

V3245

**1999 Chevrolet Blazer
into a Flat Frontal Barrier
TRC Test Number: 991215-2**

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Section 1.0

Purpose and Test Procedure

Purpose and Test Summary

This 30 mph flat frontal barrier impact test has as 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 1999 Chevrolet Blazer 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 twelve (12) accelerometers to measure longitudinal, lateral, and vertical axis accelerations and two (2) airbag squib circuits to measure airbag fire times. The vehicle's specified impact velocity range was 47.5 to 49.1 km/h. 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 per FMVSS 208 Lab 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-four (44) 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 fourteen (14) 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. Appendix D contains miscellaneous test information.

Test Results Summary

This flat frontal barrier test was conducted at TRC on December 15, 1999.

The test vehicle, a 1999 Chevrolet Blazer, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 2161.4 kilograms. The vehicle's impact speed was 48.4 km/h. The vehicle's maximum static crush was 566 millimeters.

The driver's 15-millisecond HIC was 153 and its 36-millisecond HIC was 306. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 63.1 g. The driver's chest deflection was 62 millimeters. The driver's left and right femur maximum compressive forces were 7759 N and 8504 N, respectively.

The right front passenger's 15-millisecond HIC was 289 and its 36-millisecond HIC was 340. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.8 g. The passenger's chest deflection was 15 millimeters. The right front passenger's left and right femur maximum compressive forces were 6019 N and 5572 N, respectively.

Table 1 Crash Test Summary

Test type:	Frontal barrier impact
Test date:	12/15/99
Test time:	1454
Ambient temperature at impact area:	22° C
Vehicle year/make/ model/body style:	1999/Chevrolet/Blazer/MPV
Vehicle test weight:	2161.4 kg
Impact angle ¹ :	0°
Impact velocity ² :	
Primary:	48.4 km/h
Secondary:	48.4 km/h
Maximum static crush:	566 mm
Average rebound:	654 mm
Number of cameras:	
Real-time:	1
High-speed:	14
Door opening data:	
Left-front:	Required tools
Right-front:	Required tools

¹ With respect to tow track centerline.

² Speed trap measurement ($\pm .08$ km/h accuracy)

Table 1 Crash Test Summary, Cont'd.

Dummies:	<u>Driver #551</u>	<u>Passenger #591</u>
Type:	Hybrid III 50 th percentile adult male	Hybrid III 50 th 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/head rest	Airbag
Chest:	Airbag	Airbag
Abdomen:	Steering wheel rim	None
Left knee:	Instrument panel	Instrument panel
Right knee:	Instrument panel	Instrument panel

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1999/Chevrolet/Blazer/MPV

Color: White

VIN: 1GNDT13W4X2205437

Engine data:

Placement: Longitudinal

Cylinders: V-6

Displacement: 4.3 liters

Transmission data: 5 speed, ___ manual, X automatic, ___ overdrive

Final drive: ___ fwd, ___ rwd, X 4wd

Date vehicle received: N/A

Odometer reading: N/A

Dealer's name and address: N/A

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by: General Motors Corporation

Date of manufacture: 4/99

VIN: 1GNDT13W4X2205437

GVWR: 2427 kg

GAWR: Front: 1270 kg

Rear: 1225 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P235/70R15
Spare tire: Standard
Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P235/70R15

Recommended cold tire pressure:

Front: 32 psi

Rear: 32psi

Designated Seating Capacity:

Front 2

Rear 3

Total 5

Vehicle Cargo Weight: 136 kg¹

Test vehicle attitudes:

Delivered attitude:	LF: 792 mm	RF: 796 mm	LR: 834 mm	RR: 836 mm
Fully loaded attitude:	LF: 786 mm	RF: 788 mm	LR: 800 mm	RR: 802 mm
Pre-test attitude:	LF: 780 mm	RF: 778 mm	LR: 805 mm	RR: 796 mm
Post-test attitude:	LF: 803 mm	RF: 832 mm	LR: 810 mm	RR: 800 mm

¹ 125 kg was used for calculating target test weight per VRTC personnel.

Table 2 Test Vehicle Information, Cont'd.

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

Right front	513.5 kg	Right rear	410.5 kg
Left front	538.0 kg	Left rear	431.8 kg
Total front weight	1051.5 kg	(55.5% of total vehicle weight)	
Total rear weight	842.3 kg	(44.5% of total vehicle weight)	
Total delivered weight	1893.8 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1893.8 kg)

DSC = Designated Seating Capacity (5)

RCLW = 125 kg¹

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

Target test weight = 1893.8 + 125 + 151.4 = 2170.2 kg

Weight of test vehicle with required dummies and 37.2 kg of cargo weight:

Right front	558.4 kg	Right rear	522.5 kg
Left front	570.2 kg	Left rear	510.3 kg
Total front weight	1128.6 kg	(52.2% of total vehicle weight)	
Total rear weight	1032.8 kg	(47.8% of total vehicle weight)	
Total test weight	2161.4 kg	(0.4% under target test weight)	

Weight of ballast secured in vehicle: 112 lbs behind the front passenger's seat

Components removed to meet target test weight: None

CG rearward of front wheel centerline: 1302 mm

Vehicle Wheelbase: 2725 mm

¹ Rated Cargo and Luggage Weight (RCLW) from label is 136 kg. 125 kg was used for determining target test weight per VRTC personnel.

Table 3 Post-Impact Data

Test number: 991215-2
Test date: 12/15/99
Test time: 1454
Test type: Frontal barrier impact
Impact angle: 0°
Ambient temperature
at impact area: 22° C
Temperature in
occupant compartment: 21° C
Impact velocity:
Primary: 48.4 km/h
Secondary 48.4 km/h
Specified range: 47.5 to 49.1 km/h

Distance from vehicle to barrier:

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

Test vehicle static crush:

Overall length of test vehicle:

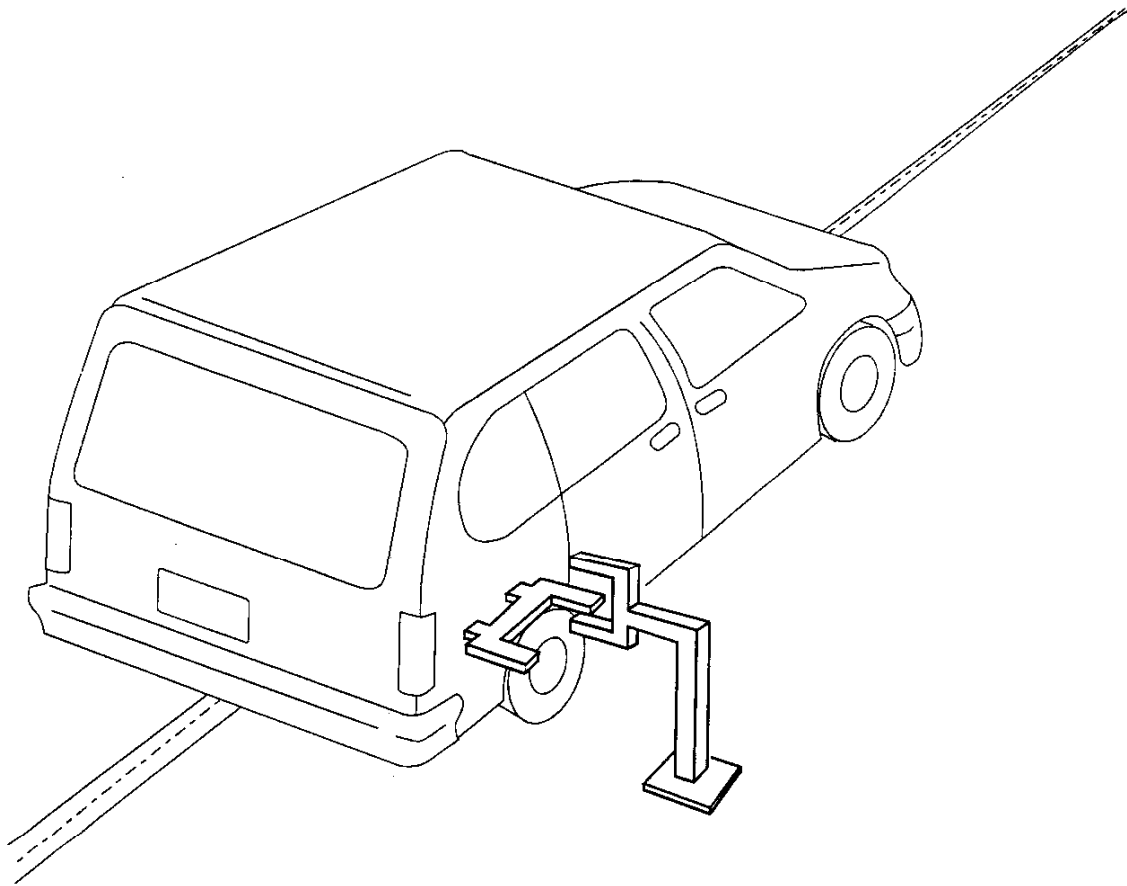
Pre-test:	L: 4690 mm	C: 4856 mm	R: 4696 mm
Post-test:	L: 4318 mm	C: 4290 mm	R: 4245 mm
Total crush:	L: 372 mm	C 566 mm	R: 451 mm
Average crush:	463 mm		

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L: 675 mm	C: 670 mm	R: 618 mm
Average rebound:	654 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: 12/15/99
 Vehicle year/make/
 model/body style: 1999/Chevrolet/Blazer/MPV
 VIN: 1GNDDT13W4X2205437
 Build date: 4/99
 Test weight: 2161.4 kg
 Vehicle wheelbase: 2725 mm
 Maximum width: 1701 mm
 Front overhang: 891 mm

Collision Deformation
 Classification (CDC) Code: 12FDAW2

Crush depth
 measurements: C1: 372 mm
 C2: 482 mm
 C3: 551 mm
 C4: 551 mm
 C5: 513 mm
 C6: 451 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged
 region: L: 1524 mm

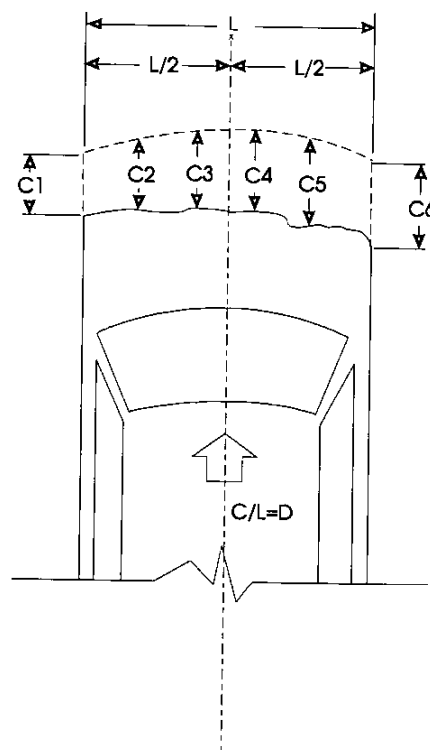
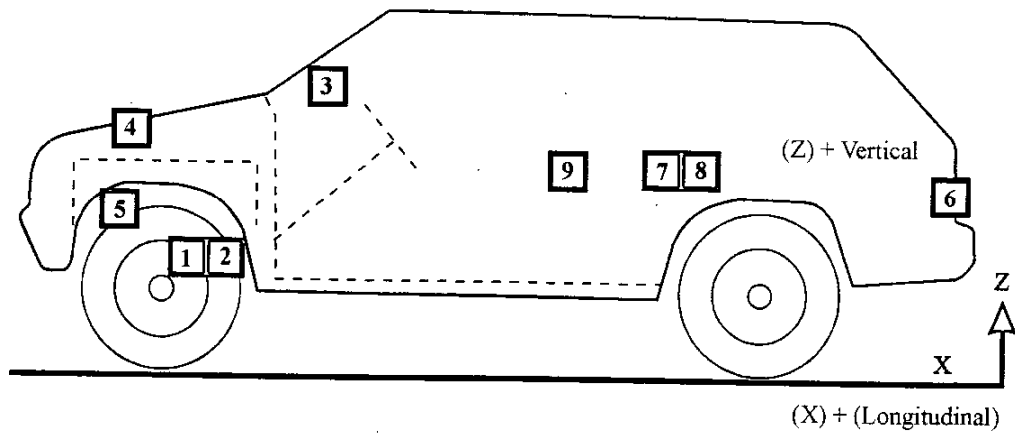
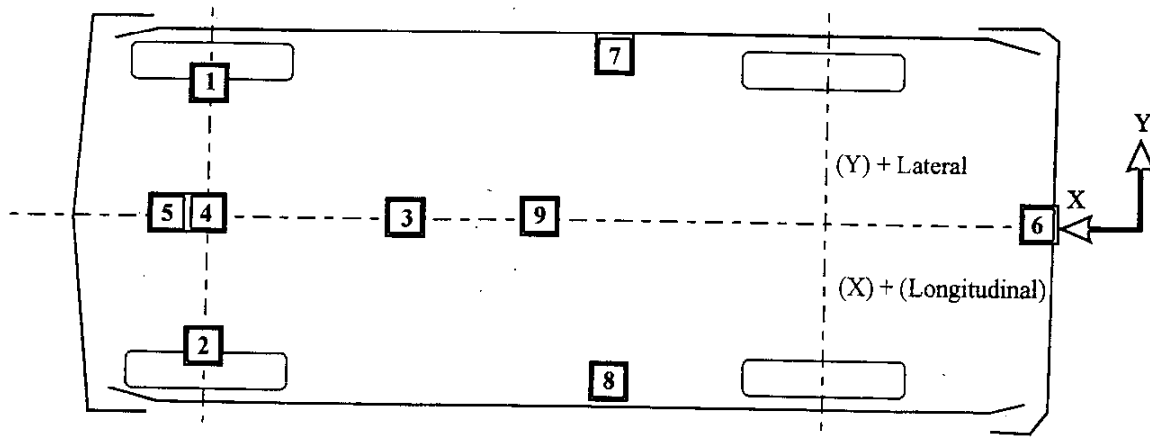


Figure 3 Vehicle Accelerometer Placement



Side View



Bottom View

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 991215-2	X			Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
No. LOCATION							
1 LEFT BRAKE CALIPER	PRE	3658 mm		625 mm	308 mm		
	POST	3430 mm		223 mm	322 mm		
LONGITUDINAL						56.9 g @ 57.0 ms	99.9 g @ 48.5 ms
2 RIGHT BRAKE CALIPER	PRE	3658 mm		-625 mm	312 mm		
	POST	3445 mm		-620 mm	340 mm		
LONGITUDINAL						40.6 g @ 32.2 ms	73.6 g @ 47.1 ms
3 INSTRUMENT PANEL CENTER	PRE	3243 mm		0 mm	1188 mm		
	POST	3230 mm		0 mm	1233 mm		
LONGITUDINAL						15.4 g @ 53.4 ms	59.4 g @ 75.4 ms
4 ENGINE TOP	PRE	4096 mm		55 mm	912 mm		
	POST	3995 mm		68 mm	909 mm		
LONGITUDINAL						21.0 g @ 64.0 ms	75.5 g @ 42.6 ms
5 ENGINE BOTTOM	PRE	3528 mm		-55 mm	223 mm		
	POST	3473 mm		-55 mm	205 mm		
LONGITUDINAL						22.3 g @ 30.5 ms	705.0 g @ 23.8 ms

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

TEST NUMBER: 991215-2 No. LOCATION	X		Y		Z		POSITIVE DIRECTION		NEGATIVE DIRECTION	
	PRE	POST	PRE	POST	PRE	POST				
6 REAR VEHICLE CENTERLINE LONGITUDINAL LATERAL	475 mm	475 mm	0 mm	0 mm	720 mm	745 mm				
							3.7 g	@ 160.6 ms	33.1 g	@ 75.2 ms
							6.0 g	@ 77.7 ms	2.3 g	@ 61.0 ms
7 LEFT REAR SEAT LONGITUDINAL	2063 mm	2035 mm	585 mm	585 mm	485 mm	450 mm				
							4.2 g	@ 155.0 ms	33.6 g	@ 59.4 ms
8 RIGHT REAR SEAT LONGITUDINAL	2063 mm	2032 mm	-585 mm	-585 mm	475 mm	450 mm				
							3.9 g	@ 154.6 ms	38.0 g	@ 60.6 ms
9 VEHICLE CENTER OF GRAVITY LONGITUDINAL LATERAL VERTICAL RESULTANT	2948 mm	2910 mm	0 mm	35 mm	525 mm	498 mm				
							27.6 g	@ 47.1 ms	63.6 g	@ 60.9 ms
							13.7 g	@ 51.3 ms	30.1 g	@ 33.5 ms
							58.8 g	@ 53.4 ms	49.9 g	@ 62.1 ms
							78.3 g	@ 61.5 ms		

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

Table 5 Dummy Injury Criteria

	<u>Maximum Acceleration</u>						
	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-40.9 g	-8.0 g	23.3 g	45.8 g	-66.0 g	3.8 g	13.1 g
Passenger	-41.8 g	44.8 g	-33.6 g	62.7 g	-49.8 g	-5.2 g	20.5 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	7759 N	8504 N
Passenger	6019 N	5572 N

15-Millisecond Head Injury Criteria¹

	HIC	Time t_1	Time t_2
Driver	153	80.1 ms	95.1 ms
Passenger	289	106.2 ms	121.2 ms

36 millisecond Head Injury Criteria

	HIC	Time t_1	Time t_2
Driver	306	73.7 ms	109.7 ms
Passenger	340	84.6 ms	120.6 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t_1	Time t_2
Driver	63.1 g	85.1 ms	88.2 ms
Passenger	51.8 g	86.5 ms	89.5 ms

Maximum Chest Deflection

Driver	62 mm
Passenger	15 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's face impacted the airbag. The dummy's head was restrained by the airbag. The dummy's abdomen impacted the steering wheel. The dummy's head and upper torso rotated rearward into the seat back. The dummy then rotated back forward and came to rest in a seated position leaning slightly to the right..

Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The dummy's head and torso rotated to the right. The dummy rebounded backward, up, and to the left. The dummy sat back down in the seat and came to rest in a seated position leaning to the left.

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

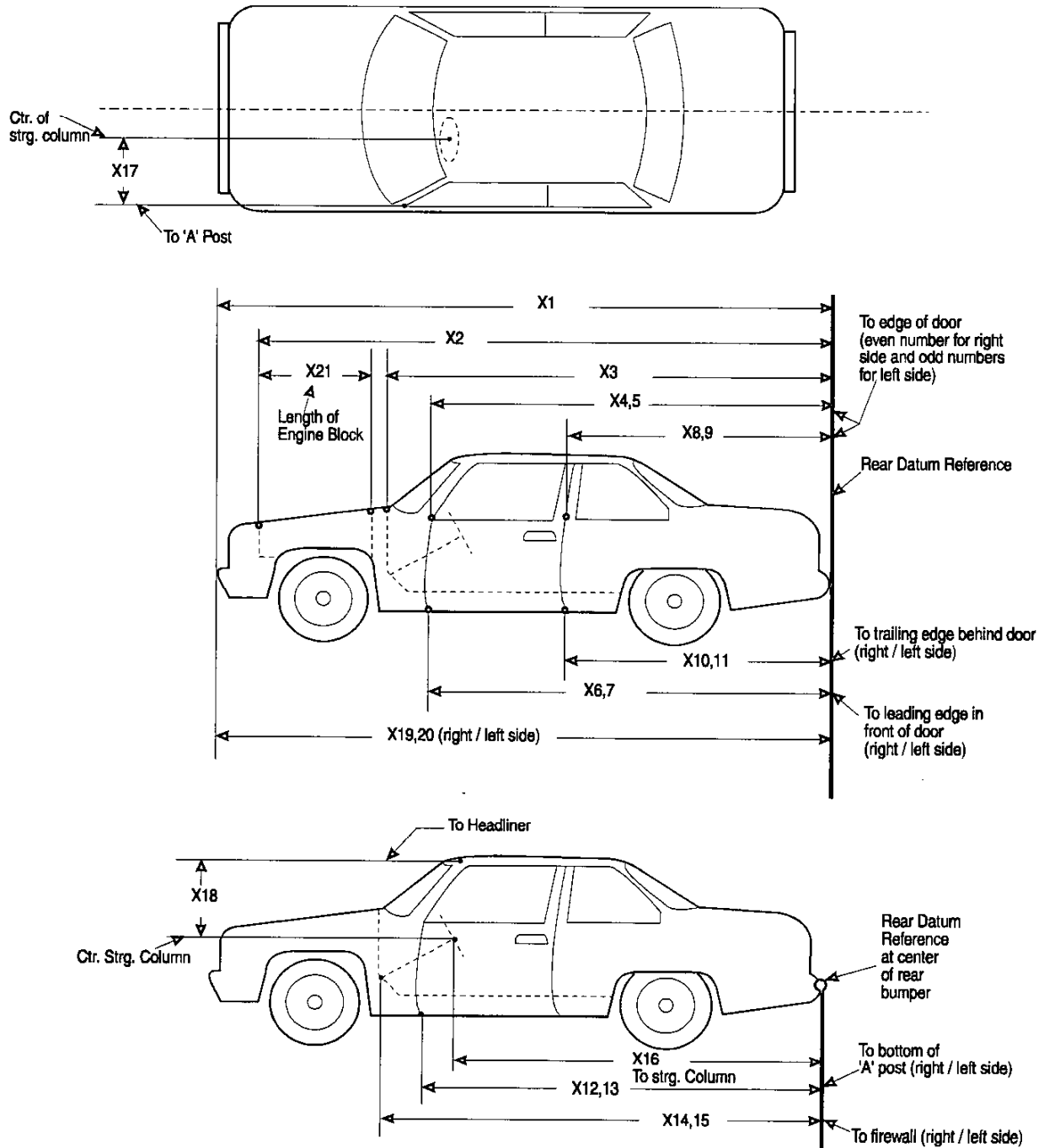


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1999/Chevrolet/Blazer/MPV

Test Number: 991215-2

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	4856	4290	566
X2	Rear Surface of Veh. to Front of Engine Block	4206	4071	135
X3	Rear Surface of Veh. to Firewall	3724	3709	15
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3449	3433	16
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3457	3435	22
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3405	3386	19
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	3420	3394	26
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2353	2333	20
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2356	2336	20
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2335	2320	15
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2349	2322	27
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3397	3390	7
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3405	3385	20
X14	Rear Surface of Veh. to Firewall--Right Side	3710	3367	343
X15	Rear Surface of Vehicle to Firewall --Left Side	3697	3659	38
X16	Rear Surface of Veh. to Steering Wheel Center	2966	3025	-59
X17	Center of Steering Column to " A " Post	284	336	-52
X18	Center of Steering Column to Headliner	465	425	40
X19	Rear Surface of Veh. to Right Side of Front Bumper	4696	4245	451
X20	Rear Surface of Veh. to Left Side of Front Bumper	4690	4318	372
X21	Length of Engine Block	440	440	0

Figure 5 Vehicle Target Locations

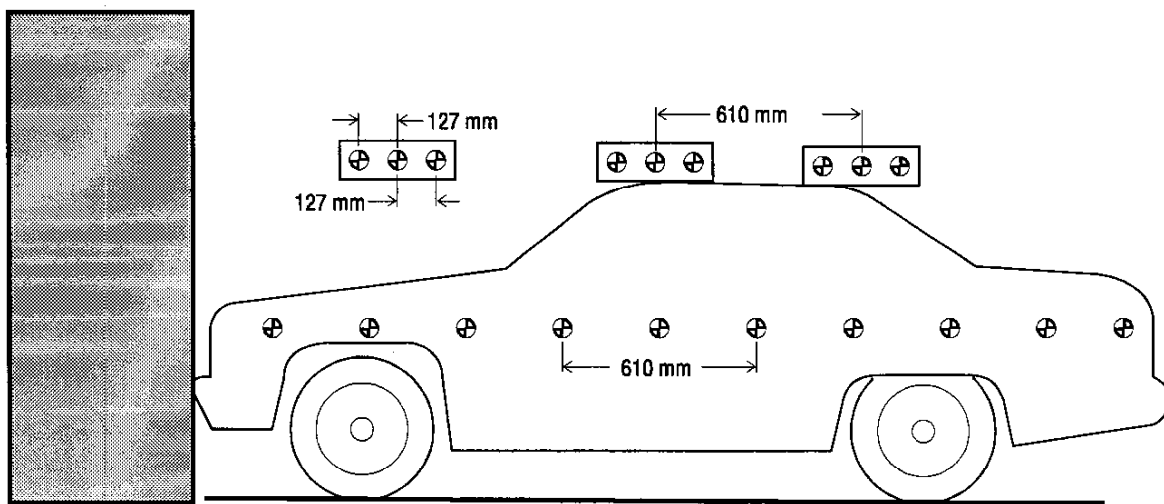


Figure 6 Dummy Measurement Locations for Front Seat Occupants

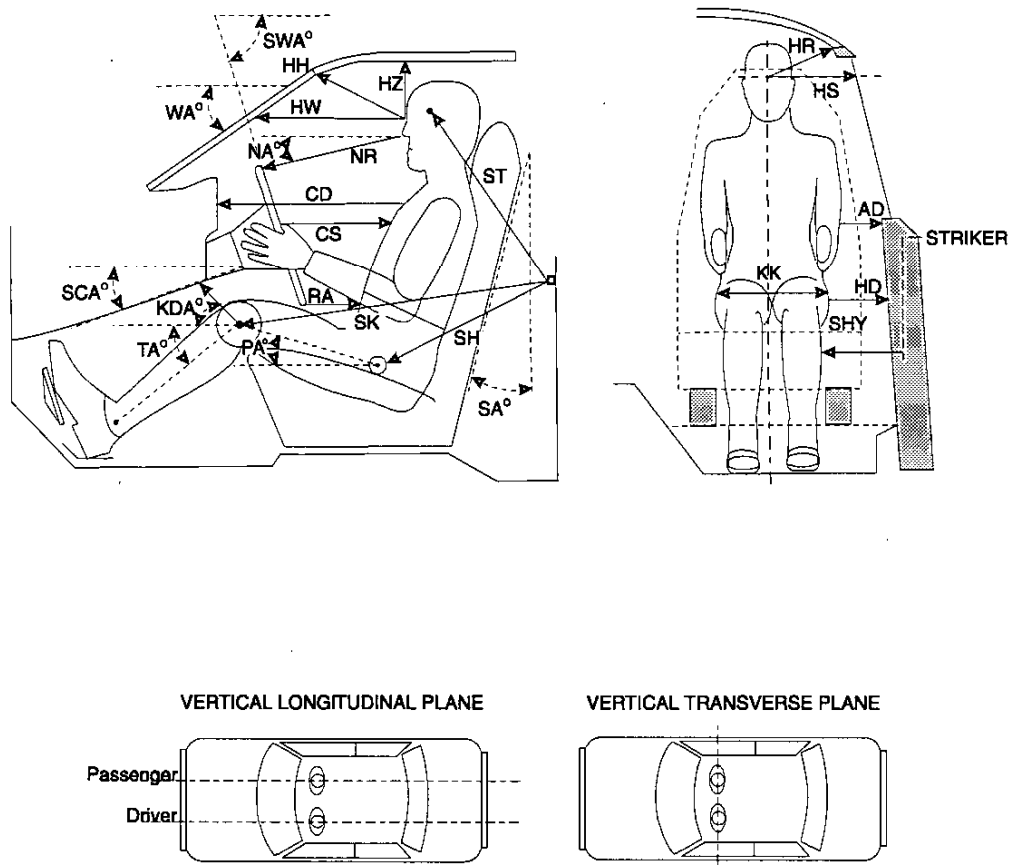


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #551)	Passenger (Serial #591)
WA	Windshield angle	35.6°	35.6°
SWA	Steering wheel angle	68.5°	N/A
SCA	Steering column angle	21.5°	N/A
SA	Seat back angle	24°	23°
HZ	Head to roof	204 mm	222 mm
HH	Head to header	507 mm	450 mm
HW	Head to windshield	657 mm	625 mm
HR	Head to side header	268 mm	263 mm
NR	Nose to rim	387 mm	N/A
NA	Nose to rim angle	18°	N/A
CD	Chest to dash	570 mm	475 mm
CS	Steering wheel to chest	345 mm	N/A
RA	Rim to abdomen	185 mm	N/A
KDL	Left knee to dash	218 mm	174 mm
KDR	Right knee to dash	215 mm	175 mm
KDA	Outboard knee to dash angle	28°	31°
PA	Pelvic angle	21.4°	22°
TA	Tibial angle	39.8°	45°
KK	Knee to knee	295 mm	275 mm
ST ¹	Striker to head	612 mm	593 mm
	Striker to head angle	-78°	-71°
SK	Striker to knee	630 mm	665 mm
	Striker to knee angle	2°	-6°
SH	Striker to H-point	264 mm	303 mm
	Striker to H-point angle	13°	10°
SHY	Striker to H-point (Y dir.)	246 mm	250 mm
HS	Head to side window	375 mm	352 mm
HD	H-point to door	180 mm	170 mm
AD	Arm to door	153 mm	135 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

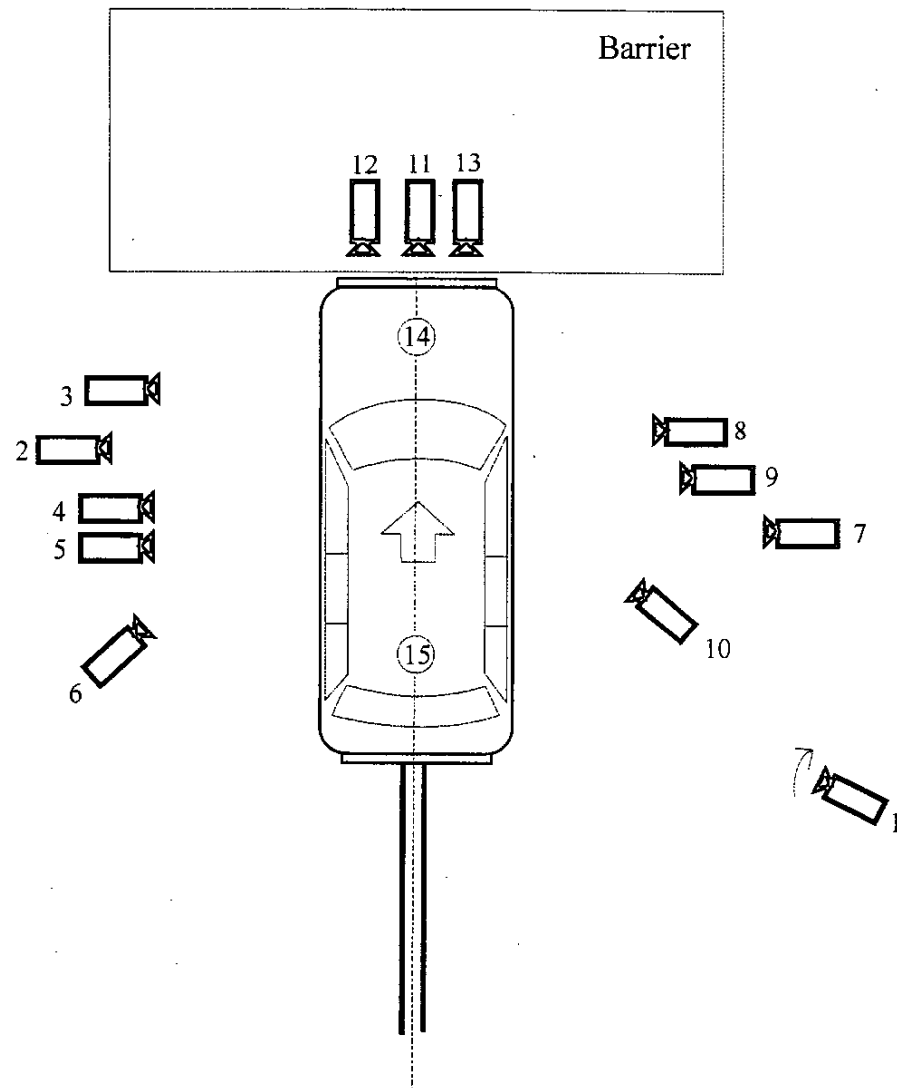


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1999/Chevrolet/Blazer/MPV

Test number: 991215-2

Camera Number	View	Camera Positions ¹			Camera Angle ²	Film Plane to Head Target	Camera Lens	Film Speed
		X	Y	Z				
1	Real-time panning	NA	NA	NA	NA	NA	16 mm	24 frames/s
2	Left vehicle crush	8738 mm	1346 mm	1461 mm	0°	6920 mm	25 mm	985 frames/s
3	Left windshield intrusion	6833 mm	940 mm	1397 mm	0°	7340 mm	50 mm	937 frames/s
4	Steering column motion	2616 mm	3531 mm	2007 mm	-13.6°	6710 mm	25 mm	1000 frames/s
5	Steering column motion	8814 mm	3073 mm	2718 mm	-5.8°	6600 mm	25 mm	985 frames/s
6	Driver kinematics	8814 mm	3073 mm	1753 mm	-20.4°	3060 mm	25 mm	1000 frames/s
7	Right overall	8788 mm	-2870 mm	838 mm	0°	6130 mm	13 mm	1002 frames/s
8	Right windshield intrusion	7010 mm	-1067 mm	1270 mm	0°	7574 mm	50 mm	1000 frames/s
9	Passenger kinematics	7137 mm	-1499 mm	1473 mm	-15.8°	3090 mm	25 mm	977 frames/s
10	Passenger kinematics	2489 mm	-3632 mm	2083 mm	-3.3°	6874 mm	25 mm	1002 frames/s
11	Windshield front view	381 mm	0 mm	2540 mm	-61.6°	NA	8.5 mm	1002 frames/s
12	Driver - front view	381 mm	305 mm	2540 mm	-55.3°	NA	17 mm	1005 frames/s
13	Passenger - front view	381 mm	-305 mm	2540 mm	-58.4°	NA	17 mm	1002 frames/s
14	Pit - front position	1295 mm	0 mm	-3048 mm	90°	NA	13 mm	1000 frames/s
15	Pit - rear position	2946 mm	0 mm	-3048 mm	90°	NA	13 mm	1000 frames/s

¹ +X: Film plane forward of barrier face

+Y: Film plane to left of monorail centerline

+Z: Film plane above ground level

² +Angle: Film plane angled upward from horizontal plane



Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Side View



Figure A-4 Post-Test Left Side View



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



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

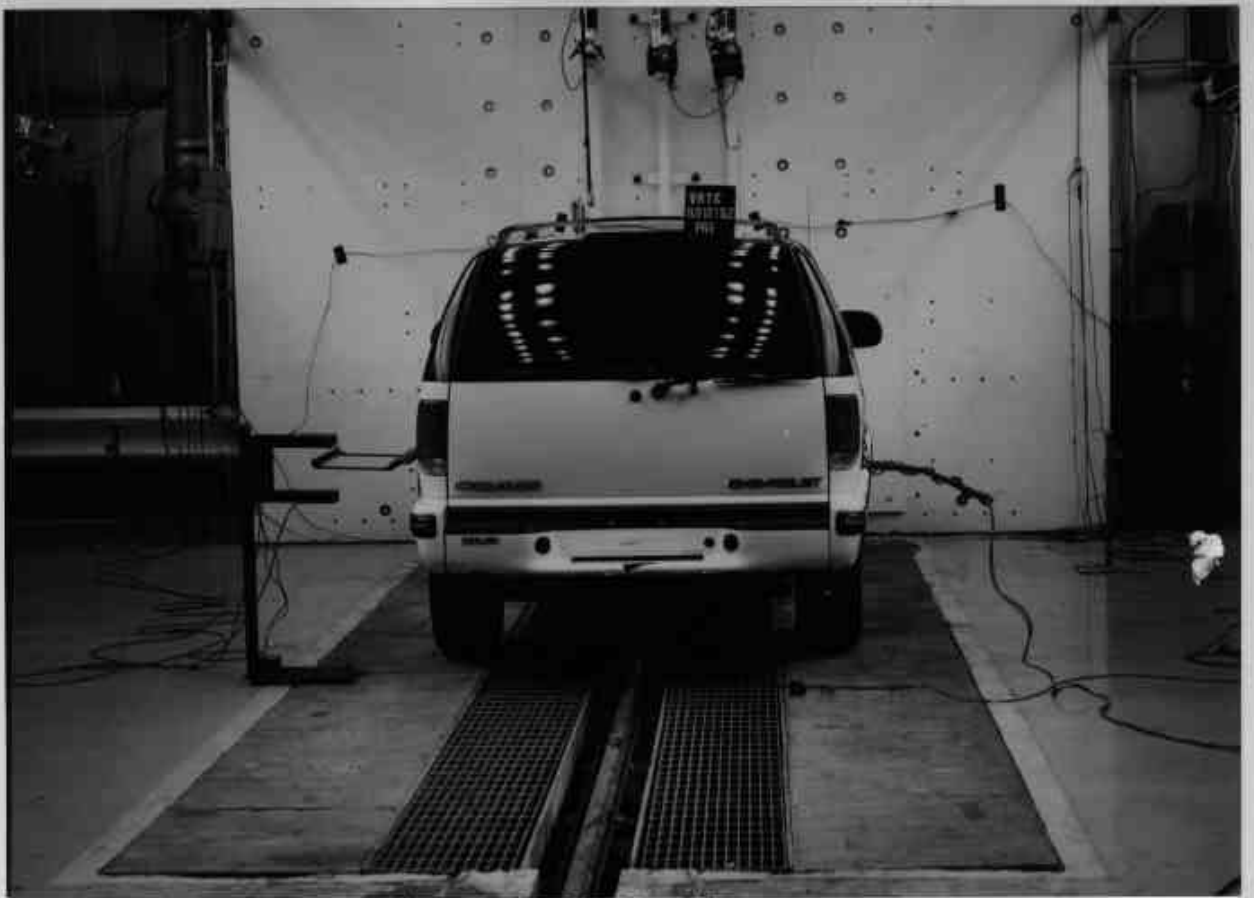


Figure A-7 Pre-Test Rear View

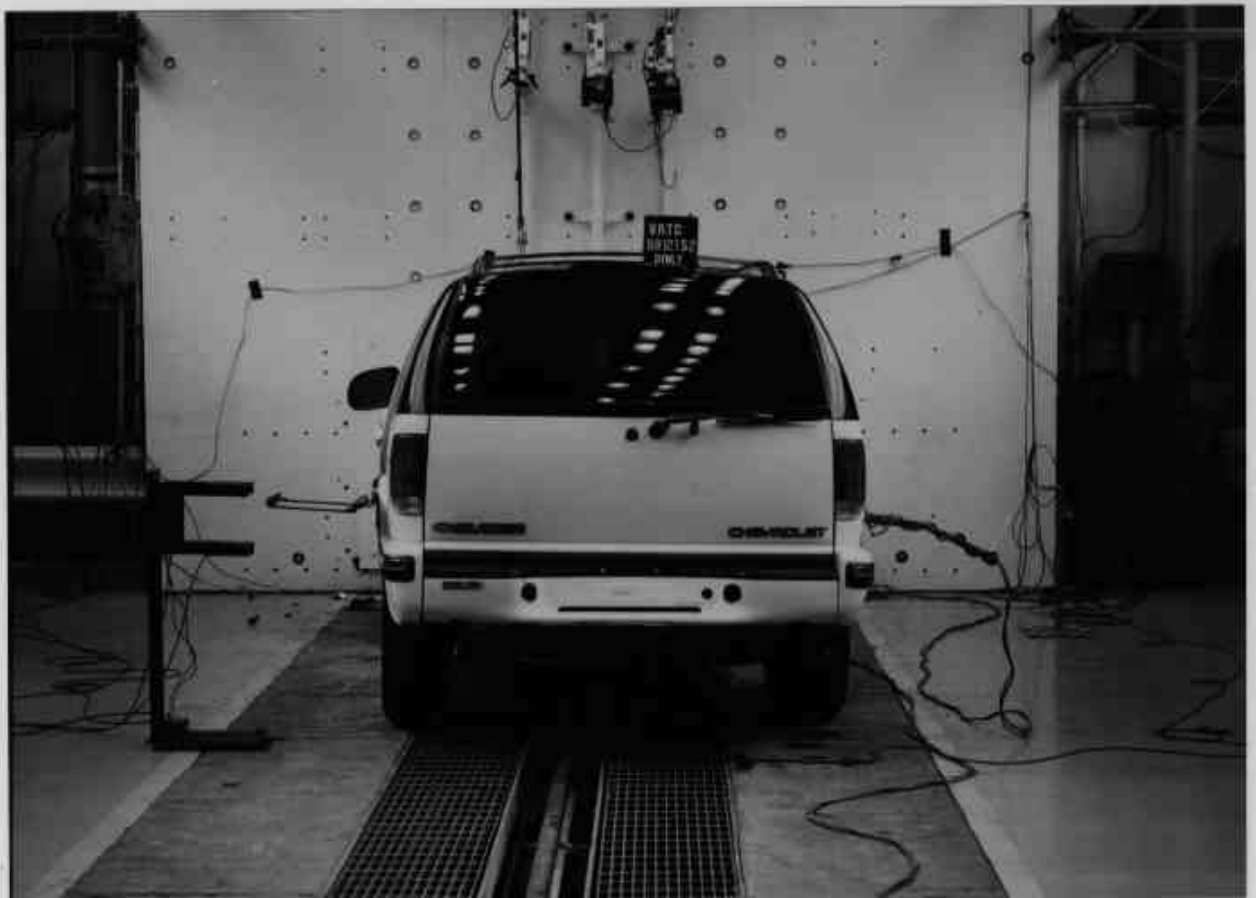


Figure A-8 Post-Test Rear View



Figure A-9 Pre-Test Right Side View



Figure A-10 Post-Test Right Side View



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



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

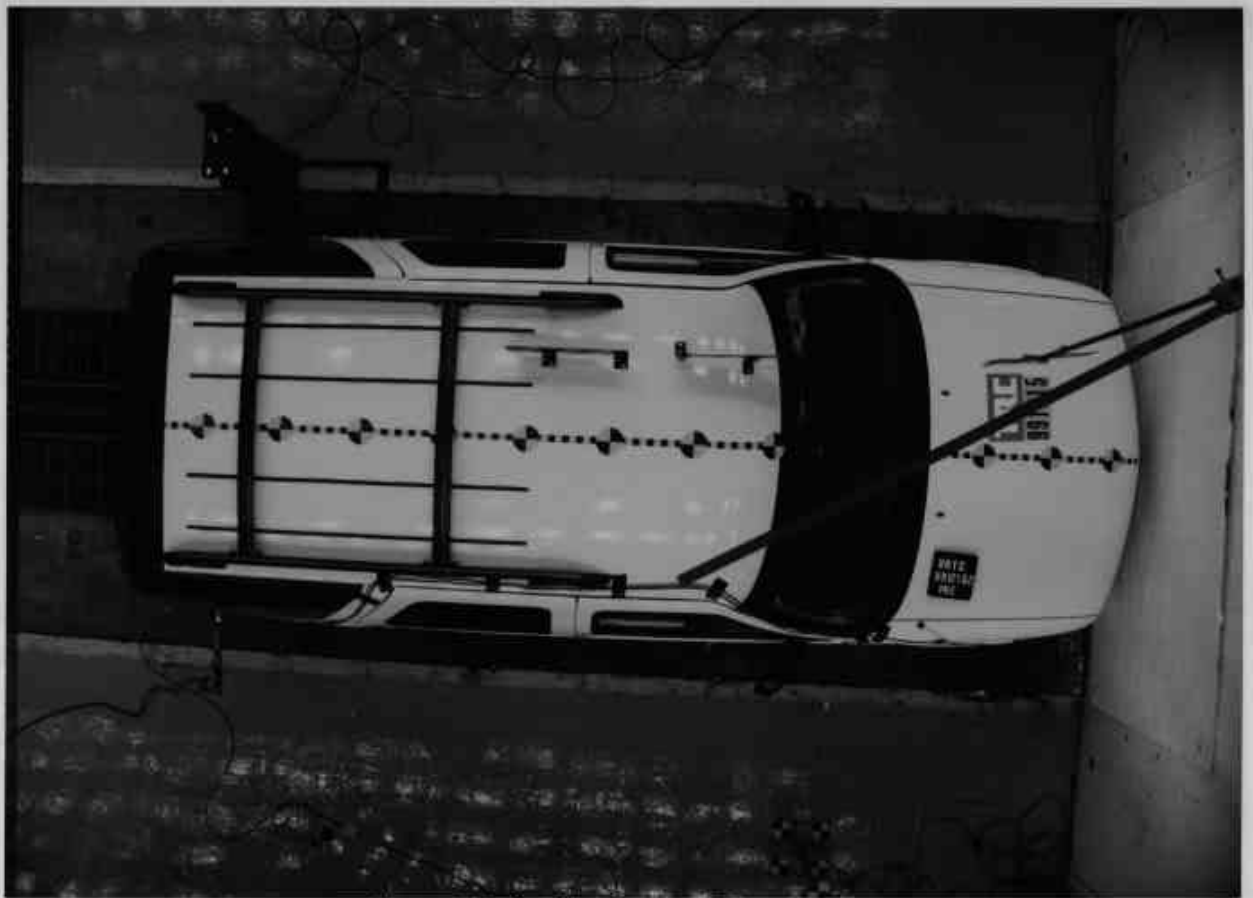


Figure A-13 Pre-Test Overhead View

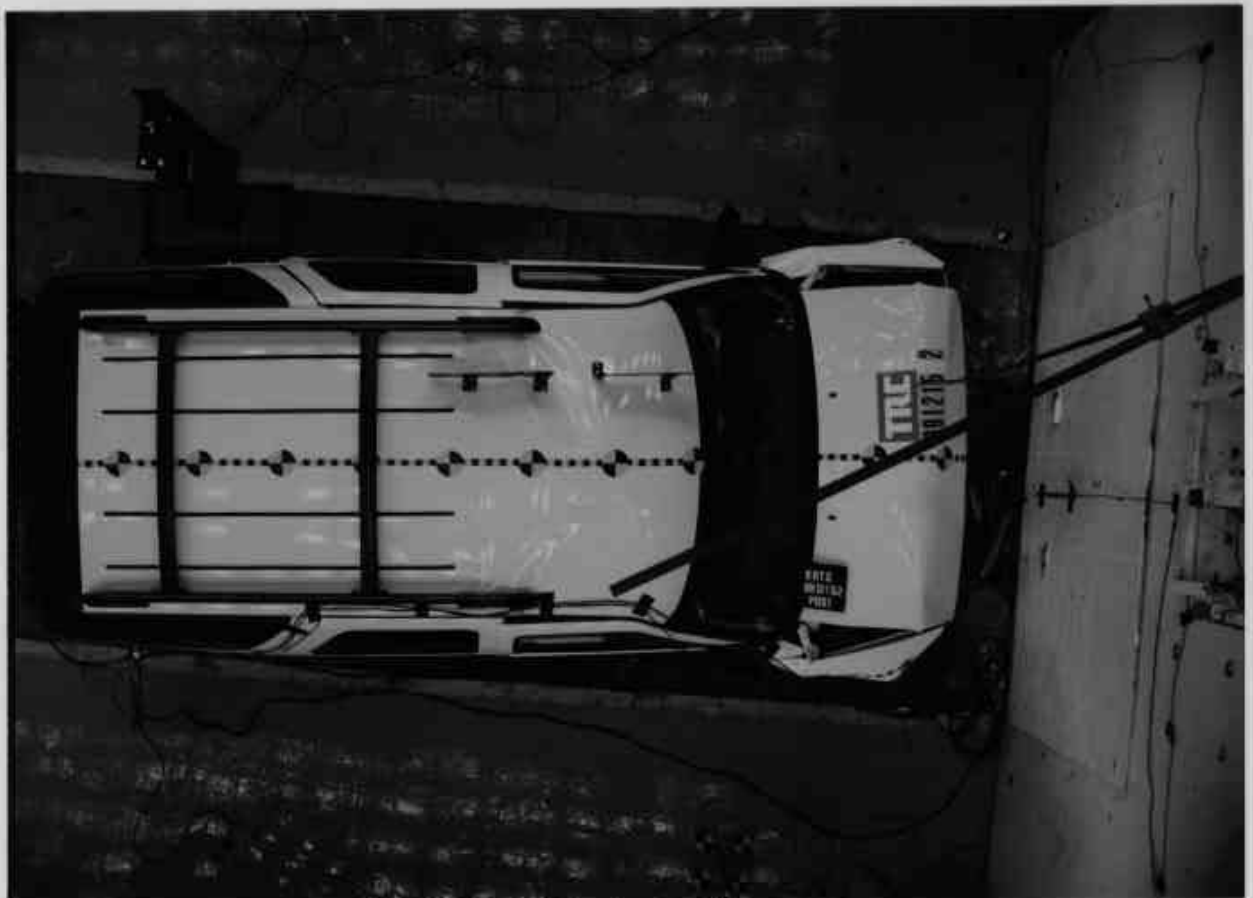


Figure A-14 Post-Test Overhead View



Figure A-15 Pre-Test Front Underbody View



Figure A-16 Post-Test Front Underbody View



Figure A-17 Pre-Test Rear Underbody View



Figure A-18 Post-Test Rear Underbody View



Figure A-19 Pre-Test Engine Compartment View



Figure A-20 Post-Test Engine Compartment View



Figure A-21 Pre-Test Front Windshield View



Figure A-22 Post-Test Front Windshield - View 1



Figure A-23 Post-Test Front Windshield - View 2

Intentionally Left Blank



Figure A-24 Pre-Test Front Windshield Driver and Passenger Dummy View



Figure A-25 Post-Test Front Windshield Driver and Passenger Dummy View



Figure A-26 Pre-Test Driver Dummy Windshield View



Figure A-27 Post-Test Driver Dummy Windshield View



Figure A-28 Pre-Test Passenger Dummy Windshield View



Figure A-29 Post-Test Passenger Dummy Windshield View



Figure A-30 Pre-Test Driver Dummy Position - View 1



Figure A-31 Post-Test Driver Dummy Position - View 1



Figure A-32 Pre-Test Driver Dummy Position - View 2



Figure A-33 Post-Test Driver Dummy Position - View 2



Figure A-34 Pre-Test Driver Dummy Position - View 3



Figure A-35 Post-Test Driver Dummy Position - View 3



Figure A-36 Pre-Test Passenger Dummy Position - View 1



Figure A-37 Post-Test Passenger Dummy Position - View 1



Figure A-38 Pre-Test Passenger Dummy Position - View 2



Figure A-39 Post-Test Passenger Dummy Position - View 2



Figure A-40 Pre-Test Passenger Dummy Position - View 3



Figure A-41 Post-Test Passenger Dummy Position - View 3



Figure A-42 Post-Test Driver Dummy View



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



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



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



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



Figure A-47 Post-Test Driver Dummy Knee Contact - View 3



Figure A-48 Post-Test Passenger Dummy View

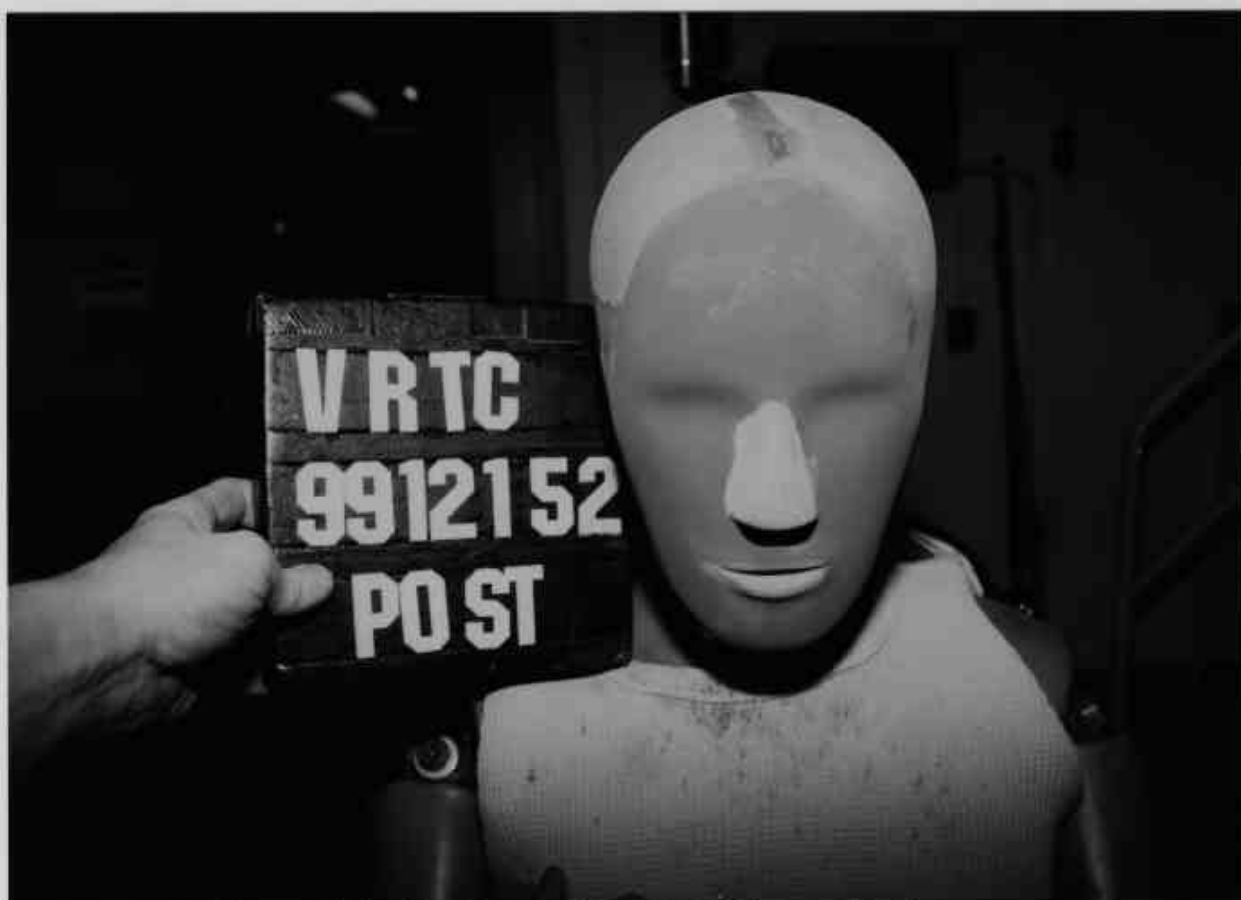


Figure A-49 Post-Test Passenger Dummy Head Contact - View 1



Figure A-50 Post-Test Passenger Dummy Head Contact - View 2



Figure A-51 Post-Test Passenger Dummy Knee Contact - View 1



Figure A-52 Post-Test Passenger Dummy Knee Contact - View 2



Figure A-53 Post-Test Damage - View 1

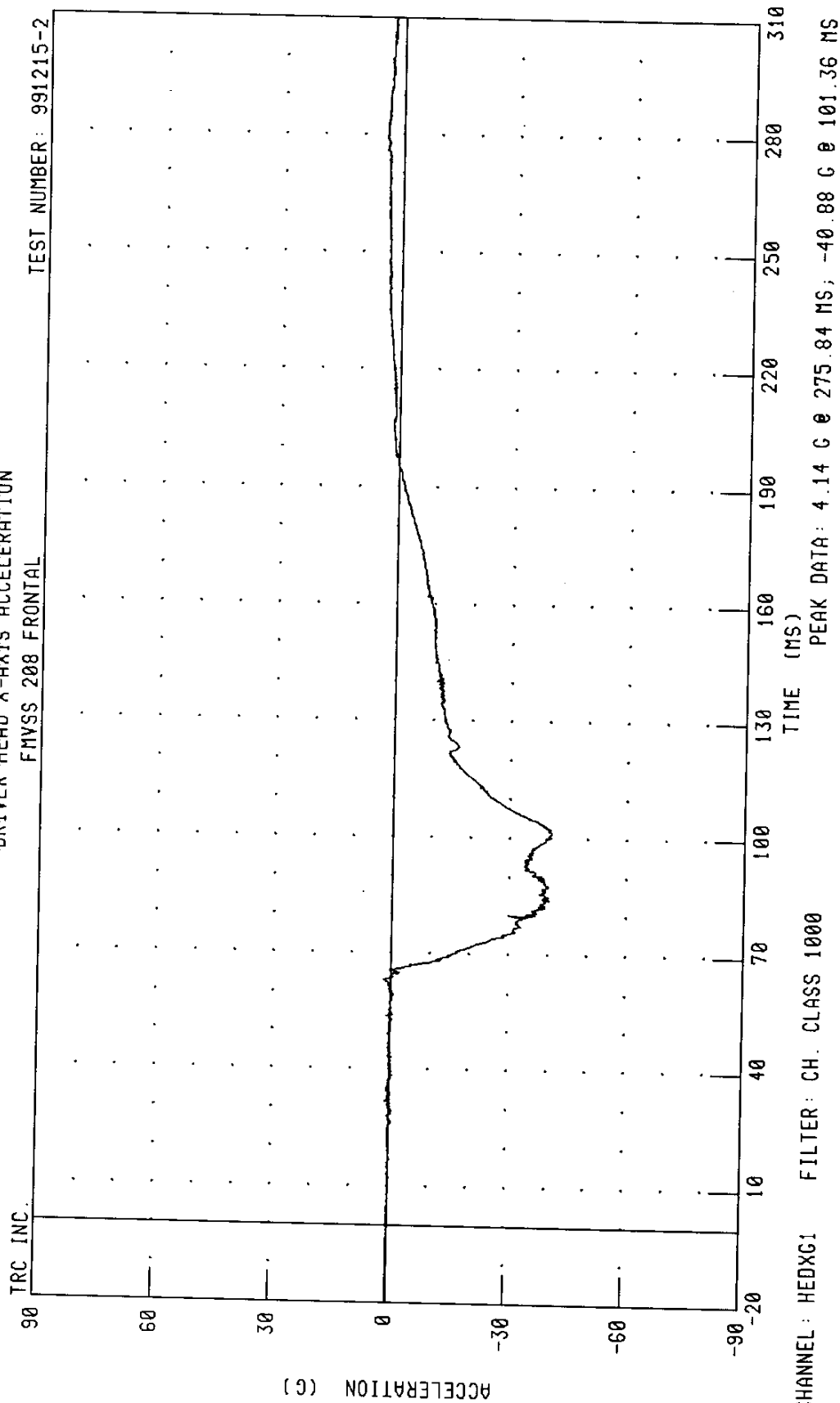


Figure A-54 Post-Test Damage - View 2



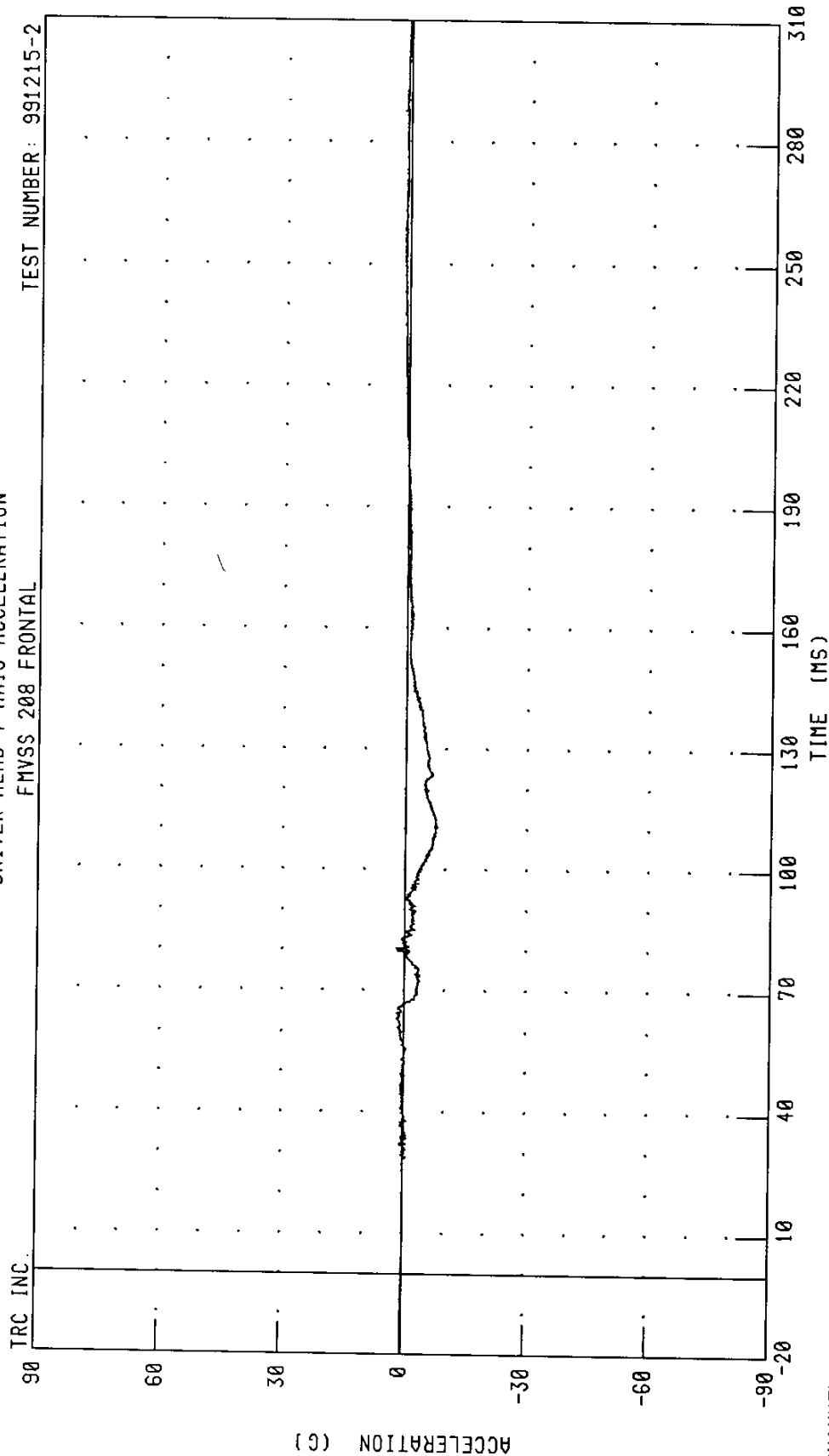
Figure A-55 Pre-Test Certification and Tire Information Label View

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD X-AXIS ACCELERATION



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD Y-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991215-2

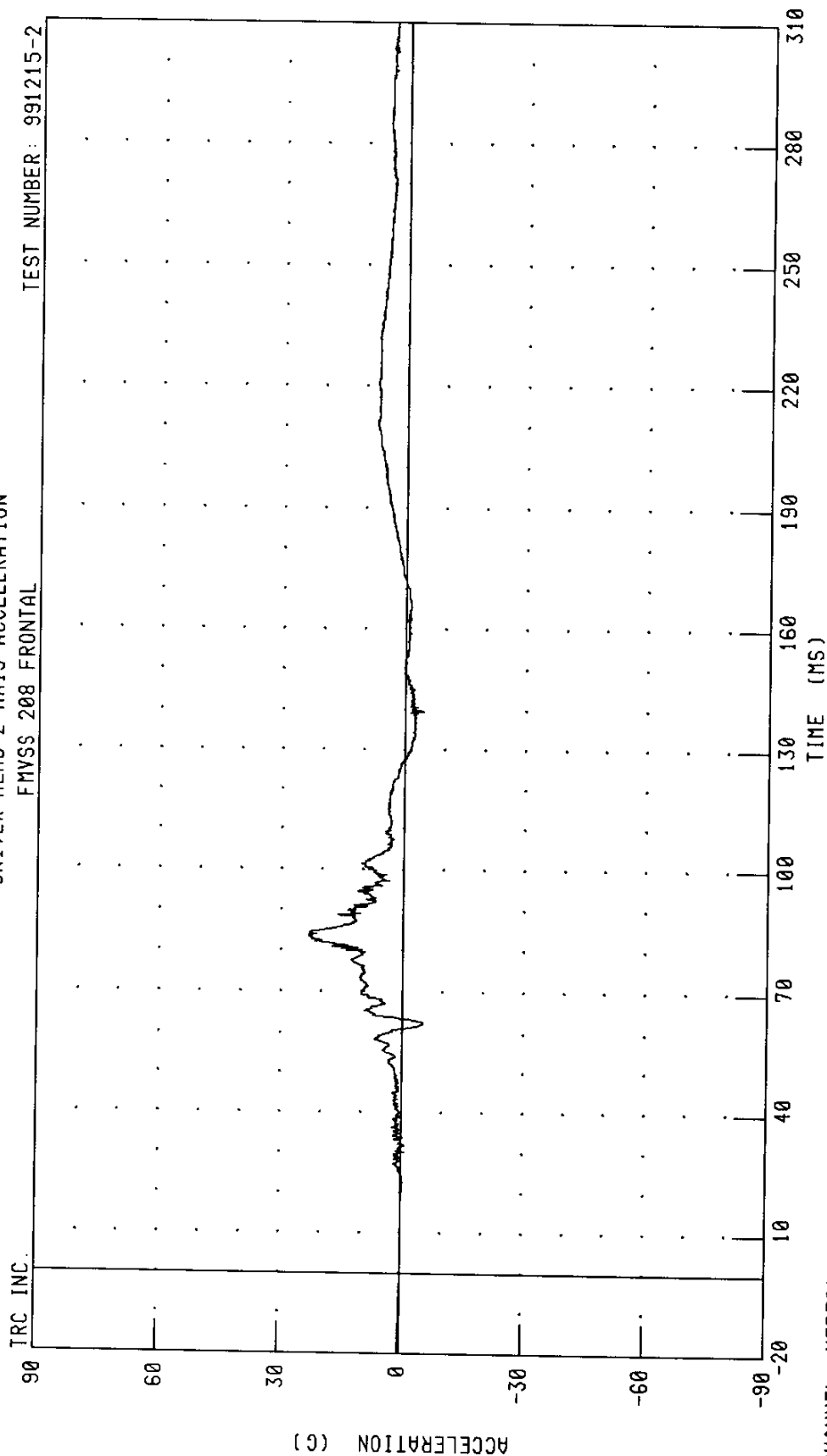


CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

PEAK DATA: 1.94 G @ 80.48 MS, -7.99 G @ 110.40 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD Z-AXIS ACCELERATION

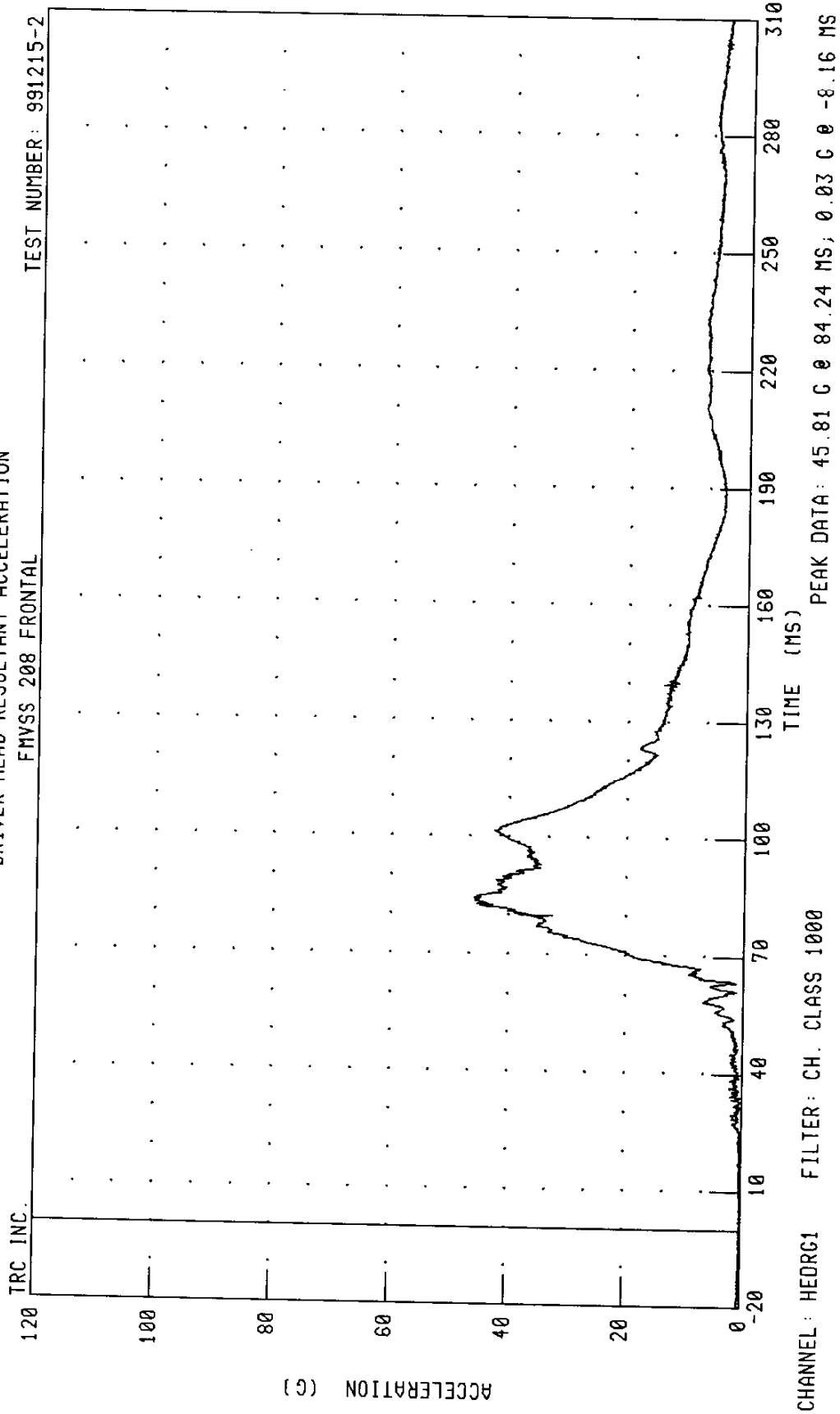
TRC INC. TEST NUMBER: 991215-2
FMVSS 208 FRONTAL



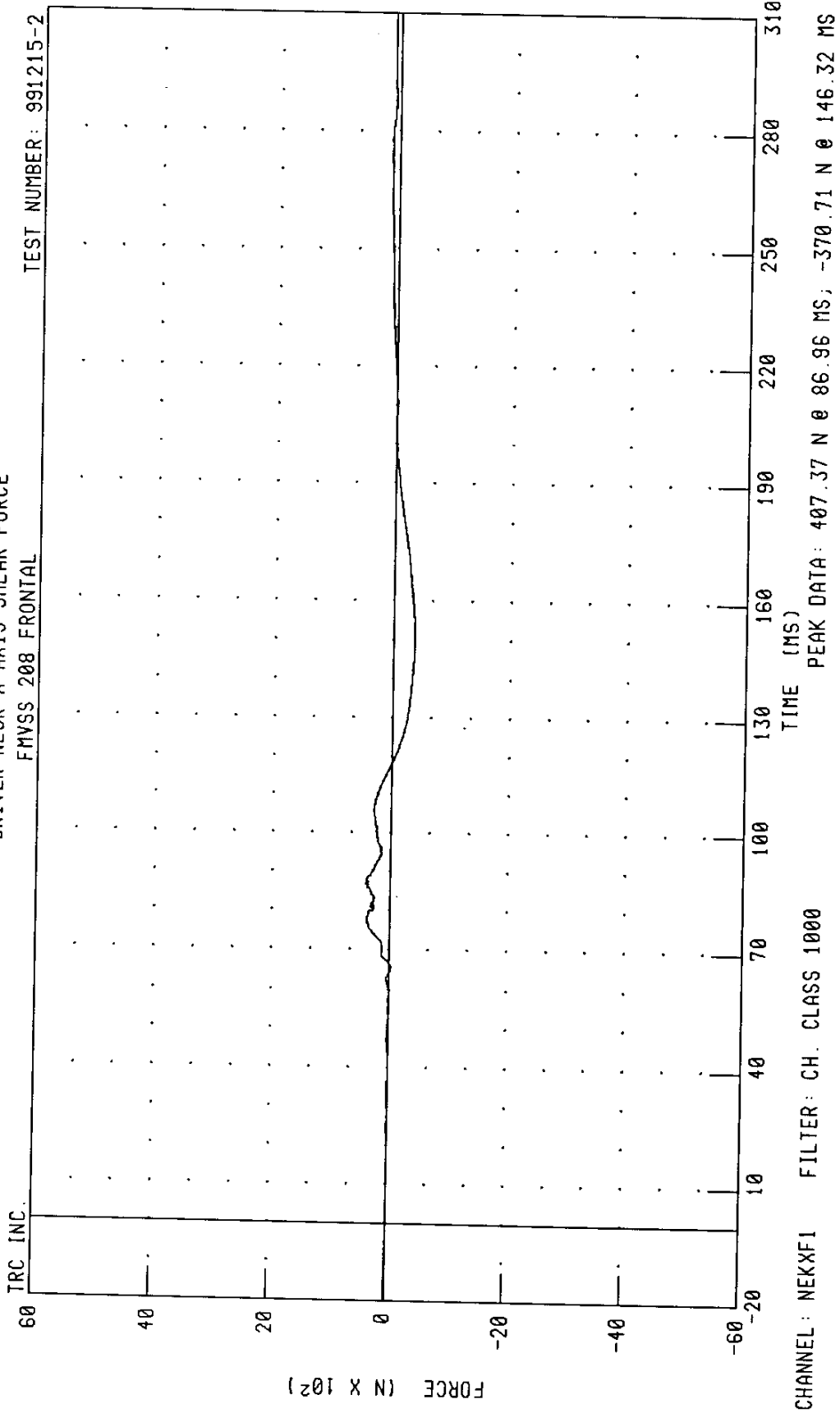
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

PEAK DATA: 23.26 G @ 83.68 MS; -5.29 G @ 62.56 MS

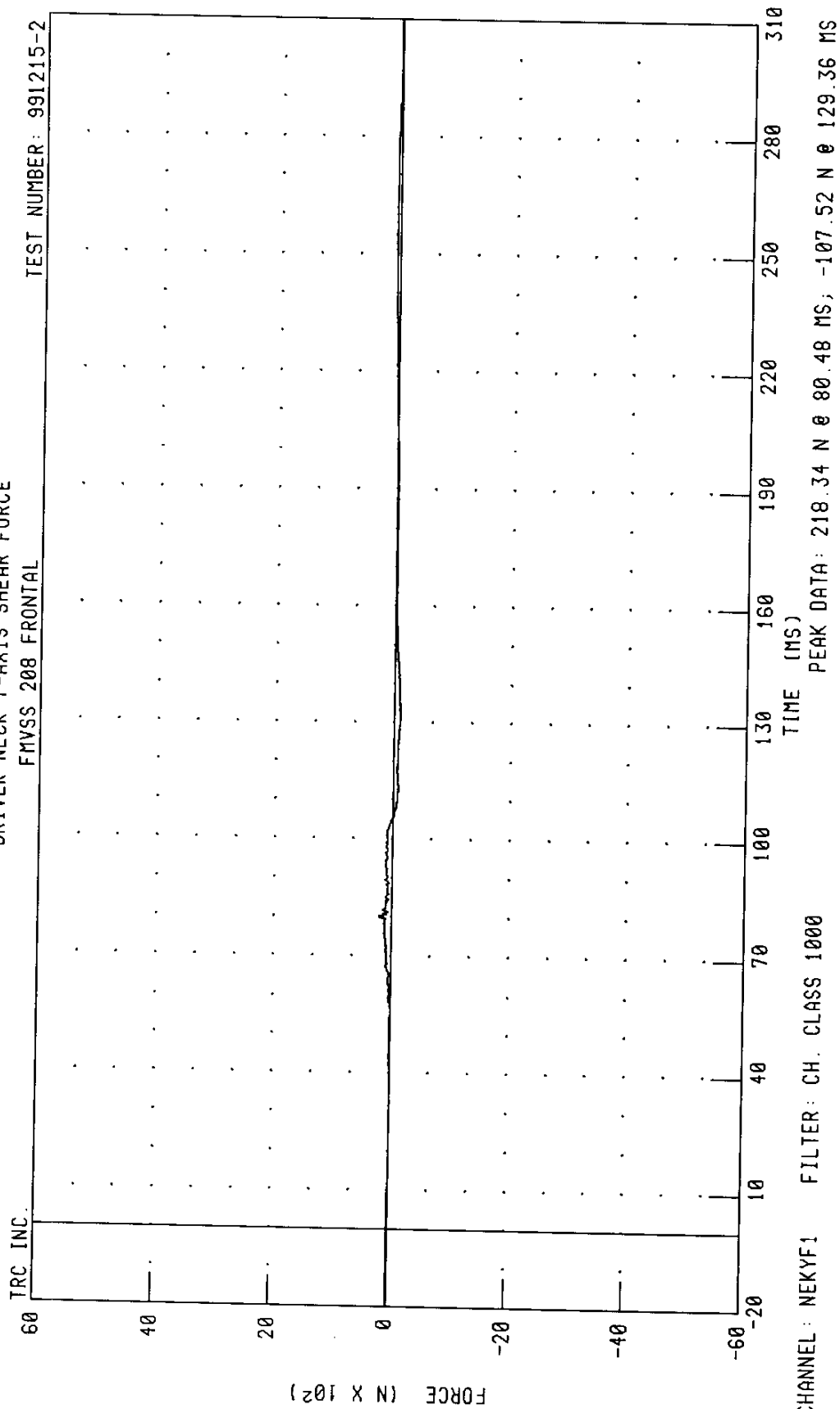
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD RESULTANT ACCELERATION



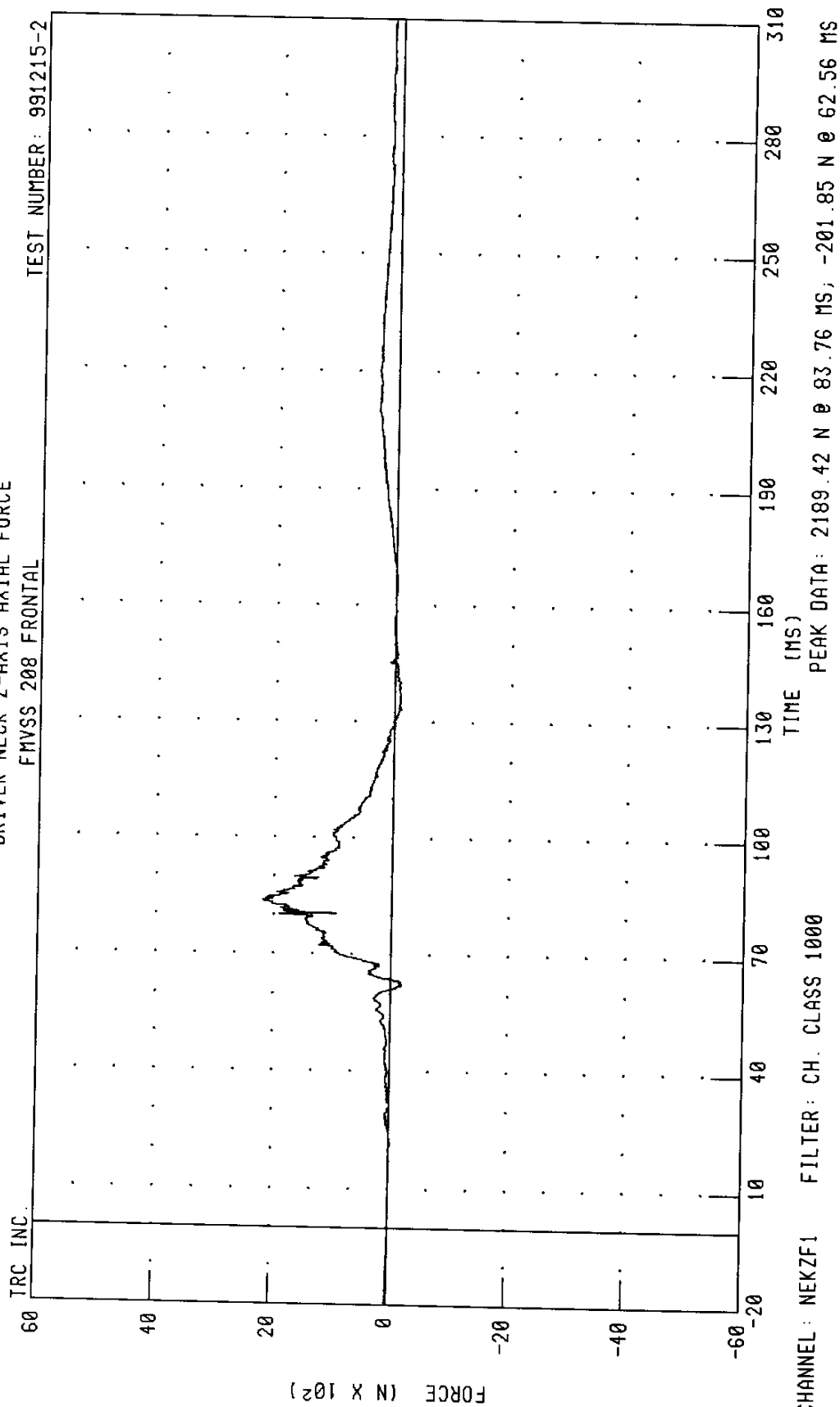
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK X-AXIS SHEAR FORCE



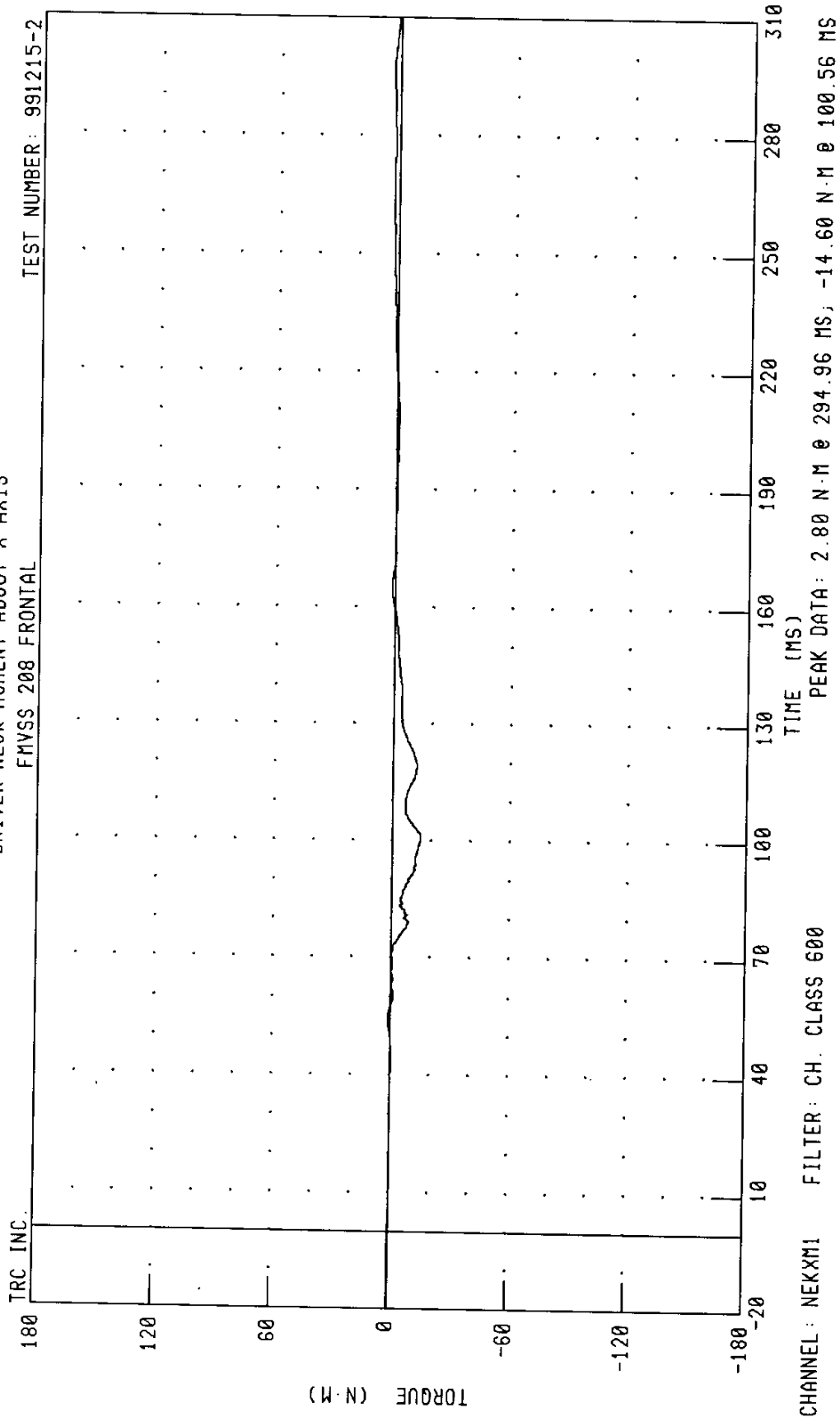
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK Y-AXIS SHEAR FORCE



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK Z-AXIS AXIAL FORCE

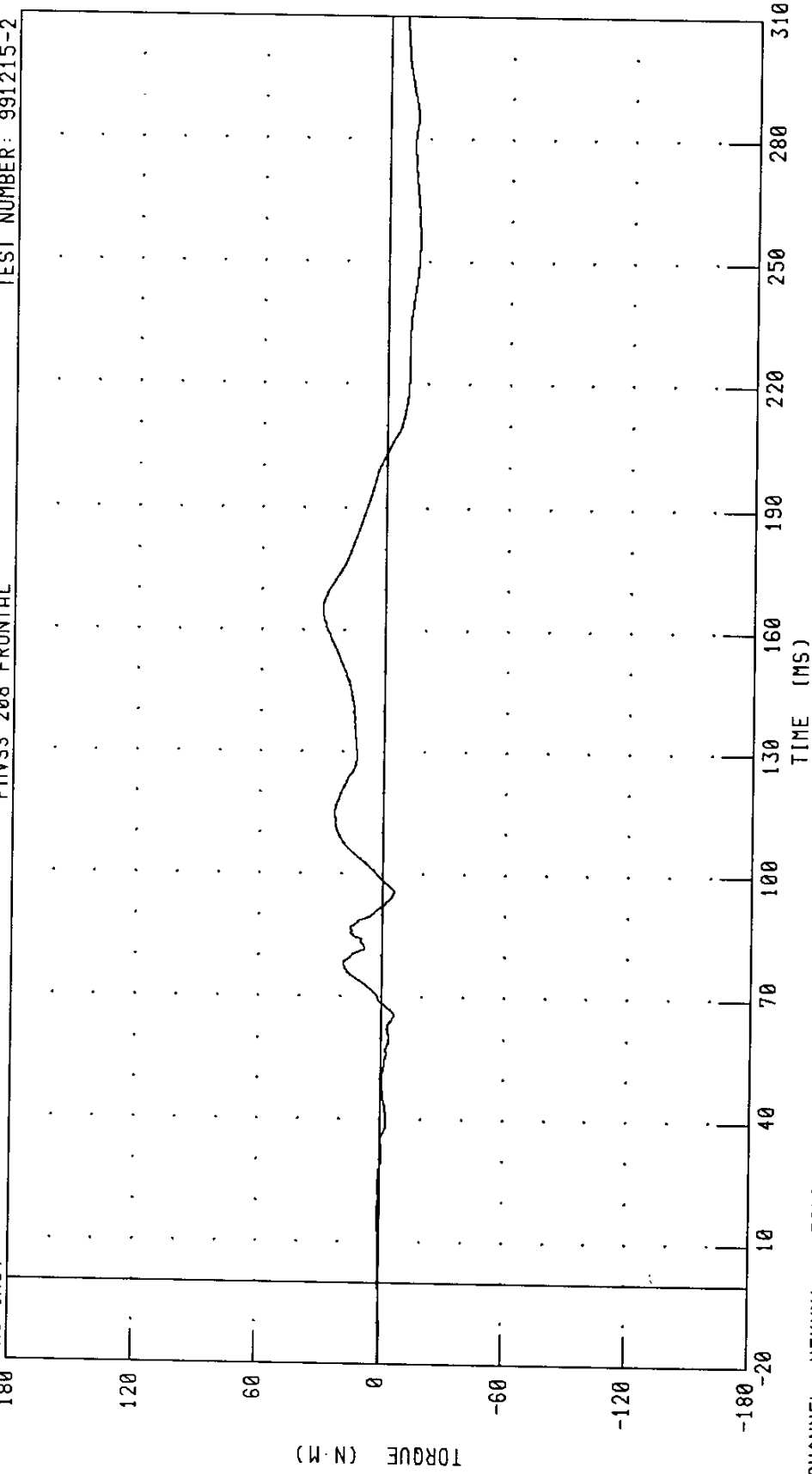


1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT X AXIS



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT Y AXIS

TRC INC. FMVSS 208 FRONTAL TEST NUMBER: 991215-2



CHANNEL: NEKYM1 FILTER: CH. CLASS 600
PEAK DATA: 30.39 N·m @ 165.76 ms; -15.26 N·m @ 256.32 ms

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 991215-2

FMVSS 208 FRONTAL

TRC INC.

