V2832

1998 Ford Taurus
into a Flat Frontal Barrier
Test No. 971222

Prepared by:

Transportation Research Center Inc.

10820 State Route 347

East Liberty, OH 43319

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Vehicle Research and Test Center

P. O. Box 37

East Liberty, OH 43319

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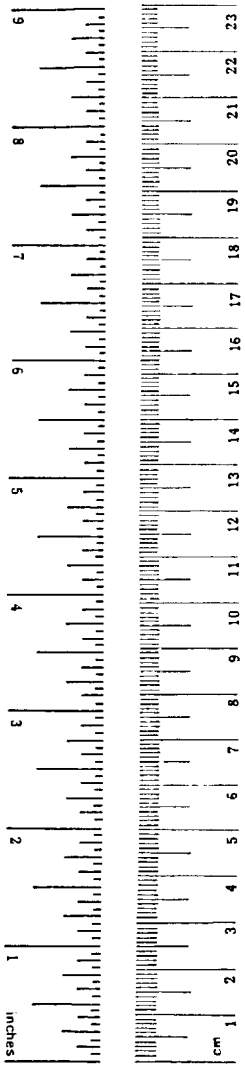
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

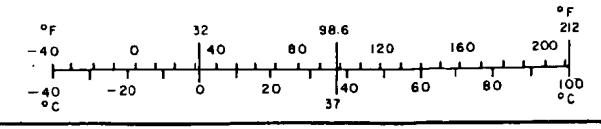
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2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

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



Approximate Conversions from Metric Measures

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



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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 Ford Taurus 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 TRC on December 22, 1997.

The test vehicle, a 1998 Ford Taurus, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 1737.6 kilograms. The vehicle's impact speed was 47.2 kph. The vehicle's maximum static crush was 314 millimeters.

The driver's 36 millisecond HIC was 290. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47.2 g. The driver's chest deflection was 22 millimeters. The driver's left and right femur maximum compressive forces were 5556 N and 4882 N, respectively.

The right front passenger's 36 millisecond HIC was 299. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.5 g. The passenger's chest deflection was 9 millimeters. The right front passenger's left and right femur maximum compressive forces were 5697 N and 5312 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 16 milliseconds and recorded questionable after that.

Table 1 Crash Test Summary

Test type:	Frontal barrier impact
Test date:	12/22/97
Test time:	1526
Ambient temperature at impact area:	22° C
Vehicle year/make/ model/body style:	1998/Ford/Taurus/4-door Sedan
Vehicle test weight:	1737.6 kg
Impact angle[1]:	0°
Impact velocity[2]:	
Primary:	47.2 kph
Secondary:	47.2 kph
Maximum static crush:	314 mm
Average rebound:	1172 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/Ford/Taurus/4-door Sedan
Color:	Red
VIN:	1FAFP52U9WG130657
Engine data:	
Placement:	Transverse/lateral
Cylinders:	6
Displacement:	3.0 liters
Transmission data:	_3_speed, ___manual, _X_automatic, ___overdrive
Final drive:	_X_fwd, ____rwd, ___4wd
Date vehicle received:	NA
Odometer reading:	13
Dealer's name and address:	Krieger Ford/Columbus, OH

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by:		Ford Motor Co., Inc.
Date of manufacture:		11/97
VIN:		1FAFP52U9WG130657
GVWR:		4687 lb
GAWR:	Front:	2647 lb
	Rear:	2065 lb

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P205/65R15
Spare tire:	Space saver
Type of front seats:	Bucket

Tire & capacity data from vehicle's label:

Recommended tire size:	P205/65R15
Recommended cold tire pressure:	
Front:	33 psi
Rear:	33 psi
Designated Seating Capacity:	
Front	2-3
Rear	3
Total	5-6
Vehicle Capacity Weight:	1100 lbs.

Test vehicle attitudes:

Delivered attitude:	LF:	710 mm	RF:	722 mm	LR:	694 mm	RR:	702 mm
Fully loaded attitude:	LF:	694 mm	RF:	705 mm	LR:	645 mm	RR:	652 mm
Pre-test attitude:	LF:	690 mm	RF:	711 mm	LR:	636 mm	RR:	655 mm
Post-test attitude:	LF:	701 mm	RF:	680 mm	LR:	665 mm	RR:	636 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	498.0 kg	Right rear	251.3 kg
Left front	477.2 kg	Left rear	268.5 kg
Total front weight	975.2 kg	(65.2% of total vehicle weight)	
Total rear weight	519.8 kg	(34.8% of total vehicle weight)	
Total delivered weight	1495.0 kg		

Calculation of test vehicle's target test weight:

RCLW[1] = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1495.0 kg)

VCW = Vehicle Capacity Weight (499.0 kg)

DSC[2] = Designated Seating Capacity (5)

RCLW[1] = VCW - 68 (DSC) = 499 - 68 (5) = 159.0 kg

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

Target test weight = 1495.0 + 136.1 + 151.4 = 1782.5 kg

Weight of test vehicle with required dummies and 91.2 kg of cargo weight:

Right front	531.6 kg	Right rear	337.9 kg
Left front	516.6 kg	Left rear	351.5 kg
Total front weight	1048.2 kg	(60.3% of total vehicle weight)	
Total rear weight	689.4 kg	(39.7% of total vehicle weight)	
Total test weight	1737.6 kg	(2.5% under target test weight)	

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: All taillights

CG rearward of front wheel centerline: 1091 mm

Vehicle Wheelbase: 2750 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.

Table 3 Post-Impact Data

Test number:	971222
Test date:	12/22/97
Test time:	1526
Test type:	Frontal barrier impact
Impact angle:	0°
Ambient temperature at impact area:	22° C
Temperature in occupant compartment:	21° 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:

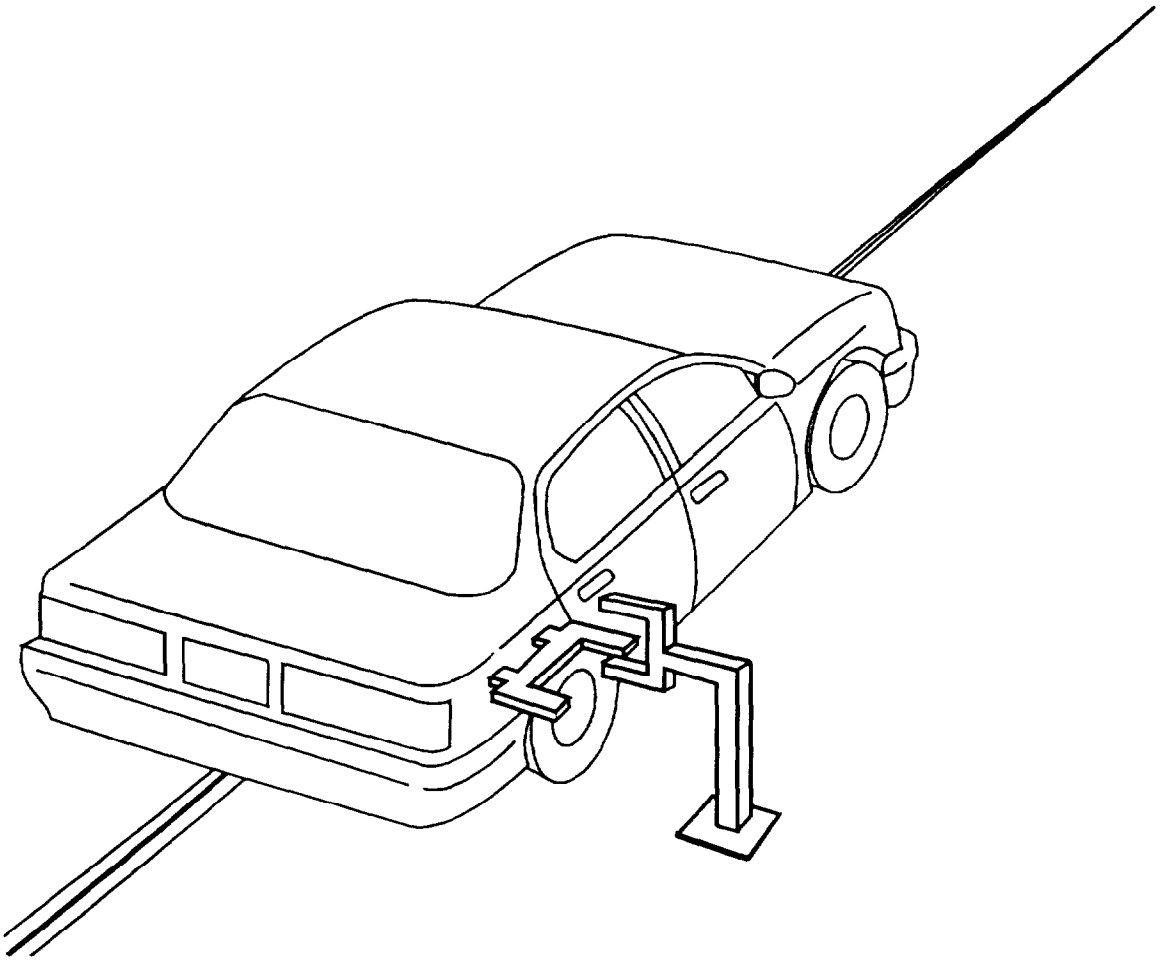
Pre-test:	L:	4800 mm	C: 5020 mm	R:	4795 mm
Post-test:	L:	4626 mm	C: 4730 mm	R:	4561 mm
Total crush:	L:	174 mm	C 290 mm	R:	234 mm
Average crush:	233 mm				

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L:	1144 mm	C: 1086 mm	R:	1286 mm
Average rebound:	1172 mm				

Figure 1 Impact Velocity Measurement System

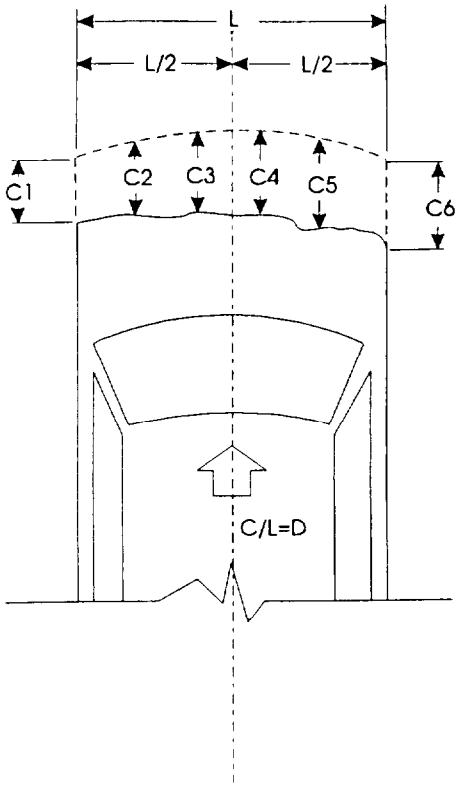


The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

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

Test date:	12/22/97
Vehicle year/make/ model/body style:	1998/Ford/Taurus/4-door Sedan
VIN:	1FAFP52U9WG130657
Build date:	11/97
Test weight:	1737.6 kg
Vehicle wheelbase:	2750 mm
Maximum width:	1856 mm
Front overhang:	1060 mm

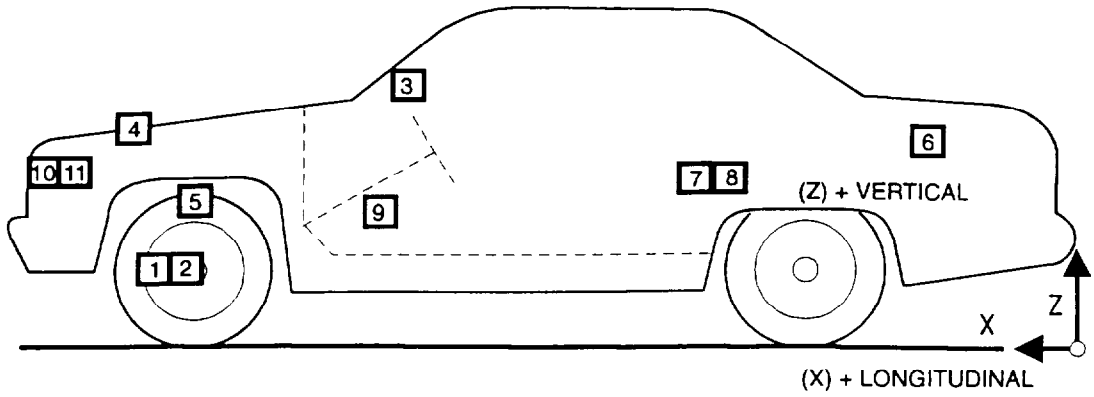


Collision Deformation

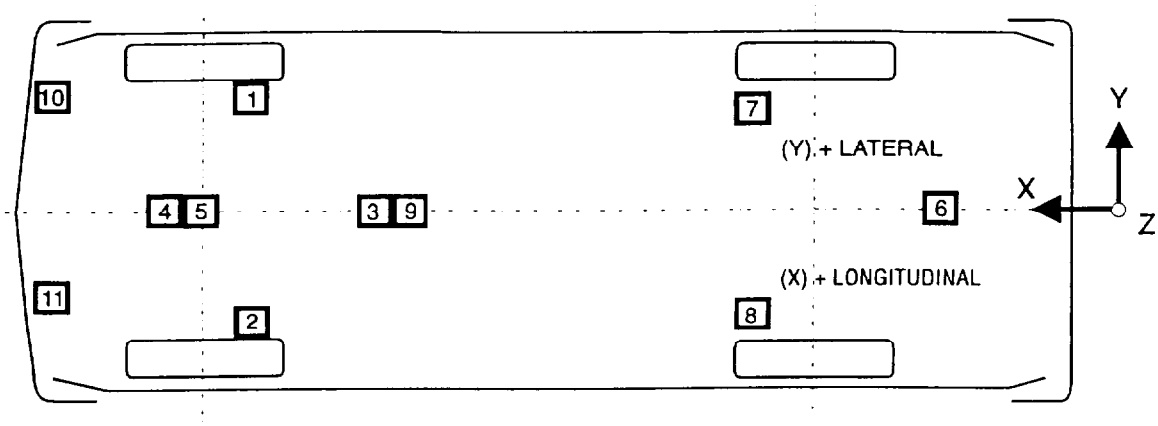
Classification (CDC) Code: NA

Crush depth measurements:	C1: 174 mm
	C2: 279 mm
	C3: 287 mm
	C4: 300 mm
	C5: 314 mm
	C6: 234 mm
Midpoint of damage:	D: Vehicle Longitudinal Centerline
Length of damaged region:	L: 1525 mm

Figure 3 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 971222 No. LOCATION		X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT BRAKE CALIPER	PRE	4074 mm	705 mm	302 mm				
	POST	4036 mm	730 mm	288 mm				
LONGITUDINAL					11.6 g	@ 81.5 ms	59.0 g	@ 37.3 ms
2 RIGHT BRAKE CALIPER	PRE	4074 mm	-705 mm	302 mm				
	POST	3566 mm	-730 mm	274 mm				
LONGITUDINAL					20.0 g	@ 69.4 ms	68.2 g	@ 37.9 ms
3 INSTRUMENT PANEL CENTER	PRE	3510 mm	0 mm	954 mm				
	POST	3535 mm	0 mm	971 mm				
LONGITUDINAL					7.1 g	@ 116.6 ms	35.7 g	@ 64.5 ms
4 ENGINE TOP	PRE	4120 mm	-75 mm	851 mm				
	POST	4045 mm	-39 mm	845 mm				
LONGITUDINAL					15.7 g	@ 58.2 ms	90.3 g	@ 41.6 ms
5 ENGINE BOTTOM	PRE	4146 mm	0 mm	183 mm				
	POST	4175 mm	-42 mm	164 mm				
LONGITUDINAL					9.1 g	@ 66.2 ms	59.0 g	@ 49.5 ms

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

TEST NUMBER: 971222 No. LOCATION		X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
6 REAR VEHICLE CENTERLINE	PRE	805 mm	0 mm	427 mm				
	POST	805 mm	0 mm	500 mm				
VERTICAL					9.5 g	@ 67.8 ms	5.0 g	@ 92.6 ms
7 LEFT REAR SEAT	PRE	1760 mm	492 mm	333 mm				
	POST	1760 mm	492 mm	220 mm				
LONGITUDINAL					0.9 g	@ 145.7 ms	24.3 g	@ 39.0 ms
8 RIGHT REAR SEAT	PRE	1760 mm	-492 mm	333 mm				
	POST	1760 mm	-492 mm	220 mm				
LONGITUDINAL					1.4 g	@ 150.4 ms	23.6 g	@ 41.6 ms
9 FLOOR TUNNEL	PRE	1845 mm	0 mm	333 mm				
	POST	1845 mm	0 mm	285 mm				
LONGITUDINAL					1.9 g	@ 148.6 ms	26.7 g	@ 73.4 ms
LATERAL					3.8 g	@ 40.5 ms	1.9 g	@ 29.7 ms
VERTICAL					6.9 g	@ 90.5 ms	10.5 g	@ 74.3 ms
RESULTANT					28.7 g	@ 73.7 ms		
10 LEFT RADIATOR	PRE	4671 mm	340 mm	371 mm				
	POST	4454 mm	333 mm	269 mm				
LONGITUDINAL[1]					1050.8 g	@ 113.5 ms	818.7 g	@ 153.6 ms

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

TEST NUMBER: 971222 No. LOCATION		X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
11 RIGHT RADIATOR	PRE	4671 mm	340 mm	371 mm				
	POST	4426 mm	329 mm	258 mm				
LONGITUDINAL[1]					1074.0 g	@ 111.4 ms	1075.2 g	@ 120.5 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	-45.5 g	-7.6 g	15.8 g	45.9 g	-45.9 g	-5.7 g	-13.7 g
Passenger	-46.4 g	15.3 g	-18.4 g	48.7 g	-44.1 g	3.7 g	-22.7 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	5556 N	4882 N
Passenger	5697 N	5312 N

Head Injury Criteria[1]

	HIC	Time t_1	Time t_2
Driver	290	68.2 ms	104.2 ms
Passenger	299	70.7 ms	106.7 ms

Chest Maximum Resultant Acceleration[2]

	Acceleration	Time t_1	Time t_2
Driver	47.2 g	89.1 ms	92.2 ms
Passenger	48.5 g	83.3 ms	86.3 ms

Maximum Chest Deflection

Driver	22 mm
Passenger	9 mm

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

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

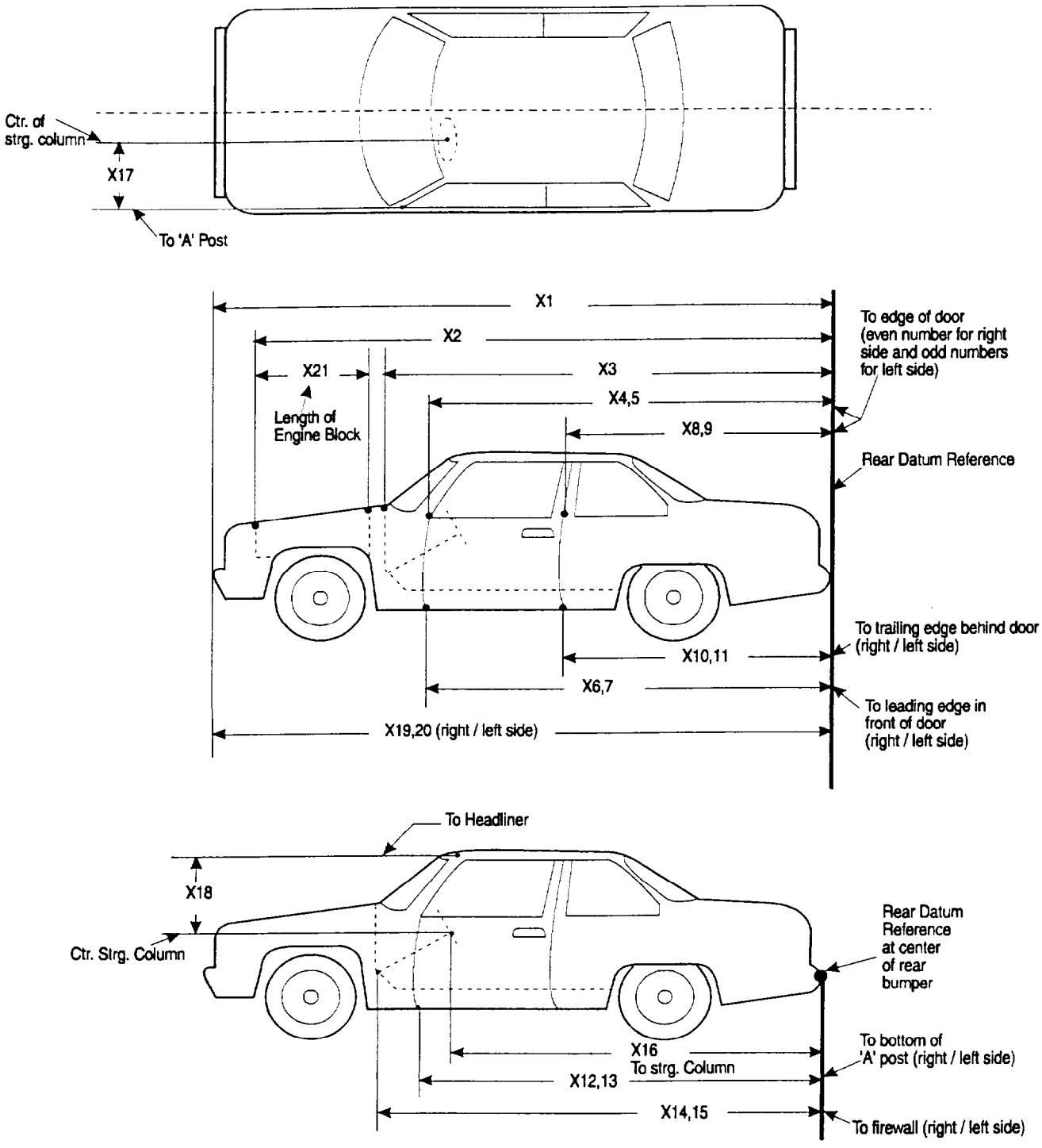


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1998/Ford/Taurus/4-door Sedan

Test Number: 971222

No.	Type of measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	5020 mm	4730 mm	290 mm
X2	Rear surface of vehicle to front of engine block	4380 mm	4270 mm	110 mm
X3	Rear surface of vehicle to firewall	3883 mm	3885 mm	-2 mm
X4	Rear surface of vehicle to upper leading edge of right door	3433 mm	3428 mm	5 mm
X5	Rear surface of vehicle to upper leading edge of left door	3430 mm	3433 mm	-3 mm
X6	Rear surface of vehicle to lower leading edge of right door	3409 mm	3410 mm	-1 mm
X7	Rear surface of vehicle to lower leading edge of left door	2391 mm	2390 mm	1 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2413 mm	2404 mm	9 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2413 mm	2414 mm	-1 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2387 mm	2382 mm	5 mm
X11	Rear surface of vehicle to lower trailing edge of left door	3404 mm	3401 mm	3 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3412 mm	3410 mm	2 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3410 mm	3415 mm	-5 mm
X14	Rear surface of vehicle to firewall - right side	3819 mm	3766 mm	53 mm
X15	Rear surface of vehicle to firewall - left side	3834 mm	3807 mm	27 mm
X16	Rear surface of vehicle to steering wheel center	3022 mm	3080 mm	-58 mm
X17	Center of steering column to "A" post	345 mm	343 mm	2 mm
X18	Center of steering column to headliner	430 mm	400 mm	30 mm
X19	Rear surface of vehicle to right side of front bumper	4795 mm	4561 mm	234 mm
X20	Rear surface of vehicle to left side of front bumper	4800 mm	4626 mm	174 mm
X21	Length of engine block	360 mm	360 mm	0 mm

Figure 5 Vehicle Target Locations

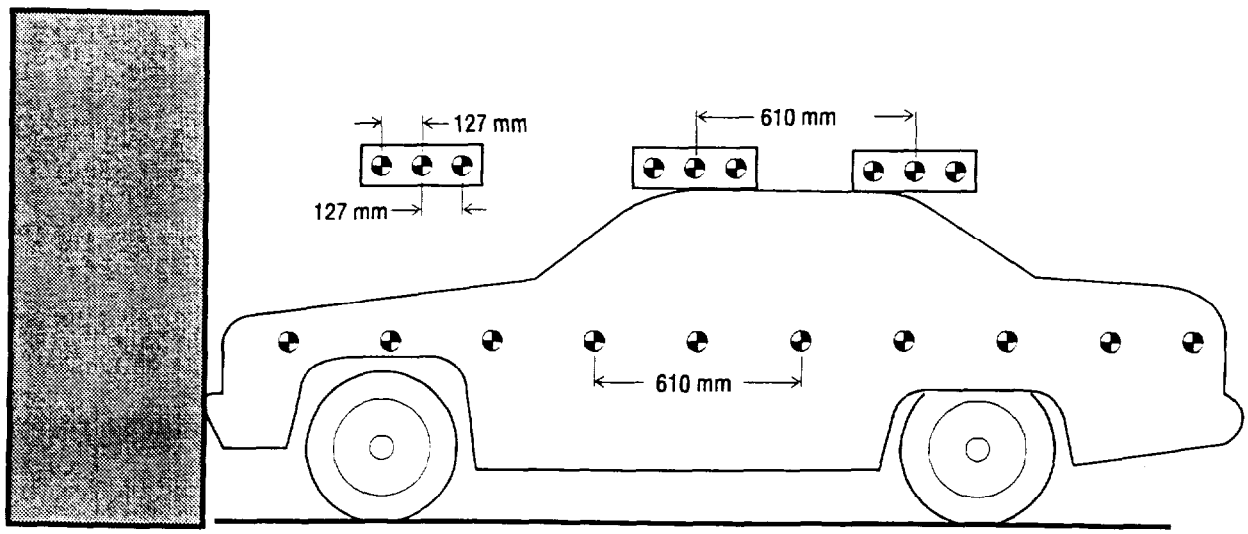


Figure 6 Dummy Measurement Locations for Front Seat Occupants

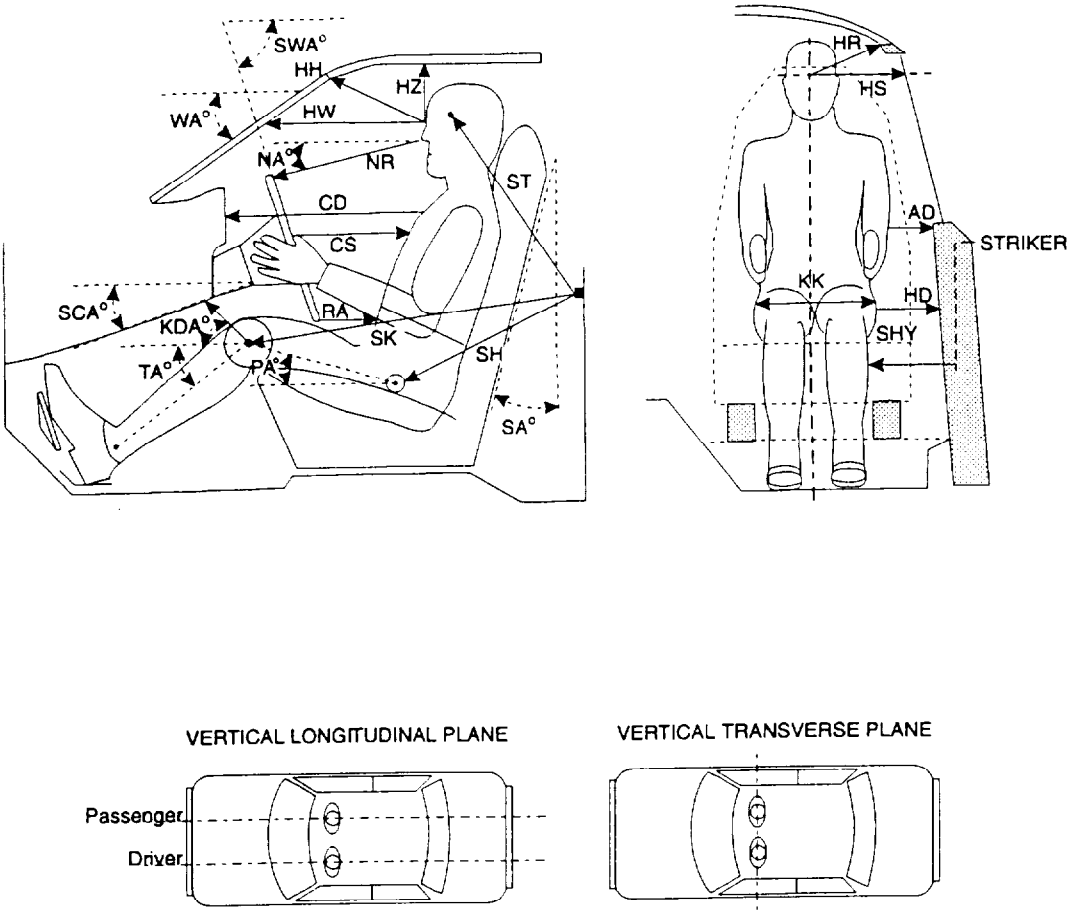


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #169)	Passenger (Serial #168)
WA	Windshield angle	30°	30°
SWA	Steering wheel angle	69°	NA
SCA	Steering column angle	30°	NA
SA	Seat back angle	27.3°	27.3°
HZ	Head to roof	160 mm	152 mm
HH	Head to header	311 mm	307 mm
HW	Head to windshield	558 mm	579 mm
HR	Head to side header	208 mm	202 mm
NR	Nose to rim	383 mm	NA
NA	Nose to rim angle	14°	NA
CD	Chest to dash	538 mm	468 mm
CS	Steering wheel to chest	318 mm	NA
RA	Rim to abdomen	189 mm	NA
KDL	Left knee to dash	150 mm	140 mm
KDR	Right knee to dash	138 mm	142 mm
KDA	Outboard knee to dash angle	30°	26°
PA	Pelvic angle	26.2°	24°
TA	Tibial angle	49.4°	44°
KK	Knee to knee	330 mm	266 mm
ST[1]	Striker to head	531 mm	537 mm
	Striker to head angle	-79.6°	-79°
SK[1]	Striker to knee	585 mm	602 mm
	Striker to knee angle	-0.9°	3°
SH[1]	Striker to H-point	250 mm	258 mm
	Striker to H-point angle	33.4°	35°
SHY	Striker to H-point (Y dir.)	285 mm	265 mm
HS	Head to side window	315 mm	314 mm
HD	H-point to door	169 mm	154 mm
AD	Arm to door	115 mm	119 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

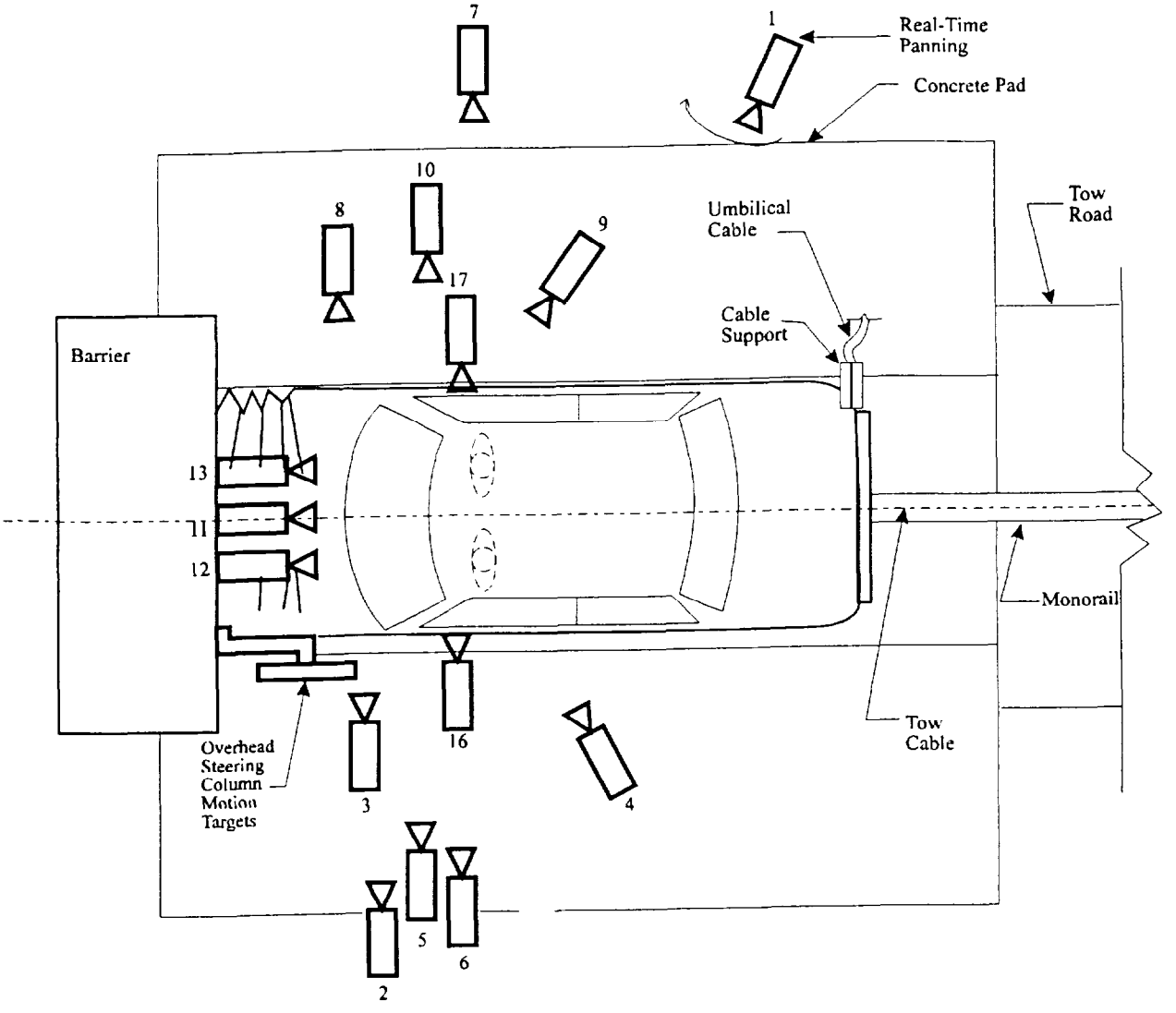


Figure 7 Camera Positions, Cont'd.

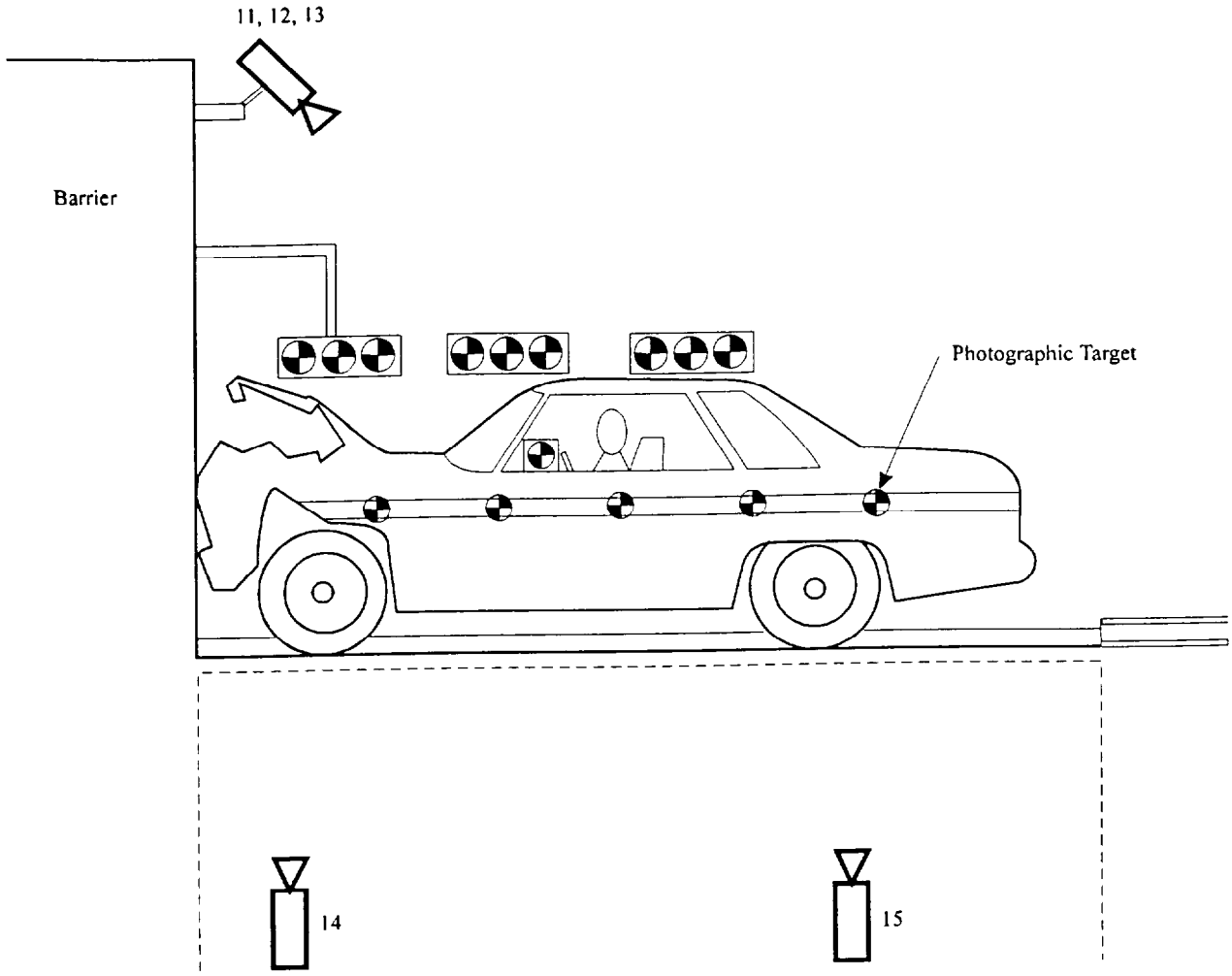


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1998/Ford/Taurus/4-door Sedan

Test number: 971222

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/s
2	Left vehicle crush	-1054 mm	7493 mm	1118 mm	-4°	7569 mm	25 mm	992 frames/s
3	Left windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA	50 mm	1002 frames/s
4	Driver kinematics	-3995 mm	2946 mm	2210 mm	-27°	2438 mm	25 mm	995 frames/s
5	Steering column motion	-1168 mm	7264 mm	2616 mm	-14°	NA	25 mm	1000 frames/s
6	Steering column motion	-1168 mm	7264 mm	1908 mm	-9°	NA	25 mm	1002 frames/s
7	Right overall	-2065 mm	-6767 mm	942 mm	-2°	NA	13 mm	1002 frames/s
8	Right windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA	50 mm	1010 frames/s
9	Passenger kinematics	-3863 mm	-2946 mm	2210 mm	-26°	2286 mm	25 mm	1000 frames/s
10	Passenger kinematics	-986 mm	-7442 mm	1151 mm	-4°	5944 mm	25 mm	1002 frames/s
11	Windshield front view	-152 mm	0 mm	2235 mm	-40°	NA	13 mm	998 frames/s
12	Driver - front view	-173 mm	368 mm	2362 mm	-50°	NA	17 mm	1002 frames/s
13	Passenger - front view	-114 mm	-351 mm	2362 mm	-50°	NA	17 mm	990 frames/s
14	Pit - front position	-1283 mm	0 mm	-2347 mm	90°	NA	13 mm	995 frames/s
15	Pit - rear position	-2522 mm	0 mm	-2515 mm	90°	NA	13 mm	1002 frames/s
16	Onboard driver	NA	NA	NA	NA	NA	8 mm	895 frames/s
17	Onboard passenger	NA	NA	NA	NA	NA	8 mm	1005 frames/s
18	Real-time documentation	NA	NA	NA	NA	NA	12-120 mm	24 frames/s

