

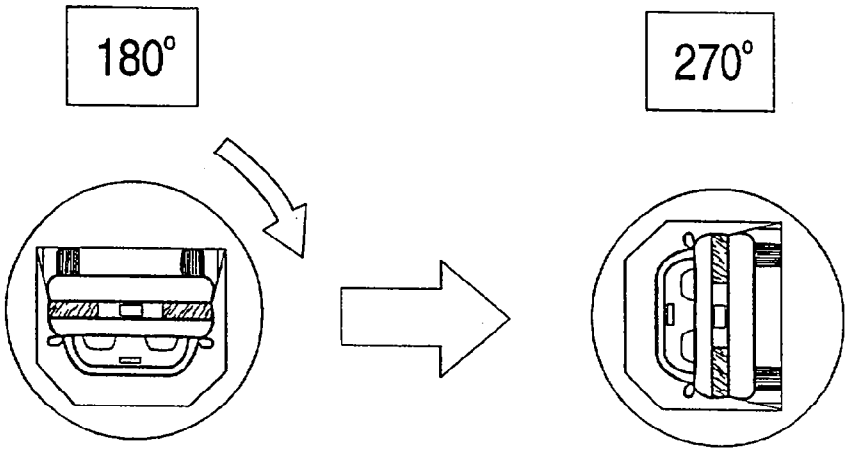
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 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	

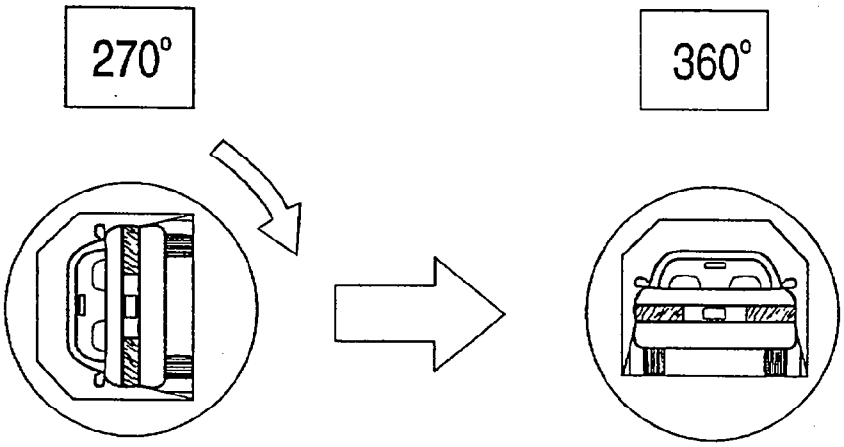
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 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:

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

Fuel system fluid spillage location(s): None

Section 4.0

Occupant, Camera, and Vehicle Information

Figure 8 Dummy Measurement Locations for Front Seat Occupants

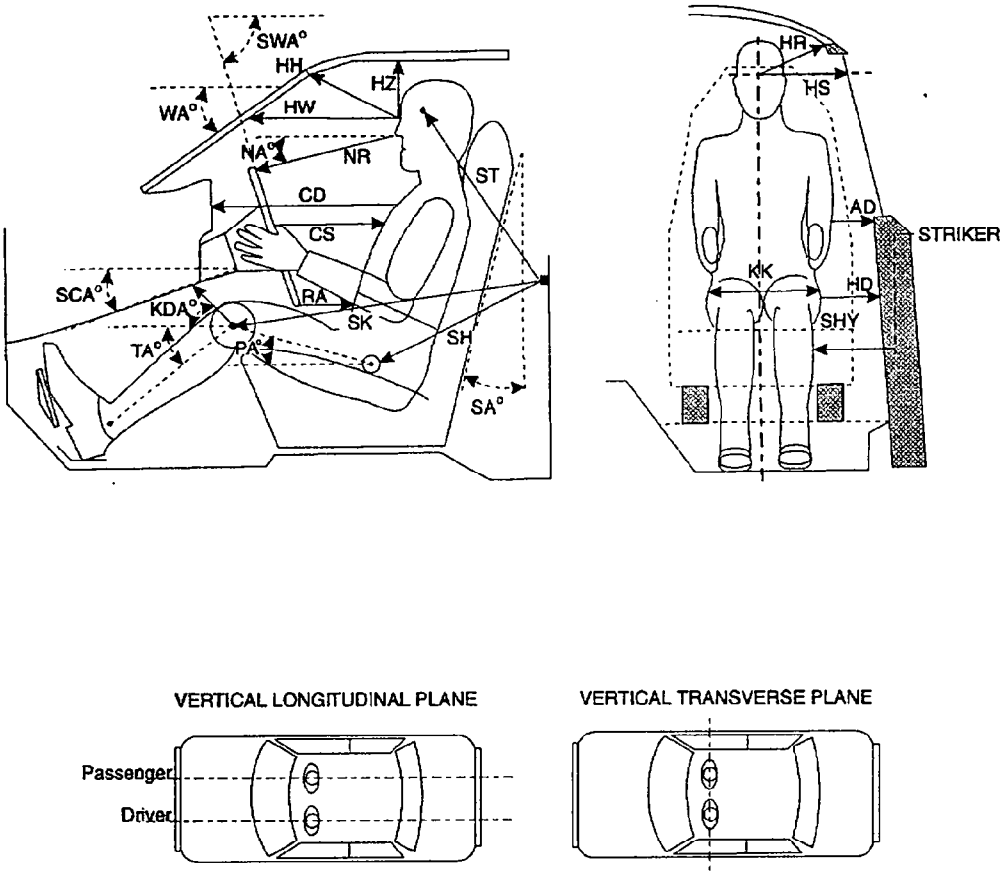


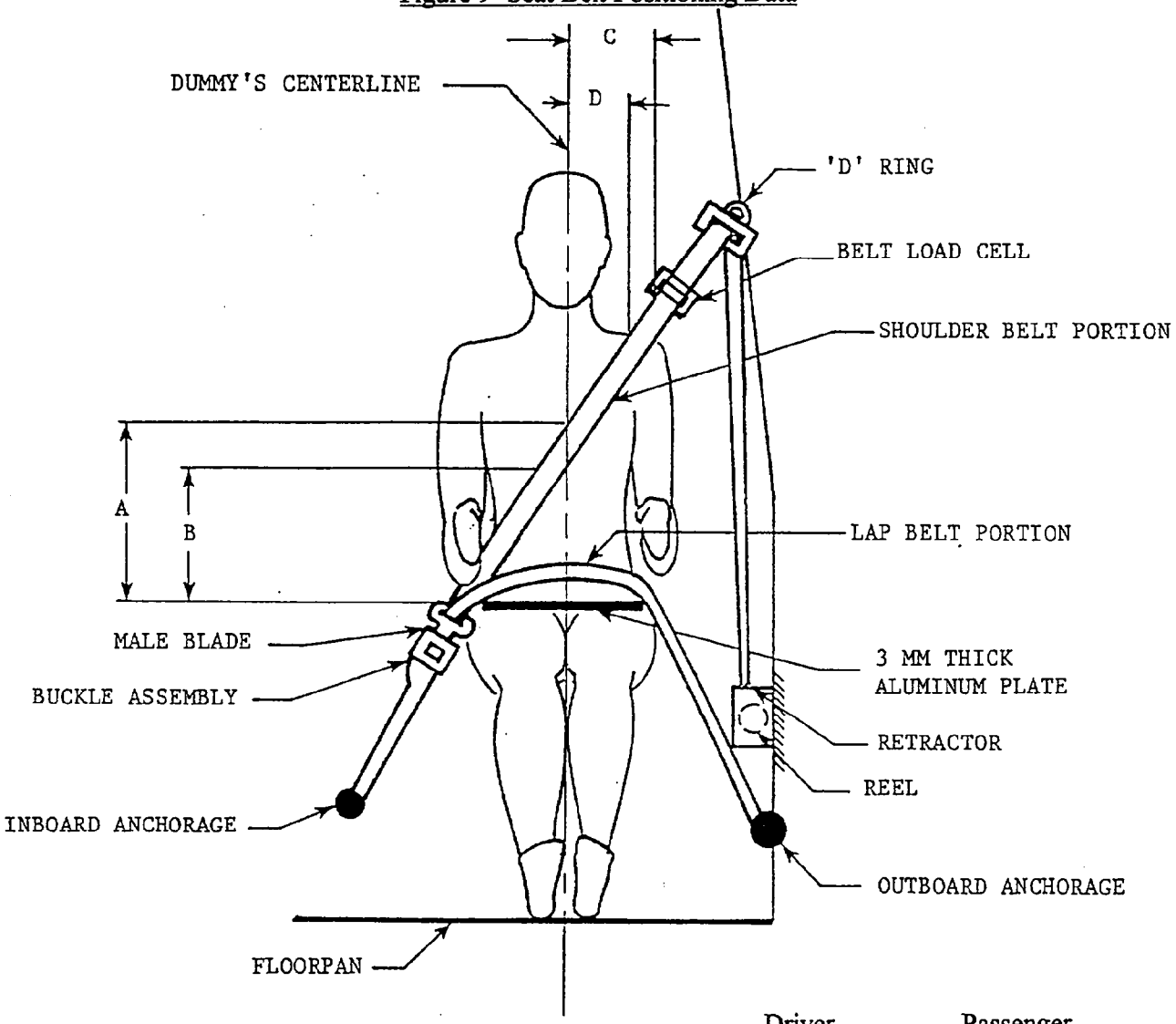
Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #192)	Passenger (Serial #142)
WA	Windshield angle	30°	NA
SWA	Steering wheel angle	65°	NA
SCA	Steering column angle	25°	NA
SA	Seat back angle	16°	16°
HZ	Head to roof	190 mm	175 mm
HH	Head to header	287 mm	307 mm
HW	Head to windshield	478 mm	522 mm
HR	Head to side header	196 mm	212 mm
NR	Nose to rim	359 mm	NA
NA	Nose to rim angle	11°	NA
CD	Chest to dash	526 mm	533 mm
CS	Steering wheel to chest	289 mm	NA
RA	Rim to abdomen	168 mm	NA
KDL	Left knee to dash	177 mm	194 mm
KDR	Right knee to dash	177 mm	173 mm
KDA	Outboard knee to dash angle	42°	26°
PA	Pelvic angle	24°	22.5°
TA	Tibial angle	38°	42°
KK	Knee to knee	344 mm	270 mm
ST[1]	Striker to head	514 mm	485 mm
	Striker to head angle	-84°	-85°
SK[1]	Striker to knee	560 mm	571 mm
	Striker to knee angle	1°	2°
SH[1]	Striker to H-point	239 mm	241 mm
	Striker to H-point angle	35°	33°
SHY	Striker to H-point (Y dir.)	260 mm	235 mm
HS	Head to side window	297 mm	318 mm
HD	H-point to door	212 mm	197 mm
AD	Arm to door	50 mm	51 mm

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

[1] A negative angle indicates the measurement point was above the striker.

Figure 9 Seat Belt Positioning Data



	Driver	Passenger
A - Top surface of aluminum plate to belt upper edge	330 mm	340 mm
B - Top surface of aluminum plate to belt lower edge	262 mm	260 mm
C - Dummy centerline to outer edge of belt at chest flesh top	114 mm	117 mm
D - Dummy centerline to inner edge of belt at chest flesh top	49 mm	56 mm
Lap belt tension	9 N	9 N
Shoulder belt tension	13 N	9 N
Position of adjustable belt anchorage	first position below uppermost	first position below uppermost

Figure 10 Camera Positions

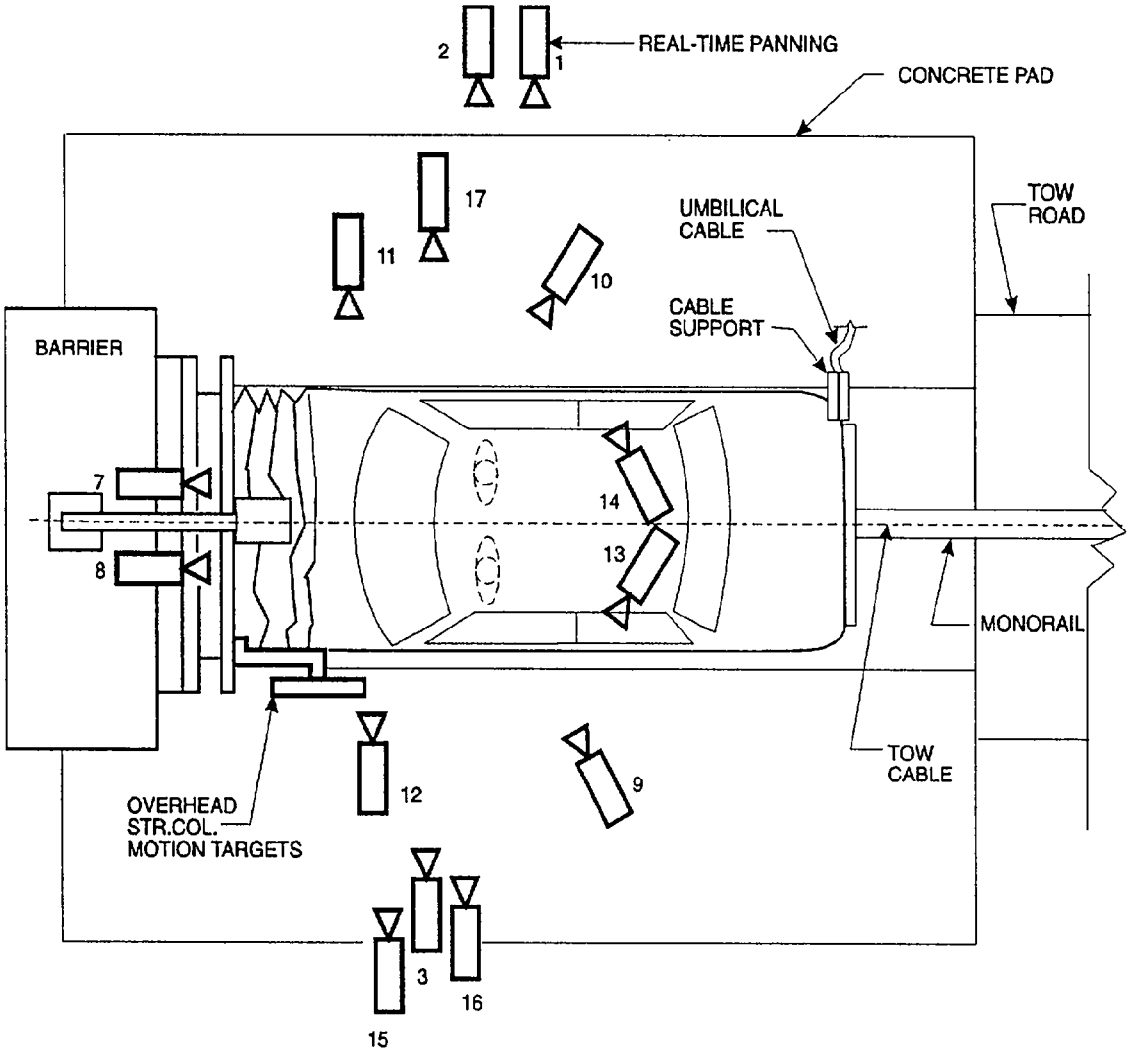


Figure 10 Camera Positions, Cont'd.

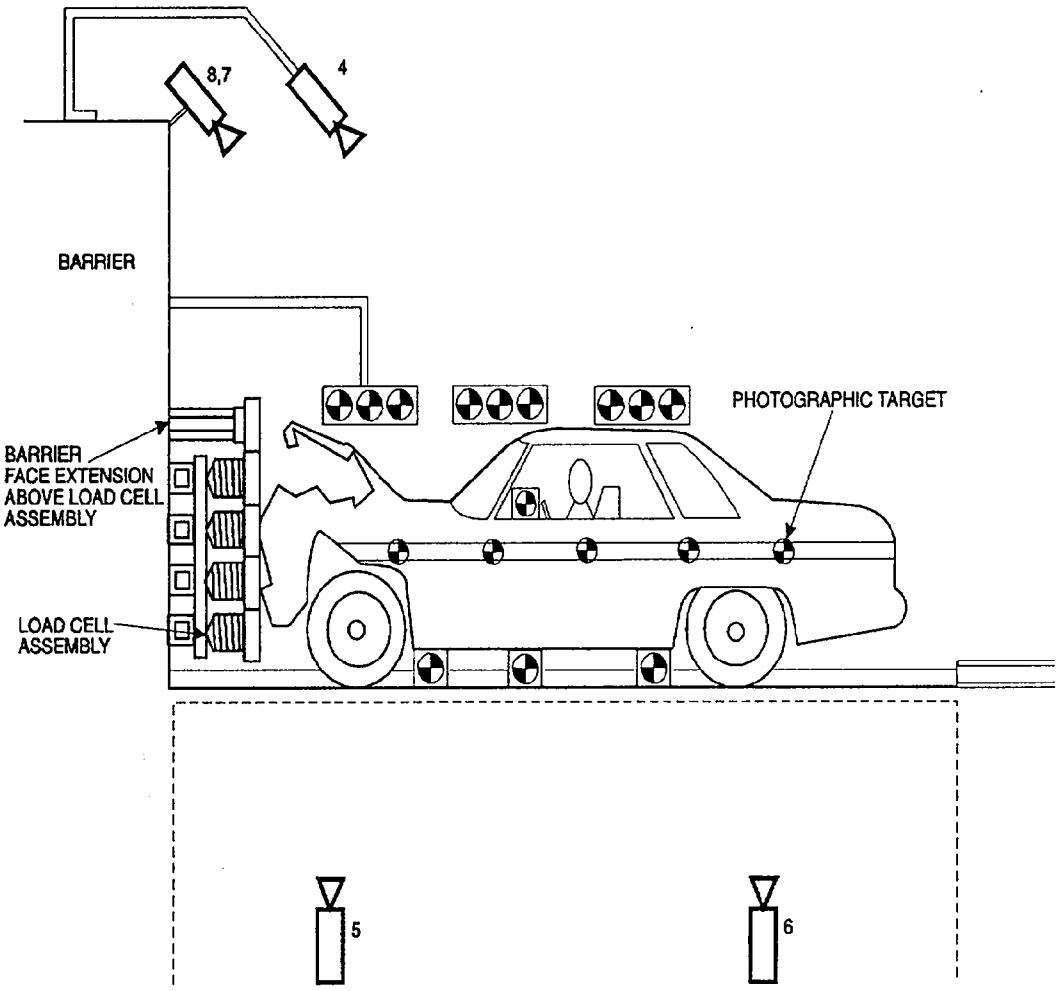


Table 13 Motion Picture Camera Locations

Test Number: 951129

Vehicle year/make/model/body style: 1996/Lexus/ES300/4-door sedan

Camera Number	View	Camera Positions[1] X	Y	Z	Angle[2]	Film Plane to Head Target	Lens	Film Speed
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	475 frames/s
3	Dummy kinematics	-1054 mm	7493 mm	1118 mm	-12°	5842 mm	25 mm	980 frames/s
4	Windshield damage	-925 mm	0 mm	2489 mm	-40°	NA mm	13 mm	512 frames/s
5	Crush & fluid spillage	-1283 mm	0 mm	-2347 mm	90°	NA mm	13 mm	992 frames/s
6	Fluid spillage	-2522 mm	0 mm	-2515 mm	90°	NA mm	13 mm	998 frames/s
7	Passenger kinematics	-114 mm	-351 mm	2159 mm	-40°	NA mm	17 mm	470 frames/s
8	Driver kinematics	-173 mm	368 mm	2159 mm	-41°	NA mm	17 mm	498 frames/s
9	Driver kinematics	-4572 mm	1854 mm	2591 mm	-27°	2463 mm	25 mm	500 frames/s
10	Passenger kinematics	-4674 mm	-1880 mm	2540 mm	-26°	2337 mm	25 mm	510 frames/s
11	Windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA mm	50 mm	508 frames/s
12	Windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA mm	50 mm	502 frames/s
13	Driver seat belt movement	NA	NA	NA	NA	NA mm	NA mm	495 frames/s
14	Passenger seat belt movement	NA	NA	NA	NA	NA mm	NA mm	725 frames/s
15	Column movement	-3099 mm	7264 mm	2616 mm	-14°	NA mm	25 mm	502 frames/s
16	Column movement	-3099 mm	7264 mm	1908 mm	-9°	NA mm	25 mm	498 frames/s
17	Passenger kinematics	-986 mm	-5354 mm	1151 mm	7°	6477 mm	25 mm	983 frames/s

[1] +X = Film plane forward of barrier face
+Y = Film plane to left of monorail centerline
+Z = Film plane above ground level

[2] +Angle = Film plane angled upward from horizontal plane

Figure 11 Vehicle Target Locations

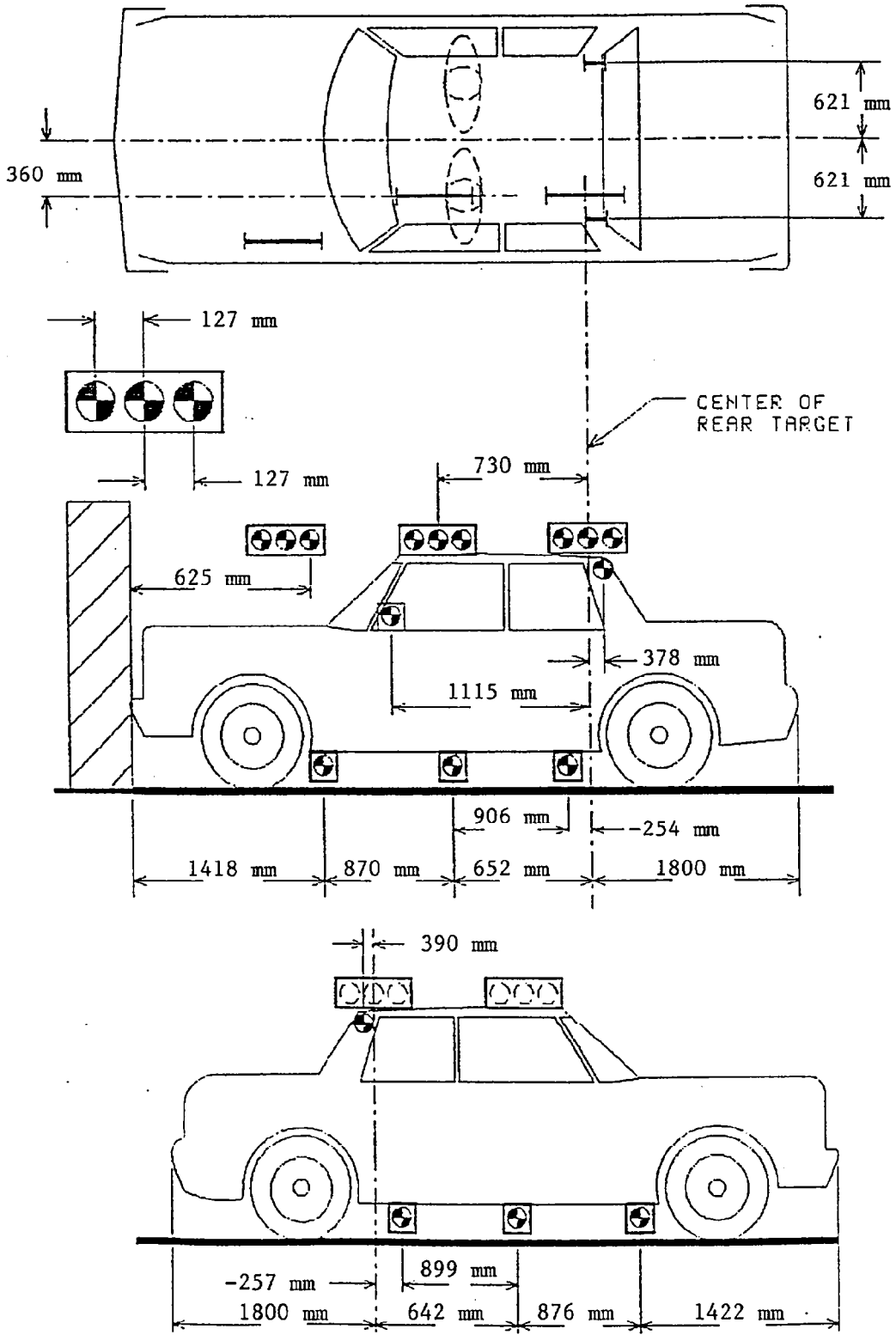


Figure 12 Pre-Test And Post-Test Measurement Points

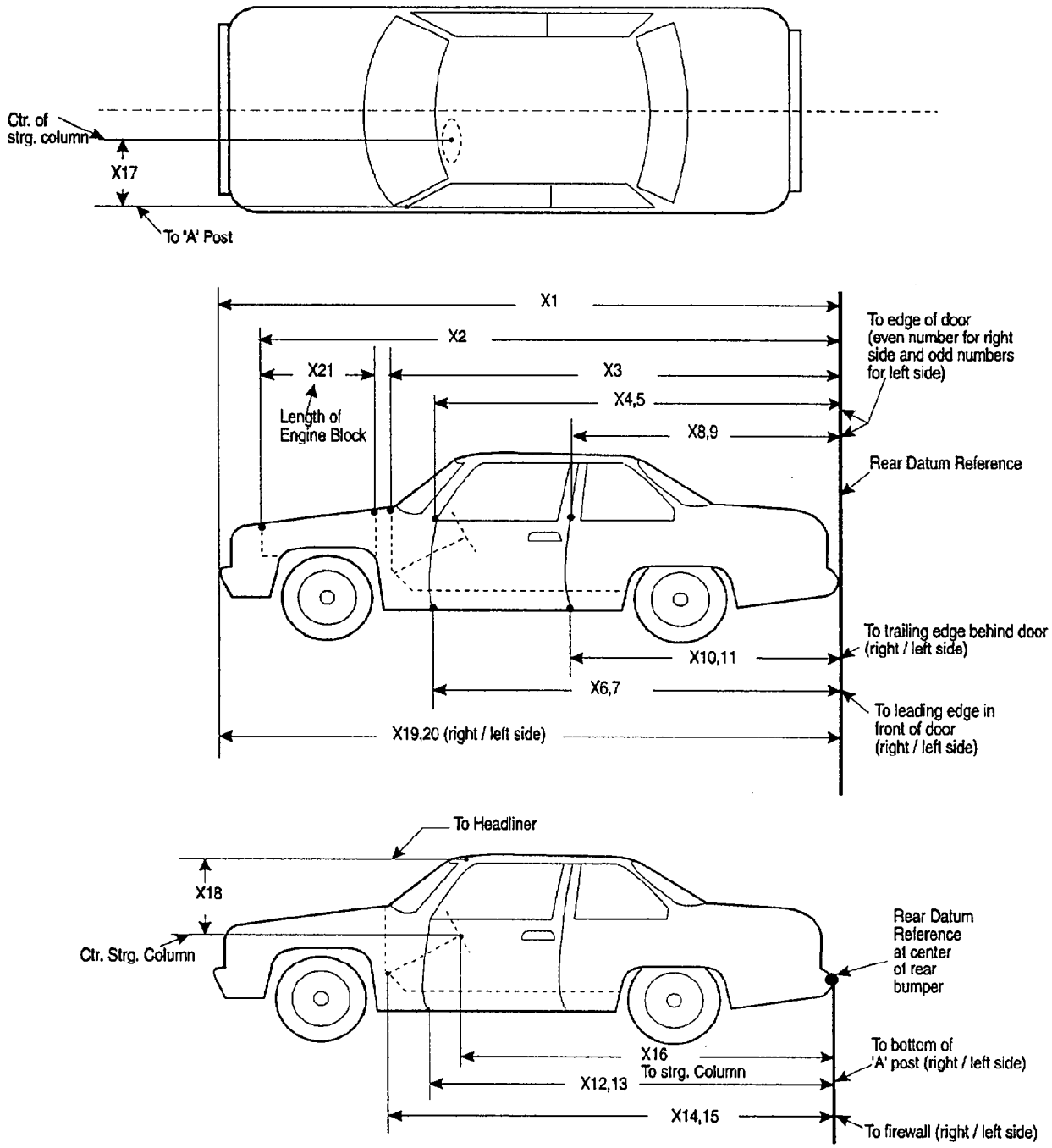


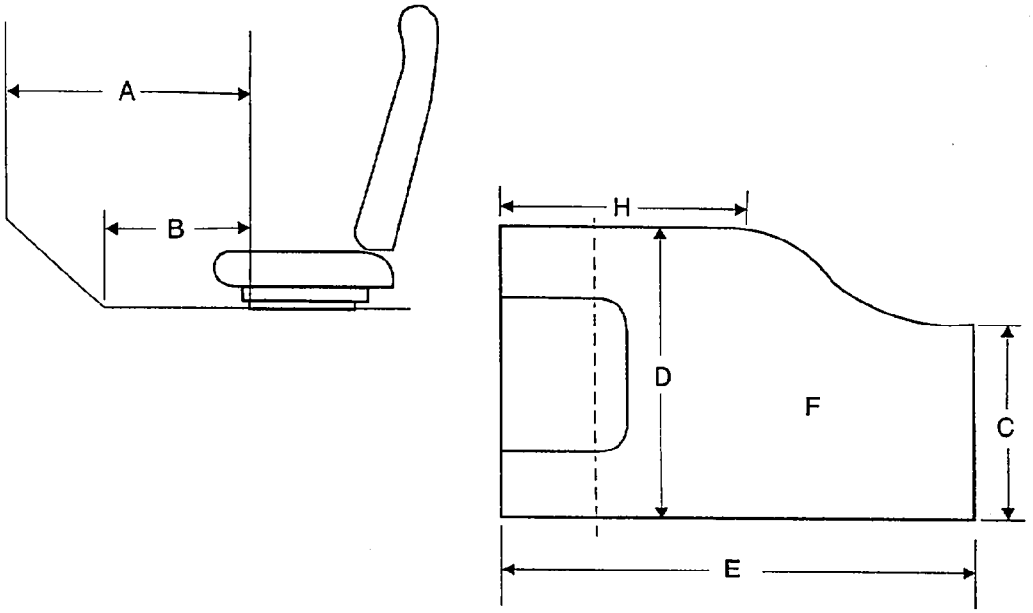
Table 14 Impacted Vehicle Measurements

Vehicle Make/Model: Lexus/ES300 Test Number: 951129

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	4740 mm	4154 mm	586 mm
X2	Rear surface of vehicle to front of engine block	4135 mm	3929 mm	206 mm
X3	Rear surface of vehicle to firewall	3498 mm	3487 mm	11 mm
X4	Rear surface of vehicle to upper leading edge of right door	3182 mm	3186 mm	-4 mm
X5	Rear surface of vehicle to upper leading edge of left door	3181 mm	3180 mm	1 mm
X6	Rear surface of vehicle to lower leading edge of right door	3192 mm	3181 mm	11 mm
X7	Rear surface of vehicle to lower leading edge of left door	3195 mm	3182 mm	13 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2185 mm	2189 mm	-4 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2185 mm	2187 mm	-2 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2185 mm	2184 mm	1 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2197 mm	2181 mm	16 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3182 mm	3187 mm	-5 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3182 mm	3186 mm	-4 mm
X14	Rear surface of vehicle to firewall - right side	3450 mm	3401 mm	49 mm
X15	Rear surface of vehicle to firewall - left side	3455 mm	3406 mm	49 mm
X16	Rear surface of vehicle to steering wheel center	2669 mm	2762 mm	-93 mm
X17	Center of steering column to "A" post	293 mm	295 mm	-2 mm
X18	Center of steering column to headliner	412 mm	407 mm	5 mm
X19	Rear surface of vehicle to right side of front bumper	4640 mm	4097 mm	543 mm
X20	Rear surface of vehicle to left side of front bumper	4645 mm	4165 mm	480 mm
X21	Length of engine block	480 mm	480 mm	0 mm

Figure 13 Static Footwell Deformation

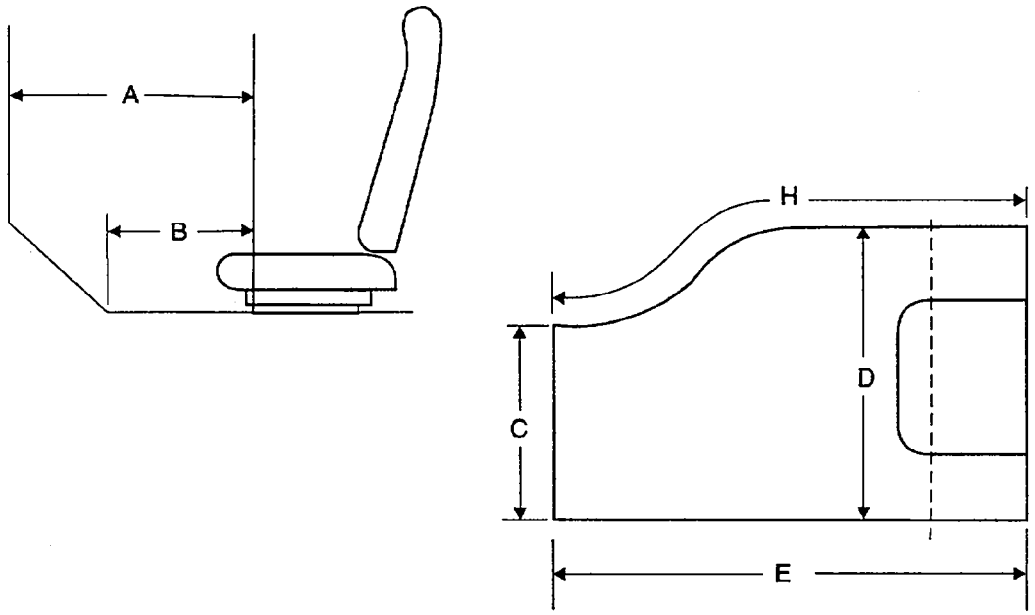
(Driver's Side)



Measurement	Pre-Test	Post-Test	Difference
A	653 mm	668 mm	-15 mm
B	518 mm	495 mm	23 mm
C	459 mm	404 mm	55 mm
D	489 mm	486 mm	3 mm
E	NA	NA	NA
H	511 mm	477 mm	34 mm

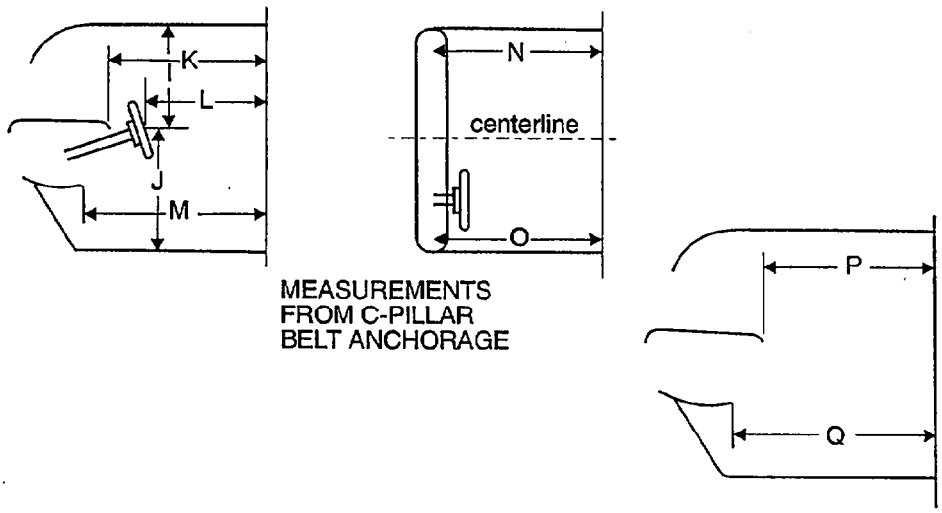
Figure 14 Static Footwell Deformation

(Passenger's Side)



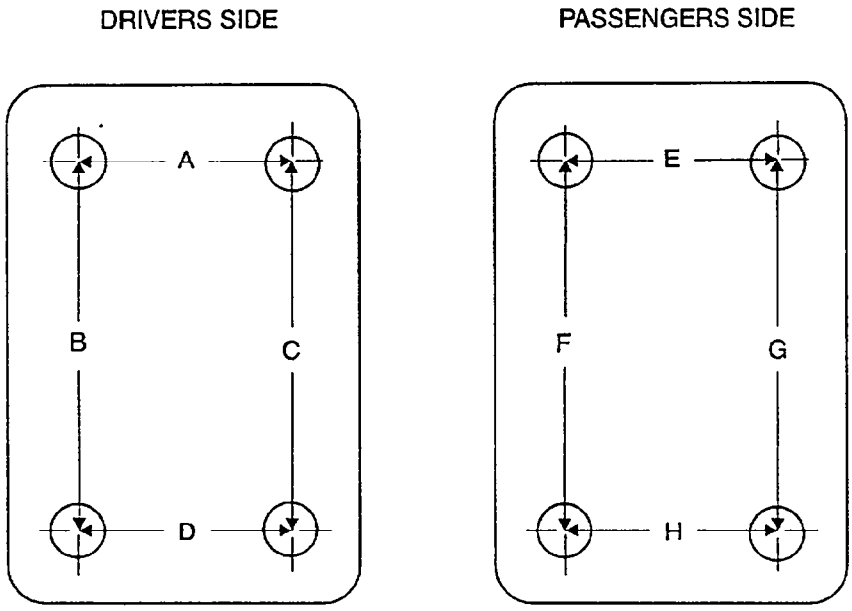
Measurement	Pre-Test	Post-Test	Difference
A	723 mm	621 mm	102 mm
B	538 mm	455 mm	83 mm
C	426 mm	376 mm	50 mm
D	470 mm	474 mm	-4 mm
E	752 mm	713 mm	39 mm
H	762 mm	631 mm	131 mm

Figure 15 Static Passenger Compartment Intrusion



Measurement	Pre-Test	Post-Test	Difference
I	351 mm	424 mm	-73 mm
J	497 mm	492 mm	5 mm
K	800 mm	777 mm	23 mm
L	535 mm	631 mm	-96 mm
M	800 mm	789 mm	11 mm
N	800 mm	693 mm	107 mm
O	700 mm	684 mm	16 mm
P	700 mm	803 mm	-103 mm
Q	800 mm	788 mm	12 mm

Figure 16 Underbody Floorboard Deformation



Measurement	Pre-Test	Post-Test	Difference
A	309 mm	311	-2
B	400 mm	400	0
C	402 mm	402	0
D	307 mm	305	2
E	316 mm	311	5
F	400 mm	402	-2
G	400 mm	399	1
H	295 mm	287	8