180

120

60

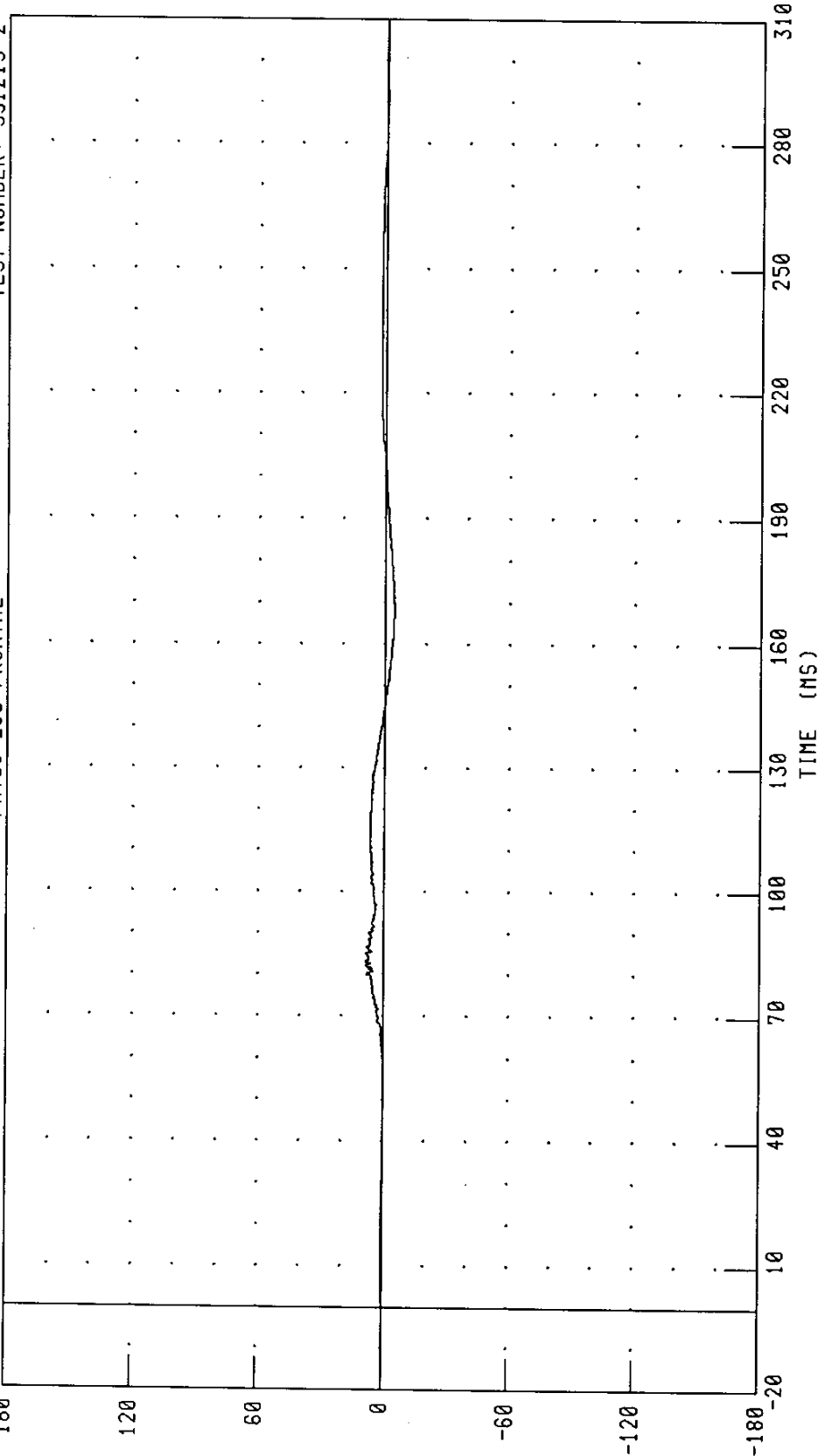
0

-60

-120

-180

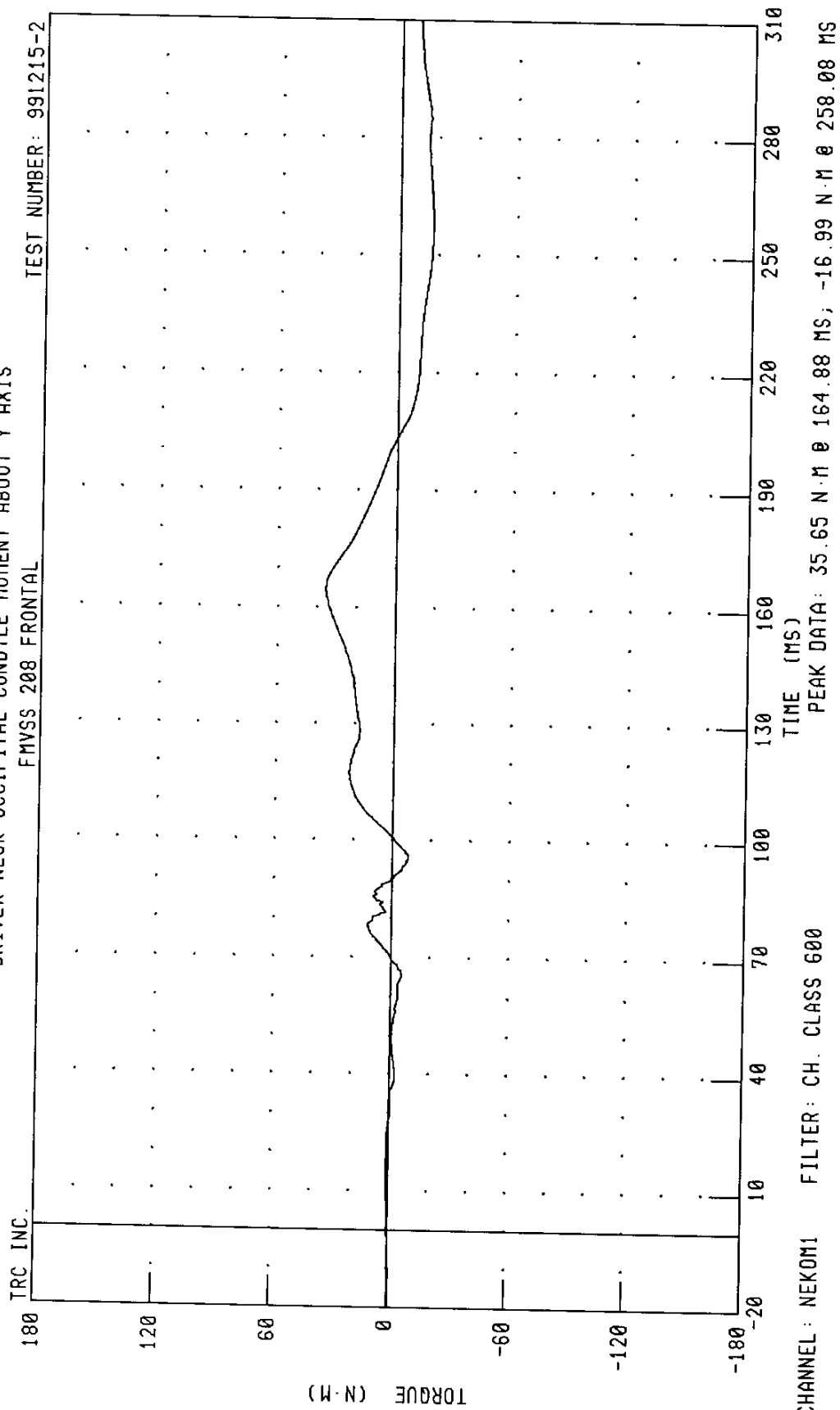
TORQUE (N·M)



CHANNEL: NEKZH1 FILTER: CH. CLASS 600

PEAK DATA: 8.60 N·M @ 83.20 MS, -4.62 N·M @ 167.60 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS

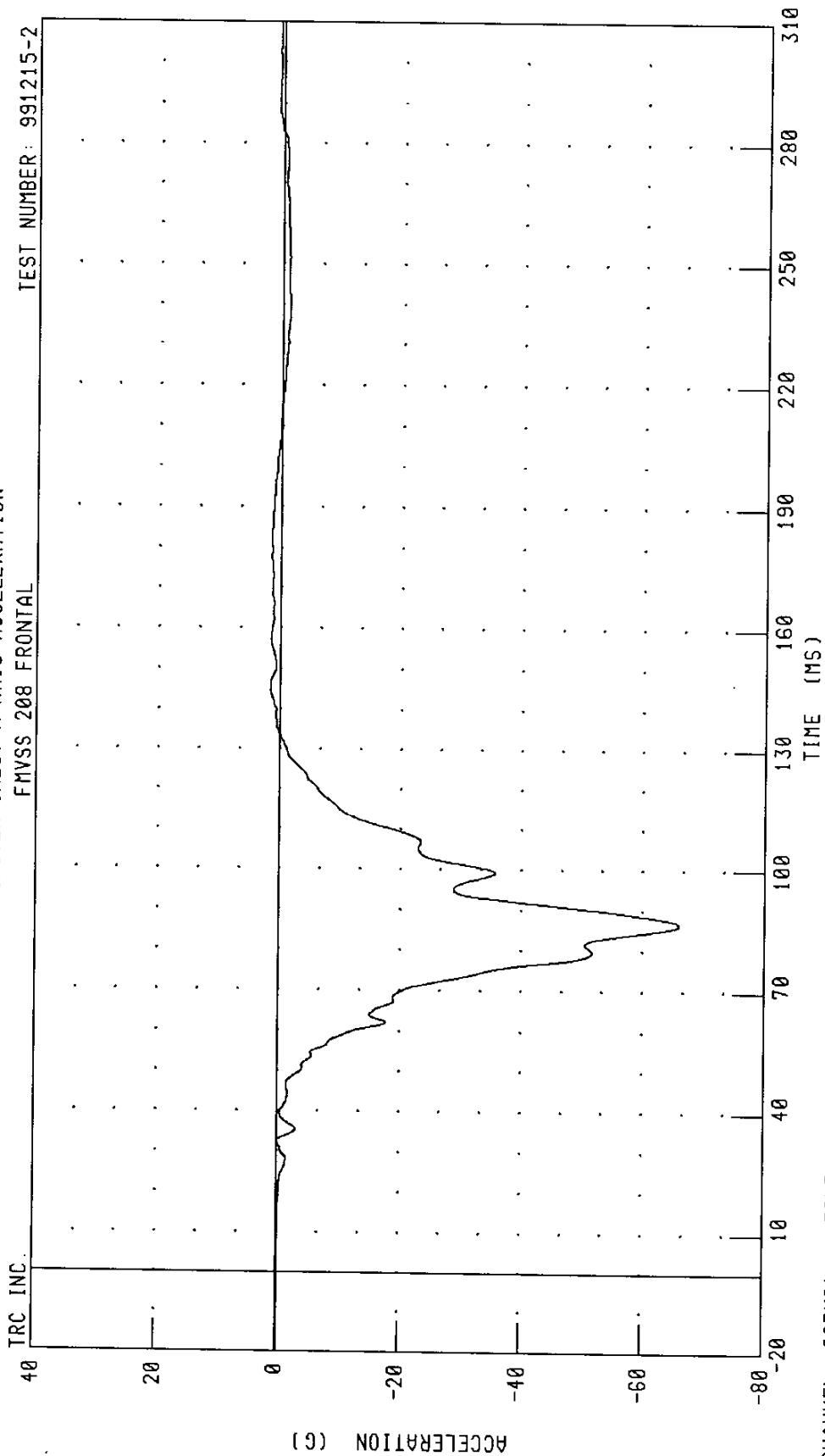


1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH

DRIVER CHEST X-AXIS ACCELERATION

FMVSS 208 FRONTAL

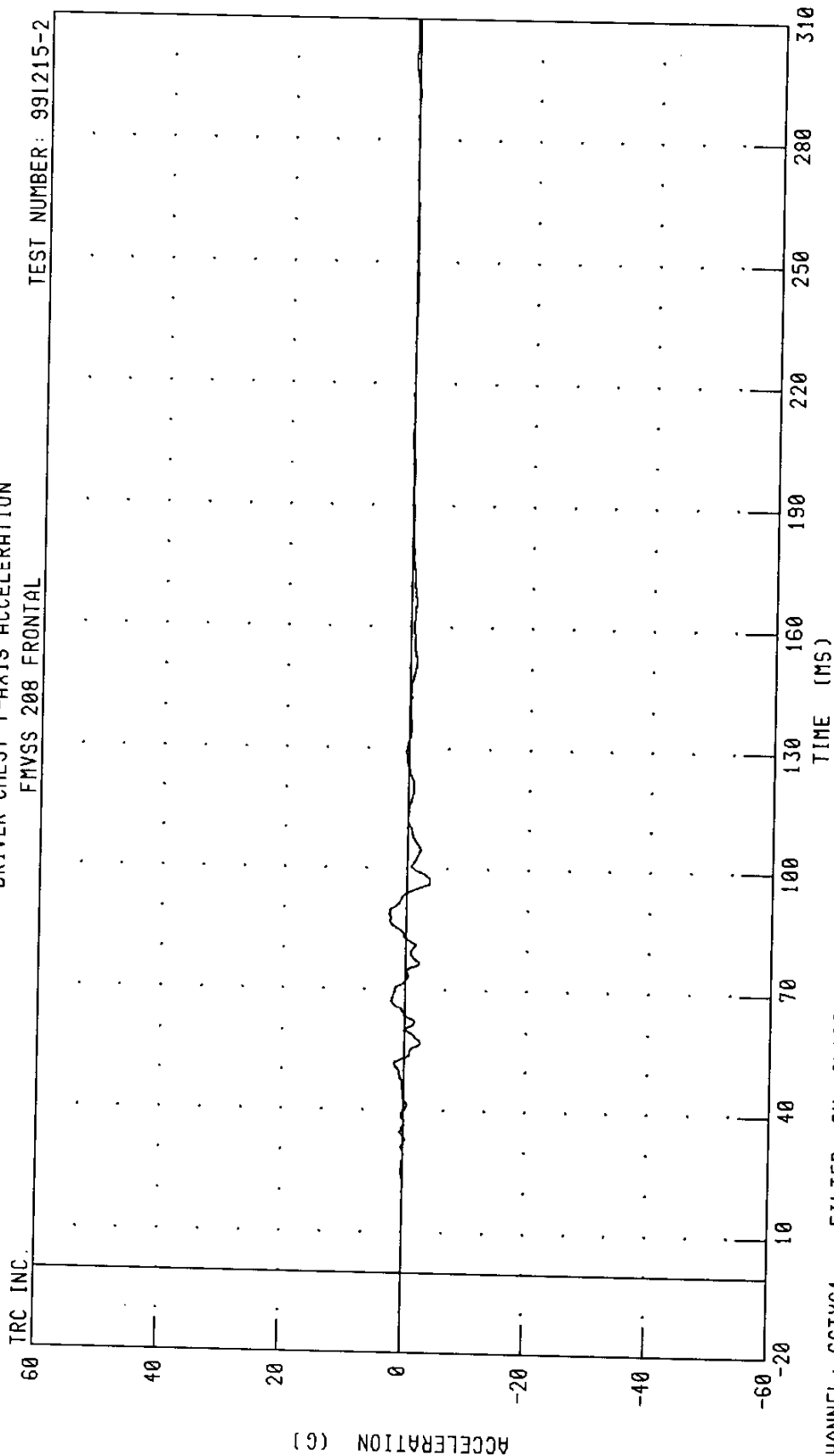
TEST NUMBER: 991215-2



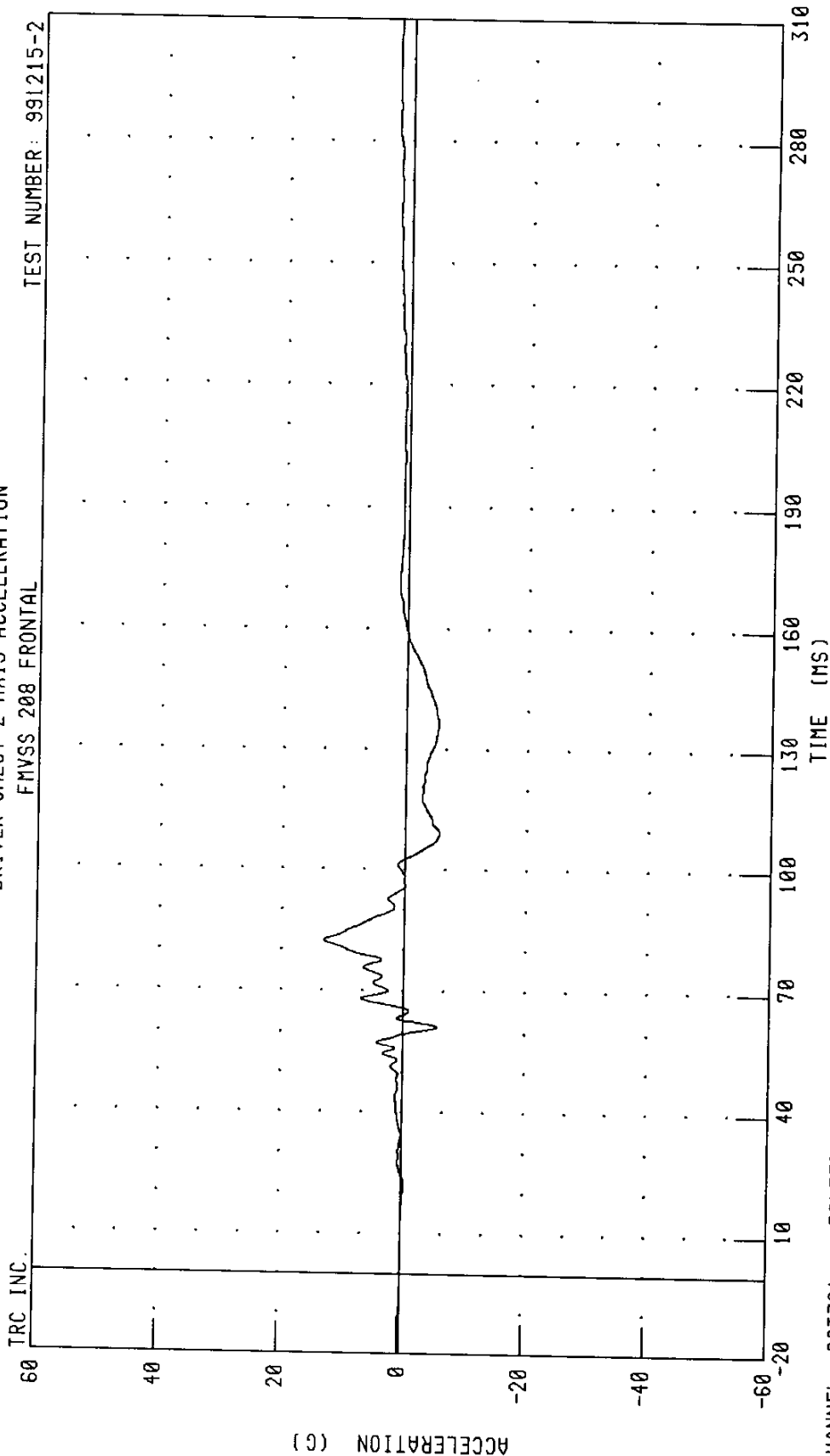
CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 1.69 G @ 144.72 MS, -66.00 G @ 86.64 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST Y-AXIS ACCELERATION
FMVSS 208 FRONTAL



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST Z-AXIS ACCELERATION
FMVSS 208 FRONTAL

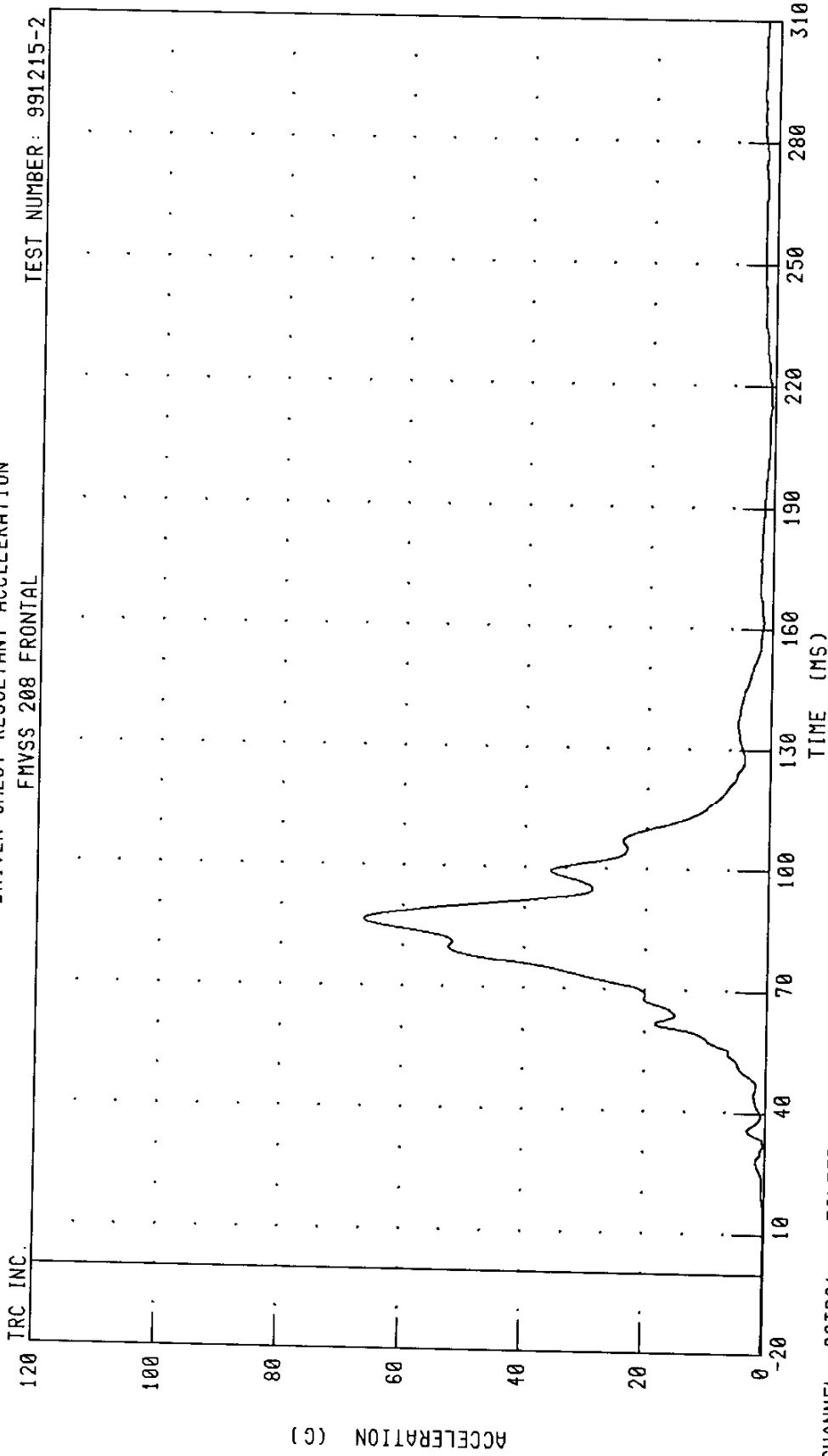


CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 13.15 G @ 82.48 MS, -5.65 G @ 109.12 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST RESULTANT ACCELERATION

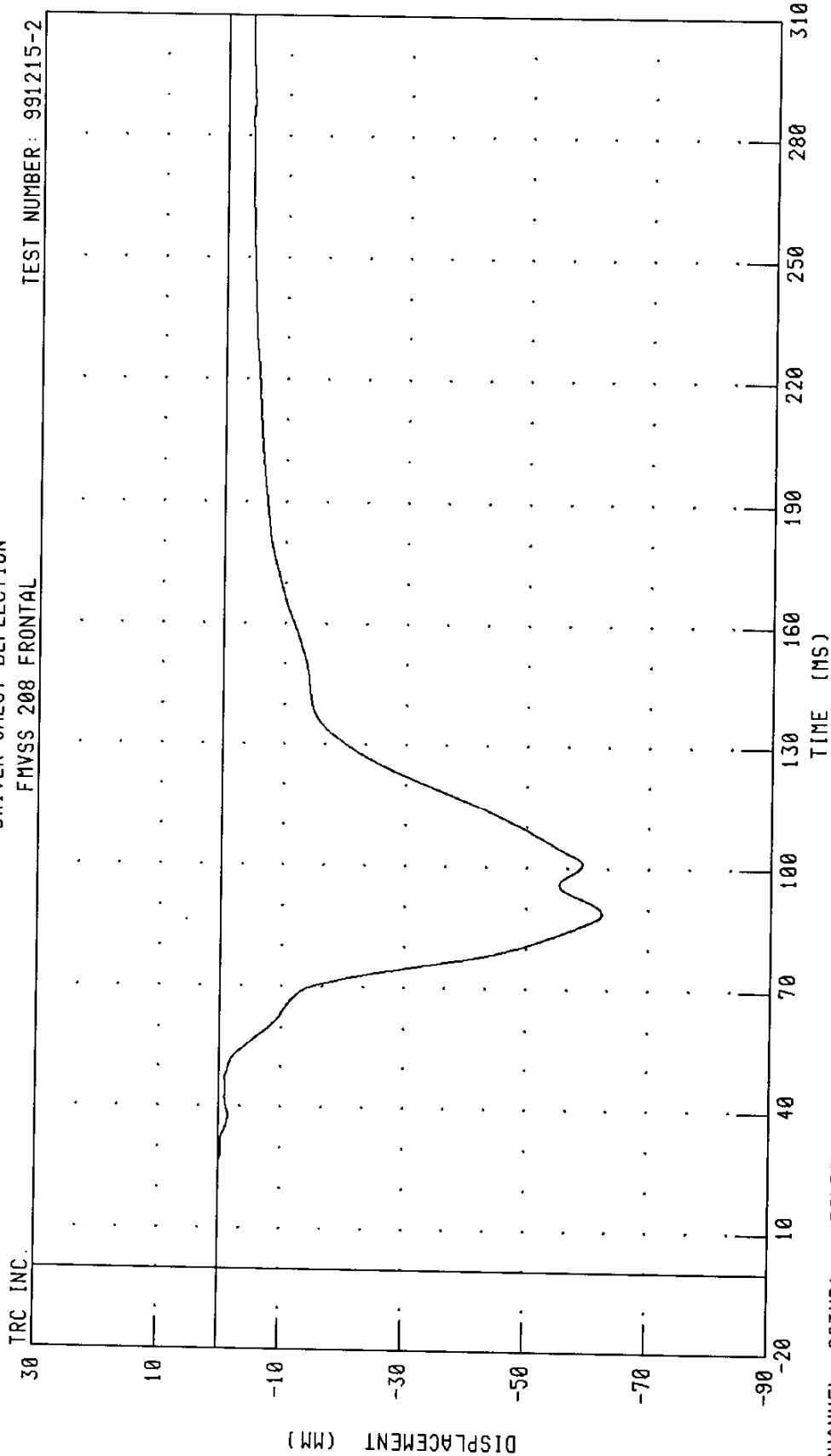
TRC INC. TEST NUMBER: 991215-2
FMVSS 208 FRONTAL



CHANNEL: CSTRG1 FILTER: CH. CLASS 180
PEAK DATA: 66.40 G @ 66.64 MS, 0.02 G @ -20.00 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST DEFLECTION
FMVSS 208 FRONTAL

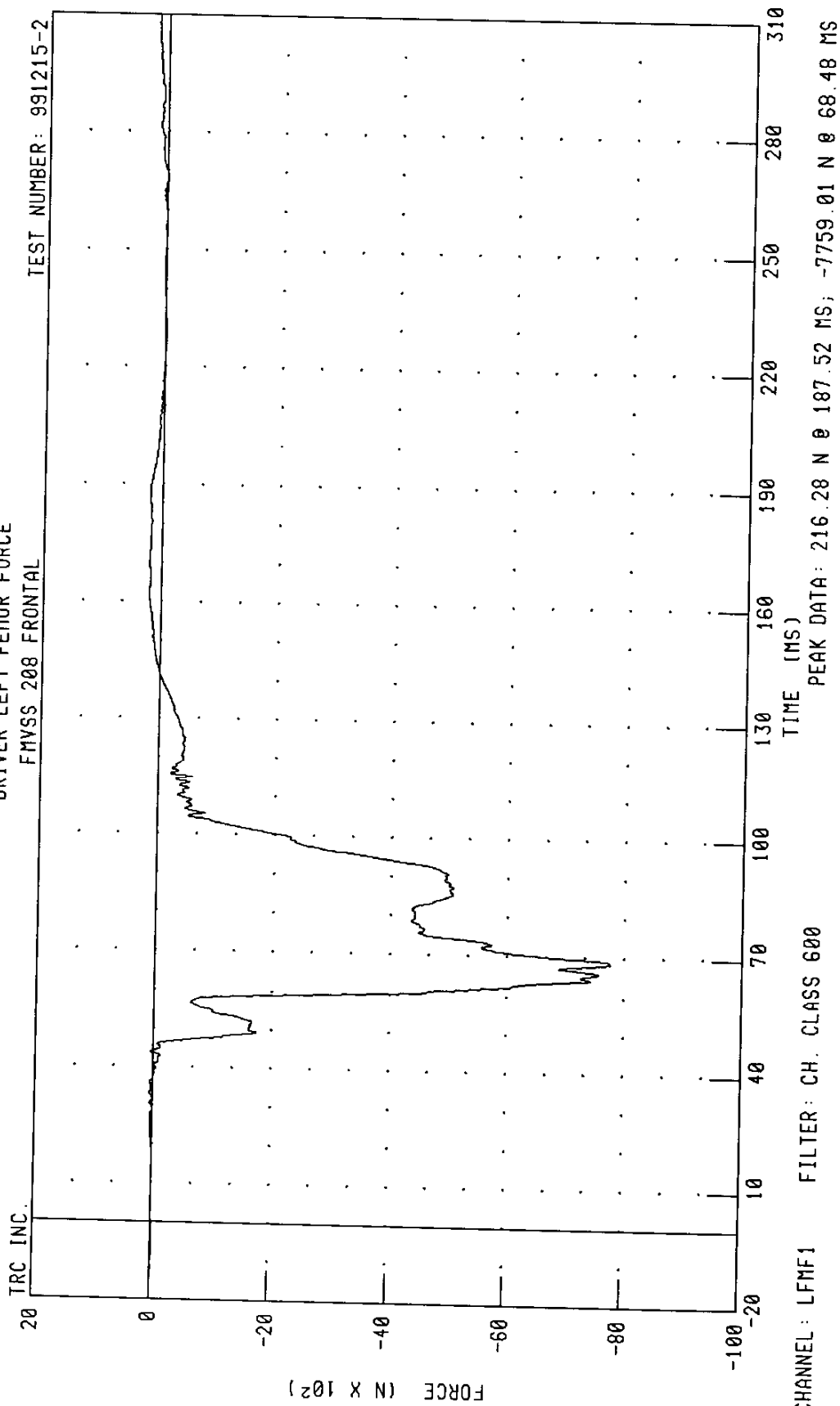
TEST NUMBER: 991215-2



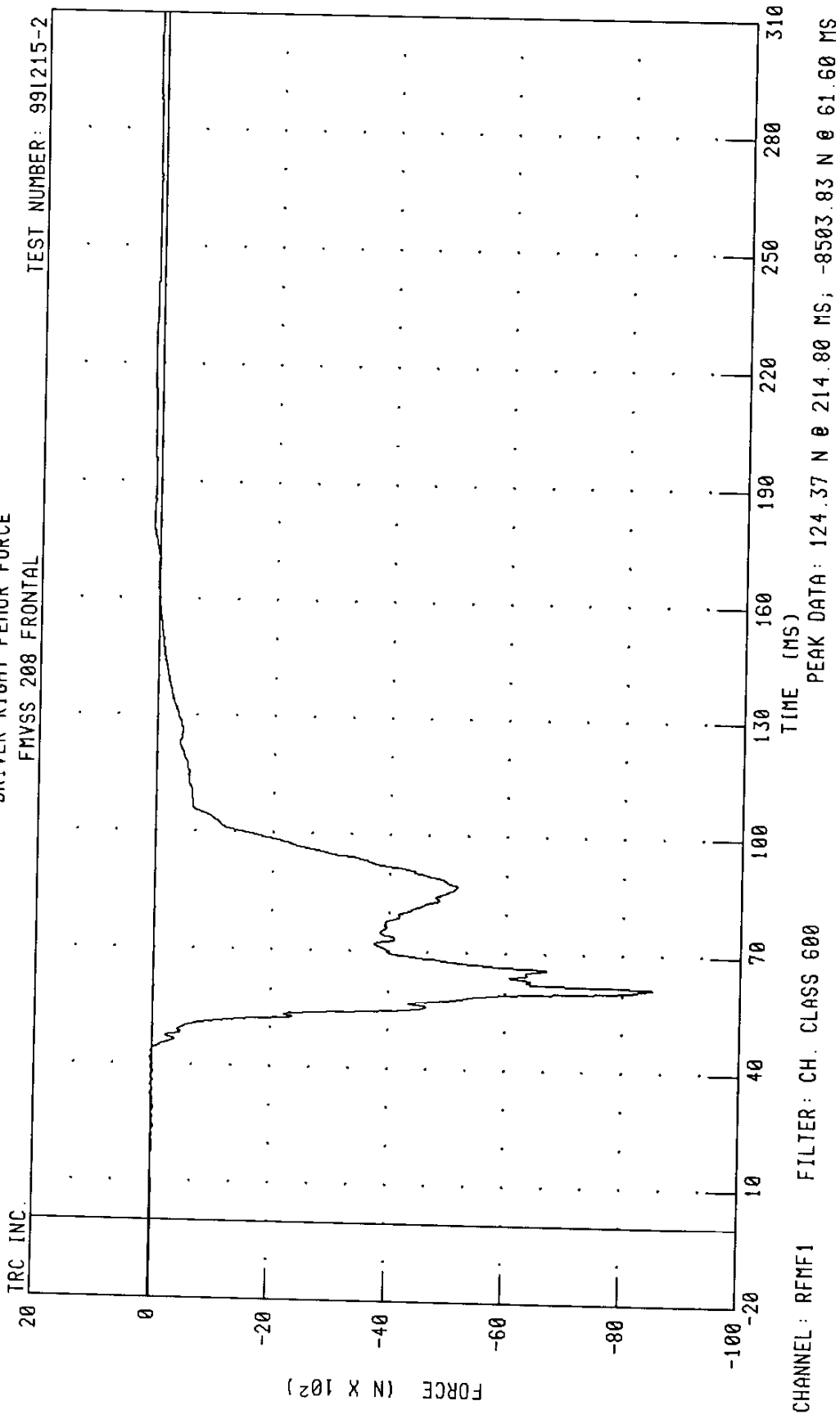
CHANNEL: CSTXD1 FILTER: CH. CLASS 180

PEAK DATA: 0.02 MM @ 25.92 MS; -62.35 MM @ 88.96 MS

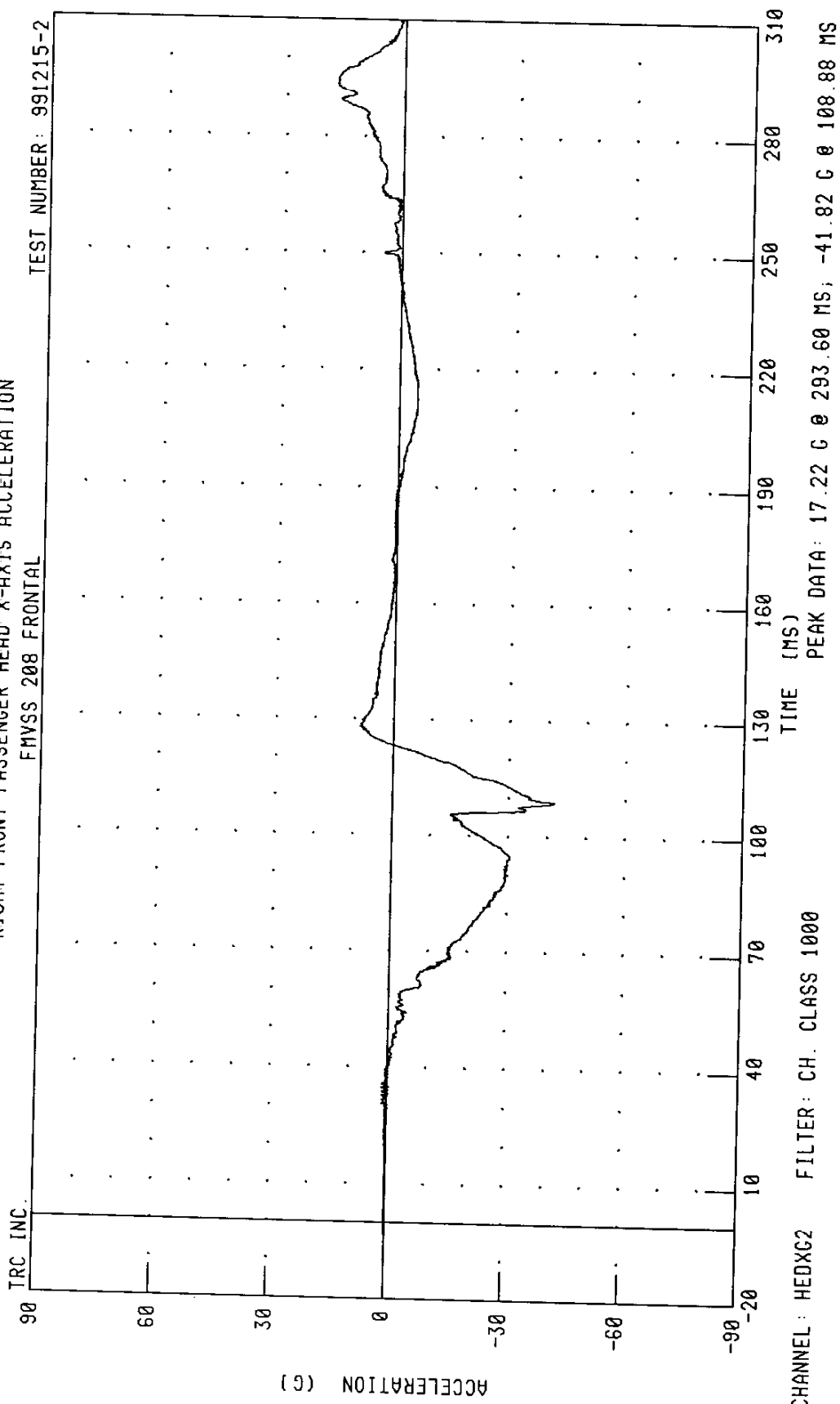
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER LEFT FEMUR FORCE
FMVSS 208 FRONTAL



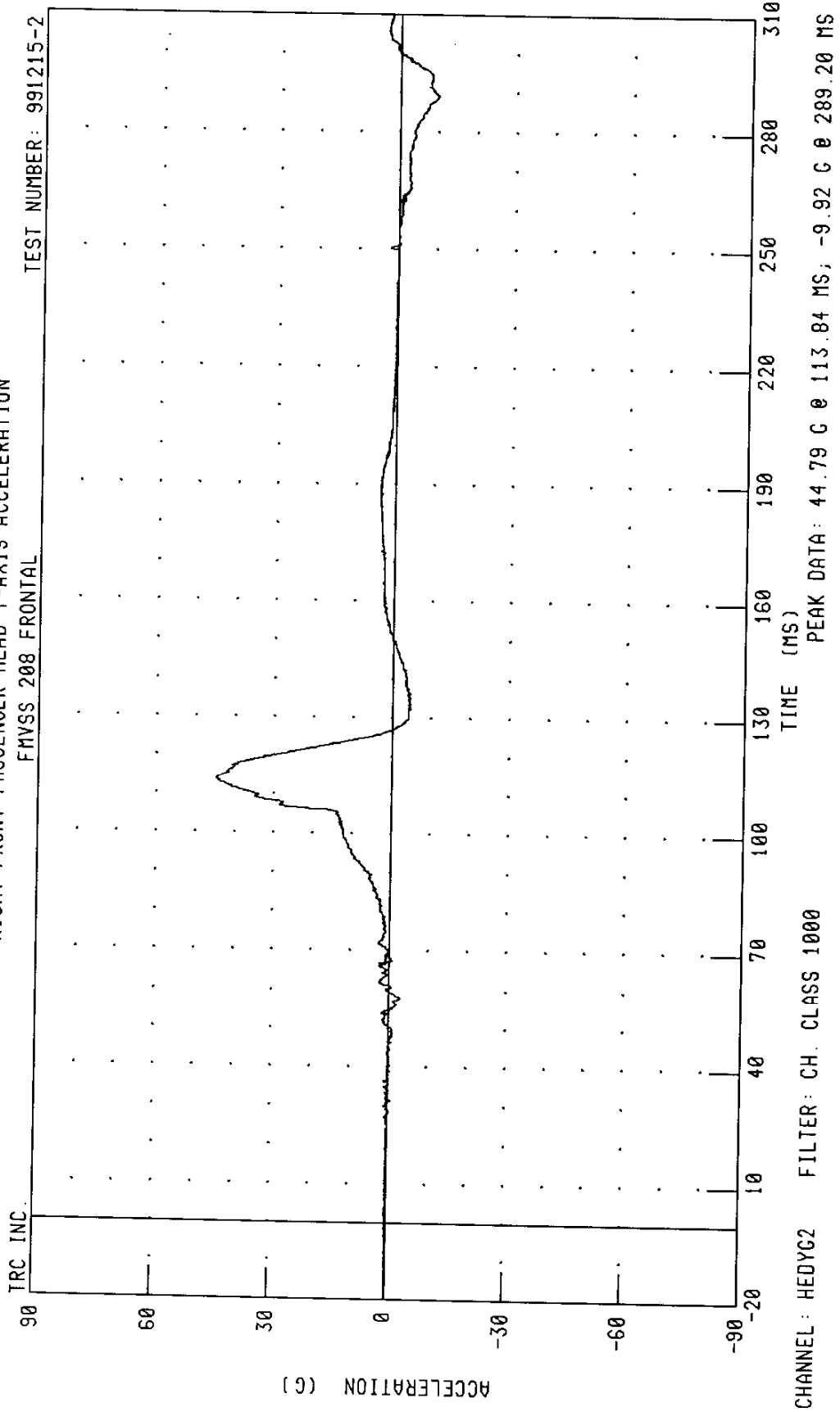
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER RIGHT FEMUR FORCE
FMVSS 208 FRONTAL



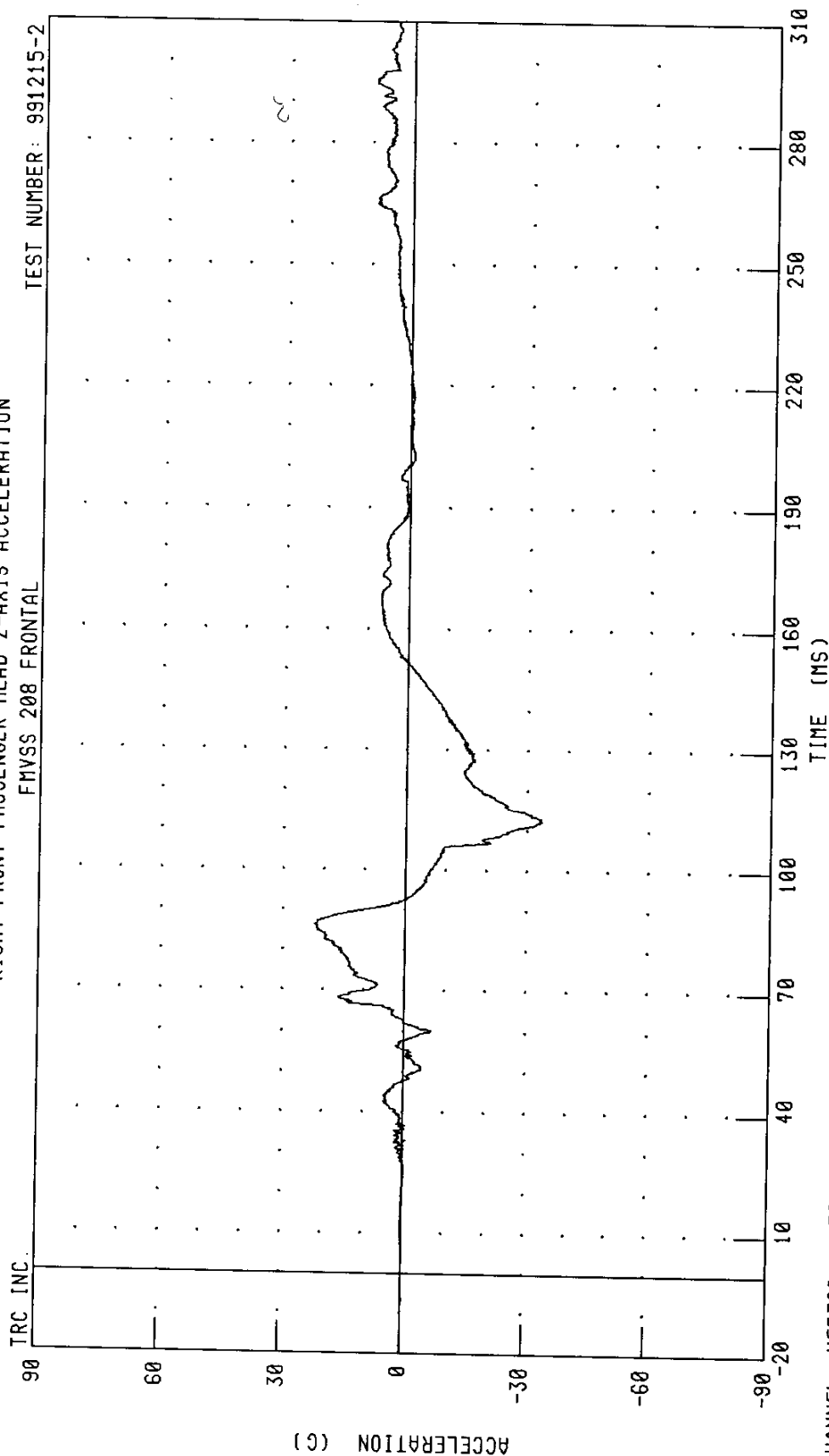
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION



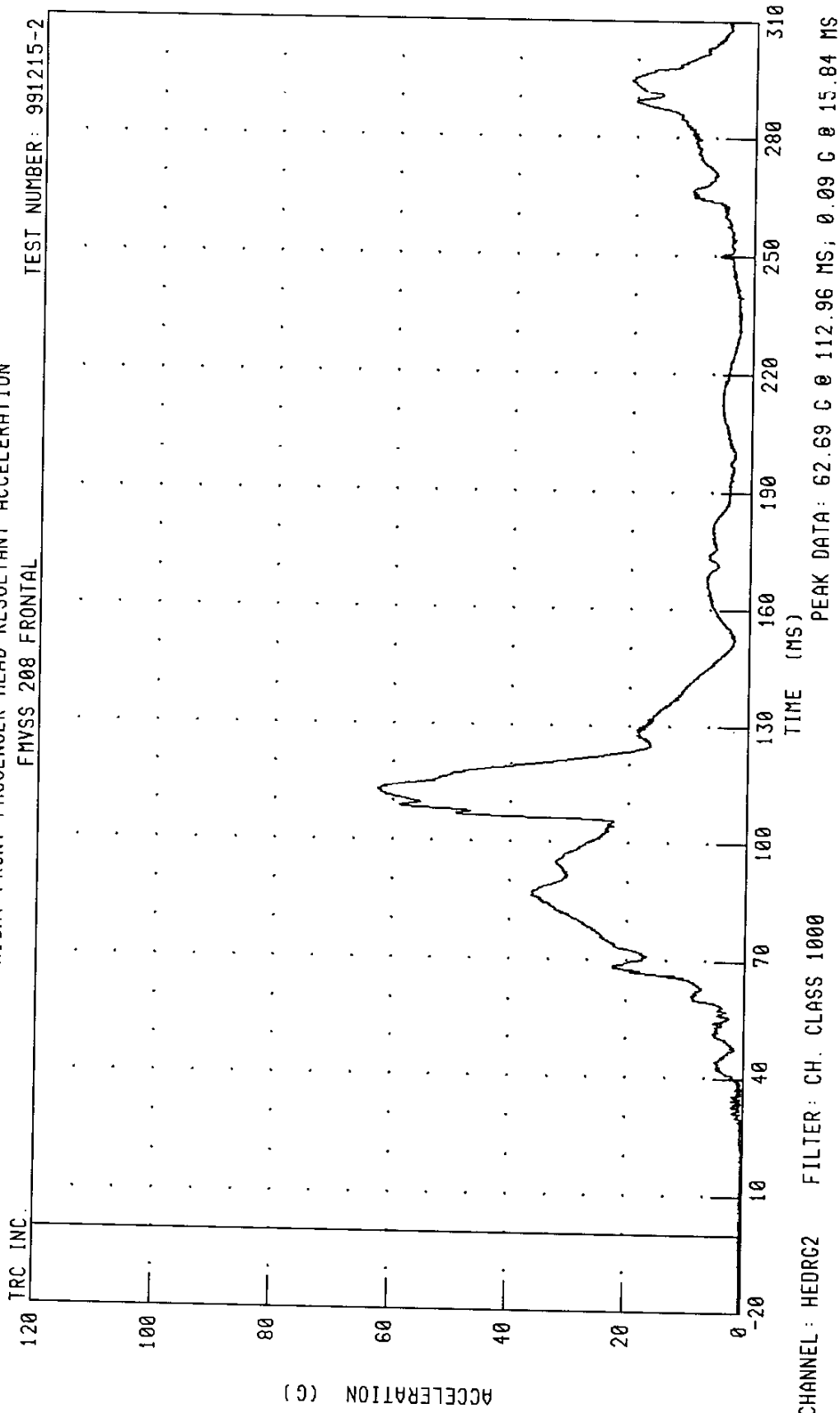
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION



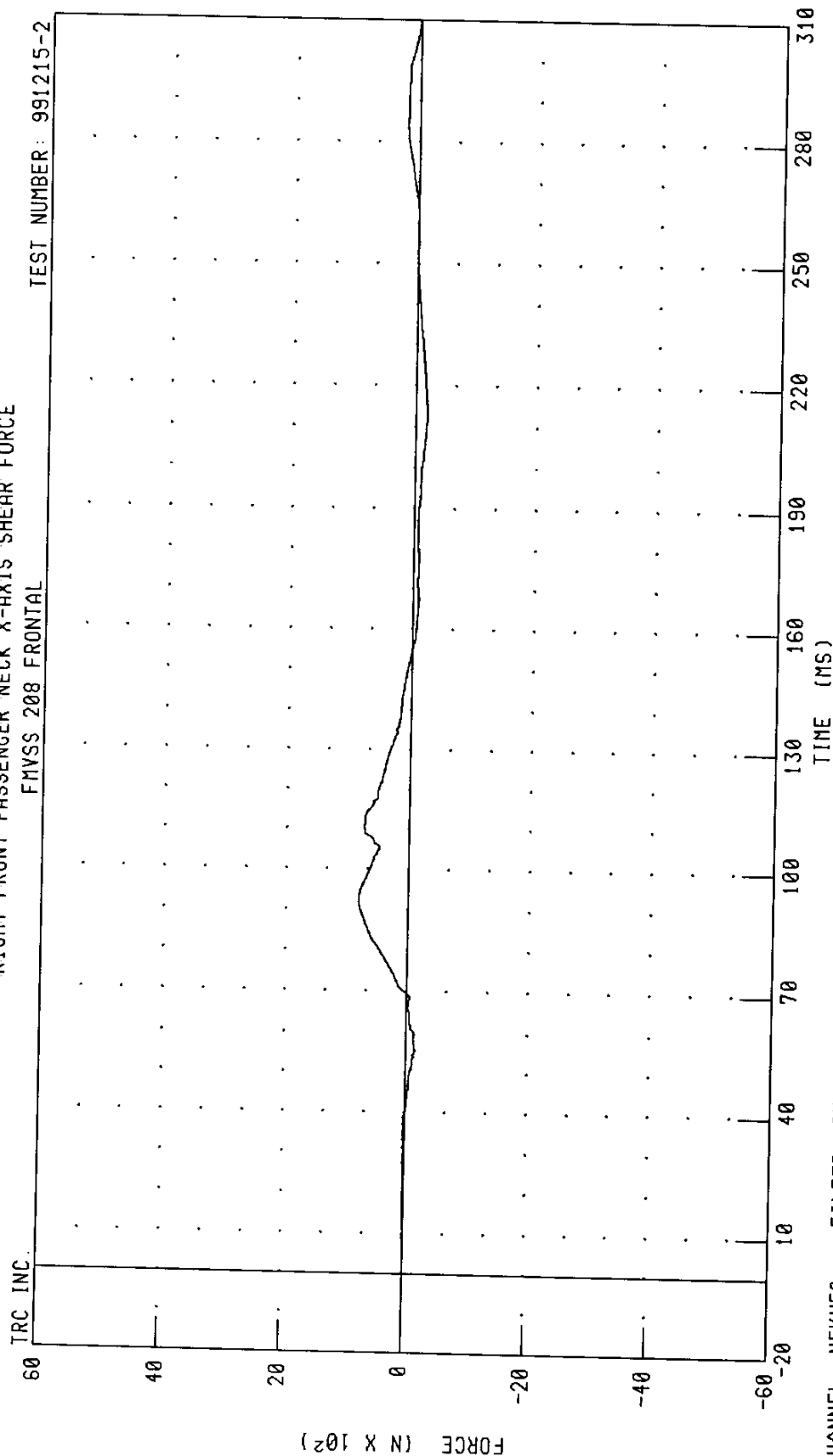
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



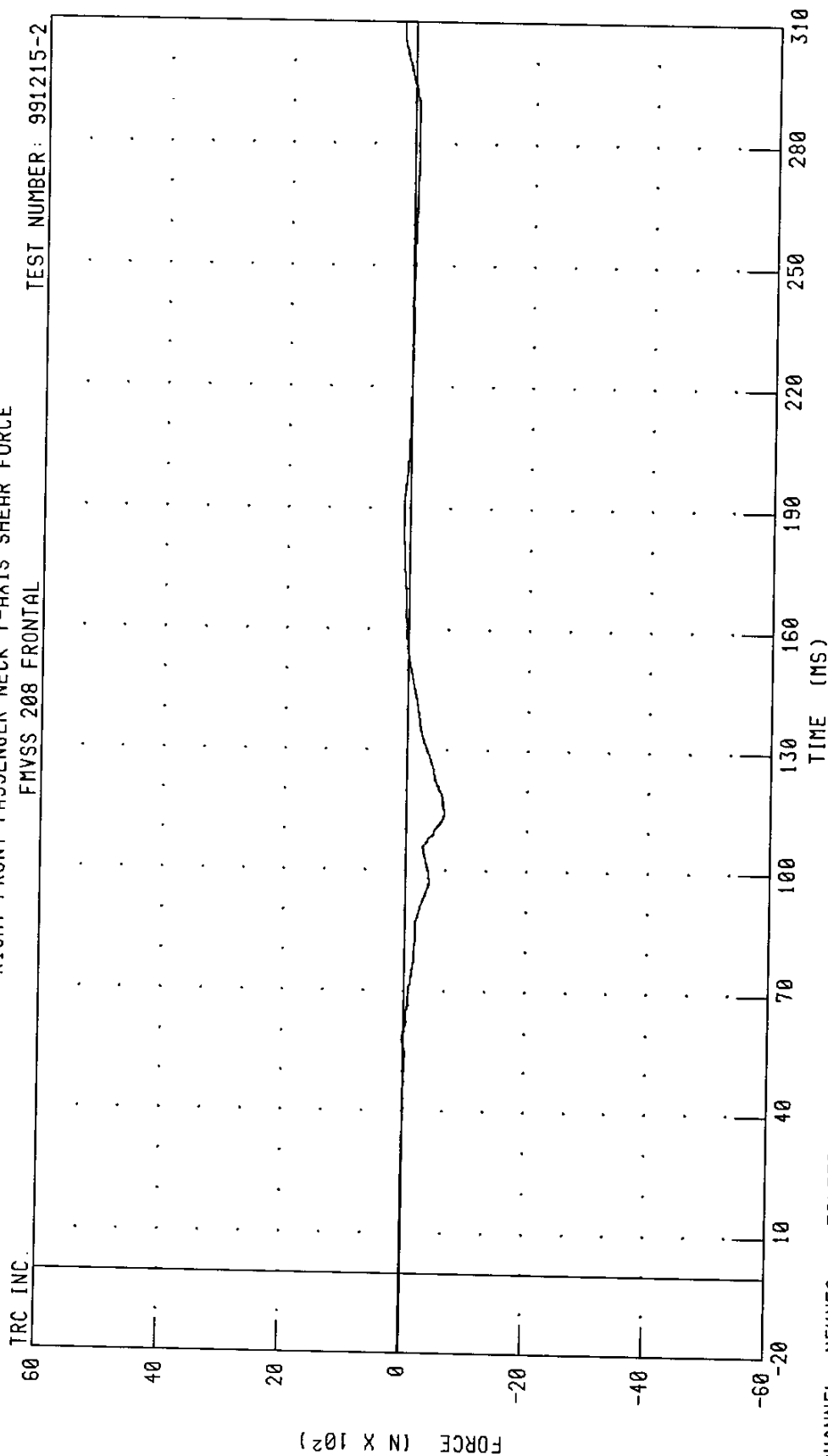
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

PEAK DATA: 811.71 N @ 91.44 MS; -192.02 N @ 211.60 MS

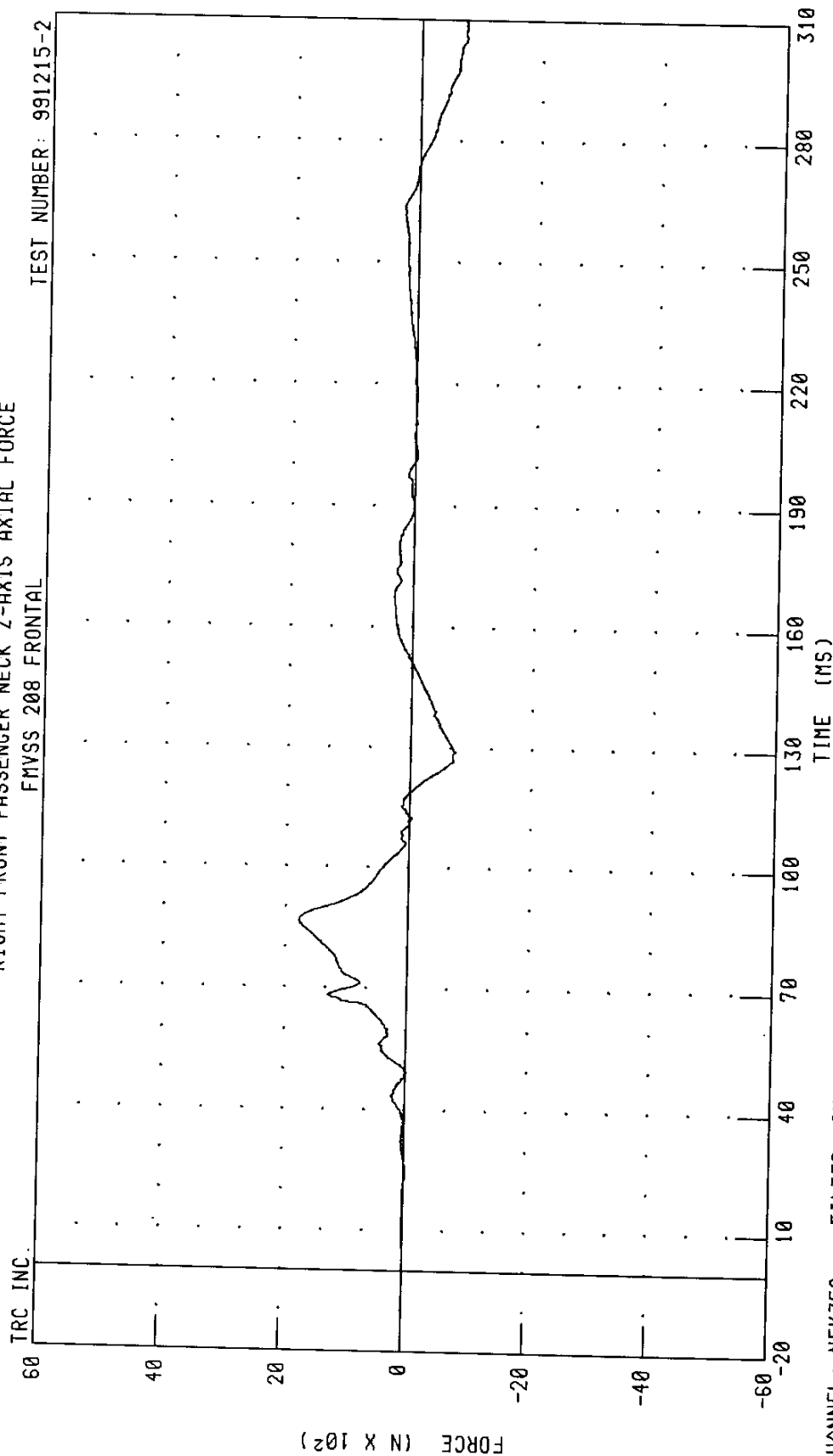
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

PEAK DATA: 183.82 N @ 308.80 MS; -632.24 N @ 113.92 MS

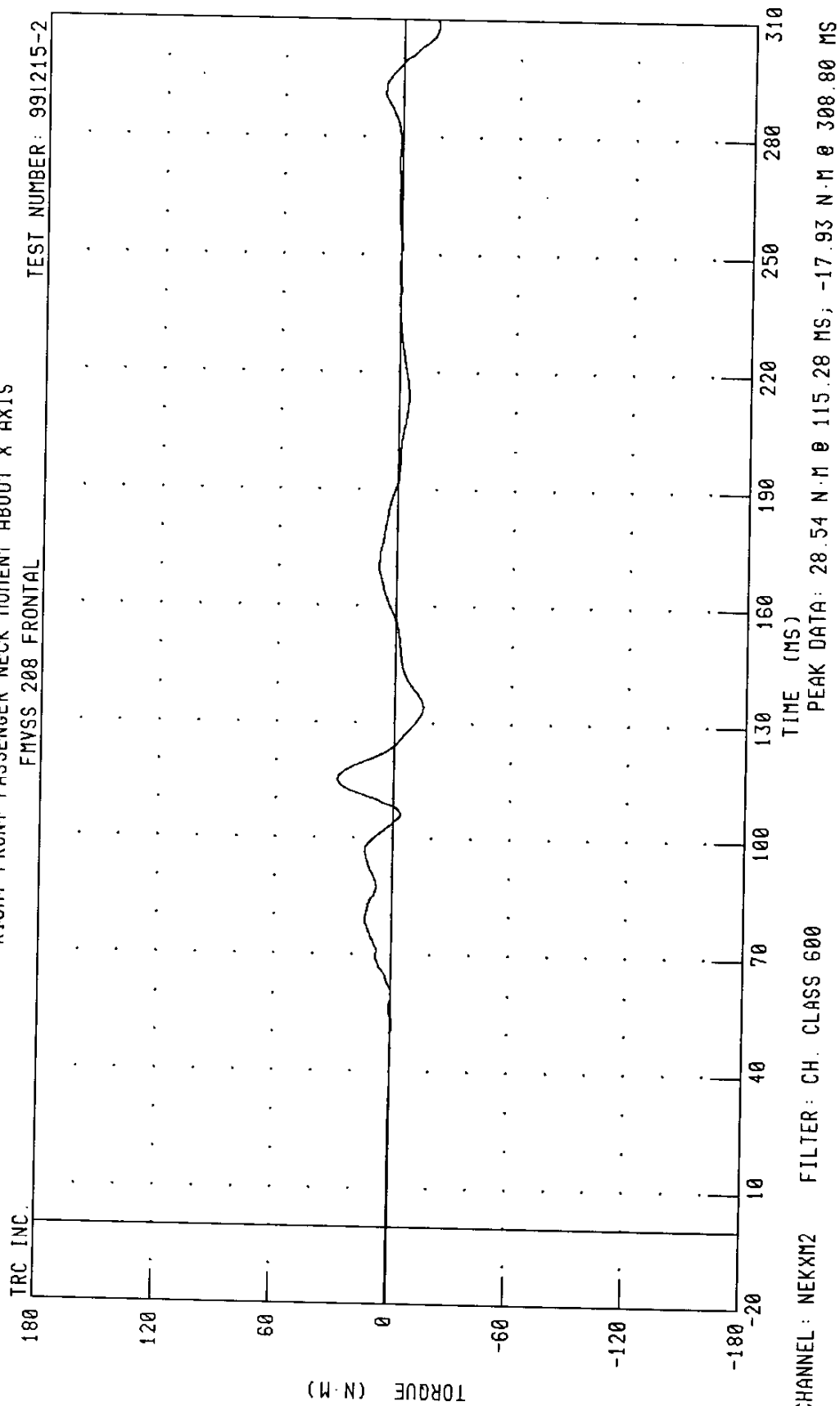
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE



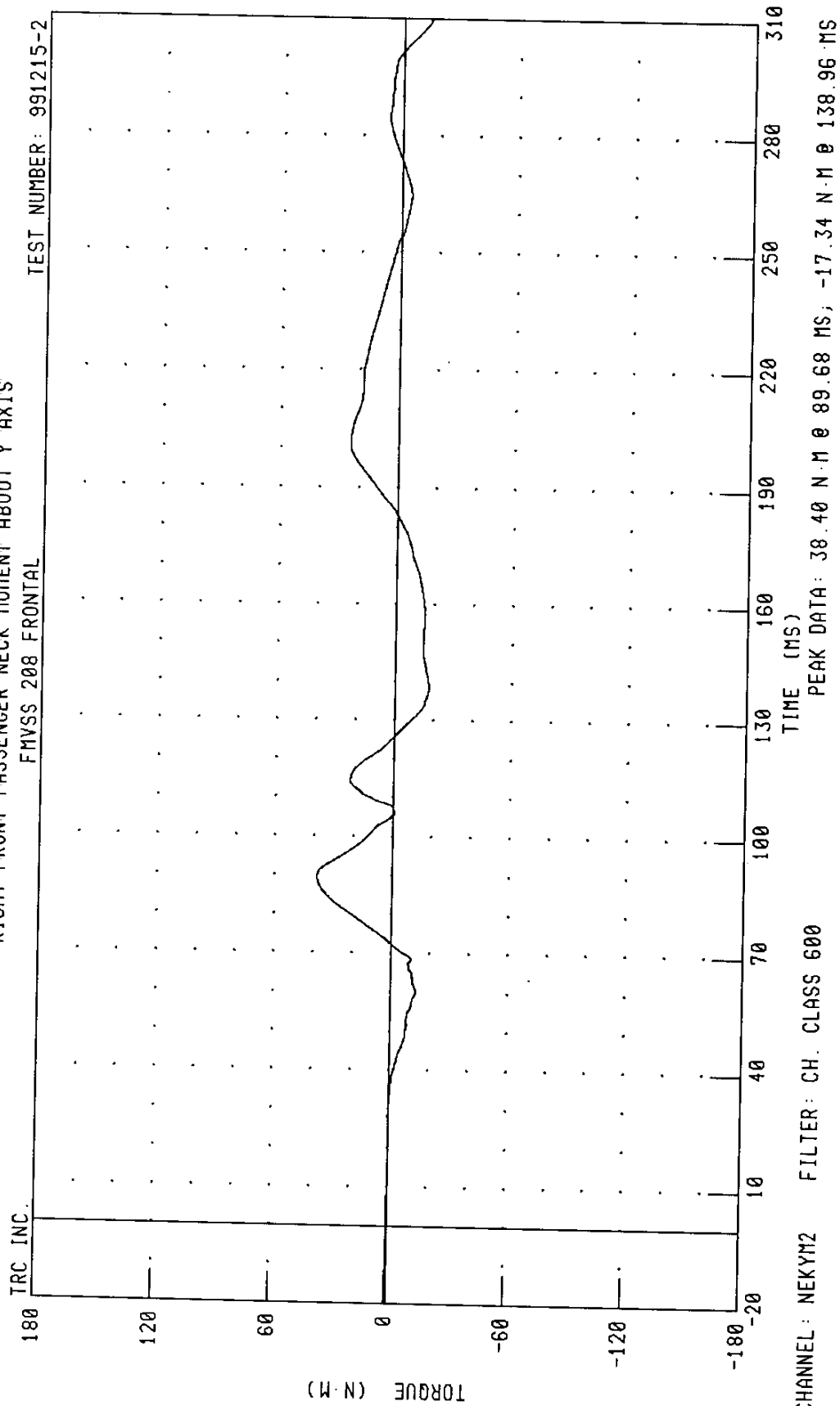
CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