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

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

Appendix A

Photographs

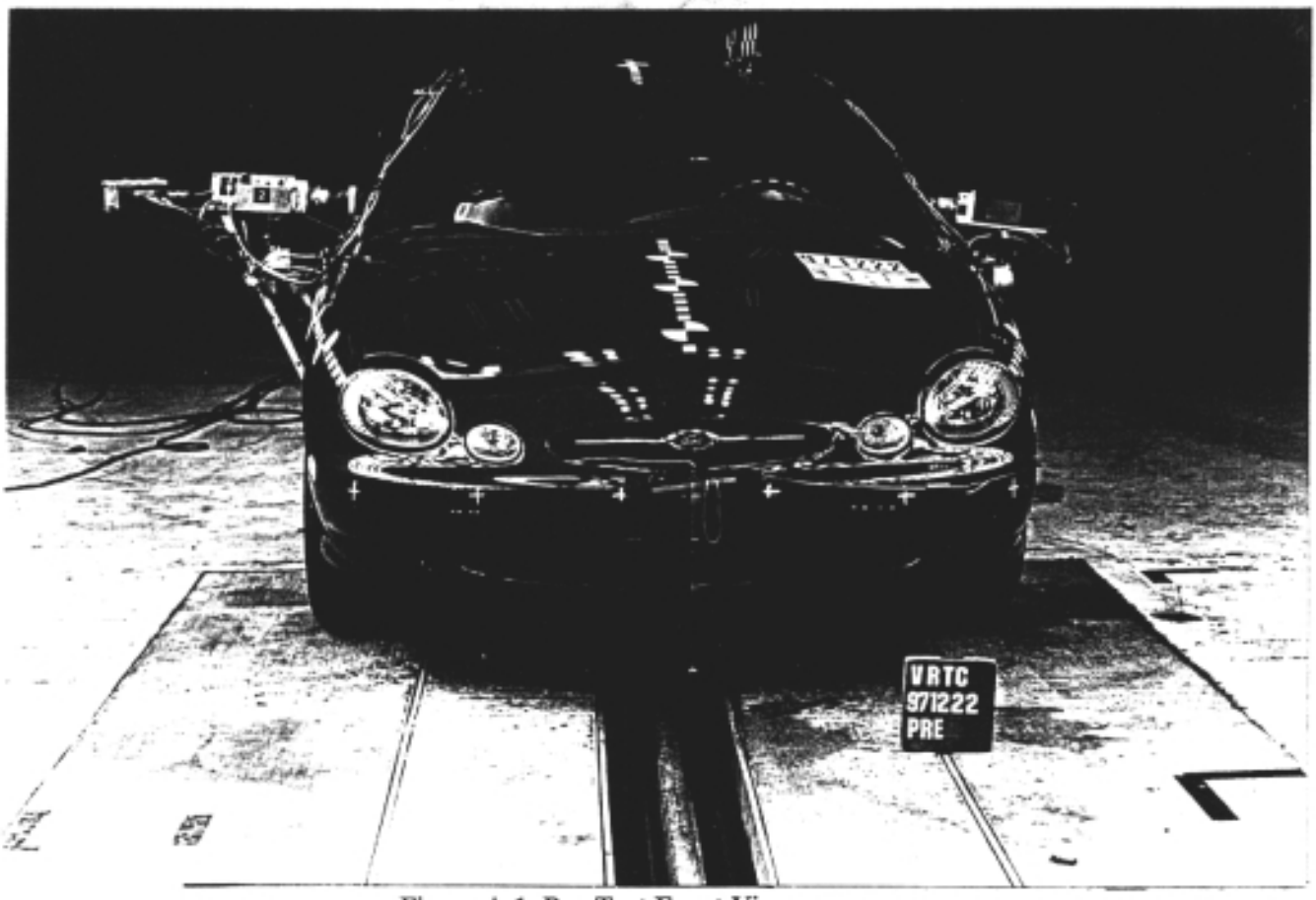


Figure A-1 Pre-Test Front View

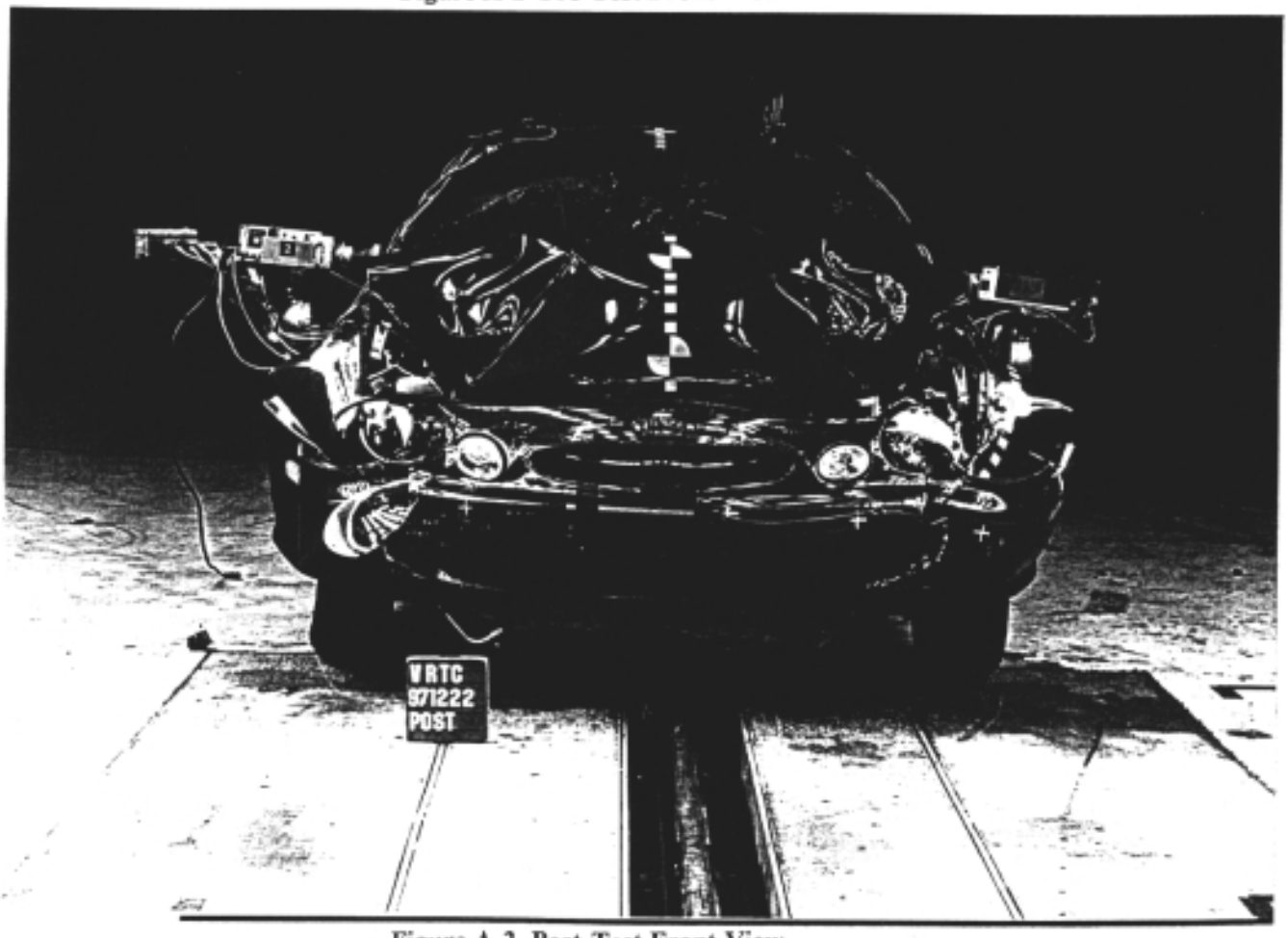


Figure A-2 Post-Test Front View

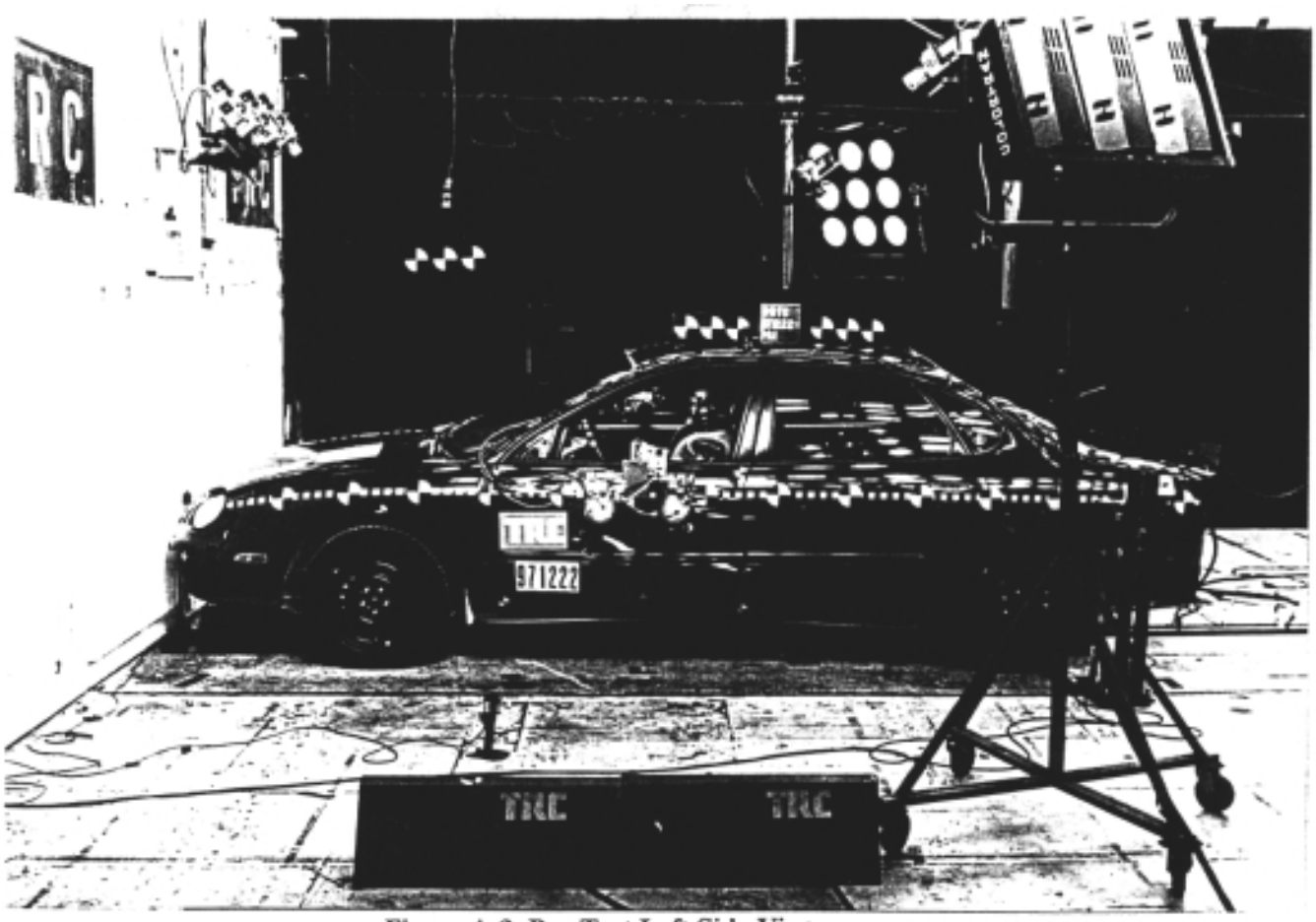


Figure A-3 Pre-Test Left Side View

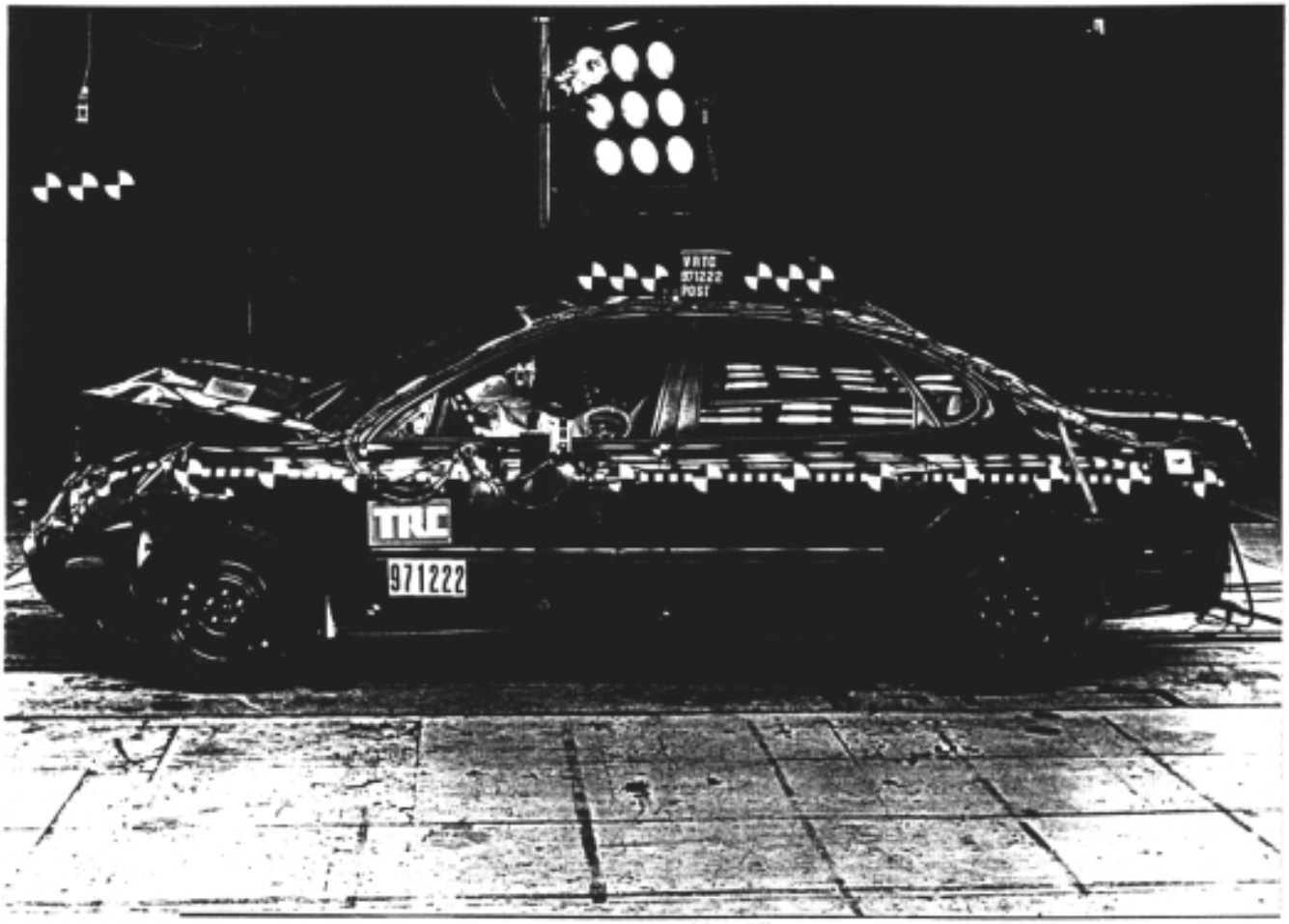


Figure A-4 Post-Test Left Side View

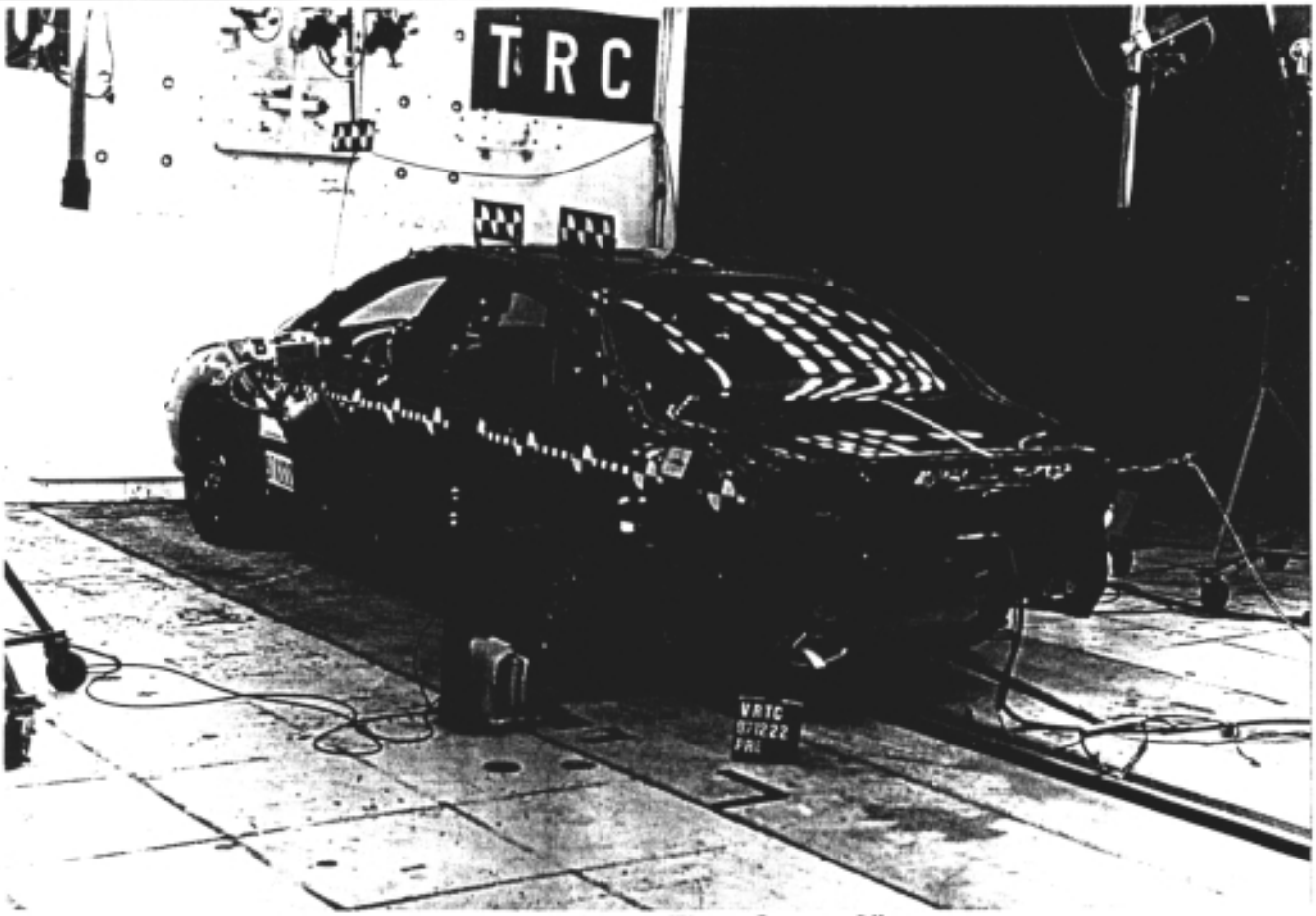


Figure A-5 Pre-Test Left Rear Three-Quarter View

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

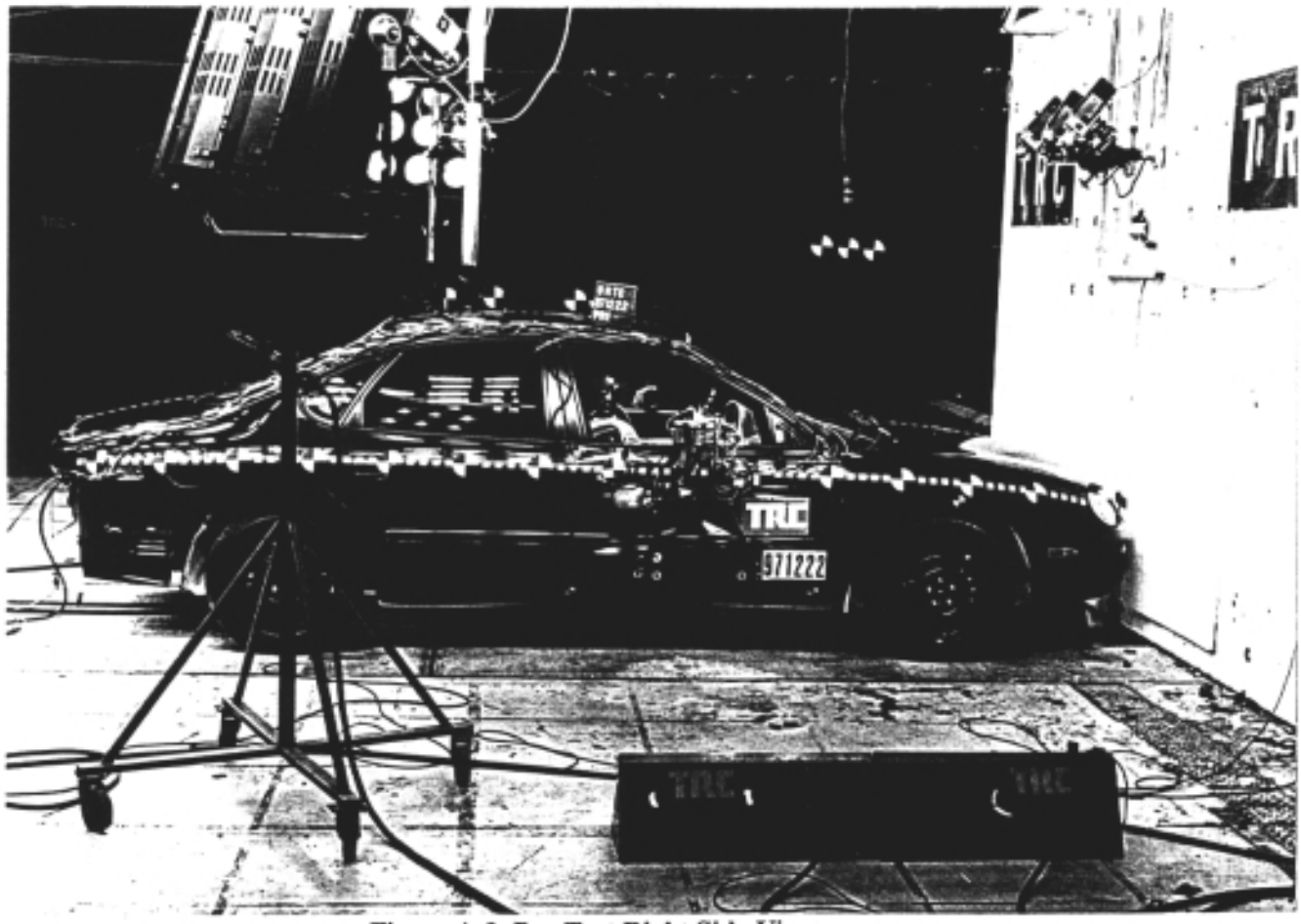


Figure A-9 Pre-Test Right Side View

Figure A-10 Post-Test Right Side View

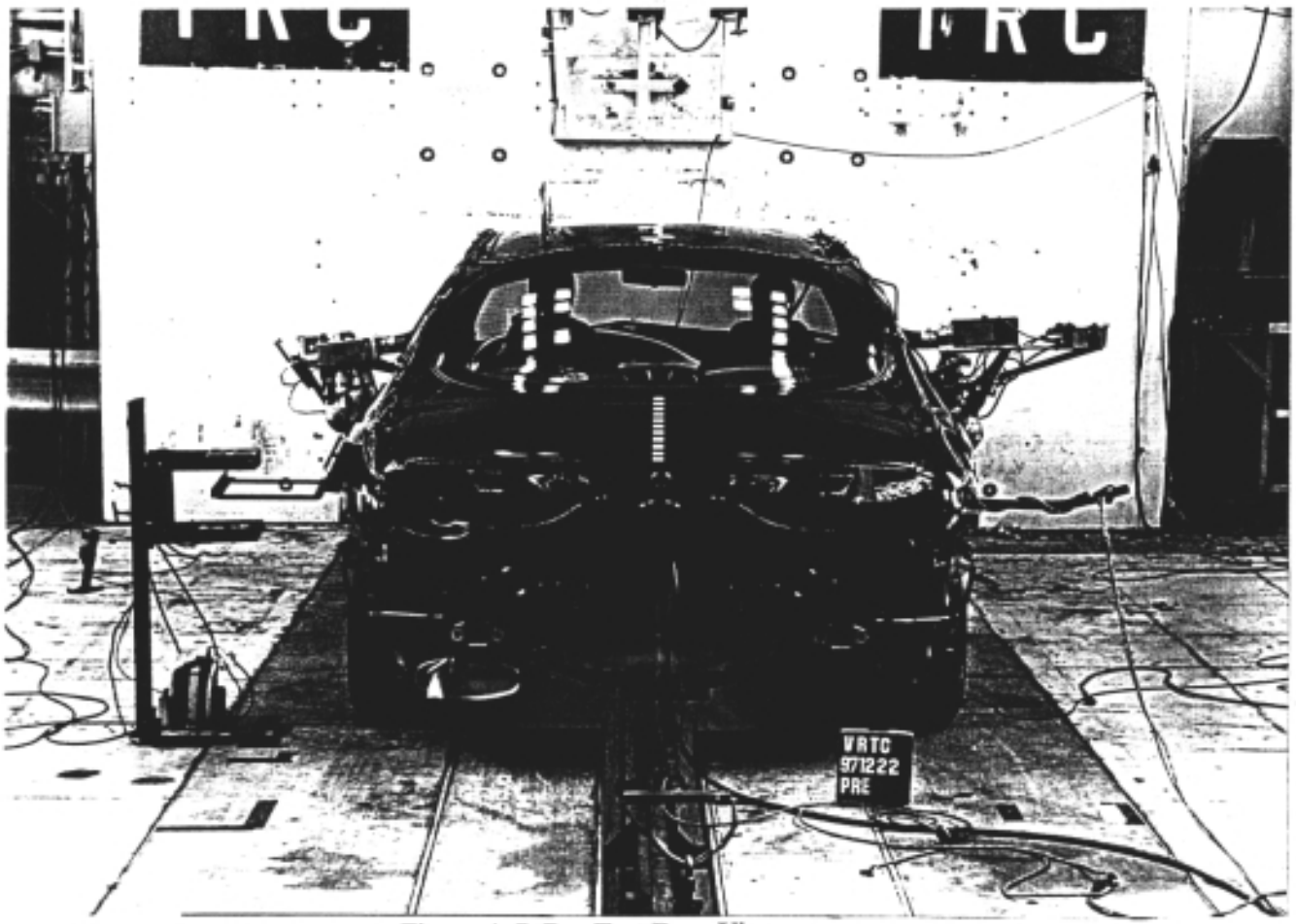


Figure A-7 Pre-Test Rear View

Figure A-8 Post-Test Rear View

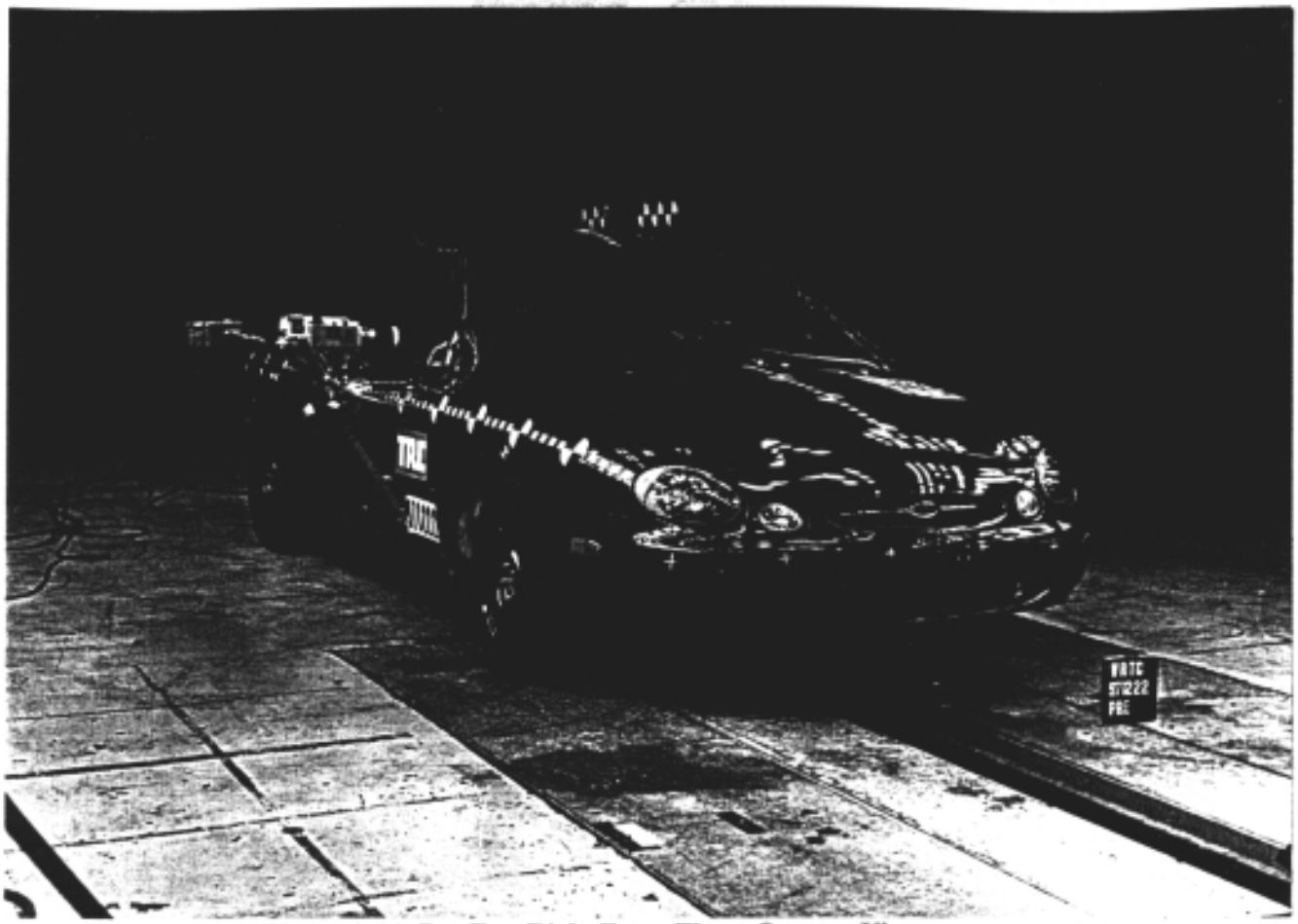


Figure A-11 Pre-Test Right Front Three-Quarter View

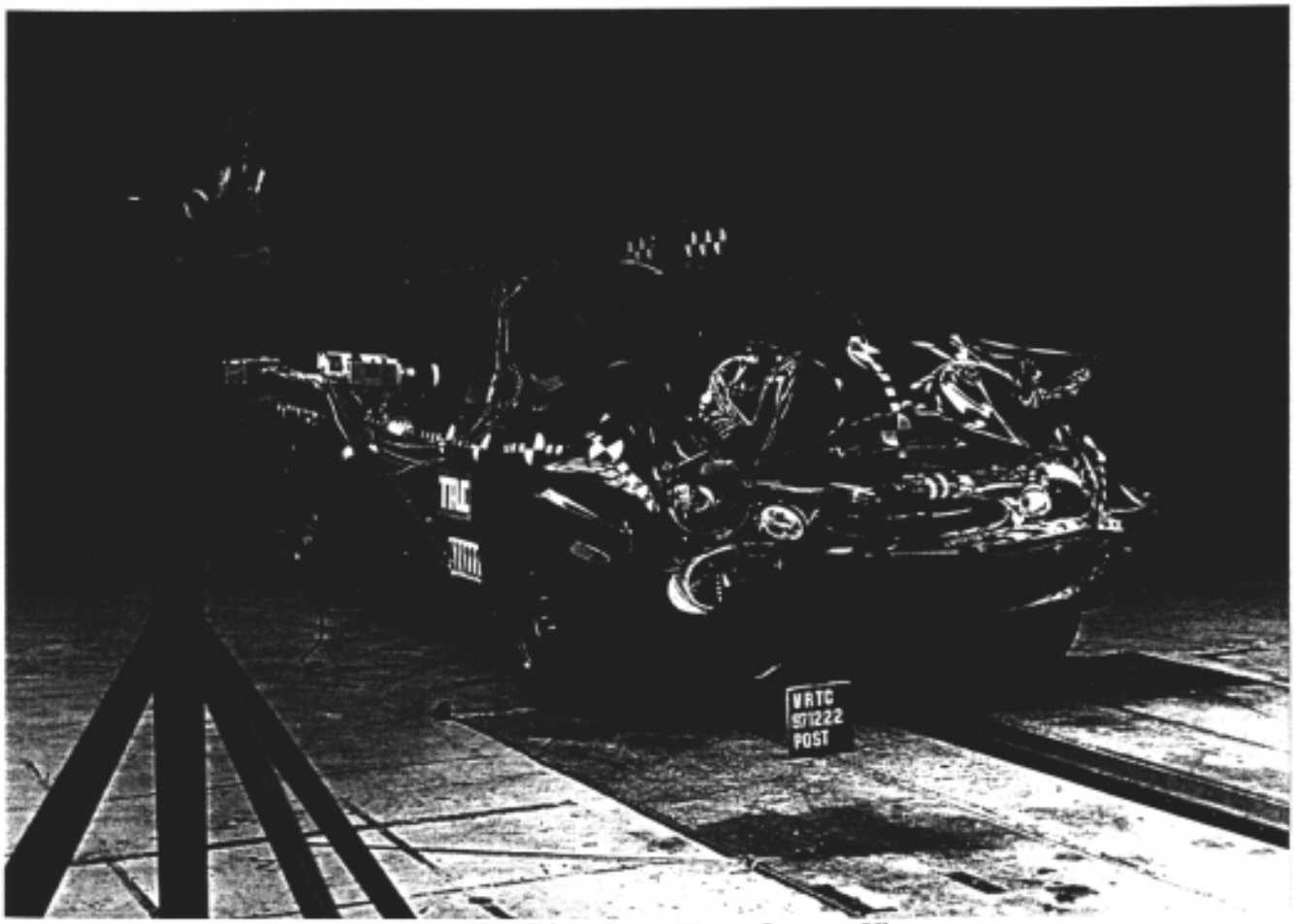


Figure A-12 Post-Test Right Front Three-Quarter View

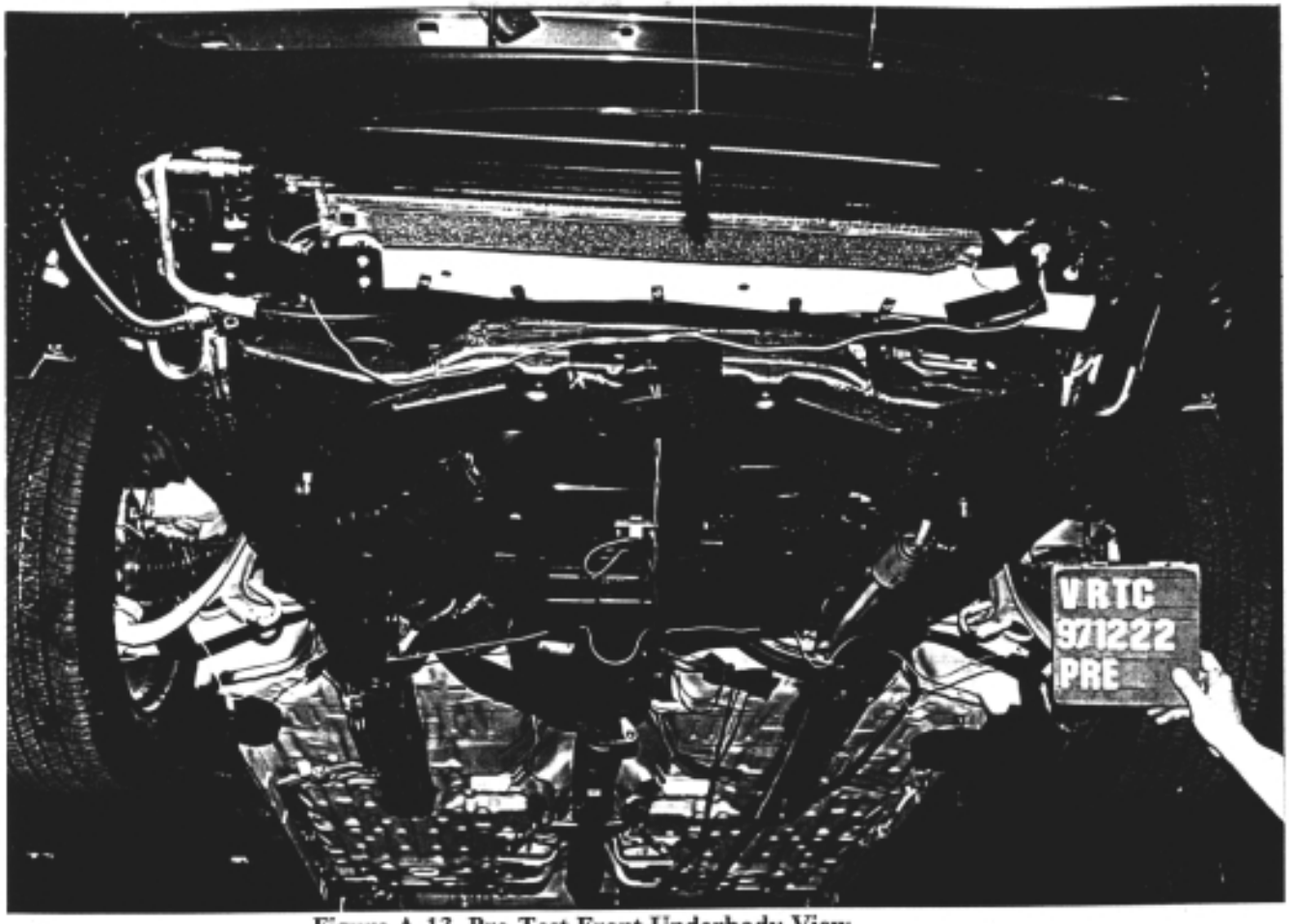


Figure A-13 Pre-Test Front Underbody View

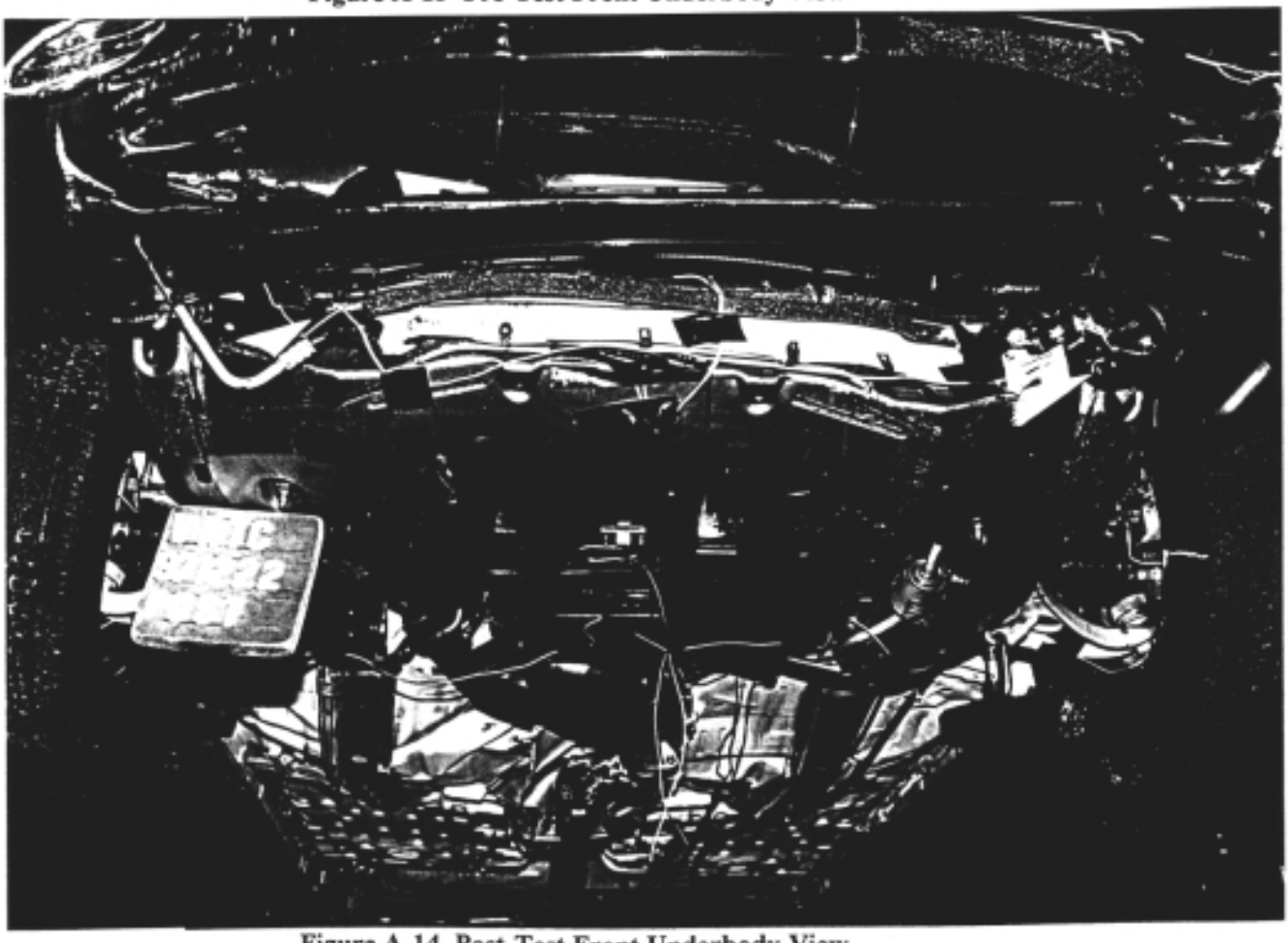


Figure A-14 Post-Test Front Underbody View

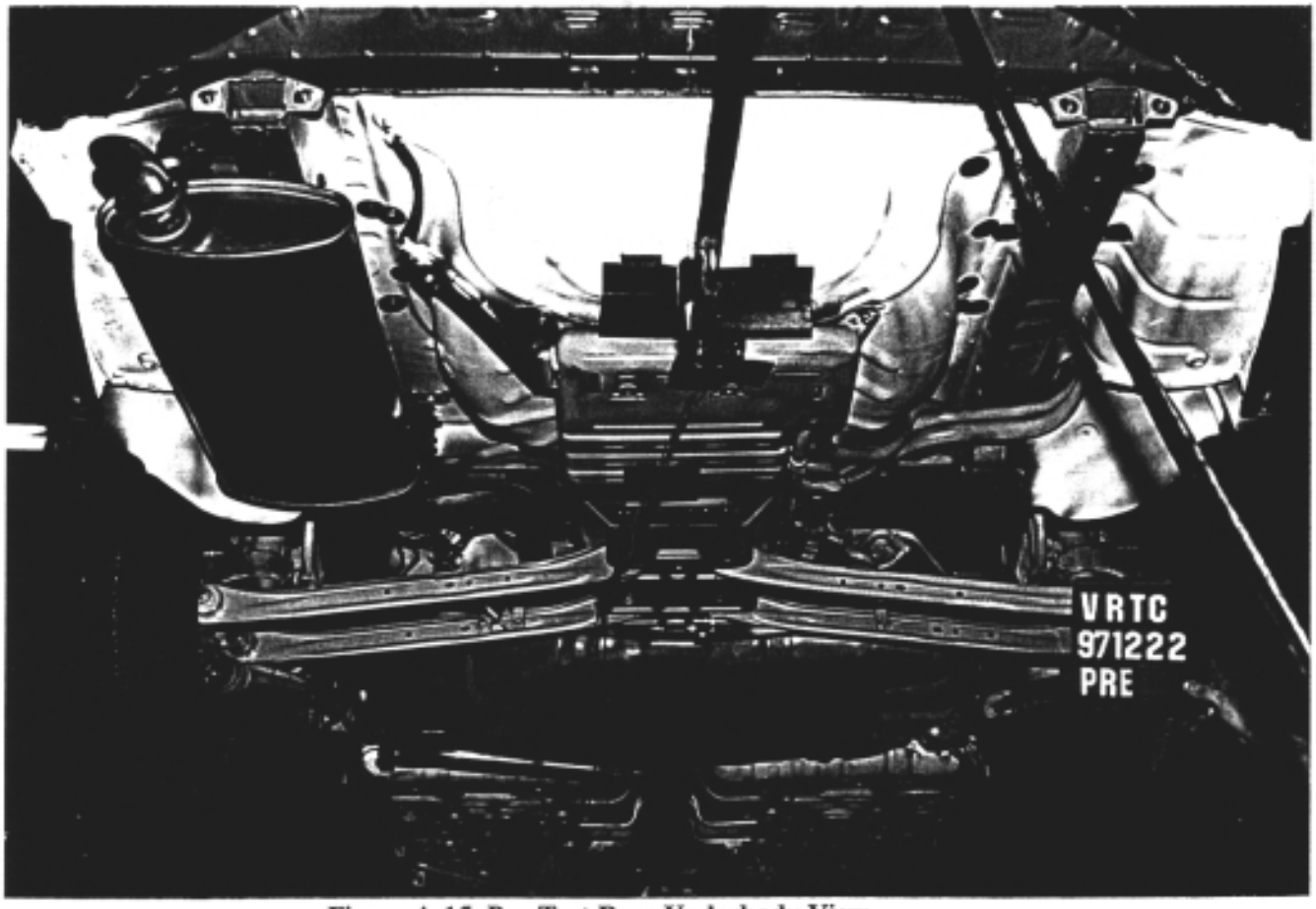


Figure A-15 Pre-Test Rear Underbody View

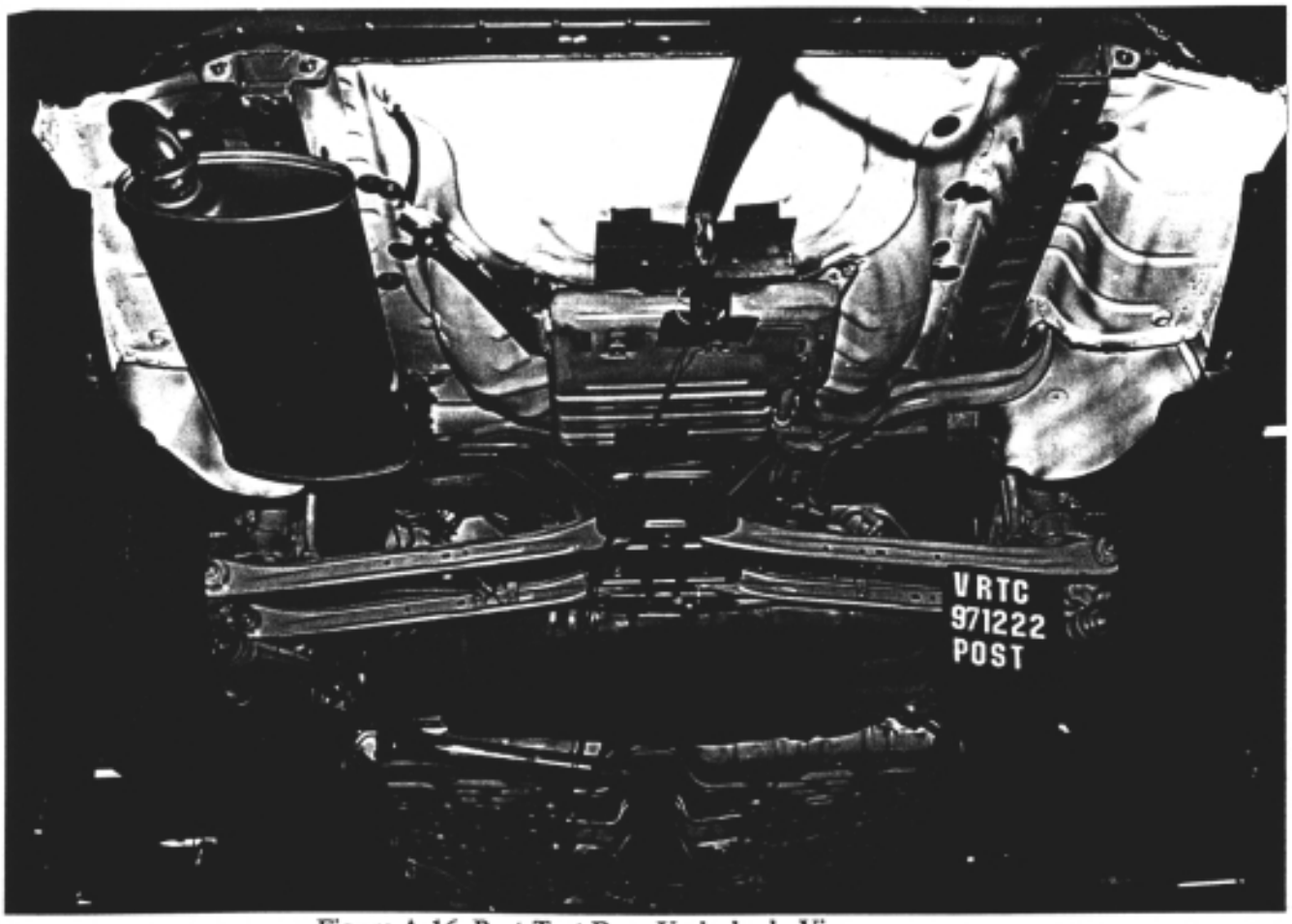


Figure A-16 Post-Test Rear Underbody View

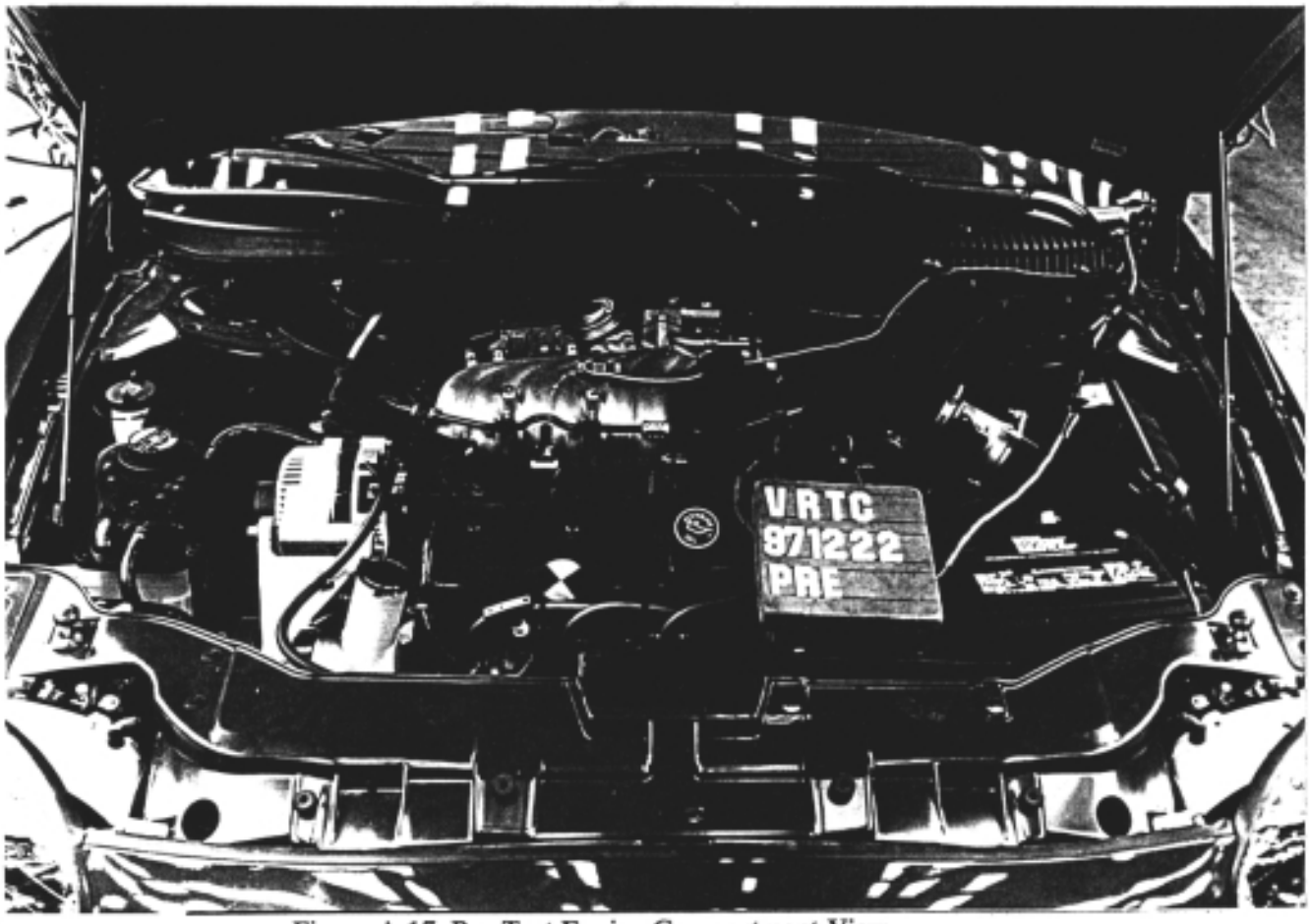


Figure A-17 Pre-Test Engine Compartment View

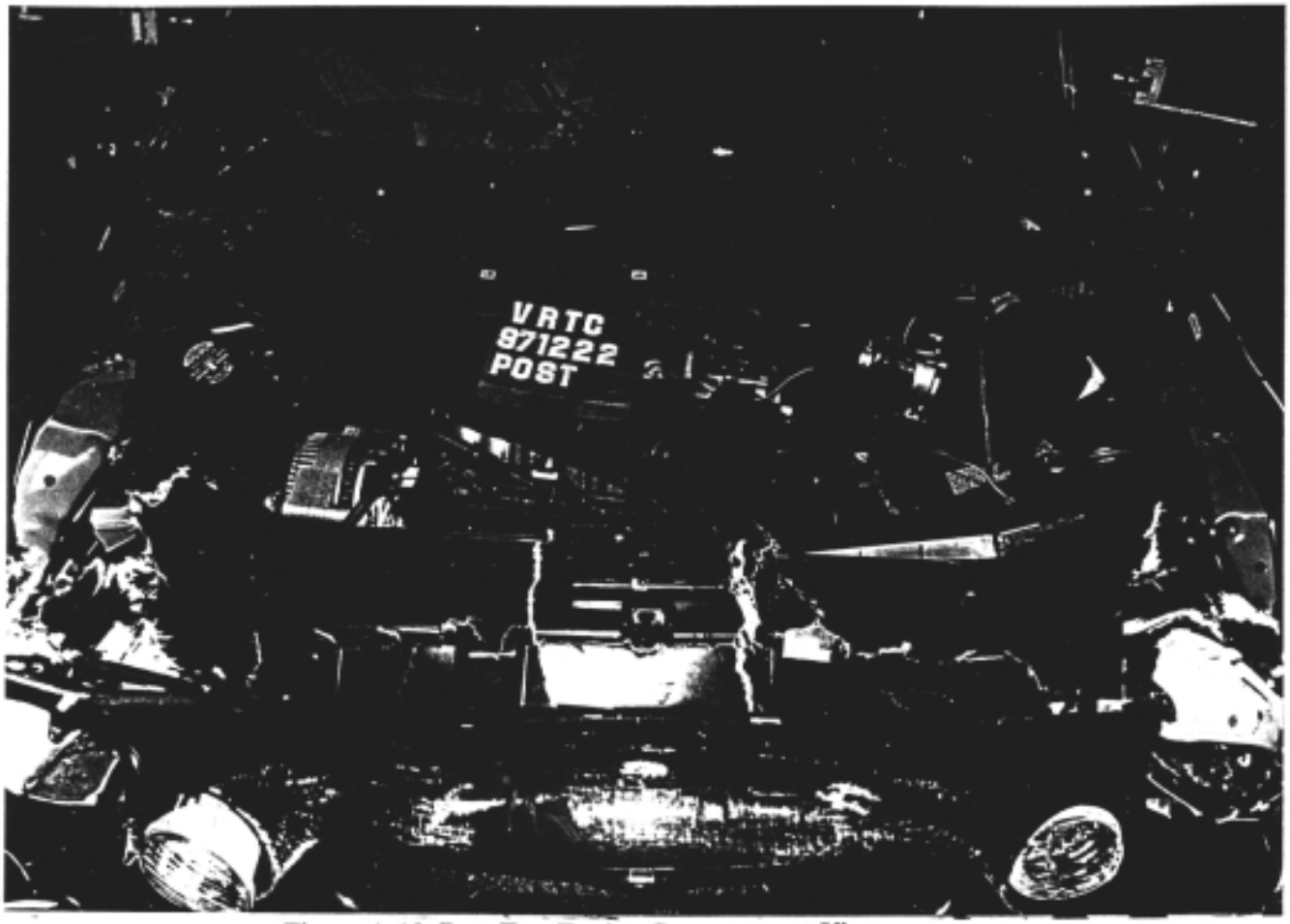


Figure A-18 Post-Test Engine Compartment View

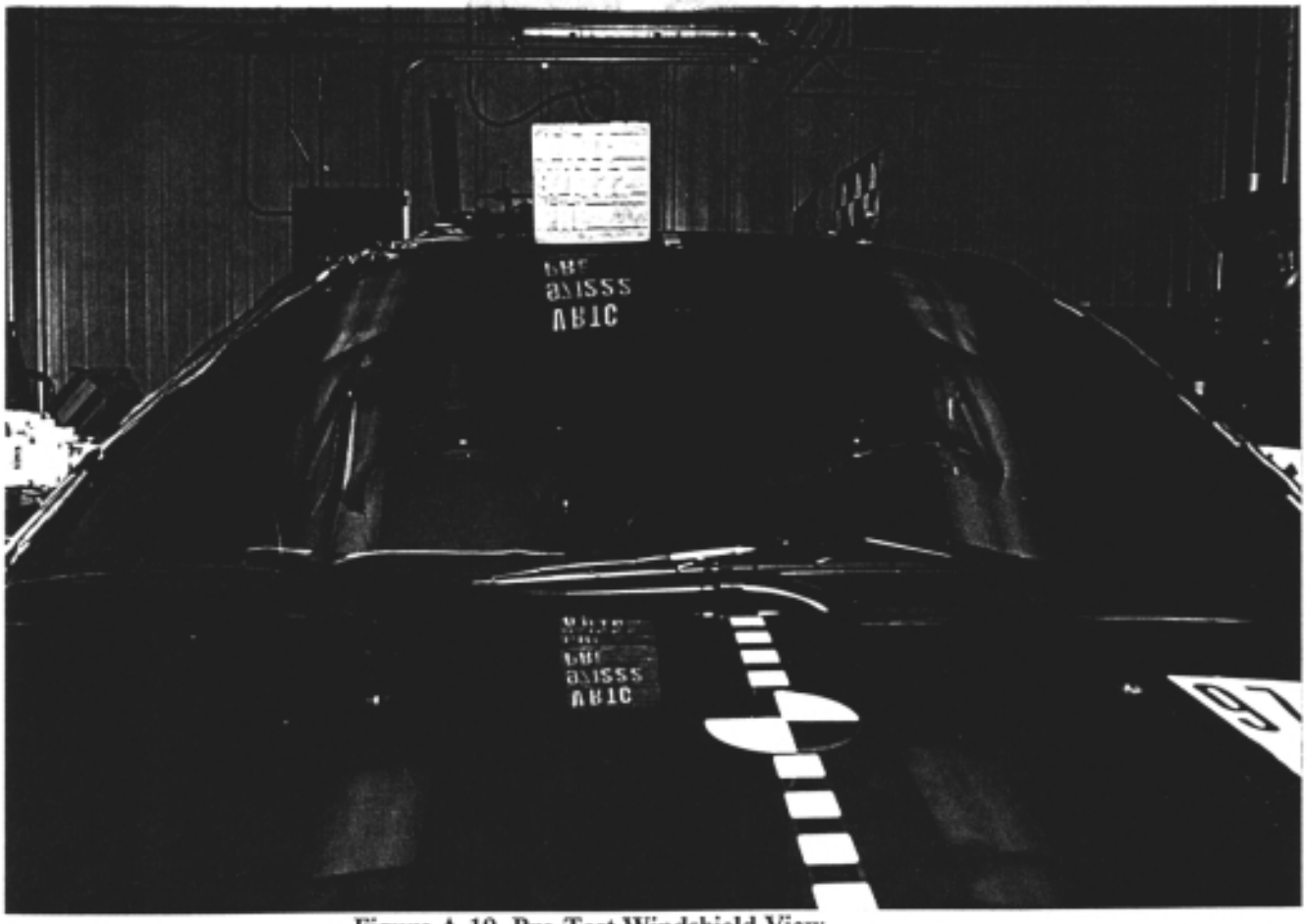


Figure A-19 Pre-Test Windshield View

Figure A-20 Post-Test Windshield View

Figure A-21 Pre-Test Fuel Filler Cap View

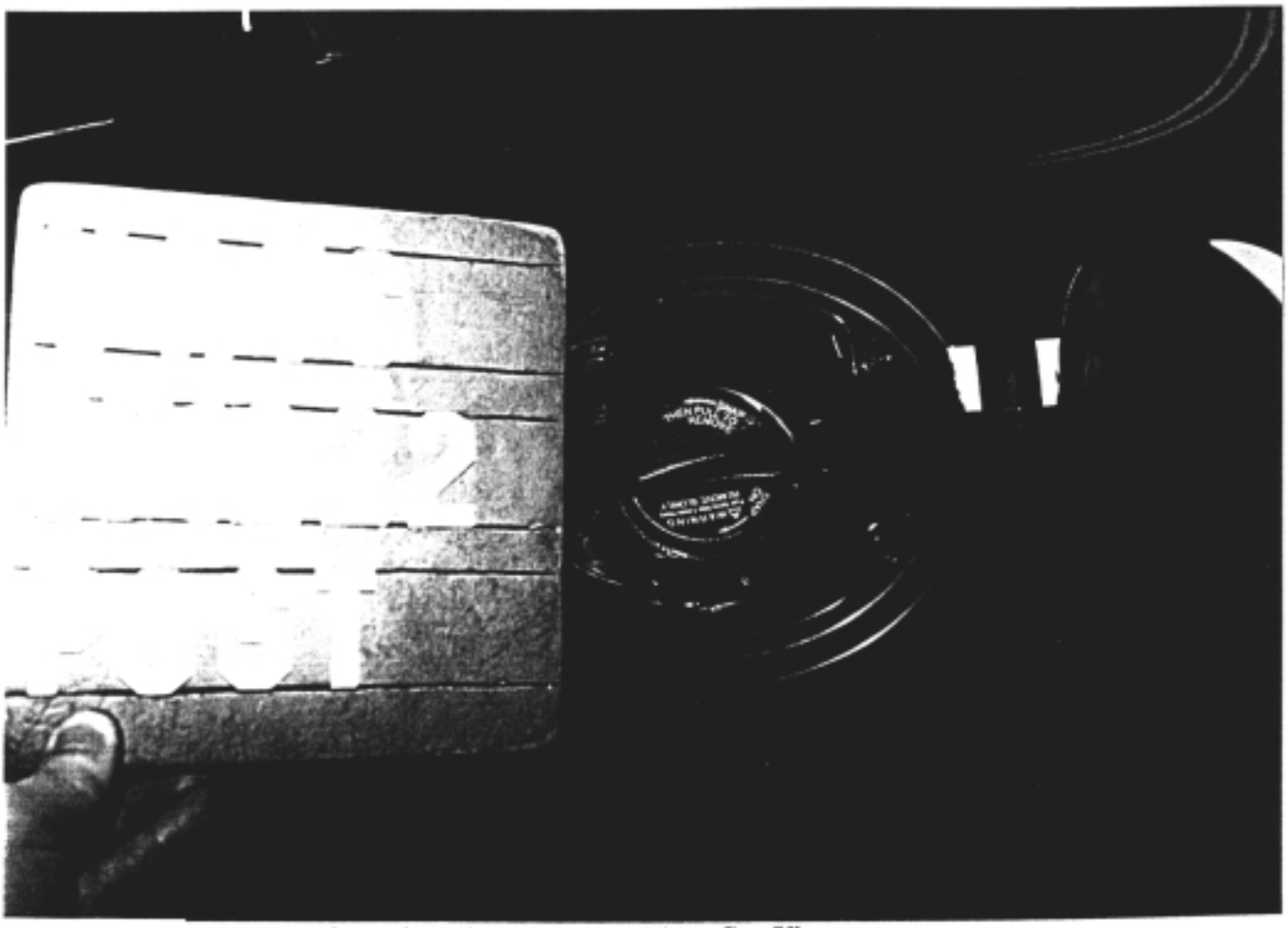


Figure A-22 Post-Test Fuel Filler Cap View

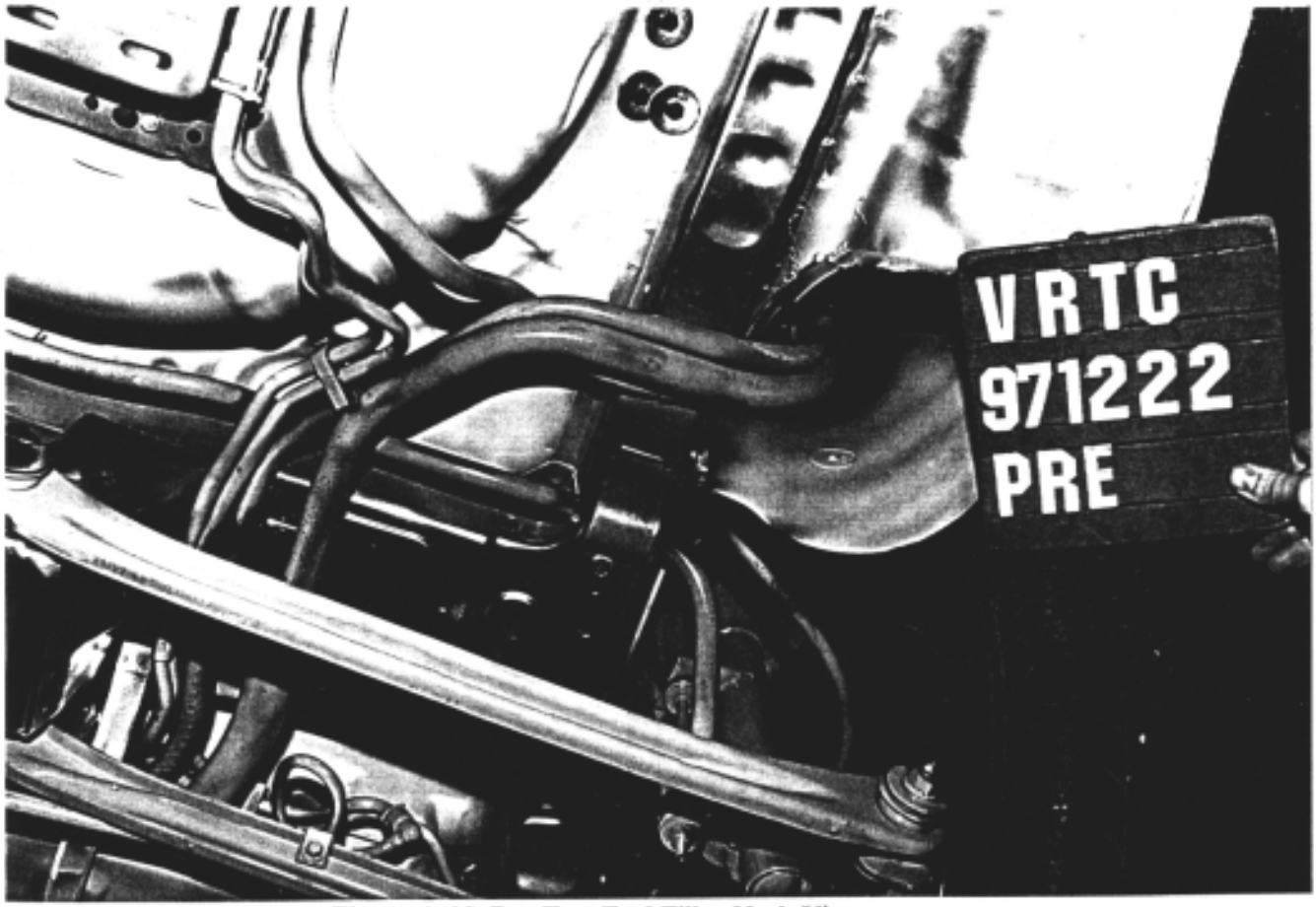


Figure A-23 Pre-Test Fuel Filler Neck View

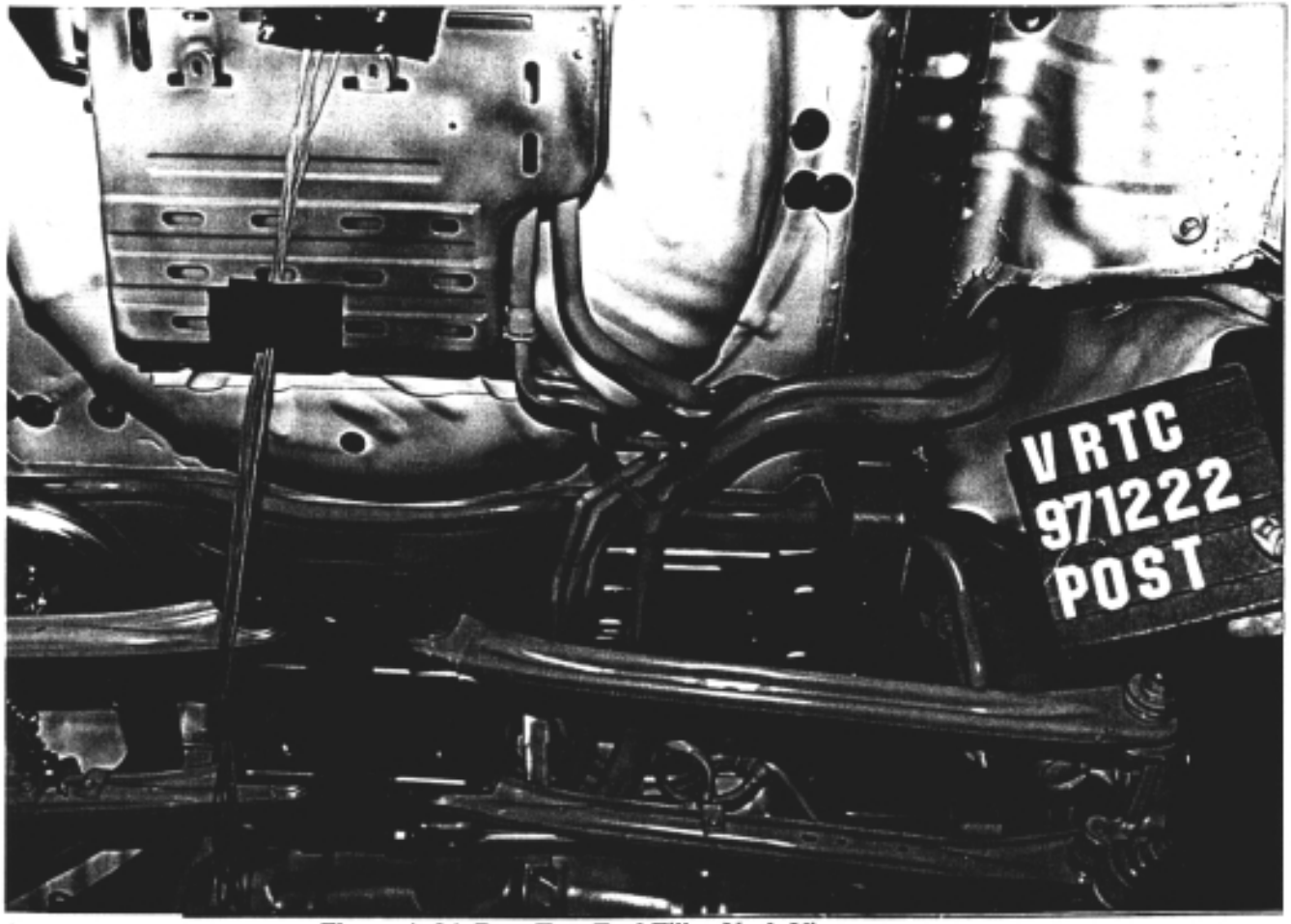


Figure A-24 Post-Test Fuel Filler Neck View

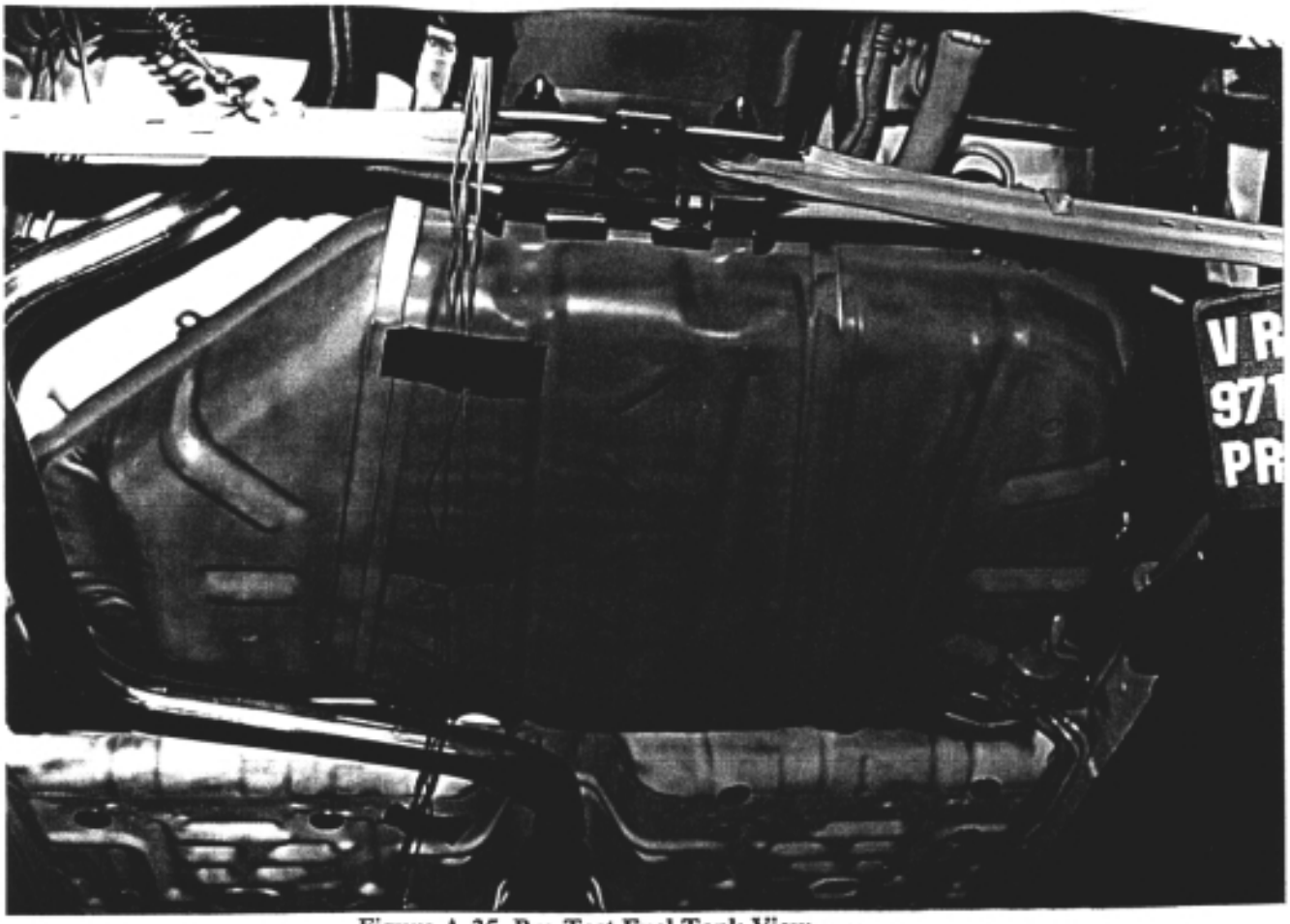


Figure A-25 Pre-Test Fuel Tank View

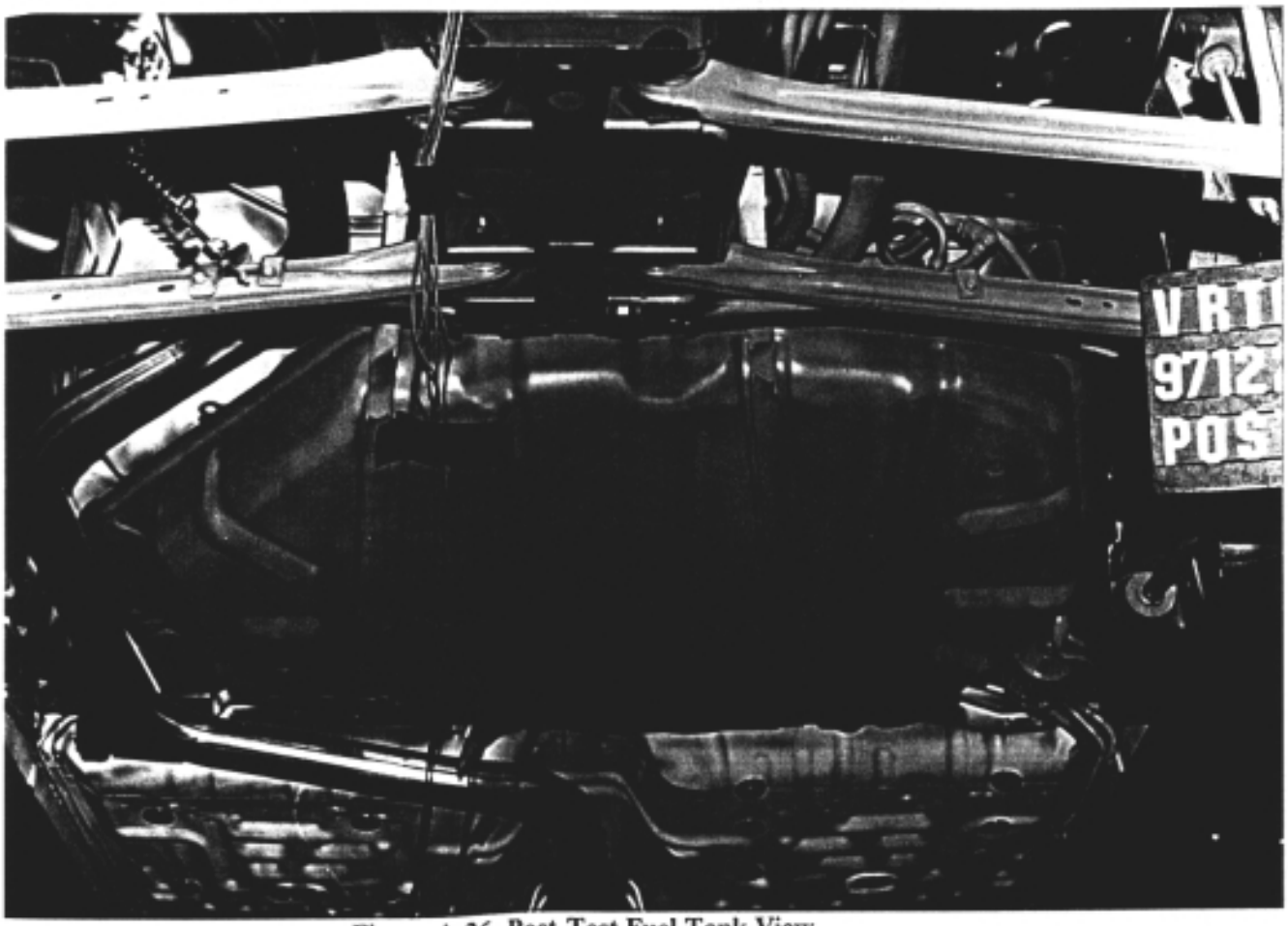


Figure A-26 Post-Test Fuel Tank View

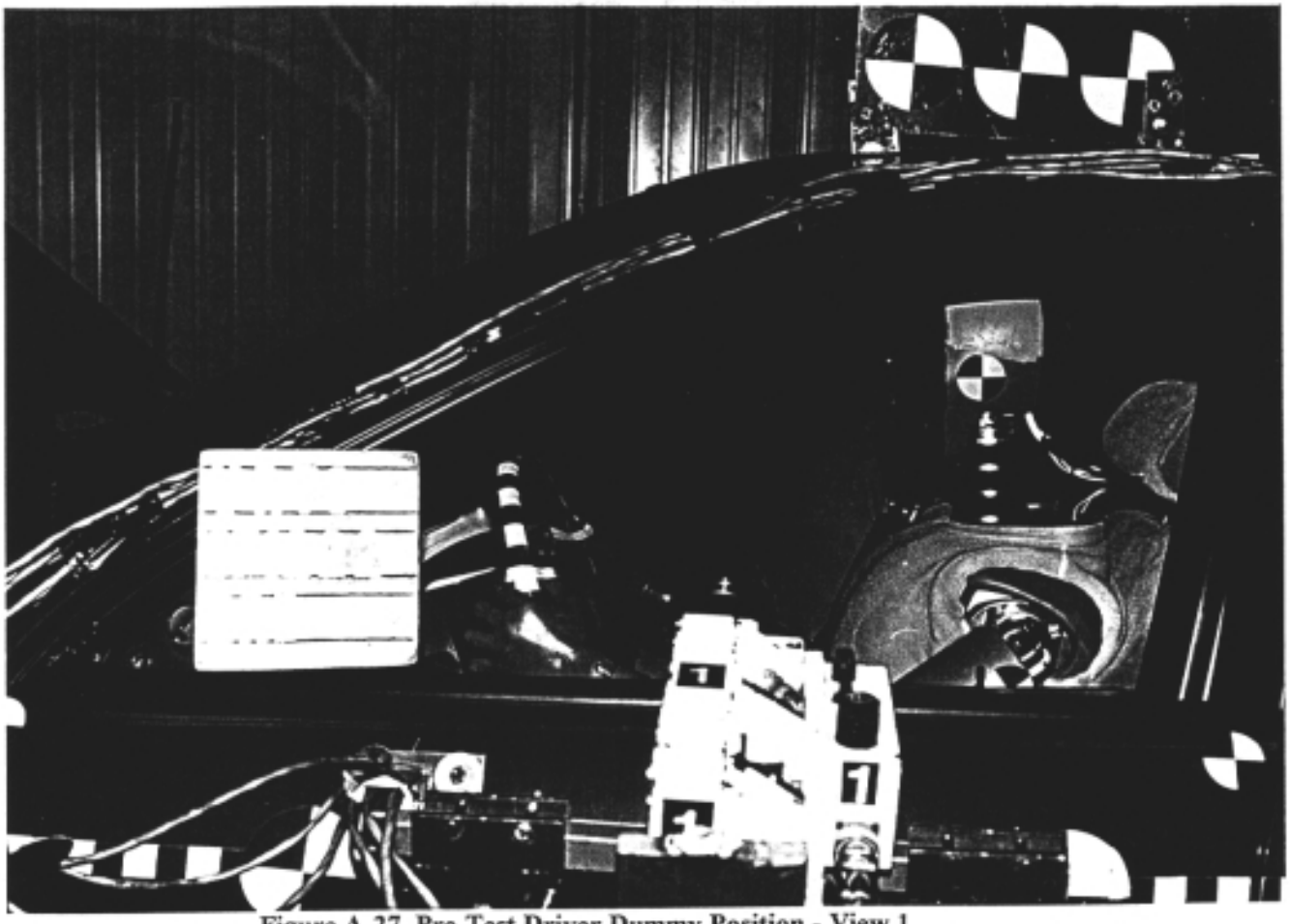


Figure A-27 Pre-Test Driver Dummy Position - View 1

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

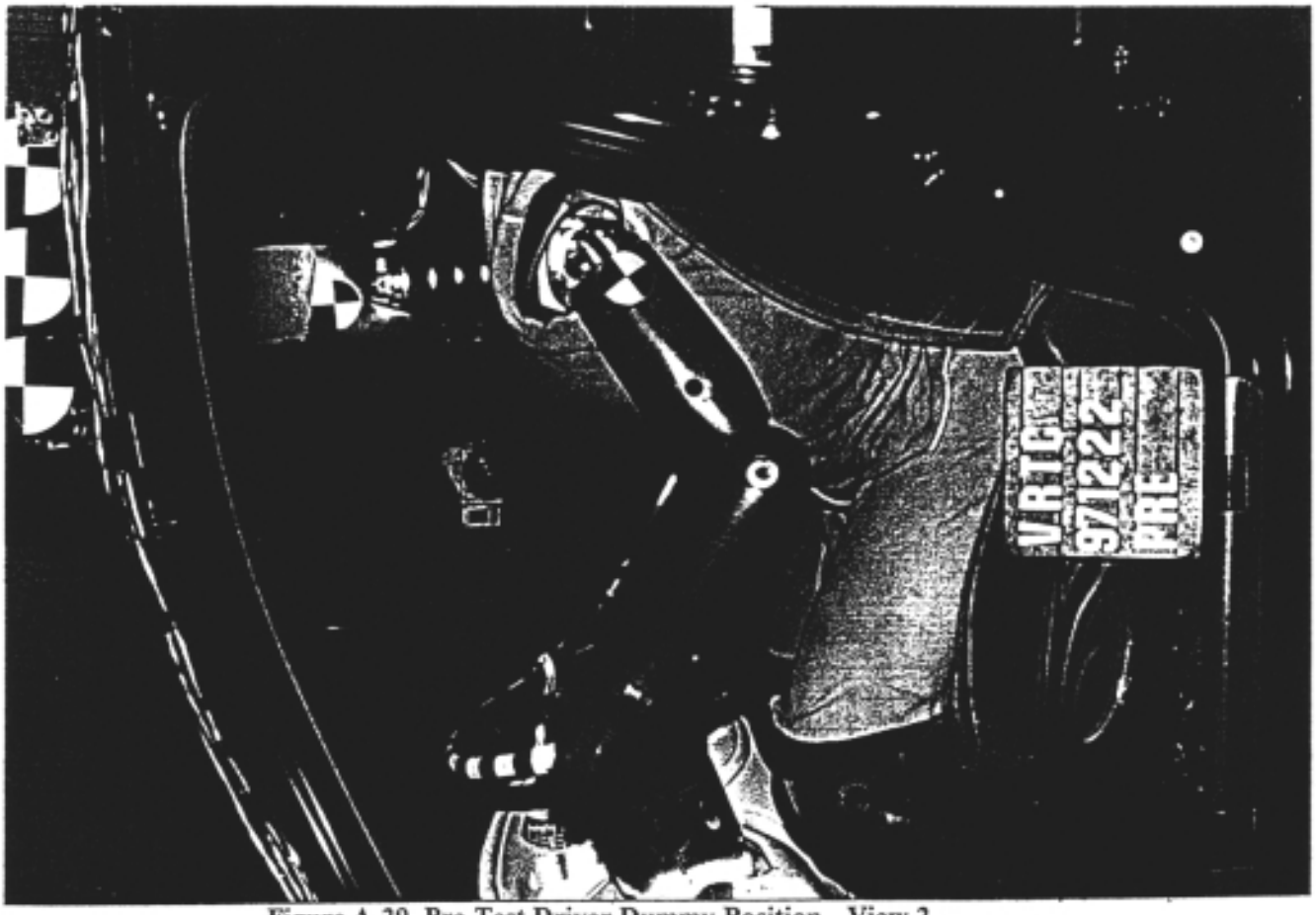


Figure A-29 Pre-Test Driver Dummy Position -View 2

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

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

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

Figure A-33 Pre-Test Passenger Dummy Position - View 1

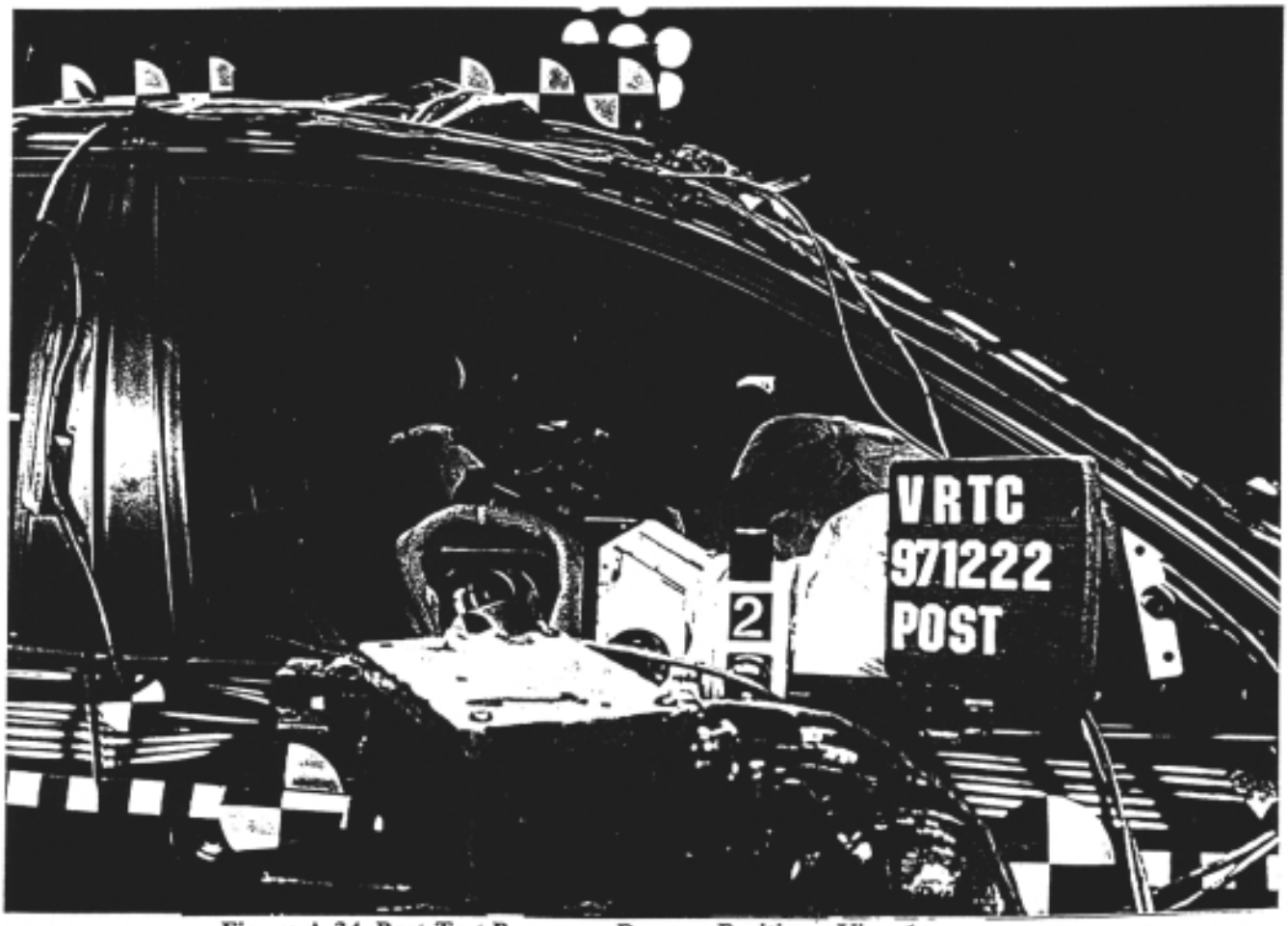


Figure A-34 Post-Test Passenger Dummy Position - View 1

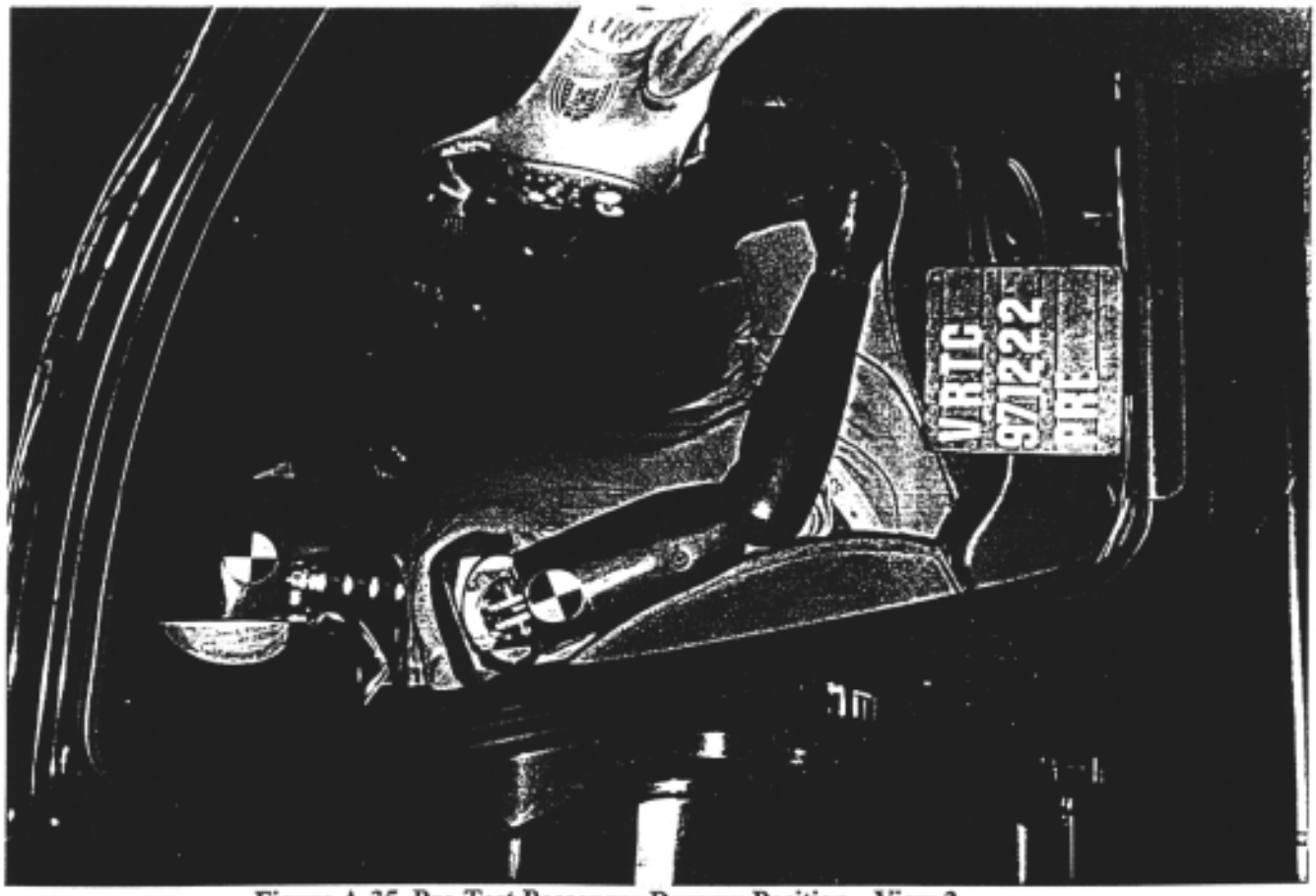


Figure A-35 Pre-Test Passenger Dummy Position - View 2

Figure A-36 Post-Test Passenger Dummy Position - View 2

Figure A-37 Pre-Test Passenger Dummy Position - View 3

Figure A-38 Post-Test Passenger Dummy Position - View 3

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

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

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

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

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

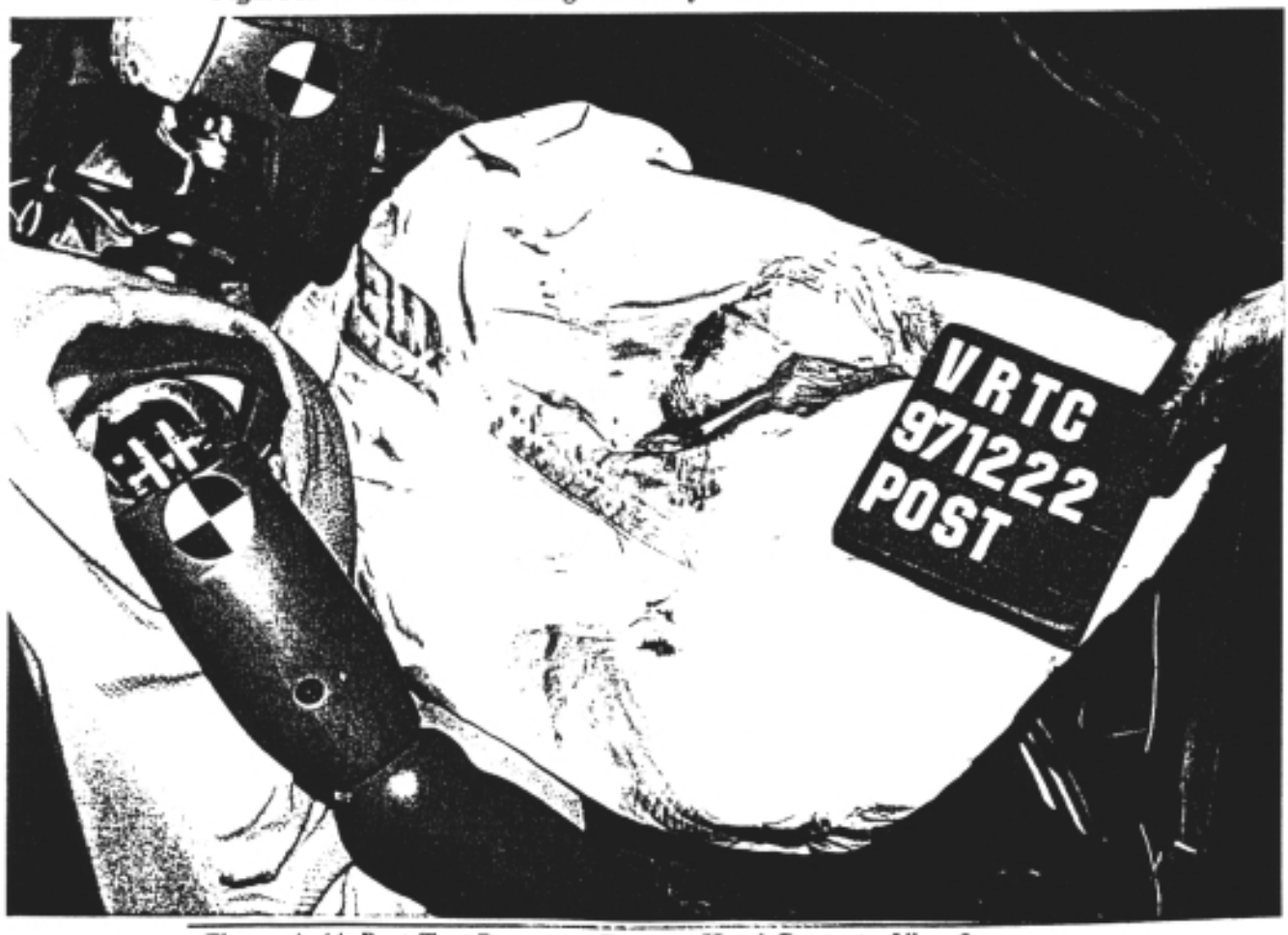


Figure A-44 Post-Test Passenger Dummy Head Contact - View 2

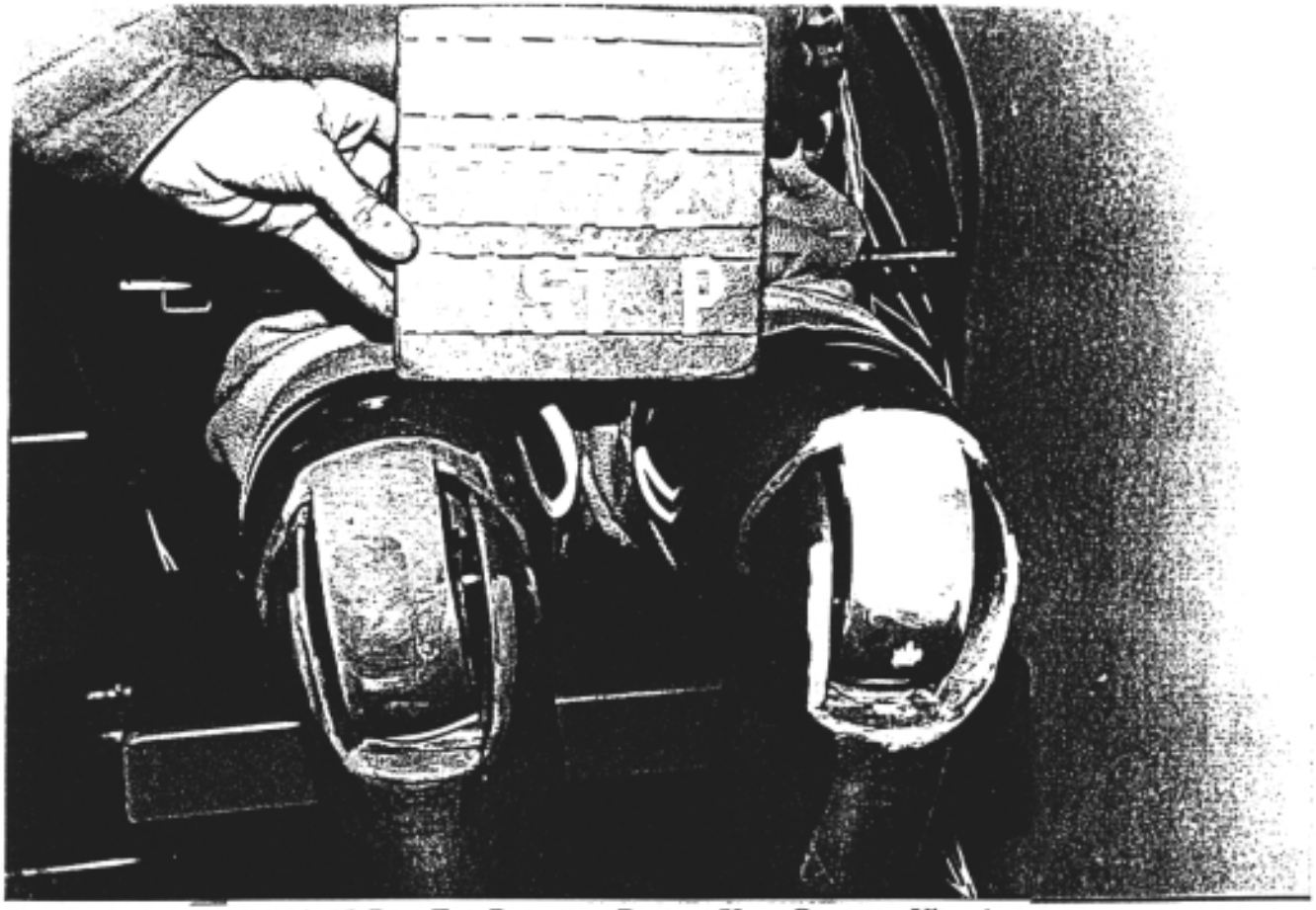


Figure A-45 Post-Test Passenger Dummy Knee Contact - View 1

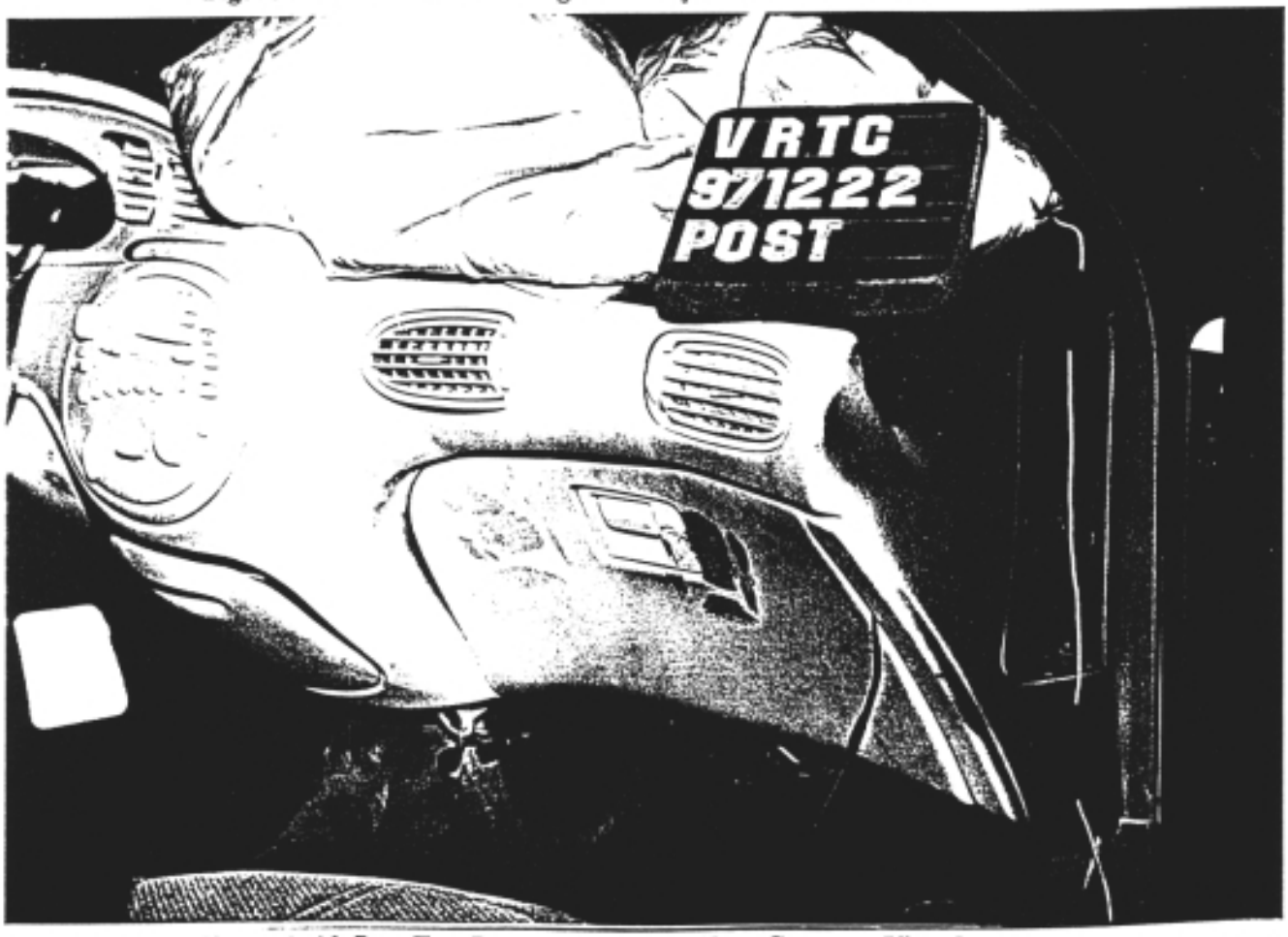
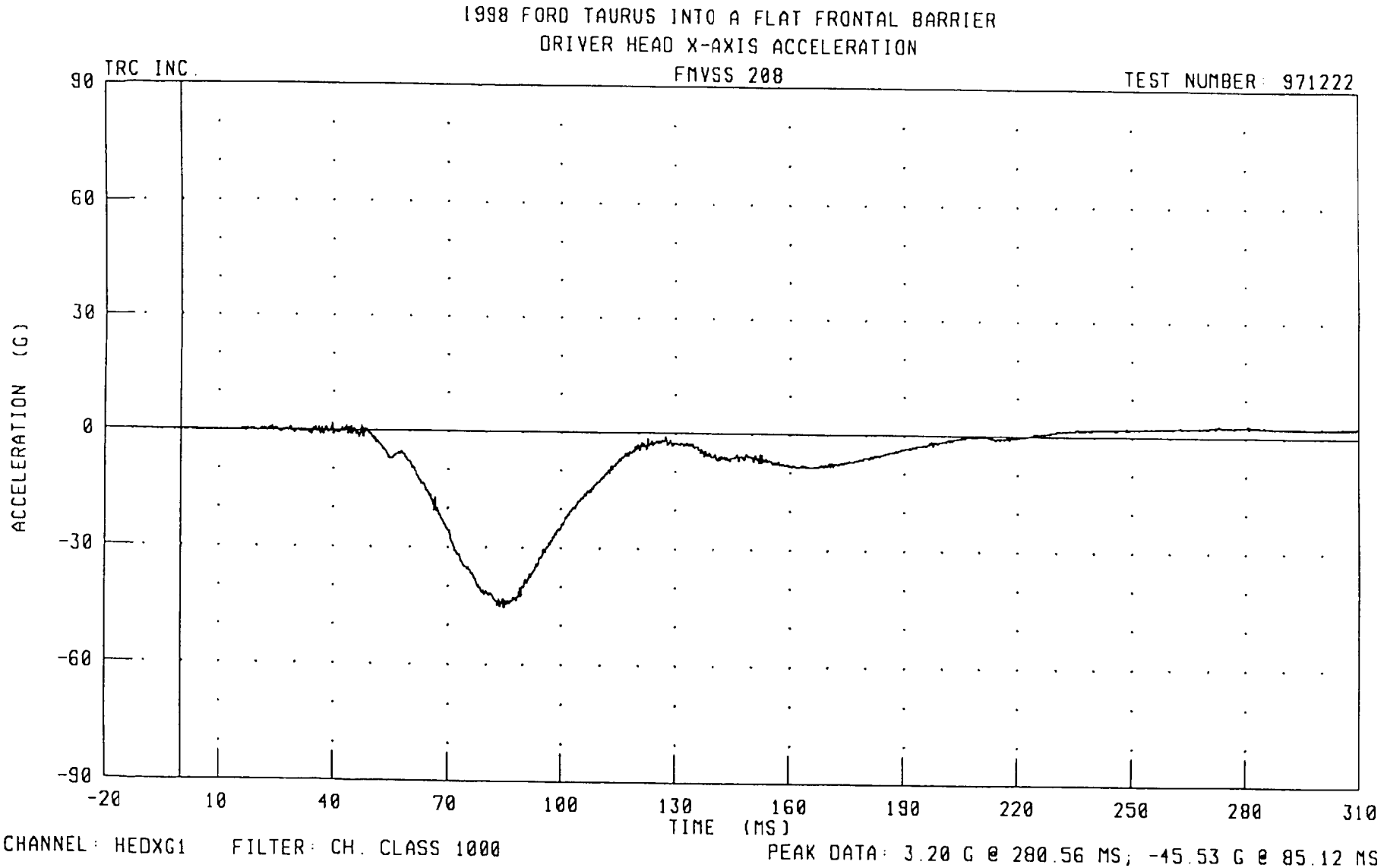


