Report Number NCAP-TRC-98-004

V2808

New Car Assessment Program (NCAP)

Flat Frontal Barrier Impact Test

Fuji Heavy Industries

1998 Subaru Legacy

4-Door Sedan

NHTSA Number: MW5500

TRC Test Number: 980210

Prepared By:

Transportation Research Center Inc.

10820 State Route 347

East Liberty, OH 43319

March 4, 1998

Final Report

Prepared For:

U. S. Department of Transportation

National Highway Traffic Safety Administration

Performance Standards,

Office of Crashworthiness Standards,

Motor Vehicle Information Division

Mail Code: NPS-10

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NCAP-TRC-98-004		

4. Title and Subtitle	5. Report Date
Final Report of New Car Assessment Program (NCAP) Frontal Barrier Impact Test of a 1998 Subaru Legacy 4-Door Sedan, NHTSA No. MW5500	March 4, 1998
	6. Performing Organization Code: TRC
7. Author(s): Allison E. Louden, Project Engineer	8. Performing Organization Report No.: NCAP-TRC-98-004
9. Performing Organization Name and Address: Transportation Research Center Inc., 10820 State Route 347, East Liberty, OH 43319-0367	10. Work Unit No. (TRAIS)
	11. Contract or Grant No.: DTNH22-96-D-22010
12. Sponsoring Agency Name and Address: U. S. Department of Transportation, National Highway Traffic Safety Administration, Performance Standards., Office of Crashworthiness Standards; Motor Vehicle Information Division, Mail Code NPS-10, 400 Seventh Street, S. W., Room 5311, Washington, DC 20590	13. Type of Report and Period Covered: Final Report, February - March 1998
	14. Sponsoring Agency Code: NPS-10
15. Supplemental Notes	

16. Abstract

A 56 kph (35 mph) flat frontal barrier impact test was conducted on a 1998 Subaru Legacy 4-door sedan, NHTSA No. MW5500, at Transportation Research Center Inc. on February 10, 1998. This test was conducted in accordance with Office of Crashworthiness Standards NCAPTP090196 for the determination of vehicle crashworthiness. The barrier impact velocity was 56.3 kph. The vehicle's maximum static crush was 672 millimeters. The ambient temperature was 20° C.

The driver's Head Injury Criteria (HIC) was 525. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.3 g. The driver's maximum chest deflection was 35 millimeters. The driver's left and right femur maximum axial forces were 2598 N and 1912 N, respectively.

The passenger's HIC was 623. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.9 g. The passenger's maximum chest deflection was 38 millimeters. The passenger's left and right femur maximum axial forces were 1836 N and 4131 N, respectively.

17. Key Words	18. Distribution Statement
56 kph (35 mph) Frontal Barrier Impact Test: New Car Assessment Program (NCAP)	Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 400 Seventh Street, S. W., Room 5108 Washington, DC 20590

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. Number of Pages	22. Price
Unclassified	Unclassified	357	

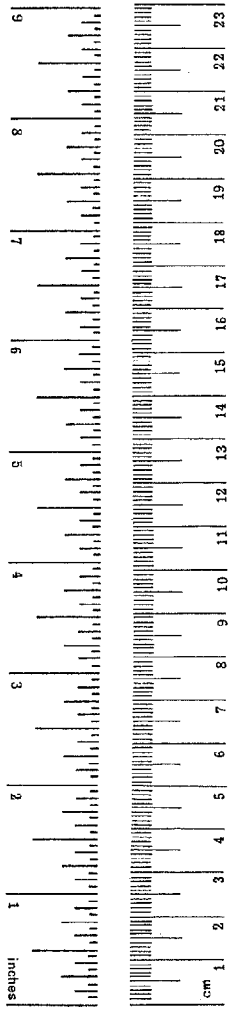
Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

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

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

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

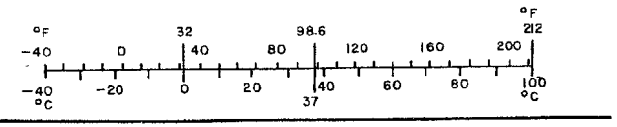


Table of Contents

List of Tables

List of Figures

List of Photographs

List Of Photographs, Cont'd.

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 Crashworthiness Standards by Transportation Research Center Inc. (TRC) under Contract Number DTNH22-96-D-22010.

The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for the subject vehicle, a 1998 Subaru Legacy 4-door sedan, NHTSA Number MW5500, at an impact speed of 57.3 kph (35.6 mph) FMVSS 208, 212, 219, and 301 requirements.

Test Procedure

This 56 kph (35 mph) test was conducted in accordance with NHTSA's Office of Crashworthiness Standards Laboratory Indicant Test Procedure, NCAPTP090196. 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 flat frontal barrier. 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 Appendix B of the Laboratory Indicant Test Procedure. This test was the third use of the driver dummy and the first use of 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, foot accelerometers to measure longitudinal and vertical axis accelerations, and upper and lower tibia load cells to measure forces and moments.

The ninety-seven (97) data channels were digitally sampled and recorded at 12,500 samples per second and processed per Section 11.13 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 and occupant 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 and vehicle 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 flat frontal barrier test was conducted at TRC on February 10, 1998.

The test vehicle, a 1998 Subaru Legacy 4-door sedan, NHTSA Number MW5500, was equipped with a 2.2-liter inline engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 1533.5 kg. The vehicle's impact speed was 56.3 kph. The vehicle sustained 672 mm of static crush during the impact.

The driver's Head Injury Criteria (HIC) was 525. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.3 g. The driver's maximum chest deflection was 35 mm. The driver's left and right femur maximum axial forces were 2598 N and 1912 N, respectively.

The right front passenger's HIC was 623. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.9 g. The passenger's maximum chest deflection was 38 mm. The passenger's left and right femur maximum axial forces were 1836 N and 4131 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 the static rollover test.

Table 1 Crash Test Summary

NHTSA number:	MW5500	
Test type:	Flat Frontal Barrier	
Test date:	02/10/98	
Test time:	1524	
Ambient temperature:	20° C	
Vehicle year/make/ model/body style:	1998/Subaru/Legacy/4-door sedan	
Vehicle test weight:	1533.5 kg	
Impact angle[1]:	0°	
Impact velocity[2]:	Primary = 56.3 kph Secondary = 56.2 kph	
Maximum static crush:	672 mm	
Average rebound:	235 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:	40	40
Number of cameras:	High-speed 16 Real-time 1	

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

Table 2 Test Vehicle Information

Vehicle year/make/ model/body style:	1998/Subaru/Legacy/4-door sedan
Color:	Ruby Pearl
VIN:	4S3BD4351W7206617
NHTSA number:	MW5500
Engine data:	
Placement:	inline
Cylinders:	4
Displacement	2.2 liters
Transmission data:	_4_speed, ___manual, _X_automatic, ___overdrive
	___FWD, ___RWD, _X_4WD _X_AWD
Date vehicle received:	02/02/98
Odometer reading:	131
Dealer's name and address:	Byers Imports 401 N. Hamilton Road, Columbus, OH 43213

Accessories:

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

Other: Rear cup holder, remote keyless entry,
popular equipment group, 7-spoke allow wheels,tweeter kit

Certification data from vehicle's label:

Vehicle manufactured by:	Fuji Heavy Industries
Date of manufacture:	10/97
VIN:	4S3BD4351W7206617
GVWR:	4110 lbs.
GAWR: Front:	2095 lbs.
Rear:	2015 lbs.

Table 2 Test Vehicle Information, Cont'd.

Size of tires:	P185/70R14
Tire pressure with maximum capacity vehicle load:	
Front:	35 psi
Rear:	35 psi
Spare tire:	T125/70D15
Type of front seats:	Bucket
Type of rear seats:	Bench

Tire & capacity data from vehicle's label:

Recommended tire size:	P185/70R14
Recommended cold tire pressure:	
Front:	32 psi
Rear:	30 psi

Designated seating capacity:

Front	2
Rear	3
Total	5

Vehicle capacity weight: 383 kg

Test vehicle attitude:

Delivered attitude:	LF 678 mm;	RF 678 mm;	LR 660 mm;	RR 662 mm
Pre-test attitude:	LF 650 mm;	RF 655 mm;	LR 627 mm;	RR 632 mm
Post-test attitude:	LF 798 mm;	RF 178 mm;	LR 623 mm;	RR 624 mm

Table 2 Test Vehicle Information Cont'd

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

Right front	377.0 kg	Right rear	290.0 kg
Left front	370.0 kg	Left rear	305.0 kg
Total front weight	747.0 kg	(55.6% of total vehicle weight)	
Total rear weight	595.0 kg	(44.2% of total vehicle weight)	
Total delivered weight	1342.0 kg		

Calculation of test vehicle's target test weight:

RCLW[1] = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1342 kg)

VCW = Vehicle capacity weight (383 kg)

DSC = Designated seating capacity (5)

RCLW[1] = VCW - 68 (DSC) = 383 - 68(5) = 43 kg

Target test weight = UDW + RCLW[1] + (Number of Hybrid III dummies x 76 kg/dummy)

Target test weight = 1342 + 43 + 152 kg

Target test weight = 1537.0 kg

Weight of test vehicle with required dummies and 39.5 kg of cargo weight:

Right front	351.5 kg	Right rear	424.5 kg
Left front	344.0 kg	Left rear	413.5 kg
Total front weight	695.5 kg	(45.3% of total vehicle weight)	
Total rear weight	838.0 kg	(54.7% of total vehicle weight)	
Total test weight	1533.5 kg	(0.3% under target test weight)	

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: Rear bumper, rear seats, rear seat belts, trunk lid, tailights, muffler and shield, rear door windows, liners, and window motor.

CG rearward of front wheel centerline: 1436 mm

[1] Cargo weight for multipurpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 136 kilograms, whichever is less.

Table 3 Post-Impact Data

Test number:	980210
NHTSA number:	MW5500
Test date:	02/10/98
Test time:	1524
Test type:	Flat frontal barrier
Impact angle:	0°
Ambient temperature at impact area:	20° C
Temperature in occupant compartment:	21° C
Impact velocity:	
Primary	56.3 kph
Secondary	56.2 kph
Specified range	N/A

Distance from vehicle to barrier:

Entering velocity trap	381 mm
Exiting velocity trap	51 mm

Test vehicle static crush:

Overall length of test vehicle:

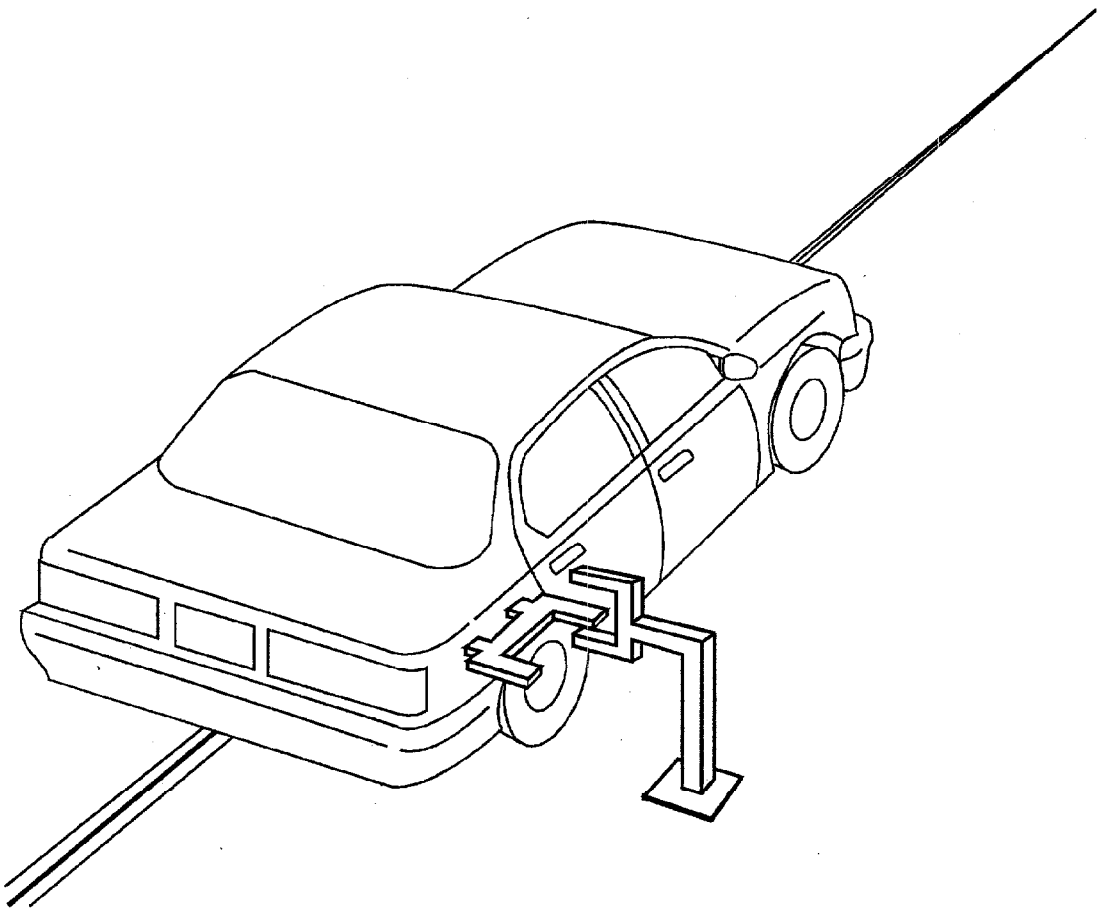
Pre-test:	L	4512 mm;	C	4692 mm;	R	4512 mm
Post-test:	L	3987 mm;	C	4065 mm;	R	3986 mm
Total crush:	L	525 mm;	C	627 mm;	R	526 mm
Average crush:	559 mm					

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L	267 mm;	C	180 mm;	R	259 mm
Average rebound	235 mm					

Figure 1 Impact Velocity Measurement System

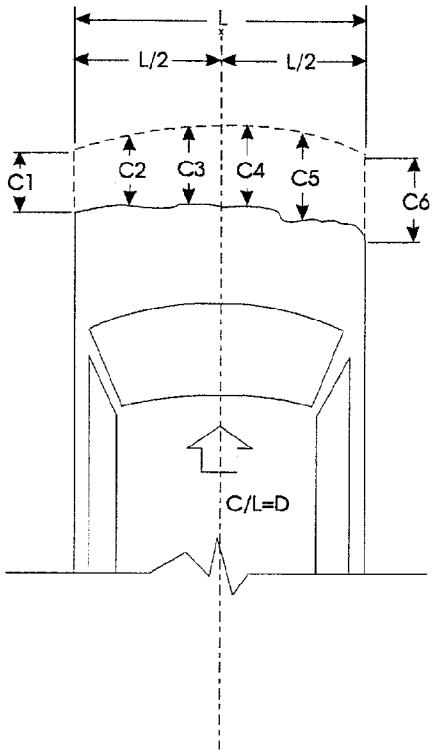


The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

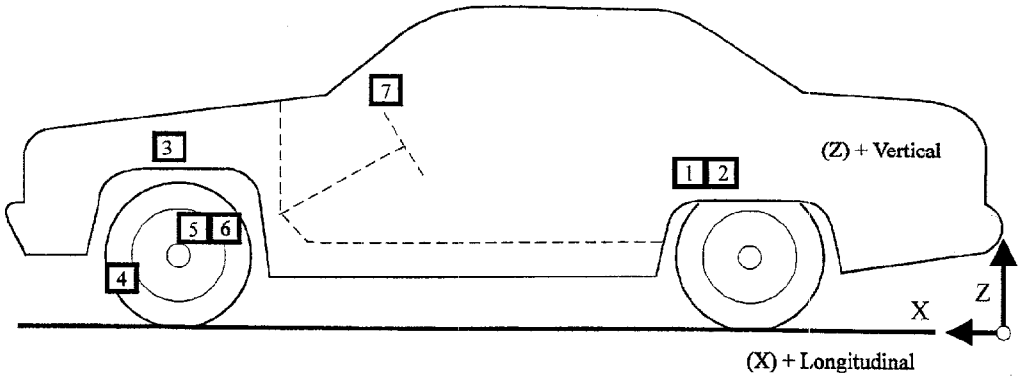
Figure 2 Accident Investigation Division Data
for 56 kph (35 mph) Frontal Barrier Impact

NHTSA number:	MW5500
Test date:	02/10/98
Vehicle year/make/ model/body style:	1998/Subaru/Legacy/4-door sedan
Vehicle size category:	Compact
VIN:	4S3BD4351W7206617
Build date:	10/97
Test weight:	1533.5 kg
Vehicle wheelbase:	2606 mm
Maximum width:	1695 mm
Front overhang:	957 mm

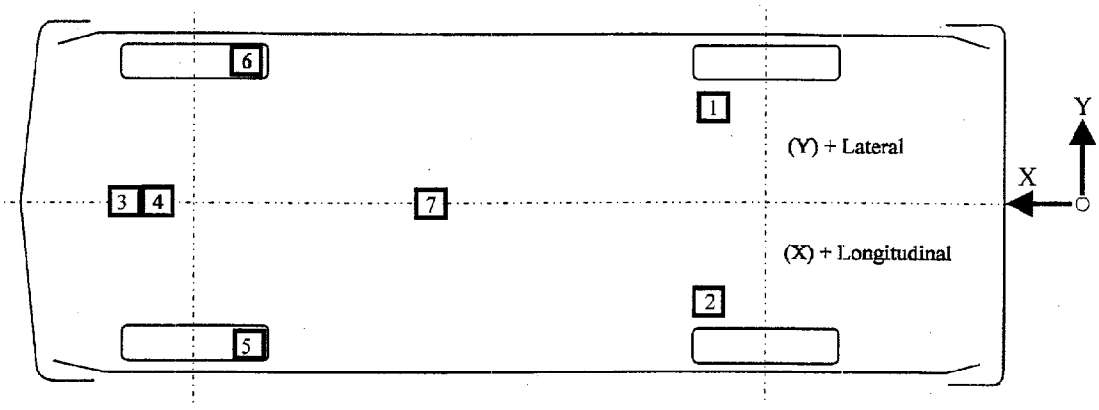


Collision Deformation Classification (CDC) code:	12FDEW3
Crush depth measurements:	C1 = 525 mm
	C2 = 607 mm
	C3 = 672 mm
	C4 = 636 mm
	C5 = 597 mm
	C6 = 526 mm
Midpoint of damage:	D: Vehicle Longitudinal Centerline
Length of damaged region:	L: 1524 mm

Figure 3 Vehicle Accelerometer Placement



Side View



Bottom View

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 980210 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT REAR SEAT CROSSMEMBER	1865 mm	425 mm	386 mm				
LONGITUDINAL				2.7 g	@ 145.4 ms	44.6 g	@ 35.8 ms
REDUNDANT				2.7 g	@ 146.0 ms	45.2 g	@ 35.7 ms
2 RIGHT REAR SEAT CROSSMEMBER	1860 mm	-400 mm	386 mm				
LONGITUDINAL				3.4 g	@ 143.4 ms	40.5 g	@ 35.7 ms
REDUNDANT				3.3 g	@ 143.0 ms	40.4 g	@ 35.7 ms
3 ENGINE TOP	4007 mm	-120 mm	725 mm				
LONGITUDINAL				18.5 g	@ 35.6 ms	151.2 g	@ 26.5 ms
4 ENGINE BOTTOM	3870 mm	0 mm	175 mm				
LONGITUDINAL				26.1 g	@ 33.9 ms	136.1 g	@ 28.8 ms
5 RIGHT BRAKE CALIPER	3391 mm	-632 mm	280 mm				
LONGITUDINAL				33.5 g	@ 48.3 ms	95.1 g	@ 42.3 ms
6 LEFT BRAKE CALIPER	3391 mm	632 mm	280 mm				
LONGITUDINAL				108.8 g	@ 75.7 ms	216.2 g	@ 62.4 ms
7 INSTRUMENT PANEL CENTER	3182 mm	30 mm	910 mm				
LONGITUDINAL				35.9 g	@ 54.2 ms	75.1 g	@ 62.1 ms

REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

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	Instrument panel
Right knee	Instrument panel	Instrument panel

Door Opening:

	Left	Right
Front	Difficult, no tools required	Difficult, no tools required
Rear	Easy	Easy

Seat Movement:

	Seat Back Failure	Seat Shift
Front	None	None
Rear	NA	NA

Glazing Damage: The entire windshield was cracked on impact.

Other Notable Impact Effects: None

Table 6 FMVSS 208 Data Summary

Vehicle year/make/
model/body style: 1998/Subaru/Legacy/4-door sedan

Vehicle NHTSA number: MW5500

Test date: 02/10/98

	Driver Dummy #192		Passenger Dummy #142	
Maximum Accelerations:				
Head X-axis	-54.6	g	-59.1	g
Head Y-axis	-6.0	g	7.0	g
Head Z-axis	-31.8	g	-28.8	g
Head resultant	58.3	g	60.7	g
Chest X-axis	-51.8	g	-49.5	g
Chest Y-axis	-3.5	g	-5.5	g
Chest Z-axis	-13.7	g	-12.6	g
Chest resultant[1]	51.3	g	57.0	g
Chest resultant time interval[1]	.003	sec	.003	sec
Head Injury Criteria (HIC) Values:				
HIC[2]	525		623	
HIC starting time	.052	sec	.053	sec
HIC ending time	.088	sec	.089	sec
Average head resultant acceleration during HIC time interval	46.3	g	49.5	g
Maximum Chest Deflections:				
Chest X-axis	35	mm	38	mm
Maximum chest deflection time	.072	sec	.073	sec
Maximum Compressive Femur Forces:				
Left femur	2598	N	1836	N
Right femur	1912	N	4131	N
Maximum Seat Belt Forces:				
Lap belt	5069	N	7977	N
Shoulder belt	8180	N	8805	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: 1998/Subaru/Legacy/4-door sedan

Vehicle NHTSA number: MW5500

Test date: 02/10/98

	Driver Dummy #192	Passenger Dummy #142
Maximum Forces		
Neck X-axis shear force	672 N	503 N
Neck Y-axis shear force	86 N	216 N
Neck Z-axis axial force	1761 N	1632 N
Maximum Moments		
Neck moment about X-axis	16.1 N·m	24.0 N·m
Neck moment about Y-axis	39.1 N·m	-50.0 N·m
Neck moment about Z-axis	-10.8 N·m	11.0 N·m
Maximum Accelerations:		
Pelvis X-axis	-24.0 g	-81.6 g
Pelvis Y-axis	-9.6 g	-7.2 g
Pelvis Z-axis	64.2 g	24.9 g
Pelvis resultant	66.3 g	83.6 g

Table 7 Hybrid III Data Summary, Cont'd.

Vehicle year/make/
model/body style: 1998/Subaru/Legacy/4-door sedan

Vehicle NHTSA number: MW5500

Test date: 02/10/98

	Driver Dummy #192	Passenger Dummy #142
Left upper tibia moment about X-axis	90.3 N·m	-34.7 N·m
Left upper tibia moment about Y-axis	-29.0 N·m	98.9 N·m
Right upper tibia moment about X-axis	71.4 N·m	-42.3 N·m
Right upper tibia moment about Y-axis	174.8 N·m	79.0 N·m
Left lower tibia X-axis force	-731 N	-753 N
Left lower tibia Z-axis force	-2768 N	-2218 N
Left lower tibia moment about Y-axis	-51.5 N·m	36.9 N·m
Right lower tibia X-axis force	-1239 N	-620 N
Right lower tibia Z-axis force	-5342 N	-2299 N
Right lower tibia moment about Y-axis	-49.1 N·m	-41.9 N·m
Left foot X-axis acceleration	-53.0 g	-62.0 g
Left foot Z-axis acceleration at heel	60.3 g	45.8 g
Left foot Z-axis acceleration at toe	78.3 g	67.8 g
Right foot X-axis acceleration	-92.6 g	-80.7 g
Right foot Z-axis acceleration at heel	113.9 g	46.0 g
Right foot Z-axis acceleration at toe	*411.8 g	168.3 g

Notes: All values listed must be occurring during primary impact event.
* Large spike in data

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest were restrained by the driver's airbag as the dummy's torso was restrained by the three-point unibelt. The dummy's head rotated rearward into the head restraint as the dummy rebounded into the seat back. The 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 rotated forward as the dummy's head and chest were restrained by the passenger's airbag and the dummy's torso was restrained by the three-point unibelt. The dummy's head rotated rearward into the head restraint as the dummy rebounded into the seat back. The dummy came to rest seated upright 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.	2390 mm	3000 mm
Shoulder belt length as measured on Part 572 dummy.	745 mm	740 mm
Lap belt length as measured on Part 572 dummy.	800 mm	800 mm
Shoulder belt spool-off length:		
As determined by film analysis	44 mm	44 mm
As determined mechanically	41 mm	48 mm
As determined electronically	39 mm	54 mm
Belt stretch length:		
As measured mechanically	0 mm/m	0.3 mm/m
As measured electronically	.03 mm/m	0.1 mm/m
Retractor lock-up time:		
As determined by shoulder belt spool-off	63 ms	67 ms

Section 3.0

FMVSS 212, 219 (partial), and 301 Data

Figure 4 FMVSS 212 Test Data

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

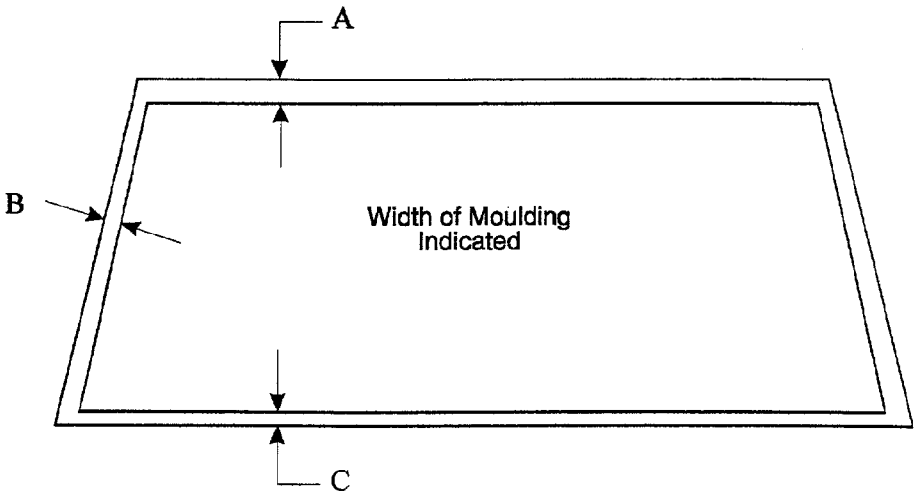
FMVSS 212 requirements: The post-test periphery retention amount must be at least 75% of the pre-test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

Windshield periphery measurements:

	Pre-test	Post-test	Percent retention
Right side	2108 mm	2108 mm	100
Left side	2108 mm	2108 mm	100
Total	4216 mm	4216 mm	100

Pre-test windshield mounting material temperature: 20° C

A = 20 mm
B = 22 mm
C = 33 mm



Front view of windshield[1]

Loss of windshield retention lengths: None

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

Figure 5 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 = 1128 mm

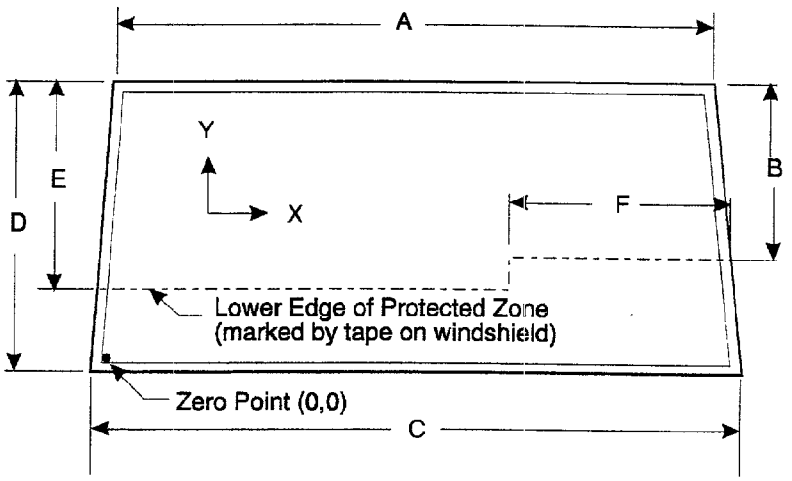
B = 525 mm

C = 1525 mm

D = 780 mm

E = 513 mm

F = 595 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 9 Fuel System Data

Vehicle year/make/ model/body style:	1998/Subaru/Legacy/4-door sedan
NHTSA number:	MW5500
Fuel system capacity:	60 liters (from owner's manual)
Usable capacity:	60 liters (furnished by COTR)
Test volume range:	55.2 liters to 56.4 liters (92-94% of usable)
Actual test volume:	55.6 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 tank was located in front of the rear axle. The fuel filler neck was located on the right side and entered the rear of the fuel tank.

Table 10 FMVSS 301 Post-Impact Test Data

NHTSA number: MW5500

Test date: 02/10/98

Vehicle year/make/
model/body style: 1998/Subaru/Legacy/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 (_57_ 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:

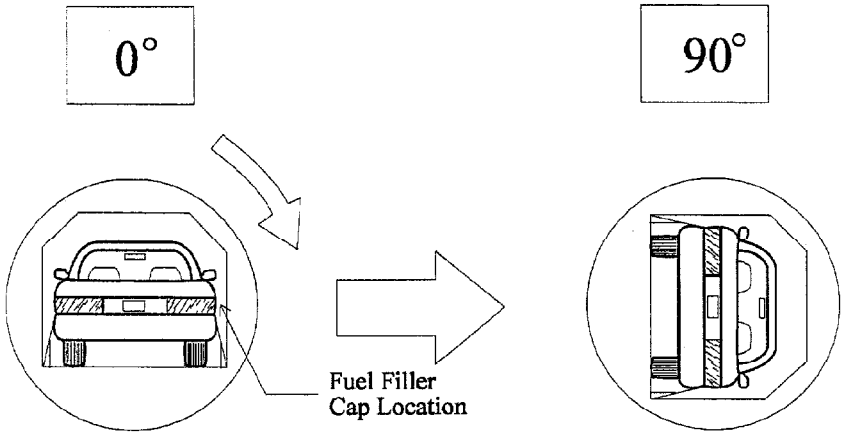
		Test Results	Maximum Allowable
1.	From impact until vehicle motion ceases	0 g	28 g
2.	5-minute period after vehicle motion ceases	0 g	142 g
3.	Next 25 minutes after 5-minute period	0 g	28 g/min

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data

NHTSA number: MW5500

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		

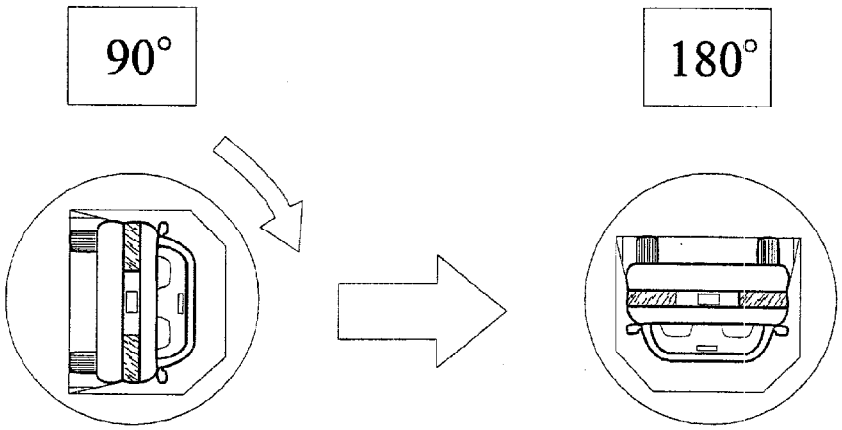
Fuel system fluid spillage measurements:

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 6 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	

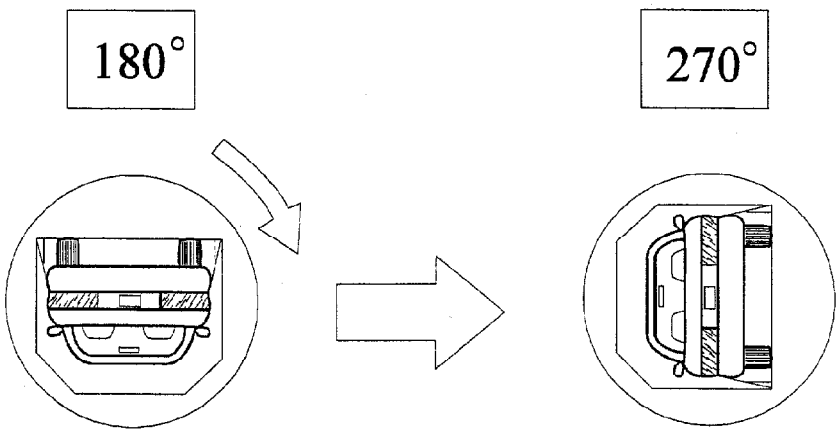
Fuel system fluid spillage measurements:

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 6 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	

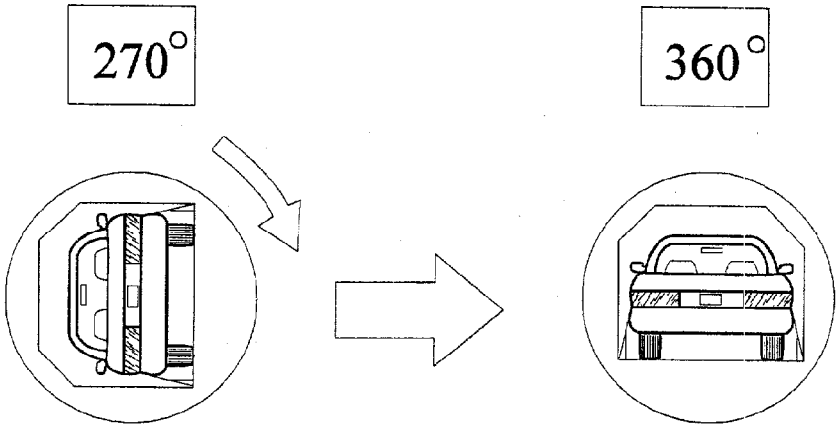
Fuel system fluid spillage measurements:

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 6 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 7 Dummy Measurement Locations for Front Seat Occupants

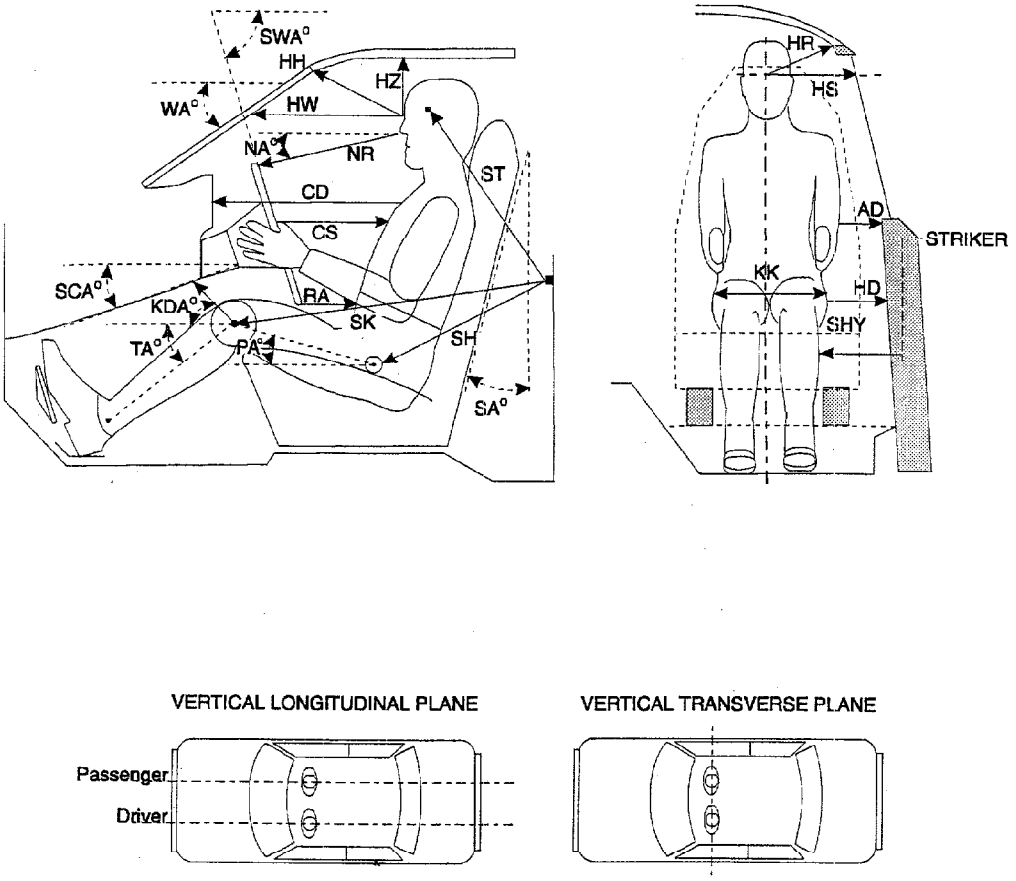


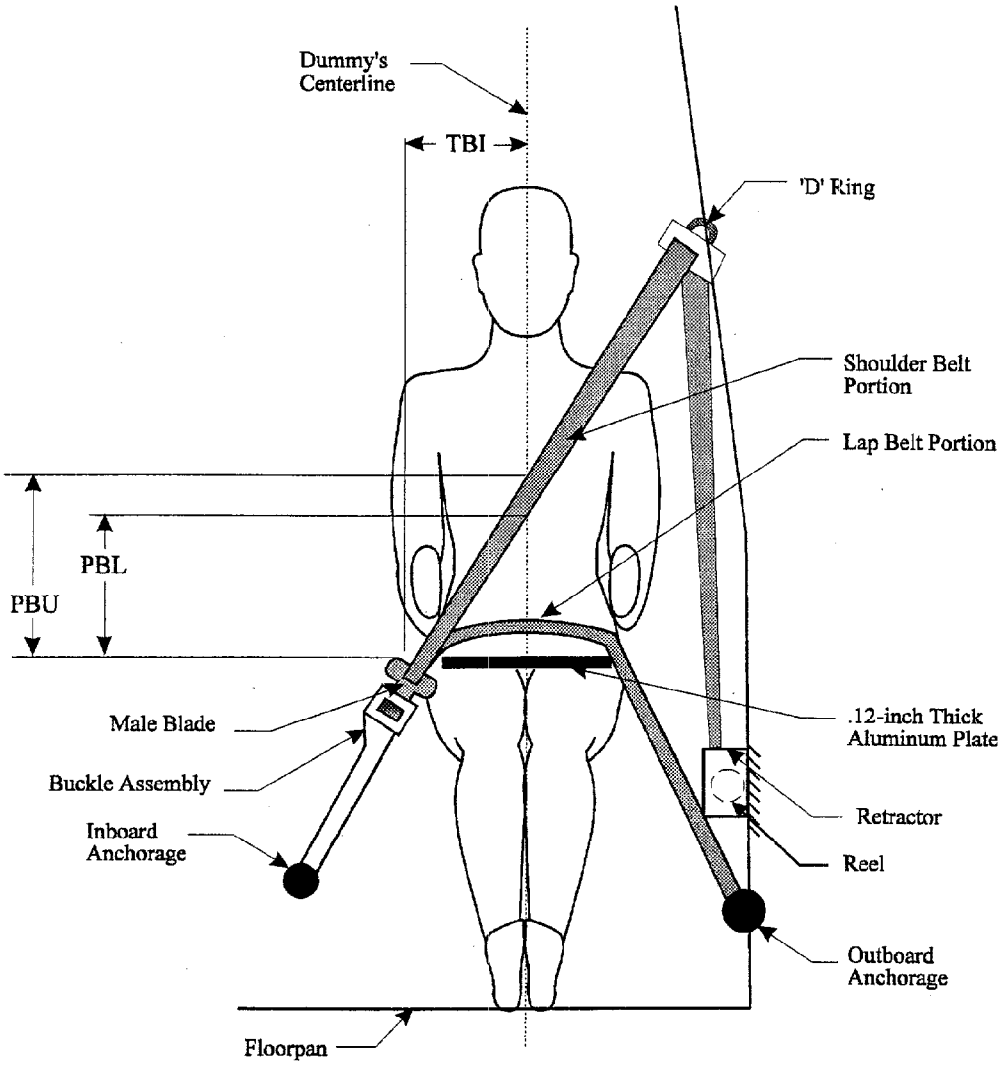
Table 11 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #192)	Passenger (Serial #142)
WA	Windshield angle	29°	29°
SWA	Steering wheel angle	67°	NA
SCA	Steering column angle	23°	NA
SA	Seat back angle	26°	26°
HZ	Head to roof	196 mm	199 mm
HH	Head to header	312 mm	234 mm
HW	Head to windshield	576 mm	543 mm
HR	Head to side header	212 mm	229 mm
NR	Nose to rim	402 mm	NA
NA	Nose to rim angle	12°	NA
CD	Chest to dash	555 mm	623 mm
CS	Steering wheel to chest	285 mm	NA
RA	Rim to abdomen	215 mm	NA
KDL	Left knee to dash	215 mm	192 mm
KDR	Right knee to dash	217 mm	187 mm
KDA	Outboard knee to dash angle	30°	26°
PA	Pelvic angle	23°	25°
TA	Tibial angle	39°	41°
KK	Knee to knee	344 mm	314 mm
ST[1]	Striker to head	550 mm	540 mm
	Striker to head angle	-84°	-80°
SK[1]	Striker to knee	533 mm	529 mm
	Striker to knee angle	0°	-8°
SH[1]	Striker to H-point	196 mm	192 mm
	Striker to H-point angle	38°	23°
SHY	Striker to H-point (Y dir.)	232 mm	223 mm
HS	Head to side window	305 mm	305 mm
HD	H-point to door	155 mm	164 mm
AD	Arm to door	76 mm	88 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 8 Seat Belt Positioning Data



	Driver	Passenger
PBU - Top surface of aluminum plate to belt upper edge	310 mm	286 mm
PBI - Top surface of aluminum plate to belt lower edge	240 mm	197 mm
TBI - Dummy centerline to intersection of upper torso belt and lap belt	118 mm	128 mm
- Dummy centerline to inner edge of belt at chest flesh top	60 mm	65 mm
Lap belt tension (N)	9 mm	9 mm
Should belt tension (N)	13 mm	22 mm

Figure 9 Camera Positions

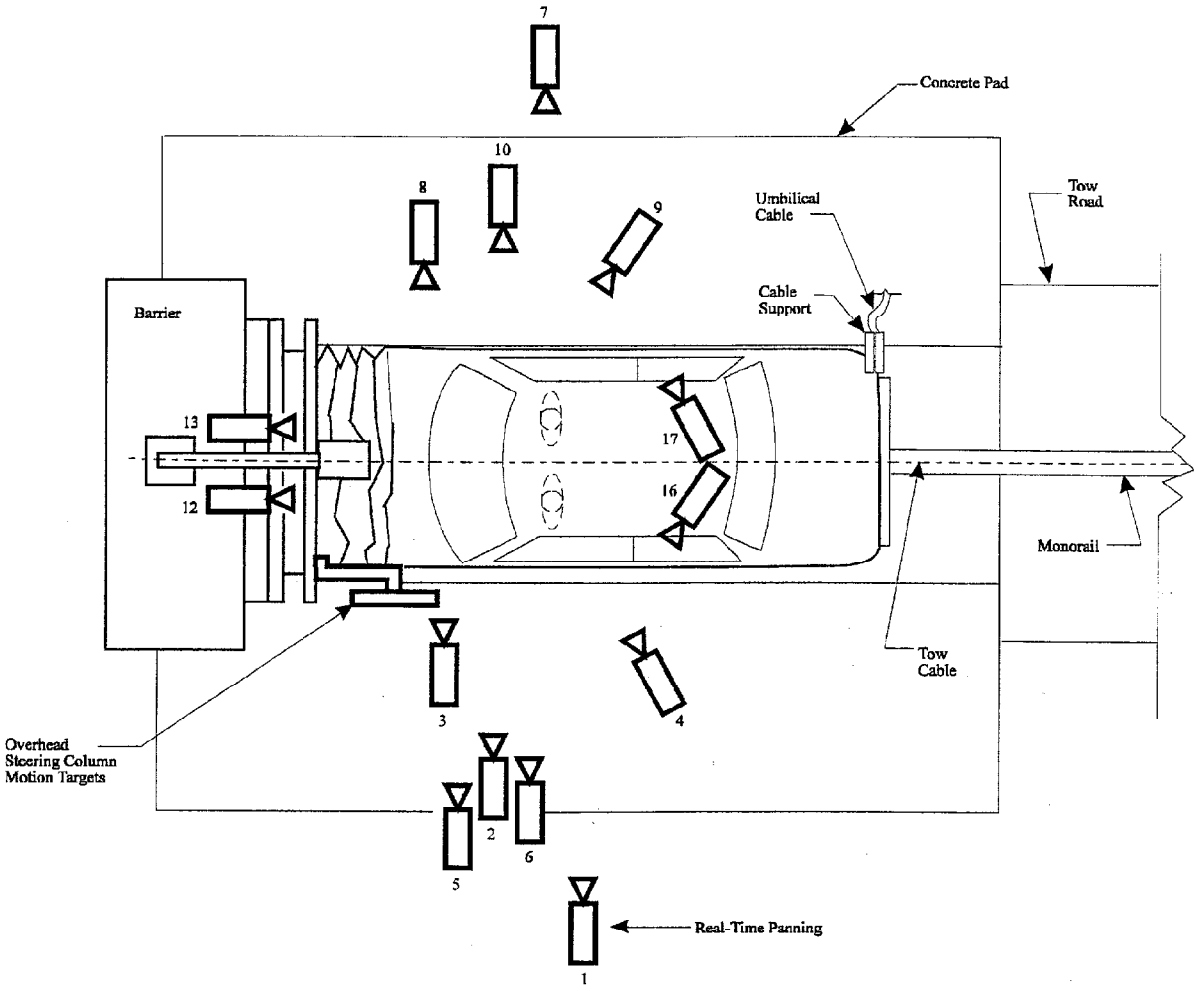


Figure 9 Camera Positions, Cont'd.

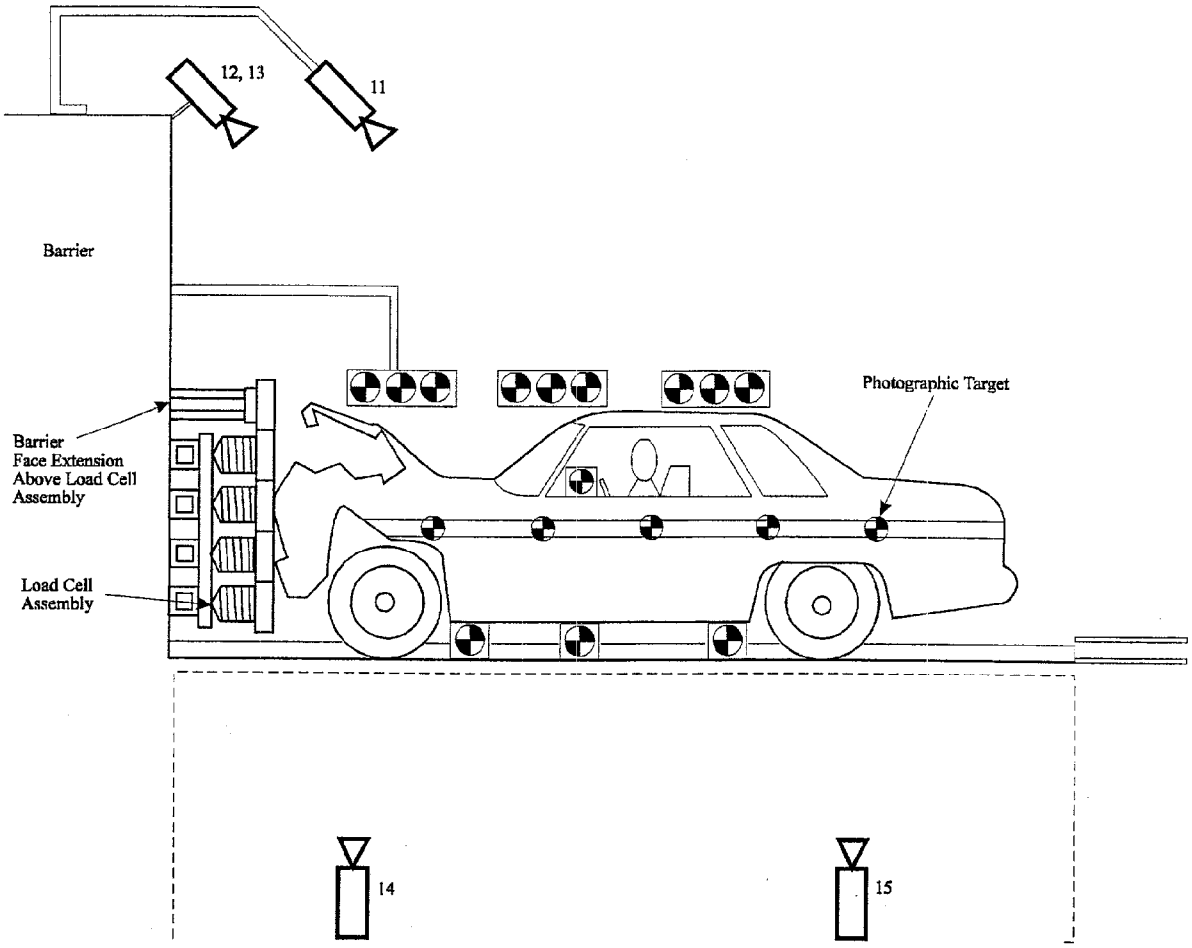


Table 12 Motion Picture Camera Locations

Test Number: 980210

Vehicle Year/Make/Model/Body Style: 1998/Subaru/Legacy/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	16 mm	24 frames/s
2	Left Barrier to seat back	-4572 mm	8534 mm	2591 mm	-27°	7925 mm	25 mm	992 frames/s
3	Left windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA	50 mm	1002 frames/s
4	Dummy angled view	-1054 mm	2438 mm	1118 mm	-12°	2743 mm	25 mm	925 frames/s
5	Column movement - upper	-2438 mm	8534 mm	2616 mm	-14°	NA	25 mm	1005 frames/s
6	Column movement - lower	-2438 mm	8534 mm	1908 mm	-9°	NA	25 mm	980 frames/s
7	Right side overall	-2065 mm	-6767 mm	942 mm	-2°	NA	13 mm	985 frames/s
8	Right windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA	50 mm	1015 frames/s
9	Passenger angled view	-986 mm	-2438 mm	1151 mm	7°	2743 mm	25 mm	1002 frames/s
10	Right medium tight	-4674 mm	-6096 mm	2540 mm	-26°	6096 mm	25 mm	1002 frames/s
11	Windshield - barrier center	-925 mm	0 mm	2489 mm	-40°	NA	13 mm	1000 frames/s
12	Driver - barrier view	-173 mm	368 mm	2159 mm	-41°	NA	17 mm	1000 frames/s
13	Passenger - barrier view	-114 mm	-351 mm	2159 mm	-40°	NA	17 mm	1002 frames/s
14	Crush & fluid spillage - front pit	-1283 mm	0 mm	-2347 mm	90°	NA	13 mm	998 frames/s
15	Fluid spillage - rear pit	-2522 mm	0 mm	-2515 mm	90°	NA	13 mm	992 frames/s
16	Driver seat belt movement	NA	NA	NA	NA	NA	NA mm	995 frames/s
17	Passenger seat belt movement	NA	NA	NA	NA	NA	NA mm	995 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 10 Vehicle Target Locations

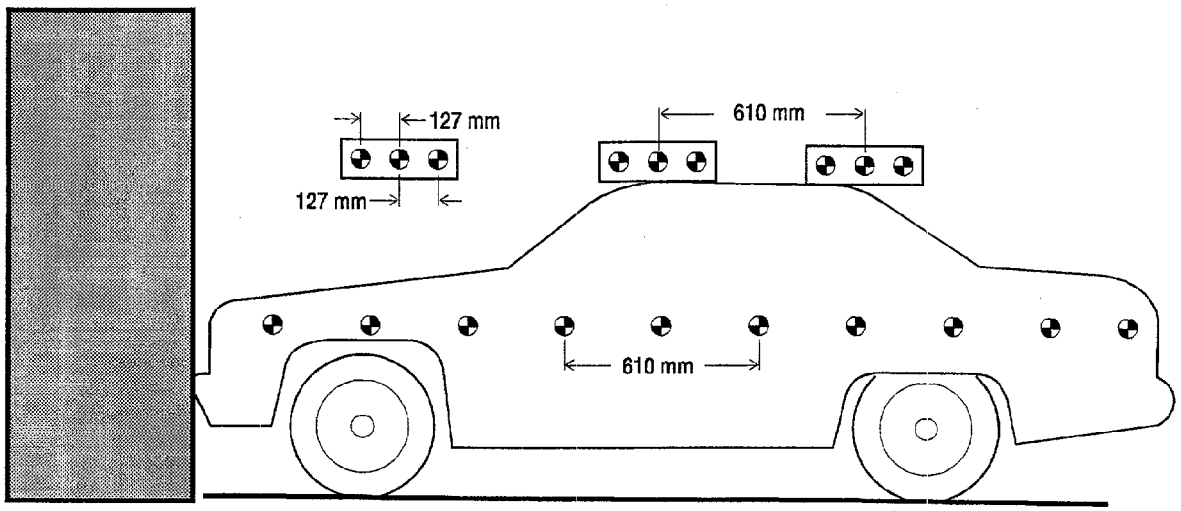


Figure 12 Pre-Test And Post-Test Measurement Points

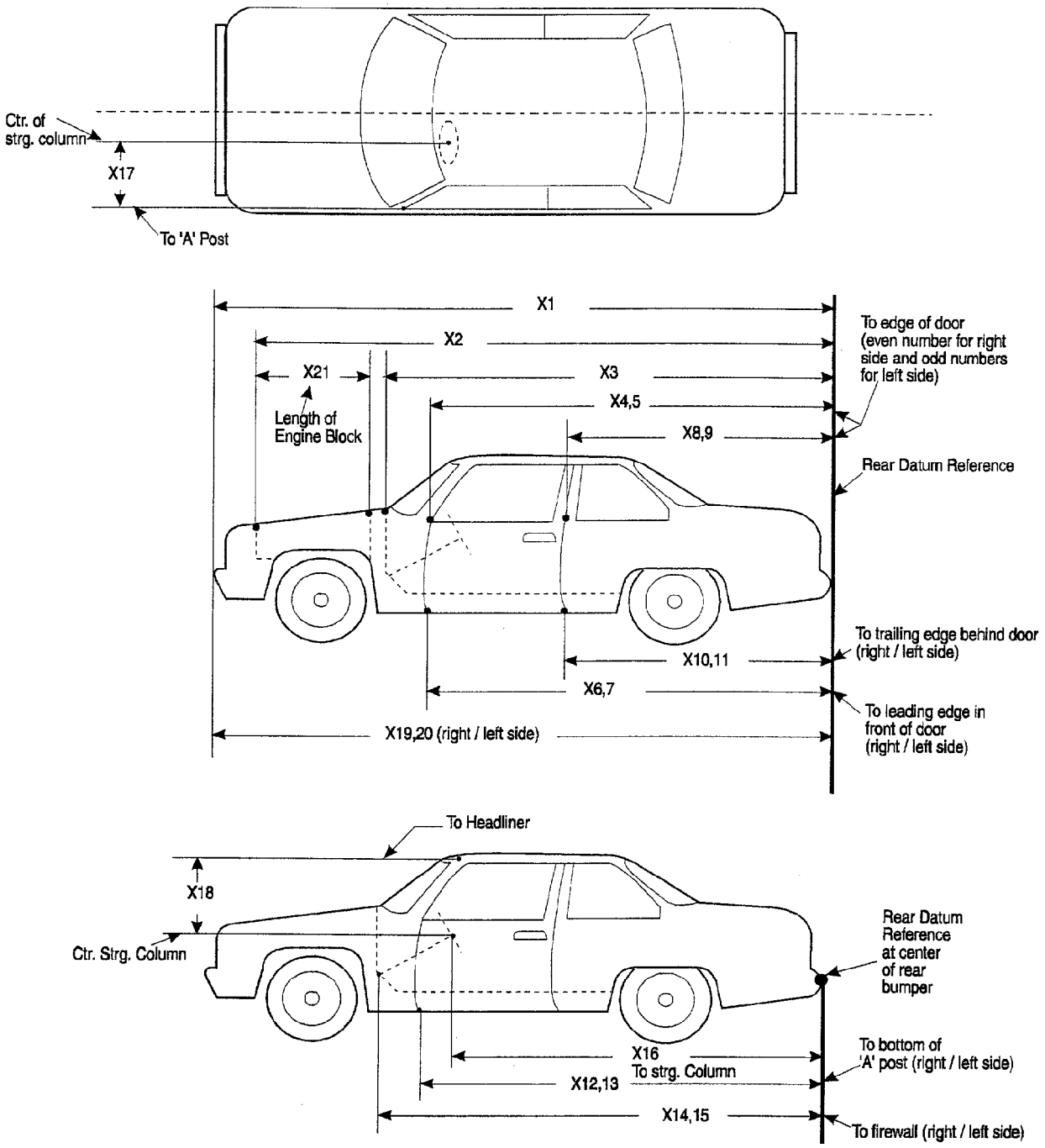


Table 13 Impacted Vehicle Measurements

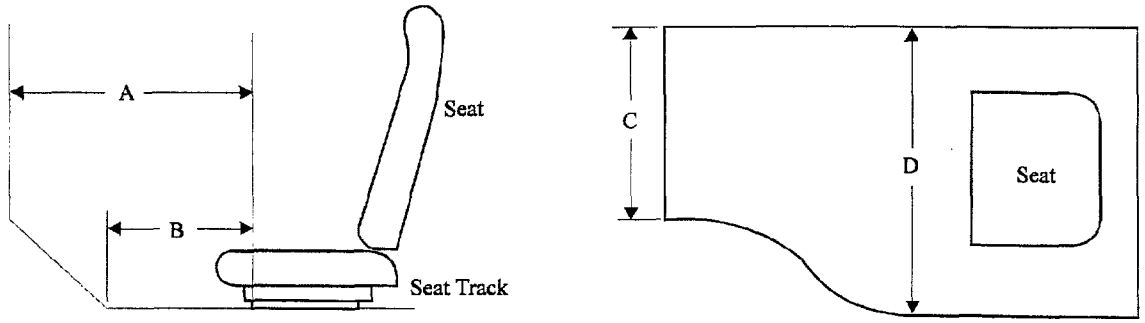
Test number: 980210

Vehicle year/make/model/body style: 1998/Subaru/Legacy/4-door sedan

No.	Type of measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	4692 mm	4065 mm	627 mm
X2	Rear surface of vehicle to front of engine block	4252 mm	3914 mm	338 mm
X3	Rear surface of vehicle to firewall	3546 mm	3644 mm	-98 mm
X4	Rear surface of vehicle to upper leading edge of right door	3181 mm	3170 mm	11 mm
X5	Rear surface of vehicle to upper leading edge of left door	3169 mm	3158 mm	11 mm
X6	Rear surface of vehicle to lower leading edge of right door	3215 mm	3204 mm	11 mm
X7	Rear surface of vehicle to lower leading edge of left door	3200 mm	3190 mm	10 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2222 mm	2211 mm	11 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2215 mm	2208 mm	7 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2233 mm	2222 mm	11 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2221 mm	2211 mm	10 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3195 mm	3170 mm	25 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3190 mm	3165 mm	25 mm
X14	Rear surface of vehicle to firewall - right side	3504 mm	3413 mm	91 mm
X15	Rear surface of vehicle to firewall - left side	3504 mm	3432 mm	72 mm
X16	Rear surface of vehicle to steering wheel center	2820 mm	2748 mm	72 mm
X17	Center of steering column to "A" post	325 mm	251 mm	74 mm
X18	Center of steering column to headliner	432 mm	461 mm	-29 mm
X19	Rear surface of vehicle to right side of front bumper	4512 mm	3986 mm	526 mm
X20	Rear surface of vehicle to left side of front bumper	4512 mm	3987 mm	525 mm
X21	Length of engine block	720 mm	720 mm	0 mm

Figure 12 Vehicle Intrusion Measurements

Static Footwell Deformation



Driver's Side

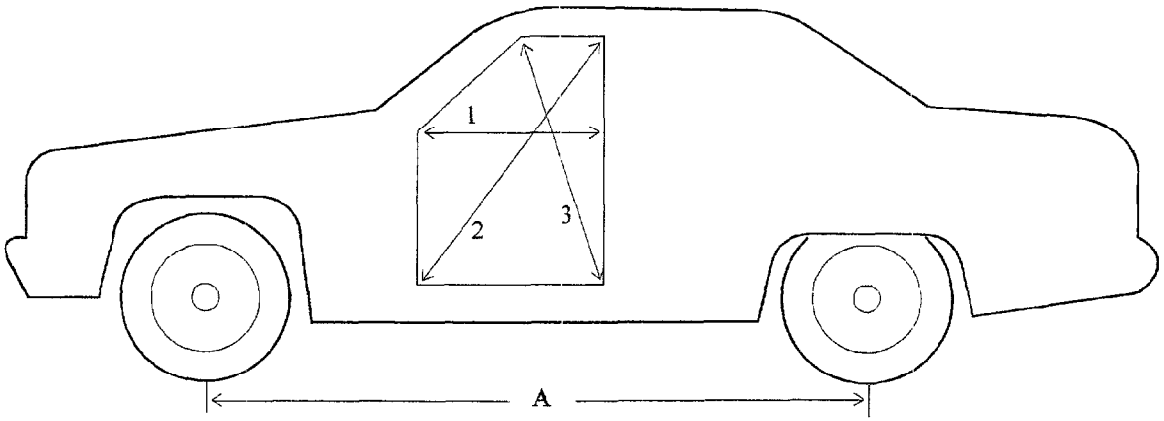
Measurement	Pre-Test	Post-Test	Difference
A	655 mm	612 mm	43 mm
B	505 mm	491 mm	14 mm
C	380 mm	361 mm	19 mm
D	355 mm	353 mm	2 mm

Passenger's Side

Measurement	Pre-Test	Post-Test	Difference
A	685 mm	660 mm	25 mm
B	500 mm	484 mm	16 mm
C	376 mm	345 mm	31 mm
D	398 mm	378 mm	20 mm

Figure 13 Vehicle Intrusion Measurements

Door Opening Width

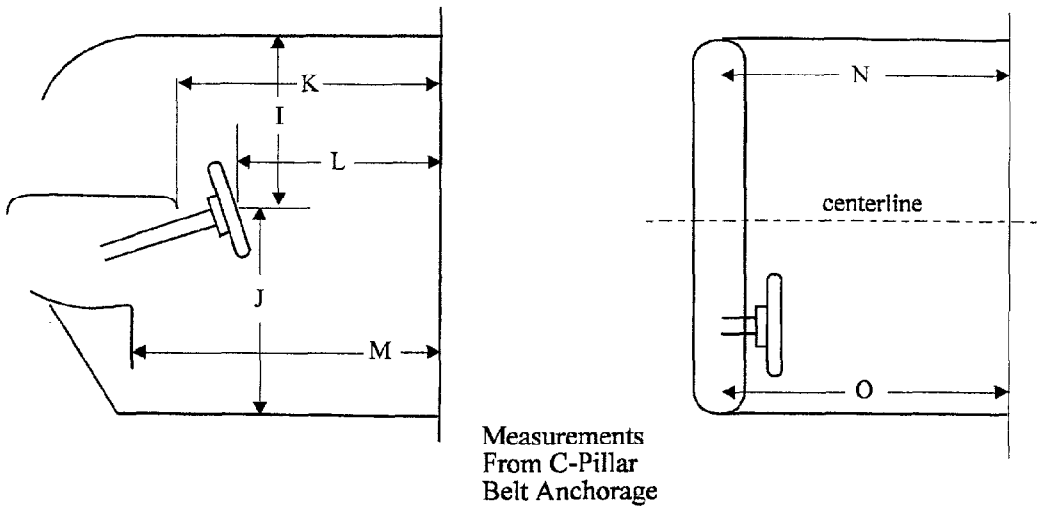


Units (mm)	Left			Right		
Measurement	1	2	3	1	2	3
Pre-Test	947 mm	1380 mm	925 mm	953 mm	1349 mm	895 mm
Post-Test	925 mm	1375 mm	954 mm	939 mm	1335 mm	920 mm
Difference	22 mm	5 mm	-29 mm	14 mm	14 mm	-25 mm

Units (mm)	A = Wheelbase Left	A = Wheelbase Right
Pre-Test	2630 mm	2630 mm
Post-Test	2537 mm	2522 mm
Difference	83 mm	108 mm

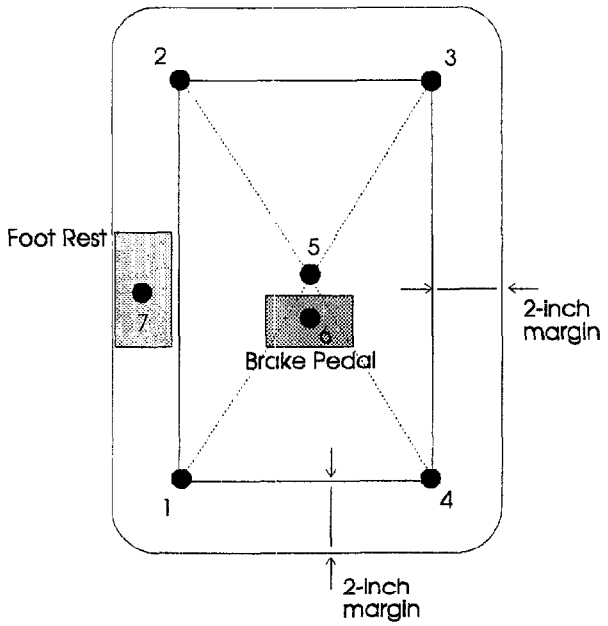
Figure 14 Vehicle Intrusion Measurements

Static Passenger Compartment Intrusion



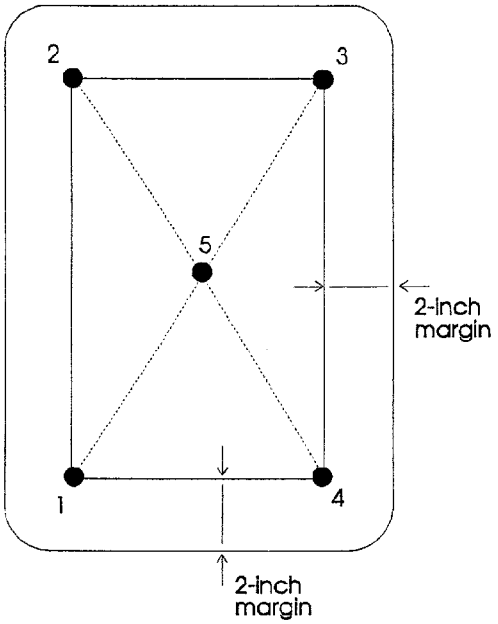
Measurement	Pre-Test	Post-Test	Difference
I	435 mm	472 mm	-37 mm
J	610 mm	571 mm	39 mm
K (driver's side)	1860 mm	1813 mm	47 mm
L	1684 mm	1661 mm	23 mm
M (driver's side)	1750 mm	1721 mm	29 mm
N	1838 mm	1812 mm	26 mm
O	1840 mm	1818 mm	22 mm
Passenger's side	1965 mm	1930 mm	35 mm
Passenger's side	1830 mm	1782 mm	42 mm

Figure 15 Driver Toeboard Measurements



Driver Side		X	Z
1	Pre-Test	910	236
	Post-Test	913	251
	Crush	-3	-15
2	Pre-Test	1420	380
	Post-Test	1382	337
	Crush	38	43
3	Pre-Test	1440	312
	Post-Test	1369	373
	Crush	71	-61
4	Pre-Test	940	259
	Post-Test	939	251
	Crush	1	8
5	Pre-Test	1230	251
	Post-Test	1226	240
	Crush	4	11
6	Pre-Test	1460	433
	Post-Test	1352	492
	Crush	108	-59
7	Pre-Test	1470	384
	Post-Test	1418	439
	Crush	52	-55

Figure 16 Passenger Toeboard Measurements



		Passenger Side	
		X	Z
1	Pre-Test	980	244
	Post-Test	952	318
	Crush	28	-74
2	Pre-Test	1400	283
	Post-Test	1363	317
	Crush	37	-34
3	Pre-Test	1423	297
	Post-Test	1406	334
	Crush	17	-37
4	Pre-Test	956	230
	Post-Test	951	269
	Crush	5	-39
5	Pre-Test	1230	244
	Post-Test	1210	258
	Crush	20	-14
6	Pre-Test	N/A	N/A
	Post-Test	N/A	N/A
	Crush	N/A	N/A
7	Pre-Test	N/A	N/A
	Post-Test	N/A	N/A
	Crush	N/A	N/A

