V2838

1998 Dodge Neon
into a Flat Frontal Barrier
Test No. 980202

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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 and Test Summary

This 30 mph flat frontal barrier impact test has the main objective to investigate both vehicle and occupant dynamics during a flat frontal barrier test. A secondary objective is to gather information on depowered airbags.

This test was conducted with a 1998 Dodge Neon that impacted a flat frontal barrier. The test vehicle contained two instrumented Hybrid III 50th percentile adult male dummies.

Section 2.0

Frontal Barrier Impact Test Summary

Test Procedure

This test was conducted per VRTC personnel's instructions. Data was obtained relative to FMVSS 208, "Occupant Crash Protection," performance.

The test vehicle was instrumented with thirteen (13) accelerometers to measure longitudinal, lateral, and vertical axis accelerations. The vehicle was also instrumented with two (2) event circuits to measure squib current fire times in the airbag system. The vehicle's specified impact velocity range was 46.5 to 48.1 kph. The vehicle impacted a flat frontal barrier.

The test vehicle contained two (2) Hybrid III 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the FMVSS 208 laboratory seating procedure.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations; chest deflection potentiometers; left and right femur load cells to measure axial forces; and upper neck load cells to measure forces and moments.

The forty-five (45) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the dummy calibration information.

Test Results Summary

This flat frontal barrier test was conducted at TKC on February 2, 1998.

The test vehicle, a 1998 Dodge Neon, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 1359.8 kilograms. The vehicle's impact speed was 47.2 kph. The vehicle's maximum static crush was 416 millimeters.

The driver's 36 millisecond HIC was 339. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 43.5 g. The driver's chest deflection was 25 millimeters. The driver's left and right femur maximum compressive forces were 6447 N and 7336 N, respectively.

The right front passenger's 36 millisecond HIC was 419. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 61.4 g. The passenger's chest deflection was 16 millimeters. The right front passenger's left and right femur maximum compressive forces were 6607 N and 6290 N, respectively.

Data Acquisition Explanations

The vehicle's left radiator X-axis acceleration data channel, RADXG1, exceeded it's data channel's full scale input at approximately 15 milliseconds and recorded questionable data after that.

The vehicle's right radiator X-axis acceleration data channel, RADXG2, exceeded it's data channel's full scale input at approximately 23 milliseconds and recorded questionable after that.

Table 1 Crash Test Summary

Test type:	Frontal barrier impact
Test date:	02/02/98
Test time:	1454
Ambient temperature at impact area:	22° C
Vehicle year/make/ model/body style:	1998/Dodge/Neon/4-door Sedan
Vehicle test weight:	1359.8 kg
Impact angle[1]:	0°
Impact velocity[2]:	
Primary:	47.2 kph
Secondary:	47.2 kph
Maximum static crush:	416 mm
Average rebound:	507 mm
Number of cameras:	
Real-time:	1
High-speed:	16
Door opening data:	
Left-front:	Easy
Right-front:	Easy

[1] With respect to tow track centerline.
[2] Speed trap measurement (± .05 mph accuracy)

Table 1 Crash Test Summary, Cont'd.

Dummies:	Driver #169	Passenger #168
Type:	Hybrid III 50th percentile adult male	Hybrid III 50th percentile adult male
Location:	Left front	Right front
Restraint:	Airbag	Airbag
Number of data channels:	15	15
Front seat data:		
Seat track failure:	None	None
Seat back failure:	None	None
Visible dummy contact points:		
Head:	Airbag	Airbag
Chest:	Airbag	Airbag
Abdomen:	None	None
Left knee:	Instrument panel	Instrument panel
Right knee:	Instrument panel	Instrument panel

Table 2 Test Vehicle Information

Vehicle year/make/ model/body style:	1998/Dodge/Neon/4-door Sedan
Color:	White
VIN:	1B3ES47C0WD578397
Engine data:	
Placement:	Transverse/lateral
Cylinders:	4
Displacement:	2.0 liters
Transmission data:	_3_speed, __manual, _X_automatic, ___overdrive
Final drive:	_X_fwd, ___rwd, ___4wd
Date vehicle received:	01/29/98
Odometer reading:	93
Dealer's name and address:	N/A

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by:		Chrysler Corporation
Date of manufacture:		11/97
VIN:		1B3ES47C0WD578397
GVWR:		3505 lb
GAWR:	Front:	1949 lb
	Rear:	1606 lb

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P185/65R14
Spare tire:	Space saver
Type of front seats:	Manually adjustable

Tire & capacity data from vehicle's label:

Recommended tire size:	P185/65R14
Recommended cold tire pressure:	
Front:	32 psi
Rear:	32 psi
Designated Seating Capacity:	
Front	2
Rear	3
Total	5
Vehicle Cargo Weight:	115 lbs.

Test vehicle attitudes:

Delivered attitude:	LF:	668 mm	RF:	667 mm	LR:	677 mm	RR:	679 mm
Fully loaded attitude:	LF:	644 mm	RF:	649 mm	LR:	649 mm	RR:	652 mm
Pre-test attitude:	LF:	642 mm	RF:	645 mm	LR:	645 mm	RR:	647 mm
Post-test attitude:	LF:	710 mm	RF:	700 mm	LR:	740 mm	RR:	635 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	390.9 kg	Right rear	207.7 kg
Left front	344.7 kg	Left rear	213.2 kg
Total front weight	735.6 kg	(63.6% of total vehicle weight)	
Total rear weight	420.9 kg	(36.4% of total vehicle weight)	
Total delivered weight	1156.5 kg		

Calculation of test vehicle's target test weight:

RCLW[1] = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1156.5 kg)

VCW = Vehicle Capacity Weight (N/A)

DSC[2] = Designated Seating Capacity (5)

RCLW[3] = 52.2 kg

Target test weight = UDW + RCLW + (number of Hybrid III Dummies x 75.7 kg per dummy)

Target test weight = 1156.5 + 52.2 + 151.4 = 1360.1 kg

Weight of test vehicle with required dummies and 51.9 kg of cargo weight:

Right front	410.0 kg	Right rear	266.7 kg
Left front	425.9 kg	Left rear	257.2 kg
Total front weight	835.9 kg	(61.5% of total vehicle weight)	
Total rear weight	523.9 kg	(38.5% of total vehicle weight)	
Total test weight	1359.8 kg	(0.02% under target test weight)	

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: Rear windows, rear door panels, rear seats, rear seat belts, rear seat belt retractors, and rear speakers.

CG rearward of front wheel centerline: 1015 mm

Vehicle Wheelbase: 2635 mm

[1] Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's calculated cargo and luggage wegith or 136.1 kg, whichever is less.

[2] The designated seating capacity is determined by counting the number of seat belts installed in the vehicle.

[3] From vehicle's tire label.

Table 3 Post-Impact Data

Test number:	980202
Test date:	02/02/98
Test time:	1454
Test type:	Frontal barrier impact
Impact angle:	0°
Ambient temperature at impact area:	22° C
Temperature in occupant compartment:	16° C

Impact velocity:

Primary:	47.2 kph
Secondary	47.2 kph
Specified range:	46.5 to 48.1 kph

Distance from vehicle to barrier:

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

Test vehicle static crush:

Overall length of test vehicle:

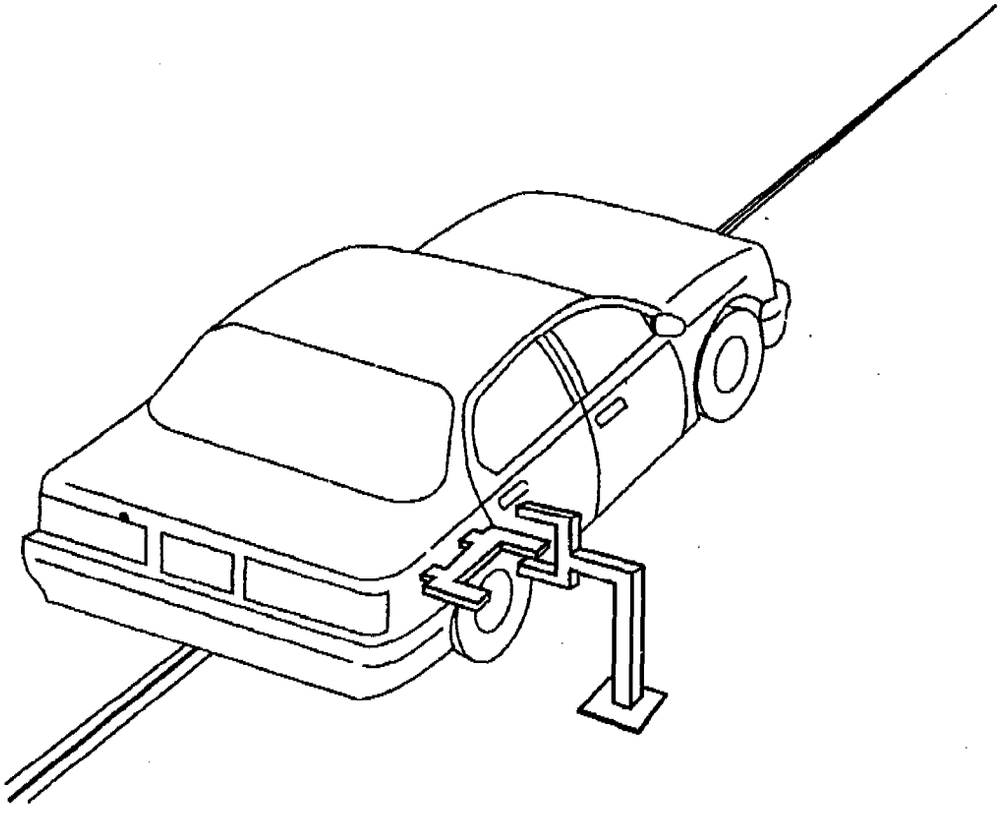
Pre-test:	L:	4205 mm	C: 4390 mm	R:	4210 mm
Post-test:	L:	3895 mm	C: 3974 mm	R:	3900 mm
Total crush:	L:	310 mm	C 416 mm	R:	310 mm
Average crush:	345 mm				

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L:	525 mm	C: 506 mm	R:	491 mm
Average rebound:	507 mm				

Figure 1 Impact Velocity Measurement System

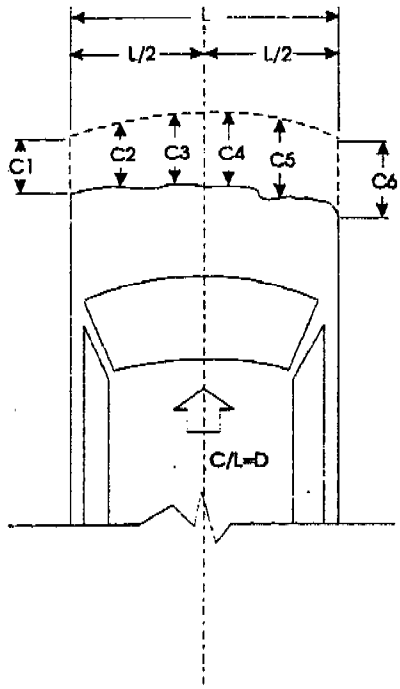


The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

Figure 2 Accident Investigation Division Data for 30 mph Frontal Barrier Impact

Test date:	02/02/98
Vehicle year/make/ model/body style:	1998/Dodge/Neon/4-door Sedan
VIN:	1B3ES47C0WD578397
Build date:	11/97
Test weight:	1359.8 kg
Vehicle wheelbase:	2635 mm
Maximum width:	1684 mm
Front overhang:	868 mm



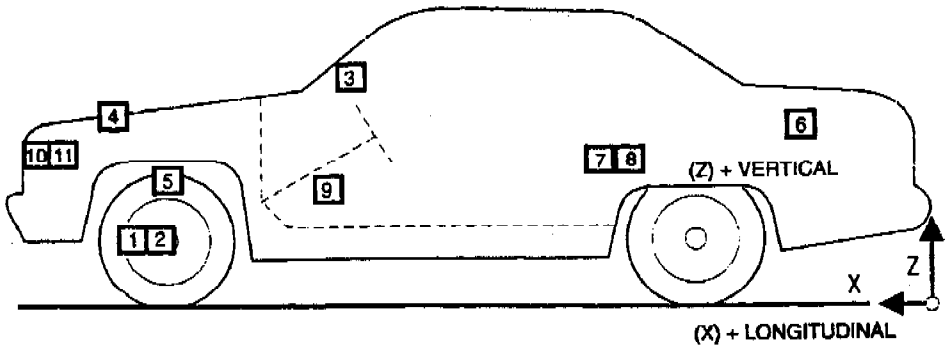
Collision Deformation Classification (CDC) Code: NA

Crush depth measurements:	C1: 310 mm
	C2: 369 mm
	C3: 415 mm
	C4: 404 mm
	C5: 358 mm
	C6: 310 mm

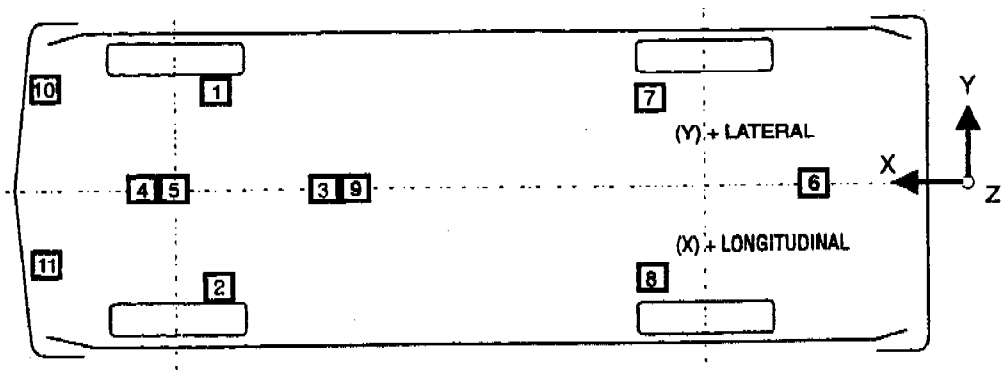
Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged region: L: 1400 mm

Figure 3 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 980202 No. LOCATION		X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT BRAKE CALIPER	PRE	3583 mm	637 mm	270 mm				
	POST	3477 mm	734 mm	265 mm				
LONGITUDINAL					39.6 g	@ 61.4 ms	88.4 g	@ 41.4 ms
2 RIGHT BRAKE CALIPER	PRE	3584 mm	-637 mm	270 mm				
	POST	3490 mm	-740 mm	289 mm				
LONGITUDINAL					47.6 g	@ 74.1 ms	80.7 g	@ 50.4 ms
3 INSTRUMENT PANEL CENTER	PRE	3018 mm	0 mm	894 mm				
	POST	3008 mm	0 mm	960 mm				
LONGITUDINAL					20.7 g	@ 31.8 ms	71.5 g	@ 44.6 ms
4 ENGINE TOP	PRE	3684 mm	-139 mm	757 mm				
	POST	3542 mm	-124 mm	780 mm				
LONGITUDINAL					52.7 g	@ 48.4 ms	129.9 g	@ 35.2 ms
5 ENGINE BOTTOM	PRE	3725 mm	337 mm	125 mm				
	POST	3522 mm	432 mm	178 mm				
LONGITUDINAL					53.8 g	@ 37.8 ms	173.2 g	@ 27.8 ms

Table 4 Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 980202 No. LOCATION		X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
6 REAR VEHICLE	PRE	272 mm	0 mm	485 mm				
CENTERLINE	POST	272 mm	0 mm	541 mm				
VERTICAL					20.2 g	@ 39.9 ms	32.2 g	@ 44.6 ms
7 LEFT REAR SEAT	PRE	1654 mm	600 mm	310 mm				
	POST	1662 mm	600 mm	348 mm				
LONGITUDINAL					2.9 g	@ 90.9 ms	37.4 g	@ 36.5 ms
8 RIGHT REAR SEAT	PRE	1654 mm	-600 mm	310 mm				
	POST	1662 mm	-600 mm	348 mm				
LONGITUDINAL					2.3 g	@ 92.2 ms	33.6 g	@ 37.4 ms
9 FLOOR TUNNEL	PRE	1688 mm	0 mm	265 mm				
	POST	1000 mm	0 mm	290 mm				
LONGITUDINAL					3.0 g	@ 92.3 ms	44.3 g	@ 36.3 ms
LATERAL					2.6 g	@ 45.5 ms	3.7 g	@ 51.4 ms
VERTICAL					12.5 g	@ 42.0 ms	22.0 g	@ 58.2 ms
RESULTANT					44.4 g	@ 36.3 ms		
10 LEFT RADIATOR	PRE	4091 mm	333 mm	634 mm				
	POST	3830 mm	350 mm	634 mm				
LONGITUDINAL[1]					10.1 g	@ 40.7 ms	236.1 g	@ 15.9 ms

Table 4 Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 980202 No. LOCATION		X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
11 RIGHT RADIATOR	PRE	4095 mm	-333 mm	634 mm				
	POST	3813 mm	-350 mm	640 mm				
LONGITUDINAL[1]					89.1 g	@ 23.5 ms	291.0 g	@ 15.9 ms

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

[1]See DATA ACQUISITION EXPLANATIONS

Section 3.0

FMVSS 208 Data

Table 5 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-46.6 g	-20.2 g	-25.1 g	50.5 g	-43.0 g	-4.7 g	-13.0 g
Passenger	-54.2 g	7.4 g	-26.0 g	54.3 g	-60.2 g	3.5 g	-23.9 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	6447 N	7336 N
Passenger	6607 N	6290 N

Head Injury Criteria[1]

	HIC	Time t_1	Time t_2
Driver	339	71.3 ms	107.3 ms
Passenger	419	67.0 ms	97.4 ms

Chest Maximum Resultant Acceleration[2]

	Acceleration	Time t_1	Time t_2
Driver	43.5 g	76.9 ms	79.9 ms
Passenger	61.4 g	76.8 ms	79.8 ms

Maximum Chest Deflection

Driver	25 mm
Passenger	16 mm

[1] As defined in FMVSS No. 208
[2] Defined as equal to or exceeding 0.003 sec. duration

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The dummy's head and chest were restrained by the airbag. The dummy's head and upper torso rotated rearward as the dummy rebounded into the seat back. The driver dummy came to rest seated in the driver's seat.

Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The dummy's head and chest were restrained by the airbag. The dummy's head and upper torso rotated rearward as the dummy rebounded into the seat back. The passenger dummy came to rest seated in the passenger's seat.

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

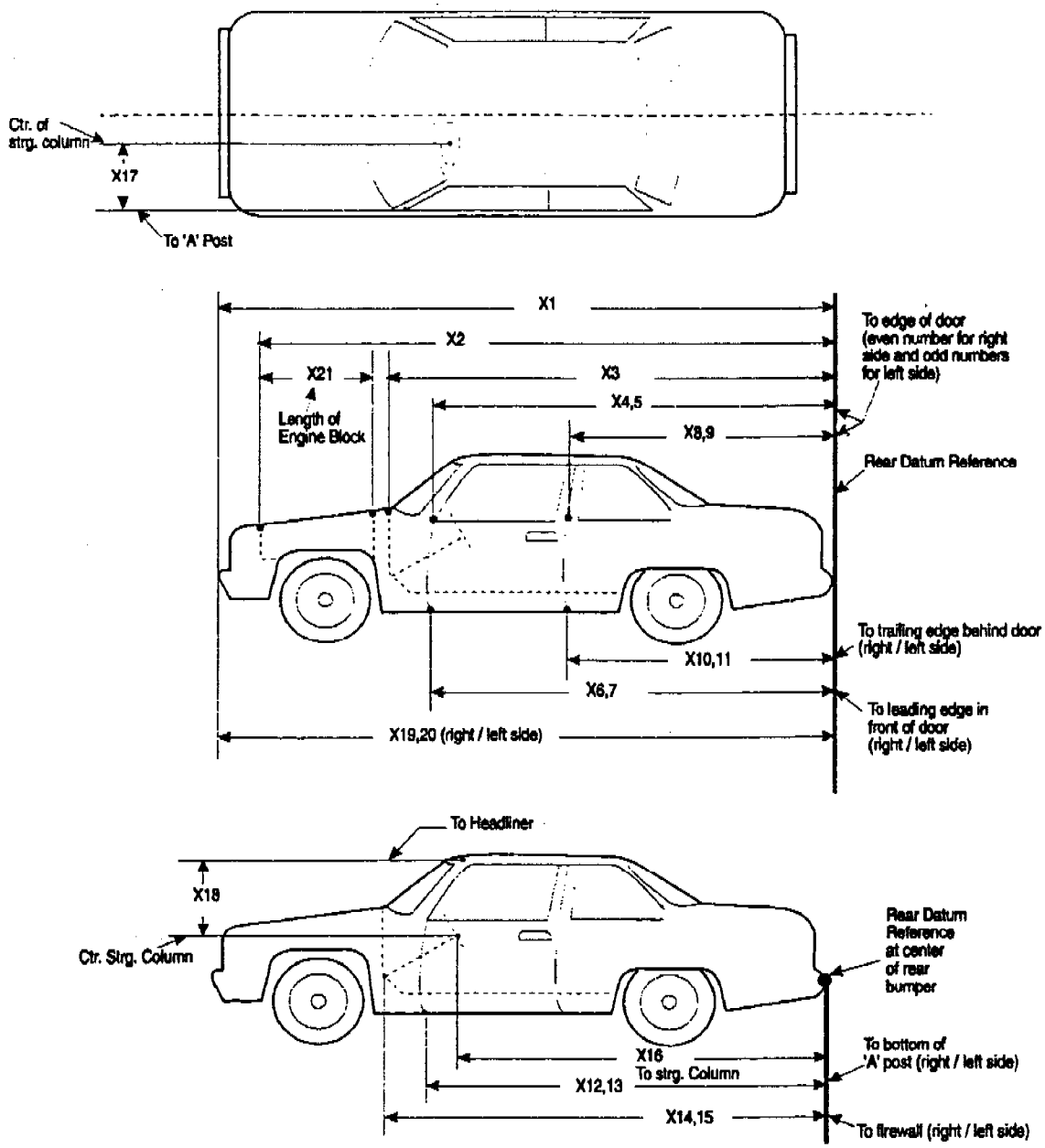


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1998/Dodge/Neon/4-door Sedan

Test Number: 980202

No.	Type of measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	4390 mm	3974 mm	416 mm
X2	Rear surface of vehicle to front of engine block	3770 mm	3614 mm	156 mm
X3	Rear surface of vehicle to firewall	3423 mm	3387 mm	36 mm
X4	Rear surface of vehicle to upper leading edge of right door	2980 mm	2970 mm	10 mm
X5	Rear surface of vehicle to upper leading edge of left door	2985 mm	2966 mm	19 mm
X6	Rear surface of vehicle to lower leading edge of right door	3034 mm	3022 mm	12 mm
X7	Rear surface of vehicle to lower leading edge of left door	3029 mm	3020 mm	9 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2011 mm	2000 mm	11 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2015 mm	1997 mm	18 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2010 mm	1990 mm	20 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2010 mm	1996 mm	14 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3021 mm	3011 mm	10 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3020 mm	3002 mm	18 mm
X14	Rear surface of vehicle to firewall - right side	3315 mm	3288 mm	27 mm
X15	Rear surface of vehicle to firewall - left side	3315 mm	3282 mm	33 mm
X16	Rear surface of vehicle to steering wheel center	2606 mm	2708 mm	-102 mm
X17	Center of steering column to "A" post	294 mm	320 mm	-26 mm
X18	Center of steering column to headliner	444 mm	420 mm	24 mm
X19	Rear surface of vehicle to right side of front bumper	4210 mm	3900 mm	310 mm
X20	Rear surface of vehicle to left side of front bumper	4205 mm	3895 mm	310 mm
X21	Length of engine block	477 mm	477 mm	0 mm

Figure 5 Vehicle Target Locations

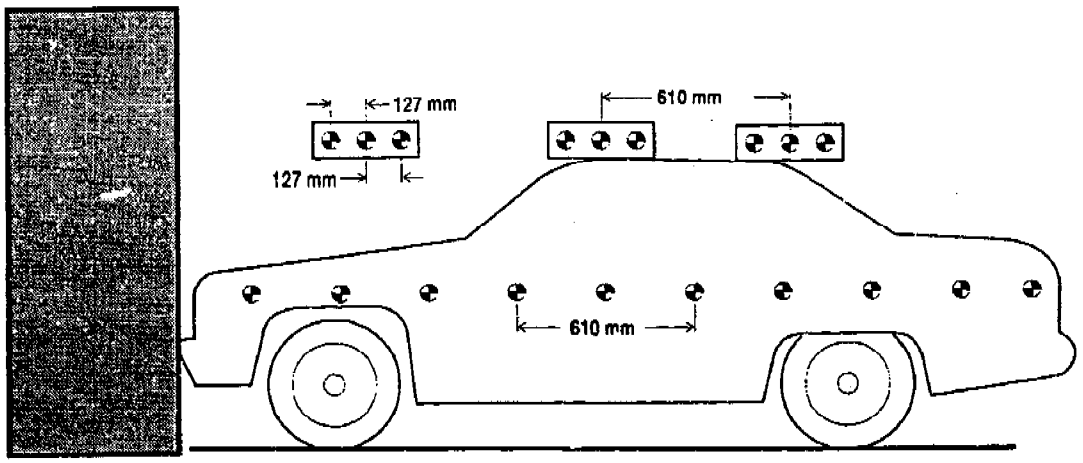


Figure 6 Dummy Measurement Locations for Front Seat Occupants

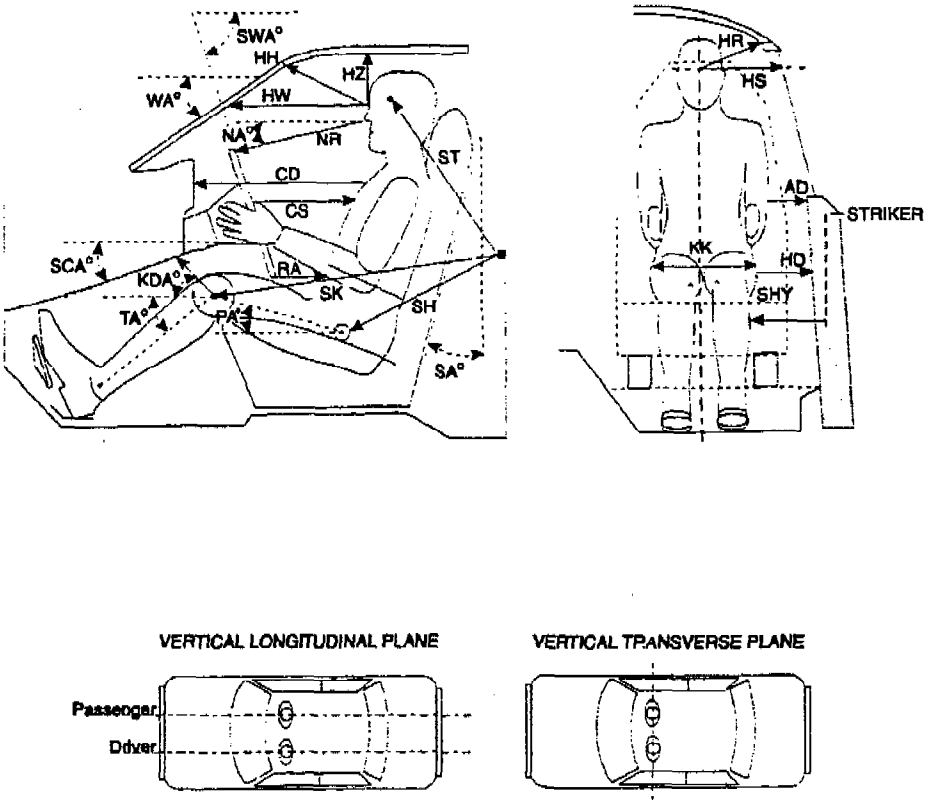


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #169)	Passenger (Serial #168)
WA	Windshield angle	26°	26°
SWA	Steering wheel angle	72°	NA
SCA	Steering column angle	18°	NA
SA	Seat back angle	NA	NA
HZ	Head to roof	177 mm	170 mm
HH	Head to header	331 mm	304 mm
HW	Head to windshield	545 mm	527 mm
HR	Head to side header	176 mm	185 mm
NR	Nose to rim	384 mm	NA
NA	Nose to rim angle	20°	NA
CD	Chest to dash	530 mm	465 mm
CS	Steering wheel to chest	317 mm	NA
RA	Rim to abdomen	176 mm	NA
KDL	Left knee to dash	150 mm	136 mm
KDR	Right knee to dash	140 mm	135 mm
KDA	Outboard knee to dash angle	26°	20°
PA	Pelvic angle	24°	24°
TA	Tibial angle	34°	37°
KK	Knee to knee	289 mm	275 mm
ST[1]	Striker to head	563 mm	538 mm
	Striker to head angle	-94°	-80°
SK	Striker to knee	595 mm	604 mm
	Striker to knee angle	2°	0°
SH[1]	Striker to H-point	229 mm	244 mm
	Striker to H-point angle	27°	26°
SHY	Striker to H-point (Y dir.)	226 mm	209 mm
HS	Head to side window	261 mm	300 mm
HD	H-point to door	184 mm	190 mm
AD	Arm to door	59 mm	85 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 7 Camera Positions

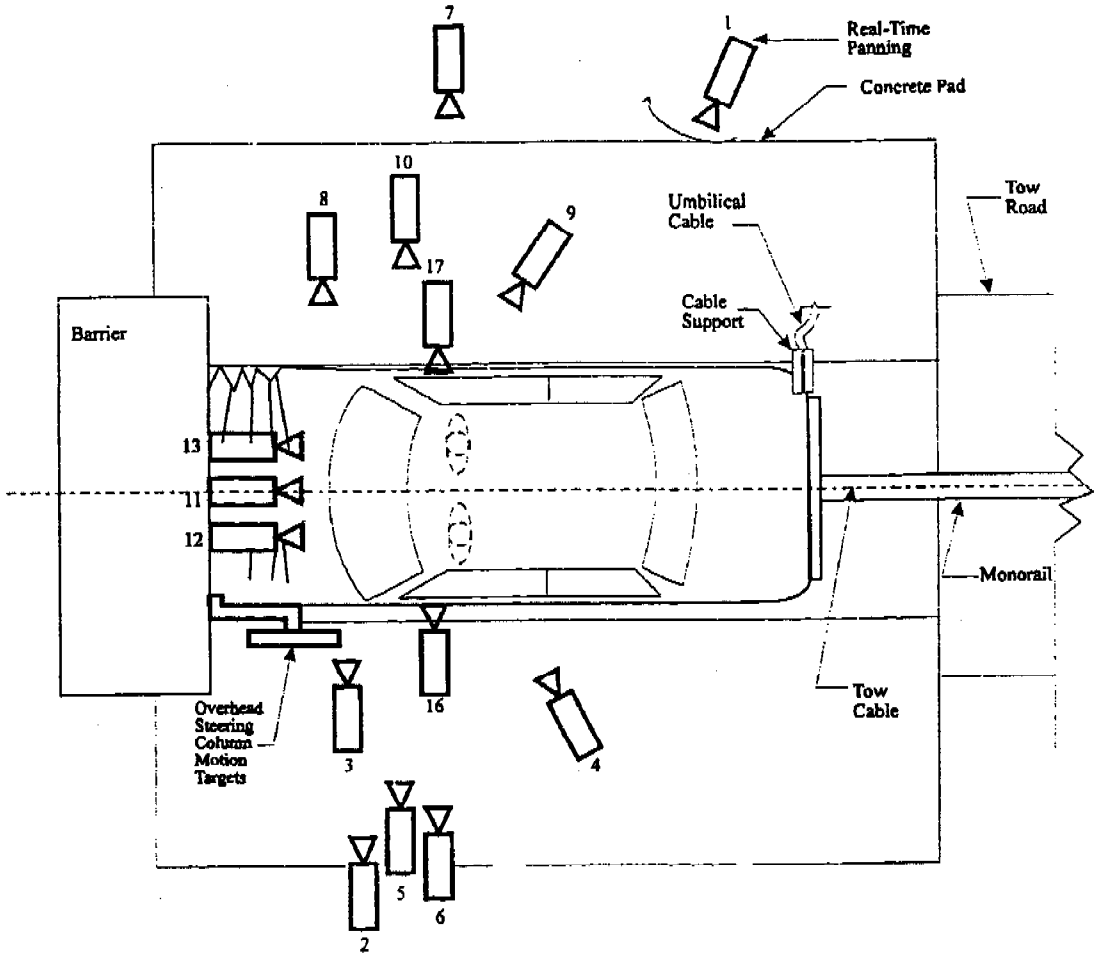


Figure 7 Camera Positions, Cont'd.

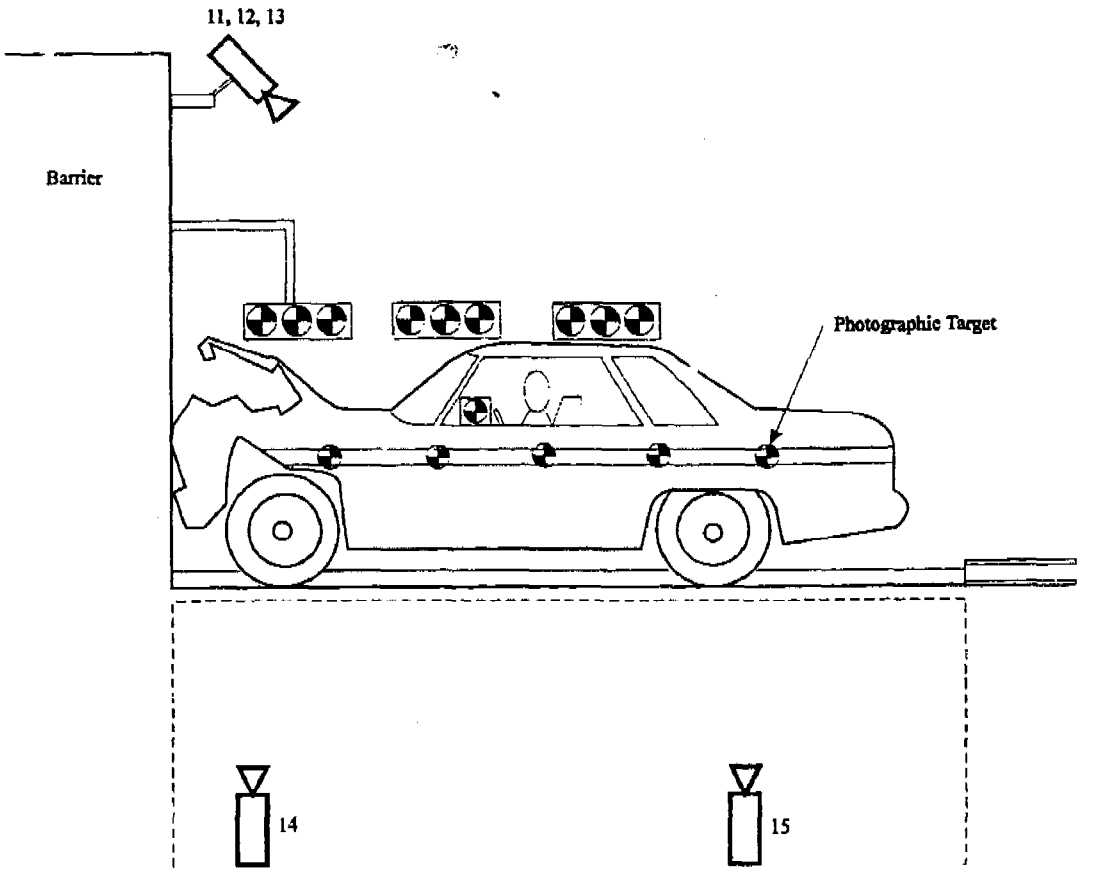


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1998/Dodge/Neon/4-door Sedan

Test number: 980202

Camera Number	View	Camera Positions[1] X	Y	Z	Camera Angle[2]	Film Plane to Head Target	Camera Lens	Film Speed
1	Real-time panning	NA	NA	NA	NA	NA	16 mm	24 frames
2	Left vehicle crush	-1054 mm	7493 mm	1118 mm	-4°	7569 mm	25 mm	995 frames
3	Left windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA	50 mm	1005 frames
4	Driver kinematics	-3995 mm	2946 mm	2210 mm	-27°	2438 mm	25 mm	943 frames
5	Steering column motion	-1168 mm	7264 mm	2616 mm	-14°	NA	25 mm	1000 frames
6	Steering column motion	-1168 mm	7264 mm	1908 mm	-9°	NA	25 mm	998 frames
7	Right overall	-2065 mm	-6767 mm	942 mm	-2°	NA	13 mm	980 frames
8	Right windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA	50 mm	1010 frames
9	Passenger kinematics	-3863 mm	-2946 mm	2210 mm	-26°	2286 mm	25 mm	983 frames
10	Passenger kinematics	-986 mm	-7442 mm	1151 mm	-4°	5944 mm	25 mm	992 frames
11	Windshield front view	-152 mm	0 mm	2235 mm	-40°	NA	13 mm	998 frames
12	Driver - front view	-173 mm	368 mm	2362 mm	-50°	NA	17 mm	1008 frames
13	Passenger - front view	-114 mm	-351 mm	2362 mm	-50°	NA	17 mm	1000 frames
14	Pit - front position	-1283 mm	0 mm	-2347 mm	90°	NA	13 mm	1002 frames
15	Pit - rear position	-2522 mm	0 mm	-2515 mm	90°	NA	13 mm	1000 frames
16	Onboard driver	NA	NA	NA	NA	NA	8 mm	998 frames
17	Onboard passenger	NA	NA	NA	NA	NA	8 mm	980 frames
18	Real-time documentation	NA	NA	NA	NA	NA	12-120 mm	24 frames