Appendix A

Photographs

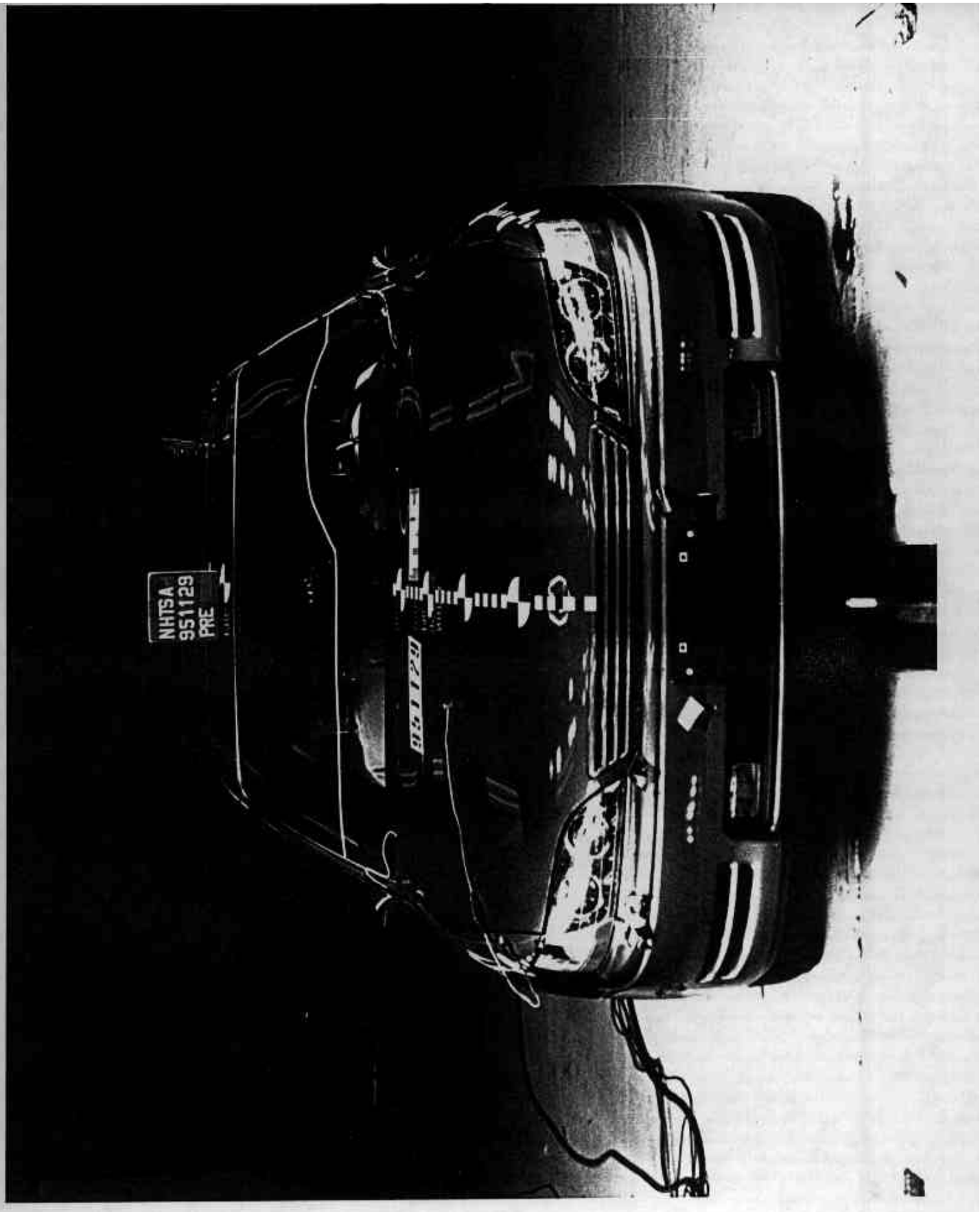


Figure A-1. Pre-Test Front View

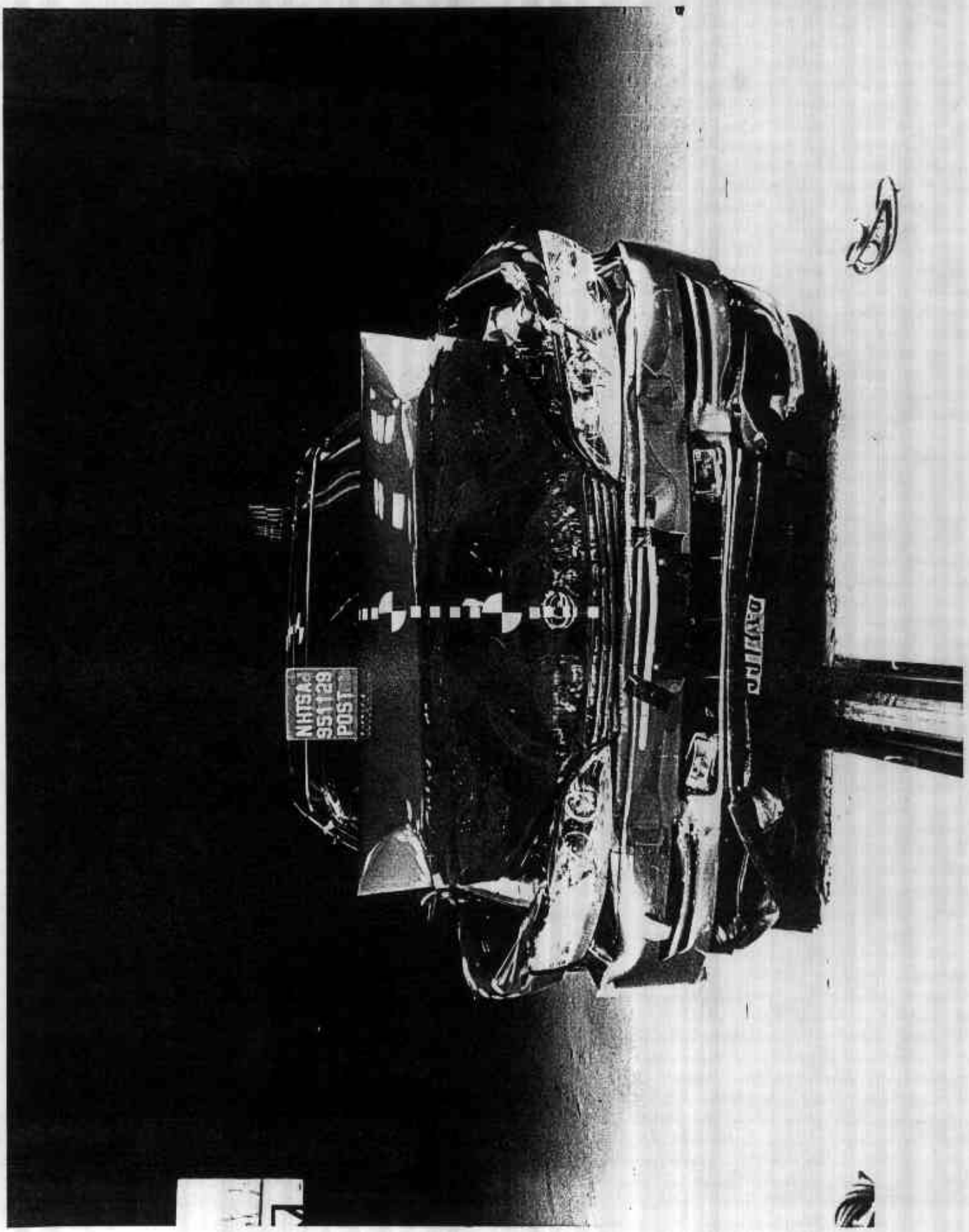


Figure A-2. Post-Test Front View

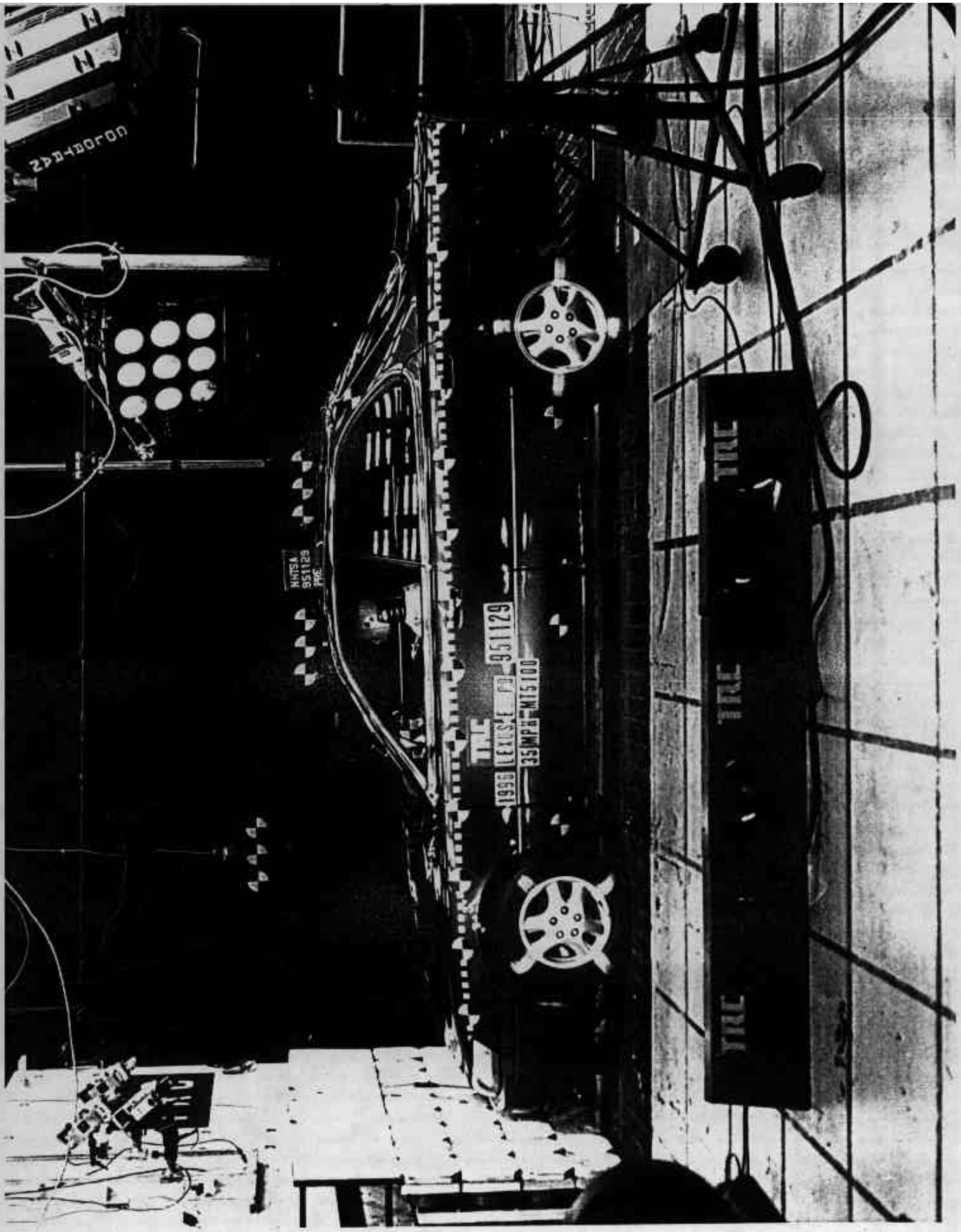


Figure A-3. Pre-Test Left Side View

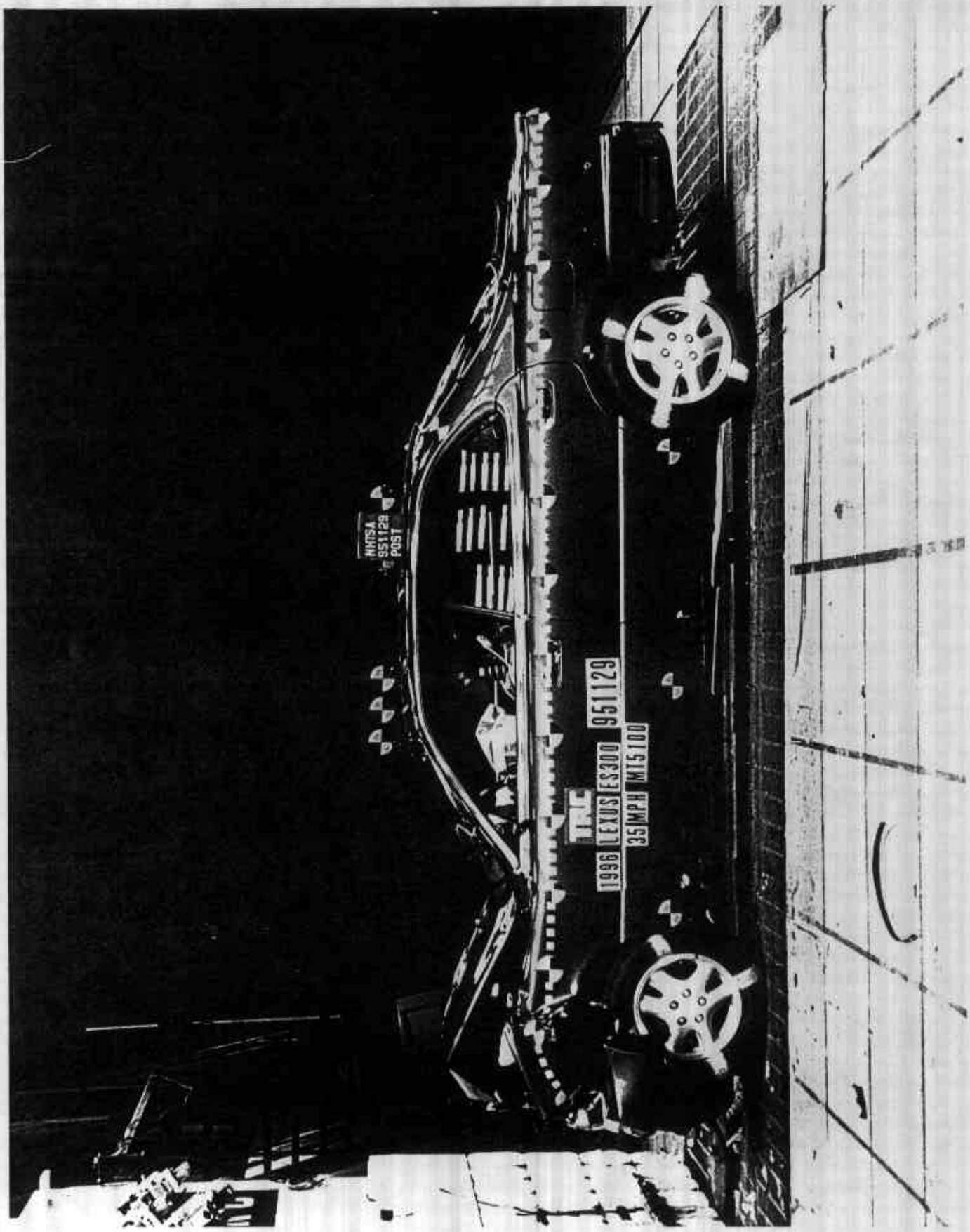


Figure A-4. Post-Test Left Side View

Figure A-5. Pre-Test Rear View

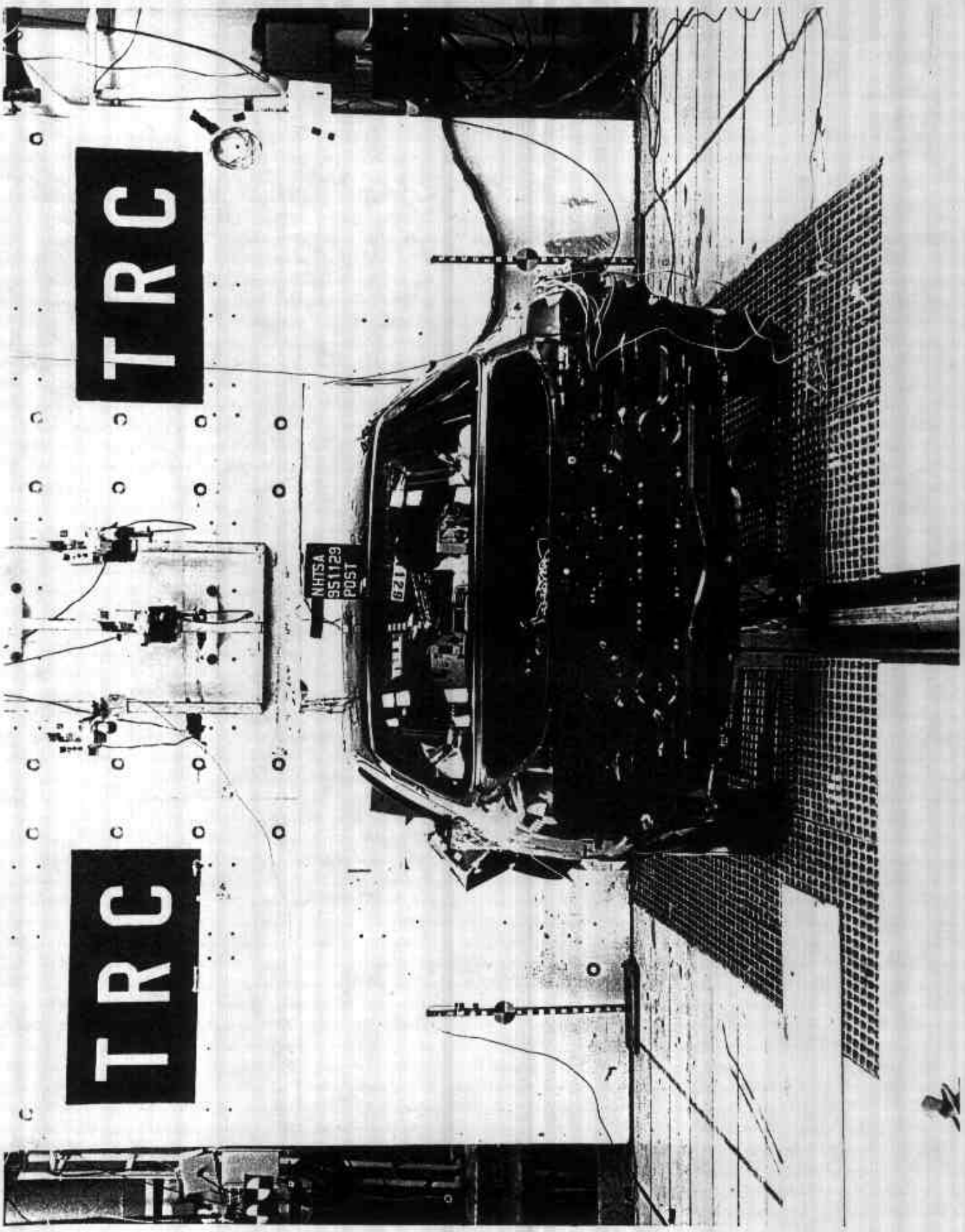


Figure A-6. Post-Test Rear View

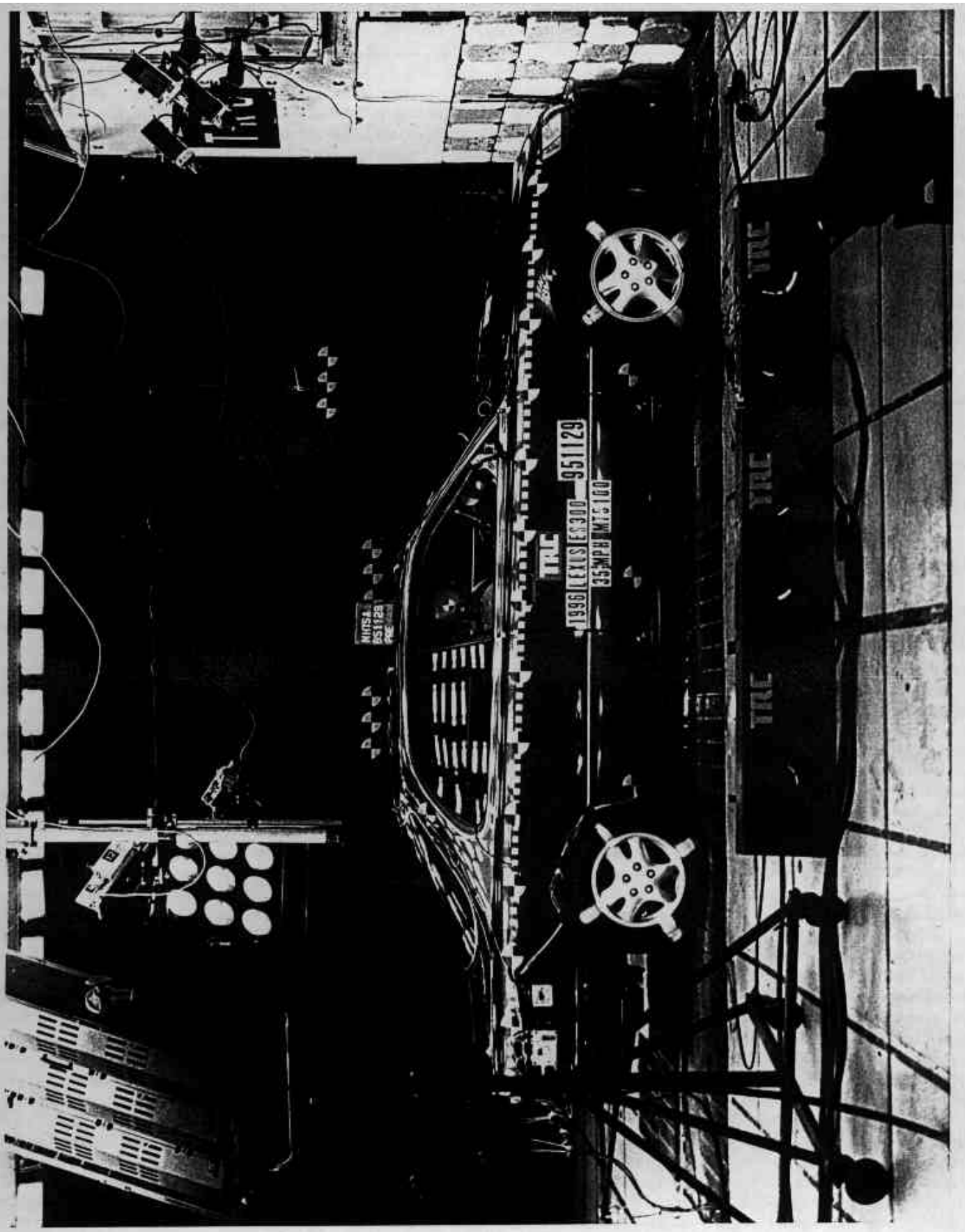


Figure A-7. Pre-Test Right Side View

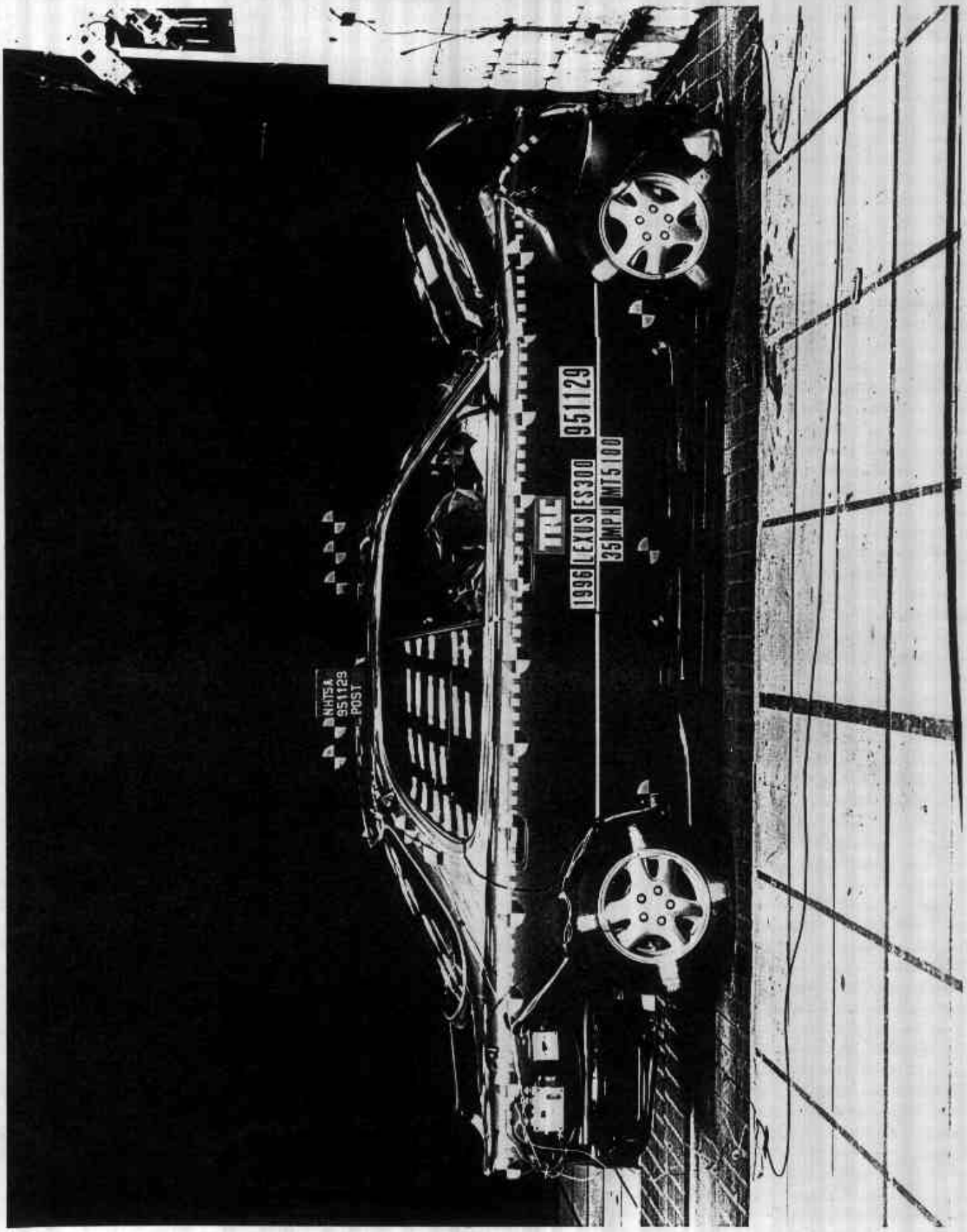


Figure A-8. Post-Test Right Side View

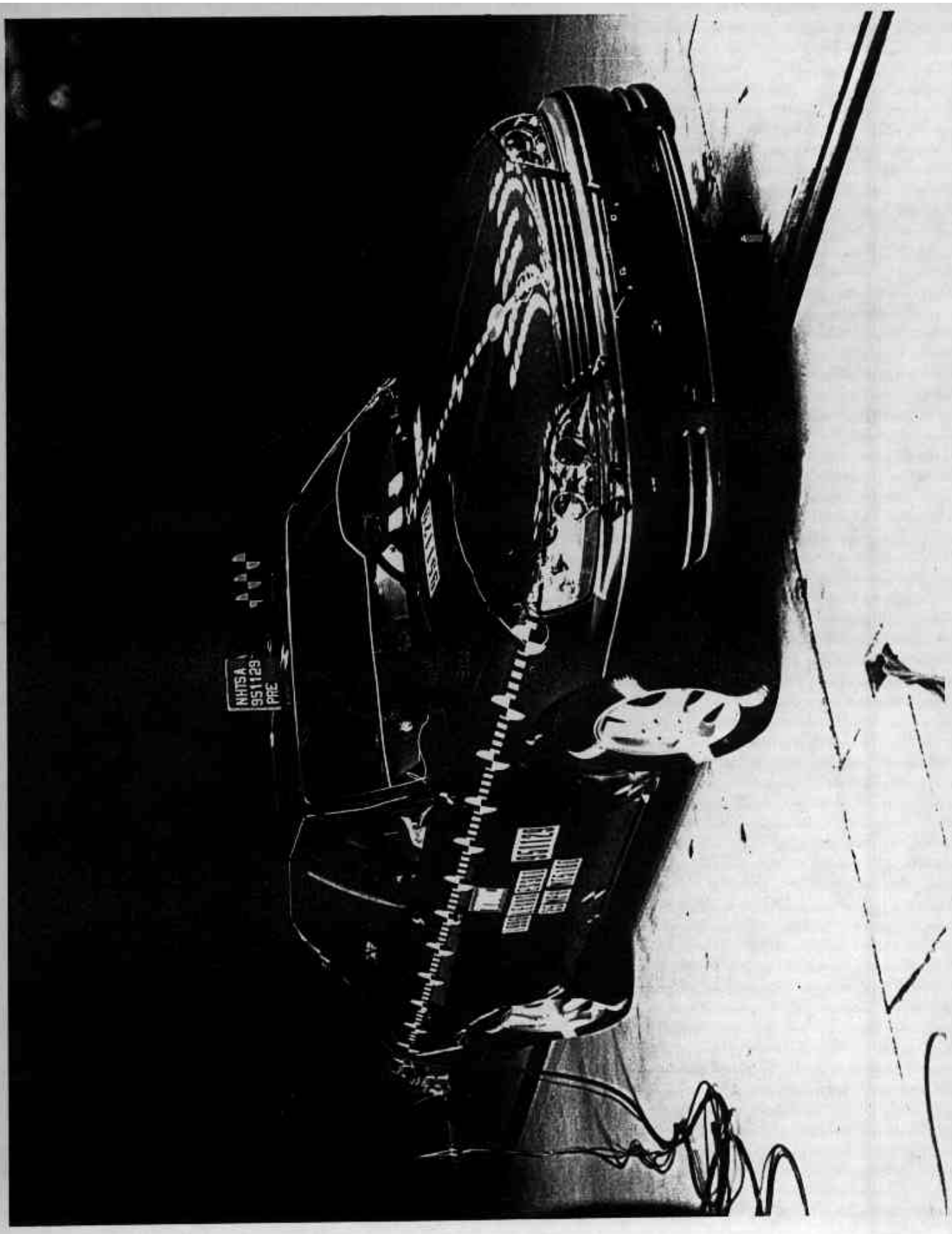


Figure A-9. Pre-Test Right Front Three-Quarter View

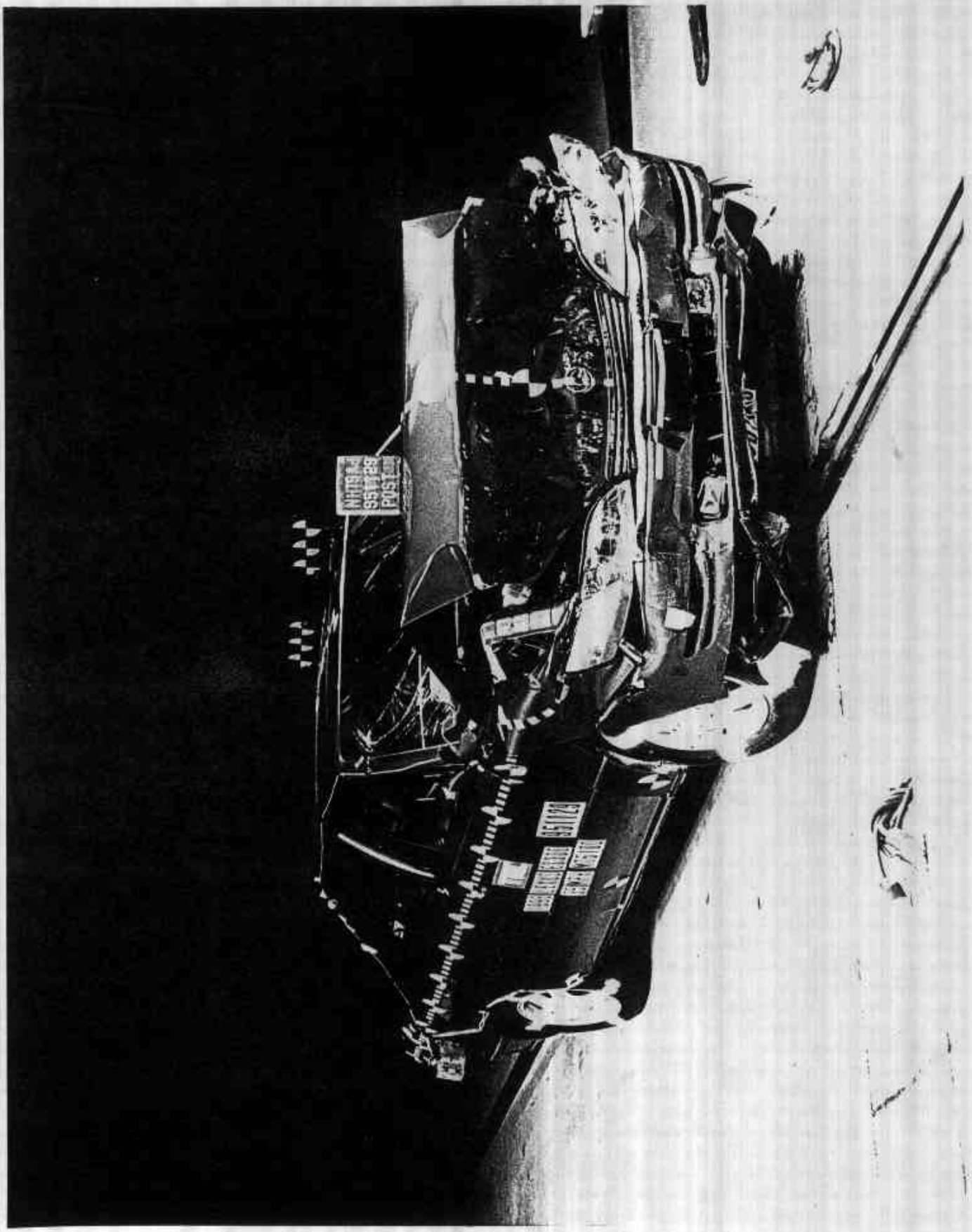


Figure A-10. Post-Test Right Front Three-Quarter View

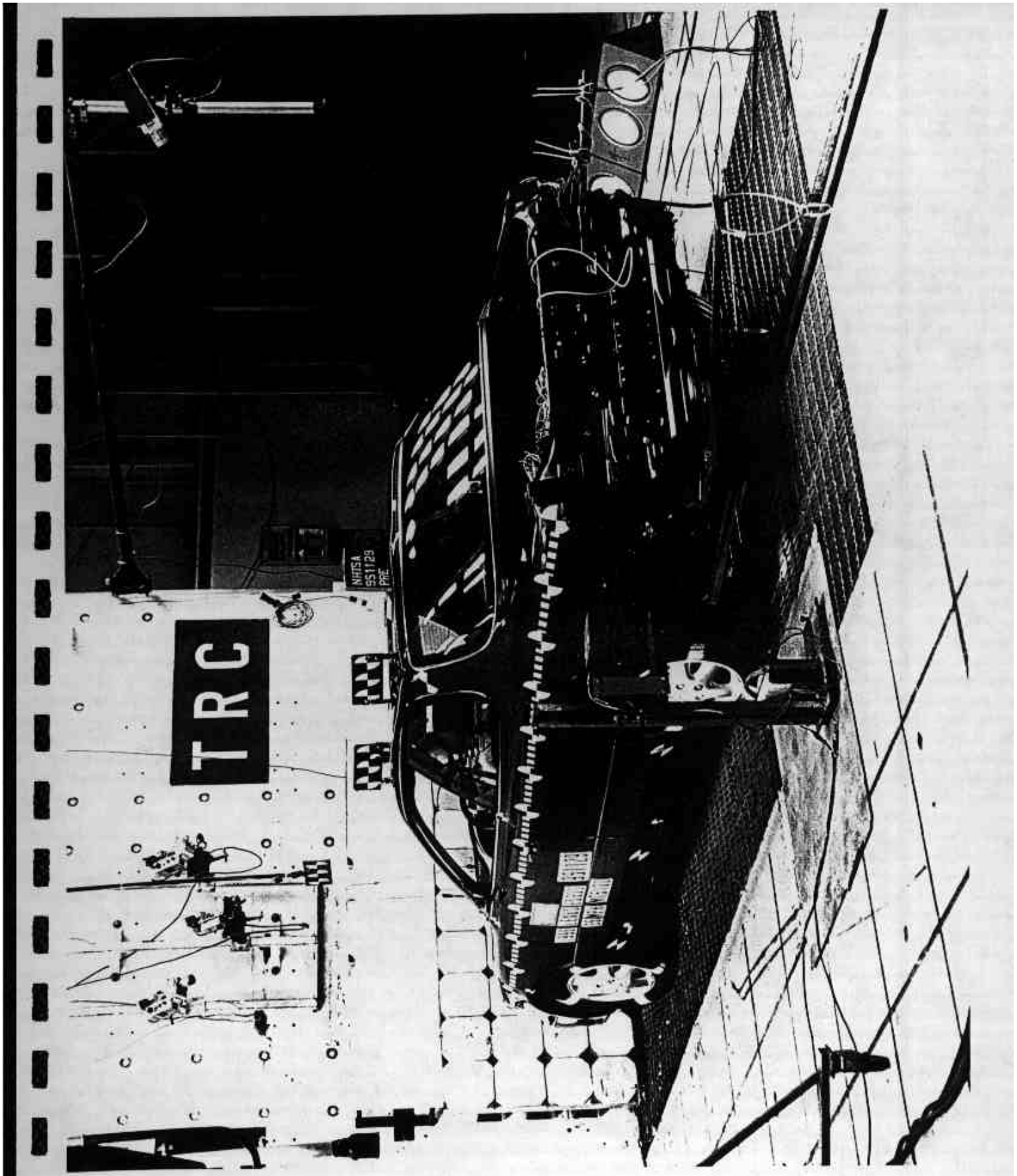


Figure A-11. Pre-Test Left Rear Three-Quarter View

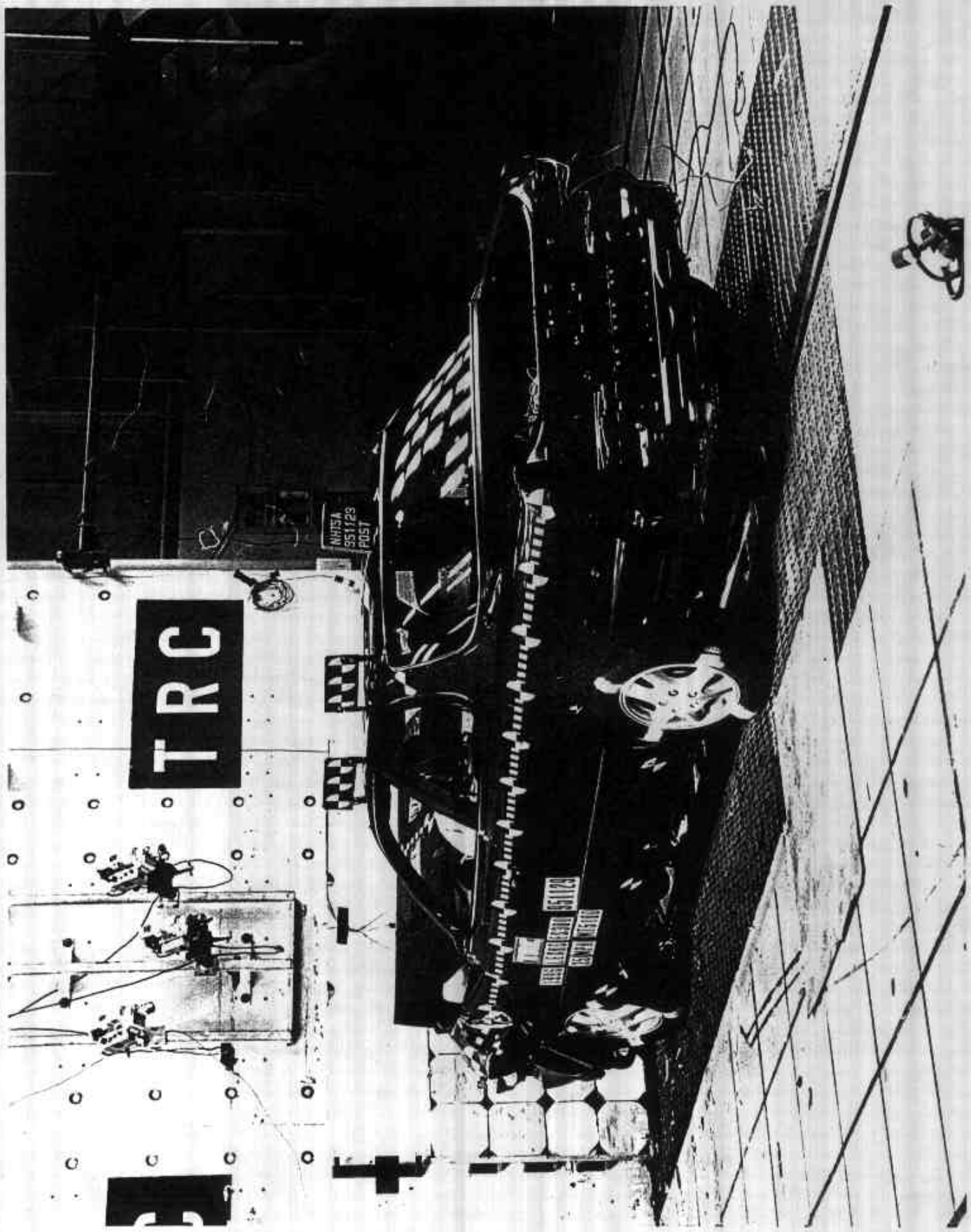


Figure A-12. Post-Test Left Rear Three-Quarter View

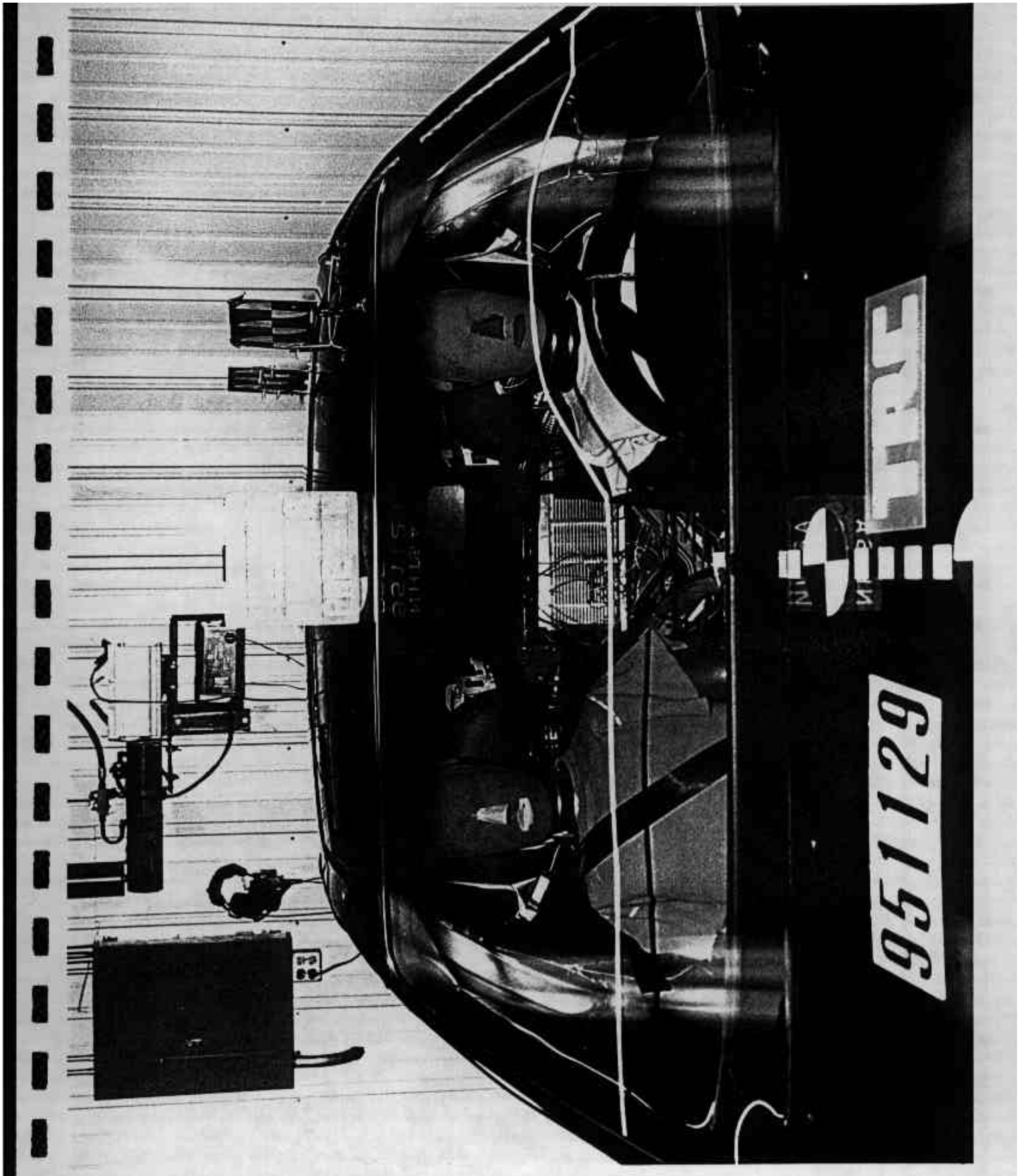


Figure A-13. Pre-Test Windshield View

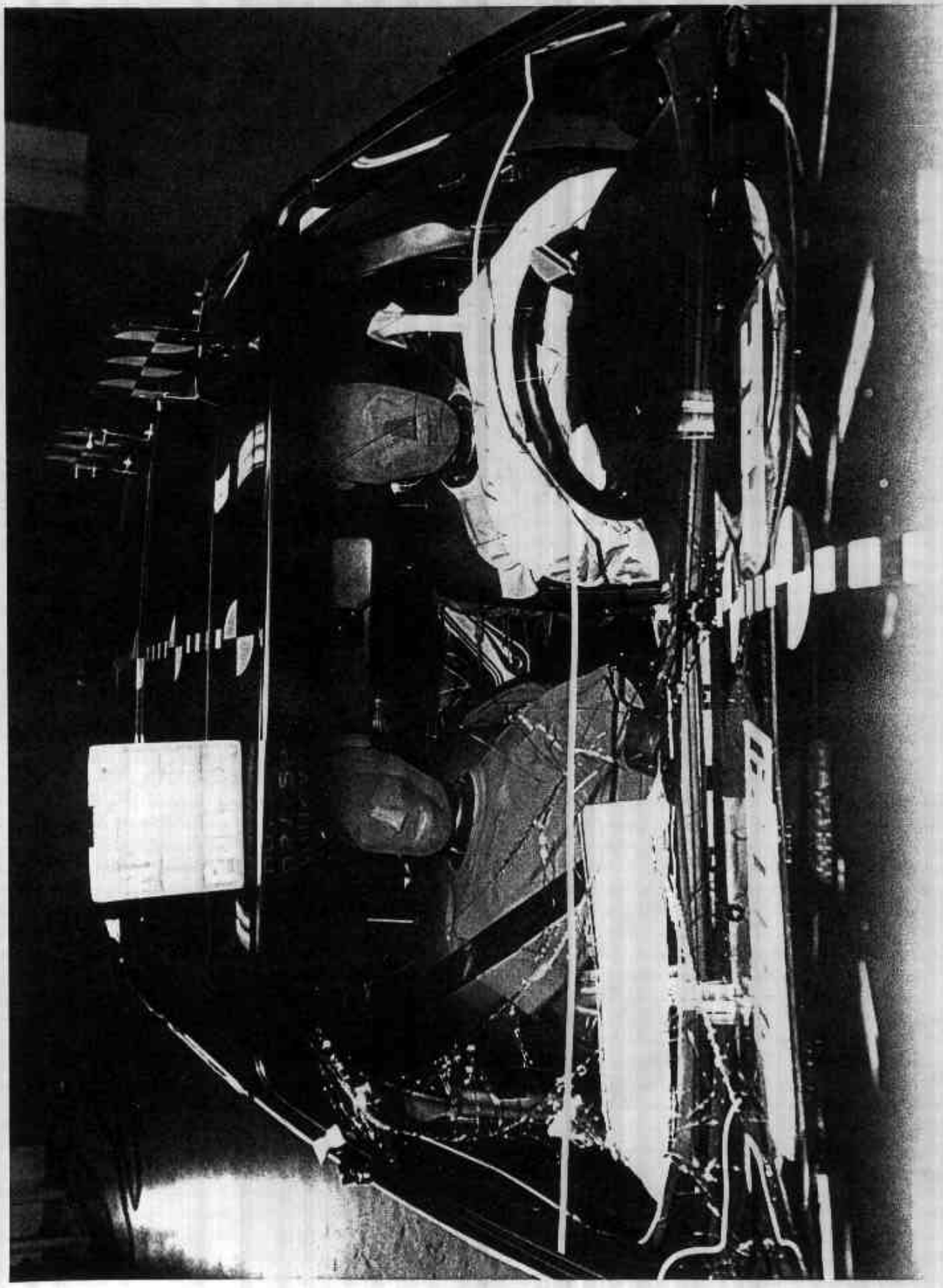


Figure A-14. Post-Test Windshield View

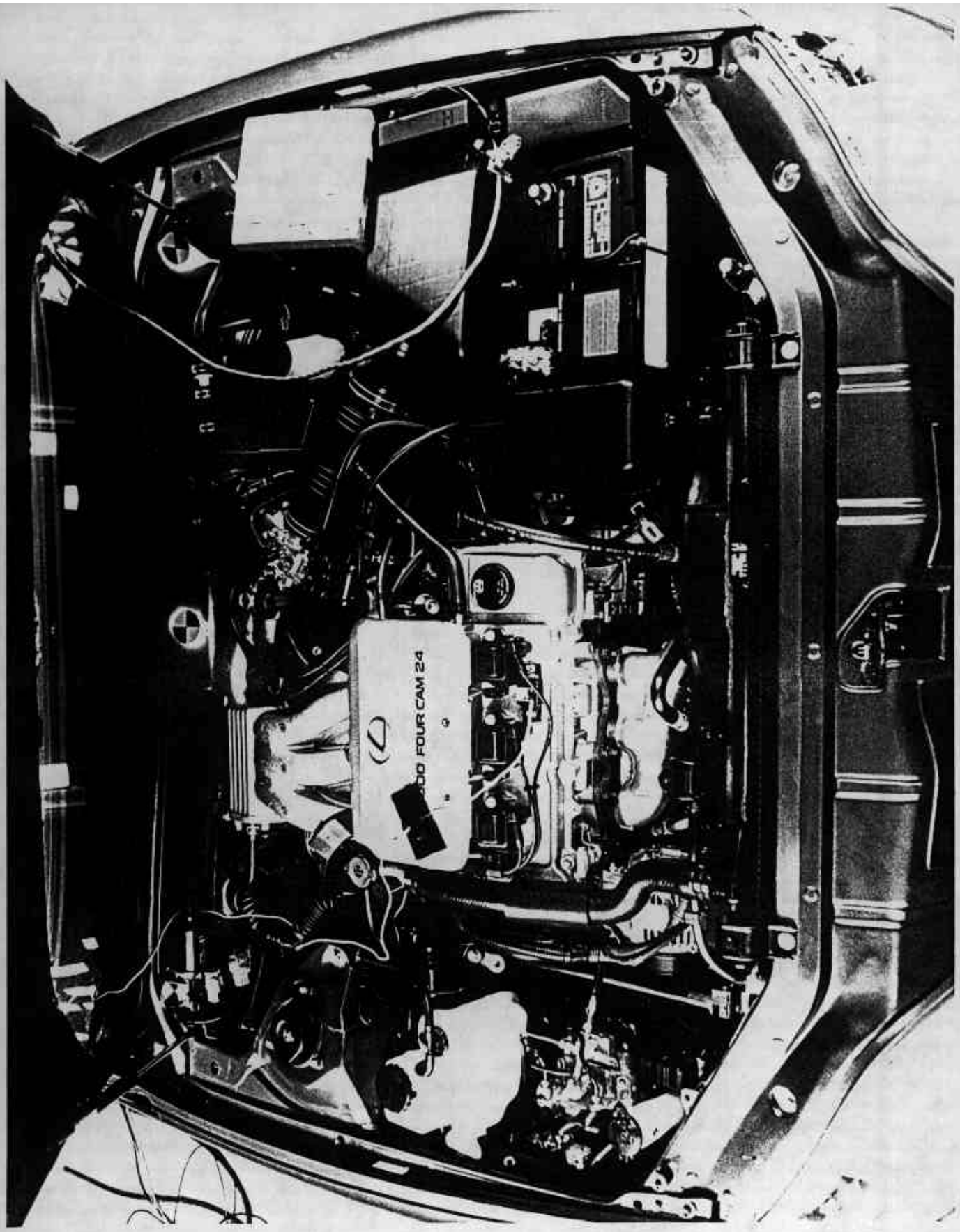


Figure A-15. Pre-Test Engine Compartment View

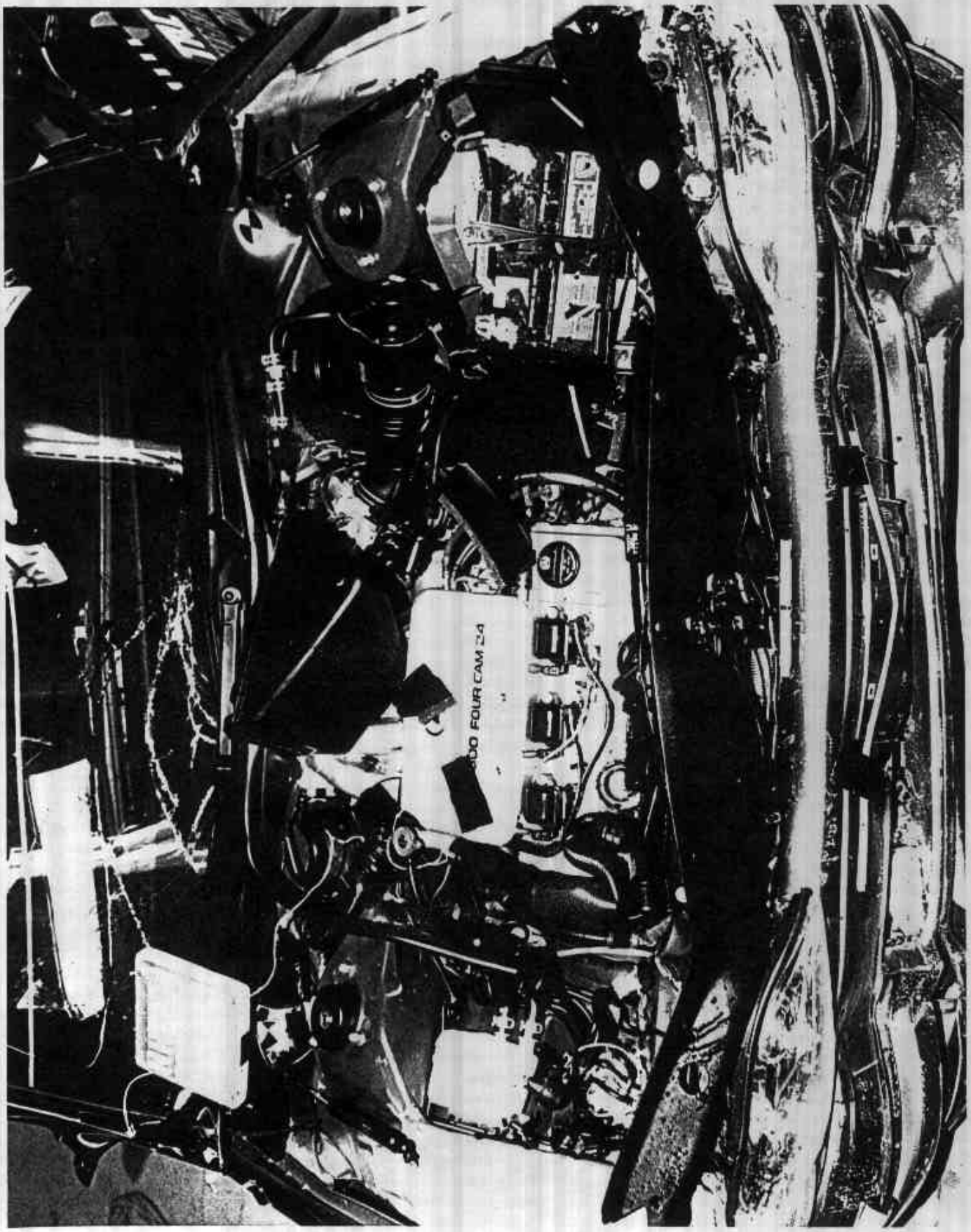


Figure A-16. Post-Test Engine Compartment View

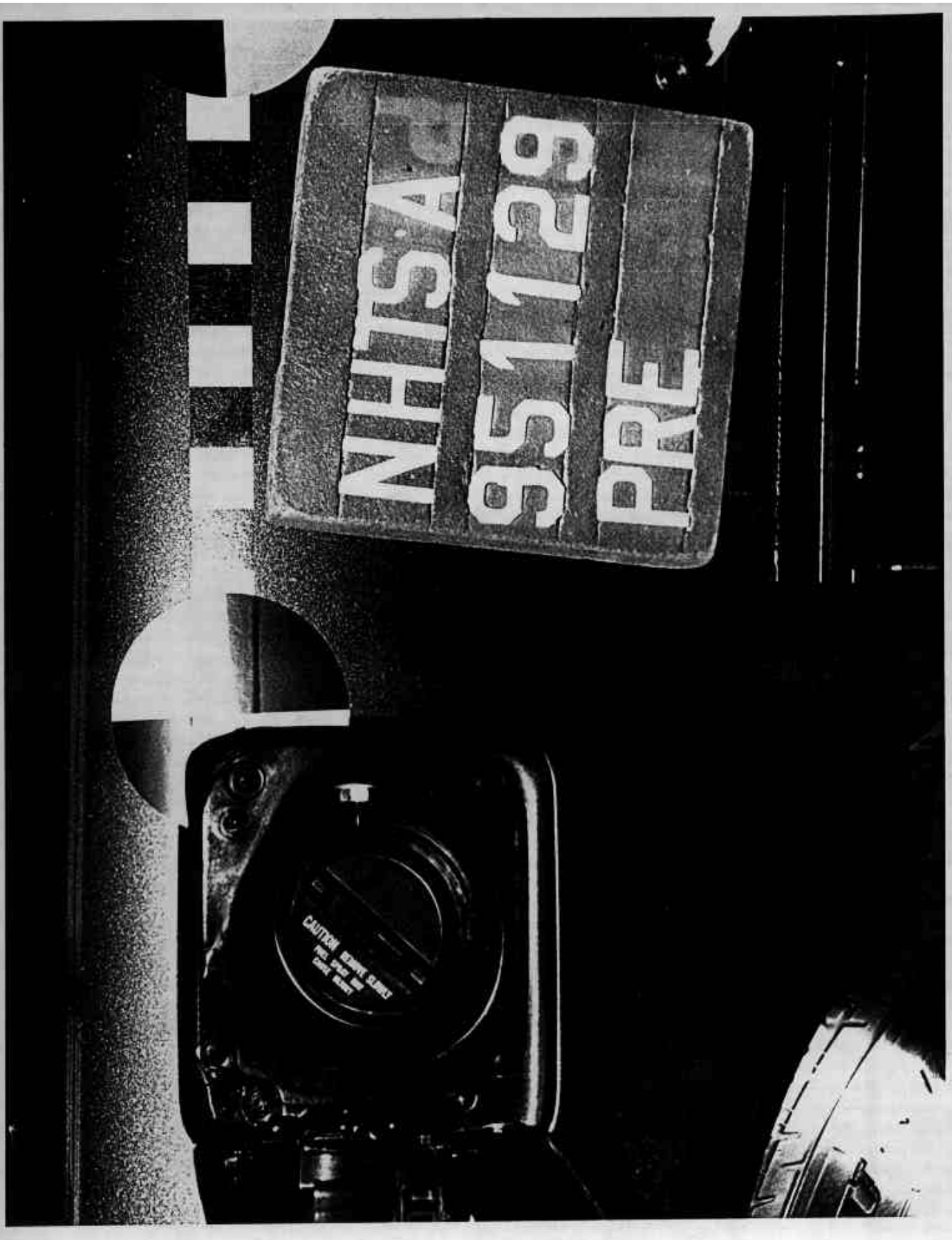


Figure A-17. Pre-Test Fuel Filler Cap View

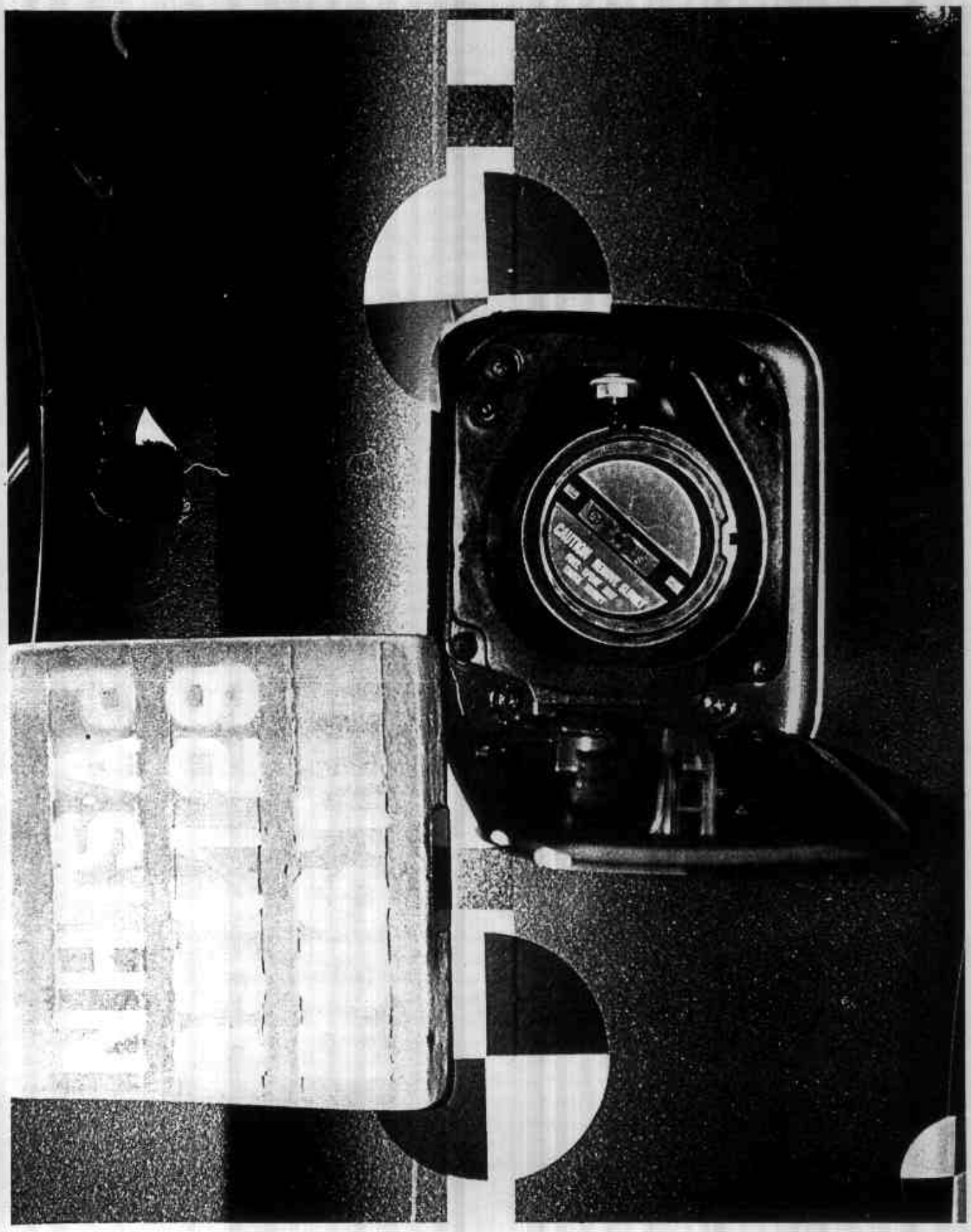


Figure A-18. Post-Test Fuel Filler Cap View

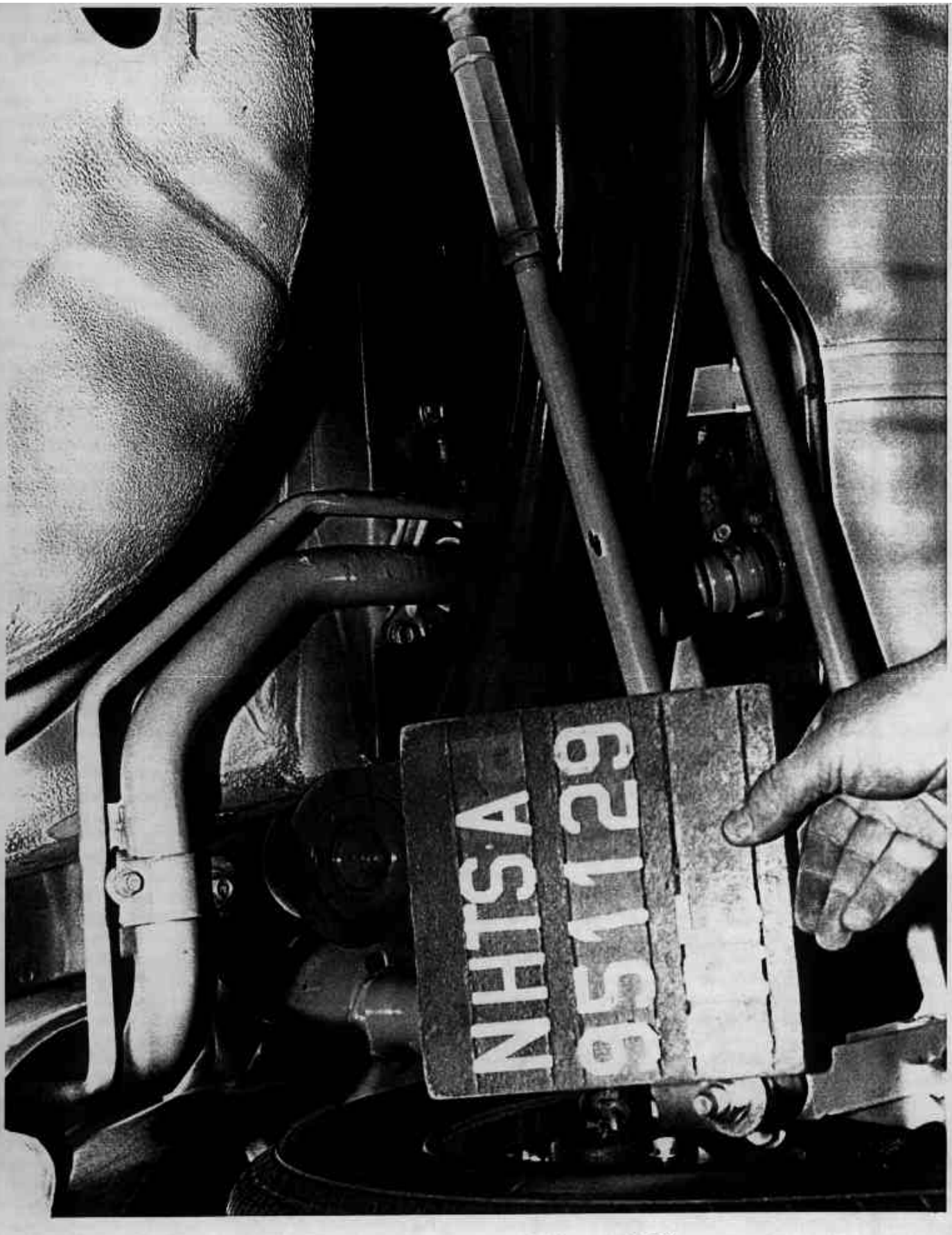


Figure A-19. Pre-Test Fuel Filler Neck View

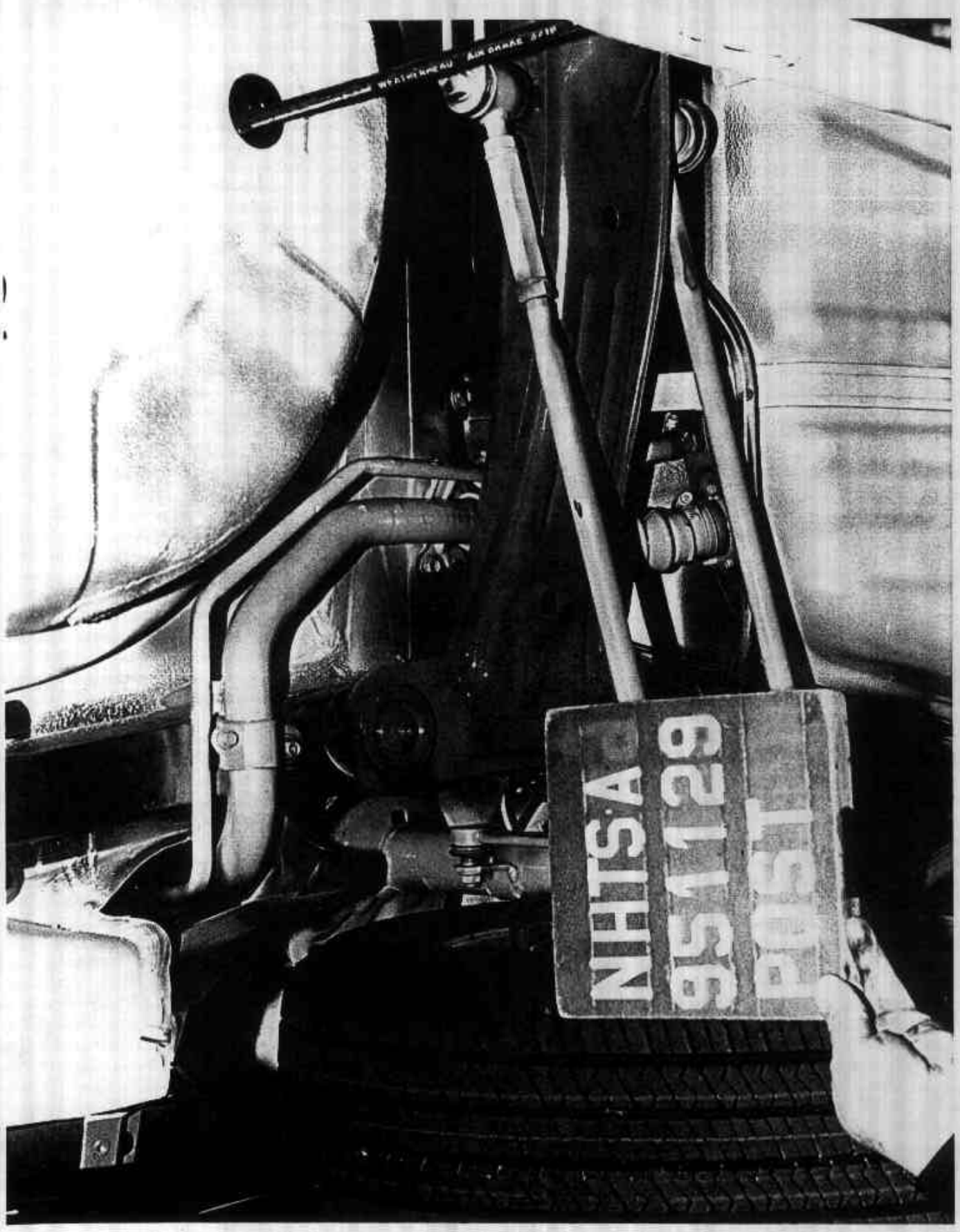


Figure A-20. Post-Test Fuel Filler Neck View

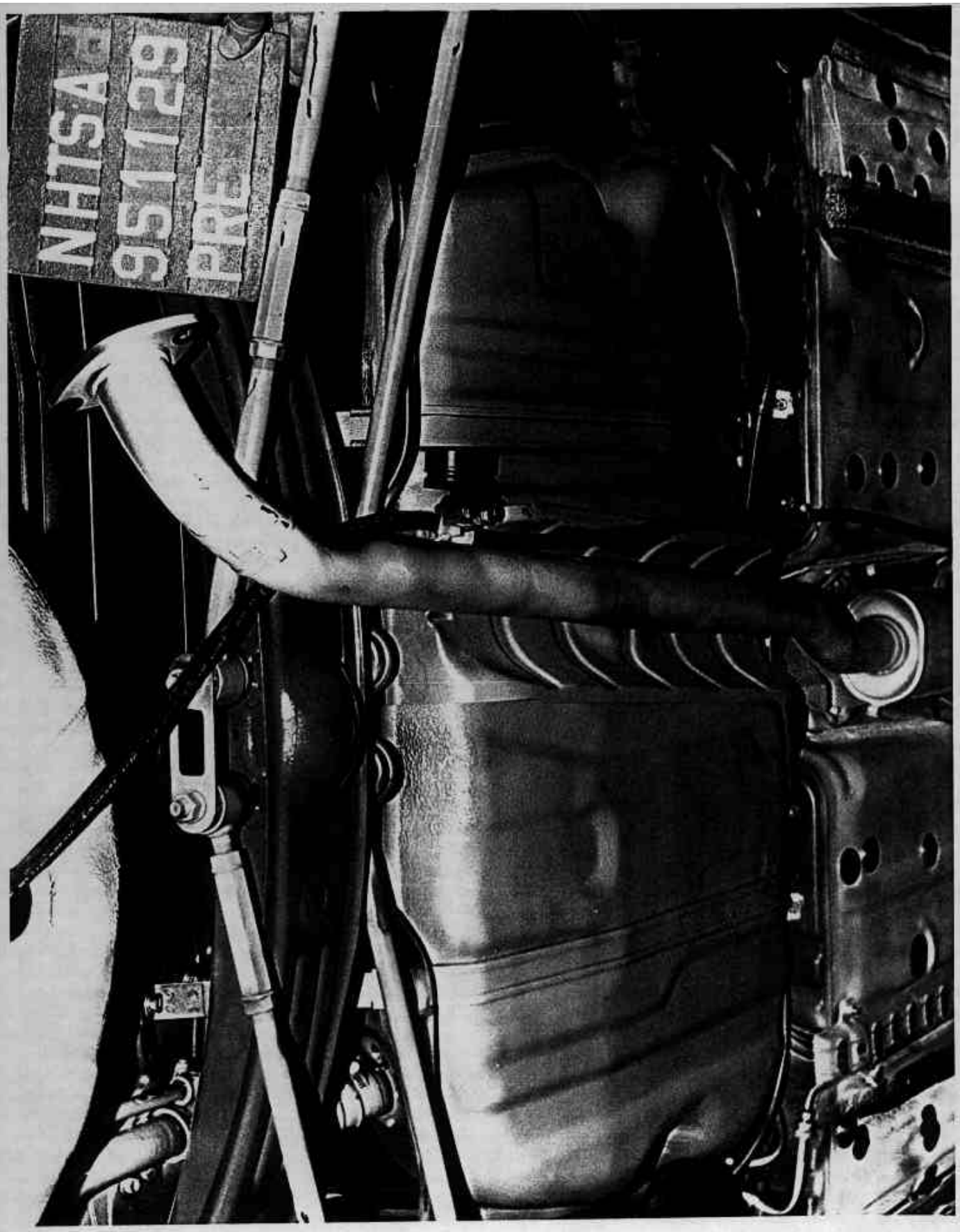


Figure A-21. Pre-Test Fuel Tank View

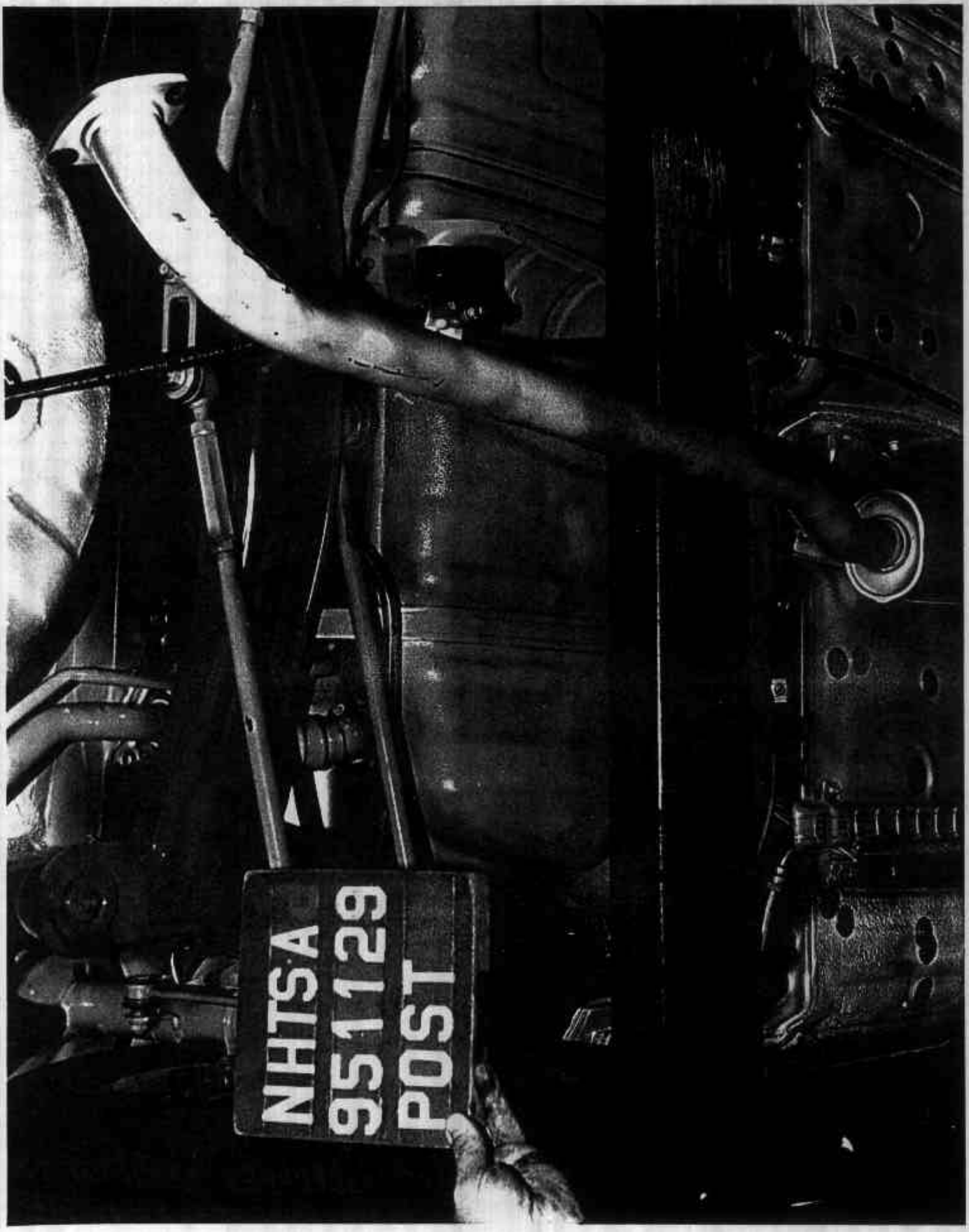


Figure A-22. Post-Test Fuel Tank View

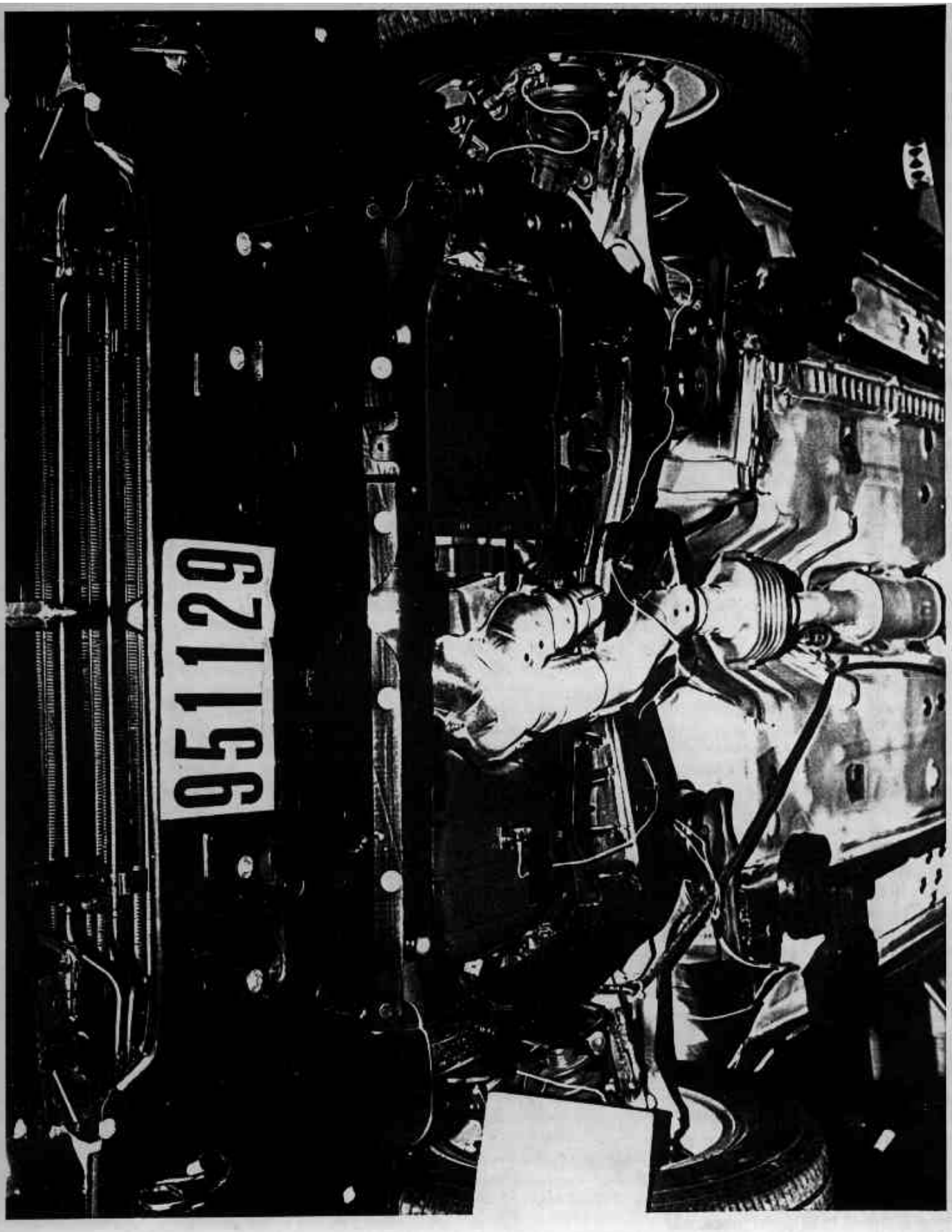


Figure A-23. Pre-Test Front Underbody View

Figure A-24. Post-Test Front Underbody View

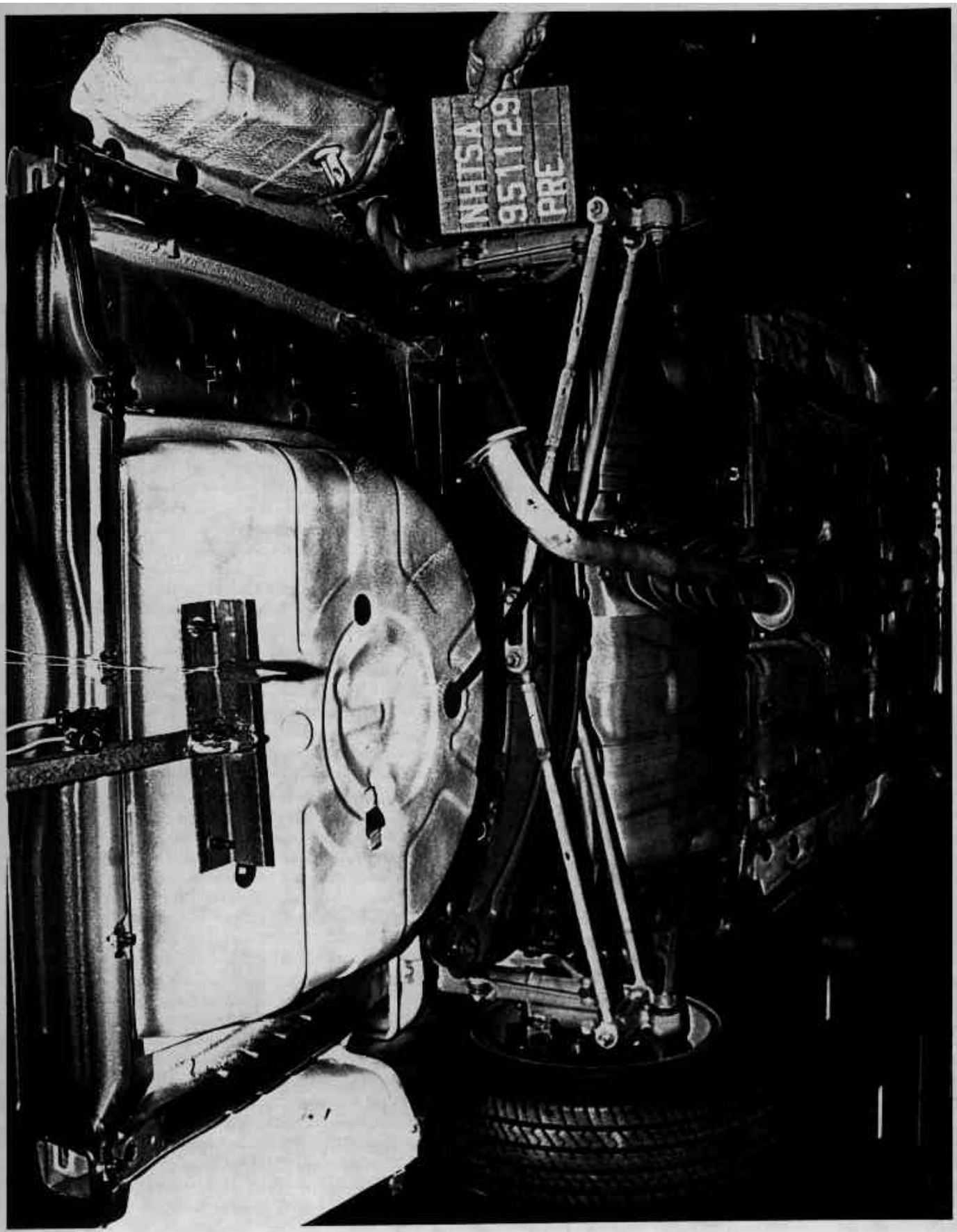


Figure A-25. Pre-Test Rear Underbody View

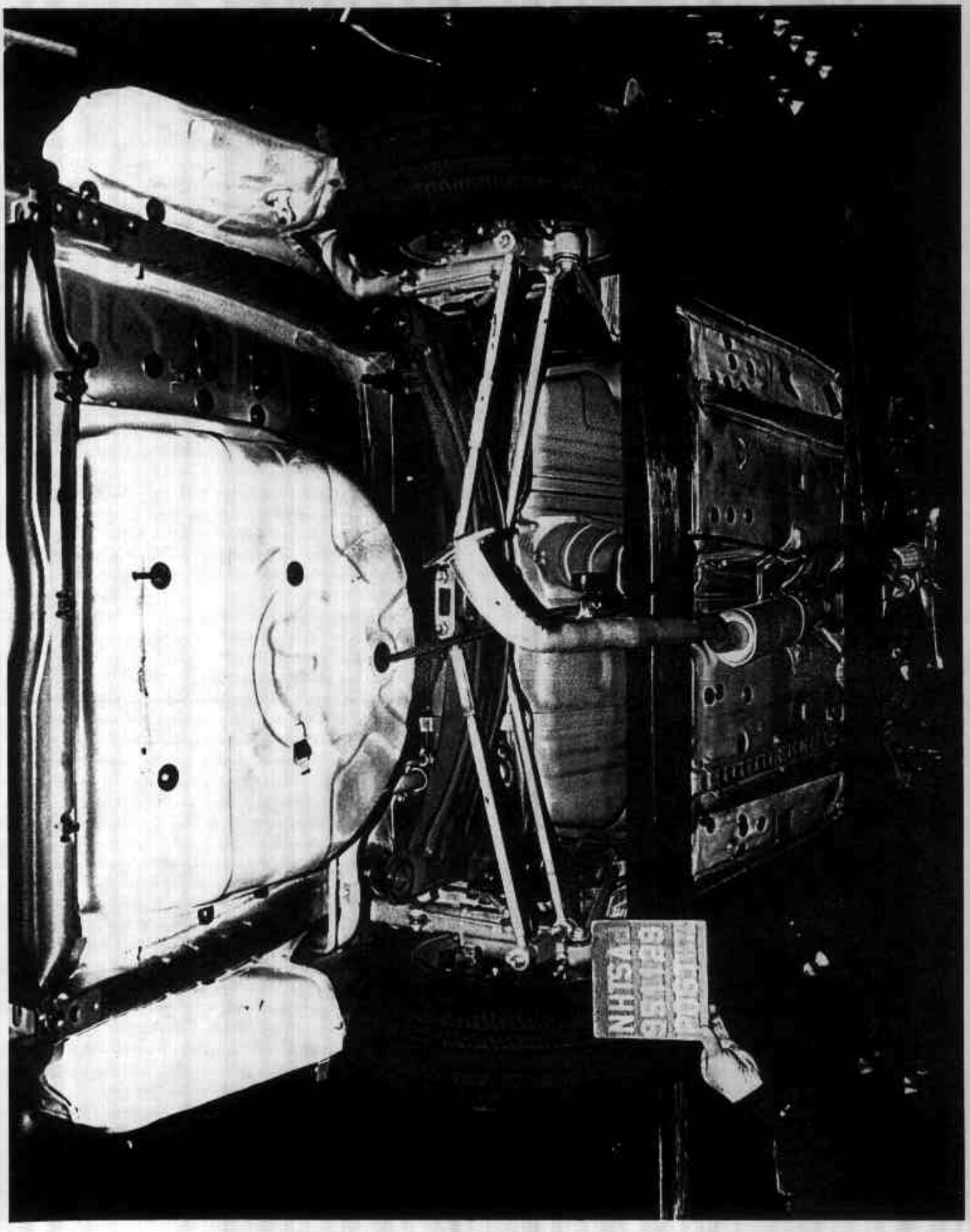


Figure A-26. Post-Test Rear Underbody View

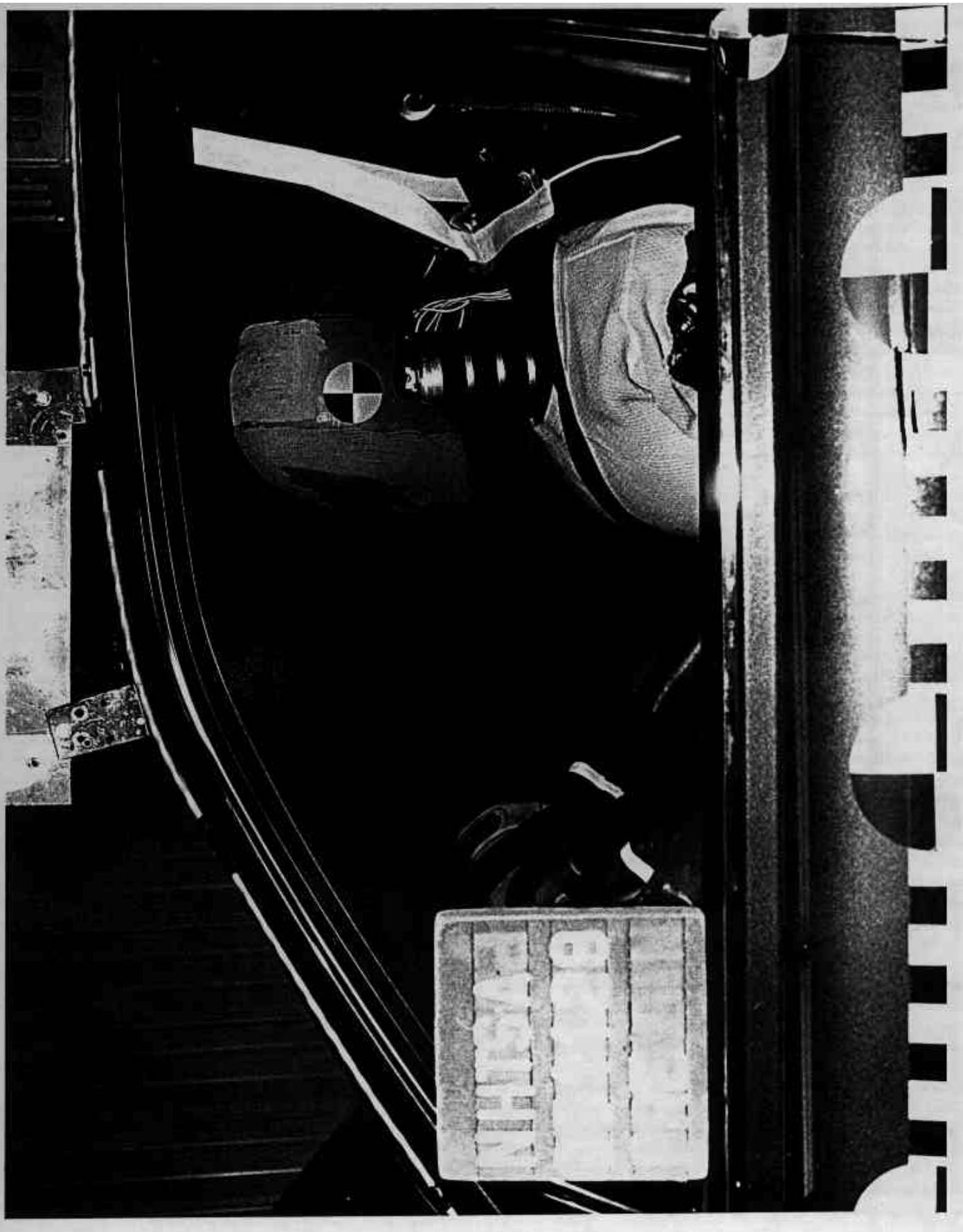


Figure A-27. Pre-Test Driver Dummy Position View

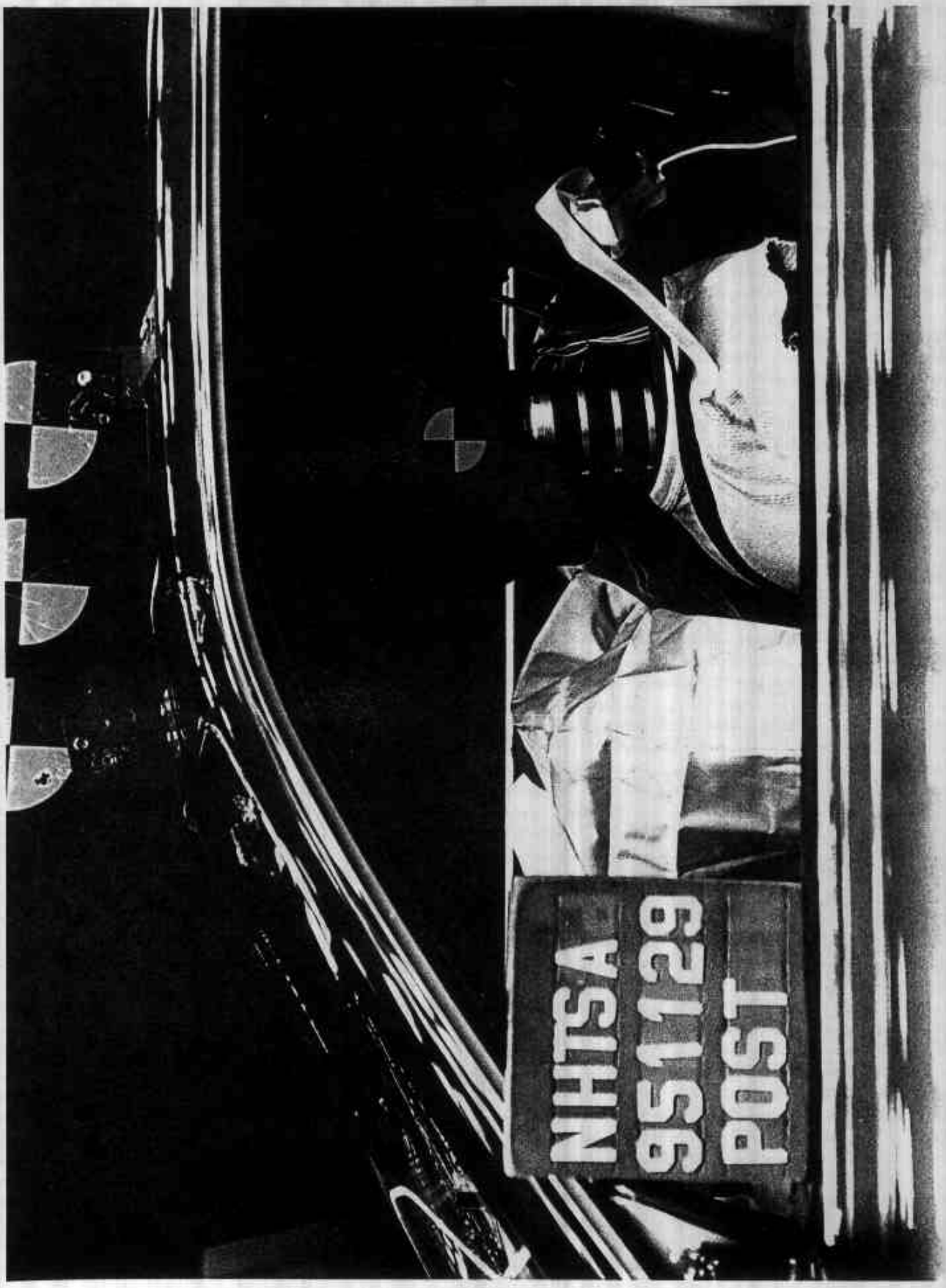


Figure A-28. Post-Test Driver Dummy Position View

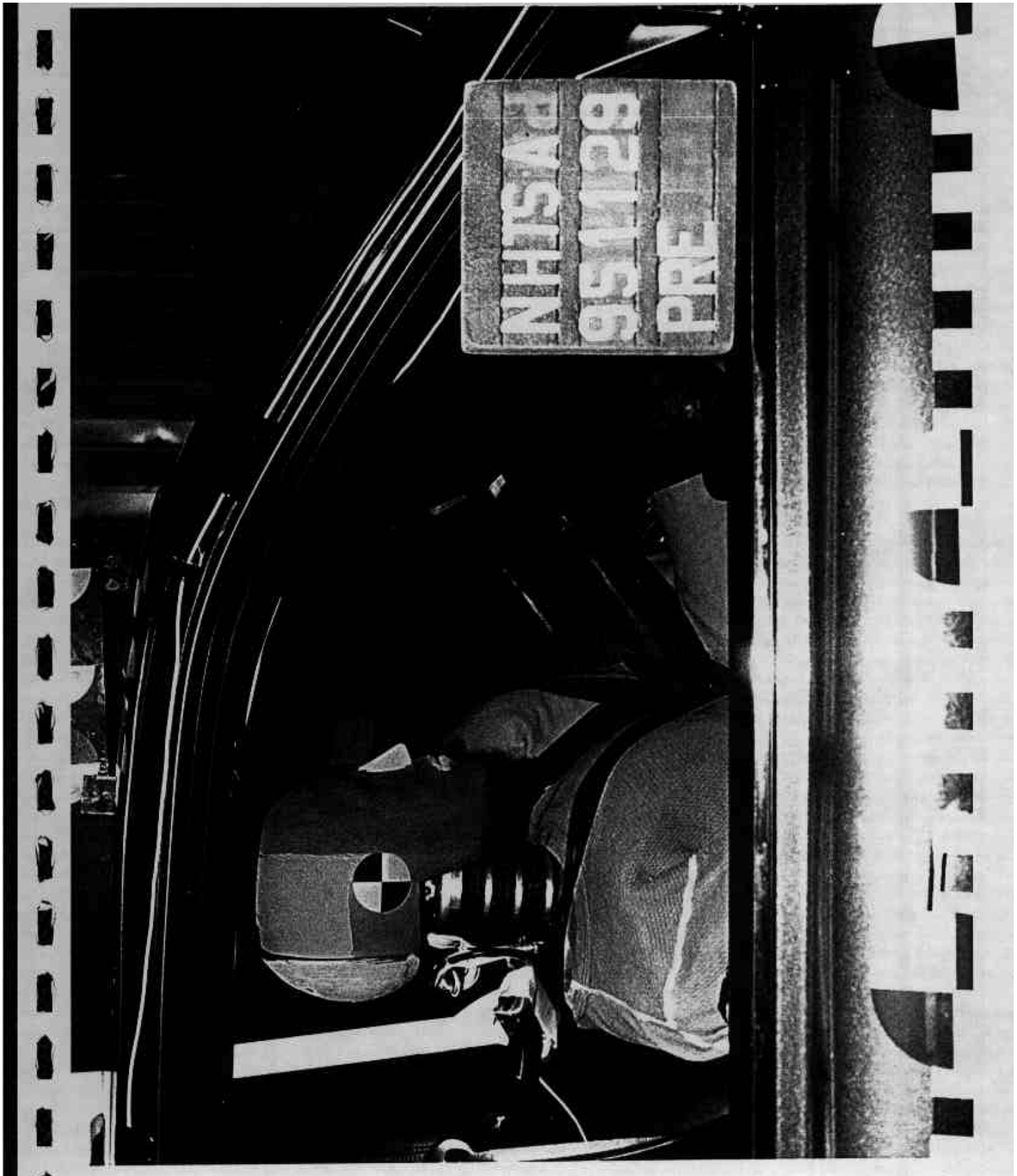


Figure A-29. Pre-Test Passenger Dummy Position View

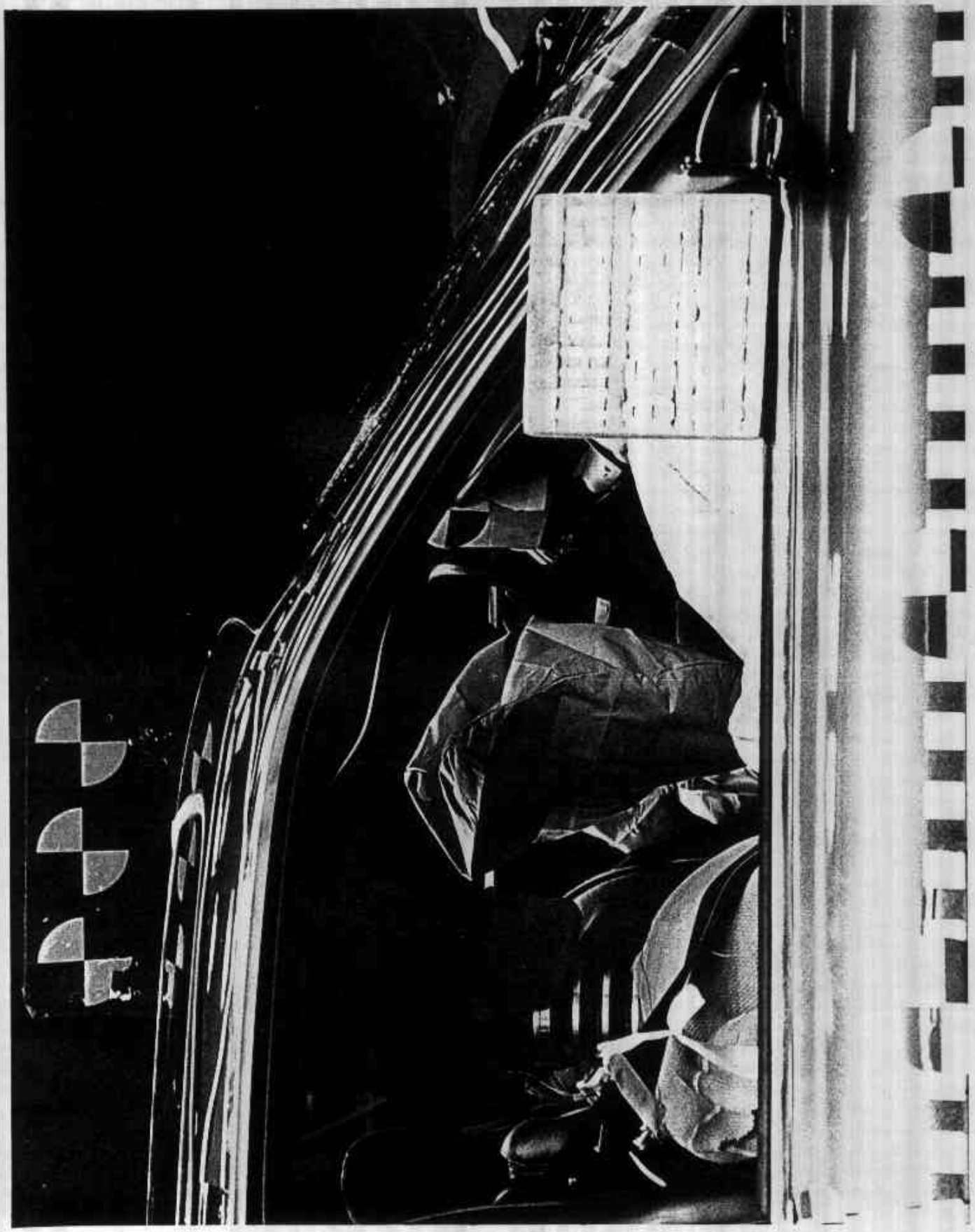


Figure A-30. Post-Test Passenger Dummy Position View

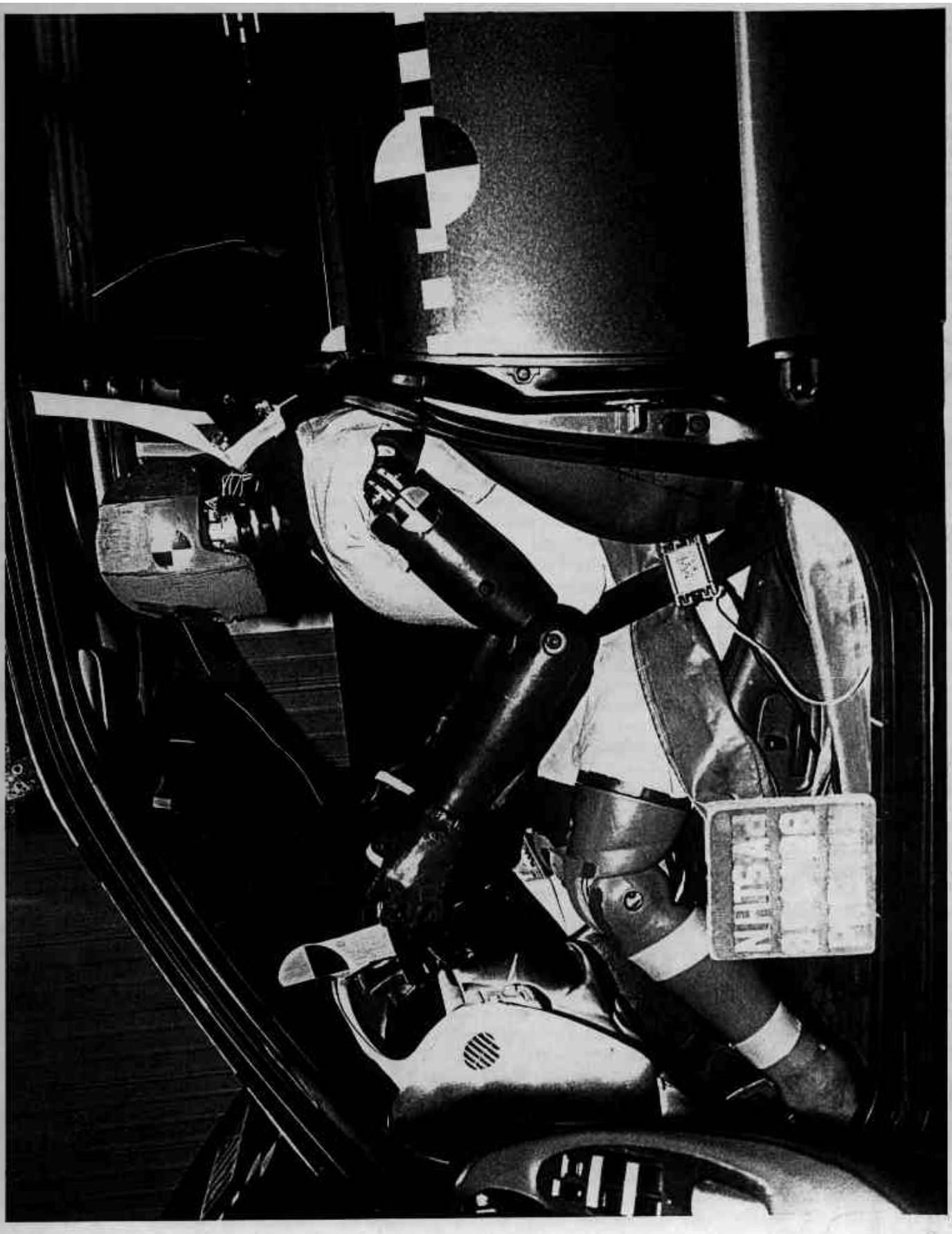


Figure A-31. Pre-Test Driver Dummy & Vehicle Interior - View 1

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

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

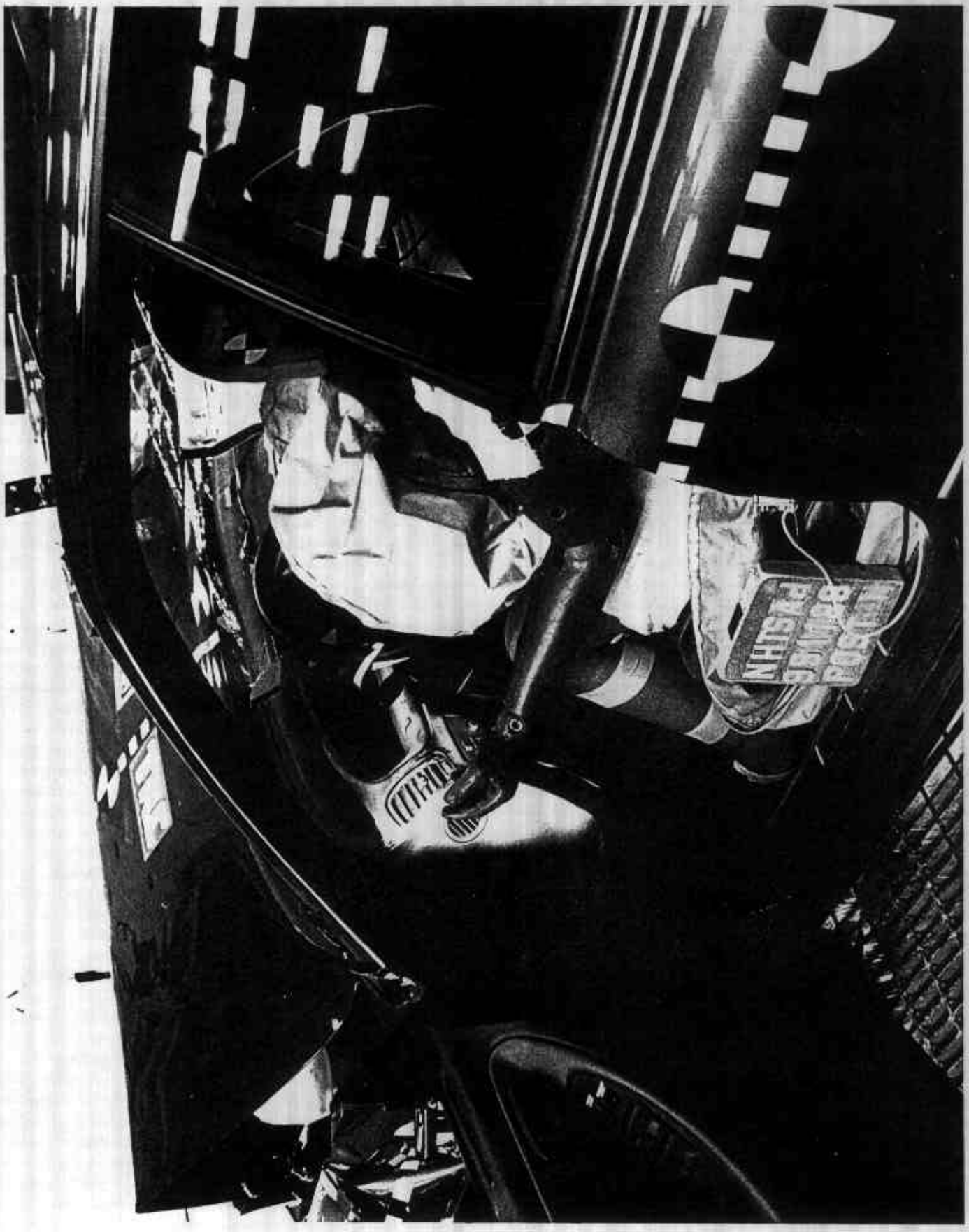


Figure A-34. Post-Test Driver Dummy & Vehicle Interior - View 2

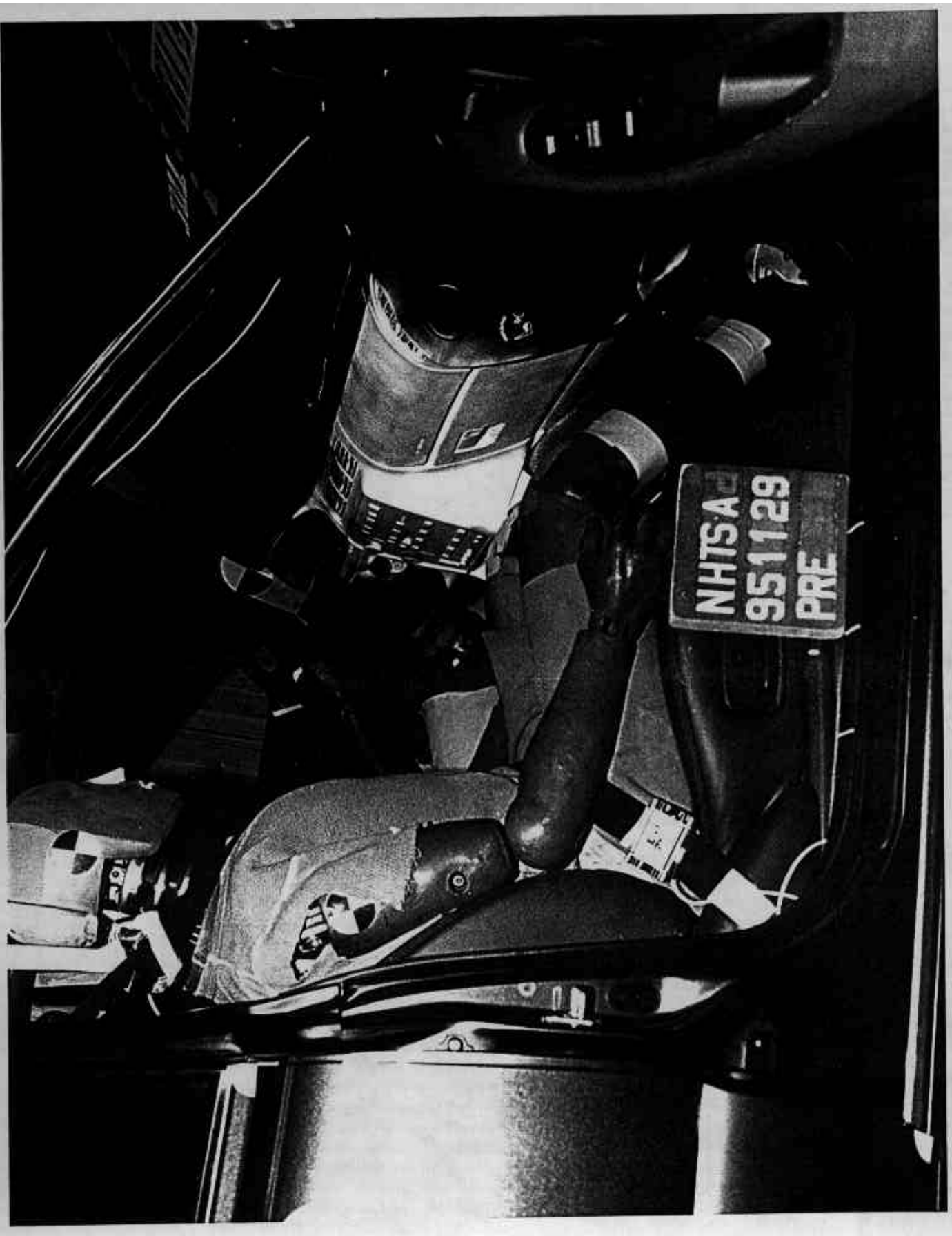


Figure A-35. Pre-Test Passenger Dummy & Vehicle Interior - View 1

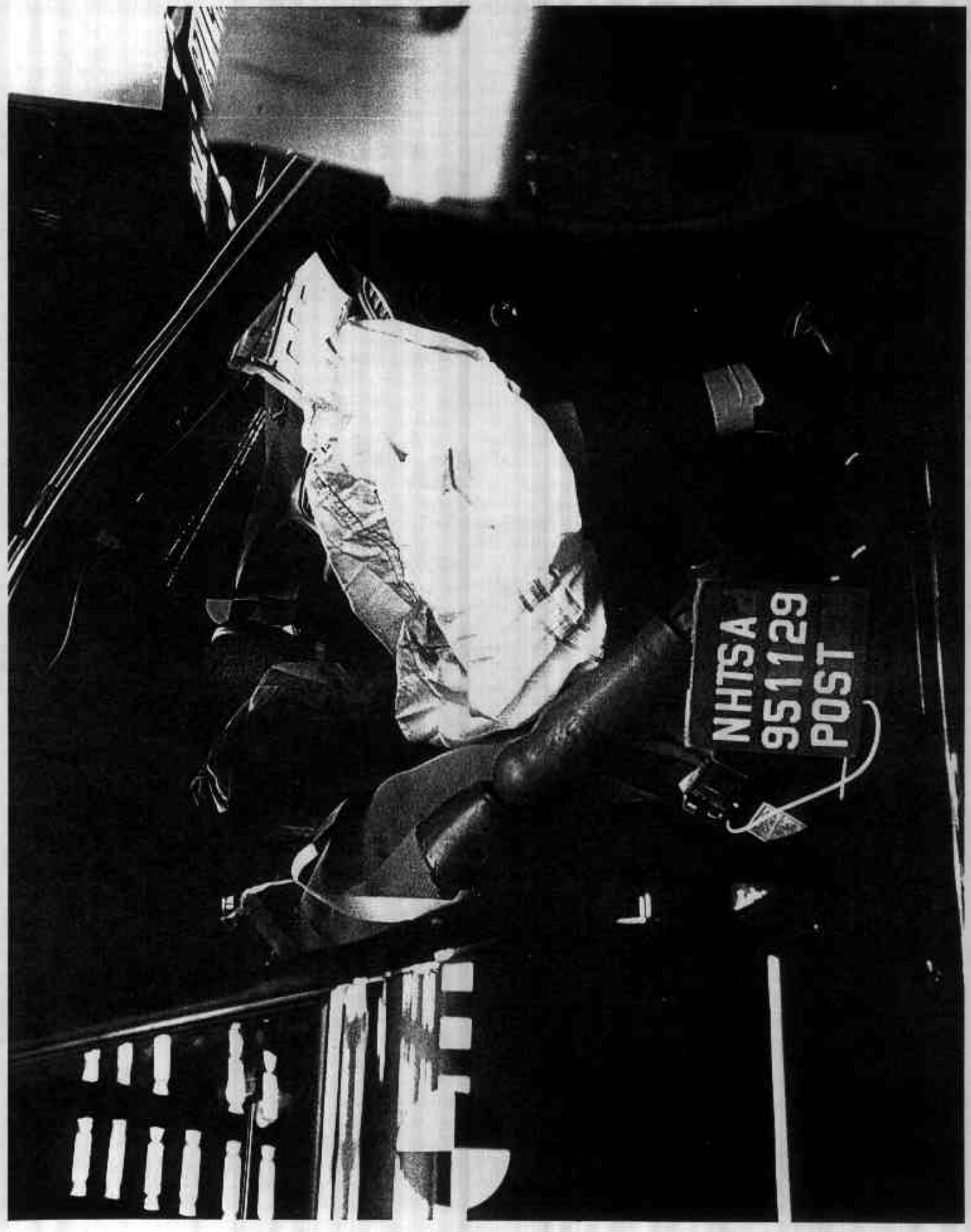


Figure A-36. Post-Test Passenger Dummy & Vehicle Interior - View 1

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

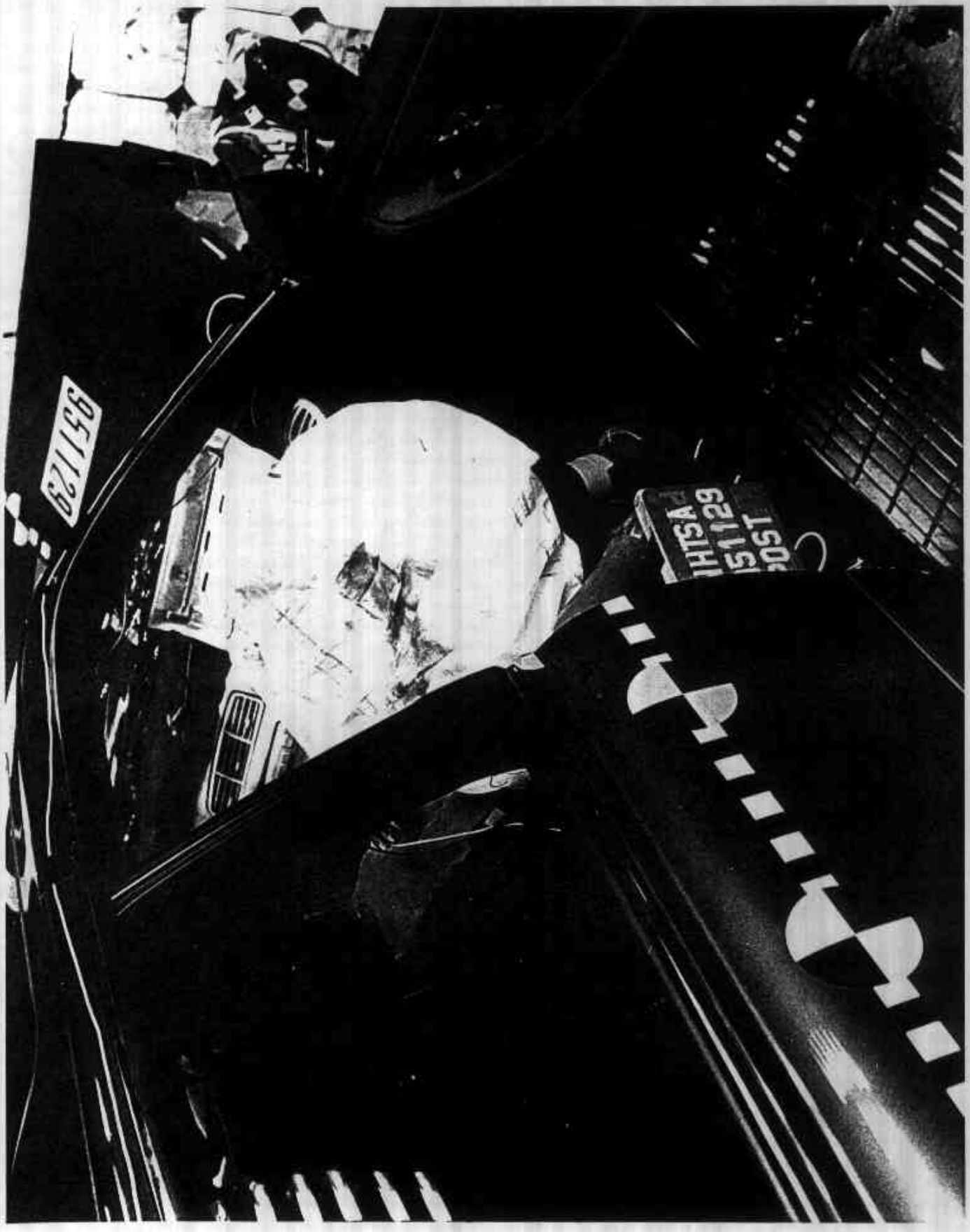


Figure A-38. Post-Test Passenger Dummy & Vehicle Interior - View 2

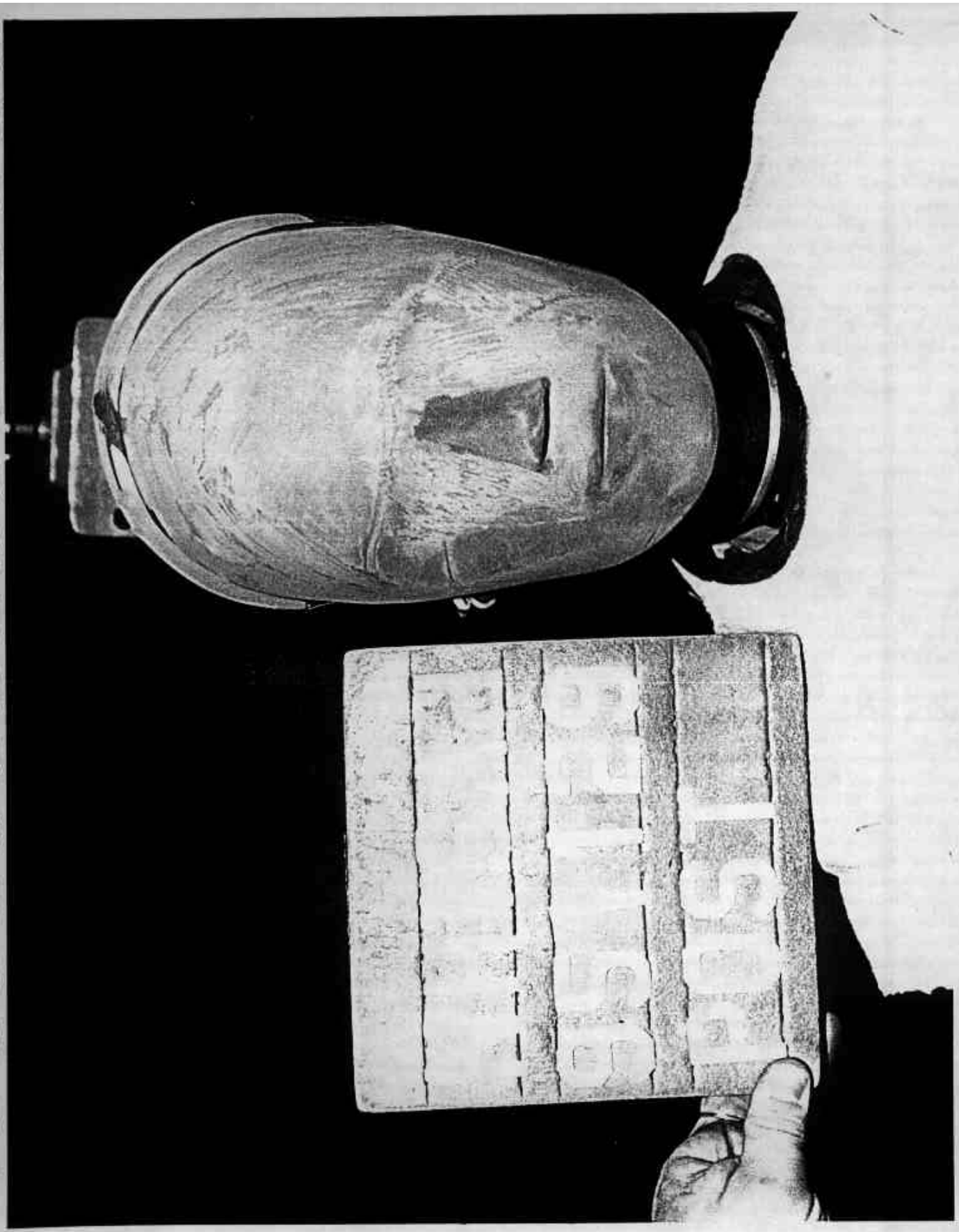


Figure A-39. Post-Test Driver Dummy Head Contact - View 1

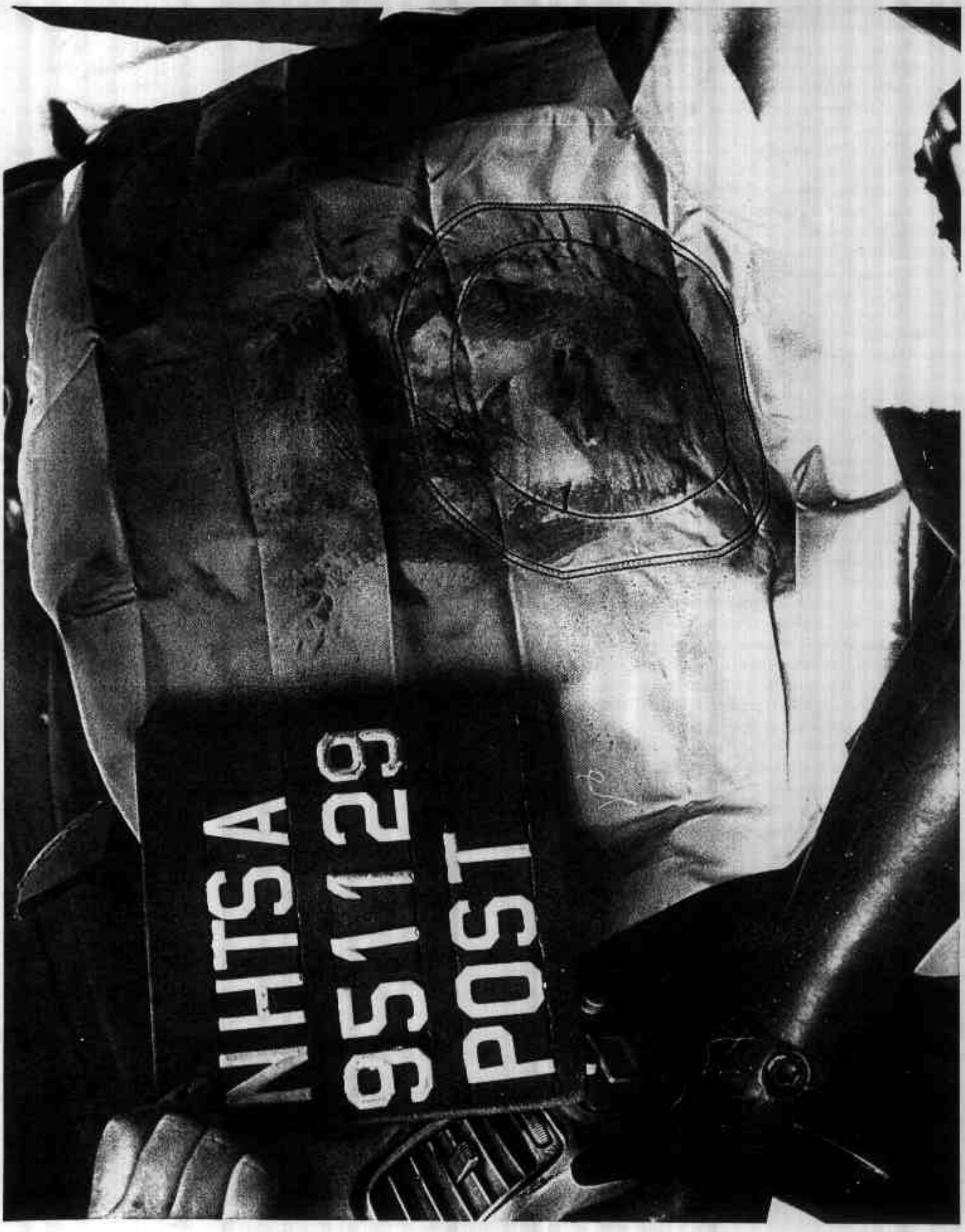


Figure A-40. Post-Test Driver Dummy Head Contact - View 2

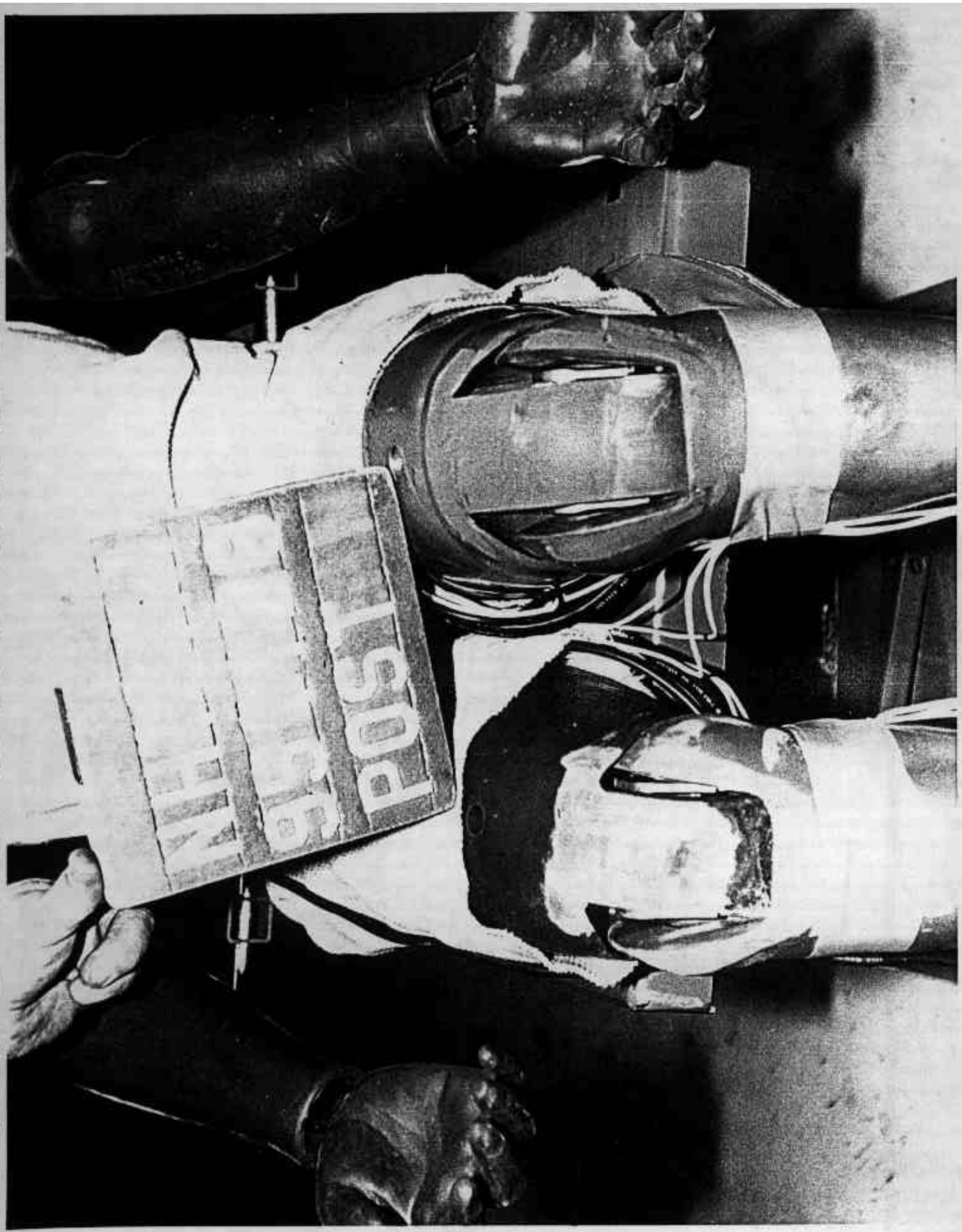


Figure A-41. Post-Test Driver Dummy Knee Contact - View 1

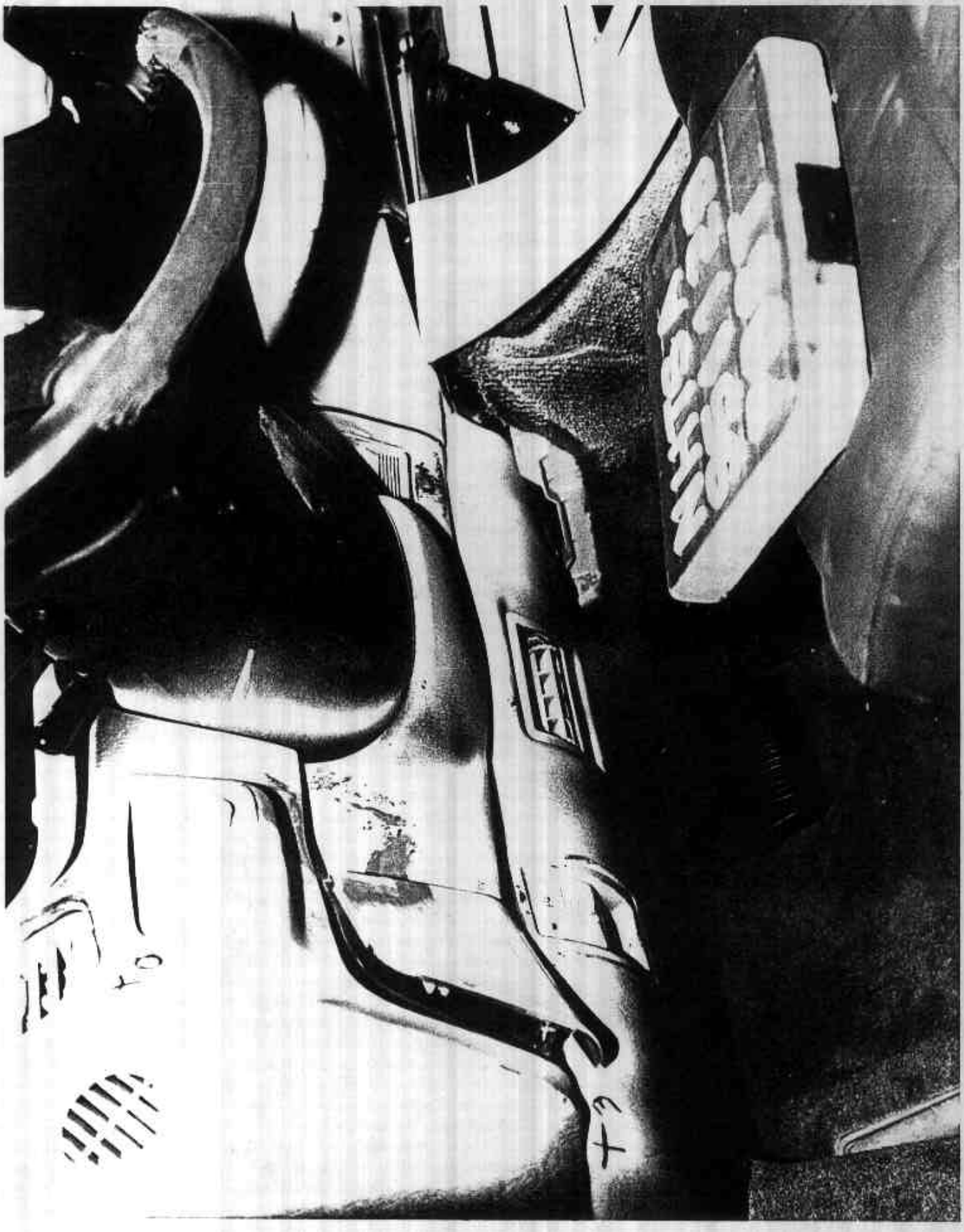


Figure A-42. Post-Test Driver Dummy Knee Contact - View 2

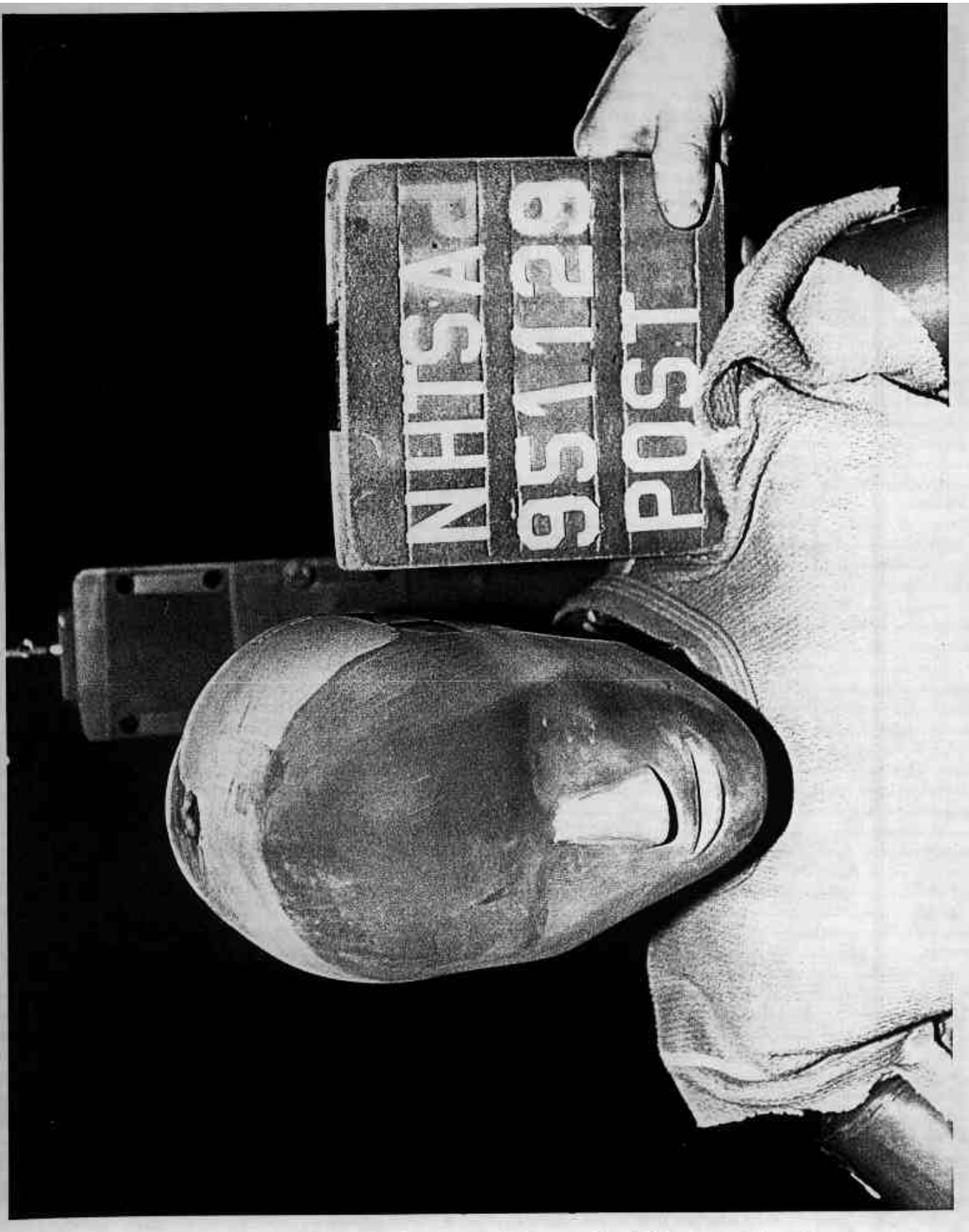


Figure A-43. Post-Test Passenger Dummy Head Contact - View 1

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

Figure A-45. Post-Test Passenger Dummy Head Contact - View 3

Figure A-46. Post-Test Passenger Dummy Knee Contact - View 1

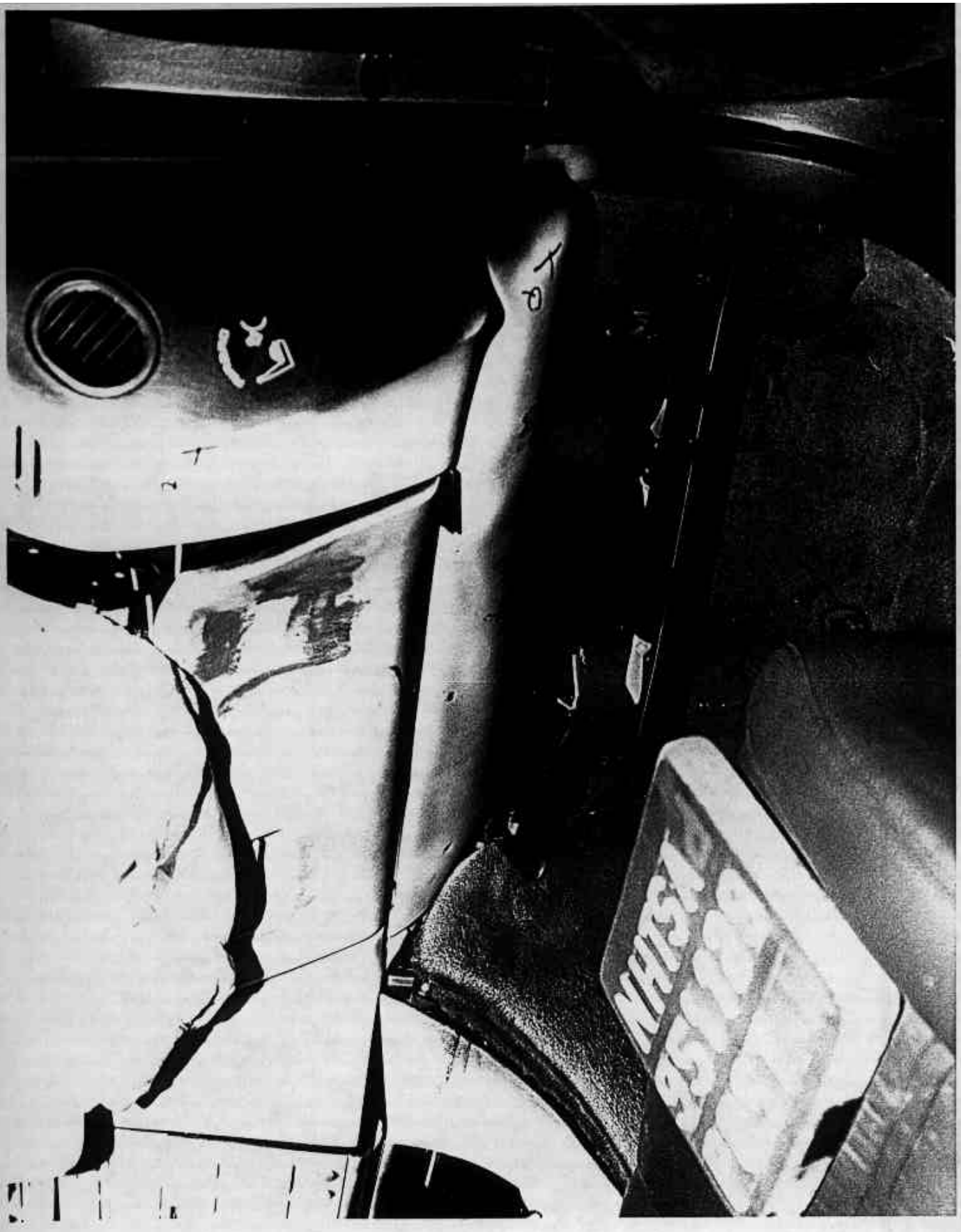


Figure A-47. Post-Test Passenger Dummy Knee Contact - View 2

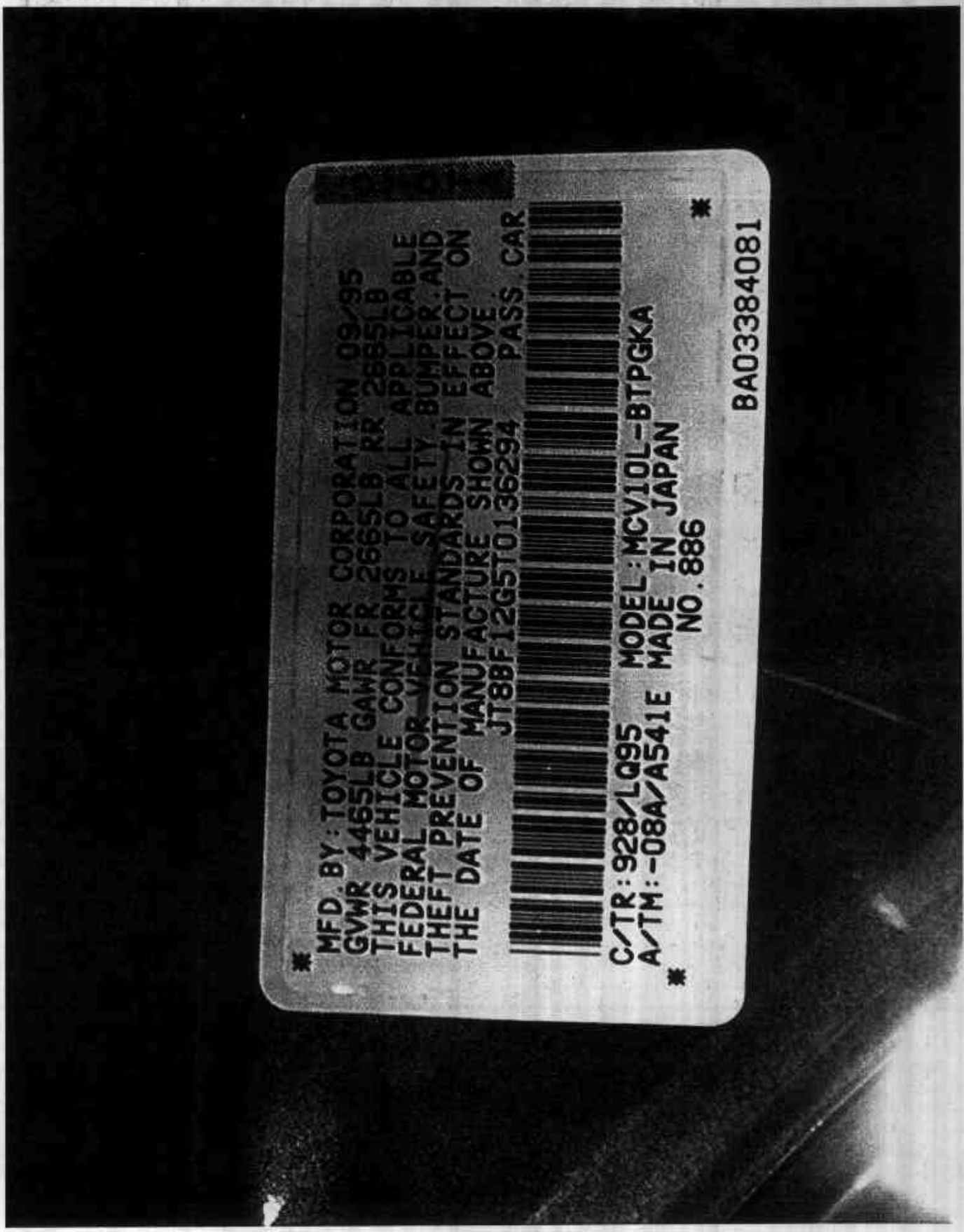


Figure A-48. Pre-Test Vehicle Certification Label View

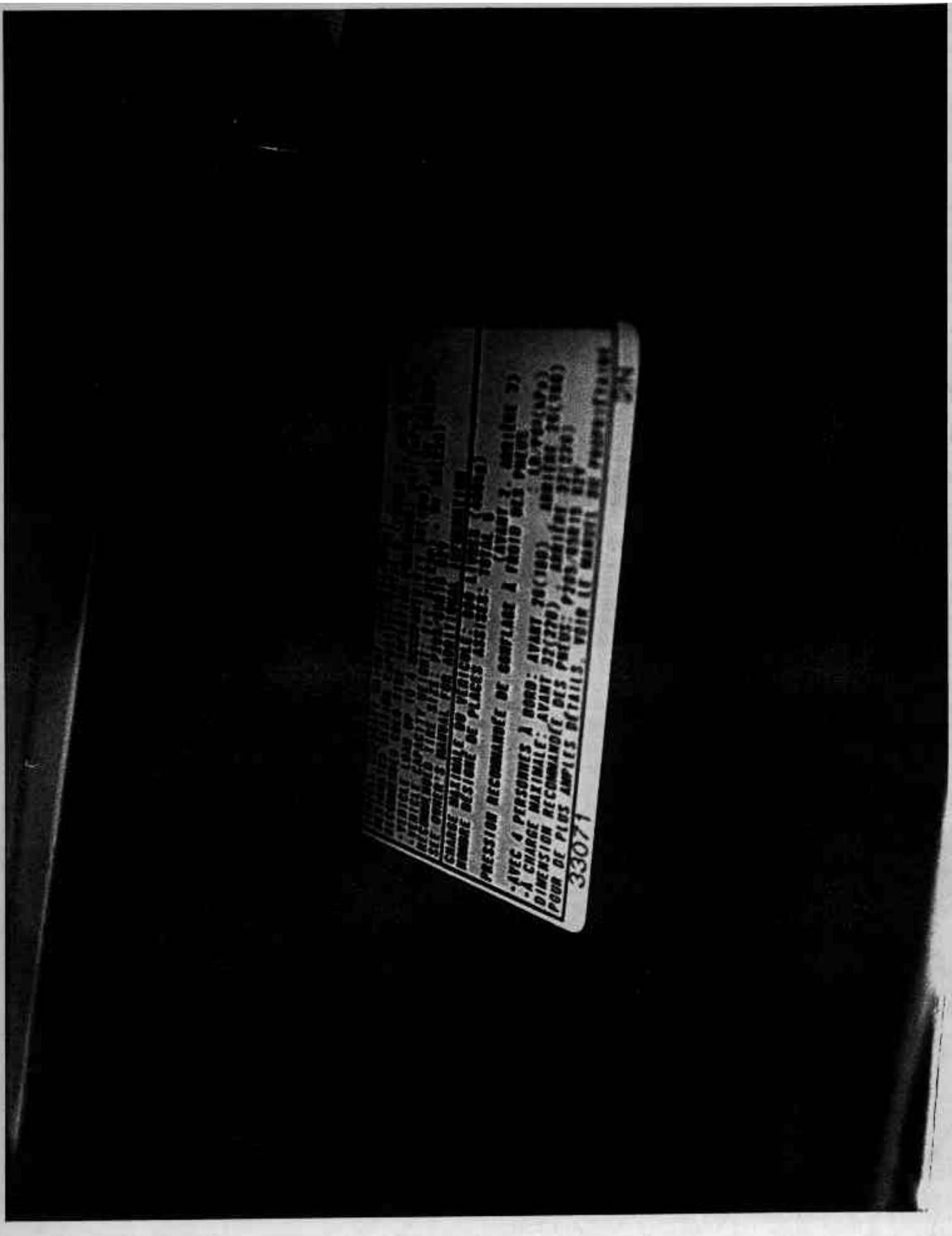


Figure A-49. Pre-Test Vehicle Recommended Tire Pressure Label View

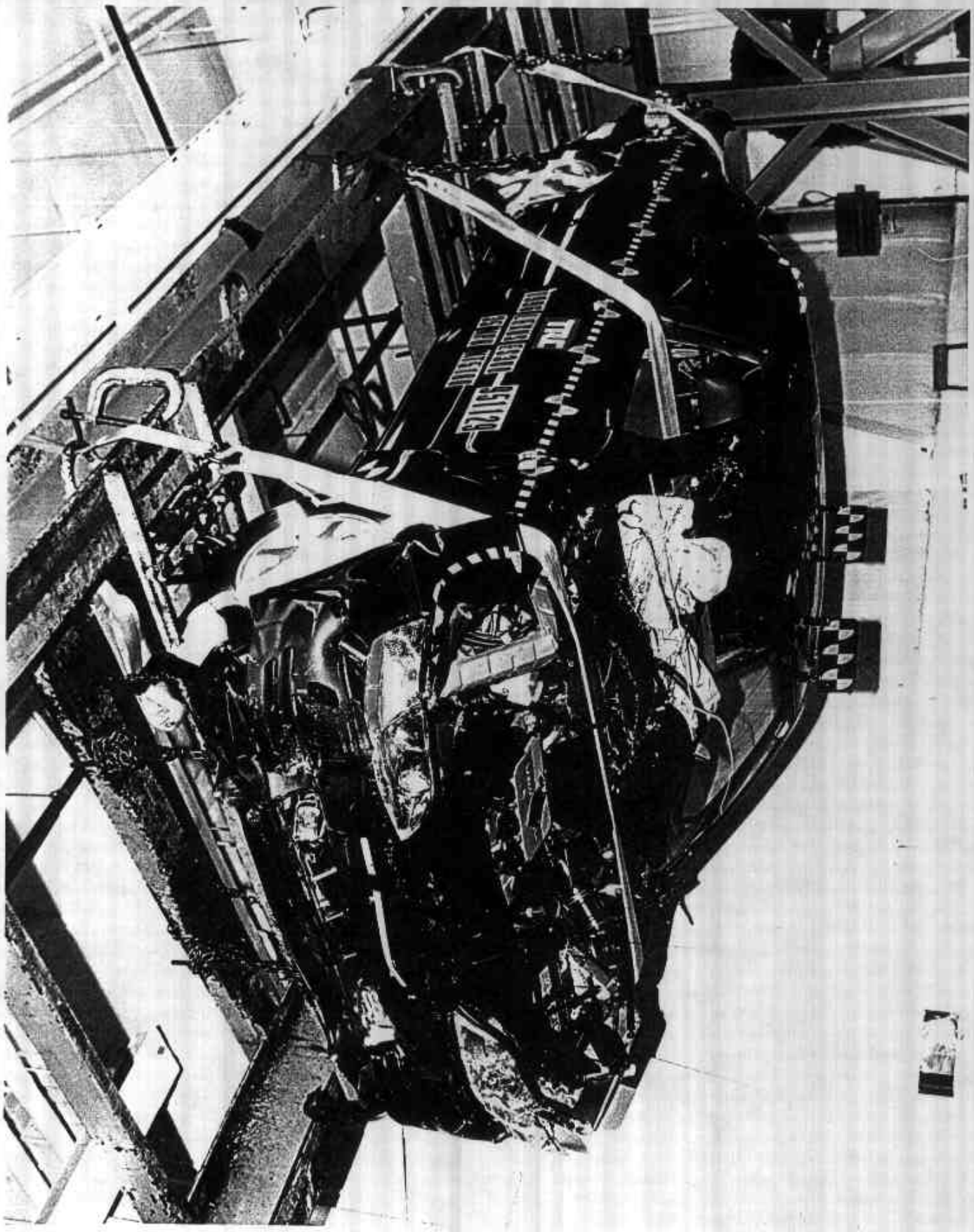
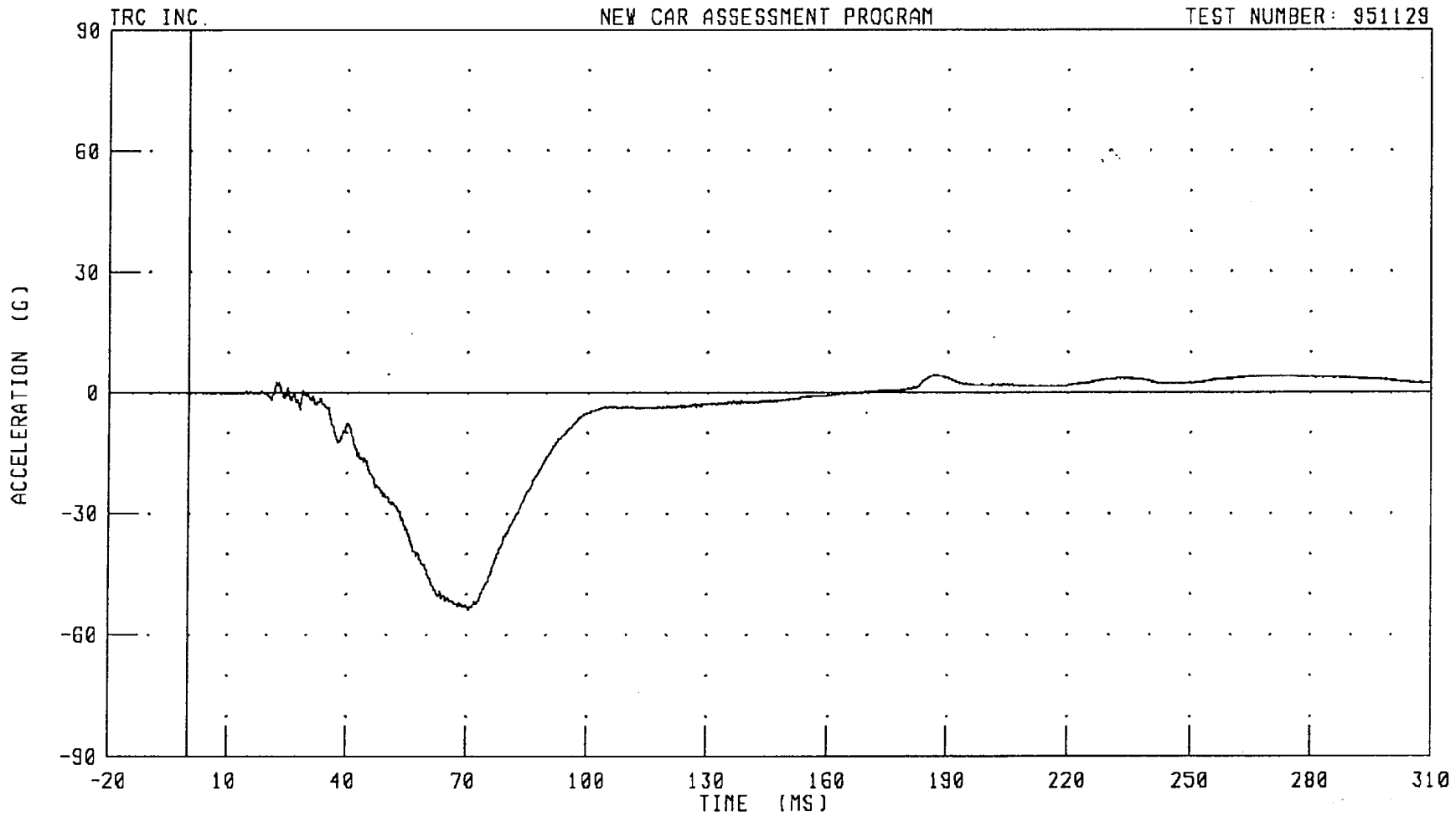


Figure A-50. Post-Test Vehicle on Static Rollover Machine View

Appendix B

Data Plots

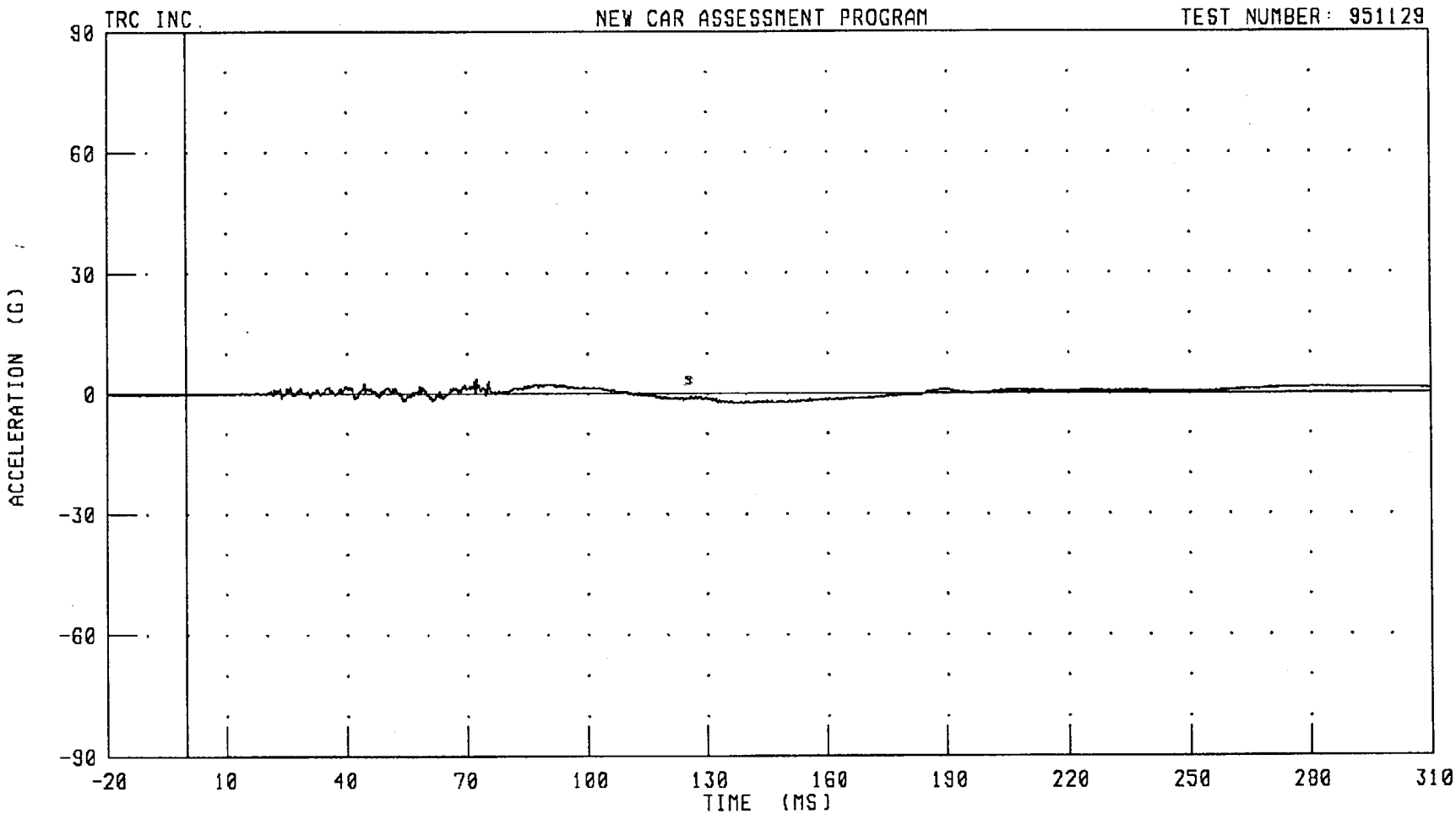
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD X-AXIS ACCELERATION



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000 PEAK DATA: 4.37 G @ 186.40 MS; -53.77 G @ 70.56 MS

951129

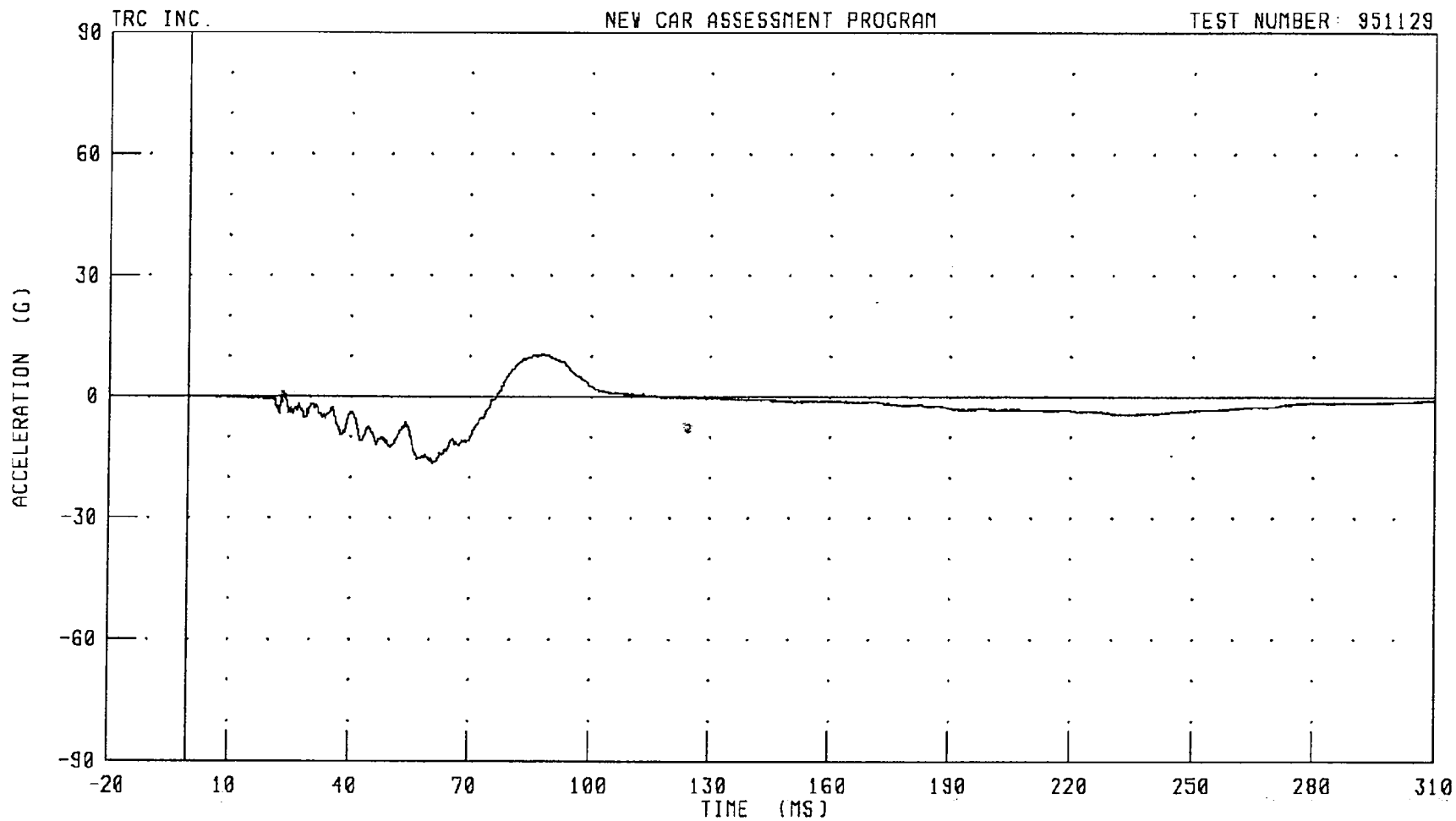
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION



CHANNEL: HEDYG1 FILTER: CH. CLASS 1000 PEAK DATA: 3.56 G @ 72.40 MS; -2.55 G @ 136.72 MS

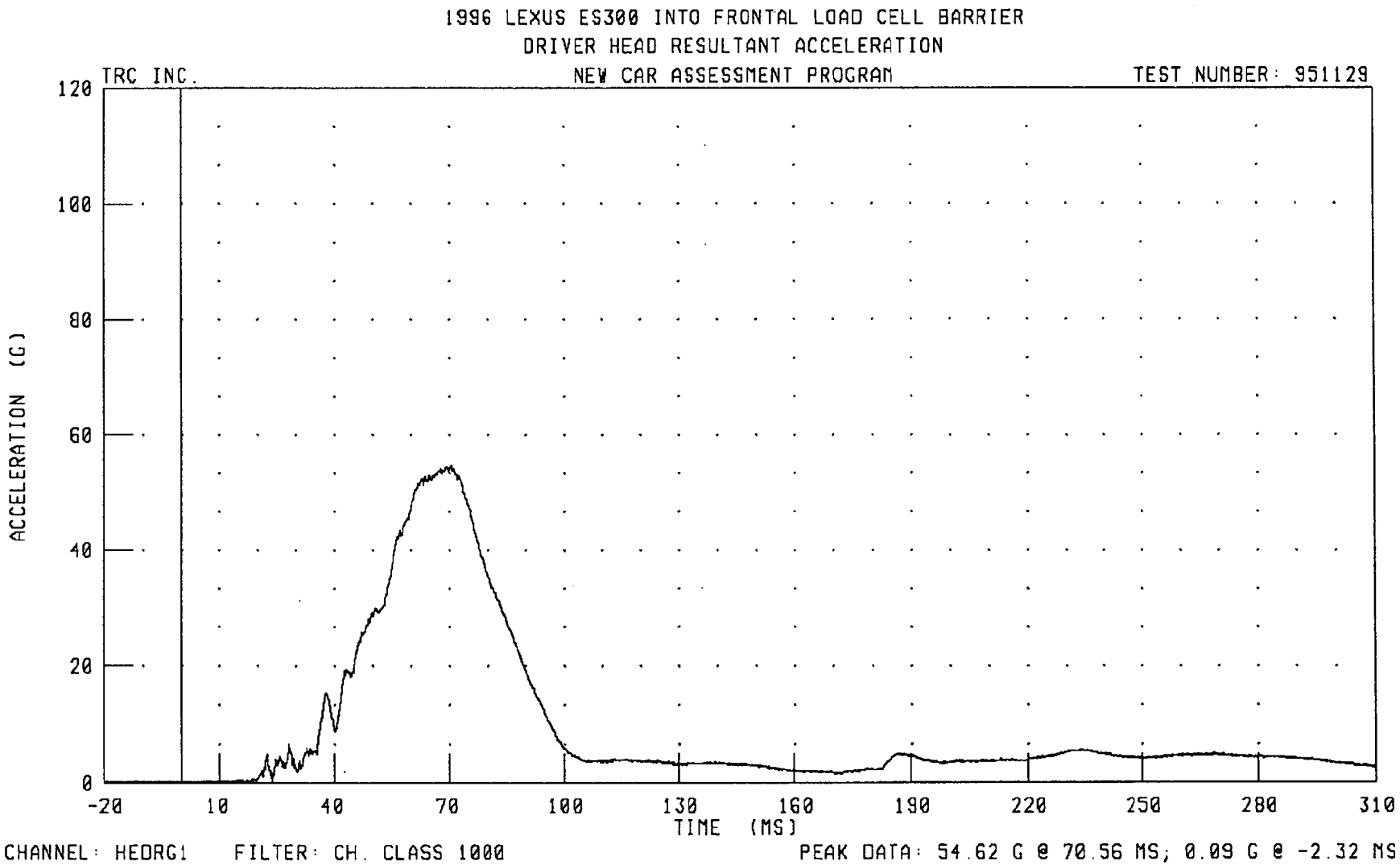
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION.



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000 PEAK DATA: 10.68 G @ 88.16 MS; -16.49 G @ 60.72 MS

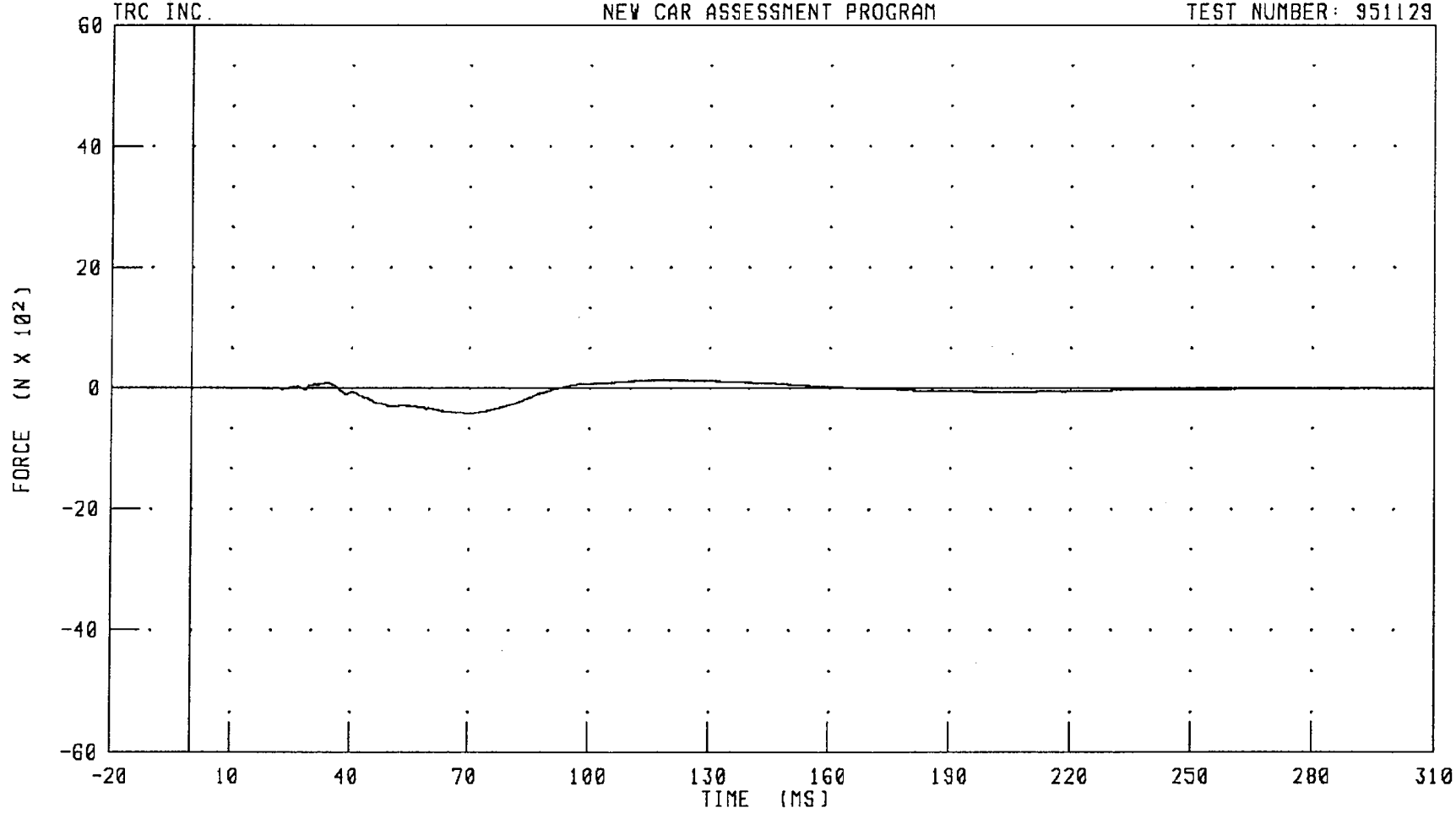
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG1
FILTER: CH. CLASS 1000
PEAK DATA: 54.62 G @ 70.56 MS; 0.09 G @ -2.32 MS

951129

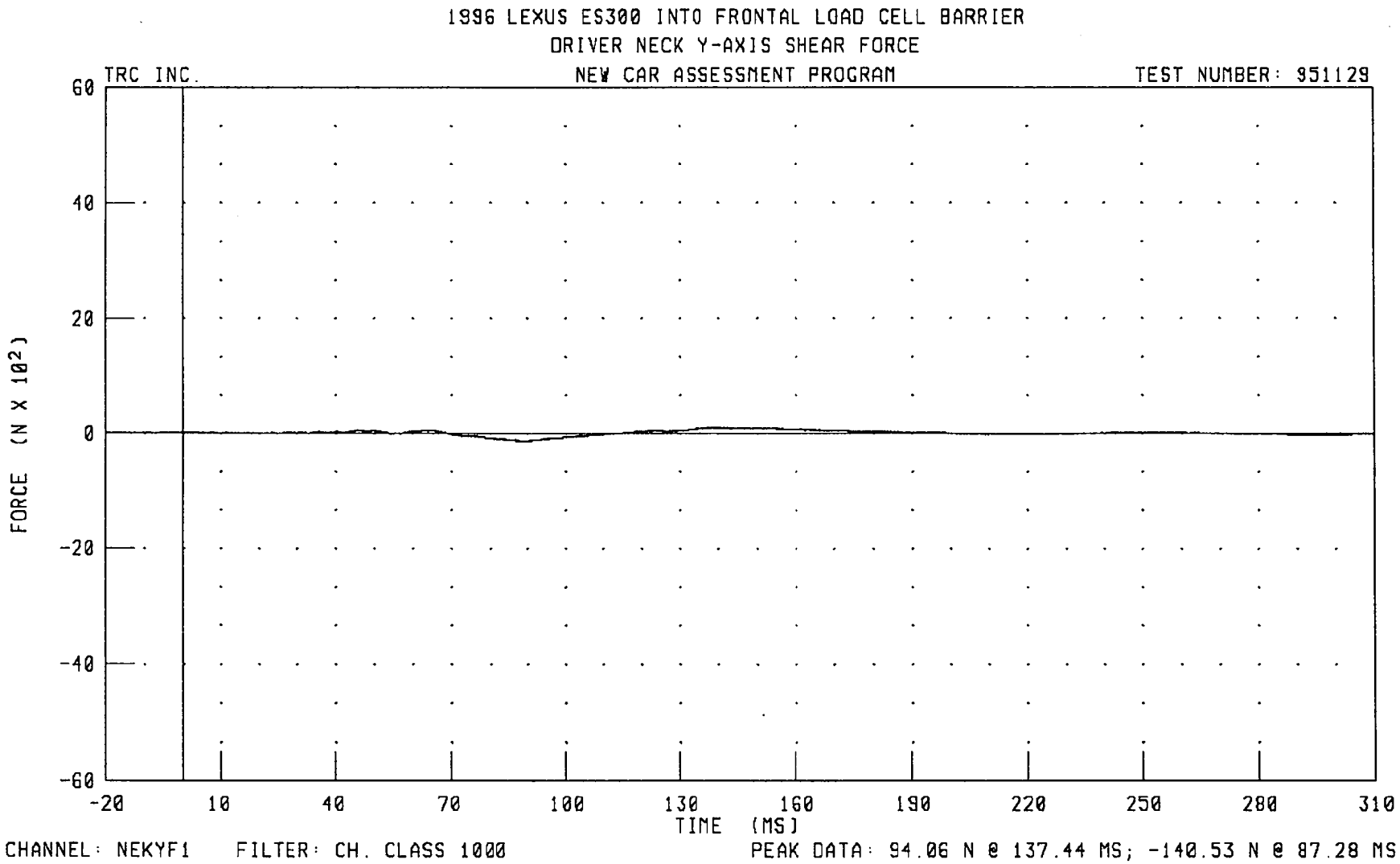
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE

TRC INC. NEW CAR ASSESSMENT PROGRAM TEST NUMBER: 951129

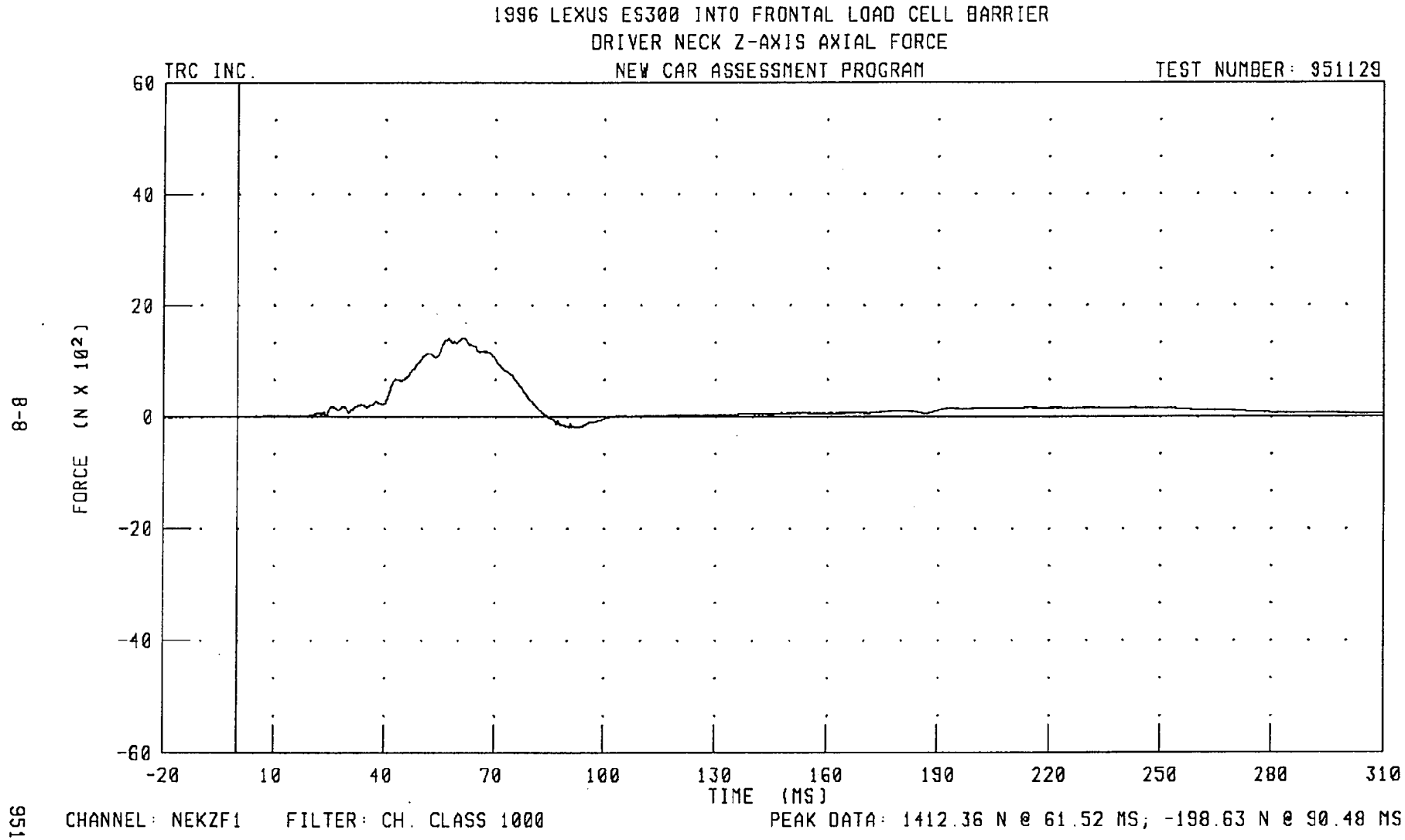


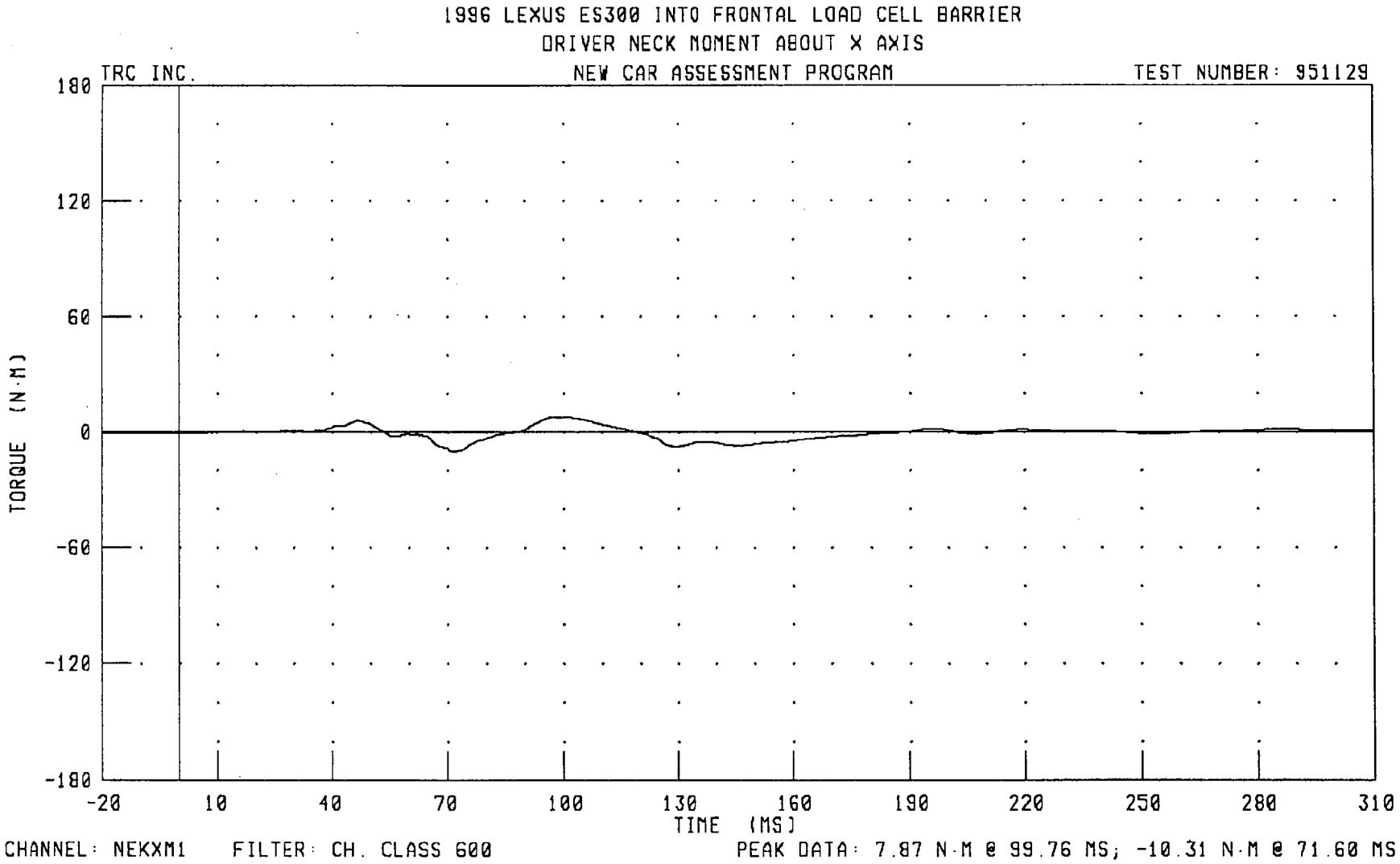
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000 PEAK DATA: 139.67 N @ 118.40 MS; -425.64 N @ 69.76 MS

951129

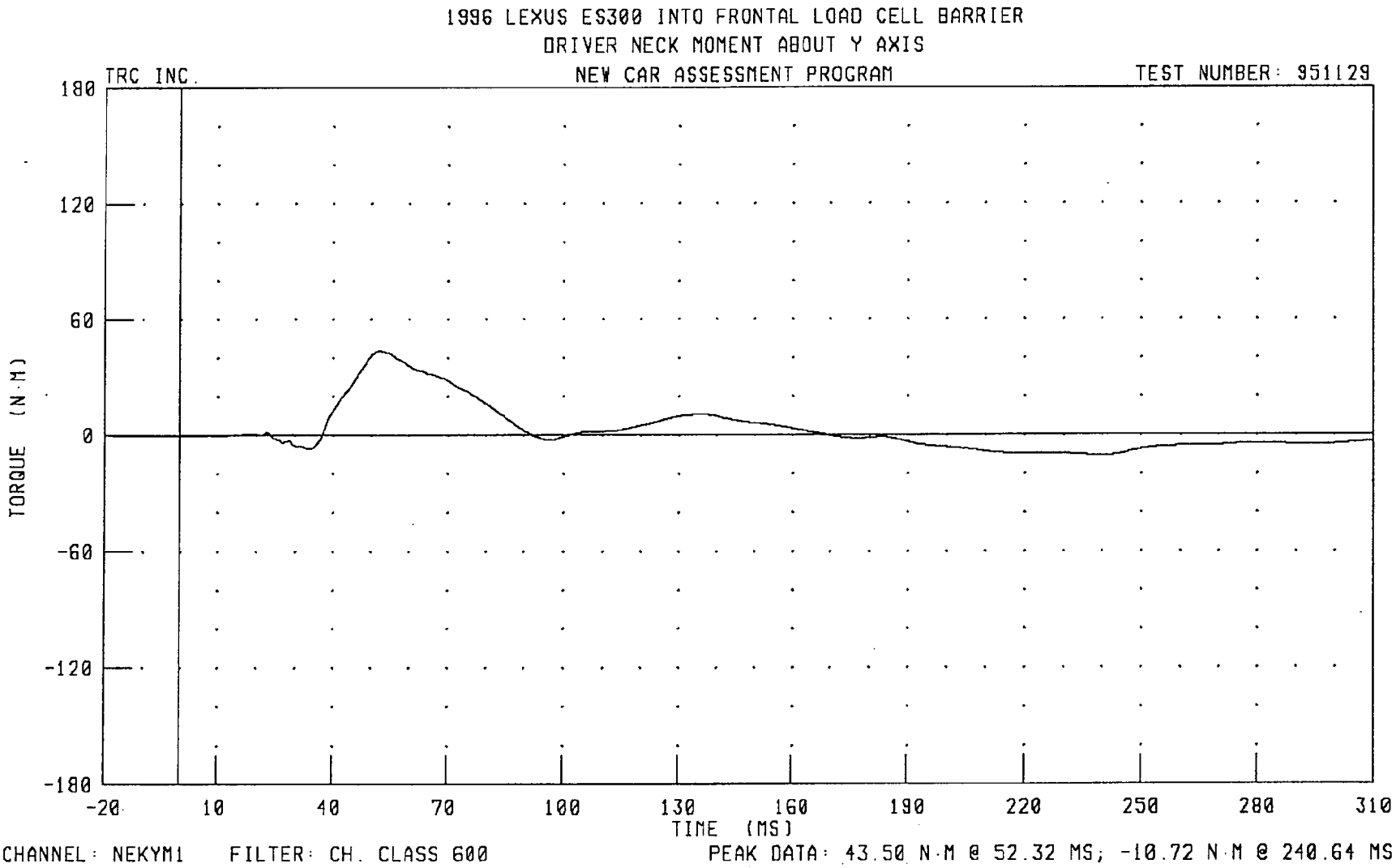

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Y-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYF1
FILTER: CH. CLASS 1000
PEAK DATA: 94.06 N @ 137.44 MS; -140.53 N @ 87.28 MS

951129

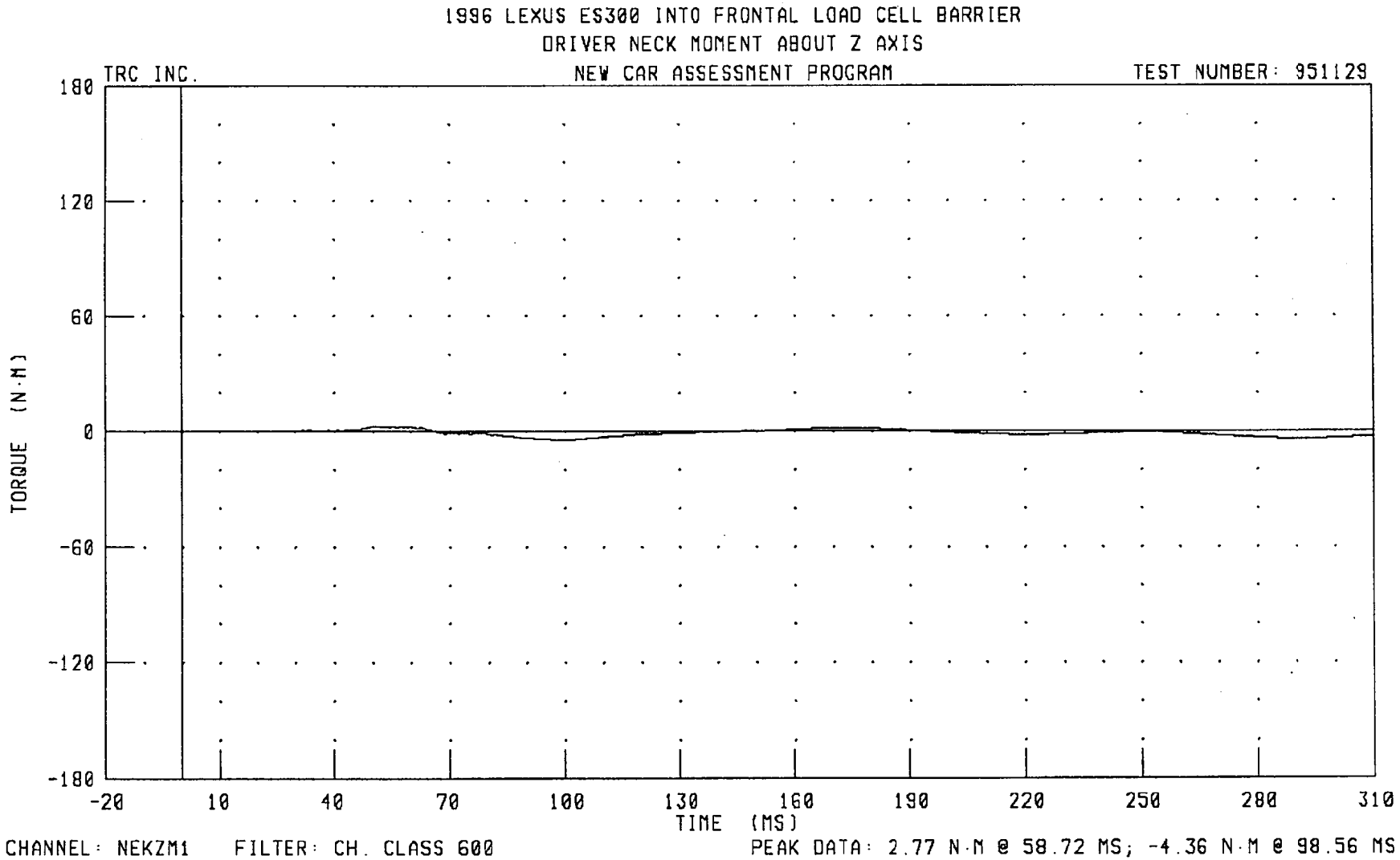

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZF1
FILTER: CH. CLASS 1000
PEAK DATA: 1412.36 N @ 61.52 MS; -198.63 N @ 90.48 MS

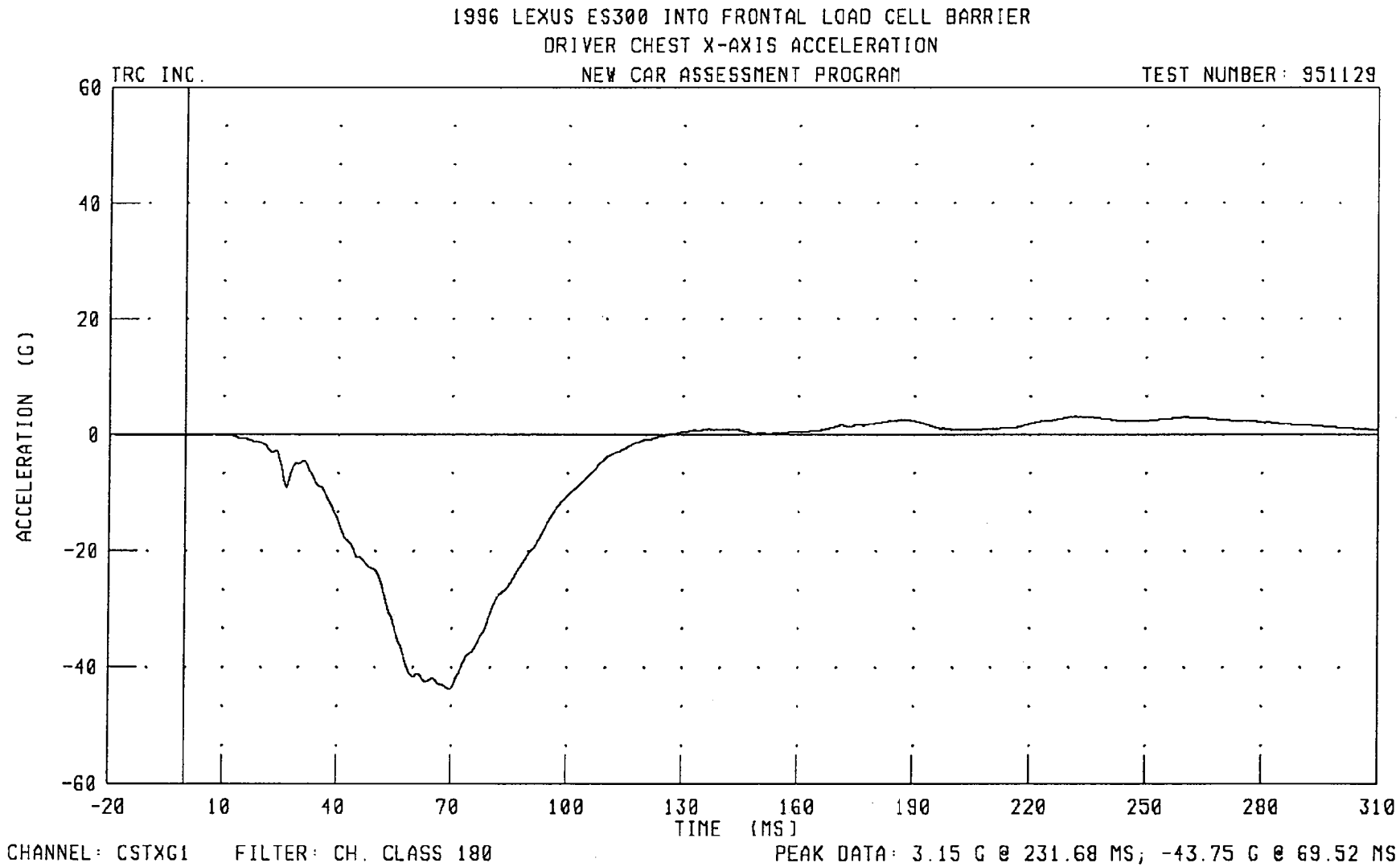

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXM1
FILTER: CH. CLASS 600
PEAK DATA: 7.87 N-M @ 99.76 MS; -10.31 N-M @ 71.60 MS