Appendix A

Photographs

Figure A-1 Pre-Test Front View

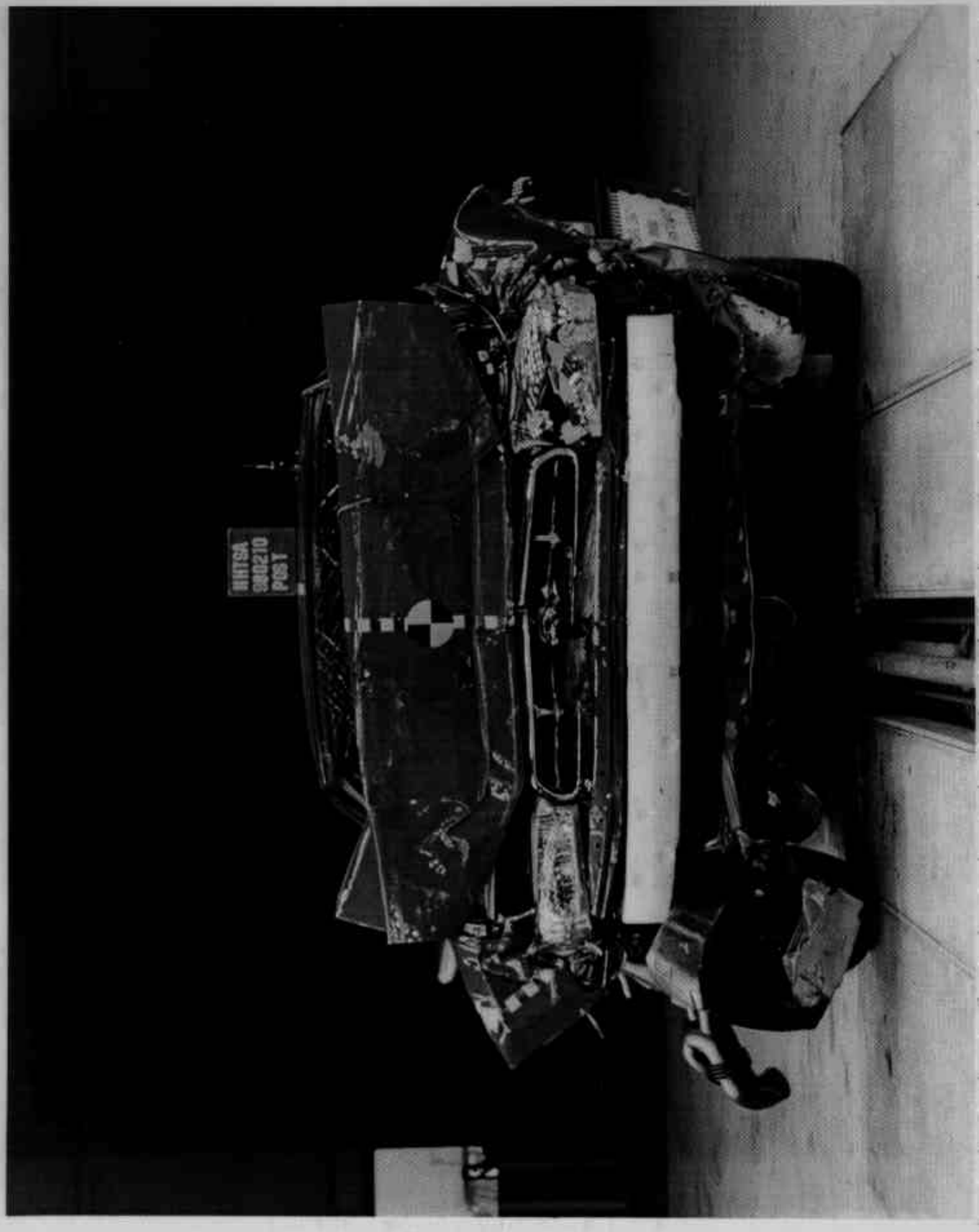


Figure A-2 Post-Test Front View

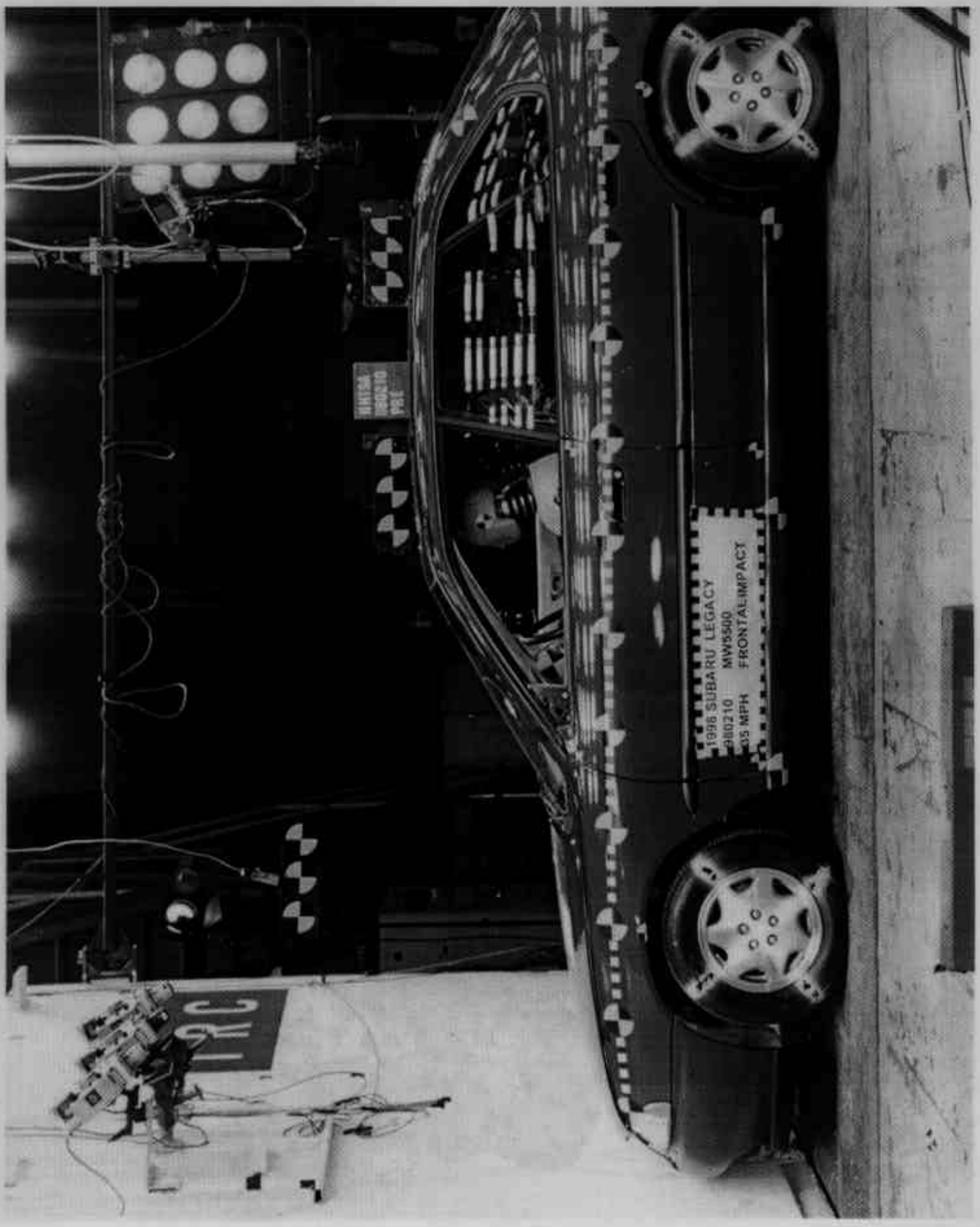


Figure A-3 Pre-Test Left Side View

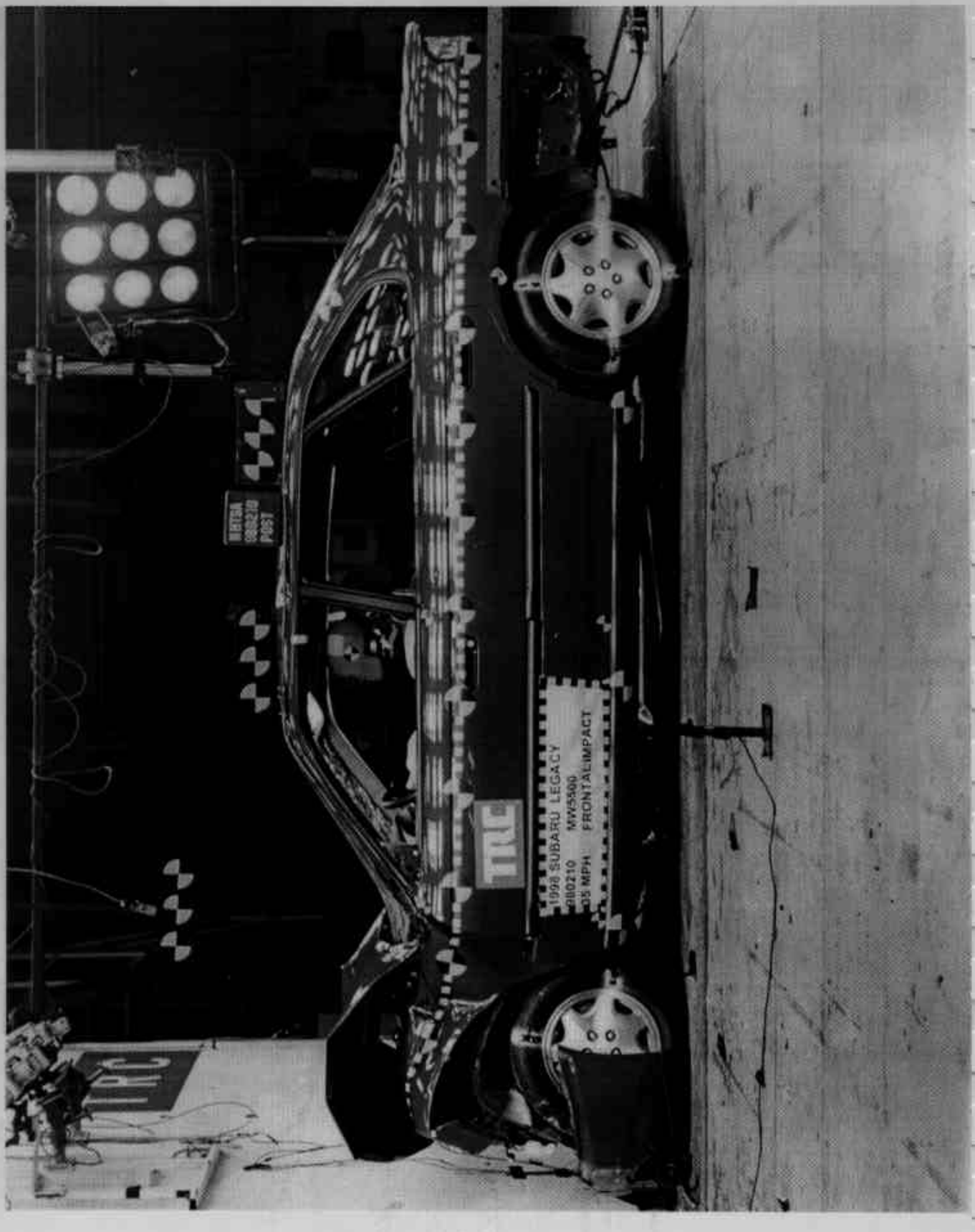


Figure A-4 Post-Test Left Side View

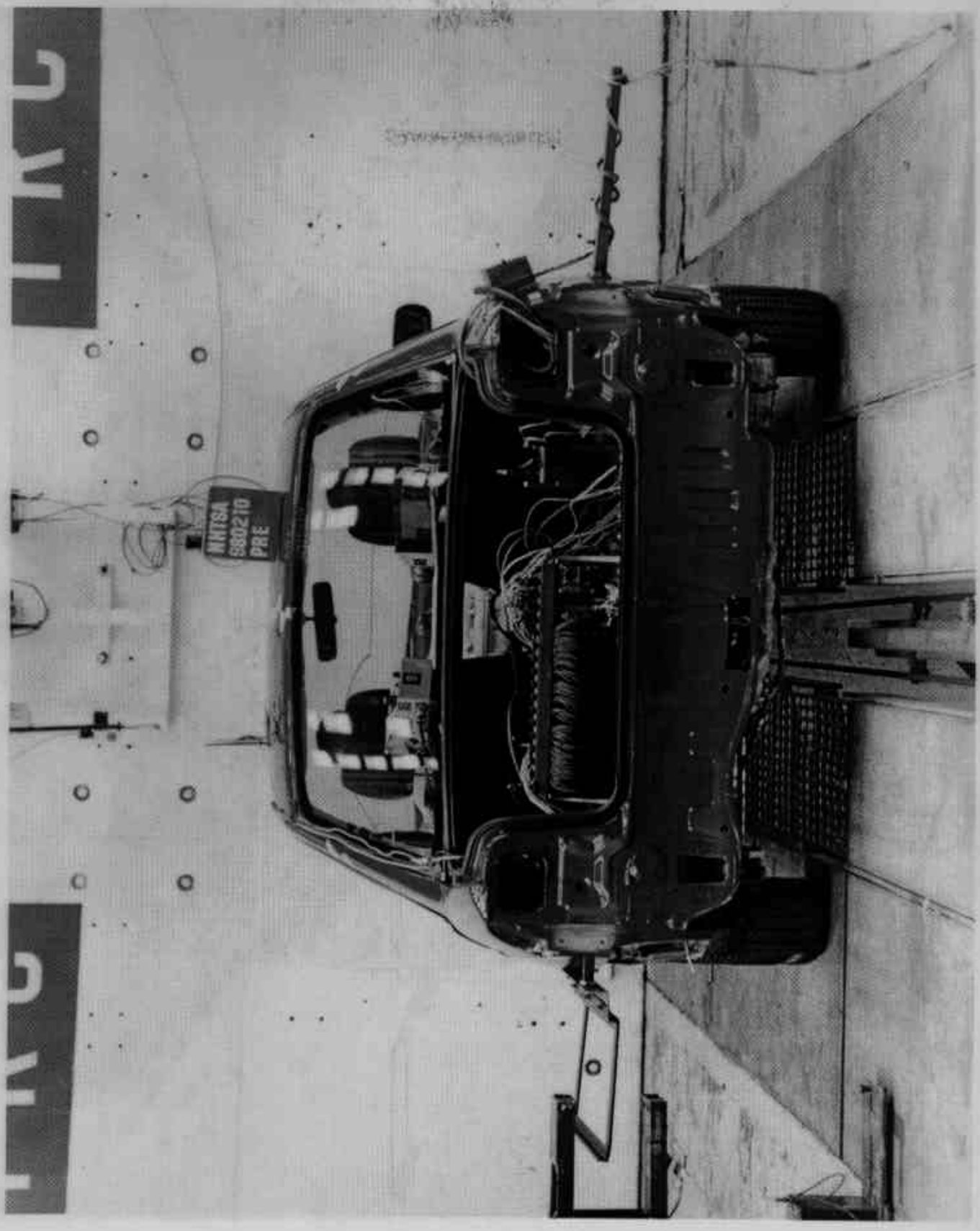


Figure A-5 Pre-Test Rear View

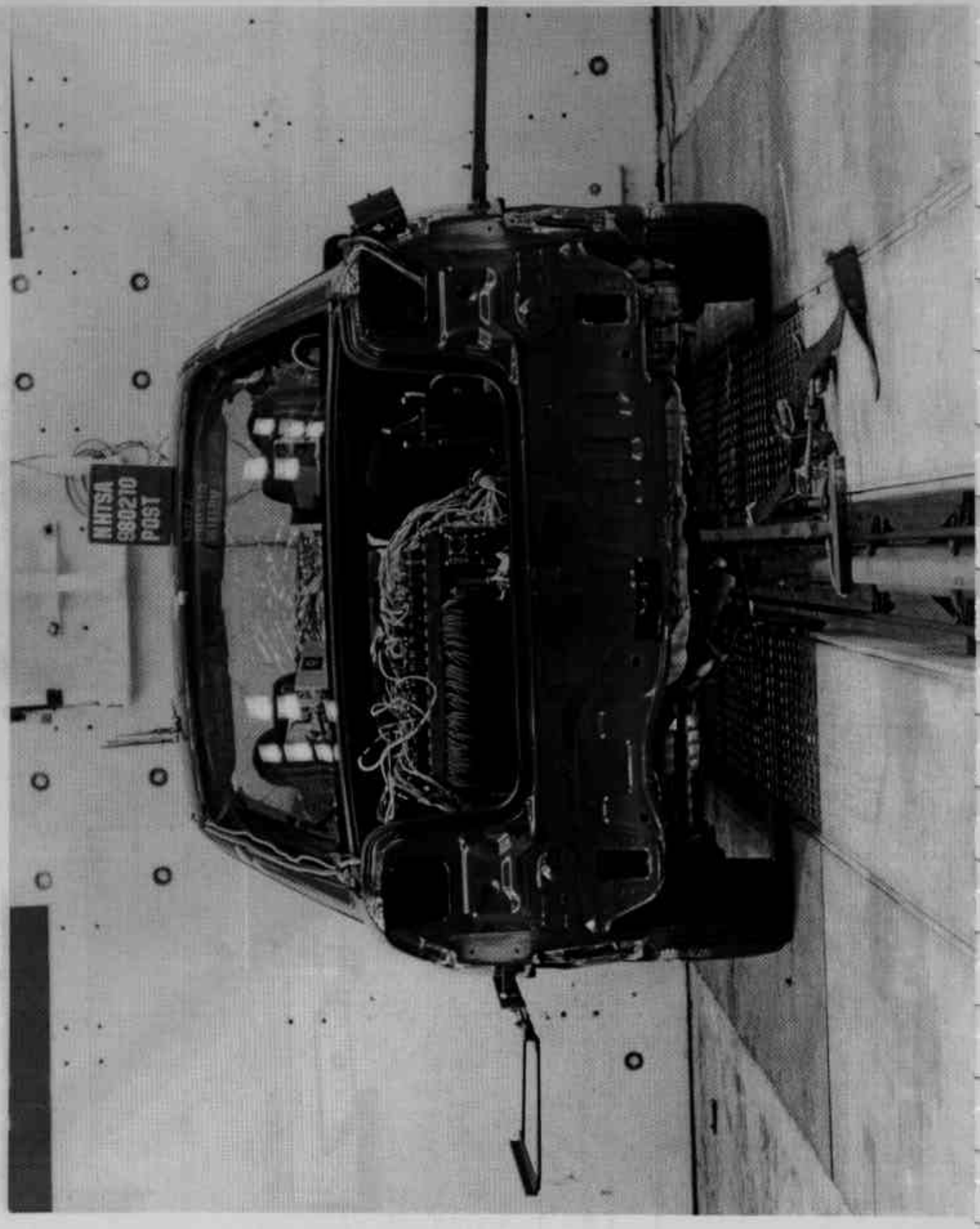


Figure A-6 Post-Test Rear View

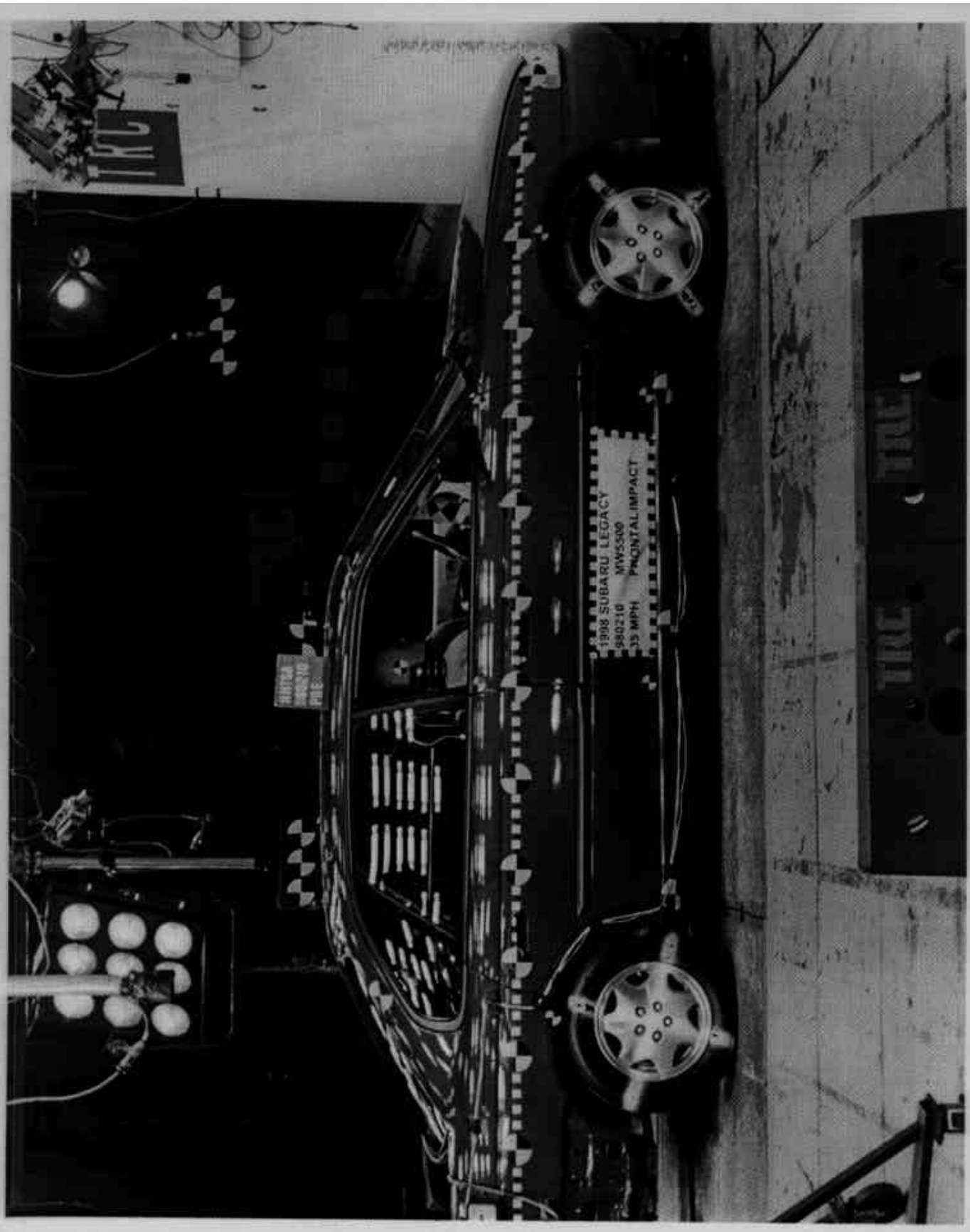


Figure A-7 Pre-Test Right Side View

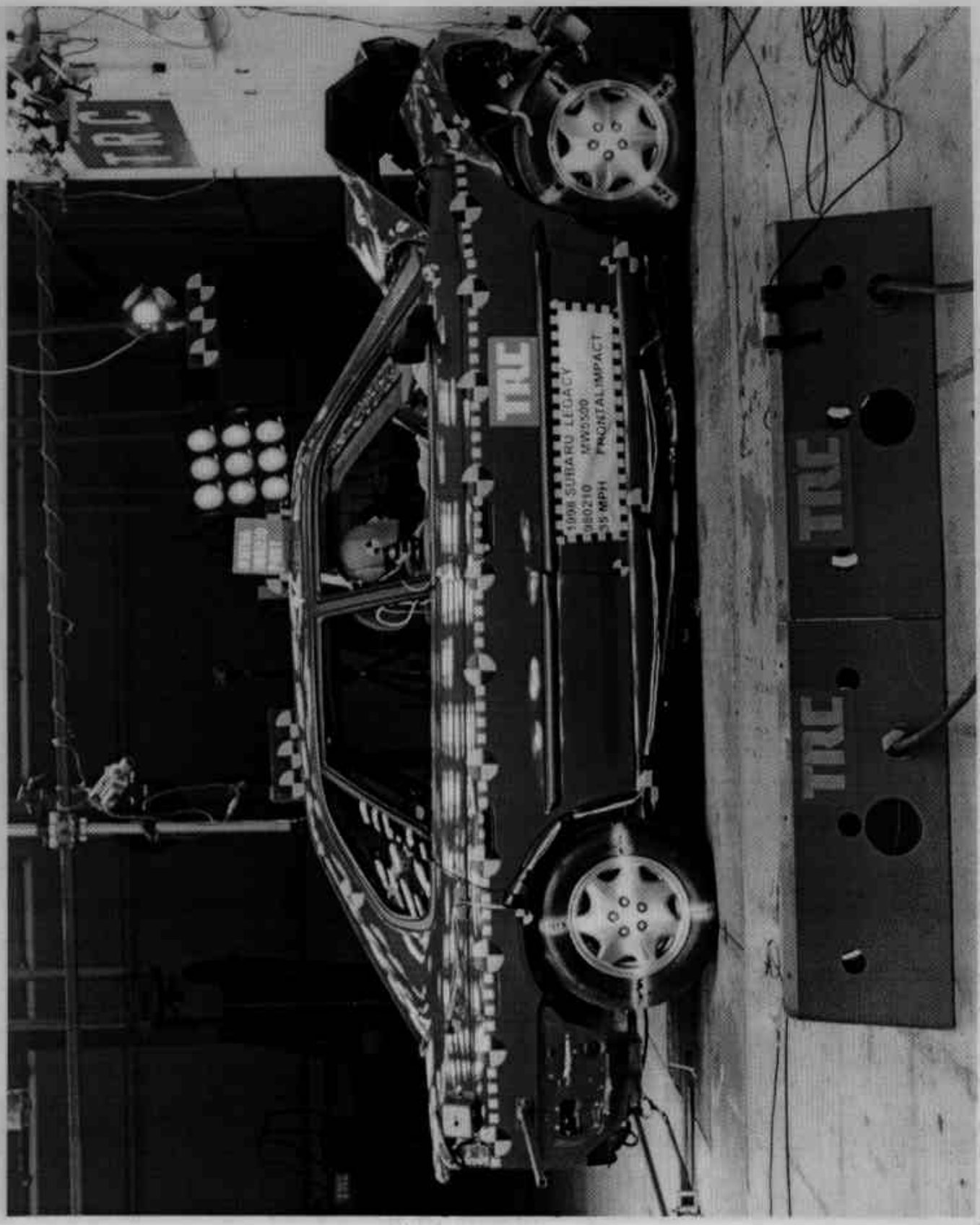


Figure A-8 Post-Test Right Side View

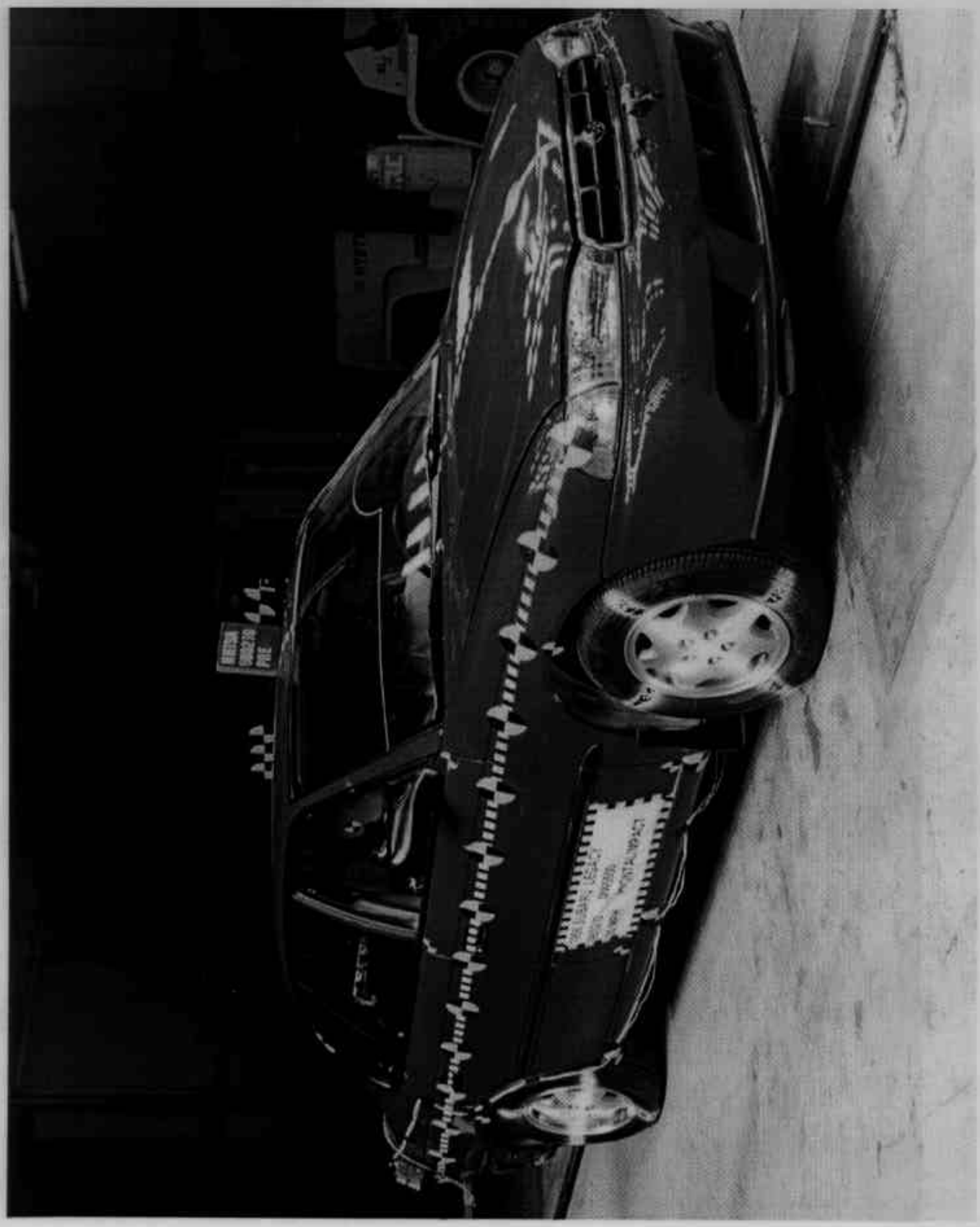


Figure A-9 Pre-Test Right Front Three-Quarter View

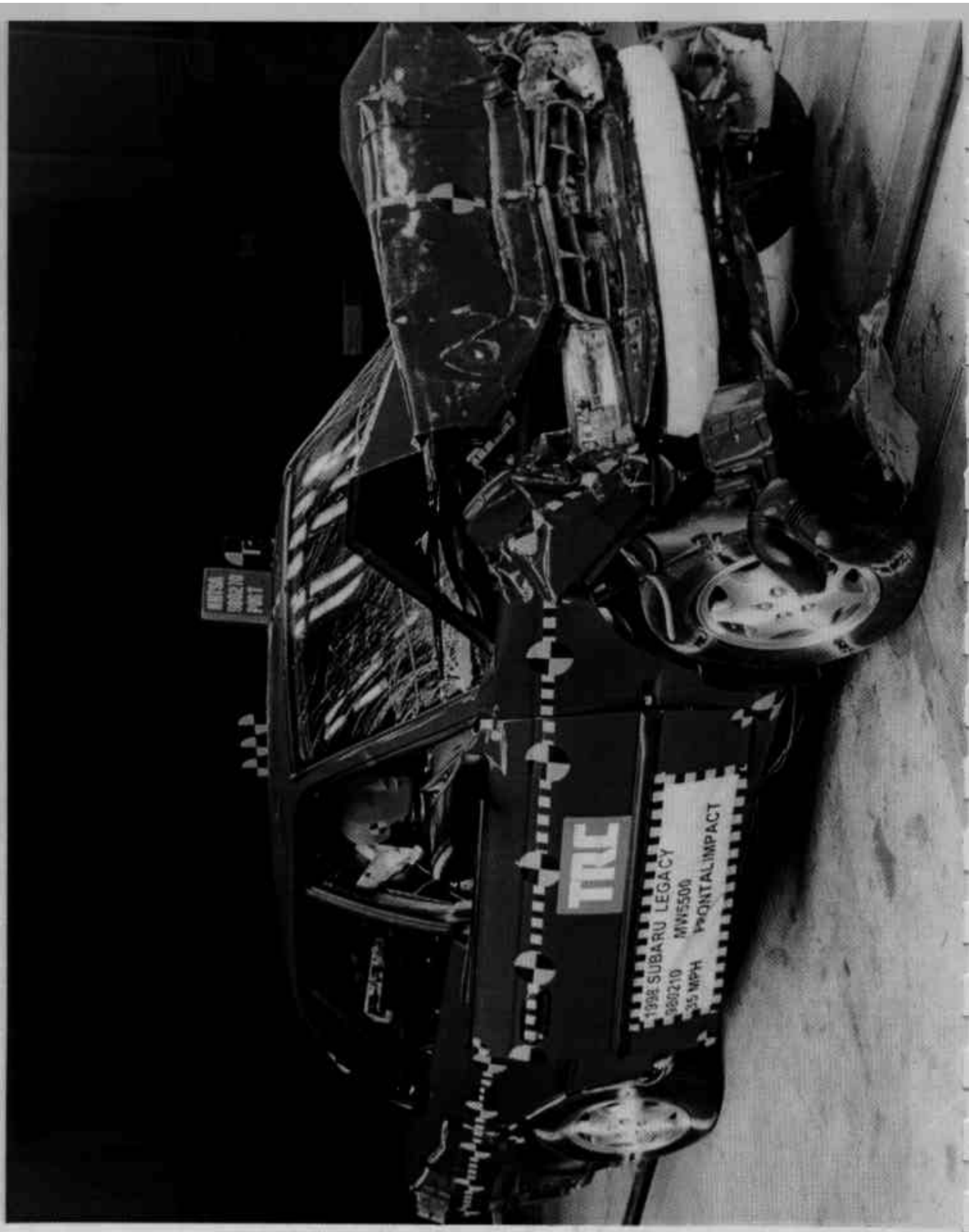


Figure A-10 Post-Test Right Front Three-Quarter View

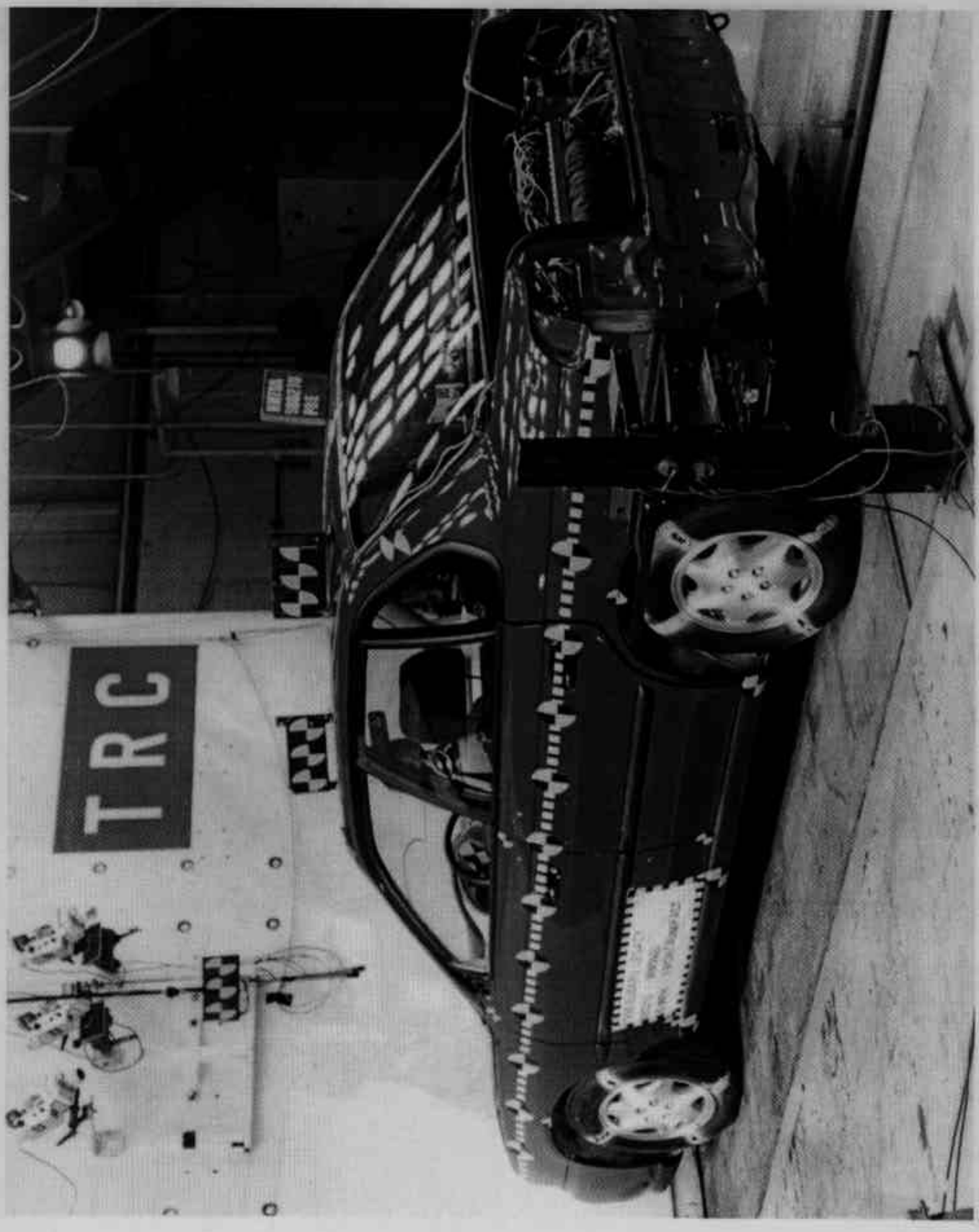


Figure A-11 Pre-Test Left Rear Three-Quarter View

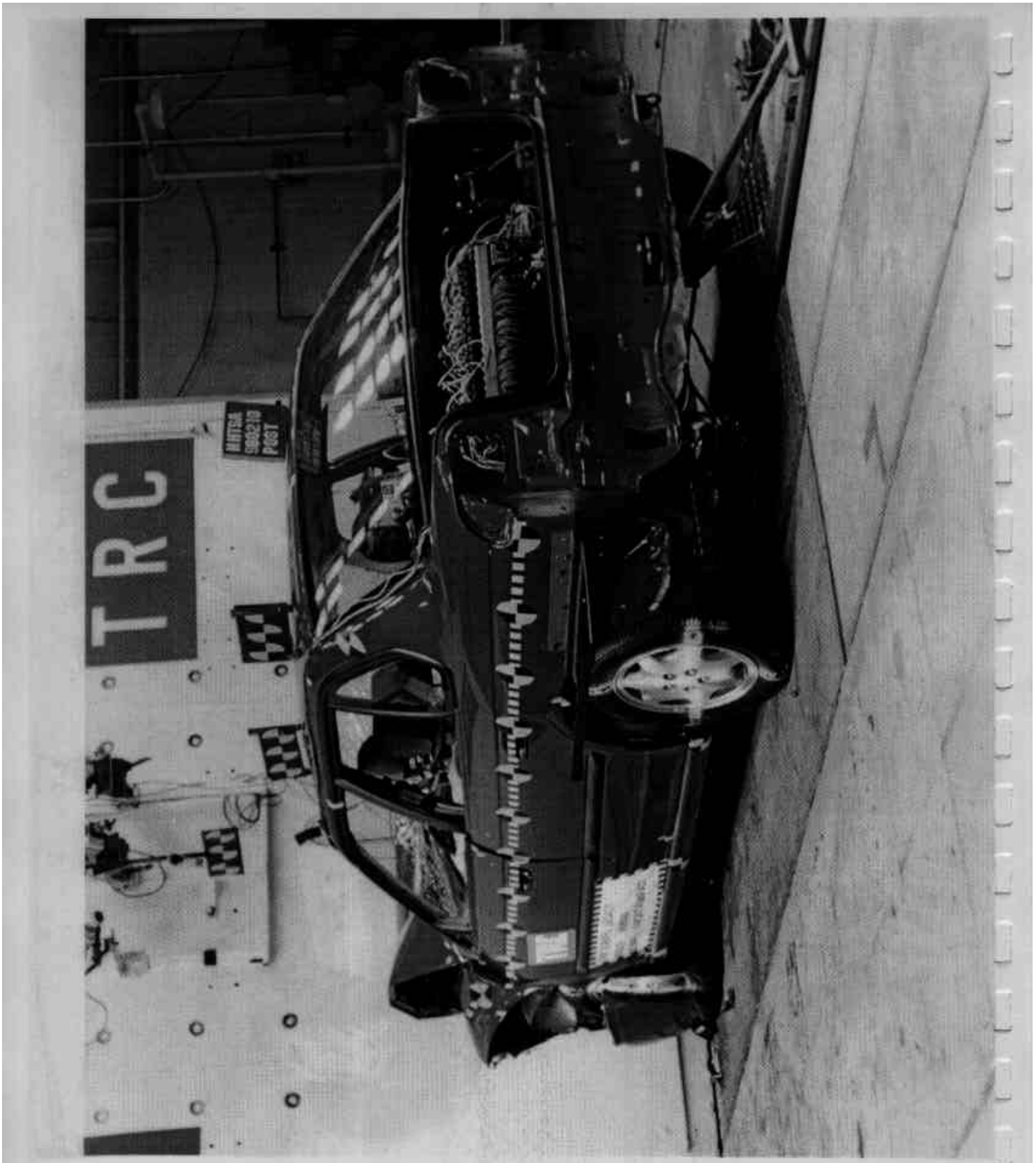


Figure A-12 Post-Test Left Rear Three-Quarter View

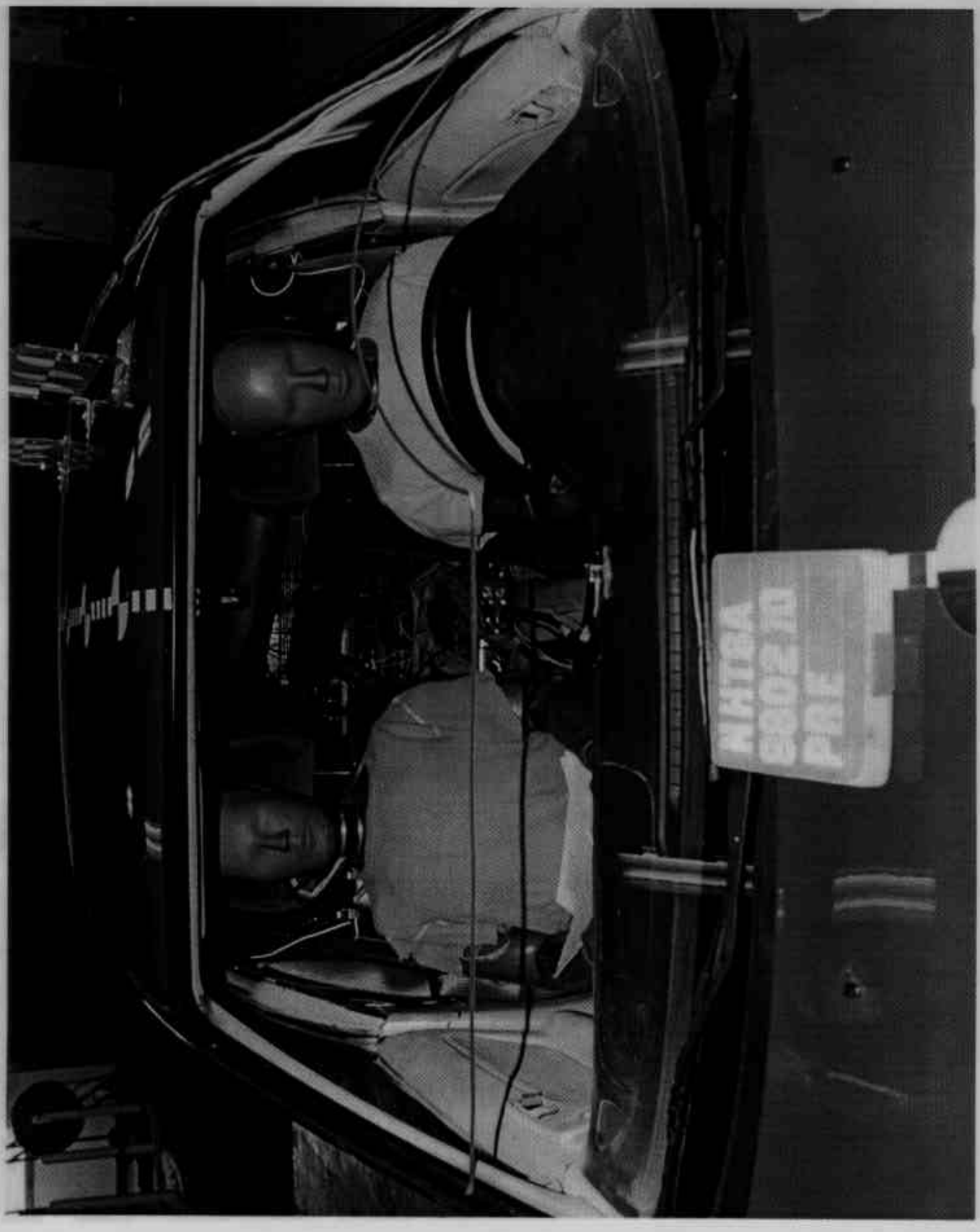


Figure A-13 Pre-Test Windshield View

Figure A-14 Post-Test Windshield View

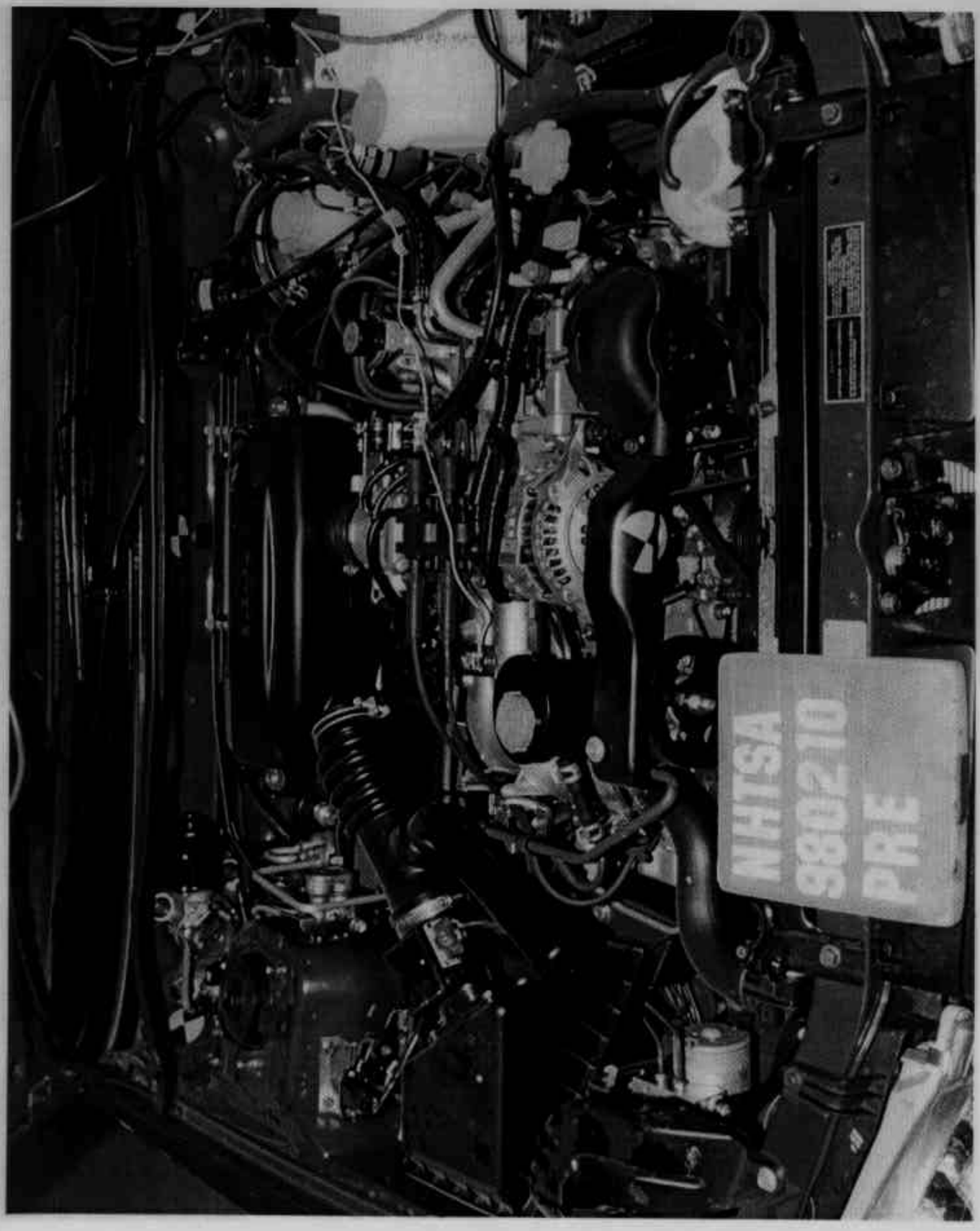


Figure A-15 Pre-Test Engine Compartment View

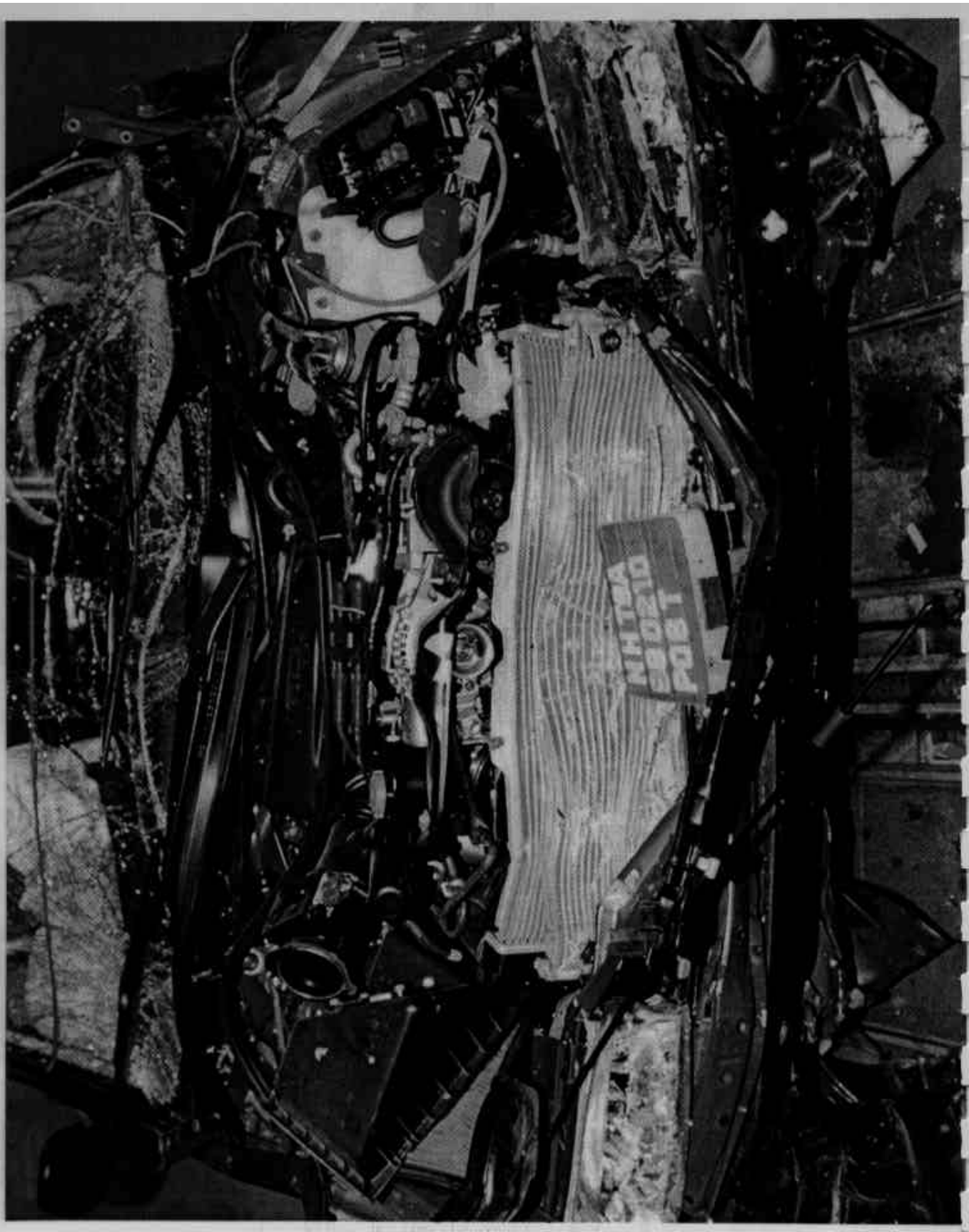


Figure A-16 Post-Test Engine Compartment View

Figure A-17 Pre-Test Fuel Filler Cap View

Figure A-18 Post-Test Fuel Filler Cap View

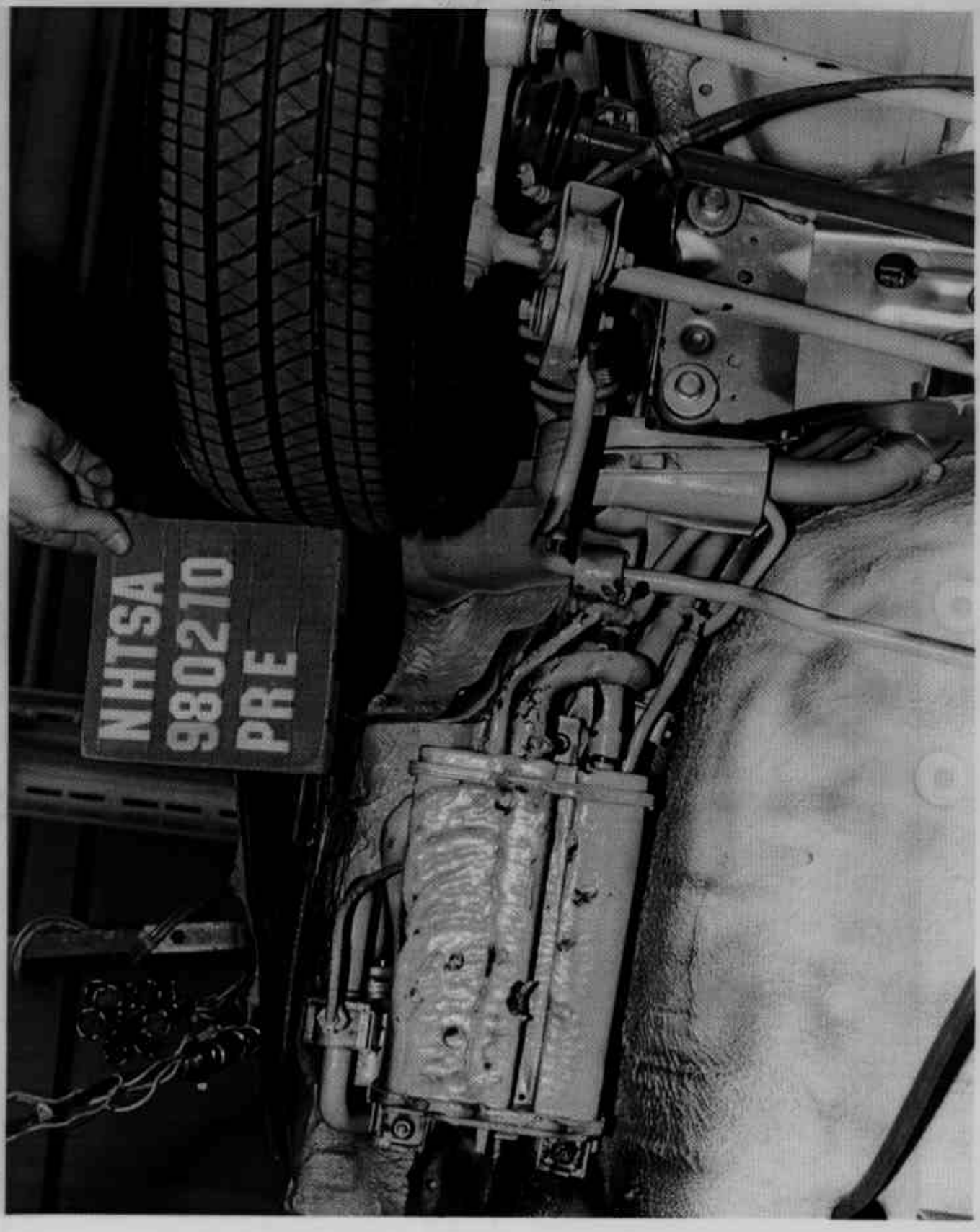


Figure A-19 Pre-Test Fuel Filler Neck View

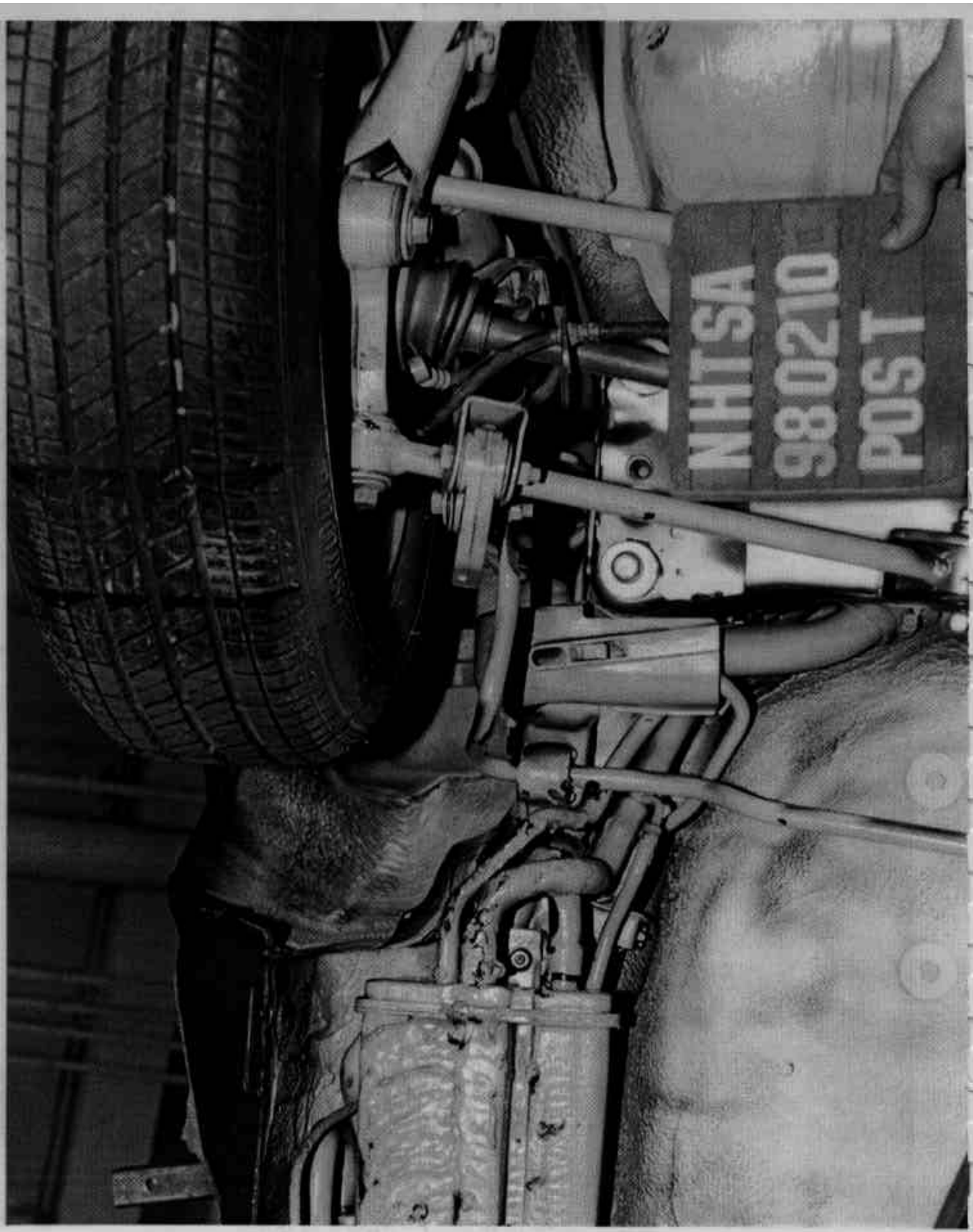


Figure A-20 Post-Test Fuel Filler Neck View

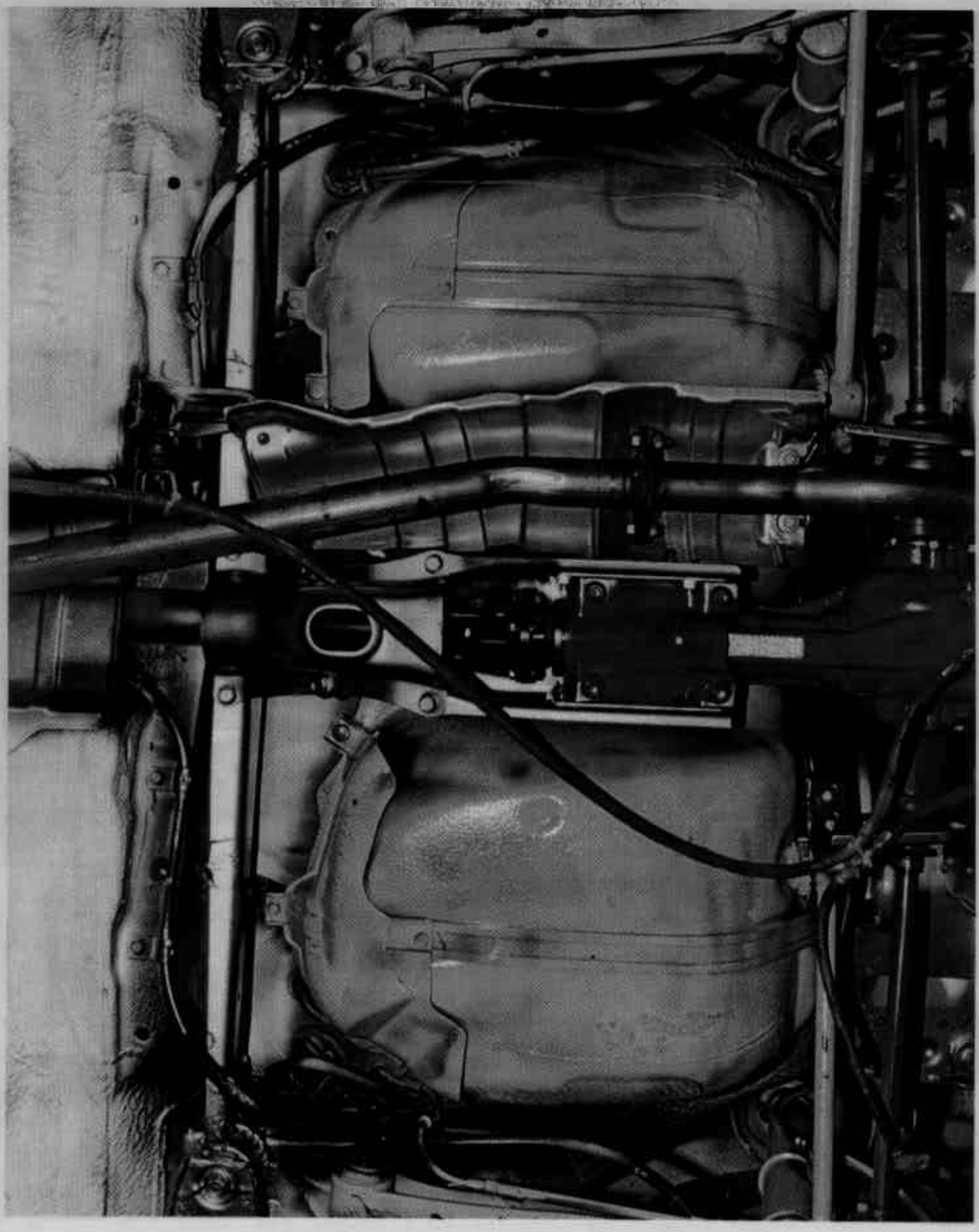


Figure A-21 Pre-Test Fuel Tank View

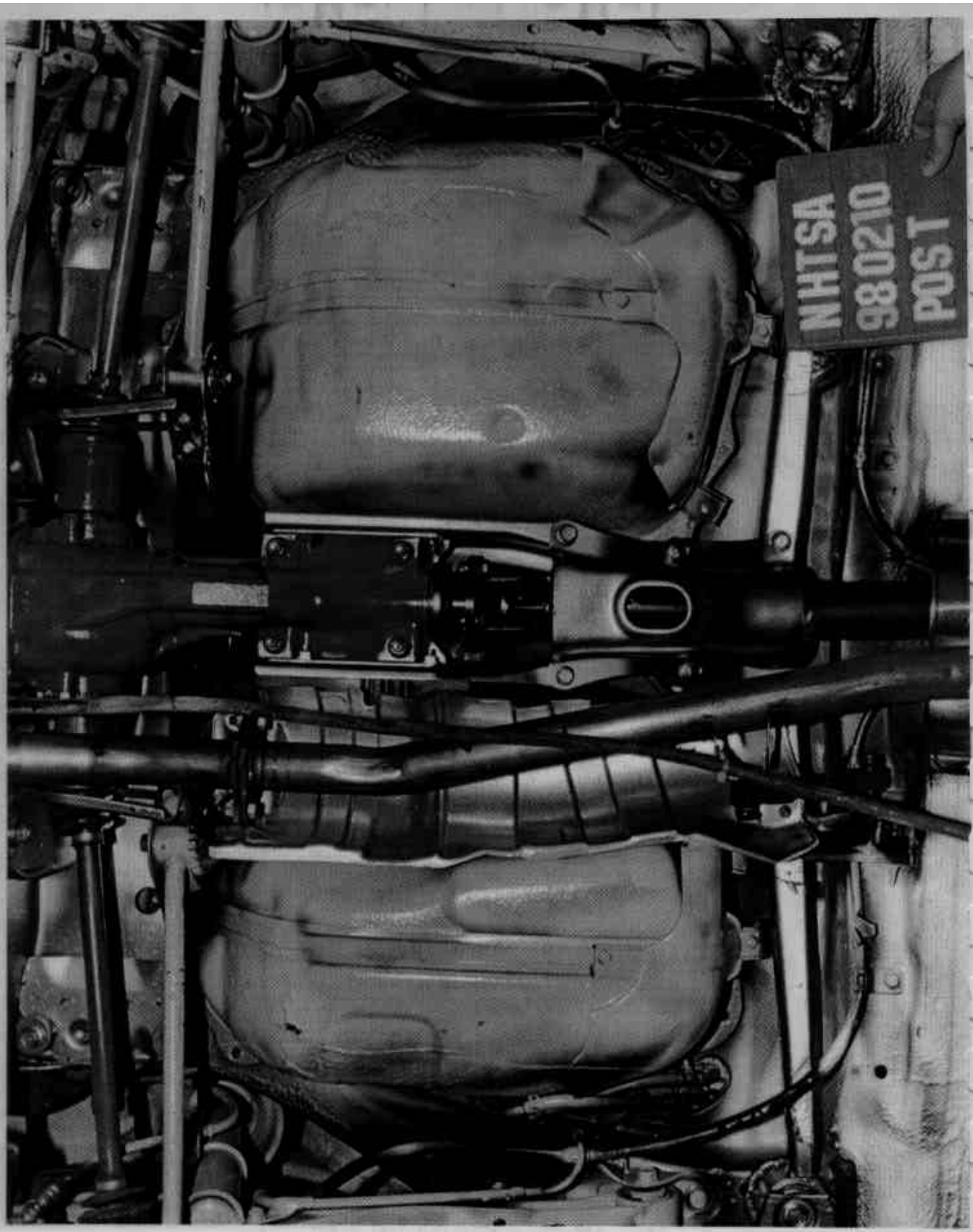


Figure A-22 Post-Test Fuel Tank View

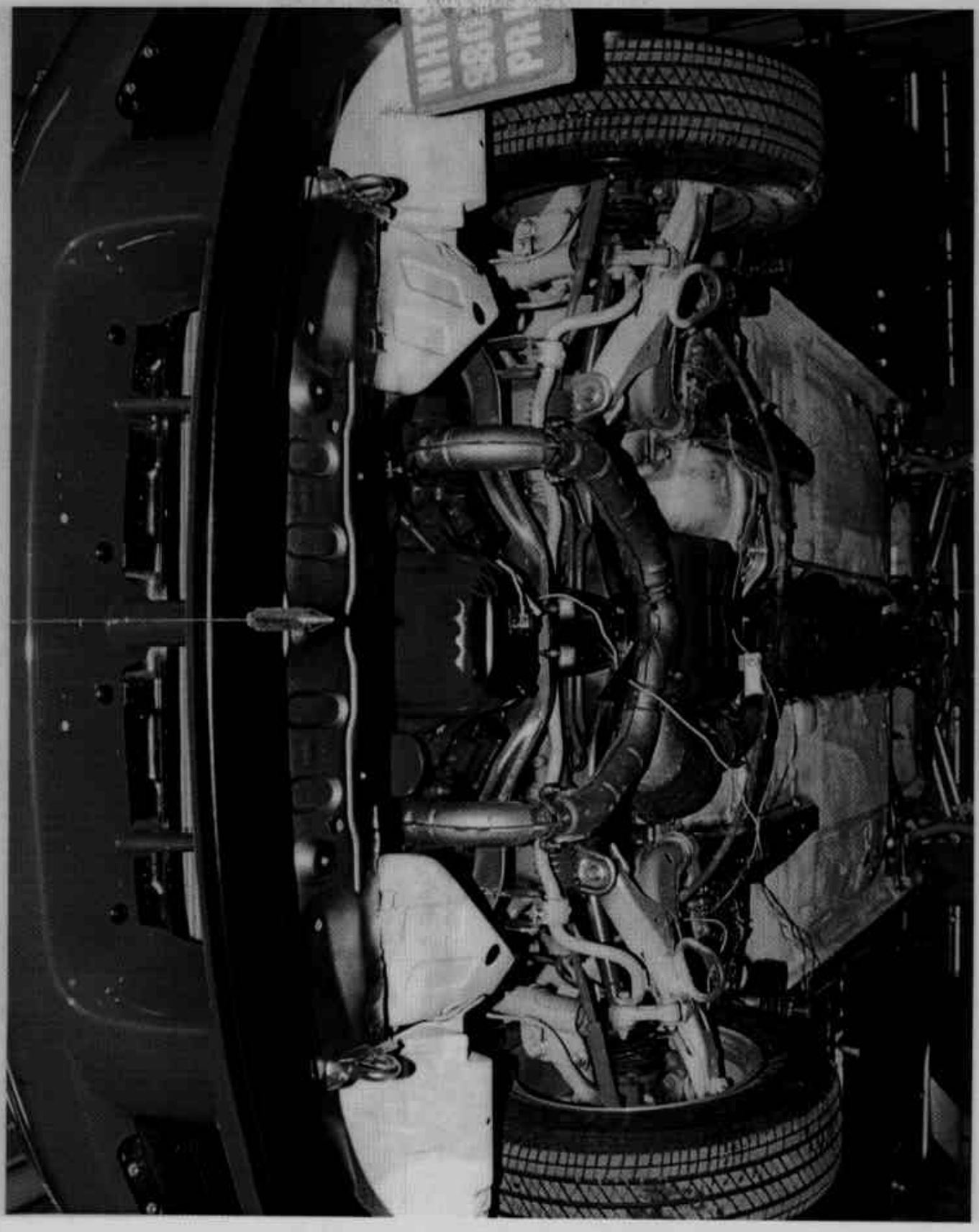


Figure A-23 Pre-Test Front Underbody View

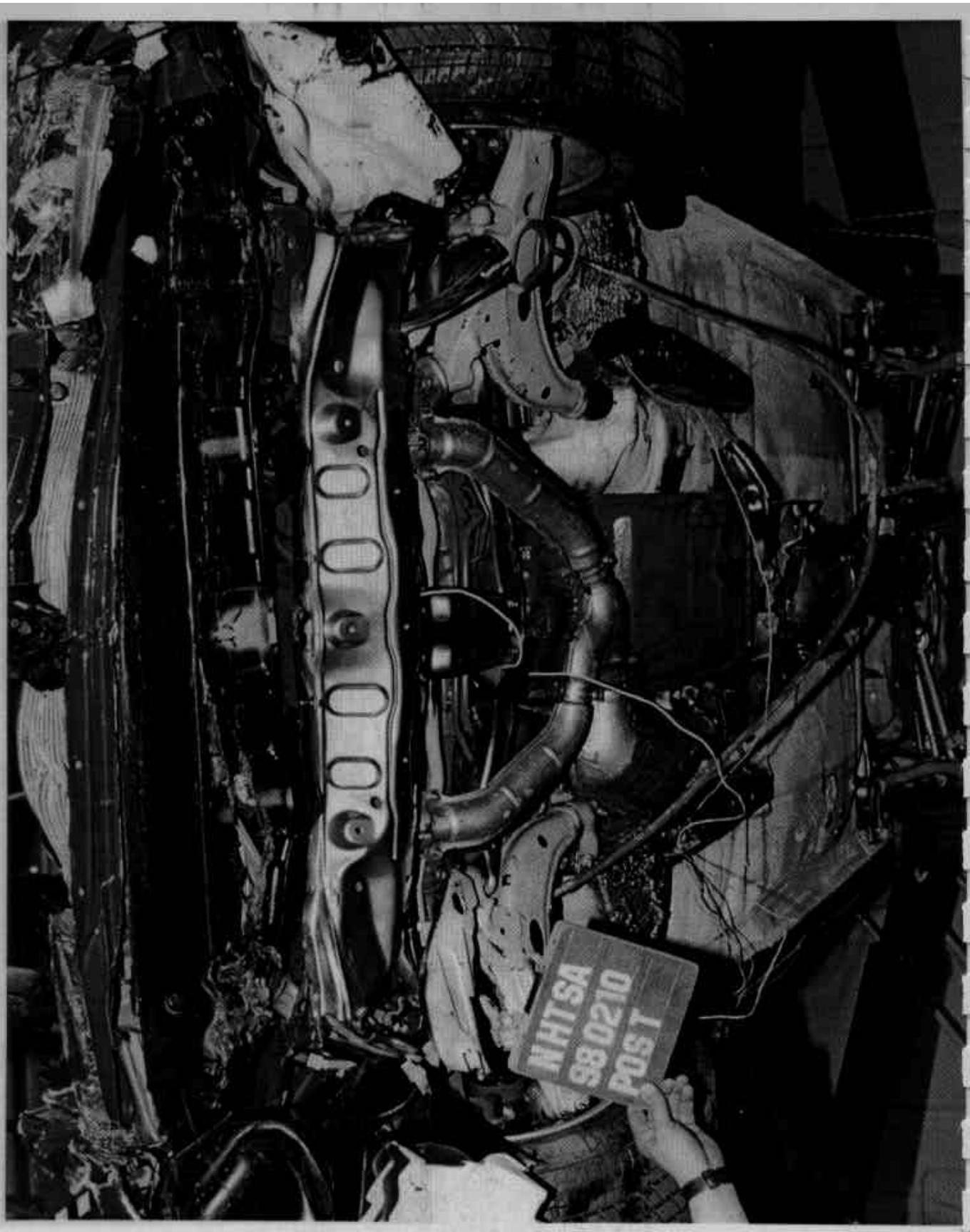


Figure A-24 Post-Test Front Underbody View

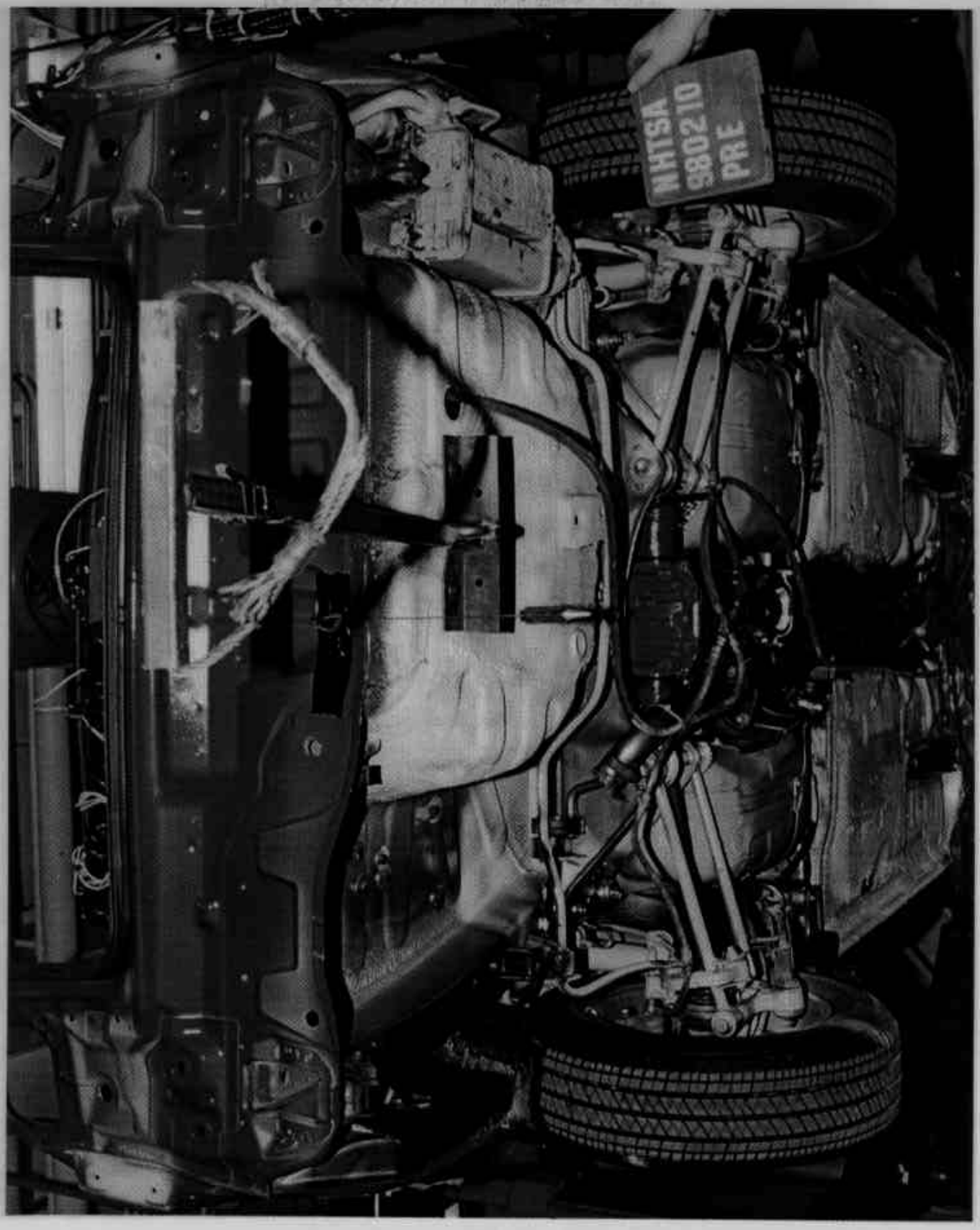


Figure A-25 Pre-Test Rear Underbody View

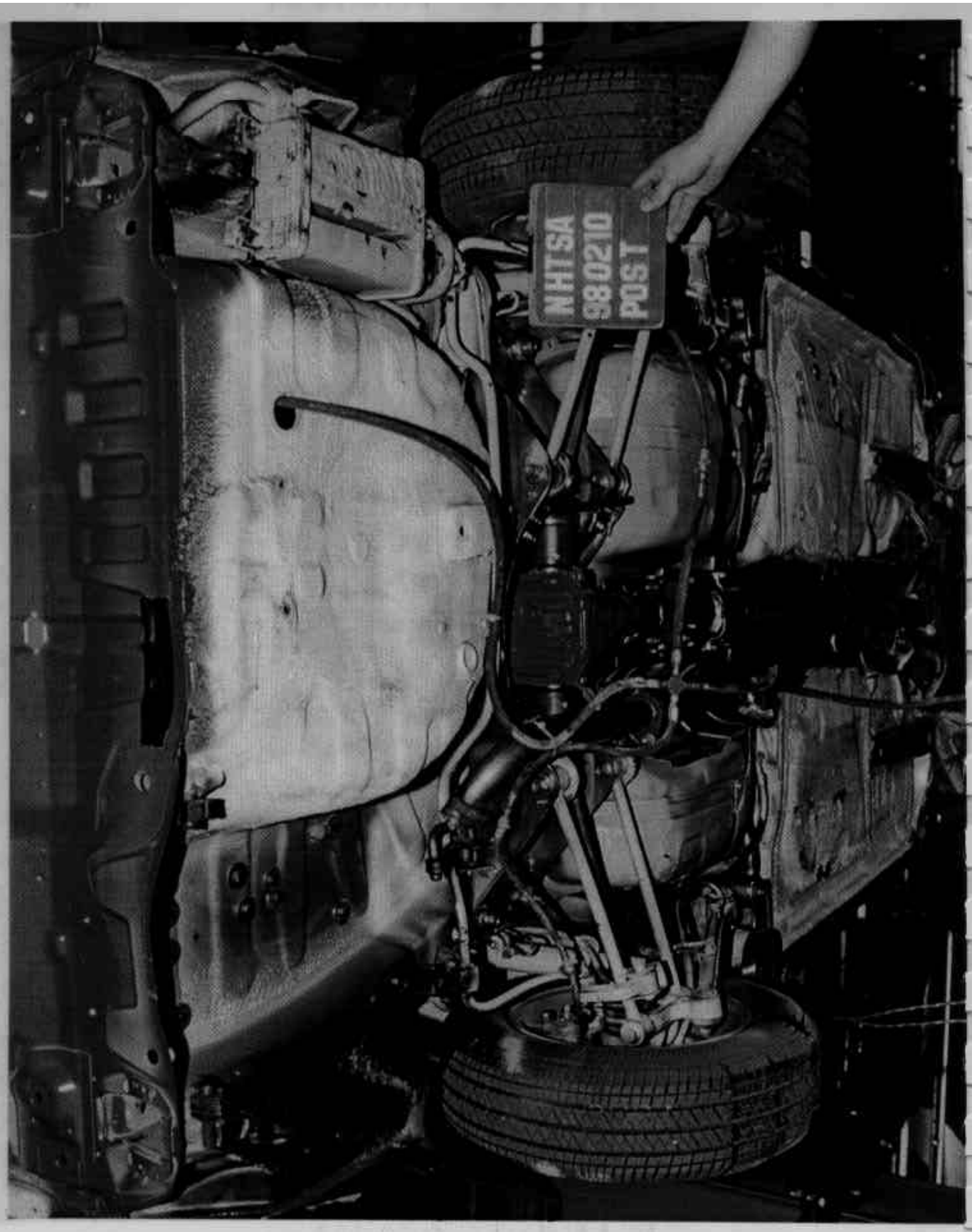


Figure A-26 Post-Test Rear Underbody View

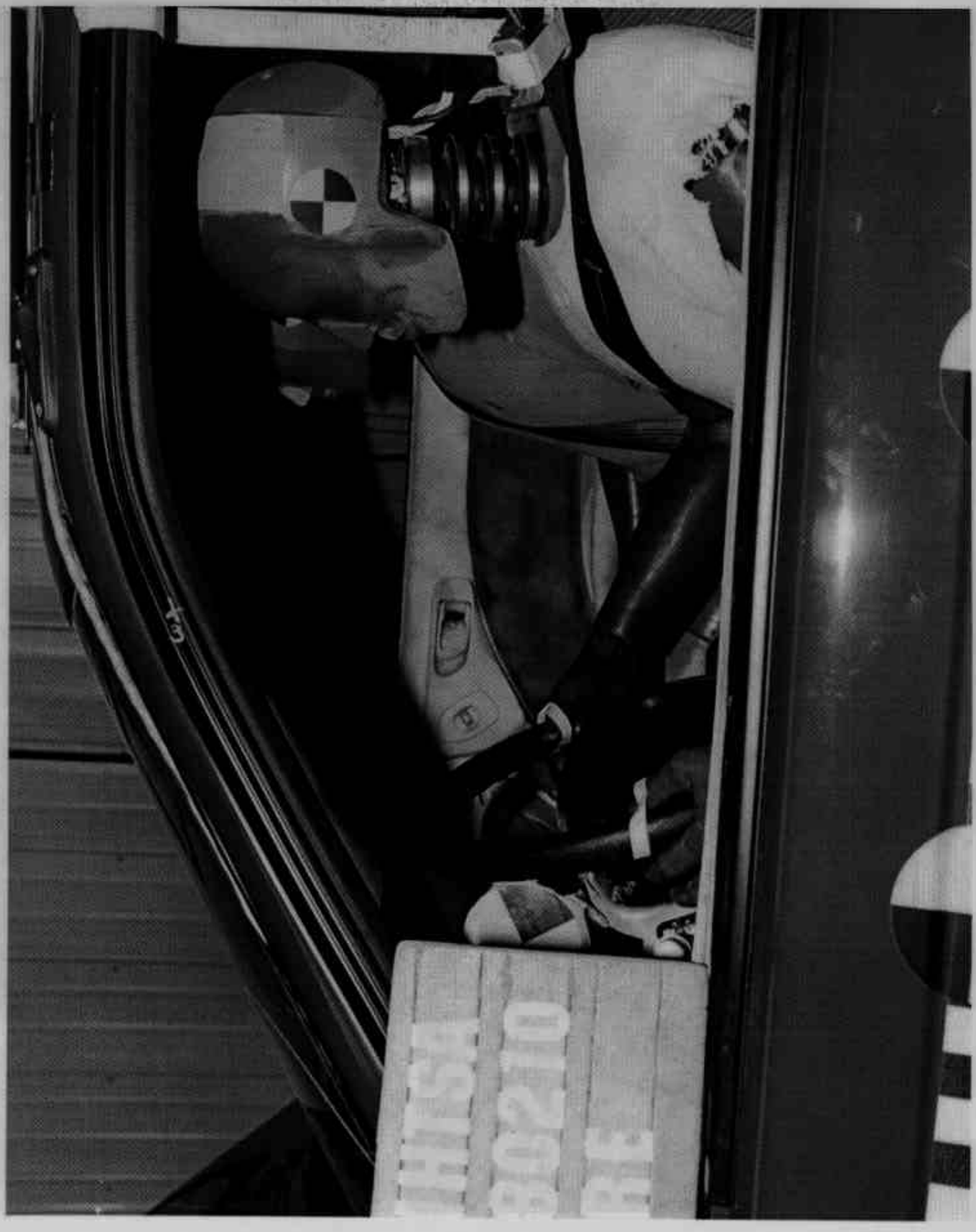


Figure A-27 Pre-Test Driver Dummy Position View

Figure A-28 Post-Test Driver Dummy Position View

Figure A-29 Pre-Test Passenger Dummy Position View

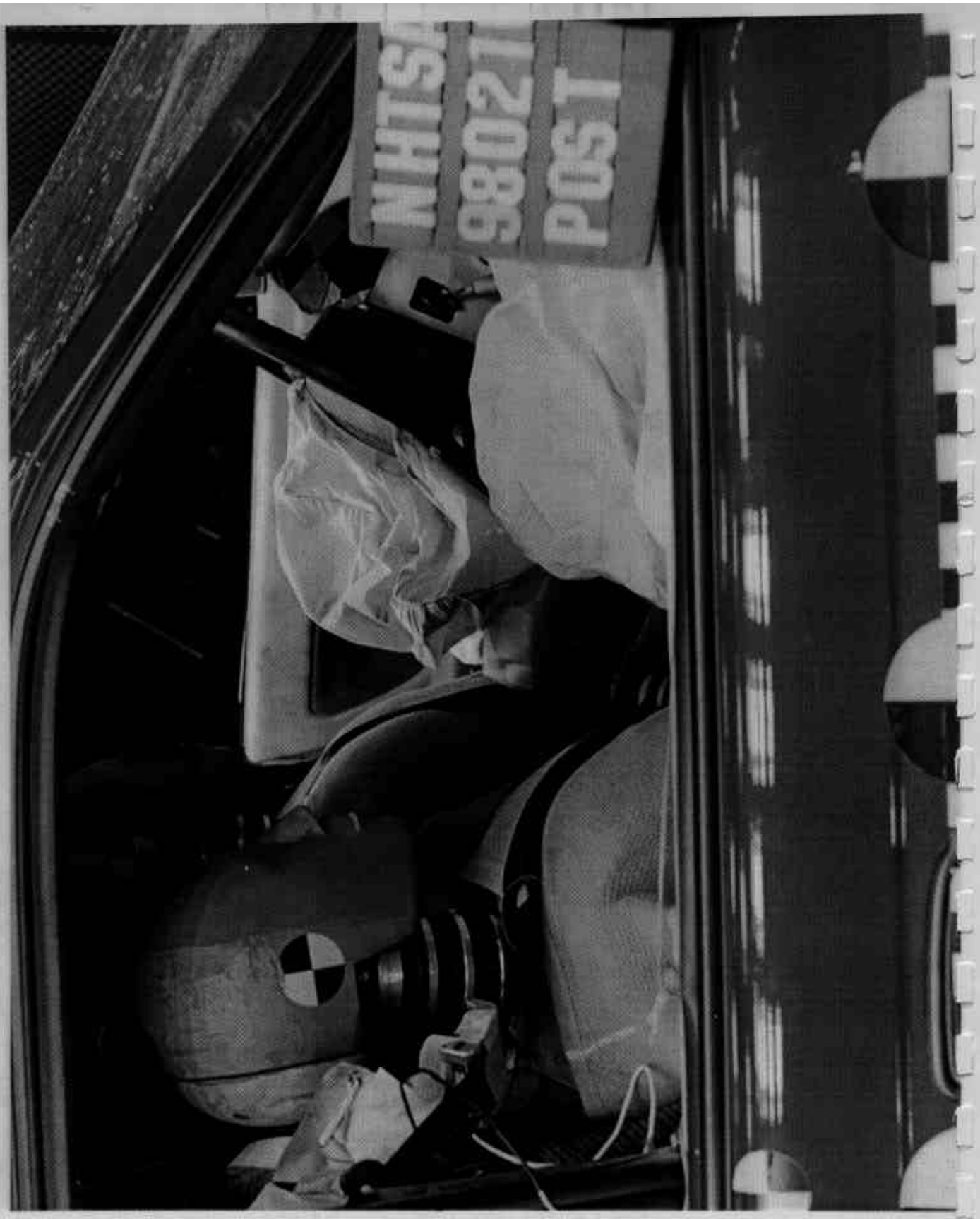


Figure A-30 Post-Test Passenger Dummy Position View

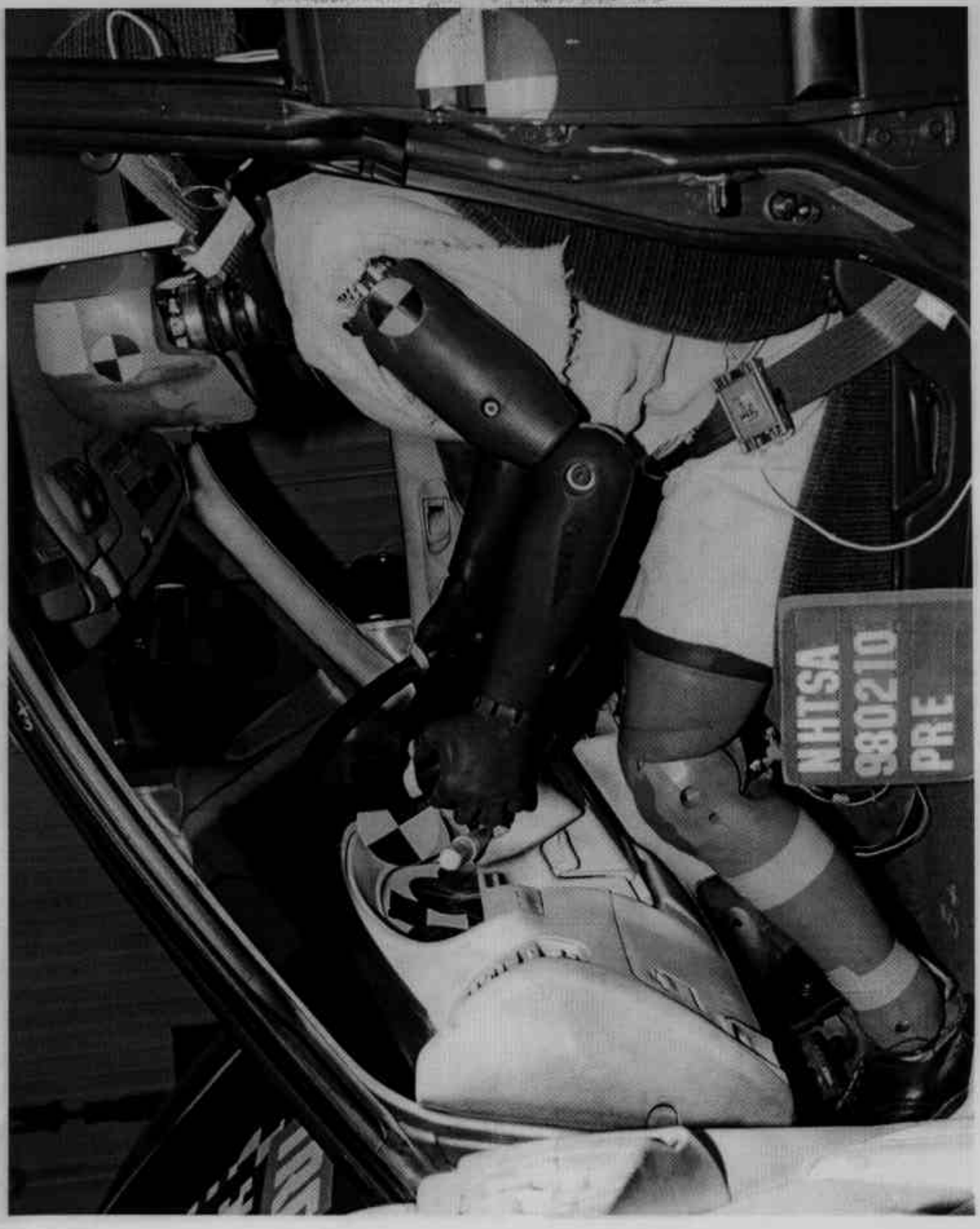


Figure A-31 Pre-Test Driver Dummy and Vehicle Interior - View 1

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

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

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

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

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

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

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

Figure A-39 Post-Test Driver Dummy View

Figure A-40 Post-Test Driver Dummy Head Contact - View 1

Figure A-41 Post-Test Driver Dummy Head Contact - View 2

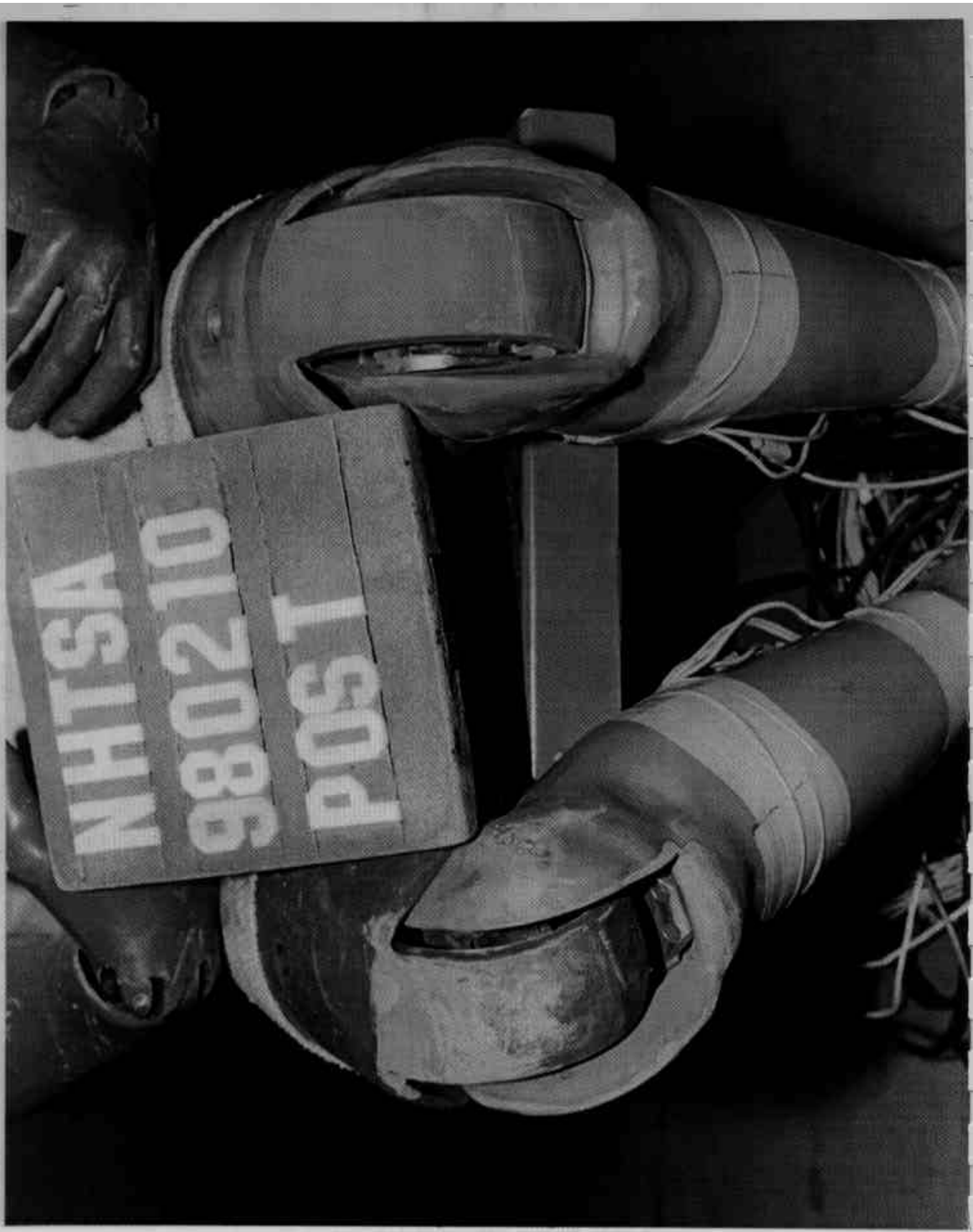


Figure A-42 Post-Test Driver Dummy Knee Contact - View 1

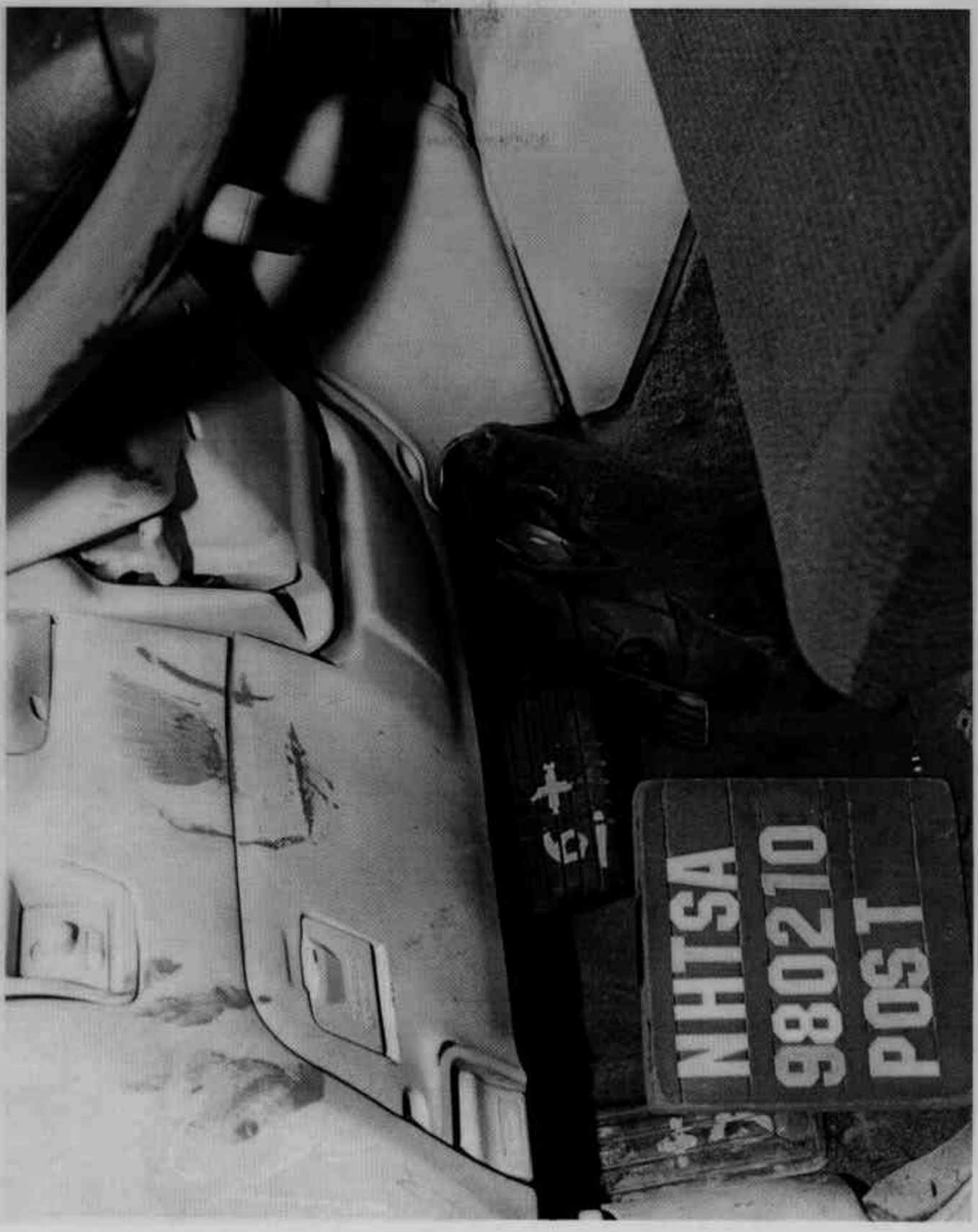


Figure A-43 Post-Test Driver Dummy Knee Contact - View 2

Figure A-44 Post-Test Passenger Dummy View

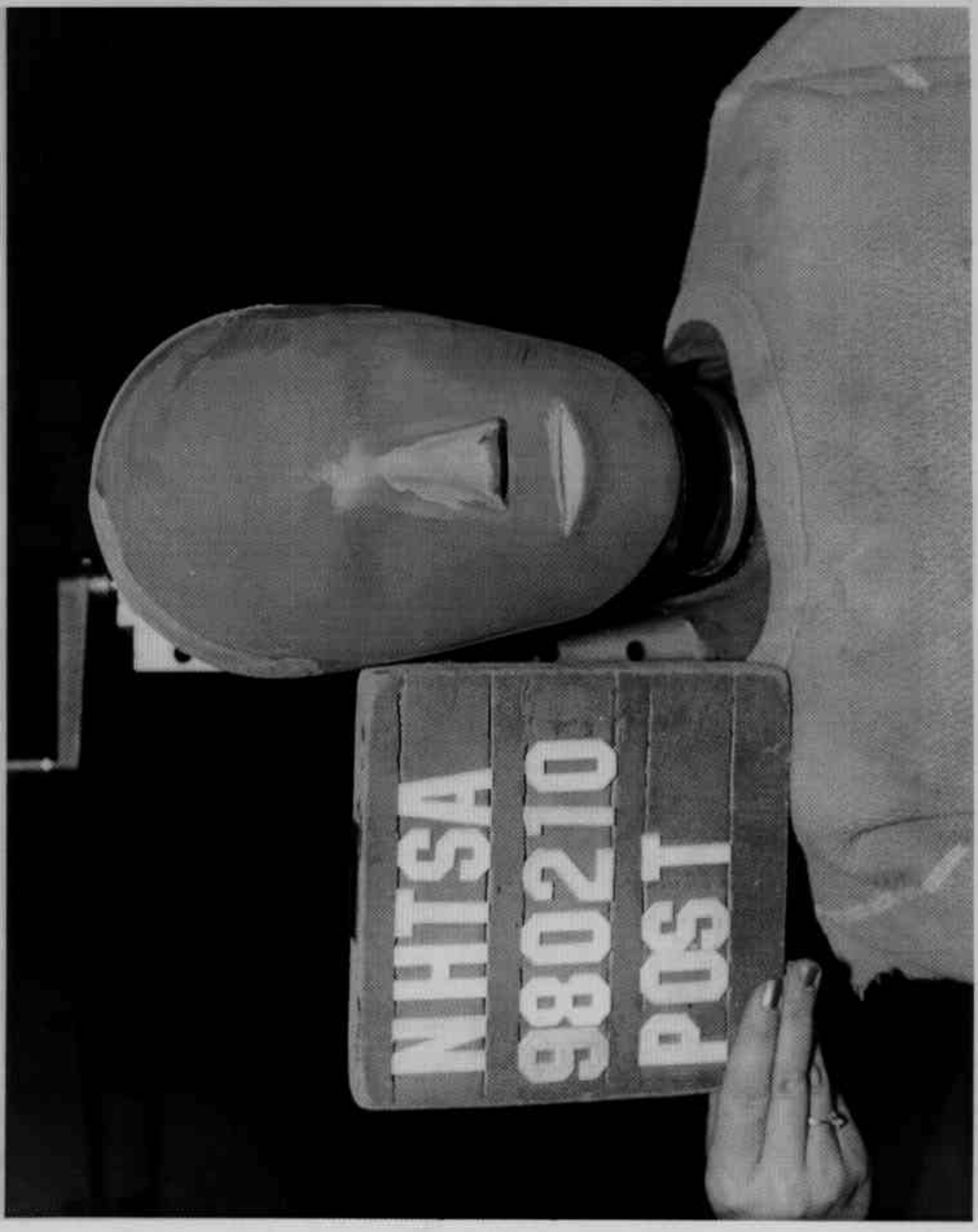


Figure A-45 Post-Test Passenger Dummy Head Contact - View 1

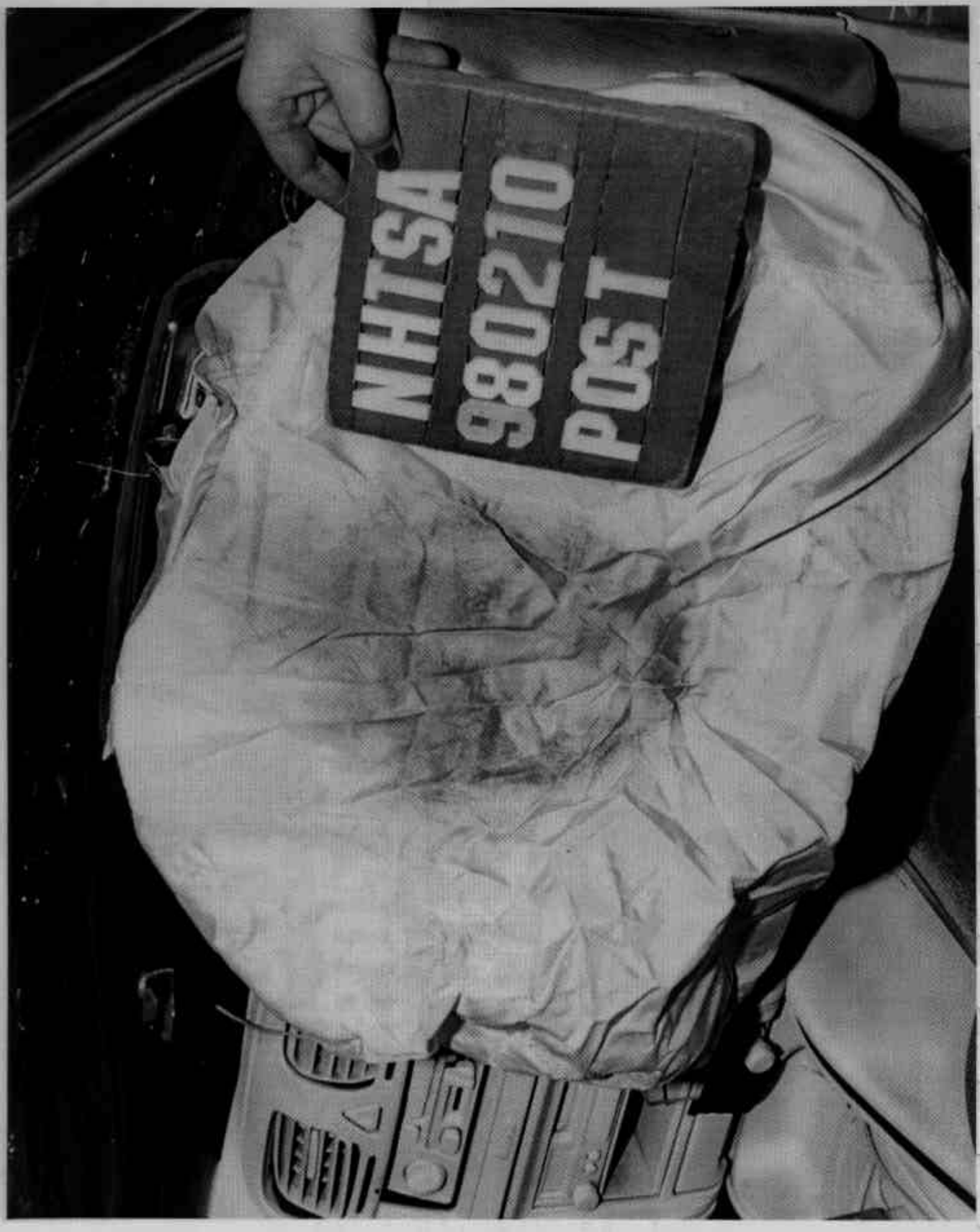


Figure A-46 Post-Test Passenger Dummy Head Contact - View 2

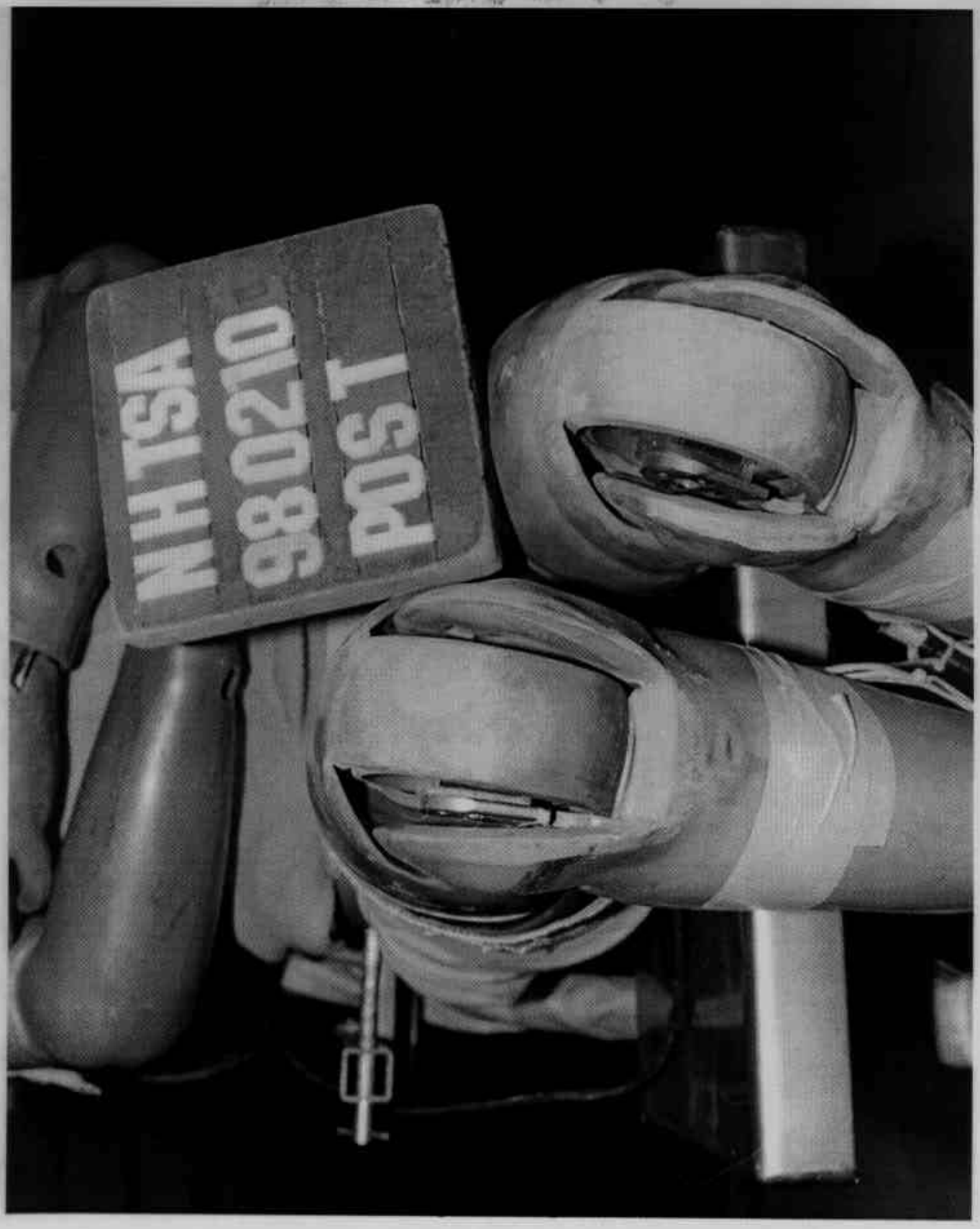


Figure A-47 Post-Test Passenger Dummy Knee Contact - View 1

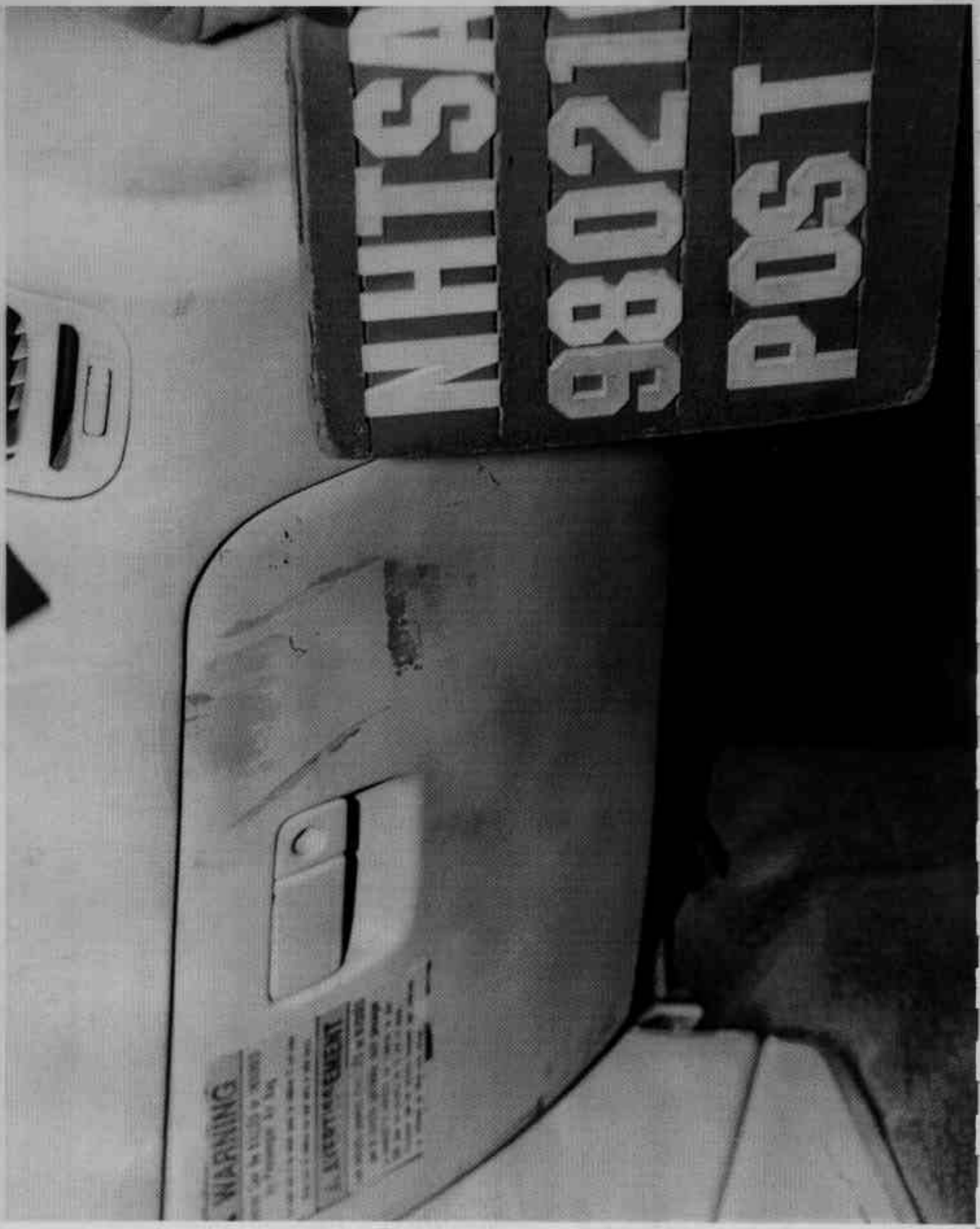


Figure A-48 Post-Test Passenger Dummy Knee Contact - View 2

Figure A-49 Pre-Test Vehicle Certification Label View

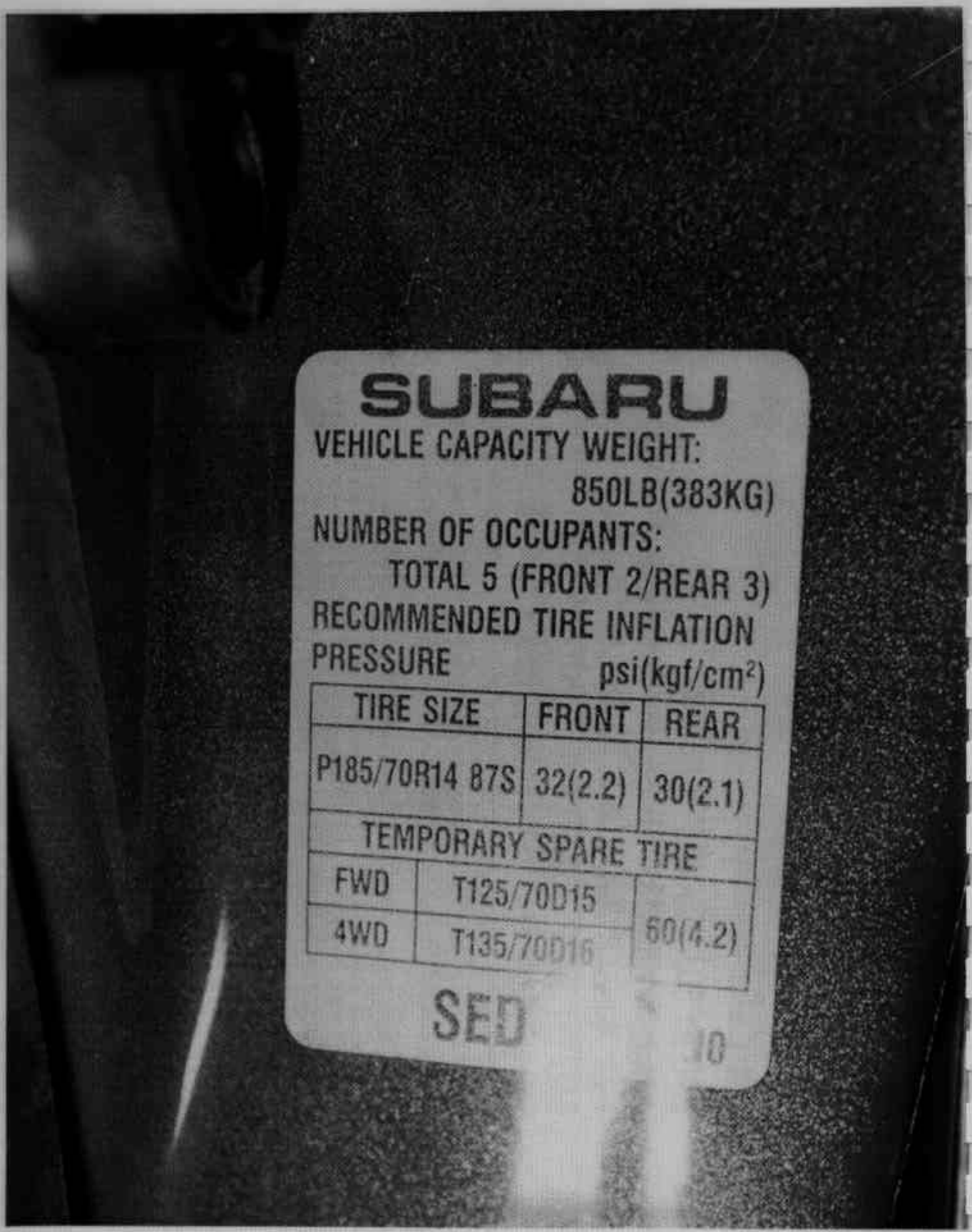


Figure A-50 Post-Test Tire Load Label View

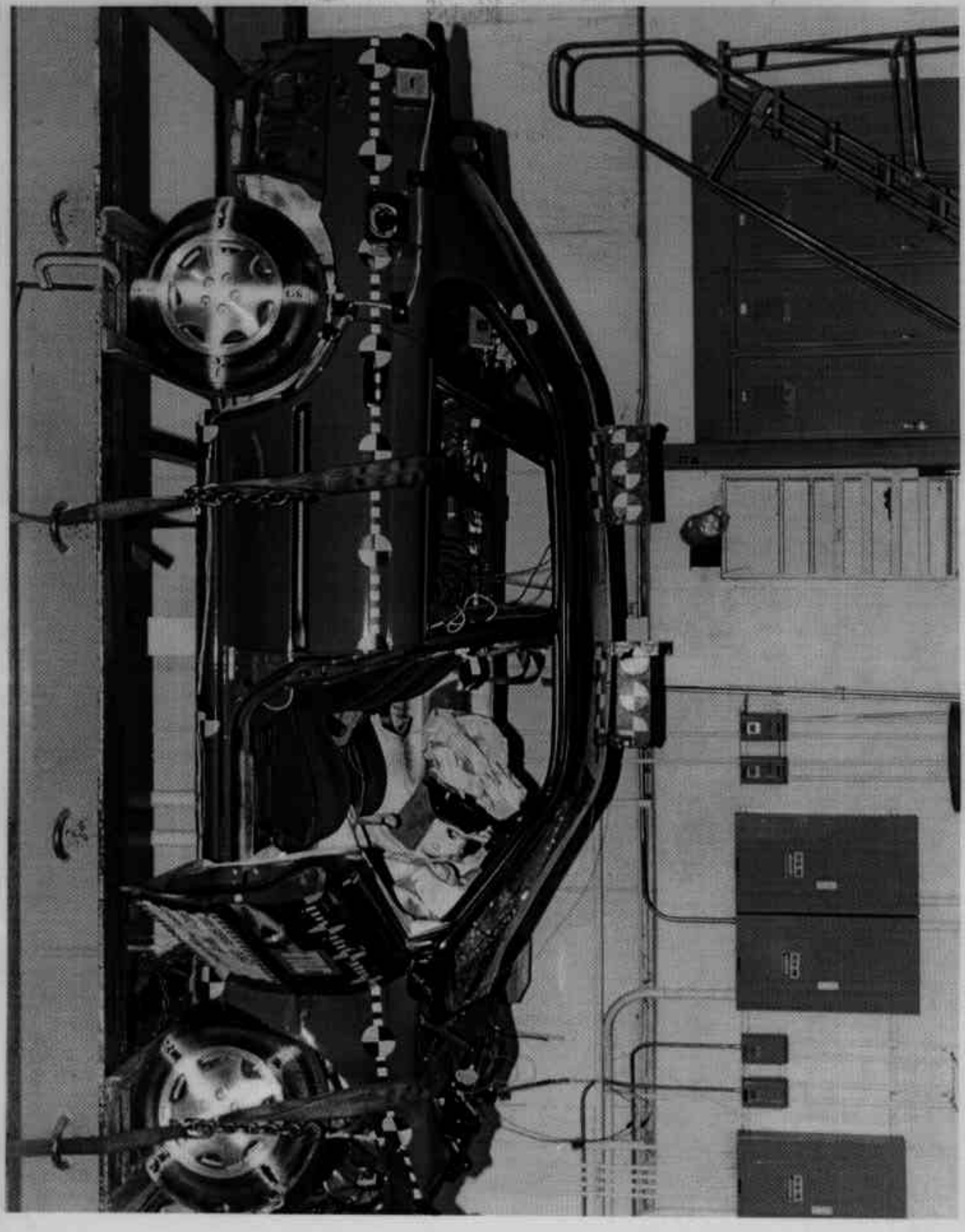
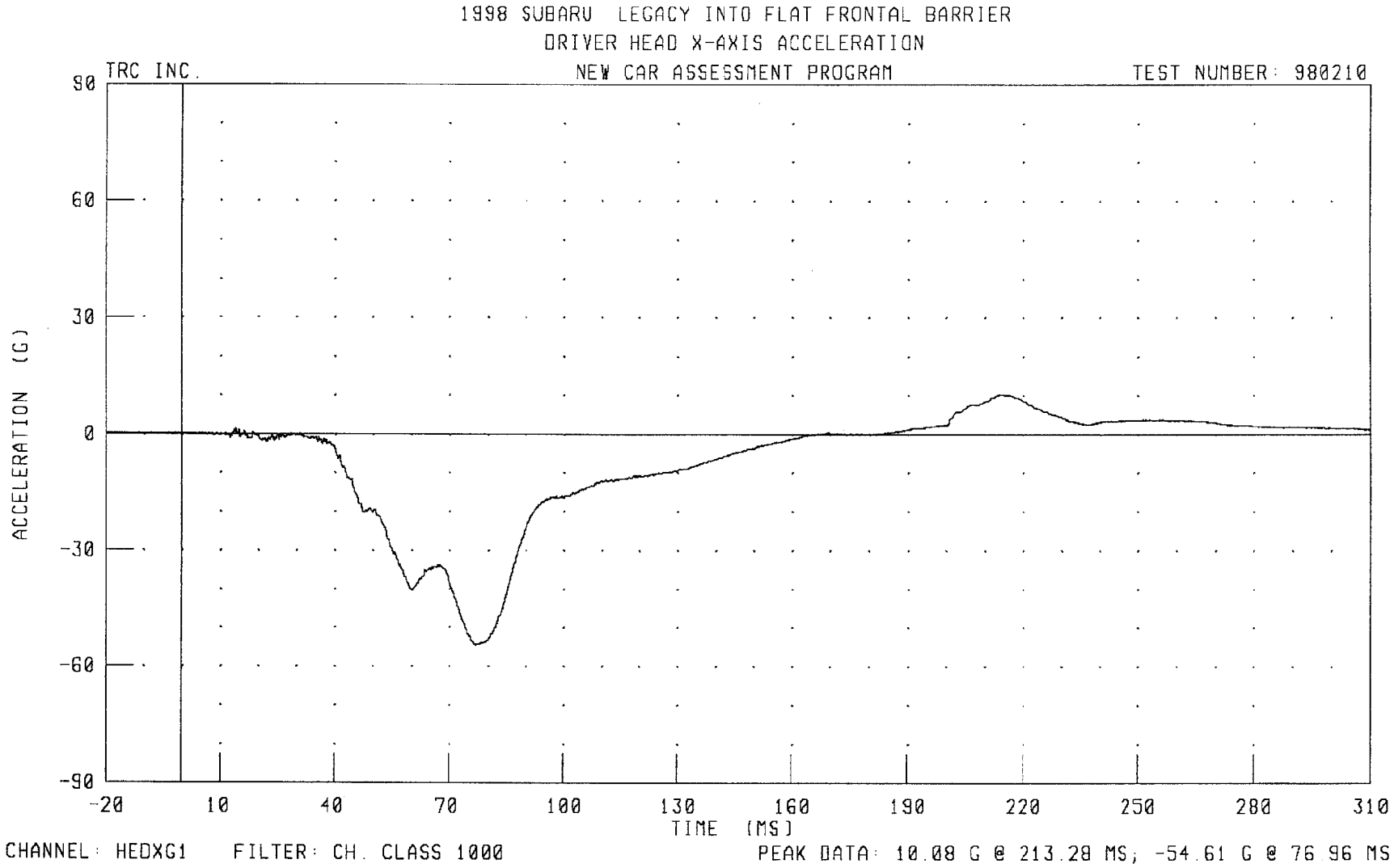


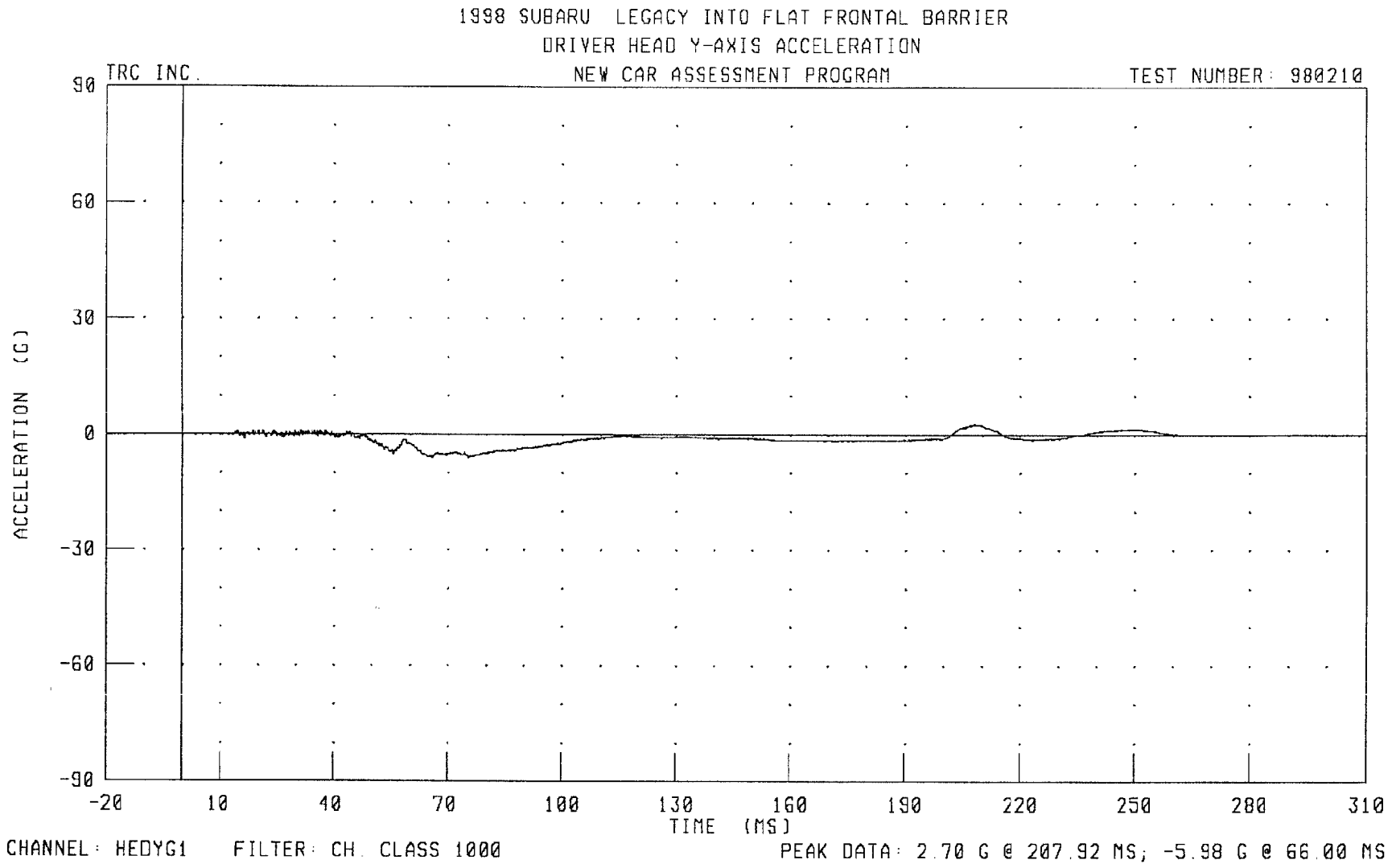
Figure A-51 Post-Test Vehicle on Static Rollover Machine View

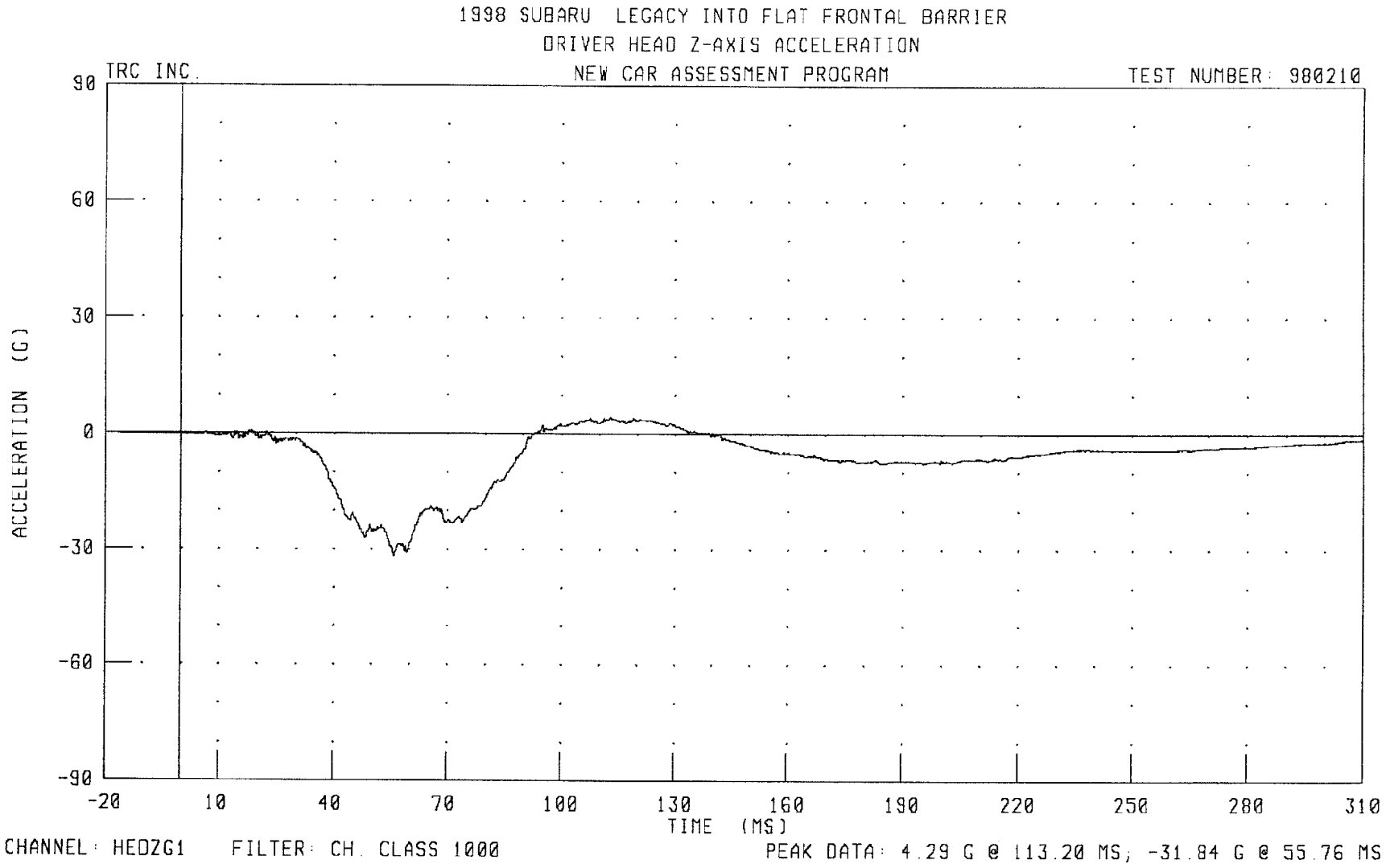
Appendix B

Data Plots

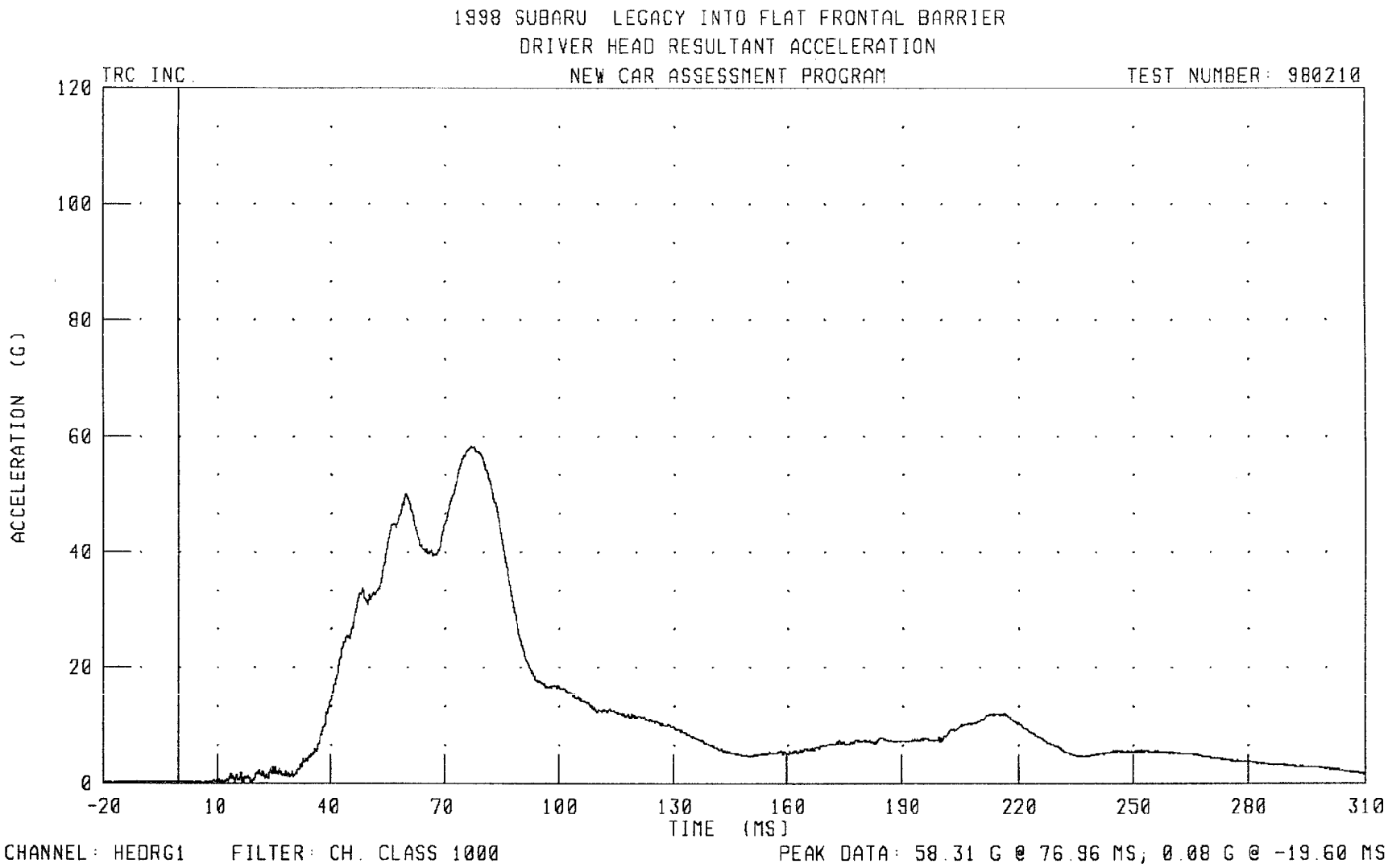

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG1
FILTER: CH. CLASS 1000
PEAK DATA: 10.08 G @ 213.28 MS; -54.61 G @ 76.96 MS

980210

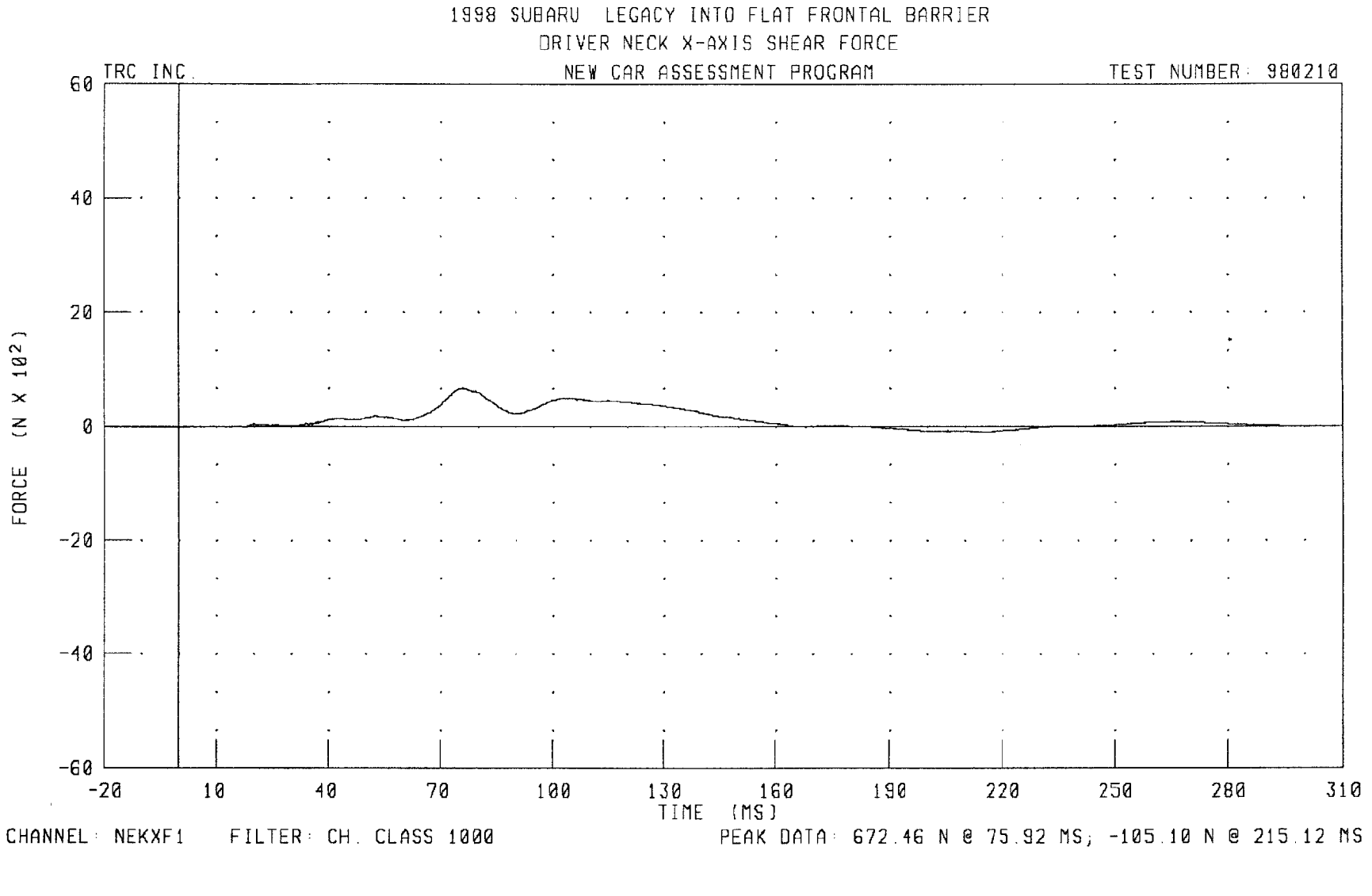

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG1
FILTER: CH. CLASS 1000
PEAK DATA: 2.70 G @ 207.92 MS; -5.98 G @ 66.00 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG1
FILTER: CH. CLASS 1000
PEAK DATA: 4.29 G @ 113.20 MS; -31.84 G @ 55.76 MS

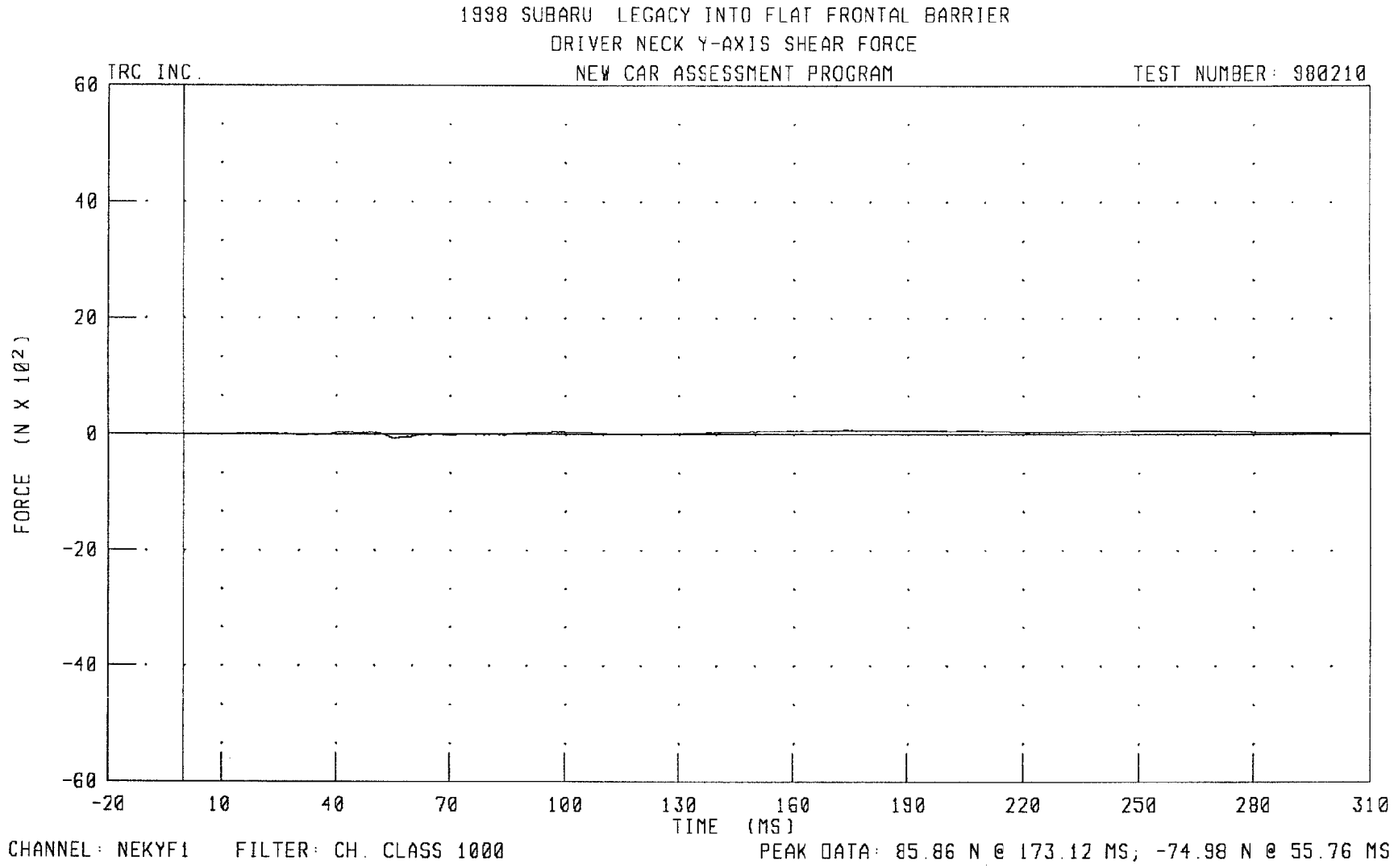
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 58.31 G @ 76.96 MS; 0.08 G @ -19.60 MS

980210

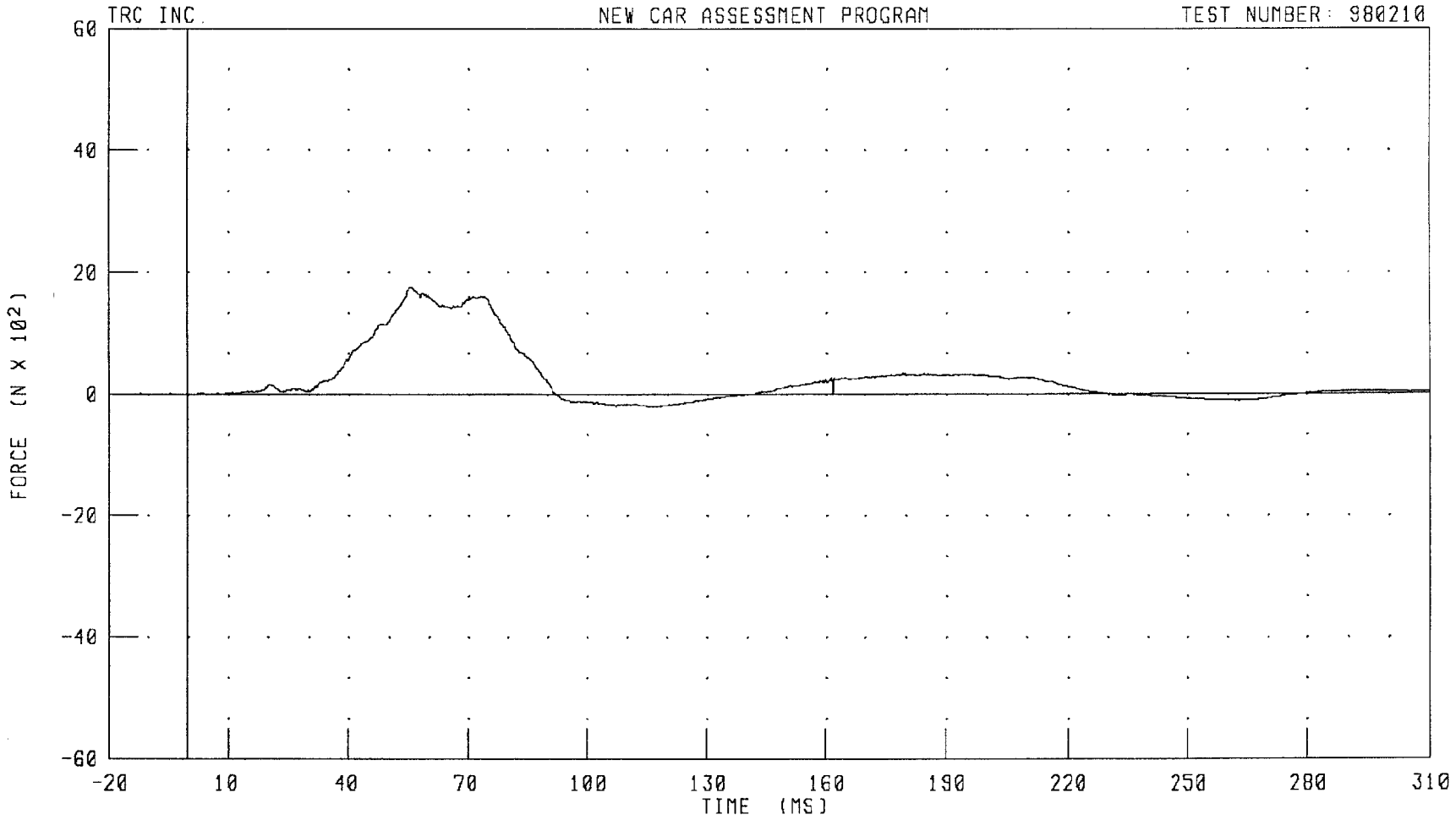

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXF1
FILTER: CH. CLASS 1000
PEAK DATA: 672.46 N @ 75.92 MS; -105.10 N @ 215.12 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER NECK Y-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: NEKYF1
FILTER: CH. CLASS 1000
PEAK DATA: 85.86 N @ 173.12 MS; -74.98 N @ 55.76 MS

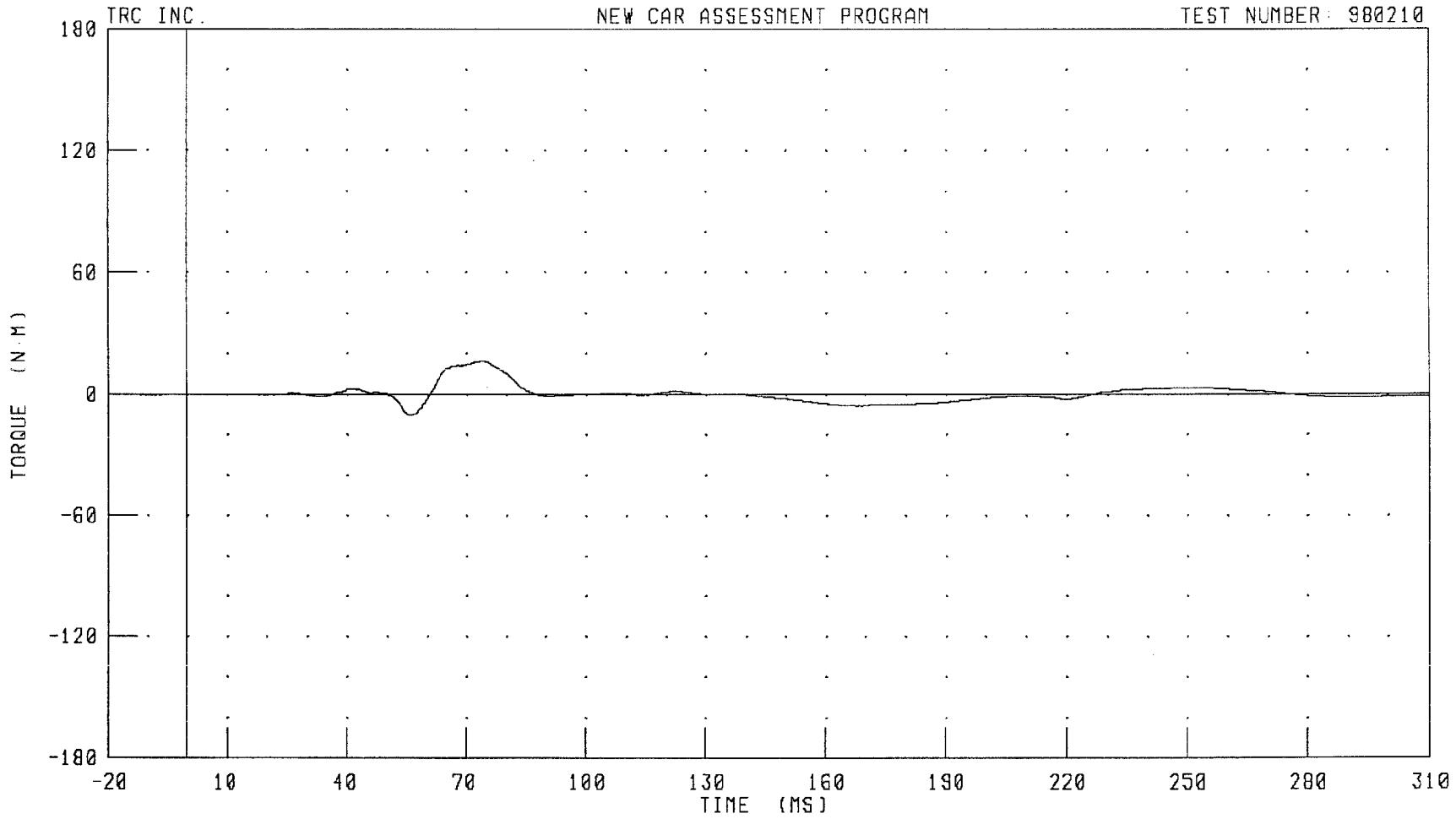
980210

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE



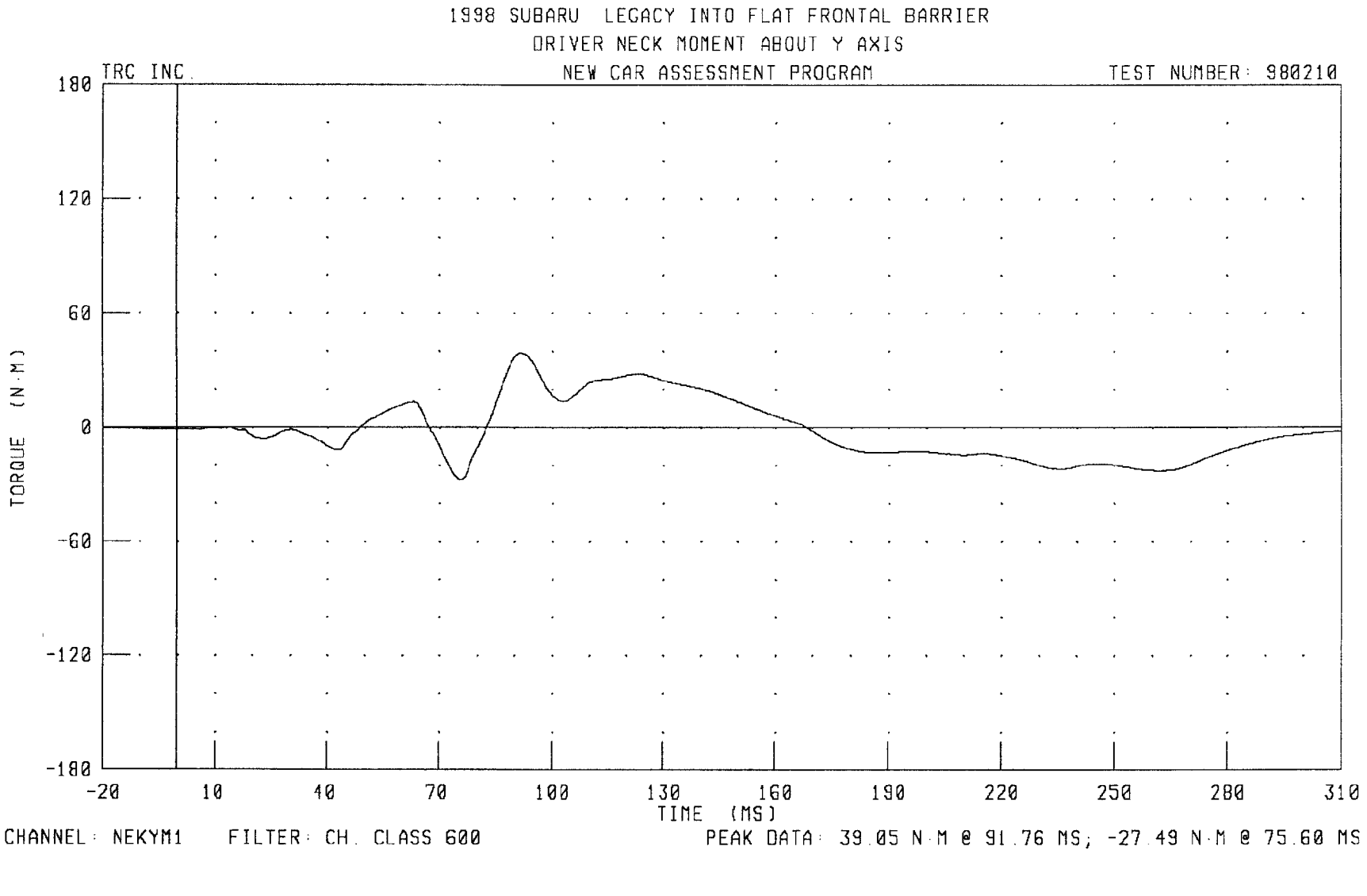
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000 PEAK DATA: 1761.32 N @ 55.28 MS; -206.76 N @ 115.04 MS