[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

Appendix A

Photographs

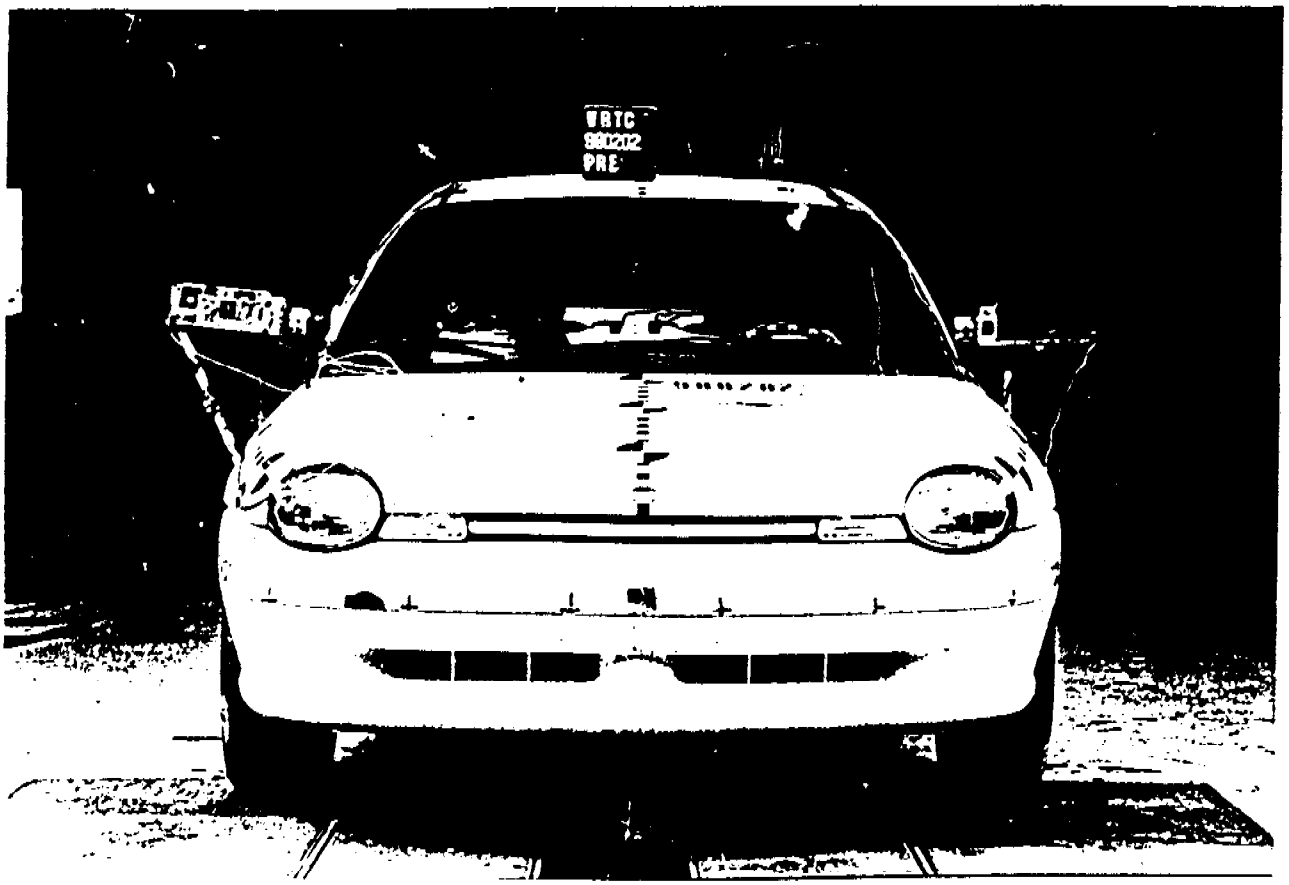


Figure A-1 Pre-Test Front View

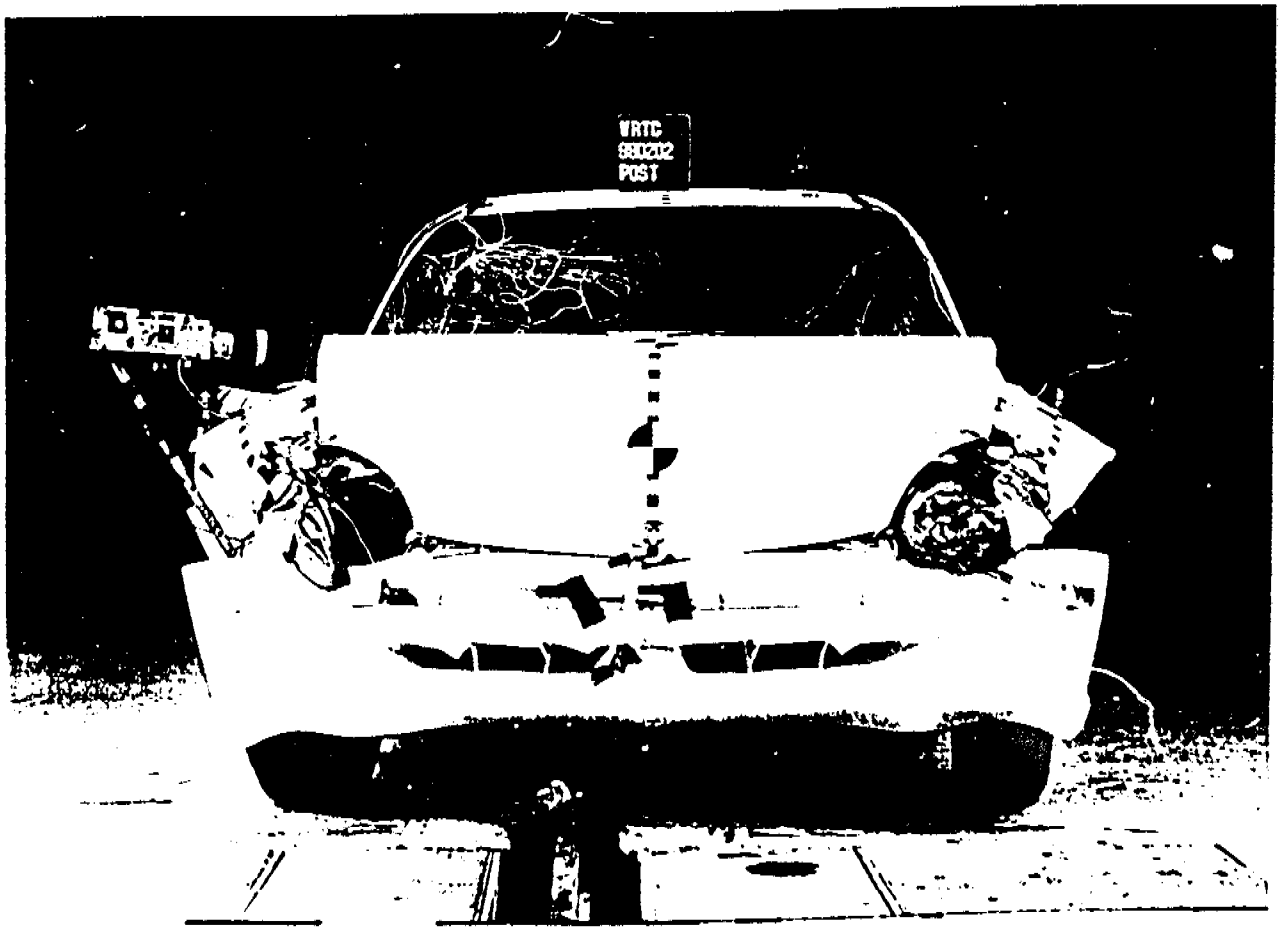


Figure A-2 Post-Test Front View

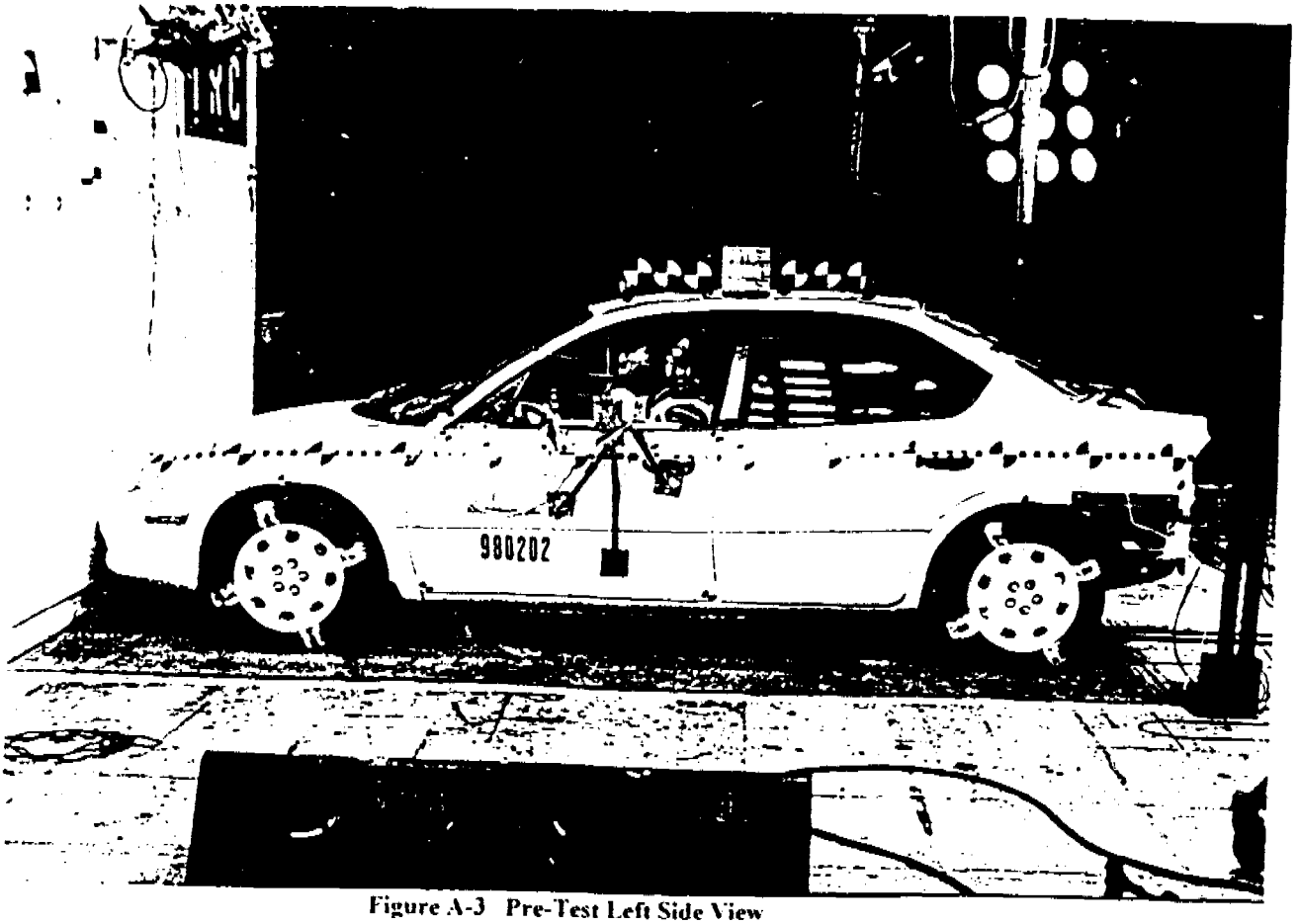


Figure A-3 Pre-Test Left Side View

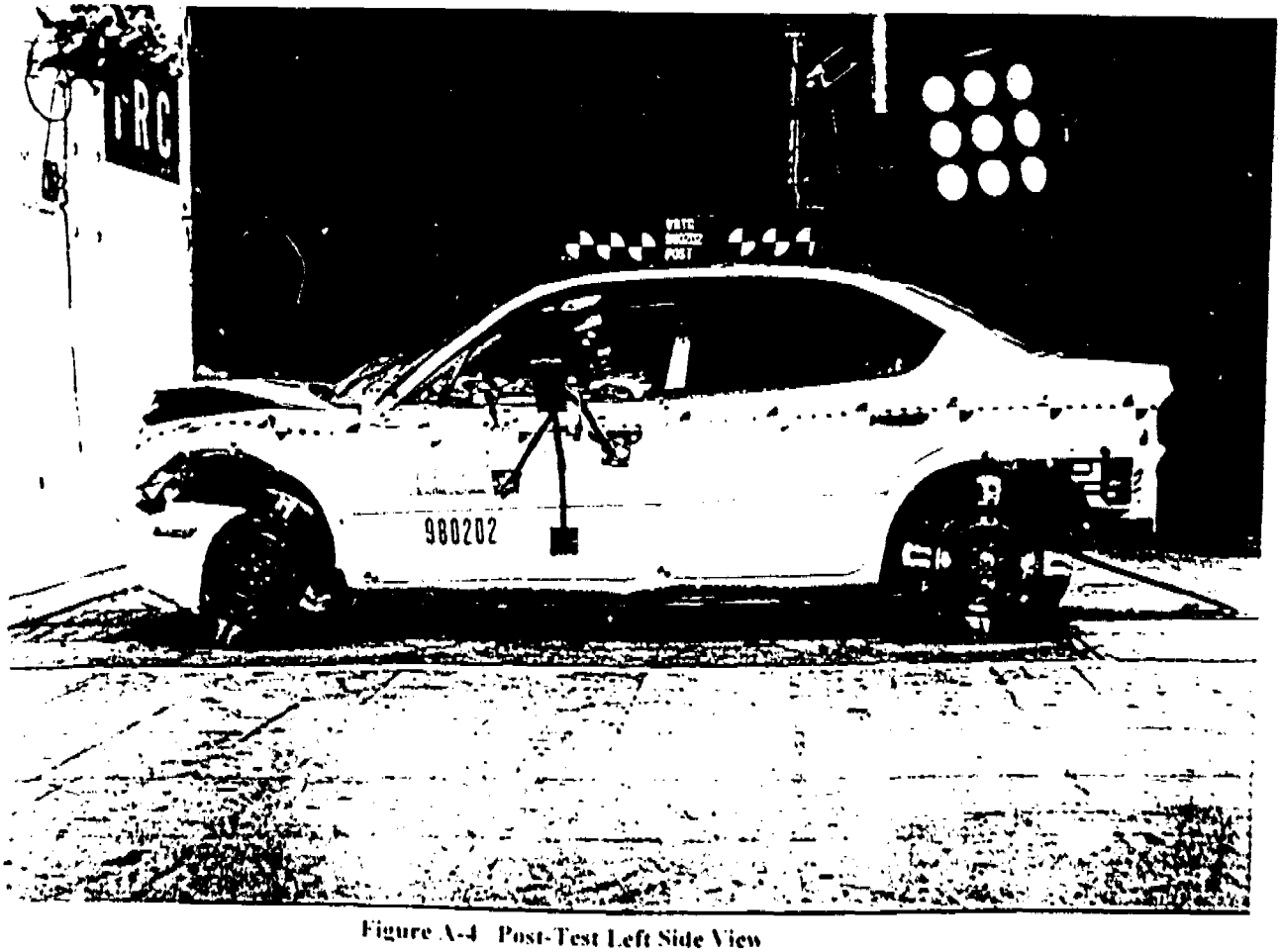


Figure A-4 Post-Test Left Side View

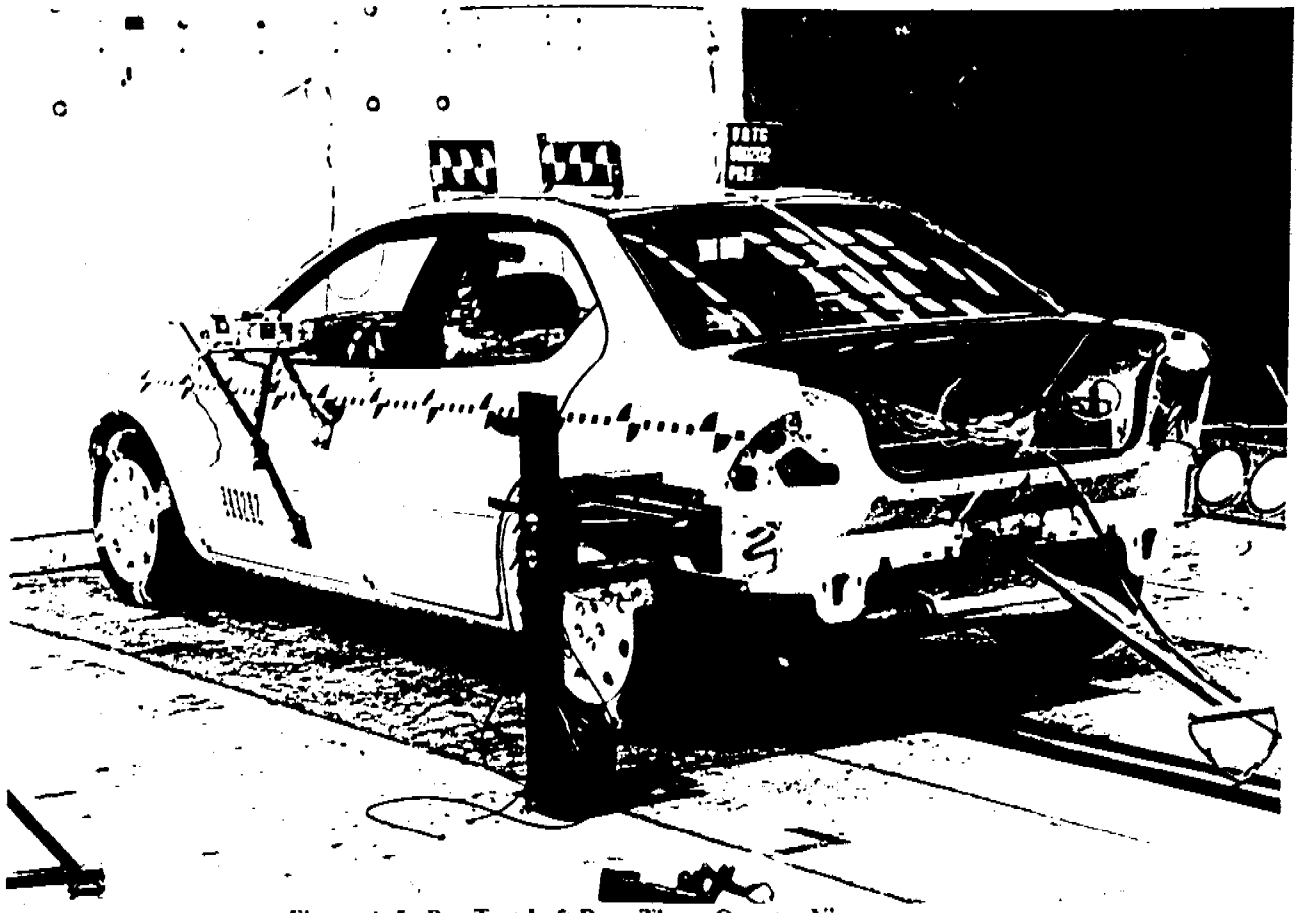


Figure A-5 Pre-Test Left Rear Three-Quarter View

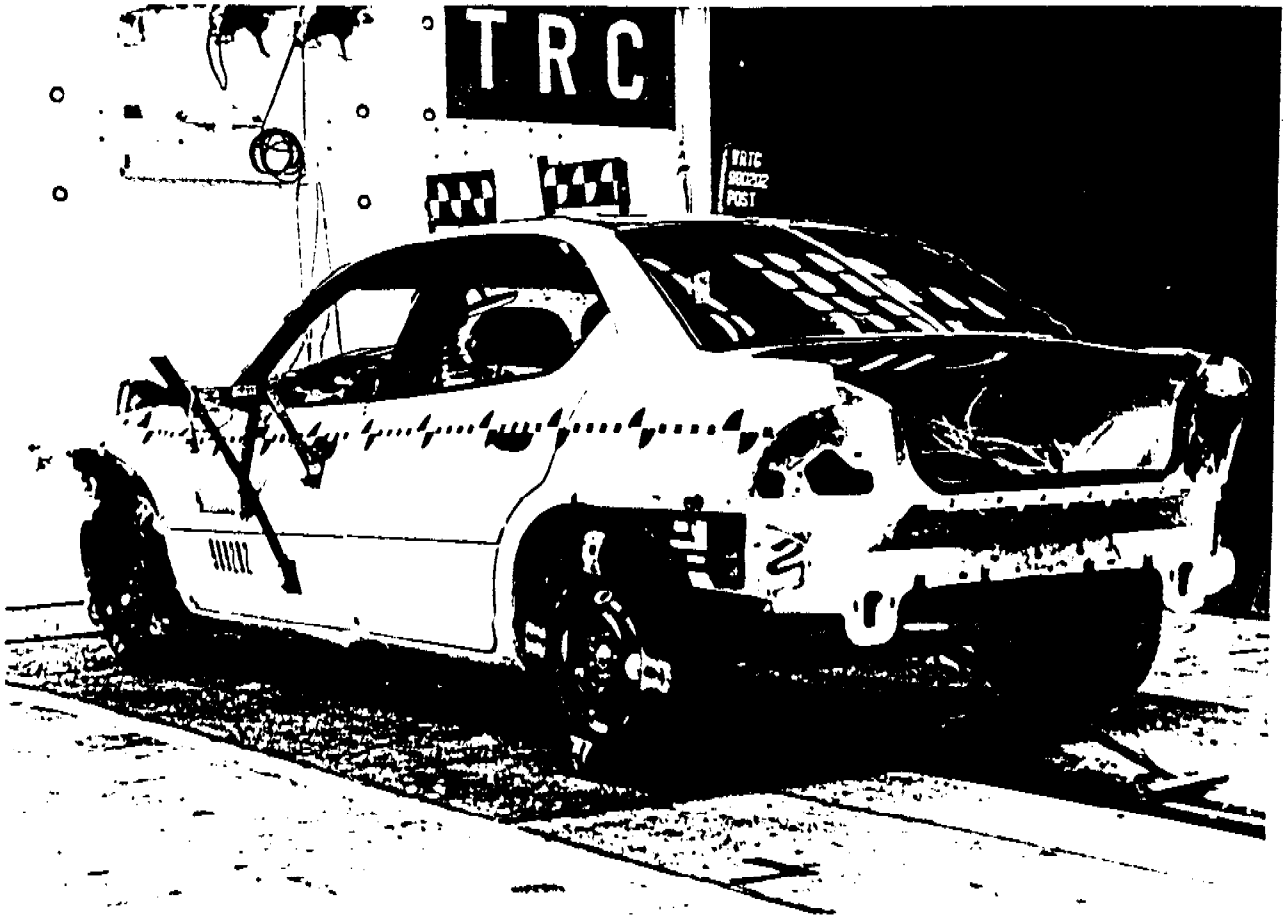


Figure A-6 Post-Test Left Rear Three-Quarter View

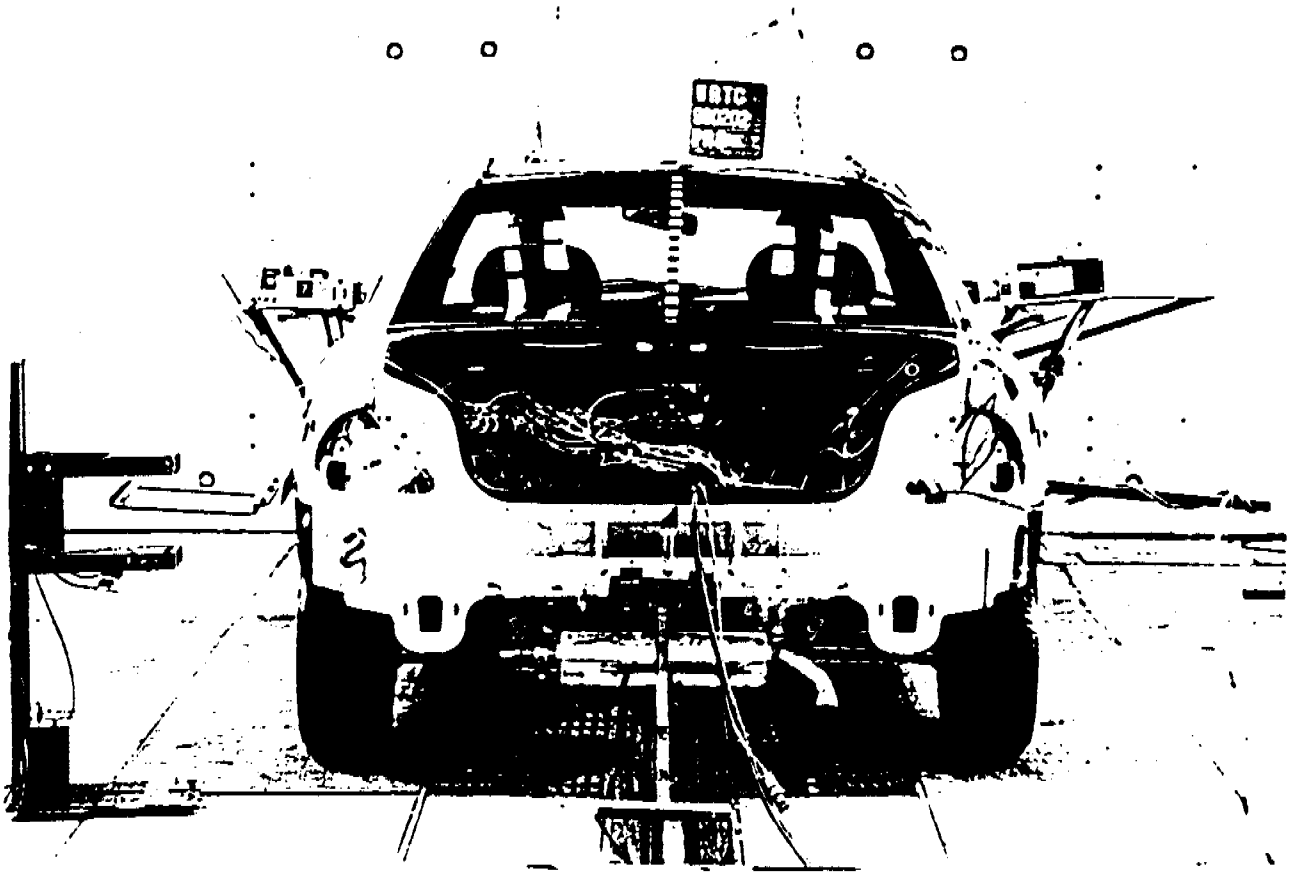


Figure A-7 Pre-Test Rear View

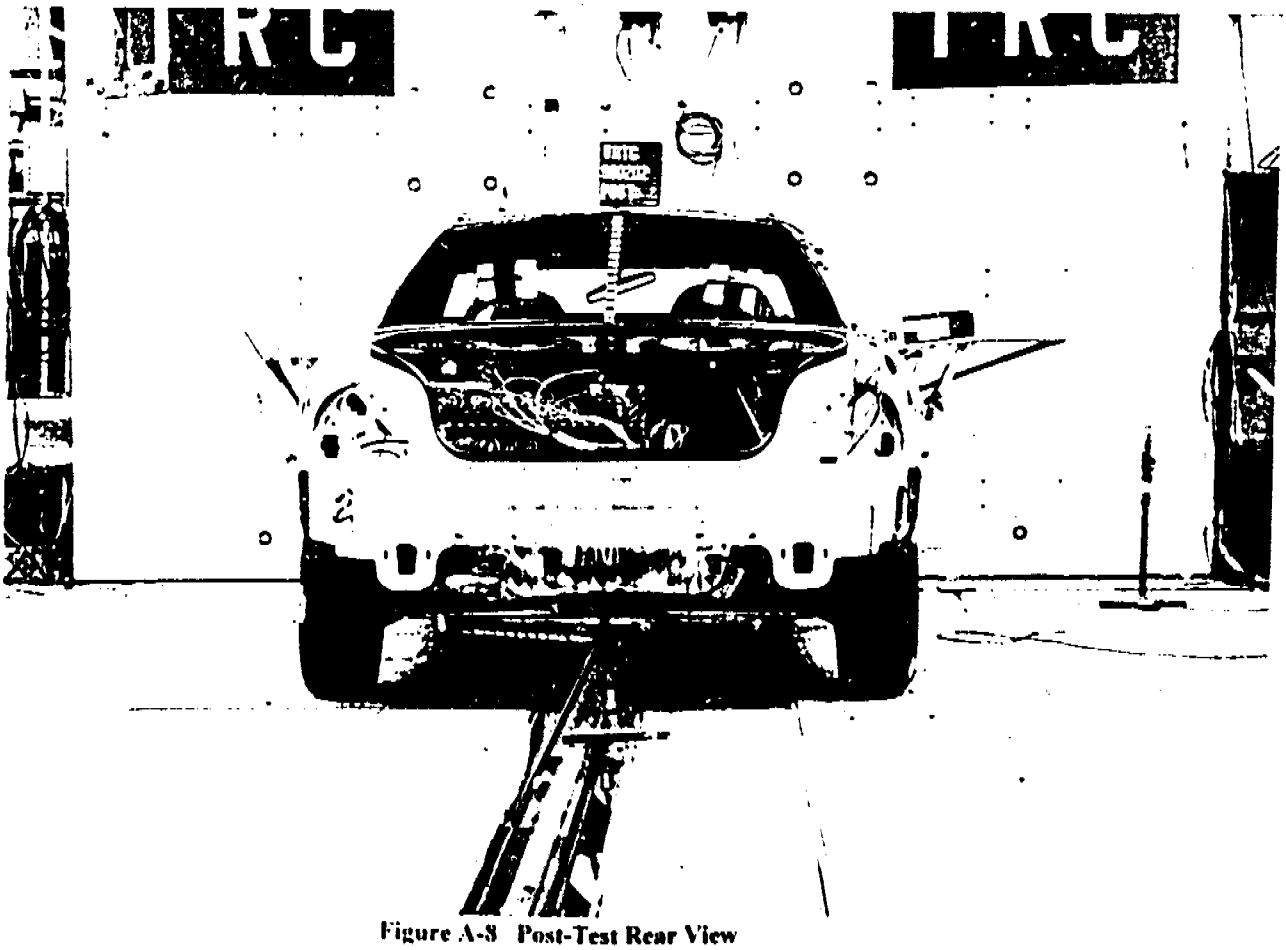


Figure A-8 Post-Test Rear View

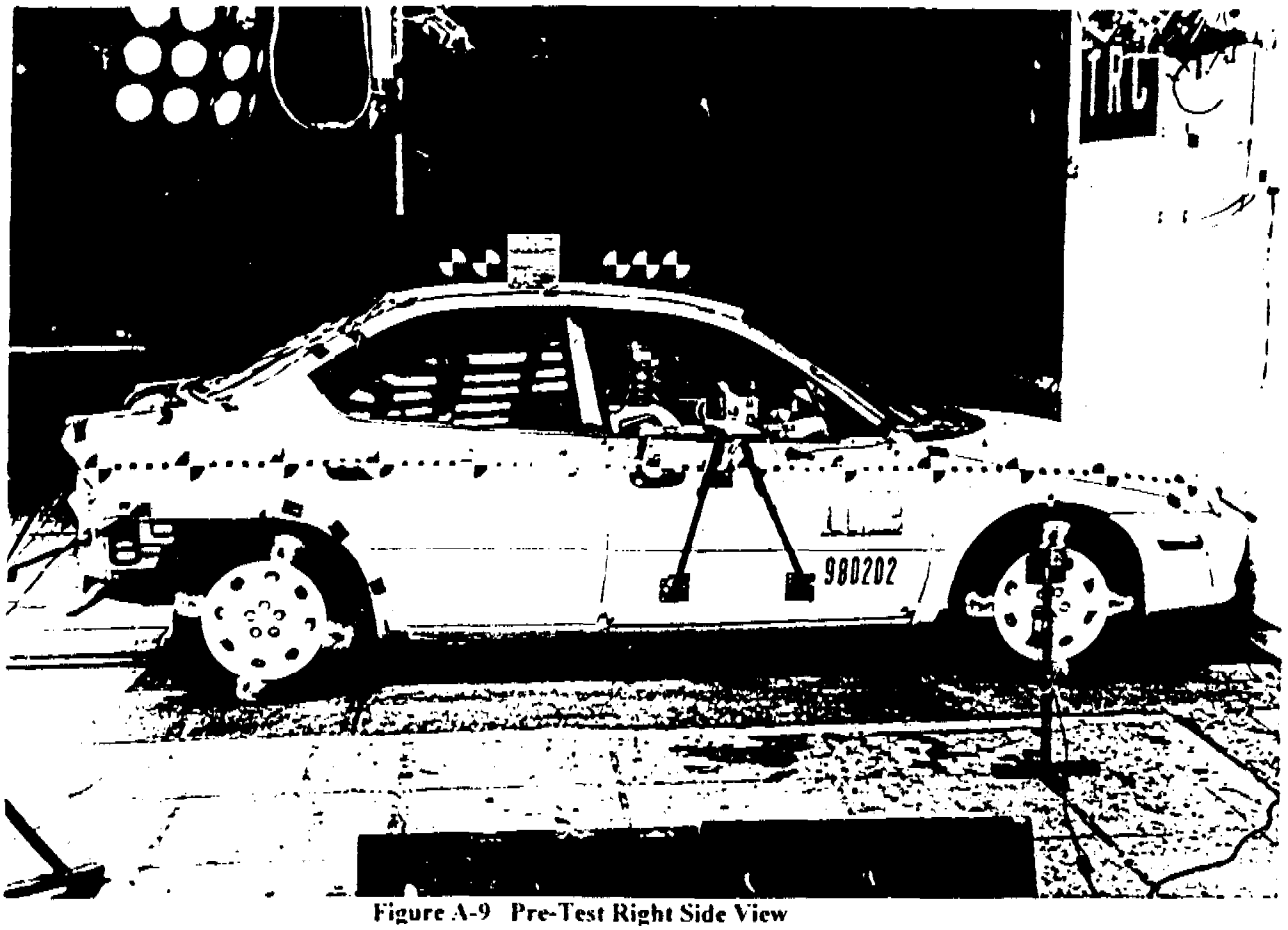


Figure A-9 Pre-Test Right Side View

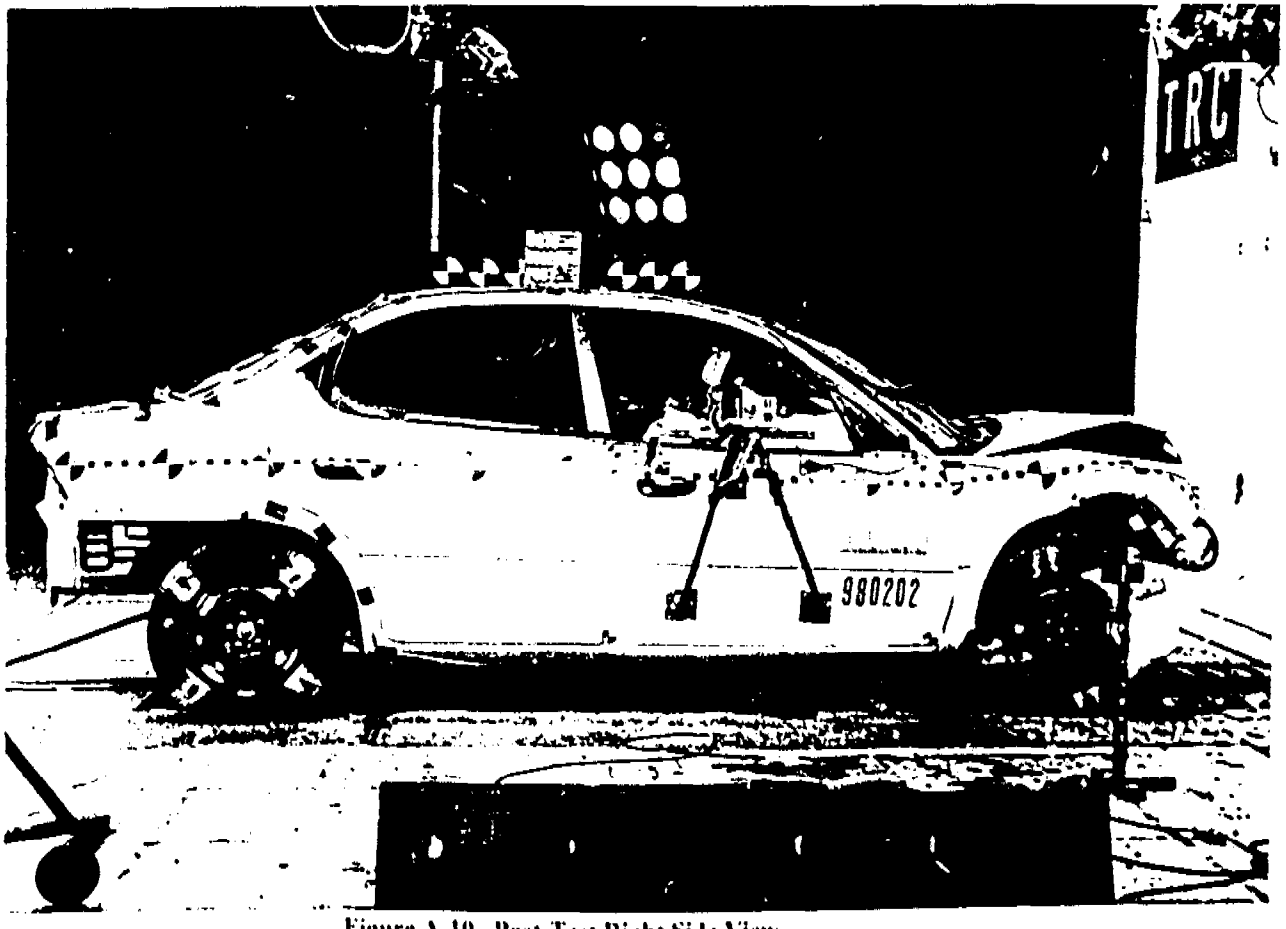


Figure A-10 Post-Test Right Side View

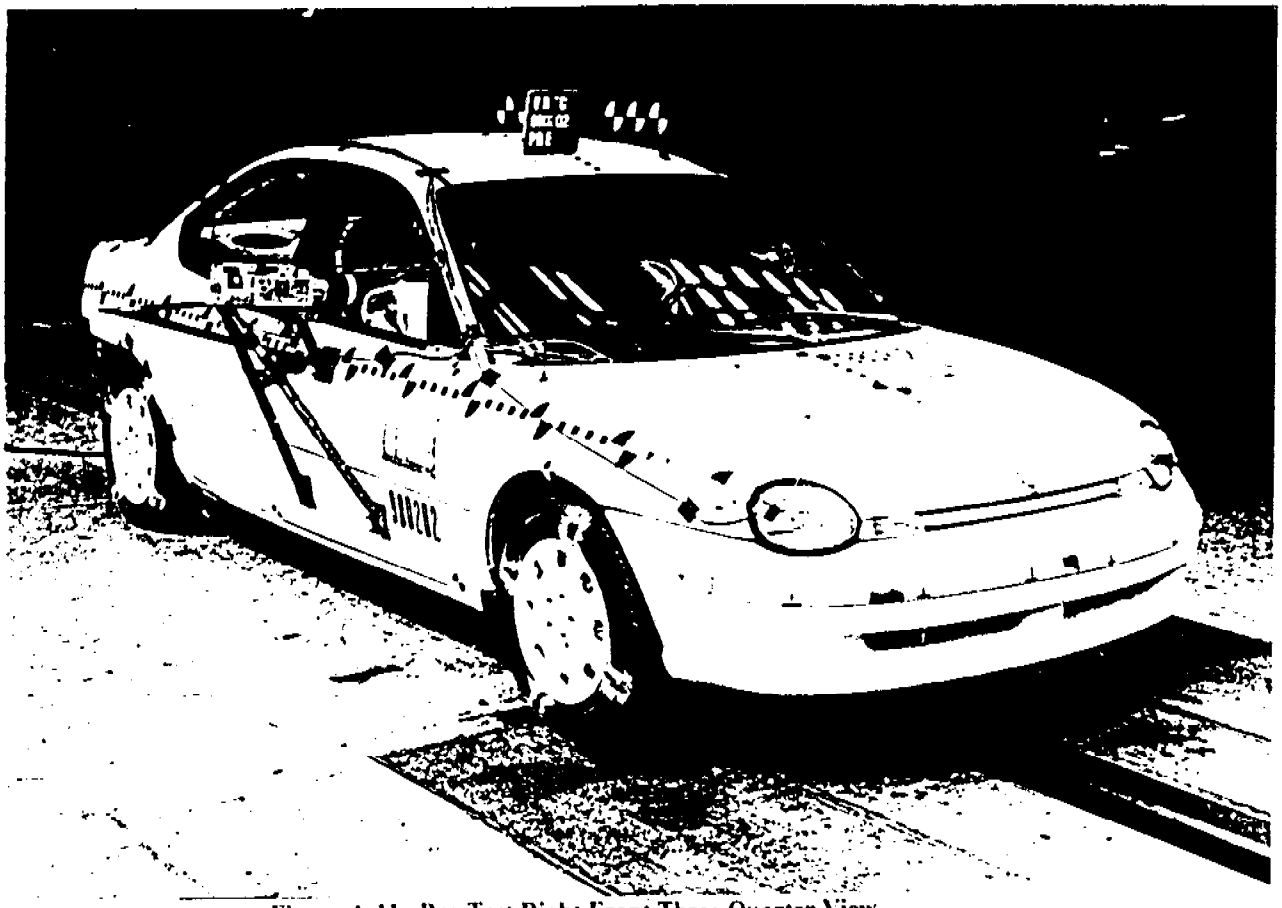


Figure A-11 Pre-Test Right Front Three-Quarter View

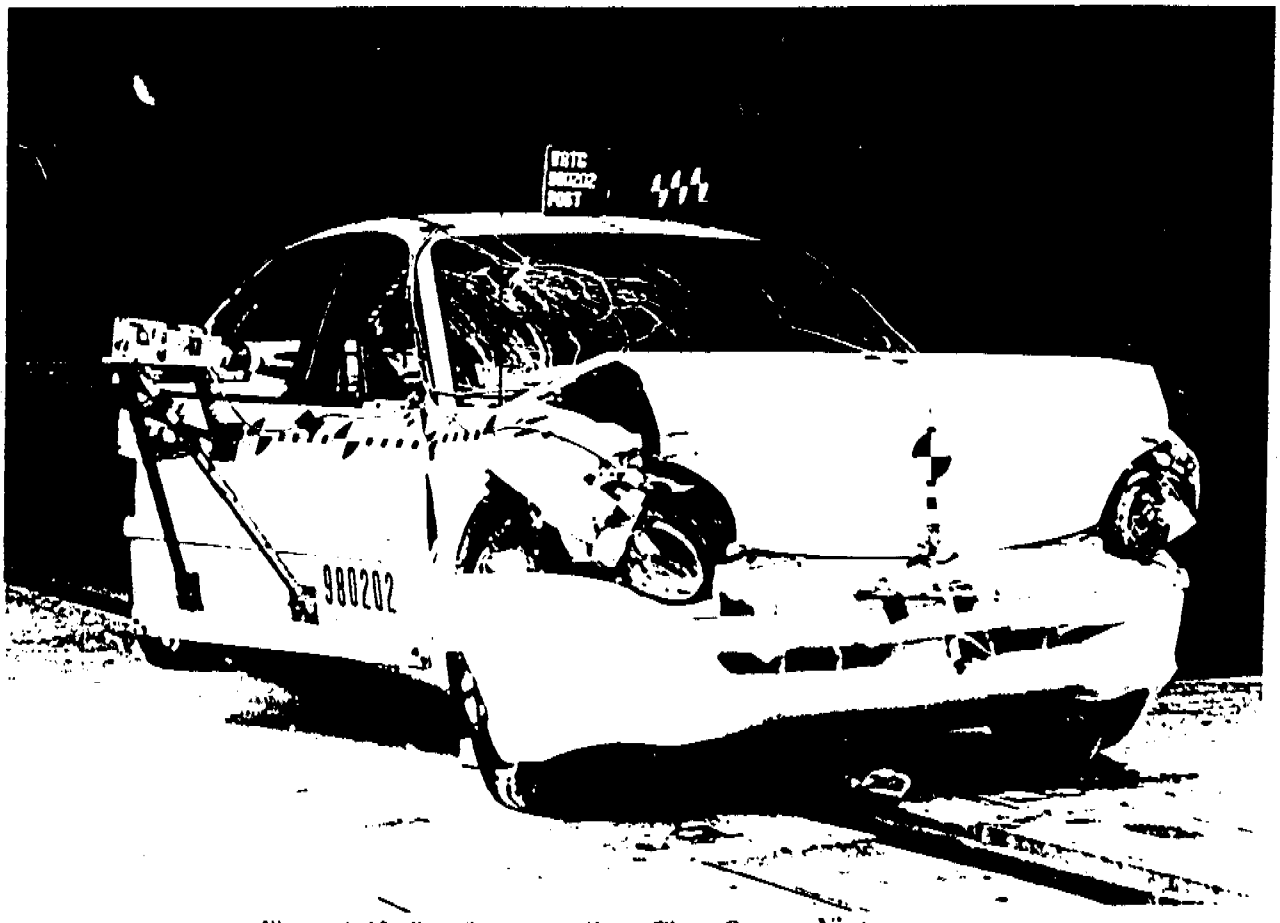


Figure A-12 Post-Test Right Front Three-Quarter View

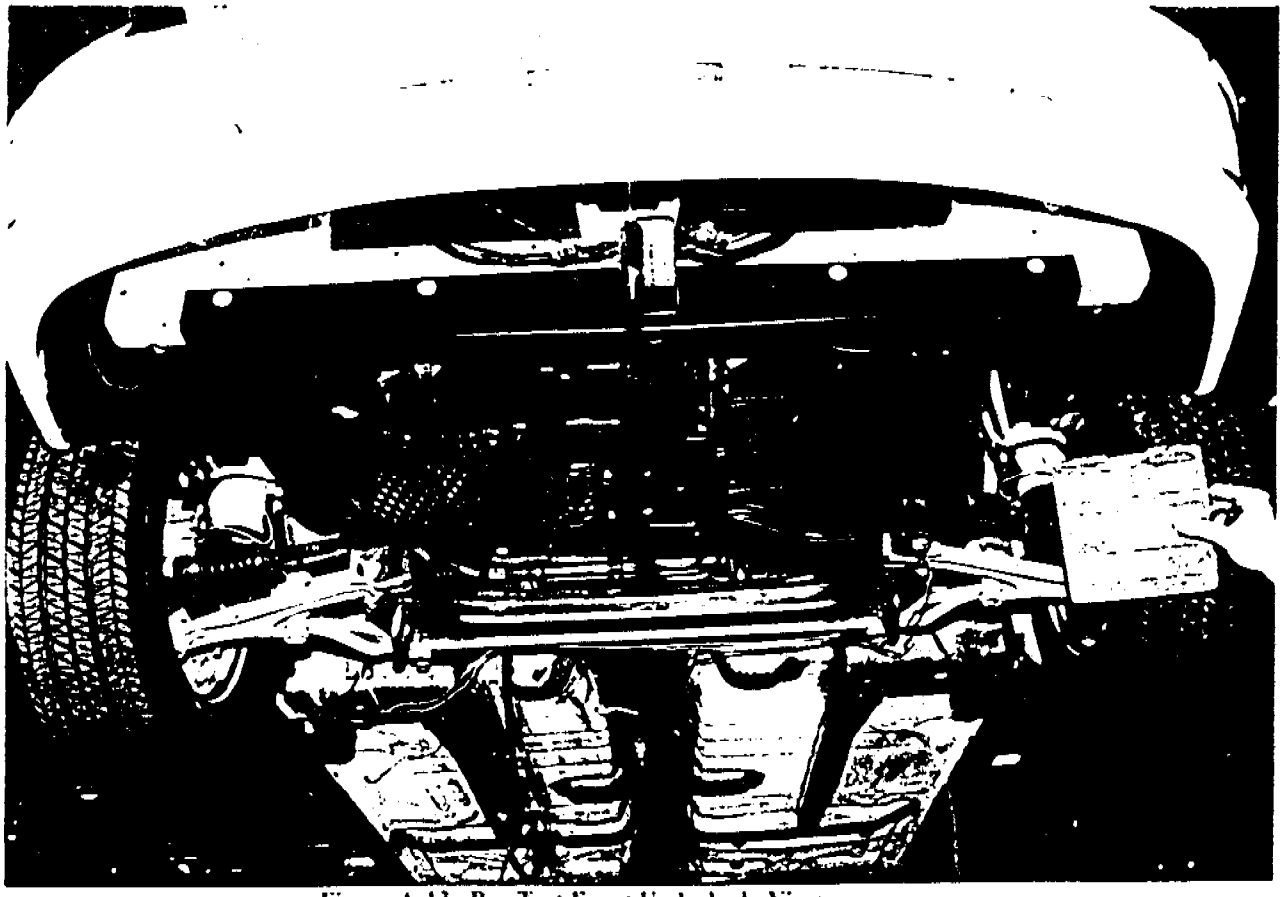


Figure A-13 Pre-Test Front Underbody View

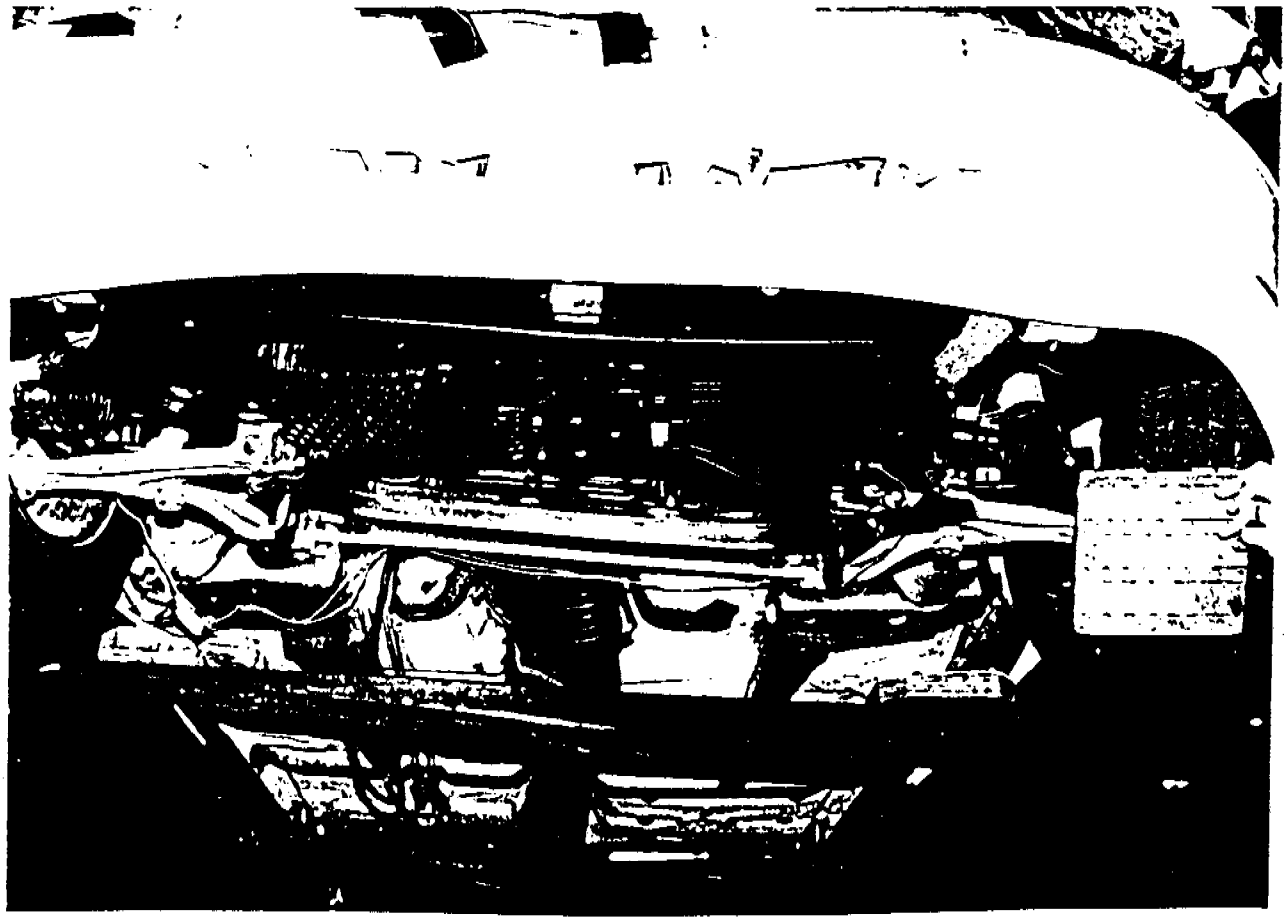


Figure A-14 Post-Test Front Underbody View

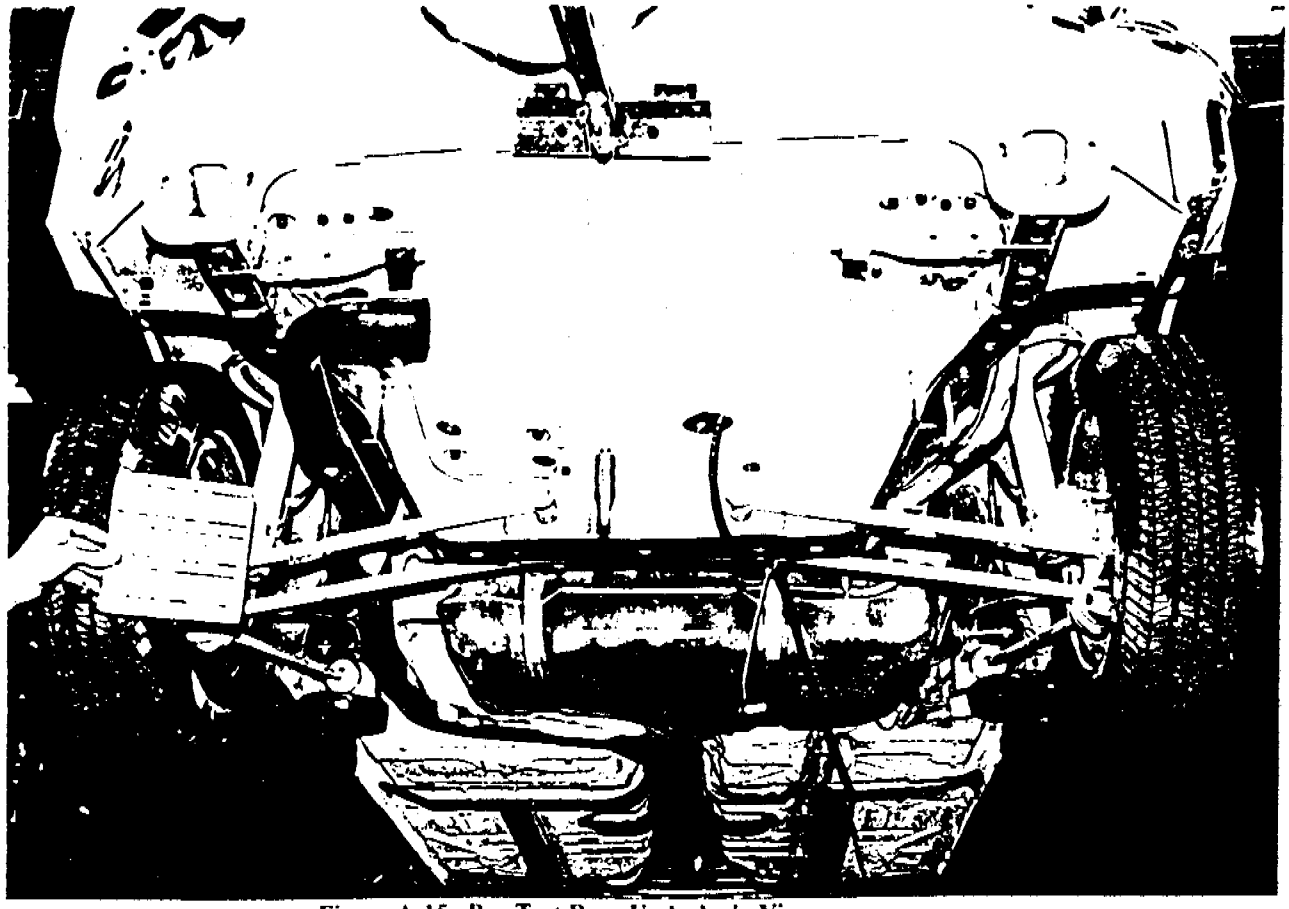


Figure A-15 Pre-Test Rear Underbody View

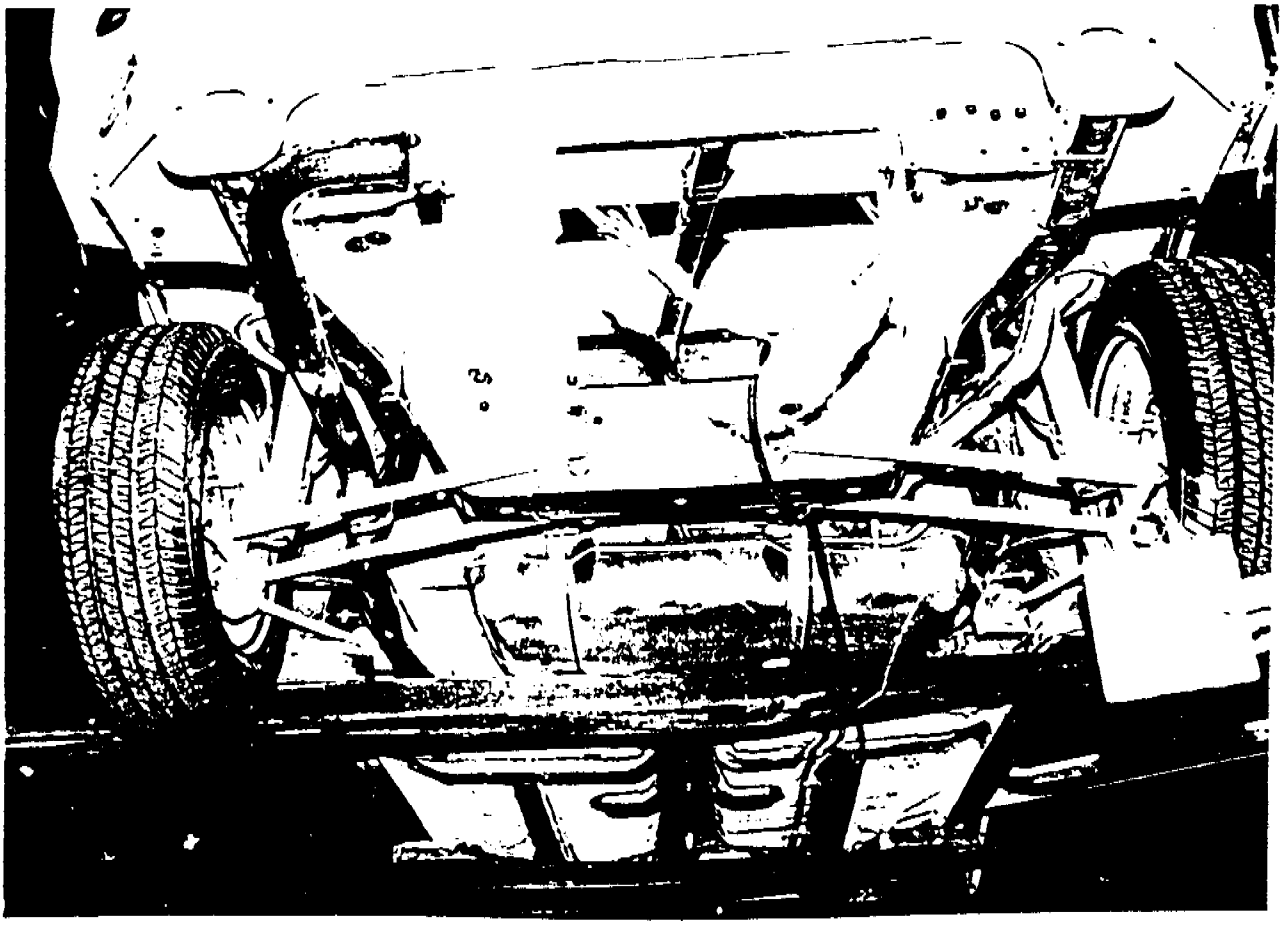


Figure A-16 Post-Test Rear Underbody View

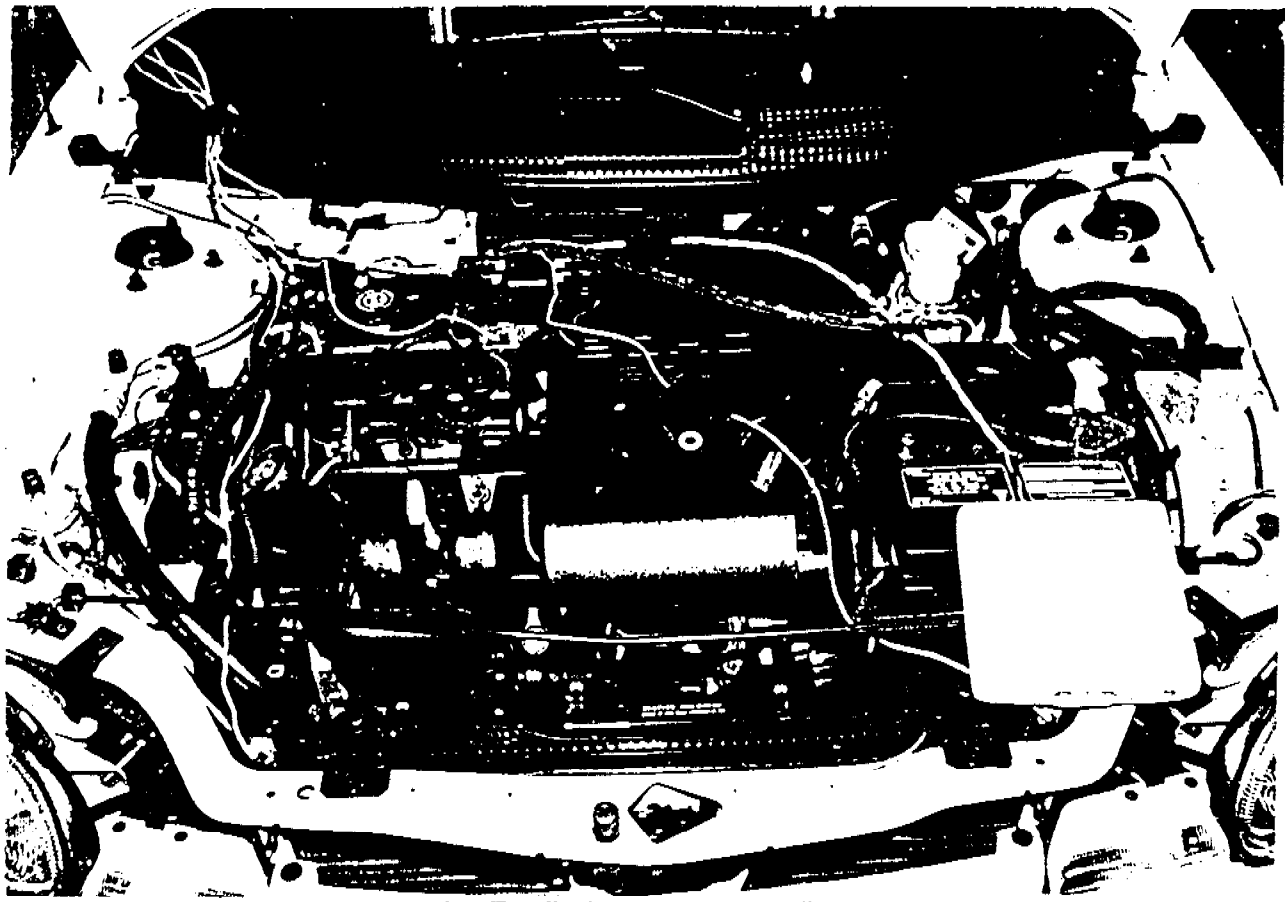


Figure A-17 Pre-Test Engine Compartment View

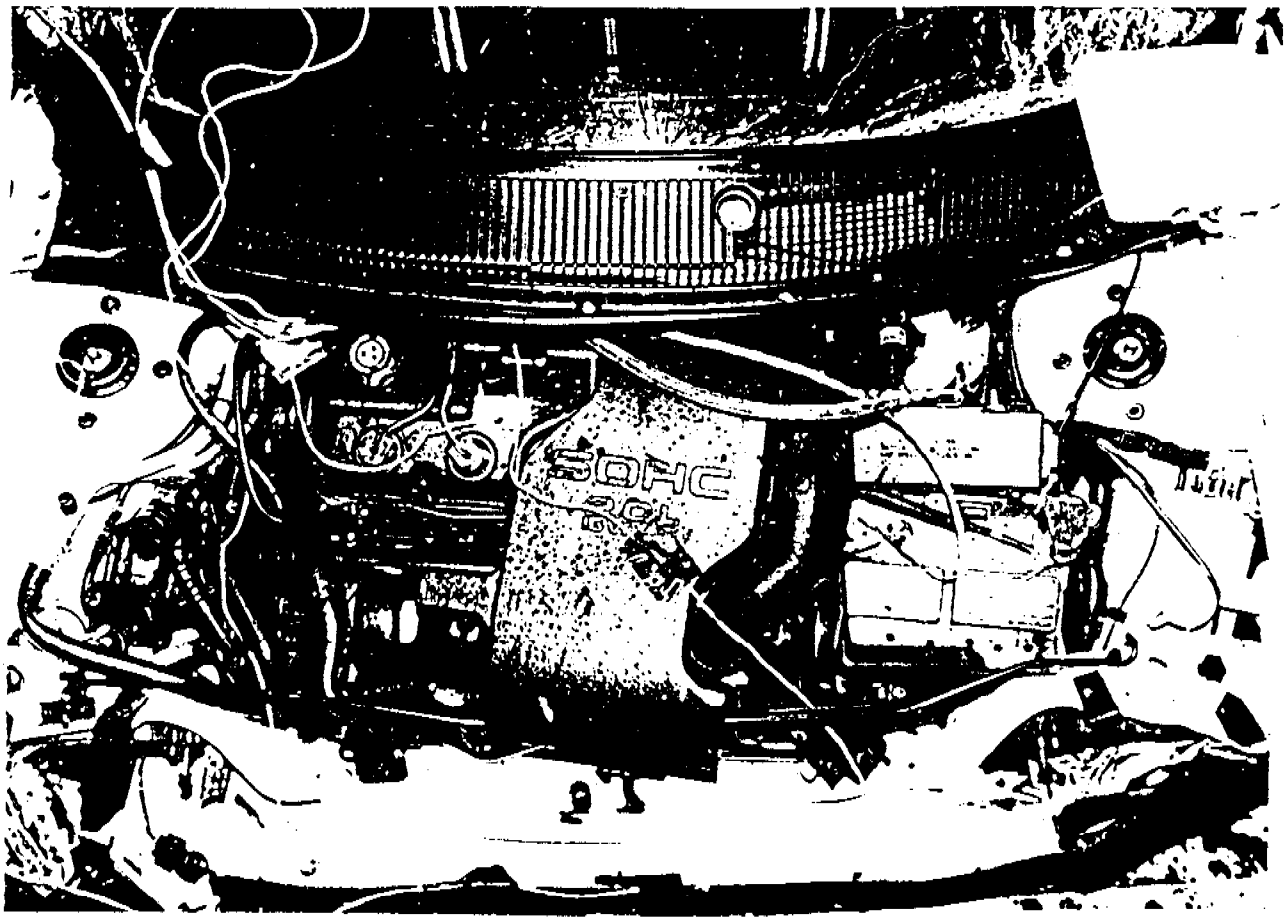


Figure A-18 Post-Test Engine Compartment View

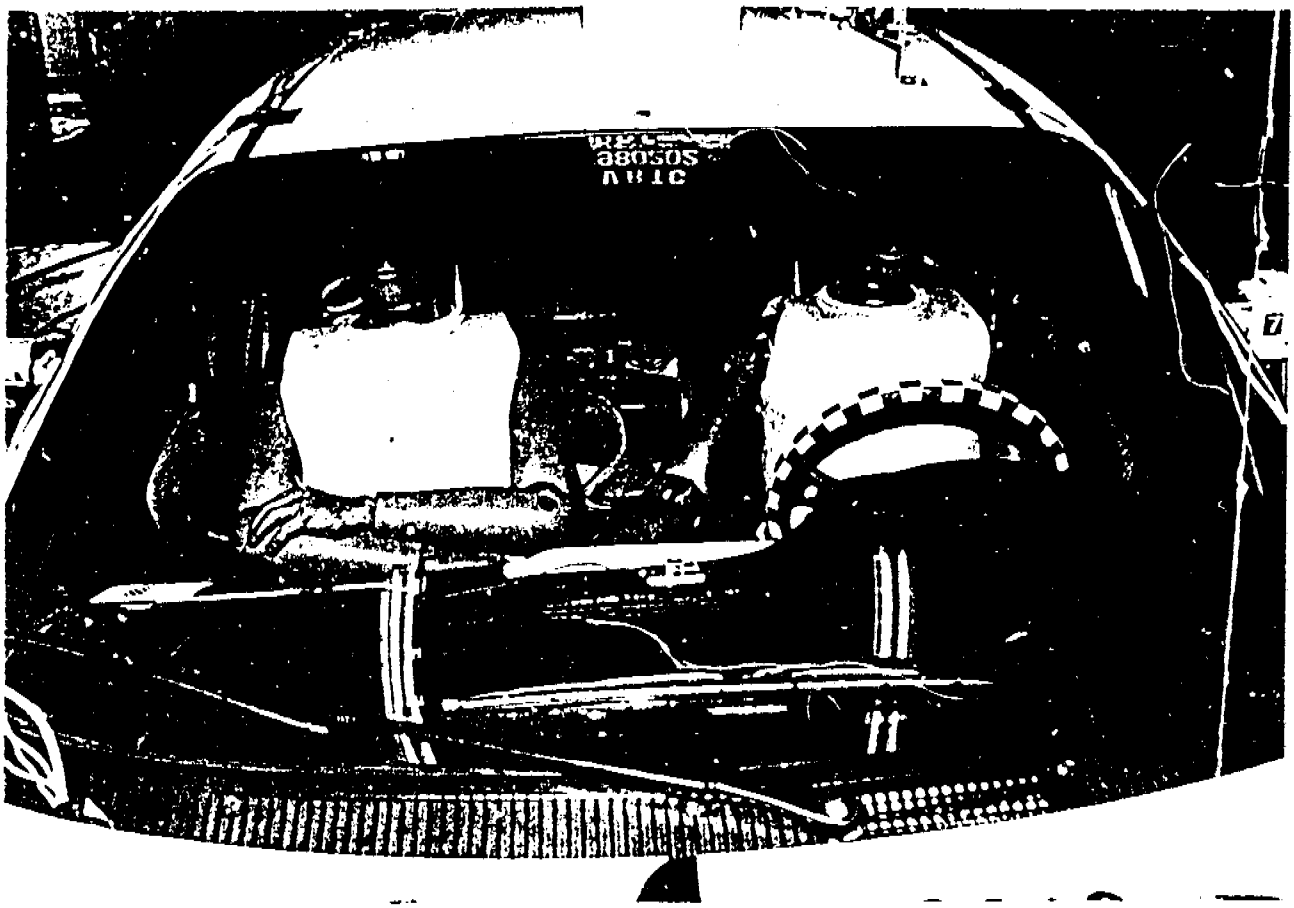


Figure A-19 Pre-Test Windshield View

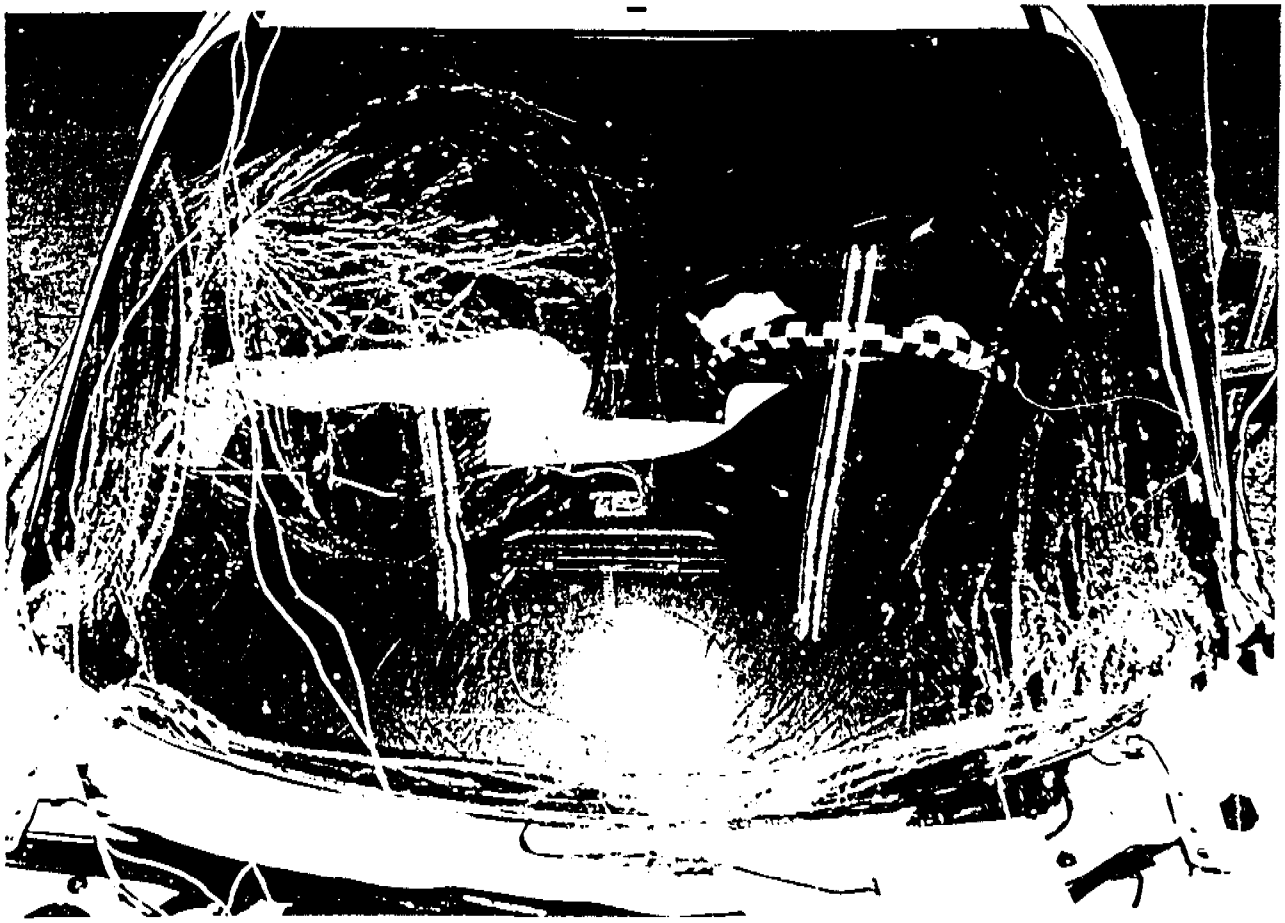


Figure A-20 Post-Test Windshield View

Figure A-21 Pre-Test Driver Dummy Position - View 1

Figure A-22 Post-Test Driver Dummy Position - View 1

Figure A-23 Pre-Test Driver Dummy Position -View 2

Figure A-24 Post-Test Driver Dummy Position - View 2

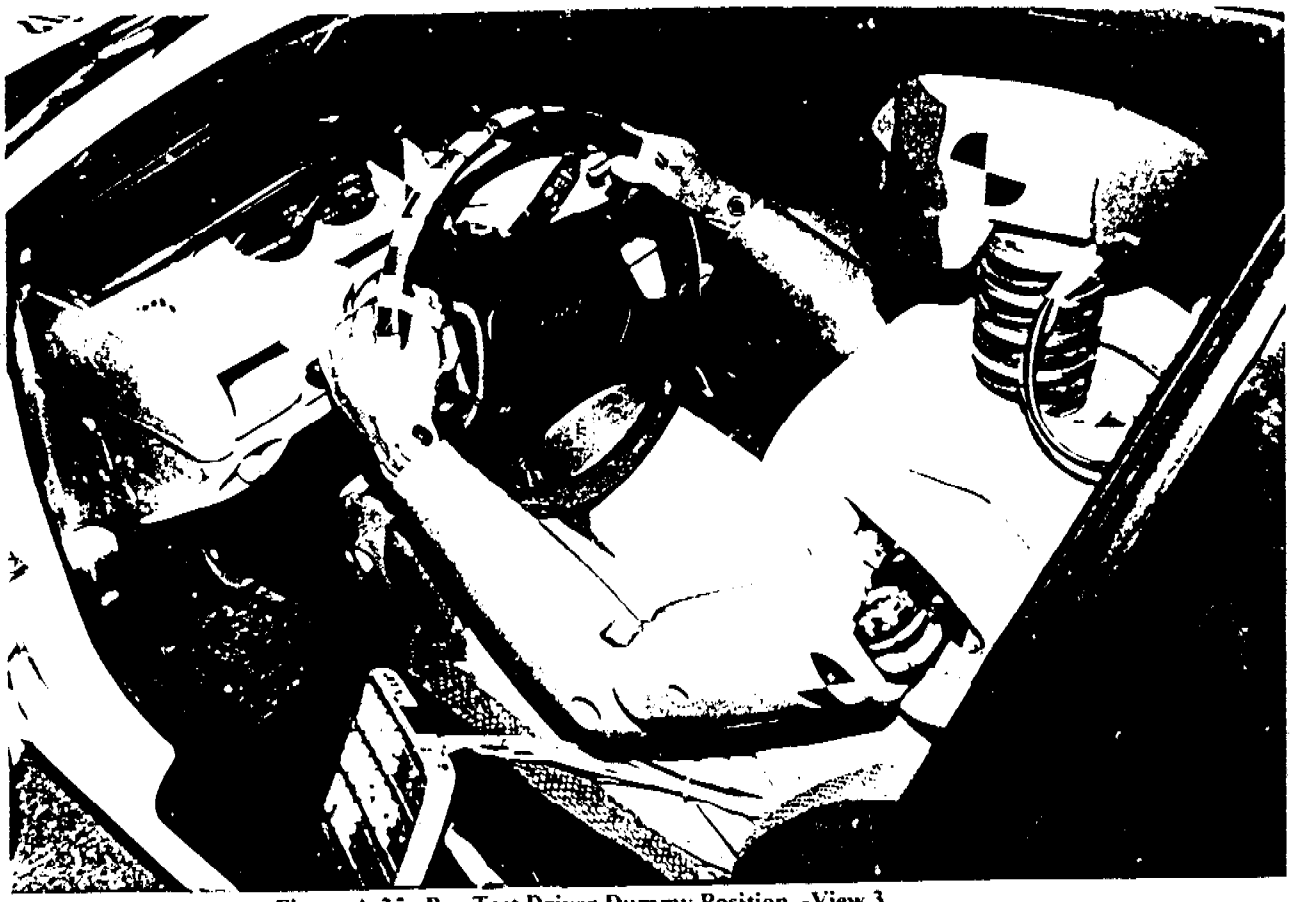


Figure A-25 Pre-Test Driver Dummy Position -View 3

Figure A-26 Post-Test Driver Dummy Position - View 3

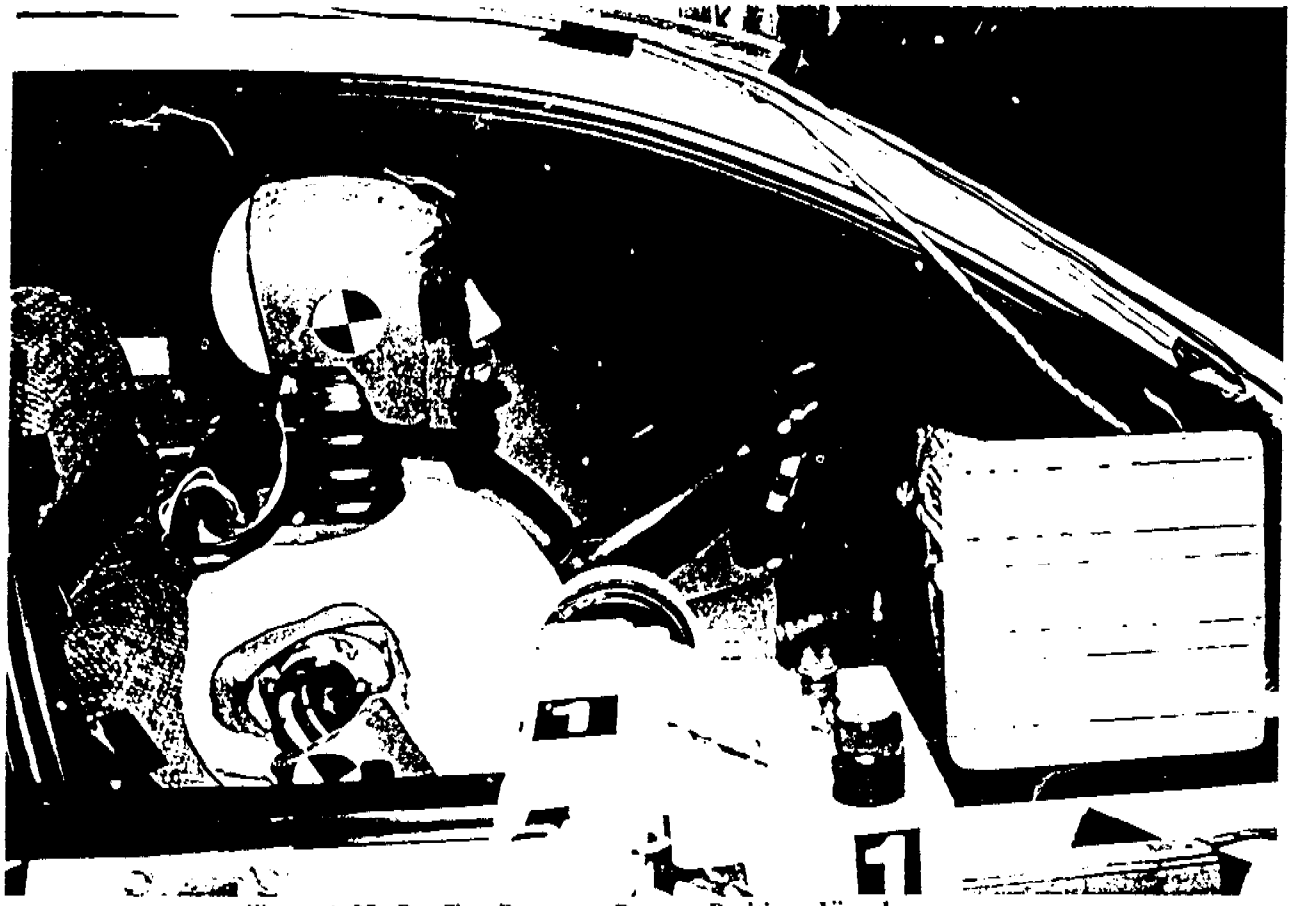


Figure A-27 Pre-Test Passenger Dummy Position - View 1

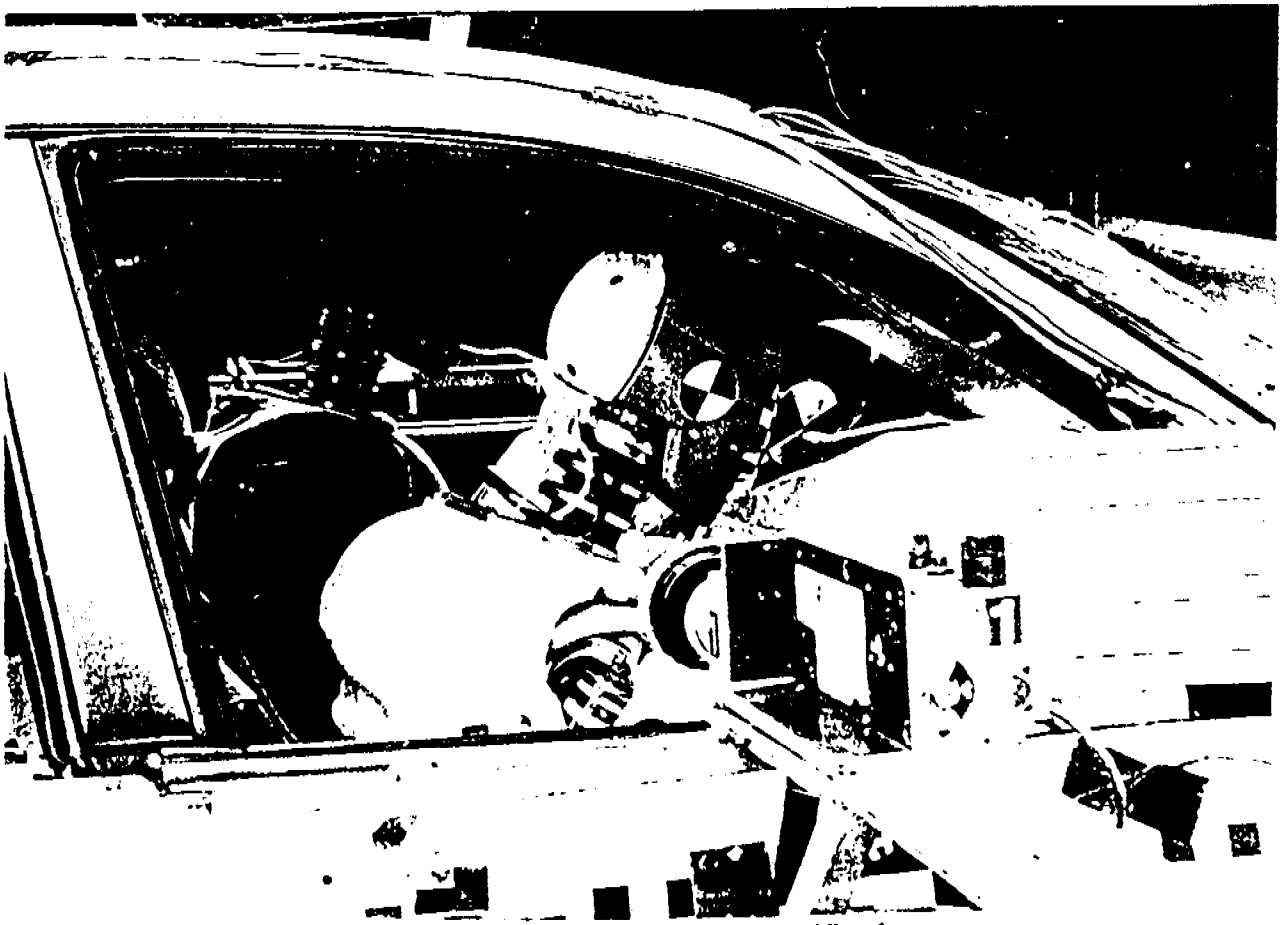


Figure A-28 Post-Test Passenger Dummy Position - View 1

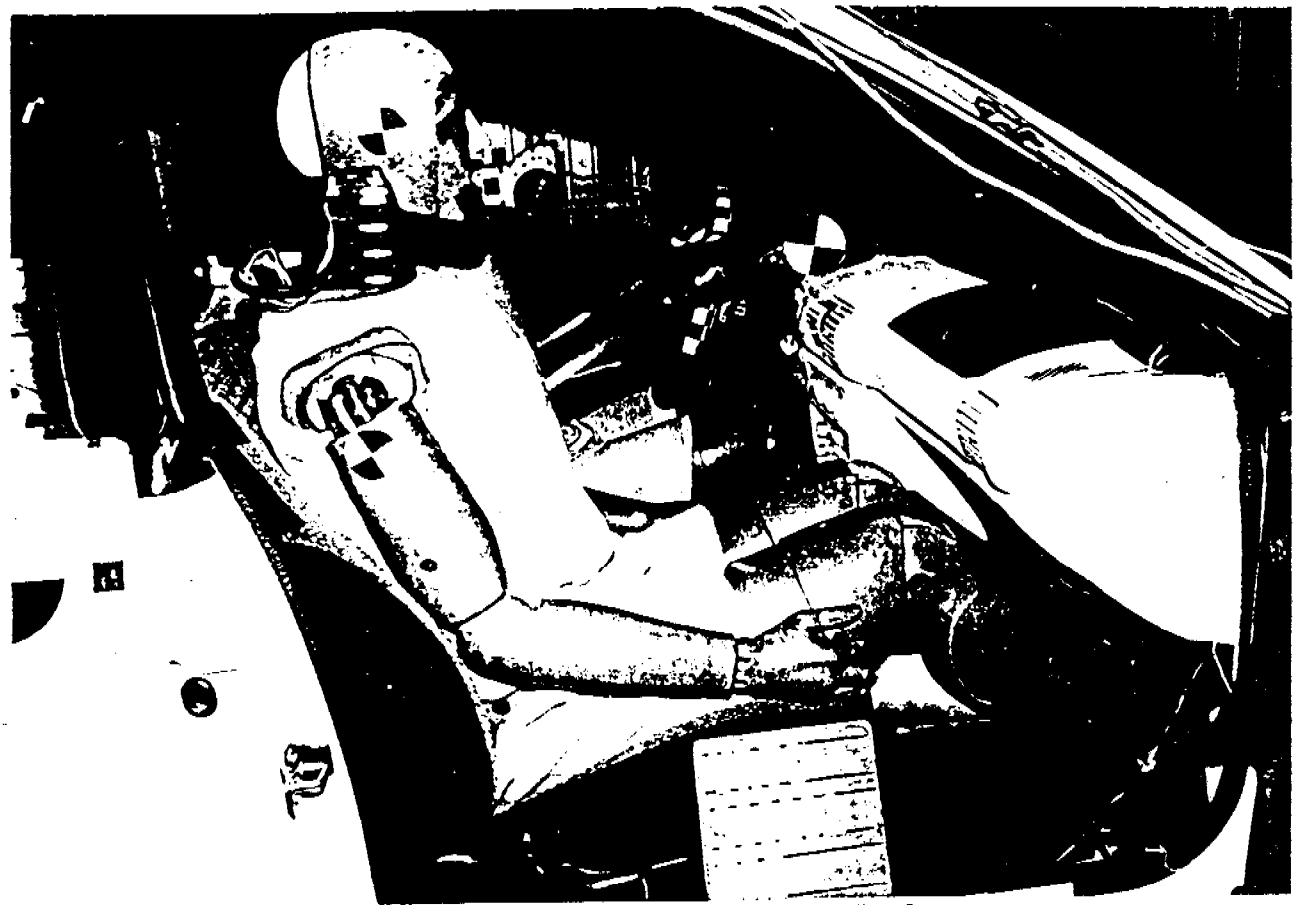


Figure A-29 Pre-Test Passenger Dummy Position - View 2

Figure A-30 Post-Test Passenger Dummy Position - View 2

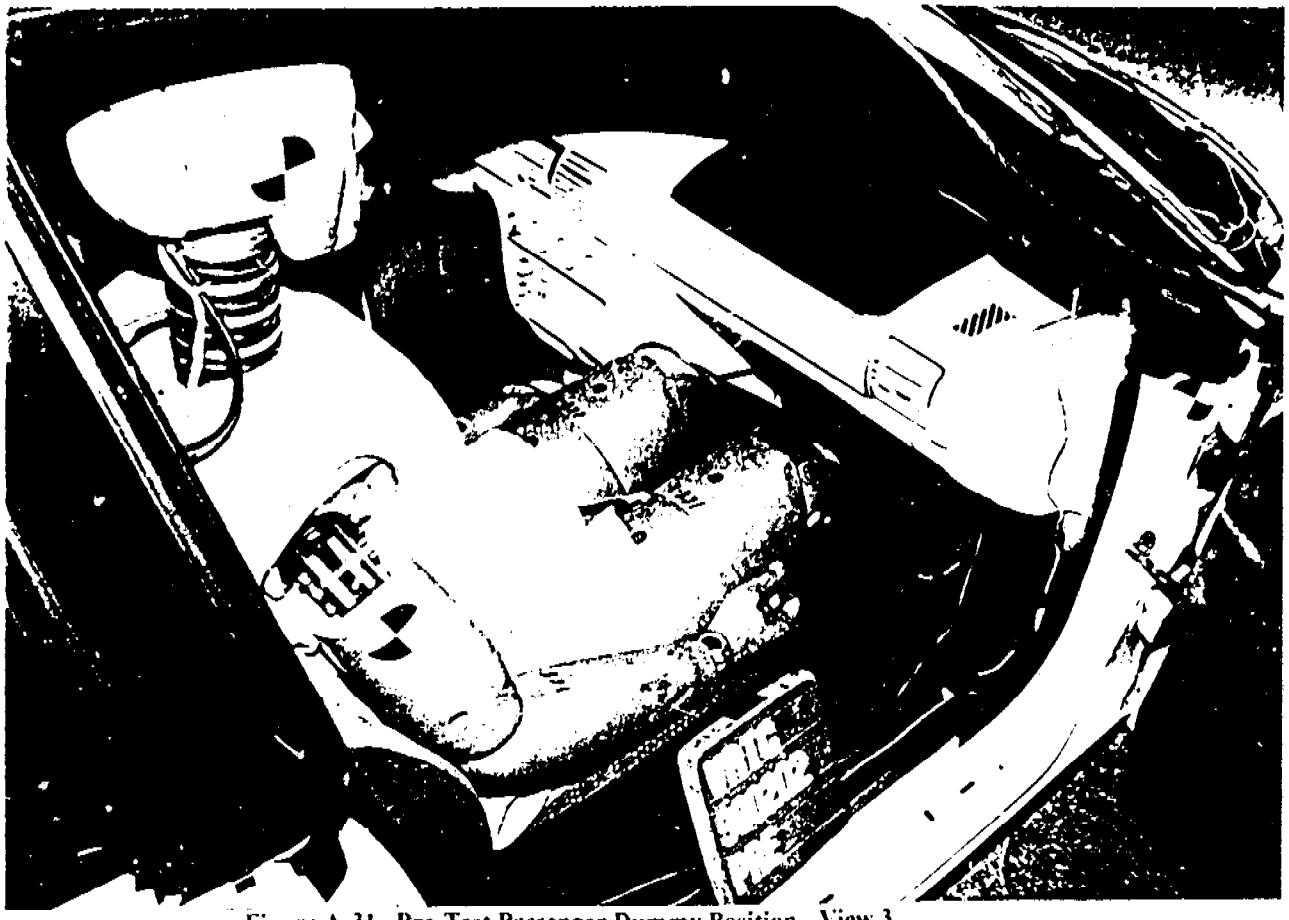


Figure A-31 Pre-Test Passenger Dummy Position - View 3

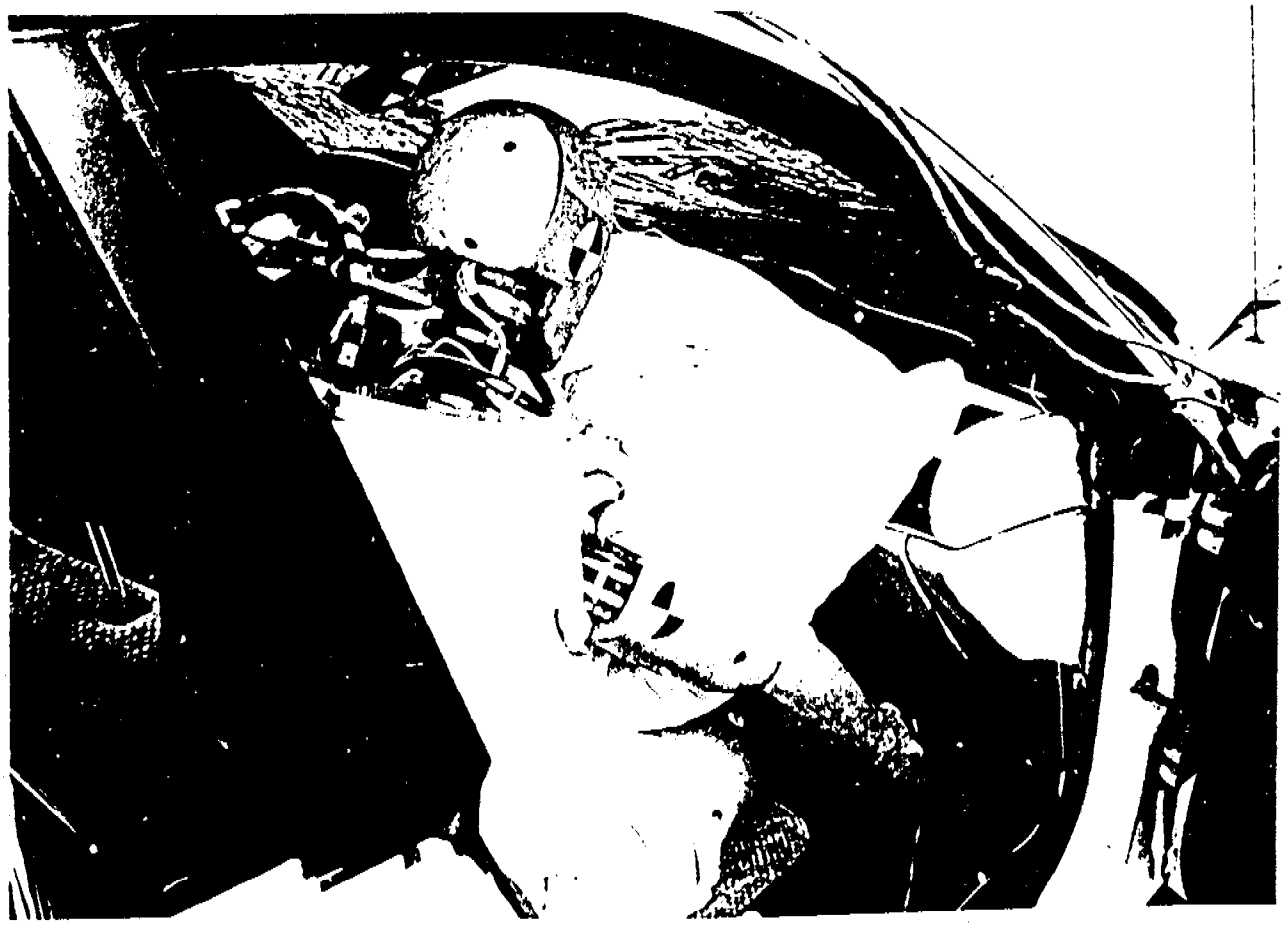


Figure A-32 Post-Test Passenger Dummy Position - View 3

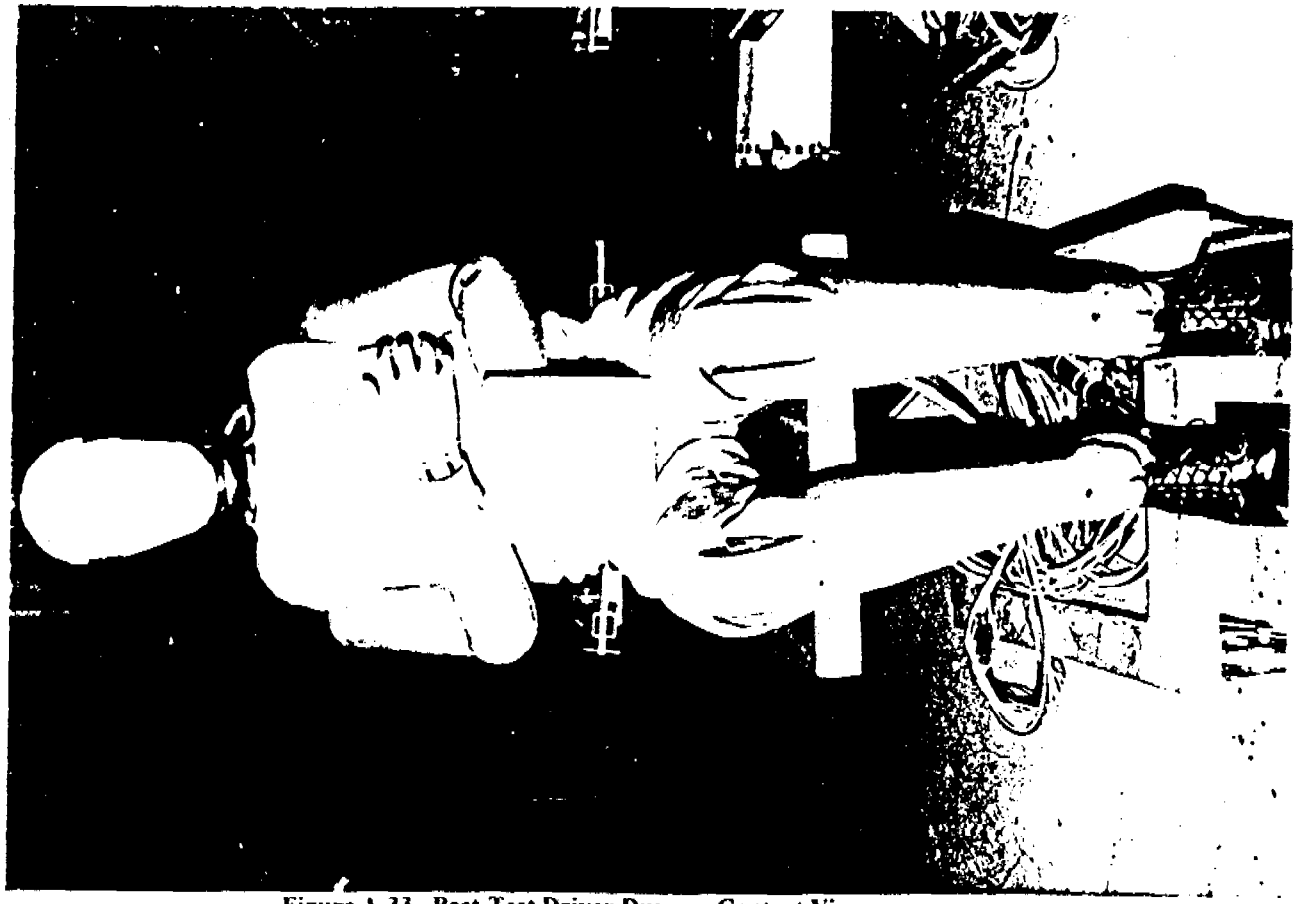


Figure A-33 Post-Test Driver Dummy Contact View

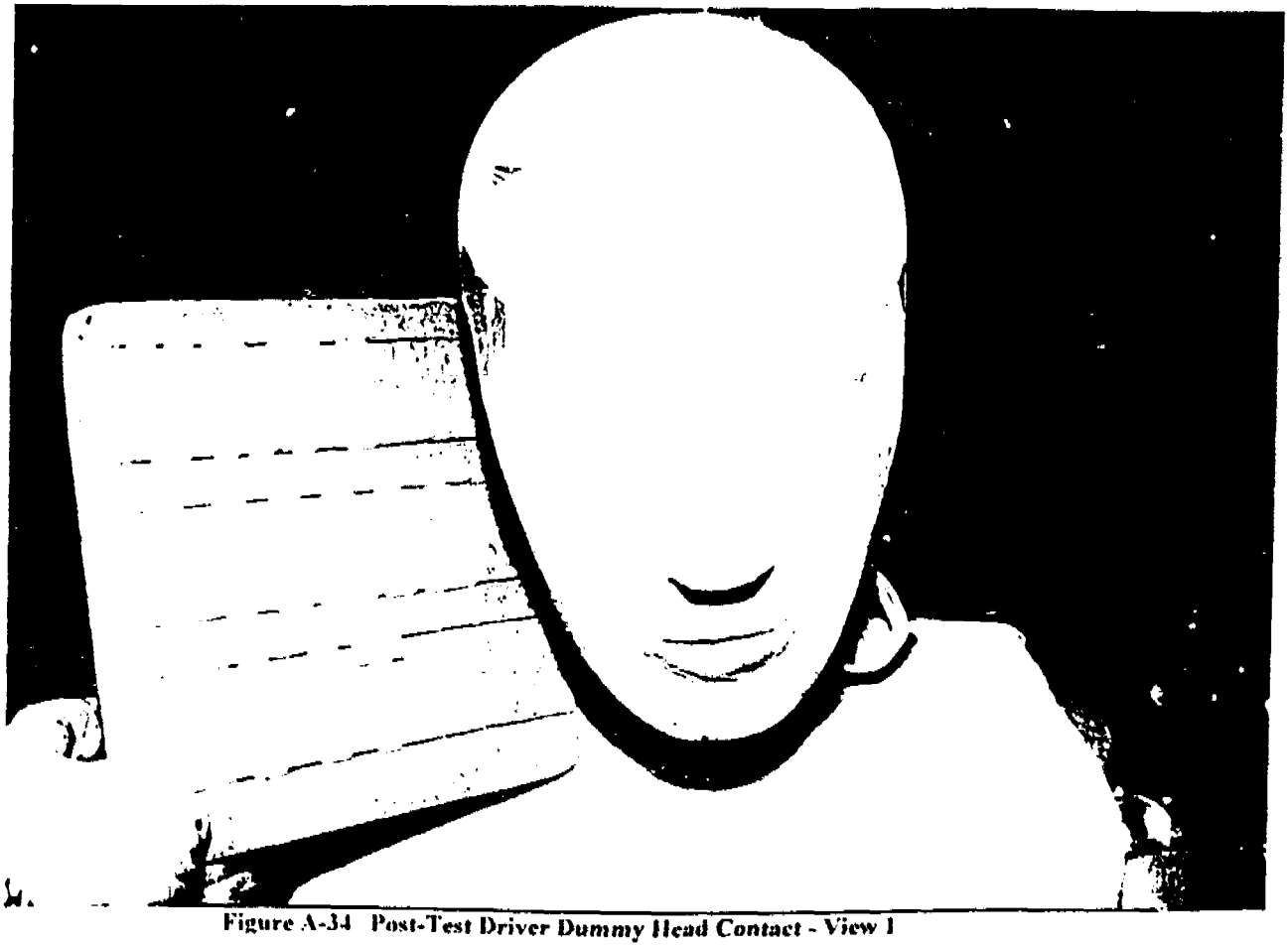


Figure A-34 Post-Test Driver Dummy Head Contact - View 1

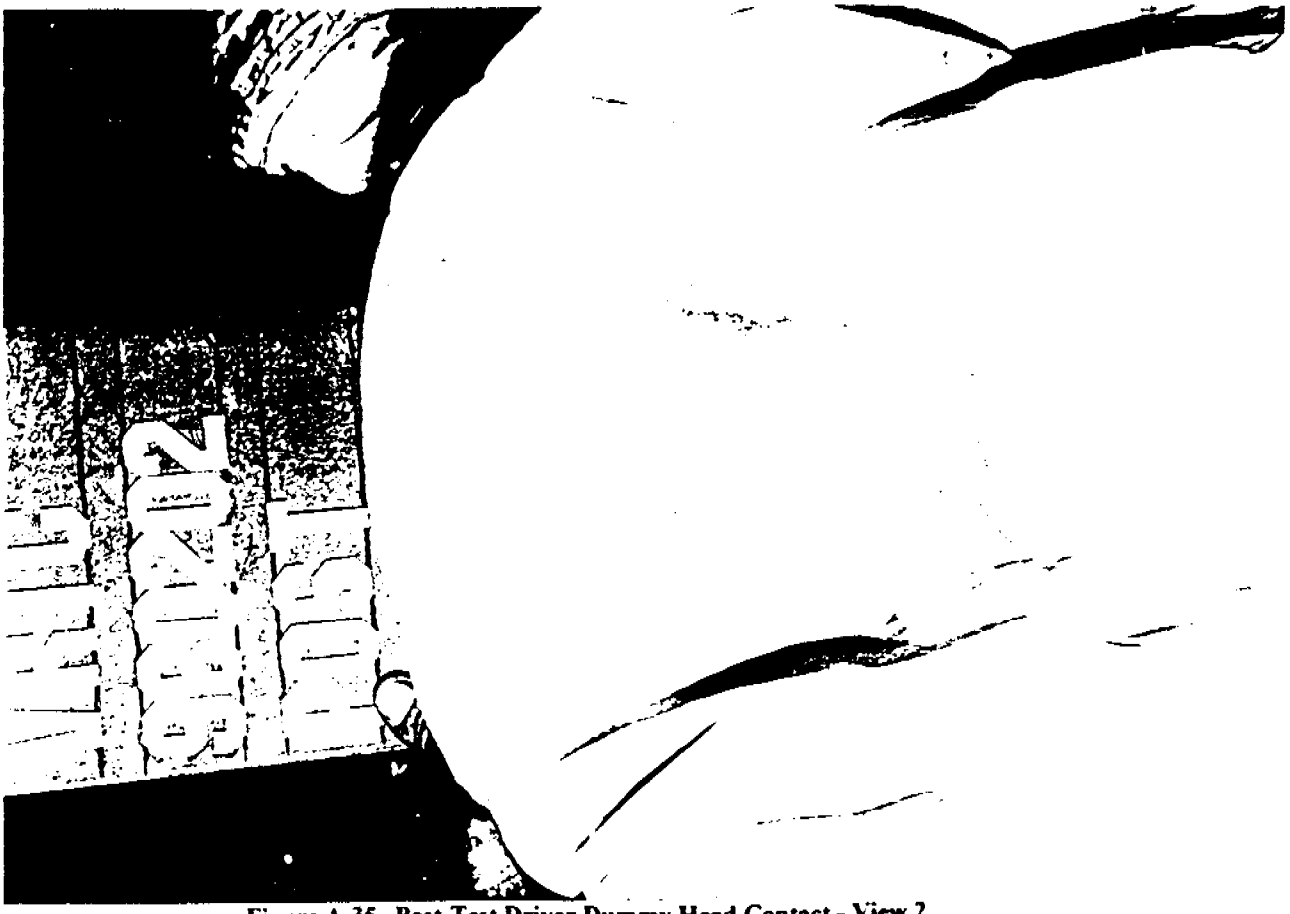


Figure A-35 Post-Test Driver Dummy Head Contact - View 2

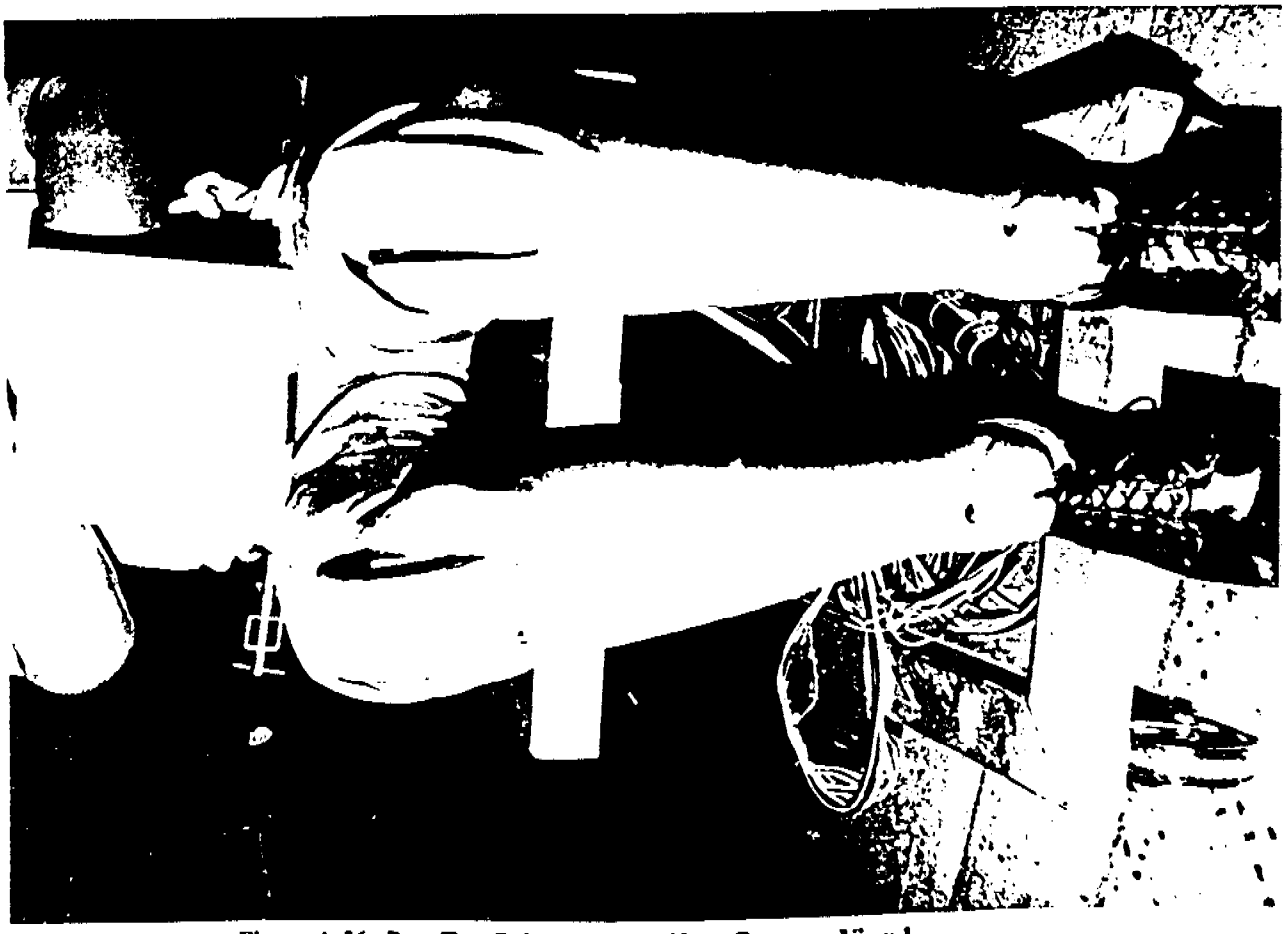


Figure A-36 Post-Test Driver Dummy Knee Contact - View 1

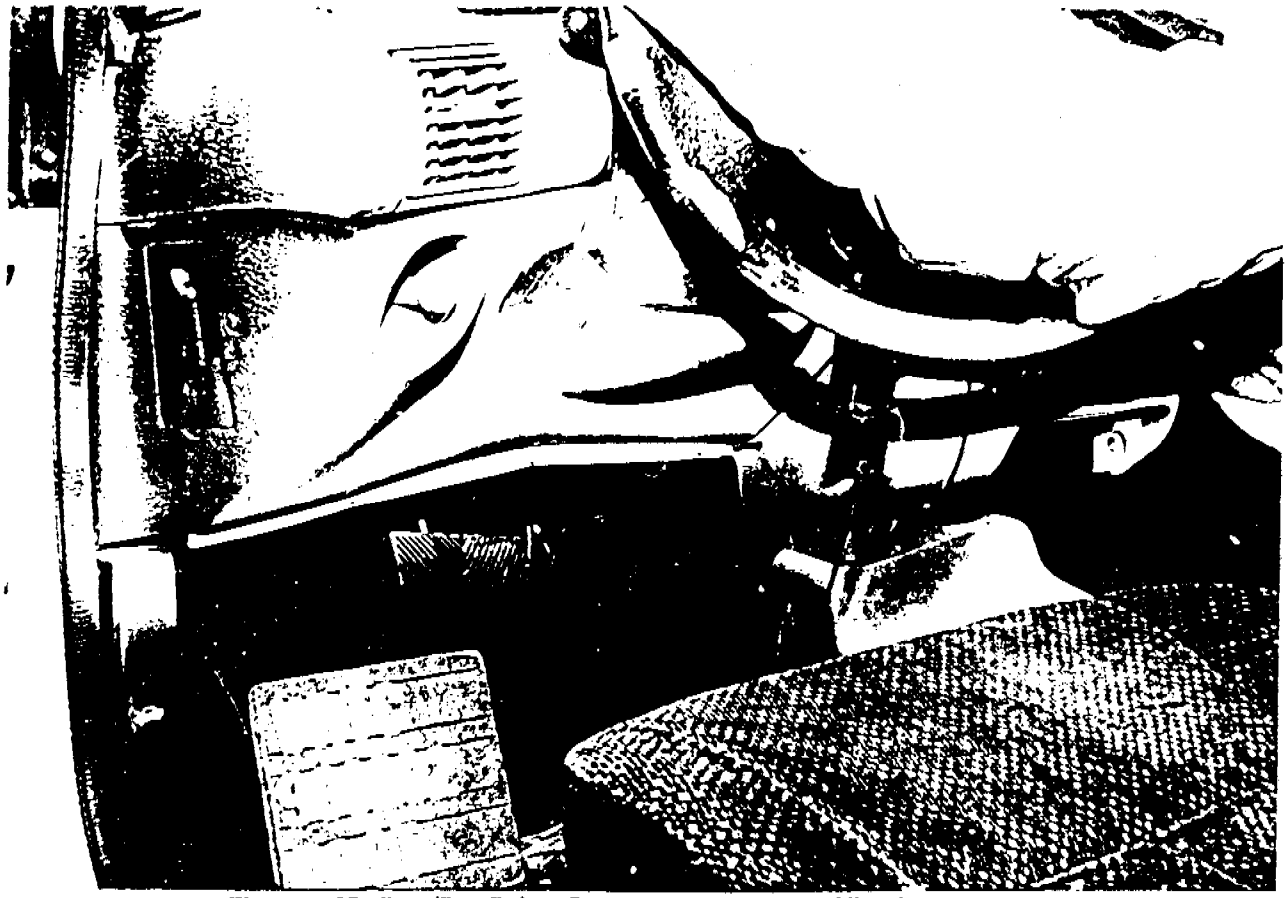


Figure A-37 Post-Test Driver Dummy Knee Contact - View 2