Figure A-46 Post-Test Passenger Dummy Knee Contact - View 2

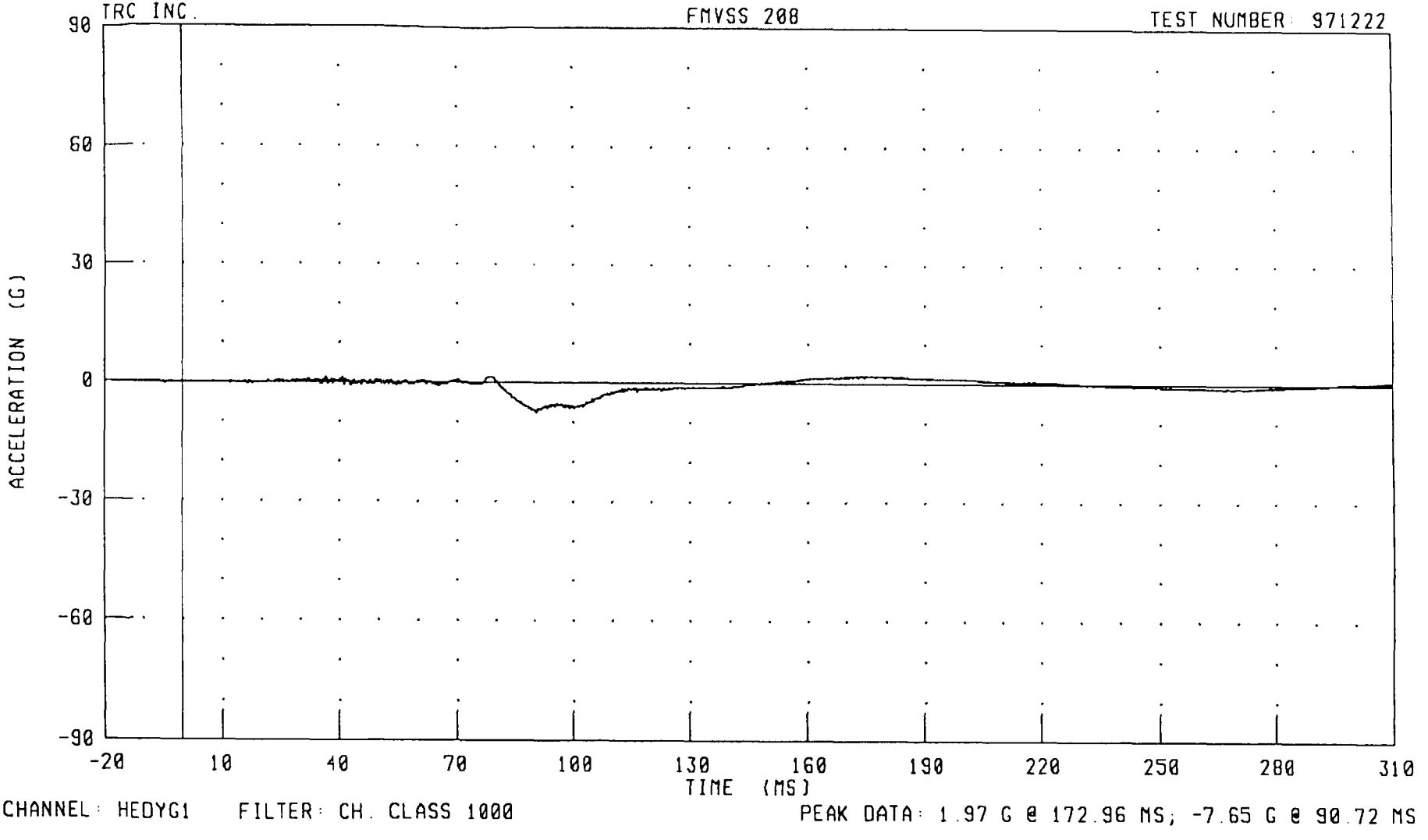
Figure A-47 Pre-Test Vehicle Certification Label View

Appendix B

Data Plots

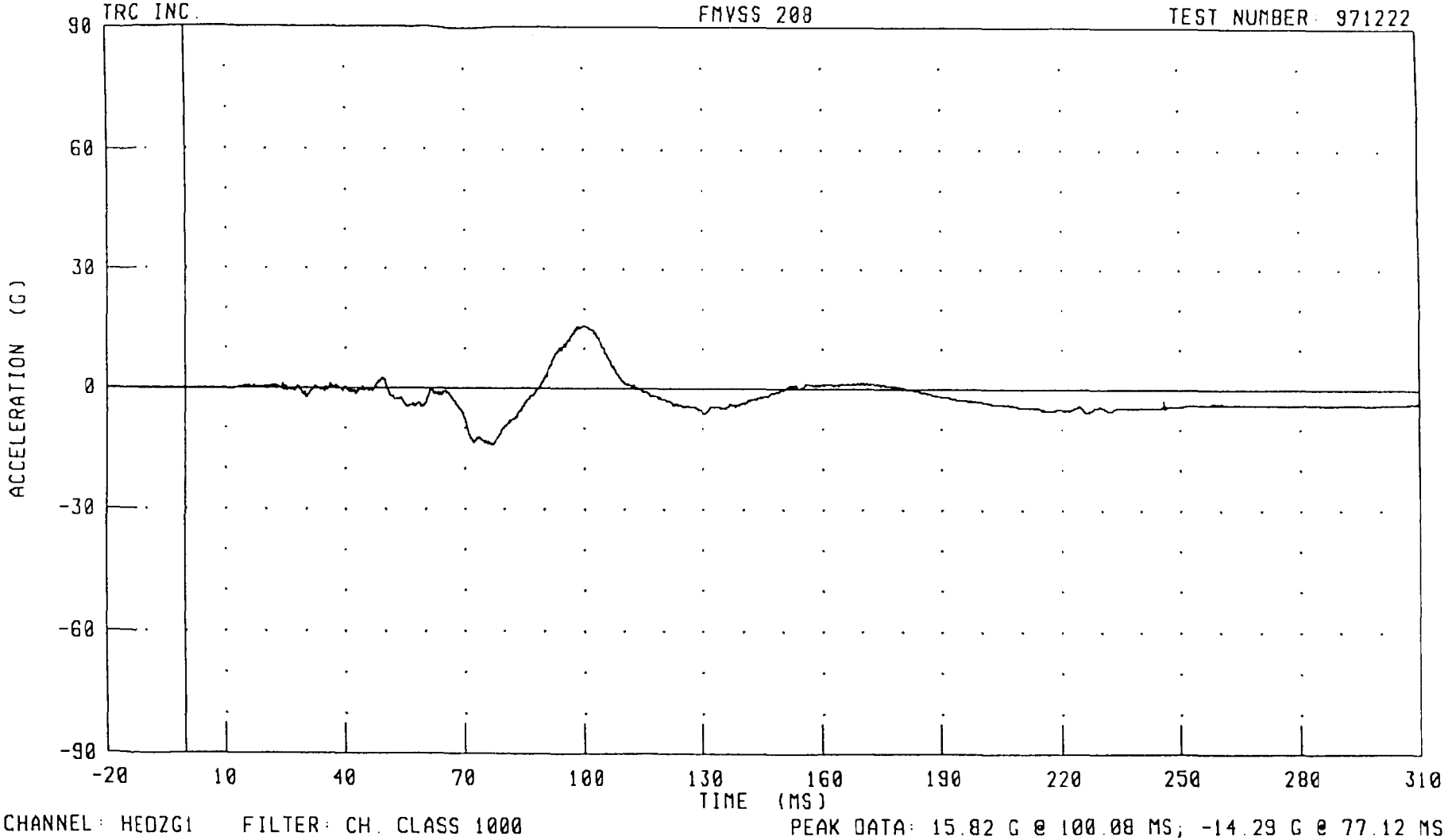

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION
FMVSS 208
TRC INC.
TEST NUMBER: 971222
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG1
FILTER: CH. CLASS 1000
PEAK DATA: 3.20 G @ 280.56 MS; -45.53 G @ 85.12 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION



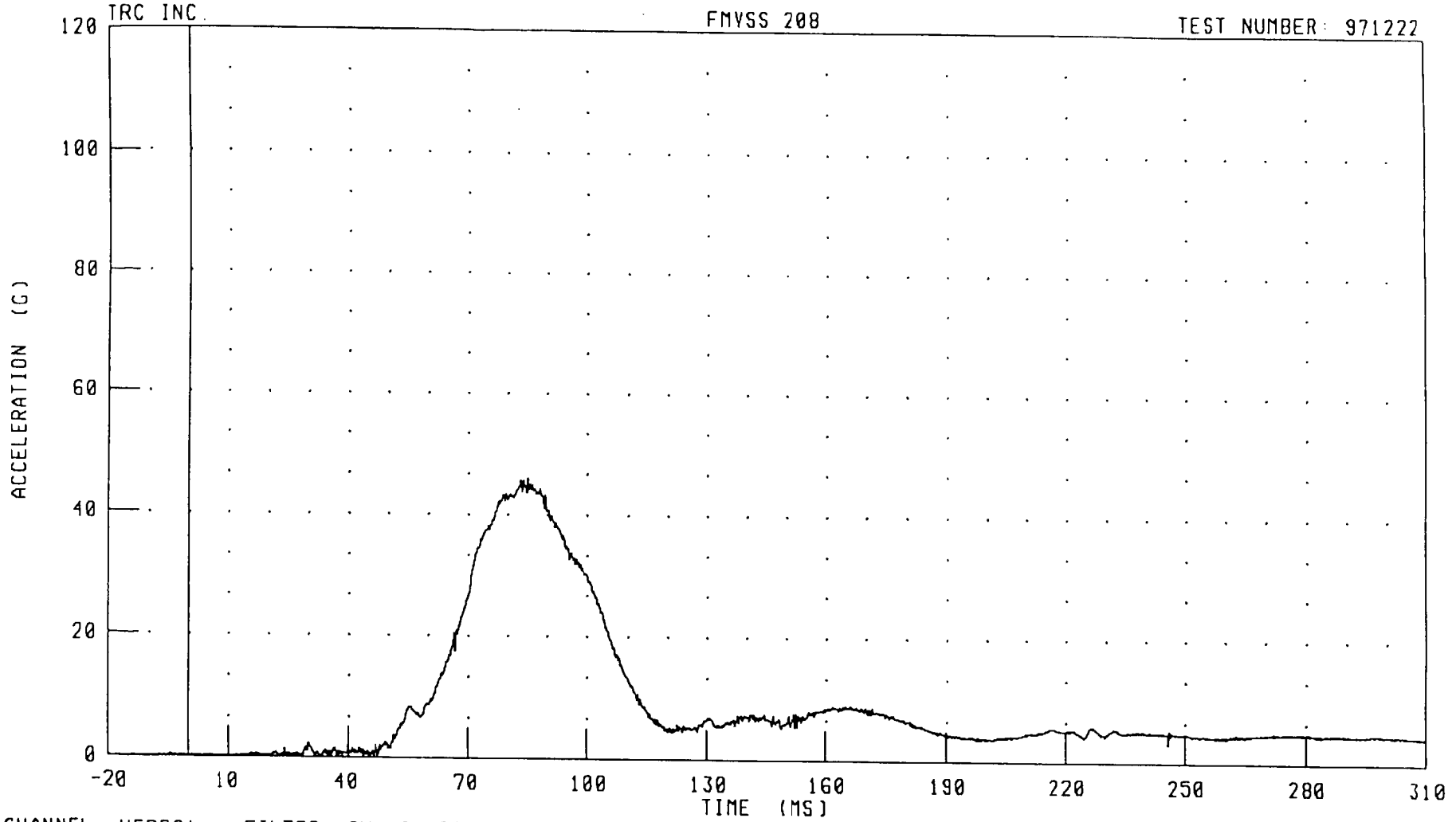
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000 PEAK DATA: 1.97 G @ 172.96 MS; -7.65 G @ 90.72 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION



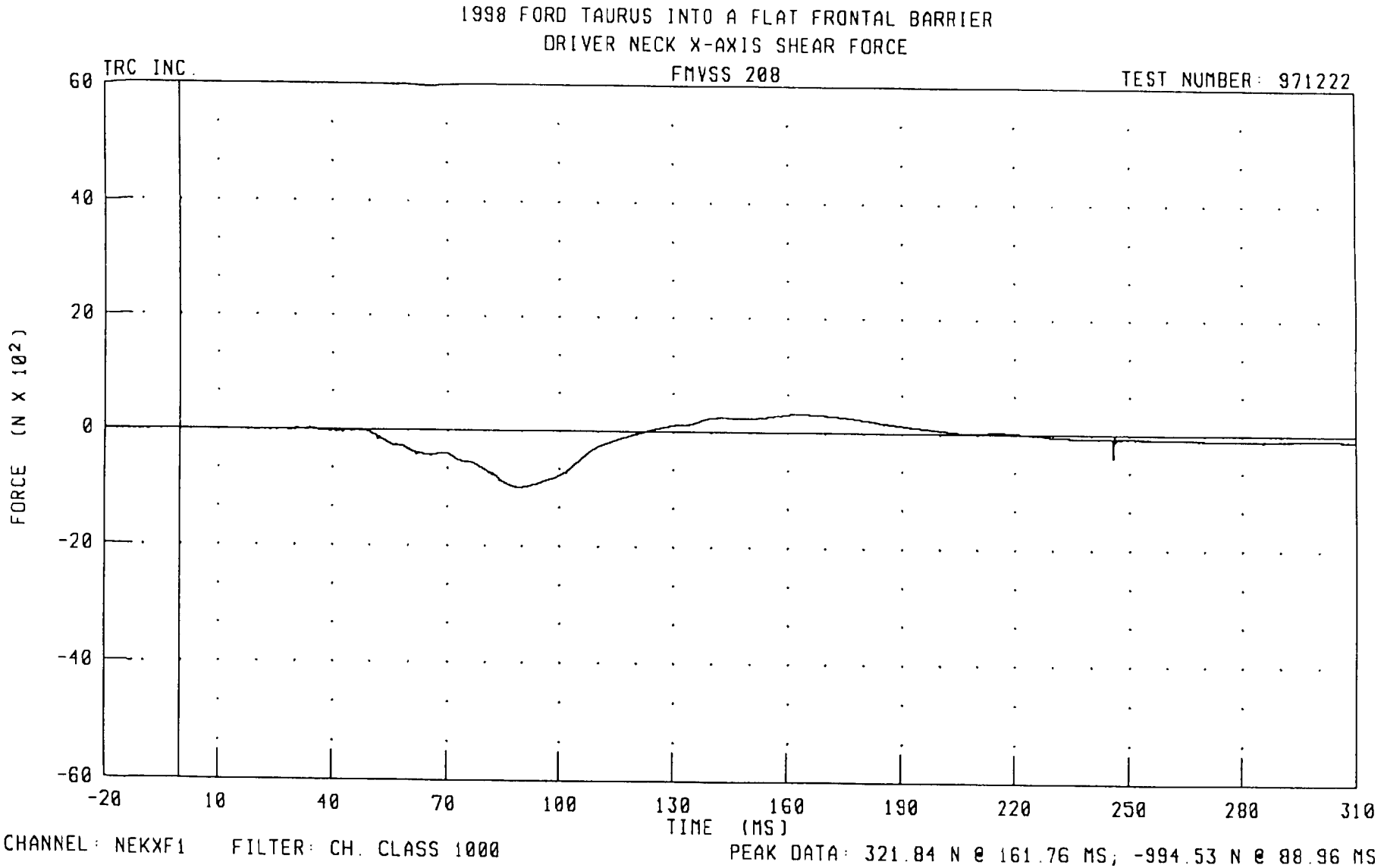
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000 PEAK DATA: 15.82 G @ 100.08 MS; -14.29 G @ 77.12 MS

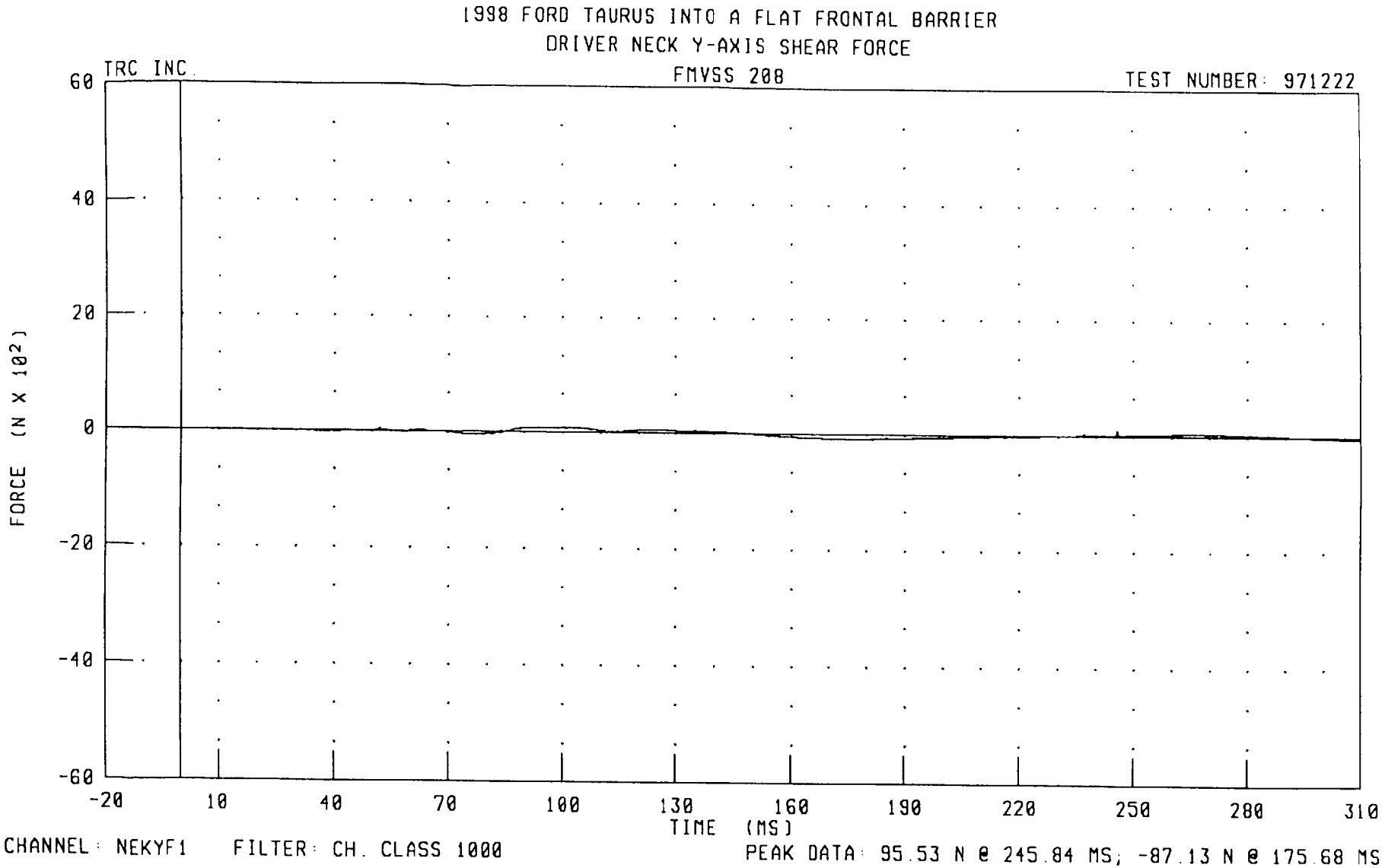
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION



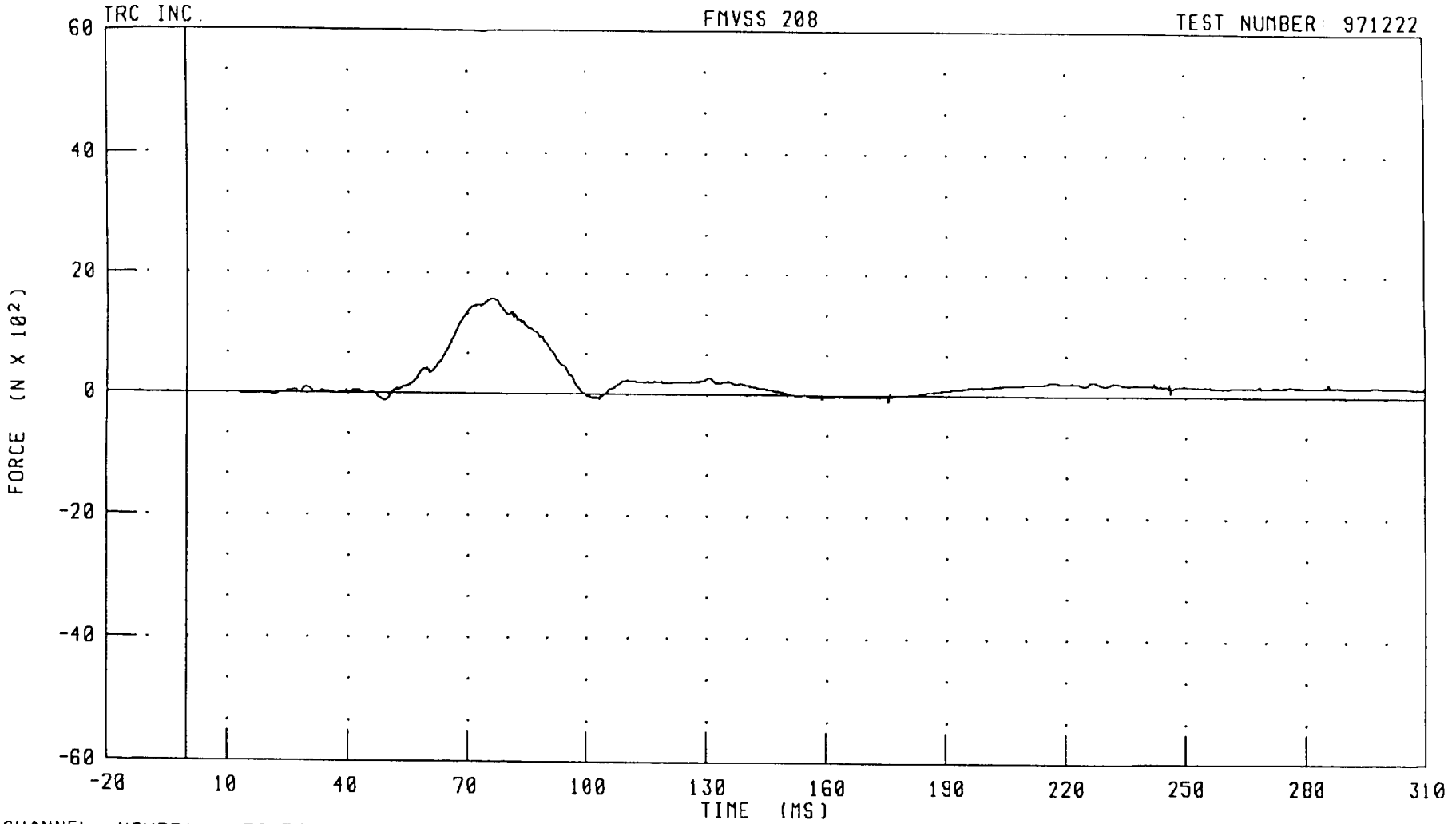
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA: 45.93 G @ 85.12 MS; 0.10 G @ 11.84 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE
TRC INC.
FMVSS 208
TEST NUMBER: 971222
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: 321.84 N @ 161.76 MS; -994.53 N @ 88.96 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER NECK Y-AXIS SHEAR FORCE
TRC INC.
FMVSS 208
TEST NUMBER: 971222
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYF1
FILTER: CH. CLASS 1000
PEAK DATA: 95.53 N @ 245.84 MS; -87.13 N @ 175.68 MS

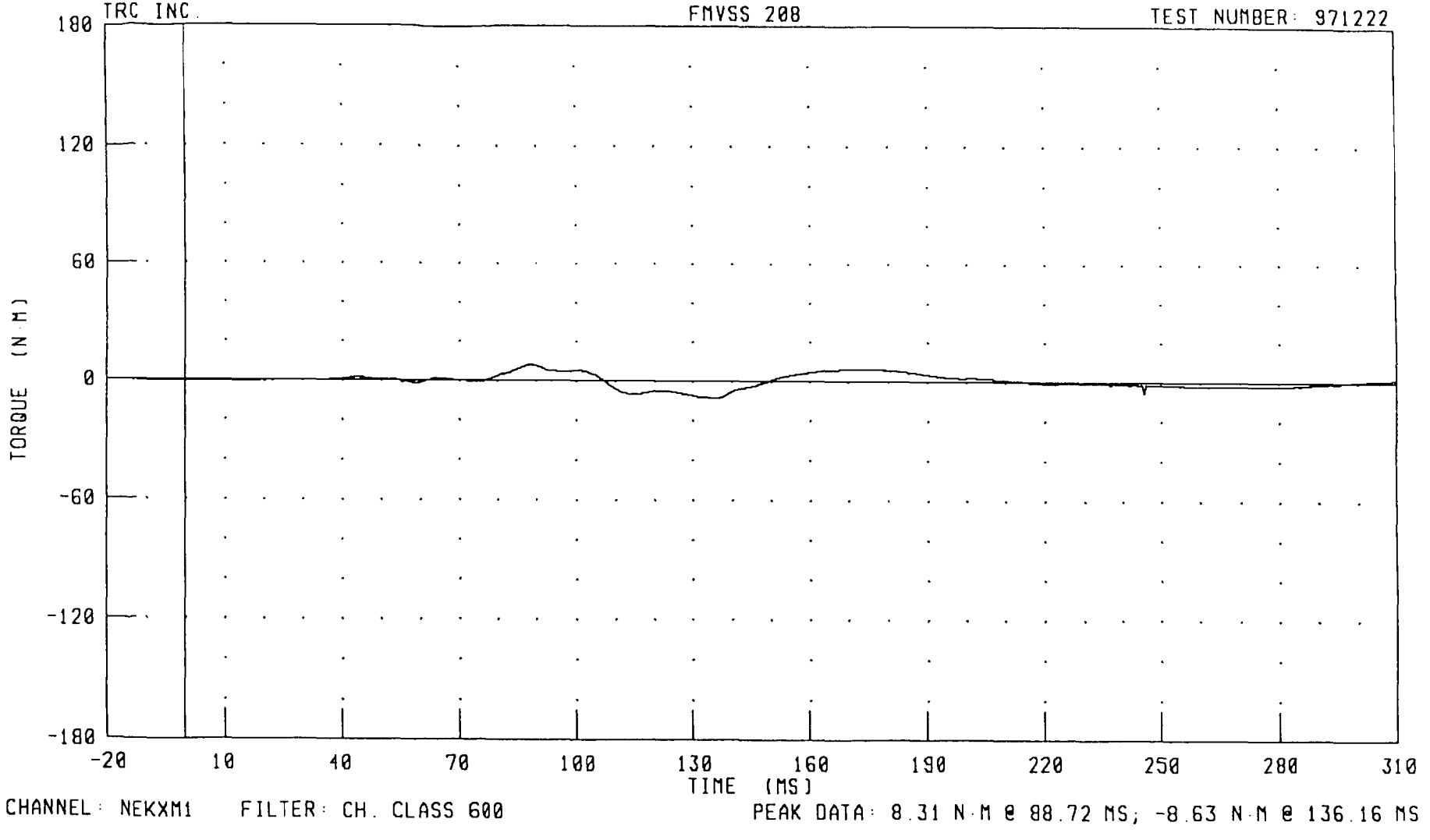
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 1576.90 N @ 76.32 MS; -124.57 N @ 49.12 MS

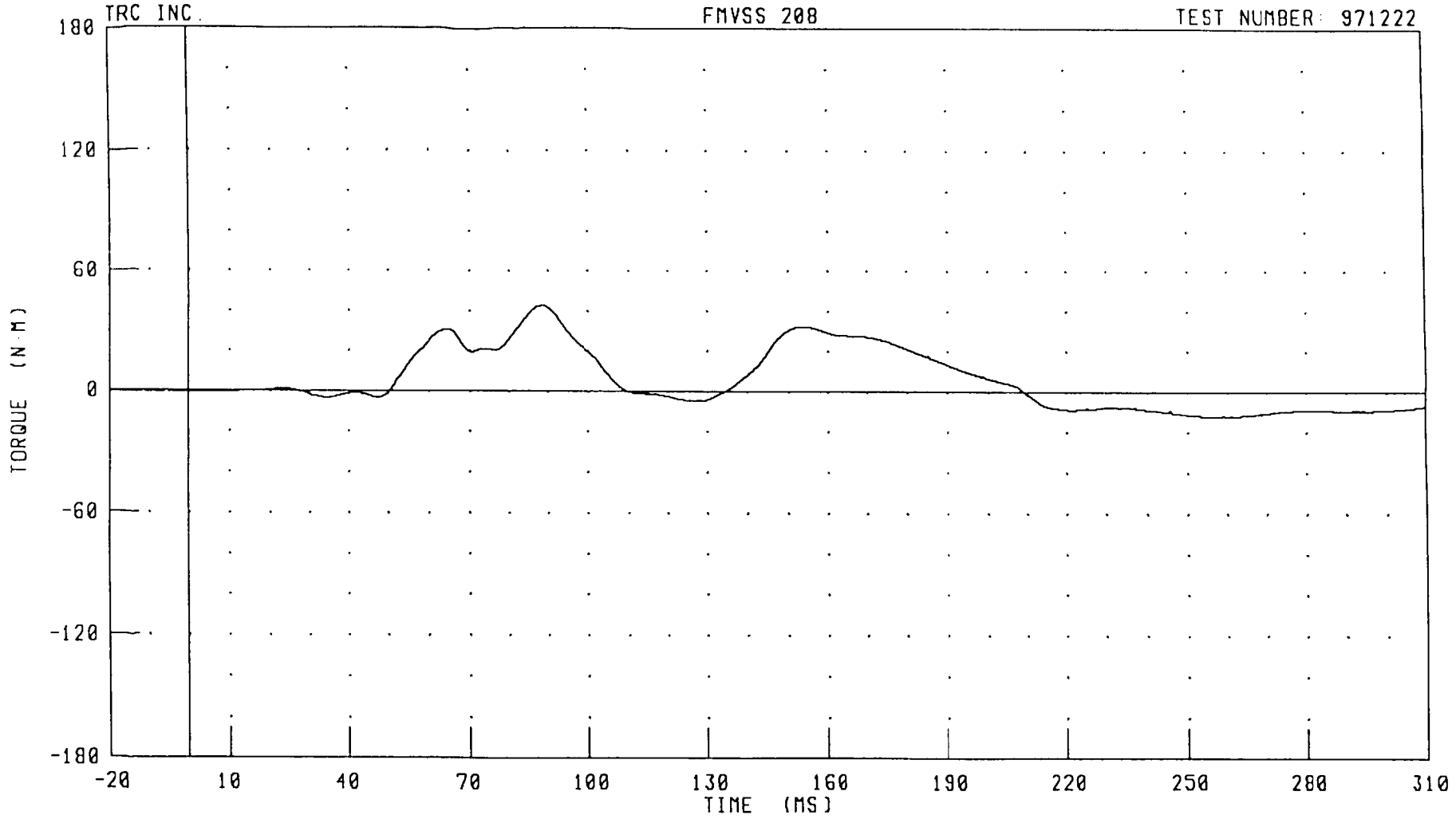
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS



CHANNEL: NEKXM1 FILTER: CH. CLASS 600

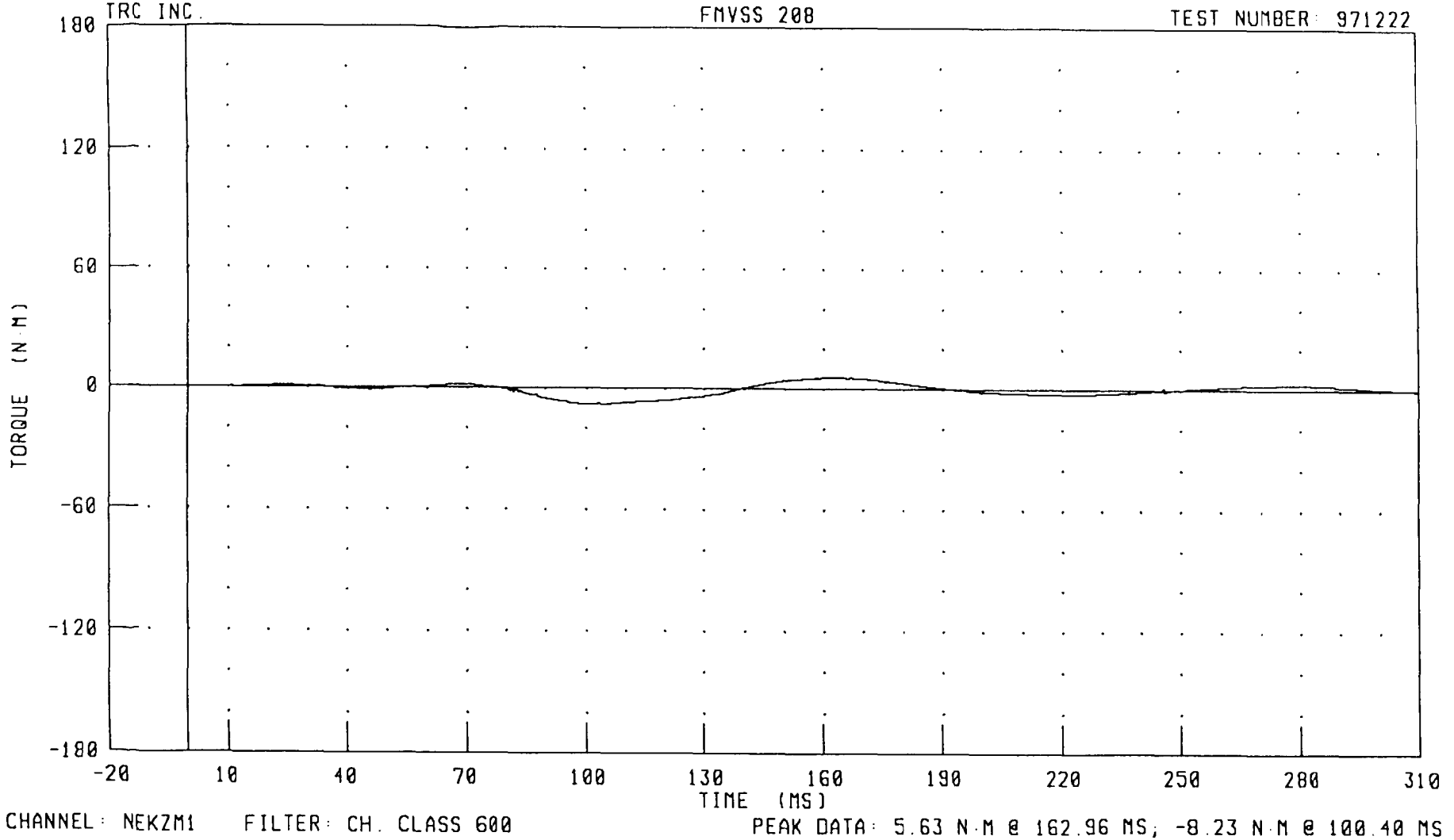
PEAK DATA: 8.31 N-M @ 88.72 MS; -8.63 N-M @ 136.16 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS



CHANNEL: NEKYM1 FILTER: CH. CLASS 600 PEAK DATA: 42.81 N-M @ 88.24 MS; -12.24 N-M @ 256.00 MS

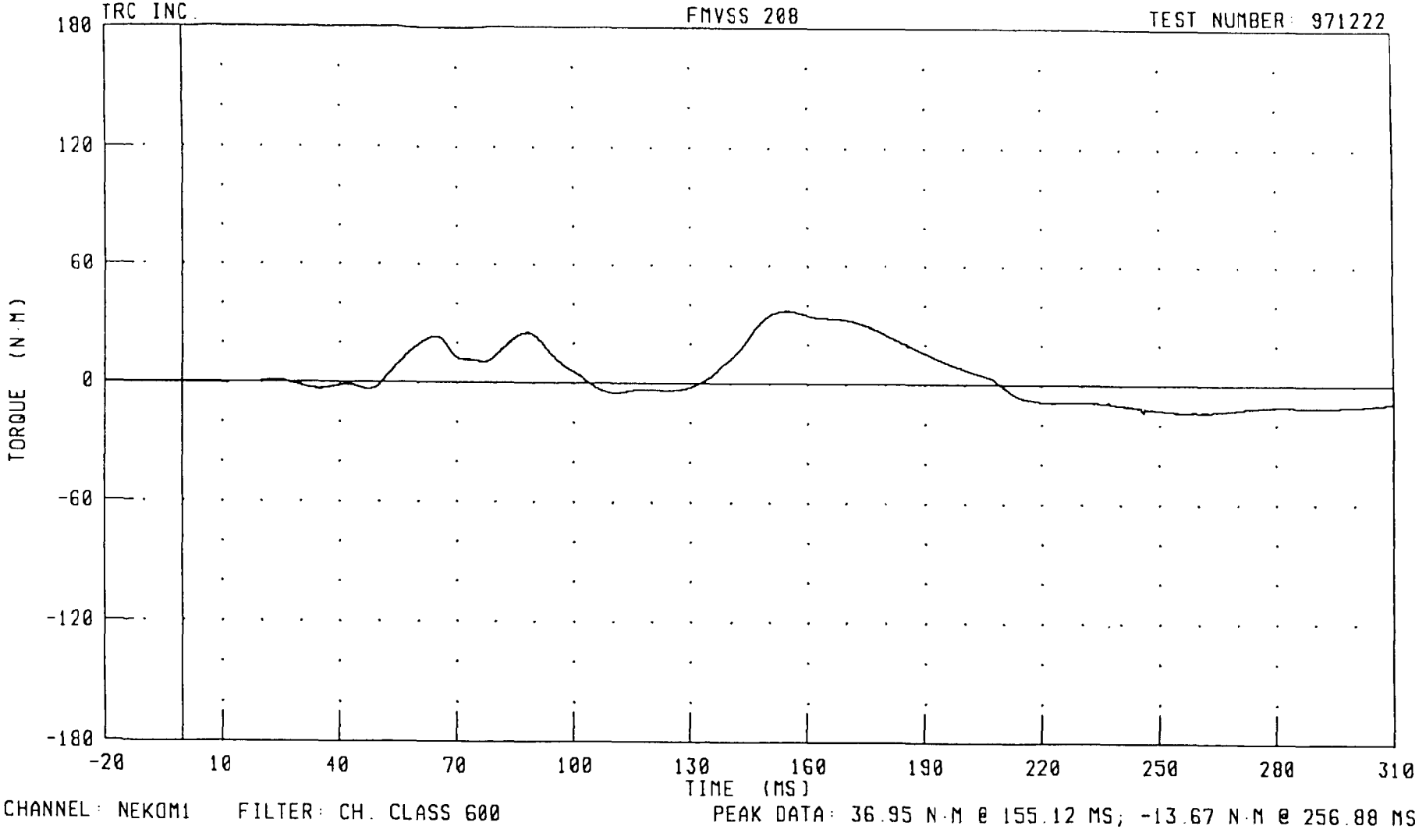
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT Z AXIS



CHANNEL: NEKZM1 FILTER: CH. CLASS 600

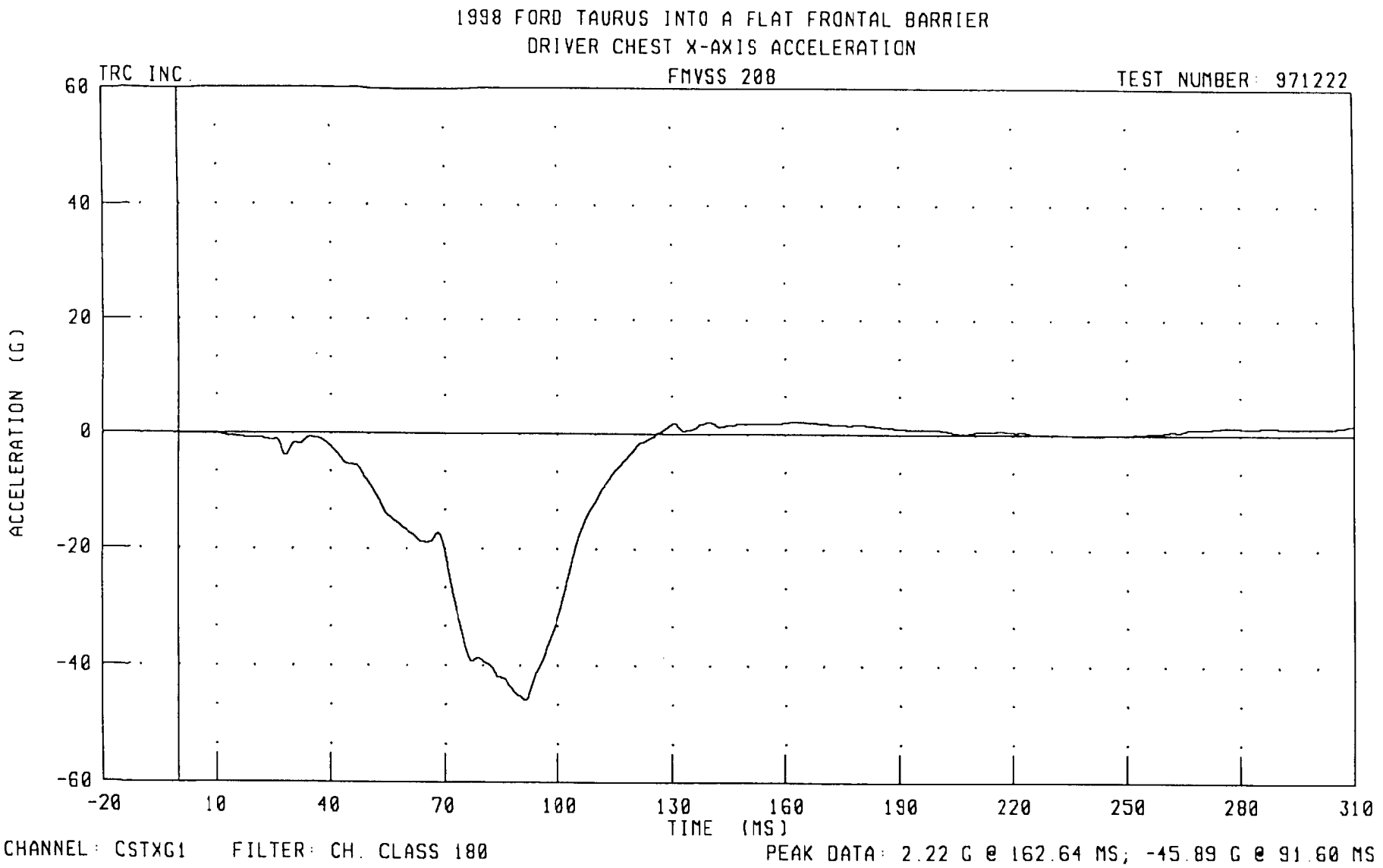
PEAK DATA: 5.63 N-M @ 162.96 MS; -8.23 N-M @ 100.40 MS

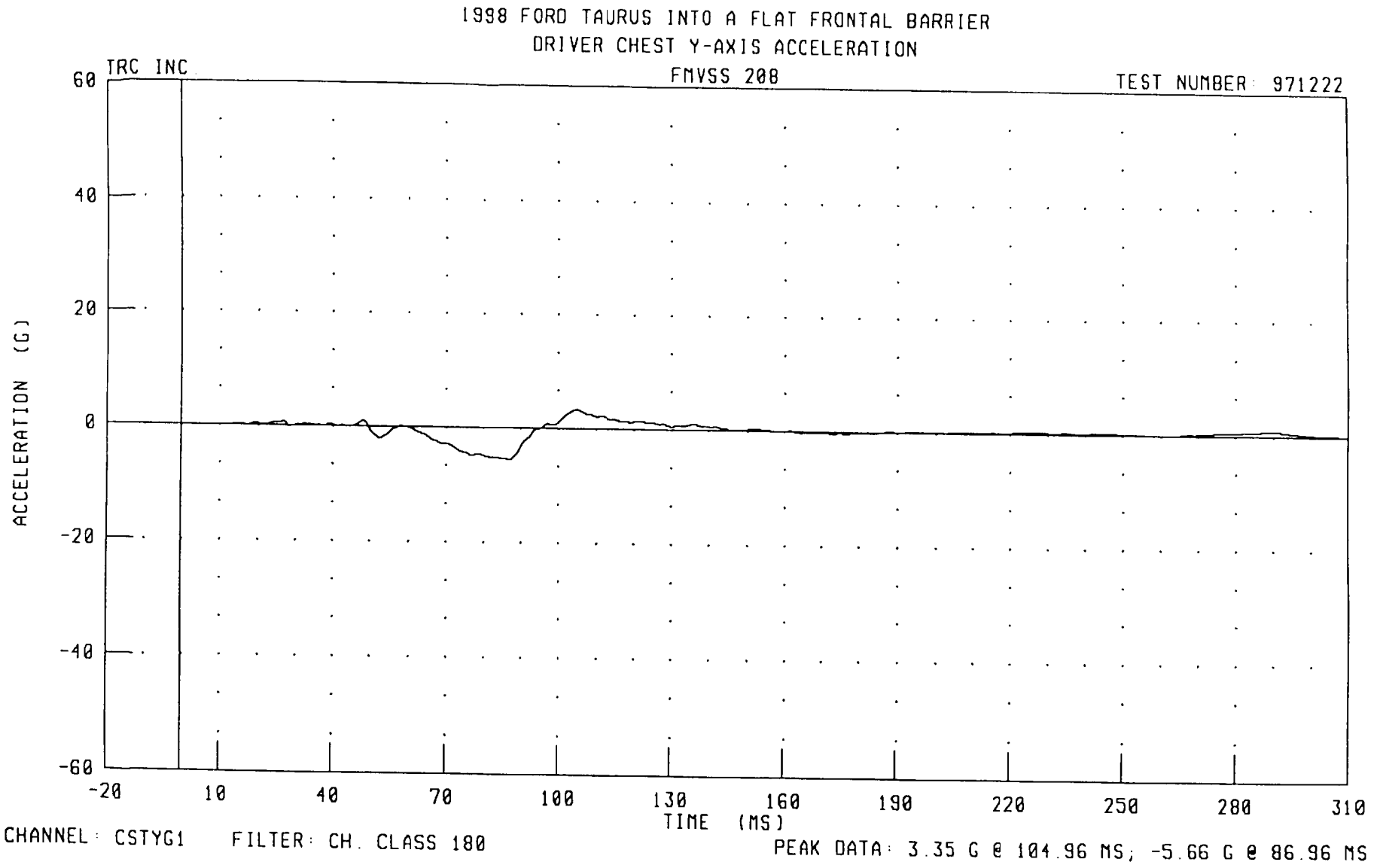
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER NECK OCCIPITAL CONDYLE



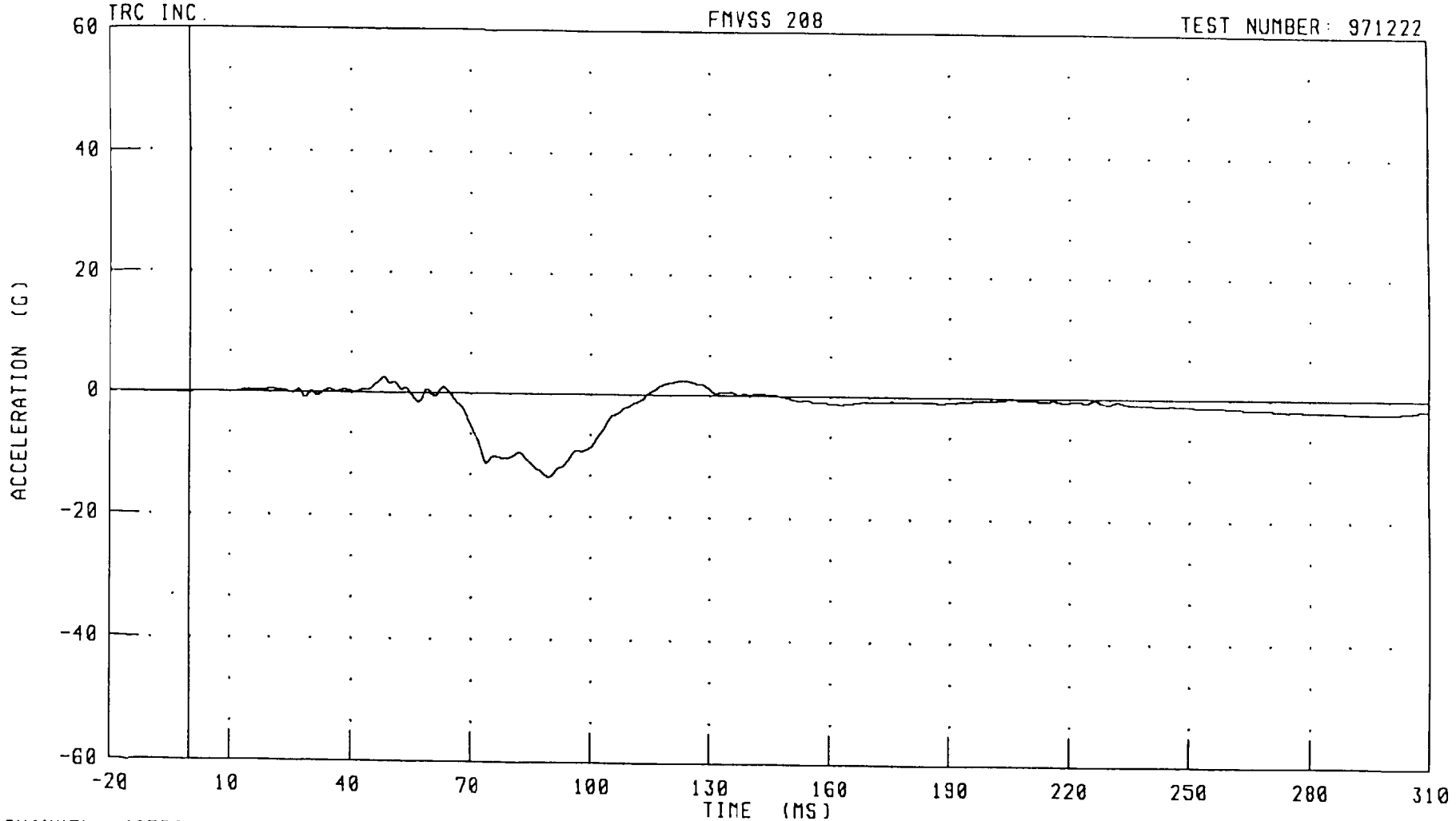
CHANNEL: NEKOM1 FILTER: CH. CLASS 600

PEAK DATA: 36.95 N-M @ 155.12 MS; -13.67 N-M @ 256.88 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 971222
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 2.22 G @ 162.64 MS; -45.89 G @ 91.60 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
FMVSS 208
TRC INC
TEST NUMBER: 971222
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: 3.35 G @ 104.96 MS; -5.66 G @ 86.96 MS

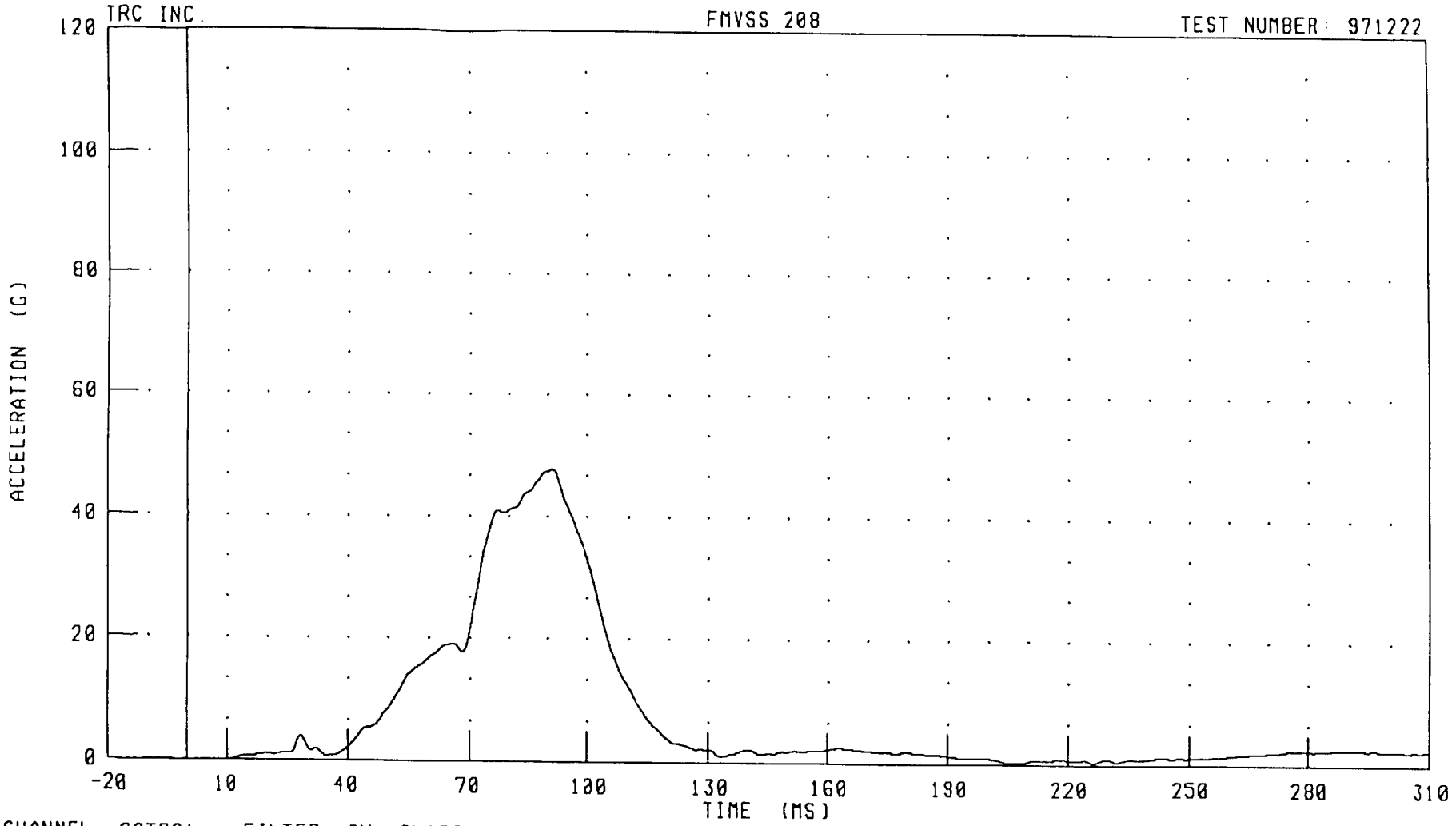
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

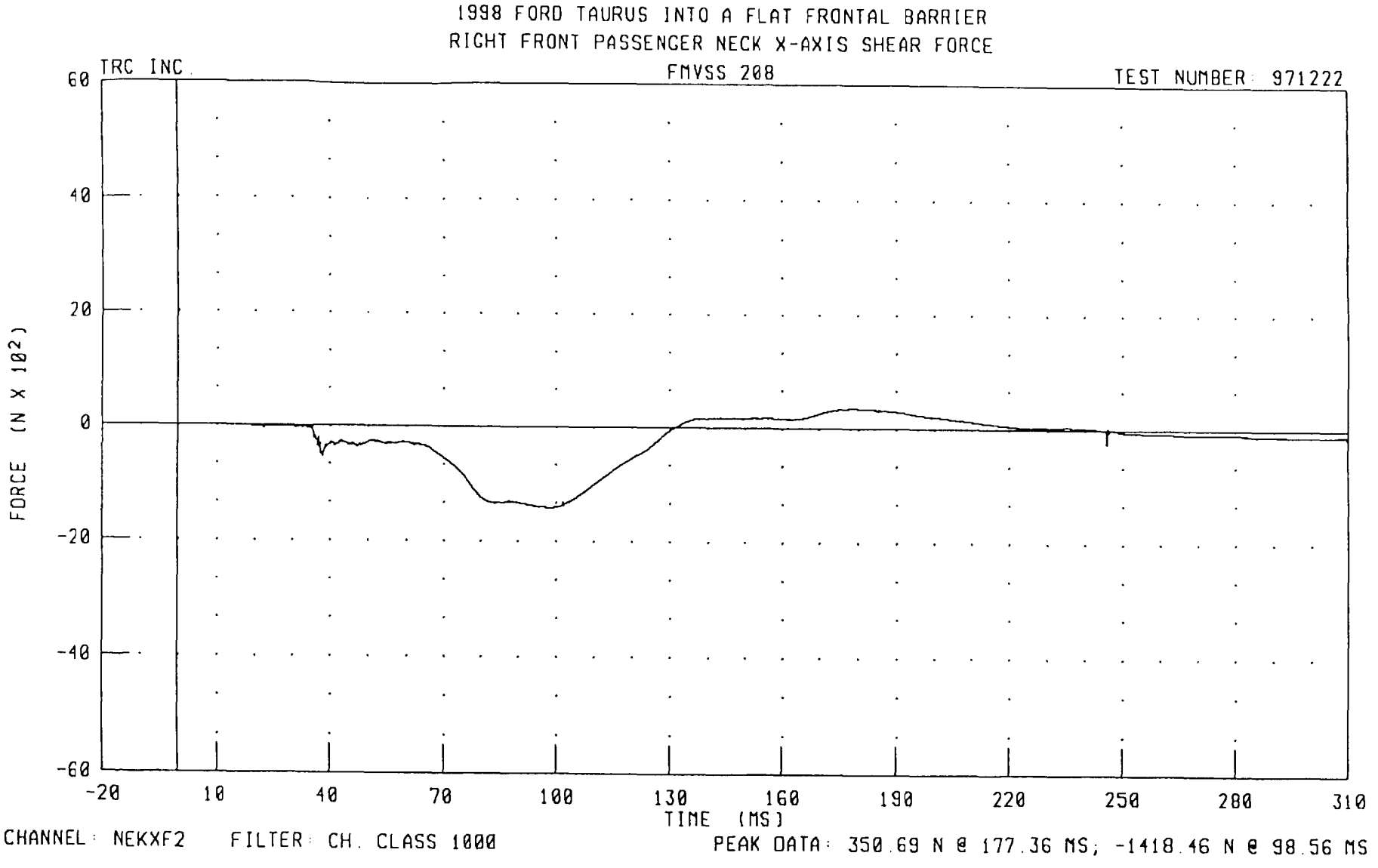
PEAK DATA: 2.58 G @ 48.40 MS; -13.66 G @ 89.44 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION

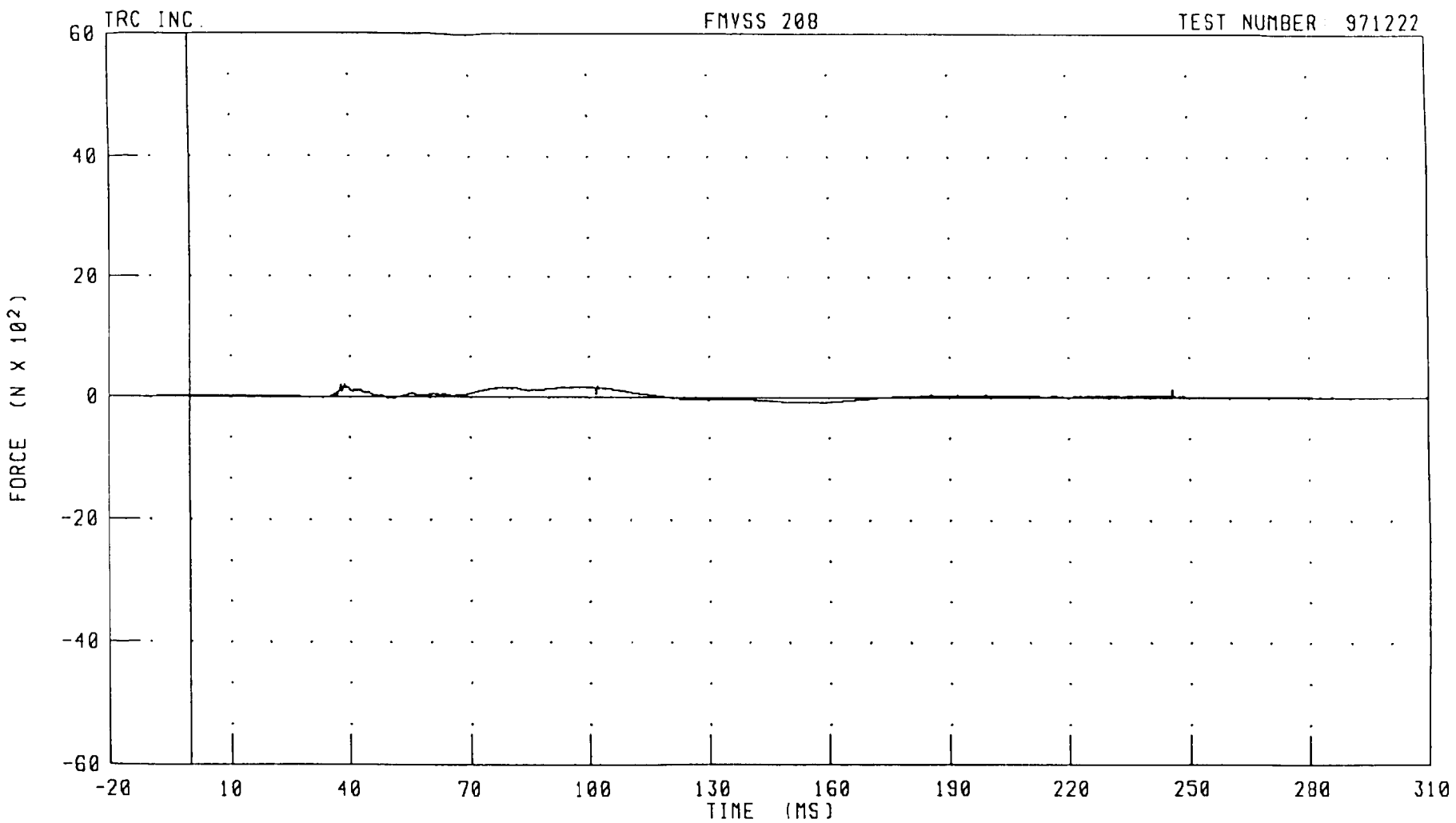


CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 47.61 G @ 91.28 MS; 0.01 G @ -20.00 MS

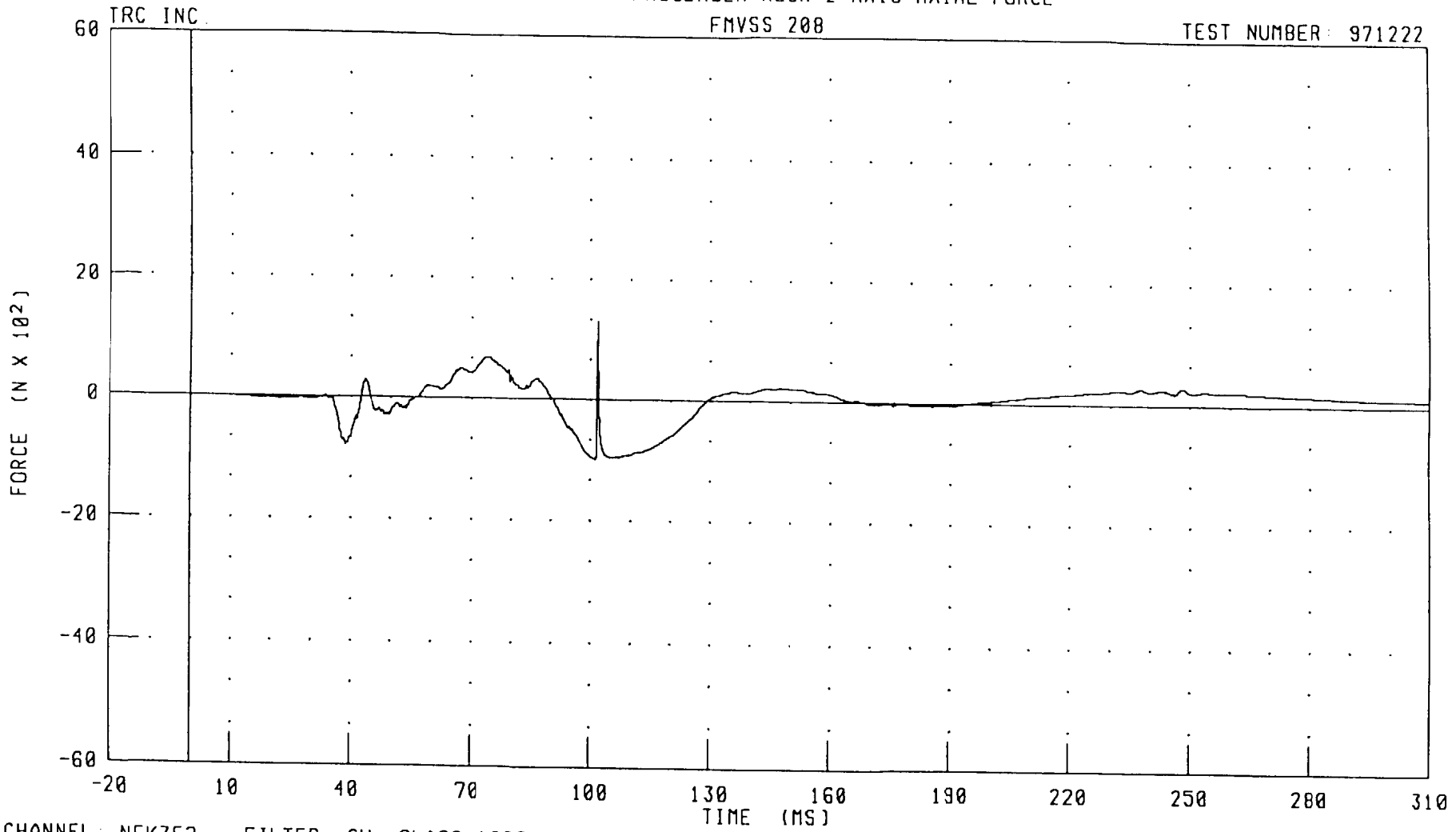

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
TRC INC
FMVSS 208
TEST NUMBER: 971222
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXF2
FILTER: CH. CLASS 1000
PEAK DATA: 350.69 N @ 177.36 MS; -1418.46 N @ 98.56 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000 PEAK DATA: 201.34 N @ 38.88 MS; -89.99 N @ 151.52 MS

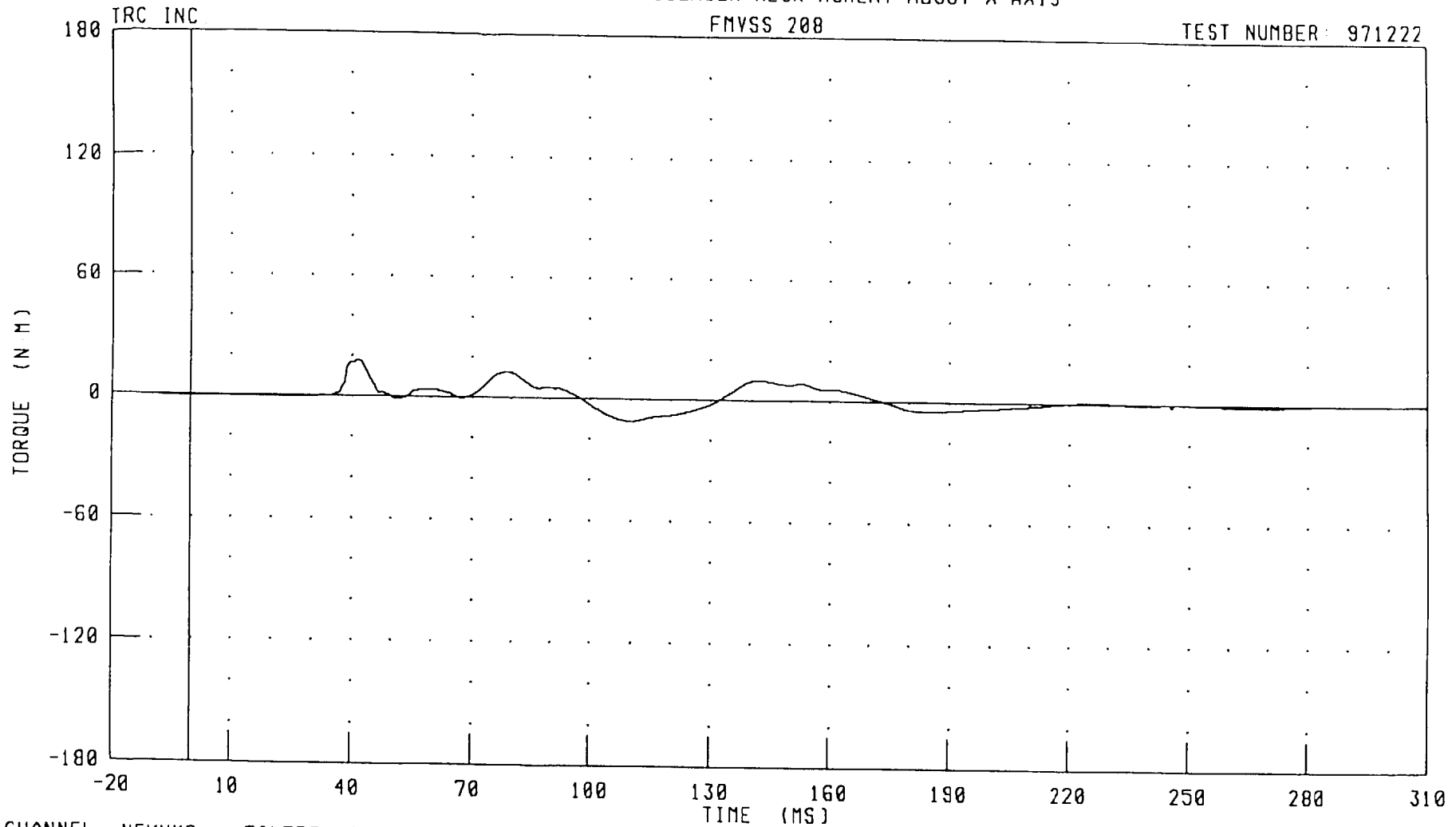
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE
FMVSS 208



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

PEAK DATA: 1305.11 N @ 101.92 MS; -989.98 N @ 101.20 MS

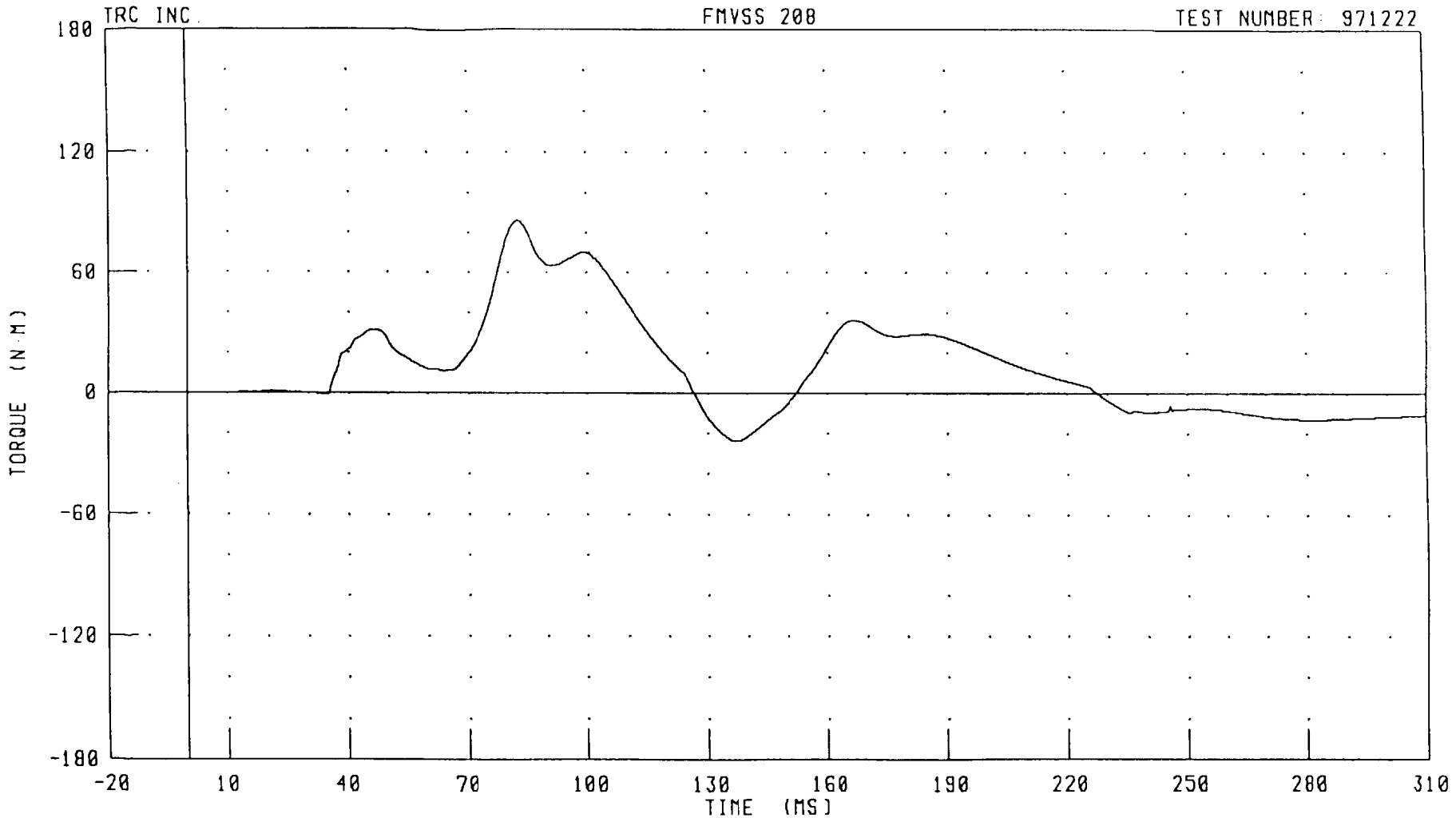
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS



CHANNEL: NEKXM2 FILTER: CH. CLASS 600

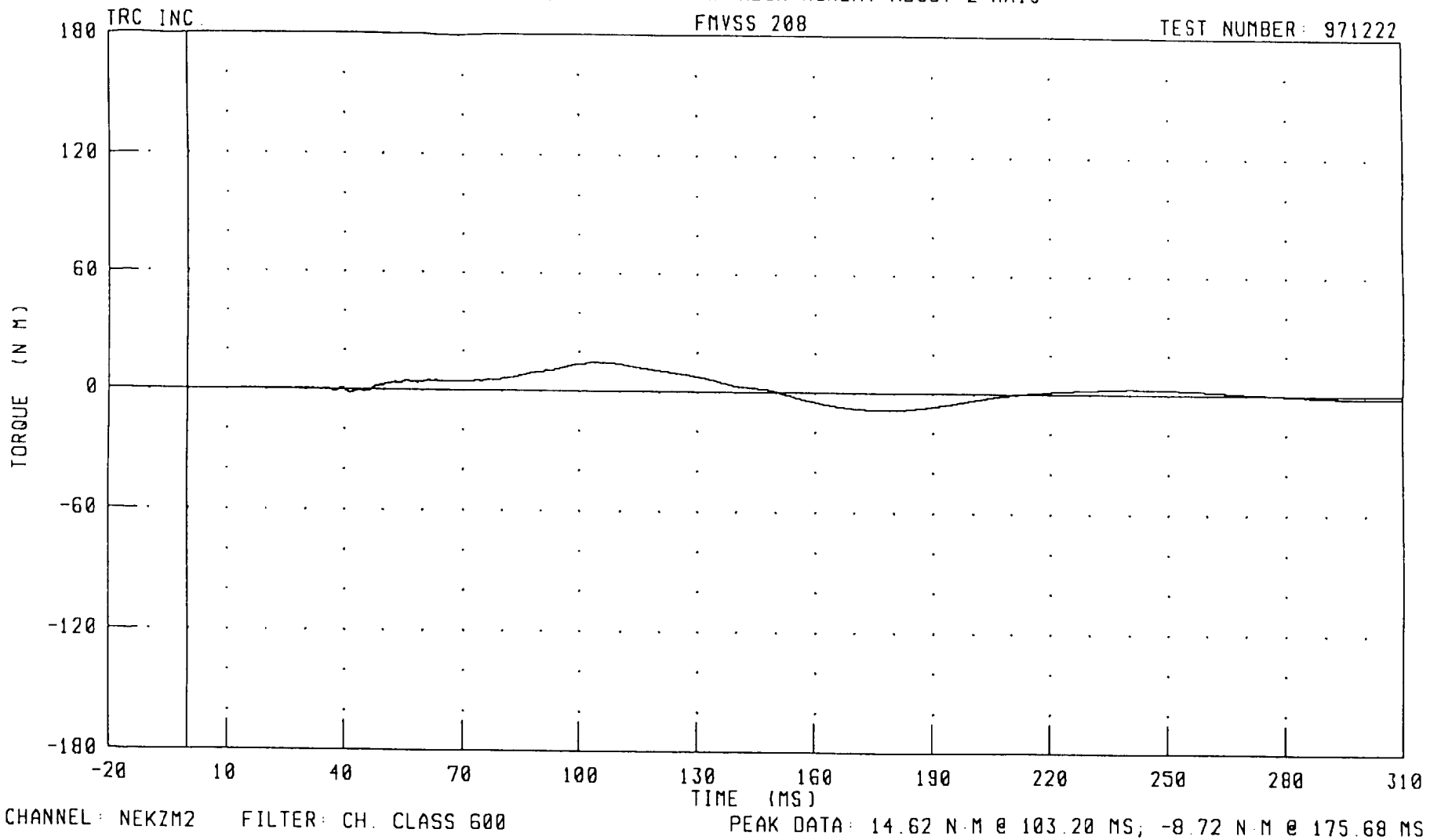
PEAK DATA: 18.07 N-M @ 41.60 MS; -10.96 N-M @ 110.64 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS