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS

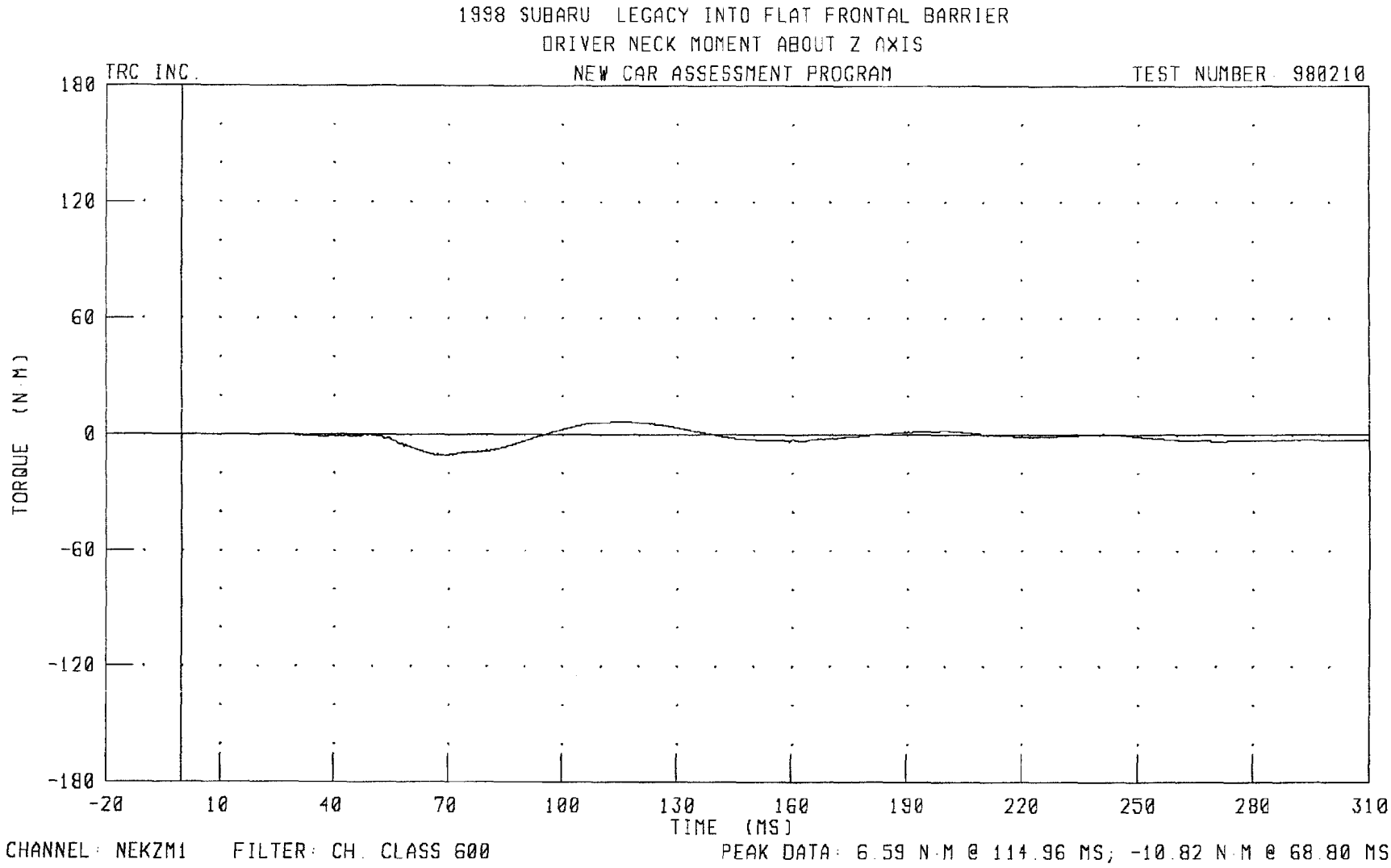


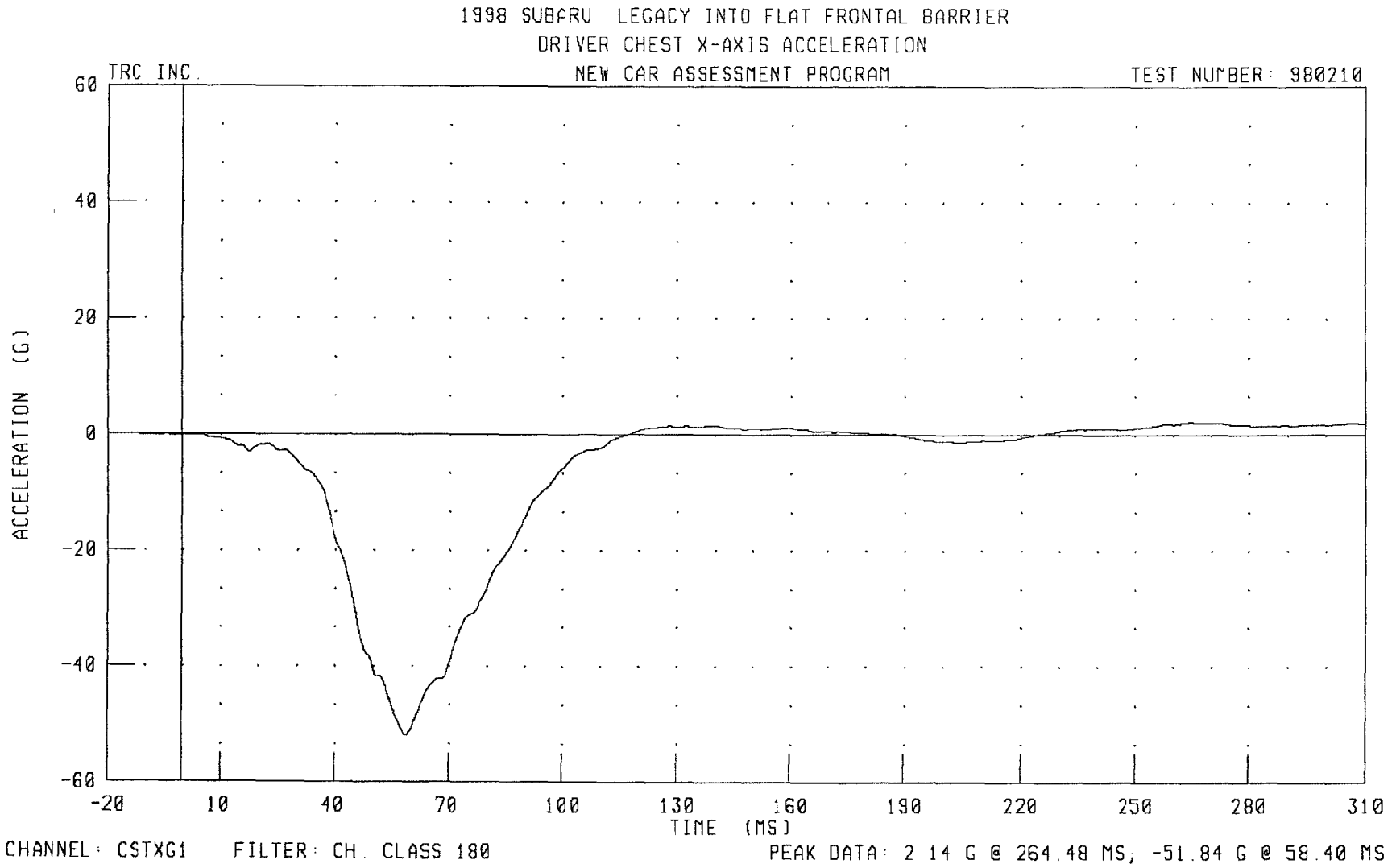
CHANNEL: NEKXM1 FILTER: CH. CLASS 600 PEAK DATA: 16.10 N-M @ 74.56 MS; -10.33 N-M @ 55.60 MS

980210

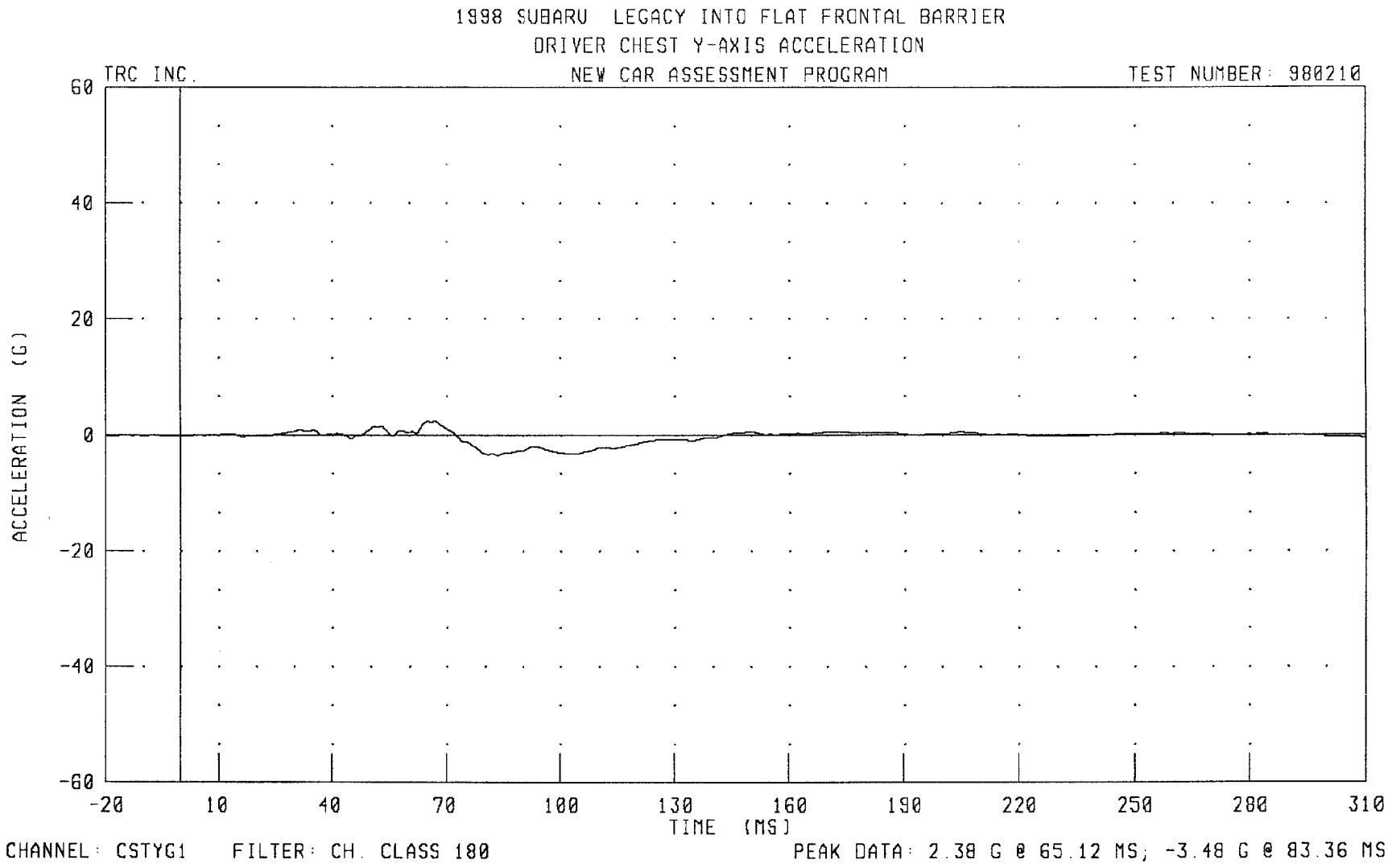

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYM1
FILTER: CH. CLASS 600
PEAK DATA: 39.05 N-M @ 91.76 MS; -27.49 N-M @ 75.60 MS

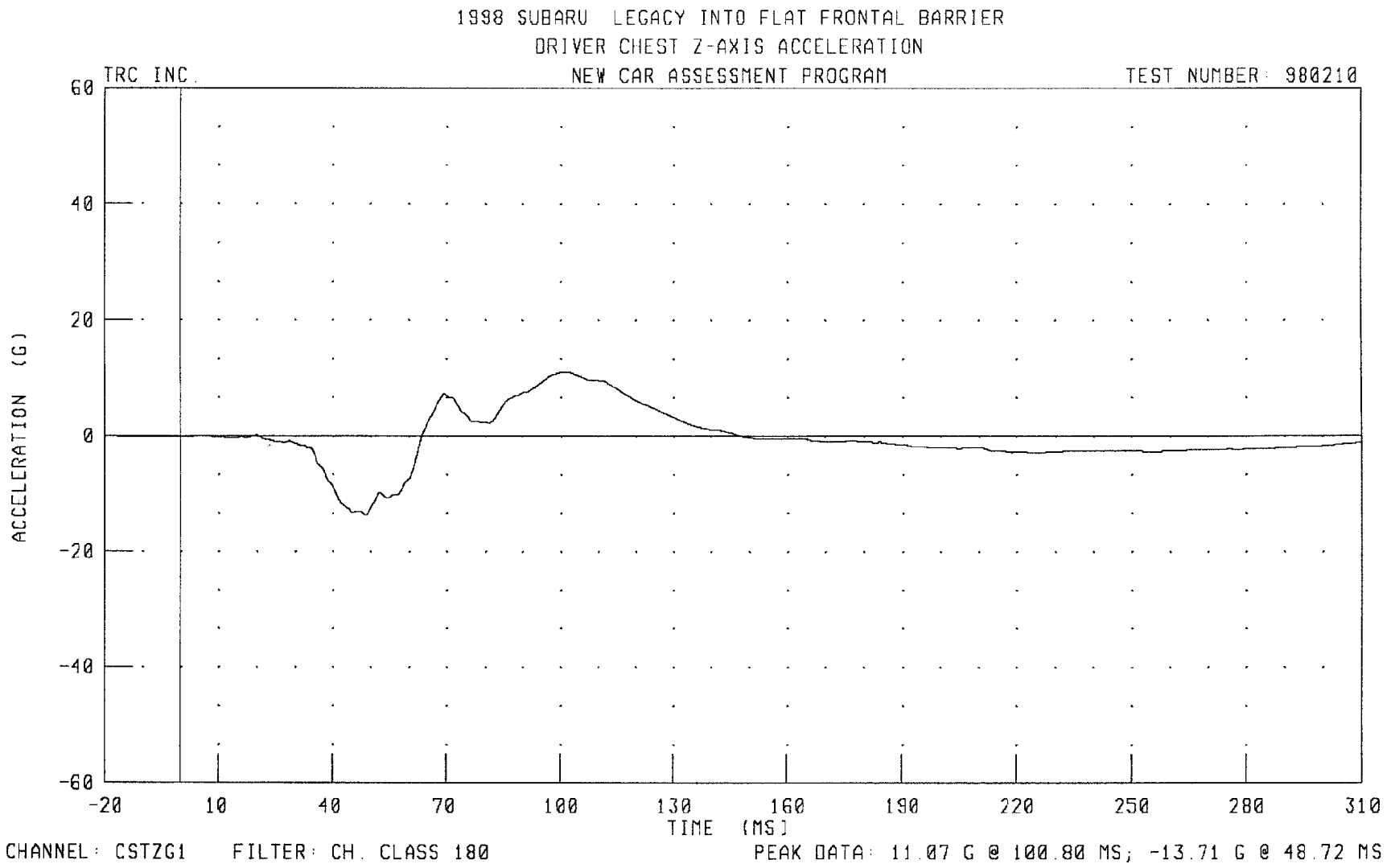
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT Z AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 6.59 N-M @ 114.96 MS; -10.82 N-M @ 68.80 MS

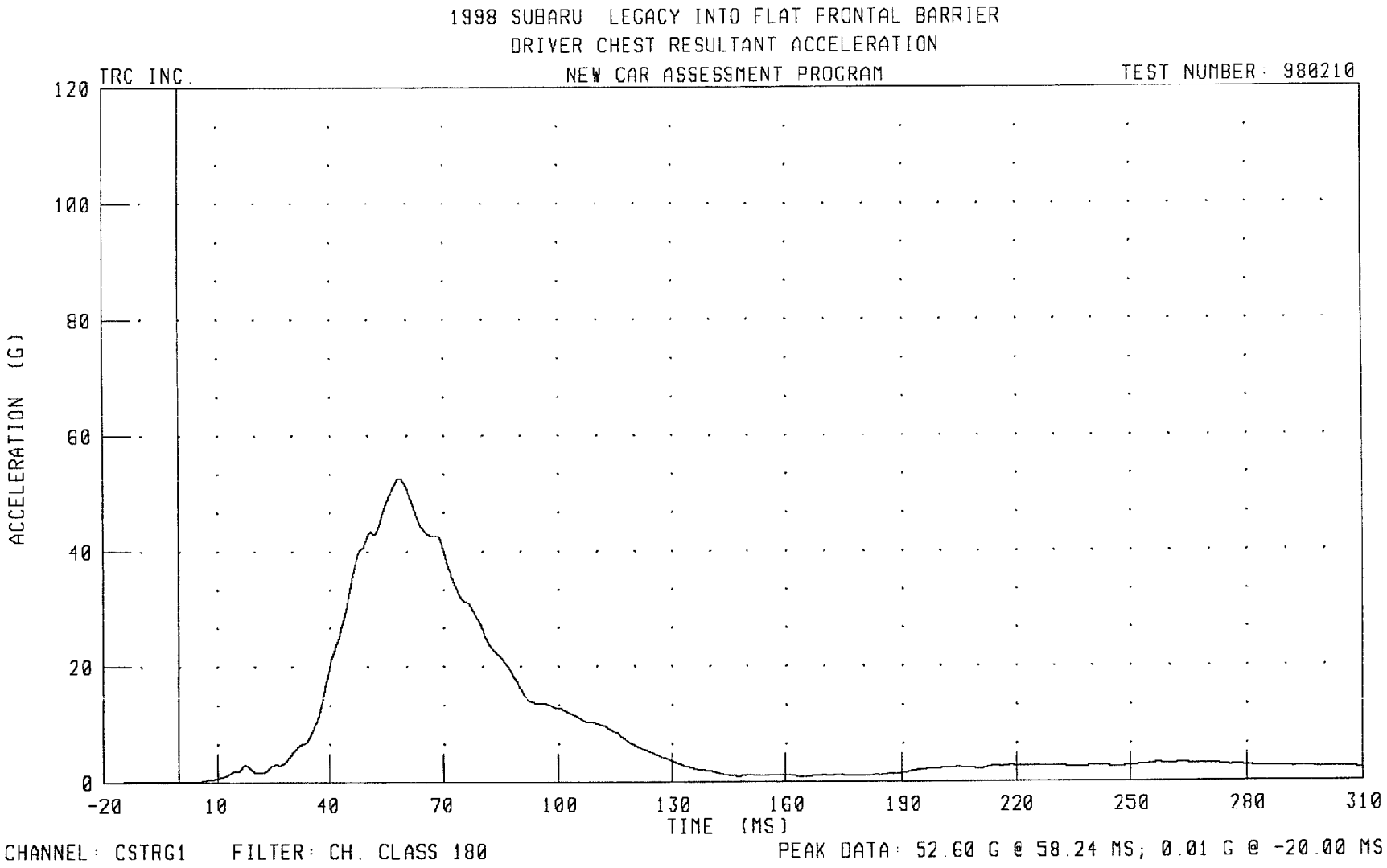

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 2 14 G @ 264.48 MS, -51.84 G @ 58.40 MS

980210

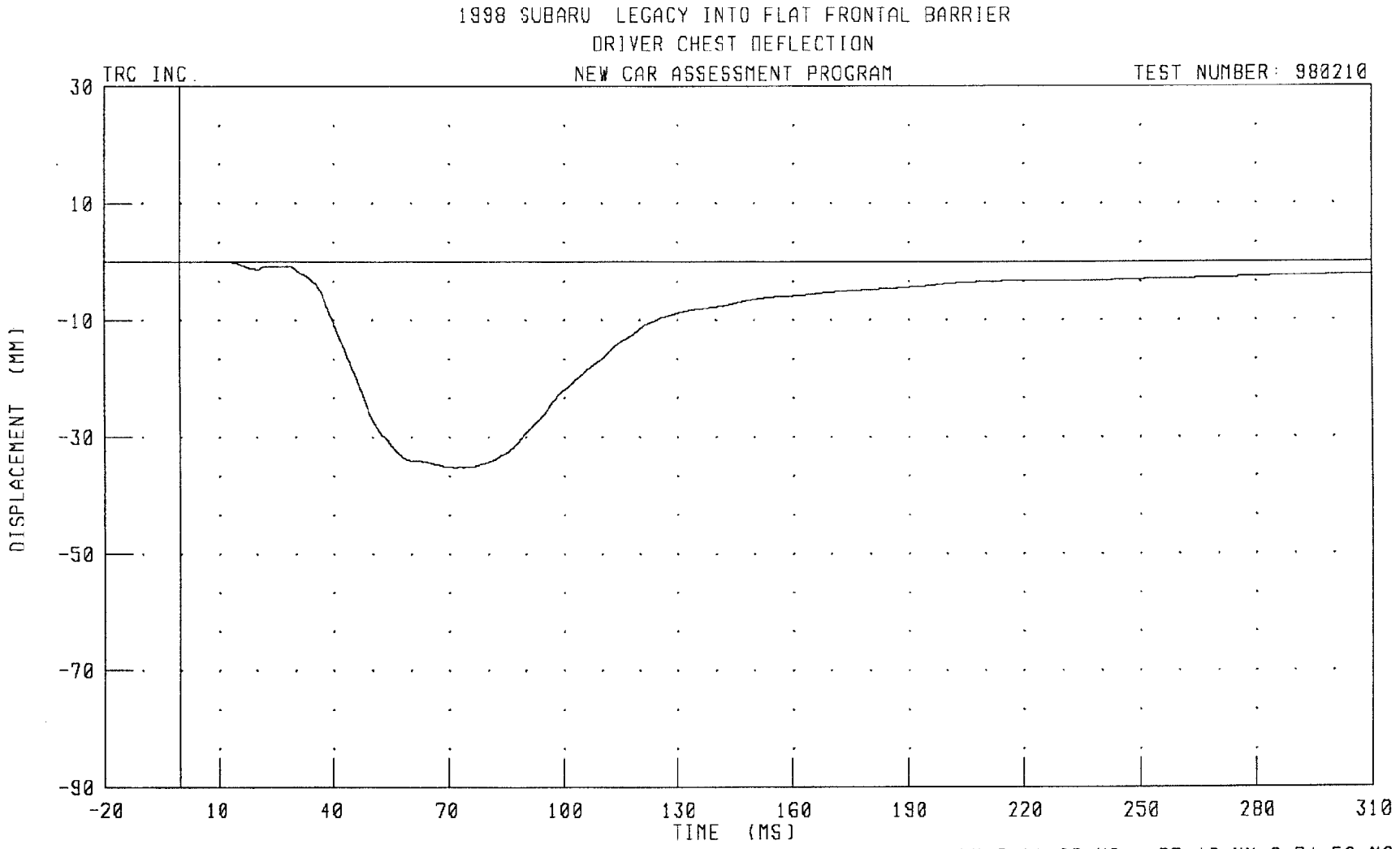

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG1
FILTER: CH. CLASS 180
PEAK DATA: 2.38 G @ 65.12 MS; -3.48 G @ 83.36 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 11.07 G @ 100.80 MS; -13.71 G @ 48.72 MS

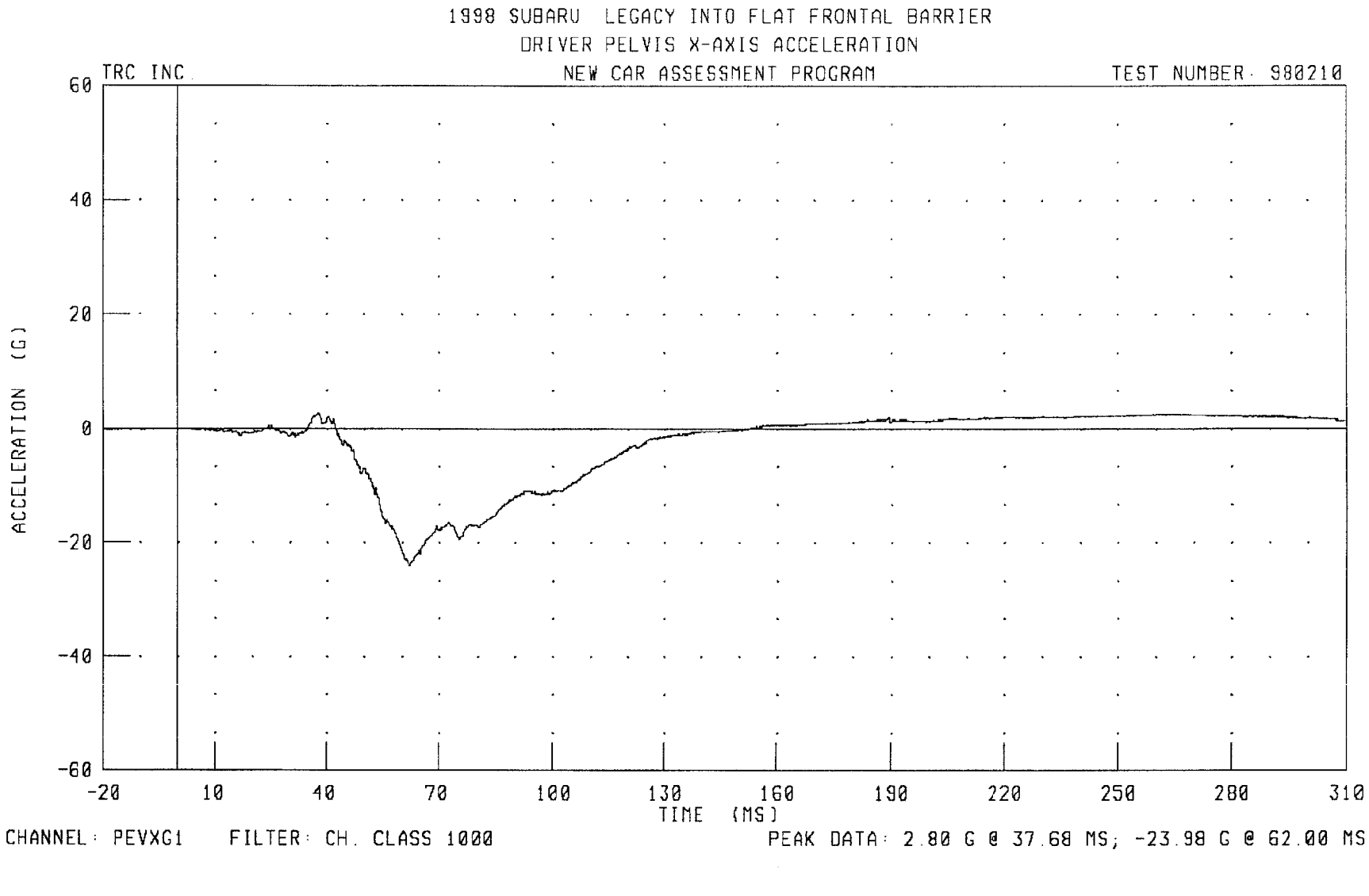
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 52.60 G @ 58.24 MS; 0.01 G @ -20.00 MS

980210

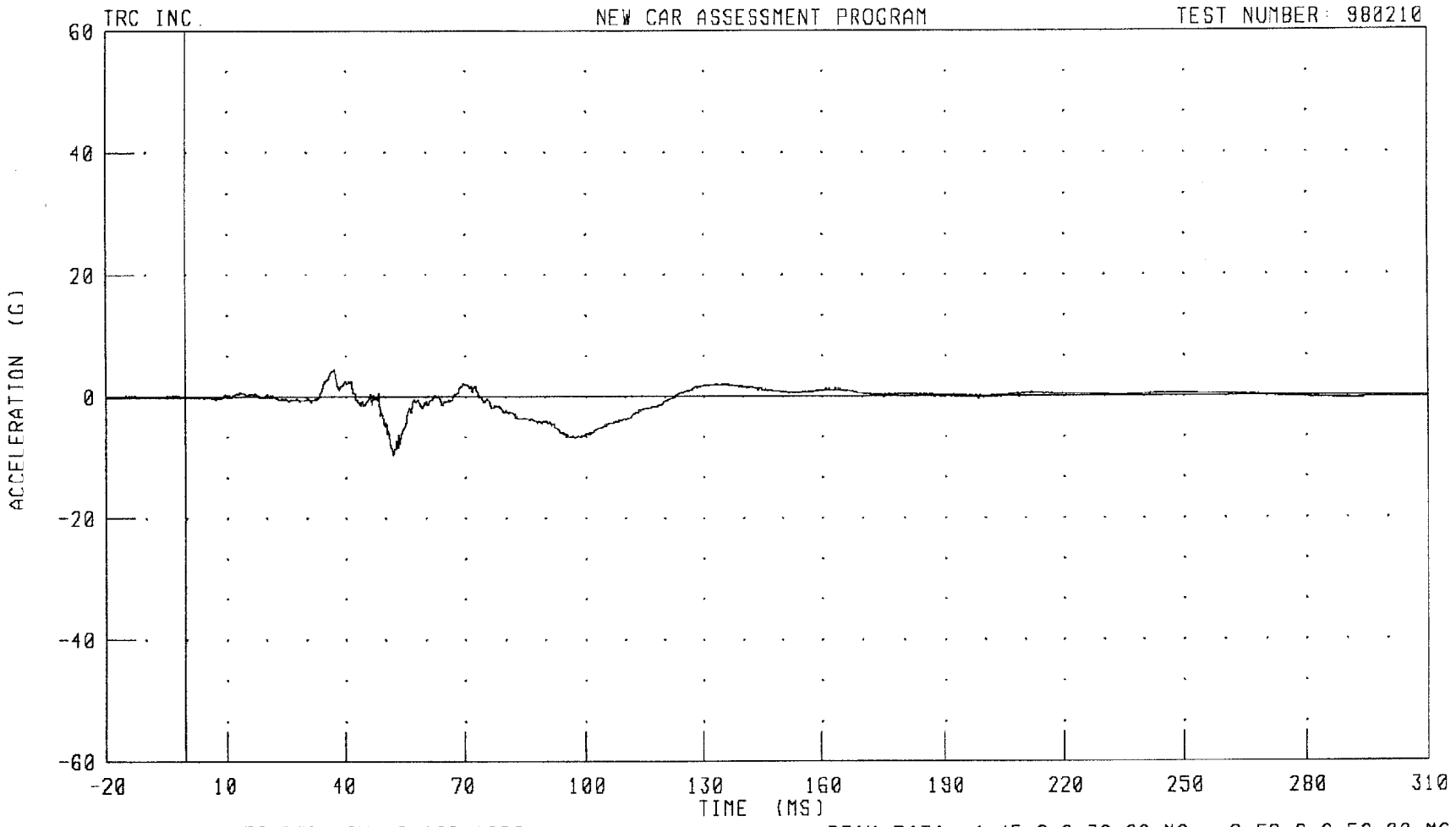

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST DEFLECTION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
30
10
-10
-30
-50
-70
-90
DISPLACEMENT (MM)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD1
FILTER: CH. CLASS 180
PEAK DATA: 0.01 MM @ 11.92 MS; -35.19 MM @ 71.52 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER PELVIS X-AXIS ACCELERATION
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVXG1
FILTER: CH. CLASS 1000
PEAK DATA: 2.80 G @ 37.68 MS; -23.98 G @ 62.00 MS

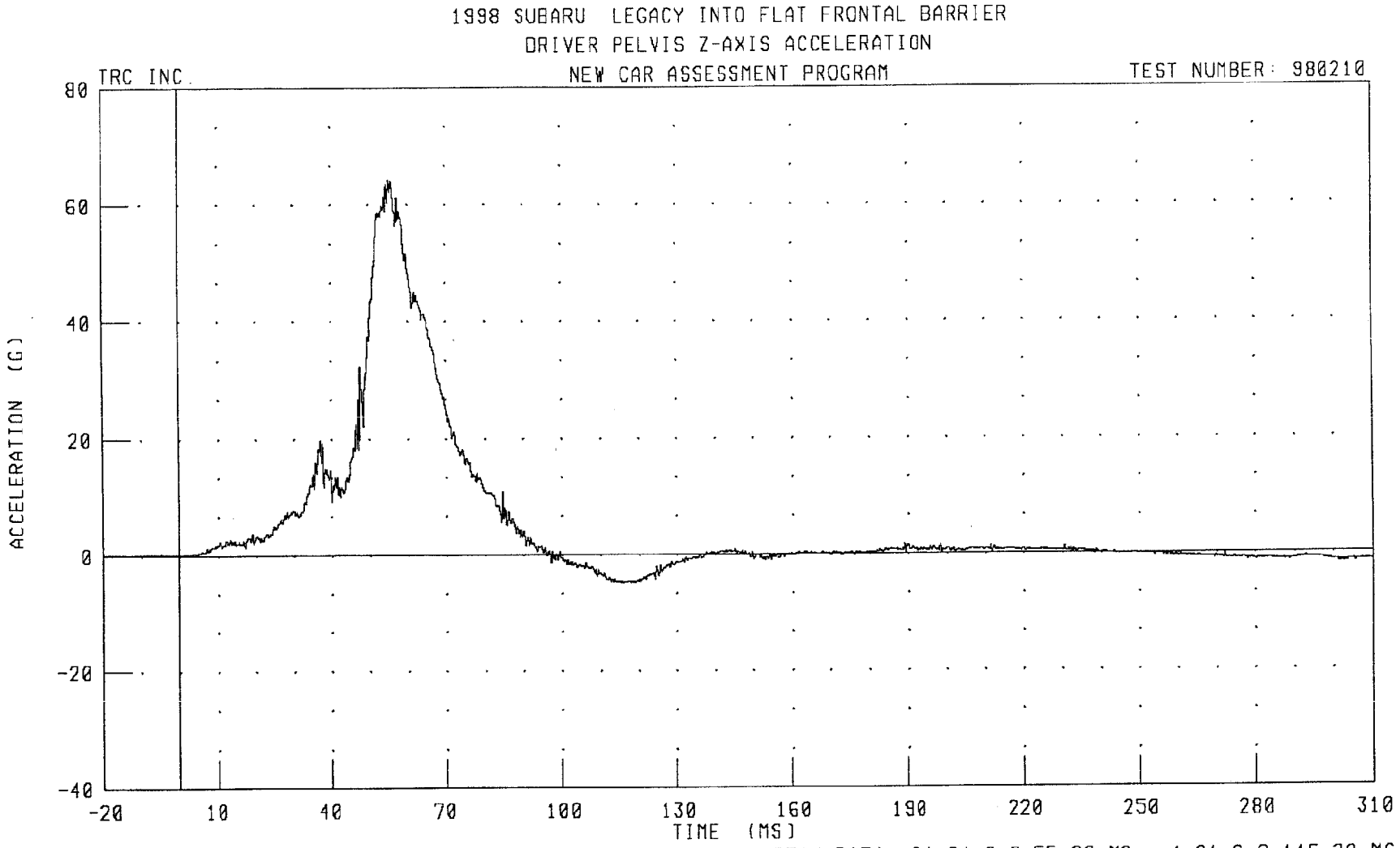
980210

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER PELVIS Y-AXIS ACCELERATION

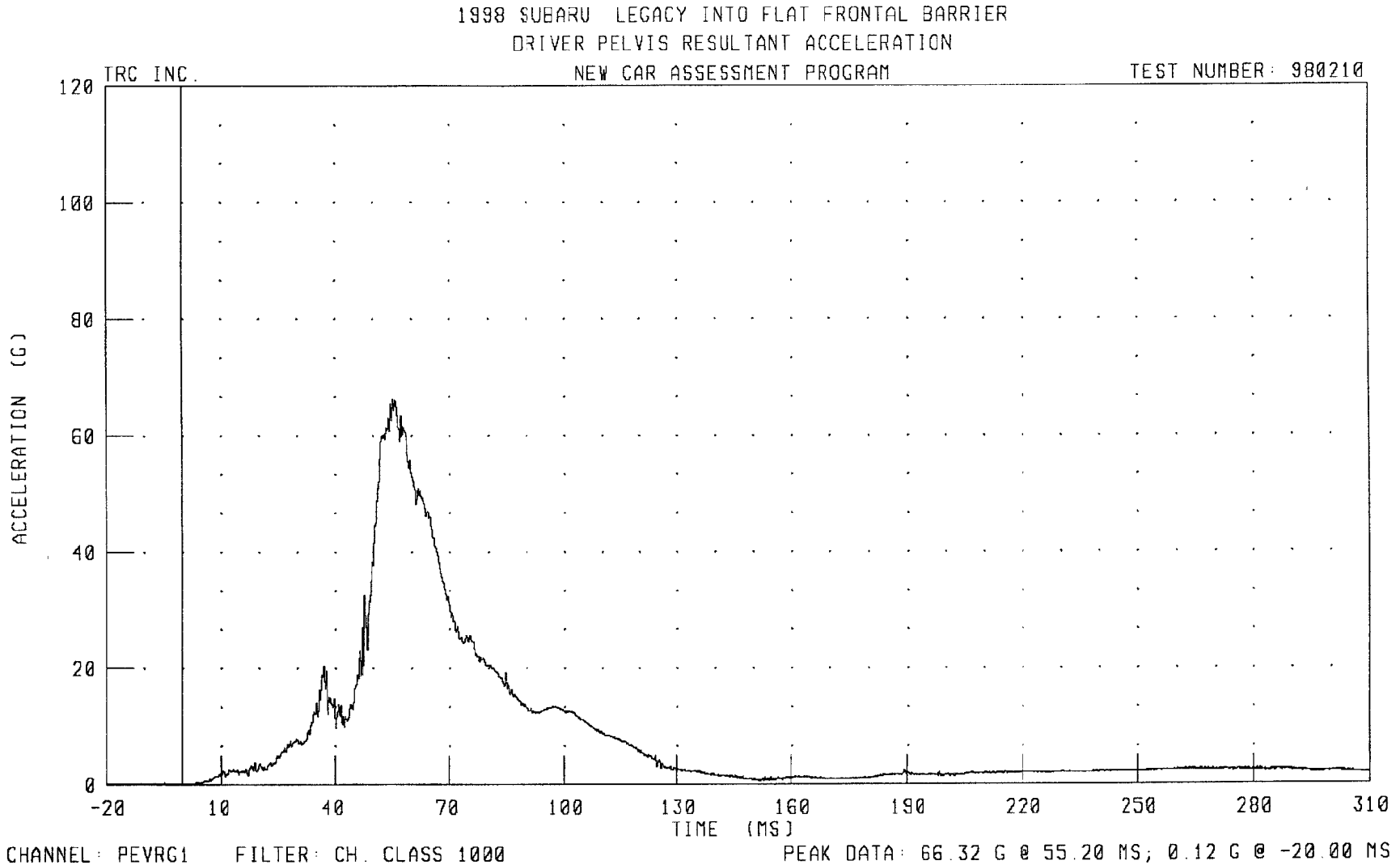


CHANNEL: PEVYG1 FILTER: CH. CLASS 1000 PEAK DATA: 4.45 G @ 36.88 MS; -9.59 G @ 52.00 MS

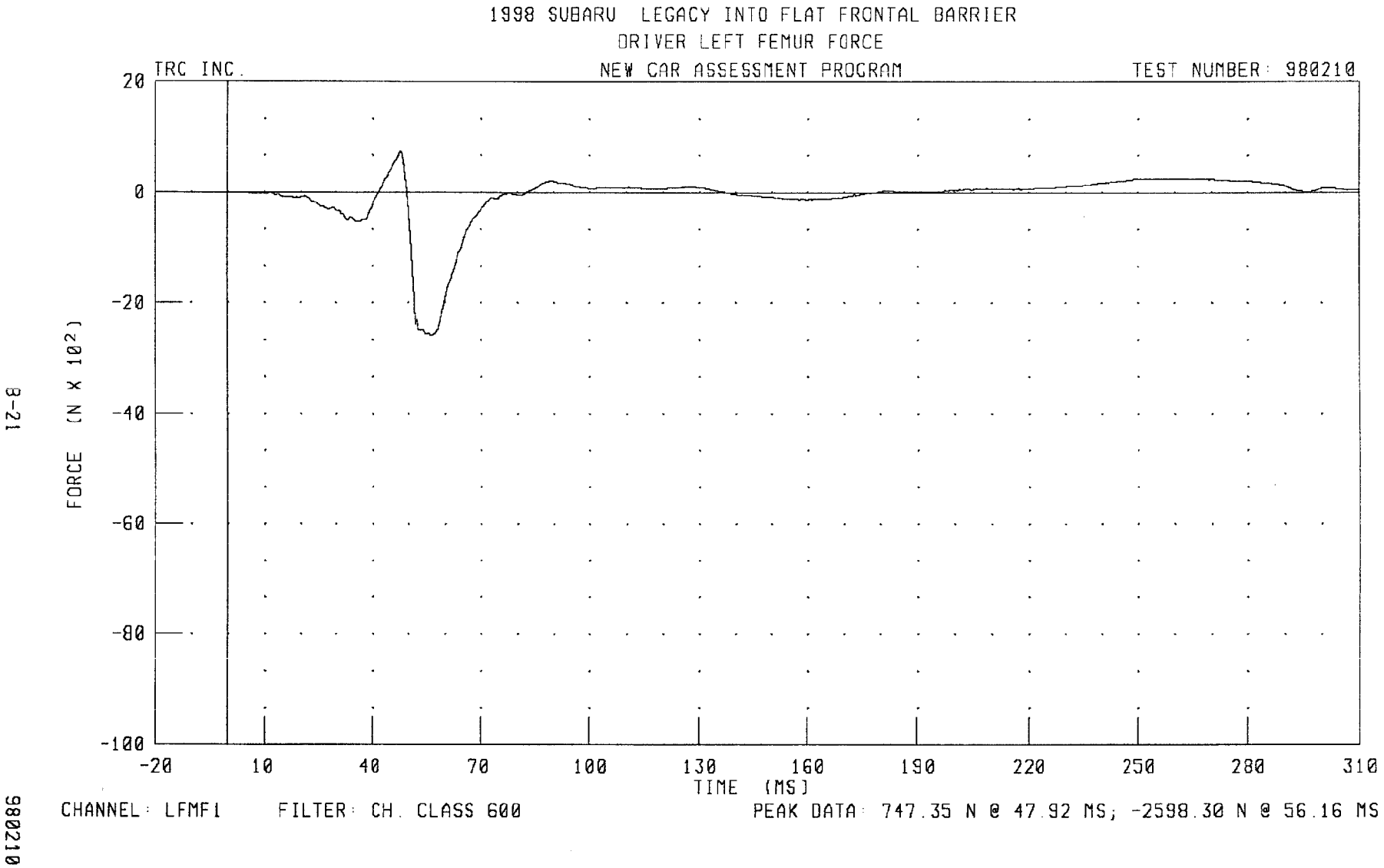
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER PELVIS Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
80
60
40
20
0
-20
-40
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVZG1
FILTER: CH. CLASS 1000
PEAK DATA: 64.24 G @ 55.20 MS; -4.91 G @ 115.28 MS

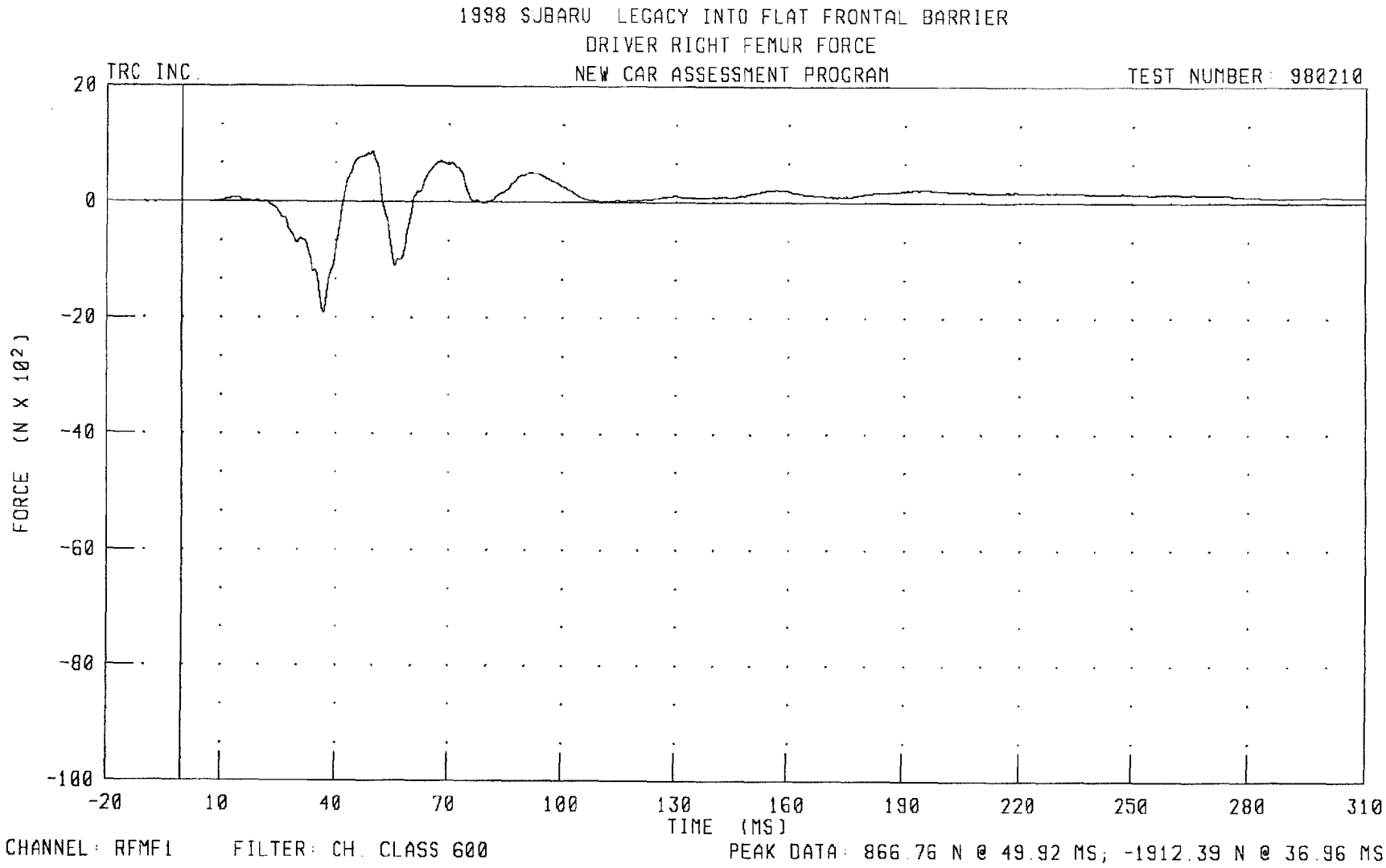
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER PELVIS RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVRG1
FILTER: CH. CLASS 1000
PEAK DATA: 66.32 G @ 55.20 MS; 0.12 G @ -20.00 MS

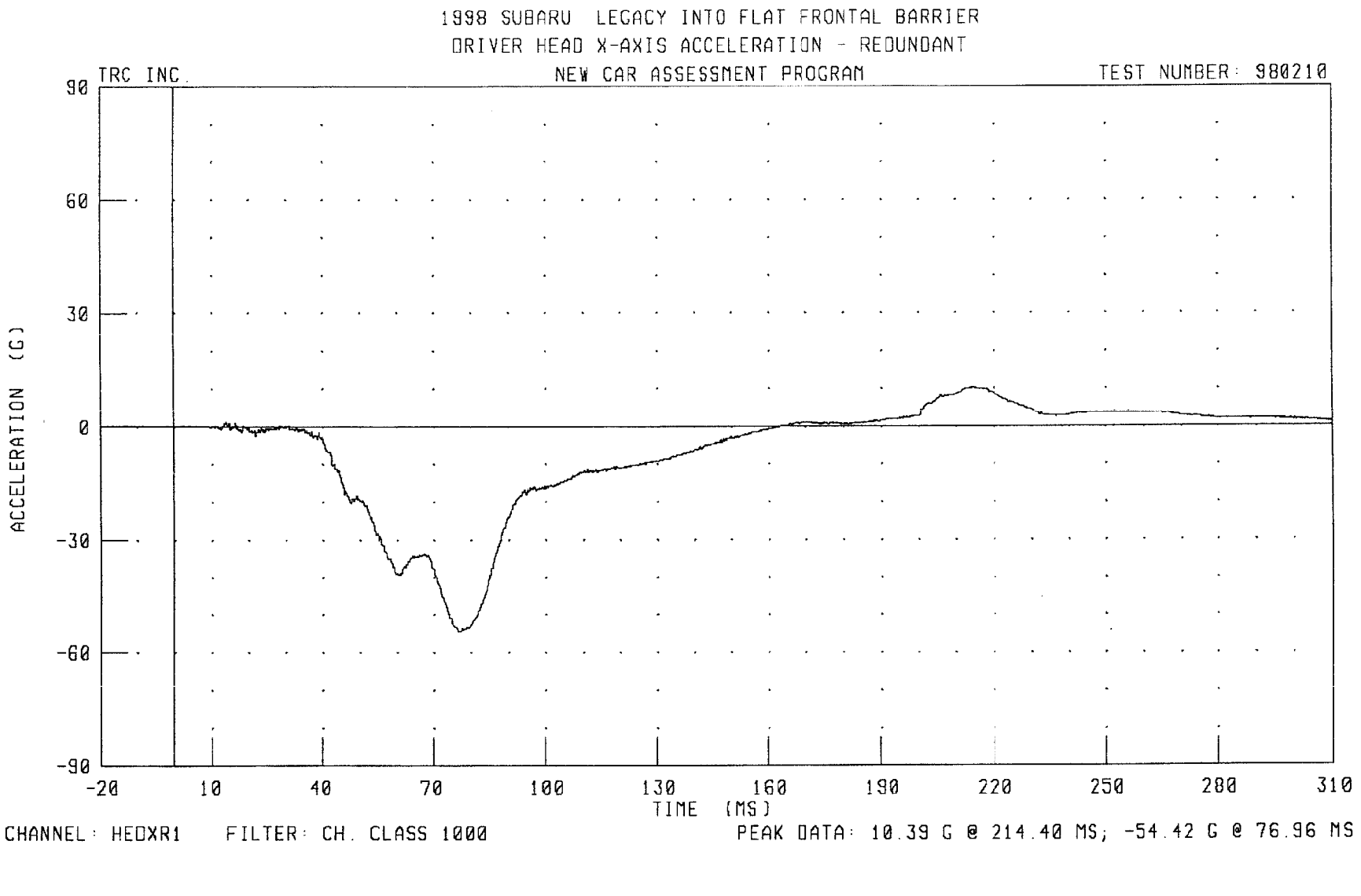
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: LFMF1
FILTER: CH. CLASS 600
PEAK DATA: 747.35 N @ 47.92 MS; -2598.30 N @ 56.16 MS

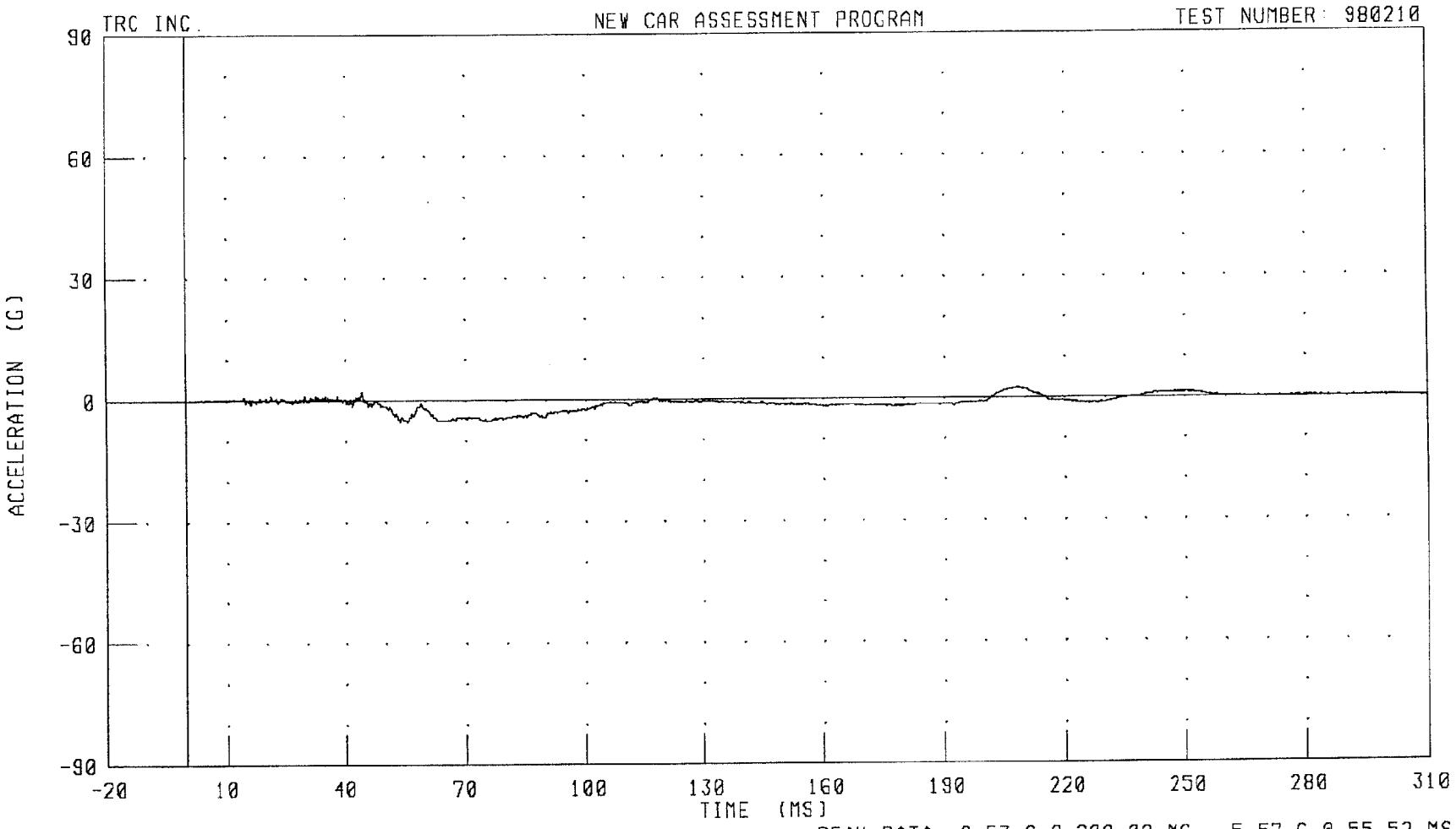
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 866.76 N @ 49.92 MS; -1912.39 N @ 36.96 MS

980210

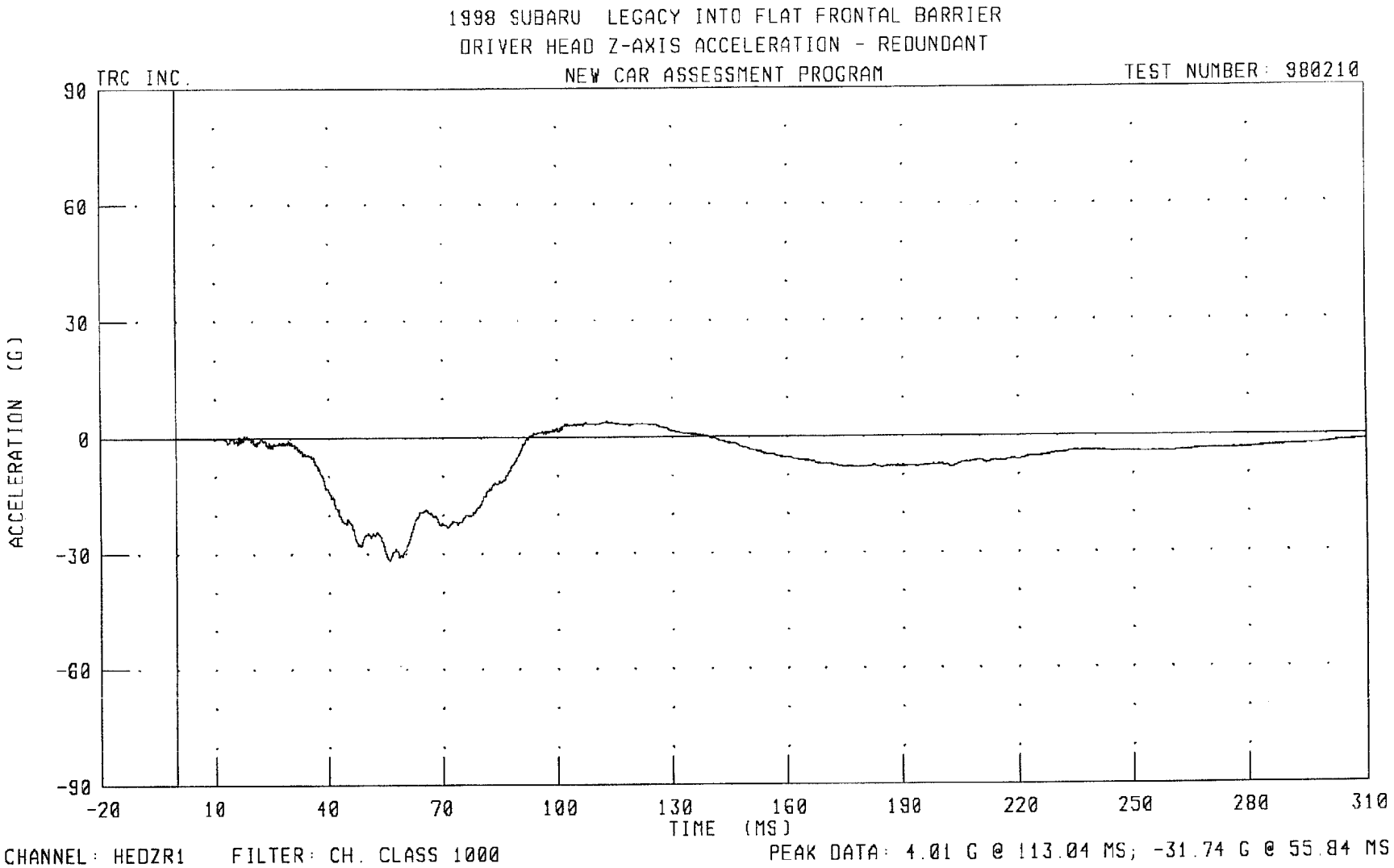

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXR1
FILTER: CH. CLASS 1000
PEAK DATA: 10.39 G @ 214.40 MS; -54.42 G @ 76.96 MS

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION - REDUNDANT

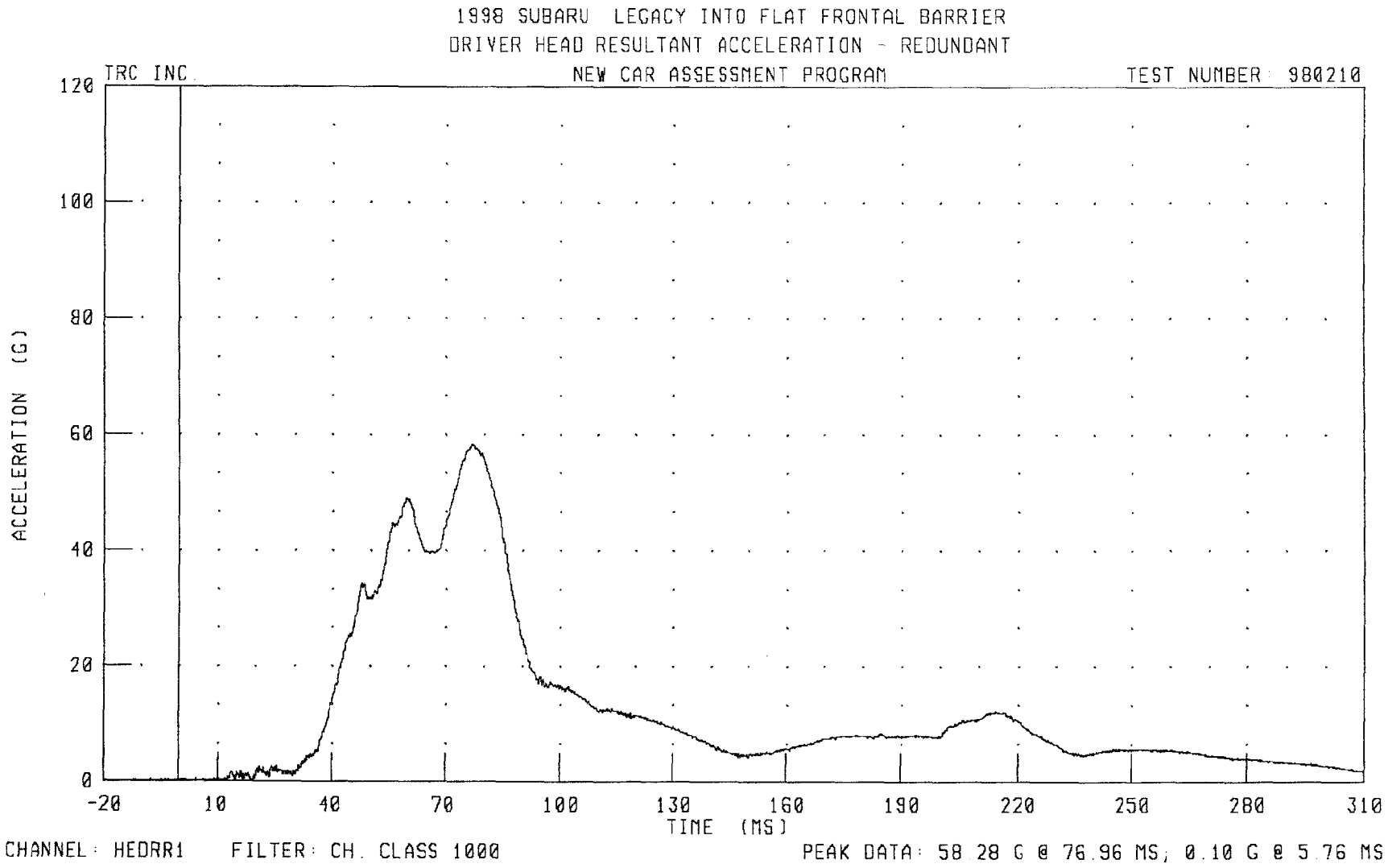


CHANNEL: HEDYR1 FILTER: CH. CLASS 1000 PEAK DATA: 2.53 G @ 208.08 MS; -5.57 G @ 55.52 MS

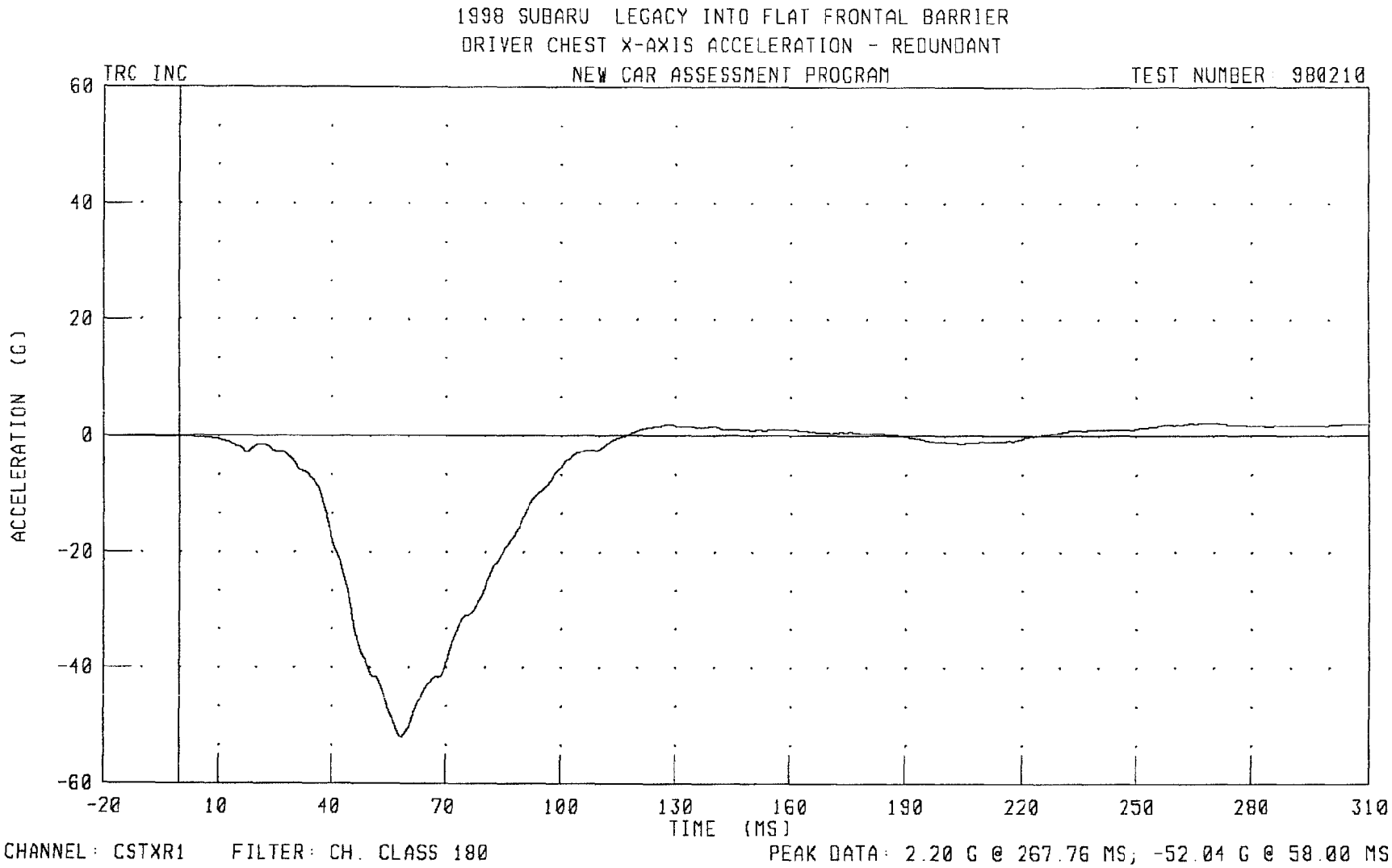
980210

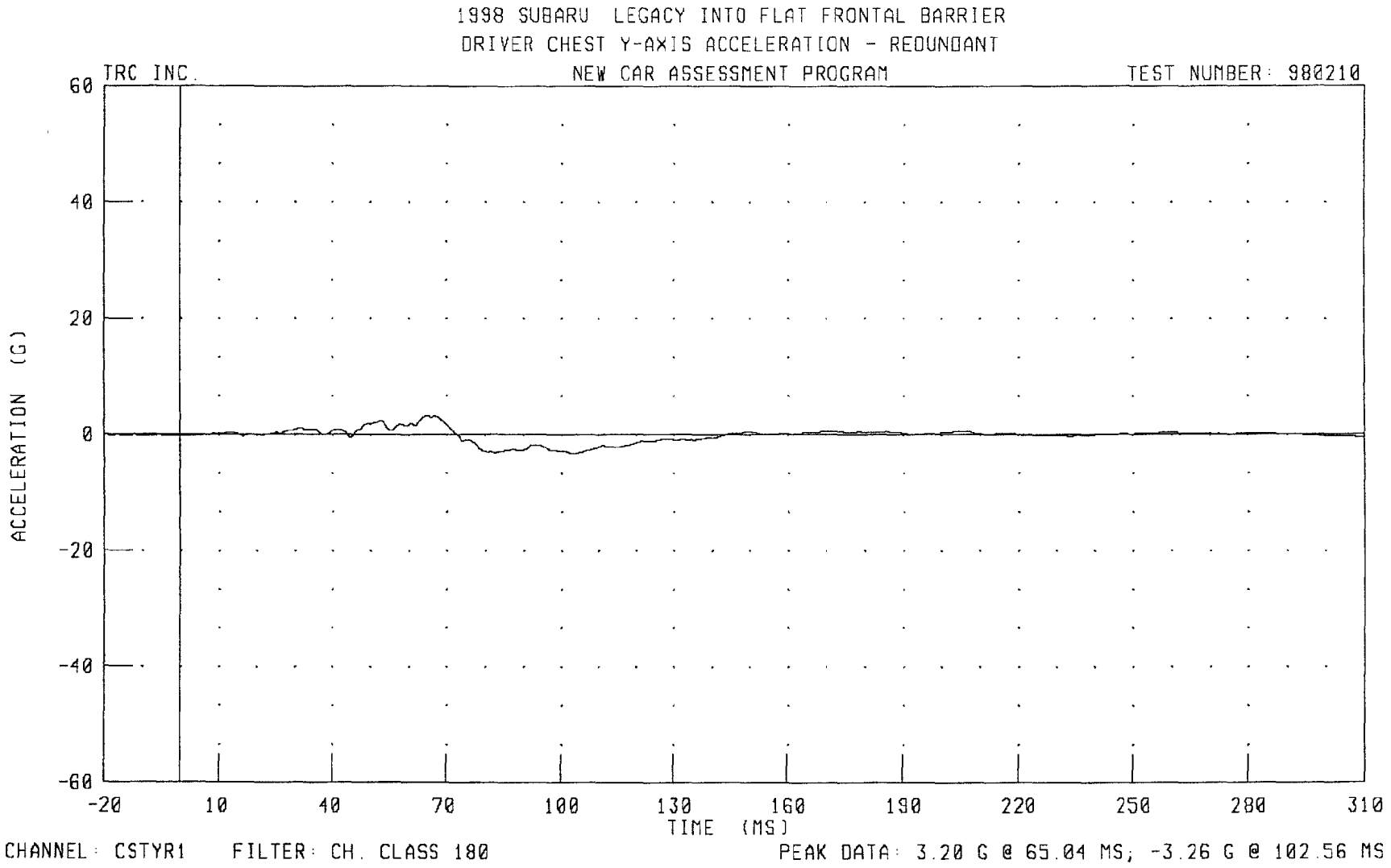

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZR1
FILTER: CH. CLASS 1000
PEAK DATA: 4.01 G @ 113.04 MS; -31.74 G @ 55.84 MS

980210

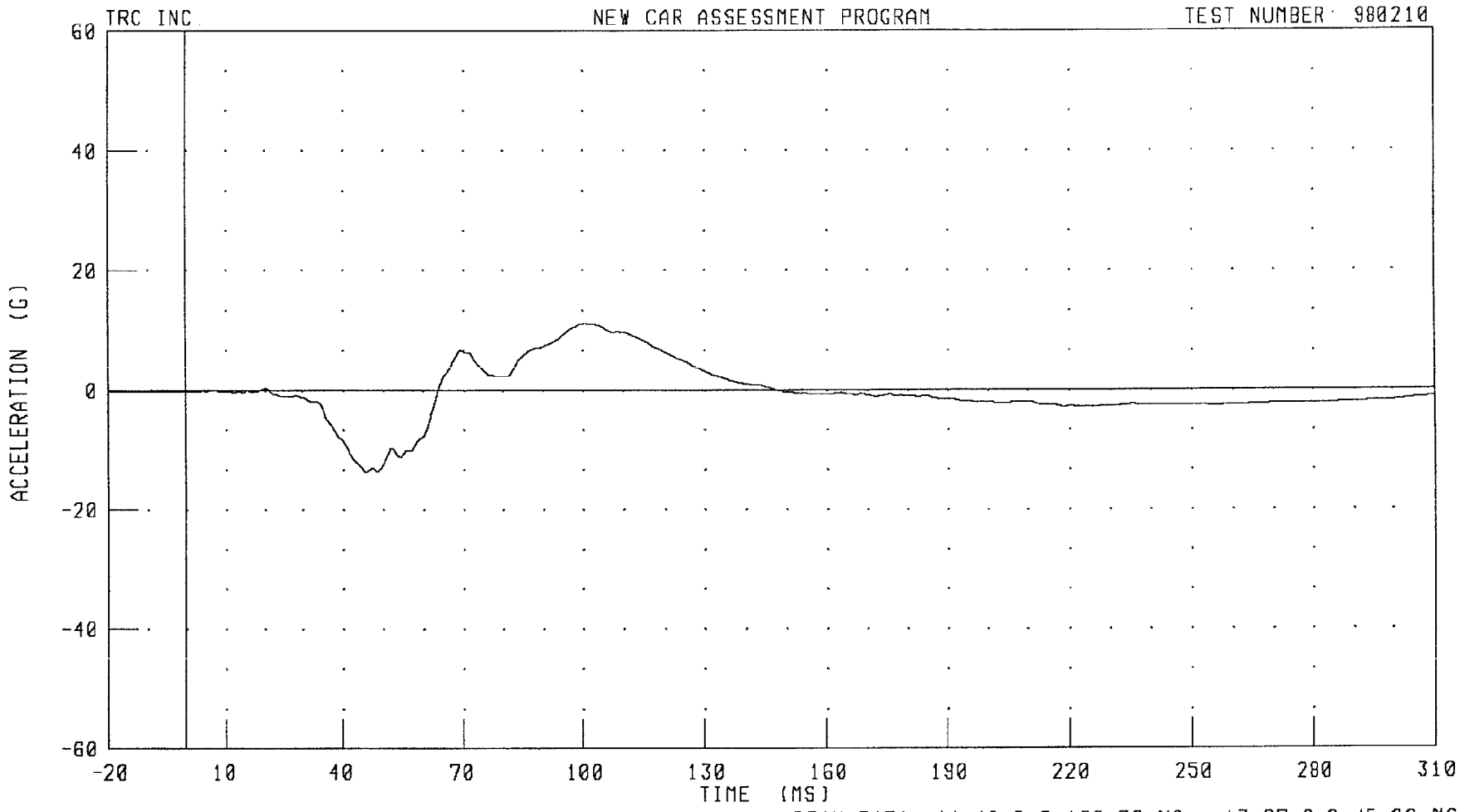

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION - REDUNDANT
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRR1
FILTER: CH. CLASS 1000
PEAK DATA: 58.28 G @ 76.96 MS; 0.10 G @ 5.76 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION - REDUNDANT
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 2.20 G @ 267.76 MS; -52.04 G @ 58.00 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYR1
FILTER: CH. CLASS 180
PEAK DATA: 3.20 G @ 65.04 MS; -3.26 G @ 102.56 MS

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION - REDUNDANT

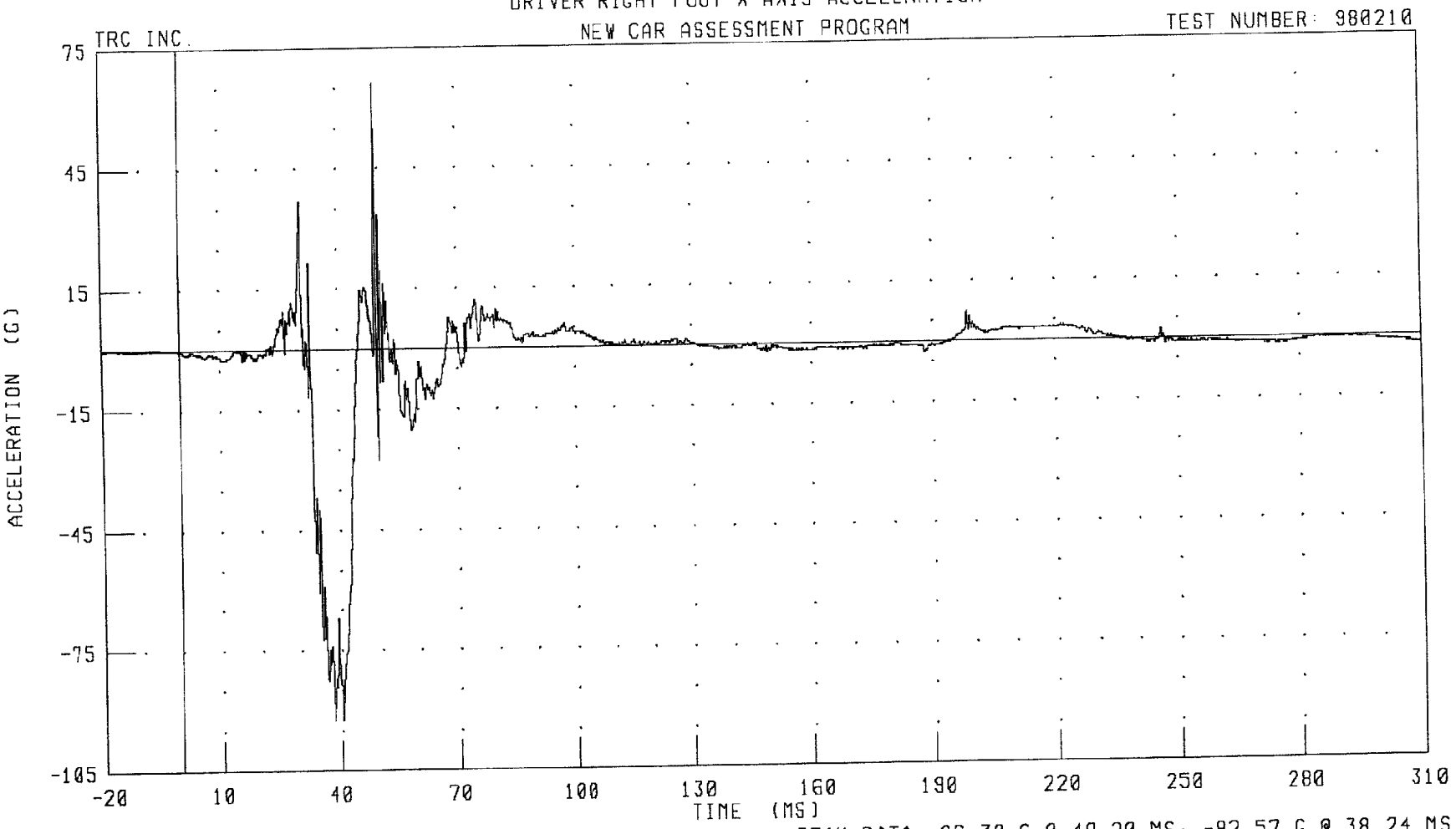


CHANNEL: CSTZR1 FILTER: CH. CLASS 180 PEAK DATA: 11.12 G @ 100.56 MS, -13.67 G @ 45.60 MS

980210

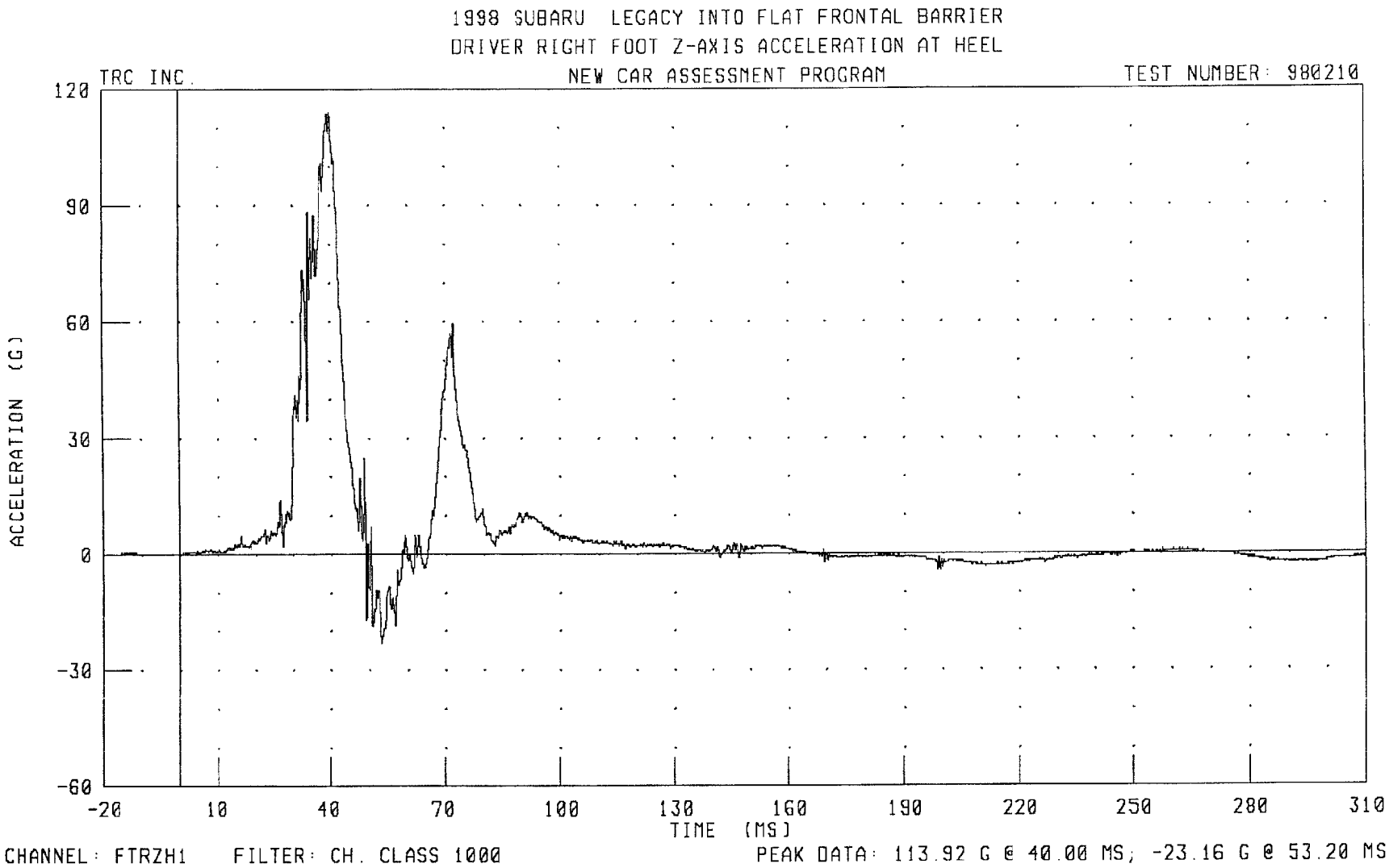
R-94

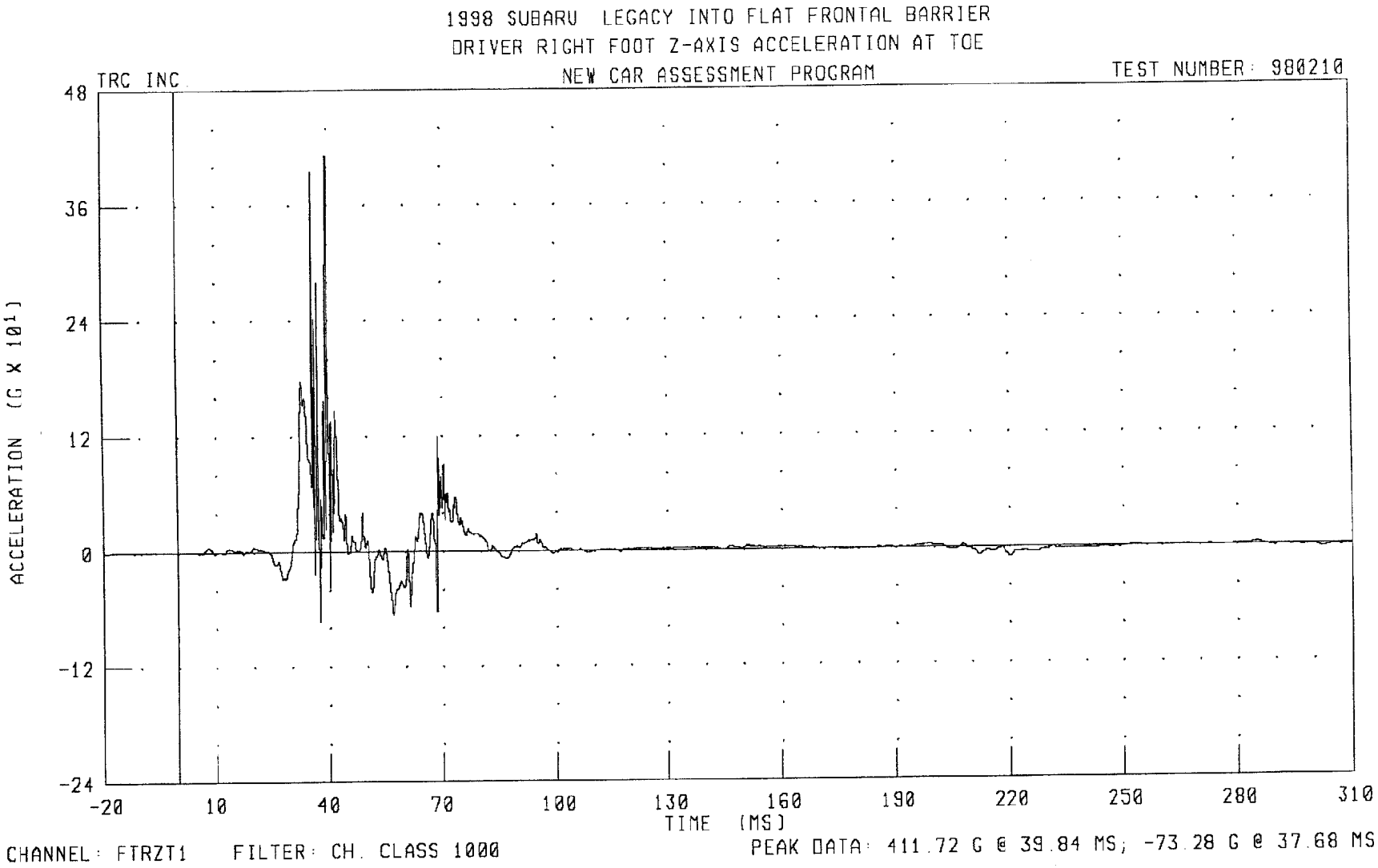
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FOOT X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

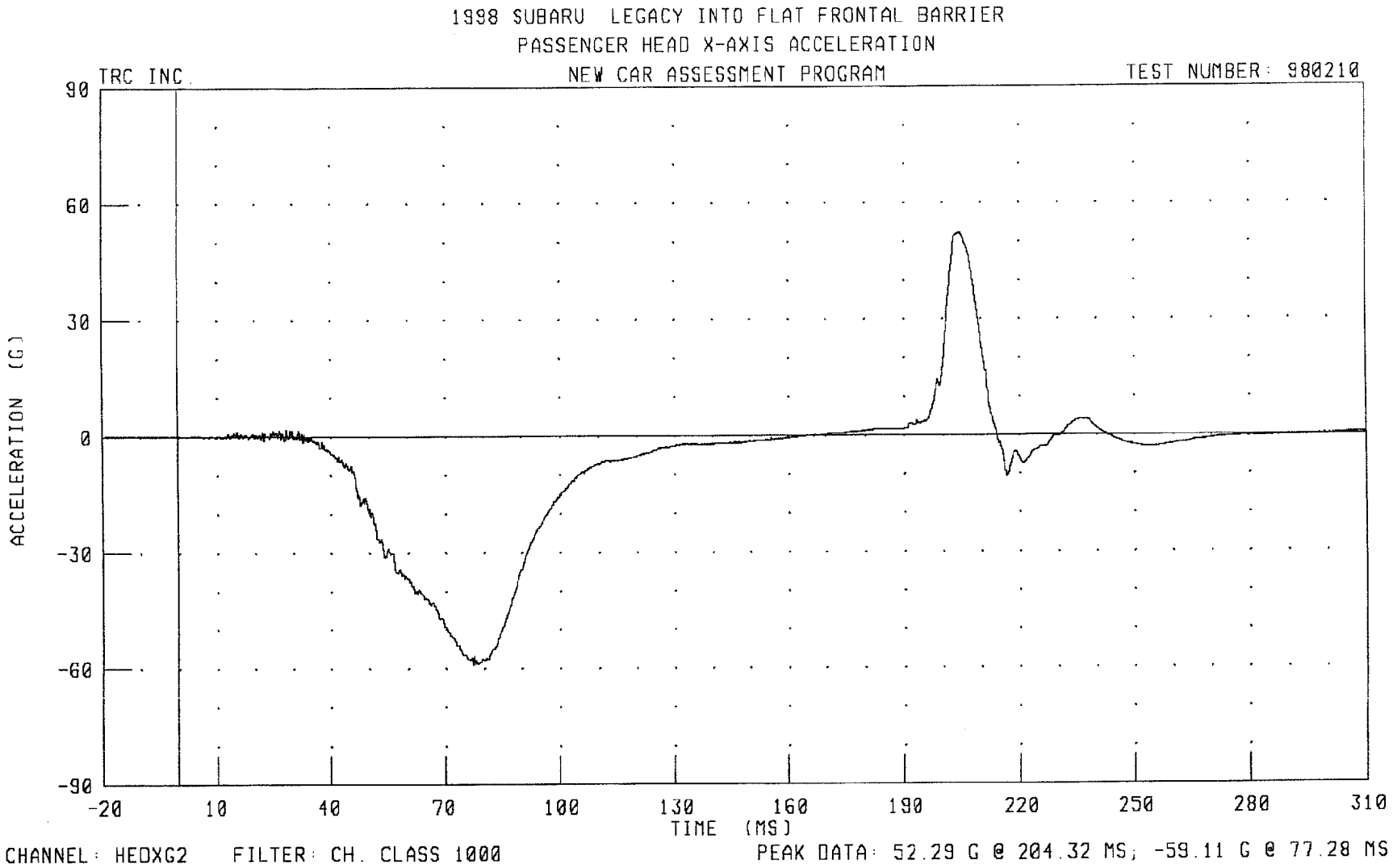


CHANNEL: FTRXG1 FILTER: CH. CLASS 1000

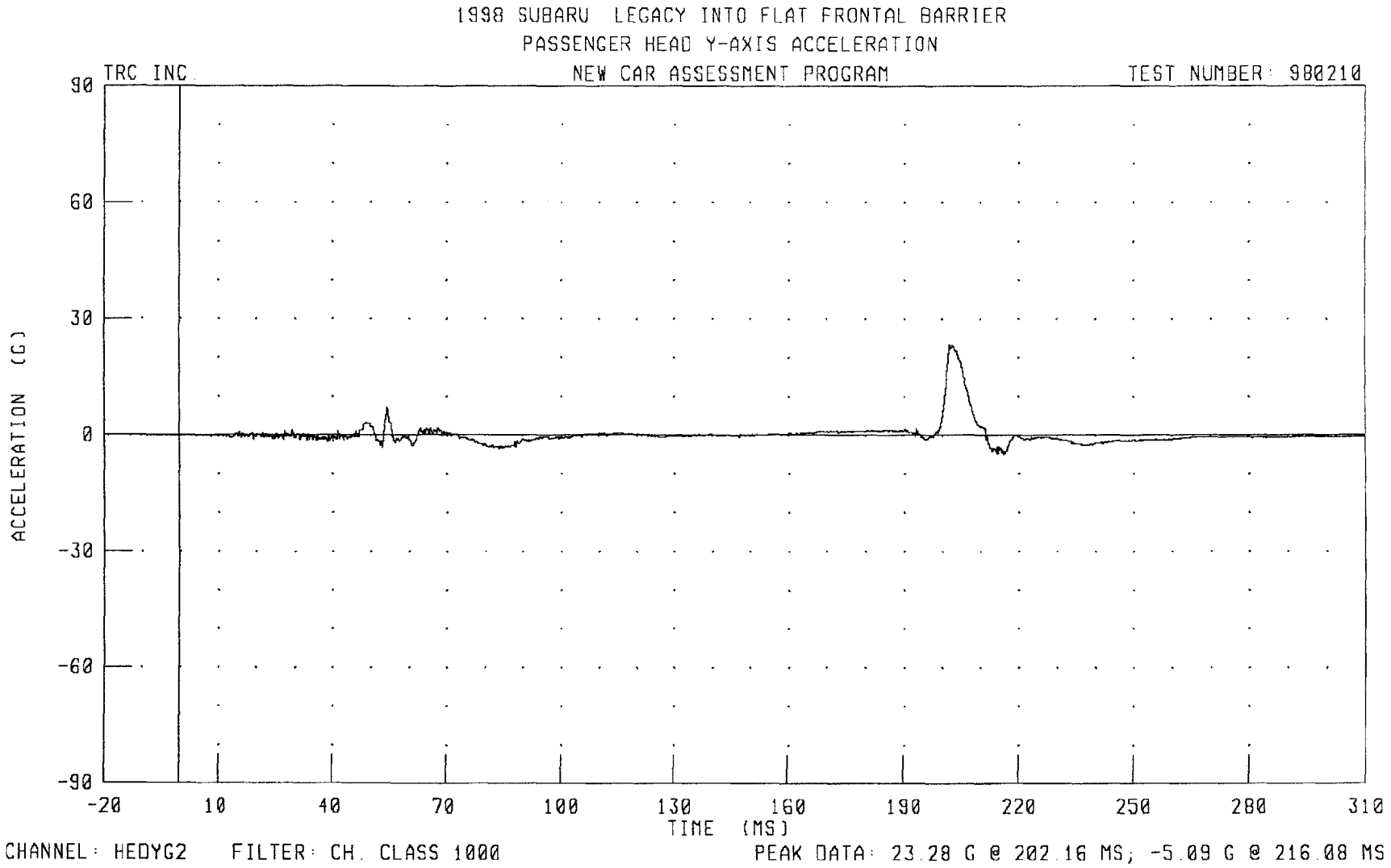
PEAK DATA: 66.30 G @ 49.20 MS; -92.57 G @ 38.24 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FOOT Z-AXIS ACCELERATION AT HEEL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 113.92 G @ 40.00 MS; -23.16 G @ 53.20 MS

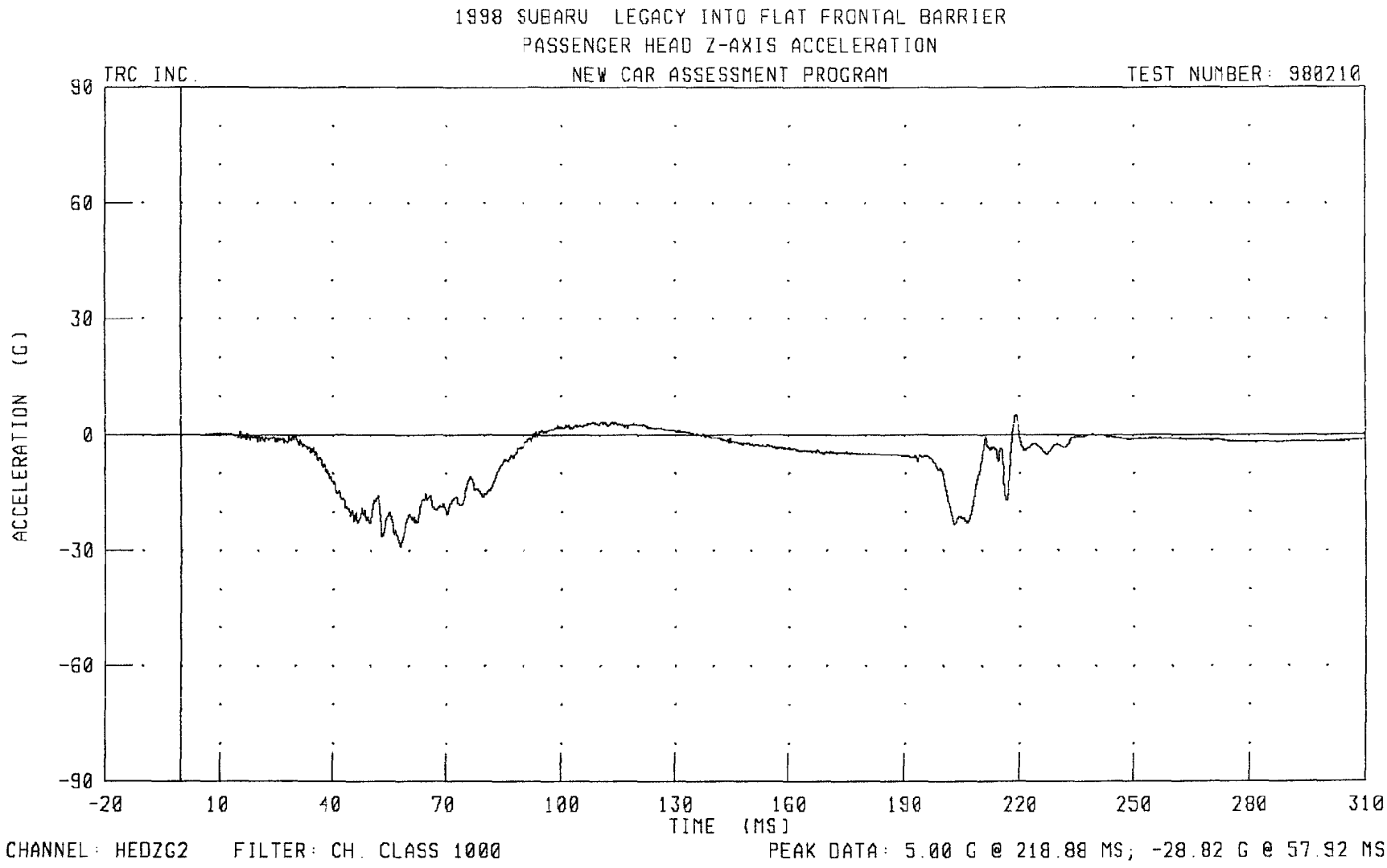

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FOOT Z-AXIS ACCELERATION AT TOE
NEW CAR ASSESSMENT PROGRAM
TRC INC
TEST NUMBER: 980210
ACCELERATION (G X 10¹)
48
36
24
12
0
-12
-24
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRZT1
FILTER: CH. CLASS 1000
PEAK DATA: 411.72 G @ 39.84 MS; -73.28 G @ 37.68 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 52.29 G @ 204.32 MS; -59.11 G @ 77.28 MS

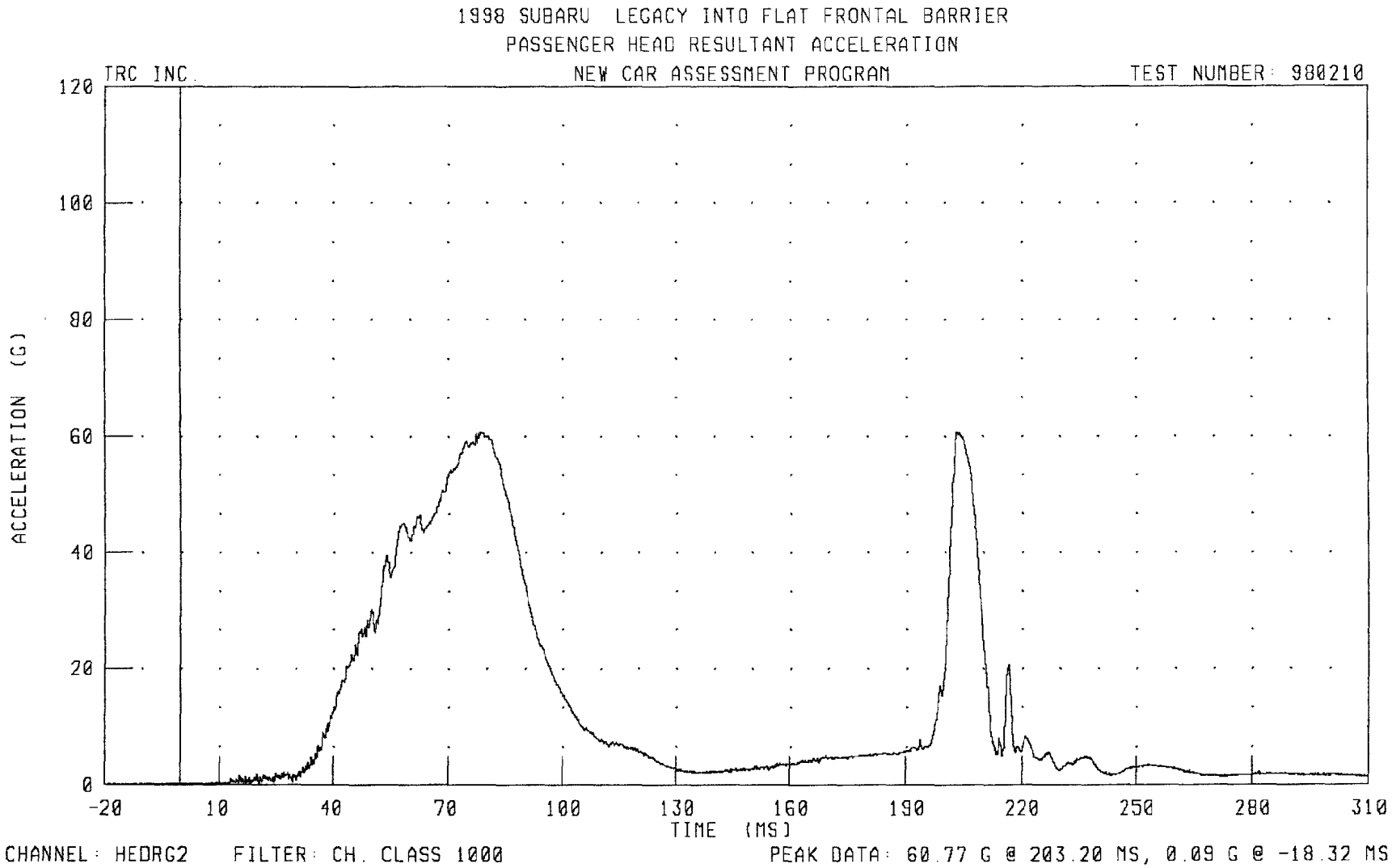
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG2
FILTER: CH. CLASS 1000
PEAK DATA: 23.28 G @ 202.16 MS; -5.09 G @ 216.08 MS

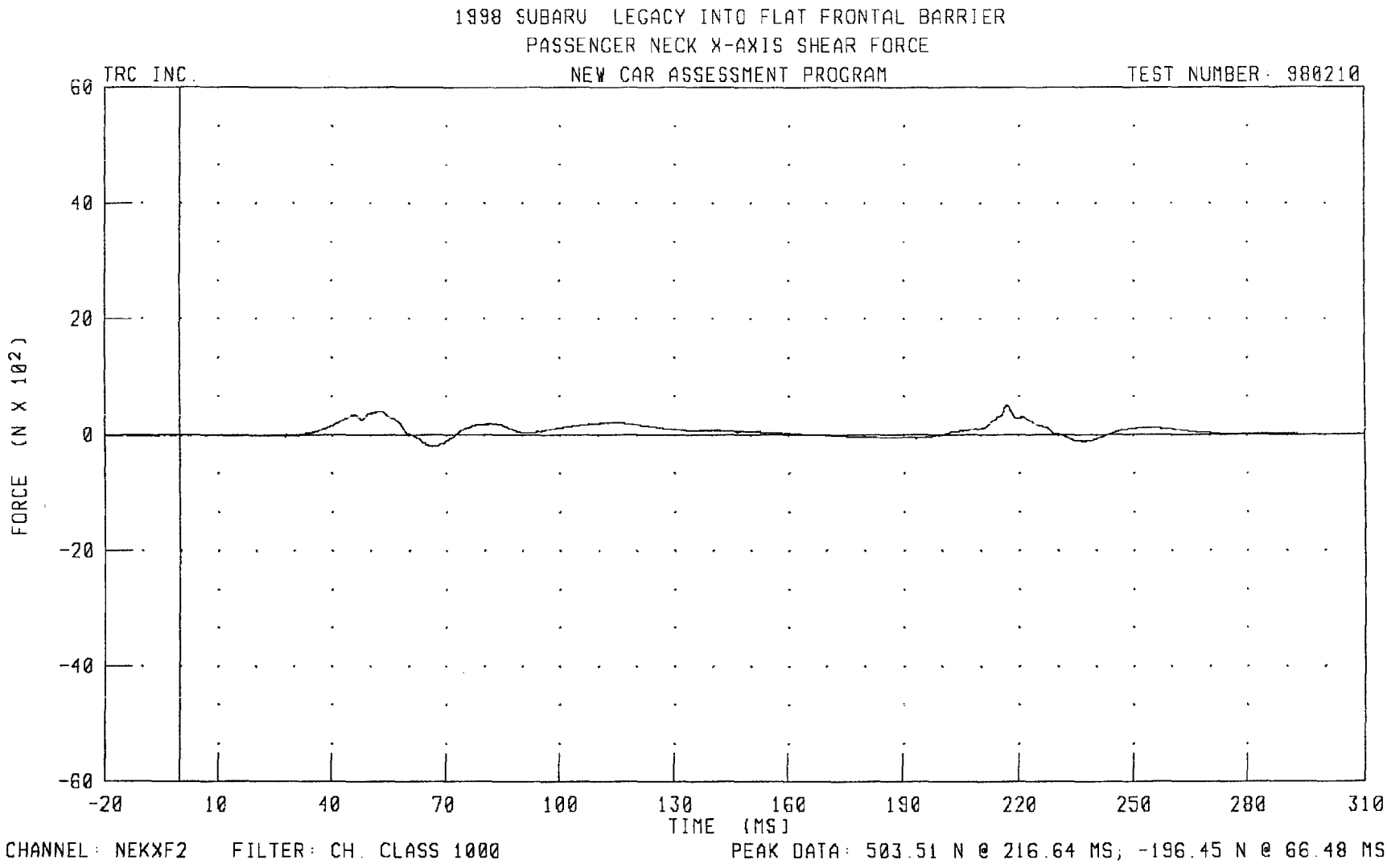
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 5.00 G @ 218.88 MS; -28.82 G @ 57.92 MS

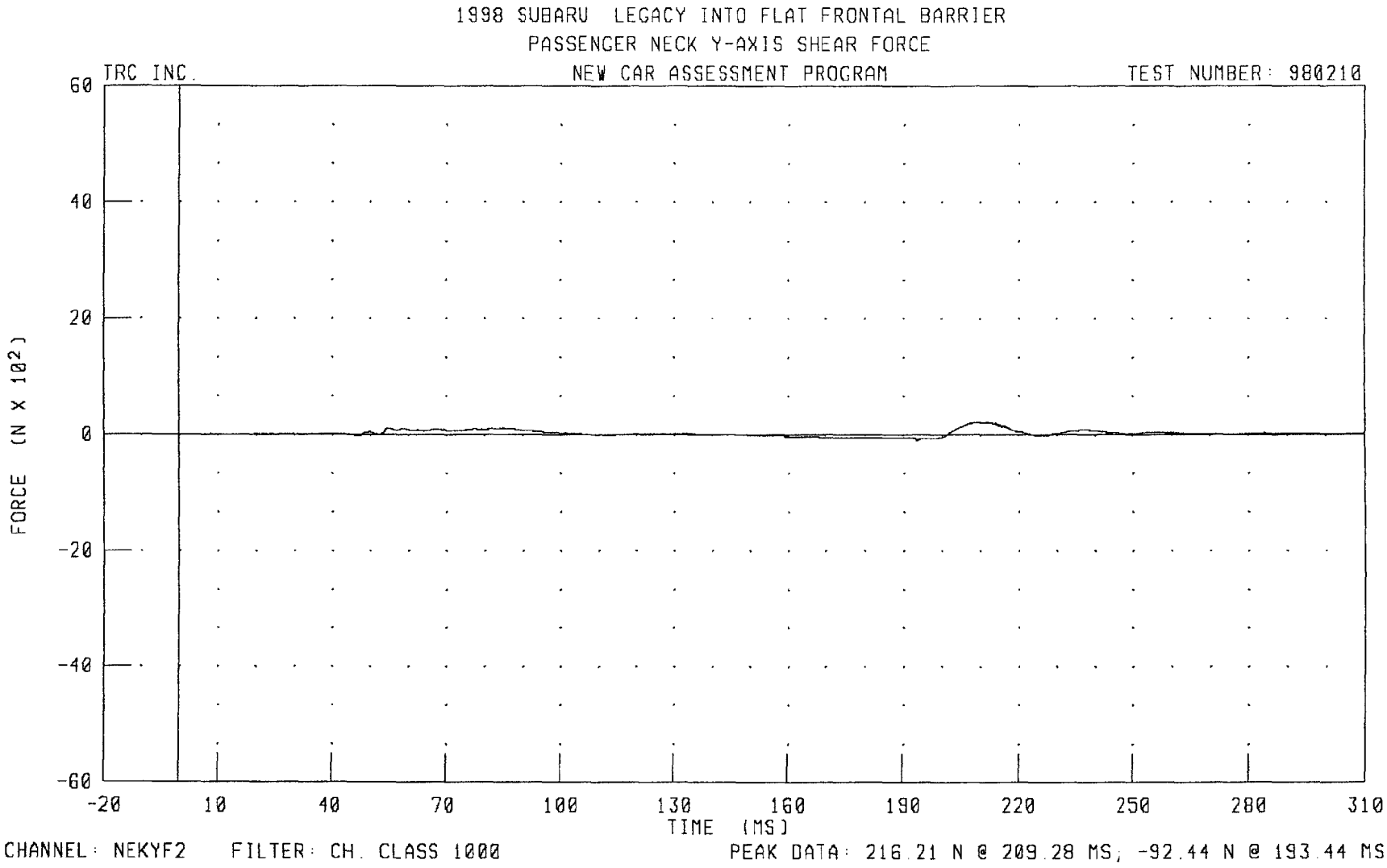
980210

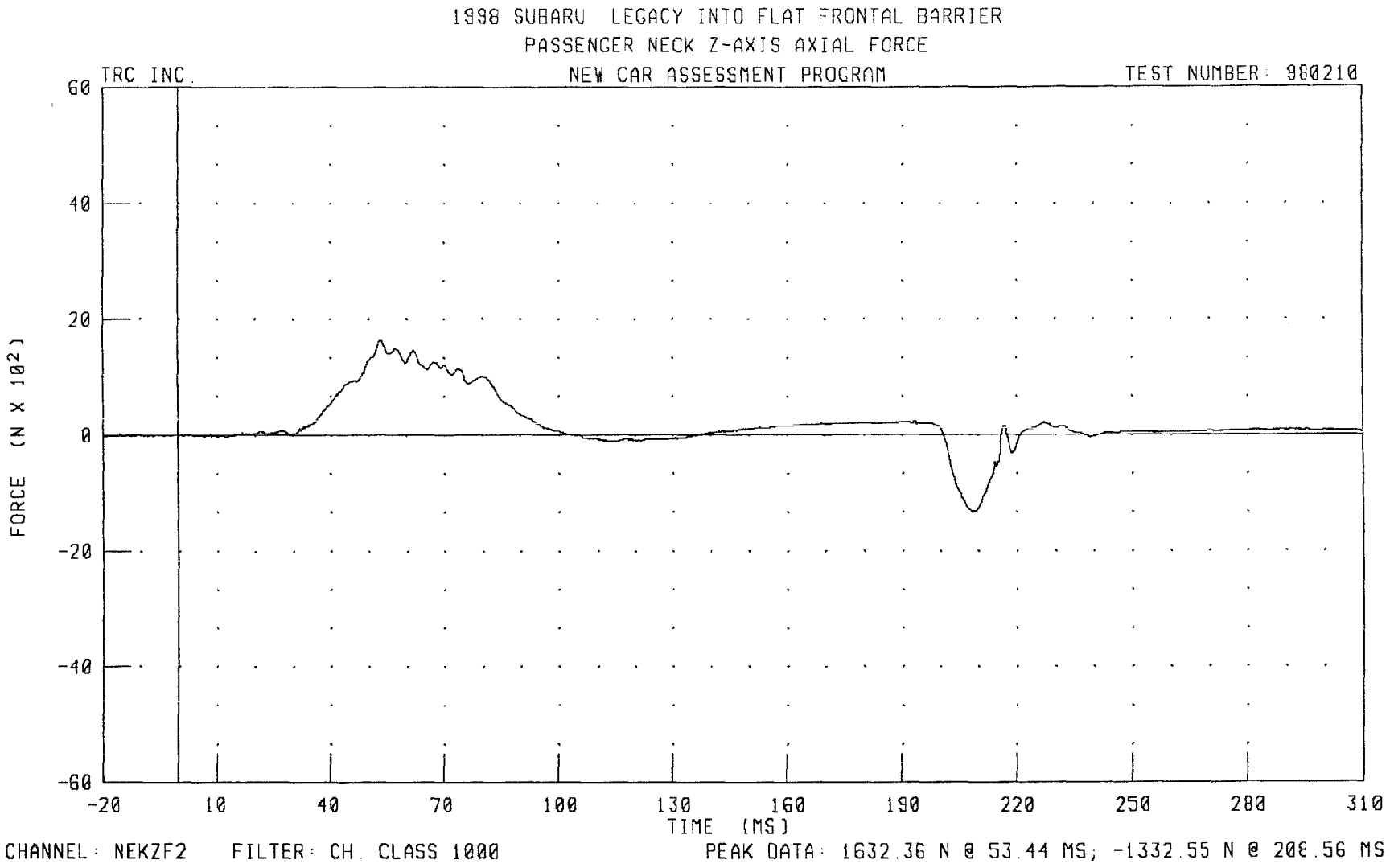

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG2
FILTER: CH. CLASS 1000
PEAK DATA: 60.77 G @ 203.20 MS, 0.09 G @ -18.32 MS

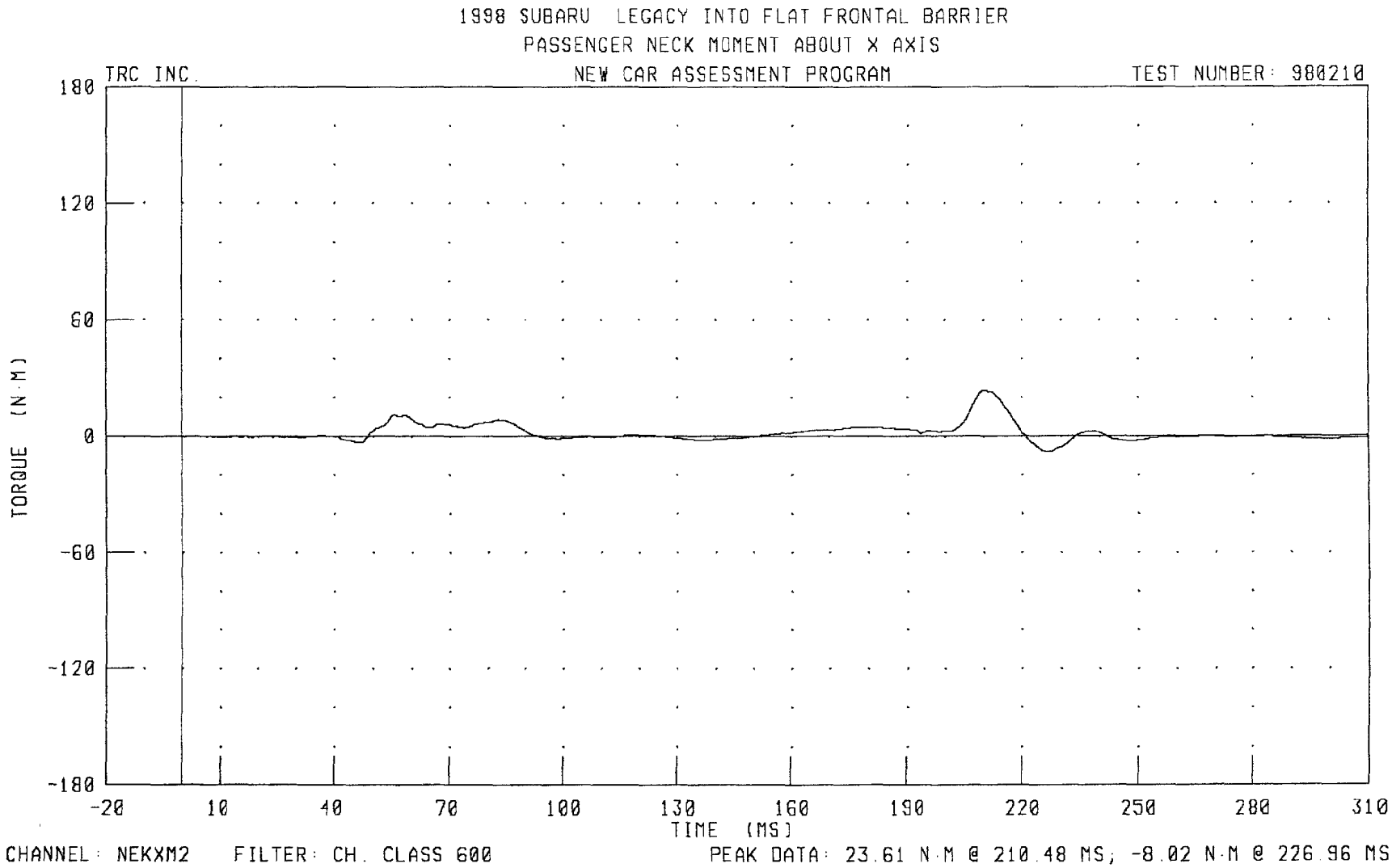
980210

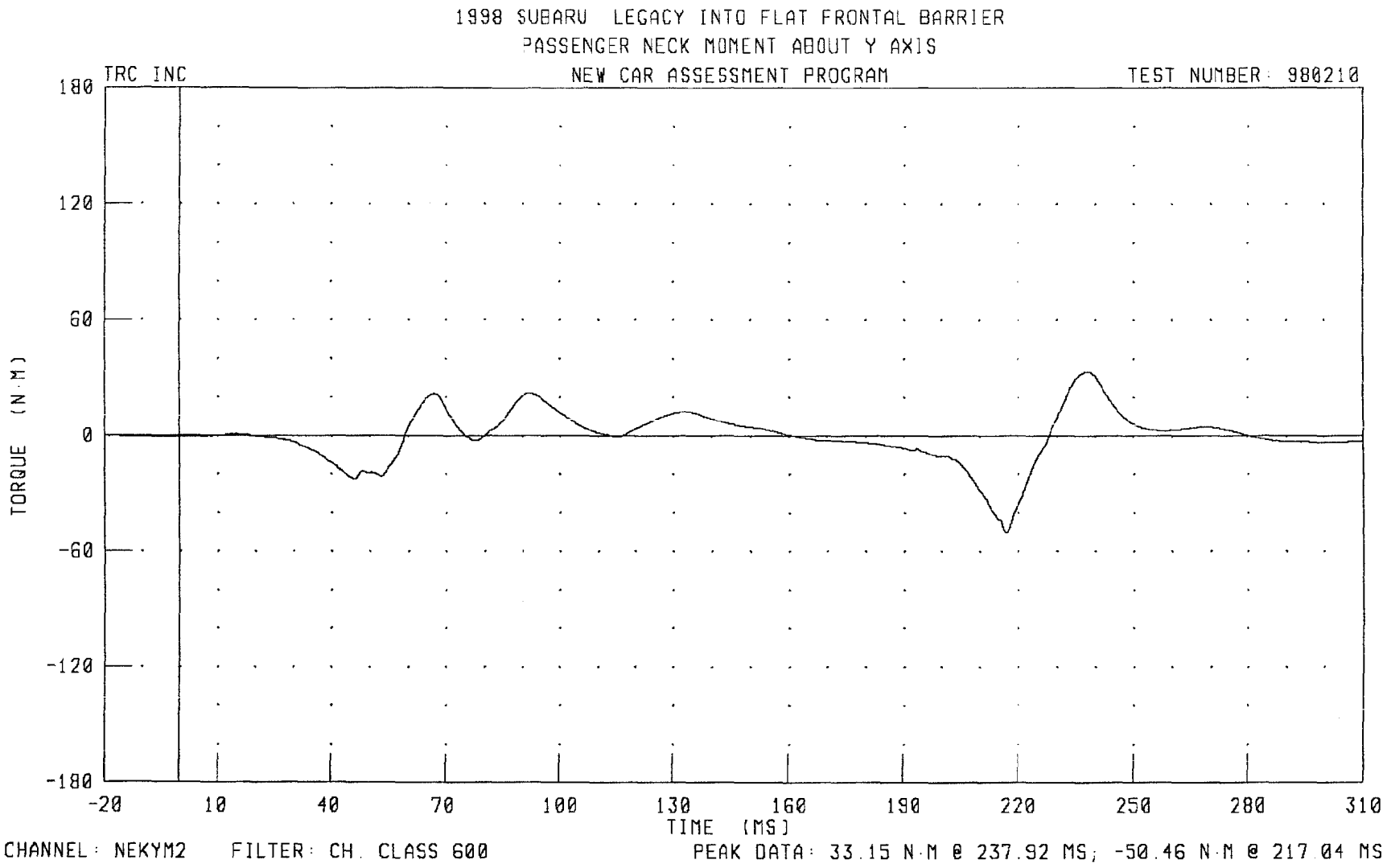

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER NECK X-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXF2
FILTER: CH. CLASS 1000
PEAK DATA: 503.51 N @ 216.64 MS; -196.45 N @ 66.48 MS