951129

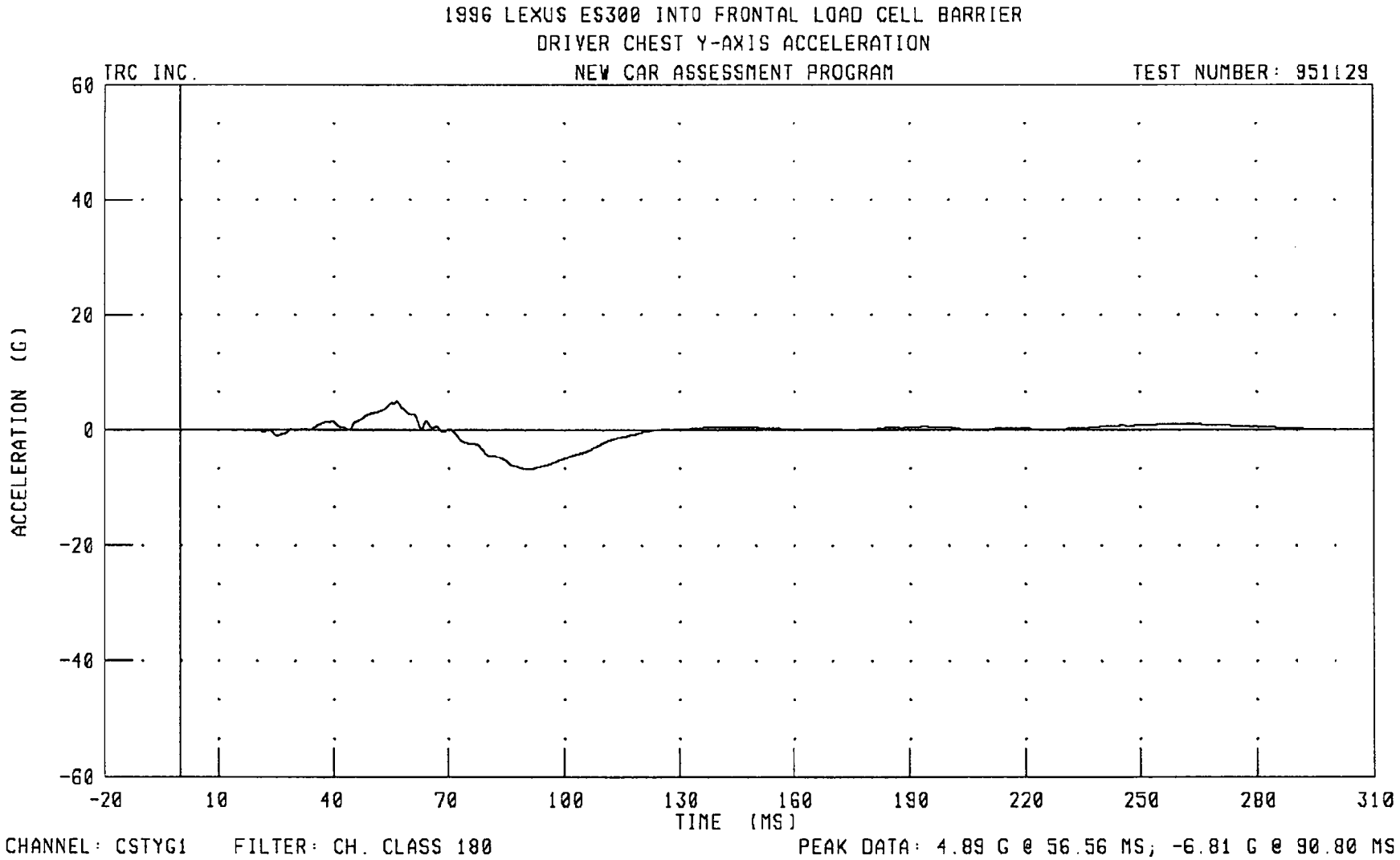

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYM1
FILTER: CH. CLASS 600
PEAK DATA: 43.50 N-M @ 52.32 MS; -10.72 N-M @ 240.64 MS

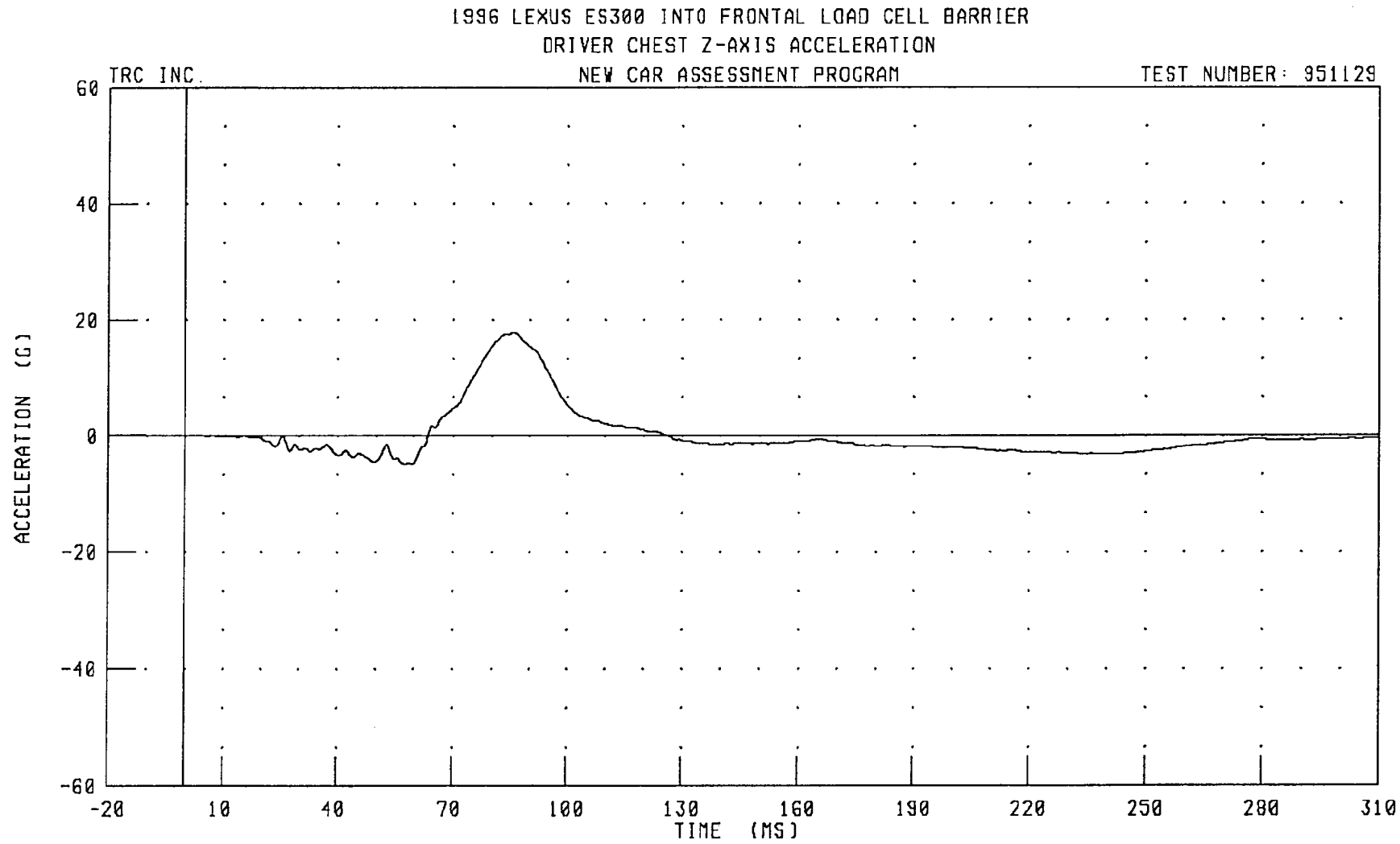
951129

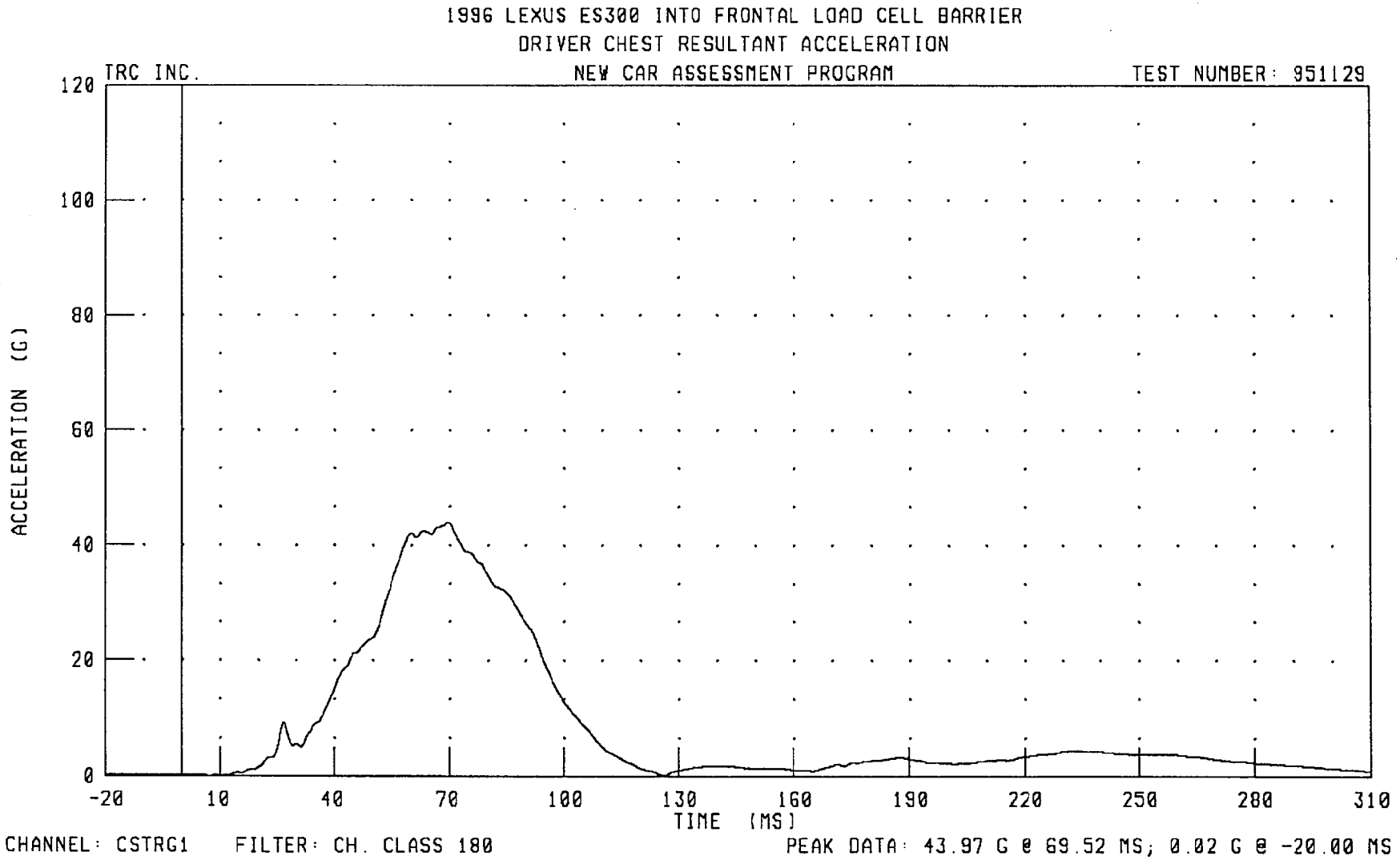

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Z AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZM1
FILTER: CH. CLASS 600
PEAK DATA: 2.77 N-M @ 58.72 MS; -4.36 N-M @ 98.56 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 3.15 G @ 231.68 MS; -43.75 G @ 69.52 MS

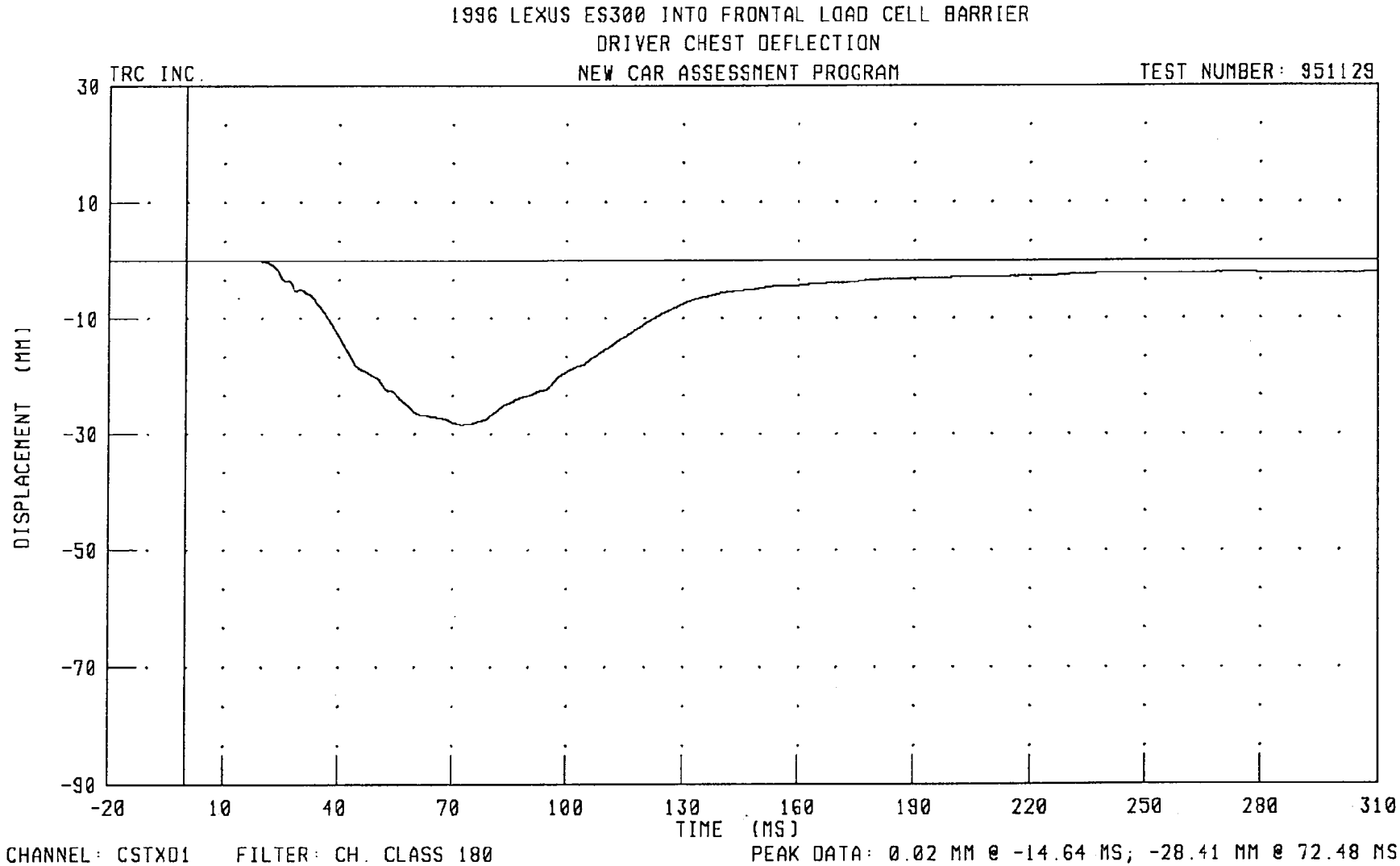
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG1
FILTER: CH. CLASS 180
PEAK DATA: 4.89 G @ 56.56 MS; -6.81 G @ 90.80 MS

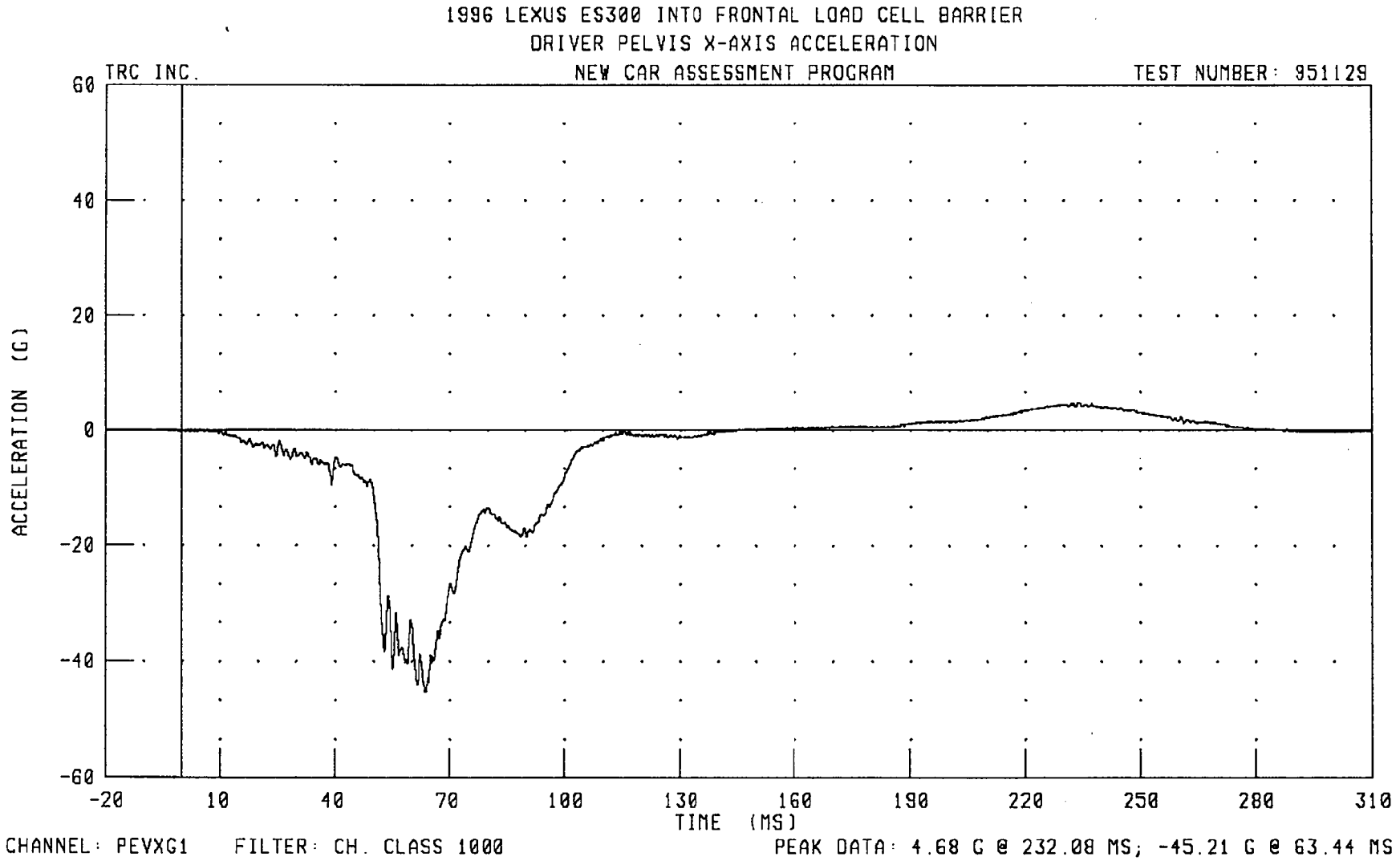

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG1
FILTER: CH. CLASS 180
PEAK DATA: 17.80 G @ 85.68 MS; -4.91 G @ 57.68 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG1
FILTER: CH. CLASS 180
PEAK DATA: 43.97 G @ 69.52 MS; 0.02 G @ -20.00 MS

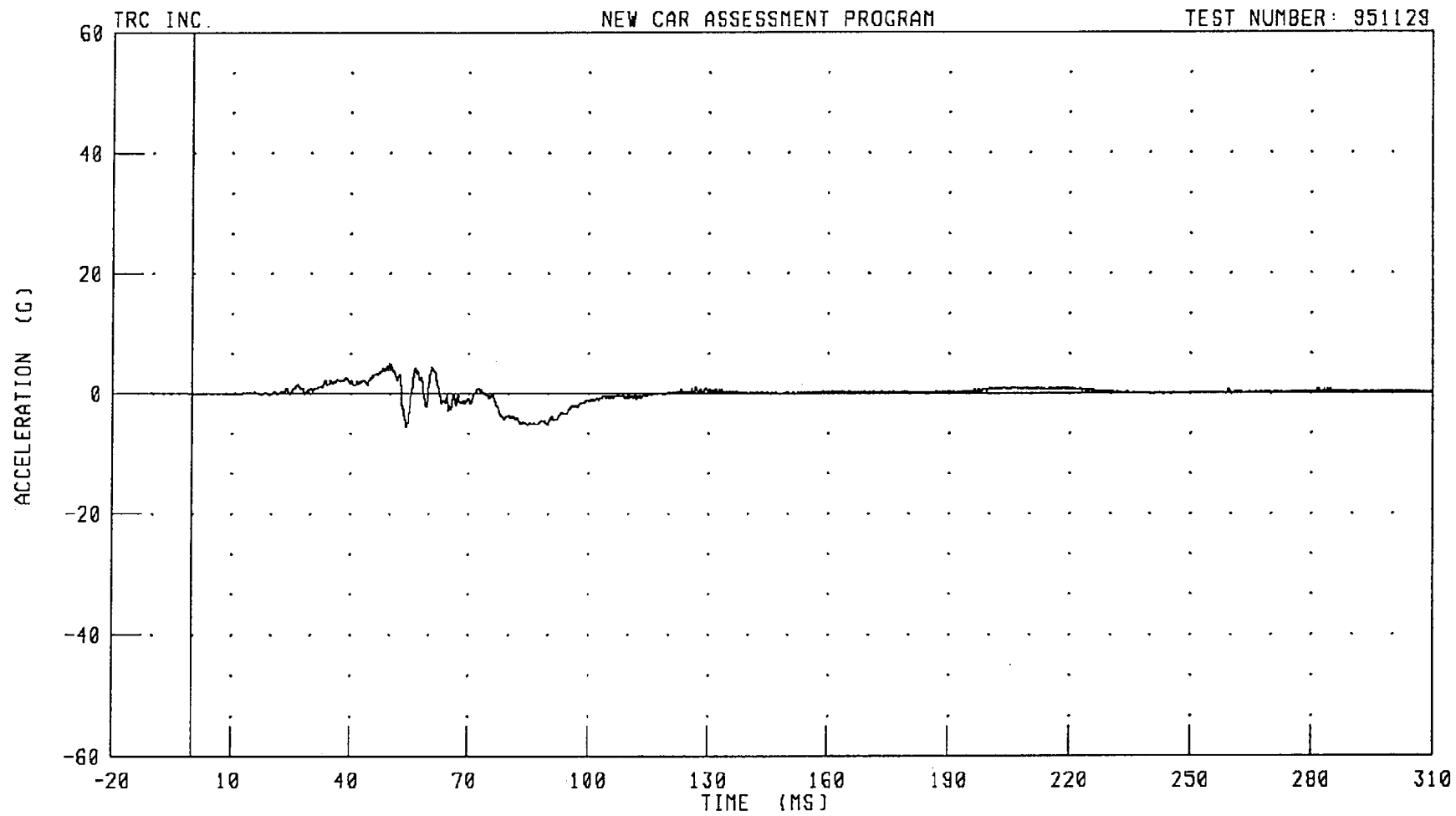
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST DEFLECTION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
10
-10
-30
-50
-70
-90
DISPLACEMENT (MM)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD1
FILTER: CH. CLASS 180
PEAK DATA: 0.02 MM @ -14.64 MS; -28.41 MM @ 72.48 MS

951129

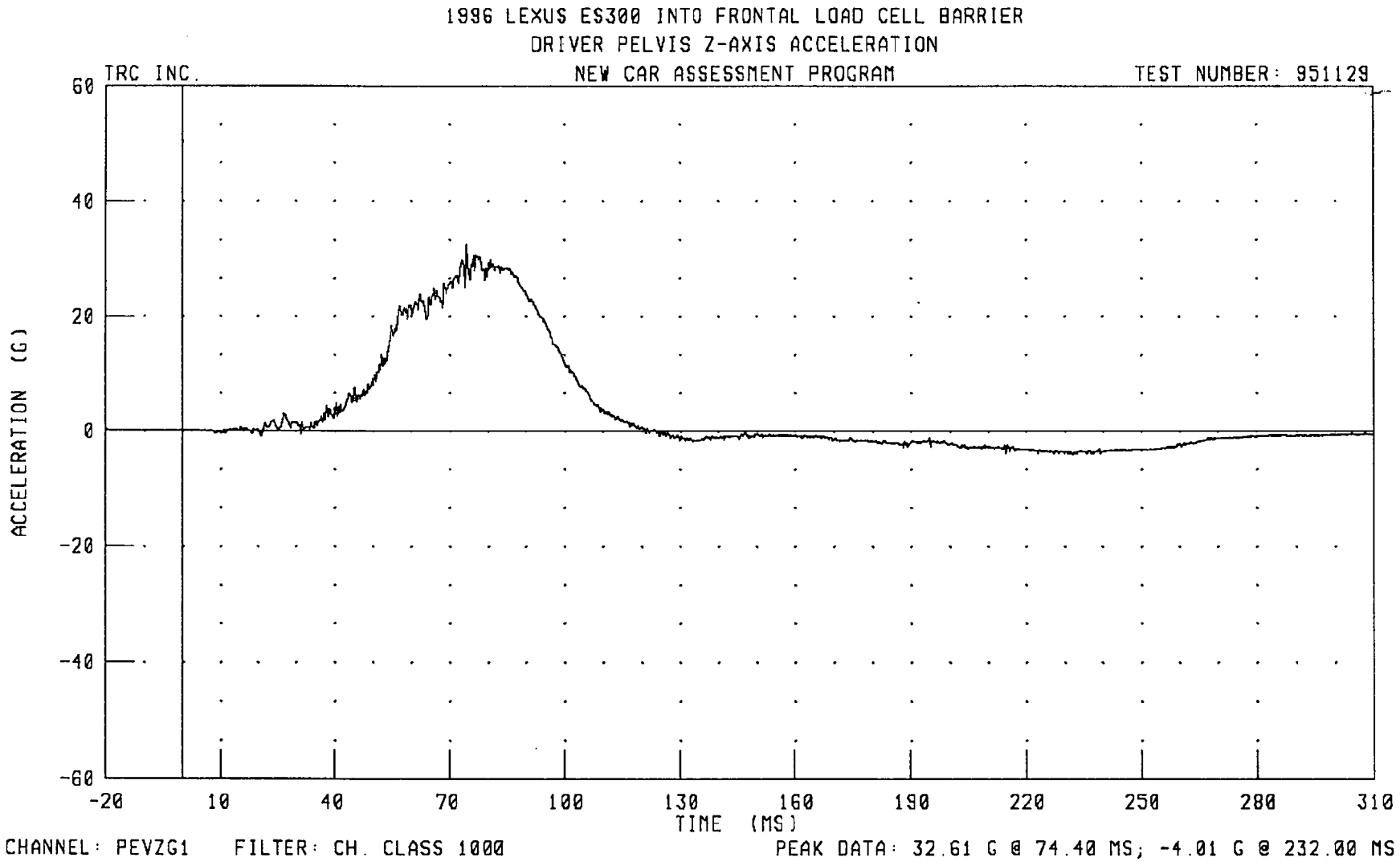

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVXG1
FILTER: CH. CLASS 1000
PEAK DATA: 4.68 G @ 232.08 MS; -45.21 G @ 63.44 MS

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS Y-AXIS ACCELERATION



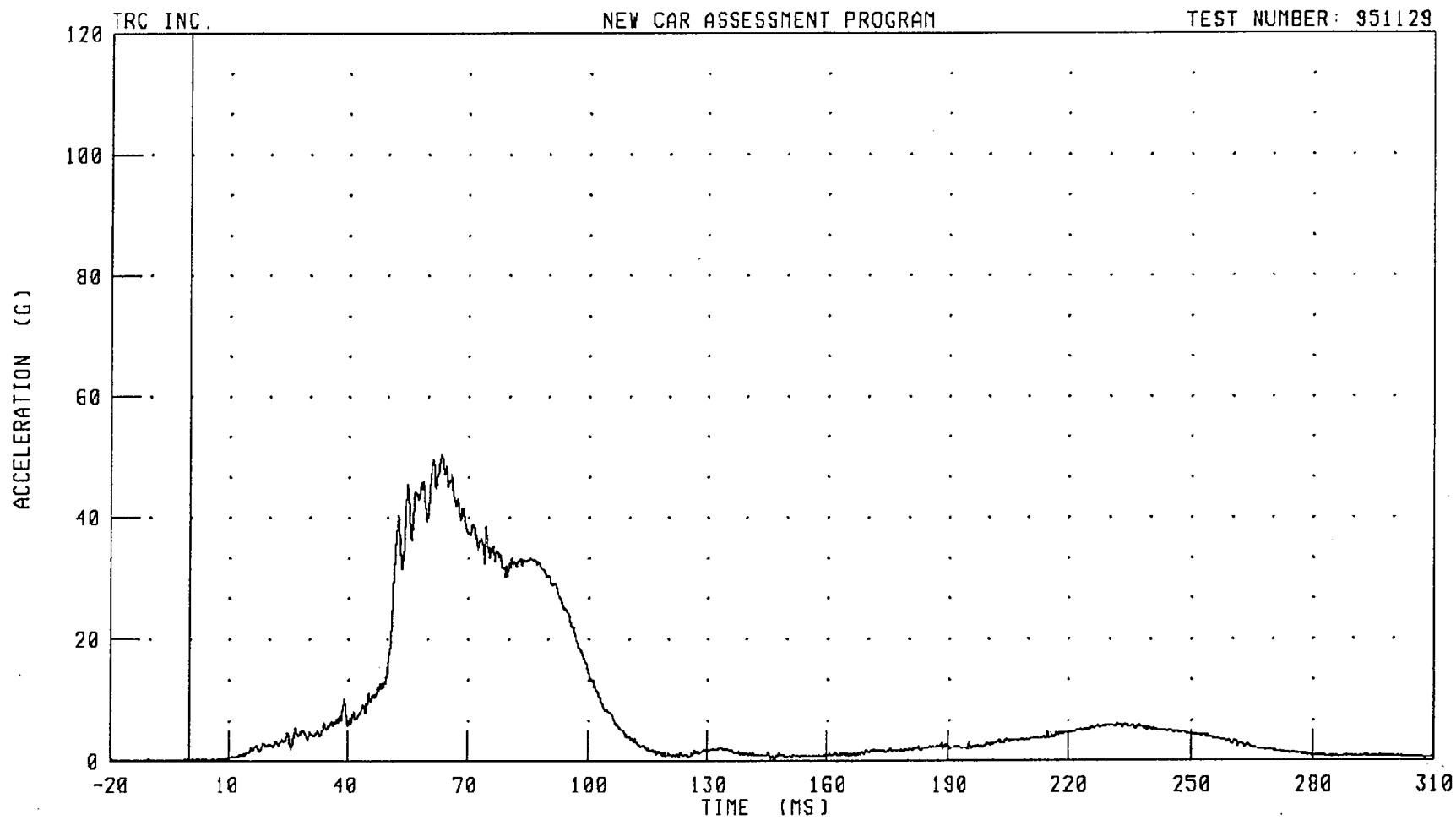
CHANNEL: PEVYG1 FILTER: CH. CLASS 1000 PEAK DATA: 5.17 G @ 49.92 MS; -5.50 G @ 54.08 MS

951129

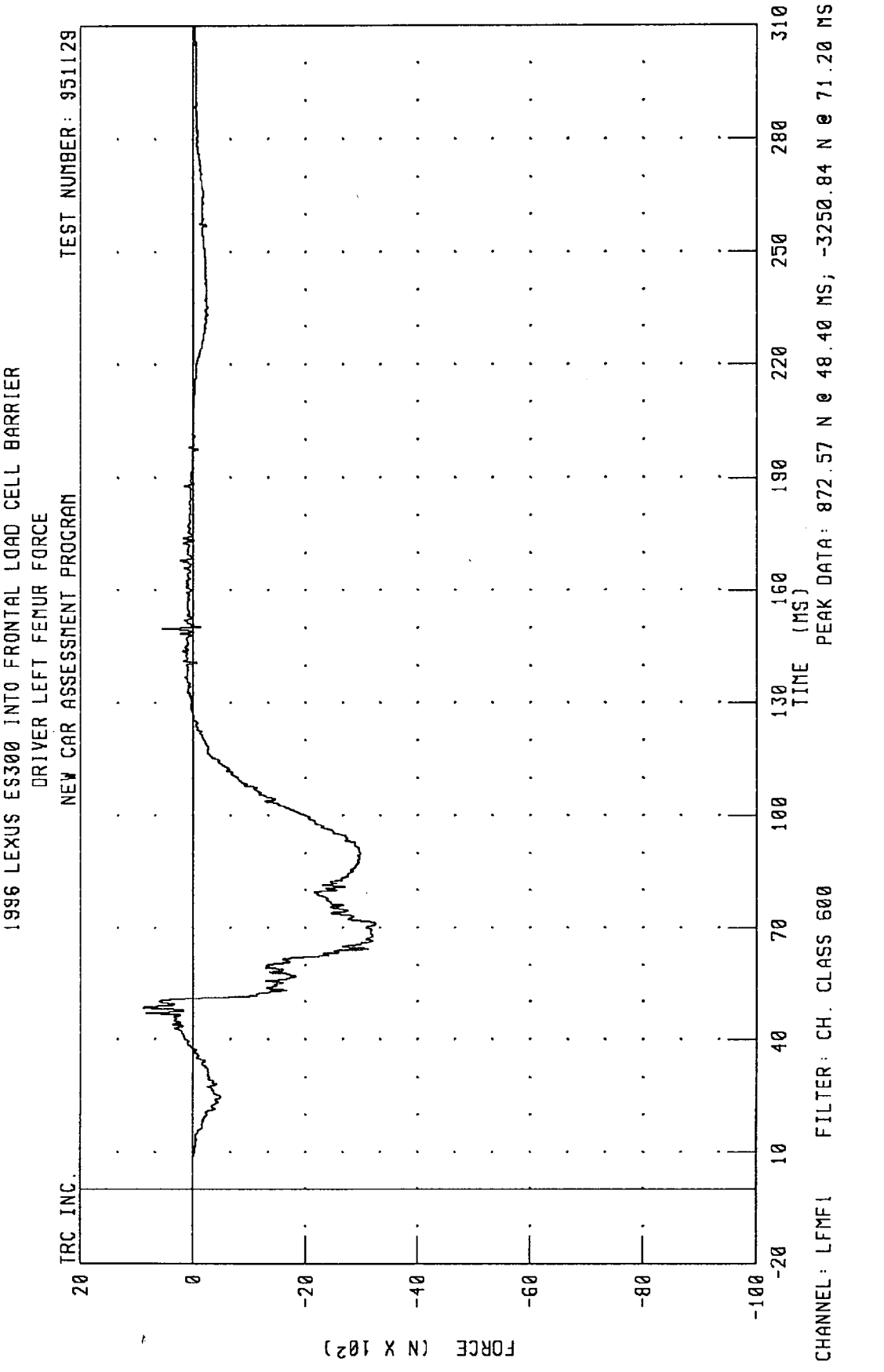

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVZG1
FILTER: CH. CLASS 1000
PEAK DATA: 32.61 G @ 74.40 MS; -4.01 G @ 232.00 MS

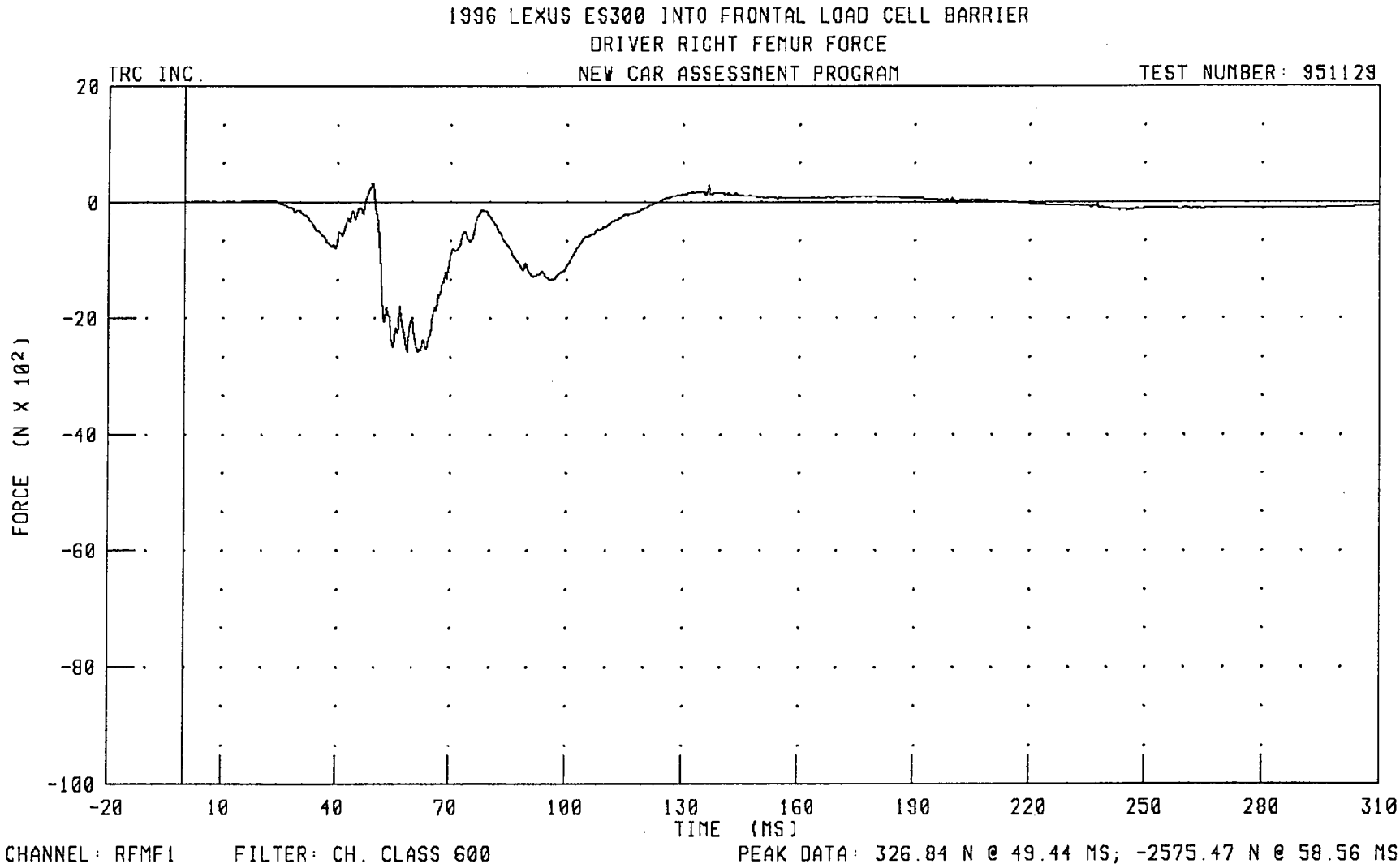
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS RESULTANT ACCELERATION

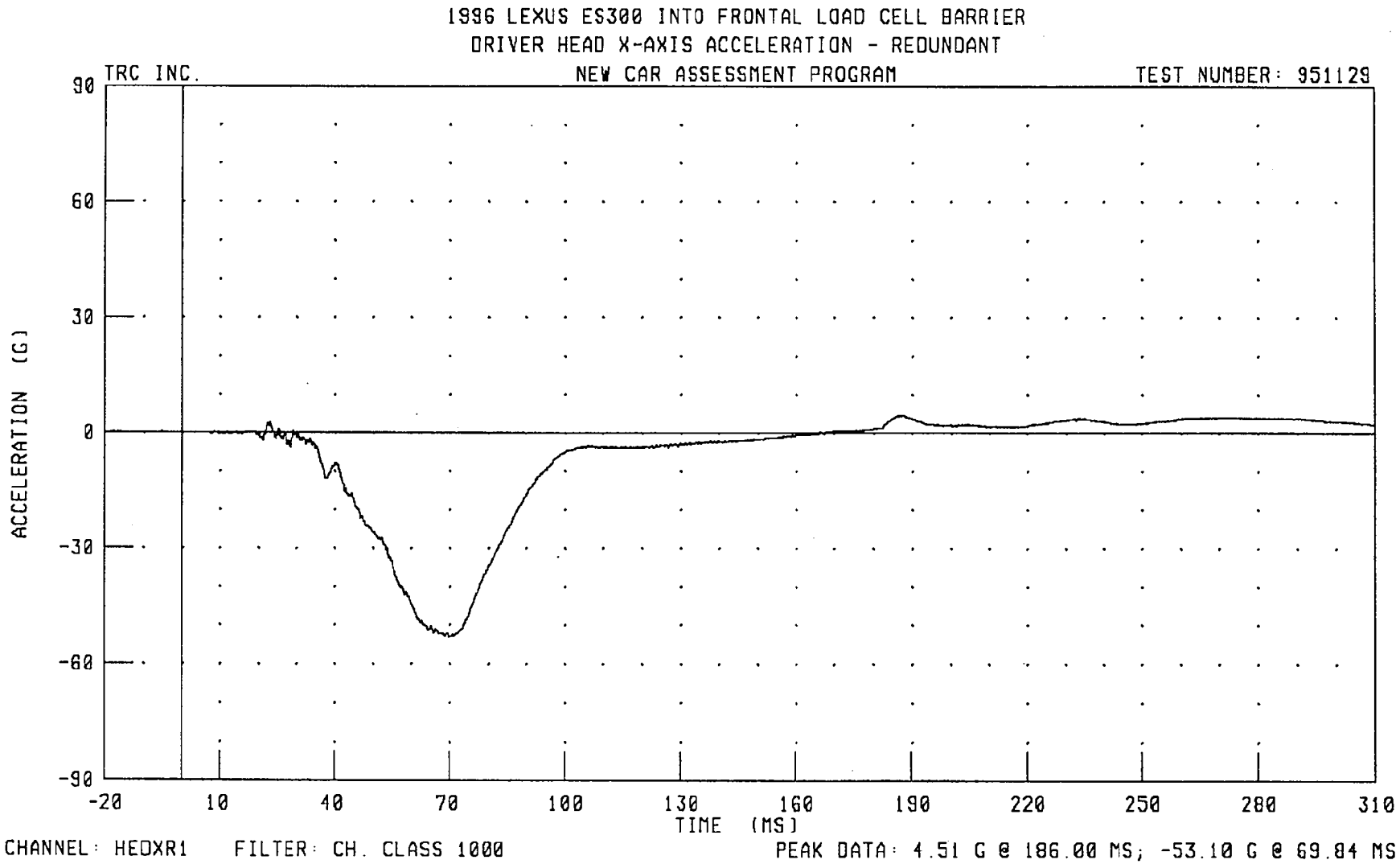


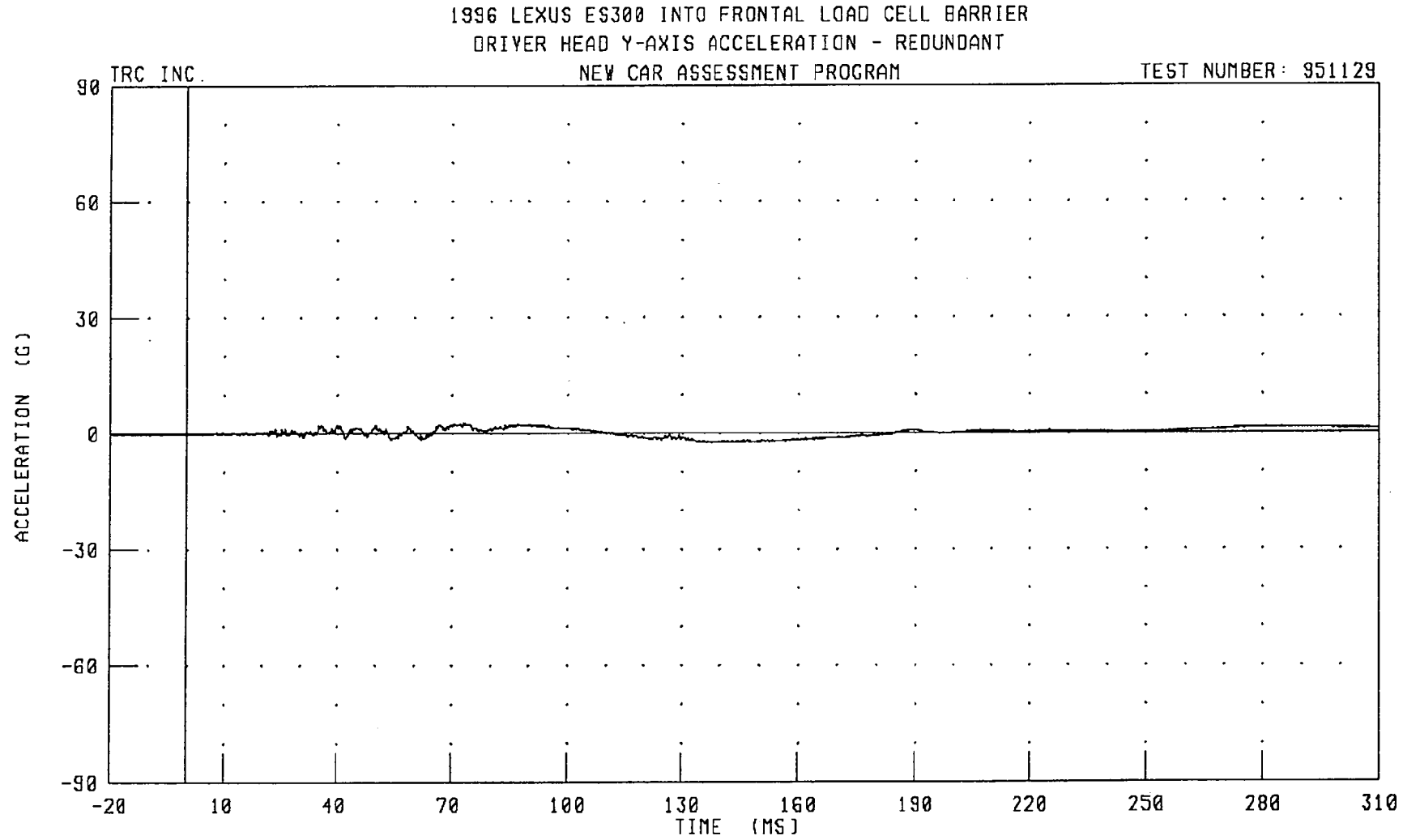
CHANNEL: PEVRG1 FILTER: CH. CLASS 1000 PEAK DATA: 50.29 G @ 63.44 MS; 0.08 G @ -12.48 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FEMUR FORCE
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
TRC INC.
FORCE (N X 10²)
TIME (MS)
CHANNEL: LFMF1 FILTER: CH. CLASS 600
PEAK DATA: 872.57 N @ 48.40 MS; -3250.84 N @ 71.20 MS

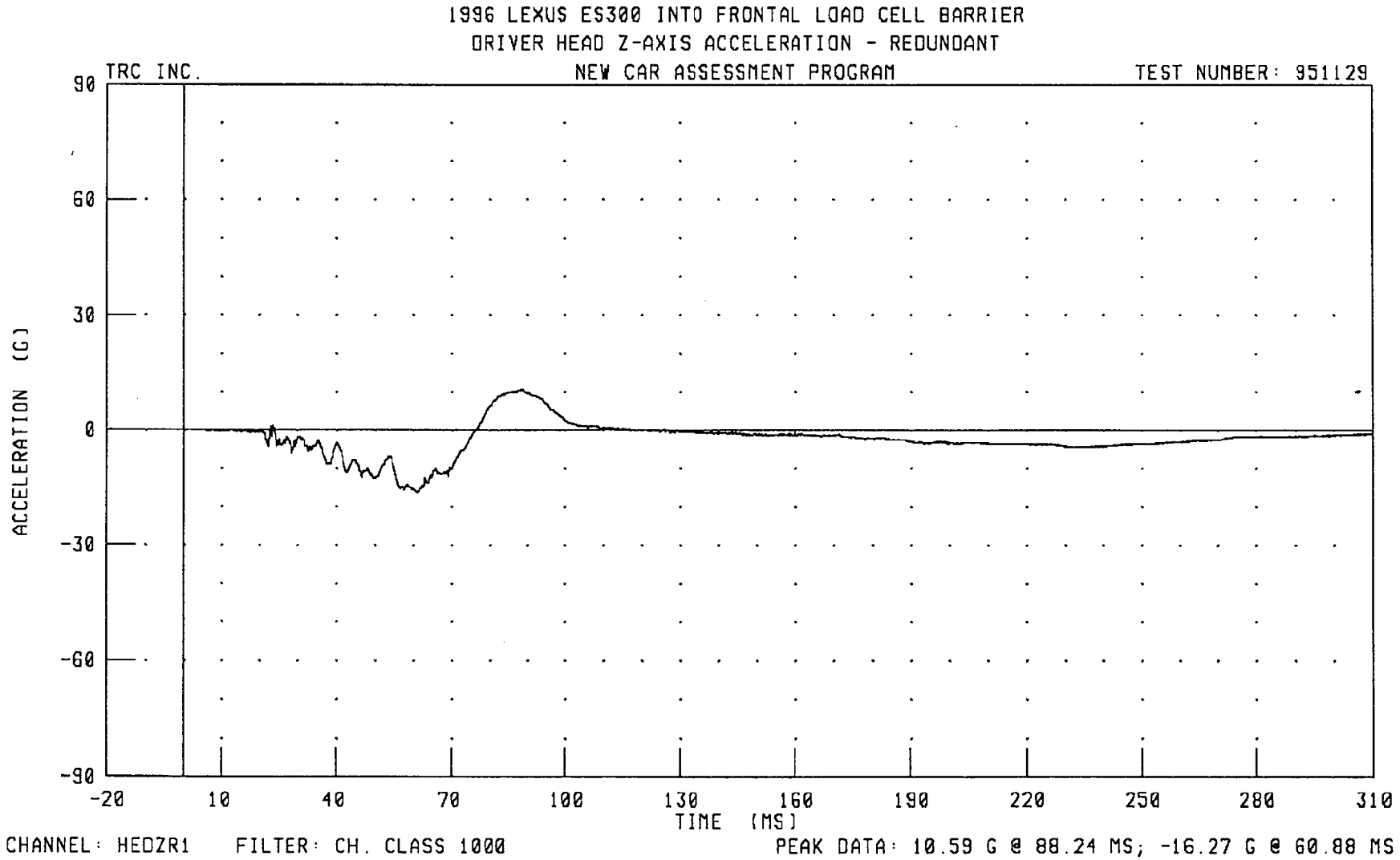

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF1
FILTER: CH. CLASS 600
PEAK DATA: 326.84 N @ 49.44 MS; -2575.47 N @ 58.56 MS

951129

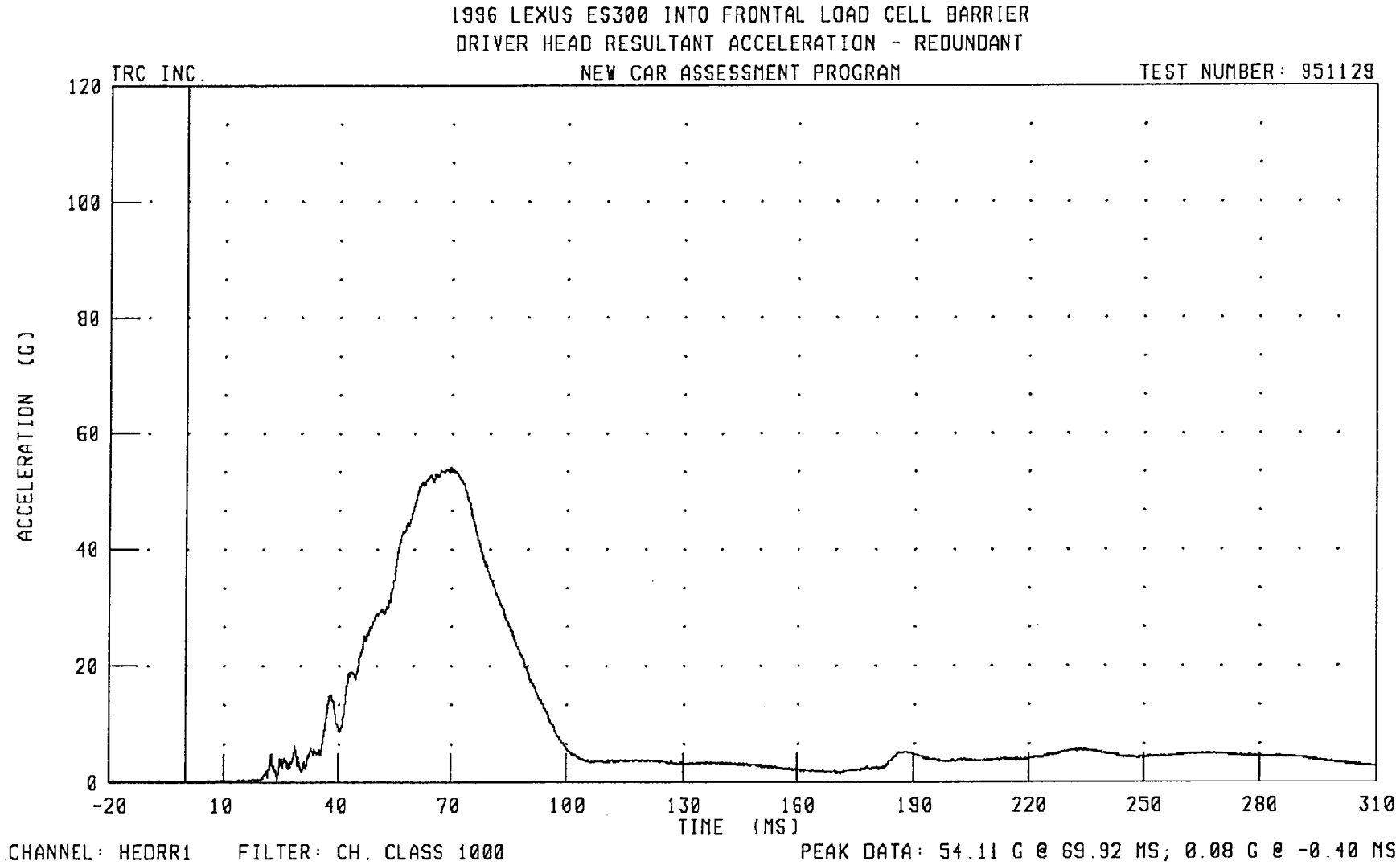

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD X-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXR1
FILTER: CH. CLASS 1000
PEAK DATA: 4.51 G @ 186.00 MS; -53.10 G @ 69.84 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYR1
FILTER: CH. CLASS 1000
PEAK DATA: 2.74 G @ 73.04 MS; -2.54 G @ 136.48 MS

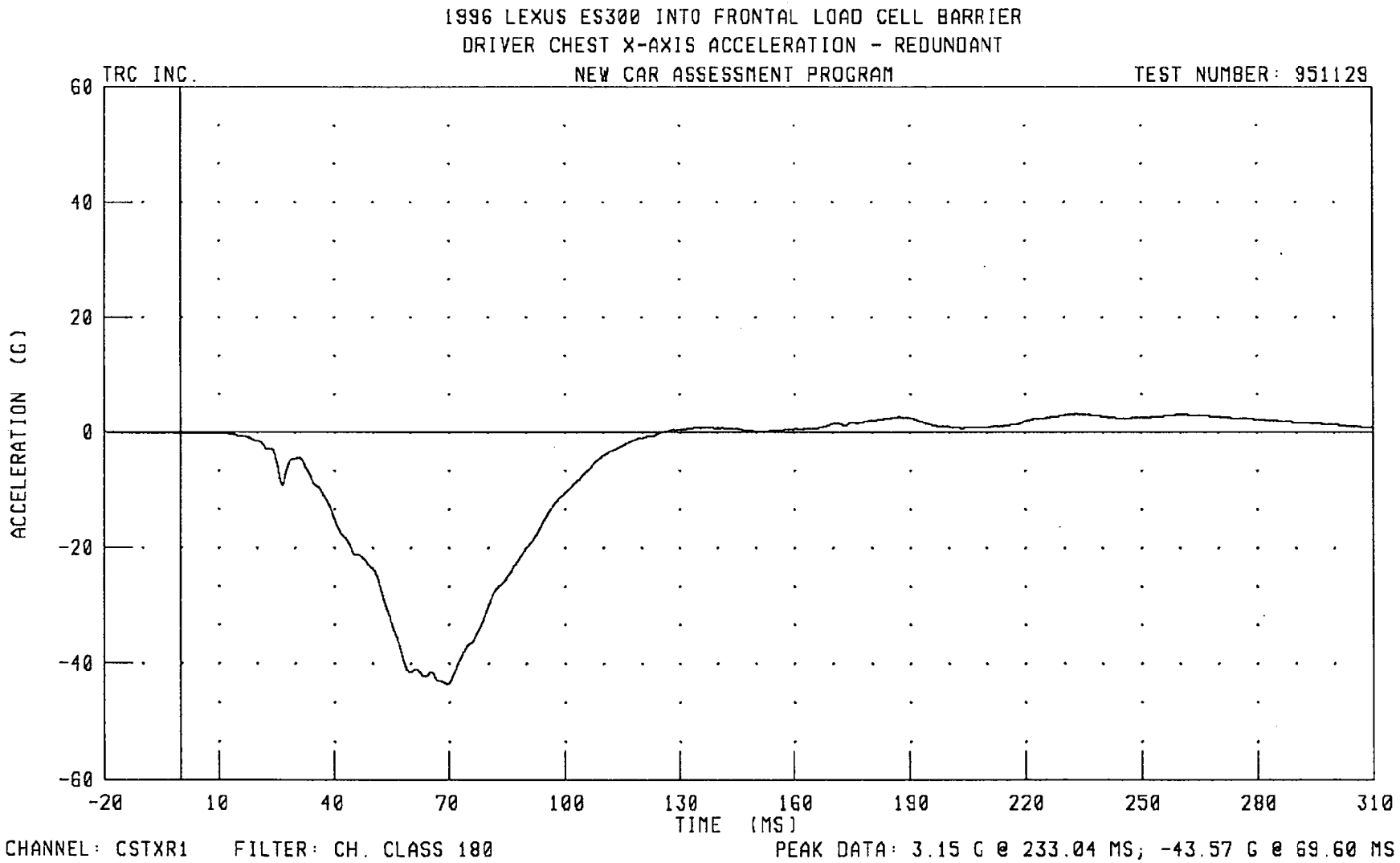
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZR1
FILTER: CH. CLASS 1000
PEAK DATA: 10.59 G @ 88.24 MS; -16.27 G @ 60.88 MS

951129

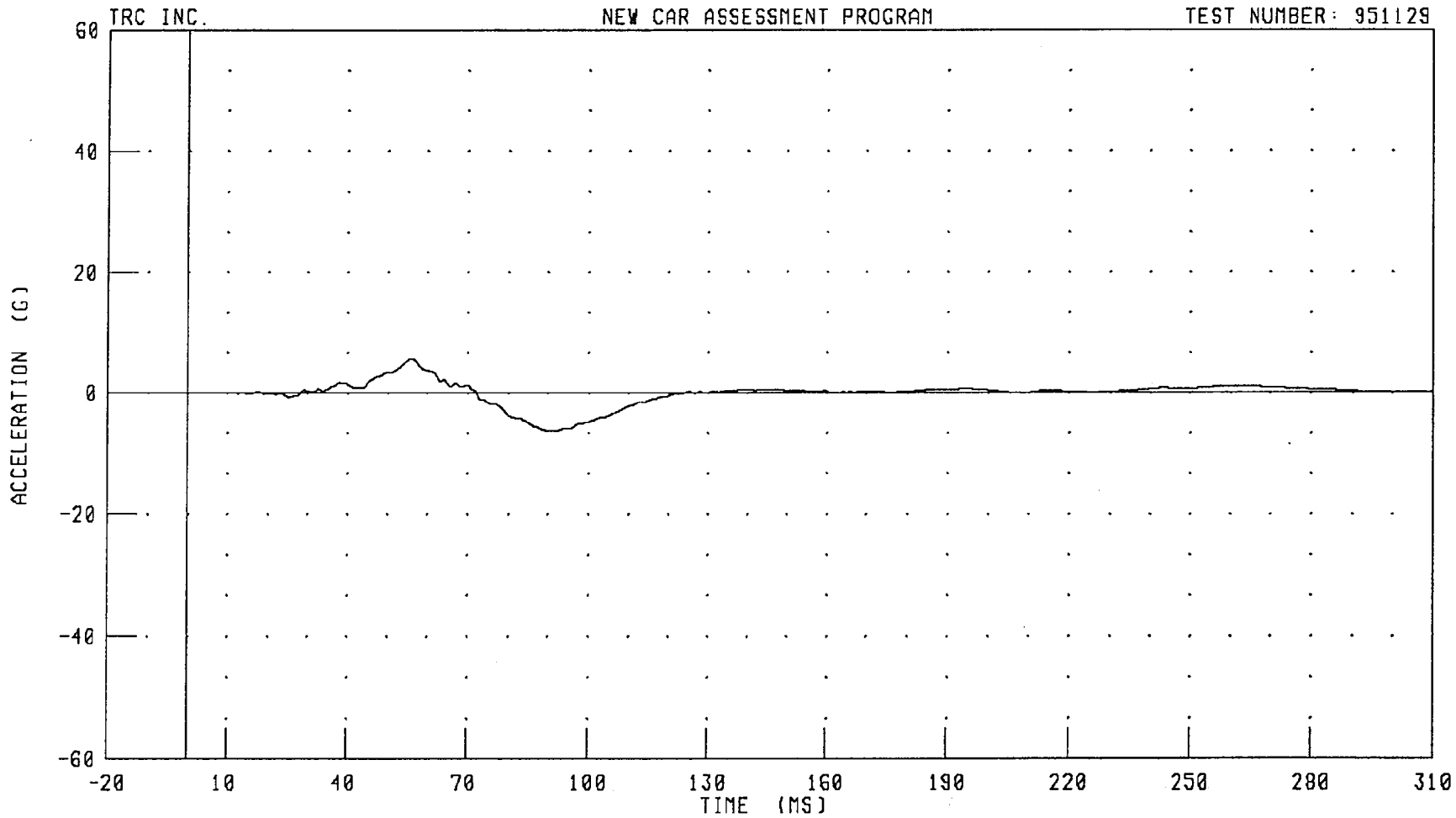

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRR1
FILTER: CH. CLASS 1000
PEAK DATA: 54.11 G @ 69.92 MS; 0.08 G @ -0.40 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST X-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXR1
FILTER: CH. CLASS 180
PEAK DATA: 3.15 G @ 233.04 MS; -43.57 G @ 69.60 MS

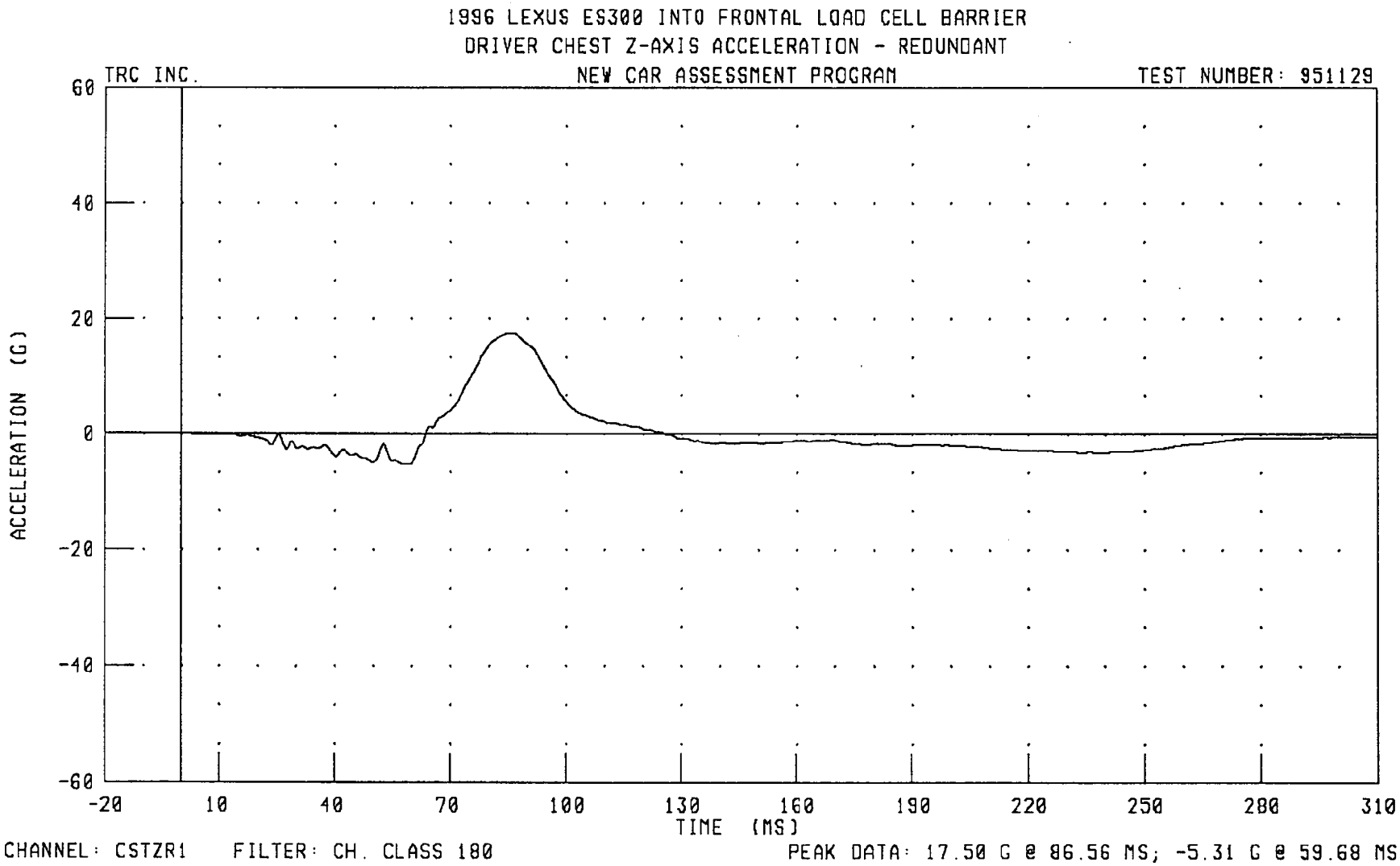
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION - REDUNDANT



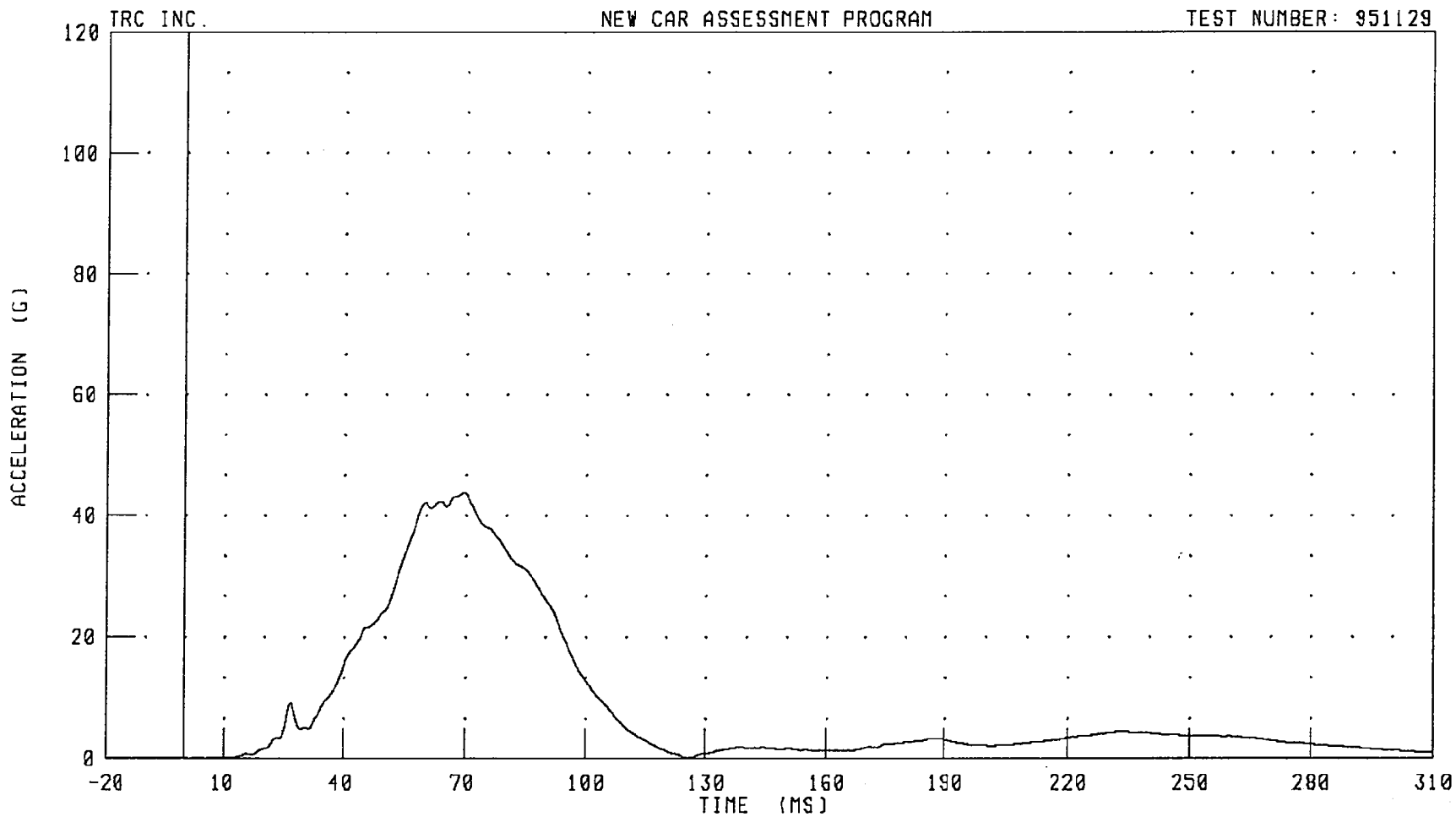
CHANNEL: CSTYR1 FILTER: CH. CLASS 180 PEAK DATA: 5.66 G @ 56.24 MS; -6.28 G @ 91.68 MS

951129

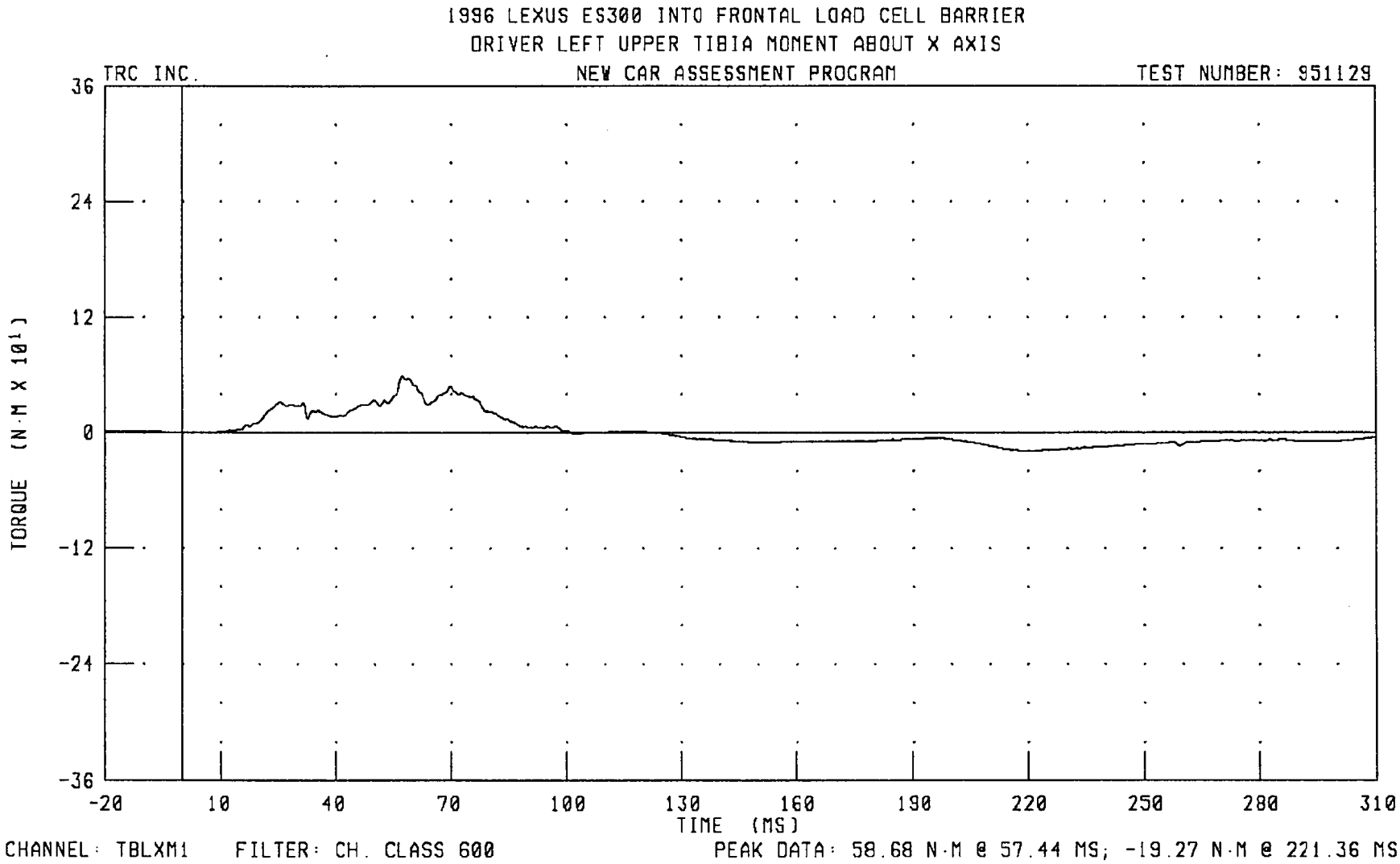

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZR1
FILTER: CH. CLASS 180
PEAK DATA: 17.50 G @ 86.56 MS; -5.31 G @ 59.68 MS

951129

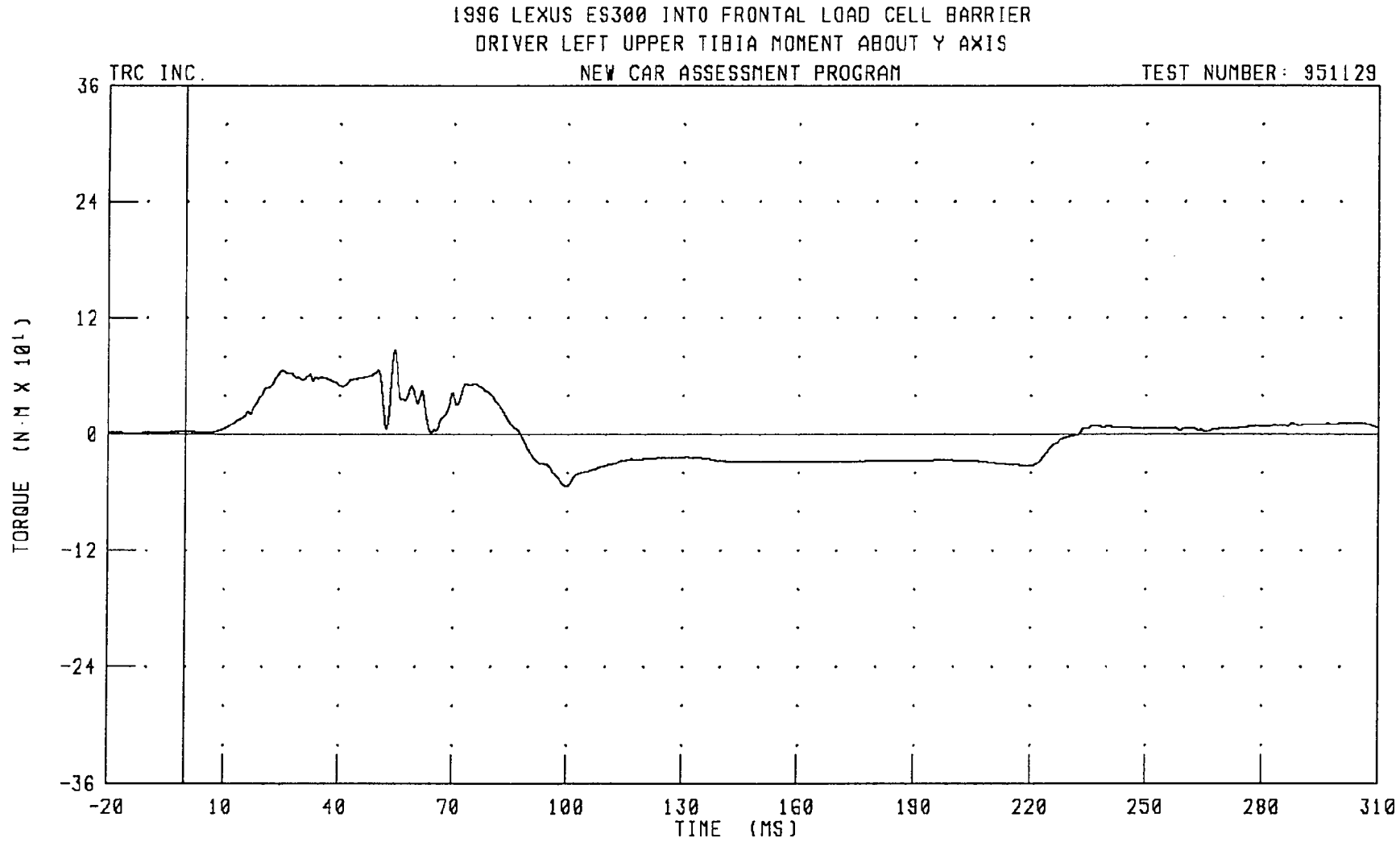
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST RESULTANT ACCELERATION - REDUNDANT



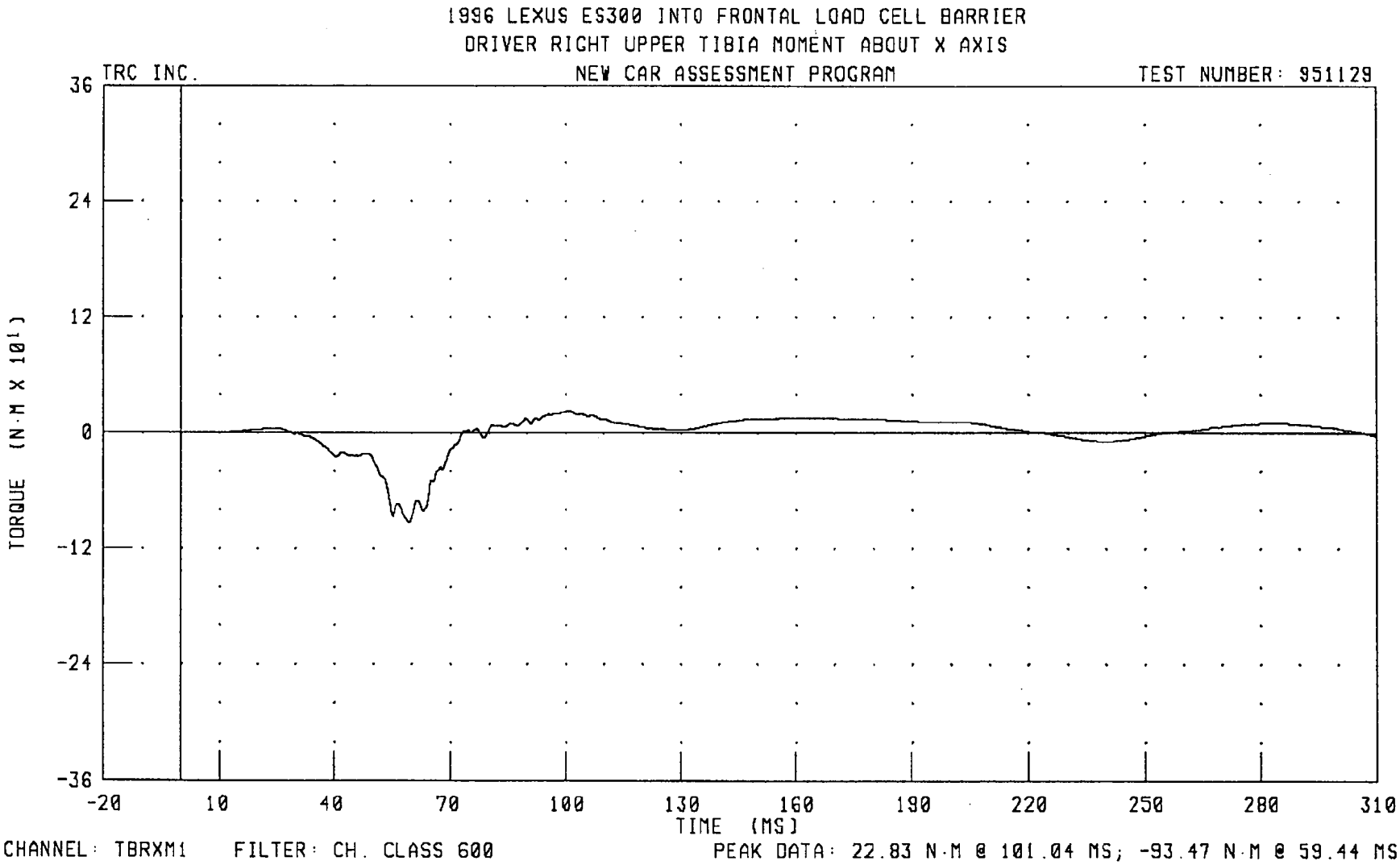
CHANNEL: CSTRR1 FILTER: CH. CLASS 180 PEAK DATA: 43.76 G @ 69.68 MS; 0.01 G @ -20.00 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
TORQUE (N-M X 10¹)
36
24
12
0
-12
-24
-36
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBLXM1
FILTER: CH. CLASS 600
PEAK DATA: 58.68 N-M @ 57.44 MS; -19.27 N-M @ 221.36 MS

951129

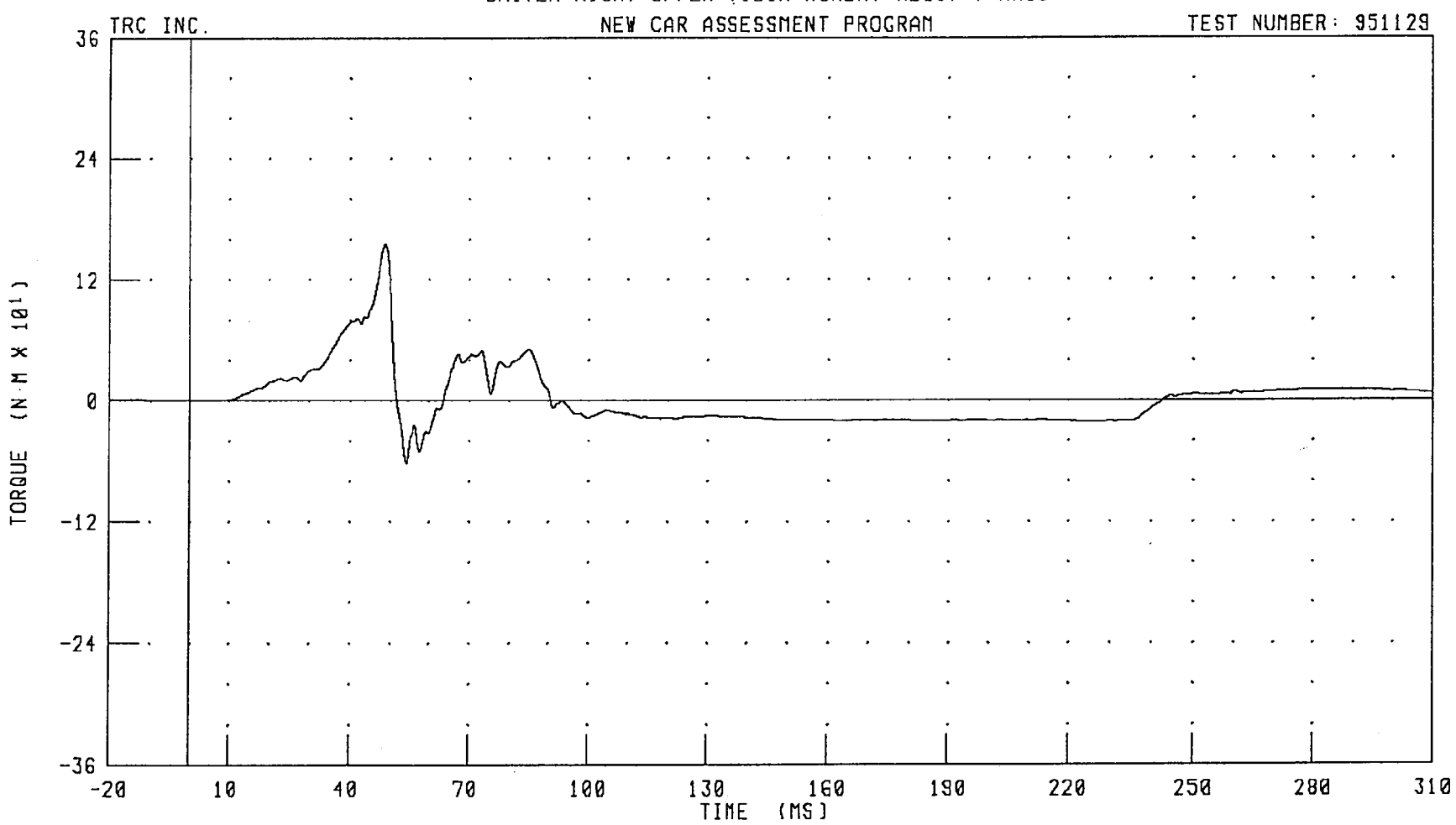

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
TORQUE (N-M X 10¹)
36
24
12
0
-12
-24
-36
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBLYM1
FILTER: CH. CLASS 600
PEAK DATA: 86.83 N-M @ 54.32 MS; -53.56 N-M @ 99.76 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
36
24
12
0
-12
-24
-36
TORQUE (N-M X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBRXM1
FILTER: CH. CLASS 600
PEAK DATA: 22.83 N-M @ 101.04 MS; -93.47 N-M @ 59.44 MS

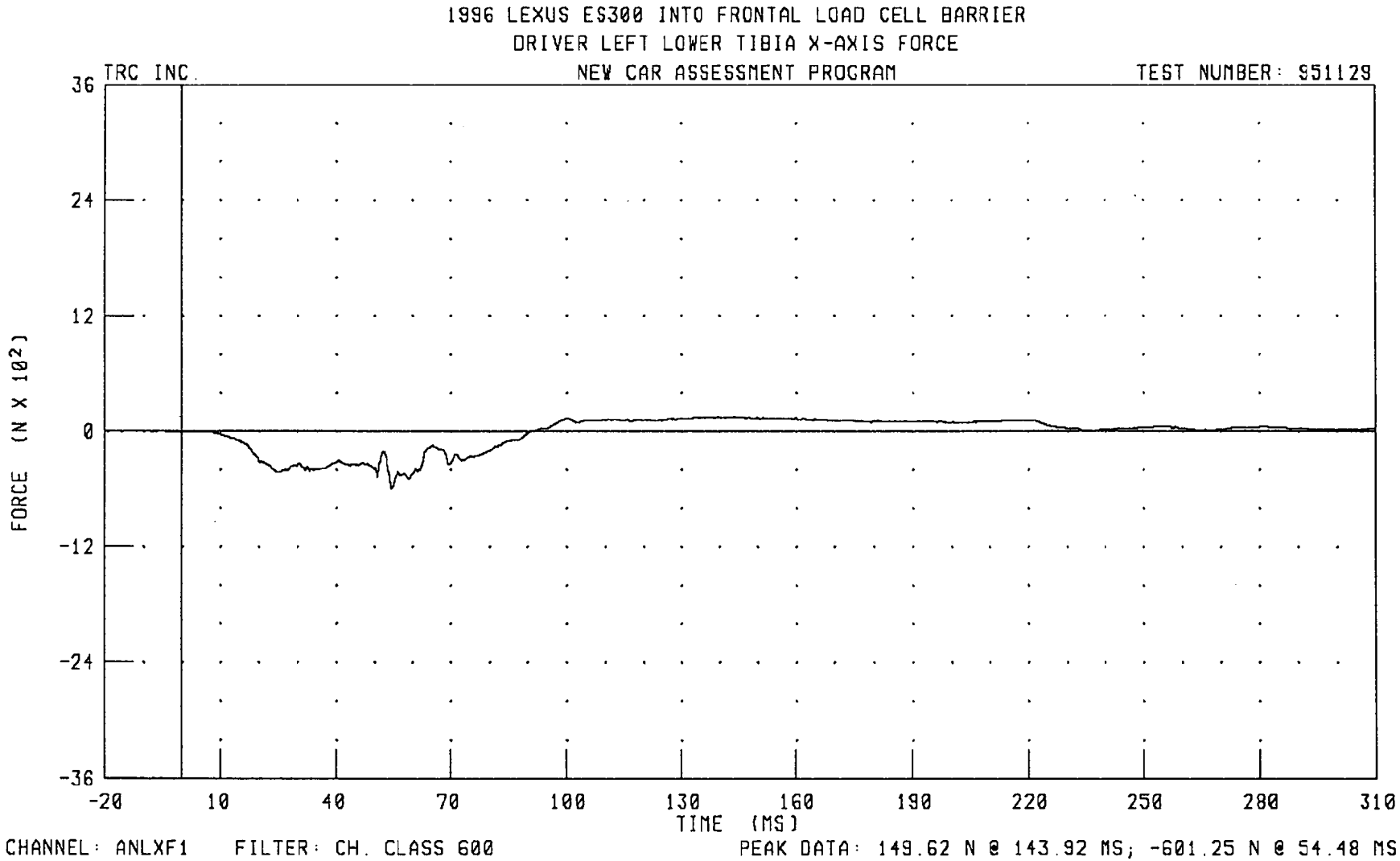
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS

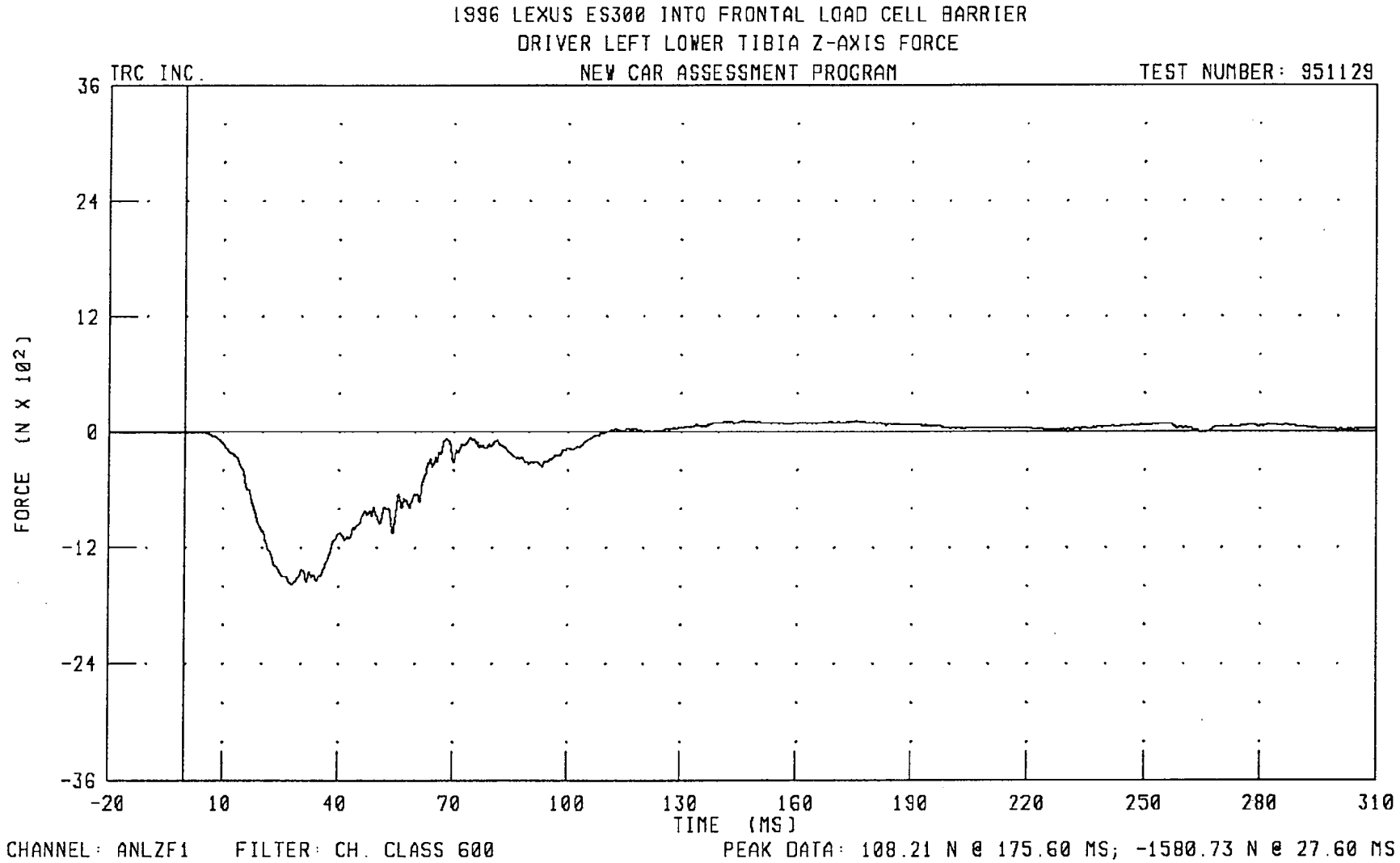


CHANNEL: TBRYM1 FILTER: CH. CLASS 600 PEAK DATA: 155.59 N·M @ 48.72 MS; -62.25 N·M @ 54.16 MS

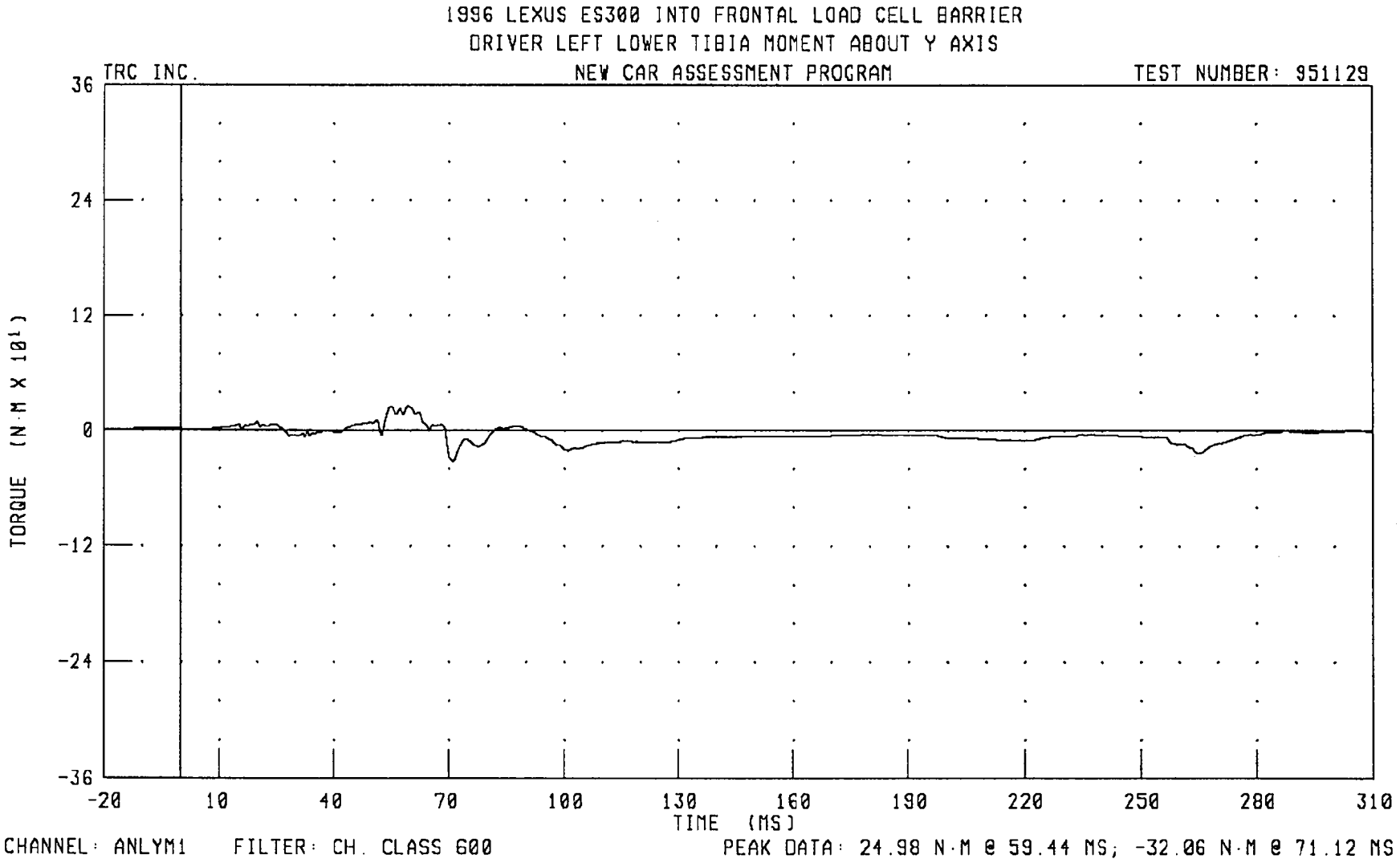
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT LOWER TIBIA X-AXIS FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
FORCE (N X 10²)
36
24
12
0
-12
-24
-36
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLXF1
FILTER: CH. CLASS 600
PEAK DATA: 149.62 N @ 143.92 MS; -601.25 N @ 54.48 MS

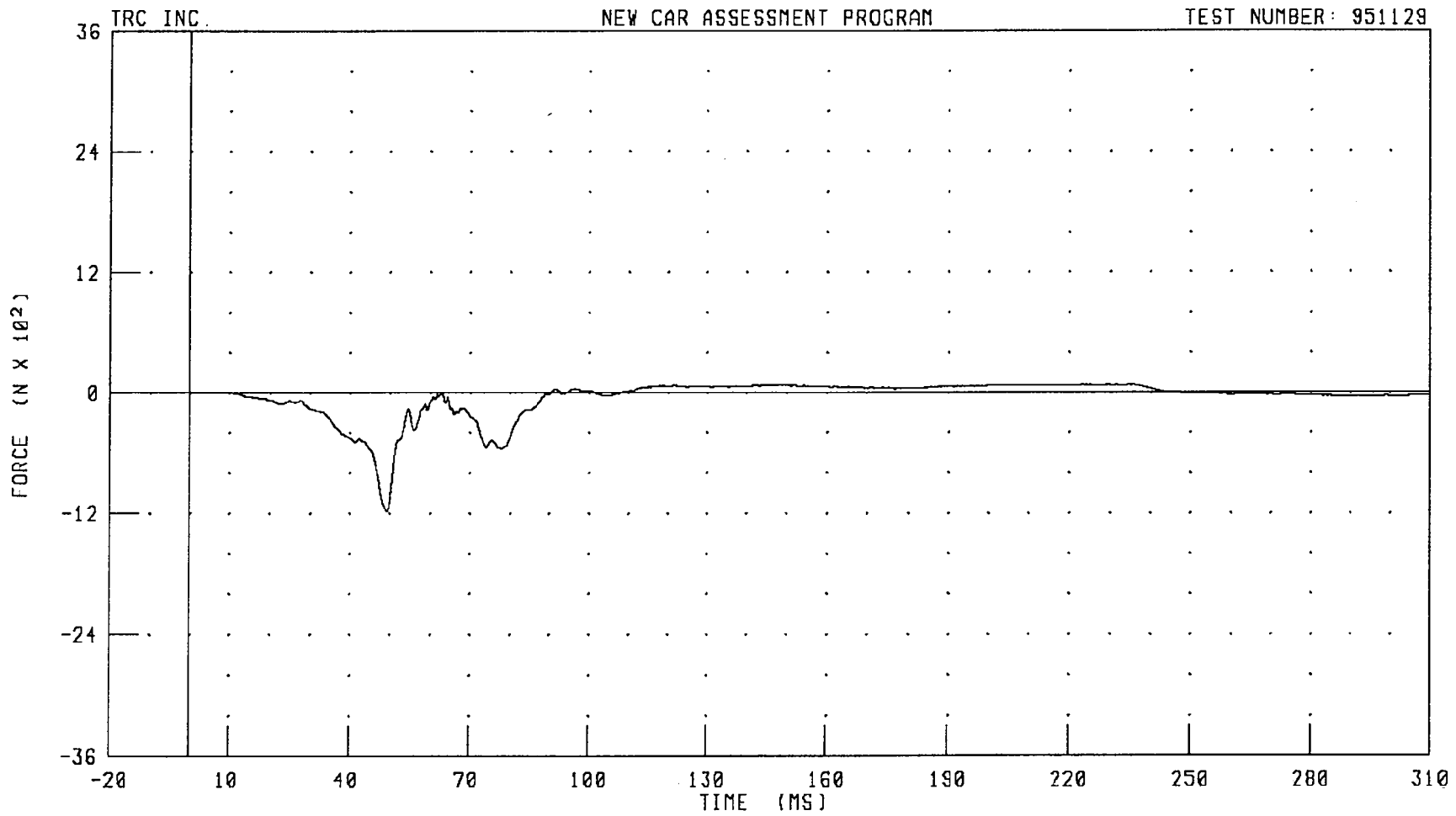
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT LOWER TIBIA Z-AXIS FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
FORCE (N X 10²)
36
24
12
0
-12
-24
-36
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLZF1
FILTER: CH. CLASS 600
PEAK DATA: 108.21 N @ 175.60 MS; -1580.73 N @ 27.60 MS

951129

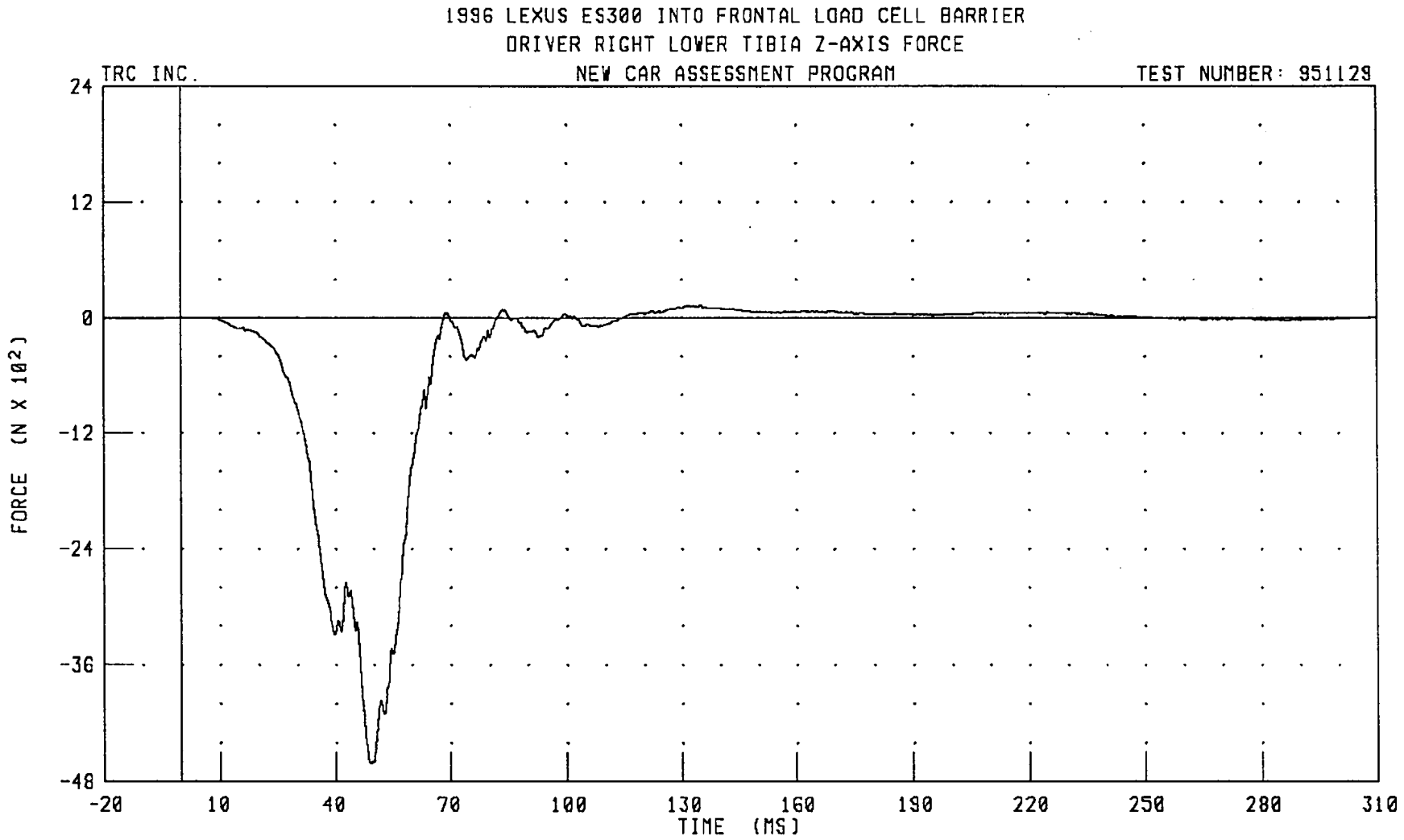

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
TORQUE (N·M X 10¹)
36
24
12
0
-12
-24
-36
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLYM1
FILTER: CH. CLASS 600
PEAK DATA: 24.98 N·M @ 59.44 MS; -32.06 N·M @ 71.12 MS

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT LOWER TIBIA X-AXIS FORCE



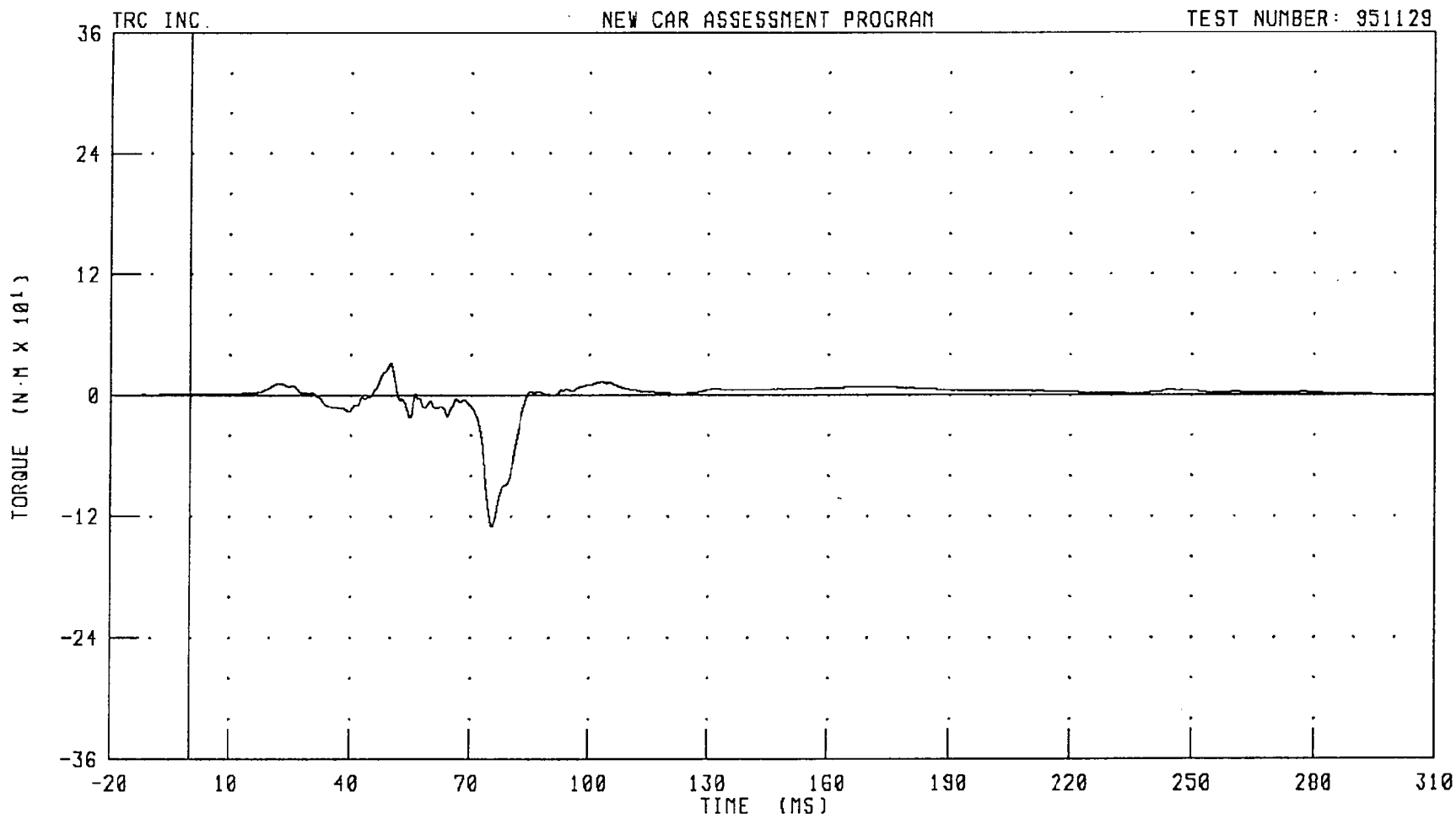
CHANNEL: ANRXF1 FILTER: CH. CLASS 600 PEAK DATA: 79.09 N @ 234.56 MS; -1174.82 N @ 49.44 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT LOWER TIBIA Z-AXIS FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
24
12
0
-12
-24
-36
-48
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRZF1
FILTER: CH. CLASS 600
PEAK DATA: 129.12 N @ 135.04 MS; -4612.96 N @ 49.12 MS

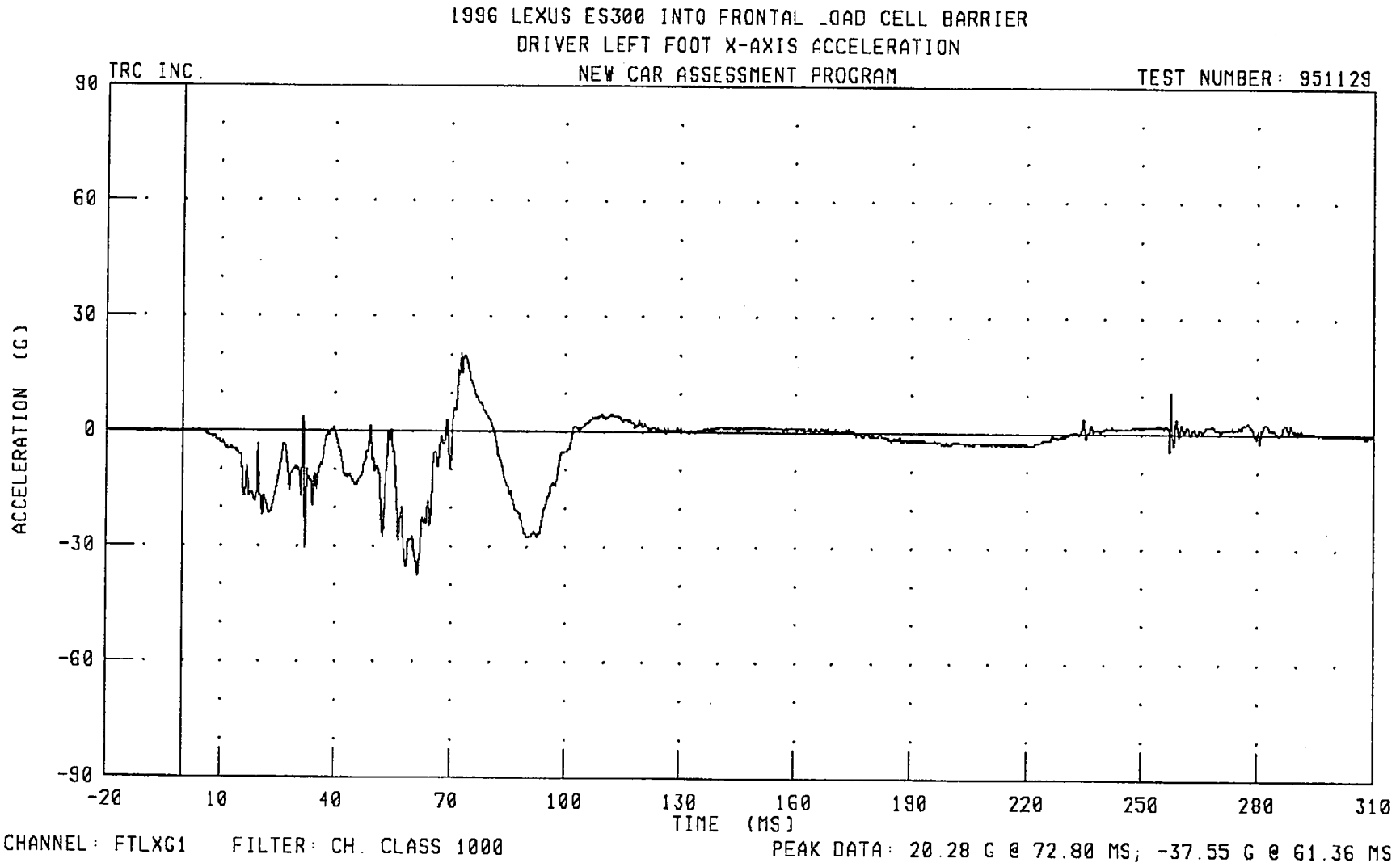
951129

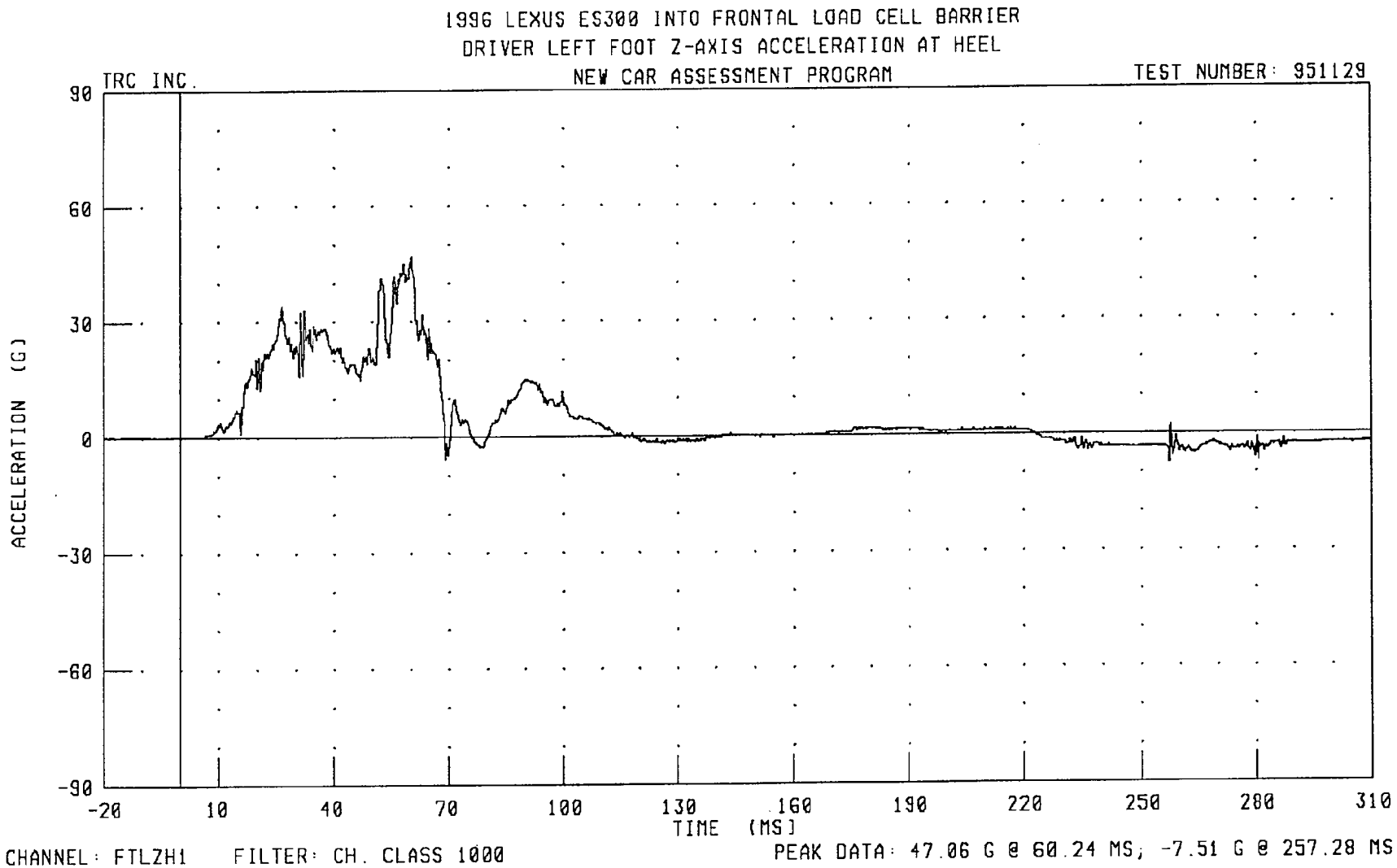
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS



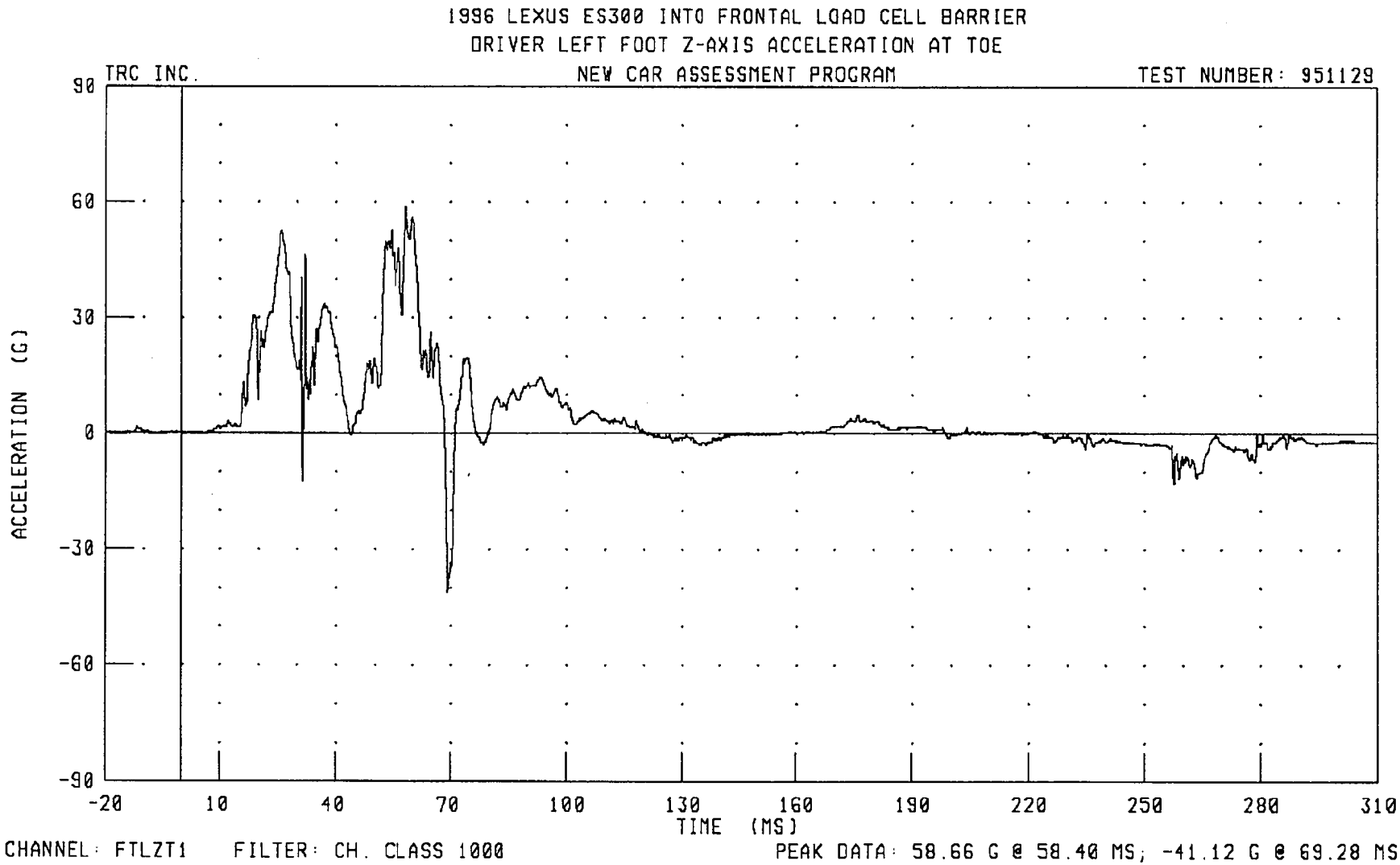
CHANNEL: ANRYM1 FILTER: CH. CLASS 600 PEAK DATA: 31.99 N-M @ 50.00 MS; -129.88 N-M @ 75.36 MS