PEAK DATA: 1781.51 N @ 86.56 MS; -759.41 N @ 305.20 MS

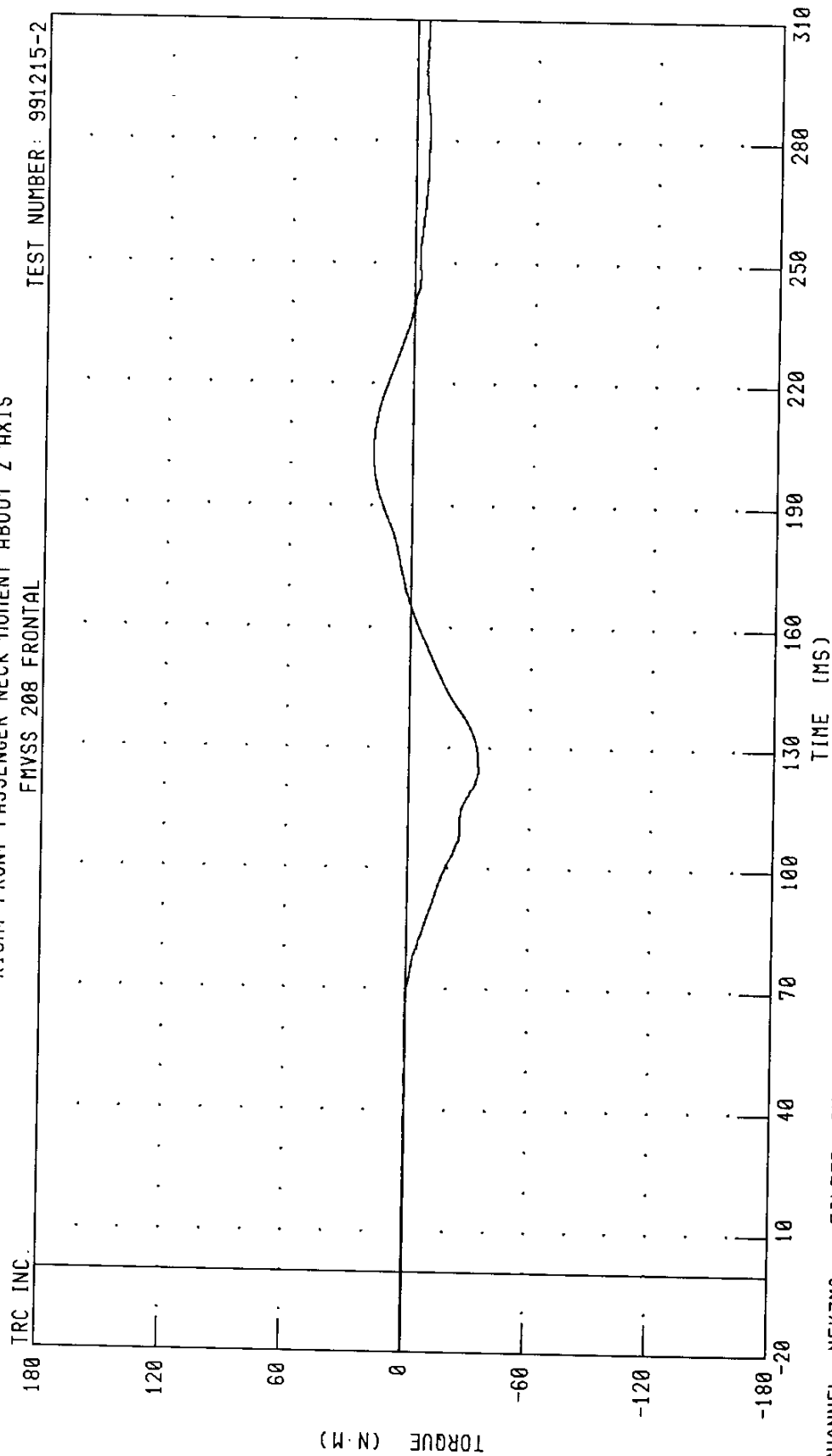
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS



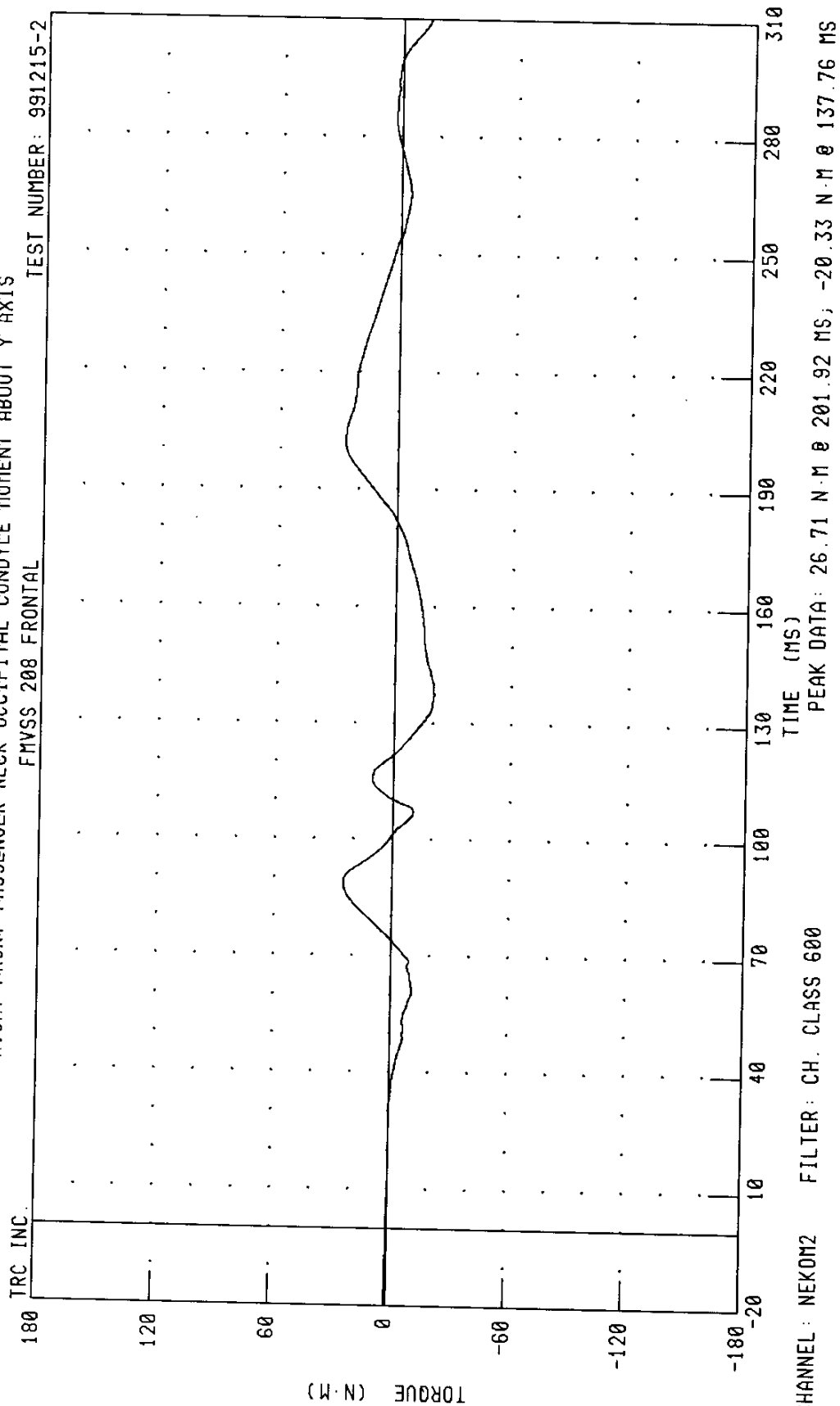
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS



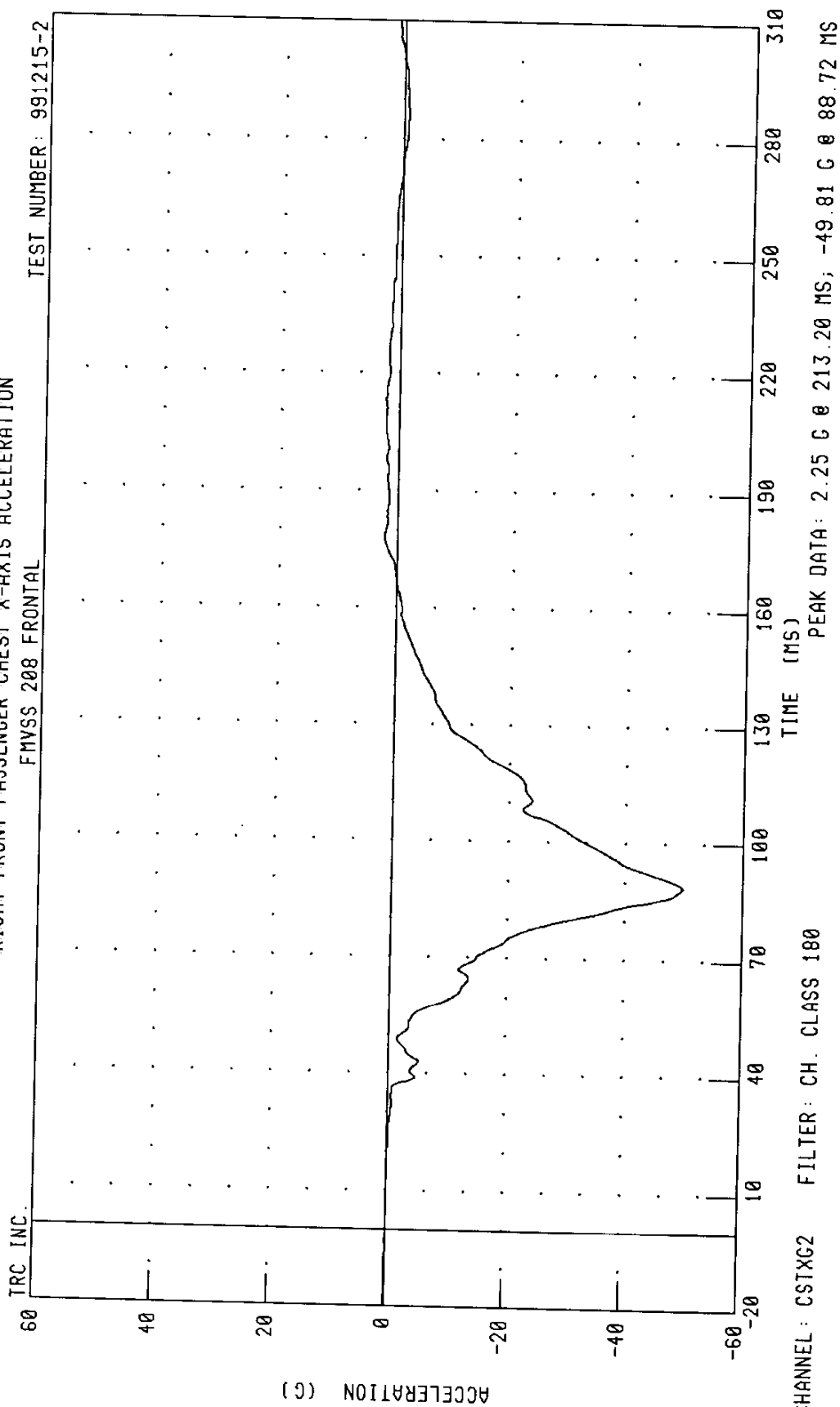
CHANNEL: NEKZM2 FILTER: CH. CLASS 600

PEAK DATA: 19.10 N·M @ 201.84 MS, -34.72 N·M @ 125.04 MS

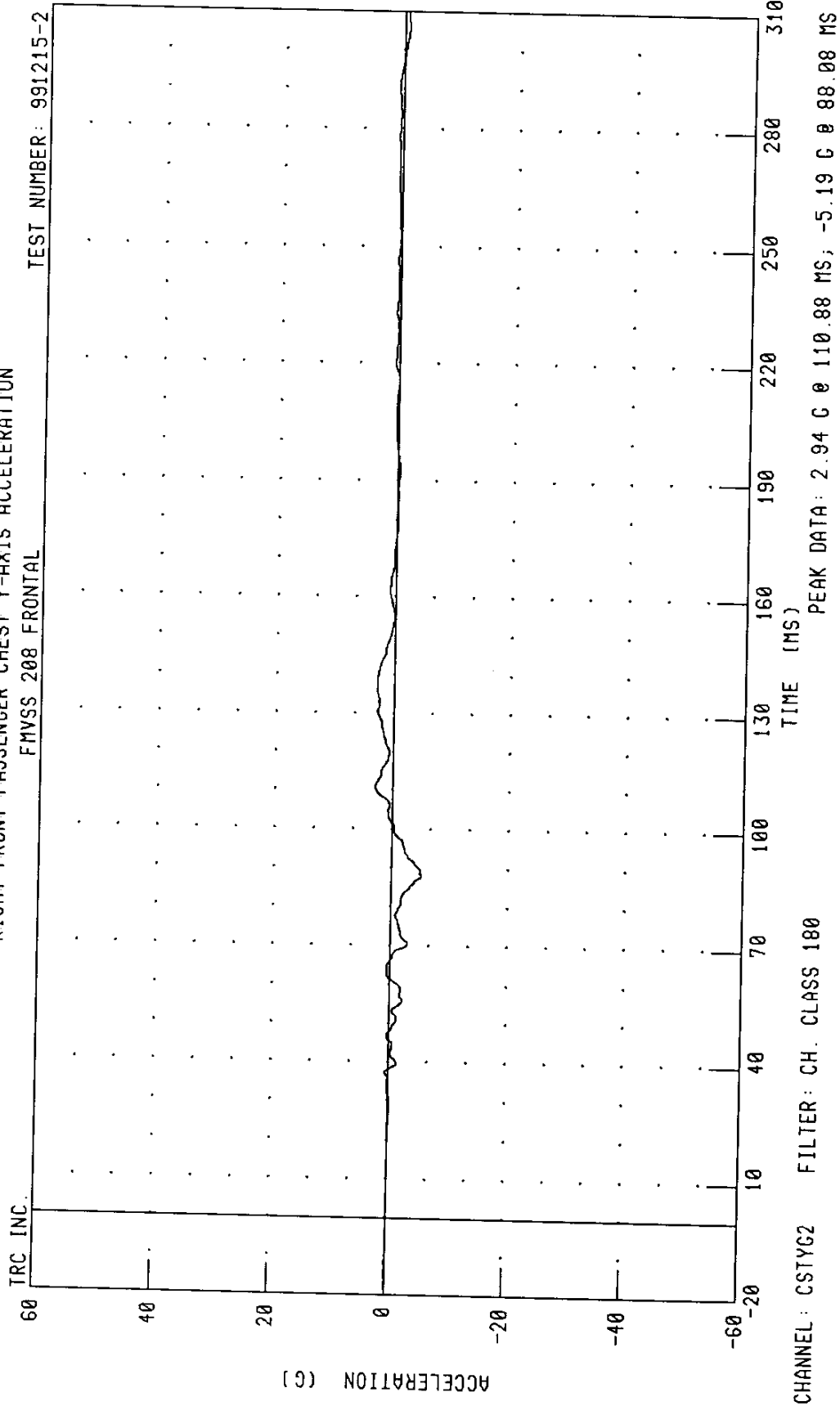
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS



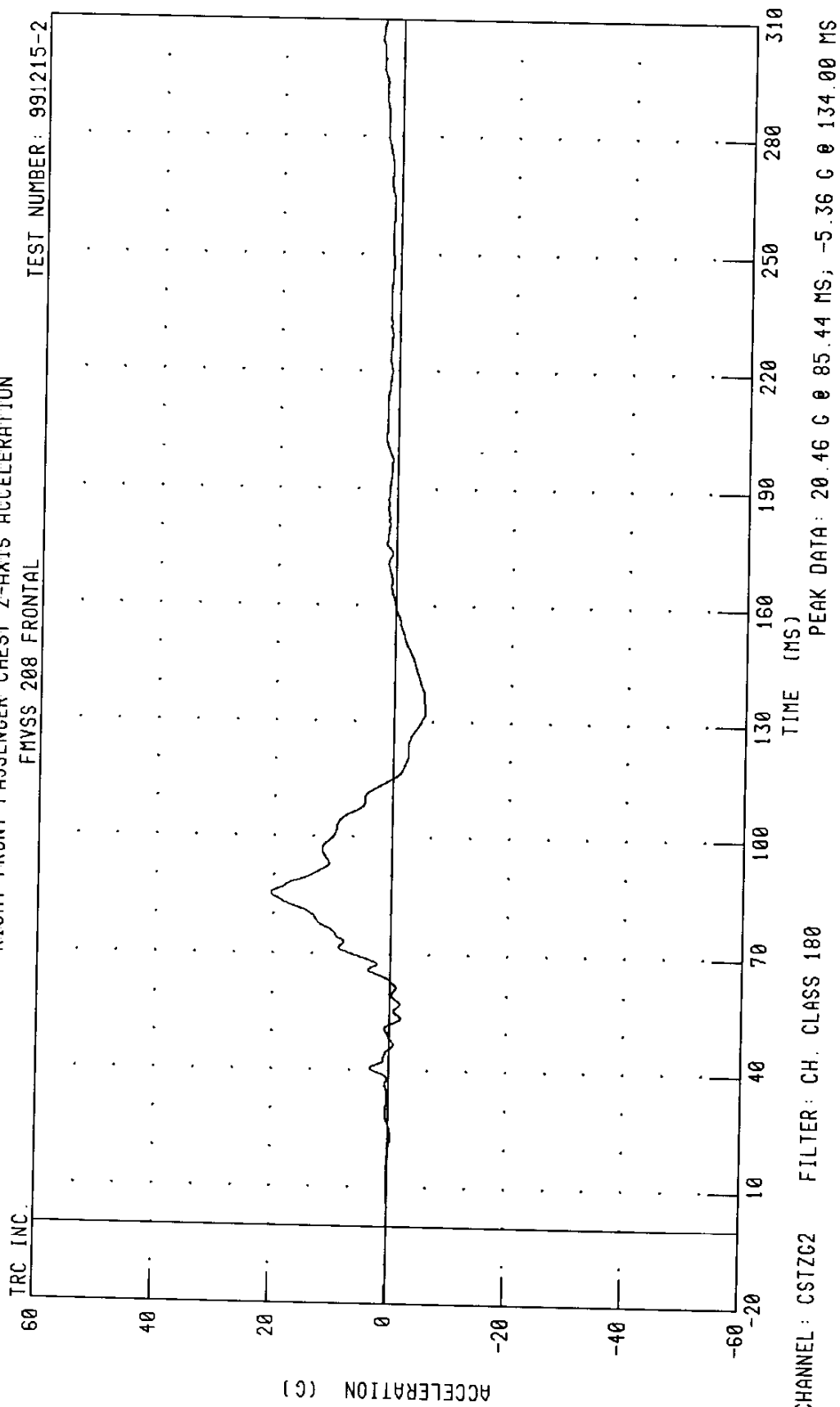
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION



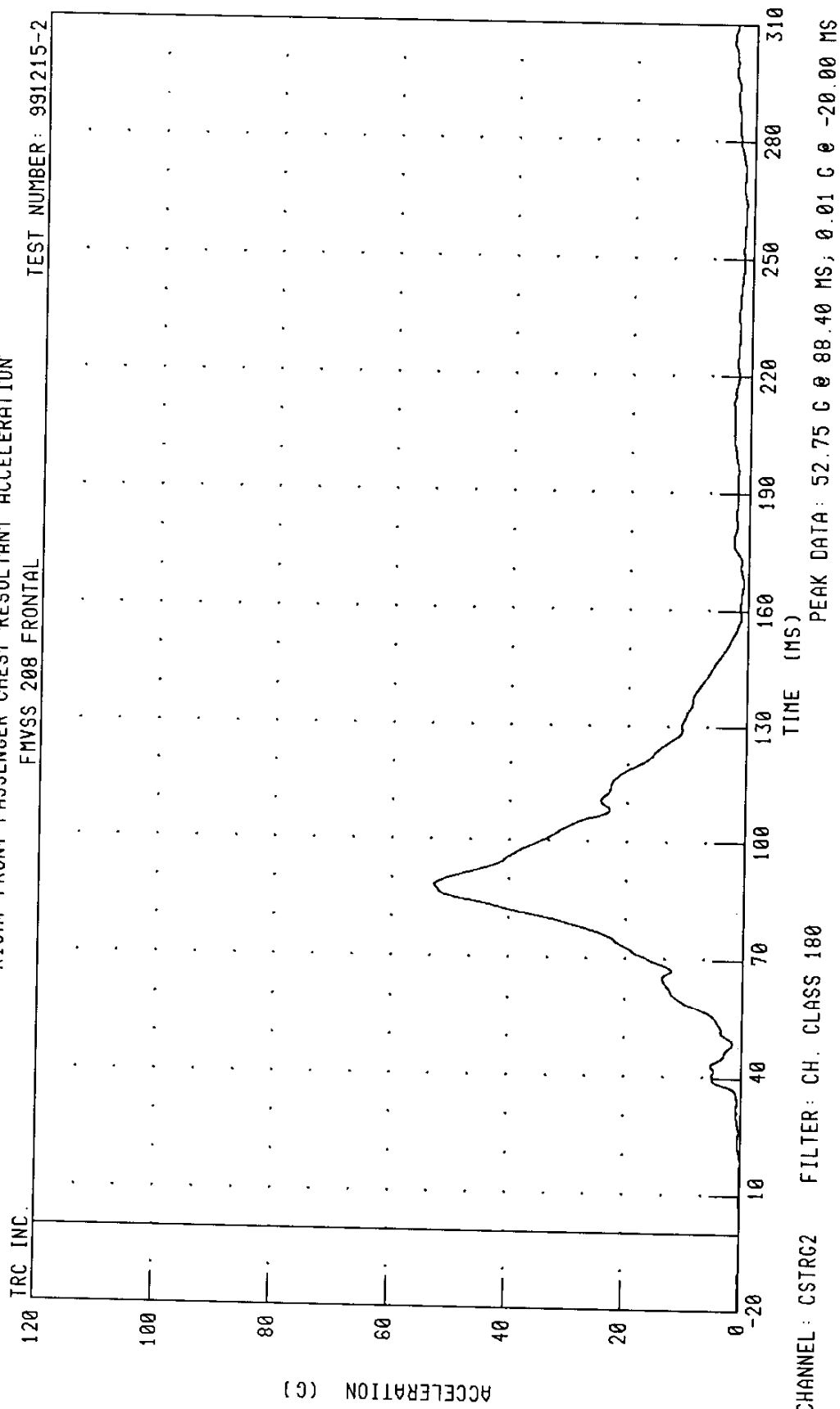
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION



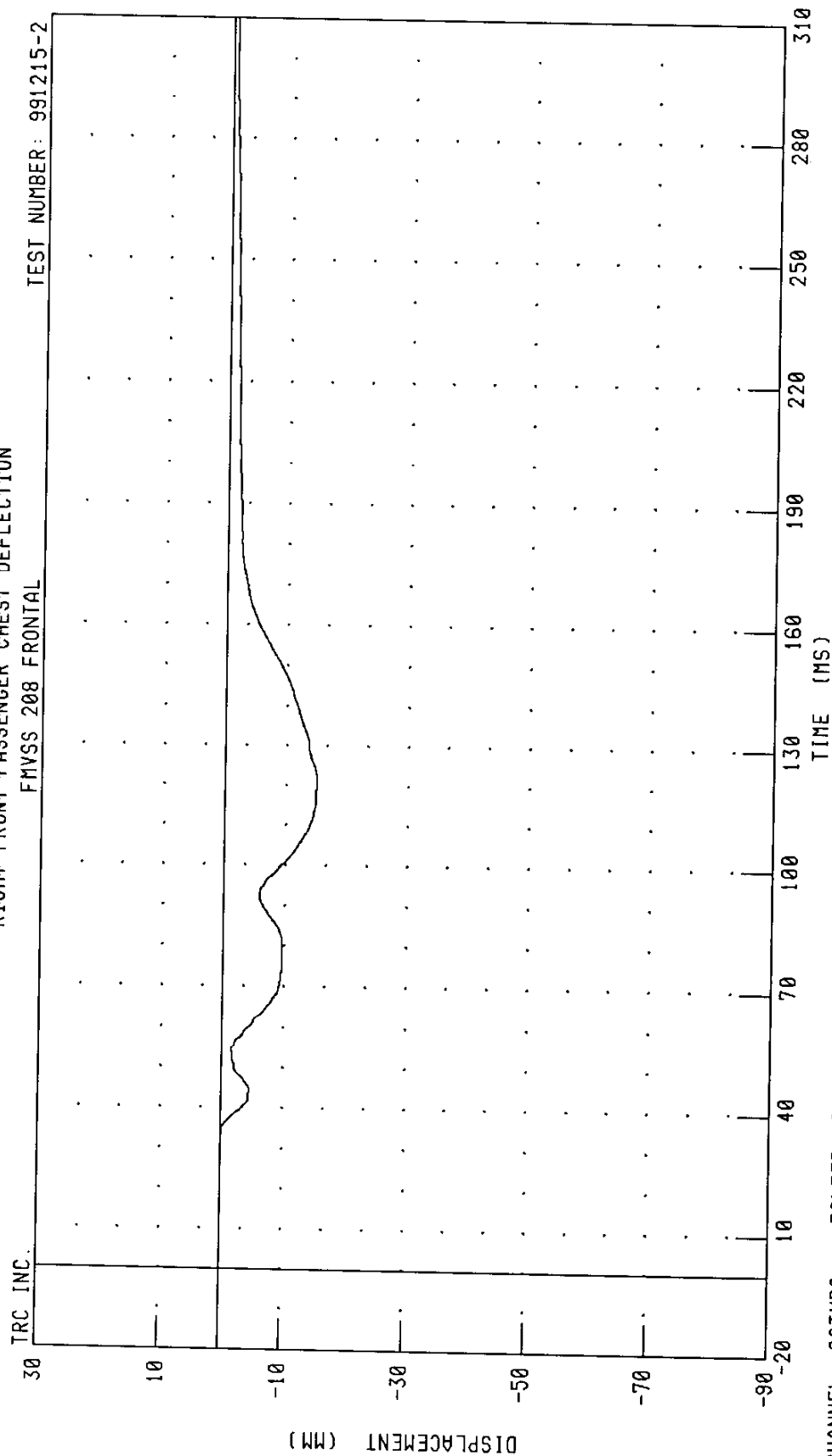
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



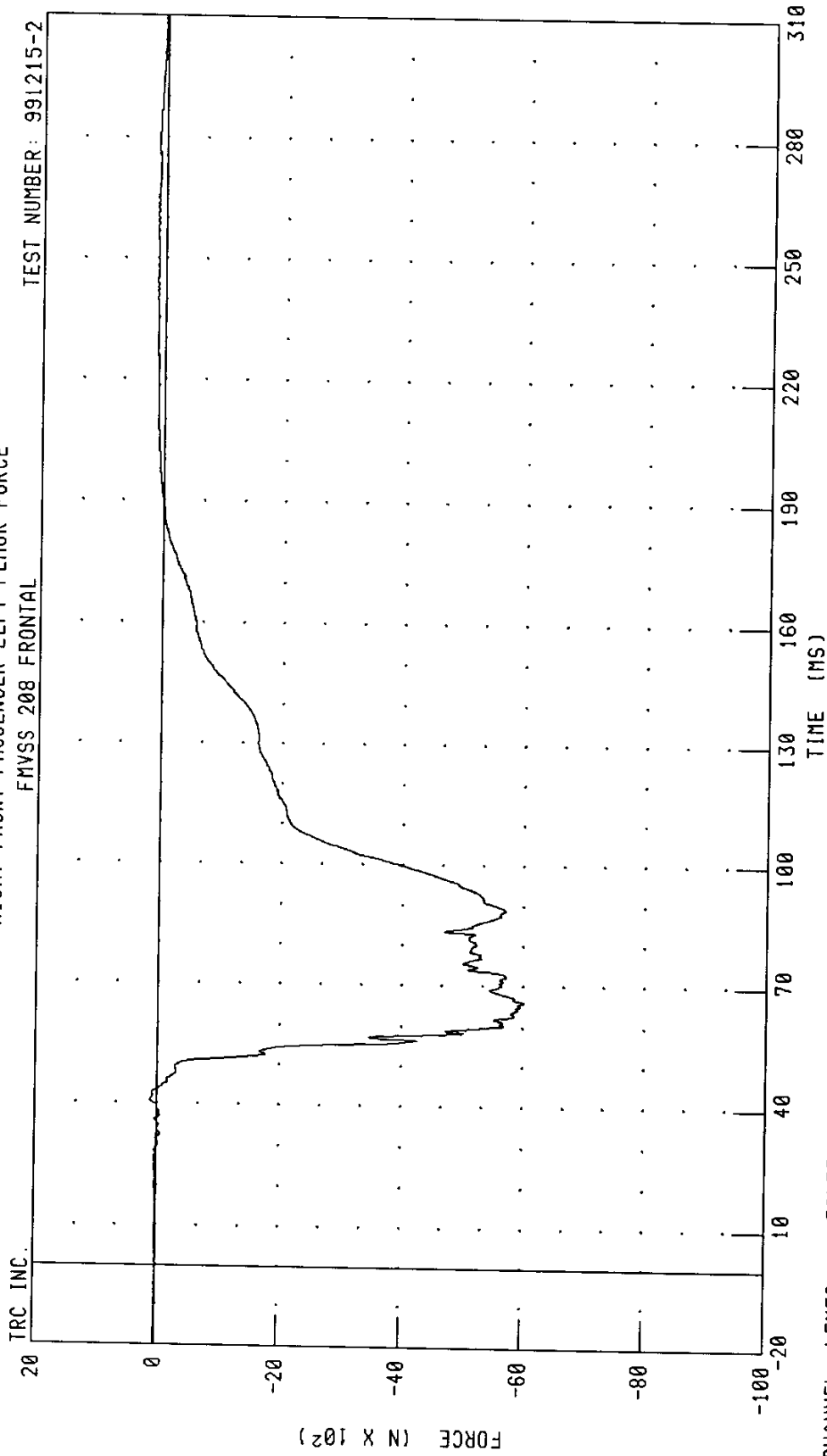
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST DEFLECTION



CHANNEL: CSTXD2 FILTER: CH. CLASS 180

PEAK DATA: 0.03 MM @ 27.76 MS, -15.07 MM @ 120.32 MS

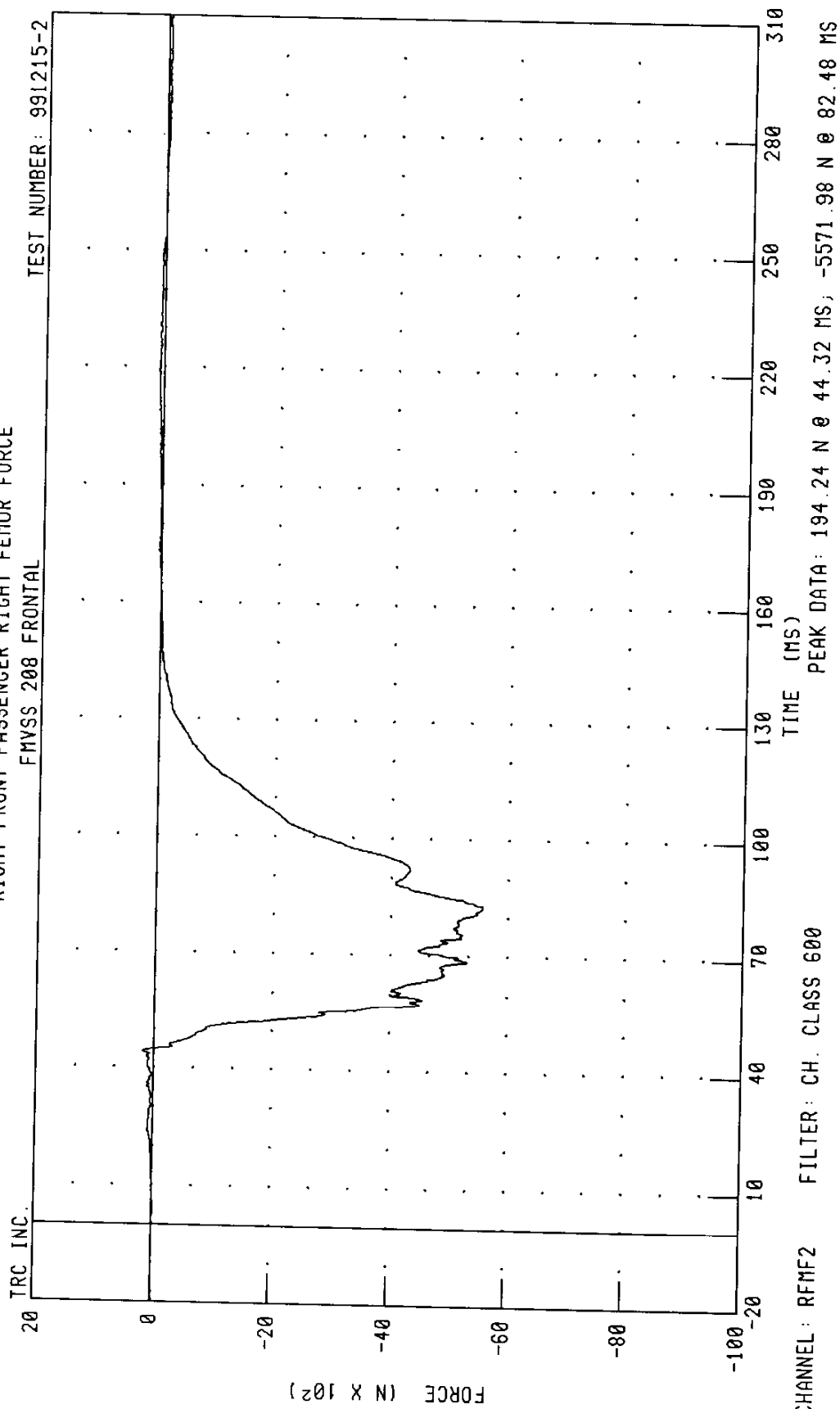
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER LEFT FEMUR FORCE



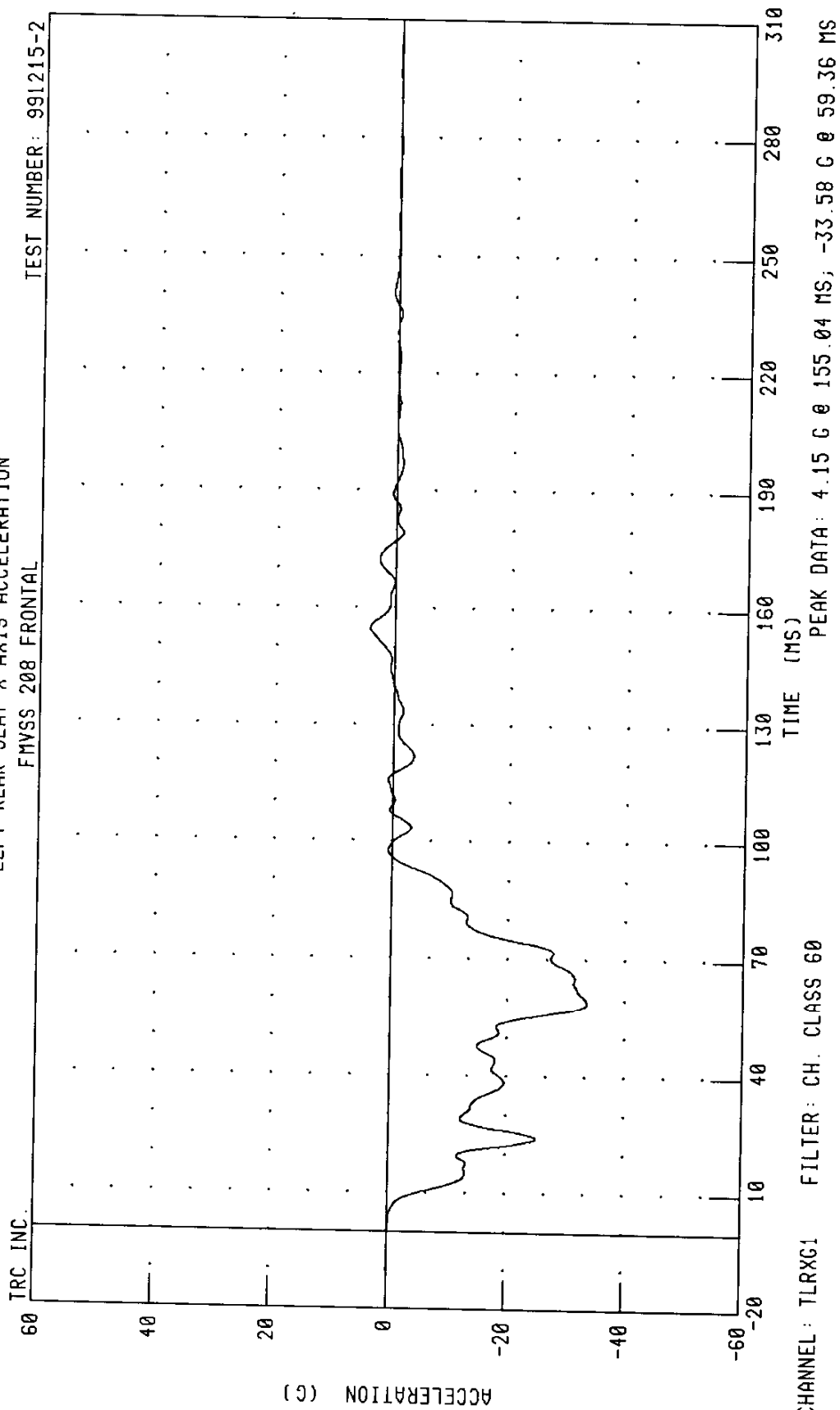
CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 141.88 N @ 261.04 MS; -6019.23 N @ 66.08 MS

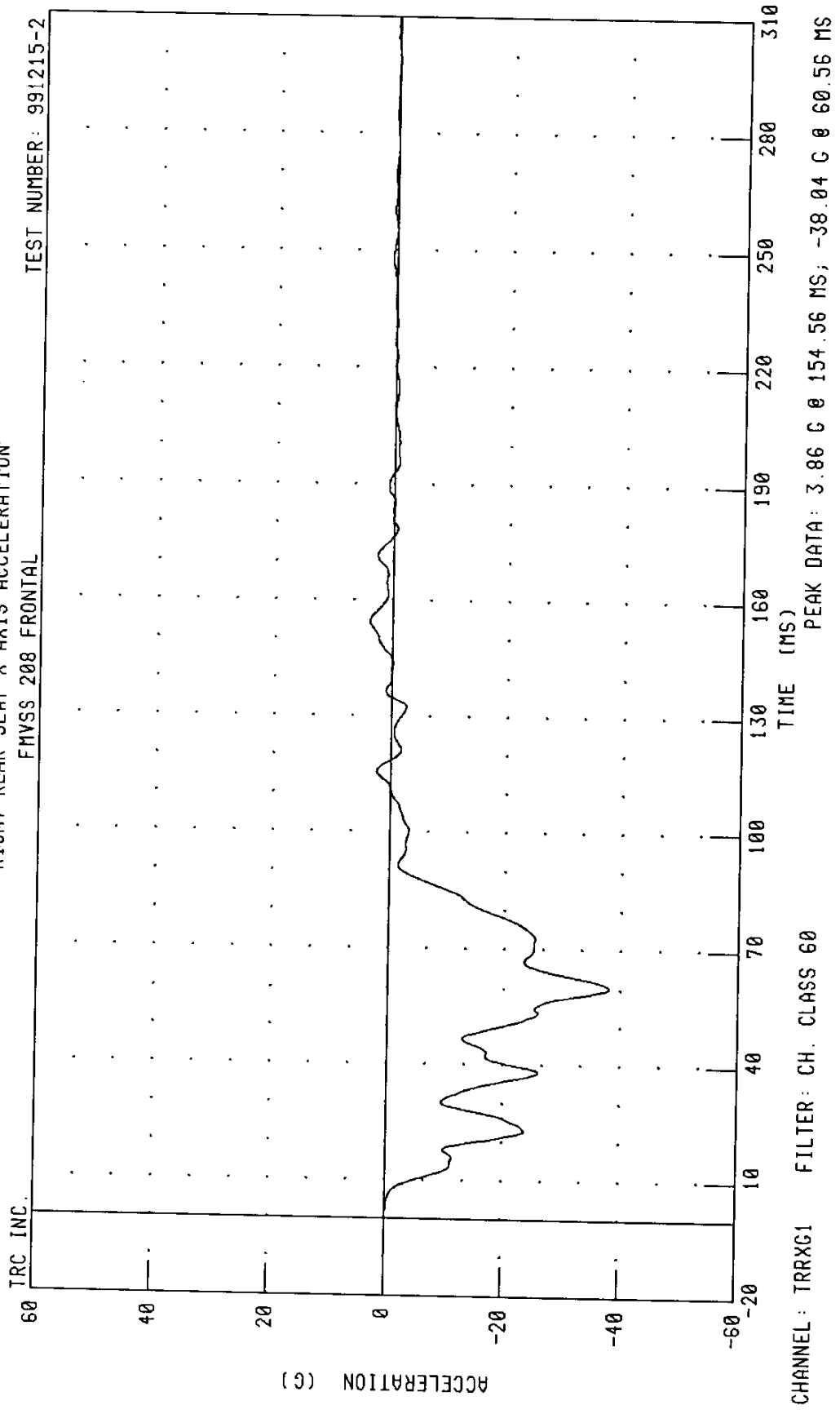
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
LEFT REAR SEAT X-AXIS ACCELERATION

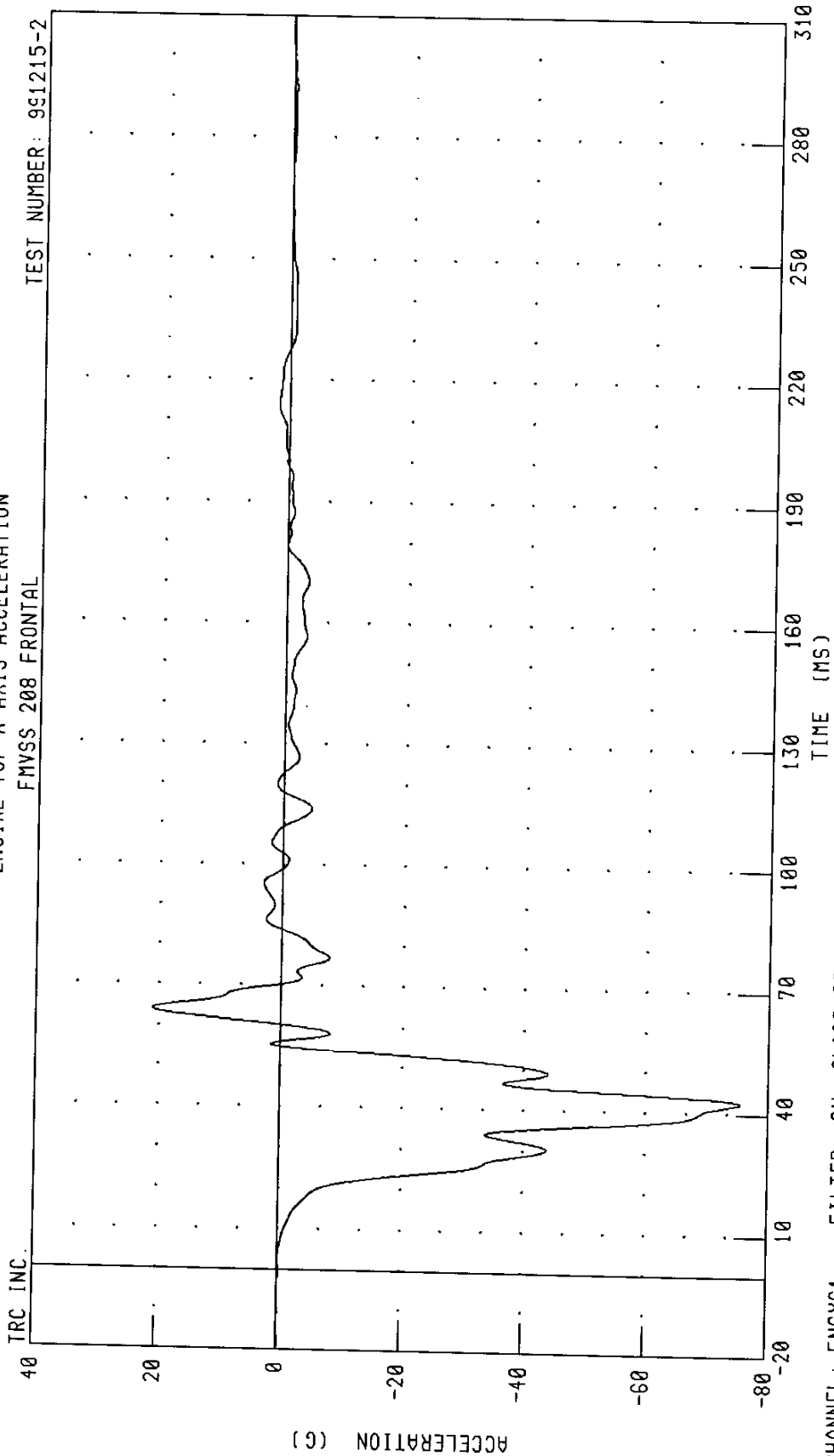


1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT REAR SEAT X-AXIS ACCELERATION



1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
ENGINE TOP X-AXIS ACCELERATION

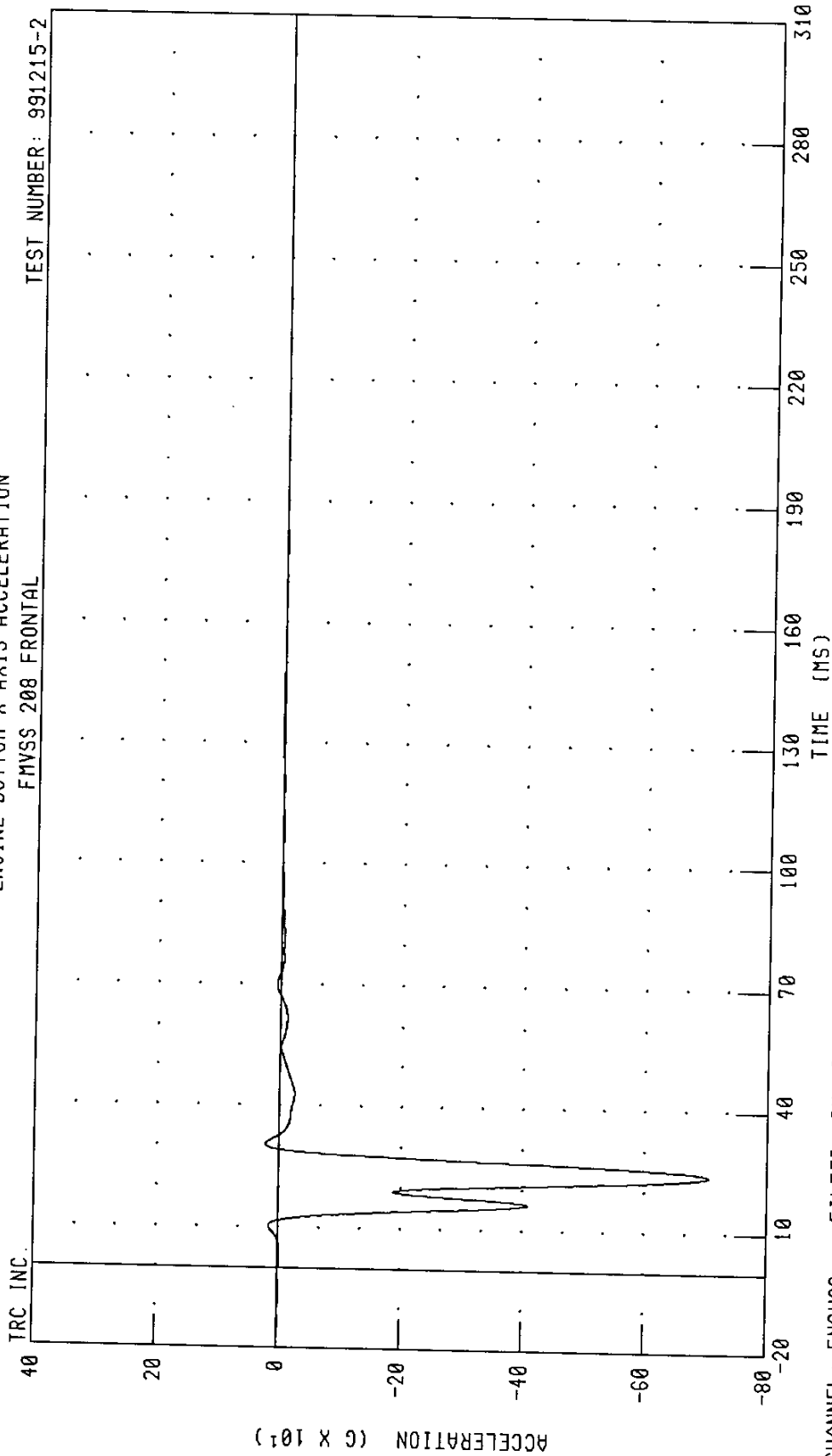
TRC INC.
FMYSS 208 FRONTAL
TEST NUMBER: 991215-2



CHANNEL: ENCXC1 FILTER: CH. CLASS 60
PEAK DATA: 21.04 G @ 64.00 MS; -75.47 G @ 42.56 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
ENGINE BOTTOM X-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991215-2

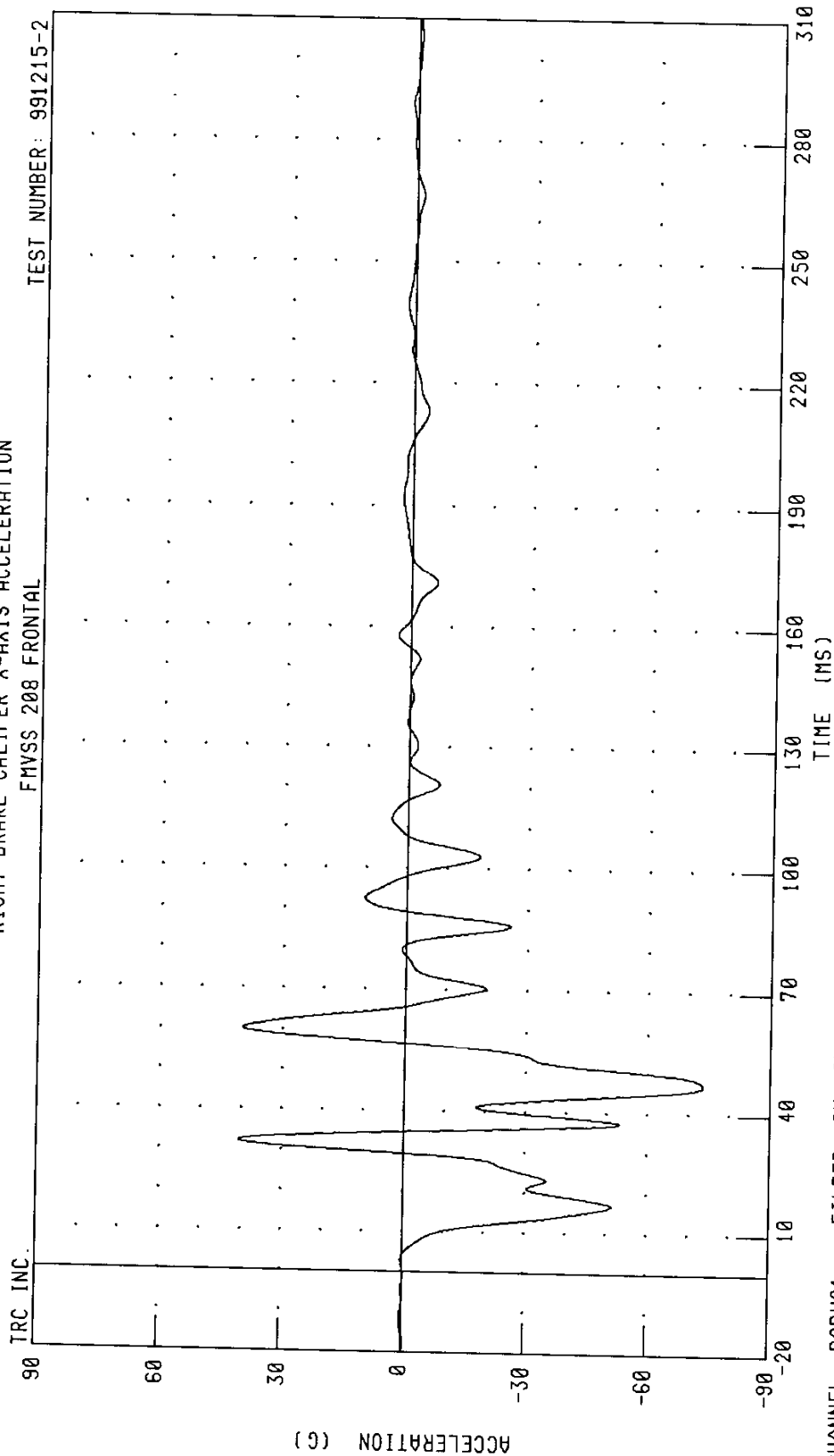


CHANNEL: ENGXC2 FILTER: CH. CLASS 60

PEAK DATA: 22.31 G @ 30.48 MS; -705.03 G @ 23.84 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991215-2

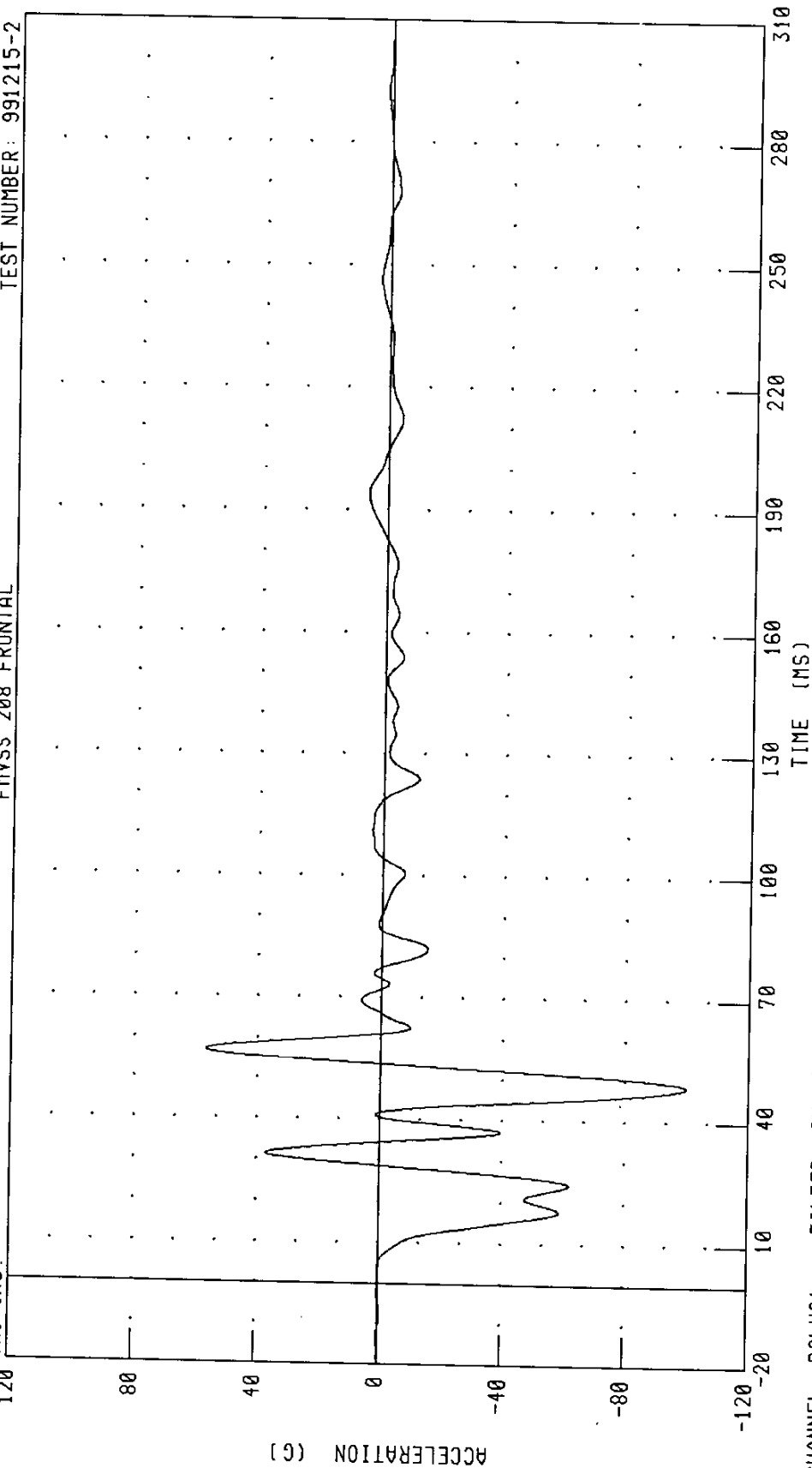


CHANNEL: BCRXC1 FILTER: CH. CLASS 60

PEAK DATA: 40.65 G @ 32.24 MS; -73.59 G @ 47.12 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
LEFT BRAKE CALIPER X-AXIS ACCELERATION

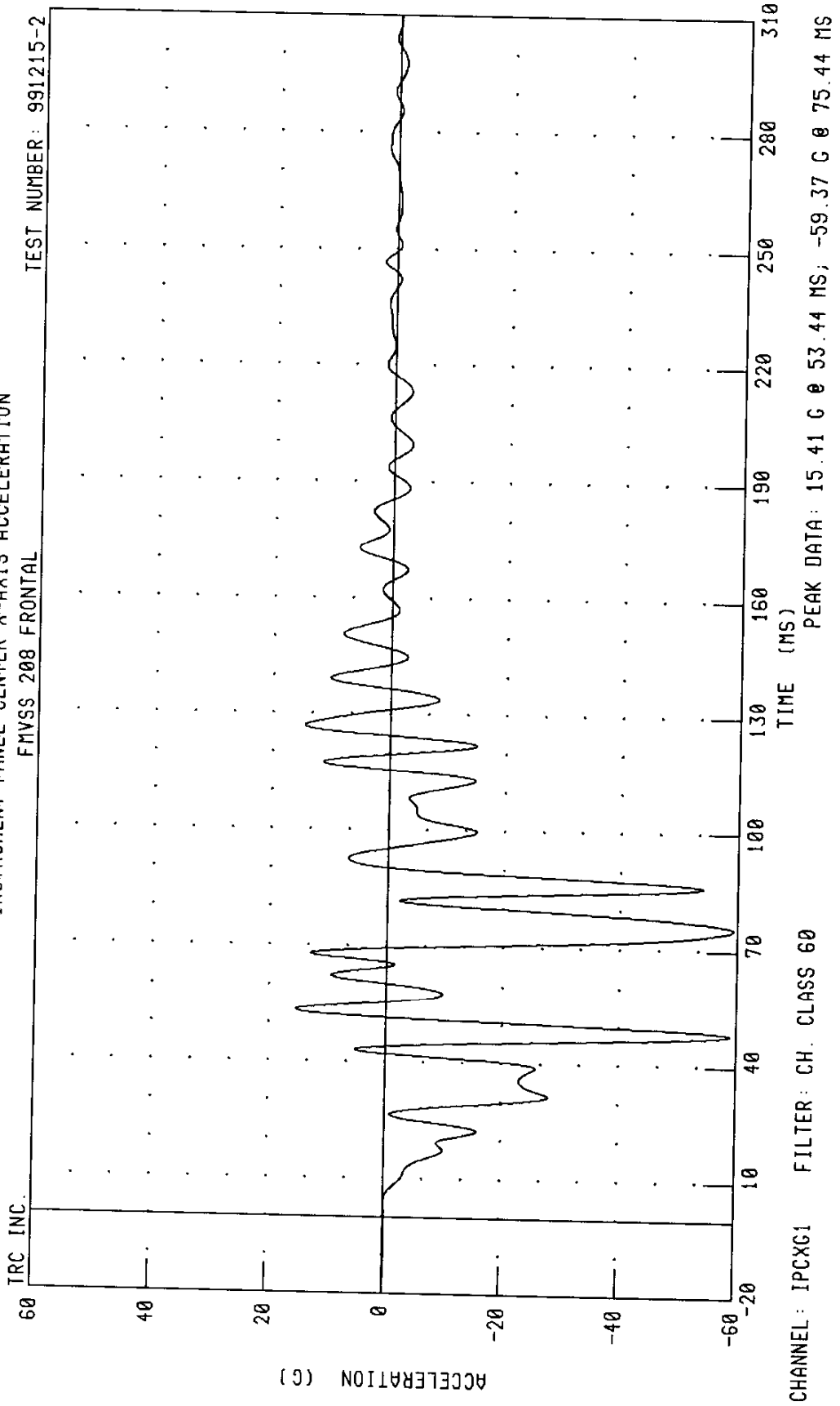
TRC INC. TEST NUMBER: 991215-2
FMVSS 208 FRONTAL



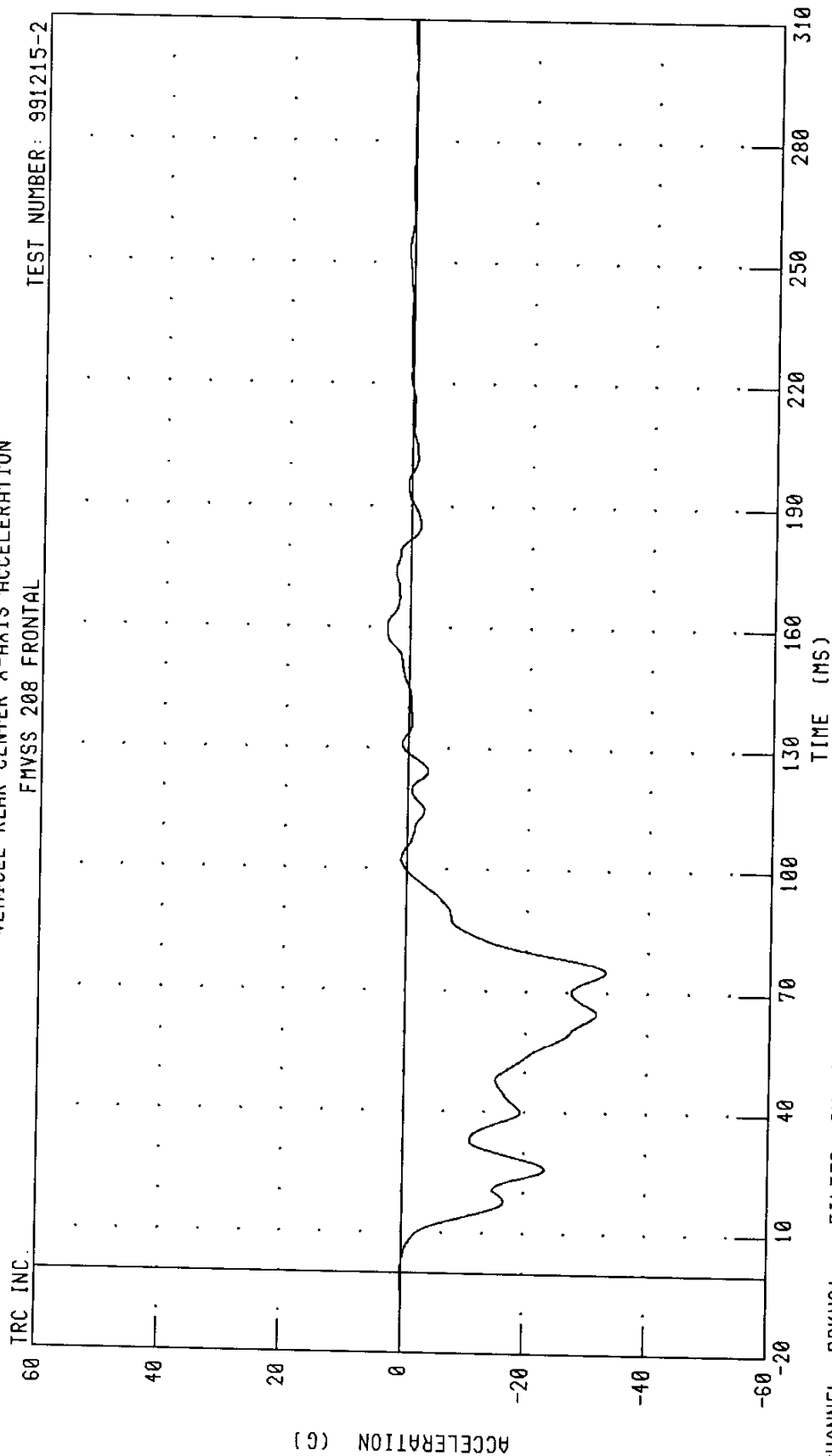
CHANNEL: BCLXC1 FILTER: CH. CLASS 60

PEAK DATA: 56.87 G @ 57.04 MS; -99.86 G @ 48.48 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

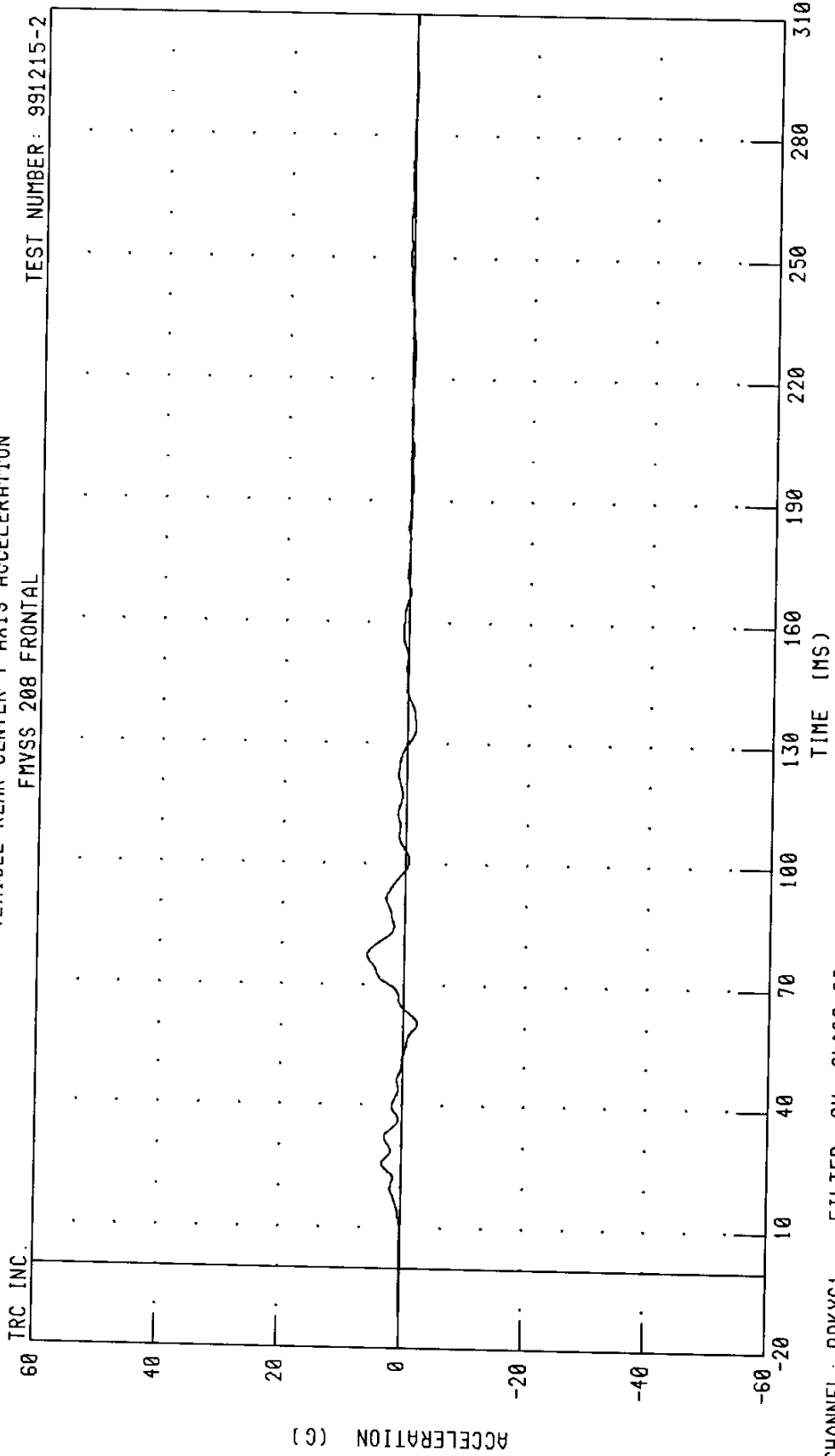


1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE REAR CENTER X-AXIS ACCELERATION



CHANNEL: RDKXG1 FILTER: CH. CLASS 60 PEAK DATA: 3.66 G @ 160.56 MS; -33.08 G @ 75.20 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE REAR CENTER Y-AXIS ACCELERATION

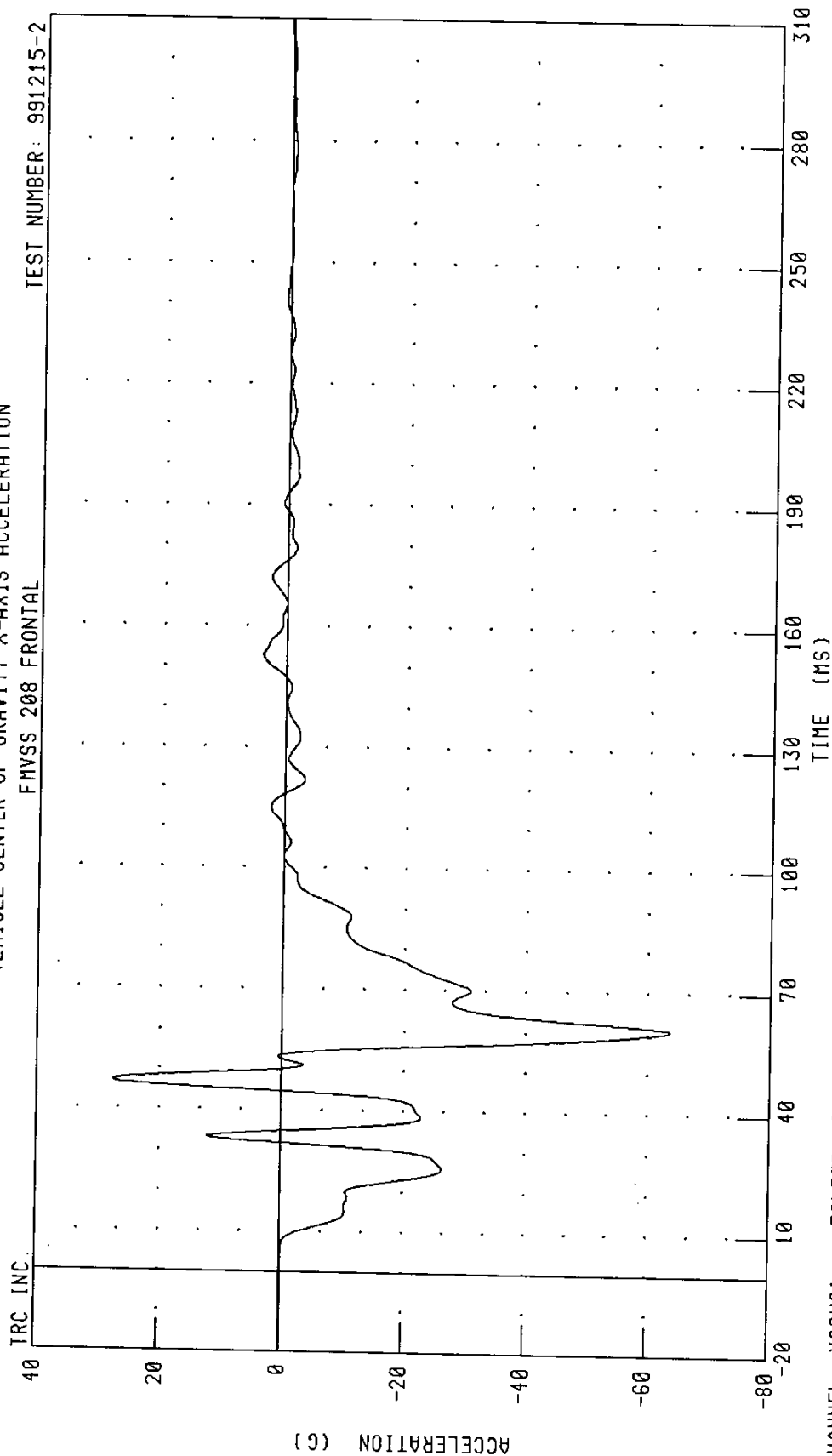


CHANNEL: RDKYC1 FILTER: CH. CLASS 60

PEAK DATA: 6.03 G @ 77.68 MS, -2.35 G @ 60.96 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION
FMVSS 208 FRONTAL

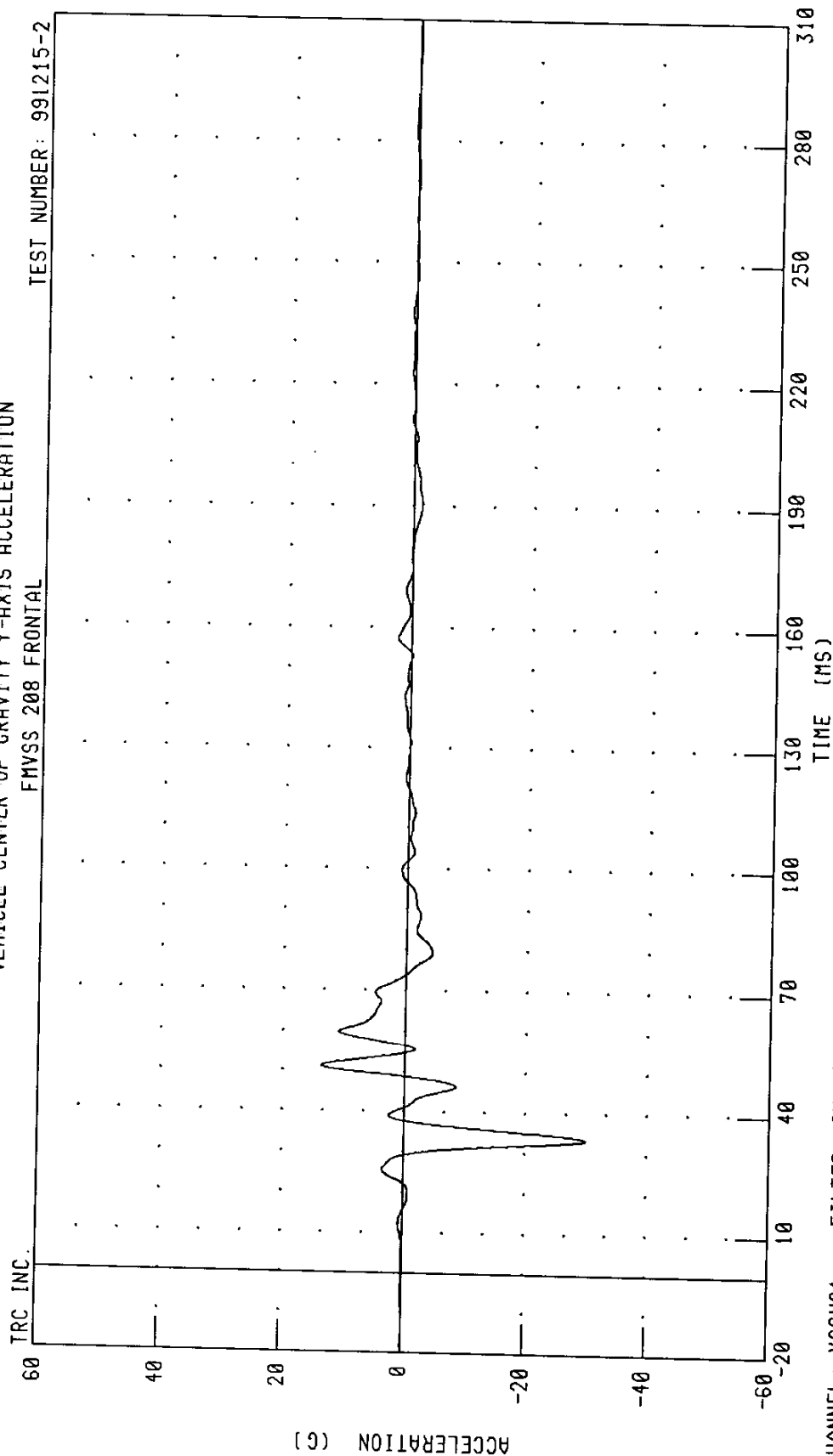
TEST NUMBER: 991215-2



CHANNEL: VCCXG1 FILTER: CH. CLASS 60

PEAK DATA: 27.56 G @ 47.12 MS; -63.63 G @ 60.88 MS

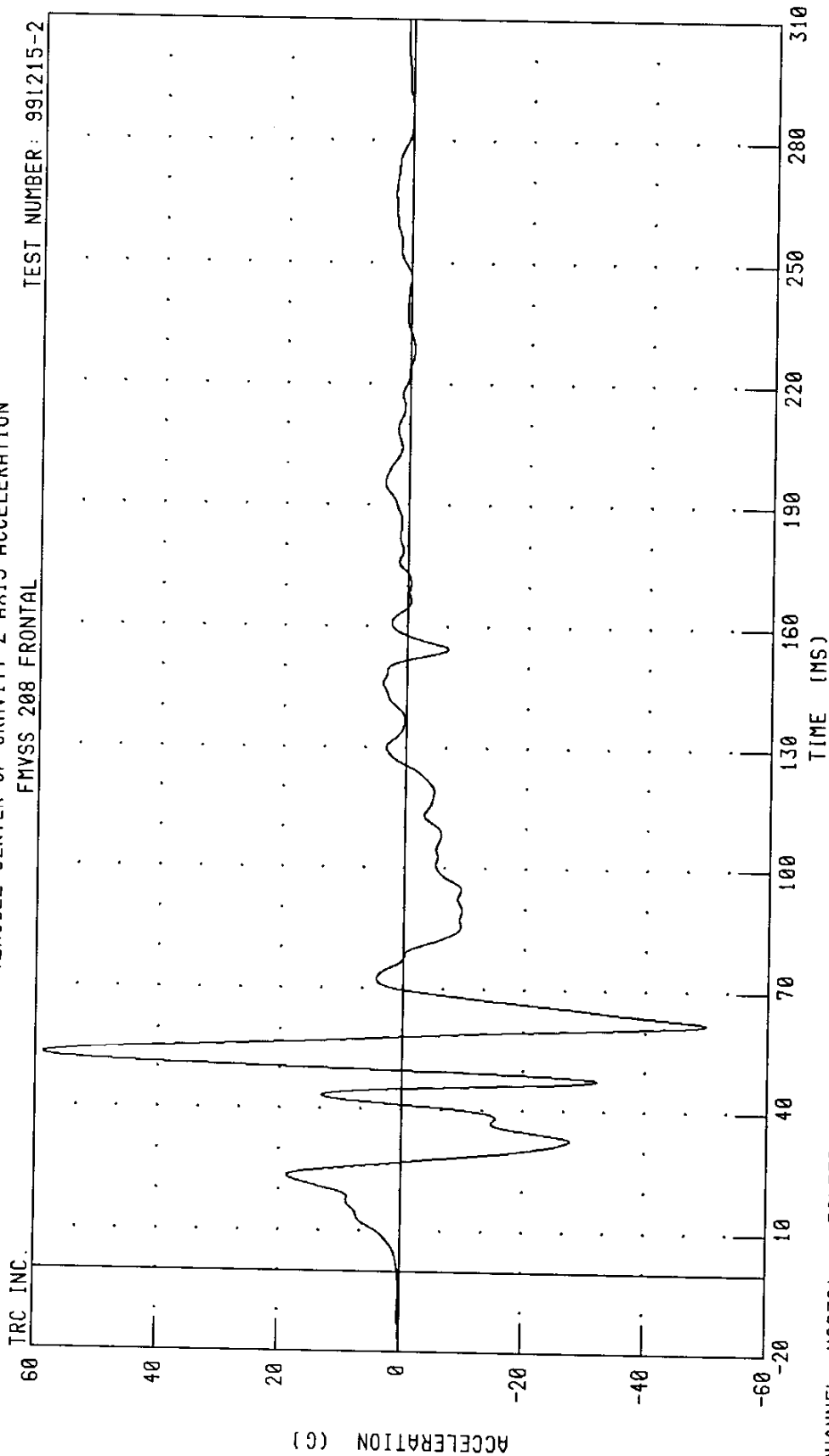
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION