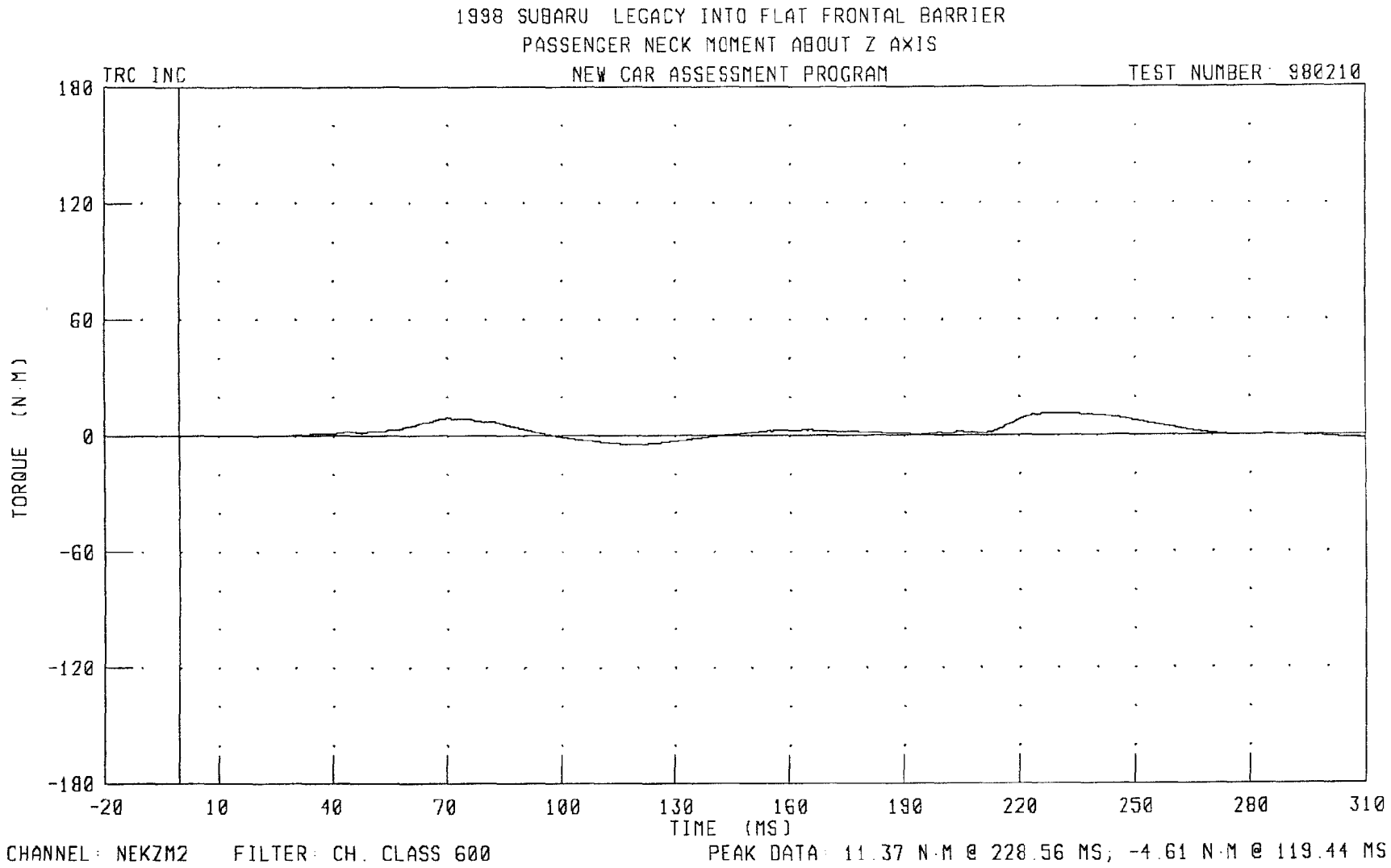
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 216.21 N @ 209.28 MS, -92.44 N @ 193.44 MS

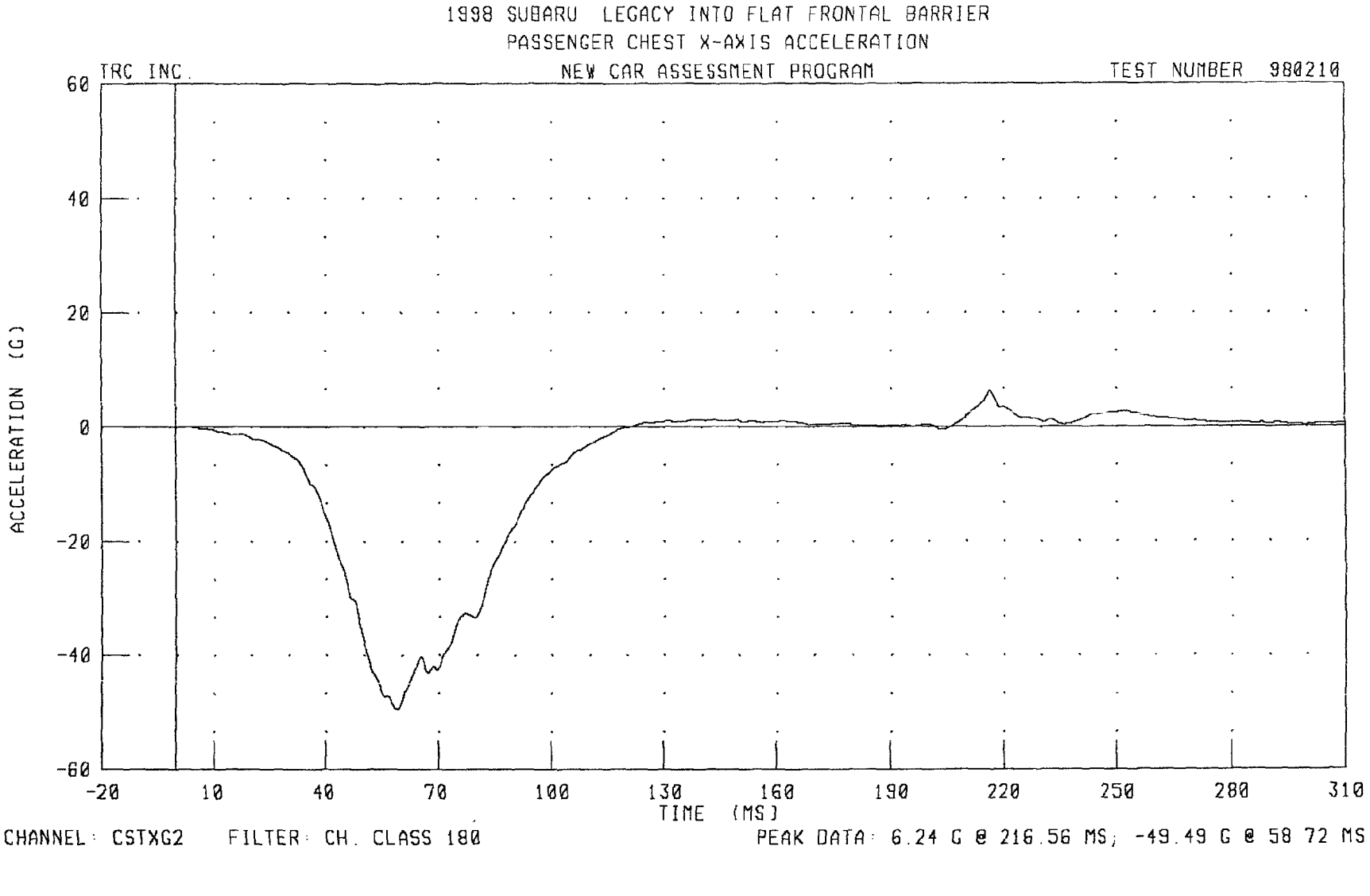

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZF2
FILTER: CH. CLASS 1000
PEAK DATA: 1632.36 N @ 53.44 MS; -1332.55 N @ 208.56 MS

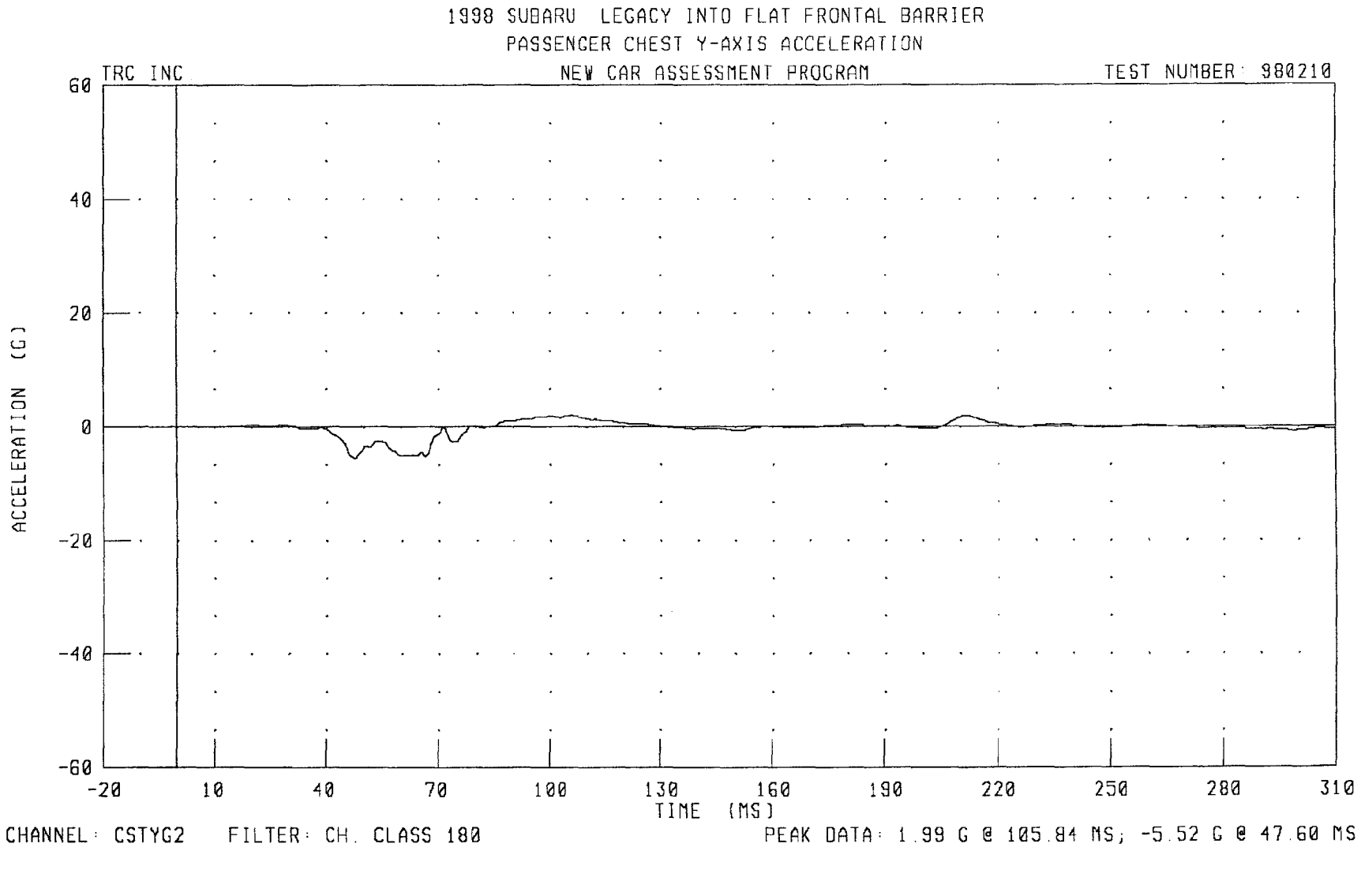

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXM2
FILTER: CH. CLASS 600
PEAK DATA: 23.61 N-M @ 210.48 MS; -8.02 N-M @ 226.96 MS

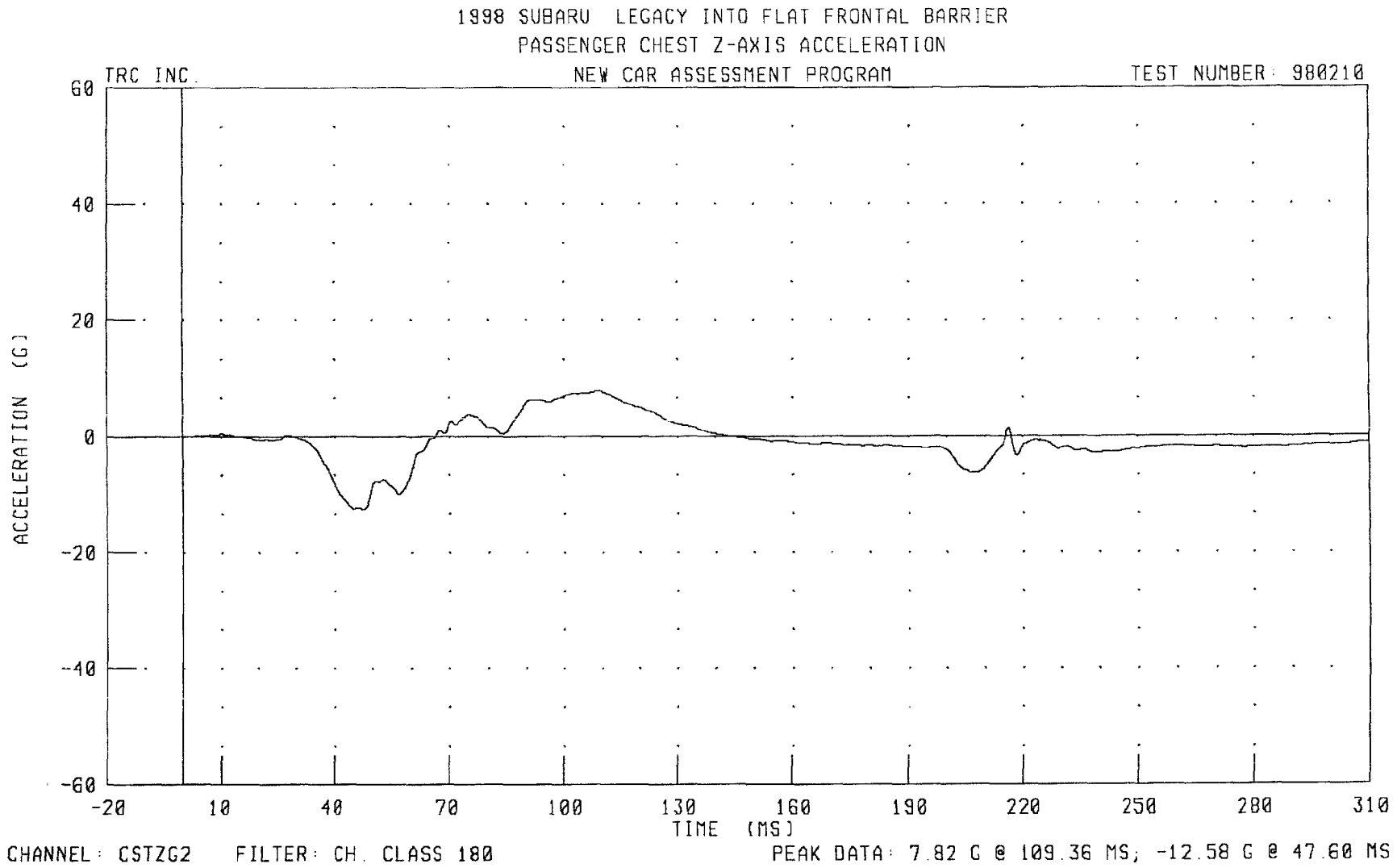

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYM2
FILTER: CH. CLASS 600
PEAK DATA: 33.15 N-M @ 237.92 MS; -50.46 N-M @ 217.04 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: NEKZM2
FILTER: CH. CLASS 600
PEAK DATA: 11.37 N-M @ 228.56 MS; -4.61 N-M @ 119.44 MS

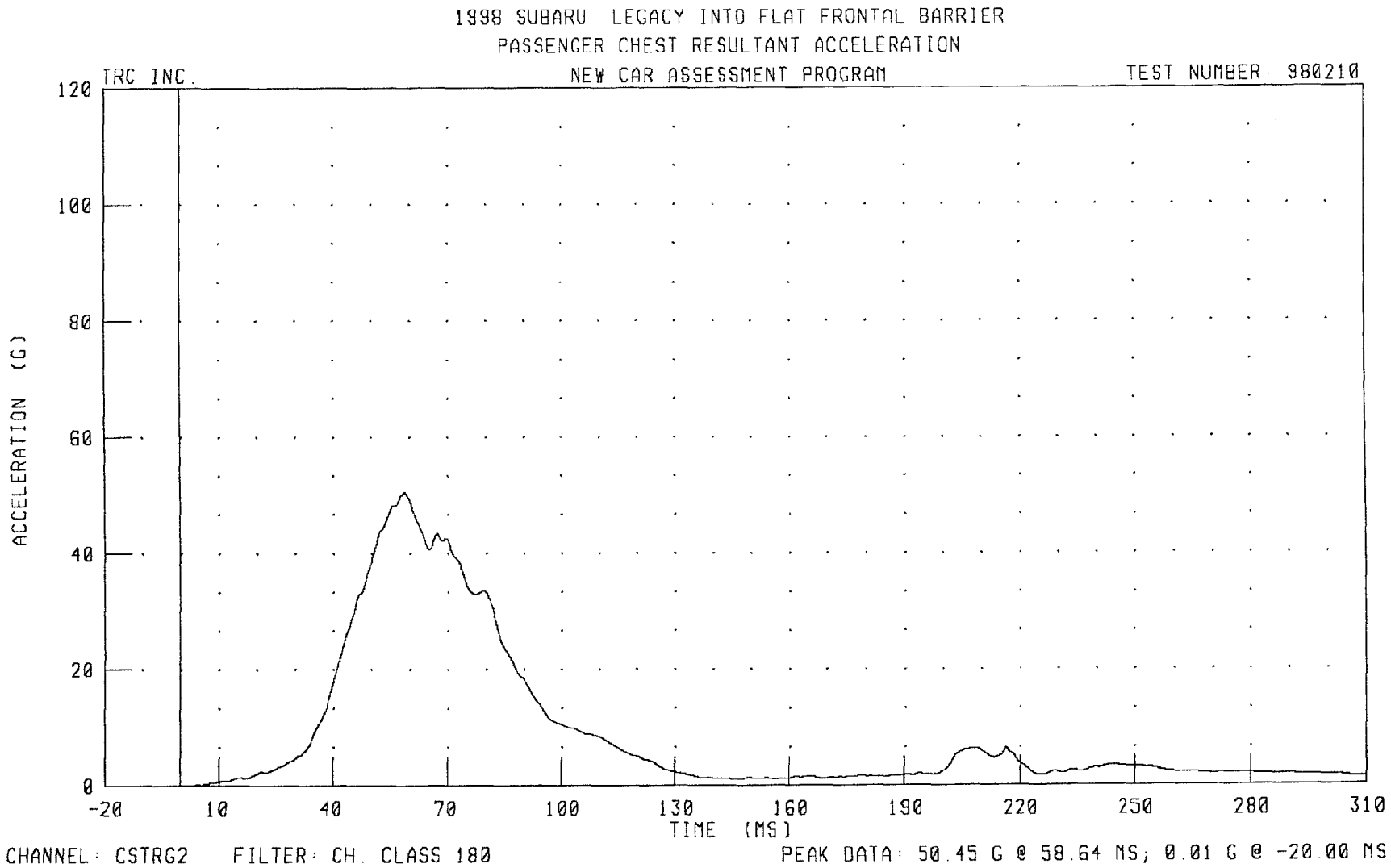
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG2
FILTER: CH. CLASS 180
PEAK DATA: 6.24 G @ 216.56 MS; -49.49 G @ 58.72 MS

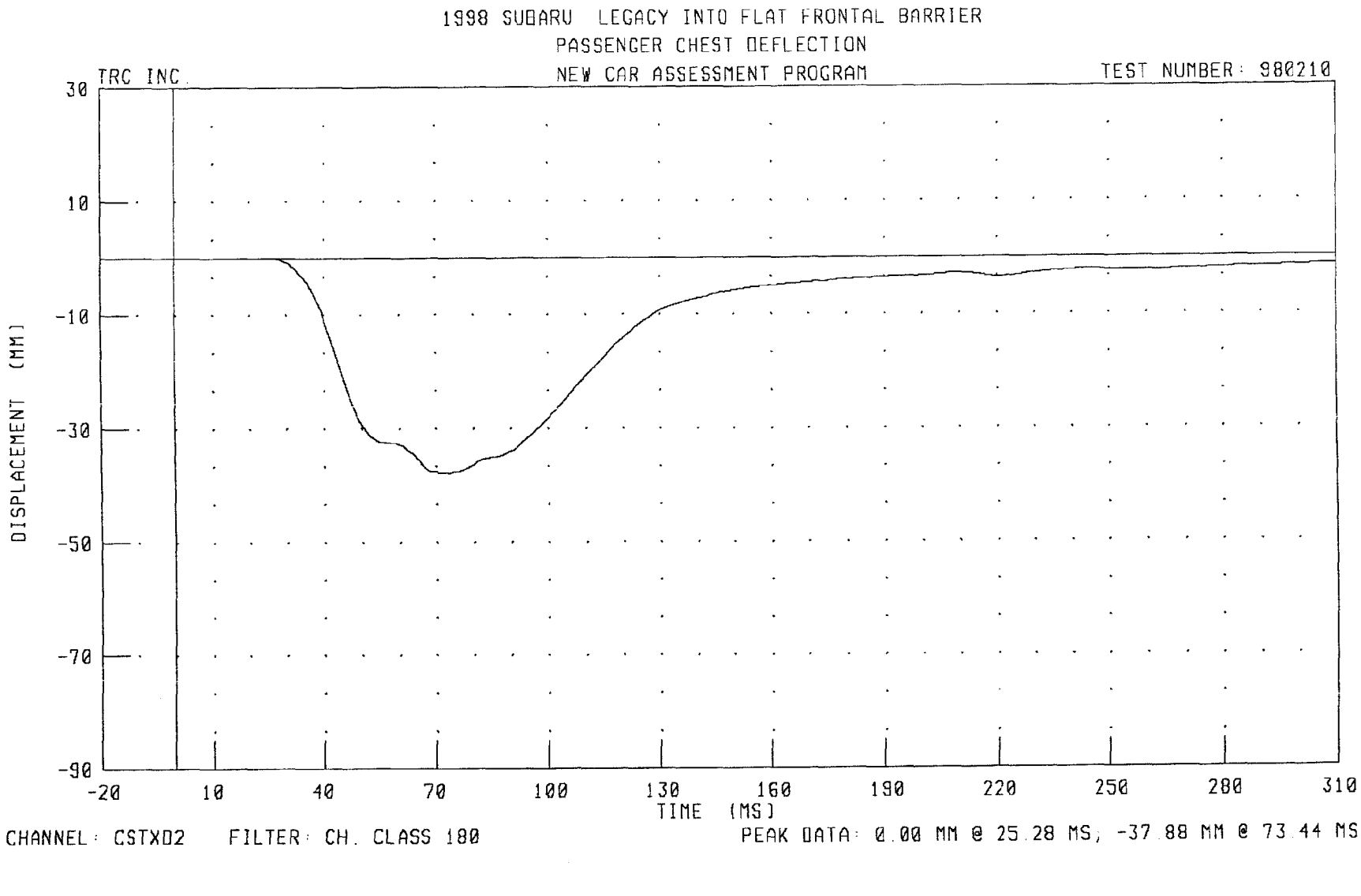

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG2
FILTER: CH. CLASS 180
PEAK DATA: 1.99 G @ 105.84 MS; -5.52 G @ 47.60 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 7.82 G @ 109.36 MS; -12.58 G @ 47.60 MS

980210

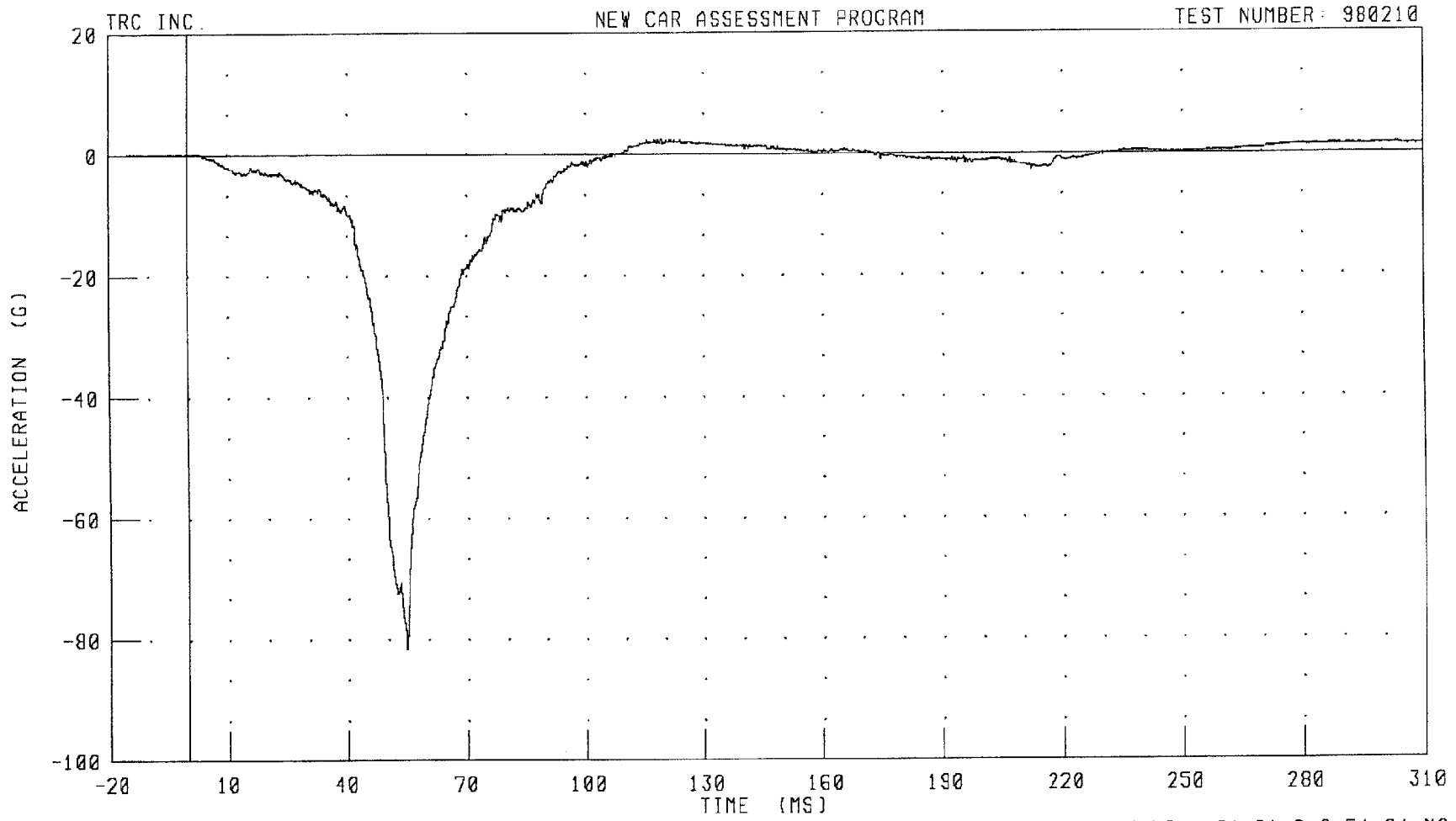

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG2
FILTER: CH. CLASS 180
PEAK DATA: 50.45 G @ 58.64 MS; 0.01 G @ -20.00 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST DEFLECTION
NEW CAR ASSESSMENT PROGRAM
TRC INC
TEST NUMBER: 980210
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: 0.00 MM @ 25.28 MS, -37.88 MM @ 73.44 MS

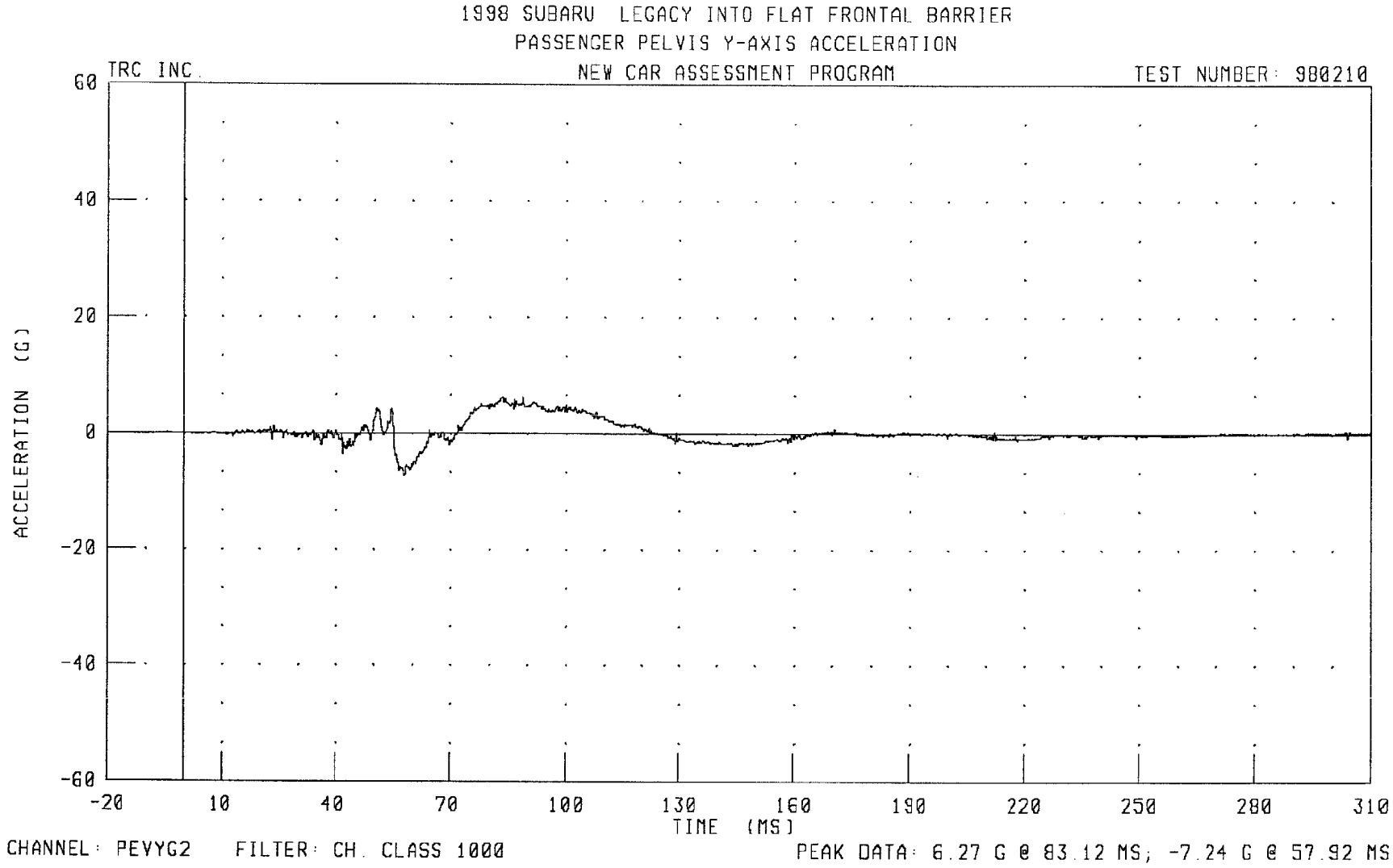
980210

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER PELVIS X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

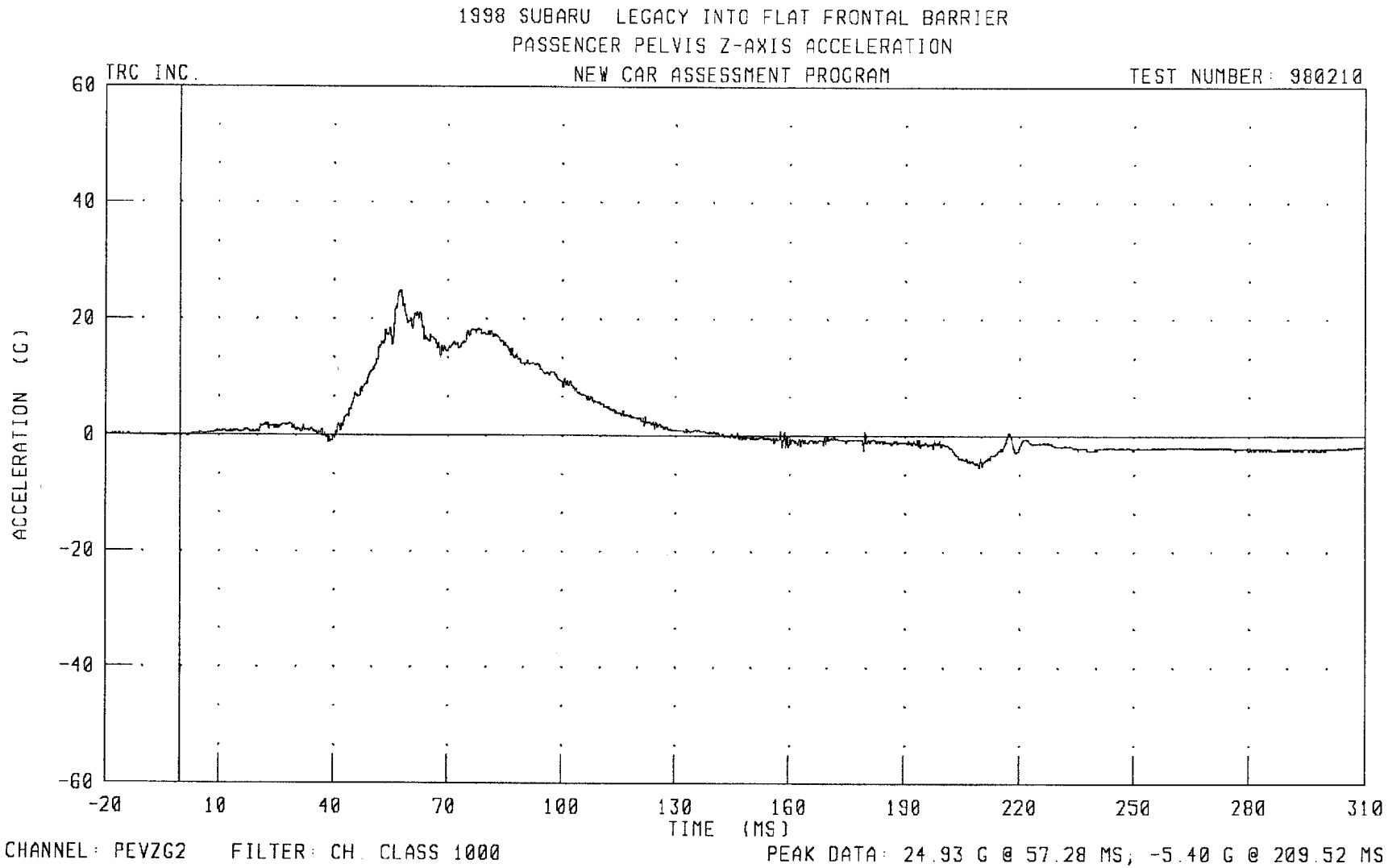


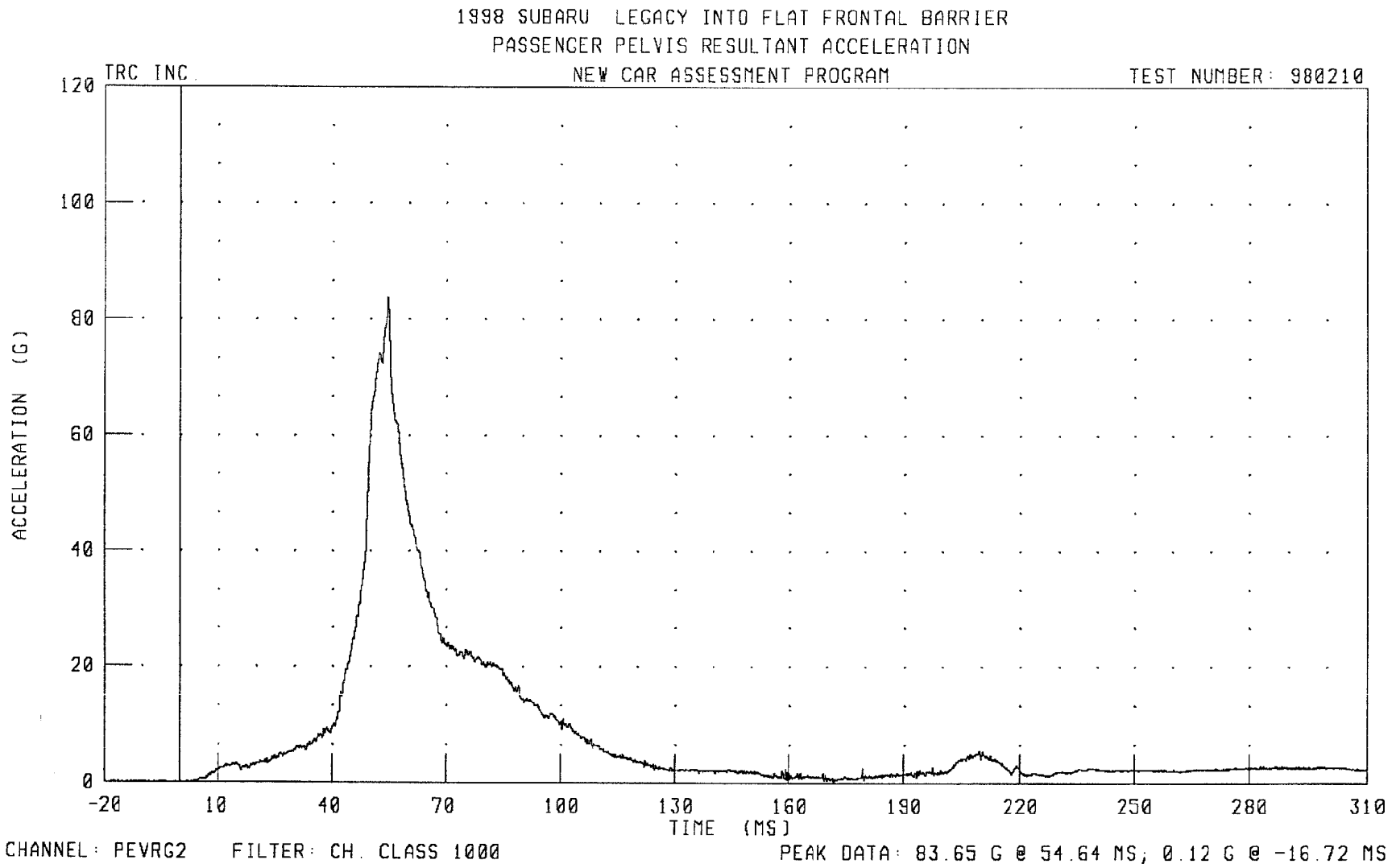
CHANNEL: PEVXG2 FILTER: CH. CLASS 1000 PEAK DATA: 2.47 G @ 119.44 MS; -81.61 G @ 54.64 MS

980210

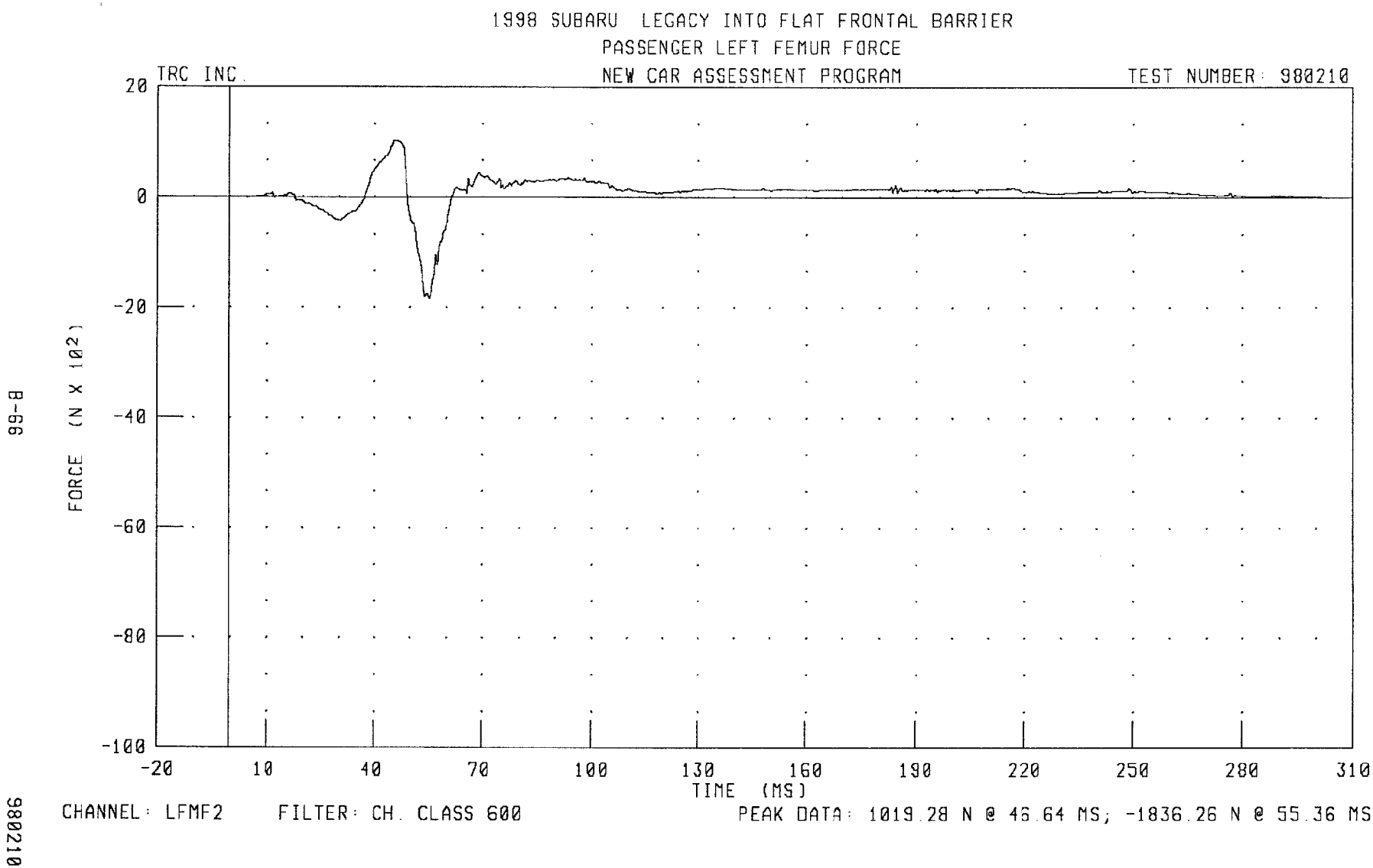

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER PELVIS Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVYG2
FILTER: CH. CLASS 1000
PEAK DATA: 6.27 G @ 83.12 MS; -7.24 G @ 57.92 MS

980210

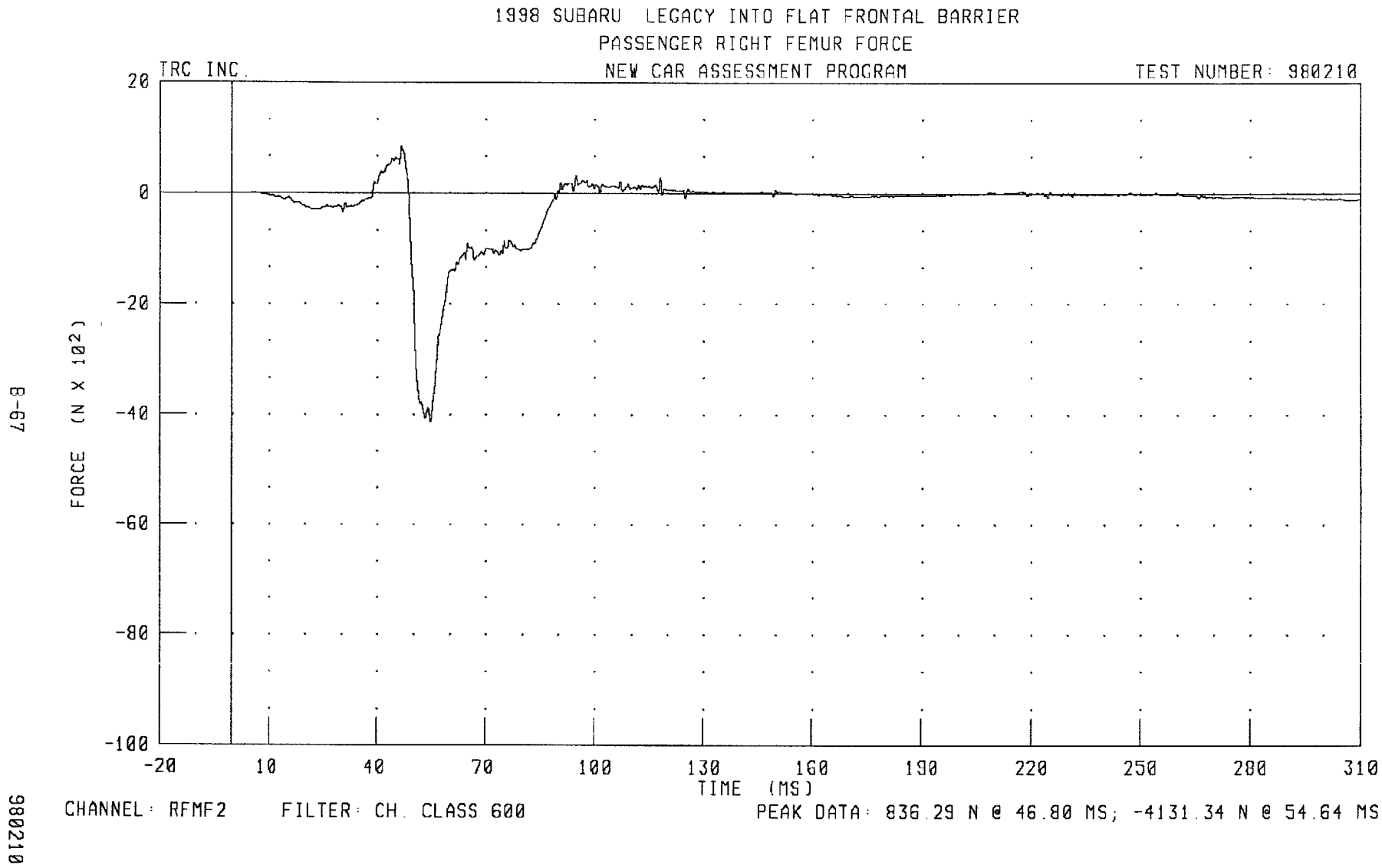

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER PELVIS Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVZG2
FILTER: CH CLASS 1000
PEAK DATA: 24.93 G @ 57.28 MS; -5.40 G @ 209.52 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER PELVIS RESULTANT ACCELERATION
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 83.65 G @ 54.64 MS; 0.12 G @ -16.72 MS

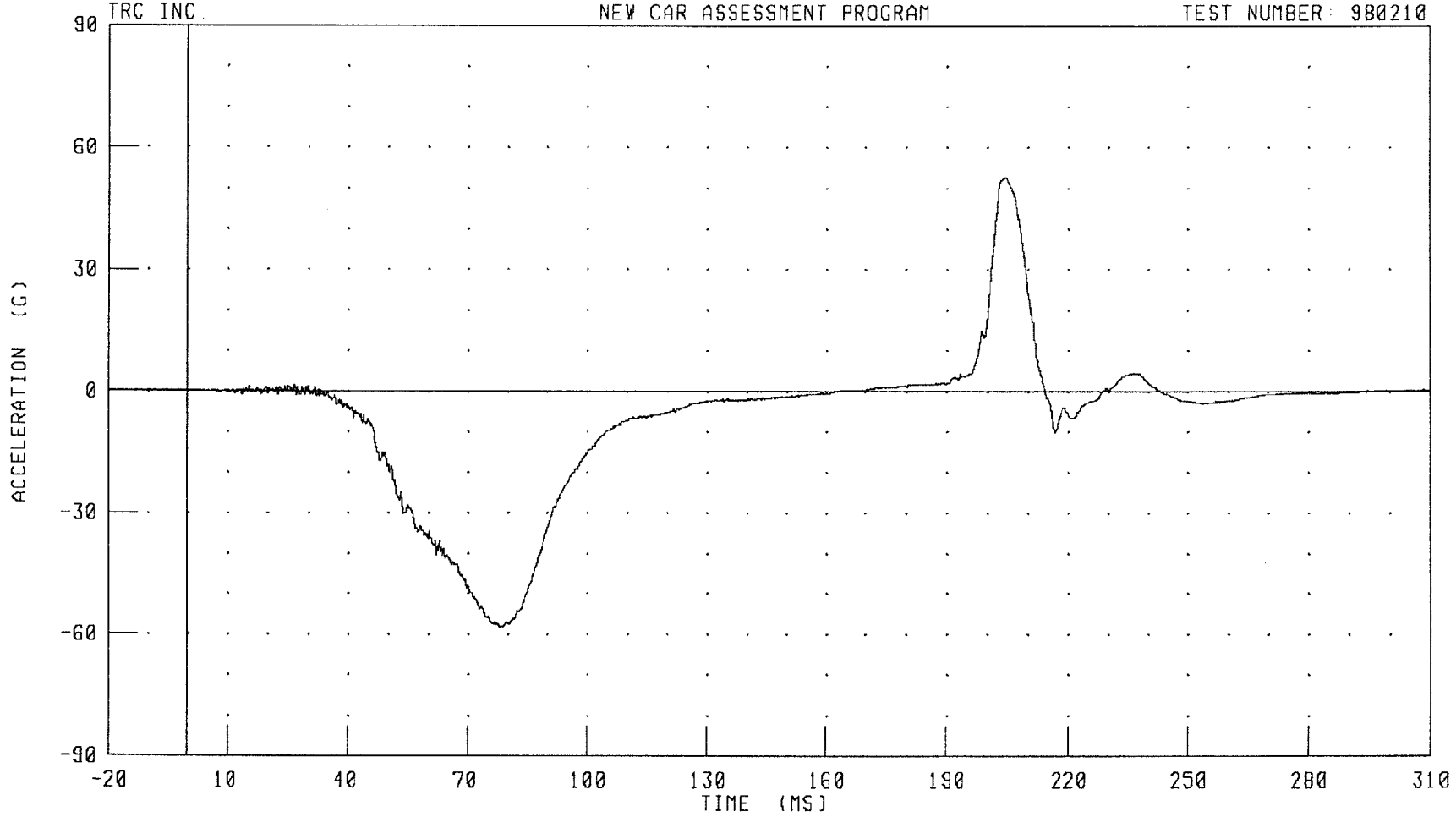
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT FEMUR FORCE
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 980210
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: 1019.28 N @ 46.64 MS; -1836.26 N @ 55.36 MS

980210

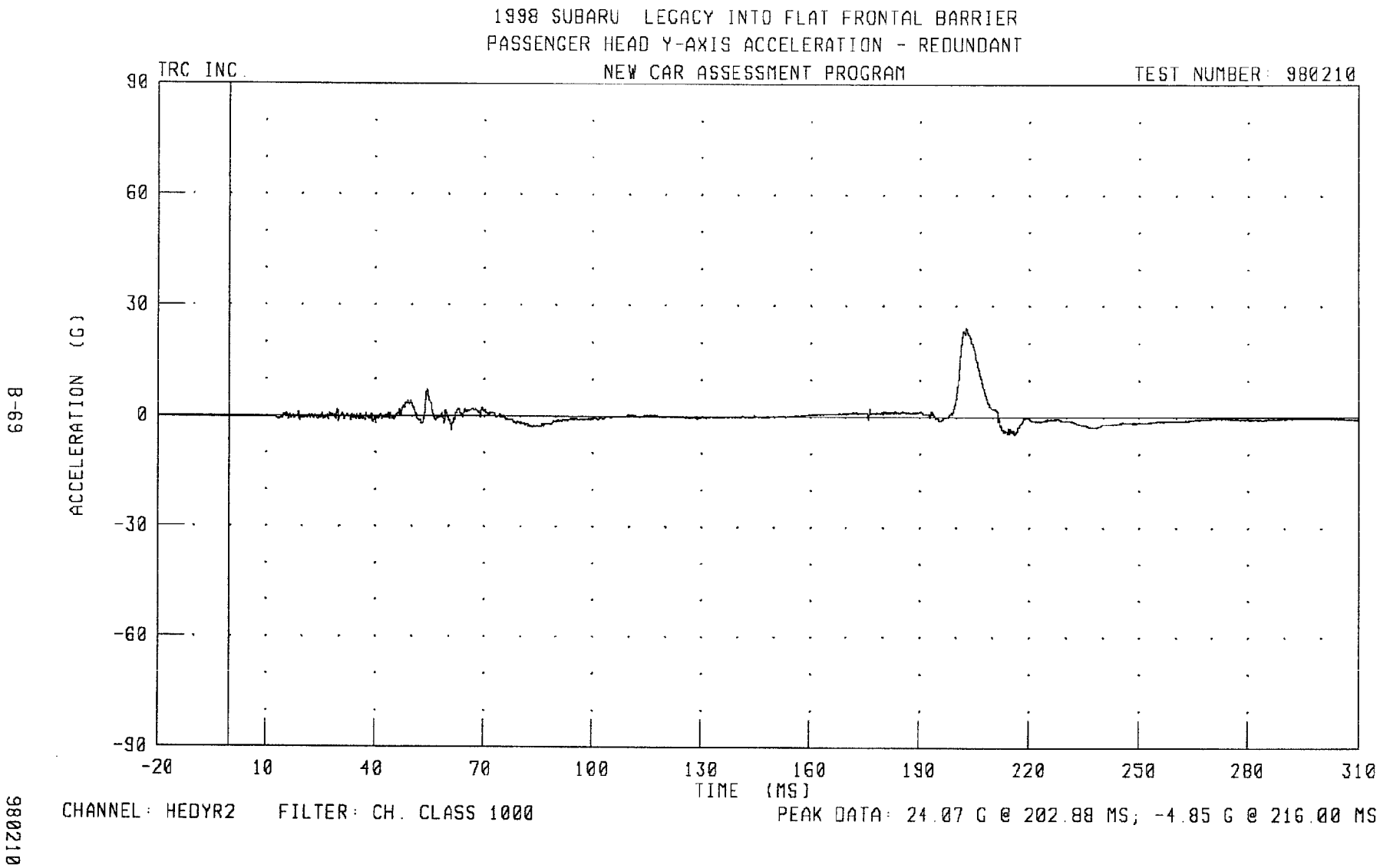

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF2
FILTER: CH. CLASS 600
PEAK DATA: 836.29 N @ 46.80 MS; -4131.34 N @ 54.64 MS

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION - REDUNDANT

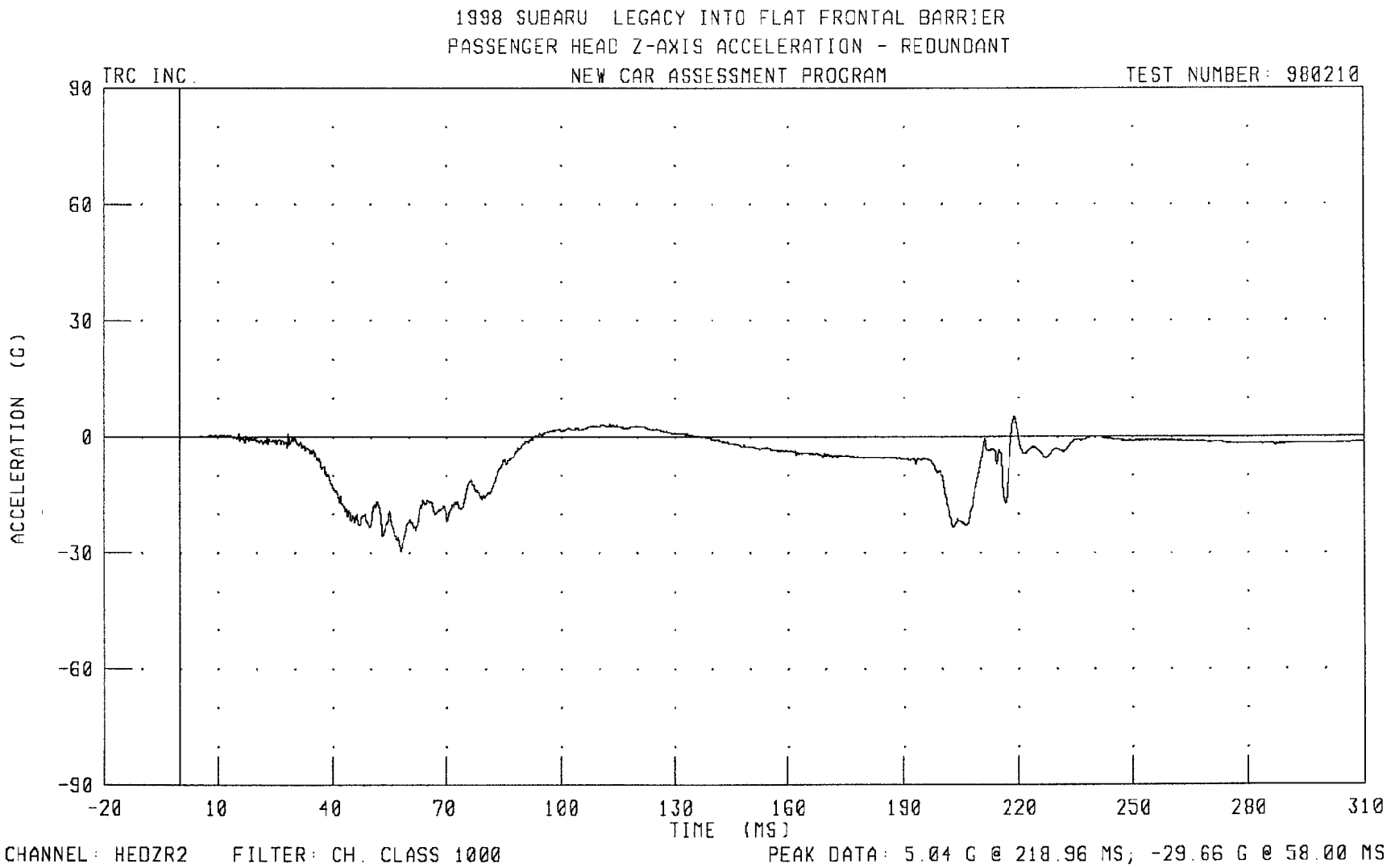


CHANNEL: HEDXR2 FILTER: CH. CLASS 1000 PEAK DATA: 52.71 G @ 204.32 MS; -58.45 G @ 78.08 MS

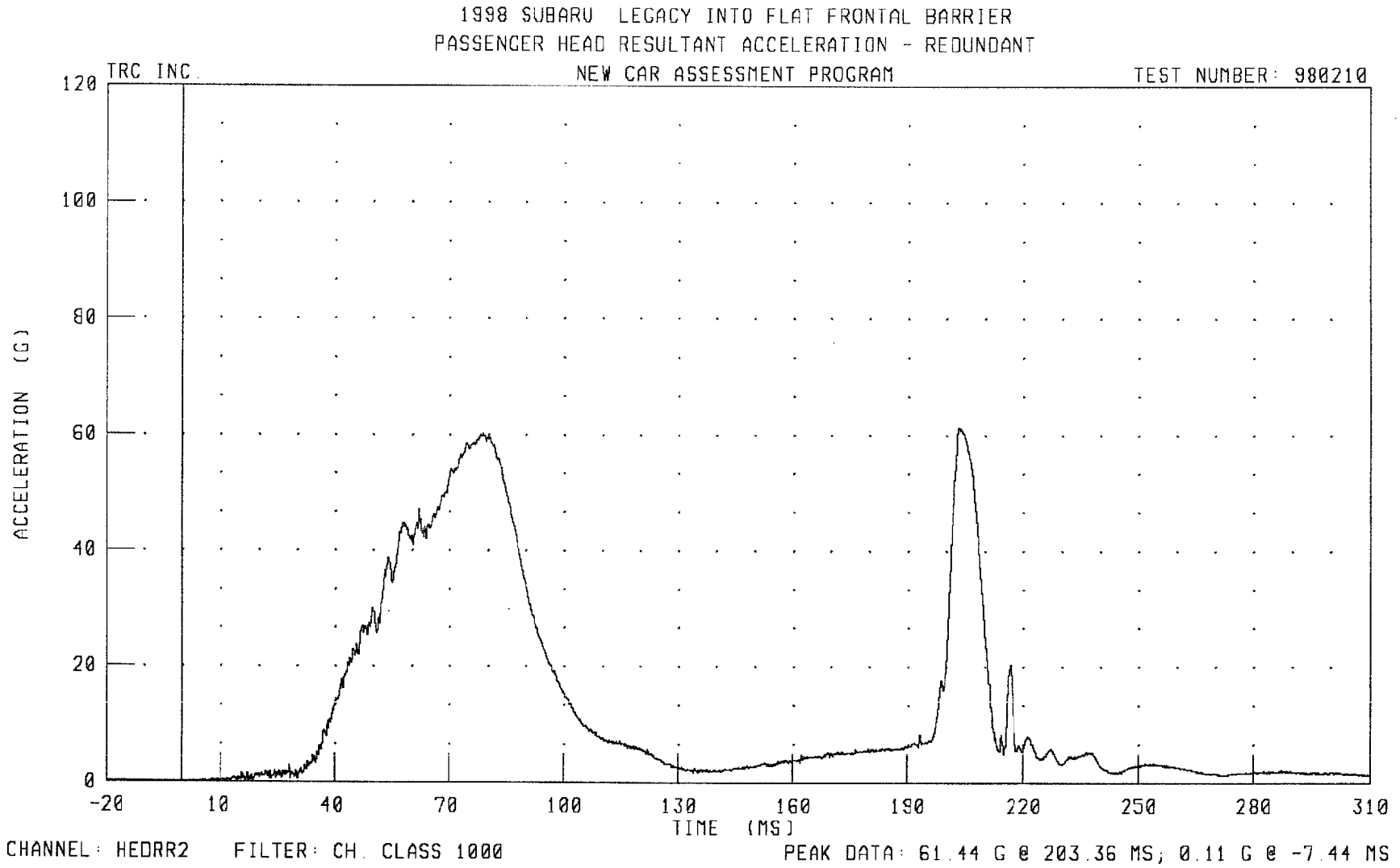
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYR2
FILTER: CH. CLASS 1000
PEAK DATA: 24.07 G @ 202.88 MS; -4.85 G @ 216.00 MS

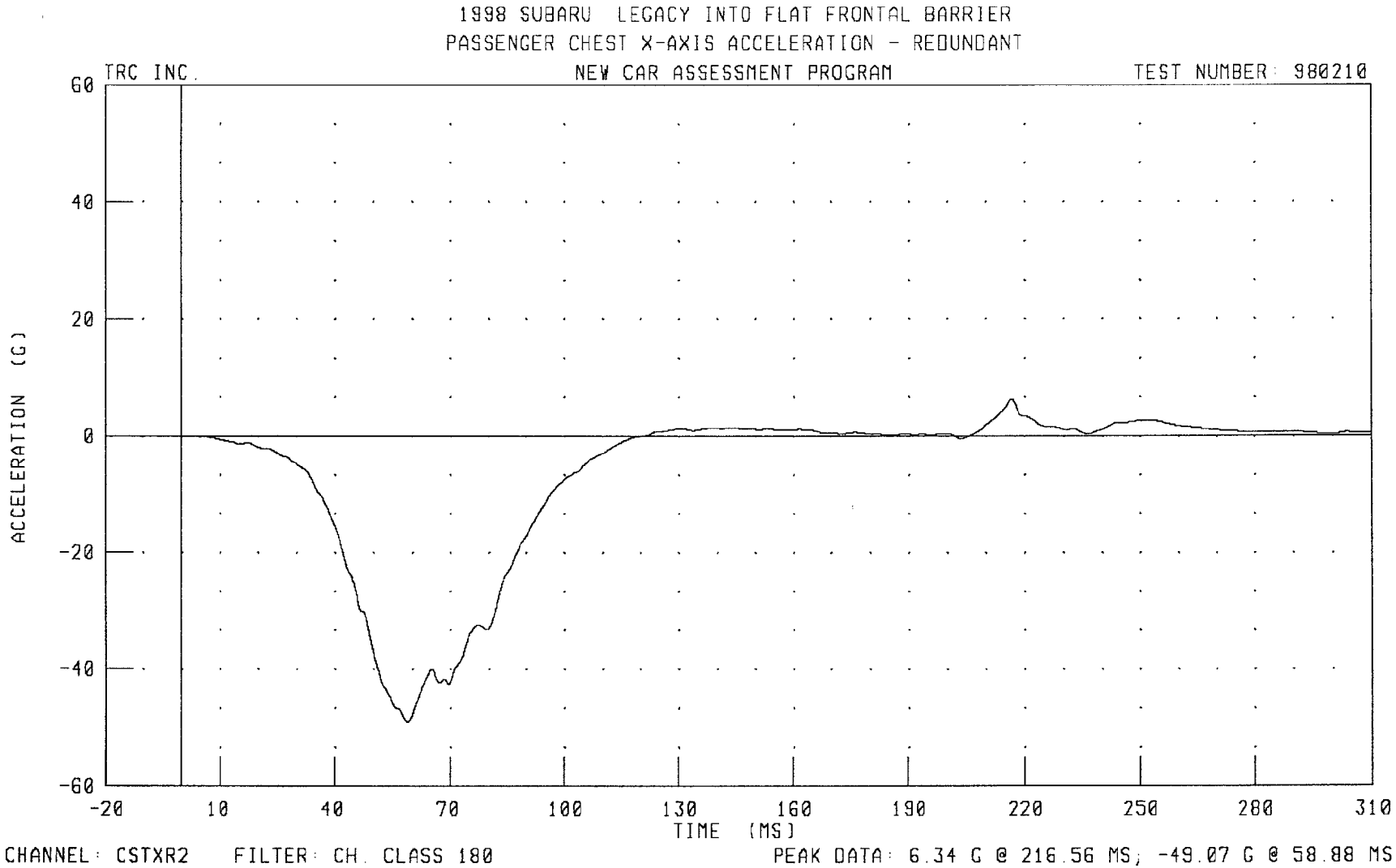
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 5.04 G @ 218.96 MS; -29.66 G @ 58.00 MS

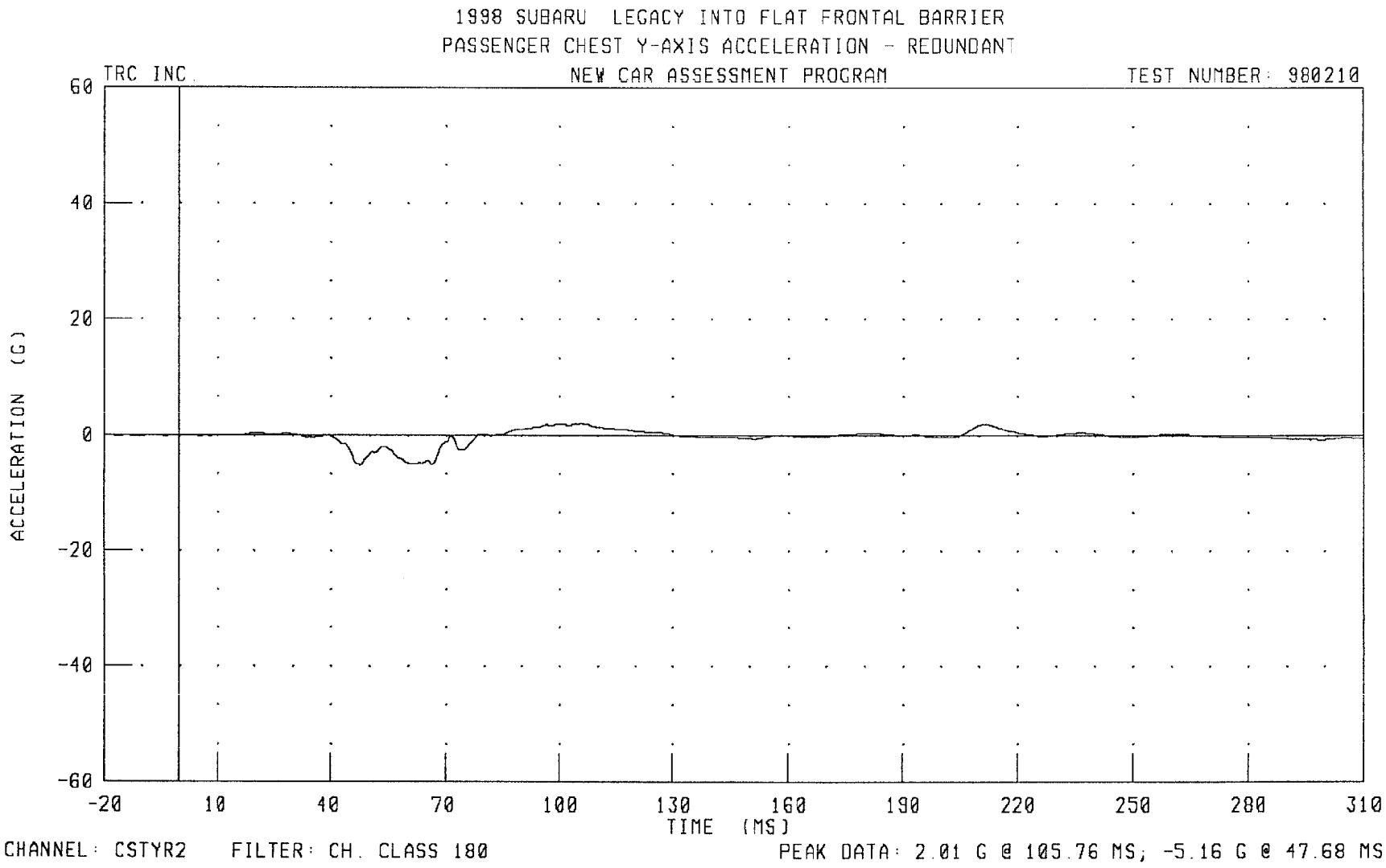
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 61.44 G @ 203.36 MS; 0.11 G @ -7.44 MS

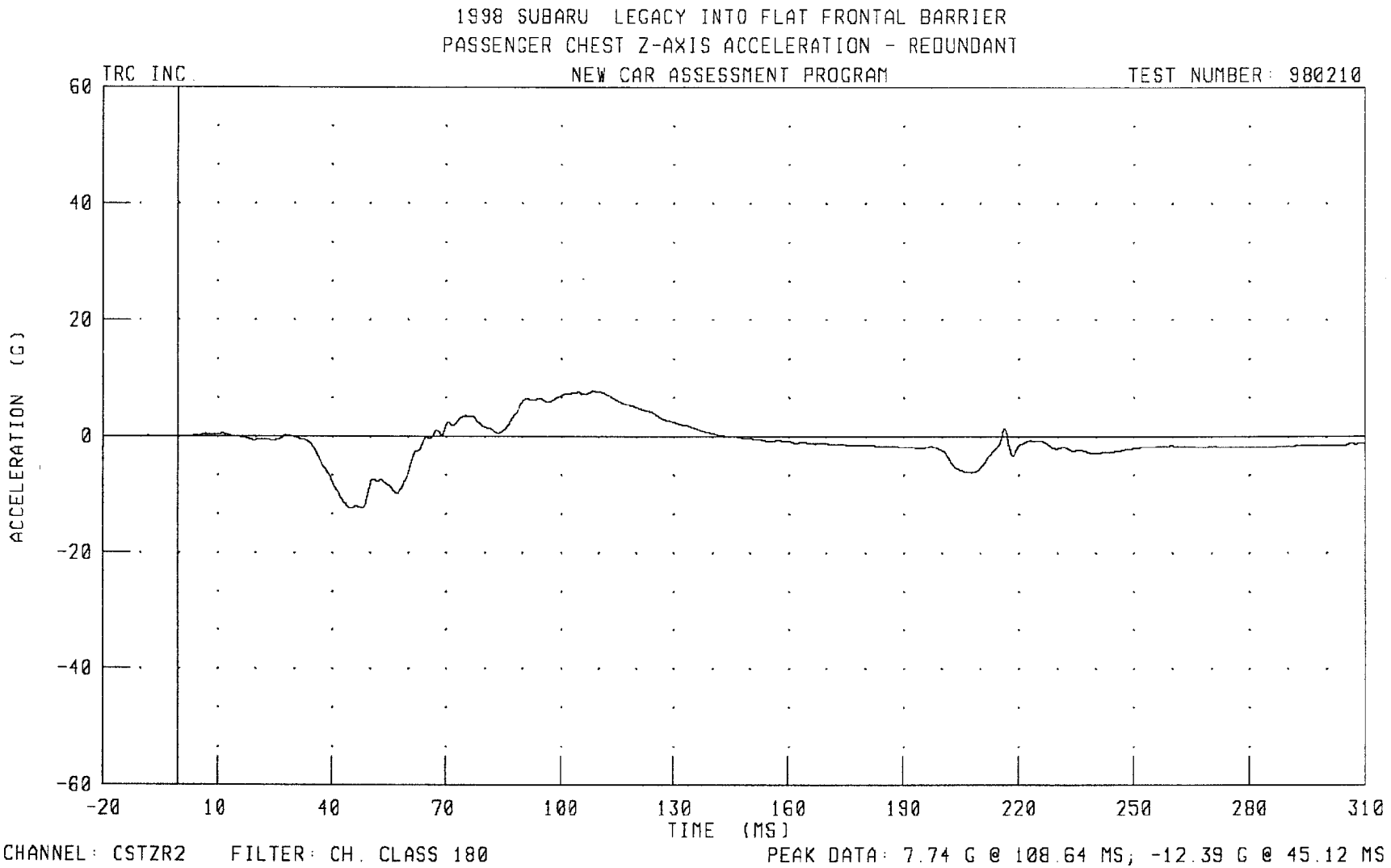
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXR2
FILTER: CH. CLASS 180
PEAK DATA: 6.34 G @ 216.56 MS; -49.07 G @ 58.88 MS

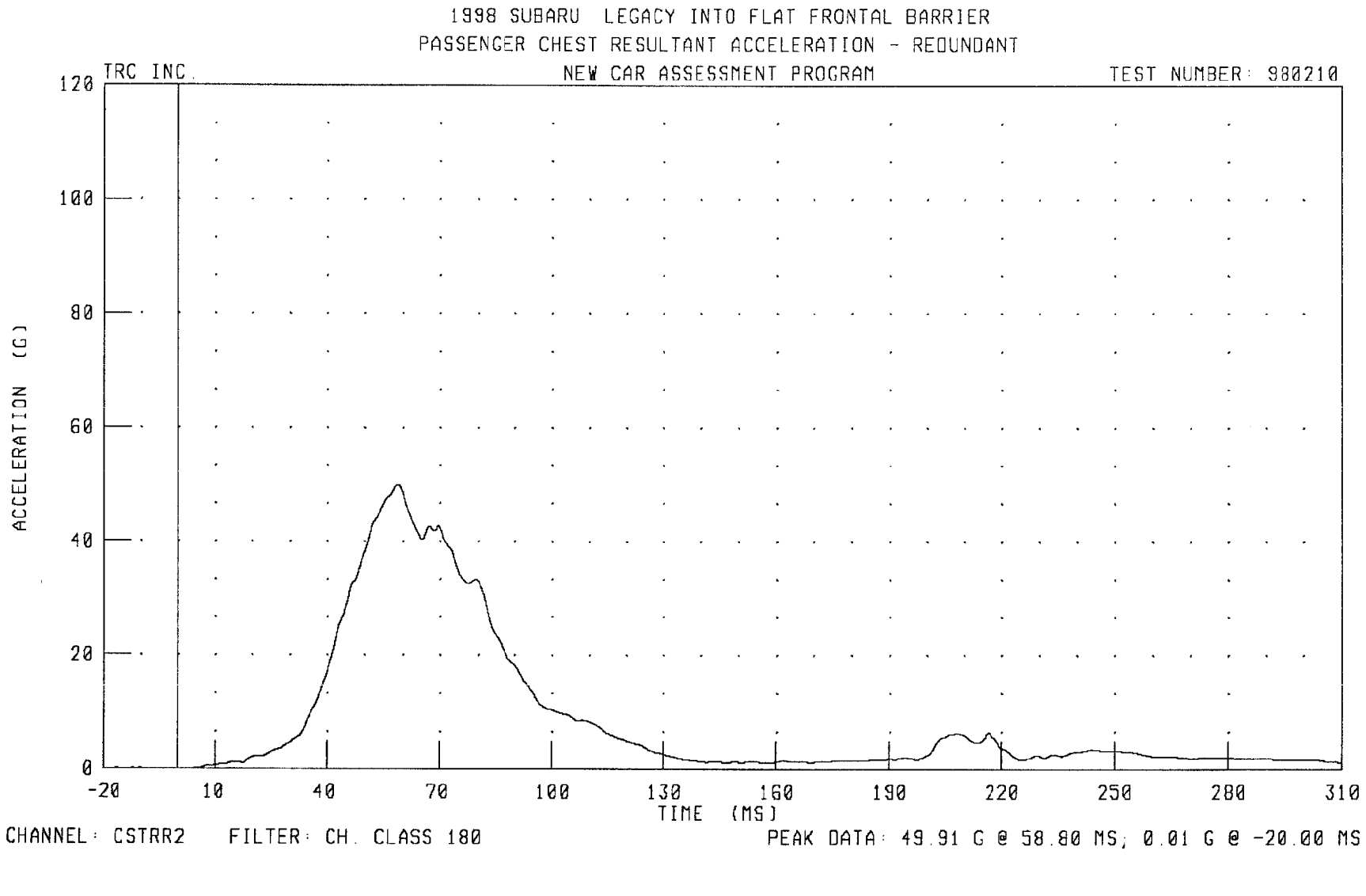
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION - REDUNDANT
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYR2
FILTER: CH. CLASS 180
PEAK DATA: 2.01 G @ 105.76 MS; -5.16 G @ 47.68 MS

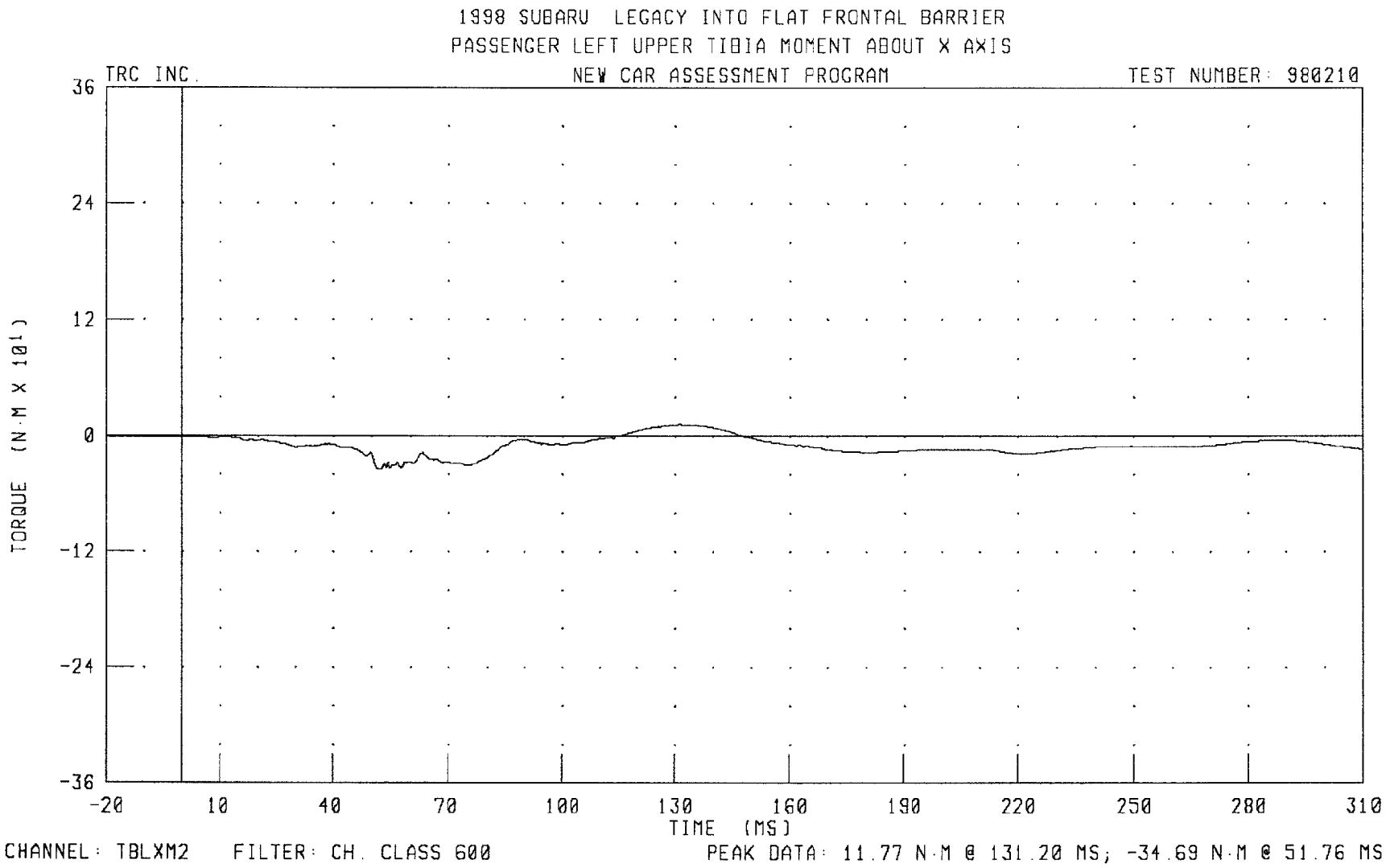
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZR2
FILTER: CH. CLASS 180
PEAK DATA: 7.74 G @ 108.64 MS; -12.39 G @ 45.12 MS

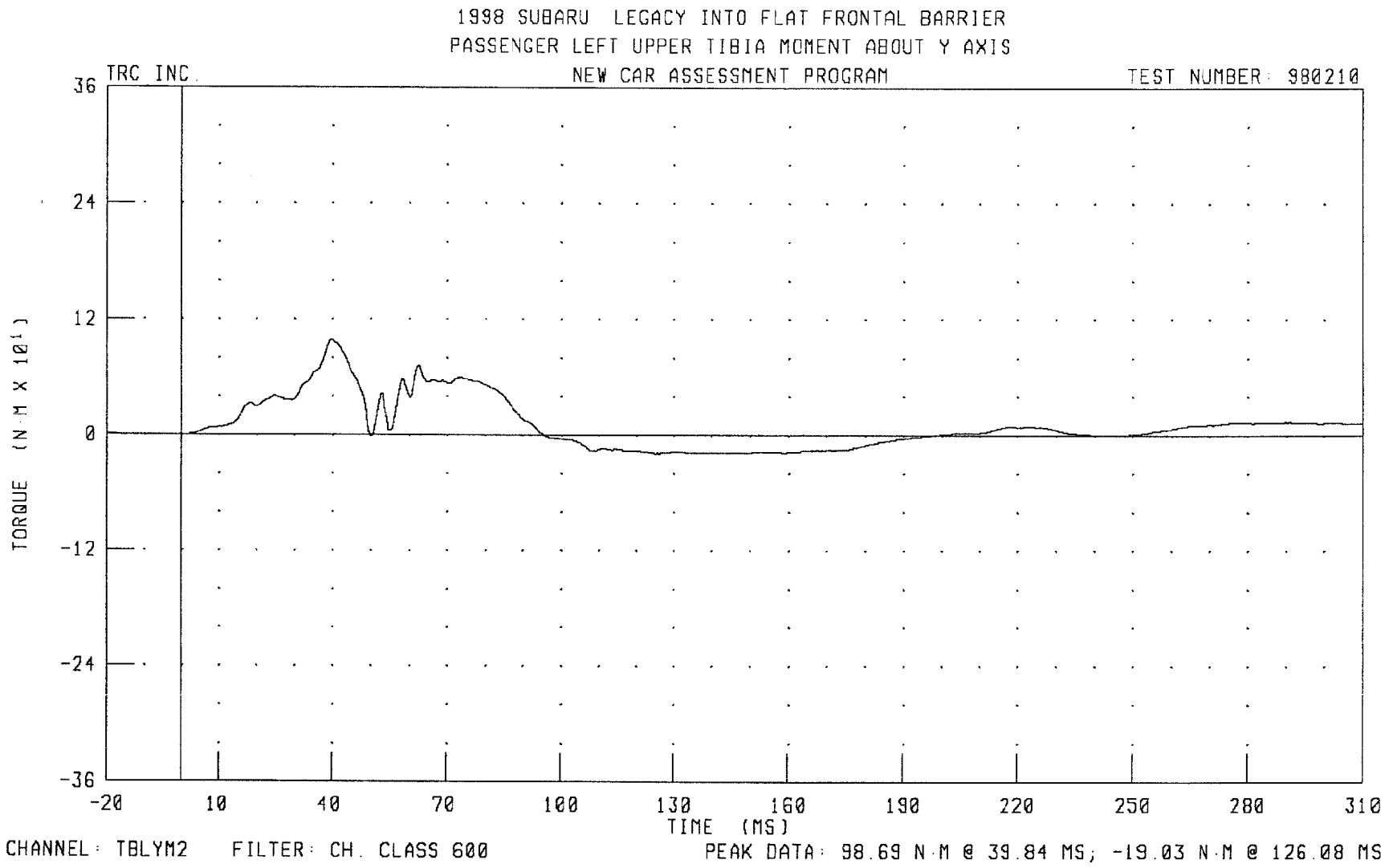
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION - REDUNDANT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: 49.91 G @ 58.80 MS; 0.01 G @ -20.00 MS

980210

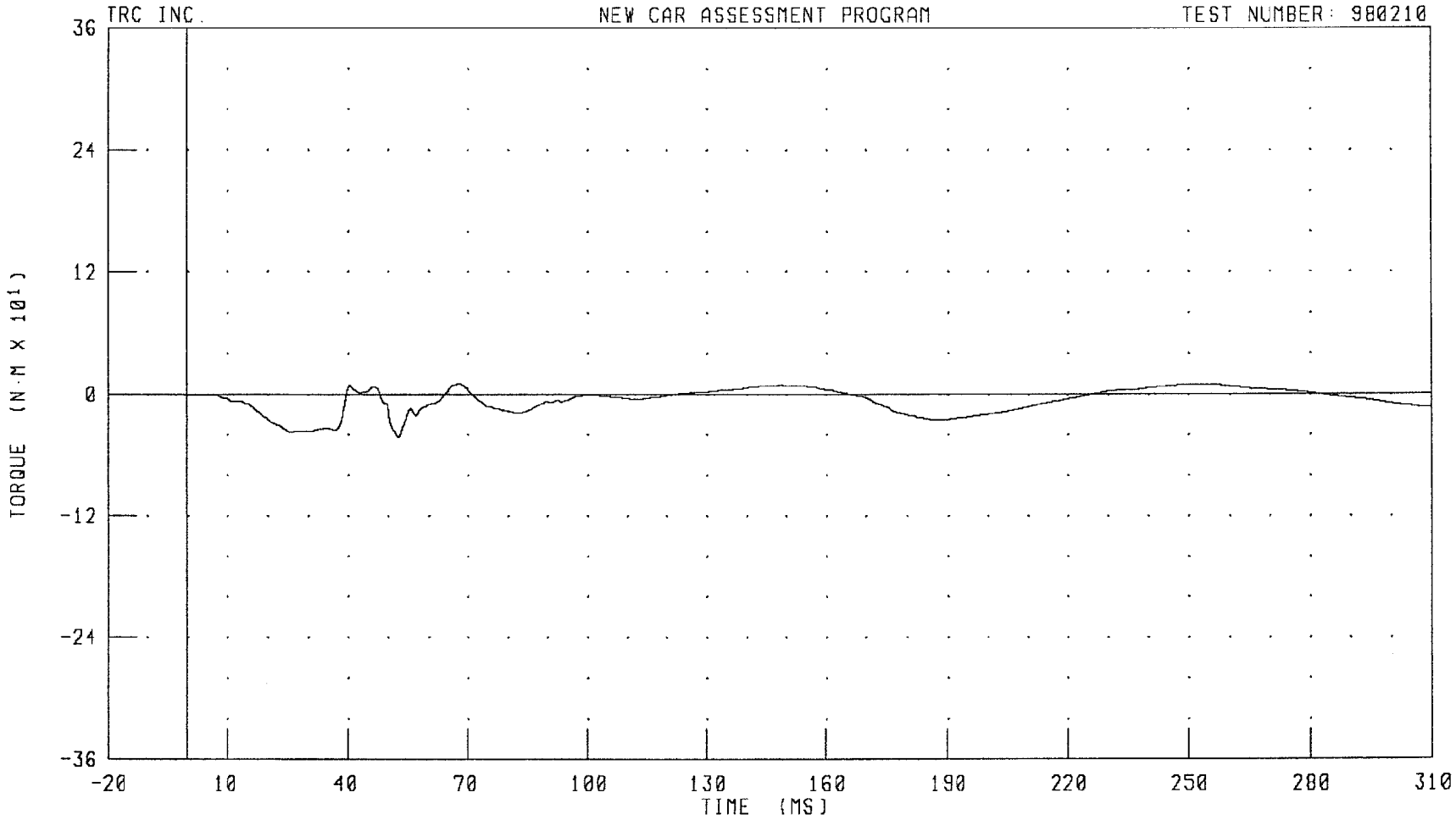

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT UPPER TIBIA MOMENT ABOUT X AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
36
24
12
0
-12
-24
-36
TORQUE (N-M X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBLXM2
FILTER: CH. CLASS 600
PEAK DATA: 11.77 N-M @ 131.20 MS; -34.69 N-M @ 51.76 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: TBLYM2
FILTER: CH. CLASS 600
PEAK DATA: 98.69 N-M @ 39.84 MS; -19.03 N-M @ 126.08 MS

980210

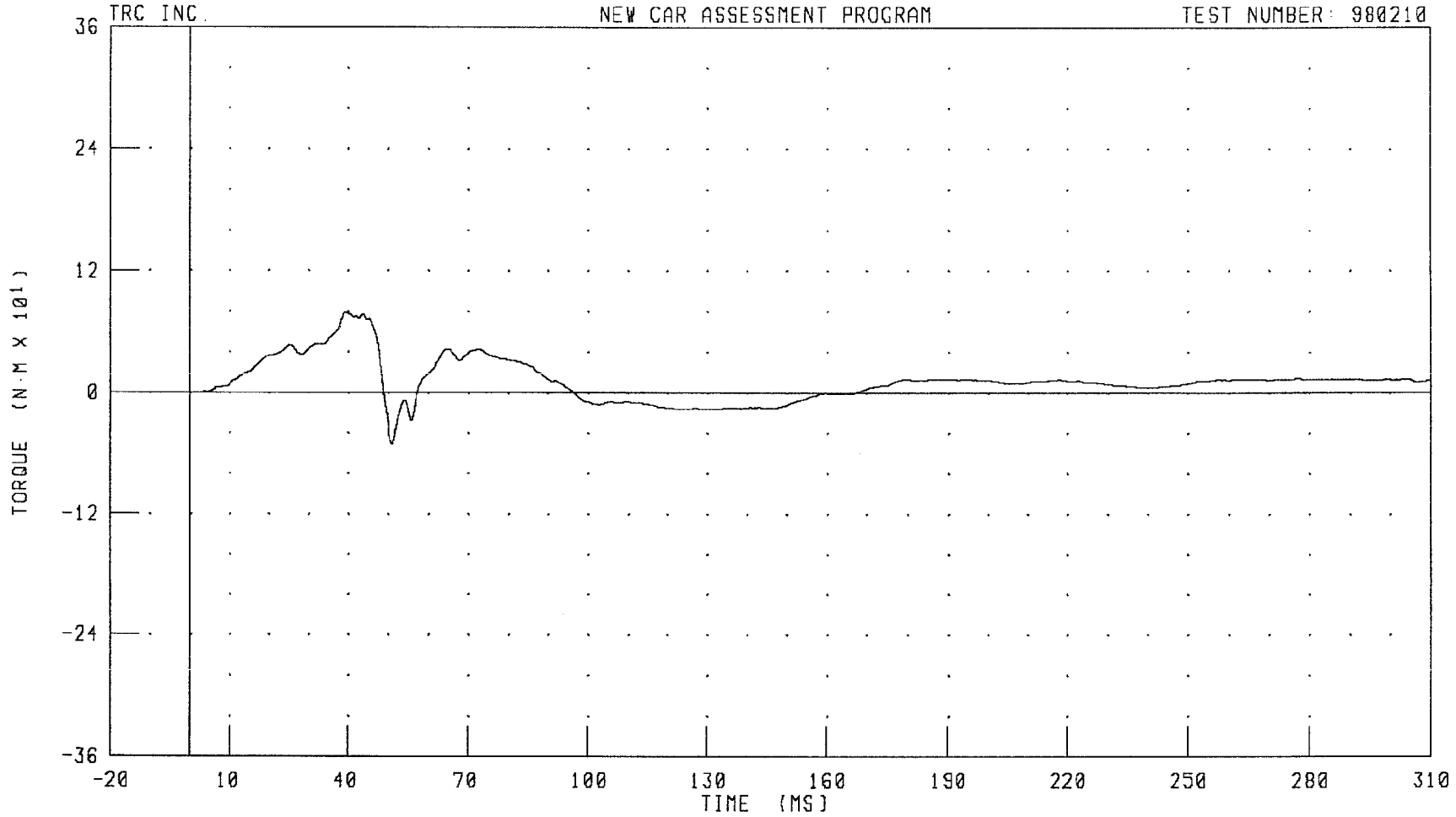
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS



CHANNEL: TBRXM2 FILTER: CH. CLASS 600 PEAK DATA: 10.26 N·M @ 68.00 MS; -42.27 N·M @ 52.48 MS

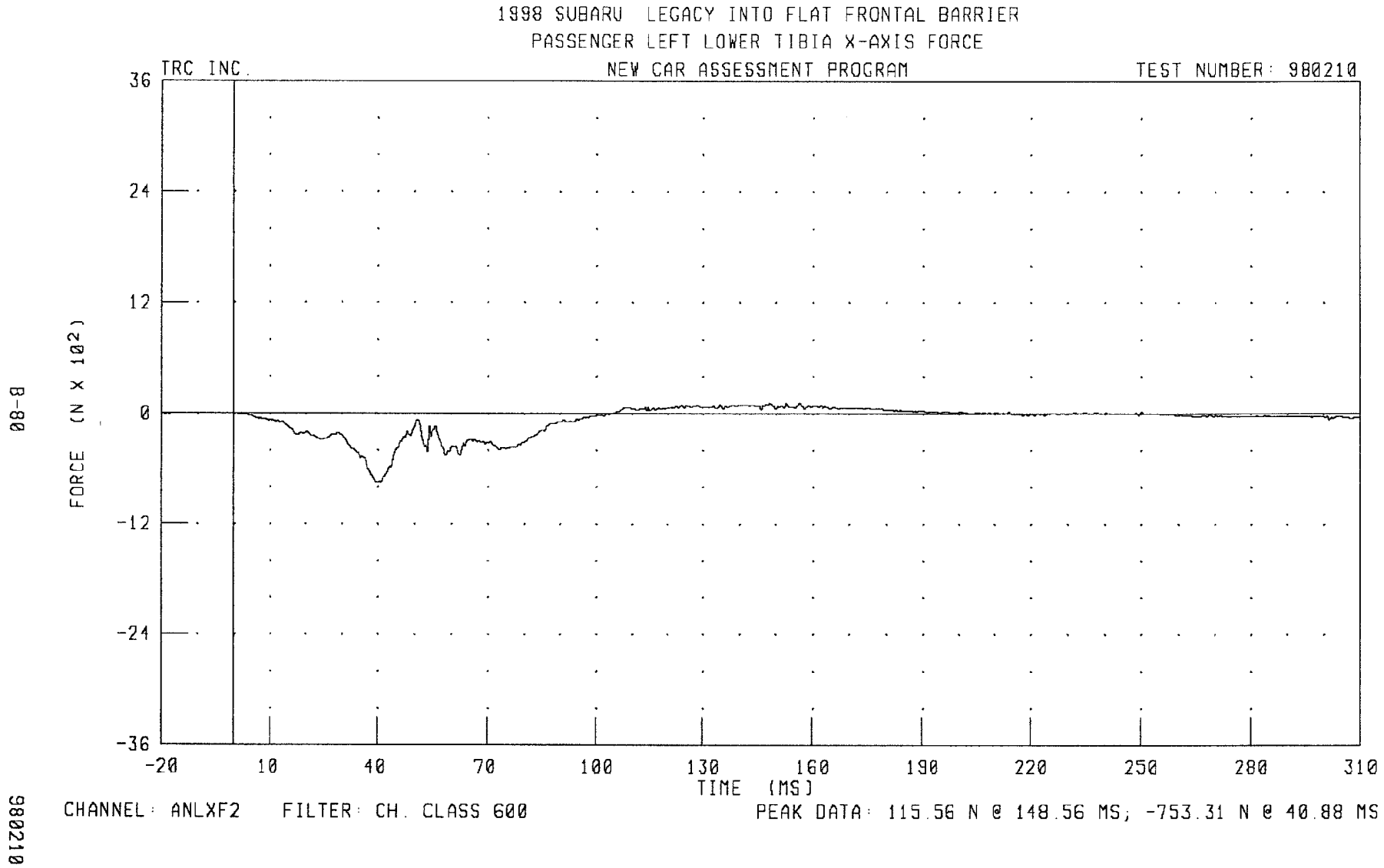
980210

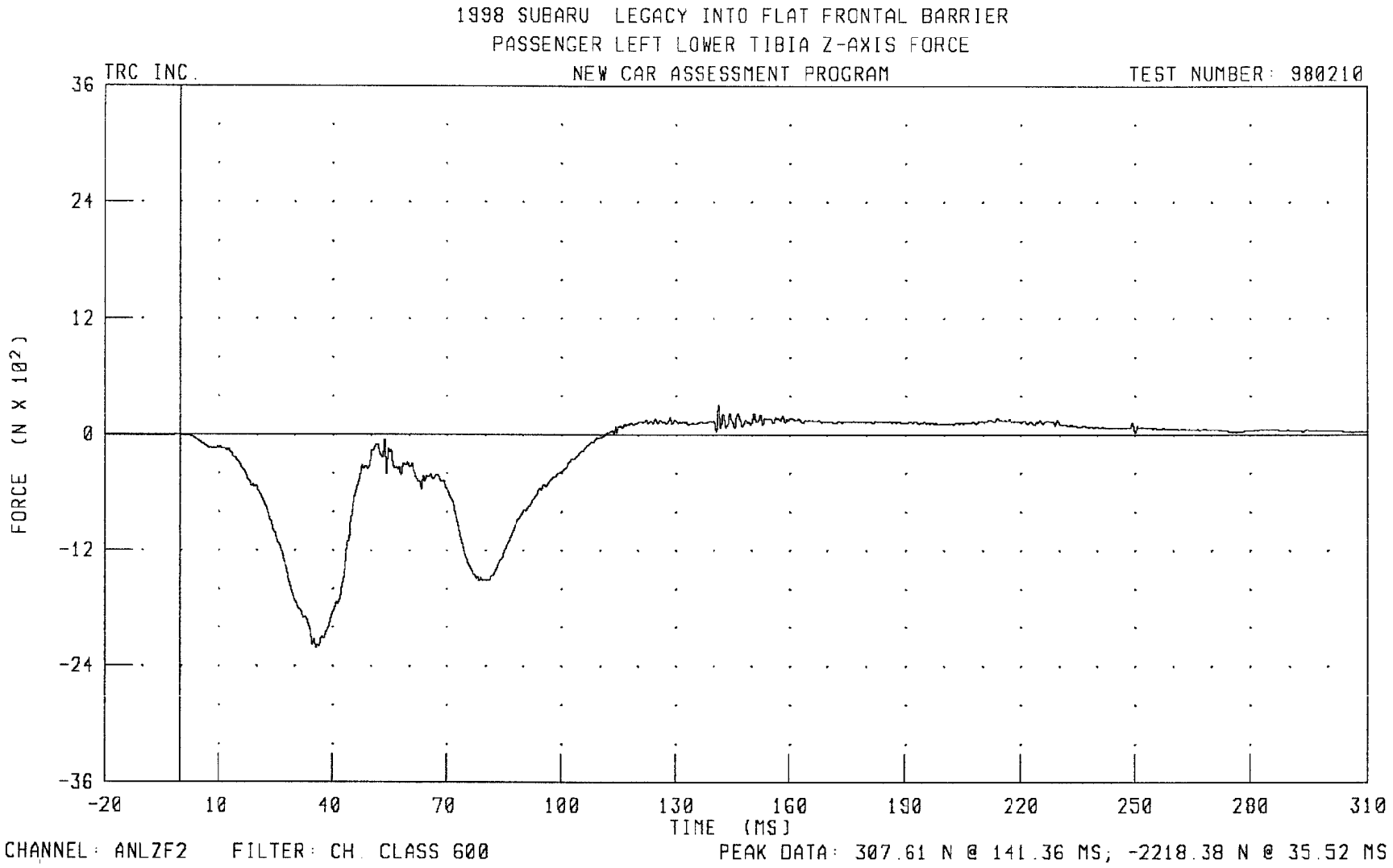
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS



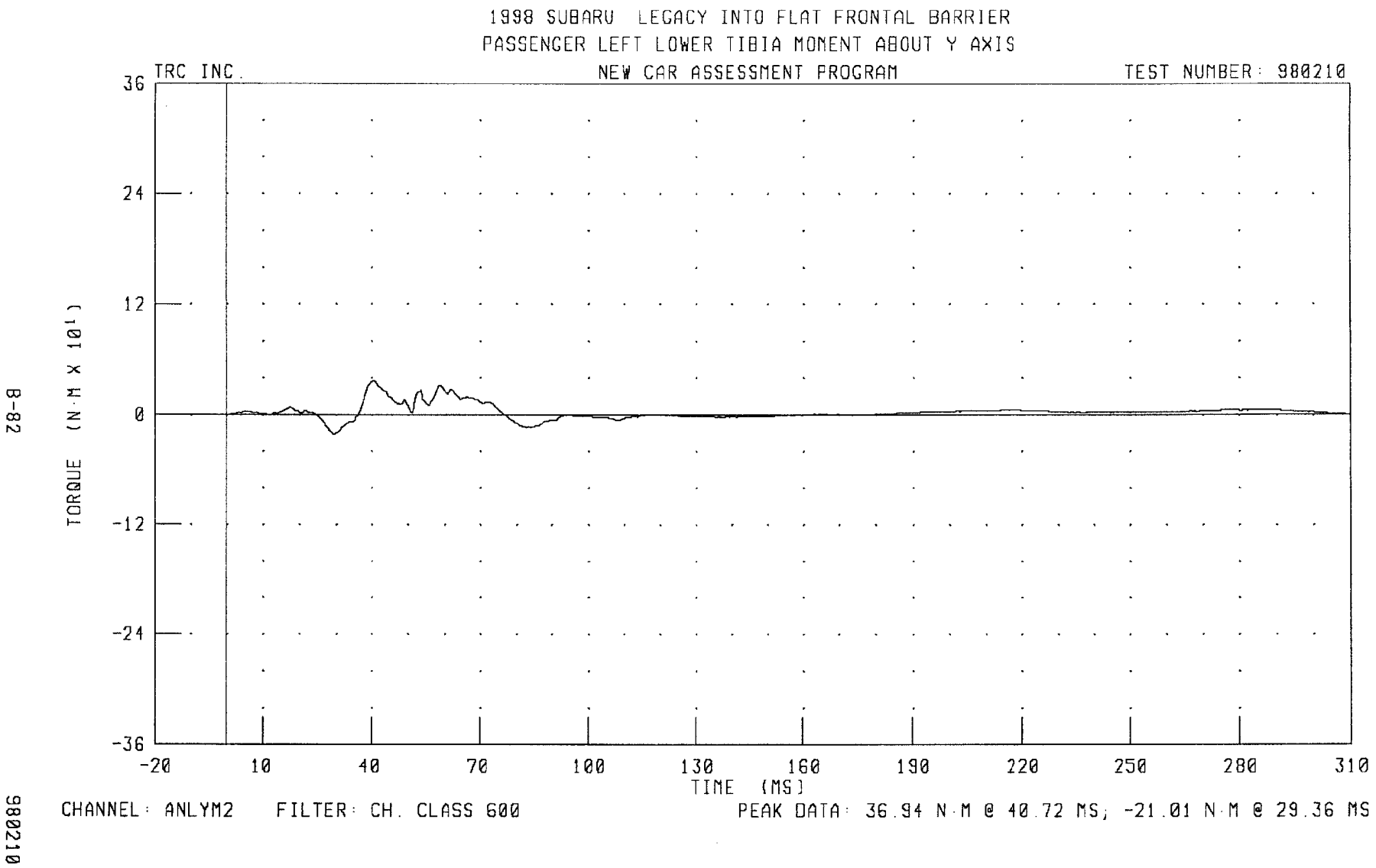
CHANNEL: TBRYM2 FILTER: CH. CLASS 600 PEAK DATA: 79.44 N-M @ 39.60 MS; -50.54 N-M @ 50.96 MS

980210

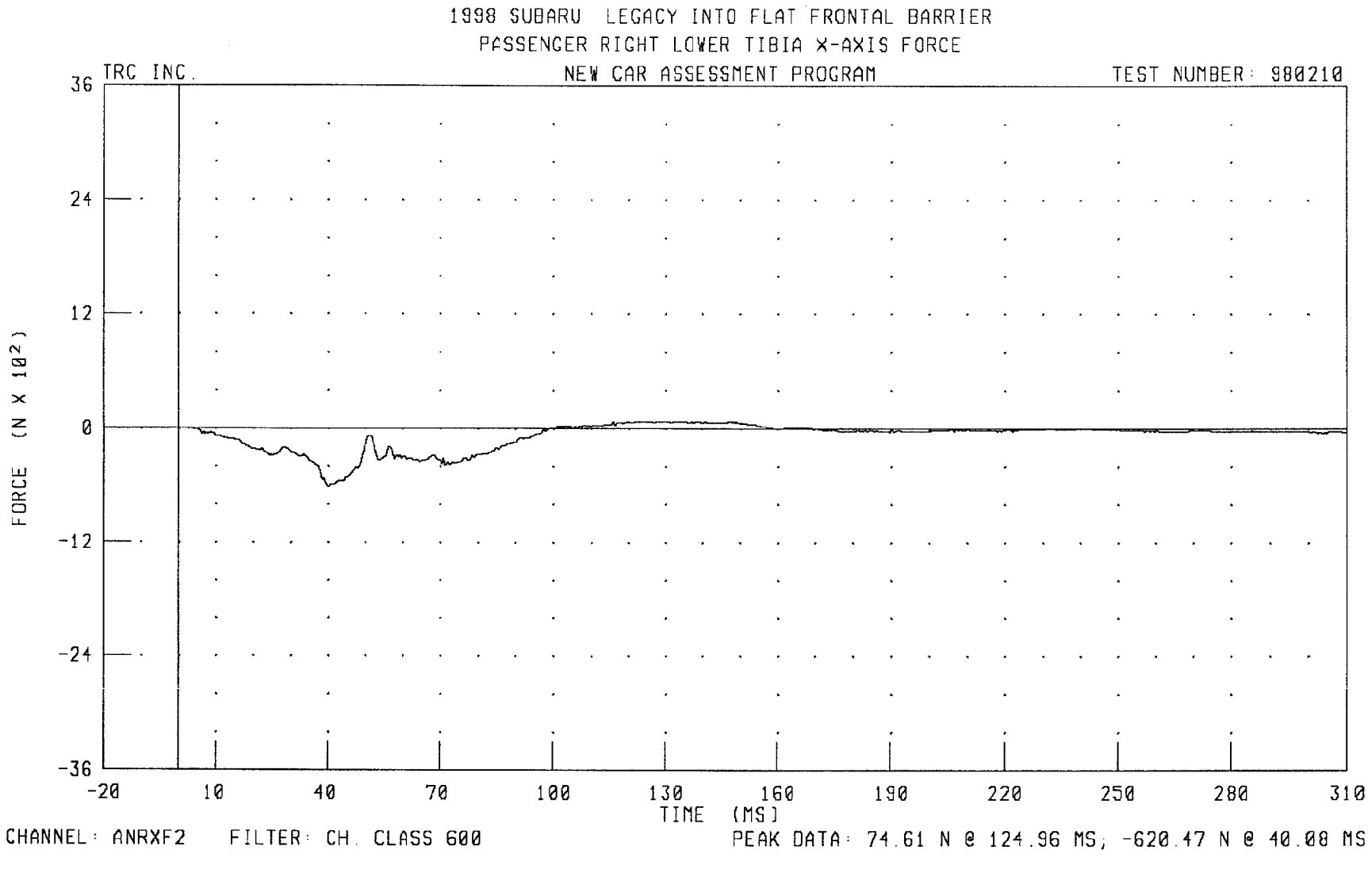

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT LOWER TIBIA X-AXIS FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
36
24
12
0
-12
-24
-36
FORCE (N X 102)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLXF2
FILTER: CH. CLASS 600
PEAK DATA: 115.56 N @ 148.56 MS; -753.31 N @ 40.88 MS
08-8
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT LOWER TIBIA Z-AXIS FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
36
24
12
0
-12
-24
-36
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLZF2
FILTER: CH. CLASS 600
PEAK DATA: 307.61 N @ 141.36 MS; -2218.38 N @ 35.52 MS

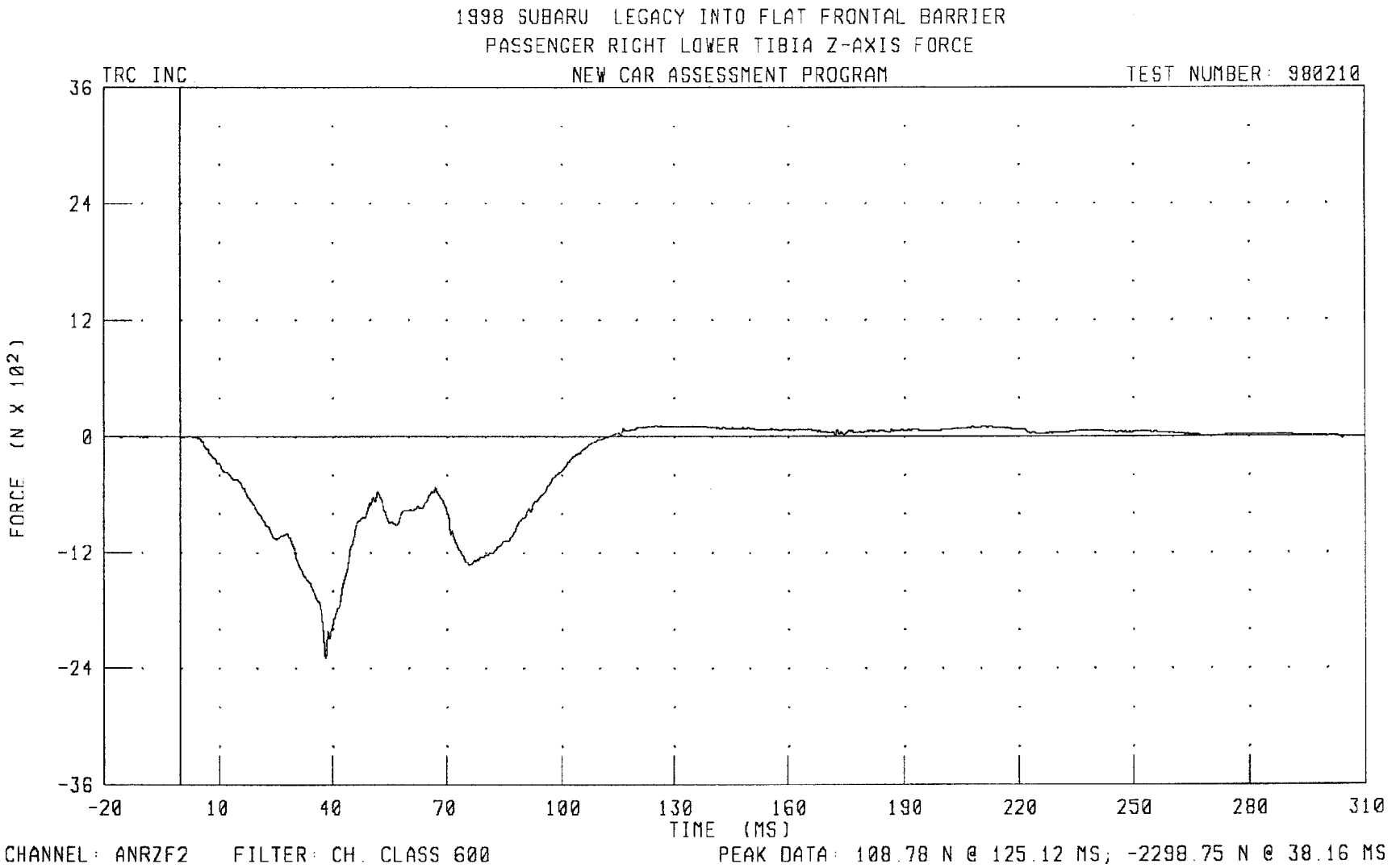
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: ANLYM2
FILTER: CH. CLASS 600
PEAK DATA: 36.94 N-M @ 40.72 MS; -21.01 N-M @ 29.36 MS