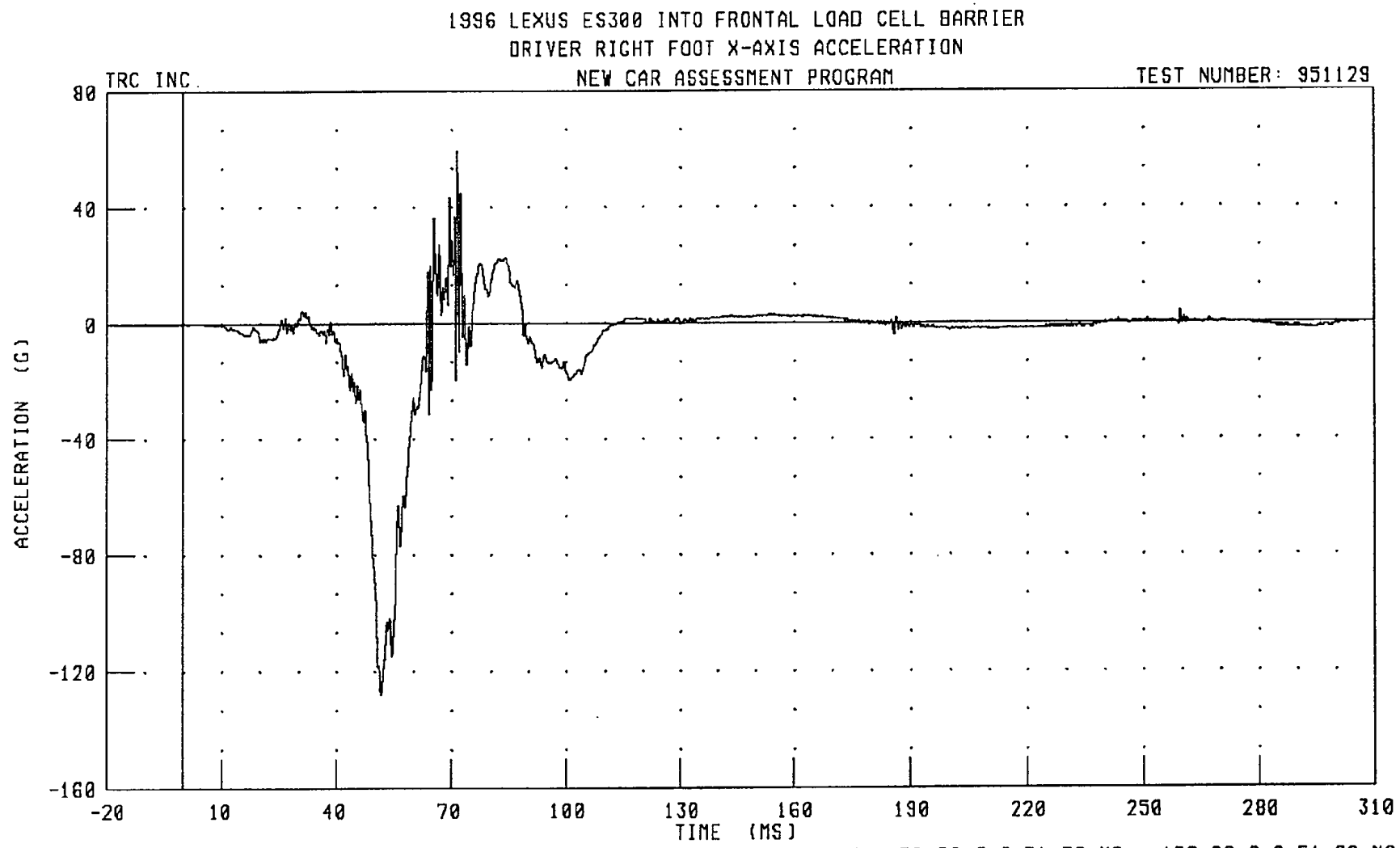
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FOOT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLXG1
FILTER: CH. CLASS 1000
PEAK DATA: 20.28 G @ 72.80 MS; -37.55 G @ 61.36 MS

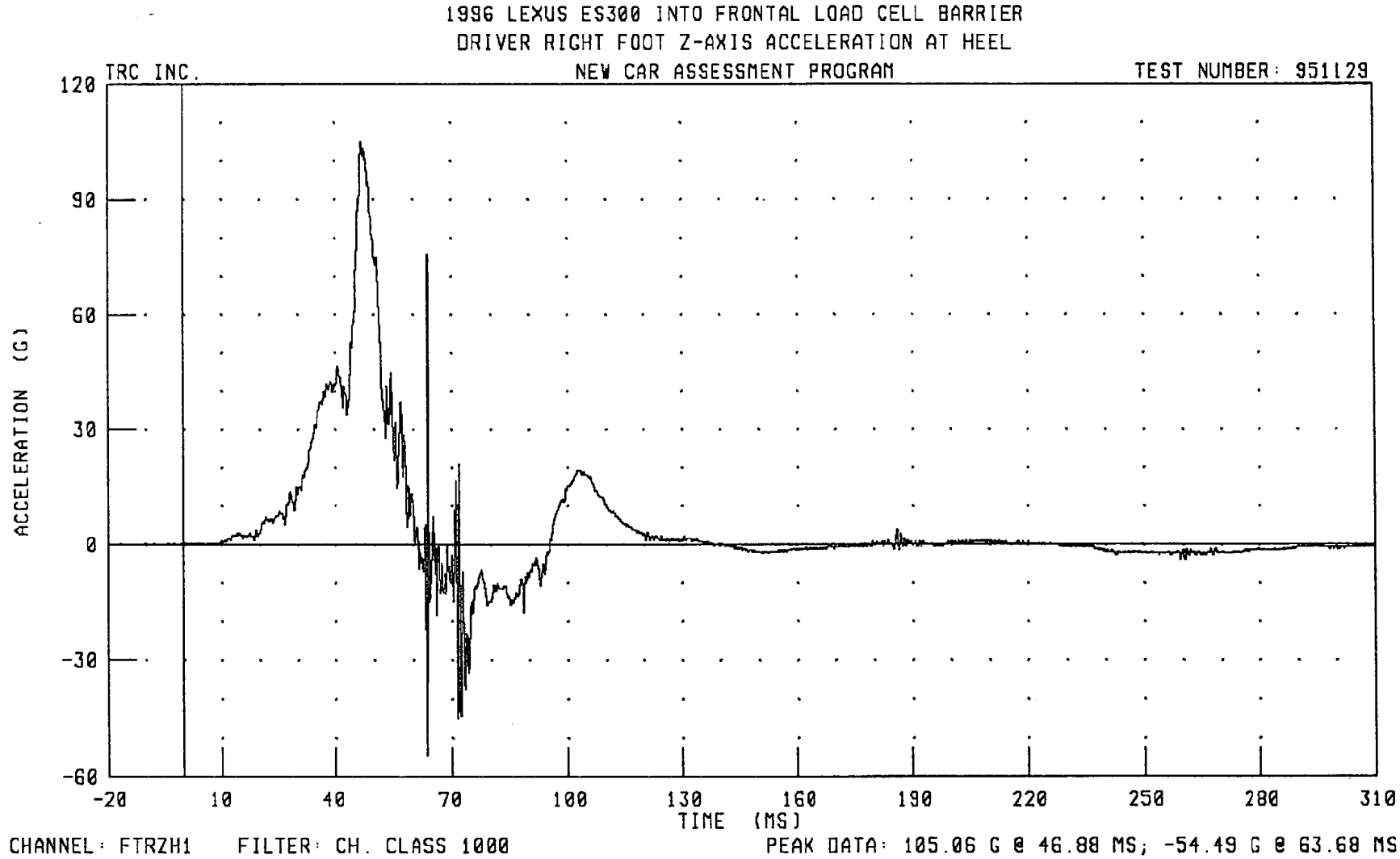

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FOOT Z-AXIS ACCELERATION AT HEEL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLZH1
FILTER: CH. CLASS 1000
PEAK DATA: 47.06 G @ 60.24 MS; -7.51 G @ 257.28 MS

951129

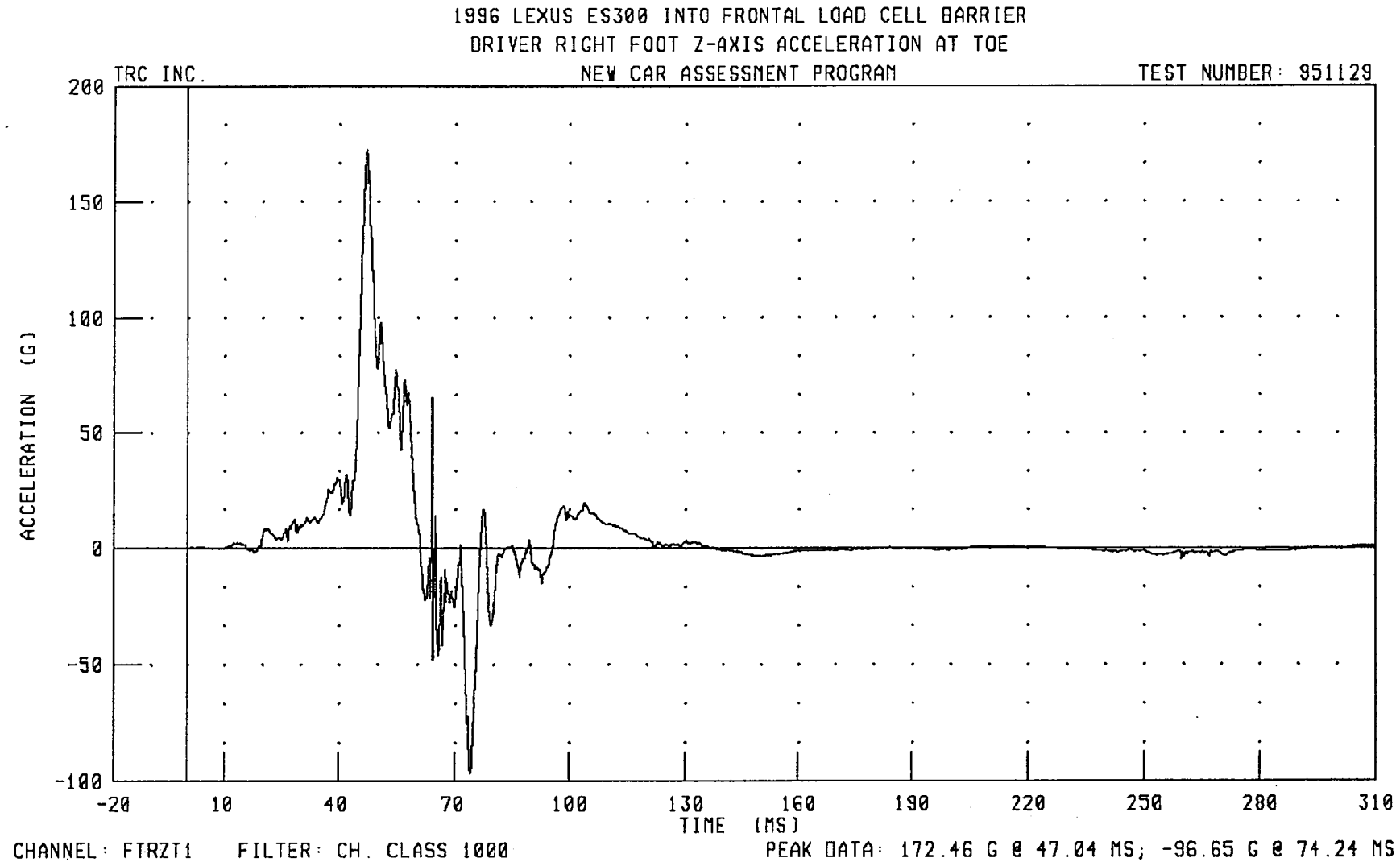

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FOOT Z-AXIS ACCELERATION AT TOE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLZT1
FILTER: CH. CLASS 1000
PEAK DATA: 58.66 G @ 58.40 MS; -41.12 G @ 69.28 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FOOT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
80
40
0
-40
-80
-120
-160
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRXG1
FILTER: CH. CLASS 1000
PEAK DATA: 59.32 G @ 71.52 MS; -128.20 G @ 51.68 MS

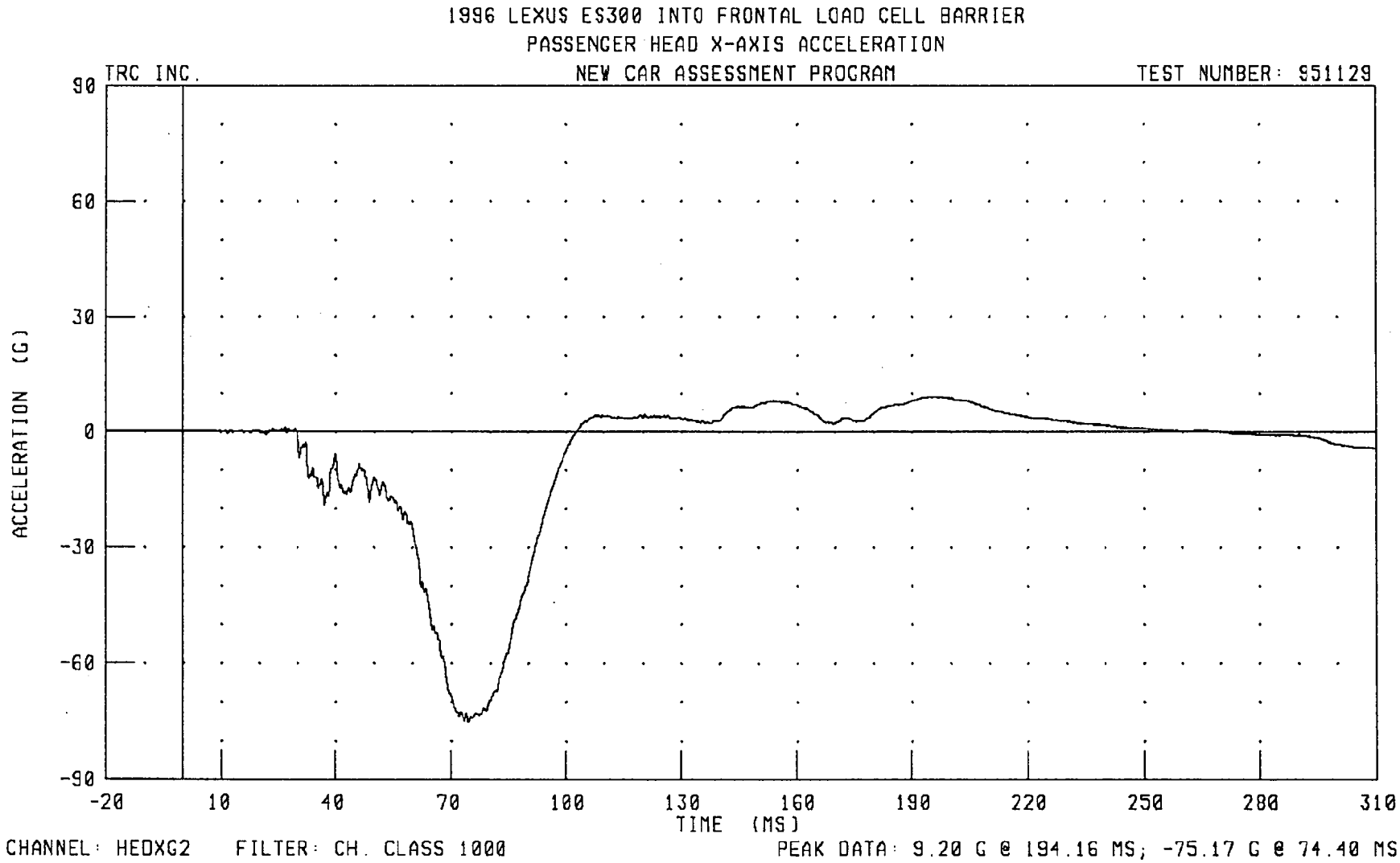
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FOOT Z-AXIS ACCELERATION AT HEEL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
90
60
30
0
-30
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRZH1
FILTER: CH. CLASS 1000
PEAK DATA: 105.06 G @ 46.88 MS; -54.49 G @ 63.68 MS

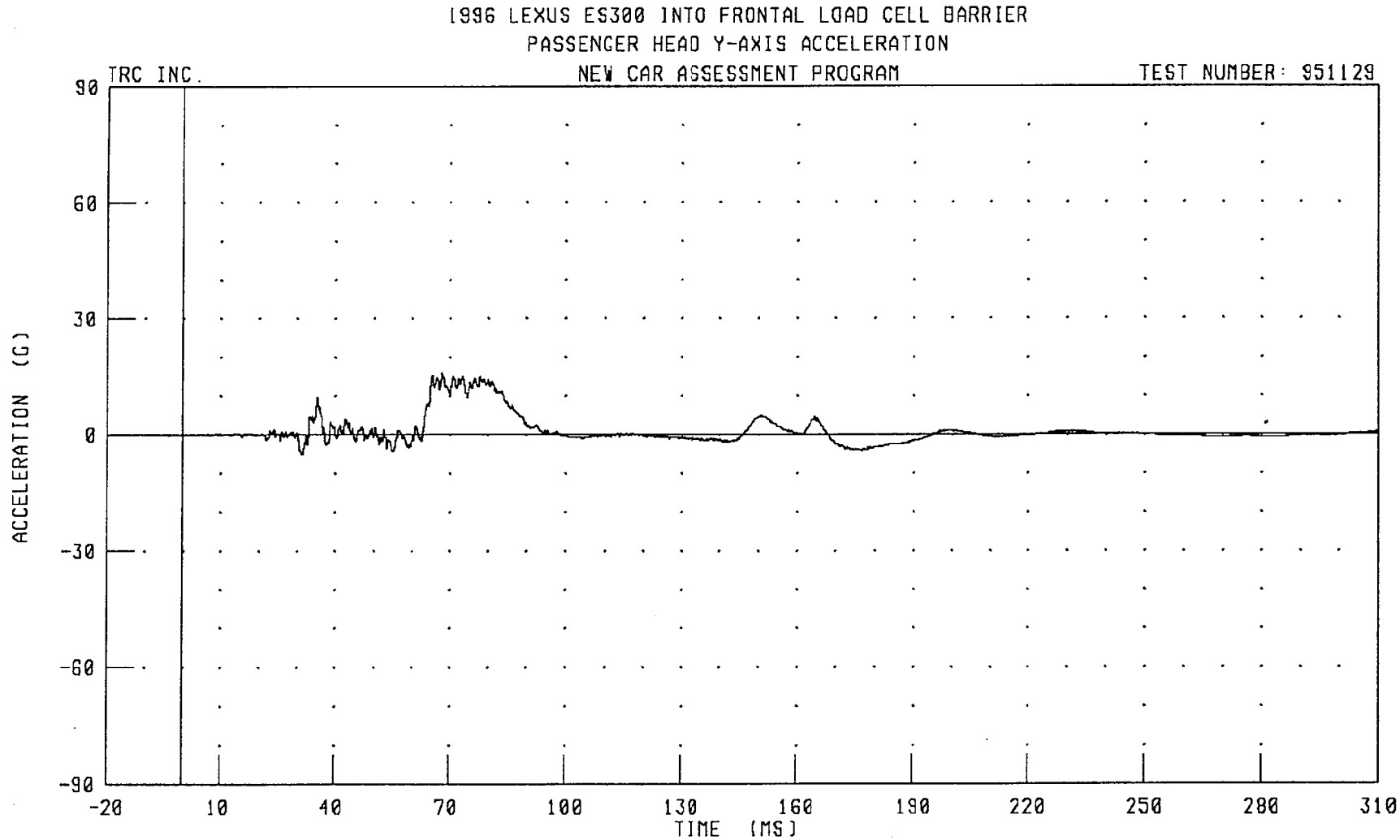
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FOOT Z-AXIS ACCELERATION AT TOE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
200
150
100
50
0
-50
-100
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRZT1
FILTER: CH. CLASS 1000
PEAK DATA: 172.46 G @ 47.04 MS; -96.65 G @ 74.24 MS

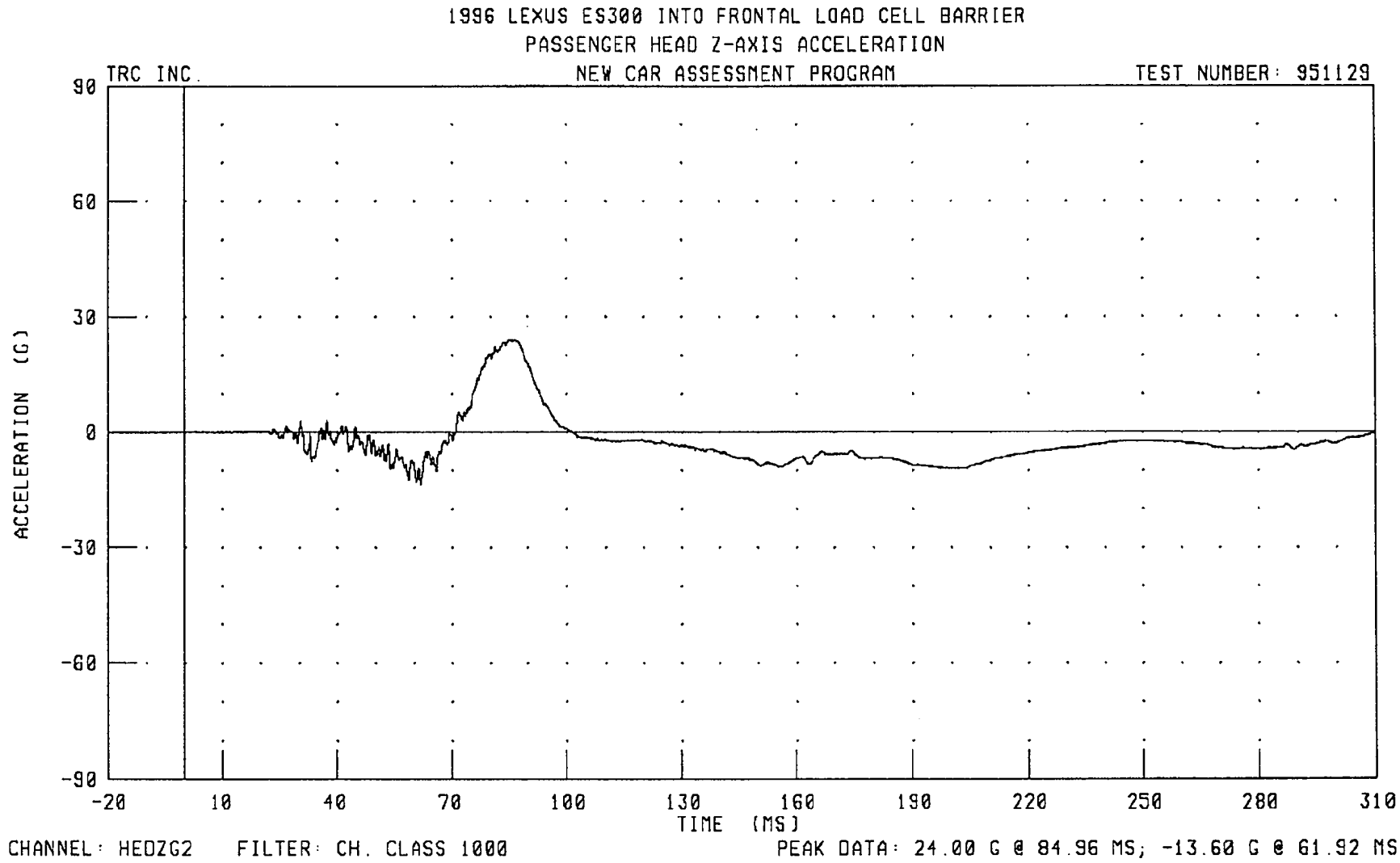
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG2
FILTER: CH. CLASS 1000
PEAK DATA: 9.20 G @ 194.16 MS; -75.17 G @ 74.40 MS

951129

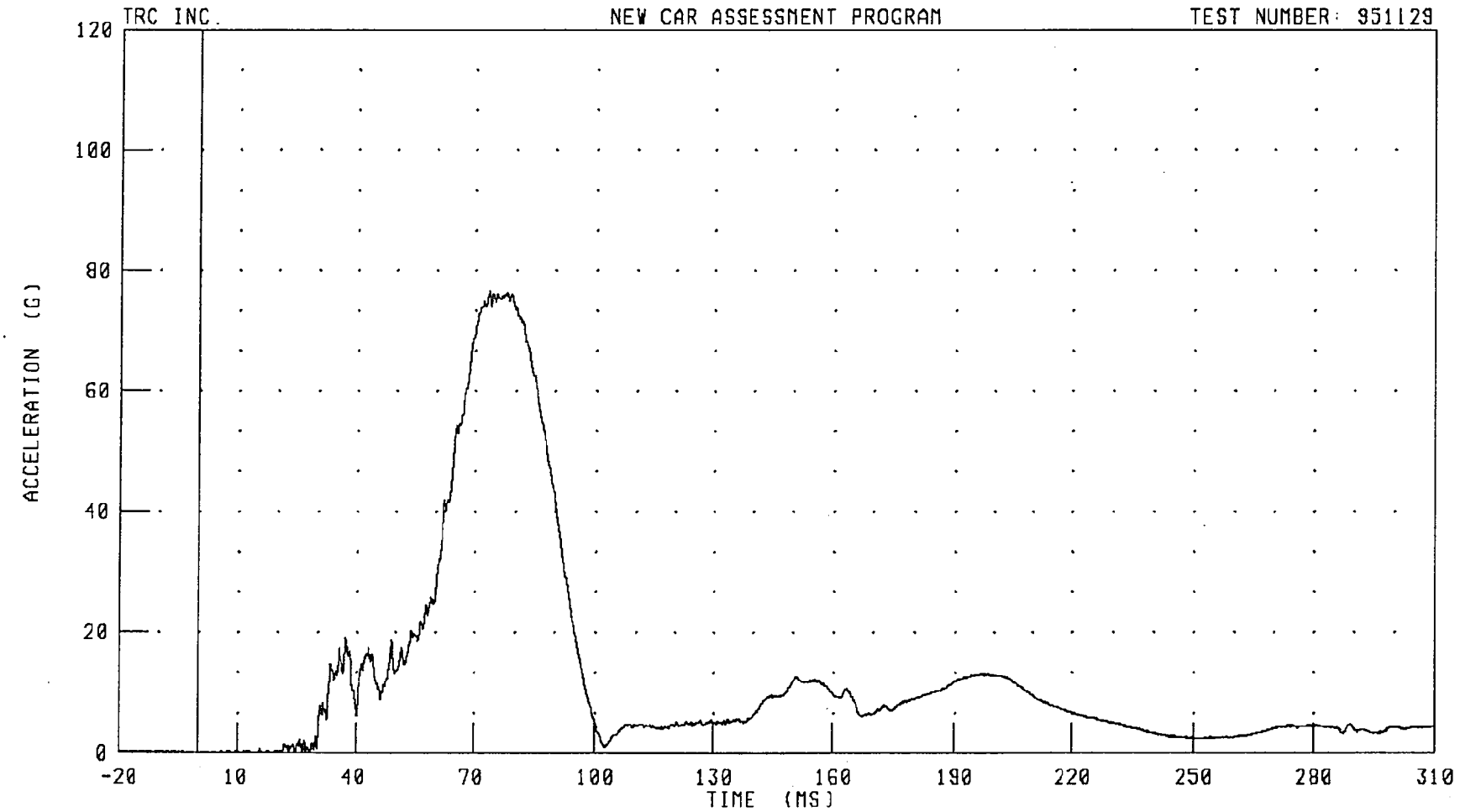

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG2
FILTER: CH. CLASS 1000
PEAK DATA: 15.93 G @ 68.00 MS; -5.16 G @ 31.12 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG2
FILTER: CH. CLASS 1000
PEAK DATA: 24.00 G @ 84.96 MS; -13.60 G @ 61.92 MS

951129

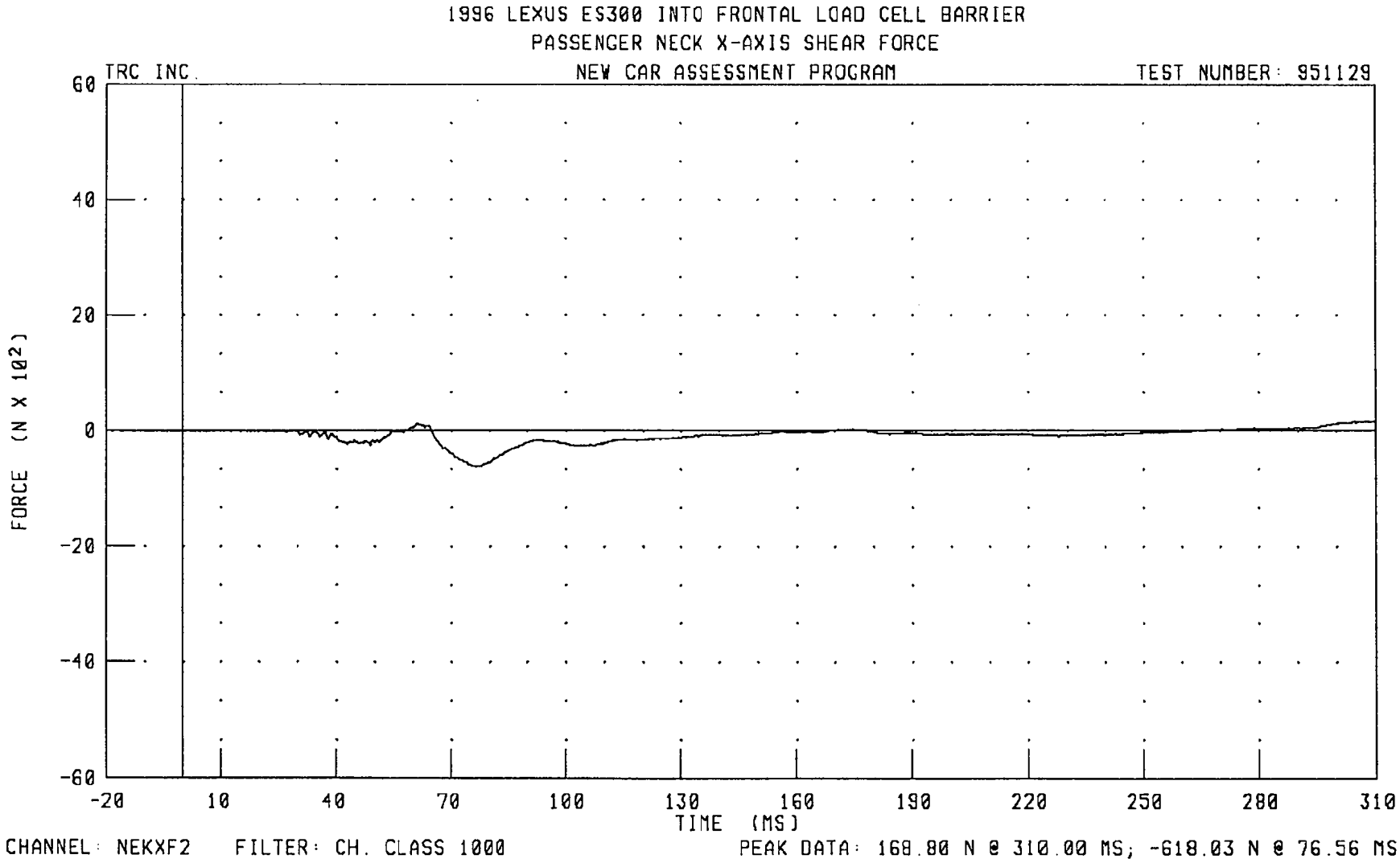
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION



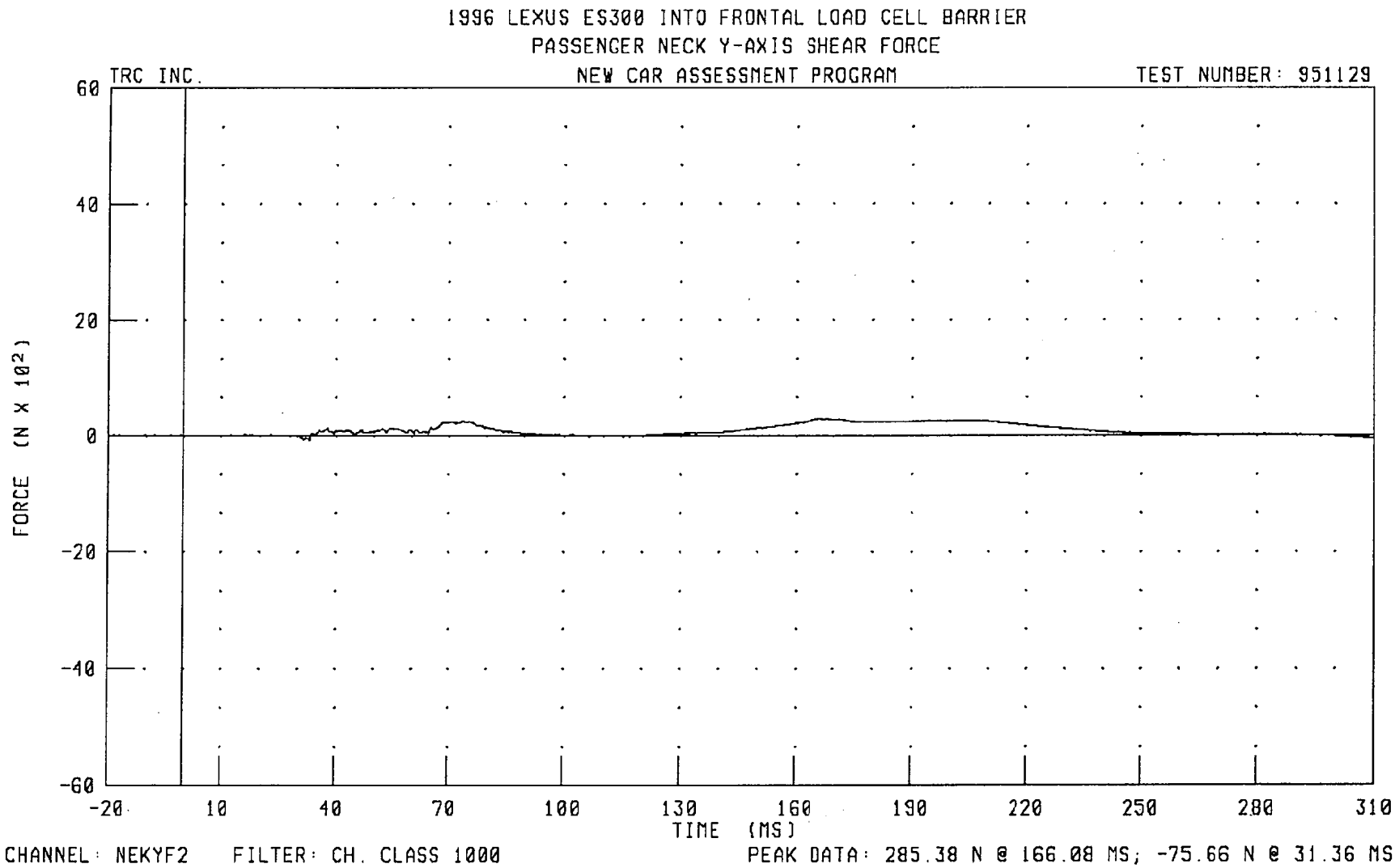
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000 PEAK DATA: 76.56 G @ 73.52 MS; 0.06 G @ -7.68 MS

8-50

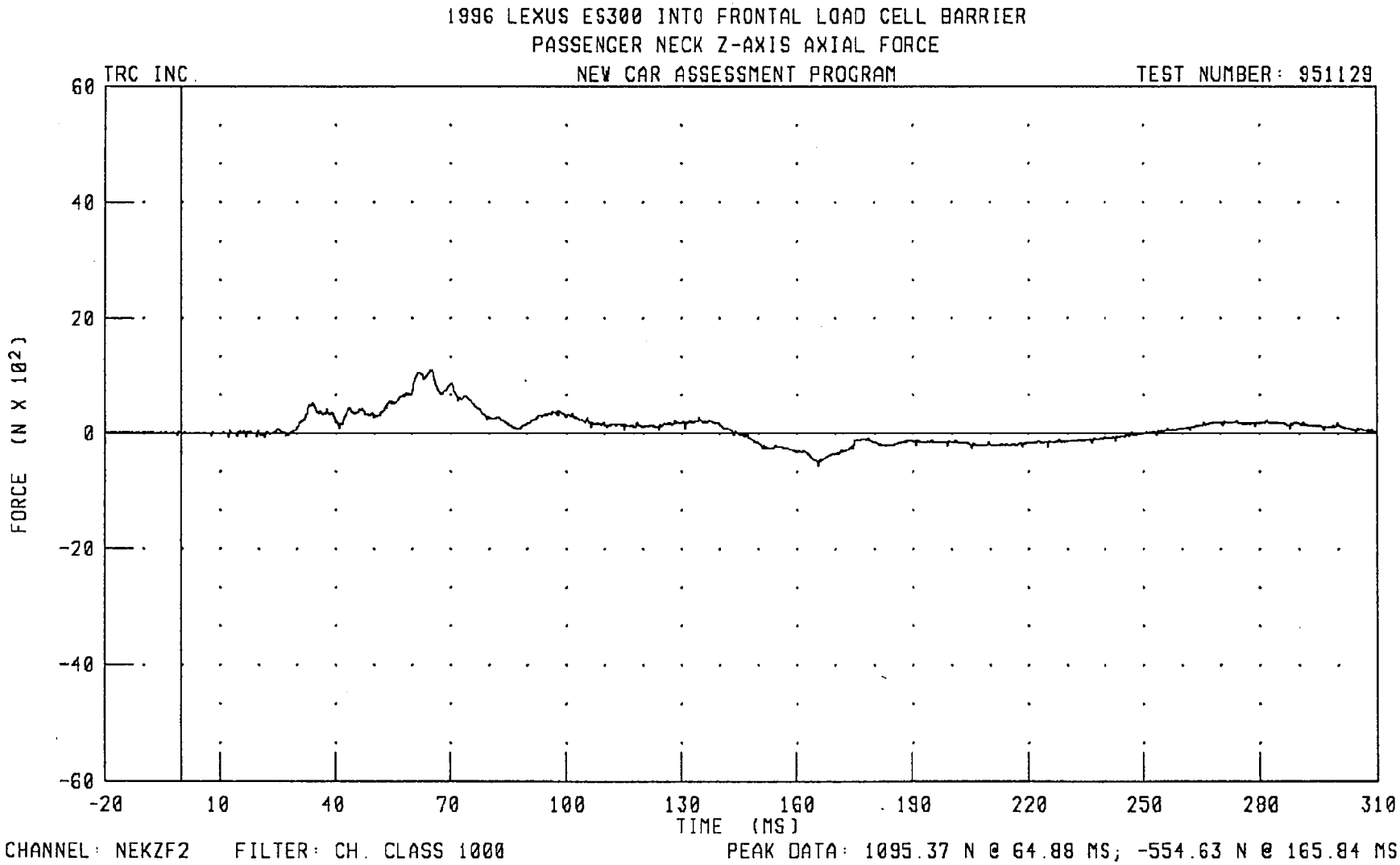
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK X-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXF2
FILTER: CH. CLASS 1000
PEAK DATA: 168.80 N @ 310.00 MS; -618.03 N @ 76.56 MS

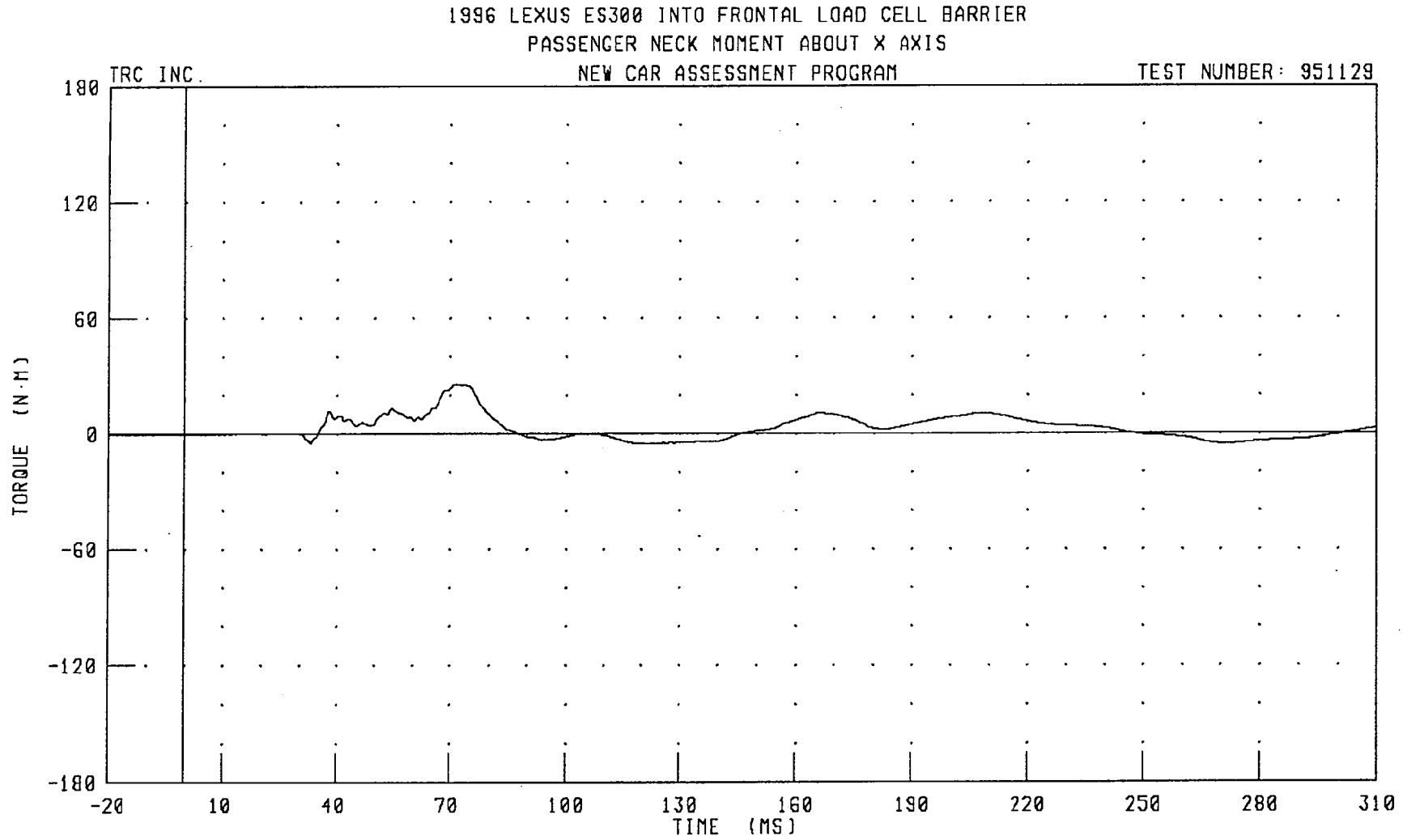
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYF2
FILTER: CH. CLASS 1000
PEAK DATA: 285.38 N @ 166.08 MS; -75.66 N @ 31.36 MS

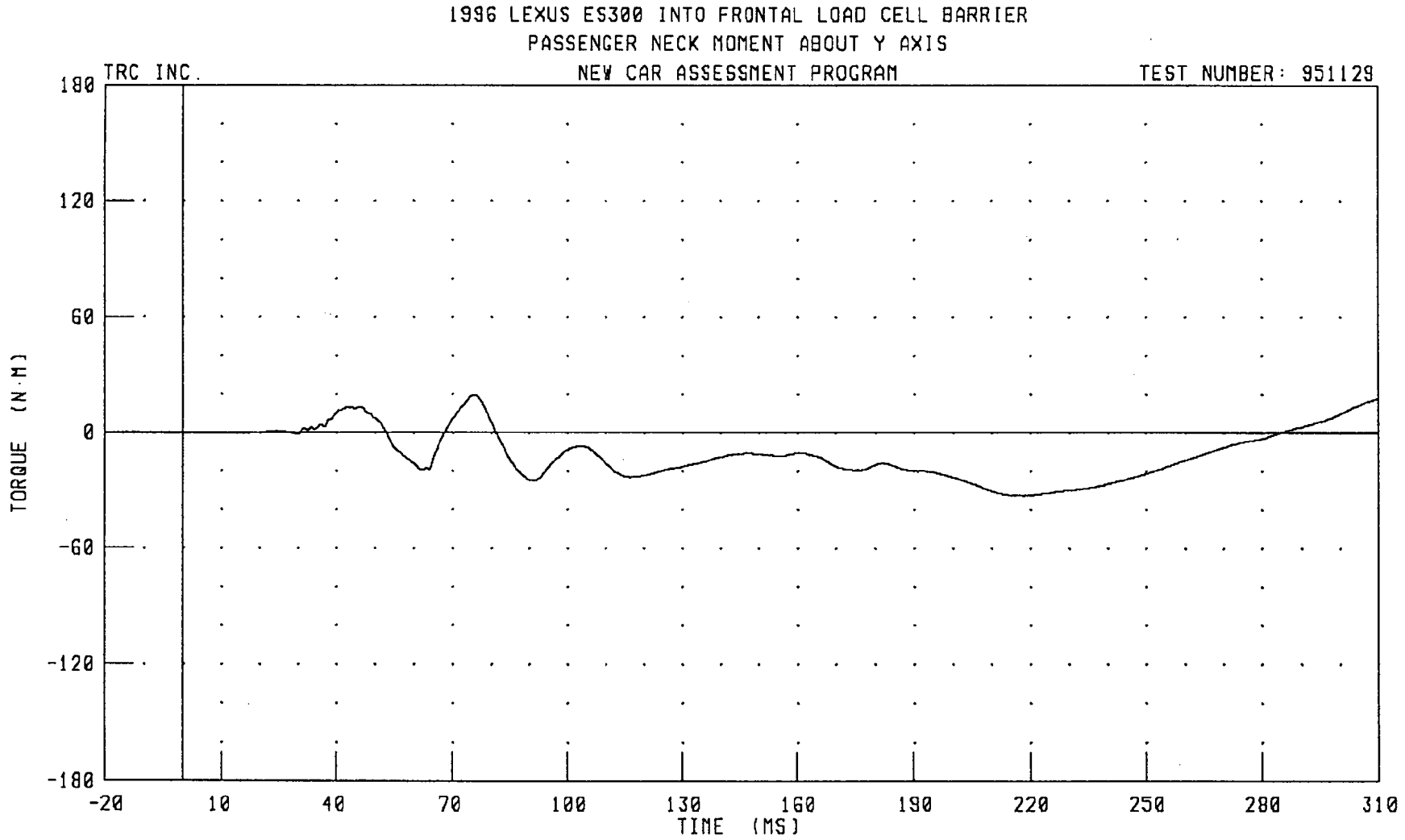
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZF2
FILTER: CH. CLASS 1000
PEAK DATA: 1095.37 N @ 64.88 MS; -554.63 N @ 165.84 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXM2
FILTER: CH. CLASS 600
PEAK DATA: 25.56 N-M @ 71.44 MS; -5.53 N-M @ 272.08 MS

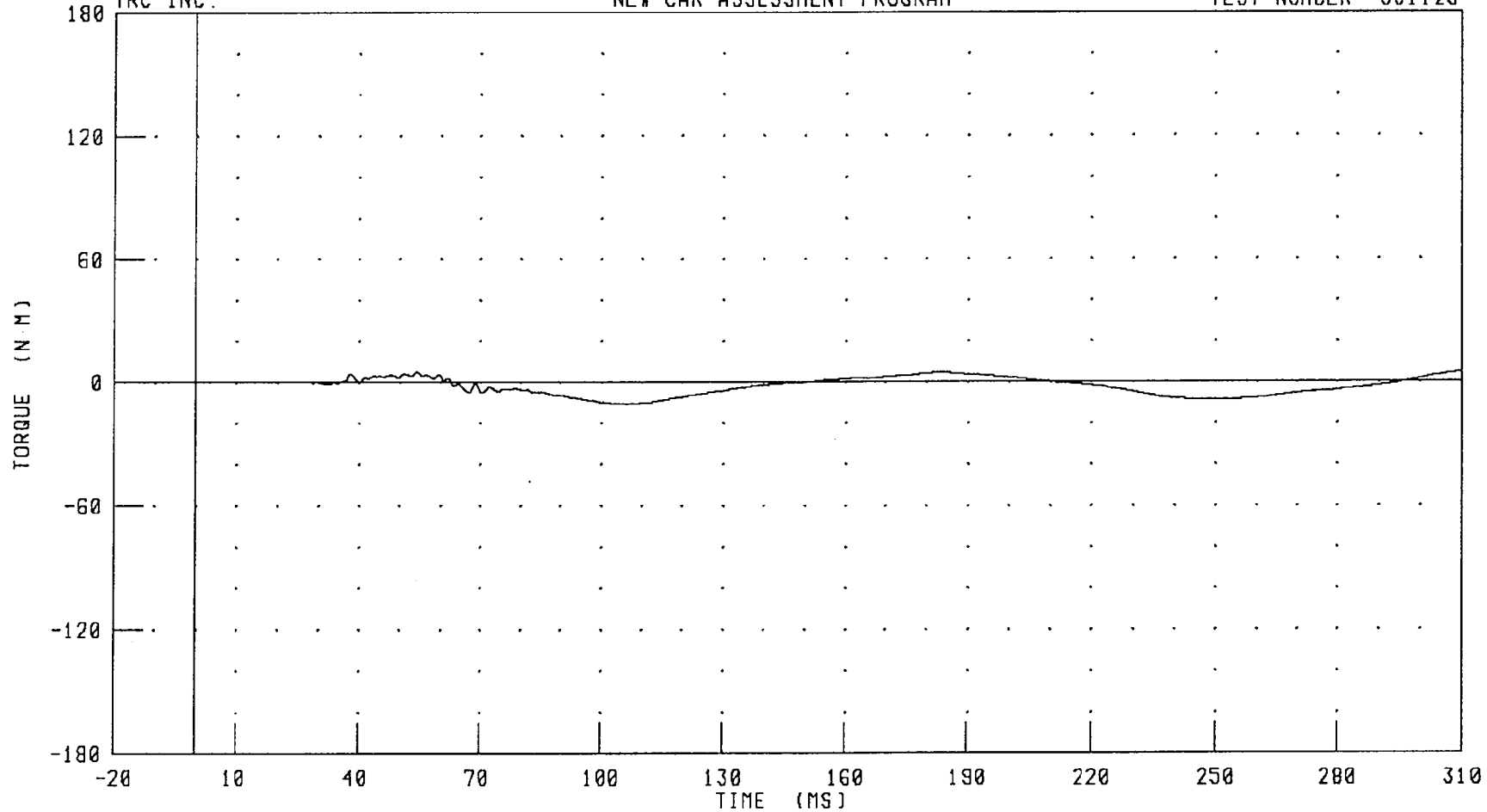
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYM2
FILTER: CH. CLASS 600
PEAK DATA: 19.39 N-M @ 75.60 MS; -32.81 N-M @ 218.48 MS

951129

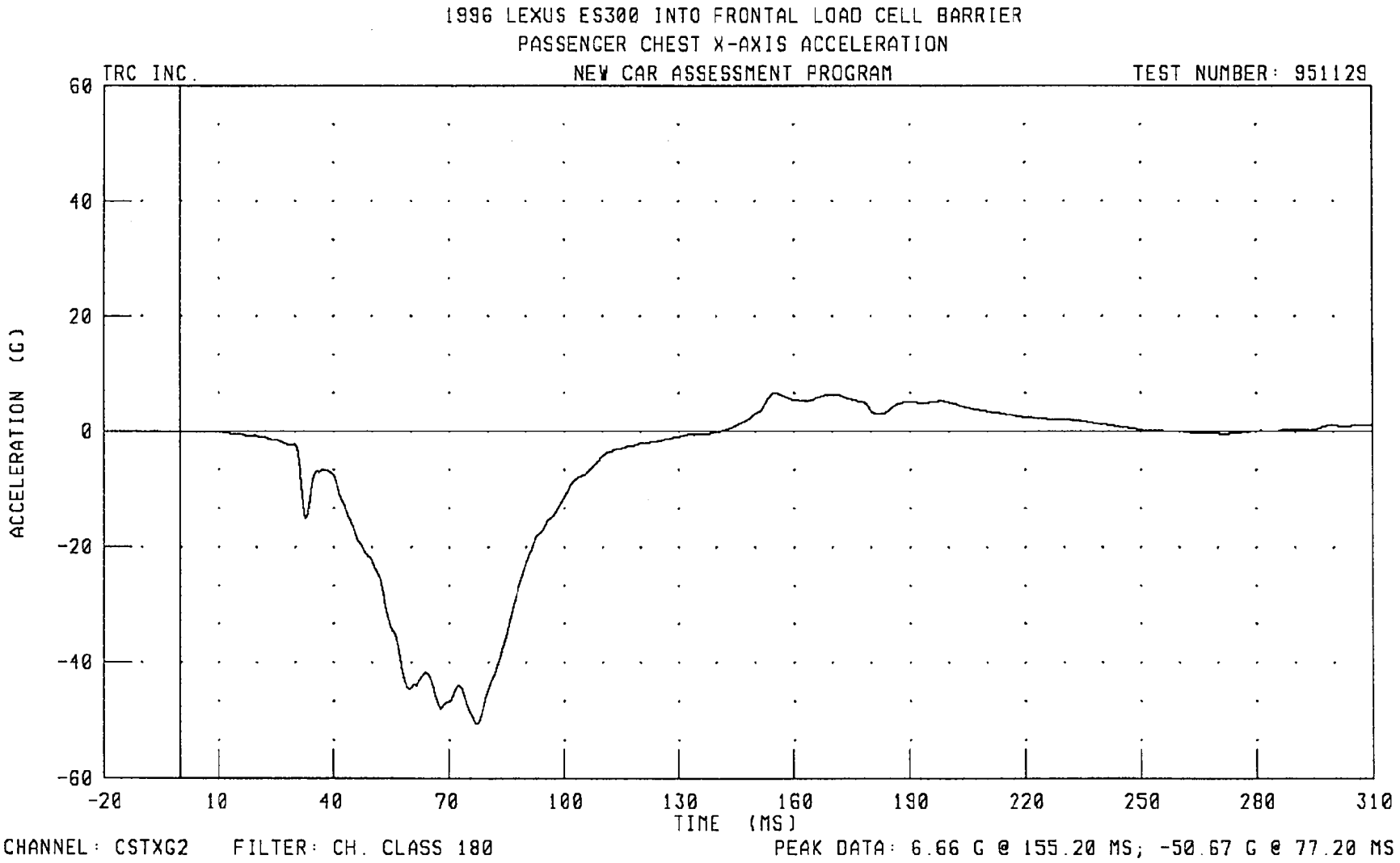
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS

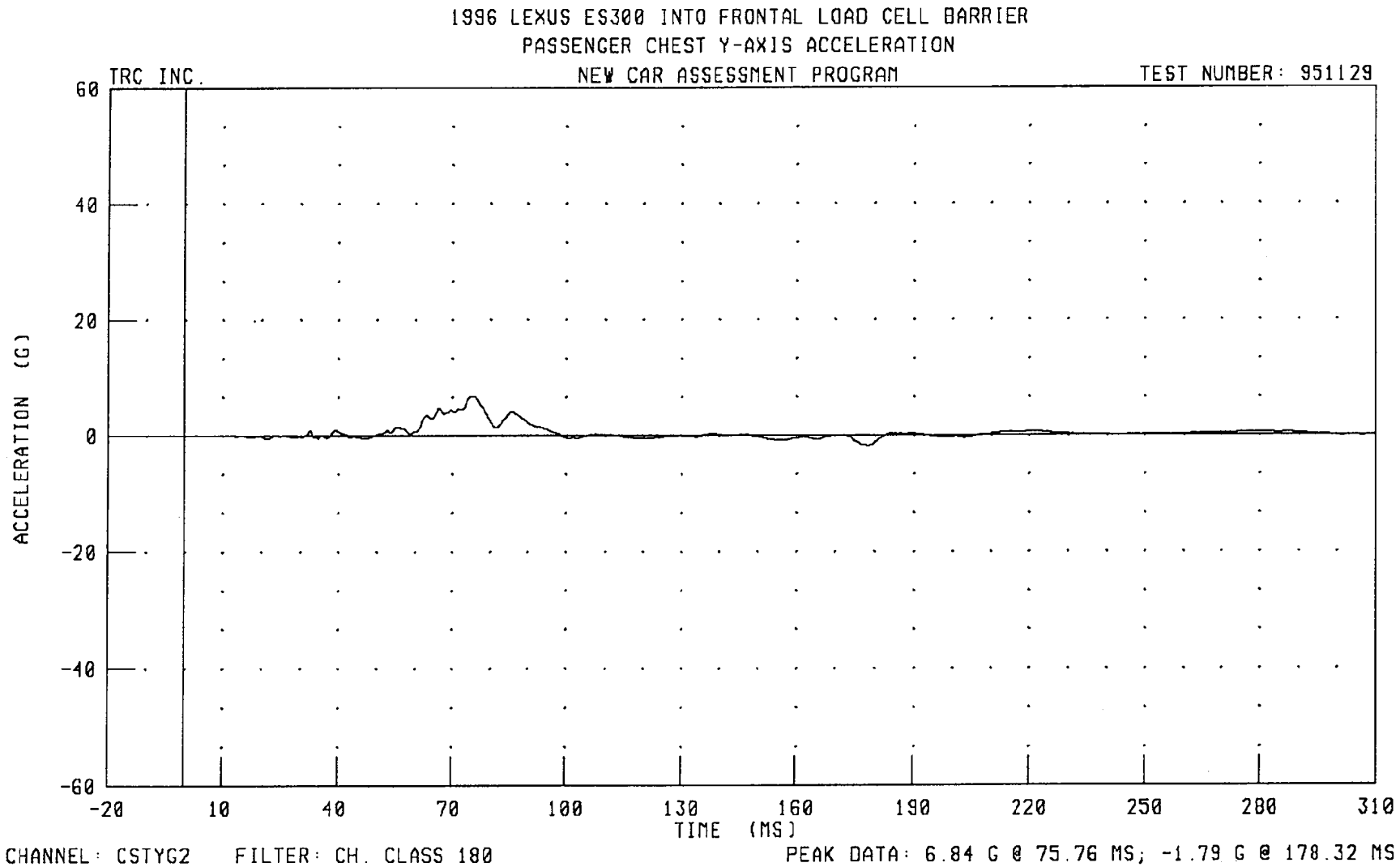
TRC INC. NEW CAR ASSESSMENT PROGRAM TEST NUMBER: 951129



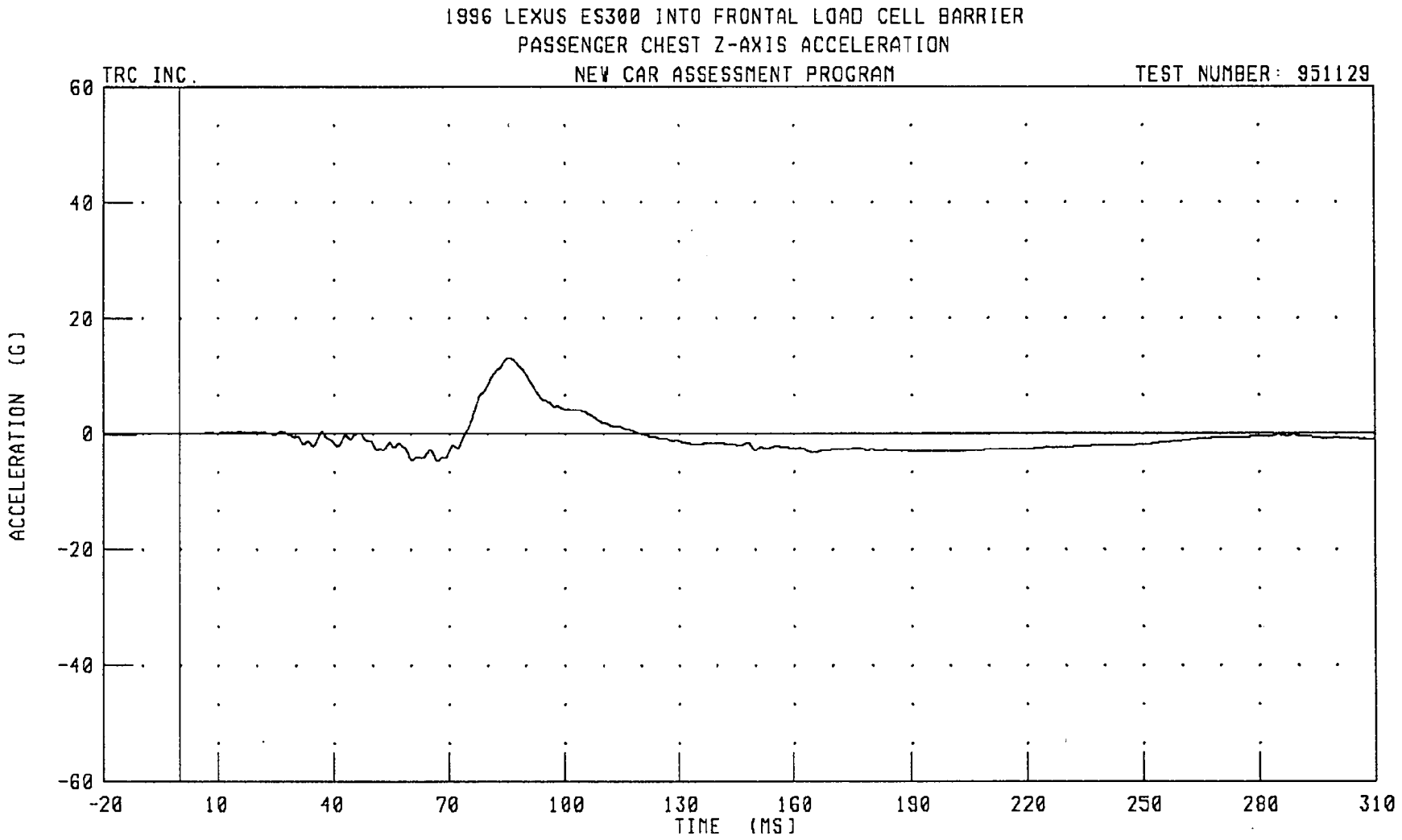
CHANNEL: NEKZM2 FILTER: CH. CLASS 600 PEAK DATA: 4.88 N-M @ 54.16 MS; -10.92 N-M @ 106.32 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG2
FILTER: CH. CLASS 180
PEAK DATA: 6.66 G @ 155.20 MS; -50.67 G @ 77.20 MS

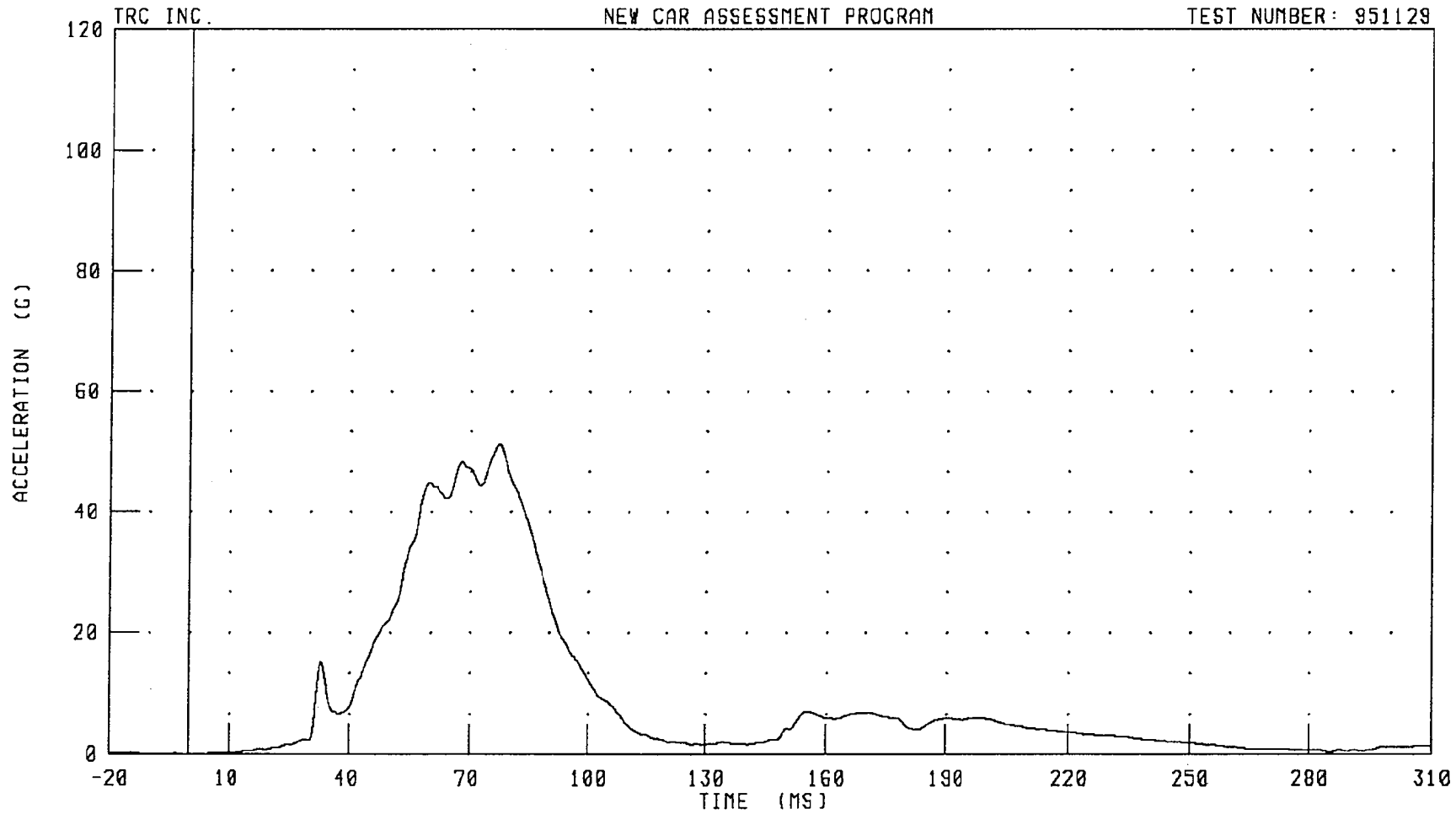

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG2
FILTER: CH. CLASS 180
PEAK DATA: 6.84 G @ 75.76 MS; -1.79 G @ 178.32 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG2
FILTER: CH. CLASS 180
PEAK DATA: 13.11 G @ 85.76 MS; -4.81 G @ 67.04 MS

951129

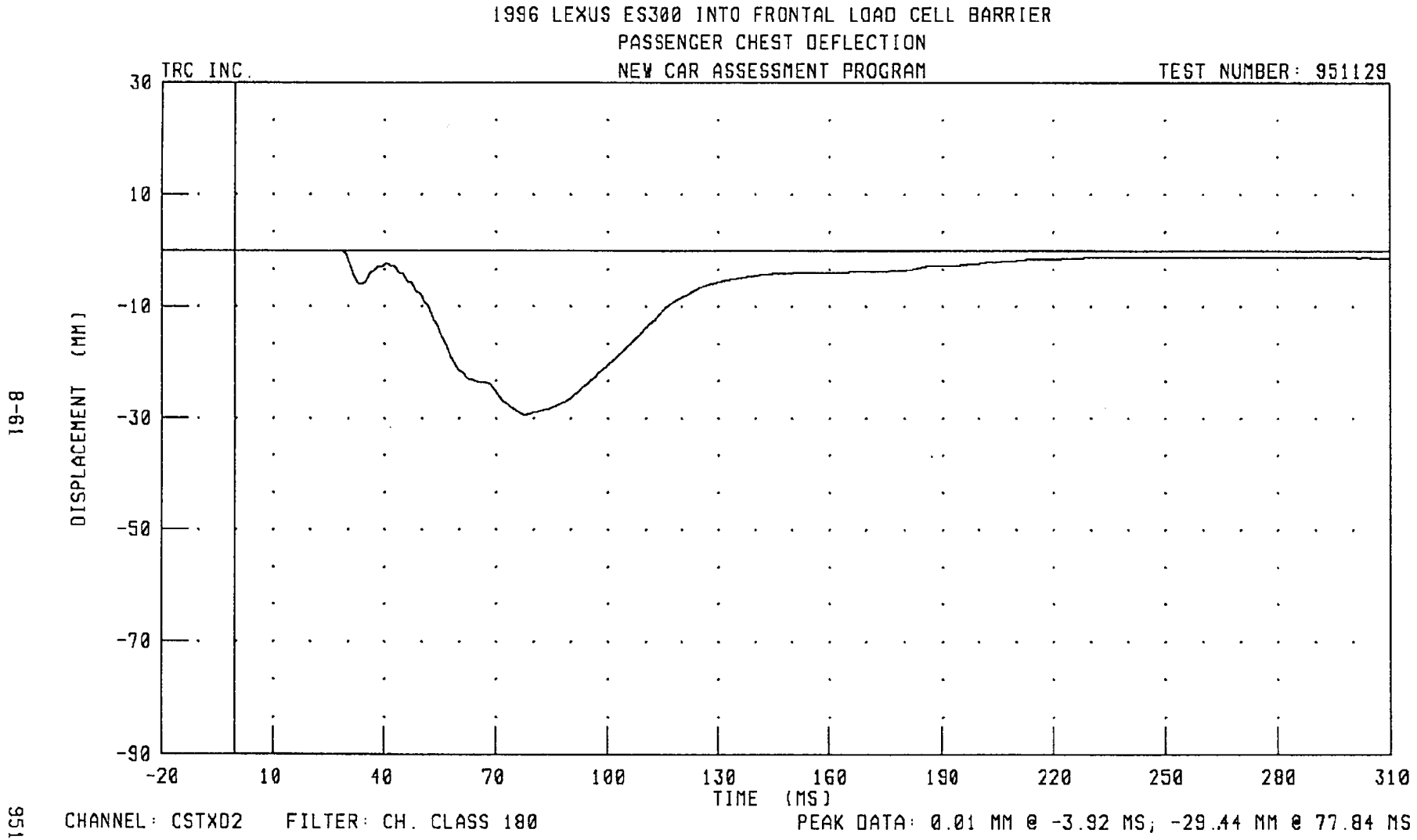
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG2 FILTER: CH. CLASS 180 PEAK DATA: 51.22 G @ 77.20 MS; 0.01 G @ -20.00 MS

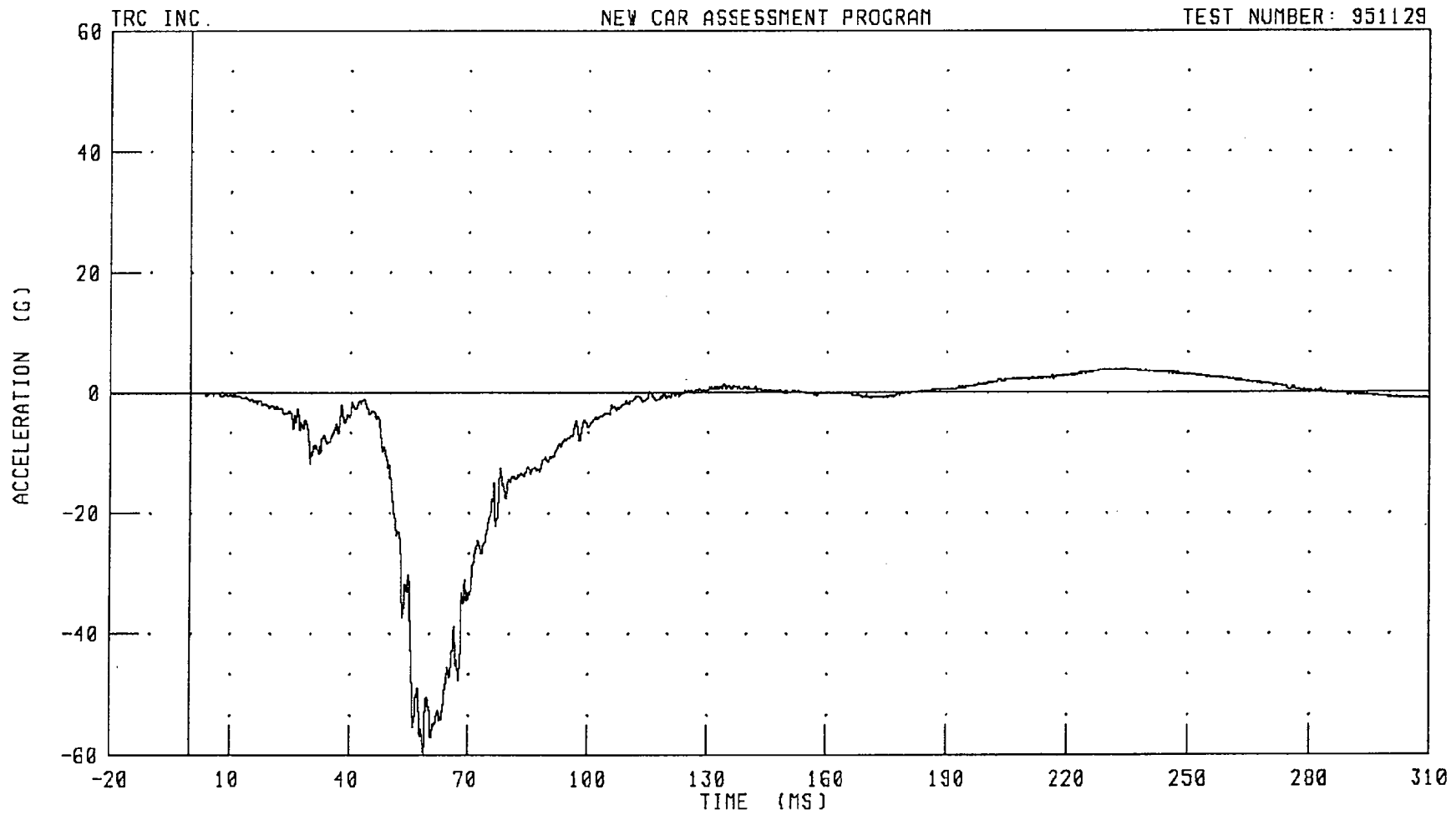
09-8

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DEFLECTION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
10
-10
-30
-50
-70
-90
DISPLACEMENT (MM)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD2
FILTER: CH. CLASS 180
PEAK DATA: 0.01 MM @ -3.92 MS; -29.44 MM @ 77.84 MS

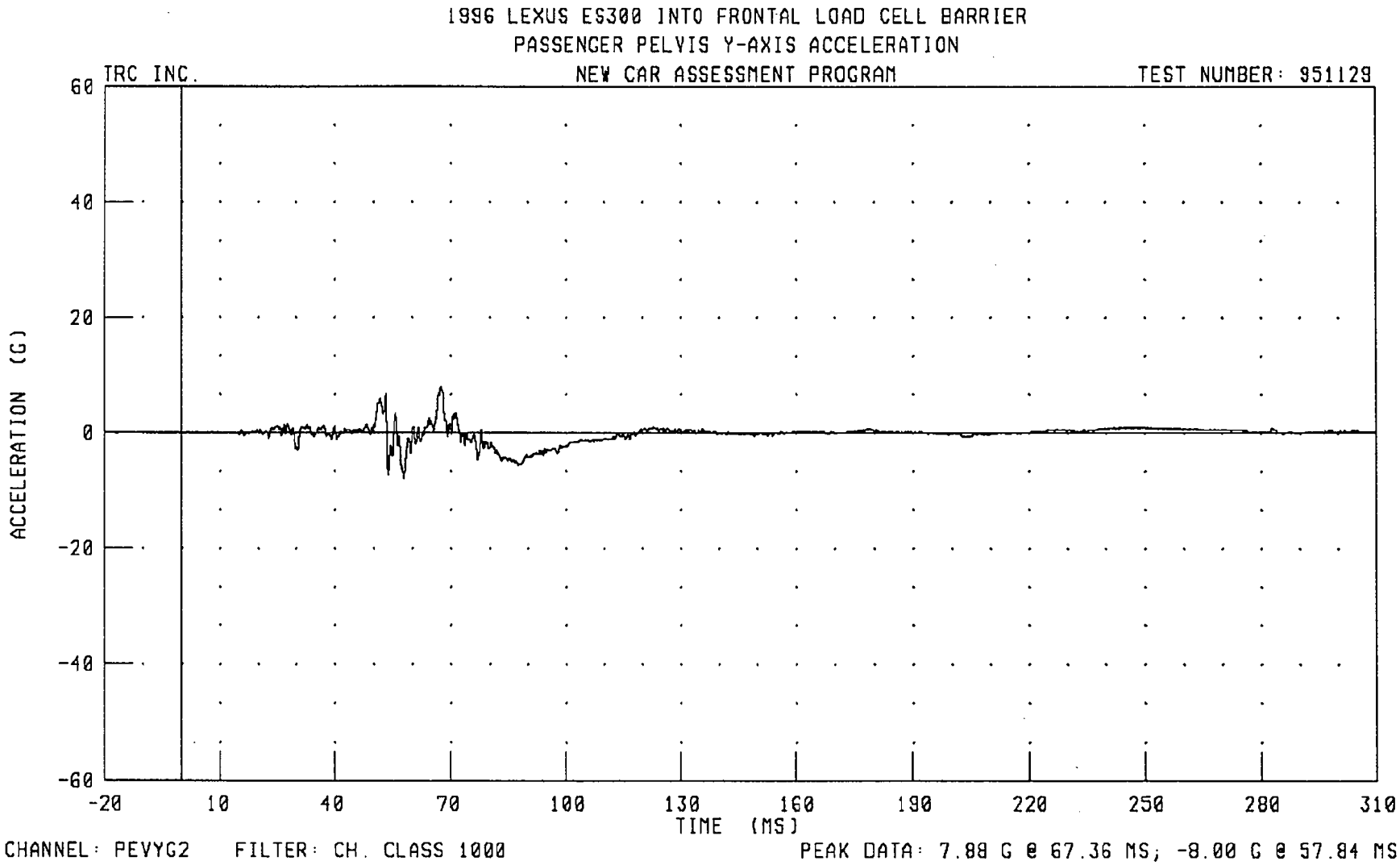
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS X-AXIS ACCELERATION



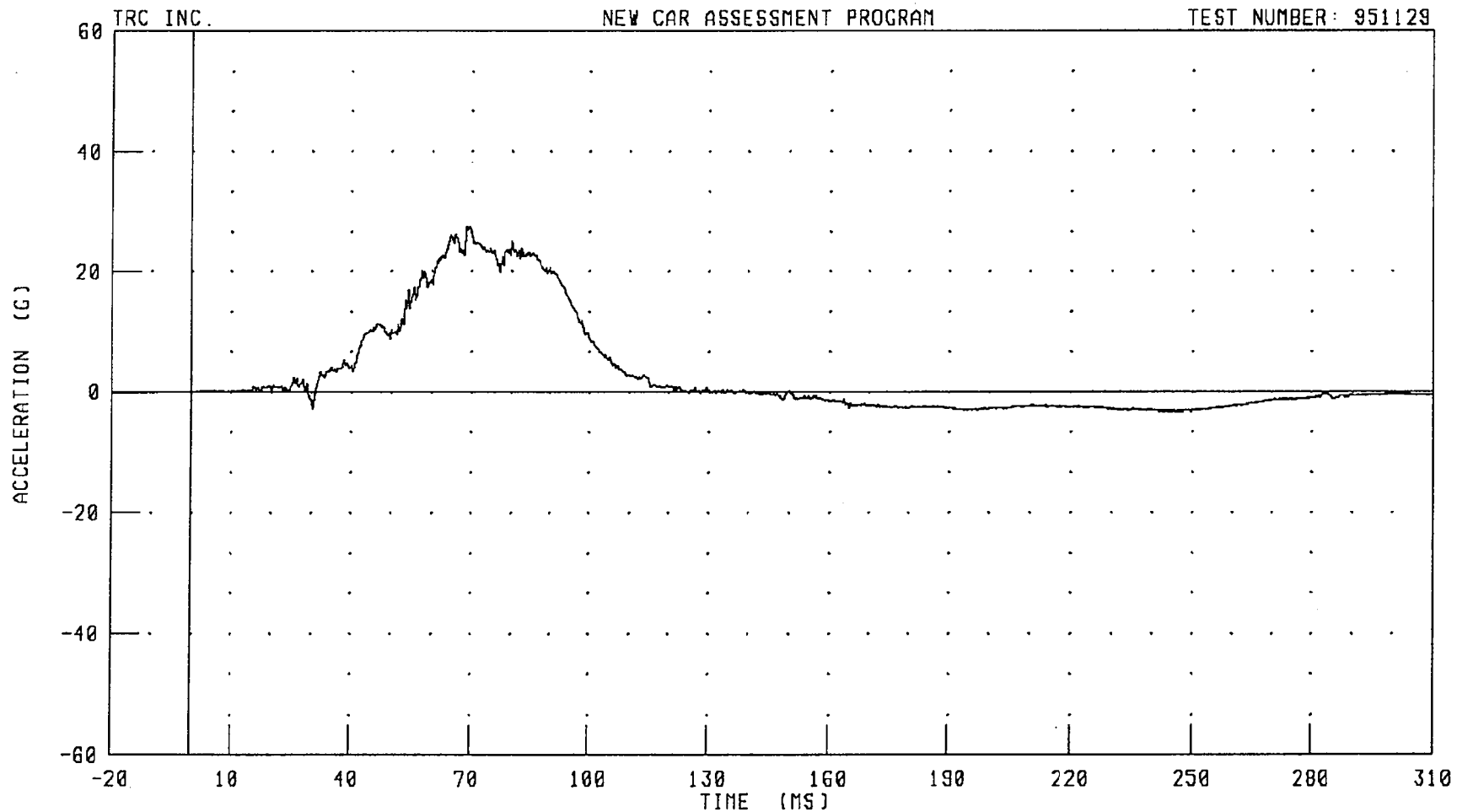
CHANNEL: PEVXG2 FILTER: CH. CLASS 1000 PEAK DATA: 3.90 G @ 229.44 MS; -60.22 G @ 58.80 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVYG2
FILTER: CH. CLASS 1000
PEAK DATA: 7.88 G @ 67.36 MS; -8.00 G @ 57.84 MS

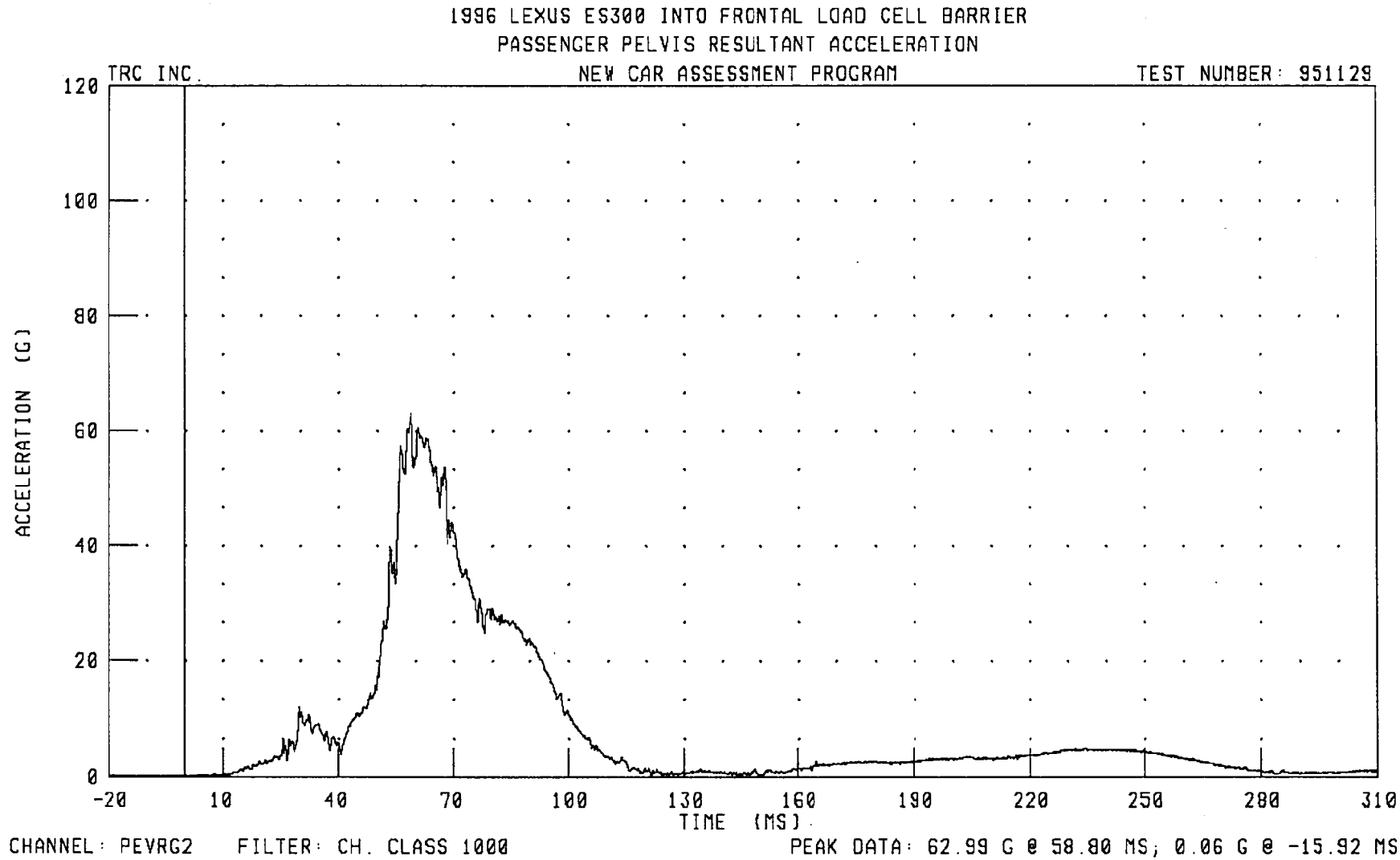
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Z-AXIS ACCELERATION

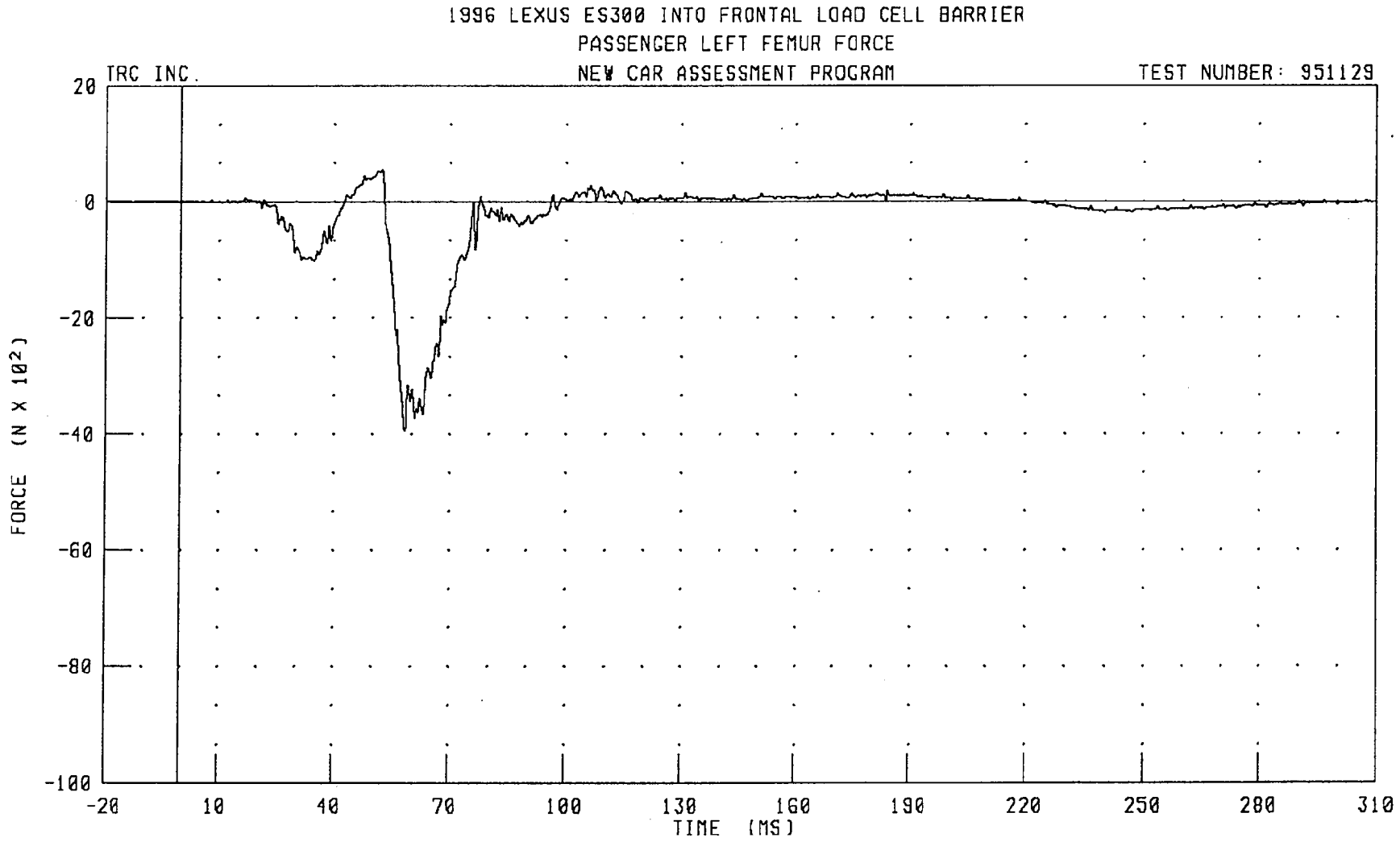


CHANNEL: PEVZG2 FILTER: CH. CLASS 1000 PEAK DATA: 27.47 G @ 68.80 MS; -3.30 G @ 241.68 MS

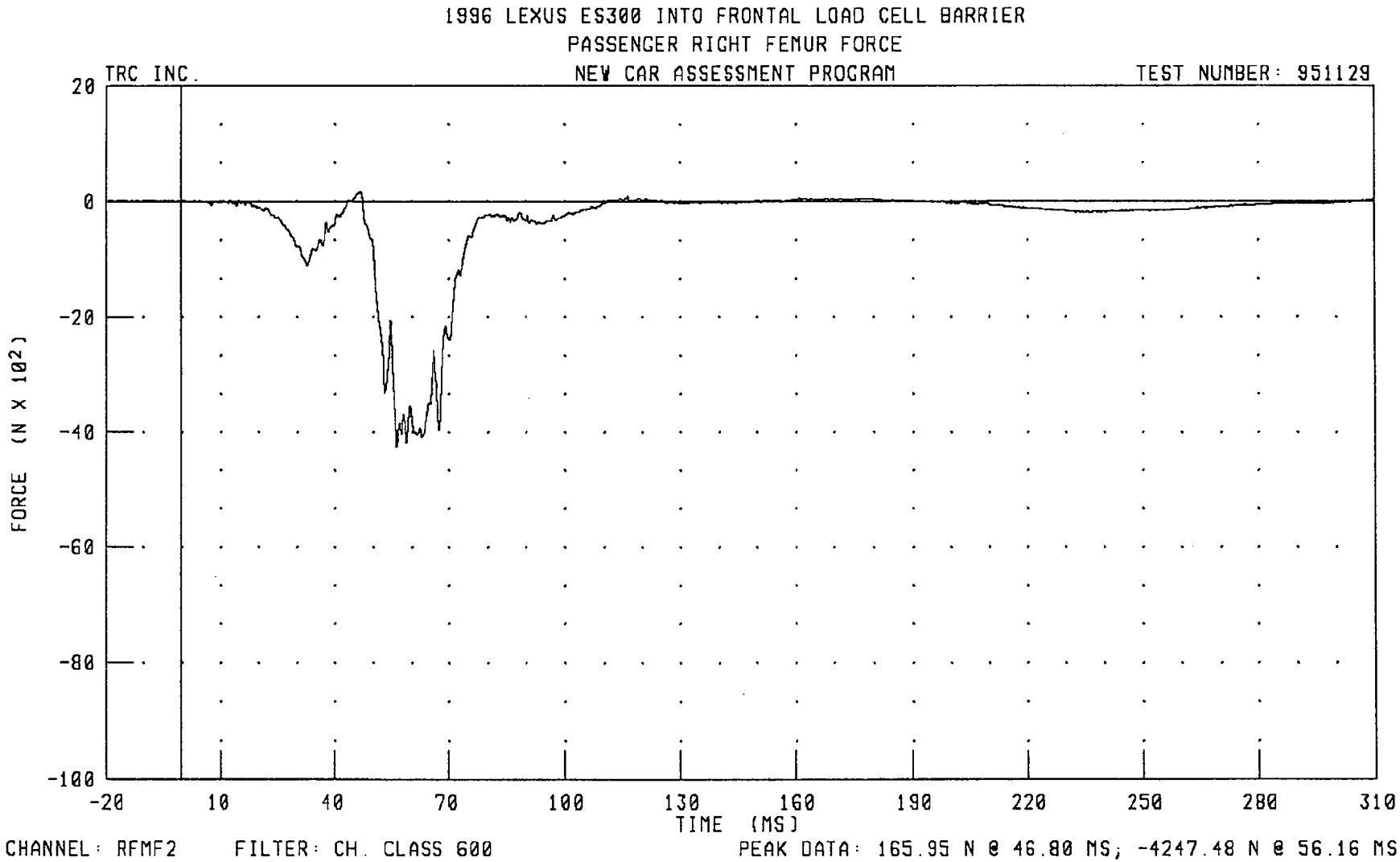
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVRG2
FILTER: CH. CLASS 1000
PEAK DATA: 62.99 G @ 58.80 MS; 0.06 G @ -15.92 MS

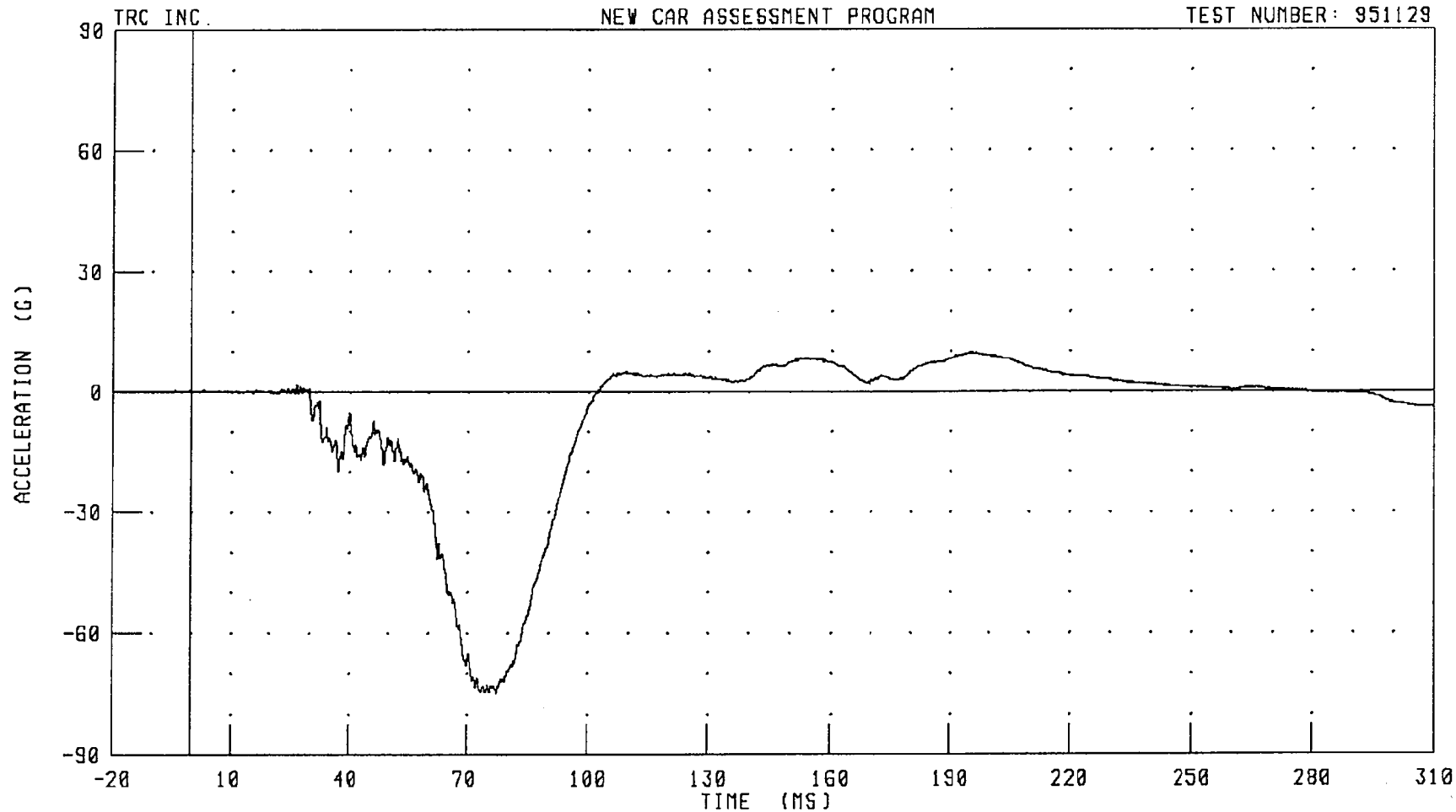
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF2
FILTER: CH. CLASS 600
PEAK DATA: 549.35 N @ 52.40 MS; -3956.05 N @ 58.40 MS

951129

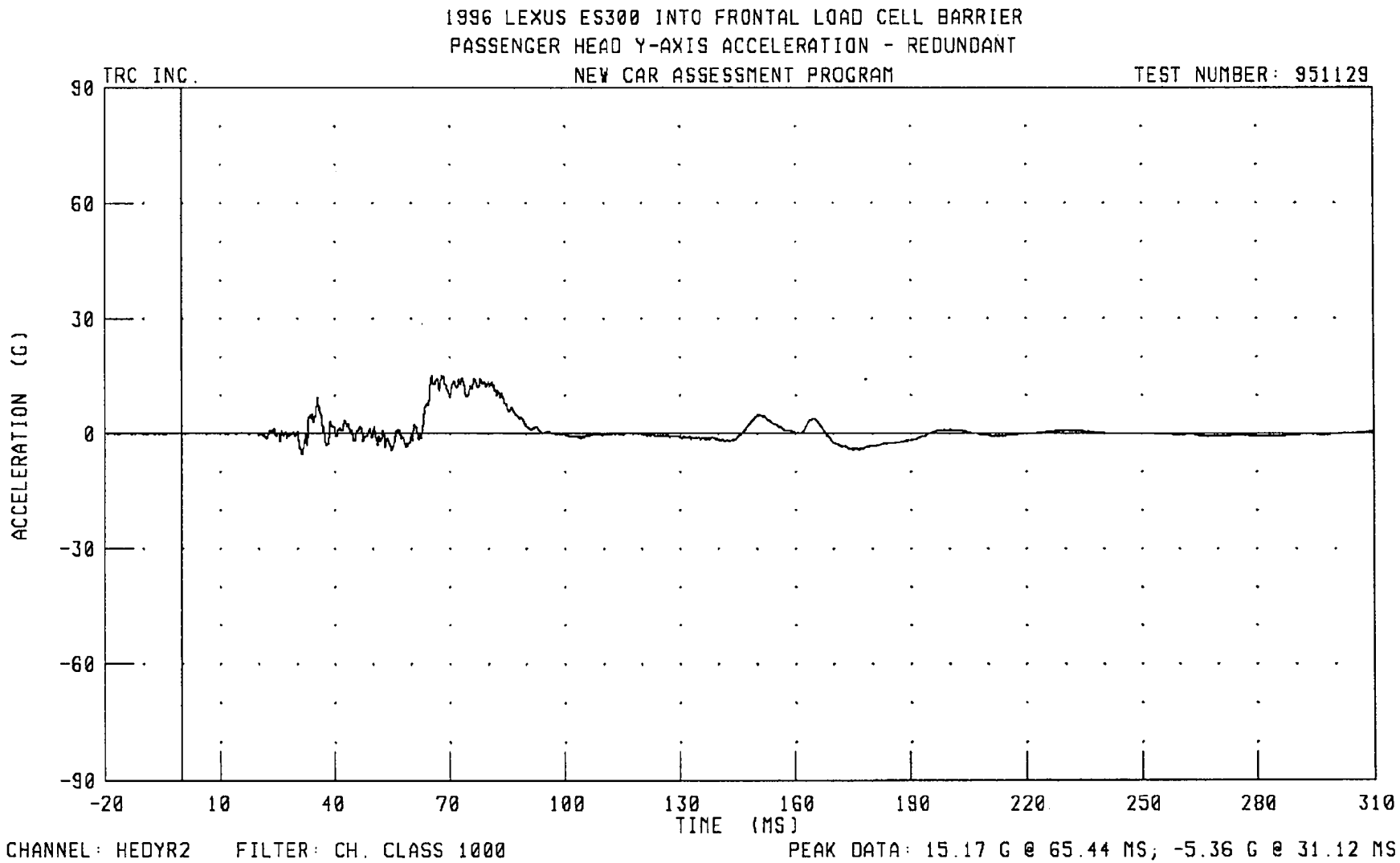

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF2
FILTER: CH. CLASS 600
PEAK DATA: 165.95 N @ 46.80 MS; -4247.48 N @ 56.16 MS

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION - REDUNDANT

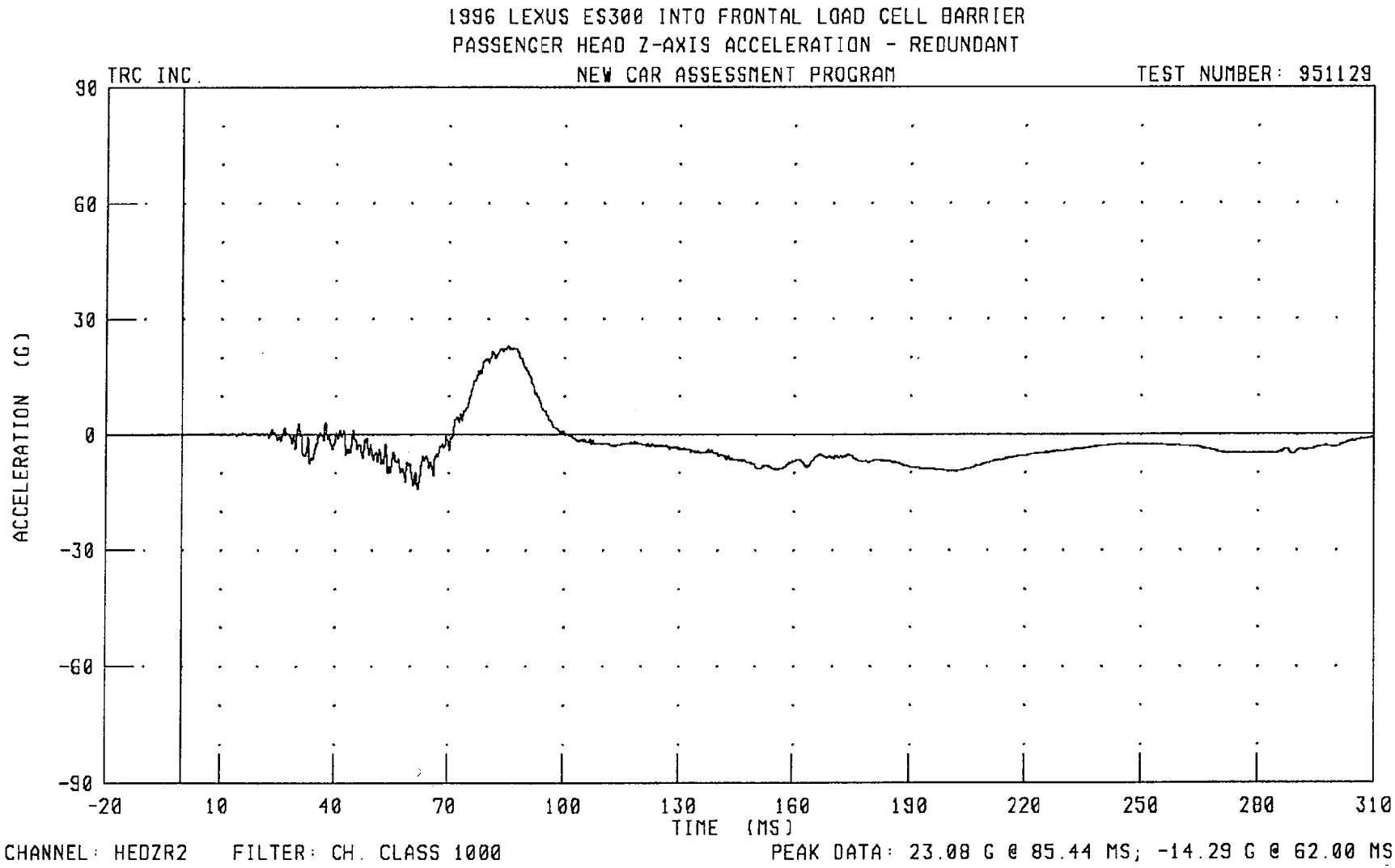


CHANNEL: HEDXR2 FILTER: CH. CLASS 1000 PEAK DATA: 9.60 G @ 194.72 MS; -74.97 G @ 77.36 MS

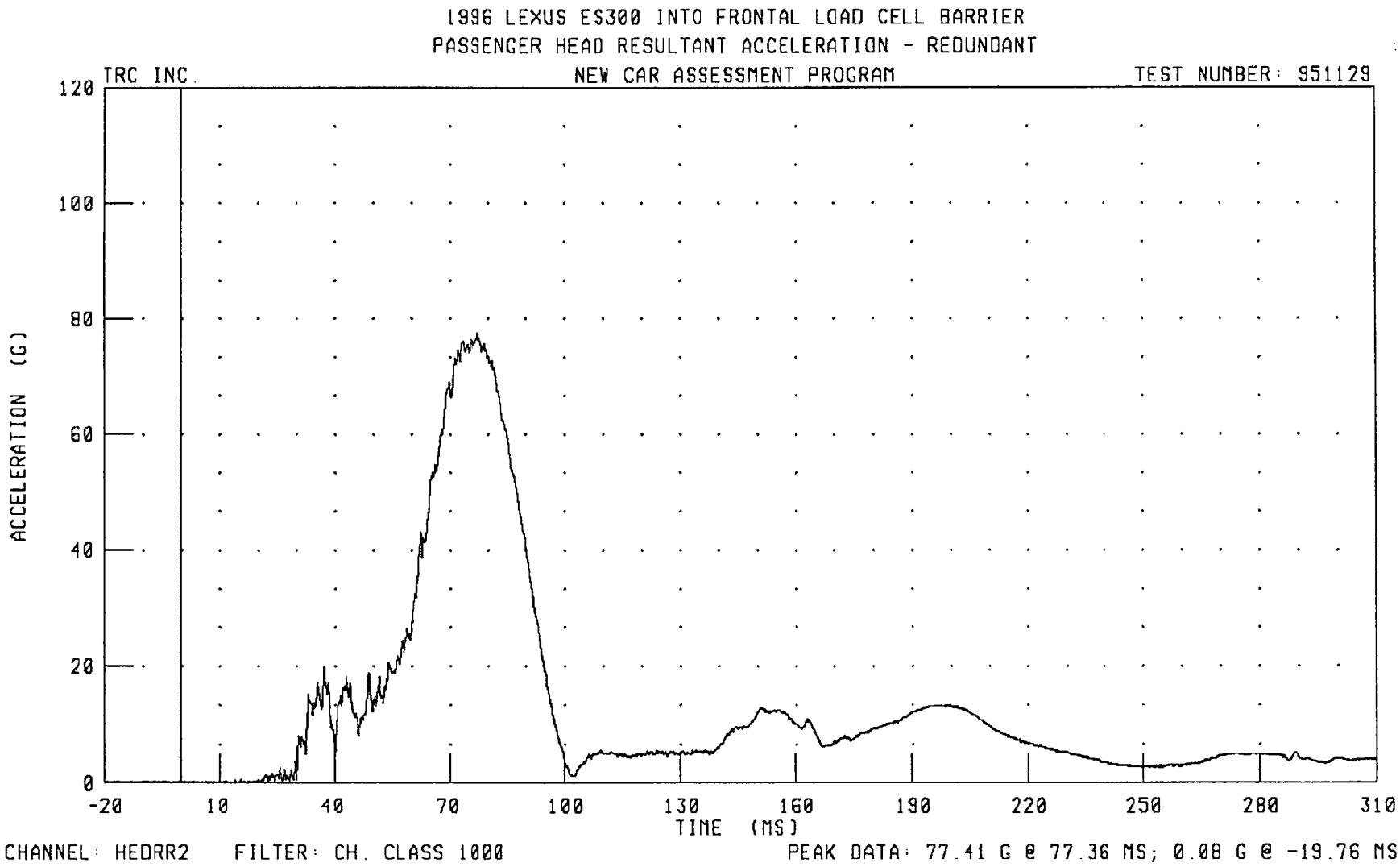
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYR2
FILTER: CH. CLASS 1000
PEAK DATA: 15.17 G @ 65.44 MS; -5.36 G @ 31.12 MS

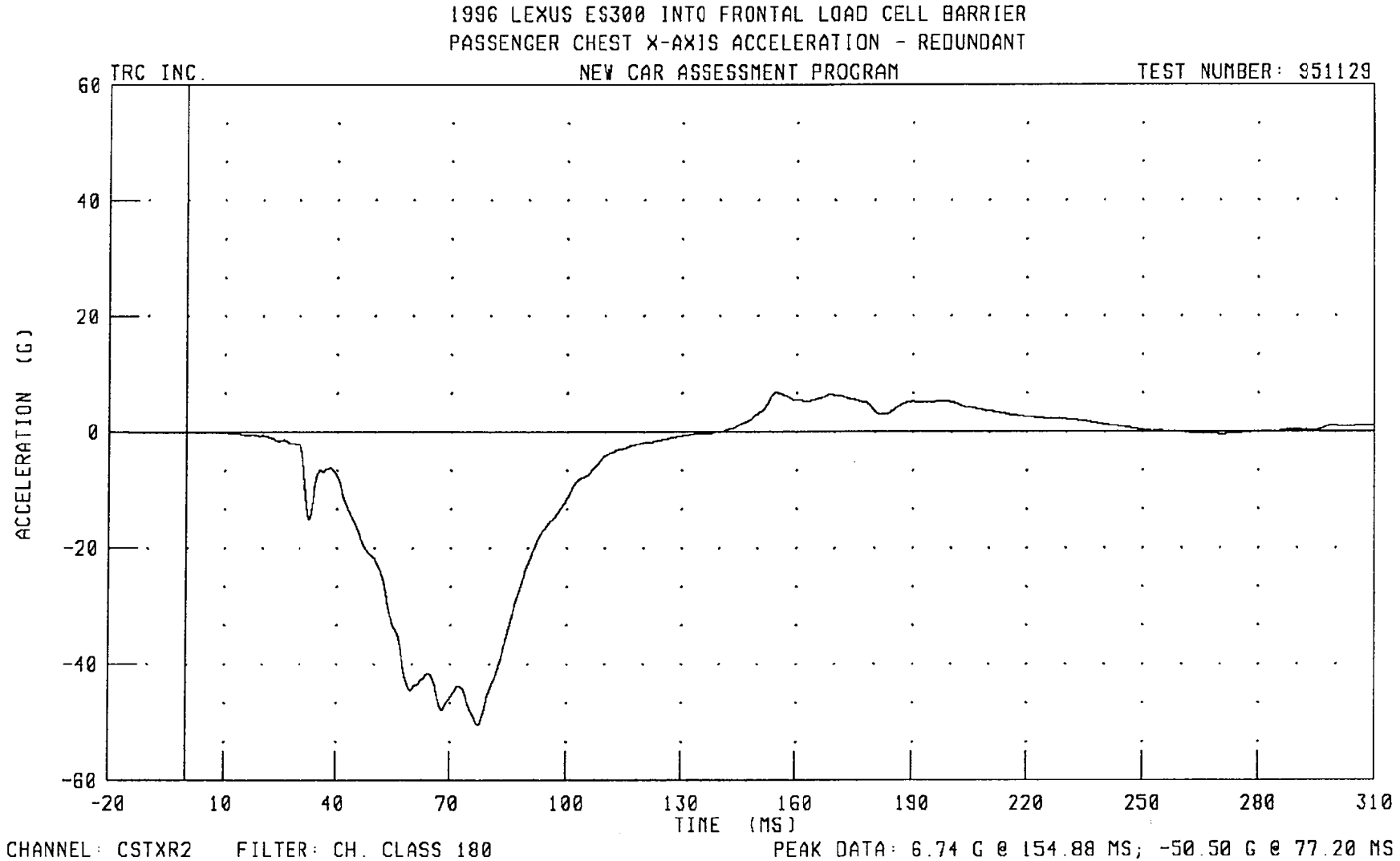
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZR2
FILTER: CH. CLASS 1000
PEAK DATA: 23.08 G @ 85.44 MS; -14.29 G @ 62.00 MS

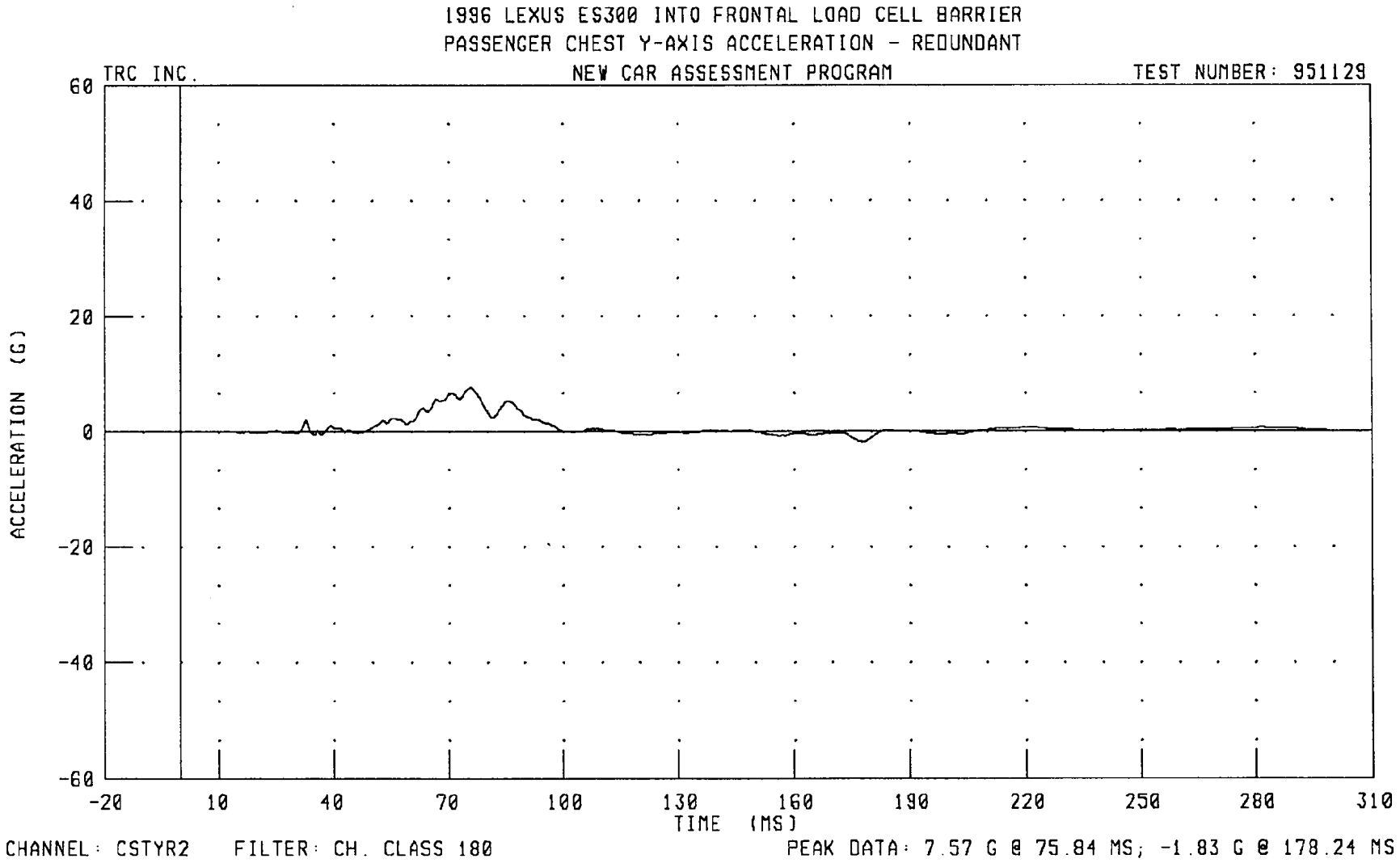
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRR2
FILTER: CH. CLASS 1000
PEAK DATA: 77.41 G @ 77.36 MS; 0.08 G @ -19.76 MS