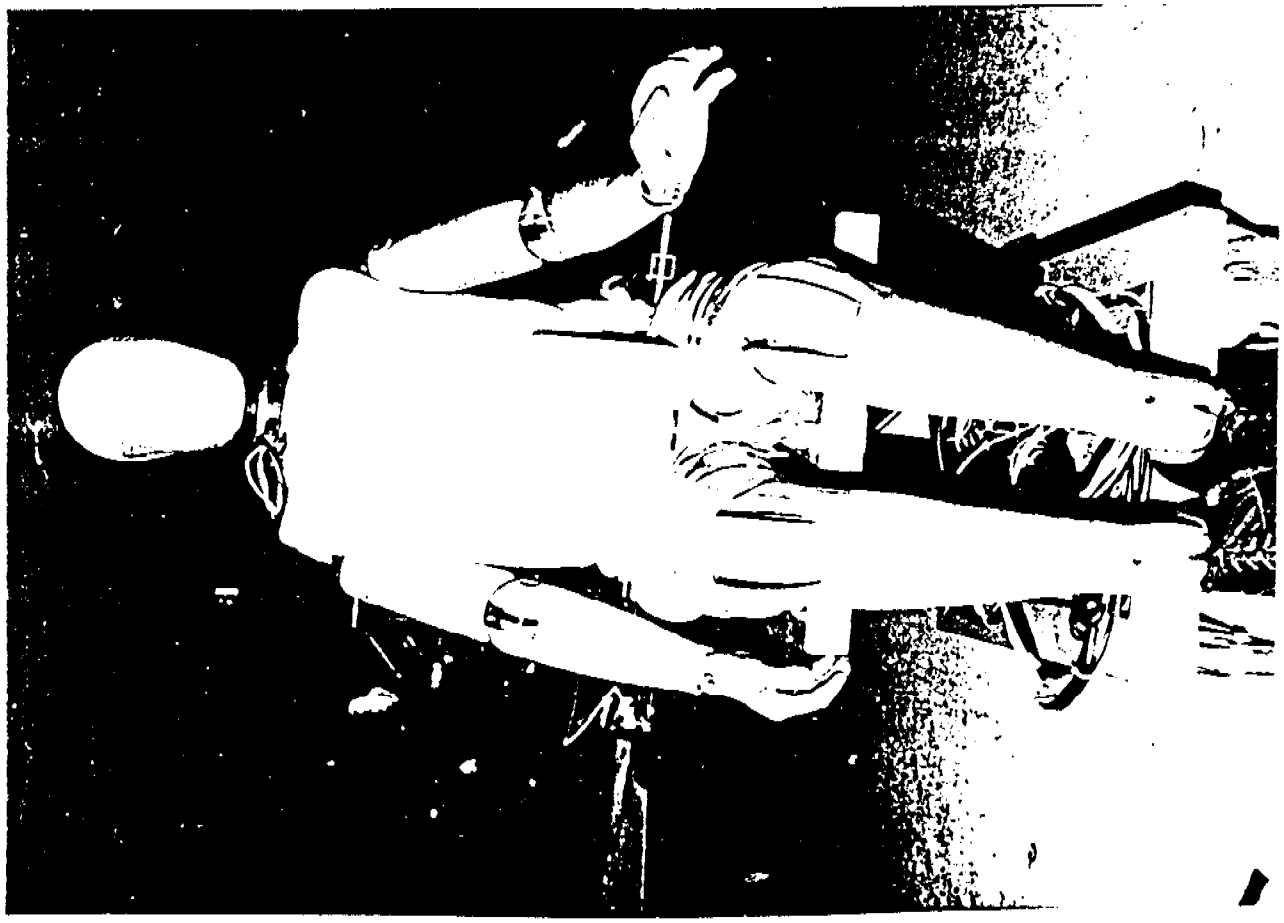


Figure A-38 Post-Test Passenger Dummy Contact View

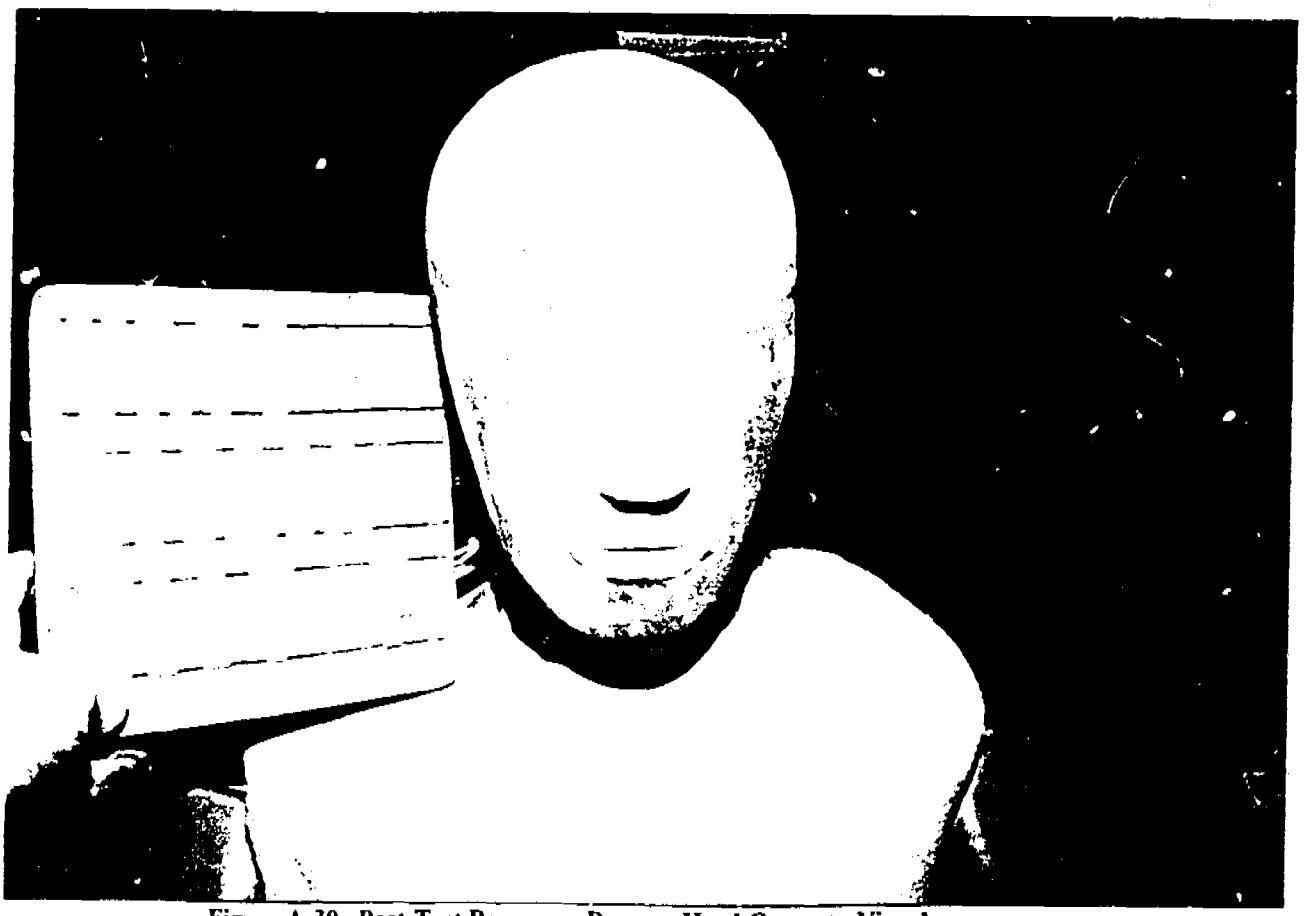


Figure A-39 Post-Test Passenger Dummy Head Contact - View 1

Figure A-40 Post-Test Passenger Dummy Head Contact - View 2

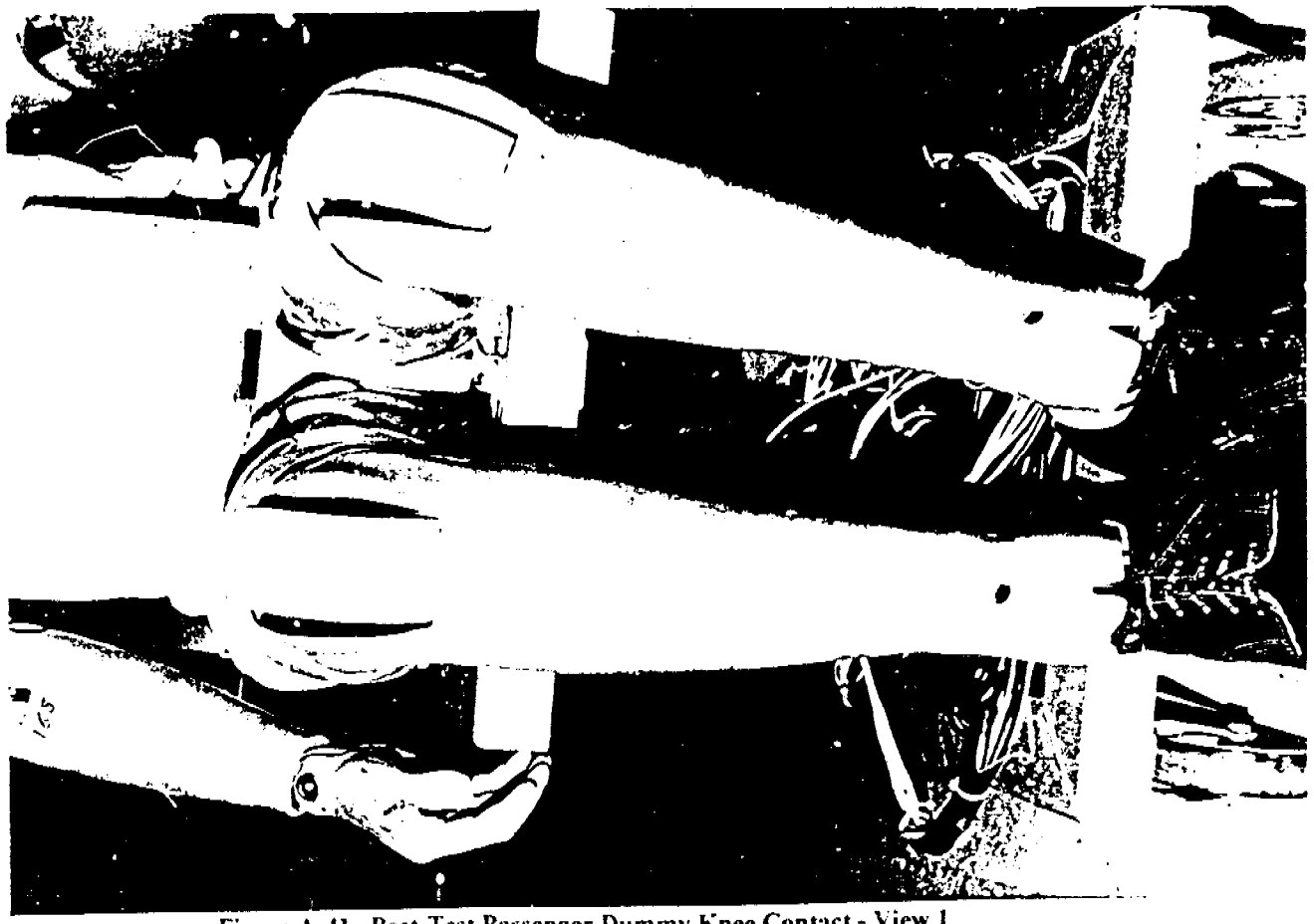


Figure A-41 Post-Test Passenger Dummy Knee Contact - View 1

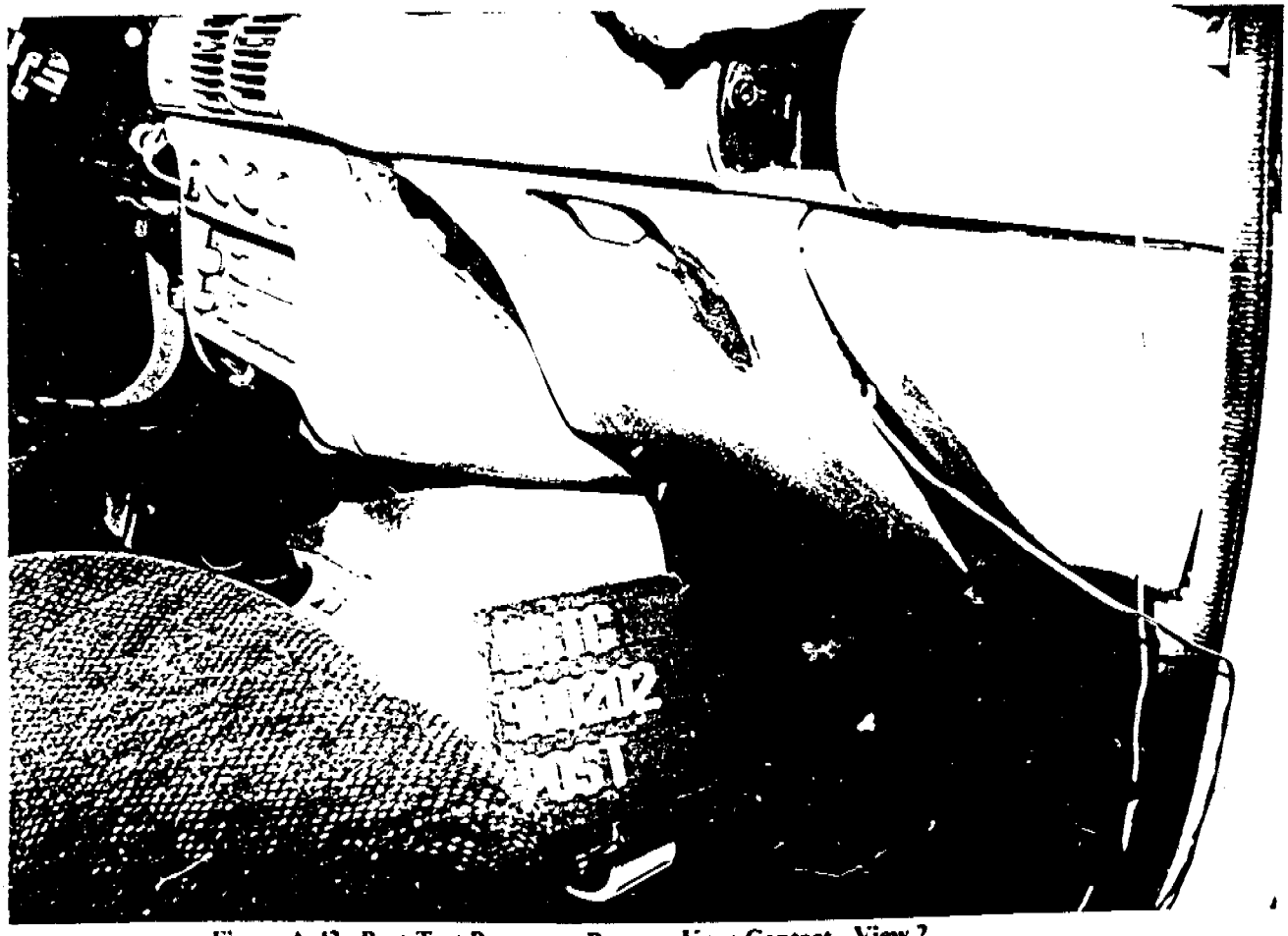


Figure A-42 Post-Test Passenger Dummy Knee Contact - View 2

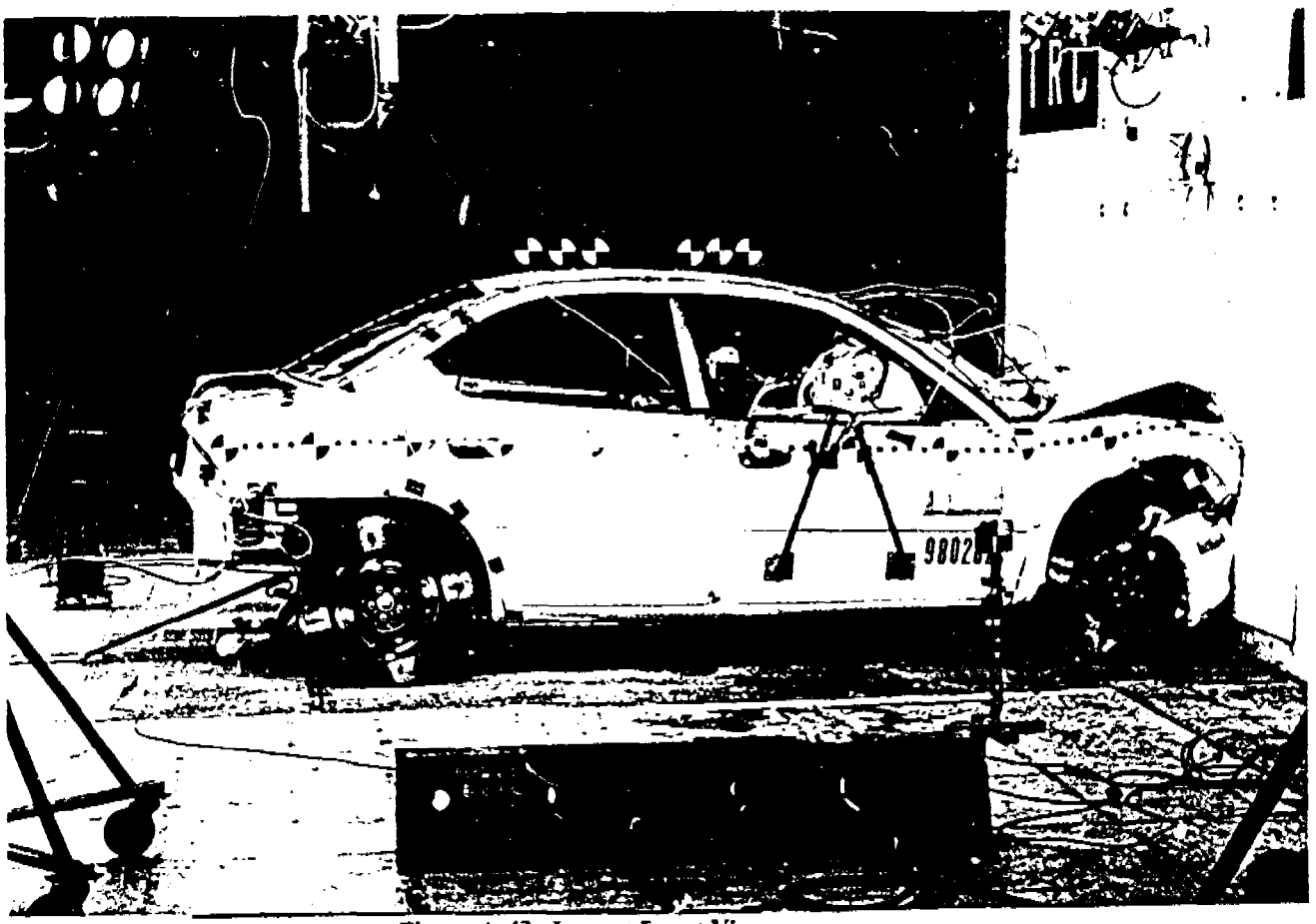
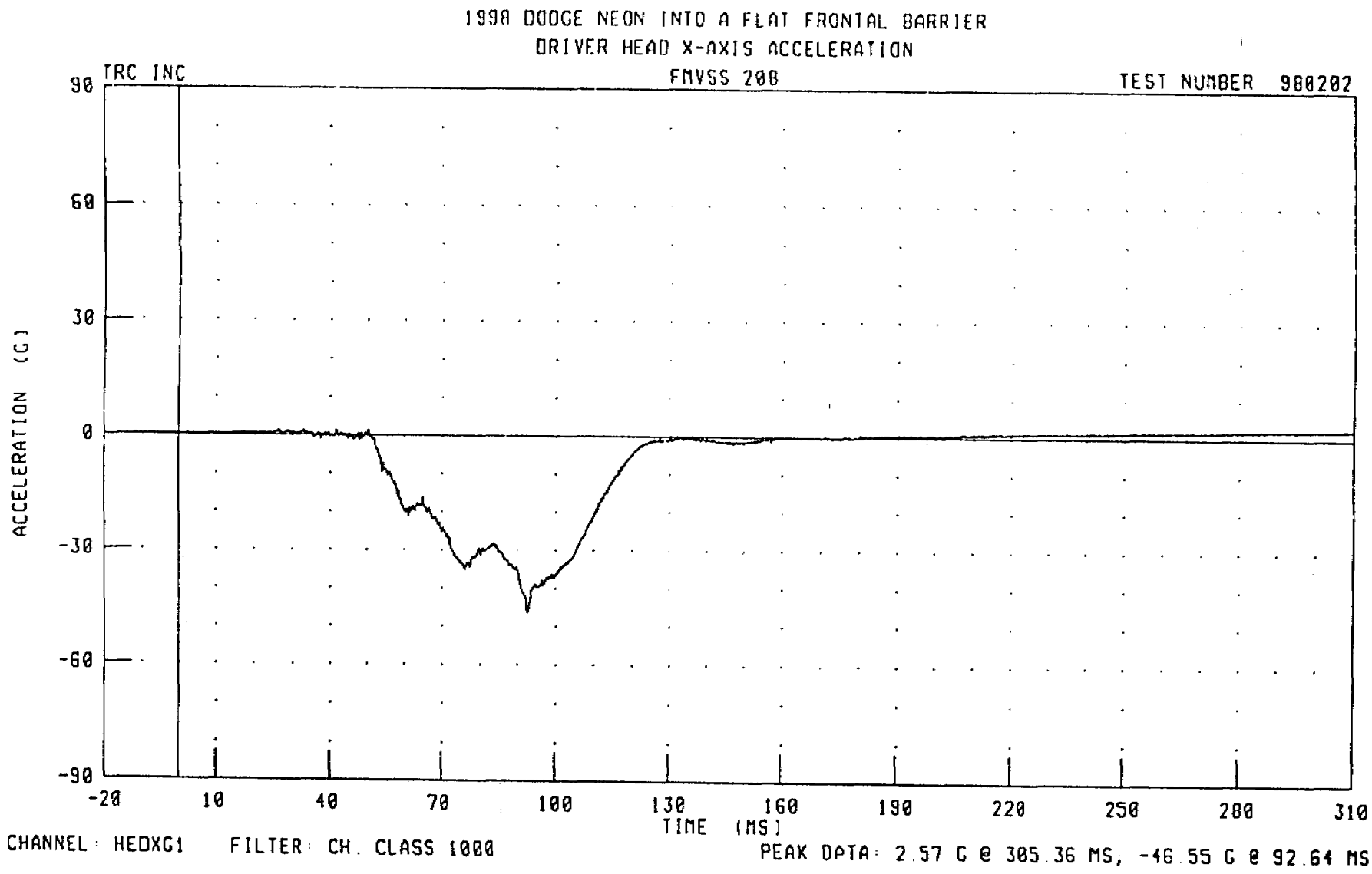


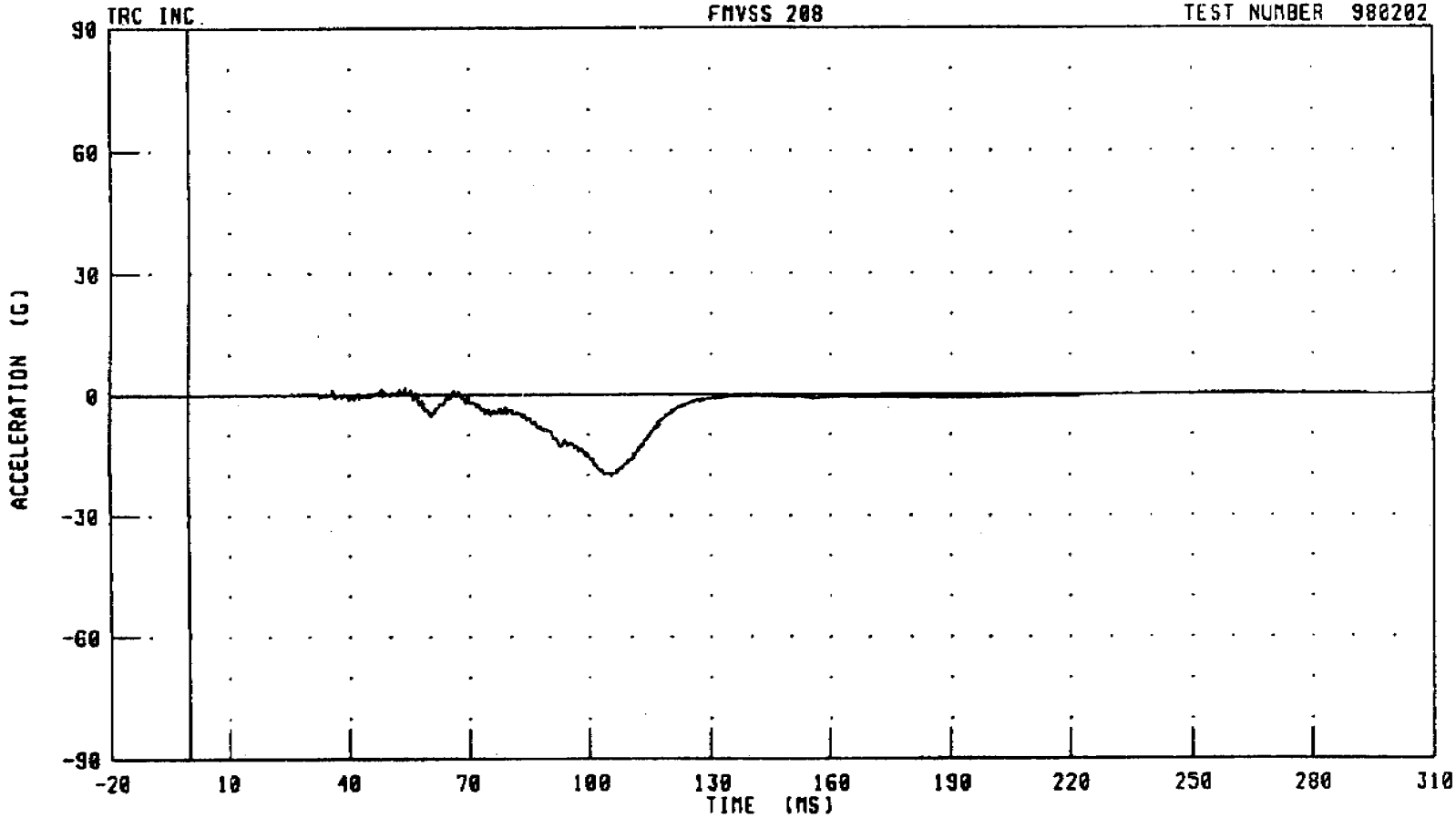
Figure A-43 Impact Event View

Appendix B

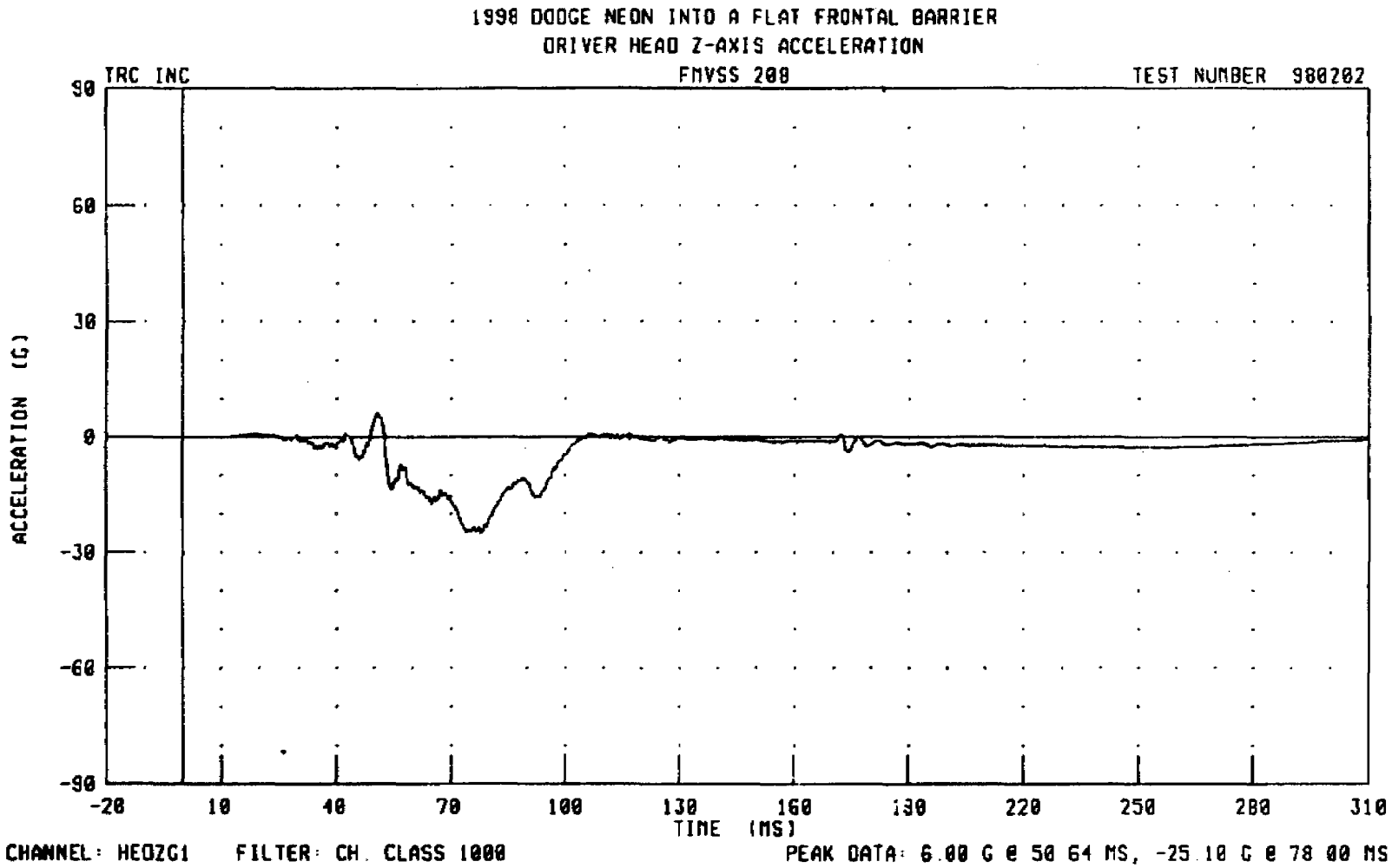
Data Plots

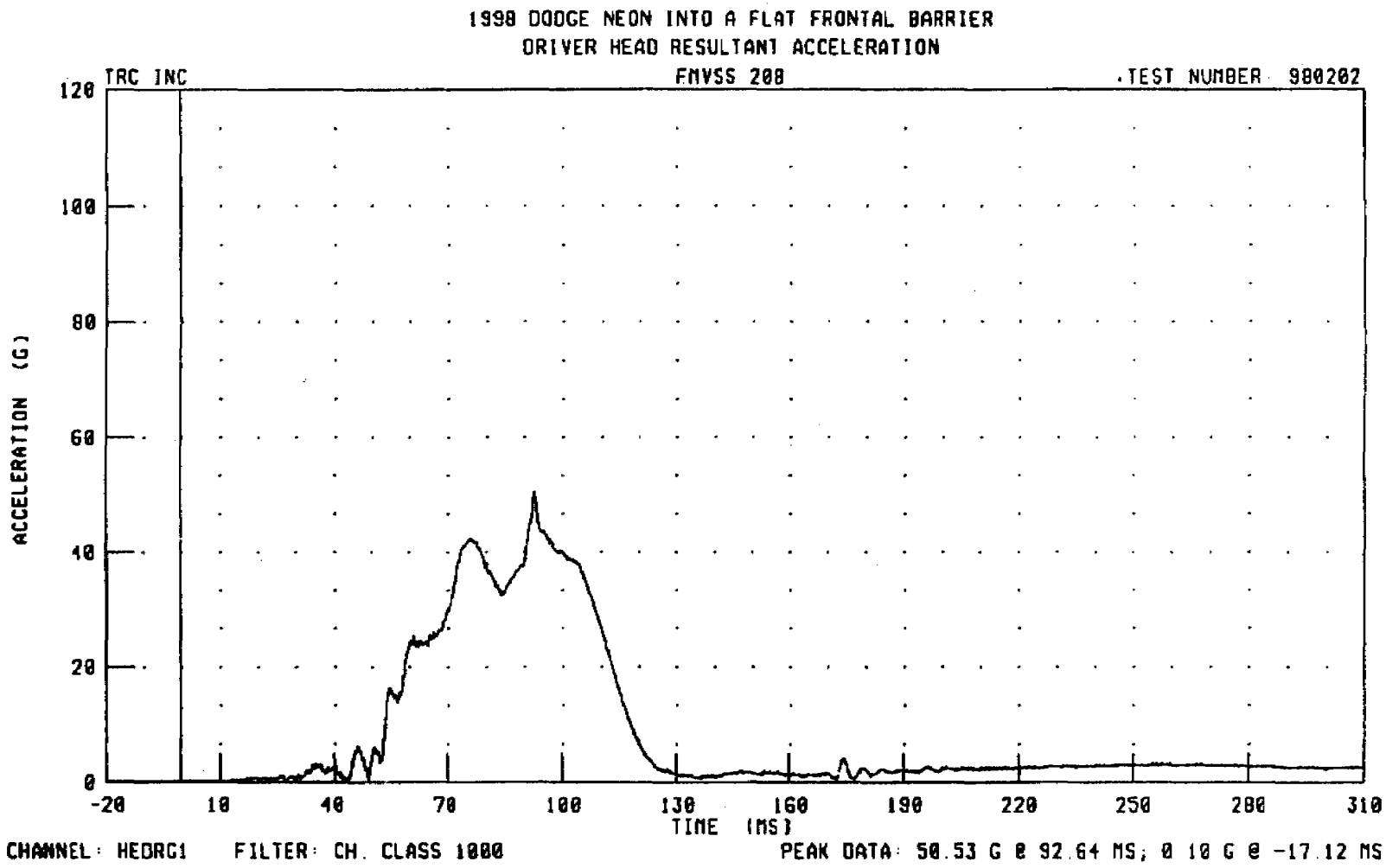

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG1
FILTER: CH. CLASS 1000
PEAK DATA: 2.57 G @ 305.36 MS, -46.55 G @ 92.64 MS

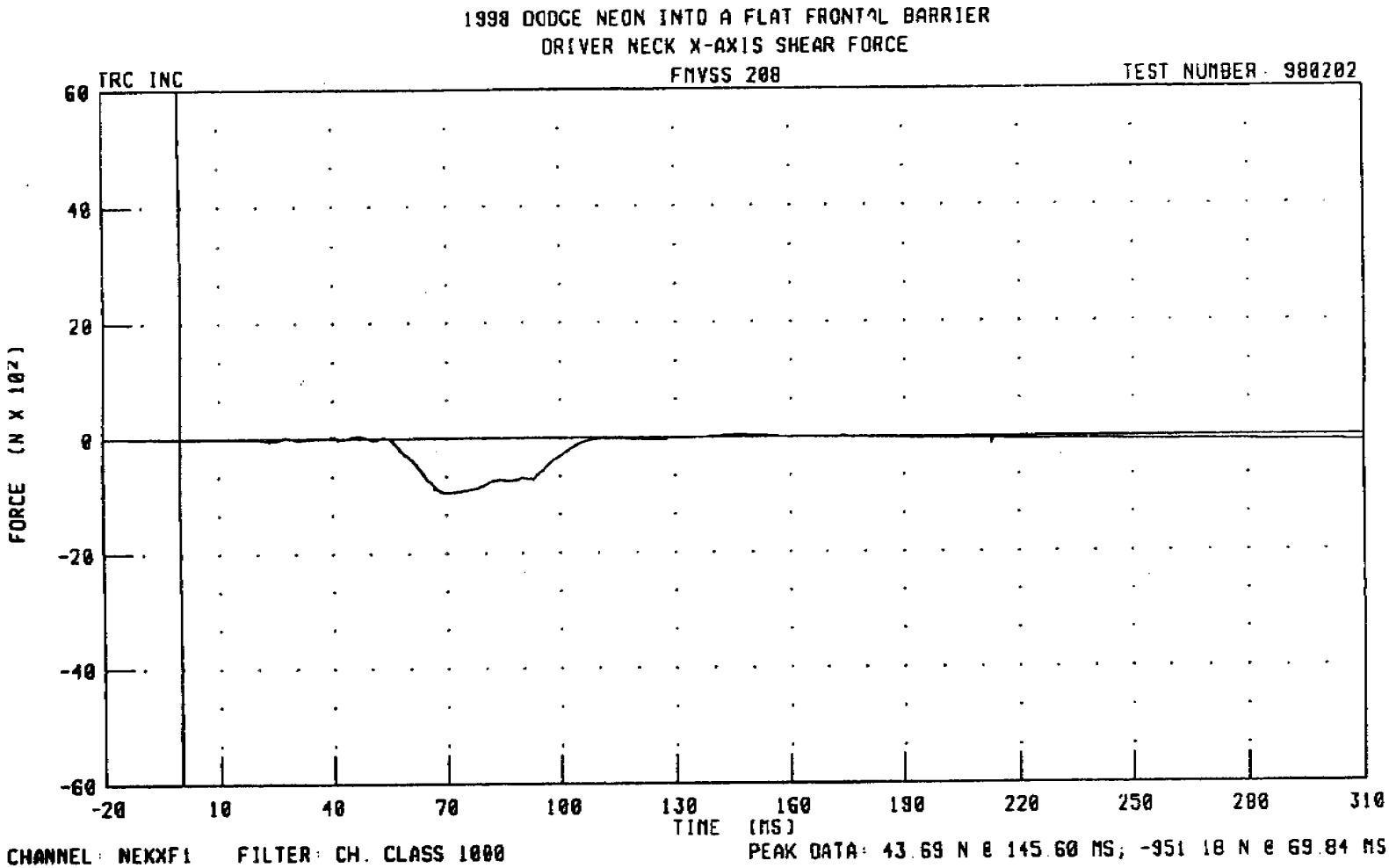
1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION



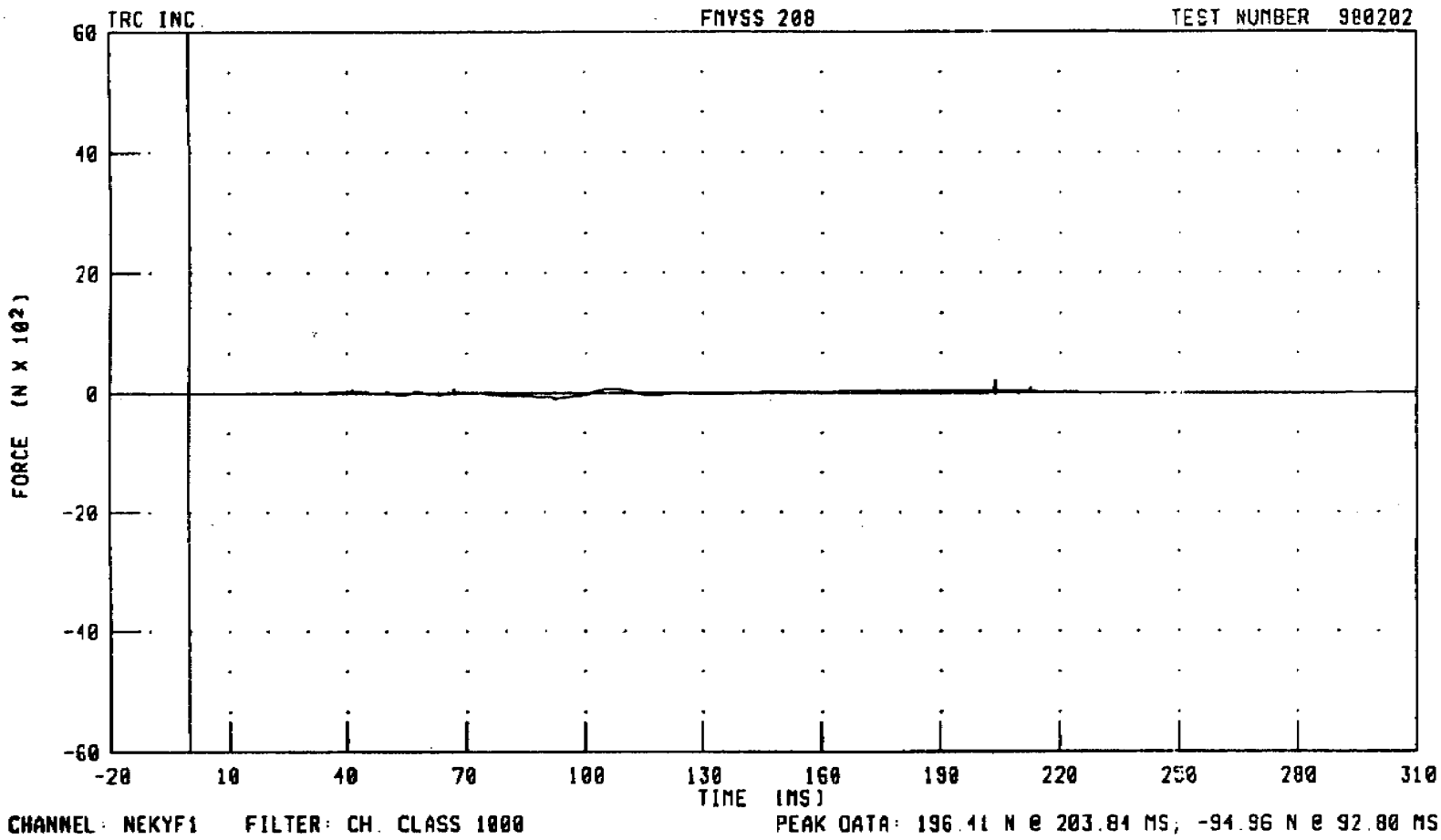
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000 PEAK DATA: 1.77 G @ 53.92 MS, -20.22 G @ 105.52 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
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: 6.00 G @ 50 64 MS, -25.10 G @ 78 00 MS

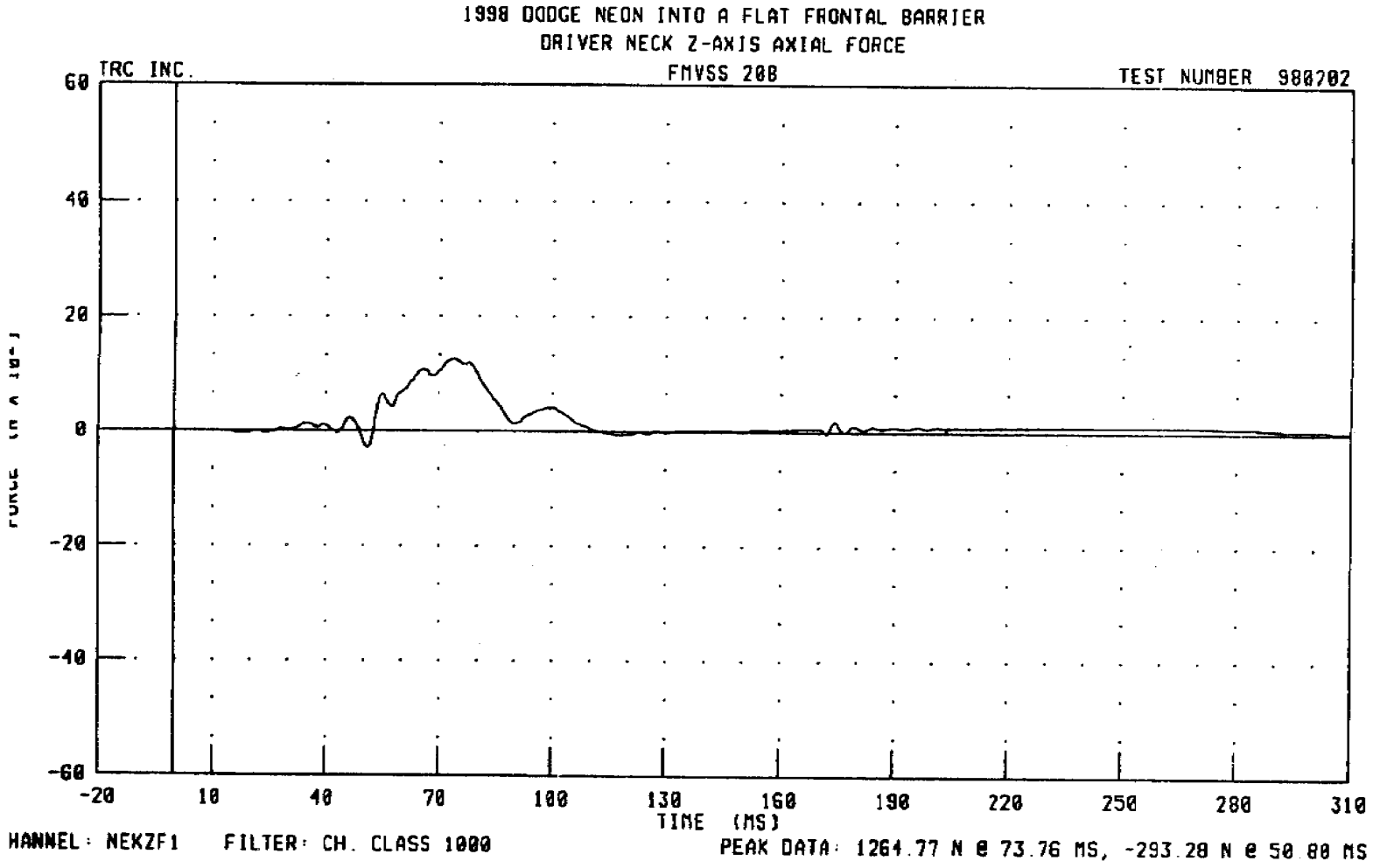

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
120
100
80
60
40
20
0
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRC1
FILTER: CH. CLASS 1000
PEAK DATA: 50.53 G @ 92.64 MS; 0 10 G @ -17.12 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE
FMVSS 208
TRC INC
TEST NUMBER: 980202
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: 43.69 N @ 145.60 MS; -951.18 N @ 69.84 MS

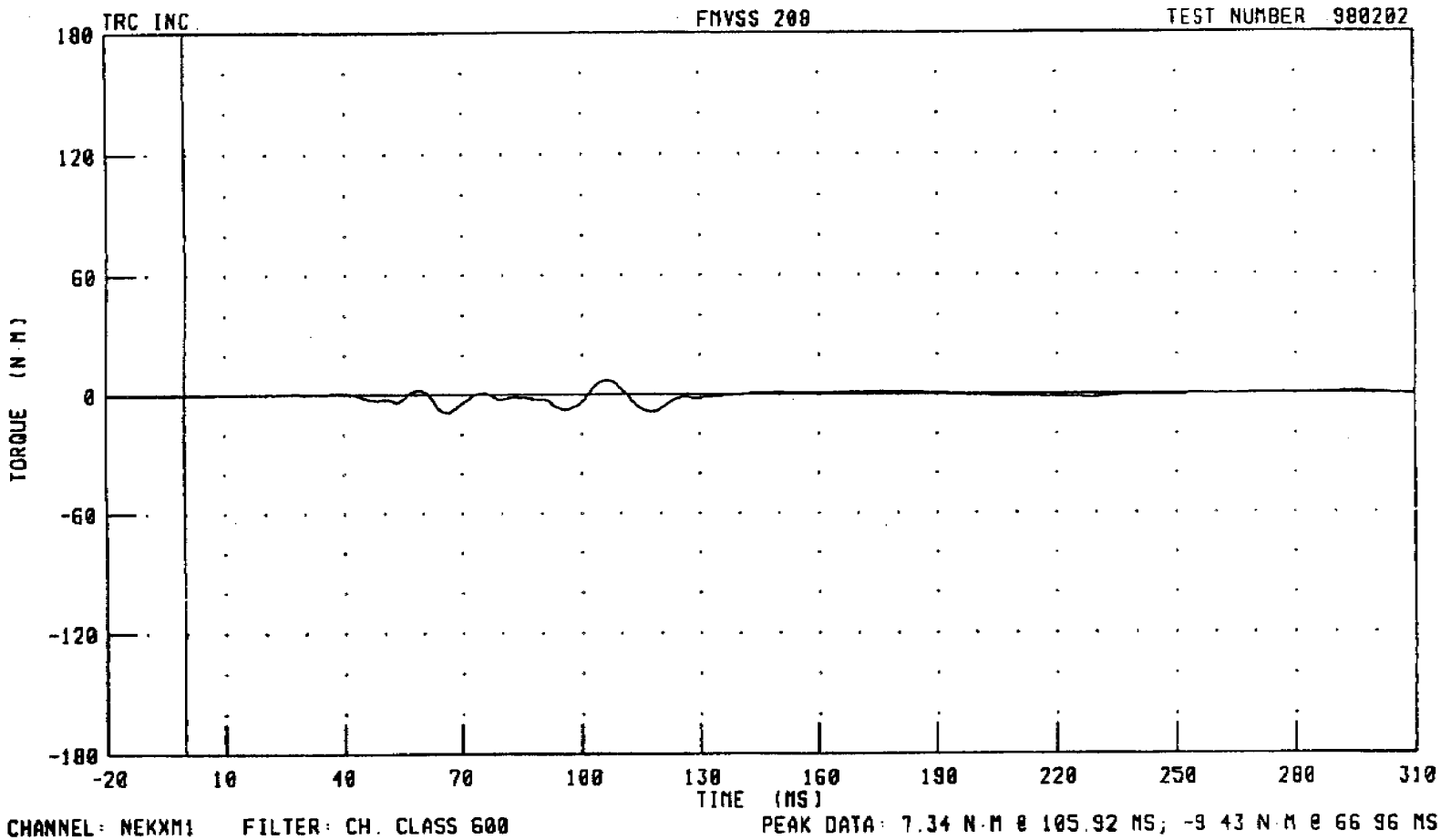
1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER NECK Y-AXIS SHEAR FORCE



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000 PEAK DATA: 196.41 N @ 203.84 MS; -94.96 N @ 92.80 MS

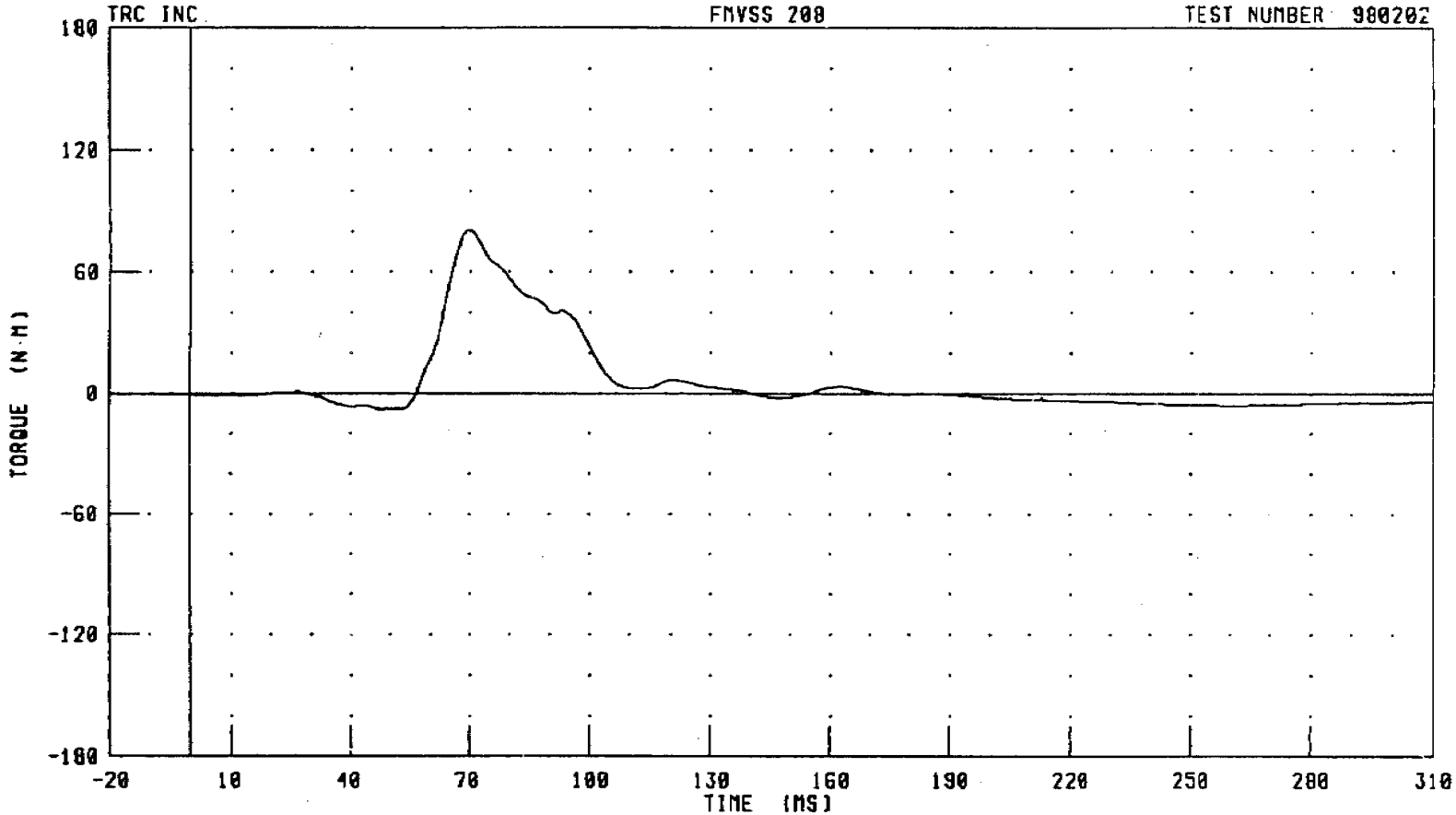

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE
TRC INC.
FMVSS 208
TEST NUMBER 980702
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZF1
FILTER: CH. CLASS 1000
PEAK DATA: 1264.77 N @ 73.76 MS, -293.28 N @ 50.80 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS



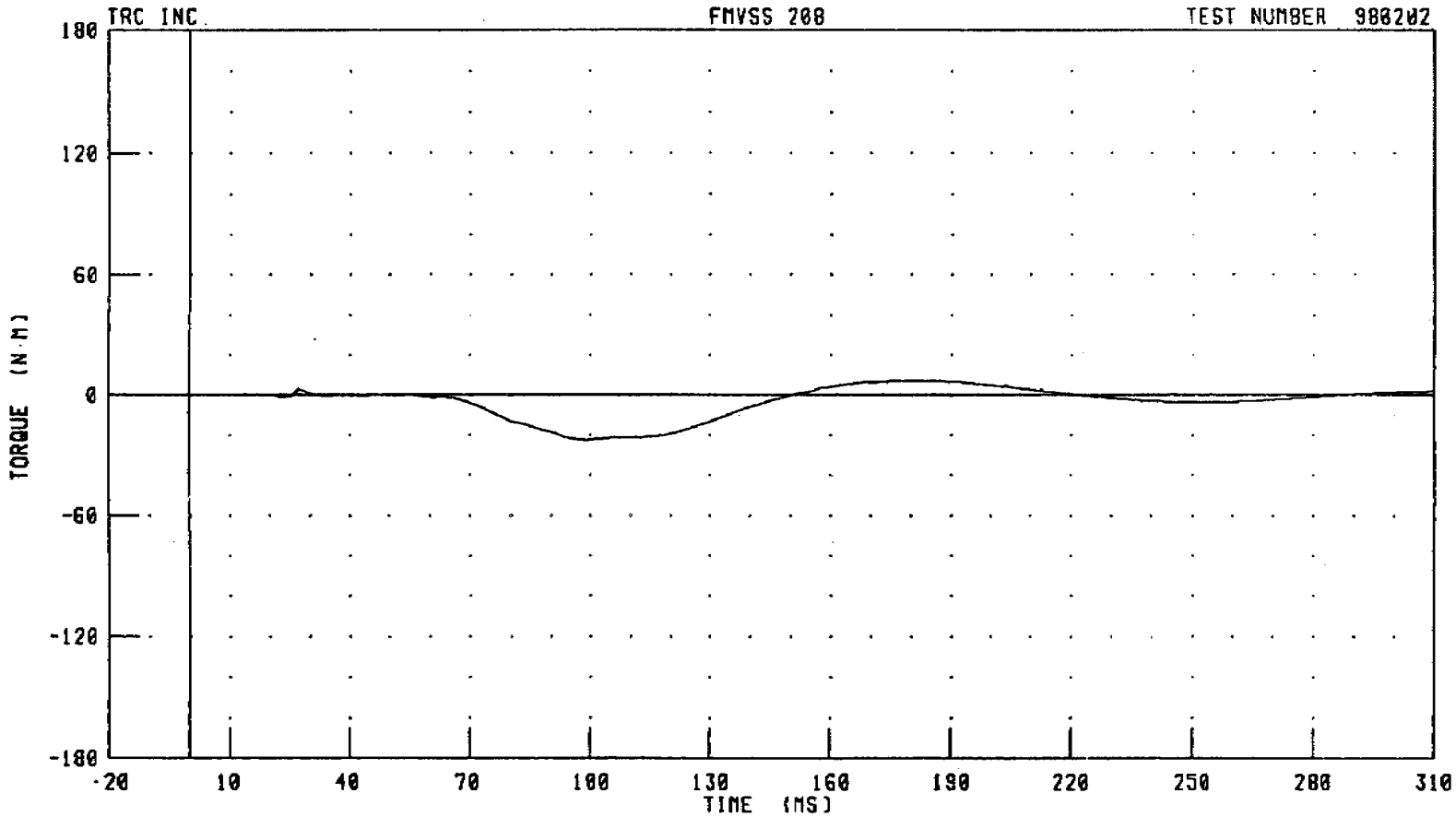
CHANNEL: NEKXM1 FILTER: CH. CLASS 600 PEAK DATA: 7.34 N-M @ 105.92 MS; -9.43 N-M @ 66.96 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS



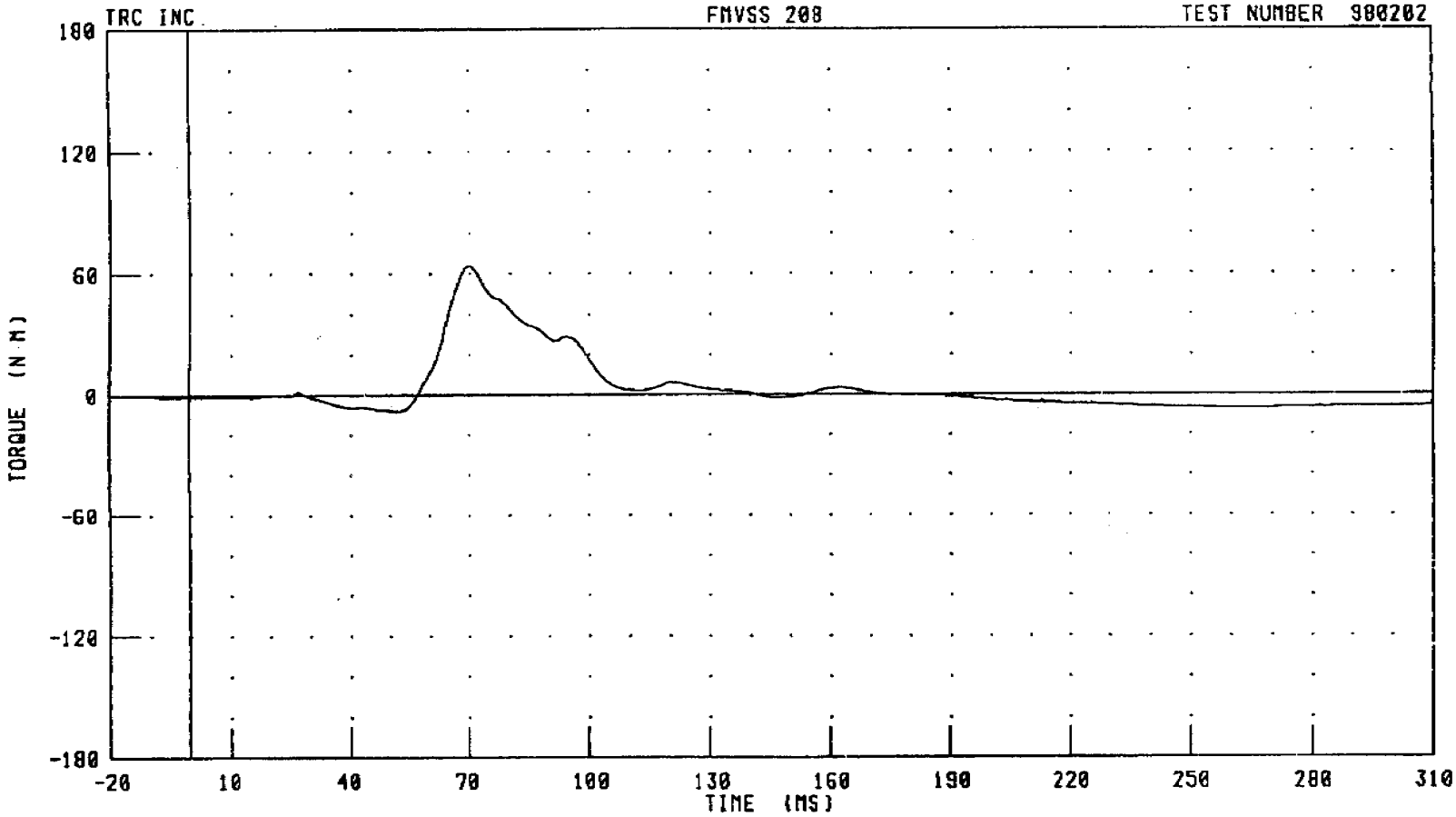
CHANNEL: NEKYM1 FILTER: CH. CLASS 600 PEAK DATA: 80.78 N-M @ 70.00 MS; -8.00 N-M @ 47.68 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT Z AXIS

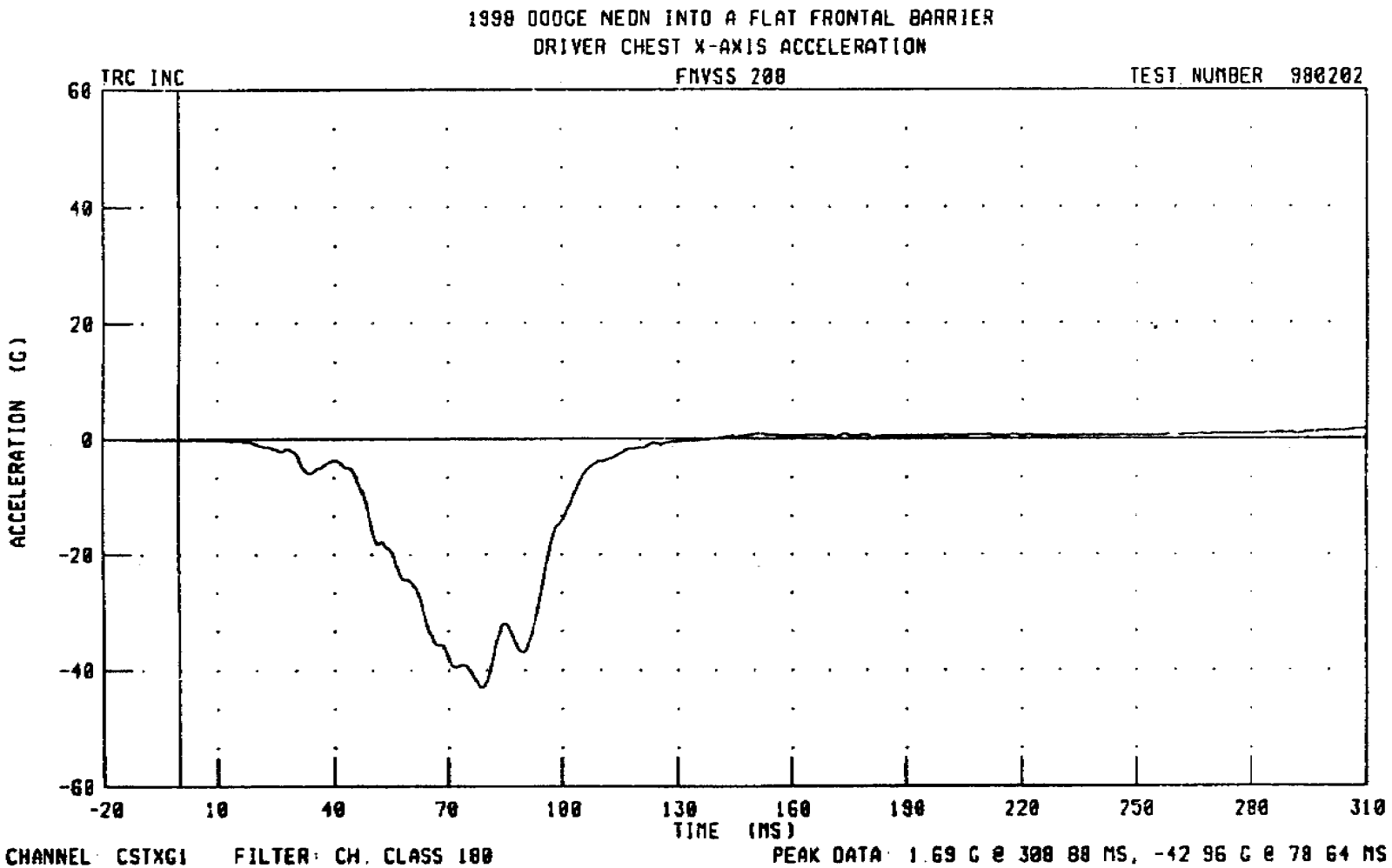


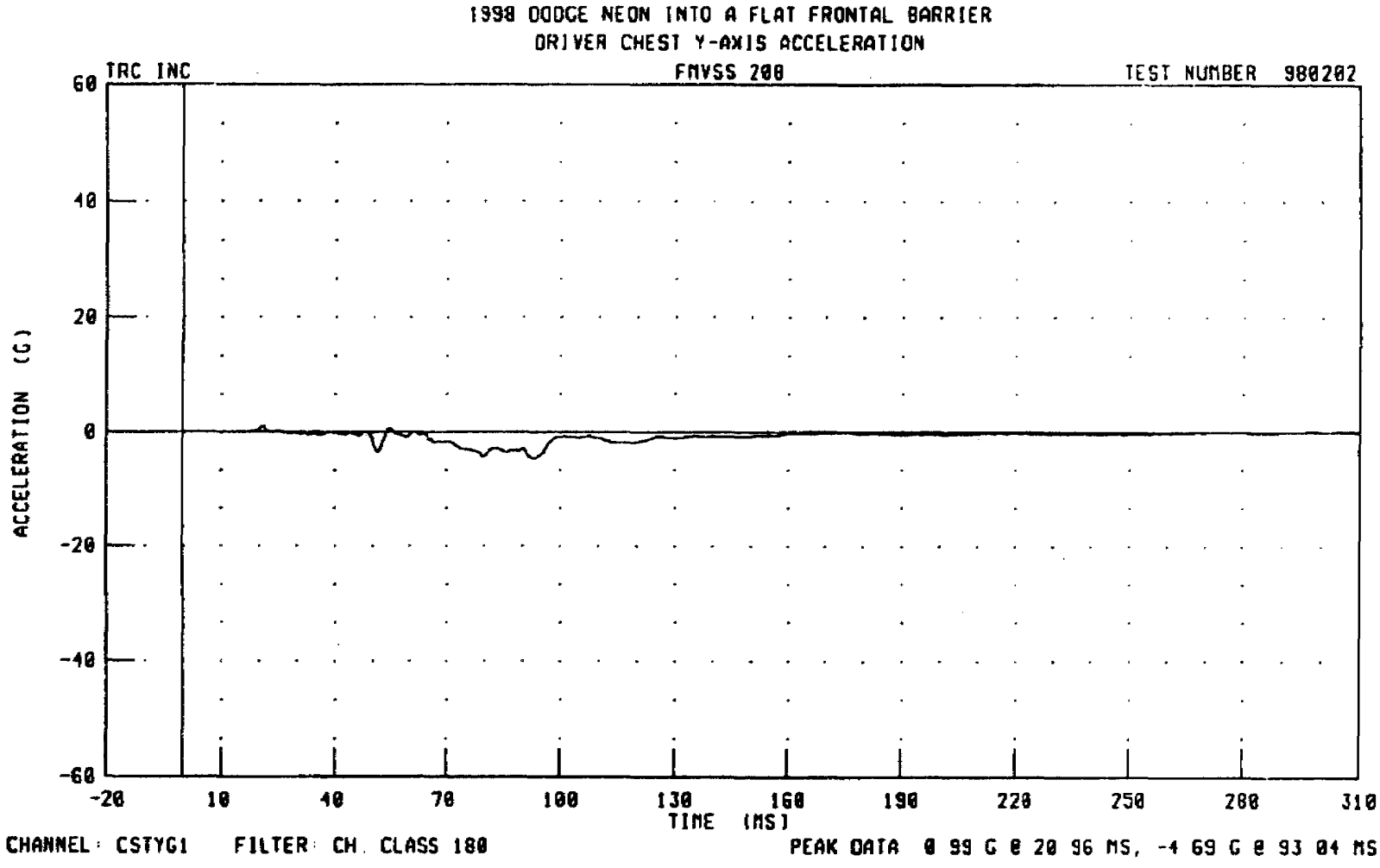
CHANNEL: NEKZM1 FILTER: CH. CLASS 600 PEAK DATA: 7.18 N-M @ 181.04 MS; -22.63 N-M @ 99.12 MS

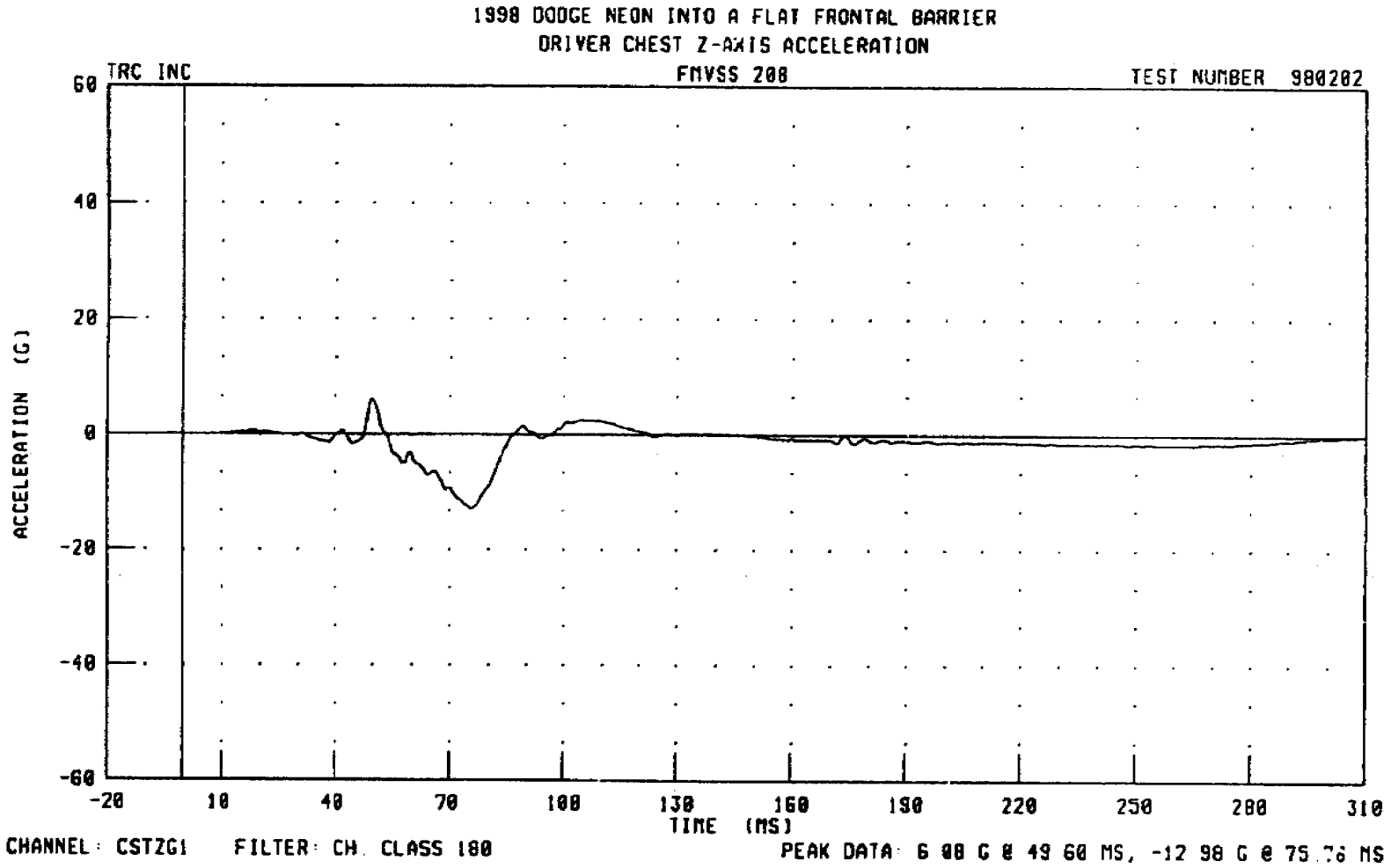
1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER NECK OCCIPITAL CONDYLE

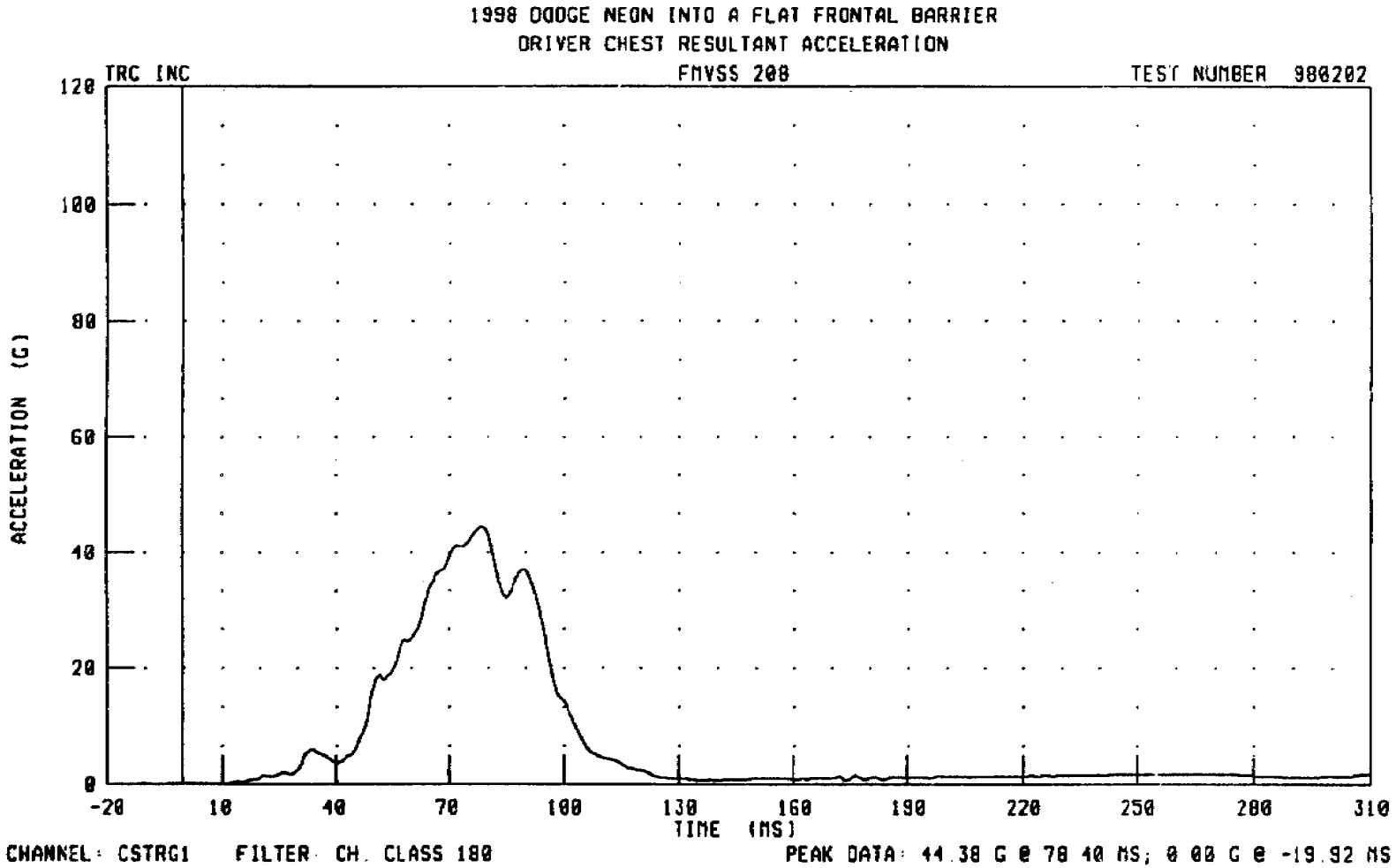


CHANNEL: NEKOM1 FILTER: CH. CLASS 600 PEAK DATA: 63.94 N M @ 70.16 MS; -8.22 N M @ 51.20 MS

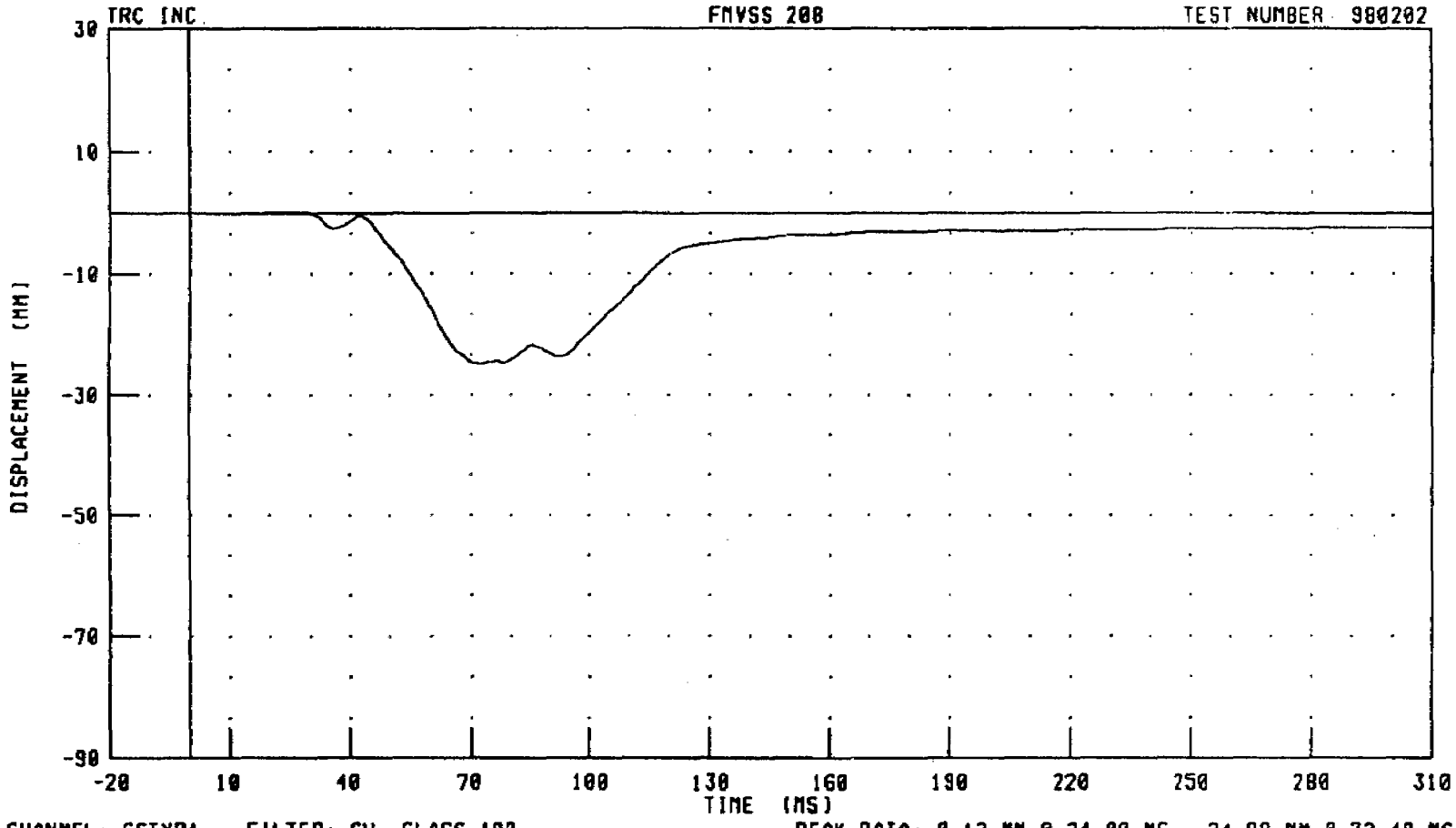

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 1.69 G @ 308.88 MS, -42.96 G @ 78.64 MS