CHANNEL: VCCYG1 FILTER: CH. CLASS 60

PEAK DATA: 13.67 G @ 51.28 MS, -30.08 G @ 33.52 MS

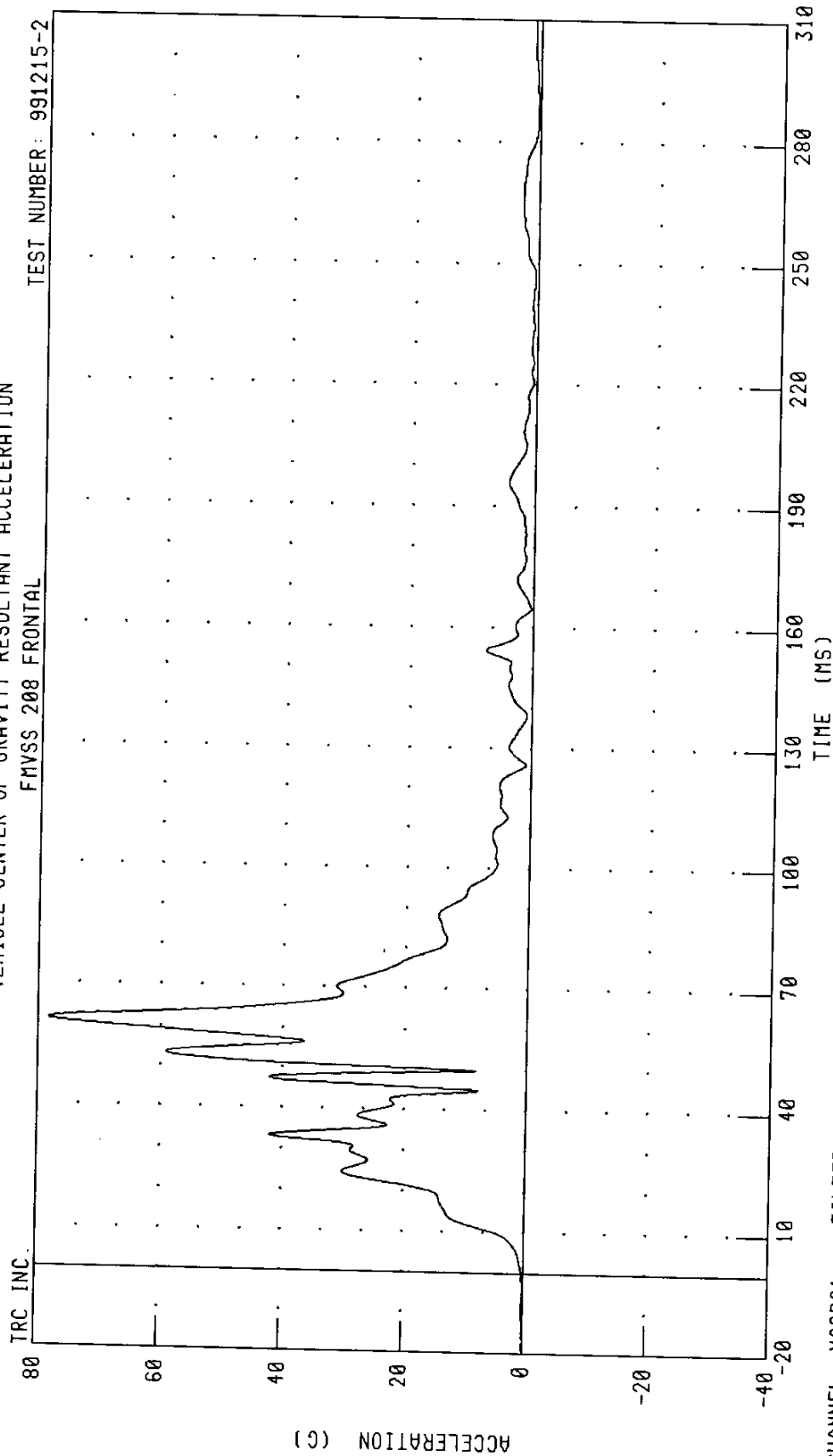
1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE CENTER OF GRAVITY Z-AXIS ACCELERATION



CHANNEL: VCGZG1 FILTER: CH. CLASS 60 PEAK DATA: 58.76 G @ 53.36 MS, -49.91 G @ 62.08 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991215-2



CHANNEL: VCGRG1 FILTER: CH. CLASS 60

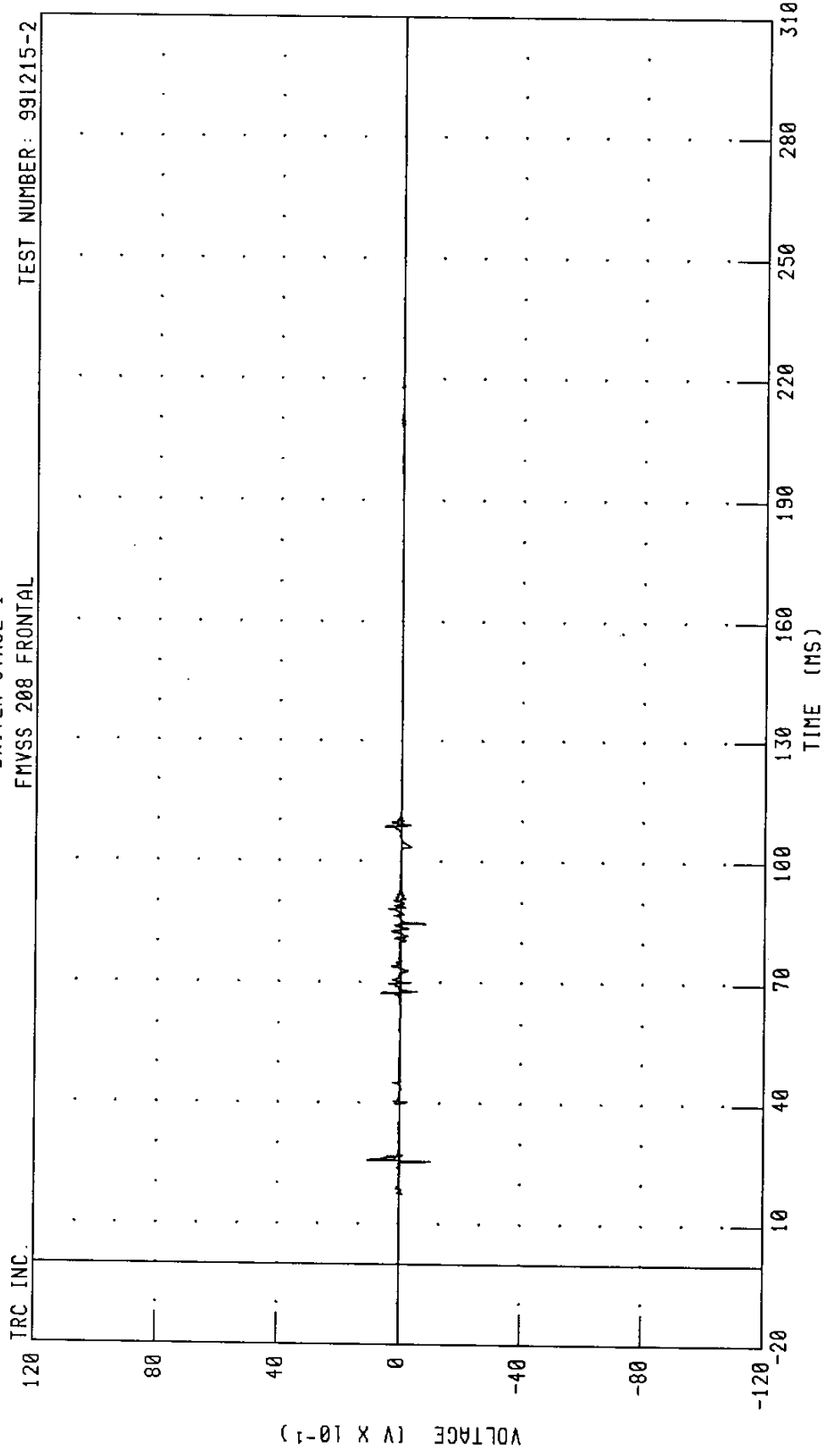
PEAK DATA: 78.34 G @ 61.52 MS; 0.01 G @ -20.00 MS

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH

DRIVER STAGE 1

FMVSS 208 FRONTAL

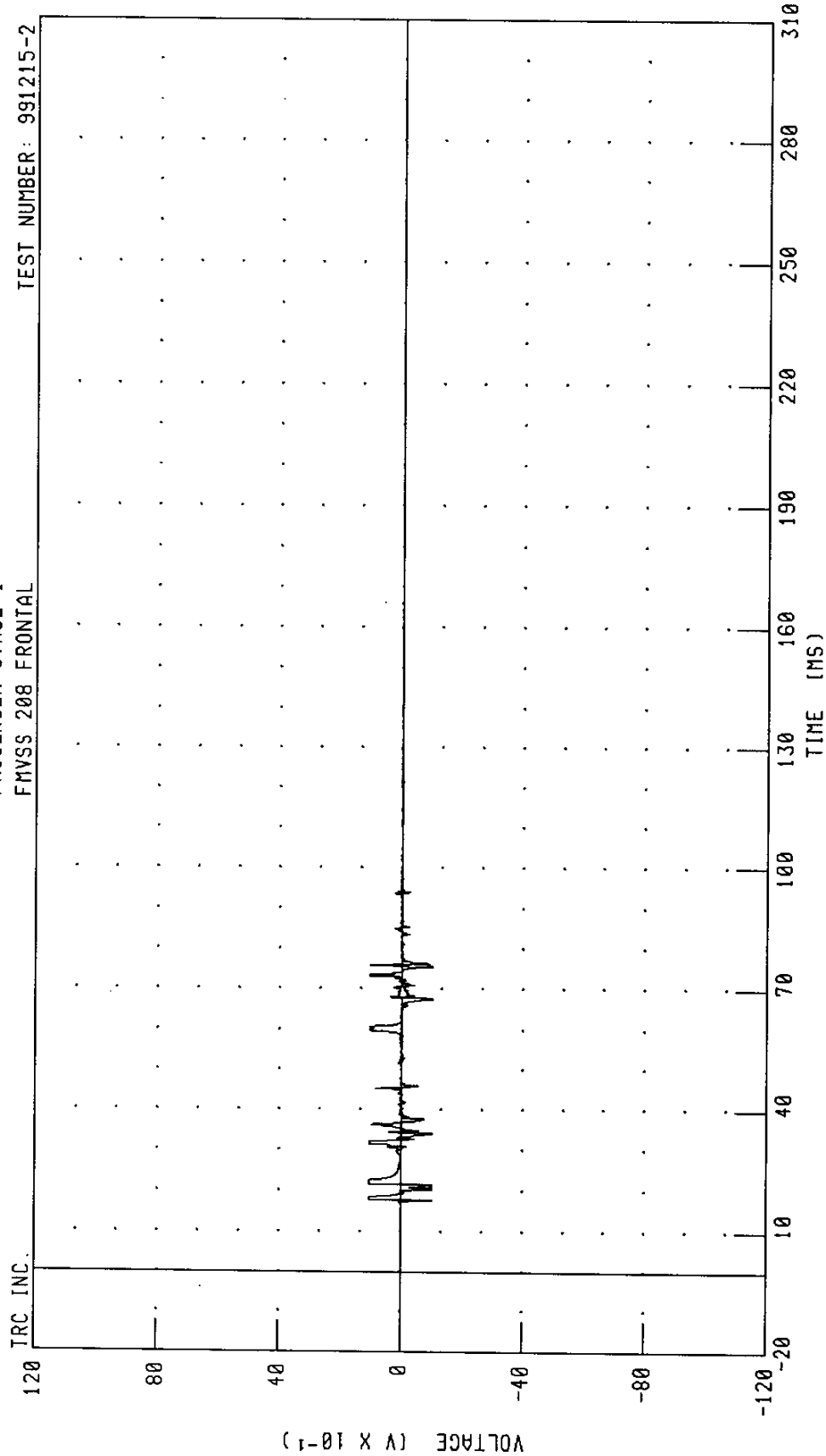
TEST NUMBER: 991215-2



CHANNEL: ABS01 FILTER: CH. CLASS 1000

1999 CHEVROLET BLAZER INTO A FLAT FRONTAL BARRIER AT 30 MPH
PASSENGER STAGE 1
FMVSS 208 FRONTAL

TEST NUMBER: 991215-2



CHANNEL: ABS02 FILTER: CH. CLASS 1000 PEAK DATA: 1.02 V @ 17.84 MS, -1.02 V @ 17.52 MS

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

12-NOV-99

TRC INC.

TEST NO: 551C73HD1

572E SN551 HEAD DROP CAL 73

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	269.90 G
PEAK LATERAL ACCELERATION	15 G MAX	5.44 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 111299.1043;1

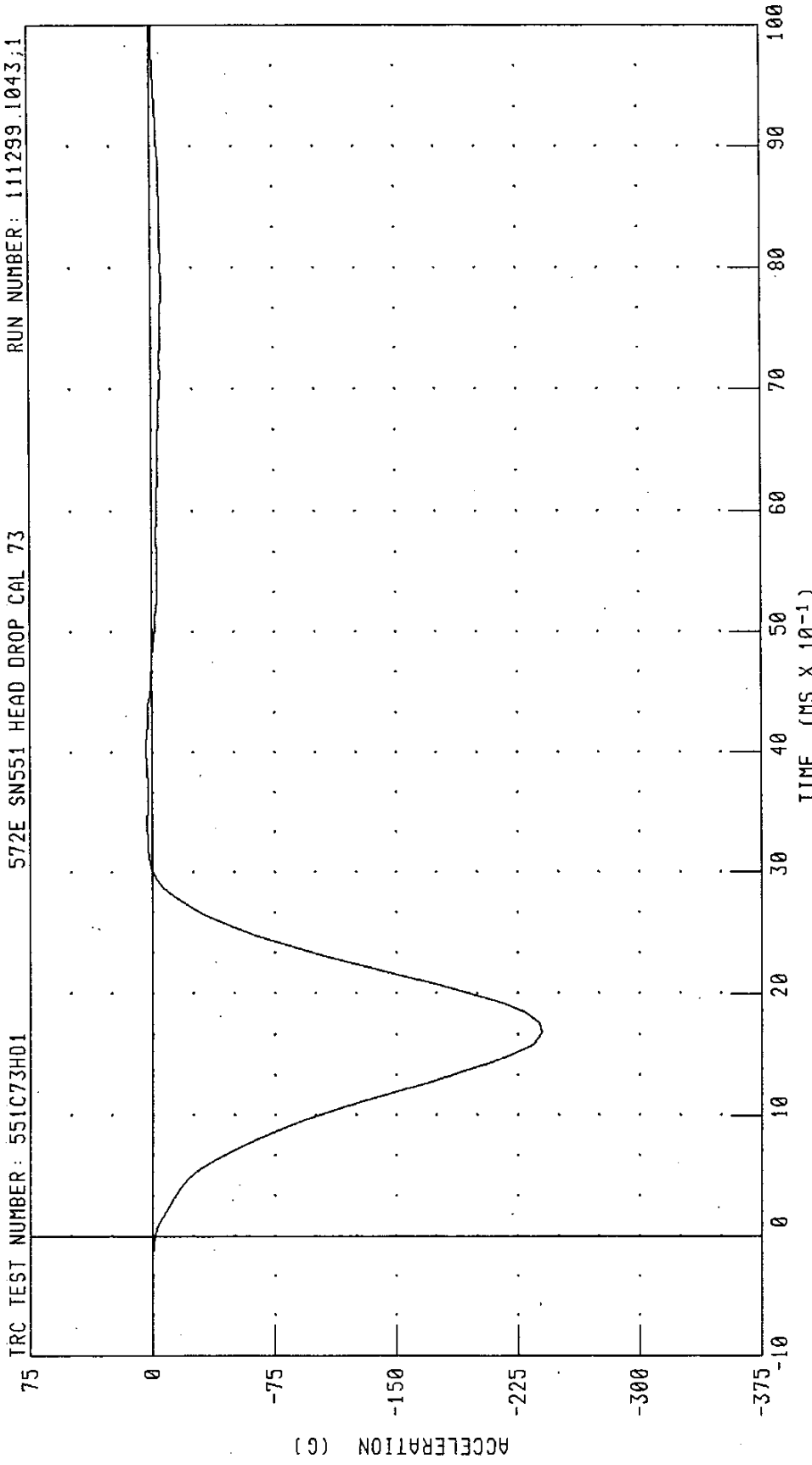
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN551 HEAD DROP CAL 73

TRC TEST NUMBER: 551C73HD1

RUN NUMBER: 111299.1043;1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 3.74 G @ 4.00 MS; -239.97 G @ 1.68 MS

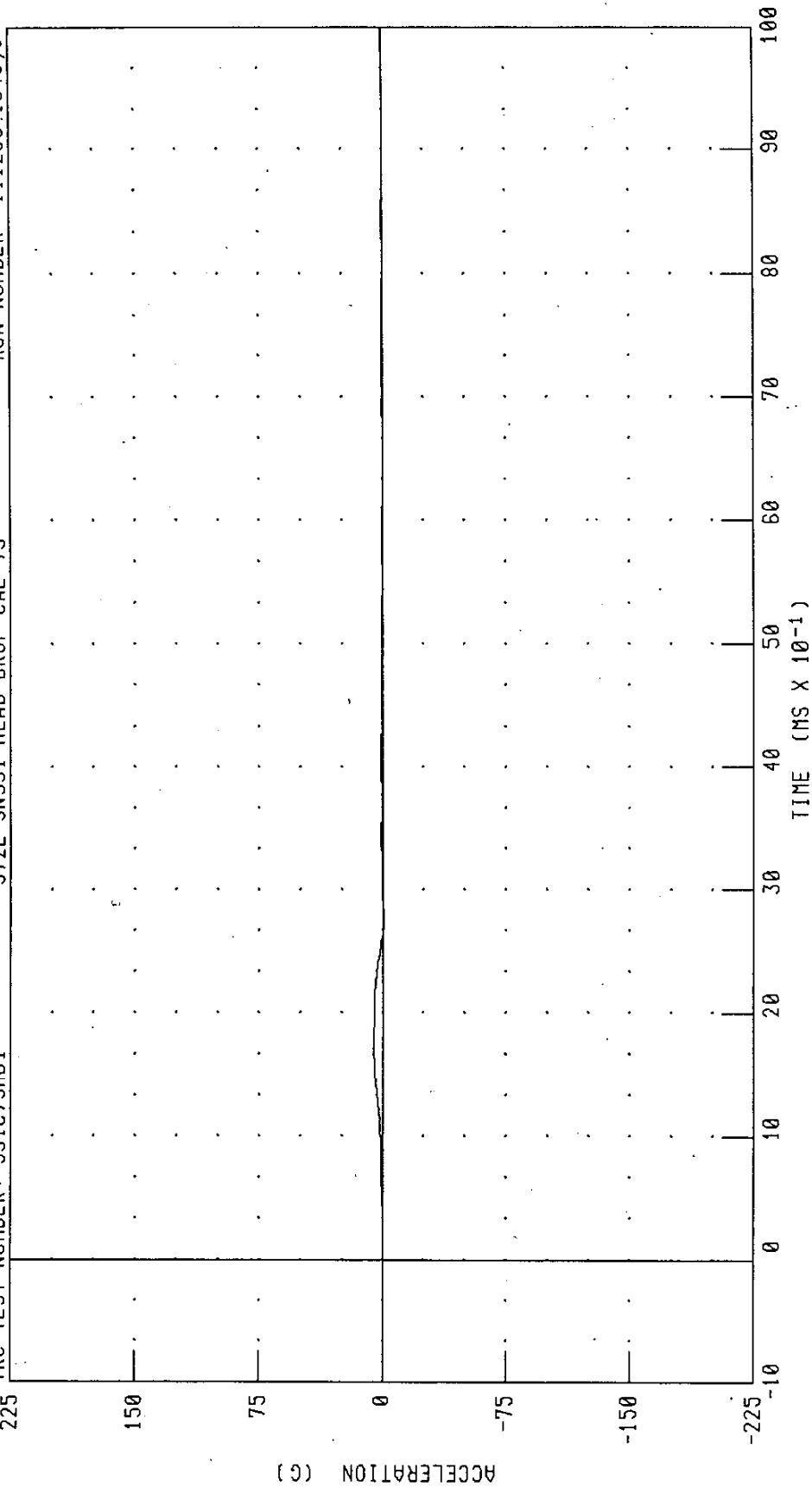
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 551C73HD1

572E SN551 HEAD DROP CAL 73

RUN NUMBER: 111299.1043;1



CHANNEL: HEDYC FILTER: CH. CLASS 1000

PEAK DATA: 5.44 G @ 1.76 MS; -1.01 G @ 2.72 MS

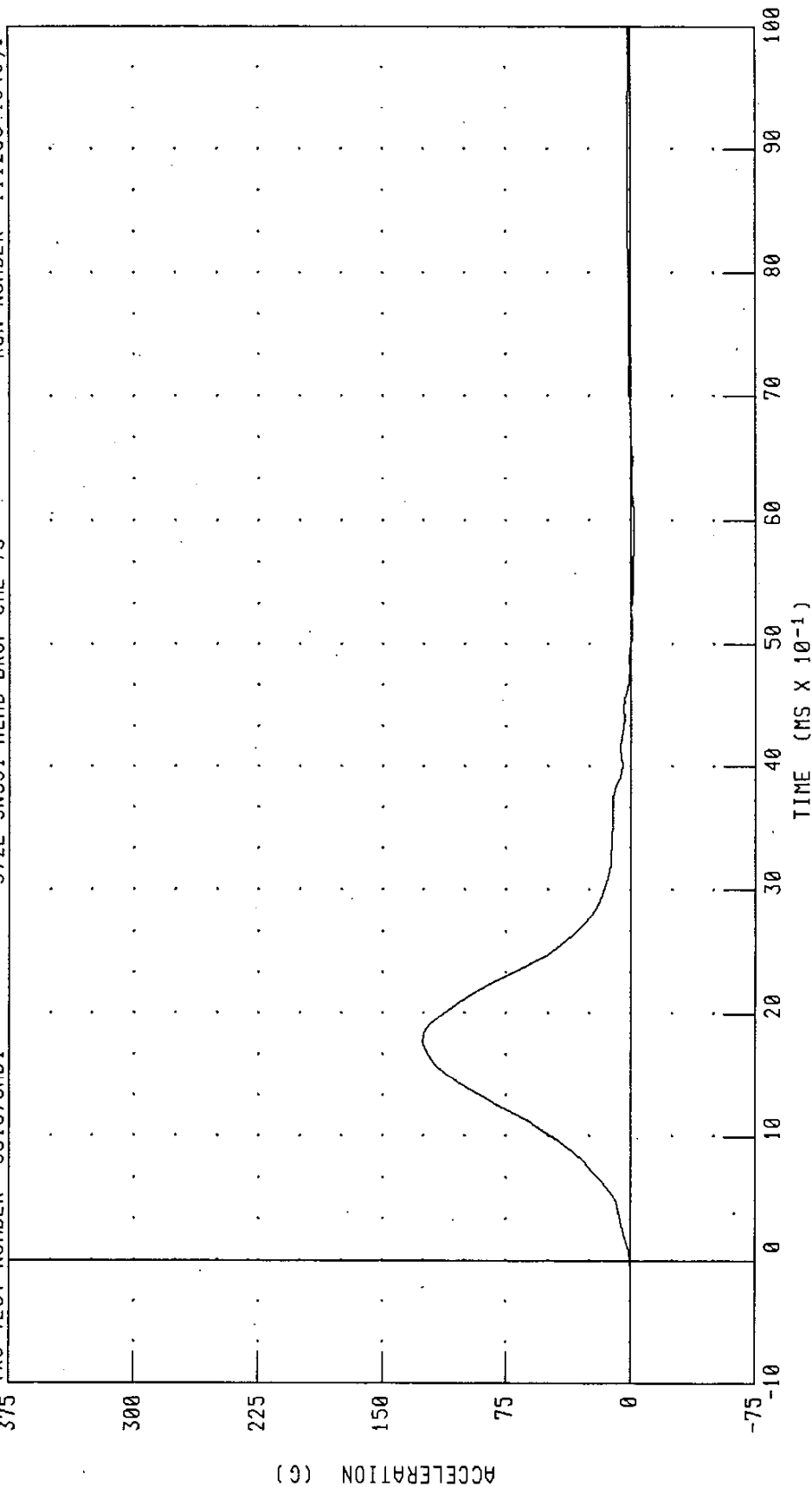
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 551C73HD1

572E SN551 HEAD DROP CAL 73

RUN NUMBER: 111299.1043,1



CHANNEL: HEDZG FILTER: CH. CLASS 1000 PEAK DATA: 125.76 G @ 1.76 MS; -1.98 G @ 5.76 MS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN551 HEAD DROP CAL 73

TRC TEST NUMBER: 551C73HD1

375

300

225

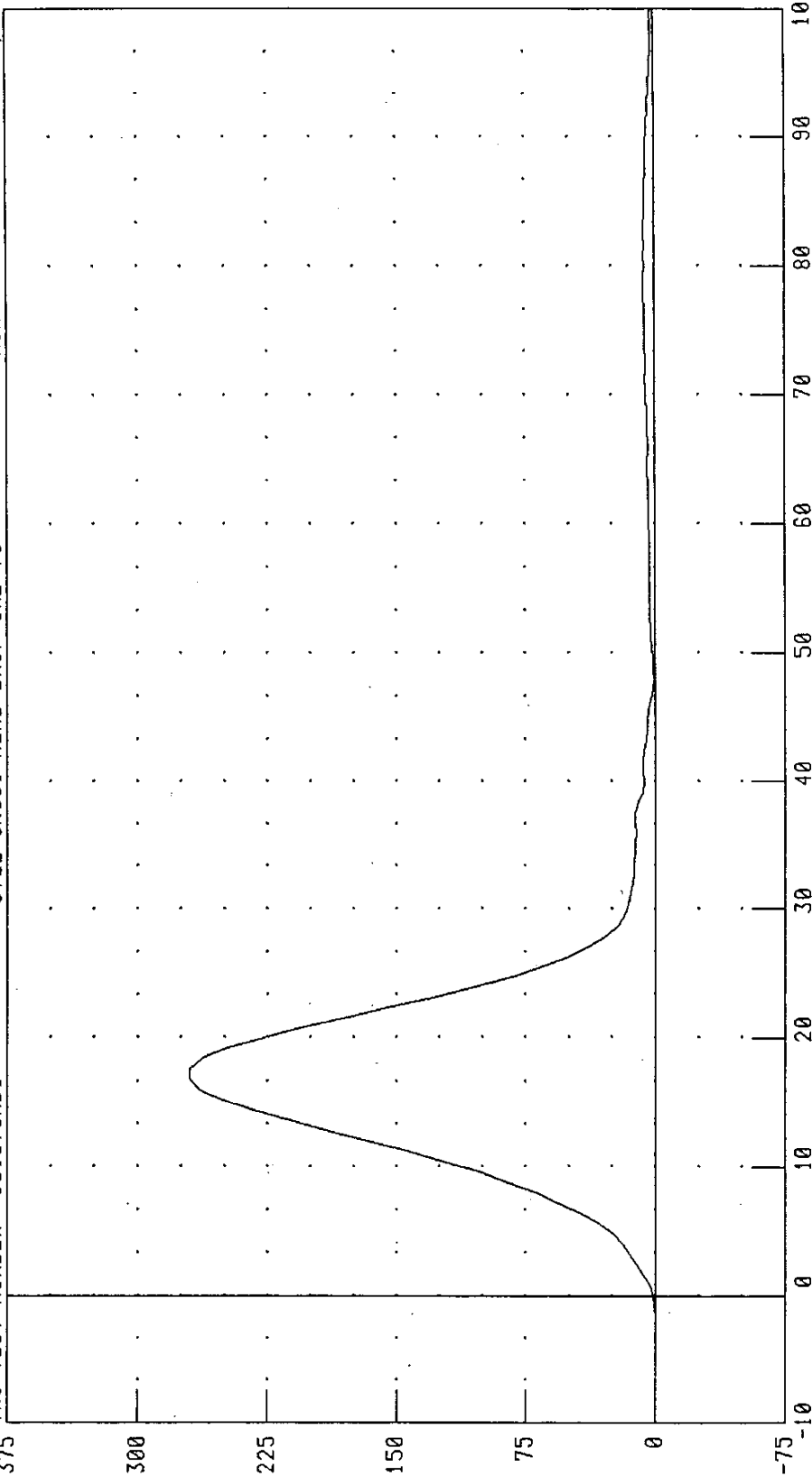
150

75

0

-75

ACCELERATION (G)



TIME (MS X 10⁻¹)

PEAK DATA: 269.91 G @ 1.76 MS, 0.09 G @ -0.96 MS

FILTER: CH. CLASS 1000

CHANNEL: HEDRC

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

12-NOV-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 551C73NF1 572E SN551 NECK FLEXION CAL73

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.54 G
	20 MS	17.60 - 22.60 G	21.40 G
	30 MS	12.50 - 18.50 G	15.59 G
MAX PENDULUM G		29 G MAX	23.12 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.52 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	40.64 MS
D PLANE	MAX	64 - 78 DEG.	72.87 DEG.
ROTATION	TIME	57 - 64 MS	60.64 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	93.08 NM
	TIME	47 - 58 MS	53.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	118.72 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	105.44 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 111299.1247;2

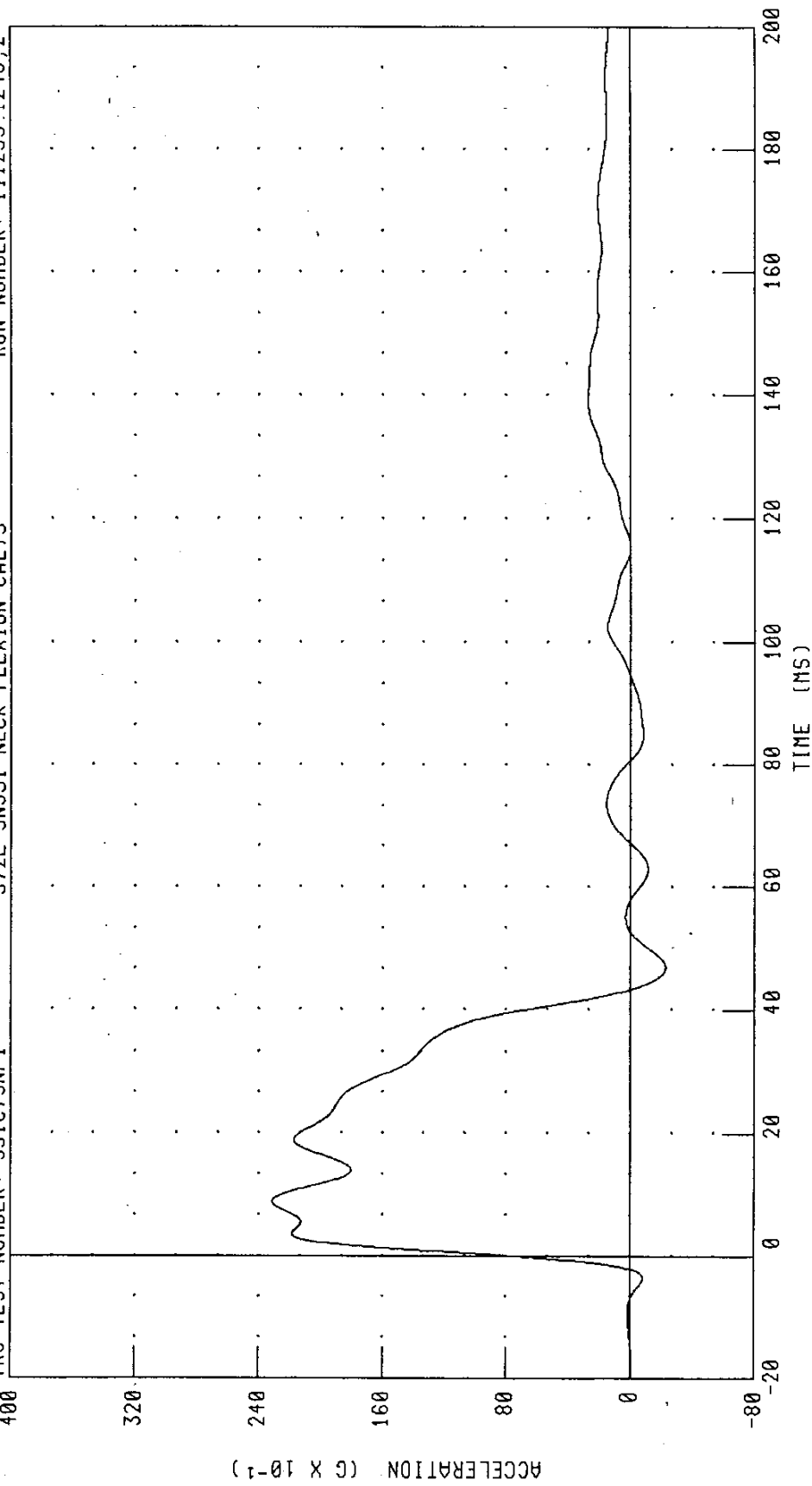
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 551C73NF1

572E SN551 NECK FLEXION CAL73

RUN NUMBER: 111299.1248,2



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 23.13 G @ 8.88 MS, -2.29 G @ 46.88 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 551C73NF1

572E SN551 NECK FLEXION CAL73

RUN NUMBER: 111299.1248;2

120

90

60

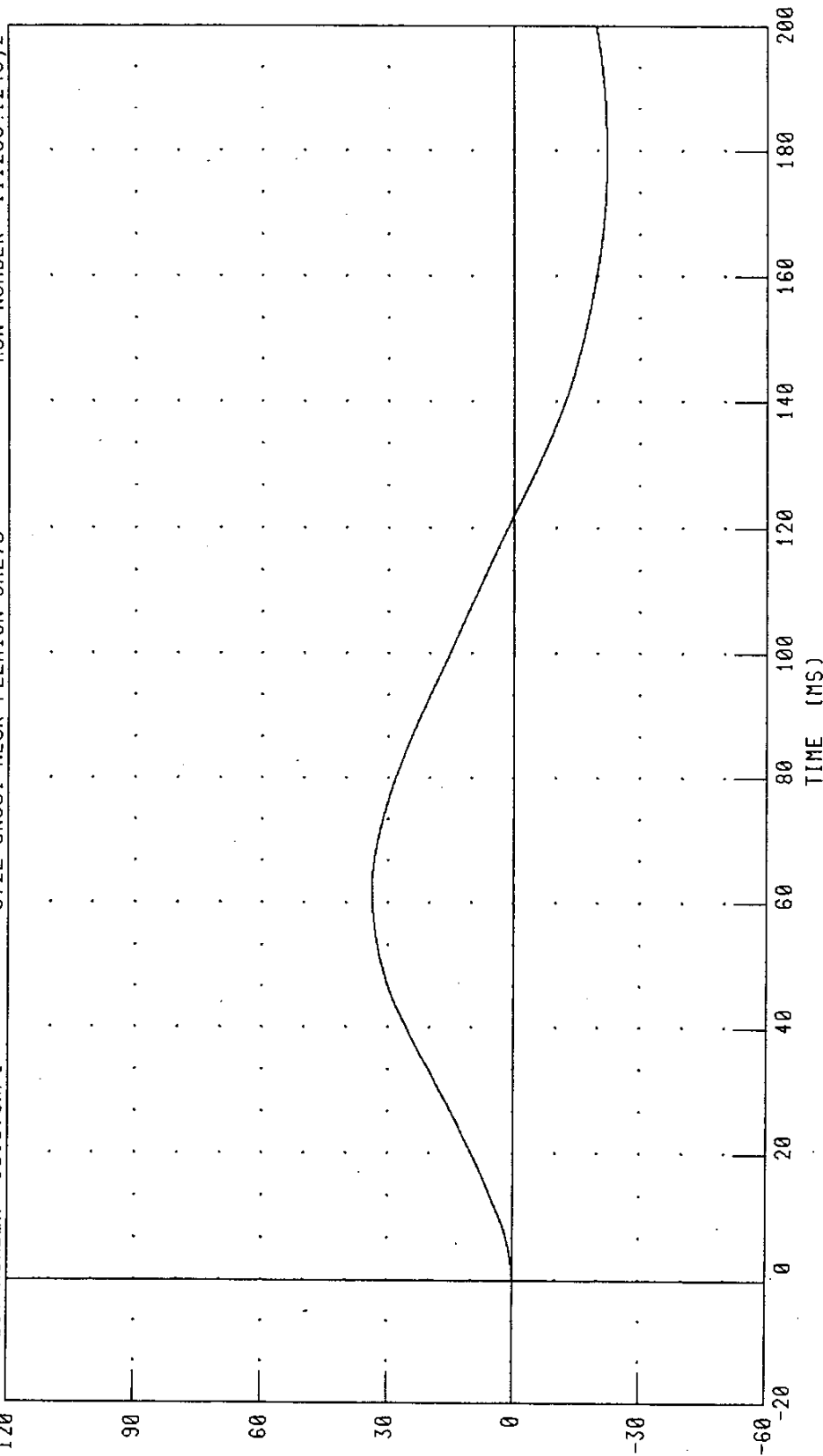
30

0

-30

-60

ANGLE (°)



TIME (MS)

PEAK DATA: 33.79 ° @ 61.60 MS; -22.12 ° @ 178.00 MS

CHANNEL: BETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

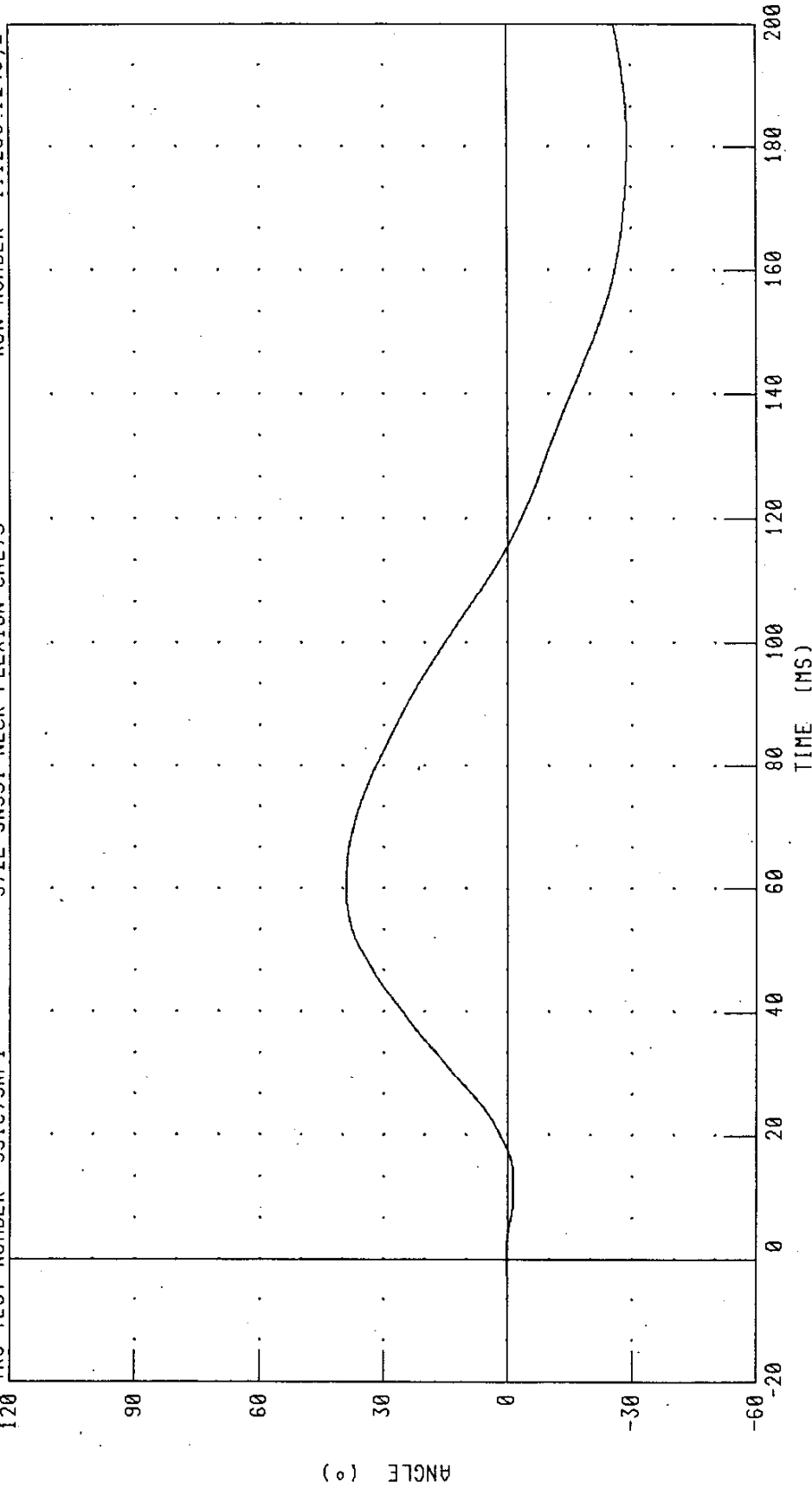
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 551C73NF1

572E SN551 NECK FLEXION CAL73

RUN NUMBER: 111299.1248;2

120



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 39.11 ° @ 59.92 MS; -28.95 ° @ 181.52 MS

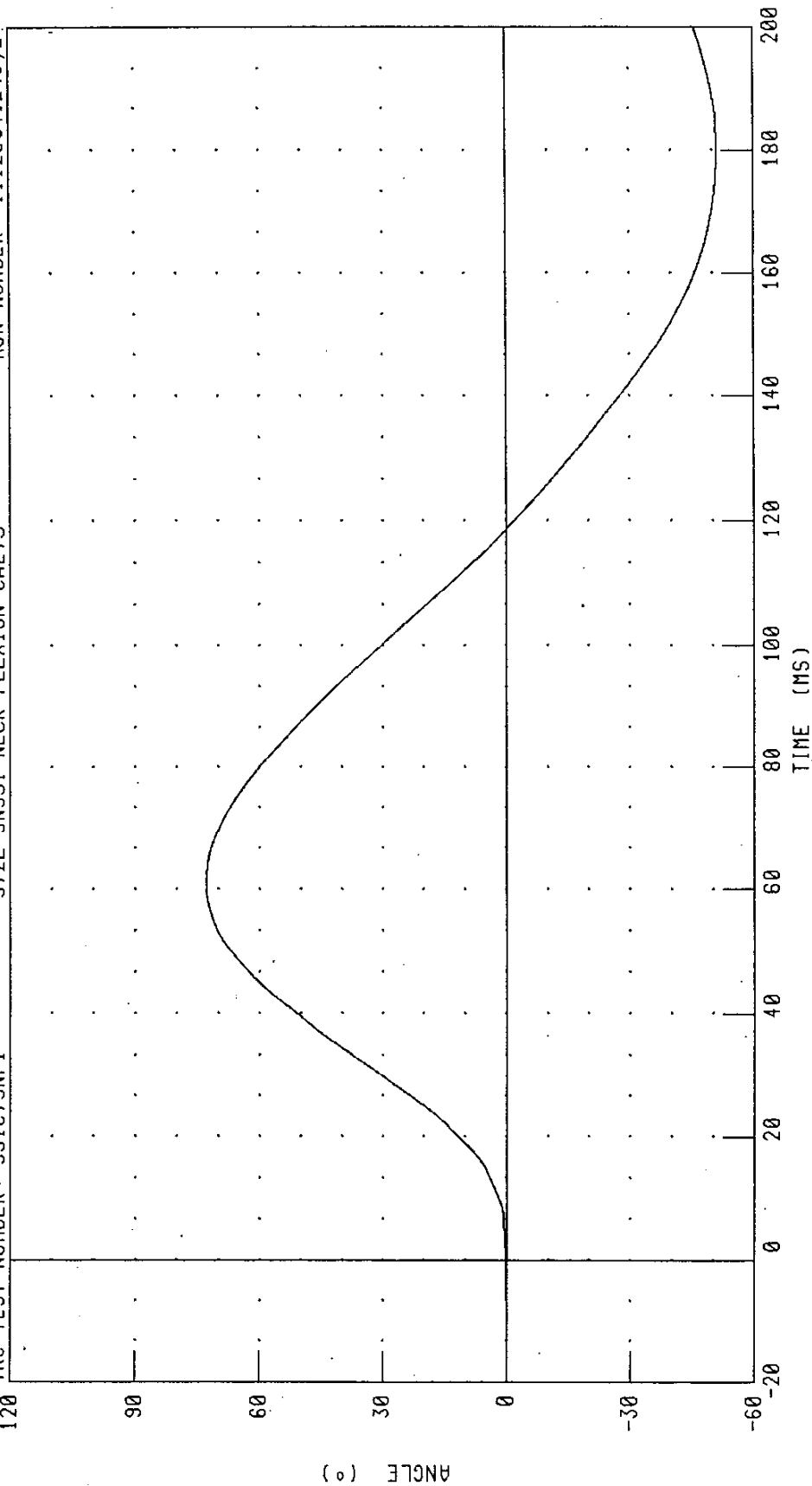
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 551C73NF1

572E SN551 NECK FLEXION CAL73

RUN NUMBER: 111299.1248;2



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 72.87 ° @ 60.64 MS, -51.05 ° @ 179.12 MS

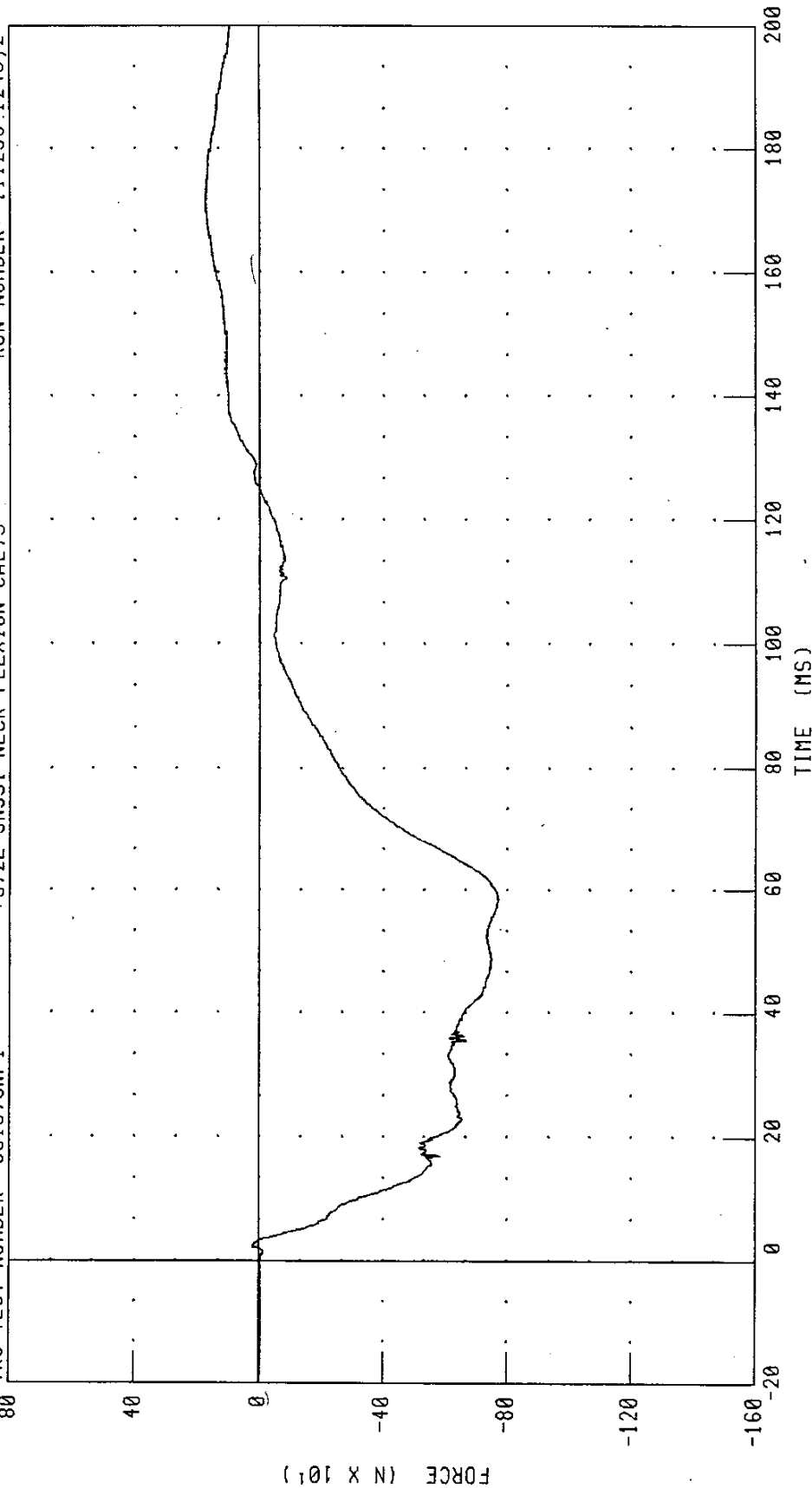
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 551C73NF1

572E SN551 NECK FLEXION CAL73

RUN NUMBER: 111299.1248,2

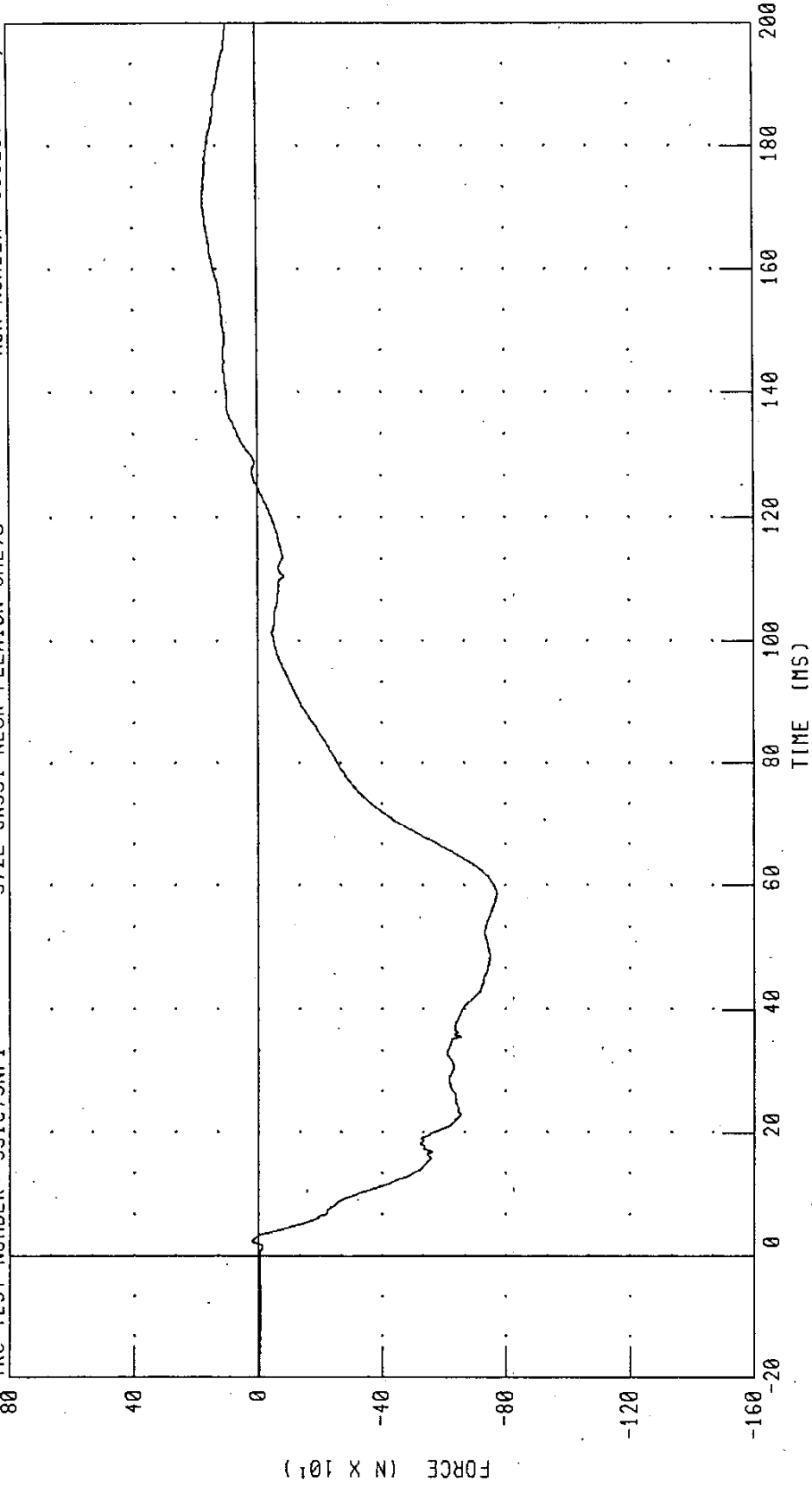


CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 174.58 N @ 169.84 MS, -775.33 N @ 58.56 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 551C73NF1 572E SN551 NECK FLEXION CAL73 RUN NUMBER: 111299.1248.2

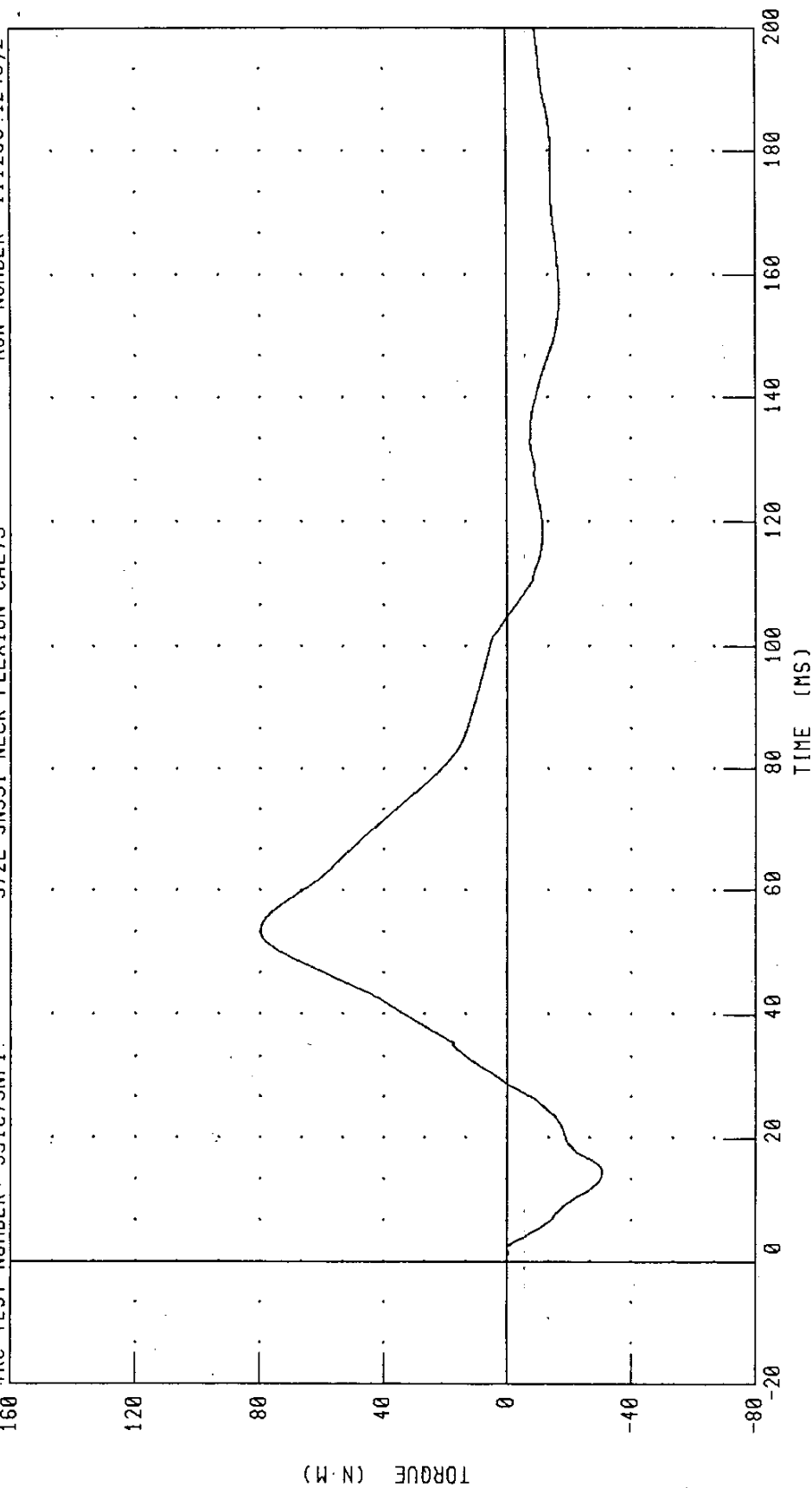


CHANNEL: NEKXFC FILTER: CH. CLASS 600 PEAK DATA: 174.59 N @ 171.44 MS; -772.35 N @ 58.56 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

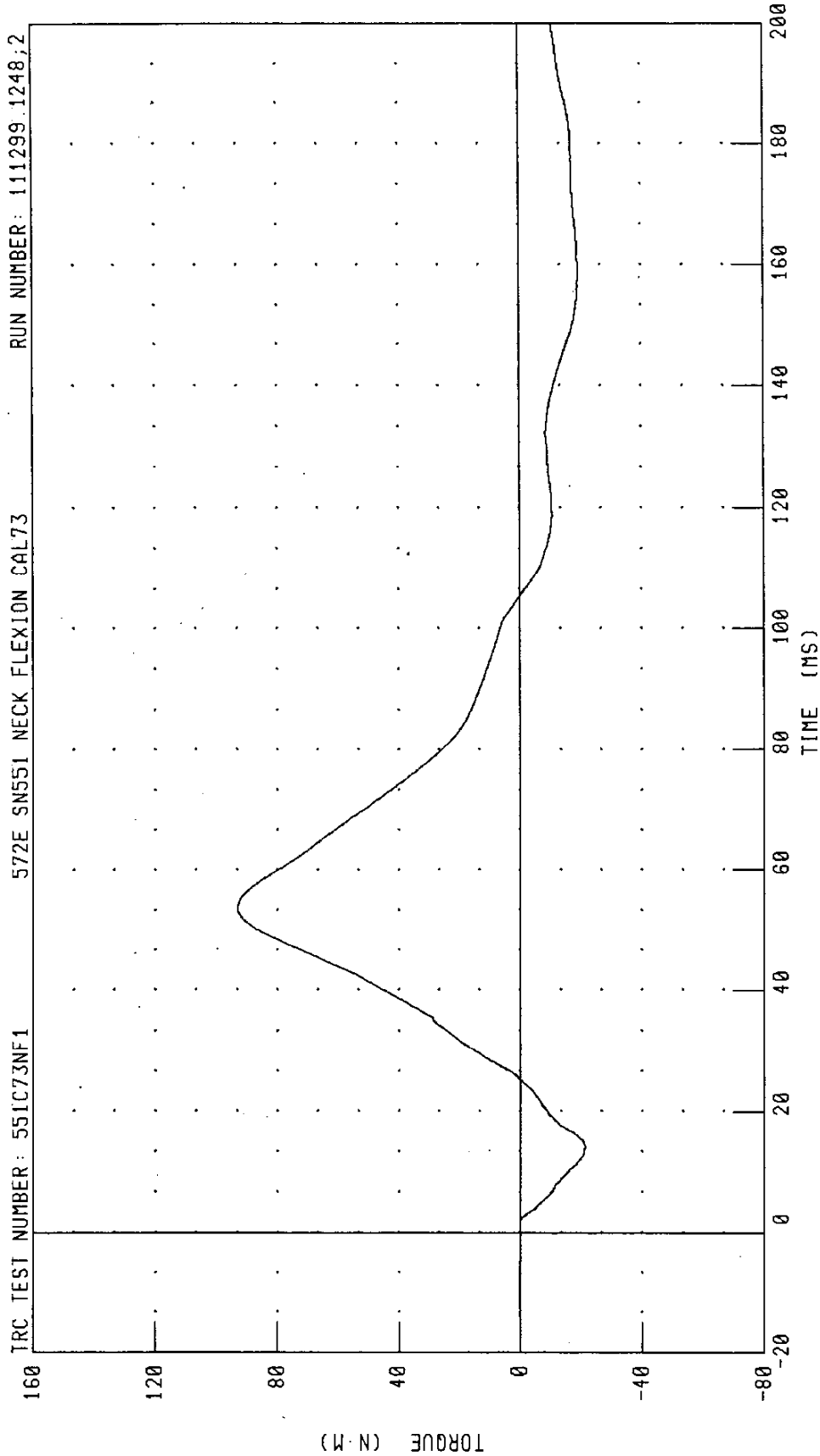
TRC TEST NUMBER: 551C73NF1 572E SN551 NECK FLEXION CAL73 RUN NUMBER: 111299.1248;2



CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 79.96 N·M @ 53.60 MS; -30.75 N·M @ 14.24 MS

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



CHANNEL: NEKOM FILTER: CH. CLASS 600 PEAK DATA: 93.08 N·M @ 53.76 MS, -21.37 N·M @ 14.16 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

12-NOV-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC.

TEST NO: 551C73NE1

572E SN551 NECK EXT CAL73

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.12 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.16 G
	20 MS	14.00 - 19.00 G	16.83 G
	30 MS	11.00 - 16.00 G	13.64 G
MAX PENDULUM G		22 G MAX	19.43 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.60 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.08 MS
D PLANE	MAX	81 - 106 DEG.	99.05 DEG.
ROTATION	TIME	72 - 82 MS	77.12 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-67.11 NM
	TIME	65 - 79 MS	71.04 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	158.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	141.12 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 111299.1314;1

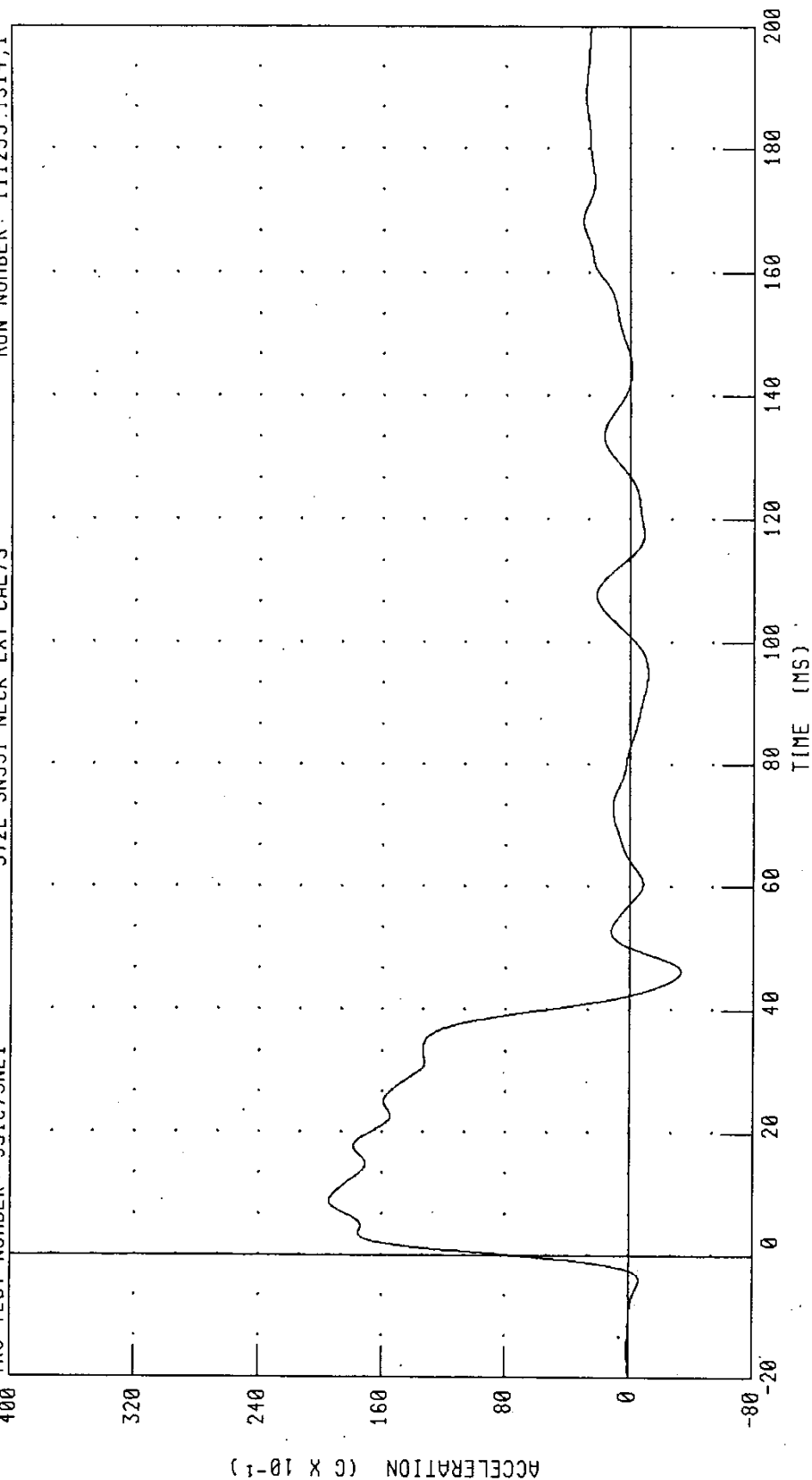
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 551C73NE1

572E SN551 NECK EXT CAL73

RUN NUMBER: 111299.1314.1



CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 19.43 G @ 8.80 MS, -3.32 G @ 48.24 MS

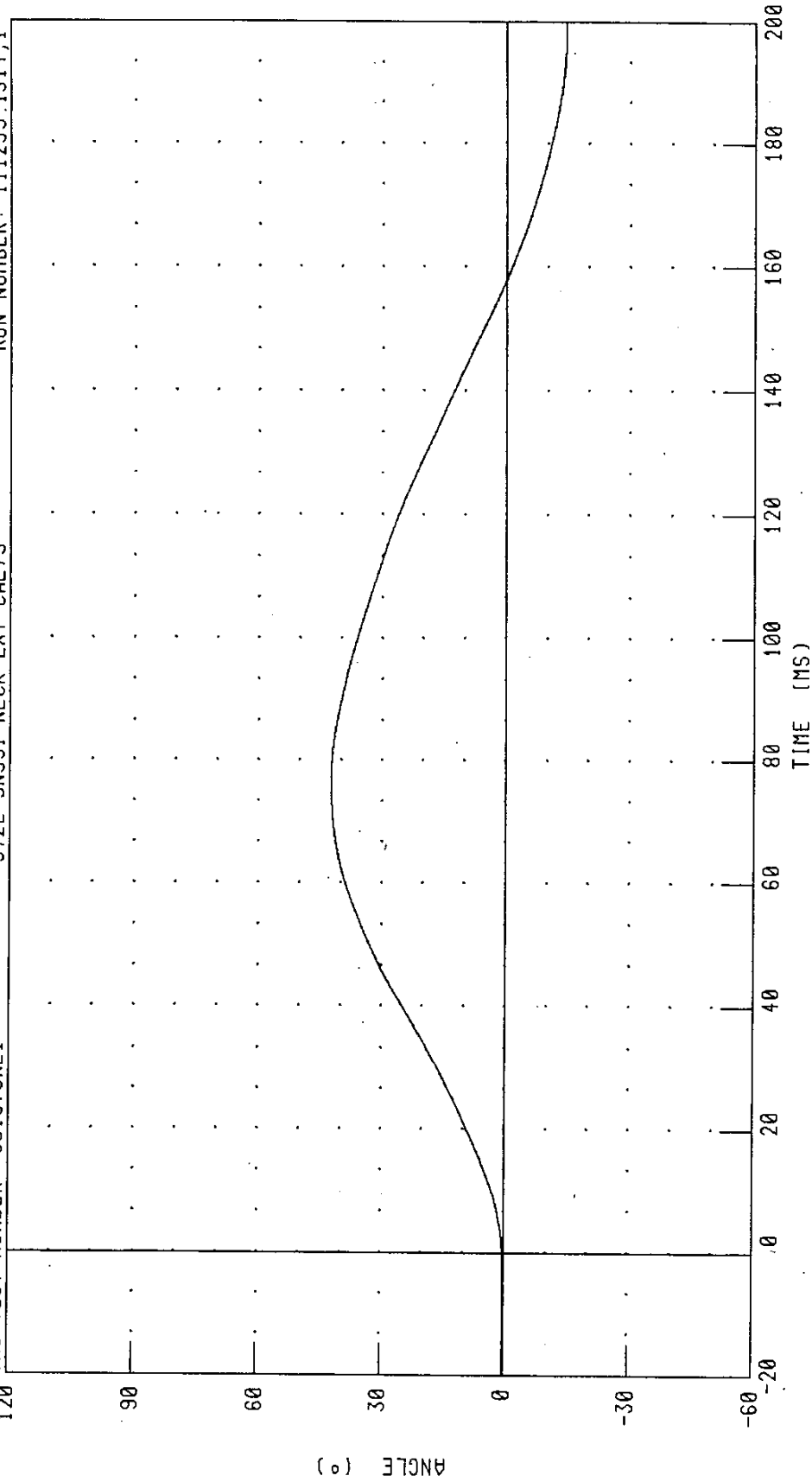
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 551C73NE1

RUN NUMBER: 111299.1314,1

572E SN551 NECK EXT CAL73



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 42.29 ° @ 76.16 MS; -14.61 ° @ 199.84 MS

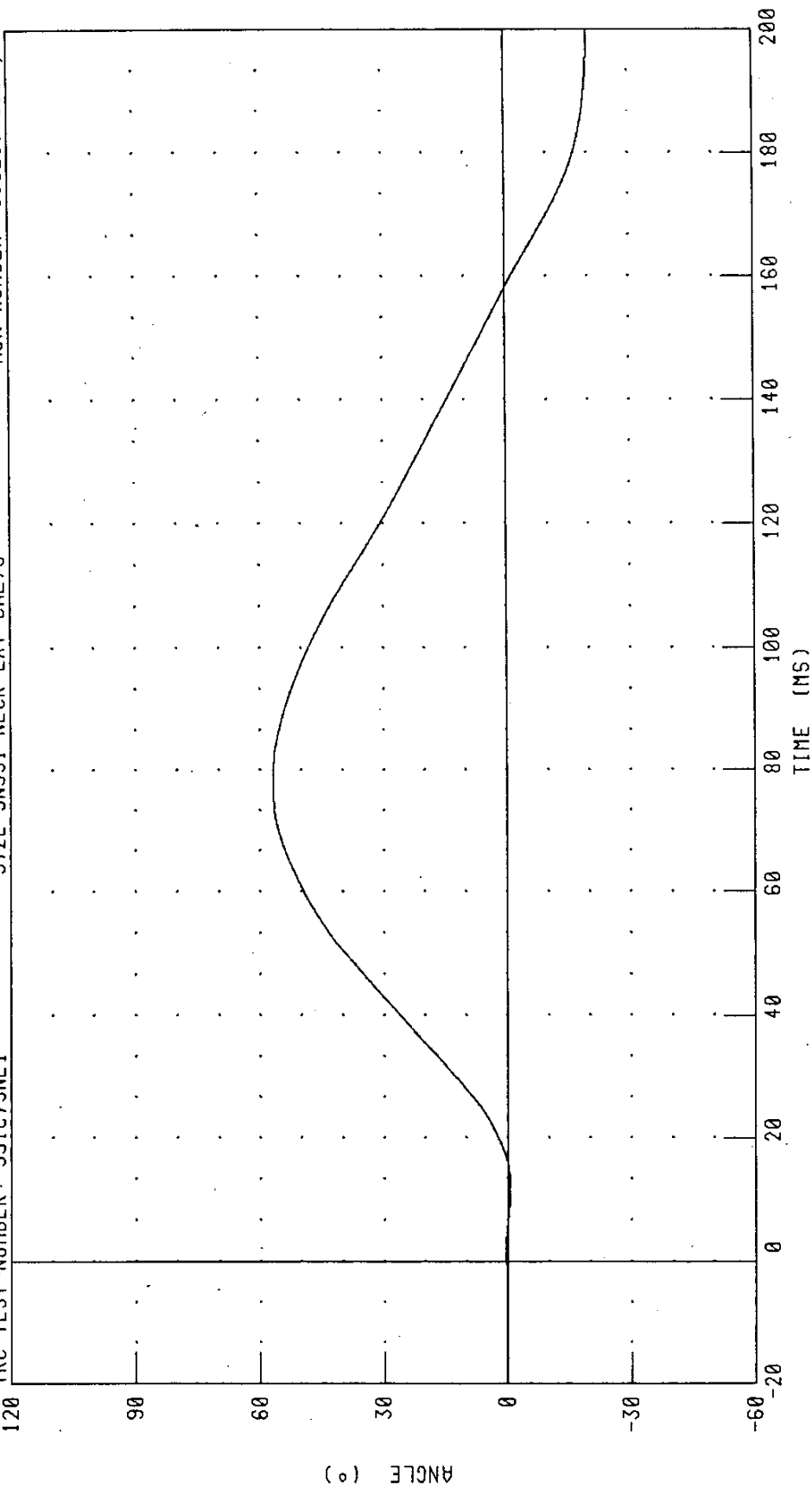
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 551C73NE1

572E SN551 NECK EXT CAL73

RUN NUMBER: 111299.1314,1



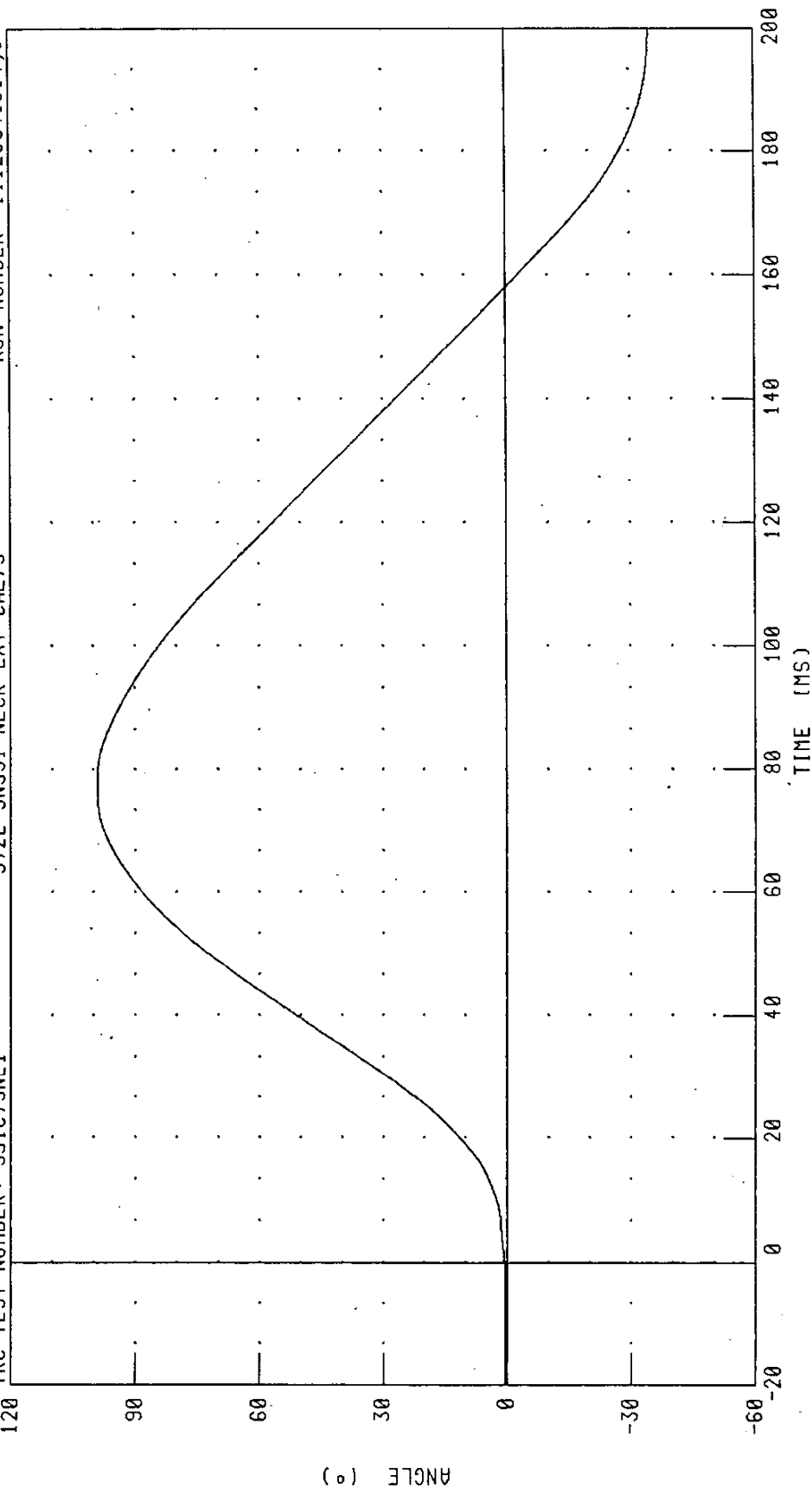
CHANNEL: THETA FILTER: CH: CLASS 60

PEAK DATA: 56.77 ° @ 77.52 MS, -20.17 ° @ 200.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 551C73NE1 572E SN551 NECK EXT CAL73 RUN NUMBER: 111299.1314;1