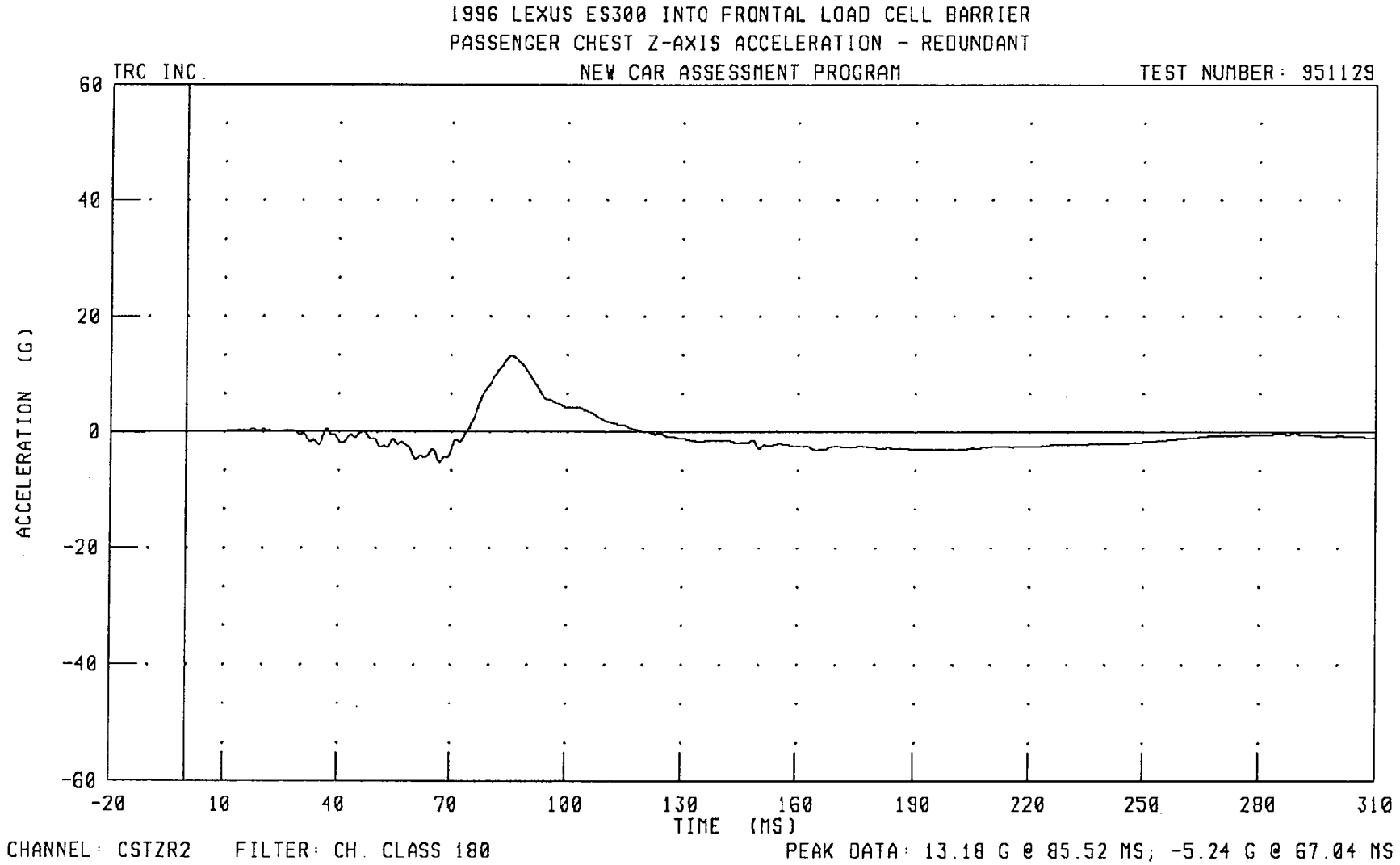
951129

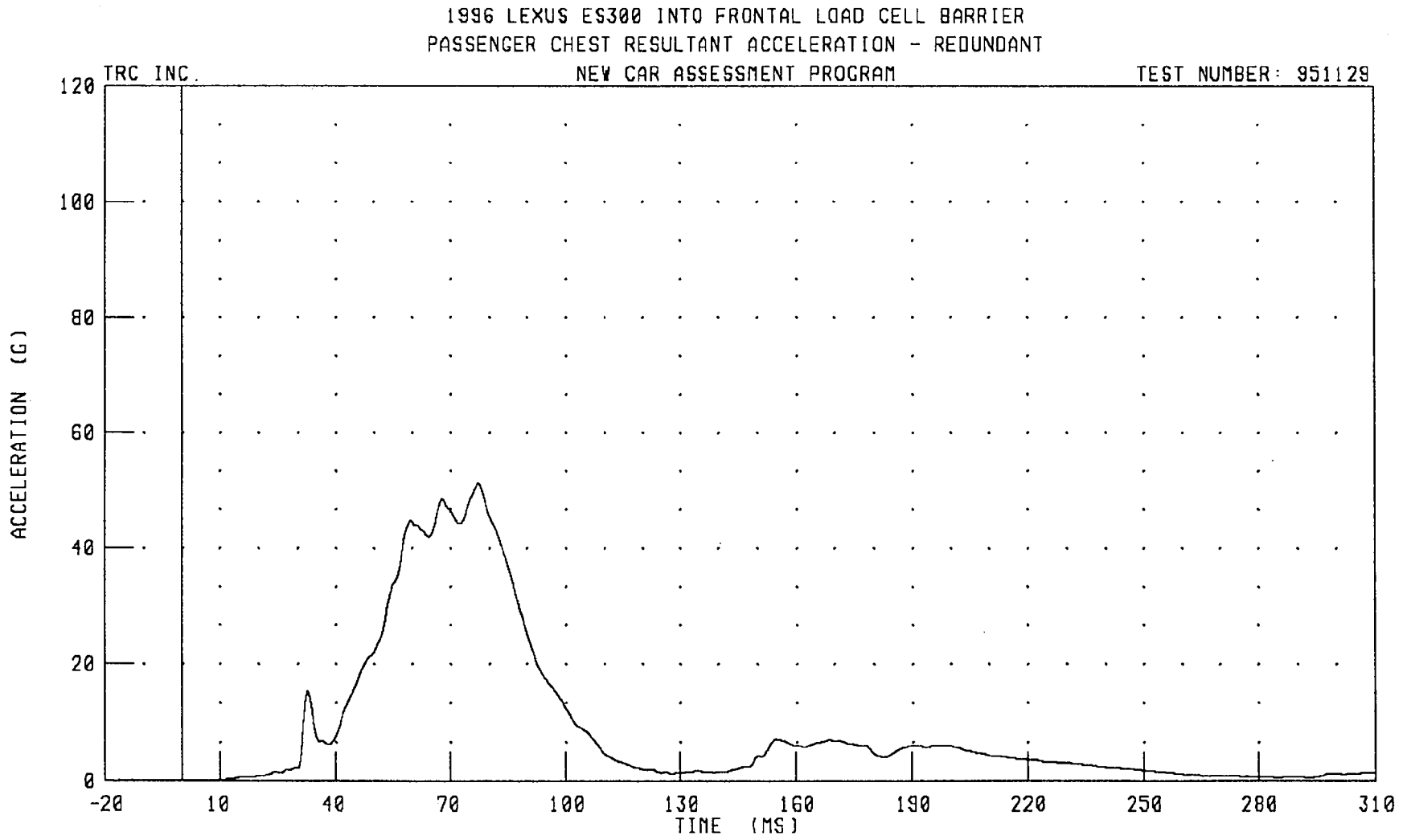

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXR2
FILTER: CH. CLASS 180
PEAK DATA: 6.74 G @ 154.88 MS; -50.50 G @ 77.20 MS

951129

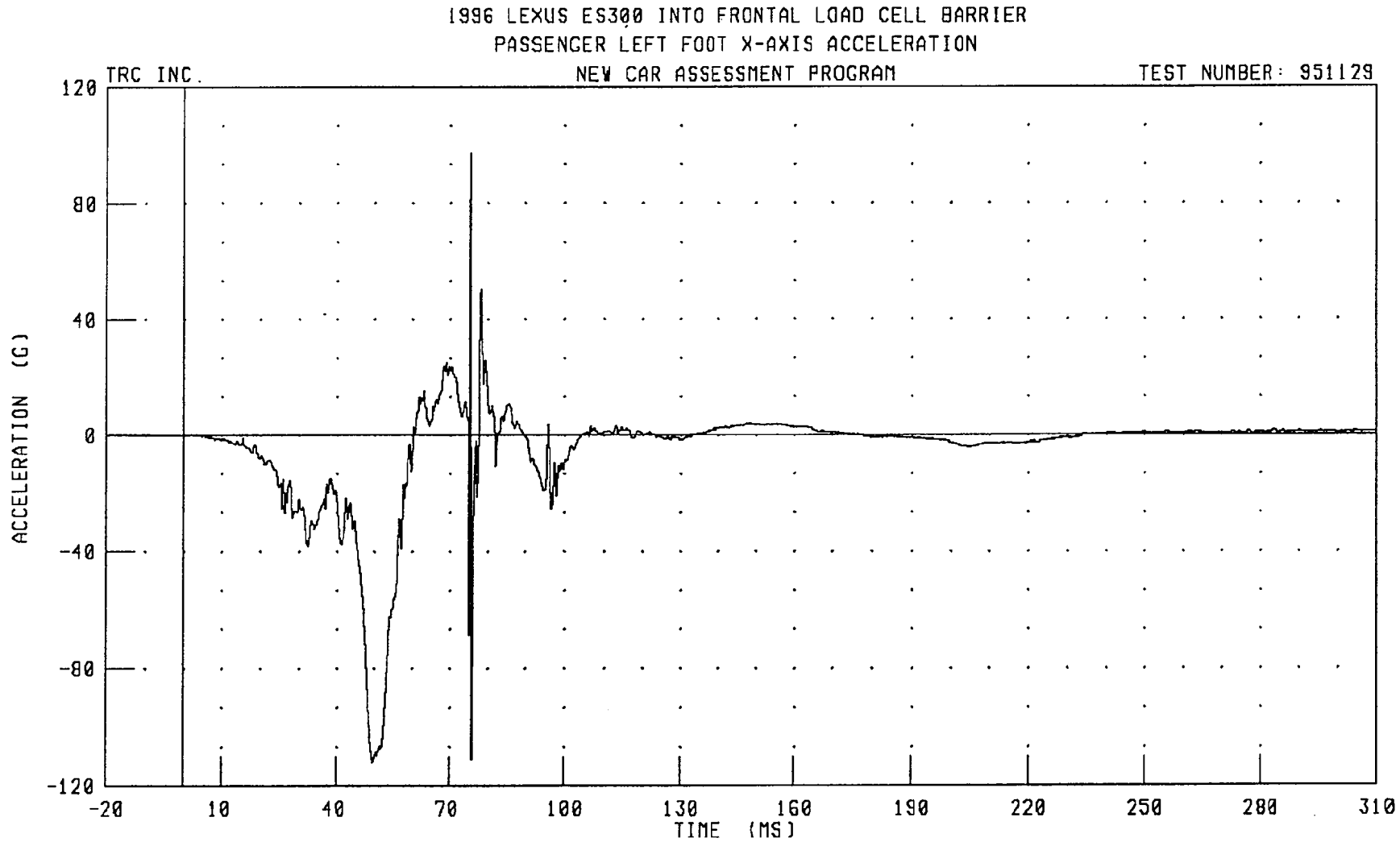

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYR2
FILTER: CH. CLASS 180
PEAK DATA: 7.57 G @ 75.84 MS; -1.83 G @ 178.24 MS

951129

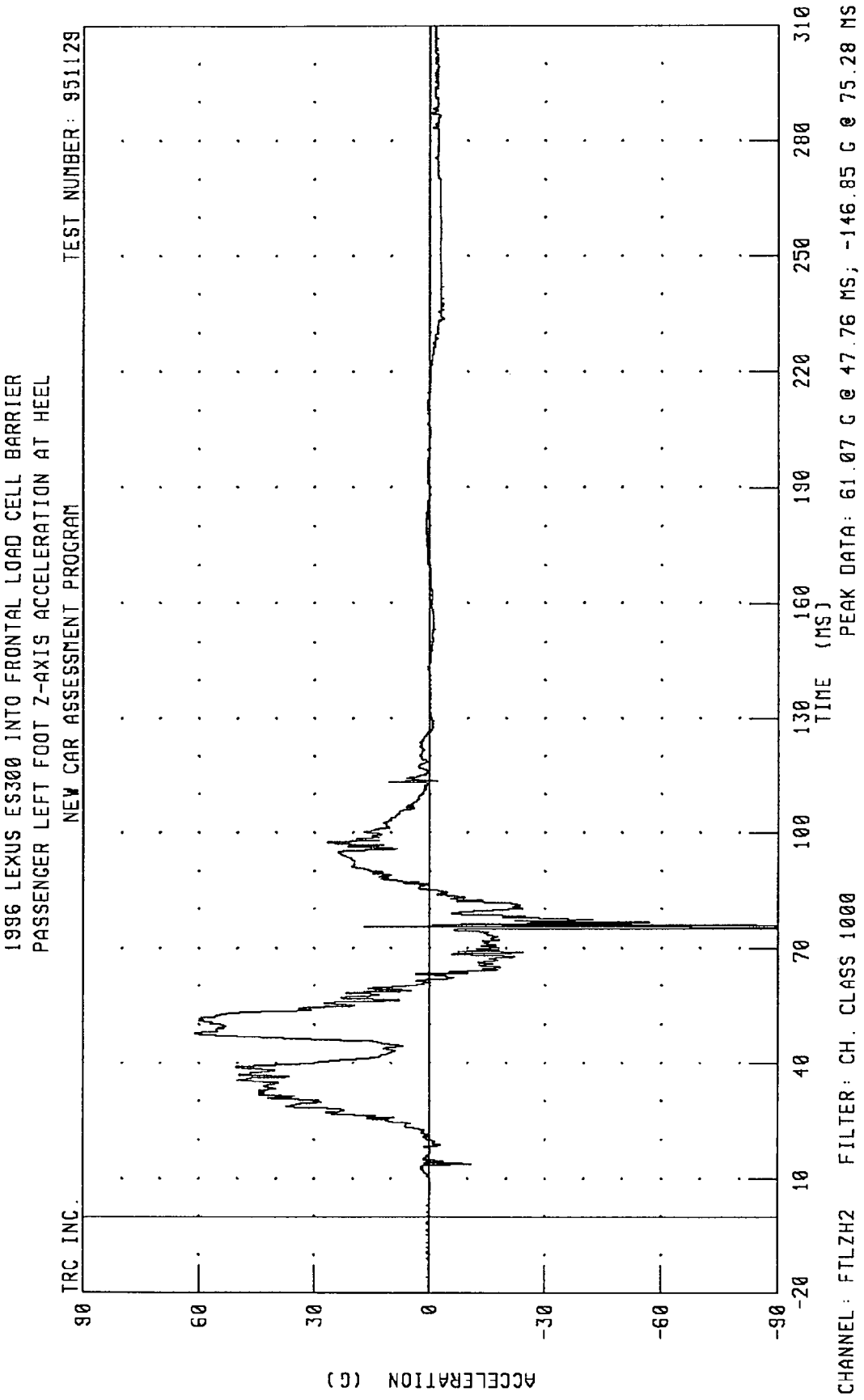

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZR2
FILTER: CH. CLASS 180
PEAK DATA: 13.18 G @ 85.52 MS; -5.24 G @ 67.04 MS

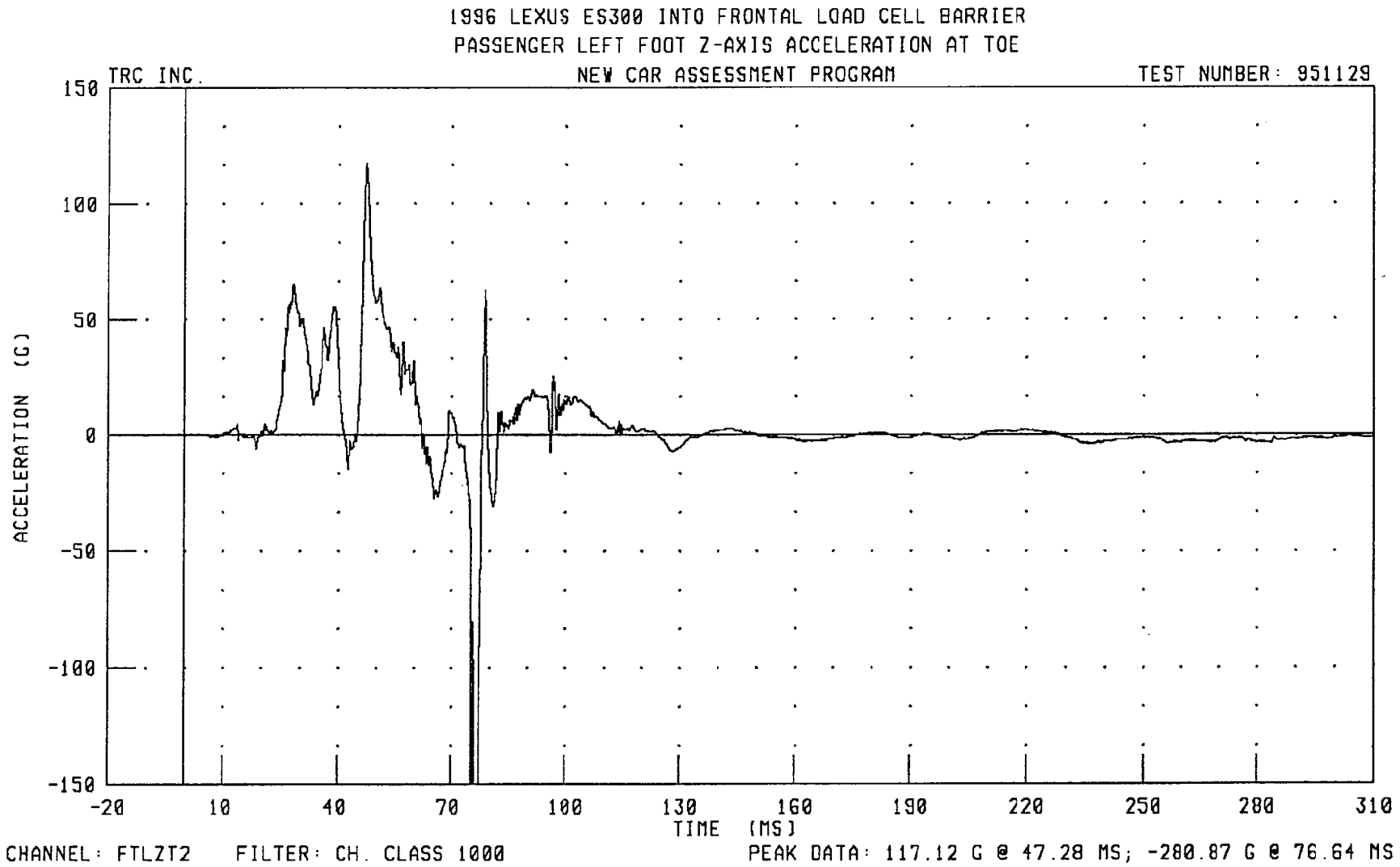

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRR2
FILTER: CH. CLASS 180
PEAK DATA: 51.14 G @ 77.28 MS; 0.01 G @ -20.00 MS

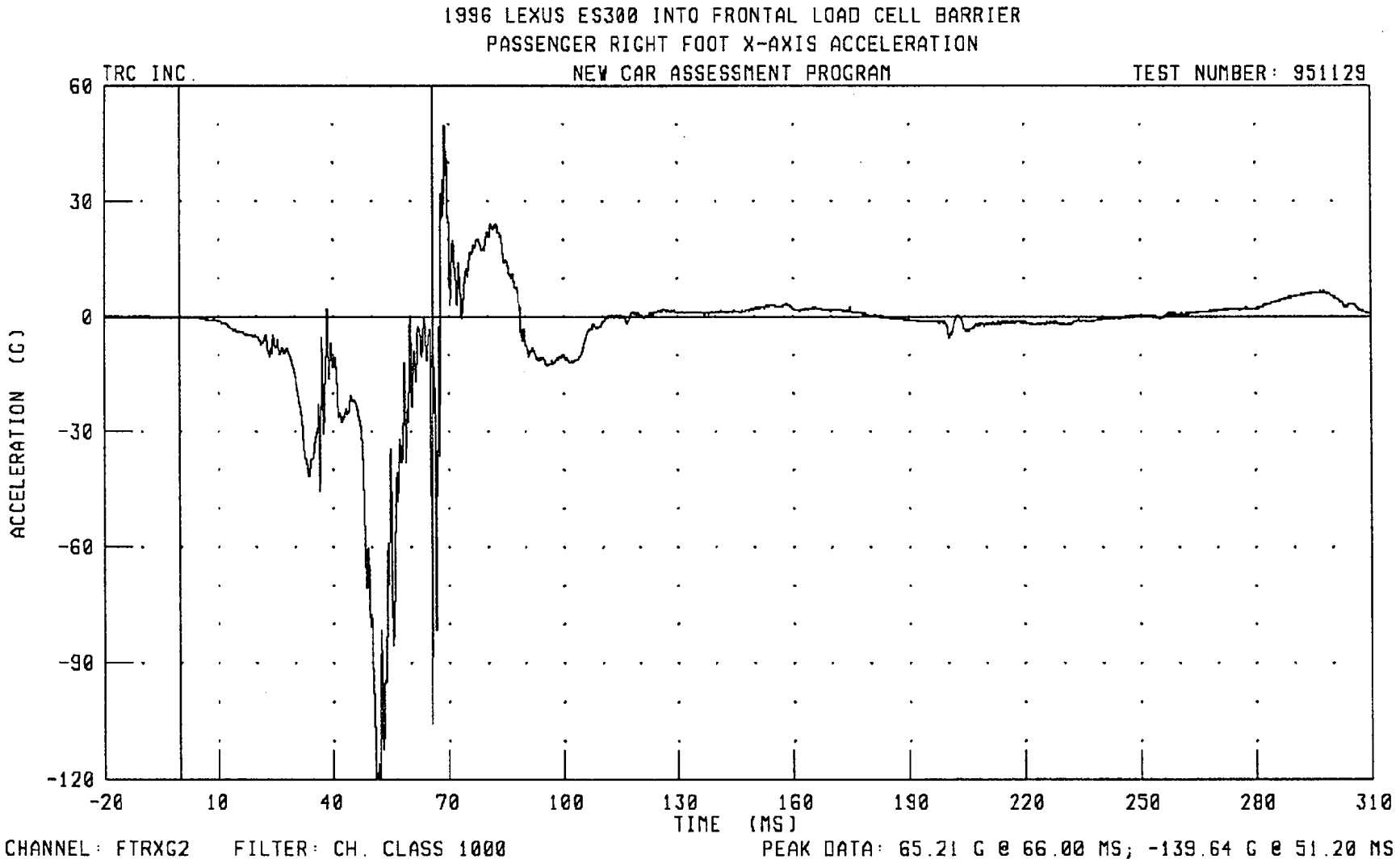
951129

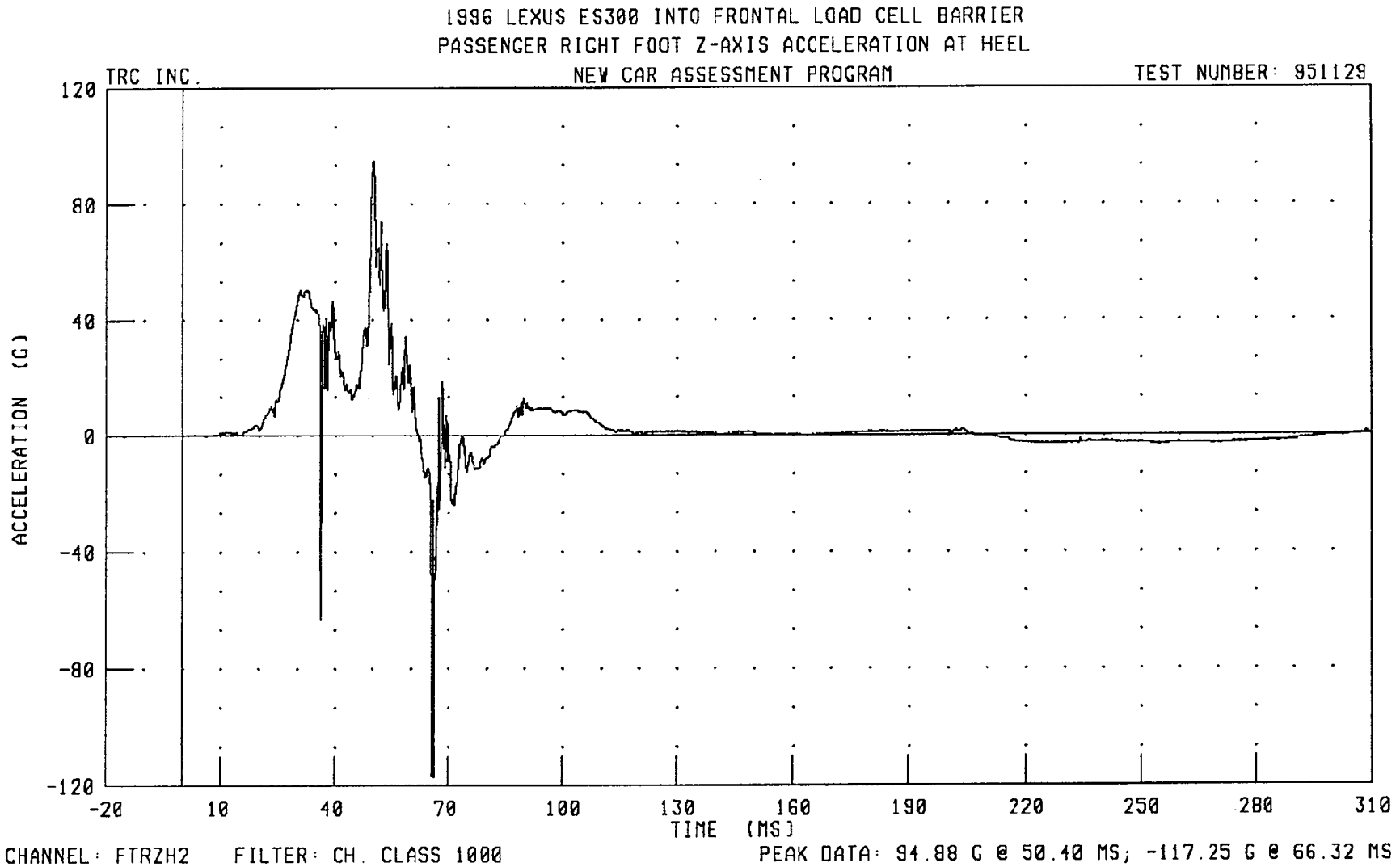

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FOOT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
120
80
40
0
-40
-80
-120
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLXG2
FILTER: CH. CLASS 1000
PEAK DATA: 97.36 G @ 75.52 MS; -111.99 G @ 49.68 MS

951129

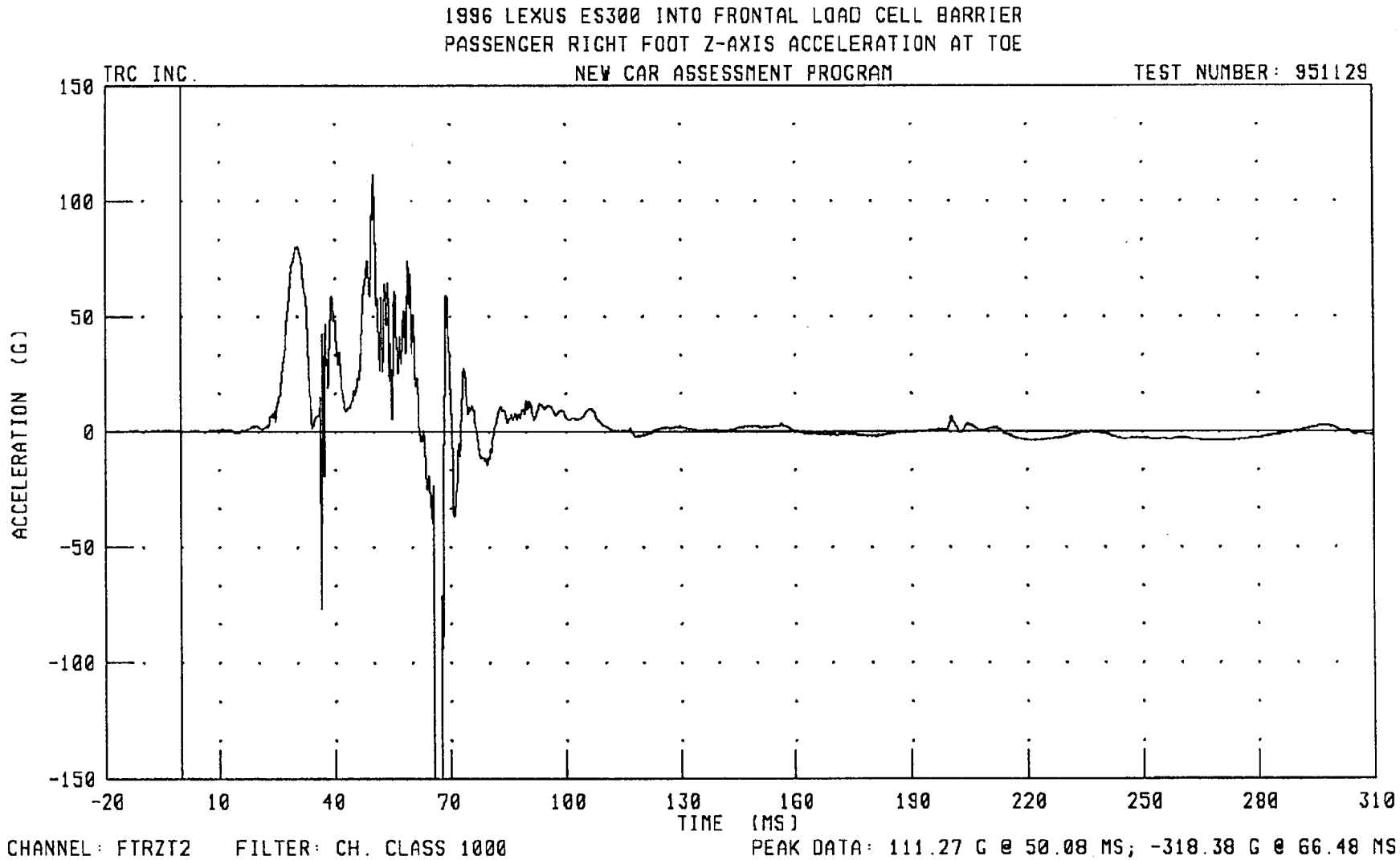

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FOOT Z-AXIS ACCELERATION AT HEEL
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
TRC INC.
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLZH2 FILTER: CH. CLASS 1000
PEAK DATA: 61.07 G @ 47.76 MS; -146.85 G @ 75.28 MS

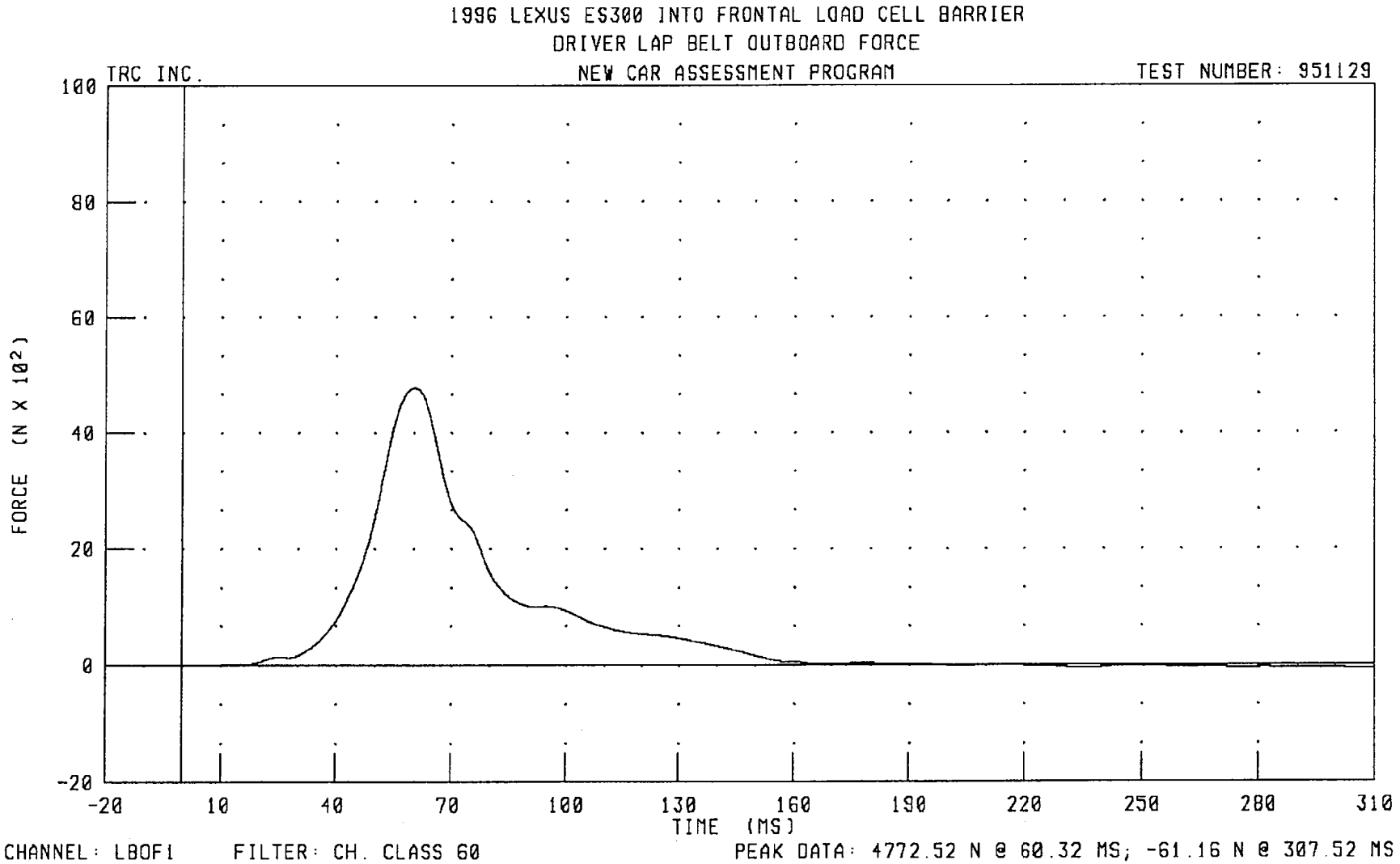

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FOOT Z-AXIS ACCELERATION AT TOE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
150
100
50
0
-50
-100
-150
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLZT2
FILTER: CH. CLASS 1000
PEAK DATA: 117.12 G @ 47.28 MS; -280.87 G @ 76.64 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FOOT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
30
0
-30
-60
-90
-120
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRXG2
FILTER: CH. CLASS 1000
PEAK DATA: 65.21 G @ 66.00 MS; -139.64 G @ 51.20 MS

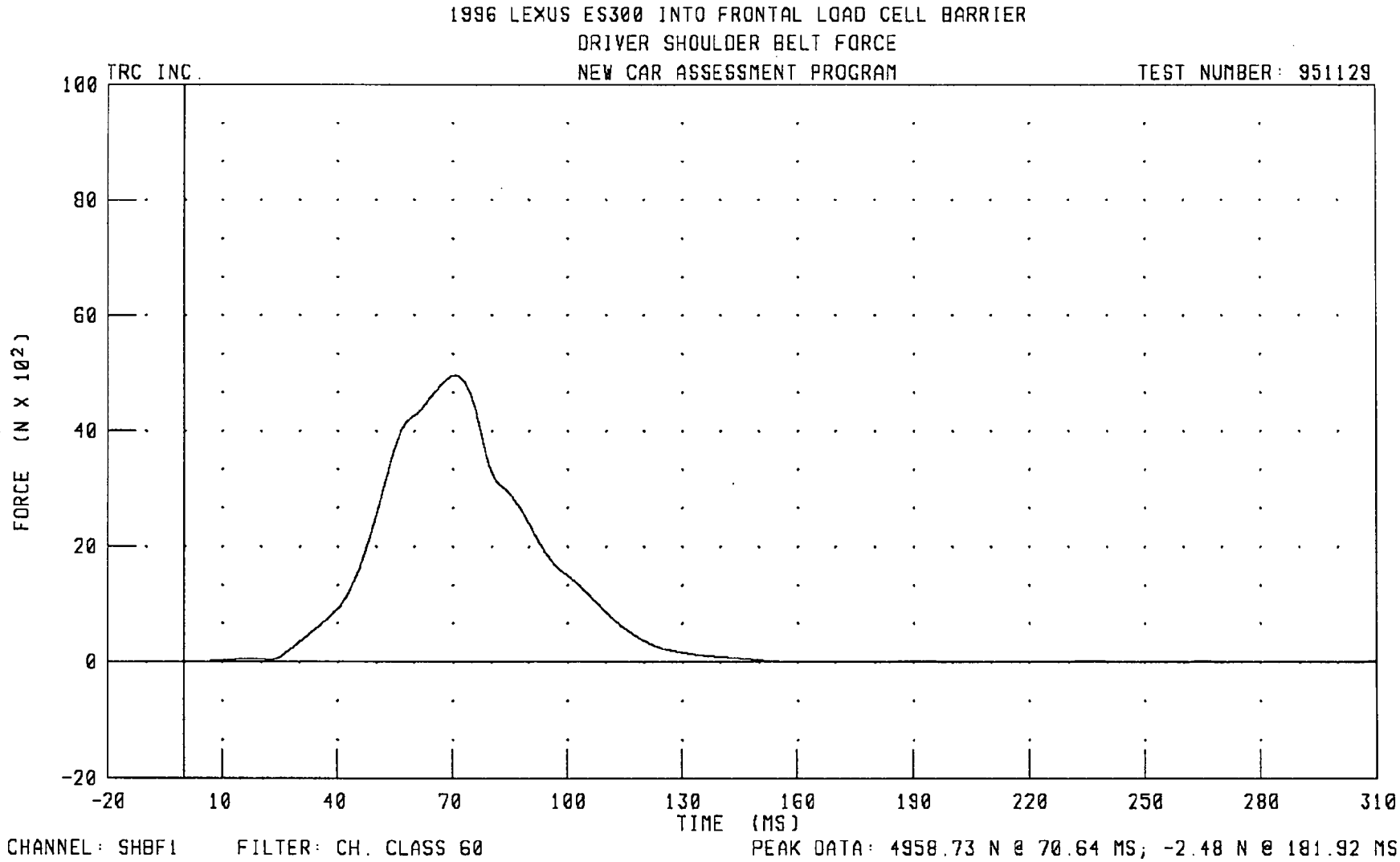

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FOOT Z-AXIS ACCELERATION AT HEEL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRZH2
FILTER: CH. CLASS 1000
PEAK DATA: 94.88 G @ 50.40 MS; -117.25 G @ 66.32 MS

951129

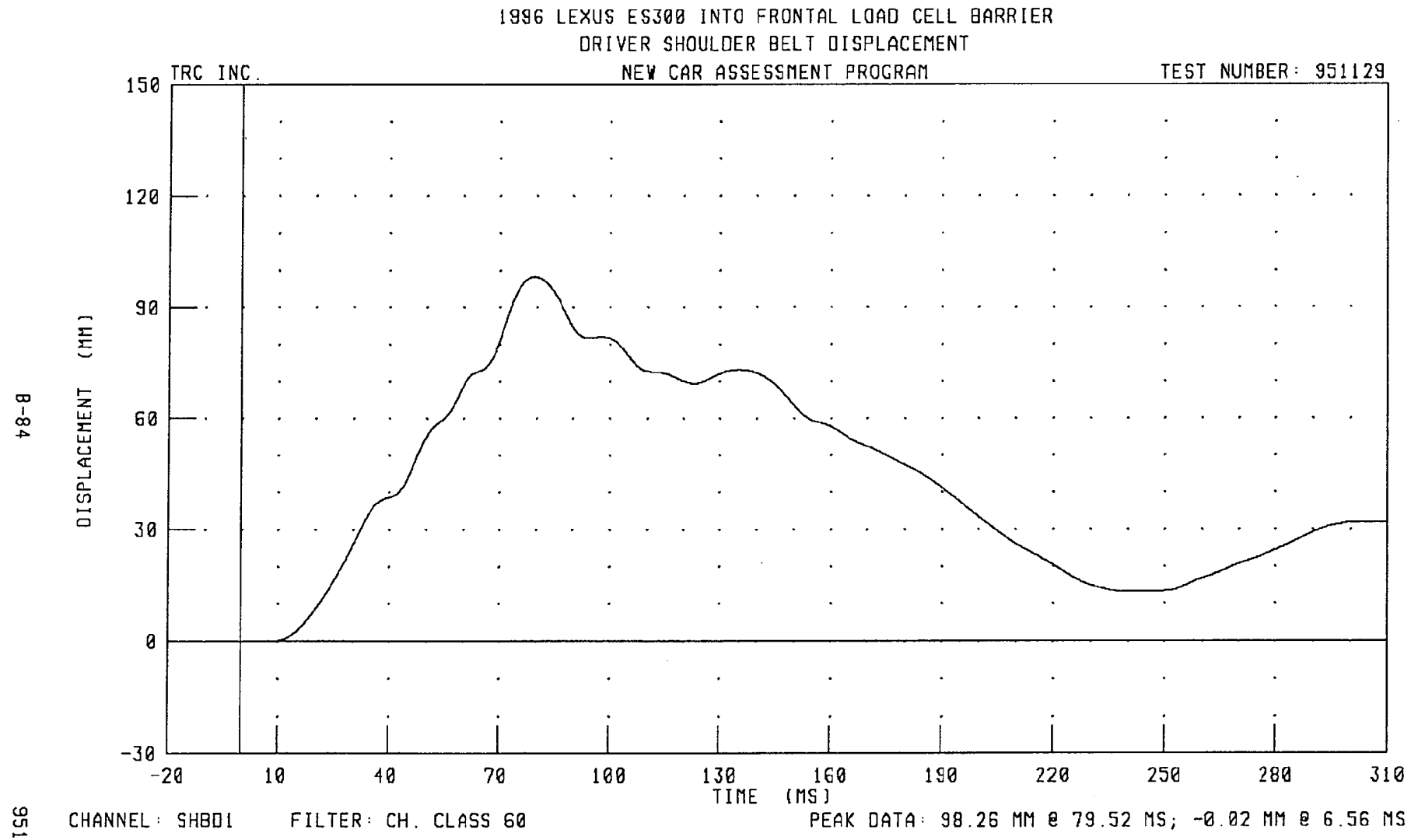

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FOOT Z-AXIS ACCELERATION AT TOE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
150
100
50
0
-50
-100
-150
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRZT2
FILTER: CH. CLASS 1000
PEAK DATA: 111.27 G @ 50.08 MS; -318.38 G @ 66.48 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER LAP BELT OUTBOARD FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
100
80
60
40
20
0
-20
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LBOF1
FILTER: CH. CLASS 60
PEAK DATA: 4772.52 N @ 60.32 MS; -61.16 N @ 307.52 MS

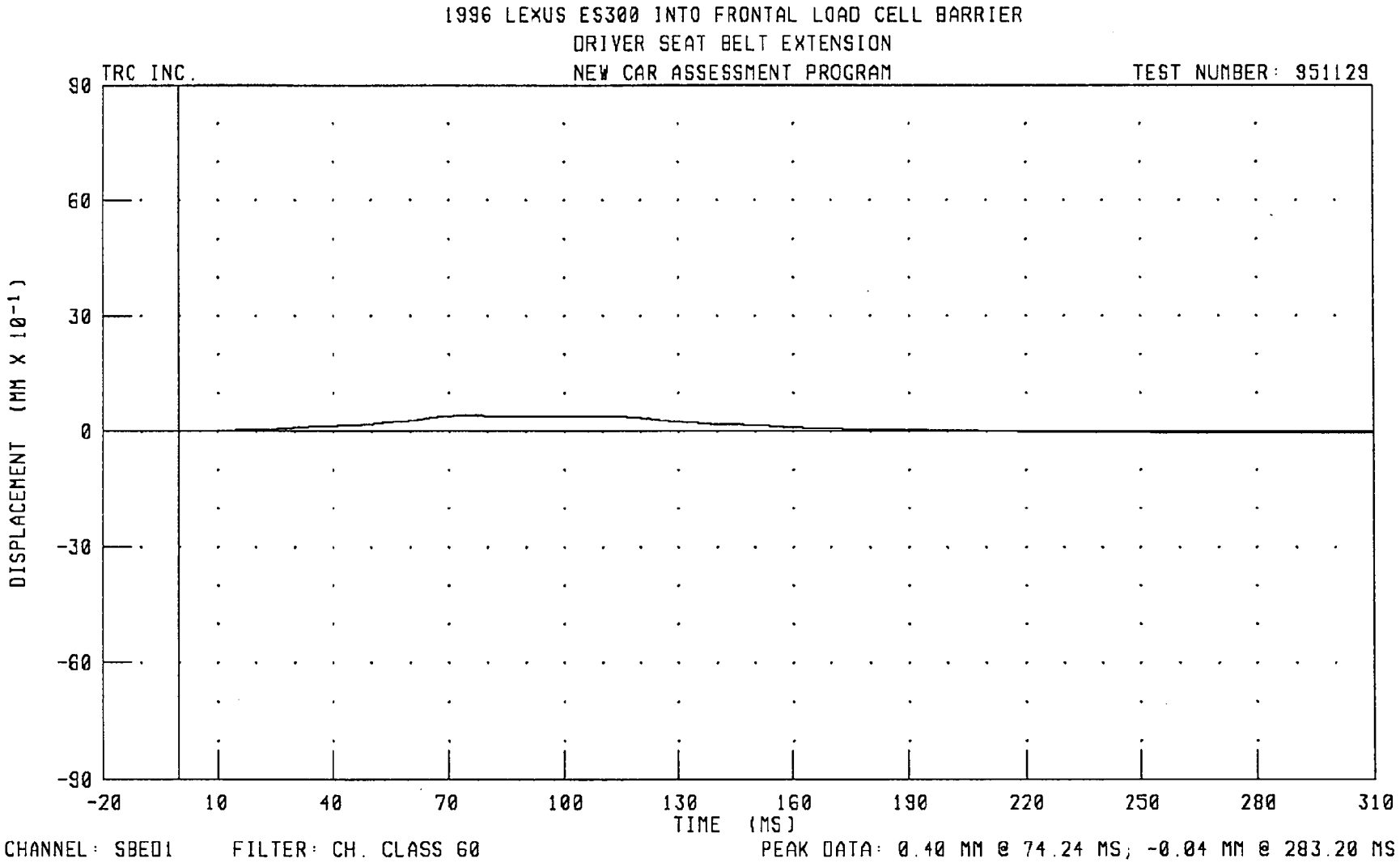
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
FORCE (N X 10²)
100
80
60
40
20
0
-20
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: SHBF1
FILTER: CH. CLASS 60
PEAK DATA: 4958.73 N @ 70.64 MS; -2.48 N @ 181.92 MS

951129

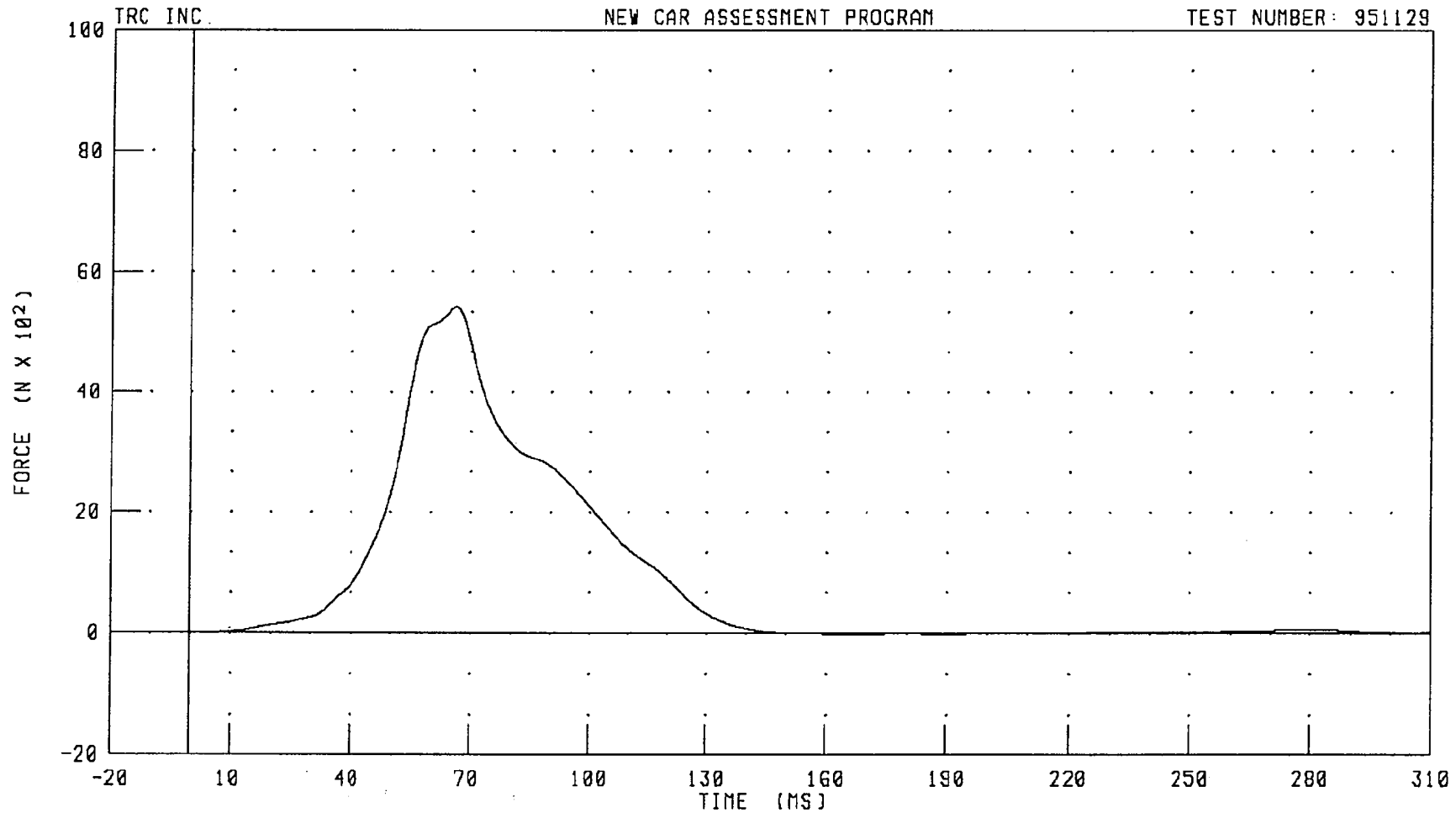

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT DISPLACEMENT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
DISPLACEMENT (MM)
150
120
90
60
30
0
-30
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: SHBD1
FILTER: CH. CLASS 60
PEAK DATA: 98.26 MM @ 79.52 MS; -0.02 MM @ 6.56 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
DRIVER SEAT BELT EXTENSION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
90
60
30
0
-30
-60
-90
DISPLACEMENT (MM X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: SBE01
FILTER: CH. CLASS 60
PEAK DATA: 0.40 MM @ 74.24 MS; -0.04 MM @ 283.20 MS

951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE



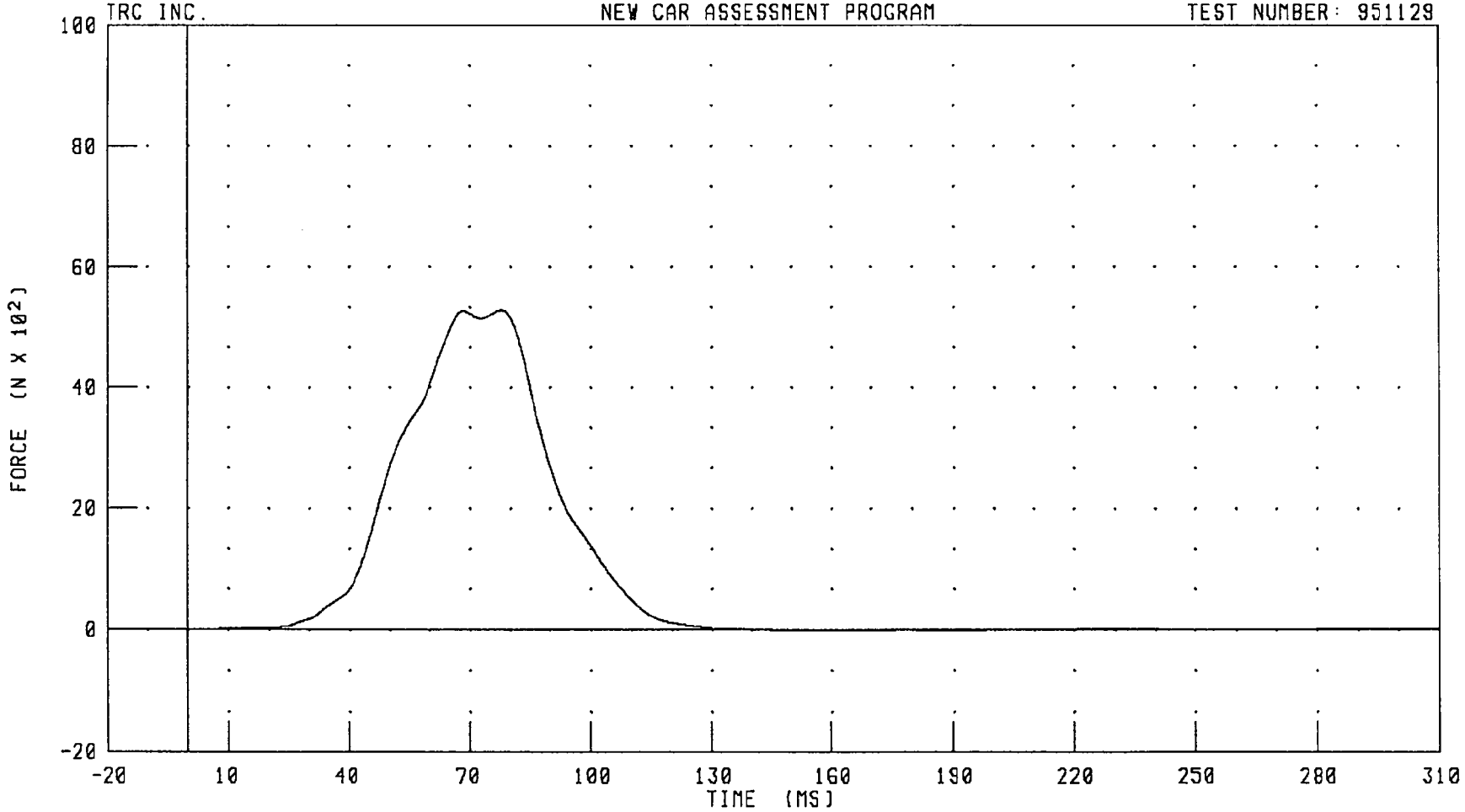
CHANNEL: LBOF2 FILTER: CH. CLASS 60 PEAK DATA: 5415.31 N @ 66.24 MS; -16.64 N @ 192.16 MS

8-86

951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT FORCE

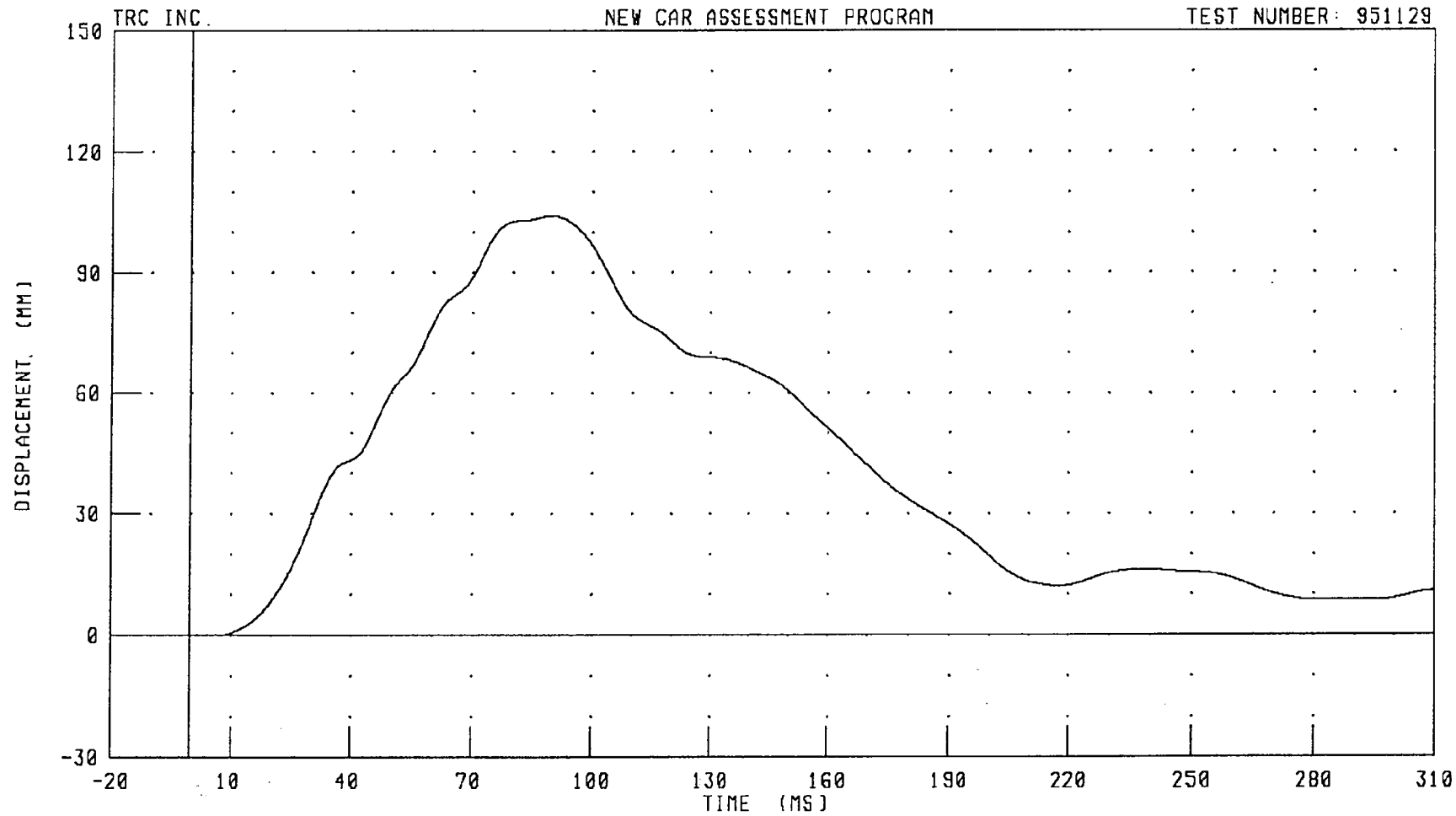
TRC INC. NEW CAR ASSESSMENT PROGRAM TEST NUMBER: 951129



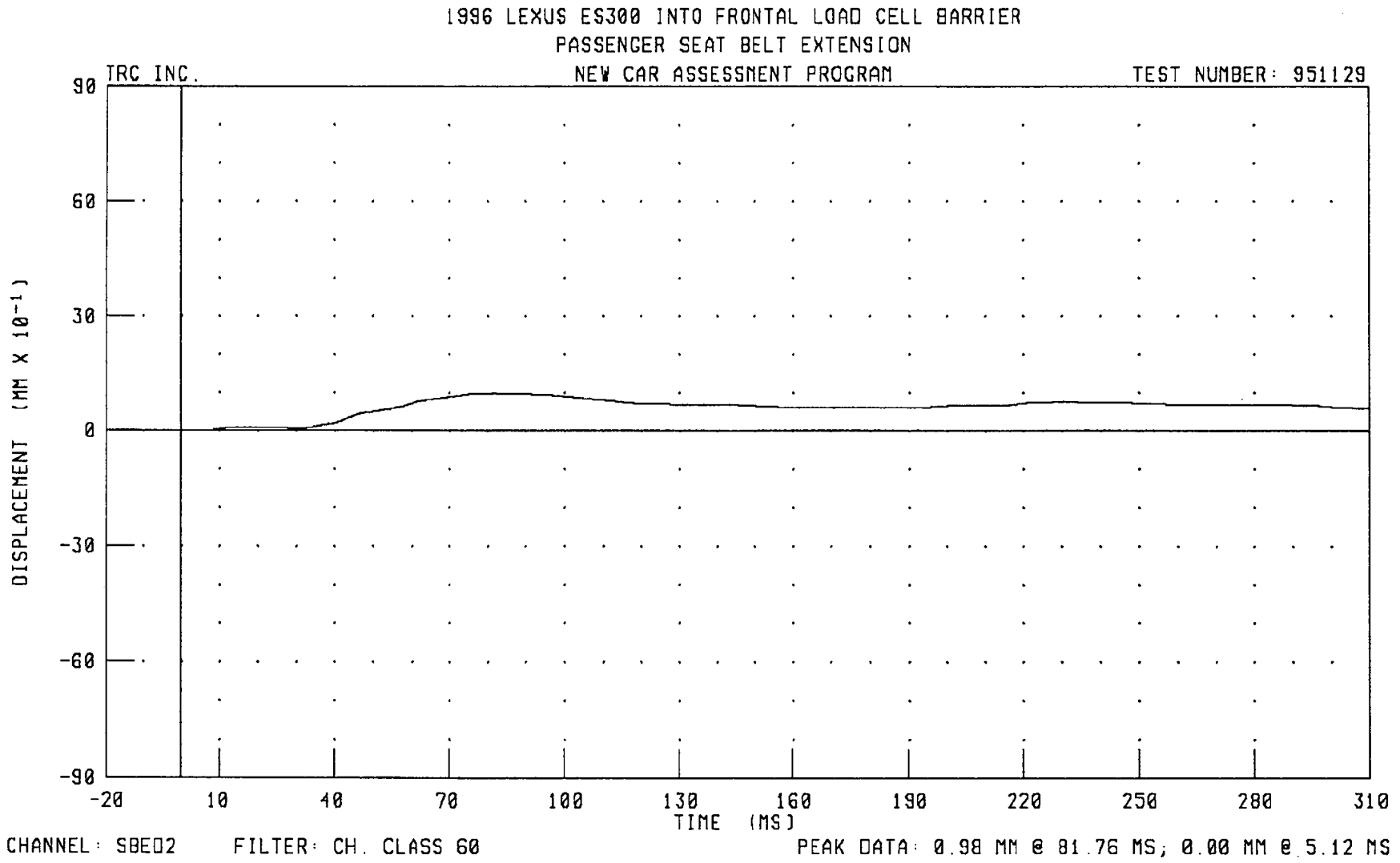
CHANNEL: SHBF2 FILTER: CH. CLASS 60 PEAK DATA: 5281.30 N @ 77.76 MS; -11.61 N @ 160.40 MS

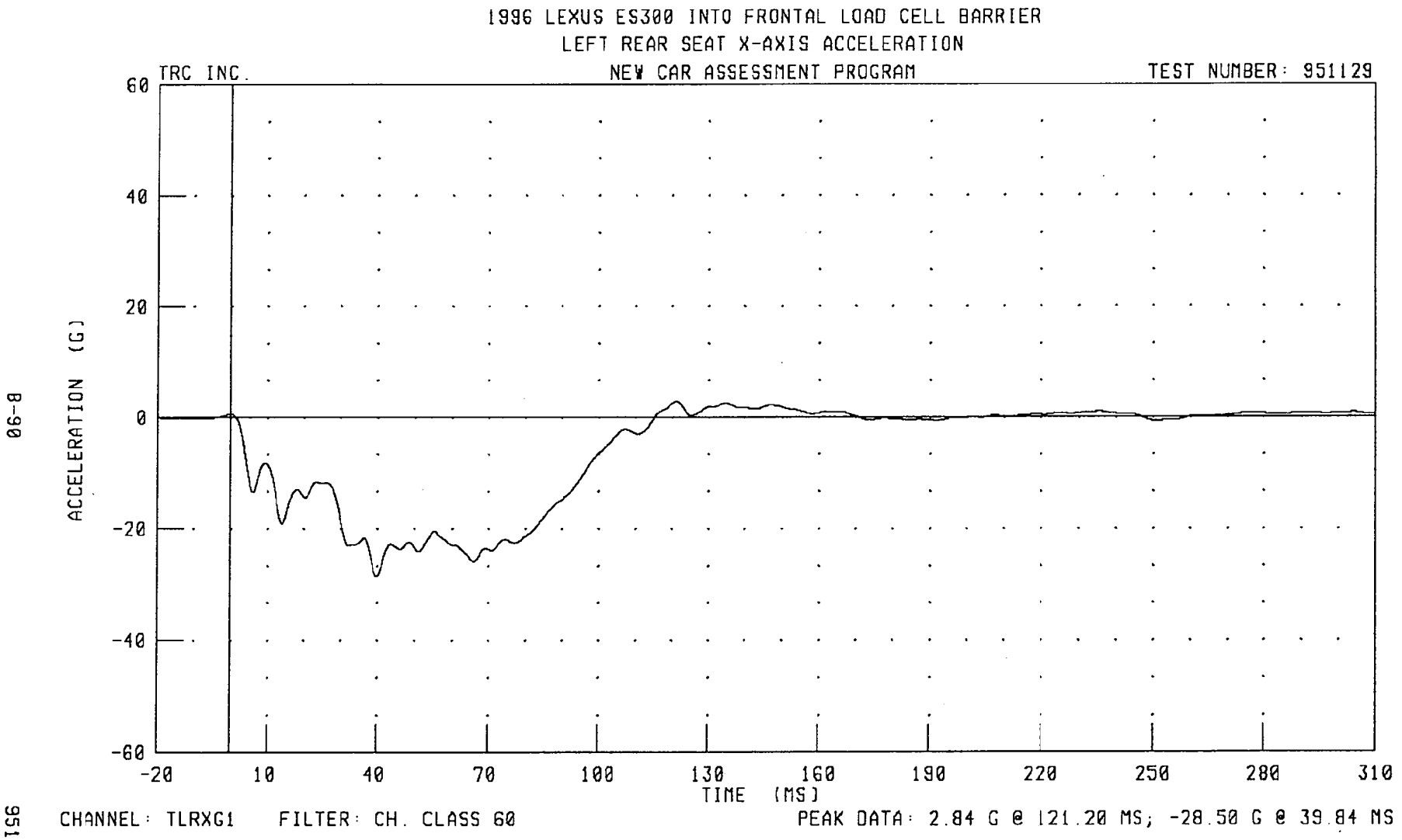
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT
NEW CAR ASSESSMENT PROGRAM

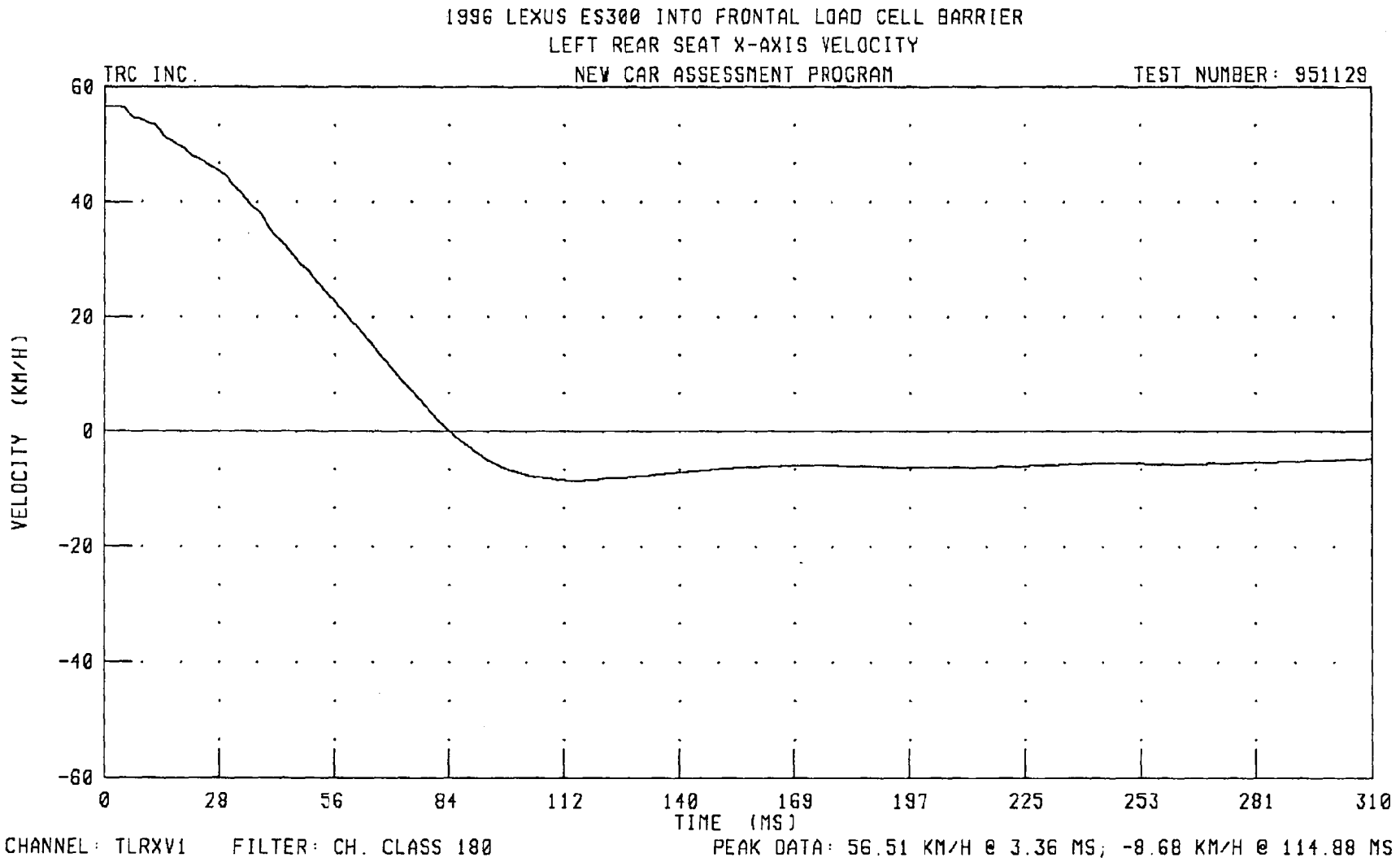


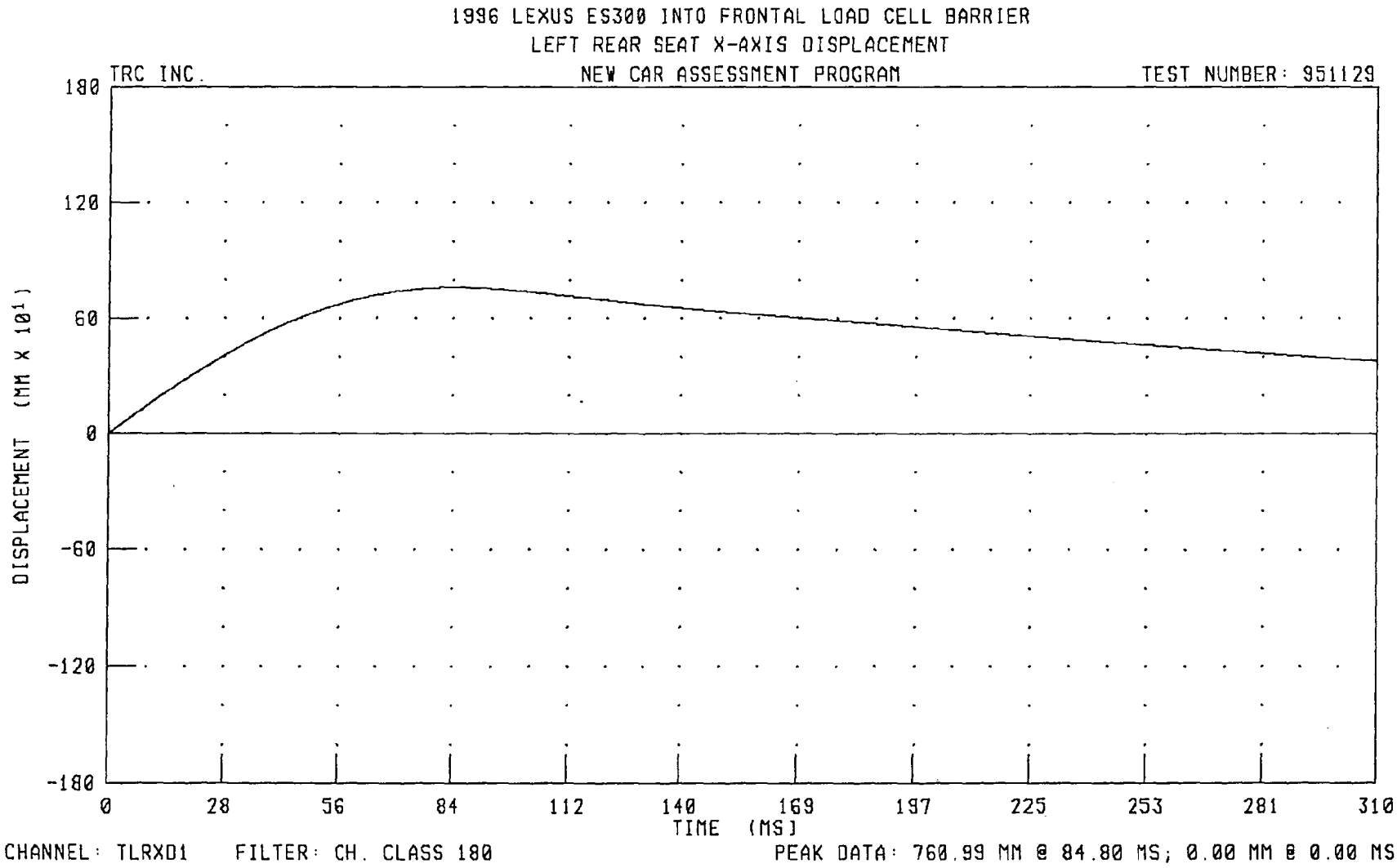
CHANNEL: SHBD2 FILTER: CH. CLASS 60 PEAK DATA: 104.06 MM @ 89.84 MS; -0.03 MM @ 5.52 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
PASSENGER SEAT BELT EXTENSION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
DISPLACEMENT (MM X 10-1)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: SBE02
FILTER: CH. CLASS 60
PEAK DATA: 0.98 MM @ 81.76 MS; 0.00 MM @ 5.12 MS

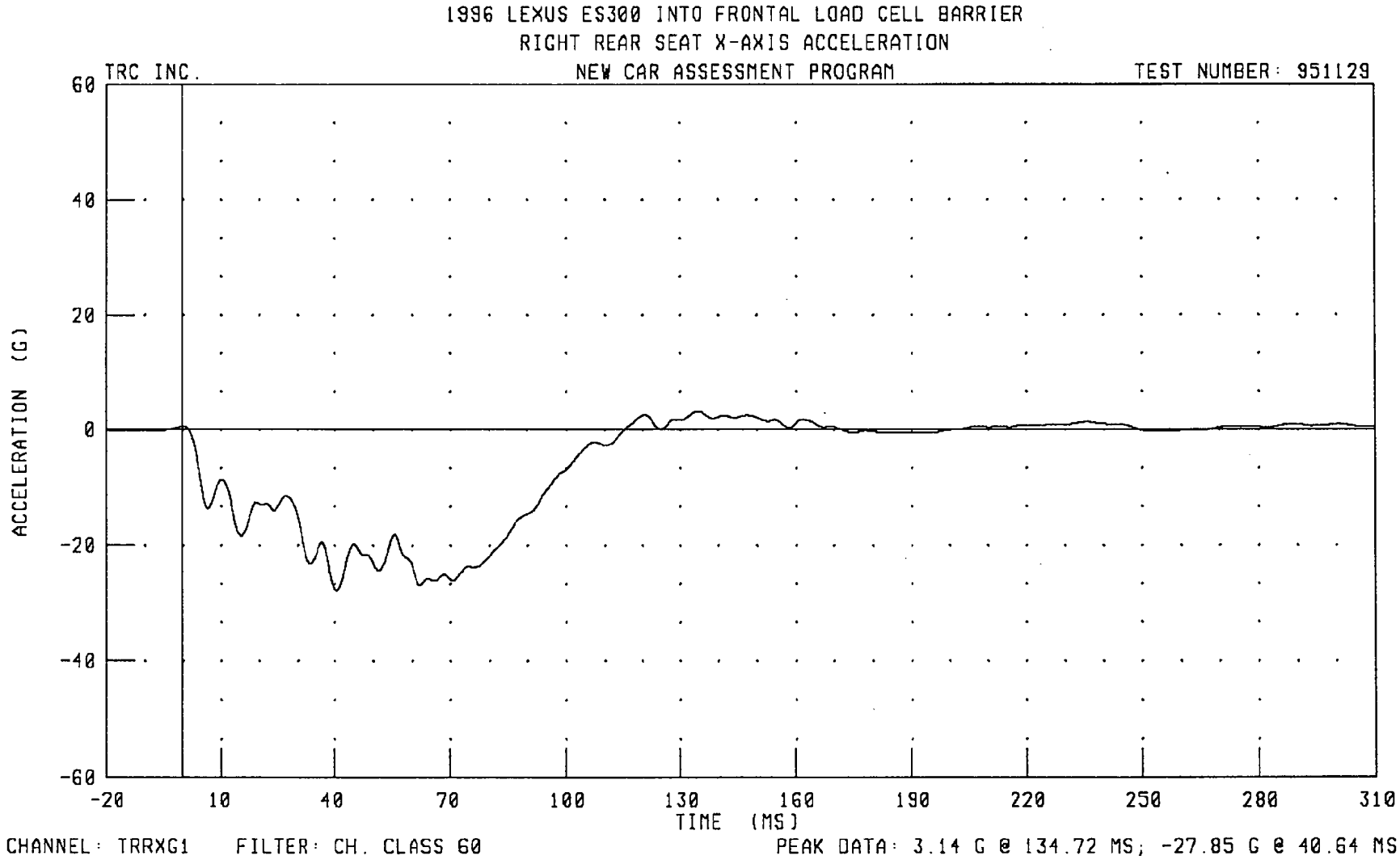

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXG1
FILTER: CH. CLASS 60
PEAK DATA: 2.84 G @ 121.20 MS; -28.50 G @ 39.84 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
VELOCITY (KM/H)
60
40
20
0
-20
-40
-60
0
28
56
84
112
140
169
197
225
253
281
310
TIME (MS)
CHANNEL: TLRXV1
FILTER: CH. CLASS 180
PEAK DATA: 56.51 KM/H @ 3.36 MS; -8.68 KM/H @ 114.88 MS

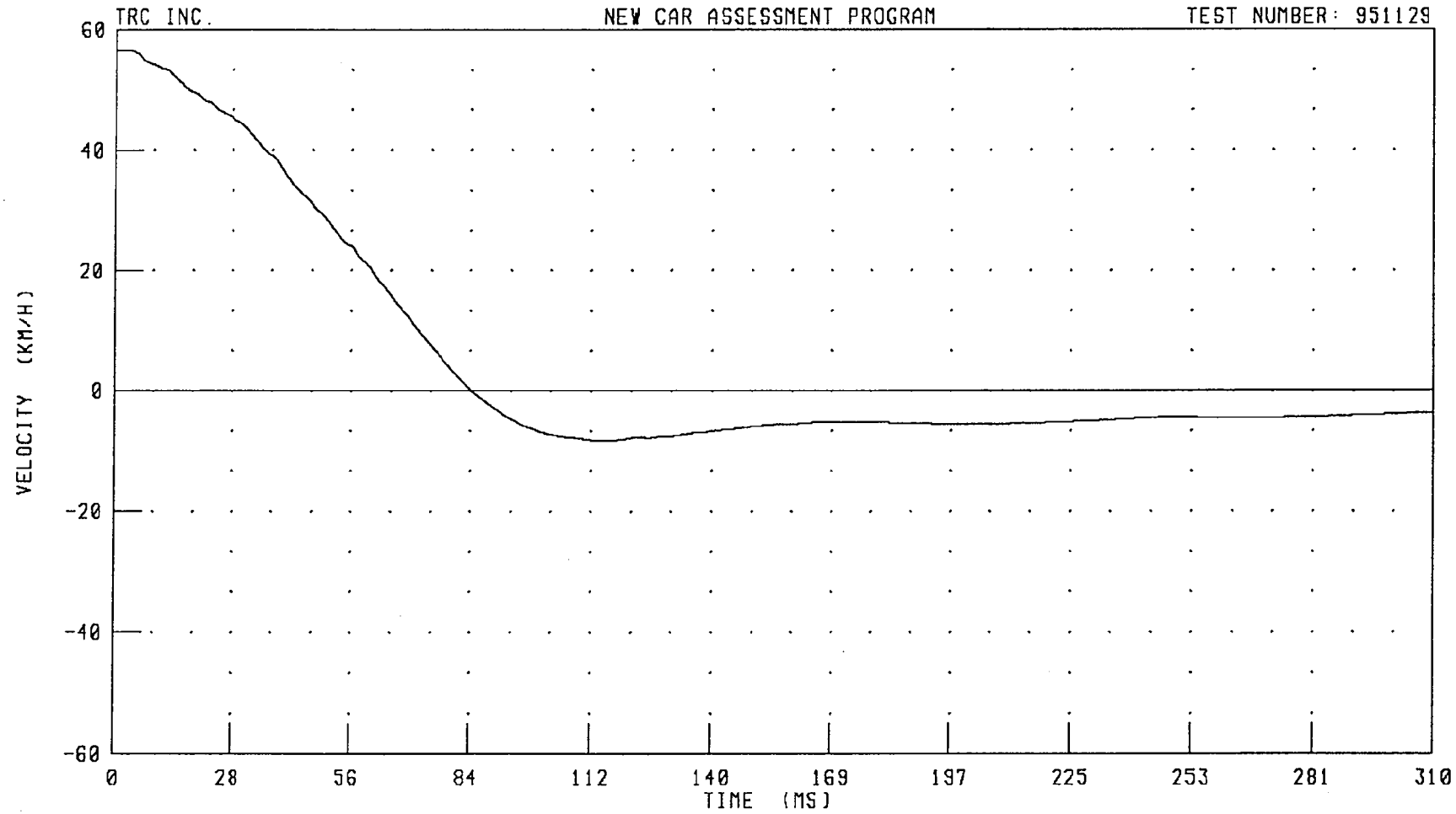

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS DISPLACEMENT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
DISPLACEMENT (MM X 10¹)
180
120
60
0
-60
-120
-180
0
28
56
84
112
140
169
197
225
253
281
310
TIME (MS)
CHANNEL: TLRXD1
FILTER: CH. CLASS 180
PEAK DATA: 760.99 MM @ 84.80 MS; 0.00 MM @ 0.00 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TRRXG1
FILTER: CH. CLASS 60
PEAK DATA: 3.14 G @ 134.72 MS; -27.85 G @ 40.64 MS

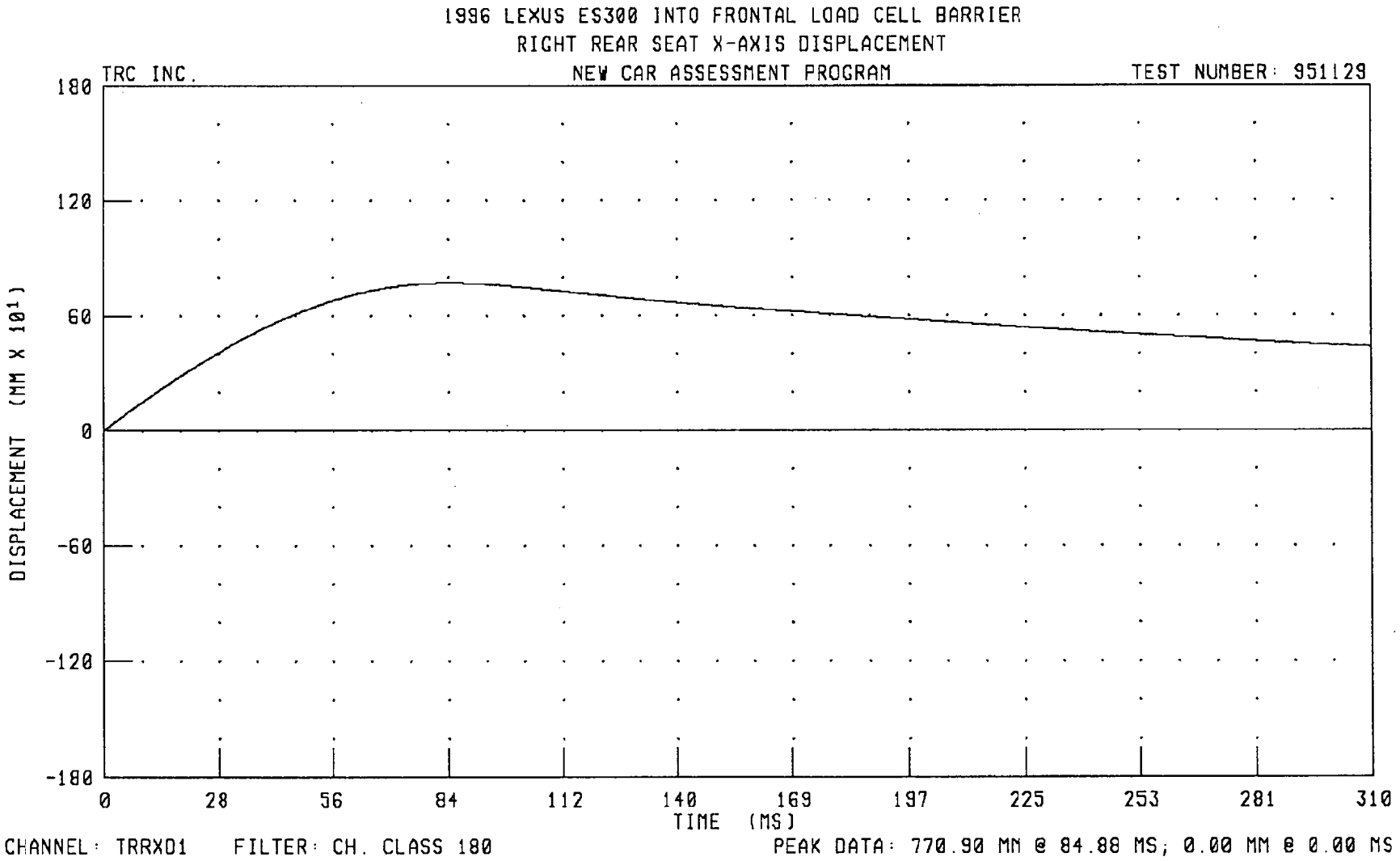
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS VELOCITY

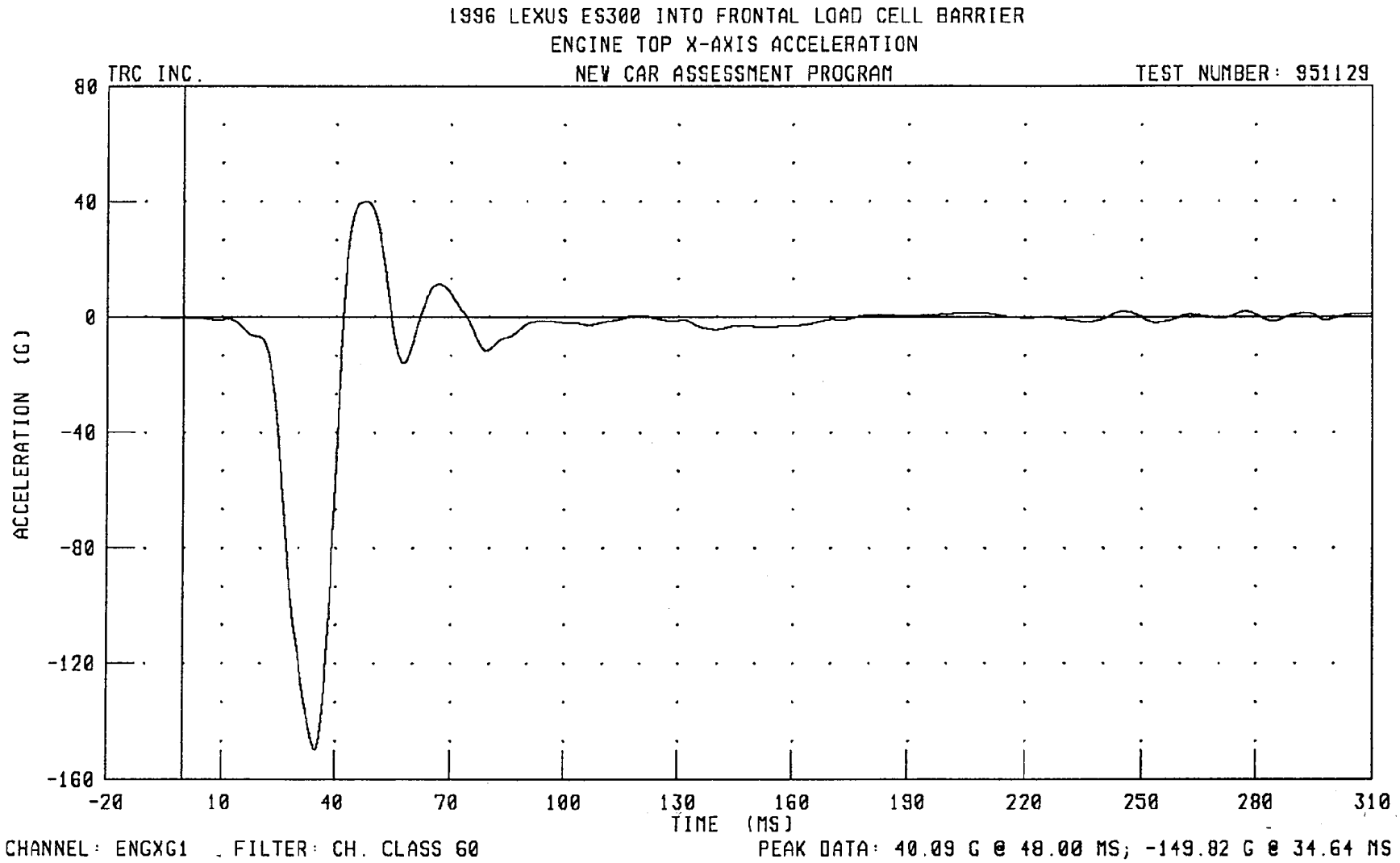


CHANNEL: TRRXV1 FILTER: CH. CLASS 180 PEAK DATA: 56.51 KM/H @ 3.36 MS; -8.31 KM/H @ 114.40 MS

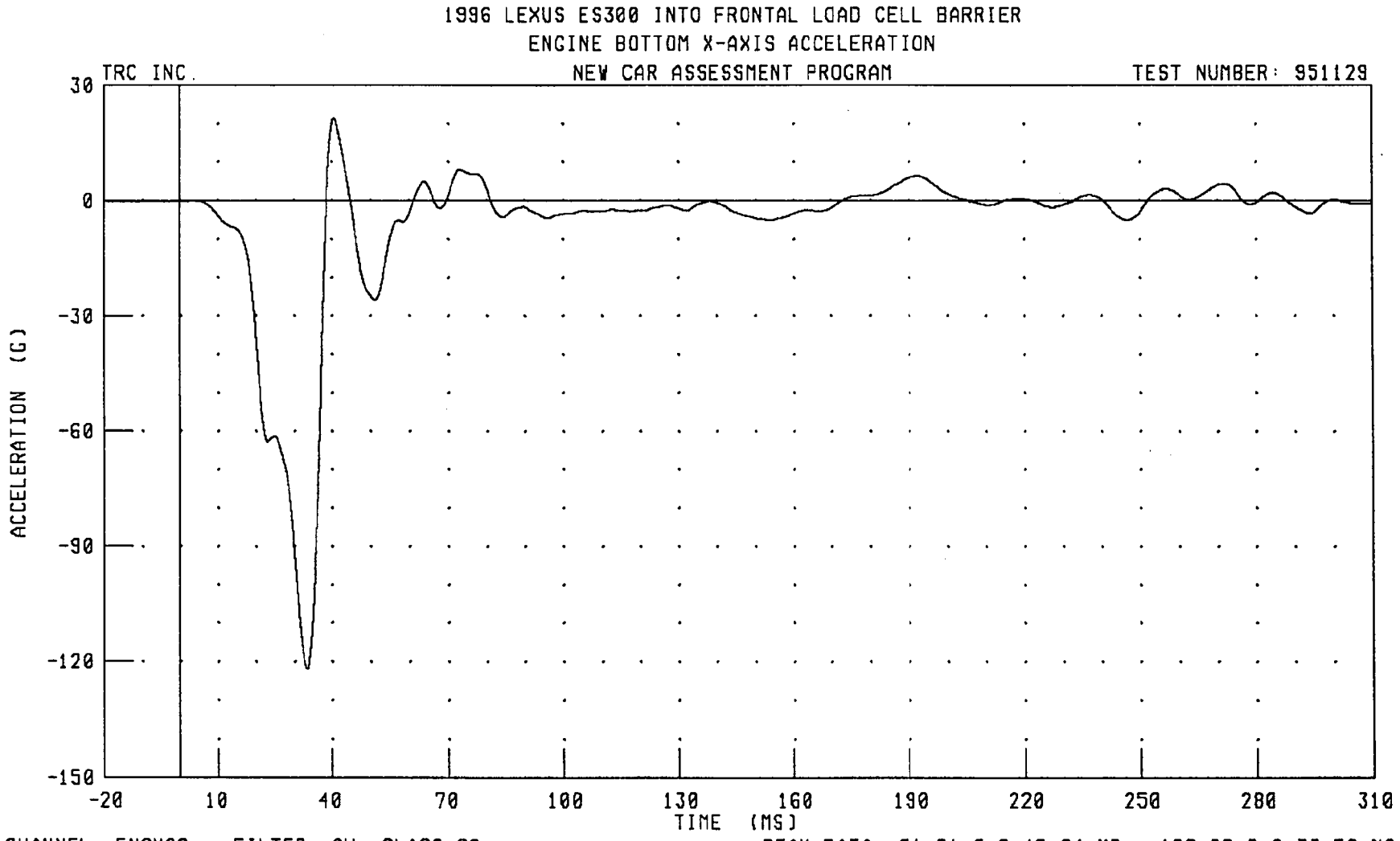
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS DISPLACEMENT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
DISPLACEMENT (MM X 10¹)
180
120
60
0
-60
-120
-180
0
28
56
84
112
140
169
197
225
253
281
310
TIME (MS)
CHANNEL: TRRXD1
FILTER: CH. CLASS 180
PEAK DATA: 770.90 MM @ 84.88 MS; 0.00 MM @ 0.00 MS

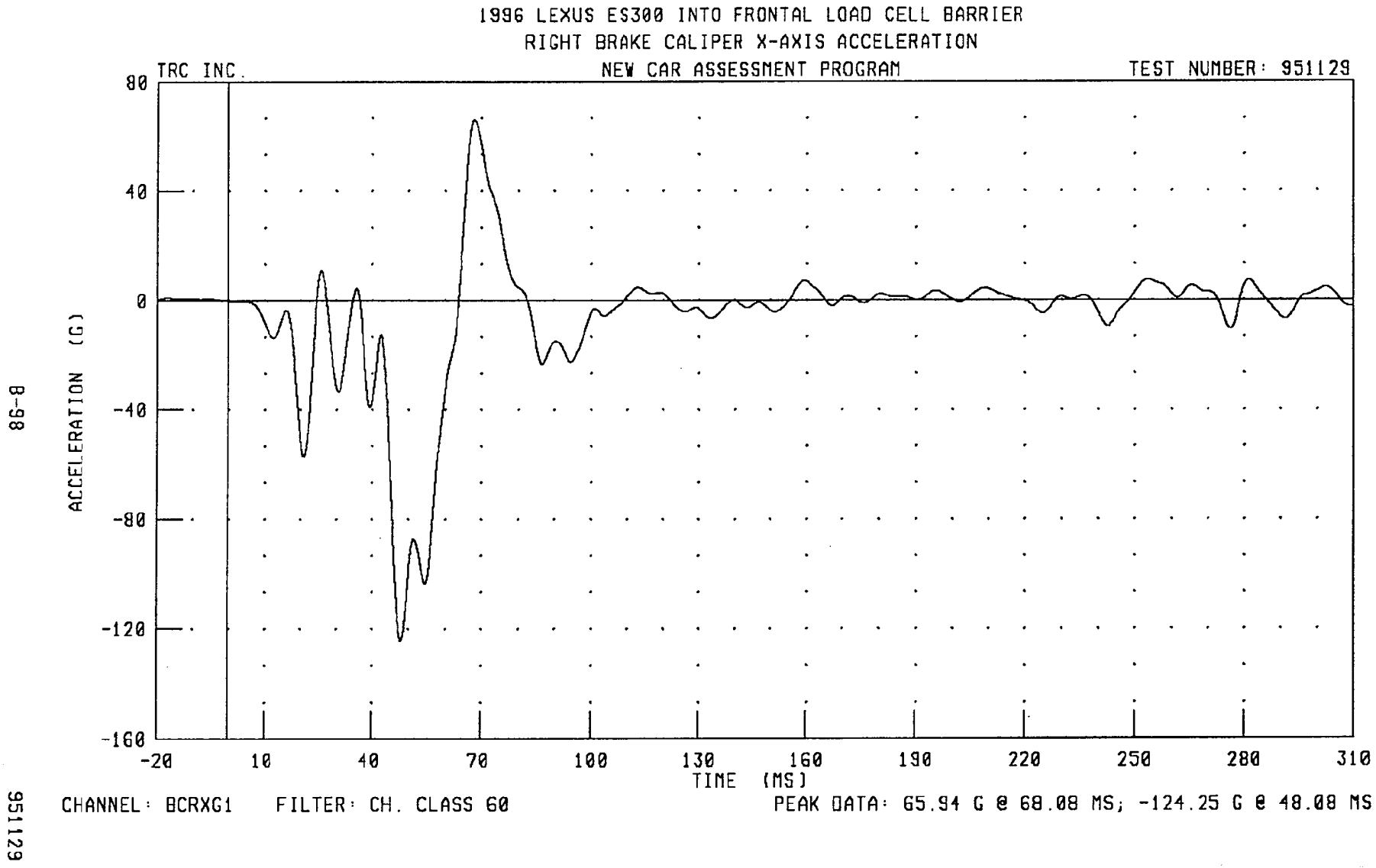
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
80
40
0
-40
-80
-120
-160
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG1 FILTER: CH. CLASS 60
PEAK DATA: 40.09 G @ 48.00 MS; -149.82 G @ 34.64 MS

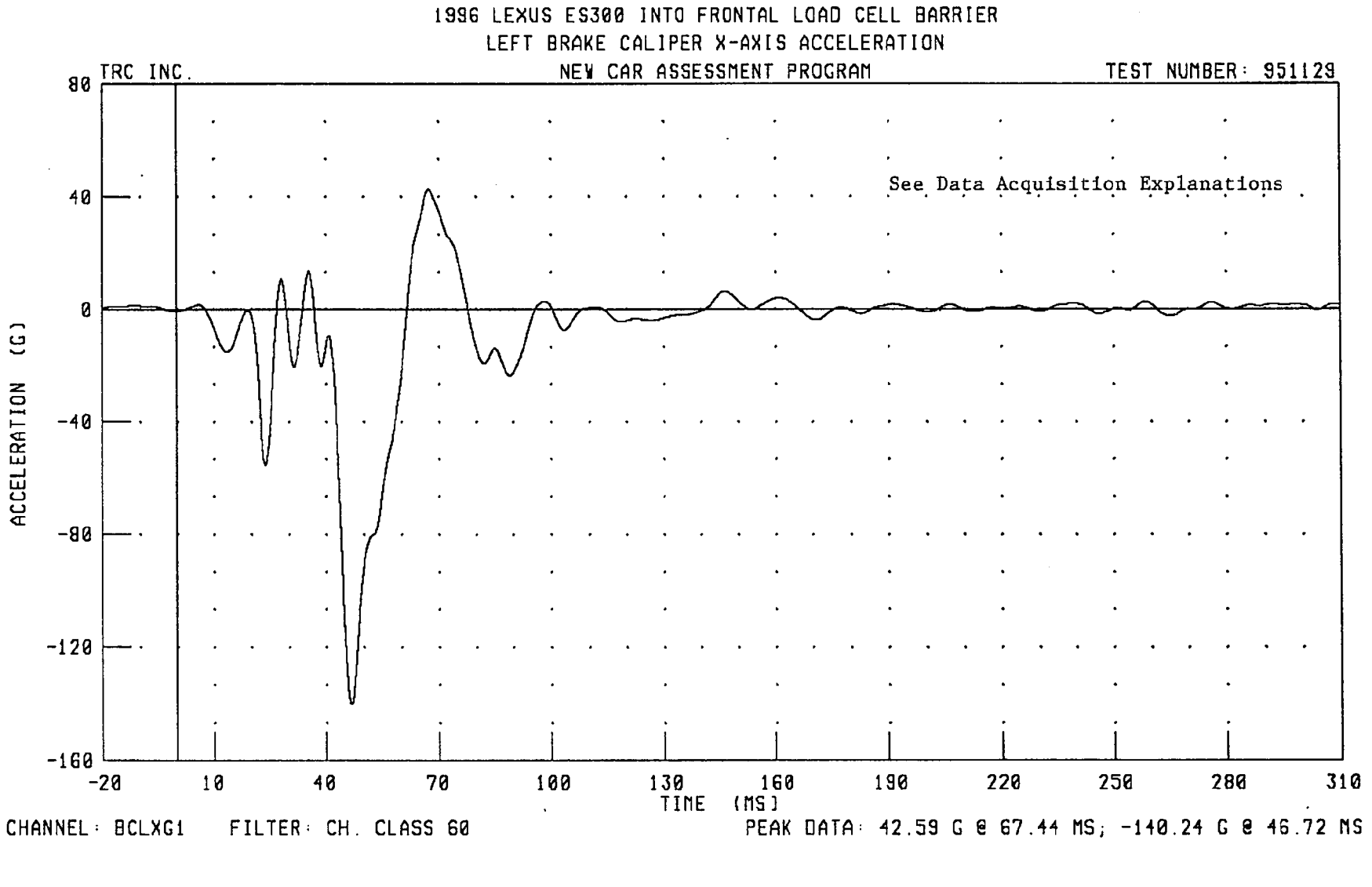
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
30
0
-30
-60
-90
-120
-150
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG2
FILTER: CH. CLASS 60
PEAK DATA: 21.21 G @ 40.64 MS; -122.08 G @ 33.52 MS

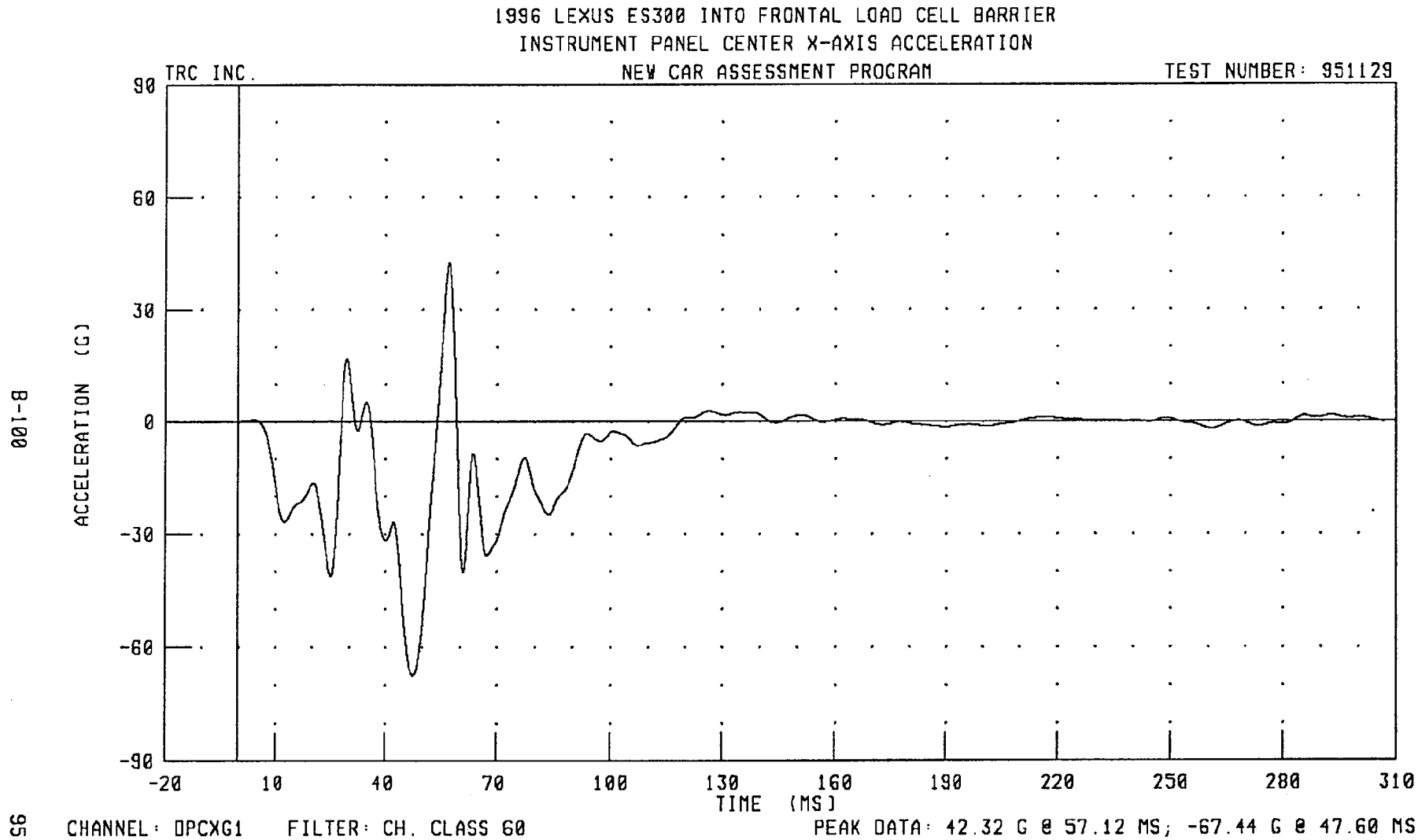
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
80
40
0
-40
-80
-120
-160
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCRXG1
FILTER: CH. CLASS 60
PEAK DATA: 65.94 G @ 68.08 MS; -124.25 G @ 48.08 MS

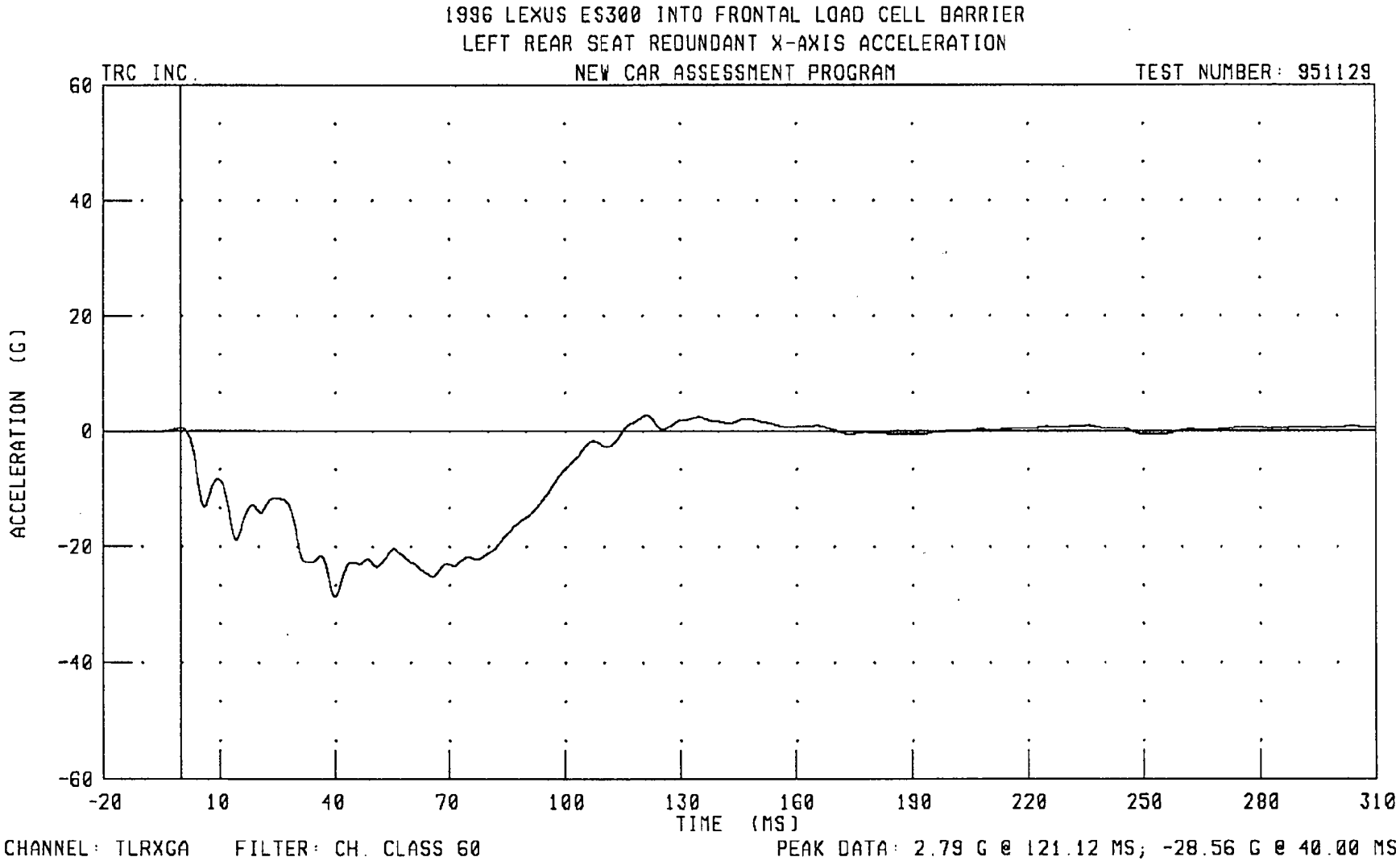
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
See Data Acquisition Explanations
ACCELERATION (G)
80
40
0
-40
-80
-120
-160
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCLXG1
FILTER: CH. CLASS 60
PEAK DATA: 42.59 G @ 67.44 MS; -140.24 G @ 46.72 MS

951129

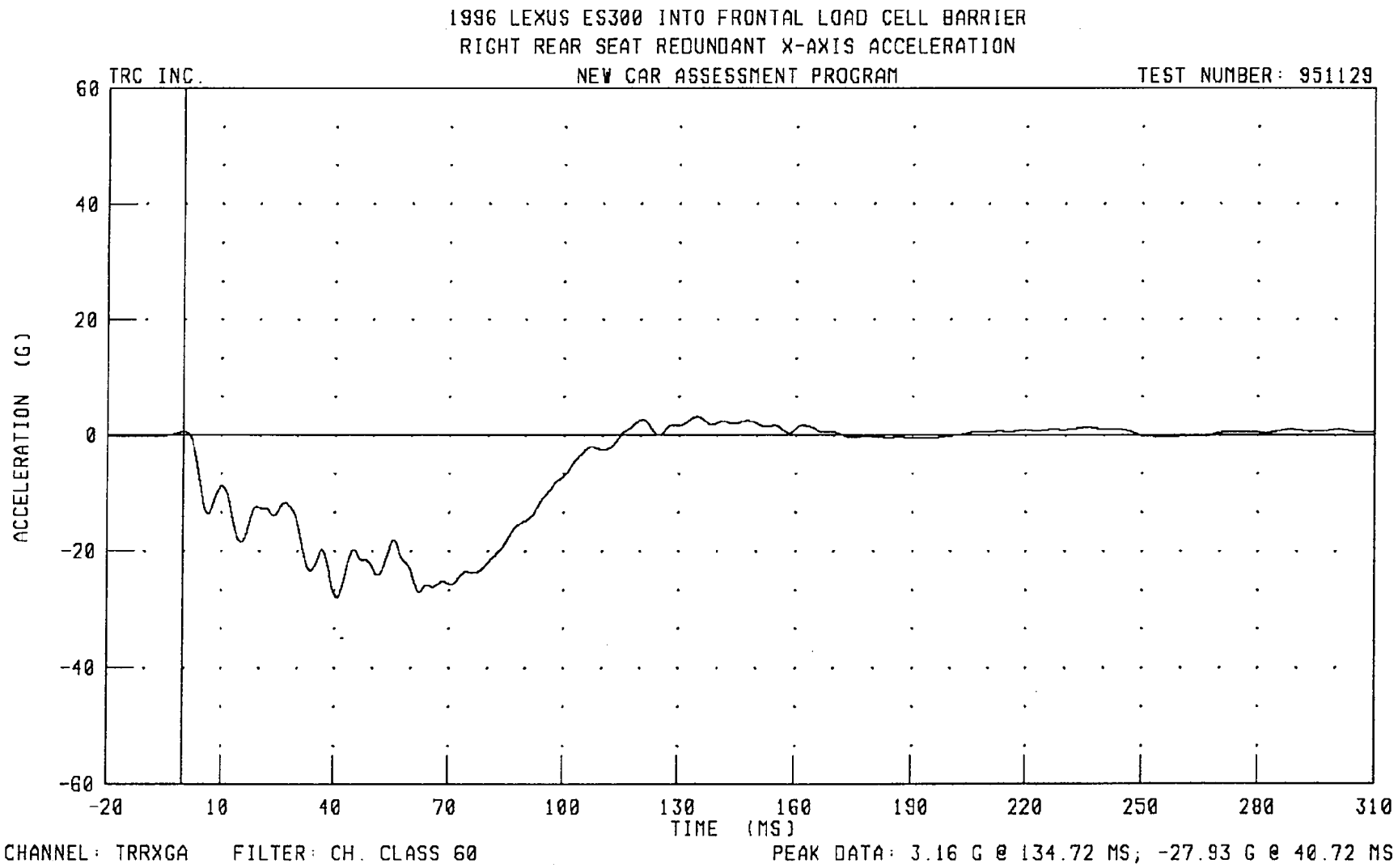

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: DPCXG1
FILTER: CH. CLASS 60
PEAK DATA: 42.32 G @ 57.12 MS; -67.44 G @ 47.60 MS

951129

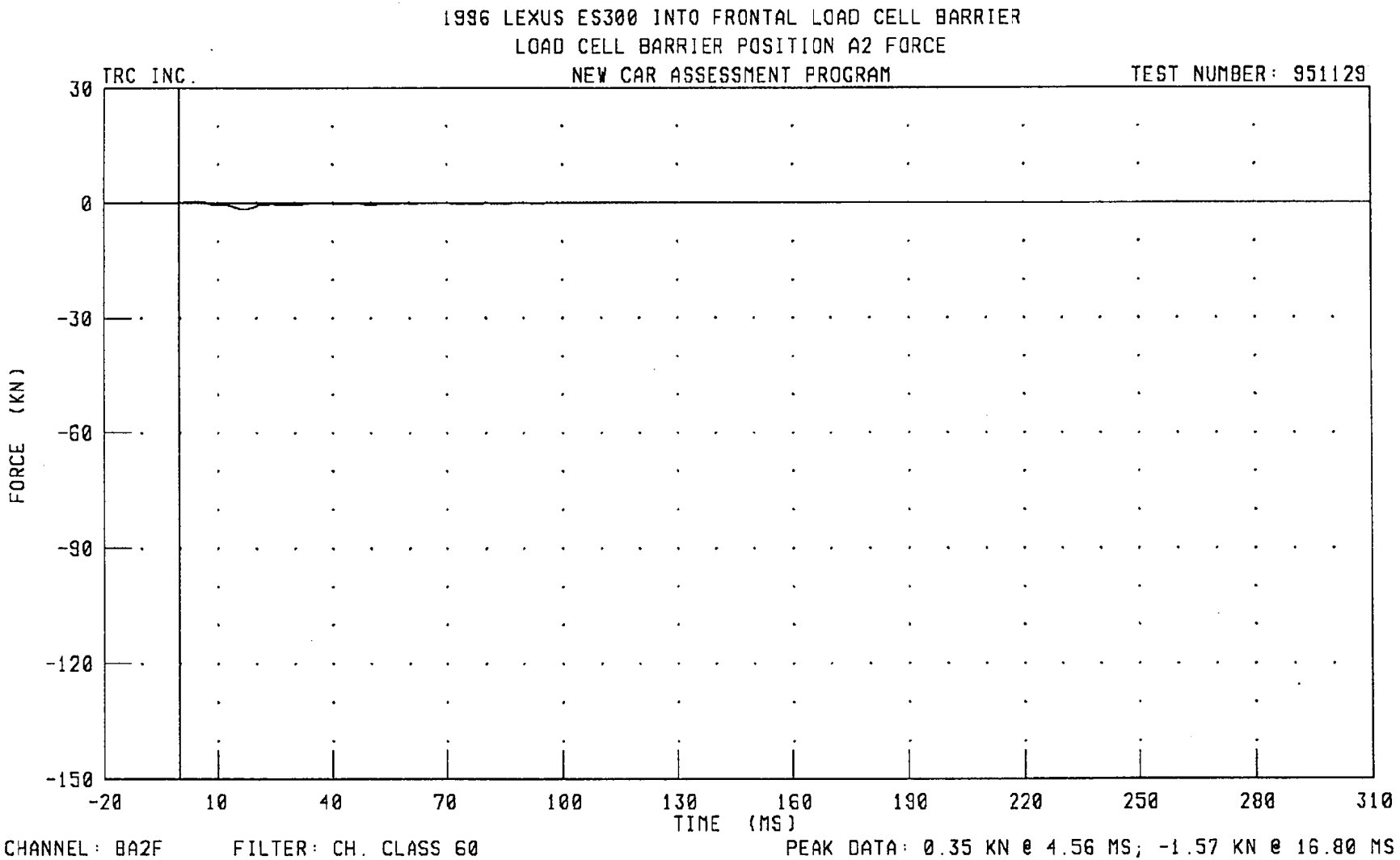

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXGA
FILTER: CH. CLASS 60
PEAK DATA: 2.79 G @ 121.12 MS; -28.56 G @ 40.00 MS

951129

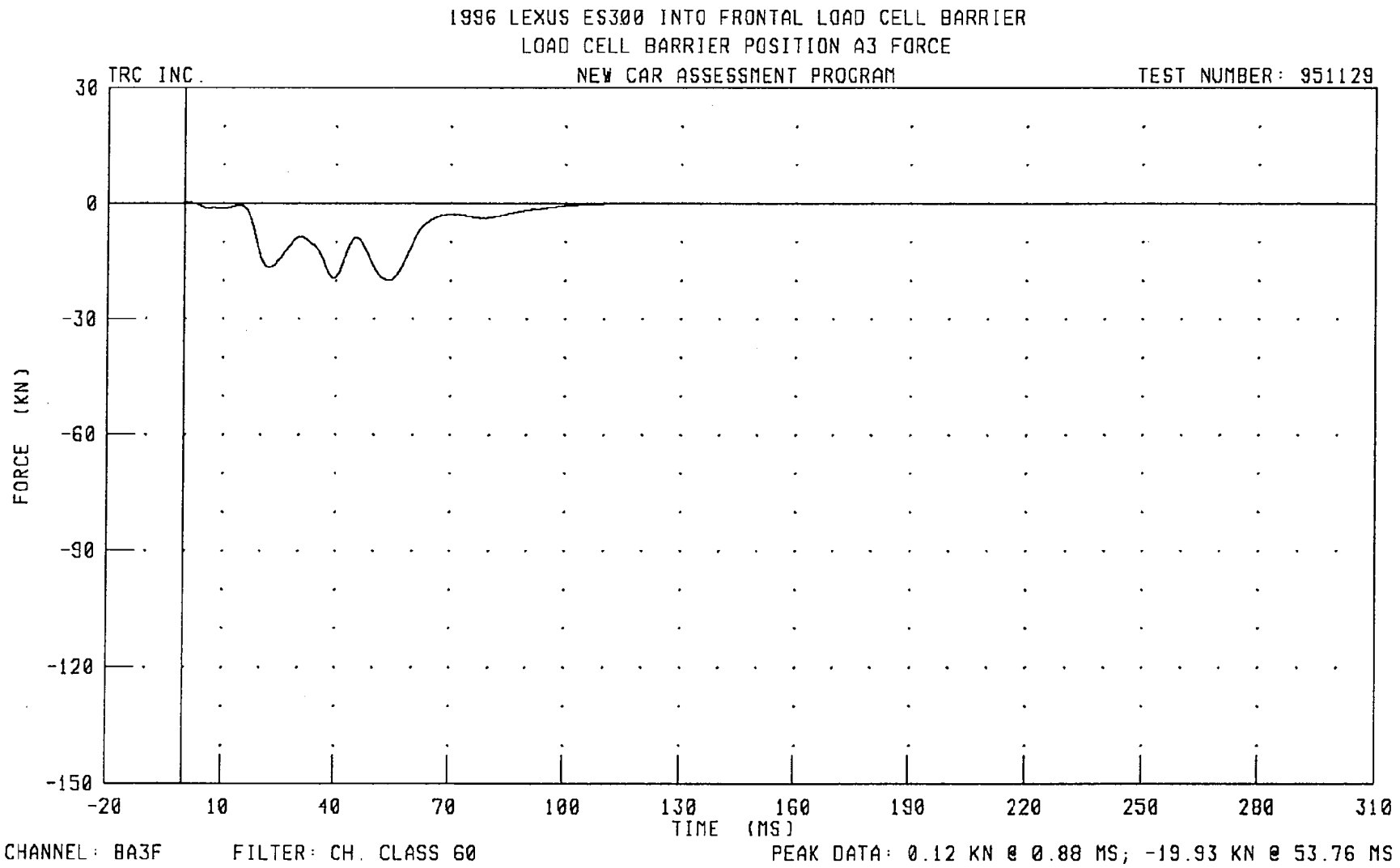
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM