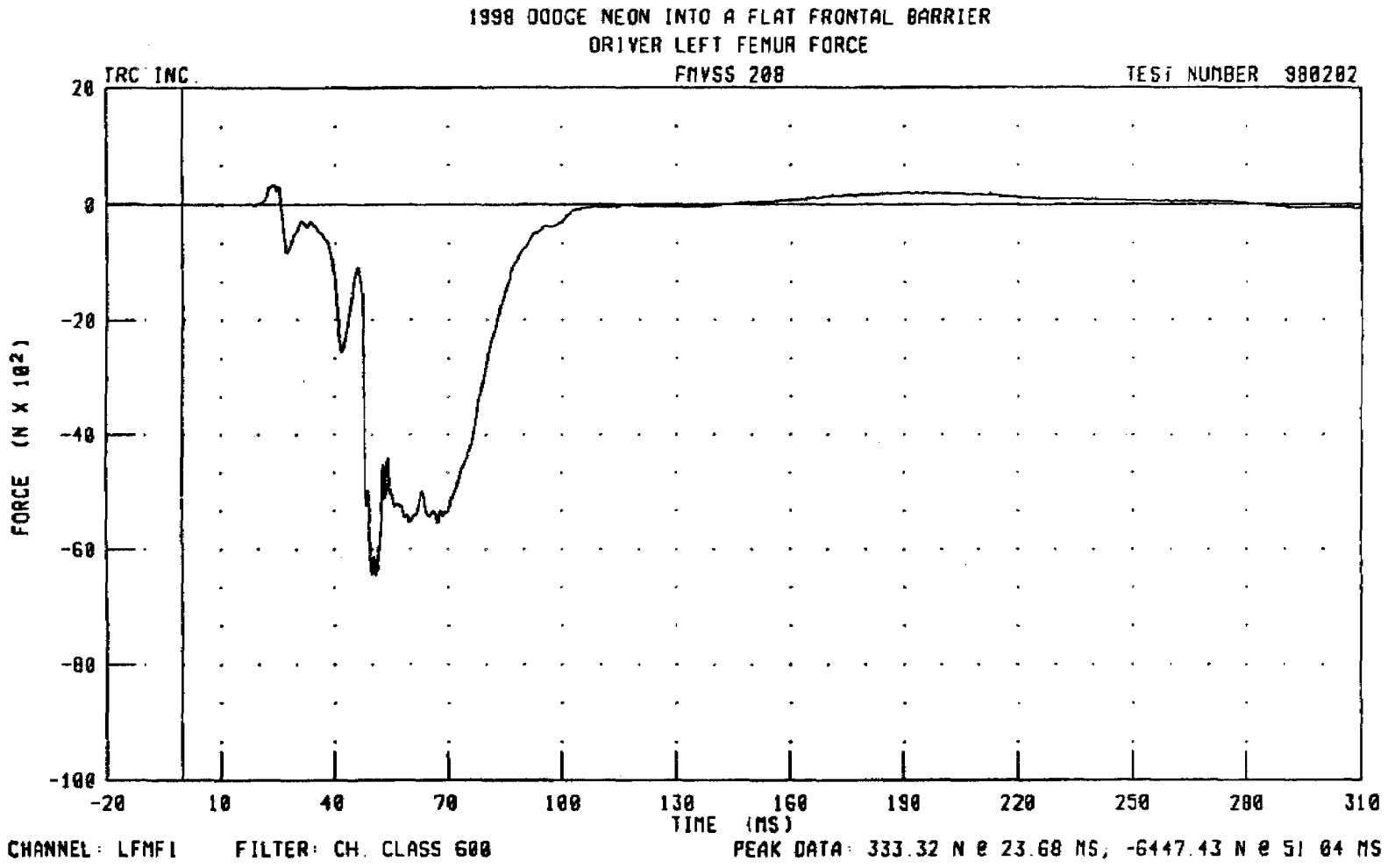

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG1
FILTER: CH. CLASS 180
PEAK DATA 0 99 G @ 20 96 MS, -4 69 G @ 93 04 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
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: 6.08 G @ 49.60 MS, -12.98 G @ 75.76 MS

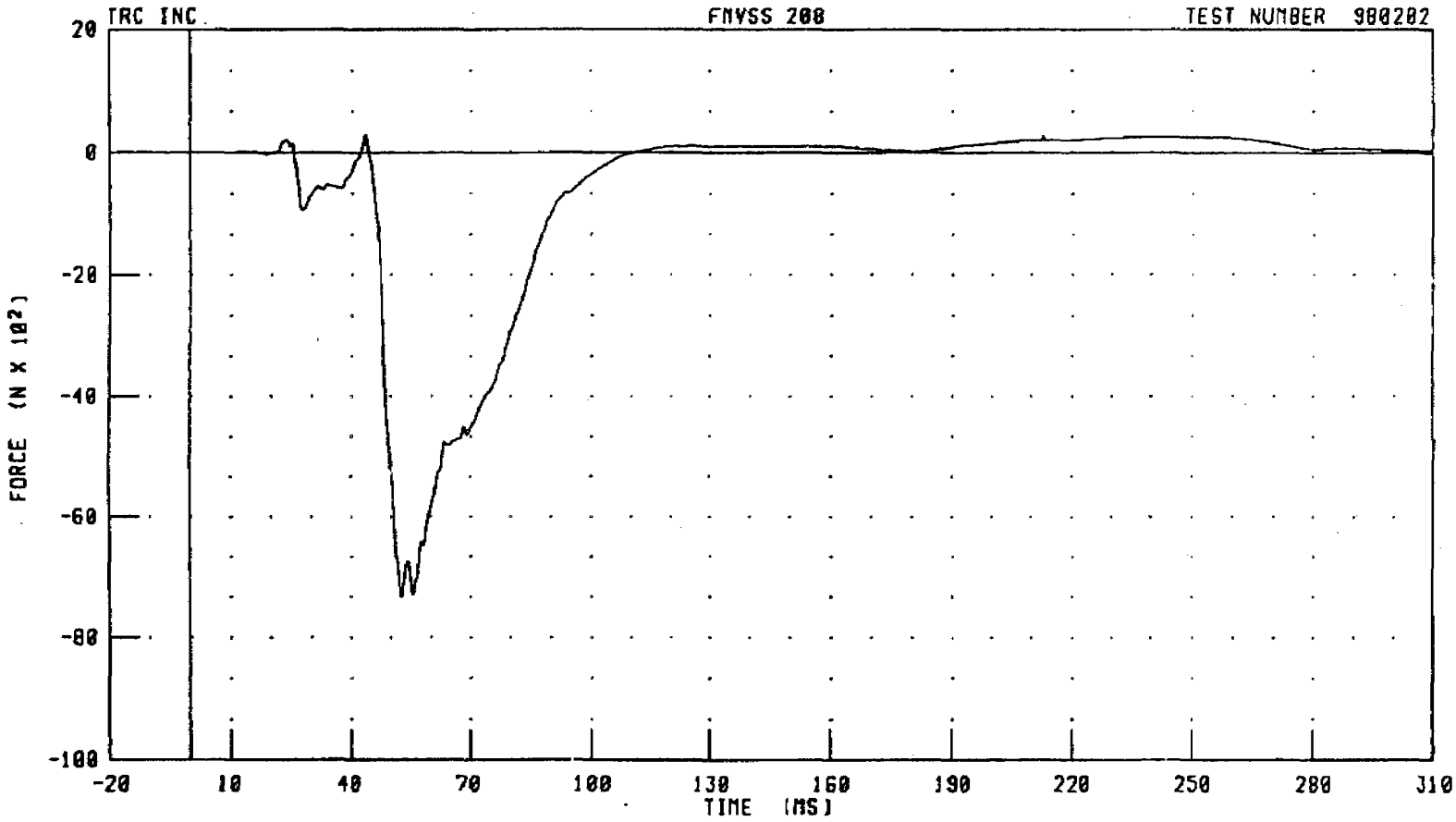

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
120
100
80
60
40
20
0
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG1 FILTER CH CLASS 180
PEAK DATA: 44.38 G @ 78.40 MS; 0.00 G @ -19.92 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER CHEST DEFLECTION



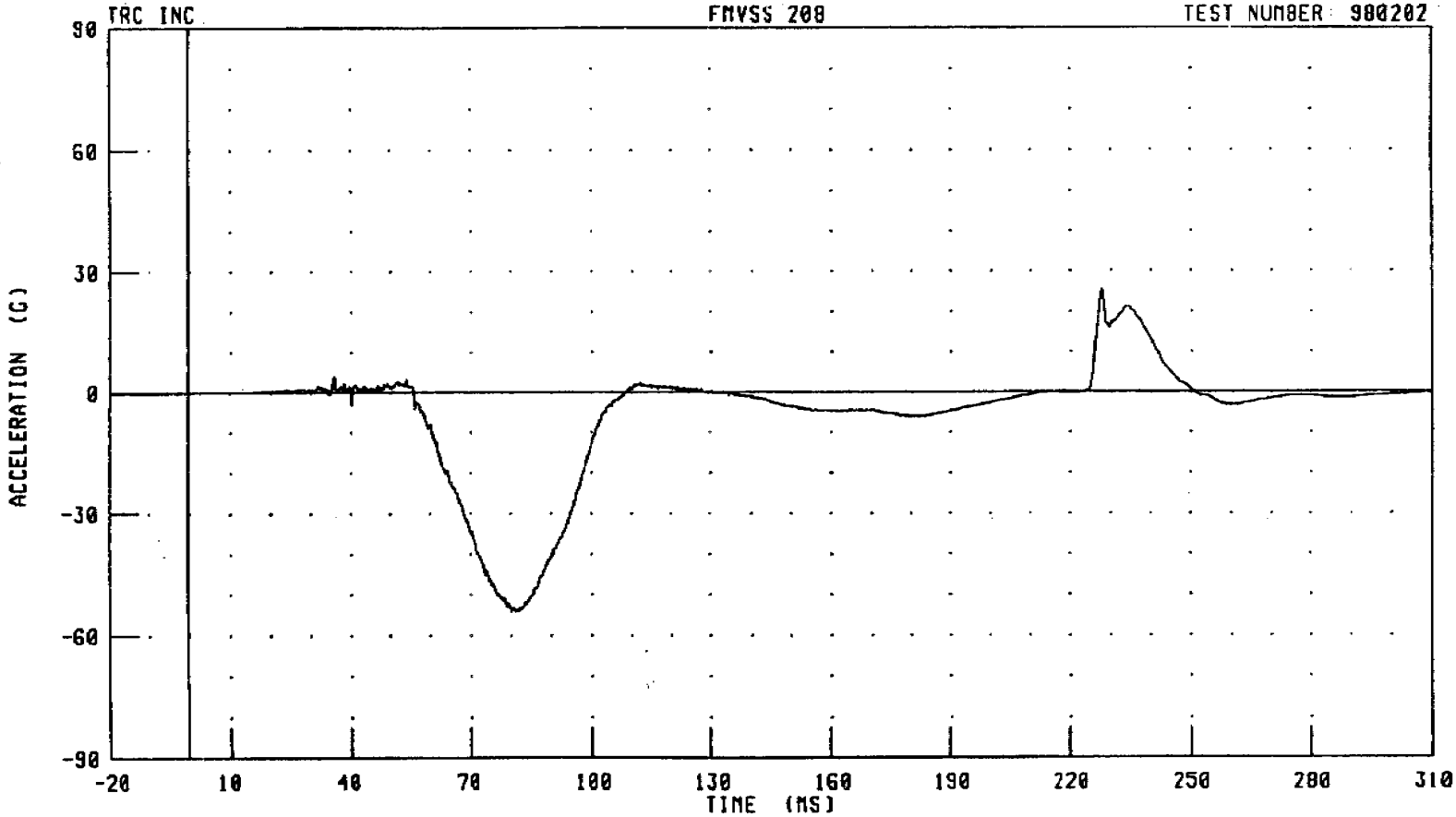

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE
TRC INC.
FMVSS 208
TEST NUMBER 980202
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF1
FILTER: CH. CLASS 600
PEAK DATA: 333.32 N @ 23.68 MS, -6447.43 N @ 51.04 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE

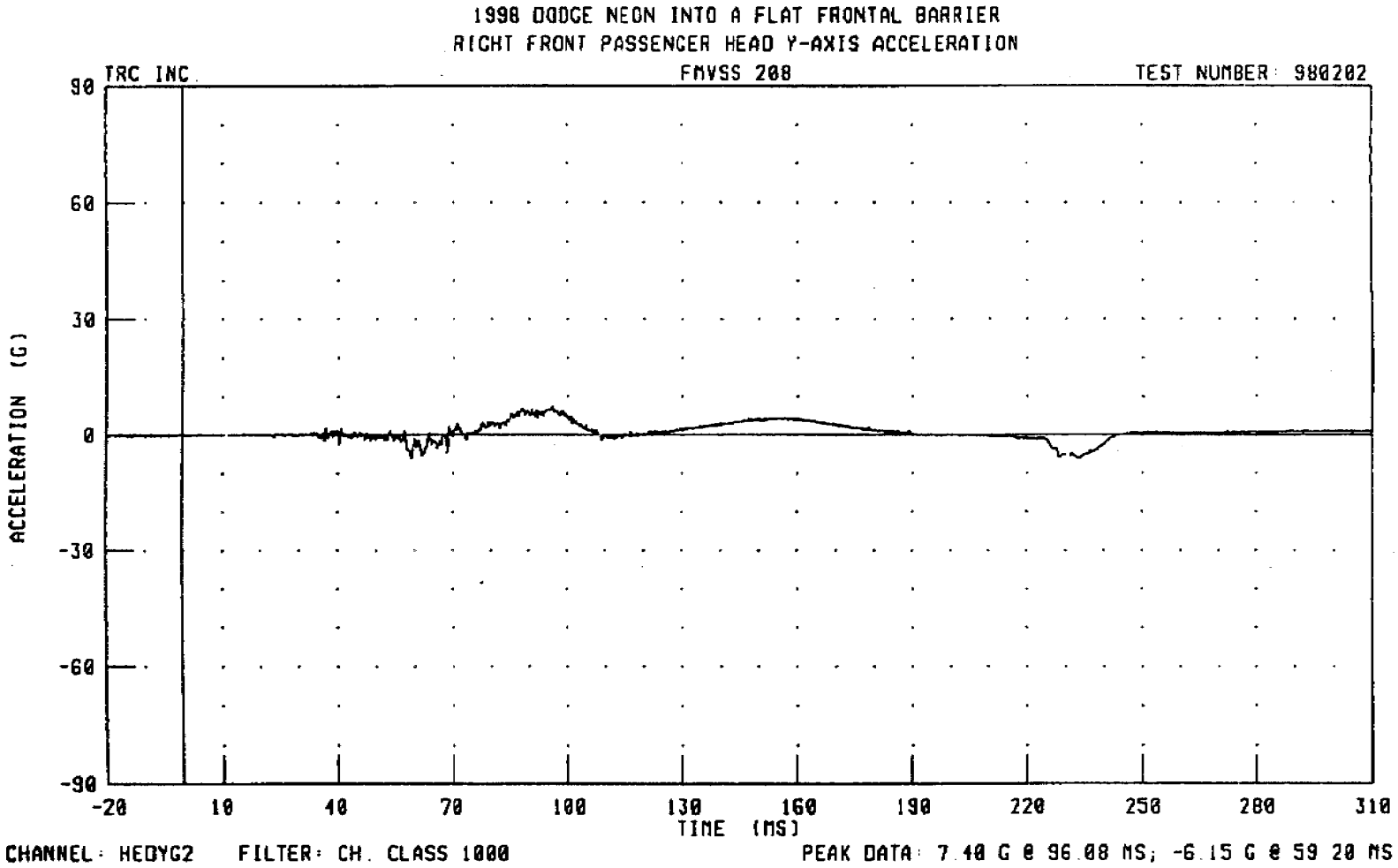


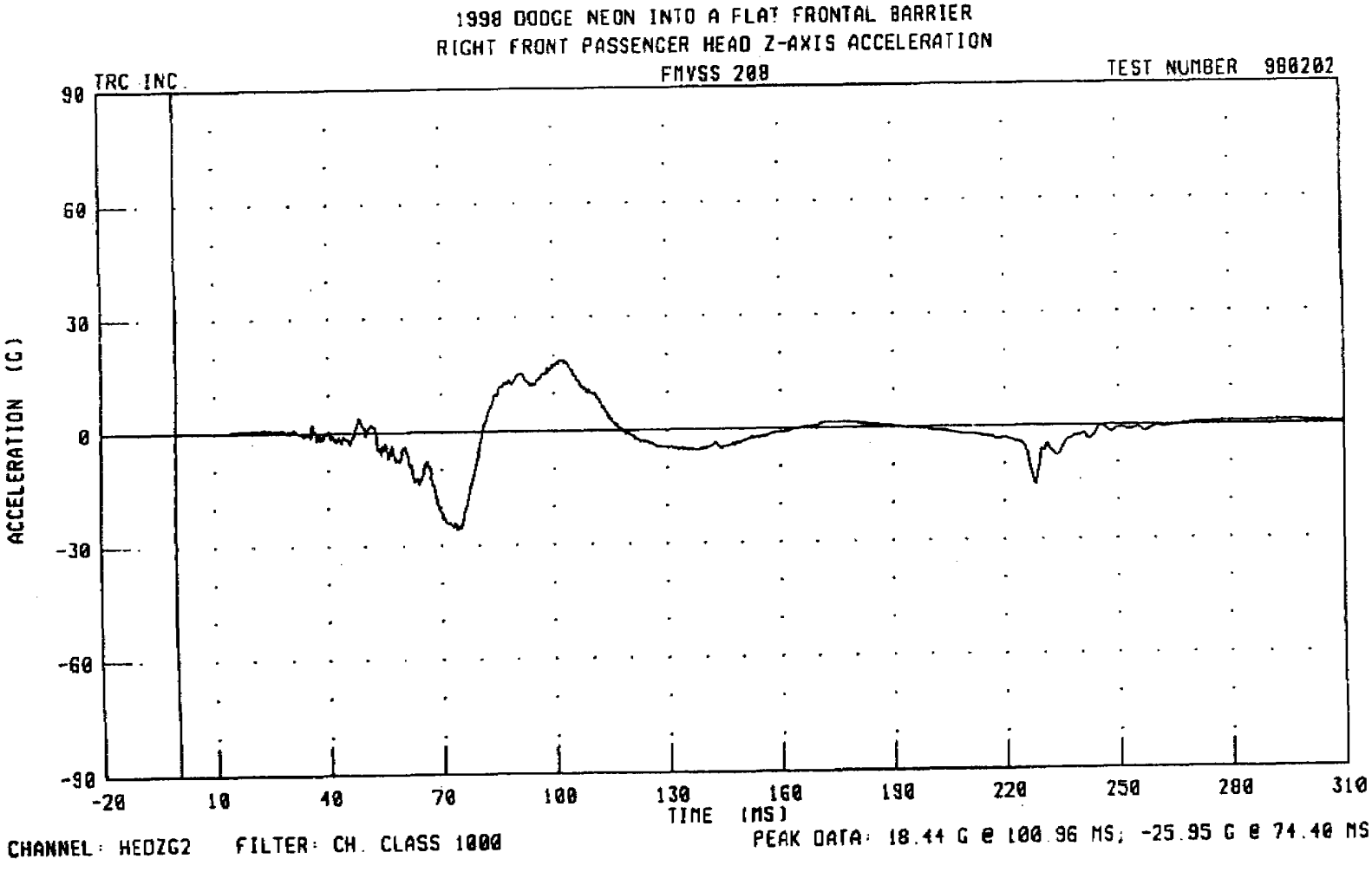
CHANNEL: RFMF1 FILTER: CH. CLASS 600 PEAK DATA: 287.81 N @ 43.44 MS; -7336.20 N @ 52.88 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

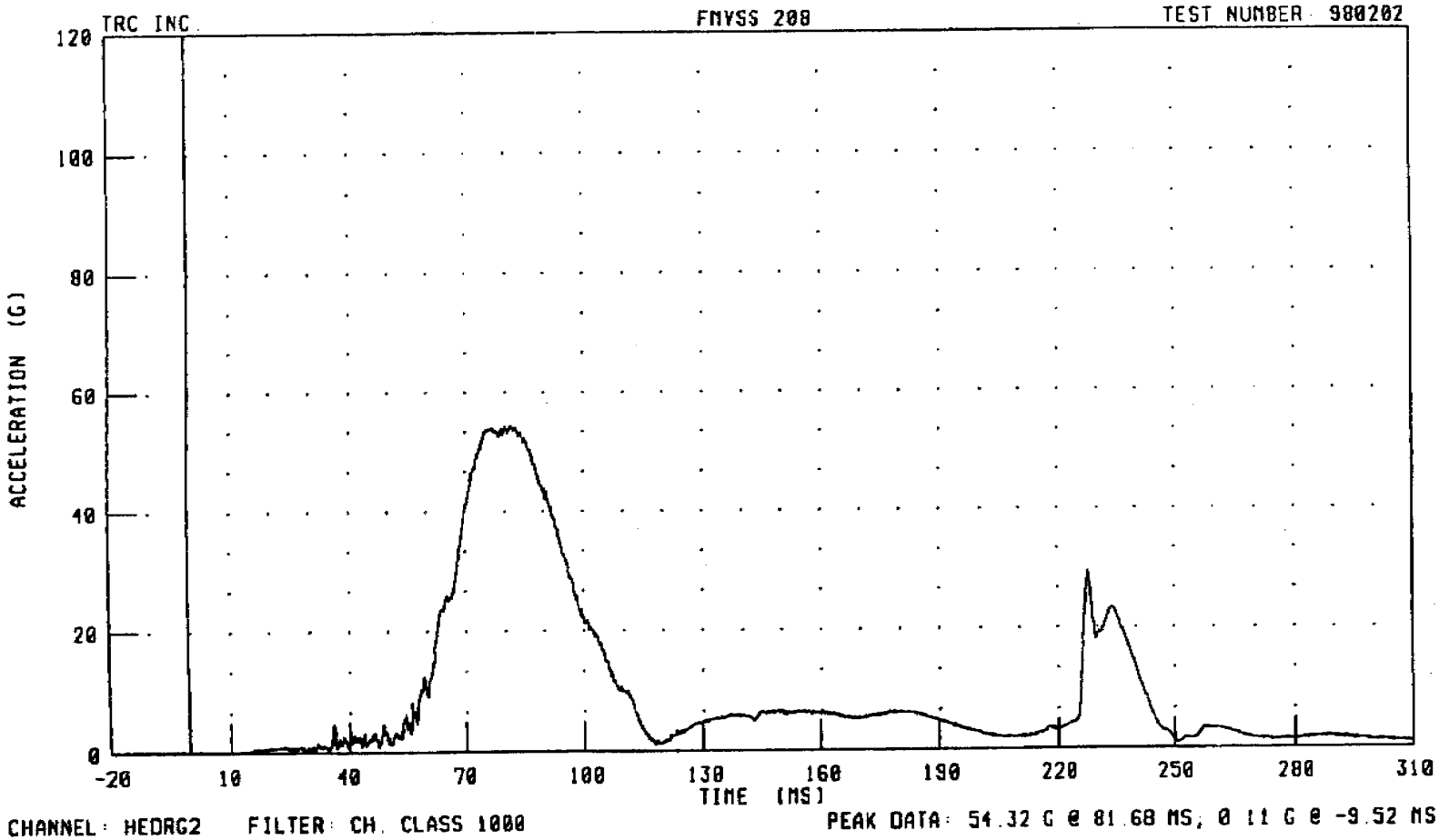


CHANNEL: HEDXG2 FILTER: CH. CLASS 1000 PEAK DATA: 25.32 G @ 227.76 MS; -54.17 G @ 81.52 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 980202
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: 7.40 G @ 96.08 MS; -6.15 G @ 59.20 MS

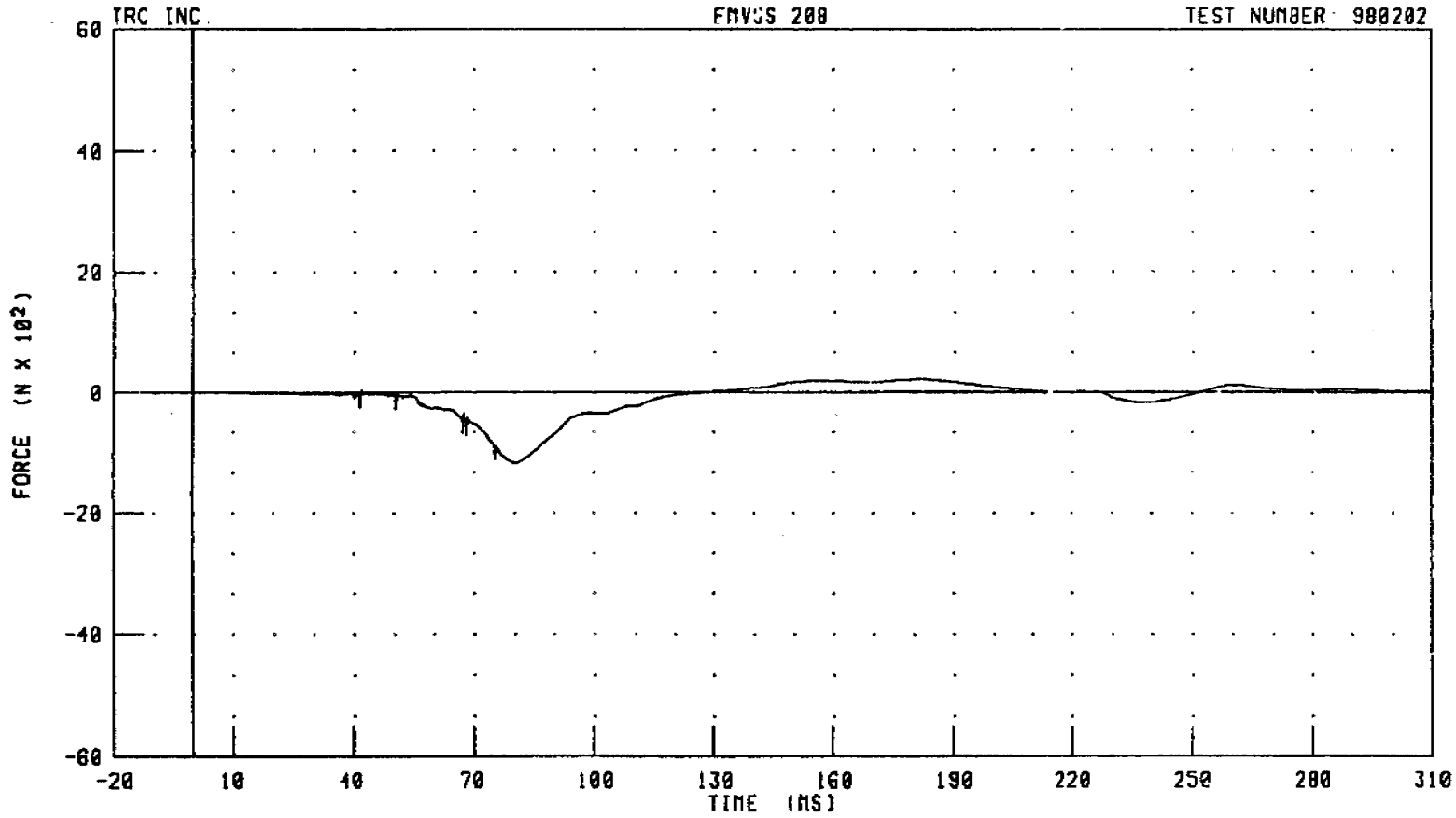

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
FMVSS 208
TRC INC.
TEST NUMBER 980202
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG2
FILTER: CH. CLASS 1000
PEAK DATA: 18.44 G @ 100.96 MS; -25.95 G @ 74.40 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

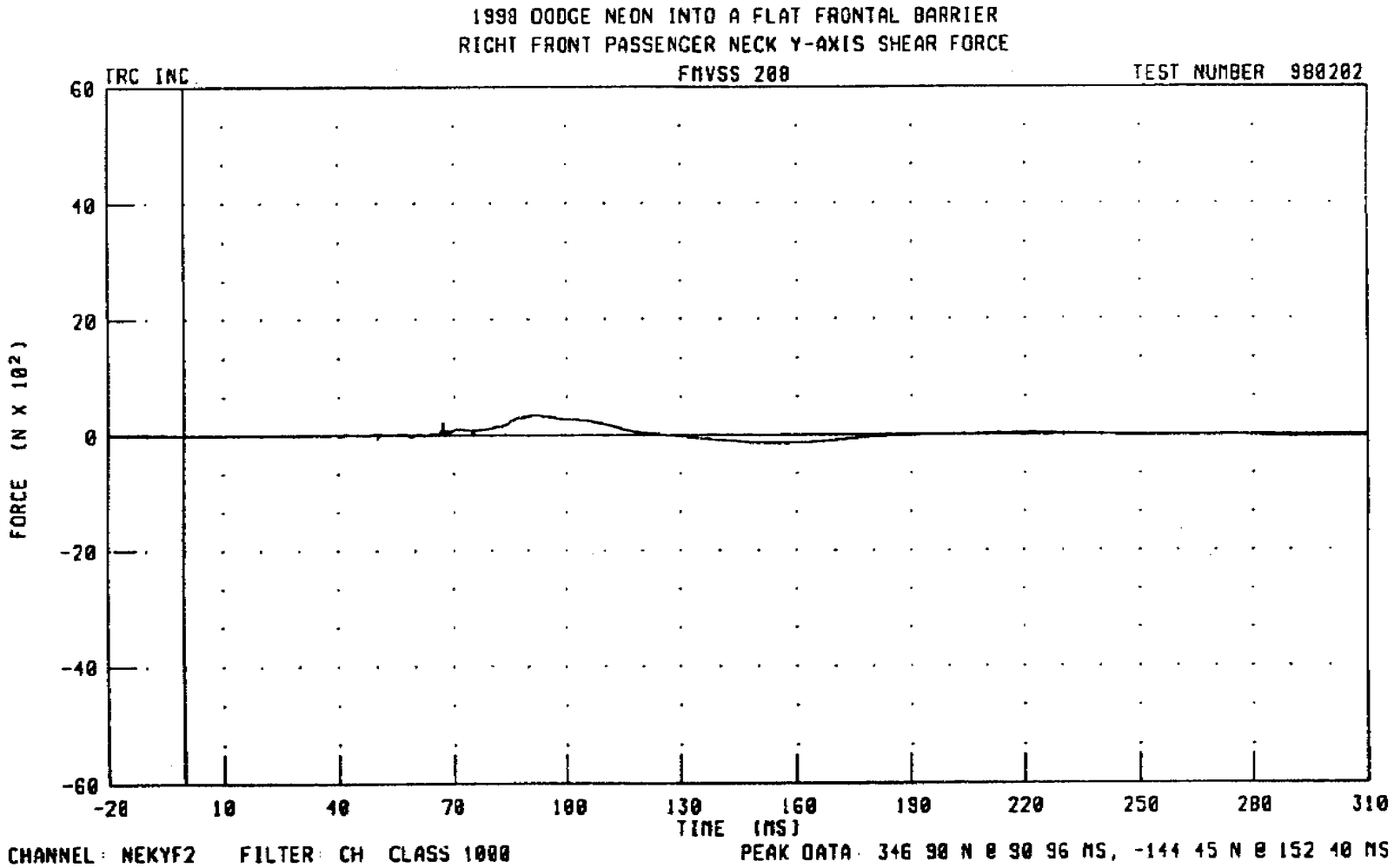


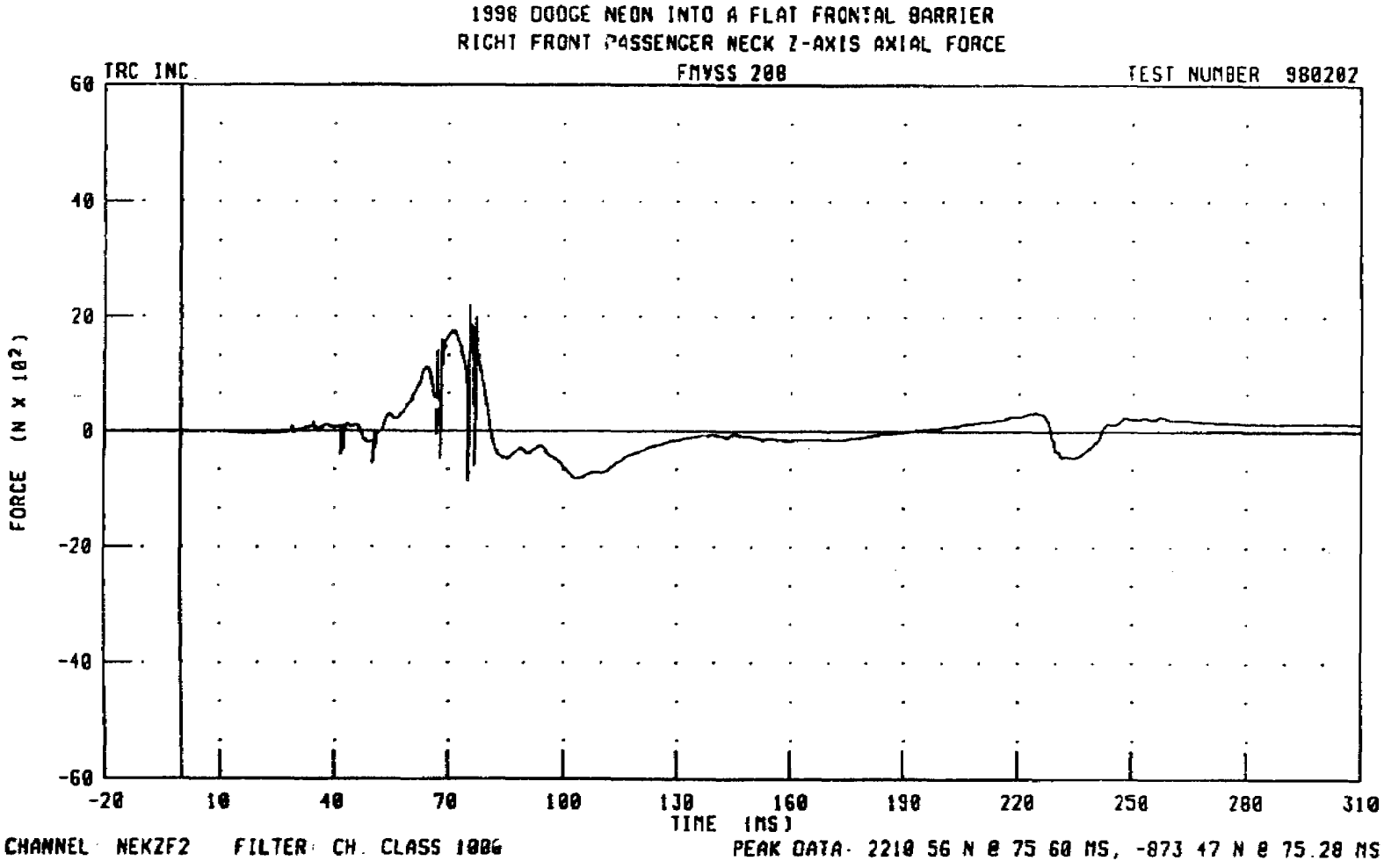
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000 PEAK DATA: 54.32 G @ 81.68 MS, 0.11 G @ -9.52 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE

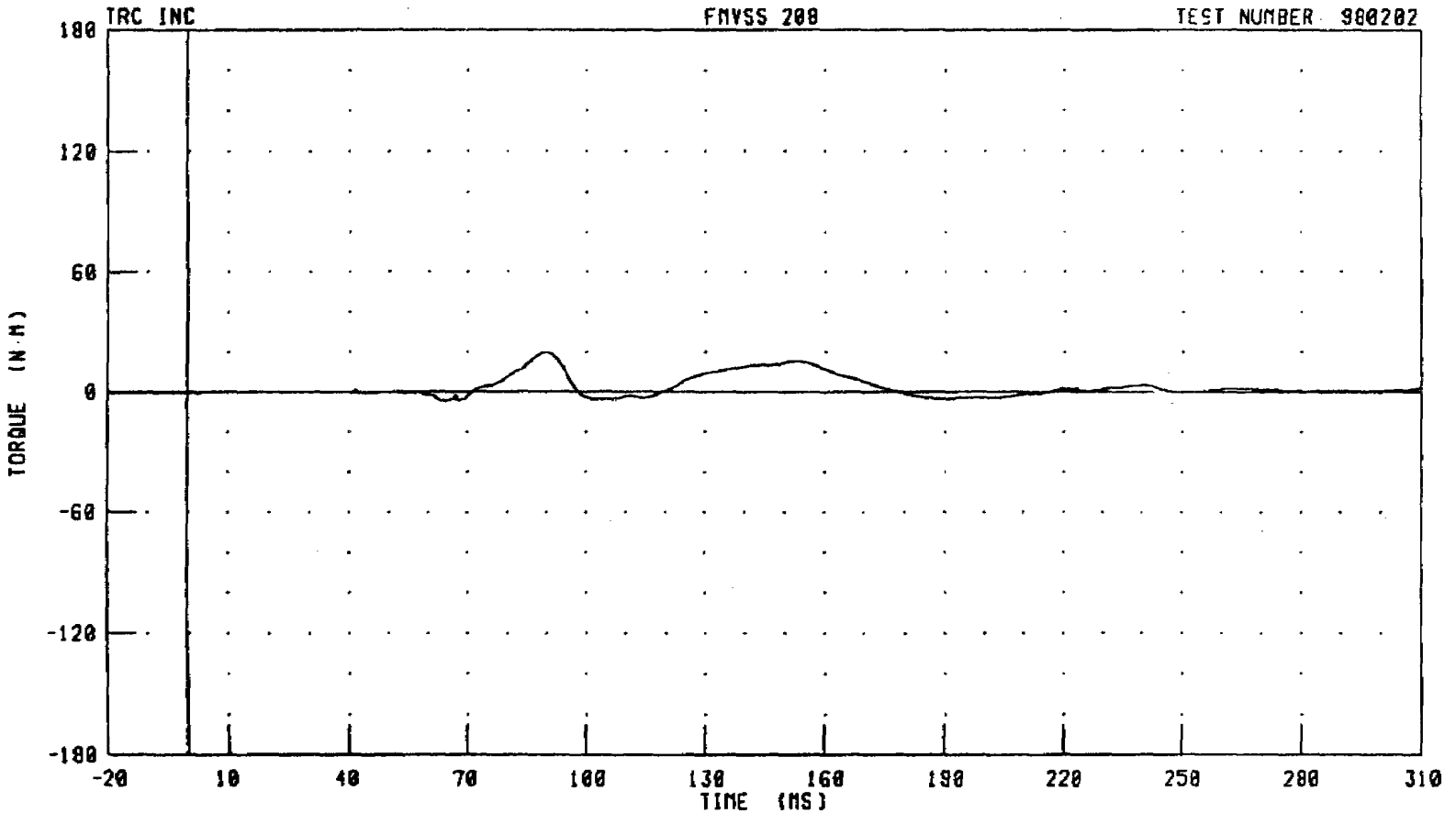


CHANNEL: NEKXF2 FILTER: CH. CLASS 1000 PEAK DATA: 219.71 N @ 180.80 MS; -1184.31 N @ 80.00 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE
FMVSS 208
TRC INC
TEST NUMBER 980202
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: 346 90 N @ 90 96 MS, -144 45 N @ 152 40 MS

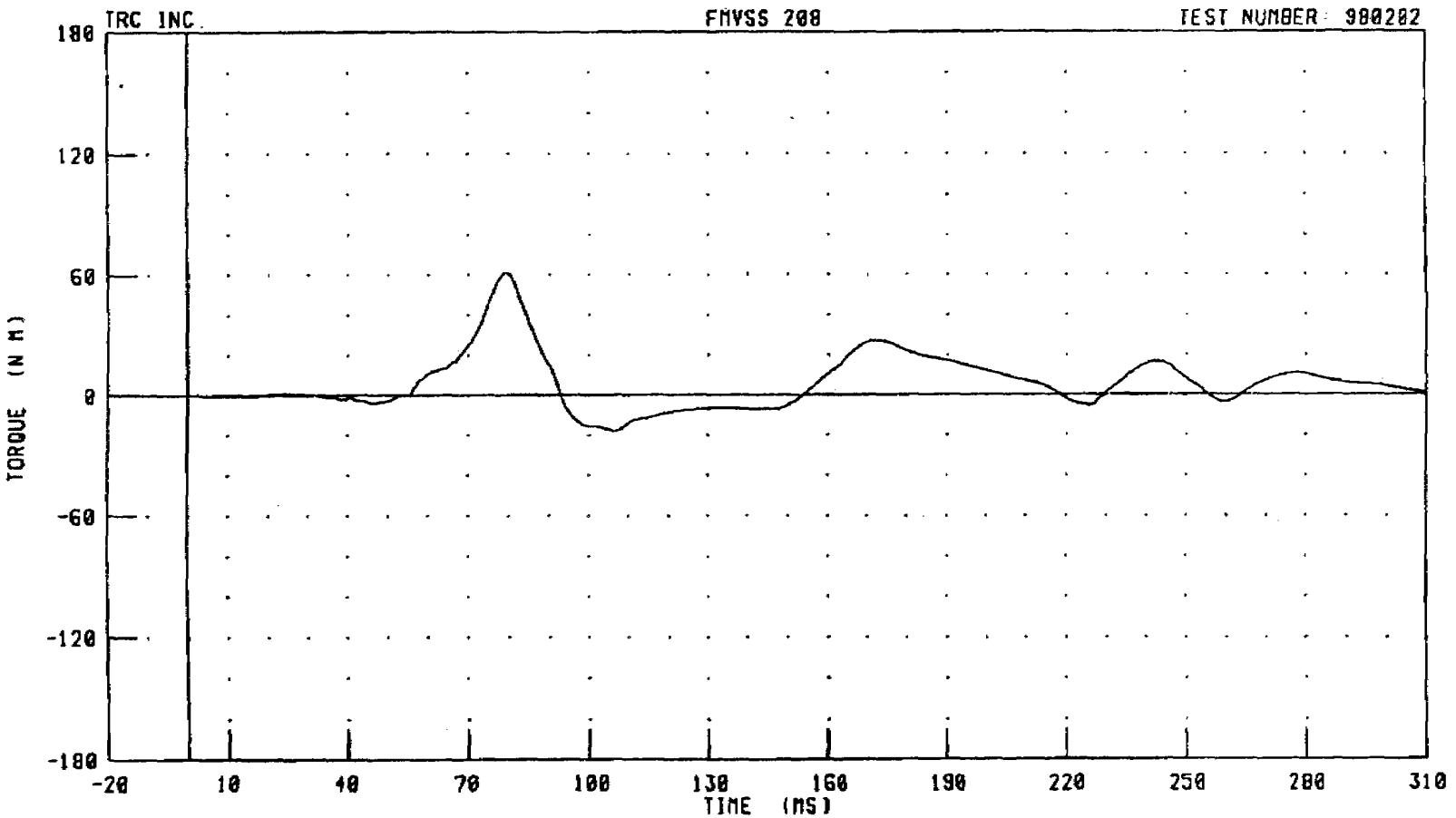

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE
TRC INC
FMVSS 208
TEST NUMBER 980202
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL NEKZF2
FILTER CH. CLASS 1000
PEAK DATA: 2210.56 N @ 75.60 MS, -873.47 N @ 75.20 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS



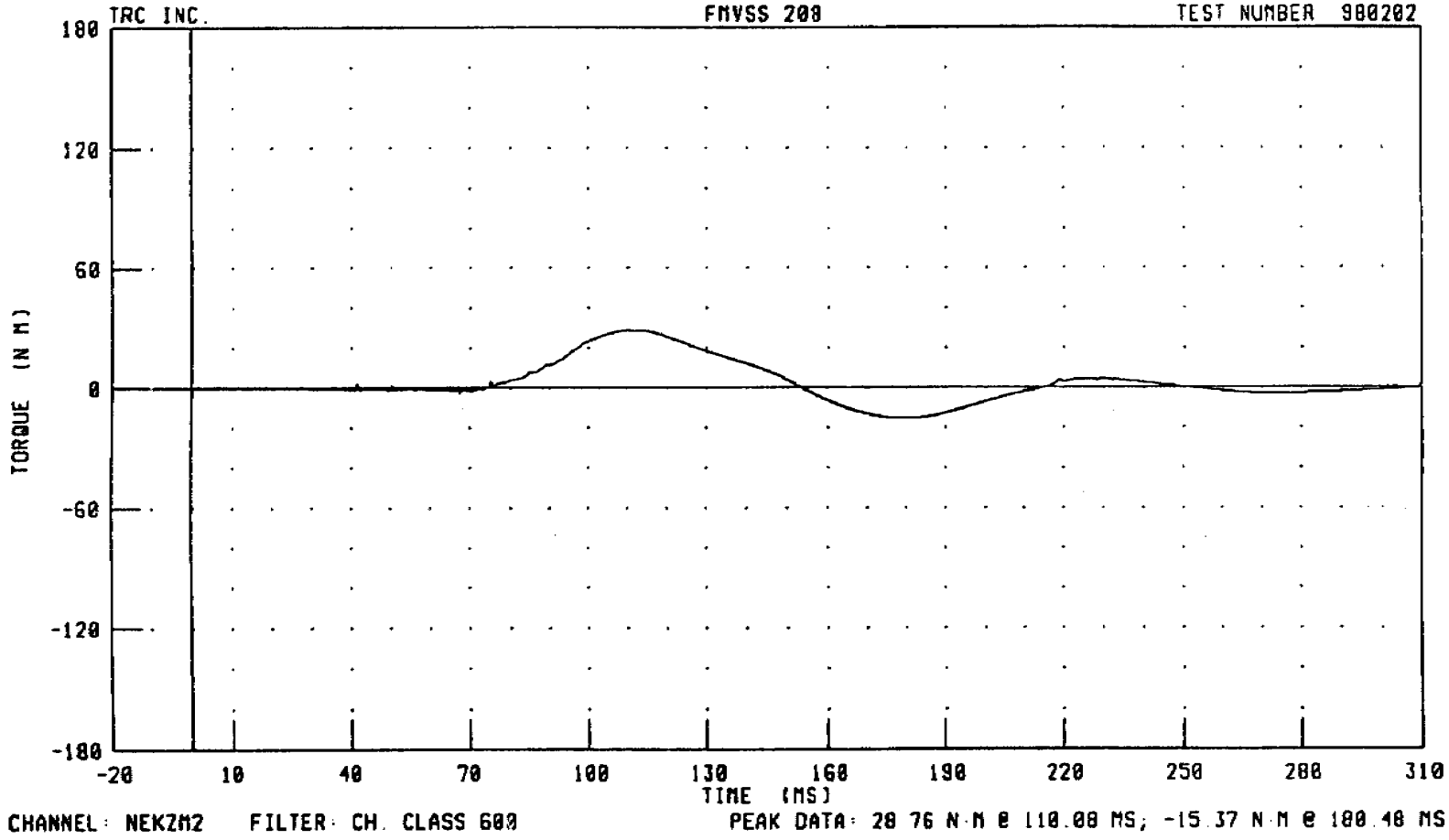
CHANNEL: NEKXM2 FILTER: CH. CLASS 600 PEAK DATA: 20.08 N-M @ 89.28 MS, -4.57 N-M @ 63.28 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS



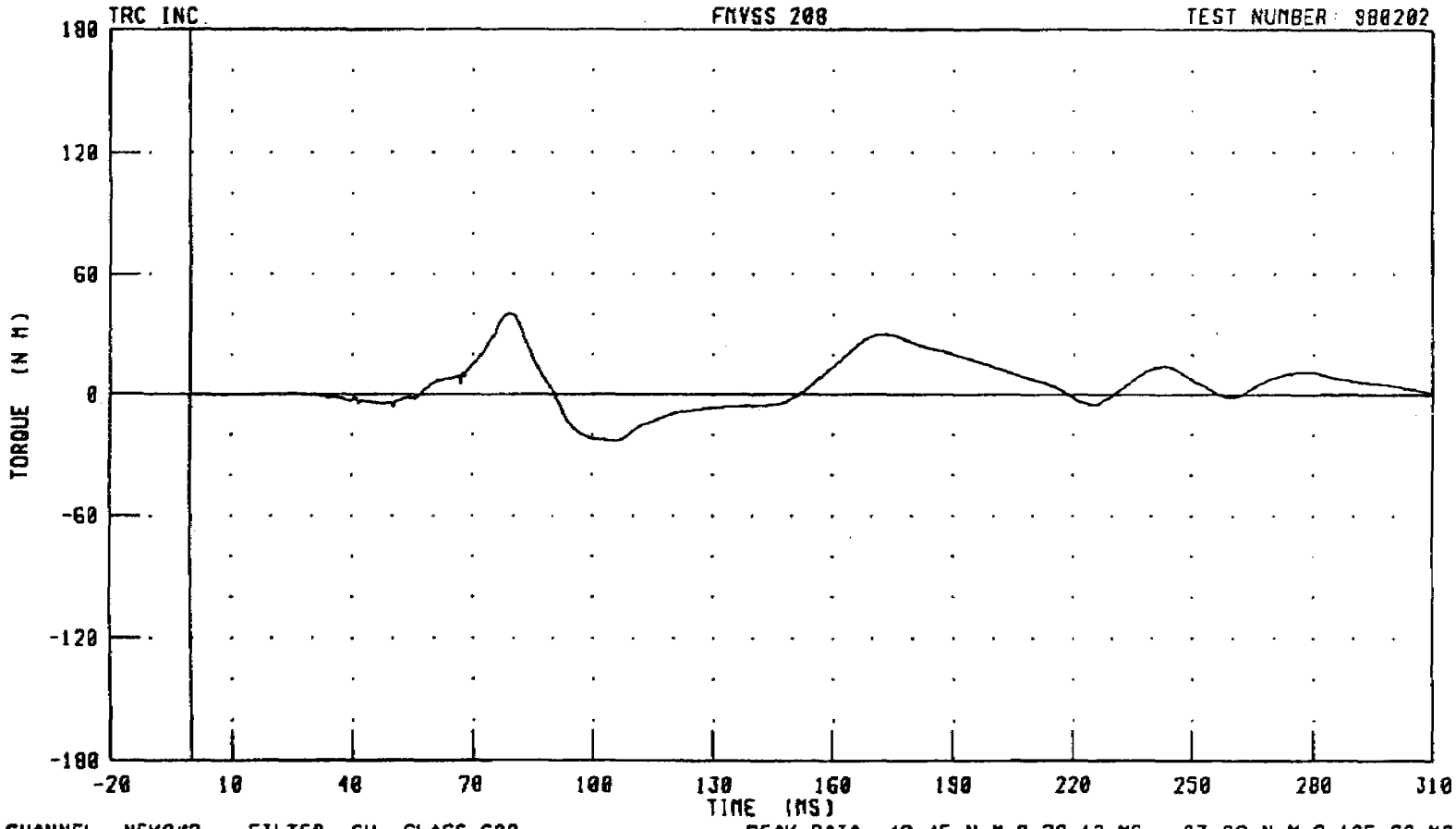
CHANNEL: NEKYM2 FILTER: CH. CLASS 600 PEAK DATA: 61.08 N-M @ 79.52 MS; -18.05 N-M @ 106.48 MS

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

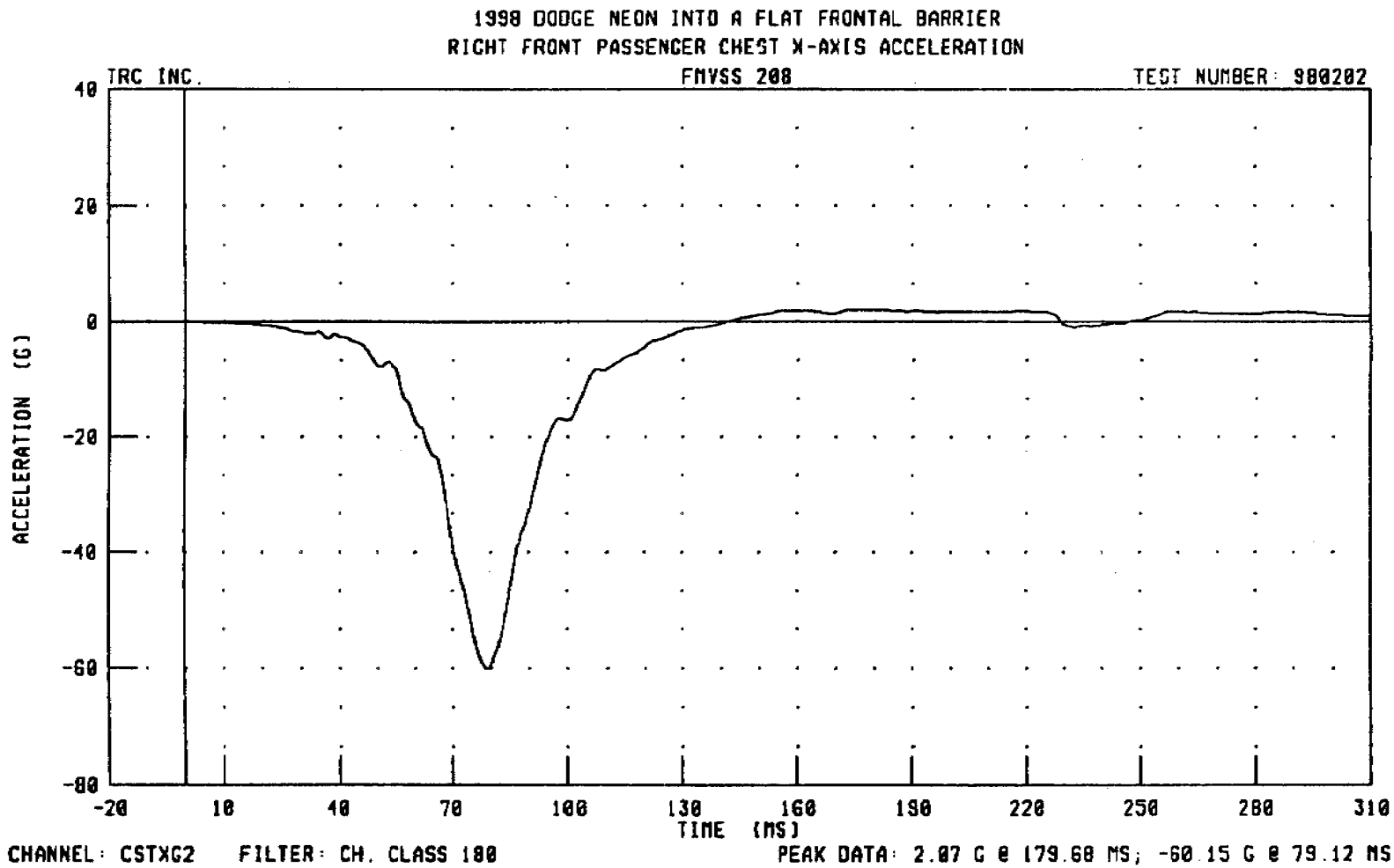


CHANNEL: NEKZM2 FILTER: CH. CLASS 600 PEAK DATA: 28.76 N-M @ 110.08 MS; -15.37 N-M @ 180.48 MS

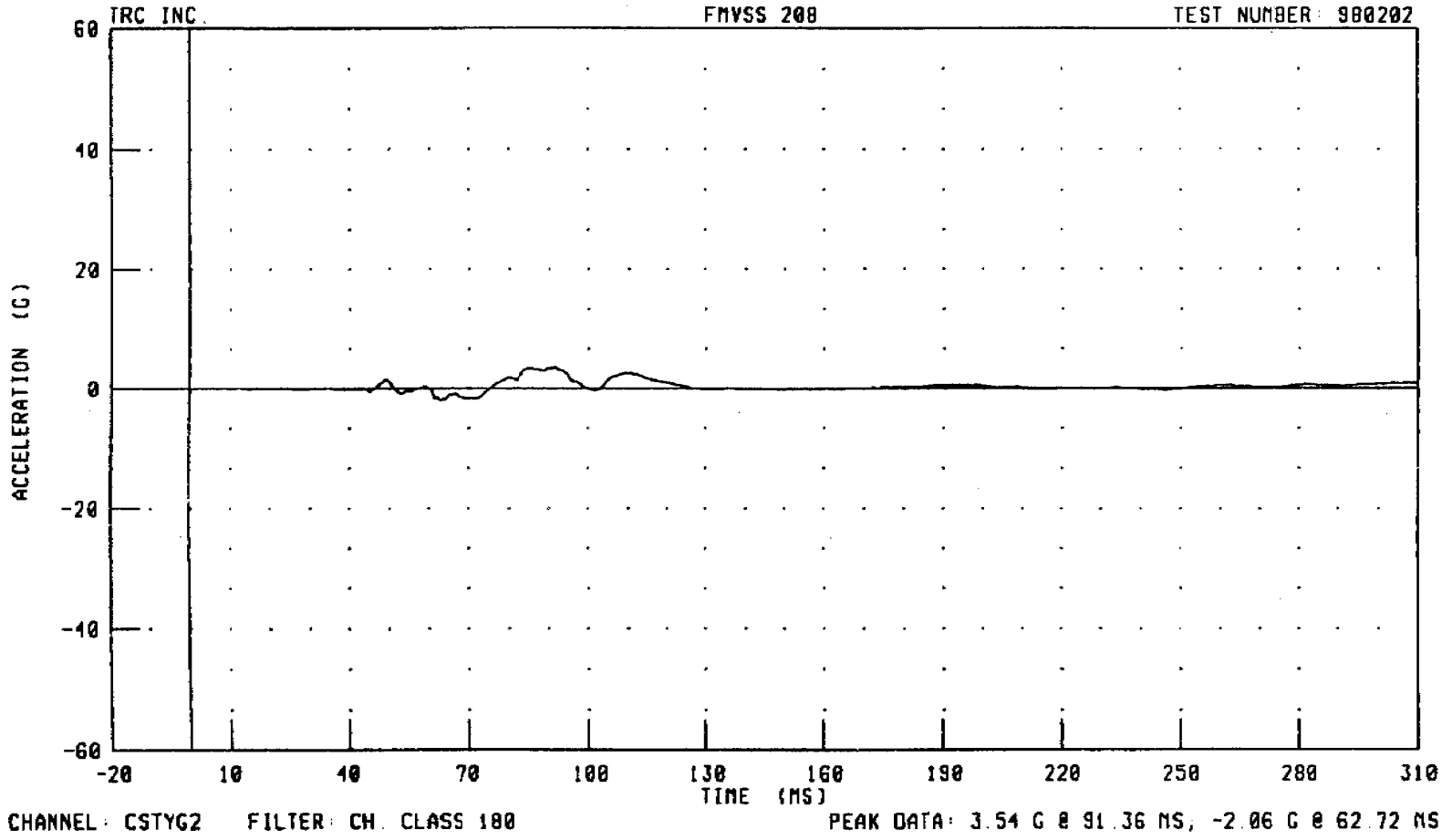
1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE



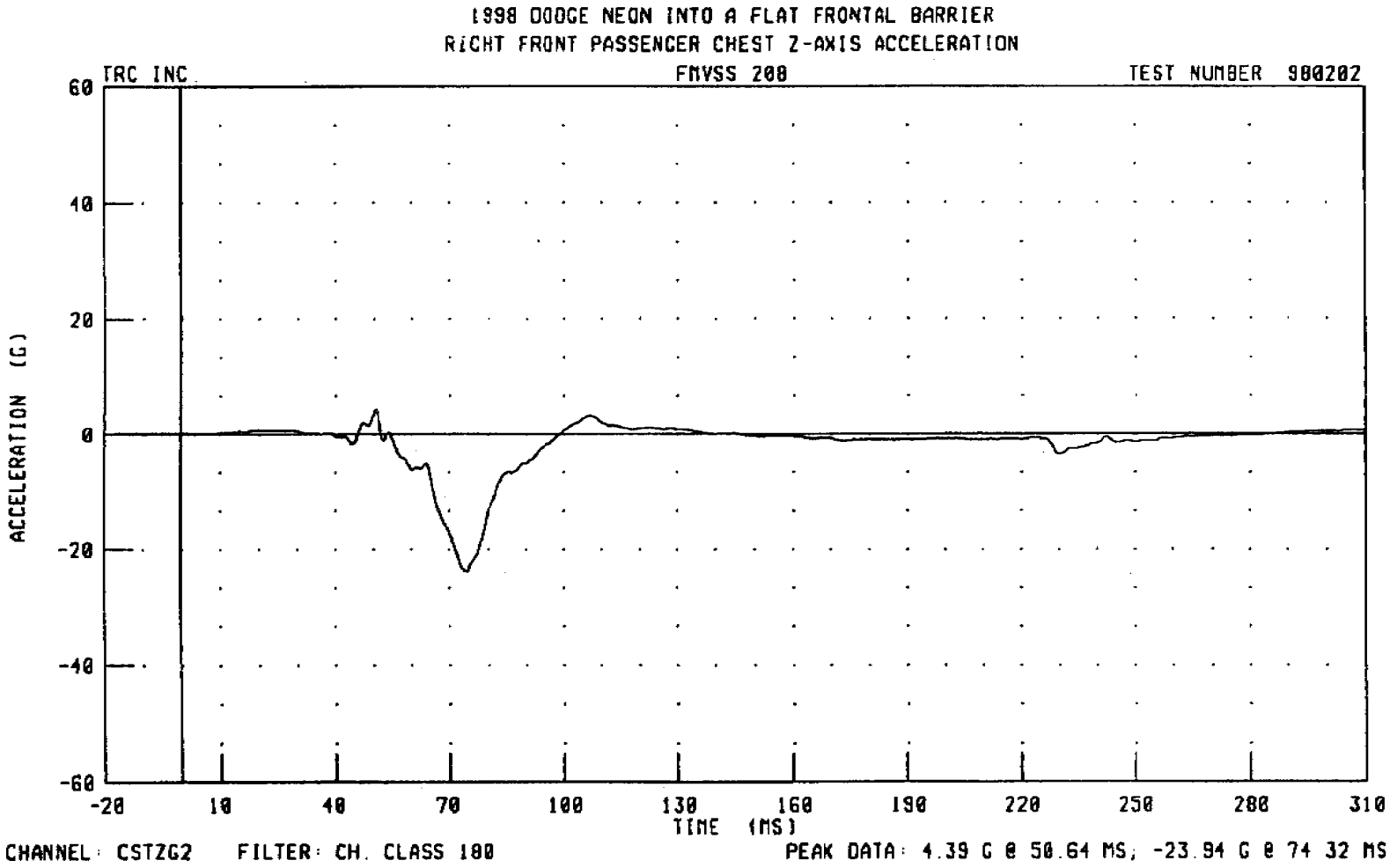
CHANNEL: NEKO:12 FILTER: CH. CLASS 600 PEAK DATA: 40.45 N-M @ 79.12 MS; -23.09 N-M @ 105.60 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 980202
40
20
0
-20
-40
-60
-80
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG2
FILTER: CH. CLASS 180
PEAK DATA: 2.07 G @ 179.68 MS; -60.15 G @ 79.12 MS

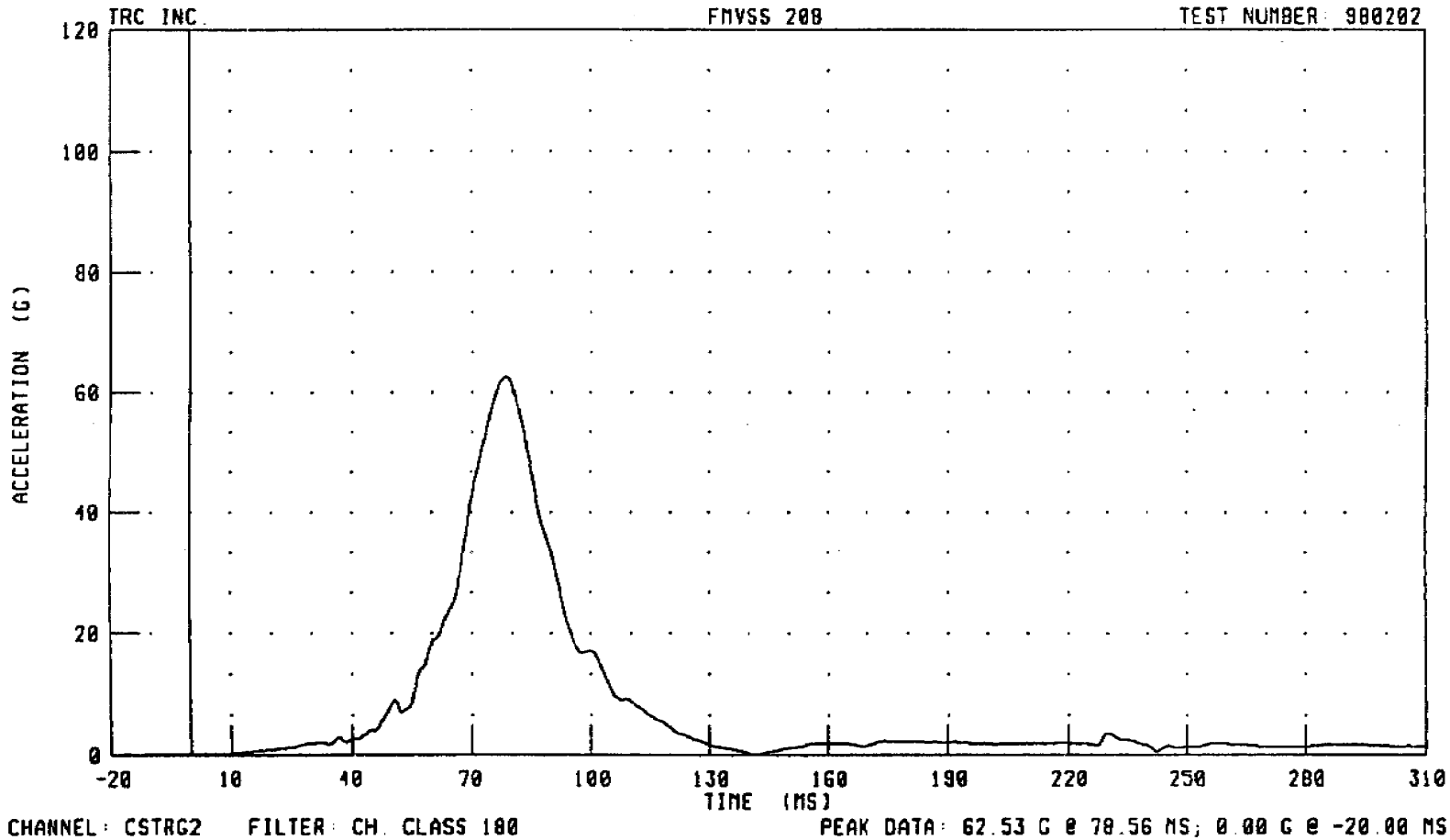
1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION



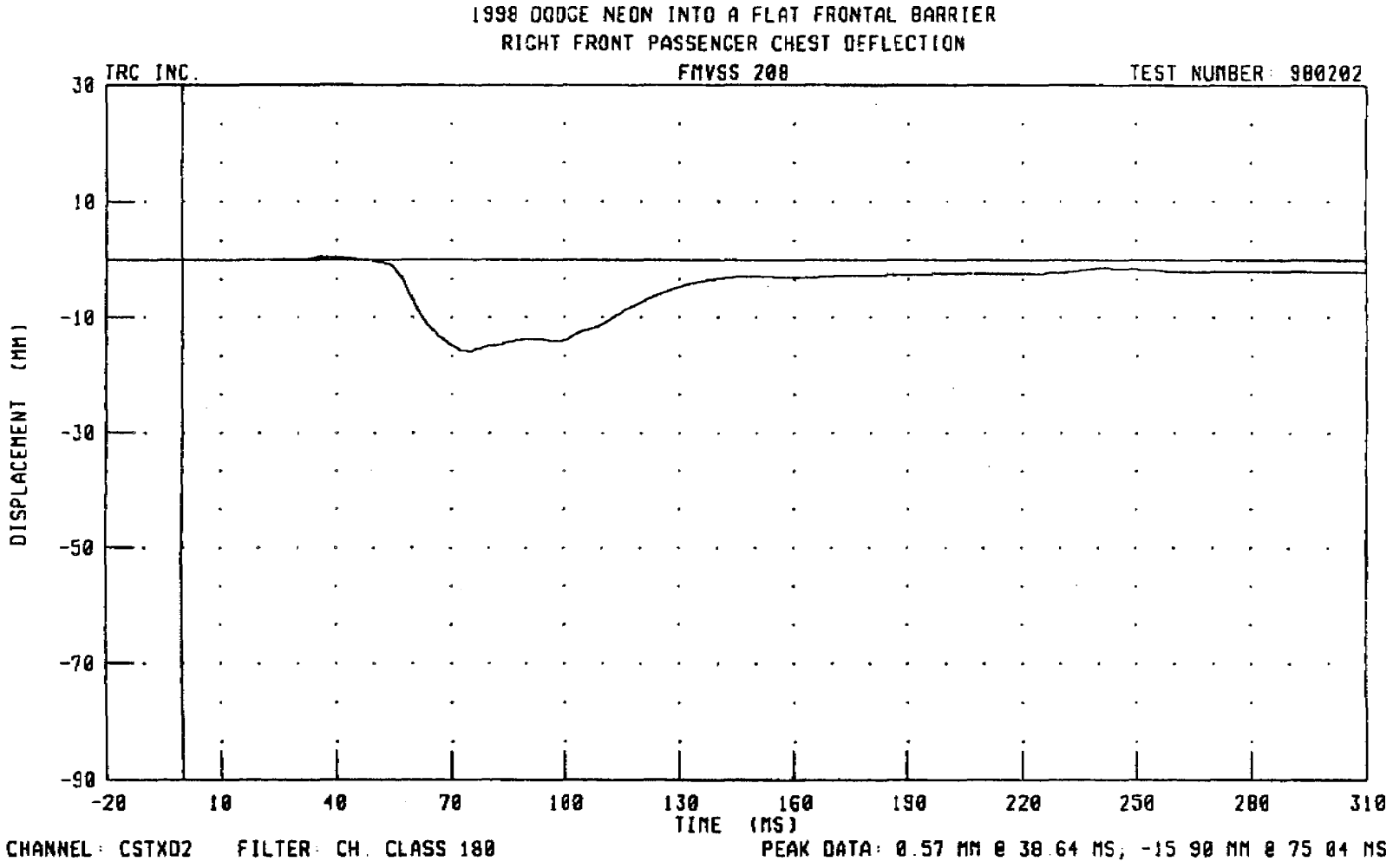
CHANNEL: CSTYG2 FILTER: CH. CLASS 180 PEAK DATA: 3.54 G @ 91.36 MS, -2.06 G @ 62.72 MS

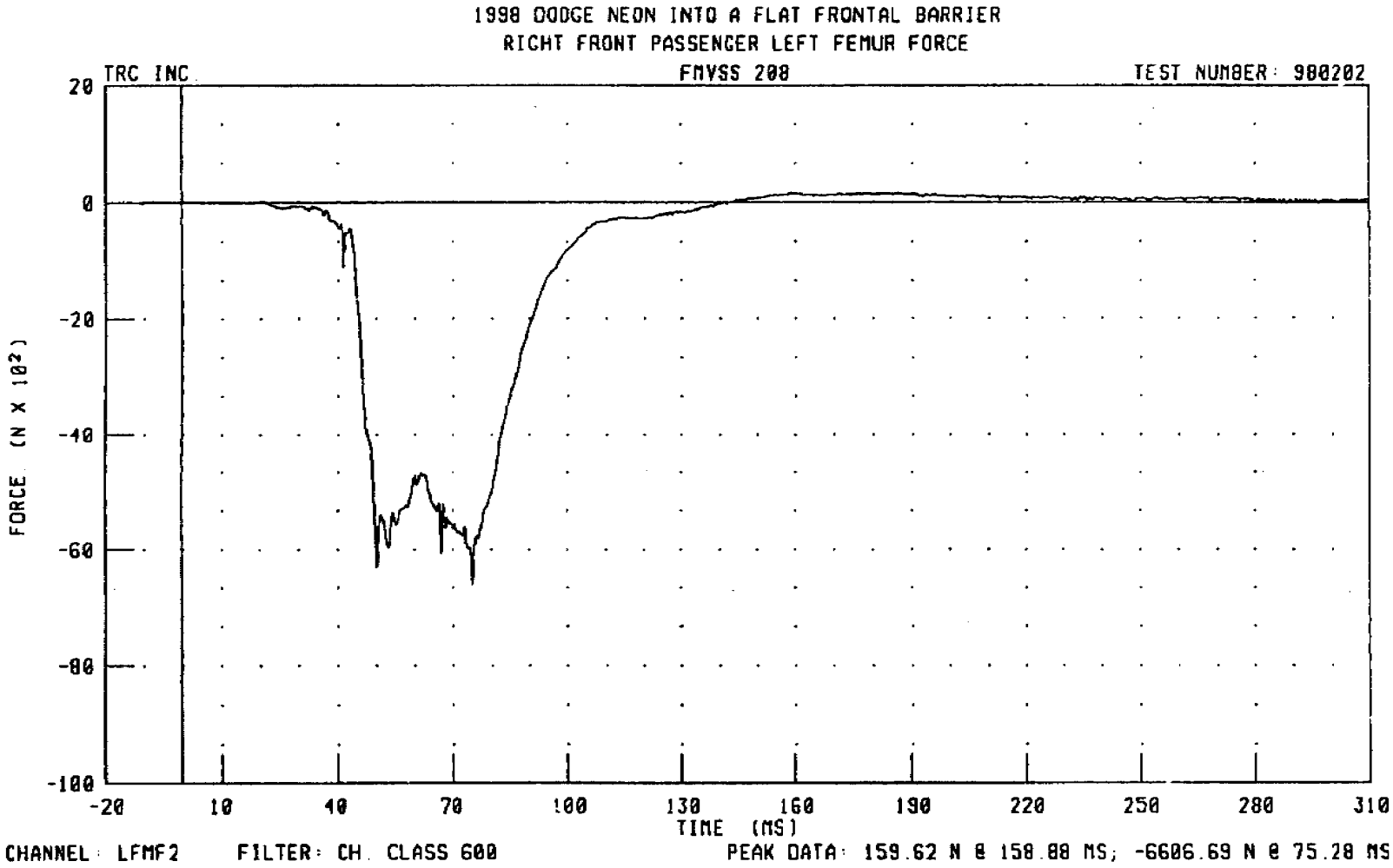

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG2
FILTER: CH. CLASS 180
PEAK DATA: 4.39 G @ 50.64 MS; -23.94 G @ 74.32 MS

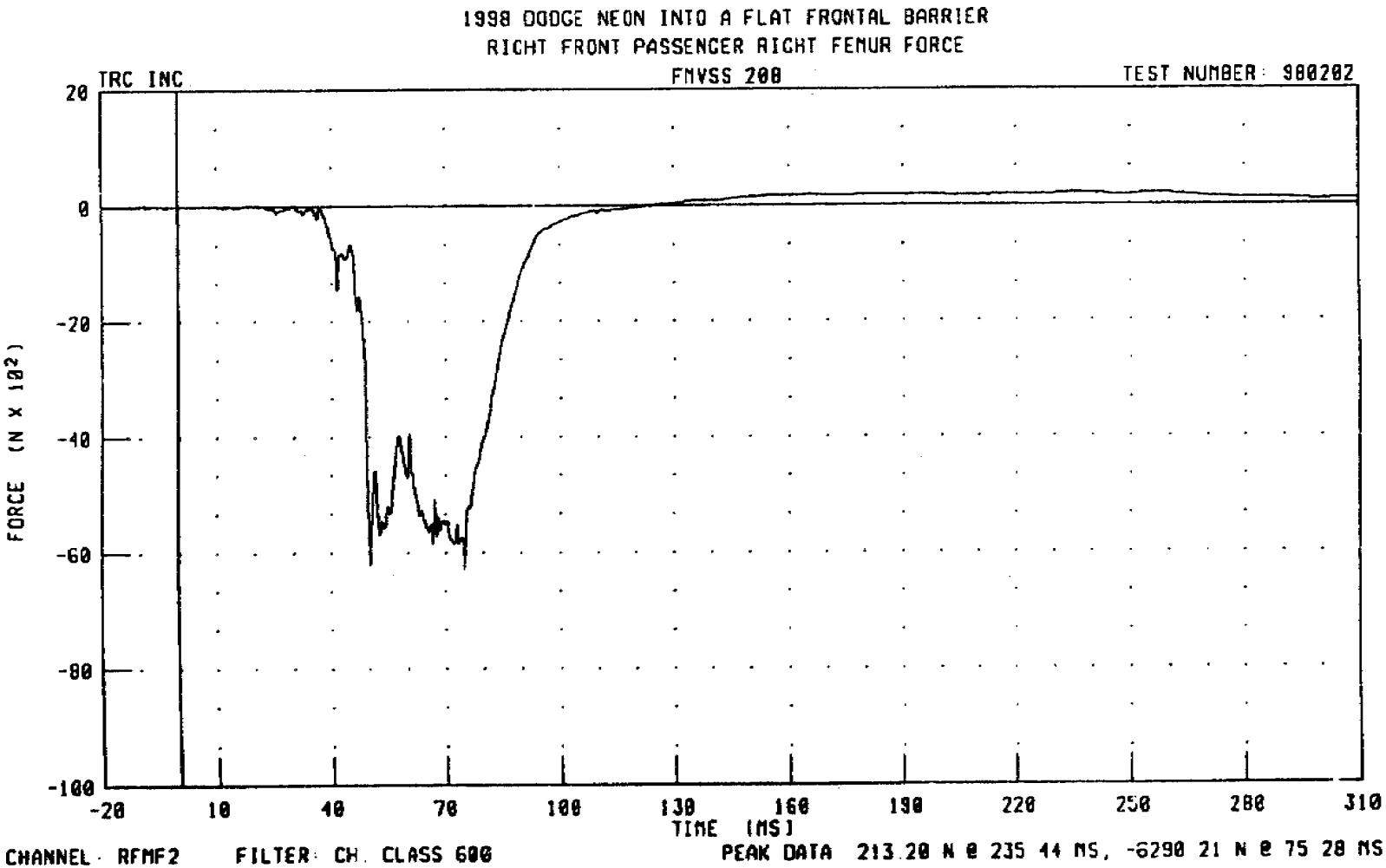
1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