CHANNEL: NEKYM2 FILTER: CH. CLASS 600 PEAK DATA: 86.13 N-M @ 82.64 MS; -24.03 N-M @ 137.28 MS

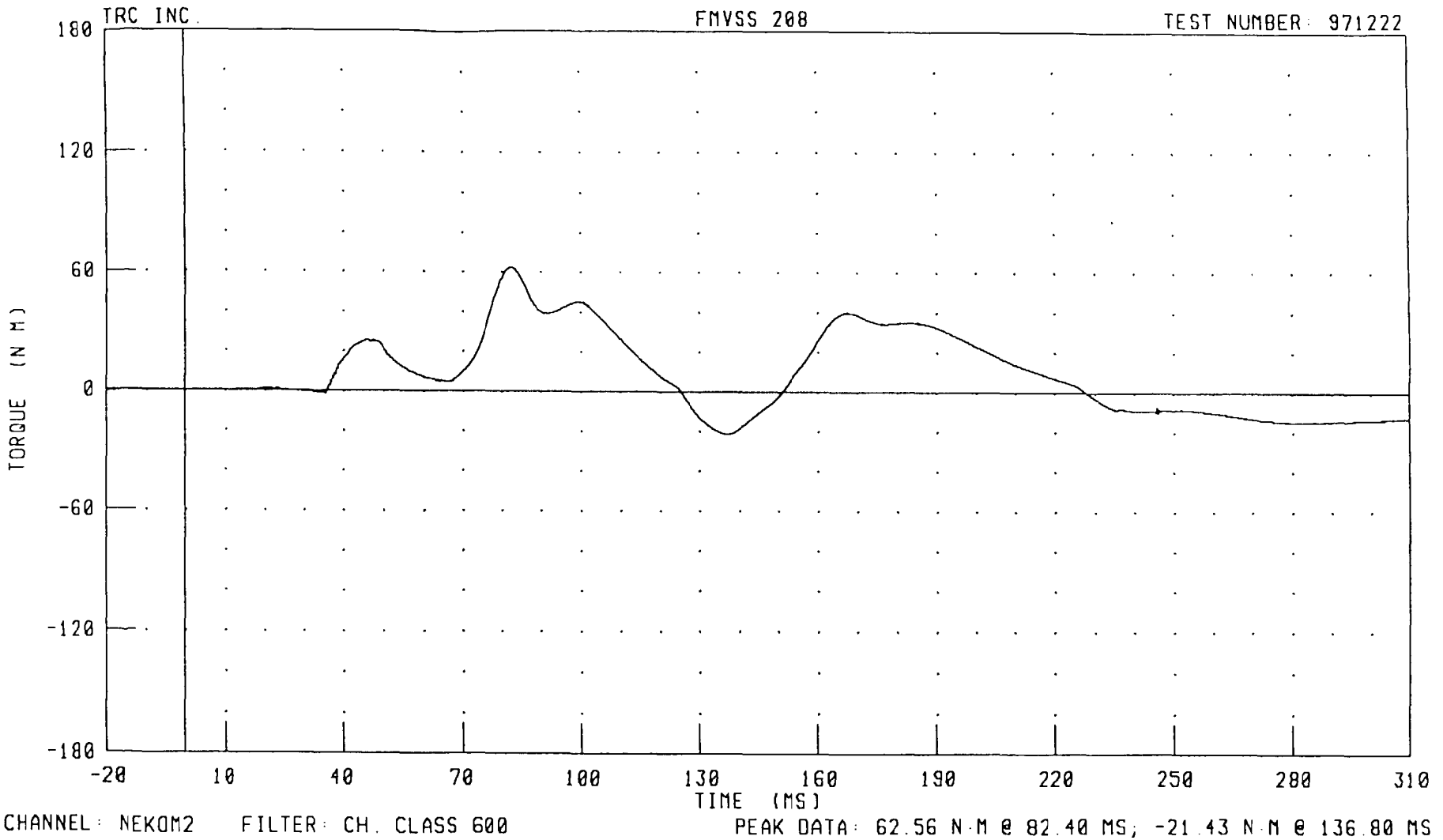
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

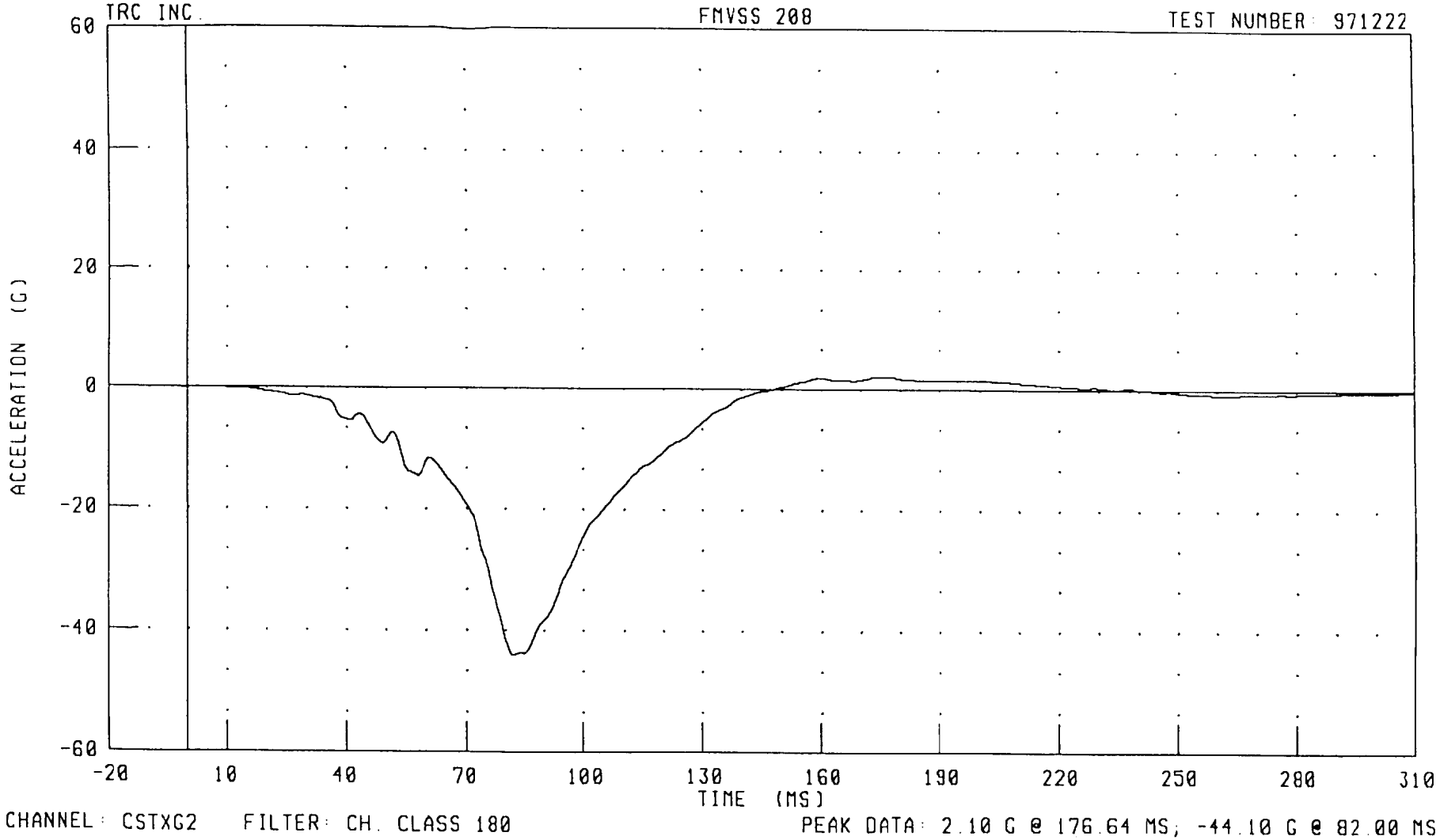
PEAK DATA: 14.62 N-M @ 103.20 MS; -8.72 N-M @ 175.68 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE

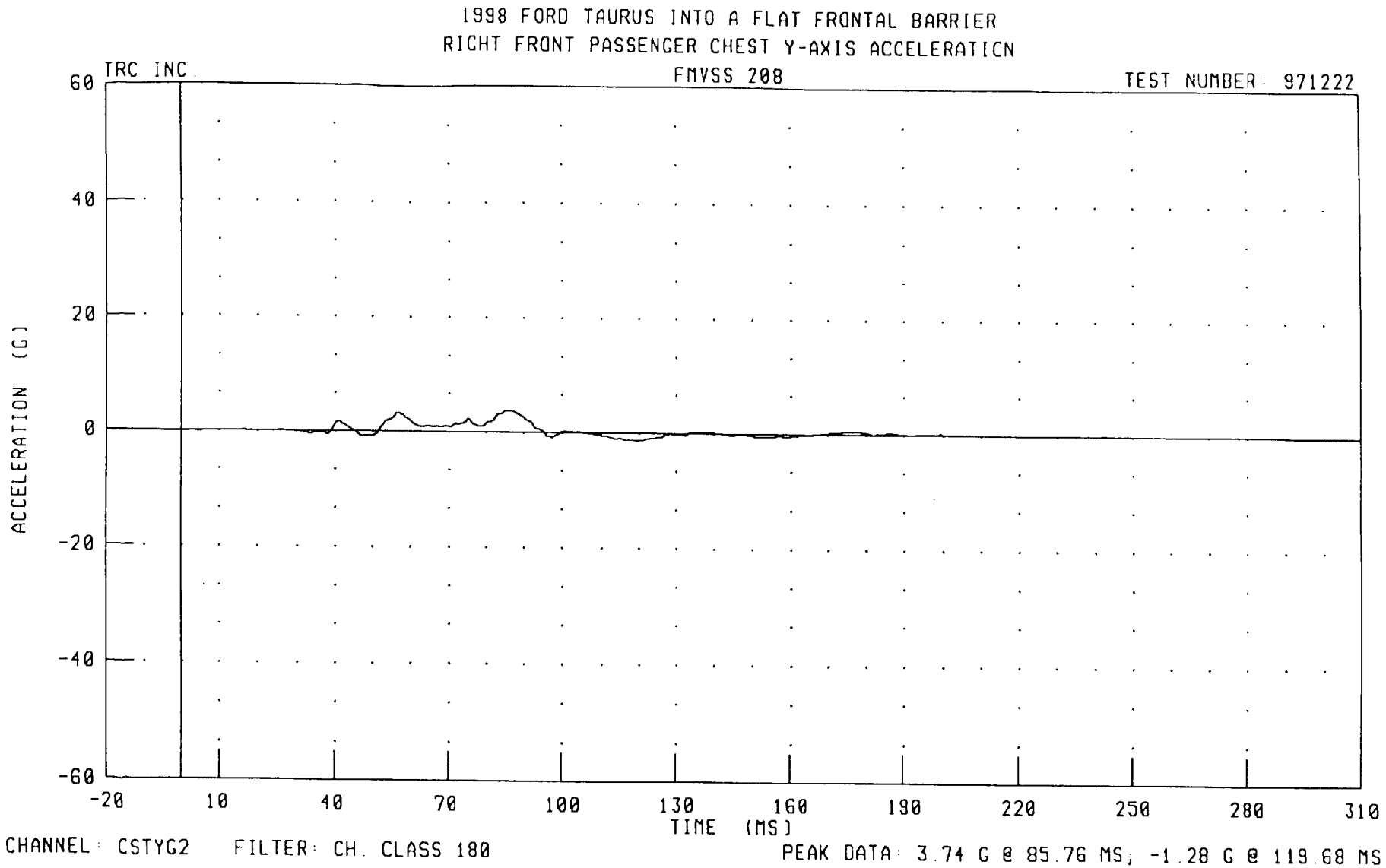


CHANNEL: NEKOM2 FILTER: CH. CLASS 600 PEAK DATA: 62.56 N-M @ 82.40 MS; -21.43 N-M @ 136.80 MS

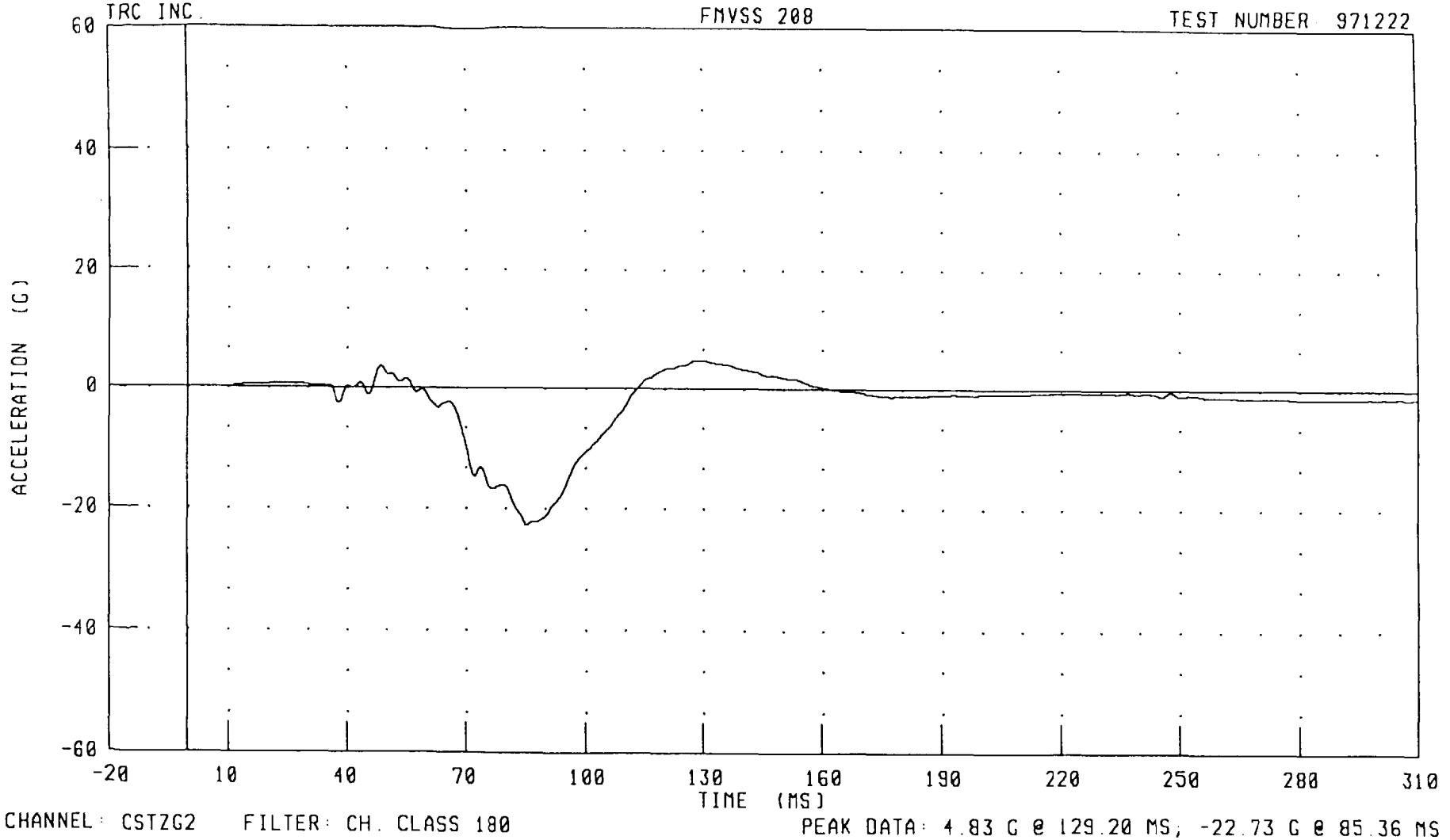
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION



CHANNEL: CSTXG2 FILTER: CH. CLASS 180 PEAK DATA: 2.10 G @ 176.64 MS; -44.10 G @ 82.00 MS

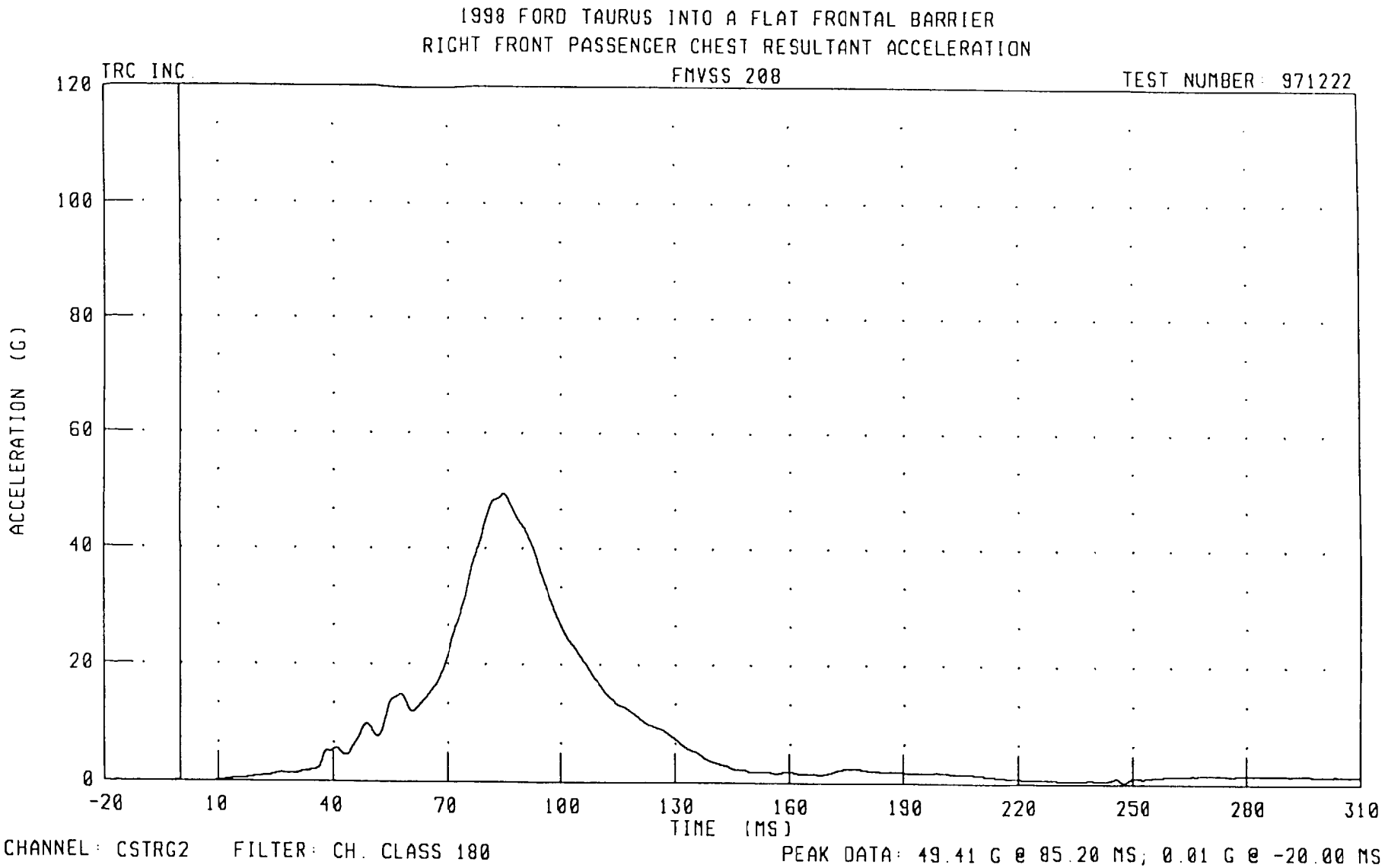

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 971222
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG2
FILTER: CH. CLASS 180
PEAK DATA: 3.74 G @ 85.76 MS; -1.28 G @ 119.68 MS

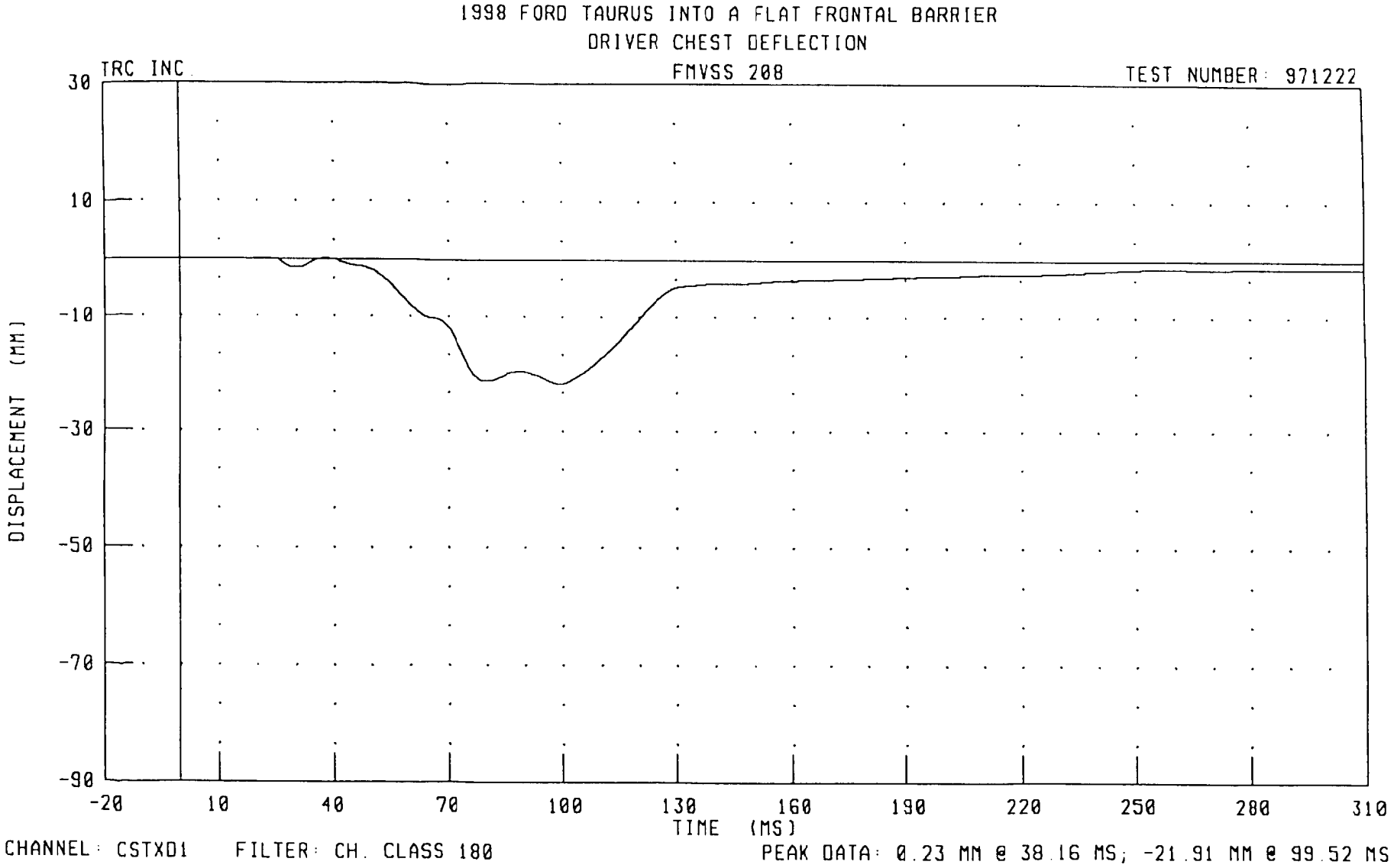
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

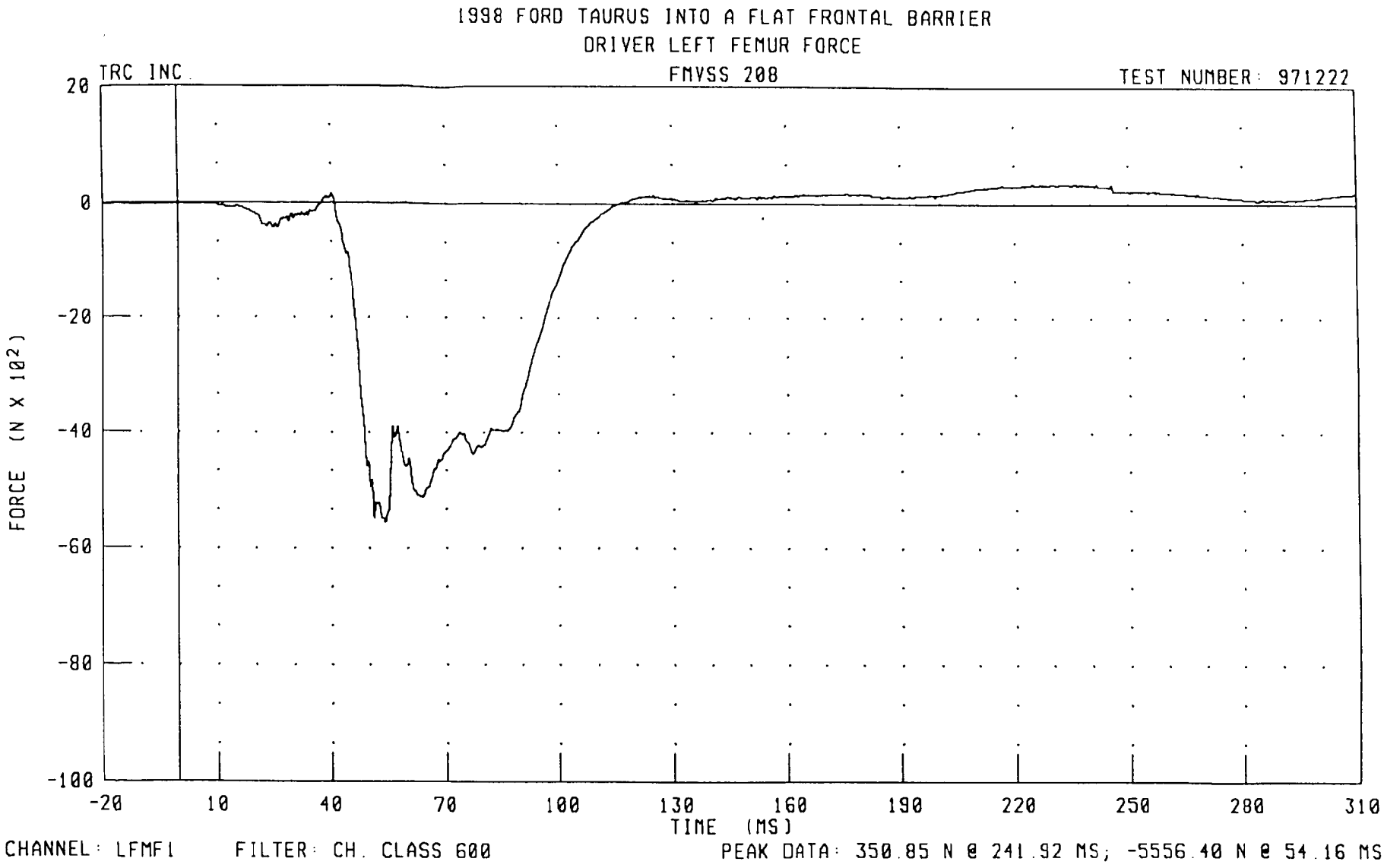


CHANNEL: CSTZG2 FILTER: CH. CLASS 180

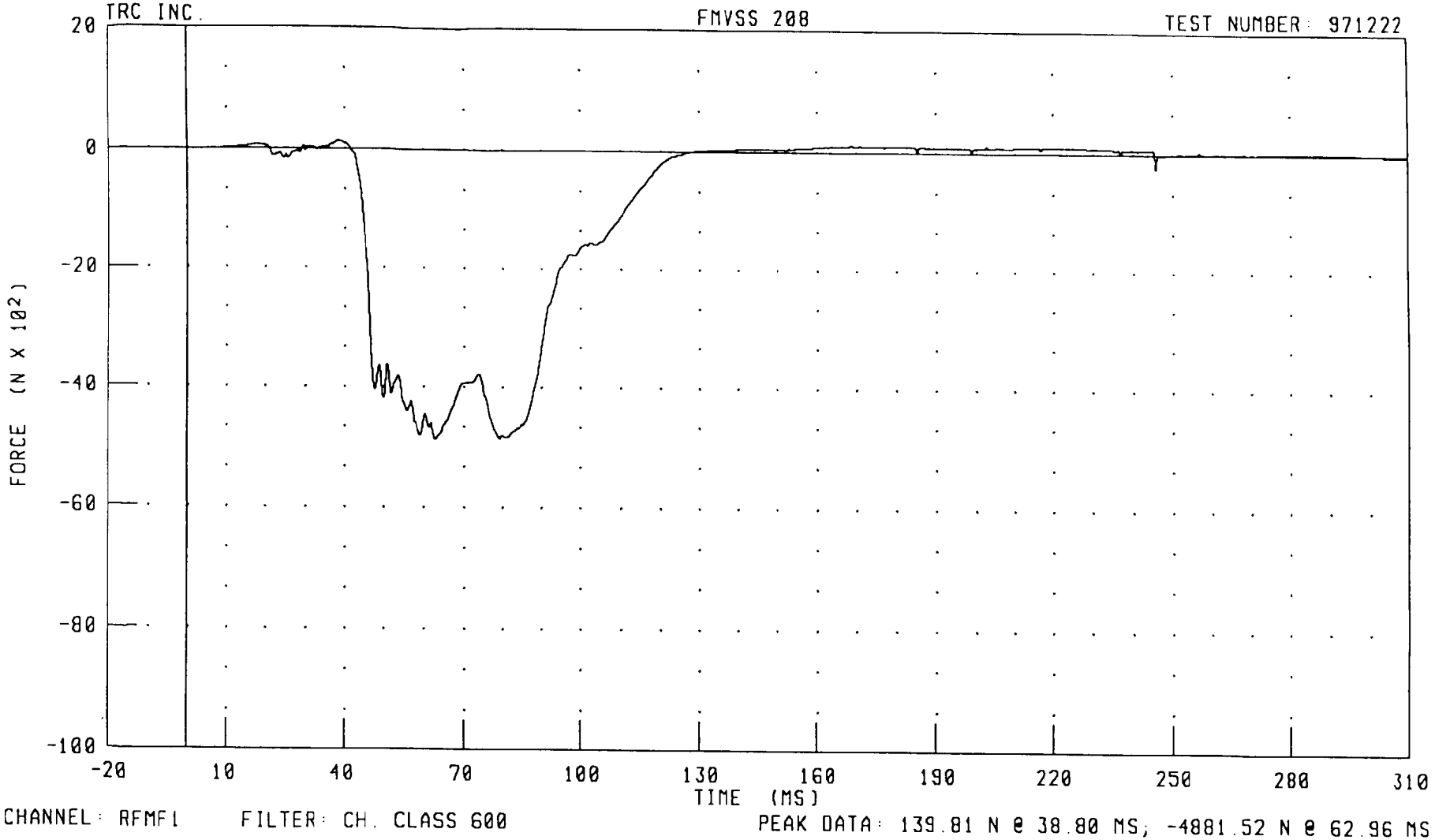
PEAK DATA: 4.83 G @ 129.20 MS; -22.73 G @ 85.36 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER: 971222
120
100
80
60
40
20
0
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG2
FILTER: CH. CLASS 180
PEAK DATA: 49.41 G @ 85.20 MS; 0.01 G @ -20.00 MS

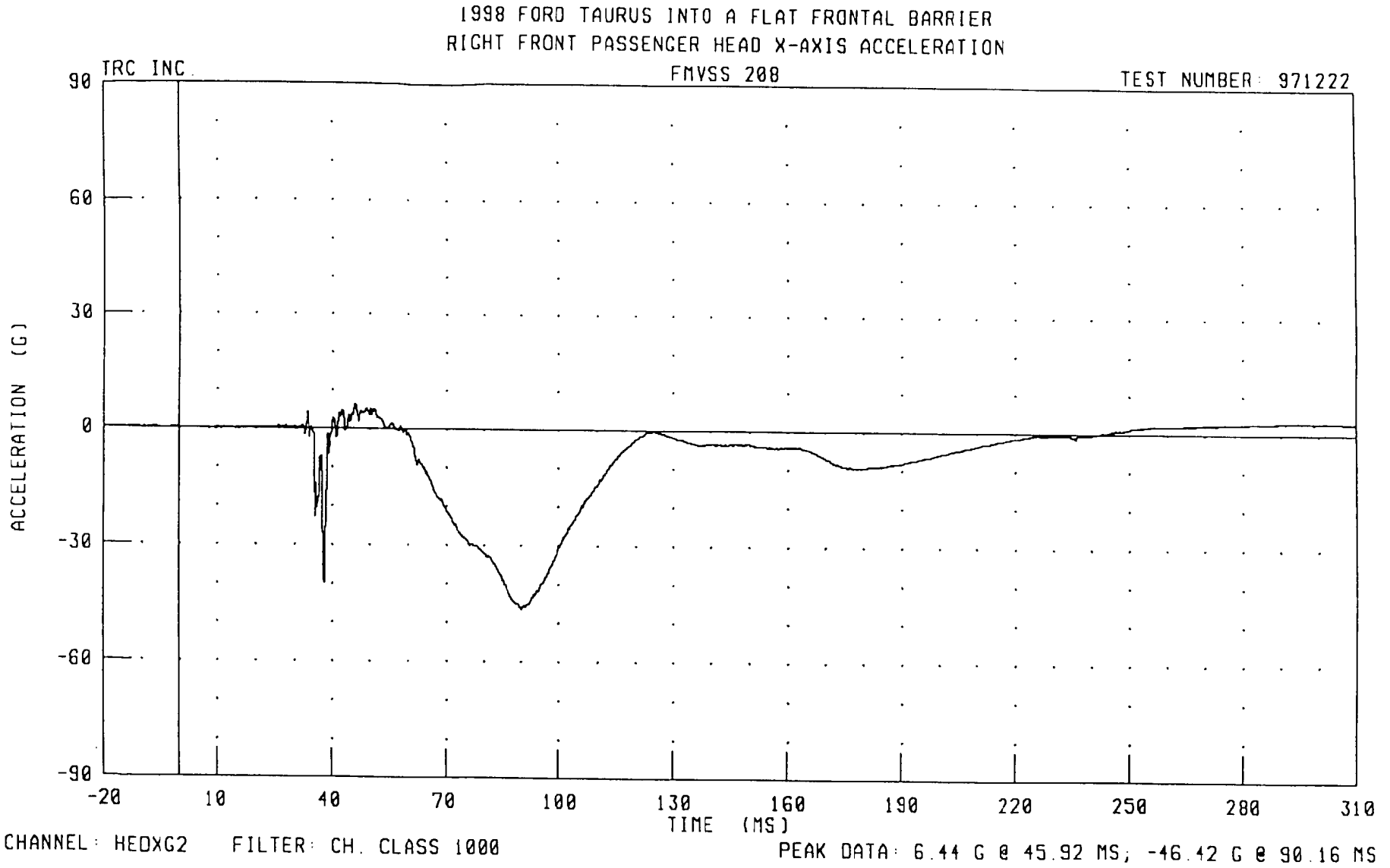

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER CHEST DEFLECTION
FMVSS 208
TRC INC
TEST NUMBER: 971222
DISPLACEMENT (MM)
30
10
-10
-30
-50
-70
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD1
FILTER: CH. CLASS 180
PEAK DATA: 0.23 MM @ 38.16 MS; -21.91 MM @ 99.52 MS

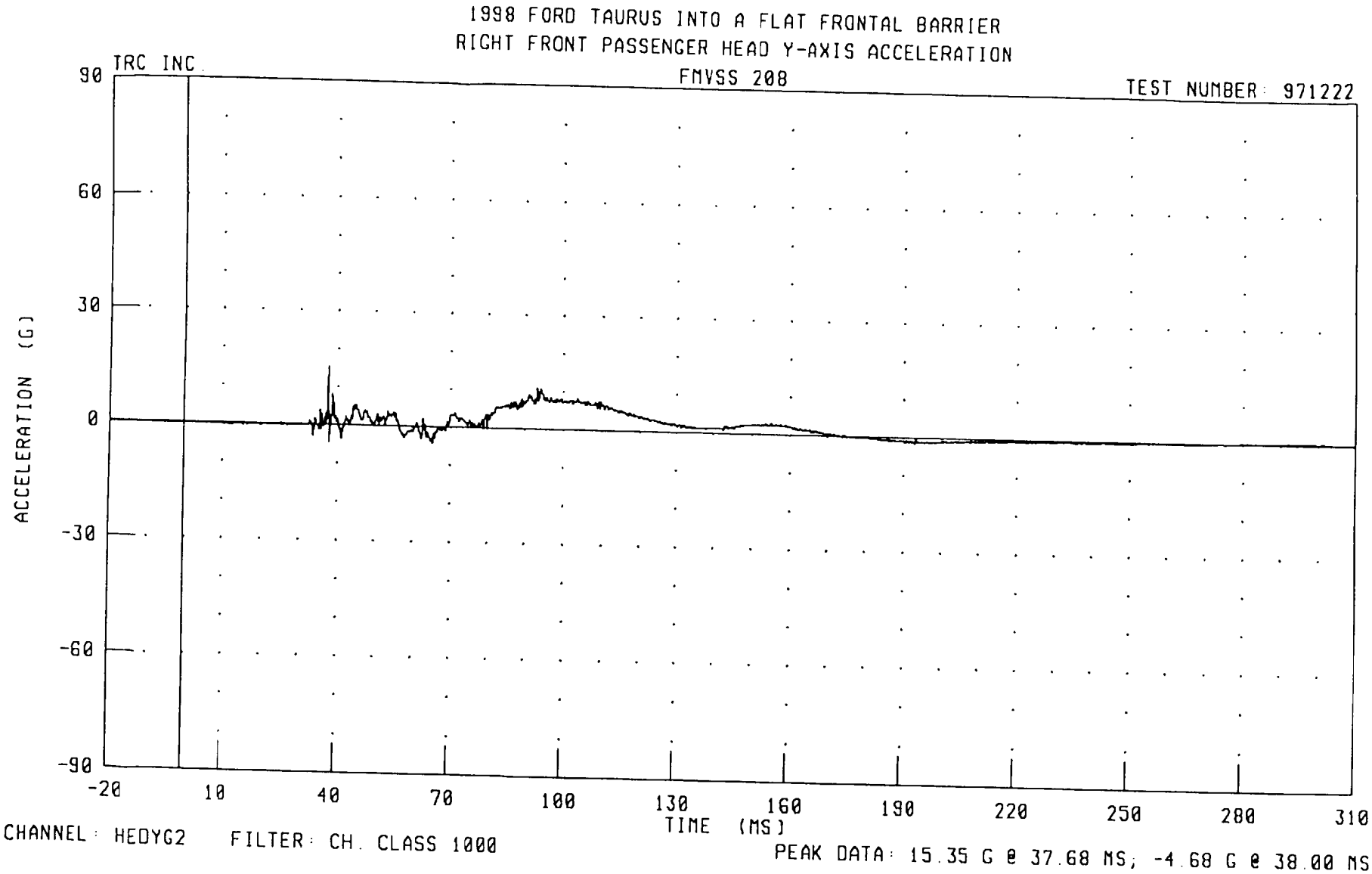

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE
TRC INC
FMVSS 208
TEST NUMBER: 971222
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF1
FILTER: CH. CLASS 600
PEAK DATA: 350.85 N @ 241.92 MS; -5556.40 N @ 54.16 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE
FMVSS 208

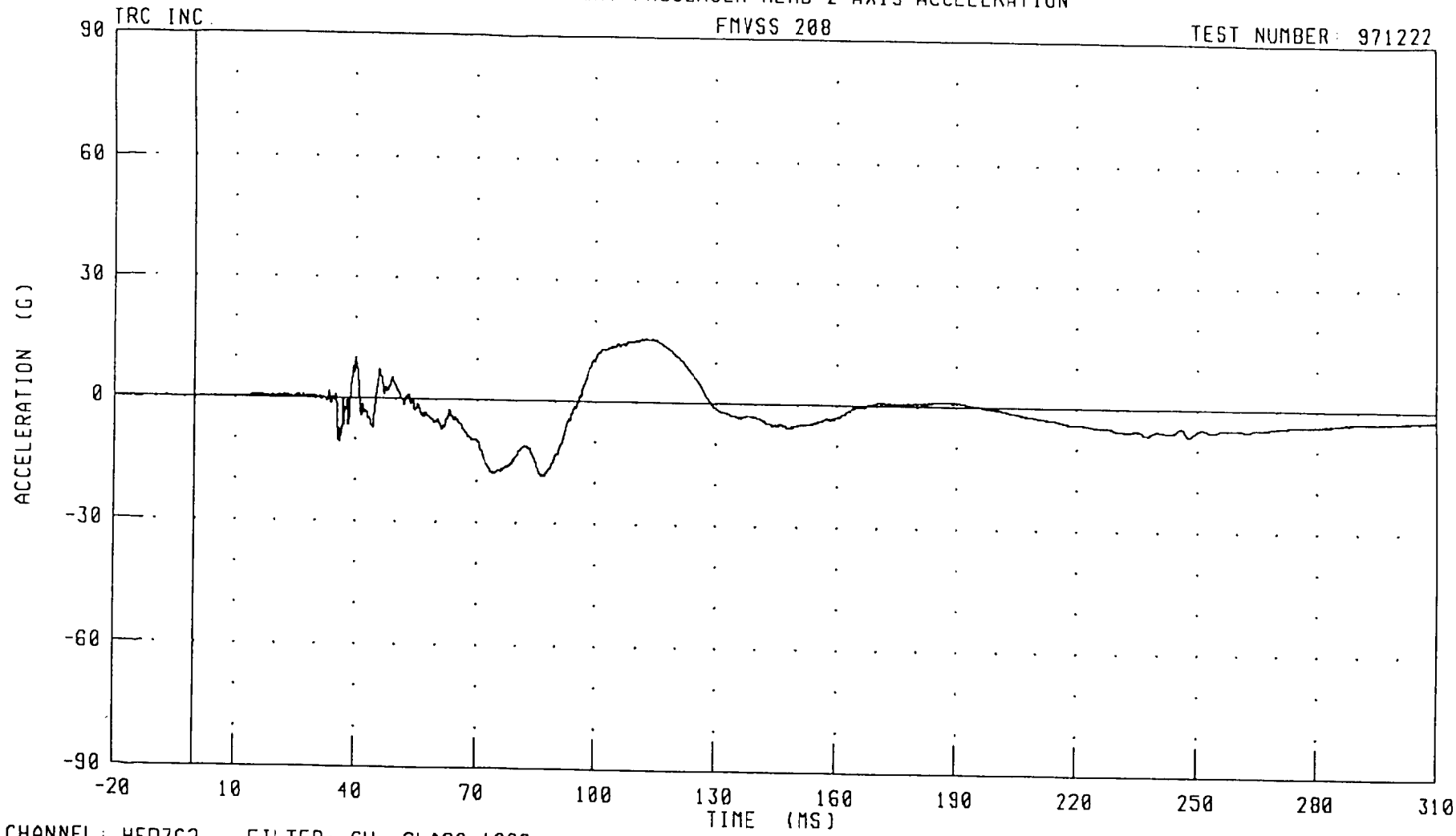


CHANNEL: RFMF1 FILTER: CH. CLASS 600 PEAK DATA: 139.81 N @ 38.80 MS; -4881.52 N @ 62.96 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 971222
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG2
FILTER: CH. CLASS 1000
PEAK DATA: 6.44 G @ 45.92 MS; -46.42 G @ 90.16 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
FMVSS 208
TRC INC.
TEST NUMBER: 971222
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG2
FILTER: CH. CLASS 1000
PEAK DATA: 15.35 G @ 37.68 MS; -4.68 G @ 38.00 MS

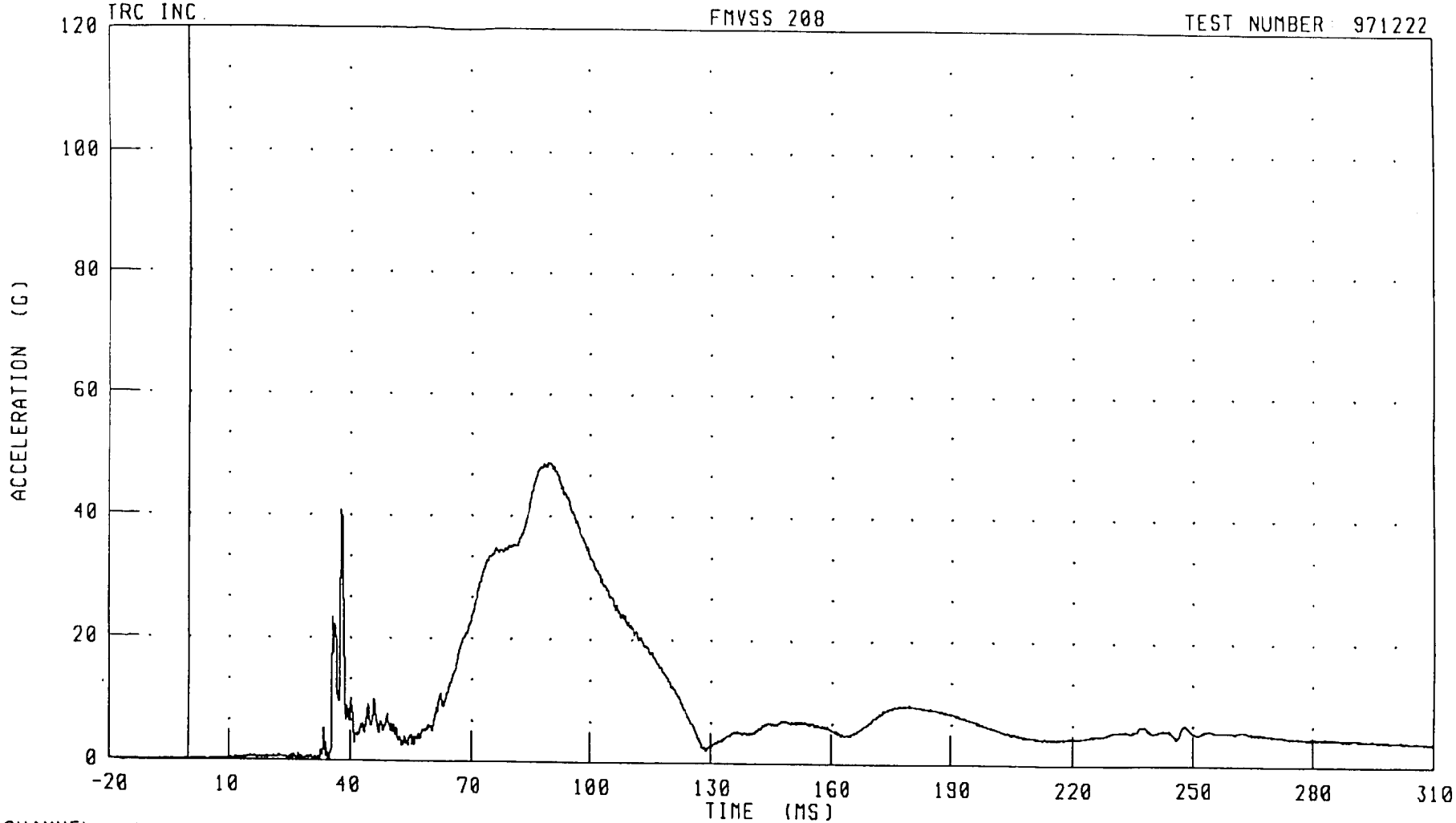
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 15.81 G @ 111.36 MS; -18.41 G @ 86.48 MS

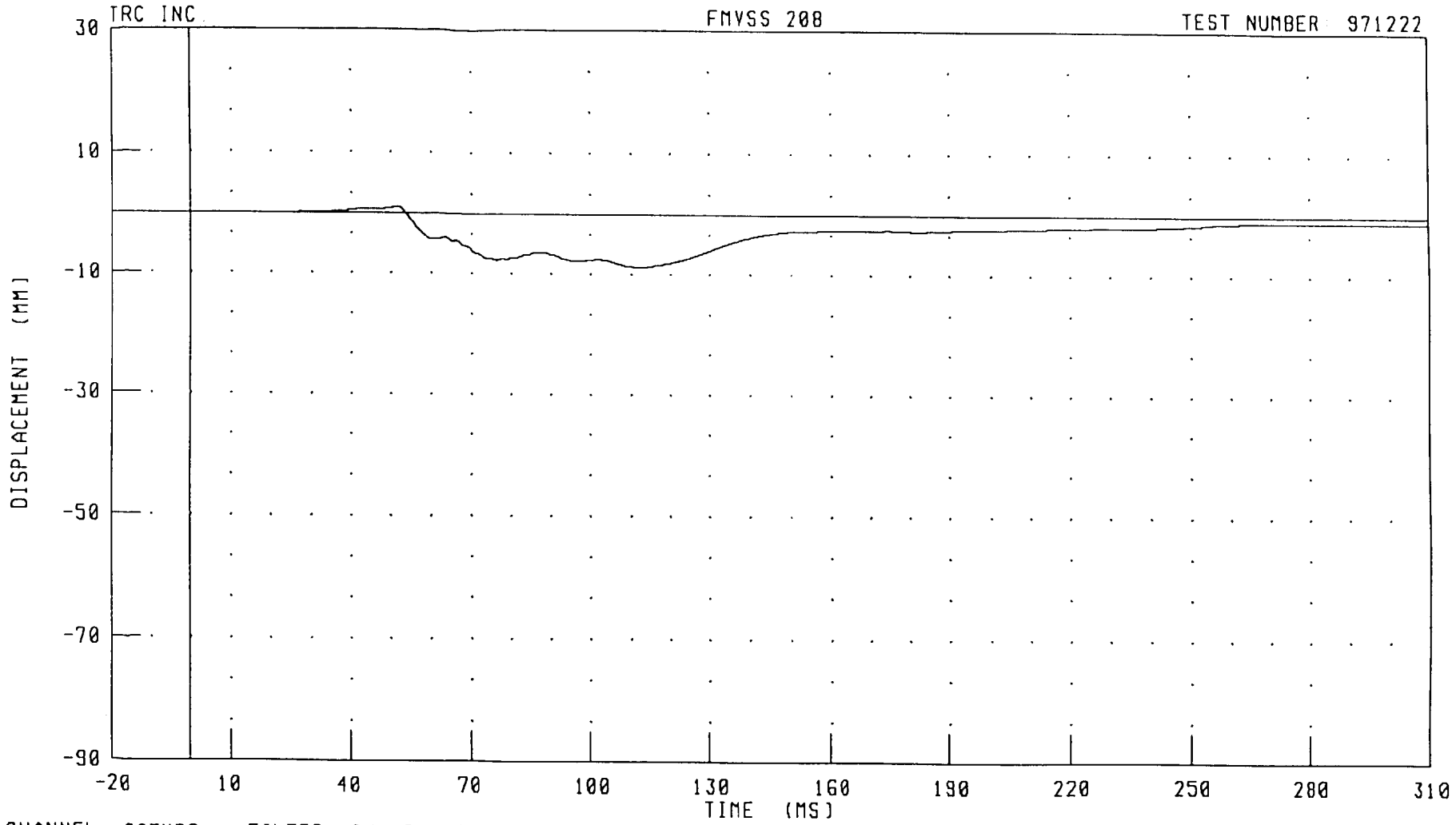
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

PEAK DATA: 48.73 G @ 90.16 MS; 0.04 G @ -19.68 MS

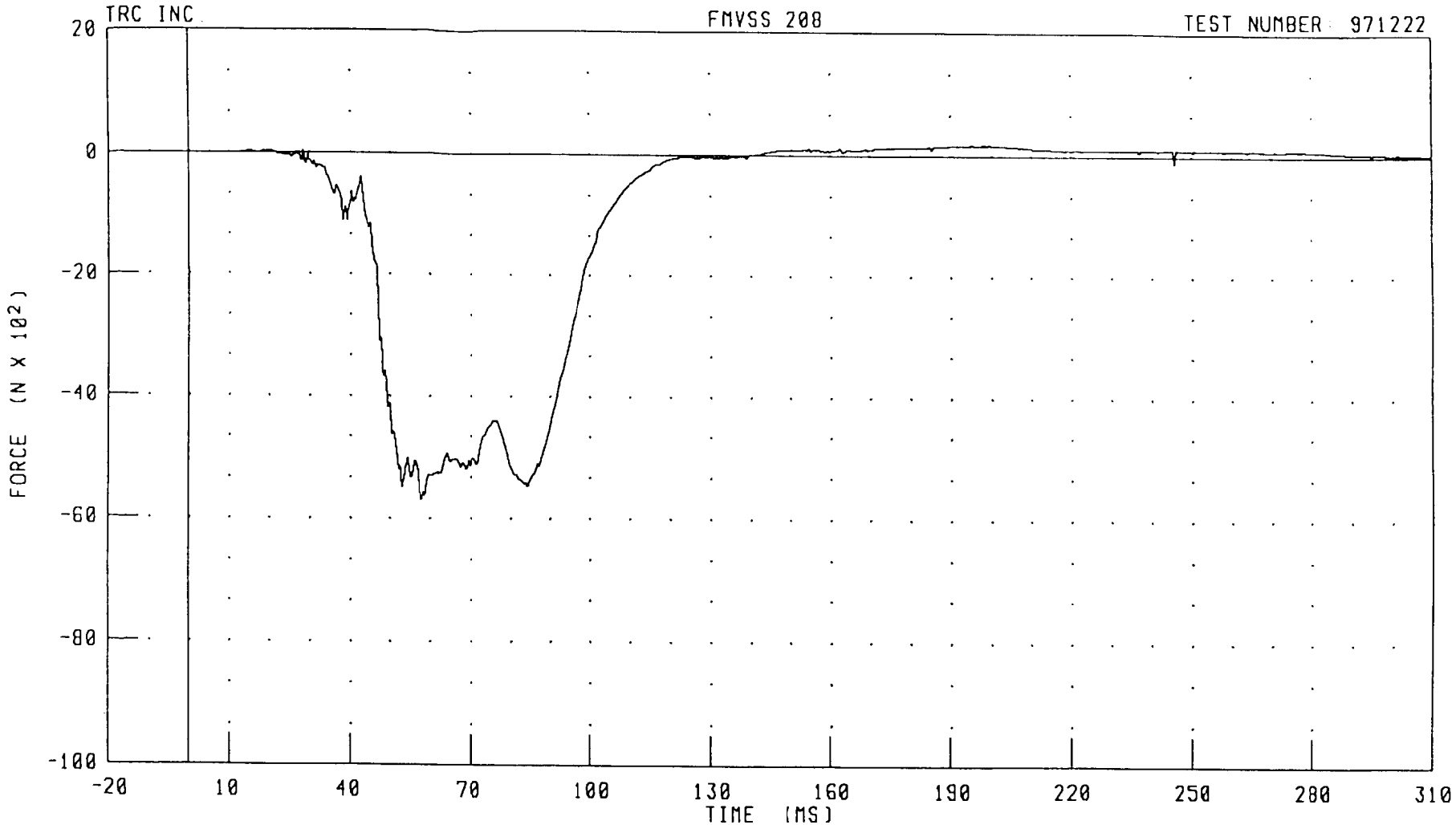
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST DEFLECTION



CHANNEL: CSTX02 FILTER: CH. CLASS 180

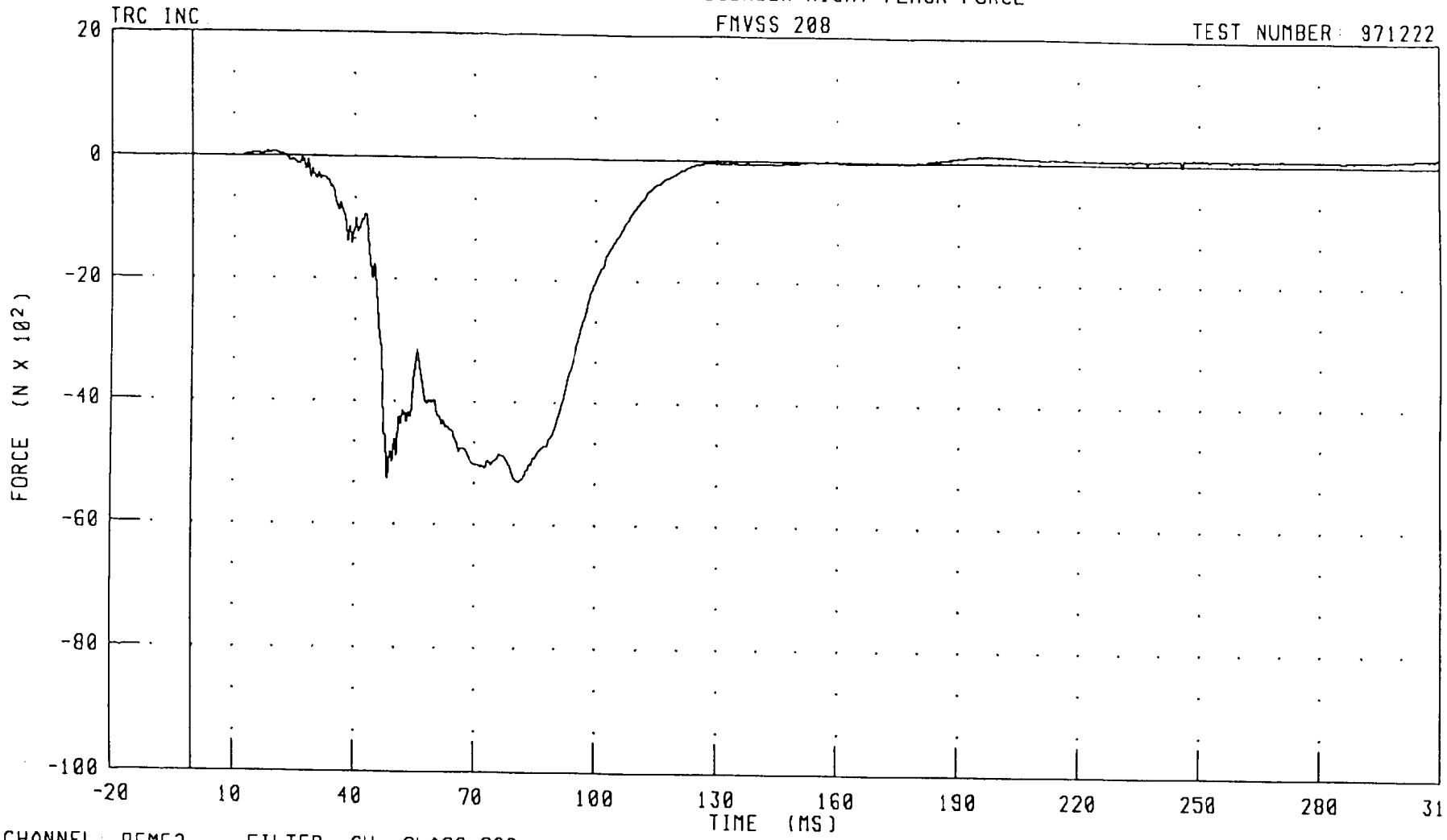
PEAK DATA: 1.05 MM @ 51.60 MS; -8.81 MM @ 112.16 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT FEMUR FORCE



CHANNEL: LFMF2 FILTER: CH. CLASS 600 PEAK DATA: 177.99 N @ 199.84 MS; -5697.24 N @ 57.84 MS

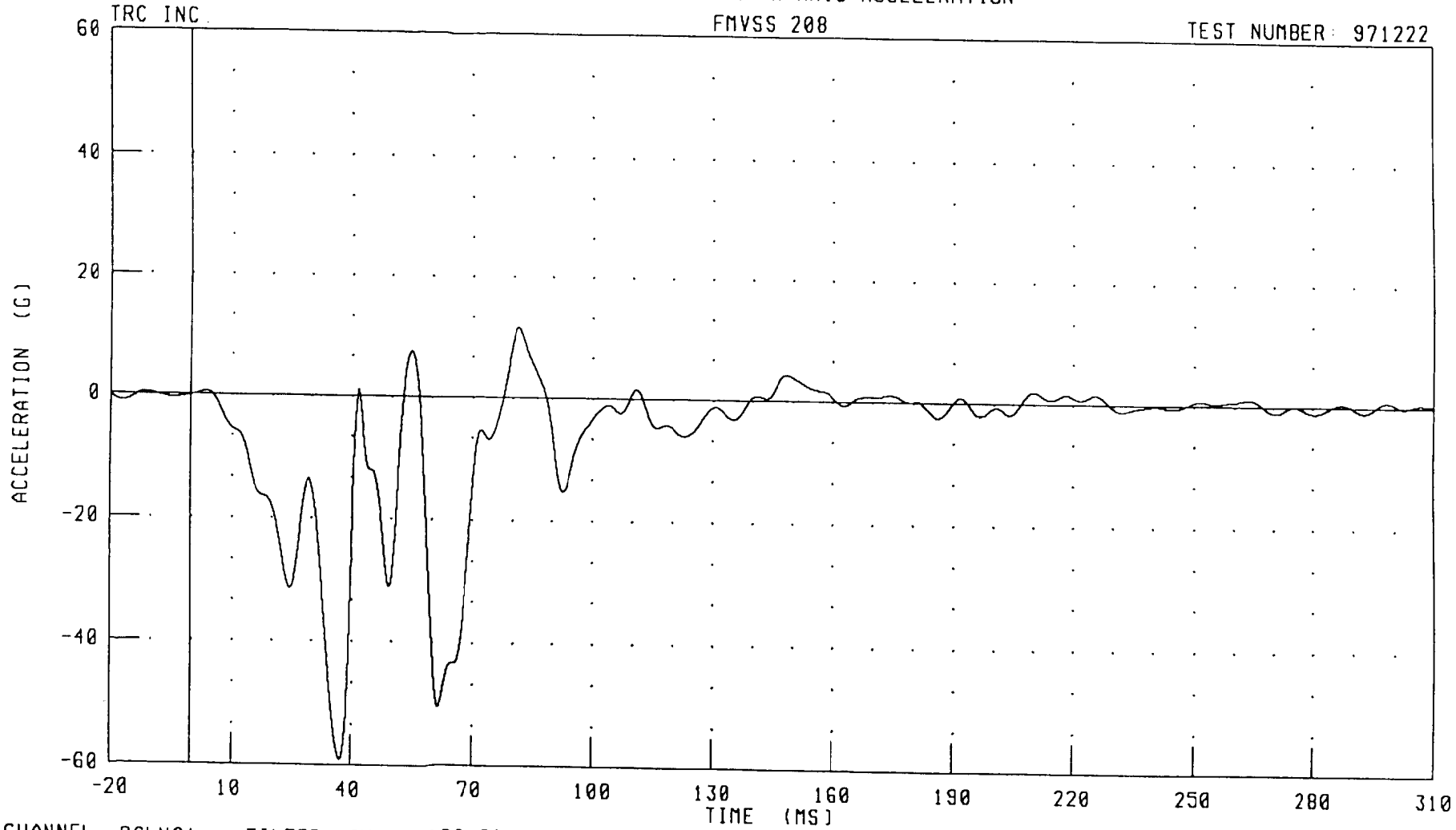
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
FMVSS 208



CHANNEL: RFMF2 FILTER: CH. CLASS 600

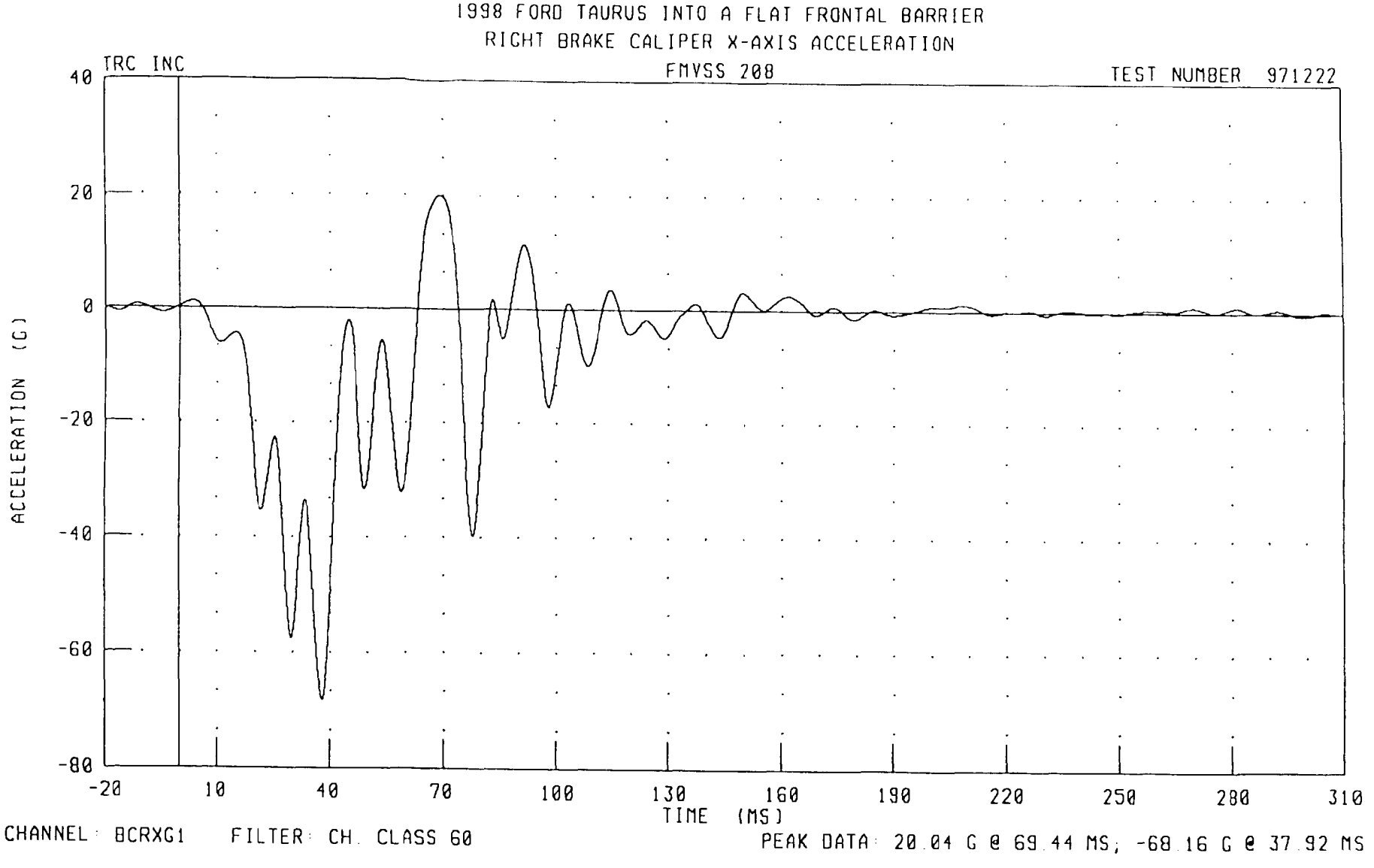
PEAK DATA: 127.22 N @ 309.68 MS; -5311.55 N @ 81.20 MS

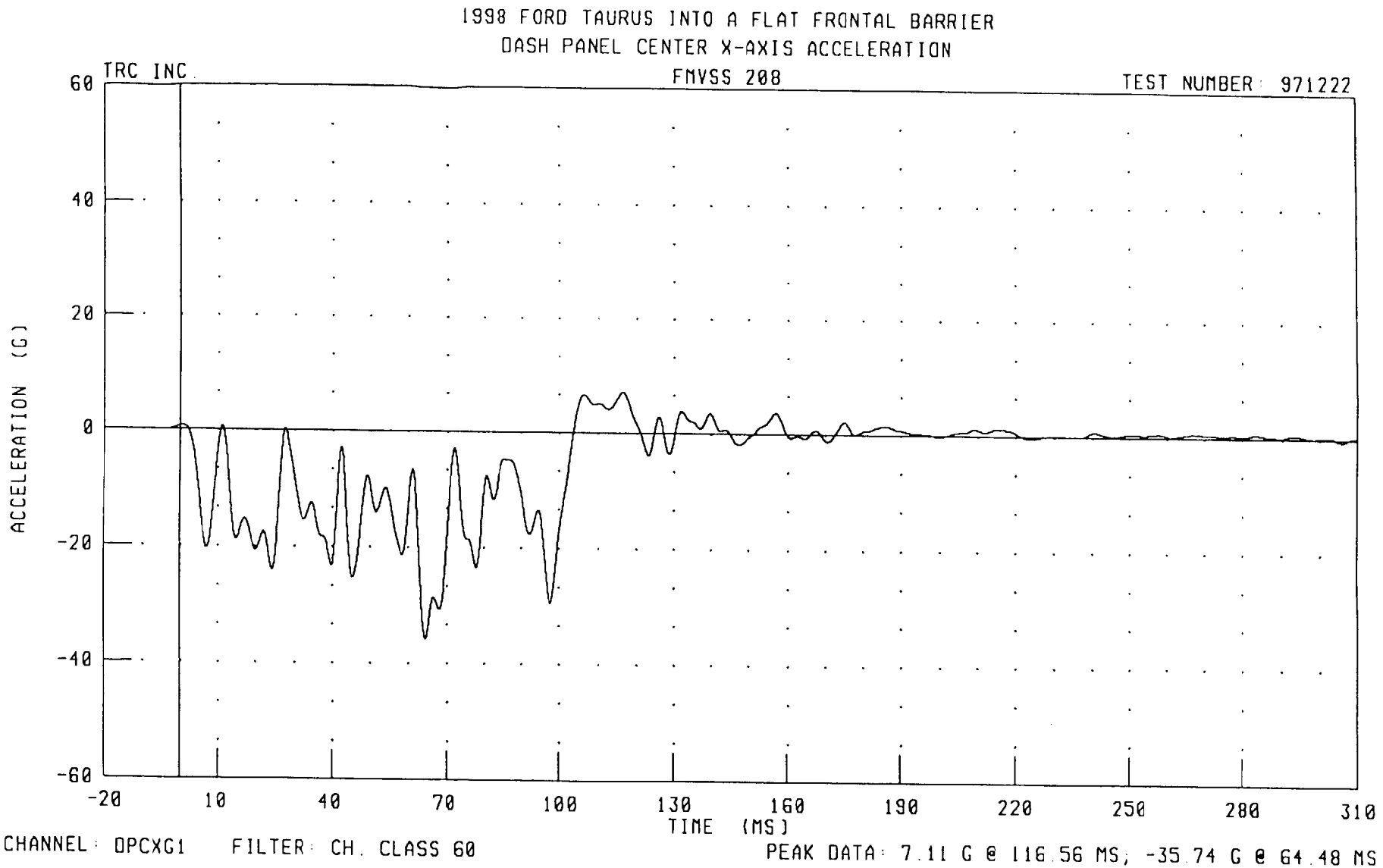
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
FMVSS 208