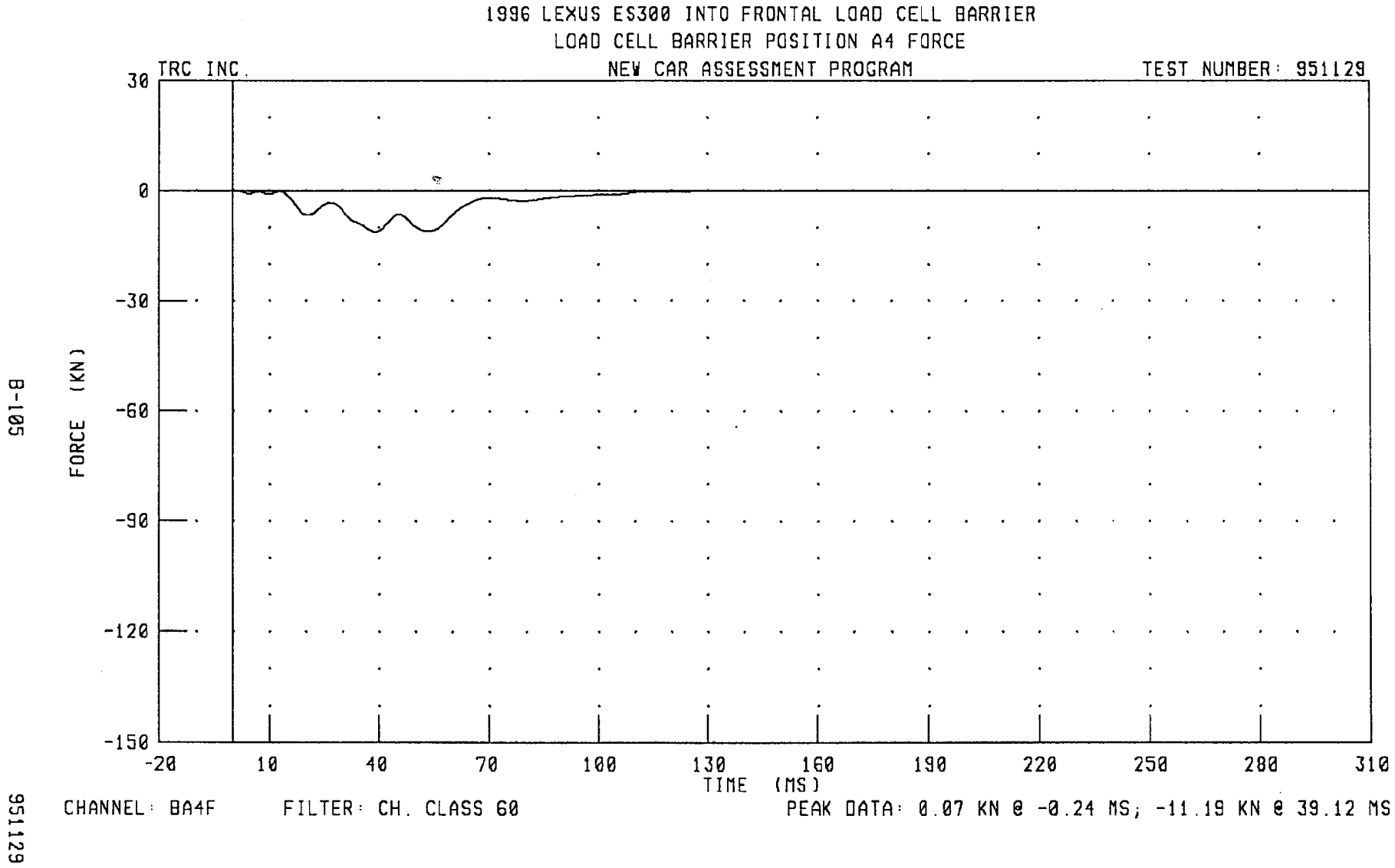
CHANNEL: TRRXGA FILTER: CH. CLASS 60 PEAK DATA: 3.16 G @ 134.72 MS; -27.93 G @ 40.72 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A2 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA2F
FILTER: CH. CLASS 60
PEAK DATA: 0.35 KN @ 4.56 MS; -1.57 KN @ 16.80 MS

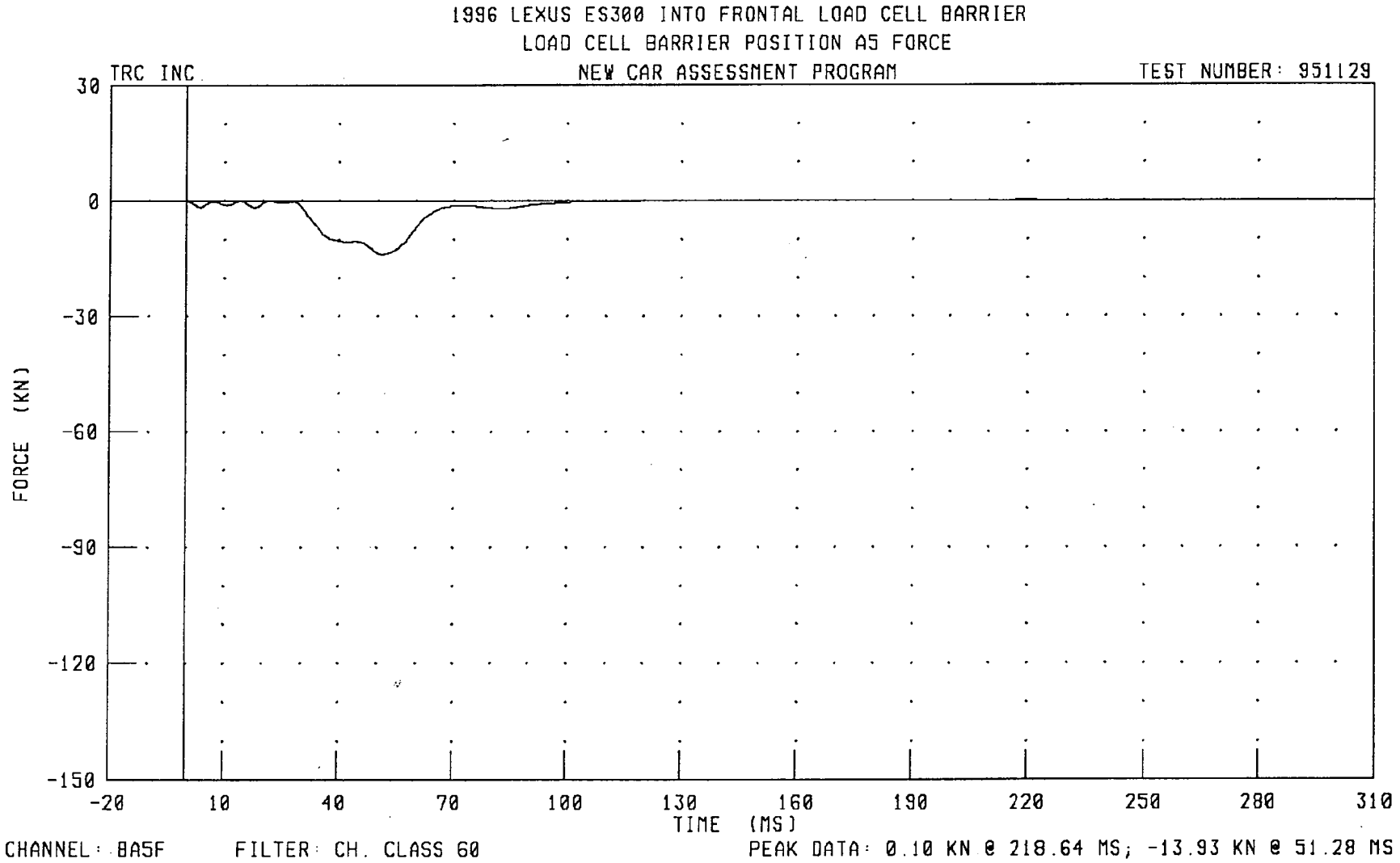
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A3 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA3F
FILTER: CH. CLASS 60
PEAK DATA: 0.12 KN @ 0.88 MS; -19.93 KN @ 53.76 MS

951129

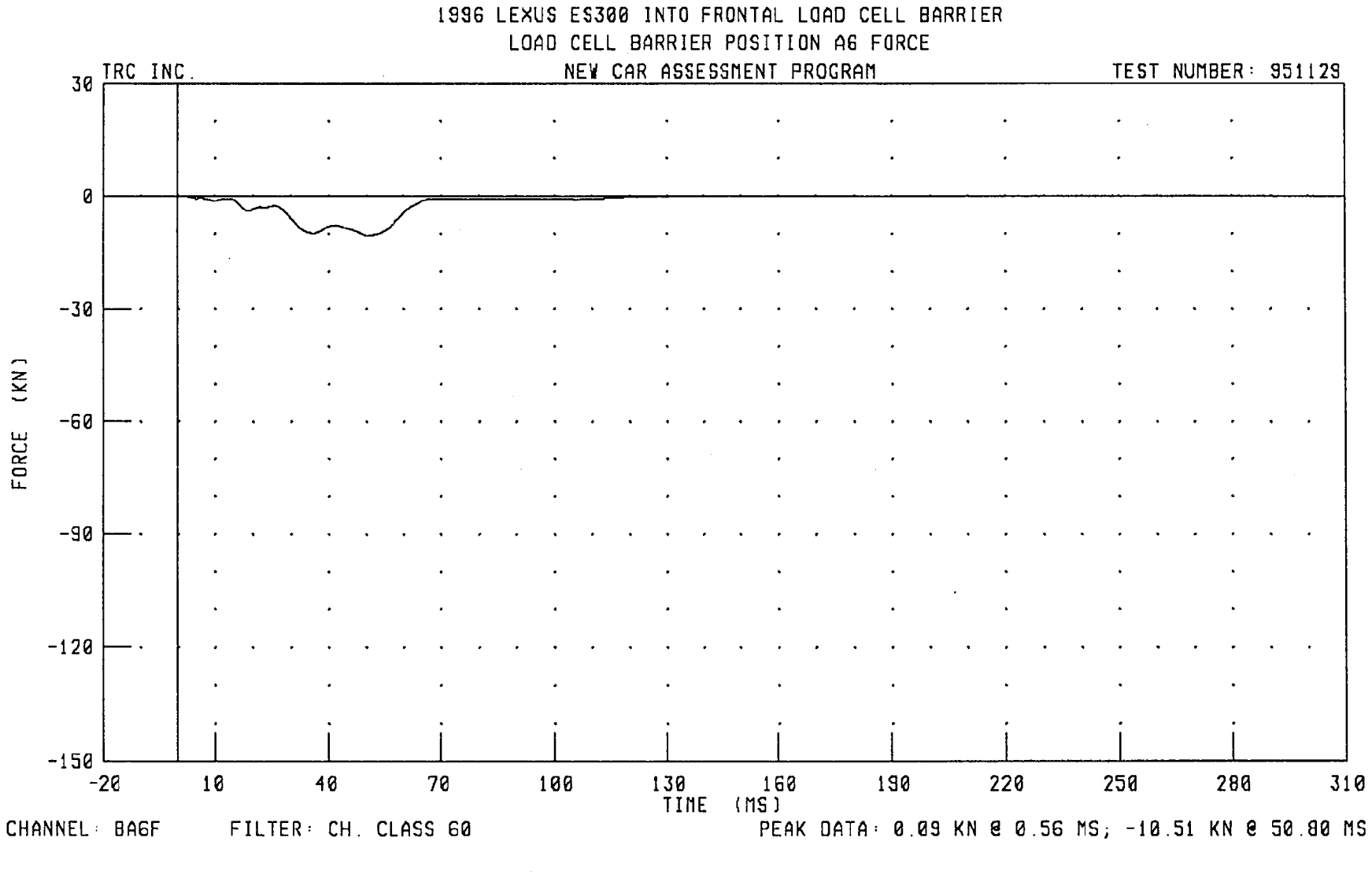

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A4 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA4F
FILTER: CH. CLASS 60
PEAK DATA: 0.07 KN @ -0.24 MS; -11.19 KN @ 39.12 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A5 FORCE
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA5F
FILTER: CH. CLASS 60
PEAK DATA: 0.10 KN @ 218.64 MS; -13.93 KN @ 51.28 MS

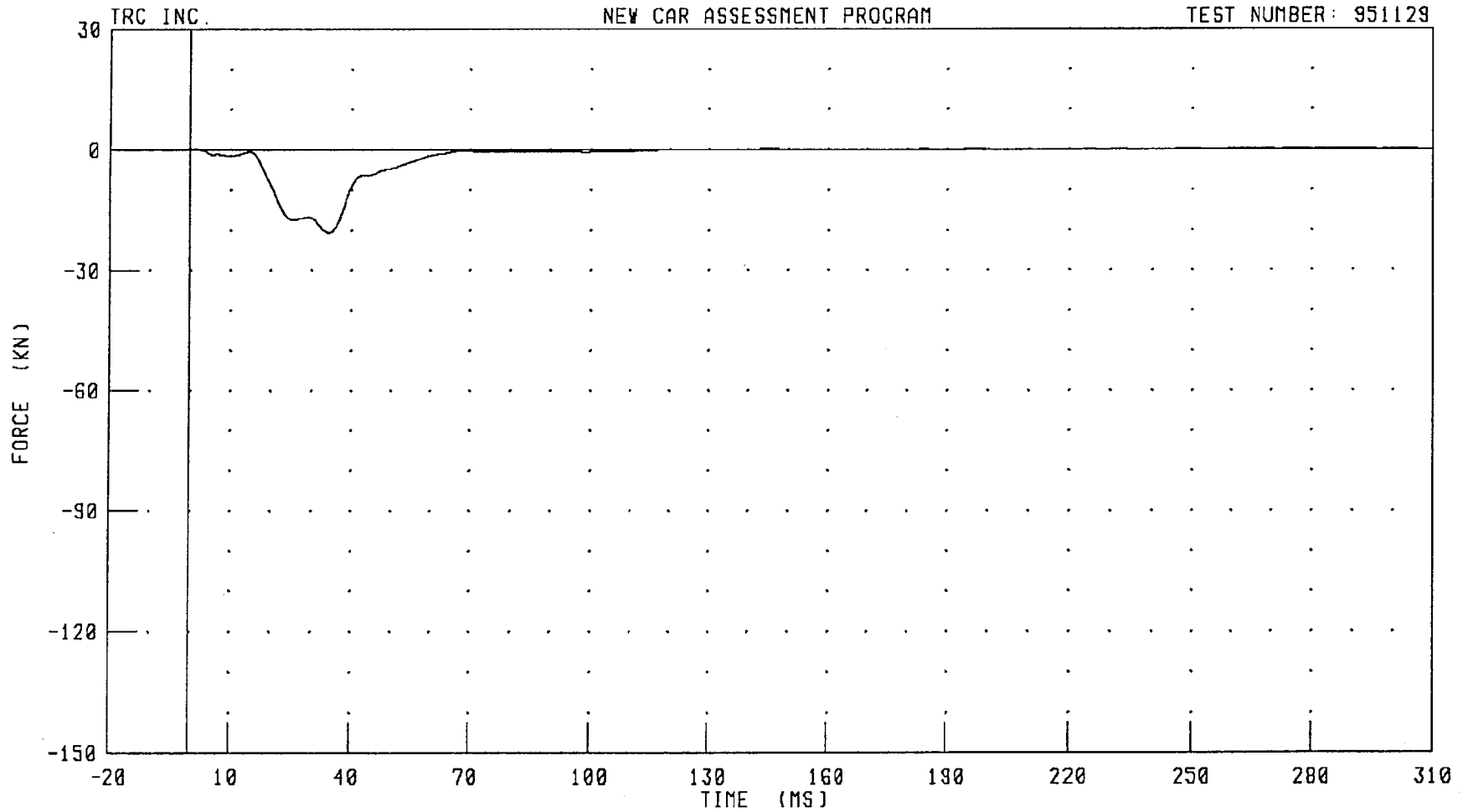
B-106

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A6 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA6F
FILTER: CH. CLASS 60
PEAK DATA: 0.09 KN @ 0.56 MS; -10.51 KN @ 50.80 MS

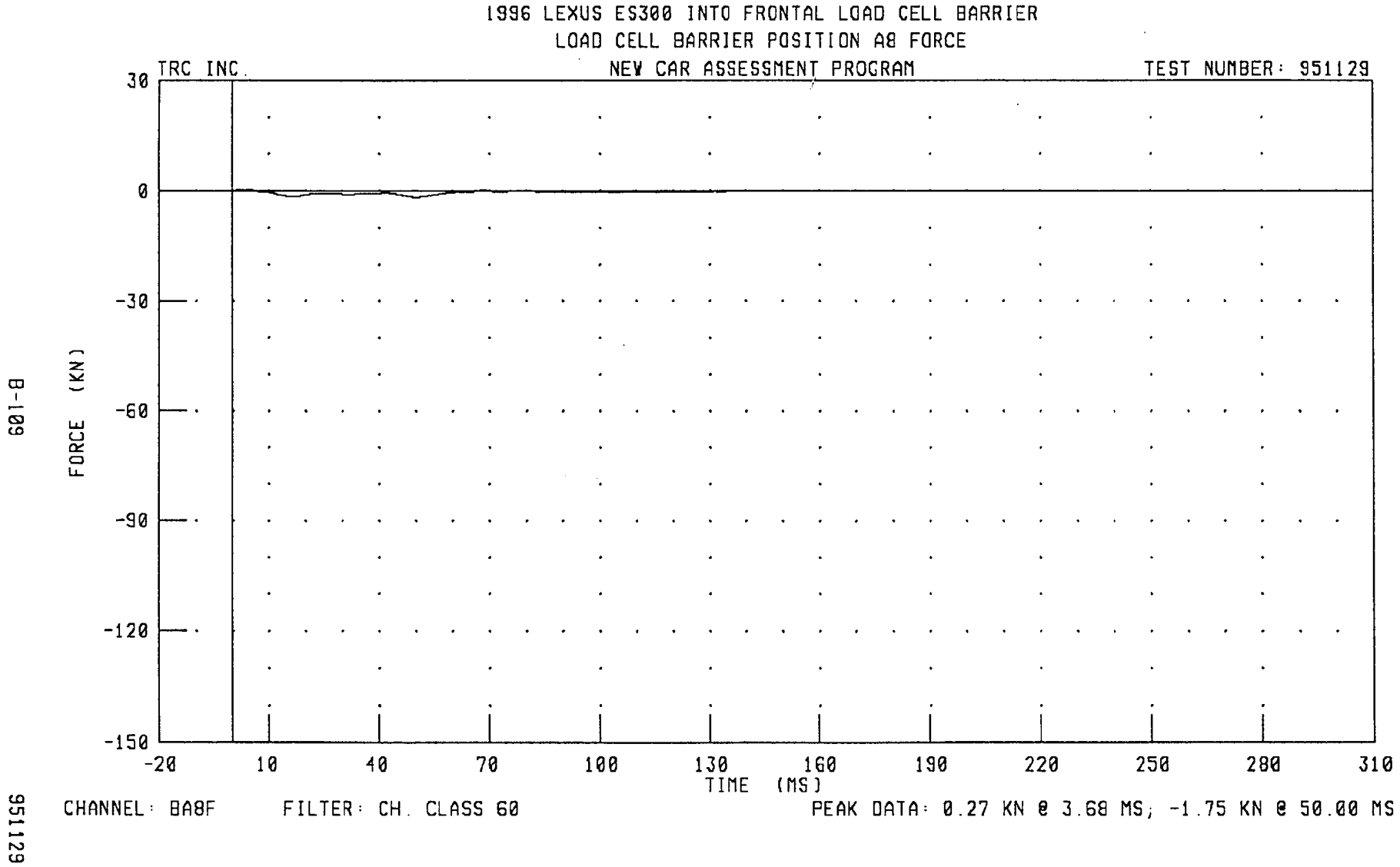
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE



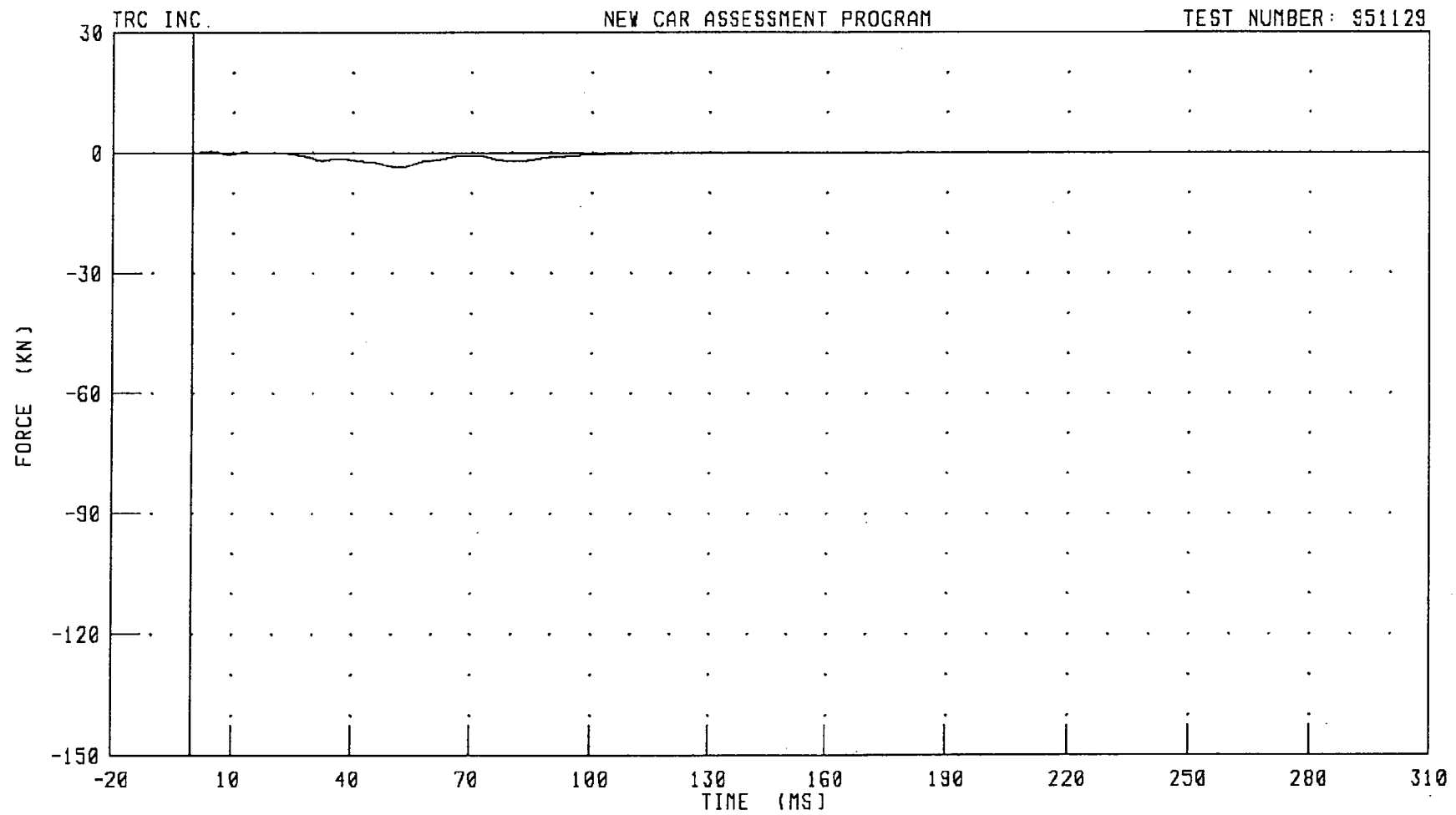
CHANNEL: BA7F FILTER: CH. CLASS 60 PEAK DATA: 0.14 KN @ 1.04 MS; -20.55 KN @ 34.48 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A8 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA8F
FILTER: CH. CLASS 60
PEAK DATA: 0.27 KN @ 3.68 MS; -1.75 KN @ 50.00 MS

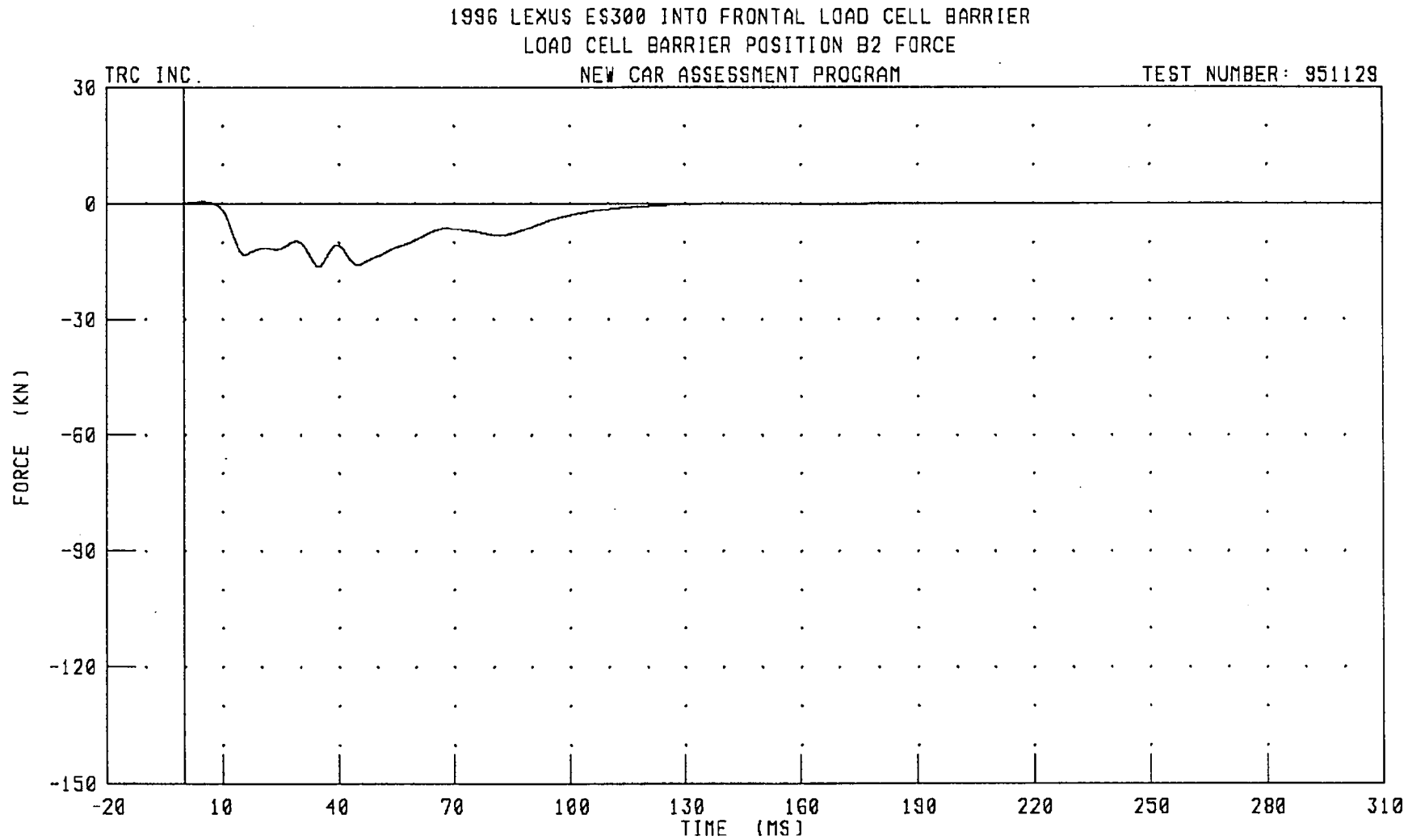
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B1 FORCE



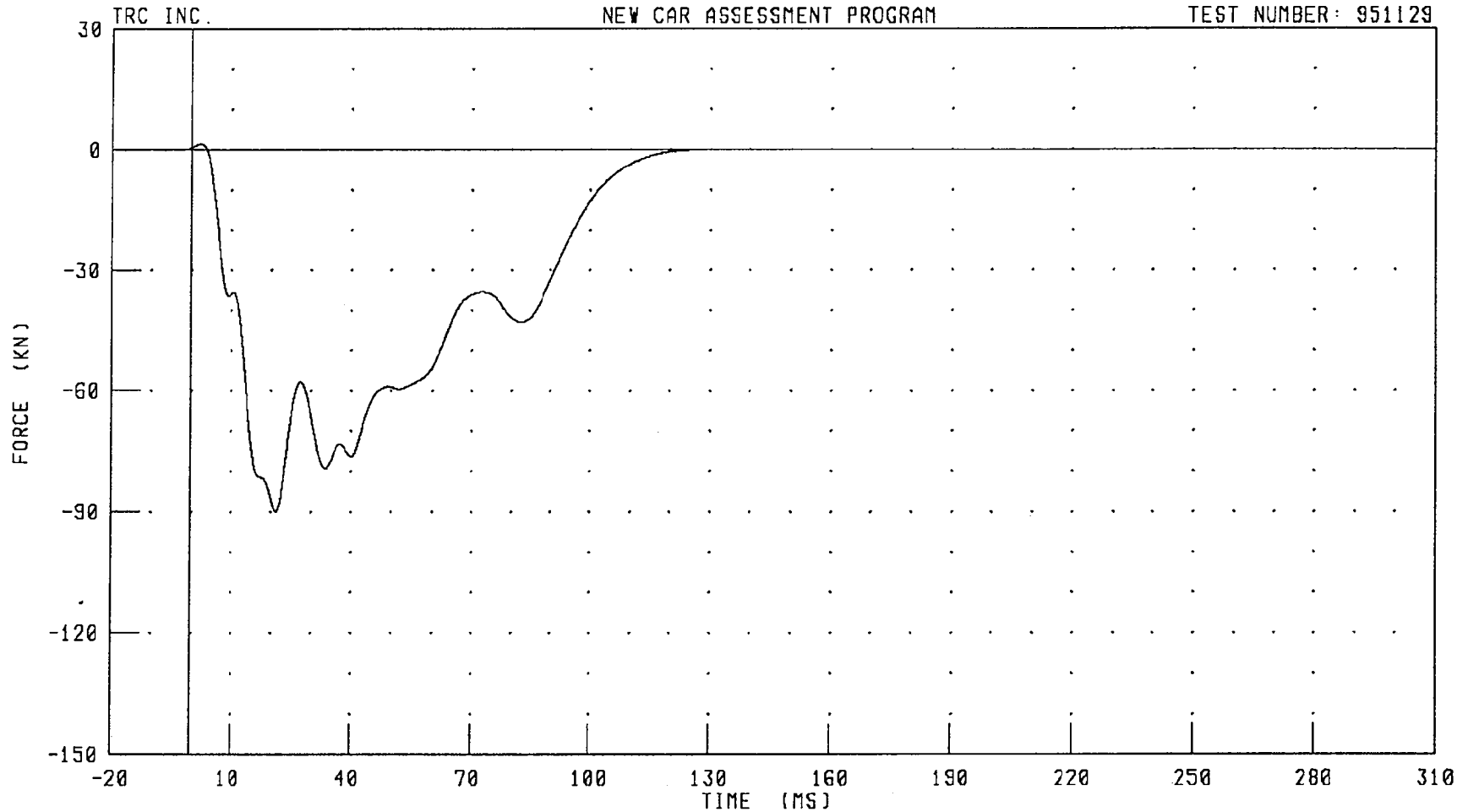
CHANNEL: BB1F FILTER: CH. CLASS 60 PEAK DATA: 0.34 KN @ 4.48 MS; -3.71 KN @ 51.76 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B2 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BB2F
FILTER: CH. CLASS 60
PEAK DATA: 0.36 KN @ 4.56 MS; -16.20 KN @ 34.96 MS

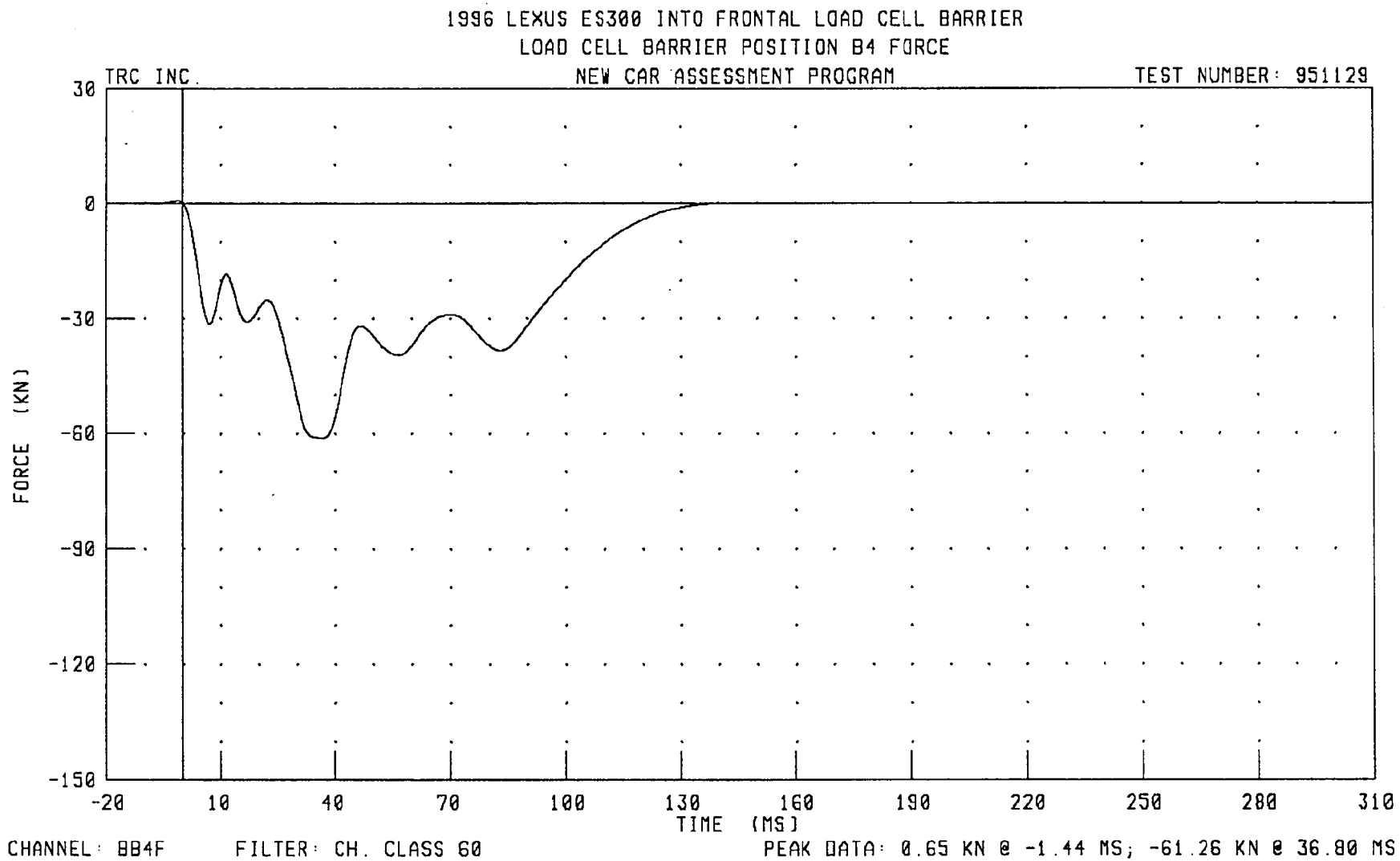
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B3 FORCE

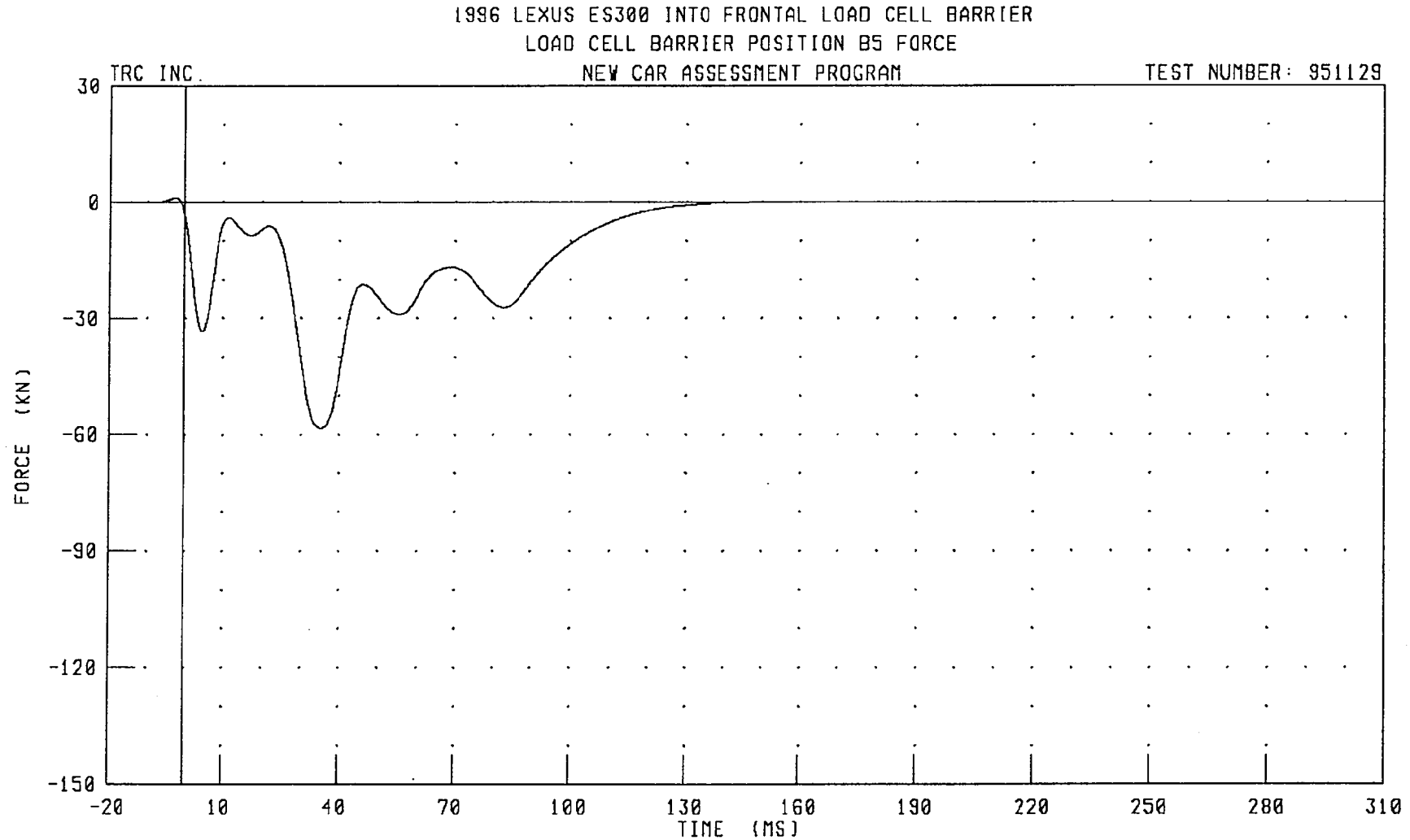


CHANNEL: 8B3F FILTER: CH. CLASS 60 PEAK DATA: 1.41 KN @ 2.16 MS; -89.92 KN @ 21.44 MS

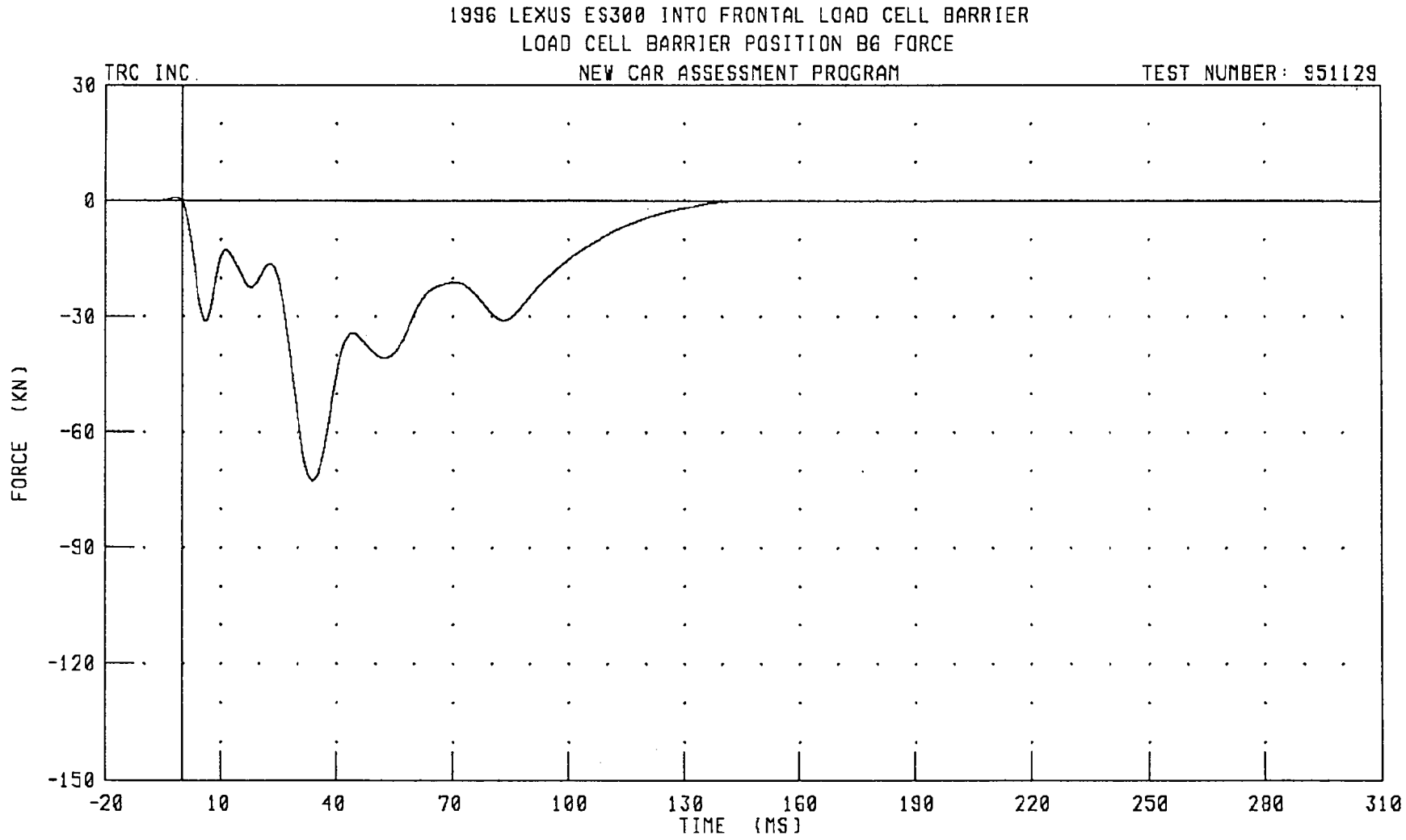
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: 8B4F
FILTER: CH. CLASS 60
PEAK DATA: 0.65 KN @ -1.44 MS; -61.26 KN @ 36.80 MS

951129

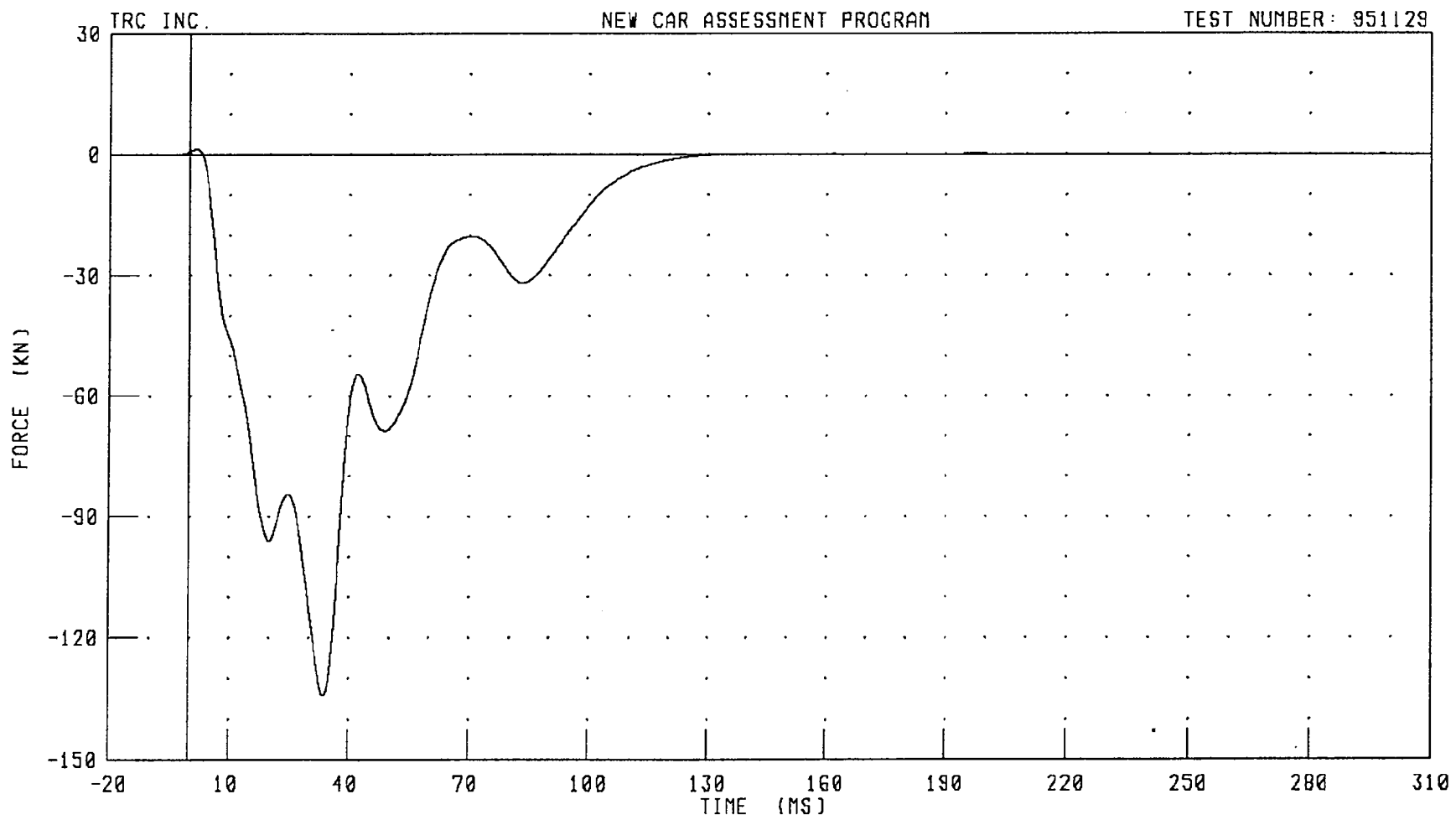

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: B85F
FILTER: CH. CLASS 60
PEAK DATA: 1.08 KN @ -2.56 MS; -58.39 KN @ 35.52 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION BG FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BB6F
FILTER: CH. CLASS 60
PEAK DATA: 0.80 KN @ -1.76 MS; -72.56 KN @ 34.00 MS

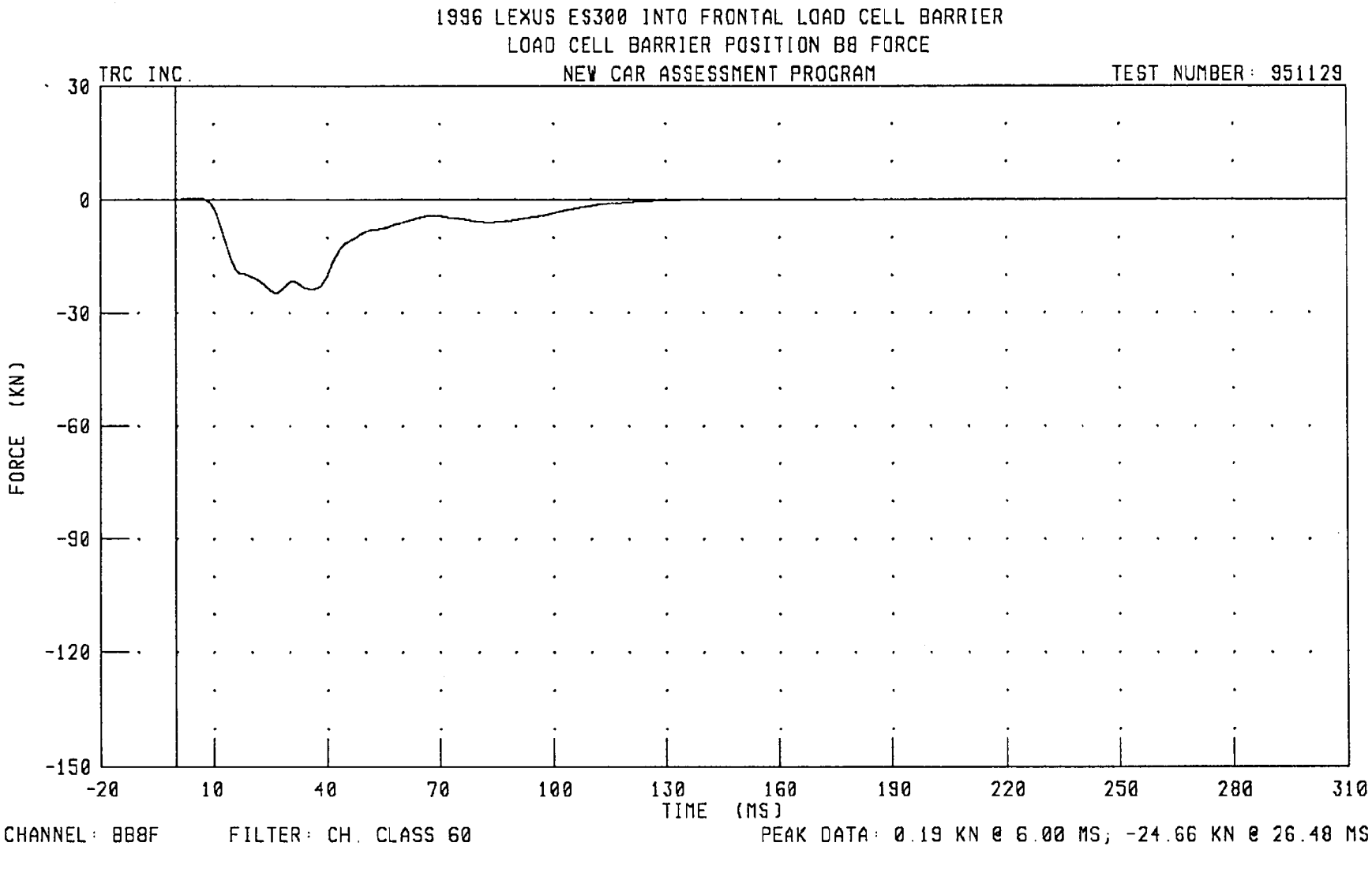
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B7 FORCE

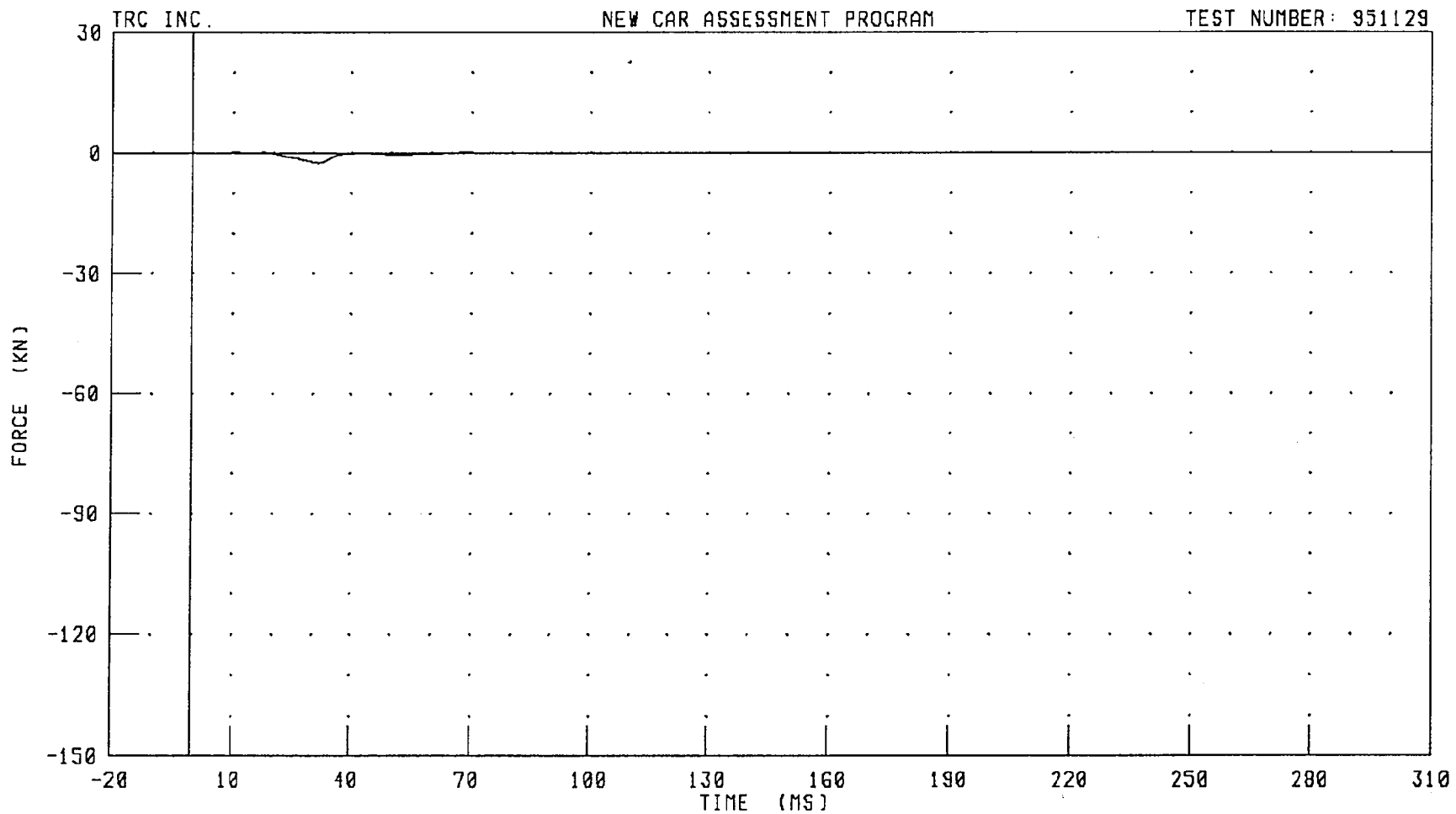


CHANNEL: B87F FILTER: CH. CLASS 60 PEAK DATA: 1.28 KN @ 1.60 MS; -134.24 KN @ 33.92 MS

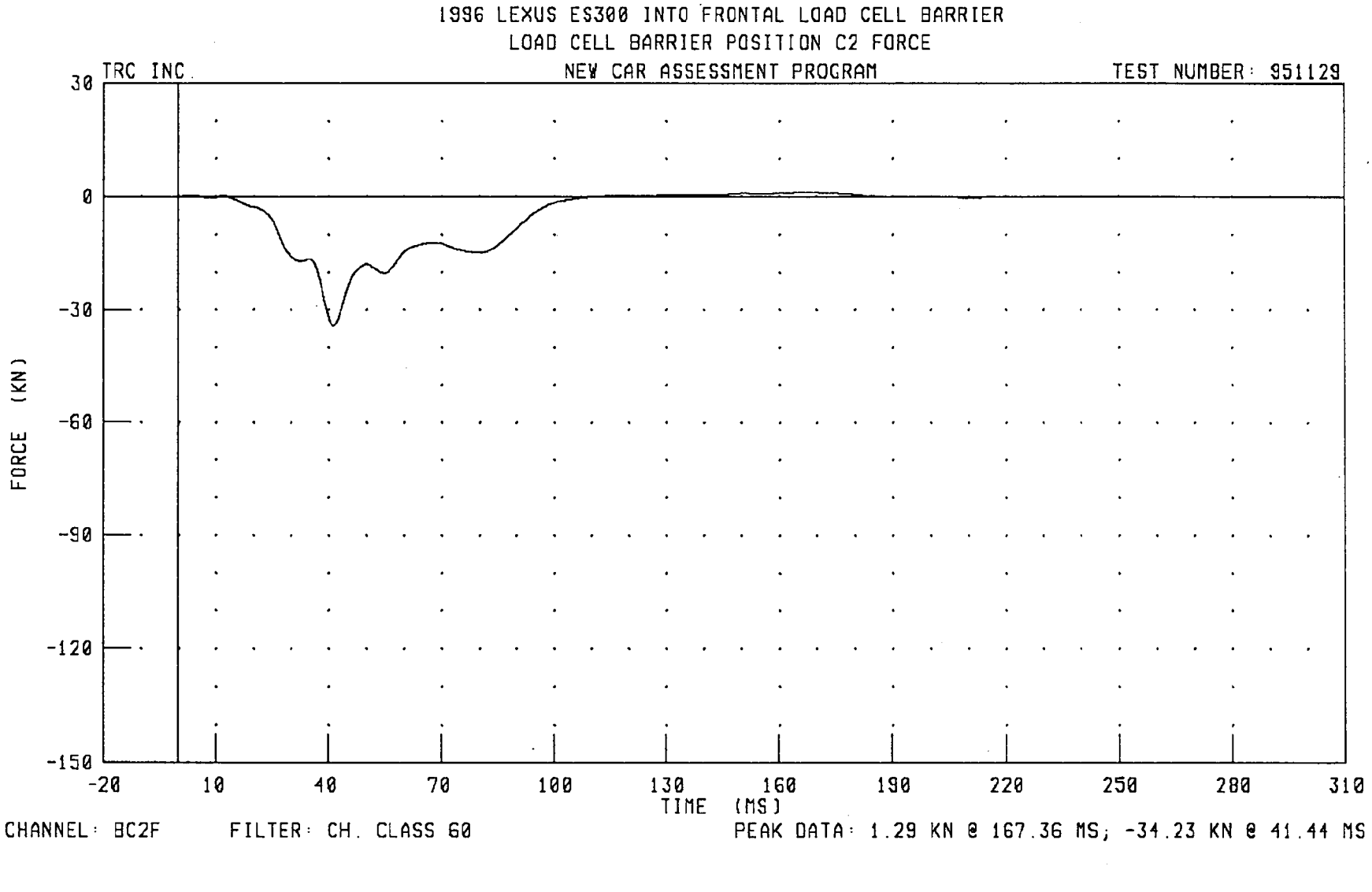
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: B8BF
FILTER: CH. CLASS 60
PEAK DATA: 0.19 KN @ 6.00 MS; -24.66 KN @ 26.48 MS

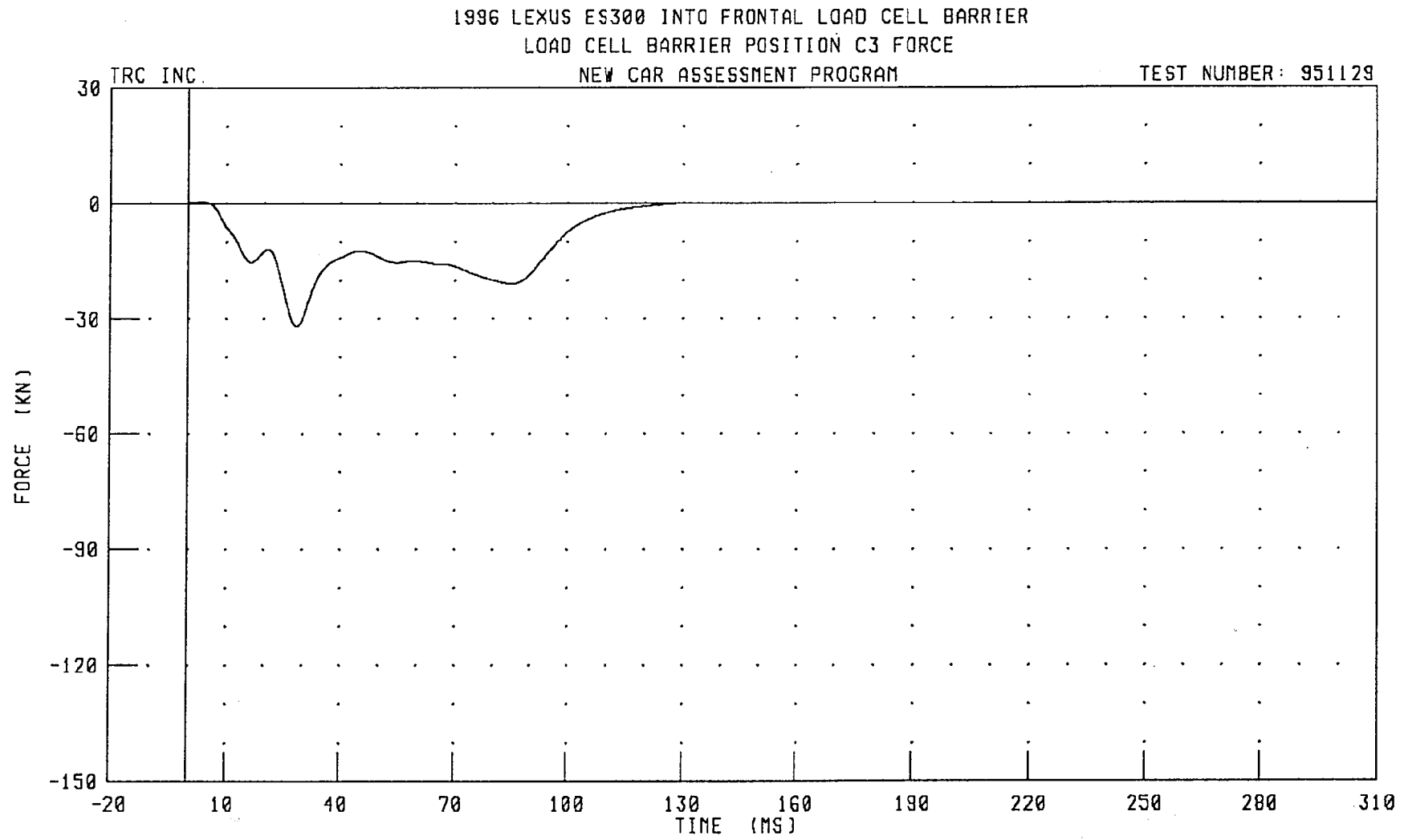
1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B9 FORCE



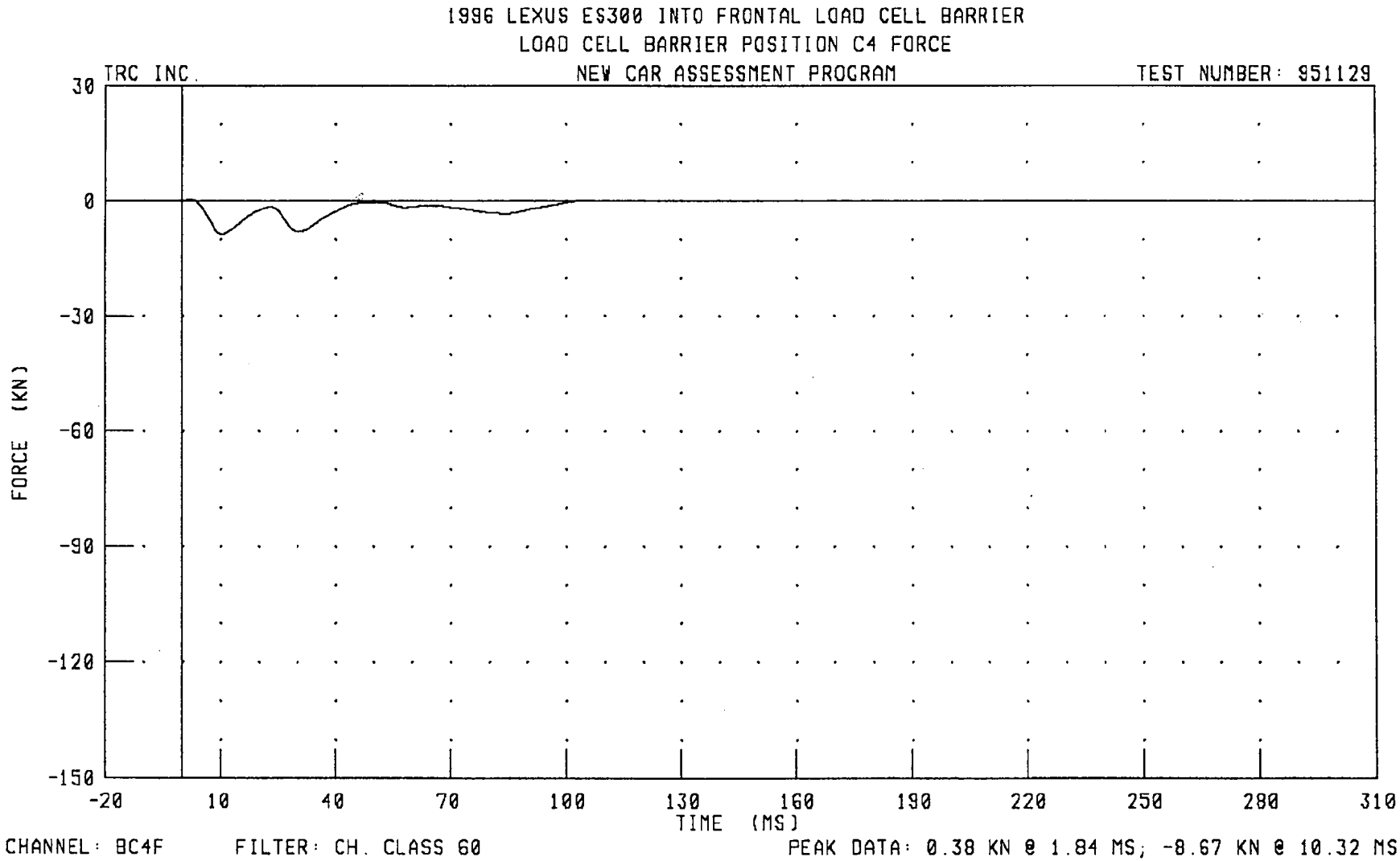
CHANNEL: B89F FILTER: CH. CLASS 60 PEAK DATA: 0.18 KN @ 68.32 MS; -2.45 KN @ 31.20 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C2 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC2F
FILTER: CH. CLASS 60
PEAK DATA: 1.29 KN @ 167.36 MS; -34.23 KN @ 41.44 MS

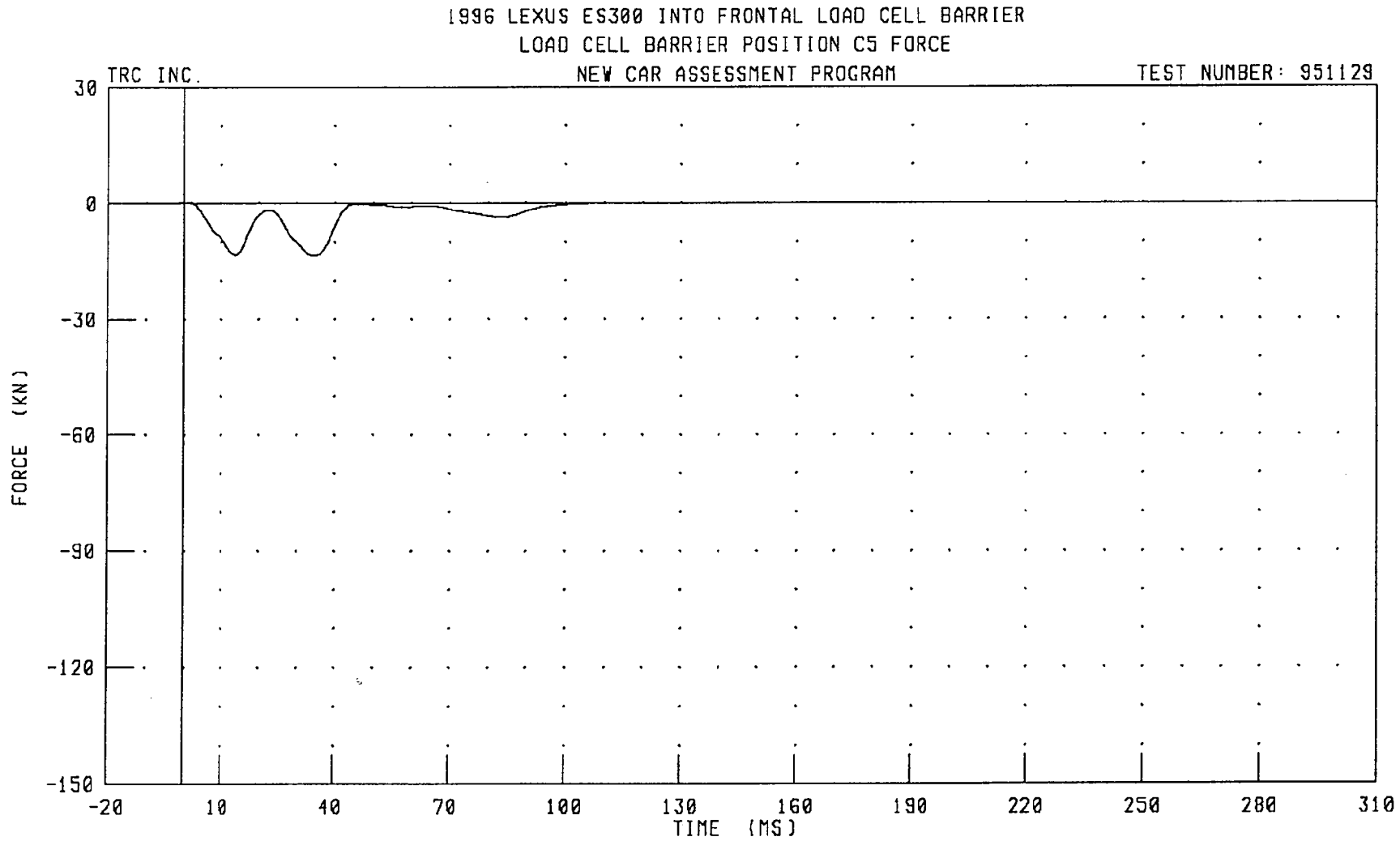
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C3 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC3F
FILTER: CH. CLASS 60
PEAK DATA: 0.40 KN @ 3.44 MS; -31.87 KN @ 28.64 MS

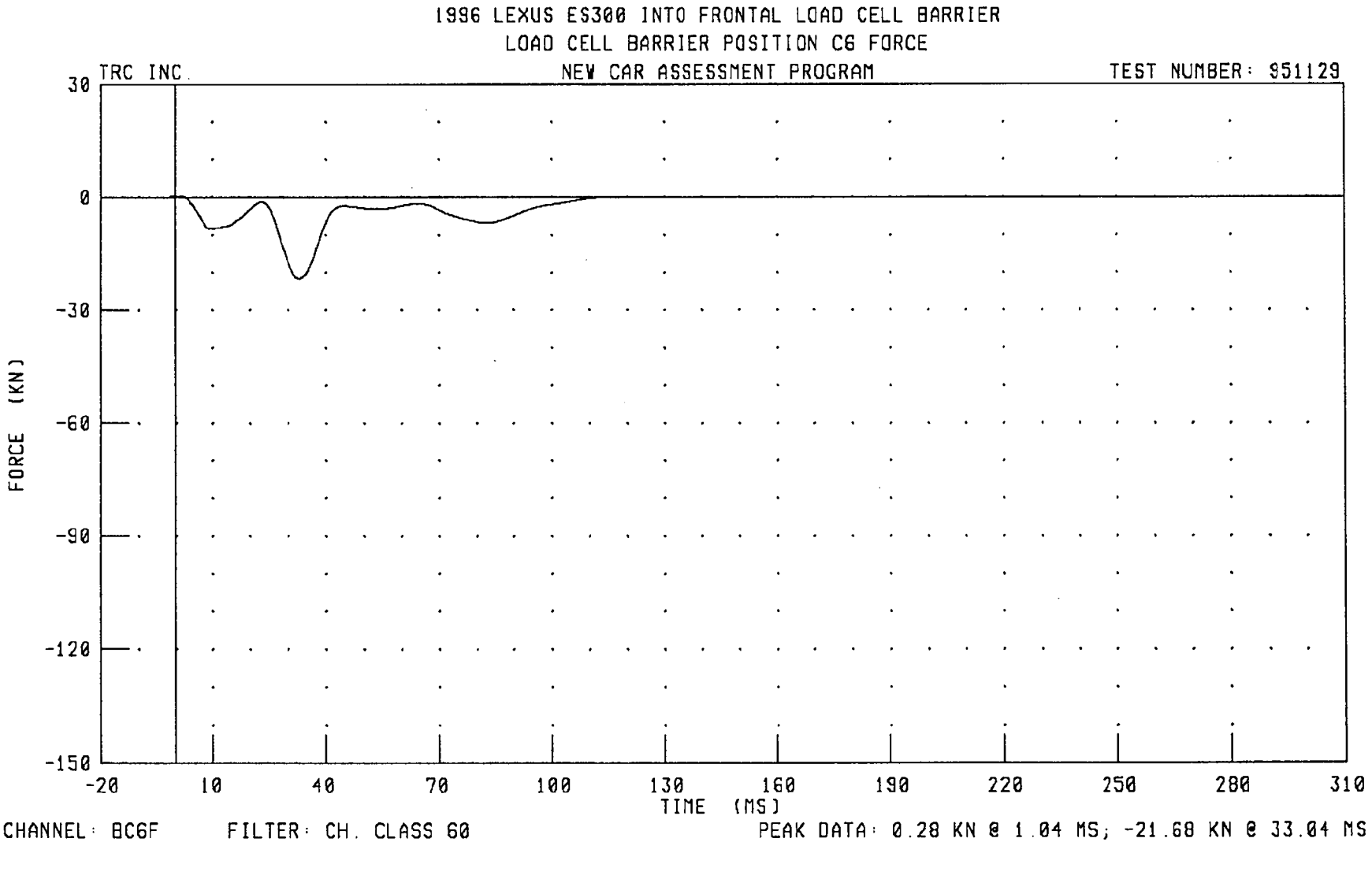
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C4 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC4F
FILTER: CH. CLASS 60
PEAK DATA: 0.38 KN @ 1.84 MS; -8.67 KN @ 10.32 MS

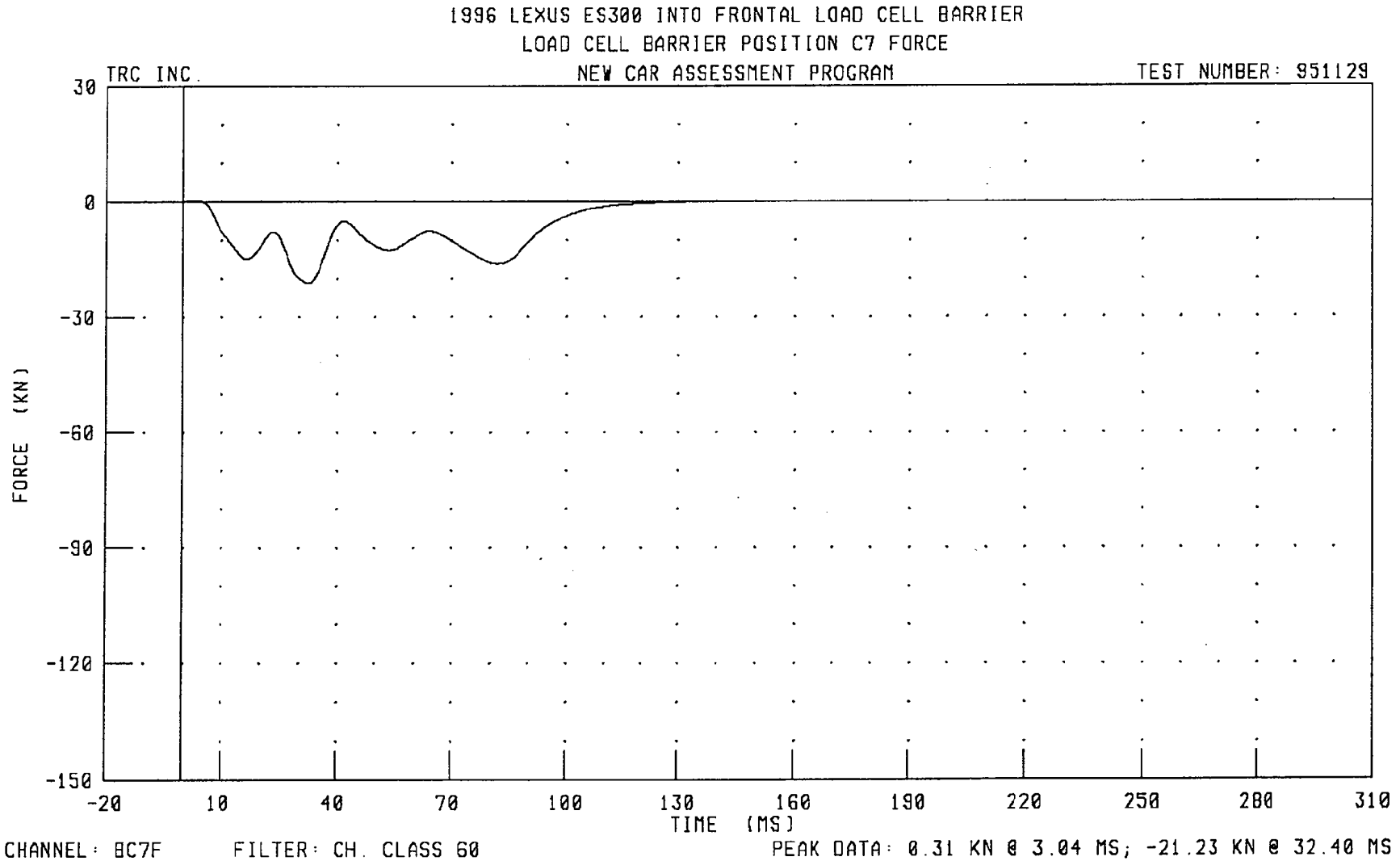
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C5 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC5F
FILTER: CH. CLASS 60
PEAK DATA: 0.29 KN @ 1.04 MS; -13.49 KN @ 34.48 MS

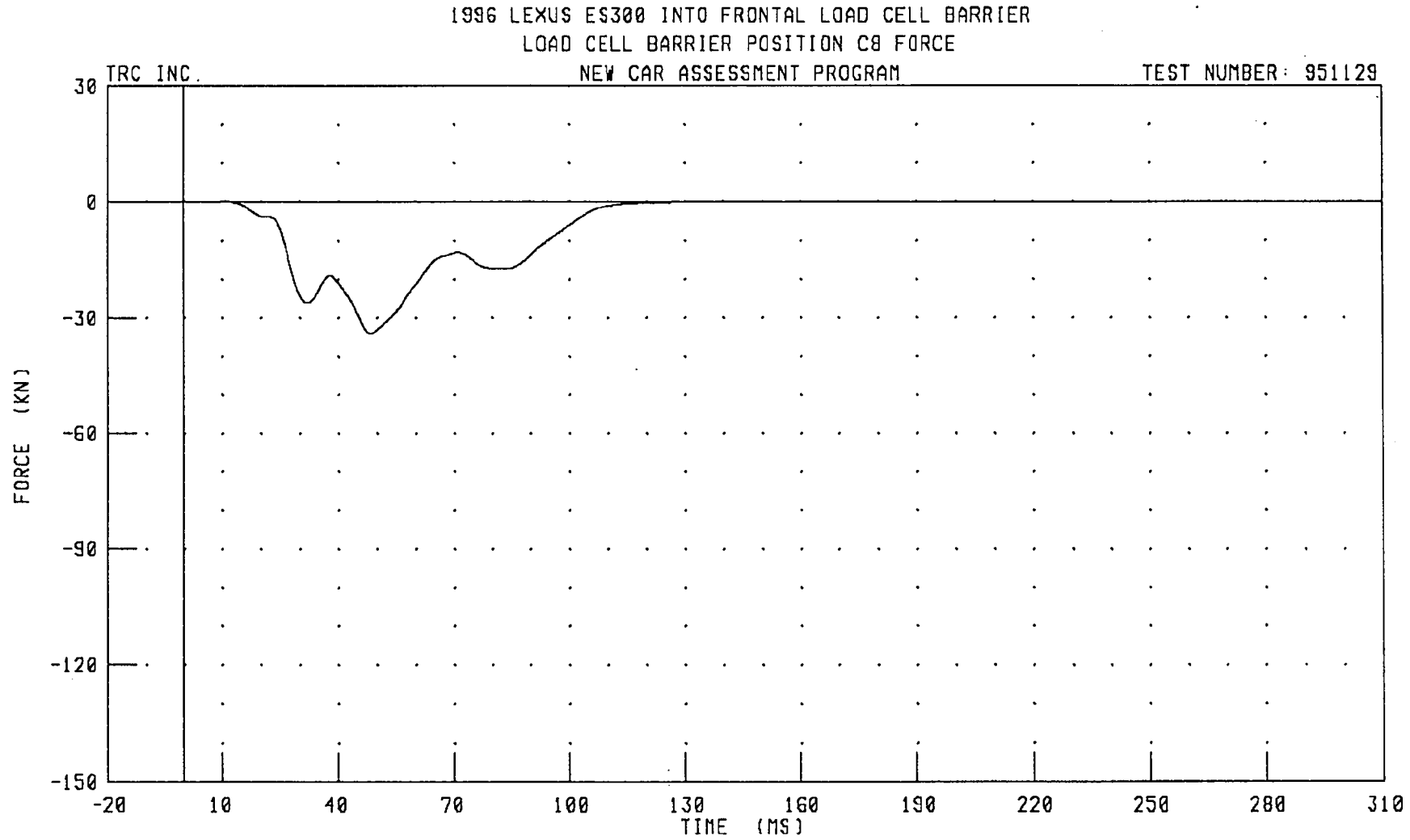
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION CG FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCGF
FILTER: CH. CLASS 60
PEAK DATA: 0.28 KN @ 1.04 MS; -21.68 KN @ 33.04 MS

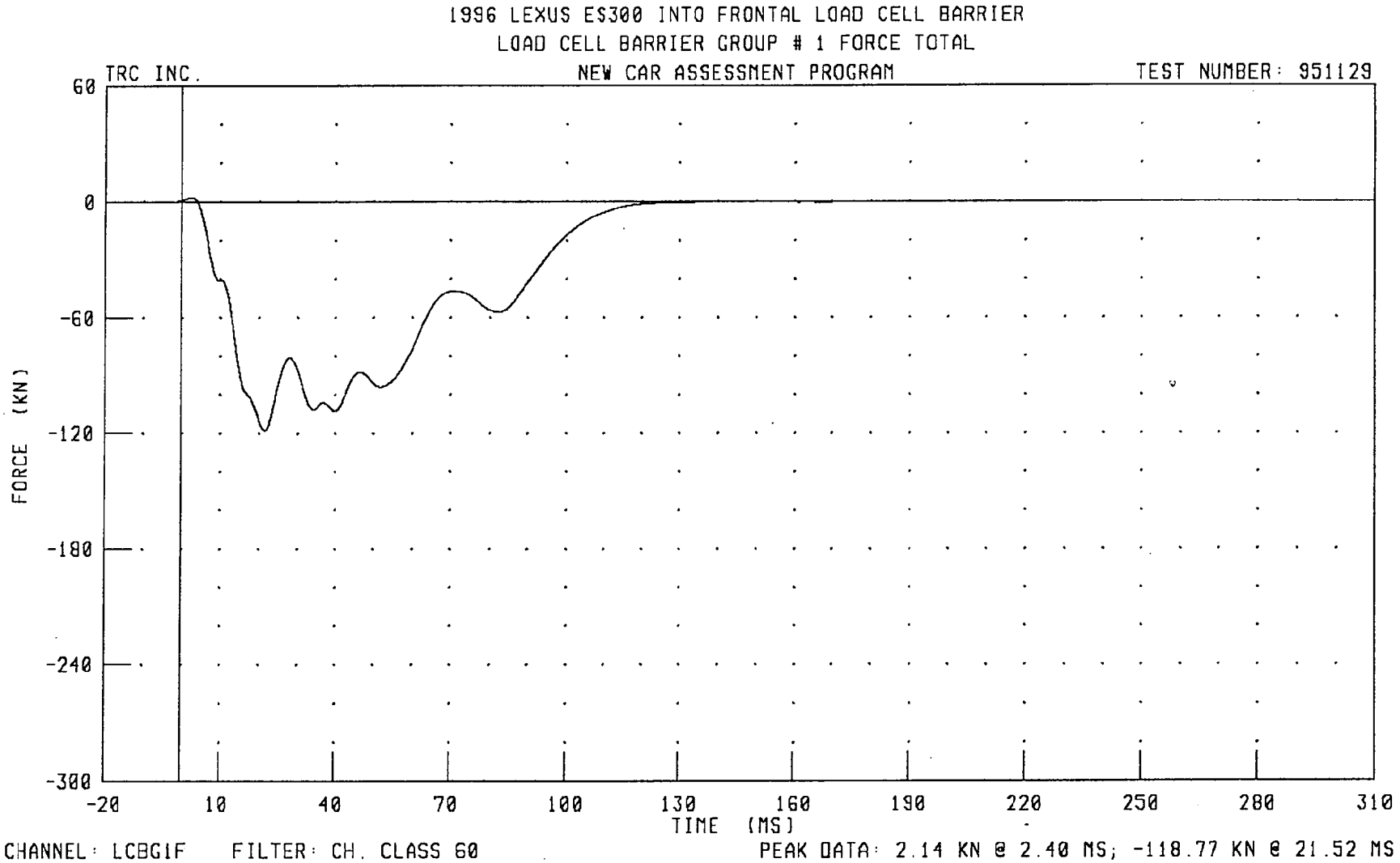
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C7 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC7F
FILTER: CH. CLASS 60
PEAK DATA: 0.31 KN @ 3.04 MS; -21.23 KN @ 32.40 MS

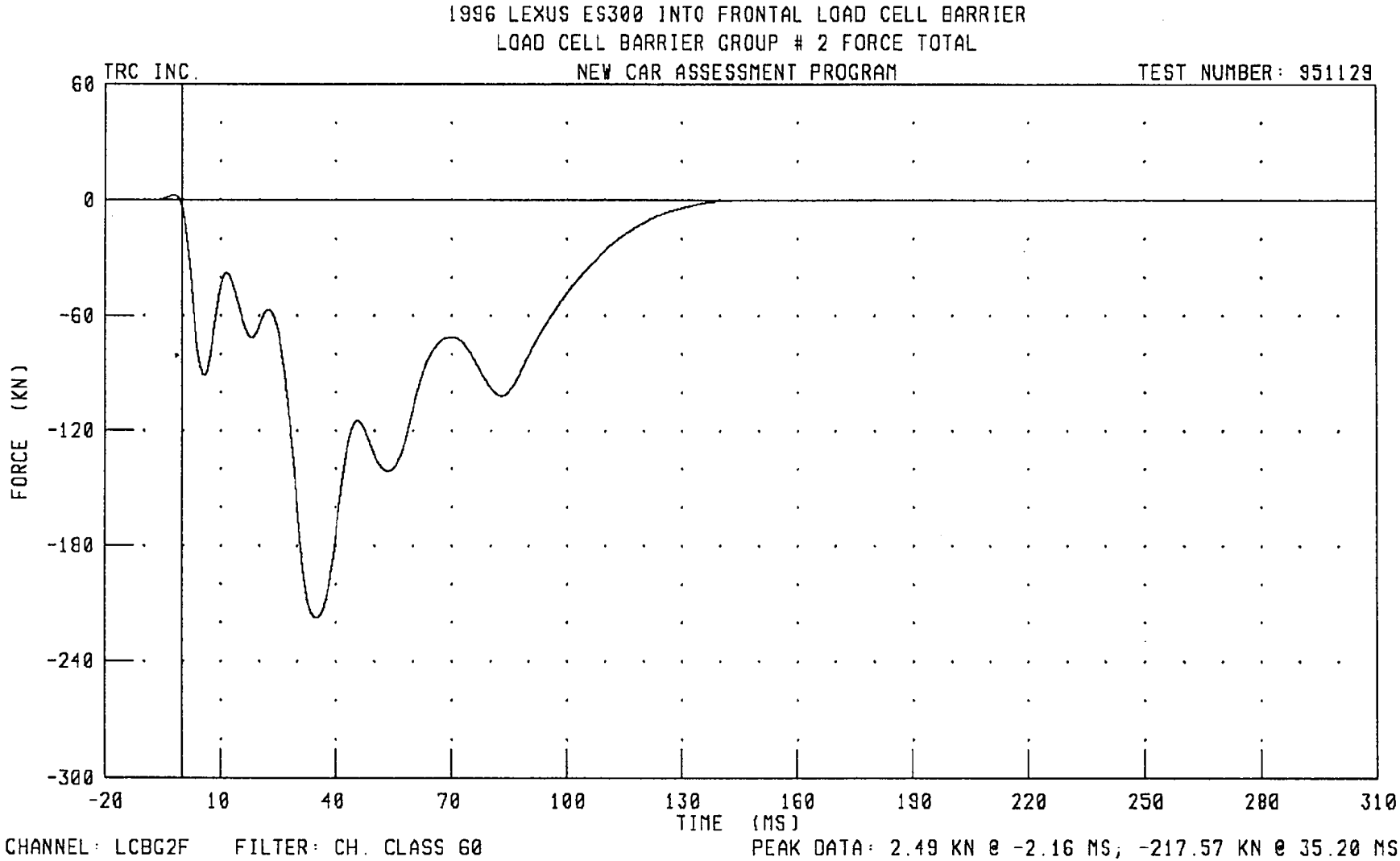
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C8 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC8F
FILTER: CH. CLASS 60
PEAK DATA: 0.10 KN @ 11.28 MS; -34.04 KN @ 48.32 MS

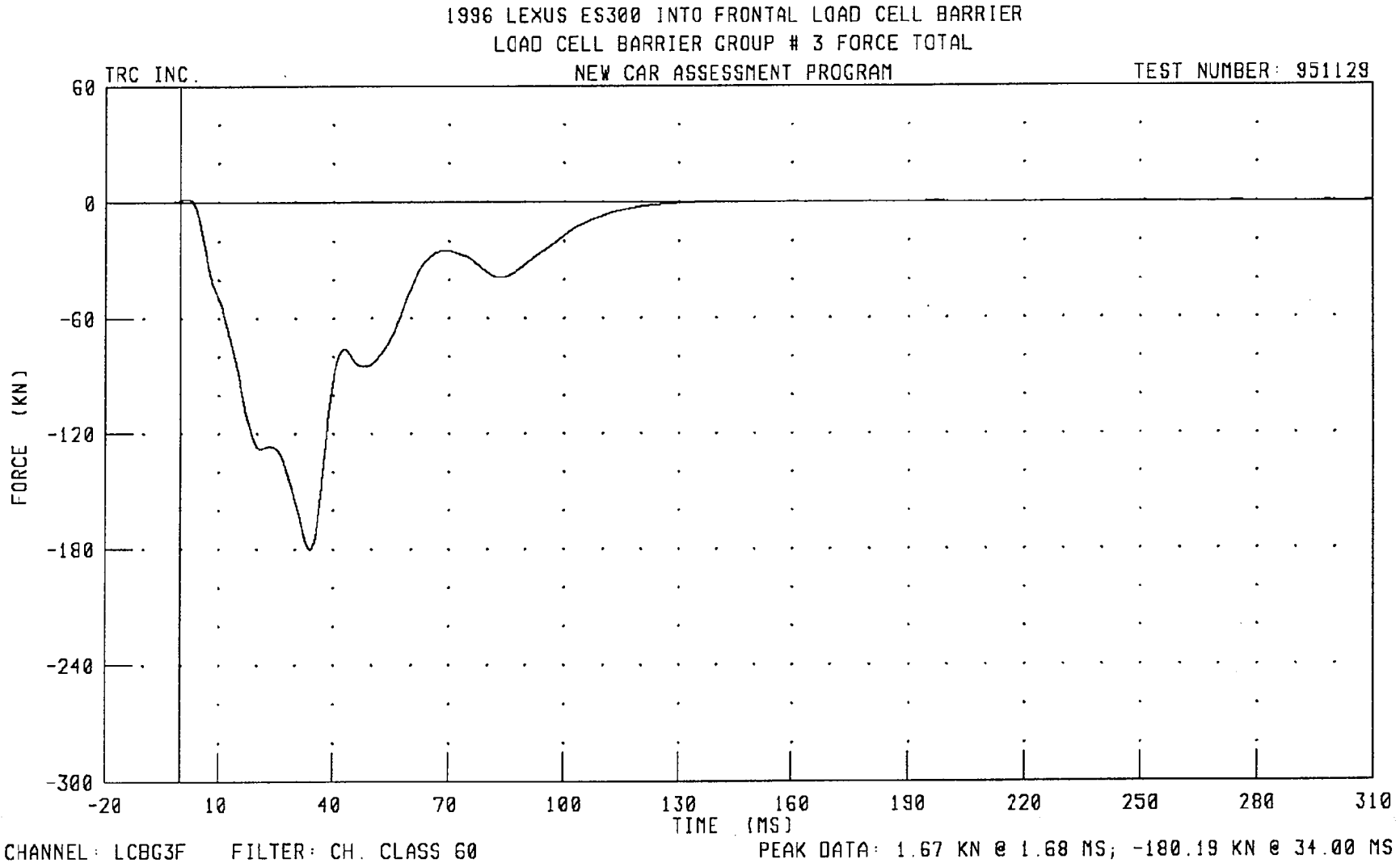
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBGIF
FILTER: CH. CLASS 60
PEAK DATA: 2.14 KN @ 2.40 MS; -118.77 KN @ 21.52 MS

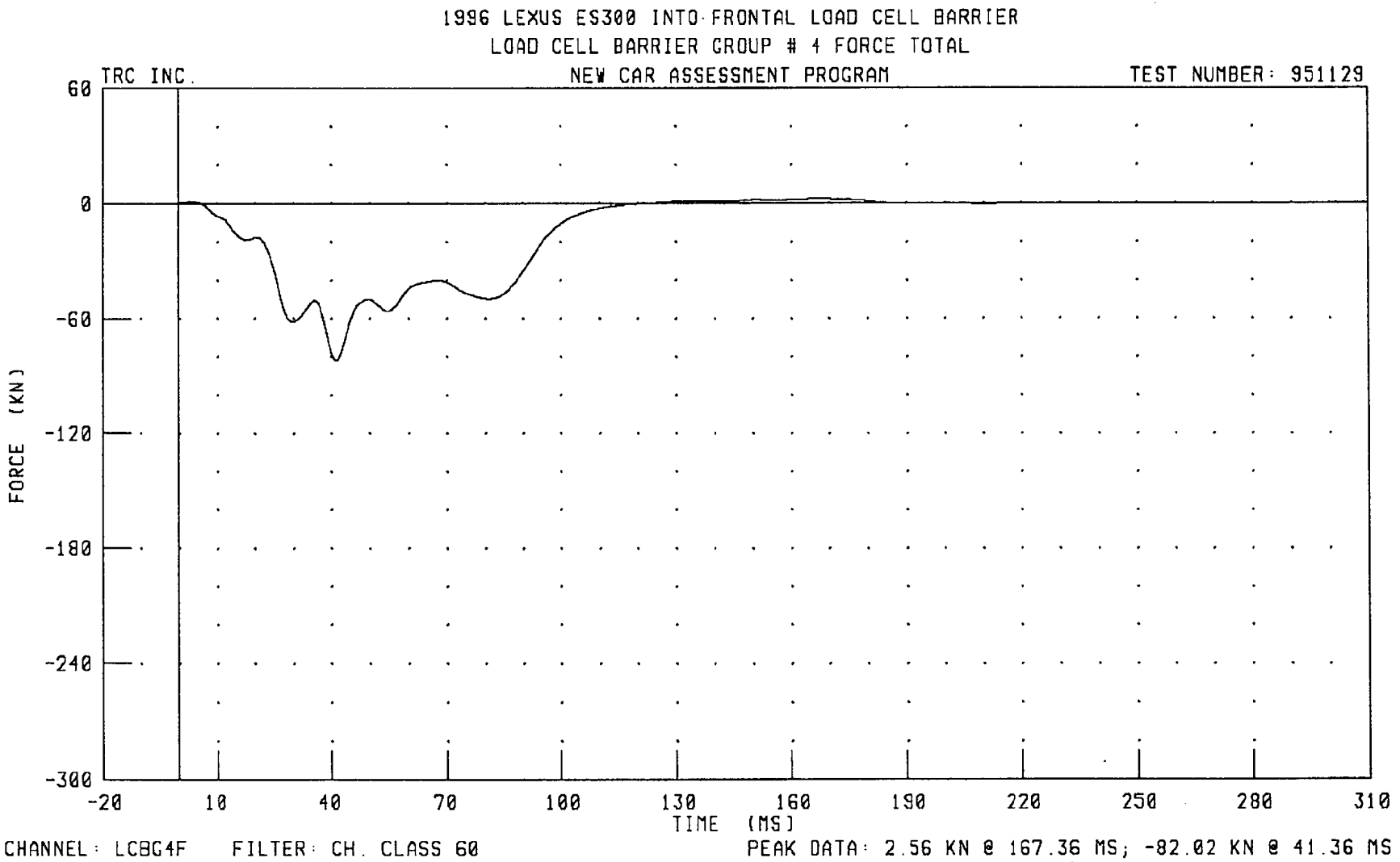
951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG2F
FILTER: CH. CLASS 60
PEAK DATA: 2.49 KN @ -2.16 MS; -217.57 KN @ 35.20 MS

951129

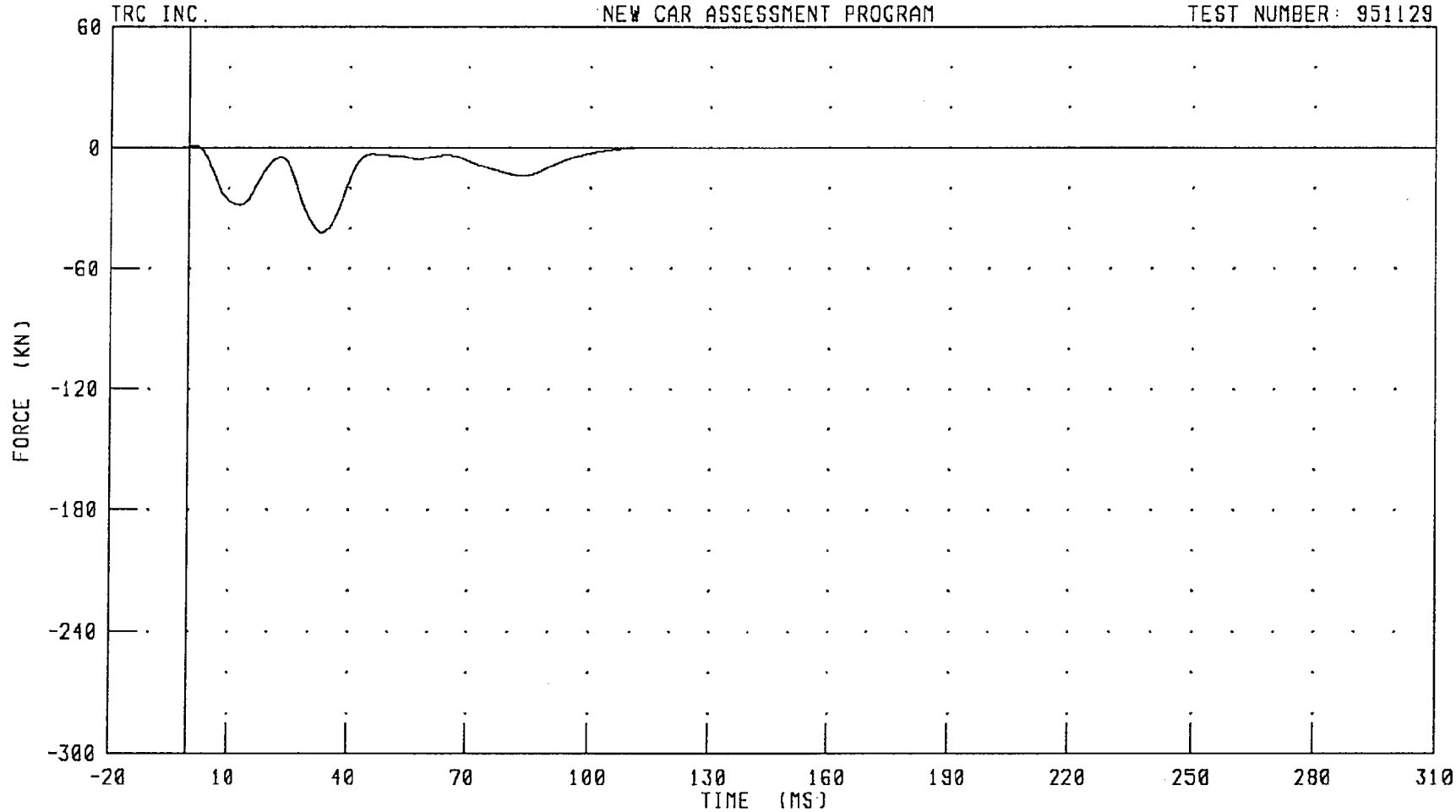

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 3 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG3F
FILTER: CH. CLASS 60
PEAK DATA: 1.67 KN @ 1.68 MS; -180.19 KN @ 34.00 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG4F
FILTER: CH. CLASS 60
PEAK DATA: 2.56 KN @ 167.36 MS; -82.02 KN @ 41.36 MS

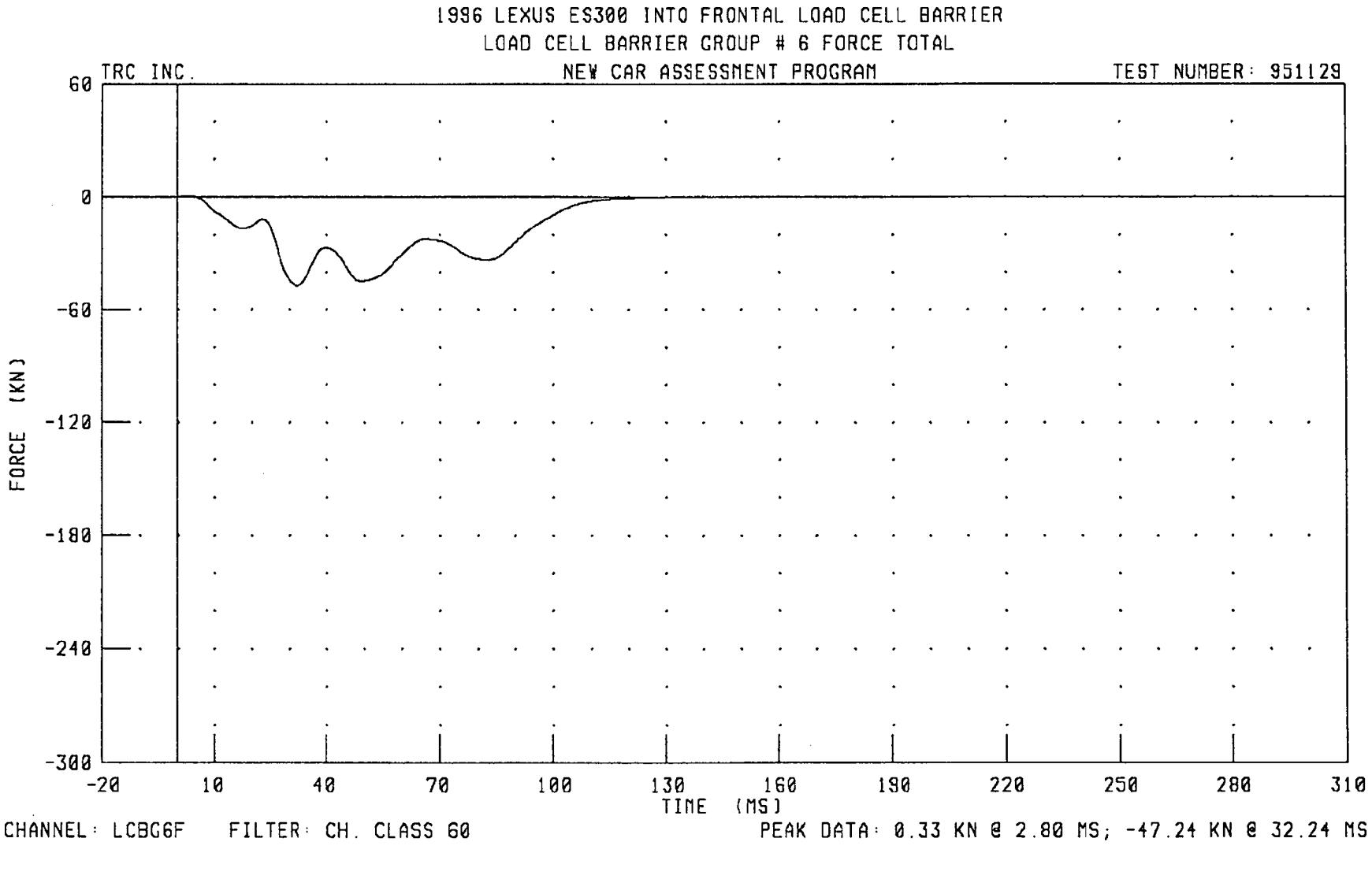
951129

1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 5 FORCE TOTAL

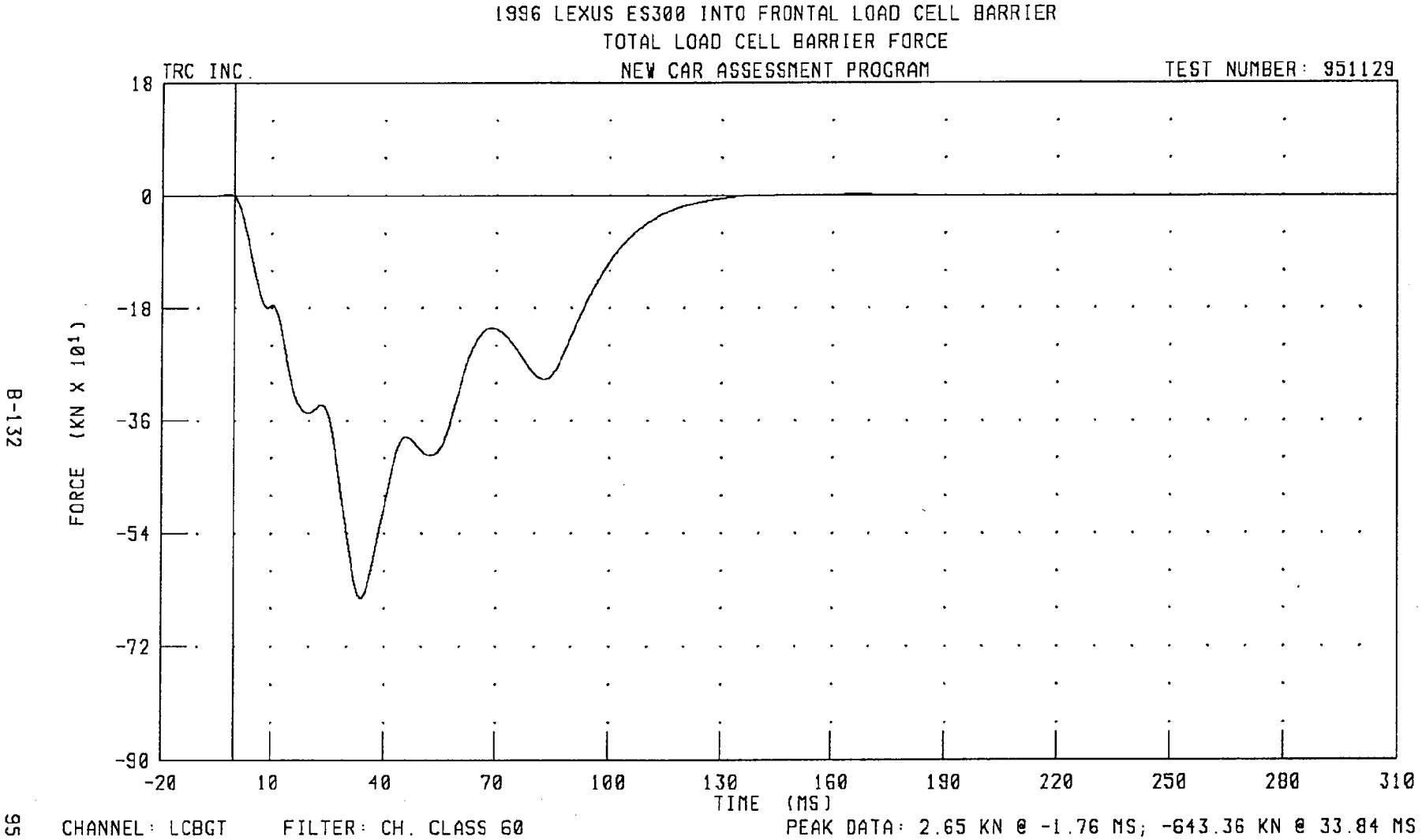


CHANNEL: LCBG5F FILTER: CH. CLASS 60

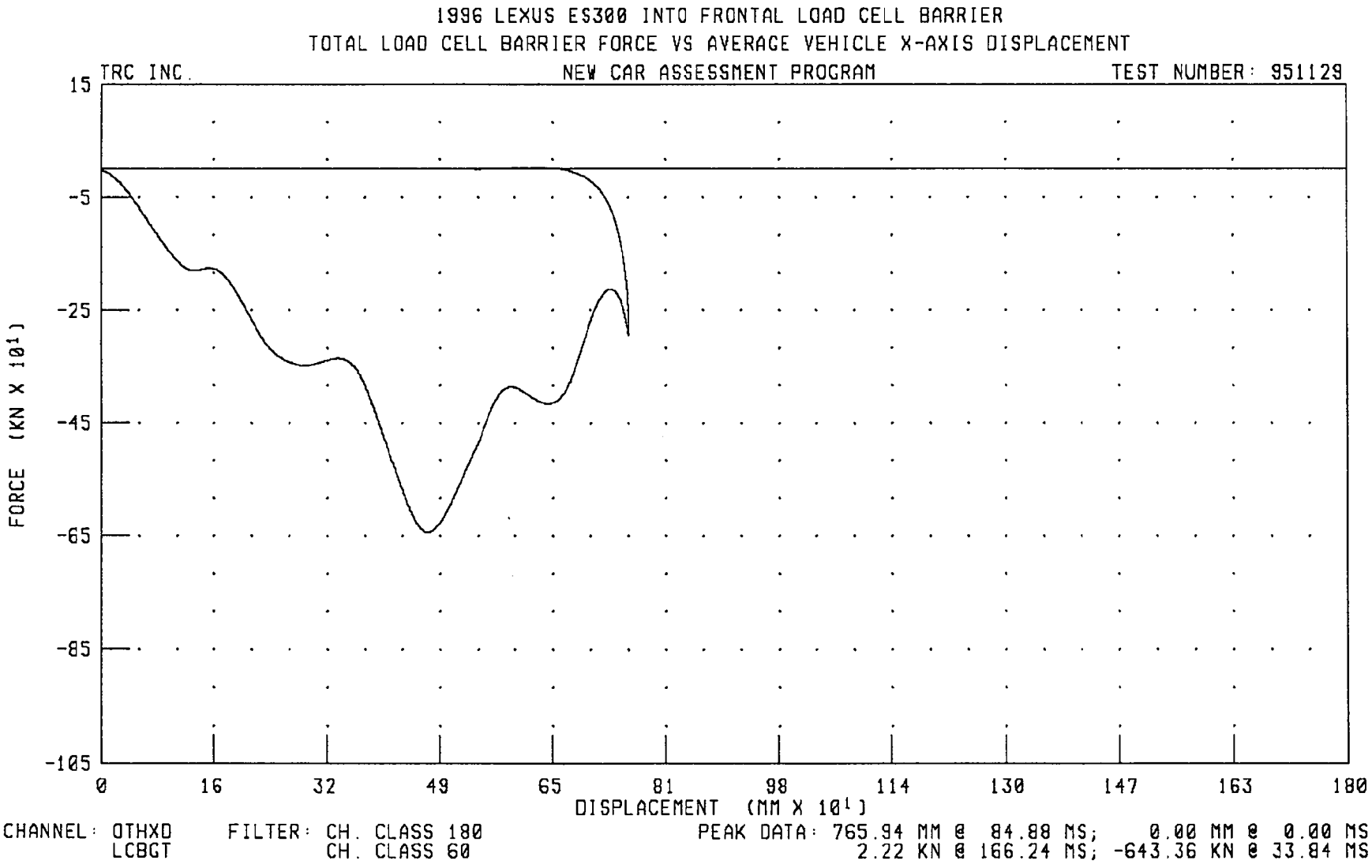
PEAK DATA: 0.91 KN @ 1.28 MS; -42.07 KN @ 33.04 MS


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG6F
FILTER: CH. CLASS 60
PEAK DATA: 0.33 KN @ 2.80 MS; -47.24 KN @ 32.24 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
18
0
-18
-36
-54
-72
-90
FORCE (KN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBGT
FILTER: CH. CLASS 60
PEAK DATA: 2.65 KN @ -1.76 MS; -643.36 KN @ 33.84 MS

951129


1996 LEXUS ES300 INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 951129
15
-5
-25
-45
-65
-85
-105
FORCE (KN X 10¹)
0
16
32
49
65
81
98
114
130
147
163
180
DISPLACEMENT (MM X 10¹)
CHANNEL: OTHXD
LCBGT
FILTER: CH. CLASS 180
CH. CLASS 60
PEAK DATA: 765.94 MM @ 84.88 MS; 0.00 MM @ 0.00 MS
2.22 KN @ 166.24 MS; -643.36 KN @ 33.84 MS

951129

Appendix C

Dummy Certification Data

Pre-test Certification Data

Driver Dummy S/N: 192

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
192 ALDERSON 07-NOV-95

TRC INC. TEST NO: 192C28ED1 572E SN192 EXT.DIMENSION CAL28

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 Chas Middlt RUN NUMBER: 111695.0906

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 07-NOV-95

TRC INC. TEST NO: 192C28HD1 572E SN192 HEAD DROP CAL 28

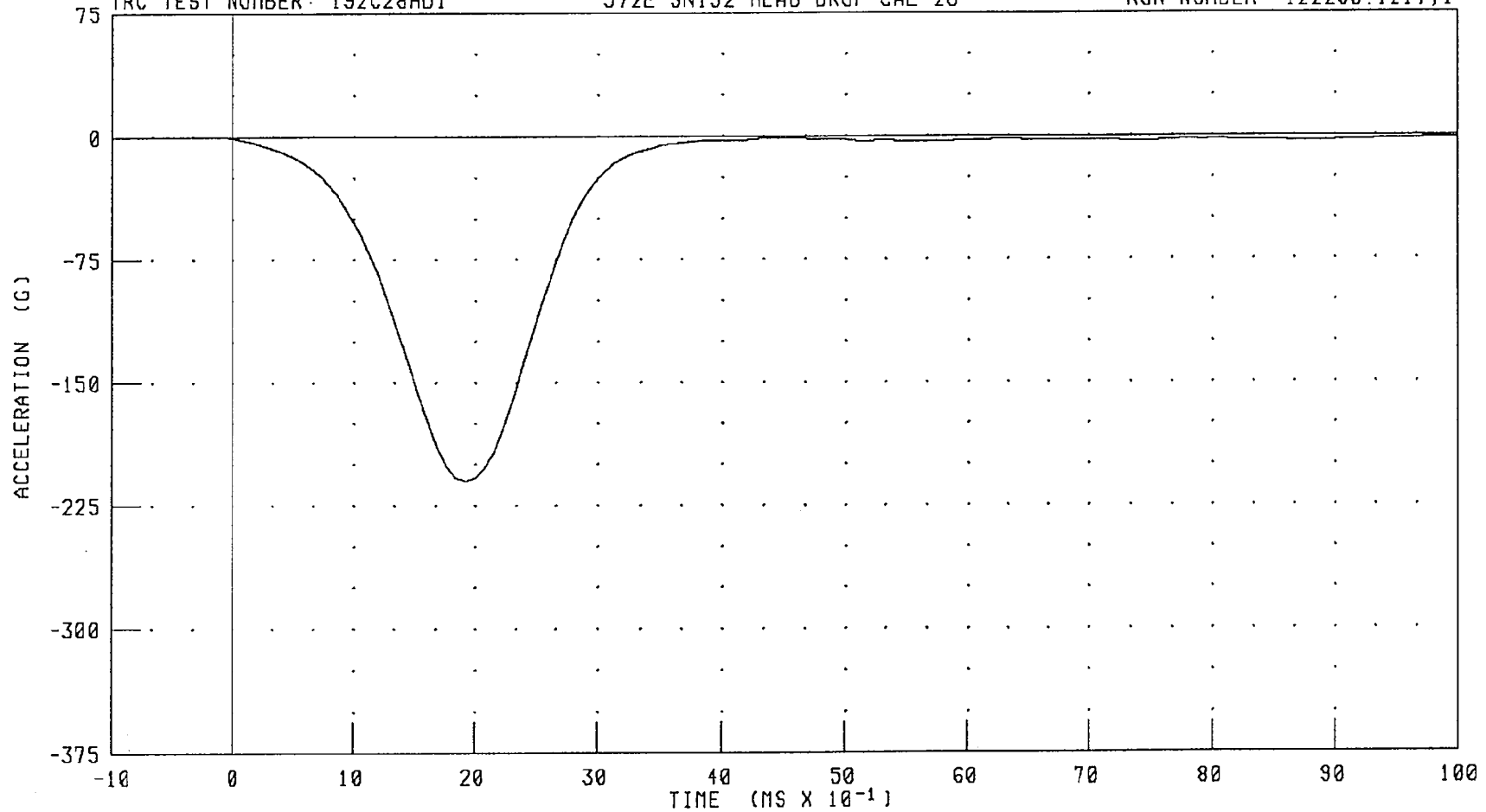
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	245.56 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.28 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Chan Middlet RUN NUMBER: 110795.1216;1

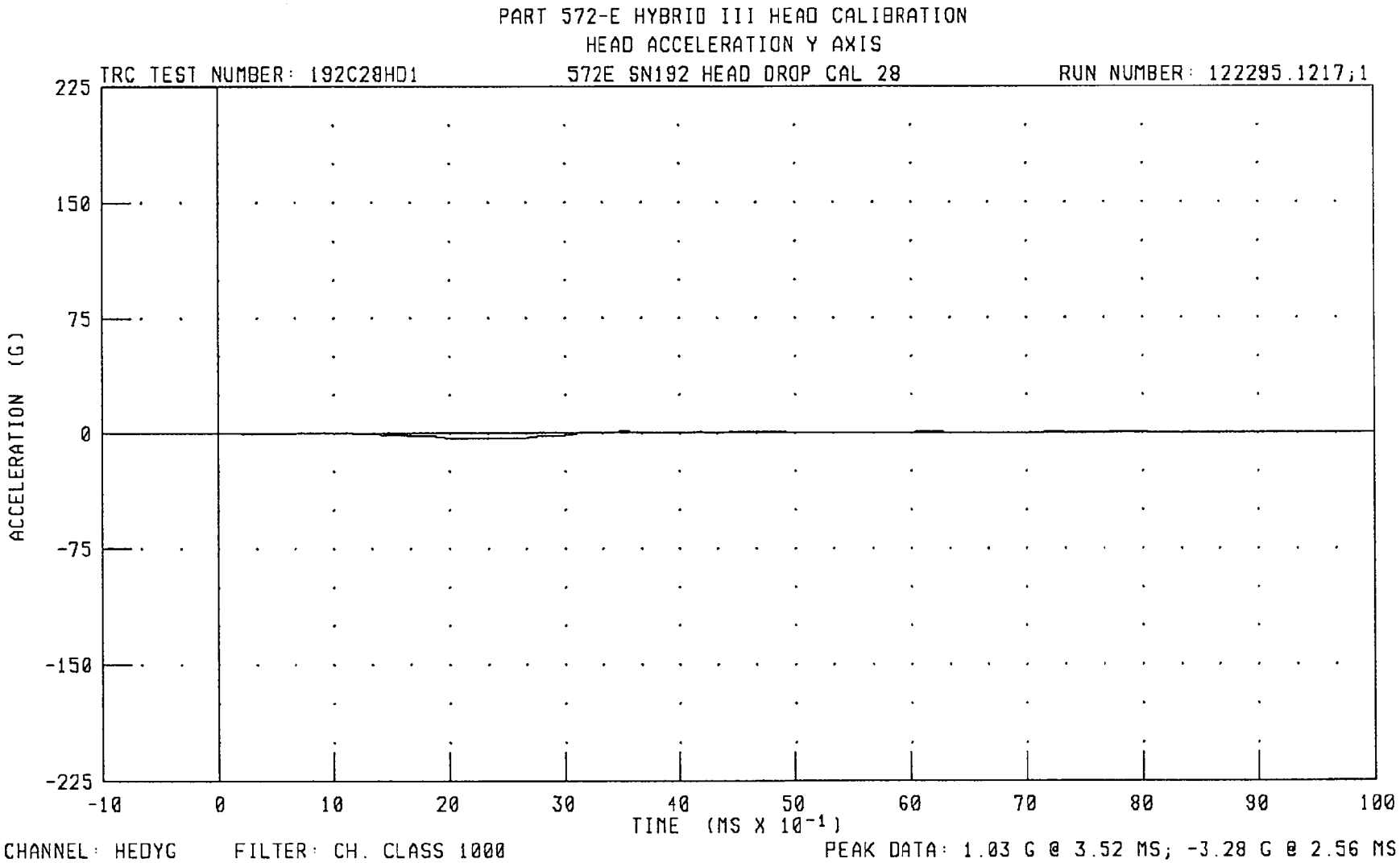
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