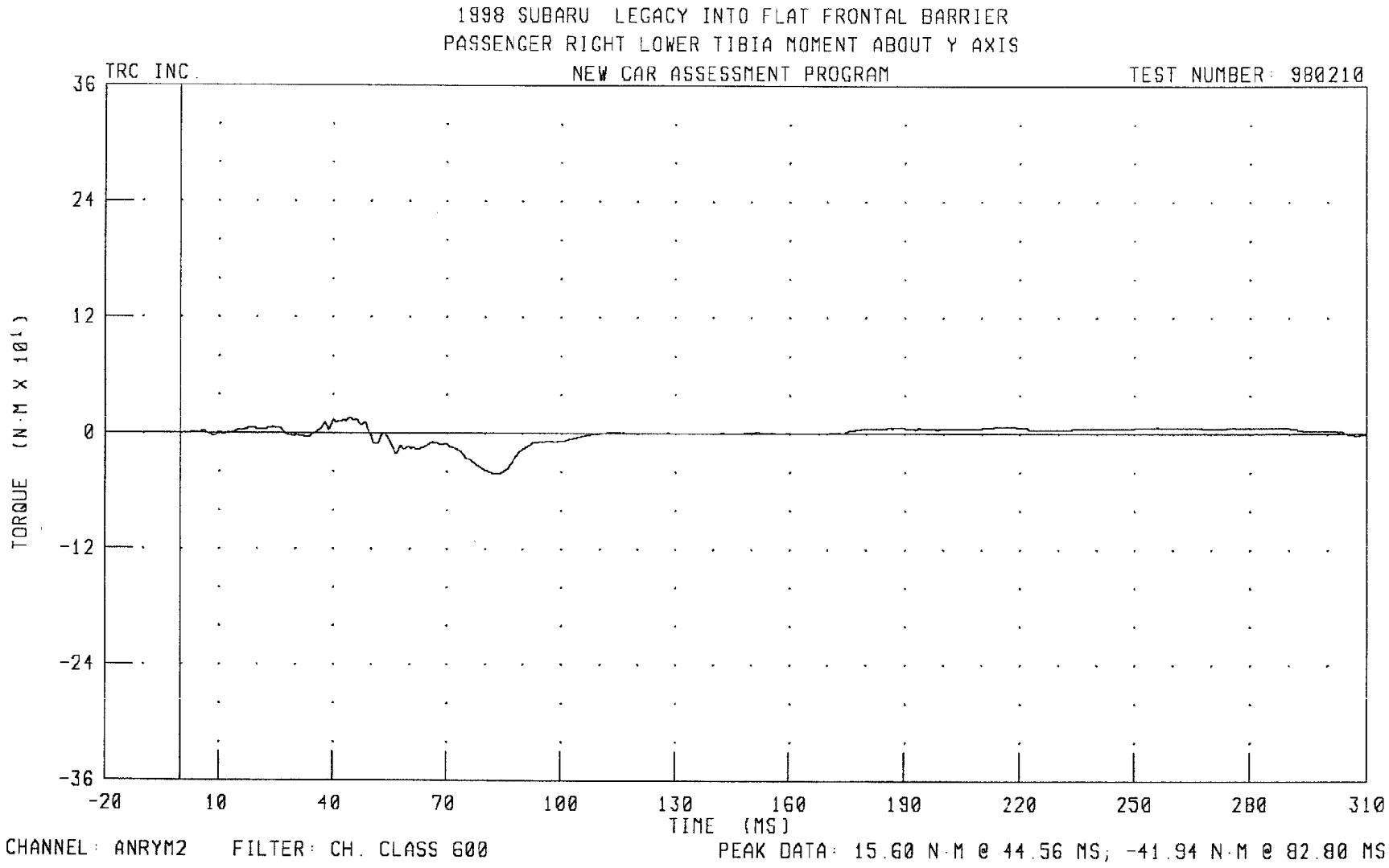
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT LOWER TIBIA X-AXIS FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
36
24
12
0
-12
-24
-36
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRXF2
FILTER: CH. CLASS 600
PEAK DATA: 74.61 N @ 124.96 MS; -620.47 N @ 40.08 MS

980210

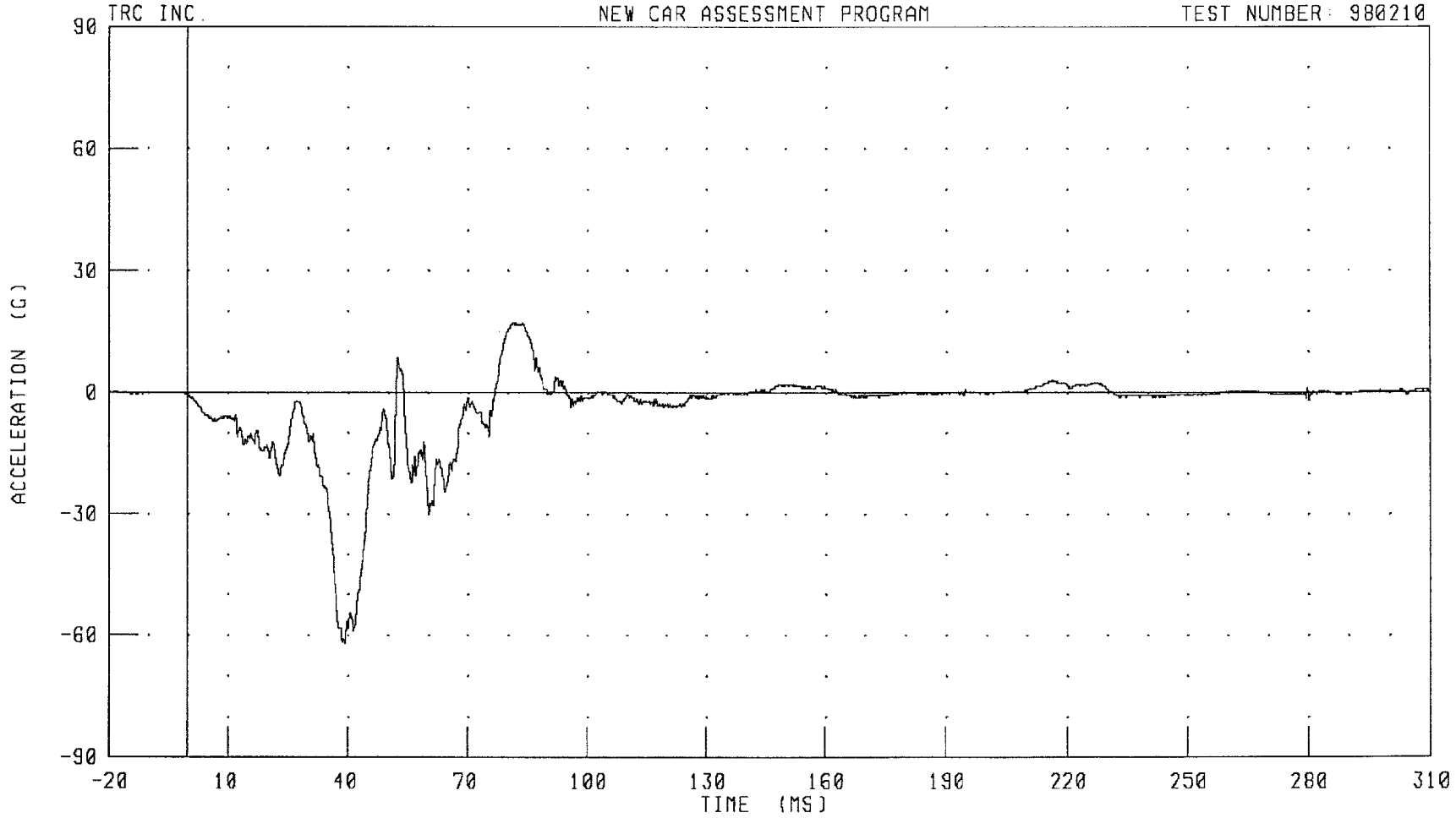

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT LOWER TIBIA Z-AXIS FORCE
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
36
24
12
0
-12
-24
-36
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRZF2
FILTER: CH. CLASS 600
PEAK DATA: 108.78 N @ 125.12 MS; -2298.75 N @ 38.16 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: ANRYM2
FILTER: CH. CLASS 600
PEAK DATA: 15.60 N·M @ 44.56 MS; -41.94 N·M @ 82.80 MS

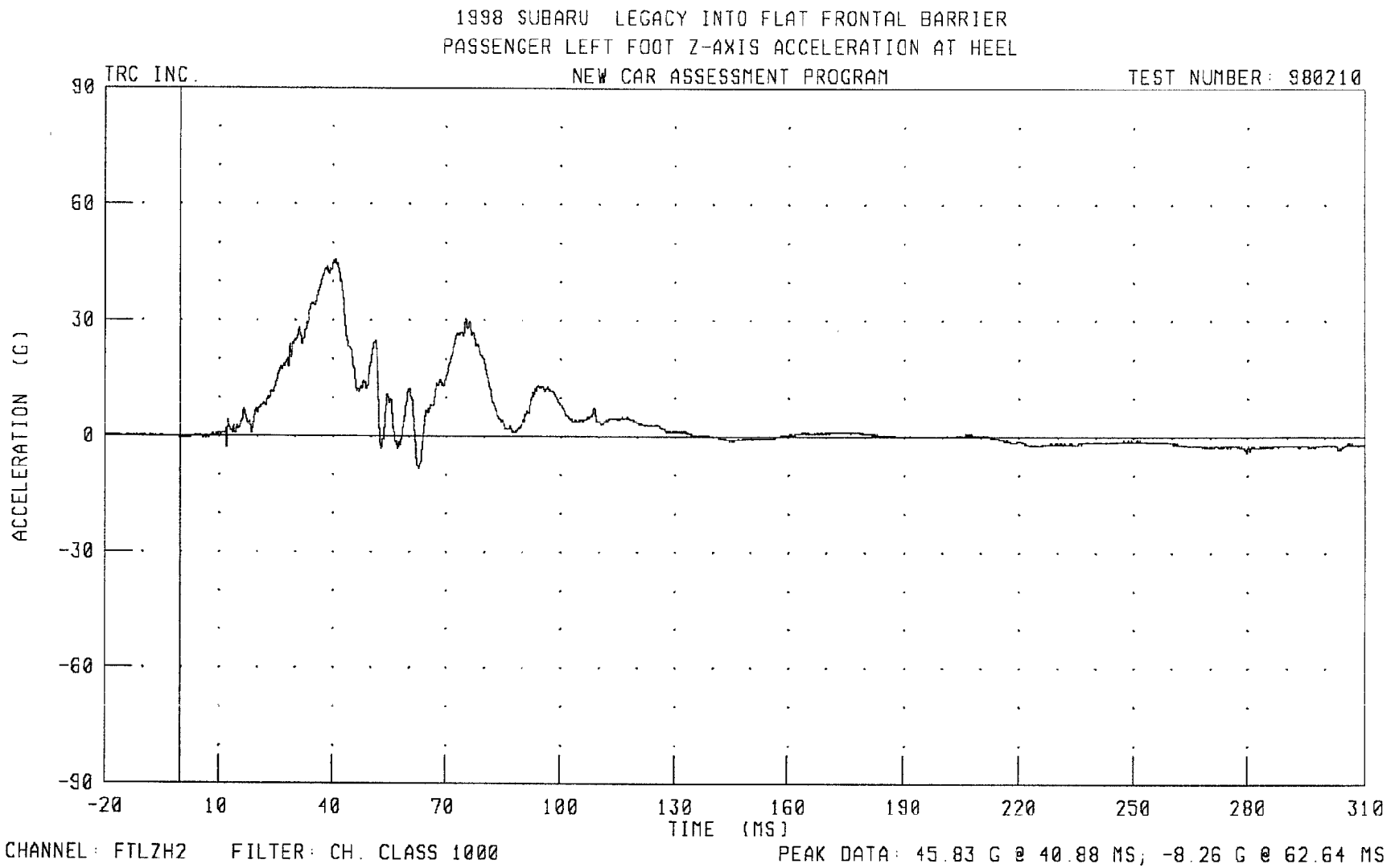
980210

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT FOOT X-AXIS ACCELERATION

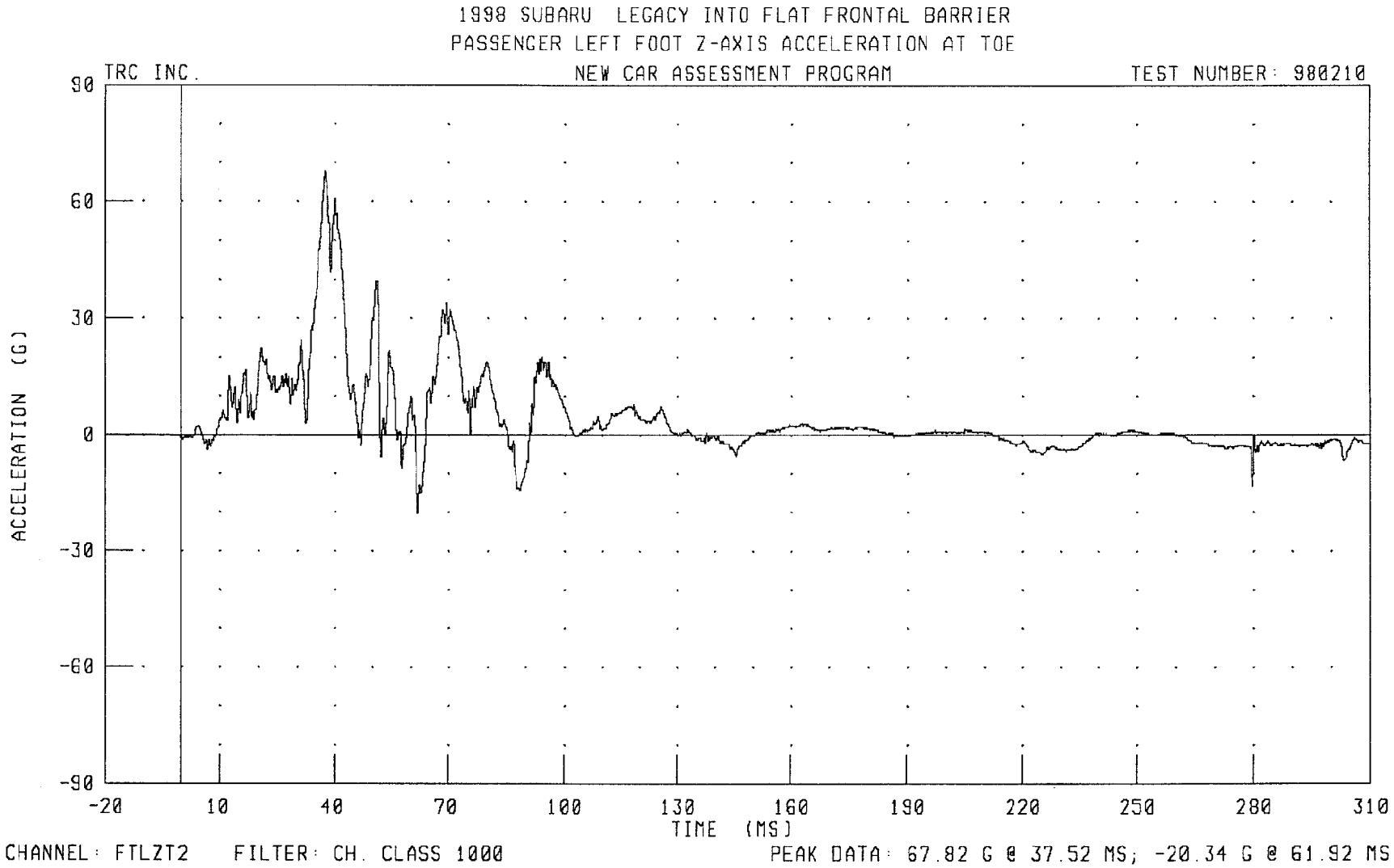


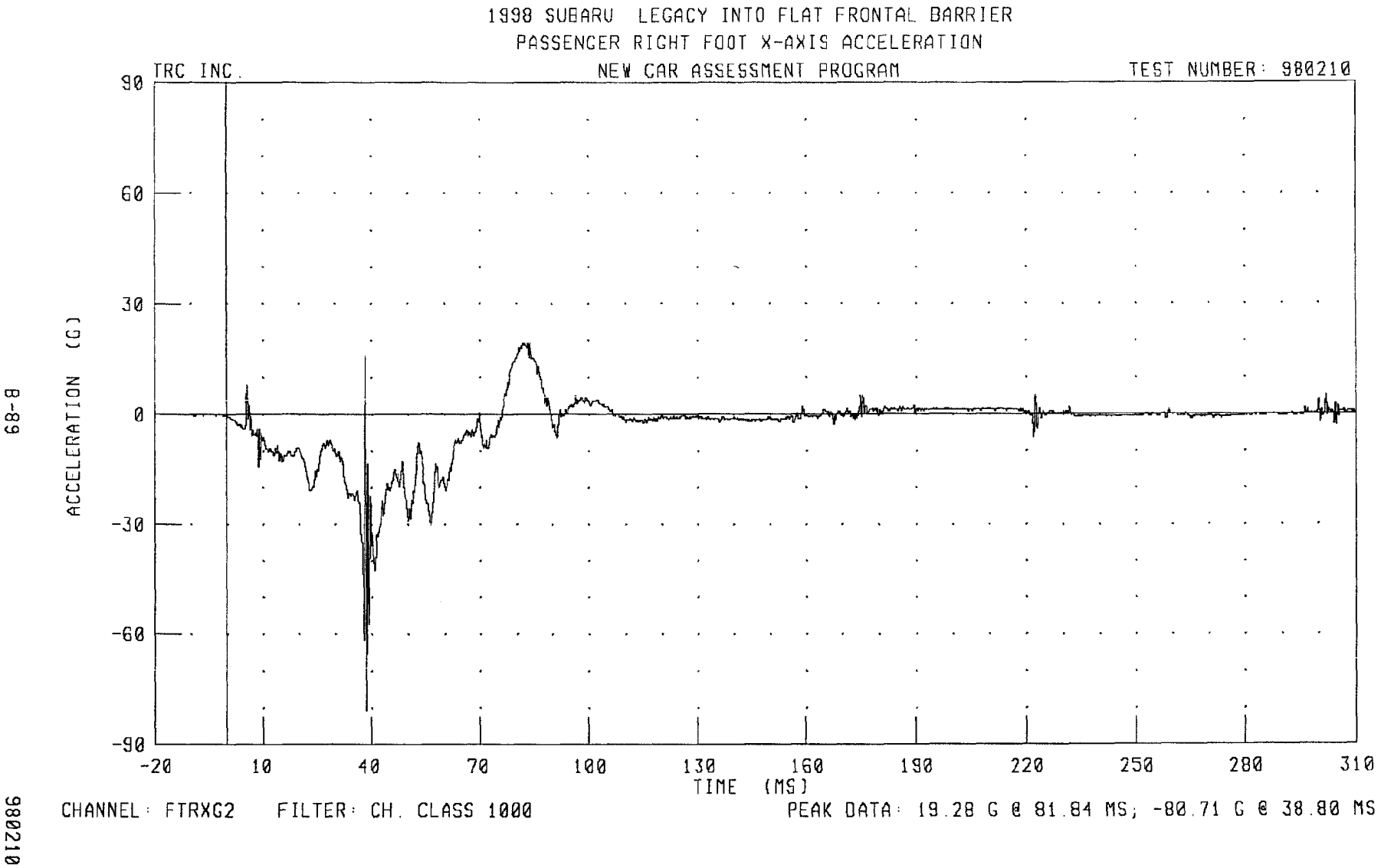
CHANNEL: FTLXG2 FILTER: CH. CLASS 1000 PEAK DATA: 17.22 G @ 81.12 MS; -62.01 G @ 39.28 MS

980210

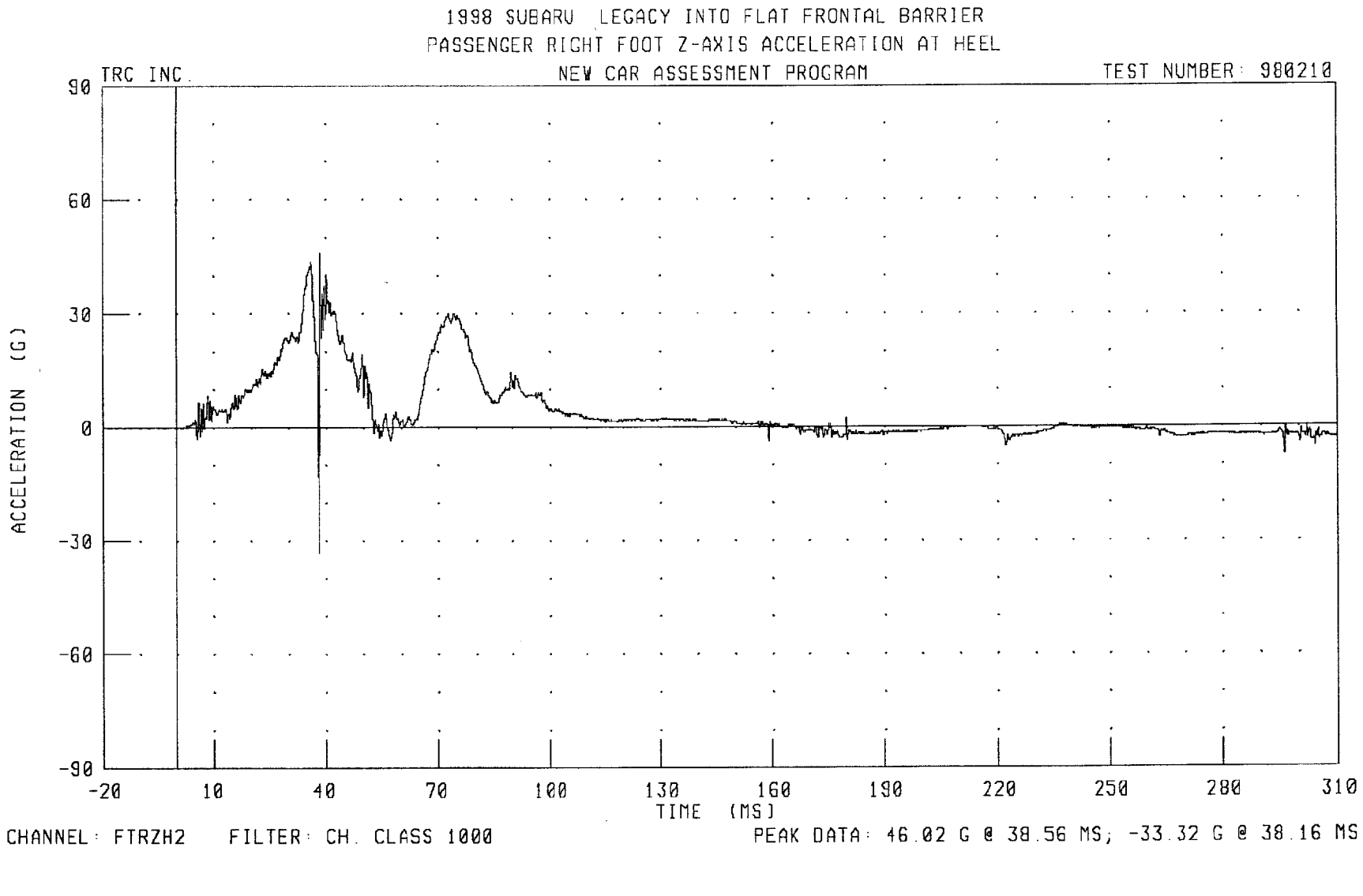

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT FOOT Z-AXIS ACCELERATION AT HEEL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLZH2
FILTER: CH. CLASS 1000
PEAK DATA: 45.83 G @ 40.88 MS; -8.26 G @ 62.64 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LEFT FOOT Z-AXIS ACCELERATION AT TOE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTLZT2
FILTER: CH. CLASS 1000
PEAK DATA: 67.82 G @ 37.52 MS; -20.34 G @ 61.92 MS

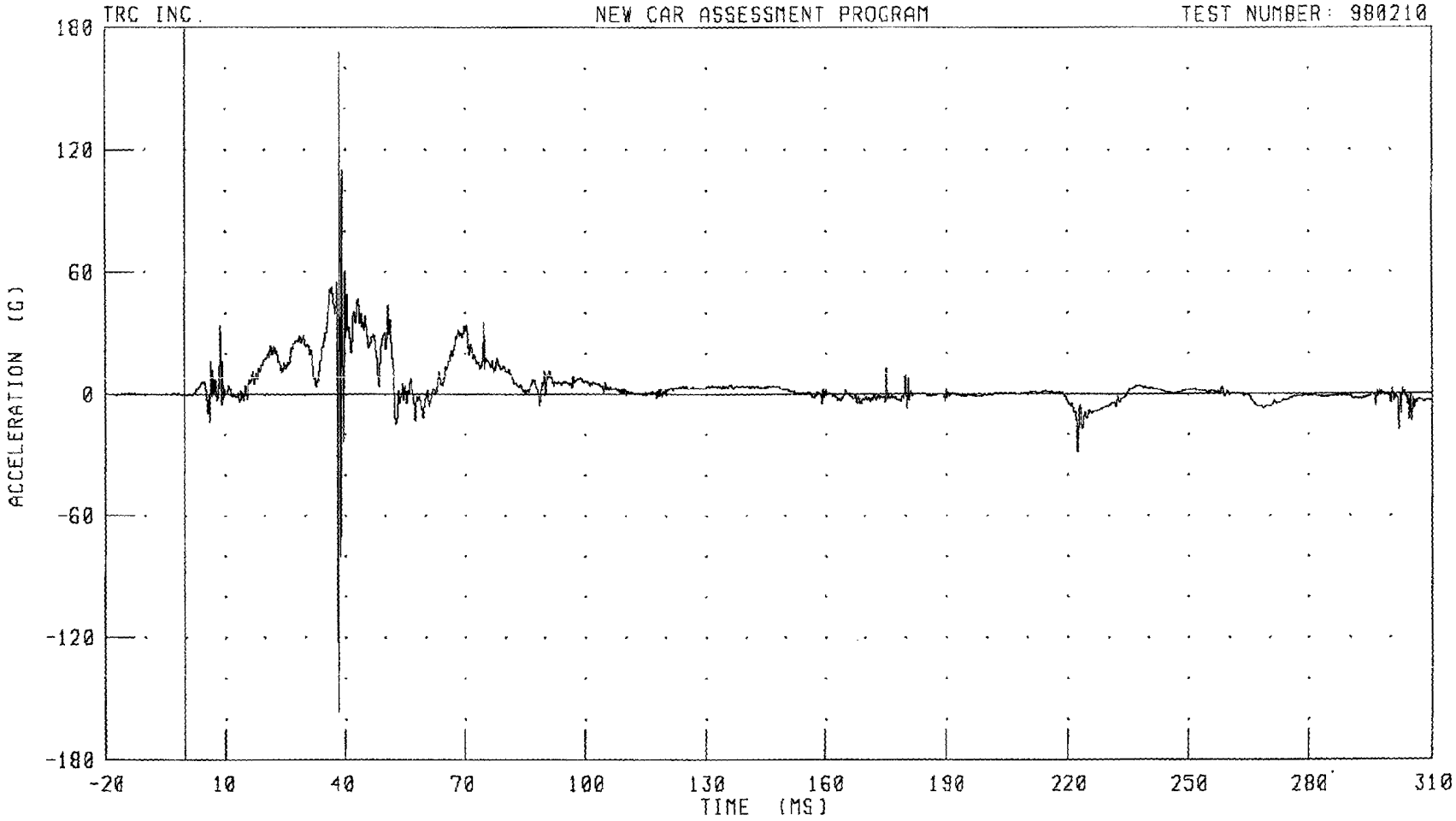

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT FOOT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRXG2
FILTER: CH. CLASS 1000
PEAK DATA: 19.28 G @ 81.84 MS; -80.71 G @ 38.80 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT FOOT Z-AXIS ACCELERATION AT HEEL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTRZH2
FILTER: CH. CLASS 1000
PEAK DATA: 46.02 G @ 38.56 MS; -33.32 G @ 38.16 MS

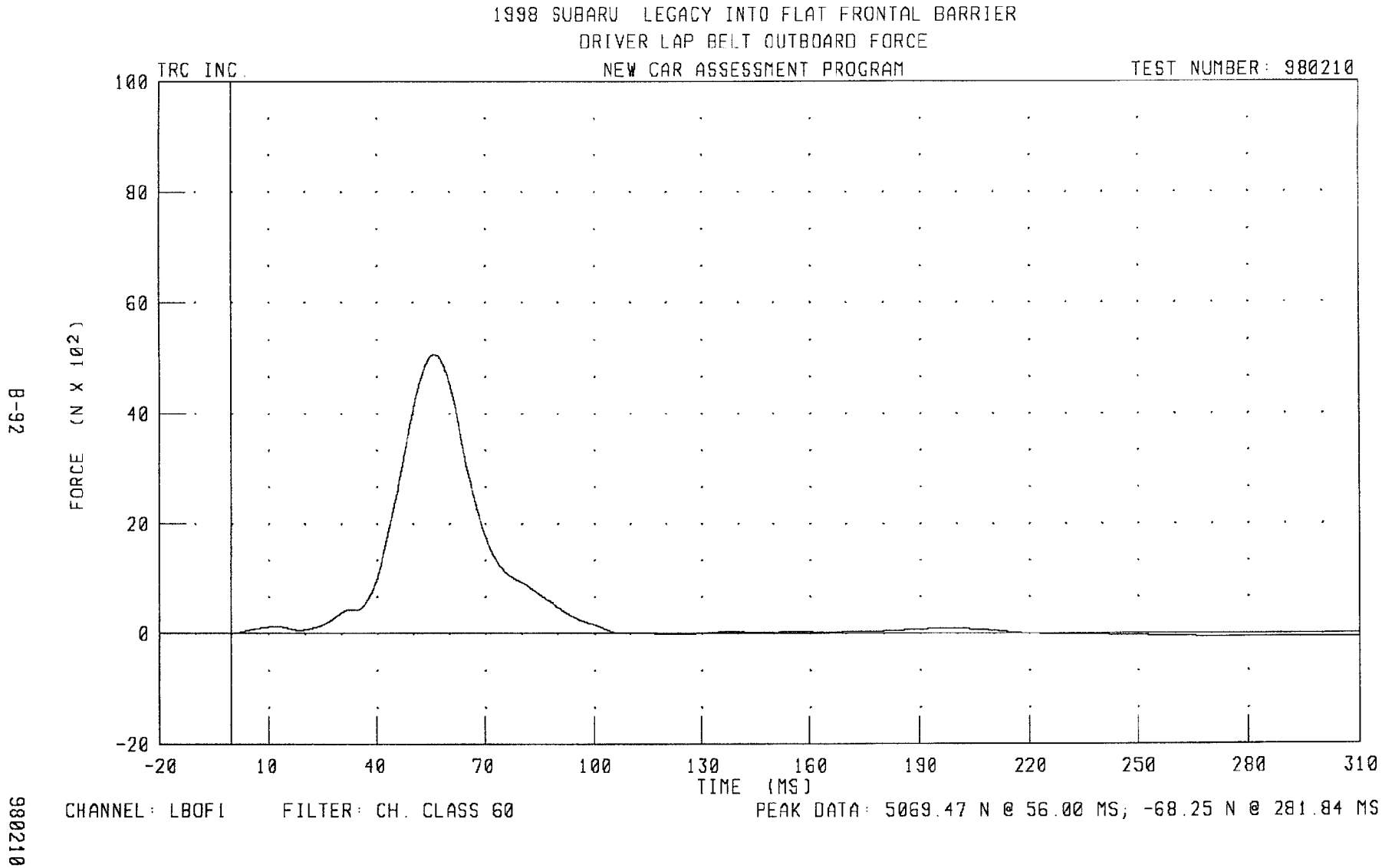
980210

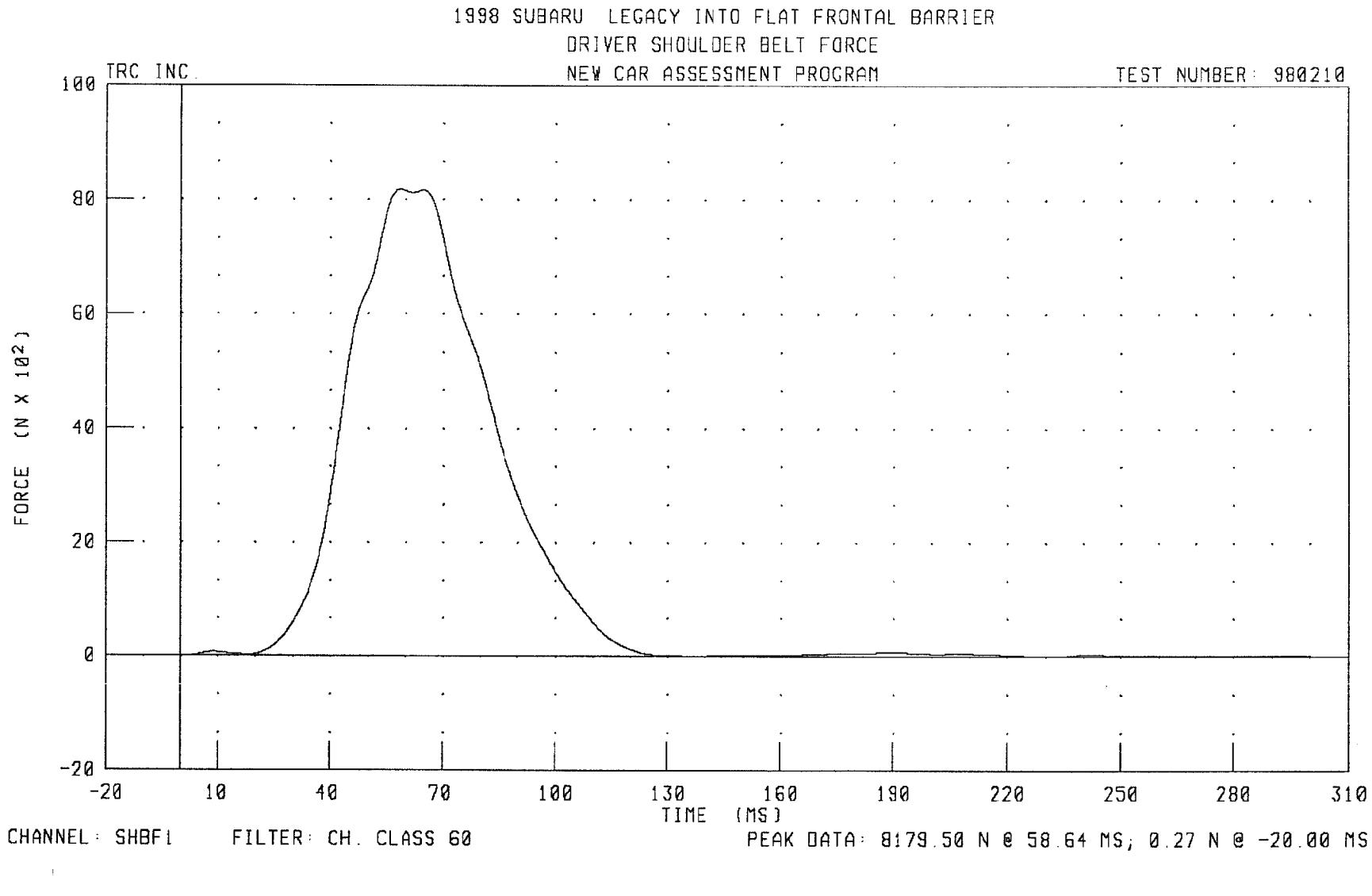
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER RIGHT FOOT Z-AXIS ACCELERATION AT TOE



CHANNEL: FTRZT2 FILTER: CH. CLASS 1000 PEAK DATA: 168.26 G @ 38.72 MS, -156.57 G @ 38.40 MS

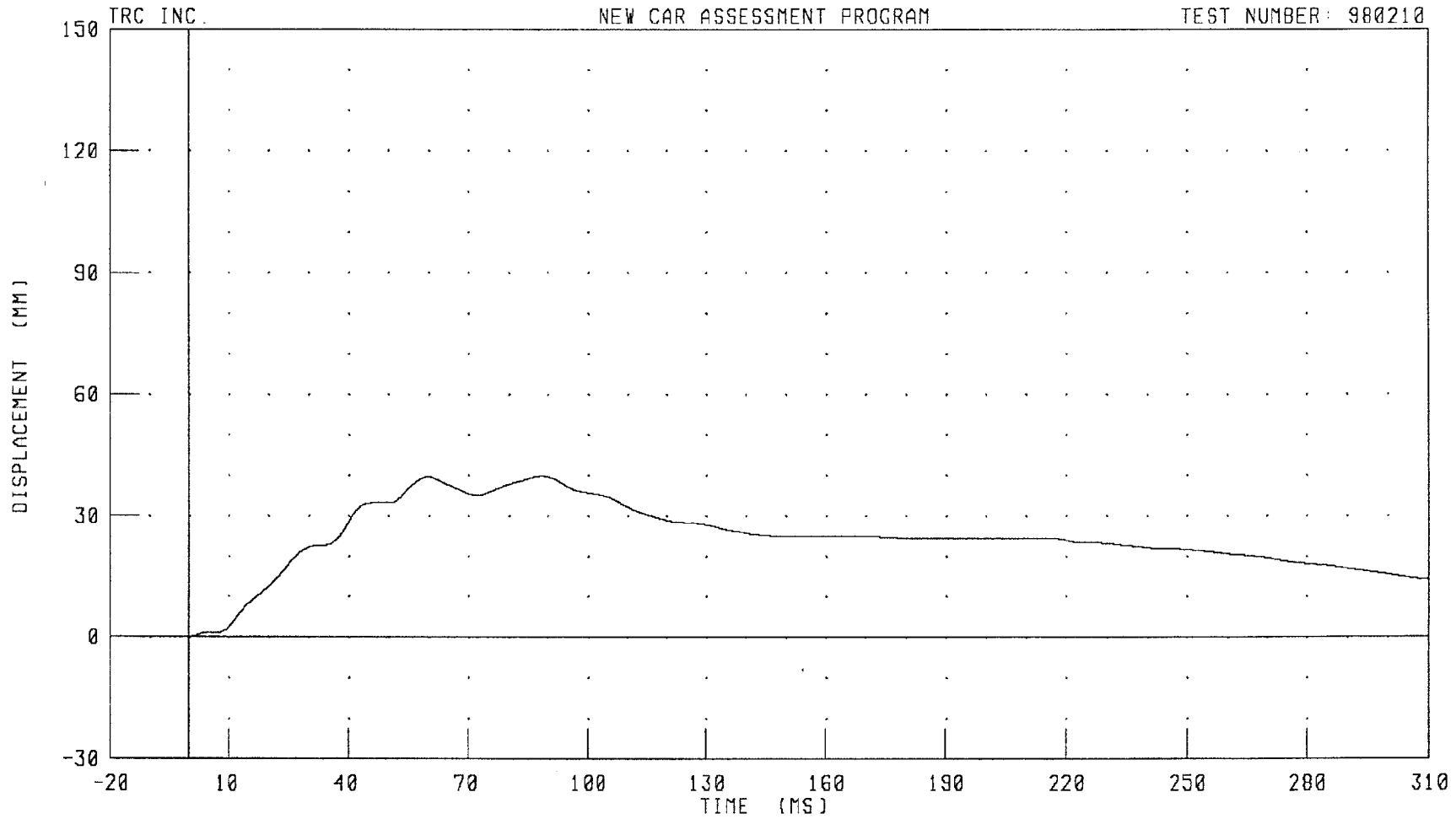
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER LAP BELT OUTBOARD FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: LBOFI
FILTER: CH. CLASS 60
PEAK DATA: 5069.47 N @ 56.00 MS; -68.25 N @ 281.84 MS

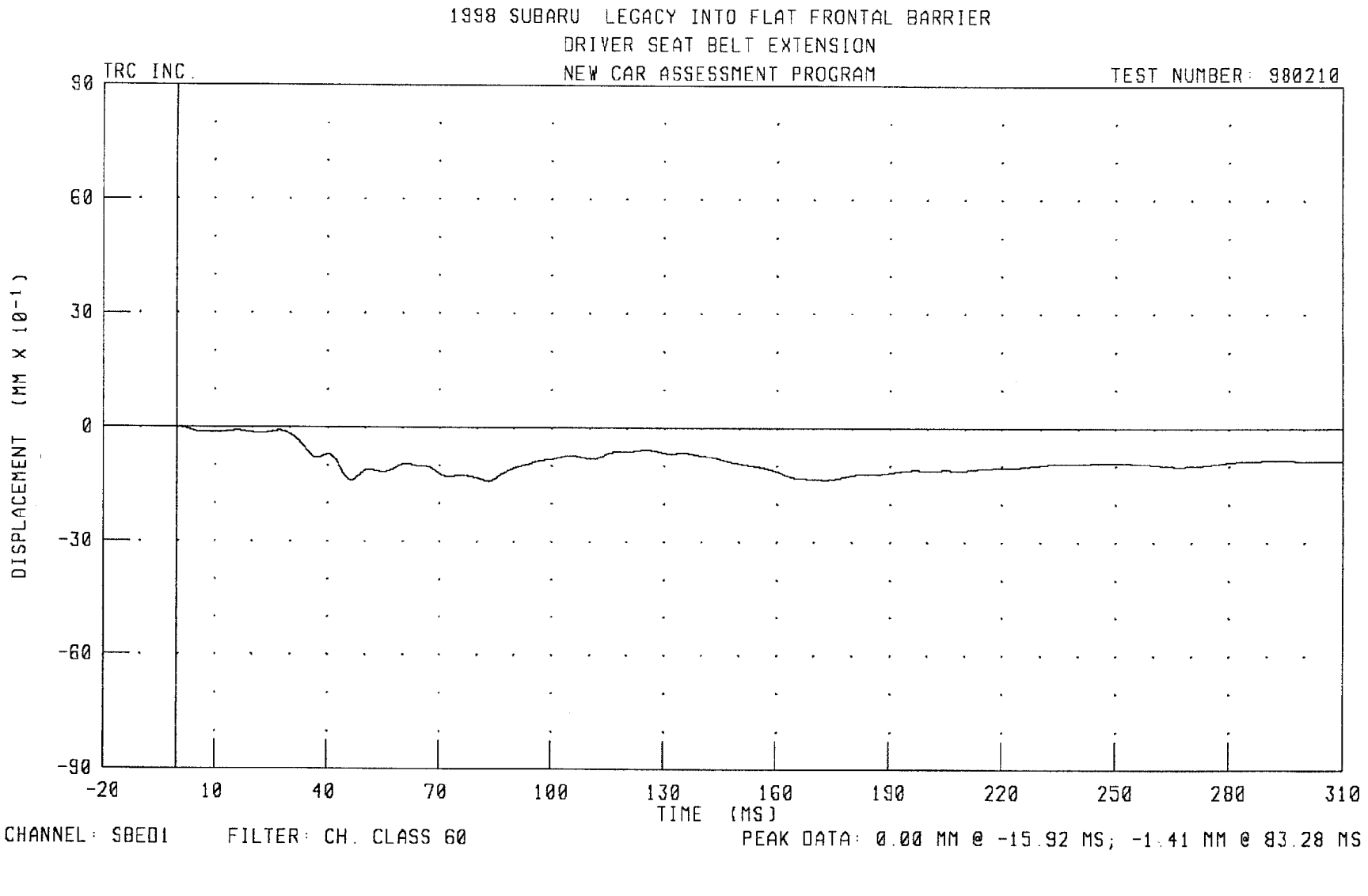

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER SHOULDER BELT FORCE
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 980210
FORCE (N X 10²)
100
80
60
40
20
0
-20
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: SHBF1
FILTER: CH. CLASS 60
PEAK DATA: 8179.50 N @ 58.64 MS; 0.27 N @ -20.00 MS

980210

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER SHOULDER BELT DISPLACEMENT

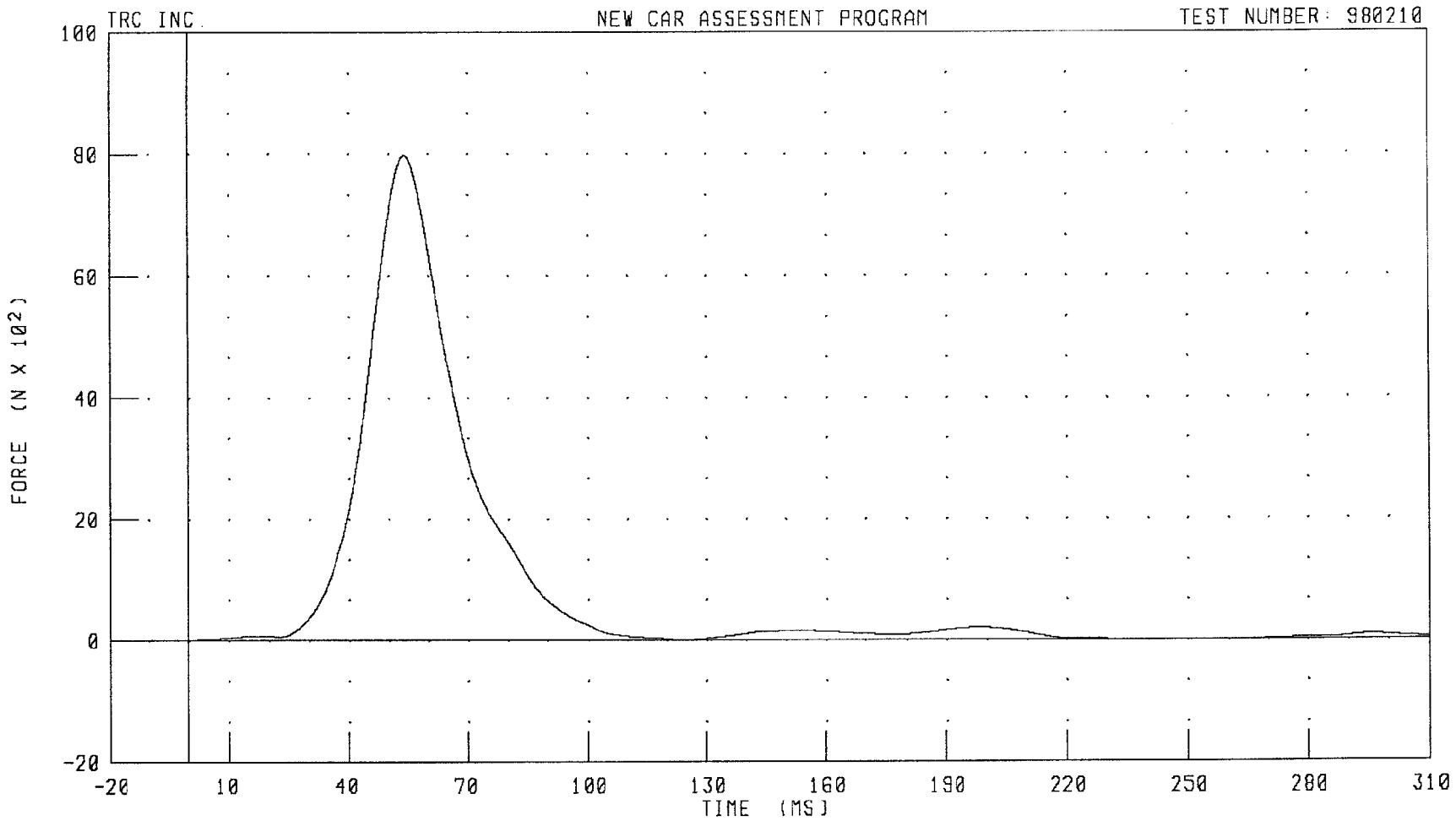


CHANNEL: SHBDI FILTER: CH. CLASS 60 PEAK DATA: 39.89 MM @ 88.32 MS; -0.04 MM @ -1.84 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
DRIVER SEAT BELT EXTENSION
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 980210
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: SBE01
FILTER: CH. CLASS 60
PEAK DATA: 0.00 MM @ -15.92 MS; -1.41 MM @ 83.28 MS

980210

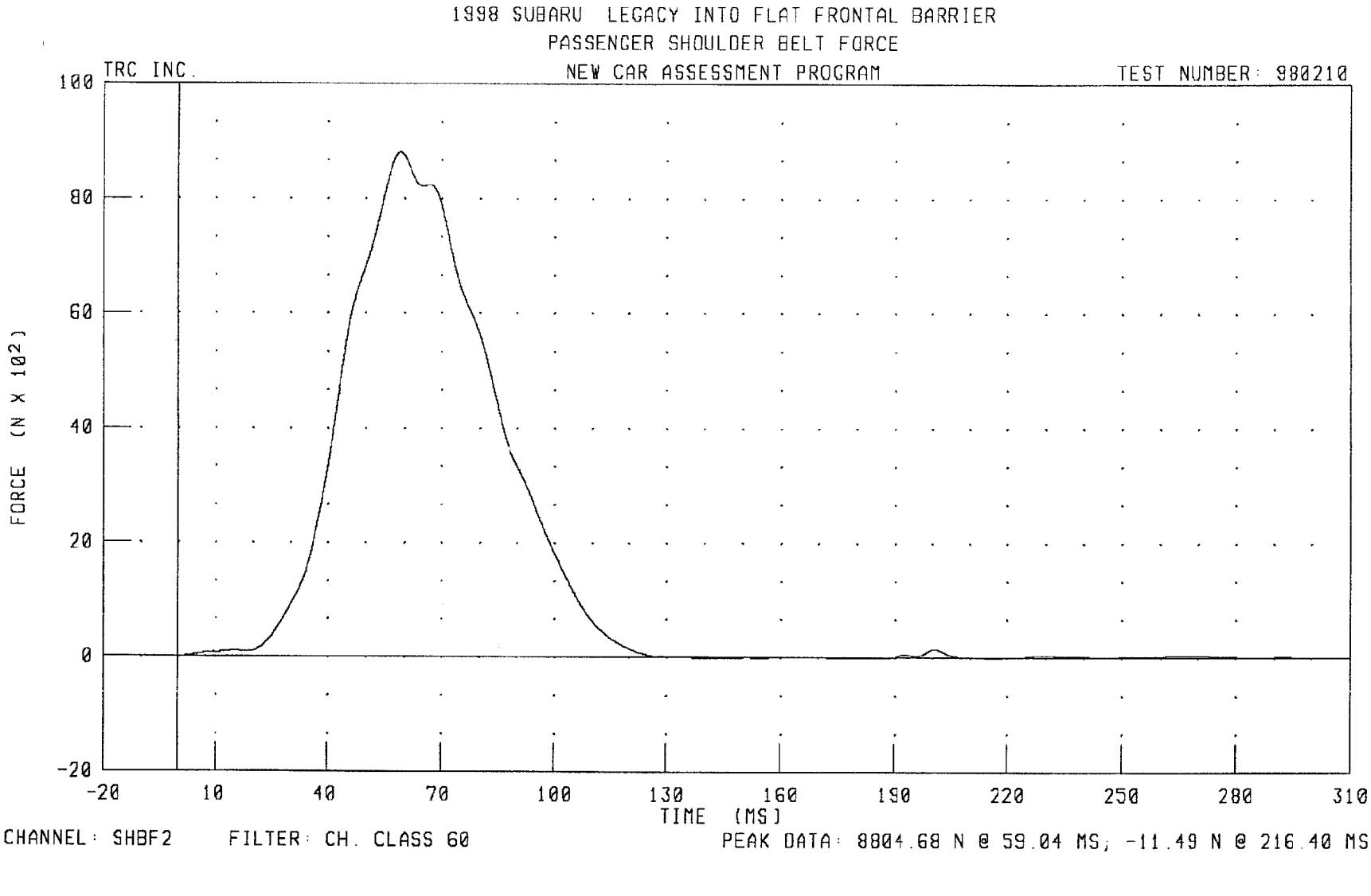
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE



CHANNEL: LBOF2 FILTER: CH. CLASS 60 PEAK DATA: 7976.90 N @ 54.00 MS; 0.04 N @ -20.00 MS

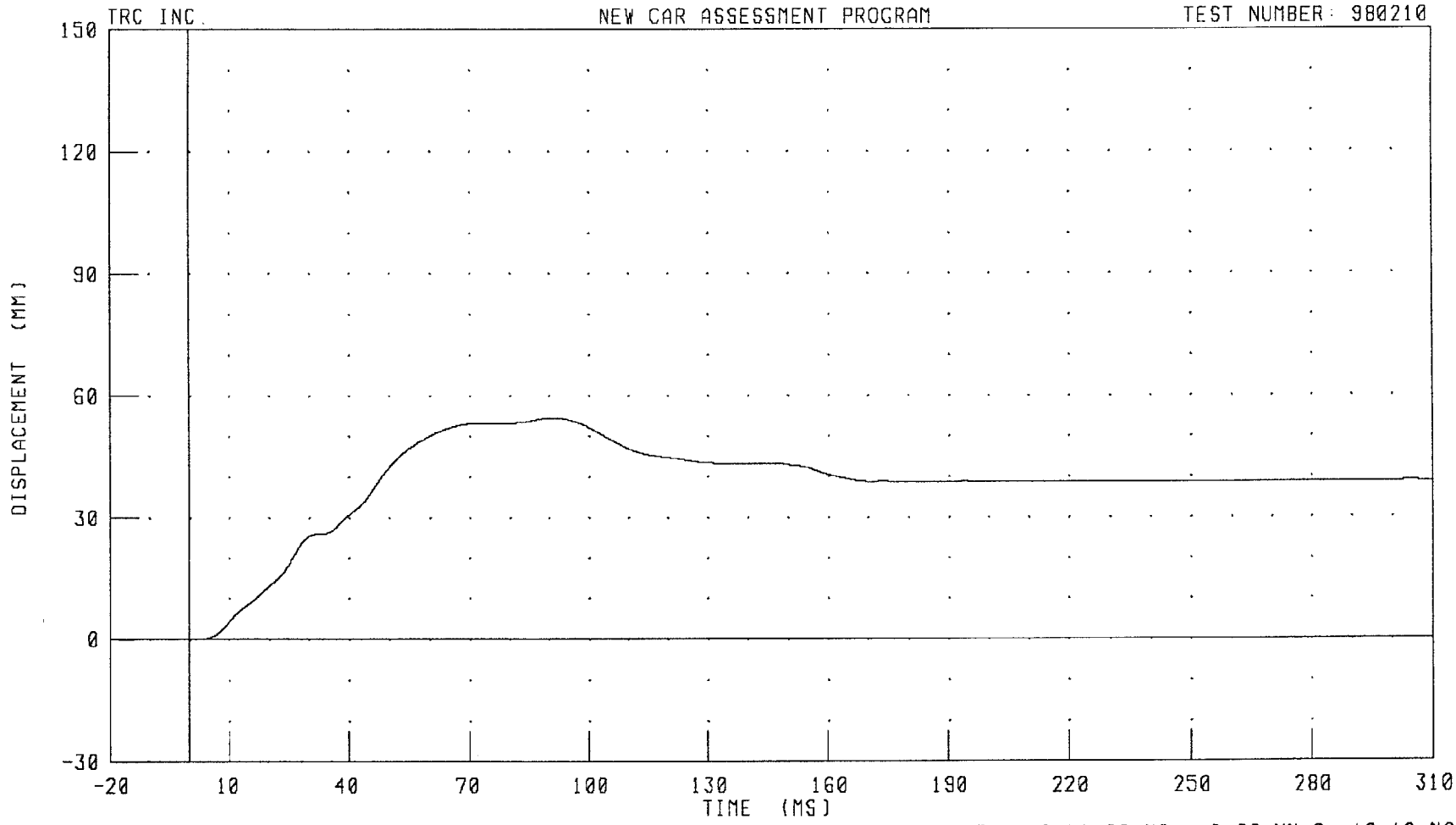
96-8

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER SHOULDER BELT FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: SHBF2
FILTER: CH. CLASS 60
PEAK DATA: 8804.68 N @ 59.04 MS; -11.49 N @ 216.40 MS

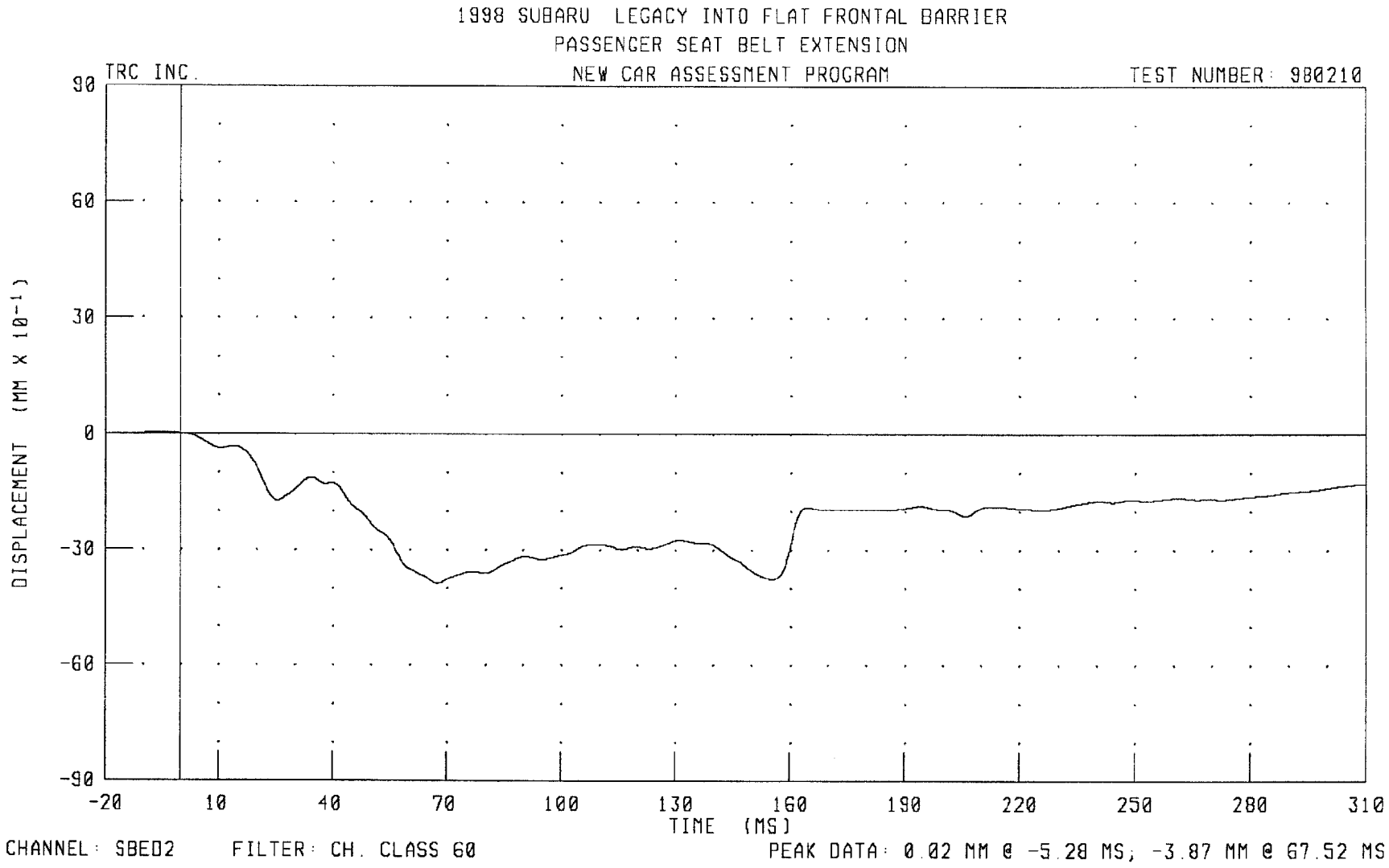
980210

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT



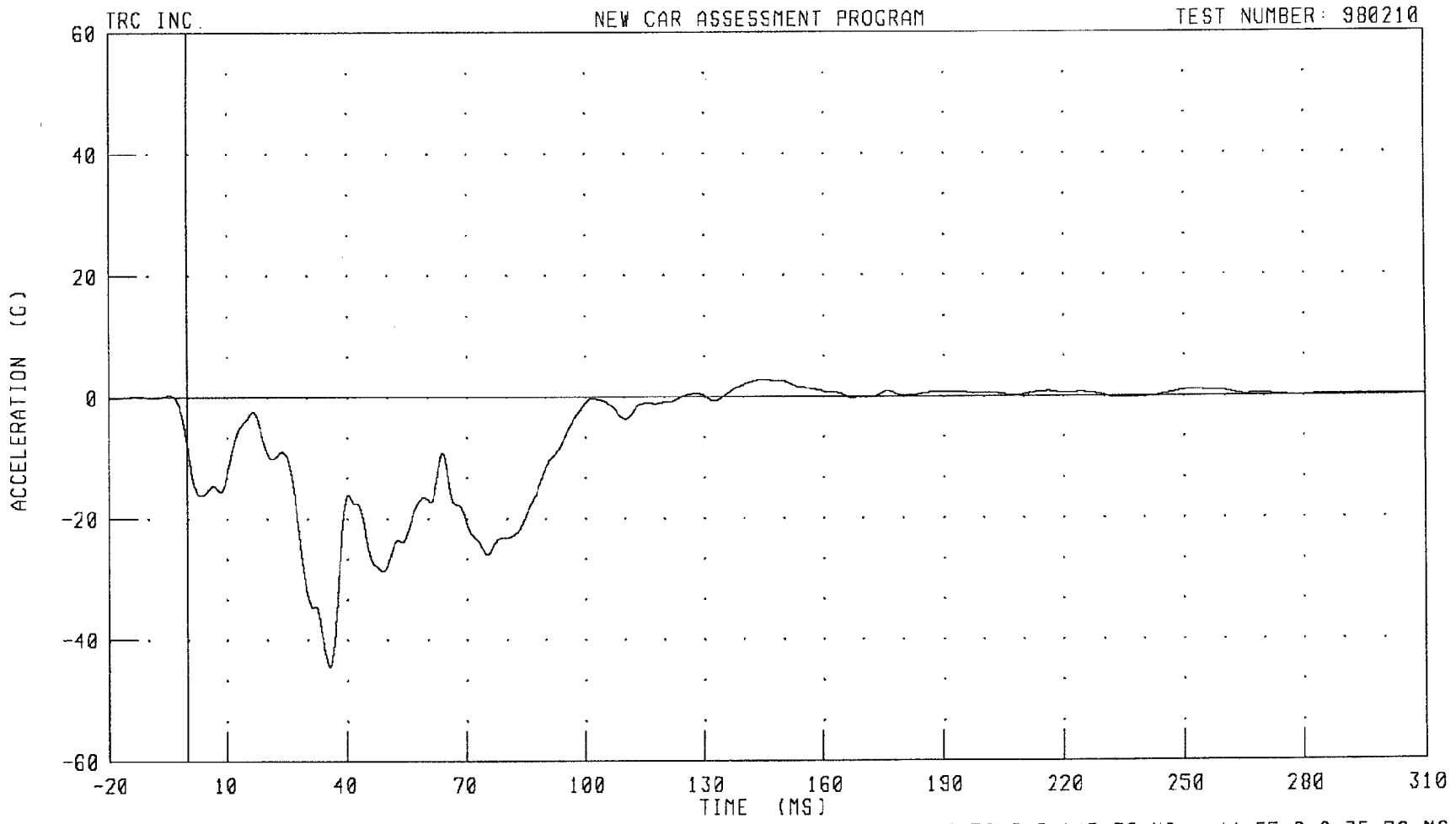
CHANNEL: SHB02 FILTER: CH. CLASS 60 PEAK DATA: 54.45 MM @ 91.60 MS; -0.06 MM @ -16.16 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
PASSENGER SEAT BELT EXTENSION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
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: SBED2
FILTER: CH. CLASS 60
PEAK DATA: 0.02 MM @ -5.28 MS; -3.87 MM @ 67.52 MS

980210

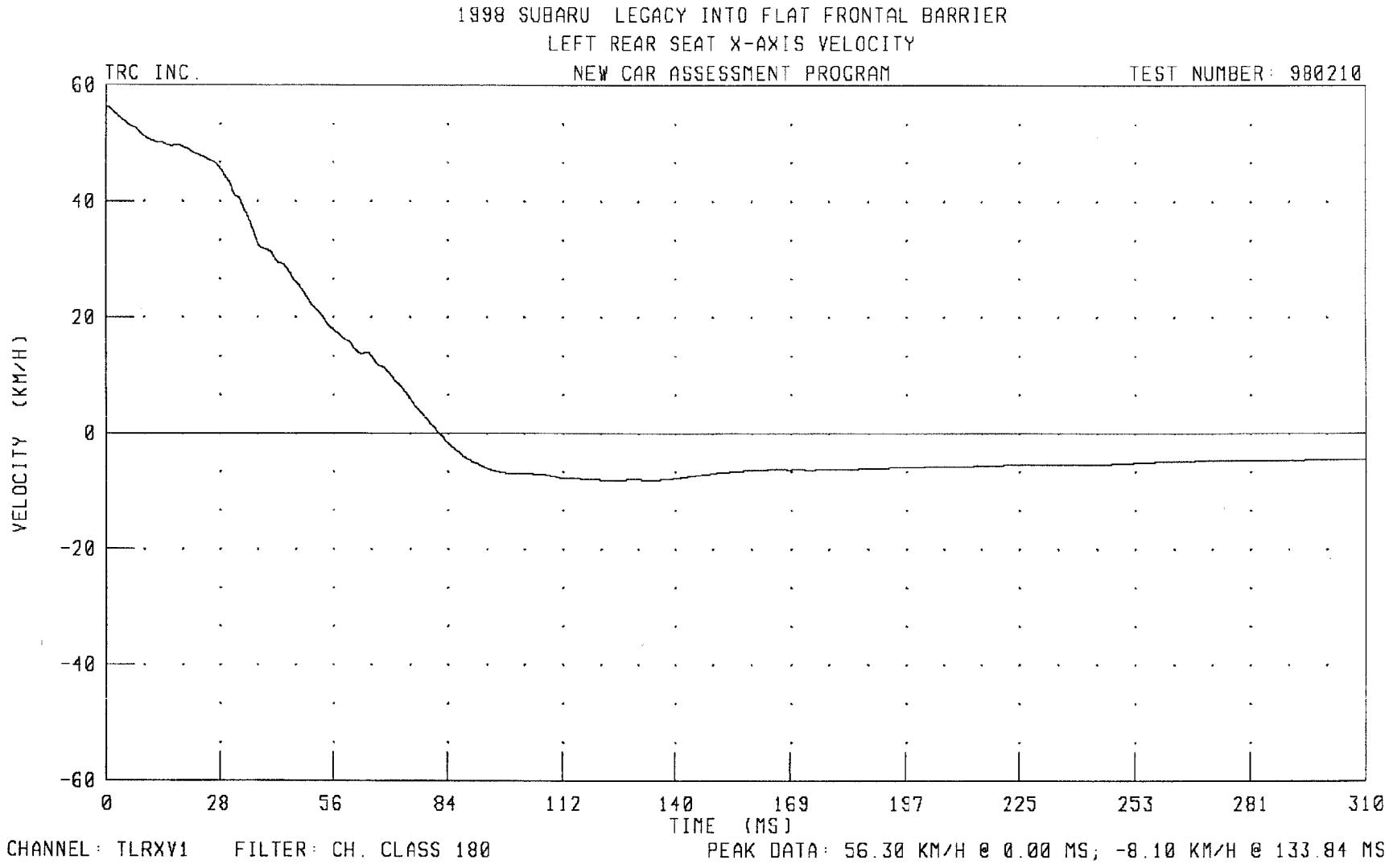
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION



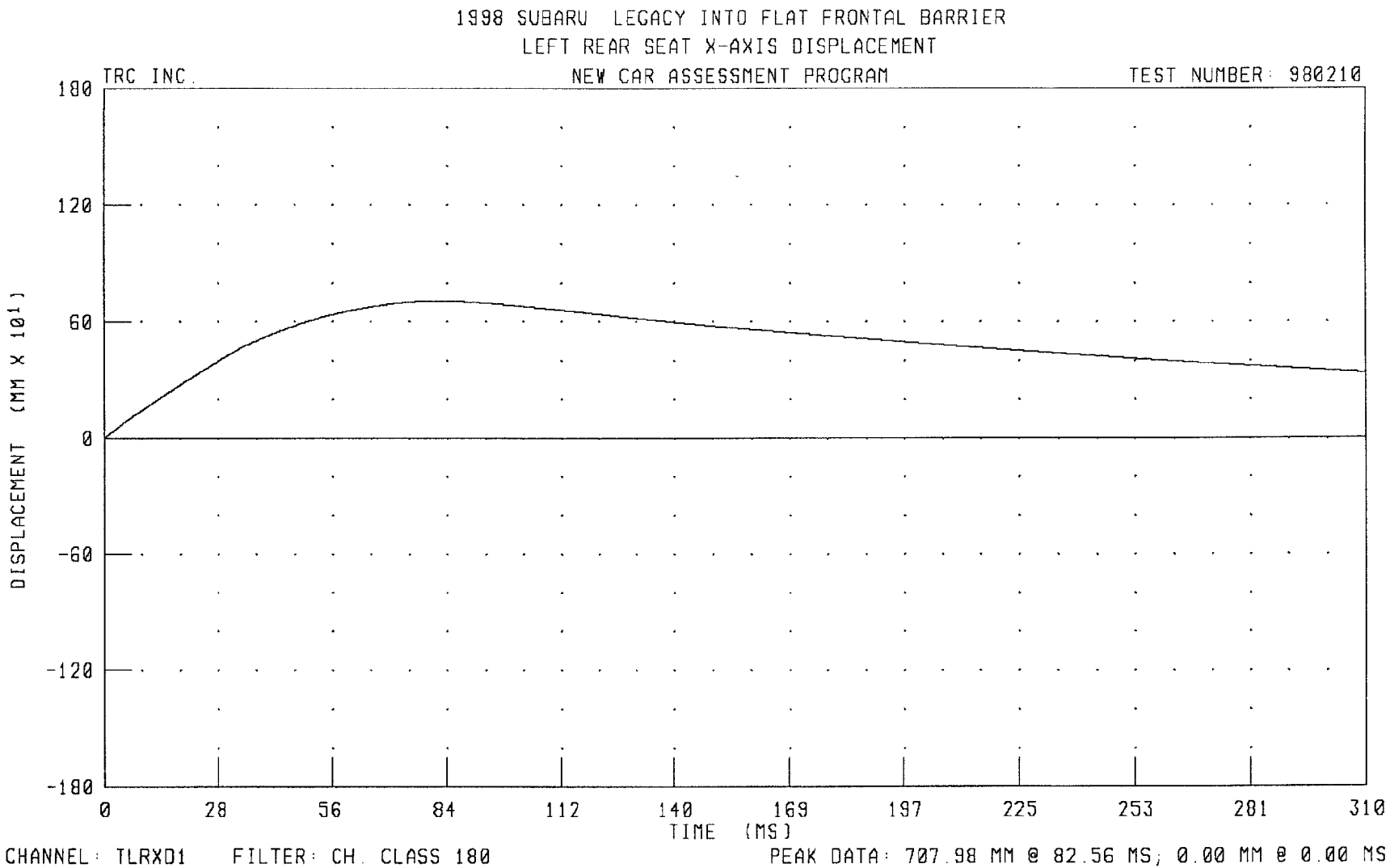
CHANNEL: TLRXG1 FILTER: CH. CLASS 60

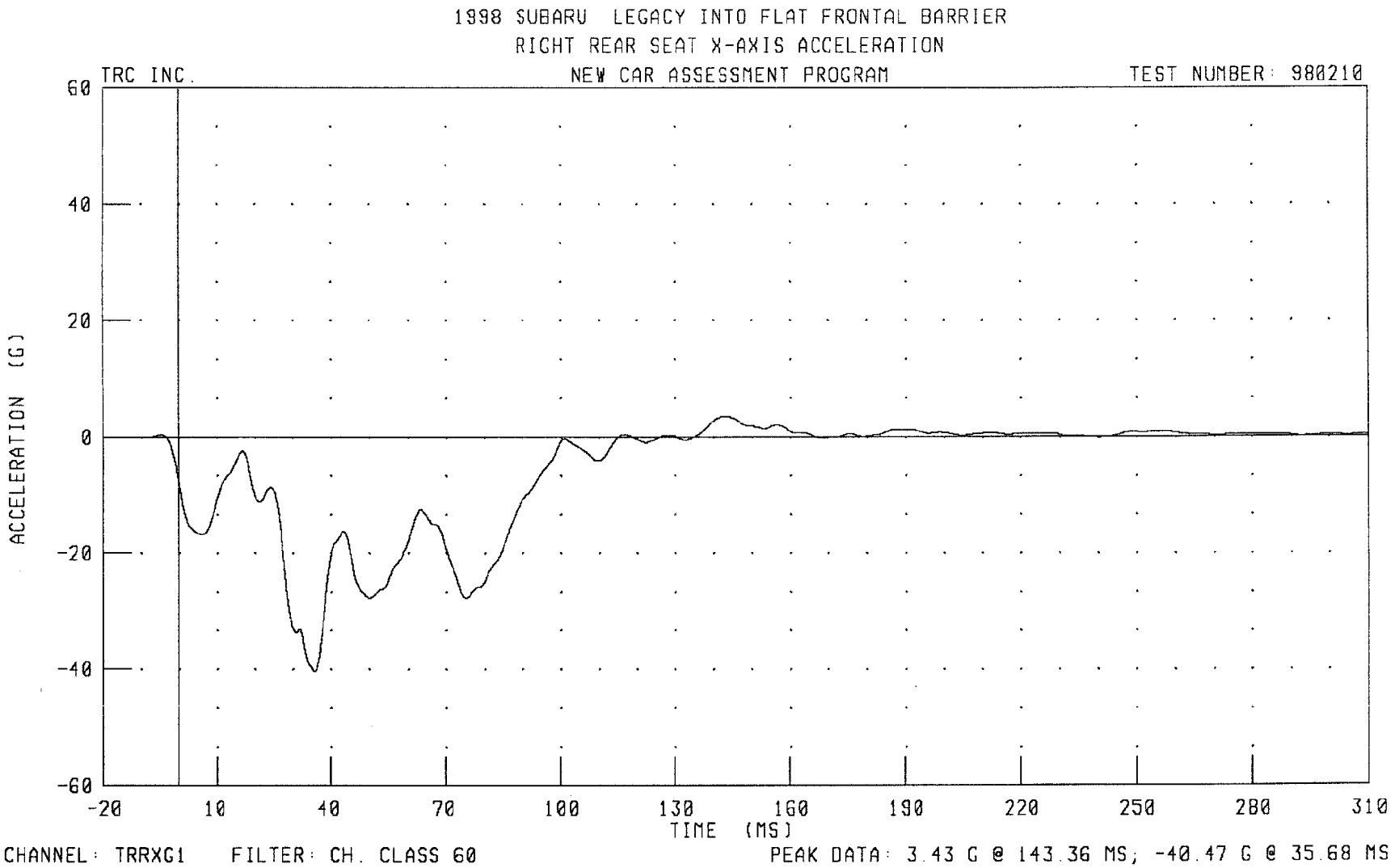
PEAK DATA: 2.72 G @ 145.36 MS; -44.55 G @ 35.76 MS

980210

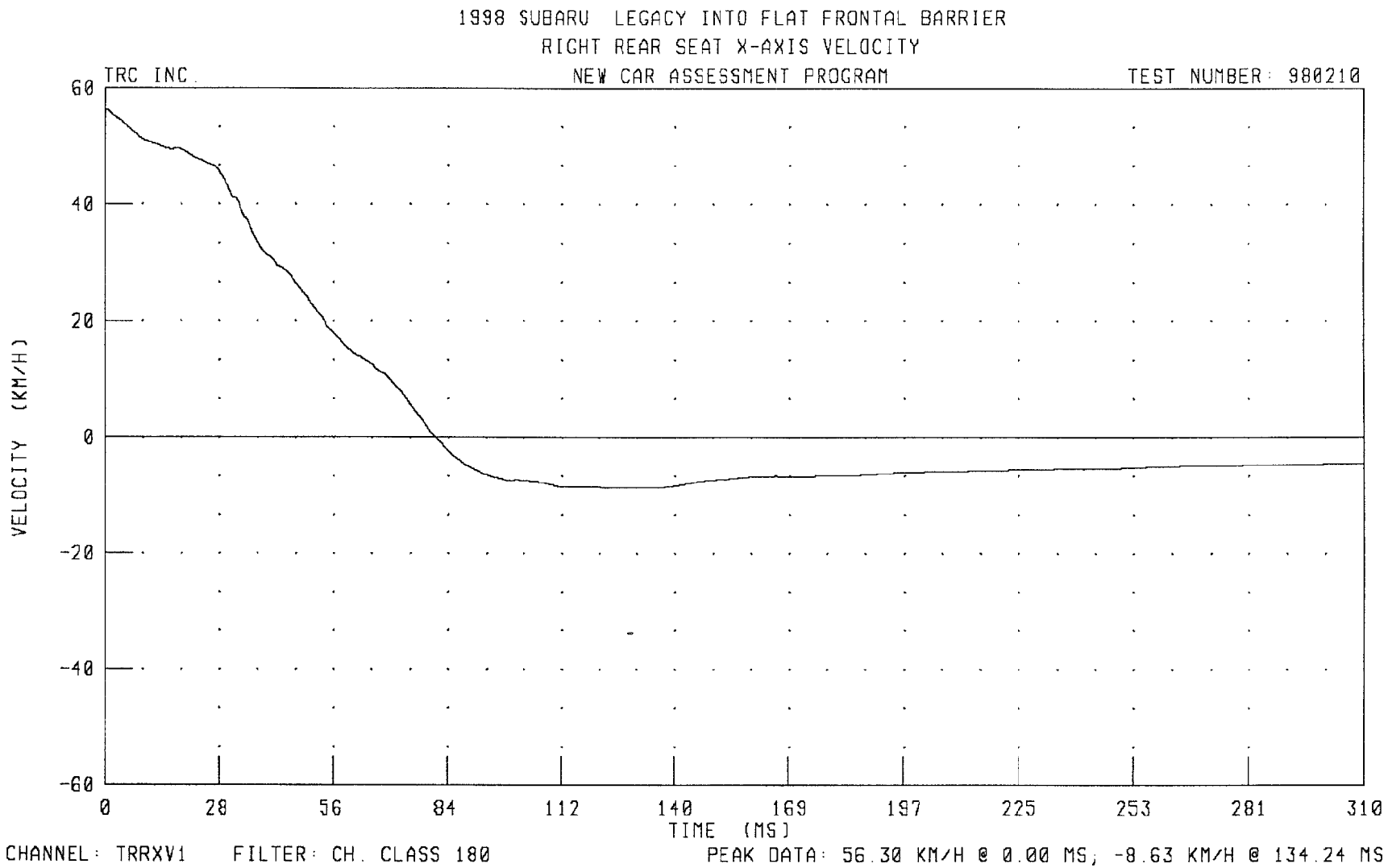

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
VELOCITY (KM/H)
0
28
56
84
112
140
169
197
225
253
281
310
TIME (MS)
CHANNEL: TLRXV1
FILTER: CH. CLASS 180
PEAK DATA: 56.30 KM/H @ 0.00 MS; -8.10 KM/H @ 133.84 MS

980210

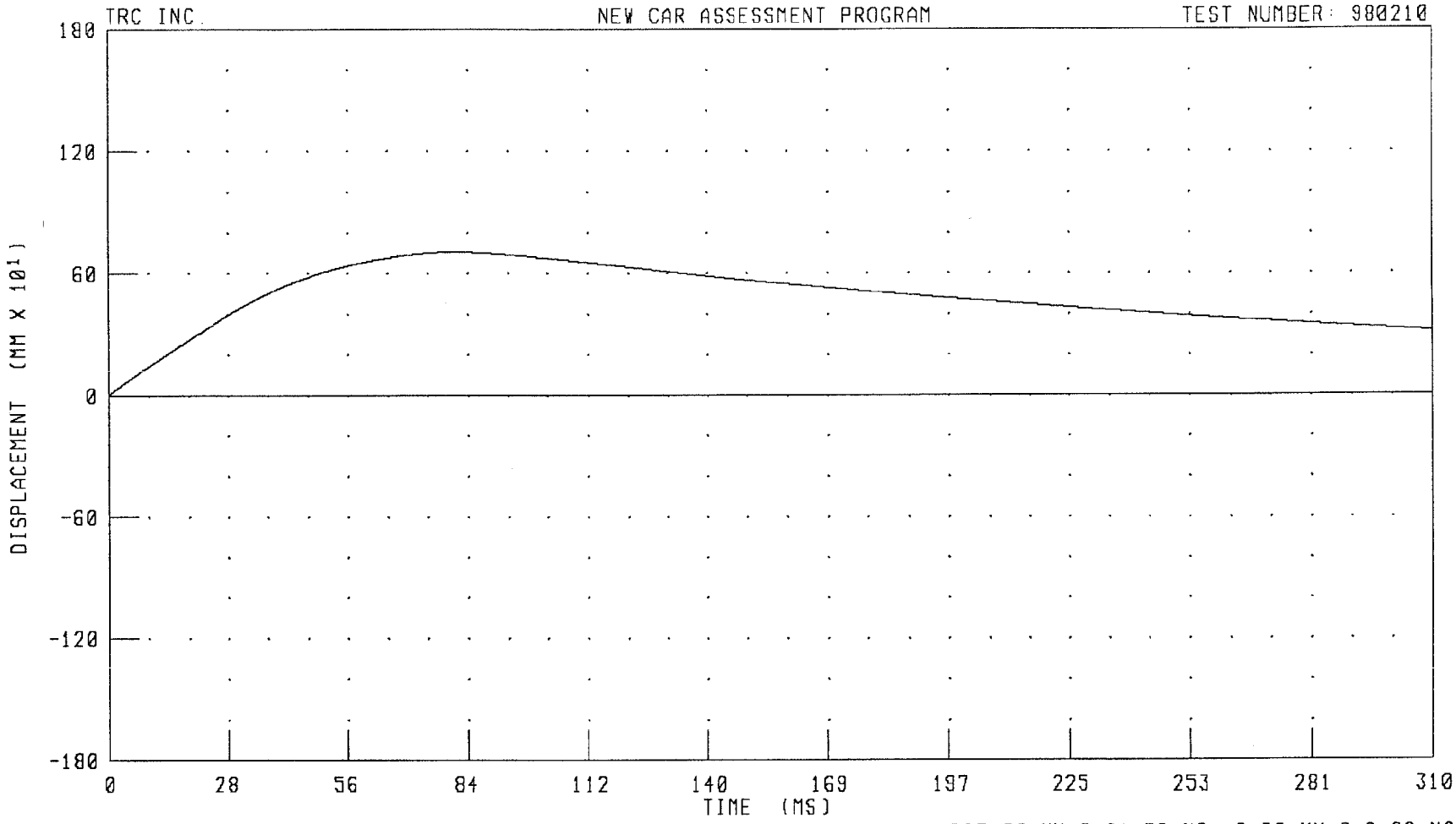

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS DISPLACEMENT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
180
120
60
0
-60
-120
-180
DISPLACEMENT (MM X 10¹)
0
28
56
84
112
140
169
197
225
253
281
310
TIME (MS)
CHANNEL: TLRXD1
FILTER: CH. CLASS 180
PEAK DATA: 707.98 MM @ 82.56 MS; 0.00 MM @ 0.00 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TRRXG1
FILTER: CH. CLASS 60
PEAK DATA: 3.43 G @ 143.36 MS; -40.47 G @ 35.68 MS

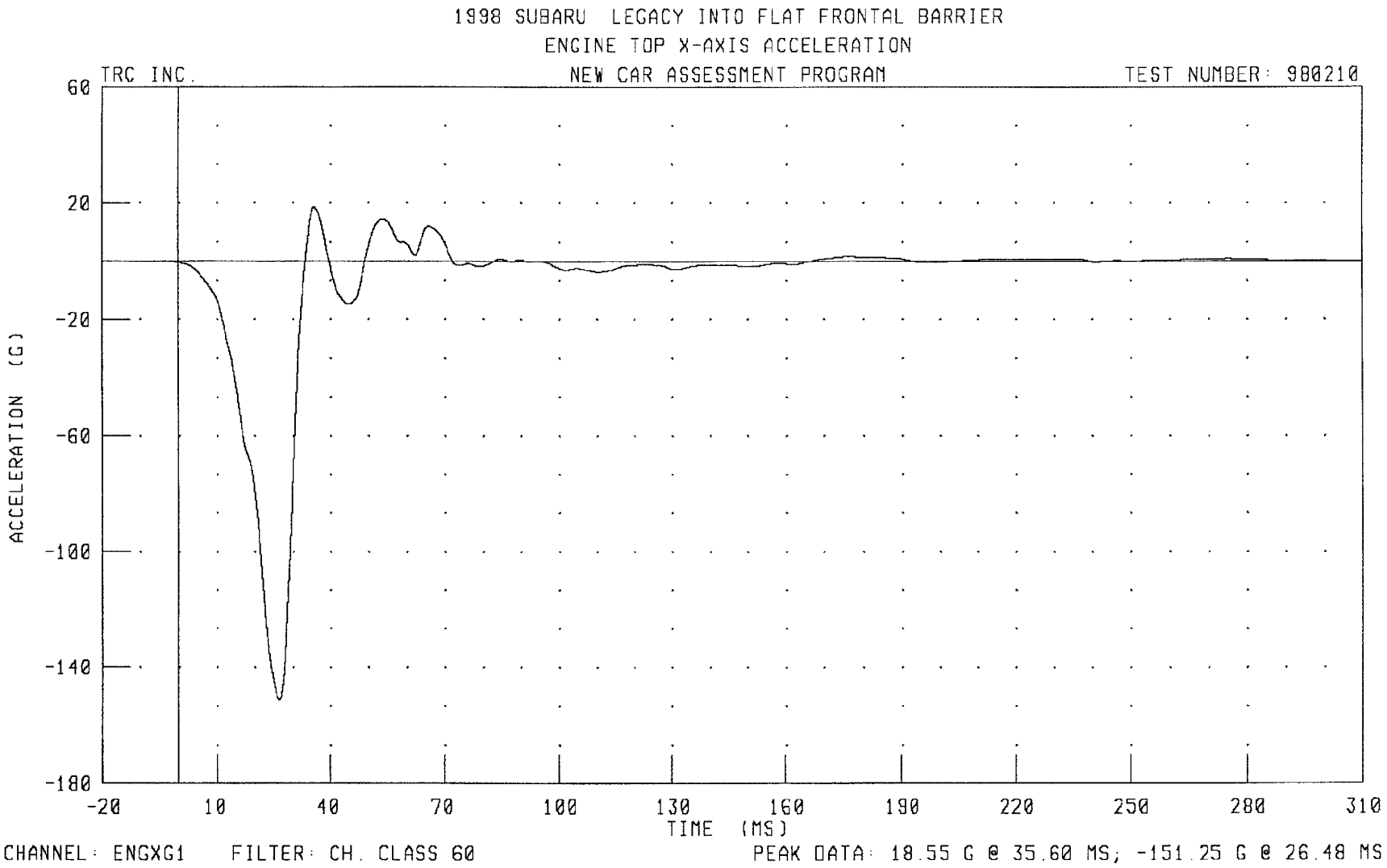
980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS VELOCITY
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
40
20
0
-20
-40
-60
VELOCITY (KM/H)
0
28
56
84
112
140
169
197
225
253
281
310
TIME (MS)
CHANNEL: TRRXV1
FILTER: CH. CLASS 180
PEAK DATA: 56.30 KM/H @ 0.00 MS, -8.63 KM/H @ 134.24 MS

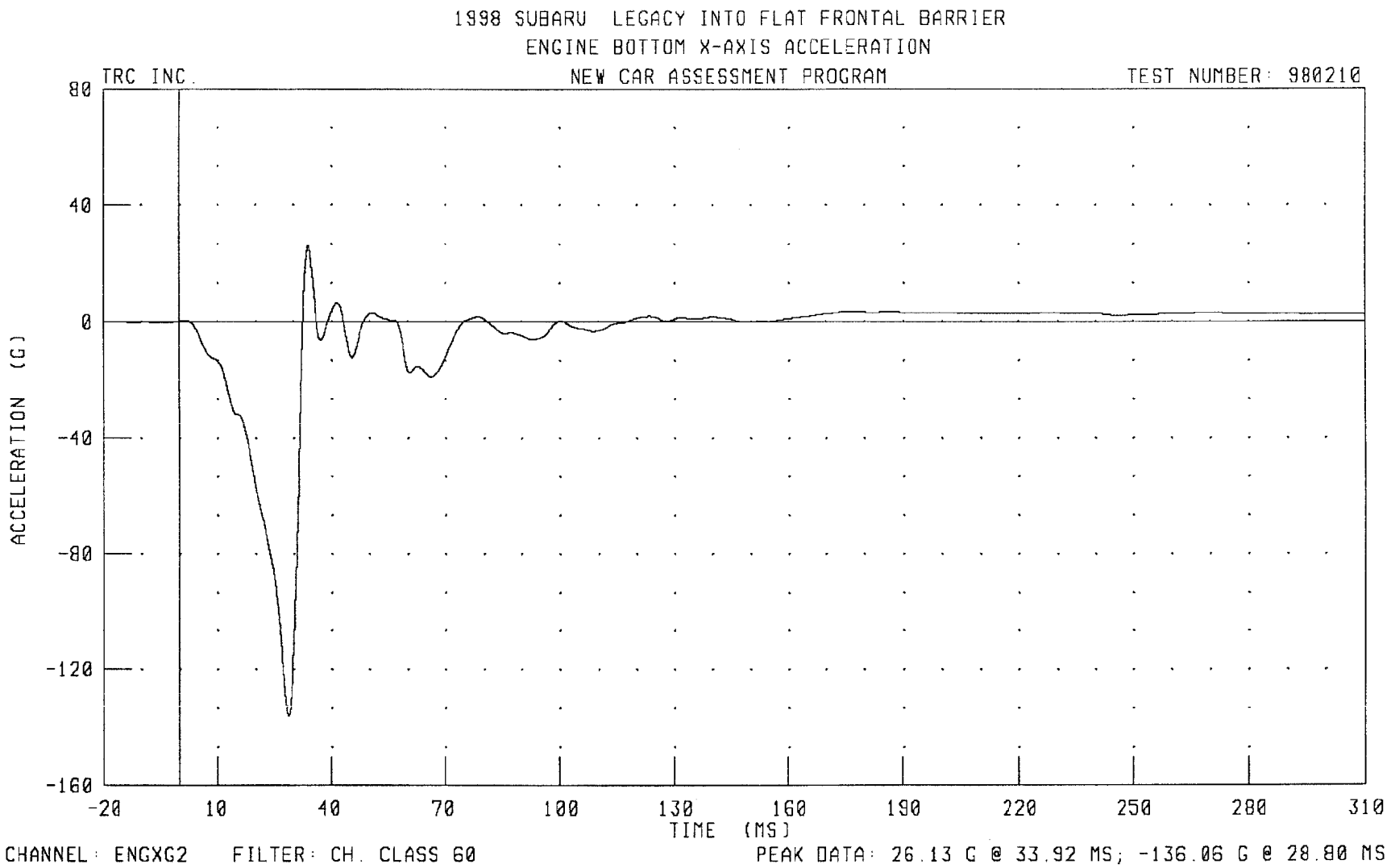
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS DISPLACEMENT



CHANNEL: TRRXD1 FILTER: CH. CLASS 180 PEAK DATA: 705.80 MM @ 81.52 MS; 0.00 MM @ 0.00 MS

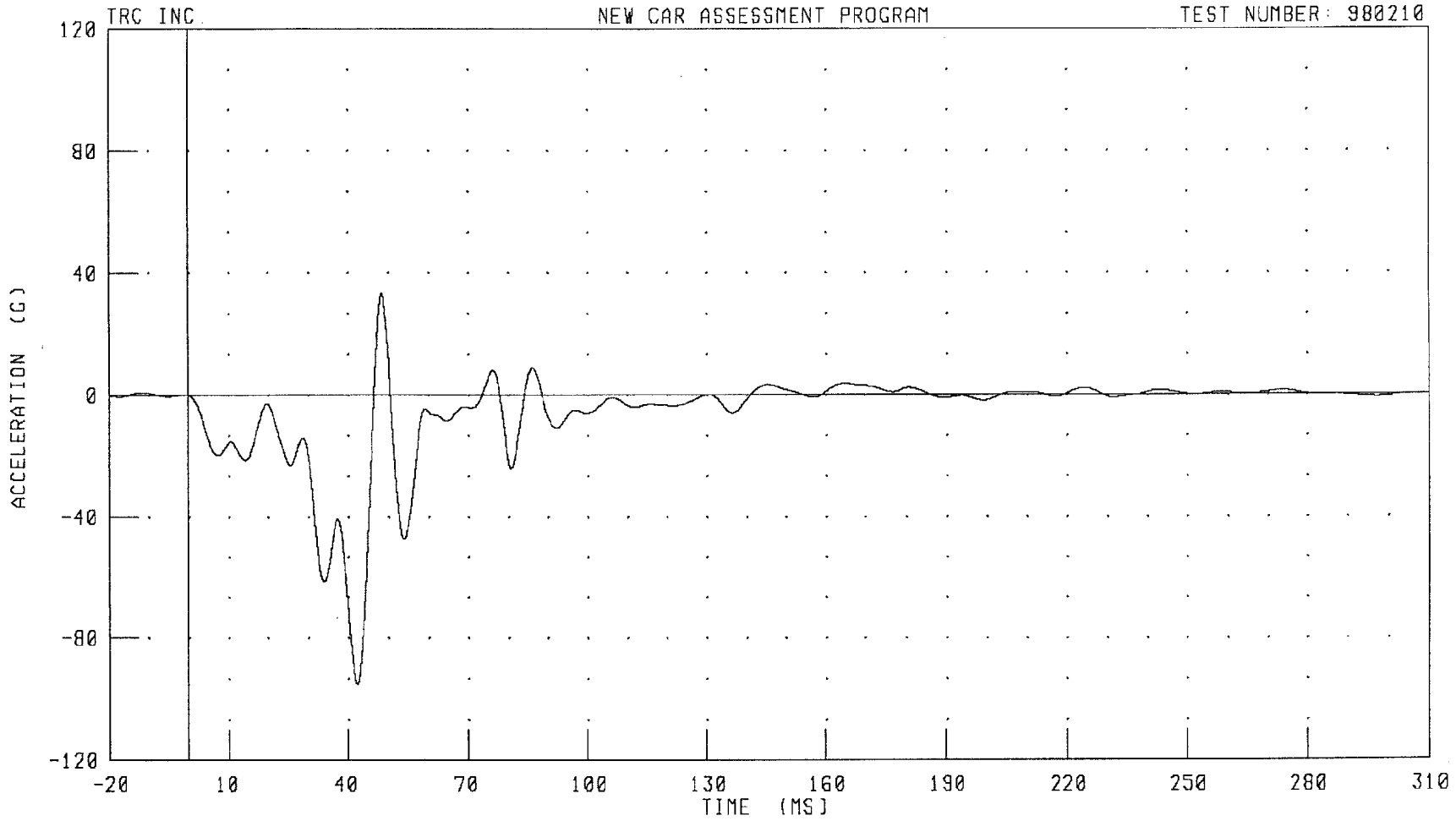

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
ENGINE TOP X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
60
20
-20
-60
-100
-140
-180
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG1
FILTER: CH. CLASS 60
PEAK DATA: 18.55 G @ 35.60 MS; -151.25 G @ 26.48 MS

980210


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
80
40
0
-40
-80
-120
-160
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG2
FILTER: CH. CLASS 60
PEAK DATA: 26.13 G @ 33.92 MS; -136.06 G @ 28.80 MS

980210

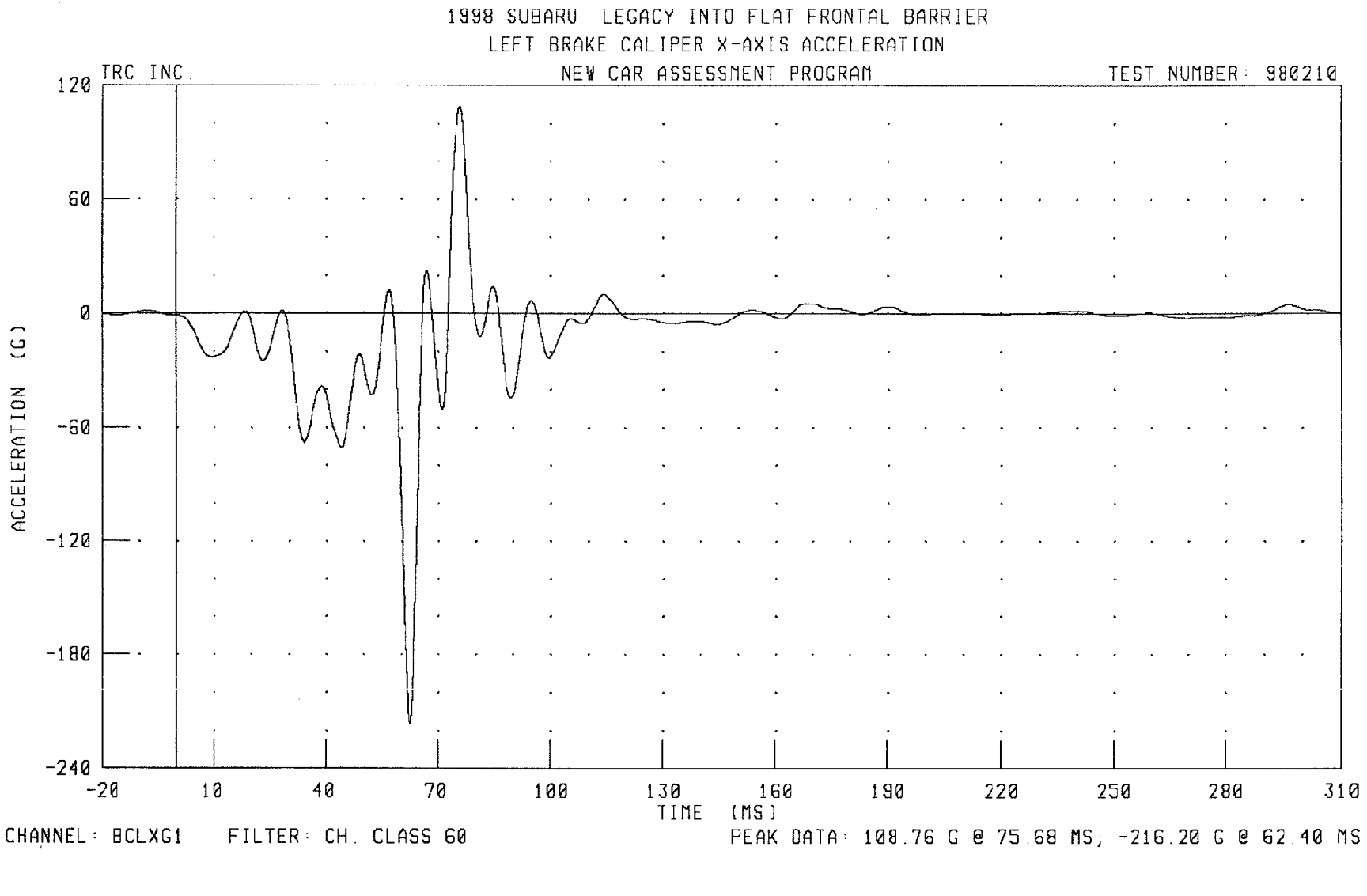
1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION



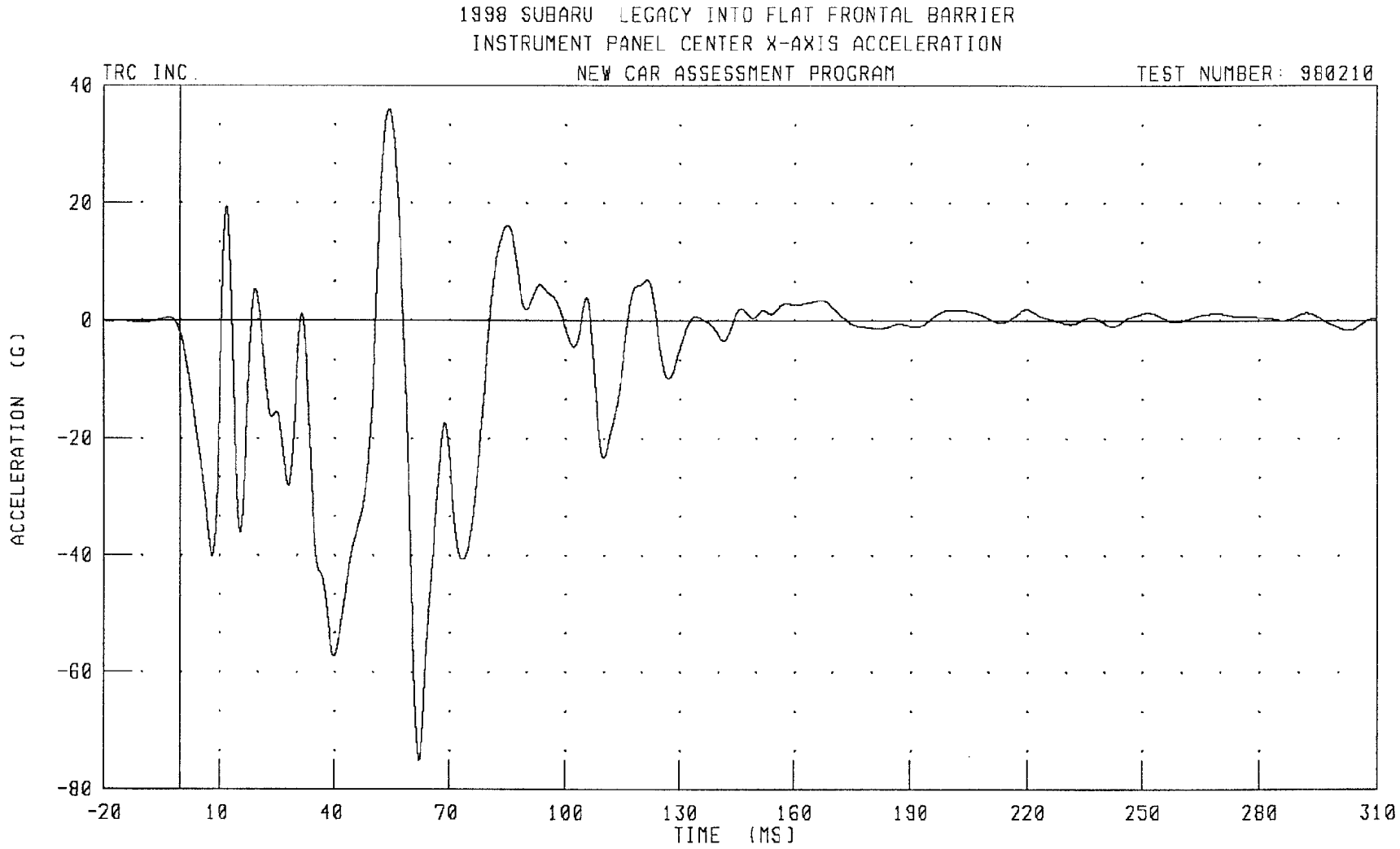
CHANNEL: BCRXG1 FILTER: CH. CLASS 60 PEAK DATA: 33.49 G @ 48.32 MS; -95.08 G @ 42.32 MS

801-8

980210

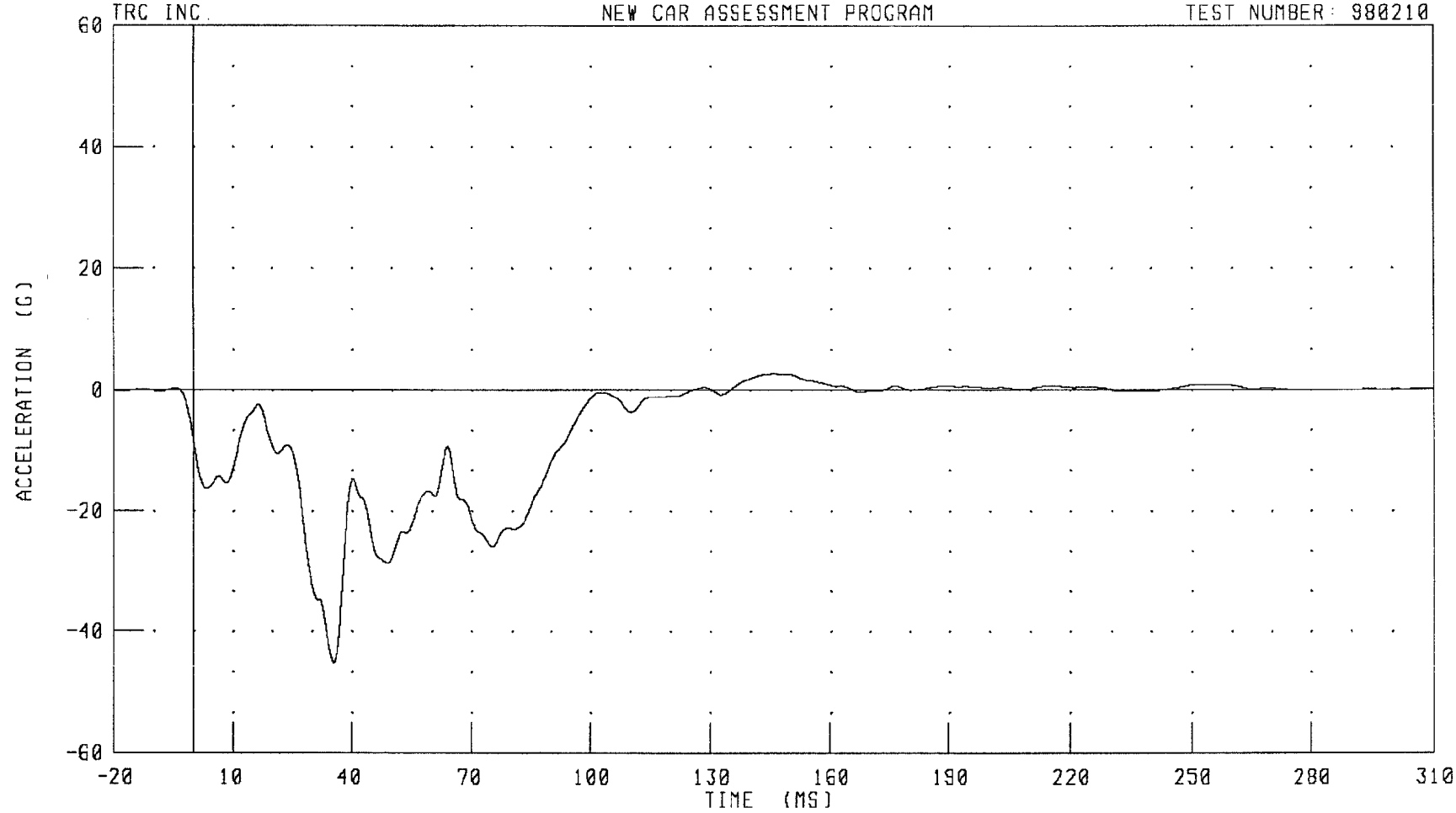

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
120
60
0
-60
-120
-180
-240
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCLXG1
FILTER: CH. CLASS 60
PEAK DATA: 108.76 G @ 75.68 MS, -216.20 G @ 62.40 MS

980210

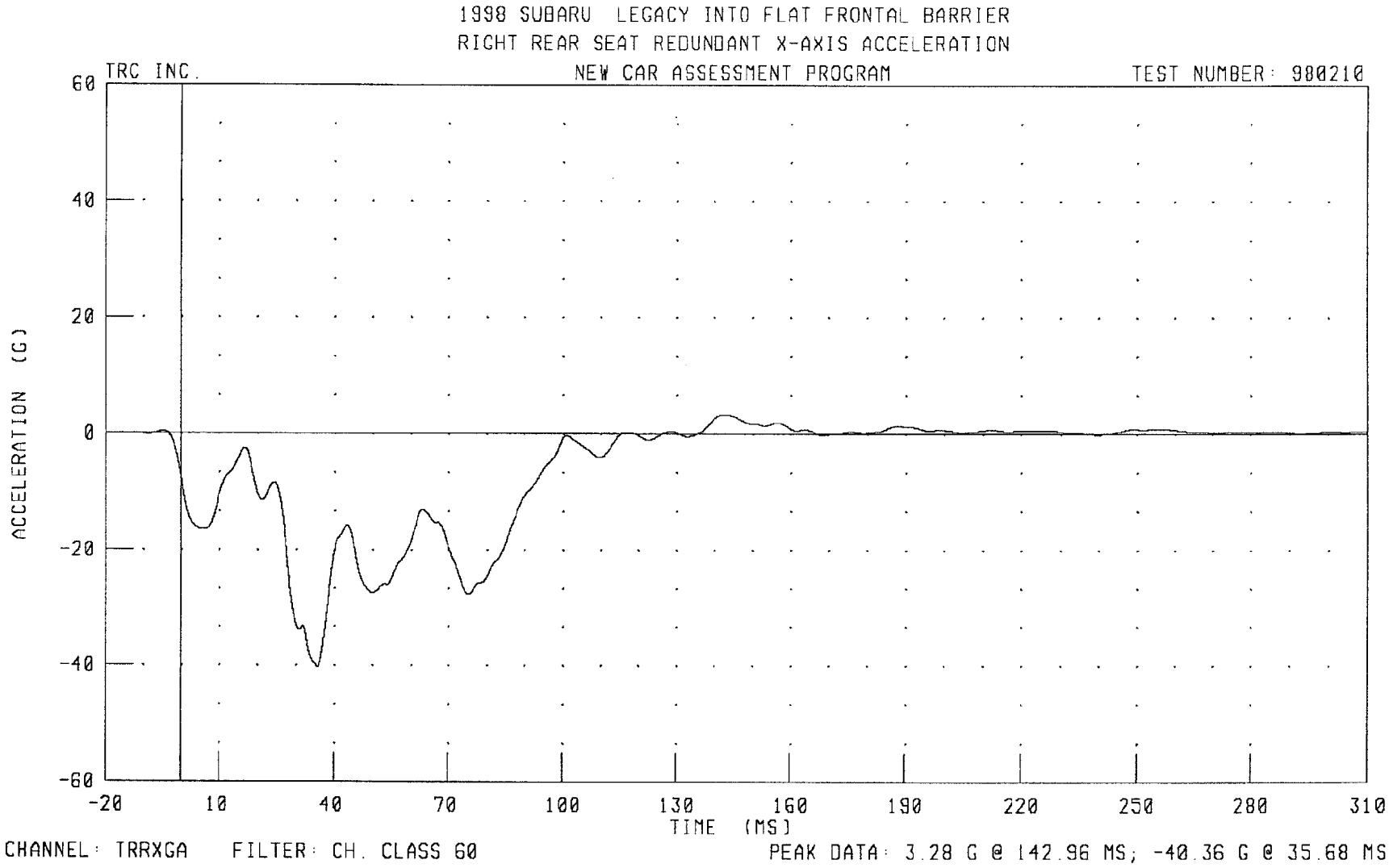

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
40
20
0
-20
-40
-60
-80
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: DPCXG1
FILTER: CH. CLASS 60
PEAK DATA: 35.93 G @ 54.24 MS; -75.08 G @ 62.08 MS

980210

1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION



CHANNEL: TLRXGA FILTER: CH. CLASS 60 PEAK DATA: 2.65 G @ 146.00 MS; -45.17 G @ 35.68 MS


1998 SUBARU LEGACY INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 980210
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TRRXGA
FILTER: CH. CLASS 60
PEAK DATA: 3.28 G @ 142.96 MS; -40.36 G @ 35.68 MS

Appendix C

Dummy Certification Data

Pre-test Certification Data

Driver Dummy S/N: 192

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
SN192 ALDERSON

TRC INC. TEST NO: 192C38ED1 572E SN192 EXT.DIMENSION CAL38 07-02-98

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	861. MM
CHEST DEPTH (O)	213 - 229 MM	216. MM
H-POINT HEIGHT (C)	84 - 89 MM	89. MM
H-POINT FROM SEATBACK (D)	135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)	879 - 889 MM	884. MM
THIGH CLEARANCE (F)	140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH (K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH (N)	452 - 478 MM	475. MM
POPLITEAL HEIGHT (L)	429 - 455 MM	447. MM
KNEE PIVOT HEIGHT (M)	485 - 500 MM	498. MM
FOOT LENGTH (P)	252 - 267 MM	262. MM
FOOT BREADTH (W)	91 - 107 MM	99. MM
SHOULDER PIVOT FROM BACKLINE (E)	84 - 94 MM	94. MM
SHOULDER BREADTH (V)	422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)	506 - 521 MM	511. MM
ELBOW REST HEIGHT (J)	191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH (I)	330 - 345 MM	333. MM
BACK OF ELBOW TO WRIST PIVOT (G)	290 - 305 MM	295. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 030298.0921

TRANSPORTATION RESEARCH CENTER INC.