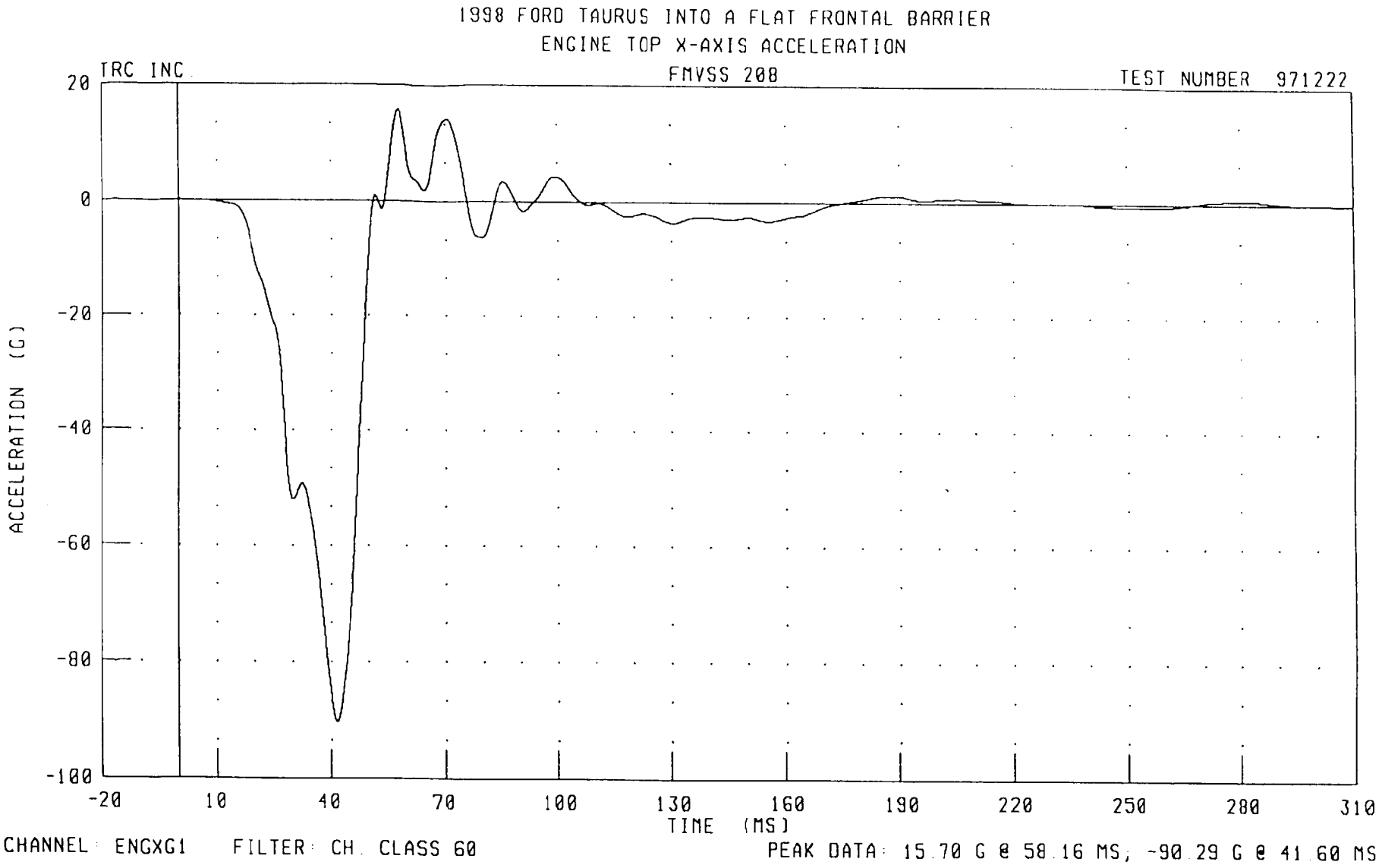


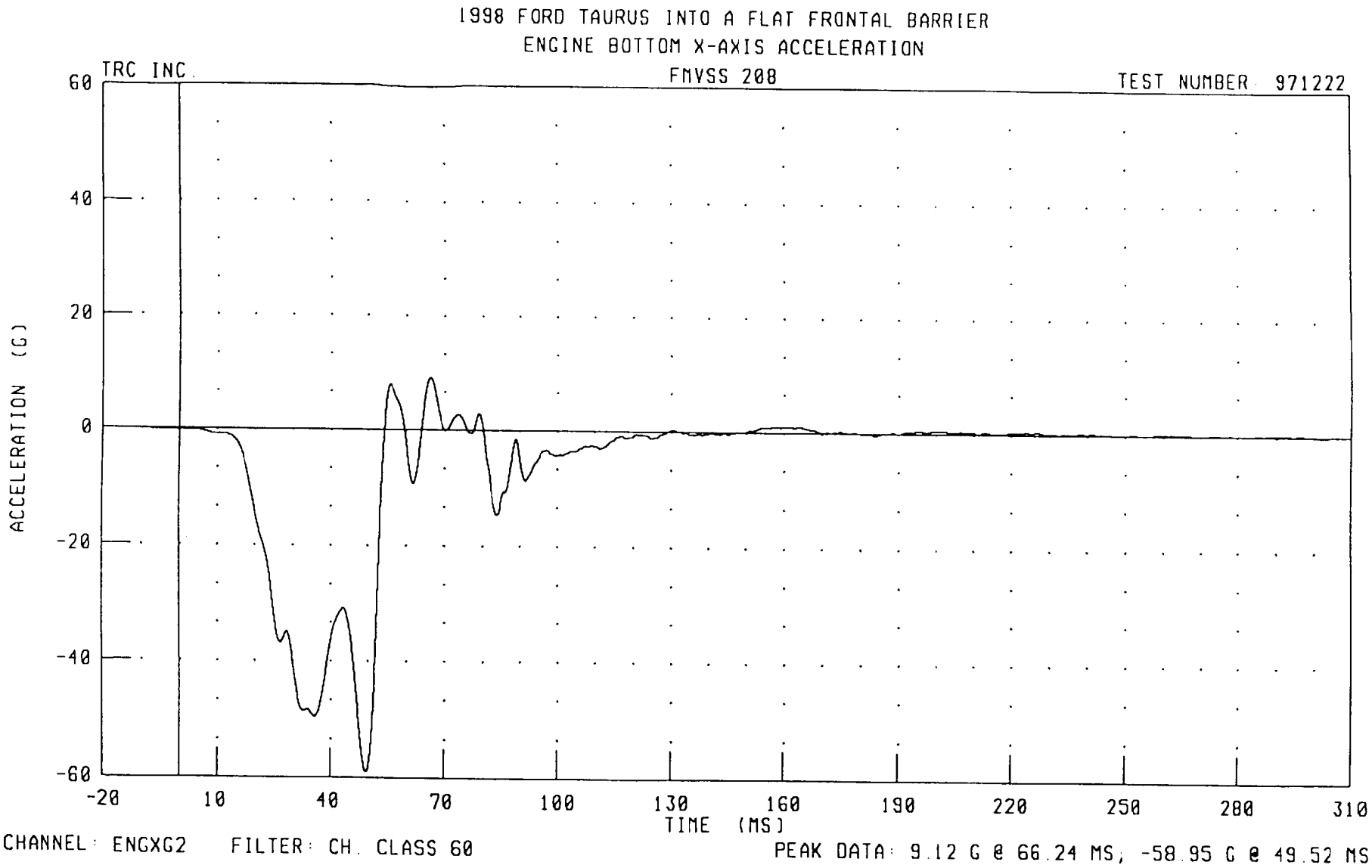
CHANNEL: BCLXG1 FILTER: CH. CLASS 60

PEAK DATA: 11.63 G @ 81.52 MS; -59.01 G @ 37.28 MS

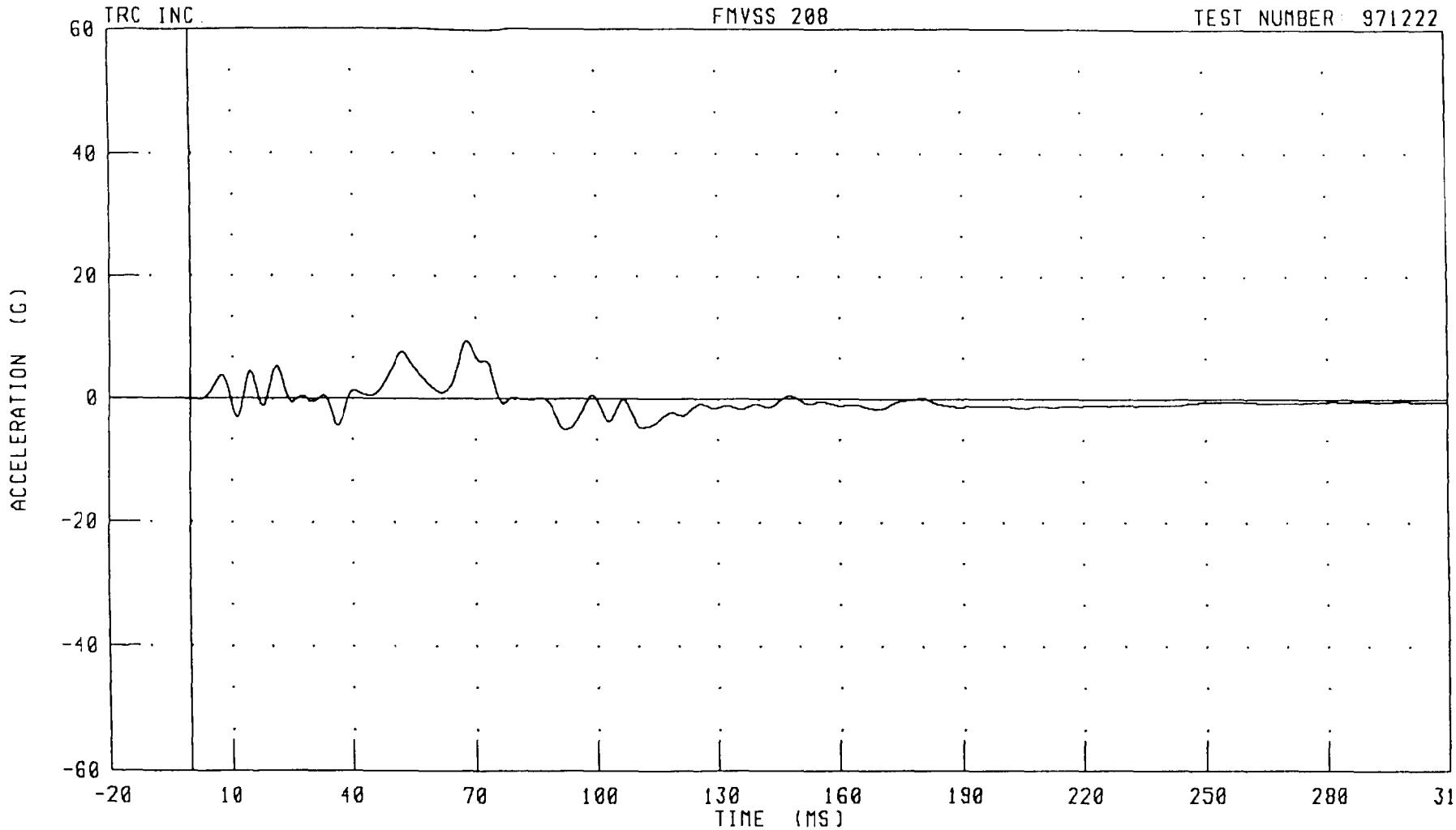

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
FMVSS 208
TRC INC
TEST NUMBER 971222
ACCELERATION (G)
40
20
0
-20
-40
-60
-80
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCRXG1
FILTER: CH. CLASS 60
PEAK DATA: 20.04 G @ 69.44 MS; -68.16 G @ 37.92 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DASH PANEL CENTER X-AXIS ACCELERATION
FMVSS 208
TRC INC.
TEST NUMBER: 971222
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: DPCXG1
FILTER: CH. CLASS 60
PEAK DATA: 7.11 G @ 116.56 MS; -35.74 G @ 64.48 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
ENGINE TOP X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 971222
20
0
-20
-40
-60
-80
-100
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG1
FILTER: CH. CLASS 60
PEAK DATA: 15.70 G @ 58.16 MS, -90.29 G @ 41.60 MS

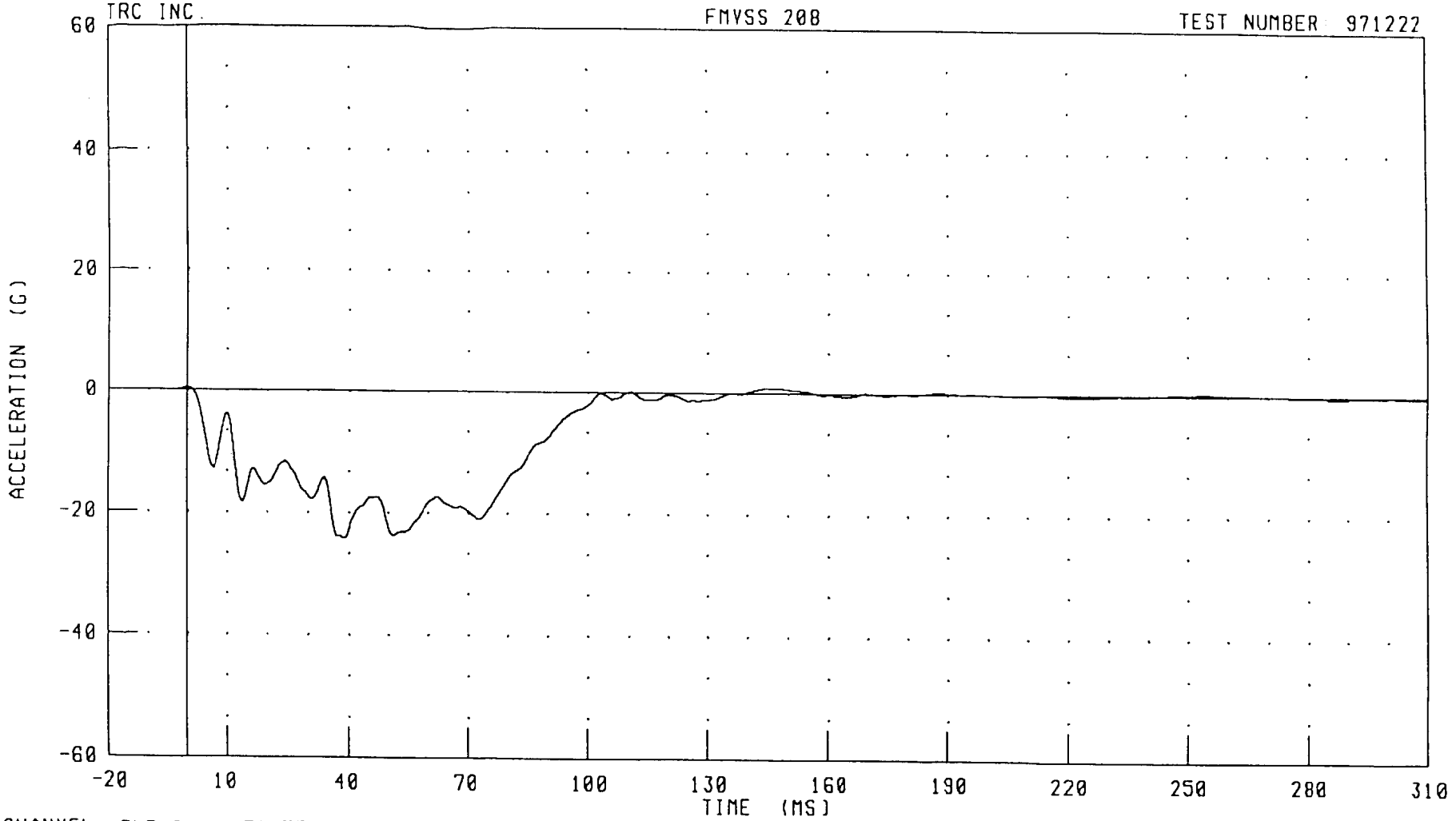

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 971222
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG2
FILTER: CH. CLASS 60
PEAK DATA: 9.12 G @ 66.24 MS; -58.95 G @ 49.52 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
VEHICLE REAR CENTER Z-AXIS ACCELERATION



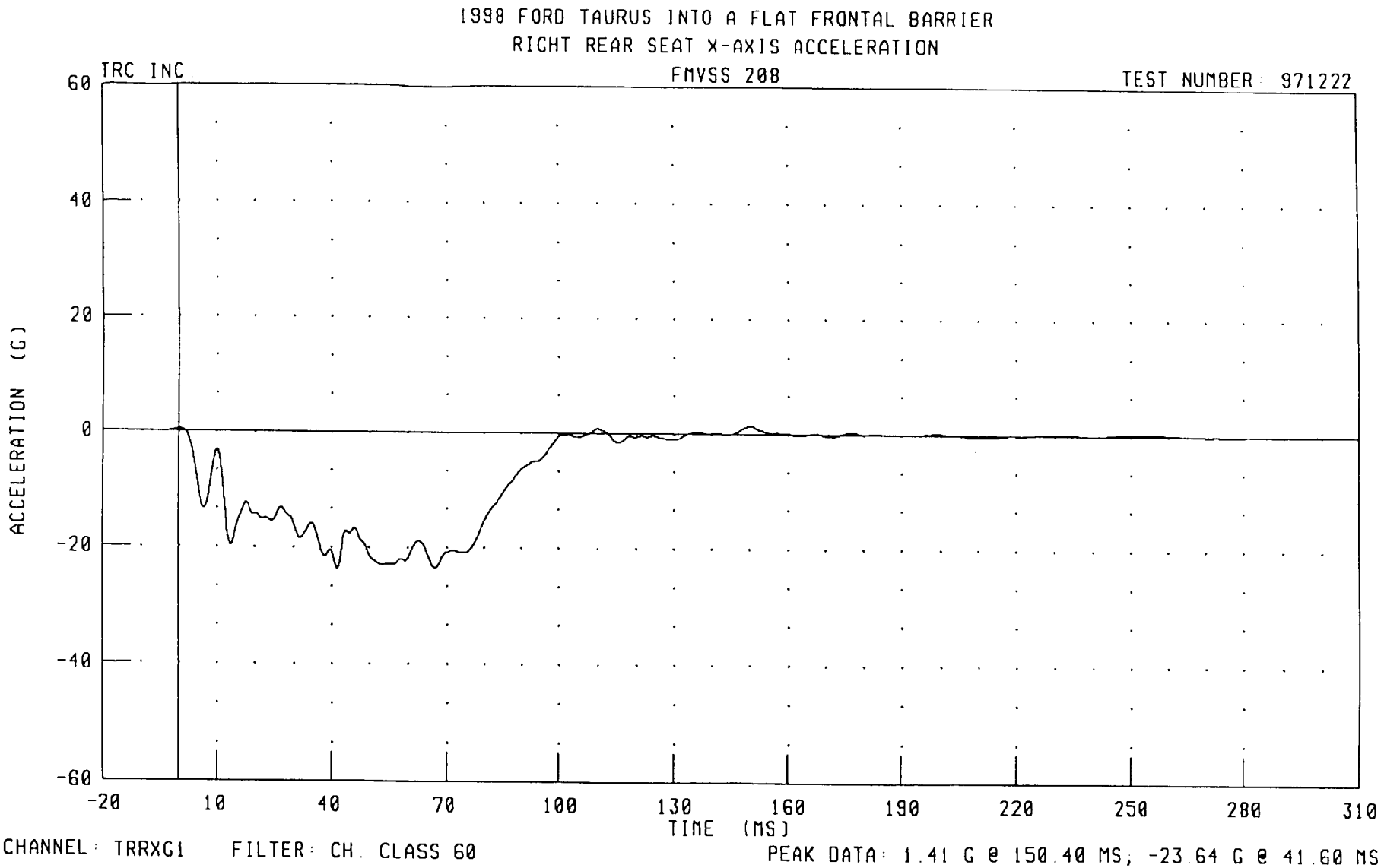
CHANNEL: TFCZG1 FILTER: CH. CLASS 60 PEAK DATA: 9.46 G @ 67.84 MS; -5.02 G @ 92.56 MS

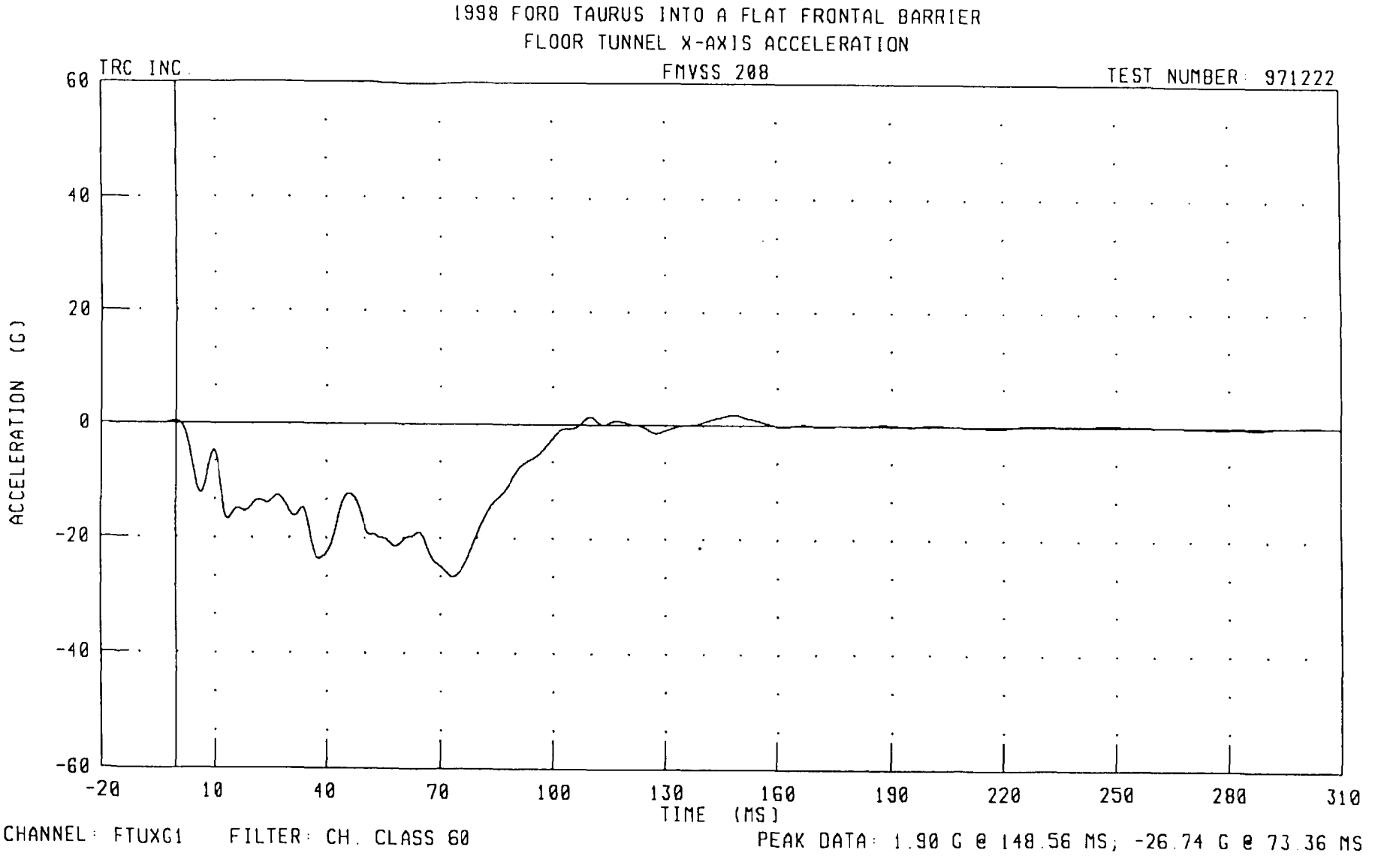
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION



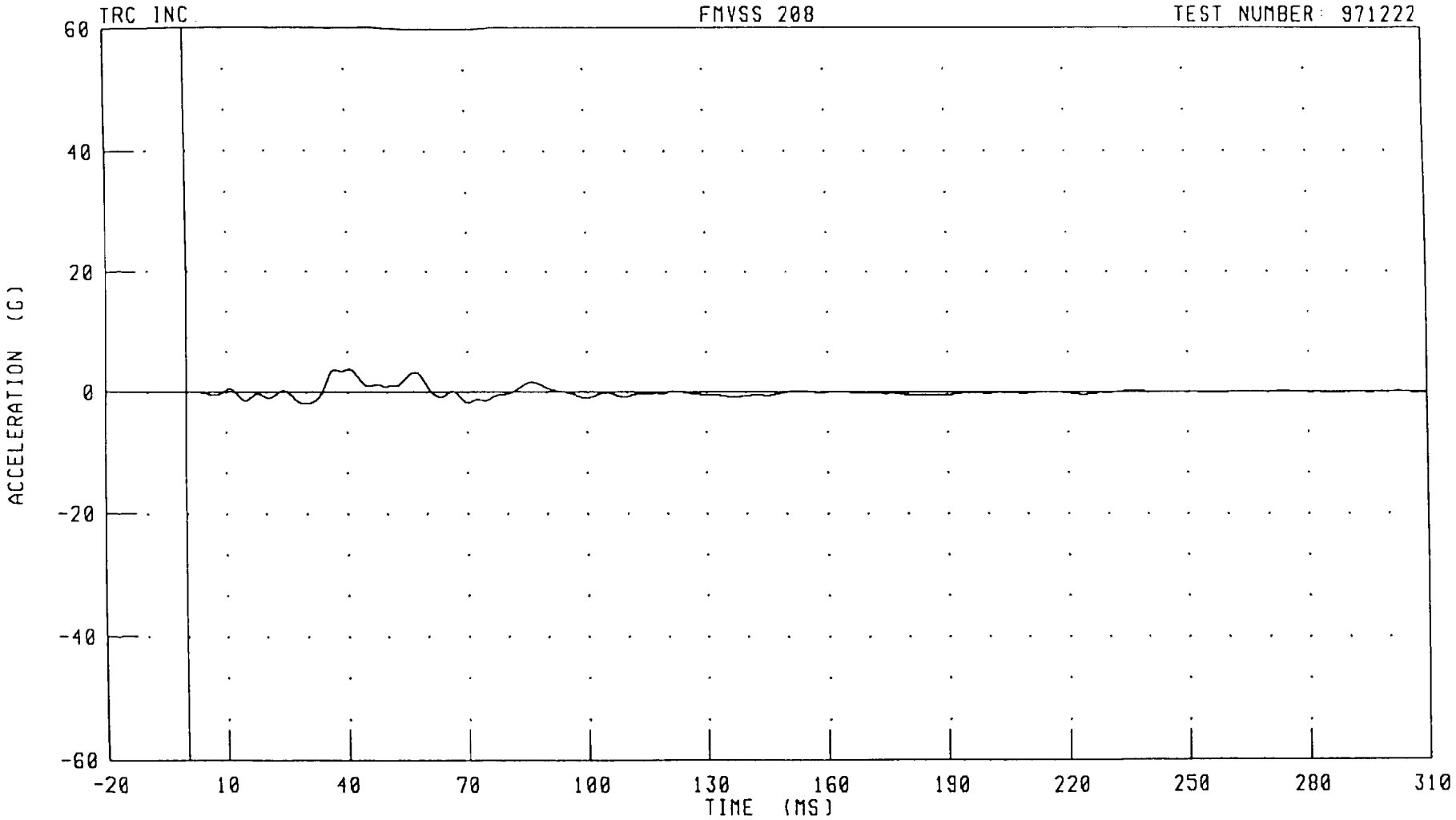
CHANNEL: TLRXG1 FILTER: CH. CLASS 60

PEAK DATA: 0.93 G @ 145.68 MS; -24.28 G @ 38.96 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER: 971222
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: 1.41 G @ 150.40 MS; -23.64 G @ 41.60 MS

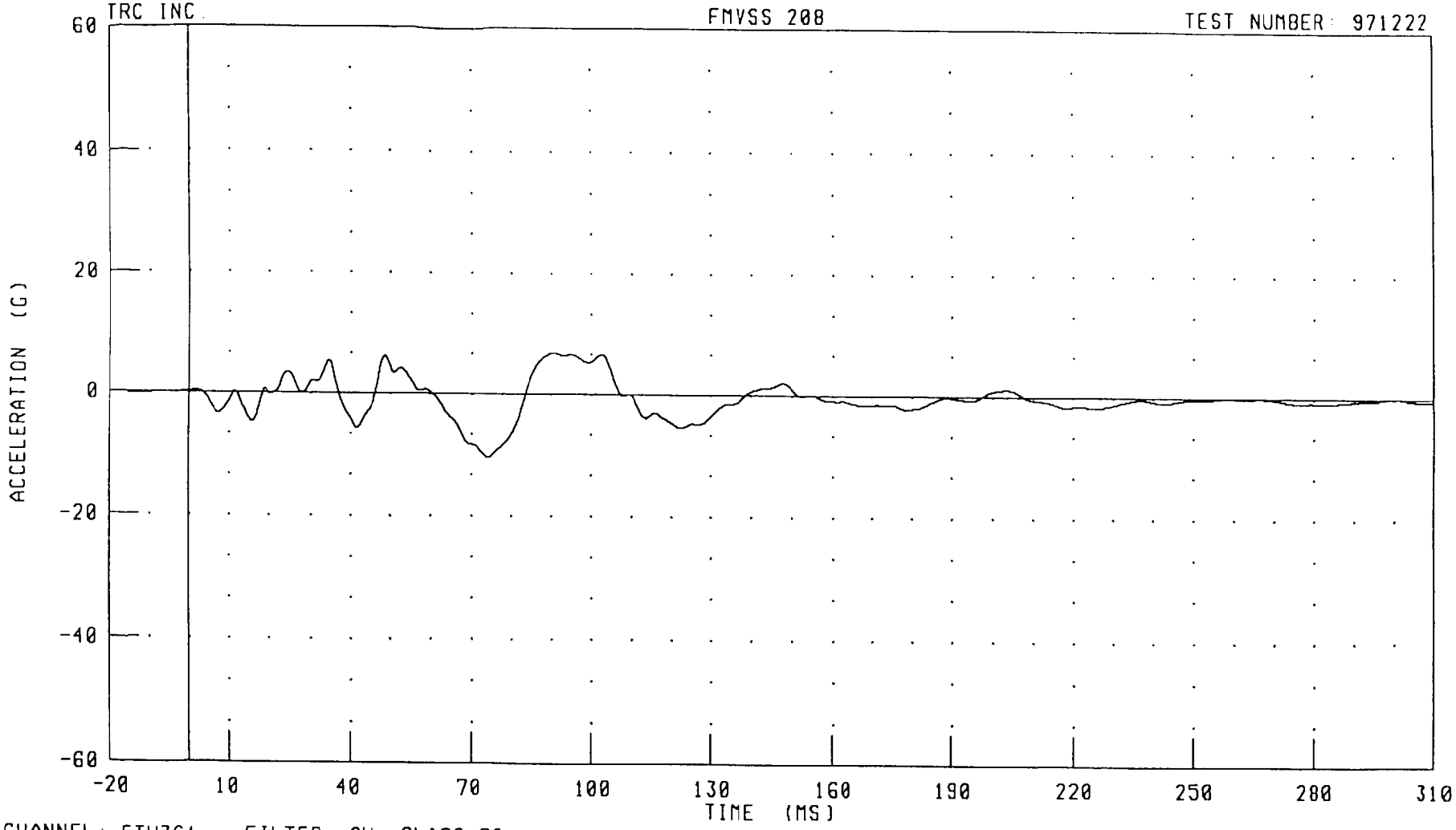

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL X-AXIS ACCELERATION
TRC INC.
FMVSS 208
TEST NUMBER: 971222
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FTUXG1
FILTER: CH. CLASS 60
PEAK DATA: 1.90 G @ 148.56 MS; -26.74 G @ 73.36 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL Y-AXIS ACCELERATION



CHANNEL: FTUYG1 FILTER: CH. CLASS 60 PEAK DATA: 3.82 G @ 40.48 MS; -1.89 G @ 29.68 MS

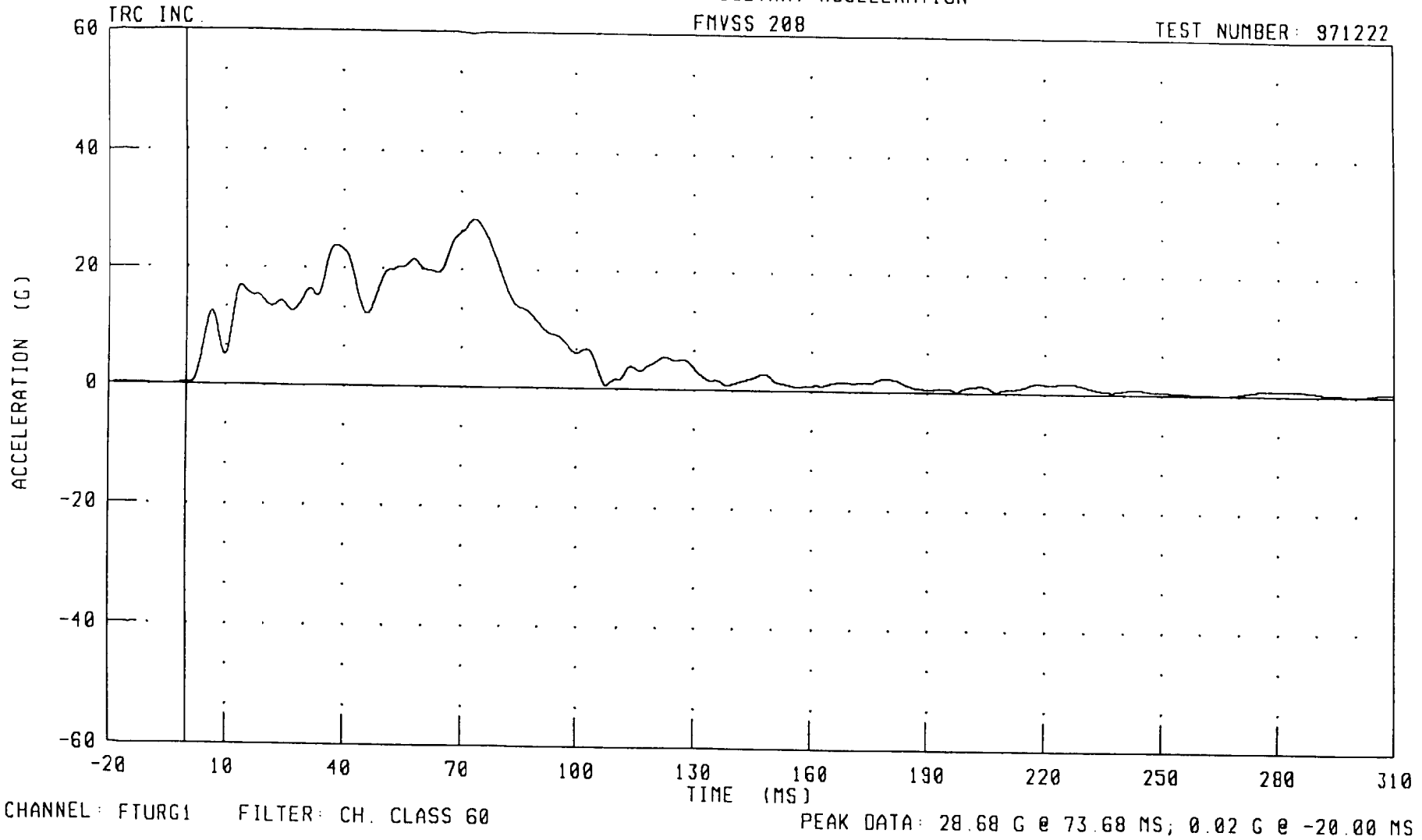
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL Z-AXIS ACCELERATION



CHANNEL: FTUZG1 FILTER: CH. CLASS 60

PEAK DATA: 6.86 G @ 90.48 MS; -10.49 G @ 74.32 MS

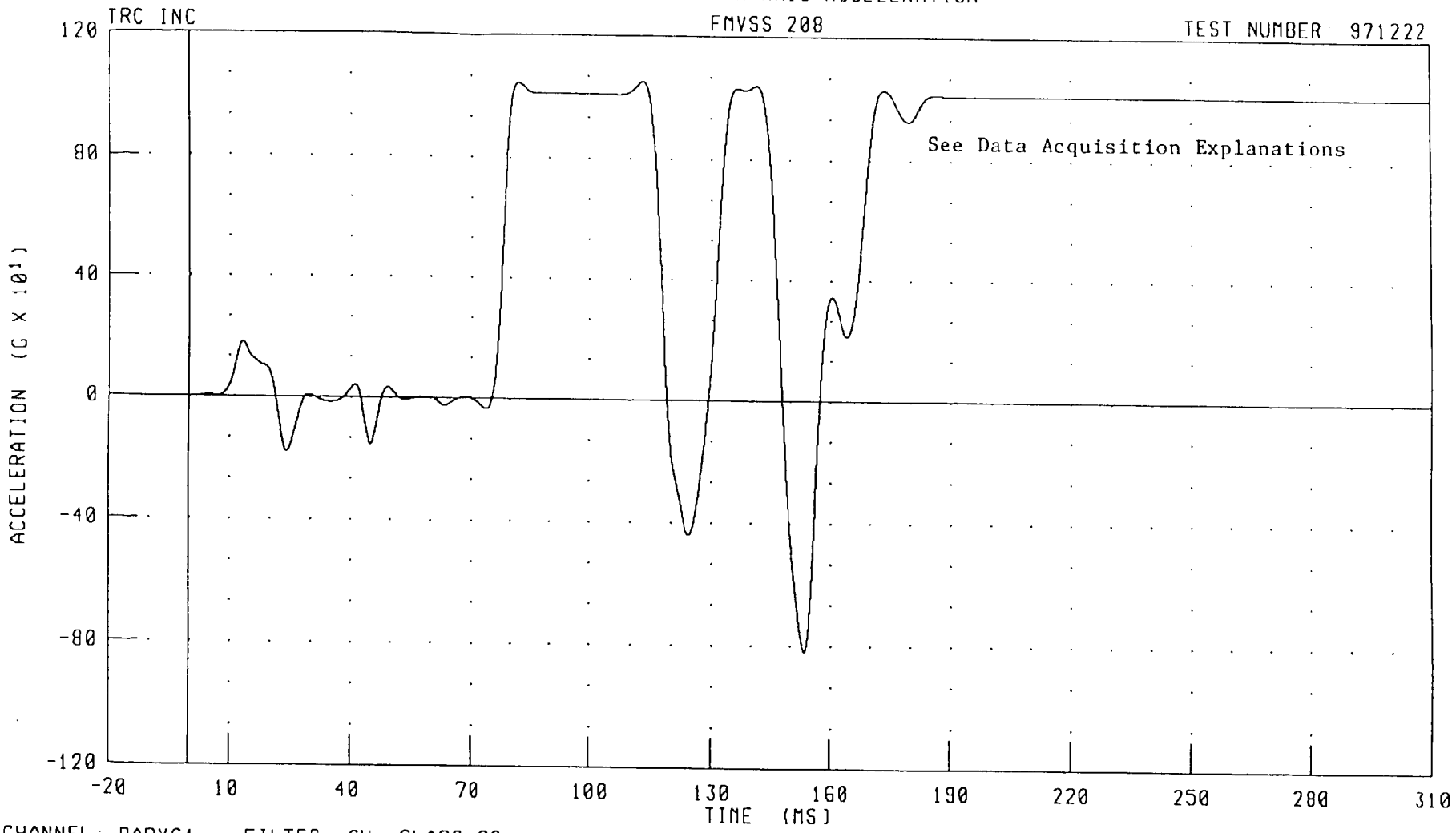
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
FLOOR TUNNEL RESULTANT ACCELERATION
FMVSS 208



CHANNEL: FTURG1 FILTER: CH. CLASS 60

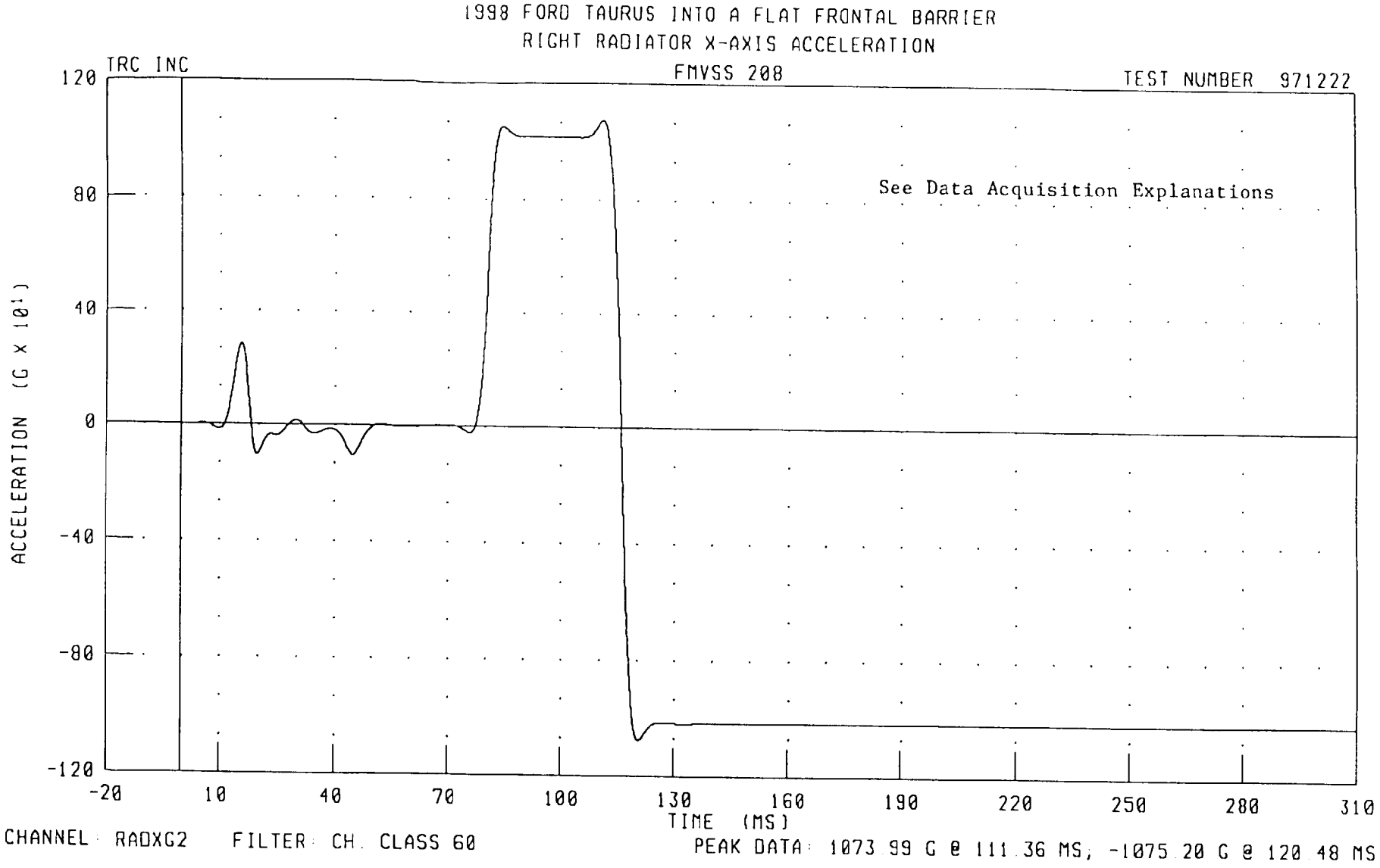
PEAK DATA: 28.68 G @ 73.68 MS; 0.02 G @ -20.00 MS

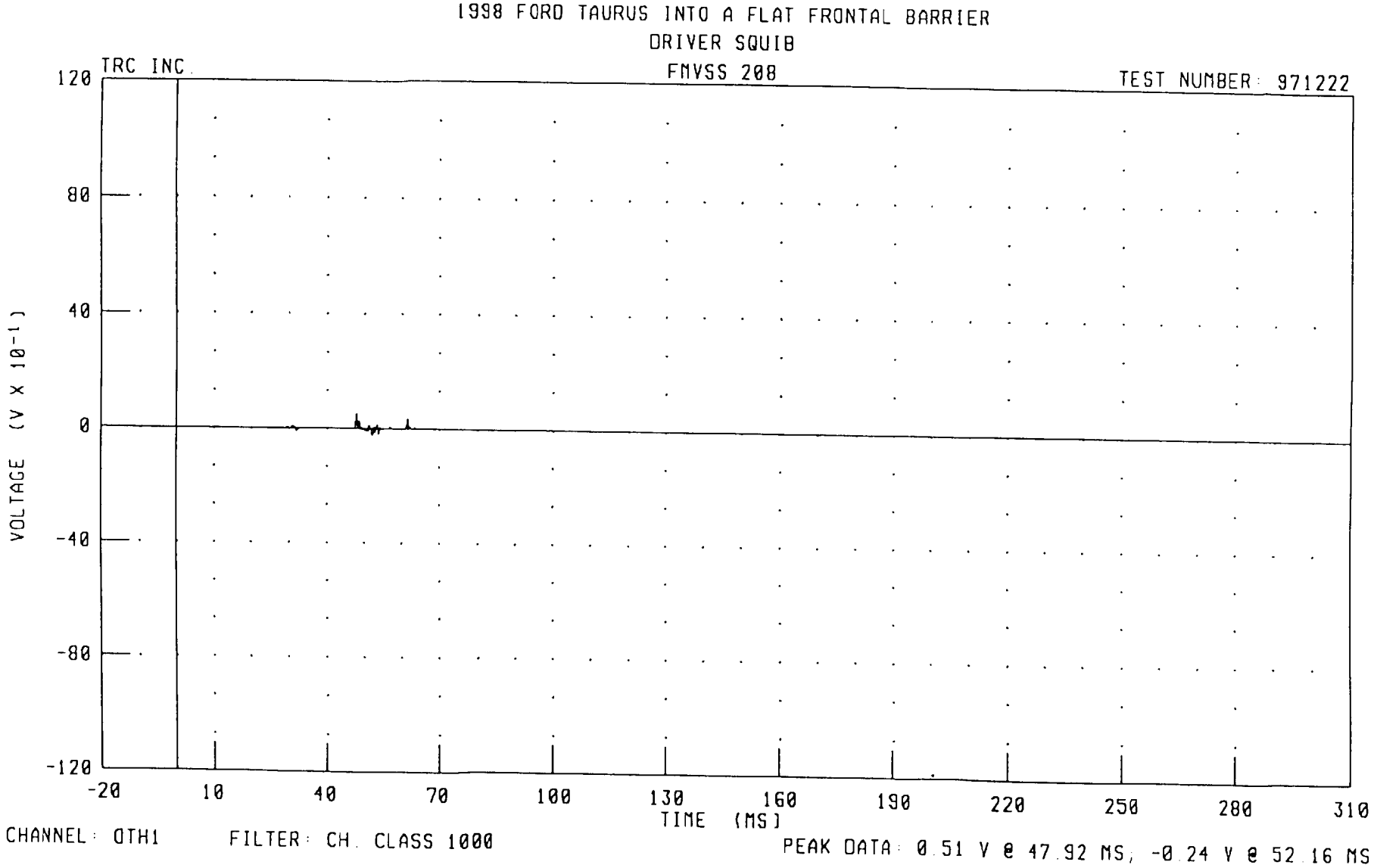
1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
LEFT RADIATOR X-AXIS ACCELERATION



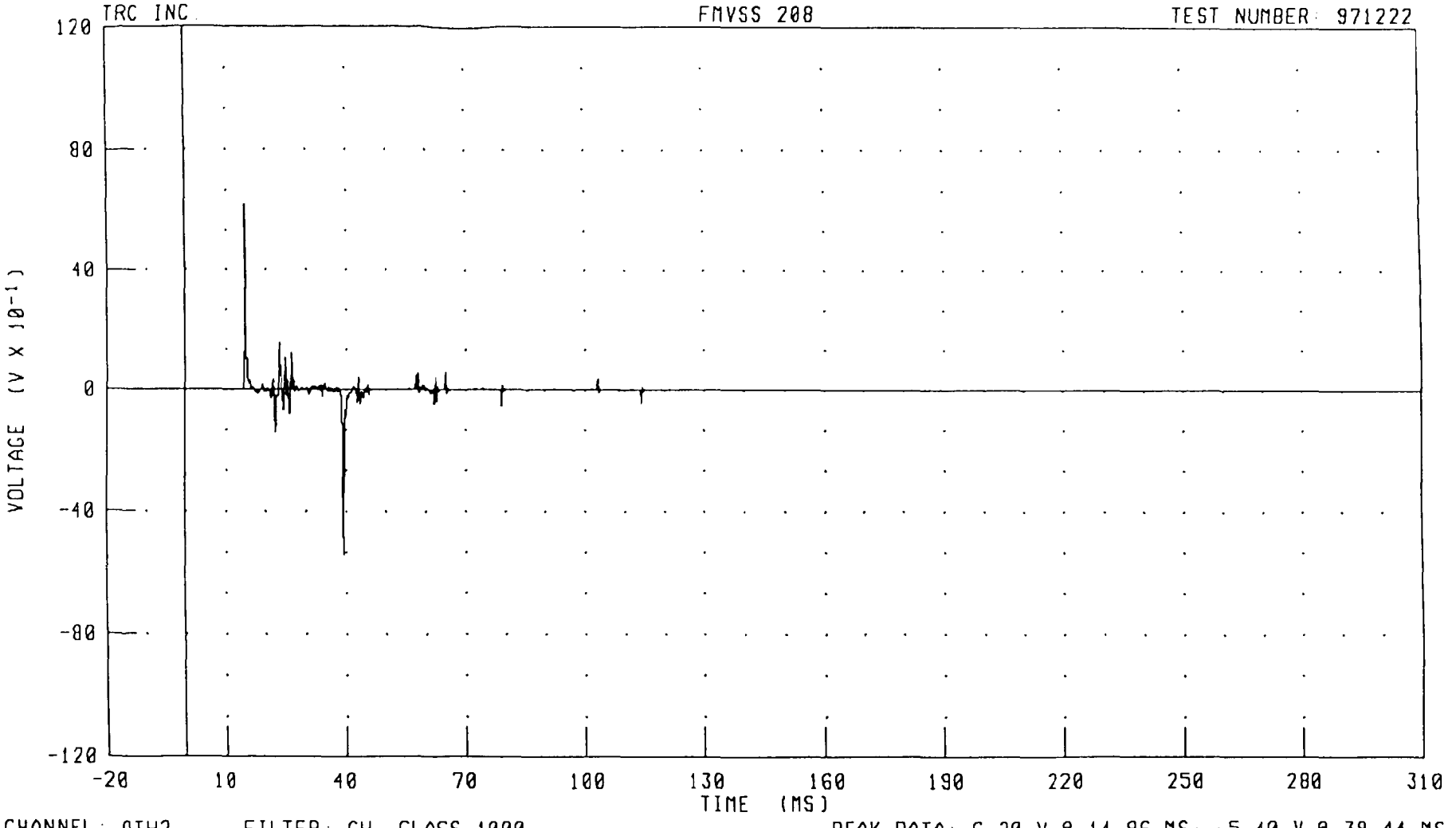
CHANNEL: RADXG1 FILTER: CH. CLASS 60

PEAK DATA: 1050.80 G @ 113.52 MS, -818.65 G @ 153.60 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
RIGHT RADIATOR X-AXIS ACCELERATION
TRC INC
FMVSS 208
TEST NUMBER 971222
See Data Acquisition Explanations
ACCELERATION (G X 10¹)
120
80
40
0
-40
-80
-120
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RADXG2 FILTER: CH. CLASS 60
PEAK DATA: 1073.99 G @ 111.36 MS, -1075.20 G @ 120.48 MS


1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
DRIVER SQUIB
FMVSS 208
TRC INC.
TEST NUMBER: 971222
120
80
40
0
-40
-80
-120
VOLTAGE (V X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: DTH1
FILTER: CH. CLASS 1000
PEAK DATA: 0.51 V @ 47.92 MS, -0.24 V @ 52.16 MS

1998 FORD TAURUS INTO A FLAT FRONTAL BARRIER
PASSENGER SQUIB



CHANNEL: 0TH2 FILTER: CH. CLASS 1000 PEAK DATA: 6.20 V @ 14.96 MS; -5.40 V @ 39.44 MS

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	516. MM
ELBOW REST HEIGHT (J)	191 - 211 MM	198. MM
SHOULDER-ELBOW LENGTH (I)	330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT (G)	290 - 305 MM	300. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 012998.1321

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

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

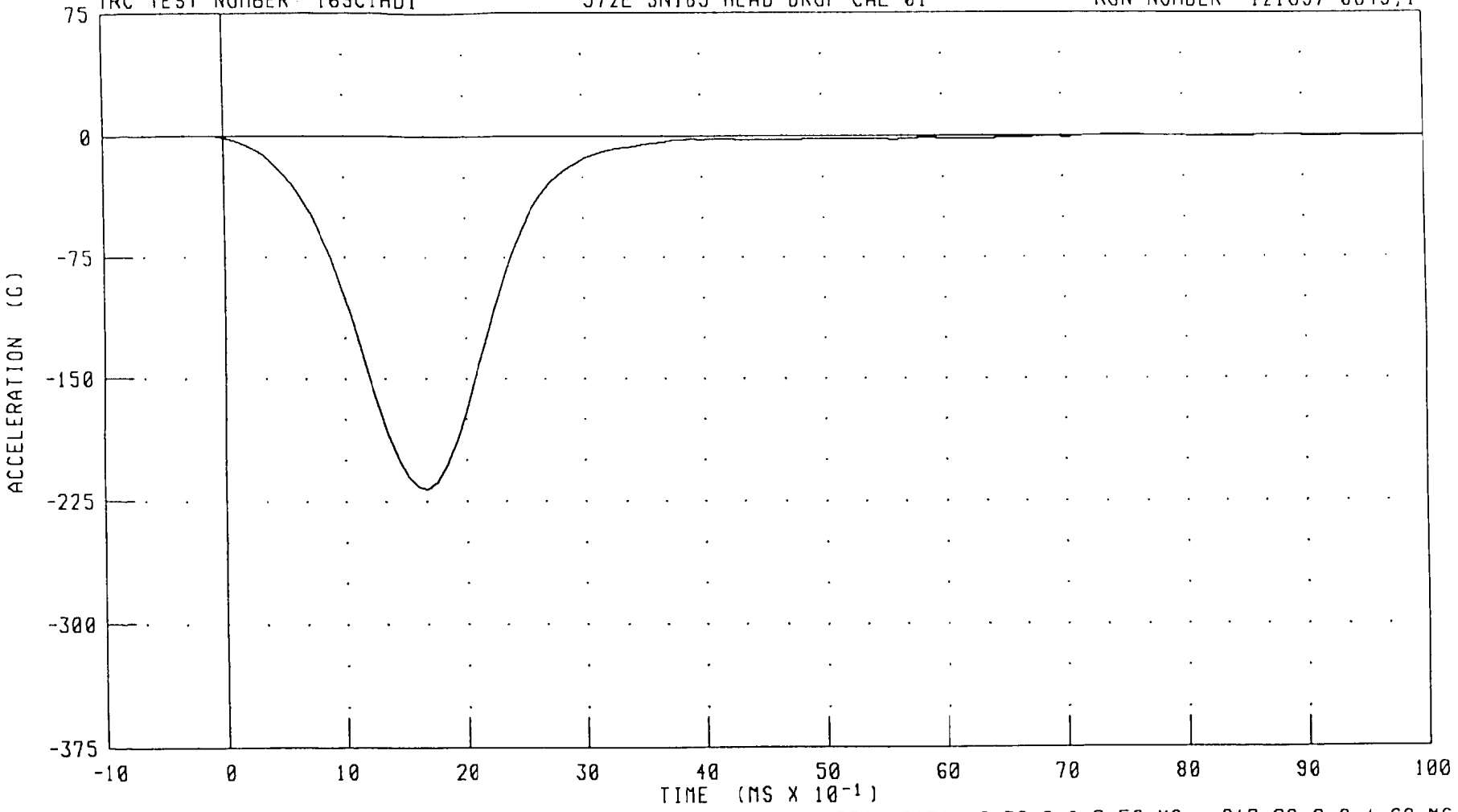
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.34 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.16 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 121897.0845;1

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

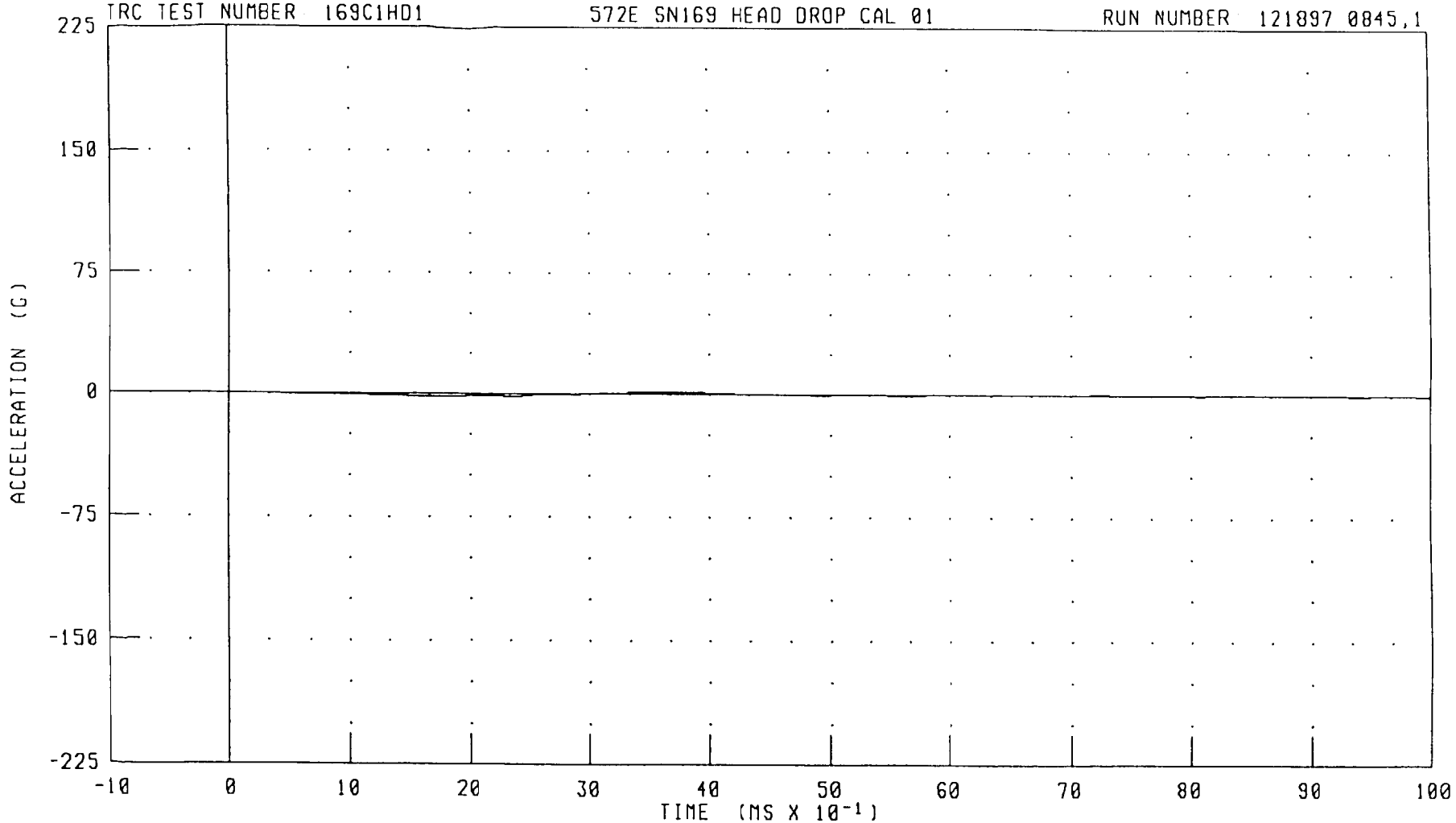
TRC TEST NUMBER: 169C1HD1 572E SN169 HEAD DROP CAL 01 RUN NUMBER 121897 0845,1



CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 0.38 G @ 7.52 MS; -217.86 G @ 1.68 MS

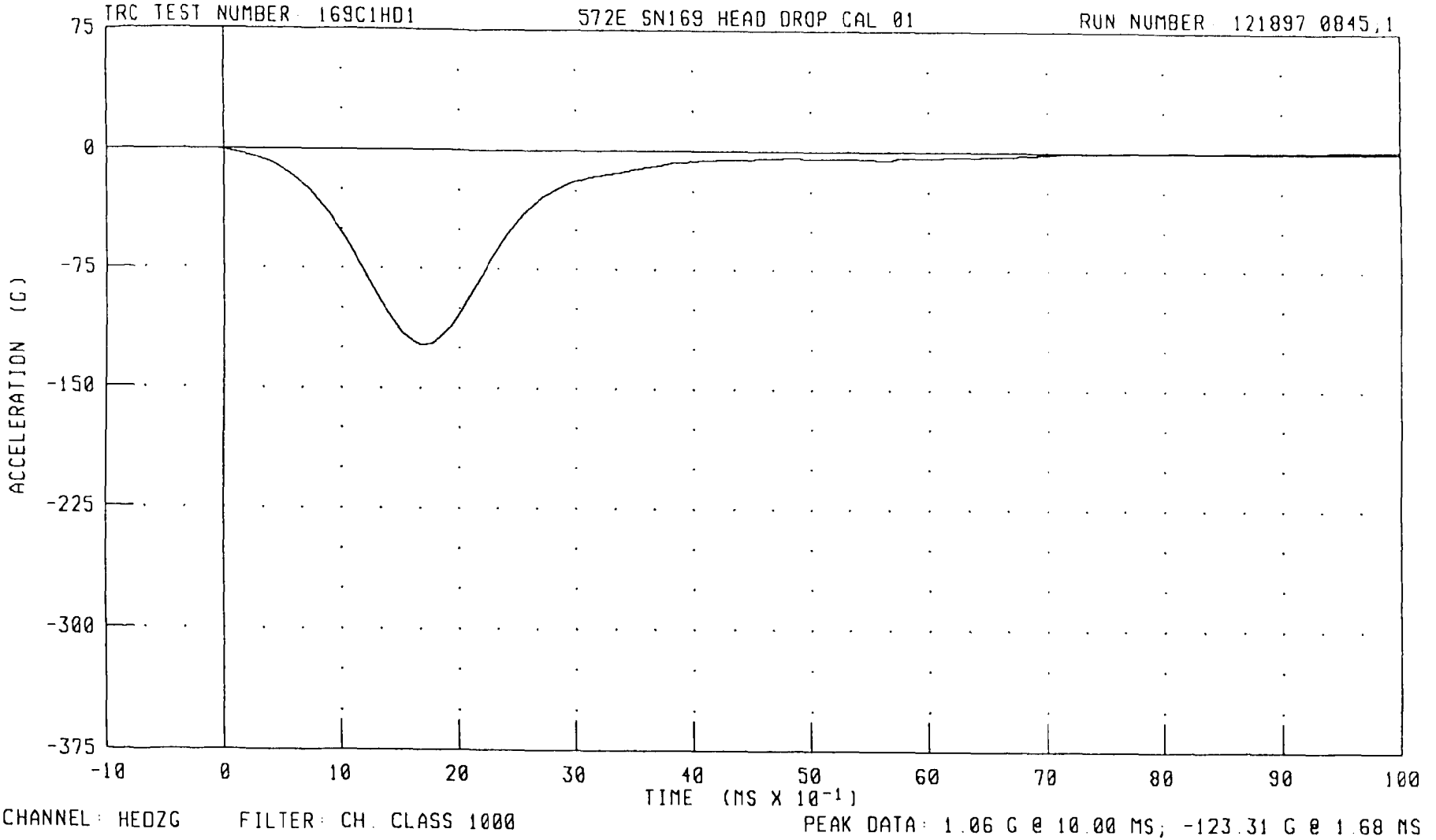
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS

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



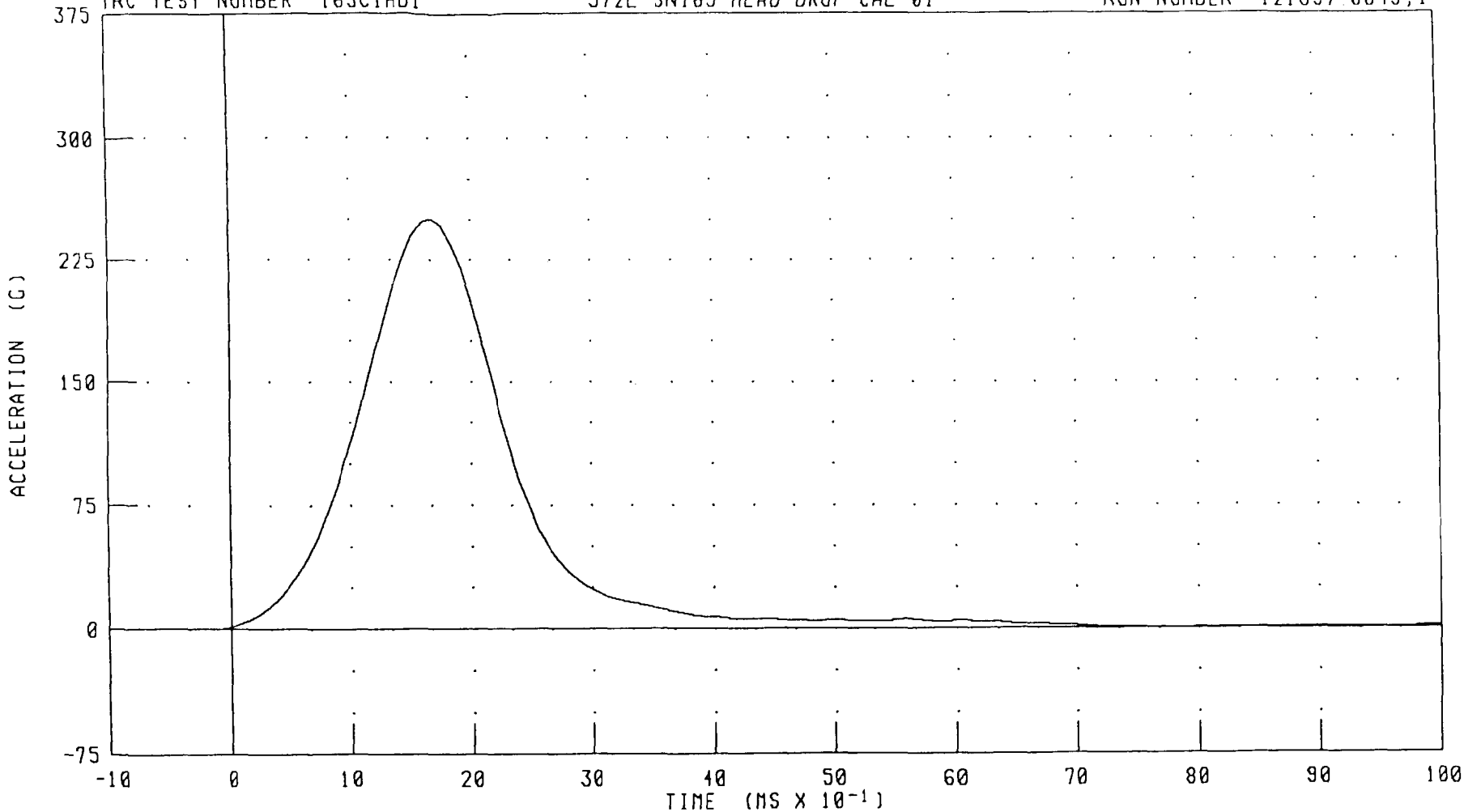
CHANNEL: HEDYG FILTER: CH. CLASS 1000 PEAK DATA: 1.32 G @ 3.52 MS, -2.17 G @ 1.76 MS

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; 0.08 G @ -0.56 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

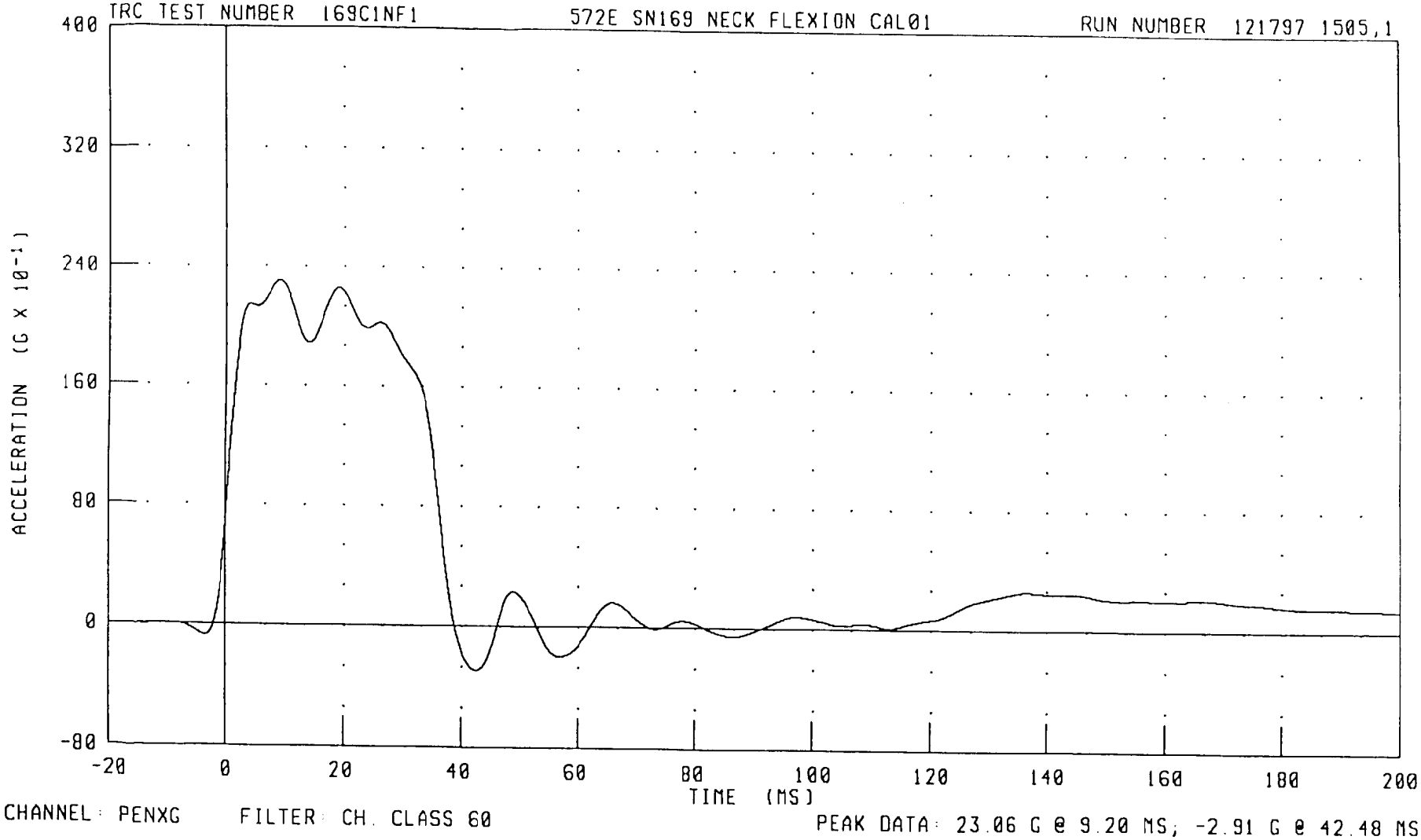
TRC INC. TEST NO: 169C1NF1 572E SN169 NECK FLEXION CAL01

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

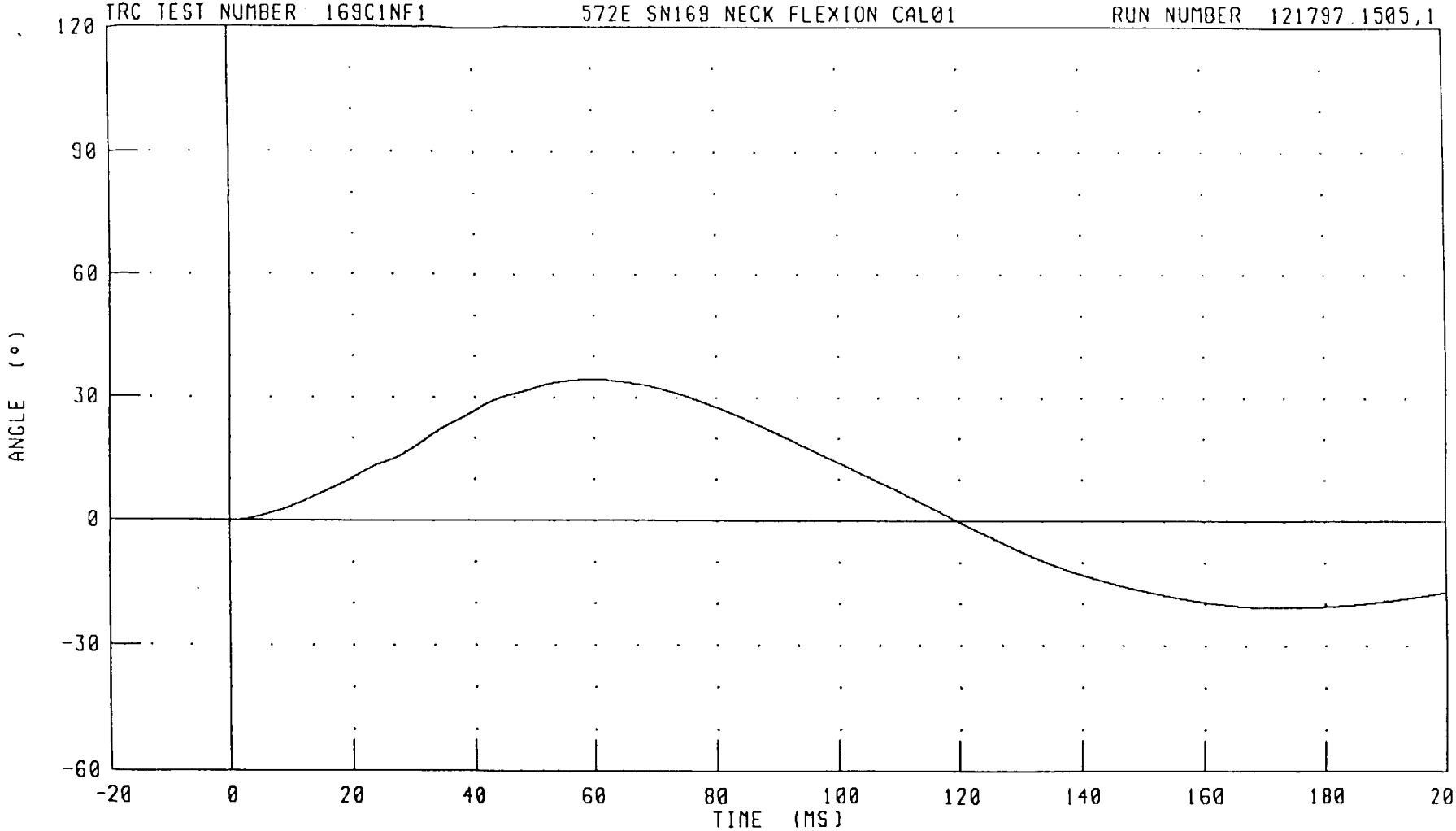


CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 23.06 G @ 9.20 MS; -2.91 G @ 42.48 MS

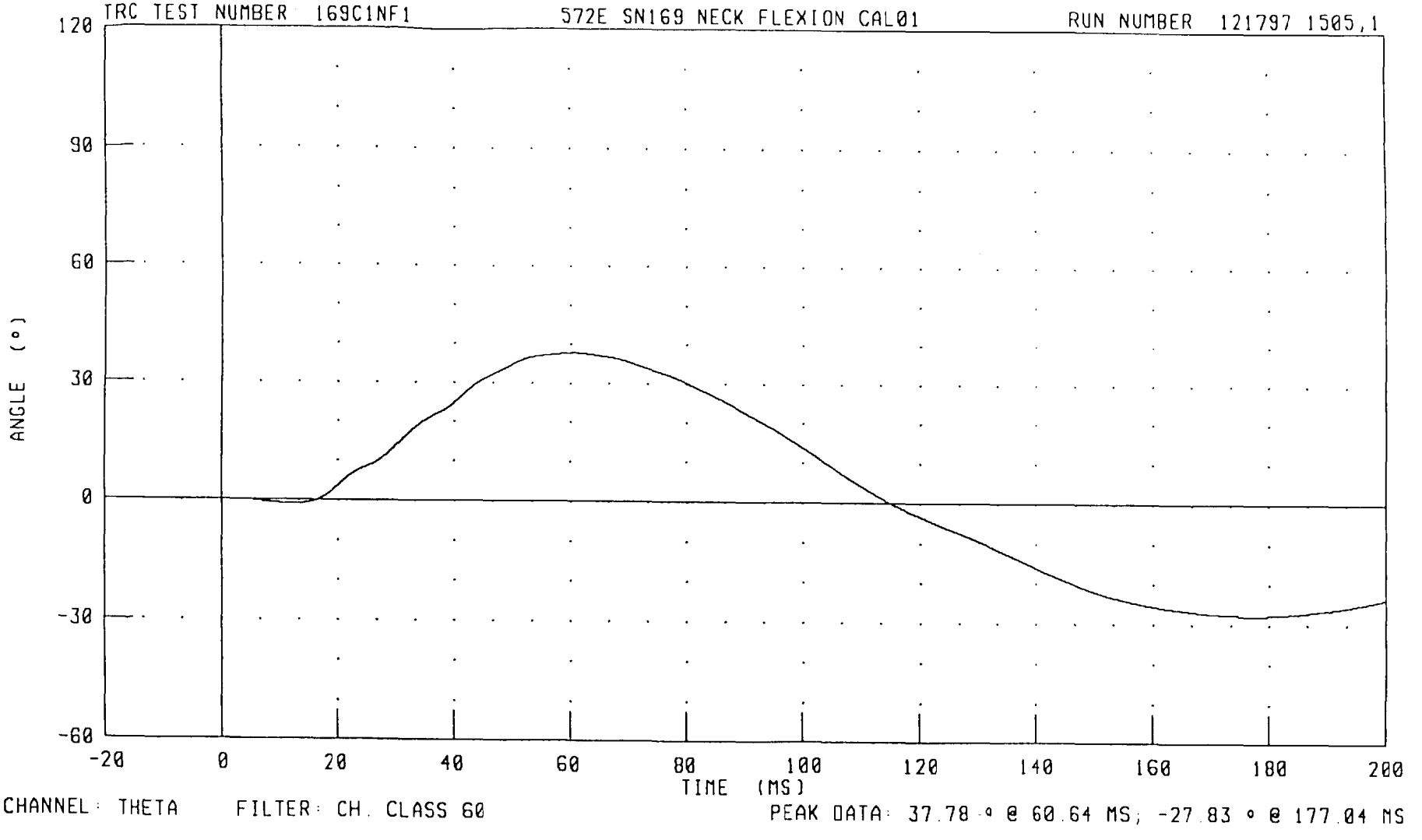
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