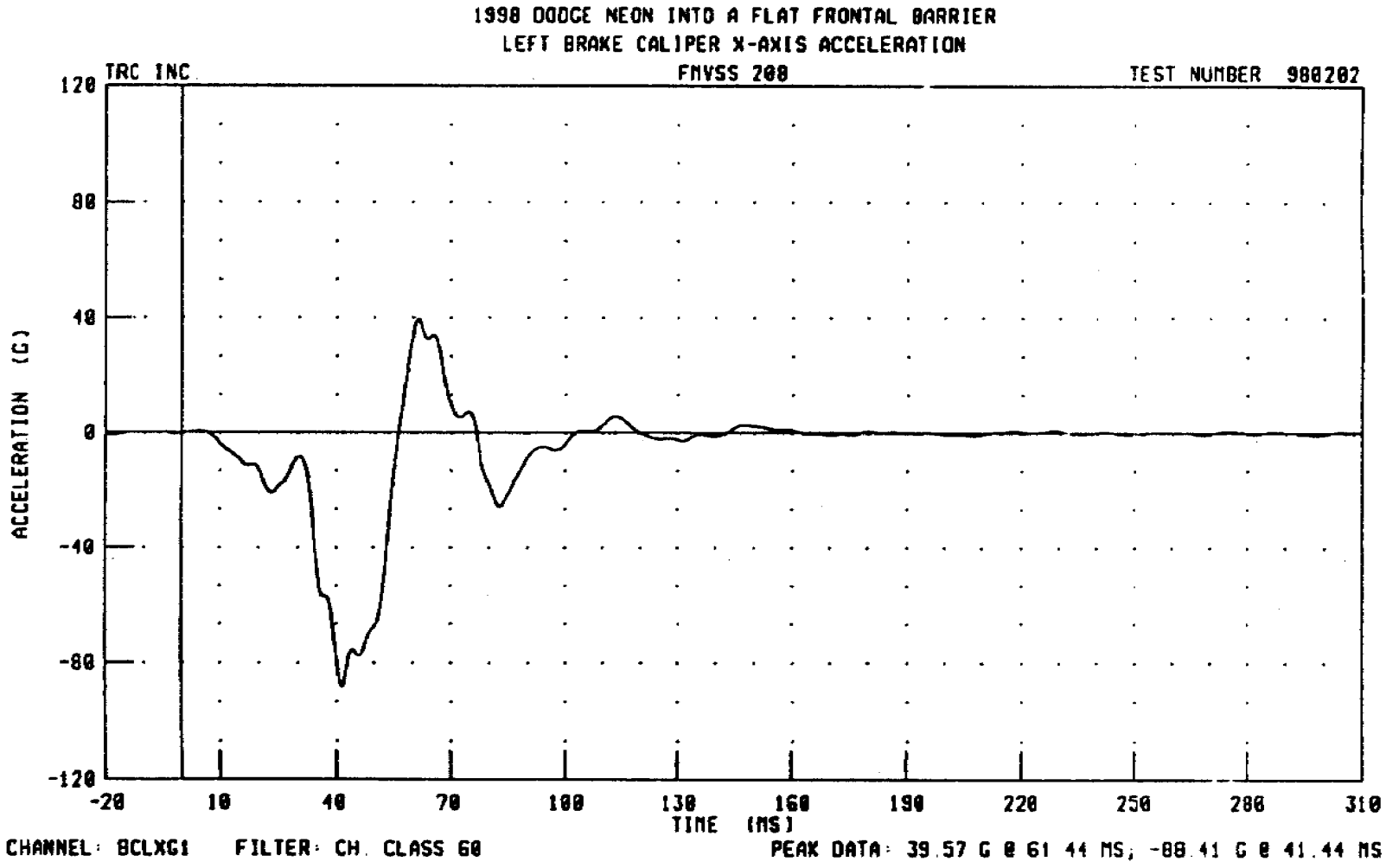


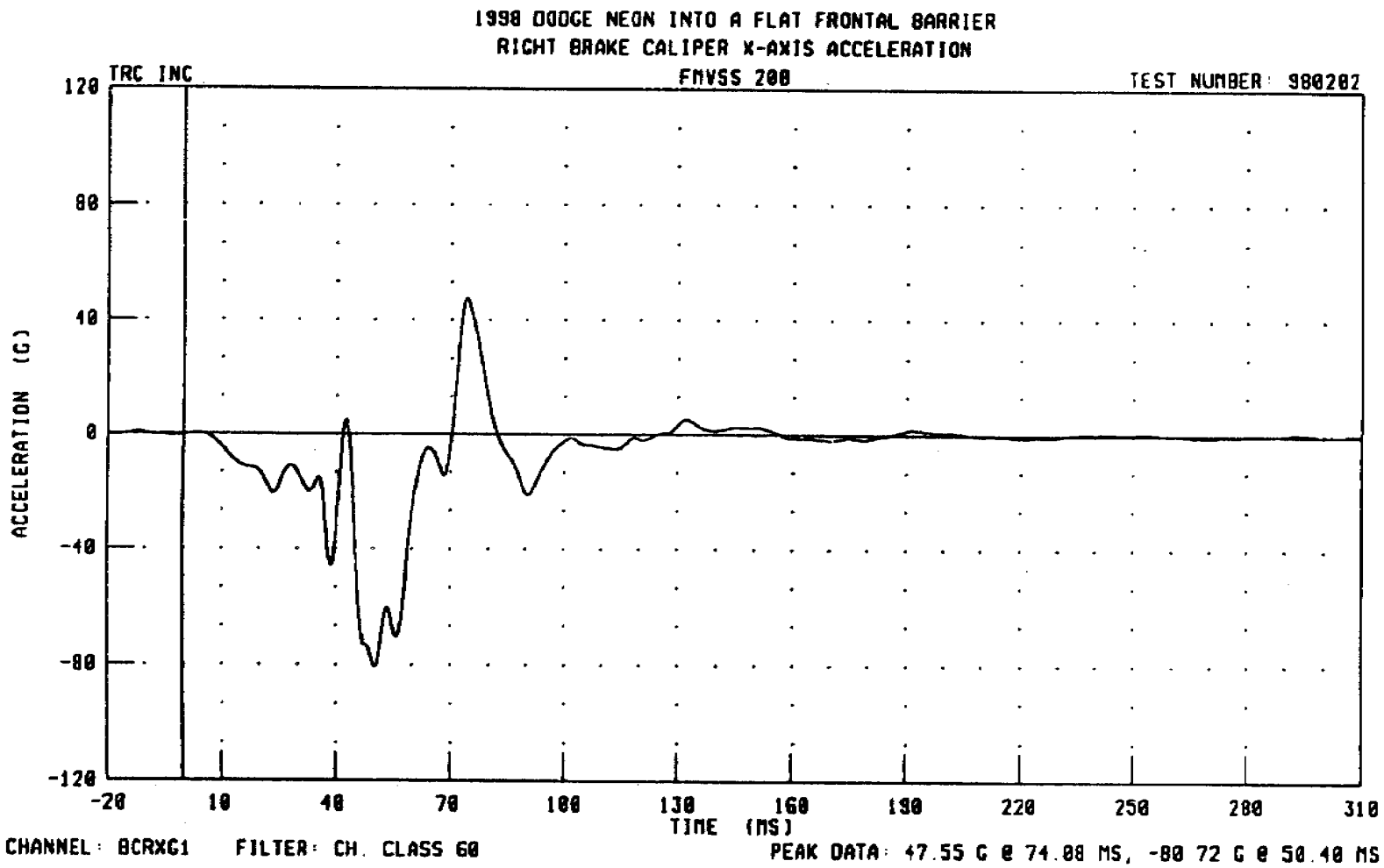
CHANNEL: CSTRG2 FILTER: CH. CLASS 180 PEAK DATA: 62.53 G @ 78.56 MS; 0.00 G @ -20.00 MS

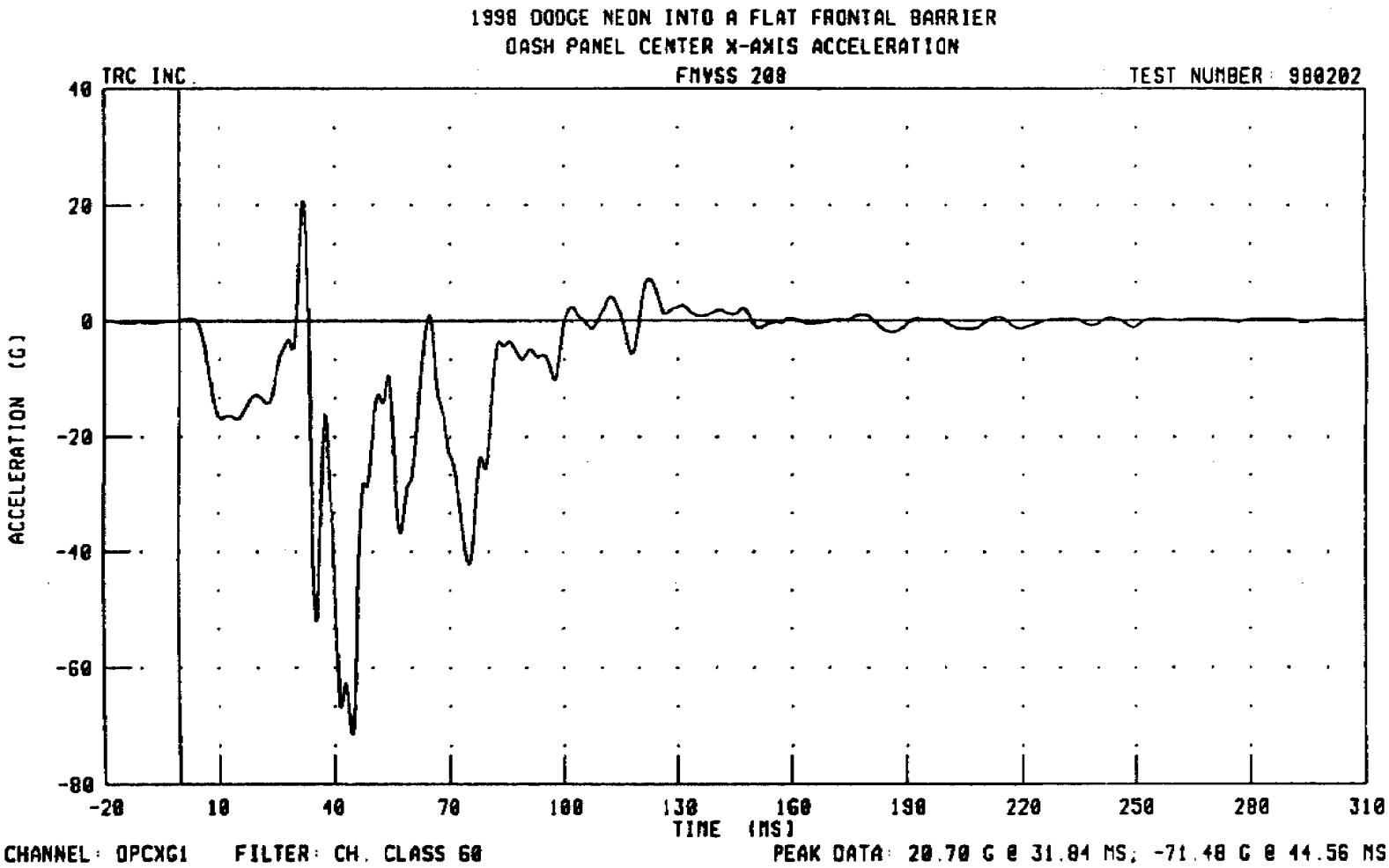

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST DEFLECTION
TRC INC.
FMVSS 208
TEST NUMBER: 980202
30
10
-10
-30
-50
-70
-90
DISPLACEMENT (MM)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD2
FILTER: CH. CLASS 180
PEAK DATA: 0.57 MM @ 38.64 MS, -15.90 MM @ 75.04 MS

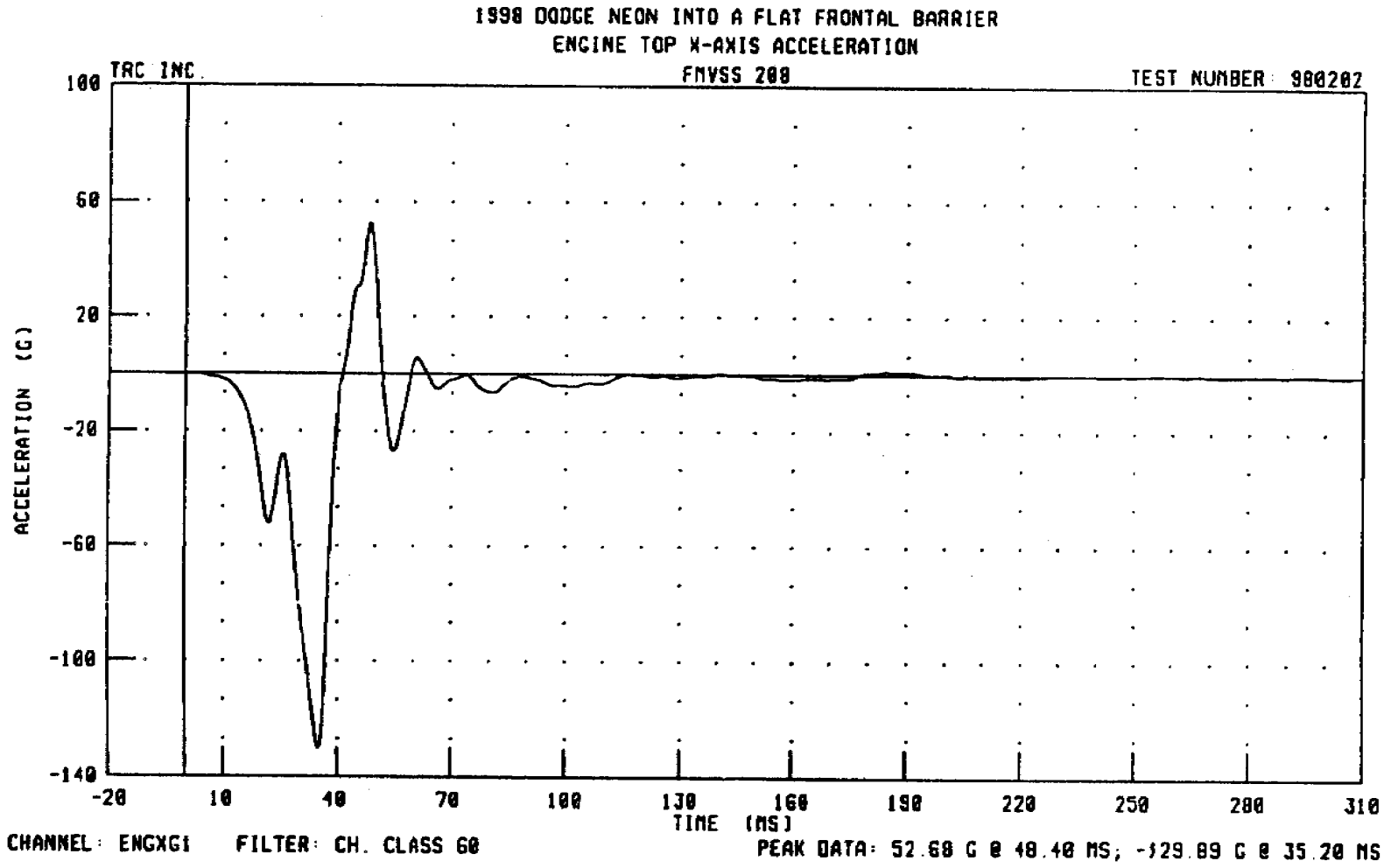

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT FEMUR FORCE
TRC INC
FMVSS 208
TEST NUMBER: 980202
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF2
FILTER: CH. CLASS 600
PEAK DATA: 159.62 N @ 158.88 MS; -6606.69 N @ 75.28 MS

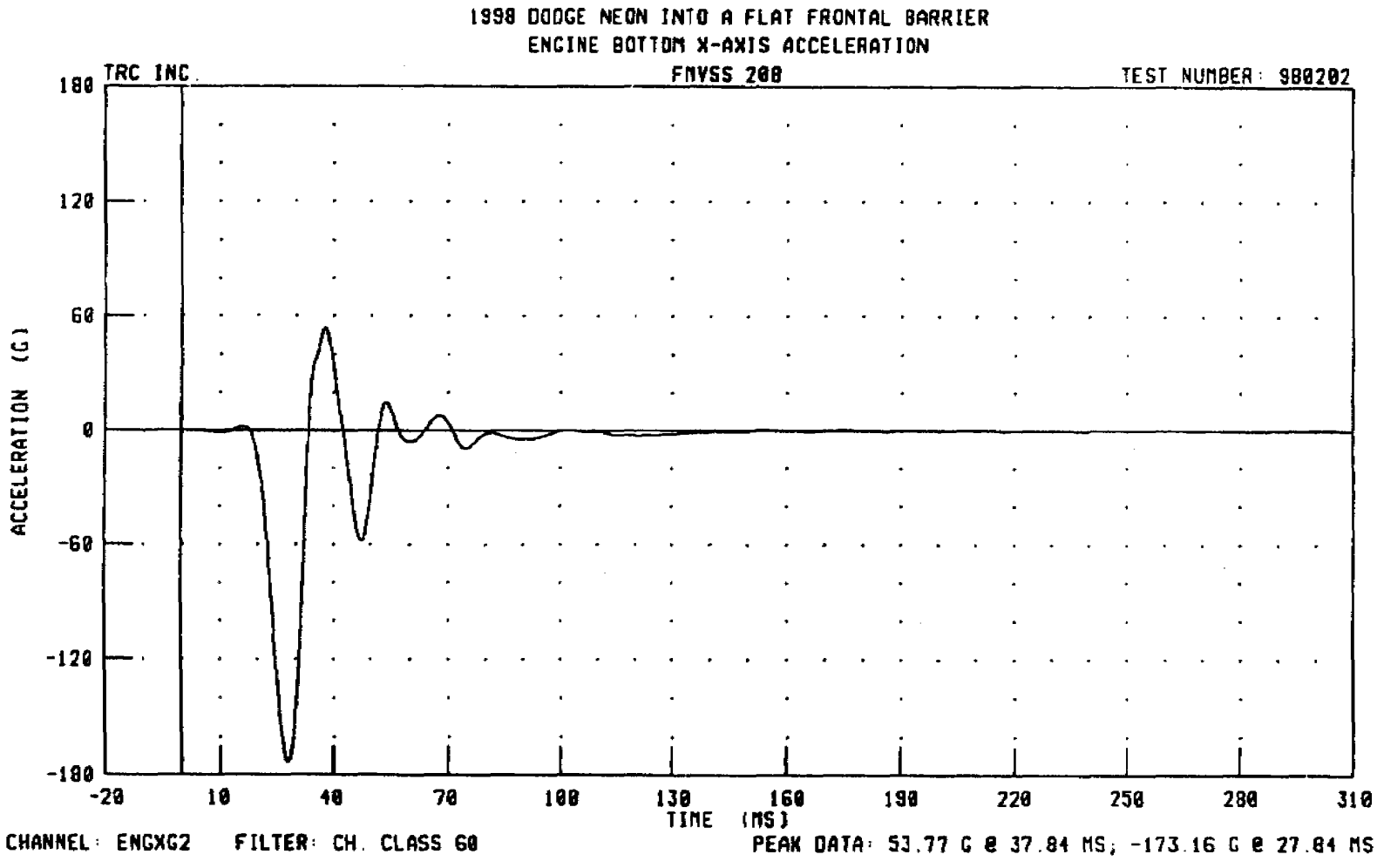

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
TRC INC
FMVSS 208
TEST NUMBER: 980202
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF2
FILTER: CH. CLASS 600
PEAK DATA 213.20 N @ 235.44 MS, -6290.21 N @ 75.28 MS

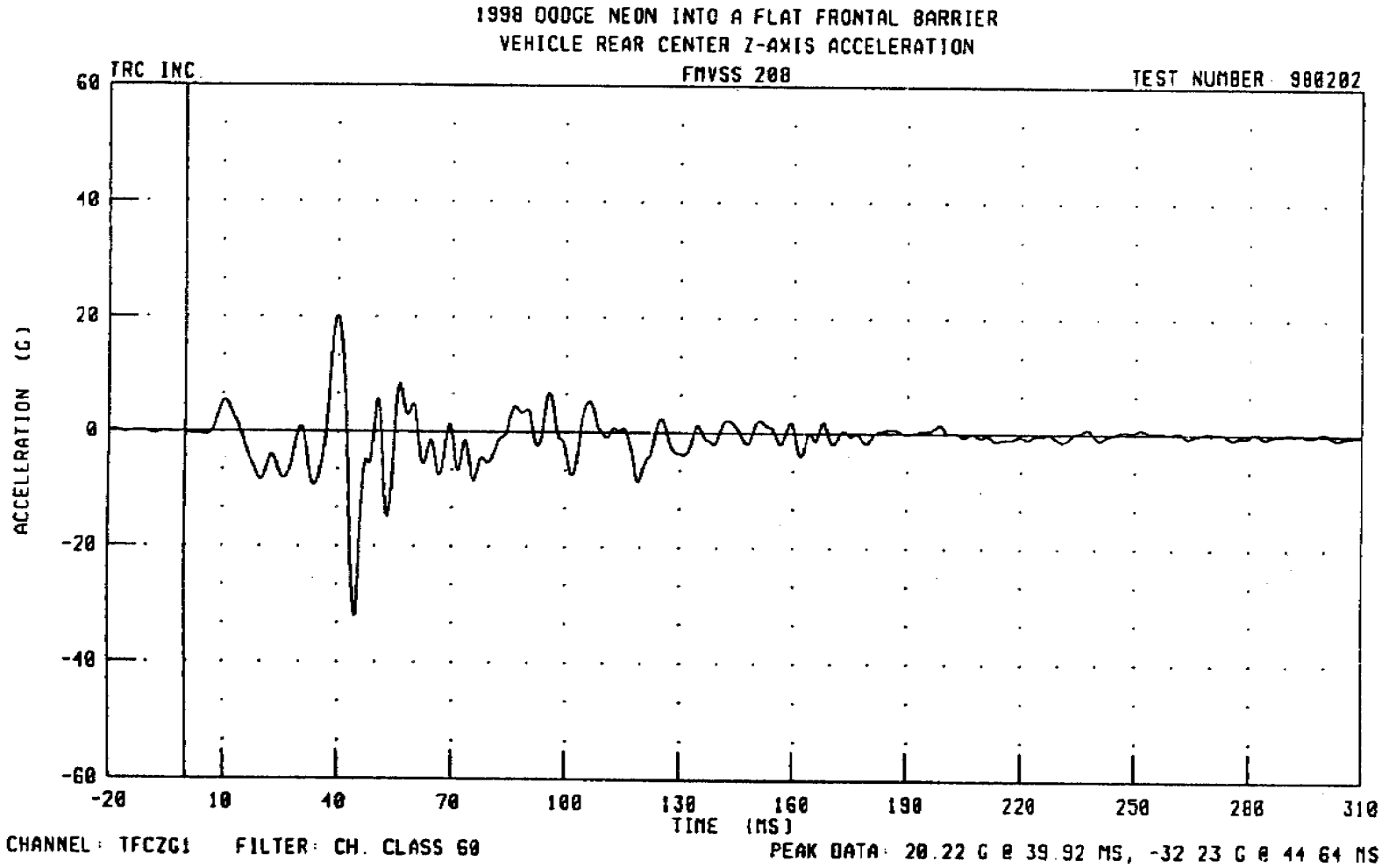

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCLXG1
FILTER: CH. CLASS 60
PEAK DATA: 39.57 G @ 61.44 MS; -88.41 G @ 41.44 MS

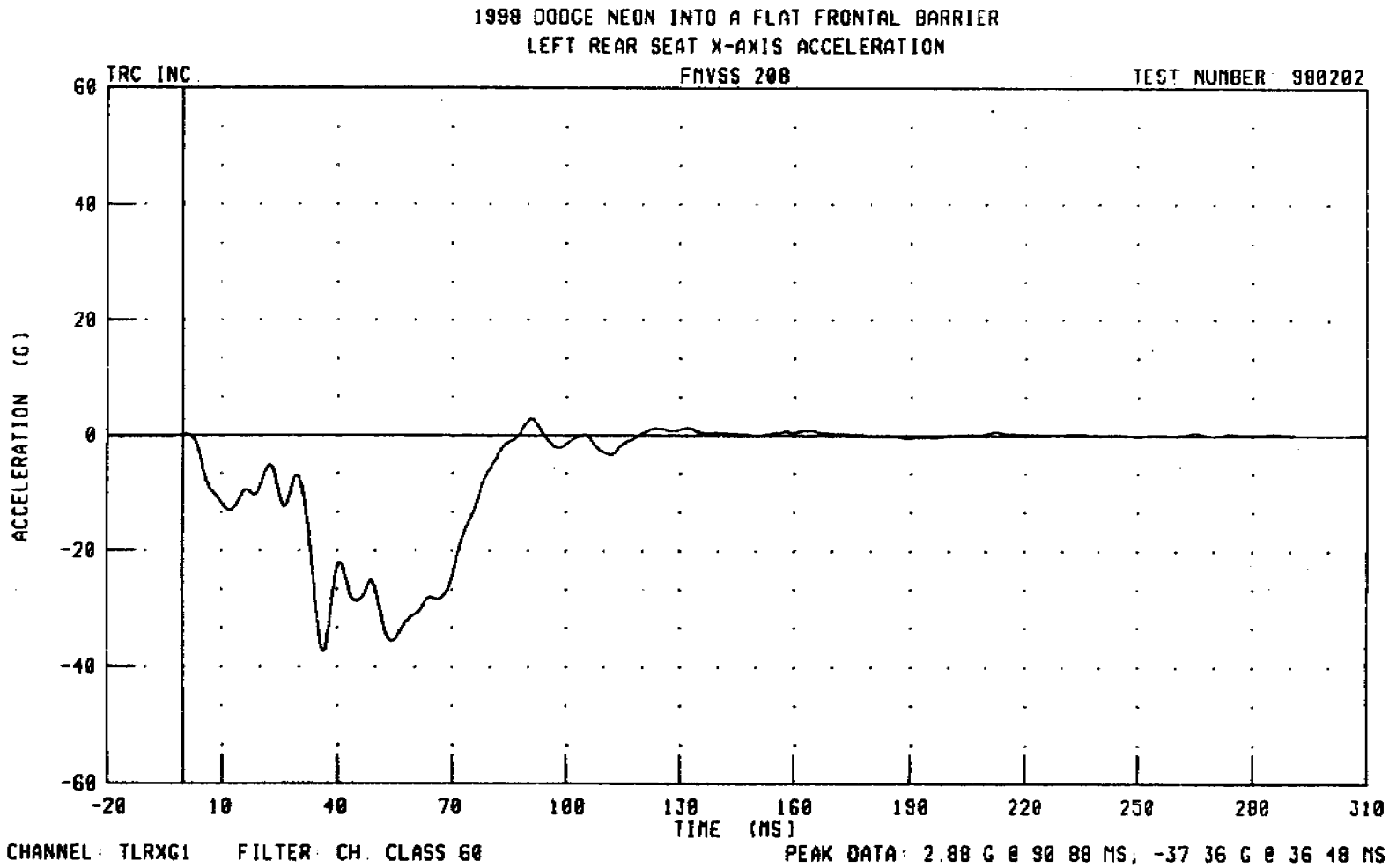

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
FMVSS 208
TRC INC
TEST NUMBER: 980202
120
80
40
0
-40
-80
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCRXG1
FILTER: CH. CLASS 60
PEAK DATA: 47.55 G @ 74.08 MS, -80.72 G @ 50.40 MS

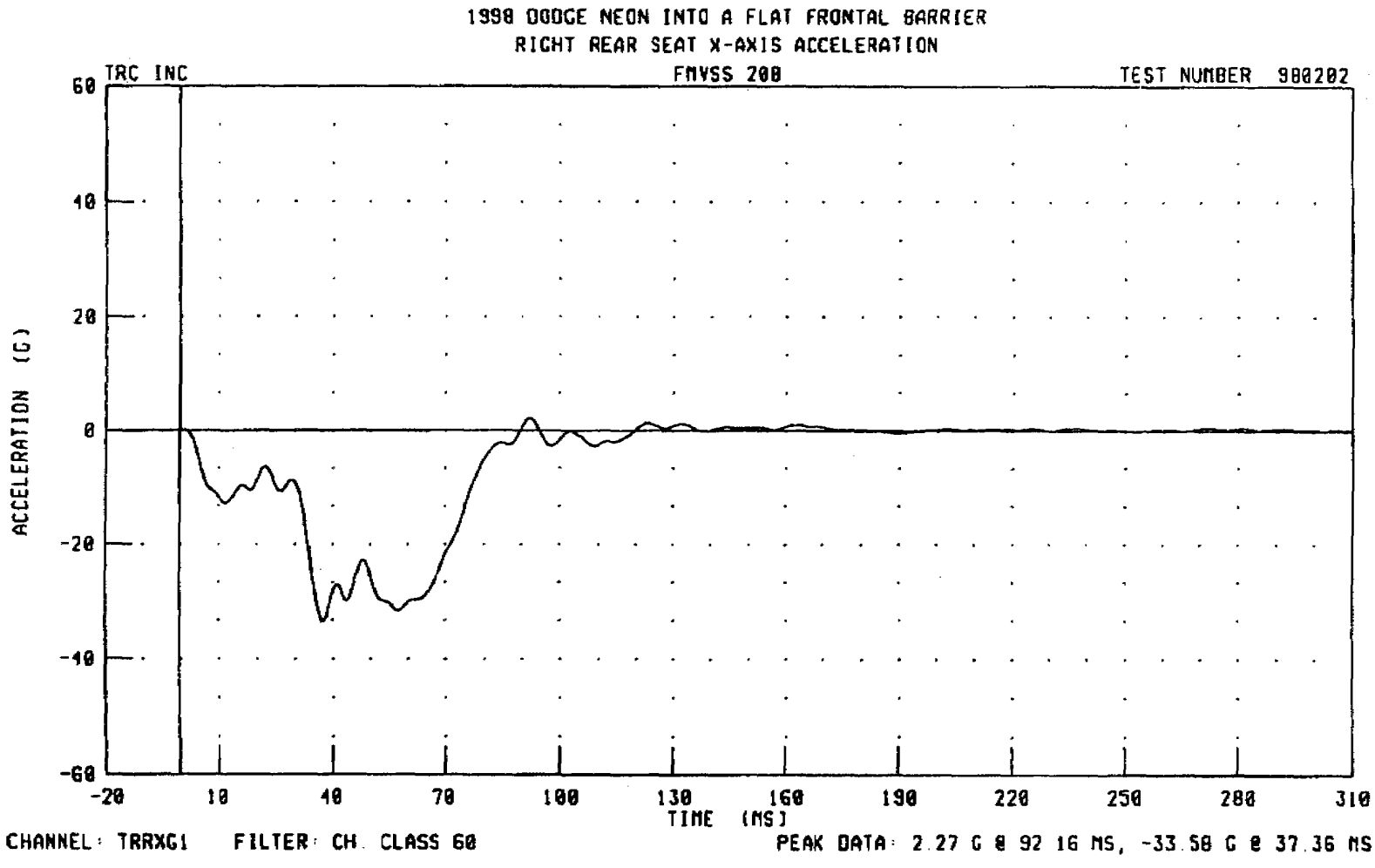

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DASH PANEL CENTER X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 980202
40
20
0
-20
-40
-60
-80
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: DPCXG1
FILTER: CH. CLASS 60
PEAK DATA: 20.70 G @ 31.84 MS; -71.48 G @ 44.56 MS

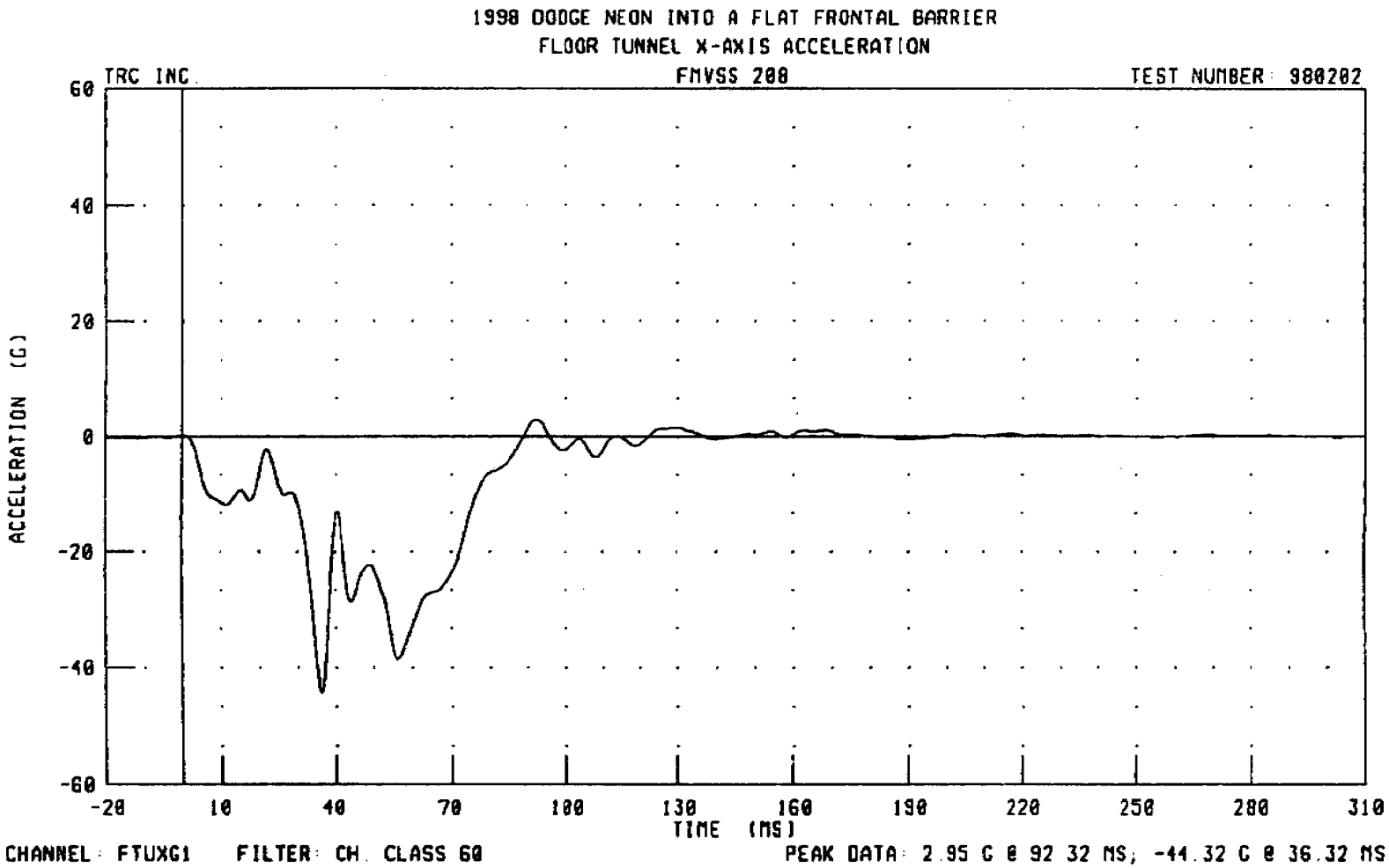

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
ENGINE TOP X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 980202
100
60
20
-20
-60
-100
-140
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXGI
FILTER: CH. CLASS 60
PEAK DATA: 52.68 G @ 48.40 MS; -129.89 G @ 35.20 MS

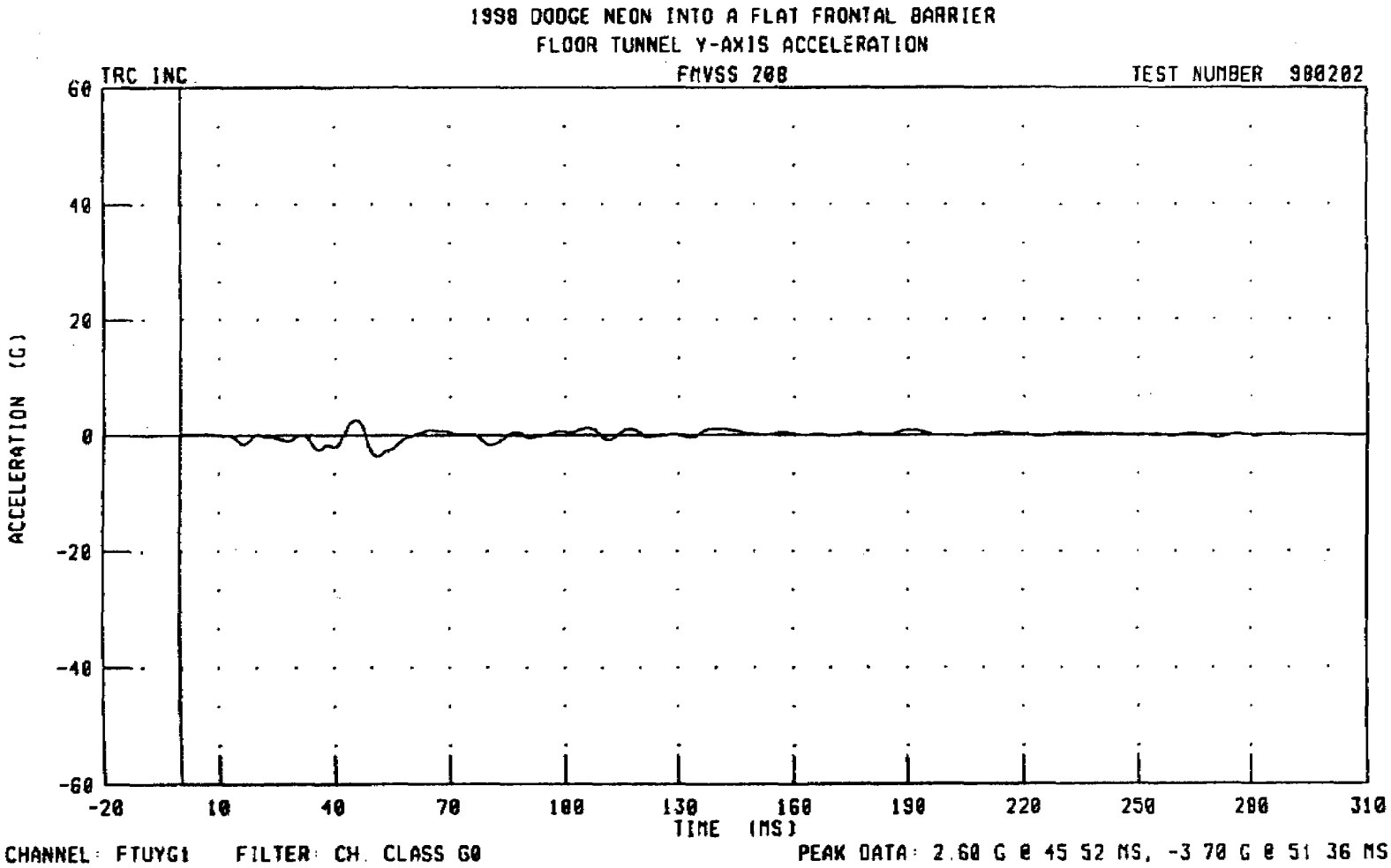

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 980202
180
120
60
0
-60
-120
-180
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG2
FILTER: CH. CLASS 60
PEAK DATA: 53.77 G @ 37.84 MS; -173.16 G @ 27.84 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
VEHICLE REAR CENTER Z-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER 980202
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TFCZG1
FILTER: CH. CLASS 60
PEAK DATA: 20.22 G @ 39.92 MS, -32.23 G @ 44.64 MS

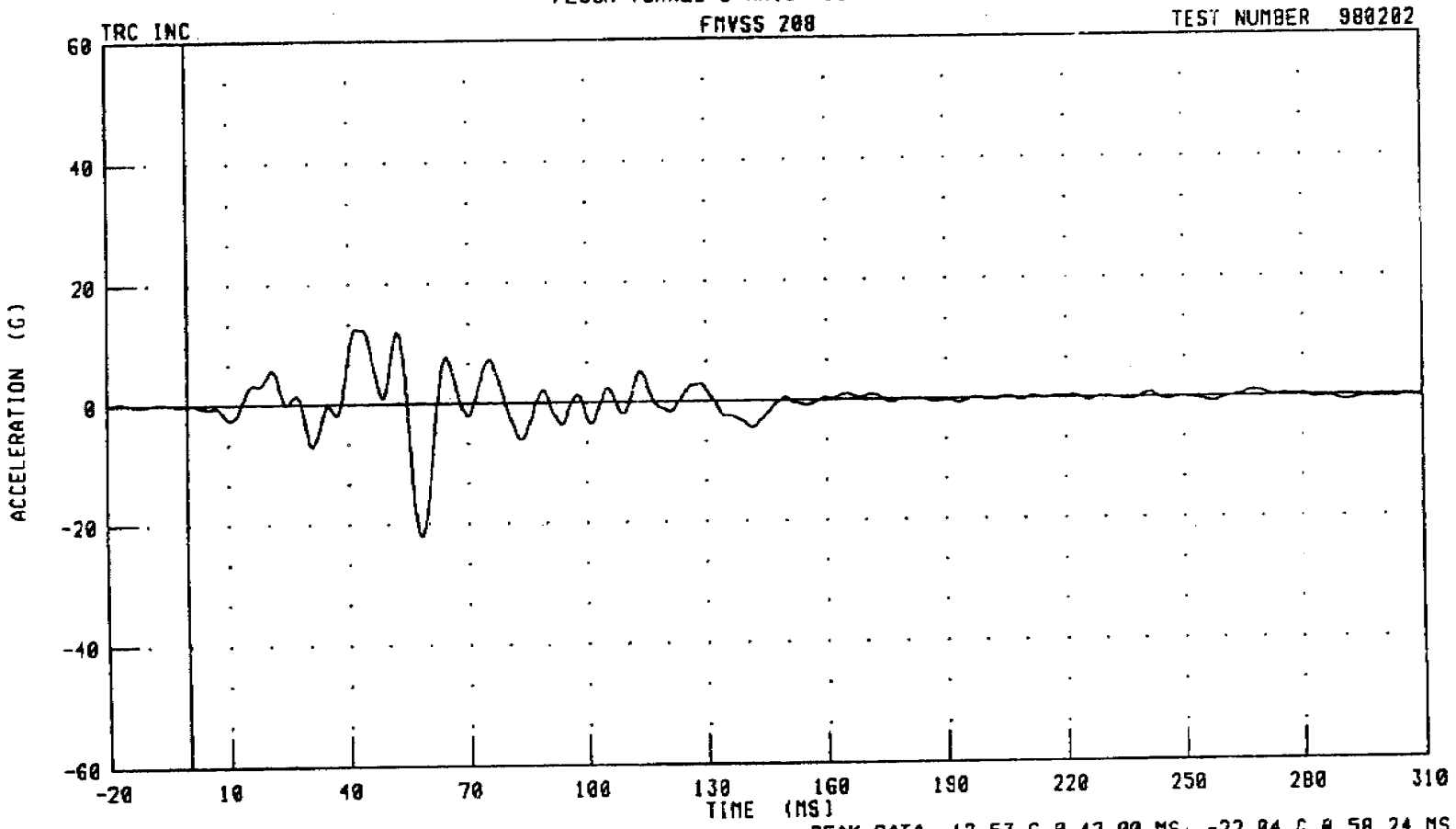

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXG1
FILTER: CH. CLASS 60
PEAK DATA: 2.88 G @ 90.88 MS; -37.36 G @ 36.48 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 980202
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: 2.27 G @ 92.16 MS, -33.58 G @ 37.36 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 980202
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTUXG1
FILTER: CH. CLASS 60
PEAK DATA: 2.95 G @ 92.32 MS; -44.32 G @ 36.32 MS

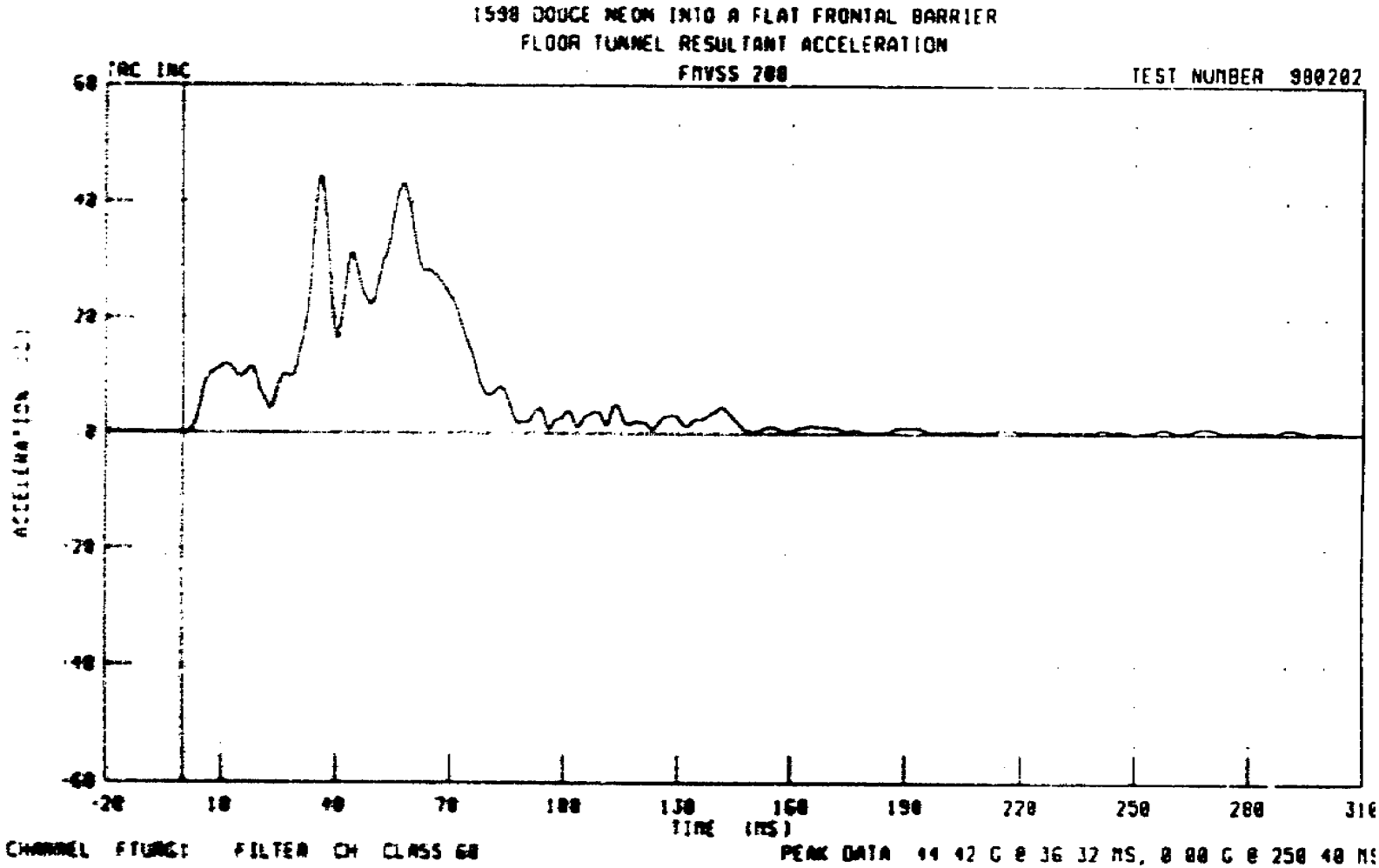

1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL Y-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER 980202
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTUYG1
FILTER: CH. CLASS 60
PEAK DATA: 2.60 G @ 45.52 MS, -3.70 G @ 51.36 MS

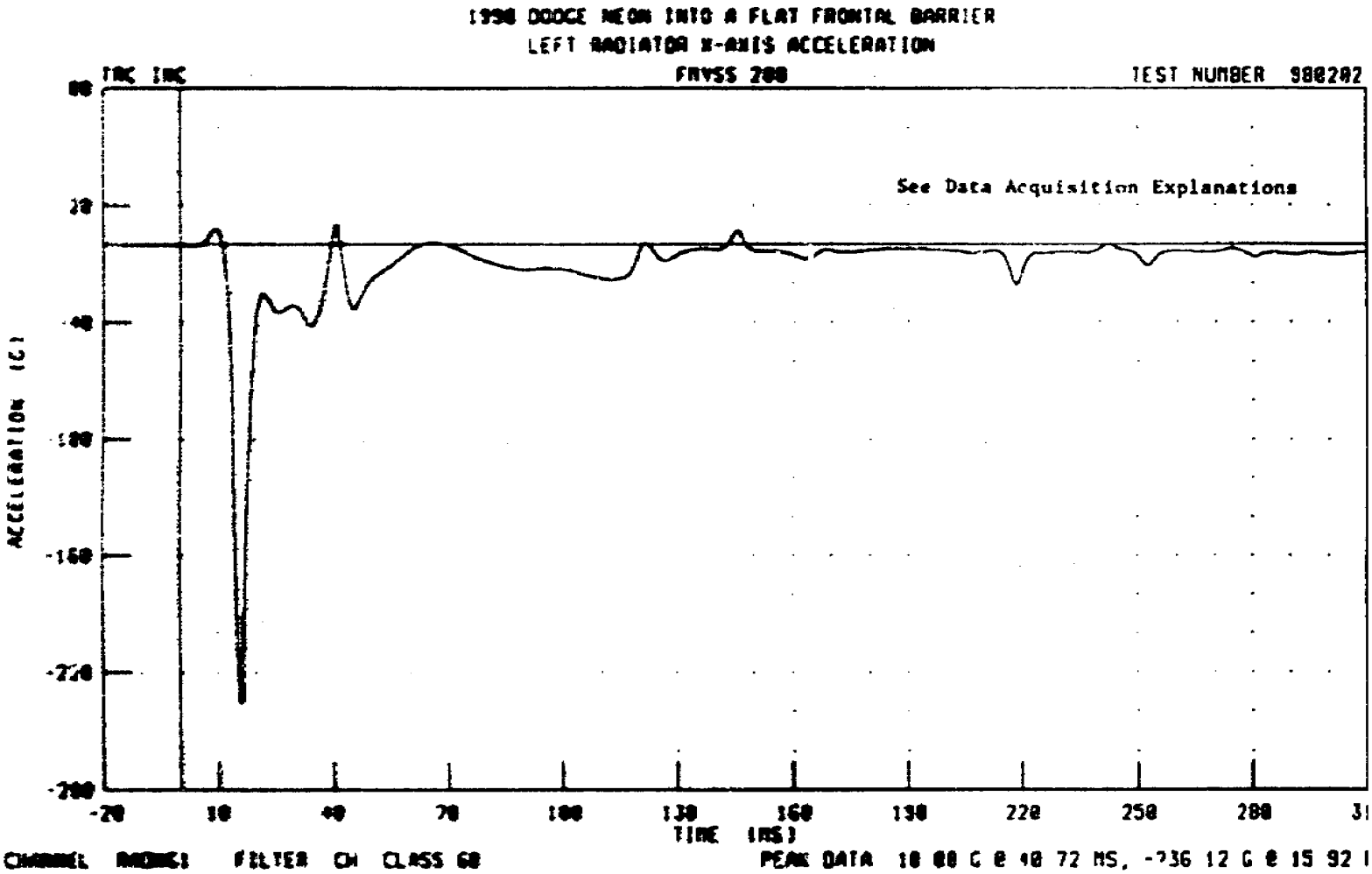
1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL Z-AXIS ACCELERATION
FMVSS 208

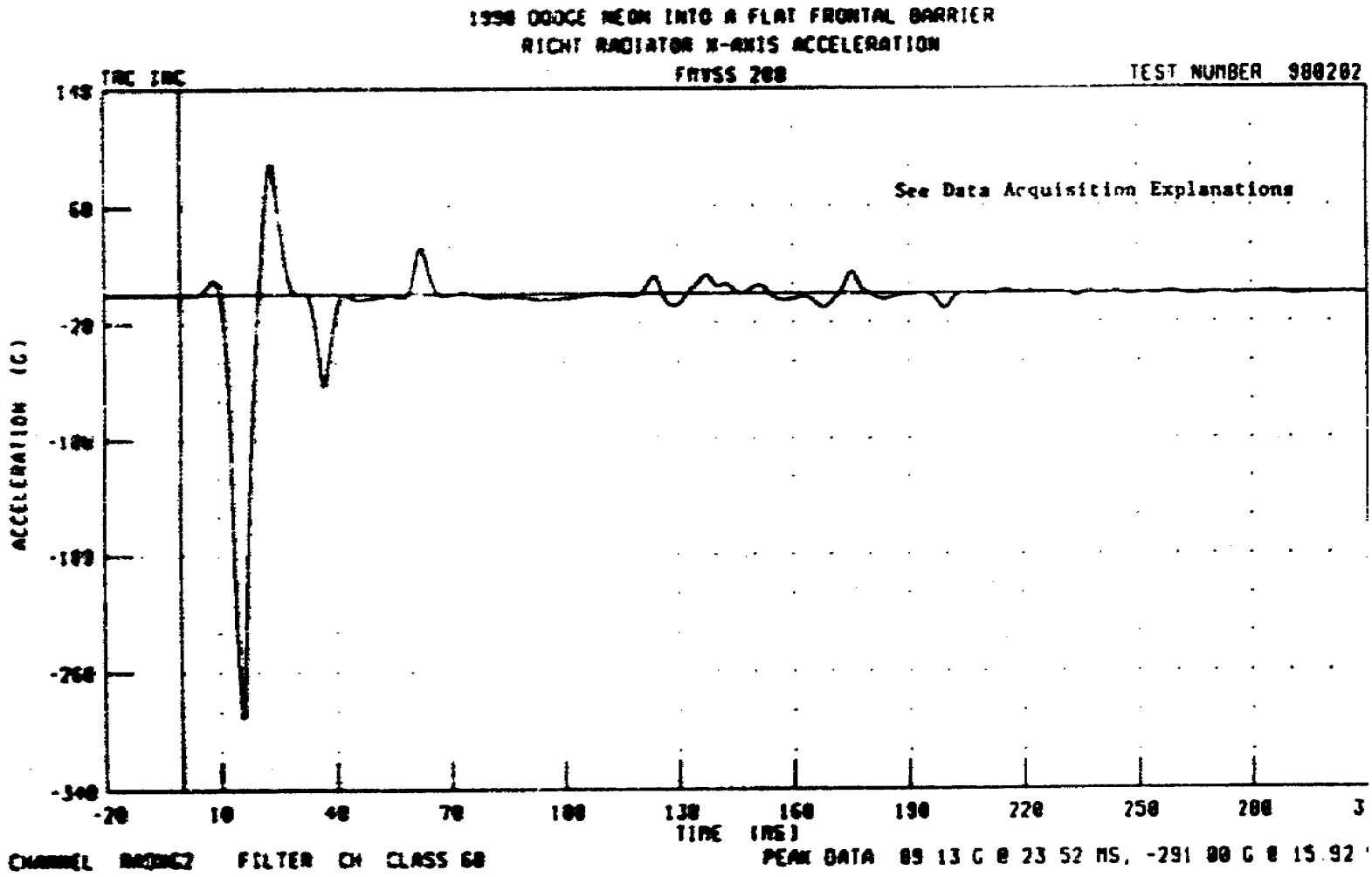


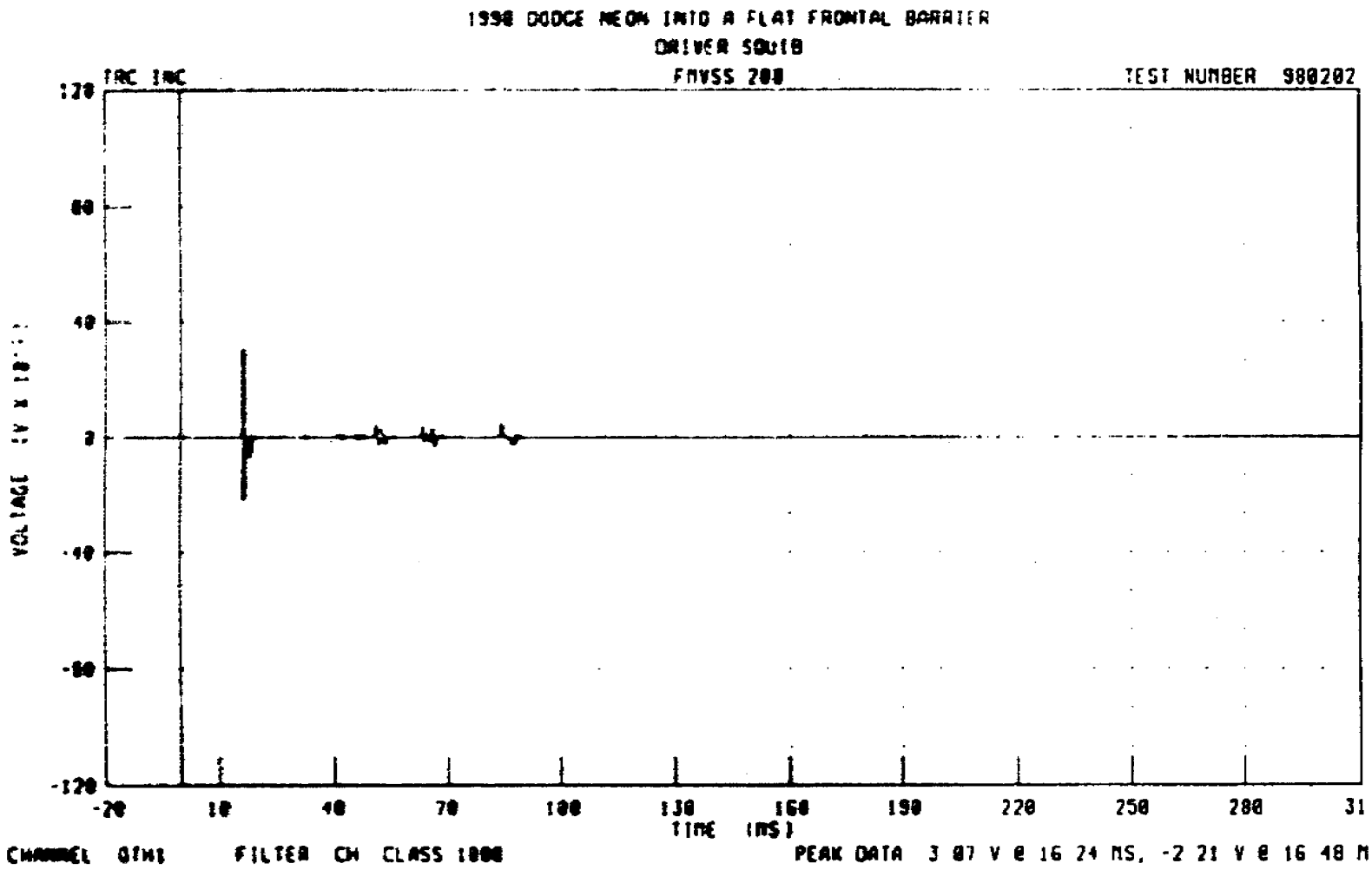
CHANNEL: FTUZG1 FILTER: CH. CLASS 60

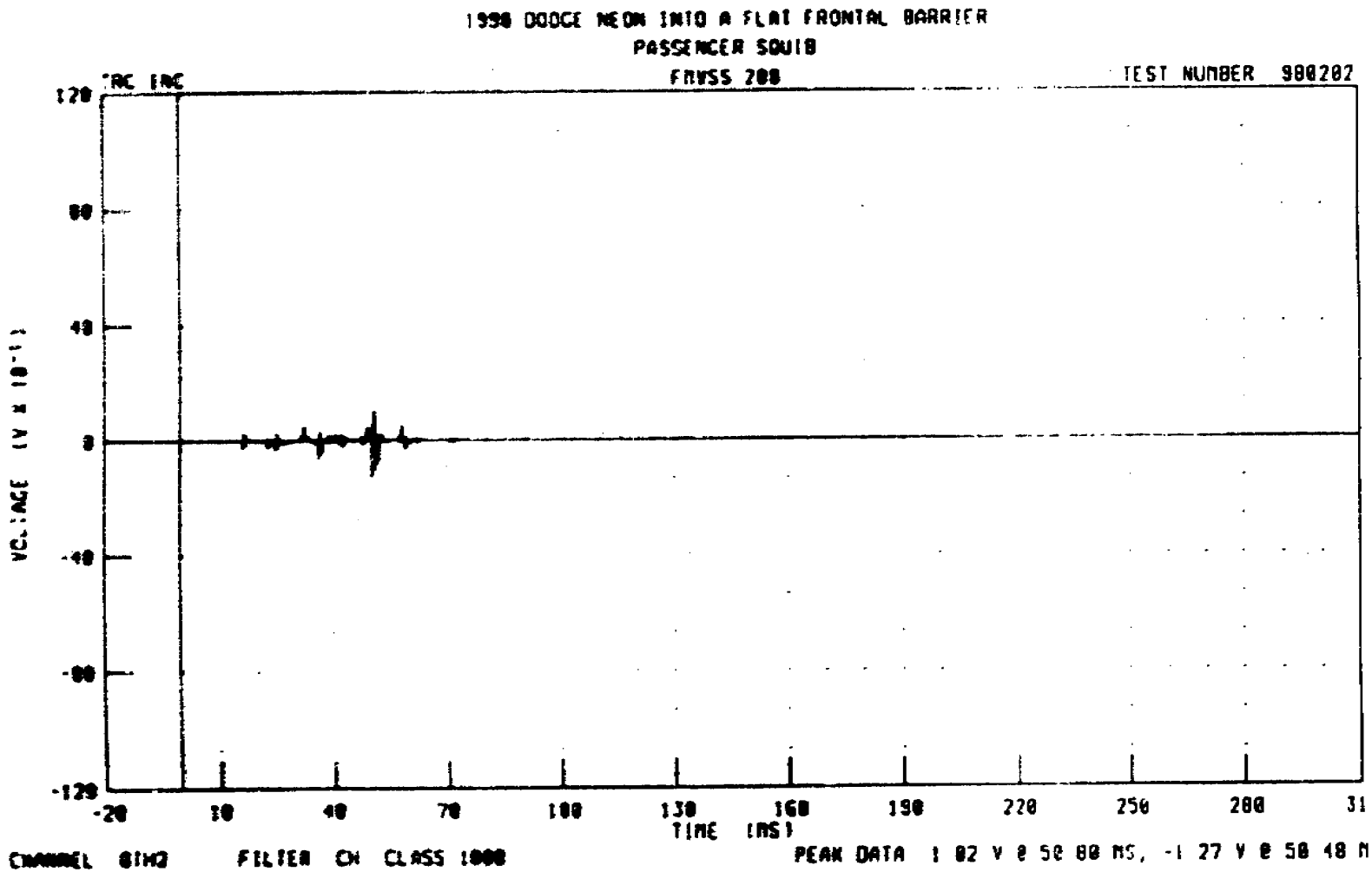
PEAK DATA: 12.53 G @ 42.00 MS; -22.04 G @ 58.24 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL RESULTANT ACCELERATION
FMVSS 208
TEST NUMBER 980202
INC INC
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL FTUNGI FILTER CH CLASS 60
PEAK DATA 44.42 G @ 36.32 MS, 0.00 G @ 250.40 MS


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
LEFT RADIATOR X-AXIS ACCELERATION
FRVSS 208
TEST NUMBER 980202
See Data Acquisition Explanations
ACCELERATION (G)
TIME (MS)
-20
10
40
70
100
130
160
190
220
250
280
FILTER CH CLASS 60
PEAK DATA


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
RIGHT RADIATOR X-AXIS ACCELERATION
FMVSS 208
TEST NUMBER 980202
TRC IRC
See Data Acquisition Explanations
ACCELERATION (G)
60
-20
-100
-200
-300
-20
10
40
70
100
130
160
190
220
250
280
TIME (MS)
CHANNEL R0206Z FILTER CH CLASS 60
PEAK DATA 89 13 G @ 23 52 MS, -291 00 G @ 15 92


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
DRIVER SQUIB
FMVSS 208
TEST NUMBER 980202
FRC INC
120
80
40
0
-40
-80
-120
-20
10
40
70
100
130
160
190
220
250
280
TIME (MS)
CHANNEL 01H1
FILTER CH CLASS 1000
PEAK DATA 3 07 V @ 16 24 MS, -2 21 V @ 16 48 M


1998 DODGE NEON INTO A FLAT FRONTAL BARRIER
PASSENGER SQUIB
FMVSS 208
TEST NUMBER 980202
TAC ENG
120
80
40
0
-40
-80
-120
VOLTAGE (V x 10⁻¹)
-20
10
40
70
100
130
160
190
220
250
280
TIME (MS)
CHANNEL 01H2
FILTER CH CLASS 1000
PEAK DATA 1 82 V @ 50 80 MS, -1 27 V @ 50 48 M

Appendix C

Dummy Certification

Dummy Certification

Driver Dummy S/N 169

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
SN169 VECTOR 17-DEC-97

TRC INC. TEST NO: 169C01ED1 572E SN169 EXT.DIMENSION CAL01

TEST PARAMETER (DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)	429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)	226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)	970 -1001 MM	988. MM
WAIST CIRCUMFERENCE (Z)	836 - 866 MM	866. MM
CHEST DEPTH (O)	213 - 229 MM	218. MM
H-POINT HEIGHT (C)	84 - 89 MM	89. MM
H-POINT FROM SEATBACK (D)	135 - 140 MM	135. MM
SKULL CAP TO BACKLINE (H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)	879 - 889 MM	881. MM
THIGH CLEARANCE (F)	140 - 155 MM	147. MM
BUTTOCK KNEE LENGTH (K)	579 - 605 MM	594. MM
BUTTOCK POPLITEAL LENGTH (N)	452 - 478 MM	470. MM
POPLITEAL HEIGHT (L)	429 - 455 MM	447. MM
KNEE PIVOT HEIGHT (M)	485 - 500 MM	498. MM
FOOT LENGTH (P)	252 - 267 MM	259. MM
FOOT BREADTH (W)	91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)	84 - 94 MM	91. MM
SHOULDER BREADTH (V)	422 - 437 MM	434. MM
SHOULDER PIVOT HEIGHT (B)	506 - 521 MM	515. MM
ELBOW REST HEIGHT (J)	191 - 211 MM	198. MM
SHOULDER-ELBOW LENGTH (I)	330 - 345 MM	335. MM
BACK OF ELBOW TO WAIST PIVOT (G)	290 - 305 MM	300. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN [signature] RUN NUMBER: 012998.1321

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

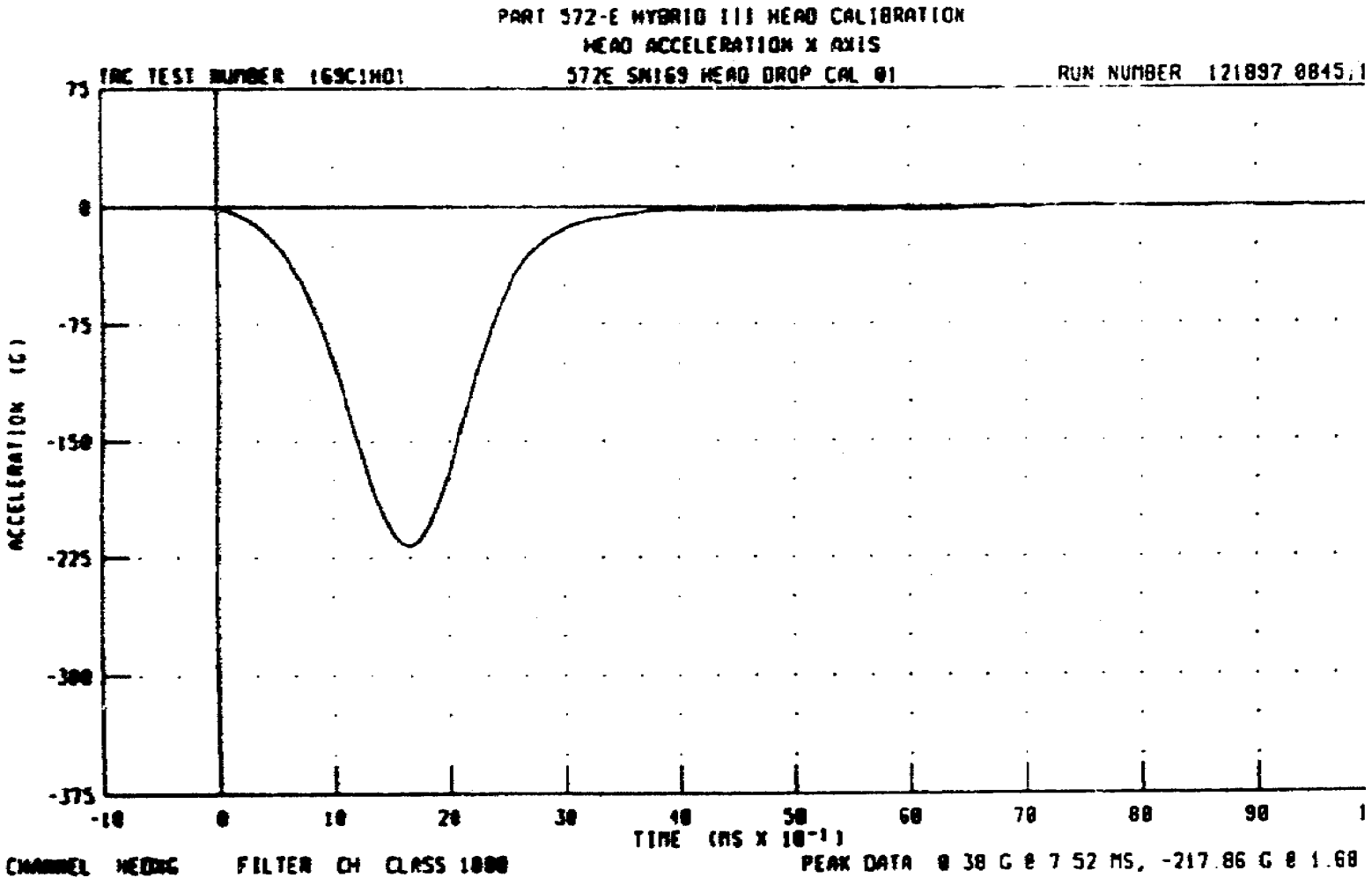
TRC INC. TEST NO: 169C1HD1 572E SN169 HEAD DROP CAL 01

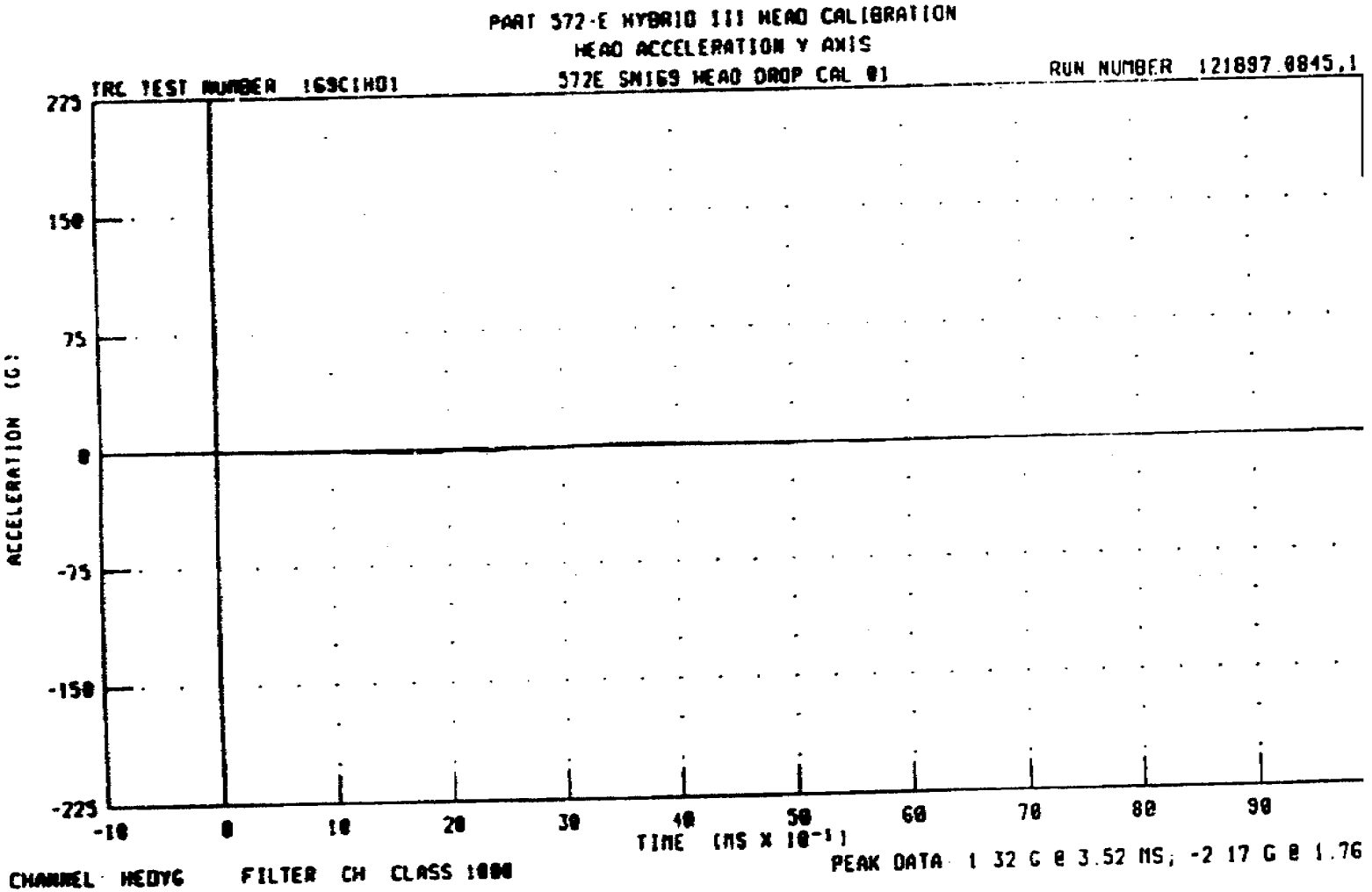
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.34 G
PEAK LATERAL ACCELERATION	1[illegible] G MAX	-2.16 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

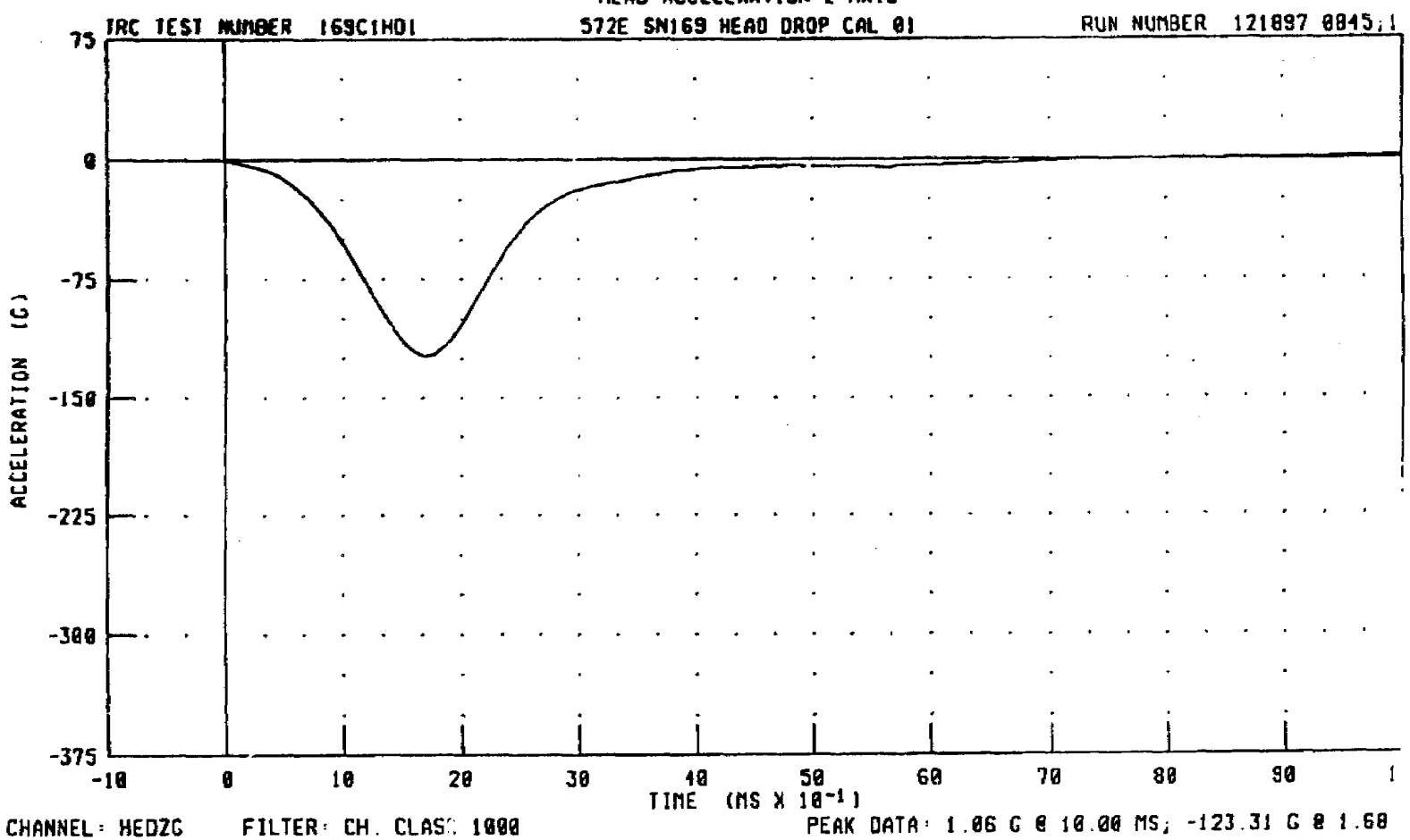
TECHNICIAN [signature]

RUN NUMBER: 121897.0845;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER (69C1H01
572E SN169 HEAD DROP CAL 01
RUN NUMBER 121897 0845.1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
1
TIME (MS X 10⁻¹)
CHANNEL HEDXG
FILTER CH CLASS 1000
PEAK DATA @ 38 G @ 7 52 MS, -217.86 G @ 1.68

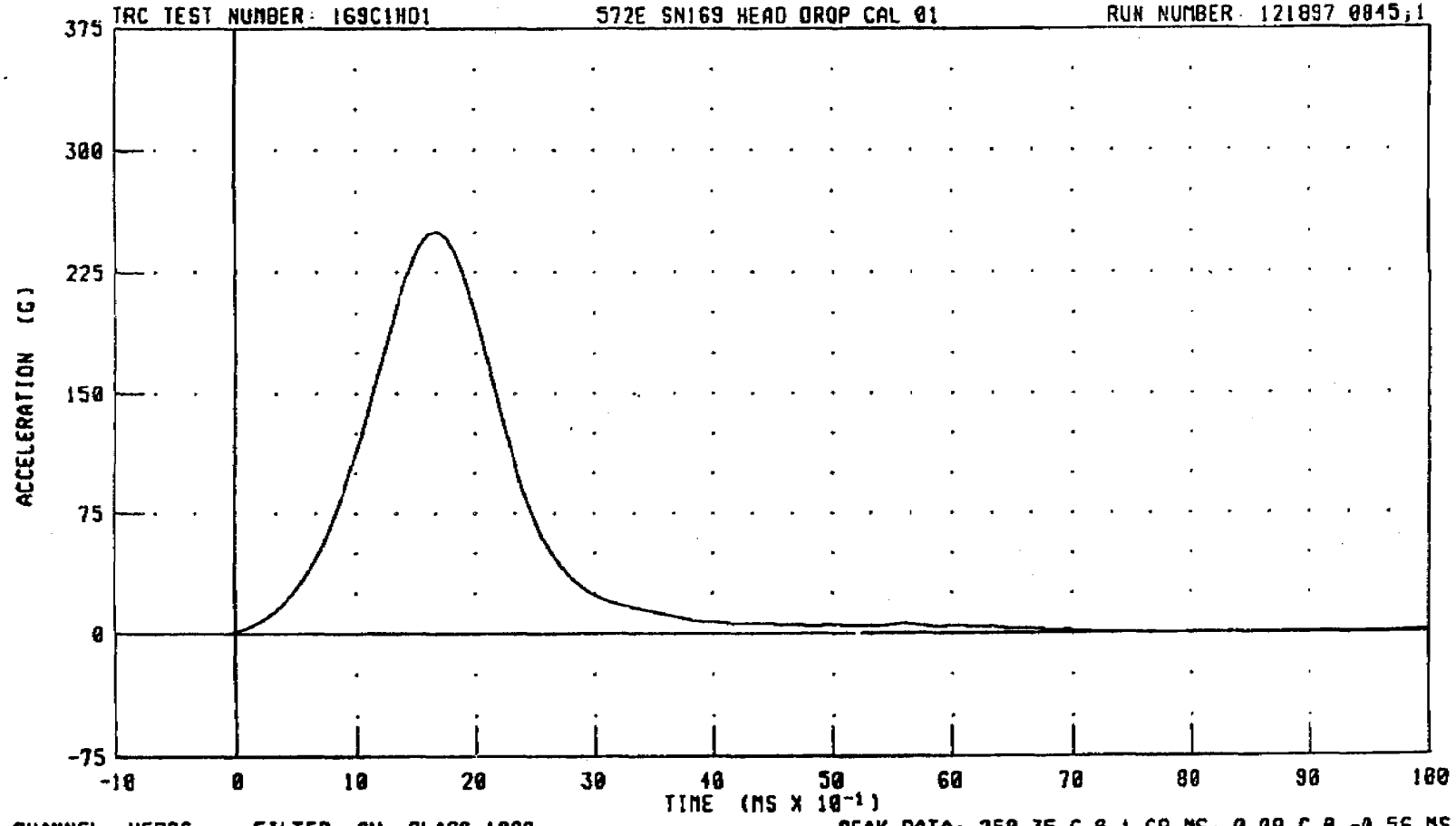

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER 169C1H01
572E SN169 HEAD DROP CAL 01
RUN NUMBER 121897.0845.1
ACCELERATION (G)
225
150
75
0
-75
-150
-225
-10
0
10
20
30
40
50
60
70
80
90
TIME (MS X 10⁻¹)
CHANNEL HEDYG FILTER CH CLASS 1000
PEAK DATA 1 32 G @ 3.52 MS; -2 17 G @ 1.76

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



PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 169C1HD1 572E SN169 HEAD DROP CAL 01 RUN NUMBER 121897 0845;1



CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 250.35 G @ 1.68 MS; 0.00 G @ -0.56 MS

TRANSPORTATION RESEARCH CENTER INC.