CHANNEL: TOTAL FILTER: CH. CLASS 60 PEAK DATA: 99.06 ° @ 77.12 MS; -34.79 ° @ 200.00 MS

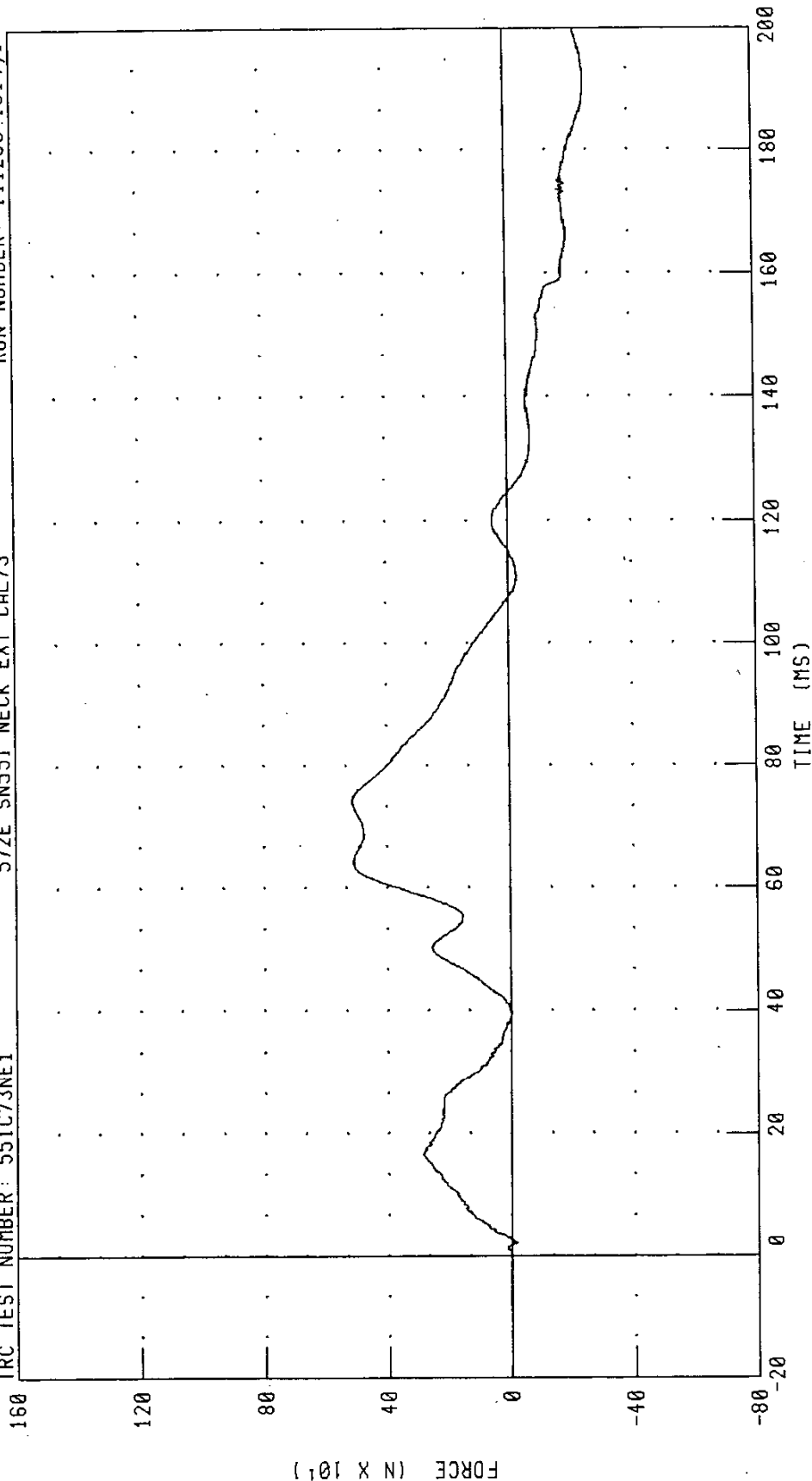
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 551C73NE1

572E SN551 NECK EXT CAL73

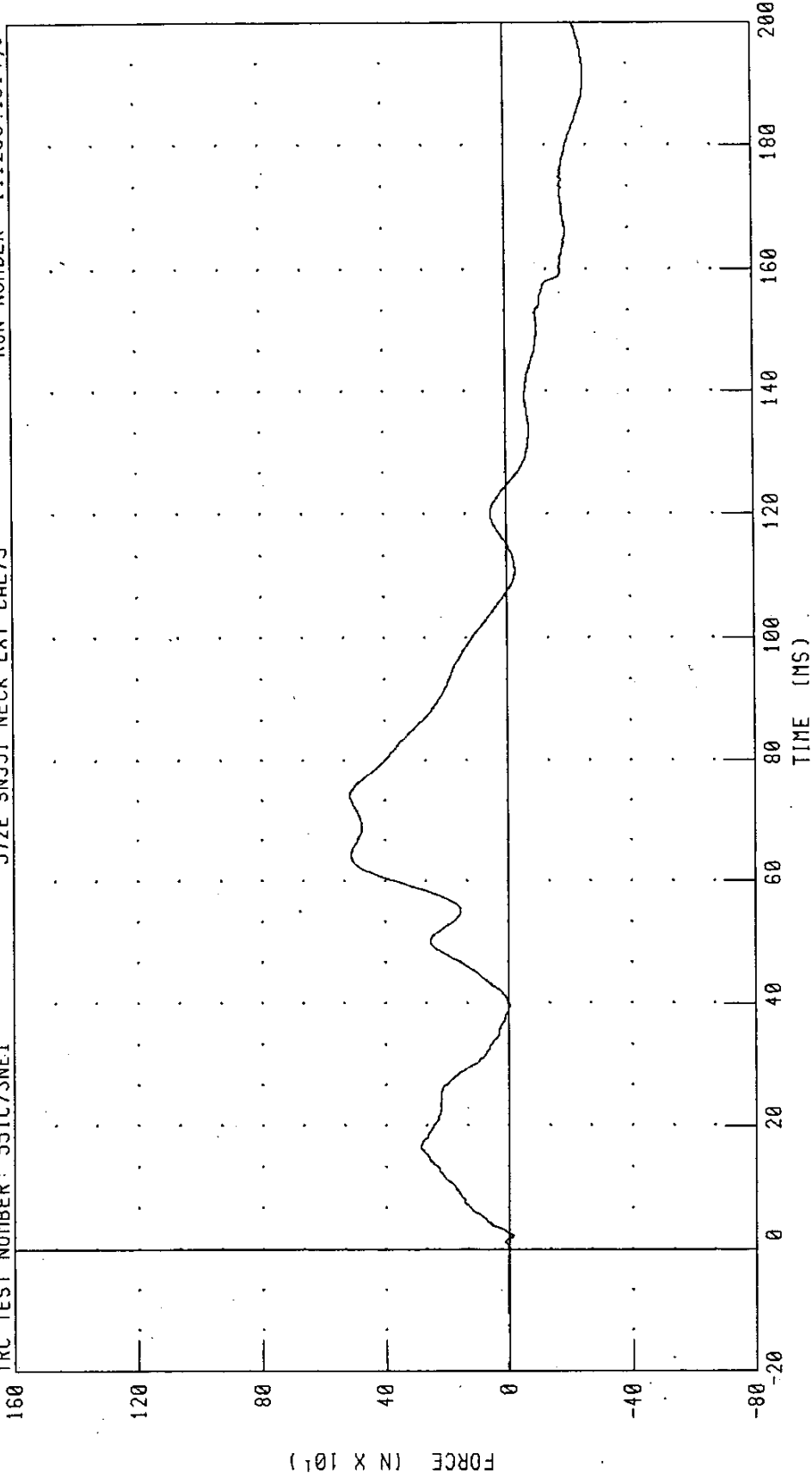
RUN NUMBER: 111299.131471



PEAK DATA: 515.13 N @ 73.84 MS; -258.87 N @ 189.12 MS

CHANNEL: NEKXF FILTER: CH. CLASS 1000

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION
TRC TEST NUMBER: 551C73NE1 572E SN551 NECK EXT CAL73 RUN NUMBER: 111299.1314,1



CHANNEL: NEKXFC FILTER: CH. CLASS 600 PEAK DATA: 514.59 N @ 74.16 MS, -259.02 N @ 192.88 MS

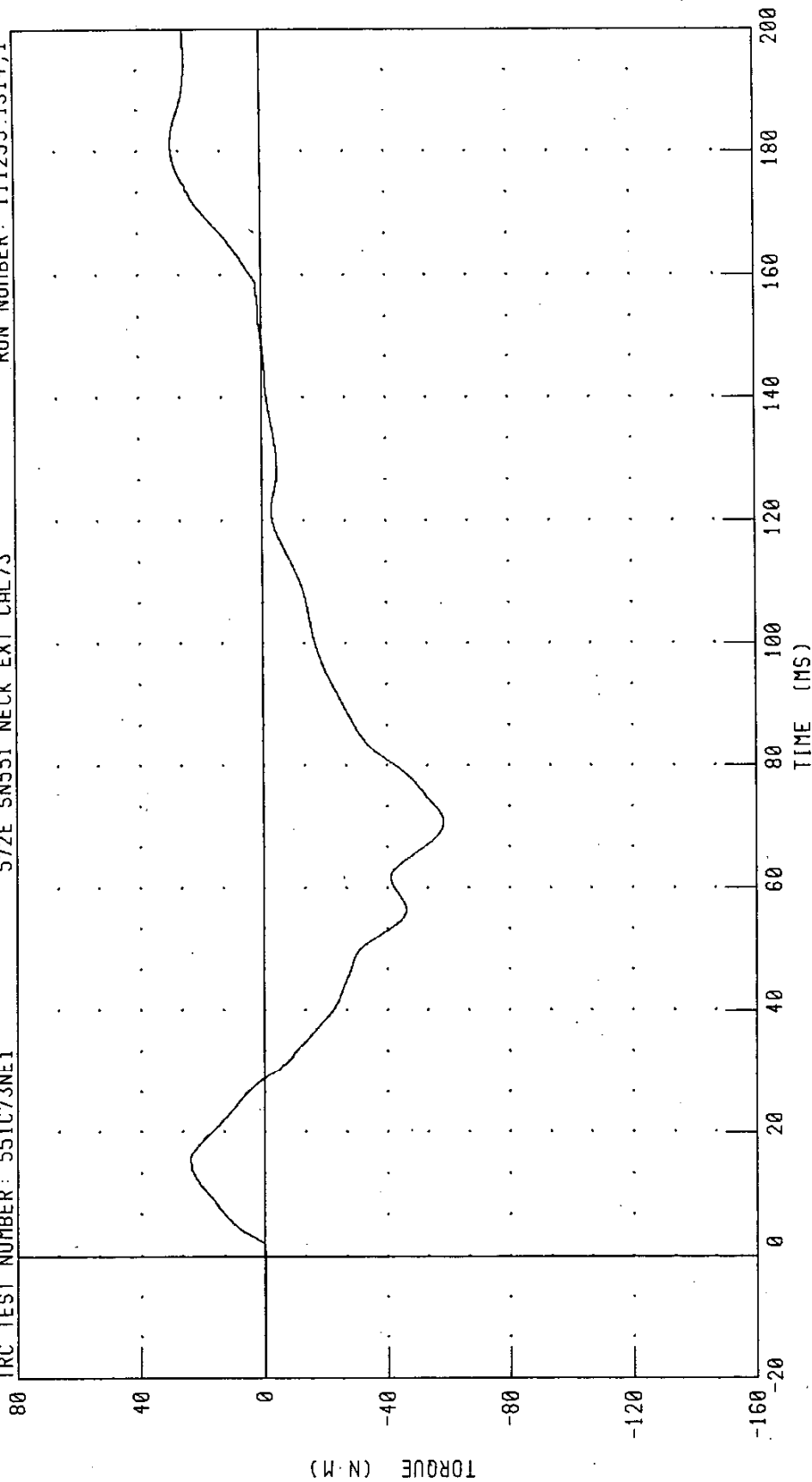
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 551C73NE1

572E SN551 NECK EXT CAL73

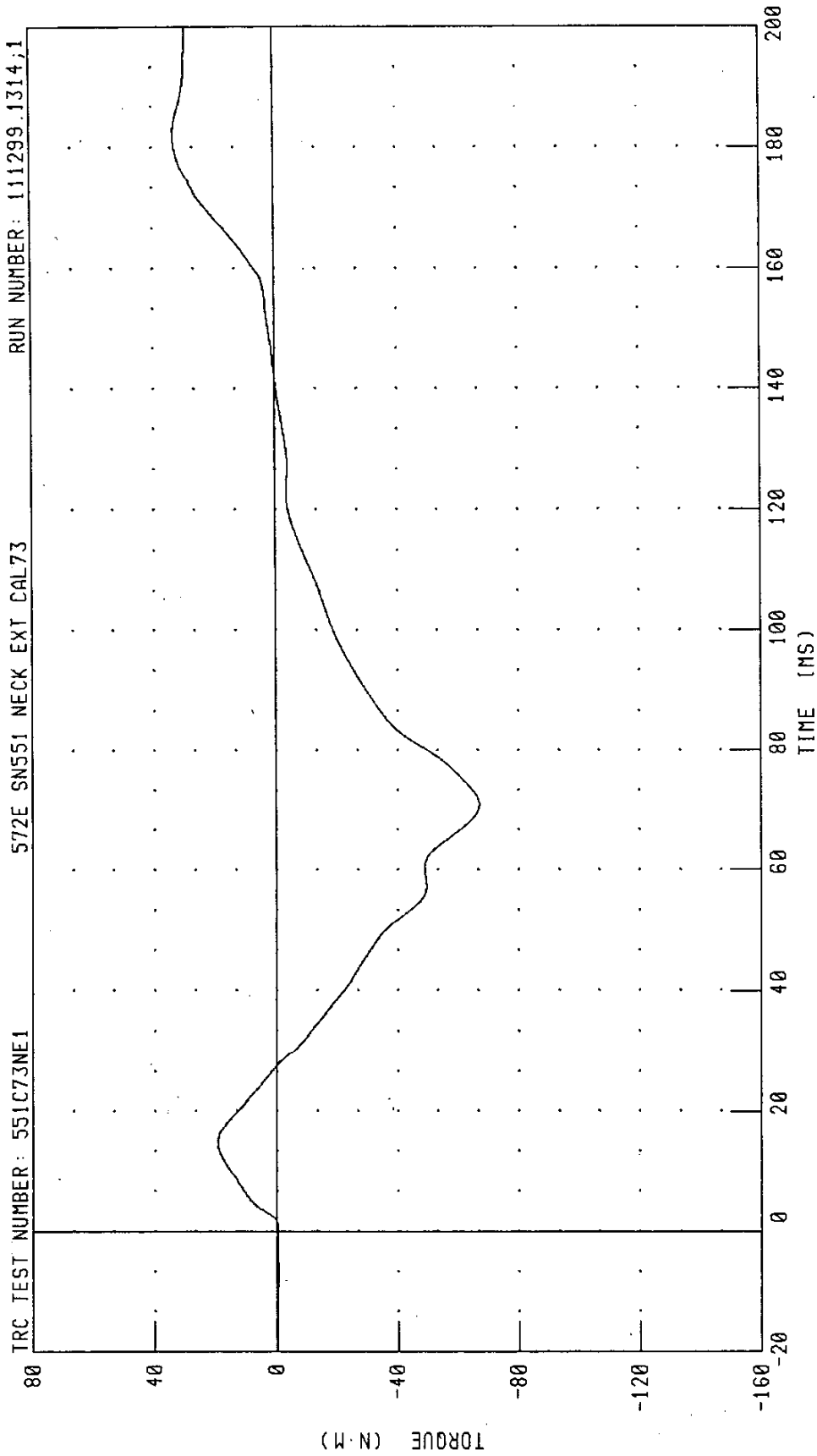
RUN NUMBER: 111299.1314.1



PEAK DATA: 29.27 N·M @ 181.44 MS, -58.49 N·M @ 70.88 MS

CHANNEL: NEKYM FILTER: CH. CLASS 600

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



CHANNEL: NEKOM FILTER: CH. CLASS 600 PEAK DATA: 32.97 N·M @ 181.60 MS; -67.11 N·M @ 71.04 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

12-NOV-99

TRC INC.

TEST NO: 551C73TH2

572E SN551 H.S.THORAX CAL73

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	71.3 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5890. N
INTERNAL HYSTERESIS	69% - 85%	69.2%

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walker

RUN NUMBER: 111299.0919;1

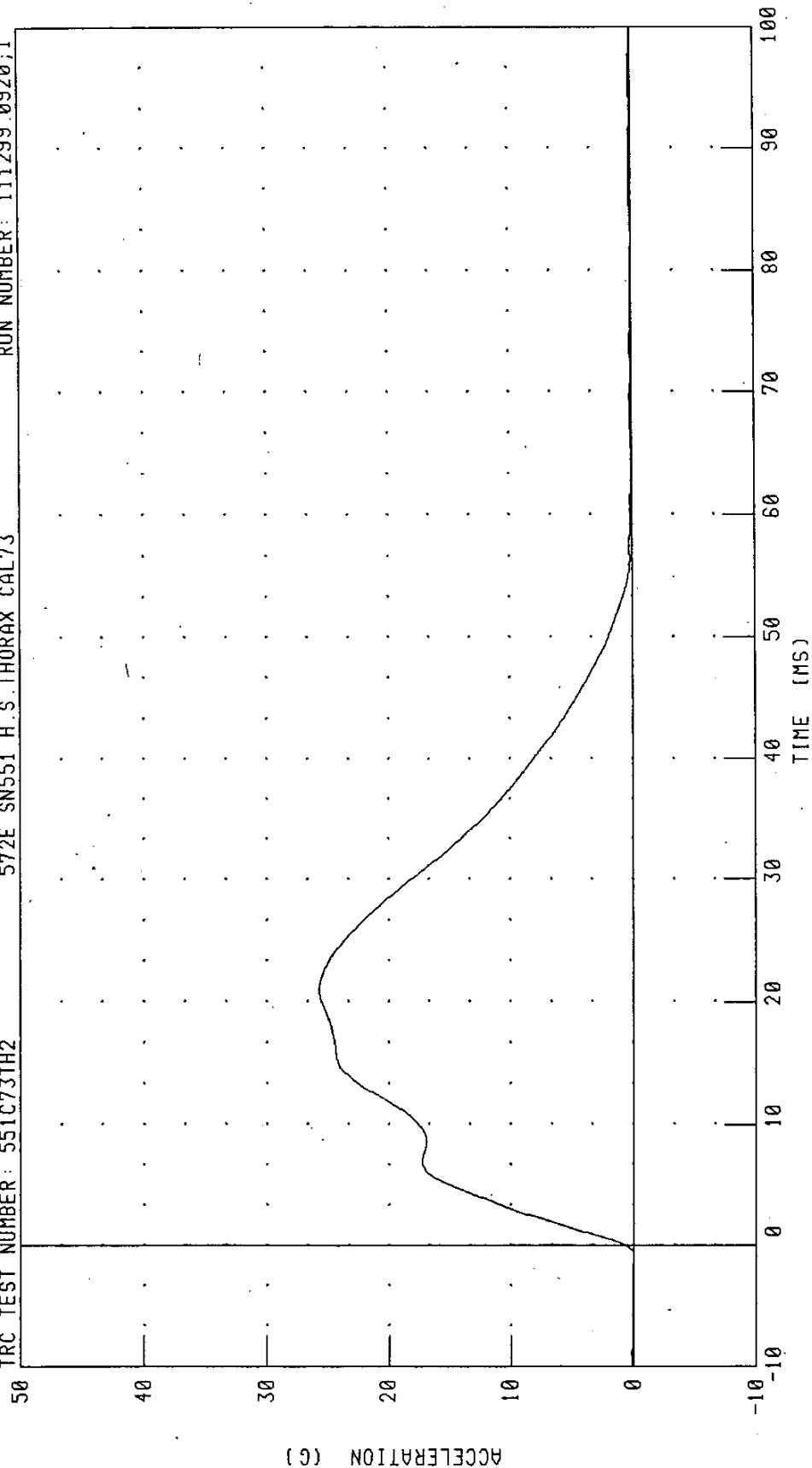
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 551C73TH2

572E SN551 H.S. THORAX CAL73

RUN NUMBER: 111299.0920;1



CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 25.71 G @ 21.04 MS; -0.02 G @ -0.96 MS

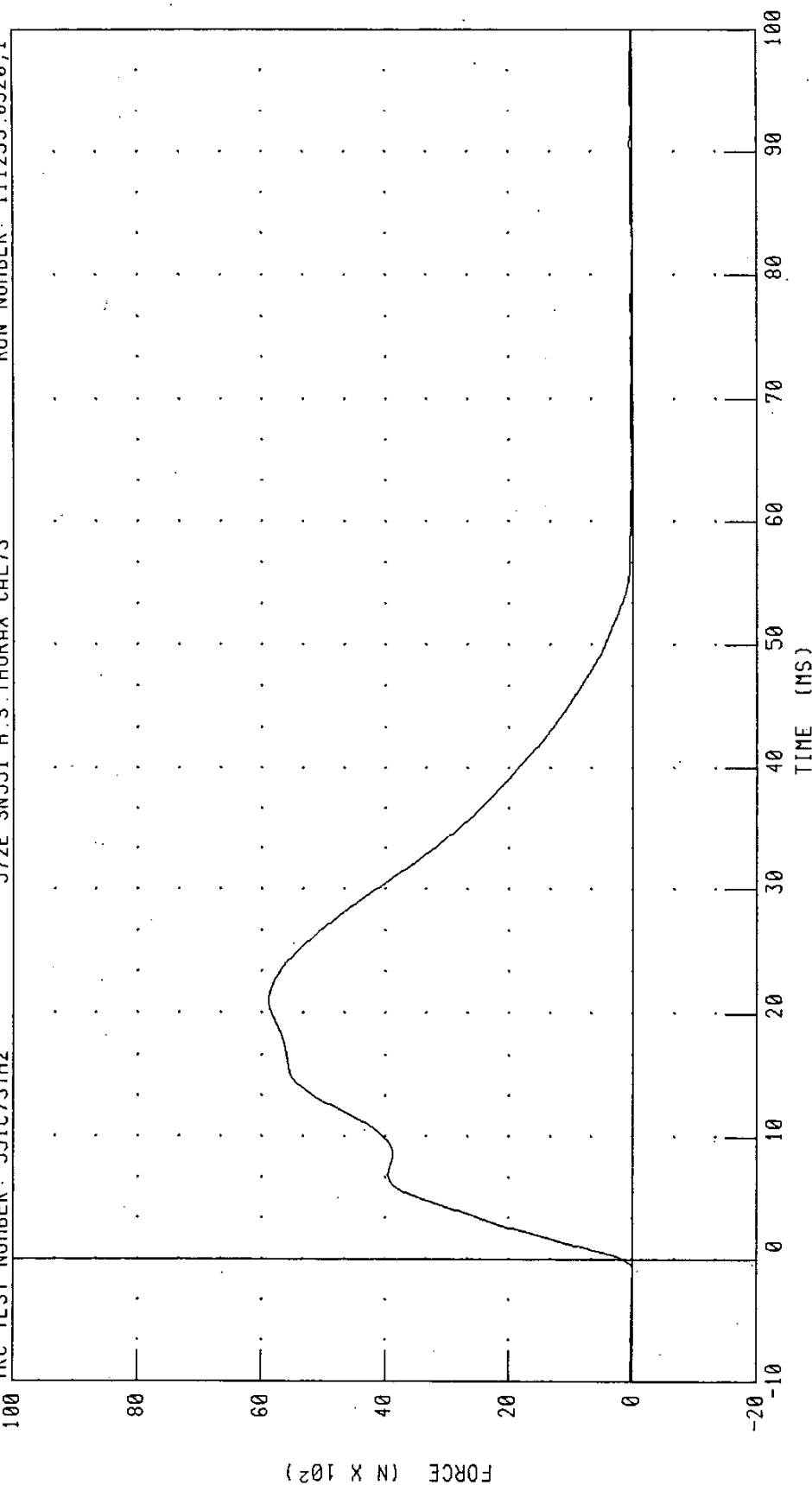
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 551C731H2

572E SN551 H.S. THORAX CAL73

RUN NUMBER: 111299.0920;1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5890.09 N @ 21.04 MS, -5.62 N @ -0.96 MS

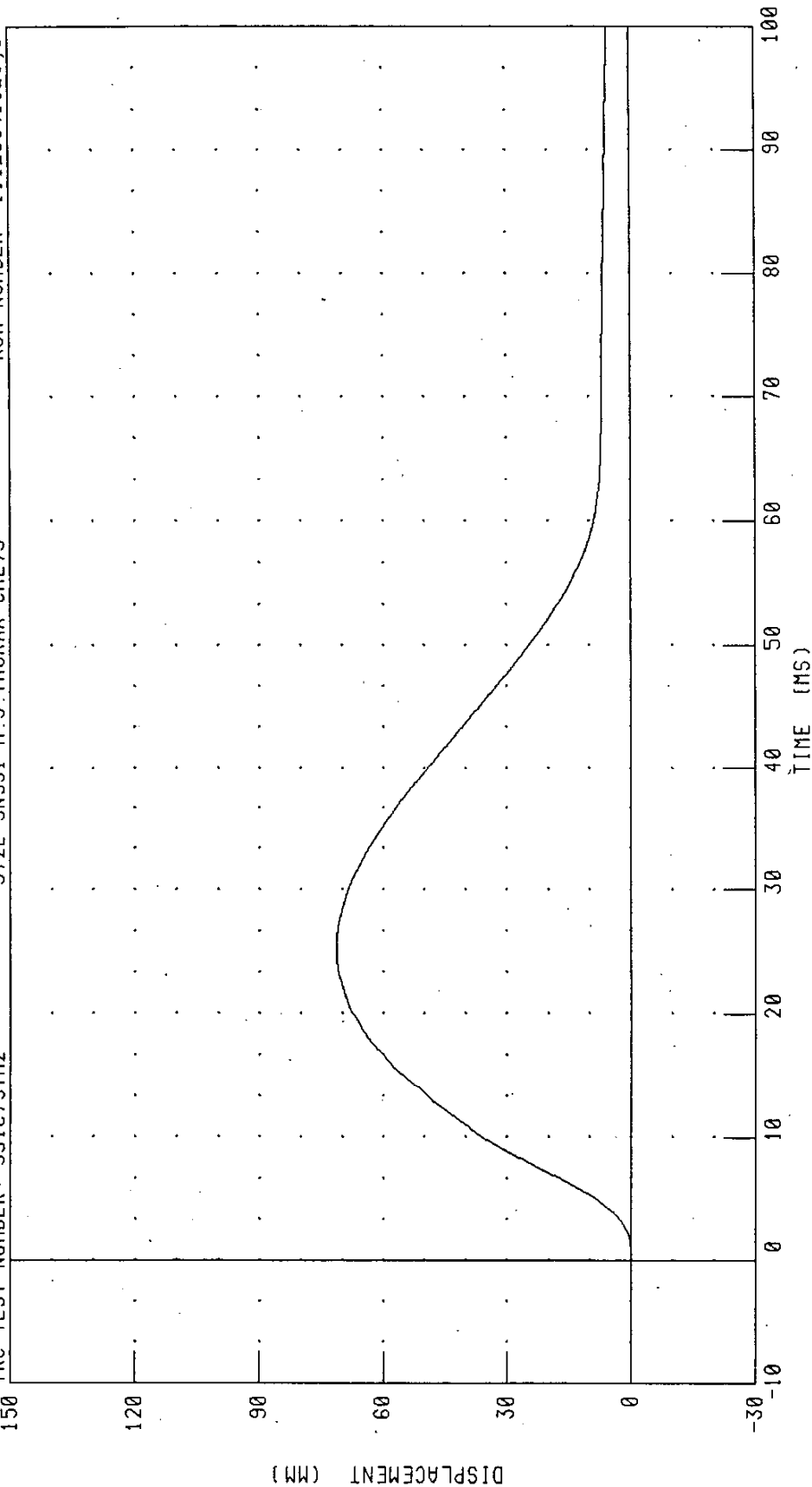
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 551C73TH2

572E SN551 H.S. THORAX CAL73

RUN NUMBER: 111299.0920,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

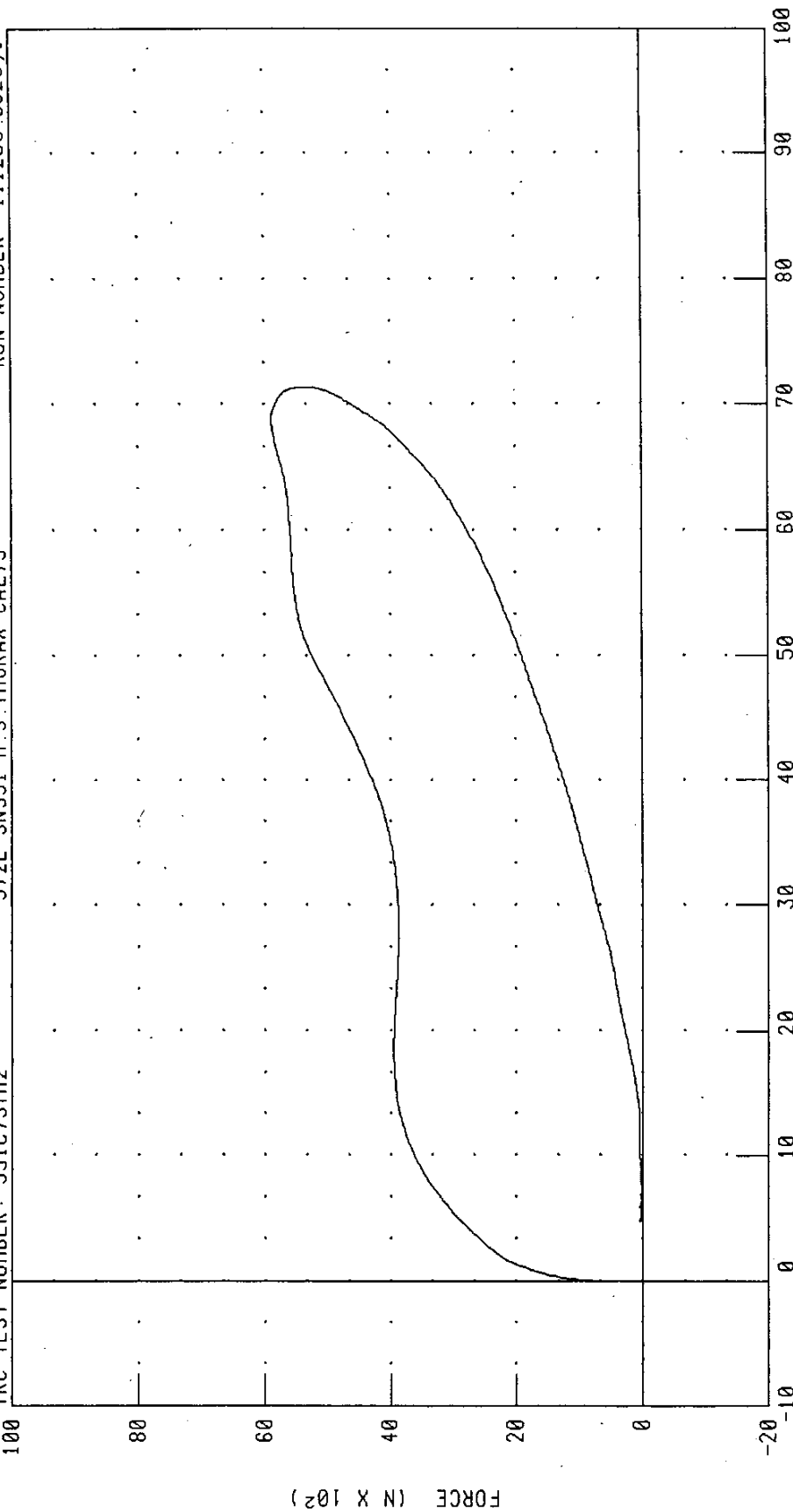
PEAK DATA: 71.37 MM @ 25.36 MS, -0.02 MM @ 0.32 MS

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

TRC TEST NUMBER: 551C73TH2

572E SN551 H.S. THORAX CAL73

RUN NUMBER: 111299.0920,1



CHANNEL: CSTXD
PENXF

FILTER: CH: CLASS 180
CH: CLASS 180

DISPLACEMENT (MM)

PEAK DATA: 71.37 MM @ 25.36 MS; -0.02 MM @ 0.32 MS
5890.09 N @ 21.04 MS; -5.62 N @ -0.96 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

12-NOV-99

TRC INC.

TEST NO: 551C73RK1

572E SN551 RIGHT KNEE CAL 73

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5523.8 N

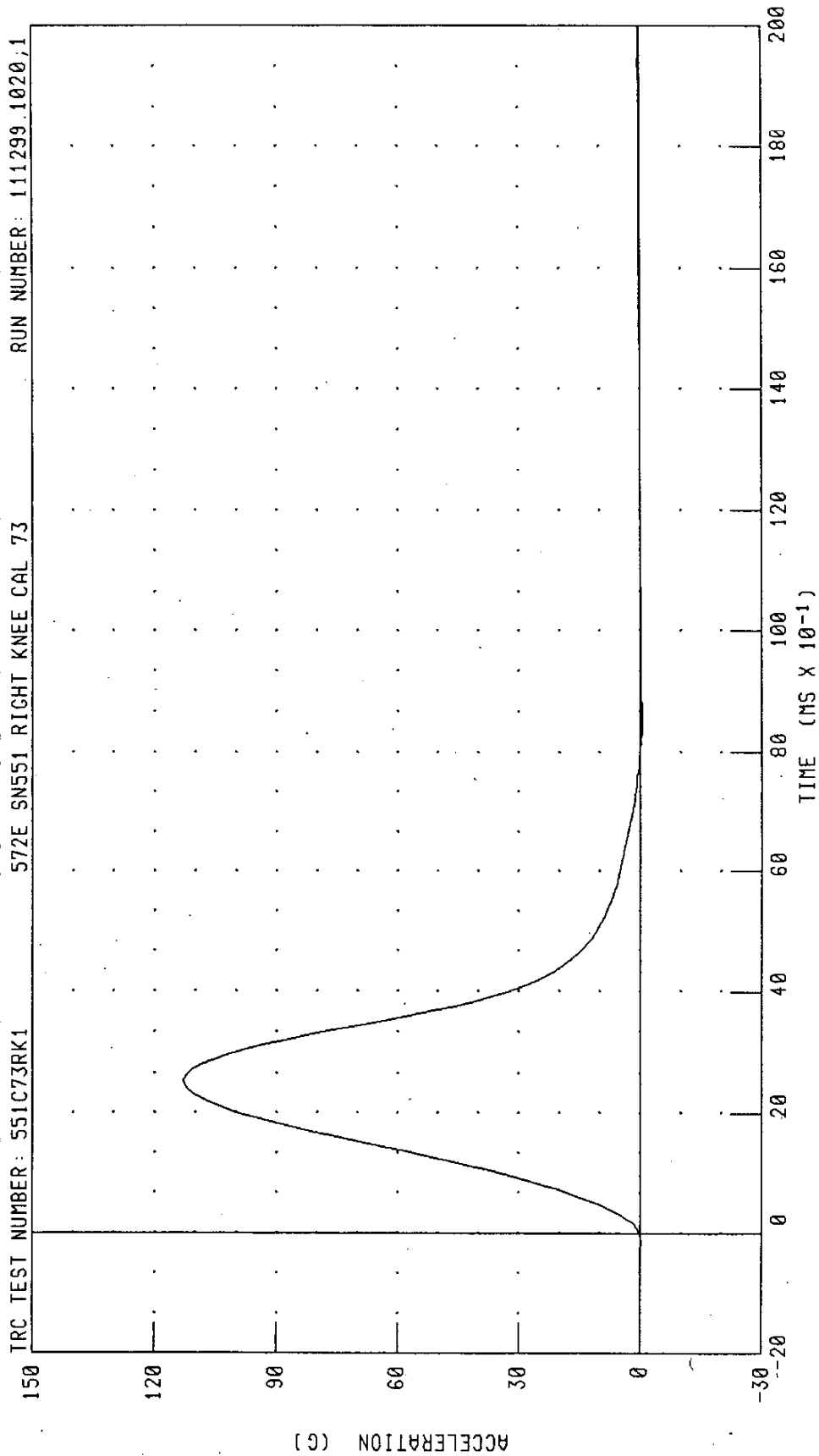
TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 111299.1020;1

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



CHANNEL: PENXC

FILTER: CH. CLASS 600

PEAK DATA: 112.90 G @ 2.56 MS; -0.52 G @ 8.64 MS

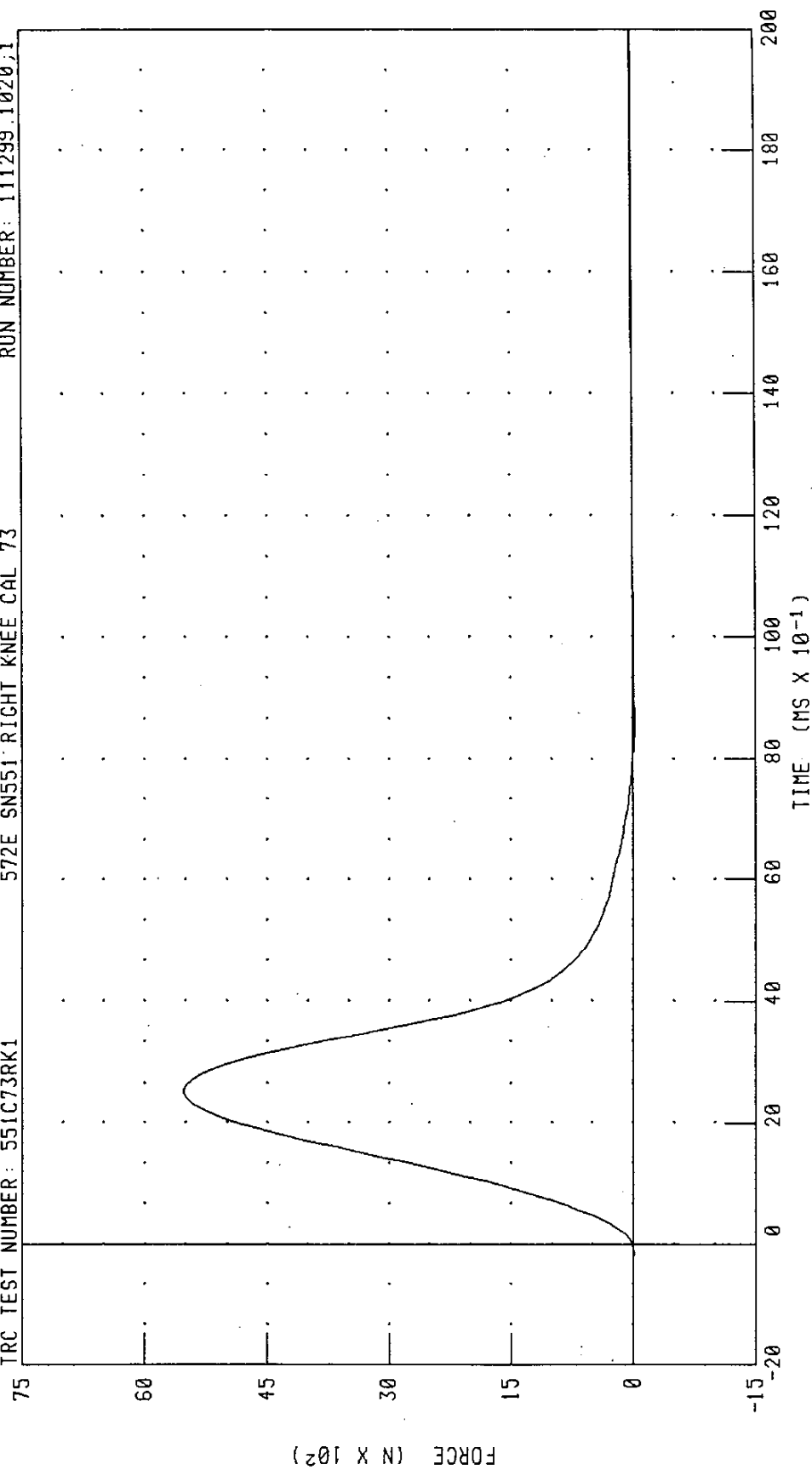
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 551C73RK1

572E SN551 RIGHT KNEE CAL 73

RUN NUMBER: 111299.1020.1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5523.84 N @ 2.56 MS; -25.57 N @ 8.64 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

12-NOV-99

TRC INC.

TEST NO: 551C73LK1

572E SN551 LEFT KNEE CAL 73

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4862.3 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 111299.1014;1

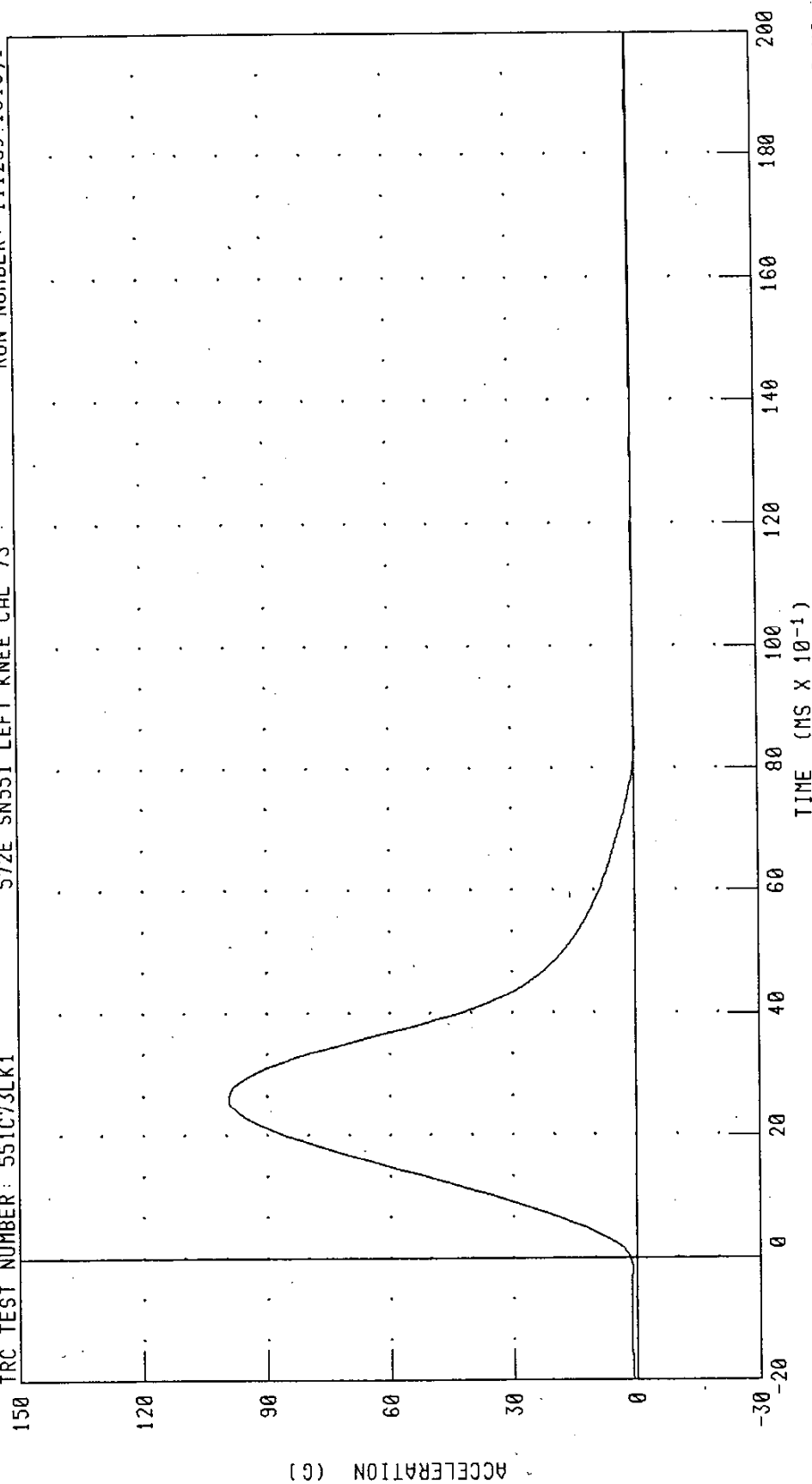
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

RUN NUMBER: 111299.1015;1

TRC TEST NUMBER: 551C73LK1

572E SN551 LEFT KNEE CAL 73



CHANNEL: PENXC

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 99.38 G @ 2.64 MS; -0.29 G @ 8.48 MS

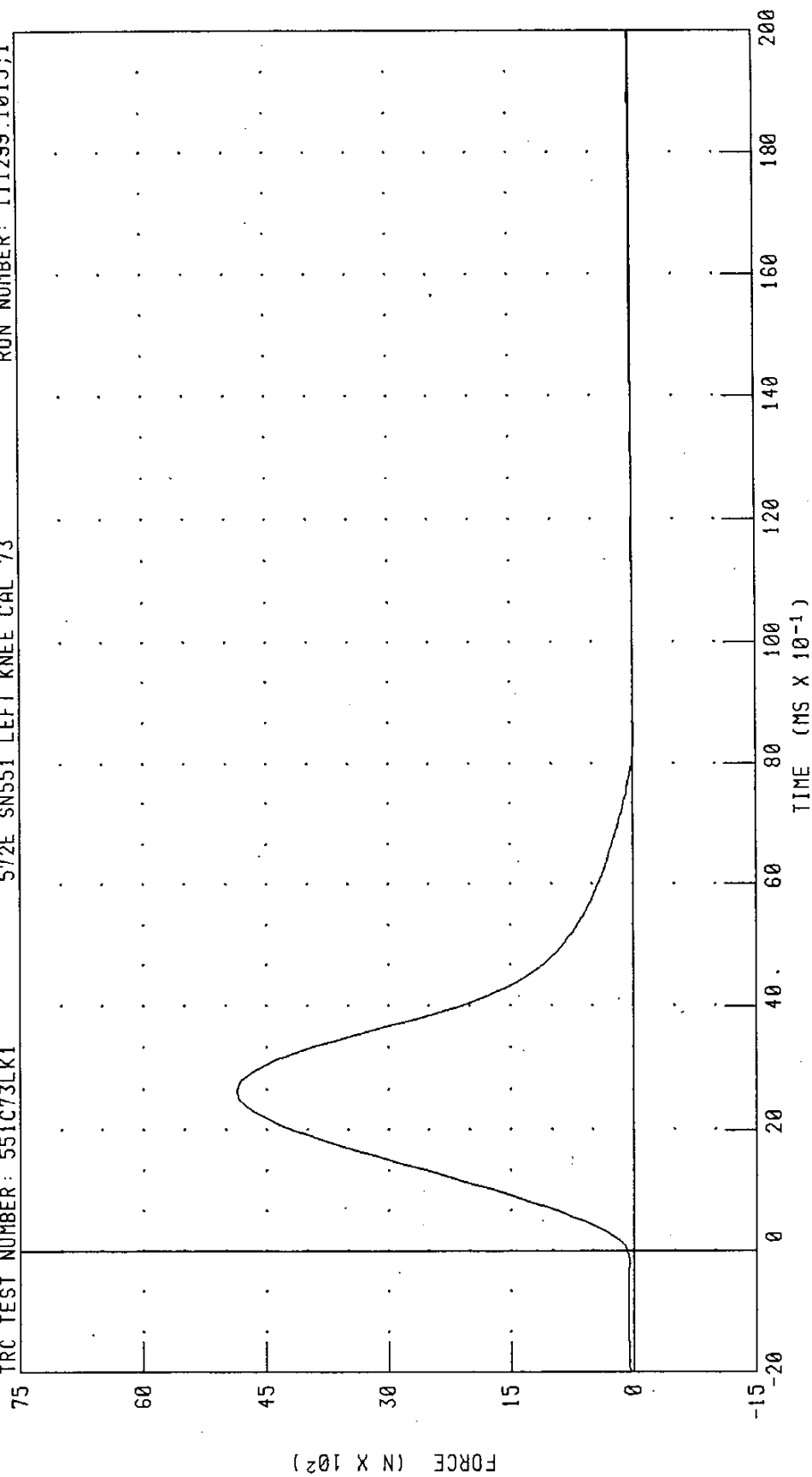
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 551C73LK1

572E SN551 LEFT KNEE CAL 73

RUN NUMBER: 111299.1015;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 4862.34 N @ 2.64 MS; -14.10 N @ 8.48 MS

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

10-NOV-99

TRC INC.

TEST NO: 591C68HD1

572E SN591 HEAD DROP CAL 68

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	254.33 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.29 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Williams

RUN NUMBER: 111099.0858;1

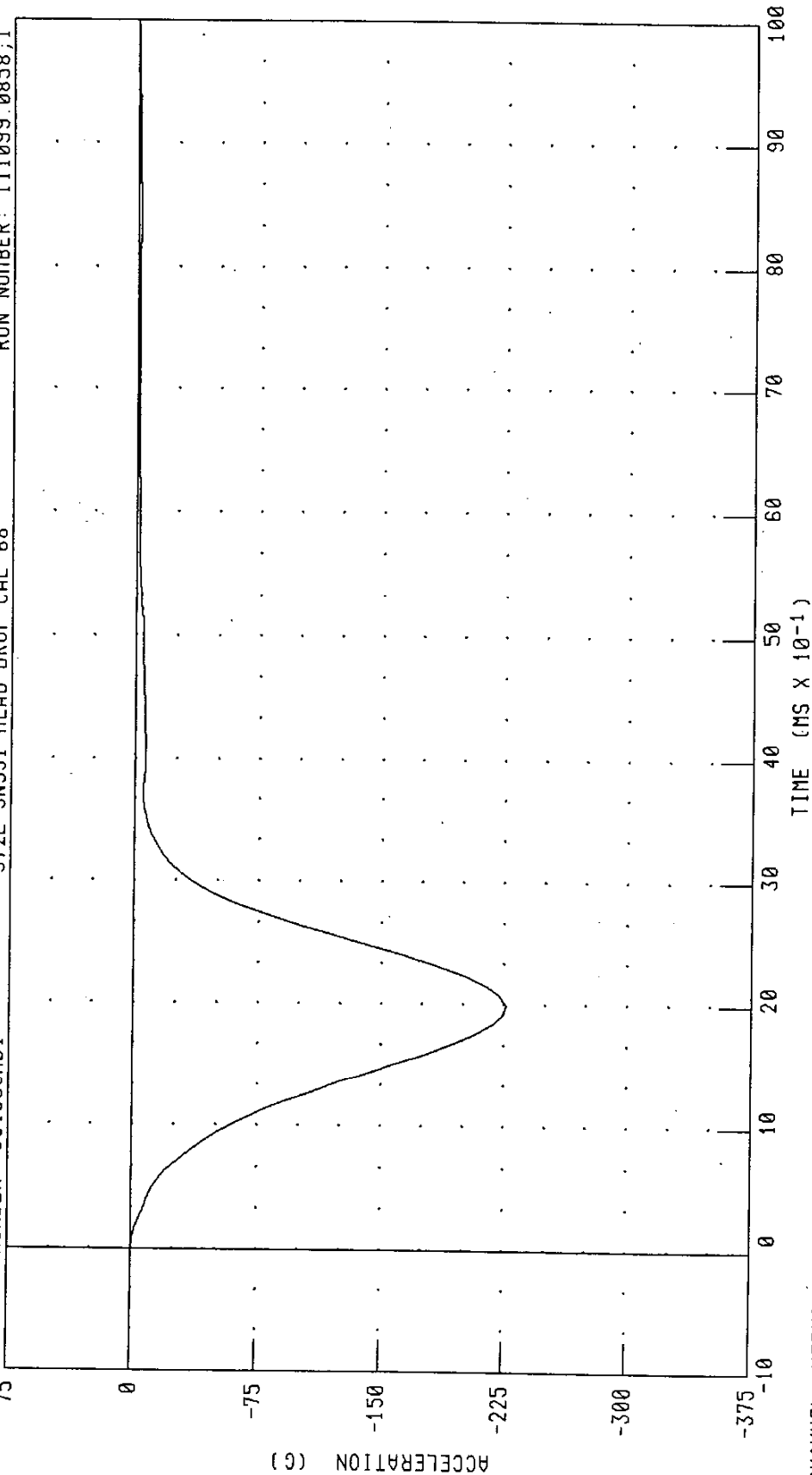
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 591C68HD1

572E SN591 HEAD DROP CAL 68

RUN NUMBER: 111099 0858,1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 0.17 G @ -0.64 MS; -226.23 G @ 2.00 MS

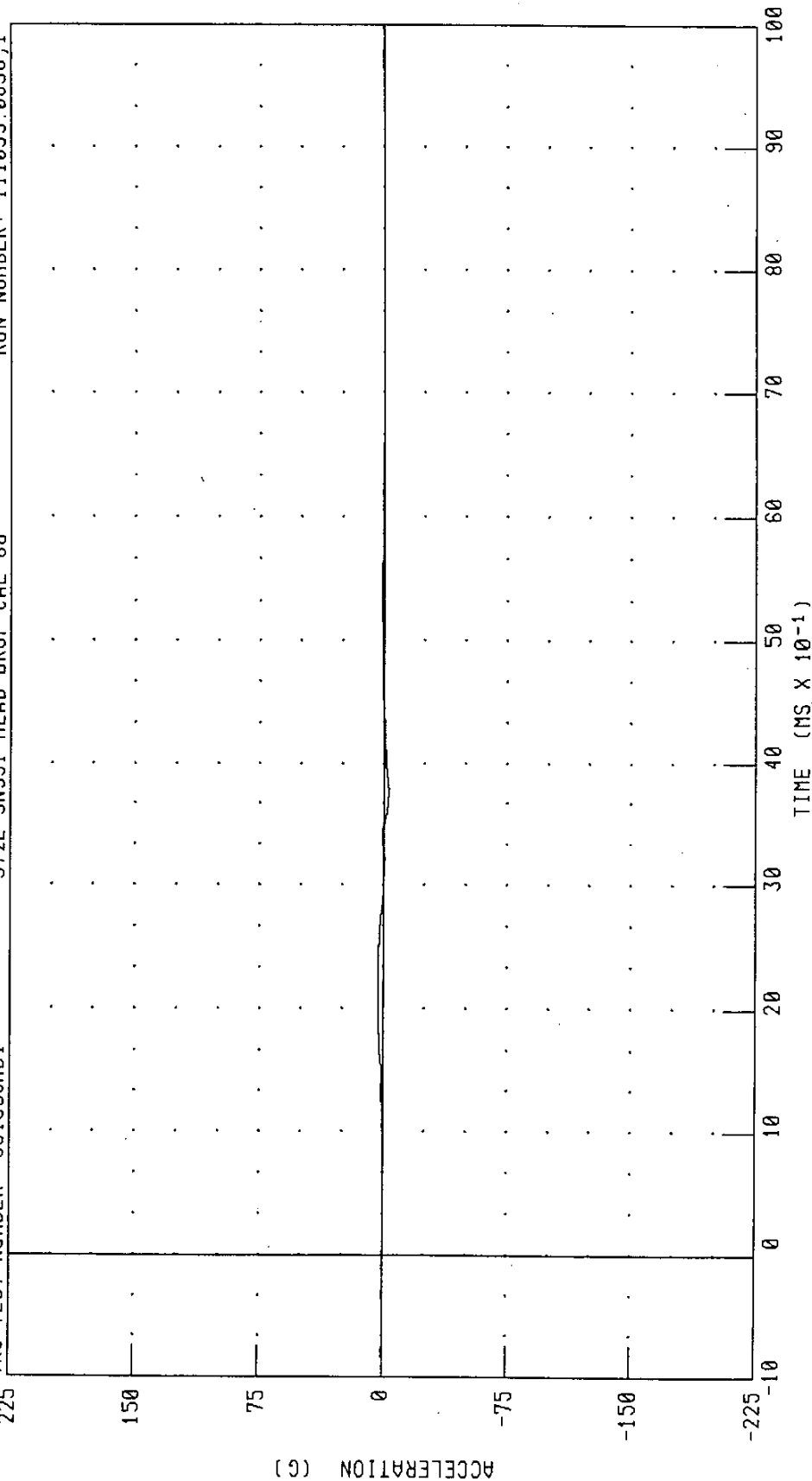
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 591C68HD1

572E SN591 HEAD DROP CAL 68

RUN NUMBER: 111099.0858,1



CHANNEL: HEDYC

FILTER: CH. CLASS:1000

PEAK DATA: 2.96 G @ 1.92 MS; -3.29 G @ 3.76 MS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 591C68HD1

572E SN591 HEAD DROP CAL 68

RUN NUMBER: 111099.0858;1

375

300

225

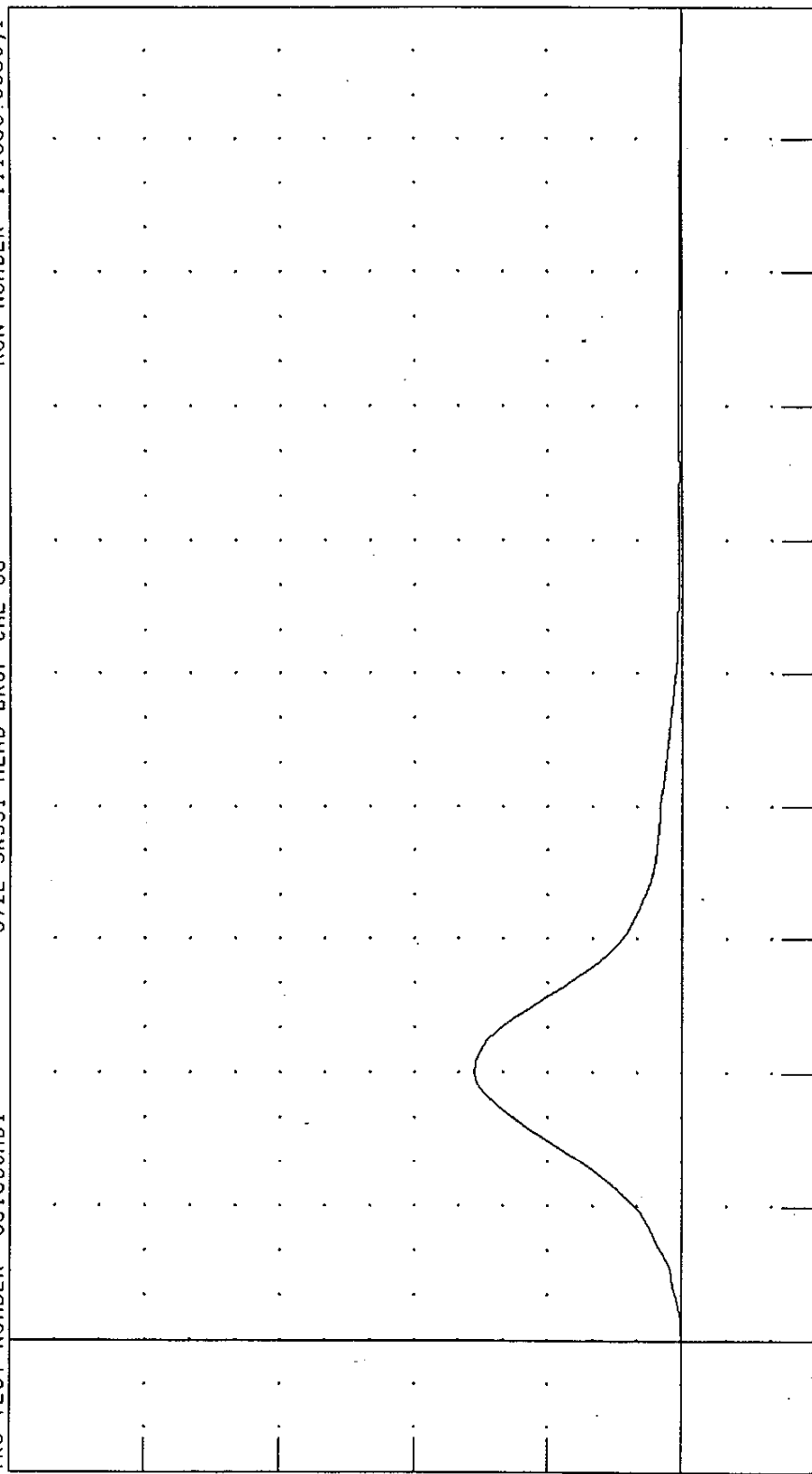
150

75

0

-75

ACCELERATION (G)



TIME (MS X 10⁻¹)

CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: 116.18 G @ 2.00 MS; -0.55 G @ 9.76 MS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN591 HEAD DROP CAL 68

TRC TEST NUMBER: 591C68HD1

375

300

225

150

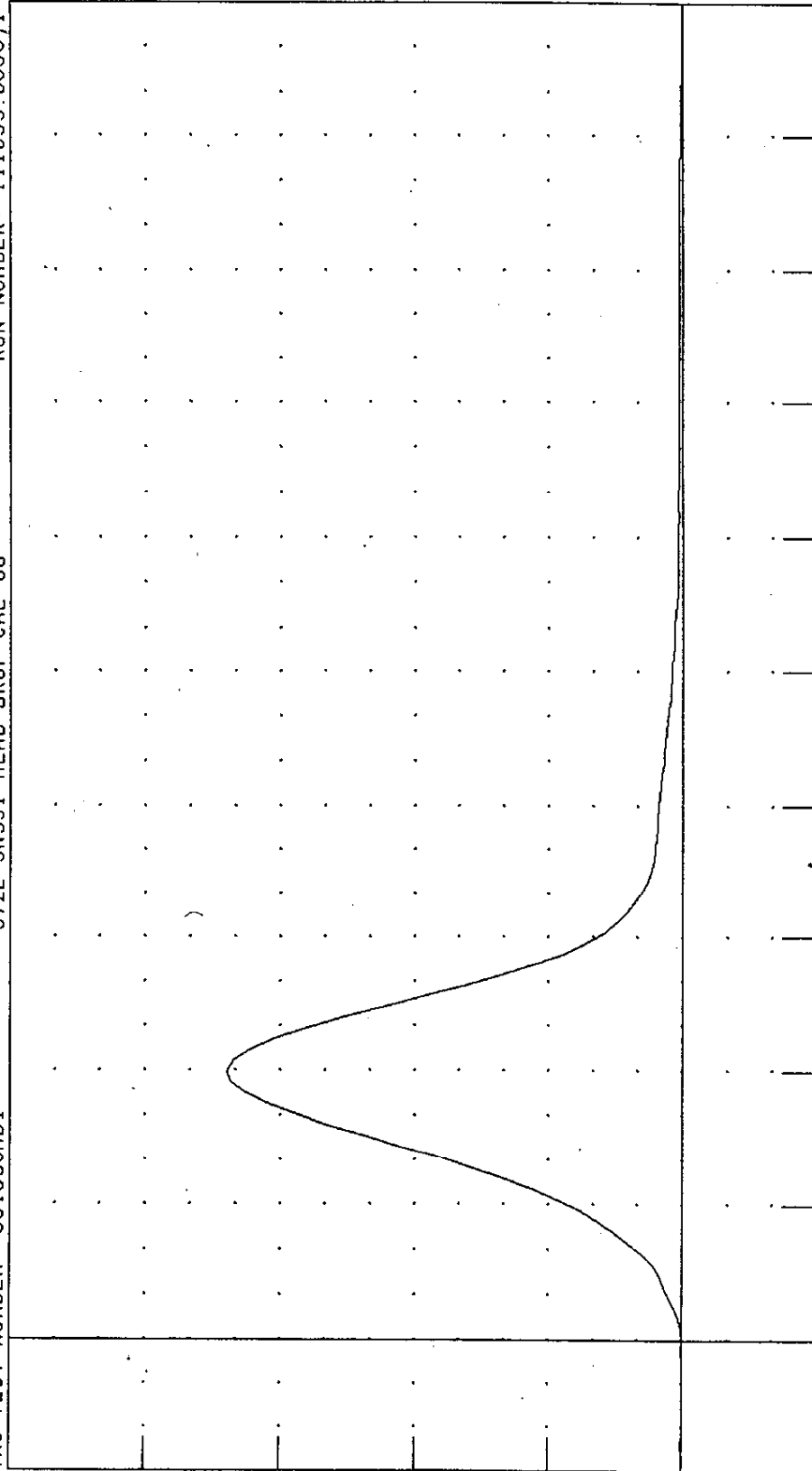
75

0

-75

-10

ACCELERATION (G)



TIME (MS X 10⁻¹)

CHANNEL: HEDRC

FILTER: CH. CLASS 1000

PEAK DATA: 254.34 G @ 2.00 MS; 0.09 G @ -0.96 MS

RUN NUMBER: 111099.0858;1

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

10-NOV-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 591C68NF1 572E SN591 NECK FLEXION CAL68

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.94 G
	20 MS	17.60 - 22.60 G	21.61 G
	30 MS	12.50 - 18.50 G	13.79 G
MAX PENDULUM G		29 G MAX	23.67 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	13.72 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	40.96 MS
D PLANE	MAX	64 - 78 DEG.	71.29 DEG.
ROTATION	TIME	57 - 64 MS	59.92 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	94.02 NM
	TIME	47 - 58 MS	54.32 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.44 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walker

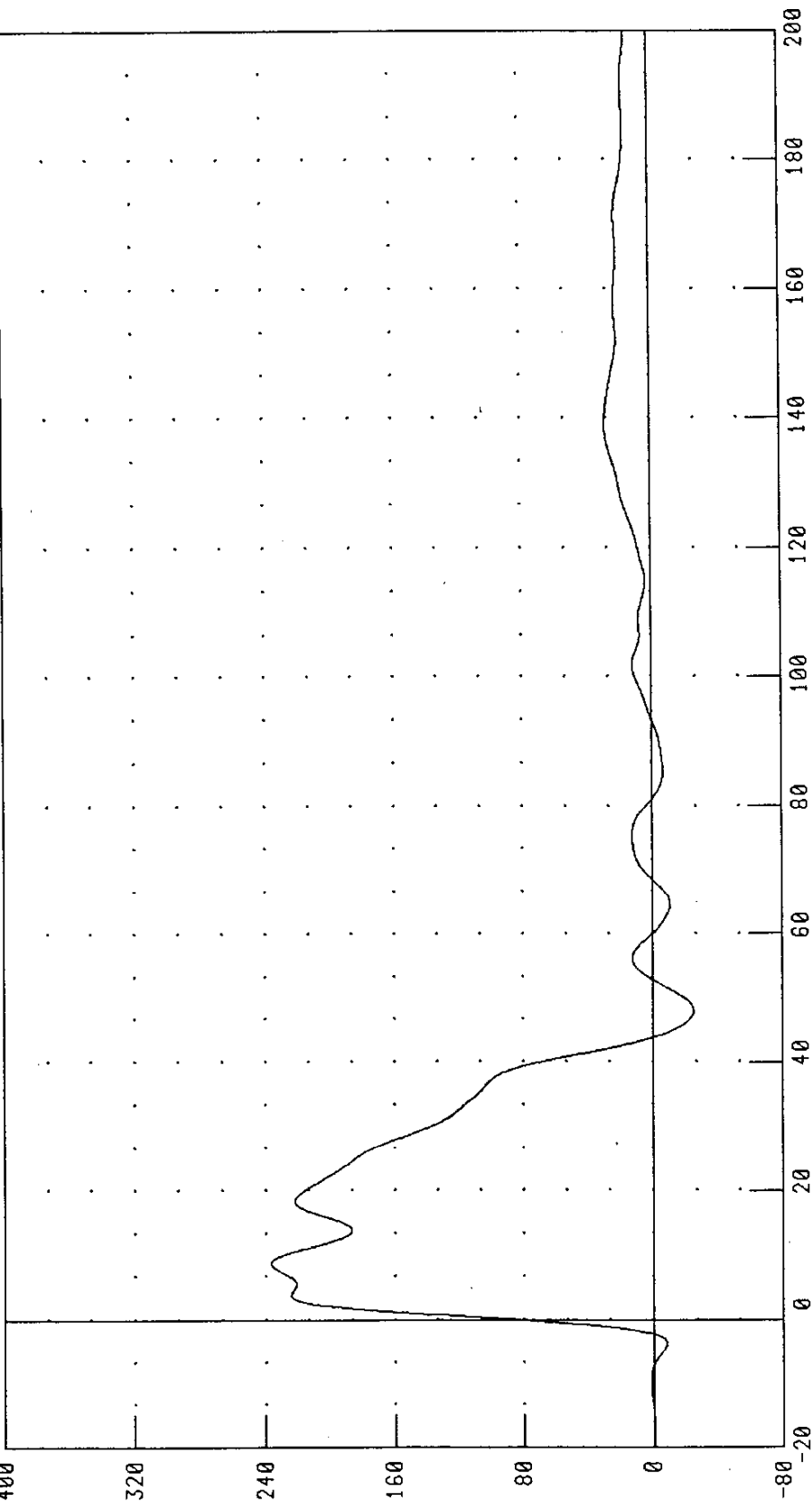
RUN NUMBER: 111099.1108;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 591C68NF1

572E SN591 NECK FLEXION CAL68

RUN NUMBER: 111099.1109,1



PEAK DATA: 23.67 G @ 8.72 MS; -2.54 G @ 48.00 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

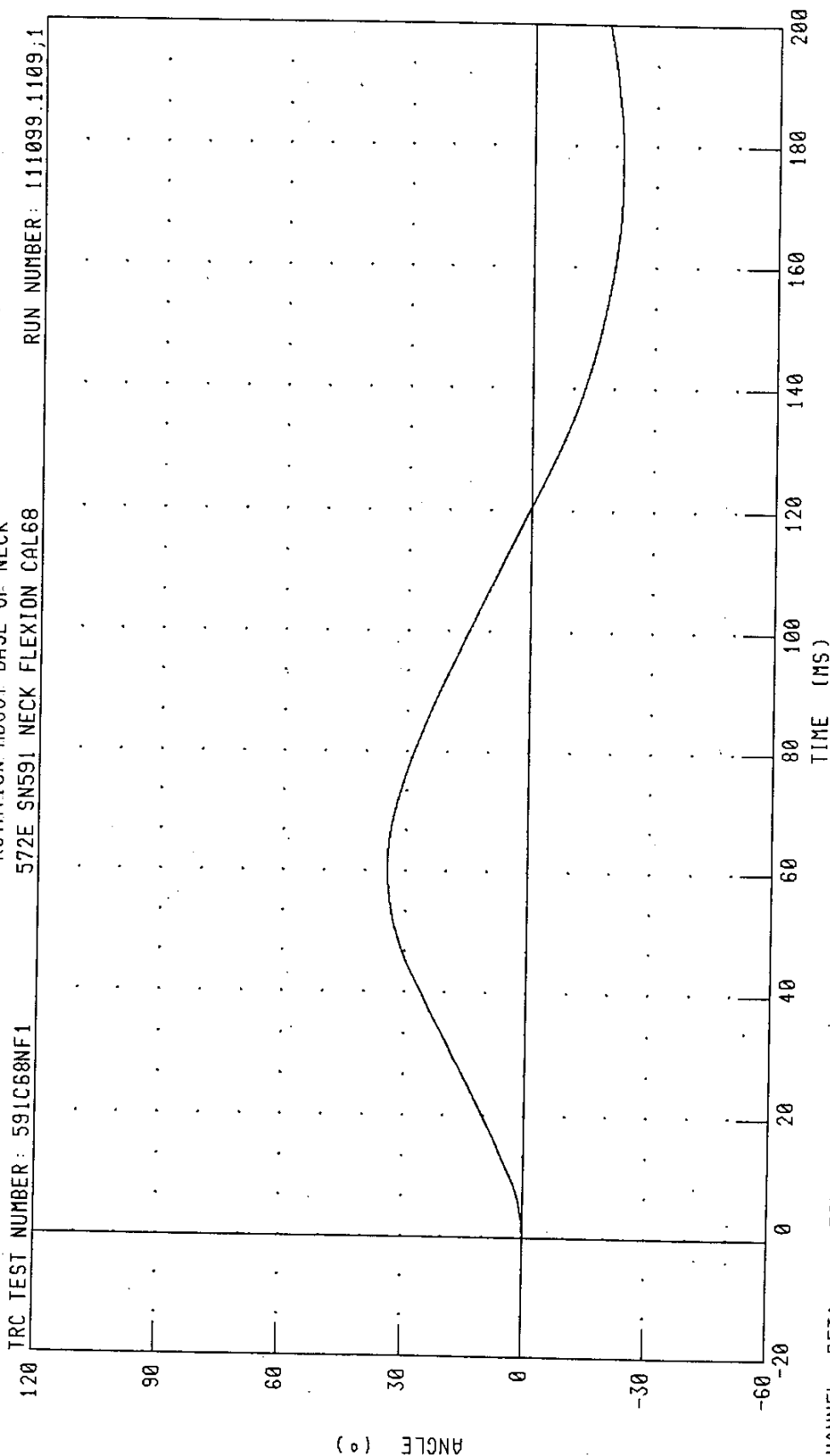
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 591C68NF1

572E SN591 NECK FLEXION CAL68

RUN NUMBER: 111099.1109;1



CHANNEL: BETA

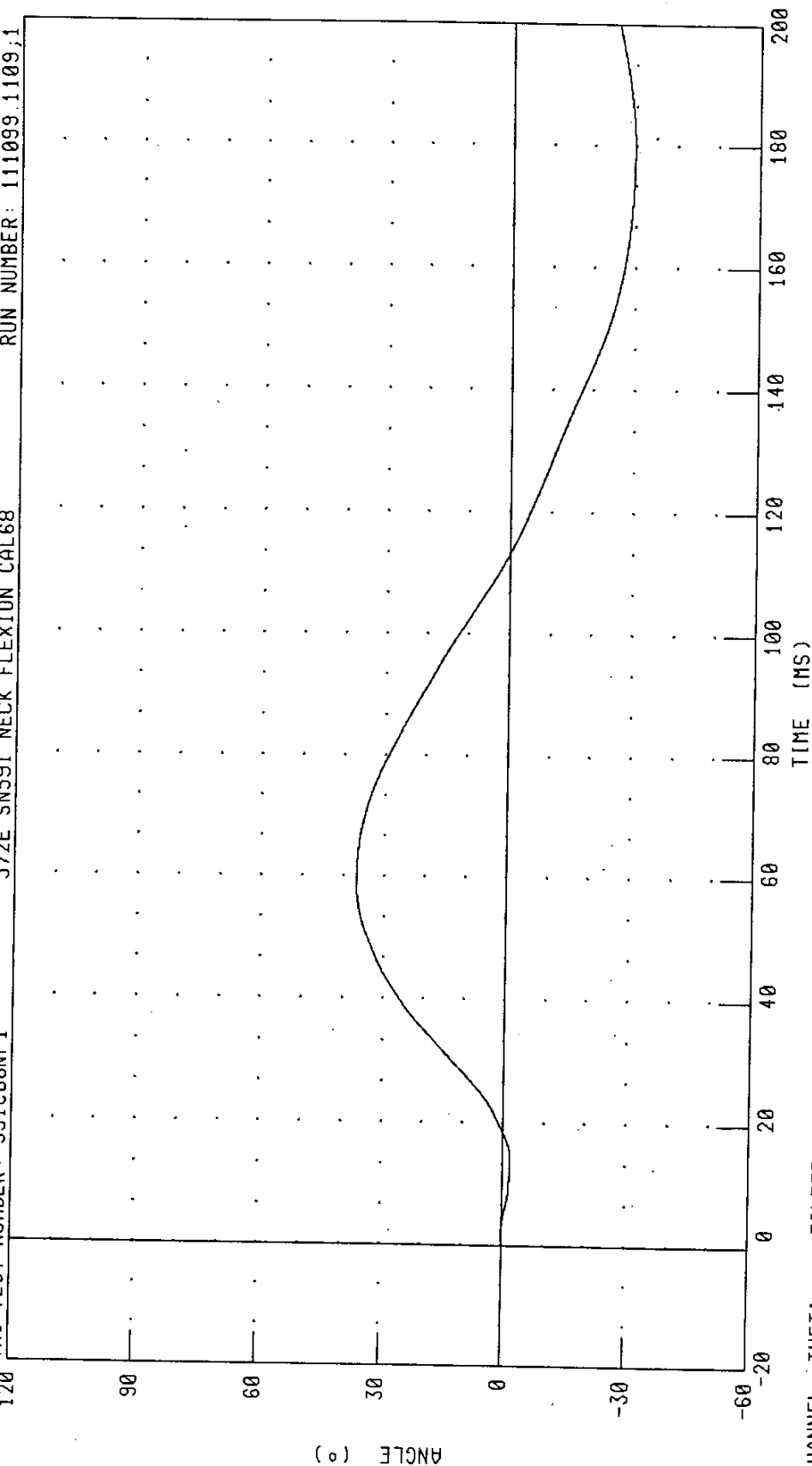
FILTER: CH. CLASS 60

PEAK DATA: 34.48 ° @ 60.64 MS; -21.70 ° @ 175.76 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 591C68NF1 572E SN591 NECK FLEXION CAL68 RUN NUMBER: 111099.1109.1

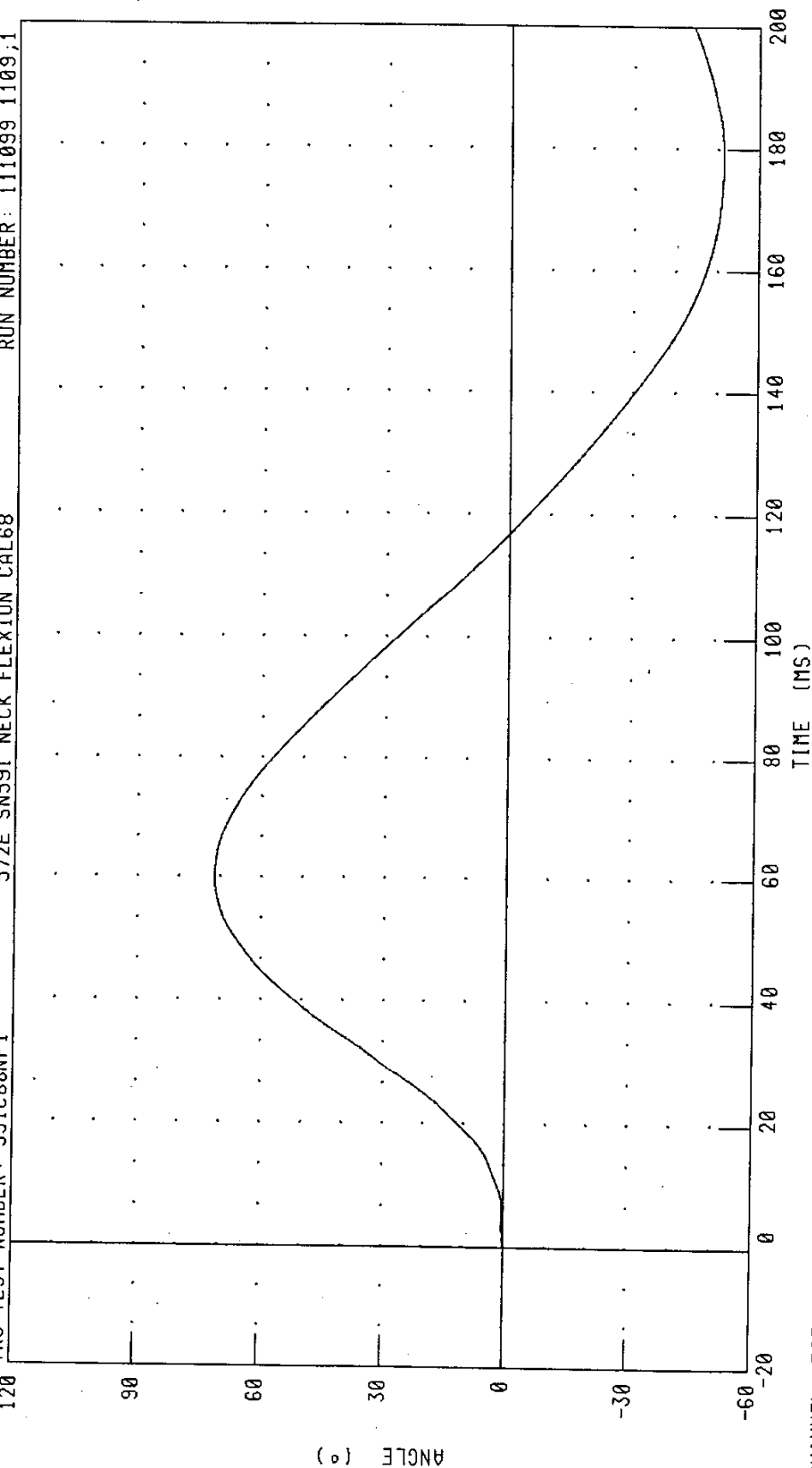


CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 36.83 ° @ 59.52 MS; -29.70 ° @ 180.00 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 591C68NF1 572E SN591 NECK FLEXION CAL68 RUN NUMBER: 111099 1109,1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 71.30 ° @ 59.92 MS; -51.36 ° @ 178.24 MS