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

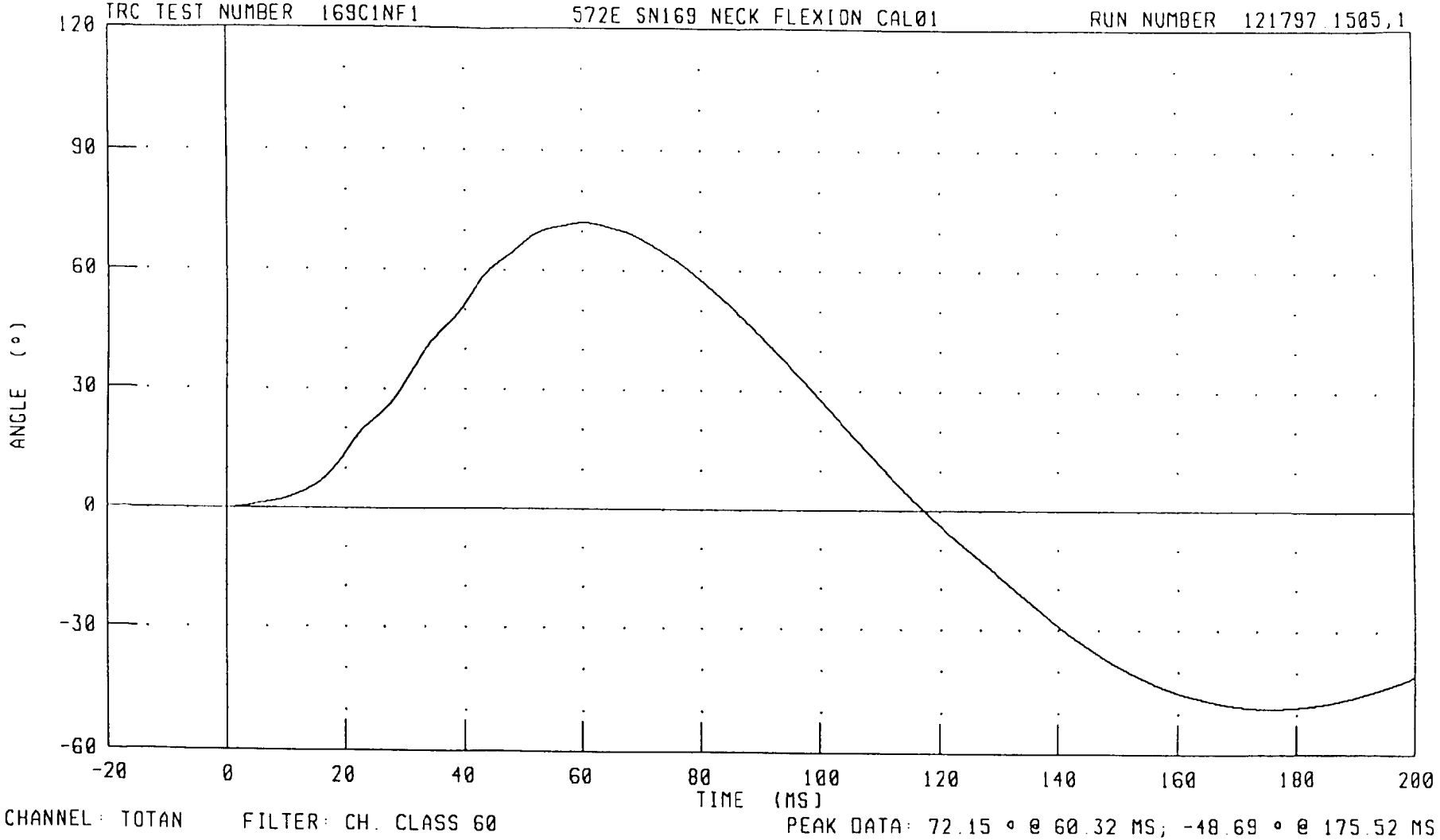
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 37.78 ° @ 60.64 MS; -27.83 ° @ 177.04 MS

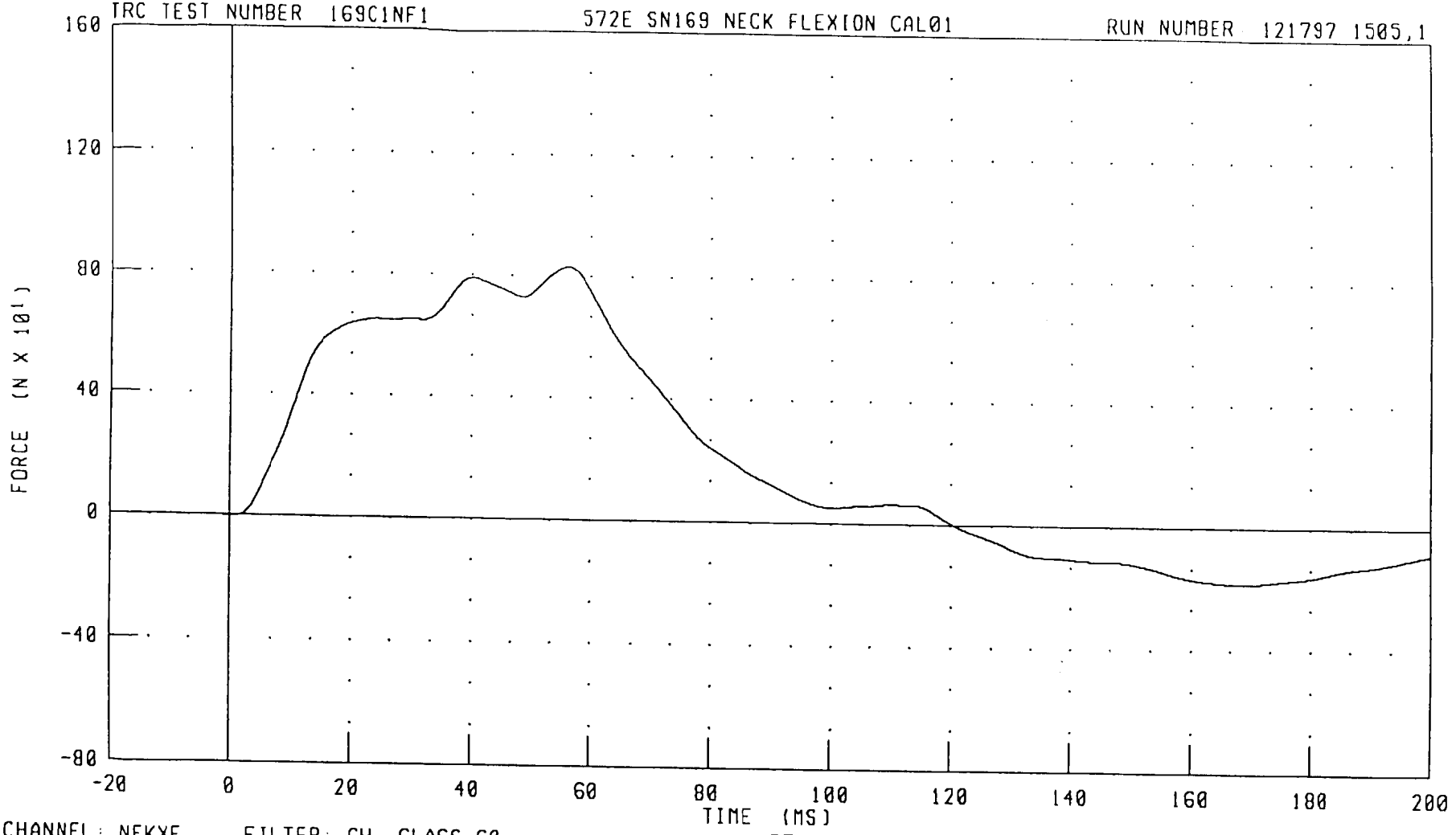
PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION



CHANNEL: TOTAN FILTER: CH. CLASS 60

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

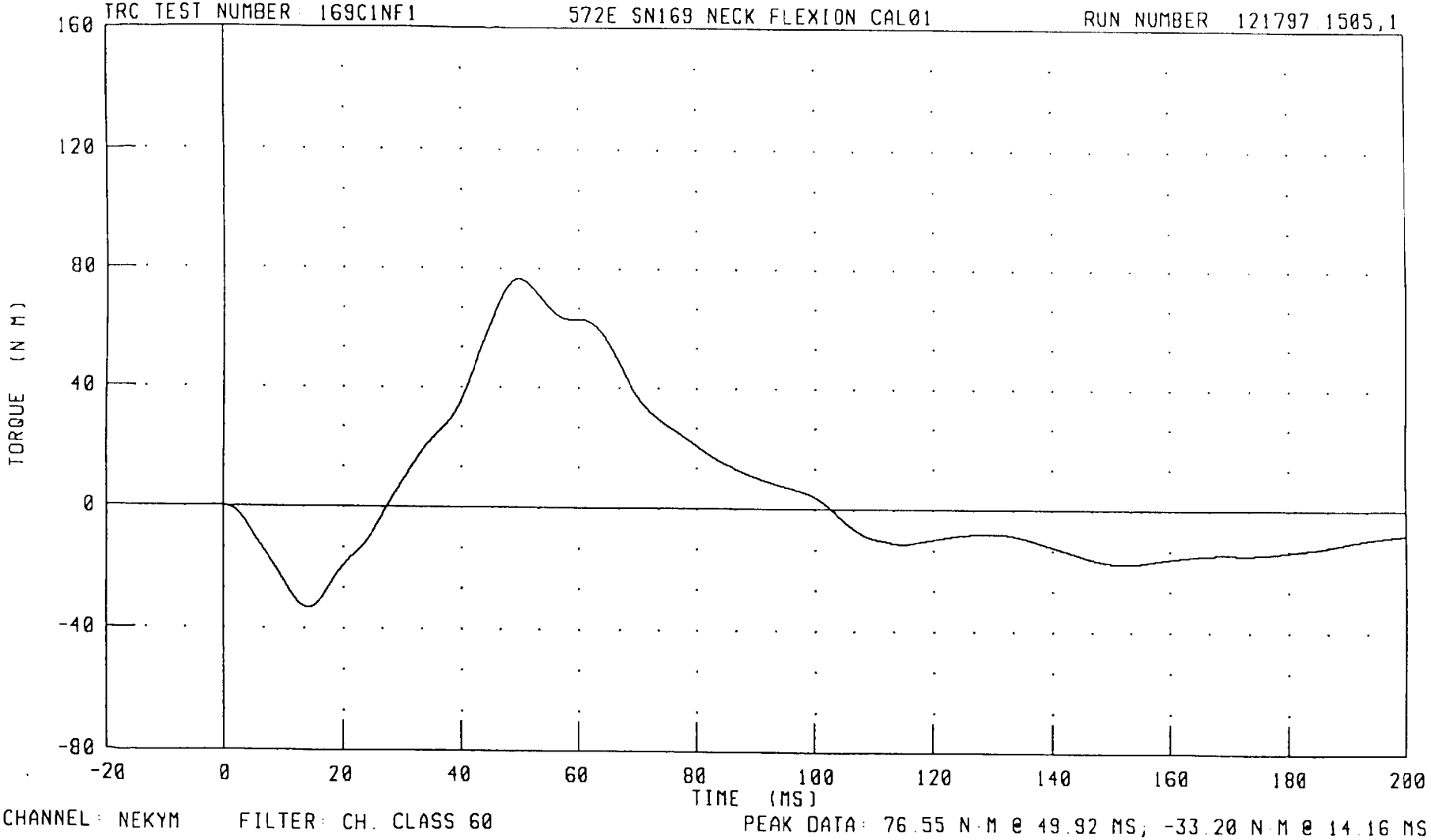
PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 830.20 N @ 56.32 MS; -183.95 N @ 168.72 MS

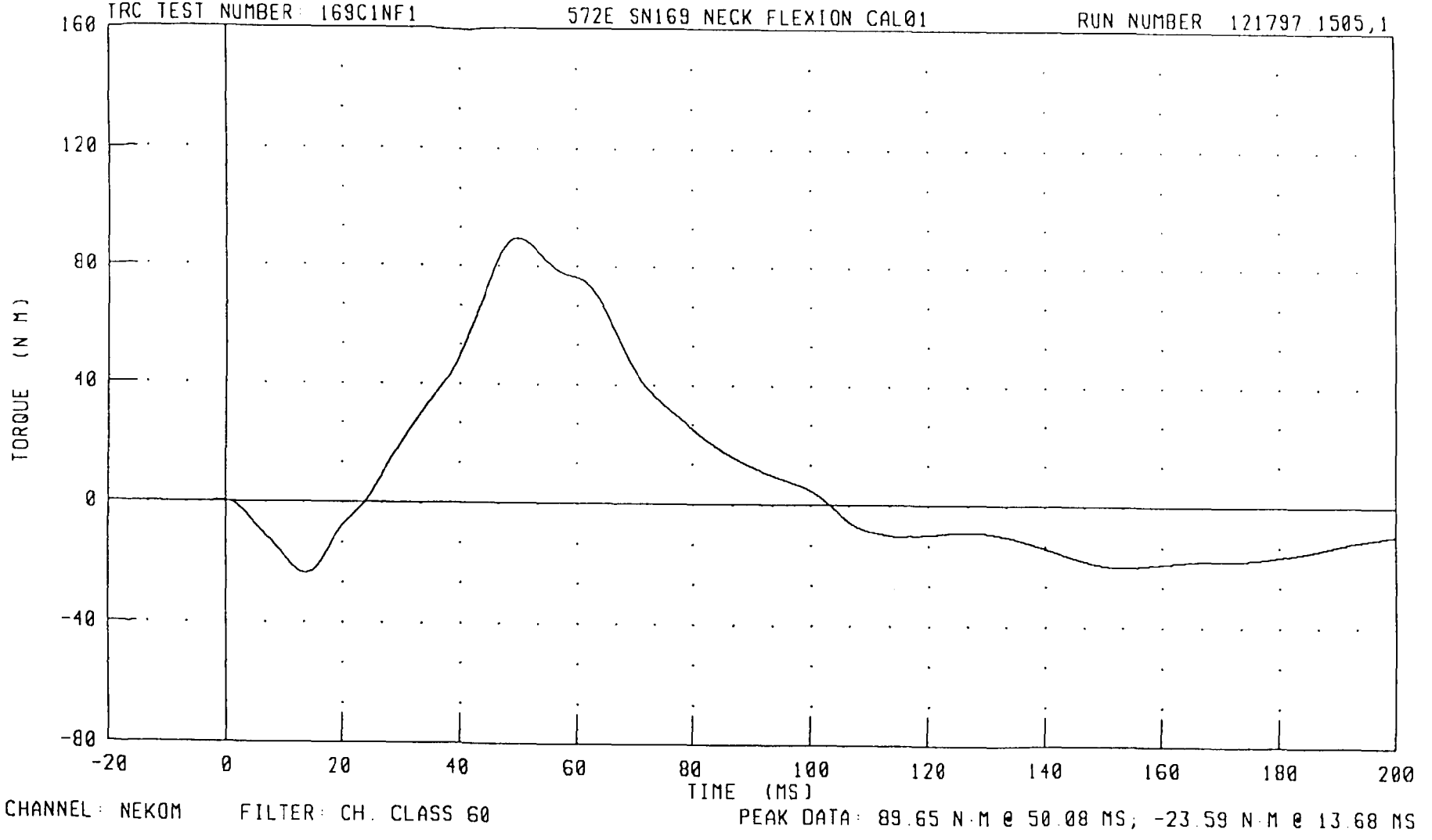
PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS



CHANNEL: NEKYM FILTER: CH. CLASS 60

PEAK DATA: 76.55 N-M @ 49.92 MS; -33.20 N-M @ 14.16 MS

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



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 89.65 N-M @ 50.08 MS; -23.59 N-M @ 13.68 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

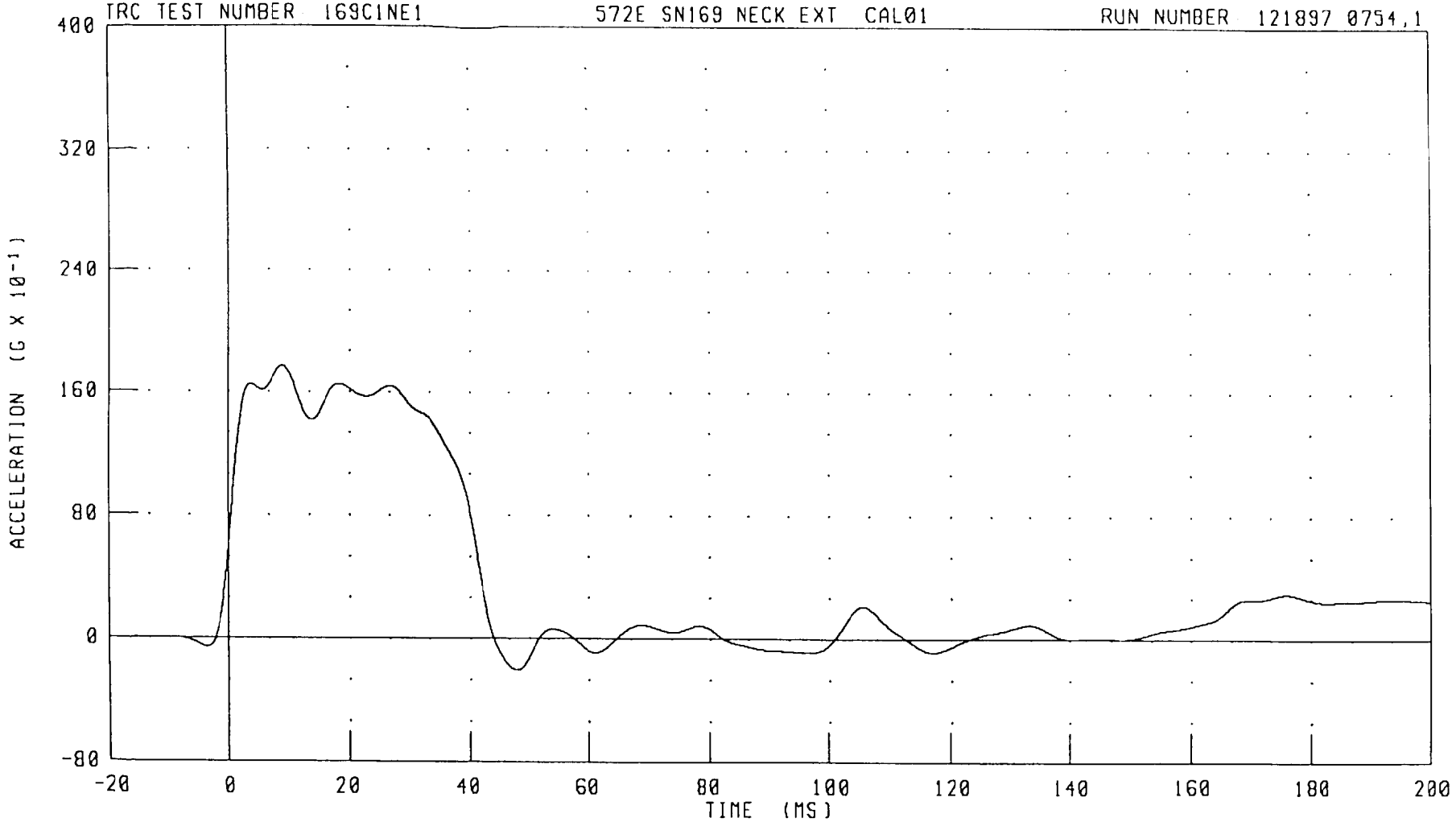
TRC INC. TEST NO: 169C1NE1 572E SN169 NECK EXT. CAL01

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

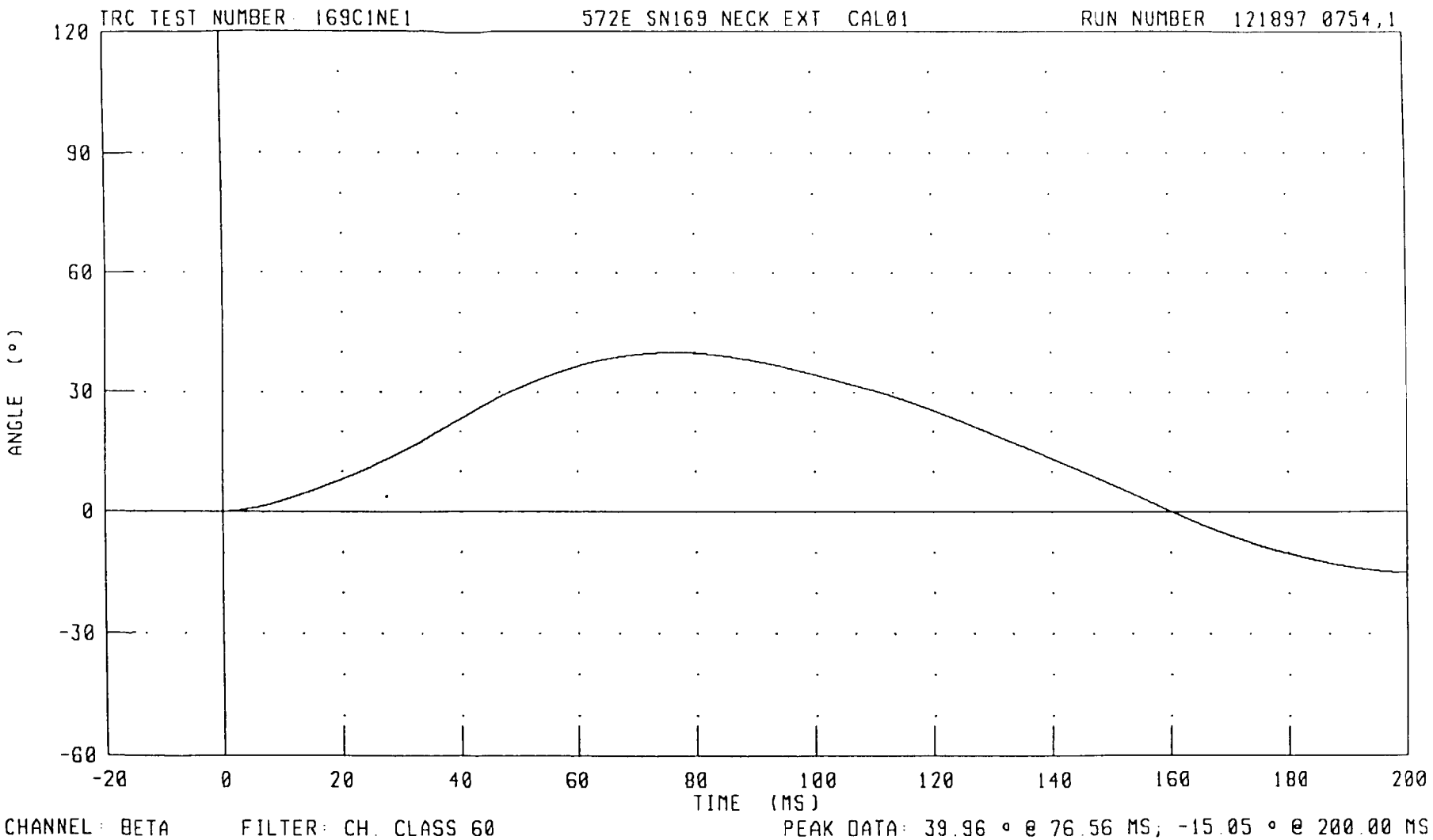
TECHNICIAN _____ RUN NUMBER: 121897.0754;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION



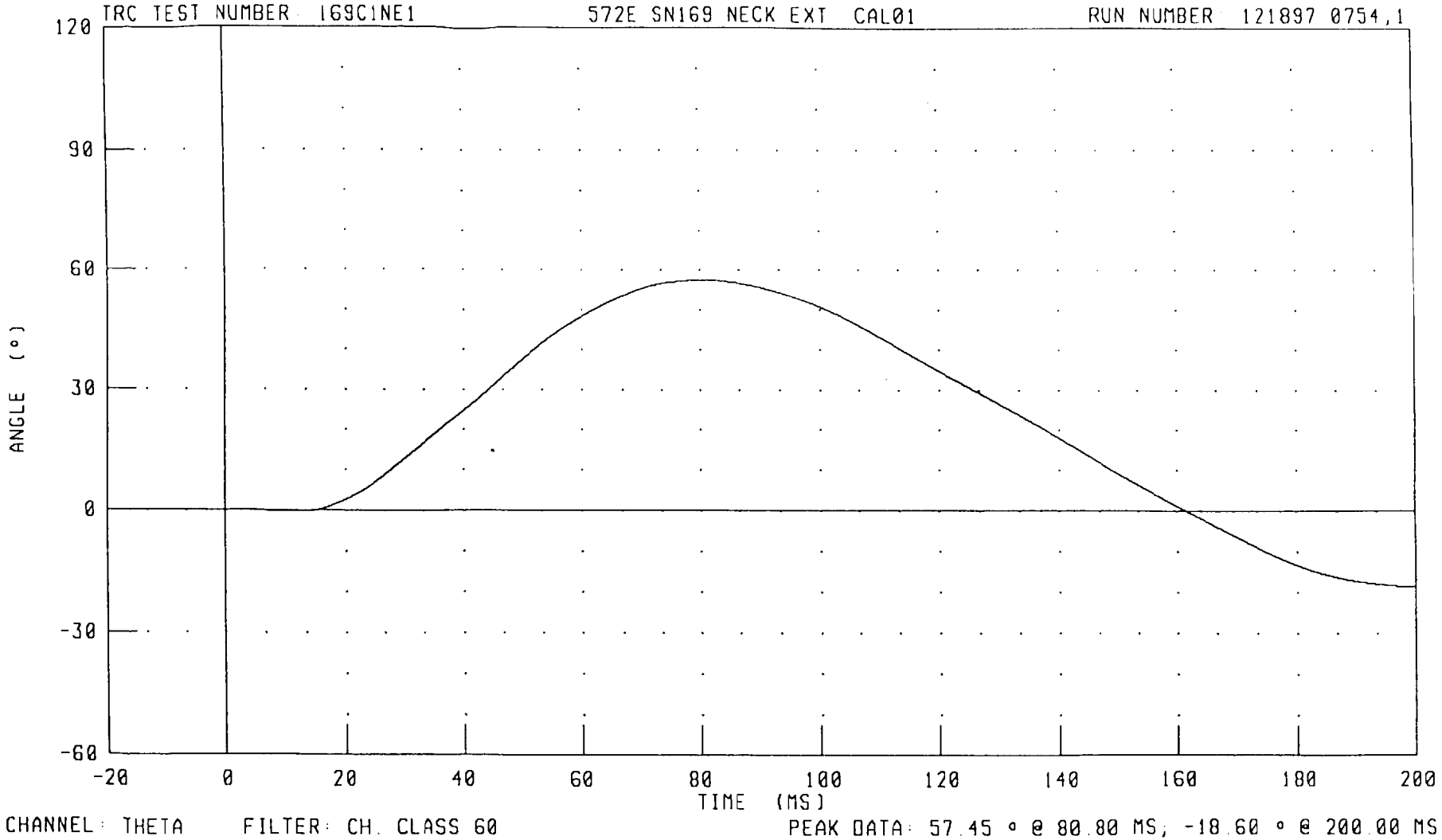
CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 17.67 G @ 8.96 MS; -2.04 G @ 47.92 MS

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

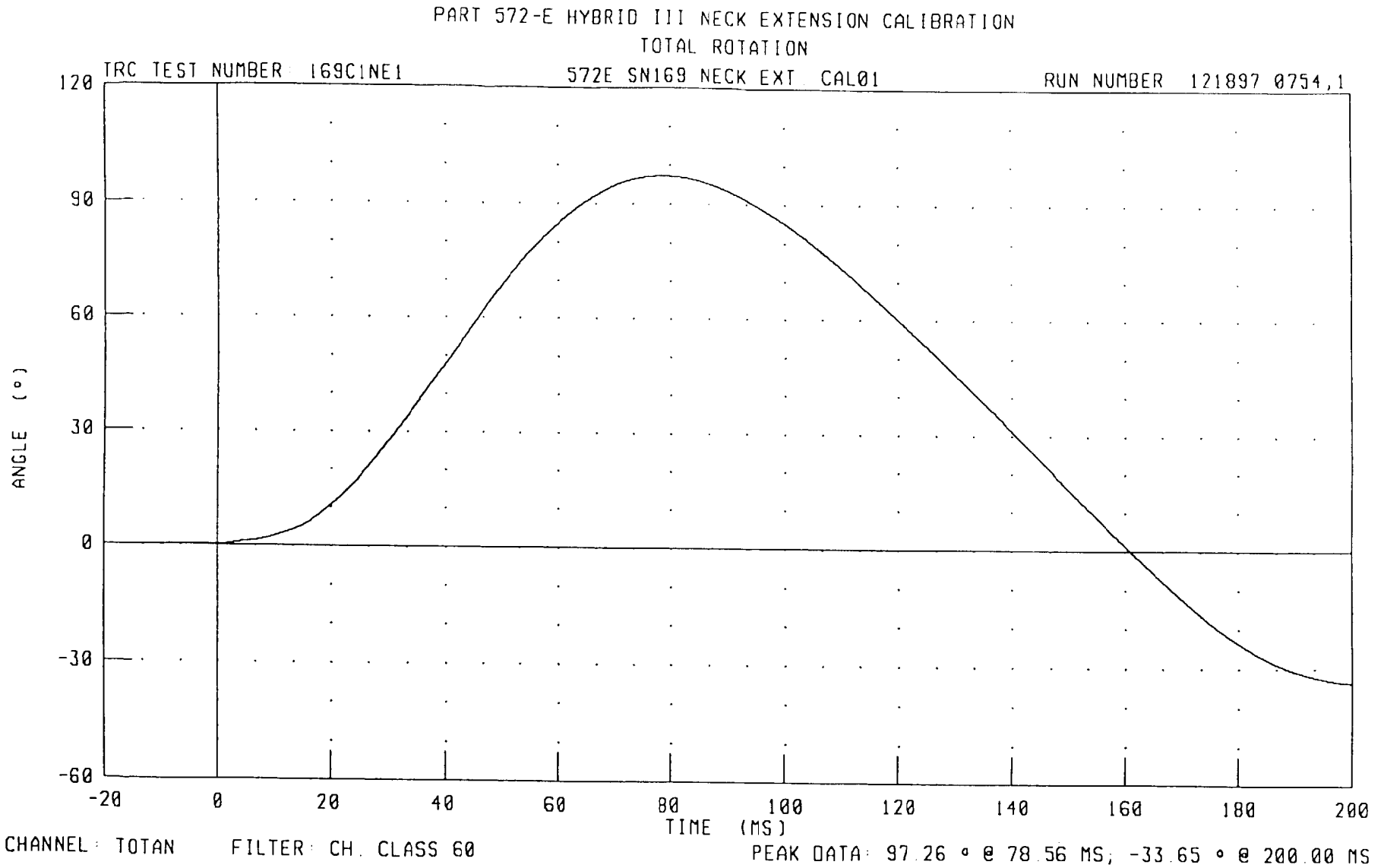


CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 39.96 ° @ 76.56 MS; -15.05 ° @ 200.00 MS

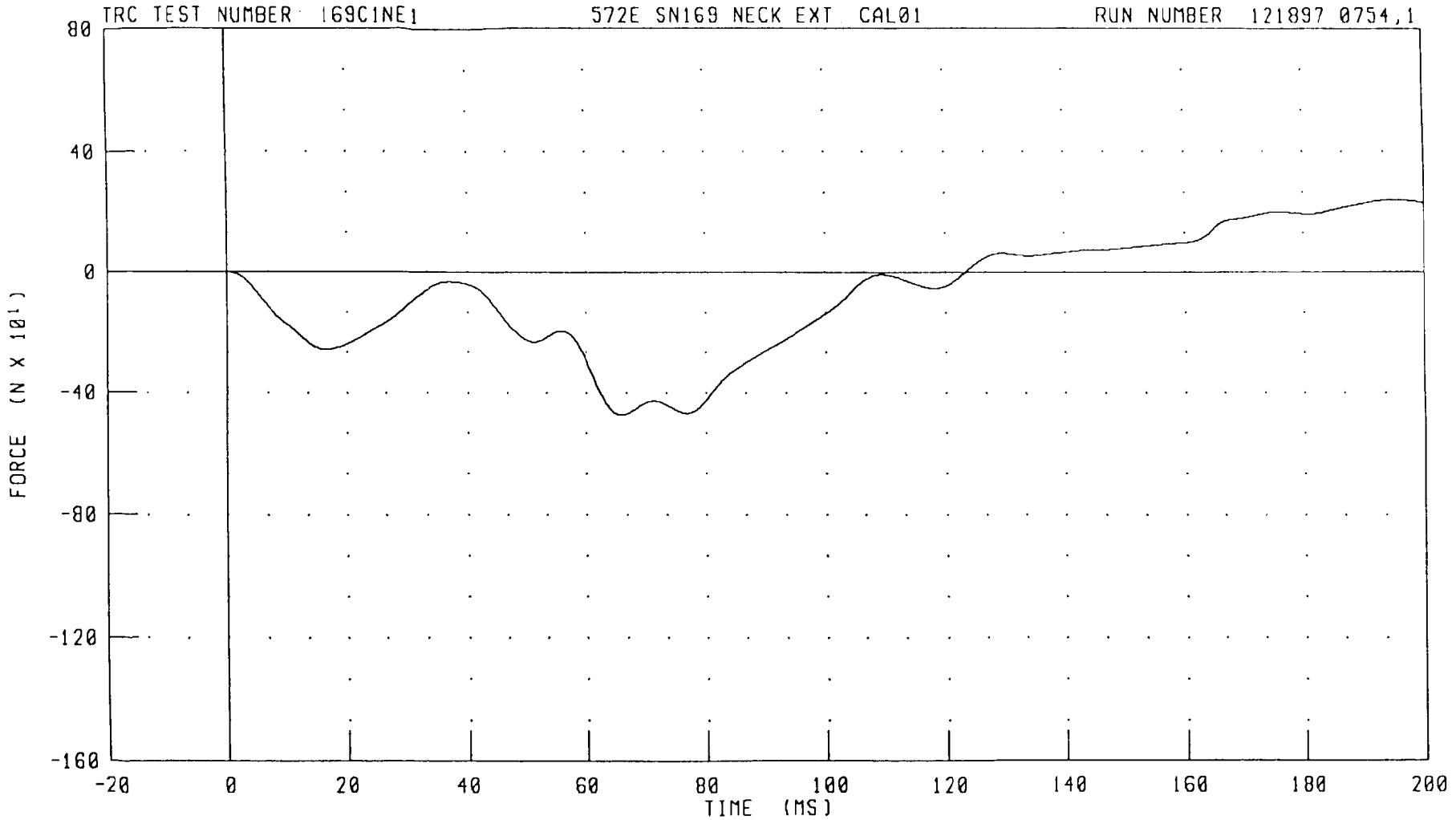
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 57.45 ° @ 80.80 MS; -18.60 ° @ 200.00 MS

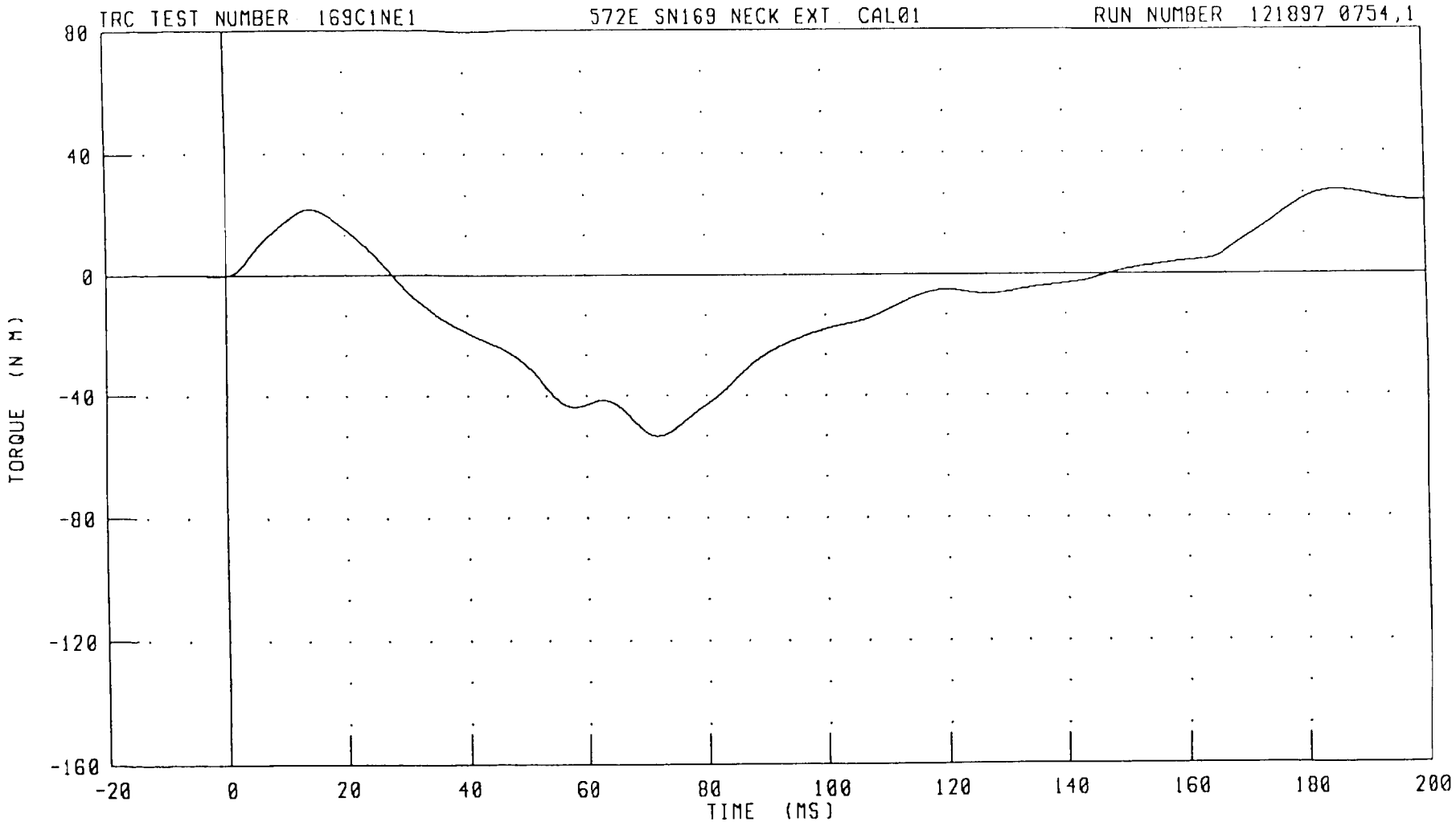

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 169CINE1
572E SN169 NECK EXT CAL01
RUN NUMBER 121897 0754,1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
FILTER: CH. CLASS 60
PEAK DATA: 97.26 ° @ 78.56 MS; -33.65 ° @ 200.00 MS

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

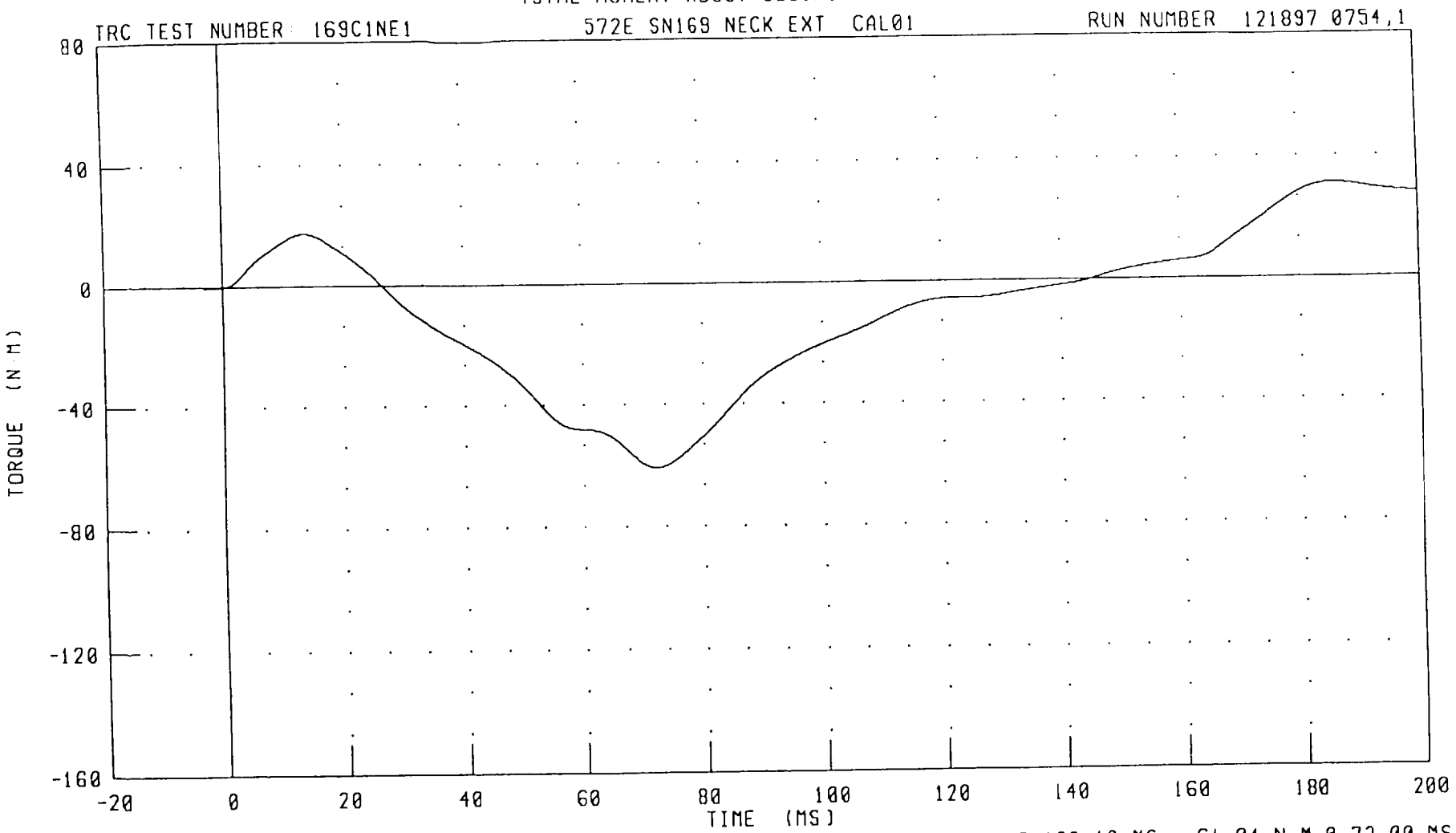
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS



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



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 31.15 N-M @ 186.16 MS; -61.04 N-M @ 72.00 MS

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%

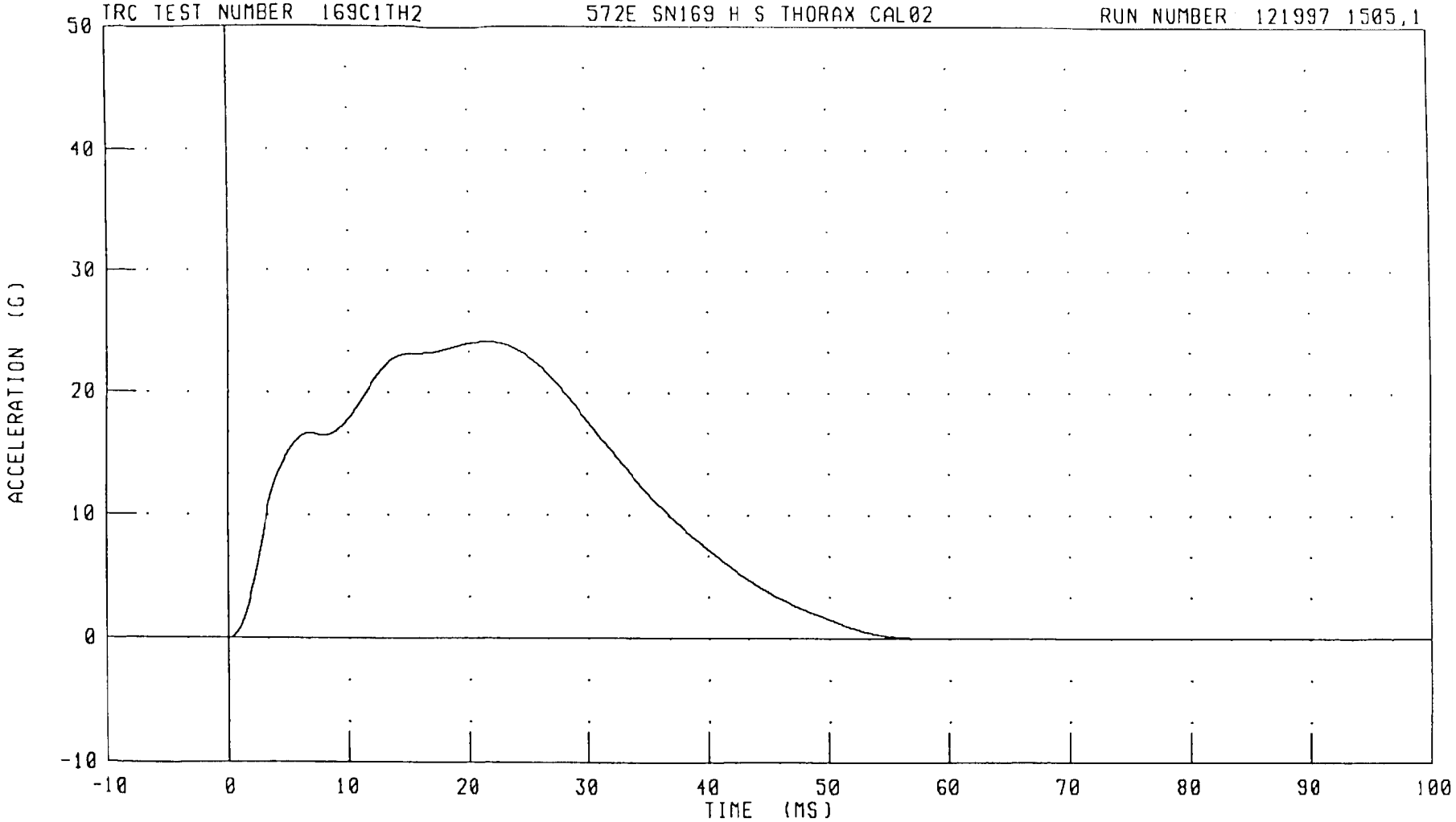
TEST MEETS SPECIFICATIONS

TECHNICIAN By Colt

RUN NUMBER: 121997.1505;1

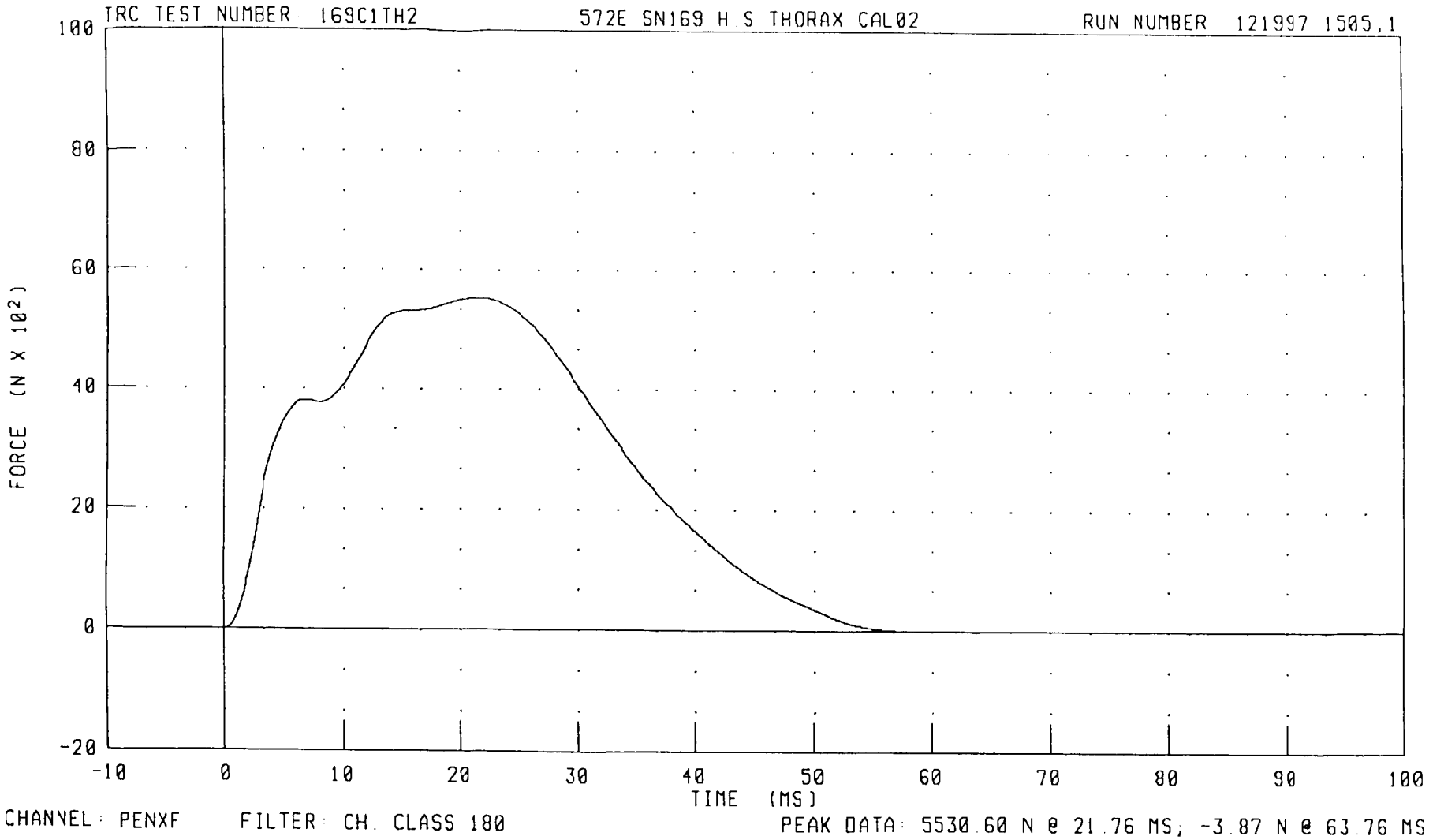
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

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

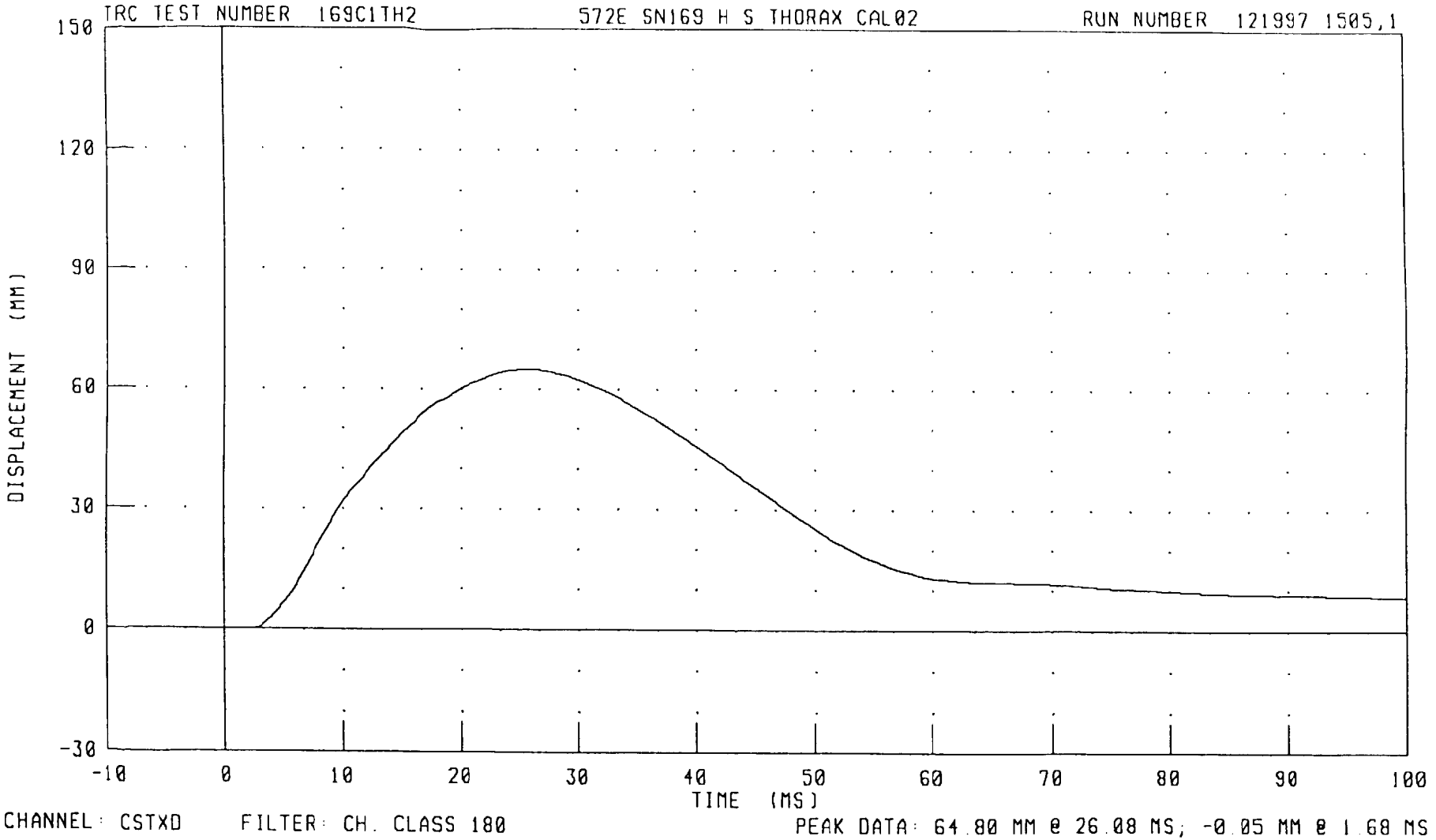
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5530.60 N @ 21.76 MS; -3.87 N @ 63.76 MS

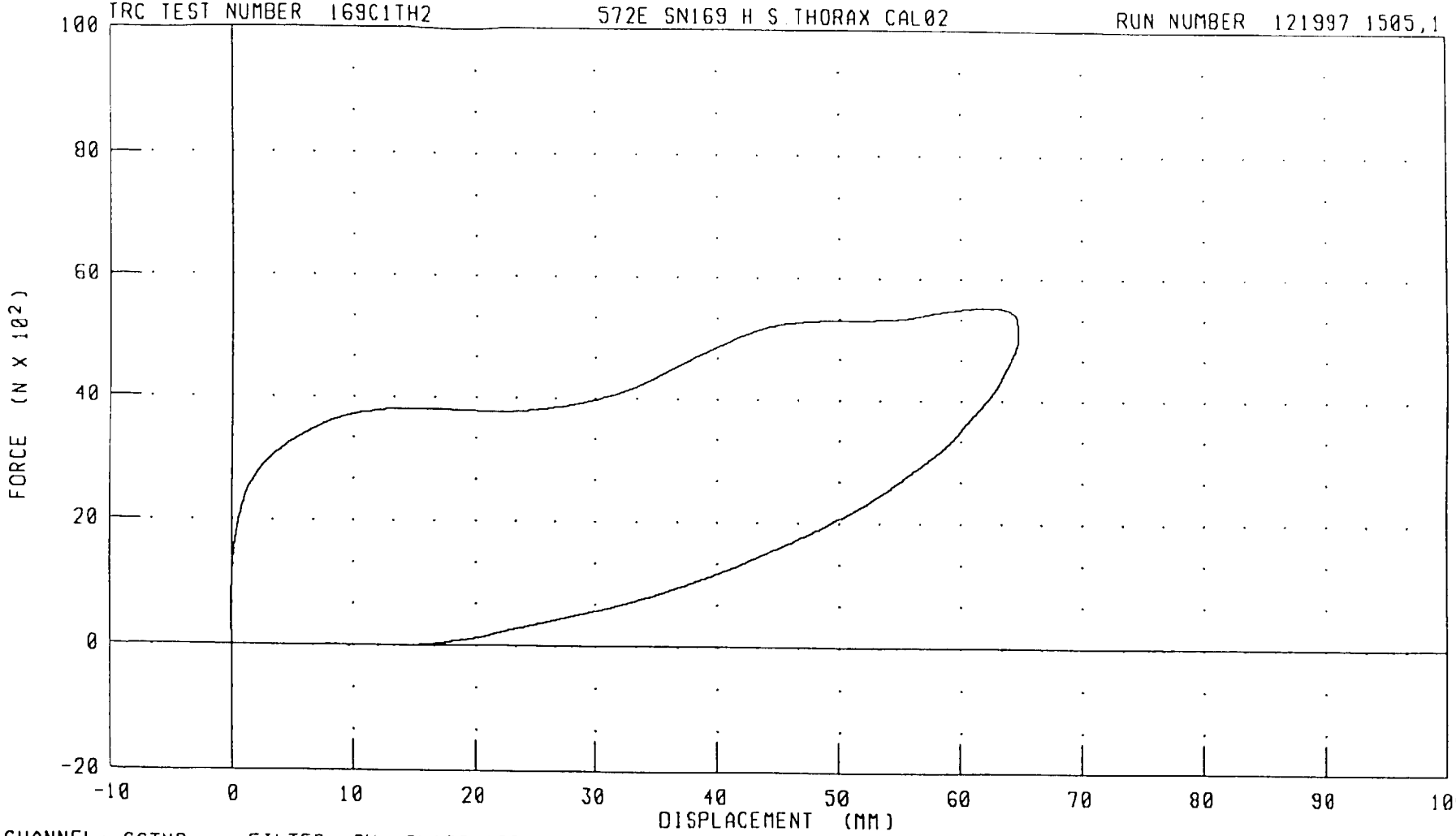
PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 64.80 MM @ 26.08 MS; -0.05 MM @ 1.68 MS

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 FILTER: CH. CLASS 180
PENXF 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

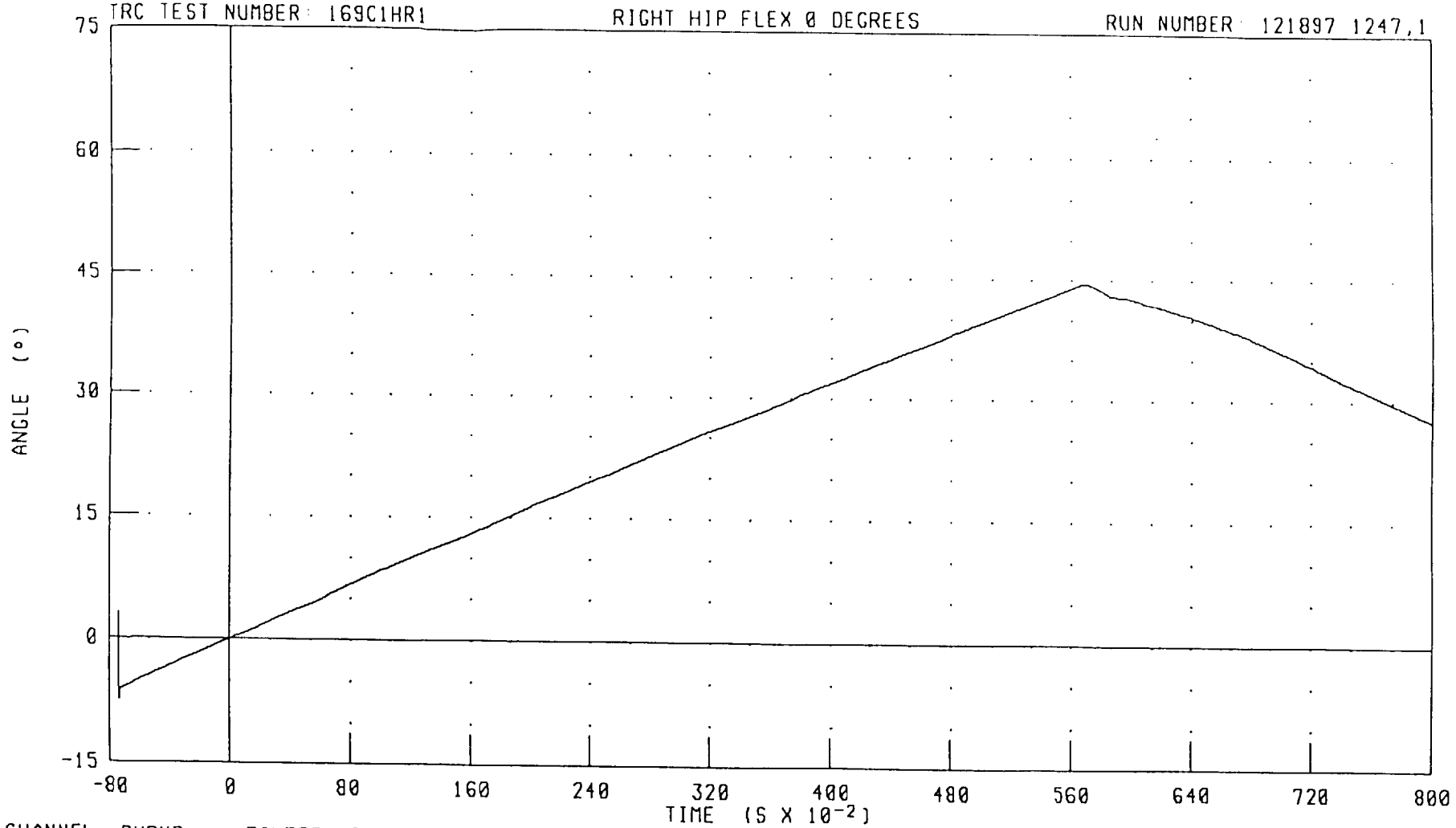
TRC INC. TEST NO: 169C1HR1 RIGHT HIP FLEX 0 DEGREES

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
RIGHT HIP FLEX 0 DEGREES



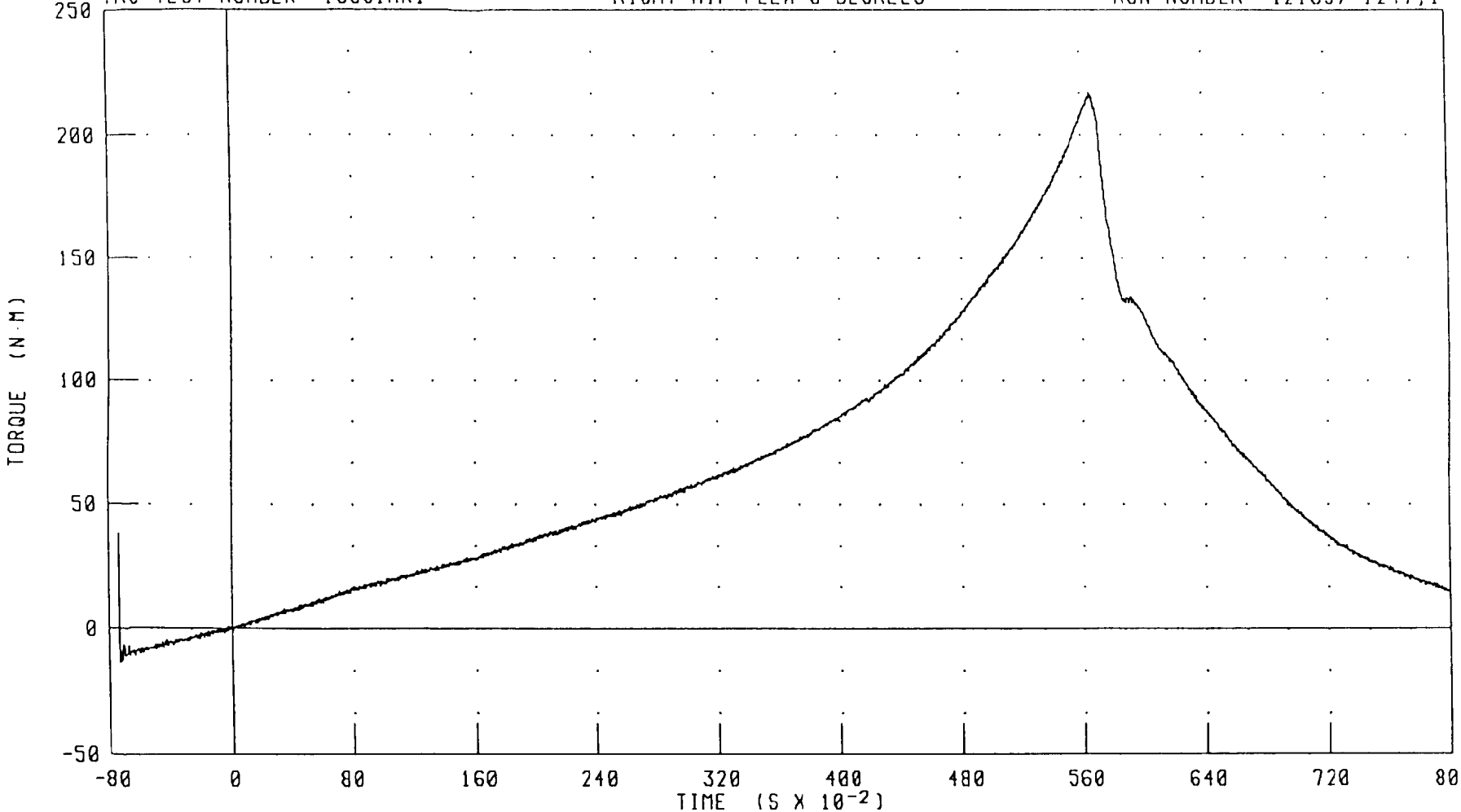
CHANNEL: RHPXD FILTER: CH. CLASS 60

PEAK DATA: 44.46 ° @ 5.66 S; -7.35 ° @ -0.73 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

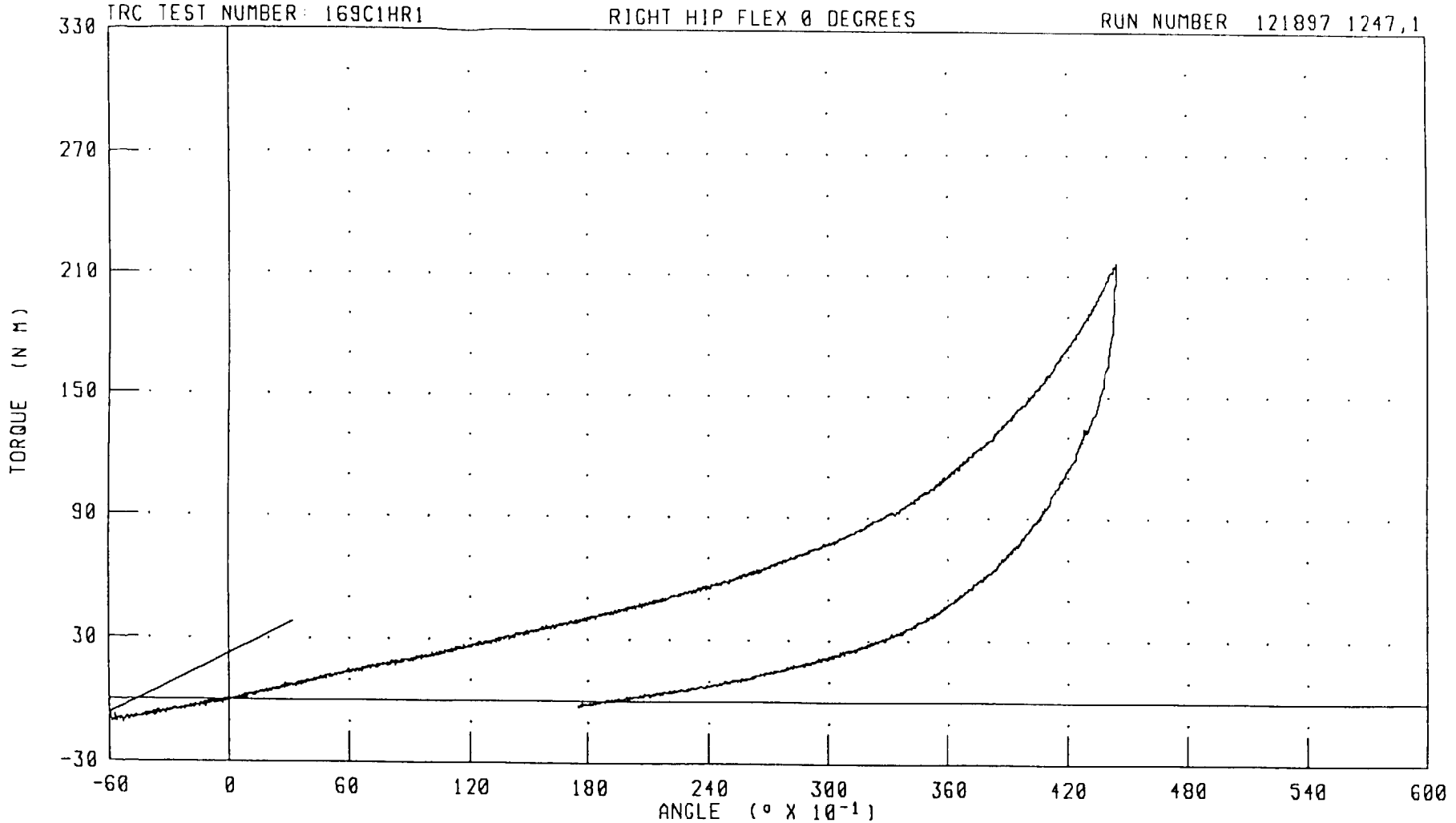
TRC TEST NUMBER: 169C1HR1 RIGHT HIP FLEX 0 DEGREES RUN NUMBER 121897 1247,1



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



CHANNEL: RHPXD FILTER: CH. CLASS 60

RHPYM CH. CLASS 60

PEAK DATA: 44.46 ° @ 5.66 S; -7.35 ° @ -0.73 S

217.13 N.M @ 5.66 S; -13.60 N.M @ -0.73 S

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

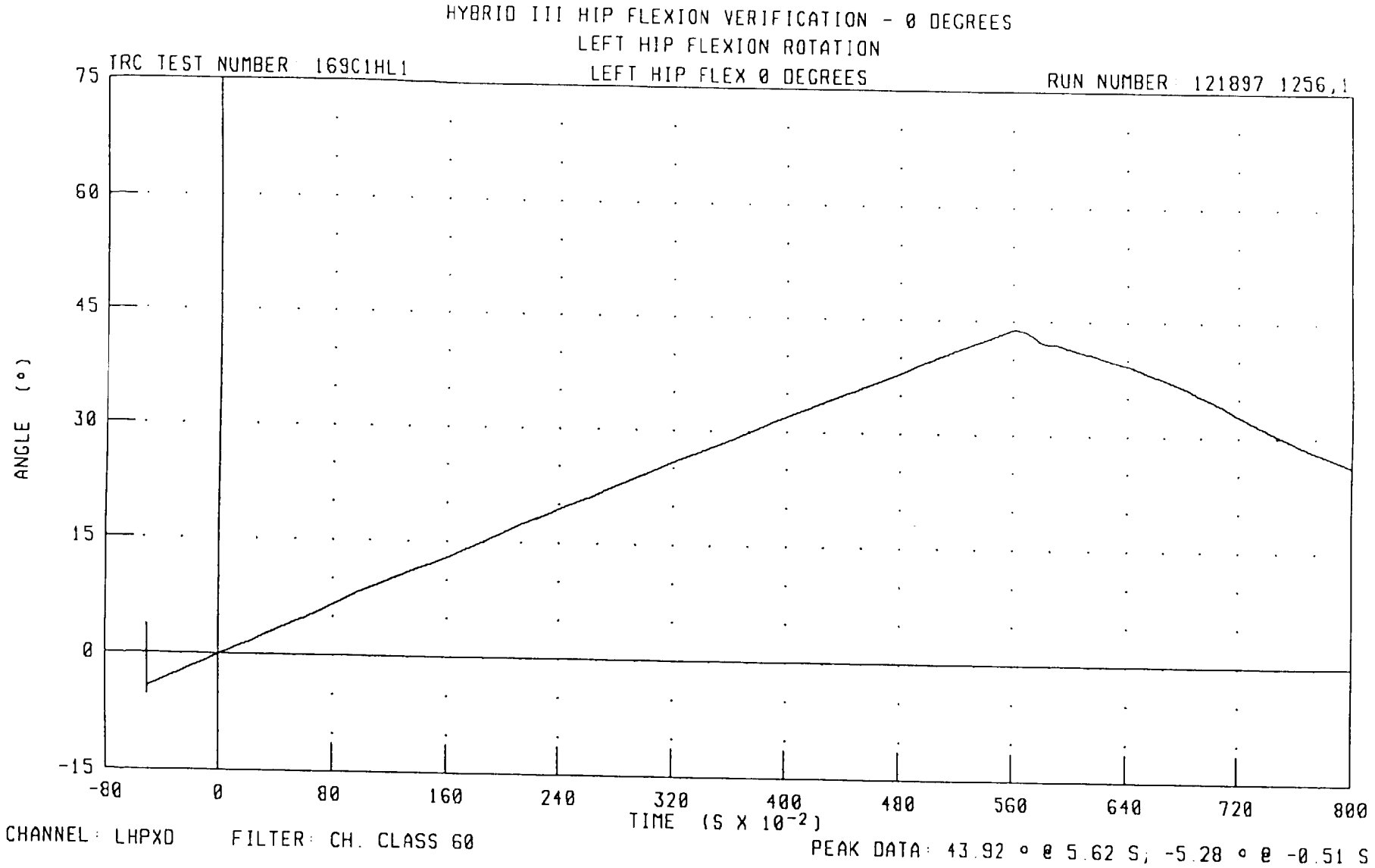
HYBRID III PART 572E 18-DEC-97

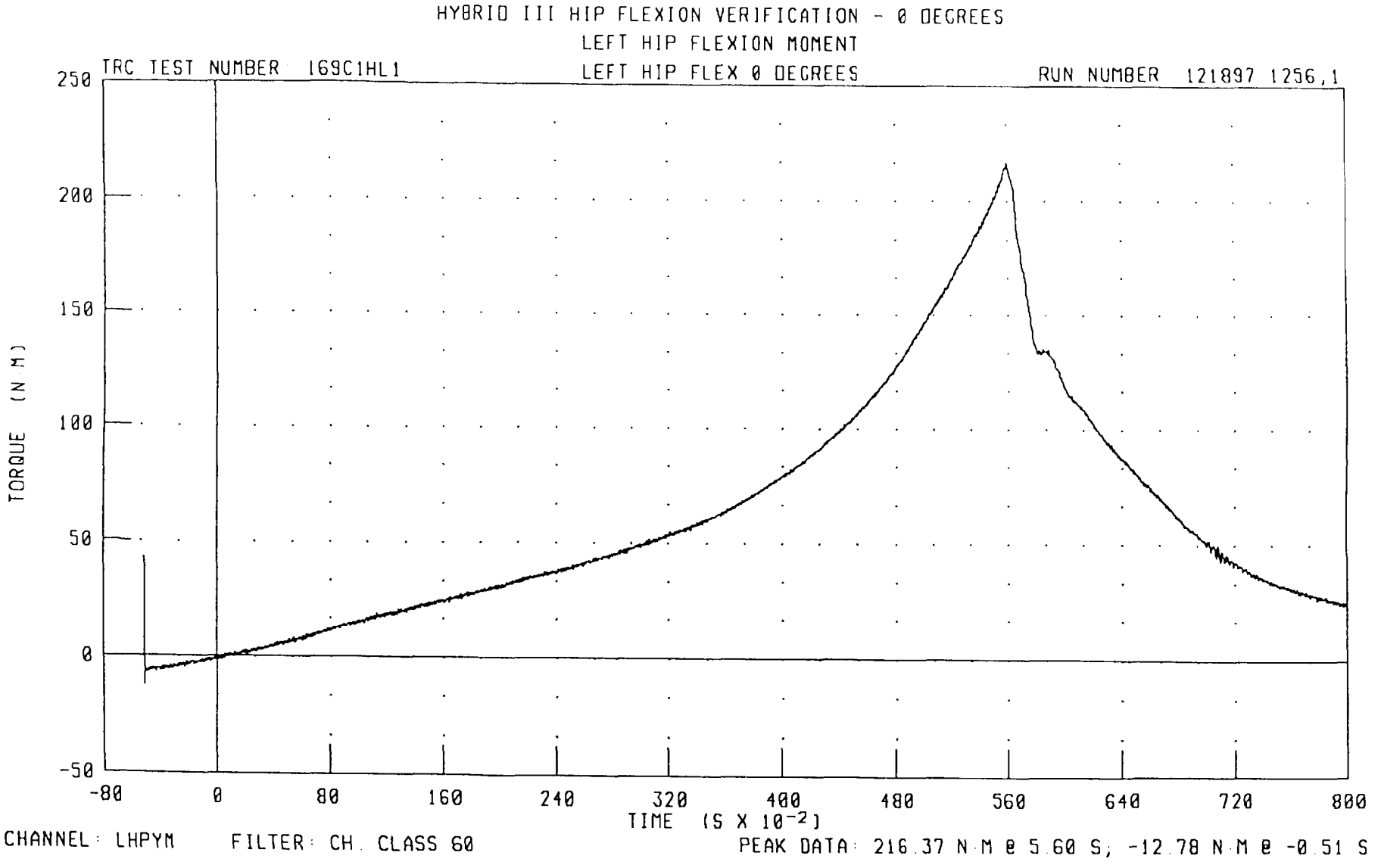
TRC INC. TEST NO: 169C1HL1 LEFT HIP FLEX 0 DEGREES