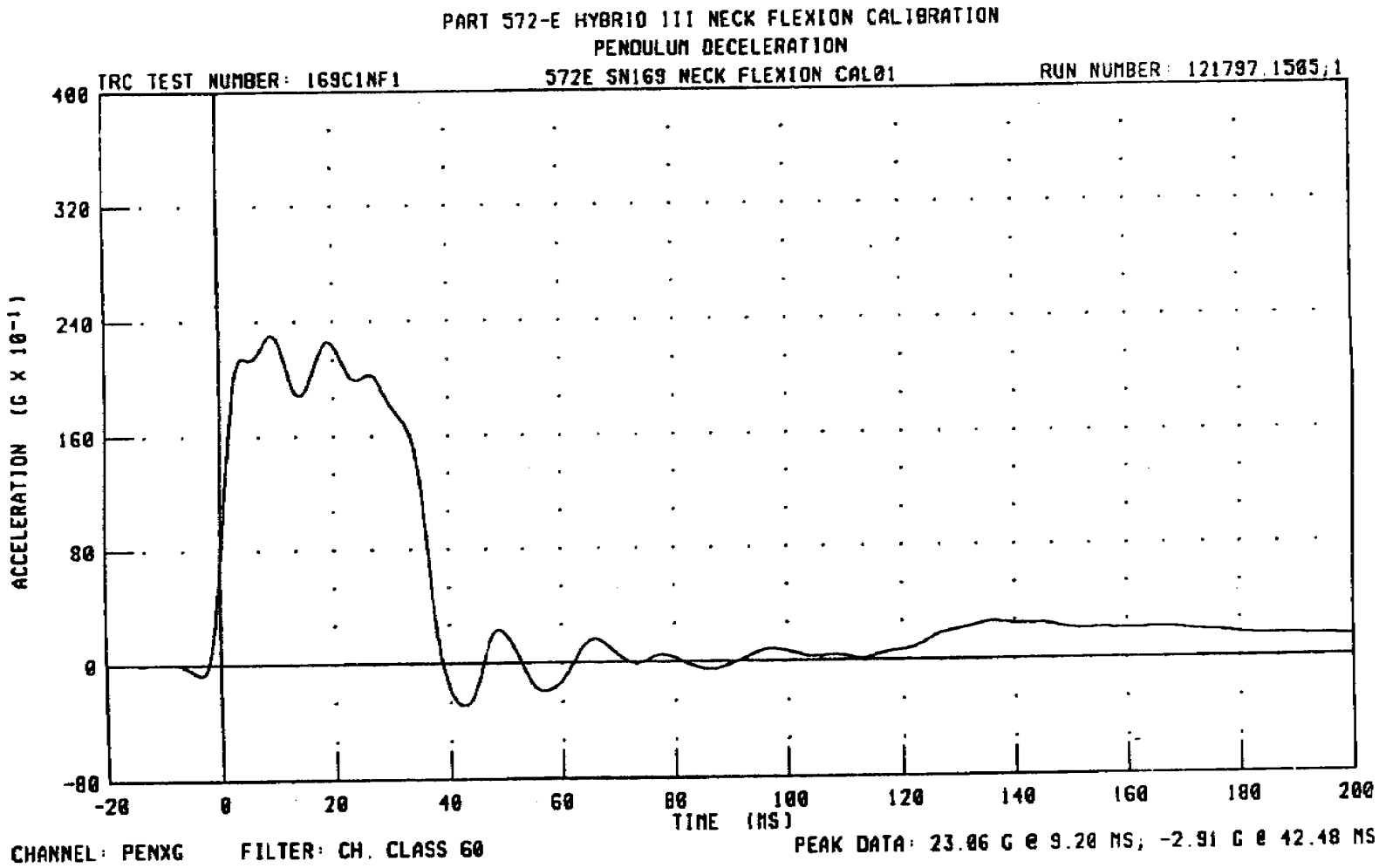
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C1NF1 572E SN169 NECK FLEXION CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	35.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.79 G
	20 MS	17.60 - 22.60 G	22.33 G
	30 MS	12.50 - 18.50 G	18.07 G
MAX PENDULUM G		29 G MAX	23.06 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	18.02 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.04 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	72.14 DEG.
	TIME	57 - 64 MS	60.32 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	89.65 NM
	TIME	47 - 58 MS	50.08 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.52 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.36 MS

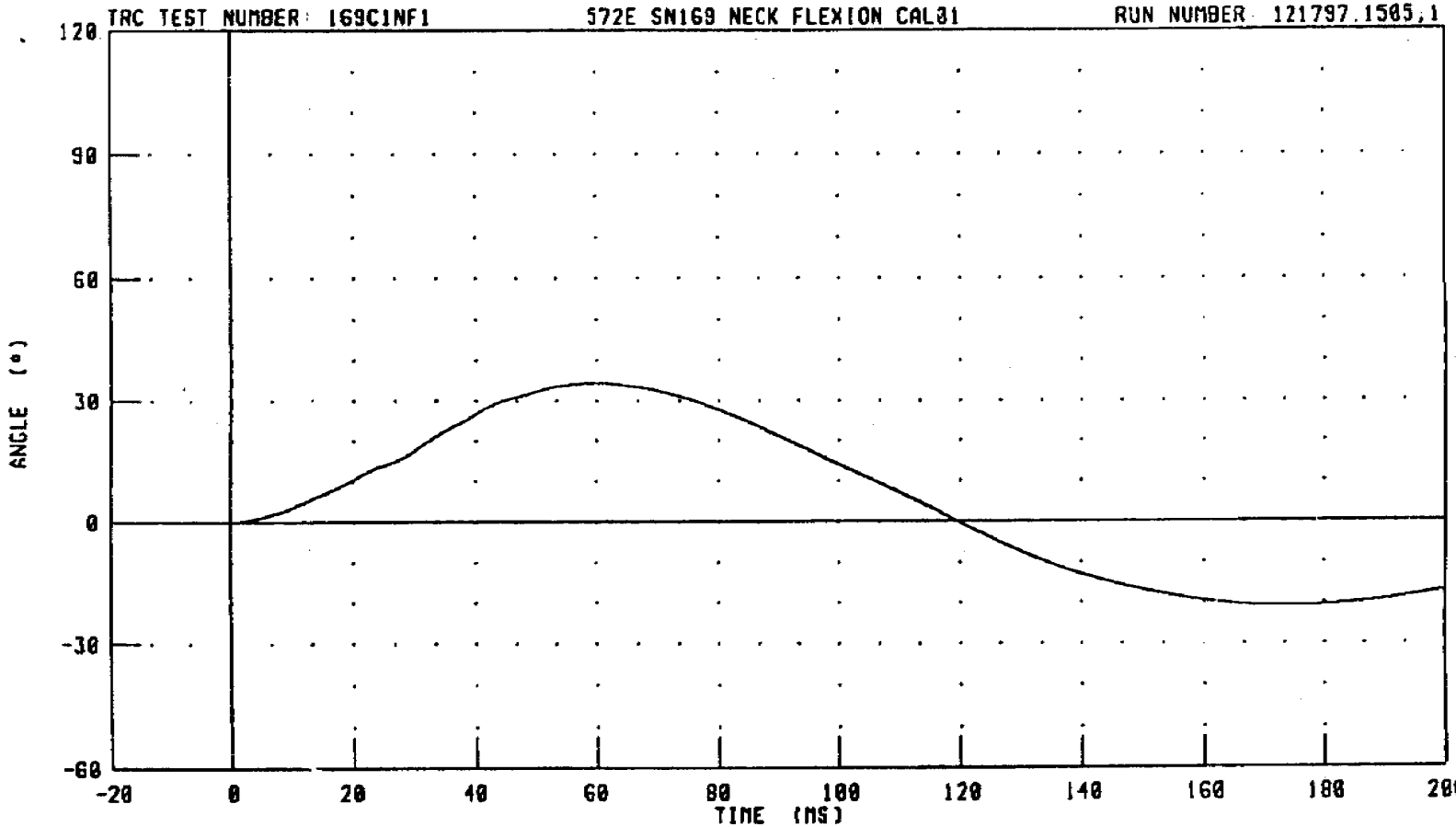
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claridge RUN NUMBER: 121797.1505;1


PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 169C1NF1
572E SN169 NECK FLEXION CAL01
RUN NUMBER: 121797.1505;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: 23.06 G @ 9.20 MS; -2.91 G @ 42.48 MS

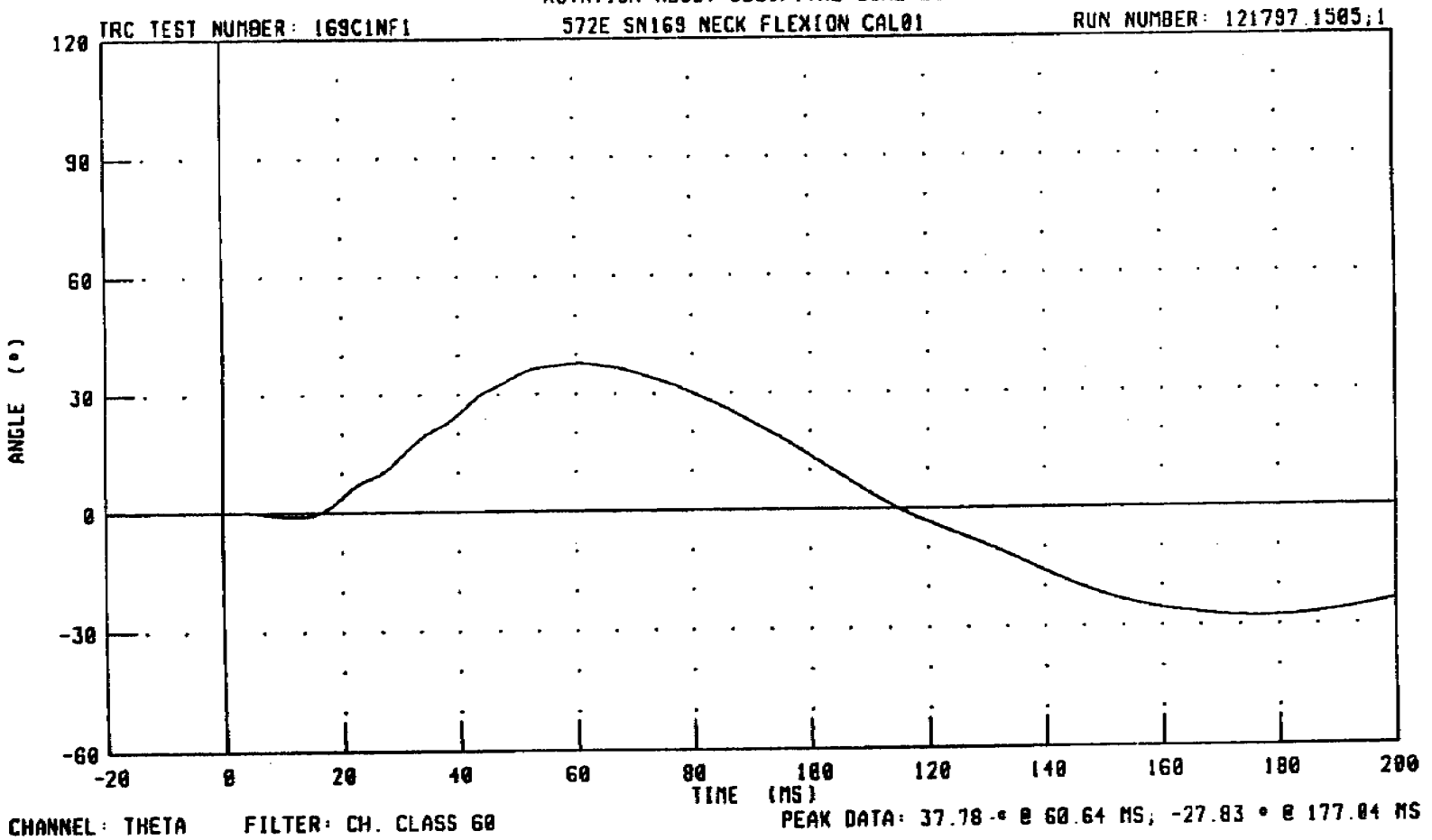
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 169C1NF1 572E SN169 NECK FLEXION CAL01 RUN NUMBER: 121797.1505.1

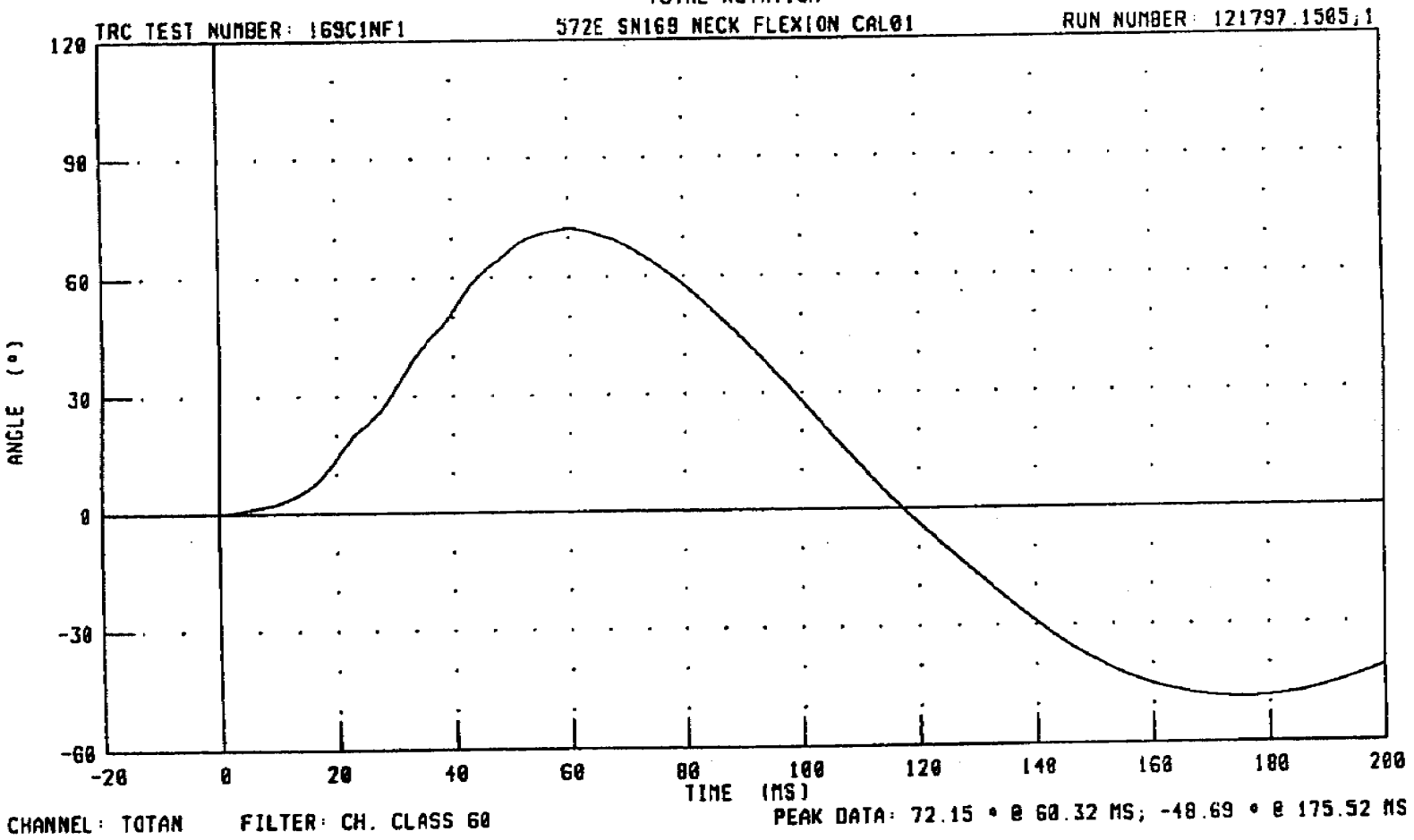


CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 34.38 ° @ 59.92 MS; -20.91 ° @ 173.52 MS

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

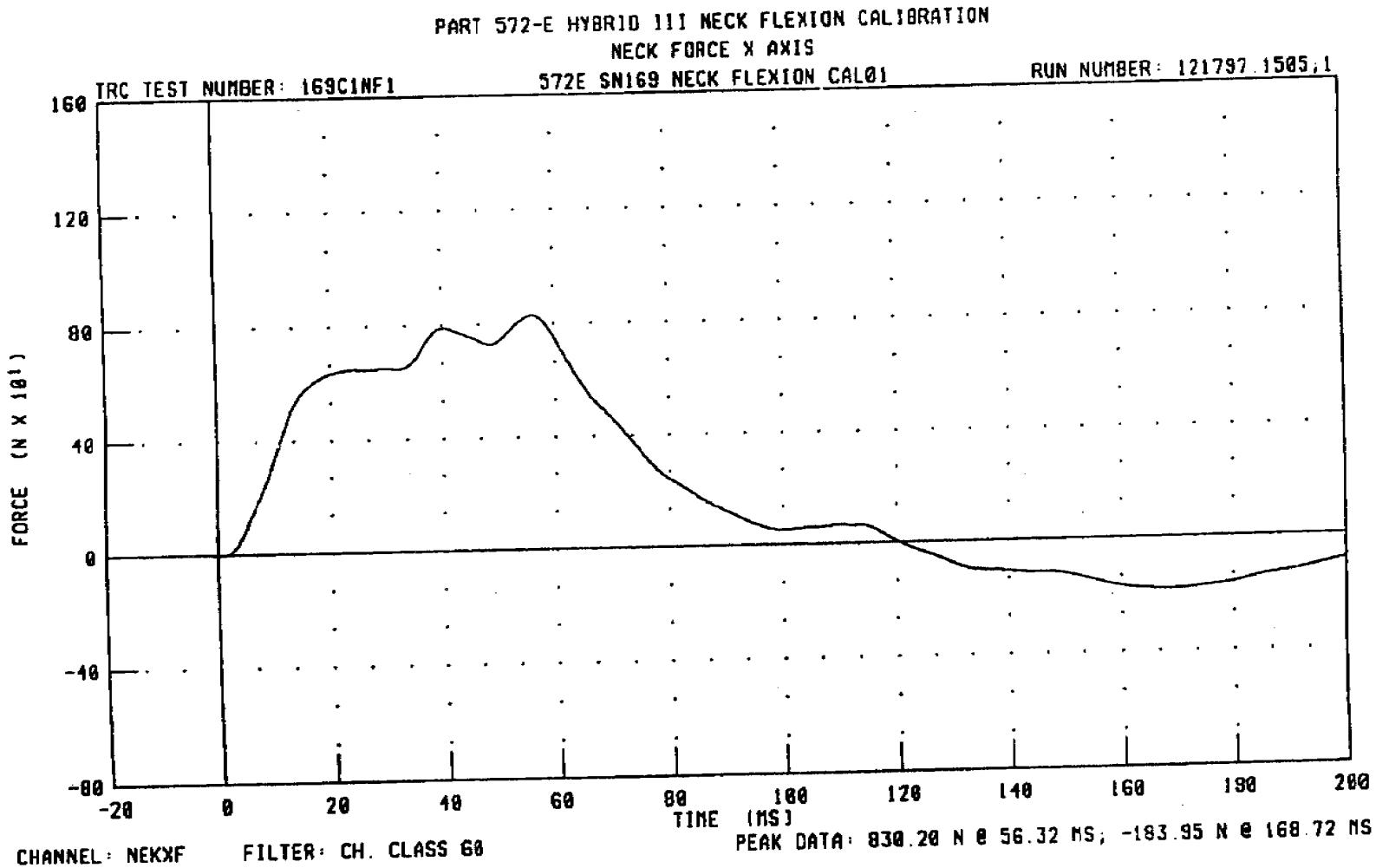


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

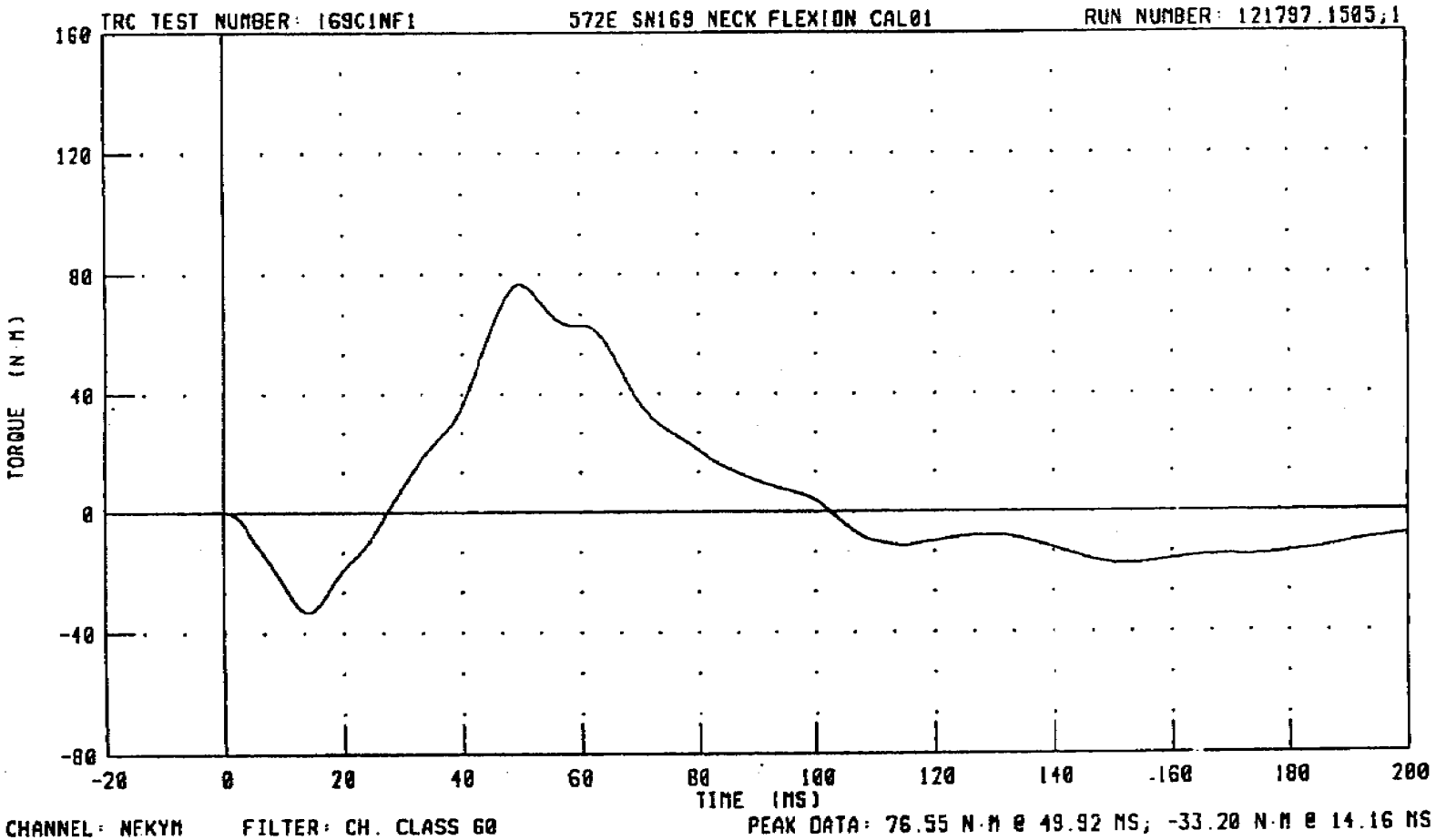


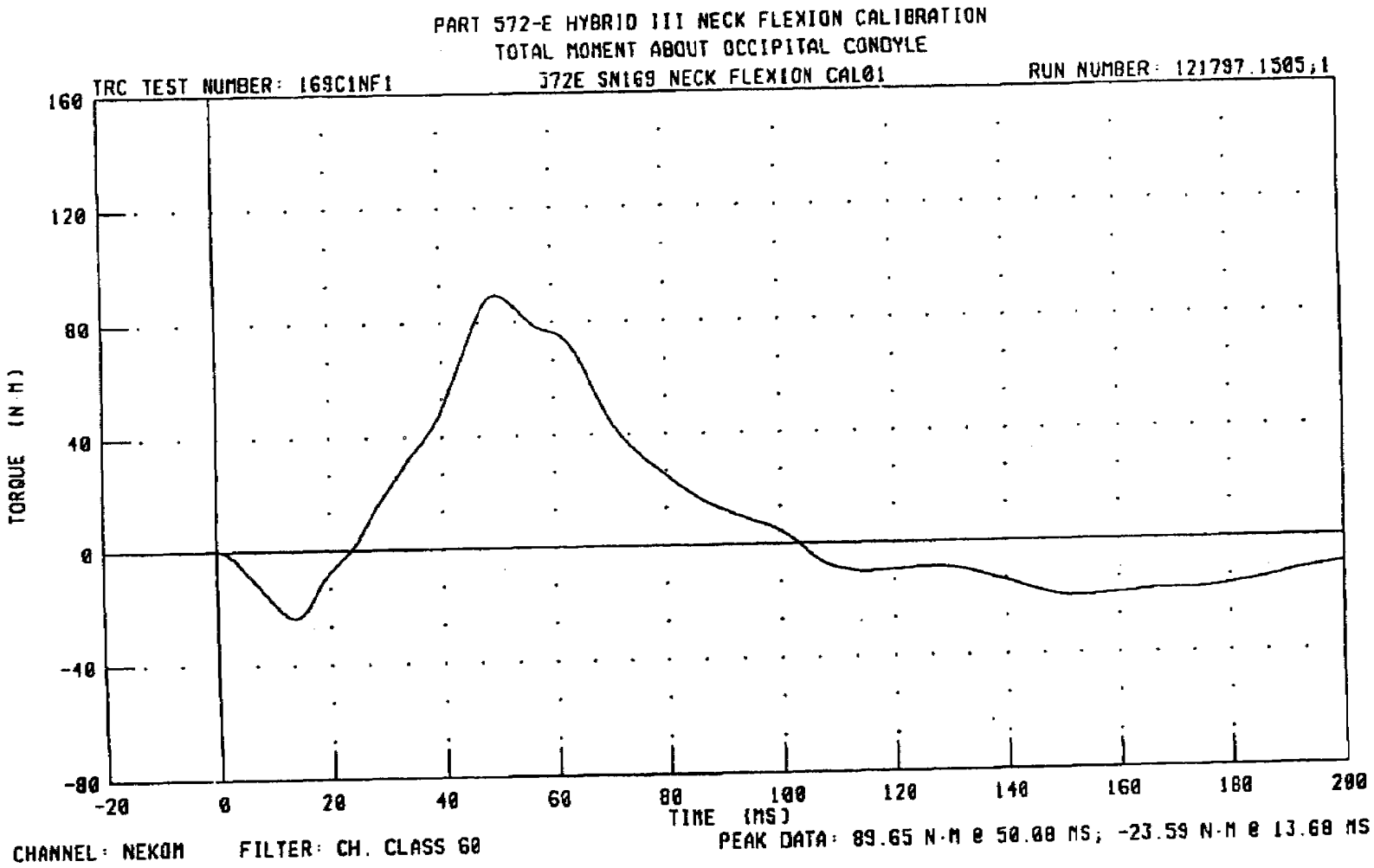
CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 72.15 ° @ 60.32 MS; -48.69 ° @ 175.52 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 169C1NF1
572E SN169 NECK FLEXION CAL01
RUN NUMBER: 121797.1505;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: 830.20 N @ 56.32 MS; -183.95 N @ 168.72 MS

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




PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 169C1NF1
J72E SN169 NECK FLEXION CAL01
RUN NUMBER: 121797.1505;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: 89.65 N-M @ 50.00 MS; -23.59 N-M @ 13.68 MS

TRANSPORTATION RESEARCH CENTER INC.

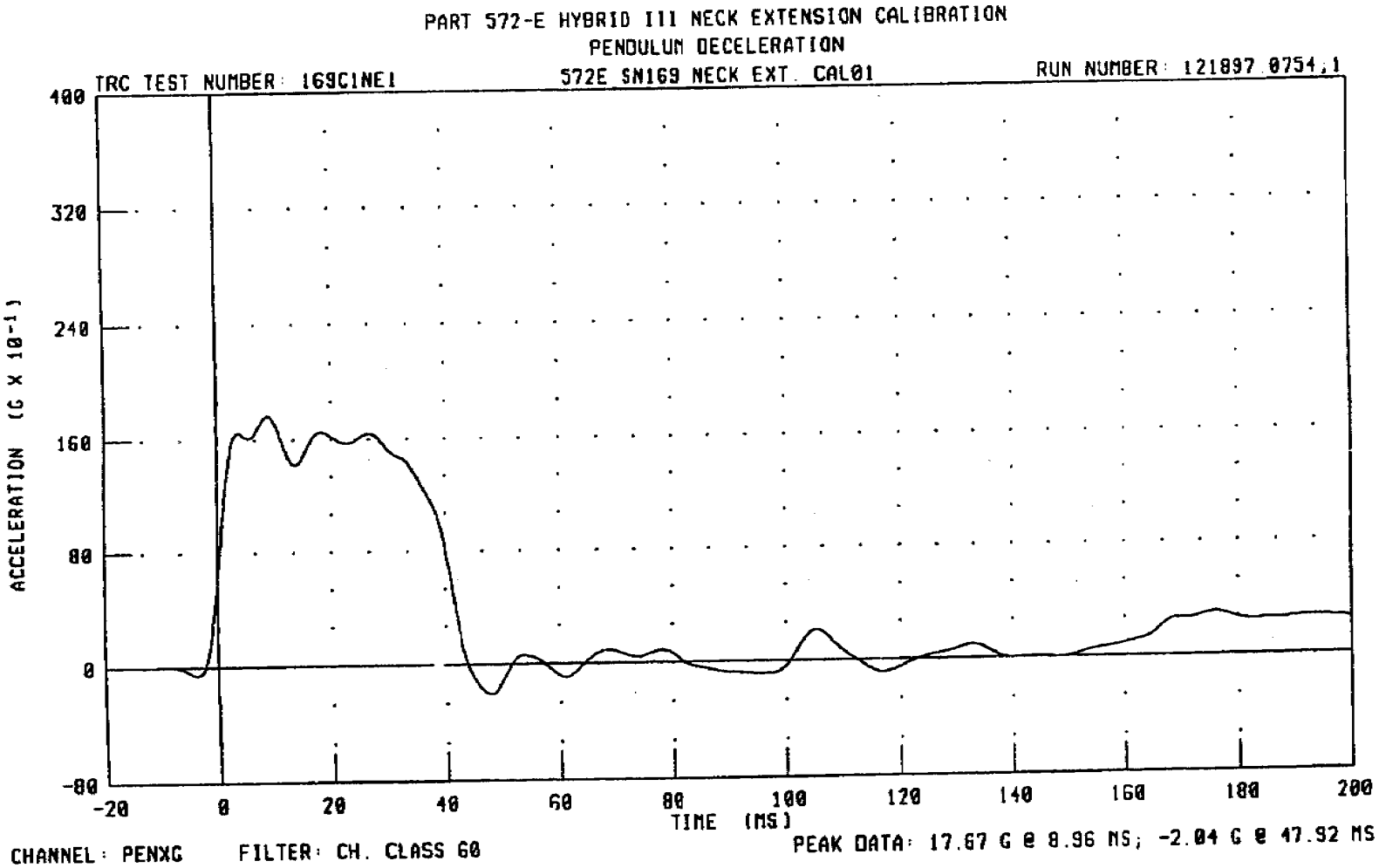
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C1NE1 572E SN169 NECK EXT. CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	35.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.25 G
	20 MS	14.00 - 19.00 G	16.19 G
	30 MS	11.00 - 16.00 G	15.15 G
MAX PENDULUM G		22 G MAX	17.67 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.12 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.36 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	97.25 DEG.
	TIME	72 - 82 MS	78.56 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-61.04 NM
	TIME	65 - 79 MS	72.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	161.04 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	145.20 MS

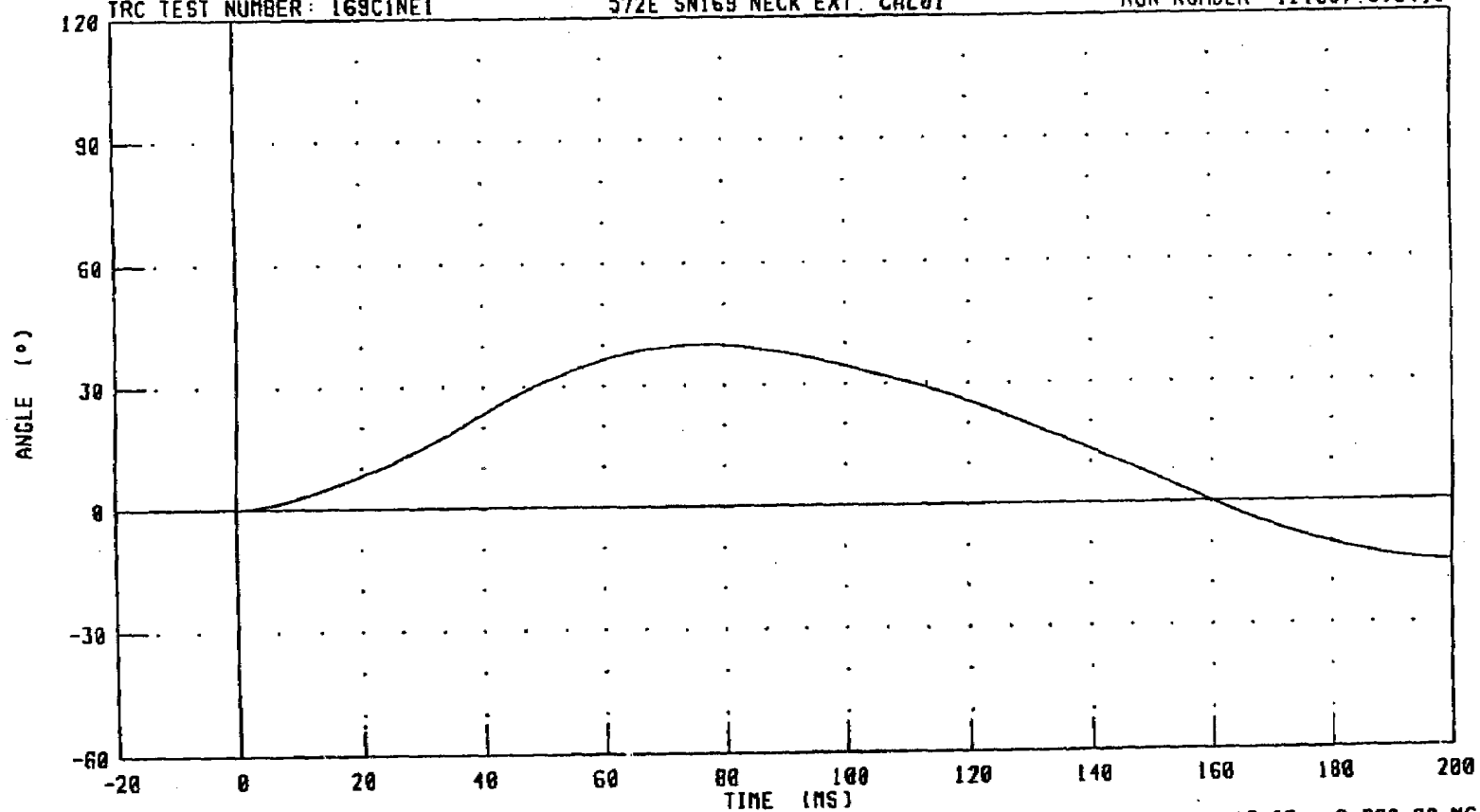
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 121897.0754;1


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 169CINE1
572E SN169 NECK EXT. CAL01
RUN NUMBER: 121897 0754.1
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: 17.67 G @ 8.96 MS; -2.04 G @ 47.92 MS

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

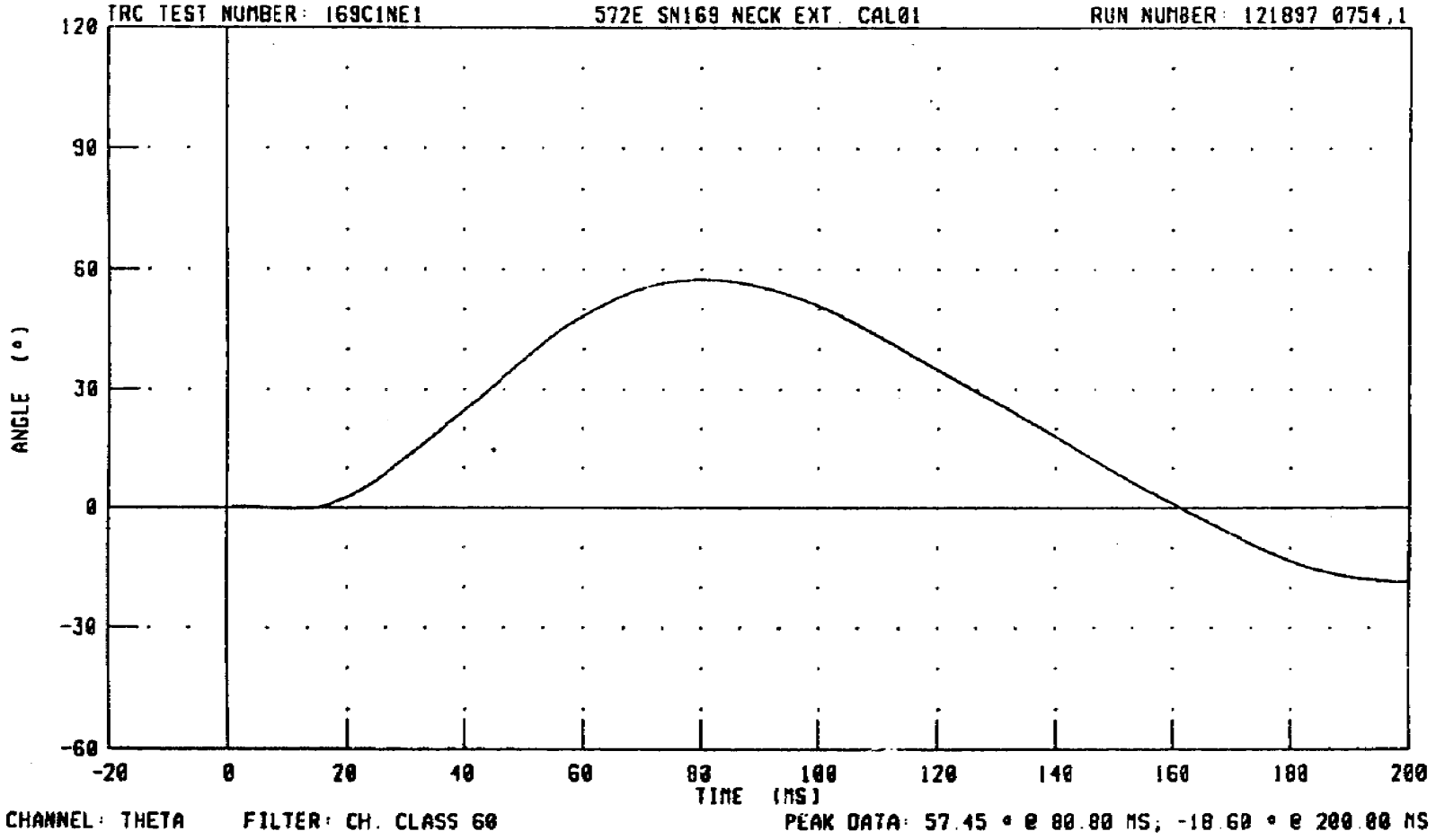
TRC TEST NUMBER: 169C1NE1 — 572E SN169 NECK EXT. CAL01 — RUN NUMBER: 121897.0754.1



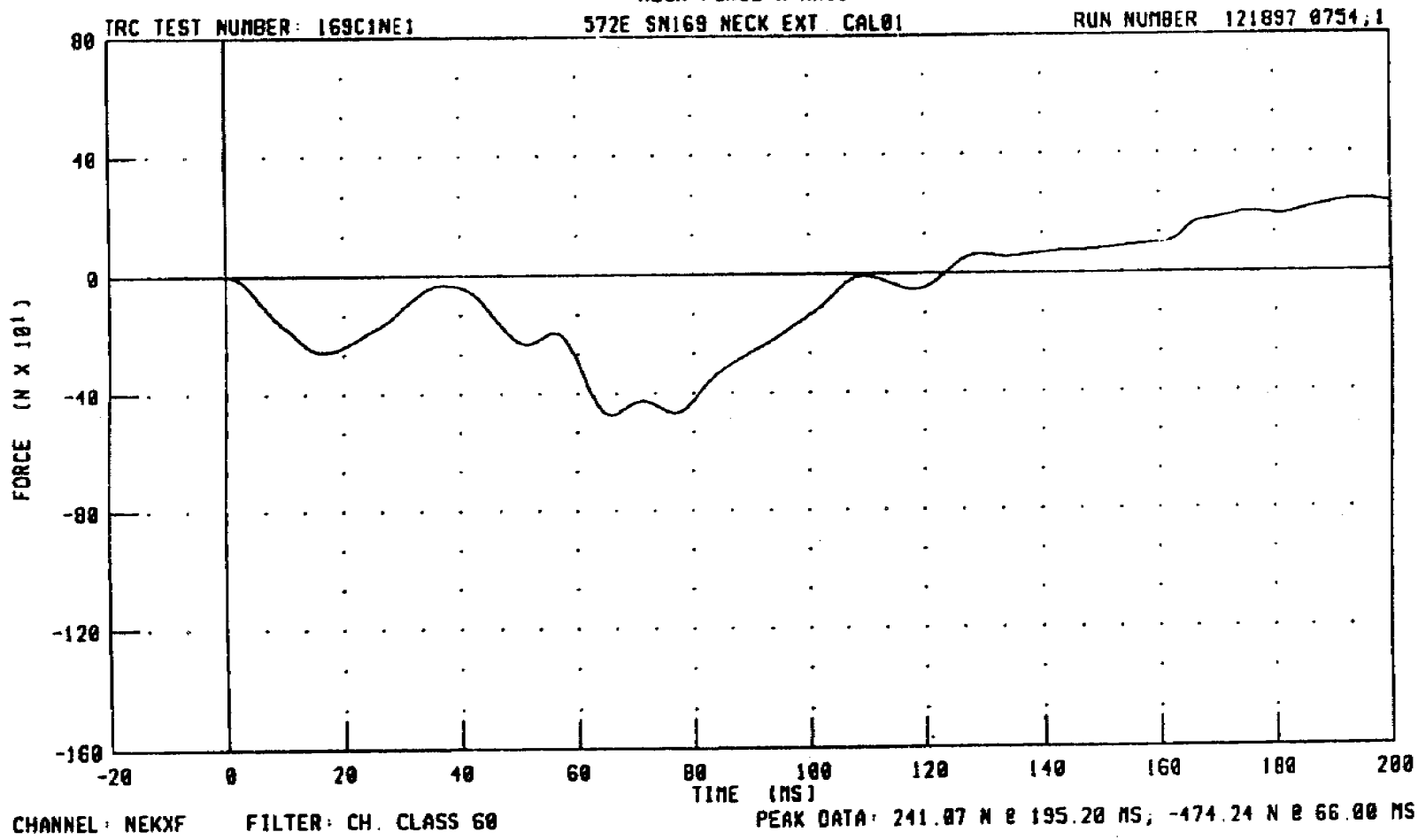
CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 39.96 • @ 76.56 MS; -15.05 • @ 200.00 MS

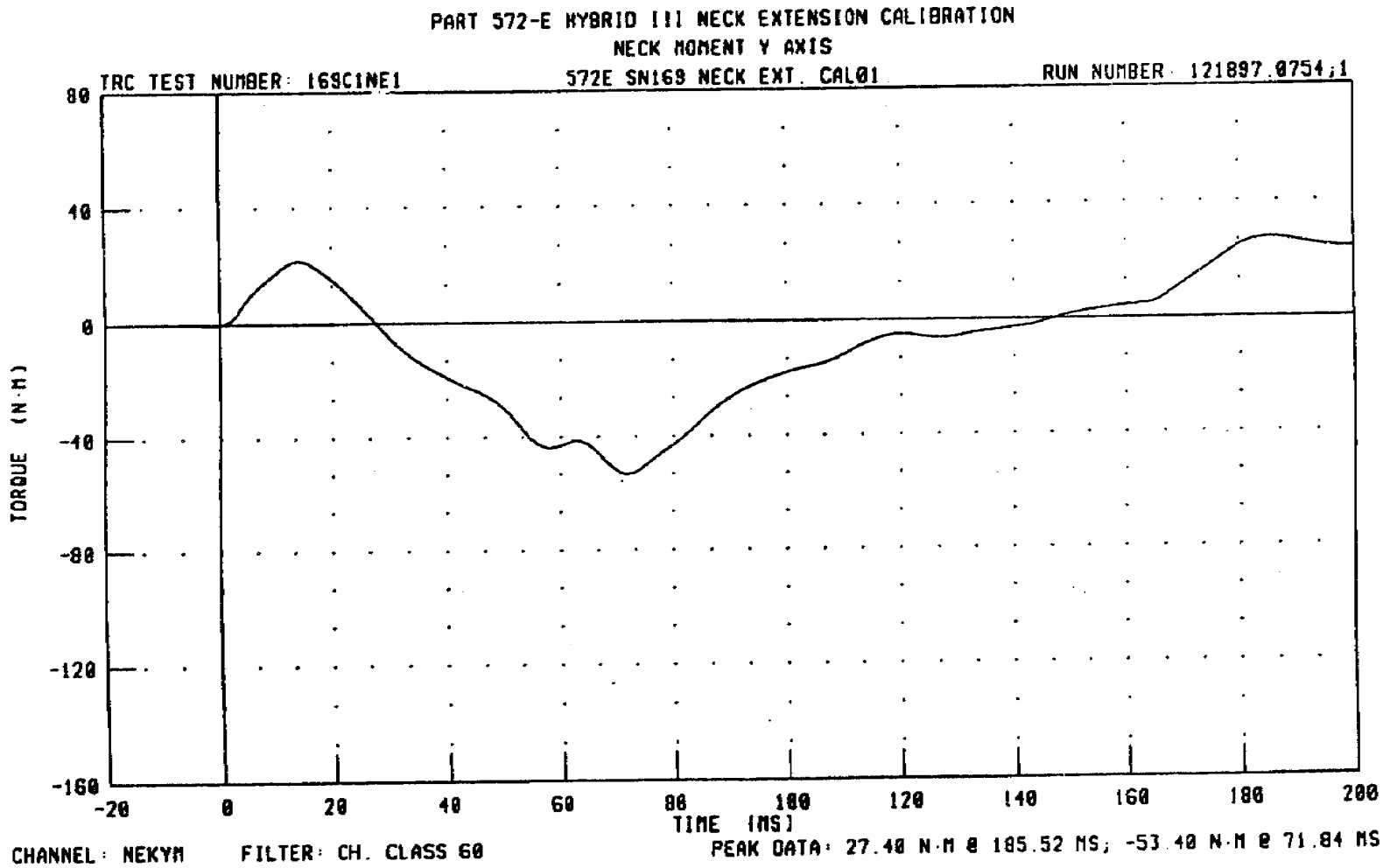
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE



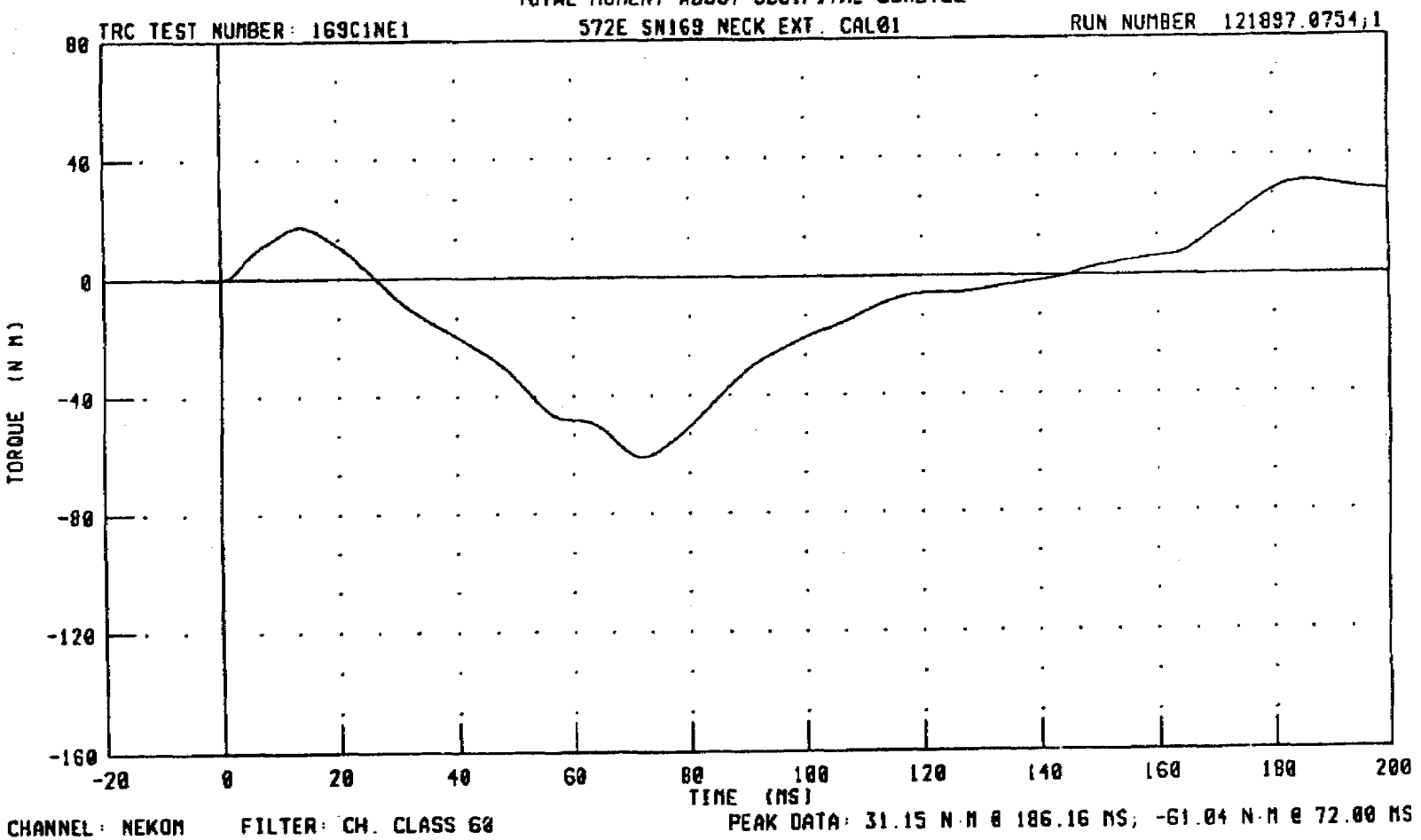
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 241.07 N @ 195.20 MS; -474.24 N @ 66.00 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 169C1NE1
572E SN169 NECK EXT. CAL01
RUN NUMBER: 121897.0754;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: 27.40 N-M @ 185.52 MS; -53.40 N-M @ 71.84 MS

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



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

TRC INC. TEST NO: 169C1TH2 572E SN169 H.S.THORAX CAL02

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	22.2 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.80 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	64.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5530. N
INTERNAL HYSTERESIS	69% - 85%	73.5%

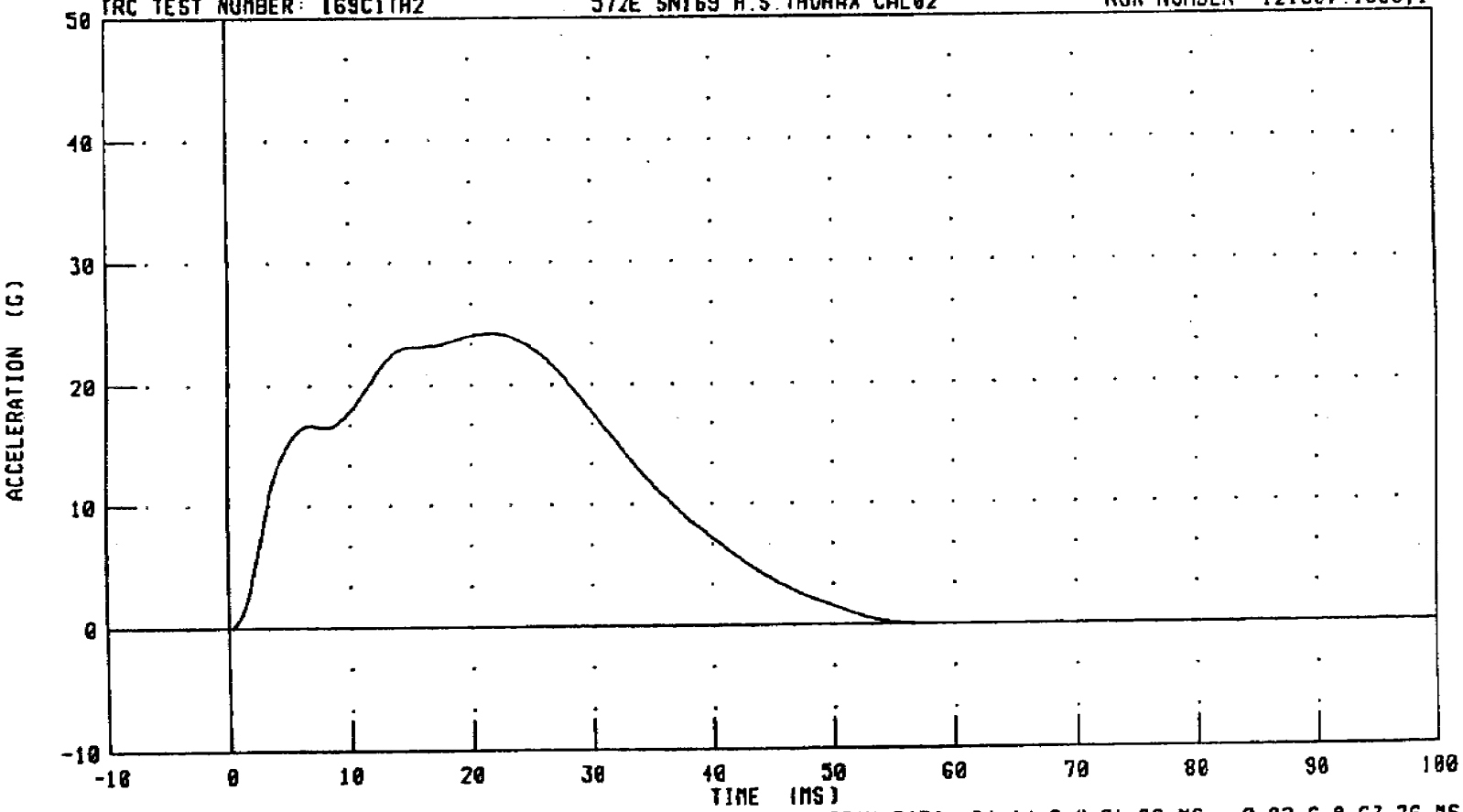
TEST MEETS SPECIFICATIONS

TECHNICIAN By Colt

RUN NUMBER: 121997.1505;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

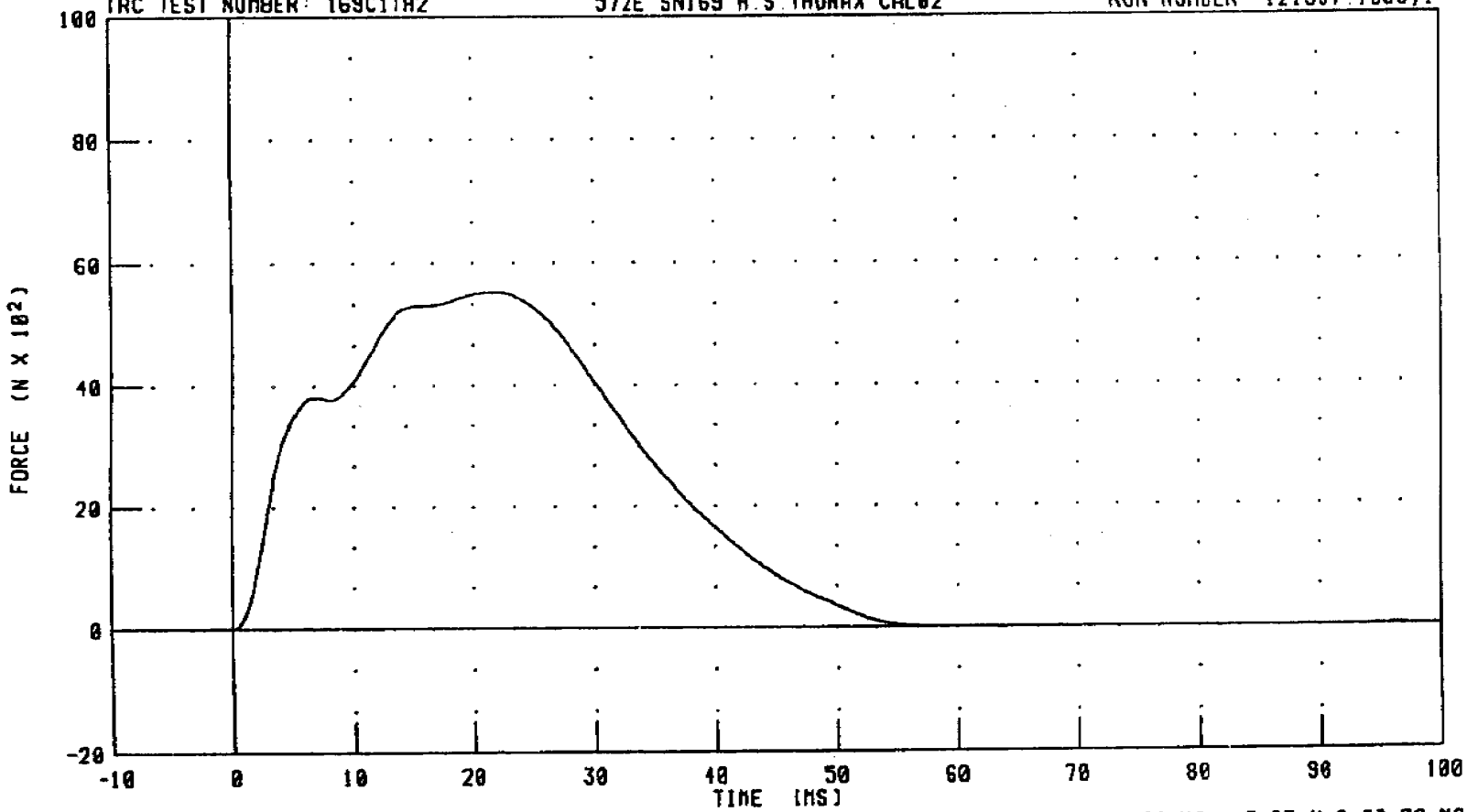
TRC TEST NUMBER: 169C1TH2 572E SN169 H.S.THORAX CAL02 RUN NUMBER: 121997.1505;1



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 24.14 G @ 21.76 MS; -0.02 G @ 63.76 MS

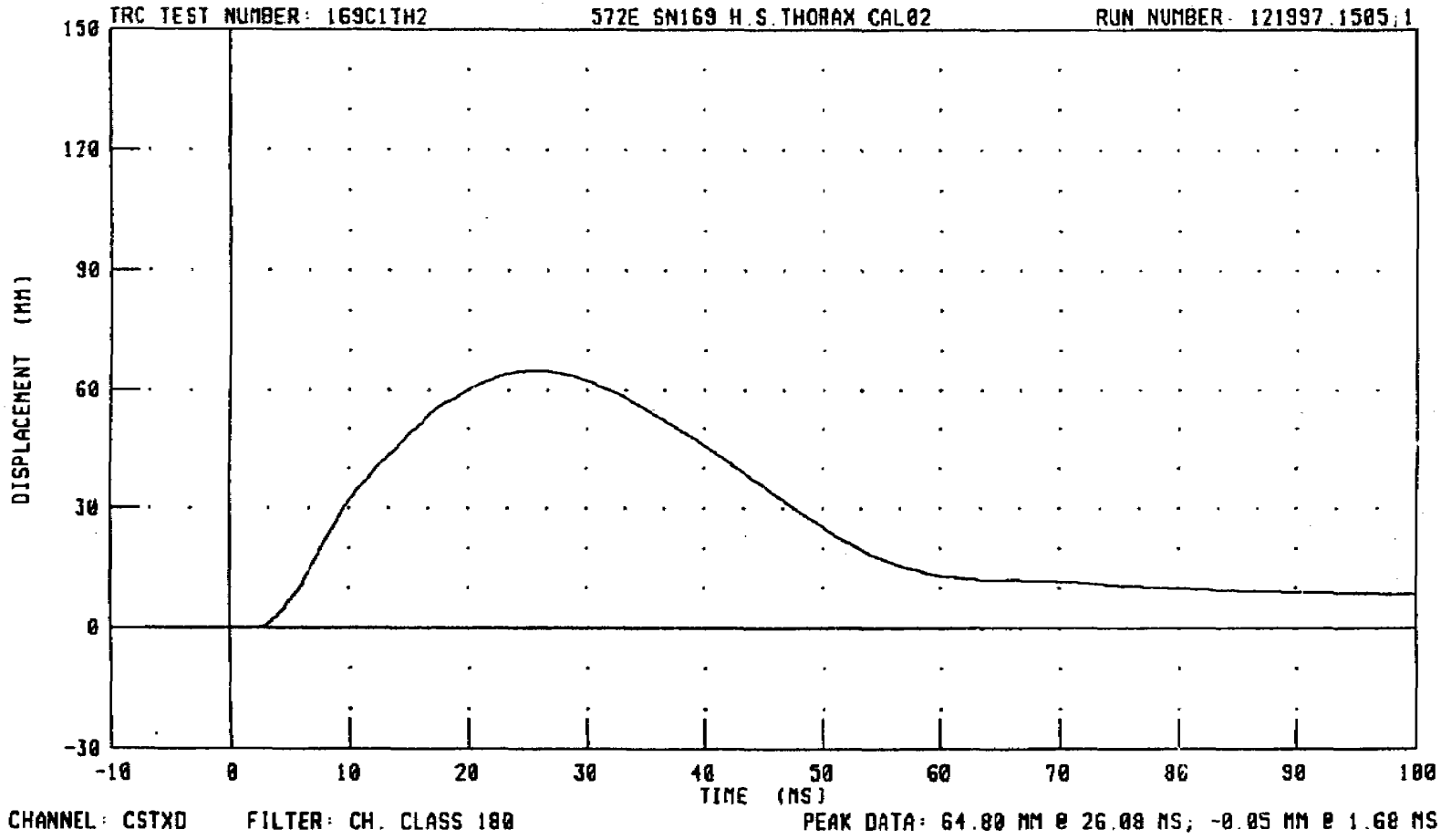
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC TEST NUMBER: 169C1TH2 572E SN169 H.S.THORAX CAL02 RUN NUMBER 121997.1505.1



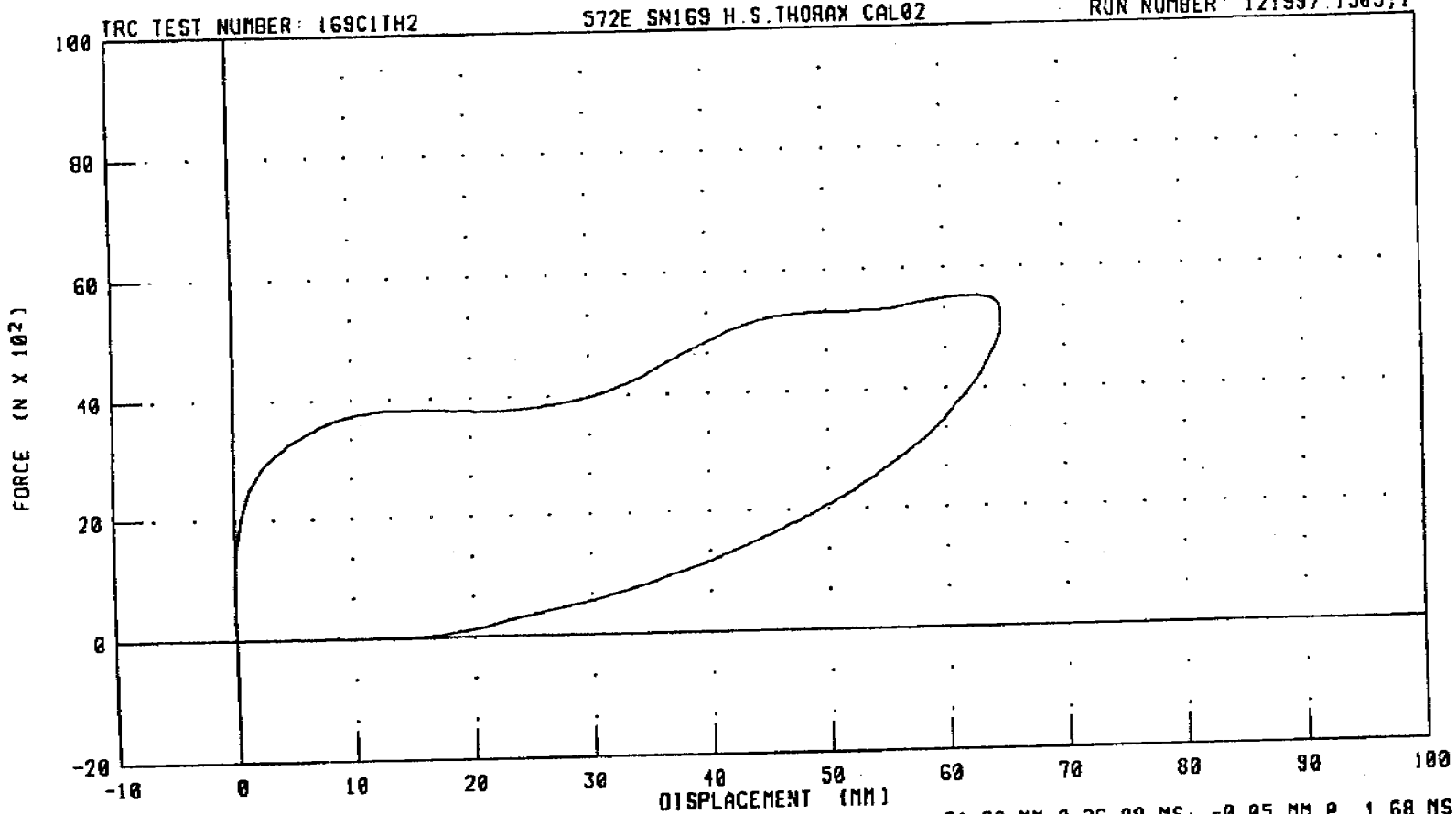
CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5530.60 N @ 21.76 MS; -3.87 N @ 63.76 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT



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

TRC TEST NUMBER: 169C1TH2 — 572E SN169 H.S.THORAX CAL02 — RUN NUMBER: 121997.1505;1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA: 64.80 MM @ 26.08 MS; -0.05 MM @ 1.68 MS
5530.60 N @ 21.76 MS; -3.87 N @ 63.76 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E 18-DEC-97

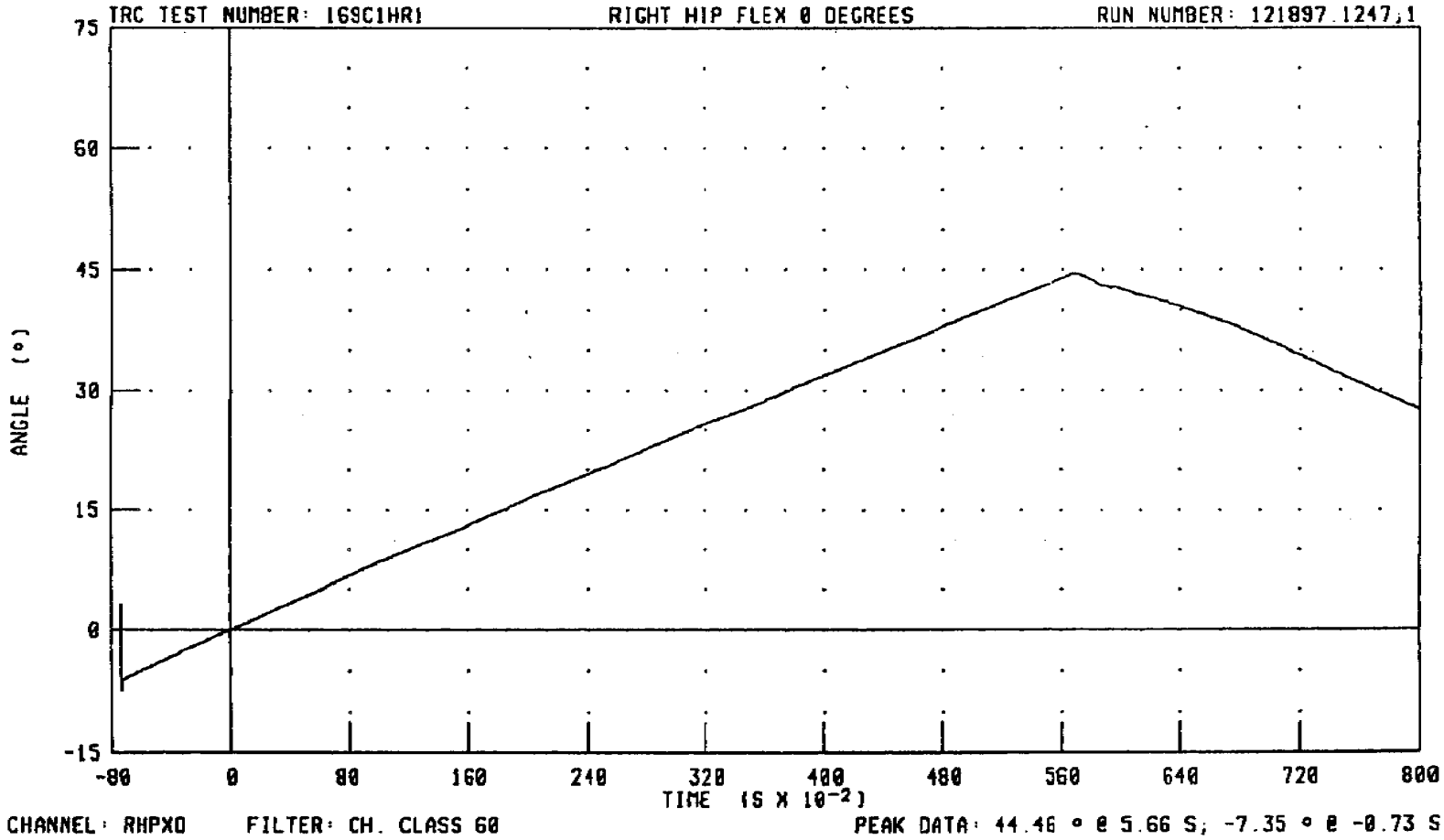
TRC INC. TEST NO: 169C1HR1 RIGHT HIP FLEX 0 DEGREES

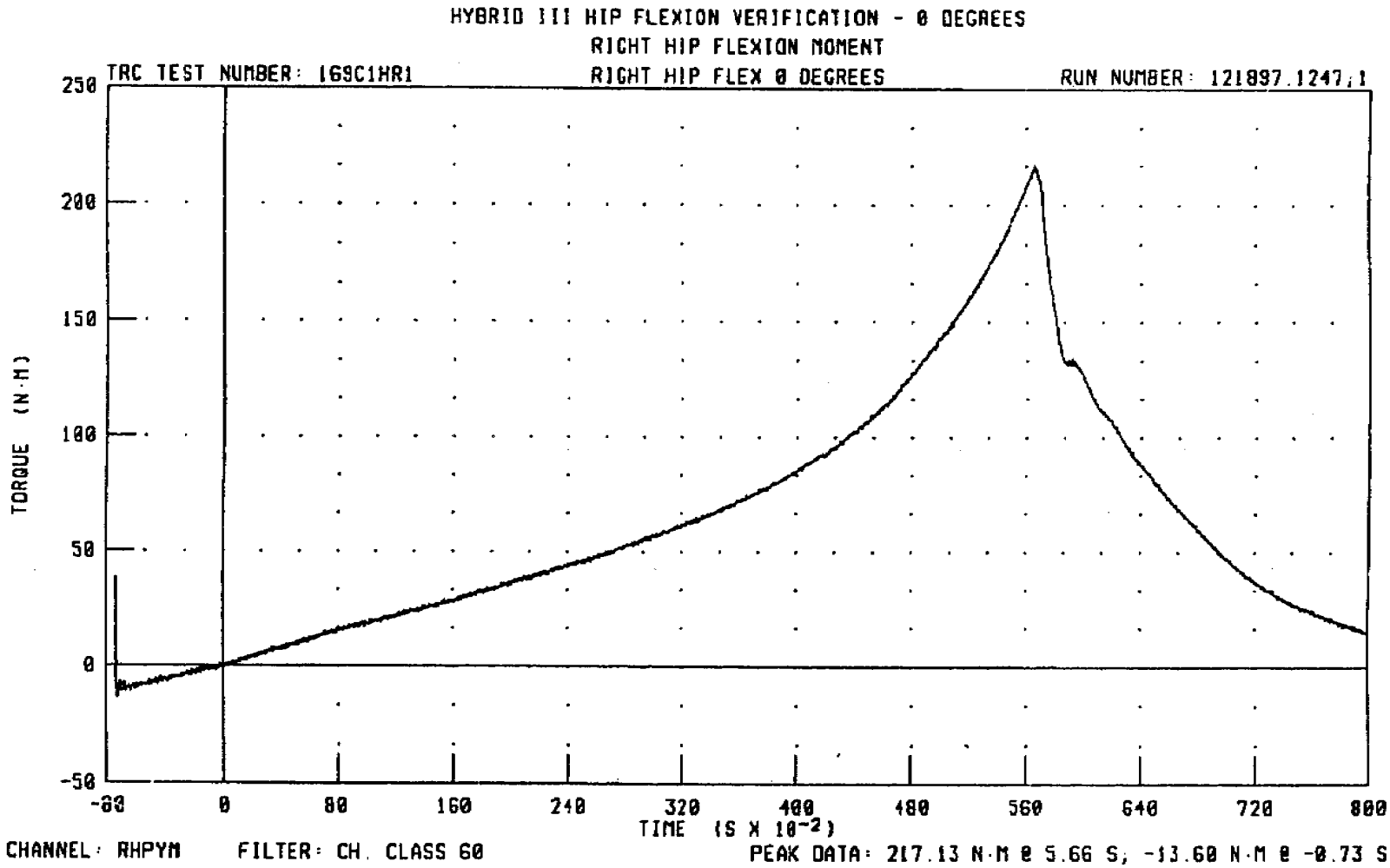
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	77.0 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	43.7 deg.