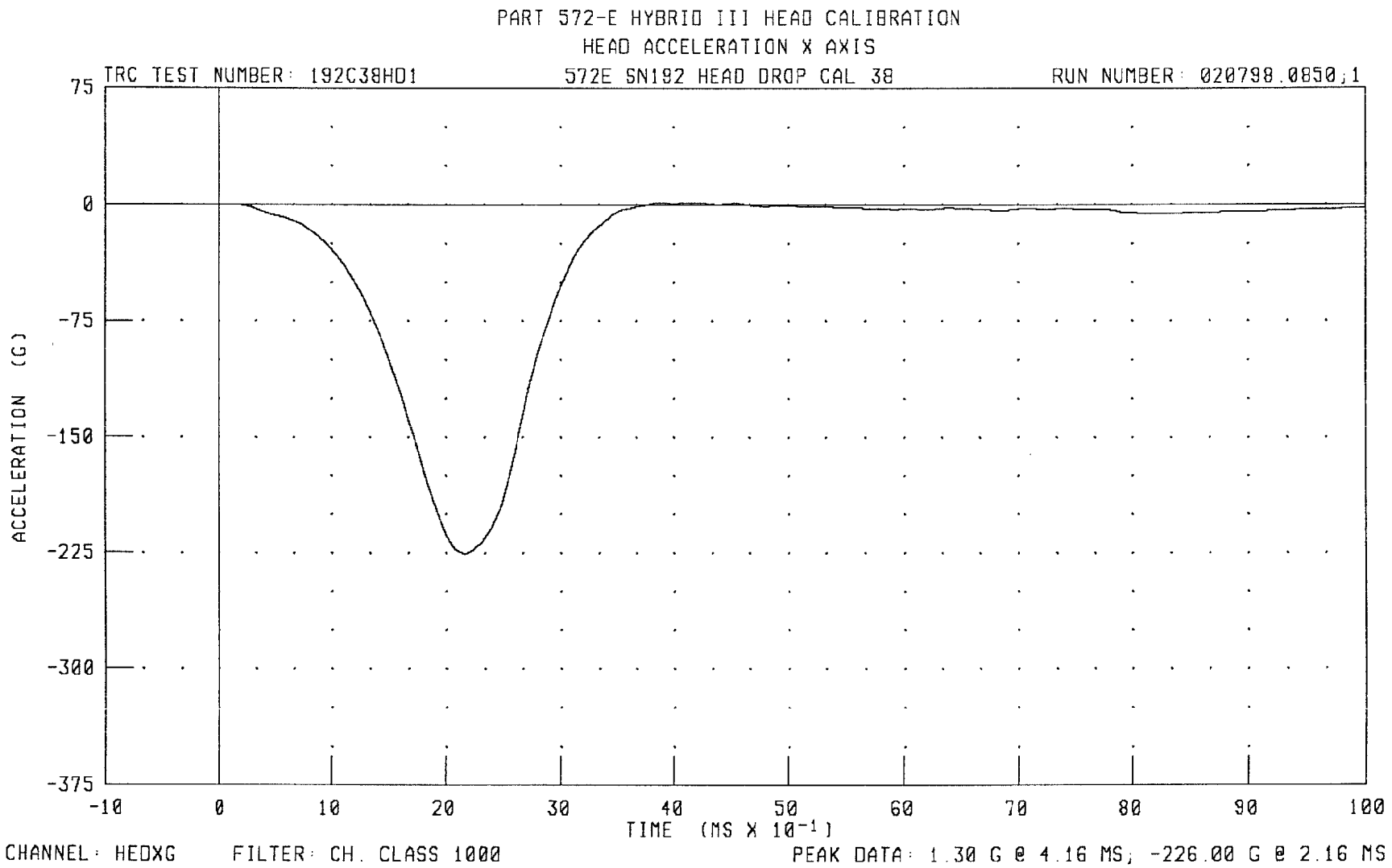
HEAD DROP TEST

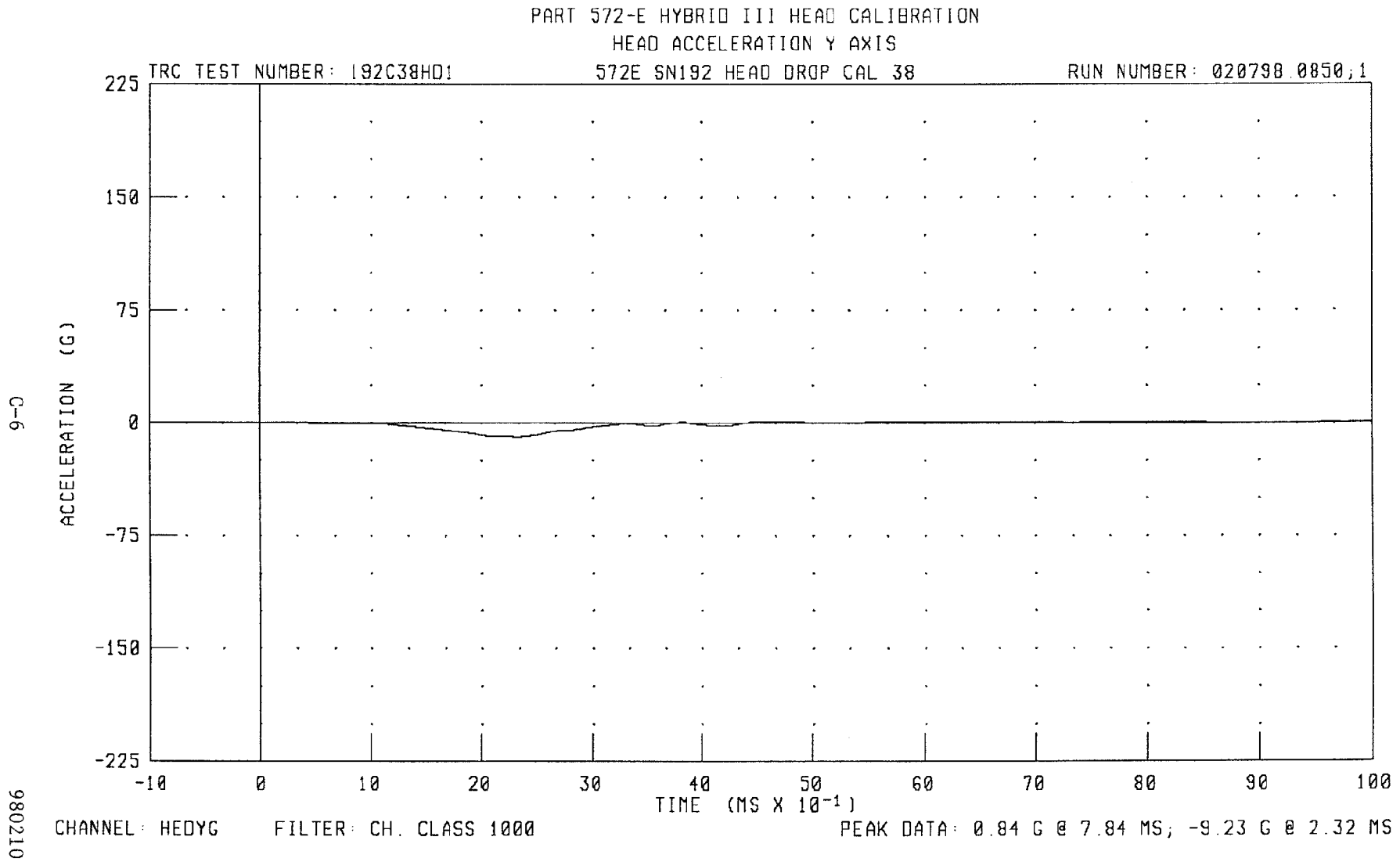
TRC INC. TEST NO: 192C38HD1 572E SN192 HEAD DROP CAL 38

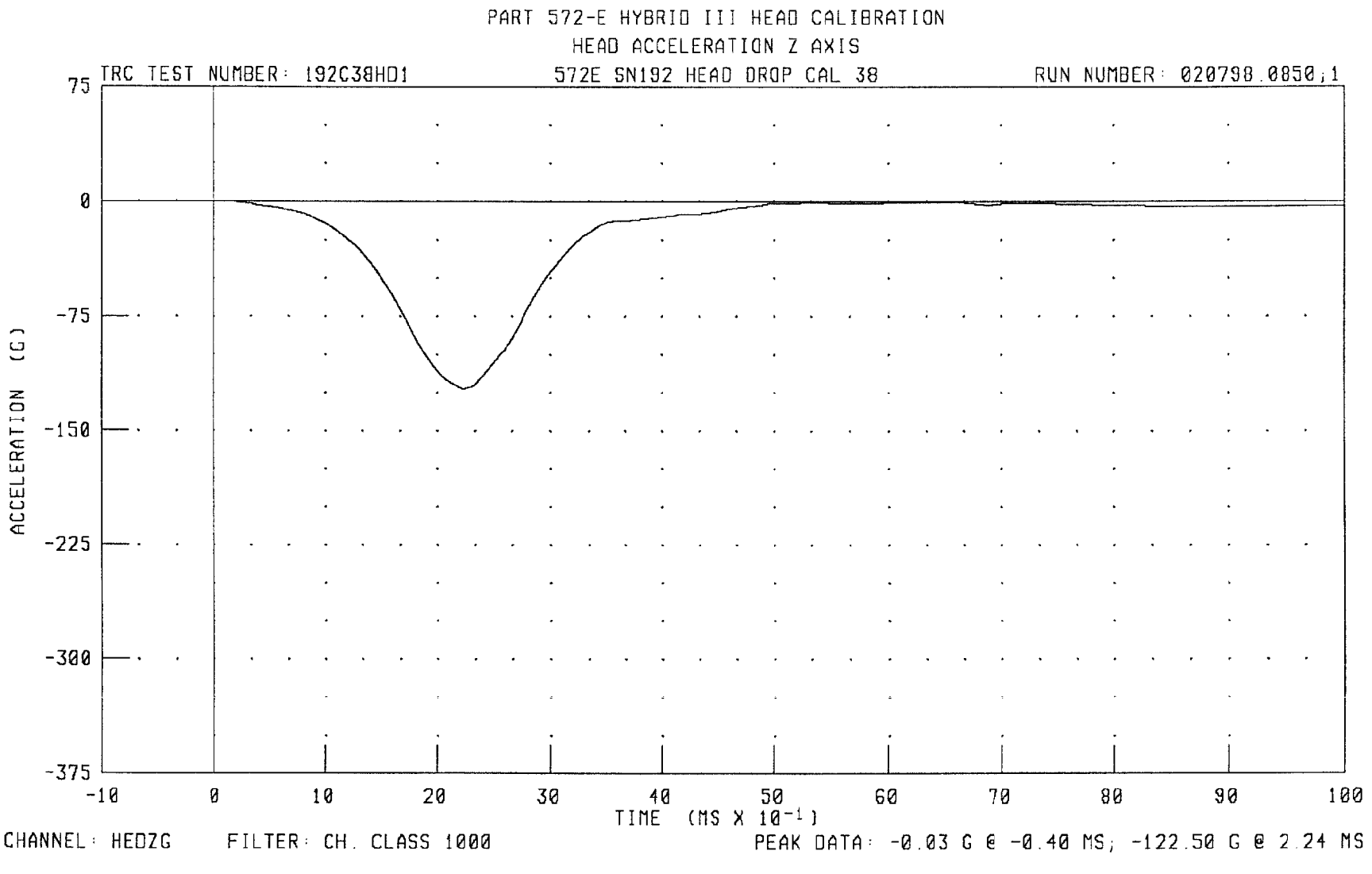
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	256.16 G
PEAK LATERAL ACCELERATION	15 G MAX	-9.23 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

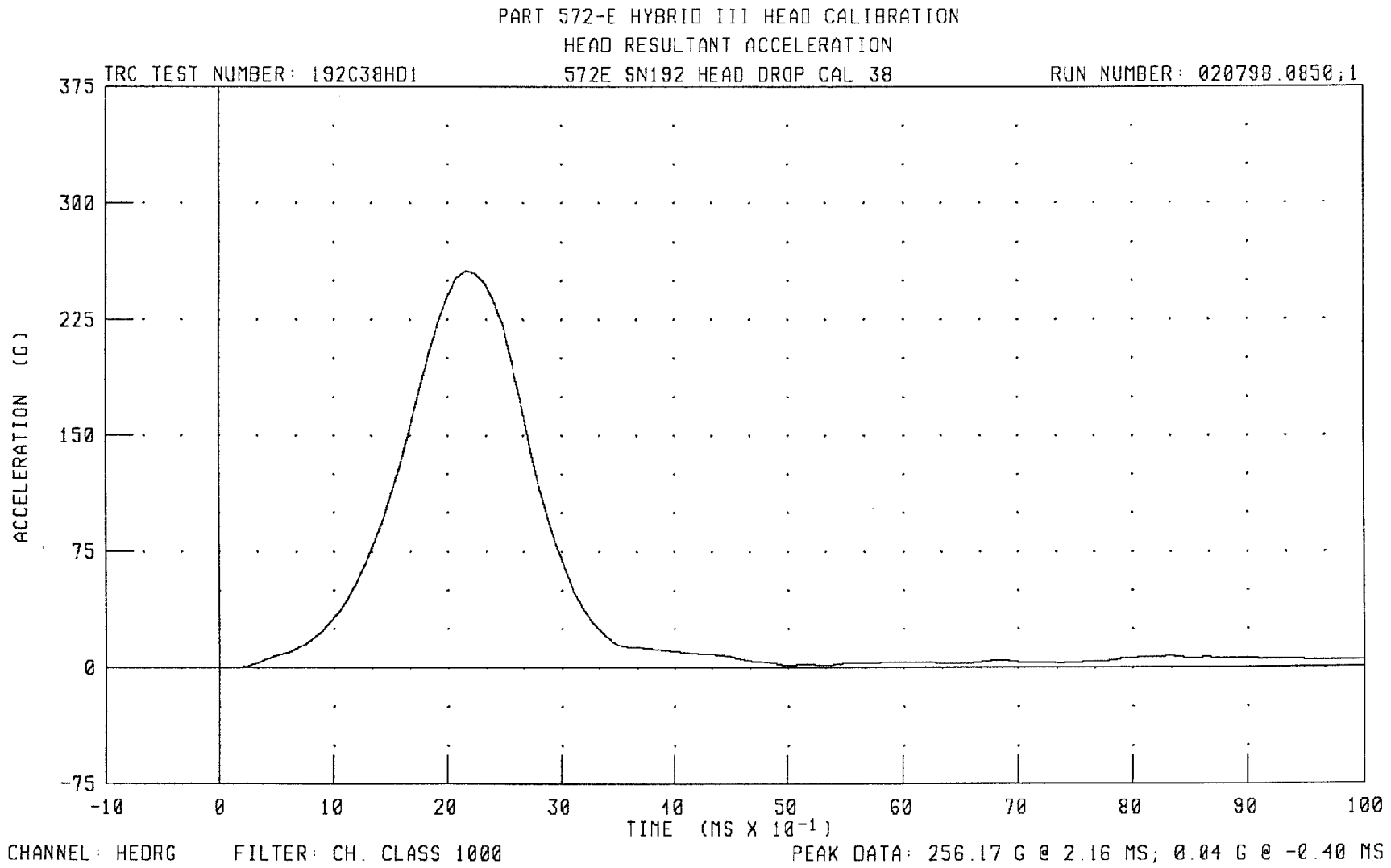
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Clawdge RUN NUMBER: 020798.0849;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER: 192C38HD1
572E SN192 HEAD DROP CAL 38
RUN NUMBER: 020798.0850;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: 1.30 G @ 4.16 MS; -226.00 G @ 2.16 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 192C38HD1
572E SN192 HEAD DROP CAL 38
RUN NUMBER: 020798.0850;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: 0.84 G @ 7.84 MS; -9.23 G @ 2.32 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
TRC TEST NUMBER: 192C38HD1
572E SN192 HEAD DROP CAL 38
RUN NUMBER: 020798.0850;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: -0.03 G @ -0.40 MS; -122.50 G @ 2.24 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
TRC TEST NUMBER: 192C38HD1
572E SN192 HEAD DROP CAL 38
RUN NUMBER: 020798.0850;1
375
300
225
150
75
0
-75
ACCELERATION (G)
-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: 256.17 G @ 2.16 MS; 0.04 G @ -0.40 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

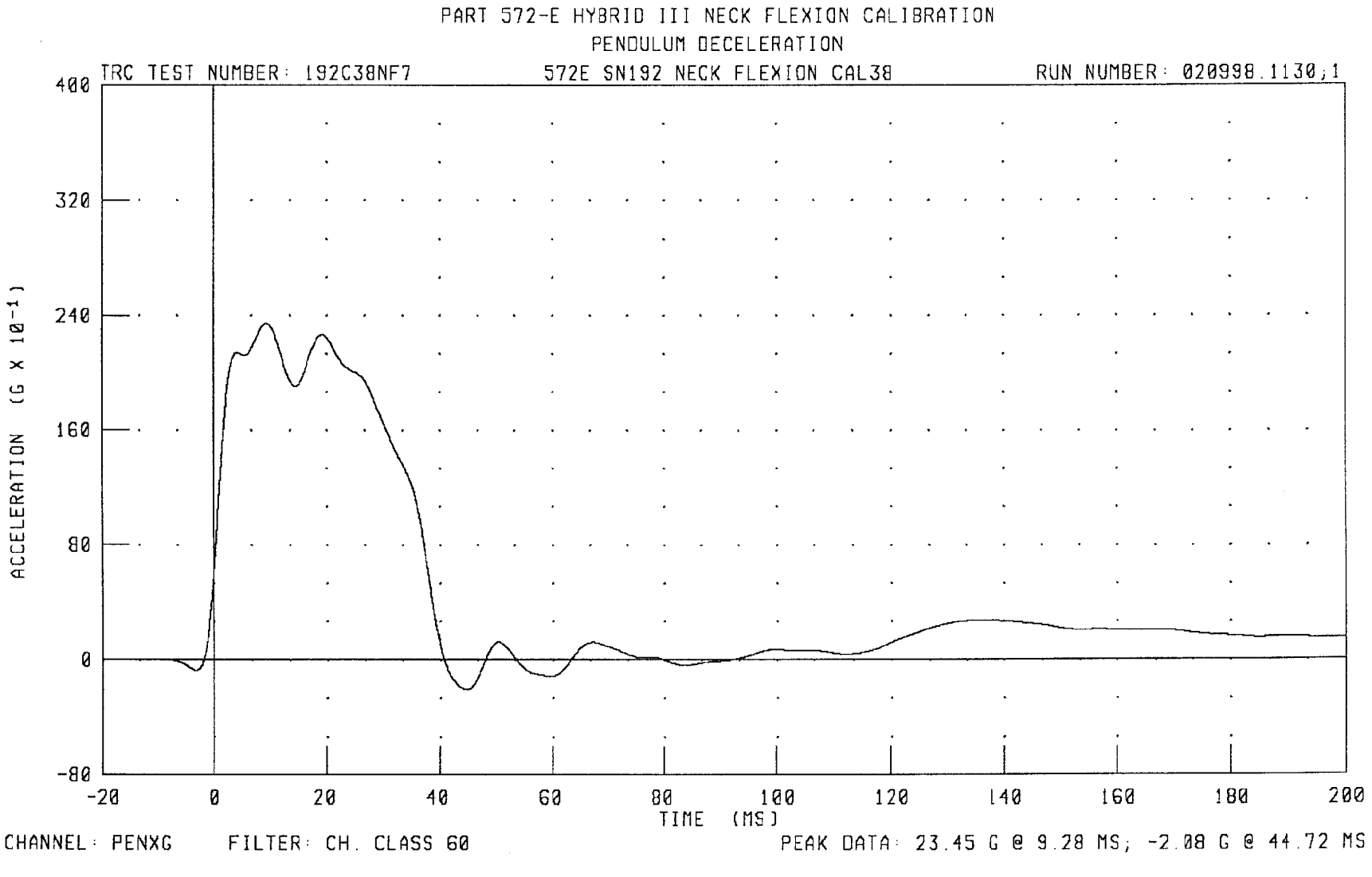
TRC INC. TEST NO: 192C38NF7 572E SN192 NECK FLEXION CAL38

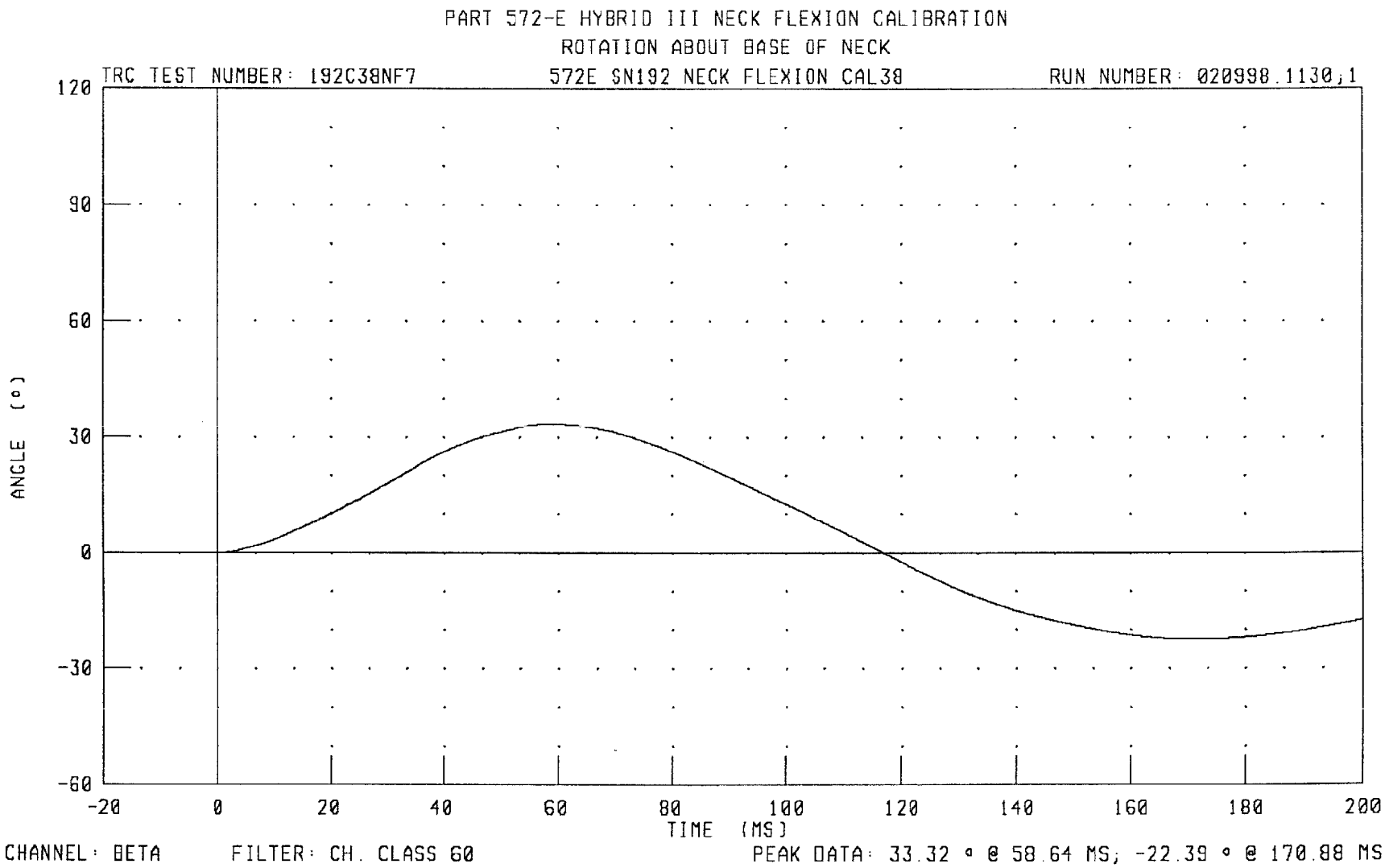
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	37.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.24 G
	20 MS	17.60 - 22.60 G	22.46 G
	30 MS	12.50 - 18.50 G	16.45 G
MAX PENDULUM G		29 G MAX	23.44 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.37 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.32 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	71.89 DEG.
	TIME	57 - 64 MS	58.24 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	100.32 NM
	TIME	47 - 58 MS	51.20 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	100.96 MS

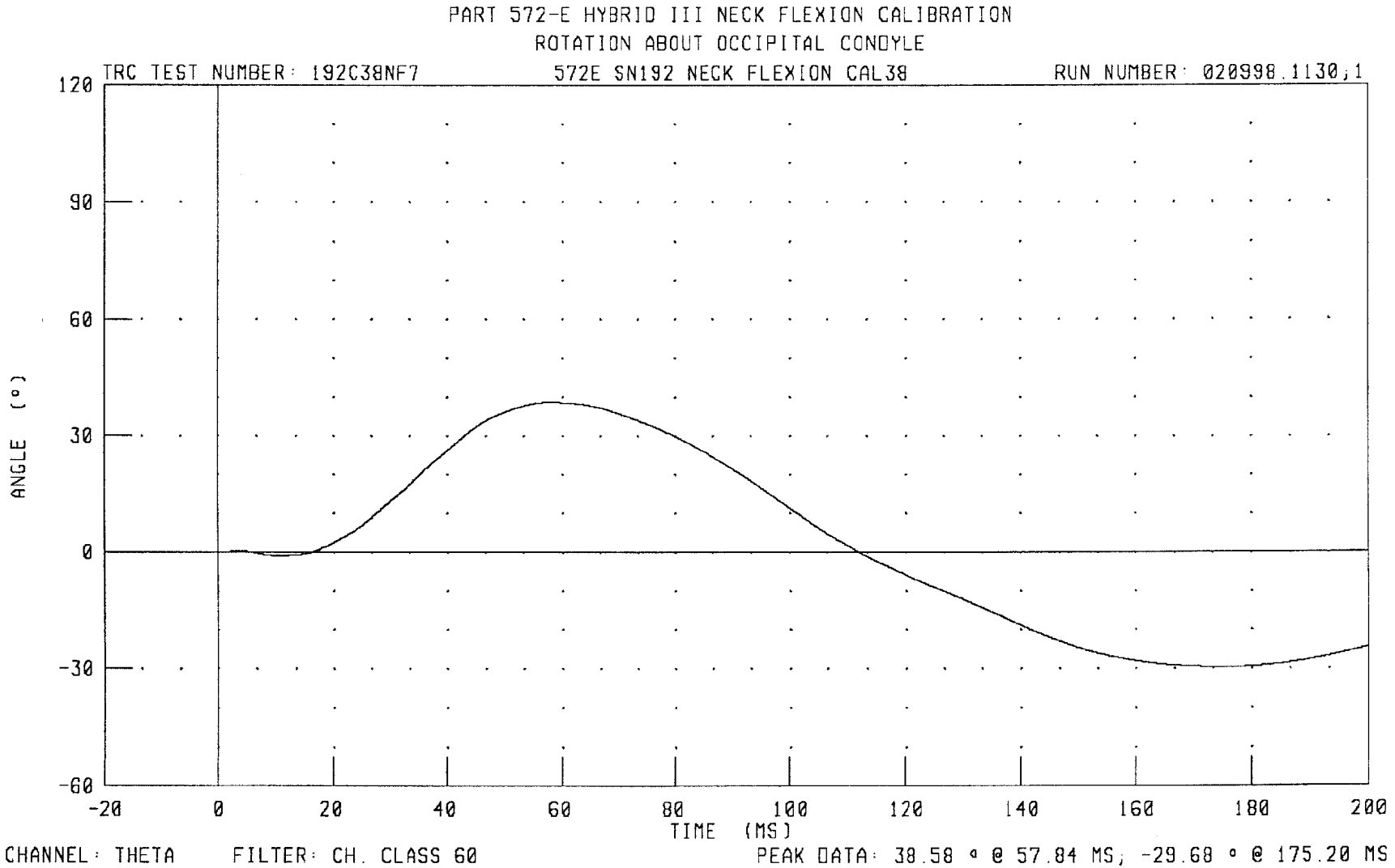
TEST MEETS SPECIFICATIONS

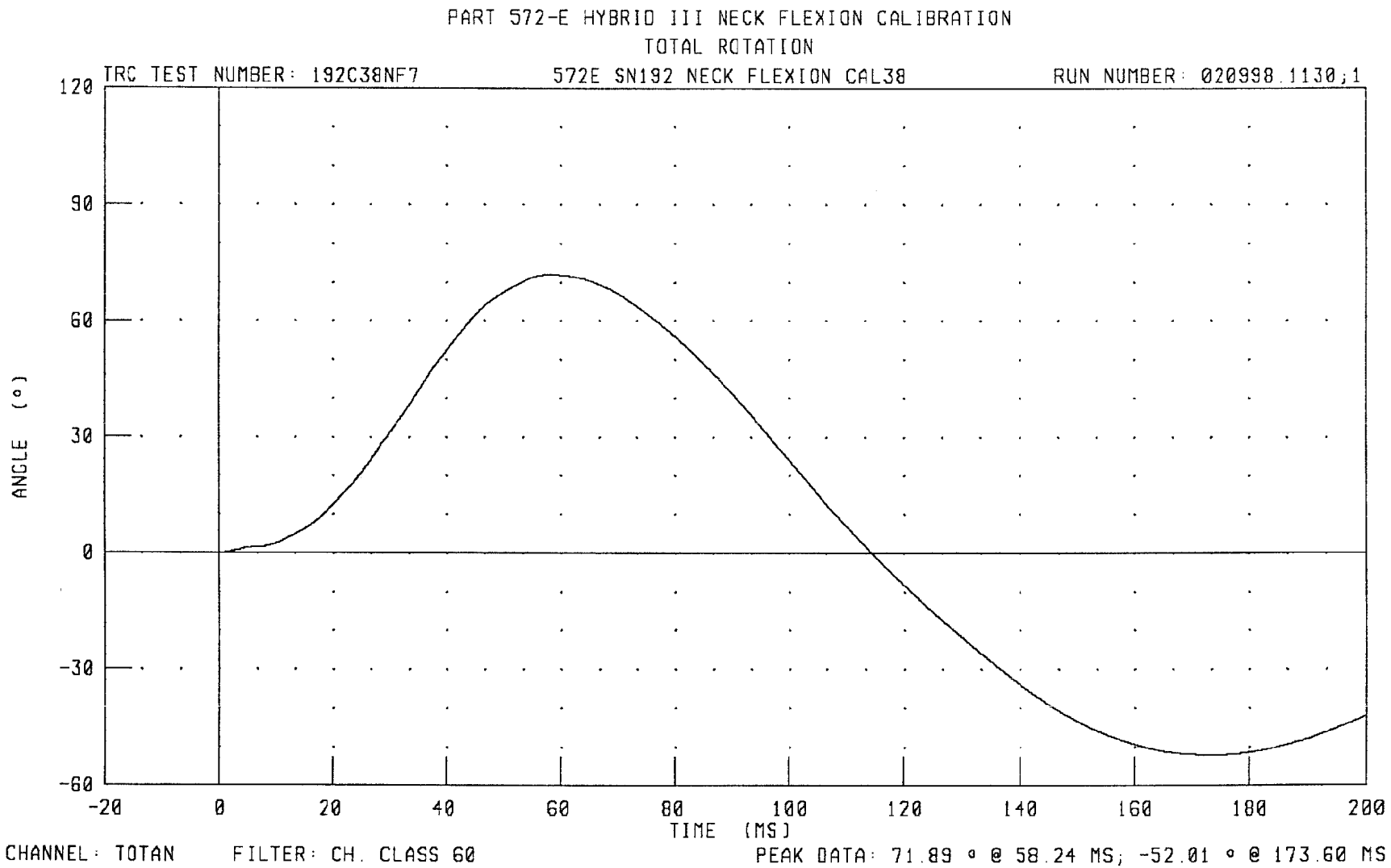
TECHNICIAN By Cobb

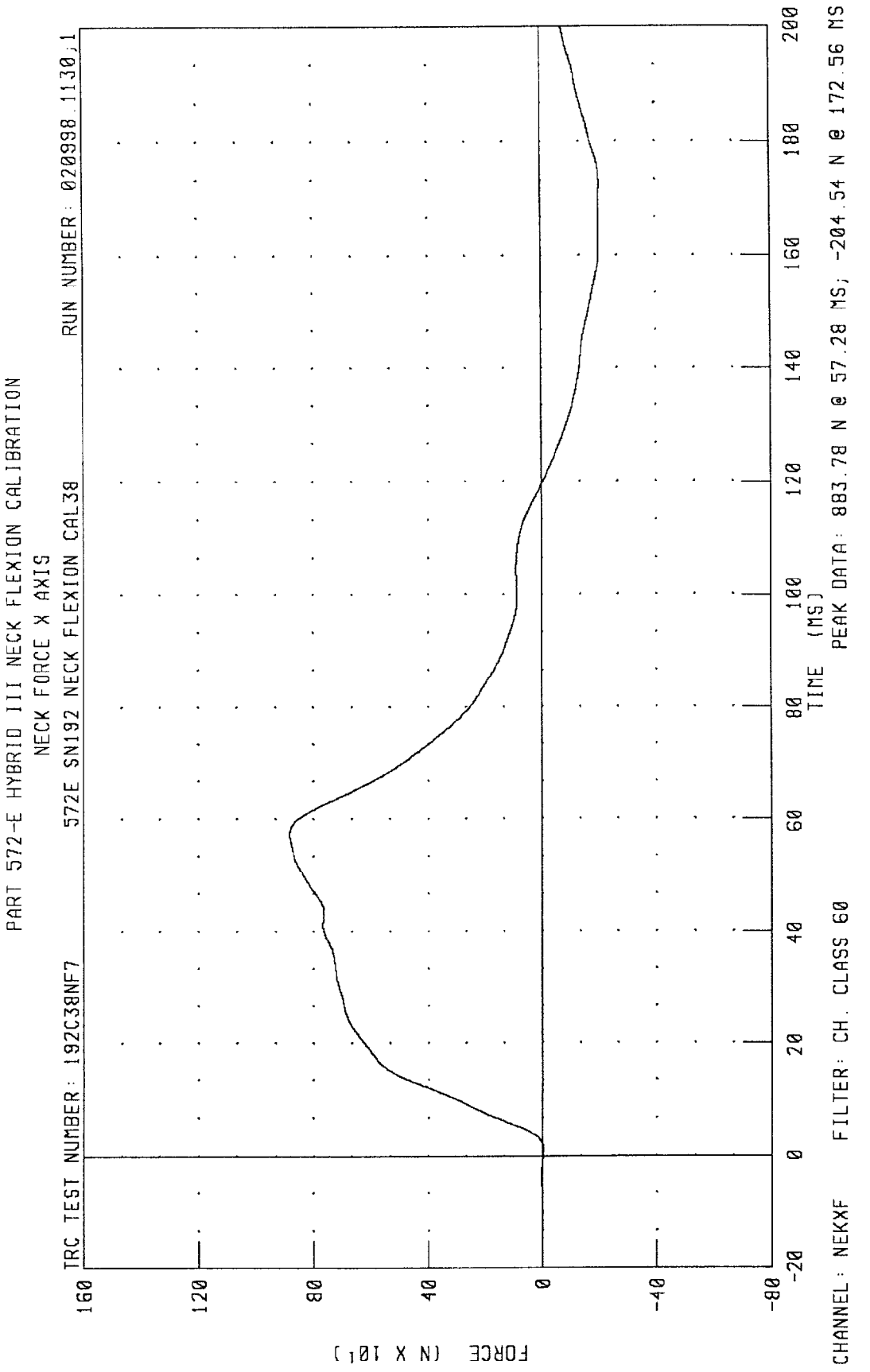
RUN NUMBER: 020998.1129;1

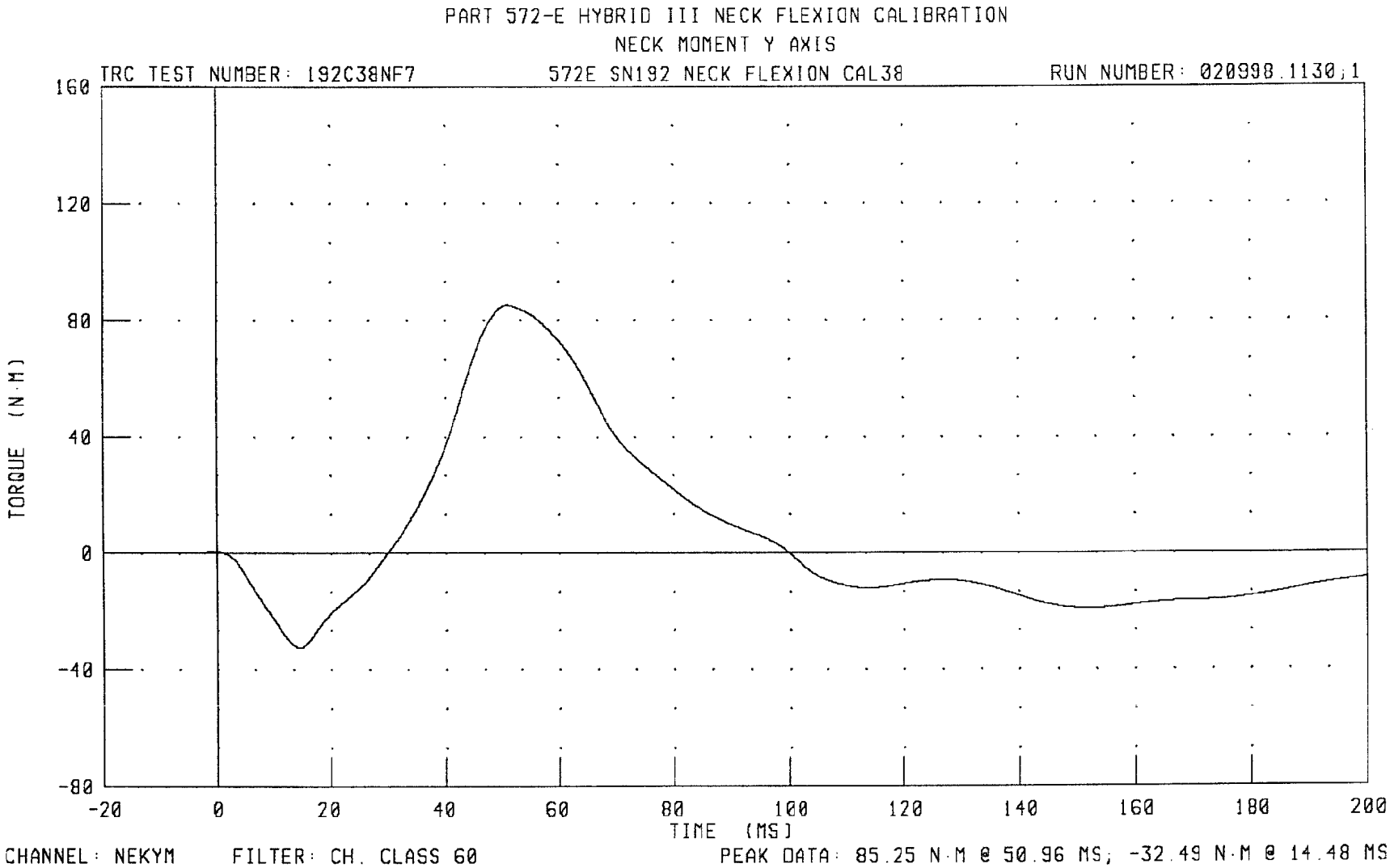

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 192C38NF7
572E SN192 NECK FLEXION CAL38
RUN NUMBER: 020998.1130;1
400
320
240
160
80
0
-80
ACCELERATION (G X 10⁻¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 23.45 G @ 9.28 MS; -2.08 G @ 44.72 MS

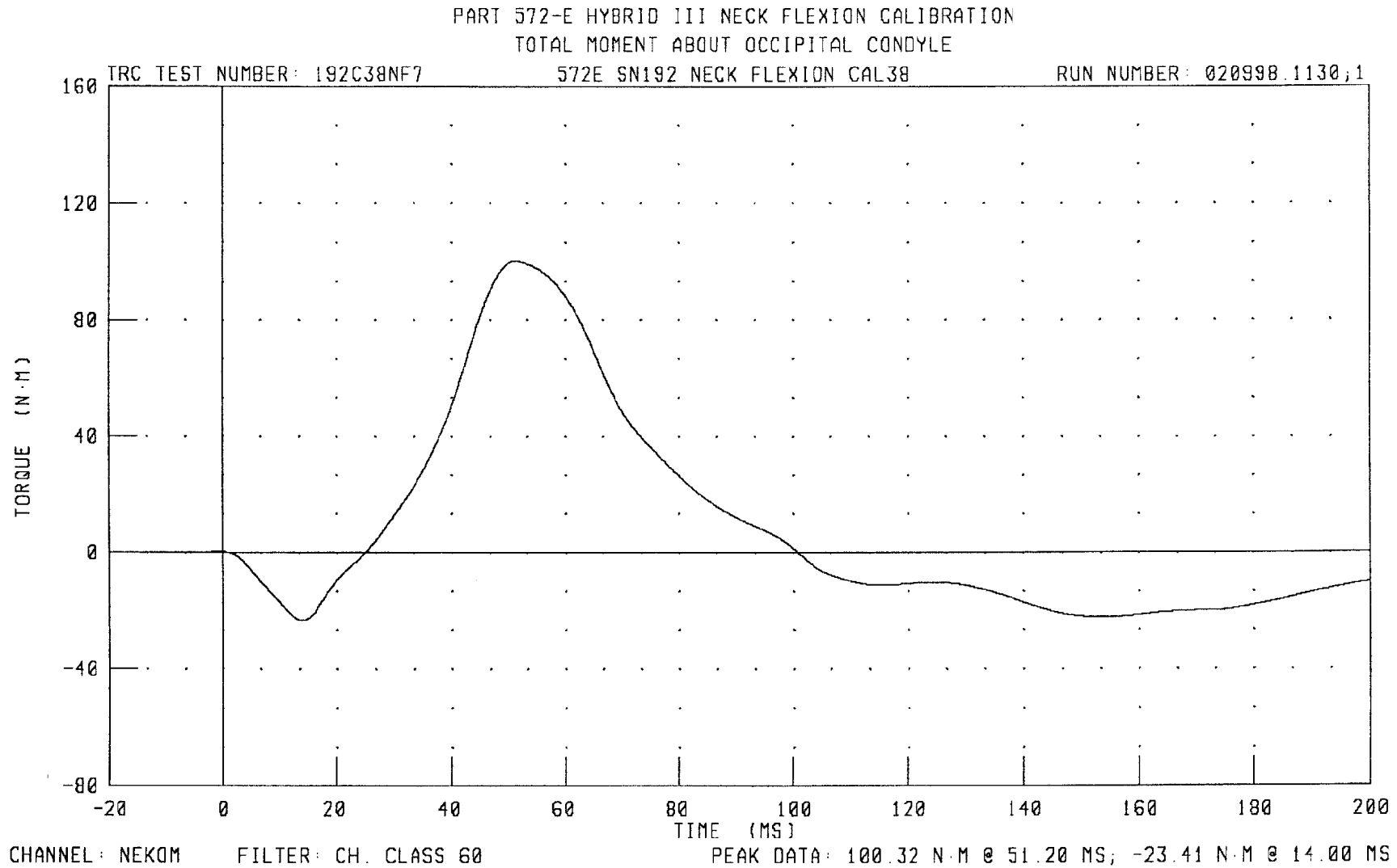

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 192C38NF7
572E SN192 NECK FLEXION CAL38
RUN NUMBER: 020998.1130;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 33.32 ° @ 58.64 MS; -22.39 ° @ 170.88 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 192C38NF7
572E SN192 NECK FLEXION CAL38
RUN NUMBER: 020998.1130;1
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: 38.58 ° @ 57.84 MS; -29.68 ° @ 175.20 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 192C38NF7
572E SN192 NECK FLEXION CAL38
RUN NUMBER: 020998.1130;1
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: 71.89 ° @ 58.24 MS; -52.01 ° @ 173.60 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 192C38NF7
572E SN192 NECK FLEXION CAL38
RUN NUMBER: 020998.1130;1
160
120
80
40
0
-40
-80
-20
0
20
40
60
80
100
120
140
160
180
200
FORCE (N X 10¹)
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 883.78 N @ 57.28 MS; -204.54 N @ 172.56 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: I92C38NF7
572E SN192 NECK FLEXION CAL38
RUN NUMBER: 020998.1130;1
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: 85.25 N·M @ 50.96 MS; -32.49 N·M @ 14.48 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 192C38NF7
572E SN192 NECK FLEXION CAL38
RUN NUMBER: 020998.1130;1
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: 100.32 N·M @ 51.20 MS; -23.41 N·M @ 14.00 MS

TRANSPORTATION RESEARCH CENTER INC.

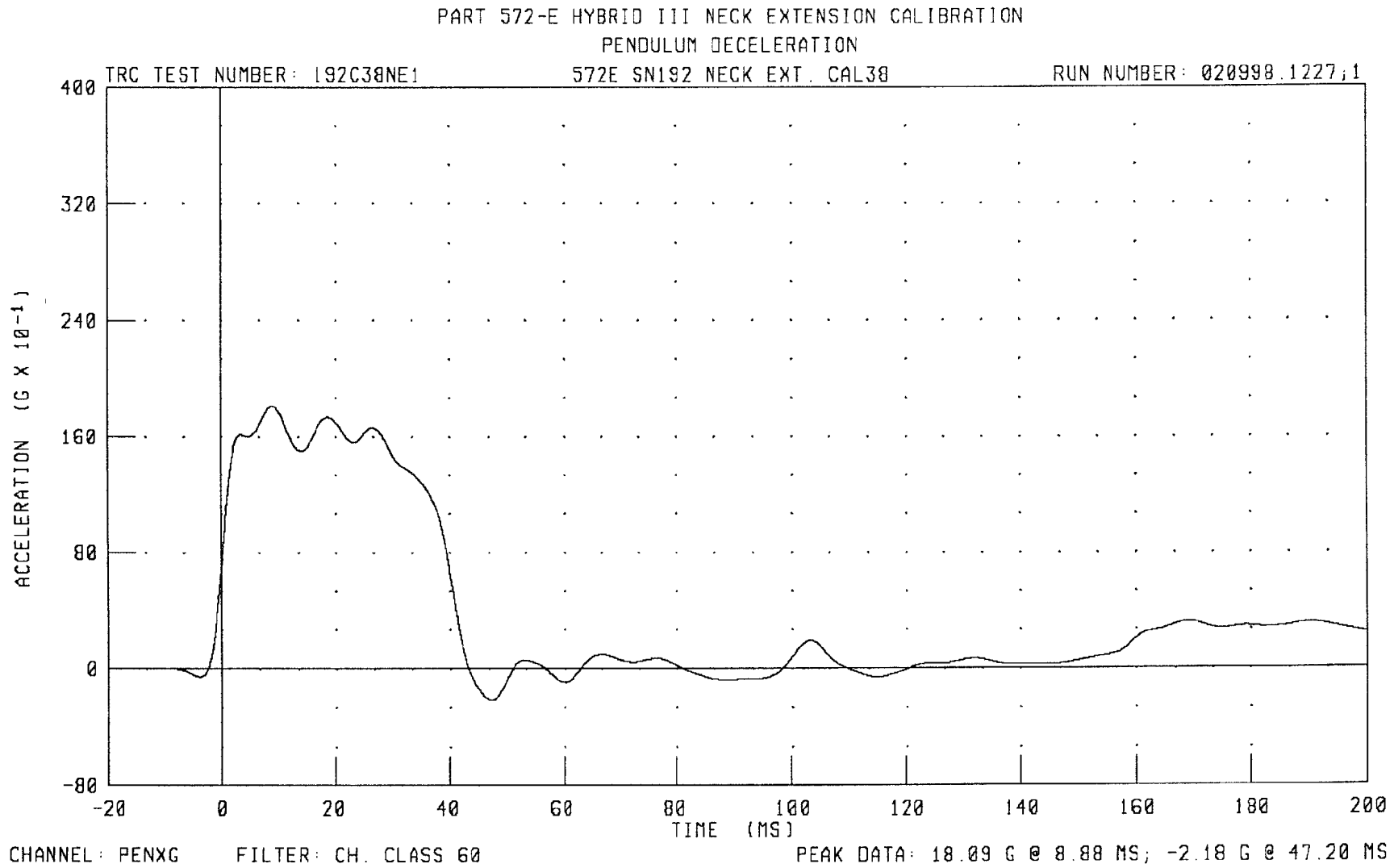
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 192C38NE1 572E SN192 NECK EXT. CAL38

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	37.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.70 G
	20 MS	14.00 - 19.00 G	17.01 G
	30 MS	11.00 - 16.00 G	14.65 G
MAX PENDULUM G		22 G MAX	18.08 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.60 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.64 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	95.34 DEG.
	TIME	72 - 82 MS	77.52 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-67.33 NM
	TIME	65 - 79 MS	71.84 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	155.92 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	142.64 MS

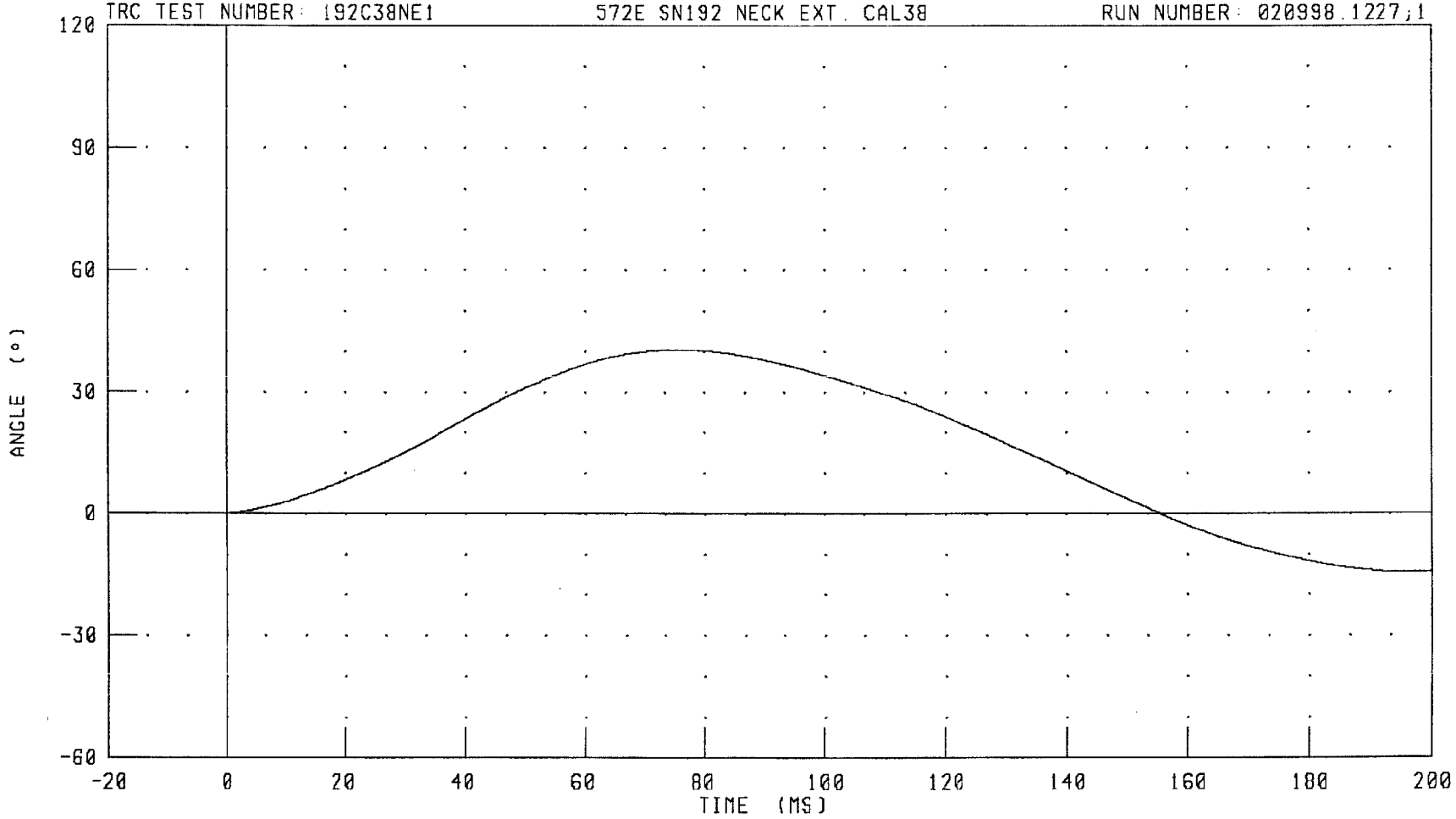
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 020998.1226;1

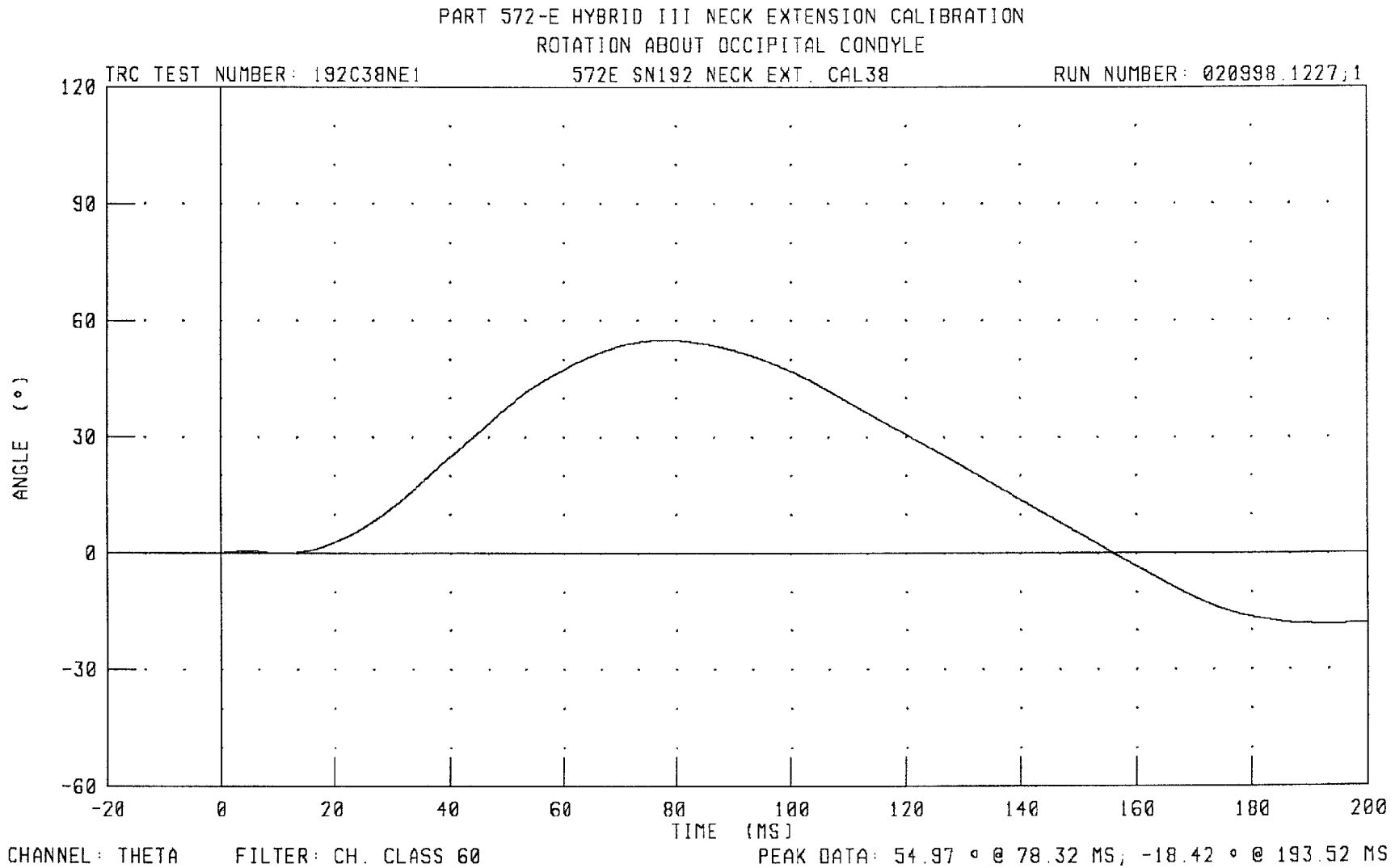

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: I92C38NE1
572E SN192 NECK EXT. CAL38
RUN NUMBER: 020998.1227;1
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 18.09 G @ 8.88 MS; -2.18 G @ 47.20 MS

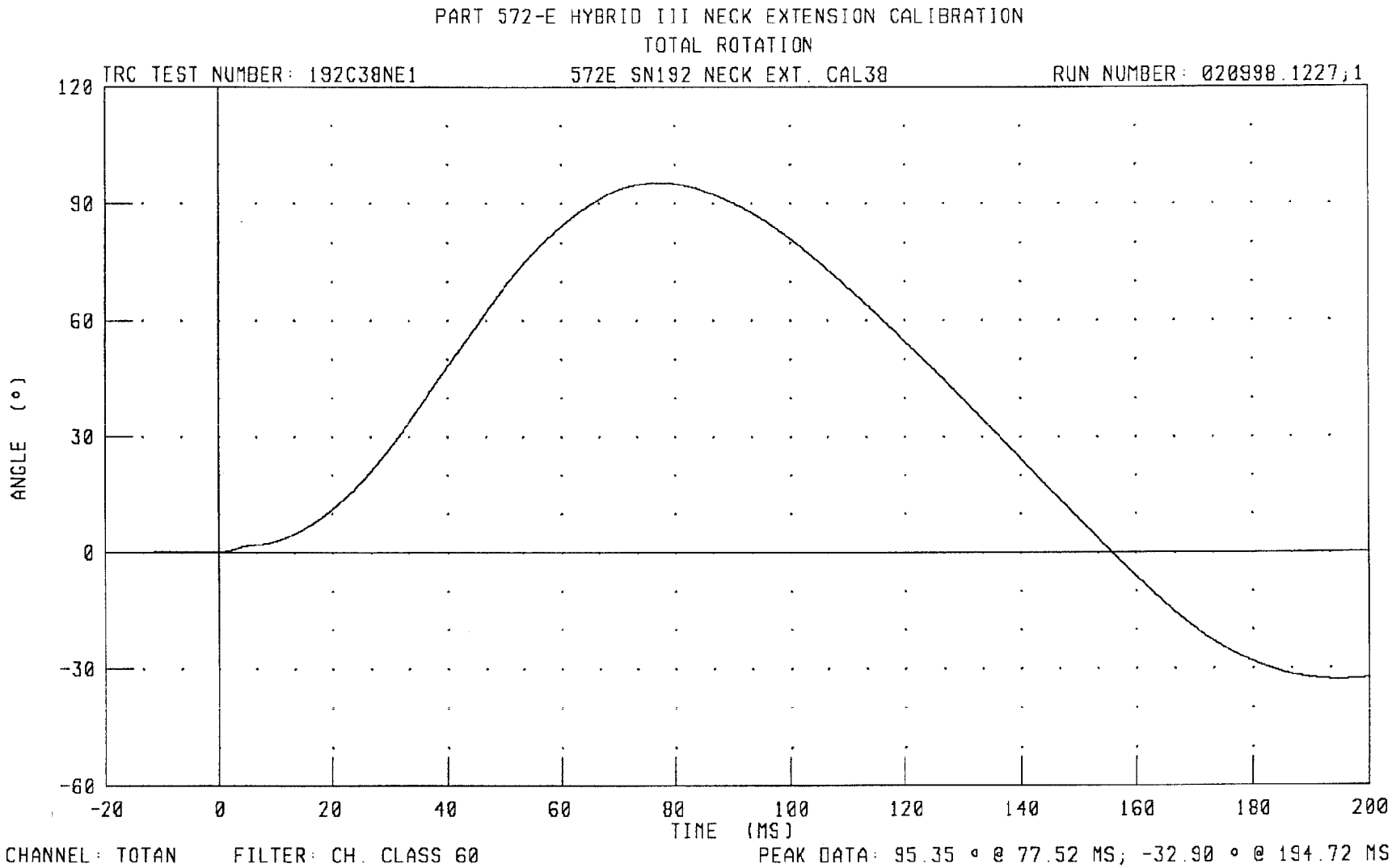
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK

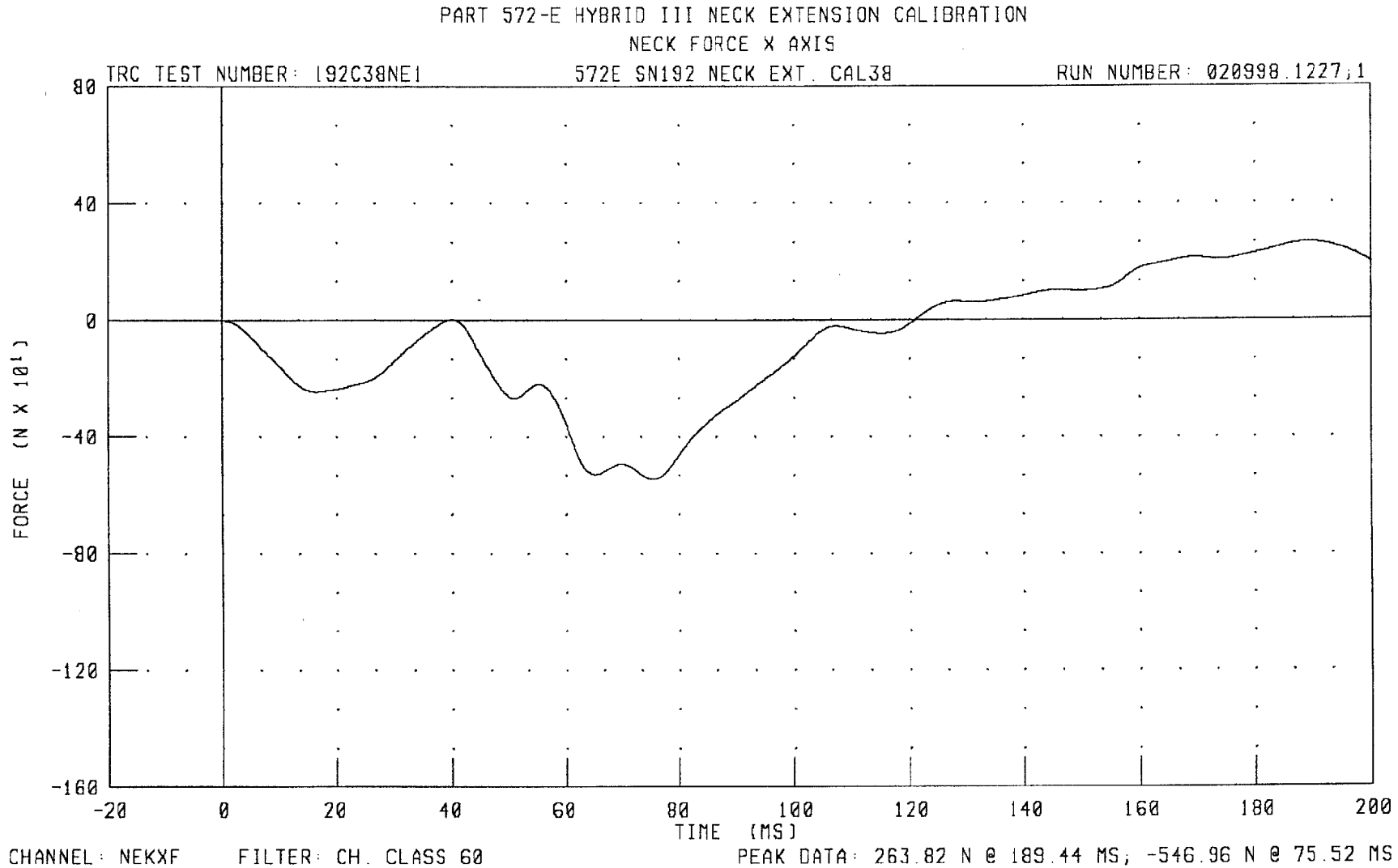
TRC TEST NUMBER: 192C38NE1 572E SN192 NECK EXT. CAL38 RUN NUMBER: 020998.1227;1

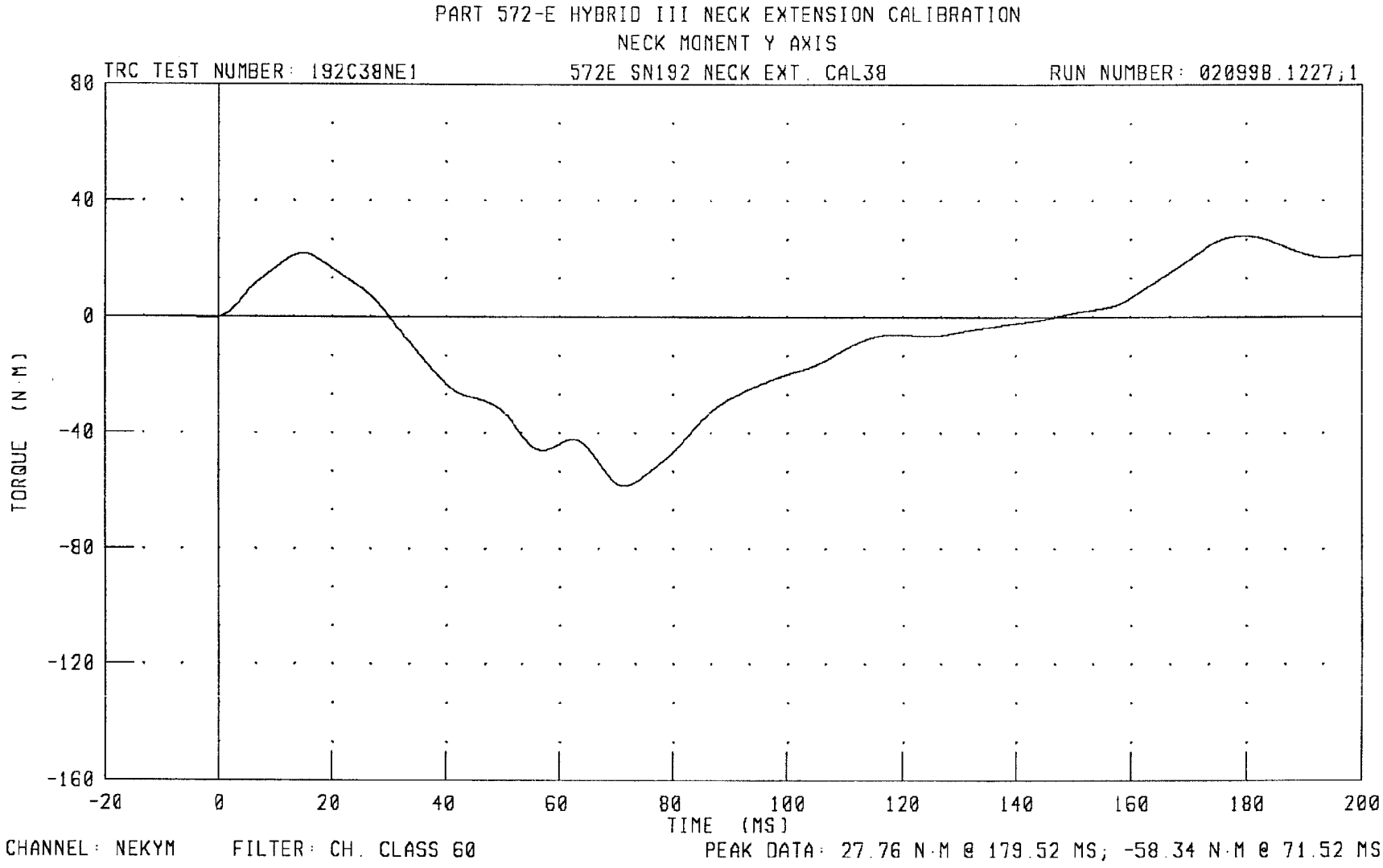


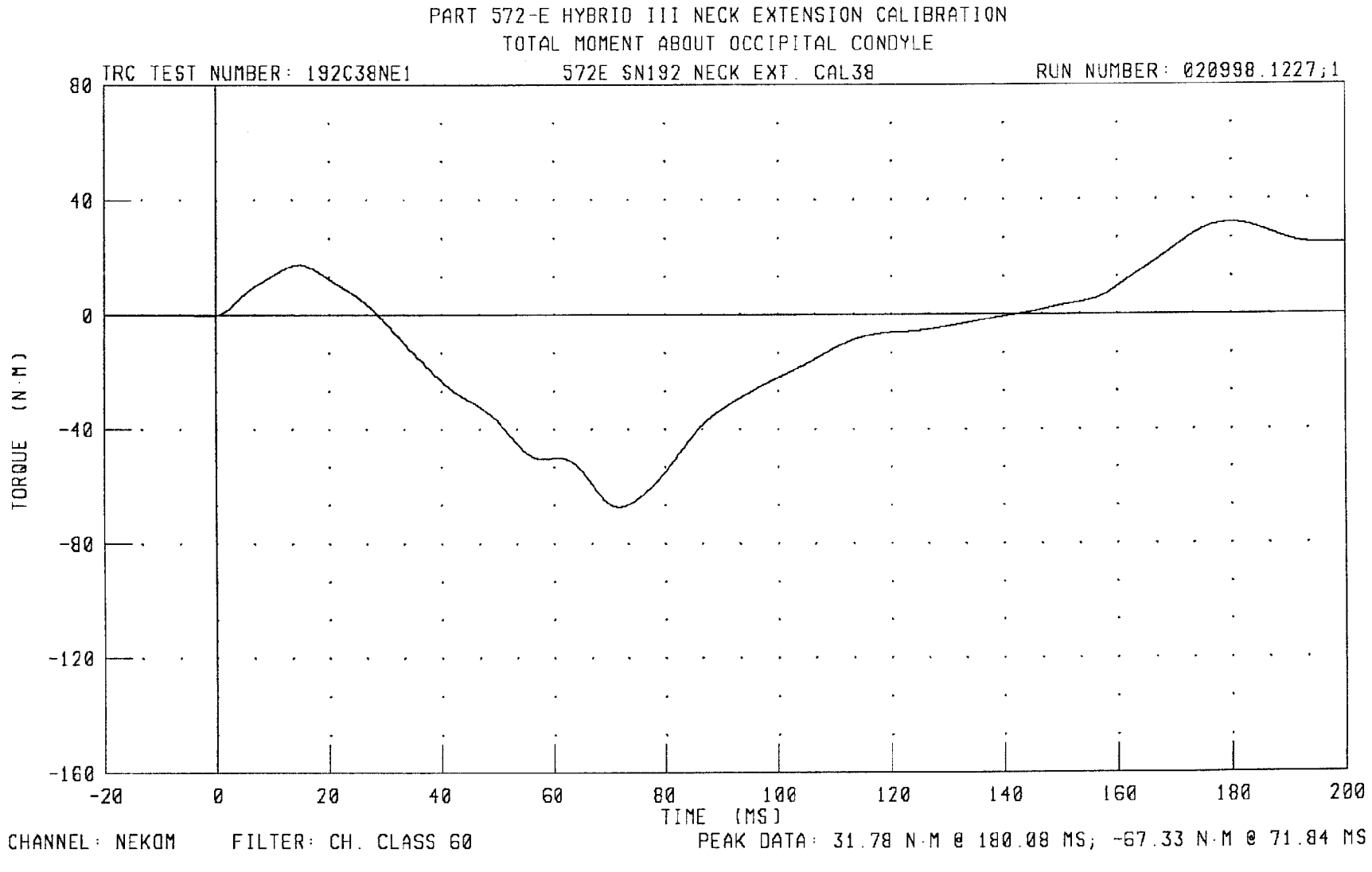
CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 40.43 ° @ 75.84 MS; -14.50 ° @ 195.52 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 192C38NE1
572E SN192 NECK EXT. CAL38
RUN NUMBER: 020998.1227;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: 54.97 ° @ 78.32 MS; -18.42 ° @ 193.52 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 192C38NE1
572E SN192 NECK EXT. CAL38
RUN NUMBER: 020998.1227;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
FILTER: CH. CLASS 60
PEAK DATA: 95.35 ° @ 77.52 MS; -32.90 ° @ 194.72 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 192C38NE1
572E SN192 NECK EXT. CAL38
RUN NUMBER: 020998.1227;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: 263.82 N @ 189.44 MS; -546.96 N @ 75.52 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 192C38NE1
572E SN192 NECK EXT. CAL38
RUN NUMBER: 020998.1227;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: 27.76 N·M @ 179.52 MS; -58.34 N·M @ 71.52 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 192C38NE1
572E SN192 NECK EXT. CAL38
RUN NUMBER: 020998.1227;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: 31.78 N-M @ 180.08 MS; -67.33 N-M @ 71.84 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

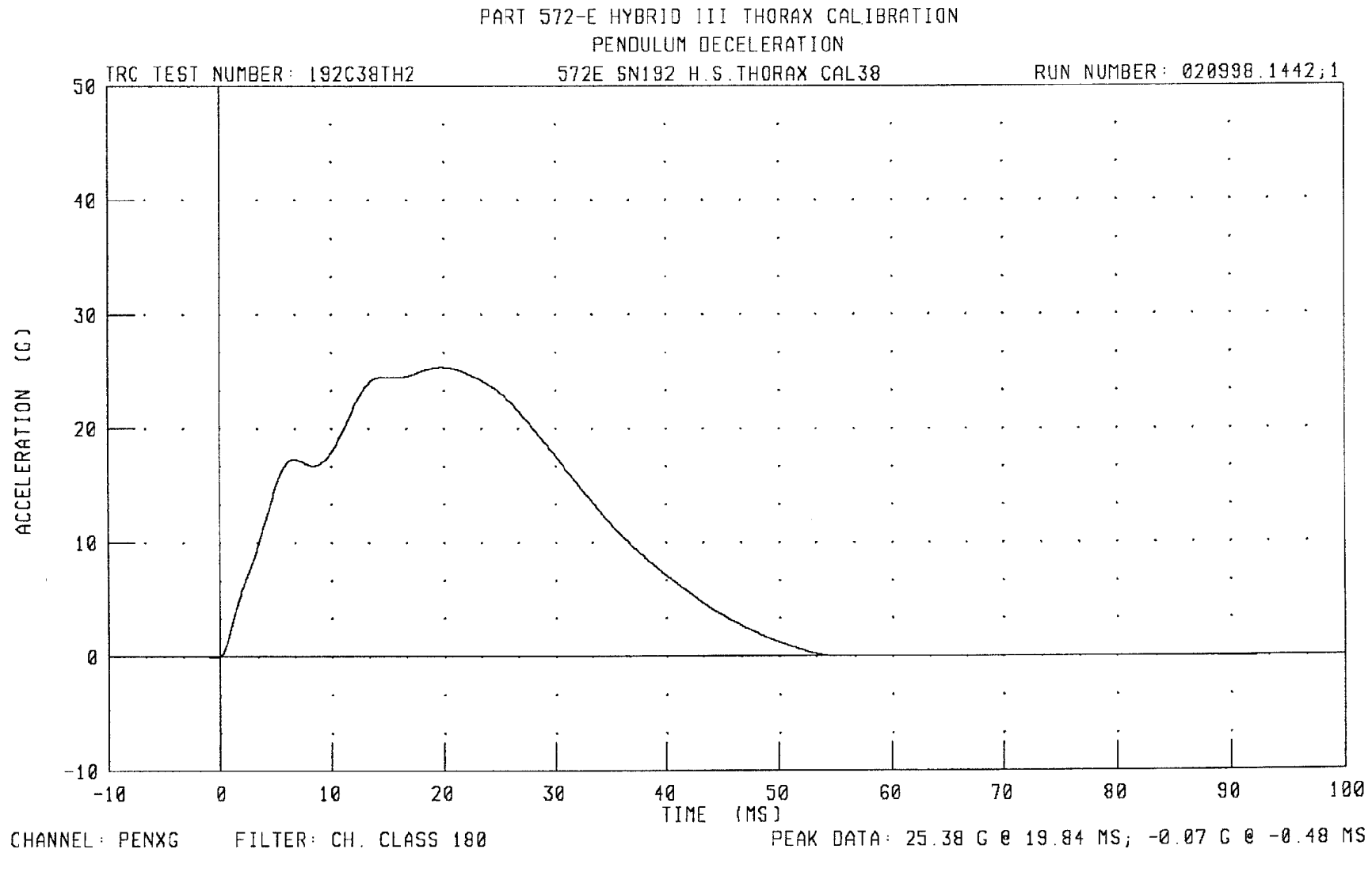
HYBRID III 50th 09-FEB-98

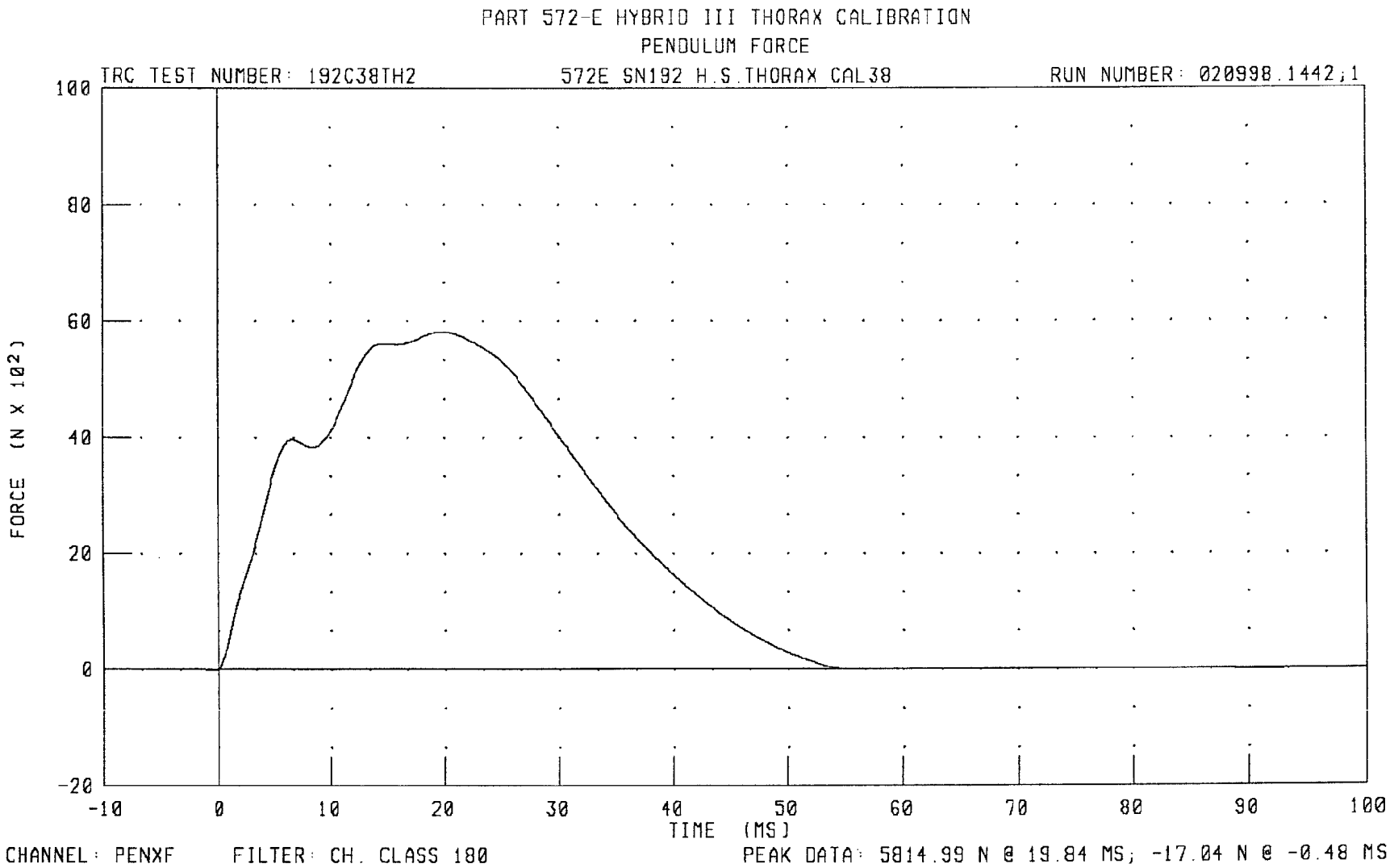
TRC INC. TEST NO: 192C38TH2 572E SN192 H.S.THORAX CAL38

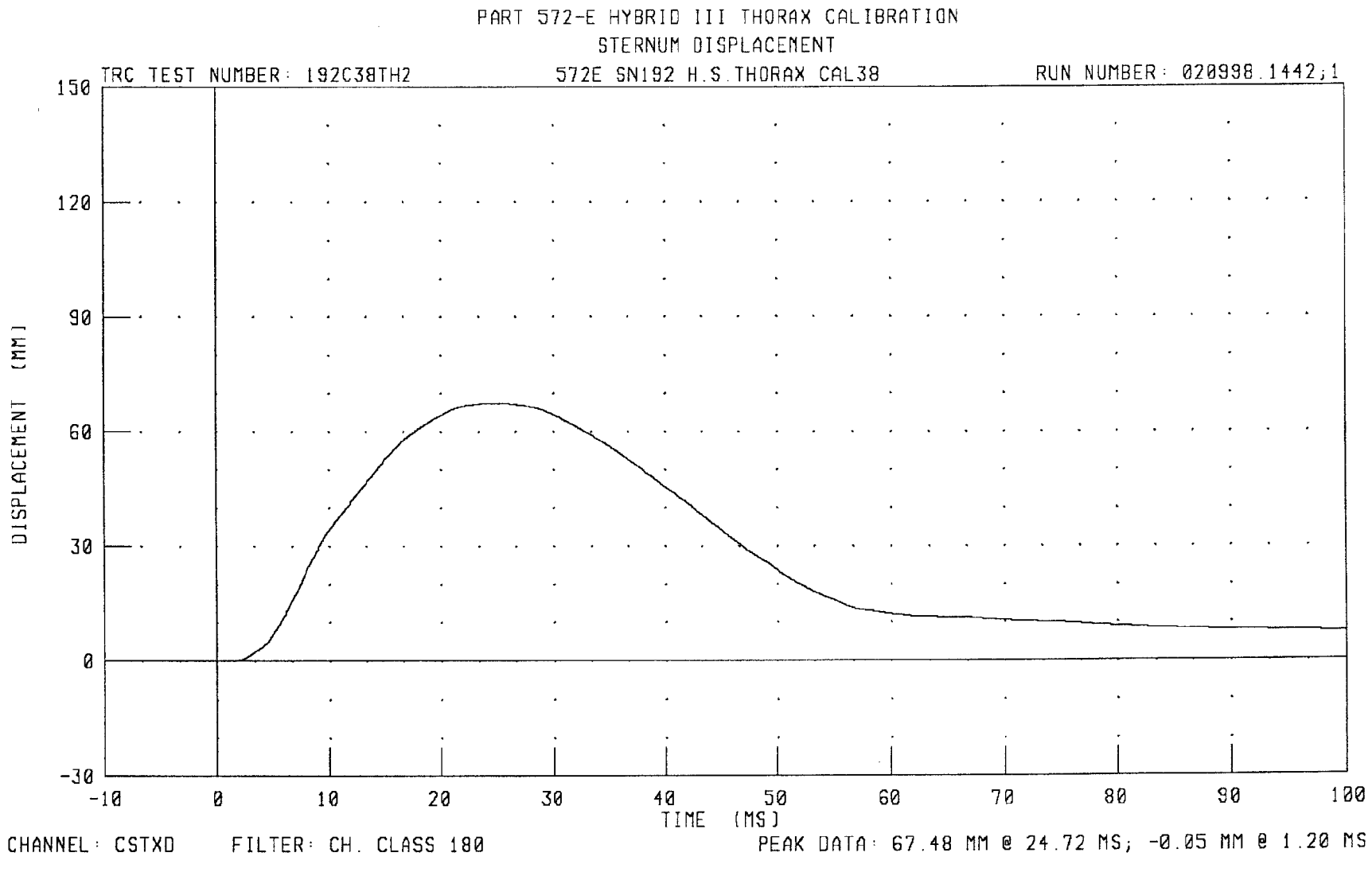
TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.65 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.4 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5814. N
INTERNAL HYSTERESIS	69% - 85%	72.1%

TEST MEETS SPECIFICATIONS

TECHNICIAN Bry Colt RUN NUMBER: 020998.1442;1

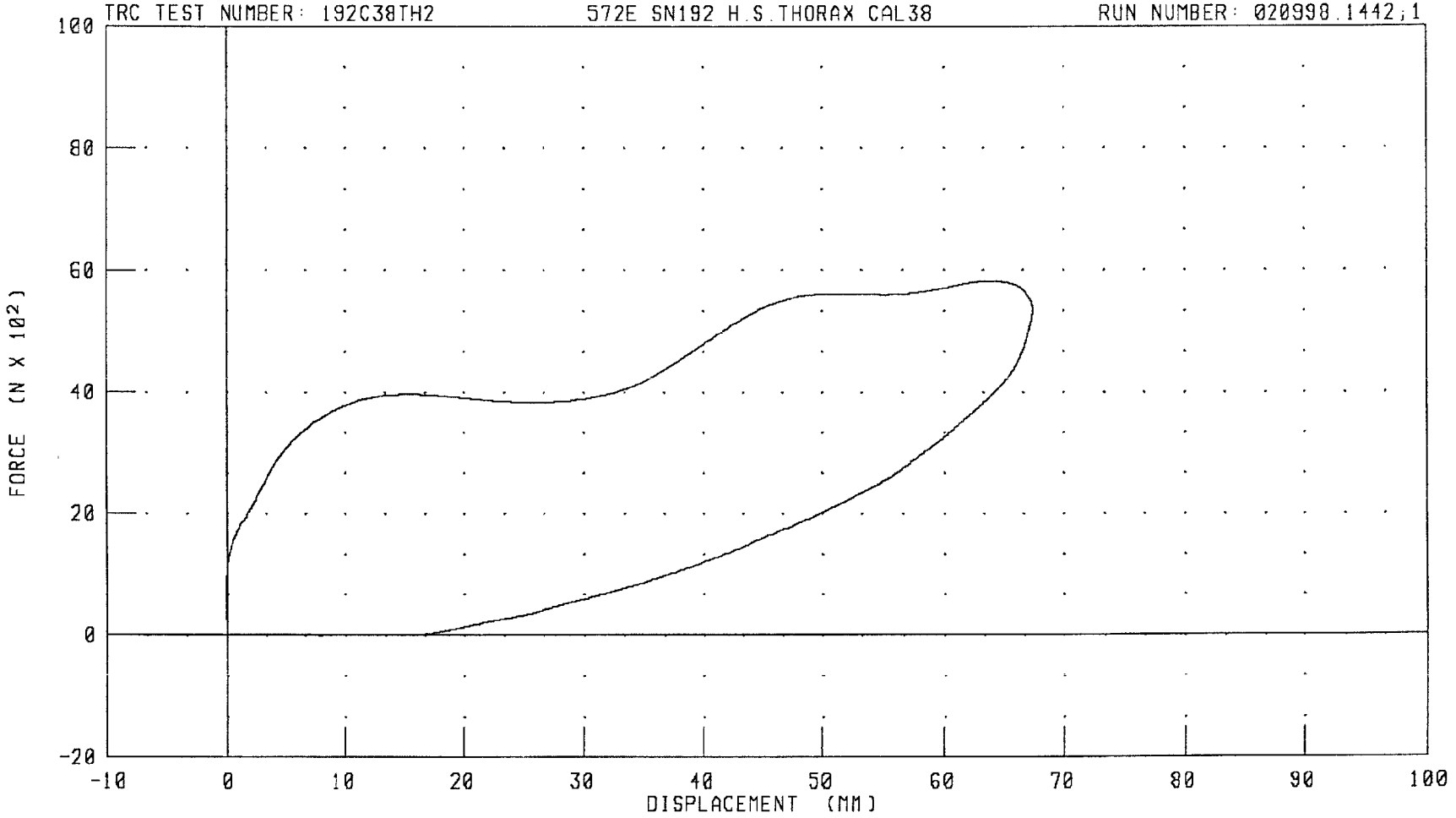

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 192C38TH2
572E SN192 H.S.THORAX CAL38
RUN NUMBER: 020998.1442;1
ACCELERATION (G)
50
40
30
20
10
0
-10
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 25.38 G @ 19.84 MS; -0.07 G @ -0.48 MS


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 192C38TH2
572E SN192 H.S.THORAX CAL38
RUN NUMBER: 020998.1442;1
100
80
60
40
20
0
-20
FORCE (N X 10²)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5814.99 N @ 19.84 MS; -17.04 N @ -0.48 MS


PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT
TRC TEST NUMBER: 192C38TH2
572E SN192 H.S.THORAX CAL38
RUN NUMBER: 020998.1442;1
DISPLACEMENT (MM)
150
120
90
60
30
0
-30
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: CSTXD
FILTER: CH. CLASS 180
PEAK DATA: 67.48 MM @ 24.72 MS; -0.05 MM @ 1.20 MS

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

TRC TEST NUMBER: 192C38TH2 572E SN192 H.S.THORAX CAL38 RUN NUMBER: 020998.1442;1



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 67.48 MM @ 24.72 MS; -0.05 MM @ 1.20 MS
PENXF CH. CLASS 180 5814.99 N @ 19.84 MS; -17.04 N @ -0.48 MS

980210

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

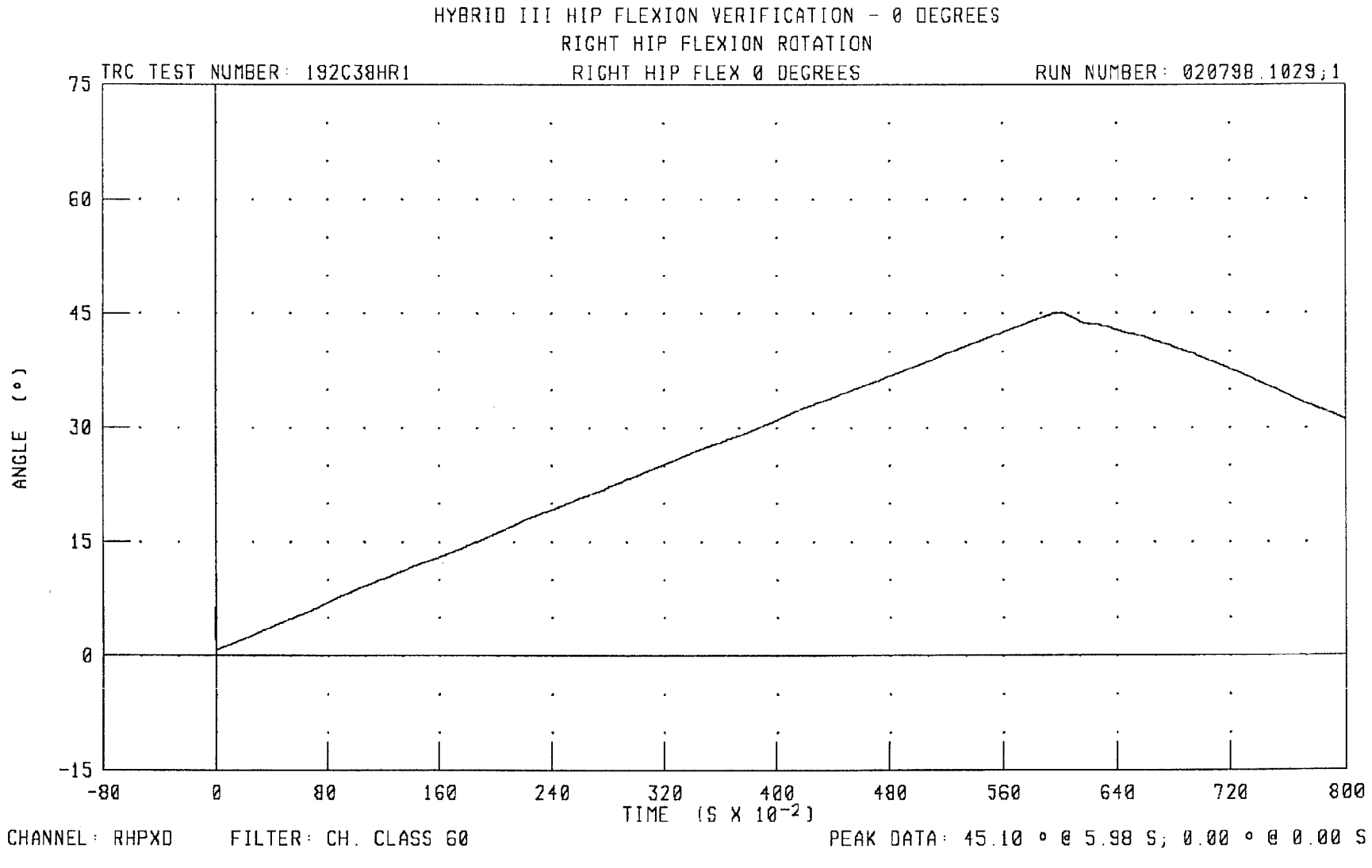
HYBRID III PART 572E 07-FEB-98

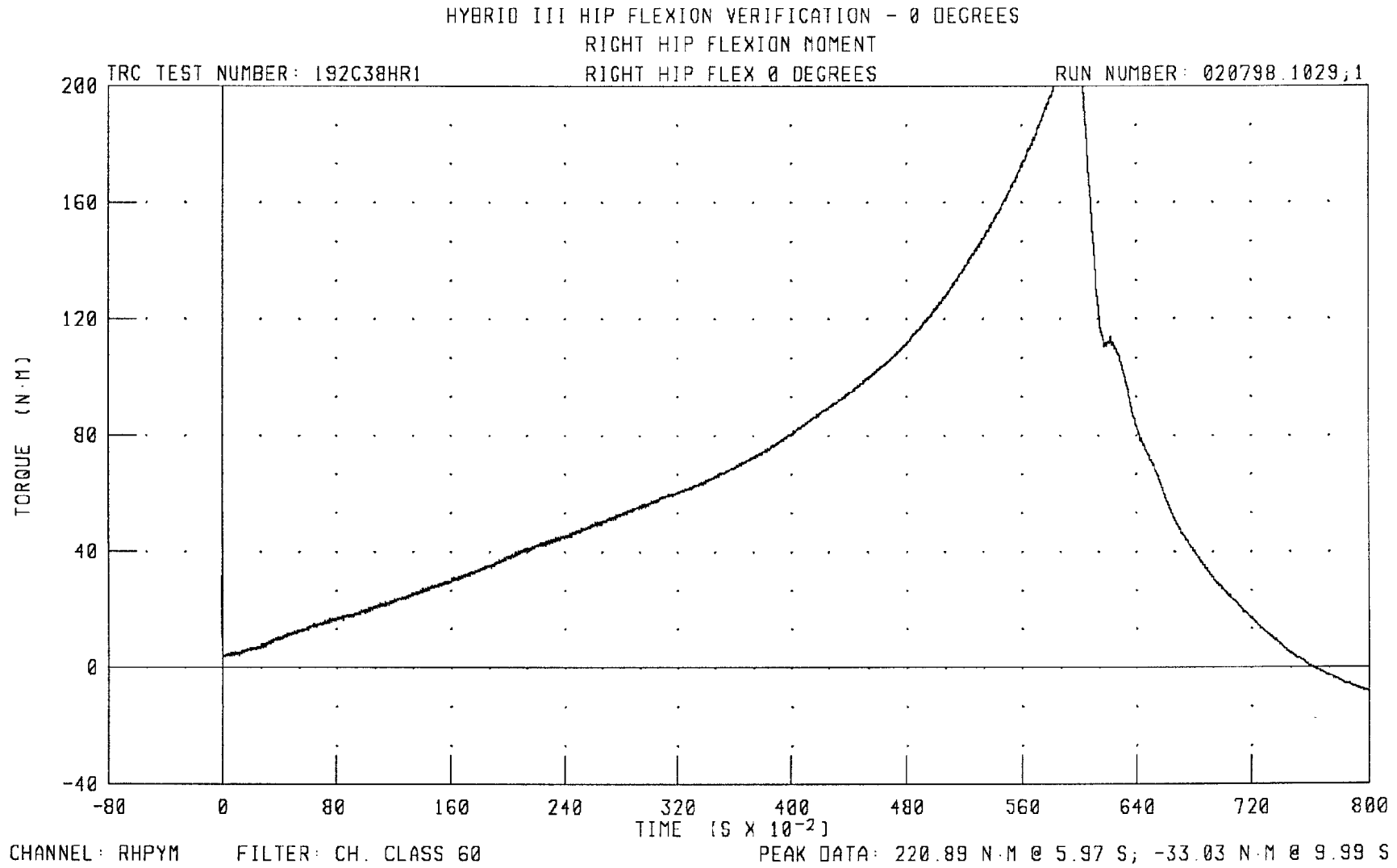
TRC INC. TEST NO: 192C38HR1 RIGHT HIP FLEX 0 DEGREES

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	76.6 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	44.3 deg.

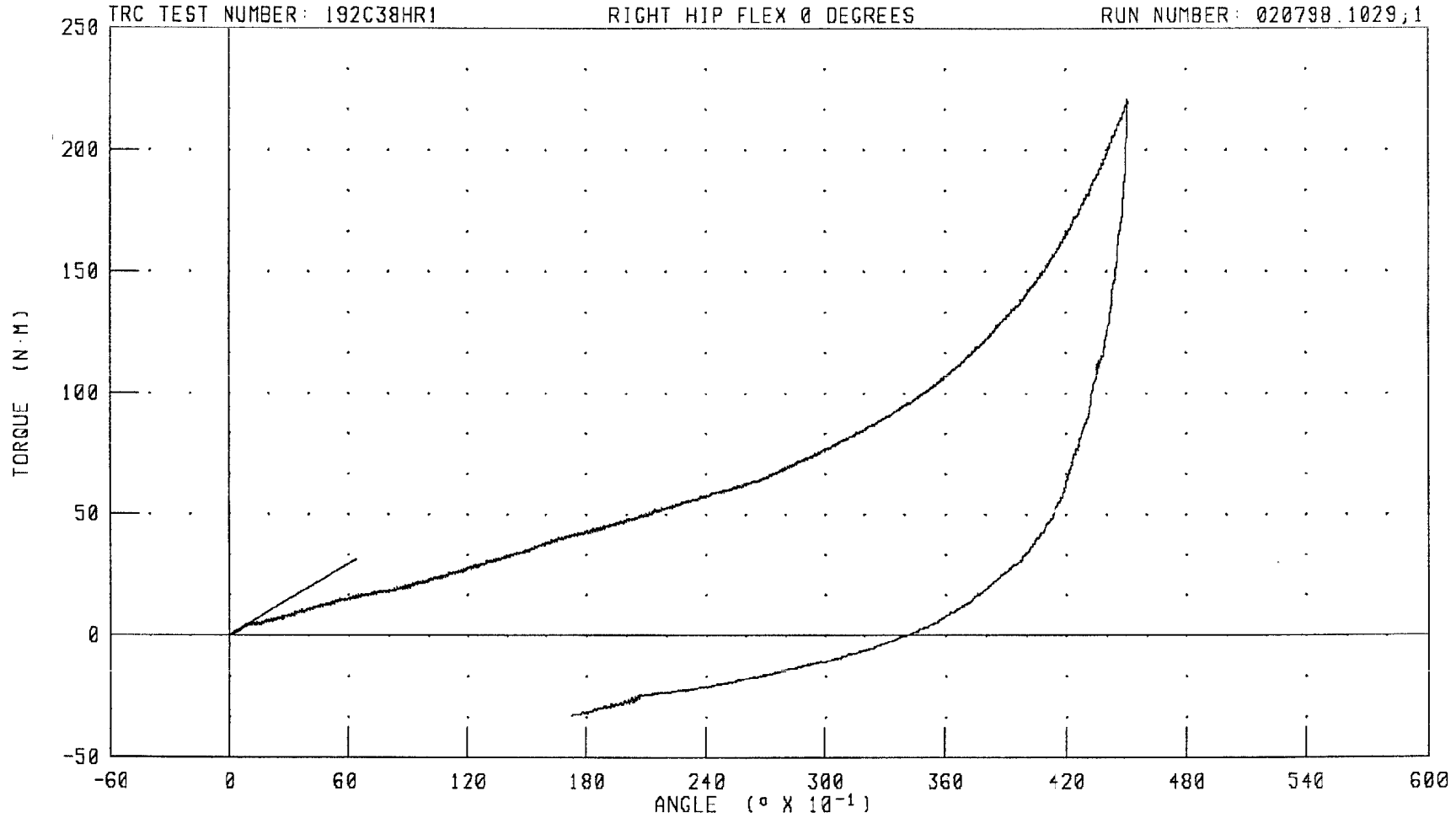
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudige RUN NUMBER: 020798.1028;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION ROTATION
TRC TEST NUMBER: 192C38HR1
RIGHT HIP FLEX 0 DEGREES
RUN NUMBER: 020798.1029;1
ANGLE (°)
75
60
45
30
15
0
-15
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10⁻²)
CHANNEL: RHPXD
FILTER: CH. CLASS 60
PEAK DATA: 45.10 ° @ 5.98 S; 0.00 ° @ 0.00 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION MOMENT
TRC TEST NUMBER: 192C38HR1
RIGHT HIP FLEX 0 DEGREES
RUN NUMBER: 020798.1029;1
TORQUE (N·M)
200
160
120
80
40
0
-40
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10⁻²)
CHANNEL: RHPYM
FILTER: CH. CLASS 60
PEAK DATA: 220.89 N·M @ 5.97 S; -33.03 N·M @ 9.99 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE



TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

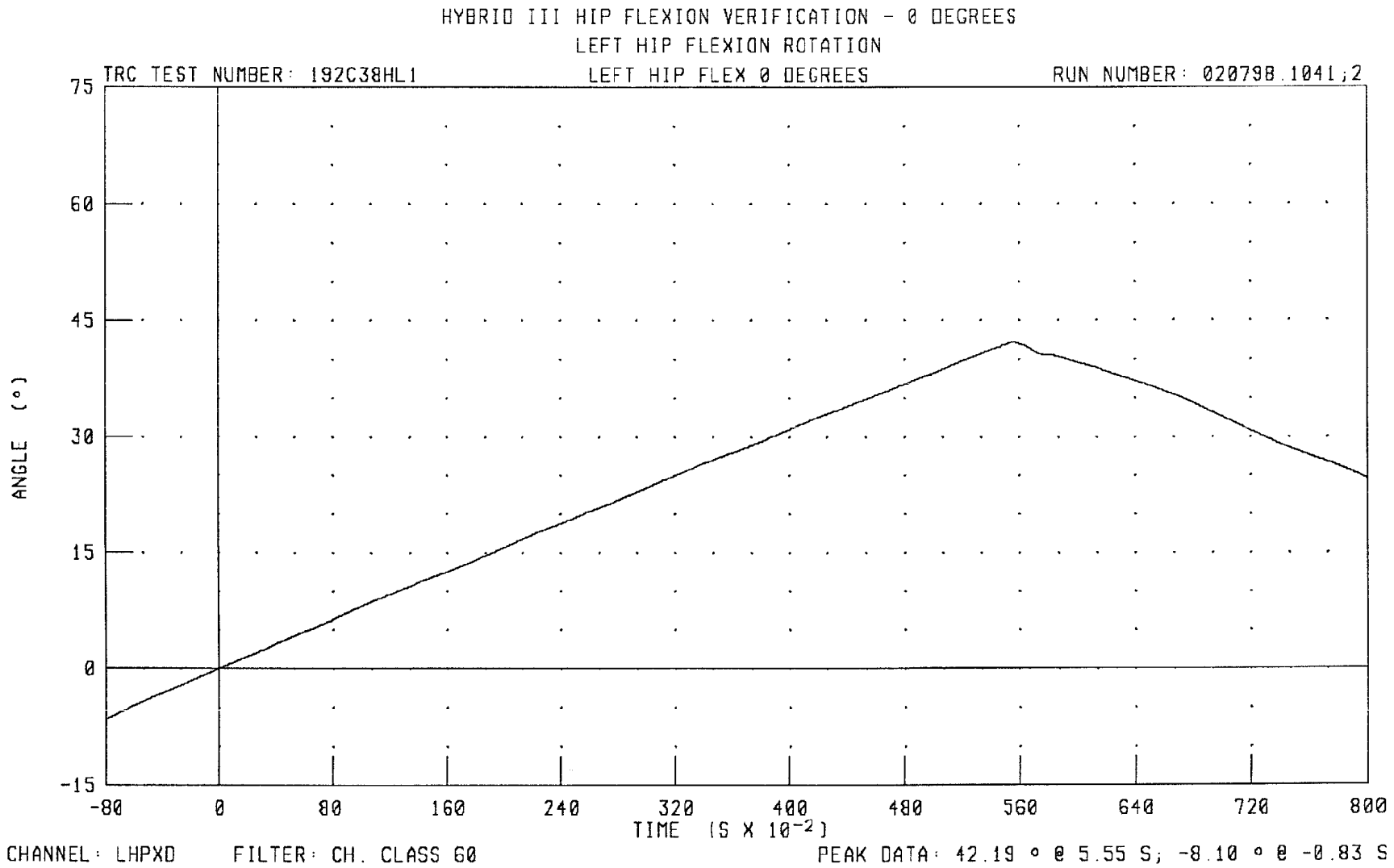
HYBRID III PART 572E 07-FEB-98

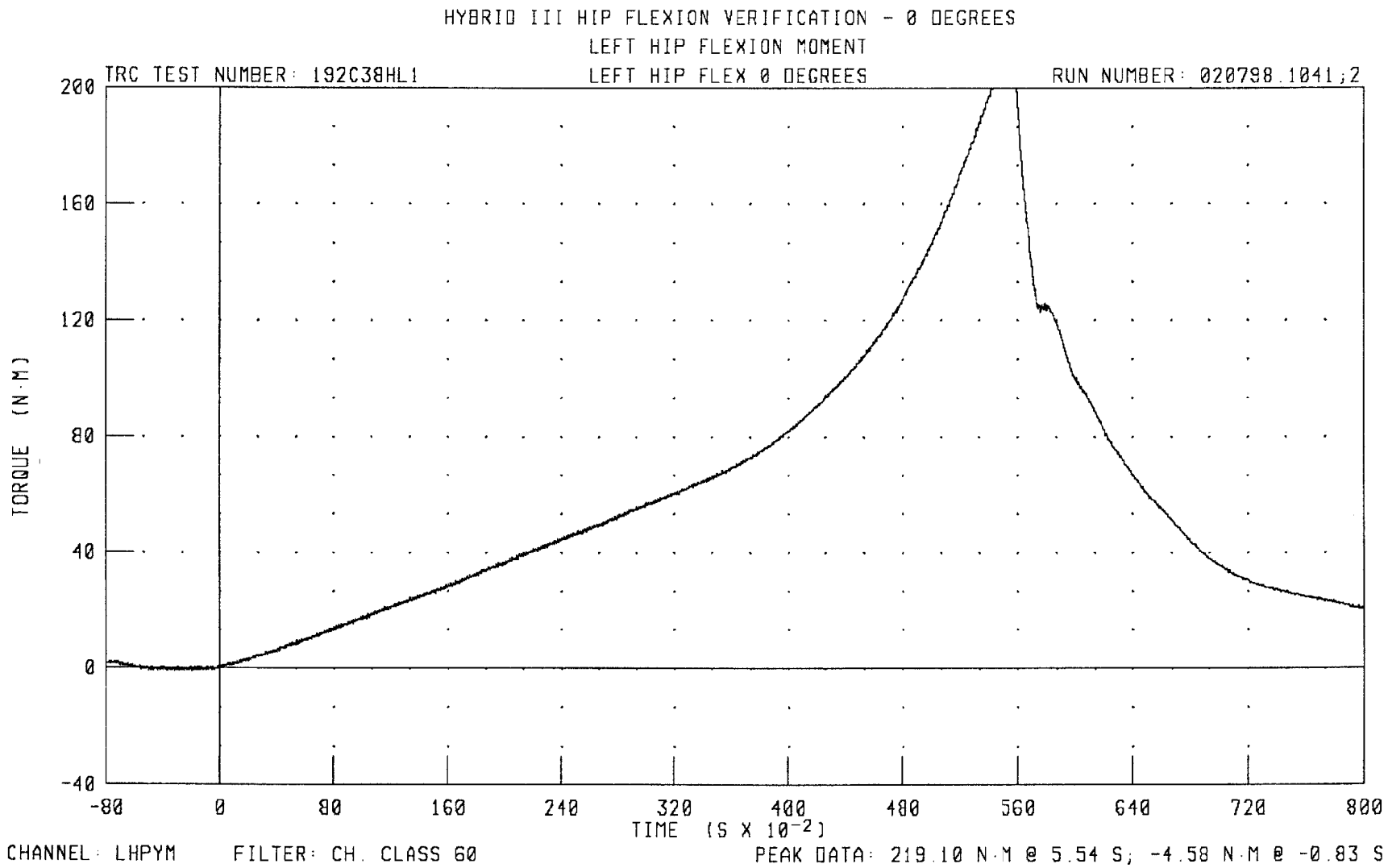
TRC INC. TEST NO: 192C38HL1 LEFT HIP FLEX 0 DEGREES

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	76.8 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	41.5 deg.

TEST MEETS SPECIFICATIONS

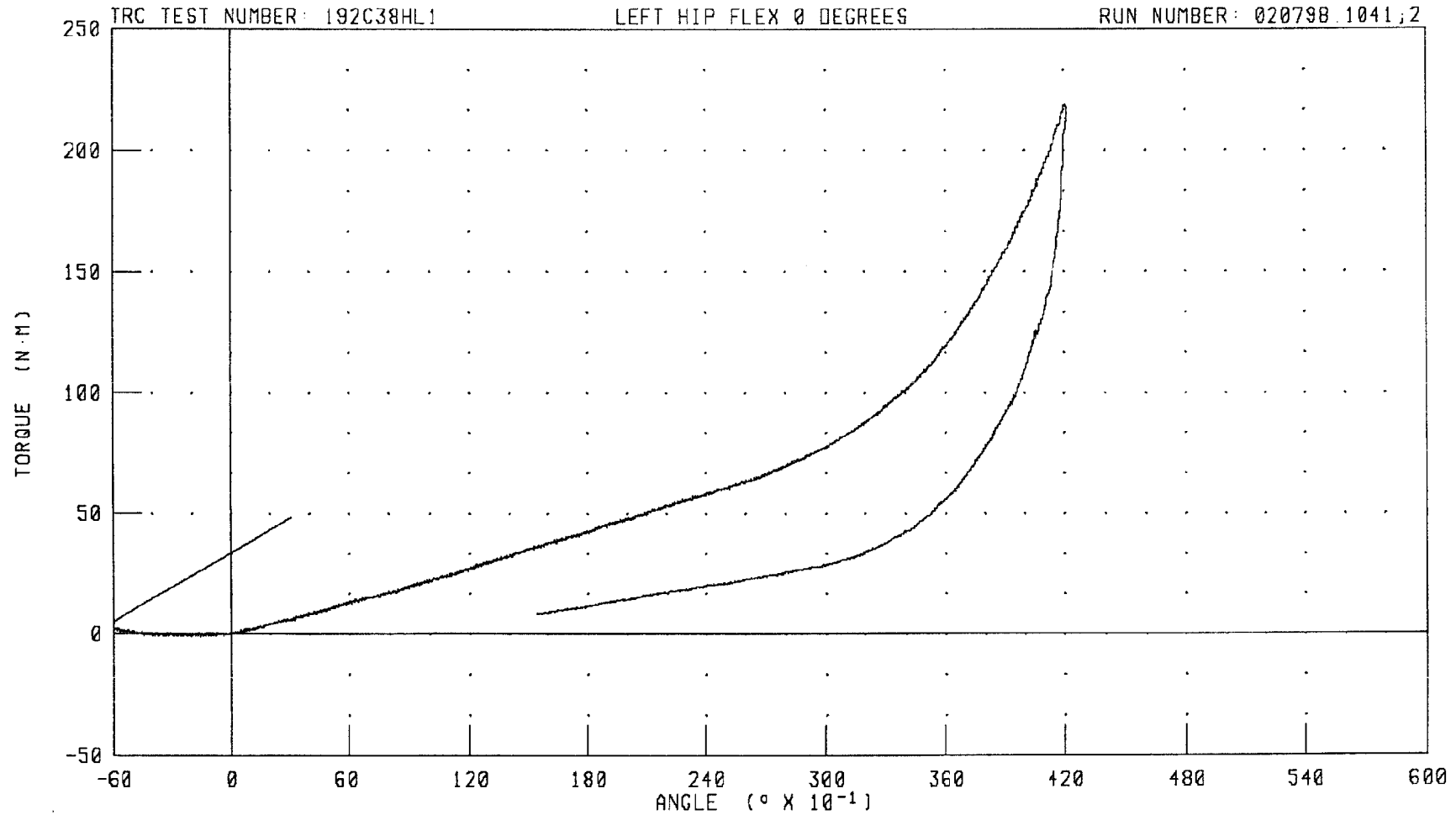
TECHNICIAN John K. Claudge RUN NUMBER: 020798.1040;2


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION ROTATION
TRC TEST NUMBER: 192C38HL1
LEFT HIP FLEX 0 DEGREES
RUN NUMBER: 020798.1041;2
75
60
45
30
15
0
-15
ANGLE (°)
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10-2)
CHANNEL: LHPXD
FILTER: CH. CLASS 60
PEAK DATA: 42.19 ° @ 5.55 S; -8.10 ° @ -0.83 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT
LEFT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 192C38HL1
RUN NUMBER: 020798.1041;2
TORQUE (N·M)
200
160
120
80
40
0
-40
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10⁻²)
CHANNEL: LHPYM
FILTER: CH. CLASS 60
PEAK DATA: 219.10 N·M @ 5.54 S; -4.58 N·M @ -0.83 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT VS ROTATION ANGLE



TRANSPORTATION RESEARCH CENTER INC.