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

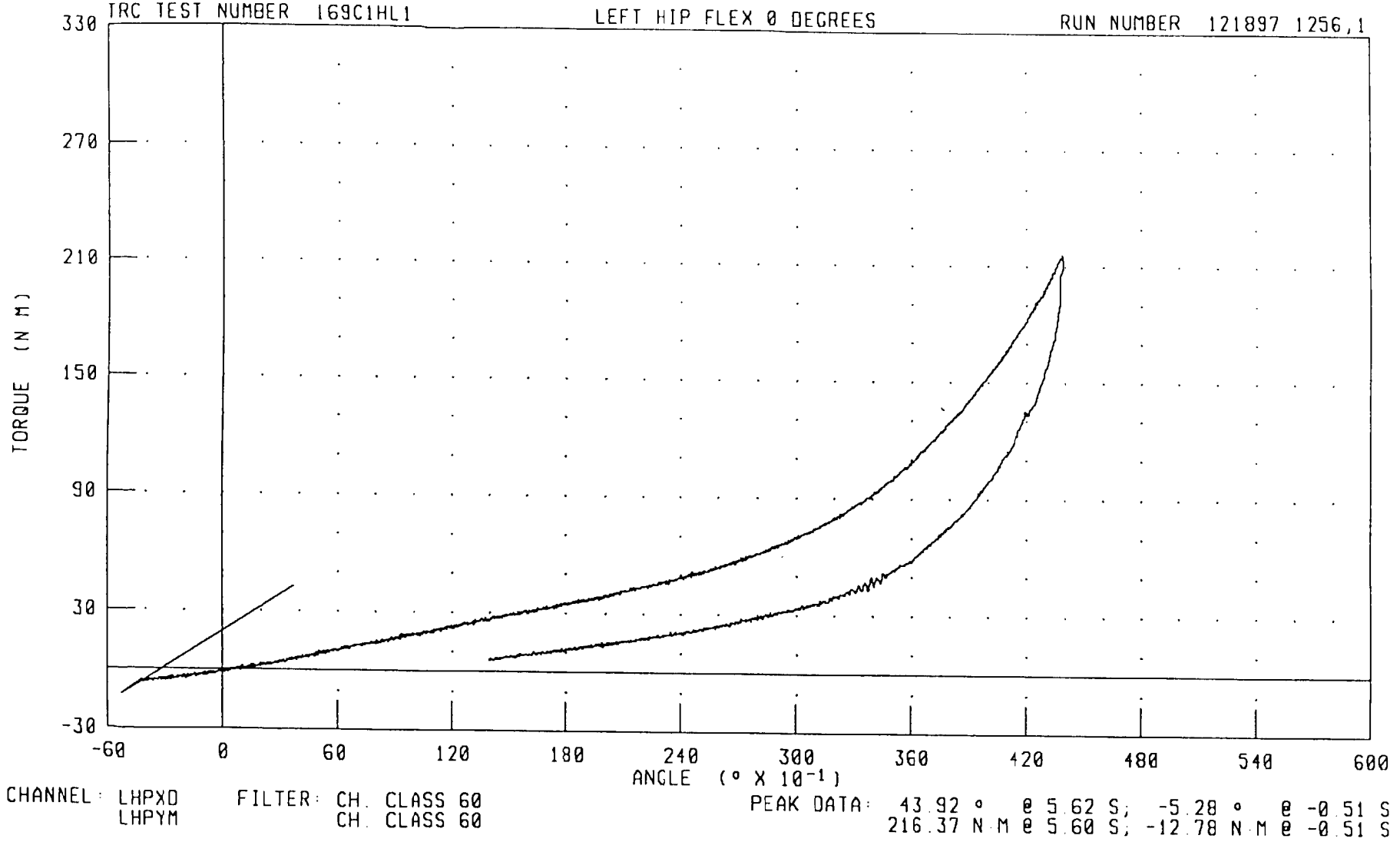
TECHNICIAN _____ RUN NUMBER: 121897.1256;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION ROTATION
LEFT HIP FLEX 0 DEGREES
IRC 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

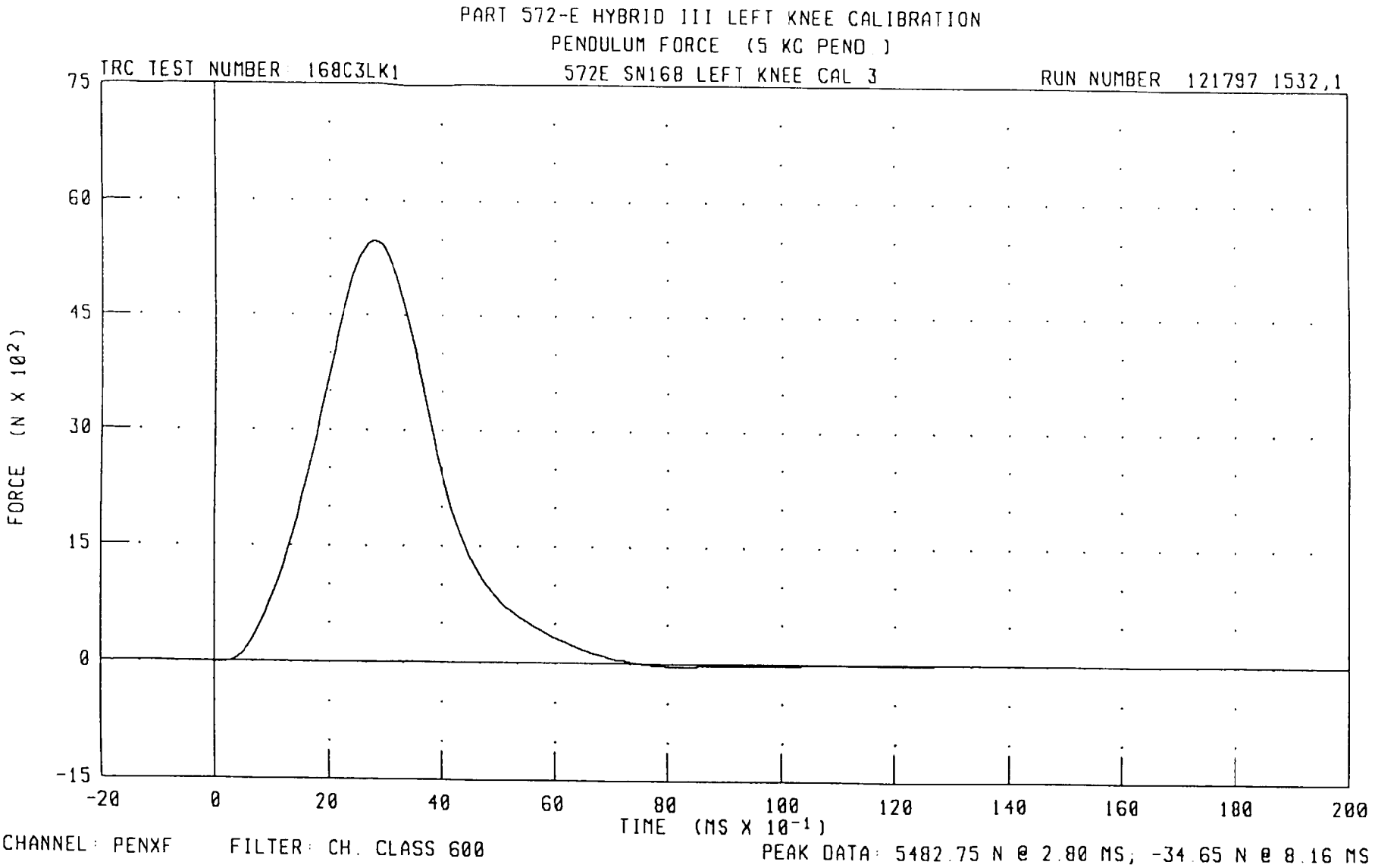
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT VS ROTATION ANGLE



CHANNEL: LHPXD 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


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
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: 5482.75 N @ 2.80 MS; -34.65 N @ 8.16 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

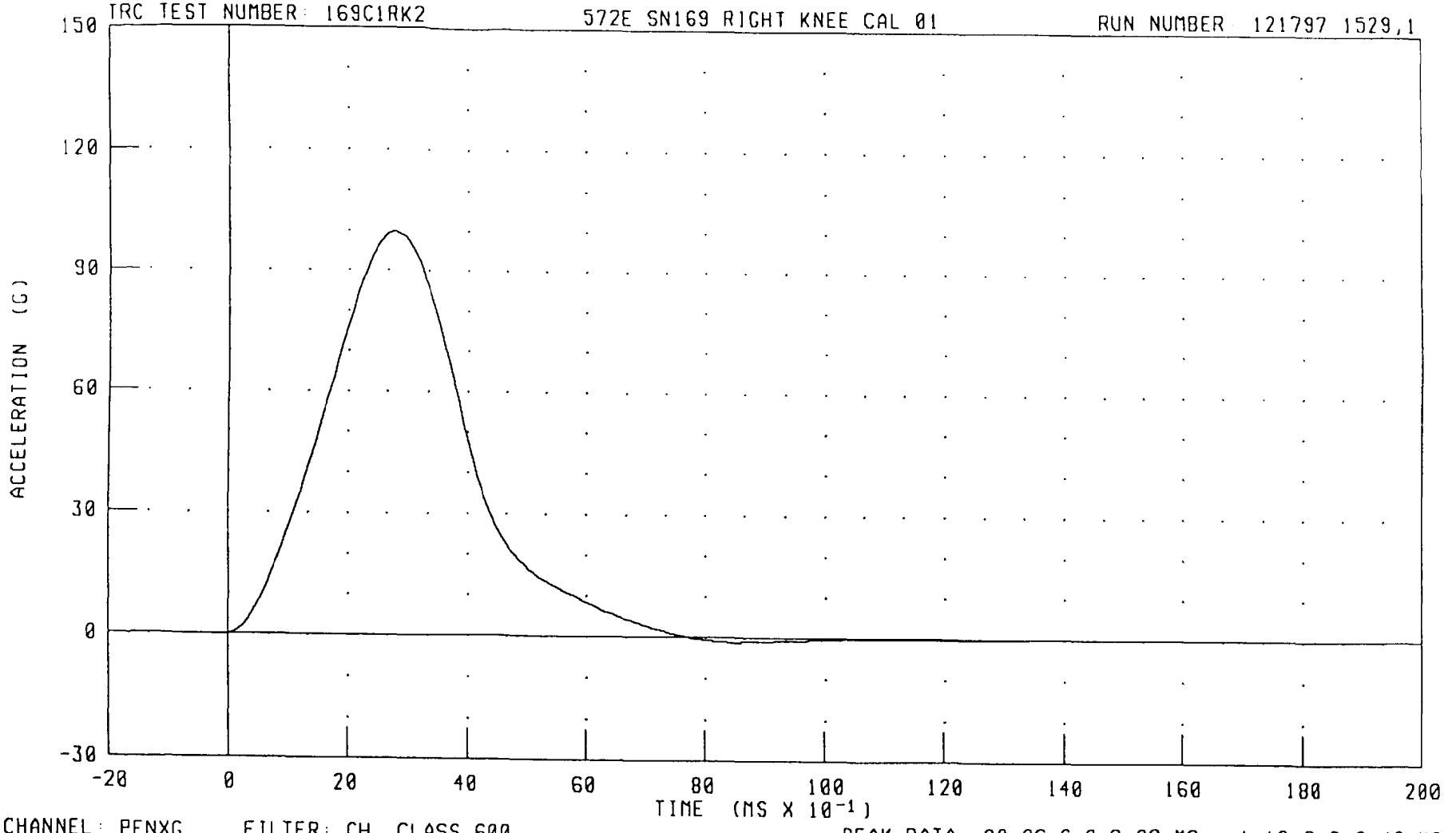
TRC INC. TEST NO: 169C1RK2 572E SN169 RIGHT KNEE CAL 01

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. Clavidge RUN NUMBER: 121797.1529;1

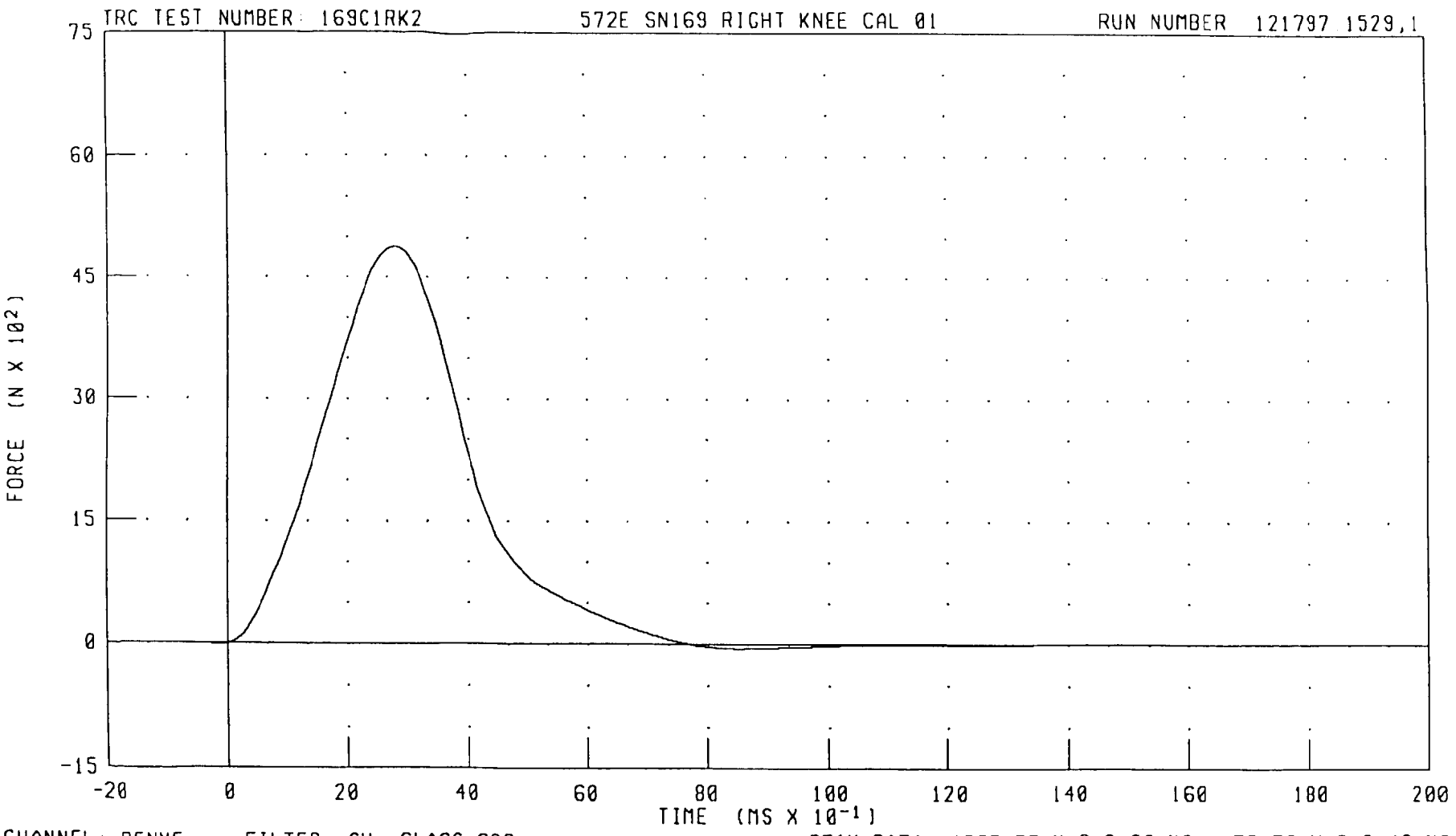
PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND)



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 99.86 G @ 2.80 MS, -1.10 G @ 8.48 MS

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



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 4885.75 N @ 2.80 MS; -53.76 N @ 8.48 MS

TRANSPORTATION RESEARCH CENTER INC.

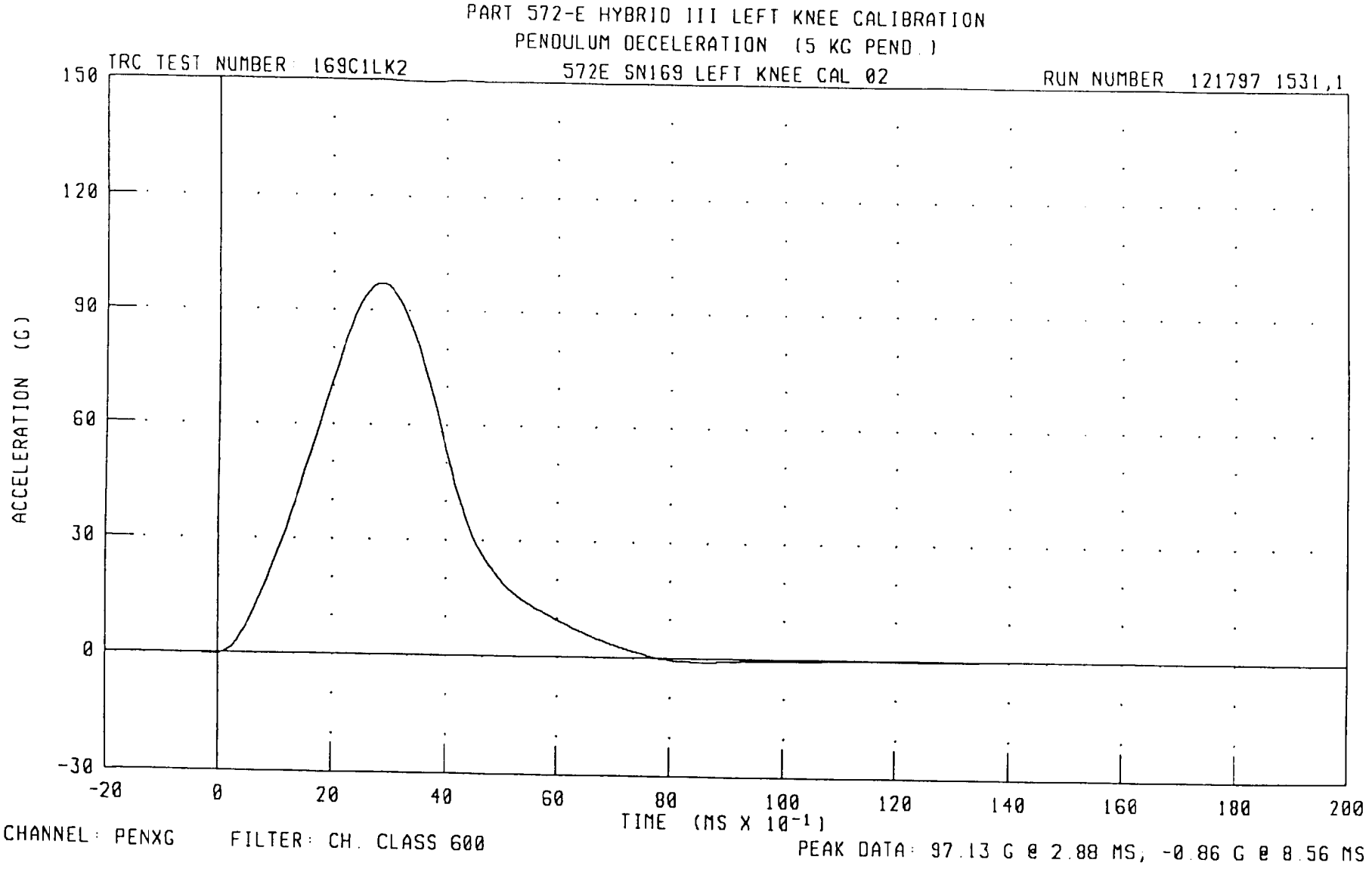
LEFT KNEE IMPACT TEST

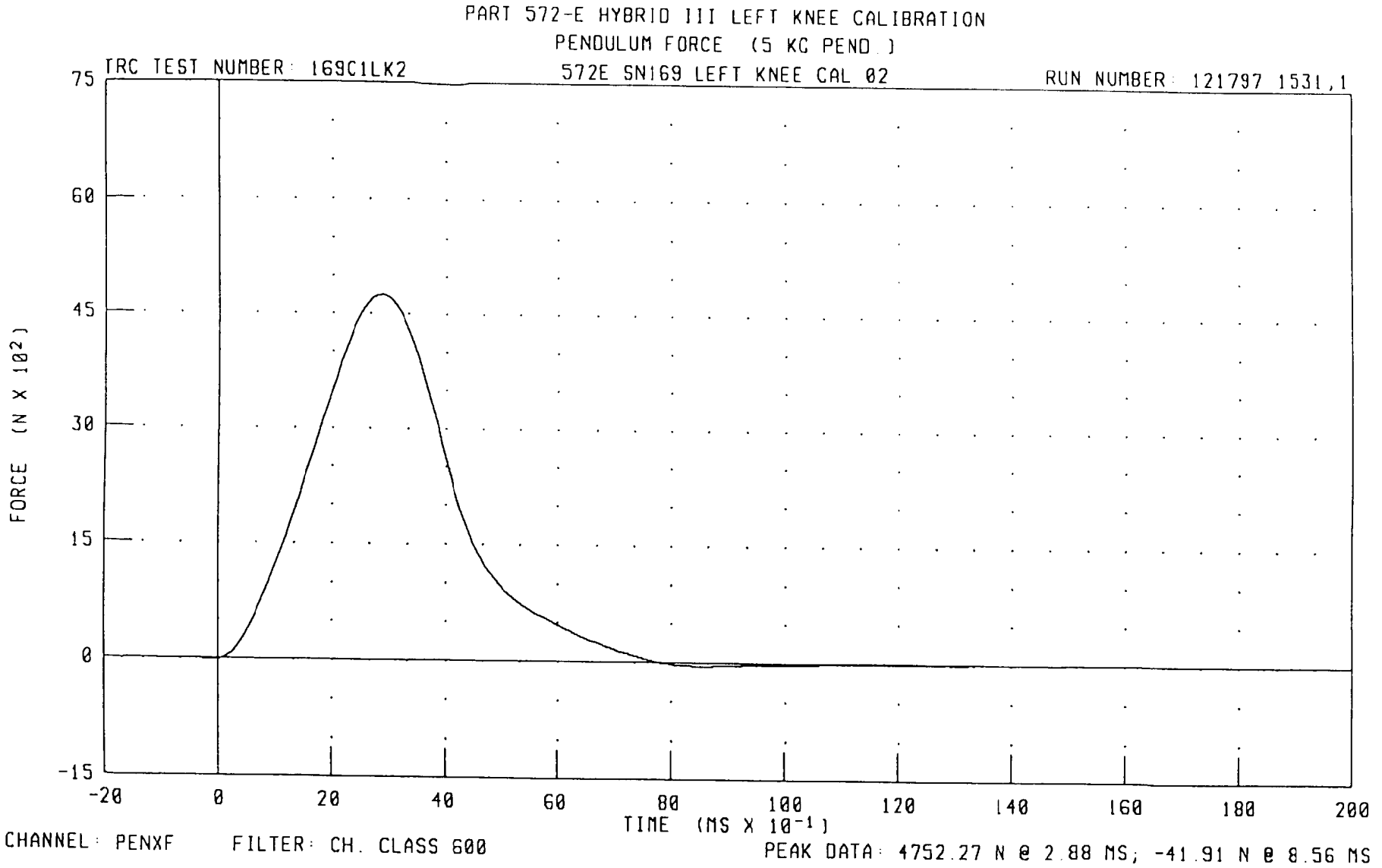
TRC INC. TEST NO: 169C1LK2 572E SN169 LEFT KNEE CAL 02

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
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 97.13 G @ 2.88 MS, -0.86 G @ 8.56 MS


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

TRANSPORTATION RESEARCH CENTER INC.
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.

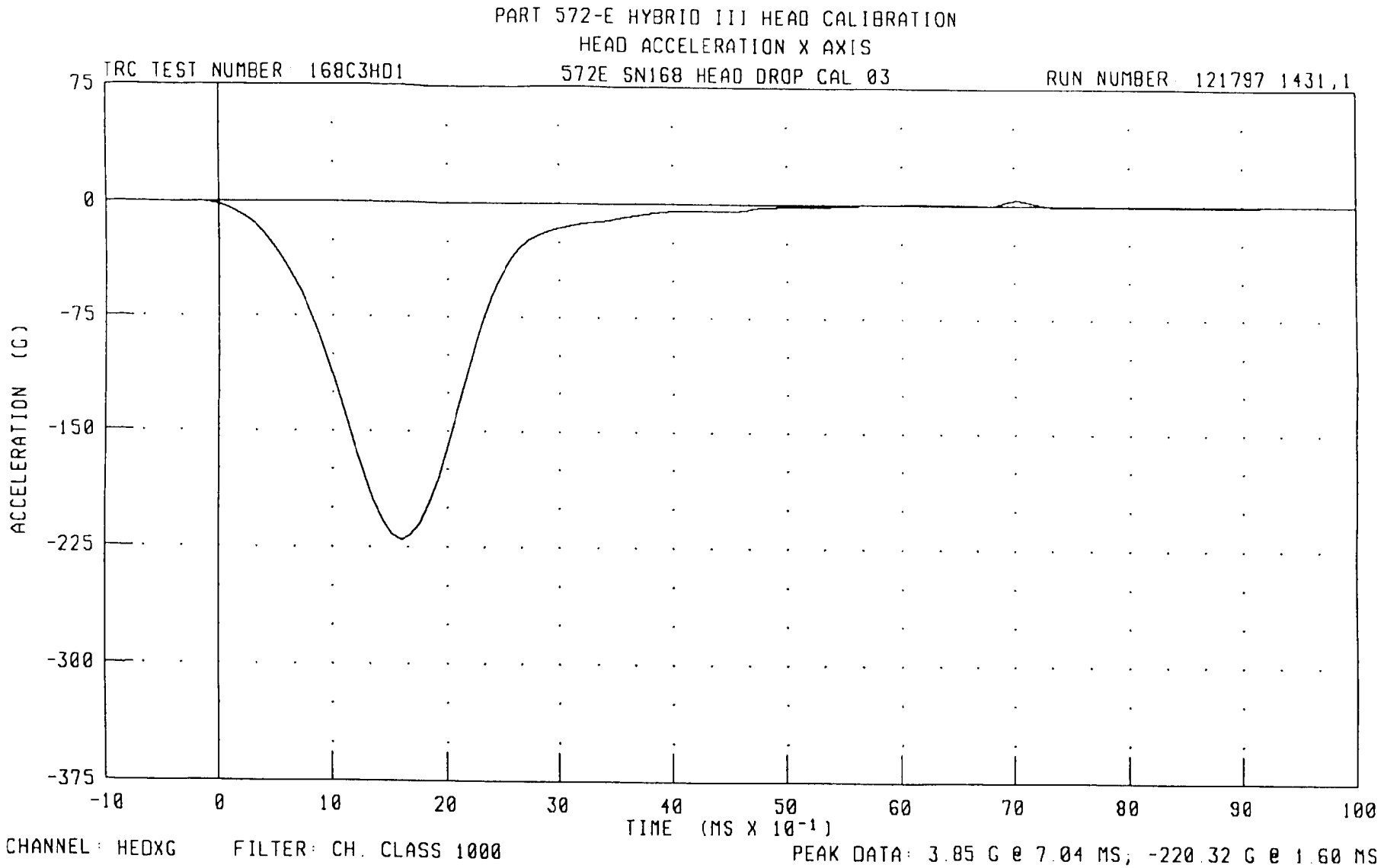
HEAD DROP TEST

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

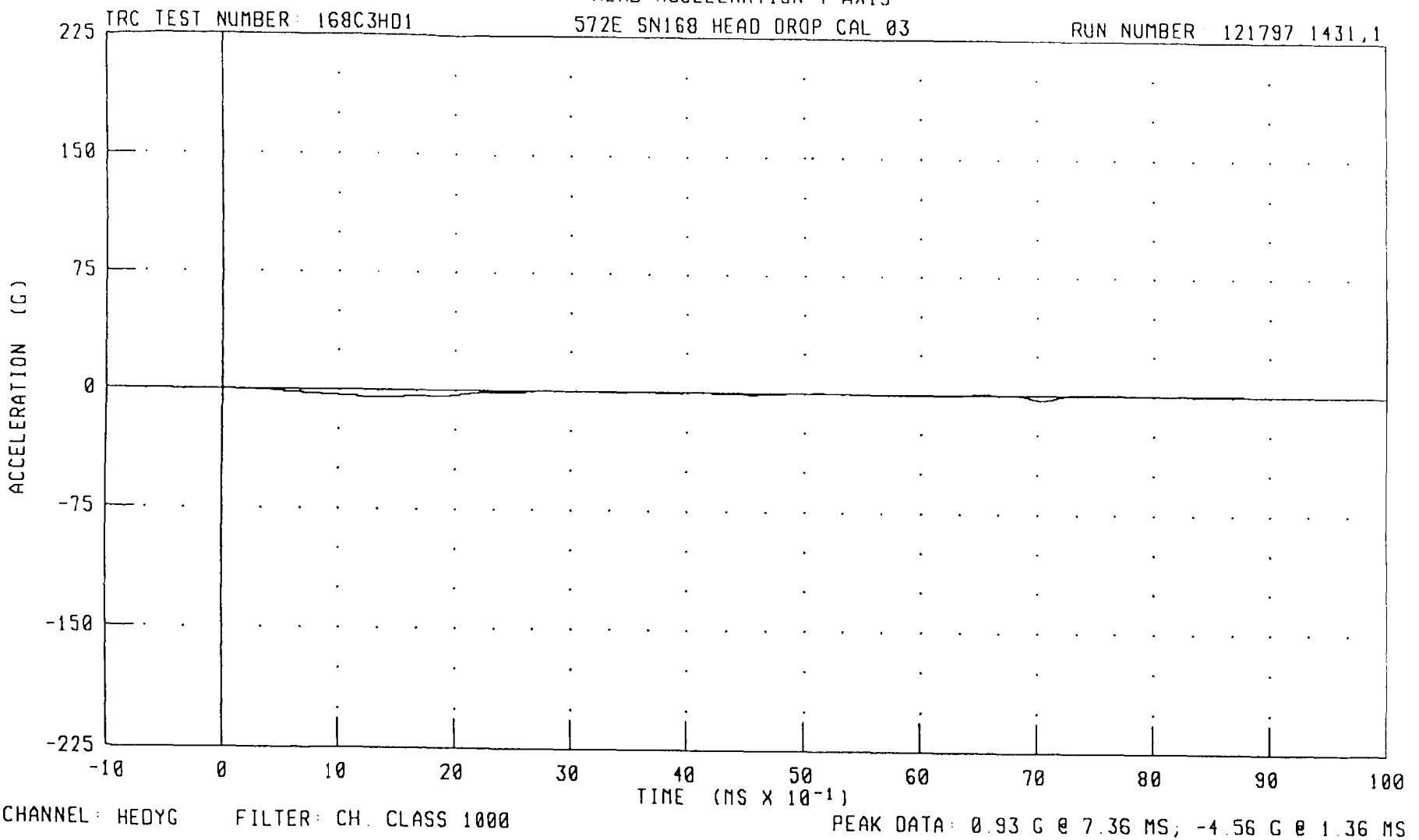
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	35.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.94 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.56 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

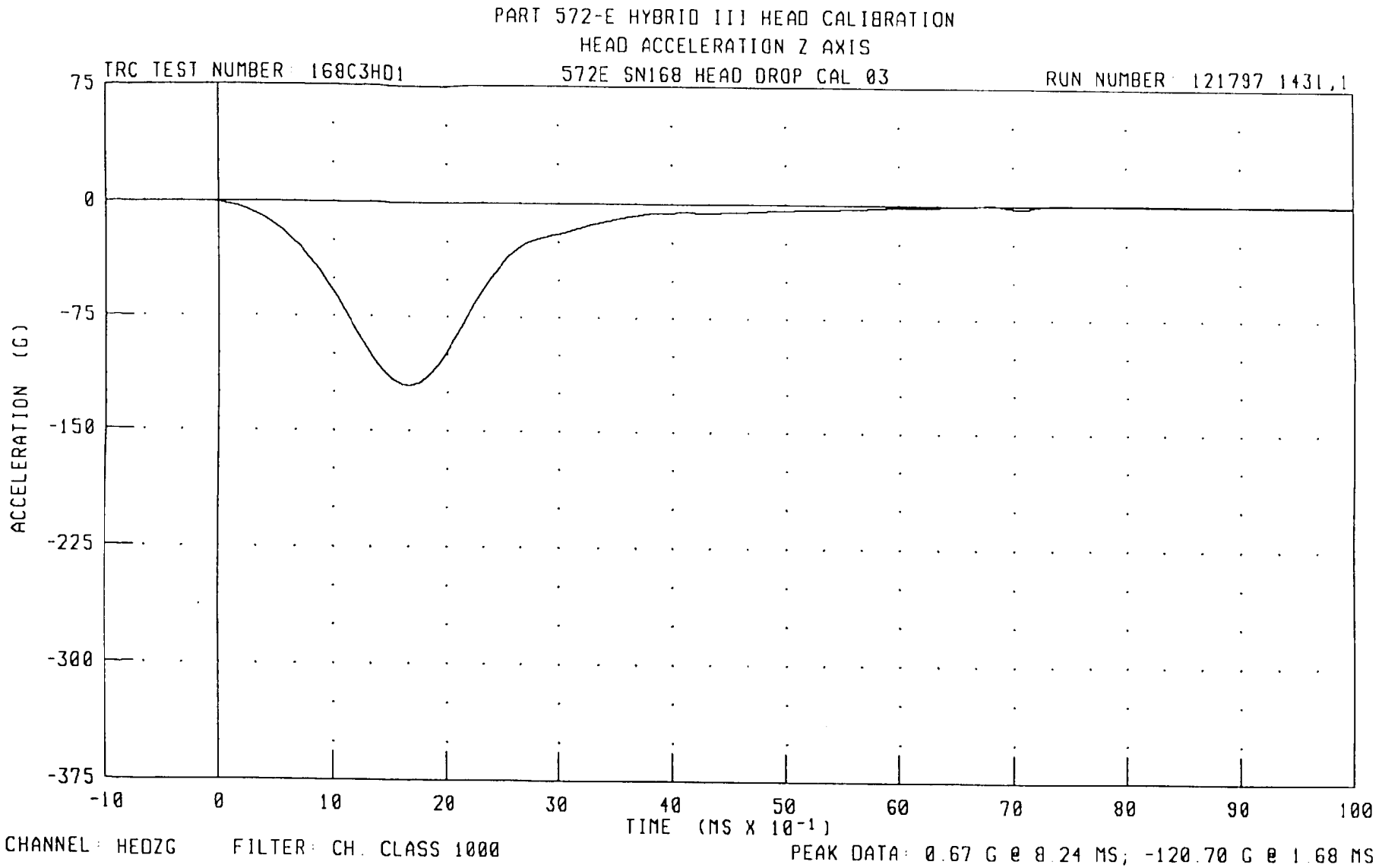
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 121797.1430;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER 168C3HD1
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: HEDXG
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

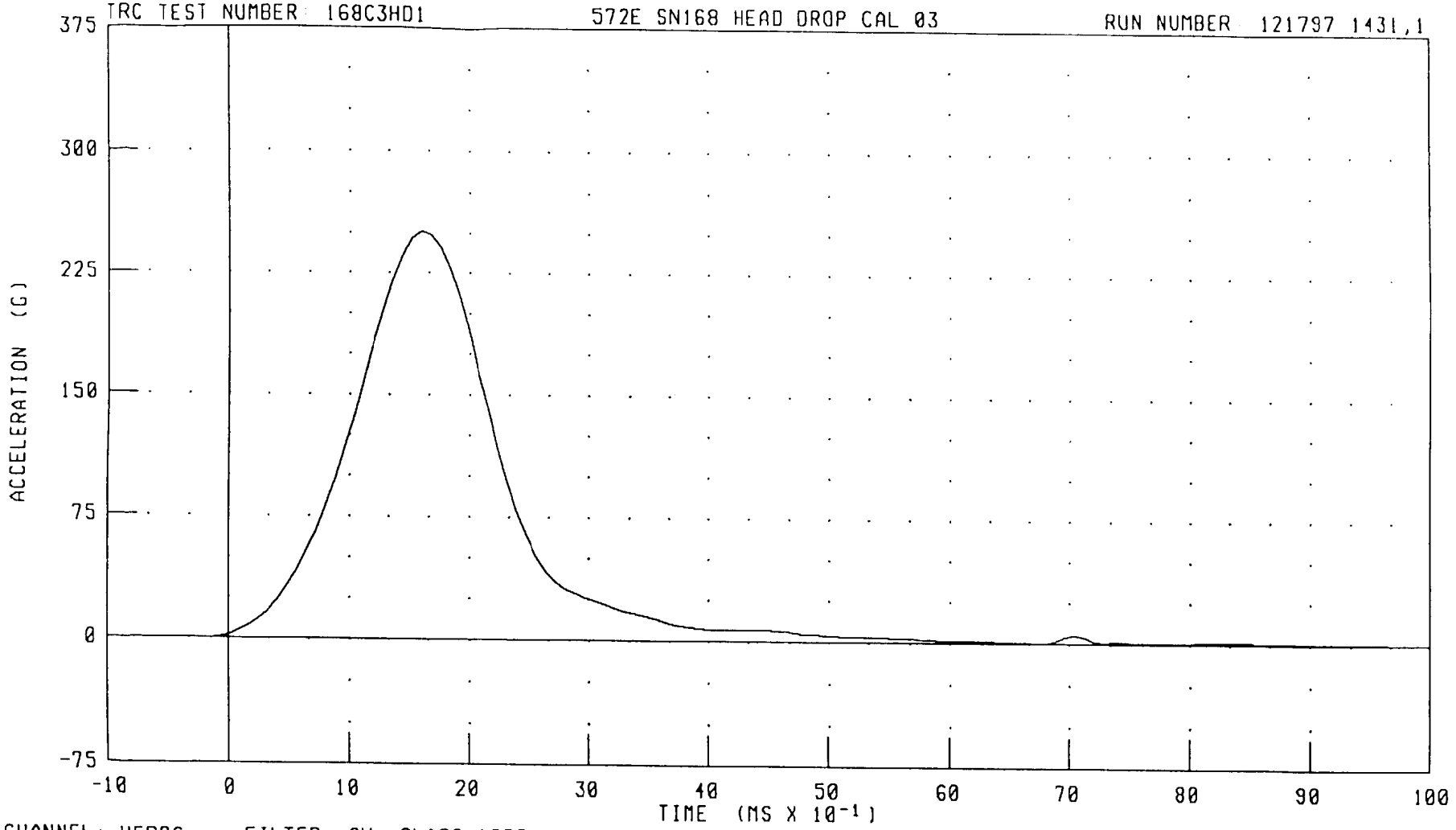



PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
TRC TEST NUMBER: 168C3HD1
572E SN168 HEAD DROP CAL 03
RUN NUMBER: 121797 1431,1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDZG
FILTER: CH. CLASS 1000
PEAK DATA: 0.67 G @ 8.24 MS; -120.70 G @ 1.68 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
572E SN168 HEAD DROP CAL 03

TRC TEST NUMBER: 168C3HD1

RUN NUMBER 121797 1431,1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 250.95 G @ 1.60 MS, 0.07 G @ -0.32 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

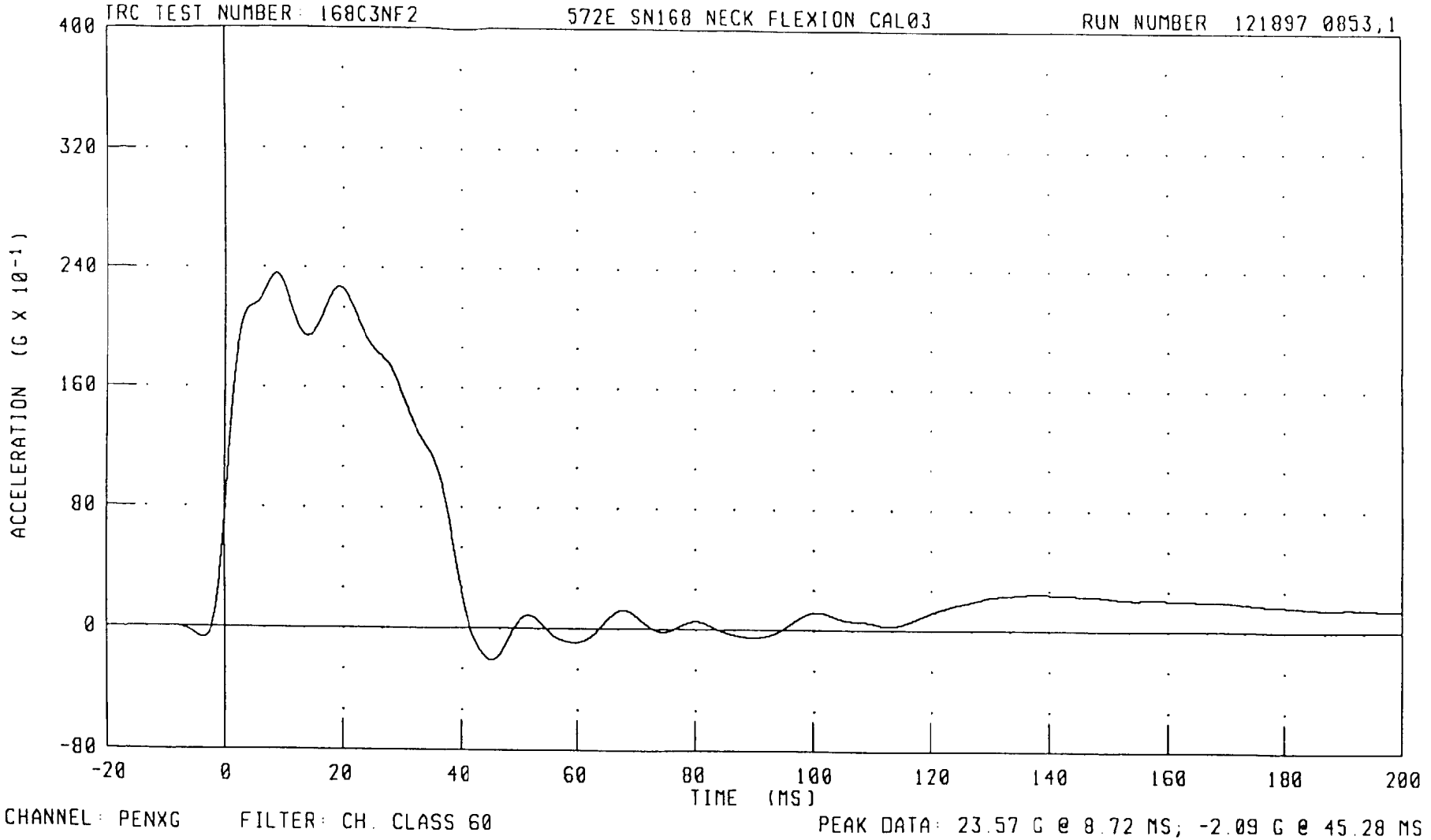
TRC INC. TEST NO: 168C3NF2 572E SN168 NECK FLEXION CAL03

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

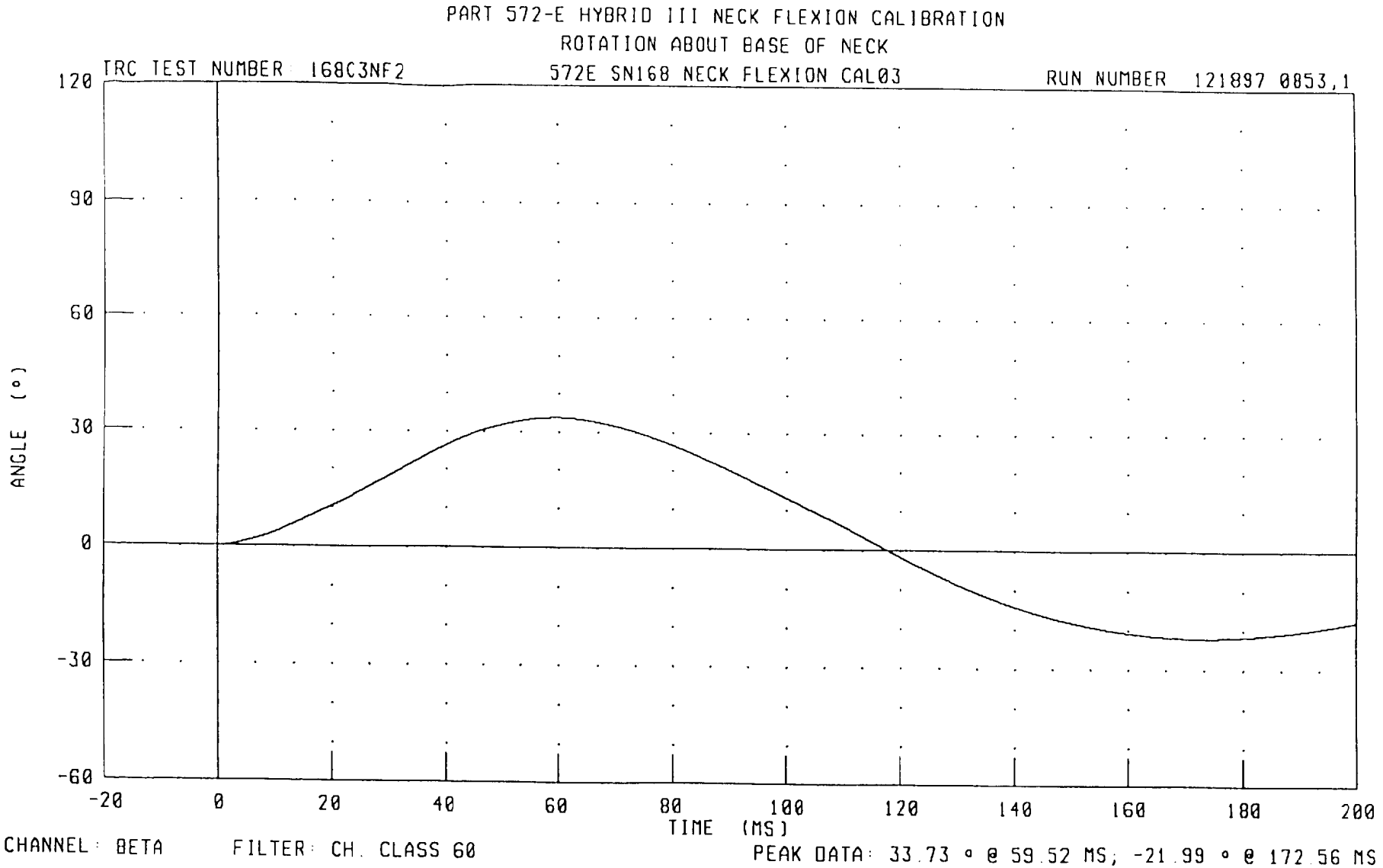
TECHNICIAN _____ RUN NUMBER: 121897.0852;1

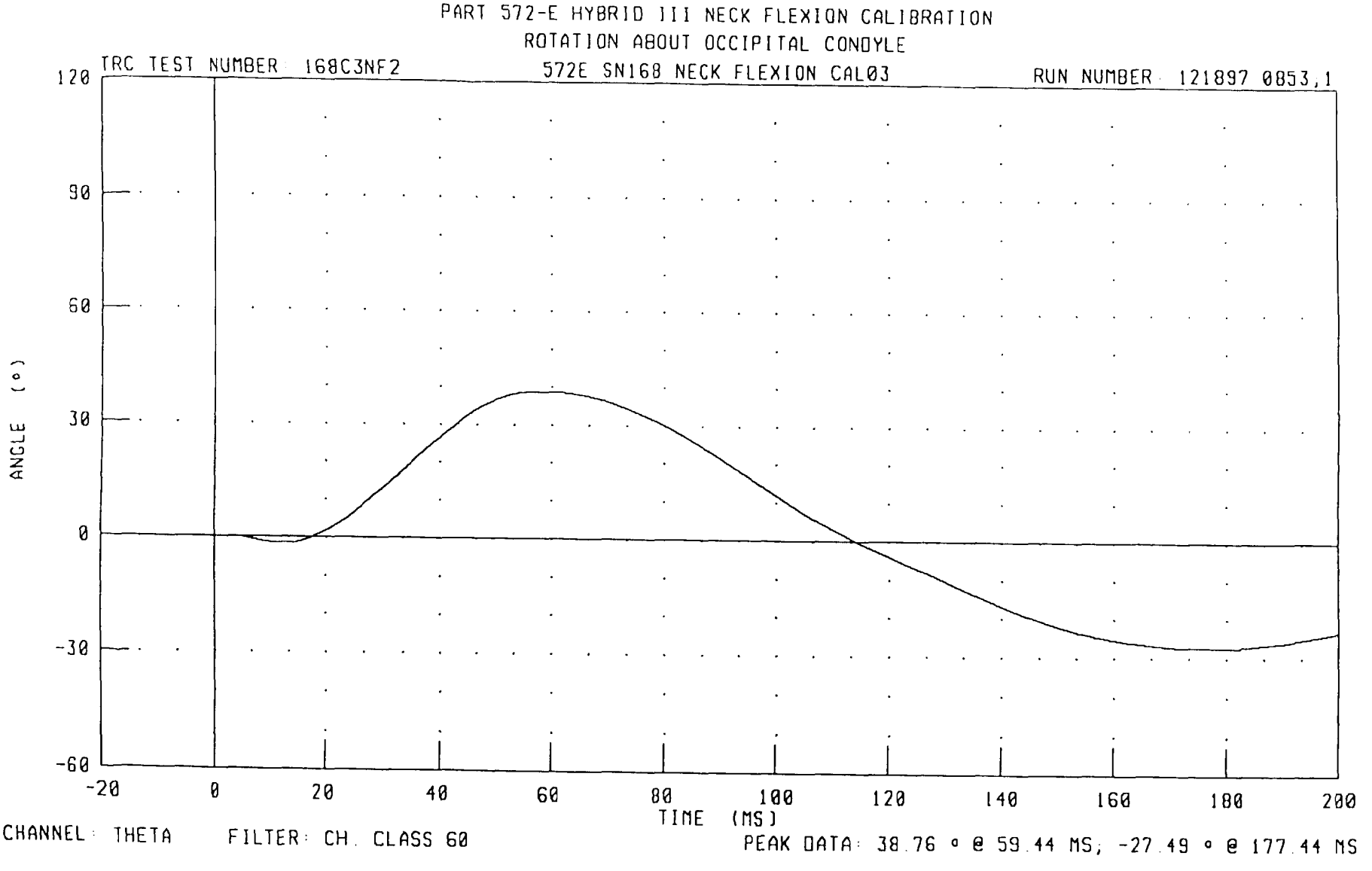
PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION



CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 23.57 G @ 8.72 MS; -2.09 G @ 45.28 MS

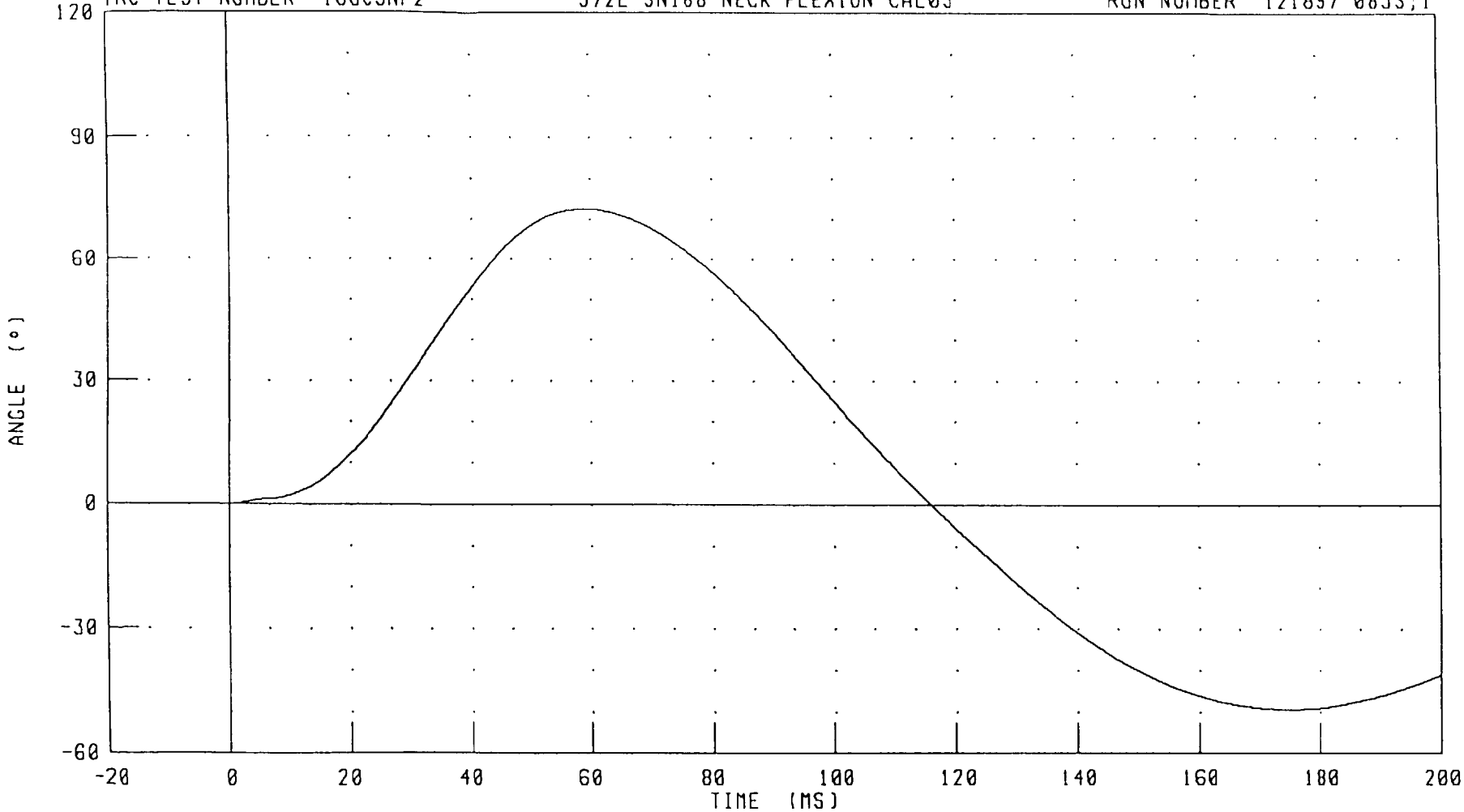

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER 168C3NF2
572E SN168 NECK FLEXION CAL03
RUN NUMBER 121897 0853,1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 33.73 ° @ 59.52 MS; -21.99 ° @ 172.56 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 168C3NF2
572E SN168 NECK FLEXION CAL03
RUN NUMBER: 121897 0853,1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 38.76 ° @ 59.44 MS; -27.49 ° @ 177.44 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

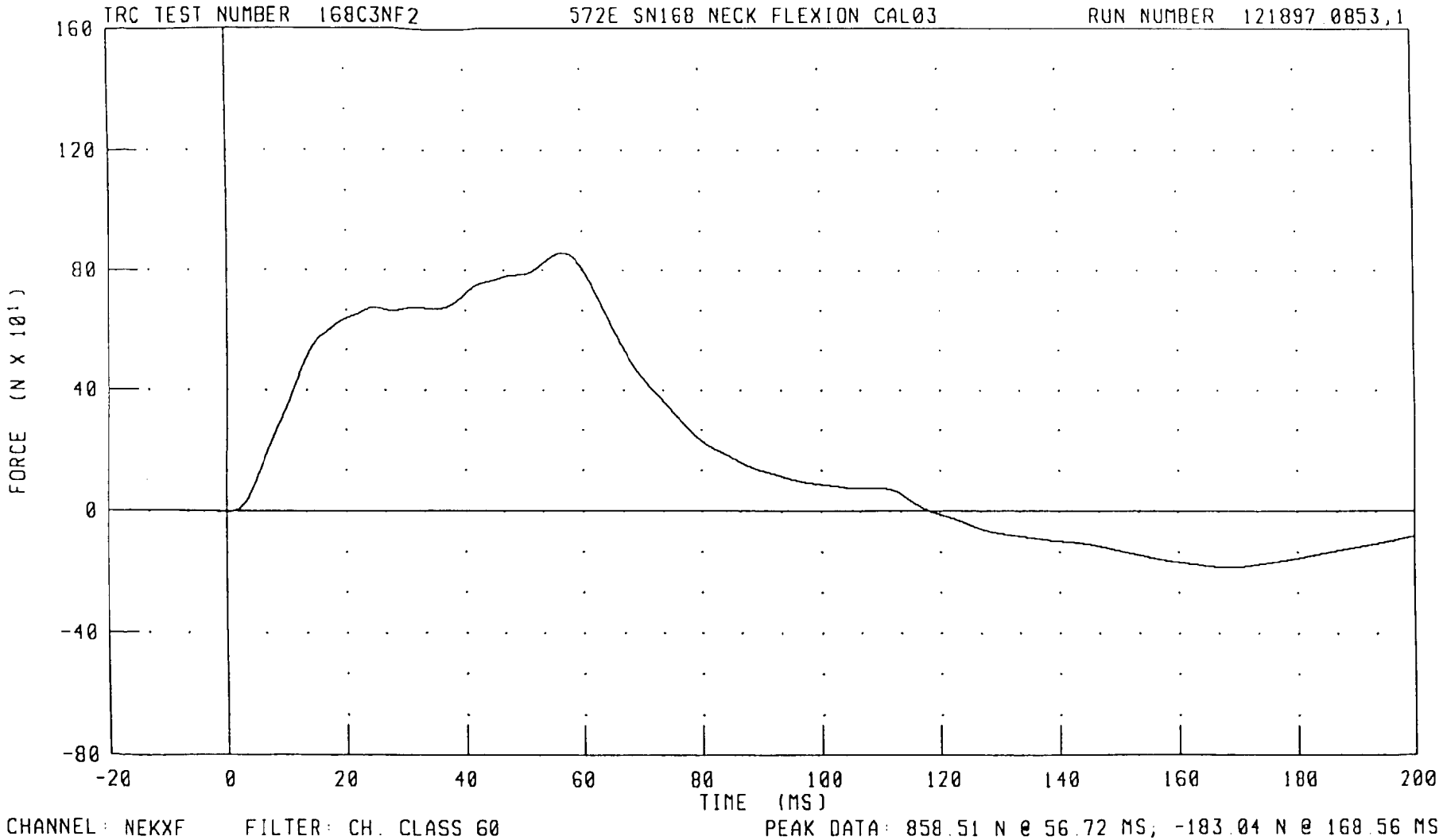
TOTAL ROTATION

TRC TEST NUMBER: 168C3NF2 572E SN168 NECK FLEXION CAL03 RUN NUMBER 121897 0853,1



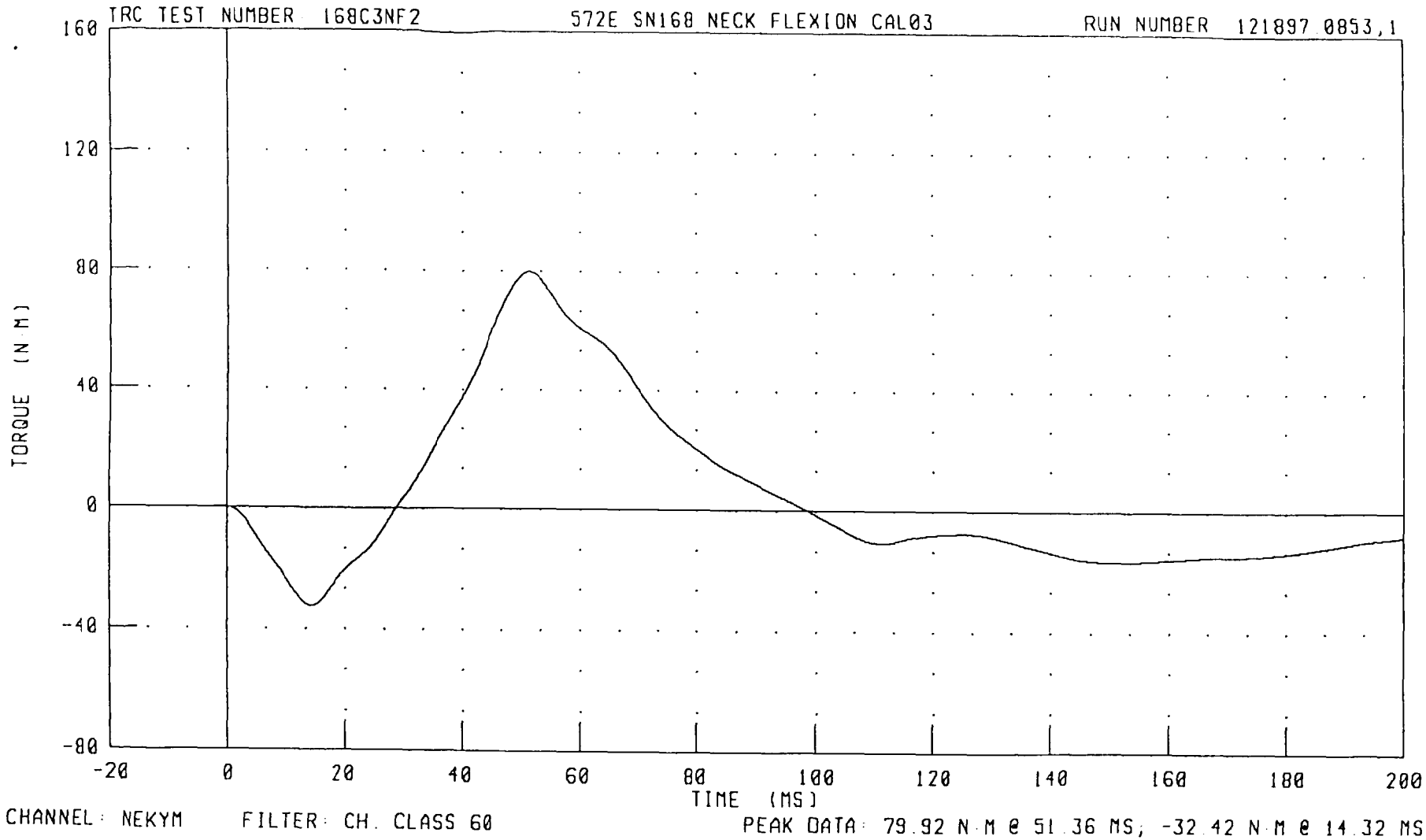
CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 72.49 ° @ 59.44 MS; -49.43 ° @ 174.56 MS

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



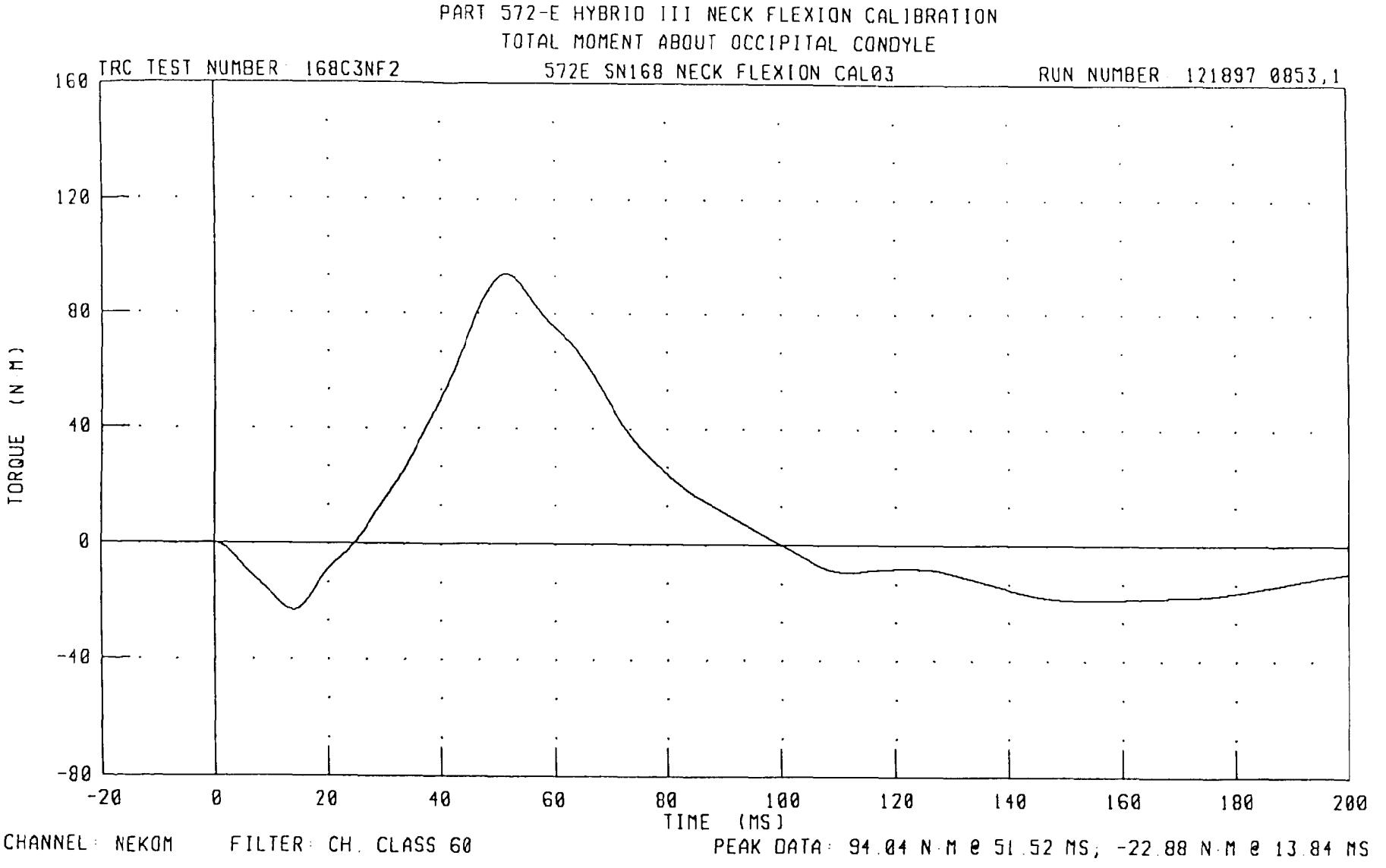
CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 858.51 N @ 56.72 MS; -183.04 N @ 168.56 MS

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



CHANNEL: NEKYM FILTER: CH. CLASS 60

PEAK DATA: 79.92 N-M @ 51.36 MS; -32.42 N-M @ 14.32 MS


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
TORQUE (N M)
160
120
80
40
0
-40
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 94.04 N-M @ 51.52 MS; -22.88 N-M @ 13.84 MS

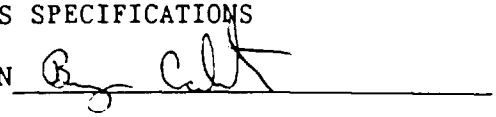
TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

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

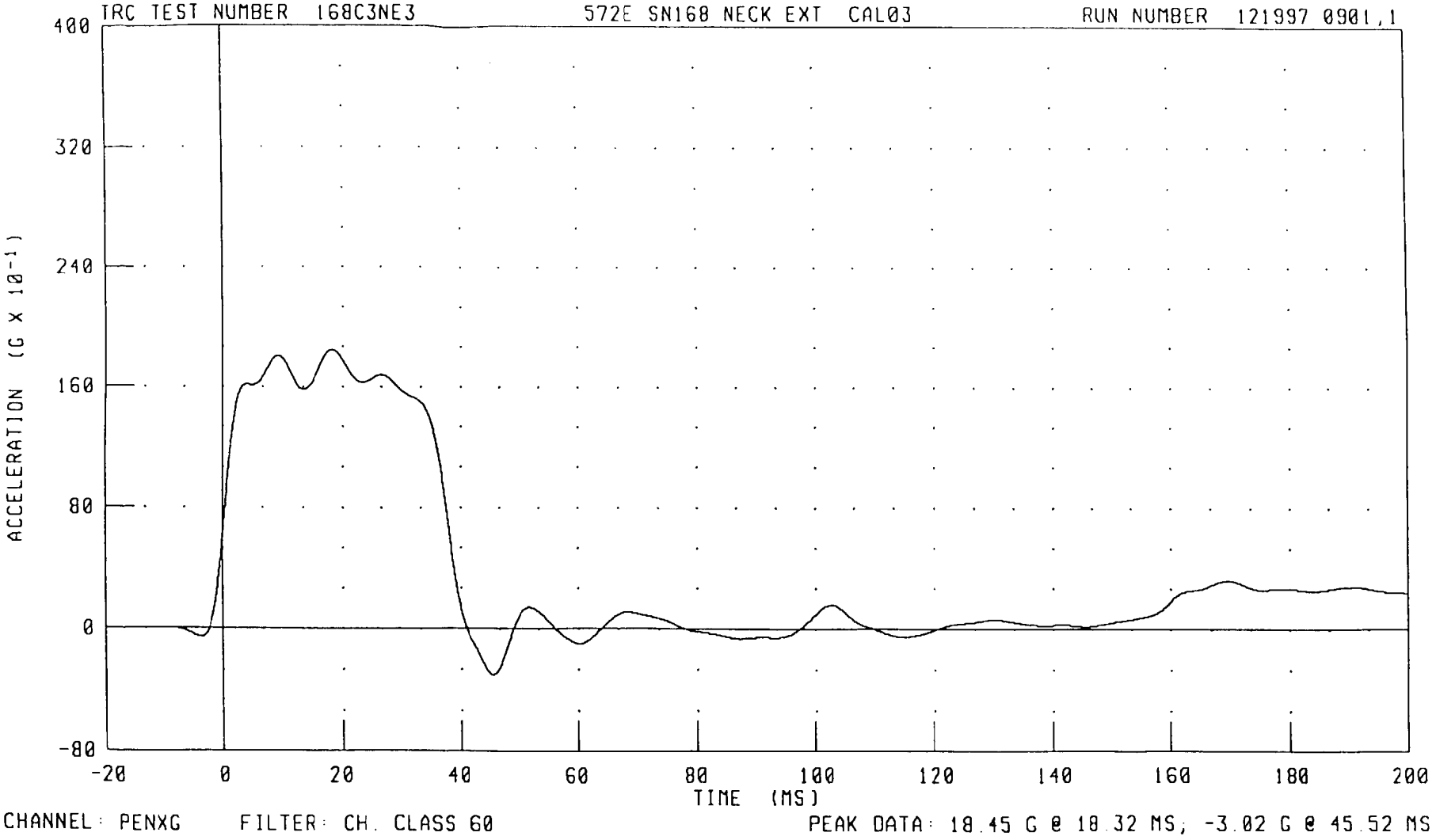
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	35.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	5.95 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.87 G
	20 MS	14.00 - 19.00 G	17.78 G
	30 MS	11.00 - 16.00 G	15.77 G
MAX PENDULUM G		22 G MAX	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 

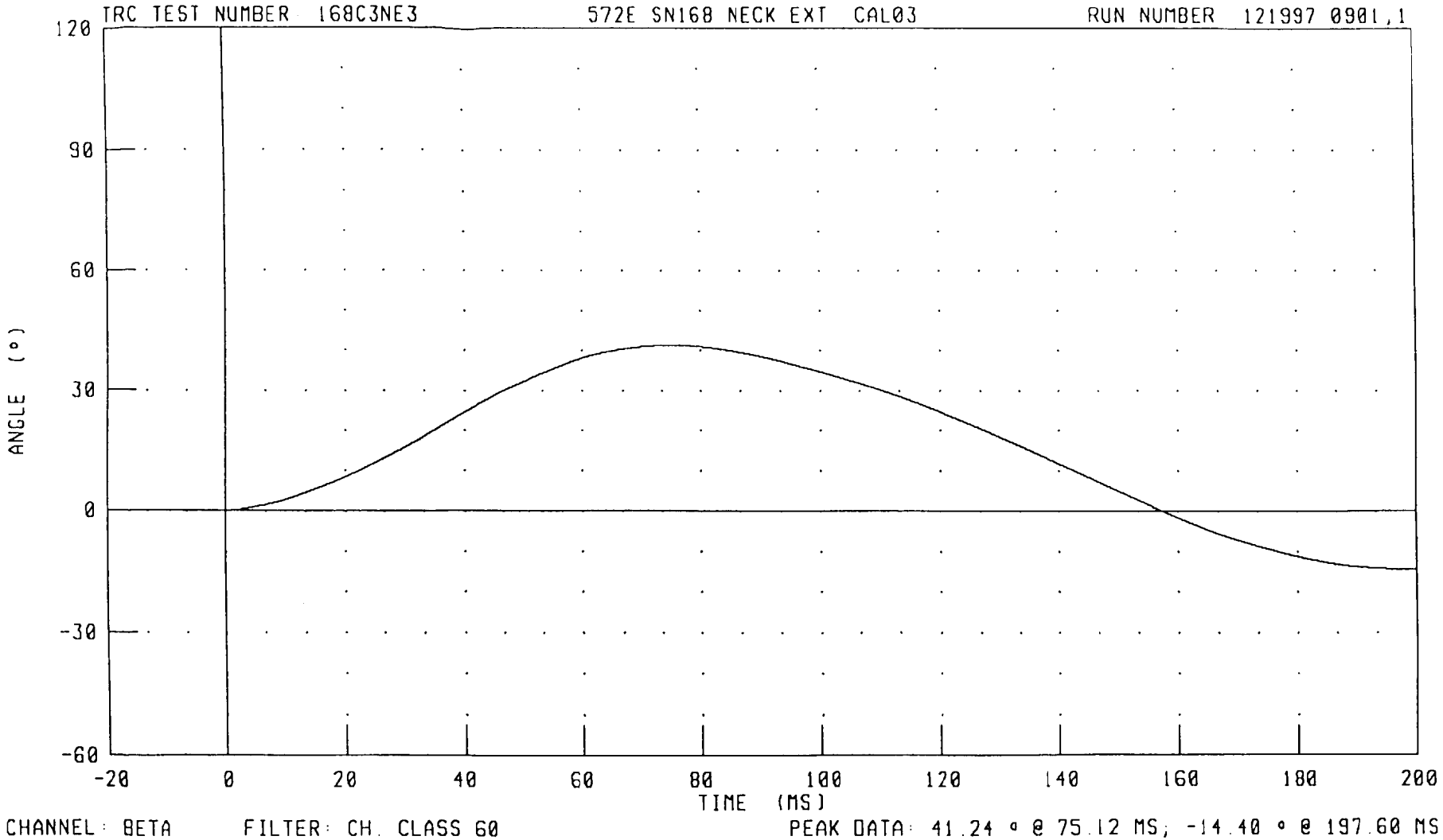
RUN NUMBER: 121997.0900;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