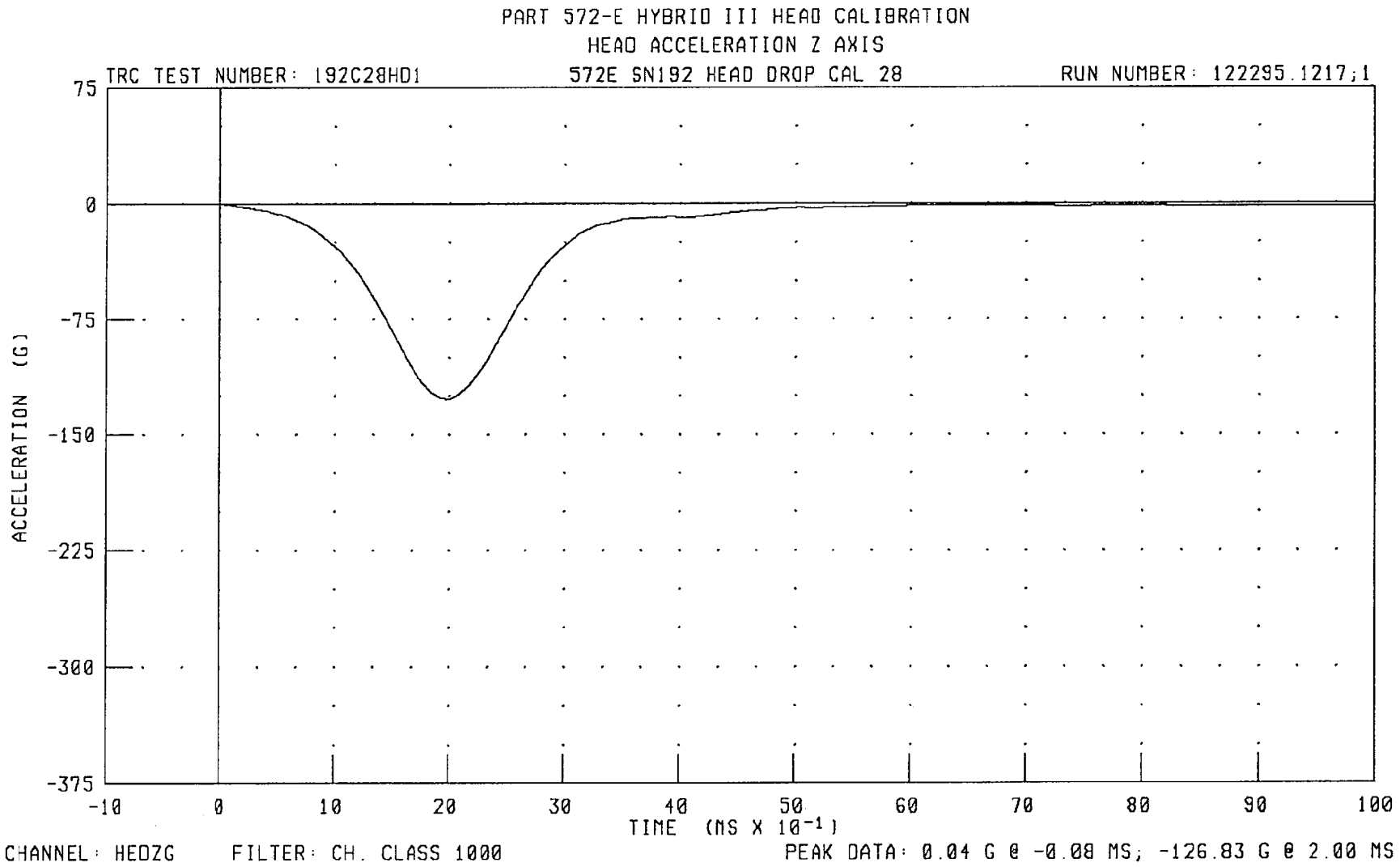
TRC TEST NUMBER: 192C28HD1 572E SN192 HEAD DROP CAL 28 RUN NUMBER: 122295.1217;1

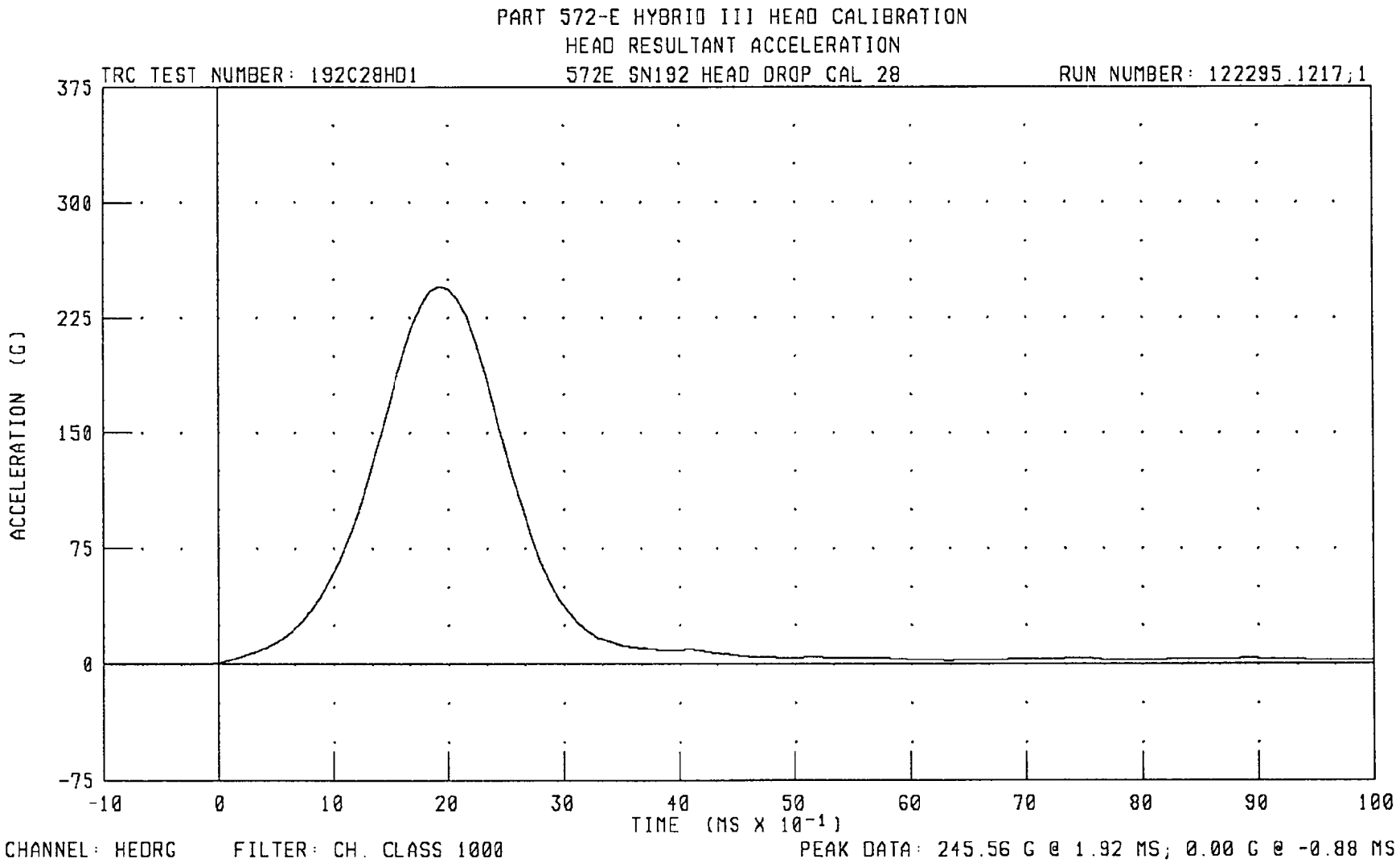


CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 0.04 G @ -0.16 MS; -210.56 G @ 1.92 MS

951129


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 192C28HD1
572E SN192 HEAD DROP CAL 28
RUN NUMBER: 122295.1217;1
225
150
75
0
-75
-150
-225
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 1.03 G @ 3.52 MS; -3.28 G @ 2.56 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
TRC TEST NUMBER: 192C28HD1
572E SN192 HEAD DROP CAL 28
RUN NUMBER: 122295.1217;1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDZG
FILTER: CH. CLASS 1000
PEAK DATA: 0.04 G @ -0.08 MS; -126.83 G @ 2.00 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
TRC TEST NUMBER: 192C28HD1
572E SN192 HEAD DROP CAL 28
RUN NUMBER: 122295.1217;1
ACCELERATION (G)
375
300
225
150
75
0
-75
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDRG
FILTER: CH. CLASS 1000
PEAK DATA: 245.56 G @ 1.92 MS; 0.00 G @ -0.88 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

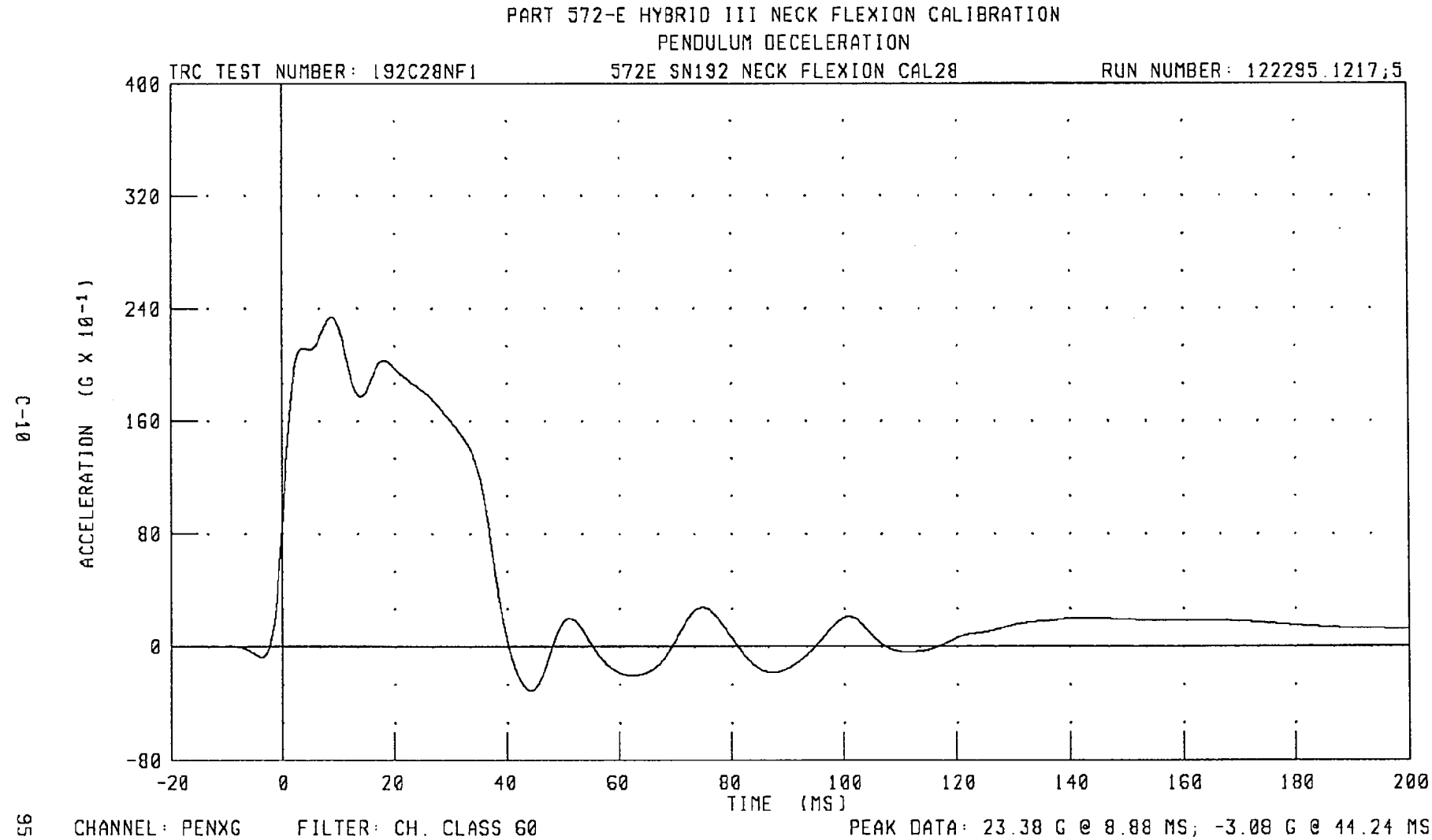
HYBRID III 07-NOV-95

TRC INC. TEST NO: 192C28NF1 572E SN192 NECK FLEXION CAL28

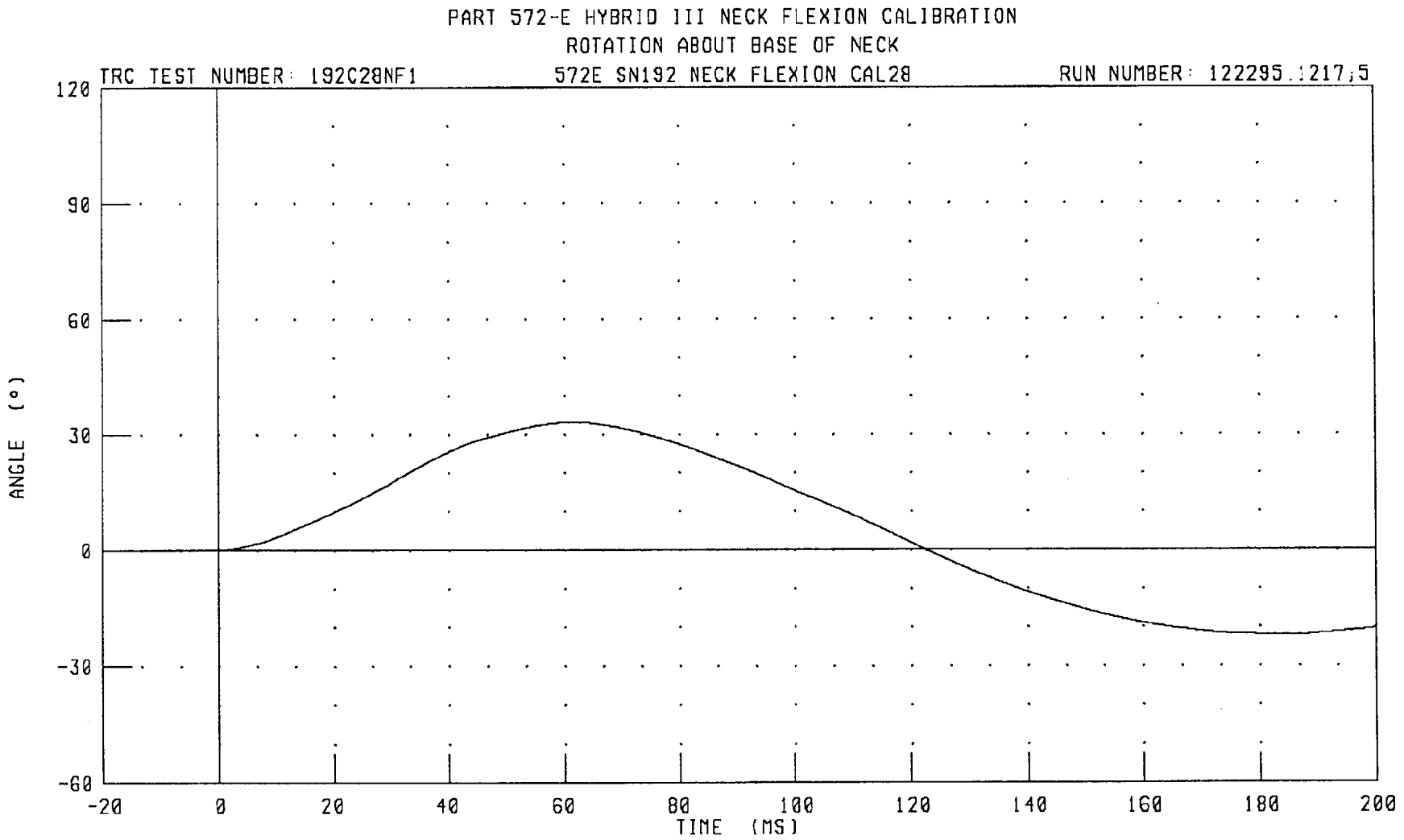
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.93 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.77 G
	20 MS	17.60 - 22.60 G	19.77 G
	30 MS	12.50 - 18.50 G	15.95 G
MAX PENDULUM G		29 G MAX	23.37 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.91 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.92 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	74.71 DEG.
	TIME	57 - 64 MS	62.40 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	99.65 NM
	TIME	47 - 58 MS	52.16 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	120.72 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.72 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet RUN NUMBER: 110795.1424;5

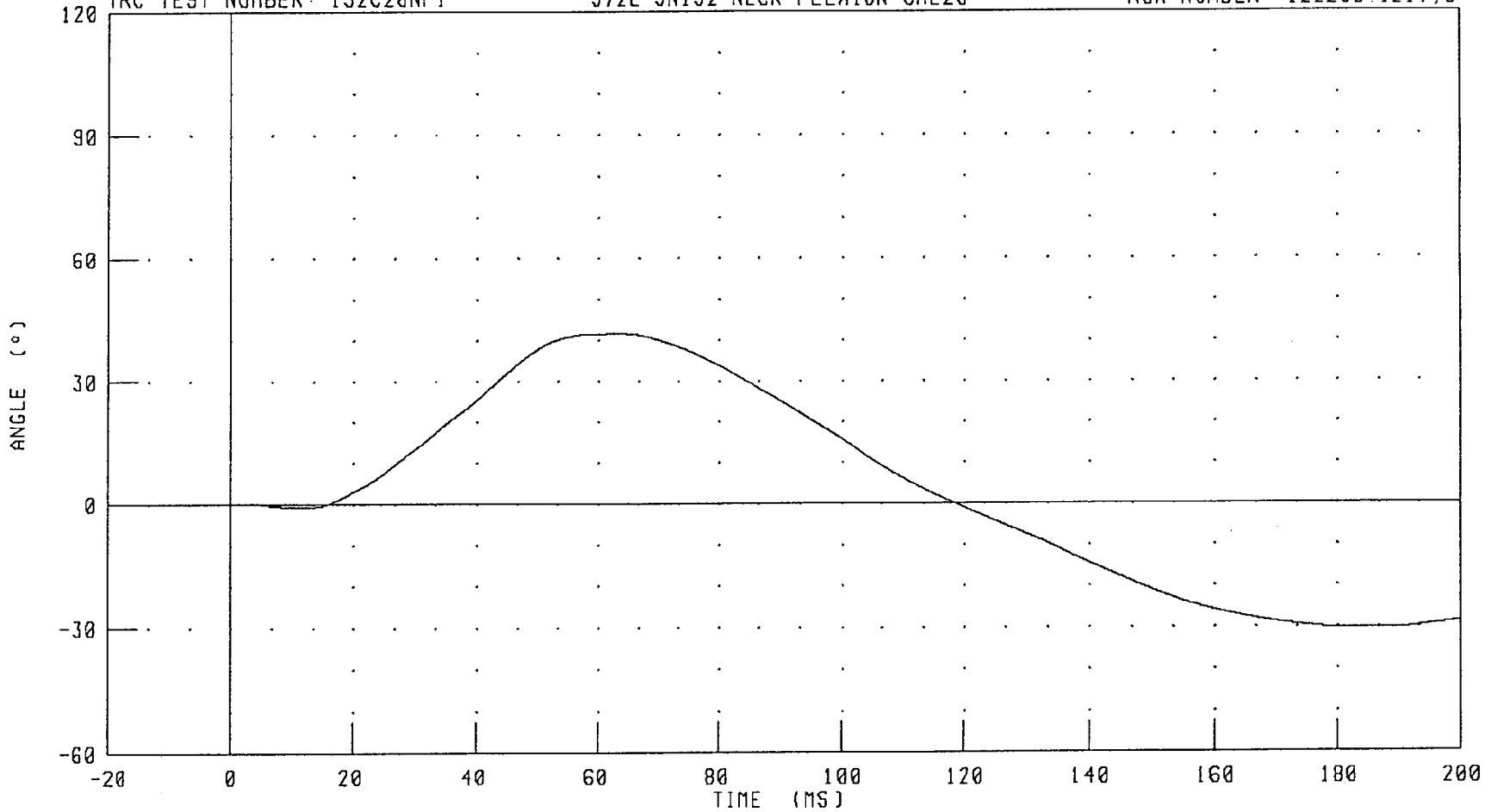

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: I92C28NF1
572E SN192 NECK FLEXION CAL28
RUN NUMBER: 122295.1217;5
ACCELERATION (G X 10⁻¹)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 23.38 G @ 8.88 MS; -3.08 G @ 44.24 MS

INTENTIONALLY LEFT BLANK


PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 192C28NF1
572E SN192 NECK FLEXION CAL28
RUN NUMBER: 122295.1217.5
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 33.12 ° @ 61.60 MS; -22.08 ° @ 184.32 MS

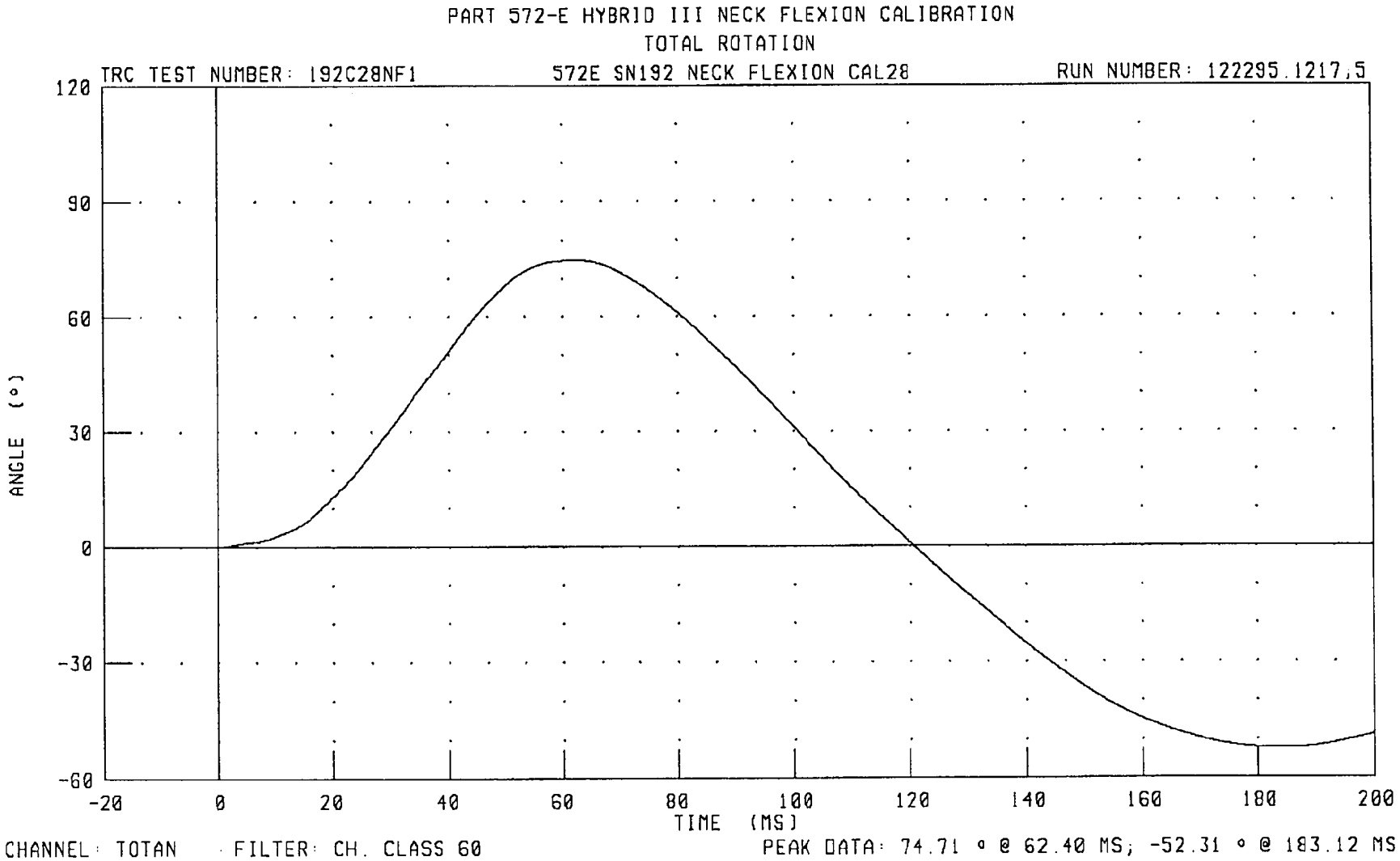
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 192C28NF1 572E SN192 NECK FLEXION CAL28 RUN NUMBER: 122295.1217;5



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 41.63 ° @ 63.20 MS; -30.24 ° @ 188.56 MS

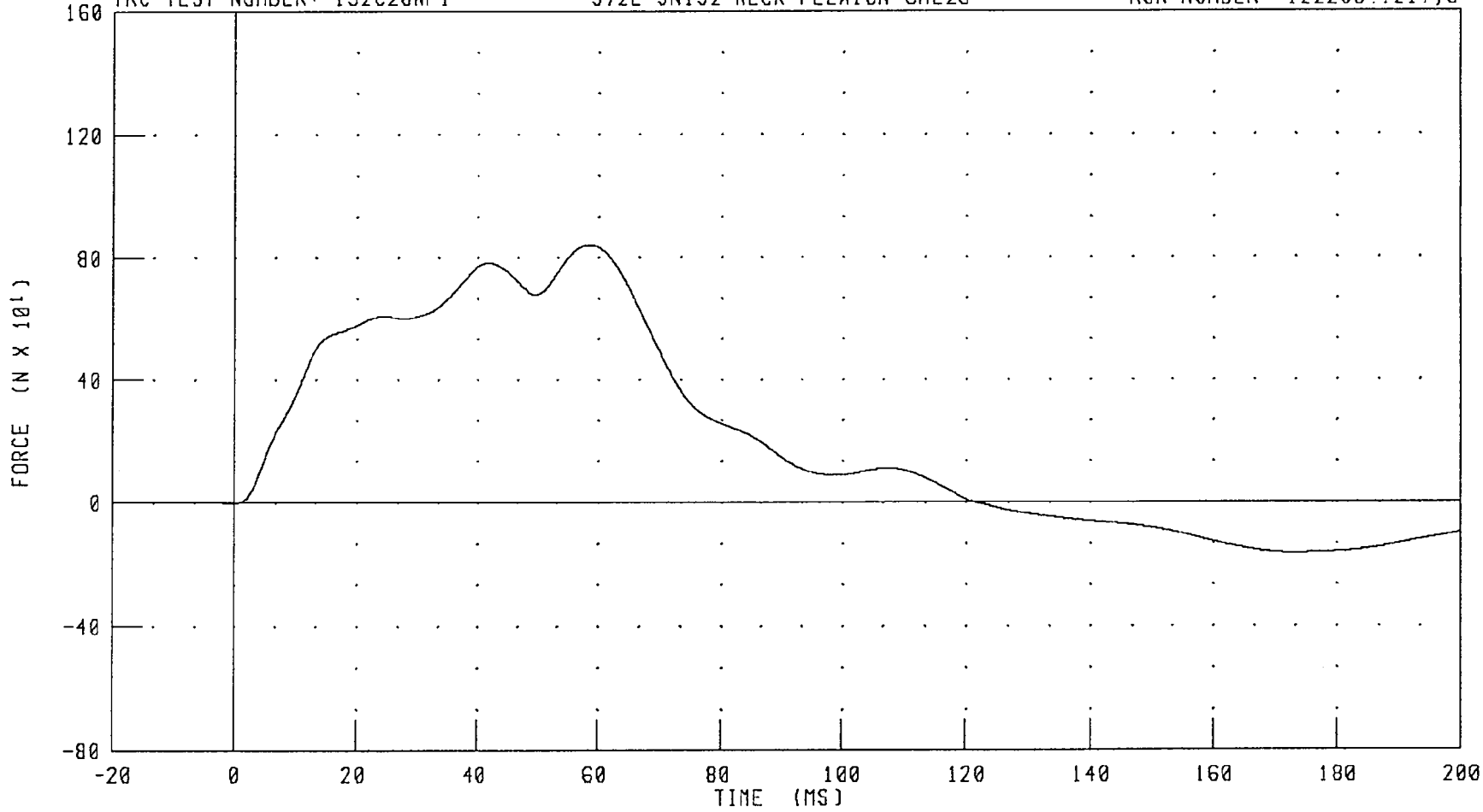
951129


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 192C28NF1
572E SN192 NECK FLEXION CAL28
RUN NUMBER: 122295.1217,5
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
FILTER: CH. CLASS 60
PEAK DATA: 74.71 ° @ 62.40 MS; -52.31 ° @ 183.12 MS

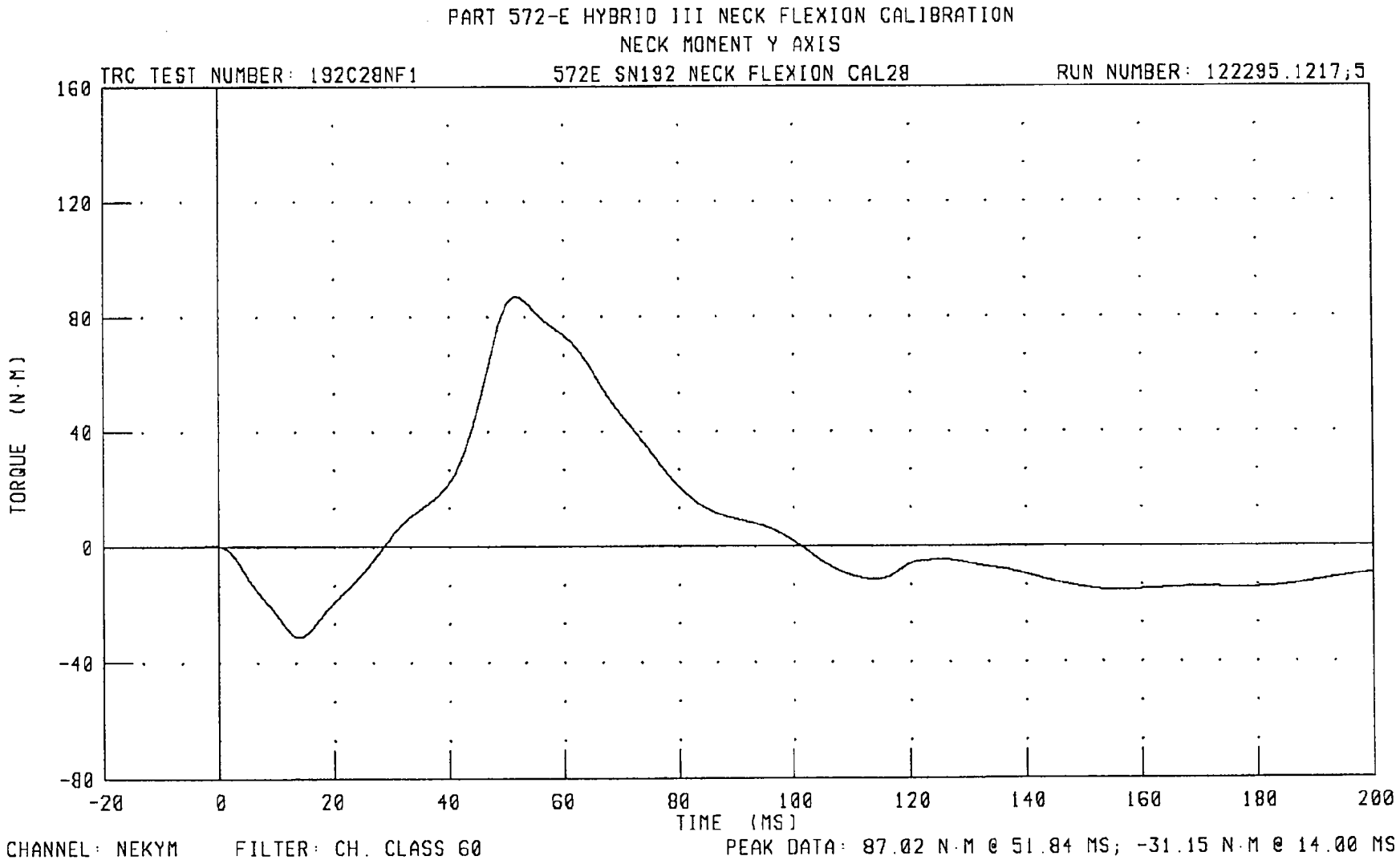
PART 572-E HYBRID III NECK FLEXION CALIBRATION

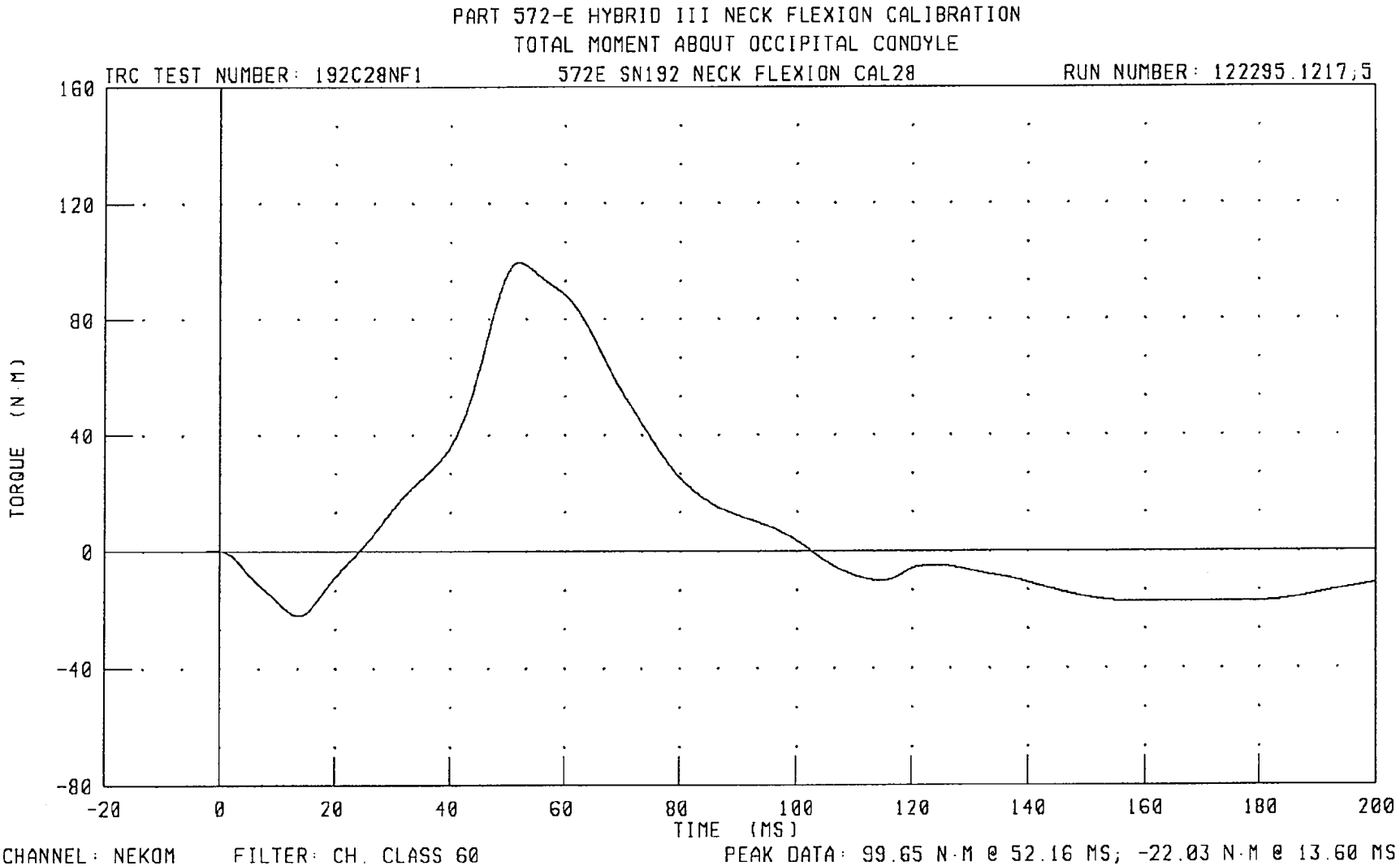
NECK FORCE X AXIS

TRC TEST NUMBER: 192C28NF1 572E SN192 NECK FLEXION CAL28 RUN NUMBER: 122295.1217;5



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 841.91 N @ 58.56 MS; -164.50 N @ 173.12 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 192C28NF1
572E SN192 NECK FLEXION CAL28
RUN NUMBER: 122295.1217;5
160
120
80
40
0
-40
-80
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 87.02 N-M @ 51.84 MS; -31.15 N-M @ 14.00 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 192C28NF1
572E SN192 NECK FLEXION CAL28
RUN NUMBER: 122295.1217.5
TORQUE (N-M)
160
120
80
40
0
-40
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 99.65 N-M @ 52.16 MS; -22.03 N-M @ 13.60 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III 07-NOV-95

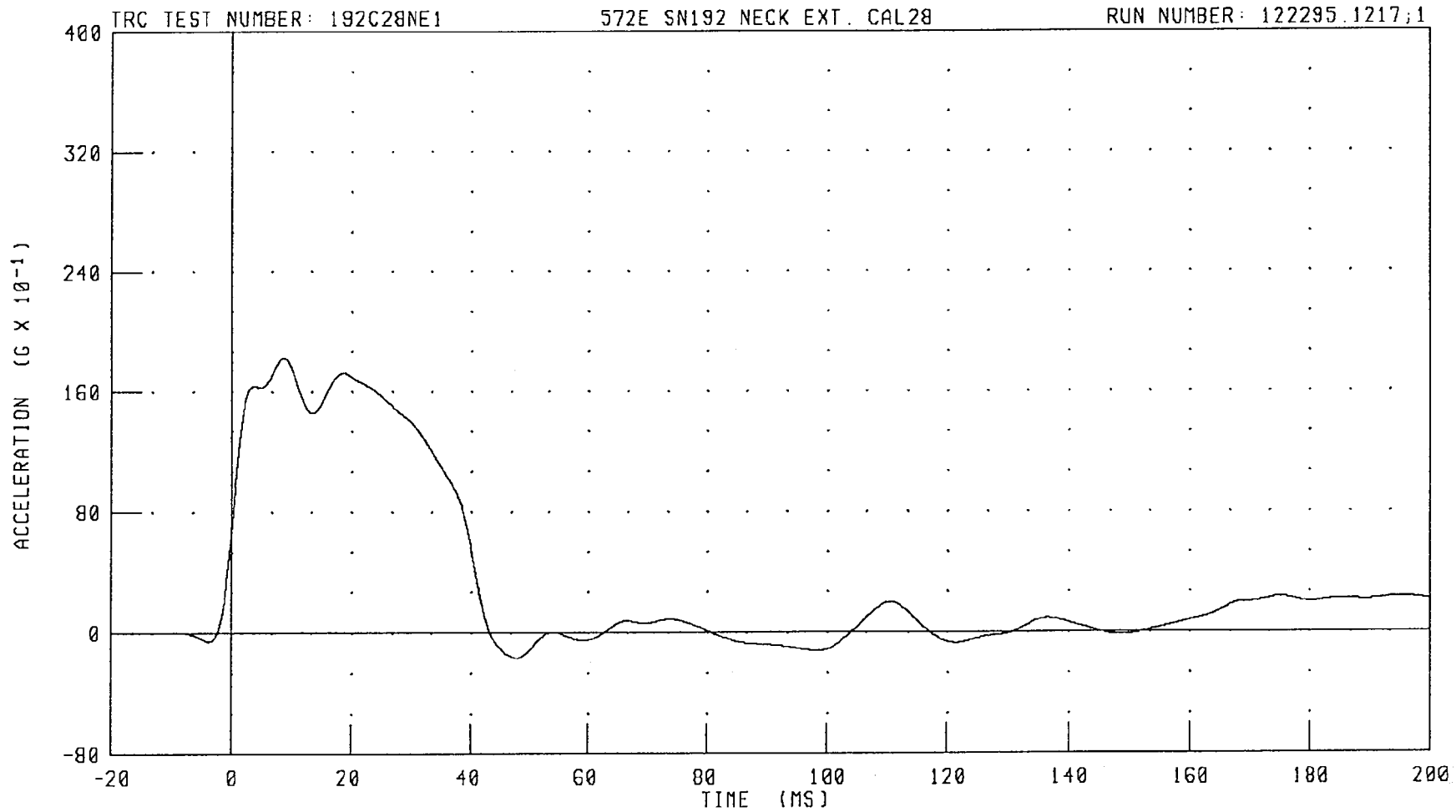
TRC INC. TEST NO: 192C28NE1 572E SN192 NECK EXT. CAL28

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.54 G
	20 MS	14.00 - 19.00 G	16.98 G
	30 MS	11.00 - 16.00 G	13.88 G
MAX PENDULUM G		22 G MAX	18.25 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.85 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.24 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	101.22 DEG.
	TIME	72 - 82 MS	77.52 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-70.60 NM
	TIME	65 - 79 MS	72.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	163.52 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	138.56 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet RUN NUMBER: 110795.1445;1

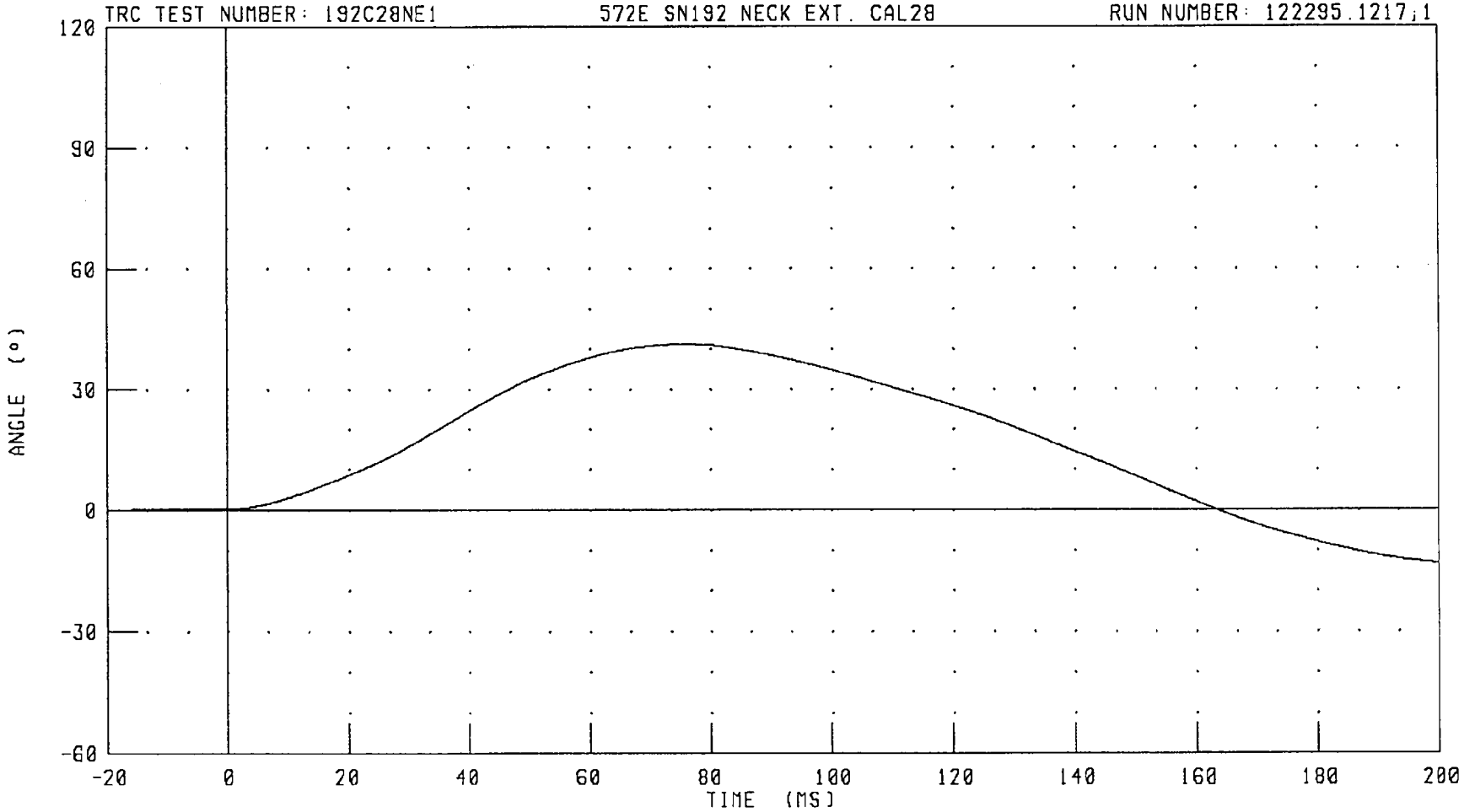
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION



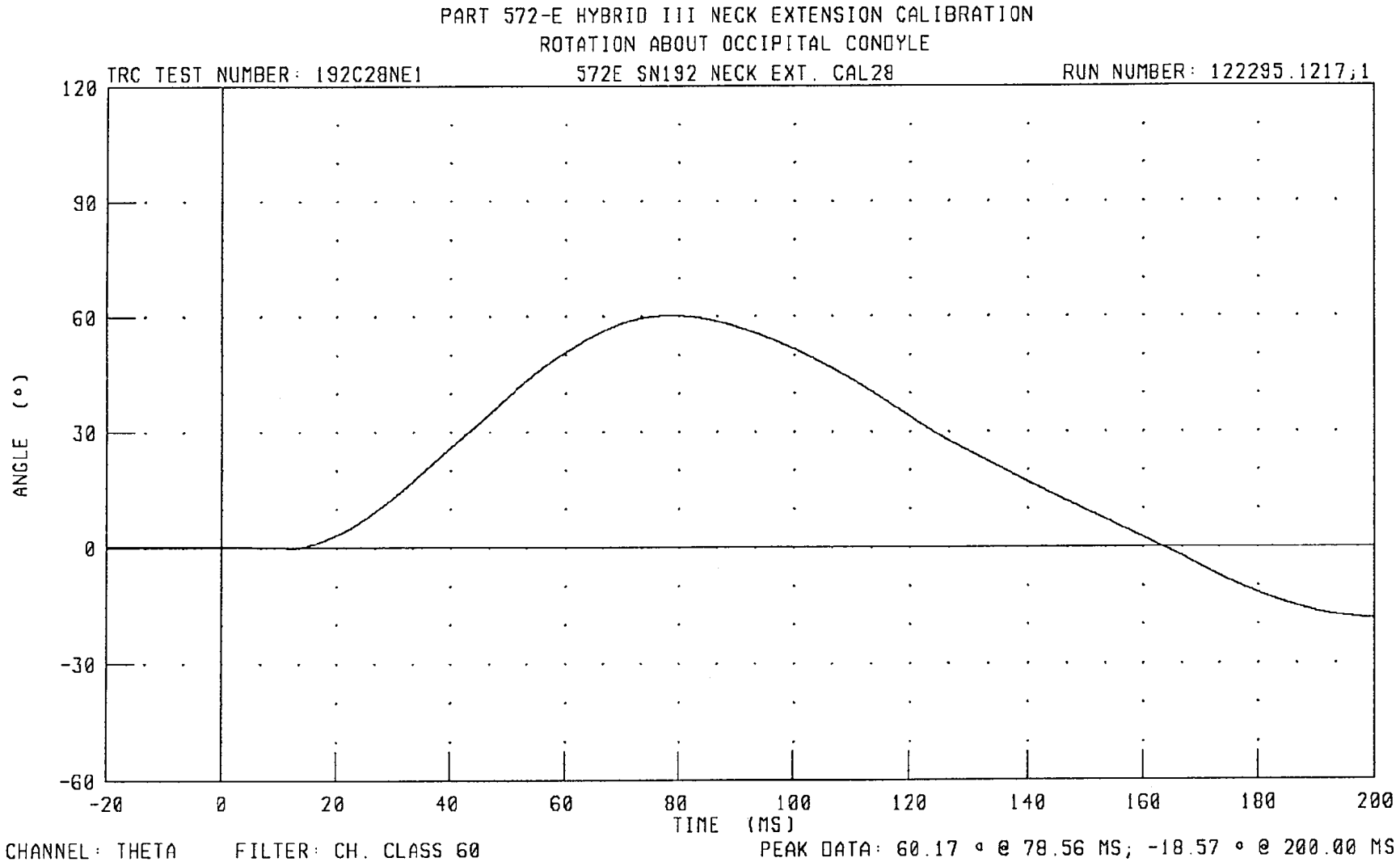
CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 18.26 G @ 8.72 MS; -1.66 G @ 47.68 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 192C28NE1 572E SN192 NECK EXT. CAL28 RUN NUMBER: 122295.1217;1



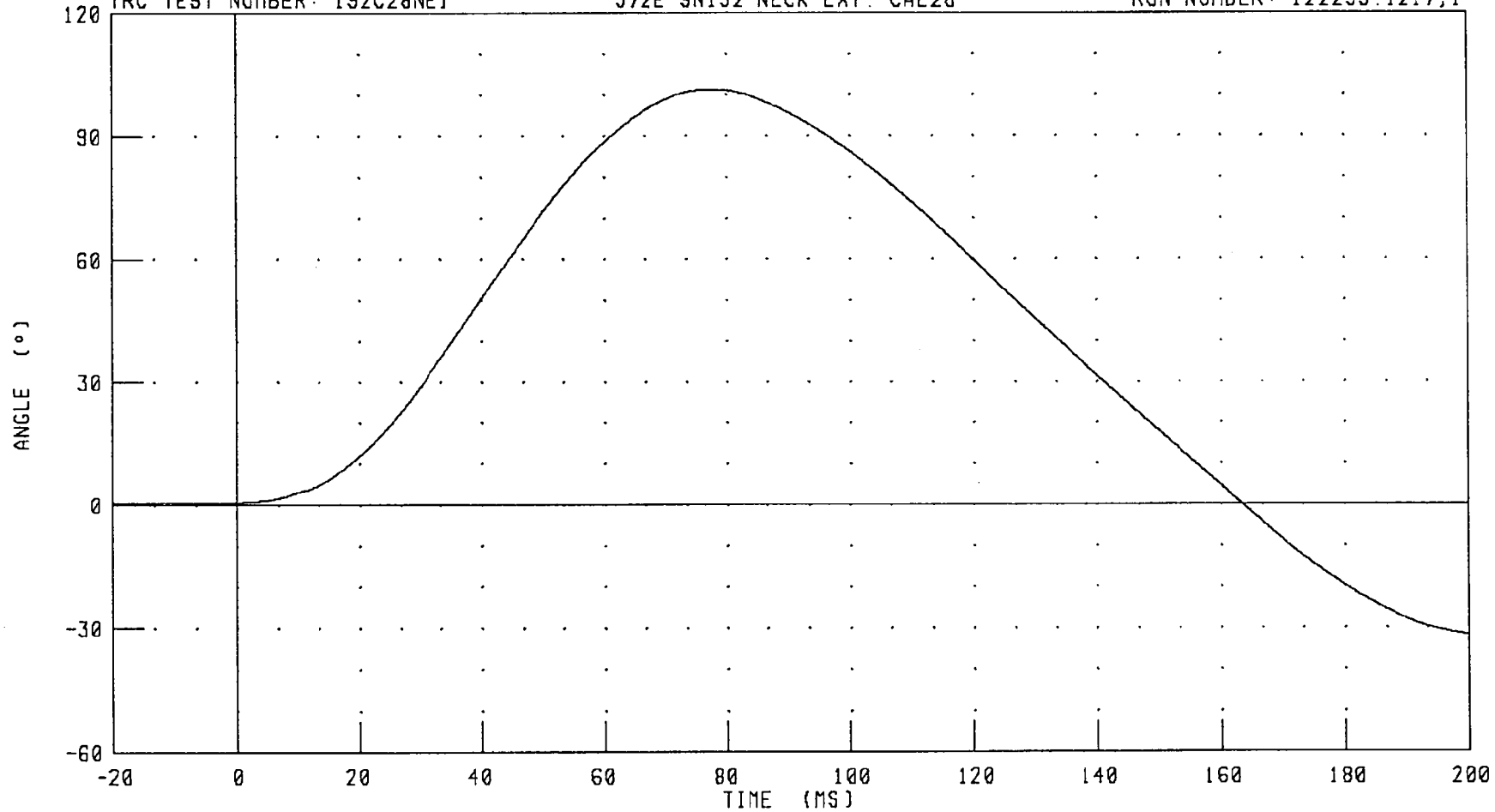
CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 41.09 ° @ 74.72 MS; -13.17 ° @ 200.00 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 192C28NE1
572E SN192 NECK EXT. CAL28
RUN NUMBER: 122295.1217;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 60.17 ° @ 78.56 MS; -18.57 ° @ 200.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C28NE1 572E SN192 NECK EXT. CAL28 RUN NUMBER: 122295.1217;1

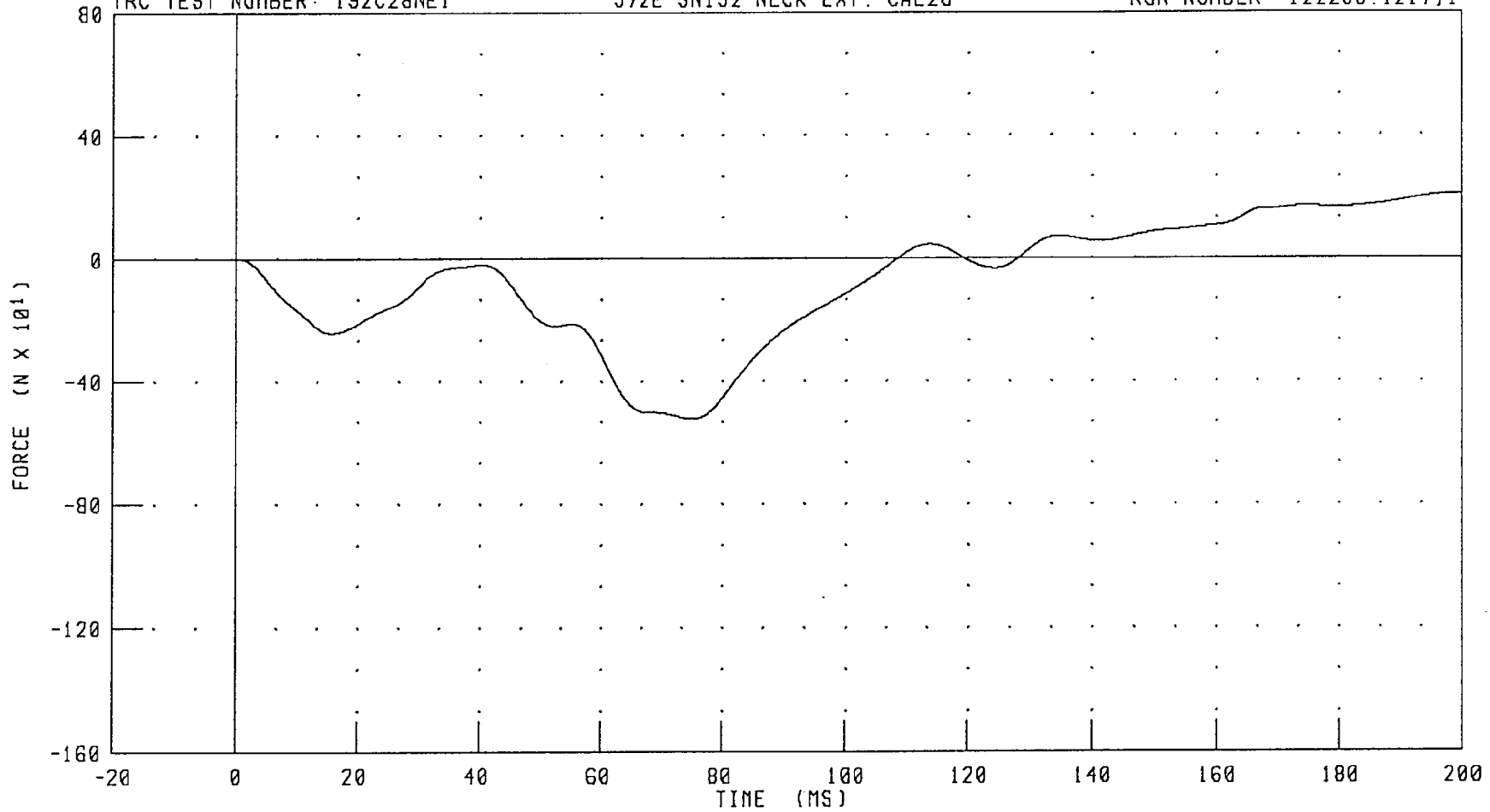


CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 101.22 ° @ 77.52 MS; -31.74 ° @ 200.00 MS

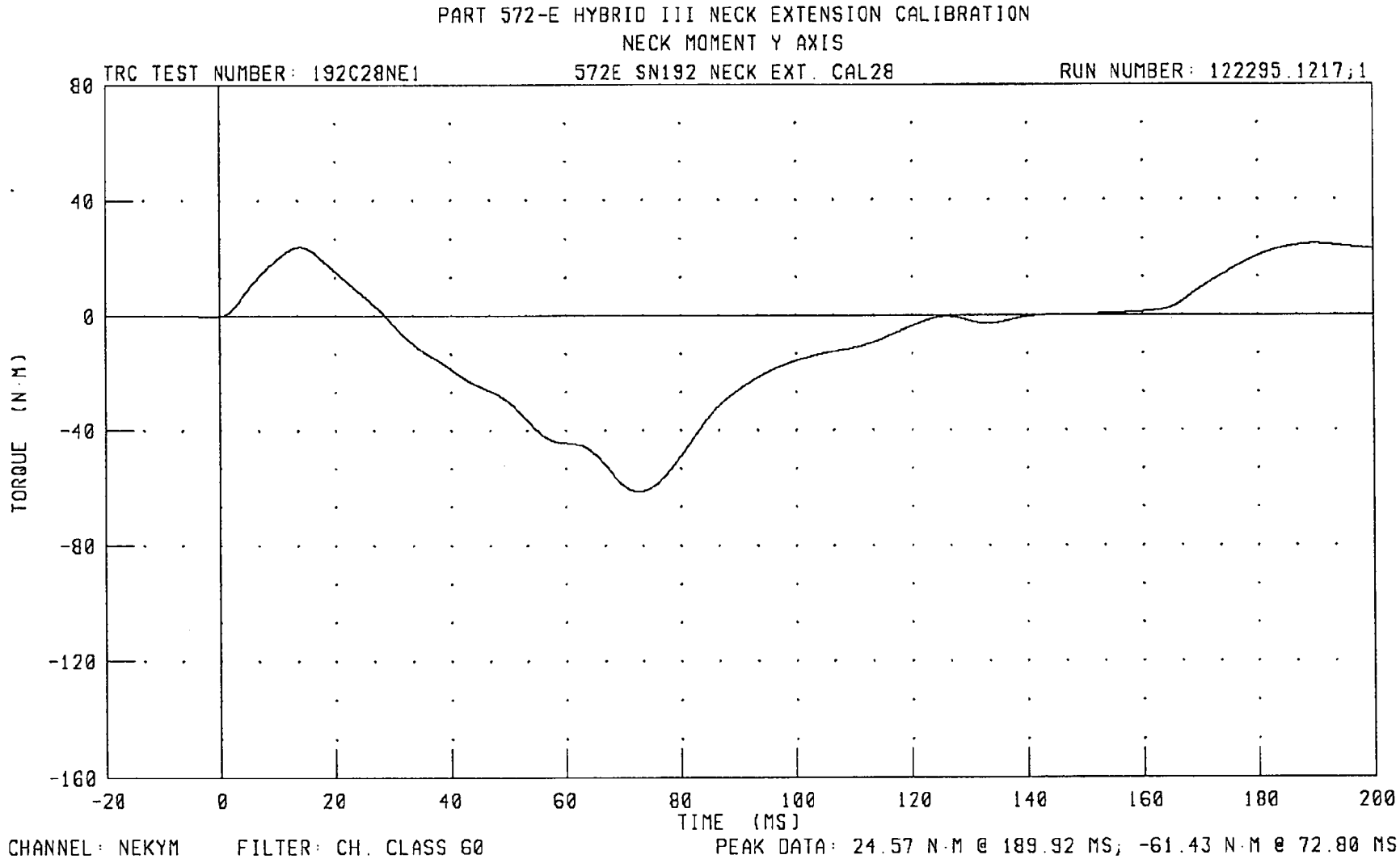
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

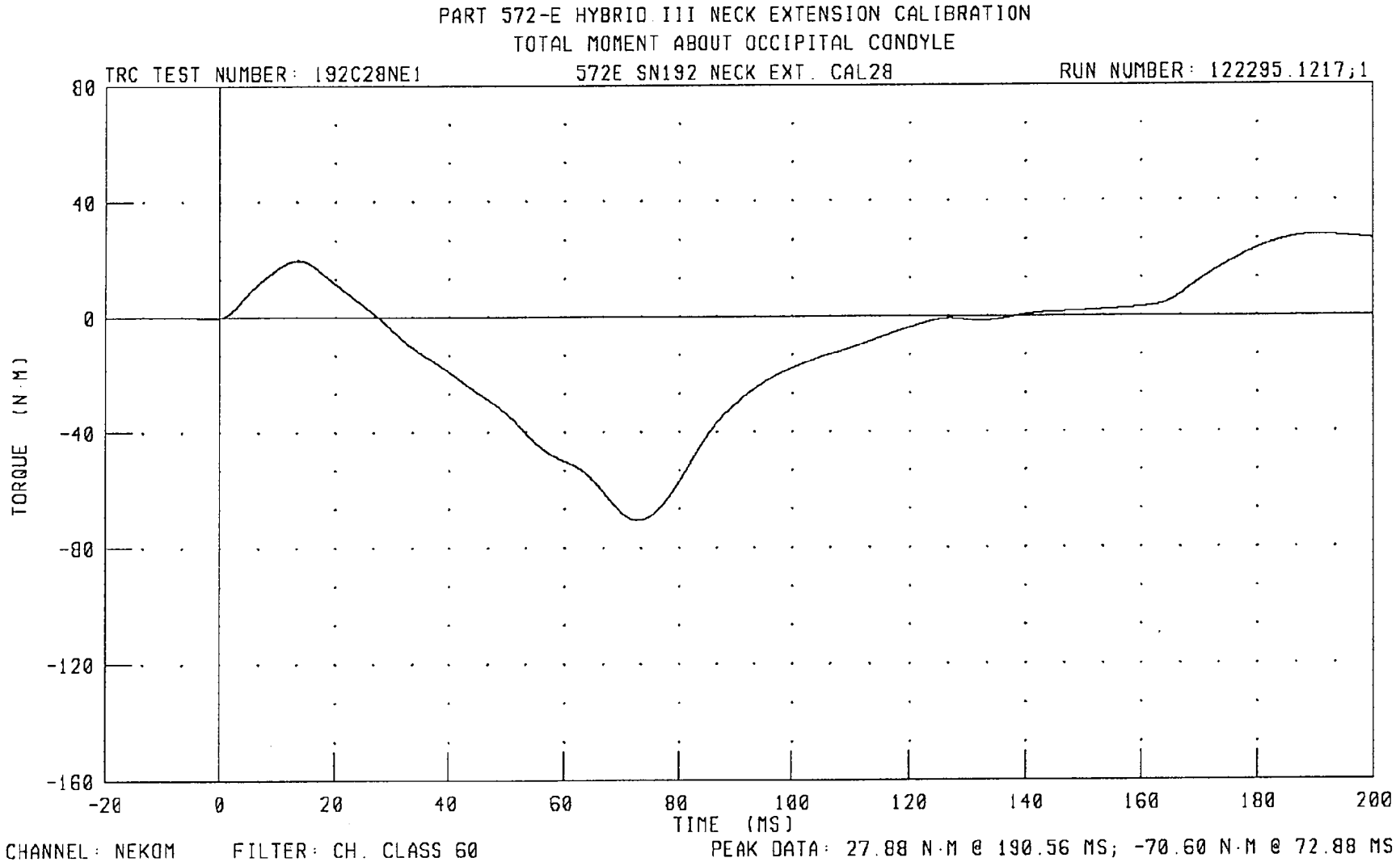
NECK FORCE X AXIS

TRC TEST NUMBER: 192C28NE1 572E SN192 NECK EXT. CAL28 RUN NUMBER: 122295.1217;1



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 206.77 N @ 199.28 MS; -523.28 N @ 75.12 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 192C28NE1
572E SN192 NECK EXT. CAL28
RUN NUMBER: 122295.1217;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 24.57 N-M @ 189.92 MS; -61.43 N-M @ 72.80 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 192C28NE1
572E SN192 NECK EXT. CAL28
RUN NUMBER: 122295.1217;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 27.88 N-M @ 190.56 MS; -70.60 N-M @ 72.88 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 07-NOV-95

TRC INC. TEST NO: 192C28TH1 572E SN192 H.S.THORAX CAL28

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	20.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.71 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	64.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5807. N
INTERNAL HYSTERESIS	69% - 85%	72.4%

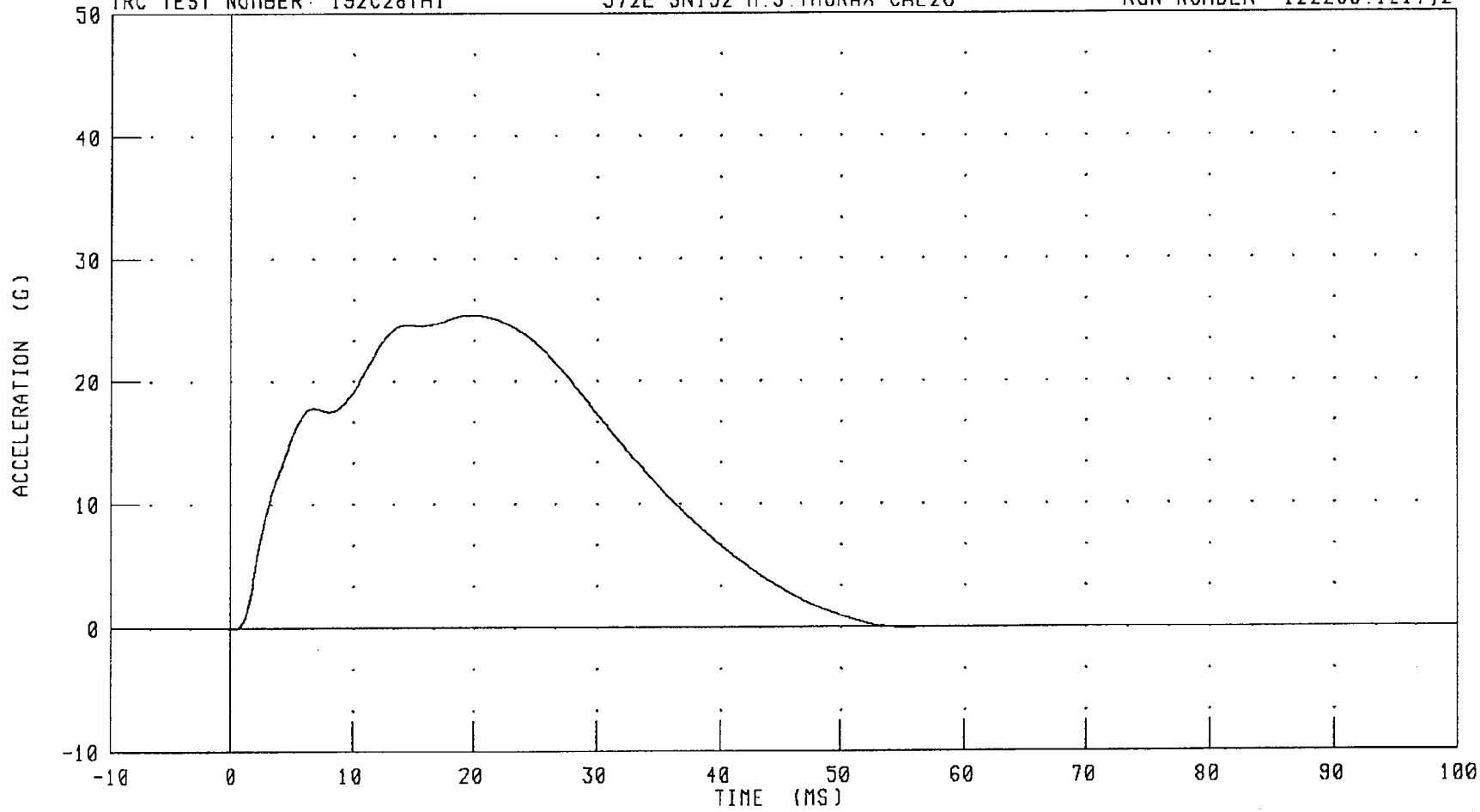
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas Mundt RUN NUMBER: 110795.1712;2

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 192C28TH1 572E SN192 H.S.THORAX CAL28 RUN NUMBER: 122295.1217;2



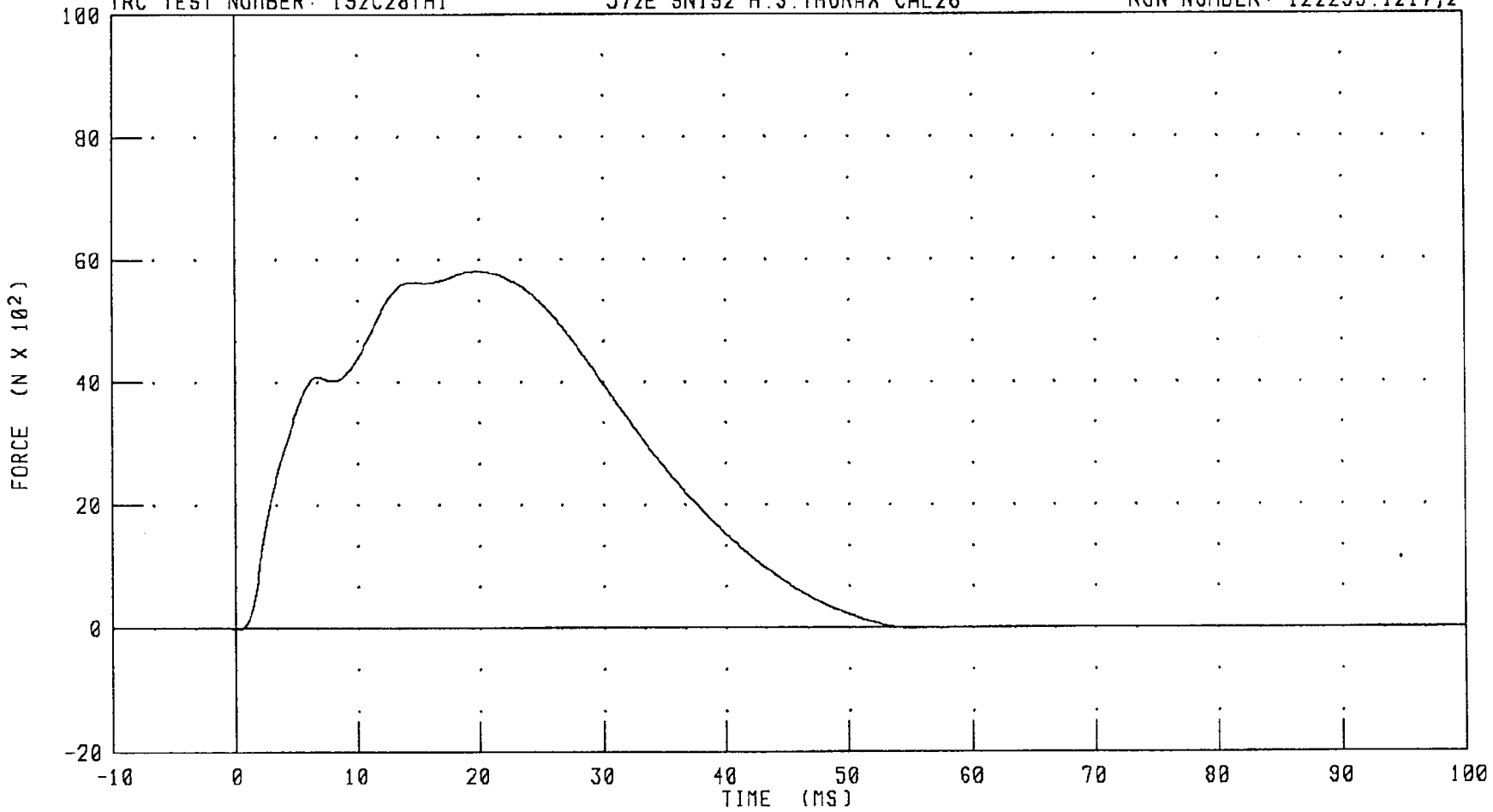
CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 25.35 G @ 19.76 MS; -0.07 G @ 0.24 MS

951129

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

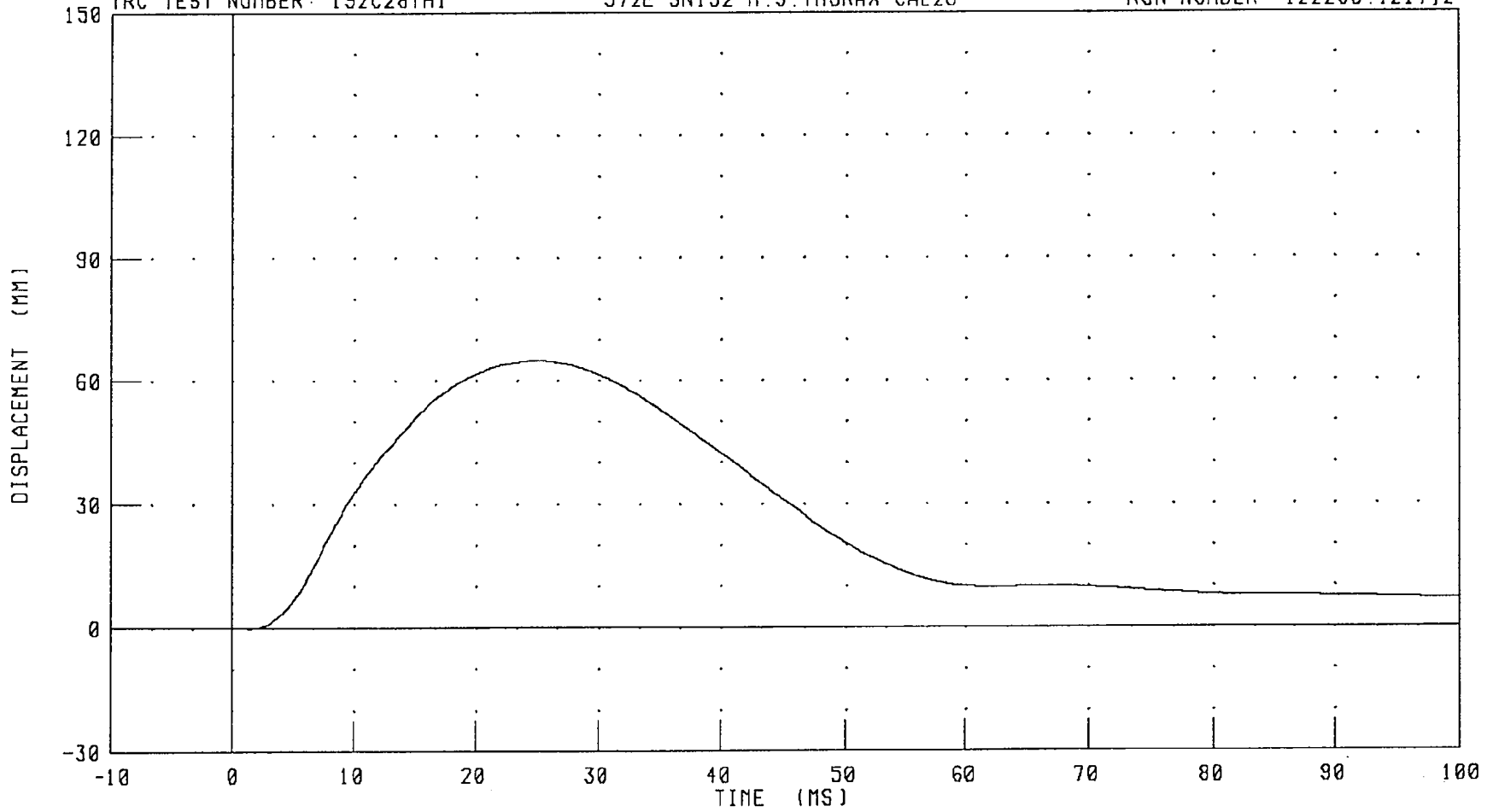
TRC TEST NUMBER: 192C28TH1 572E SN192 H.S.THORAX CAL28 RUN NUMBER: 122295.1217;2



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5807.71 N @ 19.76 MS; -16.03 N @ 0.24 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

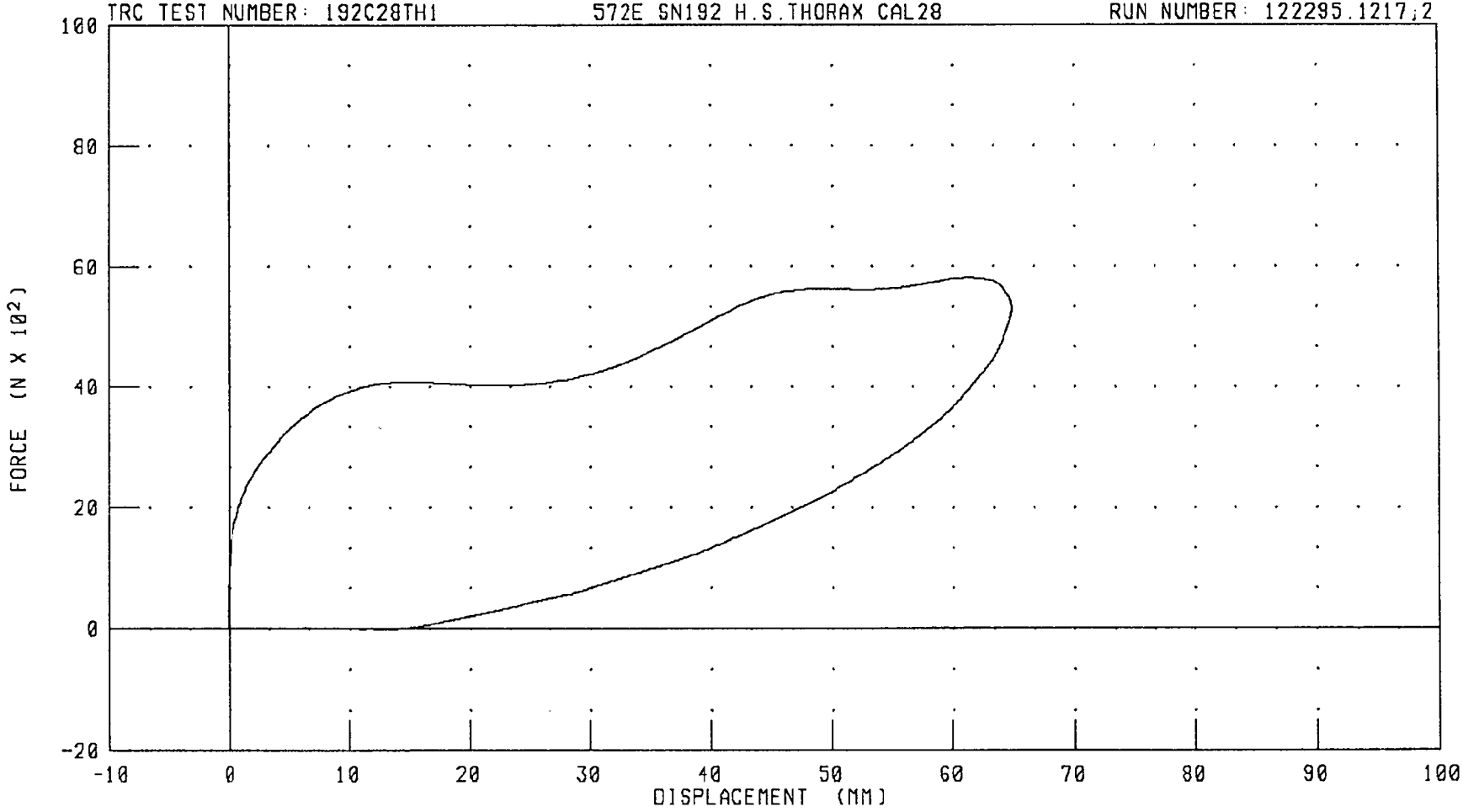
TRC TEST NUMBER: 192C28TH1 572E SN192 H.S.THORAX CAL28 RUN NUMBER: 122295.1217;2



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 64.85 MM @ 24.96 MS; -0.06 MM @ 1.44 MS

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

TRC TEST NUMBER: 192C28TH1 572E SN192 H.S.THORAX CAL28 RUN NUMBER: 122295.1217;2



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 64.85 MM @ 24.96 MS; -0.06 MM @ 1.44 MS
PENXF CH. CLASS 180 5807.71 N @ 19.76 MS; -16.03 N @ 0.24 MS

951129

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

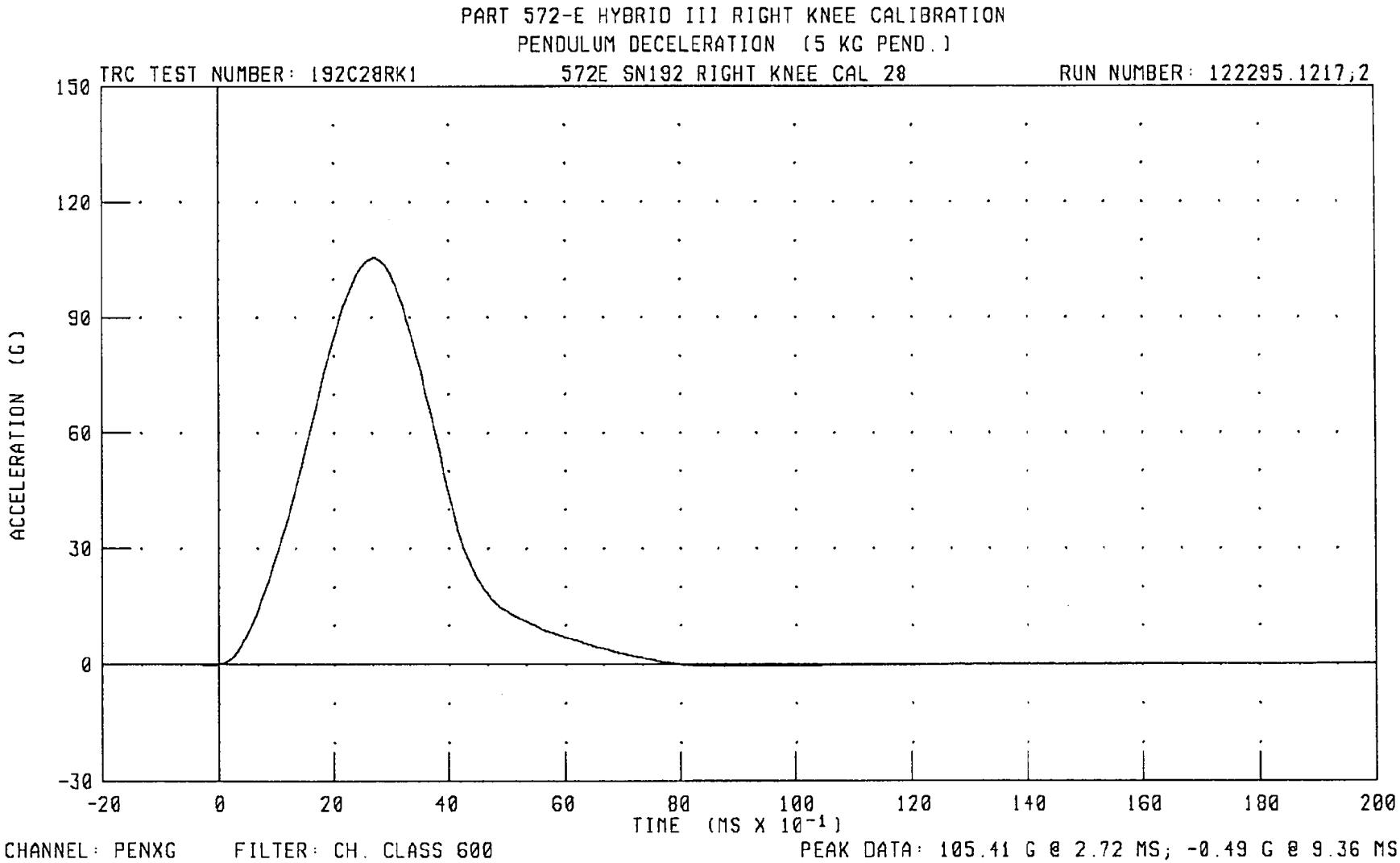
HYBRID III 07-NOV-95

TRC INC. TEST NO: 192C28RK1 572E SN192 RIGHT KNEE CAL 28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5157.5 N

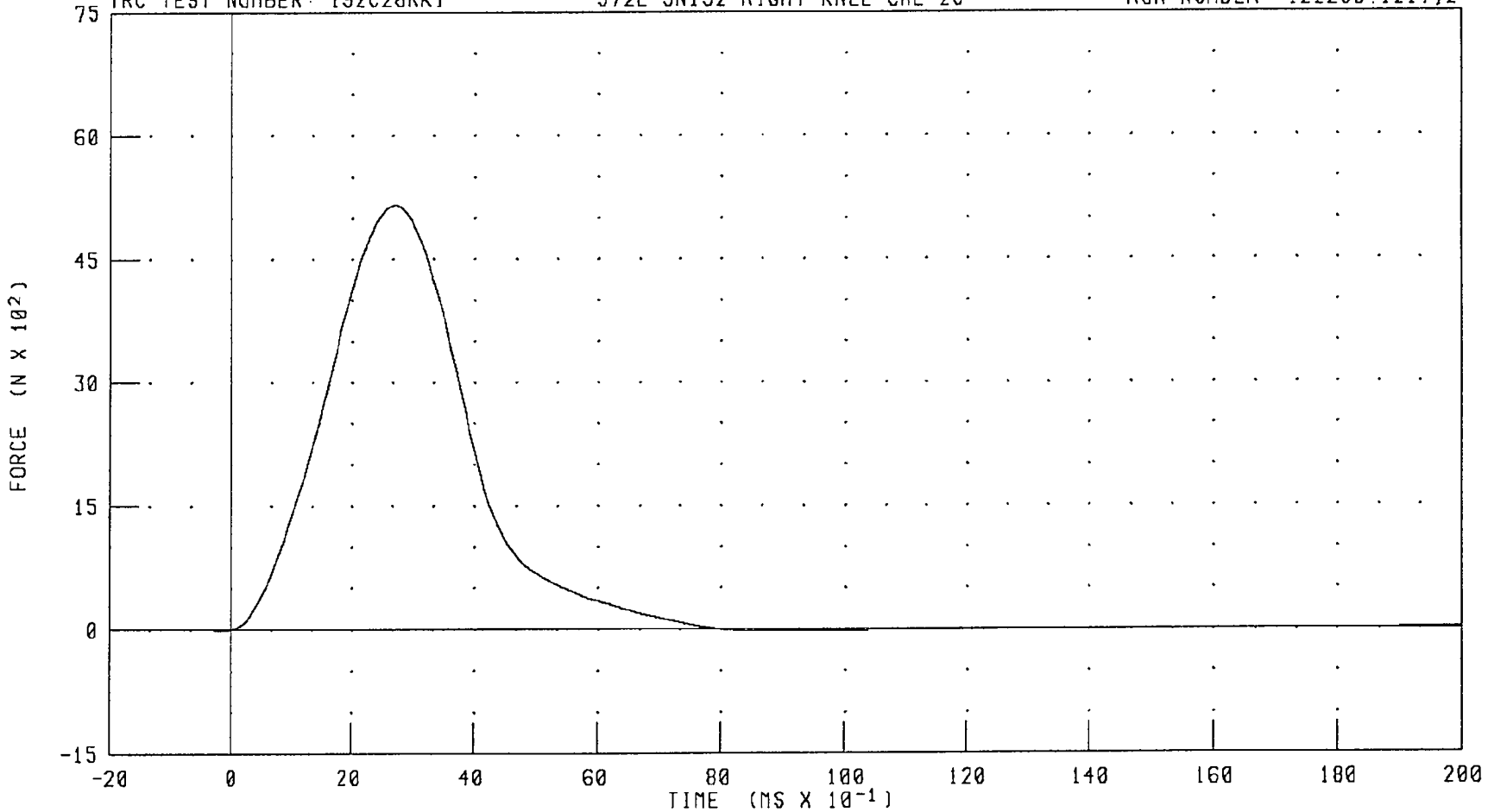
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet RUN NUMBER: 110795.1332;2


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 192C28RK1
572E SN192 RIGHT KNEE CAL 28
RUN NUMBER: 122295.1217;2
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 105.41 G @ 2.72 MS; -0.49 G @ 9.36 MS

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

TRC TEST NUMBER: 192C28RK1 572E SN192 RIGHT KNEE CAL 28 RUN NUMBER: 122295.1217;2



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 5157.55 N @ 2.72 MS; -23.75 N @ 9.36 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 07-NOV-95

TRC INC. TEST NO: 192C28LK1 572E SN192 LEFT KNEE CAL 28

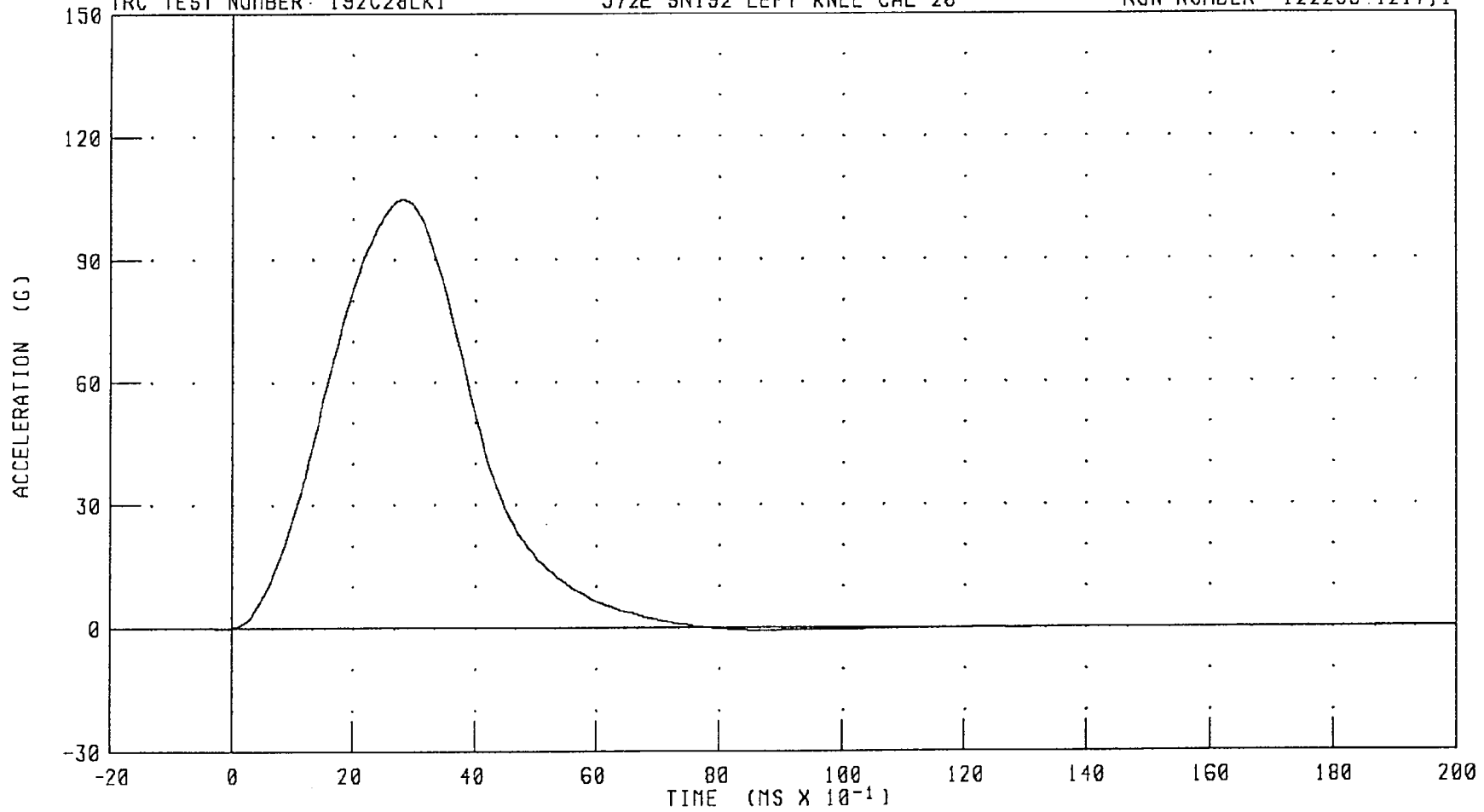
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5129.7 N

TEST MEETS SPECIFICATIONS

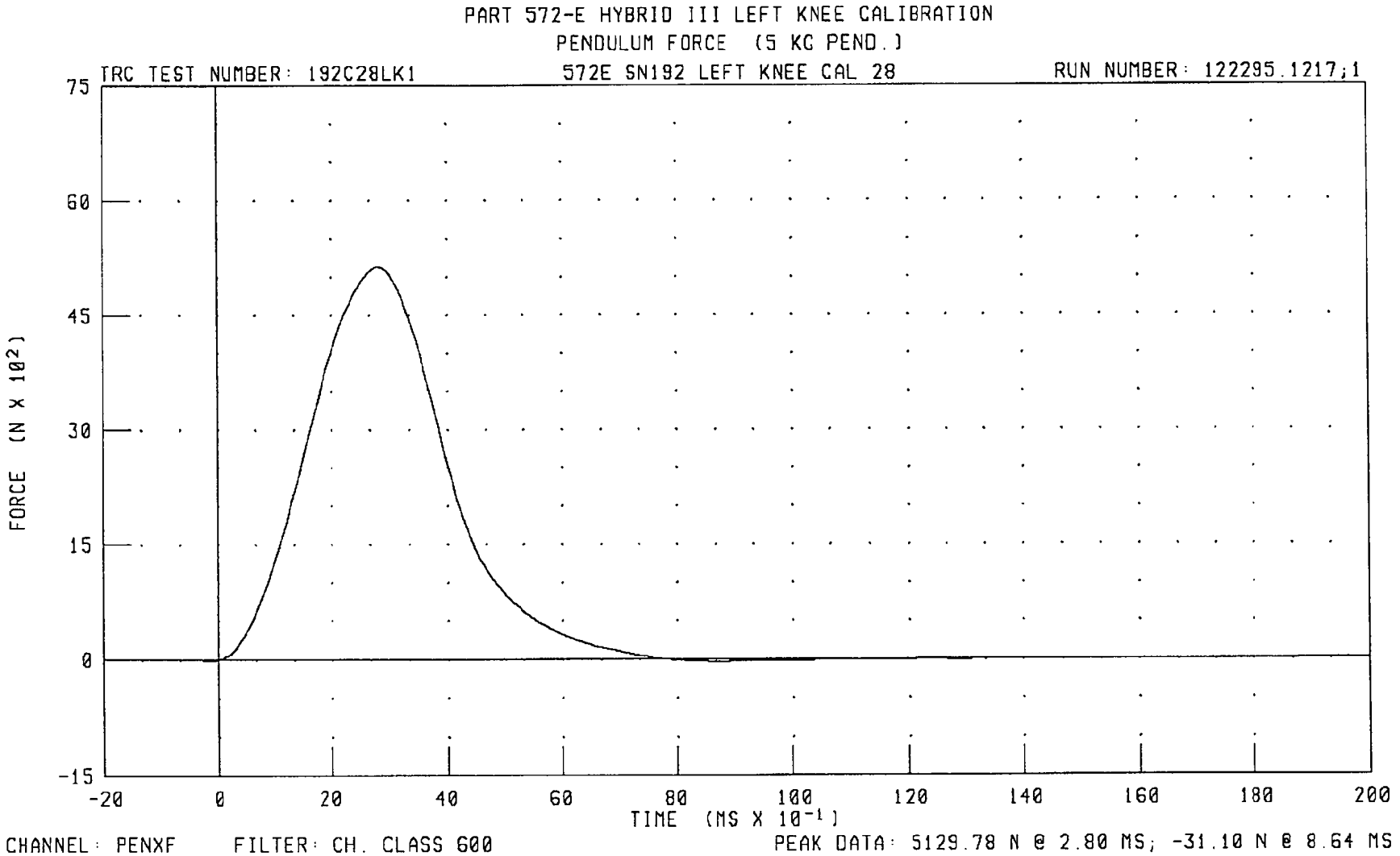
TECHNICIAN Chas Middle RUN NUMBER: 110795.1247;1

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

TRC TEST NUMBER: 192C28LK1 572E SN192 LEFT KNEE CAL 28 RUN NUMBER: 122295.1217;1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 104.84 G @ 2.80 MS; -0.64 G @ 8.64 MS


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 192C28LK1
572E SN192 LEFT KNEE CAL 28
RUN NUMBER: 122295.1217;1
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 5129.78 N @ 2.80 MS; -31.10 N @ 8.64 MS

Pre-test Certification Data

Passenger Dummy S/N: 142

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
142 HUMANOID 07-NOV-95

TRC INC. TEST NO: 142C29ED1 572E SN142 EXT.DIMENSION CAL29

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 Chas. Middlet RUN NUMBER: 111695.0902

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

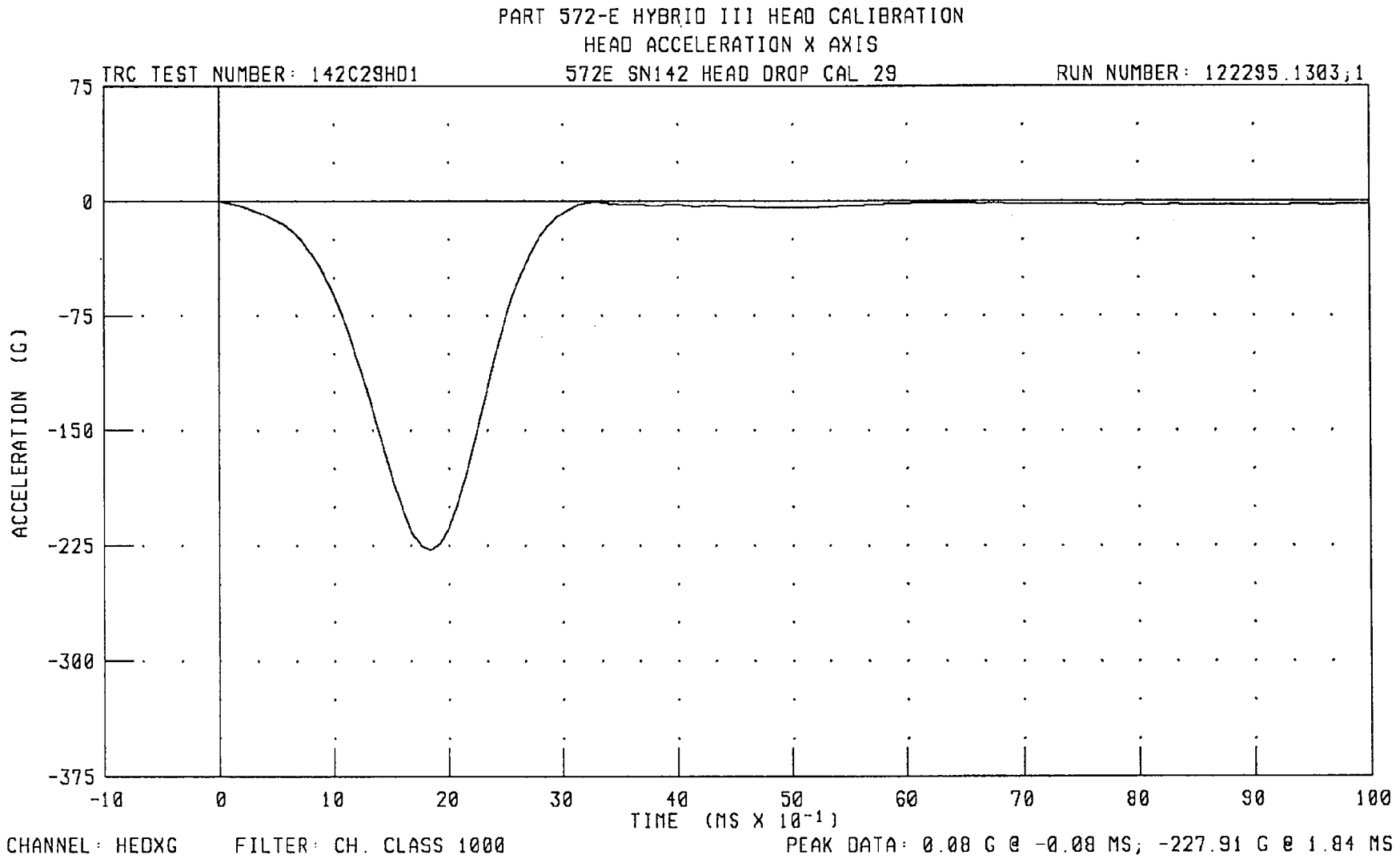
HYBRID III 07-NOV-95

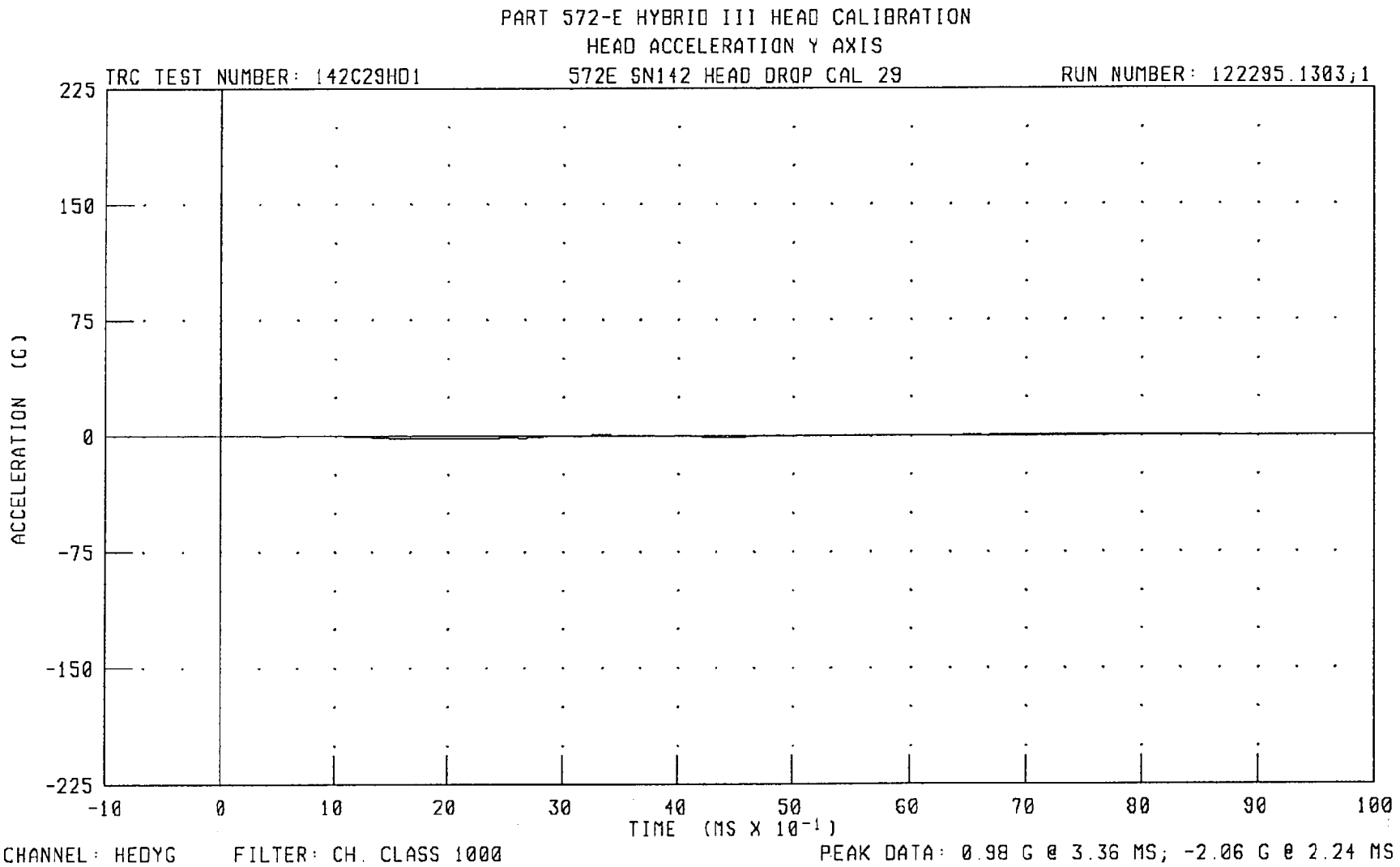
TRC INC. TEST NO: 142C29HD1 572E SN142 HEAD DROP CAL 29

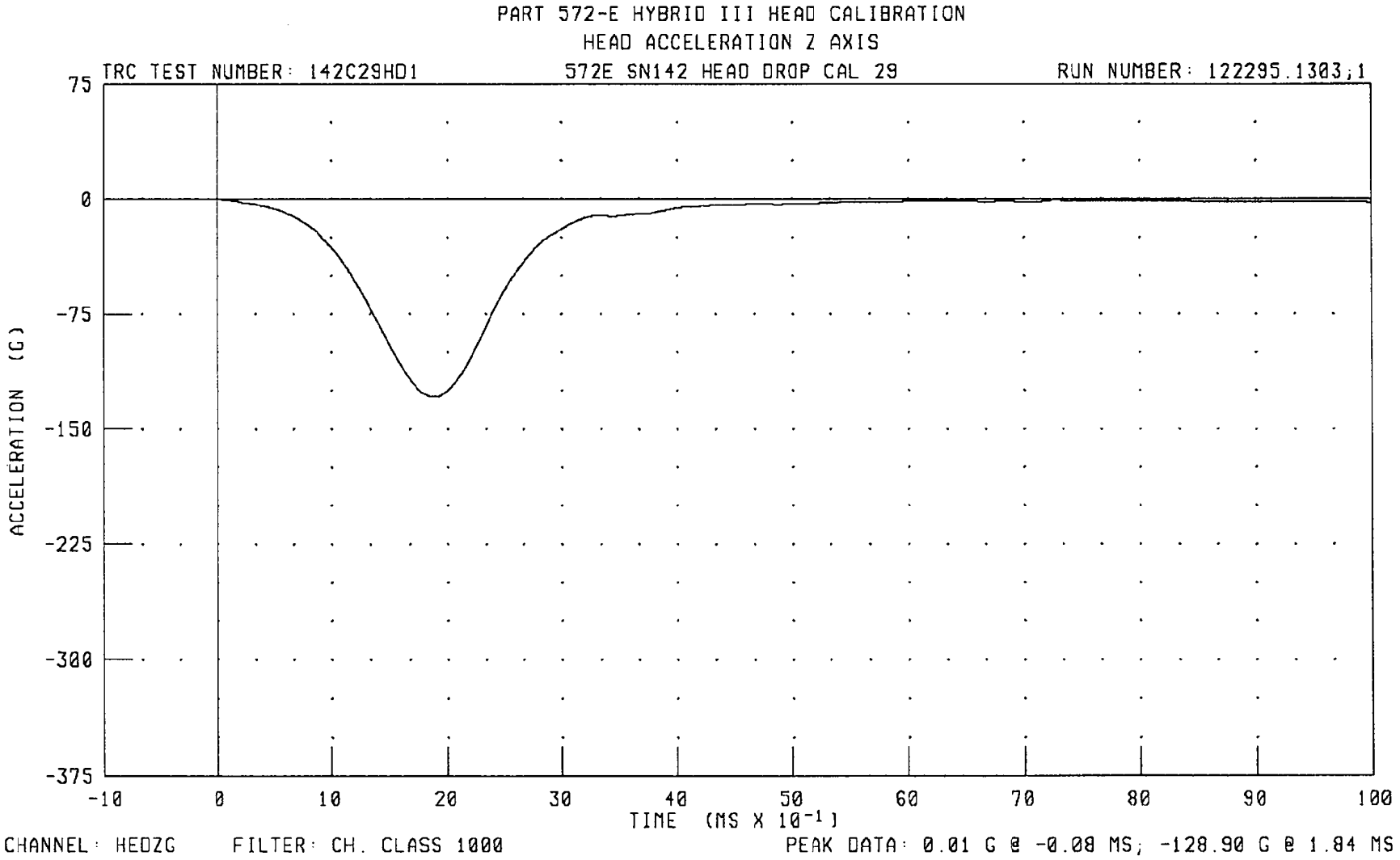
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	261.83 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.05 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet RUN NUMBER: 110795.1240;1

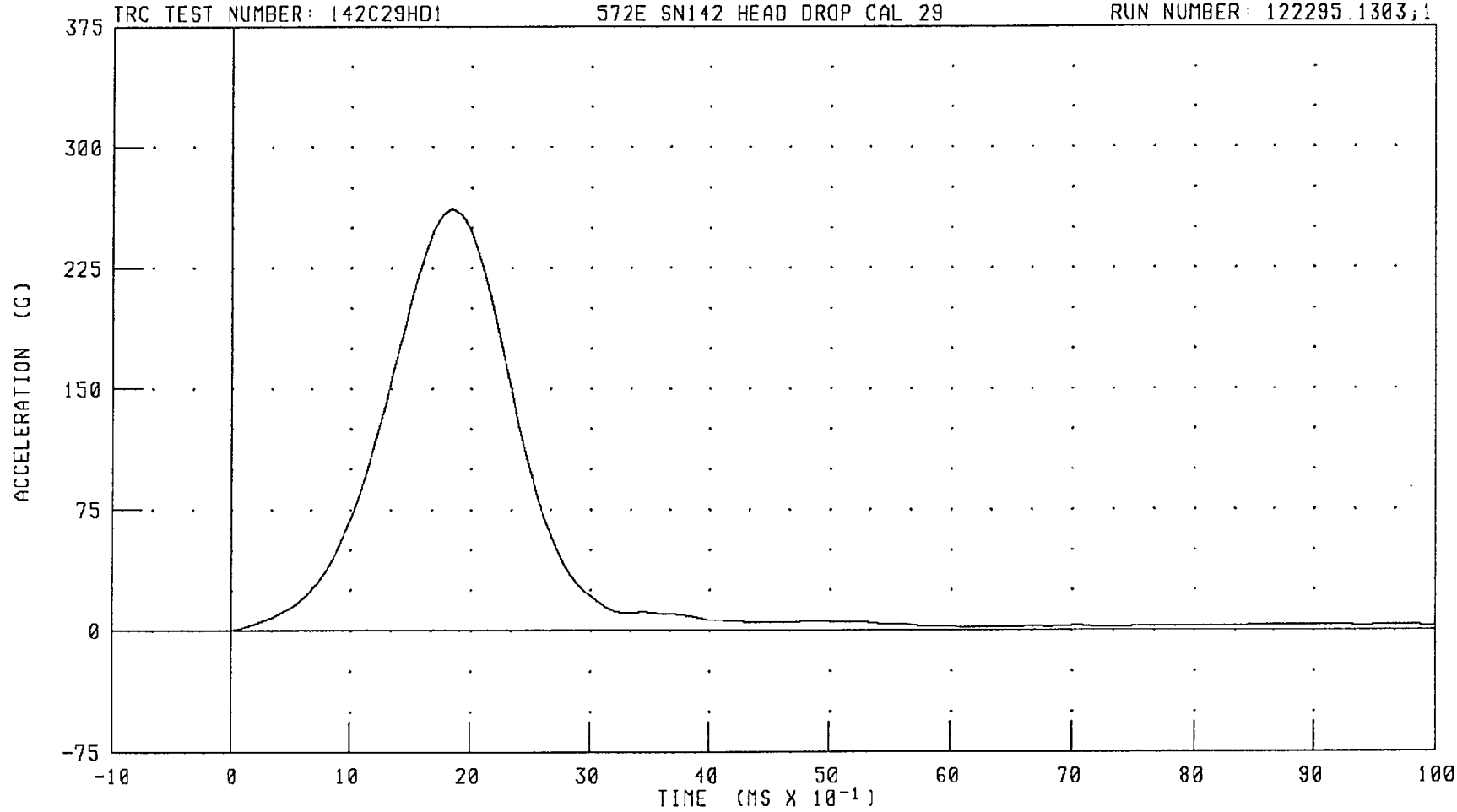

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER: 142C29HD1
572E SN142 HEAD DROP CAL 29
RUN NUMBER: 122295.1303;1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDXG
FILTER: CH. CLASS 1000
PEAK DATA: 0.08 G @ -0.08 MS; -227.91 G @ 1.84 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 142C29HD1
572E SN142 HEAD DROP CAL 29
RUN NUMBER: 122295.1303;1
225
150
75
0
-75
-150
-225
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 0.98 G @ 3.36 MS; -2.06 G @ 2.24 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
TRC TEST NUMBER: 142C29HD1
572E SN142 HEAD DROP CAL 29
RUN NUMBER: 122295.1303;1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDZG
FILTER: CH. CLASS 1000
PEAK DATA: 0.01 G @ -0.08 MS; -128.90 G @ 1.84 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 142C29HD1 572E SN142 HEAD DROP CAL 29 RUN NUMBER: 122295.1303;1



CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 261.84 G @ 1.84 MS; 0.01 G @ -0.56 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

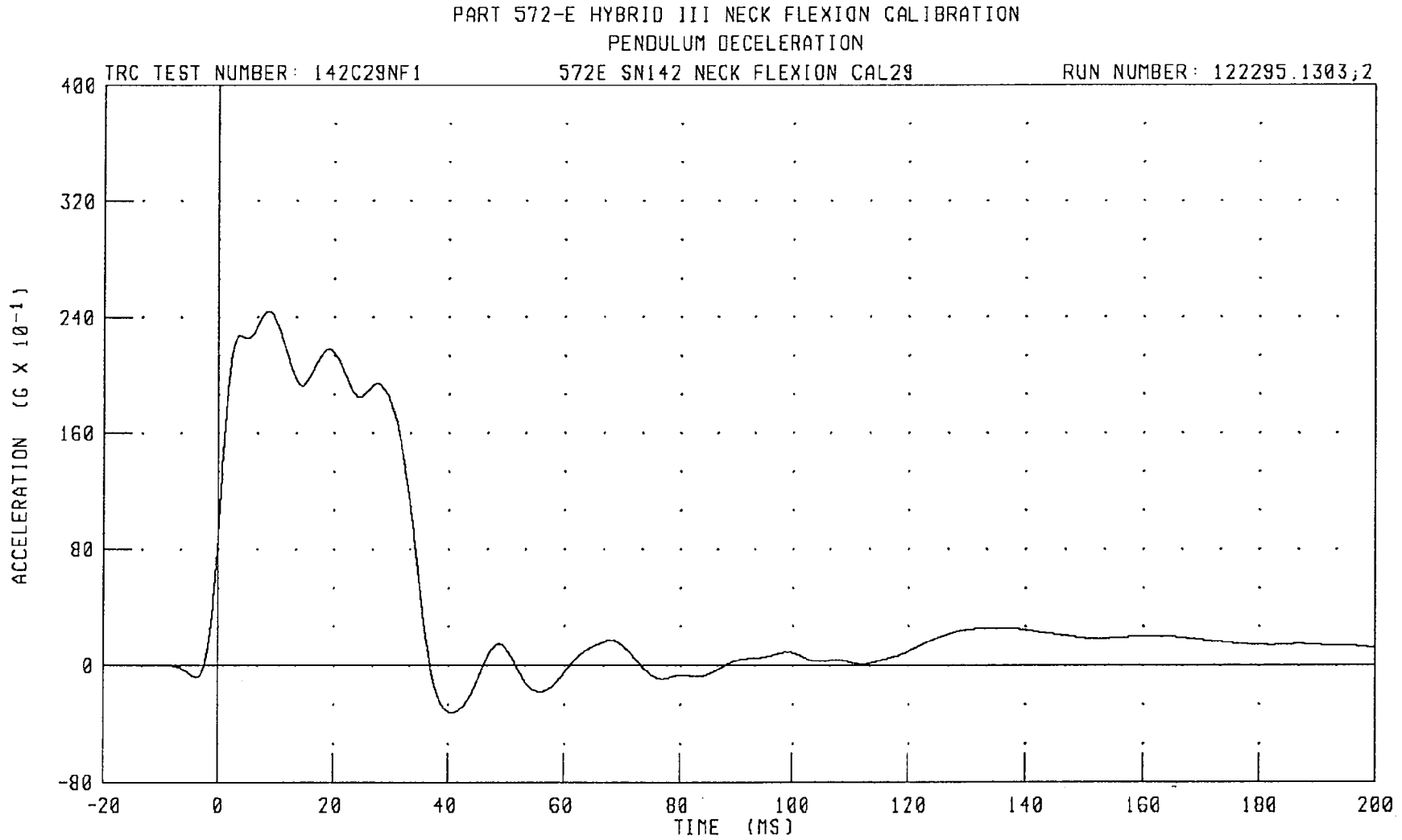
HYBRID III 07-NOV-95

TRC INC. TEST NO: 142C29NF1 572E SN142 NECK FLEXION CAL29

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.67 G
	20 MS	17.60 - 22.60 G	21.57 G
	30 MS	12.50 - 18.50 G	17.99 G
MAX PENDULUM G		29 G MAX	24.42 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.89 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	35.12 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	72.21 DEG.
	TIME	57 - 64 MS	58.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	100.85 NM
	TIME	47 - 58 MS	48.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	113.52 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	100.64 MS

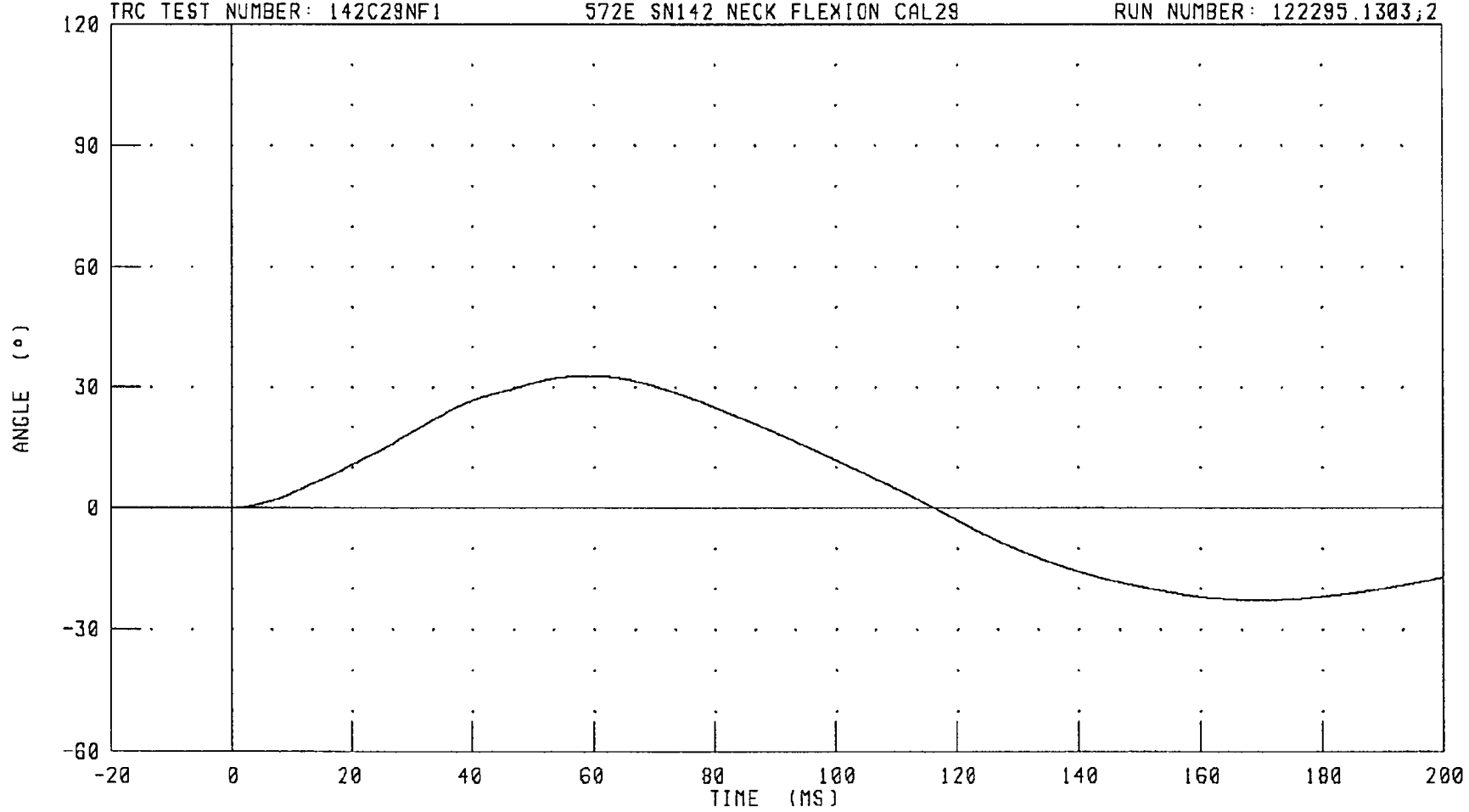
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas Middlet RUN NUMBER: 110795.1557;2