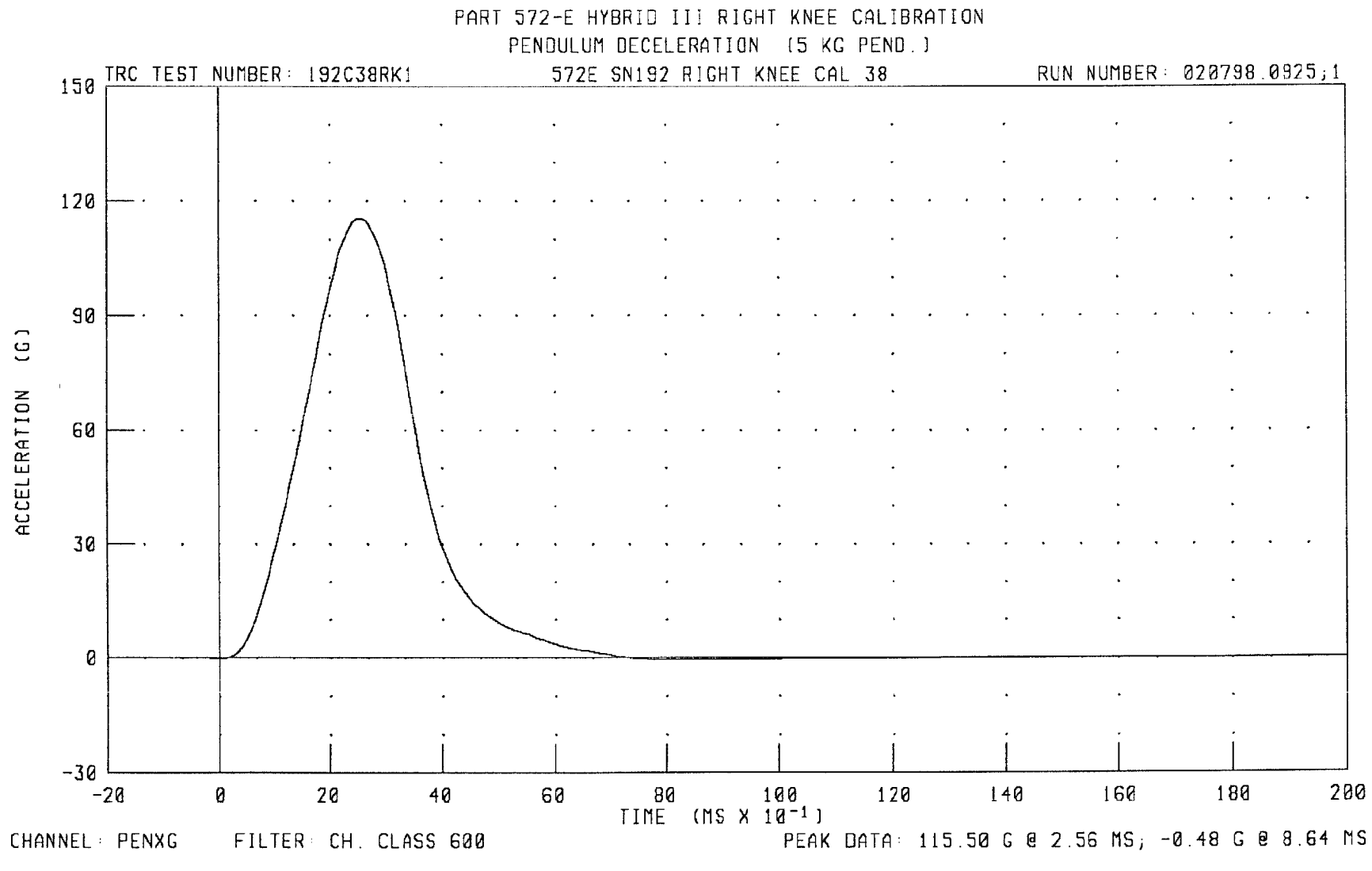
RIGHT KNEE IMPACT TEST

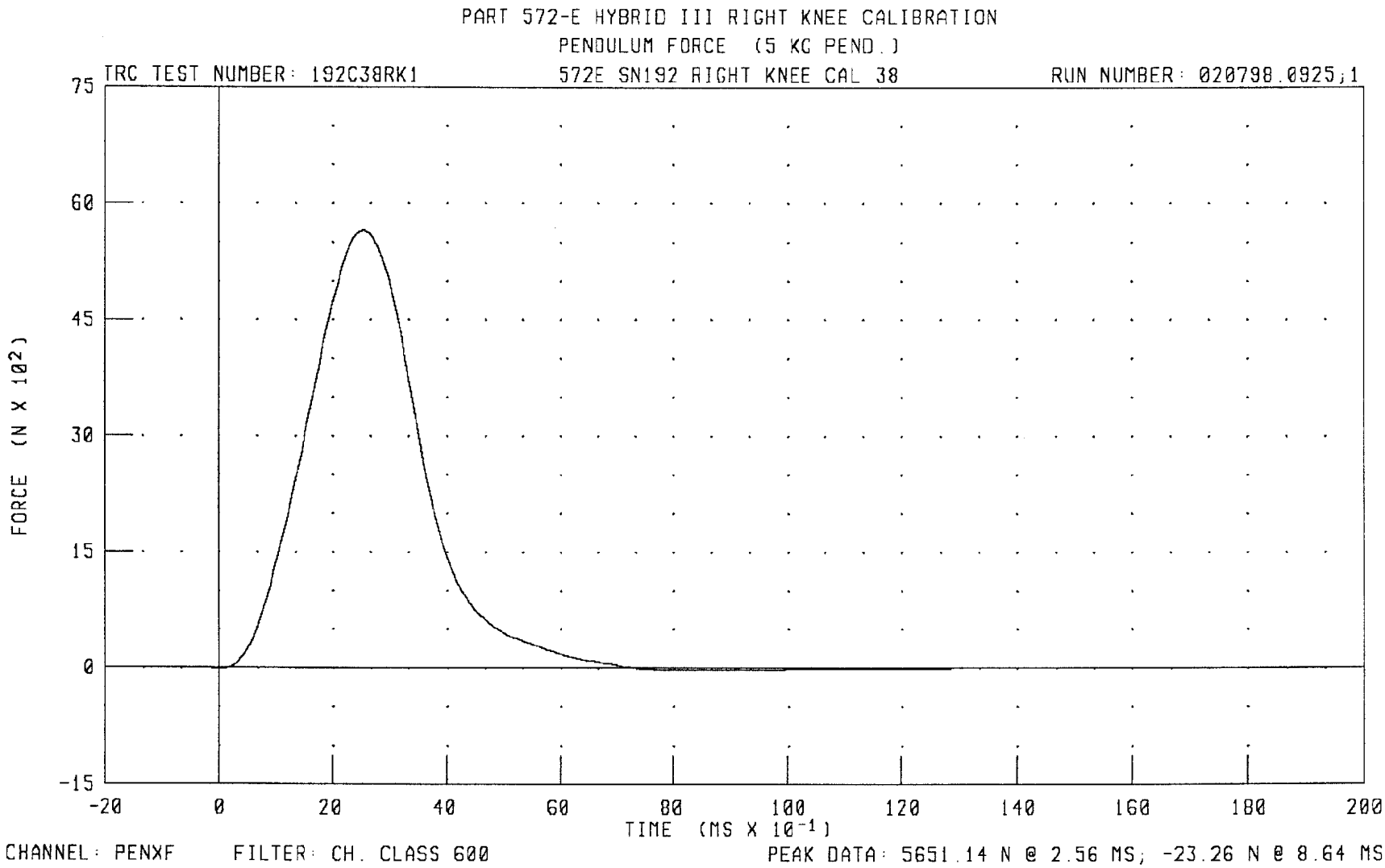
TRC INC. TEST NO: 192C38RK1 572E SN192 RIGHT KNEE CAL 38

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5651.1 N

TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Clawidge RUN NUMBER: 020798.0924;1


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 192C38RK1
572E SN192 RIGHT KNEE CAL 38
RUN NUMBER: 020798.0925;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: 115.50 G @ 2.56 MS; -0.48 G @ 8.64 MS


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 192C38RK1
572E SN192 RIGHT KNEE CAL 38
RUN NUMBER: 020798.0925;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: 5651.14 N @ 2.56 MS; -23.26 N @ 8.64 MS

TRANSPORTATION RESEARCH CENTER INC.

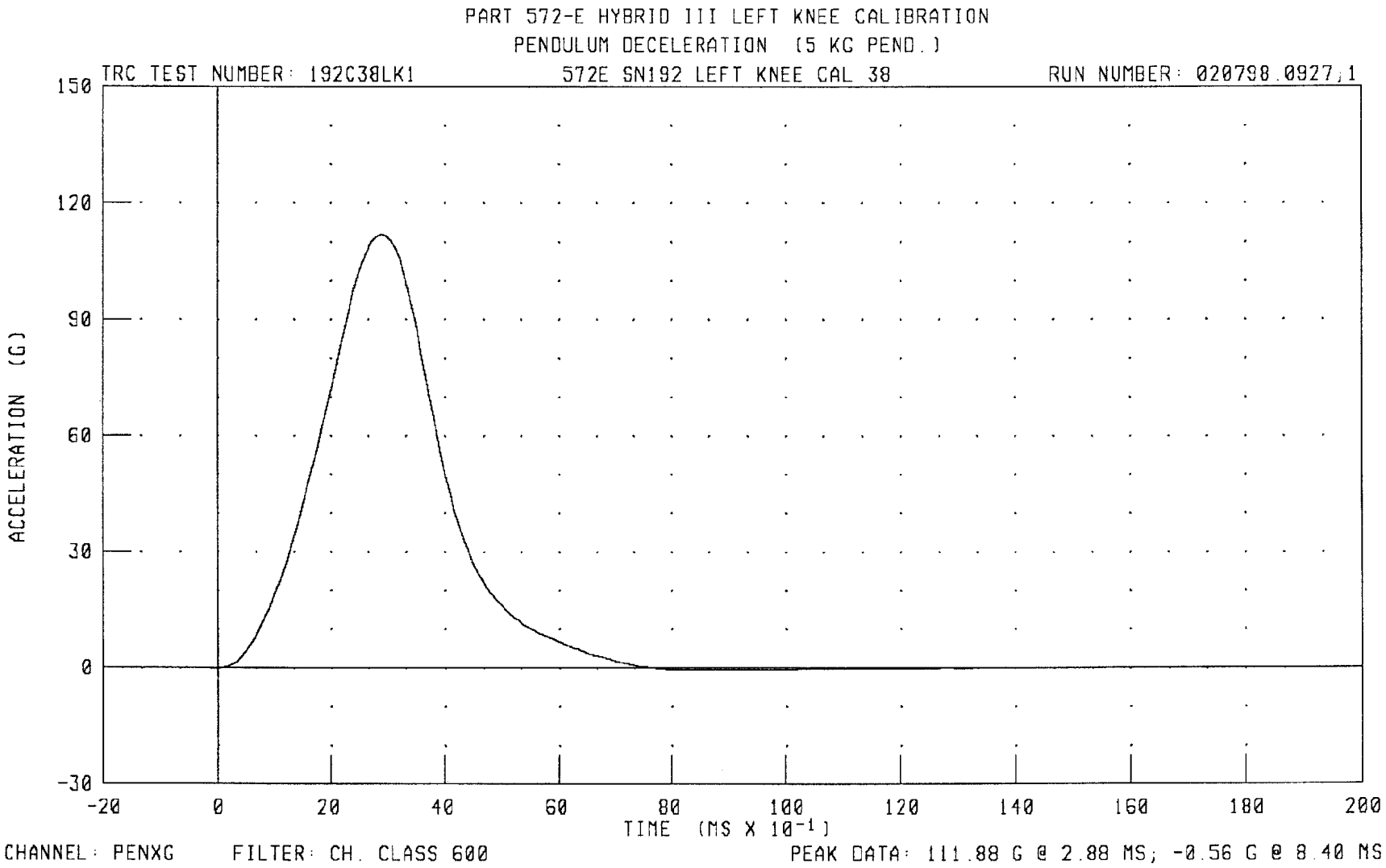
LEFT KNEE IMPACT TEST

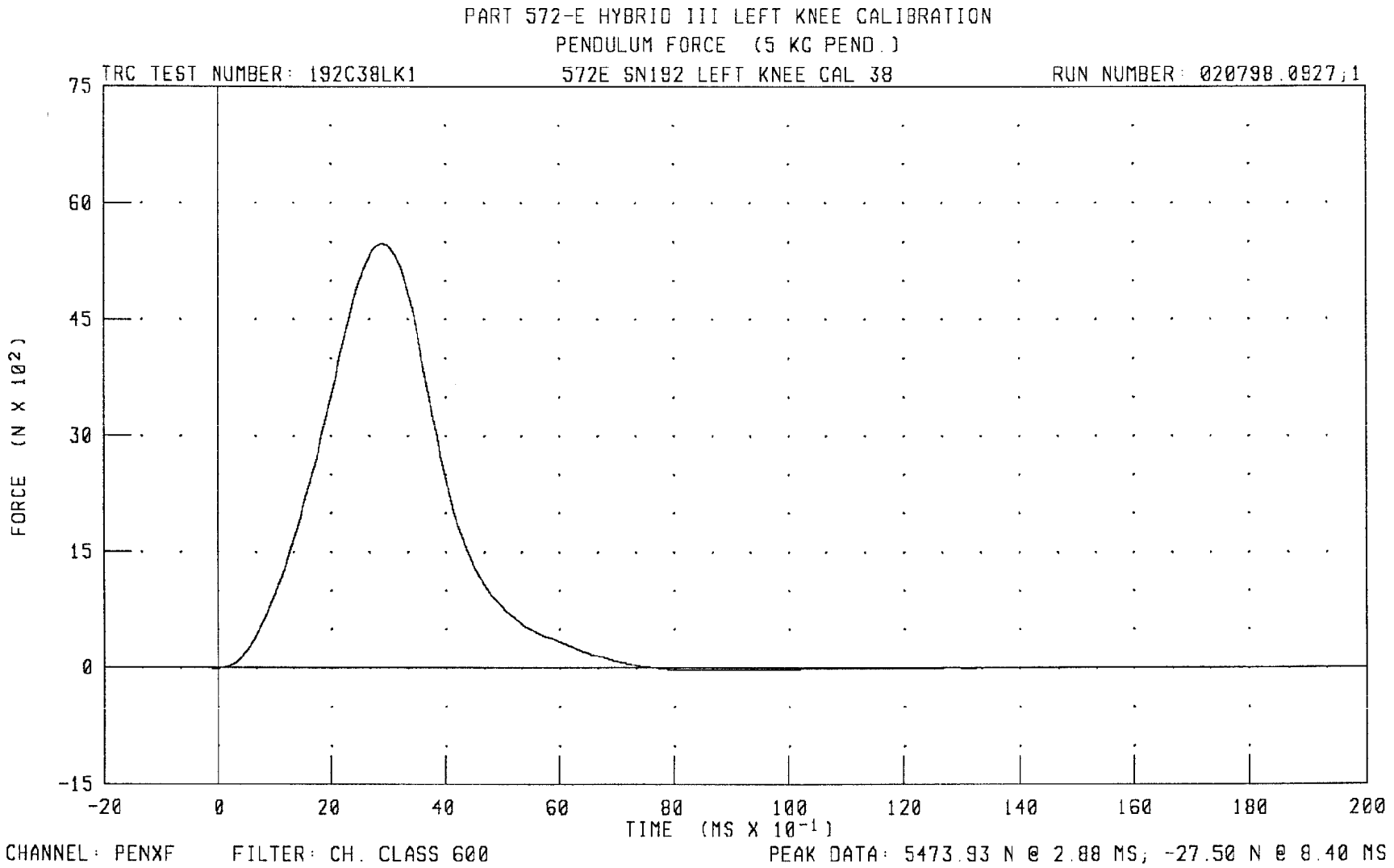
TRC INC. TEST NO: 192C38LK1 572E SN192 LEFT KNEE CAL 38

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5473.9 N

TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claridge RUN NUMBER: 020798.0920;1


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 192C38LK1
572E SN192 LEFT KNEE CAL 38
RUN NUMBER: 020798.0927;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: 111.88 G @ 2.88 MS; -0.56 G @ 8.40 MS


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 192C38LK1
572E SN192 LEFT KNEE CAL 38
RUN NUMBER: 020798.0927;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: 5473.93 N @ 2.88 MS; -27.50 N @ 8.40 MS

Pre-test Certification Data

Passenger Dummy S/N: 142

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
SN142 HUMANOID 07-02-98

TRC INC. TEST NO: 142C39ED1 572E SN142 EXT.DIMENSION CAL39

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	983. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	848. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	86. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	137. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	879. MM
THIGH CLEARANCE	(F)	140 - 155 MM	152. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	582. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	455. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	442. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	495. MM
FOOT LENGTH	(P)	252 - 267 MM	257. MM
FOOT BREADTH	(W)	91 - 107 MM	99. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	91. MM
SHOULDER BREADTH	(V)	422 - 437 MM	432. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	513. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	198. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	338. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	292. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 030298.0925

TRANSPORTATION RESEARCH CENTER INC.

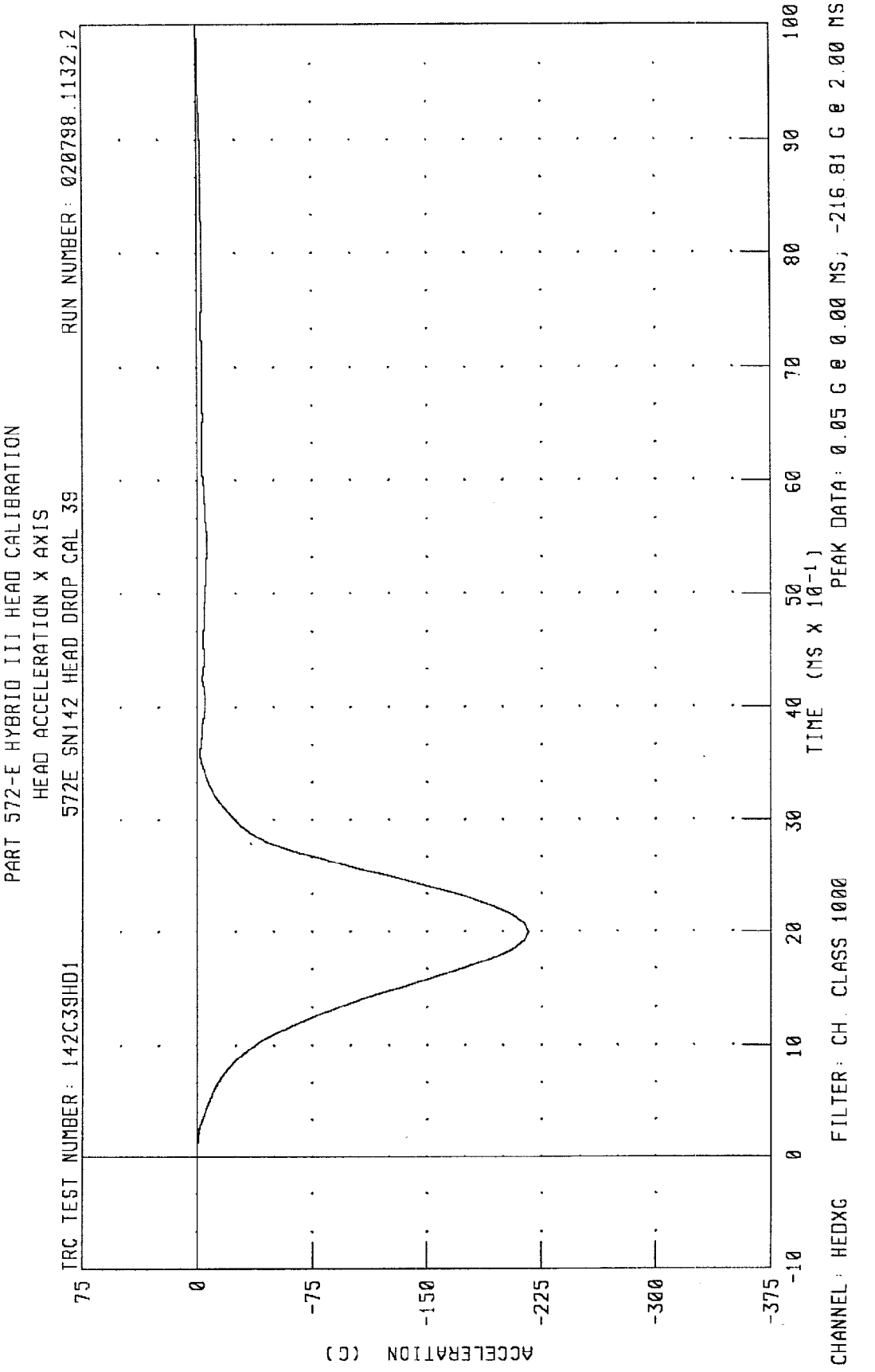
HEAD DROP TEST

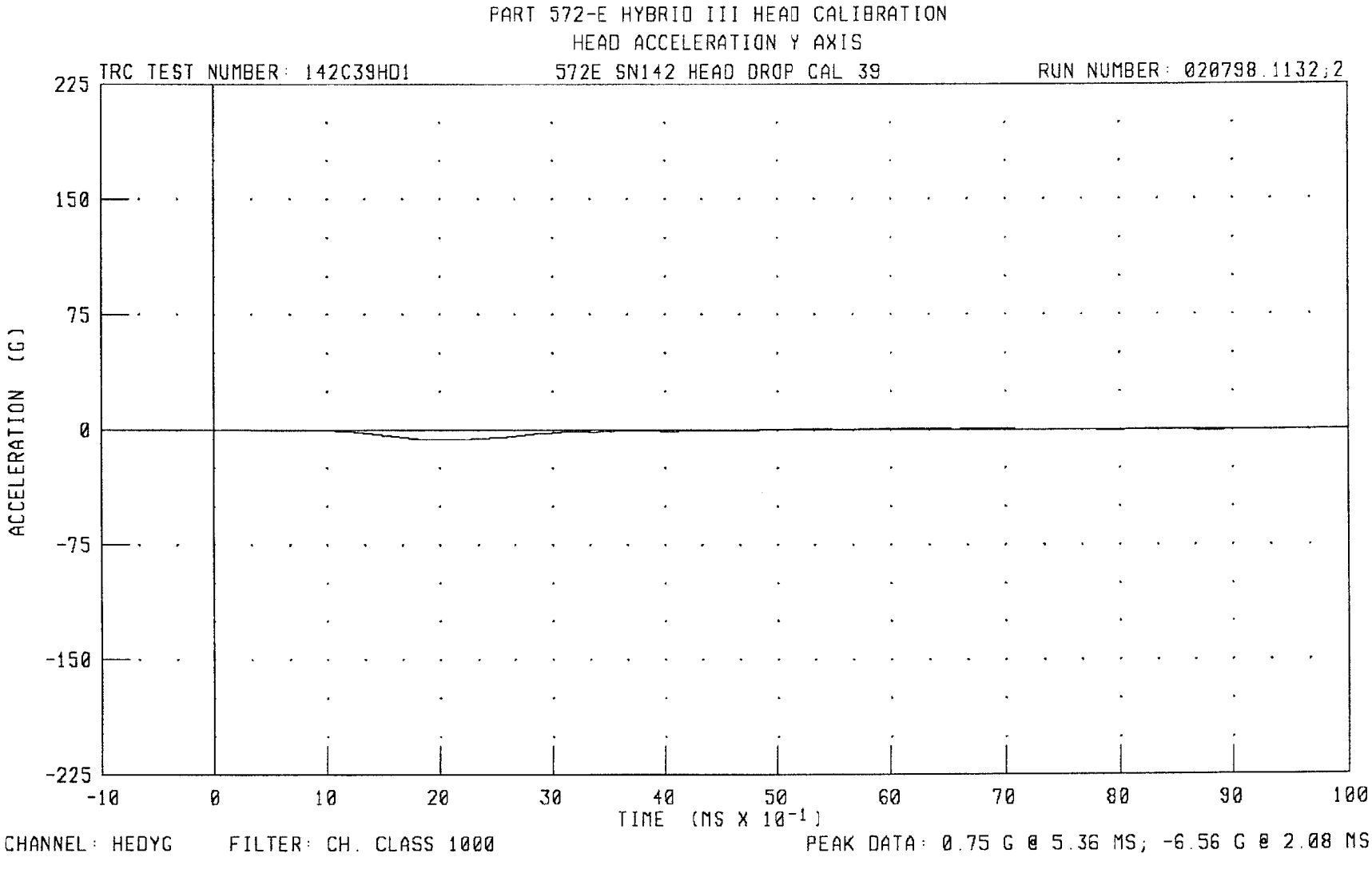
TRC INC. TEST NO: 142C39HD1 572E SN142 HEAD DROP CAL 39

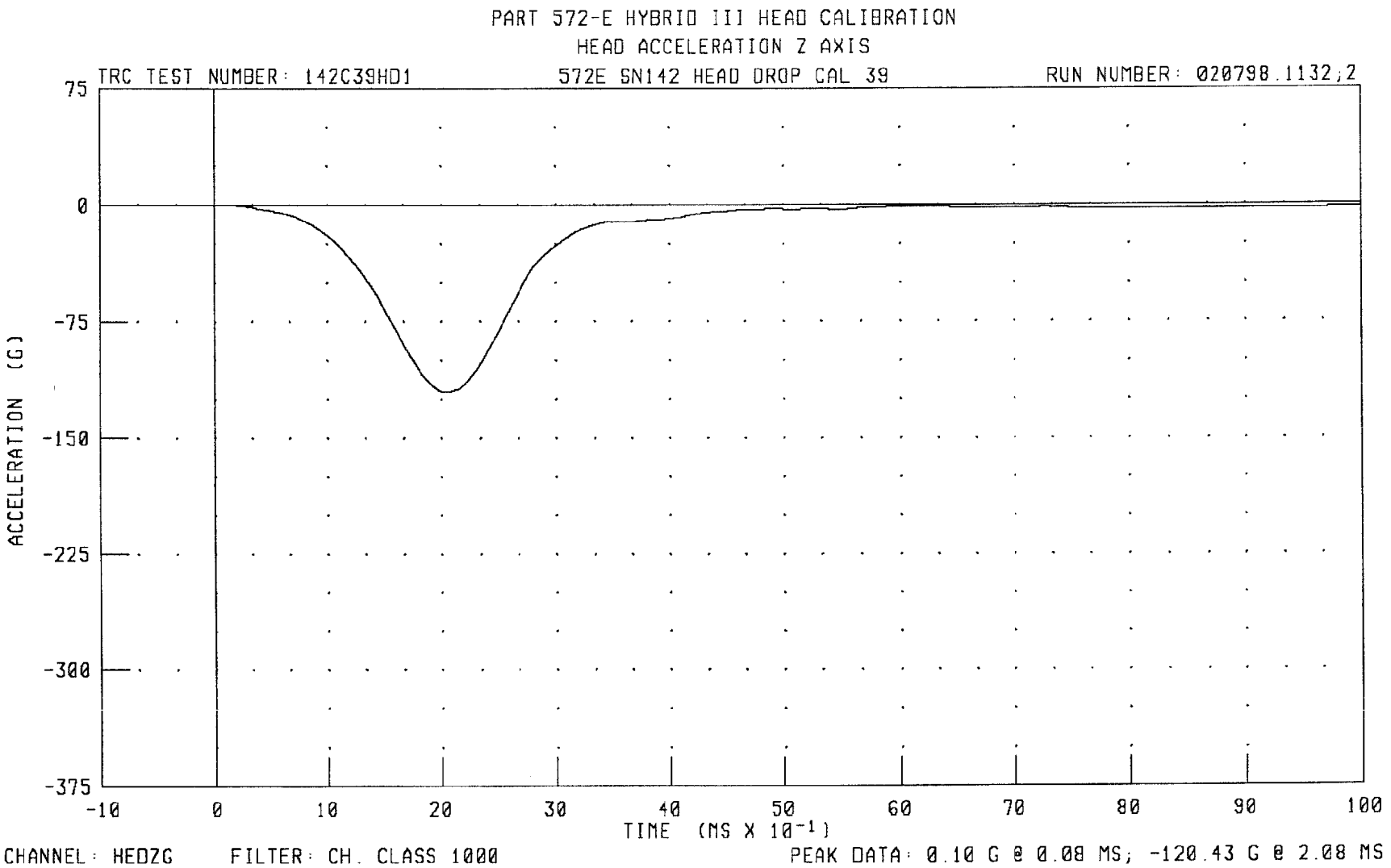
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	247.80 G
PEAK LATERAL ACCELERATION	15 G MAX	-6.55 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

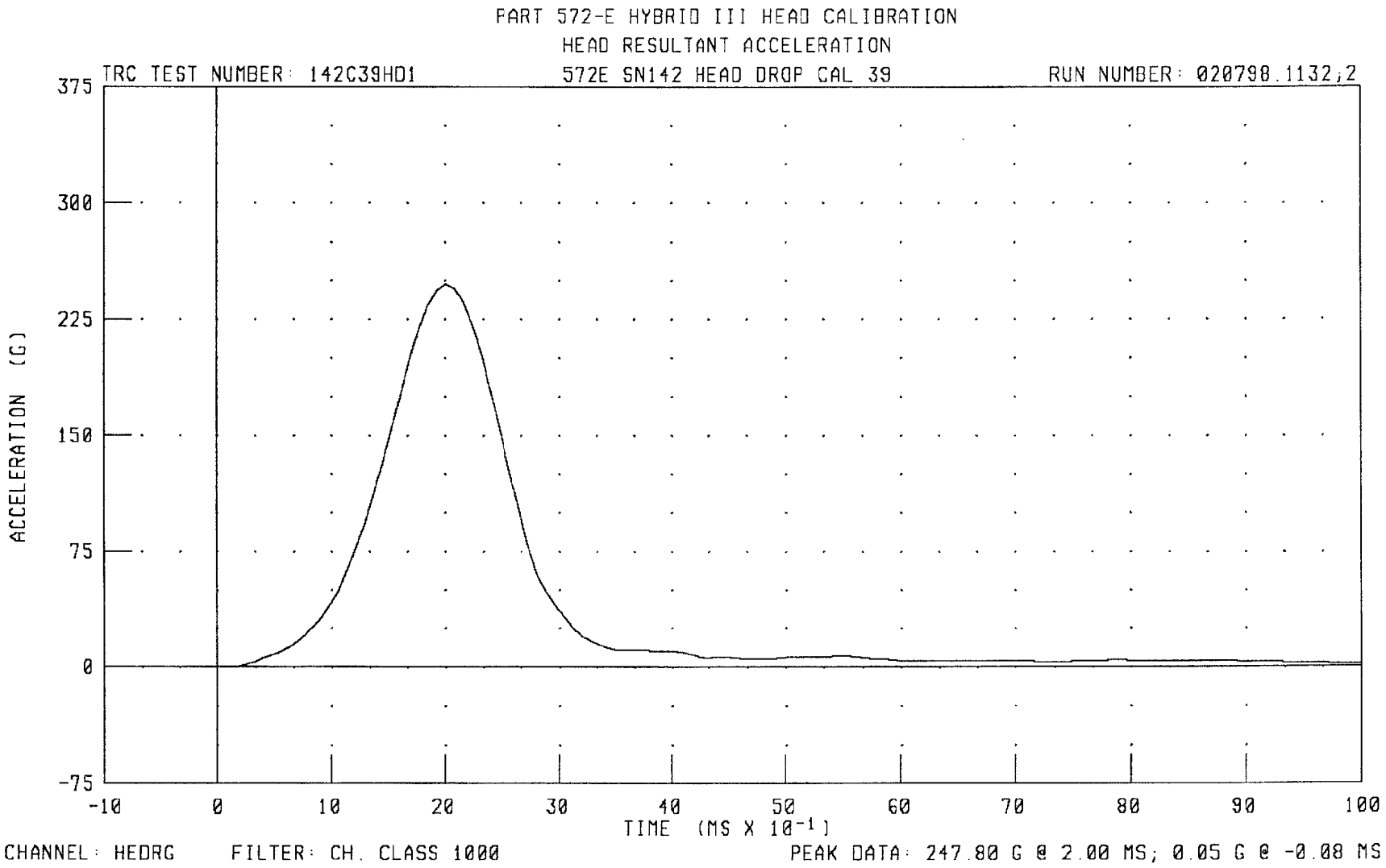
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Cumbo RUN NUMBER: 020798.0917;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER: 142C39HD1
572E SN142 HEAD DROP CAL 39
RUN NUMBER: 020798.1132;2
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: 0.05 G @ 0.00 MS; -216.81 G @ 2.00 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 142C39HD1
572E SN142 HEAD DROP CAL 39
RUN NUMBER: 020798.1132;2
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: 0.75 G @ 5.36 MS; -6.56 G @ 2.08 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
TRC TEST NUMBER: 142C39HD1
572E SN142 HEAD DROP CAL 39
RUN NUMBER: 020798.1132;2
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: 0.10 G @ 0.08 MS; -120.43 G @ 2.08 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
TRC TEST NUMBER: 142C39HD1
572E SN142 HEAD DROP CAL 39
RUN NUMBER: 020798.1132;2
375
300
225
150
75
0
-75
ACCELERATION (G)
-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: 247.80 G @ 2.00 MS; 0.05 G @ -0.08 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

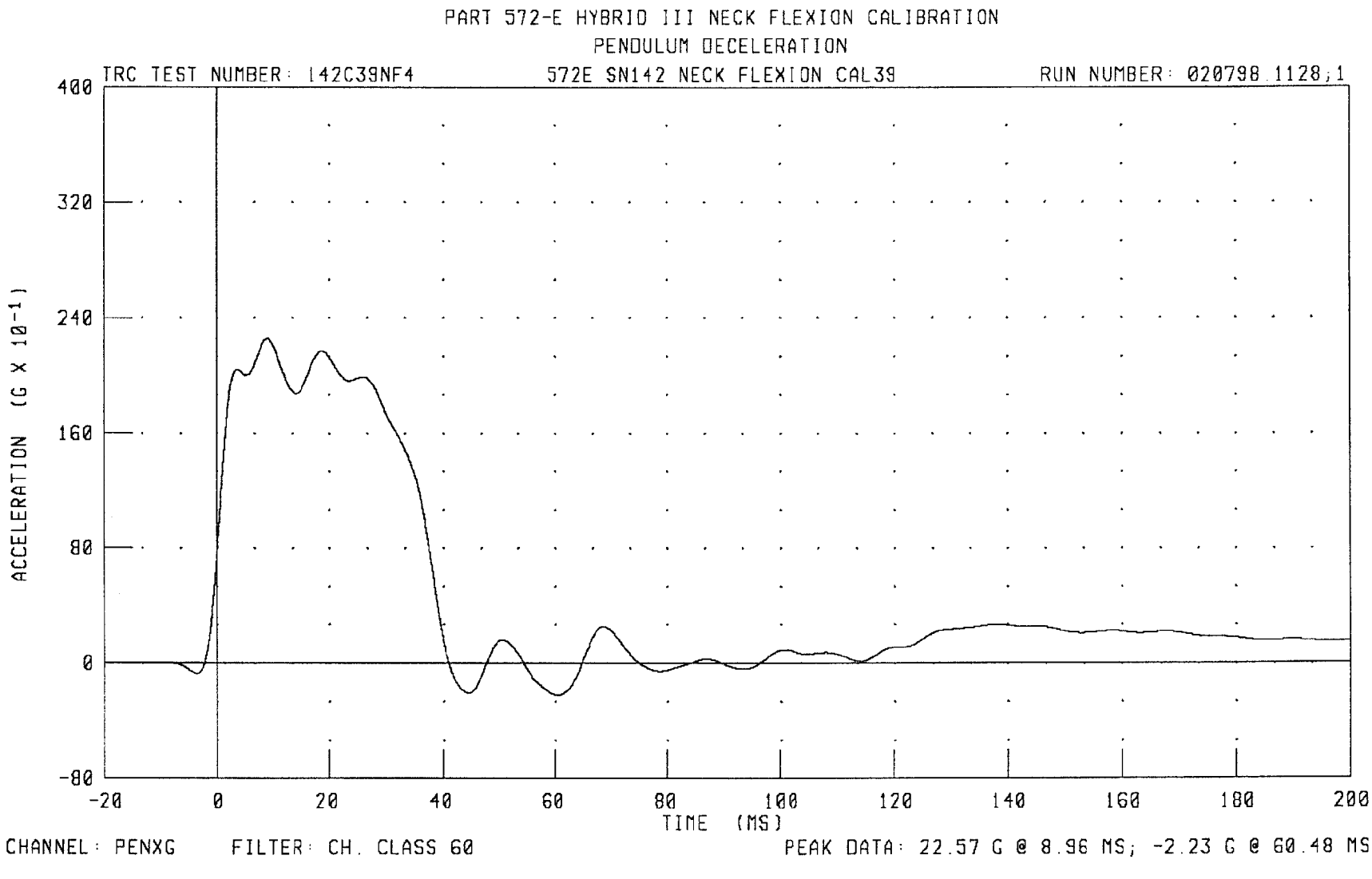
TRC INC. TEST NO: 142C39NF4 572E SN142 NECK FLEXION CAL39

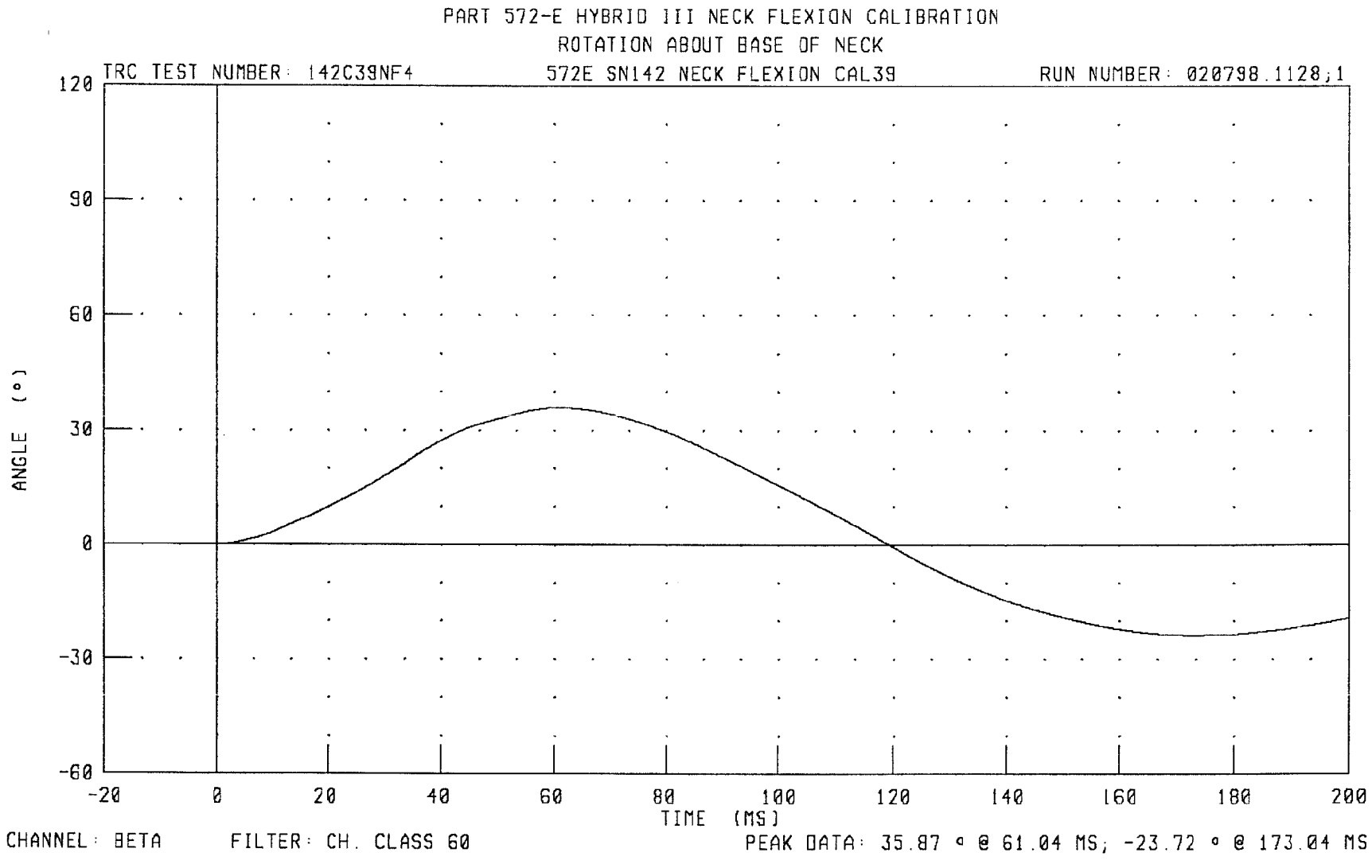
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	37.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.50 G
	20 MS	17.60 - 22.60 G	21.59 G
	30 MS	12.50 - 18.50 G	17.89 G
MAX PENDULUM G		29 G MAX	22.56 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.82 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	39.20 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	73.58 DEG.
	TIME	57 - 64 MS	60.48 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	98.54 NM
	TIME	47 - 58 MS	53.28 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.60 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.80 MS

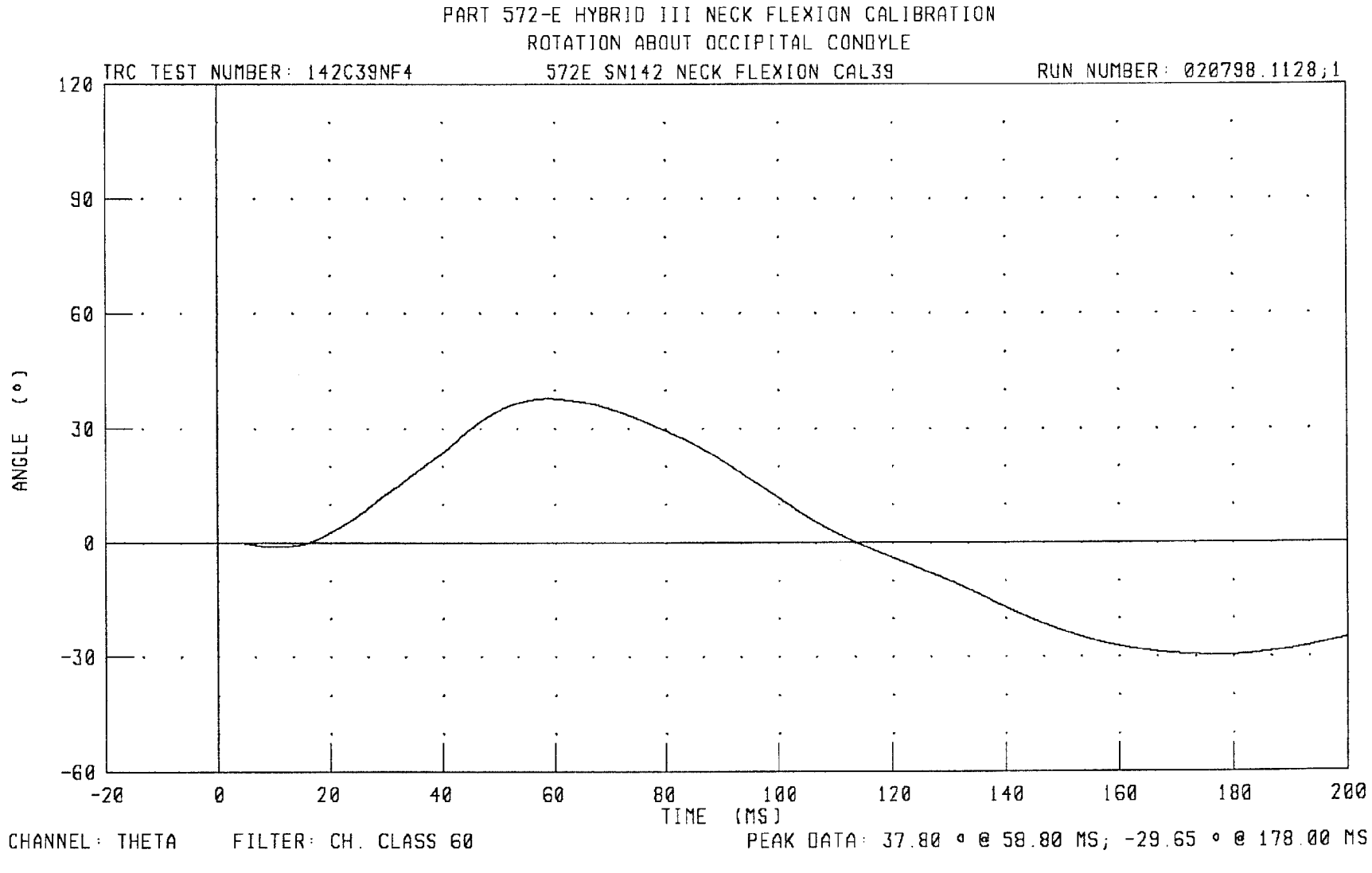
TEST MEETS SPECIFICATIONS

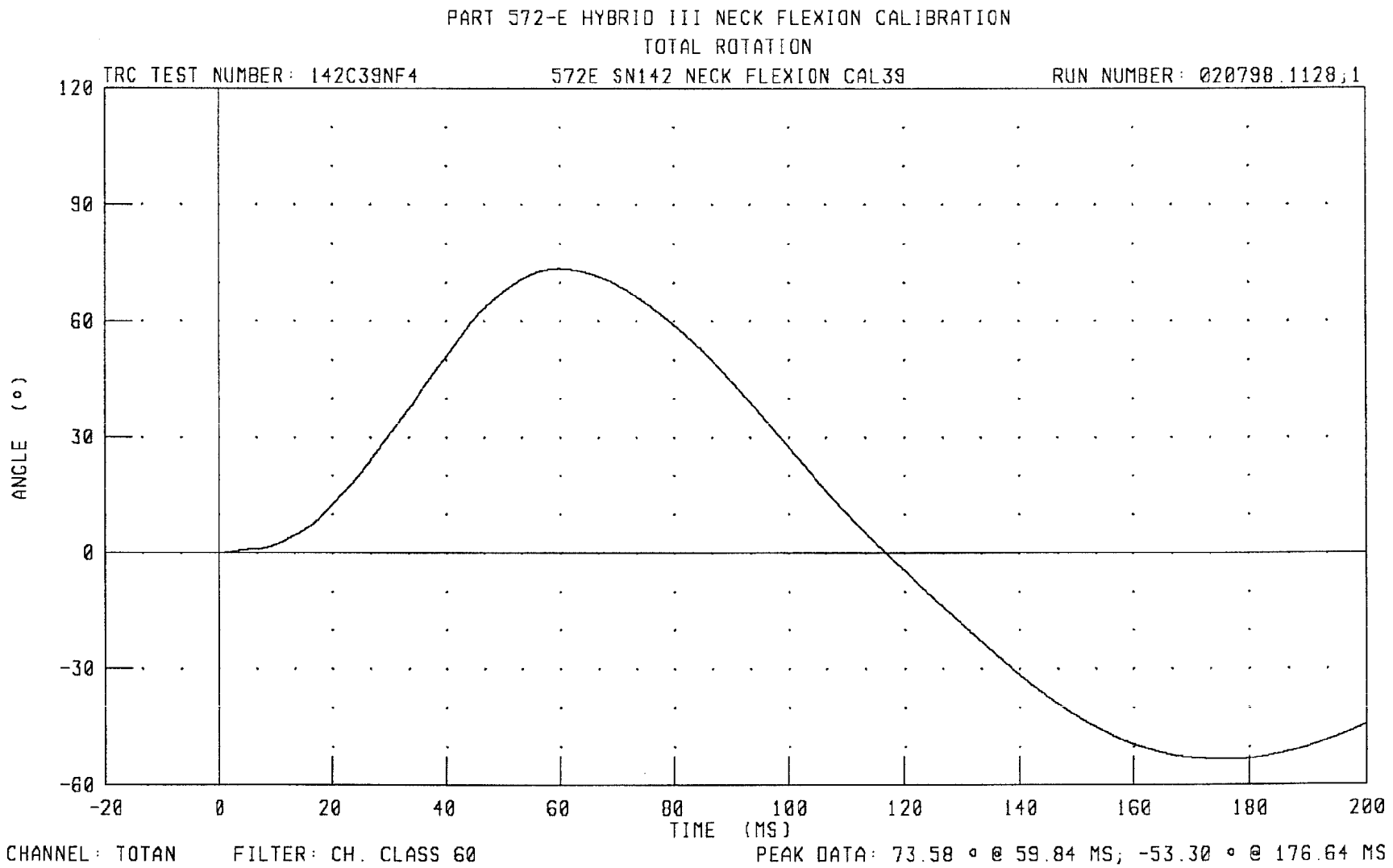
TECHNICIAN By Cult

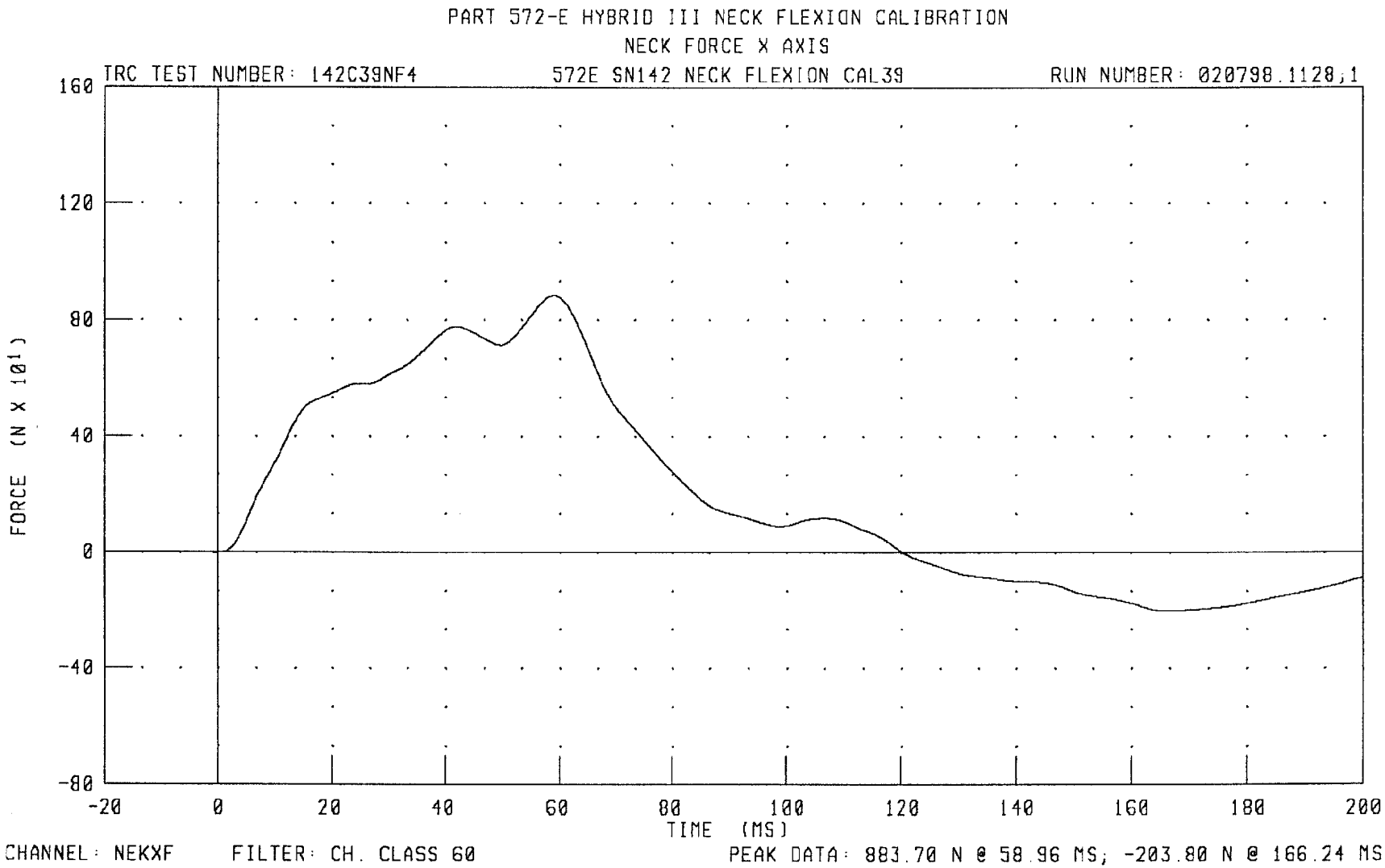
RUN NUMBER: 020798.1148;2

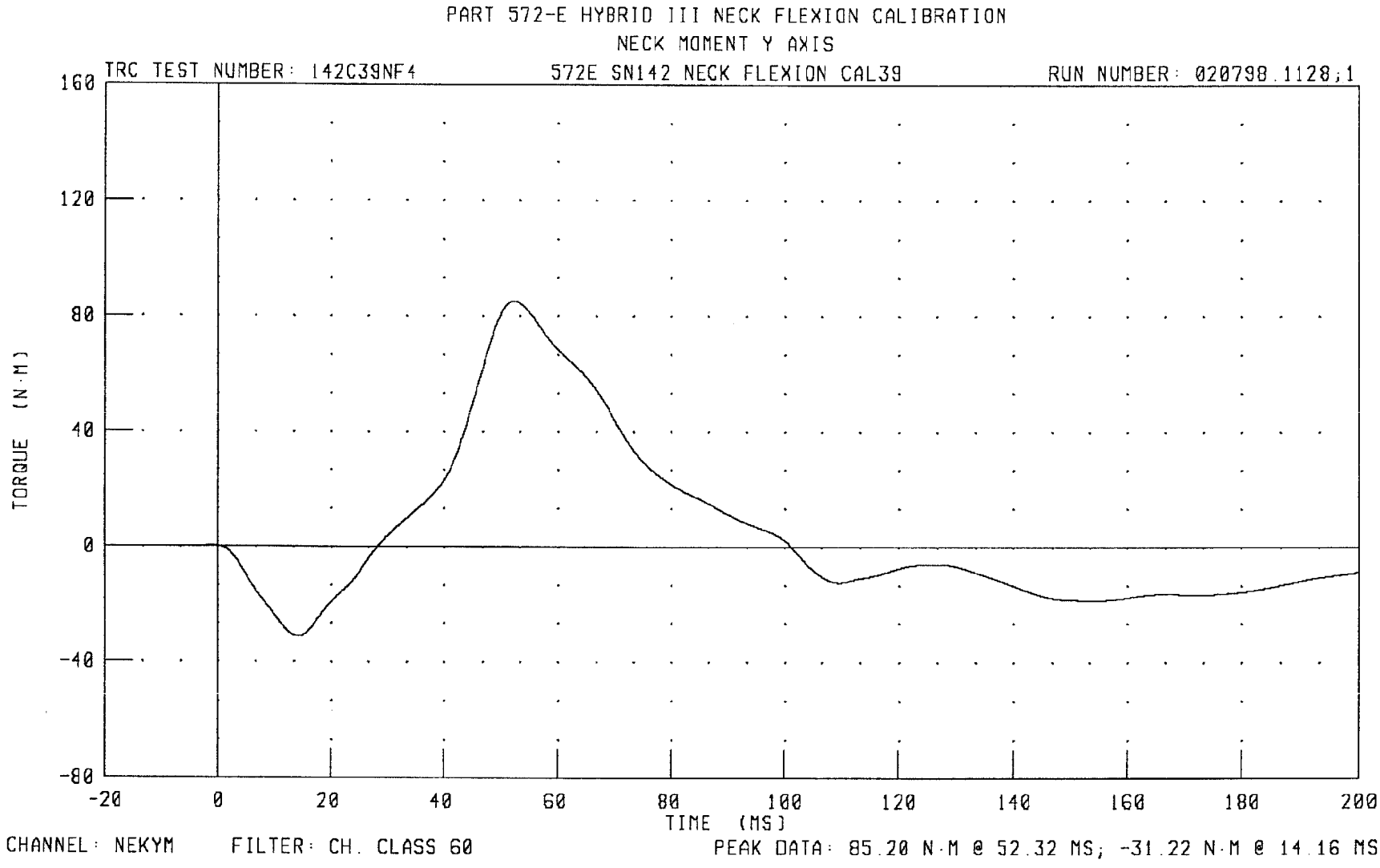

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 142C39NF4
572E SN142 NECK FLEXION CAL39
RUN NUMBER: 020798.1128;1
400
320
240
160
80
0
-80
ACCELERATION (G X 10-1)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 22.57 G @ 8.96 MS; -2.23 G @ 60.48 MS

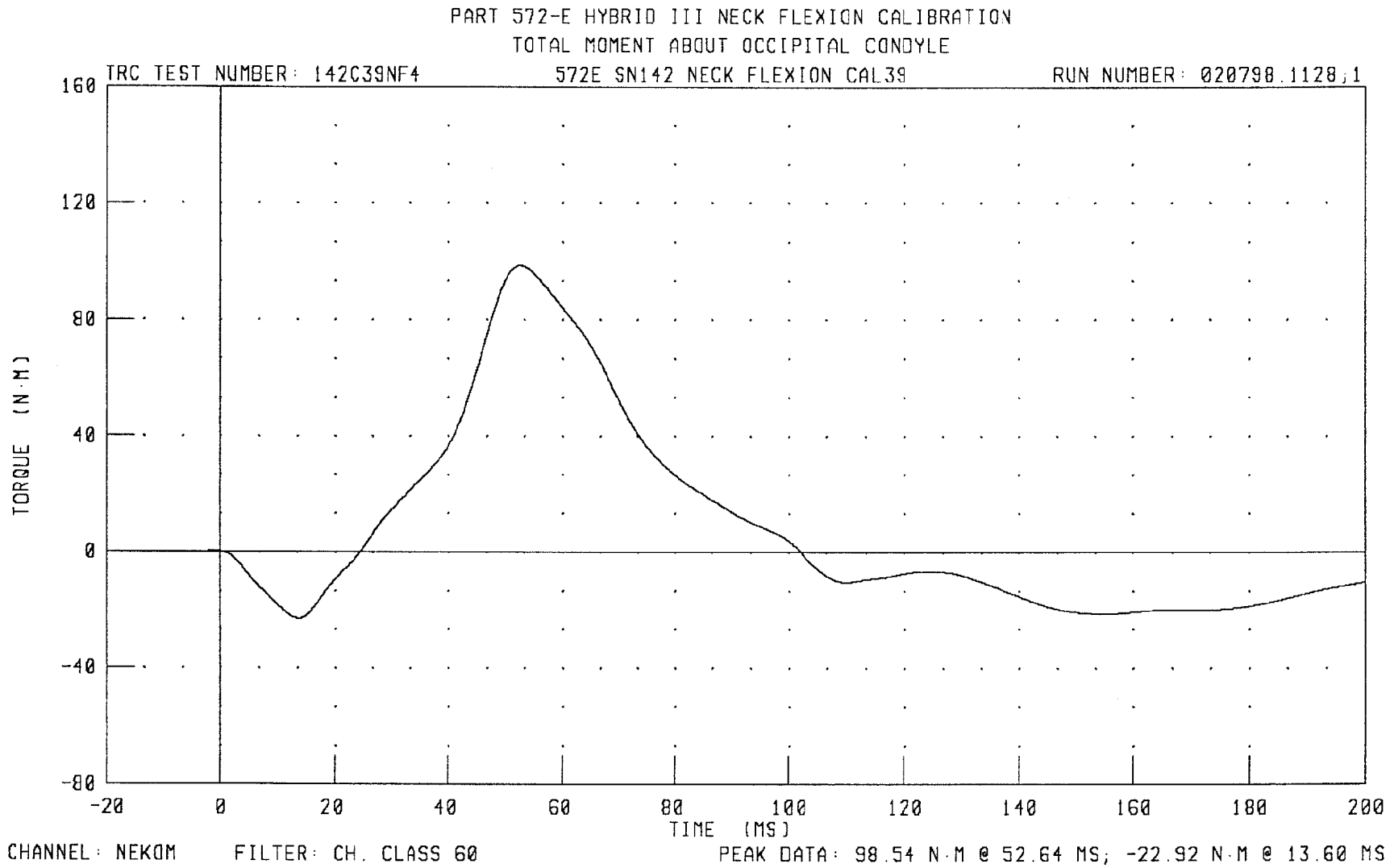

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 142C39NF4
572E SN142 NECK FLEXION CAL39
RUN NUMBER: 020798.1128;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 35.87 ° @ 61.04 MS; -23.72 ° @ 173.04 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 142C39NF4
572E SN142 NECK FLEXION CAL39
RUN NUMBER: 020798.1128;1
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: 37.80 ° @ 58.80 MS; -29.65 ° @ 178.00 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 142C39NF4
572E SN142 NECK FLEXION CAL39
RUN NUMBER: 020798.1128;1
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: 73.58 ° @ 59.84 MS; -53.30 ° @ 176.64 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 142C39NF4
572E SN142 NECK FLEXION CAL39
RUN NUMBER: 020798.1128;1
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: 883.70 N @ 58.96 MS; -203.80 N @ 166.24 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 142C39NF4
572E SN142 NECK FLEXION CAL39
RUN NUMBER: 020798.1128;1
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: 85.20 N·M @ 52.32 MS; -31.22 N·M @ 14.16 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 142C39NF4
572E SN142 NECK FLEXION CAL39
RUN NUMBER: 020798.1128;1
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: 98.54 N-M @ 52.64 MS; -22.92 N-M @ 13.60 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

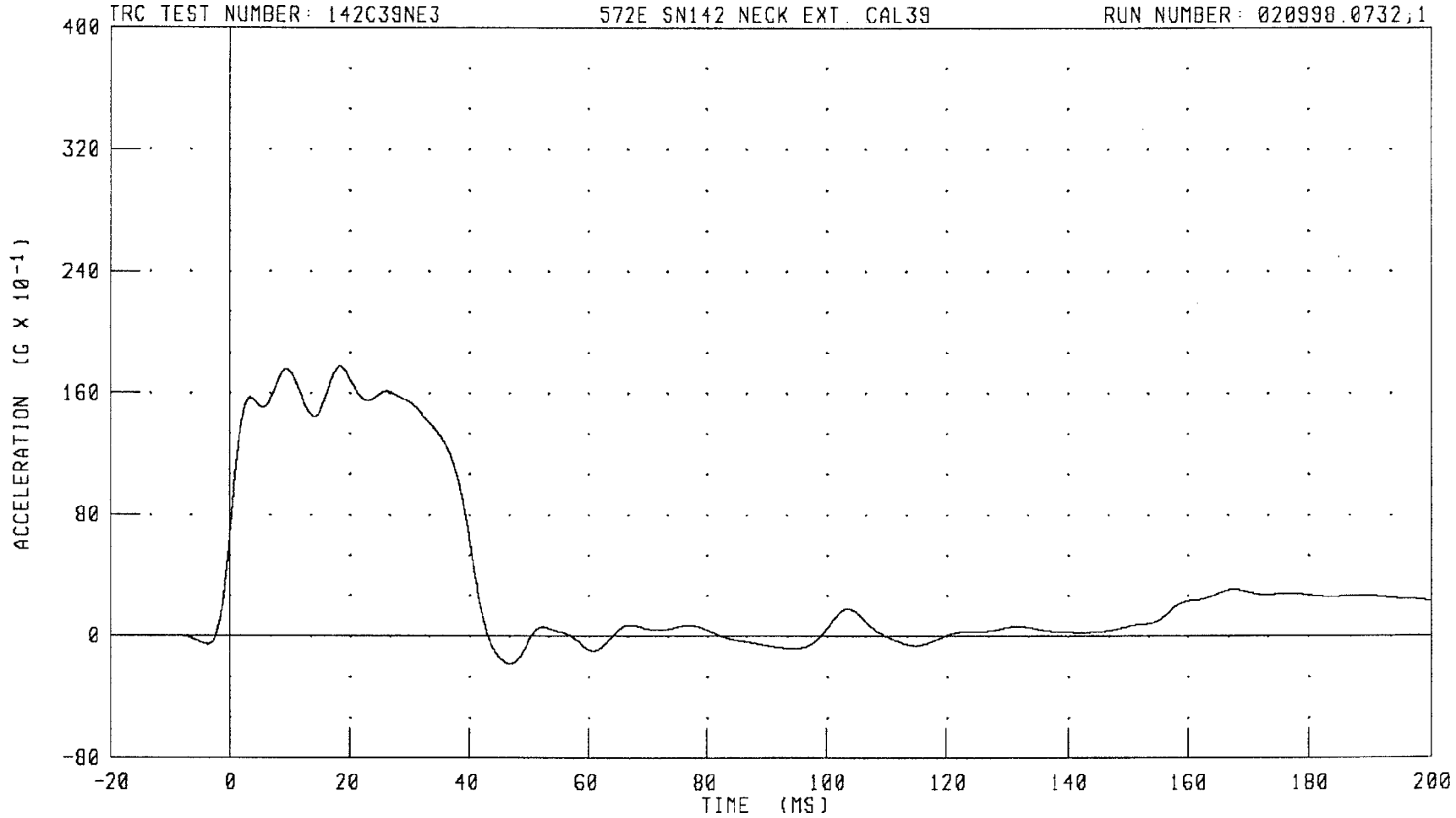
TRC INC. TEST NO: 142C39NE3 572E SN142 NECK EXT. CAL39

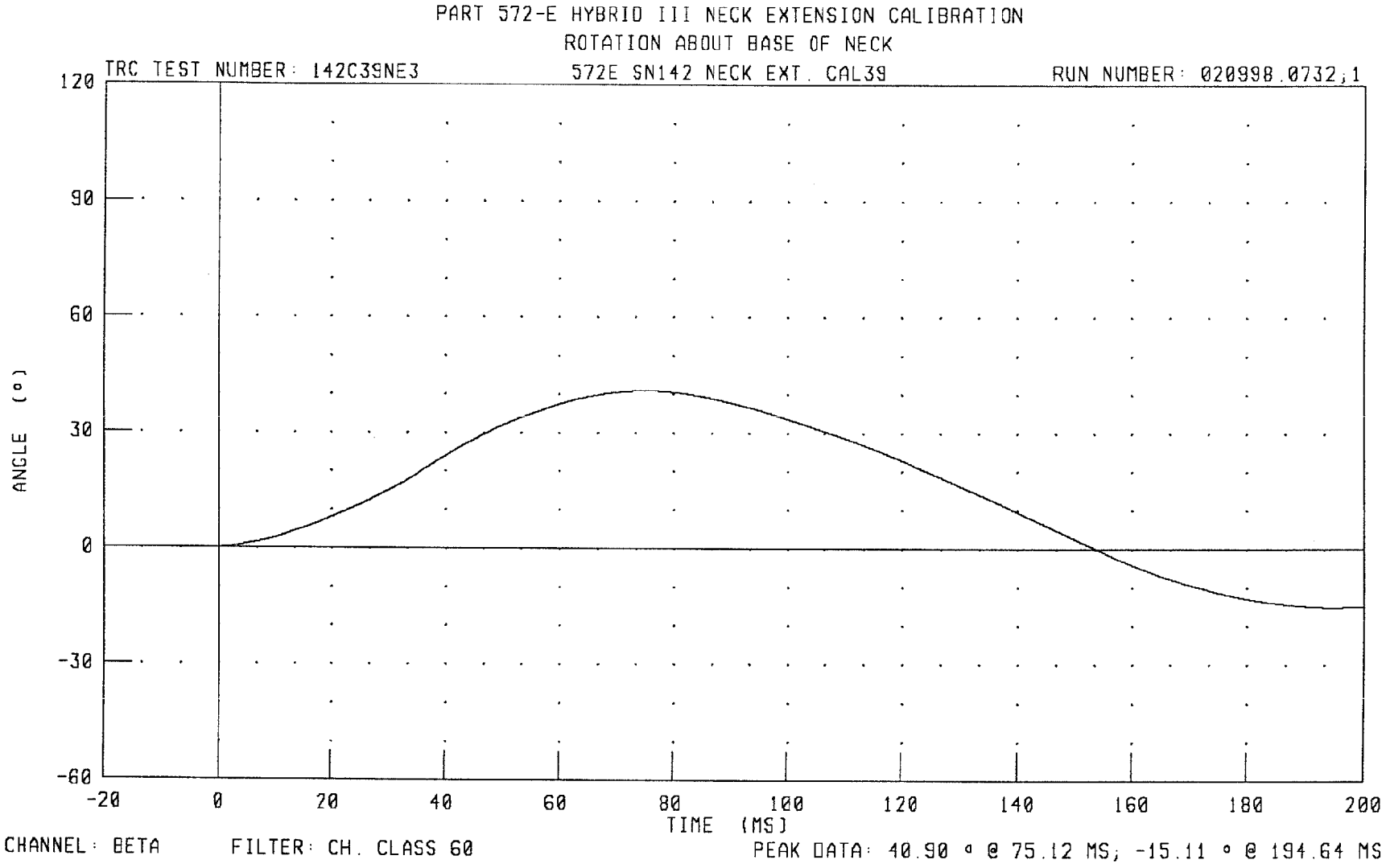
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	37.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.40 G
	20 MS	14.00 - 19.00 G	16.96 G
	30 MS	11.00 - 16.00 G	15.43 G
MAX PENDULUM G		22 G MAX	17.75 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.41 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.56 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	93.11 DEG.
	TIME	72 - 82 MS	75.60 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-68.48 NM
	TIME	65 - 79 MS	70.48 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	153.60 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	138.80 MS

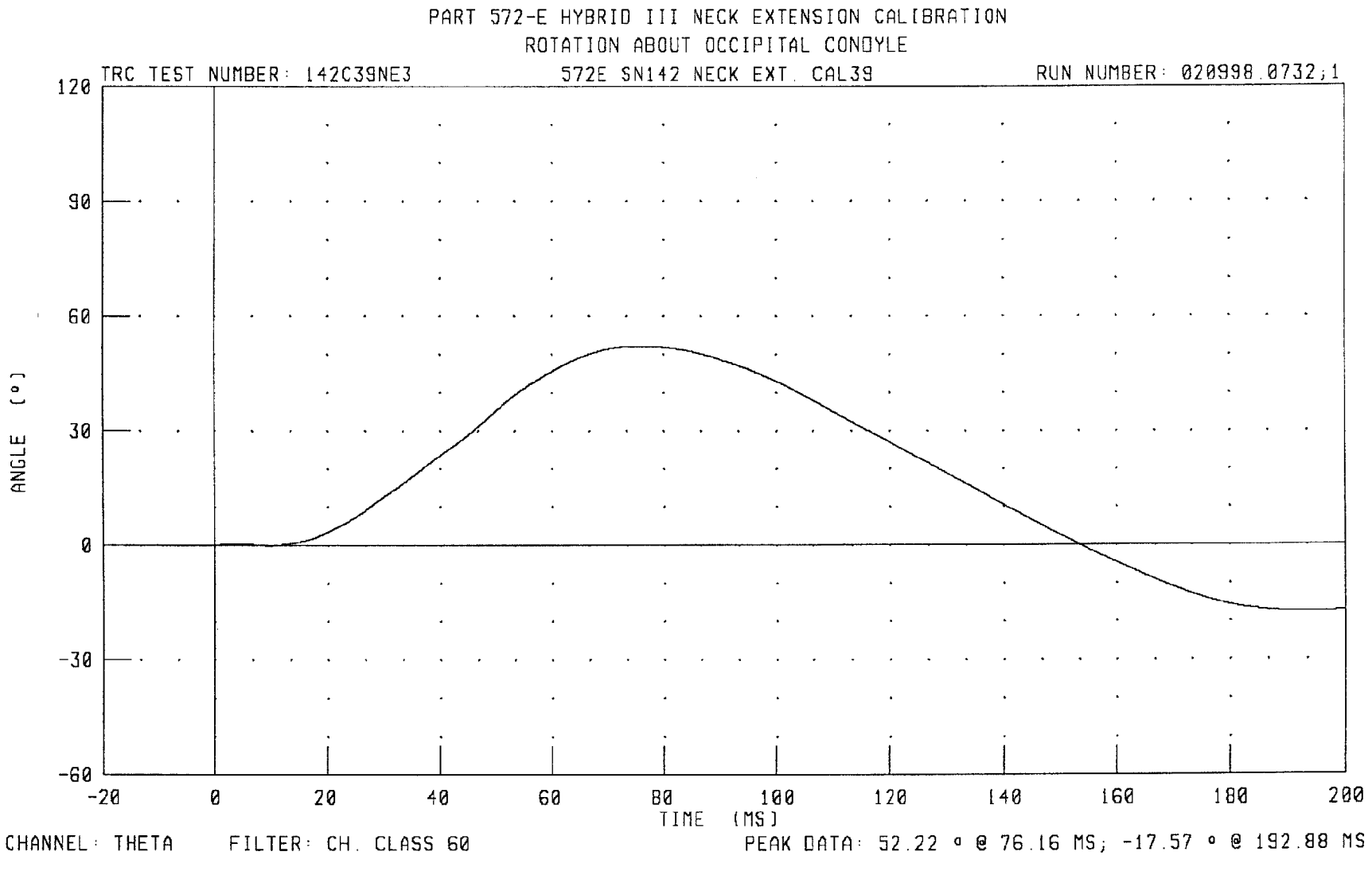
TEST MEETS SPECIFICATIONS

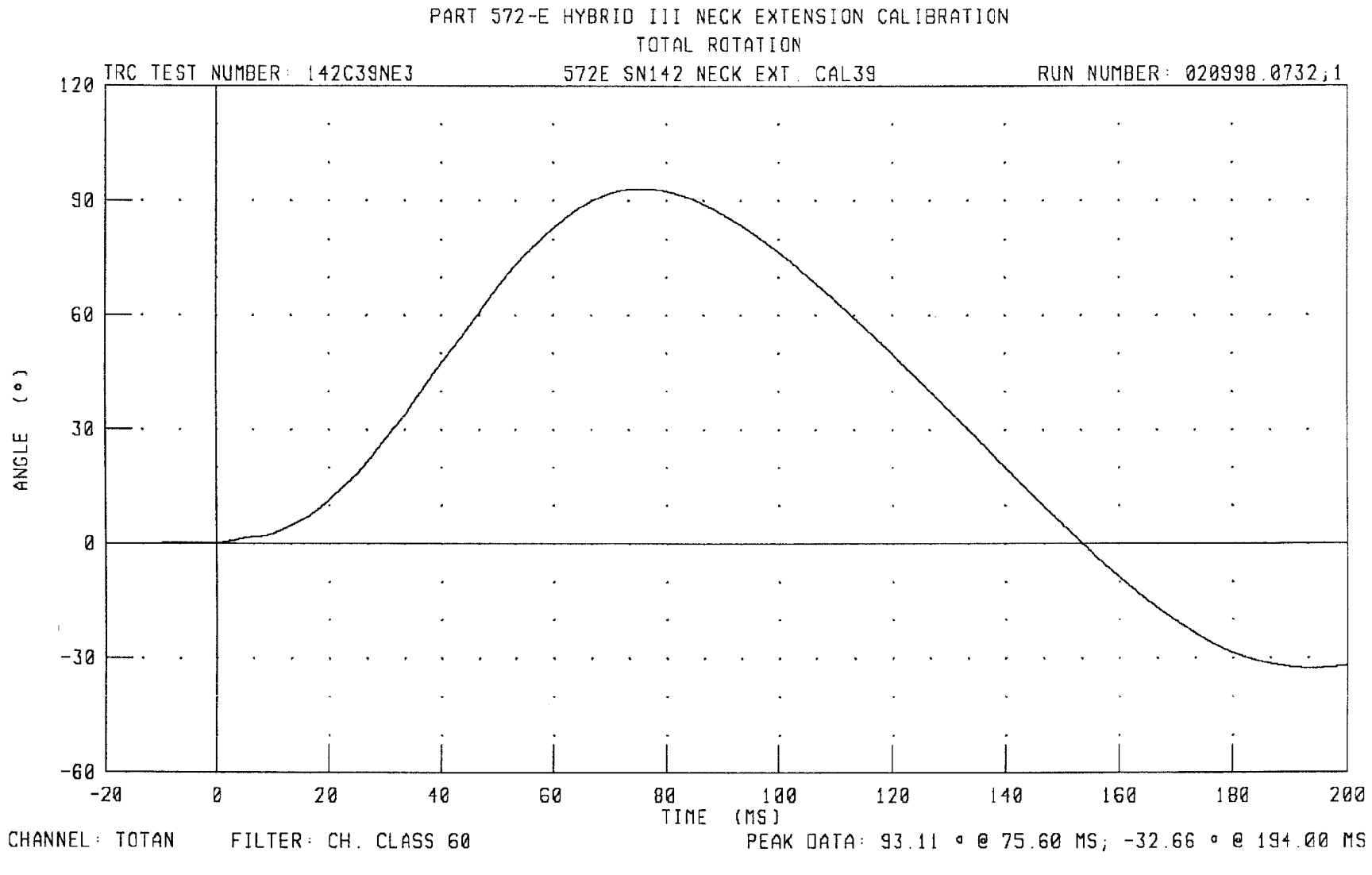
TECHNICIAN _____ RUN NUMBER: 020998.0731;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION



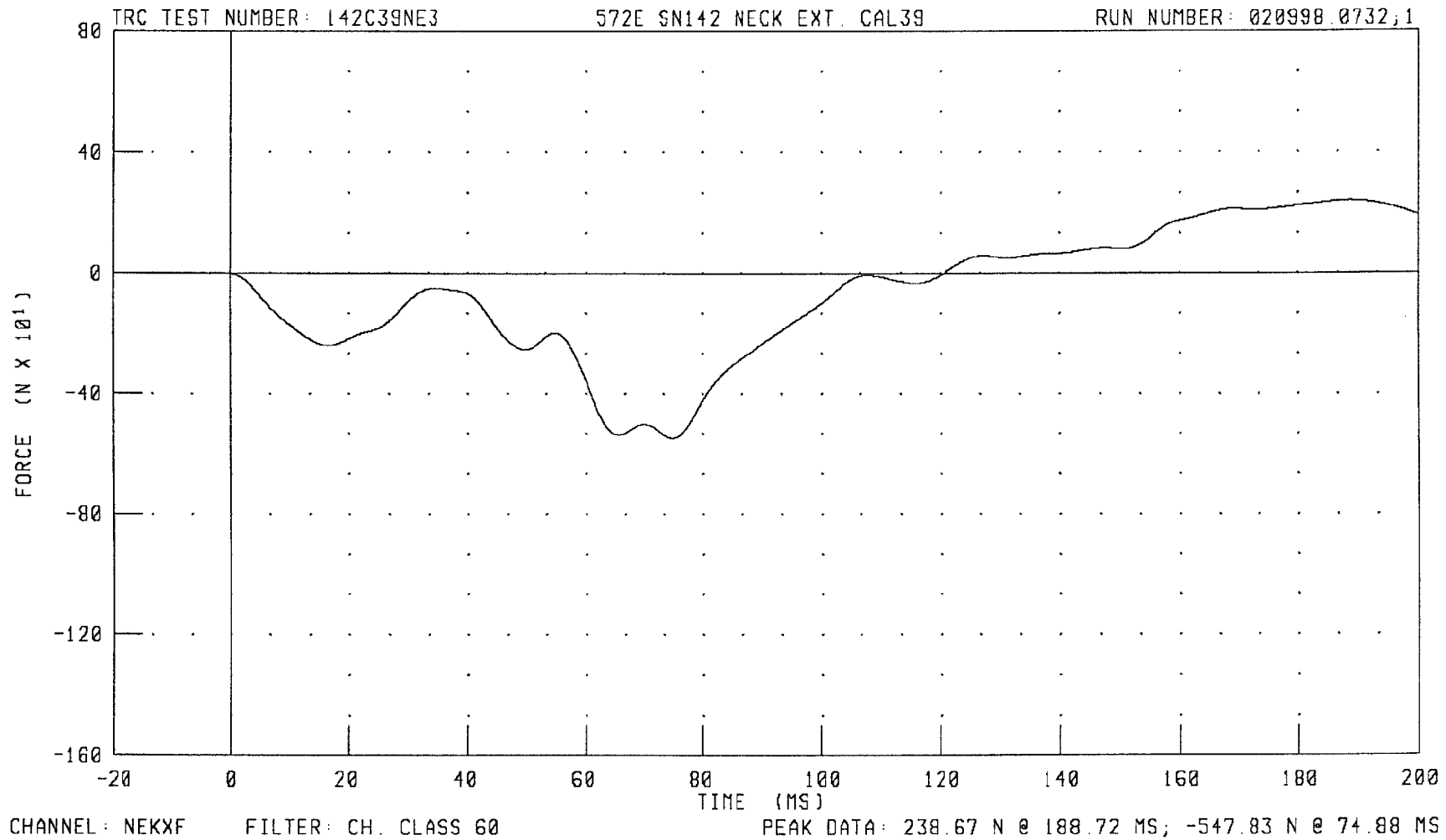

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 142C39NE3
572E SN142 NECK EXT. CAL39
RUN NUMBER: 020998.0732;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 40.90 ° @ 75.12 MS; -15.11 ° @ 194.64 MS

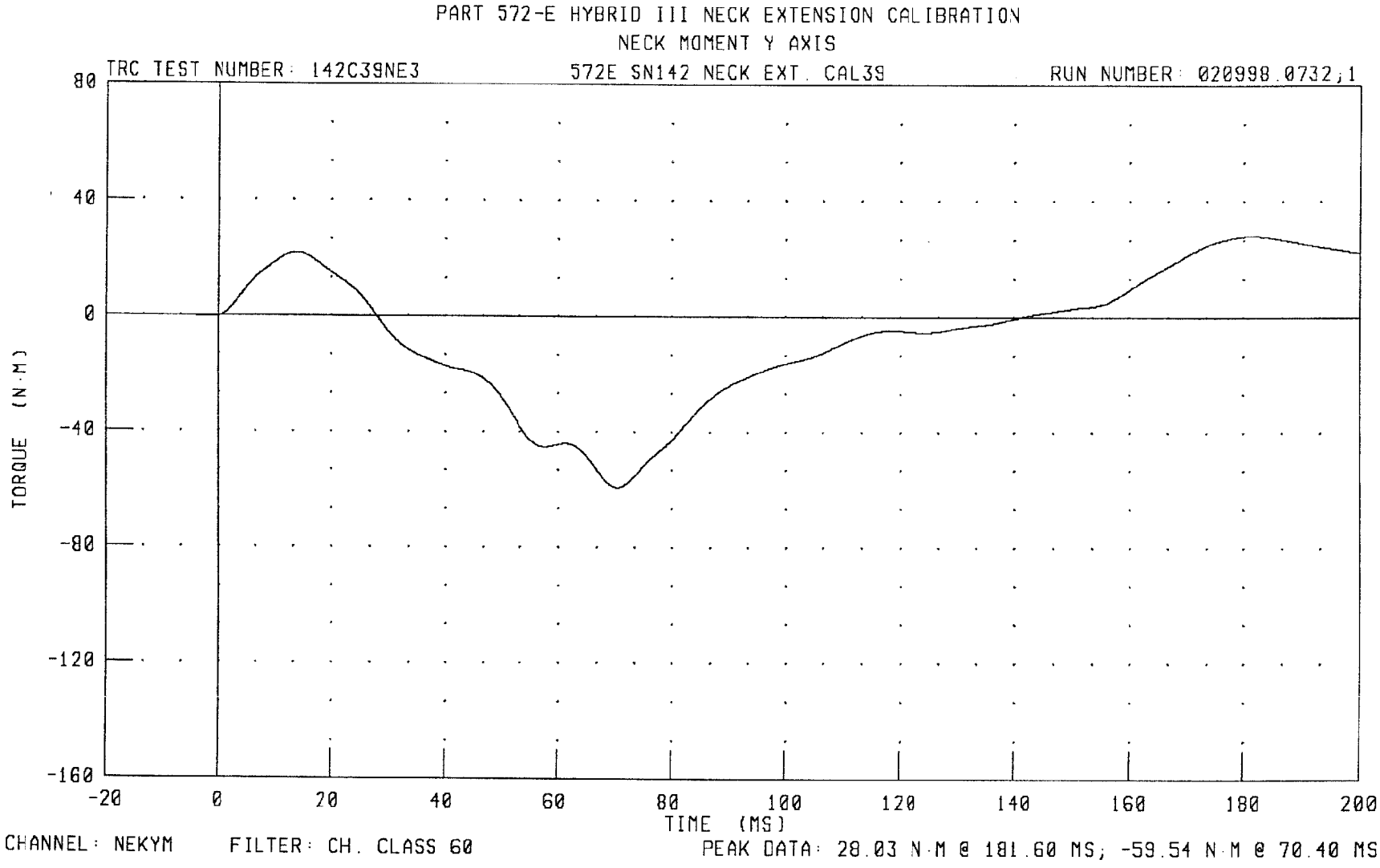

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 142C39NE3
572E SN142 NECK EXT. CAL39
RUN NUMBER: 020998.0732;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 52.22 ° @ 76.16 MS; -17.57 ° @ 192.88 MS

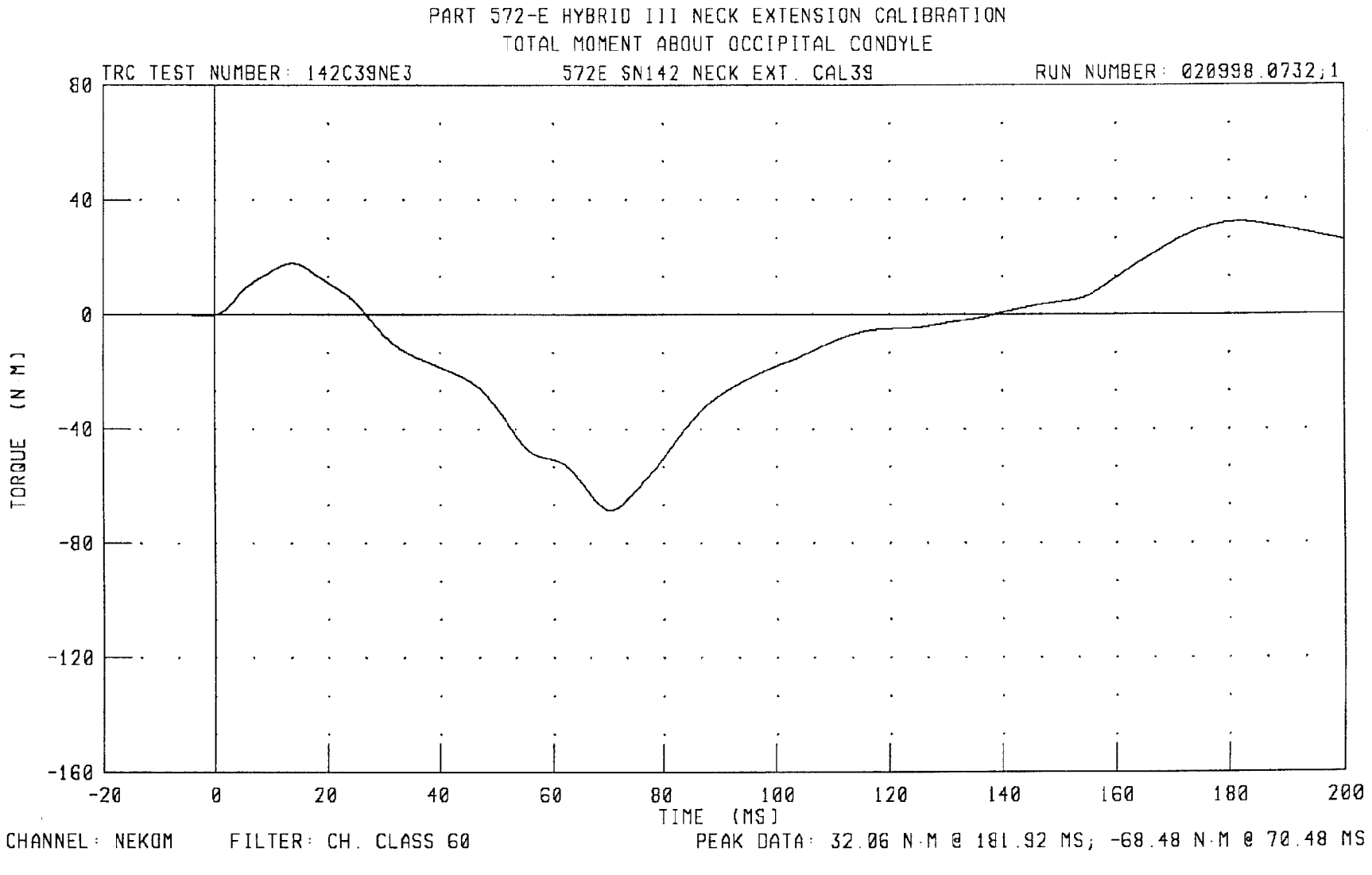

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 142C39NE3
572E SN142 NECK EXT. CAL39
RUN NUMBER: 020998.0732;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
FILTER: CH. CLASS 60
PEAK DATA: 93.11 ° @ 75.60 MS; -32.66 ° @ 194.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS




PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 142C39NE3
572E SN142 NECK EXT. CAL39
RUN NUMBER: 020998.0732;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: 28.03 N.M @ 181.60 MS; -59.54 N.M @ 70.40 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 142C39NE3
572E SN142 NECK EXT. CAL39
RUN NUMBER: 020998.0732;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: 32.06 N-M @ 181.92 MS; -68.48 N-M @ 70.48 MS

TRANSPORTATION RESEARCH CENTER INC.

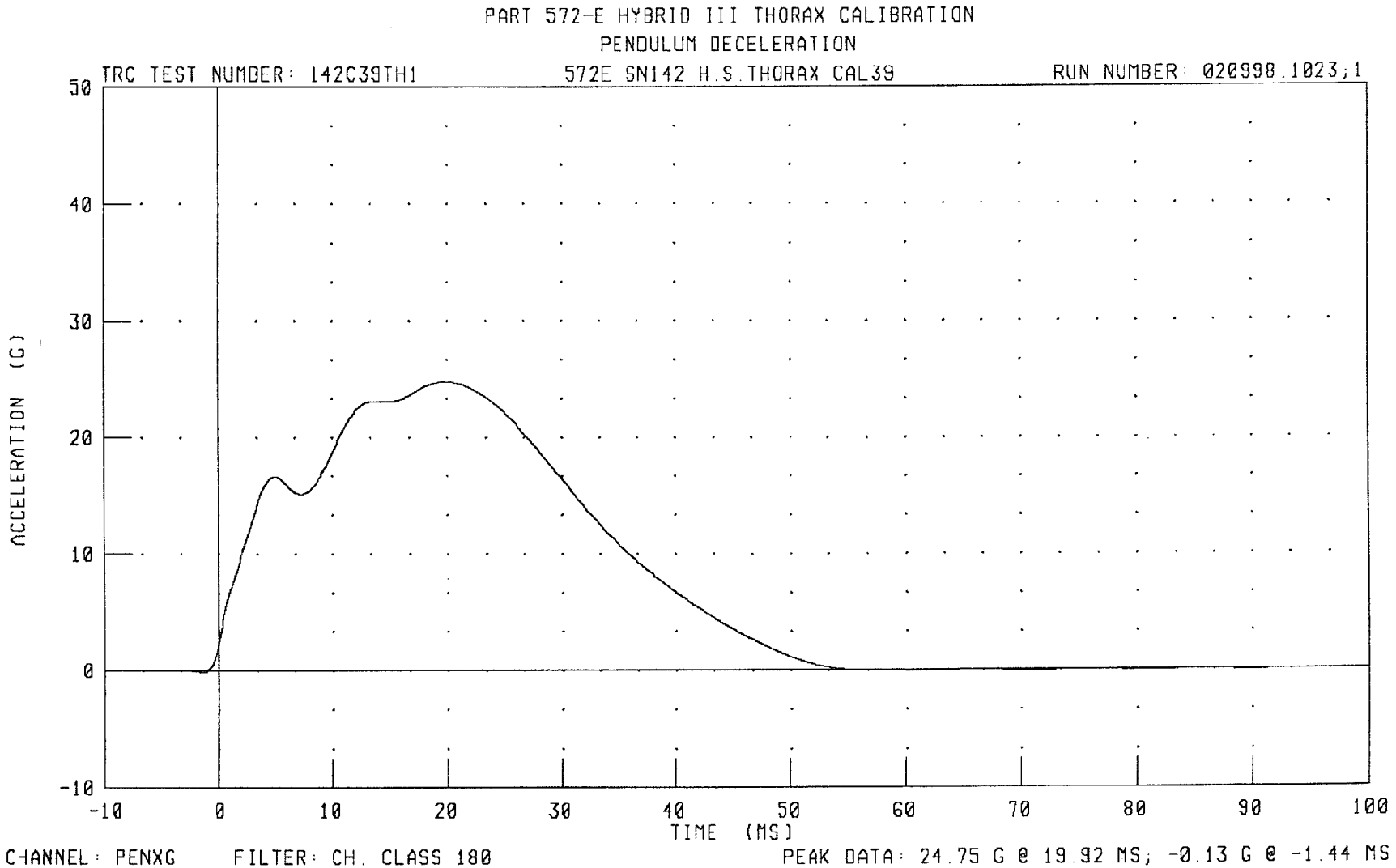
THORAX IMPACT TEST

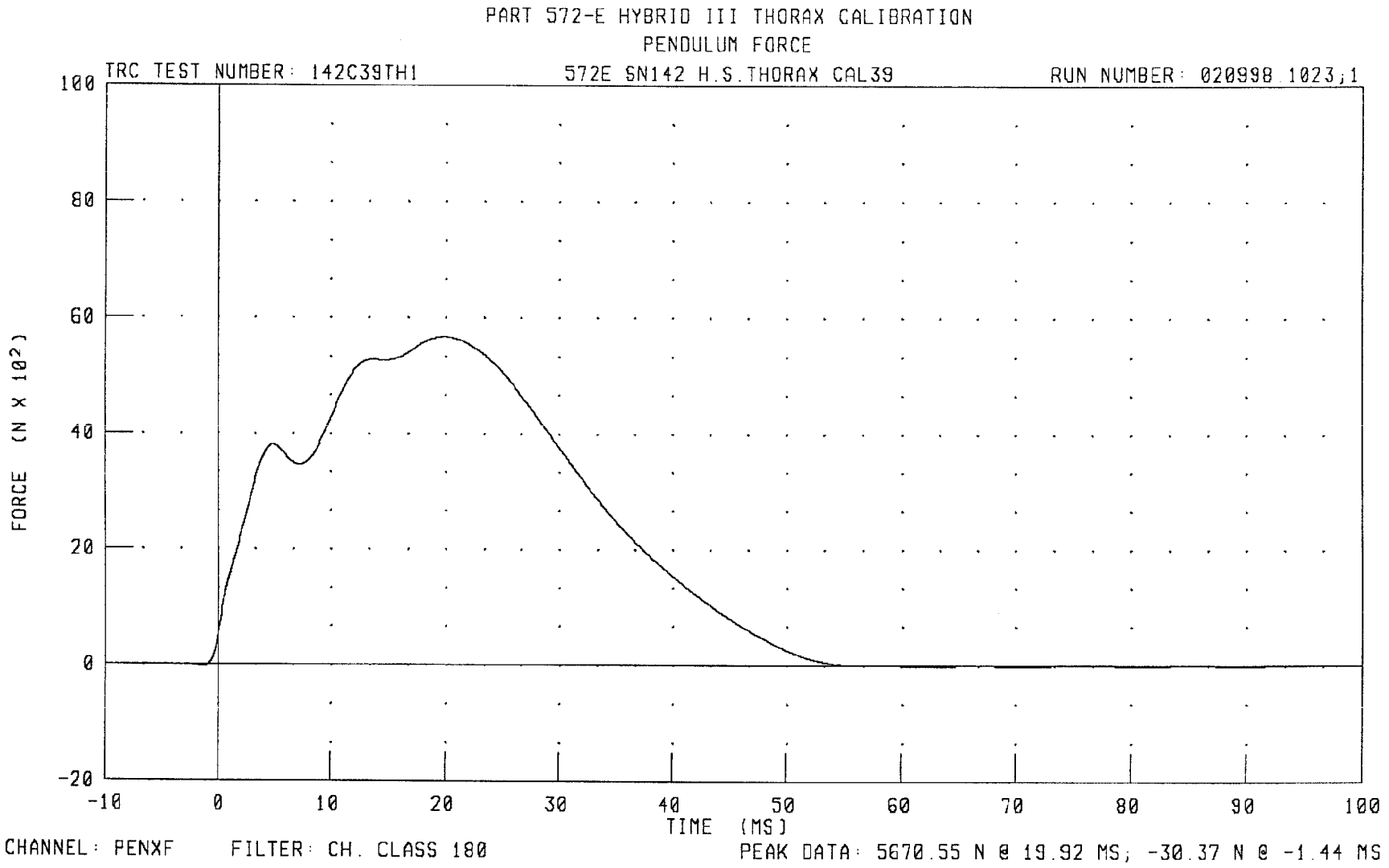
TRC INC. TEST NO: 142C39TH1 572E SN142 H.S.THORAX CAL39

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.71 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	72.5 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5670. N
INTERNAL HYSTERESIS	69% - 85%	70.9%

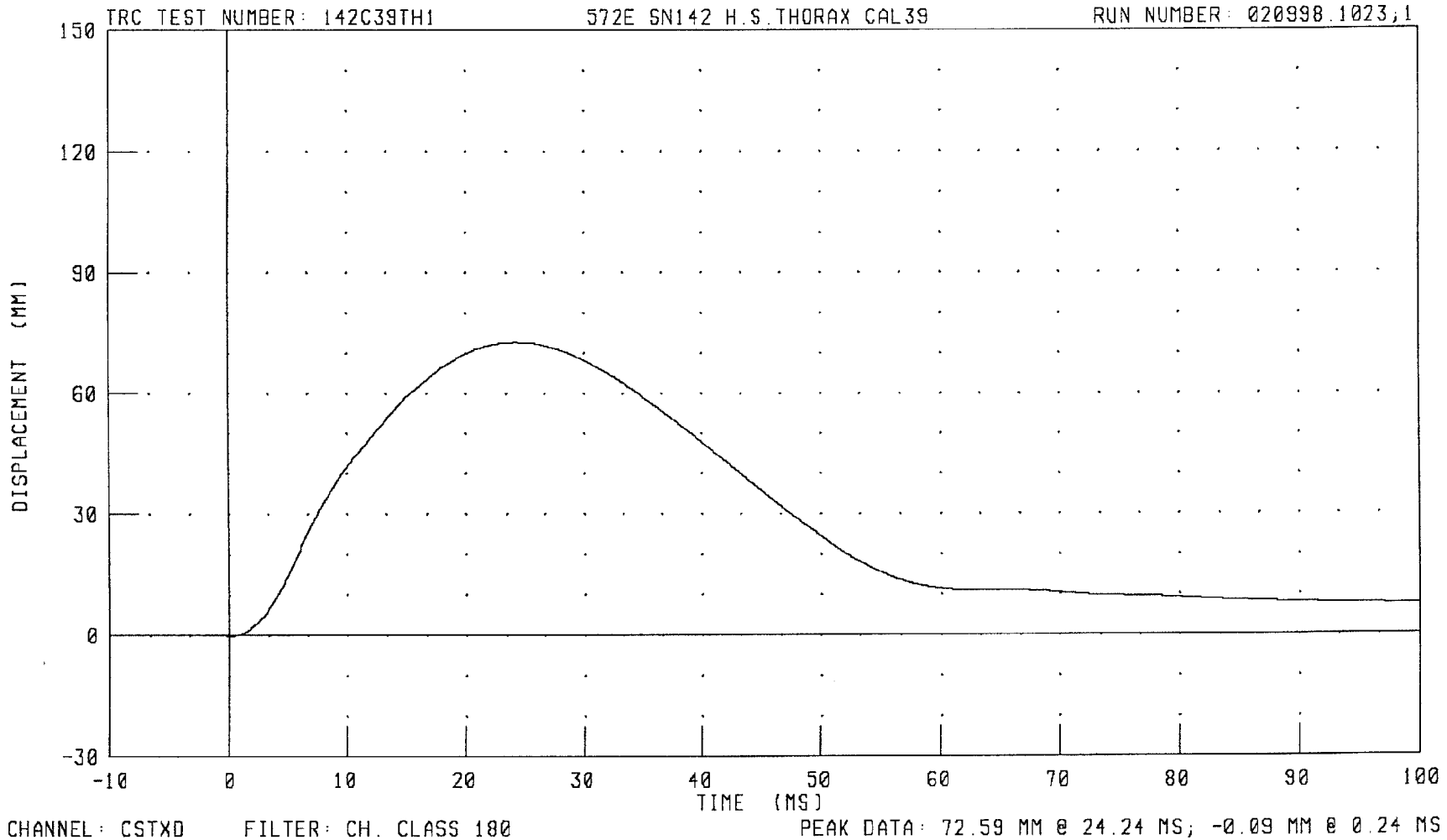
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 020998.1022;1


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 142C39TH1
572E SN142 H.S.THORAX CAL39
RUN NUMBER: 020998.1023;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: 24.75 G @ 19.92 MS; -0.13 G @ -1.44 MS

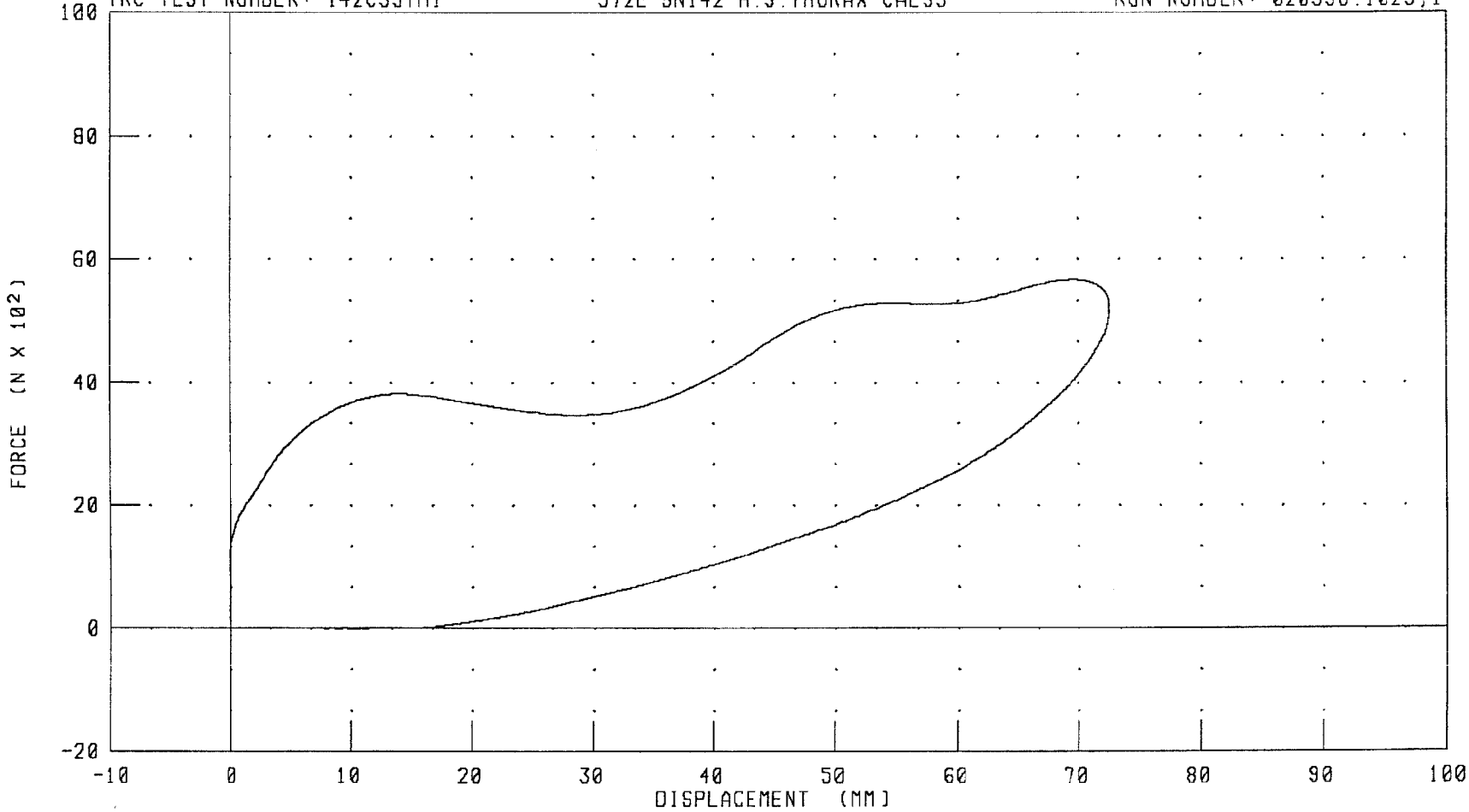

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 142C39TH1
572E SN142 H.S.THORAX CAL39
RUN NUMBER: 020998 1023;1
100
80
60
40
20
0
-20
FORCE (N X 10²)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5670.55 N @ 19.92 MS; -30.37 N @ -1.44 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT



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

TRC TEST NUMBER: 142C39TH1 572E SN142 H.S.THORAX CAL39 RUN NUMBER: 020998.1023;1



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 72.59 MM @ 24.24 MS; -0.09 MM @ 0.24 MS
PENXF CH. CLASS 180 5670.55 N @ 19.92 MS; -30.37 N @ -1.44 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

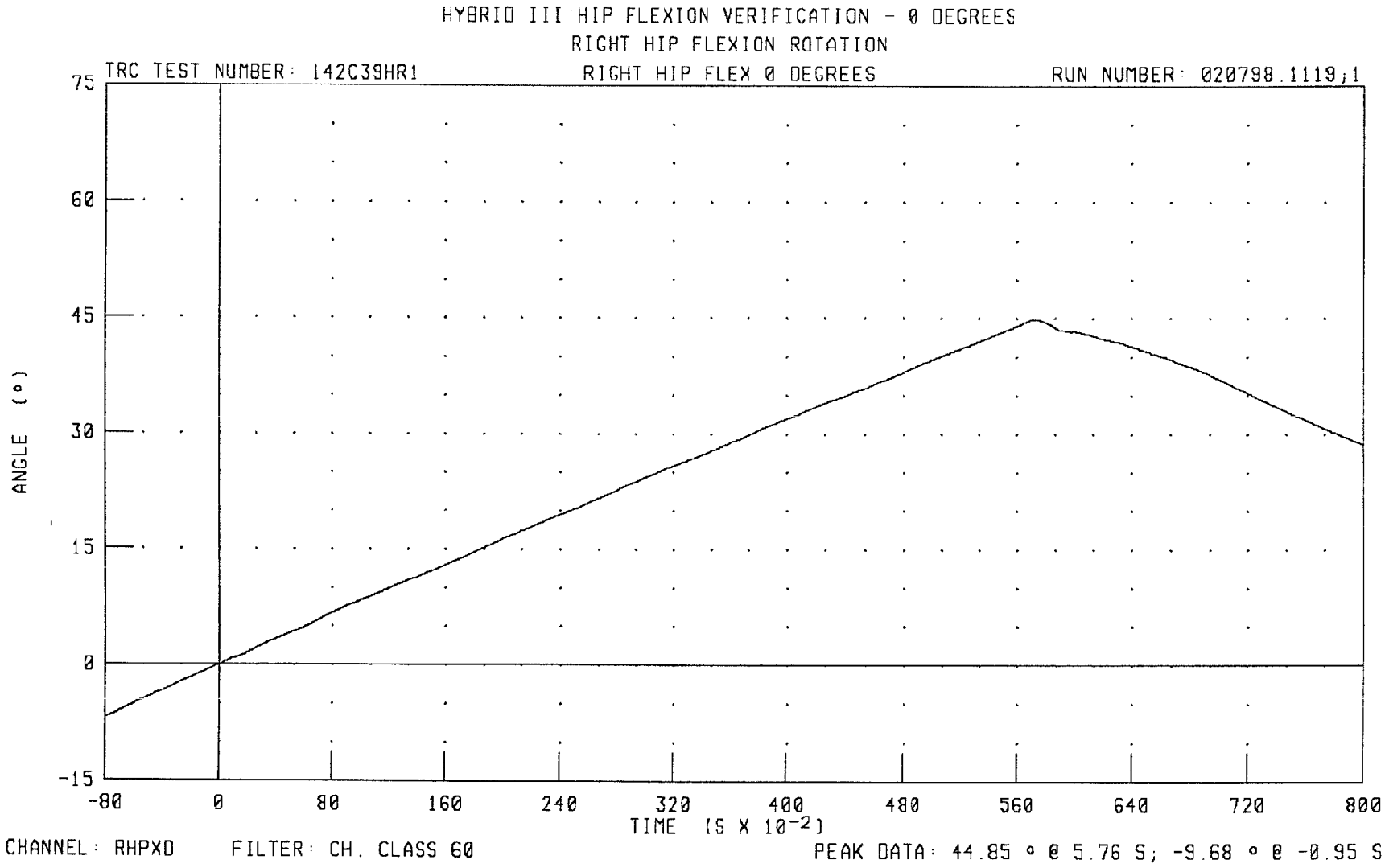
HYBRID III PART 572E 07-FEB-98

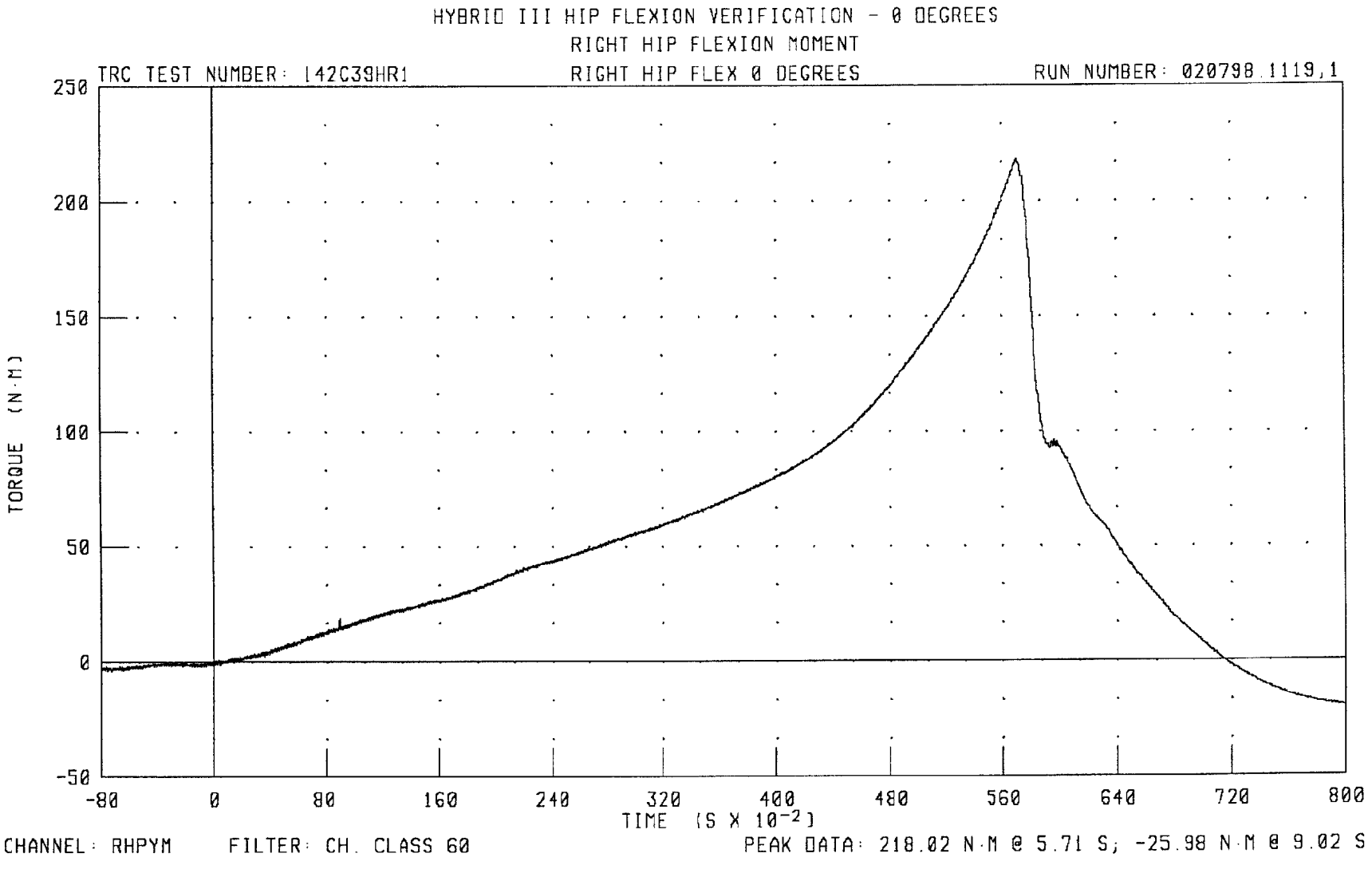
TRC INC. TEST NO: 142C39HR1 RIGHT HIP FLEX 0 DEGREES

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	72.9 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	44.2 deg.