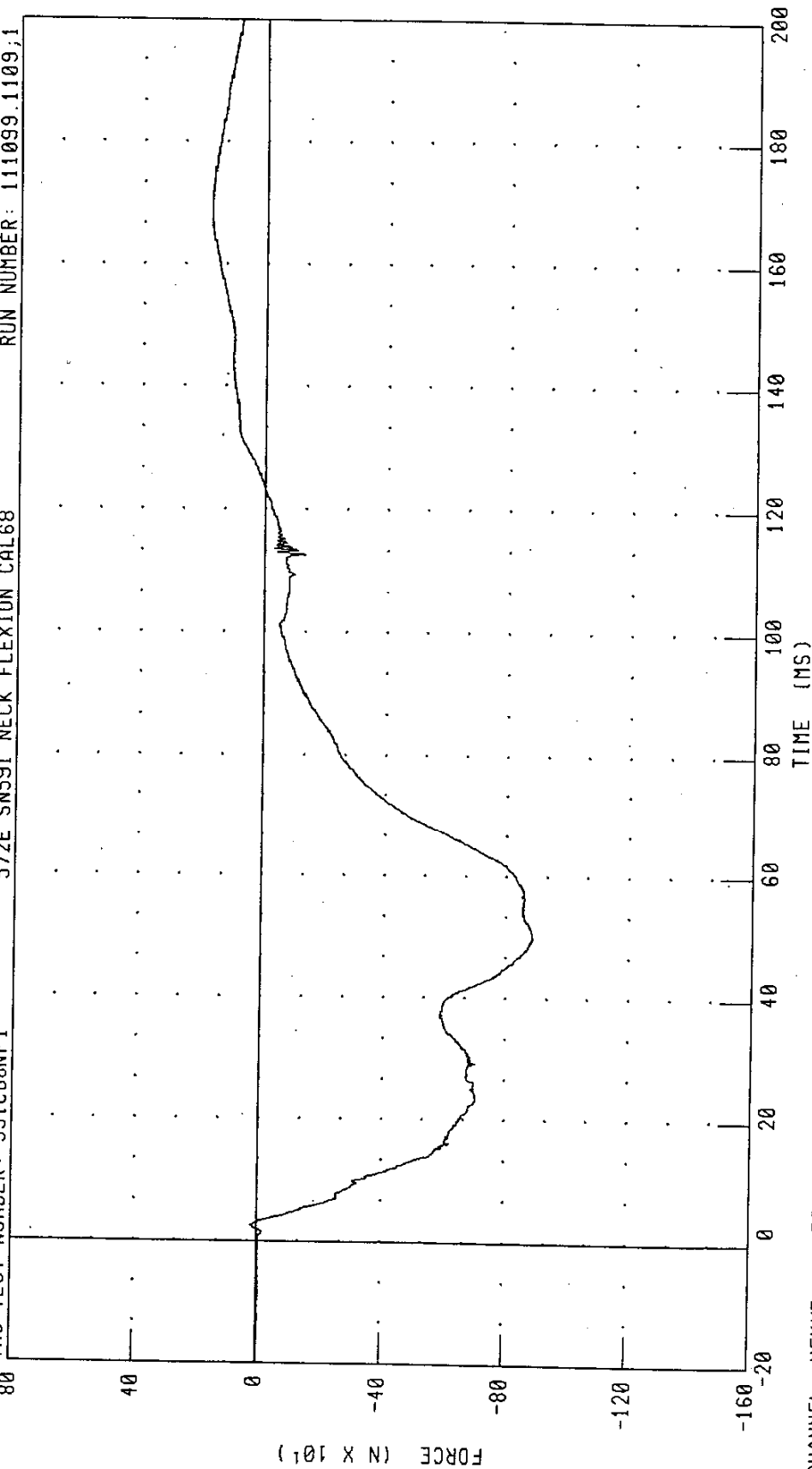
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 591C68NF1

572E SN591 NECK FLEXION CAL68

RUN NUMBER: 111099.1109,1

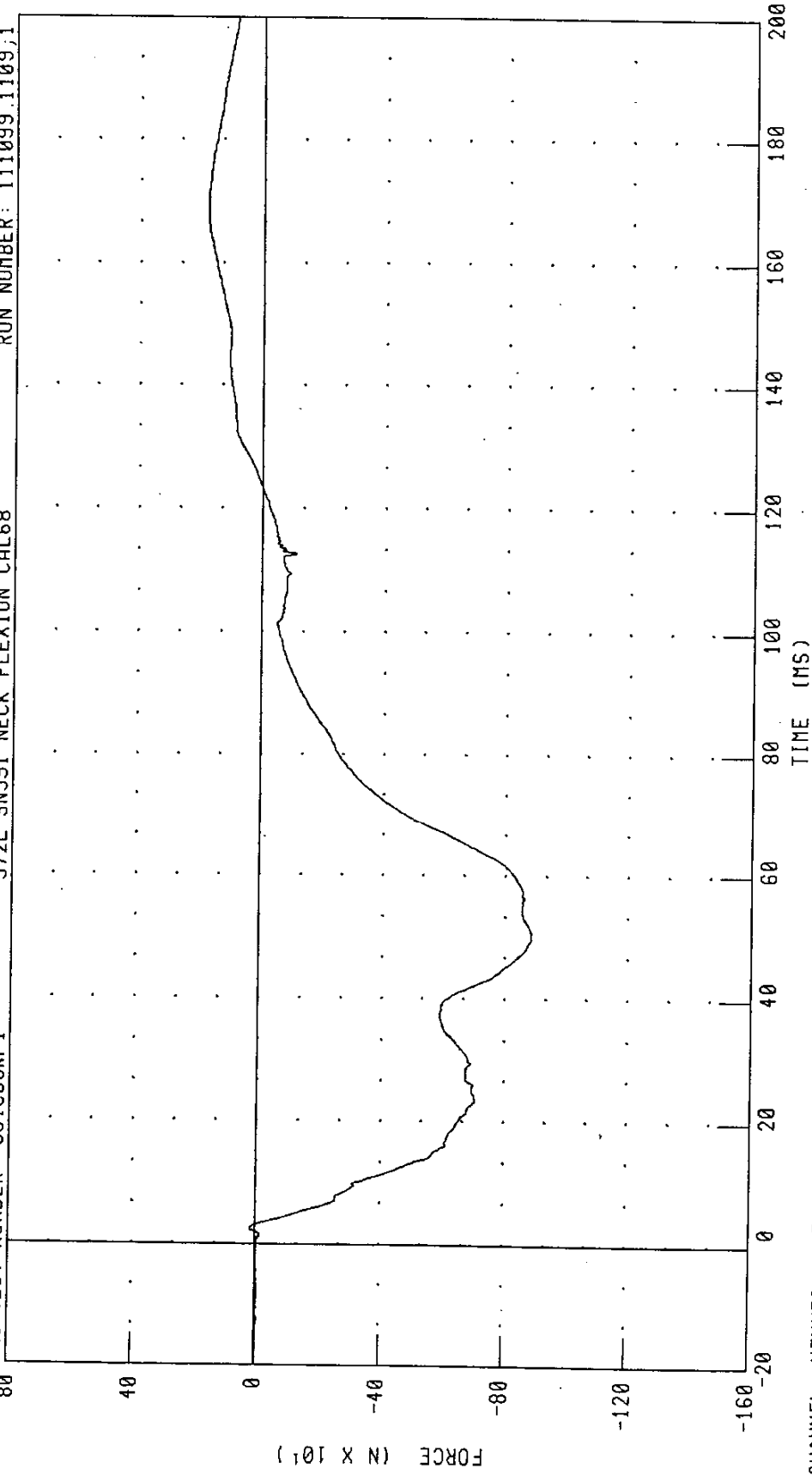


CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 180.84 N @ 165.92 MS, -890.30 N @ 49.84 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 591C68NF1 572E SN591 NECK FLEXION CAL68 RUN NUMBER: 111099.1109.1



CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 180.92 N @ 170.08 MS, -887.29 N @ 43.84 MS

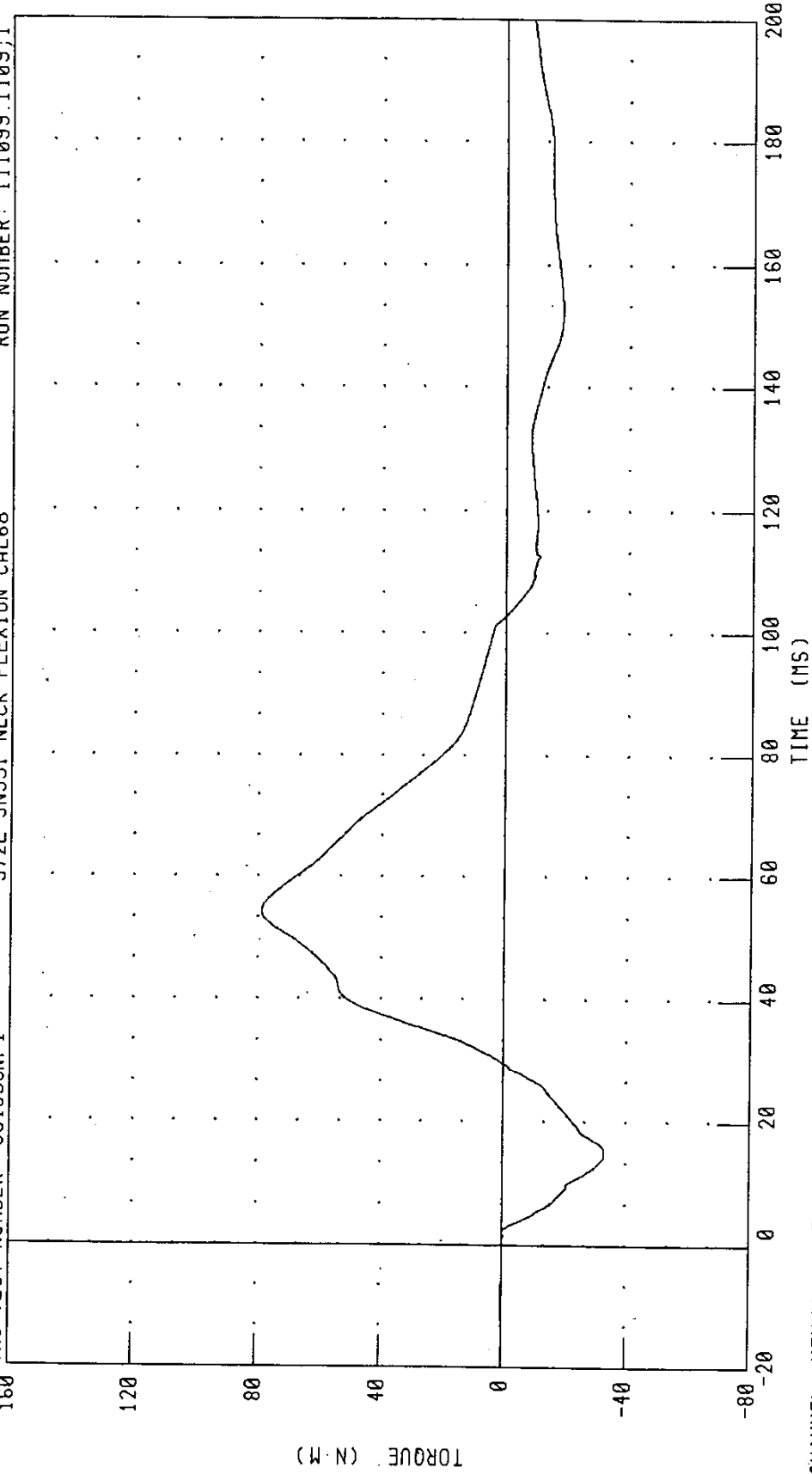
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 591C68NF1

572E SN591 NECK FLEXION CAL68

RUN NUMBER: 111099.1109,1



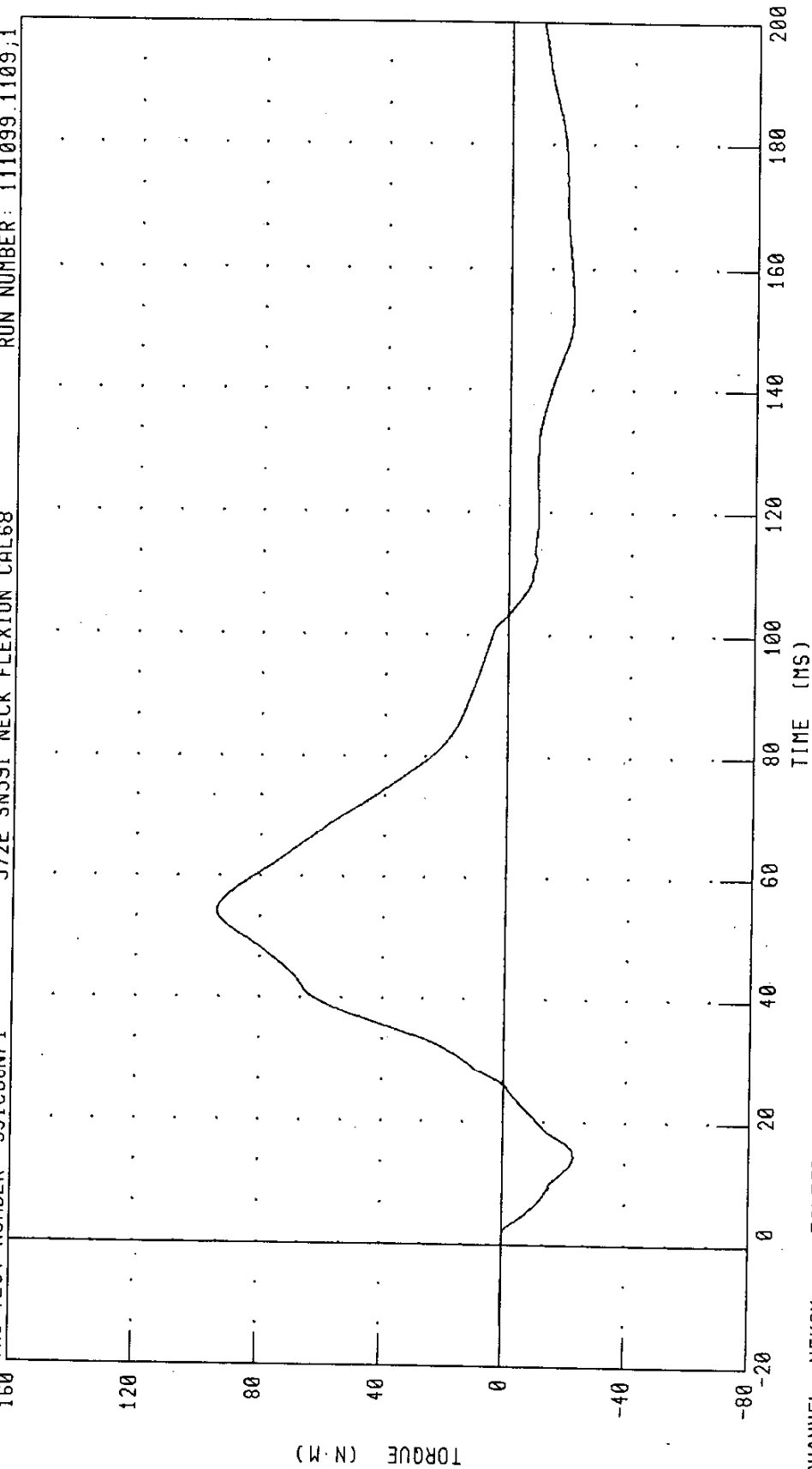
CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 78.81 N-M @ 54.32 MS, -33.09 N-M @ 15.44 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 591C68NF1 572E SN591 NECK FLEXION CAL68 RUN NUMBER: 111099.1109,1



CHANNEL: NEKOM FILTER: CH. CLASS 600

PEAK DATA: 94.02 N-M @ 54.32 MS; -23.03 N-M @ 14.40 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

10-NOV-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 591C68NE1 572E SN591 NECK EXT CAL68

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.77 G
	20 MS	14.00 - 19.00 G	17.55 G
	30 MS	11.00 - 16.00 G	15.80 G
MAX PENDULUM G		22 G MAX	19.04 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.74 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.88 MS
D PLANE	MAX	81 - 106 DEG.	97.58 DEG.
ROTATION	TIME	72 - 82 MS	76.08 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-70.71 NM
	TIME	65 - 79 MS	70.24 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	155.36 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	139.84 MS

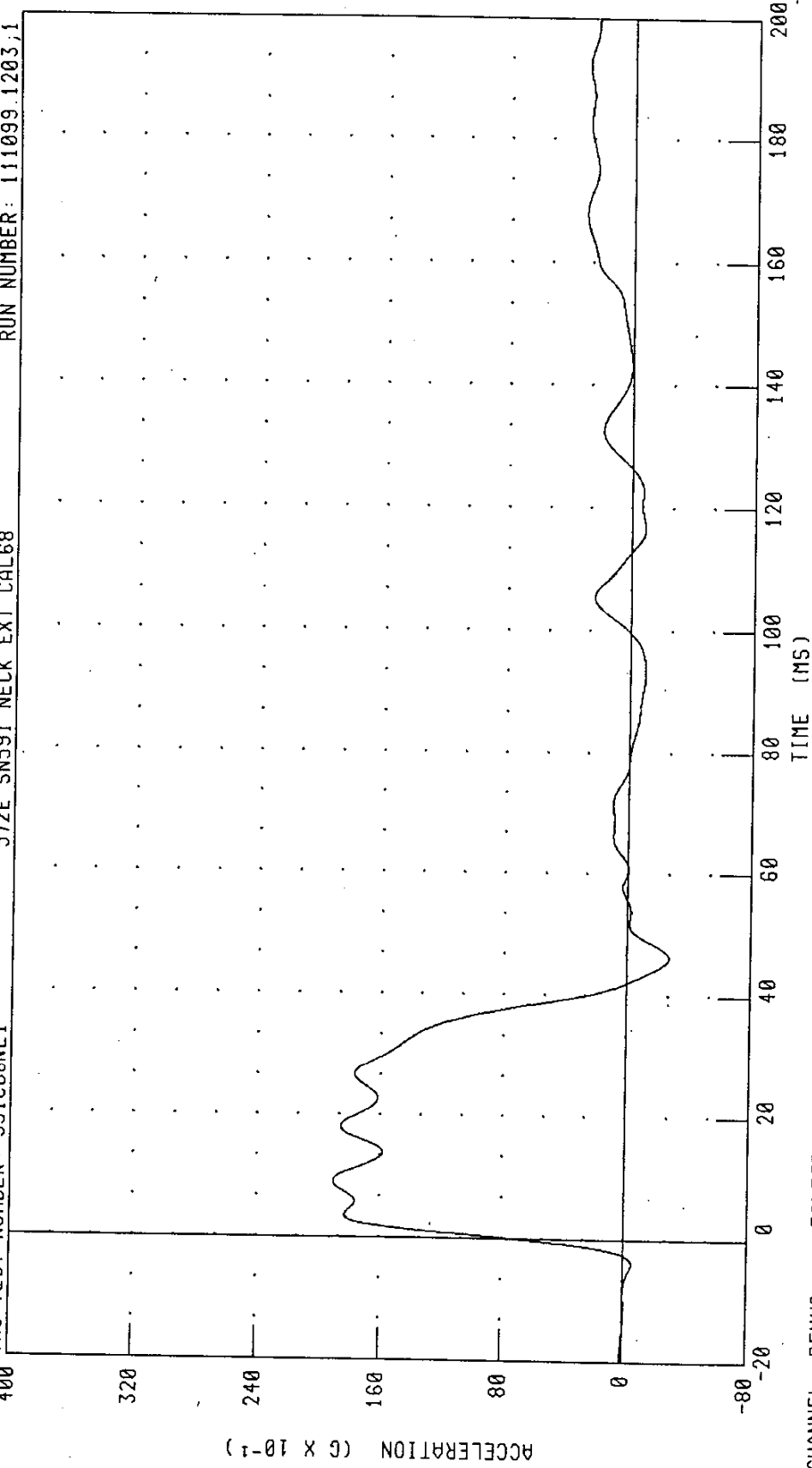
TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Waller RUN NUMBER: 111099.1203;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 591C68NE1 572E SN591 NECK EXT CAL68 RUN NUMBER: 111099.1203,1



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 19.05 G @ 9.12 MS, -2.72 G @ 46.24 MS

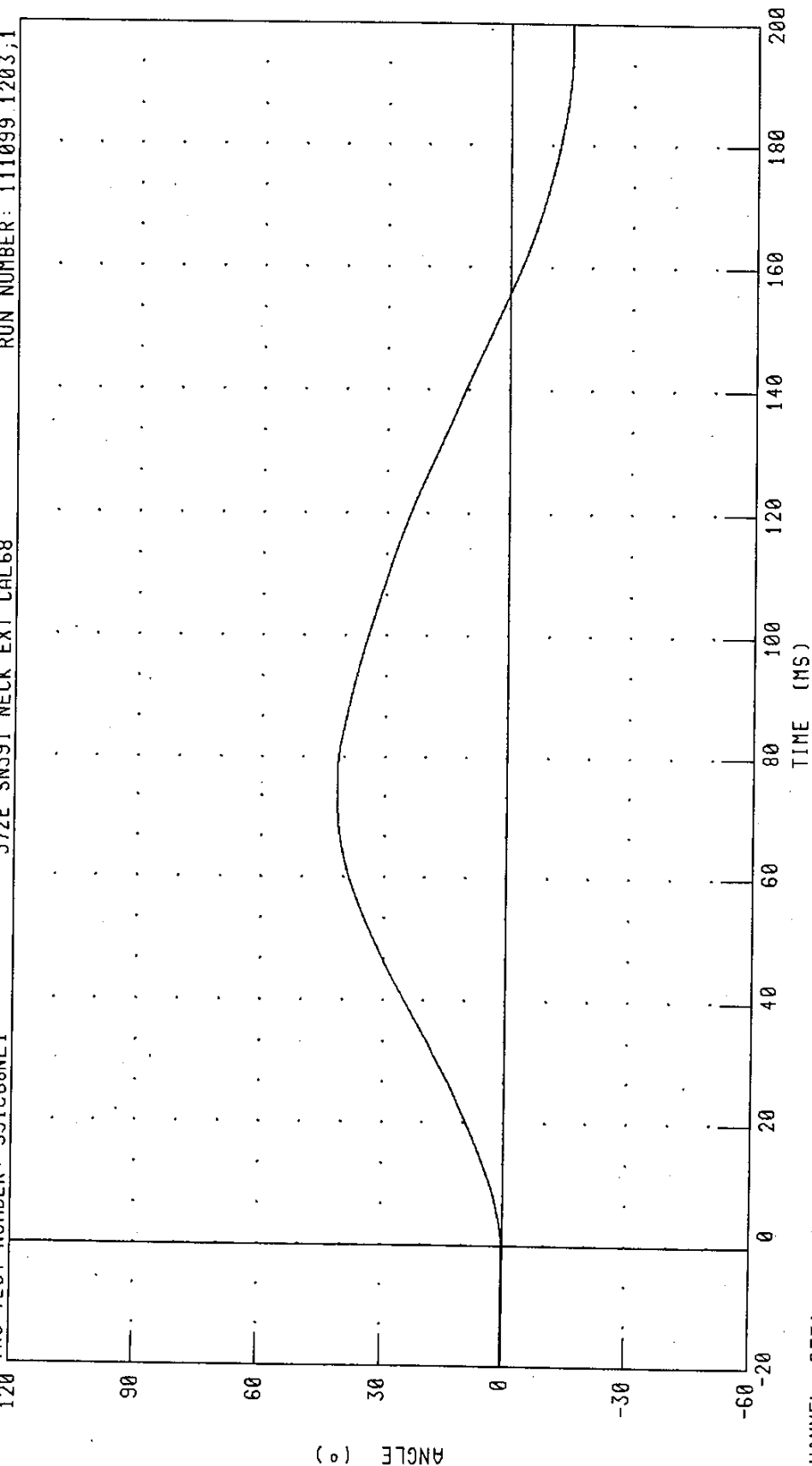
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 591C68NE1

572E SN591 NECK EXT CAL68

RUN NUMBER: 111099.1203,1



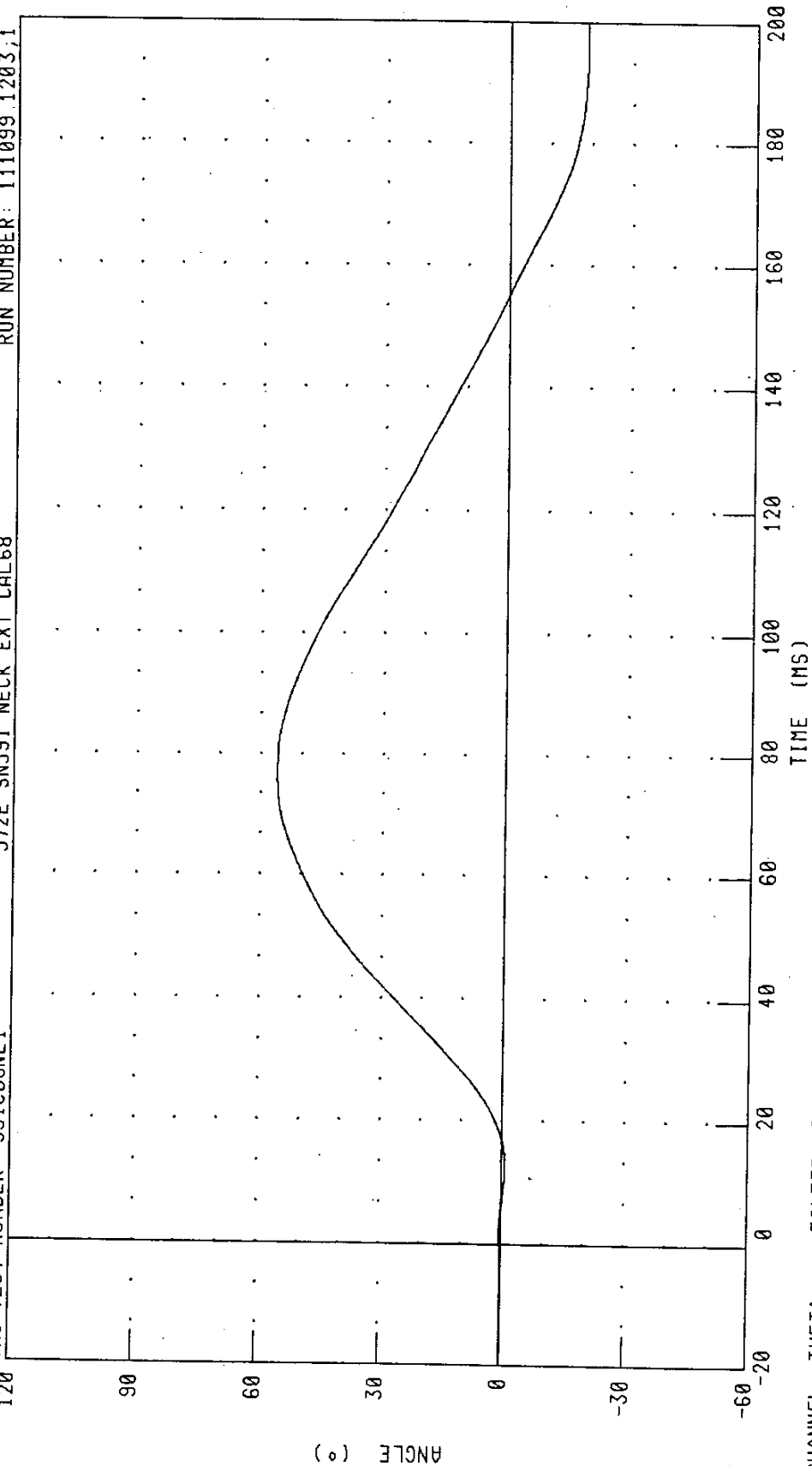
CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 41.64 ° @ 75.44 MS; -15.11 ° @ 196.88 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 591C68NE1 572E SN591 NECK EXT CAL68 RUN NUMBER: 111099.1203;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 55.95 ° @ 76.56 MS; -18.93 ° @ 196.88 MS

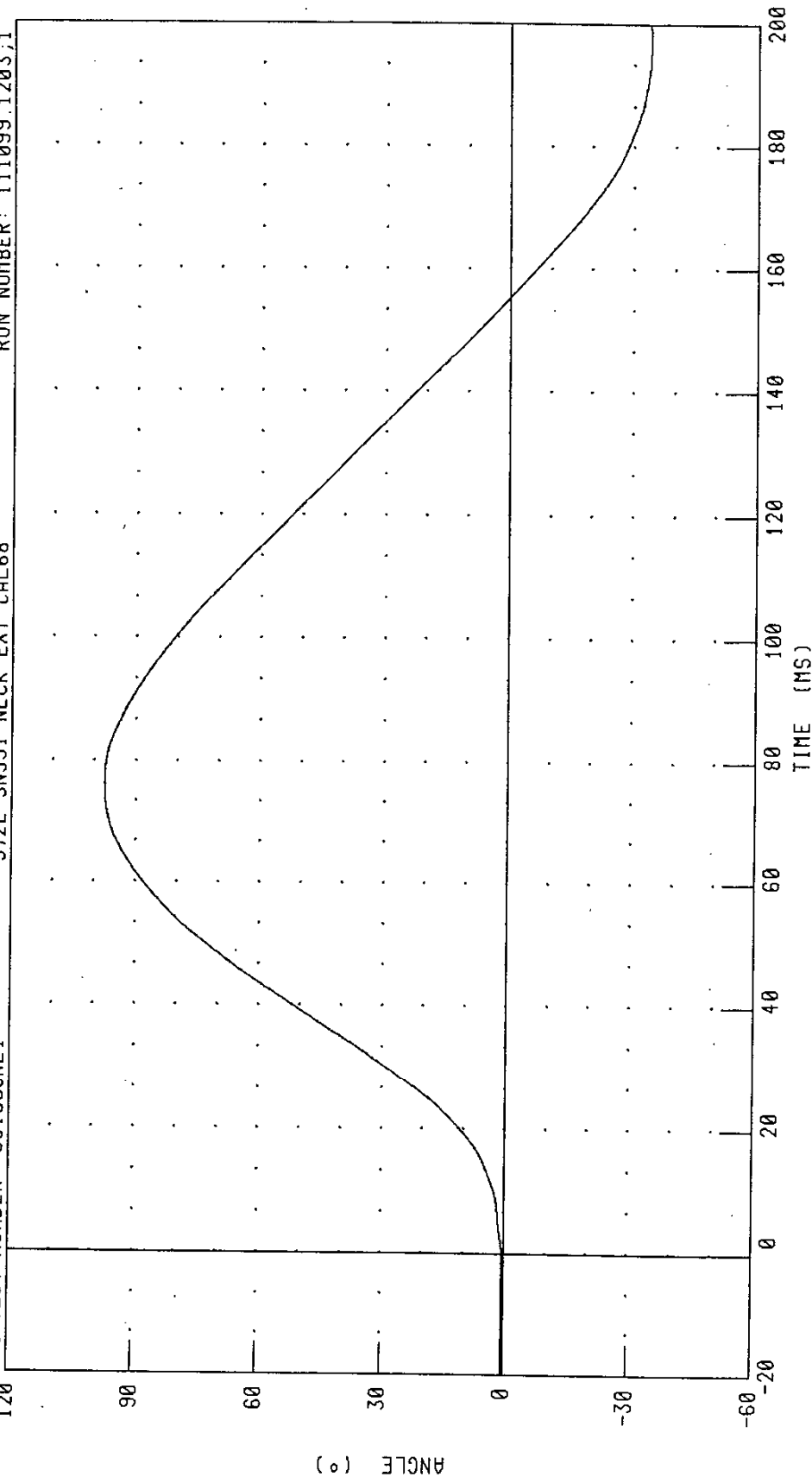
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 591C68NE1

572E SN591 NECK EXT CAL68

RUN NUMBER: 111099.1203,1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 97.58 ° @ 76.08 MS; -34.03 ° @ 196.88 MS

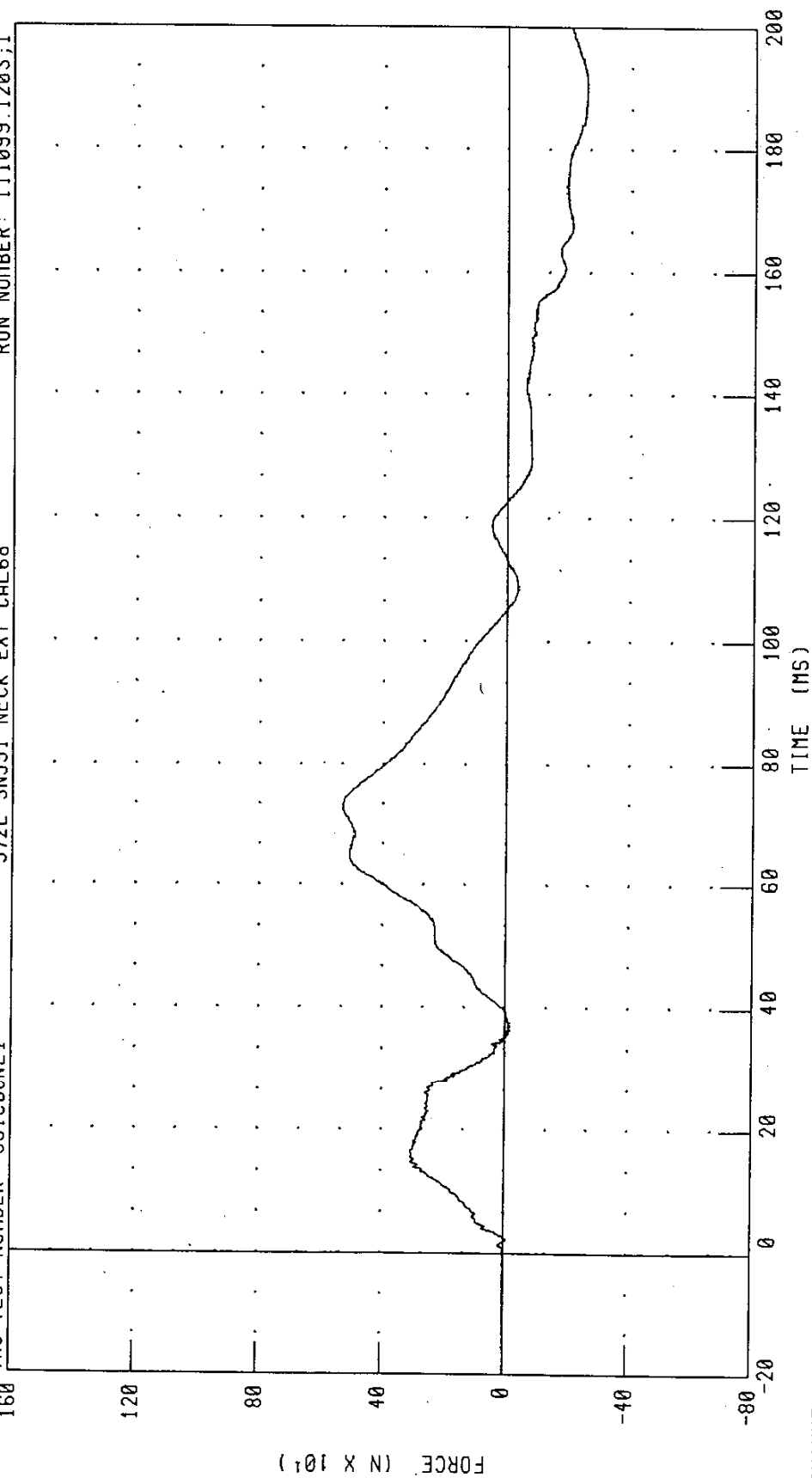
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 591C68NE1

572E SN591 NECK EXT CAL68

RUN NUMBER: 111099.1203;1



CHANNEL: NEKXF

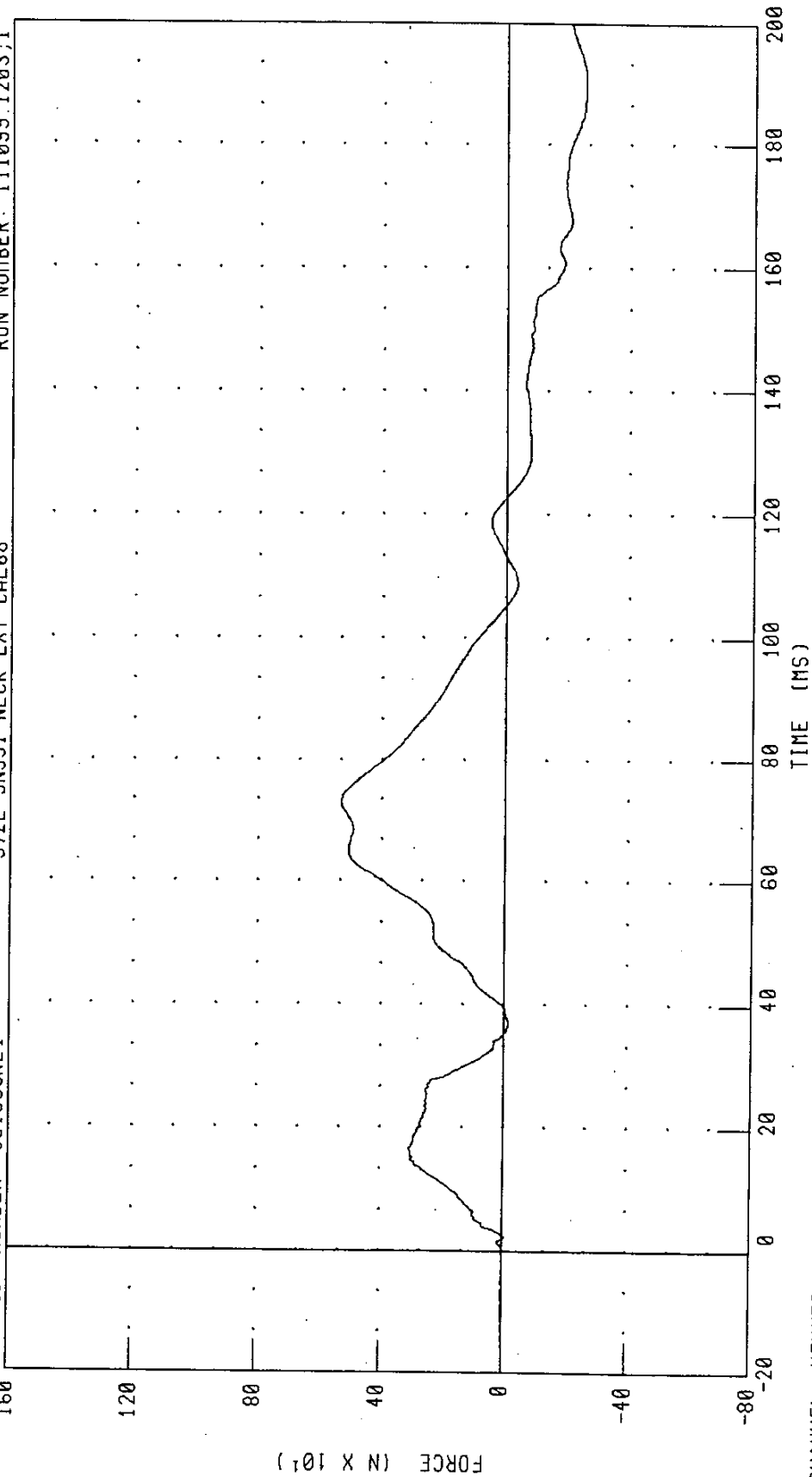
FILTER: CH. CLASS 1000

PEAK DATA: 530.57 N @ 72.32 MS; -259.11 N @ 189.68 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 591C68NE1 572E SN591 NECK EXT CAL68 RUN NUMBER: 111099.1203;1



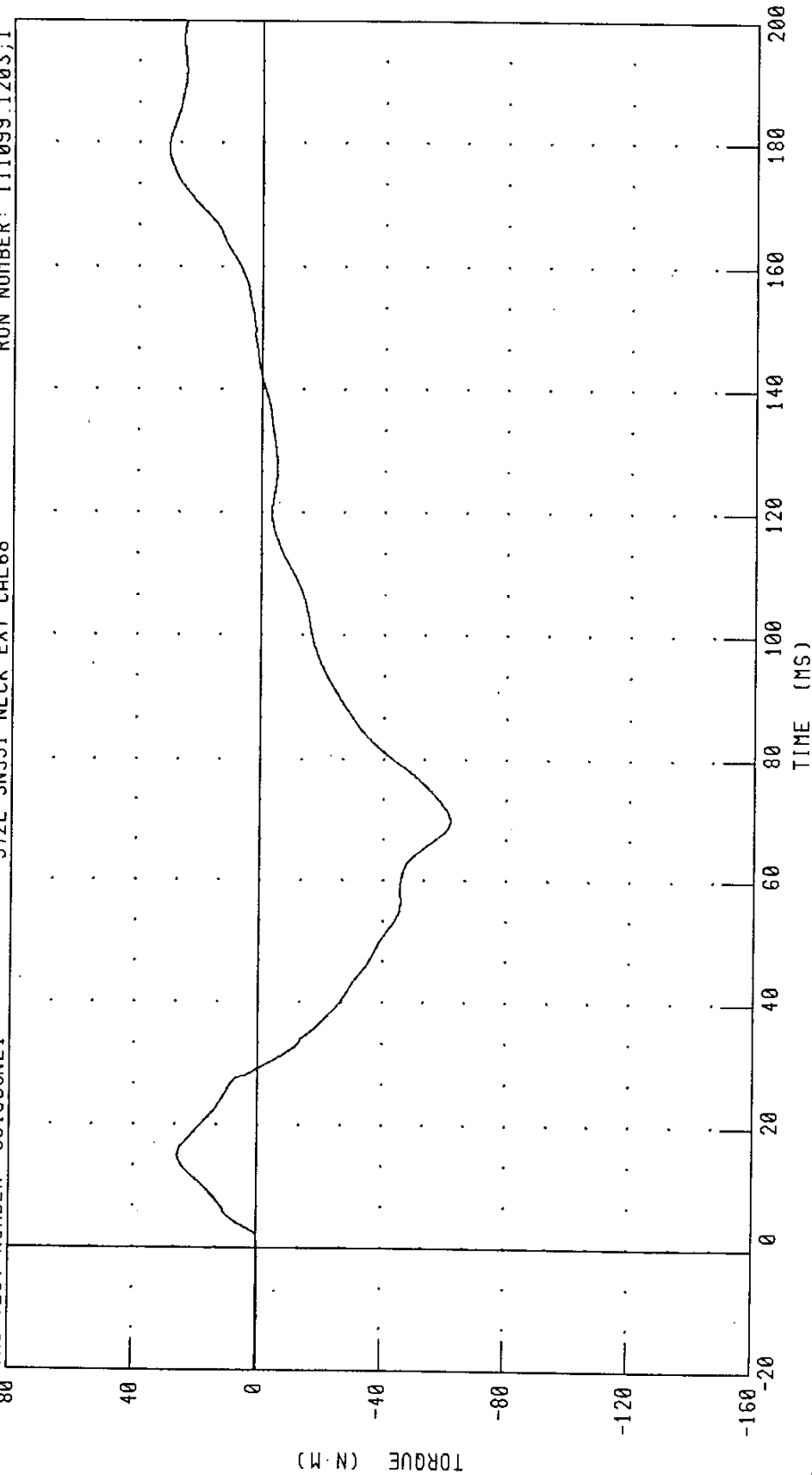
CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 530.70 N @ 73.12 MS, -256.00 N @ 190.72 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 591C68NE1 572E SN591 NECK EXT CAL68 RUN NUMBER: 111099.1203,1



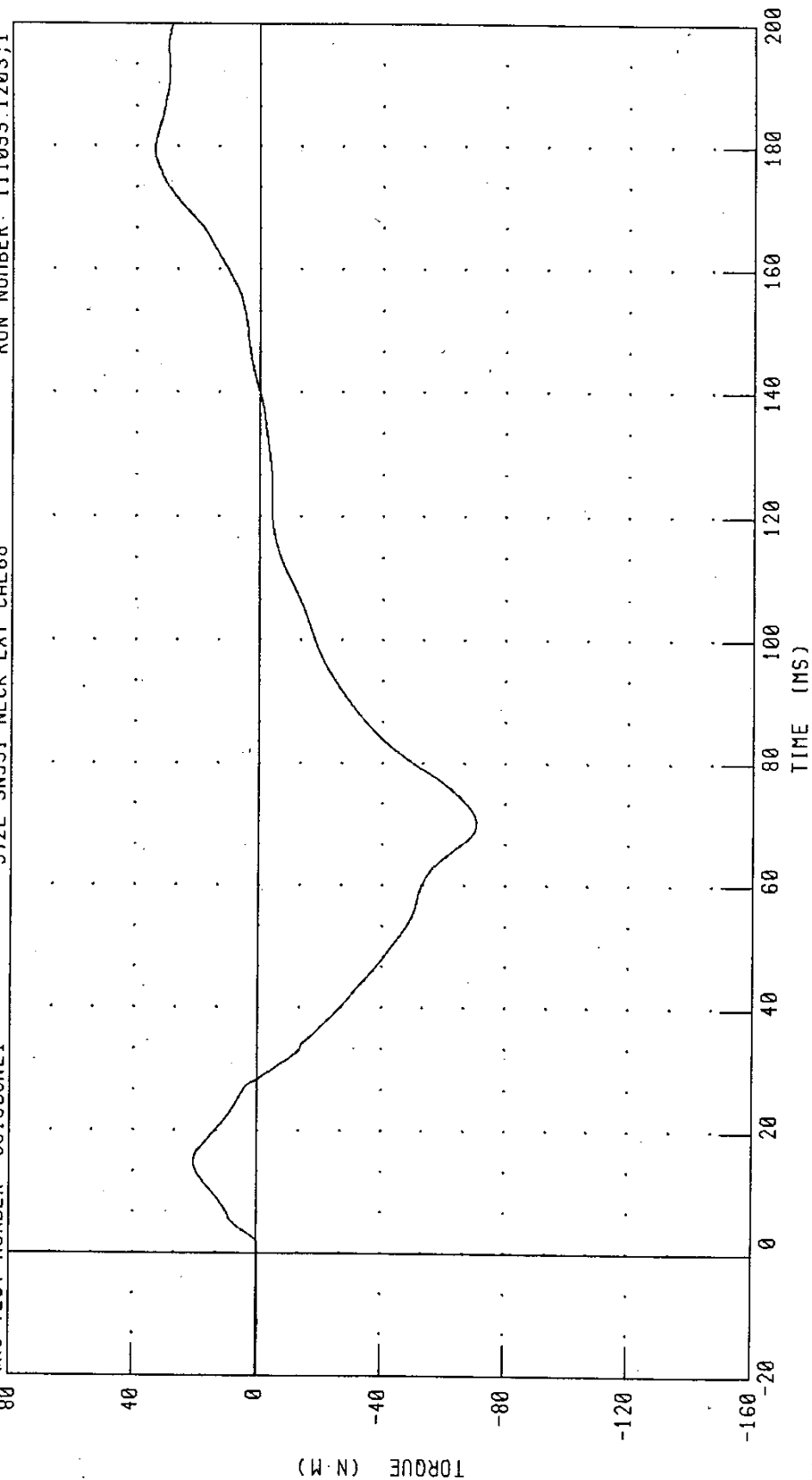
CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 30.42 N·M @ 179.04 MS; -61.75 N·M @ 70.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT, ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 591C68NE1 572E SN591 NECK EXT CAL68 RUN NUMBER: 111099.1203,1



CHANNEL: NEKOM FILTER: CH. CLASS 600

PEAK DATA: 34.07 N-M @ 179.12 MS; -70.71 N-M @ 70.24 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

10-NOV-99

TRC INC.

TEST NO: 591C68TH1

572E SN591 H.S.THORAX CAL68

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	70.6 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5864. N
INTERNAL HYSTERESIS	69% - 85%	73.3%

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walton

RUN NUMBER: 111099.1305;1

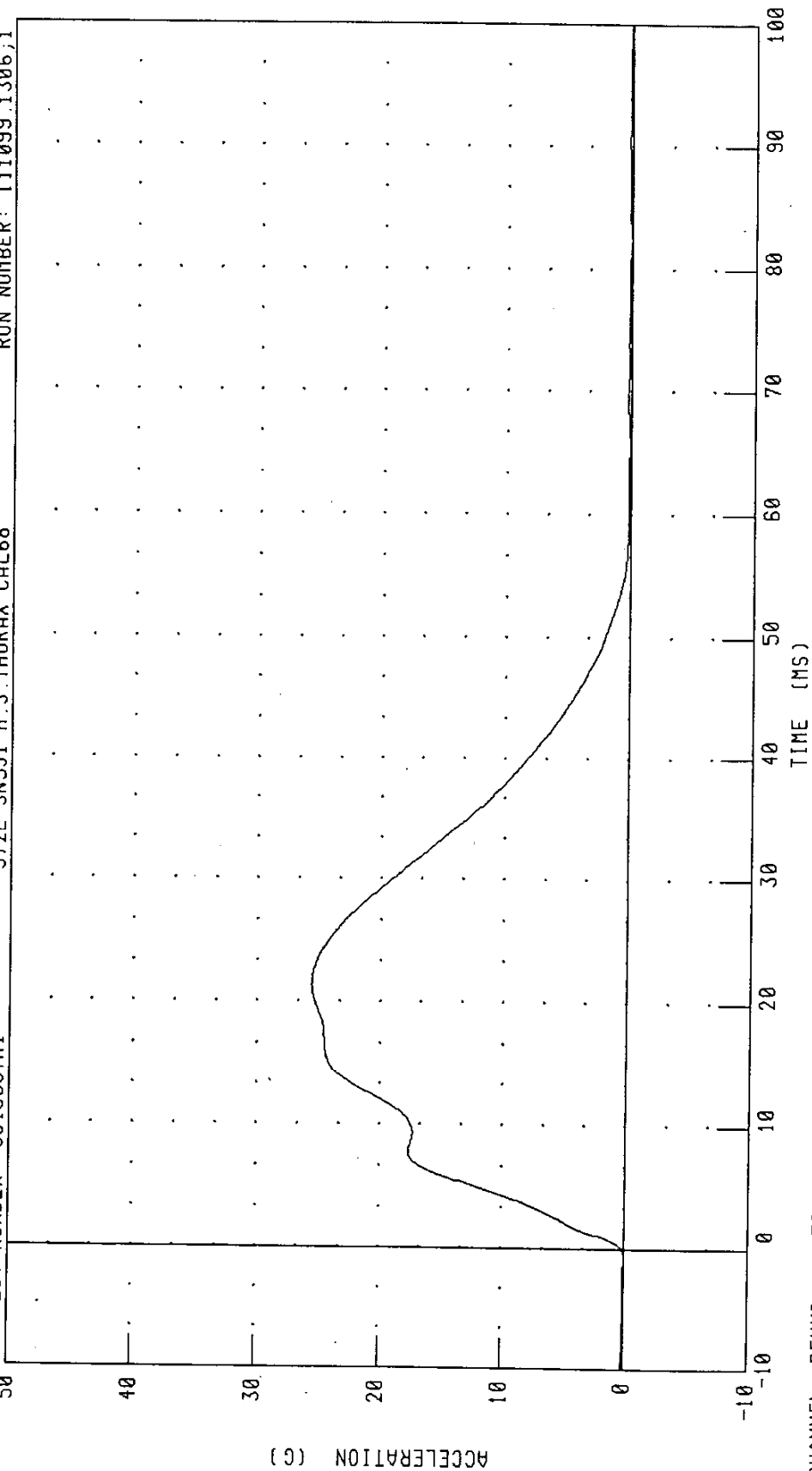
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 591C68TH1

572E SN591 H.S. THORAX CAL68

RUN NUMBER: 111099.1306,1



CHANNEL: PENXC FILTER: CH. CLASS 180 PEAK DATA: 25.60 G @ 21.36 MS, -0.01 G @ -0.72 MS

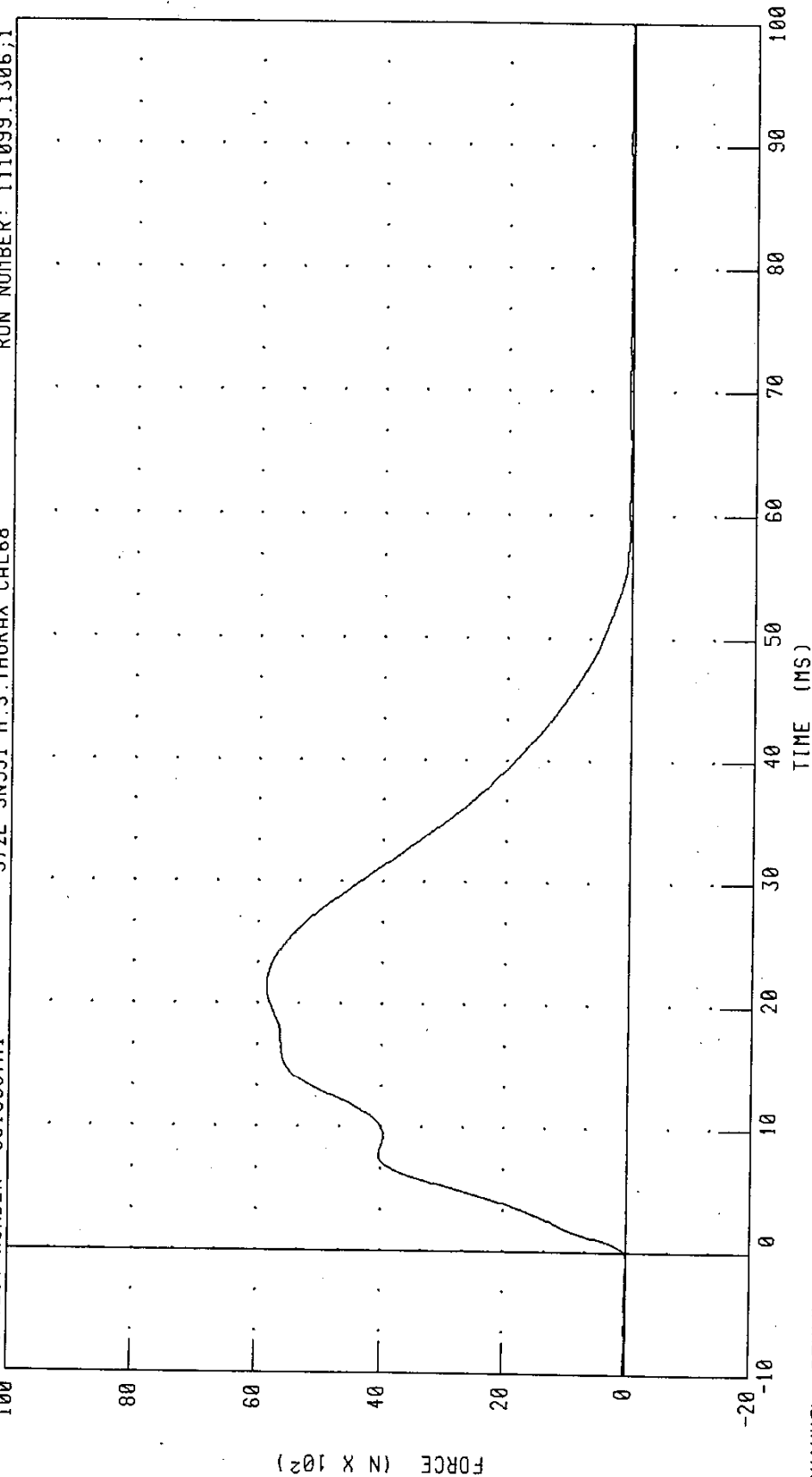
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 591C68TH1

572E SN591 H.S.THORAX CAL68

RUN NUMBER: 111099.1306,1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5864.04 N @ 21.36 MS; -1.91 N @ -0.72 MS

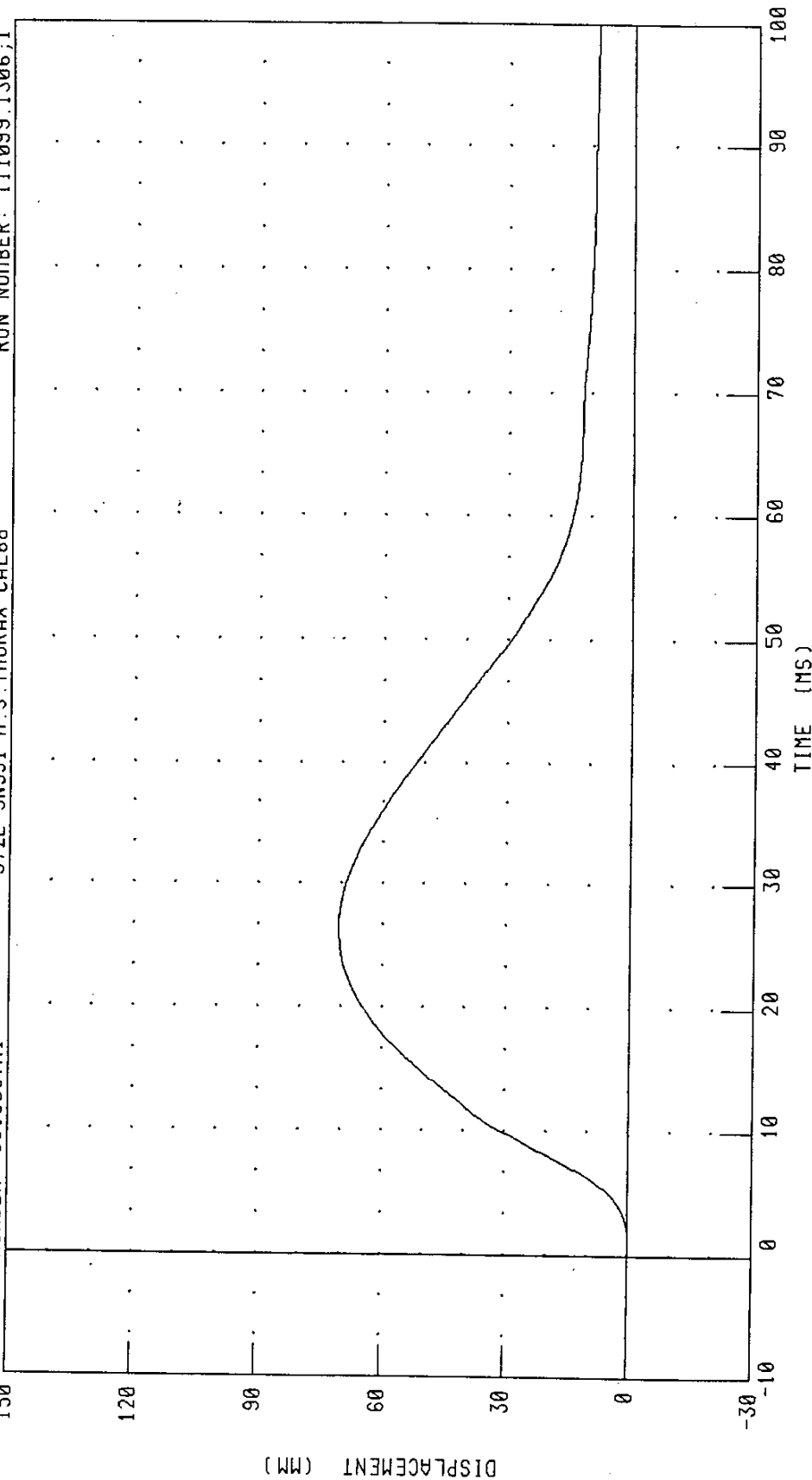
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 591C68TH1

572E SN591 H.S. THORAX CAL68

RUN NUMBER: 111099.1306,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

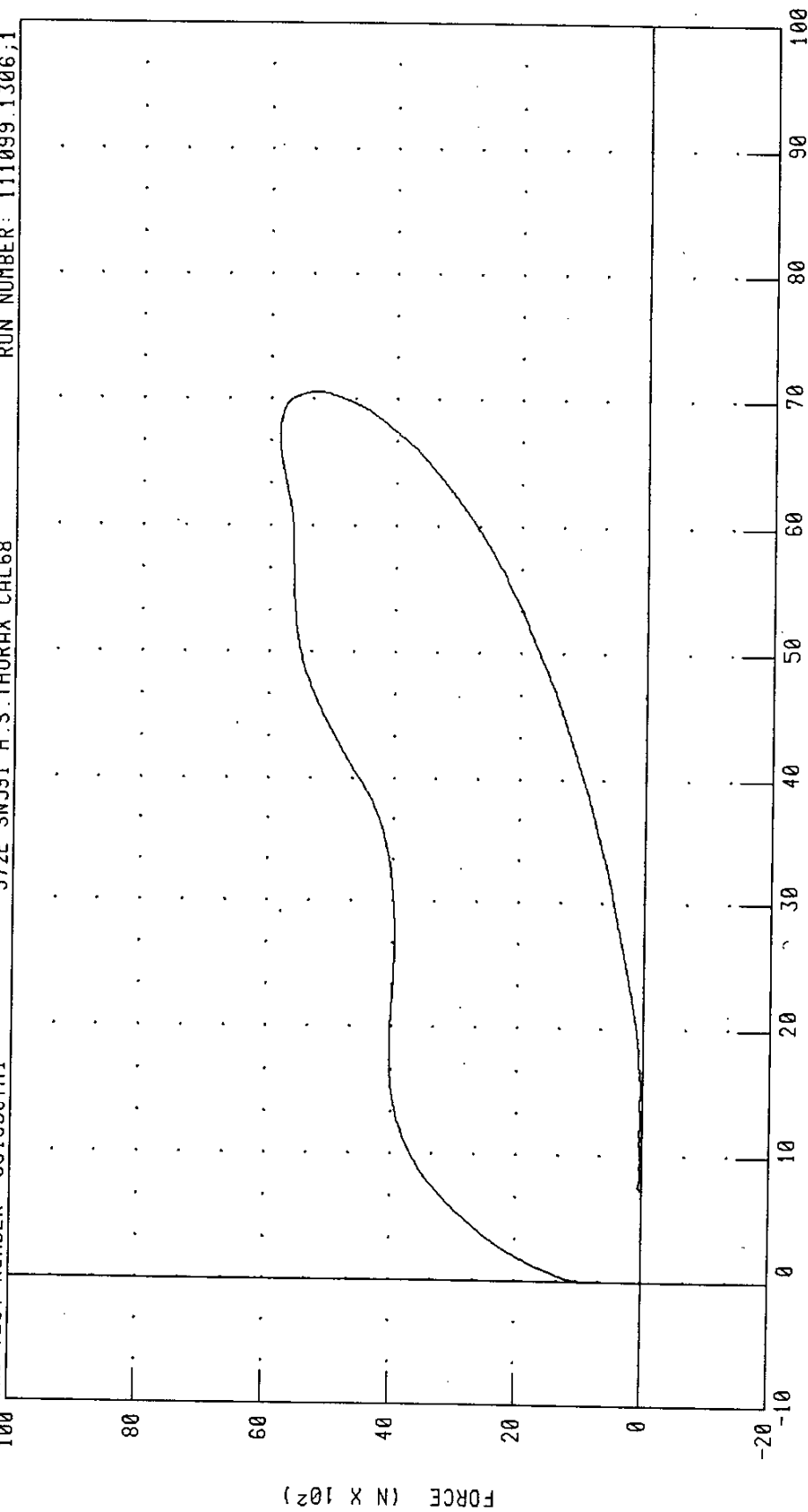
PEAK DATA: 70.61 MM @ 26.56 MS; -0.03 MM @ 1.20 MS

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

TRC TEST NUMBER: 591C68TH1

RUN NUMBER: 111099.1306;1

572E SN591 H.S.THORAX CAL68



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

DISPLACEMENT (MM)

PEAK DATA: 70.61 MM @ 26.56 MS; -0.03 MM @ 1.20 MS
5864.04 N @ 21.36 MS; -1.91 N @ -0.72 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

10-NOV-99

TRC INC.

TEST NO: 591C68RK1

572E SN591 RIGHT KNEE CAL 68

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5441.8 N

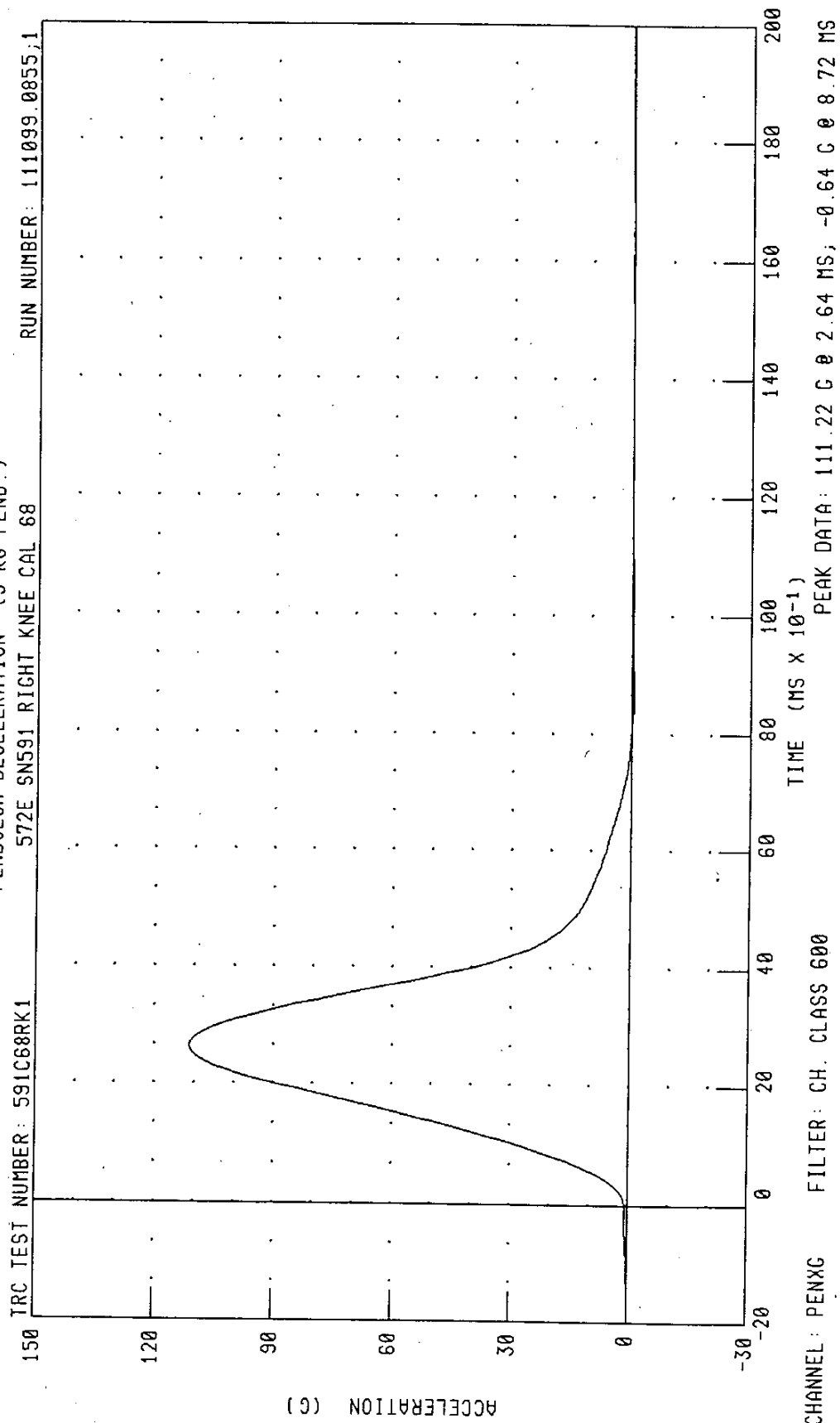
TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walker

RUN NUMBER: 111099.0855;1

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



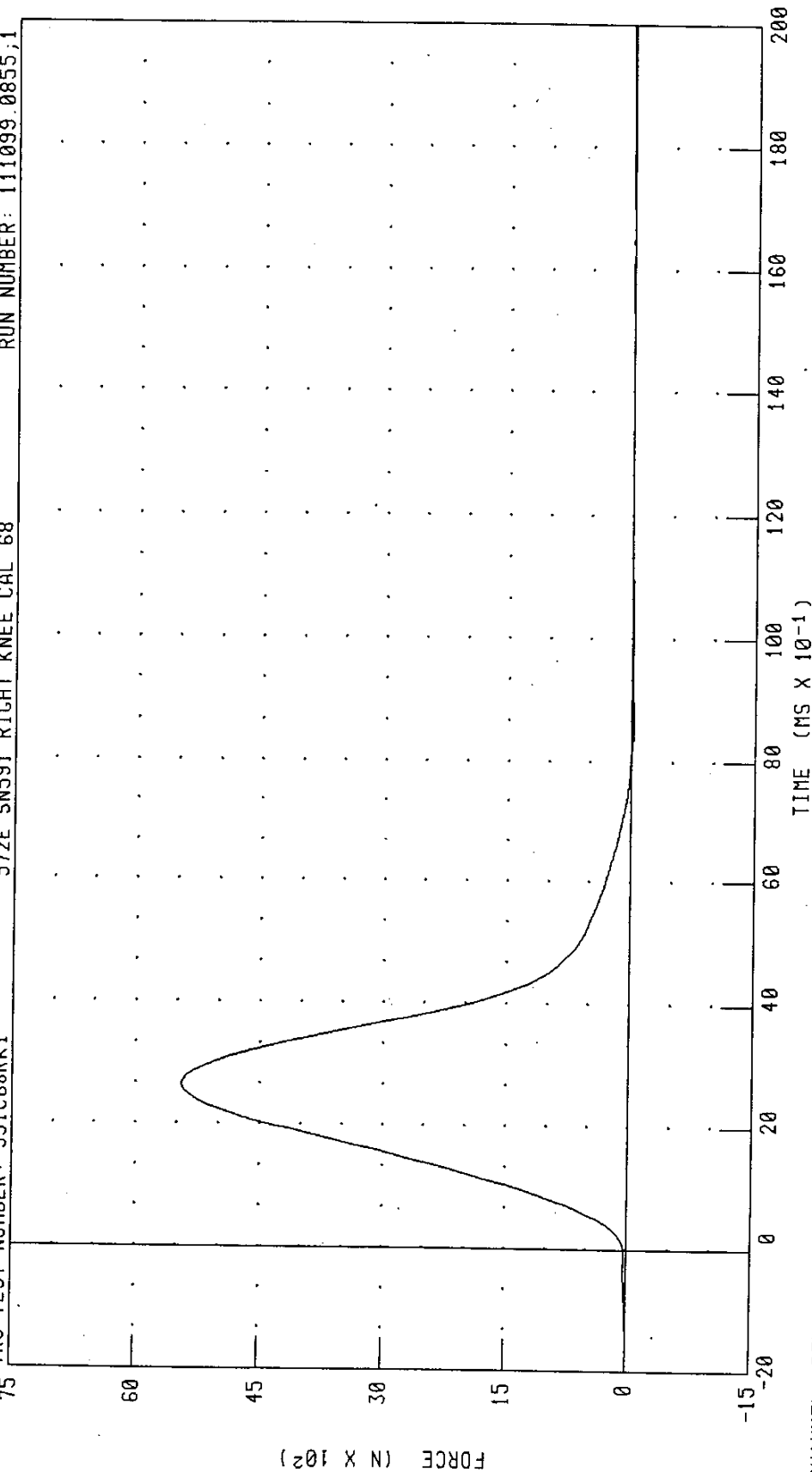
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 591C68RK1

572E SN591 RIGHT KNEE CAL 68

RUN NUMBER: 111099.0855;1



CHANNEL: PENXF

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 5441.80 N @ 2.64 MS; -31.43 N @ 8.72 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

10-NOV-99

TRC INC.

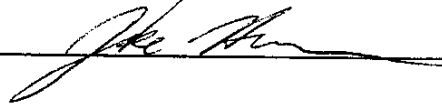
TEST NO: 591C68LK1

572E SN591 LEFT KNEE CAL 68

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5227.9 N

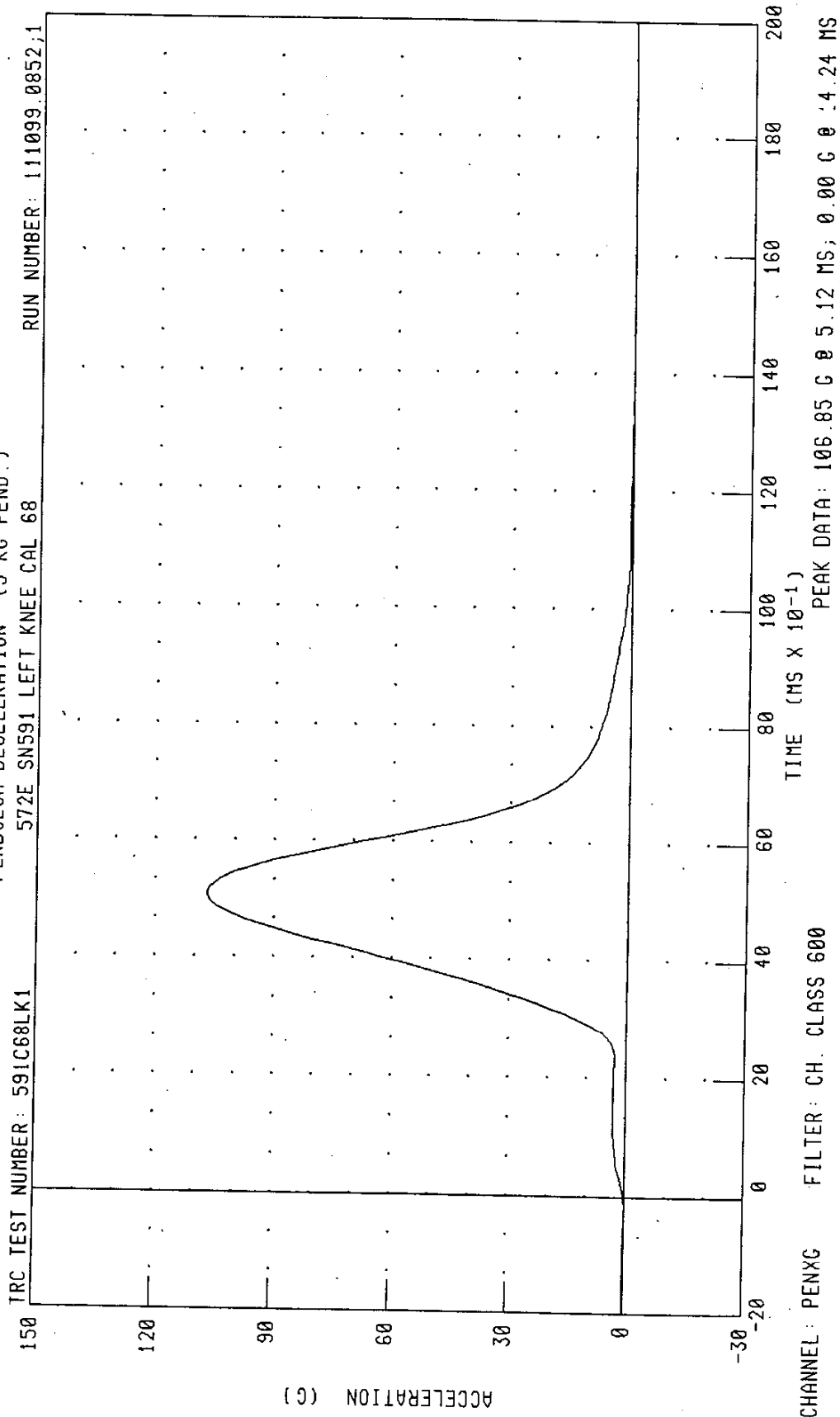
TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 111099.0852;1

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



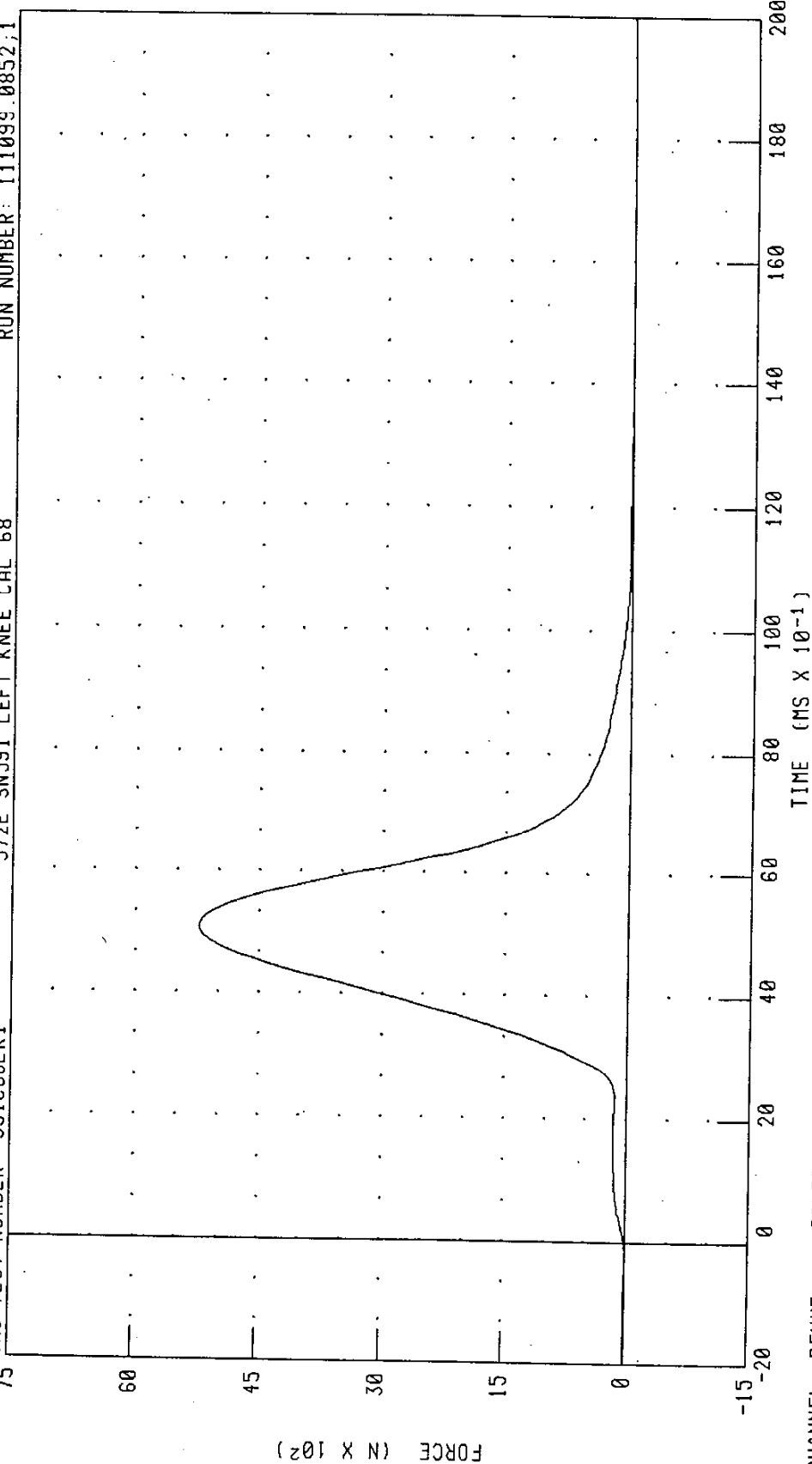
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 591C68LK1

572E SN591 LEFT KNEE CAL 68

RUN NUMBER: 111099.0852;1



CHANNEL: PENXF

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 5227.96 N @ 5.12 MS; -0.10 N @ 14.24 MS

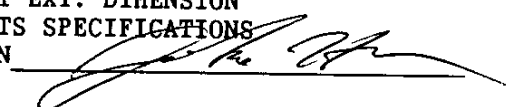
TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

SN551 FST

TRC INC. TEST NO: 551C74ED

22-DEC-99
551C74ED

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	991. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	848. MM
CHEST DEPTH (O)		213 - 229 MM	226. MM
H-POINT HEIGHT (C)		84 - 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	140. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	884. MM
THIGH CLEARANCE (F)		140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	467. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	452. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	493. MM
FOOT LENGTH (P)		252 - 267 MM	262. MM
FOOT BREADTH (W)		91 - 107 MM	97. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	94. MM
SHOULDER BREADTH (V)		422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	513. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	206. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	340. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	297. MM

572E SN551 EXT. DIMENSION
DUMMY MEETS SPECIFICATIONS
TECHNICIAN 

RUN NUMBER: 010300.0842

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

22-DEC-99

TRC INC.