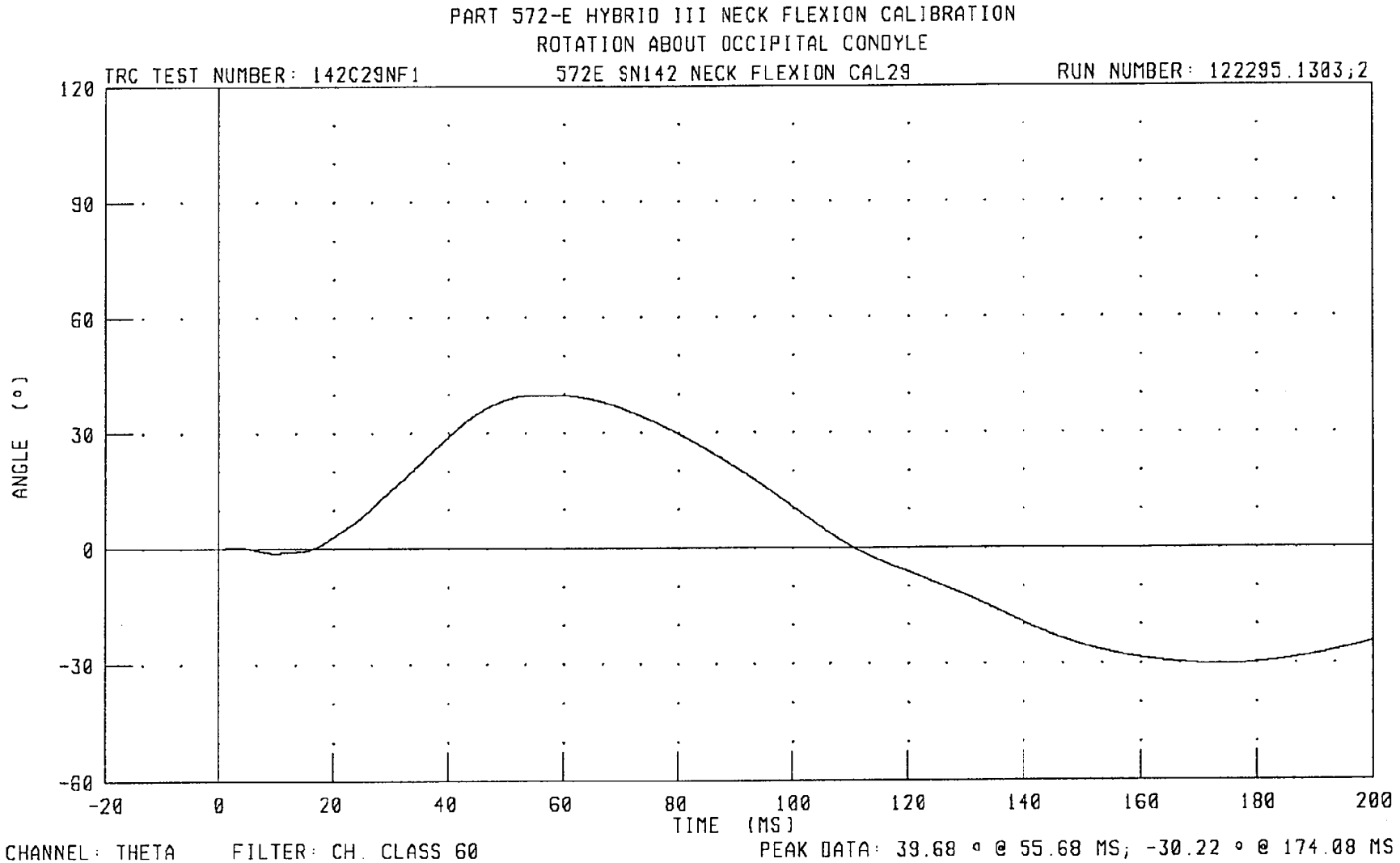

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 142C29NF1
572E SN142 NECK FLEXION CAL29
RUN NUMBER: 122295.1303;2
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 24.43 G @ 8.56 MS; -3.22 G @ 40.64 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 142C29NF1 572E SN142 NECK FLEXION CAL29 RUN NUMBER: 122295.1303;2

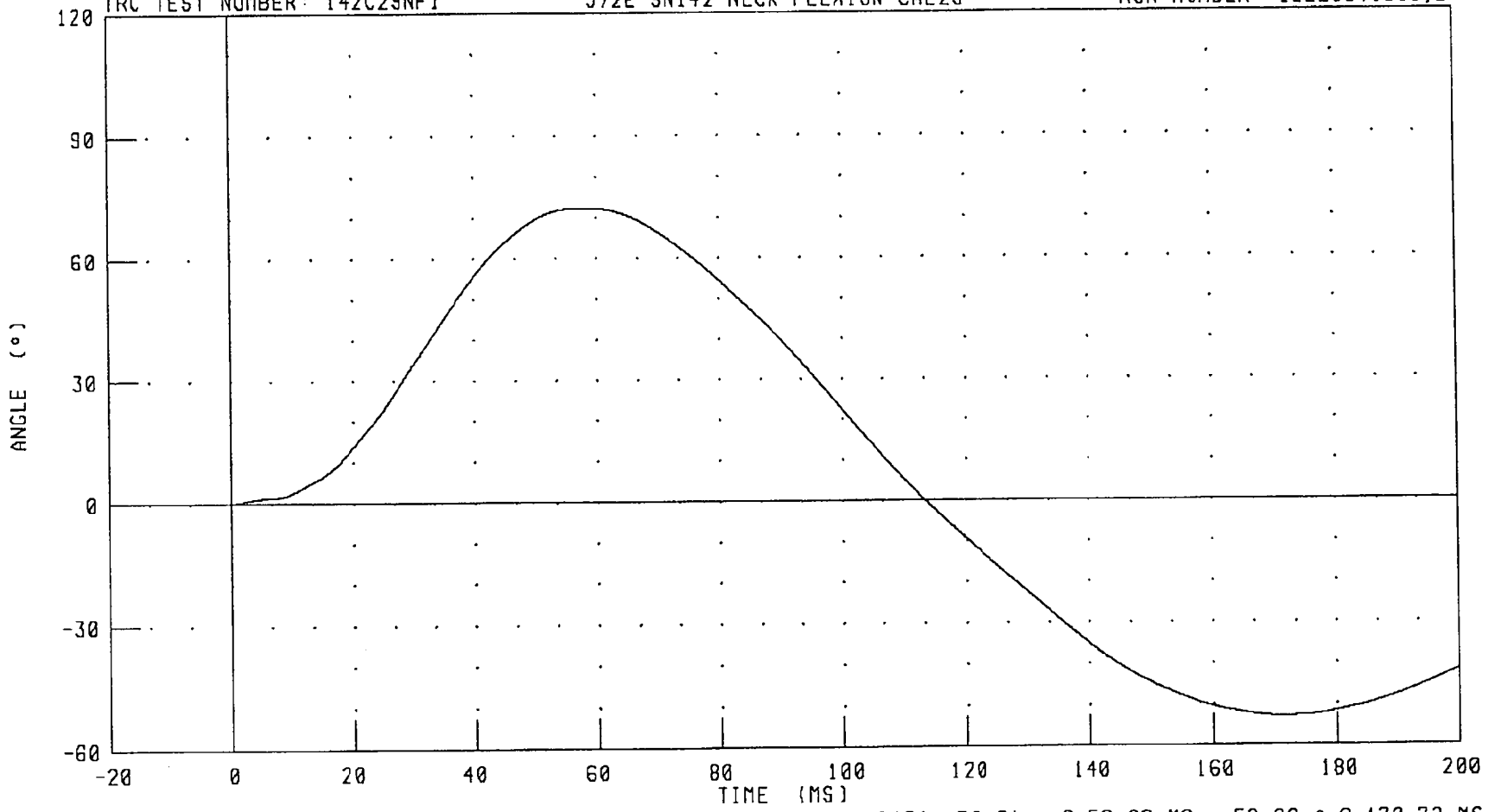


CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 32.55 ° @ 60.00 MS; -22.91 ° @ 168.88 MS

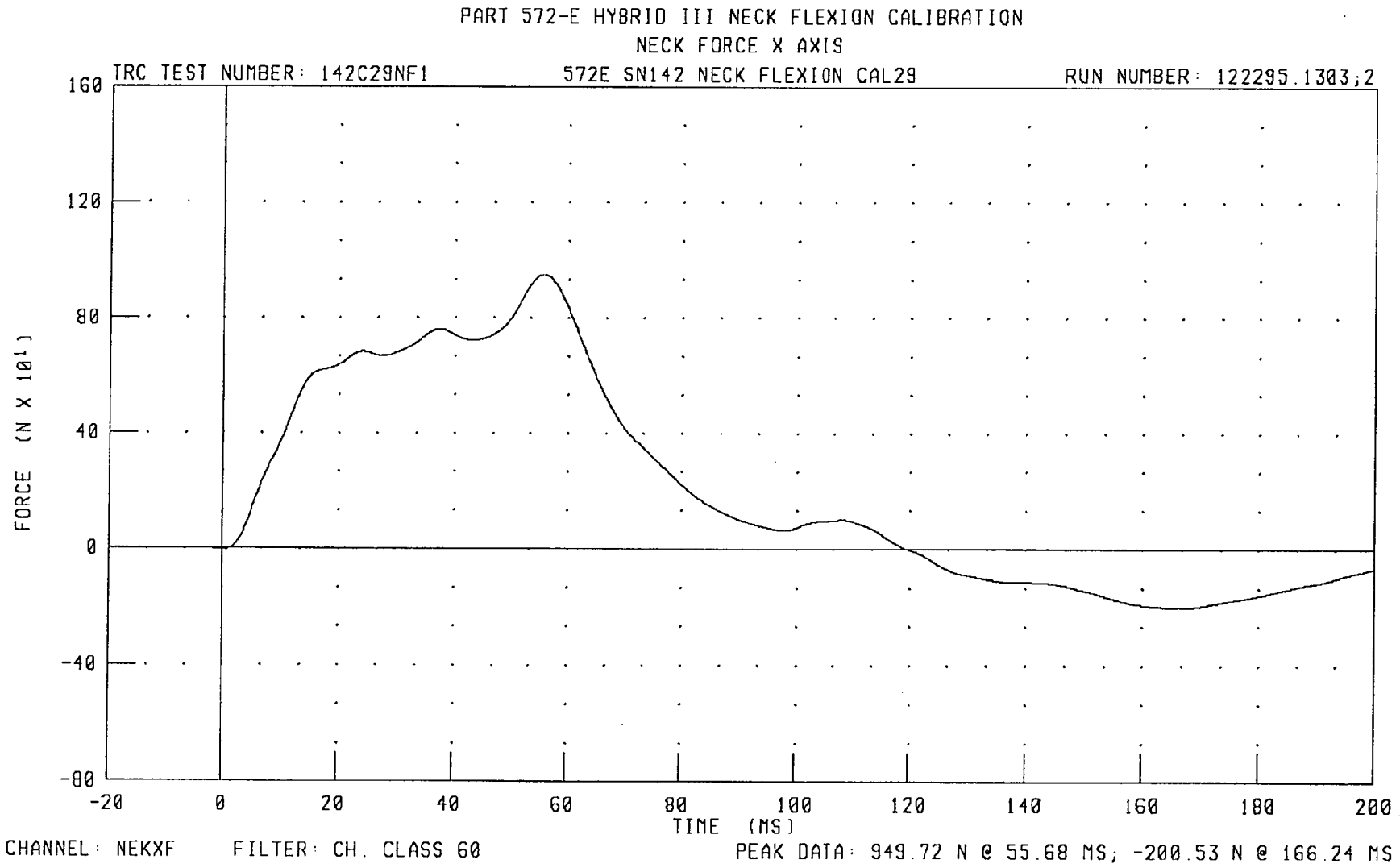

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 142C29NF1
572E SN142 NECK FLEXION CAL29
RUN NUMBER: 122295.1303;2
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 39.68 ° @ 55.68 MS; -30.22 ° @ 174.08 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

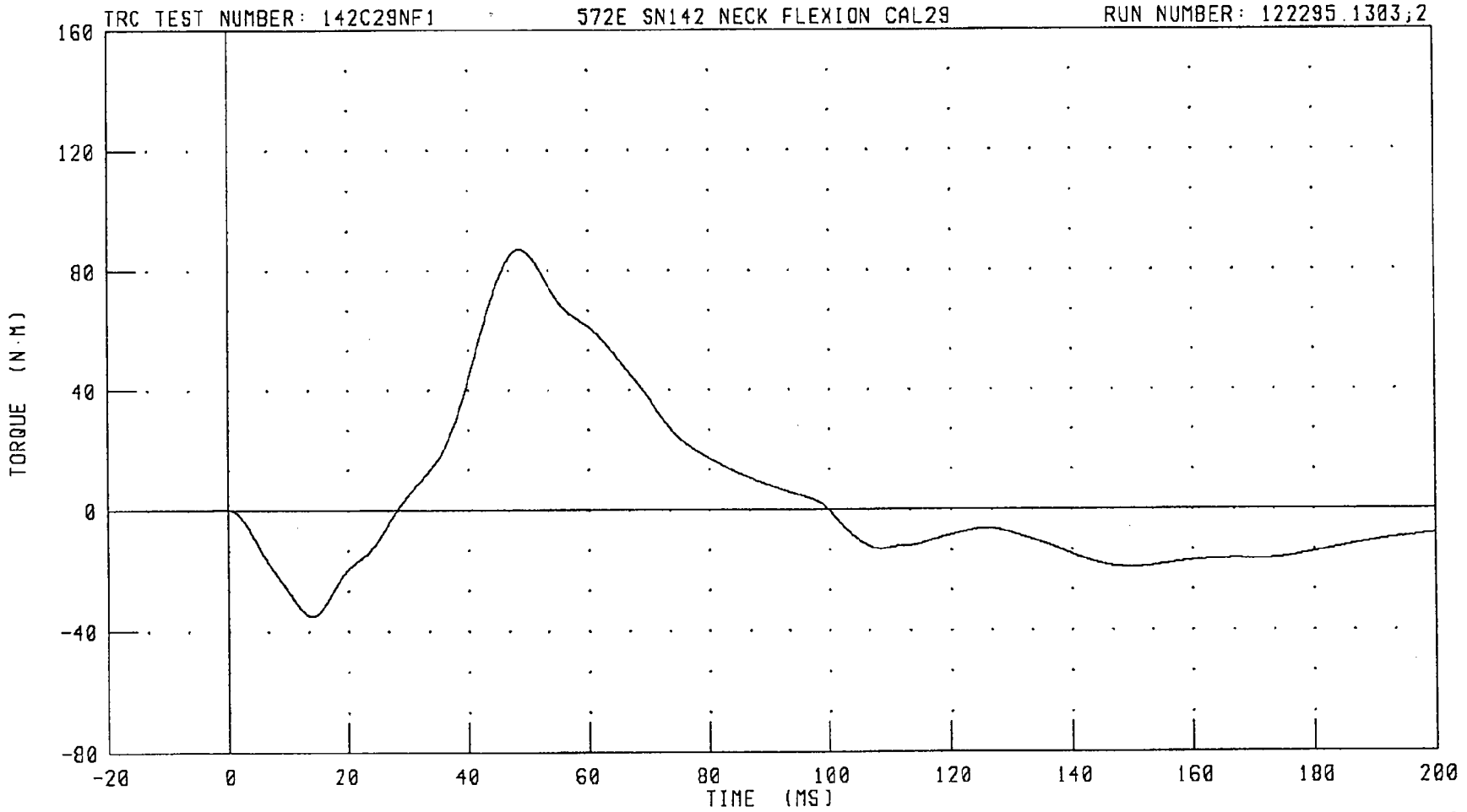
TRC TEST NUMBER: 142C29NF1 572E SN142 NECK FLEXION CAL29 RUN NUMBER: 122295.1303;2

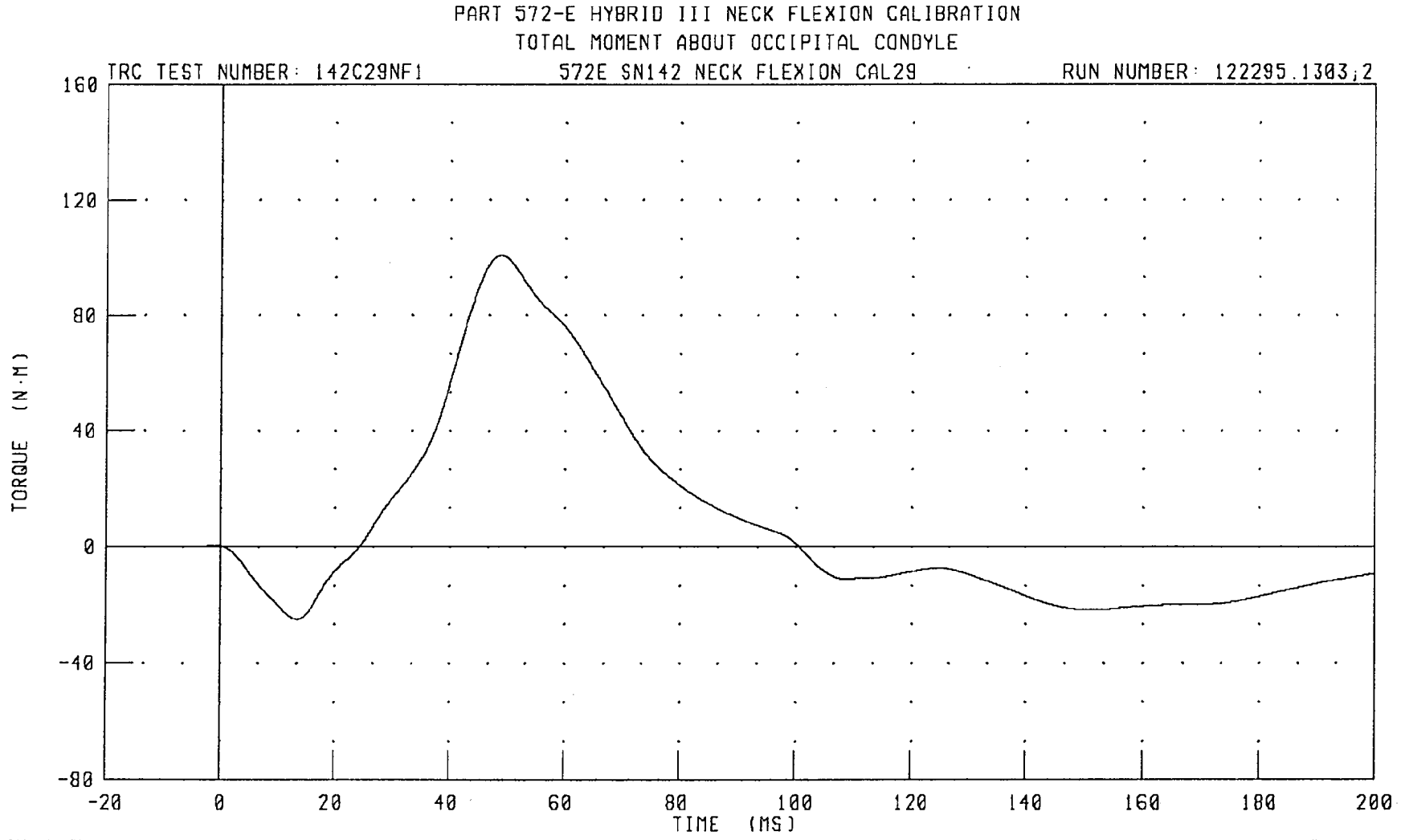


CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 72.21 ° @ 58.80 MS; -52.98 ° @ 170.72 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 142C29NF1
572E SN142 NECK FLEXION CAL29
RUN NUMBER: 122295.1303;2
160
120
80
40
0
-40
-80
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 949.72 N @ 55.68 MS; -200.53 N @ 166.24 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS




PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 142C29NF1
572E SN142 NECK FLEXION CAL29
RUN NUMBER: 122295.1303;2
160
120
80
40
0
-40
-80
TORQUE (N·M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 100.85 N·M @ 48.88 MS; -24.91 N·M @ 13.44 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III 07-NOV-95

TRC INC. TEST NO: 142C29NE1 572E SN142 NECK EXT. CAL29

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.13 G
	20 MS	14.00 - 19.00 G	16.85 G
	30 MS	11.00 - 16.00 G	13.23 G
MAX PENDULUM G		22 G MAX	18.56 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.19 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.76 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	96.63 DEG.
	TIME	72 - 82 MS	74.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-71.35 NM
	TIME	65 - 79 MS	69.92 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	152.16 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	136.72 MS

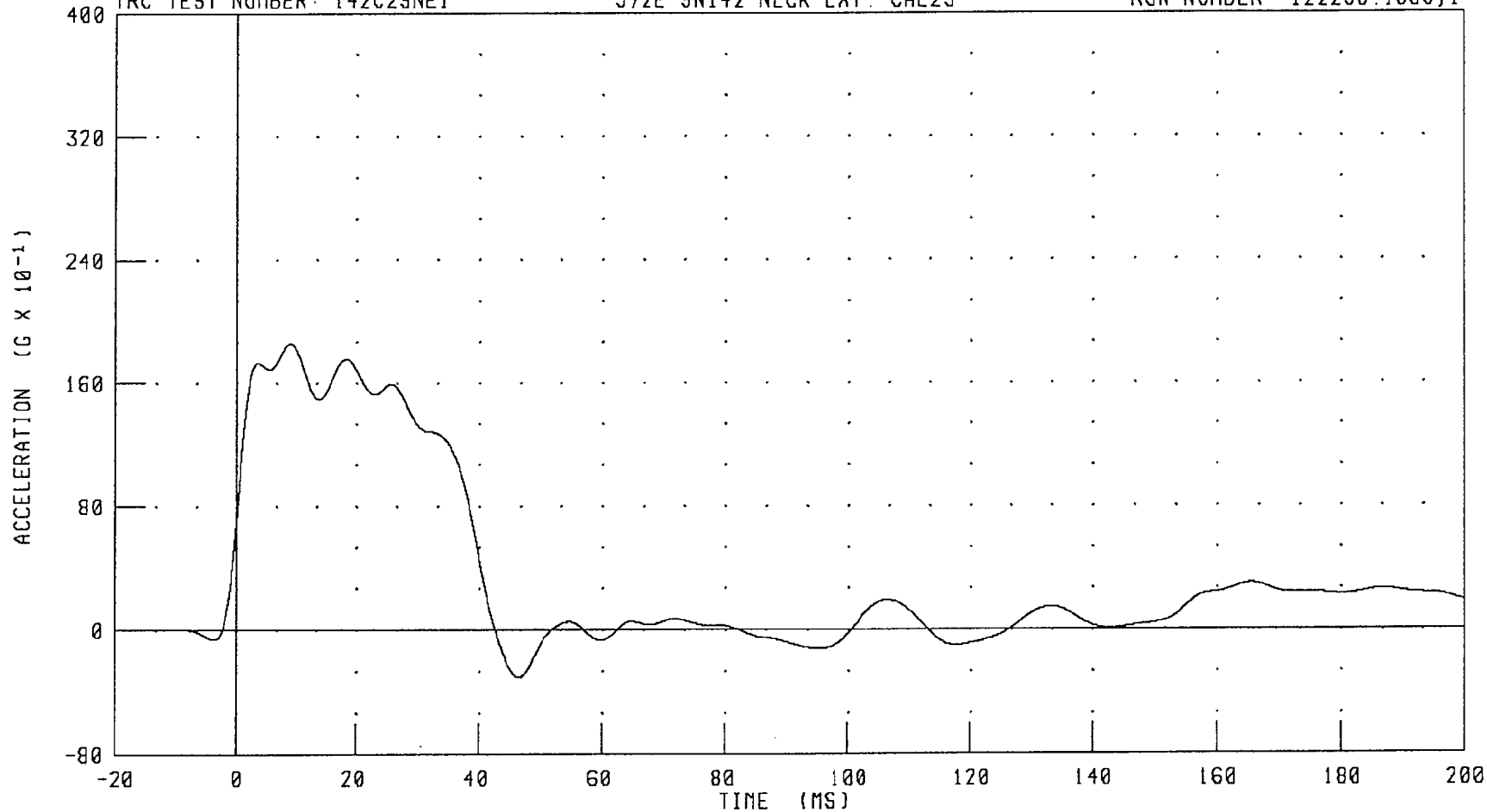
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet RUN NUMBER: 110795.1610;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

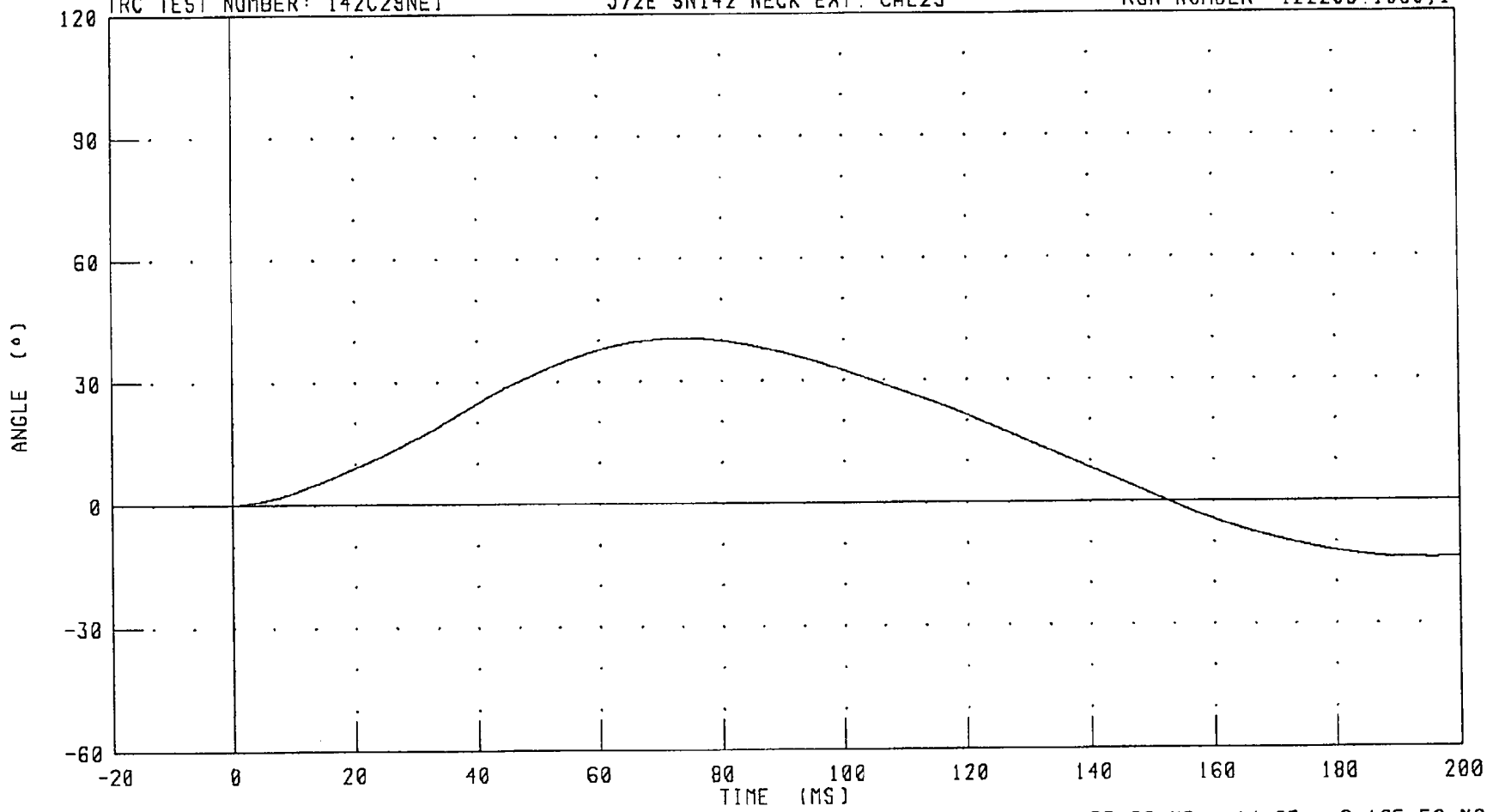
TRC TEST NUMBER: 142C29NE1 572E SN142 NECK EXT. CAL29 RUN NUMBER: 122295.1303;1



CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 18.56 G @ 8.96 MS; -3.06 G @ 46.48 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 142C29NE1 572E SN142 NECK EXT. CAL29 RUN NUMBER: 122295.1303;1

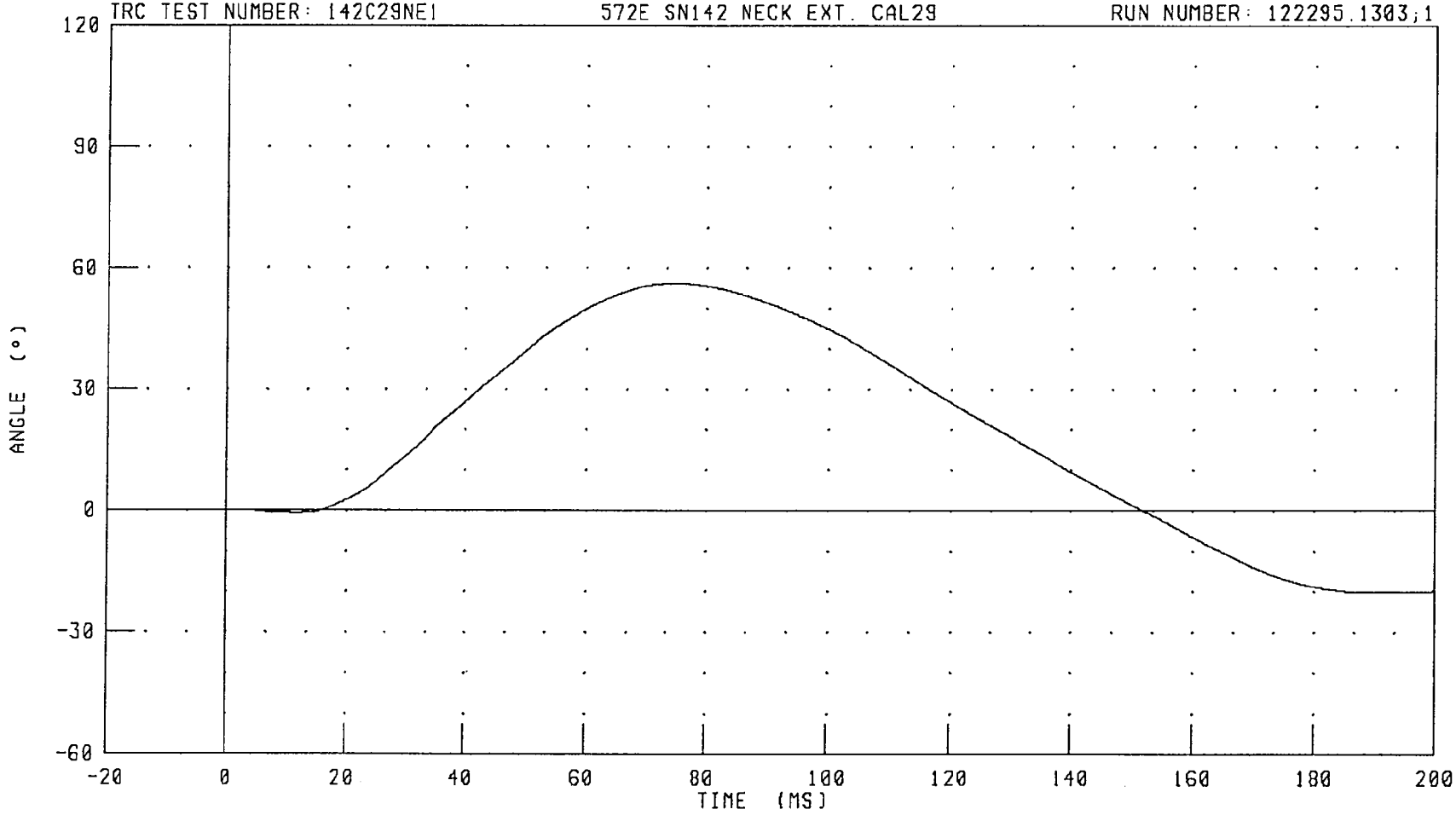


CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 40.52 ° @ 73.36 MS; -14.05 ° @ 195.52 MS

951129

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

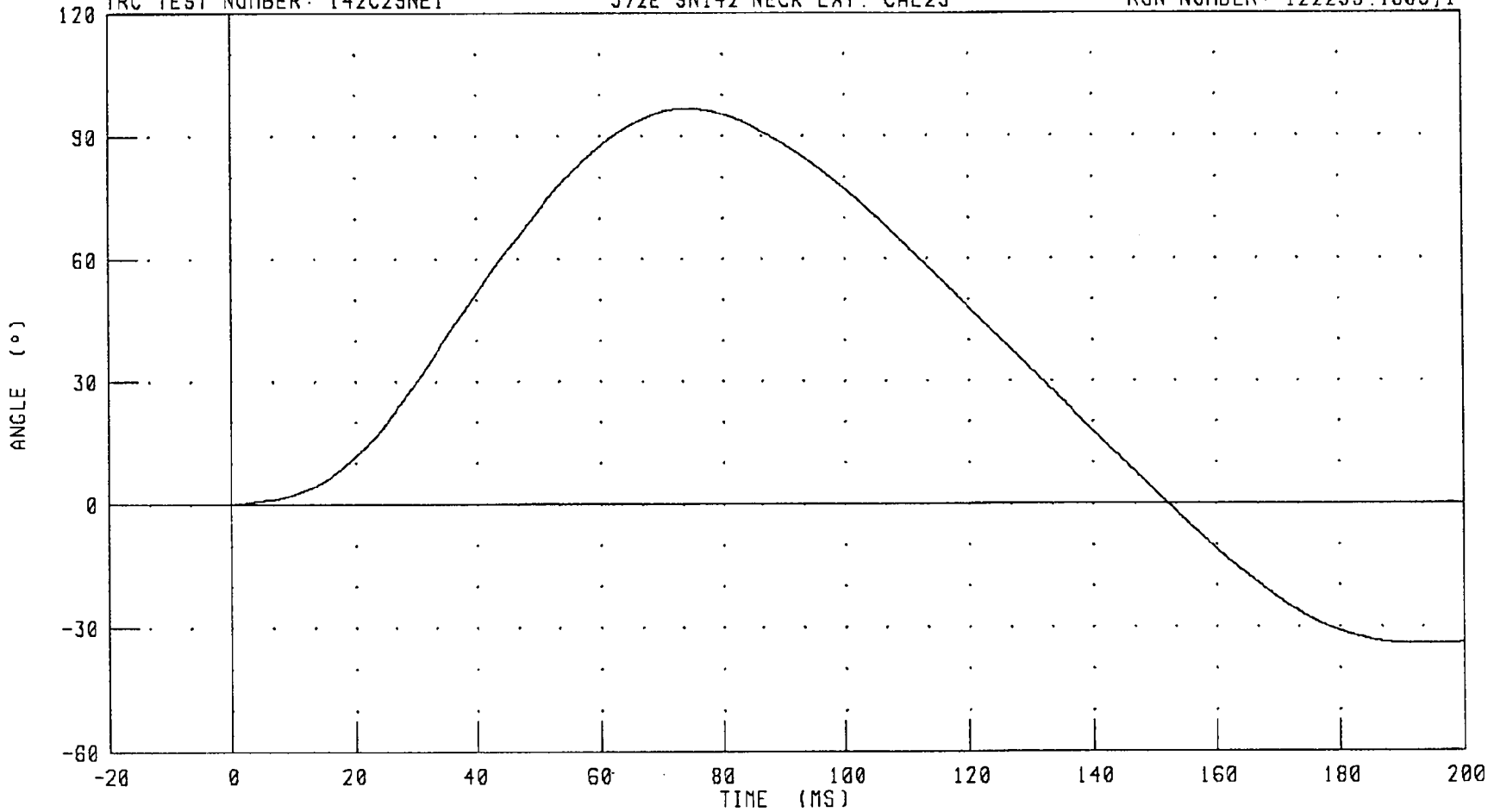
TRC TEST NUMBER: 142C29NE1 572E SN142 NECK EXT. CAL29 RUN NUMBER: 122295.1303;1



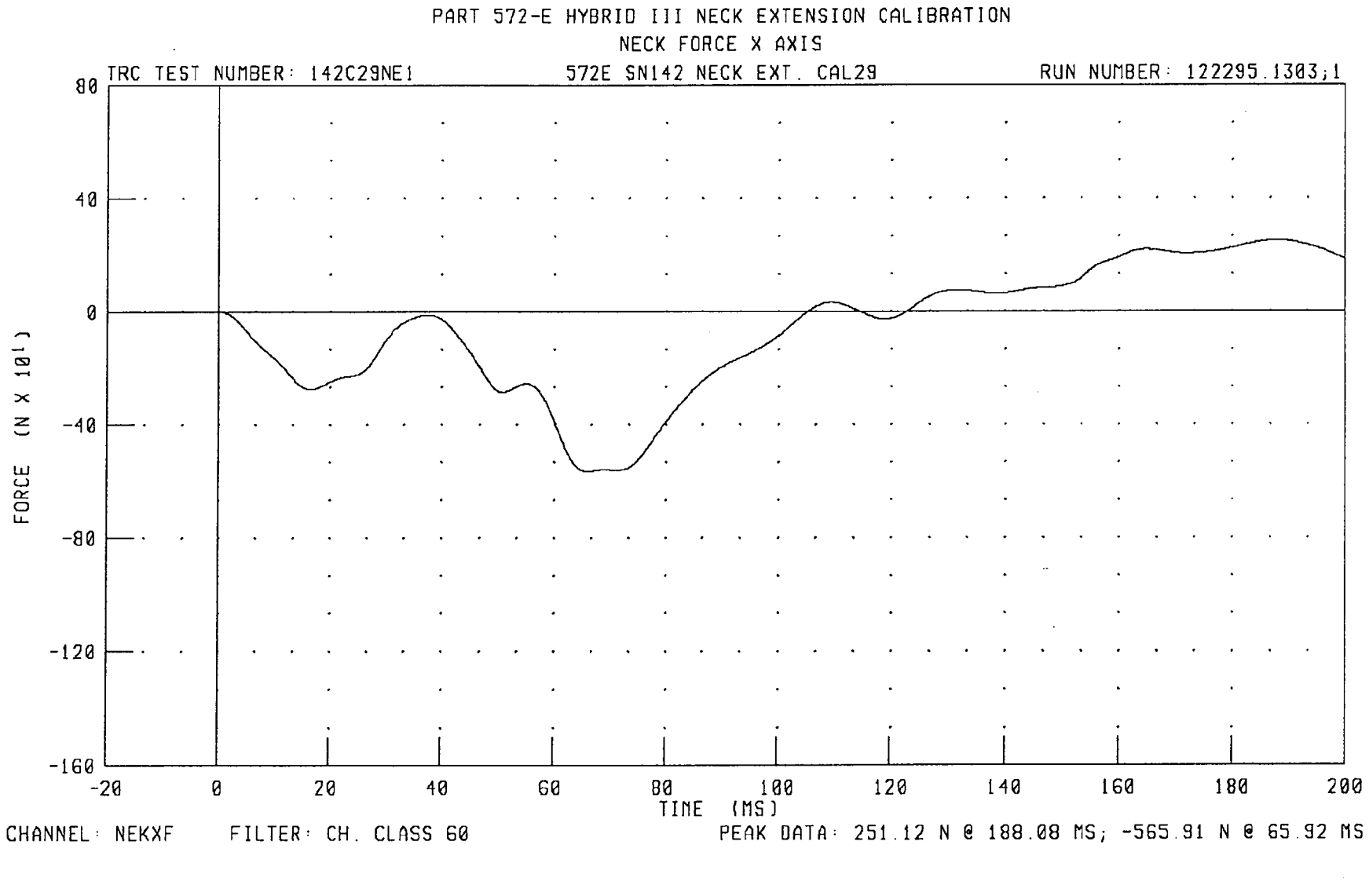
CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 56.13 ° @ 74.80 MS; -20.04 ° @ 188.16 MS

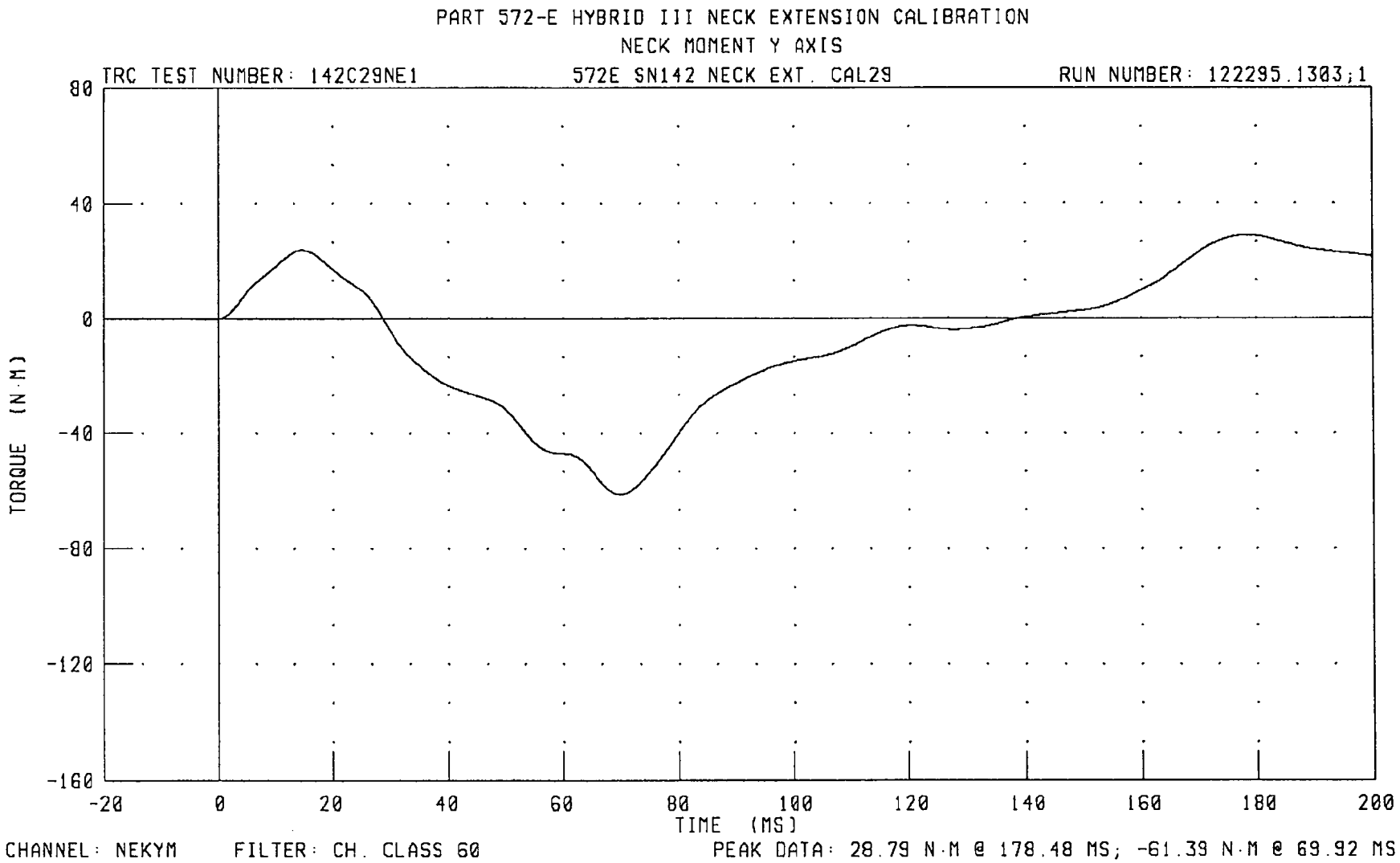
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION

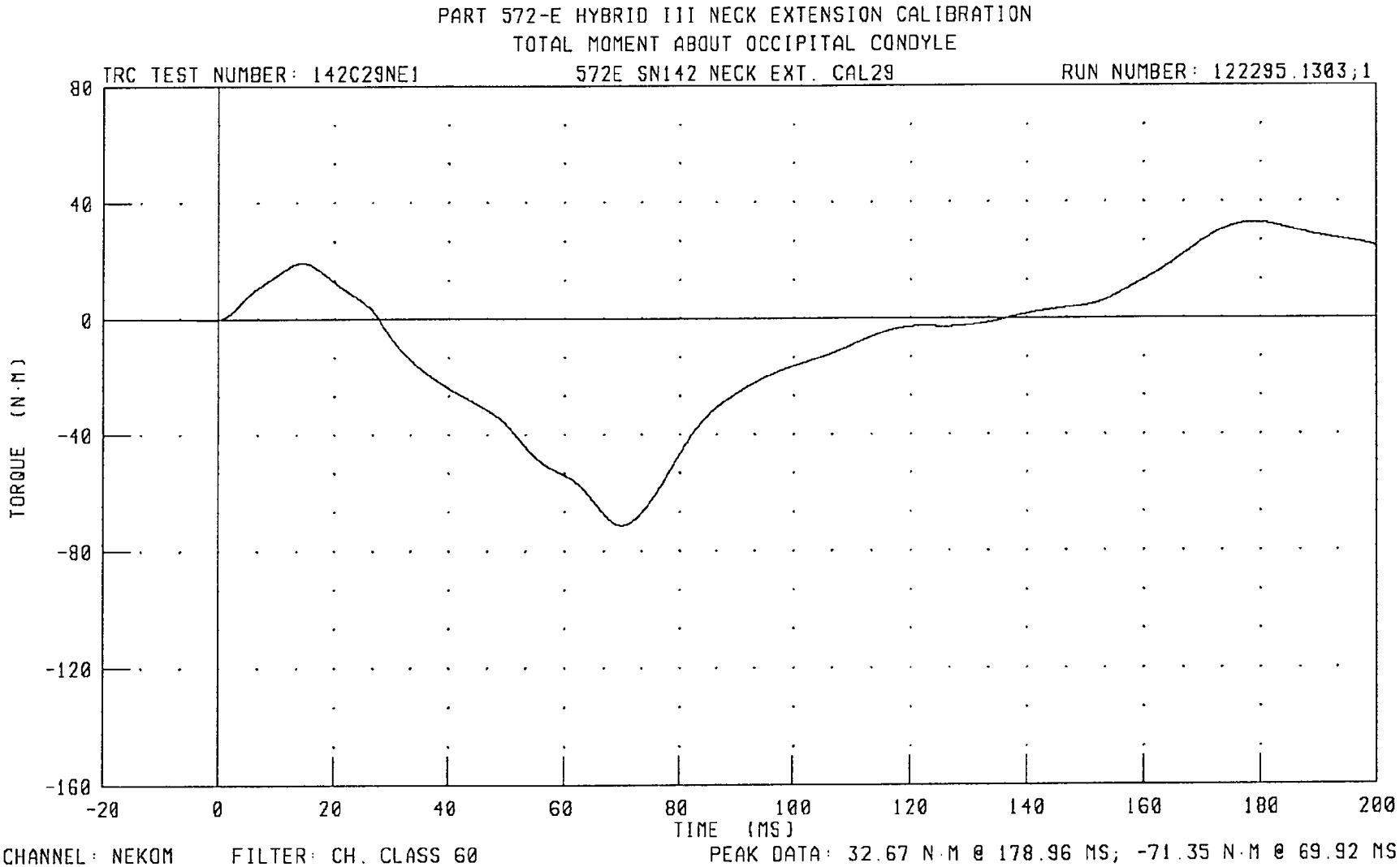
TRC TEST NUMBER: 142C29NE1 572E SN142 NECK EXT. CAL29 RUN NUMBER: 122295.1303;1



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 96.63 ° @ 74.00 MS; -34.09 ° @ 196.08 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 142C29NE1
572E SN142 NECK EXT. CAL29
RUN NUMBER: 122295.1303;1
80
40
0
-40
-80
-120
-160
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 251.12 N @ 188.08 MS; -565.91 N @ 65.92 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 142C29NE1
572E SN142 NECK EXT. CAL29
RUN NUMBER: 122295.1303;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 28.79 N-M @ 178.48 MS; -61.39 N-M @ 69.92 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 142C29NE1
572E SN142 NECK EXT. CAL29
RUN NUMBER: 122295.1303;1
80
40
0
-40
-80
-120
-160
TORQUE (N·M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 32.67 N·M @ 178.96 MS; -71.35 N·M @ 69.92 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

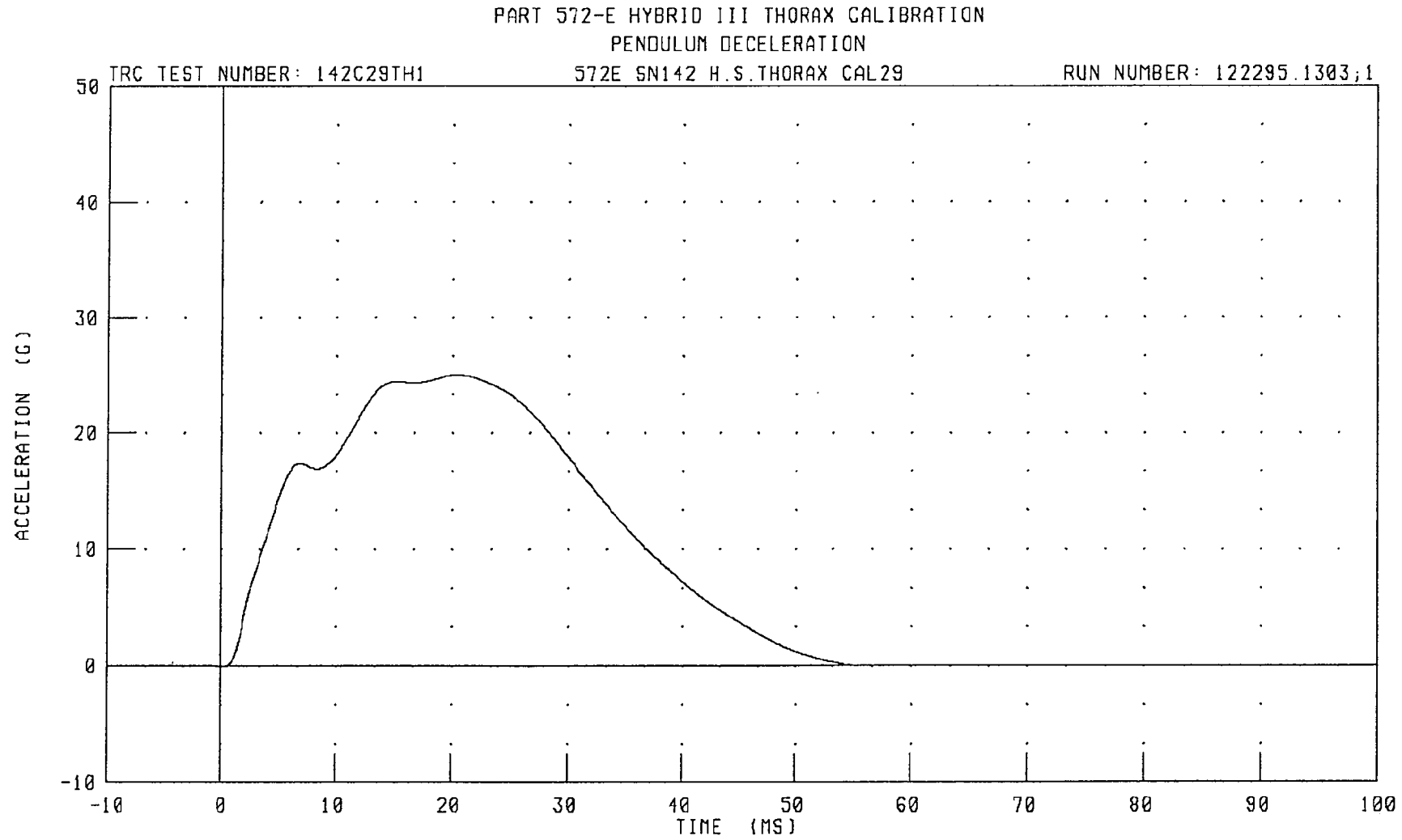
HYBRID III 08-NOV-95

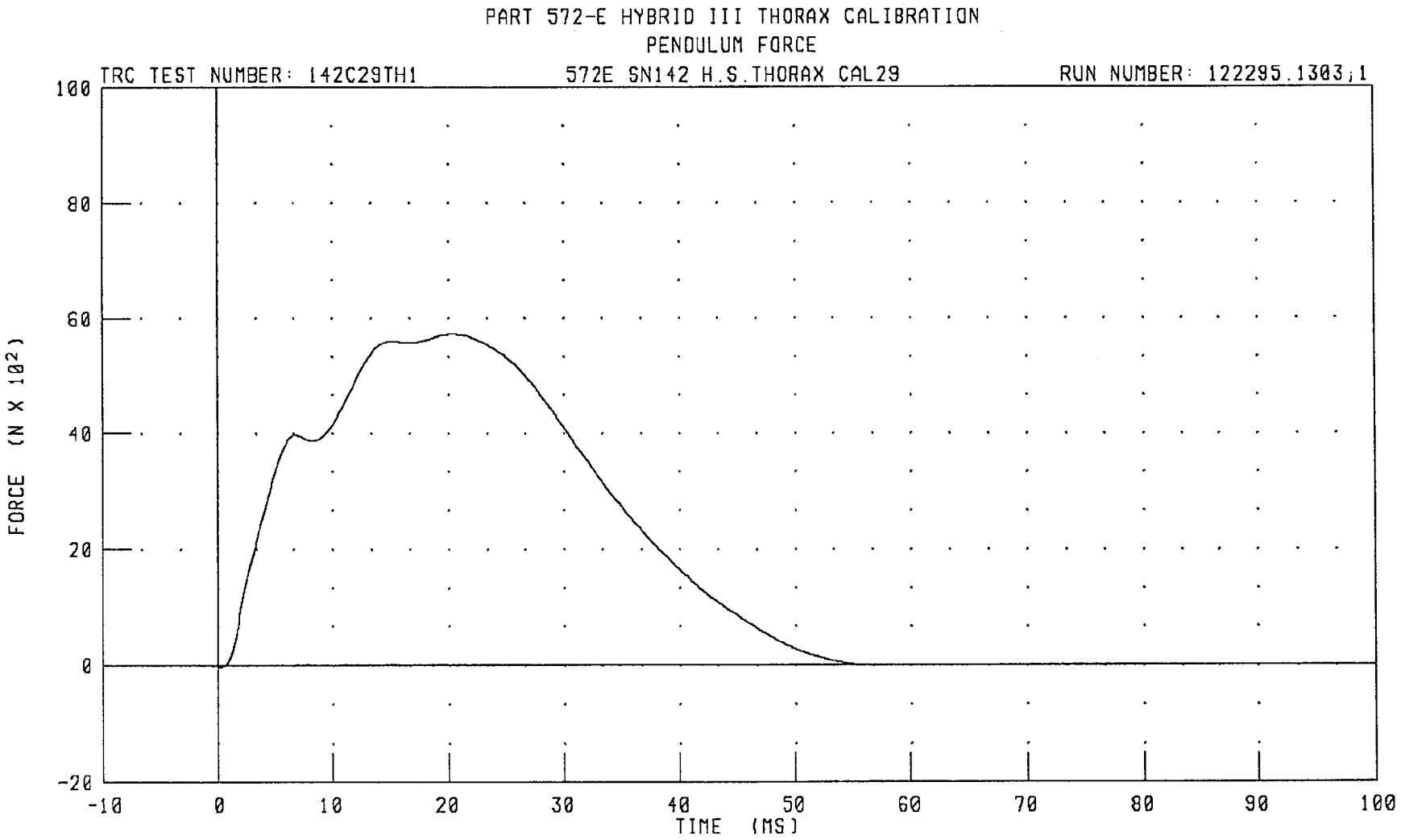
TRC INC. TEST NO: 142C29TH1 572E SN142 H.S.THORAX CAL29

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	38.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5724. N
INTERNAL HYSTERESIS	69% - 85%	73.8%

TEST MEETS SPECIFICATIONS

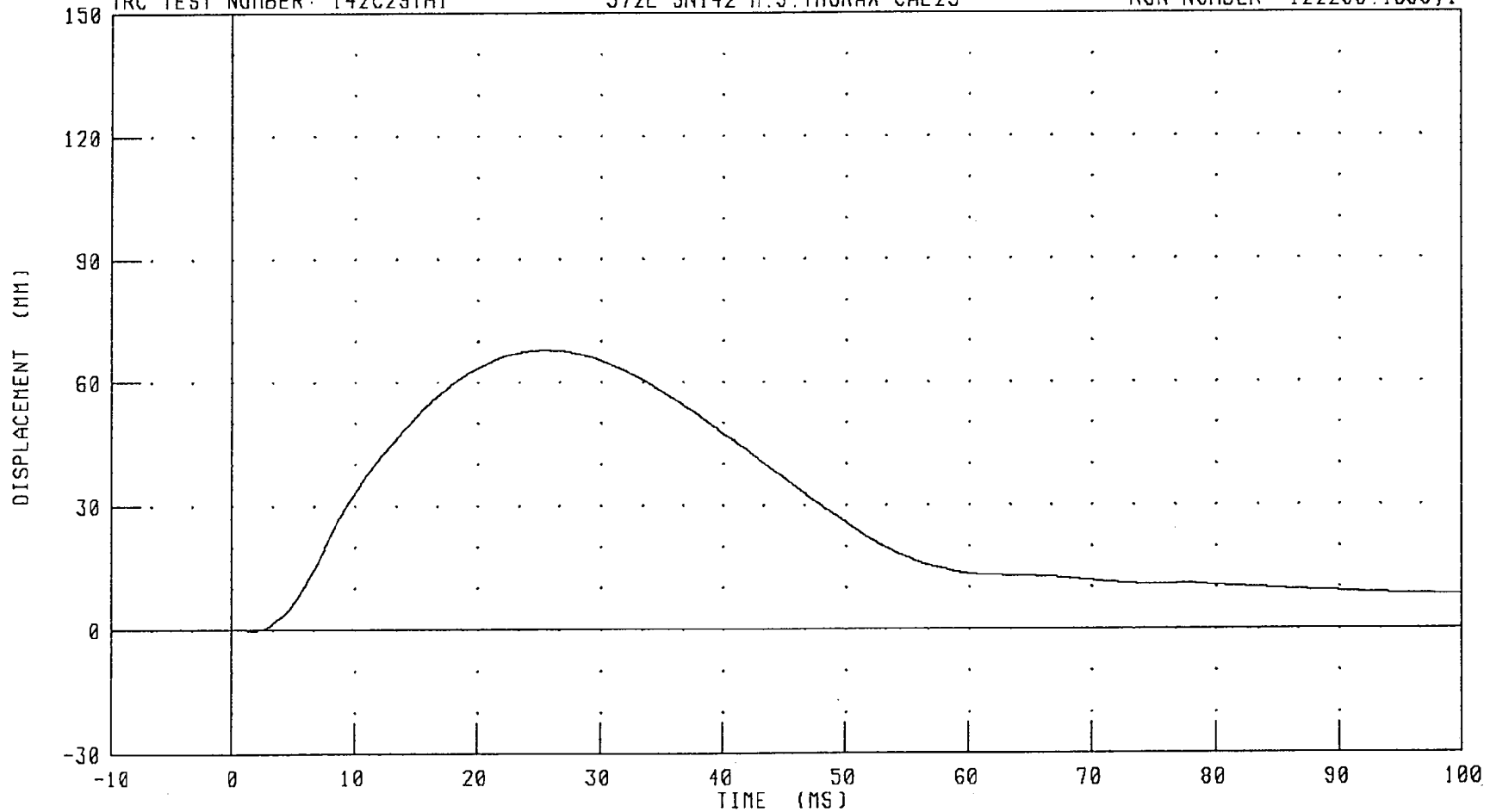
TECHNICIAN Chas Middlz RUN NUMBER: 110895.0740;1


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 142C29TH1
572E SN142 H.S.THORAX CAL29
RUN NUMBER: 122295.1303;1
ACCELERATION (G)
50
40
30
20
10
0
-10
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 24.99 G @ 20.40 MS; -0.10 G @ 0.24 MS


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 142C29TH1
572E SN142 H.S.THORAX CAL29
RUN NUMBER: 122295.1303;1
FORCE (N X 10²)
100
80
60
40
20
0
-20
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5724.19 N @ 20.40 MS; -22.28 N @ 0.24 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

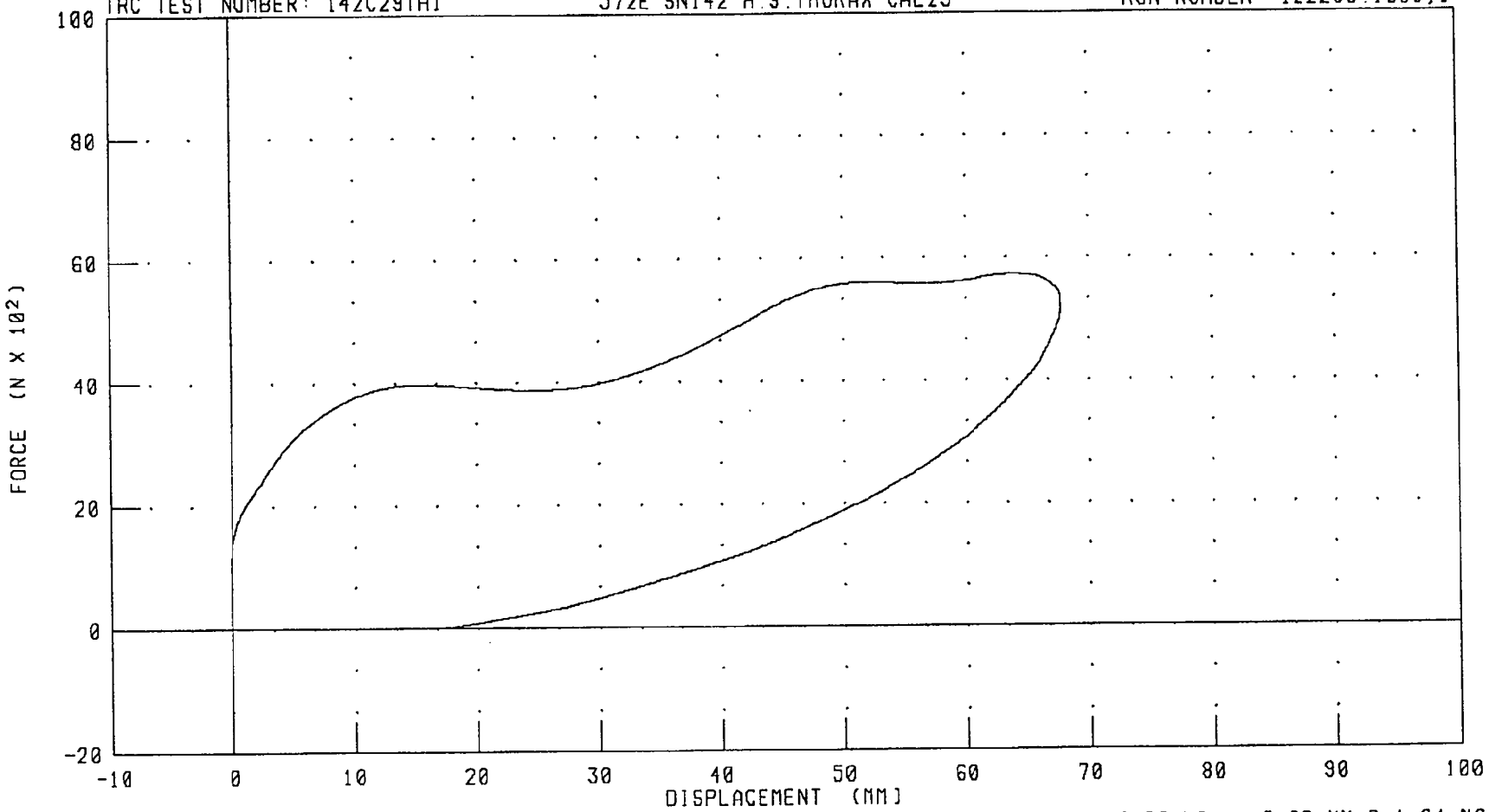
TRC TEST NUMBER: 142C29TH1 572E SN142 H.S.THORAX CAL29 RUN NUMBER: 122295.1303;1



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 67.78 MM @ 25.28 MS; -0.08 MM @ 1.84 MS

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

TRC TEST NUMBER: 142C29TH1 572E SN142 H.S.THORAX CAL29 RUN NUMBER: 122295.1303;1



CHANNEL: CSTXD FILTER: CH. CLASS 180
PENXF CH. CLASS 180

PEAK DATA: 67.78 MM @ 25.28 MS; -0.08 MM @ 1.84 MS
5724.19 N @ 20.40 MS; -22.28 N @ 0.24 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

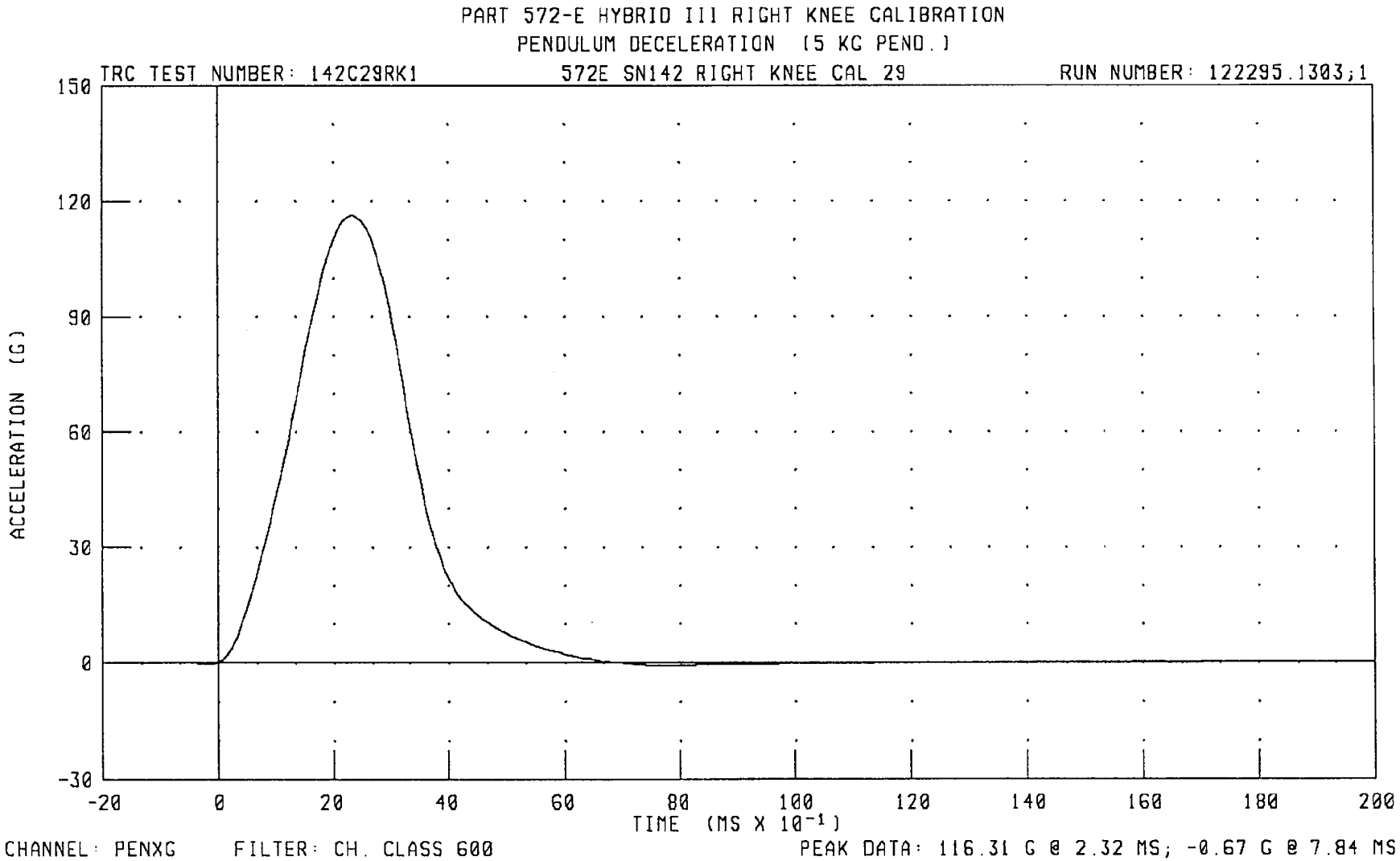
07-NOV-95

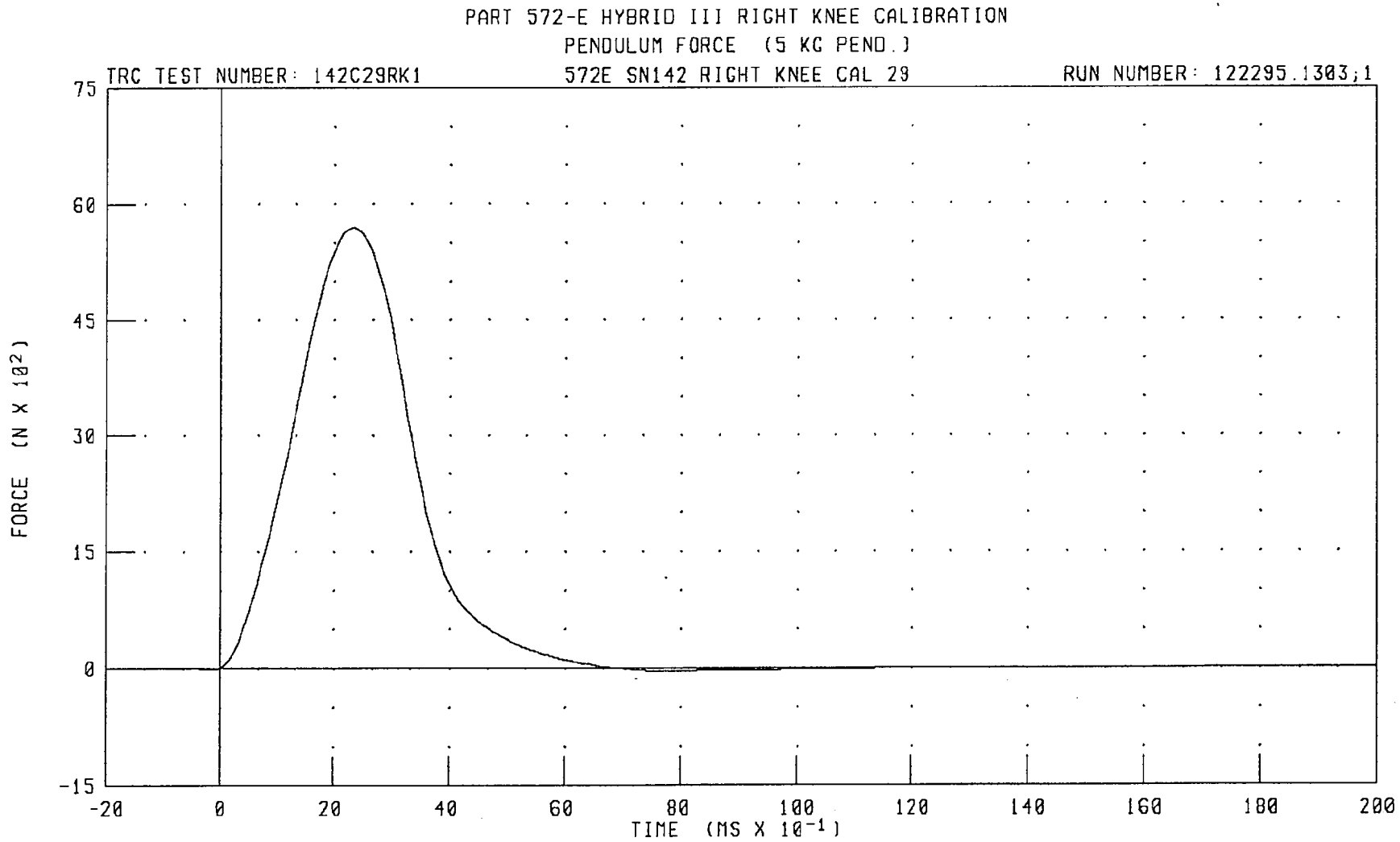
TRC INC. TEST NO: 142C29RK1 572E SN142 RIGHT KNEE CAL 29

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5691.0 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet RUN NUMBER: 110795.1300;1


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 142C29RK1
572E SN142 RIGHT KNEE CAL 29
RUN NUMBER: 122295.1303;1
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 116.31 G @ 2.32 MS; -0.67 G @ 7.84 MS


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 142C29RK1
572E SN142 RIGHT KNEE CAL 29
RUN NUMBER: 122295.1303;1
75
60
45
30
15
0
-15
FORCE (N X 10²)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 5691.03 N @ 2.32 MS; -33.01 N @ 7.84 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 07-NOV-95

TRC INC. TEST NO: 142C29LK1 572E SN142 LEFT KNEE CAL 29

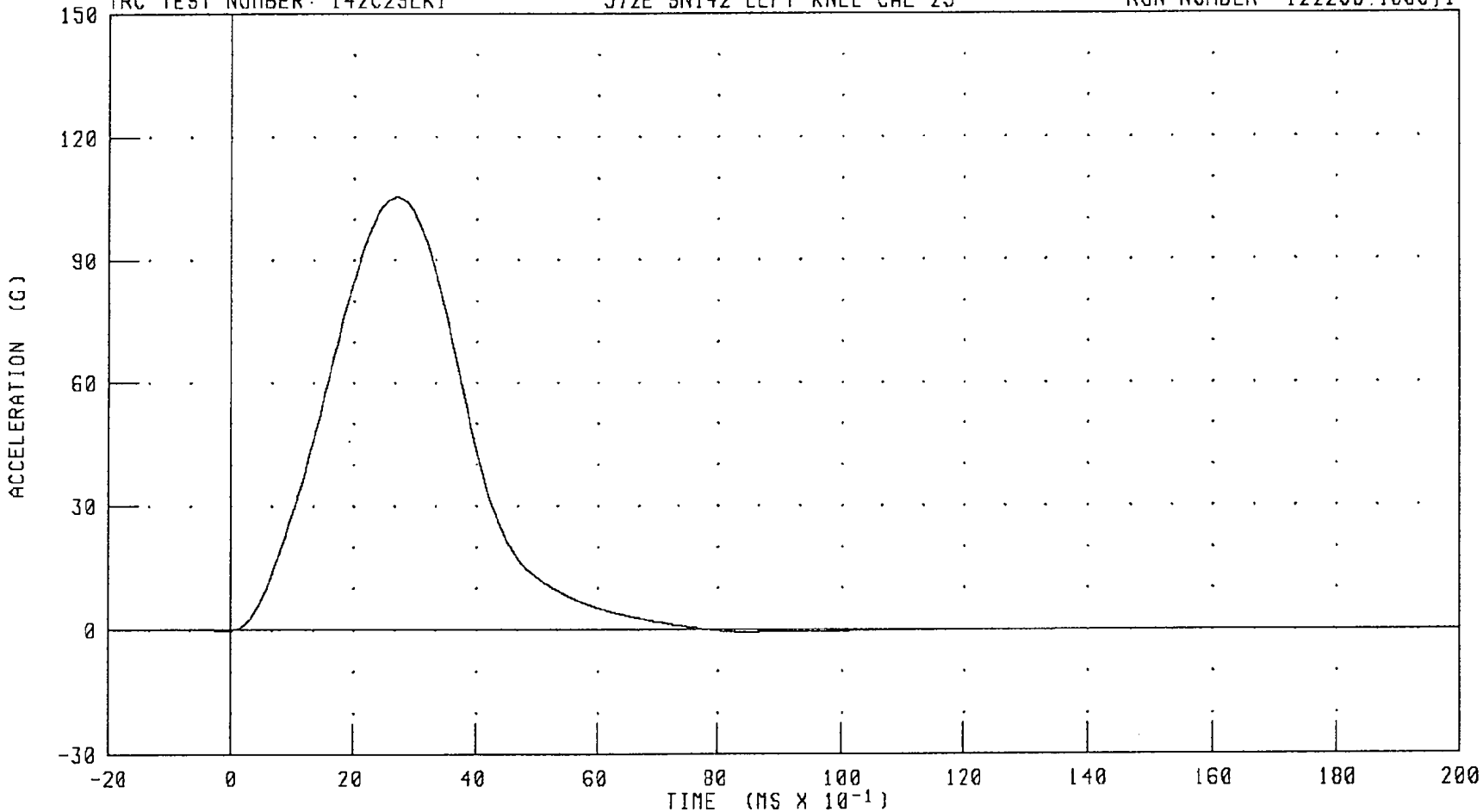
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5157.4 N

TEST MEETS SPECIFICATIONS

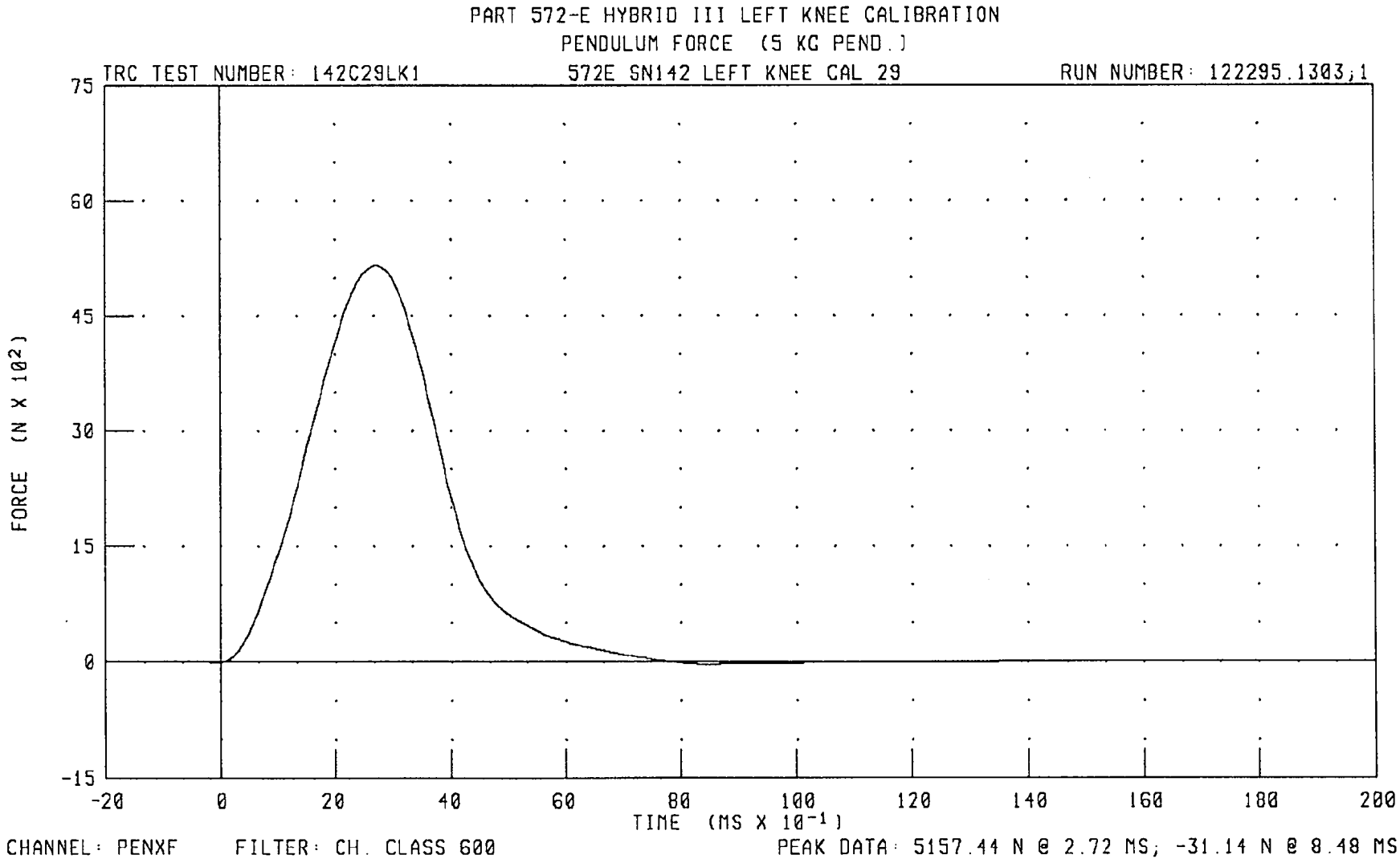
TECHNICIAN Chas. Mallett RUN NUMBER: 110795.1255;1

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

TRC TEST NUMBER: 142C29LK1 572E SN142 LEFT KNEE CAL 29 RUN NUMBER: 122295.1303;1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 105.41 G @ 2.72 MS; -0.64 G @ 8.48 MS


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 142C29LK1
572E SN142 LEFT KNEE CAL 29
RUN NUMBER: 122295.1303;1
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 5157.44 N @ 2.72 MS; -31.14 N @ 8.48 MS

Appendix D

Miscellaneous Test Information

Dummy Instrument Calibrations
Driver Dummy #192

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Head X-axis accelerometer	AAL82	7264	Endevco	08/30/95	03/01/96
Head X-axis accelerometer-redundant	AJ8J7	7264	Endevco	08/30/95	03/01/96
Head Y-axis accelerometer	A84JJ	7264	Endevco	08/30/95	03/01/96
Head Y-axis accelerometer-redundant	AJ8A6	7264	Endevco	08/30/95	03/01/96
Head Z-axis accelerometer	FH87J	7264	Endevco	08/07/95	03/07/96
Head Z-axis accelerometer-redundant	AC8W6	7264	Endevco	08/30/95	03/01/96
Chest X-axis accelerometer	CT22H	7264	Endevco	08/30/95	03/01/96
Chest X-axis accelerometer-redundant	A79GJ	7264	Endevco	08/30/95	03/01/96
Chest Y-axis accelerometer	AC708	7264	Endevco	08/30/95	03/01/96
Chest Y-axis accelerometer-redundant	AGR69	7264	Endevco	08/30/95	03/01/96
Chest Z-axis accelerometer	CW59H	7264	Endevco	08/30/95	03/01/96
Chest Z-axis accelerometer-redundant	DB74H	7264	Endevco	08/30/95	03/01/96
Left femur force load cell	986	2430	GSE	08/30/95	03/01/96
Right femur force load cell	987	2430	GSE	08/30/95	03/01/96
Neck X-axis force load cell[1]	85	1716	Denton	08/30/95	03/01/96
Neck Y-axis force load cell[1]	85	1716	Denton	08/30/95	03/01/96
Neck Z-axis force load cell[1]	85	1716	Denton	08/30/95	03/01/96
Neck Moment about X-axis load cell[1]	85	1716	Denton	08/30/95	03/01/96
Neck Moment about Y-axis load cell[1]	85	1716	Denton	08/30/95	03/01/96
Neck Moment about Z-axis load cell[1]	85	1716	Denton	08/30/95	03/01/96
Pelvis X-axis accelerometer	AJ694	7264	Endevco	08/30/95	03/01/96
Pelvis Y-axis accelerometer	AJ656	7264	Endevco	08/30/95	03/01/96
Pelvis Z-axis accelerometer	AJ788	7264	Endevco	08/30/95	03/01/96
Chest deflection potentiometer	87313-96	14CB1-2981	Vernitech	08/30/95	03/01/96
Lap belt force load cell	249	3419	Lebow	07/14/95	01/14/96
Shoulder belt force load cell	615	3419	Lebow	07/14/95	01/14/96

[1] Hybrid III use only.

Dummy Instrument Calibrations, Cont'd.
Driver Dummy #192

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Left upper tibia moment about X-axis load cell	46	1583	Denton	10/03/95	04/03/96
Left upper tibia moment about Y-axis load cell	46	1583	Denton	10/03/95	04/03/96
Right upper tibia moment about X-axis load cell	35	1583	Denton	10/03/95	04/03/96
Right upper tibia moment about Y-axis load cell	35	1583	Denton	10/03/95	04/03/96
Left Lower tibia X-axis force load cell	42	1584	Denton	10/03/95	04/03/96
Left Lower tibia Z-axis force load cell	42	1584	Denton	10/03/95	04/03/96
Left Lower tibia moment about Y-axis load cell	42	1584	Denton	10/03/95	04/03/96
Right Lower tibia X-axis force load cell	39	1584	Denton	10/03/95	04/03/96
Right Lower tibia Z-axis force load cell	39	1584	Denton	10/03/95	04/03/96
Right Lower tibia moment about Y-axis load cell	39	1584	Denton	10/03/95	04/03/96
Left foot X-axis accelerometer	10073	7264	Endevco	10/17/95	04/17/96
Left foot heel Z-axis accelerometer	10263	7264	Endevco	10/31/95	05/11/96
Left foot toe Z-axis accelerometer	10101	7264	Endevco	10/17/95	04/17/96
Right foot X-axis accelerometer	APYT4	7264	Endevco	10/17/95	04/17/96
Right foot heel Z-axis accelerometer	APOR8	7264	Endevco	10/17/95	04/17/96
Right foot toe Z-axis accelerometer	10076	7264	Endevco	10/16/95	04/16/96

Dummy Instrument Calibrations
Right Front Passenger Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Head X-axis accelerometer	A74JJ	7264	Endevco	09/01/95	03/01/96
Head X-axis accelerometer-redundant	AC8L5	7264	Endevco	09/01/95	03/01/96
Head Y-axis accelerometer	ACCR7	7264	Endevco	09/01/95	03/01/96
Head Y-axis accelerometer-redundant	AC872	7264	Endevco	09/01/95	03/01/96
Head Z-axis accelerometer	ACCJ1	7264	Endevco	09/01/95	03/01/96
Head Z-axis accelerometer-redundant	A68JJ	7264	Endevco	09/01/95	03/01/96
Chest X-axis accelerometer	AC721	7264	Endevco	09/01/95	03/01/96
Chest X-axis accelerometer-redundant	A65JJ	7264	Endevco	09/01/95	03/01/96
Chest Y-axis accelerometer	CY47H	7264	Endevco	09/01/95	03/01/96
Chest Y-axis accelerometer-redundant	FH14J	7264	Endevco	09/01/95	03/01/96
Chest Z-axis accelerometer	AAL44	7264	Endevco	09/01/95	03/01/96
Chest Z-axis accelerometer-redundant	AC745	7264	Endevco	09/01/95	03/01/96
Left femur force load cell	903	2430	GSE	09/01/95	03/01/96
Right femur force load cell	904	2430	GSE	09/01/95	03/01/96
Neck X-axis force load cell[1]	280	1716	Denton	09/01/95	03/01/96
Neck Y-axis force load cell[1]	280	1716	Denton	09/01/95	03/01/96
Neck Z-axis force load cell[1]	280	1716	Denton	09/01/95	03/01/96
Neck Moment about X-axis load cell[1]	280	1716	Denton	09/01/95	03/01/96
Neck Moment about Y-axis load cell[1]	280	1716	Denton	09/01/95	03/01/96
Neck Moment about Z-axis load cell[1]	280	1716	Denton	09/01/95	03/01/96
Pelvis X-axis accelerometer	CY63H	7264	Endevco	09/01/95	03/01/96
Pelvis Y-axis accelerometer	AMWA9	7264	Endevco	09/01/95	03/01/96
Pelvis Z-axis accelerometer	ANA55	7264	Endevco	09/01/95	03/01/96
Chest deflection potentiometer[1]	142	14CB1-2981	Servo	09/01/95	03/01/96
Lap belt force load cell	130	3419	Lebow	11/21/95	05/21/96
Shoulder belt force load cell	613	3419	Lebow	11/21/95	05/21/96

[1] Hybrid III use only.

Dummy Instrument Calibrations
Right Front Passenger Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Left foot X-axis accelerometer	APOA1	7264	Endevco	10/16/95	04/16/96
Left foot heel Z-axis accelerometer	10102	7264	Endevco	10/16/95	04/16/96
Left foot toe Z-axis accelerometer	10074	7264	Endevco	10/16/95	04/16/96
Right foot X-axis accelerometer	10088	7264	Endevco	10/16/95	04/16/96
Right foot heel Z-axis accelerometer	10089	7264	Endevco	10/16/95	04/16/96
Right foot toe Z-axis accelerometer	10087	7264	Endevco	10/17/95	04/17/96

Vehicle and Calibration Laboratory Instrument Calibrations

Vehicle Accelerometers

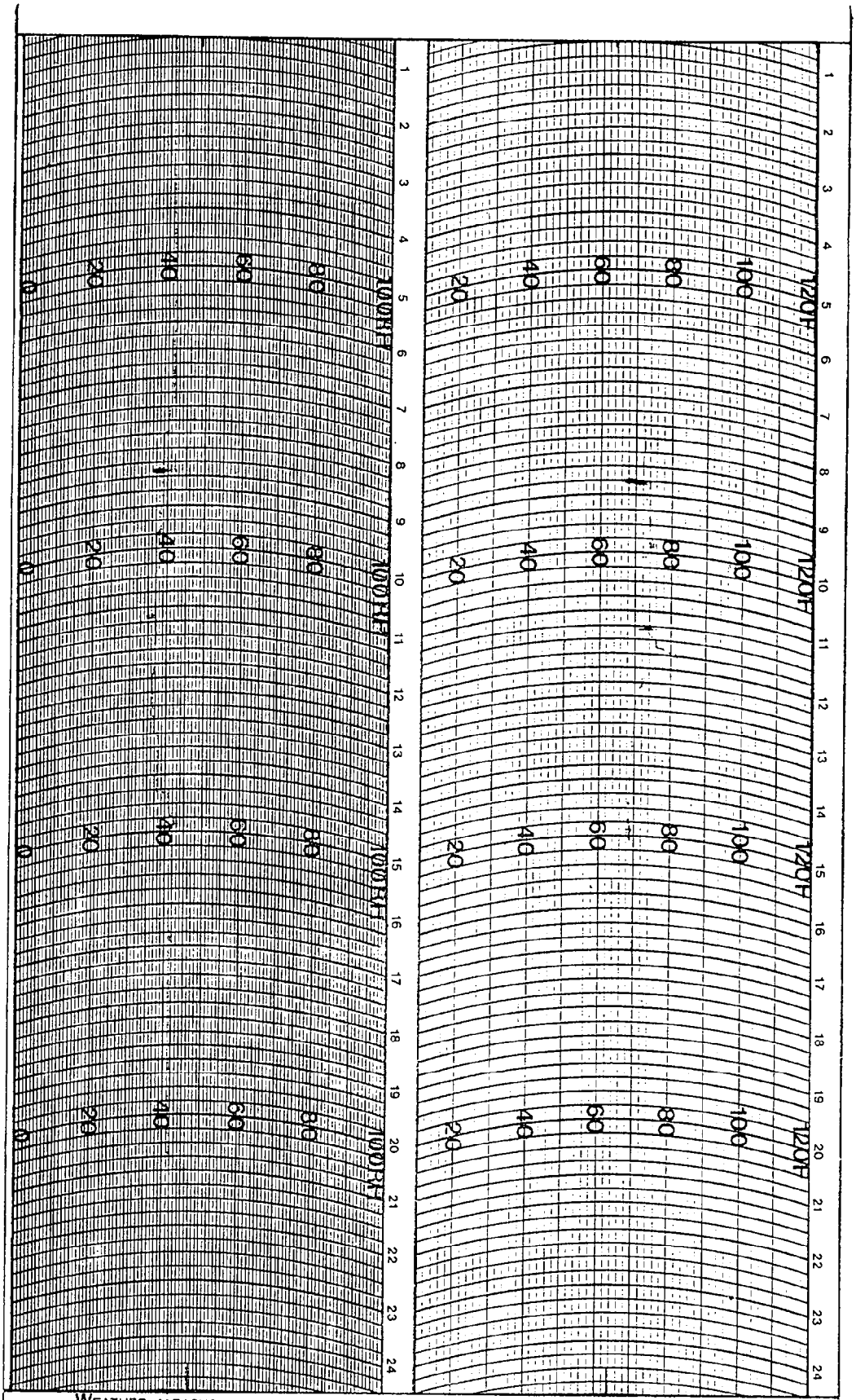
	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Left rear seat crossmember X-axis	DY16J	7264	Endevco	10/13/95	04/13/96
Left rear seat crossmember X-axis redundant	ANA36	7264	Endevco	09/07/95	03/07/96
Right rear seat crossmember X-axis	CY78H	7264	Endevco	11/09/95	05/09/96
Right rear seat crossmember X-axis redundant	10079	7264	Endevco	10/17/95	04/17/96
Engine top X-axis	DA99H	7264	Endevco	11/02/95	05/02/96
Engine bottom X-axis	10237	7264	Endevco	10/31/95	05/01/96
Right brake caliper X-axis	AGRF1	7264	Endevco	09/07/95	03/07/96
Left brake caliper X-axis	AGR75	7264	Endevco	10/05/95	04/05/96
Instrument panel center X-axis	10232	7264	Endevco	10/31/95	05/01/96

Calibration Laboratory Instruments

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Neck bending pendulum accelerometer	CB27	7232	Endevco	09/19/95	03/19/96
Neck bending rotary potentiometer	NA	35435-1-102	Bournes	Mfr. Specification	
Neck bending linear potentiometer	NA	5184-2051846003	Bournes	09/19/95	03/19/96
Thorax/Hybrid II femur pendulum accelerometer	CC64	7232	Endevco	09/19/95	03/19/96
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	09/19/95	03/19/96
Abdomen compression force gauge	3443	3167	Lebow	09/19/95	03/19/96
Hybrid III femur pendulum accelerometer	CG83	7232	Endevco	09/19/95	03/19/96

Sign Convention
NHTSA Data Tape Reference Guide

Accelerometers:	+X: Forward	
	+Y: Leftward	
	+Z: Upward	
Potentiometers:	+Chest longitudinal deflection:	Outward
	+Chest lateral deflection:	Leftward
	+Seat belt displacement:	Outward
	+Seat belt extension:	Elongation
	+Knee slider displacement:	Distance between femur and tibia increased (in relation to a seated dummy)
Load cells:	+Femur force:	Tension
	+Seat belt force:	Tension
	+Barrier force:	Tension
Neck load cells:	+X force:	Head pushed forward
	+y force:	Head pushed leftward
	+Z force:	Head pulled upward (tension on neck)
	+X moment:	Right ear rotating toward right shoulder
	+Y moment:	Chin rotating toward chest
	+Z moment:	Chin rotating toward left shoulder
Tibia load cells:	+X force:	Tension
	+Y force:	Tension
	+Z force:	Tension
	+X moment:	Bottom of tibia moving leftward
	+Y moment:	Bottom of tibia moving rearward



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

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION 951129 DATE ON _____ DATE OFF _____

Appendix E

Restraint System Instructions from Owner's Manual

SEAT BELTS

Seat belt precautions

Lexus recommends that the driver and passengers in the vehicle be properly restrained at all times with the seat belts provided. Failure to do so could increase the chance of injury and/or the severity of injury in accidents.

Baby or small child. Use a child restraint system which fits your vehicle. See "Child restraint" for details.

Child. If a child is too large for a child restraint system, the child should sit in the rear seat and must be restrained using the vehicle's seat belts. According to accident statistics, the child is safer when properly restrained in the rear seat than in the front seat. Do not allow the child to stand up or kneel both on rear and front seats. If the shoulder belt falls across the child's neck or face, move the child to the center position and use the center lap belt.

Pregnant woman. Lexus recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

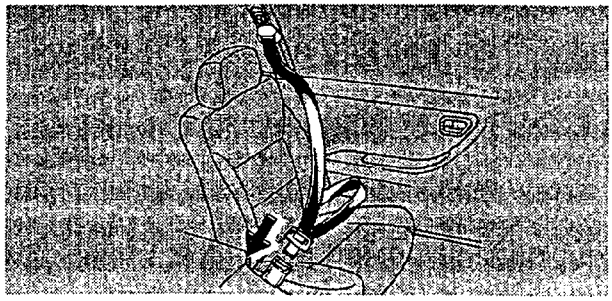
Injured person. Lexus recommends the use of a seat belt. Depending on the injury, however, first check with your doctor.

CAUTION:
Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury in the event of sudden braking or a collision.

When using the seat belts, observe the following:

- **Use the belt for only one person at a time. Do not use a single belt for two or more people – even children.**
- **Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (See "Adjusting seatback angle".)**
- **Be careful not to damage the belt webbing or hardware. Take care that they do not get caught or pinched in the seat or doors.**
- **Inspect the belt system periodically. Check for cuts, fraying, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.**
- **Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners – they may severely weaken the belts.**
- **Replace the belt assembly (including bolts) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.**

Front seat belts



Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

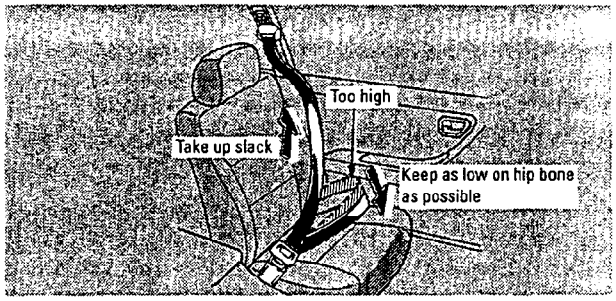
The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.

When a passenger's shoulder belt is completely extended and is then retracted even slightly, the belt is locked in that position and cannot be extended. This feature is used to hold the child restraint system securely. (For details, see "Child restraint" on page 66.) To free the belt again, fully retract the belt and then pull the belt out once more.

If the seat belt cannot be pulled out of the retractor, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.

CAUTION:

- **After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.**
- **Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.**
- **If the seat belt does not function normally, immediately contact your Lexus dealer.**

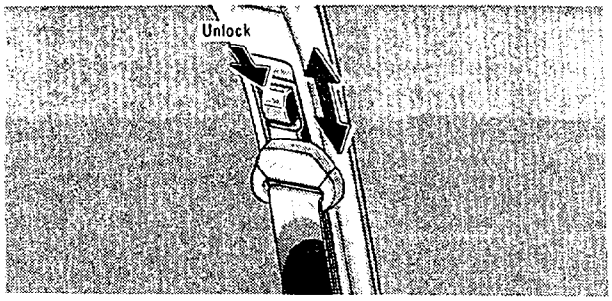


Adjust the position of the lap and shoulder belts.

Position the lap belt as low as possible on your hips – not on your waist, then adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

COMFORT ADJUSTMENT

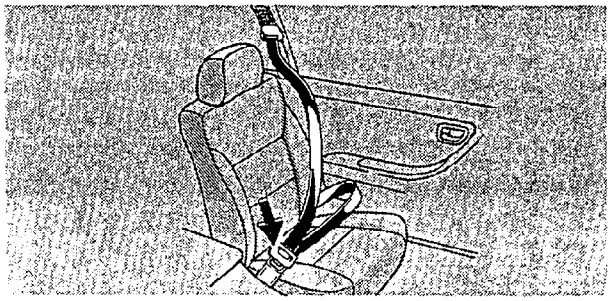
CAUTION:
- **High-positioned lap belts and loose-fitting belts both could increase the chance of injury due to sliding under the lap belt during an accident.**
- **For your safety, do not place the shoulder belt under your arm.**



Adjust the shoulder anchor position to your size.

To raise the anchor position, push the anchor up. To lower the anchor position, support the anchor while you push the lock release button then slide the anchor down. After the adjustment, make sure the anchor is locked in position.

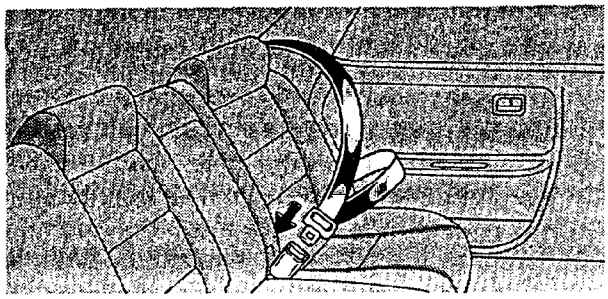
CAUTION:
Always be sure that the belt is positioned across your shoulder, as close to your neck as possible; not on your upper arm or on your neck. Failure to do so could reduce the amount of protection in an accident and increase the chance of injury.



To release the belt, press the buckle release button and allow the belt to retract.

If the belt does not retract smoothly, pull it out and check for kinks or twists. Then make sure it remains untwisted as it retracts.

Rear outside seat belts



Sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size.

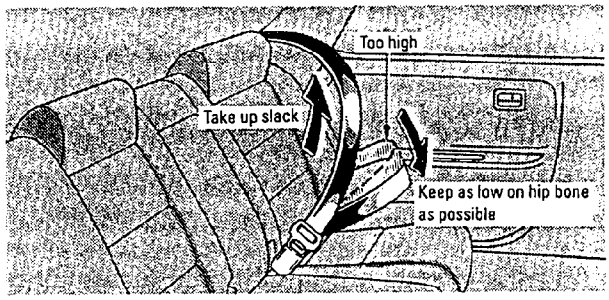
The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely. When a shoulder belt is completely extended and is then retracted even slightly, the belt is locked in that position and cannot be extended. This feature is used to hold the child restraint system securely. (For details, see "Child restraint" on page 66.)

To free the belt again, fully retract the belt and then pull the belt out once more.

If the seat belt cannot be pulled out of the retractor, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.

CAUTION:

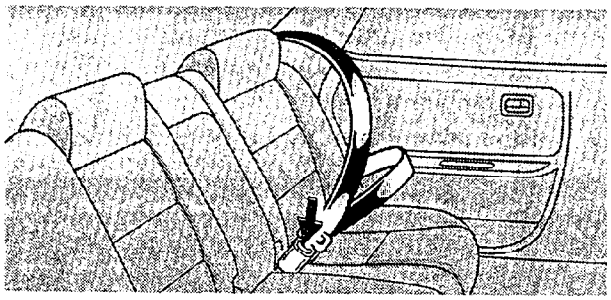
- **After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.**
- **Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.**
- **If the seat belt does not function normally, immediately contact your Lexus dealer.**



Adjust the position of the lap and shoulder belts.

Position the lap belt as low as possible on your hips – not on your waist, then adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

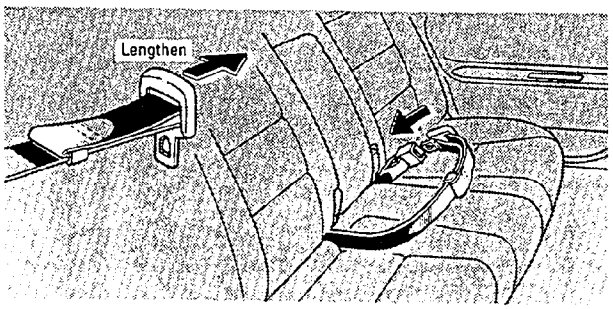
CAUTION:
- **High-positioned lap belts and loose-fitting belts both could increase the chance of injury due to sliding under the lap belt during an accident.**
- **For your safety, do not place the shoulder belt under your arm.**



To release the belt, press the buckle release button and allow the belt to retract.

If the belt does not retract smoothly, pull it out and check for kinks or twists. Then make sure it remains untwisted as it retracts.

Rear center seat belt

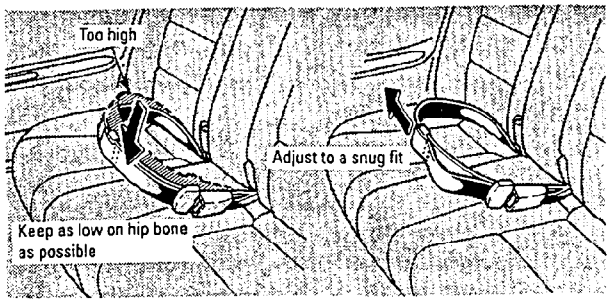


Sit up straight and well back in the seat. To fasten your belt, insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

If the belt is not long enough for you, hold the tab at a right angle to the belt and pull on the tab.

CAUTION:
- **After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.**
- **Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.**
- **If the seat belt does not function normally, immediately contact your Lexus dealer.**

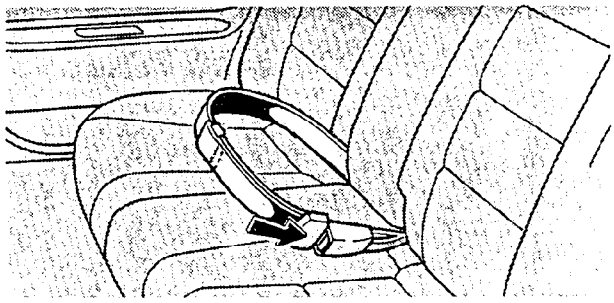


Remove excess length of the belt and adjust the belt position.

To shorten the belt, pull the free end of the belt.

Position the lap belt as low as possible on your hips – not on your waist, then adjust it to a snug fit.

CAUTION:
High-positioned and loose-fitting lap belts could increase the chance of injury due to sliding under the lap belt during an accident.



To release the belt, press the buckle release button.

Seat belt extender

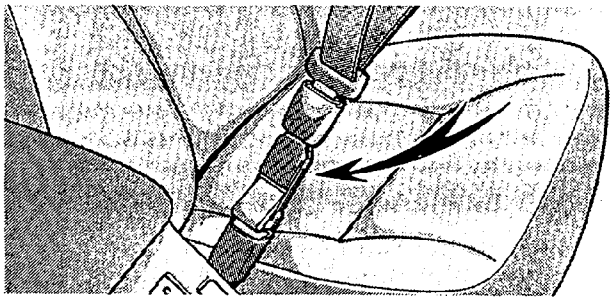
If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

Please contact your local Lexus dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:
When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- **Never use the seat belt extender if you can fasten the seat belt without it.**

- **Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.**



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

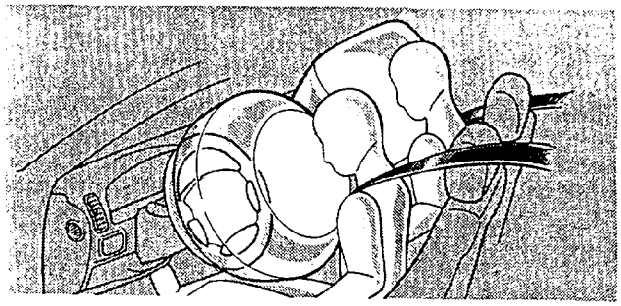
When not in use, remove the extender and store in the vehicle for future use.

CAUTION:

- **After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.**
- **Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.**
- **If the seat belt does not function normally, immediately contact your Lexus dealer.**

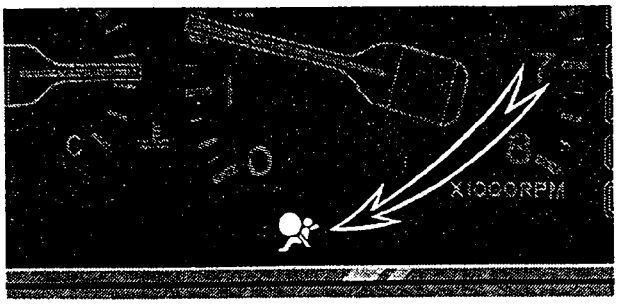
SRS AIRBAGS

The SRS (Supplemental Restraint System) airbags are designed to provide further protection to the driver and front passenger when added to the primary protection provided by the seat belts.



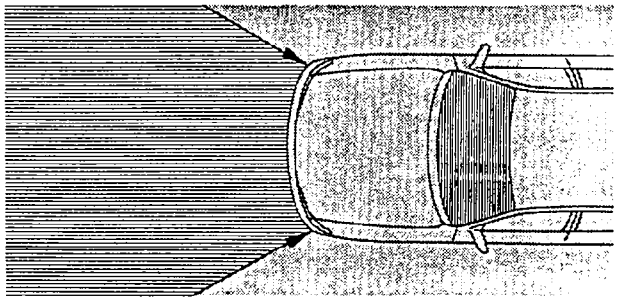
In response to a severe frontal impact, the SRS airbags work together with the seat belts to prevent or reduce injury by inflating, in order to decrease the likelihood of the driver's or front passenger's head or face directly hitting the steering wheel or dashboard.

The passenger airbag is activated even with no passenger in the front seat.



This indicator comes on when the ignition key is turned to the "ACC" or "ON" position. It goes off after about 6 seconds. This means the SRS airbags are operating properly.

The SRS airbag warning light system monitors the front airbag sensors, center airbag sensor assembly, inflators, warning light, interconnecting wiring and power sources.



The SRS airbag system is designed to activate in response to a severe frontal impact within the shaded area between the arrows in the illustration.

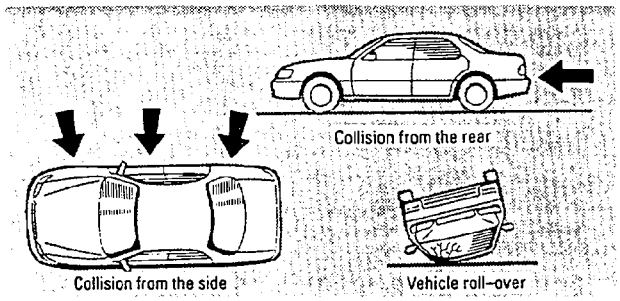
The SRS airbags will deploy if the severity of the impact is above the designed threshold level, comparable to an approximate 20 km/h (14 mph) collision when impacting straight into a fixed barrier that does not move or deform.

If the severity of the impact is below the above threshold level, the SRS airbags may not deploy.

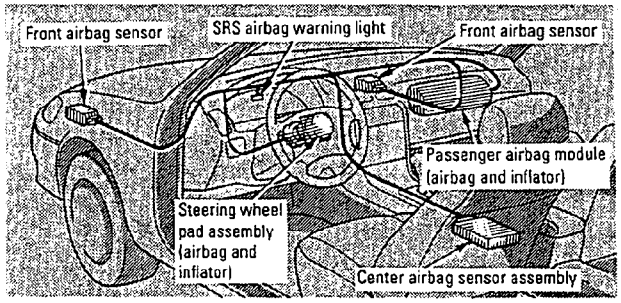
However, this threshold velocity will be considerably higher if the vehicle strikes an object, such as a parked vehicle or sign pole, which can move or deform on impact, or if it is involved in an underride collision (a collision in which the nose of the vehicle "underrides", or goes under, the bed of a truck).

It is possible with collision severity at the marginal level of airbag sensor detection and activation that only one of your vehicle's two airbags will deploy.

For your safety, be sure to always wear your seat belts.



The SRS airbags are not designed to inflate if the vehicle is subjected to a side or rear impact, if it rolls over, or if it is involved in a low-speed frontal collision.



The center airbag sensor assembly consists of a safing sensor and center airbag sensor.

In a severe frontal impact, sensors detect deceleration and the system triggers the airbag inflators. Then a chemical reaction in the inflators momentarily fills the airbags with non-toxic nitrogen gas to help restrain the forward motion of the occupants.

When the airbags inflate, they produce a fairly loud noise and release some smoke along with the nitrogen gas. This is not harmful and does not indicate a fire. Be sure to wash off any residue as soon as possible to prevent minor skin irritation.

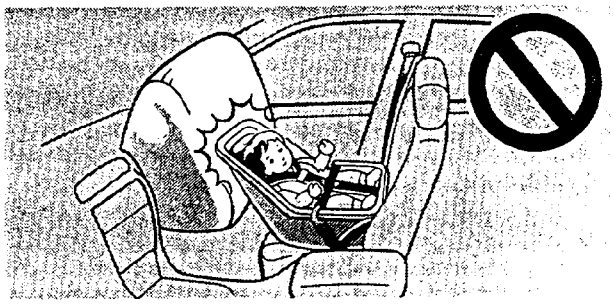
Deployment of the airbags happen in a fraction of a second, so the airbags must inflate with considerable force. While the system is designed to reduce serious injuries, it may also cause minor burns or abrasions and swellings.

Parts of the airbag module (steering wheel hub, dashboard) may be hot for several minutes, but the airbags themselves will not be hot. The airbags are designed to inflate only once.

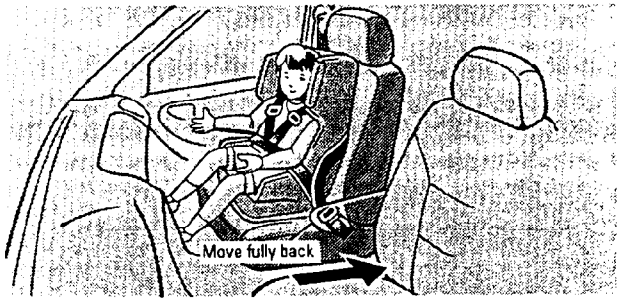
A crash severe enough to inflate the airbags may break the windshield as the vehicle buckles. In vehicles with a passenger airbag the windshield may also be damaged by absorbing some of the force of the inflating airbag.

CAUTION:

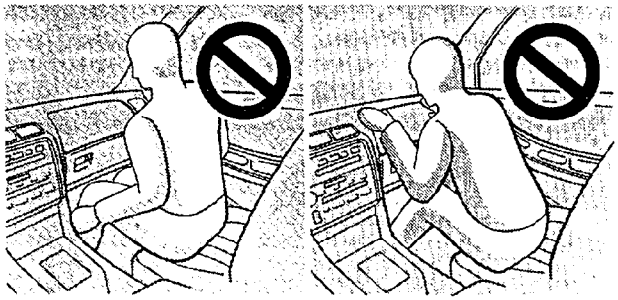
- **The SRS airbag system is designed only as a supplement to the primary protection of the seat belt systems of the driver and front passenger. The front seat occupants are particularly susceptible to injury if they do not wear their seat belts; when sudden braking or a collision occurs, they may be thrown forward. To obtain further protection in an accident, the driver and all passengers in the vehicle should always wear their seat belts when driving. For instructions and precautions concerning the seat belt system, see "SEAT BELTS" on page 54.**
- **A baby or small child who is too small to use a seat belt should be properly secured in a rear seat using a child restraint system.**



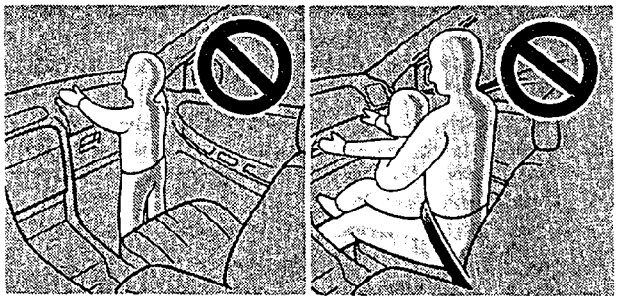
- **Do not use a rear-facing child restraint system in the front seat because the force of the rapid inflation of the passenger airbag may cause severe injury to the child.**



- **When using a forward-facing child restraint system in the front seat, the seat must be moved as far back as possible. For instructions concerning the installation of a child restraint system, see "Child restraint" on page 66.**

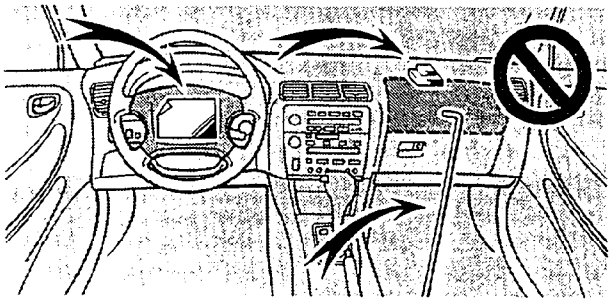


- Do not sit on the edge of the seat or lean over the dashboard when the vehicle is in use. The airbags inflate with considerable speed and force; you may be severely injured. Sit up straight and well back in the seat, and always use your seat belt.



- Do not allow a child to stand up, or to kneel on the front passenger seat. The airbag inflates with considerable speed and force; the child may be severely injured.

- Do not hold a child on your lap or in your arms. Use a child restraint system in the rear seat. For instructions concerning the installation of a child restraint system, see "Child restraint" on page 66.

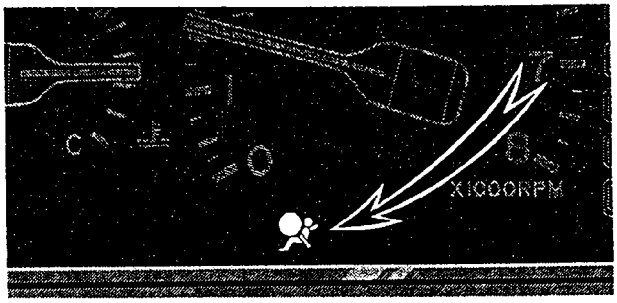


- Do not put objects on or in front of the dashboard or steering wheel pad that houses the airbag system. They might restrict inflation or cause personal injury as they are projected rearward.
- Do not modify, remove or open any component or wiring, such as the steering wheel, column cover, front passenger airbag cover, front passenger airbag, center airbag sensor assembly or front airbag sensors. Doing any of these may cause sudden SRS airbag inflation or disable the system, which could result in personal injury.

Failure to follow these instructions can result in severe injuries.

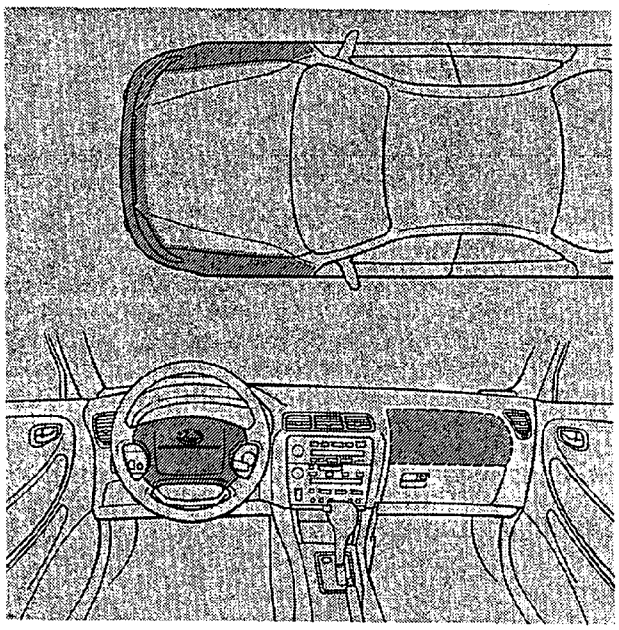
NOTICE:
Do not perform any of the following changes without consulting your Lexus dealer. Such changes can interfere with proper operation of the SRS airbag system in some cases.

- **Installation of electronic items such as a mobile two-way radio, cassette tape player or compact disc player.**
- **Modification of the suspension system.**
- **Modification of the front end structure.**
- **Attachment of a grille guard (bull bar, kangaroo bar, etc.), snow plow, winches or any other equipment to the front end.**
- **Repairs made on or near the front fenders, front console, steering column, steering wheel or dashboard near the front passenger airbag.**



This SRS airbag system has a service reminder indicator to inform the driver of operating problems. If either of the following conditions occurs, this indicates a malfunction of the airbags. Contact your Lexus dealer as soon as possible to service the vehicle.

- The light does not come on when the ignition key is turned to the "ACC" or "ON" position, or remains on.
- The light comes on while driving.



In the following cases, contact your Lexus dealer as soon as possible:

- The SRS airbags have been inflated.
- The front part of the vehicle (shaded in the illustration) was involved in an accident not of the extent to cause the SRS airbags to inflate.
- The pad section of the steering wheel or front passenger airbag cover (shaded in the illustration) is scratched, cracked, or otherwise damaged.

CHILD RESTRAINT

Child restraint precautions

Lexus strongly urges the use of child restraint systems for children small enough to use it.

The laws of all fifty states in the U.S.A. and Canada now require the use of a child restraint system.

CAUTION:
For effective protection in automobile accidents and sudden stops, children must be properly restrained. Holding a child in your arms is not a substitute for a child restraint system. In an accident, the child can be crushed against the windshield, or between you and the vehicle's interior if you are unrestrained.