TEST MEETS SPECIFICATIONS

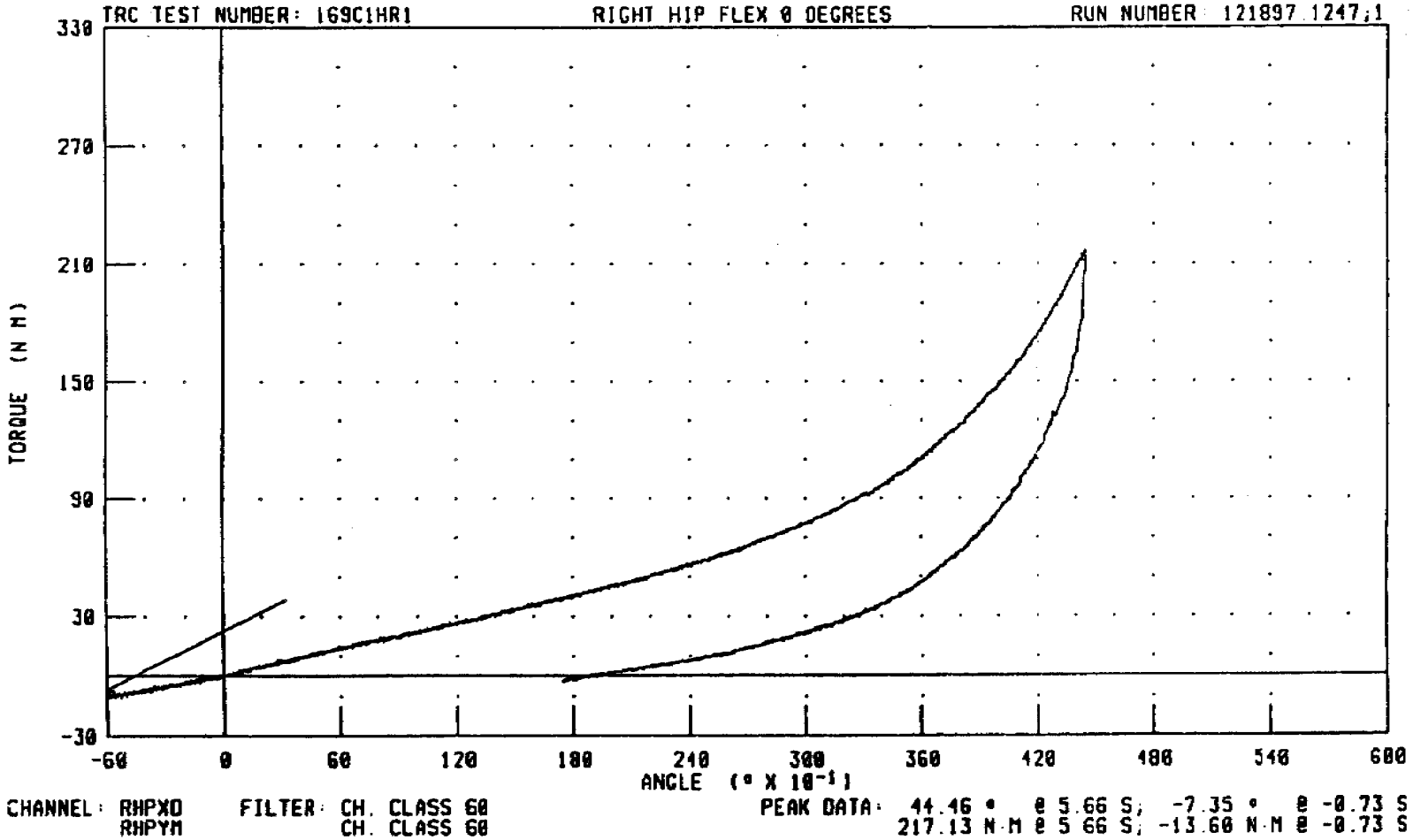
TECHNICIAN _____ RUN NUMBER: 121897.1246;1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION ROTATION




HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION MOMENT
RIGHT HIP FLEX 0 DEGREES
TRC TEST NUMBER: I69C1HR1
RUN NUMBER: 121897.1247.1
TORQUE (N·M)
250
200
150
100
50
0
-50
-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: 217.13 N·M @ 5.66 S; -13.60 N·M @ -0.73 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

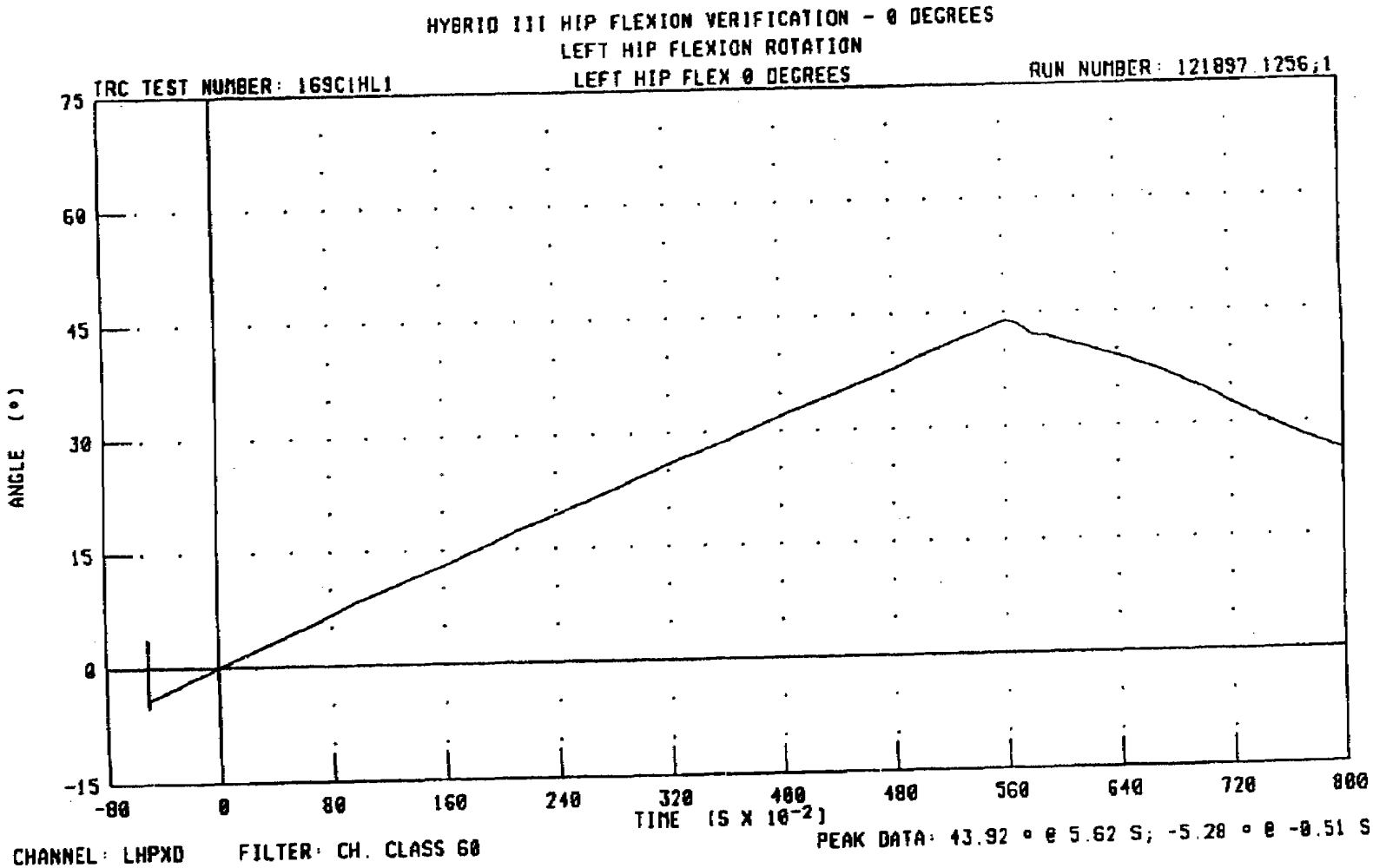
HYBRID III PART 572E 18-DEC-97

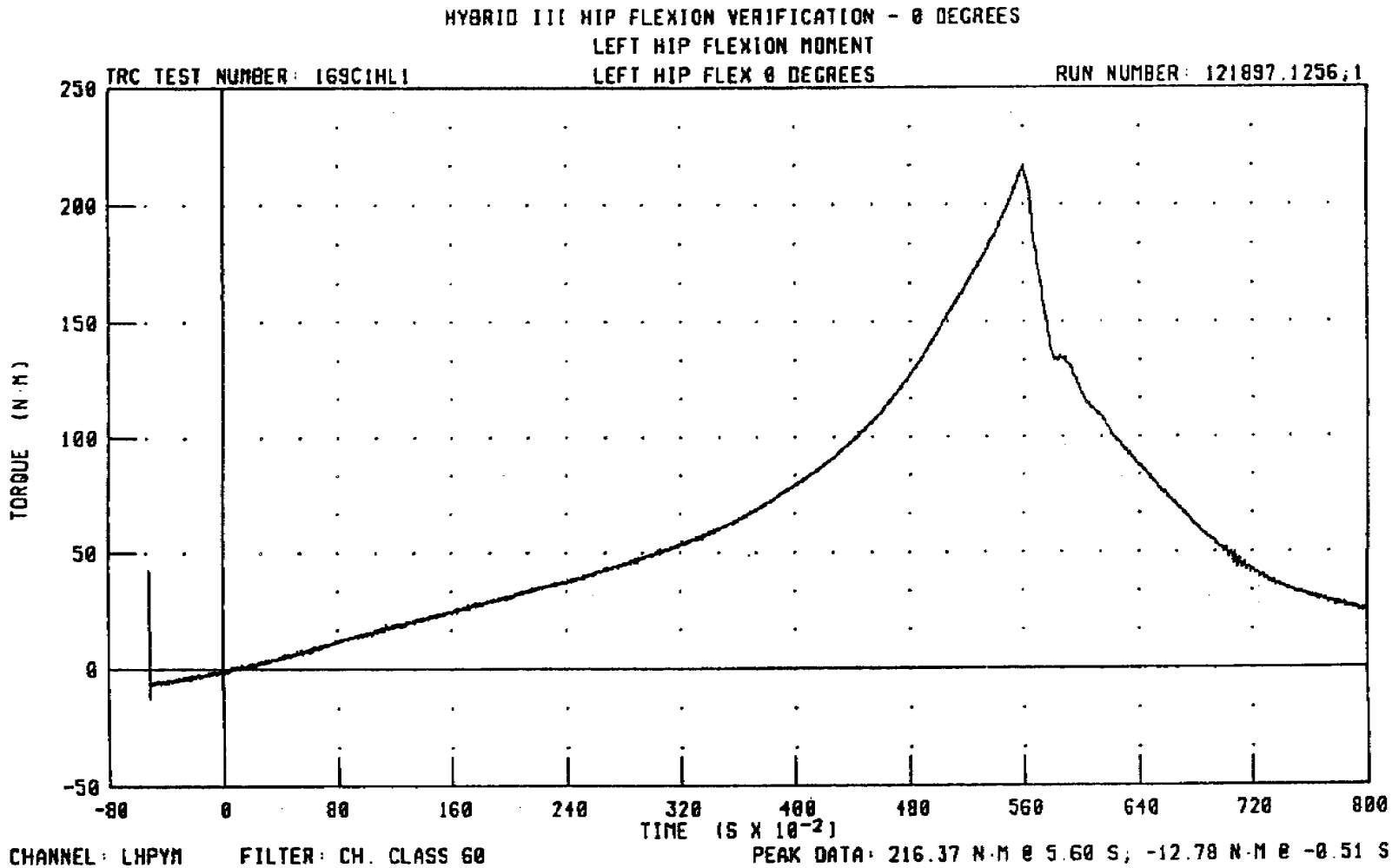
TRC INC. TEST NO: 169C1HL1 LEFT HIP FLEX 0 DEGREES

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	69.8 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	43.2 deg.

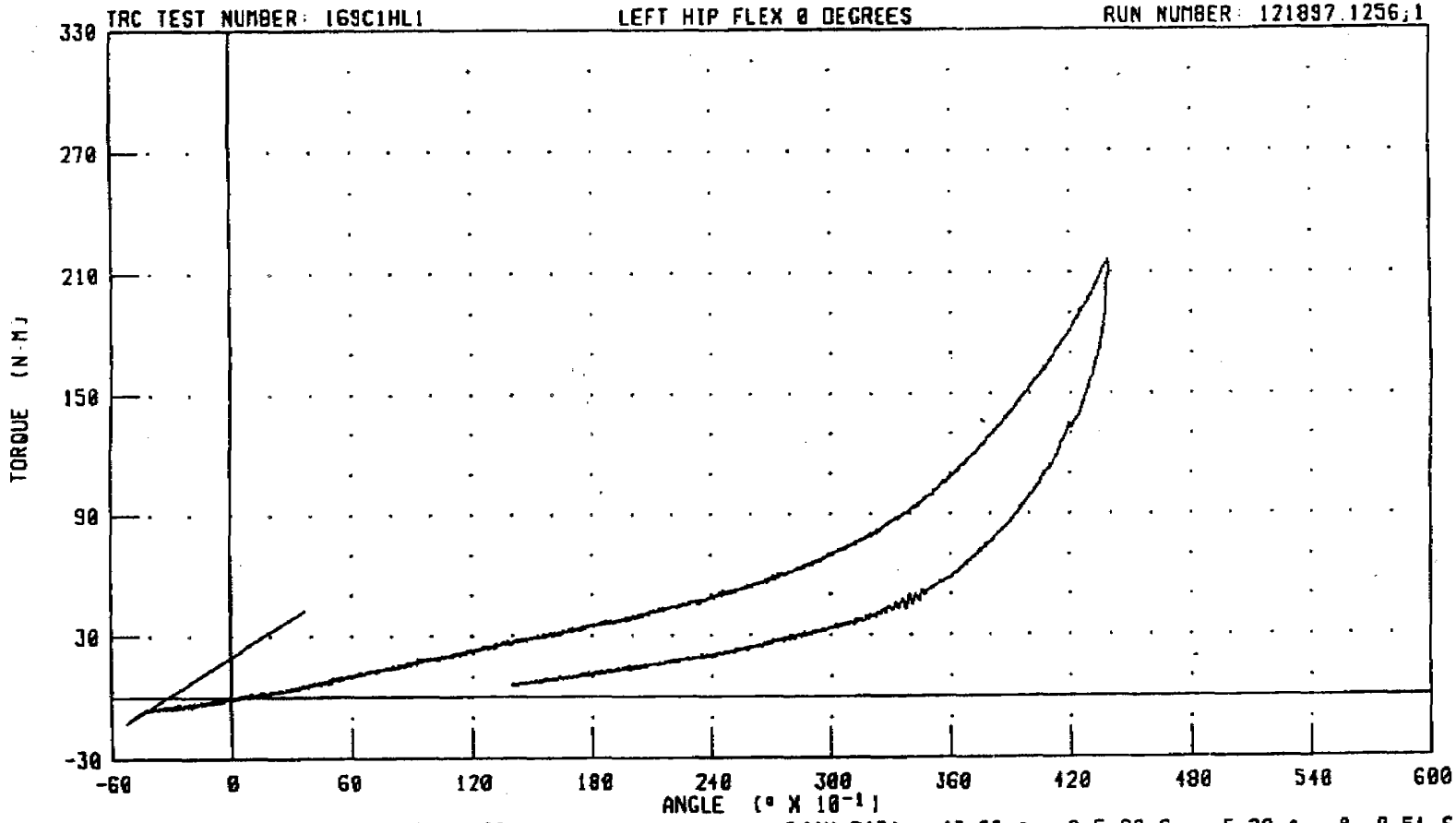
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 121897.1256;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION ROTATION
LEFT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 169C1HL1
RUN NUMBER: 121897 1256;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: LHPXD
FILTER: CH. CLASS 60
PEAK DATA: 43.92 ° @ 5.62 S; -5.28 ° @ -0.51 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT
LEFT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 169C1HL1
RUN NUMBER: 121897.1256;1
TORQUE (N-M)
250
200
150
100
50
0
-50
-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: 216.37 N-M @ 5.60 S; -12.78 N-M @ -0.51 S

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



CHANNEL: LHPX0 FILTER: CH. CLASS 60
LHPYM CH. CLASS 60

PEAK DATA: 43.92 ° @ 5.62 S; -5.28 ° @ -0.51 S
216.37 N-M @ 5.60 S; -12.78 N-M @ -0.51 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

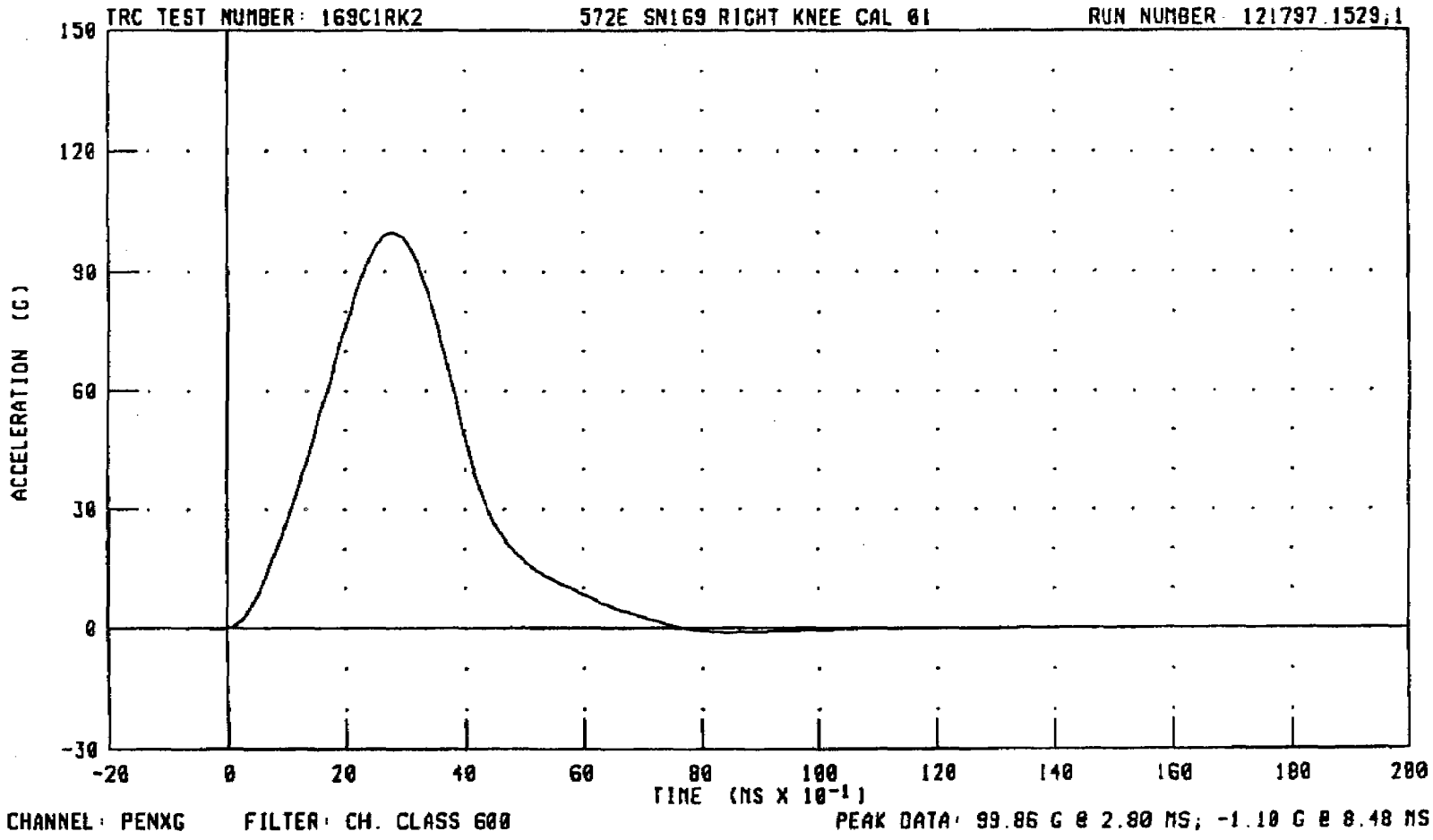
TRC INC. TEST NO: 169C1RK2 572E SN169 RIGHT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4885.7 N

TEST MEETS SPECIFICATIONS

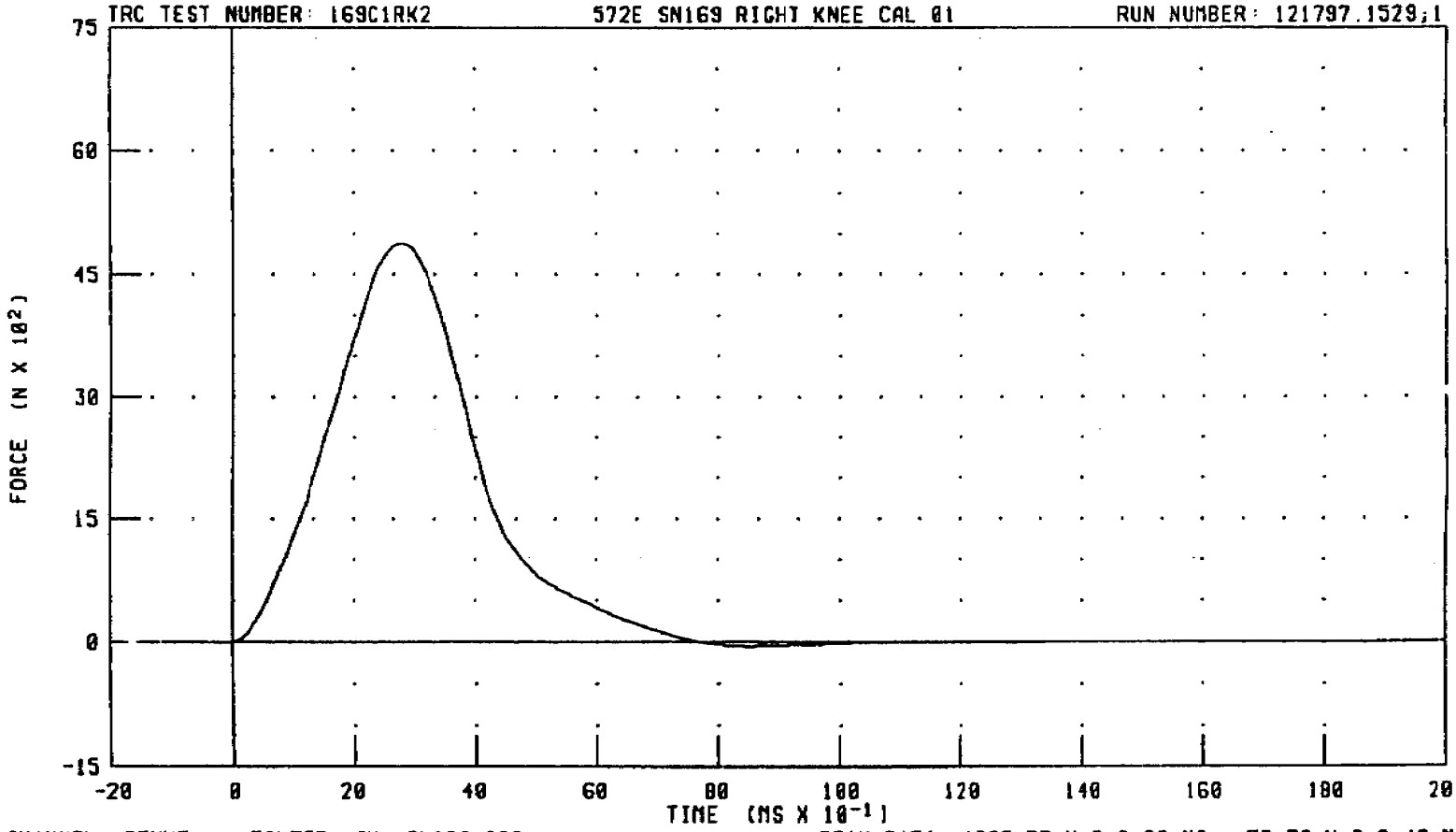
TECHNICIAN John K. Claudy RUN NUMBER: 121797.1529;1

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



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

TRC TEST NUMBER: 169C1RK2
572E SN169 RIGHT KNEE CAL 01
RUN NUMBER: 121797.1529;1



CHANNEL: PENXF FILTER: CH. CLASS 600
PEAK DATA: 4885.75 N @ 2.80 MS; -53.76 N @ 8.40 M

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

TRC INC. TEST NO: 169C1LK2 572E SN169 LEFT KNEE CAL 02

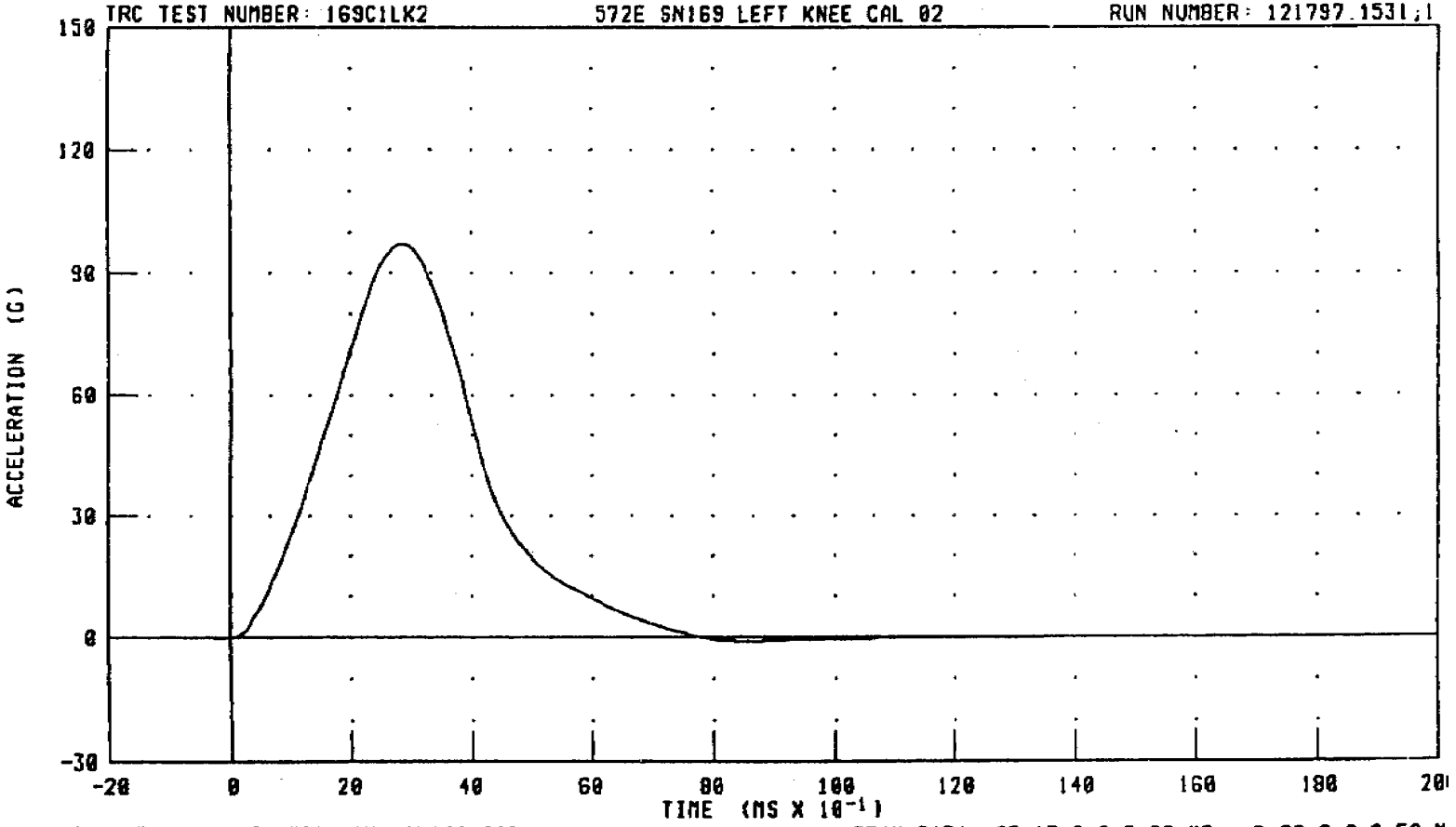
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4752.2 N

TEST MEETS SPECIFICATIONS

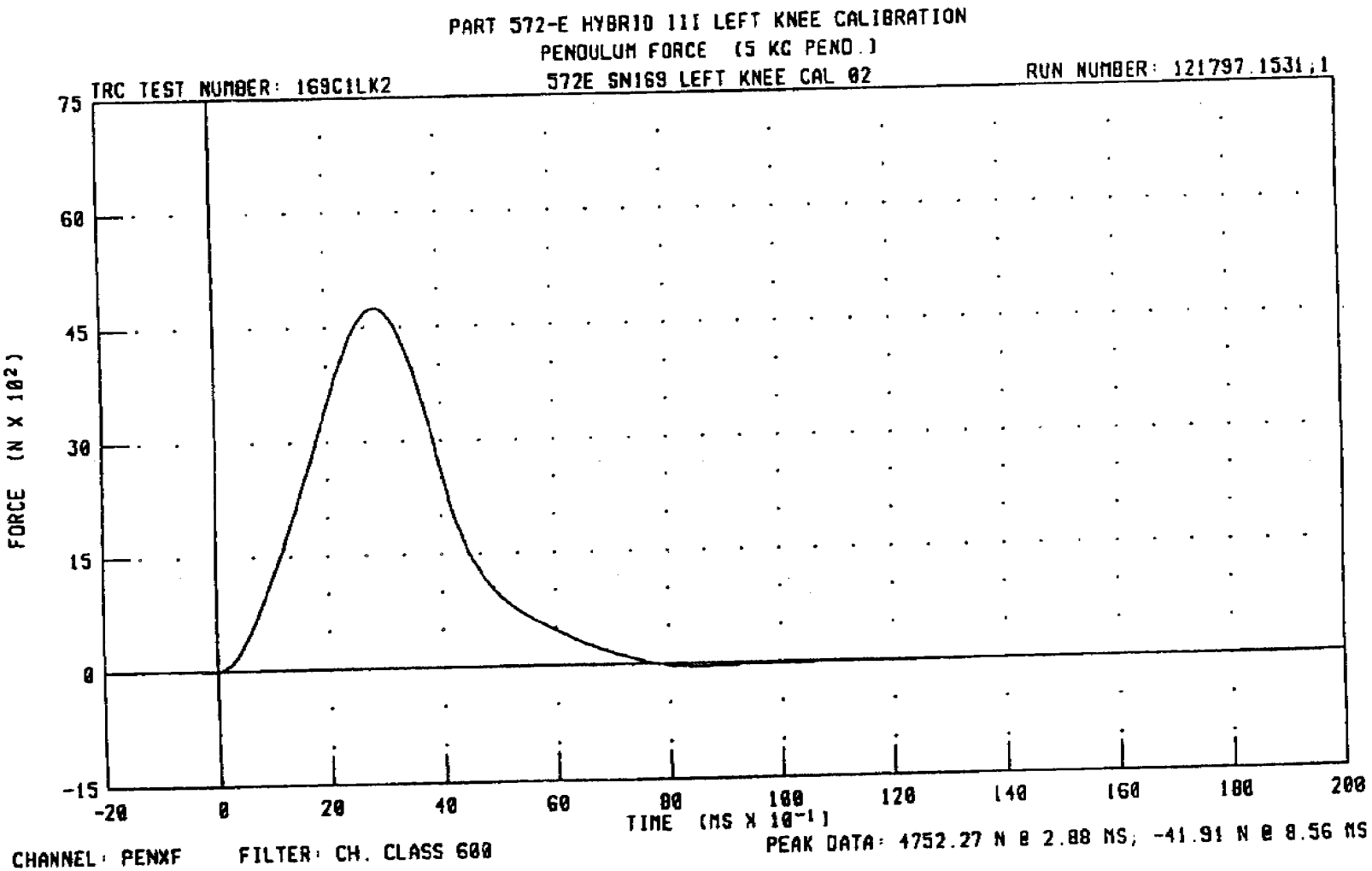
TECHNICIAN John K. Claridge RUN NUMBER: 121797.1524;1

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

TRC TEST NUMBER: 169C1LK2 572E SN169 LEFT KNEE CAL 02 RUN NUMBER: 121797.1531;1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 97.13 G @ 2.88 MS; -0.86 G @ 8.56 M


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 169C1LK2
572E SN169 LEFT KNEE CAL 02
RUN NUMBER: 121797.1531;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: 4752.27 N @ 2.88 MS; -41.91 N @ 8.56 MS

Dummy Certification

Passenger Dummy S/N 168

HYBRID III EXTERNAL DIMENSIONS
SN168 VECTOR 17-DEC-97
TRC INC. TEST NO: 168C03ED1 572E SN168 EXT.DIMENSION CAL03

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	851. MM
CHEST DEPTH (O)	213 - 229 MM	224. 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	889. MM
THIGH CLEARANCE (F)	140 - 155 MM	150. 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	445. MM
KNEE PIVOT HEIGHT (M)	485 - 500 MM	495. MM
FOOT LENGTH (P)	252 - 267 MM	262. MM
FOOT BREADTH (W)	91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)	84 - 94 MM	91. MM
SHOULDER BREADTH (V)	422 - 437 MM	429. MM
SHOULDER PIVOT HEIGHT (B)	506 - 521 MM	521. MM
ELBOW REST HEIGHT (J)	191 - 211 MM	211. MM
SHOULDER-ELBOW LENGTH (I)	330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT (G)	290 - 305 MM	295. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN _____ RUN NUMBER: 012998.1318

TRANSPORTATION RESEARCH CENTER INC.

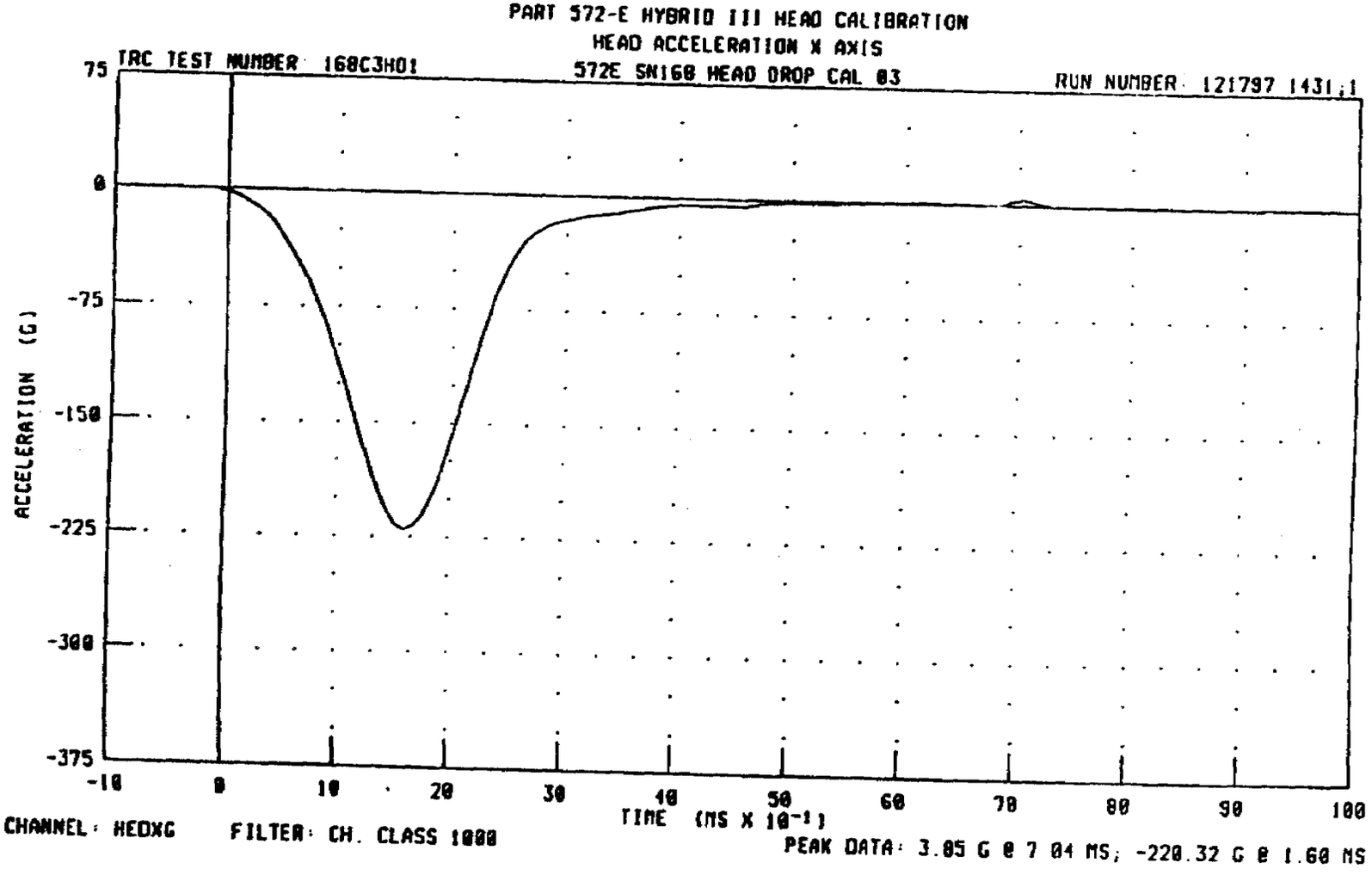
HEAD DROP TEST

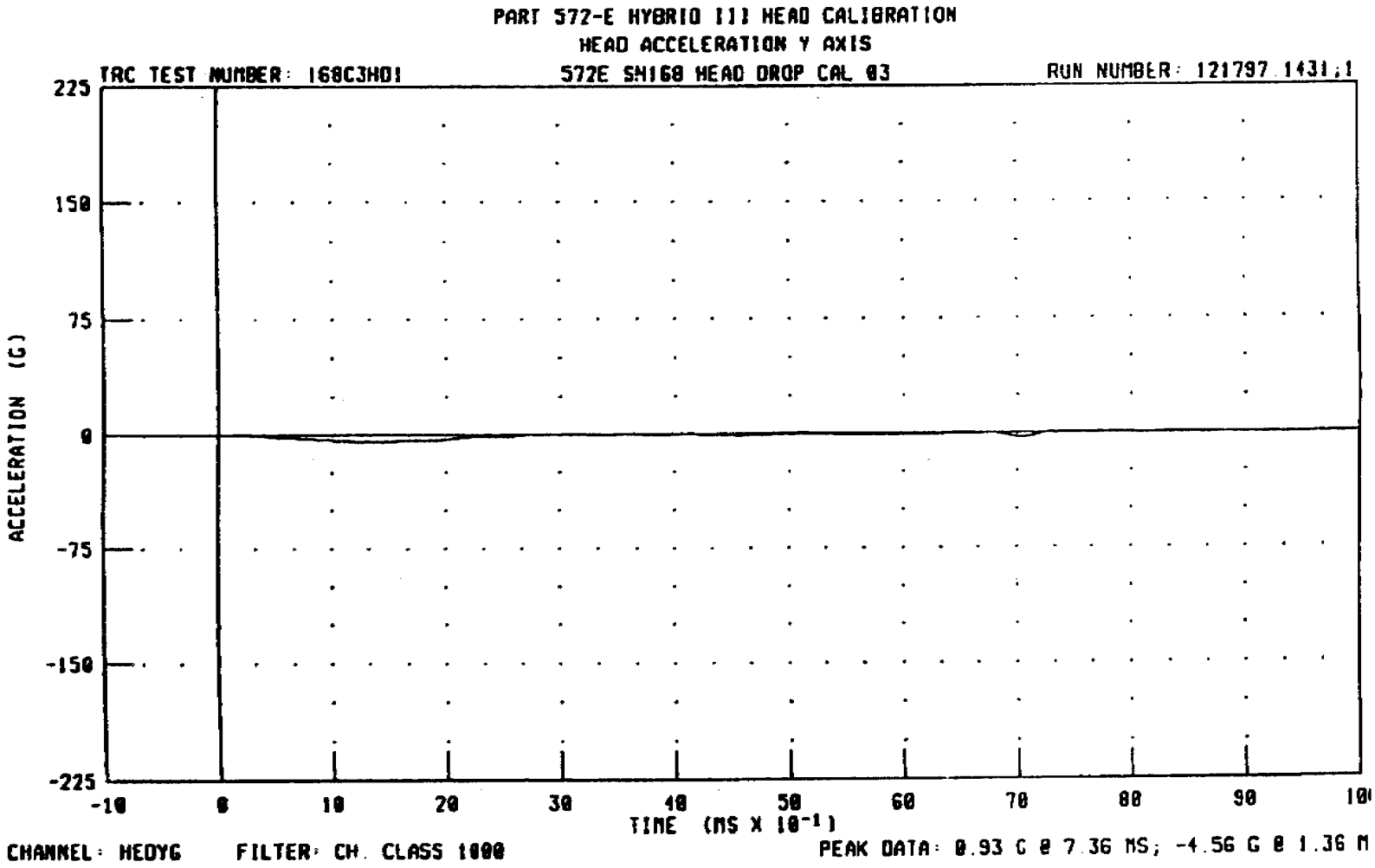
TRC INC. TEST NO: 168C3HD1 572E SN168 HEAD DROP CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.94 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.56 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

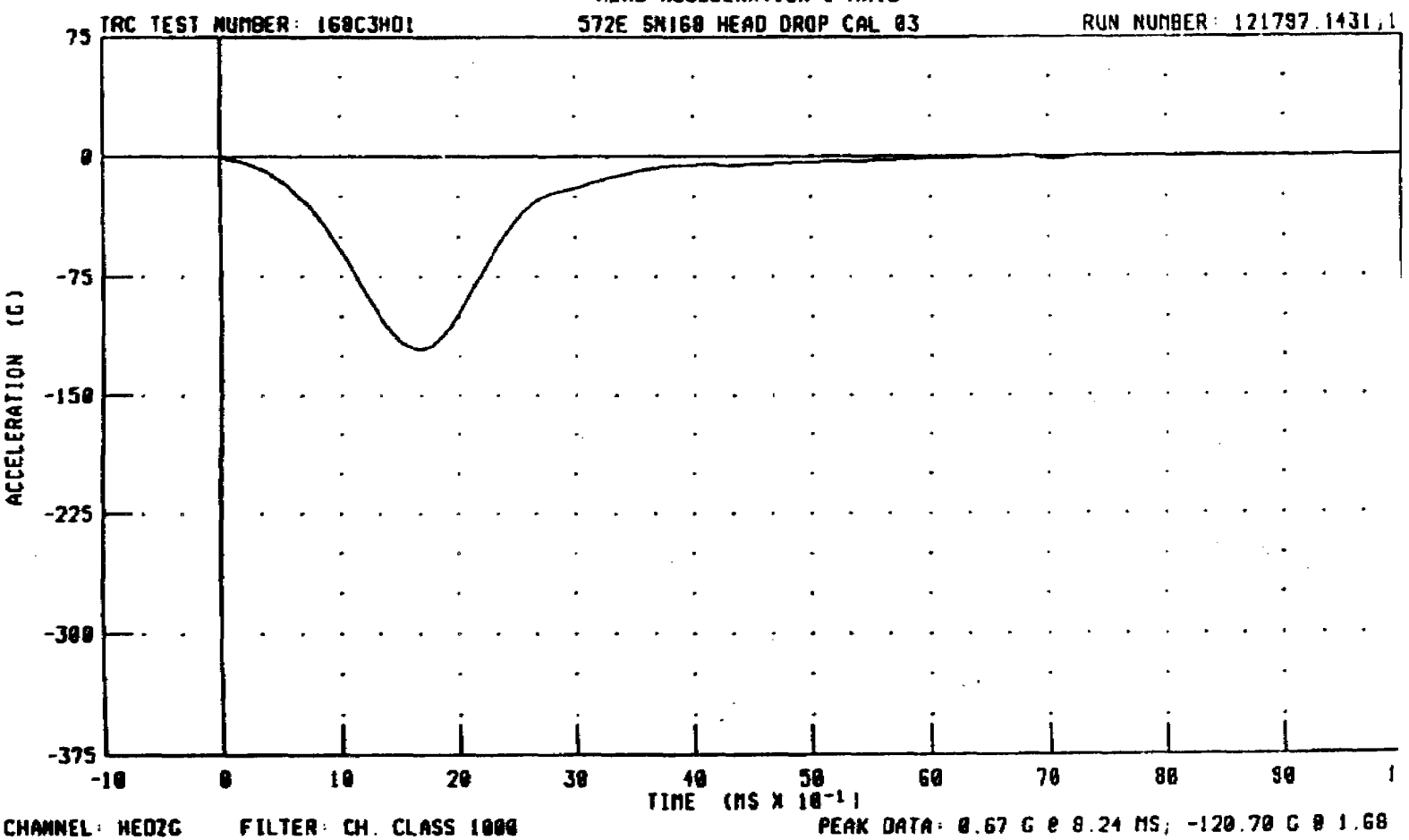
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 121797.1430;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER 168C3H01
572E SN168 HEAD DROP CAL 03
RUN NUMBER 121797 1431.1
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: HEDXC
FILTER: CH. CLASS 1000
PEAK DATA: 3.85 G @ 7.04 MS; -220.32 G @ 1.60 MS

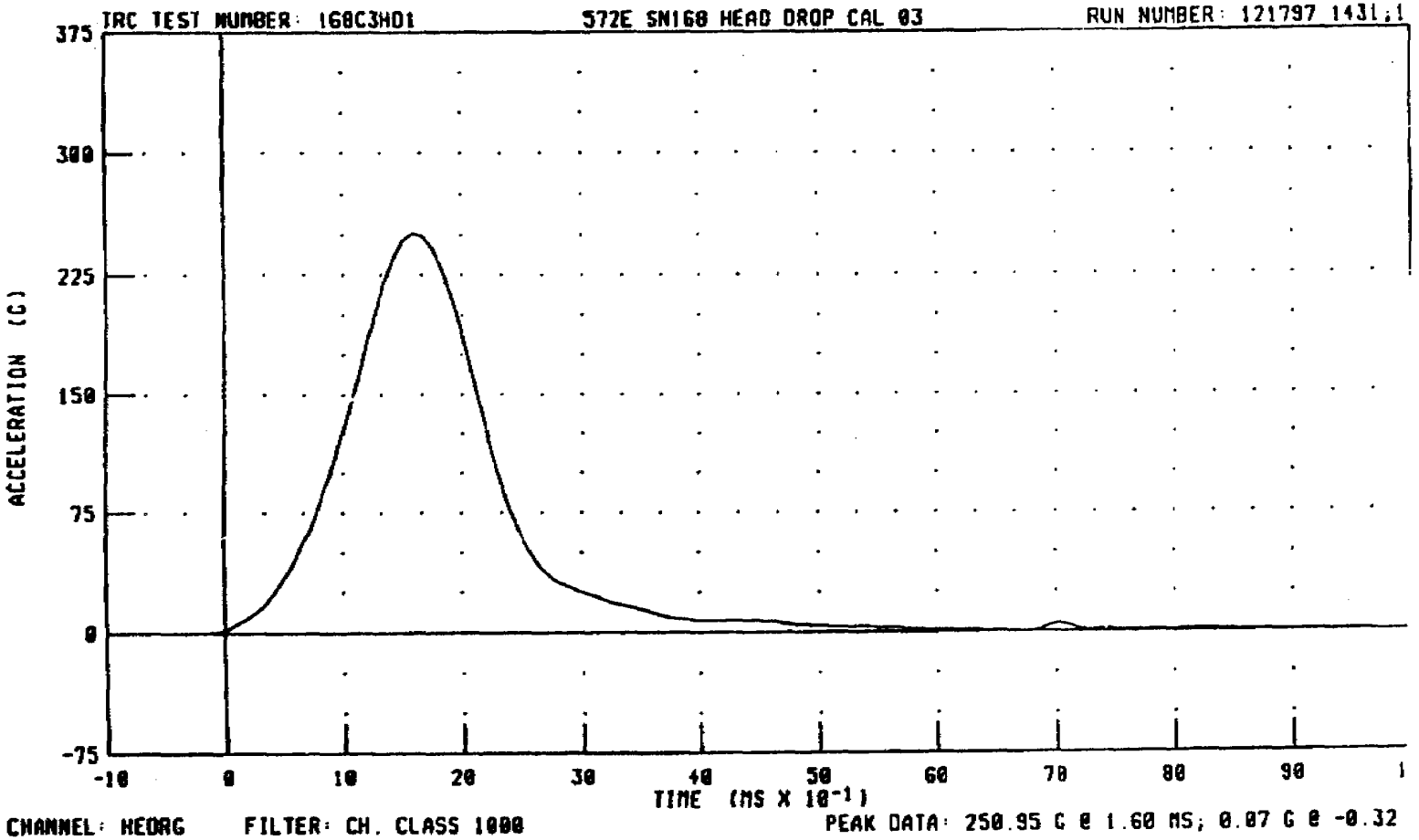

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 168C3H01
572E SN168 HEAD DROP CAL 03
RUN NUMBER: 121797.1431;1
225
150
75
0
-75
-150
-225
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 0.93 G @ 7.36 MS; -4.56 G @ 1.36 M

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



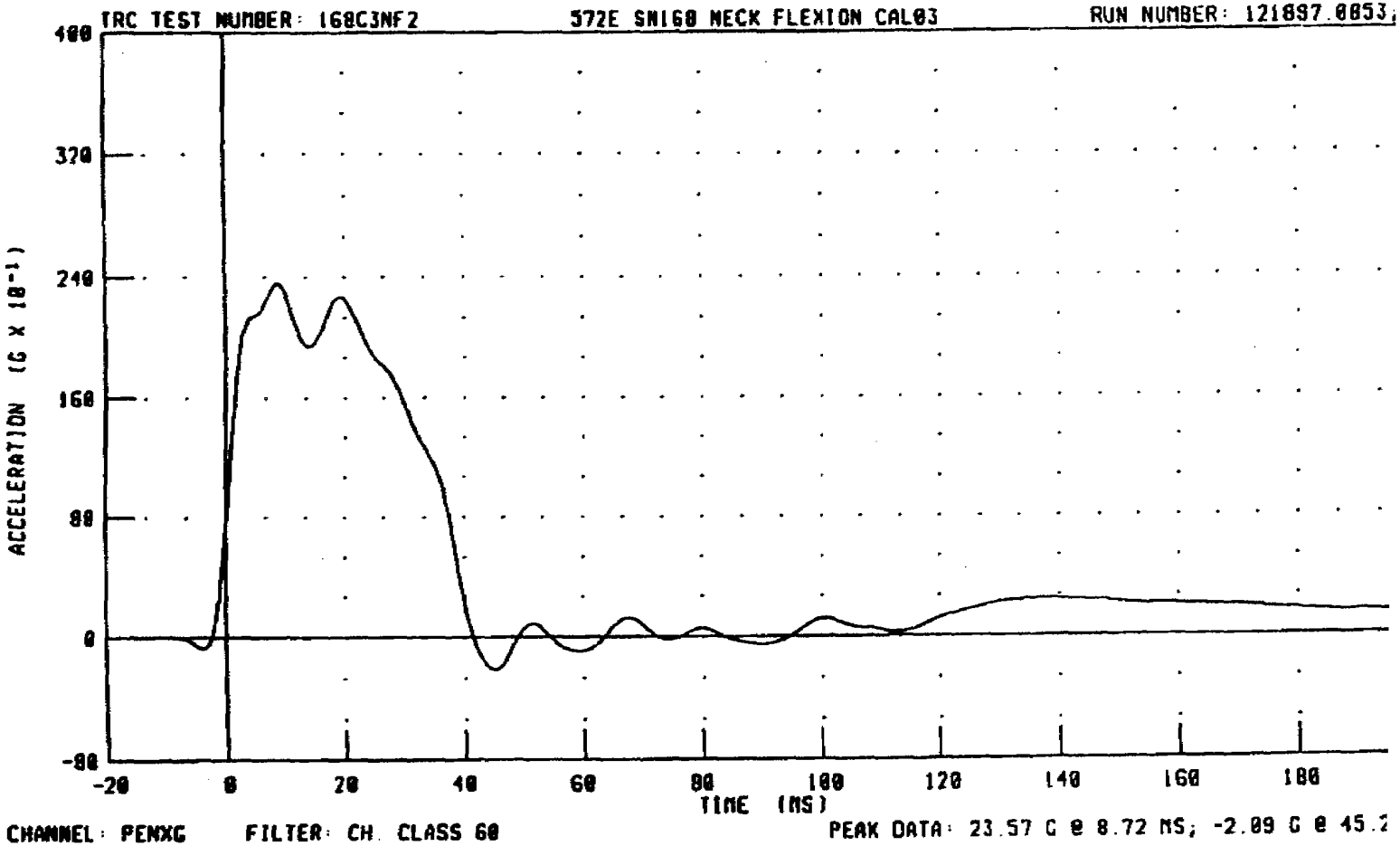
PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

IRC TEST NUMBER: 168C3HD1 572E SN168 HEAD DROP CAL 03 RUN NUMBER: 121797 1431;1



CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 250.95 G @ 1.60 MS; 0.07 G @ -0.32

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION



NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C3NF2 572E SN168 NECK FLEXION CAL03

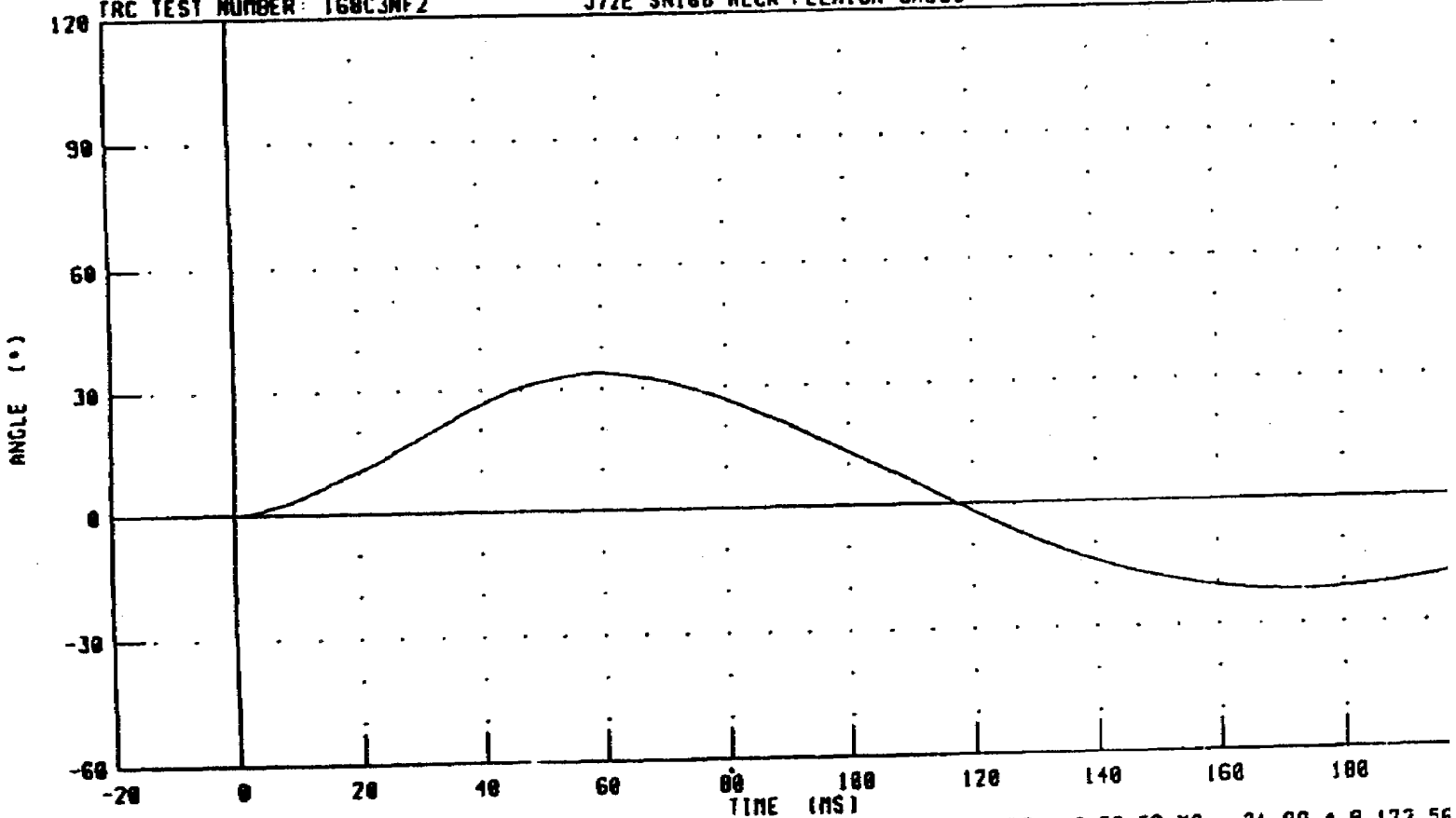
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	35.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.87 G
	20 MS	17.60 - 22.60 G	22.60 G
	30 MS	12.50 - 18.50 G	15.67 G
MAX PENDULUM G		29 G MAX	23.57 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.58 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.88 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	72.48 DEG.
	TIME	57 - 64 MS	59.44 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	94.04 NM
	TIME	47 - 58 MS	51.52 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116.16 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	100.24 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 121897.0852;1

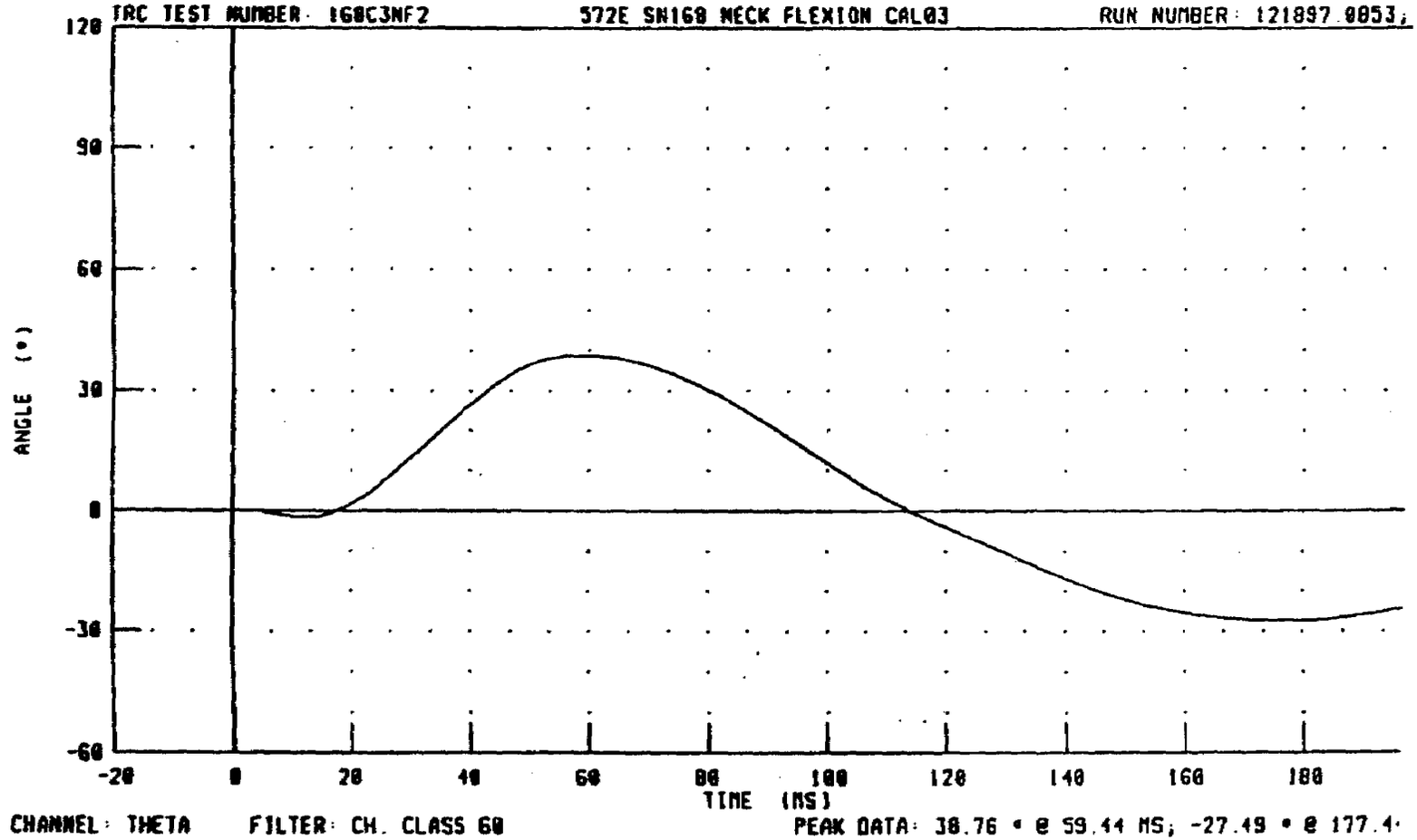
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 168C3NF2
572E SN168 NECK FLEXION CAL03
RUN NUMBER: 121897.0853,



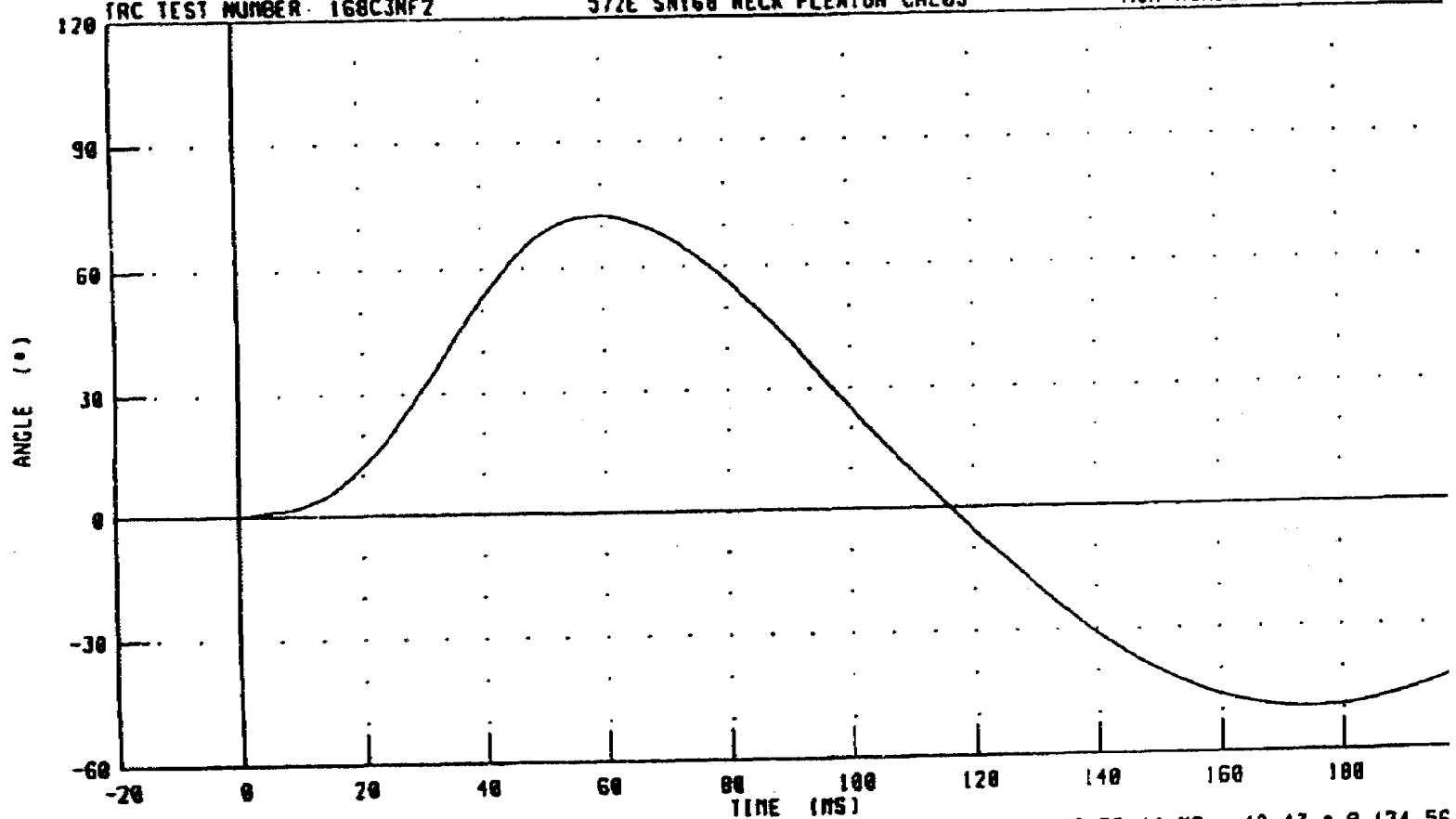
CHANNEL: BETA FILTER: CH. CLASS 60
PEAK DATA: 33.73 • @ 59.52 MS; -21.99 • @ 172.56

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



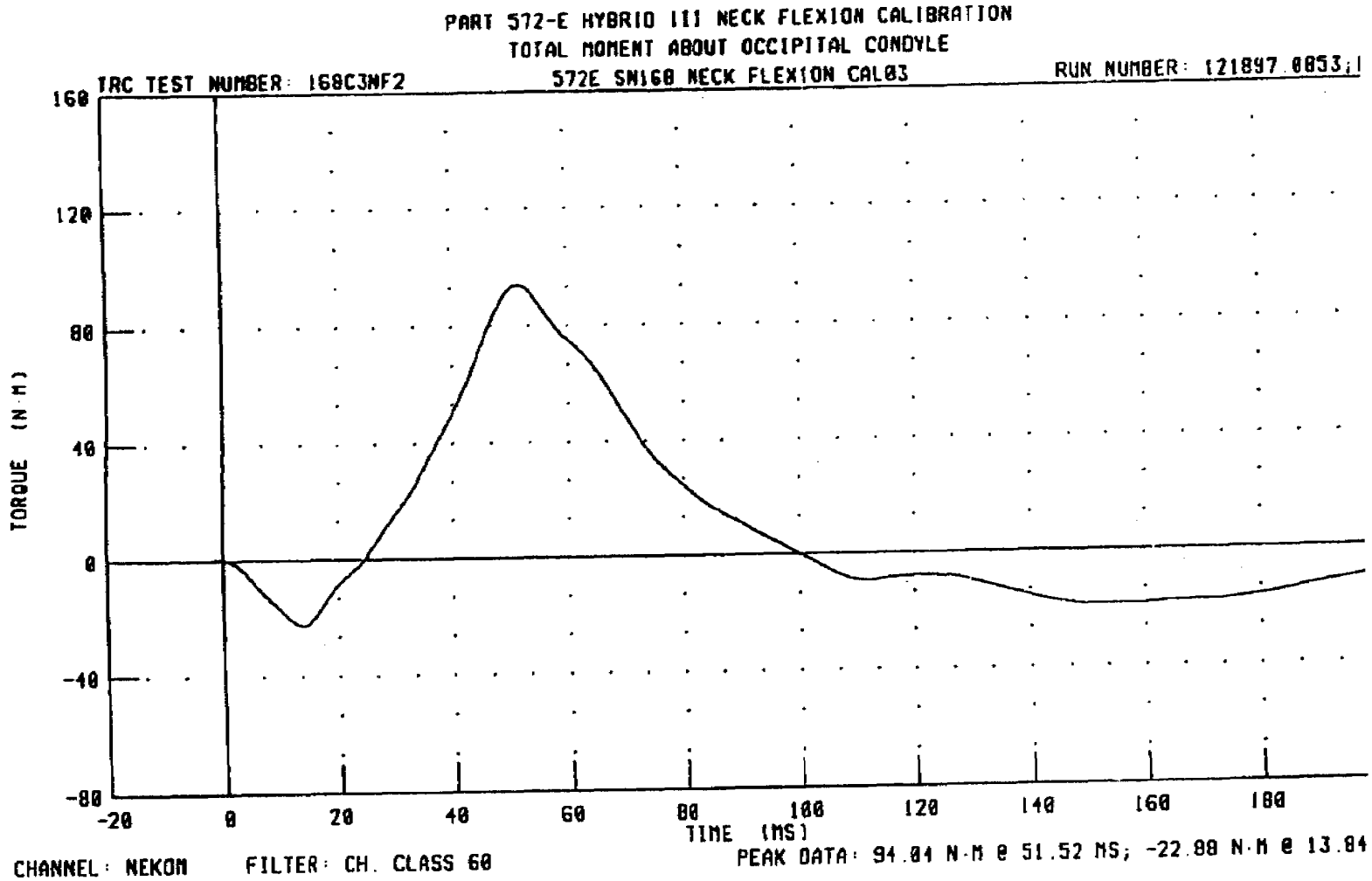
PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

TRC TEST NUMBER: 168C3NF2 572E SN168 NECK FLEXION CAL03 RUN NUMBER: 121897.0853;



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 72.49 ° @ 59.44 MS; -49.43 ° @ 174.56


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 168C3NF2
572E SN168 NECK FLEXION CAL03
RUN NUMBER: 121897.0853;1
160
120
80
40
0
-40
-80
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 94.84 N-M @ 51.52 MS; -22.88 N-M @ 13.84

TRANSPORTATION RESEARCH CENTER INC.