TEST NO: 551C74HD1

572E SN551 HEAD DROP CAL 74

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	263.28 G
PEAK LATERAL ACCELERATION	15 G MAX	3.66 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

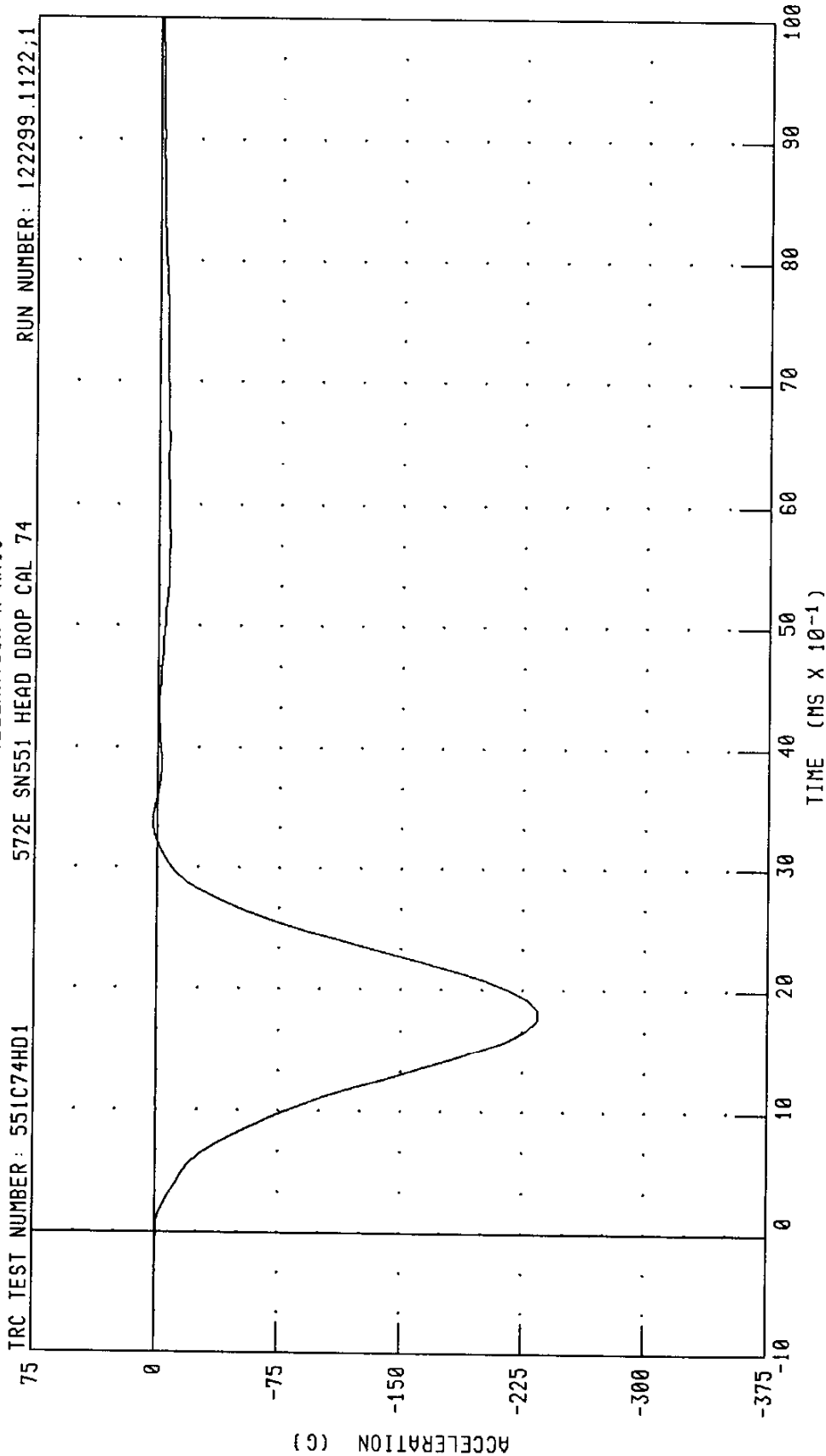
Dustin Wallen

RUN NUMBER: 122299.1122;1

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

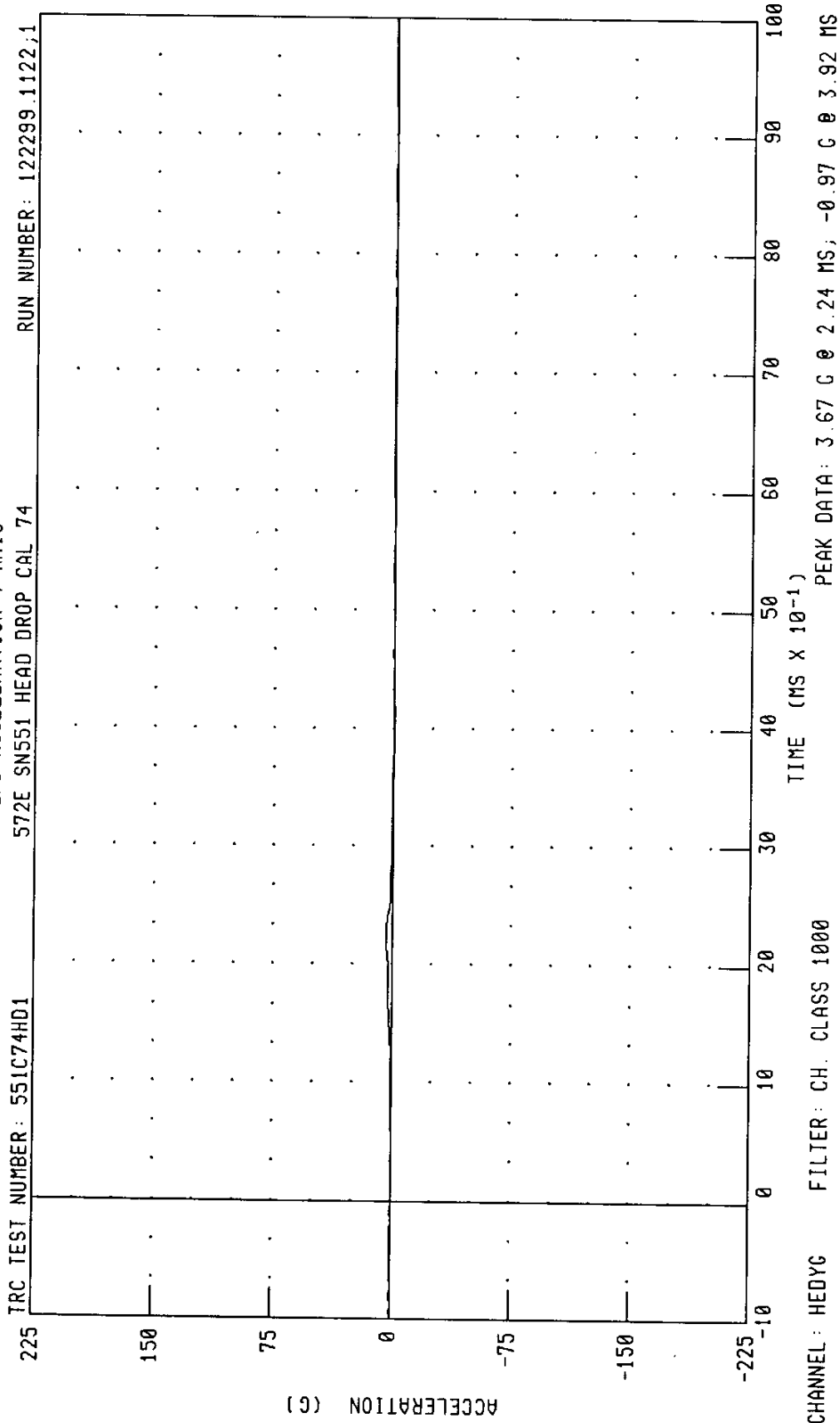
TRC TEST NUMBER: 551C74HD1 572E SN551 HEAD DROP CAL 74 RUN NUMBER: 122299.1122,1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

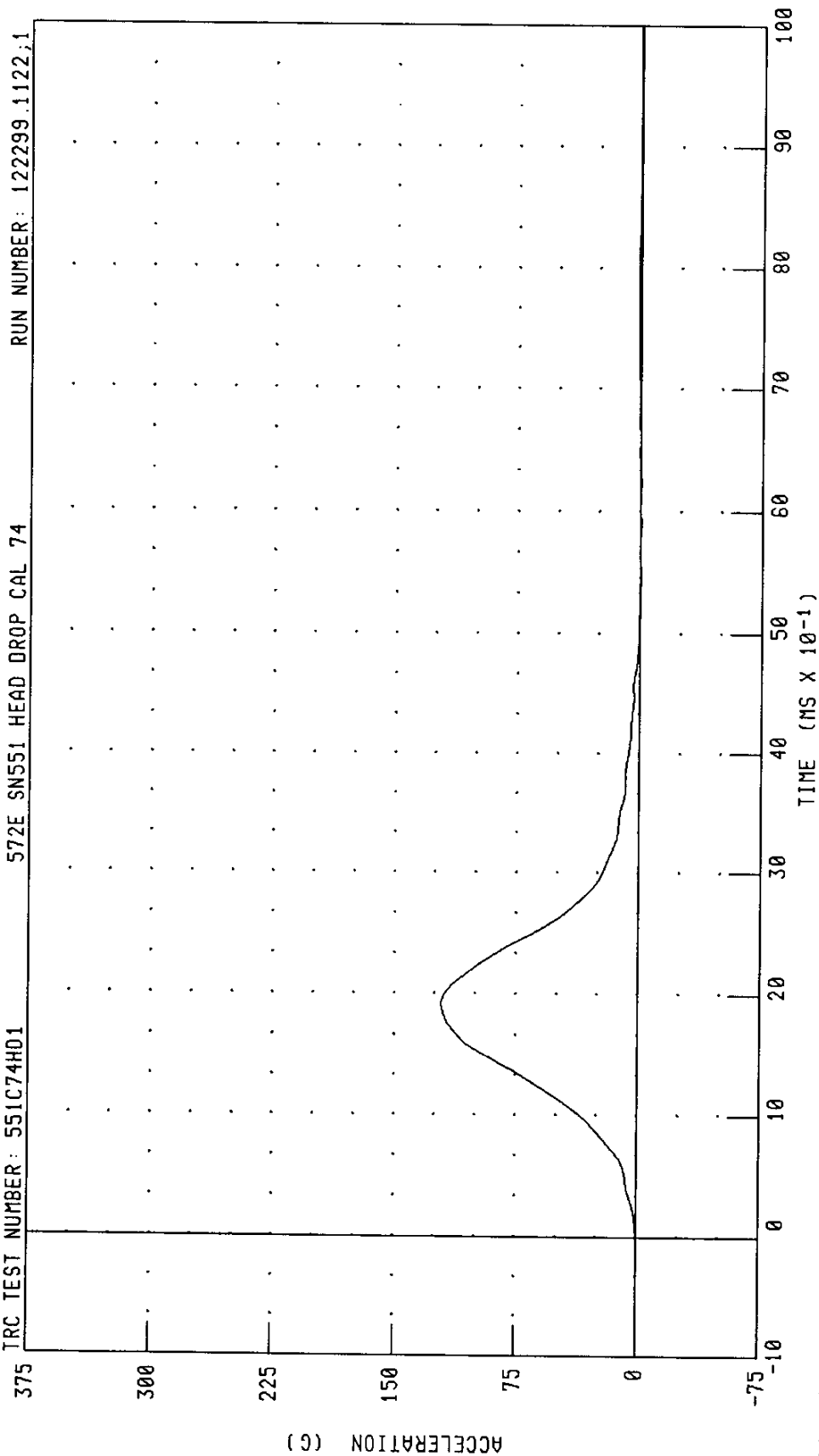
PEAK DATA: 2.98 G @ 3.36 MS, -234.28 G @ 1.84 MS

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



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

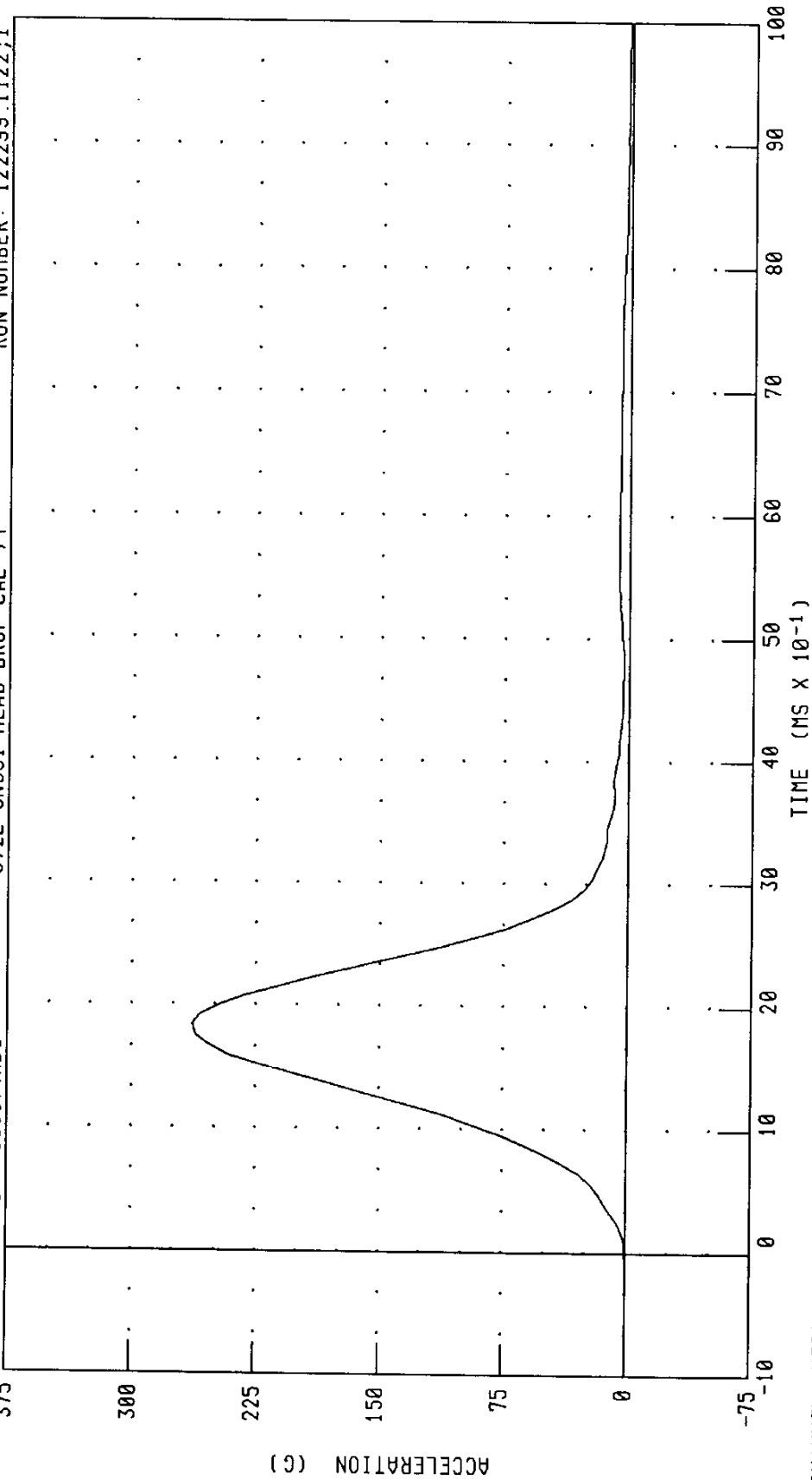
TRC TEST NUMBER: 551C74HD1 572E SN551 HEAD DROP CAL 74 RUN NUMBER: 122299.1122,1



CHANNEL: HEDZC FILTER: CH. CLASS 1000 PEAK DATA: 121.12 G @ 1.92 MS; -0.62 G @ 5.44 MS

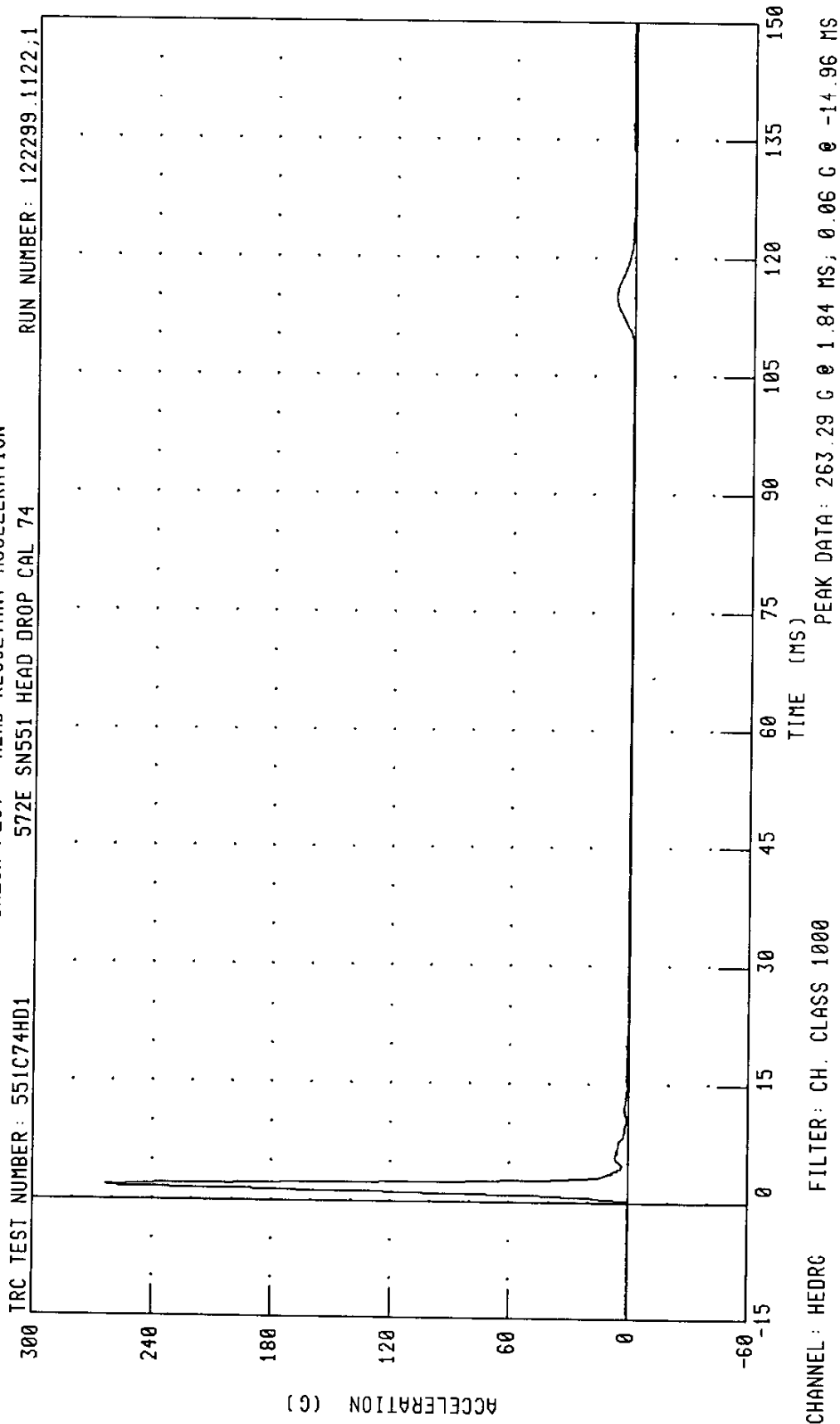
PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 551C74HD1 572E SN551 HEAD DROP CAL 74 RUN NUMBER: 122299.1122,1



CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 263.29 G @ 1.84 MS; 0.06 G @ -0.96 MS

PART 572-E HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 551C74NF1 572E SN551 NECK FLEXION CAL74

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.93 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.53 G
	20 MS	17.60 - 22.60 G	21.78 G
	30 MS	12.50 - 18.50 G	17.73 G
MAX PENDULUM G		29 G MAX	24.04 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.65 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.56 MS
D PLANE	MAX	64 - 78 DEG.	70.67 DEG.
ROTATION	TIME	57 - 64 MS	61.12 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	95.86 NM
	TIME	47 - 58 MS	50.24 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.12 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	105.20 MS

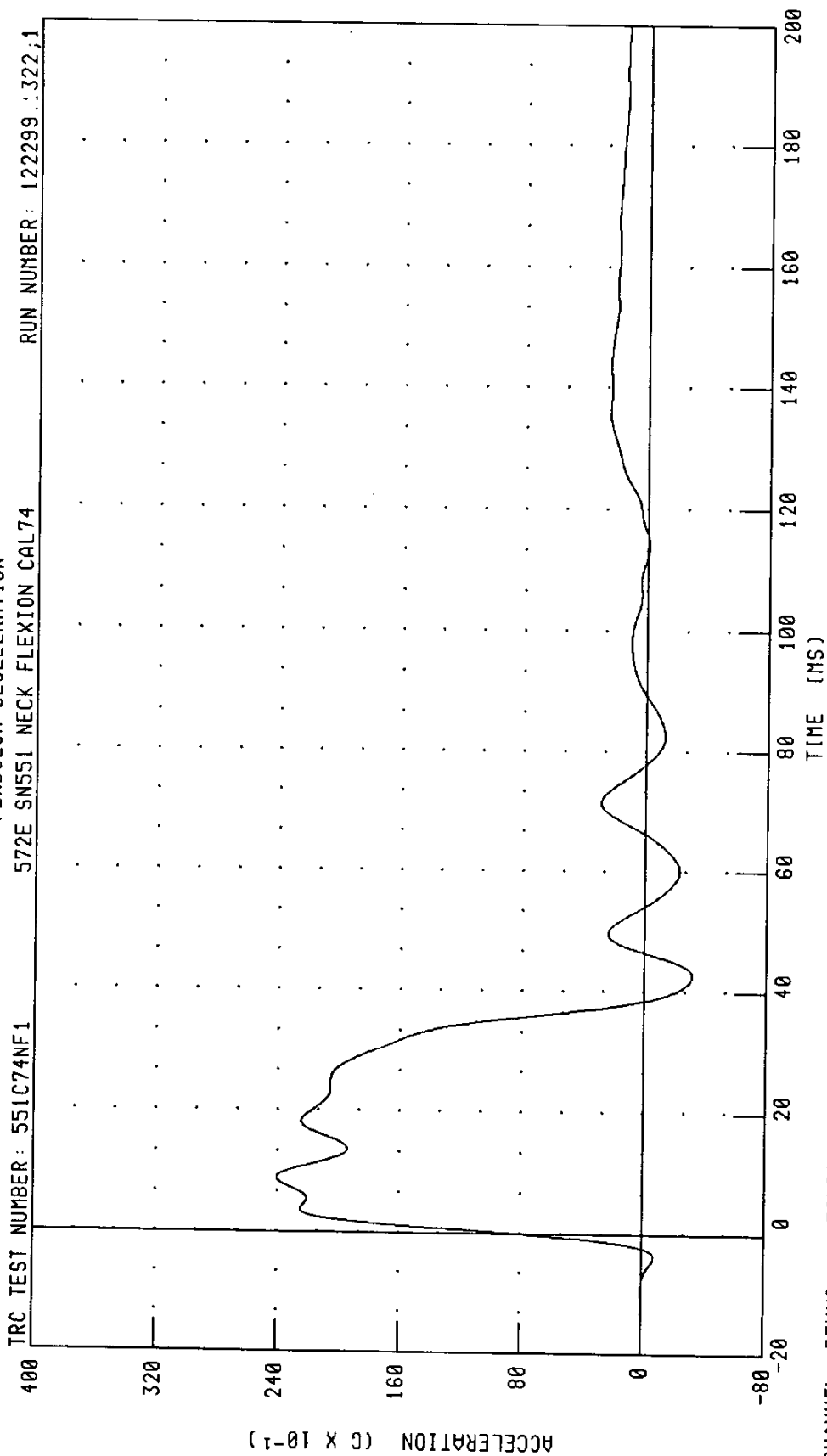
TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walker

RUN NUMBER: 122299.1321;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION



CHANNEL: PENXC FILTER: CH. CLASS 60 PEAK DATA: 24.04 G @ 8.96 MS; -3.16 G @ 42.80 MS

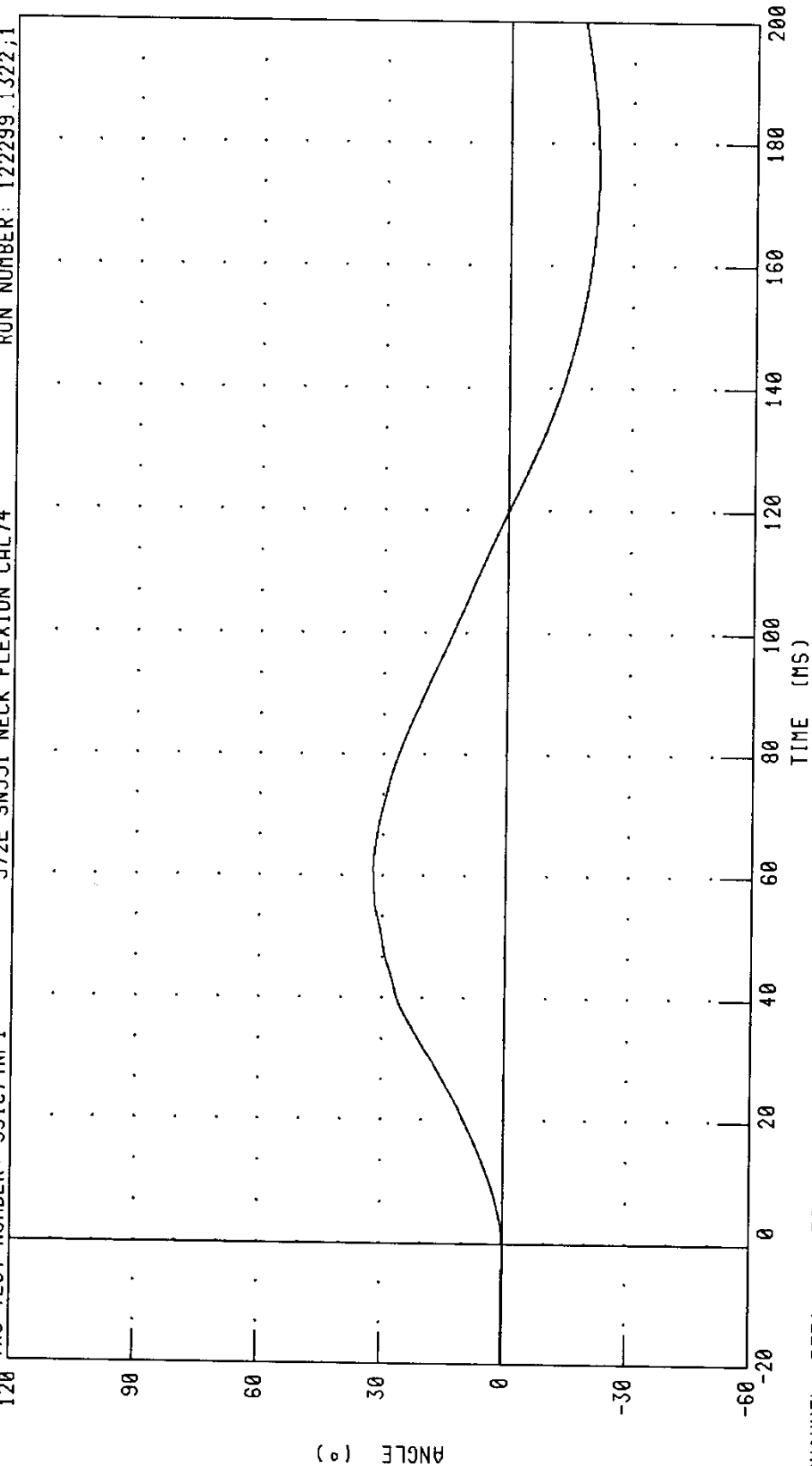
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 551C74NF1

572E SN551 NECK FLEXION CAL74

RUN NUMBER: 122299.1322;1



CHANNEL: BETA

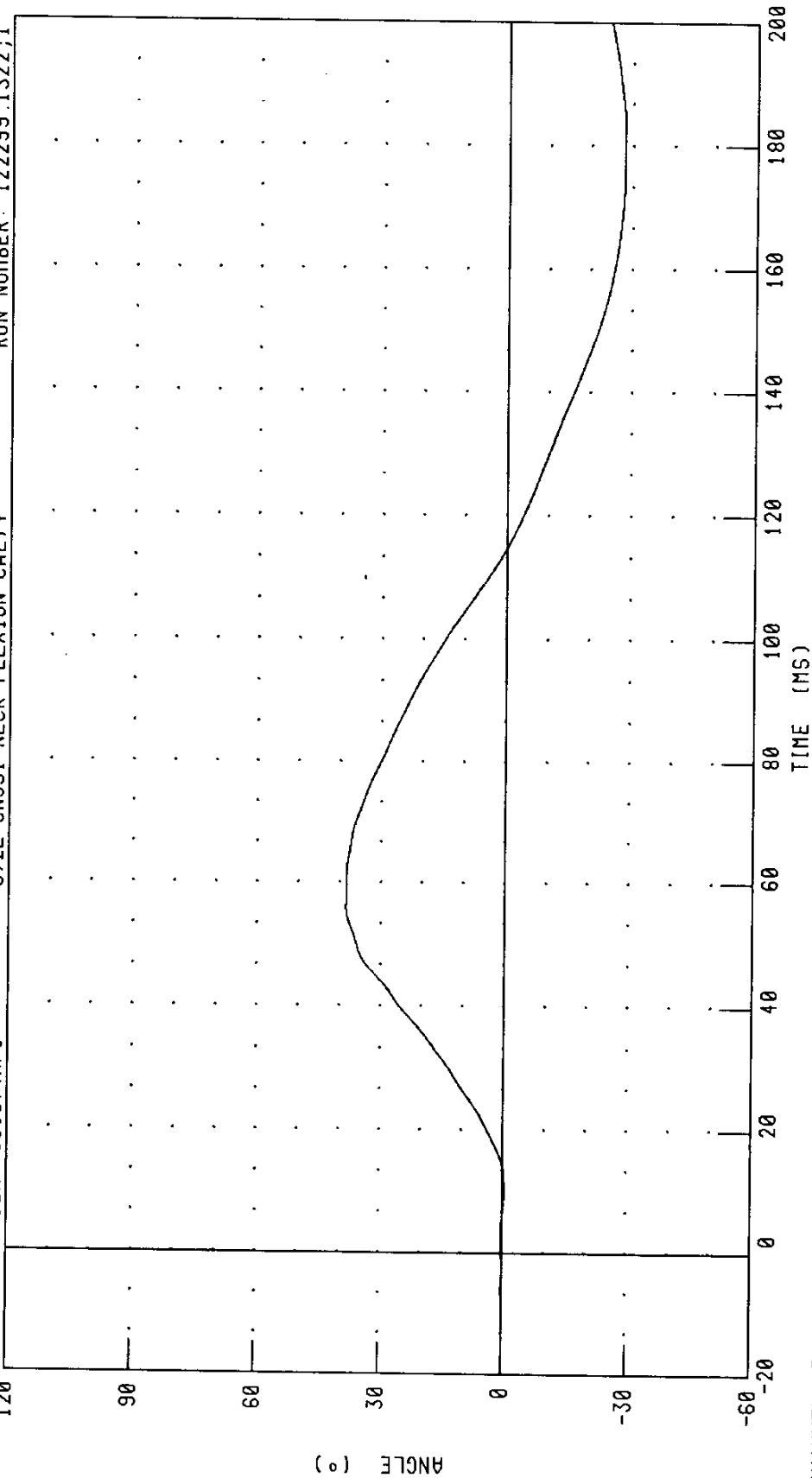
FILTER: CH. CLASS 60

TIME (MS)

PEAK DATA: 32.31 ° @ 61.12 MS; -21.63 ° @ 175.52 MS

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

TRC TEST NUMBER: 551C74NF1 572E SN551 NECK FLEXION CAL74 RUN NUMBER: 122299.1322,1

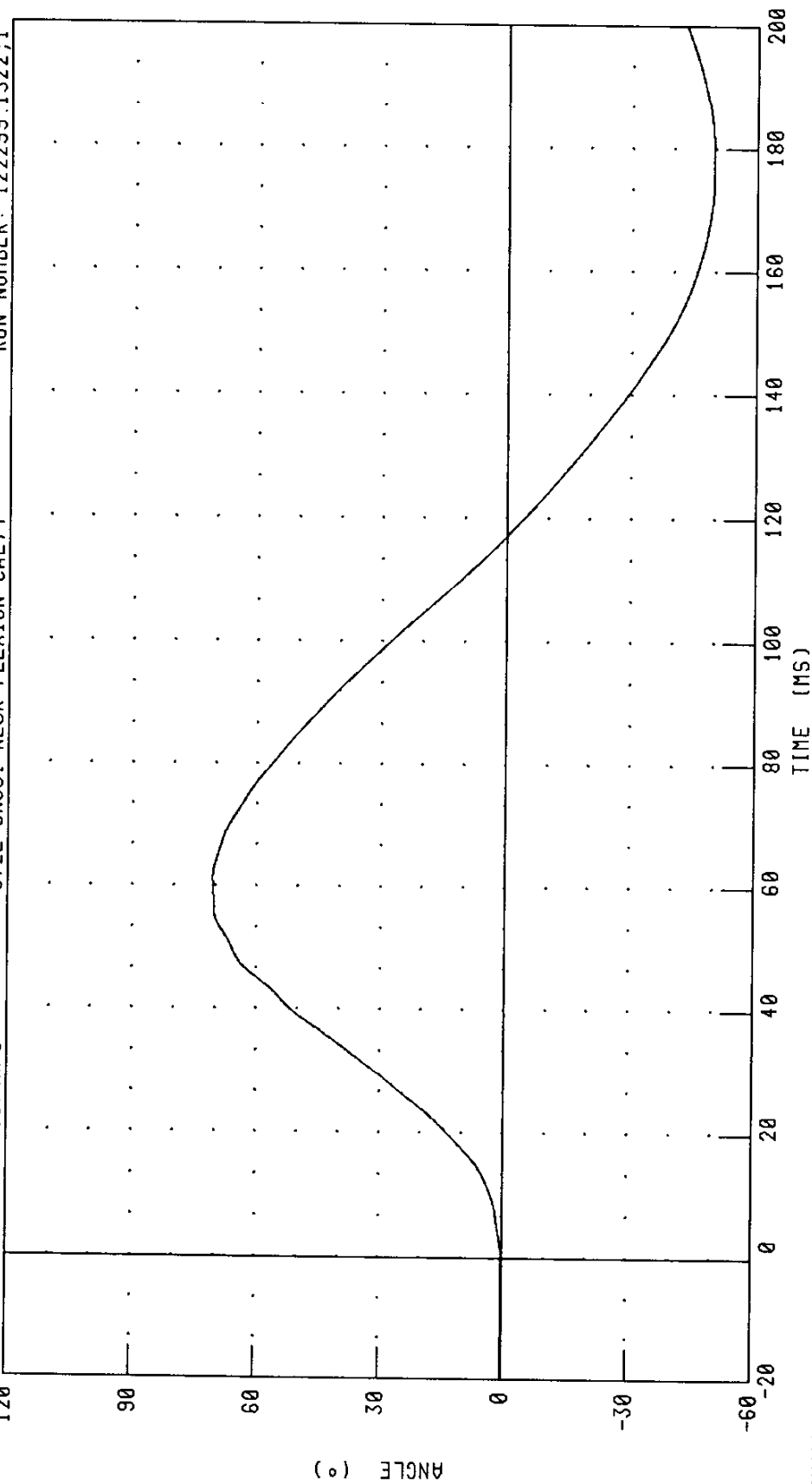


CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 38.41 ° @ 55.92 MS; -28.11 ° @ 180.00 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 551C74NF1 572E SN551 NECK FLEXION CAL74 RUN NUMBER: 122299.1322,1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 70.67 ° @ 61.12 MS, -49.71 ° @ 176.72 MS

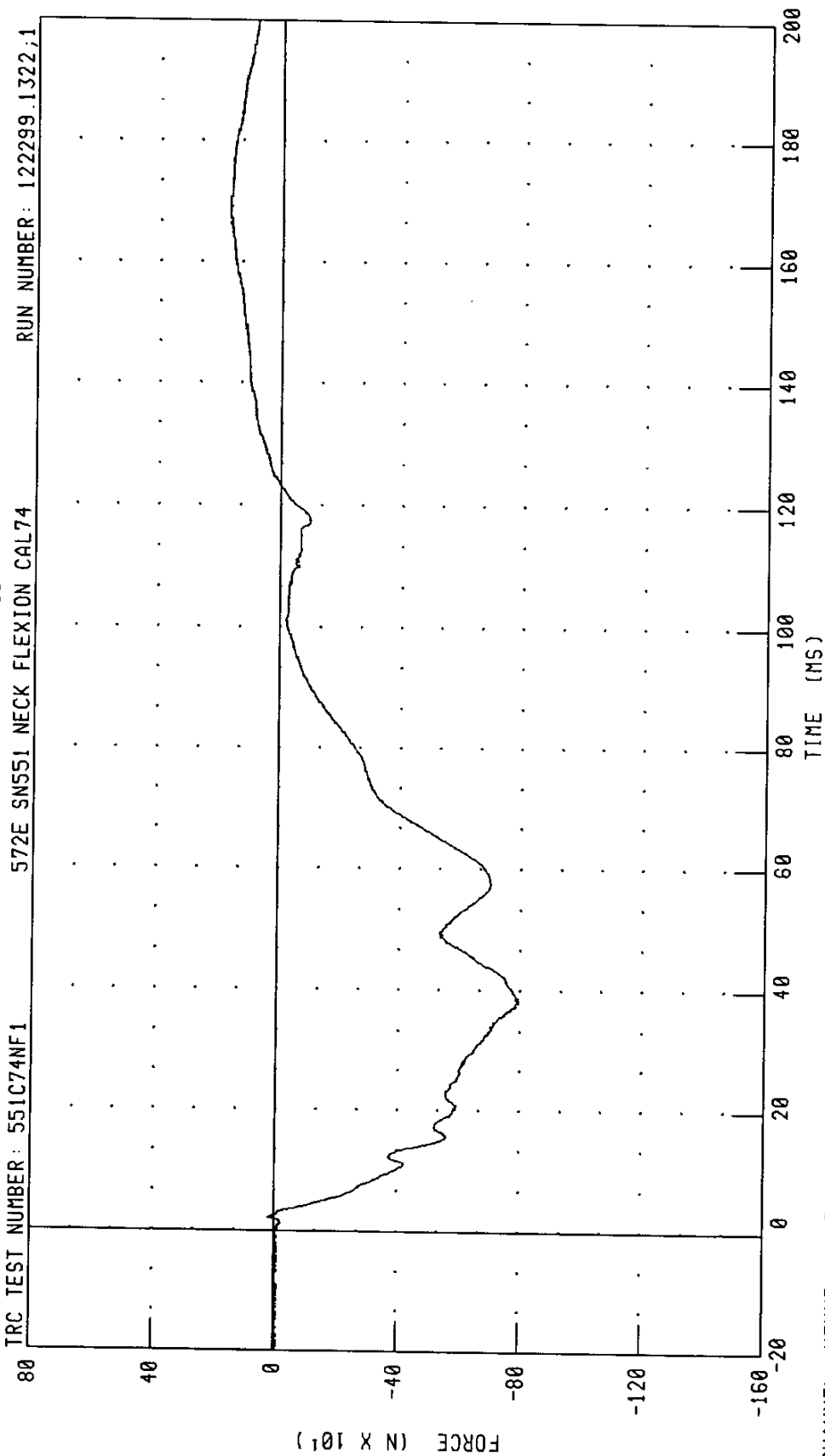
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 551C74NF1

572E SN551 NECK FLEXION CAL74

RUN NUMBER: 122299.1322,1



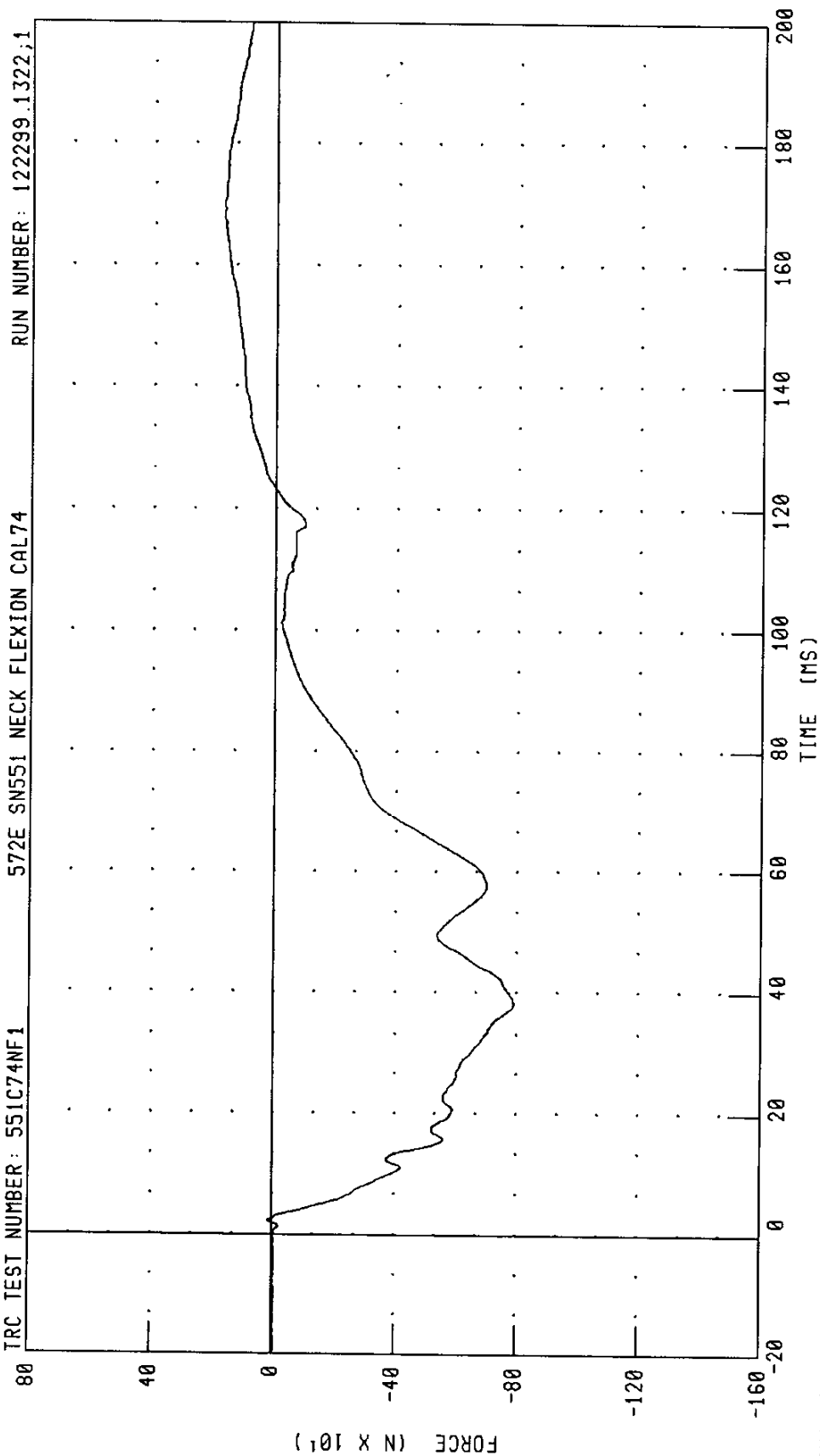
CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 172.80 N @ 166.32 MS; -792.75 N @ 37.92 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 551C74NF1 572E SN551 NECK FLEXION CAL74 RUN NUMBER: 122299.1322,1



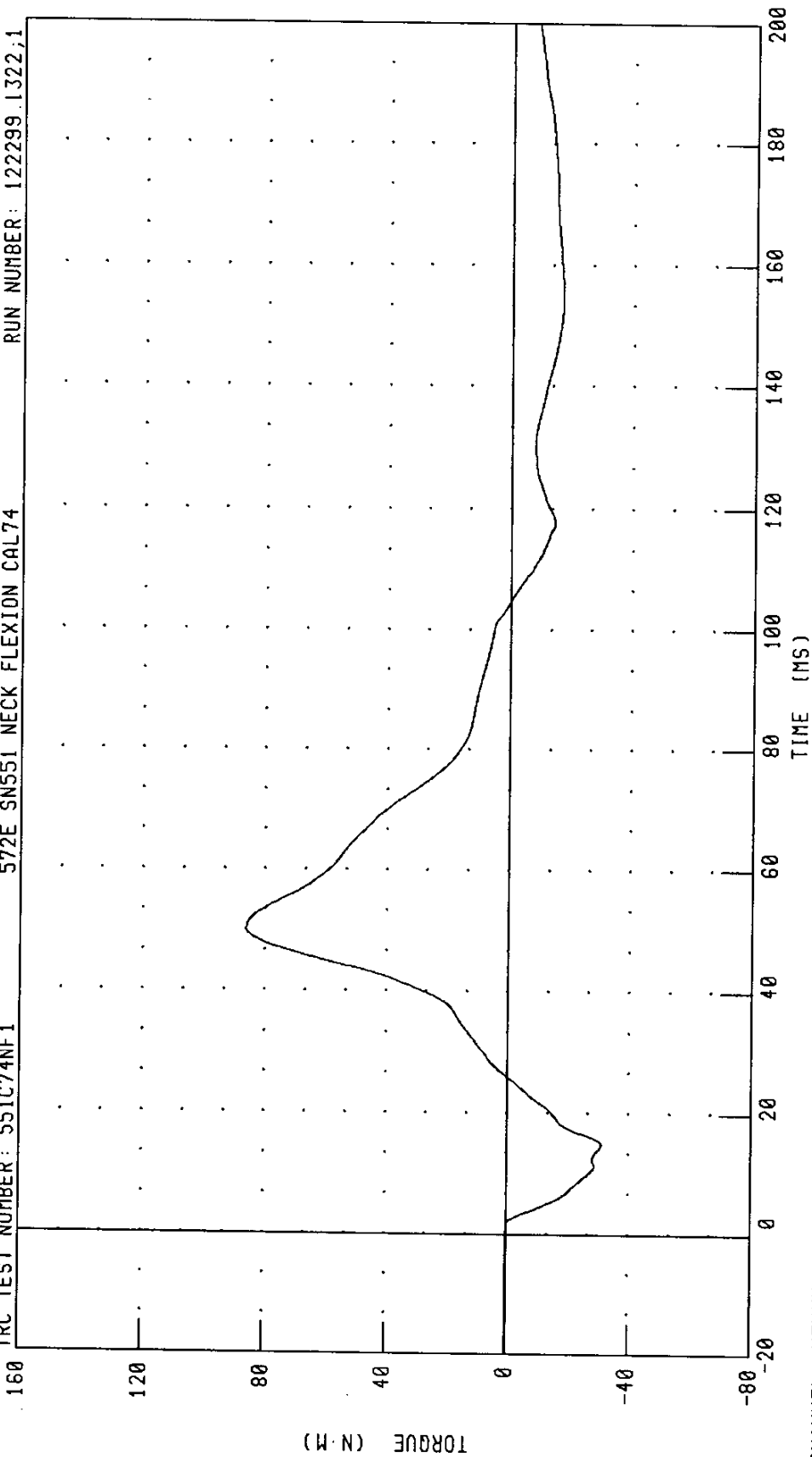
CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 172.95 N @ 167.68 MS; -792.54 N @ 38.16 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

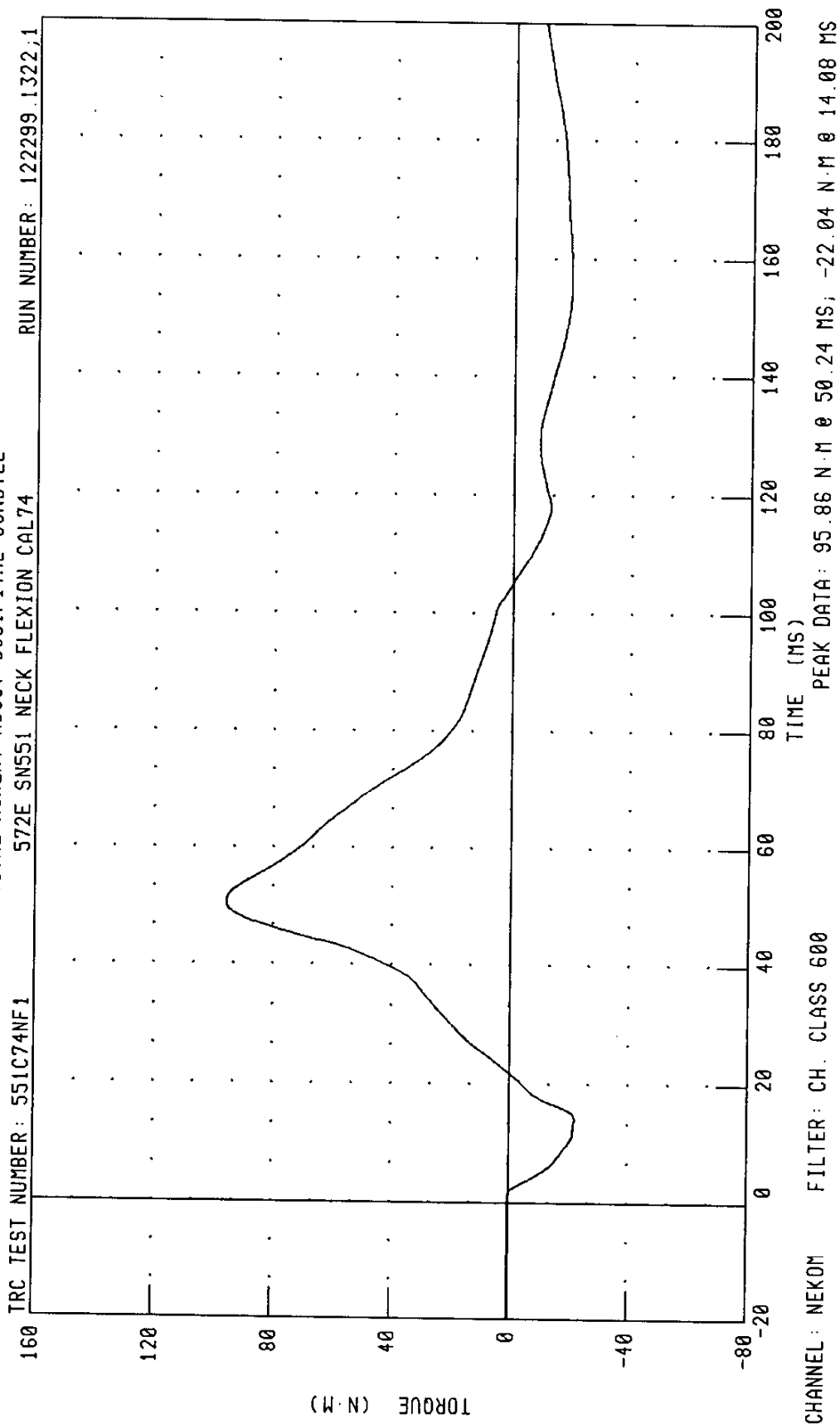
NECK MOMENT Y AXIS

TRC TEST NUMBER: 551C74NF1 572E SN551 NECK FLEXION CAL74 RUN NUMBER: 122299.1322,1



CHANNEL: NEKYM FILTER: CH. CLASS 600 PEAK DATA: 86.17 N.M @ 50.16 MS; -31.09 N.M @ 14.88 MS

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



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-DEC-99

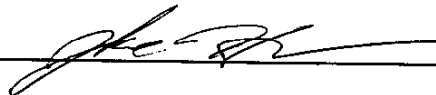
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 551C74NE1 572E SN551 NECK EXT CAL74

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.72 G
	20 MS	14.00 - 19.00 G	16.83 G
	30 MS	11.00 - 16.00 G	14.65 G
MAX PENDULUM G		22 G MAX	18.22 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.63 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.76 MS
D PLANE	MAX	81 - 106 DEG.	94.51 DEG.
ROTATION	TIME	72 - 82 MS	78.96 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-61.78 NM
	TIME	65 - 79 MS	72.80 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.56 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	143.44 MS

TEST MEETS SPECIFICATIONS

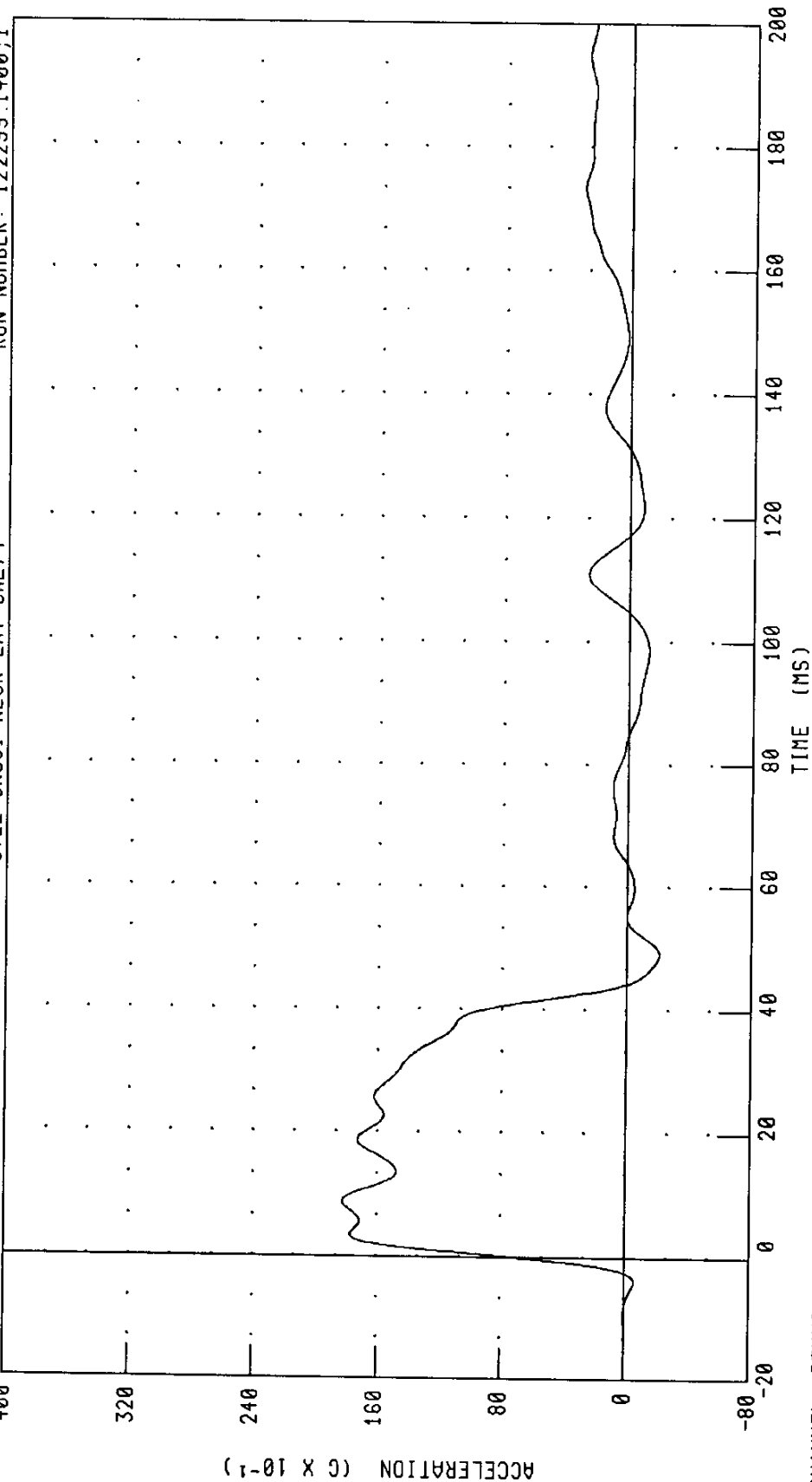
TECHNICIAN



RUN NUMBER: 122299.1359;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 551C74NE1 572E SN551 NECK EXT CAL74 RUN NUMBER: 122299.1400,1

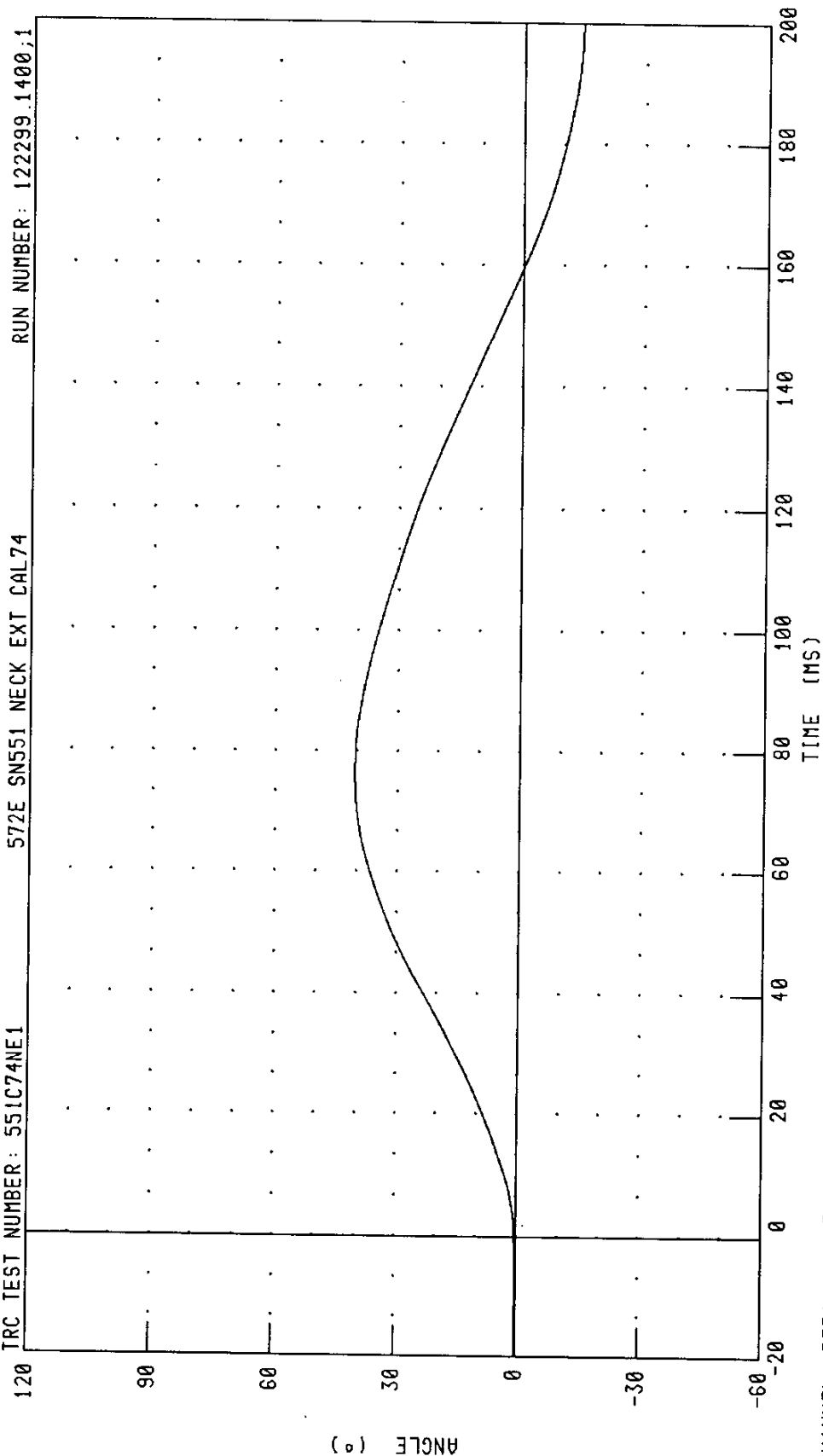


CHANNEL: PENXC FILTER: CH. CLASS 60 PEAK DATA: 18.23 G @ 8.80 MS, -2.10 G @ 49.20 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

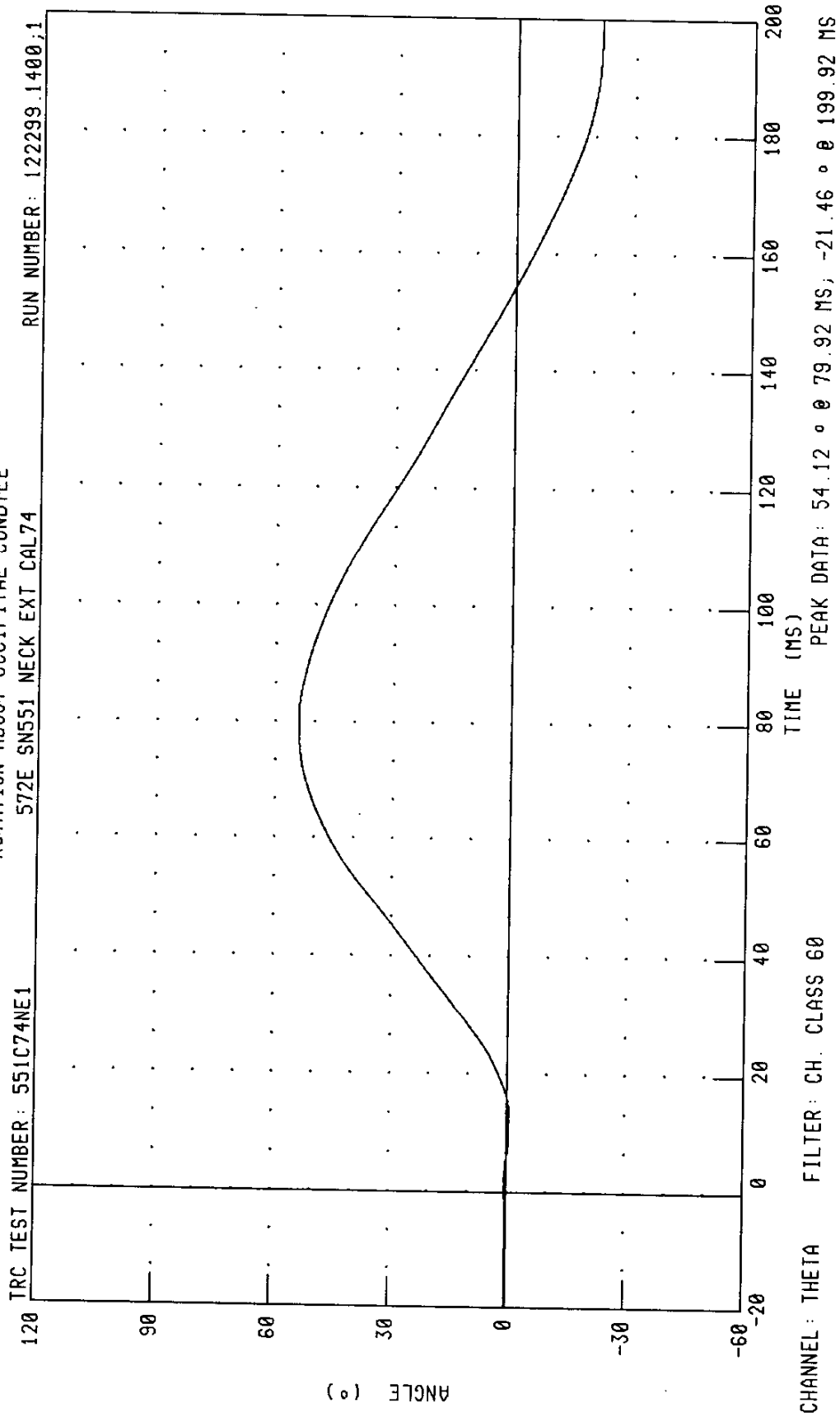
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 551C74NE1 572E SN551 NECK EXT CAL74 RUN NUMBER: 122299.1400,1



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 40.44 ° @ 76.32 MS, -14.47 ° @ 200.00 MS

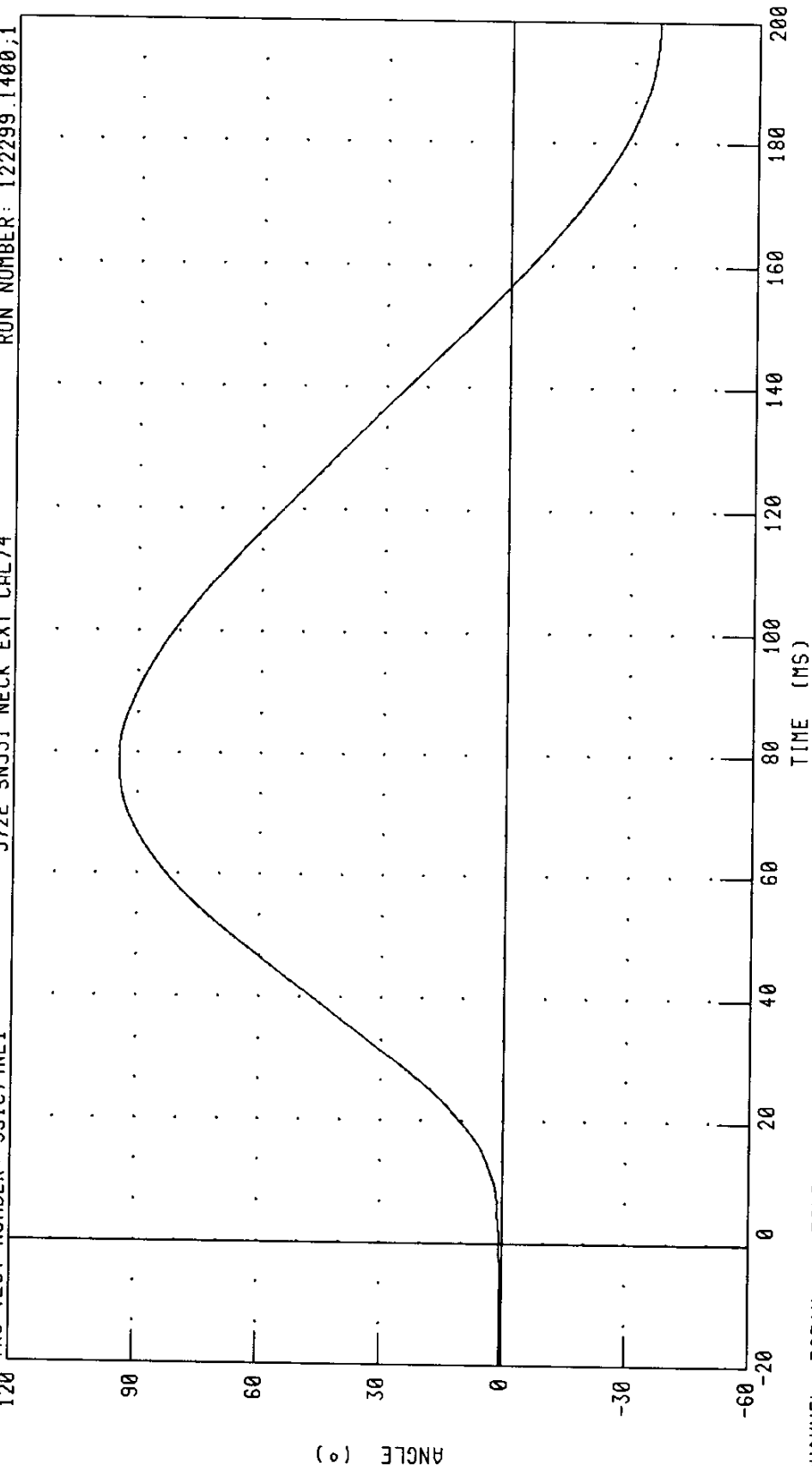
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 551C74NE1 572E SN551 NECK EXT CAL74 RUN NUMBER: 122299.1400;1

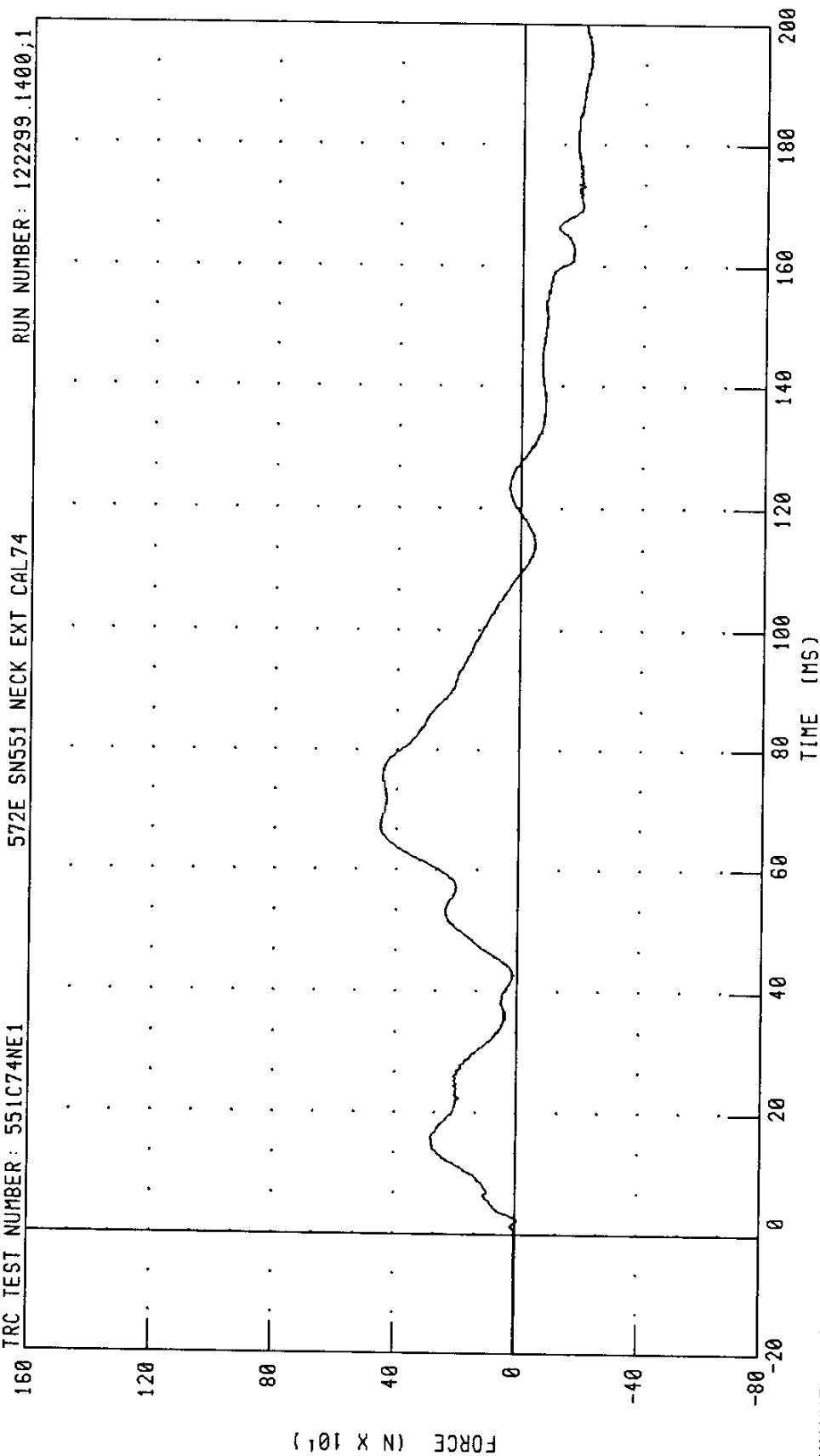


CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 94.52 ° @ 78.96 MS; -35.94 ° @ 200.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 551C74NE1 572E SN551 NECK EXT CAL74 RUN NUMBER: 122299.1400;1



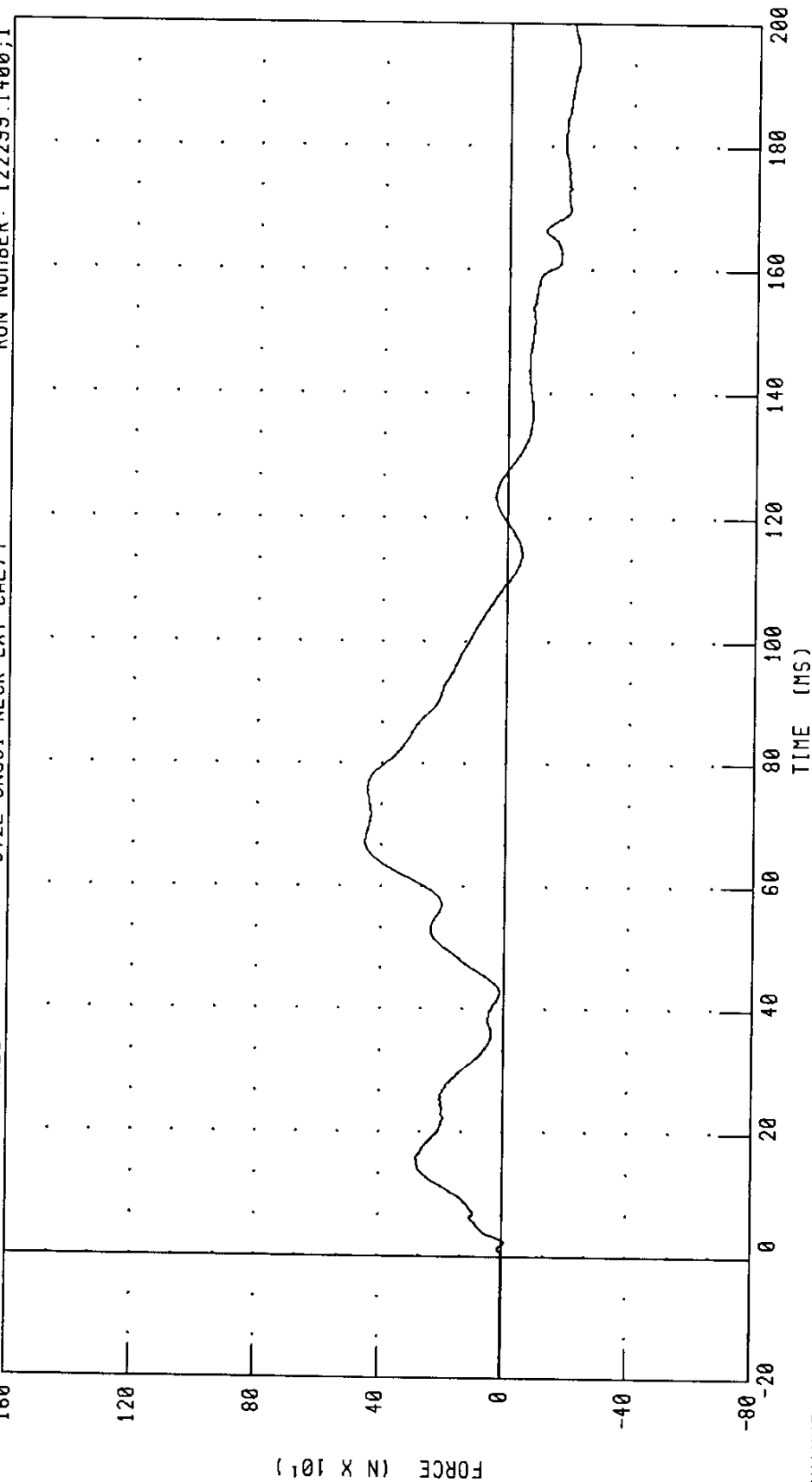
CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 452.14 N @ 66.64 MS; -224.13 N @ 194.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 551C74NE1 572E SN551 NECK EXT CAL74 RUN NUMBER: 122299.1400;1



CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 452.15 N @ 67.36 MS; -222.65 N @ 194.88 MS

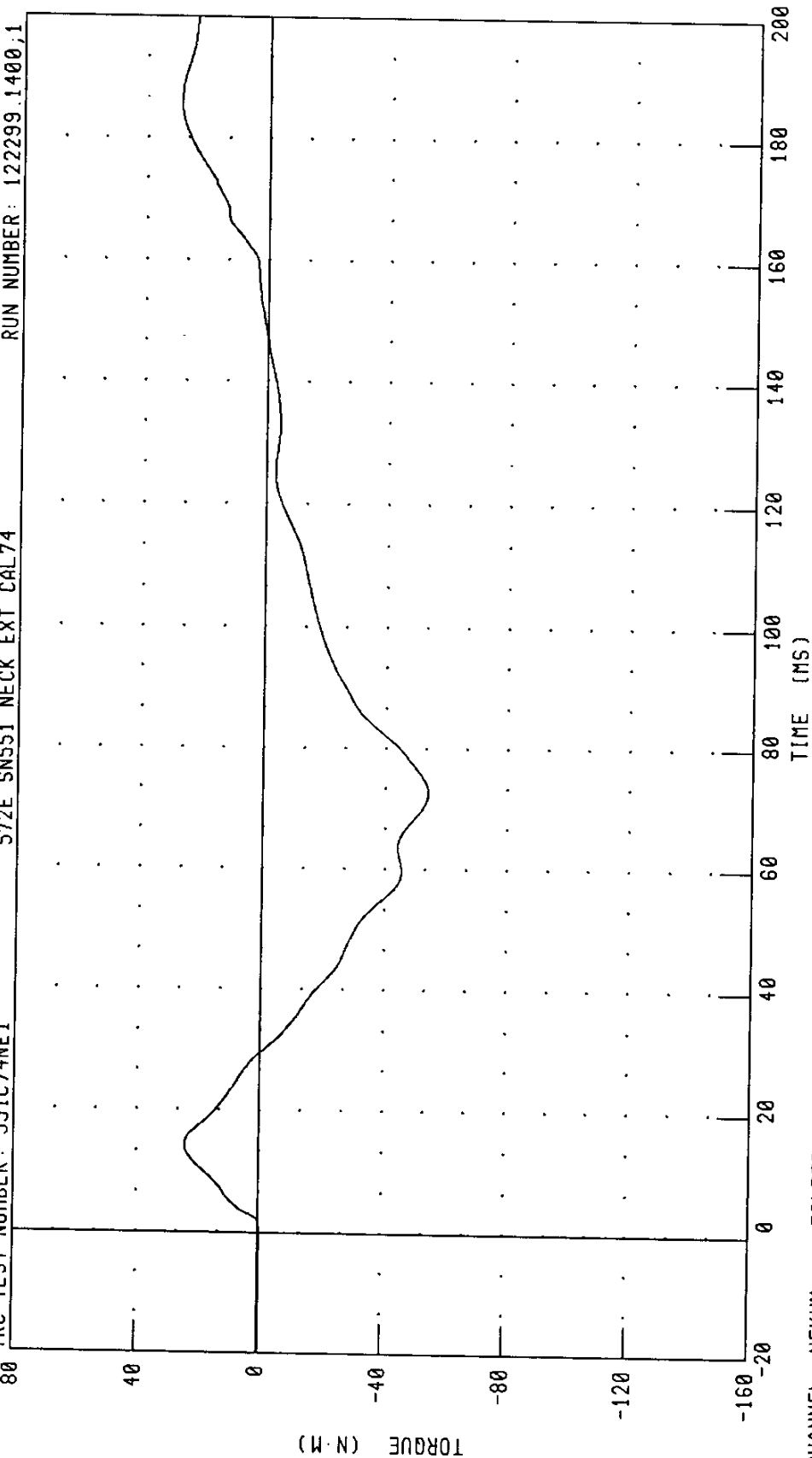
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 551C74NE1

572E SN551 NECK EXT CAL74

RUN NUMBER: 122299.1400,1

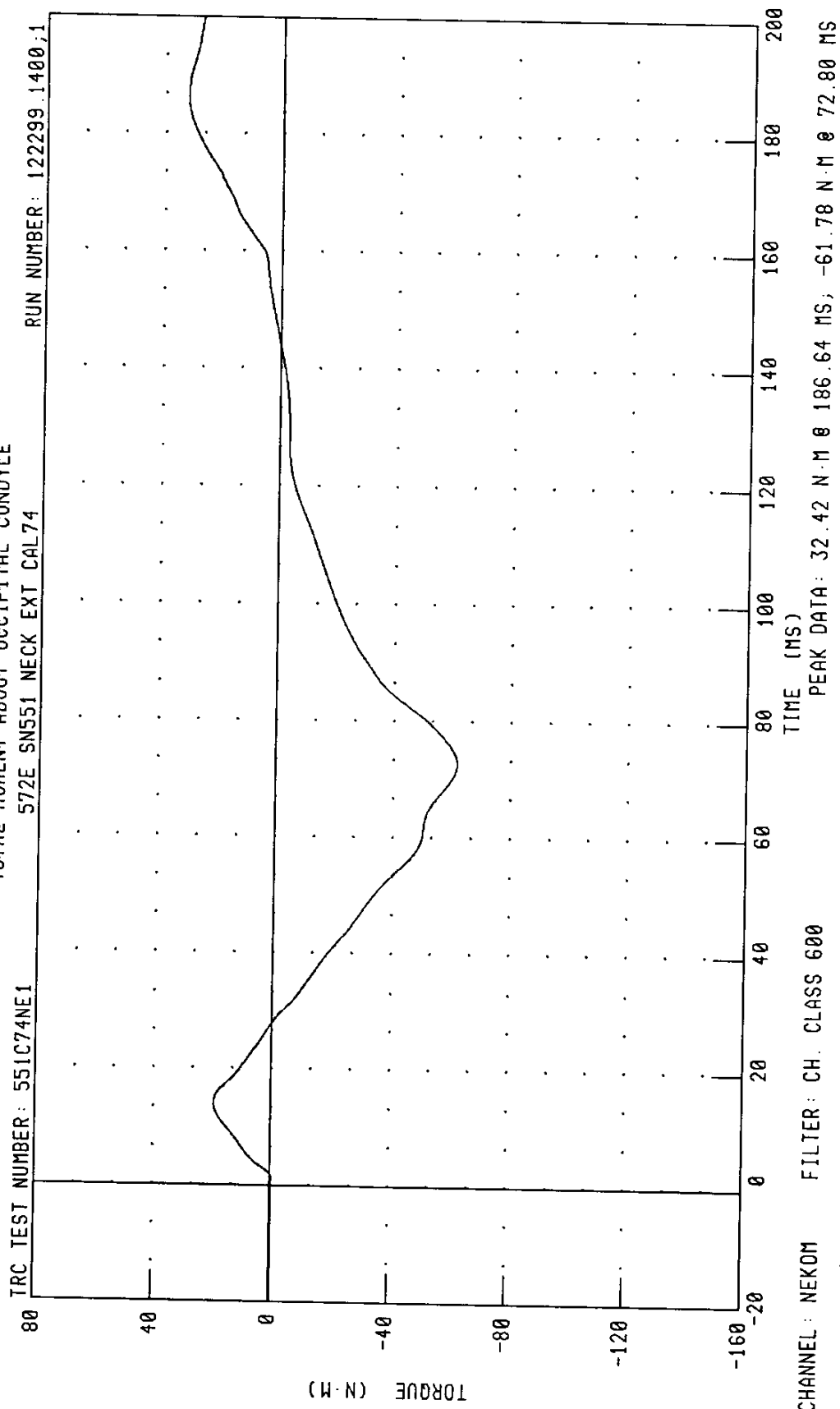


CHANNEL: NEKYM FILTER: CH. CLASS 600

TIME (MS)

PEAK DATA: 28.92 N.M @ 186.64 MS; -54.03 N.M @ 72.72 MS

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



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

23-DEC-99

TRC INC.