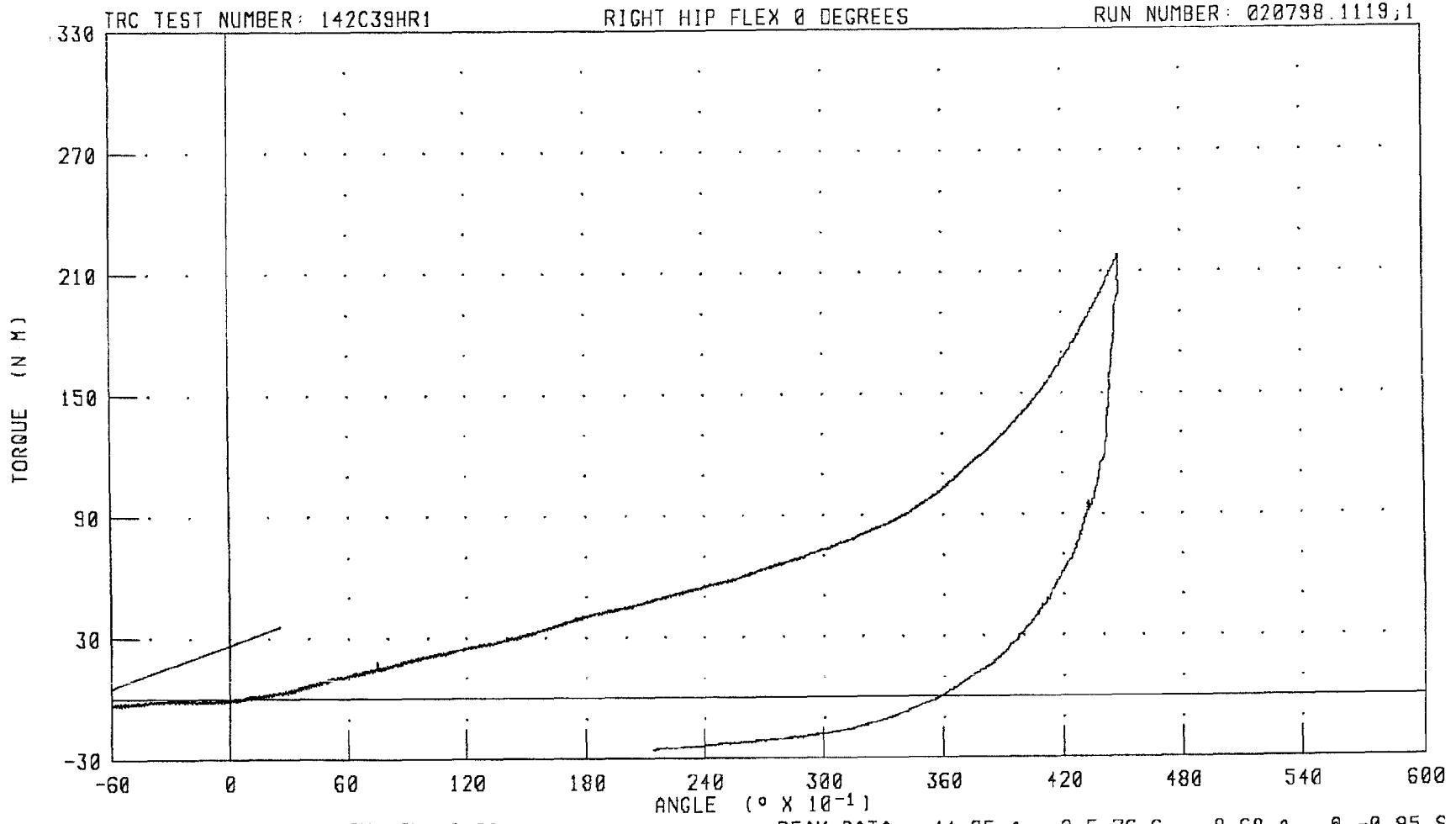
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudy RUN NUMBER: 020798.1107;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION ROTATION
TRC TEST NUMBER: 142C39HR1
RIGHT HIP FLEX 0 DEGREES
RUN NUMBER: 020798.1119;1
ANGLE (°)
75
60
45
30
15
0
-15
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10-2)
CHANNEL: RHPXD
FILTER: CH. CLASS 60
PEAK DATA: 44.85 ° @ 5.76 S; -9.68 ° @ -0.95 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION MOMENT
RIGHT HIP FLEX 0 DEGREES
TRC TEST NUMBER: I42C39HR1
RUN NUMBER: 020798.1119,1
250
200
150
100
50
0
-50
TORQUE (N-M)
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10^-2)
CHANNEL: RHPYM
FILTER: CH. CLASS 60
PEAK DATA: 218.02 N-M @ 5.71 S; -25.98 N-M @ 9.02 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE



TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

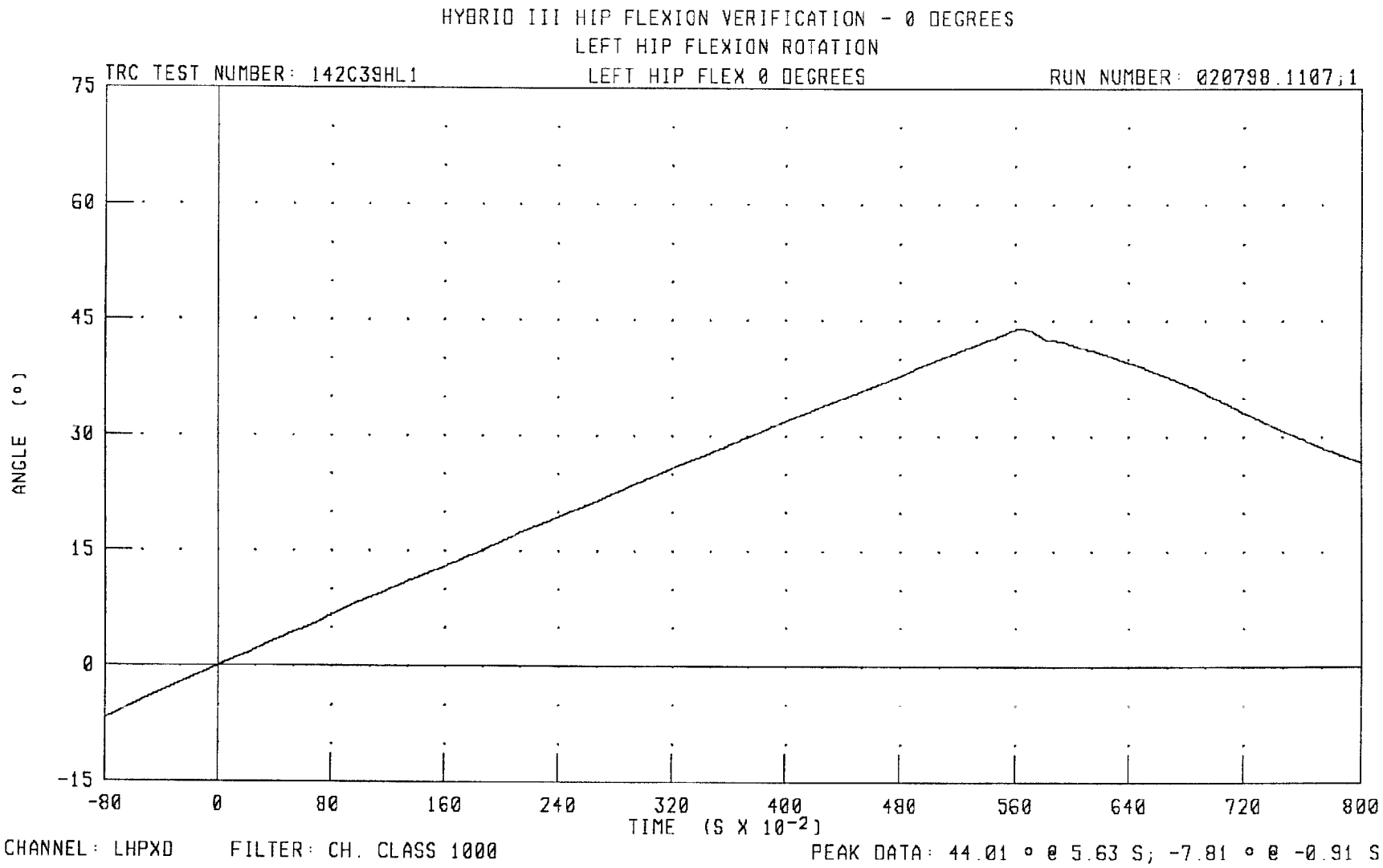
HYBRID III PART 572E 07-FEB-98

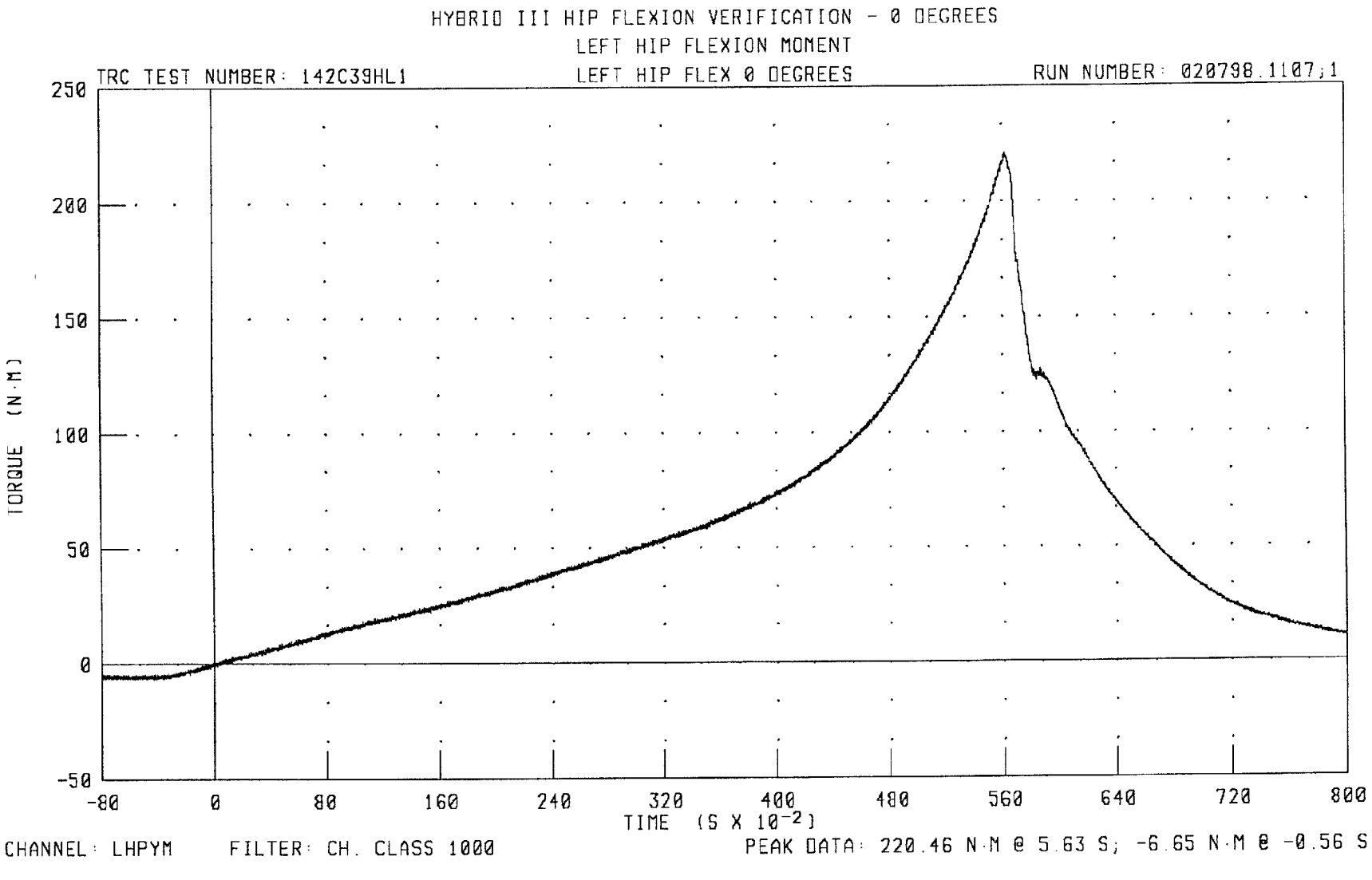
TRC INC. TEST NO: 142C39HL1 LEFT HIP FLEX 0 DEGREES

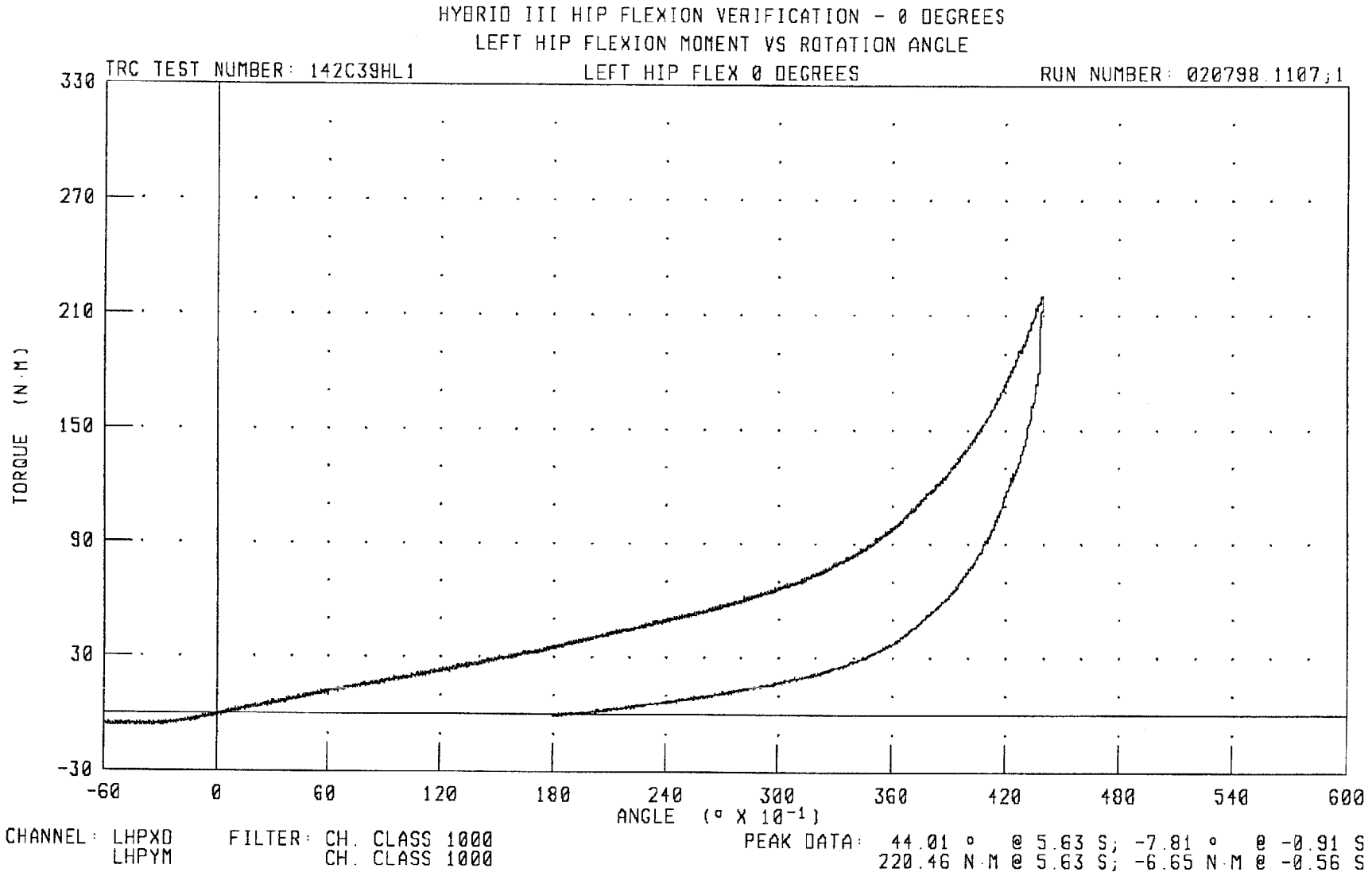
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	66.5 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	43.3 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudy RUN NUMBER: 020798.1104;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION ROTATION
TRC TEST NUMBER: 142C39HL1
LEFT HIP FLEX 0 DEGREES
RUN NUMBER: 020798.1107;1
75
60
45
30
15
0
-15
ANGLE (°)
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10-2)
CHANNEL: LHPXD
FILTER: CH. CLASS 1000
PEAK DATA: 44.01 ° @ 5.63 S; -7.81 ° @ -0.91 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT
LEFT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 142C39HL1
RUN NUMBER: 020798.1107;1
250
200
150
100
50
0
-50
TORQUE (N·M)
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10⁻²)
CHANNEL: LHPYM
FILTER: CH. CLASS 1000
PEAK DATA: 220.46 N·M @ 5.63 S; -6.65 N·M @ -0.56 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT VS ROTATION ANGLE
TRC TEST NUMBER: 142C39HL1
LEFT HIP FLEX 0 DEGREES
RUN NUMBER: 020798.1107;1
330
270
210
150
90
30
-30
TORQUE (N.M)
-60
0
60
120
180
240
300
360
420
480
540
600
ANGLE (° X 10⁻¹)
CHANNEL: LHPXD
LHPYM
FILTER: CH. CLASS 1000
CH. CLASS 1000
PEAK DATA: 44.01 ° @ 5.63 S; -7.81 ° @ -0.91 S
220.46 N.M @ 5.63 S; -6.65 N.M @ -0.56 S

TRANSPORTATION RESEARCH CENTER INC.

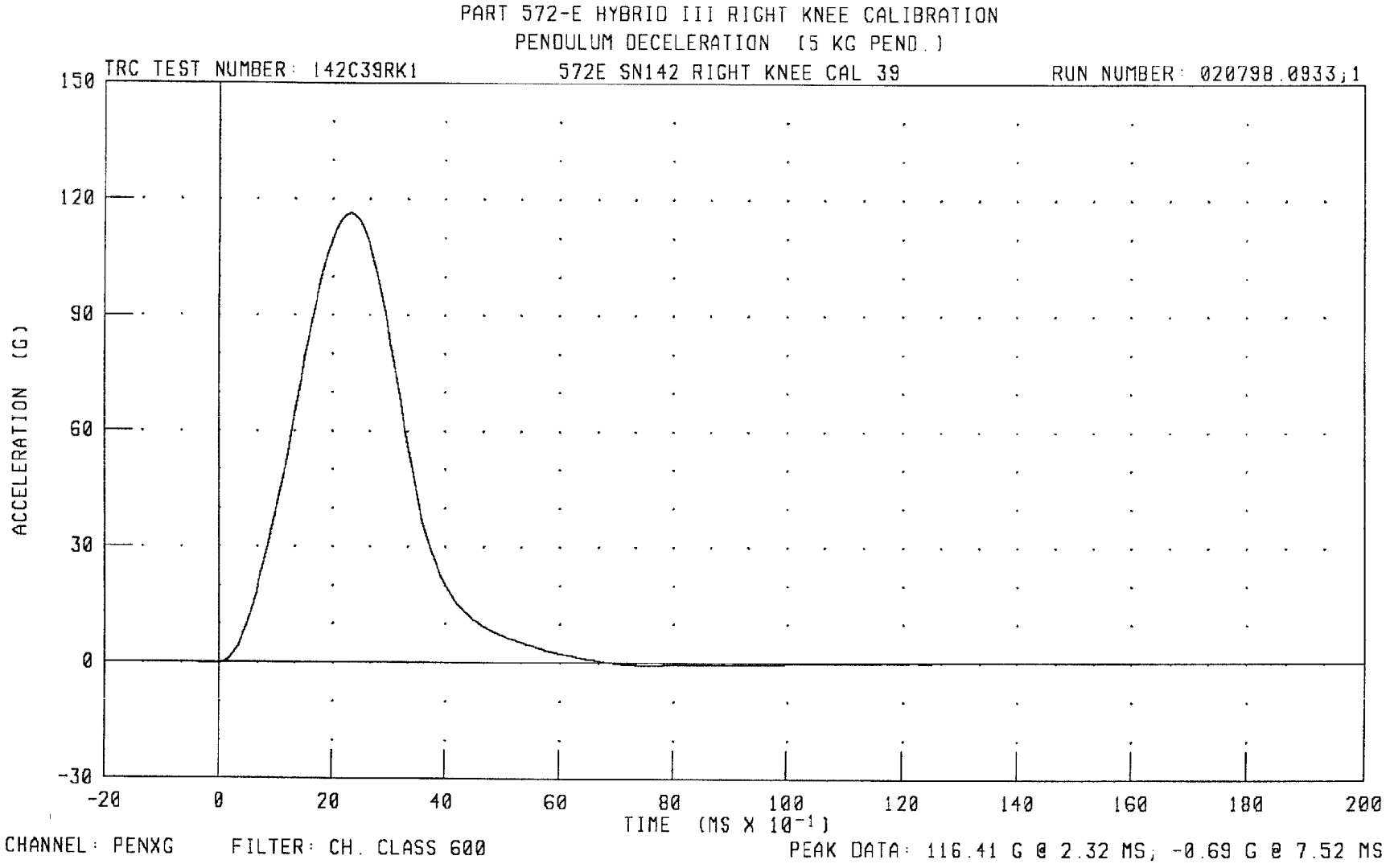
RIGHT KNEE IMPACT TEST

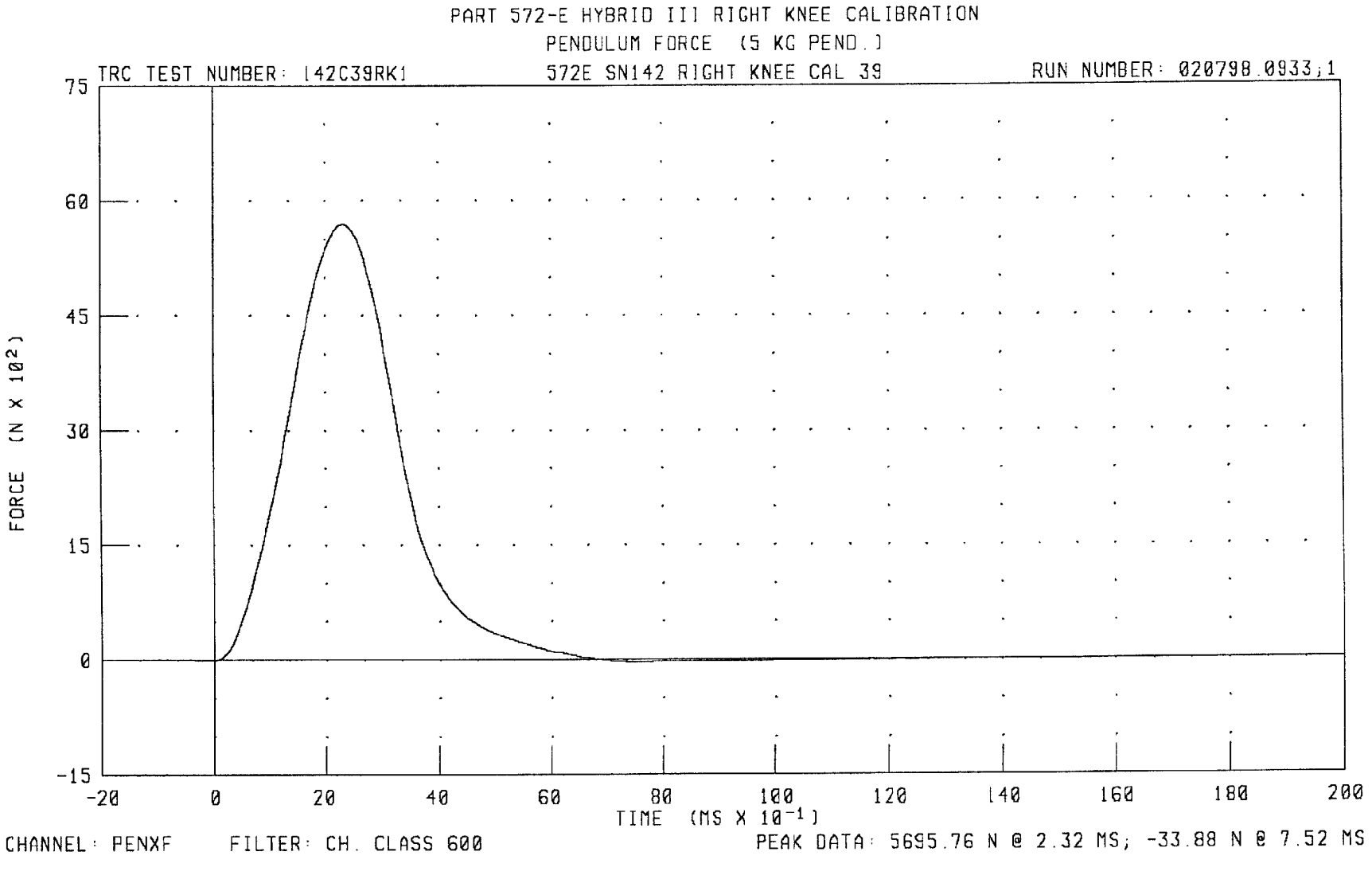
TRC INC. TEST NO: 142C39RK1 572E SN142 RIGHT KNEE CAL 39

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5695.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudon RUN NUMBER: 020798.0933;1


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 142C39RK1
572E SN142 RIGHT KNEE CAL 39
RUN NUMBER: 020798.0933;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: 116.41 G @ 2.32 MS; -0.69 G @ 7.52 MS


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 142C39RK1
572E SN142 RIGHT KNEE CAL 39
RUN NUMBER: 020798.0933;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: 5695.76 N @ 2.32 MS; -33.88 N @ 7.52 MS

TRANSPORTATION RESEARCH CENTER INC.

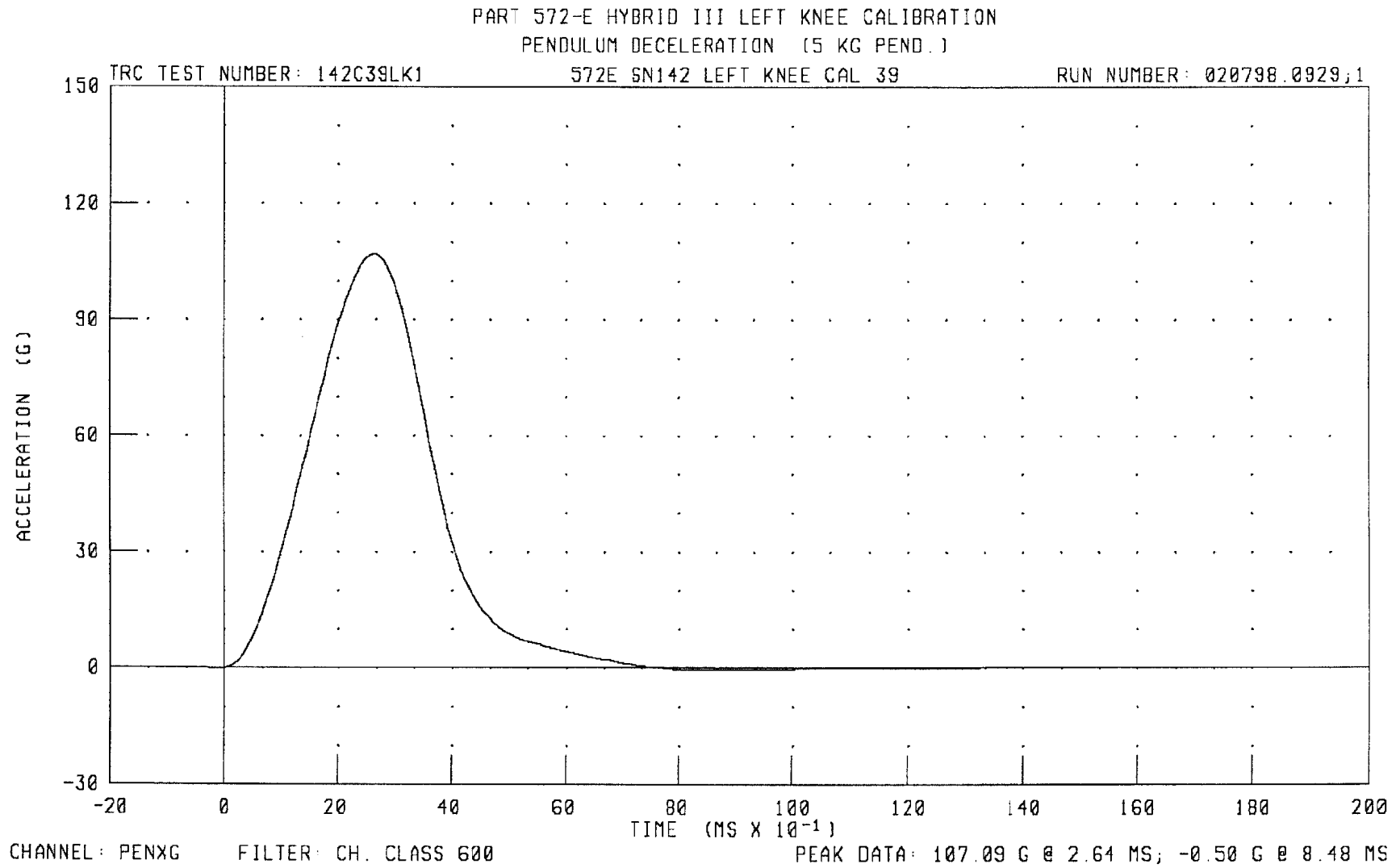
LEFT KNEE IMPACT TEST

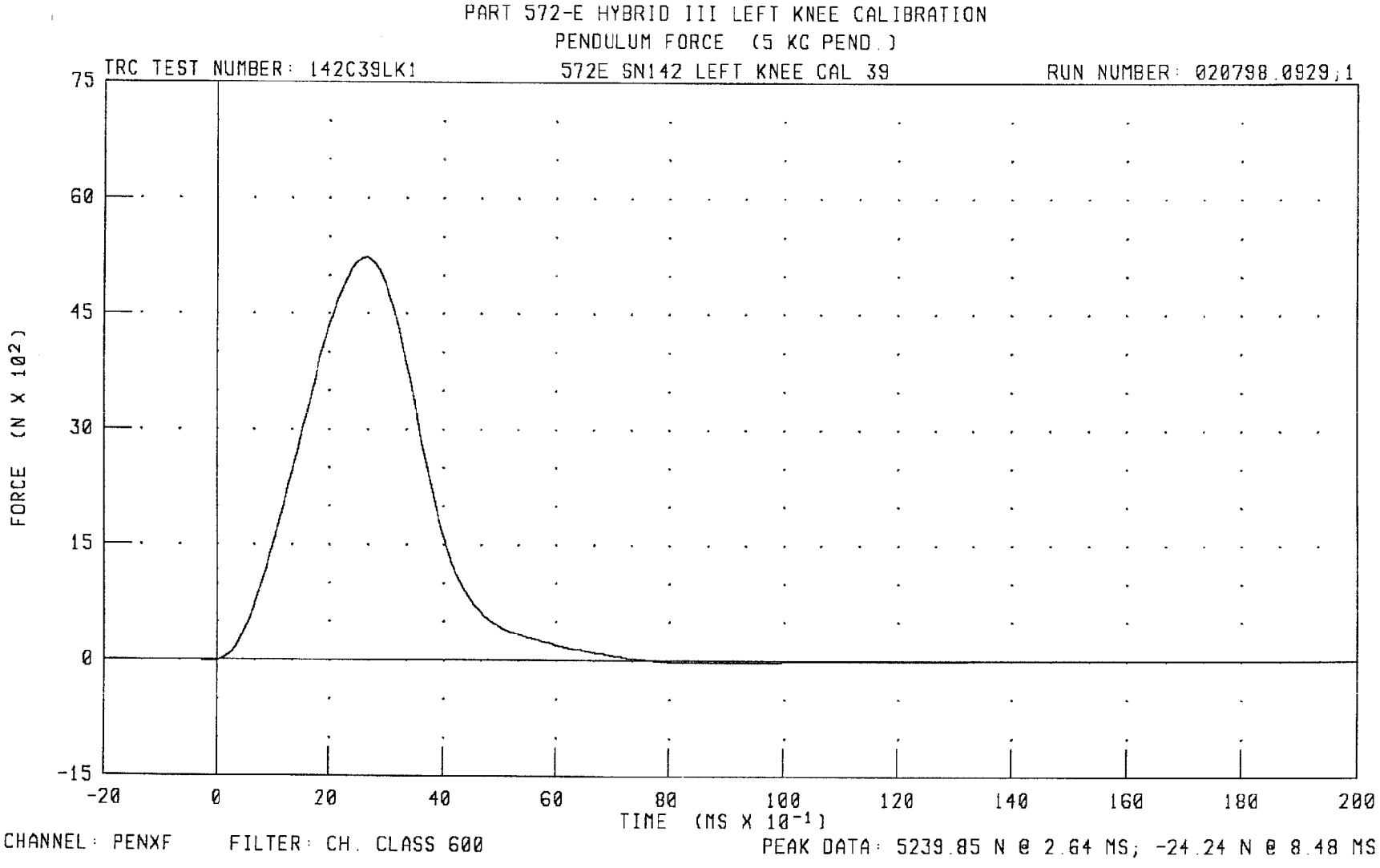
TRC INC. TEST NO: 142C39LK1 572E SN142 LEFT KNEE CAL 39

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5239.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN John K Claridge RUN NUMBER: 020798.0927;1


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 142C39LK1
572E SN142 LEFT KNEE CAL 39
RUN NUMBER: 020798.0929;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: 107.09 G @ 2.64 MS; -0.50 G @ 8.48 MS


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 142C39LK1
572E SN142 LEFT KNEE CAL 39
RUN NUMBER: 020798.0929;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: 5239.85 N @ 2.64 MS; -24.24 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	AAL54	7264	Endevco	01/05/98	07/05/98
Head X-axis accelerometer-redundant	AJ8J7	7264	Endevco	01/05/98	07/05/98
Head Y-axis accelerometer	AAMP6	7264	Endevco	01/05/98	07/05/98
Head Y-axis accelerometer-redundant	J15391	7264	Endevco	01/05/98	07/05/98
Head Z-axis accelerometer	ACB35	7264	Endevco	01/05/98	07/05/98
Head Z-axis accelerometer-redundant	AC8W6	7264	Endevco	01/05/98	07/05/98
Chest X-axis accelerometer	ACCD0	7264	Endevco	01/05/98	07/05/98
Chest X-axis accelerometer-redundant	A79GJ	7264	Endevco	01/05/98	07/05/98
Chest Y-axis accelerometer	ACC82	7264	Endevco	01/05/98	07/05/98
Chest Y-axis accelerometer-redundant	AGR69	7264	Endevco	01/05/98	07/05/98
Chest Z-axis accelerometer	ACC59	7264	Endevco	01/05/98	07/05/98
Chest Z-axis accelerometer-redundant	AAL82	7264	Endevco	01/05/98	07/05/98
Left femur force load cell	263	2121	Denton	01/05/98	07/05/98
Right femur force load cell	264	2121	Denton	01/05/98	07/05/98
Neck X-axis force load cell	445	1716	Denton	10/01/97	04/01/98
Neck Y-axis force load cell	445	1716	Denton	10/01/97	04/01/98
Neck Z-axis force load cell	445	1716	Denton	10/01/97	04/01/98
Neck Moment about X-axis load cell	445	1716	Denton	10/01/97	04/01/98
Neck Moment about Y-axis load cell	445	1716	Denton	10/01/97	04/01/98
Neck Moment about Z-axis load cell	445	1716	Denton	10/01/97	04/01/98
Pelvis X-axis accelerometer	AJ694	7264	Endevco	01/05/98	07/05/98
Pelvis Y-axis accelerometer	J15376	7264	Endevco	01/05/98	07/05/98
Pelvis Z-axis accelerometer	AJ788	7264	Endevco	01/05/98	07/05/98
Chest deflection potentiometer	87313-96	14CB1-2981	Vernitech	01/05/98	07/05/98
Lap belt force load cell	134	3419	Lebow	01/02/98	07/02/98
Shoulder belt force load cell	590	3419	Lebow	01/02/98	07/02/98

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	039-MX	1583	Denton	09/26/97	03/26/98
Left upper tibia moment about Y-axis load cell	039-MY	1583	Denton	09/26/97	03/26/98
Right upper tibia moment about X-axis load cell	036-MX	1583	Denton	09/26/97	03/26/98
Right upper tibia moment about Y-axis load cell	036-MY	1583	Denton	09/26/97	03/26/98
Left Lower tibia X-axis force load cell	033-FY	1584	Denton	09/26/97	03/26/98
Left Lower tibia Z-axis force load cell	033-FZ	1584	Denton	09/26/97	03/26/98
Left Lower tibia moment about Y-axis load cell	033-MX	1584	Denton	09/26/97	03/26/98
Right Lower tibia X-axis force load cell	040-FY	1584	Denton	09/26/97	03/26/98
Right Lower tibia Z-axis force load cell	040-FZ	1584	Denton	09/26/97	03/26/98
Right Lower tibia moment about Y-axis load cell	040-MY	1584	Denton	09/26/97	03/26/98
Left foot X-axis accelerometer	10073	7264	Endevco	01/05/98	07/05/98
Left foot heel Z-axis accelerometer	10263	7264	Endevco	01/05/98	07/05/98
Left foot toe Z-axis accelerometer	10101	7264	Endevco	01/05/98	07/05/98
Right foot X-axis accelerometer	APYT4	7264	Endevco	01/05/98	07/05/98
Right foot heel Z-axis accelerometer	AP0R8	7264	Endevco	01/05/98	07/05/98
Right foot toe Z-axis accelerometer	10076	7264	Endevco	01/05/98	07/05/98

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

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Left knee left sensor	036	1587	Denton	09/26/97	03/26/98
Left knee right sensor	036	1587	Denton	09/26/97	03/26/98
Right knee left sensor	043	1587	Denton	09/26/97	03/26/98
Right knee right sensor	043	1587	Denton	09/26/97	03/26/98

Dummy Instrument Calibrations, Cont'd.
Passenger Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Head X-axis accelerometer	ACC63	7264	Endevco	01/05/98	07/05/98
Head X-axis accelerometer-redundant	AC8L5	7264	Endevco	01/05/98	07/05/98
Head Y-axis accelerometer	ACC02	7264	Endevco	01/05/98	07/05/98
Head Y-axis accelerometer-redundant	ACCR7	7264	Endevco	01/05/98	07/05/98
Head Z-axis accelerometer	ACCF3	7264	Endevco	01/05/98	07/05/98
Head Z-axis accelerometer-redundant	A68JJ	7264	Endevco	01/05/98	07/05/98
Chest X-axis accelerometer	ACC14	7264	Endevco	01/05/98	07/05/98
Chest X-axis accelerometer-redundant	A65JJ	7264	Endevco	01/05/98	07/05/98
Chest Y-axis accelerometer	ACCR0	7264	Endevco	01/05/98	07/05/98
Chest Y-axis accelerometer-redundant	FH14J	7264	Endevco	01/05/98	07/05/98
Chest Z-axis accelerometer	ACCT5	7264	Endevco	01/05/98	07/05/98
Chest Z-axis accelerometer-redundant	AC745	7264	Endevco	01/05/98	07/05/98
Left femur force load cell	257	2121	Denton	01/05/98	07/05/98
Right femur force load cell	258	2121	Denton	01/05/98	07/05/98
Neck X-axis force load cell[1]	441	1716	Denton	10/01/97	04/01/98
Neck Y-axis force load cell[1]	441	1716	Denton	10/01/97	04/01/98
Neck Z-axis force load cell[1]	441	1716	Denton	10/01/97	04/01/98
Neck Moment about X-axis load cell[1]	441	1716	Denton	10/01/97	04/01/98
Neck Moment about Y-axis load cell[1]	441	1716	Denton	10/01/97	04/01/98
Neck Moment about Z-axis load cell[1]	441	1716	Denton	10/01/97	04/01/98
Pelvis X-axis accelerometer	CY63H	7264	Endevco	01/05/98	07/05/98
Pelvis Y-axis accelerometer	AMWA9	7264	Endevco	01/05/98	07/05/98
Pelvis Z-axis accelerometer	ANA55	7264	Endevco	01/05/98	07/05/98
Chest deflection potentiometer	142	14CB1-2981	Vernitech	01/05/98	07/05/98
Lap belt force load cell	243	3419	Lebow	01/02/98	07/02/98
Shoulder belt force load cell	615	3419	Lebow	01/02/98	07/02/98

Dummy Instrument Calibrations, Cont'd.
Passenger Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Left upper tibia moment about X-axis load cell	023-MX	1583	Denton	09/26/97	03/26/98
Left upper tibia moment about Y-axis load cell	023-MY	1583	Denton	09/26/97	03/26/98
Right upper tibia moment about X-axis load cell	040-MX	1583	Denton	09/26/97	03/26/98
Right upper tibia moment about Y-axis load cell	040-MY	1583	Denton	09/26/97	03/26/98
Left Lower tibia X-axis force load cell	019-FY	1584	Denton	09/26/97	03/26/98
Left Lower tibia Z-axis force load cell	019-FZ	1584	Denton	09/26/97	03/26/98
Left Lower tibia moment about Y-axis load cell	019-MX	1584	Denton	09/26/97	03/26/98
Right Lower tibia X-axis force load cell	034-FY	1584	Denton	09/26/97	03/26/98
Right Lower tibia Z-axis force load cell	034-FZ	1584	Denton	09/26/97	03/26/98
Right Lower tibia moment about Y-axis load cell	034-MX	1584	Denton	09/26/97	03/26/98
Left foot X-axis accelerometer	APA01	7264	Endevco	01/05/98	07/05/98
Left foot heel Z-axis accelerometer	J14136	7264	Endevco	01/05/98	07/05/98
Left foot toe Z-axis accelerometer	DW58JC	7264	Endevco	01/05/98	07/05/98
Right foot X-axis accelerometer	10088	7264	Endevco	01/05/98	07/05/98
Right foot heel Z-axis accelerometer	10089	7264	Endevco	01/05/98	07/05/98
Right foot toe Z-axis accelerometer	10087	7264	Endevco	01/05/98	07/05/98

Dummy Instrument Calibrations, Cont'd.
Passenger Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Left knee left sensor	045	1587	Denton	09/26/97	03/26/98
Left knee right sensor	045	1587	Denton	09/26/97	03/26/98
Right knee left sensor	037	1587	Denton	09/26/97	03/26/98
Right knee right sensor	037	1587	Denton	09/26/97	03/26/98

Vehicle and Calibration Laboratory Instrument Calibrations

Vehicle Accelerometers

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Left rear seat crossmember X-axis	J19697	7264	Endevco	01/02/98	07/02/98
Left rear seat crossmember X-axis redundant	J22049	7264	Endevco	11/13/97	05/13/98
Right rear seat crossmember X-axis	J20009	7264	Endevco	08/15/97	02/15/98
Right rear seat crossmember X-axis redundant	J14167	7264	Endevco	12/15/97	06/15/98
Engine top X-axis	J18895	7264	Endevco	08/20/97	02/20/98
Engine bottom X-axis	96601-Z04	7264	Endevco	01/09/98	07/09/98
Right brake caliper X-axis	J14177	7264	Endevco	12/15/97	06/15/98
Left brake caliper X-axis	J20037	7264	Endevco	12/16/97	06/16/98
Instrument panel center X-axis	J19976	7264	Endevco	08/15/97	02/15/98

Calibration Laboratory Instruments

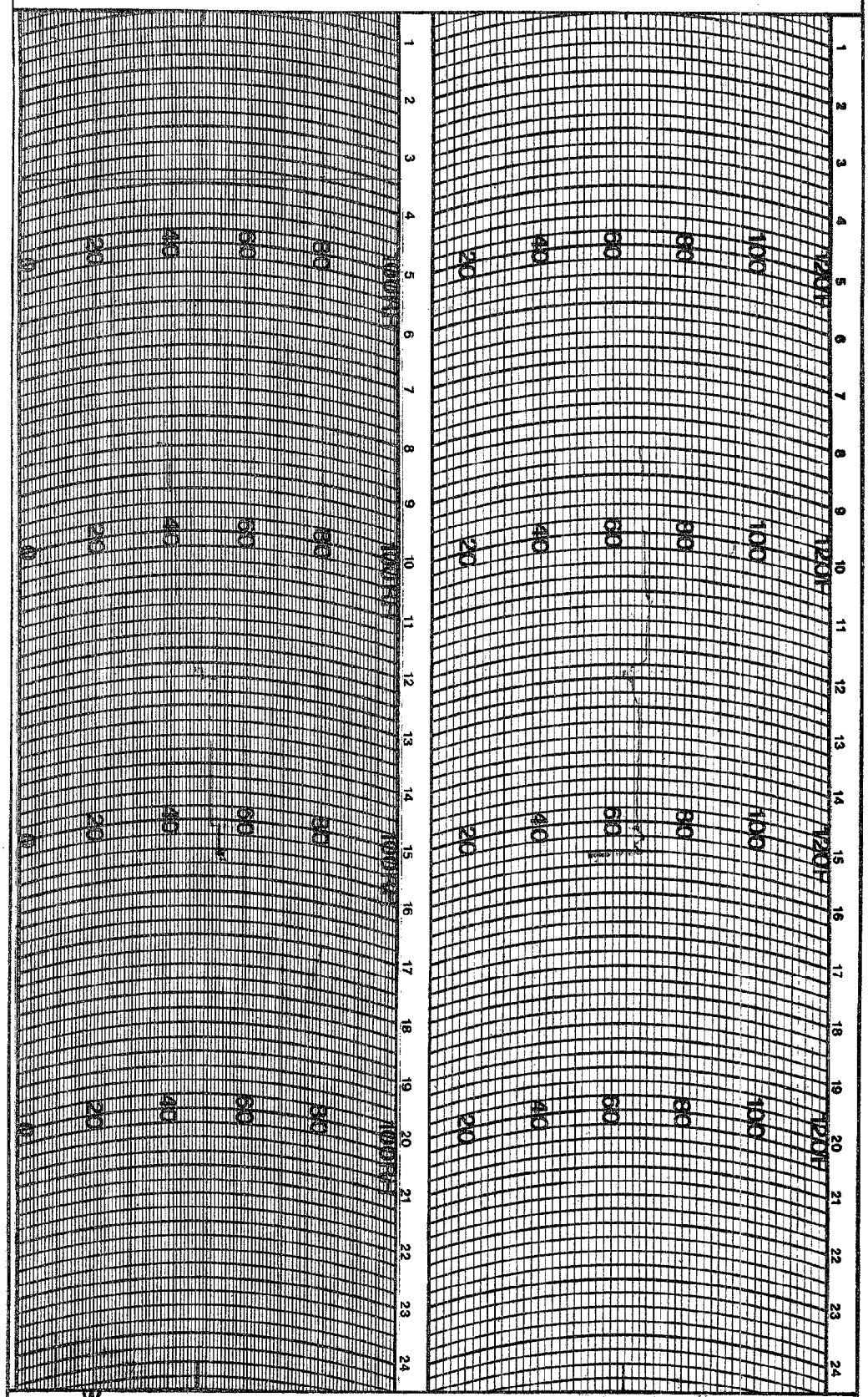
	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Neck bending pendulum accelerometer	CB27	7232	Endevco	09/18/97	03/18/98
Neck bending rotary potentiometer	6	6657S	Bournes	08/04/97	02/04/98
Neck bending rotary potentiometer	7	6657S	Bournes	08/04/97	02/04/98
Thorax/Hybrid III femur pendulum accelerometer	CC64	7232	Endevco	09/18/97	03/18/98
Hybrid III femur pendulum accelerometer	CB35	7232	Endevco	09/18/97	03/18/98

Sign Convention
NHTSA Data Tape Reference Guide

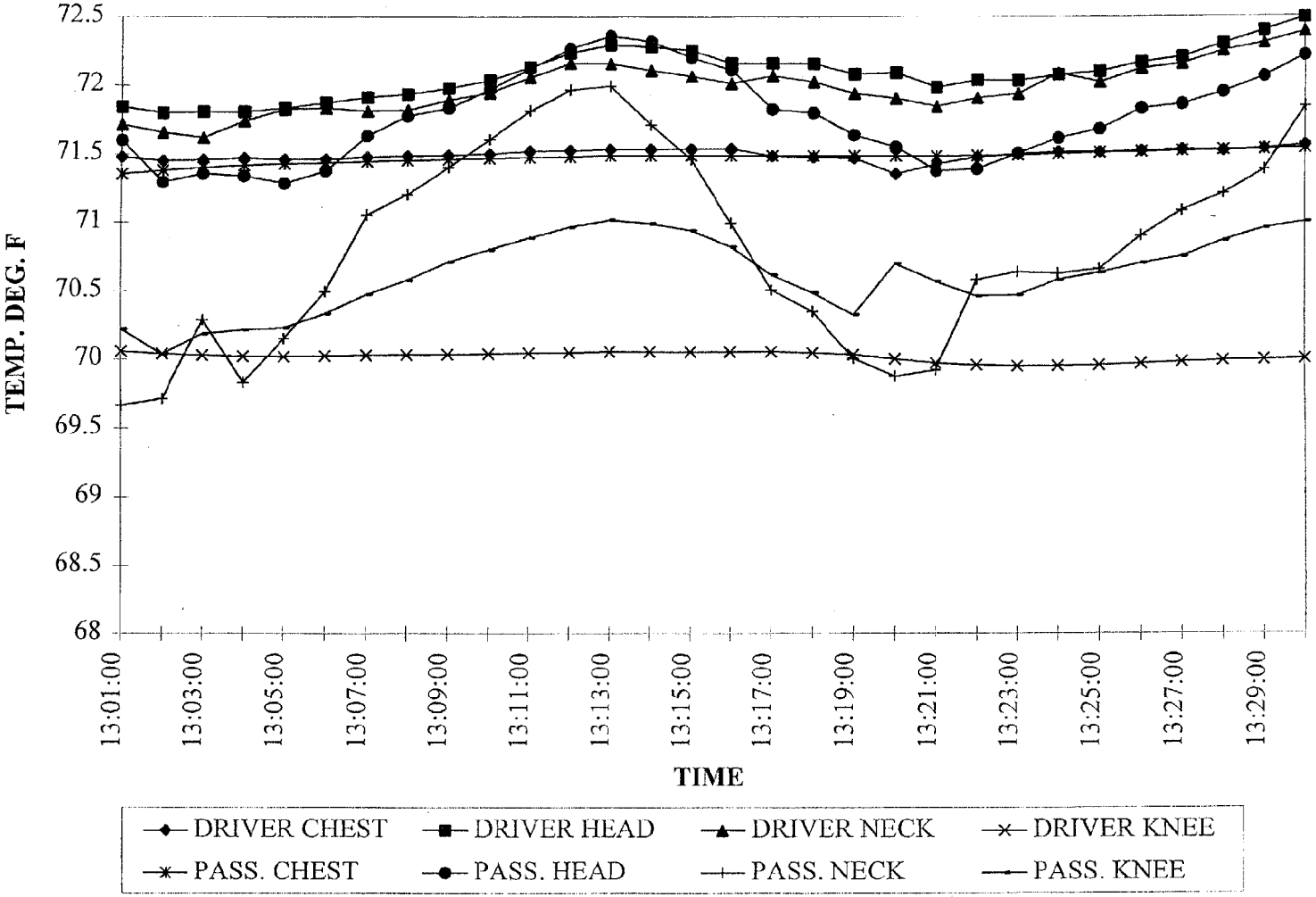
Accelerometers:	+X: Forward	
	+Y: Leftward	
	+Z: Upward	
Potentiometers:	+Chest longitudinal deflection:	Outward
	+Chest lateral deflection:	Leftward
	+Seat belt displacement:	Outward
	+Seat belt extension:	Elongation
	+Knee slider displacement:	Distance between femur and tibia increased (in relation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

Frequency Response Classes
SAE J211 OCT88

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


WEATHER MEASURE
P.O. BOX 41257
SACRAMENTO, CA. 95841
PHONE (916) 481-7565
HYGROTHERMOGRAPH
1 DAY
CHART # C311 D HF
PART # 699123
STATION
DATE ON 2/10/98
DATE OFF

980210


72.5
72
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69.5
69
68.5
68
TEMP. DEG. F
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13:05:00
13:07:00
13:09:00
13:11:00
13:13:00
13:15:00
13:17:00
13:19:00
13:21:00
13:23:00
13:25:00
13:27:00
13:29:00
TIME
DRIVER CHEST
DRIVER HEAD
DRIVER NECK
DRIVER KNEE
PASS. CHEST
PASS. HEAD
PASS. NECK
PASS. KNEE

Appendix E

Restraint System Instructions from Owner's Manual

Seat, seat belt and SRS AIRBAG

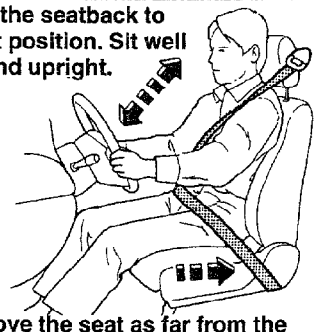
Front seats

⚠ WARNING

- Never adjust the seat while driving to avoid the possibility of loss of vehicle control and of personal injury.
- Never drive the vehicle with the head restraints removed because they are designed to reduce the risk of serious neck injury in the event that the vehicle is struck from the rear.
- Before adjusting the seat, make sure the hands and feet of rear seat passengers are clear of the adjusting mechanism.
- Seat belts provide maximum restraint when the occupant sits well back and upright in the seat. To reduce the risk of sliding under the seat belt in a collision, the front seatbacks should be always used in the upright position while the vehicle is running. If the front seatbacks are not used in the upright position in a collision, the risk of sliding under the lap belt and of the lap belt sliding up over the abdomen will increase, and both can result in serious internal injury or death.
- Do not put cushions or any other materials between occupants and seatbacks or seat cushions. If you do so, the risk of sliding under the lap belt and of the lap belt sliding up over the abdomen will increase, and both can result in serious internal injury or death.
- The SRS AIRBAGs deploy with considerable speed and force. Occupants who are out of proper position when the SRS AIRBAG deploys could suffer very serious injuries. Because the SRS AIRBAG needs much space for deployment, the driver should always sit upright and well back in the seat as far from the steering wheel as practical while still maintaining full vehicle control and the front passenger should move the seat as far back as possible and sit upright and well back in the seat.
- Be sure to put children aged 12 and under in the rear seat properly restrained at all times. The SRS AIRBAG deploys with considerable speed and force and can injure or even kill children, especially if they are 12 years of age and under and are not restrained or improperly restrained. Because children are lighter and weaker

than adults, their risk of being injured from deployment is greater. For that reason, we strongly recommend that ALL children (including those in child seats and those that have outgrown child restraint devices) sit in the REAR seat properly restrained at all times in a child restraint device or in a seat belt, whichever is appropriate for the child's age, height and weight. Be sure to secure ALL types of child restraint devices (including forward facing child seat) in the REAR seats at all times. NEVER INSTALL A REARWARD FACING CHILD SEAT IN THE FRONT SEAT. DOING SO RISKS SERIOUS INJURY OR DEATH TO THE CHILD BY PLACING THE CHILD'S HEAD TOO CLOSE TO THE SRS AIRBAG. According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions. For instructions and precautions concerning child restraint systems, see the Child Restraint System section in this chapter.

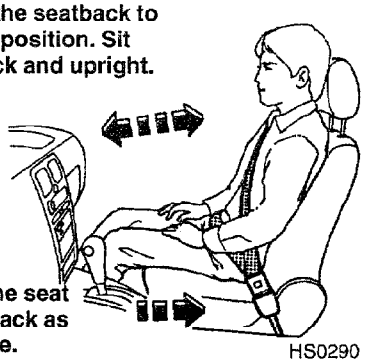
Adjust the seatback to upright position. Sit well back and upright.



Move the seat as far from the steering wheel as practical.

HS0233

Adjust the seatback to upright position. Sit well back and upright.



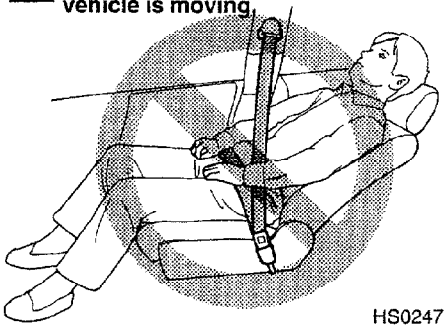
Move the seat as far back as possible.

HS0290

Put children in the rearseat properly restrained at all times.

HS0291

⚠ Do not recline the seatback while vehicle is moving.



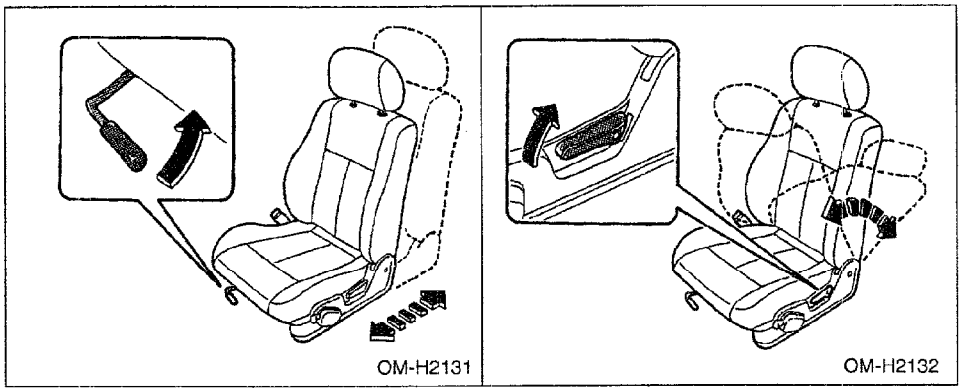
HS0247

– CONTINUED –

⚠ CAUTION

Metallic parts of the seat belt can become very hot in a vehicle that has been closed up in sunny weather; they could burn an occupant. Do not touch such hot parts.

■ Fore and aft adjustment

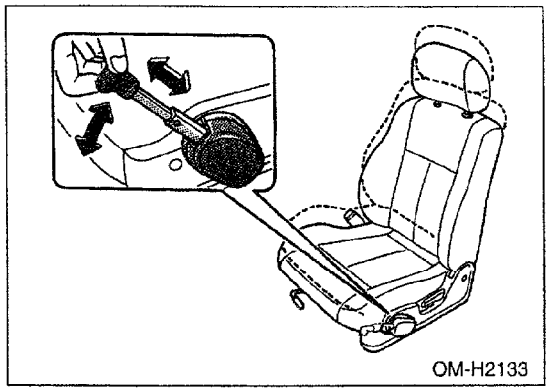


Pull the lever upward and slide the seat to the desired position. Then release the lever and move the seat back and forth to make sure that it is securely locked into place.

■ Reclining the seatback

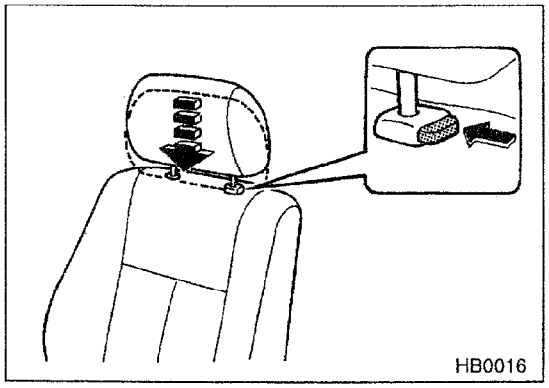
Pull the reclining lever up and adjust the seatback to the desired position. Then release the lever and make sure the seatback is securely locked into place.

■ Height adjustment (if equipped)



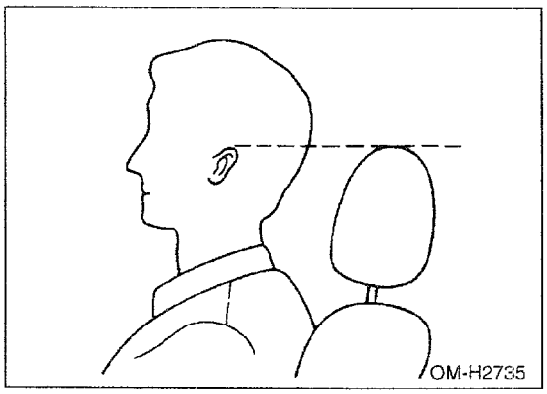
Pull the adjustment lever out and move it up or push it down to raise or lower the seat.

■ Head restraint adjustment



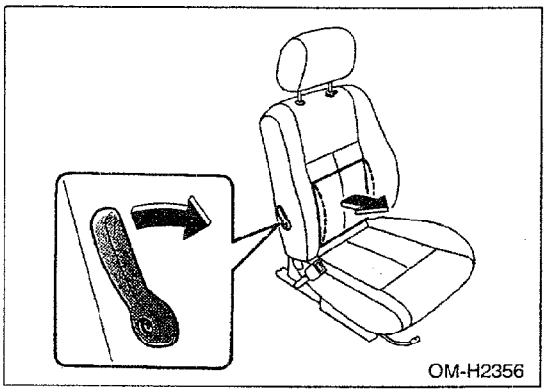
To raise the head restraint, pull it up. To lower it, push the head restraint down while depressing the release button on the top of the seatback.

– CONTINUED –
2-5



The best position for the head restraint is just above or level with the top of the ears.

■ Lumbar support (if equipped)

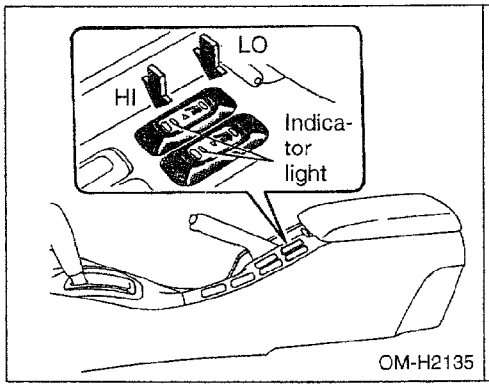


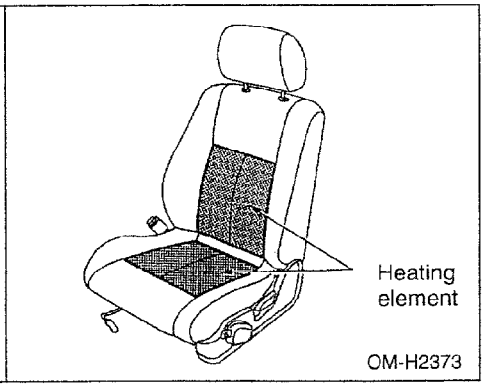
Pull the lever forward or backward.
Pulling the lever forward will increase the amount of support for your lower back.

■ Seat heater (if equipped)

> **⚠ CAUTION**
> - **Do not use the seat heater when the engine is not running. The battery could run down if the heater is operated while the engine is not running.**
> - **Do not put anything on the seat which insulates against heat, such as a blanket, cushion, or similar items. This may cause the seat heater to overheat.**
> - **When cleaning the seat, do not use benzine, paint thinner, or any similar materials.**

The seat heater operates when the ignition switch is either in the "ACC" or "ON" position.





To turn on the seat heater, push the "LO" or "HI" position on the switch, as desired, depending on the temperature.

LO: Normal heating

HI: Rapid heating

The indicator located on the switch comes on when the seat heater in operation. When the vehicle's interior is warmed enough or before you leave the vehicle, be sure to turn the switch off.

Rear seats

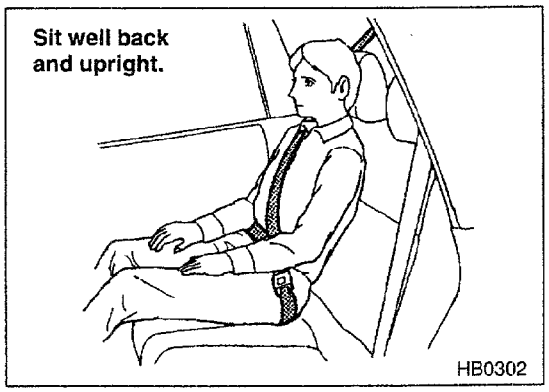
⚠ WARNING

• Seat belts provide maximum restraint when the occupant sits well back and upright in the seat. Do not put cushions or any other materials between occupants and seatbacks or seat cushions. If you do so, the risk of sliding under the lap belt and of the lap belt sliding up over the abdomen will increase, and both can result in serious internal injury or death.

• Never allow passengers to ride on the folded rear seatback, in the trunk or in the cargo area. Doing so may result in serious injury.

• Never stack luggage or other cargo higher than the top of the seatback because it could tumble forward and injure passengers in the event of a sudden stop or accident.

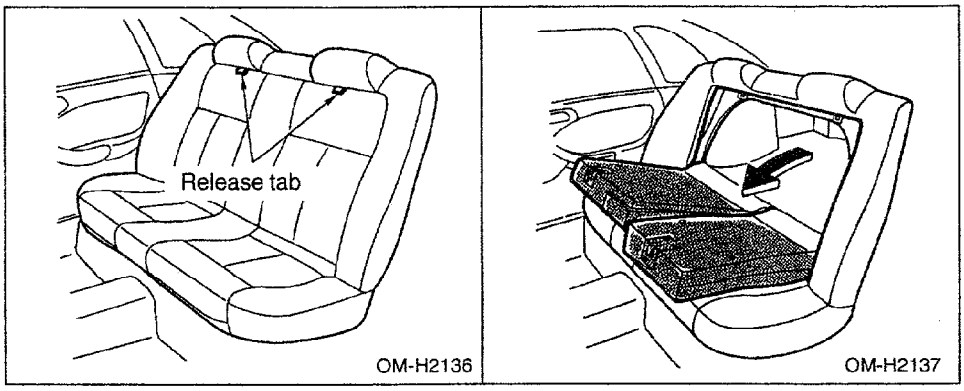
• Secure skis and other lengthy items properly to prevent them from shooting forward and causing serious injury during a sudden stop.



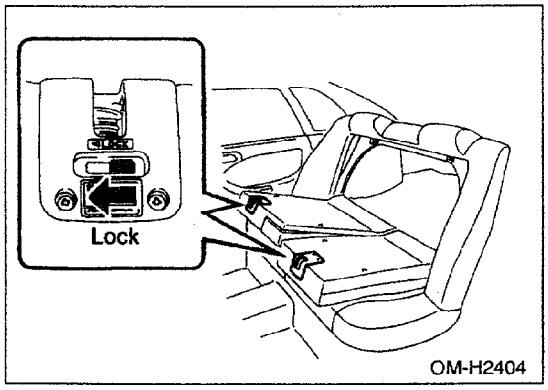
⚠ CAUTION

Metallic parts of the seat belt can become very hot in a vehicle that has been closed up in sunny weather; they could burn a occupant. Do not touch such hot parts.

■ Fold down rear seat — Sedan



To fold the seatback down, pull the release tab attached to the top of the seatback. To restore it, push the seatback up to its original position until it locks. Be sure to confirm that it is locked in place.

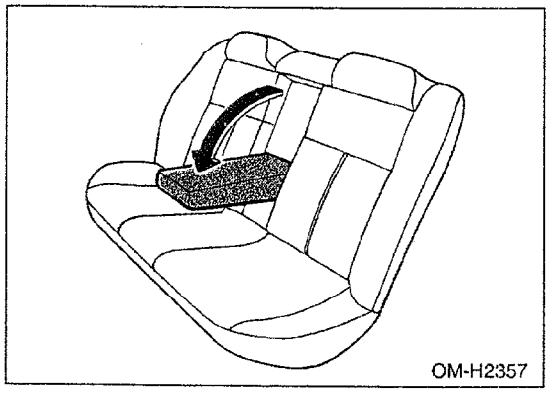


To cancel the fold down function, slide the lock knob located on the backside of the seatback to the "LOCK" position and close the seatback.

– CONTINUED –

▼ **Armrest (if equipped)**

⚠ WARNING
To avoid the possibility of serious injury, passengers must never be allowed to sit on the center armrest while the vehicle is in motion.

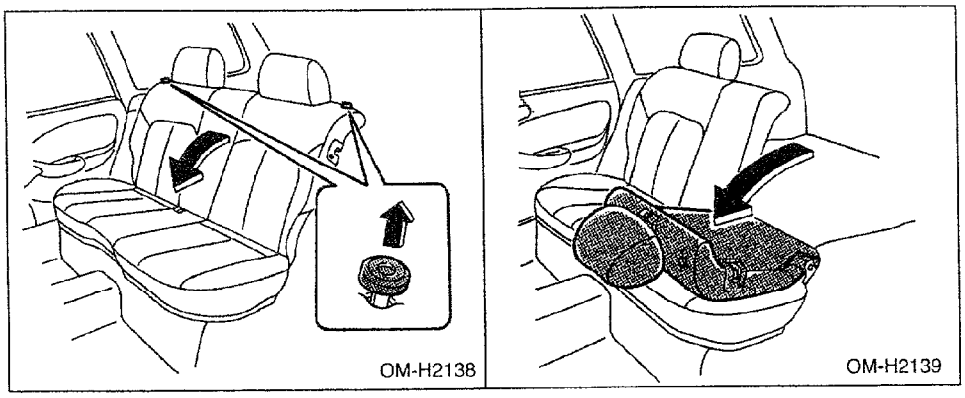


To lower the armrest, pull on the top edge of the armrest.

■ **Fold down rear seat — Wagon**

⚠ WARNING
After returning the rear seat to its original position, be certain to place all of the seat belts and the tab attached to the seat cushion above the seat cushion. And make certain that the shoulder belts are fully visible.

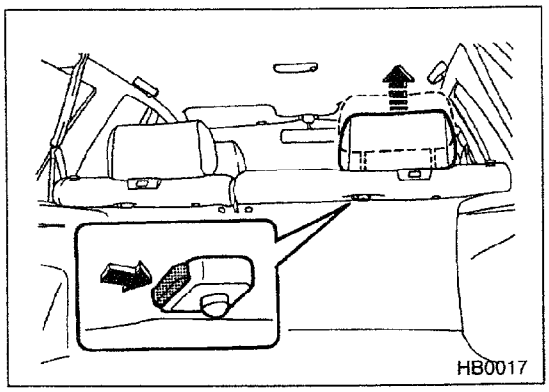
▼ Folding down the seatback



Unlock the seatback by pulling the release knob and fold it down.

▼ Folding down the seat cushion and seatback

1. Move the front seat forward.
2. (If your vehicles' rear seatbacks are equipped with head restraints.) To remove the head restraint, pull the head restraint up while pushing the release button located on the backside of the set-back.



3. Store the seat belts in the seat belt pocket to prevent them falling below the cushion.

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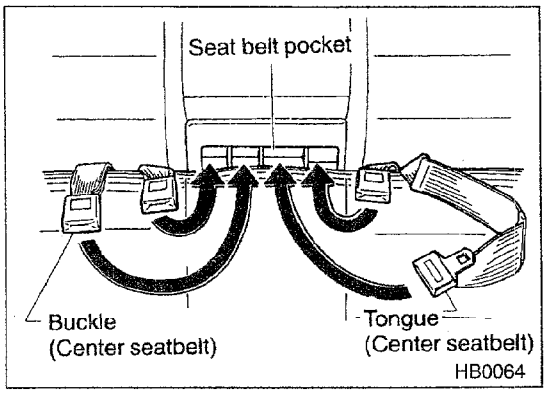
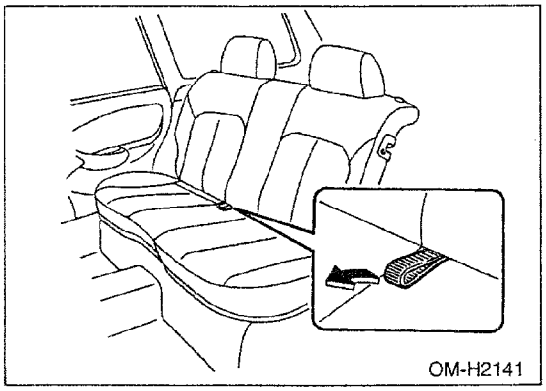
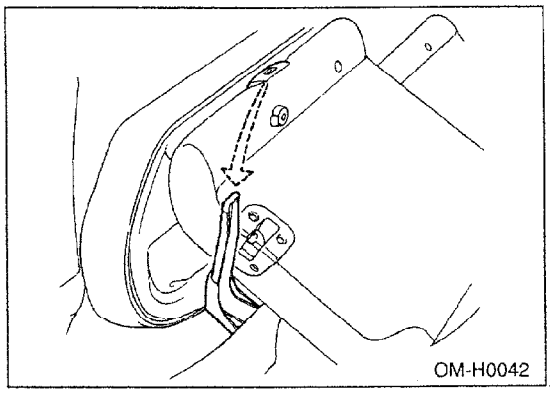


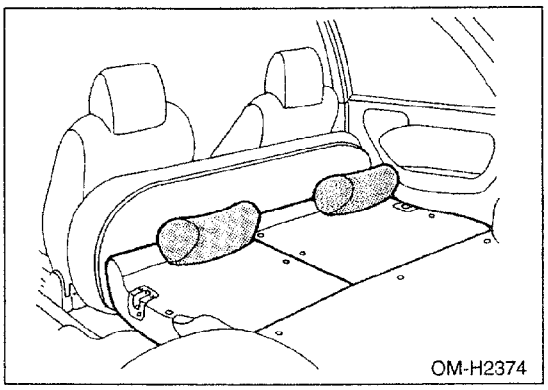
4. Raise the seat cushion by pulling up the tab.



5. Unlock the seatback by pulling the release knob and fold it down. Confirm that the pin located at the bottom of the seat cushion is inserted into the slot at the top of the seatback.



6. Install the head restraints onto the backside of the seatback.



To return the rear seat to its original position, raise the seatback and seat cushion until it locks into place and make sure that they are securely locked.
Make sure that the rear seat belts are not under the seat cushion or seatback.
Place the head restraints (if so equipped) back in their normal position.

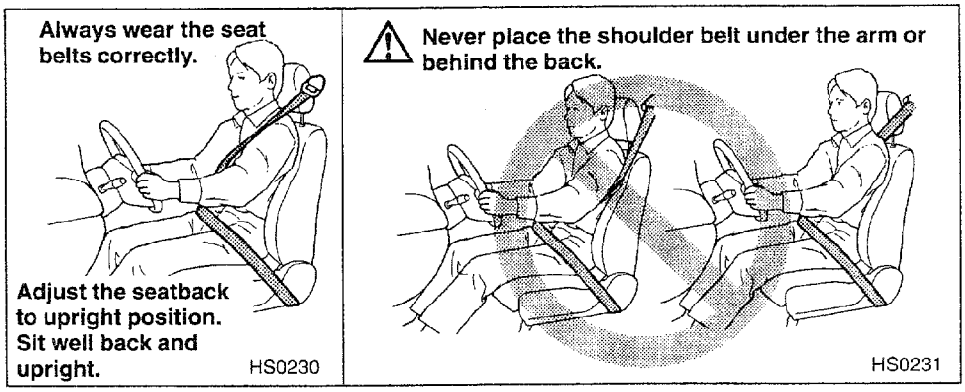
– CONTINUED –

3-point type seat belts (Combination lap/shoulder belts)

⚠ WARNING

- Never use a belt that is twisted or reversed. In an accident, this can increase the risk or severity of injury.
- Never place the shoulder belt under the arm or behind the back. If an accident occurs, this can increase the risk or severity of injury.
- Keep the lap belt as low as possible on your hips. In a collision, this spreads the force of the lap belt over stronger hip bones instead of across the weaker abdomen.
- Seat belts provide maximum restraint when the occupant sits well back and upright in the seat. To reduce the risk of sliding under the seat belt in a collision, the front seatbacks should be always used in the upright position while the vehicle is running. If the front seatbacks are not used in the upright position in a collision, the risk of sliding under the lap belt and of the lap belt sliding up over the abdomen will increase, and both can result in serious internal injury or death.
- Do not put cushions or any other materials between occupants and seatbacks or seat cushions. If you do so, the risk of sliding under the lap belt and of the lap belt sliding up over the abdomen will increase, and both can result in serious internal injury or death.
- Be sure to put children aged 12 and under in the rear seat properly restrained at all times. The SRS AIRBAG deploys with considerable speed and force and can injure or even kill children, especially if they are 12 years of age and under and are not restrained or improperly restrained. Because children are lighter and weaker than adults, their risk of being injured from deployment is greater. For that reason, we strongly recommend that ALL children (including those in child seats and those that have outgrown child restraint devices) sit in the REAR seat properly restrained at all times in a child restraint device or in a seat belt, whichever is appropriate for the child's age, height and weight. Be sure to secure

ALL types of child restraint devices (including forward facing child seats) in the REAR seats at all times. NEVER INSTALL A REARWARD FACING CHILD SEAT IN THE FRONT SEAT. DOING SO RISKS SERIOUS INJURY OR DEATH TO THE CHILD BY PLACING THE CHILD'S HEAD TOO CLOSE TO THE SRS AIRBAG. According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions. For instructions and precautions concerning child restraint systems, see the Child Restraint System section in this chapter.



⚠ CAUTION

Metallic parts of the seat belt can become very hot in a vehicle that has been closed up in sunny weather; they could burn an occupant. Do not touch such hot parts.

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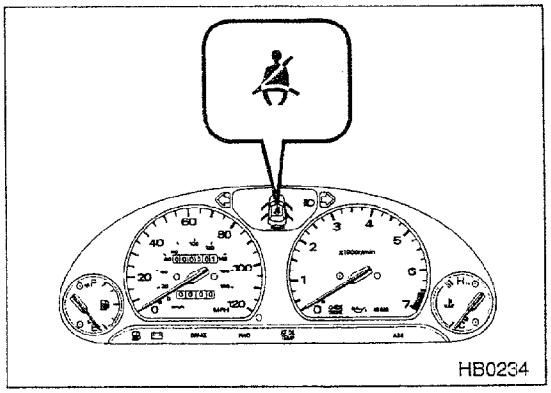
■ Seat belt warning light and chime



Your vehicle is equipped with a seat belt warning device at the driver's seat.
This device causes the seat belt warning light on the instrument panel to light up for about six seconds when the ignition switch is turned to the "ON" position to remind the driver to wear the seat belt. If the driver's seat belt is not fastened, a warning chime sounds at the same time.

■ Emergency Locking Retractor (ELR) function

3-point type seat belts have an emergency locking retractor. This allows normal body movement but the retractor locks automatically during a sudden stop, impact or if you pull the belt very quickly out of the retractor.

■ Automatic Locking Retractor (ALR) function

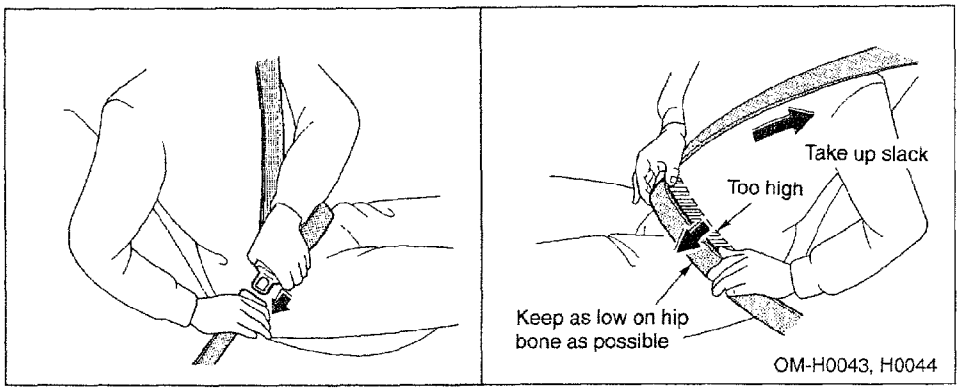
When securing a child restraint system on the passengers' seats, the three-point type seat belt must be changed over to the Automatic Locking Retractor (ALR) mode.

When the child restraint system is removed, make sure that the retractor operates as an Emergency Locking Retractor (ELR).
For instructions on how to convert the retractor to the ALR mode and restore it to the ELR mode, see the "Child Restraint System" section in this chapter.

■ Fastening the seat belt

⚠ CAUTION

Metallic parts of the seat belt can become very hot in a vehicle that has been closed up in sunny weather; they could burn an occupant. Do not touch such hot parts.



1. Adjust the seat position:

Driver's seat: Move the seat back as far from the steering wheel as practical while still maintaining full vehicle control and adjust the seatback to the upright position.

Front passenger's seat: Move the seat as far back as possible and adjust the seatback to the upright position.

2. Sit well back in the seat.
3. Pick up the tongue plate and pull the belt out slowly. Do not let it get twisted. If the belt stops before reaching the buckle, return the belt slightly and pull it out more slowly.
4. Insert the tongue plate into the buckle until you hear a click.

For the driver's side seat belt, a seat belt warning device is provided; if the driver is not wearing the seat belt with the ignition in the "ON" position, the warning light on the instrument panel comes on and a warning chime also sounds to remind the driver to wear the seat belt.

Refer to Warning and Indicator Lights section (chapter 3) for more details.

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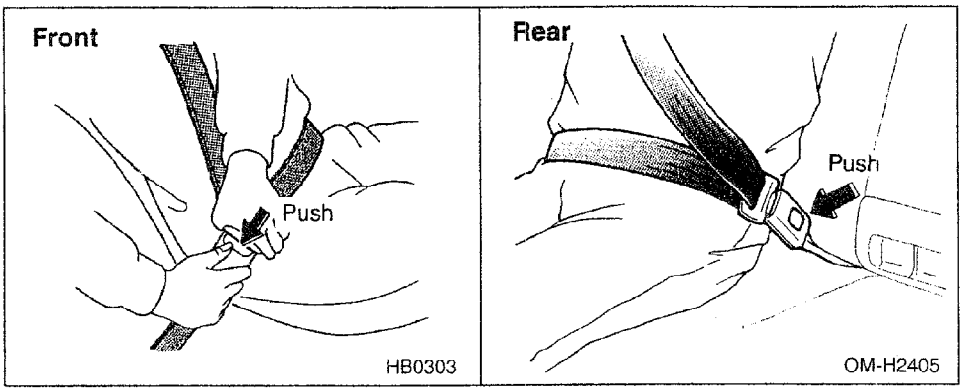
5. To make the lap part tight, pull up on the shoulder belt. And place the lap belt as low as possible on your hips, not on your waist.

■ Unfastening the belt



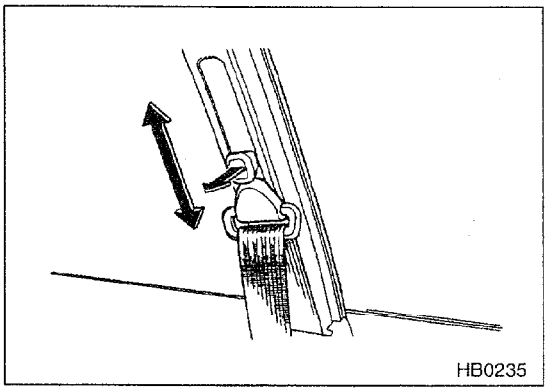
Push the button on the buckle.

Before closing the door, make sure that the belts are retracted properly, to avoid catching the belt webbing in the door.

■ Adjusting the front seat shoulder belt anchor height

⚠ WARNING

When wearing the front seat belts, make sure the shoulder portion of the webbing does not pass over your neck. If it does, adjust the seat belt anchor to a lower position. Placing the shoulder belt over the neck may result in neck injury during sudden braking or in a collision.



The shoulder belt anchor height should be adjusted to the position best for you. To adjust the anchor height, pull the release knob and move the anchor to the desired position so that the shoulder belt passes over the middle of the shoulder without touching the neck.

2-point type seat belts (lap only belts)

⚠ WARNING

• Seat belts provide maximum restraint when the occupant sits well back and upright in the seat. Do not put cushions or any other materials between occupants and seatbacks or seat cushions. If you do so, the risk of sliding under the lap belt and of the lap belt sliding up over the abdomen will increase, and both can result in serious internal injury or death.

• Never use a belt that is twisted or reversed. In an accident, this can increase the risk or severity of injury.

• Keep the lap belt as low as possible on your hips. In a collision, this spreads the force of the lap belt over stronger hip bones instead of across the weaker abdomen.

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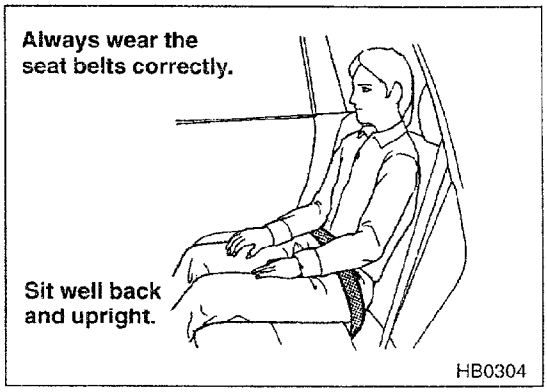
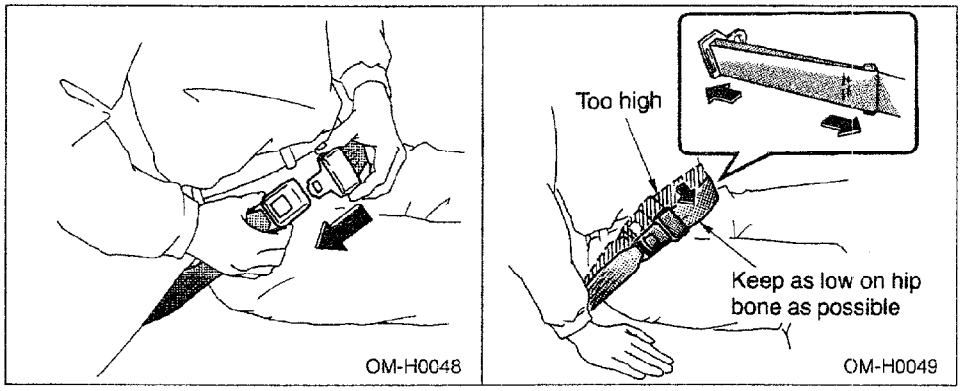


⚠ CAUTION

Metallic parts of the seat belt can become very hot in a vehicle that has been closed up in sunny weather; they could burn an occupant. Do not touch such hot parts.

The 2-point type seat belt has a manual adjustment device.

■ Fastening the seat belt

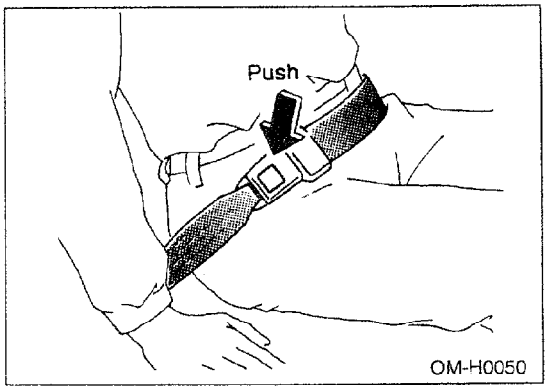


1. Sit well back in the seat and pick up the tongue plate marked "CENTER". Be careful not to twist the belt.
2. Insert the tongue plate into the buckle marked "CENTER" until you hear a click. The tongue plate marked "CENTER" can be fastened only into the buckle marked "CENTER". If the belt is not long enough for you,

hold the tongue plate at a right angle to the belt and pull the belt to extend.

3. To make the belt tight, pull up on the belt. And place the lap belt as low as possible on your hips, not on your waist.

■ Unfastening the belt

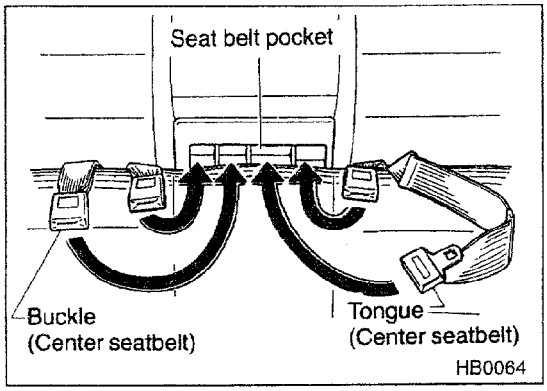


Push the button on the buckle.

When the belt is not in use, buckle the belt to prevent it from being caught in the door.

NOTE

When folding down the rear seat of the wagon, store the seat belts in the seat belt pocket to prevent them falling below the cushion.



Seat belt safety tips

⚠ WARNING

• All persons in the vehicle should fasten their seat belts BEFORE the vehicle starts to move. Otherwise, the possibility of serious injury becomes greater in the event of a sudden stop or accident.

• All belts should fit snugly in order to provide full restraint. Loose fitting belts are not as effective in preventing or reducing injury.

• Each seat belt is designed to support only one person. Never use a single belt for two or more persons — even children. Otherwise, in an accident, serious injury or death could result.

• Replace all seat belt assemblies including retractors and attaching hardware worn by occupants of a vehicle that has been in a serious accident. The entire assembly should be replaced even if damage is not obvious.

■ Infants or small children

Use a child restraint system that is suitable for your vehicle. See information on "Child Restraint System" in this chapter.

■ Children

If a child is too big for a child restraint system, the child should sit in the rear seat and be restrained using the seat belts. According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions. Never allow a child to stand up or kneel on the seat.

If the shoulder portion of the belt crosses the face or neck, move the child closer to the center of vehicle to help provide a good shoulder belt fit. If the shoulder portion of the belt cannot be properly positioned, a child restraint system should be used. If that is not possible, the child should sit in the center rear seat and use the 2-point type seat belt. Care must be taken to securely place the lap belt as low as possible on the

hips and not on the child's waist.

■ Expectant mothers

Expectant mothers also need to use the seat belts. They should consult their doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips, not over the waist.

■ Maintenance

⚠ CAUTION

- **Keep the belts free of polishes, oils, chemicals and particularly battery acid.**
- **Never attempt to make modifications or changes that will prevent the seat belt from operating properly.**

To clean the seat belts, use a mild soap and lukewarm water. Never bleach or dye the belts because this could seriously affect their strength.

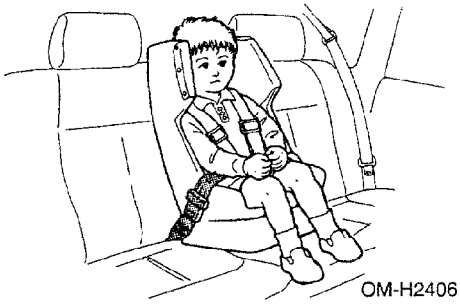
Inspect the seat belts and attachments including the webbing and all hardware periodically for cracks, cuts, gashes, tears, damage, loose bolts or worn areas. Replace the seat belts even if only minor damage is found.

Child restraint systems

⚠ WARNING

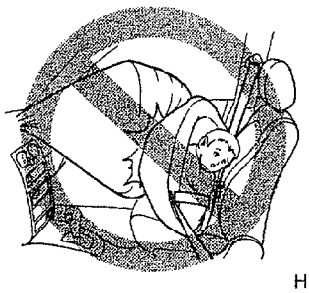
- **Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision, because the child will be caught between the passenger and objects inside the vehicle. Additionally, holding a child in your lap or arms in the front seat exposes that child to another serious danger. Since the SRS AIRBAG deploys with considerable speed and force, the child could be injured or even killed.**
- **Be sure to put children aged 12 and under in the rear seat properly restrained at all times. The SRS AIRBAG deploys with considerable speed and force and can injure or even kill children, especially if they are 12 years of age and under and are not restrained or improperly restrained. Because children are lighter and weaker than adults, their risk of being injured from deployment is greater. For that reason, be sure to secure ALL types of child restraint devices (including forward facing child seats) in the REAR seats at all times. You should choose a restraint device which is appropriate for the child's age, height and weight. According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions.**
- **SINCE YOUR VEHICLE IS EQUIPPED WITH A PASSENGER'S SRS AIRBAG, DO NOT INSTALL A REARWARD FACING CHILD SEAT IN THE FRONT PASSENGER'S SEAT. DOING SO RISKS SERIOUS INJURY OR DEATH TO THE CHILD BY PLACING THE CHILD'S HEAD TOO CLOSE TO THE SRS AIRBAG.**
- **Children should be properly restrained in the rear seat at all times. Never allow a child to stand up, or to kneel on the front passenger's seat. The SRS AIRBAG deploys with considerable force and can injure or even kill the child.**

Secure child restraint devices in the REAR seats at all times.



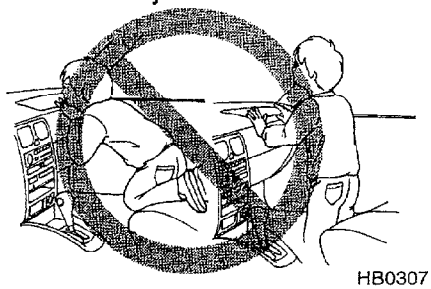
OM-H2406

⚠ Never install rearward facing child seat in the front passenger's seat.



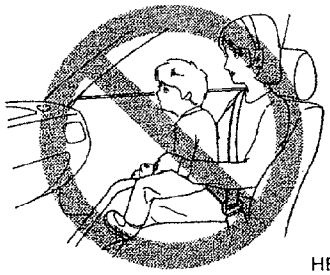
HB0306

⚠ Never allow a child to stand up, or to kneel on the front passenger's seat or any other seat



HB0307

⚠ Never hold a child on your lap or in your arms in the front passenger's seat or any other seat.



HB0308

⚠ WARNING

• Child restraint systems and seat belts can become hot in a vehicle that has been closed up in sunny weather; they could burn a small child. Check the child restraint system before you place a child in it.

• Do not leave an unsecured child restraint system in your vehicle. Unsecured child restraint systems can be thrown around inside of the vehicle in a sudden stop, turn or accident; it can strike and injure vehicle occupants as well as result in serious injuries or death to the child.

Infants and small children should always be placed in an infant or child restraint system in the rear seat while riding in the vehicle. You should use an infant or child restraint system that meets Federal Motor Vehicle

– CONTINUED –

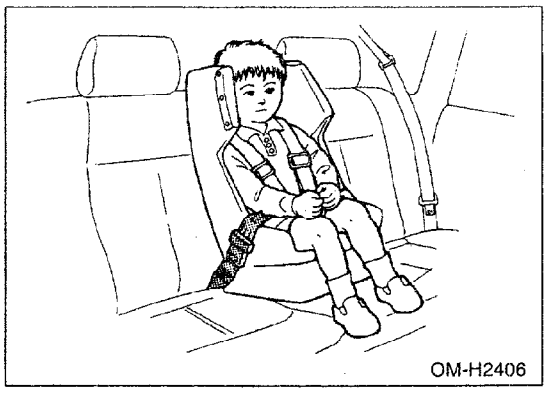
Safety Standard or Canada Motor Vehicle Safety Standard and is appropriate for the child's age and size. All child restraint systems are designed to be secured in vehicle seats by lap belts or the lap portion of a lap/shoulder belt.

Children could be endangered in an accident if their child restraints are not properly secured in the vehicle. When installing the child restraint system, carefully follow the manufacturer's instructions.

According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions. These statistics also indicate that the safest position for a child restraint system is the center of the rear seat.

All U.S. states and Canadian provinces require that infants and small children be restrained in an approved child restraint system at all times while the vehicle is moving.

■ Installing child restraint systems in the 2-point type seat belt position (Rear center seating position)



1. Set the child restraint system in the center seating position.
2. Fasten the 2-point type seat belt to the child restraint system following the instructions provided by its manufacturer.
3. Tighten the seat belt.
4. Before having a child sit in the child restraint system, move it back and forth to check if it is firmly secured. Sometimes a child restraint can

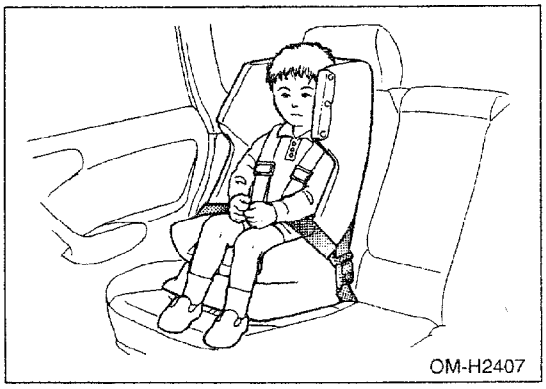
be more firmly secured by pushing it down into the seat cushion and then tightening the seatbelt.

If the child restraint system requires a top strap, latch the hook onto the top strap anchor and tighten the top strap.

■ Installing child restraint systems in the 3-point type seat belt position

NOTE

When the child restraint system is no longer in use, remove it and restore the ELR function of the retractor. That function is restored by allowing the seat belt to retract fully.

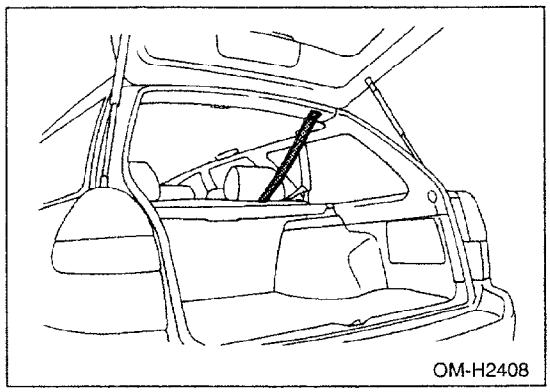


1. Set the child restraint system in the seating position.
2. Fasten the lap and shoulder belts to the child restraint system following the instructions provided by its manufacturer.
3. Take up the slack in the lap belt.
4. Put the shoulder portion of the belt between the rear seatback and the child restraint system.
5. Pull out the seat belt fully from the retractor to change the retractor over from the Emergency Locking Retractor (ELR) to the Automatic Locking Retractor (ALR) function. Then, allow the belt to rewind into the retractor. As the belt is rewinding, clicks will be heard which indicate the retractor functions as ALR.
6. Before having a child sit in the child restraint system, move it back and forth to check if it is firmly secured. Sometimes a child restraint can

– CONTINUED –

be more firmly secured by pushing it down into the seat cushion and then tightening the seat belt.
7. Pull at the shoulder portion of the belt to confirm that it cannot be pulled out (ALR properly functioning).

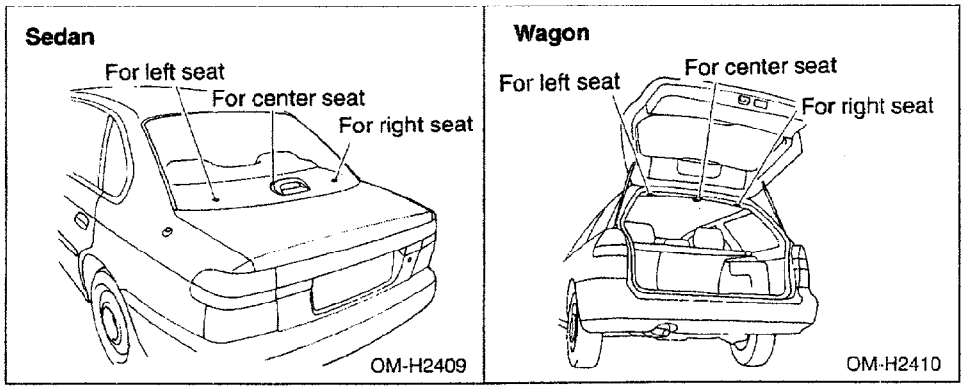
If the child restraint system requires a top strap, latch the hook onto the top strap anchor and tighten the top strap.



■ Top strap anchors

⚠ CAUTION
Always use a genuine top strap anchor.

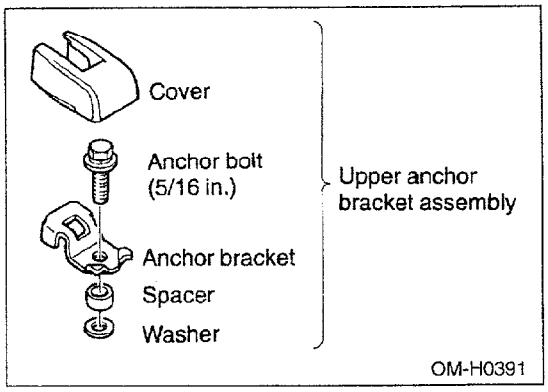
▼ Installation point



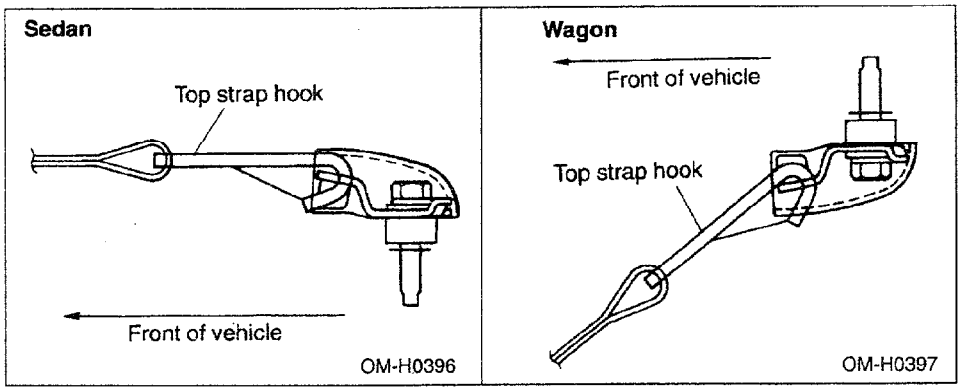
- **Sedan:** Anchor installation points are located under the covers on the rear shelf.
- **Wagon:** Anchor installation points are located under the covers at the rear edge of the roof.

▼ Top strap anchor installation (for Canada models)

All vehicles built for sale in Canada include an anchor kit in the glove compartment.



1. Take the anchor kit out and make sure that it is assembled as shown in the illustration above.



2. Remove the cover from the anchor installation point.
3. Set the anchor at the desired installation point and tighten the bolt until the anchor is firmly secured.
4. Install the anchor plate cover.

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Please contact your SUBARU dealer about any questions you may have regarding the installation of the top strap anchor.

▼ Top strap anchor installation (for U.S. models)
Vehicles built for sale in U.S. do not include an anchor kit in the glove compartment. However, the anchor kit and installation instructions are available from your SUBARU dealer. You can also follow the installation instructions for Canada models.

*SRS AIRBAG (Supplemental Restraint System Airbag)

*SRS: This stands for supplemental restraint system. This name is used because the AIRBAG system supplements the vehicle's seat belts.

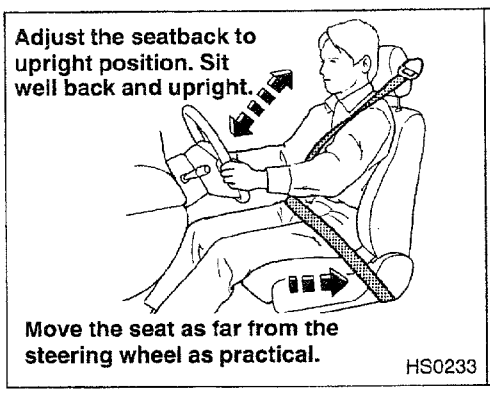
■ Vehicle with driver's and front passenger's SRS AIRBAGs and lap/shoulder restraints

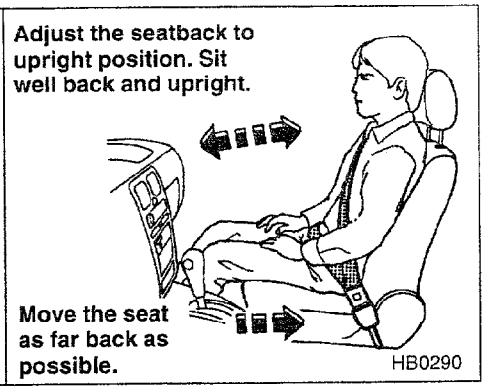
⚠ WARNING

• To obtain maximum protection in the event of an accident, the driver and all passengers in the vehicle should always wear seat belts when the vehicle is moving. The SRS AIRBAG does not do away with the need to fasten seat belts. In combination with the seat belts, it offers the best combined protection in case of a serious accident.
Not wearing a seat belt increases the chance of severe injury or death in a crash even when the car has the SRS AIRBAG.
• For instructions and precautions concerning the seat belt system, see the sections 3-point Type Seat Belts and 2-point Type Seat Belts in this chapter.
• Do not sit or lean unnecessarily close to the SRS AIRBAG. The SRS AIRBAG deploys with considerable speed – faster than the blink of an eye – and force to protect in high speed collisions. However, the force of an SRS AIRBAG can injure an occupant whose body is too close to SRS AIRBAG. It is also important to wear your seat belt to help avoid injuries that can result when the

SRS AIRBAG contacts an occupant not in proper position such as one thrown toward the front of the car during pre-accident braking.

- The SRS AIRBAGs deploy with considerable speed and force. Occupants who are out of proper position when the SRS AIRBAG deploys could suffer very serious injuries. Because the SRS AIRBAG needs much space for deployment, the driver should always sit upright and well back in the seat as far from the steering wheel as practical while still maintaining full vehicle control and the front passenger should move the seat as far back as possible and sit upright and well back in the seat.
- Do not place any objects over the SRS AIRBAG cover or between you and the SRS AIRBAG. If the SRS AIRBAG deploys, those objects could interfere with its proper operation and could be propelled inside the car and cause injury.





⚠ WARNING

- Be sure to put children aged 12 and under in the rear seat properly restrained at all times. The SRS AIRBAG deploys with considerable speed and force and can injure or even kill children, especially if they are 12 years of age and under and are not restrained or improperly restrained. Because children are lighter and weaker than adults, their risk of being injured from deploy-

– CONTINUED –

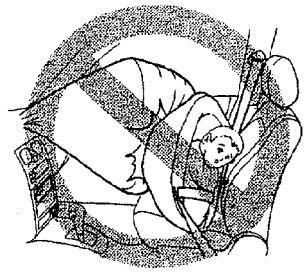
ment is greater. For that reason, we strongly recommend that ALL children (including those in child seats and those that have outgrown child restraint devices) sit in the REAR seat properly restrained at all times in a child restraint device or in a seat belt, whichever is appropriate for the child's age, height and weight. Be sure to secure ALL types of child restraint devices (including forward facing child seats) in the REAR seats at all times.
According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions.
For instructions and precautions concerning the child restraint system, see the Child Restraint System section in this chapter.

- NEVER INSTALL A REARWARD FACING CHILD SEAT IN THE FRONT SEAT. DOING SO RISKS SERIOUS INJURY OR DEATH TO THE CHILD BY PLACING THE CHILD'S HEAD TOO CLOSE TO THE SRS AIRBAG.
- Never allow a child to stand up, or to kneel on the front passenger's seat, or never hold a child on your lap or in your arms. The SRS AIRBAG deploys with considerable force and can injure or even kill the child.

Put children in the REAR seat properly restrained at all times.

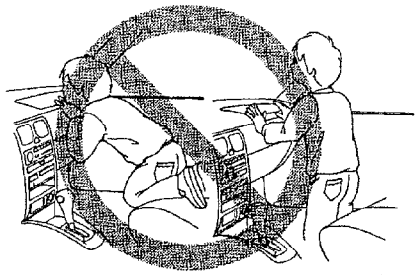
HB0291

⚠ **Never install rearward facing child seat in the front passenger's seat.**



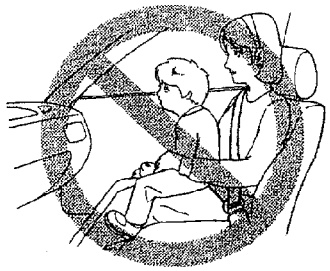
HB0306

⚠ **Never allow a child to stand up, or to kneel on the front passenger's seat.**

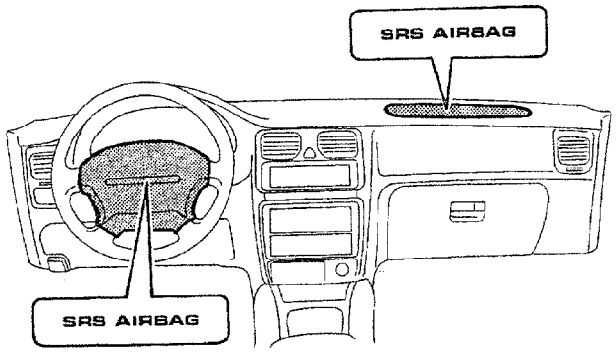


HB0307

⚠ **Never hold a child on your lap or in your arms.**



HB0308



HB0236

The driver's side SRS AIRBAG is stored in the center portion of the steering wheel. The passenger's side SRS AIRBAG is stored near the top of the dashboard under the cover marked "SRS AIRBAG".

The SRS (Supplemental Restraint System) AIRBAG in your vehicle af-

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fords the driver and front seat passenger additional protection during a moderate to severe frontal or front-angled collision. This system is available for the driver and front seat passenger and is designed to supplement the protection provided by the seat belt. In a moderate to severe frontal or front-angled collision, the SRS AIRBAG supplements the seat belt by reducing the impact on the driver's and front passenger's head and chest.

The SRS AIRBAG is designed to deploy in the event of an accident involving a moderate to severe frontal or front-angled collision. It is basically not designed to deploy in lesser frontal impacts because the necessary protection can be achieved by the seat belt alone. Also, it is basically not designed to deploy in side or rear impacts or in roll-over accidents because SRS AIRBAG deployment would not help the occupant in those situations. The SRS AIRBAG is designed to function on a one-time-only basis. In the event that the SRS AIRBAG is deployed, replacement of the system should be performed only by an authorized SUBARU dealer. When the components of the SRS AIRBAG are replaced, use only genuine SUBARU parts.

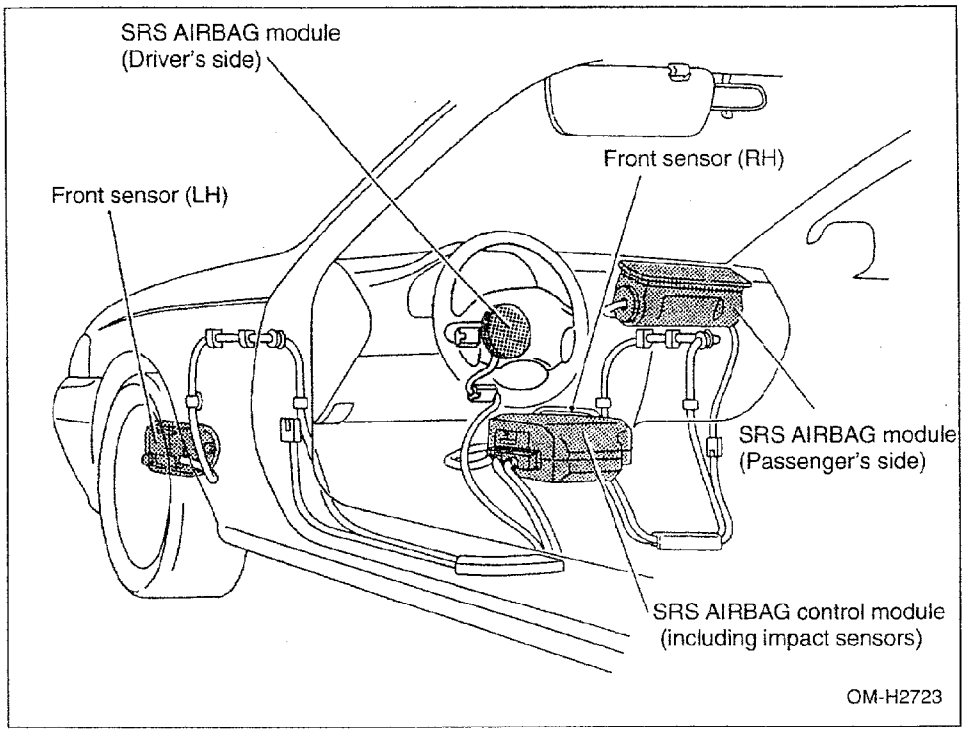
NOTE

When you sell your vehicle, we urge you to explain to the buyer that it is equipped with SRS AIRBAGs by alerting him or her to the applicable section in this owner's manual.

■ SRS AIRBAG system operation

⚠ CAUTION

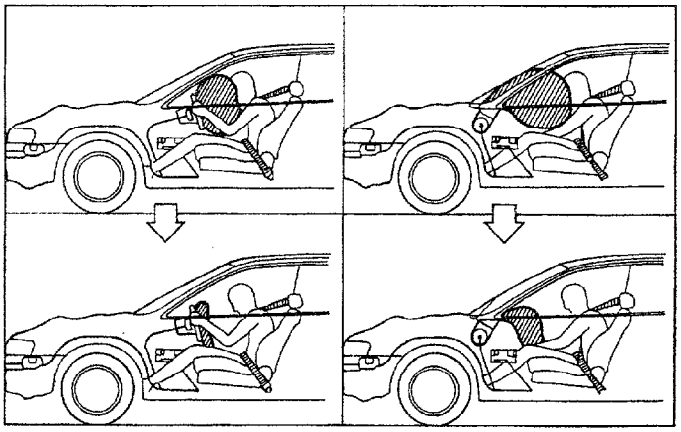
- **When the SRS AIRBAG deploys, some smoke will be released. This smoke could cause breathing problems for people with a history of asthma or other breathing trouble. If you or your passengers have breathing problems after SRS AIRBAG deploys, get fresh air promptly.**
- **Do not touch the SRS AIRBAG system components around the steering wheel and dashboard with bare hands right after deployment. Doing so can cause burns because the components can be very hot as a result of deployment.**



Driver's side **Passenger's side**

SRS AIRBAGs deploy as soon as a collision occurs.

After deployment, SRS AIRBAGs start to deflate immediately so that the driver's vision is not obstructed.



OM-H0384

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The SRS AIRBAG can function only when the ignition switch is in the "ON" position.

If the front sensor and impact sensors in the airbag control module detect a certain predetermined amount of force during a frontal or front-angled collision, the control module sends signals to the airbag modules instructing them to inflate the SRS AIRBAGs. Then both airbag modules produce gas by chemical reaction, which instantly inflates driver's and passenger's SRS AIRBAGs. After the deployment, the SRS AIRBAGs immediately start to deflate so that the driver's vision is not obstructed. The time required from detecting impact to deflating of the SRS AIRBAGs after deployment is shorter than the blink of eye.

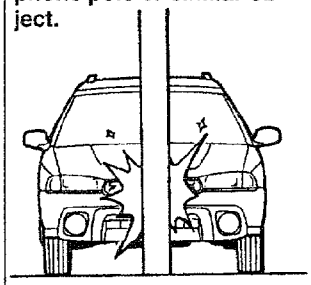
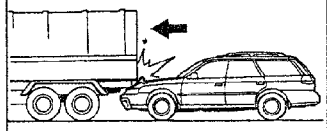
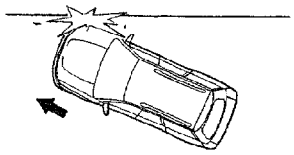
Although it is highly unlikely that the SRS AIRBAG would activate in a non-accident situation, should it occur, the bag will deflate quickly, not obscuring vision and will not interfere with the driver's ability to maintain control of the vehicle.

When the SRS AIRBAG deploys, a sudden, fairly loud inflation noise will be heard and some smoke will be released. These occurrences are a normal result of the chemical reaction in the airbag module. This smoke does not indicate a fire in the vehicle.

SRS AIRBAG deployment depends on the level of force experienced in the passenger compartment during a collision. That level differs from one type of collision to another, and it may have no bearing on the visible damage done to the vehicle itself.

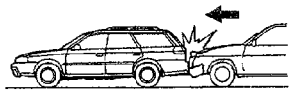
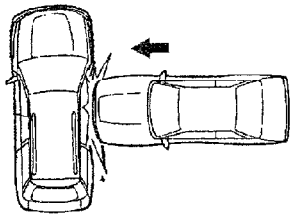
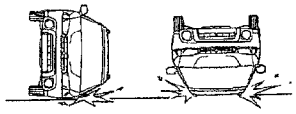
▼ Examples of the types of accidents in which the SRS AIRBAG is unlikely to deploy.

There are many types of collisions which might not necessarily require SRS AIRBAG deployment. If the vehicle strikes an object, such as a telephone pole or sign pole, or if it slides under a truck's load bed, or if it sustains an oblique offset frontal impact, the SRS AIRBAG may not deploy depending on the level of accident forces involved.

The vehicle strikes a telephone pole or similar object.	The vehicle slides under a truck's load bed.	The vehicle sustains an oblique offset frontal impact.
 HB0309	 HB0310	 HB0311

▼ Examples of the types of accidents in which the SRS AIRBAG will basically not deploy.

The SRS AIRBAG is basically not designed to deploy if it is stuck from side or from behind, or if it rolls onto its side or roof, or if it is involved in a low-speed frontal collision.

The vehicle is struck from behind.	The vehicle is struck from the side.	The vehicle rolls onto its side or roof.
 HB0312	 HB0313	 HB0314

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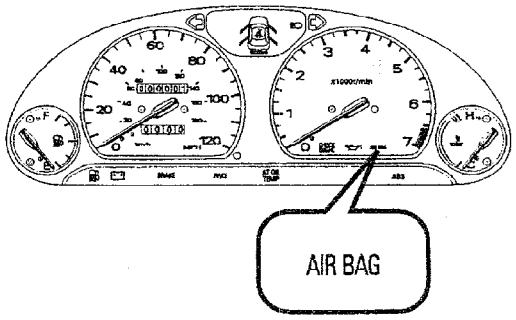
System monitors



SRS AIRBAG warning light HB0238

A diagnostic system continually monitors the readiness of the SRS AIR-BAG while the vehicle is being driven. The SRS AIRBAG warning light will show normal system operation by lighting for about 6 seconds when the ignition key is first turned to the "ON" position and then turning off.

The following components are monitored by the indicator:

- Right front sensor
- Left front sensor
- AIRBAG control module (including impact sensors)
- AIRBAG module (driver's side)
- AIRBAG module (passenger's side)
- All related wiring

In the event of a malfunction indicated by any of following, the vehicle should be taken promptly to your nearest SUBARU dealer to have the system checked. Unless checked and repaired, the SRS AIRBAG will not function reliably:

- Flashing or flickering of the warning light.
- Failure of the warning light to illuminate when the ignition switch is first turned to the "ON" position.
- Continuous illumination of the warning light.
- Illumination of the warning light while driving.

■ System servicing

⚠ WARNING

• When discarding an airbag module or scrapping the entire car damaged by a collision, consult your SUBARU dealer.

• The SRS AIRBAG has no user-serviceable parts. Tampering with or disconnecting the system's wiring could result in accidental inflation of the airbag or could make the system inoperative, which may result in serious injury. The wiring harnesses of the SRS AIRBAG system are covered with yellow insulation and the connectors of the system are yellow for easy identification. Do not use electrical test equipment on any circuit related to the SRS AIRBAG system. For required servicing of the SRS AIRBAG, see your nearest SUBARU dealer.

⚠ CAUTION

The front sensors are located in both front fenders and the SRS AIRBAG control module including the impact sensors is located under the center console. If you need service or repair in those area or near the steering wheel and column, we recommend that you have an authorized SUBARU dealer perform the work.

To ensure its long-term reliability, the SRS AIRBAG must be inspected by a SUBARU dealer ten years after the date of manufacture, which is shown on the certification label attached to the driver's door.

NOTE

• If the front part of the vehicle was involved in an accident not of the extent to cause the SRS AIRBAGs to deploy, contact your SUBARU dealer as soon as possible.

• If the pad section of the steering wheel or front passenger's SRS AIRBAG cover is scratched, cracked, or otherwise damaged, contact your SUBARU dealer as soon as possible.

– CONTINUED –

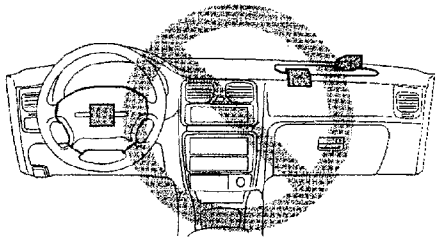
■ Precautions for vehicle modification

⚠ WARNING

- **Do not put any objects over the steering wheel pad and dashboard. If the SRS AIRBAG deploys, those objects could interfere with its proper operation and could be propelled inside the vehicle and cause injury.**
- **Do not attach accessories to the windshield, or fit an extra-wide mirror over the rear view mirror. If the SRS AIRBAG deploys, those objects could become projectiles that could seriously injure vehicle occupants.**
- **To avoid accidental actuation of the system or rendering the system inoperative, which may result in serious injury, no modifications should be made to any components or wiring of the SRS AIRBAG.**

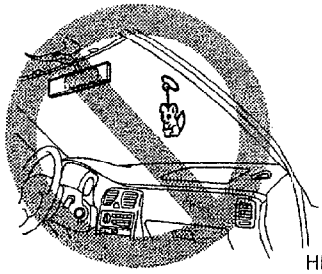
This includes the installation of "custom" steering wheels or additional trim material, or badges over the pad section of the steering wheel. Installation of additional electrical/electronic equipment such as a mobile two way radio on or near SRS AIRBAG components and/or wiring is not advisable.

⚠ Do not put any objects over the steering wheel pad and dashboard



HB0239

⚠ Do not attach accessories to the windshield, or fit an extra-wide mirror over the rear view mirror.



HB0315

⚠ CAUTION

Do not perform any of the following modifications. Such modifications can interfere with proper operation of the SRS AIRBAG system.

- **Attachment of any equipment (brush bar, winches, snow plow, skid plate, etc.) other than SUBARU genuine accessory parts to the front end.**
- **Modification of the suspension system and front end structure.**
- **Installation of a tire of different size and construction from the original tire listed on the tire placard attached to the door jamb.**

Always consult your SUBARU dealer if you want to install any accessory parts to your vehicle.