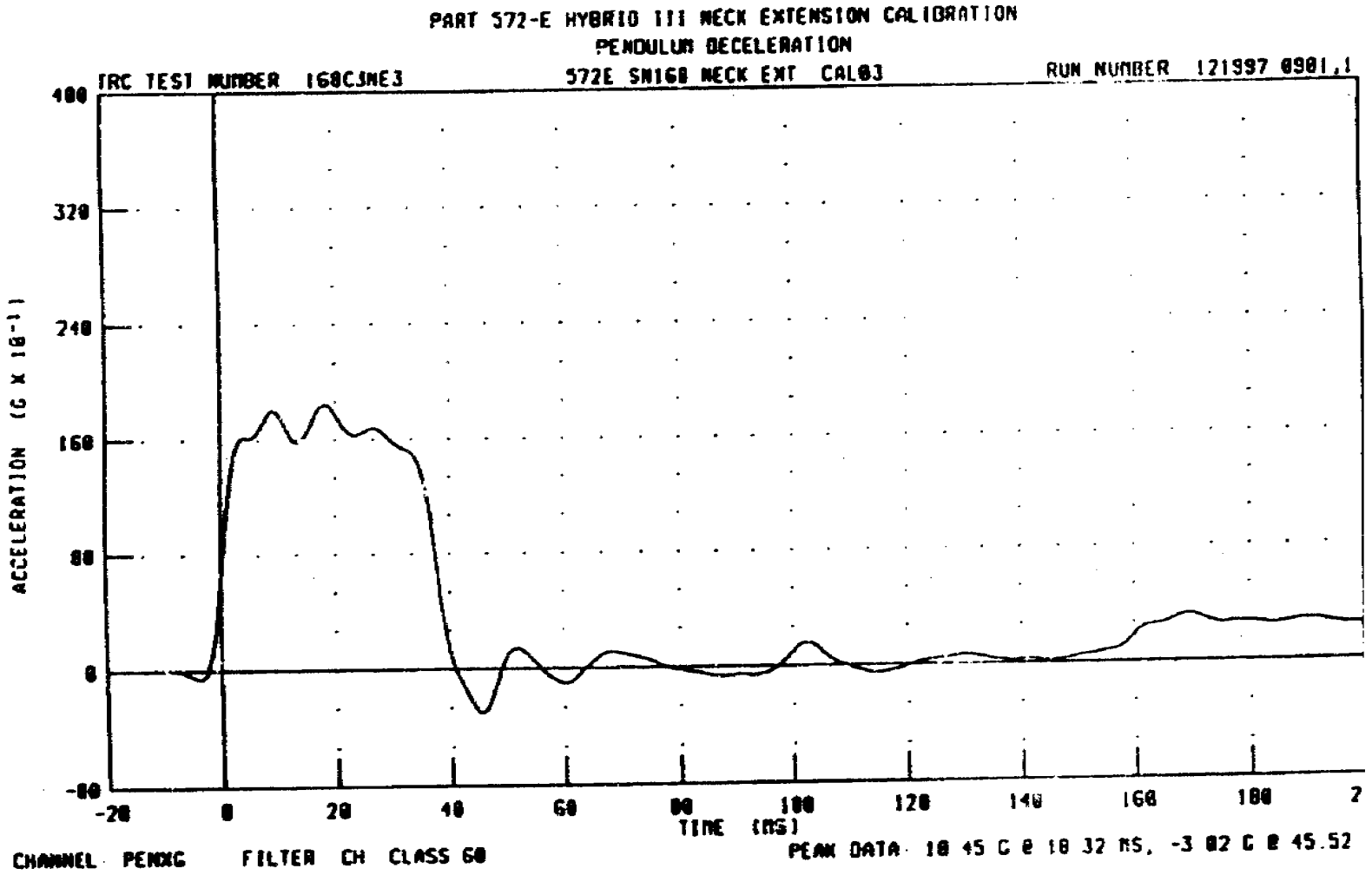
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

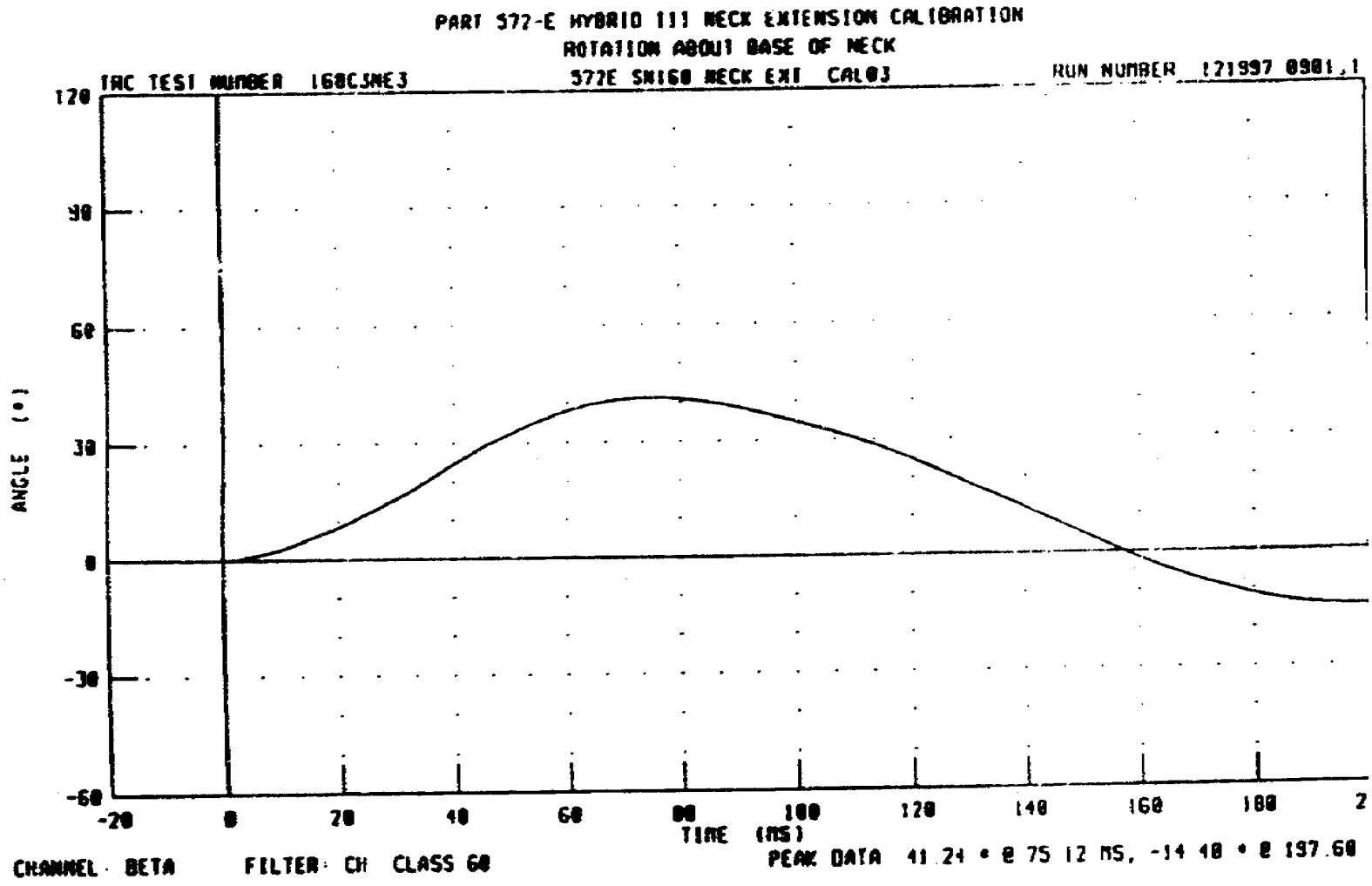
TRC INC. TEST NO: 168C3NE3 572E SN168 NECK EXT. CAL03

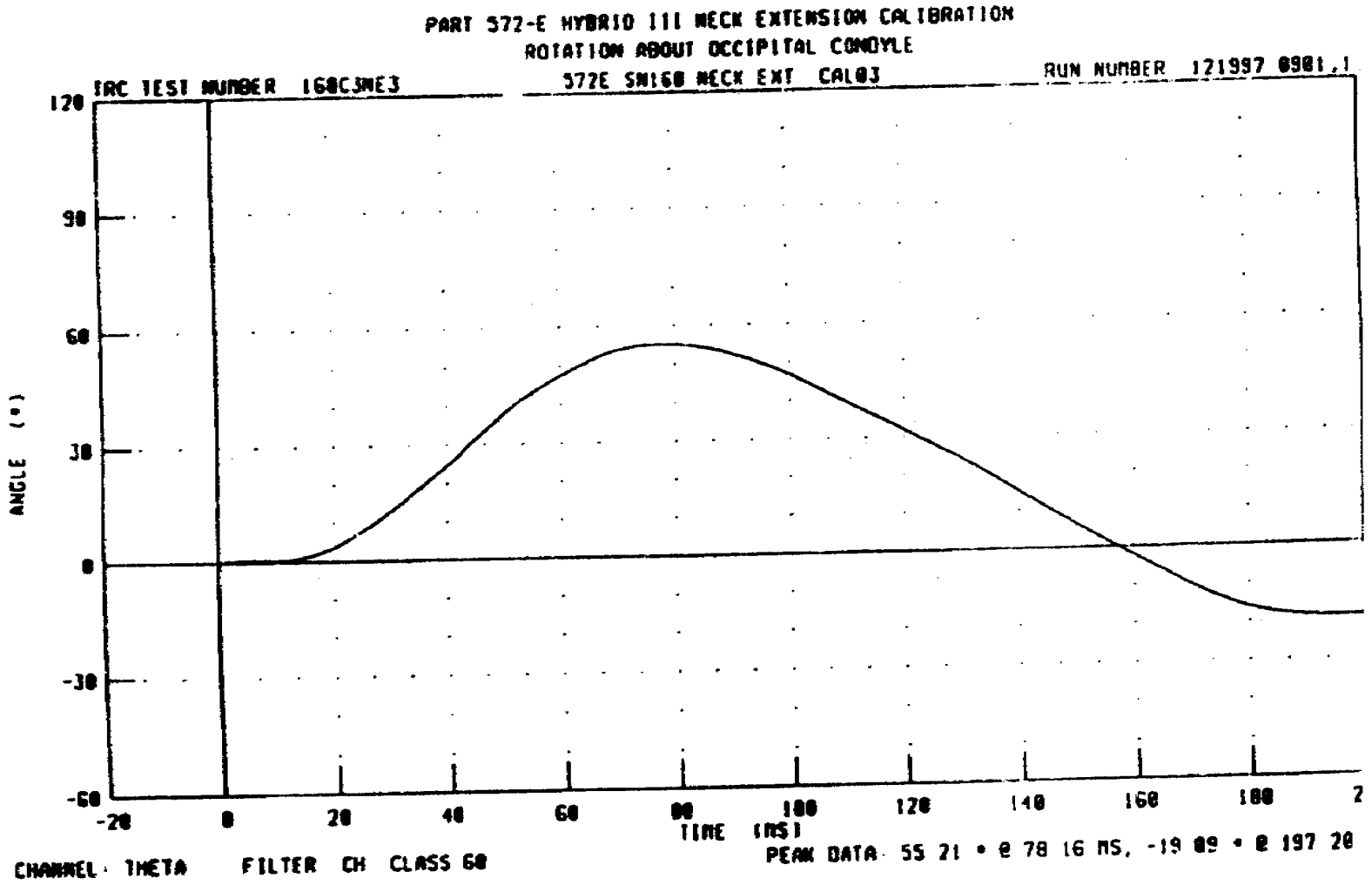
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	35.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	5.95 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.87 G
	20 MS	14.00 - 19.00 G	17.78 G
	30 MS	11.00 - 16.00 G	15.77 G
MAX PENDULUM G		22 G MAX	18.44 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.74 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.48 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	96.38 DEG.
	TIME	72 - 82 MS	76.40 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-63.48 NM
	TIME	65 - 79 MS	70.16 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	157.44 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	142.80 MS

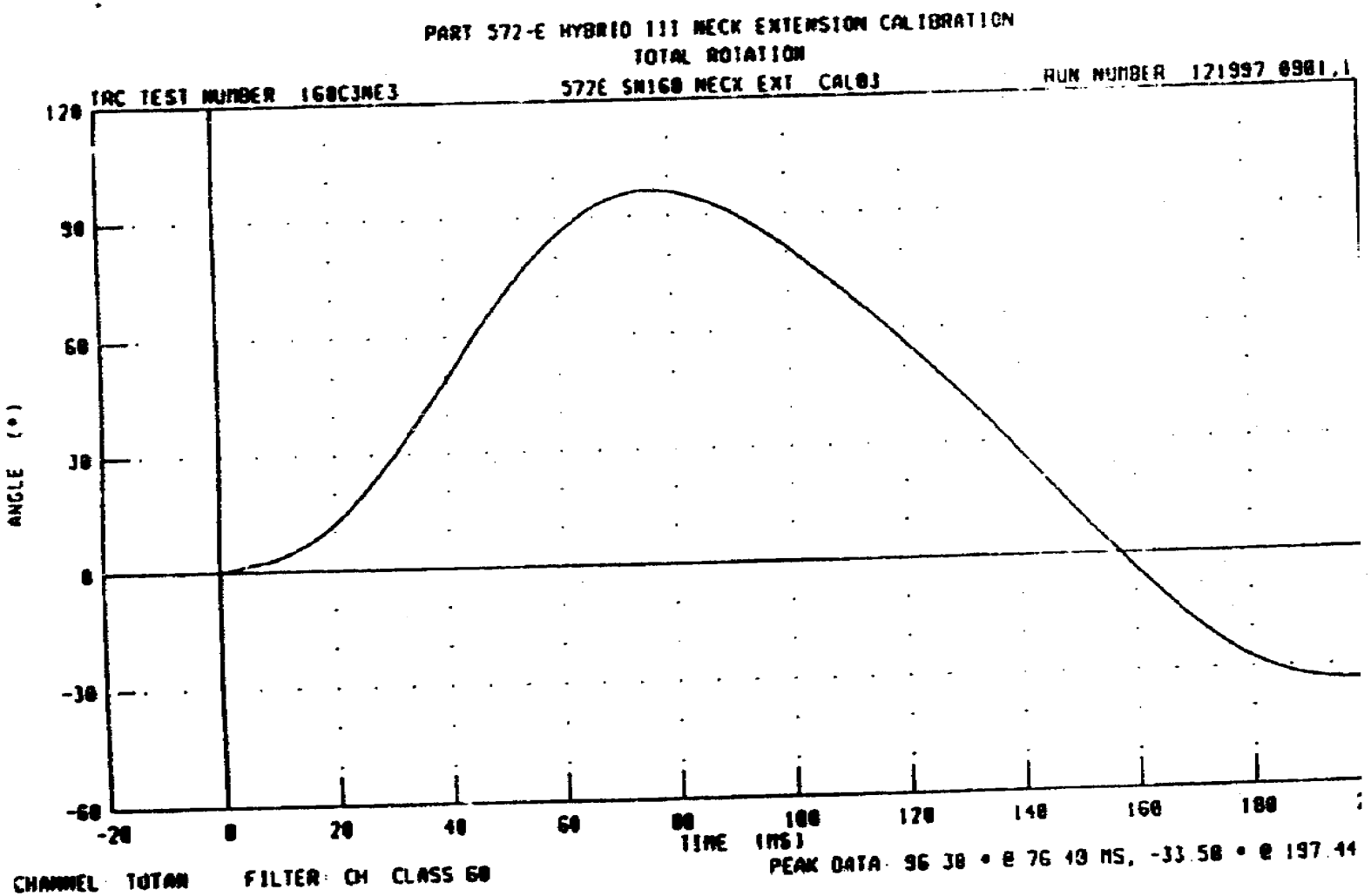
TEST MEETS SPECIFICATIONS

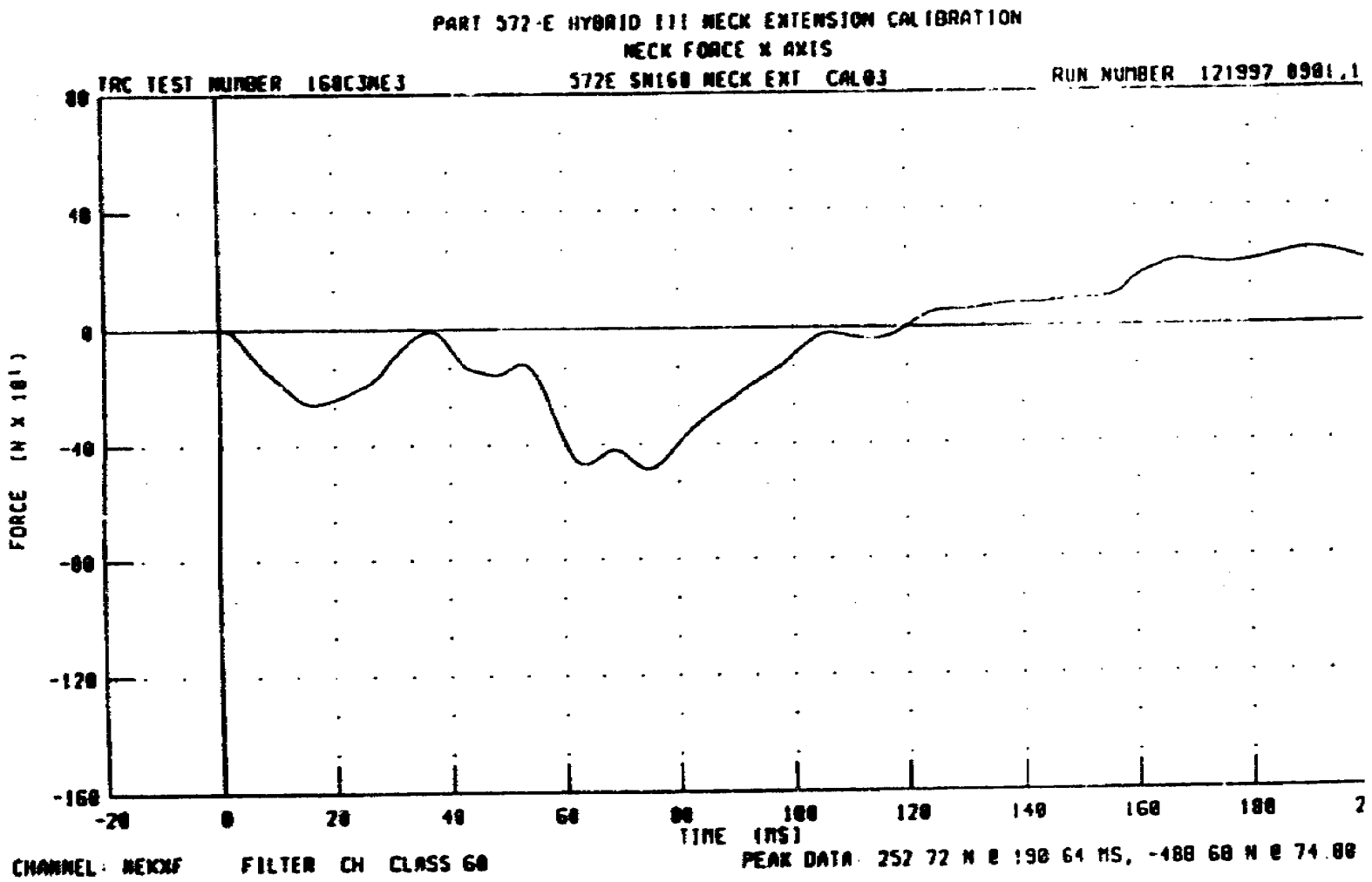
TECHNICIAN _____ RUN NUMBER: 121997.0900;1

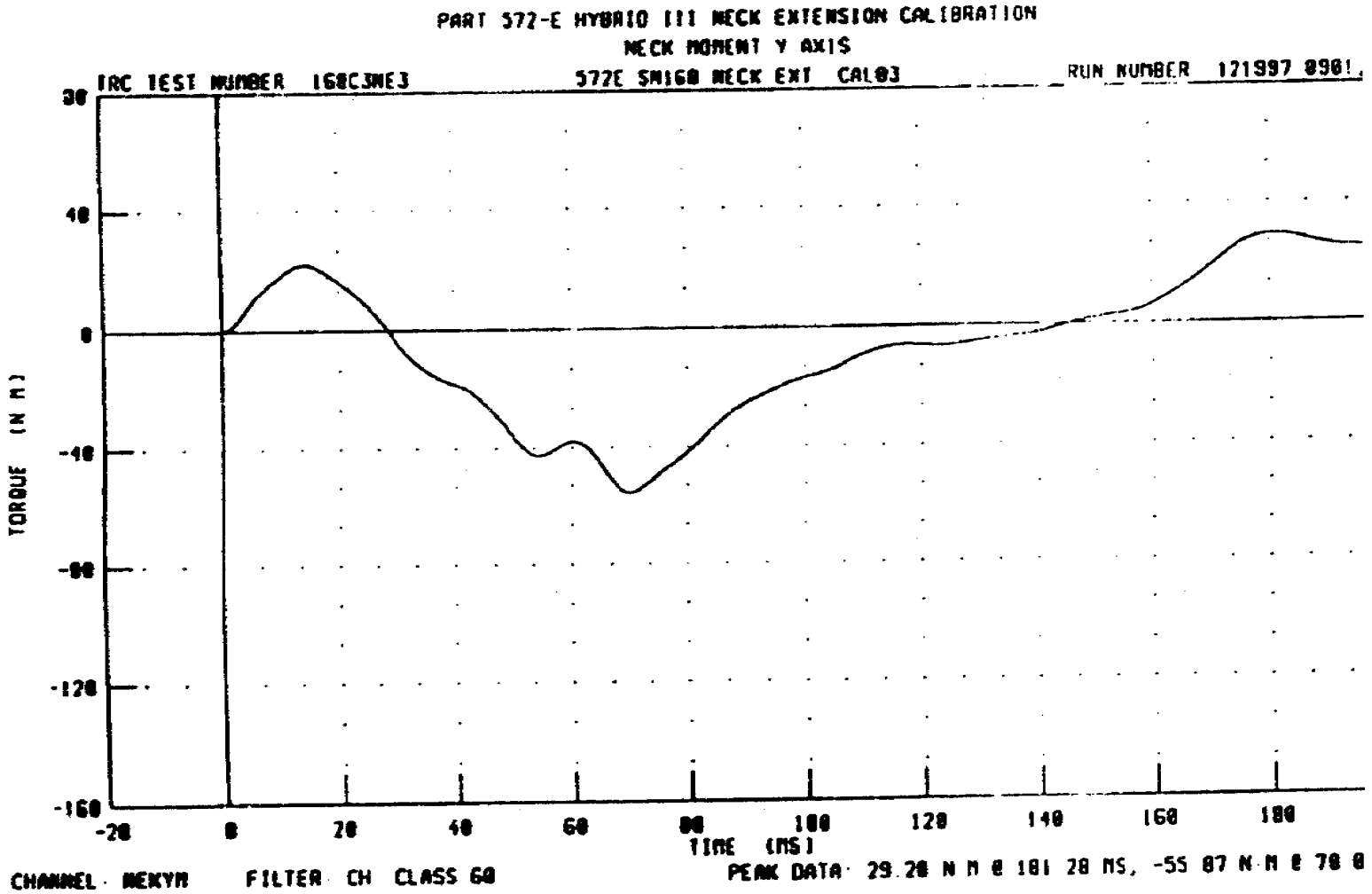

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
IRC TEST NUMBER 168C3NE3
572E SN168 NECK EXT CAL03
RUN NUMBER 121997 0901,1
ACCELERATION (G X 10⁻¹)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
TIME (MS)
CHANNEL PENXC FILTER CH CLASS 60
PEAK DATA 10 45 G @ 10 32 MS, -3 02 G @ 45.52

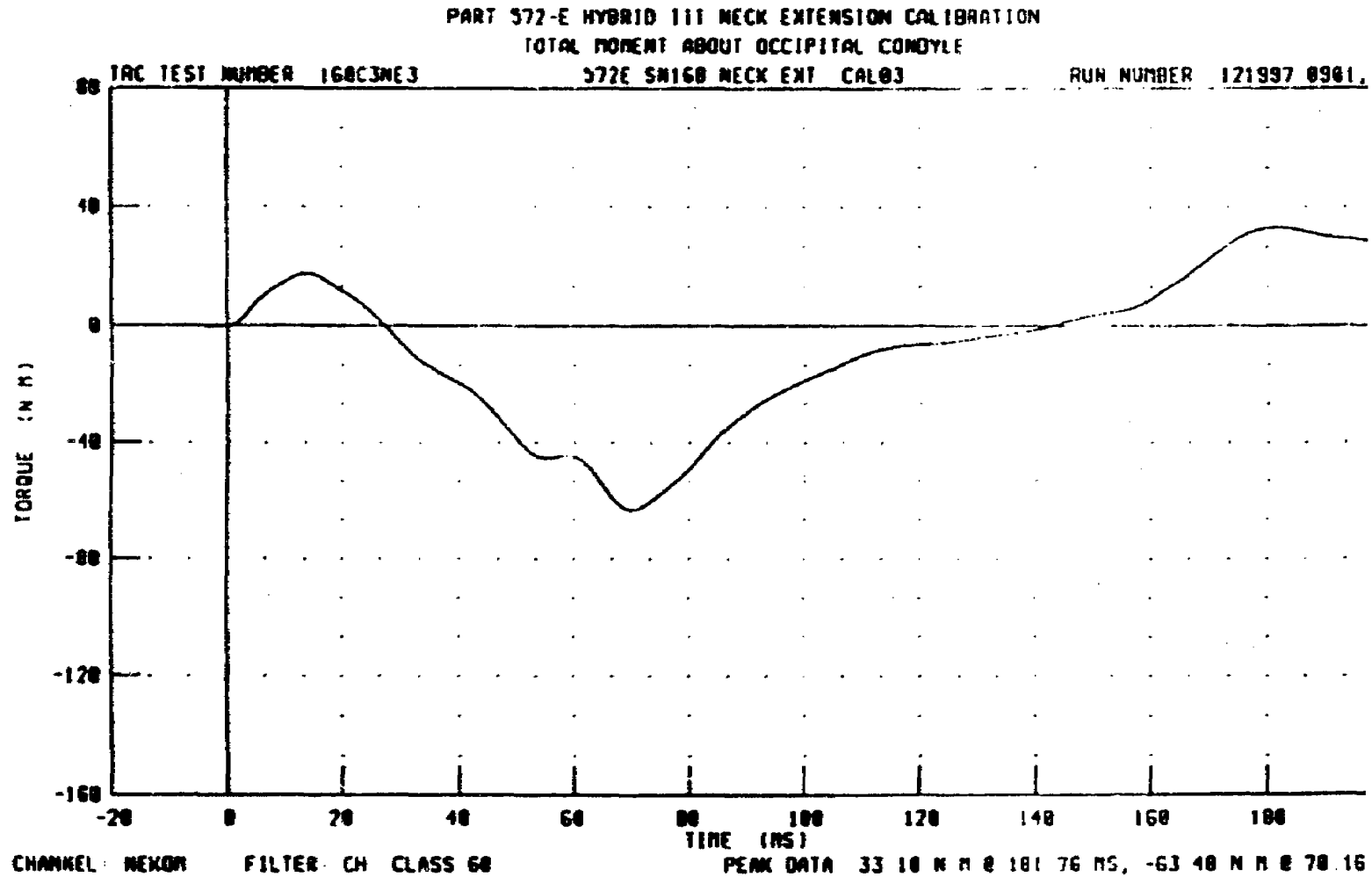

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK
TAC TEST NUMBER 168C3NE3
572E SN168 NECK EXT CAL#3
RUN NUMBER 121997 0901.1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
2
TIME (MS)
CHANNEL: BETA
FILTER: CH CLASS 60
PEAK DATA 41.24 @ 75.12 MS, -14.48 @ 197.60


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
IRC TEST NUMBER 168C3NE3
572E SN168 NECK EXT CAL03
RUN NUMBER 121997 0981.1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
TIME (MS)
CHANNEL THETA FILTER CH CLASS 60
PEAK DATA 55 21 • @ 78 16 MS, -19 89 • @ 197 20


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION
IAC TEST NUMBER 160C3NE3
572E SN160 NECK EXT CAL03
RUN NUMBER 121997 0981.1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
TIME (MS)
CHANNEL TOTAN FILTER CH CLASS 60
PEAK DATA 96.30 @ 76.40 MS, -33.58 @ 197.44


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER 168C3AE3
572E SN168 NECK EXT CAL03
RUN NUMBER 121997 0901.1
FORCE (N X 10¹)
80
40
0
-40
-80
-120
-160
-20
0
20
40
60
80
100
120
140
160
180
TIME (MS)
CHANNEL: NEKXF
FILTER CH CLASS 60
PEAK DATA 252.72 N @ 190.64 MS, -488.60 N @ 74.80


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
IRC TEST NUMBER 168C3NE3
572E SN168 NECK EXT CAL03
RUN NUMBER 121997 0901
TORQUE (N M)
TIME (MS)
CHANNEL NECKYM
FILTER CH CLASS 60
PEAK DATA 29.28 N M @ 181.28 MS, -55.87 N M @ 78.0


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TAC TEST NUMBER 168C3NE3
572E SN168 NECK EXT CAL03
RUN NUMBER 121997 0961.
80
40
0
-40
-80
-120
-160
TORQUE (N M)
-20
0
20
40
60
80
100
120
140
160
180
TIME (MS)
CHANNEL NEXOR
FILTER CH CLASS 60
PEAK DATA 33 10 N M @ 101 76 MS, -63 40 N M @ 78 16

THORAX IMPACT TEST

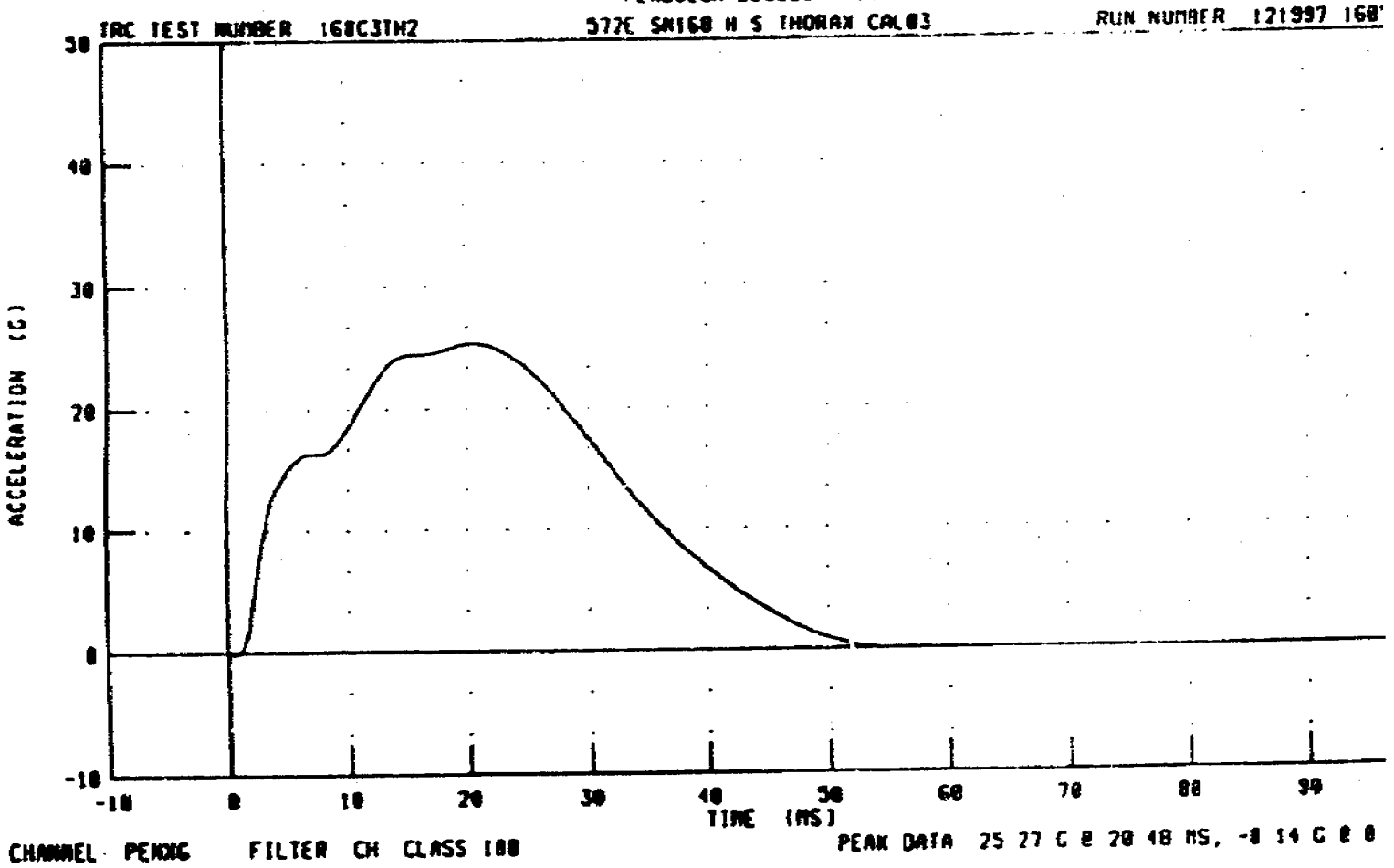
TRC INC. TEST NO: 168C3TH2 572E SN168 H.S.THORAX CAL03

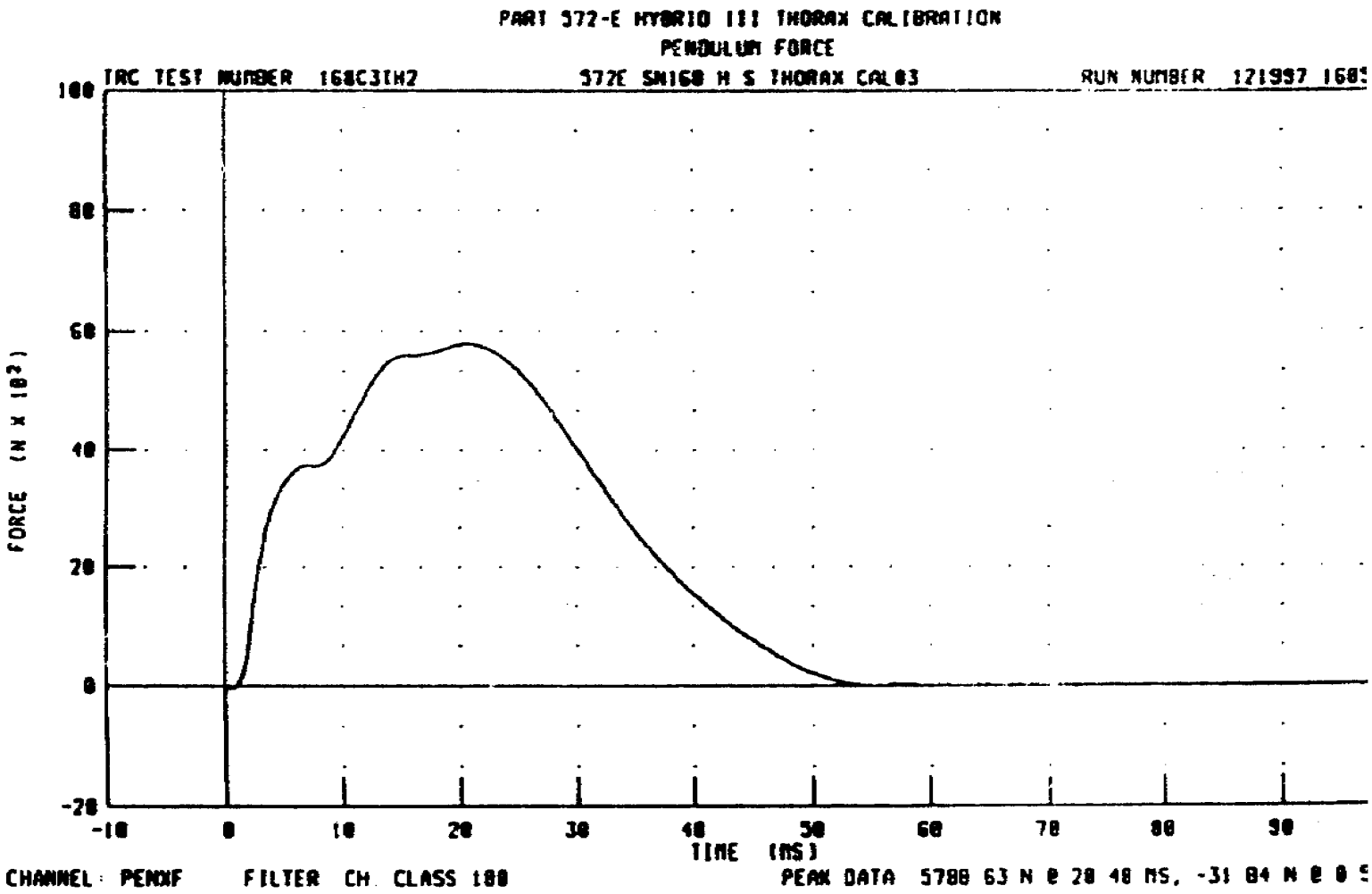
TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	20.9 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.80 M/S
MAXIMUM DEFLECTION	63.5 - 72.[illegible] MM	64.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5788. N
INTERNAL HYSTERESIS	69% - 85%	72.3%

TEST MEETS SPECIFICATIONS

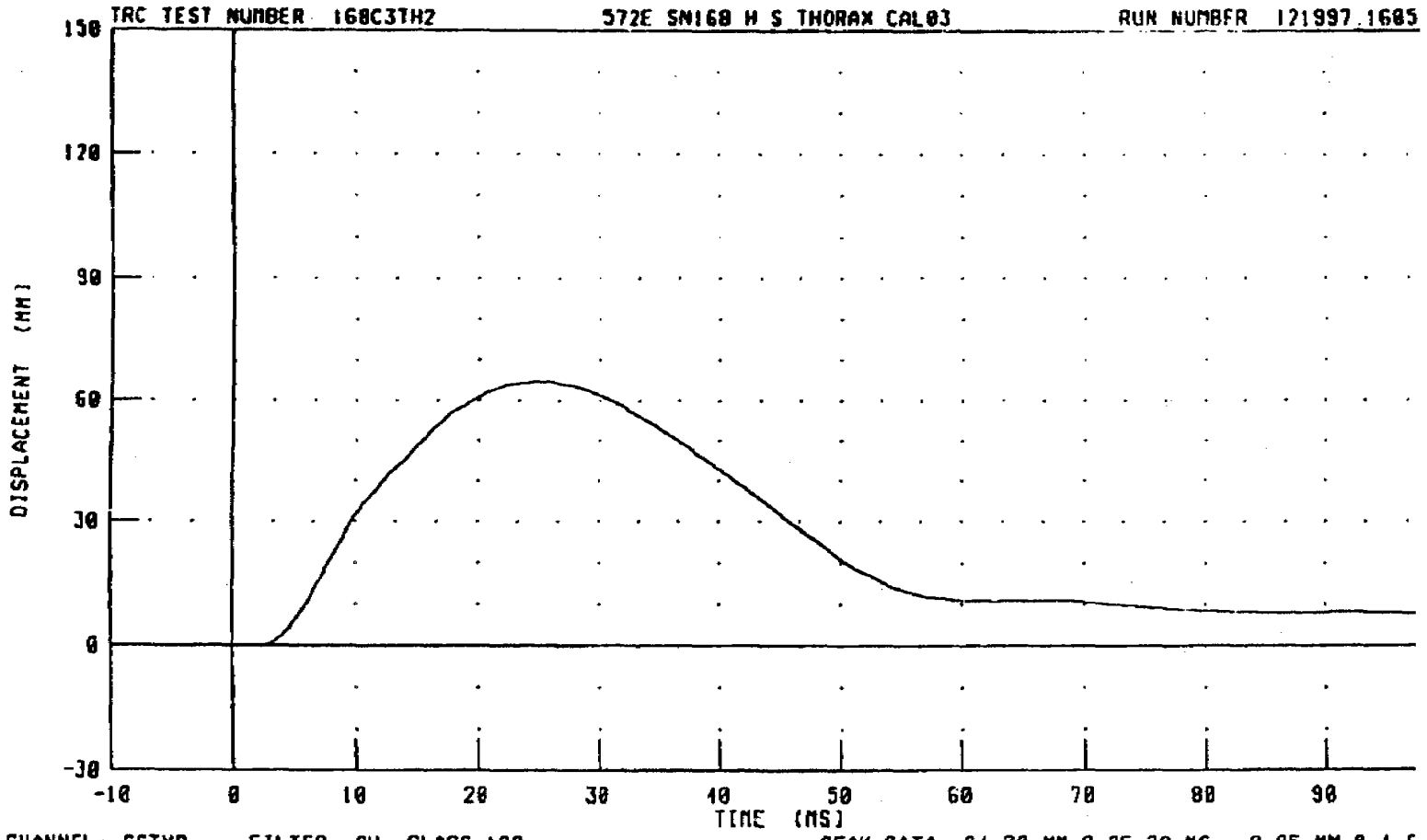
TECHNICIAN John K. Claridge RUN NUMBER: 121997.1604;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION



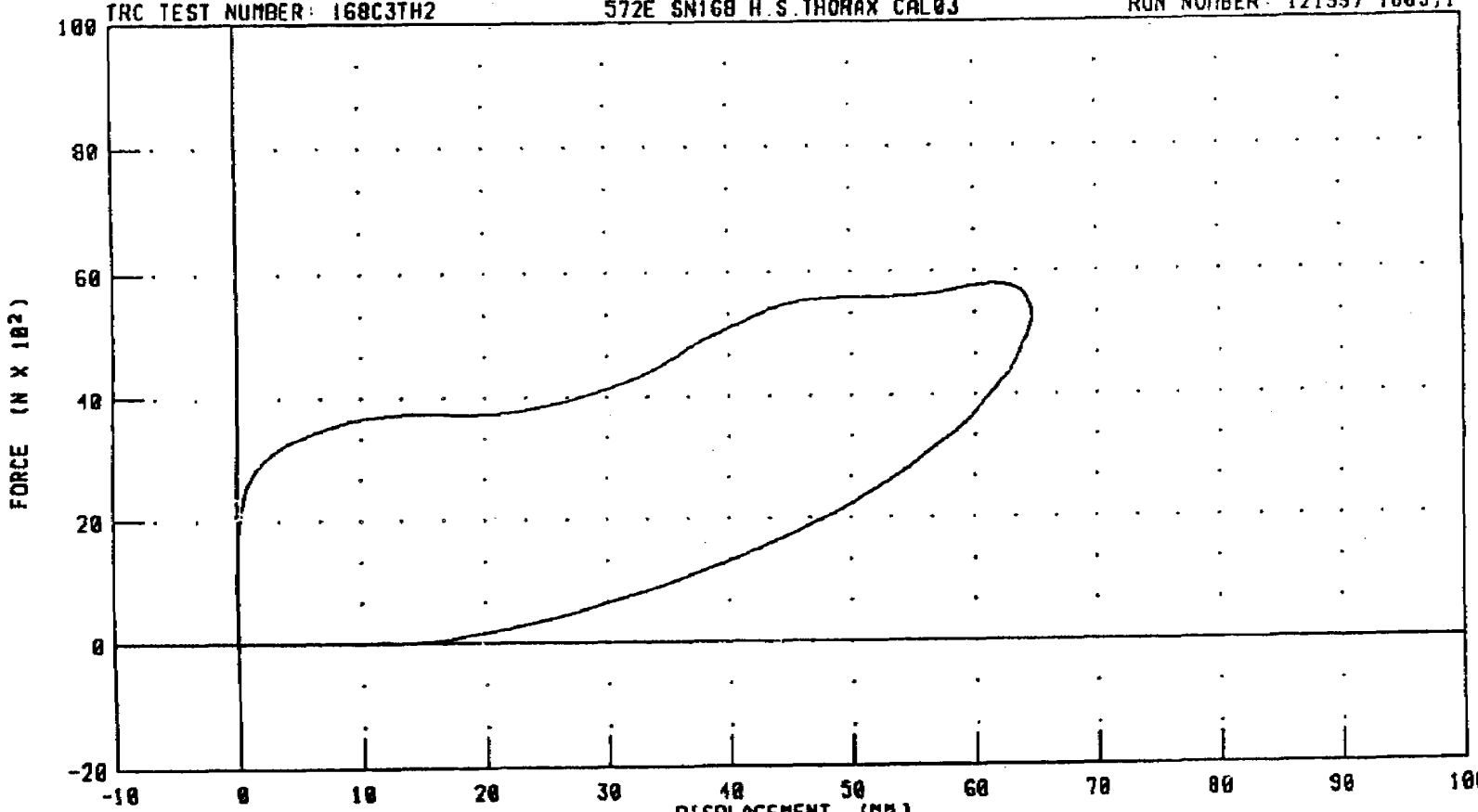

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER 168C3IH2
572E SN168 H S THORAX CAL03
RUN NUMBER 121997 168
100
80
60
40
20
0
-20
FORCE (N X 10²)
-10
0
10
20
30
40
50
60
70
80
90
TIME (MS)
CHANNEL: PENXF
FILTER CH CLASS 180
PEAK DATA 5788 63 N @ 28 48 MS, -31 84 N @ 0

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT



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

TRC TEST NUMBER: 168C3TH2
572E SN168 H.S.THORAX CAL03
RUN NUMBER: 121997 1605,1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA: 64.70 MM @ 25.20 MS; -0.05 MM @ 1.92 MS
5780.63 N @ 20.48 MS; -31.84 N @ 0.56 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

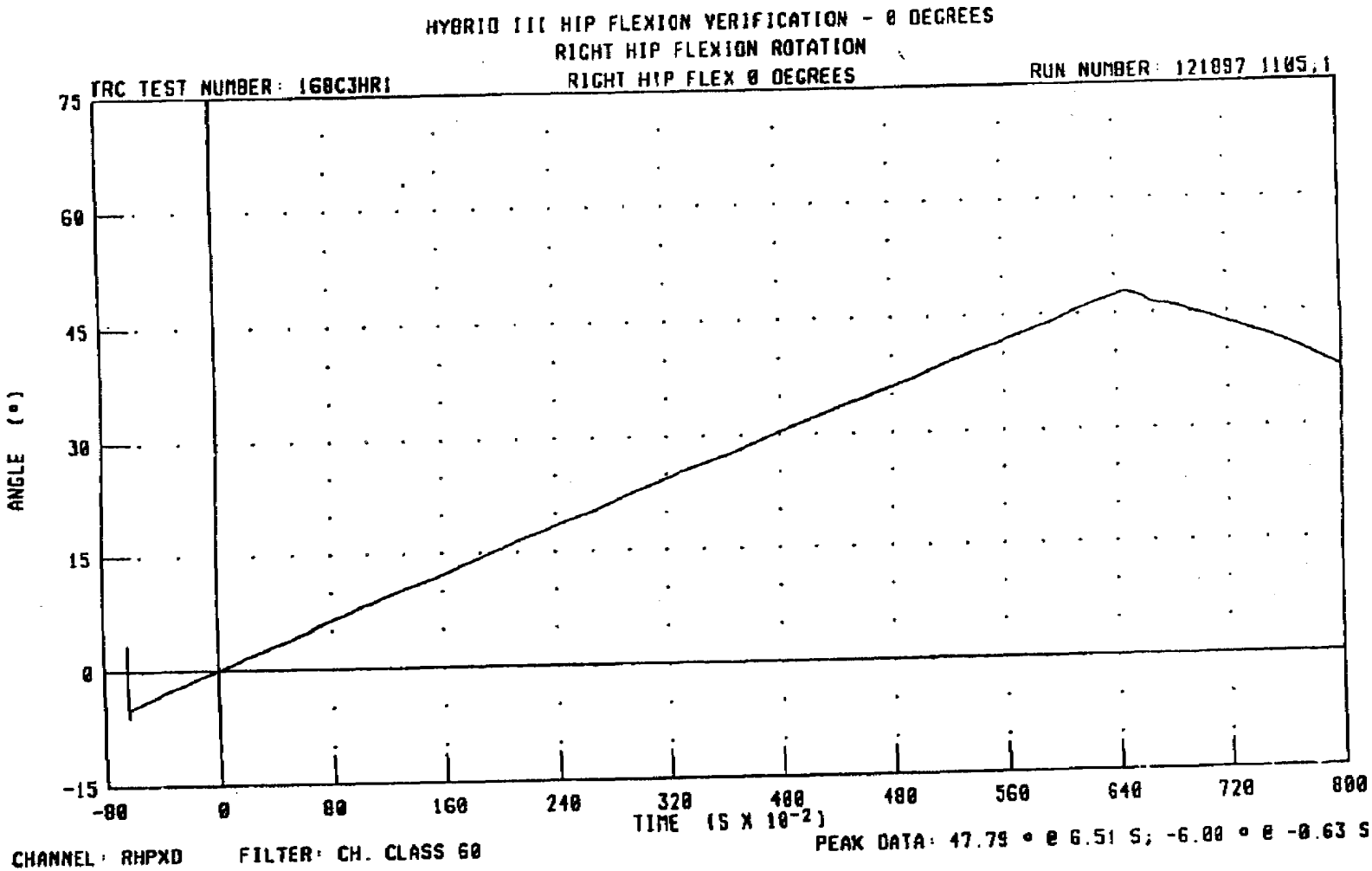
HYBRID III PART 572E 18-DEC-97

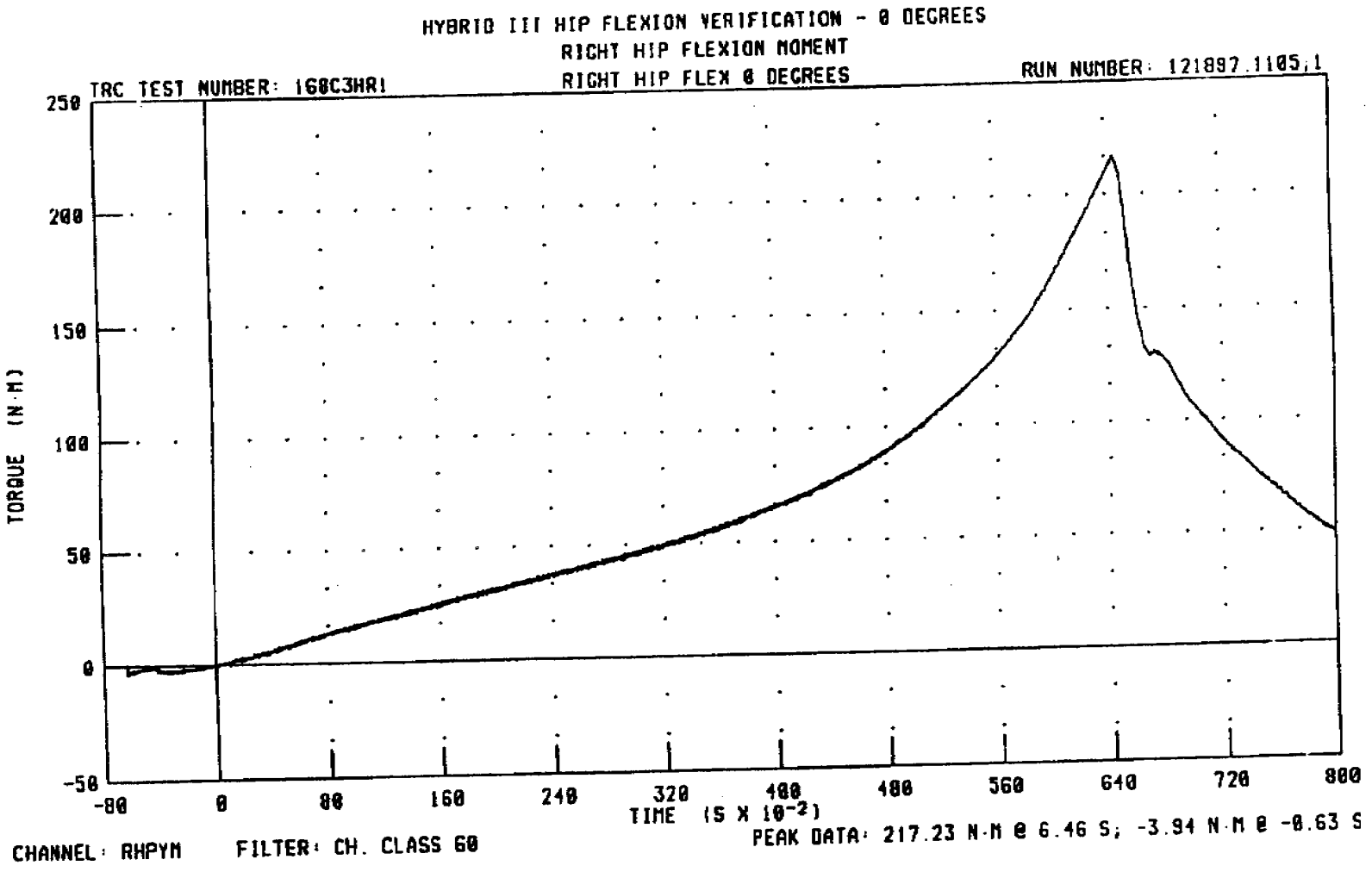
TRC INC. TEST NO: 168C3HR1 RIGHT HIP FLEX 0 DEGREES

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	65.5 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	47.1 deg.

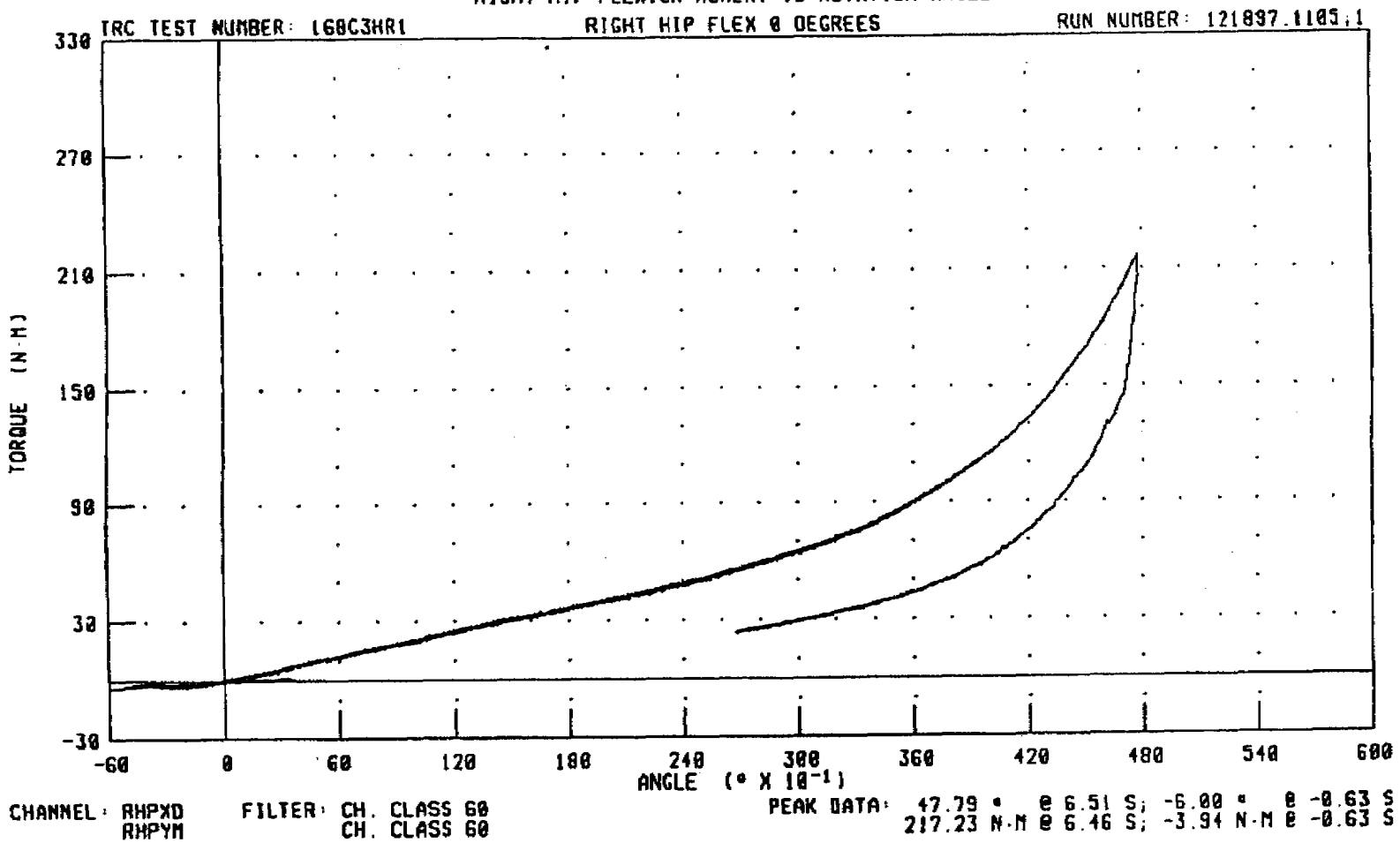
TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins RUN NUMBER: 121897.1105;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION ROTATION
RIGHT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 168C3HRI
RUN NUMBER: 121897 1105.1
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: 47.79 ° @ 6.51 S; -6.00 ° @ -0.63 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
RIGHT HIP FLEXION MOMENT
RIGHT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 168C3HR1
RUN NUMBER: 121897.1105,1
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: 217.23 N-M @ 6.46 S; -3.94 N-M @ -0.63 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

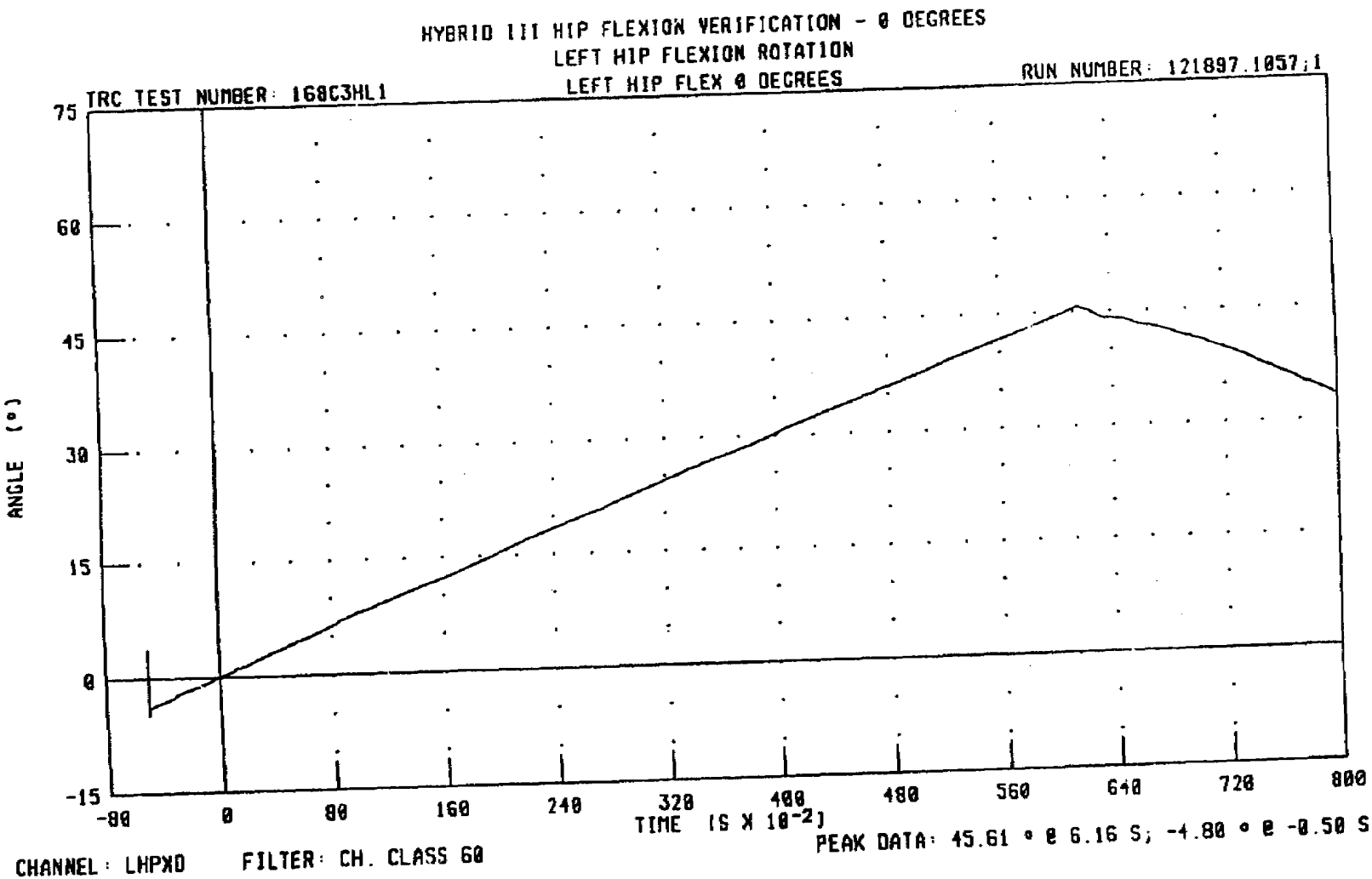
HYBRID III PART 572E 18-DEC-97

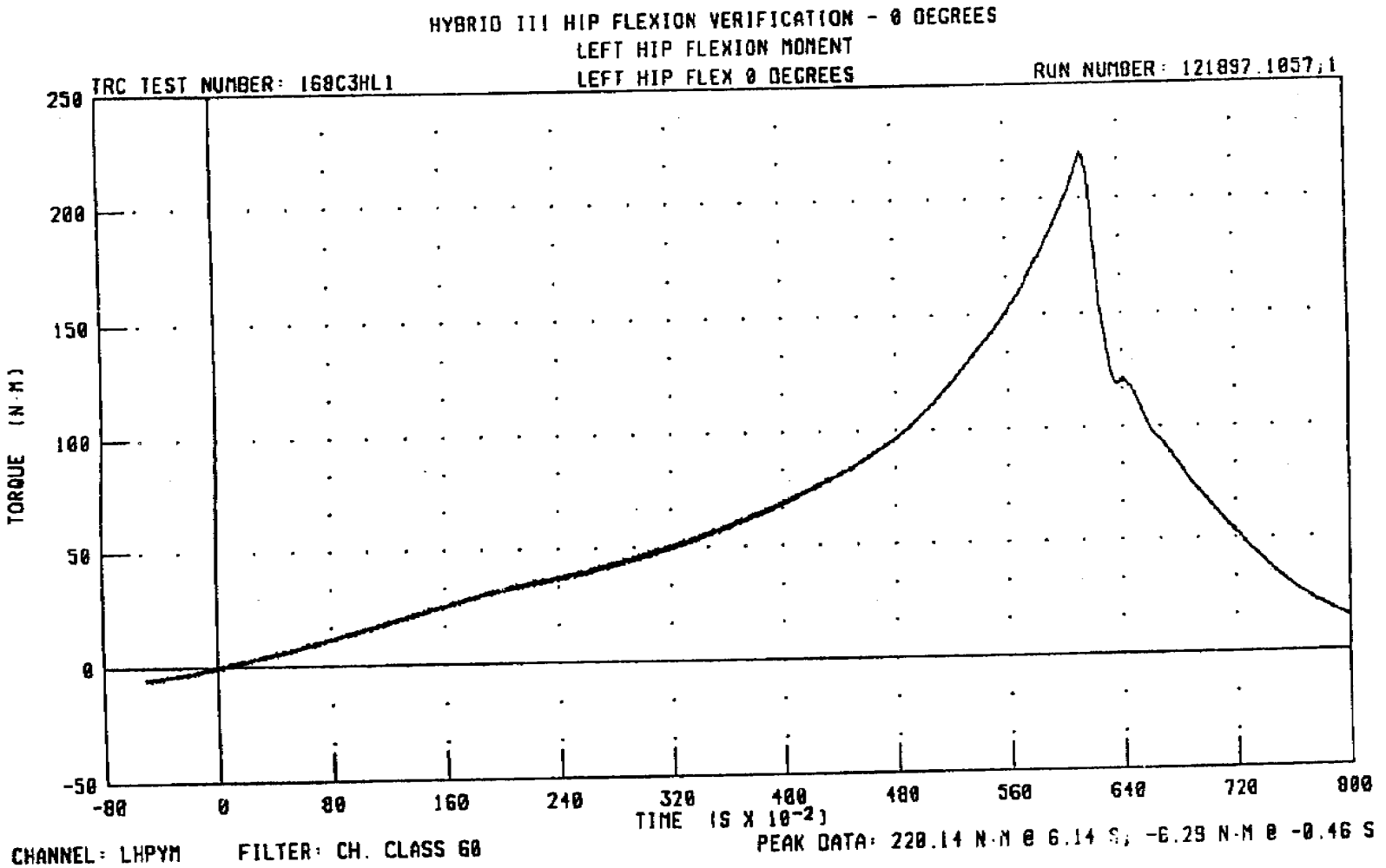
TRC INC. TEST NO: 168C3HL1 LEFT HIP FLEX 0 DEGREES

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	68.5 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	44.8 deg.

TEST MEETS SPECIFICATIONS

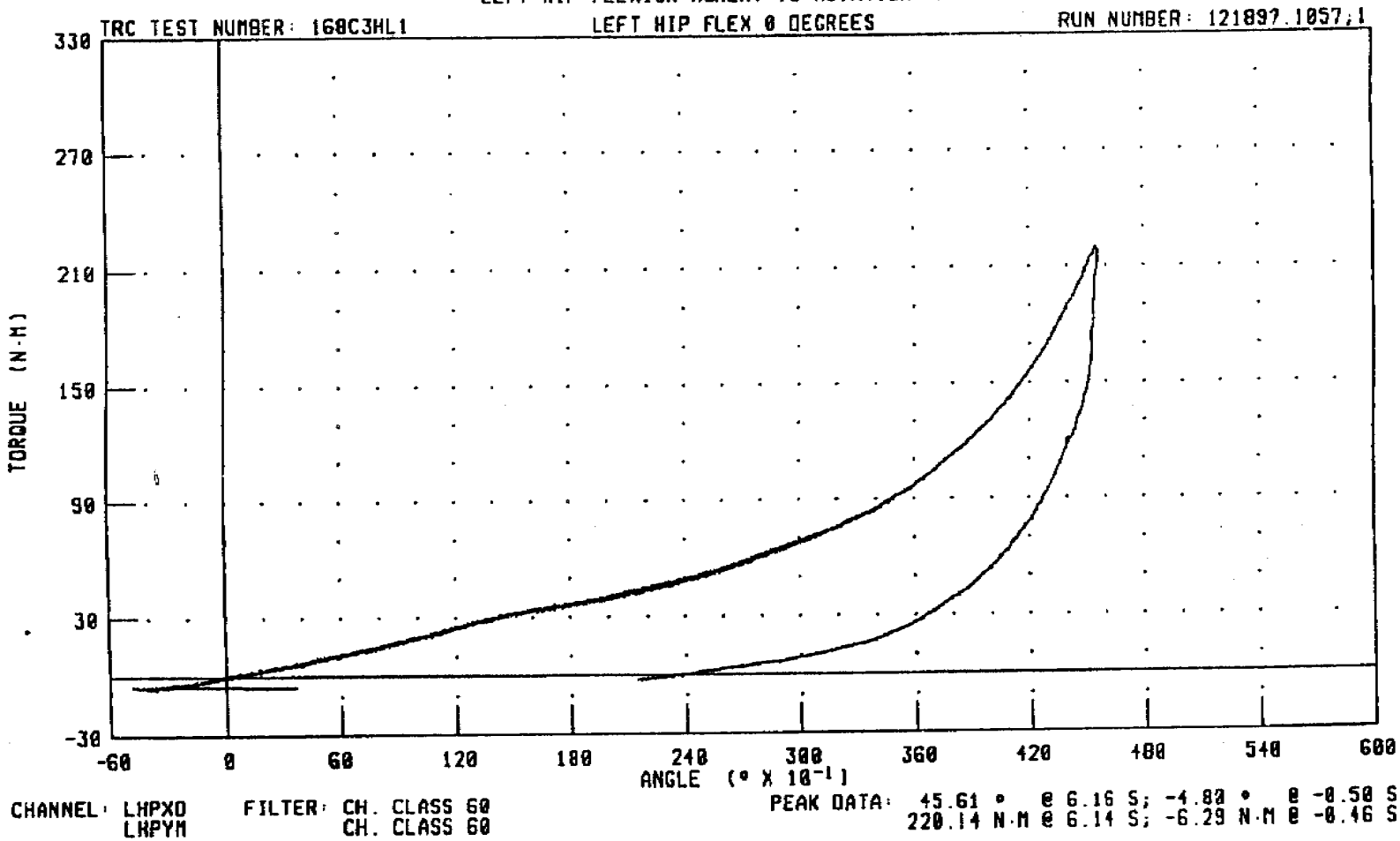
TECHNICIAN Kevin Watkins RUN NUMBER: 121897.1056;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION ROTATION
LEFT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 168C3HL1
RUN NUMBER: 121897.1057;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: LHPXD
FILTER: CH. CLASS 60
PEAK DATA: 45.61 @ 6.16 S; -4.80 @ -0.50 S


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT
LEFT HIP FLEX 0 DEGREES
TRC TEST NUMBER: 168C3HL1
RUN NUMBER: 121897.1057;1
TORQUE (N-M)
250
200
150
100
50
0
-50
-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: 220.14 N-M @ 6.14 S; -6.29 N-M @ -0.46 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT VS ROTATION ANGLE



CHANNEL: LHPXD FILTER: CH. CLASS 60

LHPYM CH. CLASS 60

PEAK DATA: 45.61 ° @ 6.16 S; -4.80 ° @ -0.50 S

220.14 N-M @ 6.14 S; -6.29 N-M @ -0.46 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

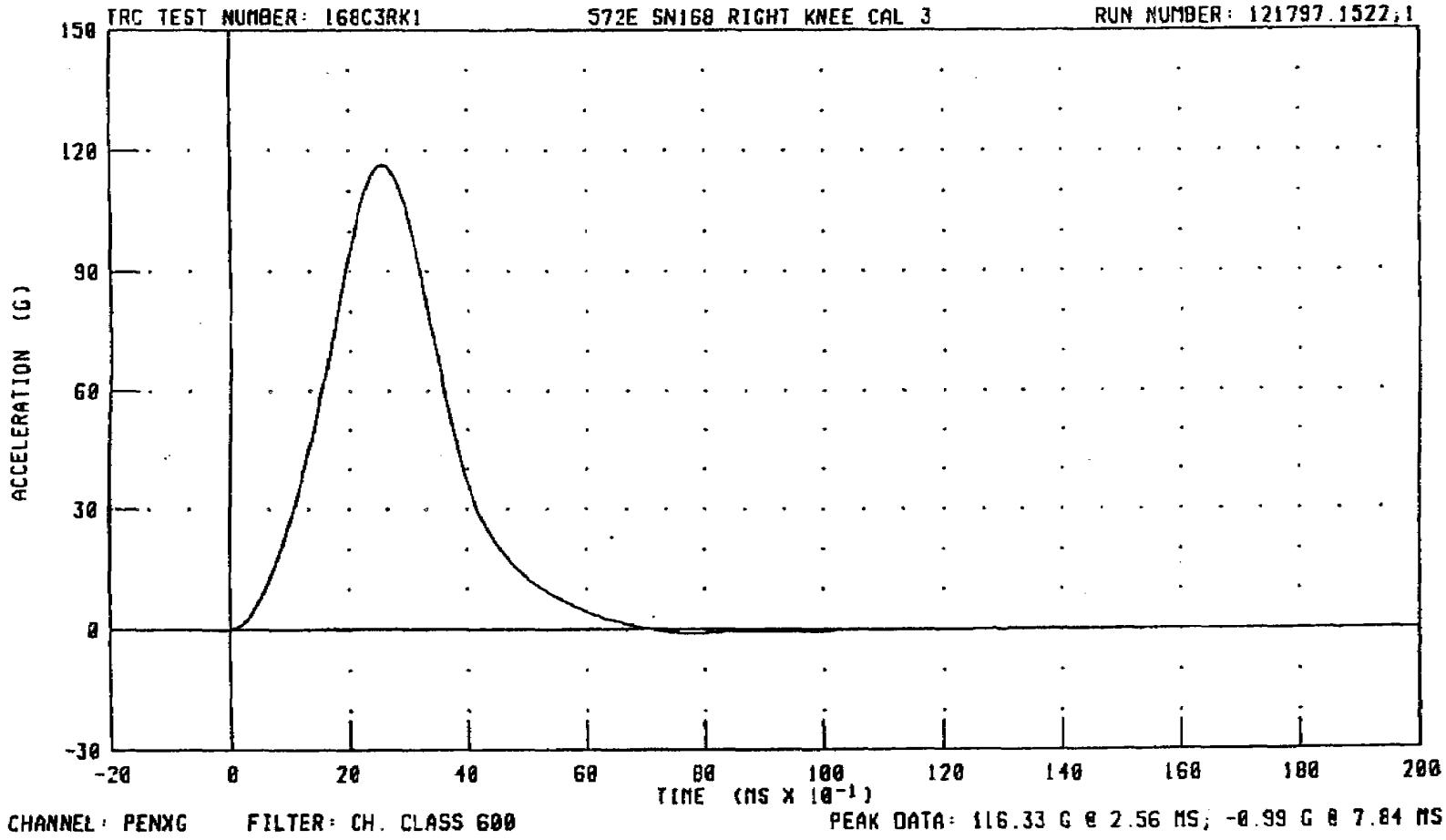
TRC INC. TEST NO: 168C3RK1 572E SN168 RIGHT KNEE CAL 3

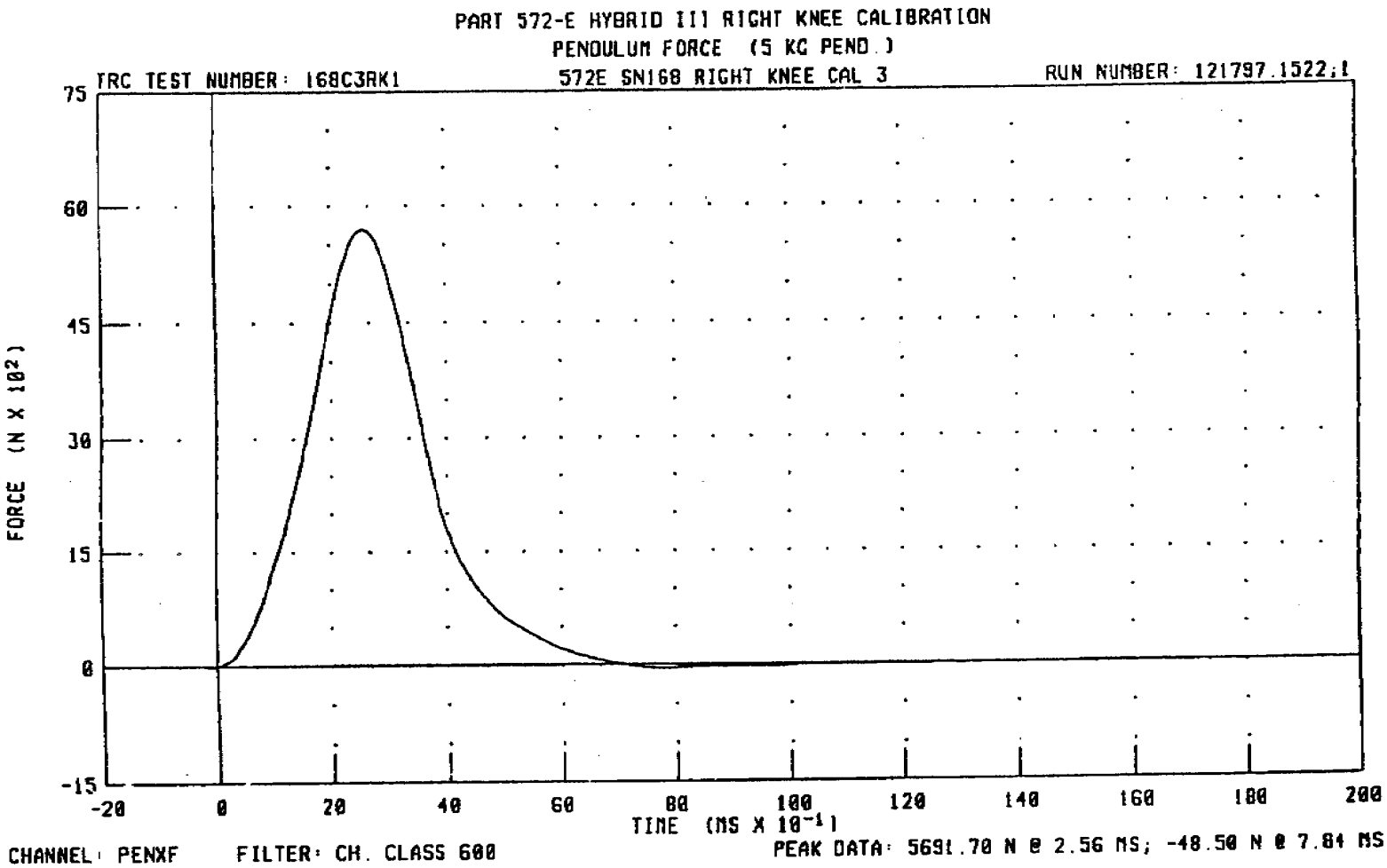
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5691.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudge RUN NUMBER: 121797.1507;1

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




PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 168C3RK1
572E SN168 RIGHT KNEE CAL 3
RUN NUMBER: 121797.1522;1
75
60
45
30
15
0
-15
FORCE (N X 10²)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 5691.70 N @ 2.56 MS; -48.50 N @ 7.84 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

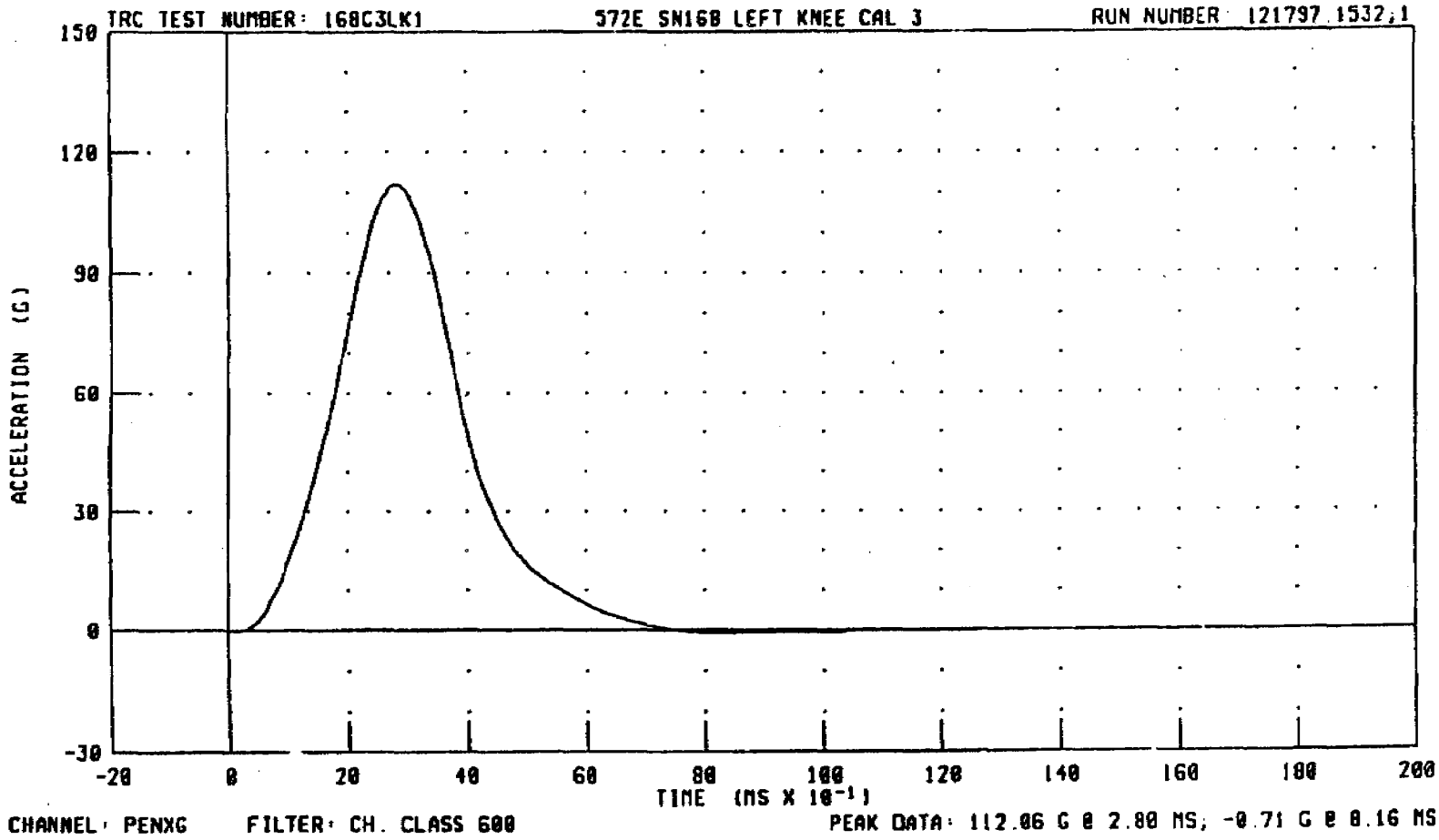
TRC INC. TEST NO: 168C3LK1 572E SN168 LEFT KNEE CAL 3

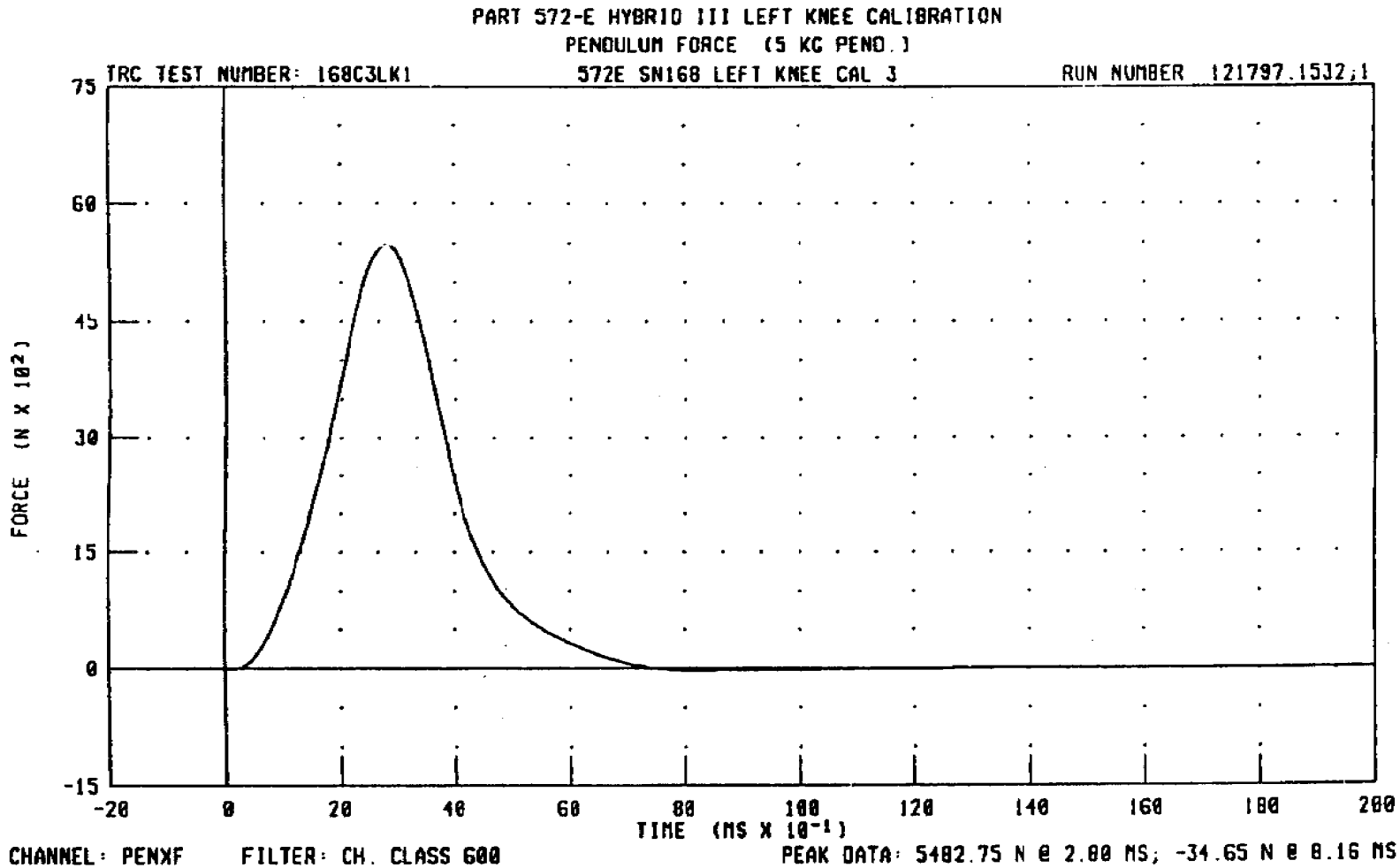
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5482.7 N

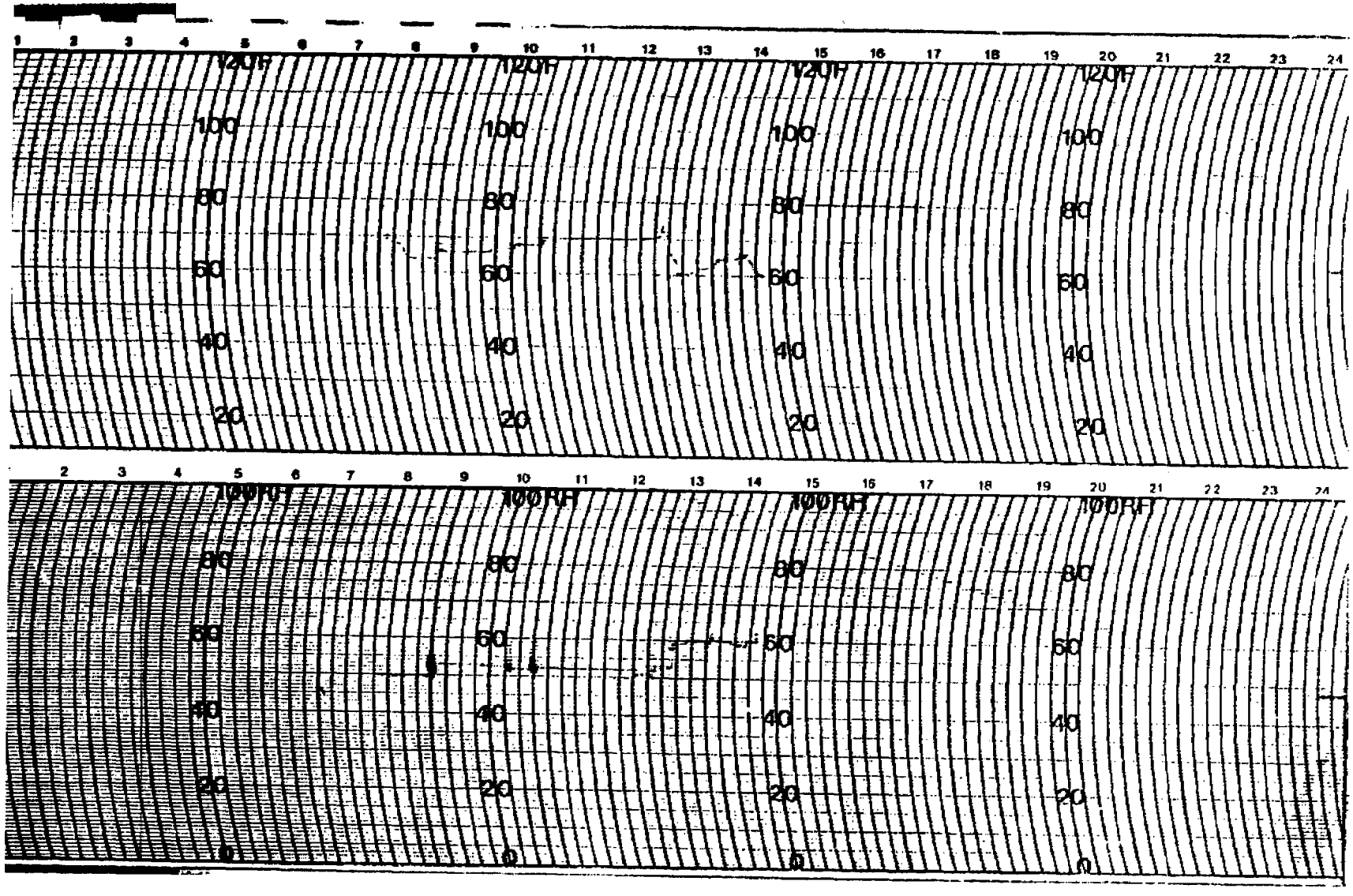
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudy RUN NUMBER: 121797.1504;1

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




PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 168C3LK1
572E SN168 LEFT KNEE CAL 3
RUN NUMBER 121797.1532;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: 5482.75 N @ 2.00 MS; -34.65 N @ 8.16 MS


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
120°F
100
80
60
40
20
100°RH
0