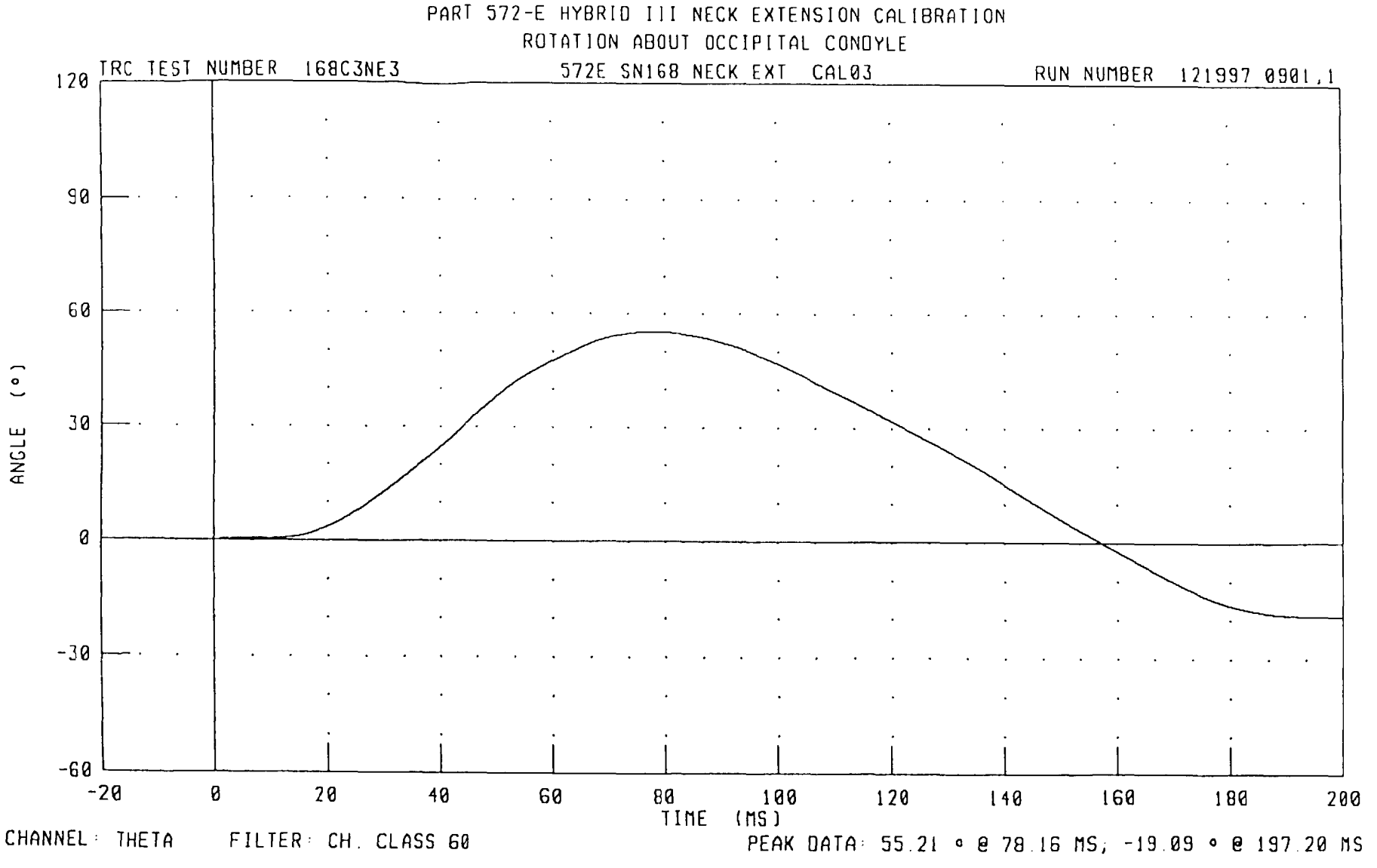


CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 18.45 G @ 18.32 MS; -3.02 G @ 45.52 MS

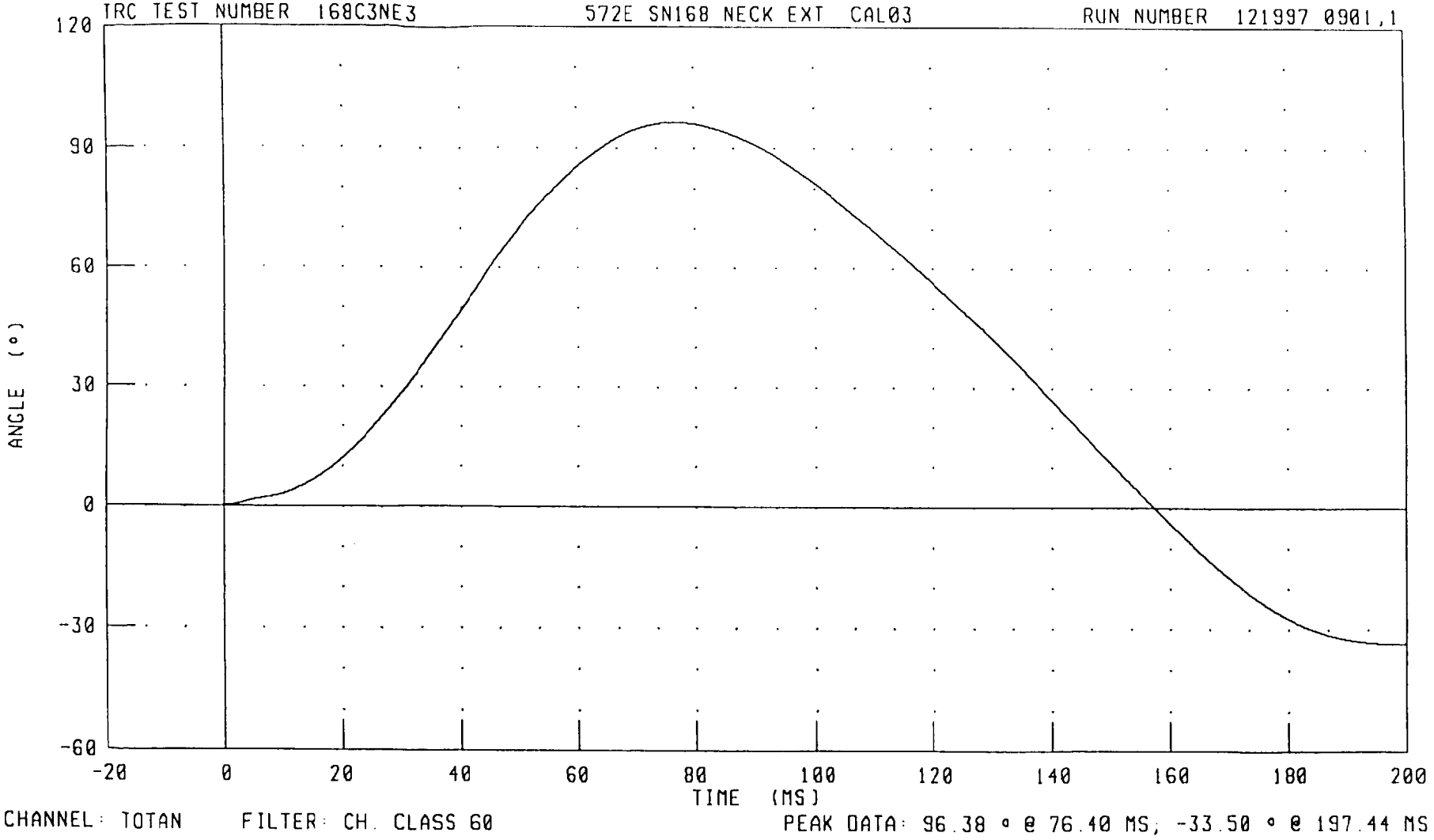
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 41.24 ° @ 75.12 MS; -14.40 ° @ 197.60 MS

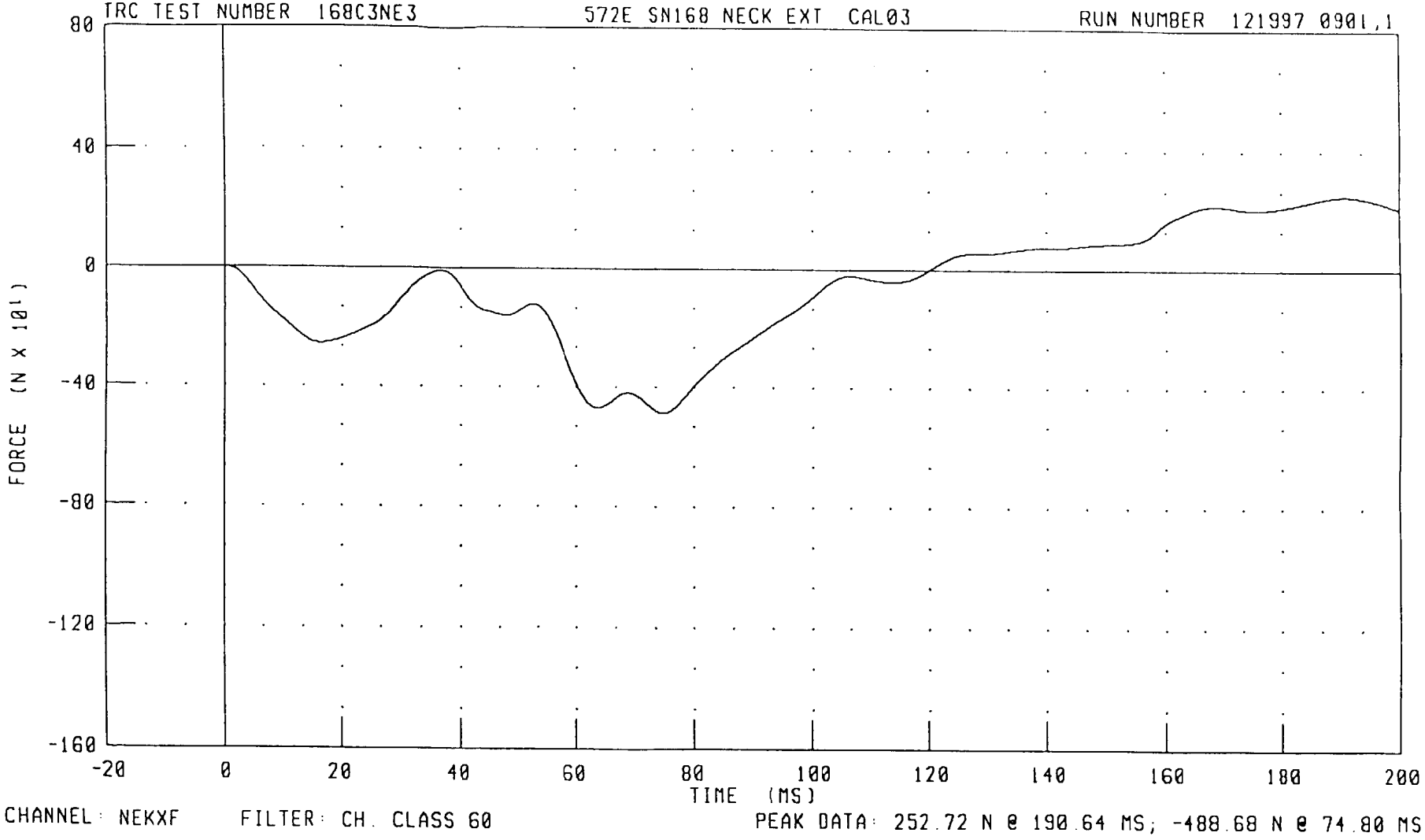

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER 168C3NE3
572E SN168 NECK EXT CAL03
RUN NUMBER 121997 0901.1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 55.21 ° @ 78.16 MS; -19.09 ° @ 197.20 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION



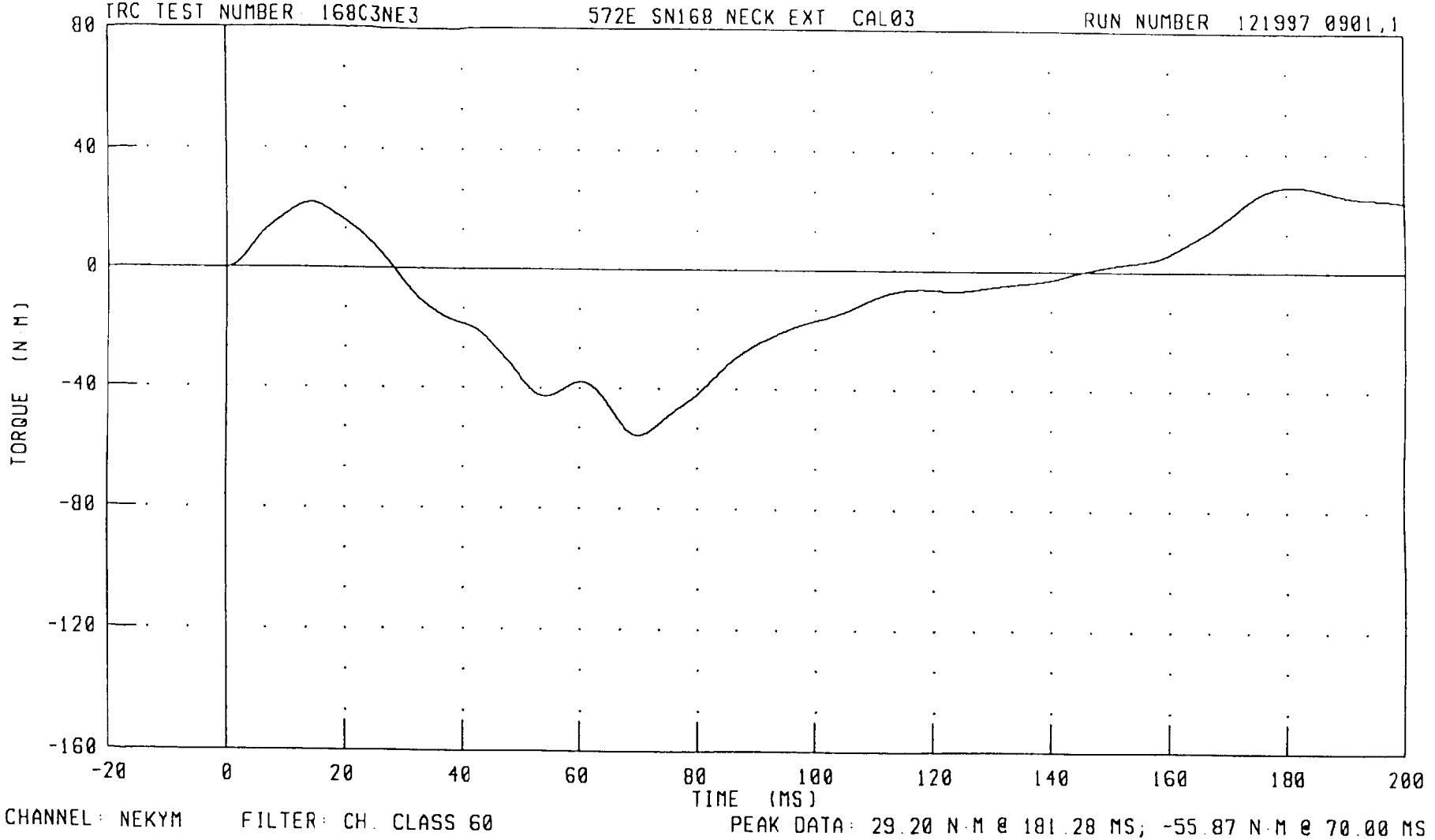
CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 96.38 ° @ 76.40 MS; -33.50 ° @ 197.44 MS

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

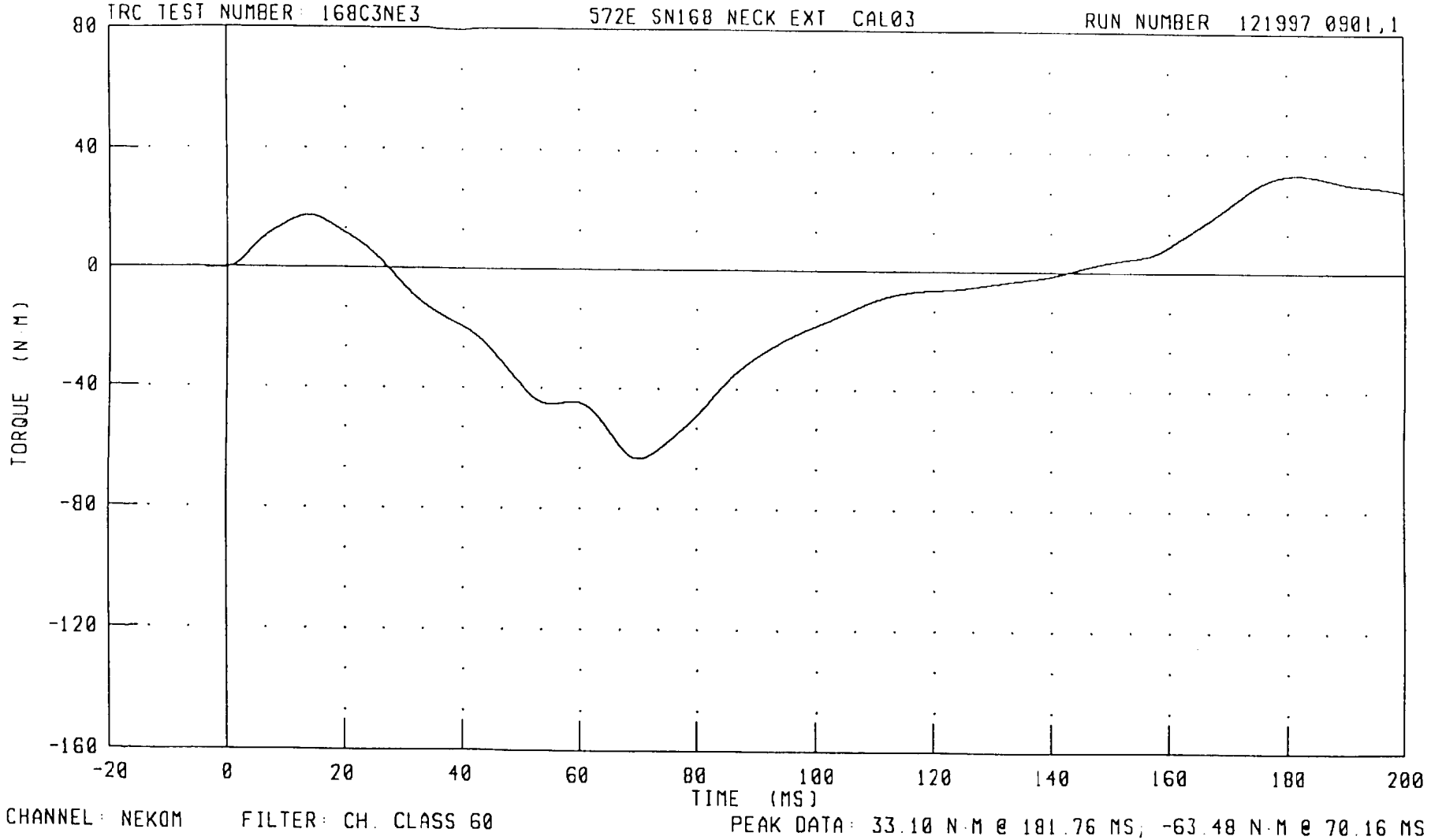


CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 252.72 N @ 190.64 MS; -488.68 N @ 74.80 MS

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



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



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 33.10 N-M @ 181.76 MS; -63.48 N-M @ 70.16 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

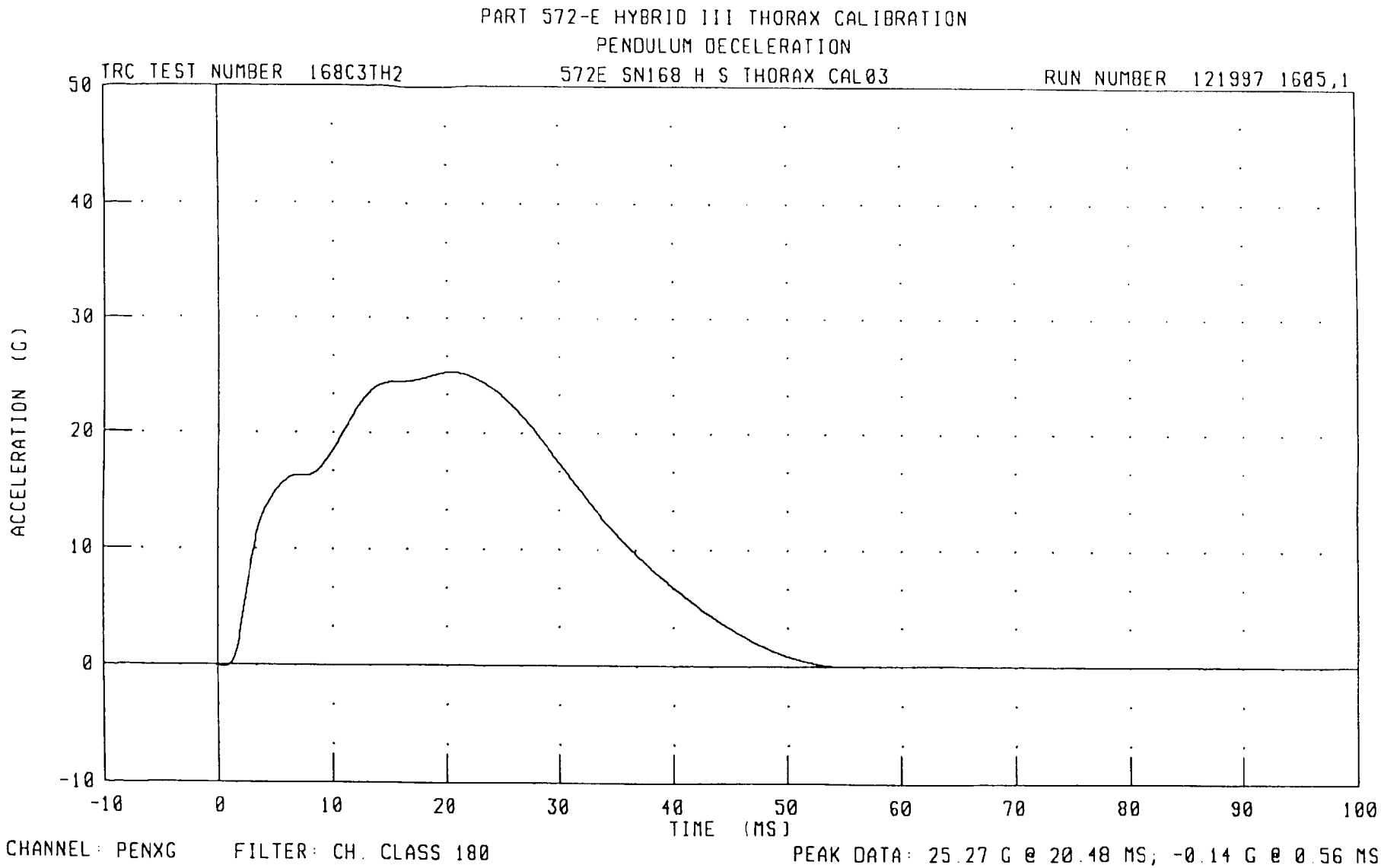
TRC INC. TEST NO: 168C3TH2 572E SN168 H.S.THORAX CAL03

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 - 72.6 MM	64.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5788. N
INTERNAL HYSTERESIS	69% - 85%	72.3%

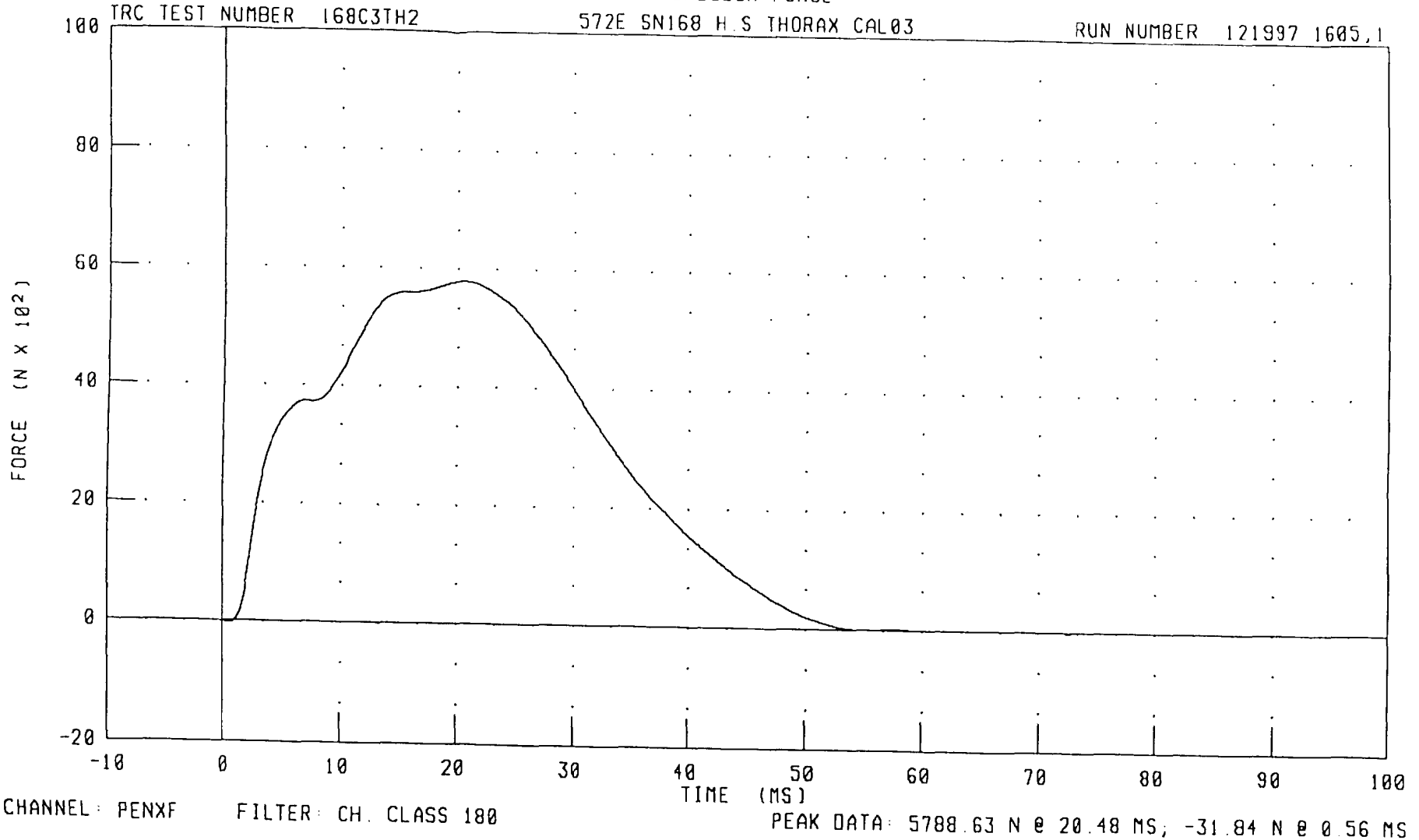
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudge

RUN NUMBER: 121997.1604;1


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER 168C3TH2
572E SN168 H S THORAX CAL03
RUN NUMBER 121997 1605,1
ACCELERATION (G)
50
40
30
20
10
0
-10
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 25.27 G @ 20.48 MS; -0.14 G @ 0.56 MS

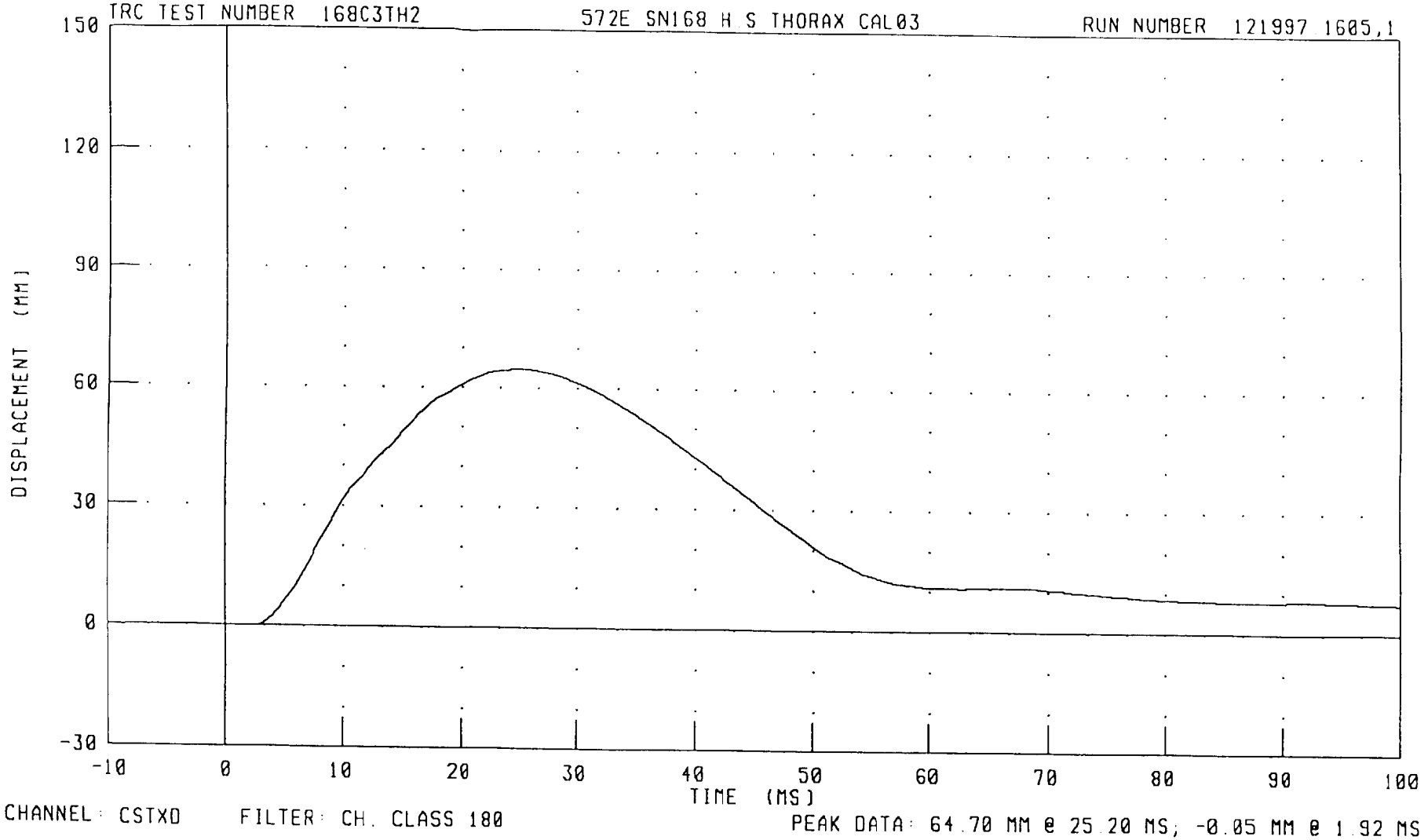
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5788.63 N @ 20.48 MS; -31.84 N @ 0.56 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

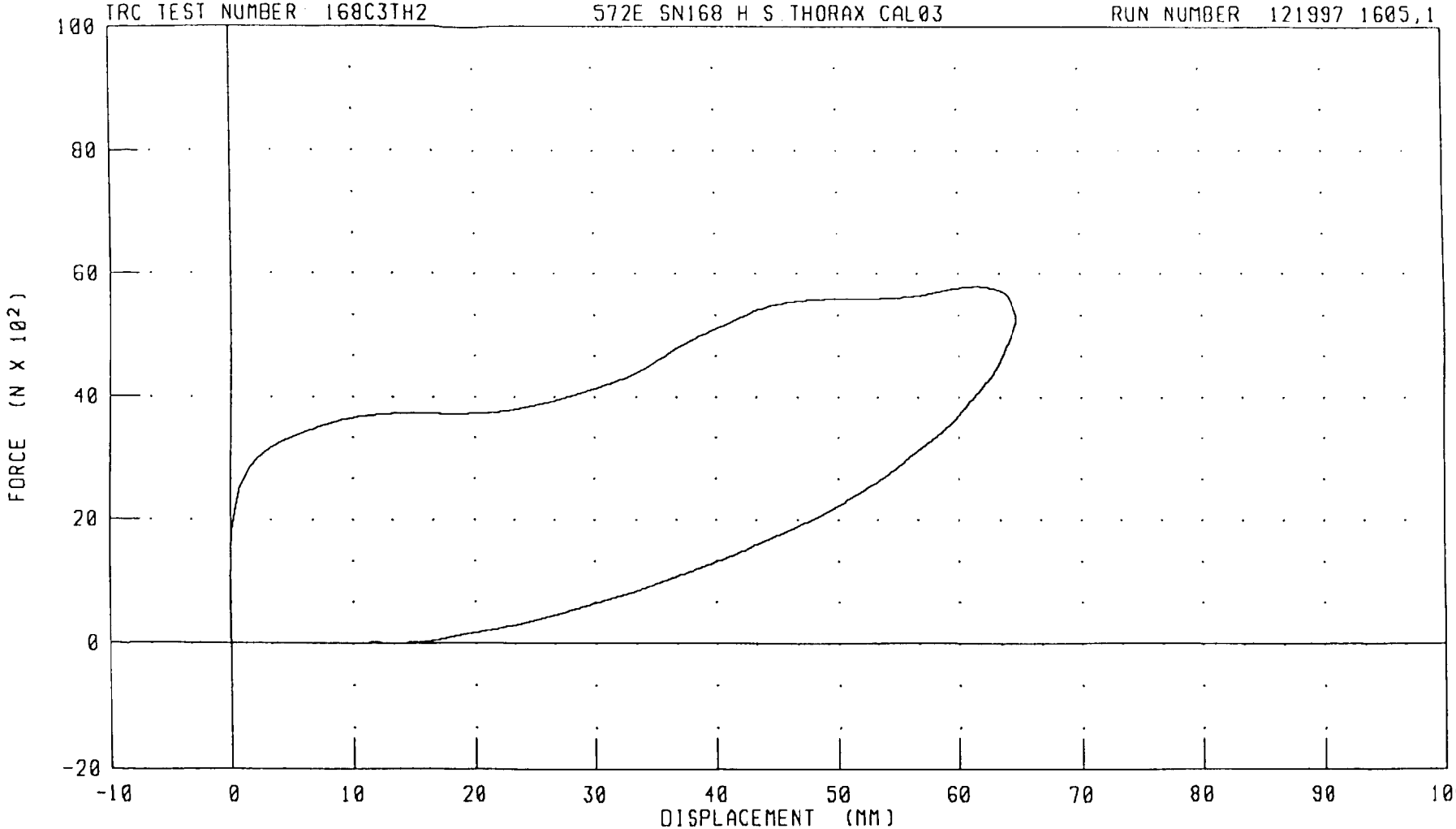


CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 64.70 MM @ 25.20 MS; -0.05 MM @ 1.92 MS

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 FILTER: CH. CLASS 180 PEAK DATA: 64.70 MM @ 25.20 MS; -0.05 MM @ 1.92 MS
PENXF CH. CLASS 180 5788.63 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.

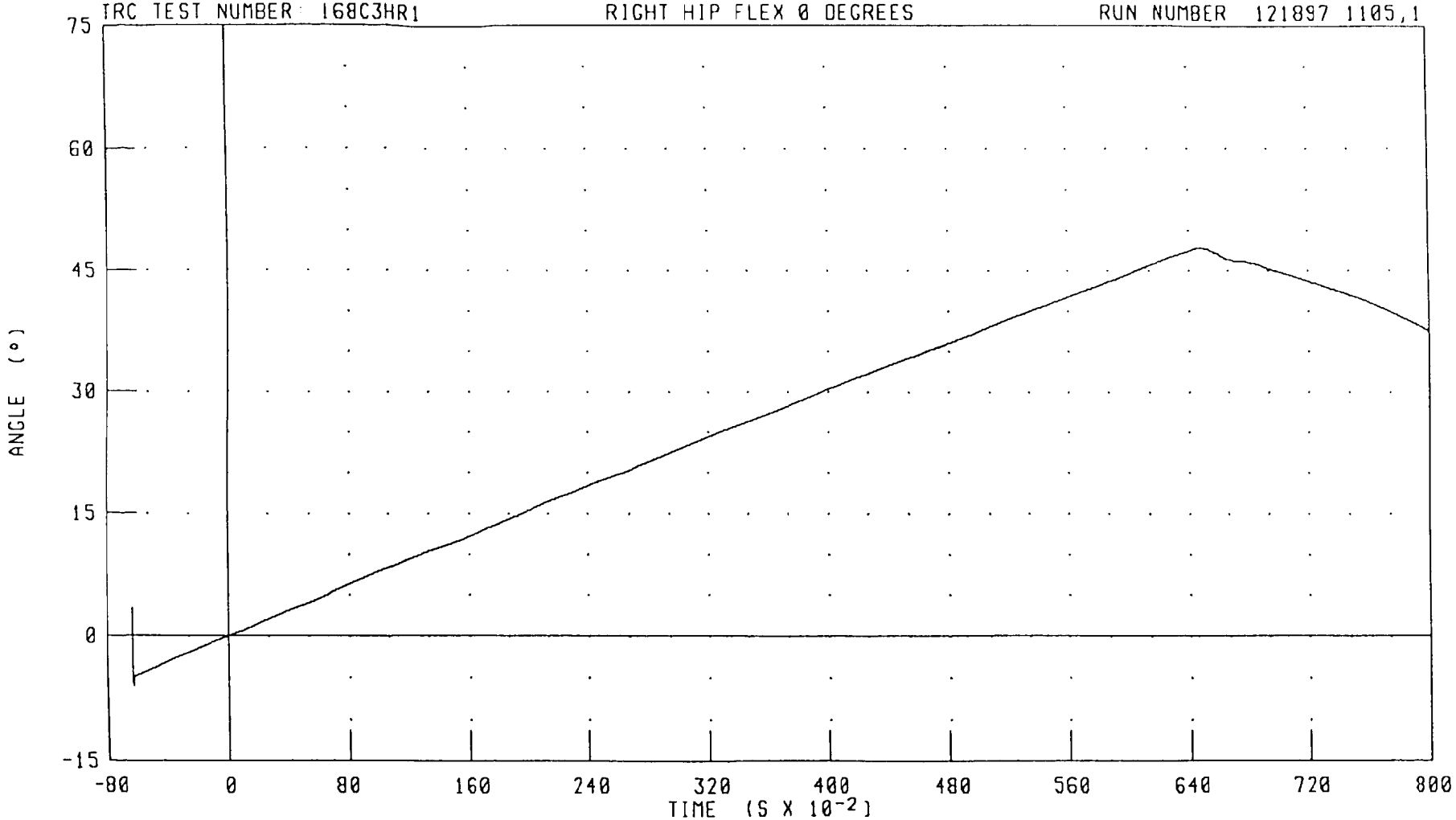
TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins RUN NUMBER: 121897.1105;1

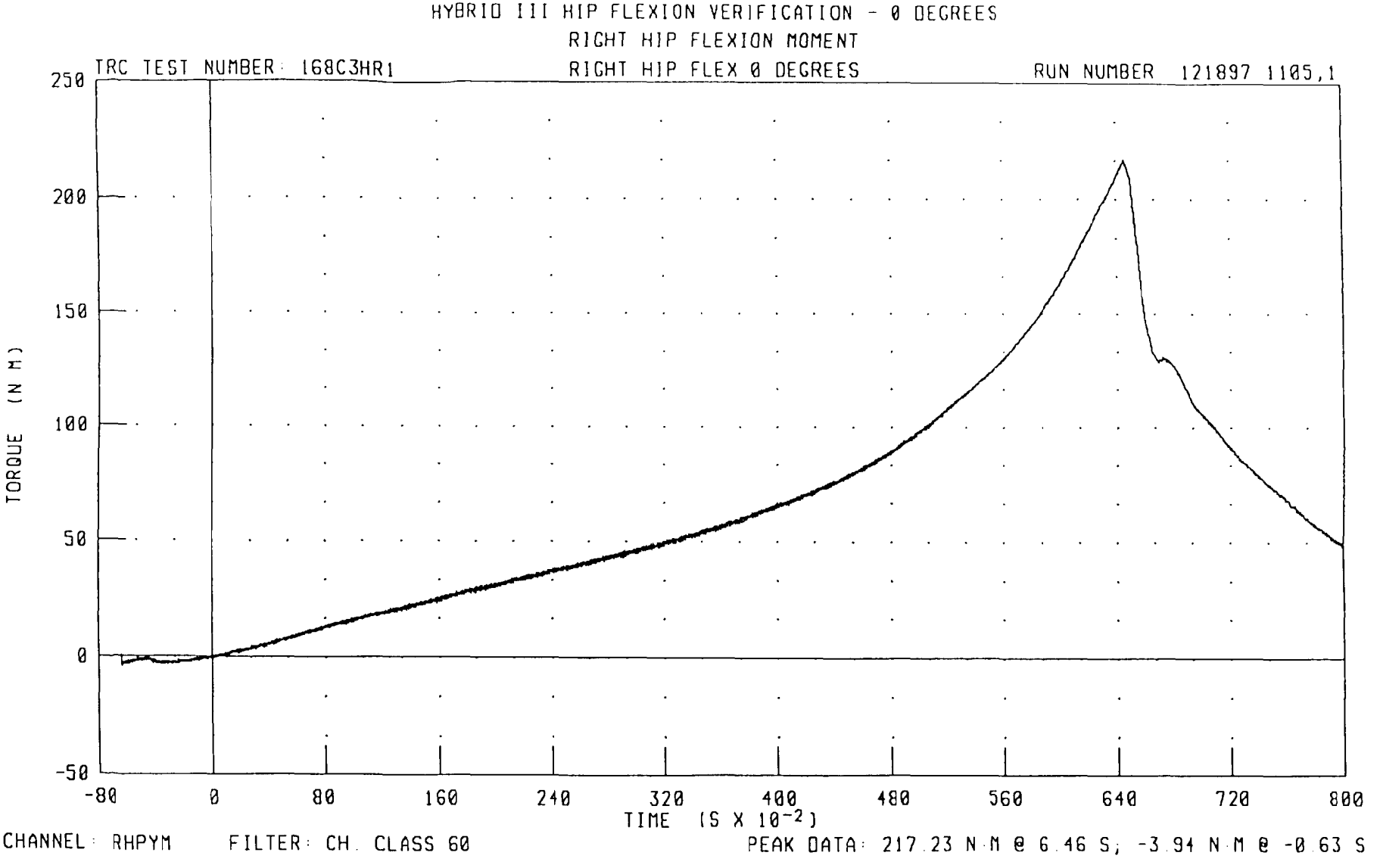
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

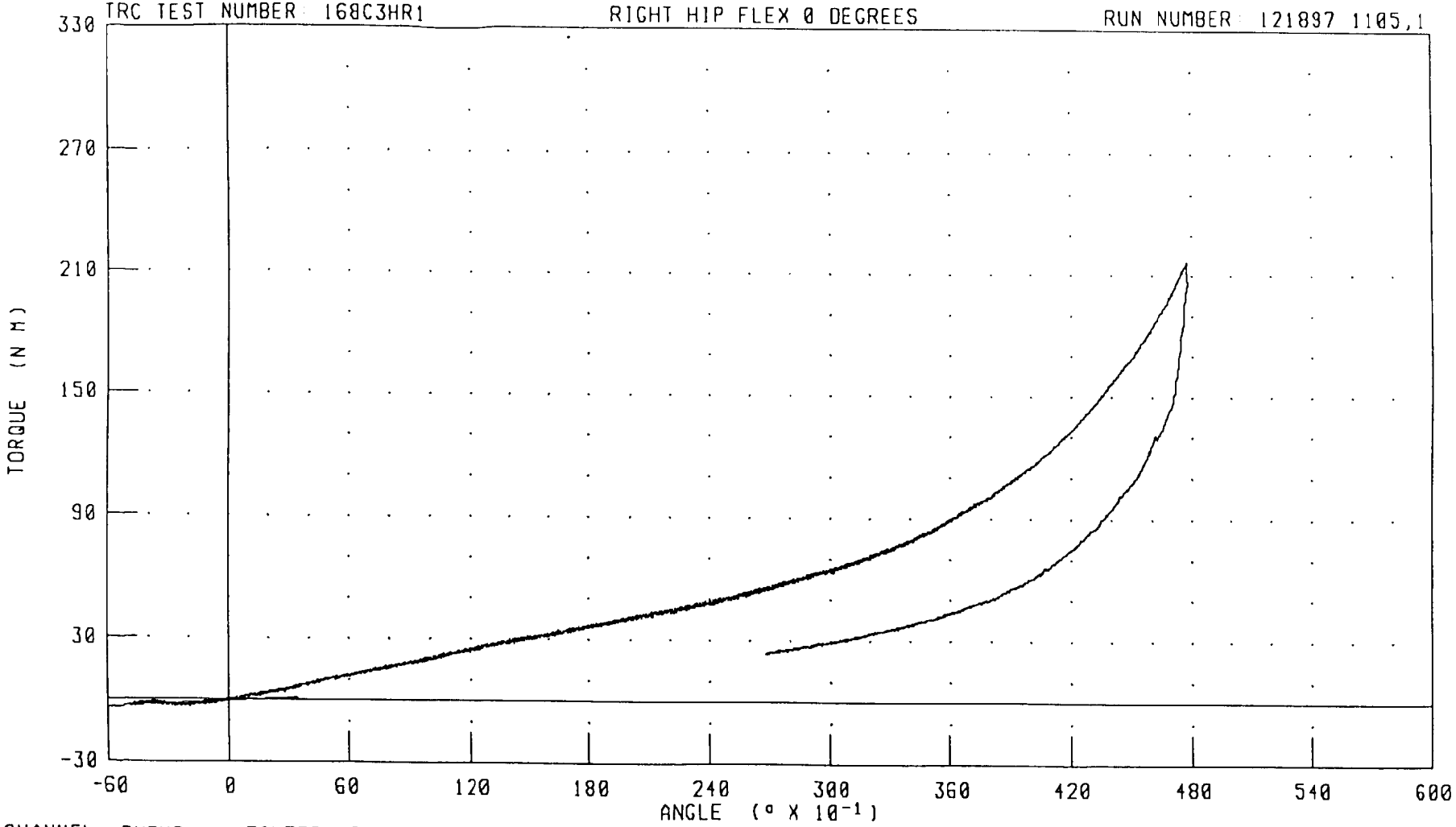
TRC TEST NUMBER: 168C3HR1 RIGHT HIP FLEX 0 DEGREES RUN NUMBER 121897 1105,1



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
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: 217.23 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



CHANNEL: RHPXD FILTER: CH. CLASS 60
RHPYM CH. CLASS 60

PEAK DATA: 47.79 ° @ 6.51 S; -6.00 ° @ -0.63 S
217.23 N.M @ 6.46 S; -3.94 N.M @ -0.63 S

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

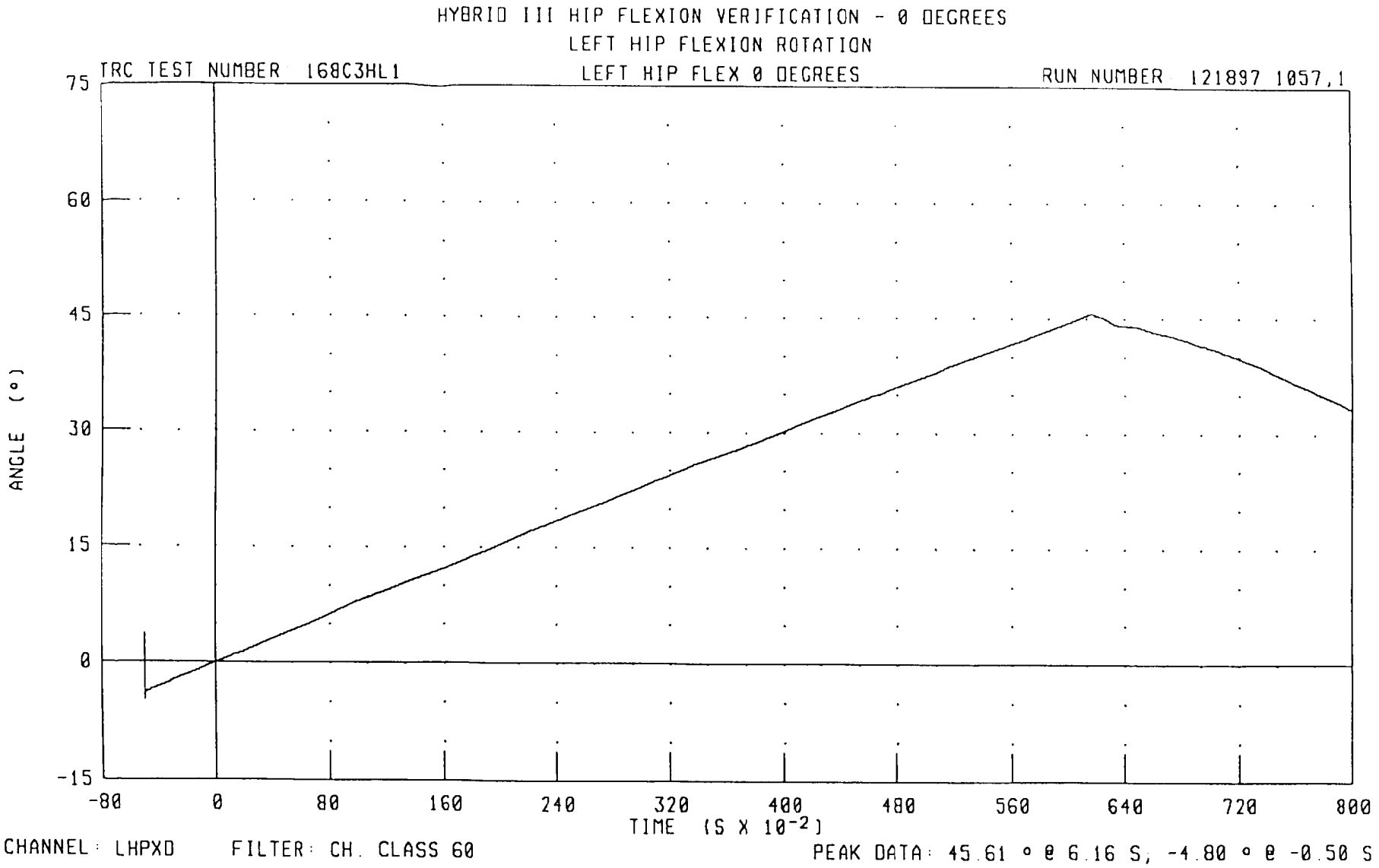
HYBRID III PART 572E 18-DEC-97

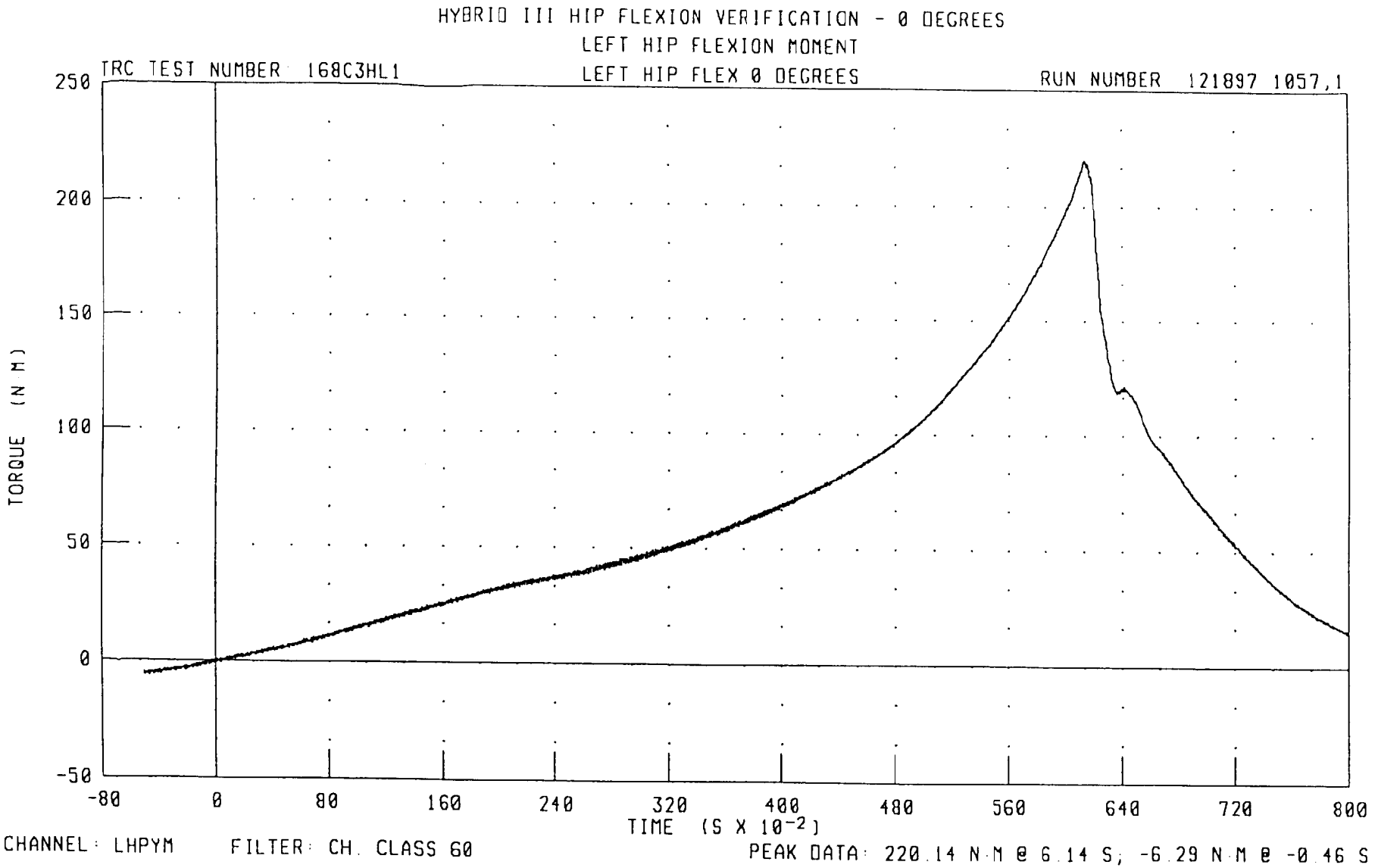
TRC INC. TEST NO: 168C3HL1 LEFT HIP FLEX 0 DEGREES

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.

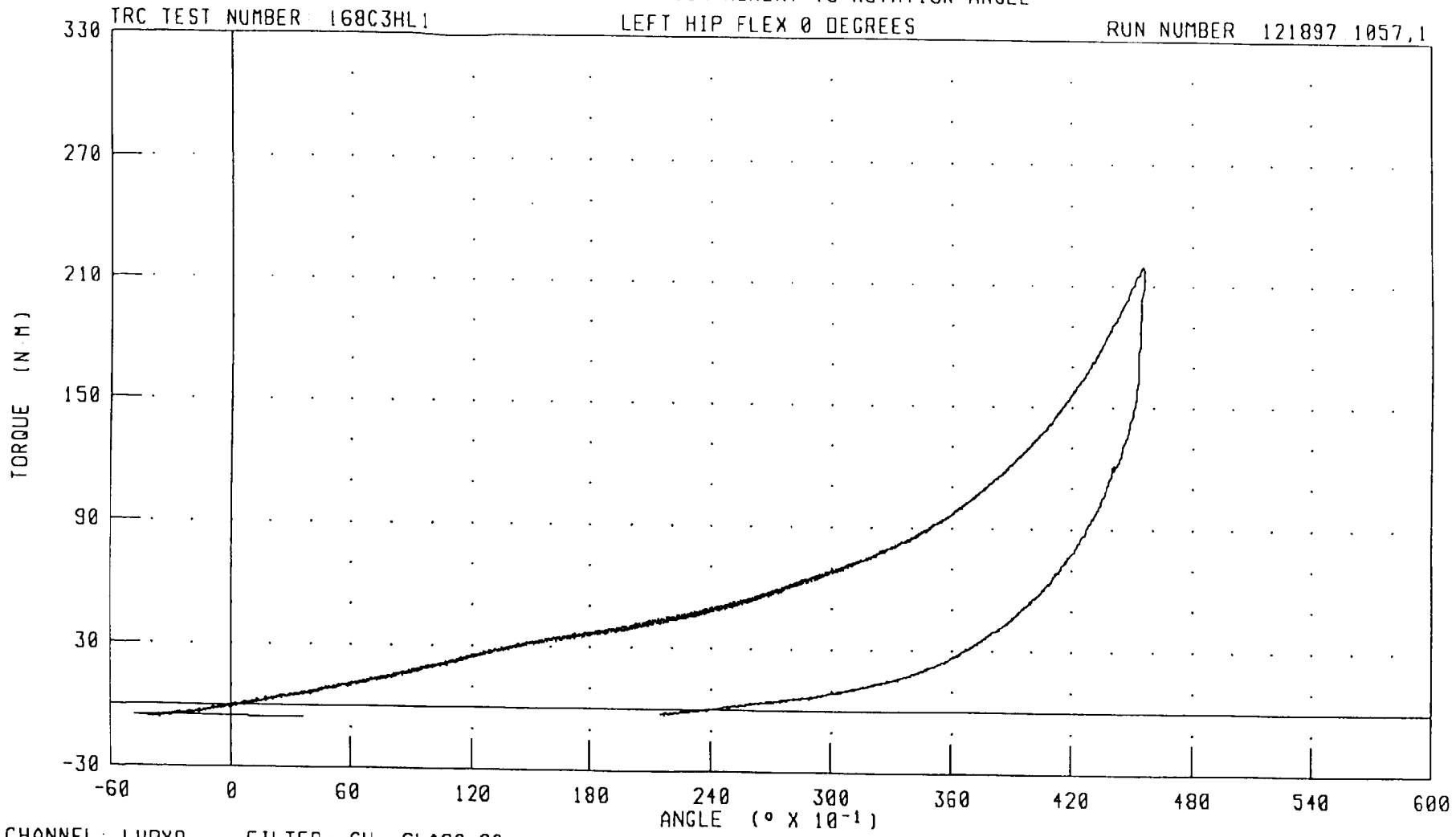
TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins RUN NUMBER: 121897.1056;1


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION ROTATION
TRC TEST NUMBER 168C3HL1
LEFT HIP FLEX 0 DEGREES
RUN NUMBER 121897 1057,1
75
60
45
30
15
0
-15
ANGLE (°)
-80
0
80
160
240
320
400
480
560
640
720
800
TIME (S X 10-2)
CHANNEL: LHPXD
FILTER: CH. CLASS 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

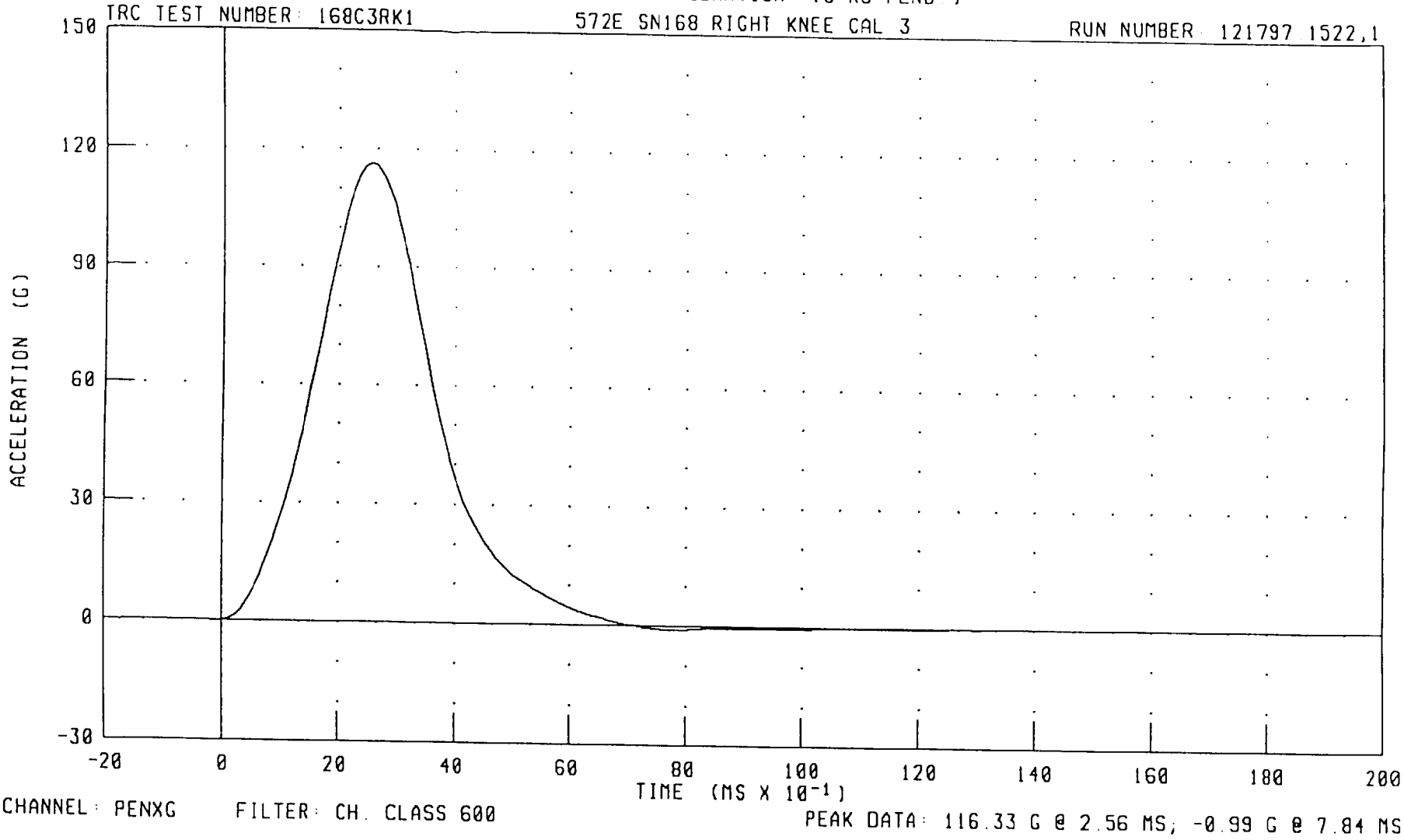
TRC INC. TEST NO: 168C3RK1 572E SN168 RIGHT KNEE CAL 3

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

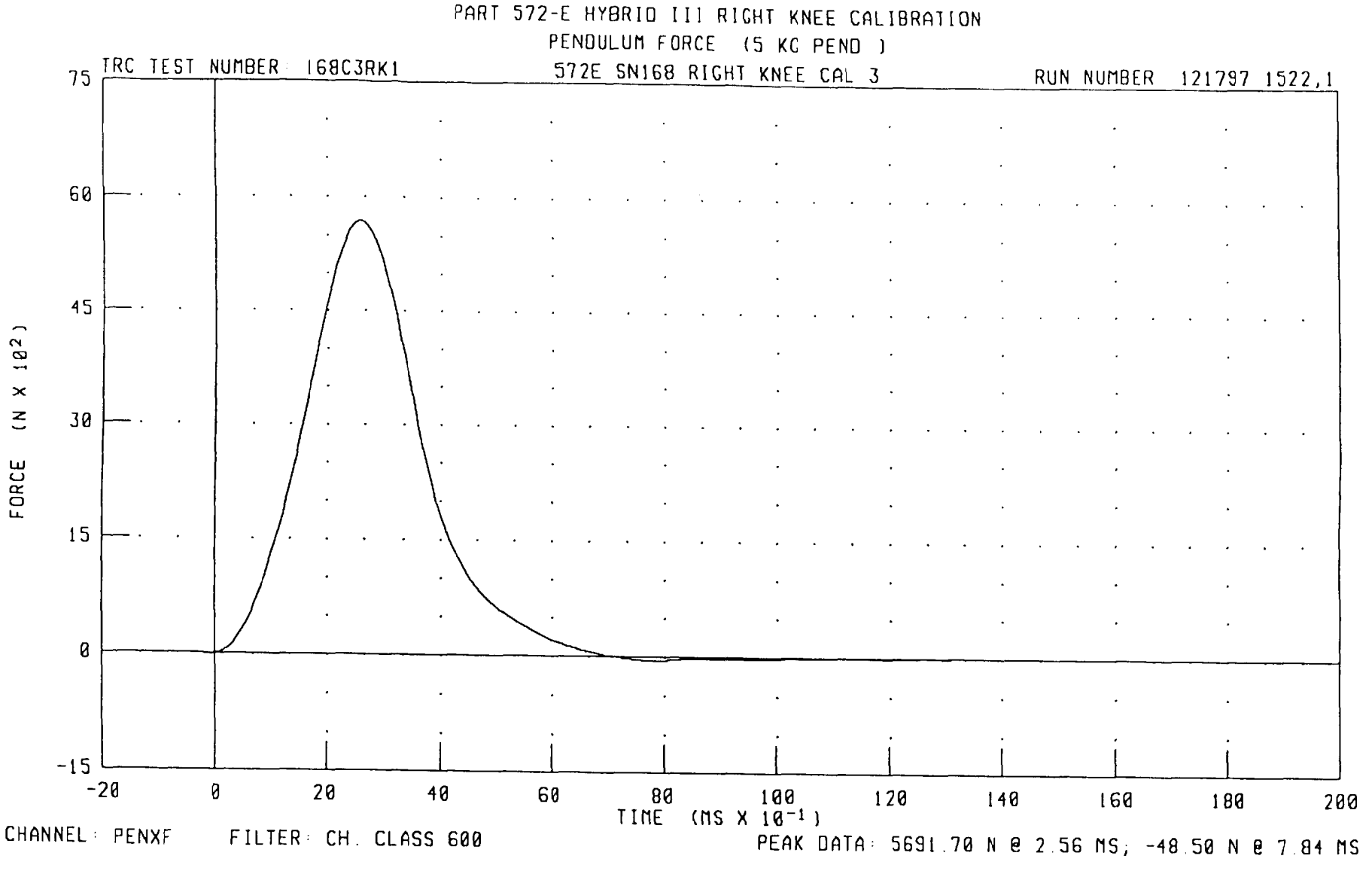
TECHNICIAN John K. Claudge RUN NUMBER: 121797.1507;1

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



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 116.33 G @ 2.56 MS; -0.99 G @ 7.84 MS


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

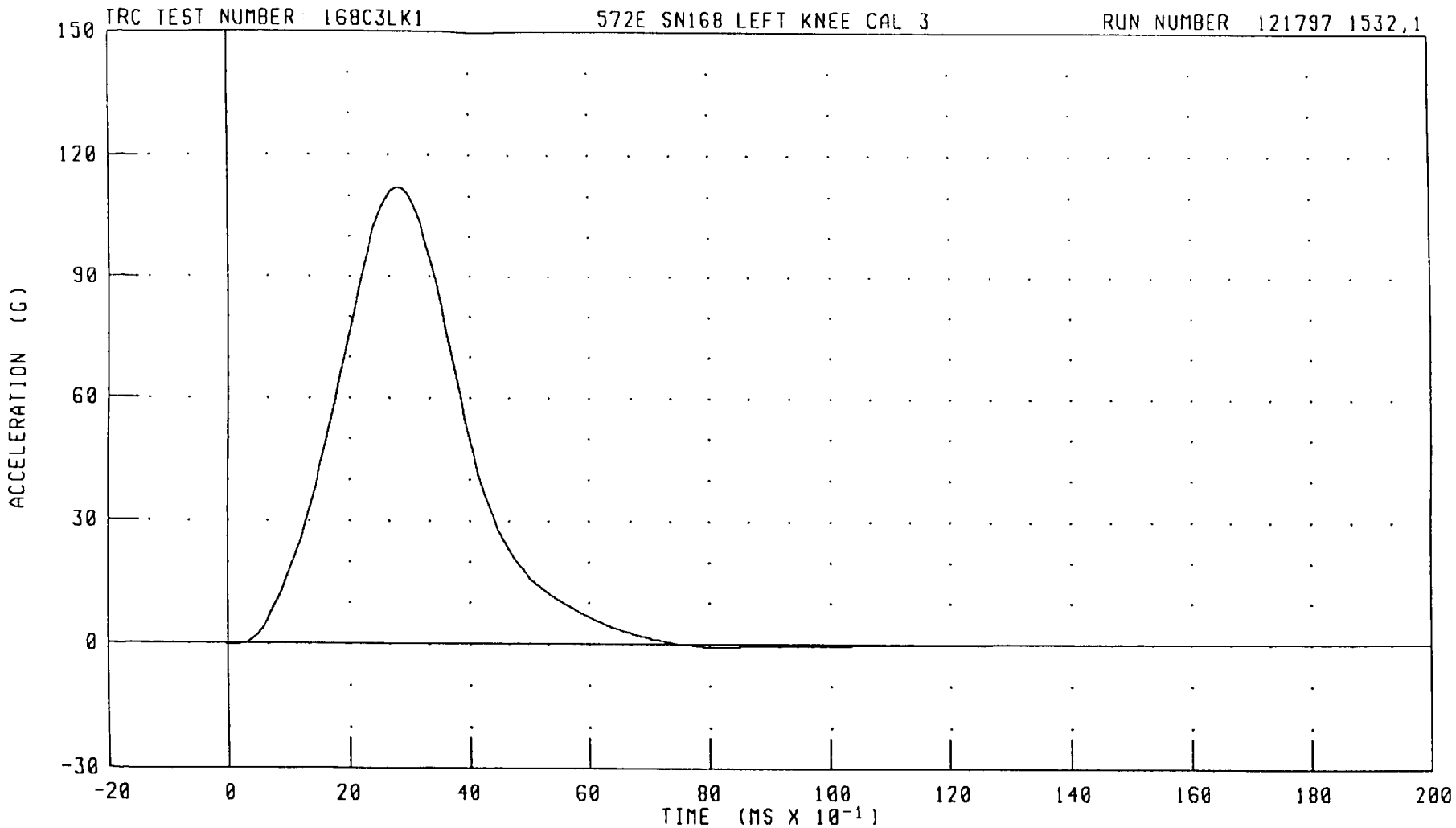
TRC INC. TEST NO: 168C3LK1 572E SN168 LEFT KNEE CAL 3

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

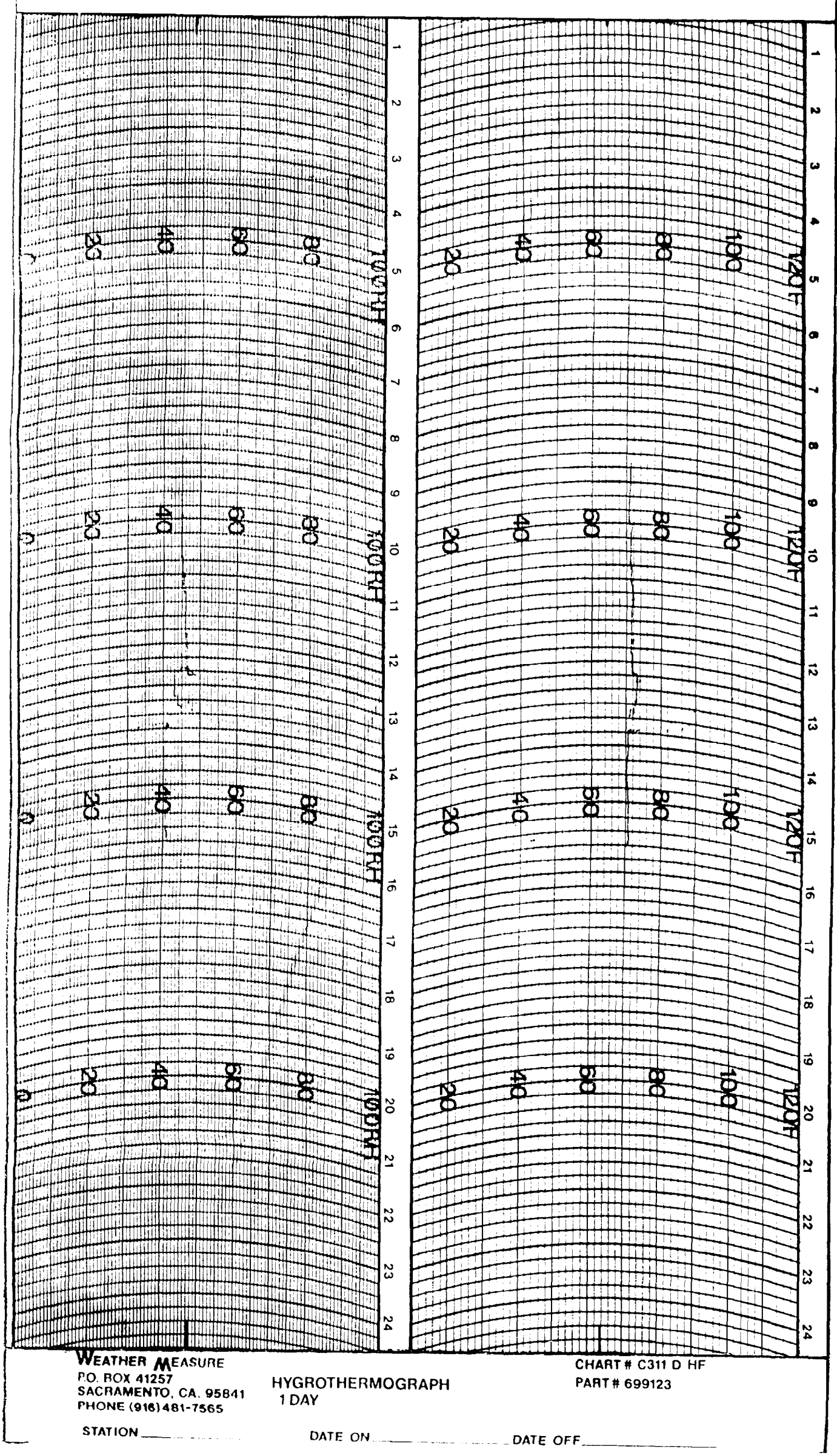
TEST MEETS SPECIFICATIONS

TECHNICIAN John K. Claudy RUN NUMBER: 121797.1504;1

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



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 112.06 G @ 2.80 MS; -0.71 G @ 8.16 MS



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

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION _____ DATE ON _____ DATE OFF _____