TEST NO: 551C74TH2

572E SN551 H.S.THORAX CAL74

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	70.1 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5887. N
INTERNAL HYSTERESIS	69% - 85%	70.5%

TEST MEETS SPECIFICATIONS

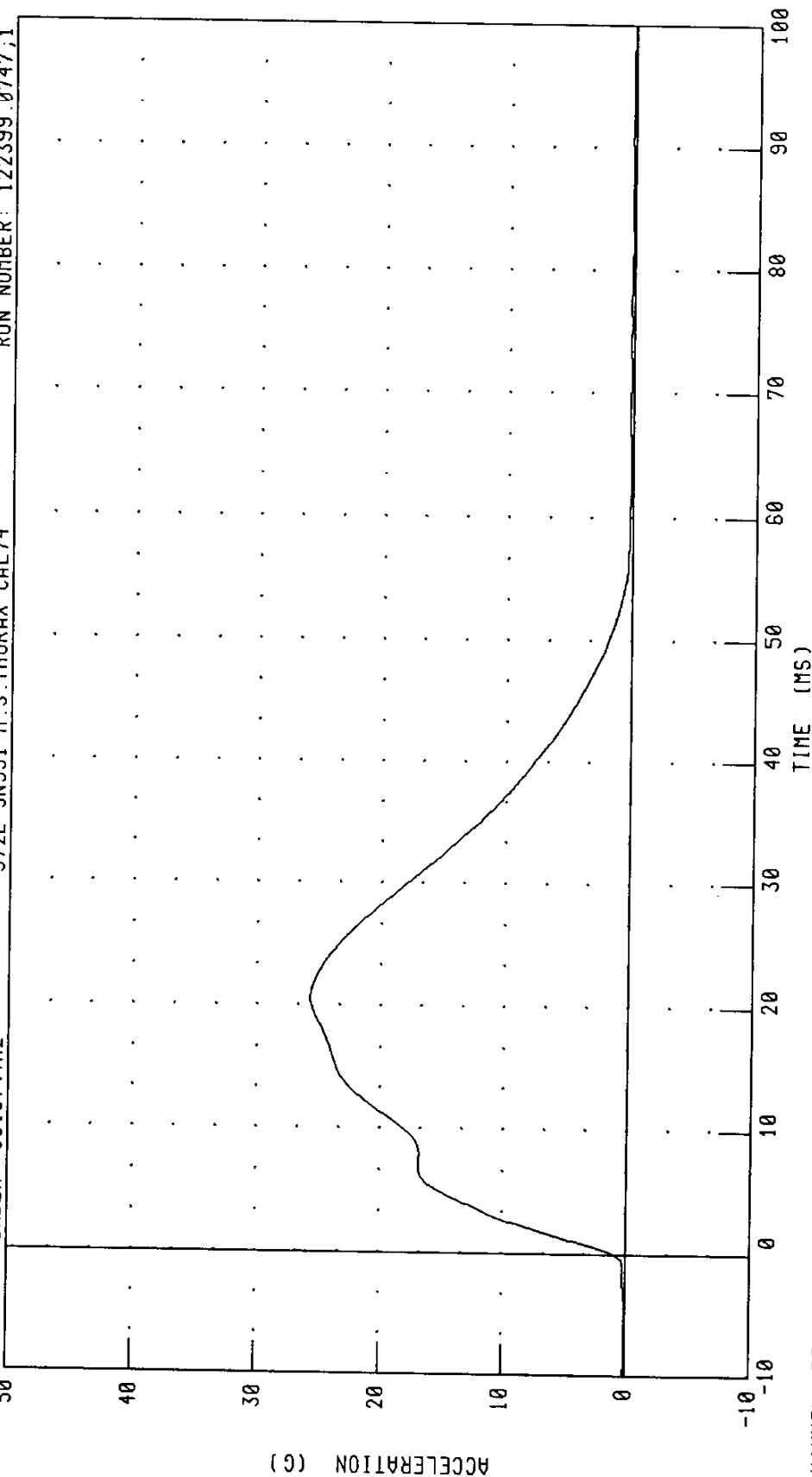
TECHNICIAN

Dustin Walborn

RUN NUMBER: 122399.0747;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 551C741H2 572E SN551 H.S. THORAX CAL74 RUN NUMBER: 122399 0747,1

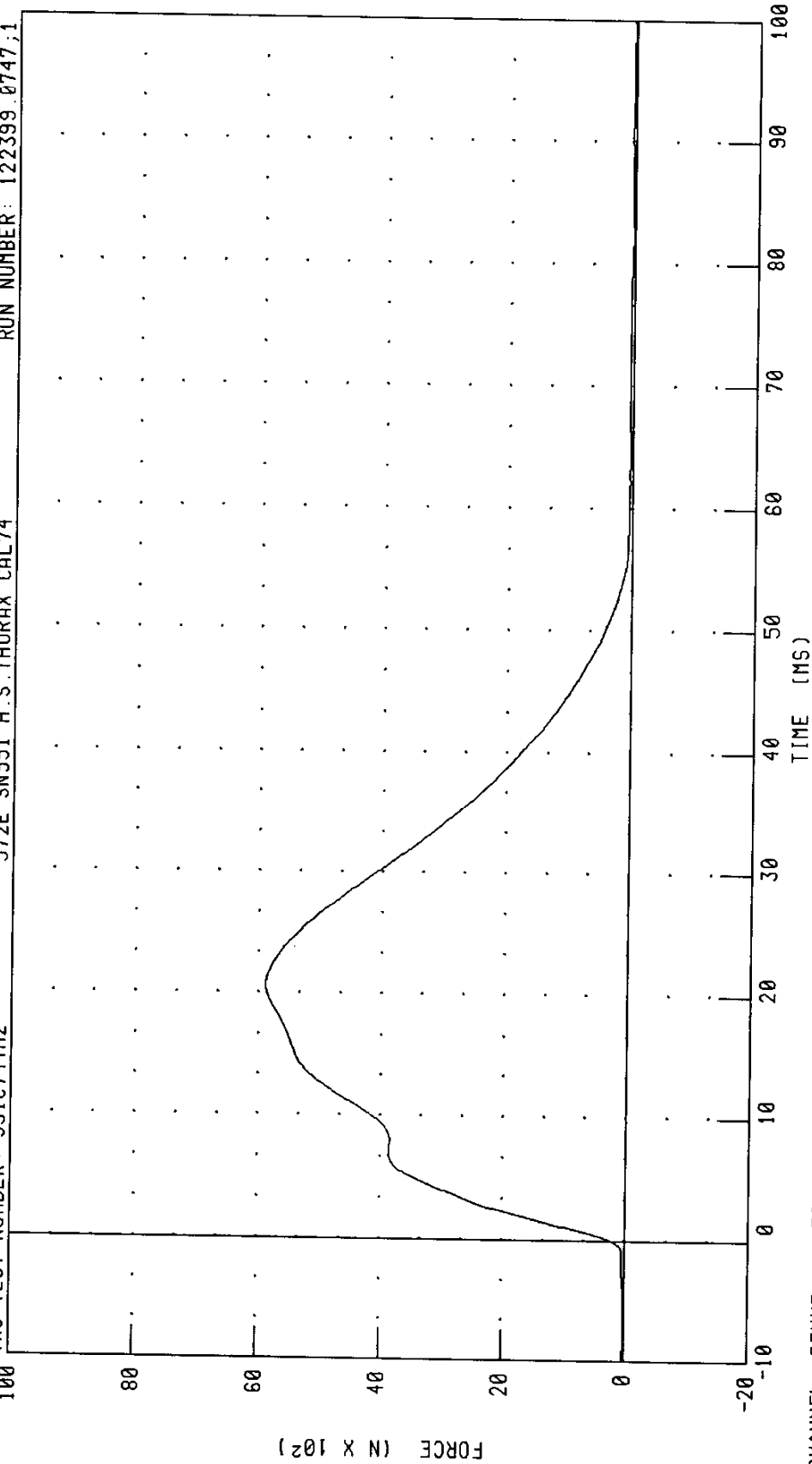


CHANNEL: PENXC FILTER: CH. CLASS 180 PEAK DATA: 25.70 G @ 20.64 MS, 0.04 G @ -7.84 MS

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 551C74TH2 572E SN551 H.S. THORAX CAL74 RUN NUMBER: 122399.0747;1

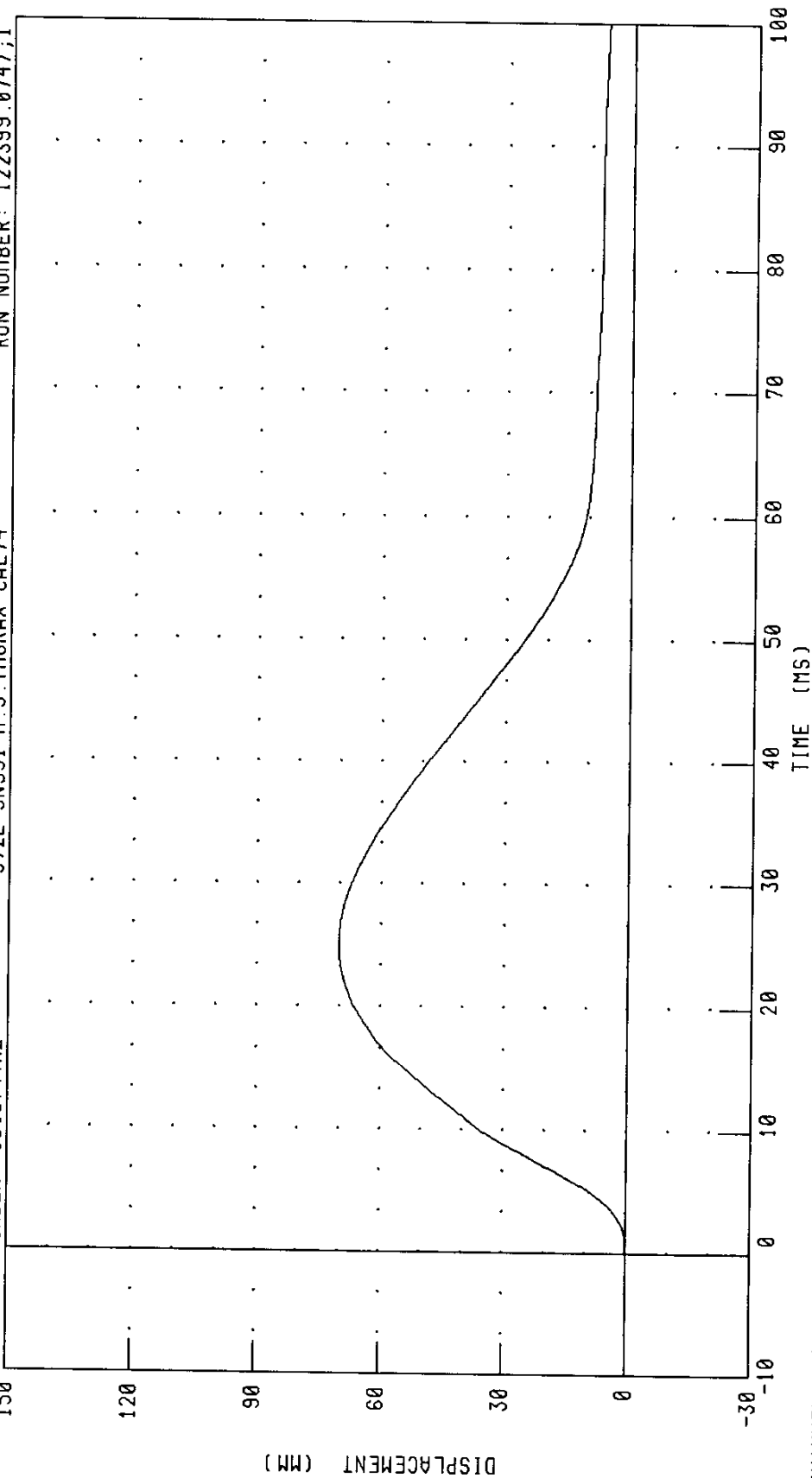


CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5887.12 N @ 20.64 MS; 10.29 N @ -7.84 MS

PART 572-E HYBRID III THORAX CALIBRATION

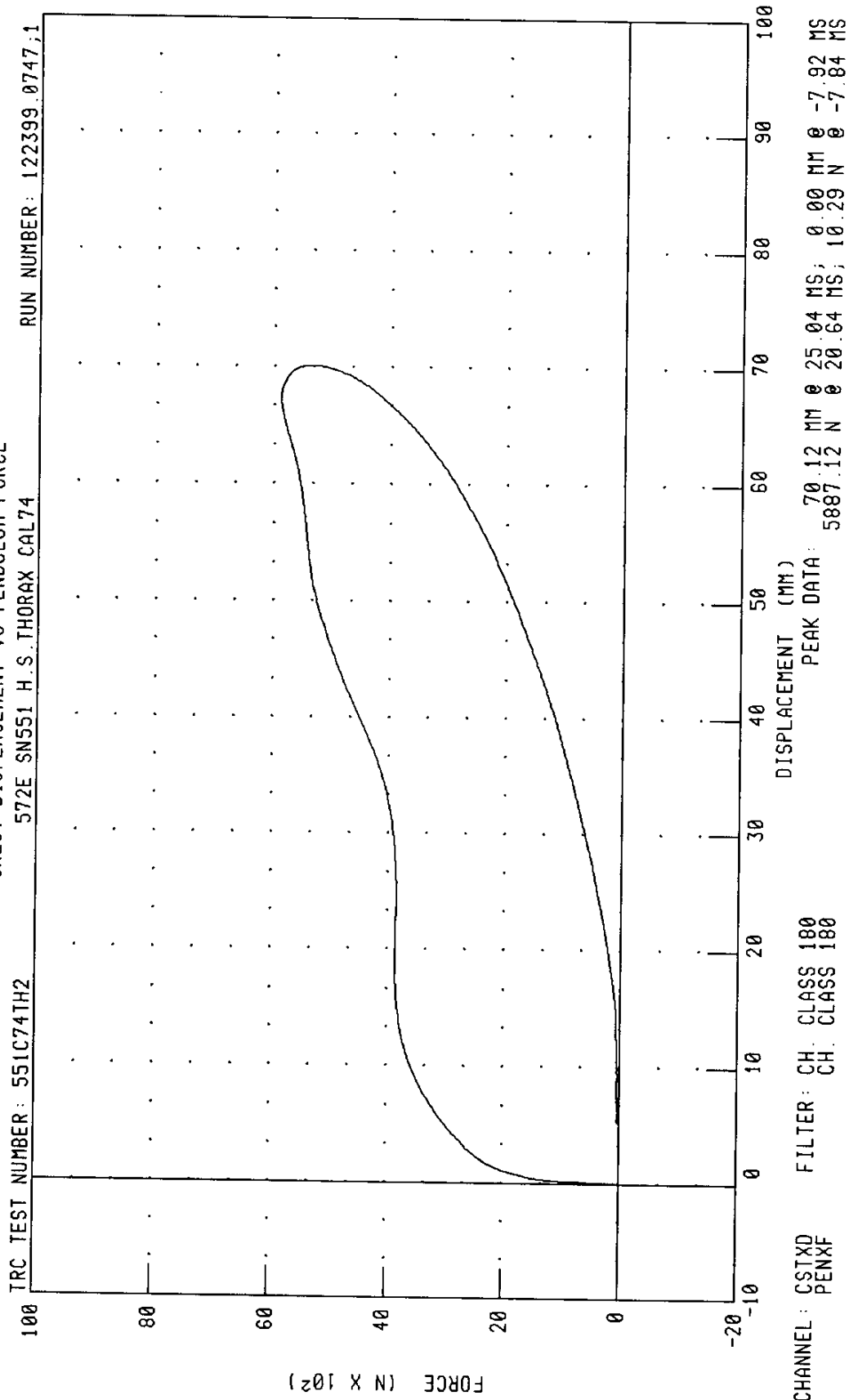
STERNUM DISPLACEMENT

TRC TEST NUMBER: 551C74TH2 572E SN551 H.S. THORAX CAL74 RUN NUMBER: 122399.0747;1



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 70.12 MM @ 25.04 MS; 0.00 MM @ -7.92 MS

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



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

22-DEC-99

TRC INC.

TEST NO: 551C74RK1

572E SN551 RIGHT KNEE CAL 74

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5536.5 N

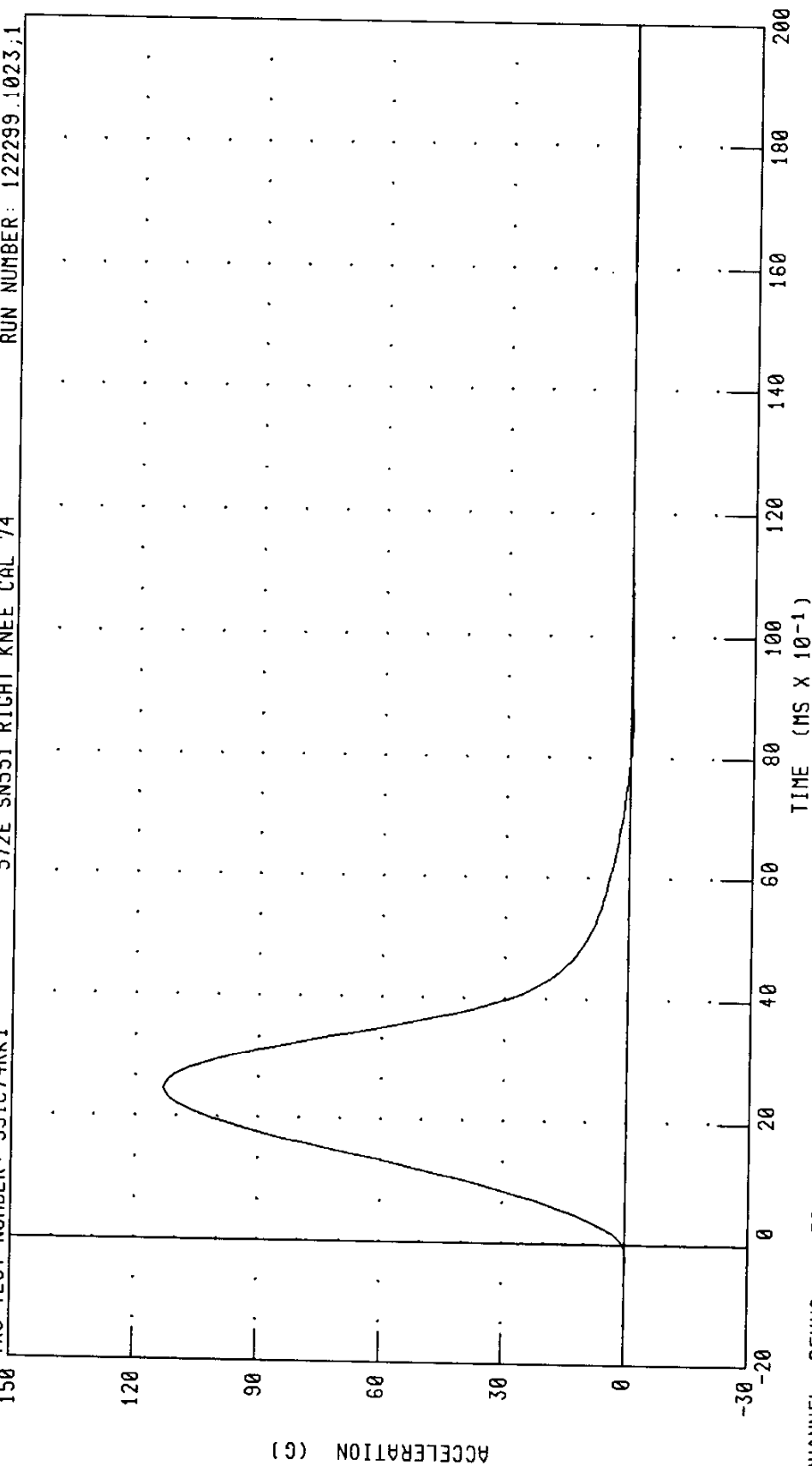
TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Wallom

RUN NUMBER: 122299.1023;1

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

TRC TEST NUMBER: 551C74RK1
572E SN551 RIGHT KNEE CAL 74
RUN NUMBER: 122299.1023,1

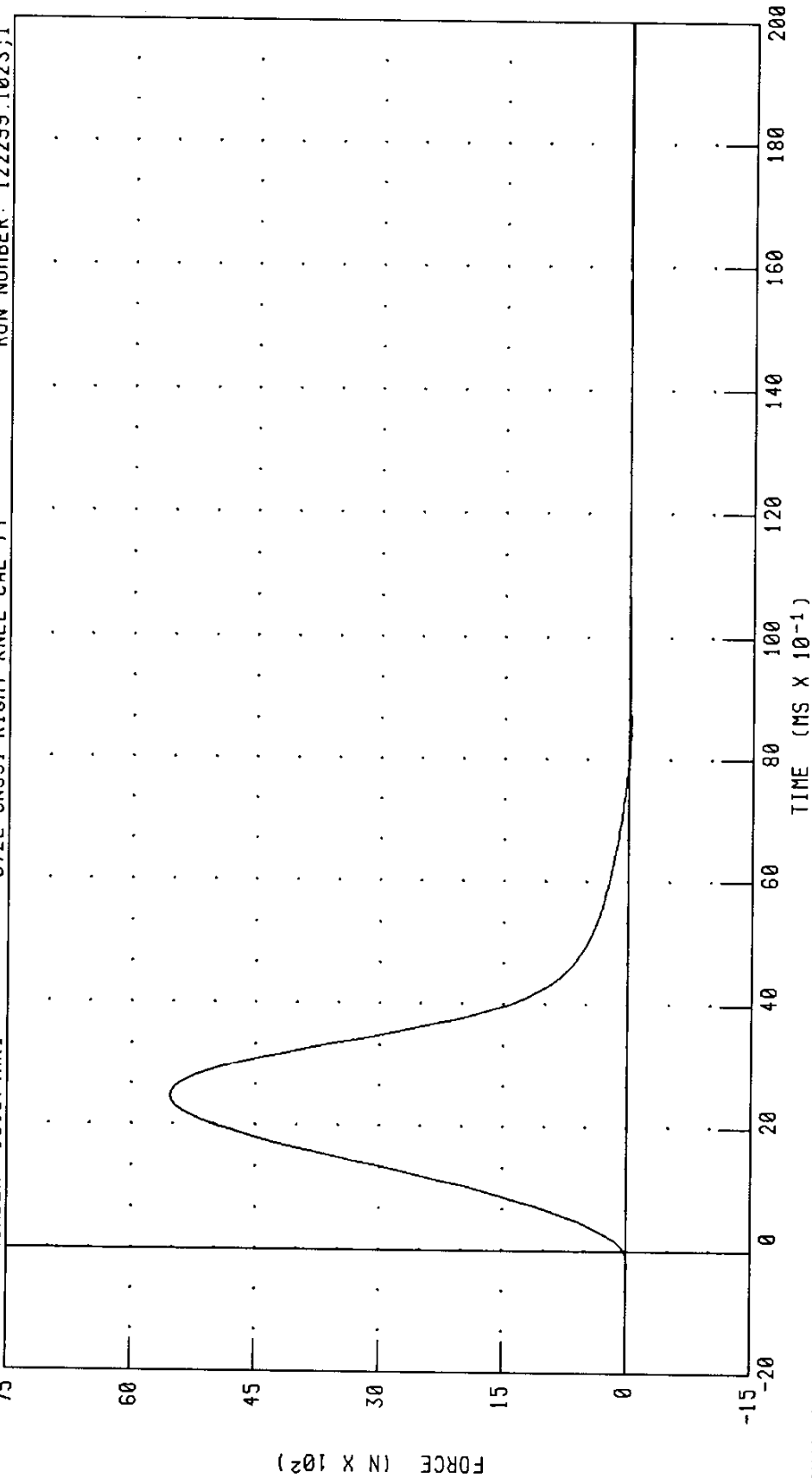


CHANNEL: PENXC FILTER: CH. CLASS 600
PEAK DATA: 113.16 G @ 2.48 MS; -0.51 G @ 8.56 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 551C74RK1 572E SN551 RIGHT KNEE CAL 74 RUN NUMBER: 122299.1023;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5536.56 N @ 2.48 MS; -24.88 N @ 8.56 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

22-DEC-99

TRC INC.

TEST NO: 551C74LK1

572E SN551 LEFT KNEE CAL 74

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5501.4 N

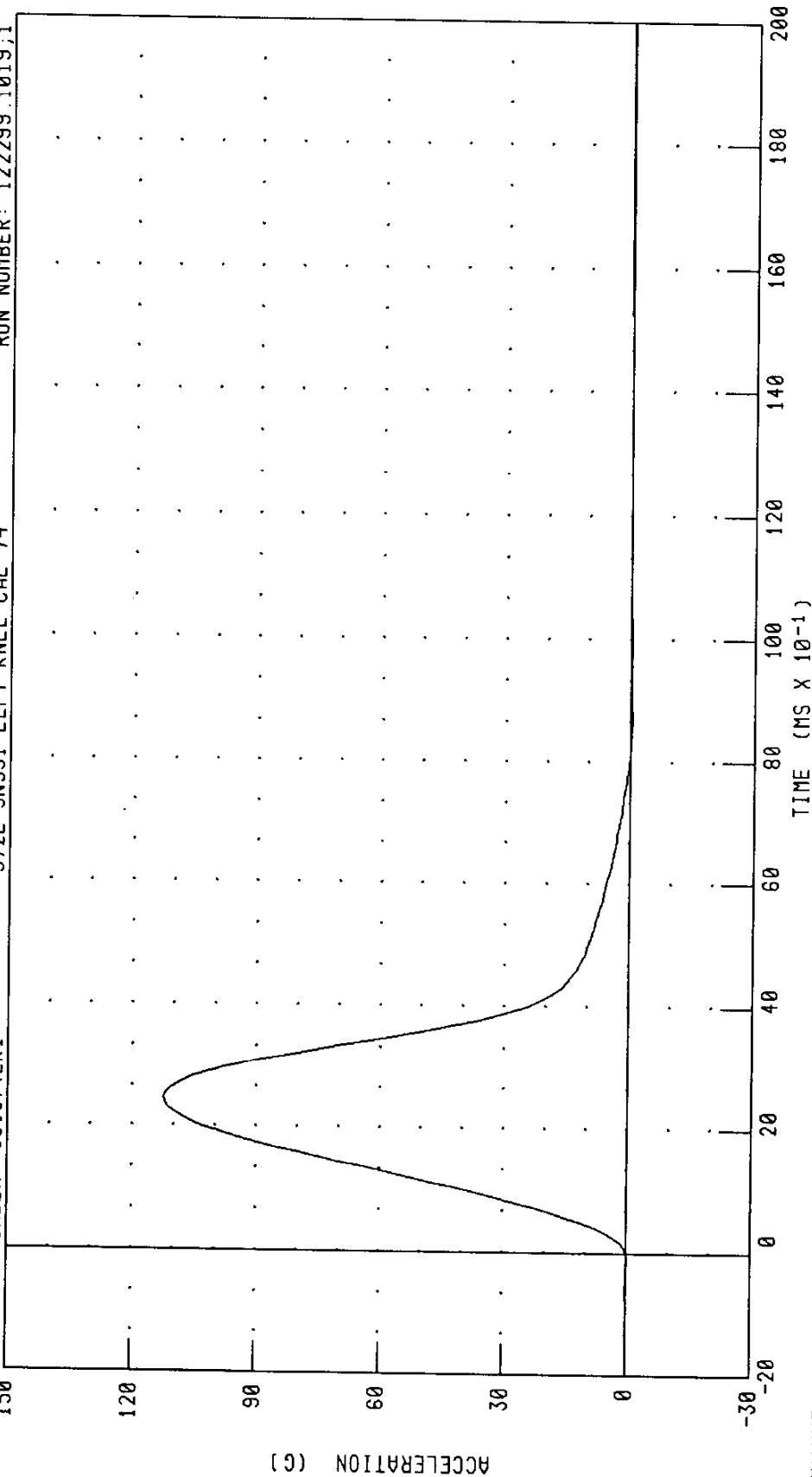
TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Walborn

RUN NUMBER: 122299.1019;1

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

TRC TEST NUMBER: 551C74LK1 572E SN551 LEFT KNEE CAL 74 RUN NUMBER: 122299.1019,1



CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 112.44 G @ 2.48 MS, -0.49 G @ 8.72 MS

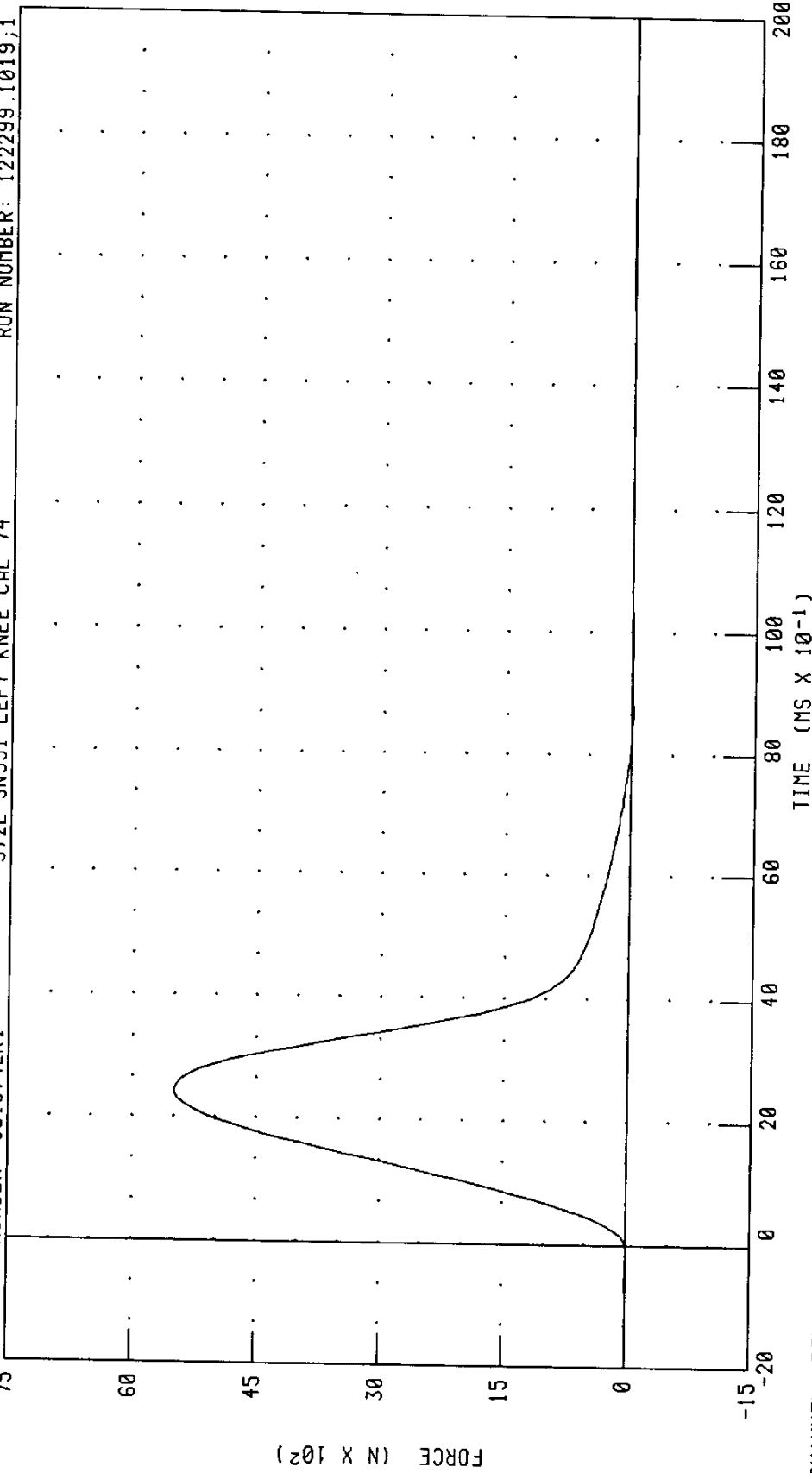
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 551C74LK1

572E SN551 LEFT KNEE CAL 74

RUN NUMBER: 122299.1019;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5501.44 N @ 2.48 MS, -23.74 N @ 8.72 MS

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

SN591 FST

22-DEC-99

TRC INC.

TEST NO: 591C69ED

572E SN591 EXT. DIMENSION

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	978. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	848. MM
CHEST DEPTH (O)		213 - 229 MM	216. MM
H-POINT HEIGHT (C)		84 - 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	886. 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	457. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	447. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	495. MM
FOOT LENGTH (P)		252 - 267 MM	264. MM
FOOT BREADTH (W)		91 - 107 MM	94. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	94. MM
SHOULDER BREADTH (V)		422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	511. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	198. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	297. MM

572E SN591 EXT. DIMENSION
DUMMY MEETS SPECIFICATIONS
TECHNICIAN 

RUN NUMBER: 010300.0902

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

22-DEC-99

TRC INC.

TEST NO: 591C69HD1

572E SN591 HEAD DROP CAL 69

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	254.17 G
PEAK LATERAL ACCELERATION	15 G MAX	2.62 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walker

RUN NUMBER: 122299.1026;1

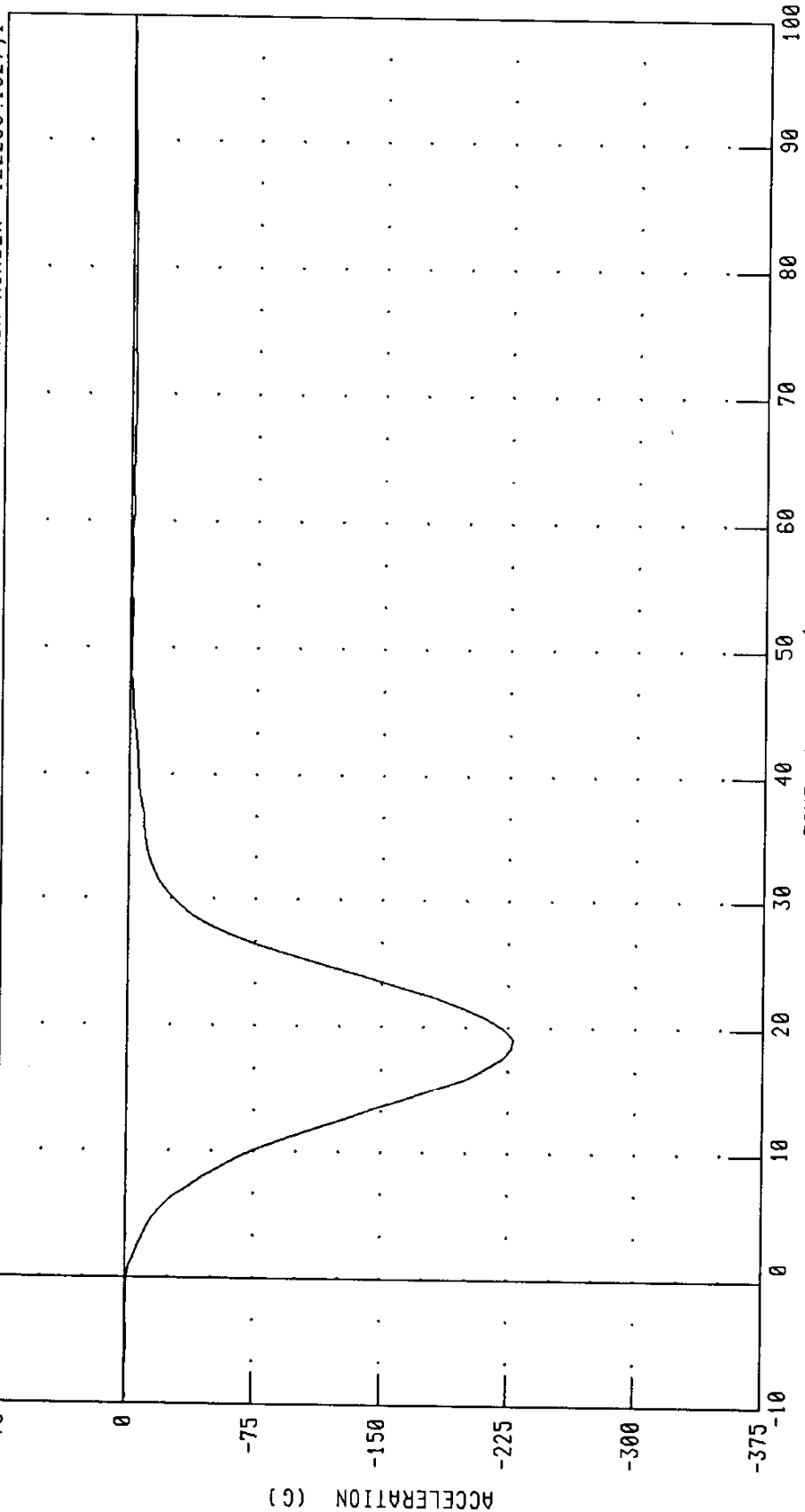
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 591C69HD1

572E SN591 HEAD DROP CAL 69

RUN NUMBER: 122299.1027;1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

TIME (MS X 10⁻¹)

PEAK DATA: 0.08 G @ 10.00 MS, -227.52 G @ 1.92 MS

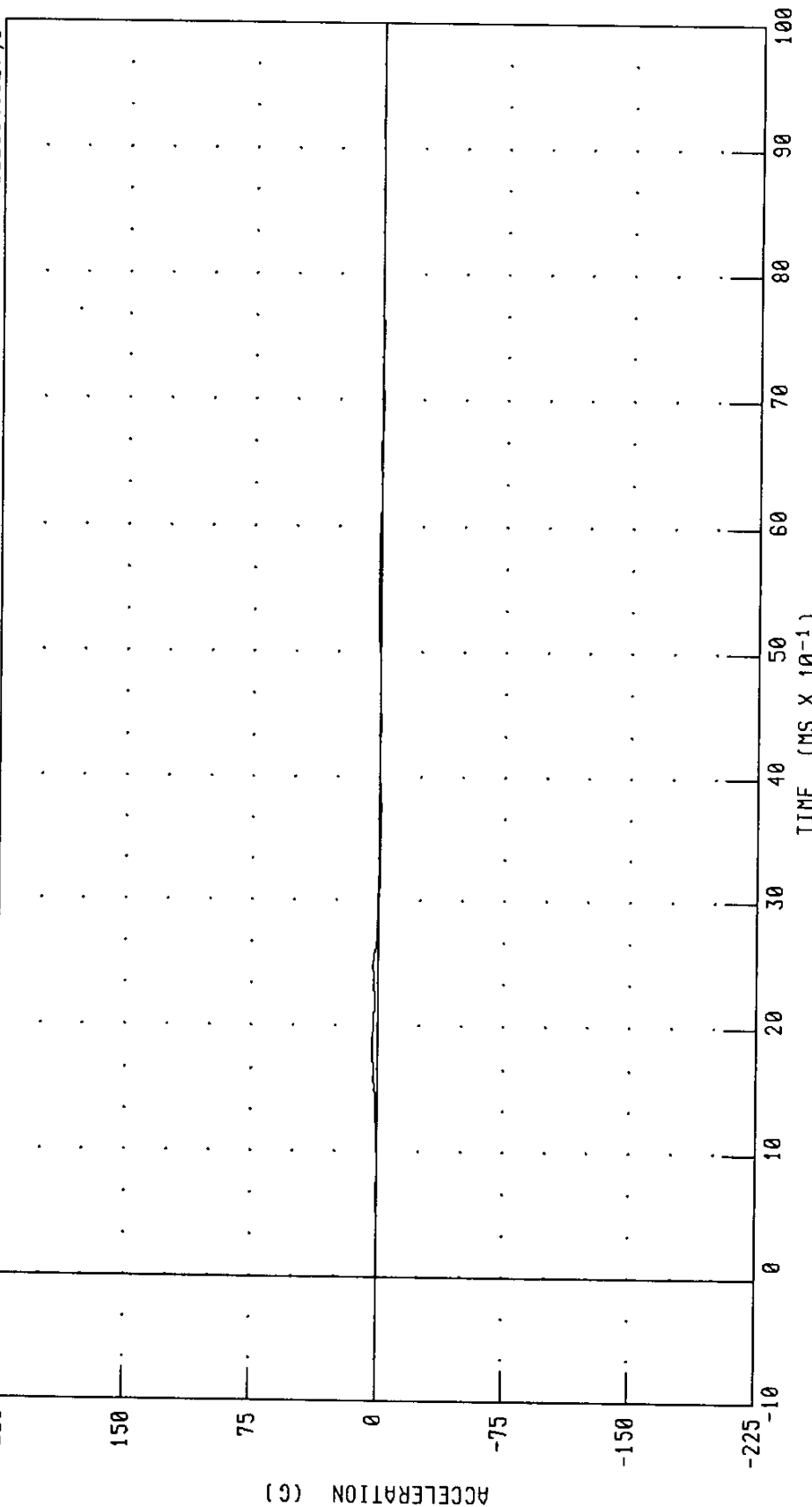
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 591C69HD1

572E SN591 HEAD DROP CAL 69

RUN NUMBER: 122299.1027,1



CHANNEL: HEDYC FILTER: CH. CLASS 1000

PEAK DATA: 2.62 G @ 1.76 MS, -1.41 G @ 3.76 MS

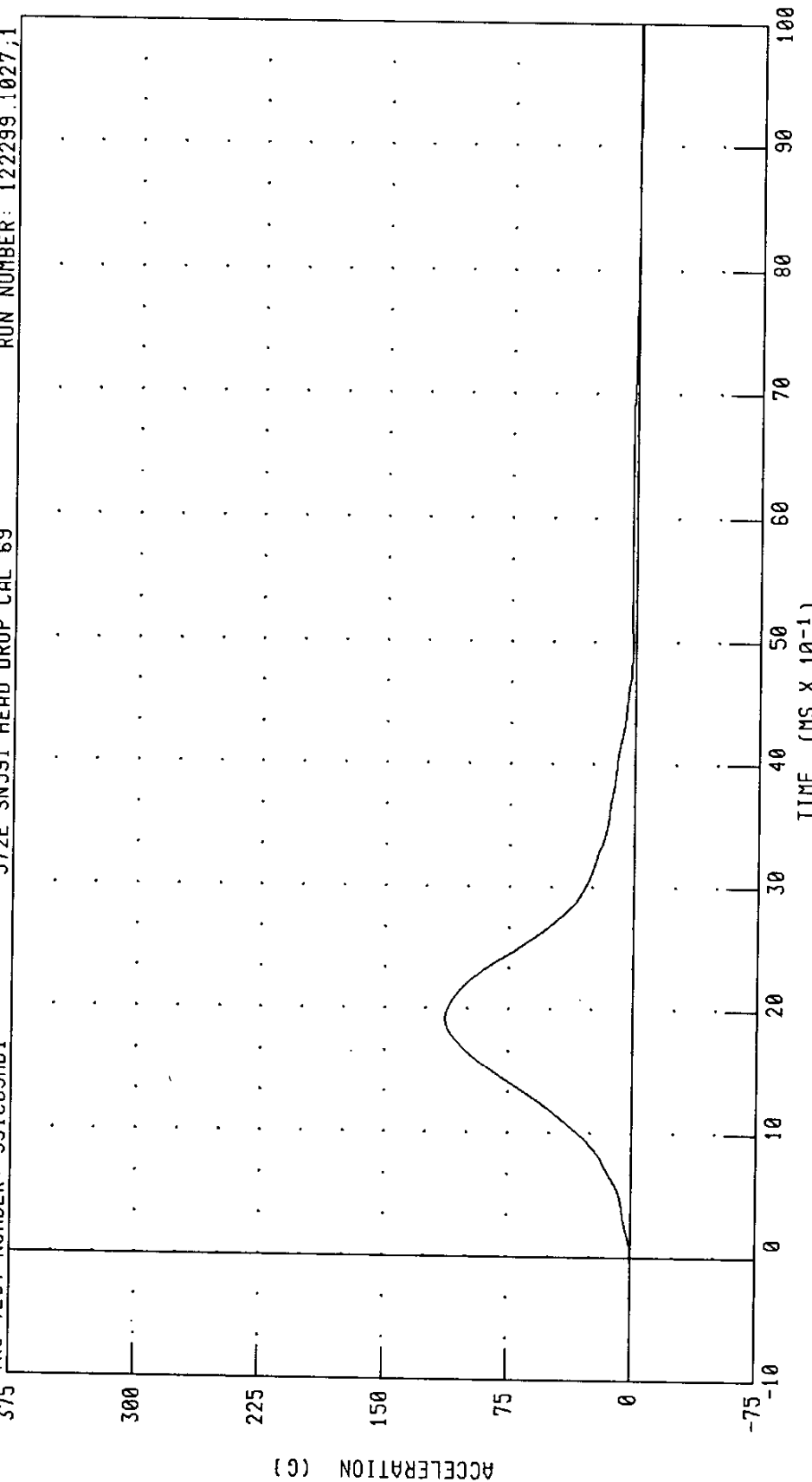
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 591C69HD1

572E SN591 HEAD DROP CAL 69

RUN NUMBER: 122299.1027;1



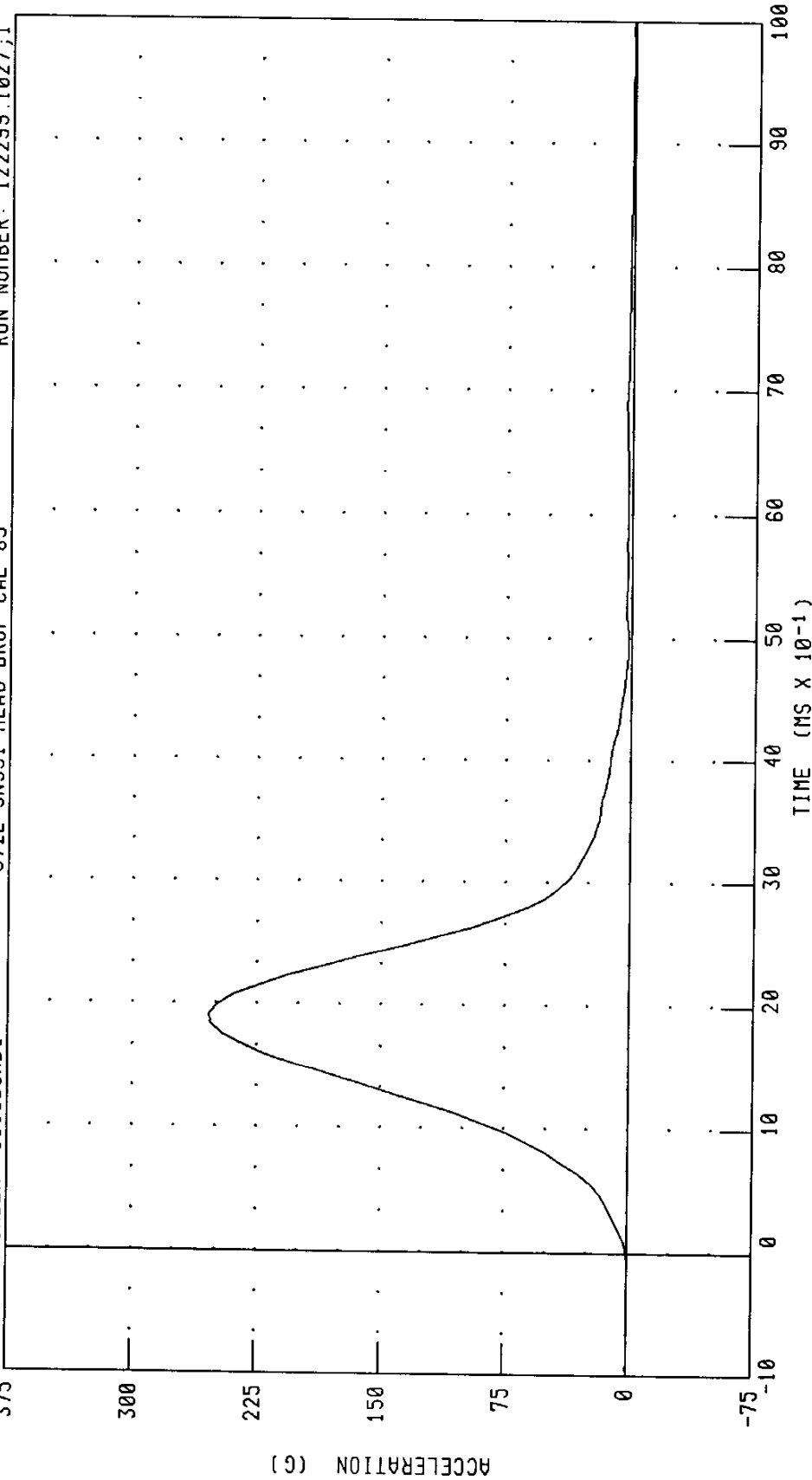
CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: 113.28 G @ 1.92 MS, -0.84 G @ 9.92 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
572E SN591 HEAD DROP CAL 69

TRC TEST NUMBER: 591C69HD1

RUN NUMBER: 122299.1027,1

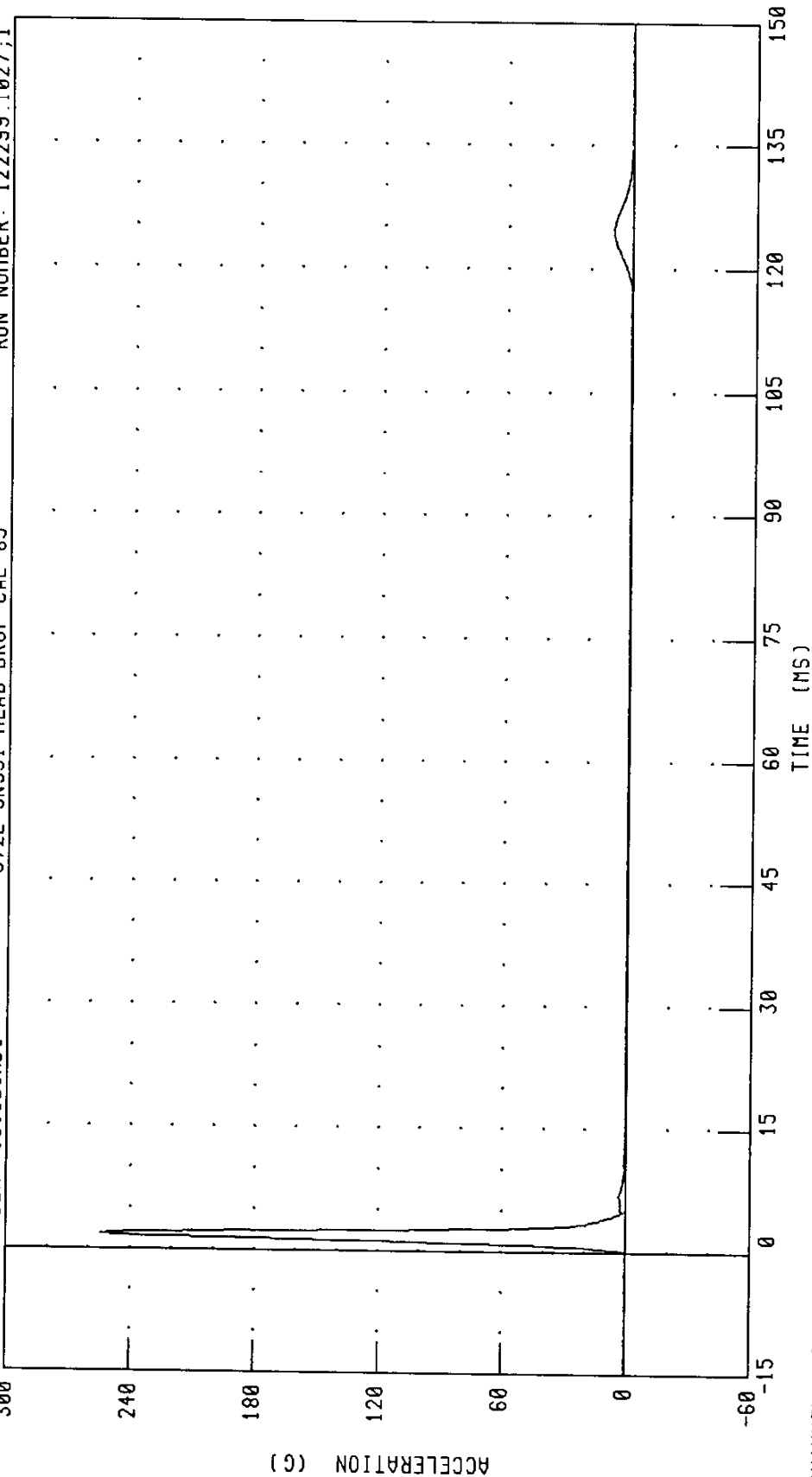


CHANNEL: HEDRC FILTER: CH. CLASS 1000

PEAK DATA: 254.18 G @ 1.92 MS, 0.09 G @ -0.88 MS

PART 572-E HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 591C69HD1 572E SN591 HEAD DROP CAL 69 RUN NUMBER: 122299.1027,1



CHANNEL: HEDRC FILTER: CH. CLASS 1000

PEAK DATA: 254.18 G @ 1.92 MS; 0.09 G @ -14.96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 591C69NF2 572E SN591 NECK FLEXION CAL69

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.34 G
	20 MS	17.60 - 22.60 G	20.29 G
	30 MS	12.50 - 18.50 G	14.83 G
MAX PENDULUM G		29 G MAX	25.38 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	14.76 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	39.44 MS
D PLANE	MAX	64 - 78 DEG.	71.33 DEG.
ROTATION	TIME	57 - 64 MS	61.20 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	92.07 NM
	TIME	47 - 58 MS	52.96 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.44 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

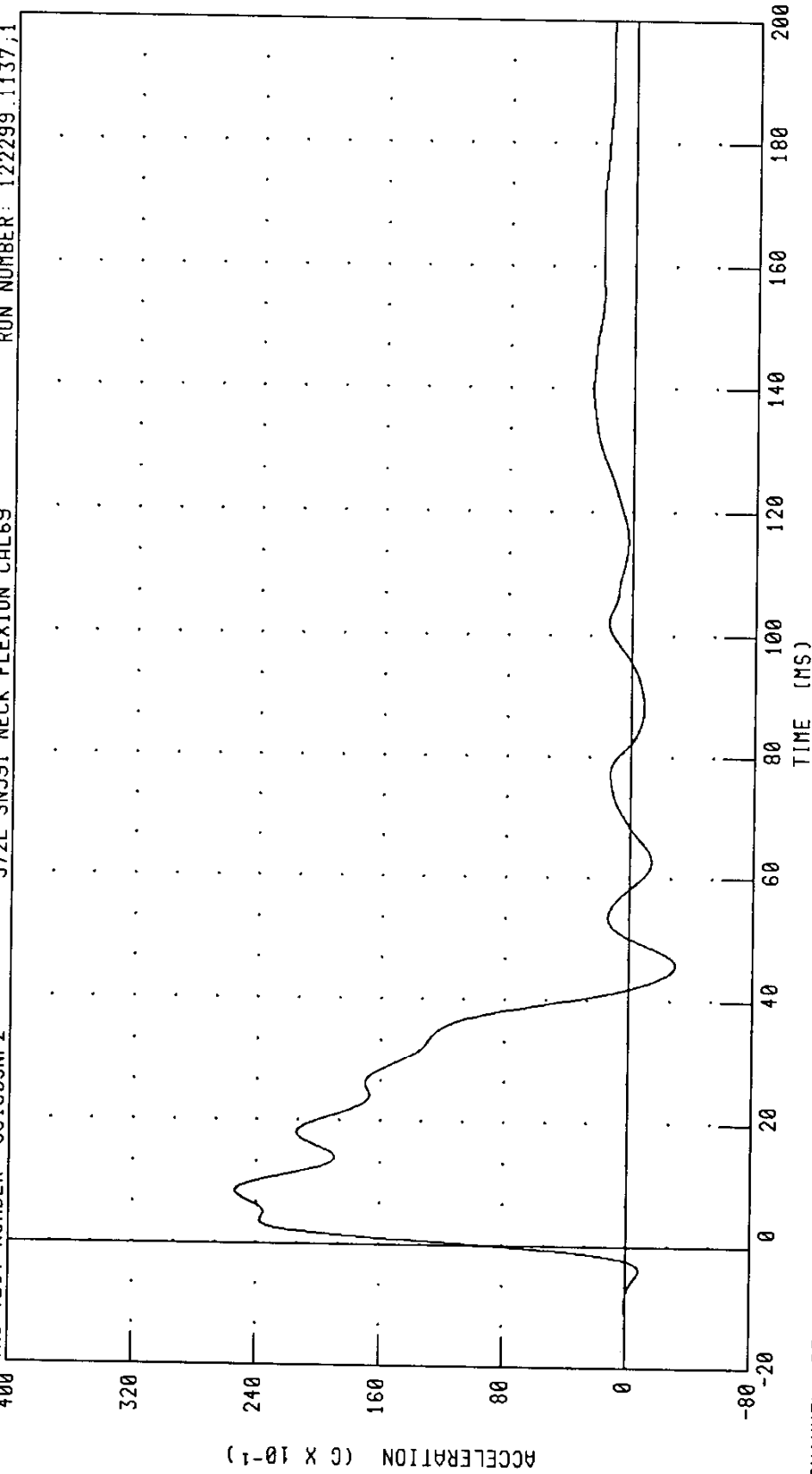
Dustin Walker

RUN NUMBER: 122299.1136;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 591C69NF2 572E SN591 NECK FLEXION CAL69 RUN NUMBER: 122299.1137.1



CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 25.38 G @ 8.48 MS, -3.01 G @ 45.92 MS

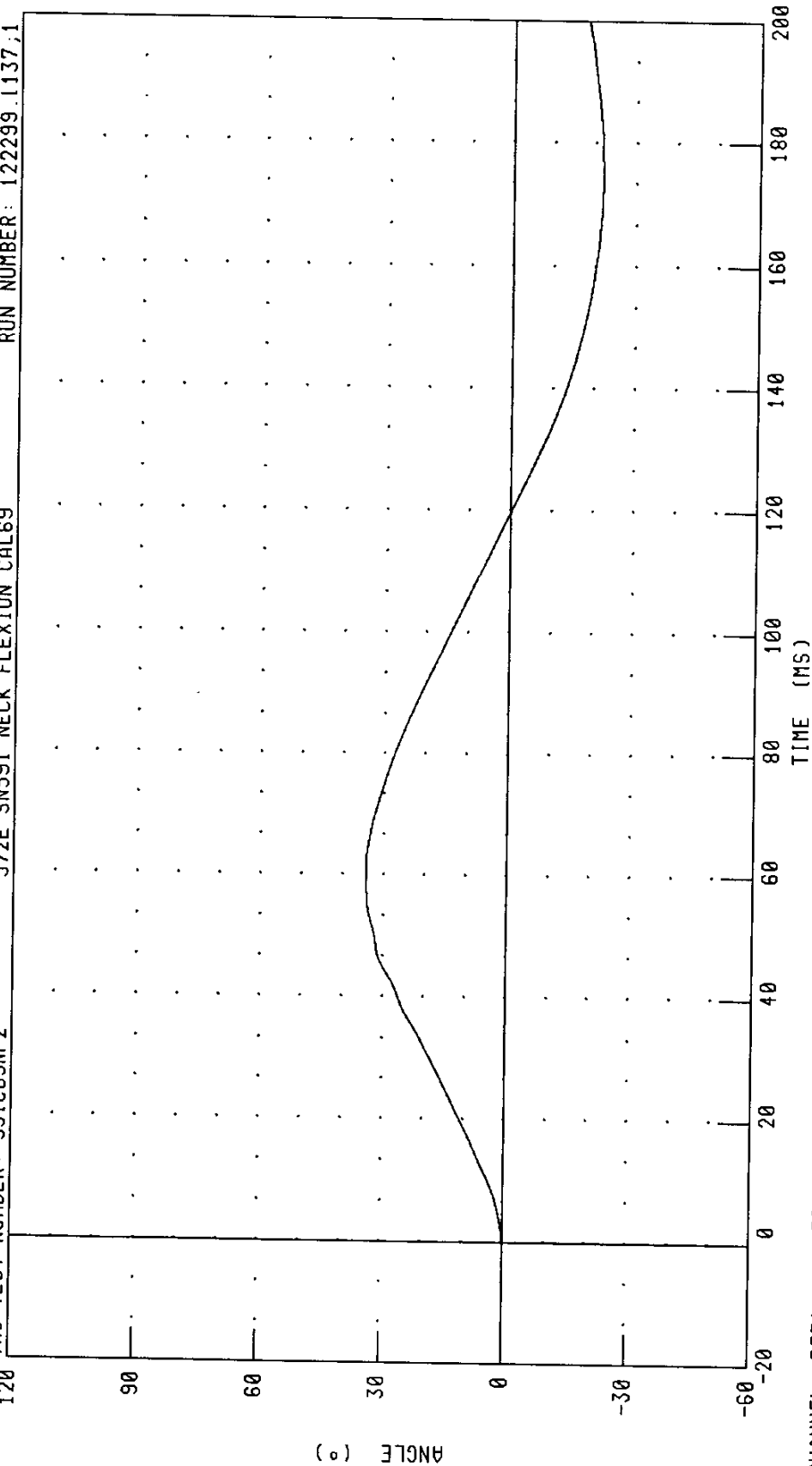
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 591C69NF2

572E SN591 NECK FLEXION CAL69

RUN NUMBER: 122299.1137,1

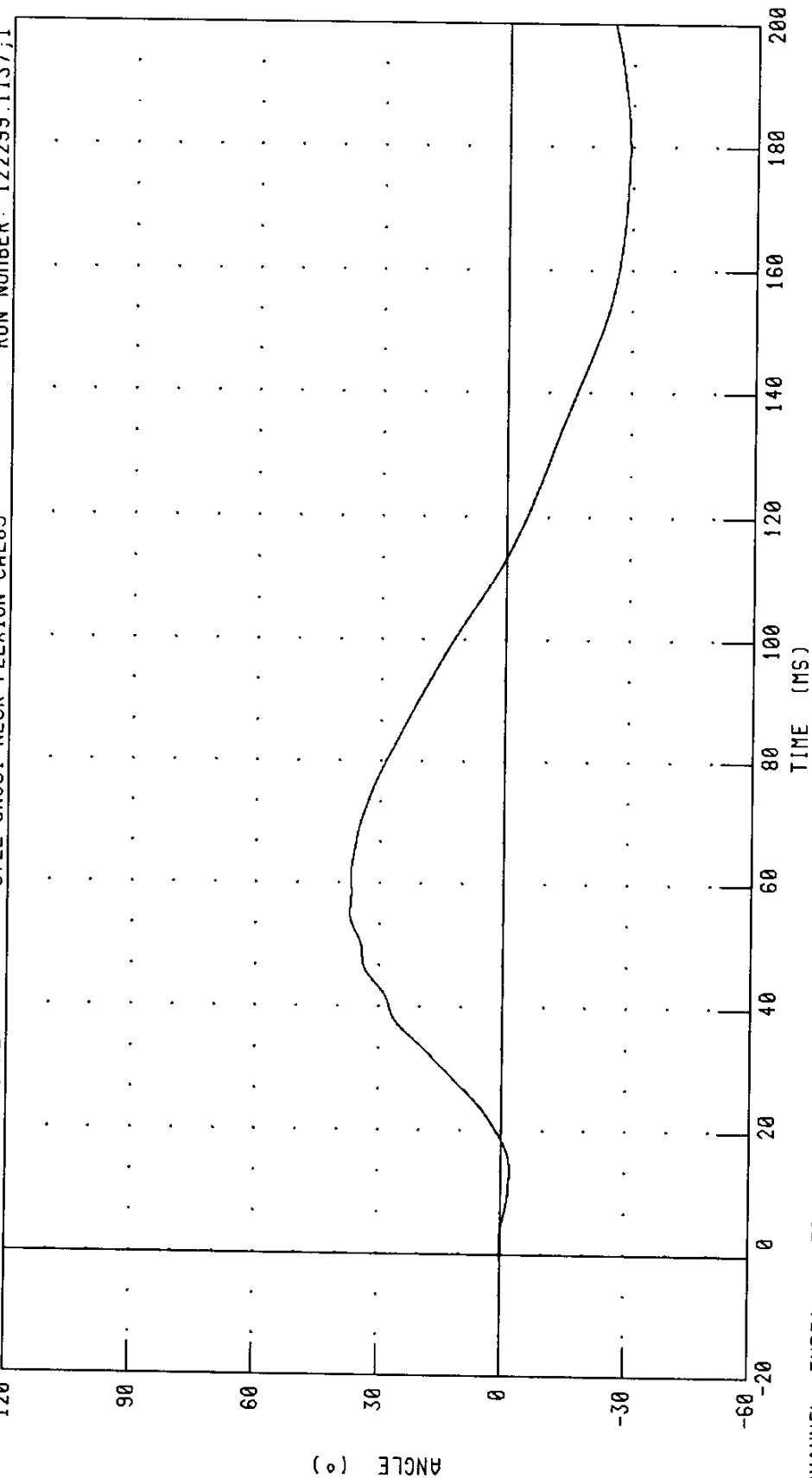


CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 34.33 ° @ 61.12 MS; -21.82 ° @ 174.40 MS

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

TRC TEST NUMBER: 591C69NF2 572E SN591 NECK FLEXION CAL69 RUN NUMBER: 122299.1137,1

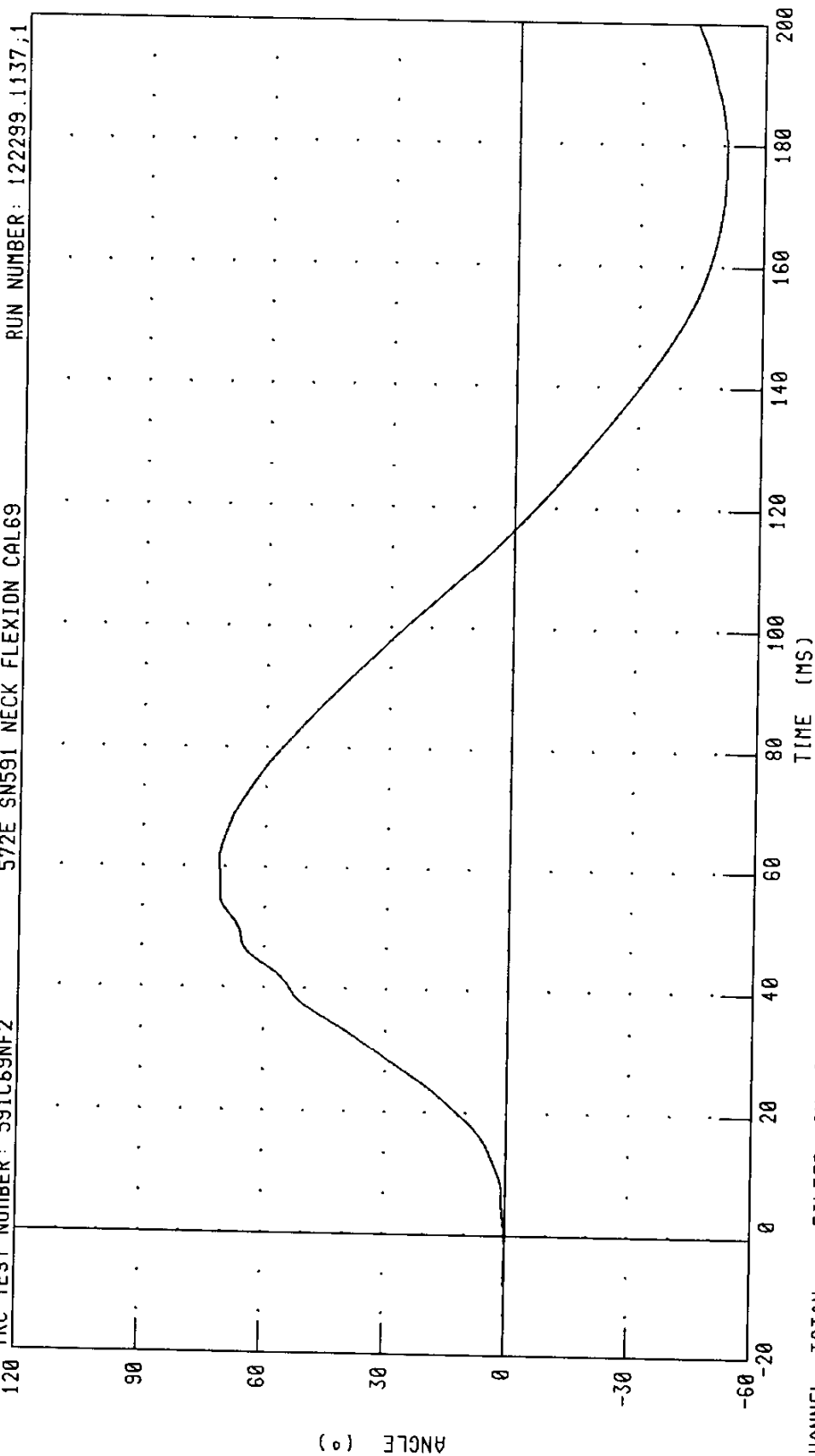


CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 37.18 ° @ 55.28 MS; -29.17 ° @ 179.68 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 591C69NF2 572E SN591 NECK FLEXION CAL69 RUN NUMBER: 122299.1137,1

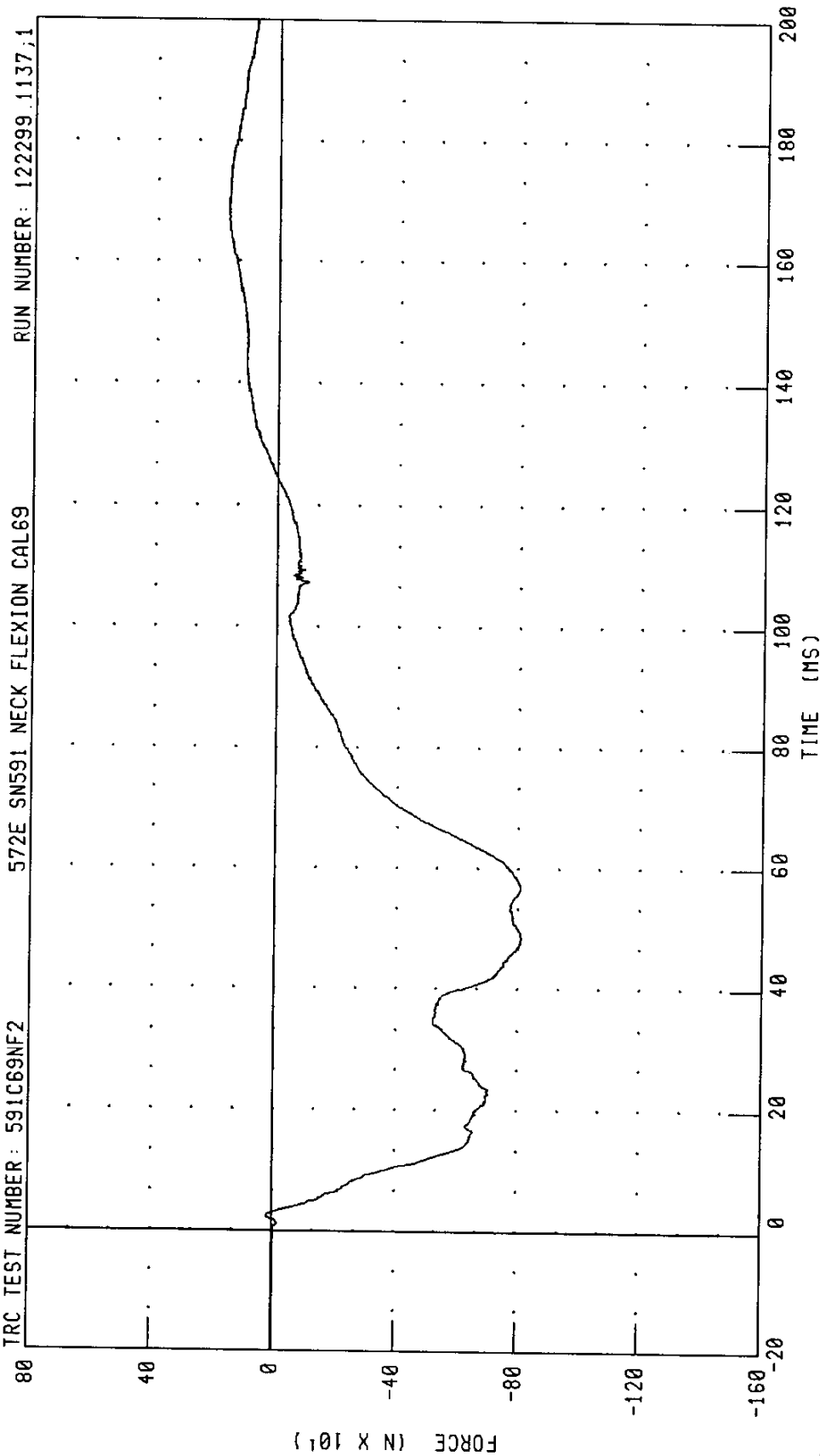


CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 71.33 ° @ 61.20 MS, -50.92 ° @ 178.16 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 591C69NF2 572E SN591 NECK FLEXION CAL69 RUN NUMBER: 122299.1137,1



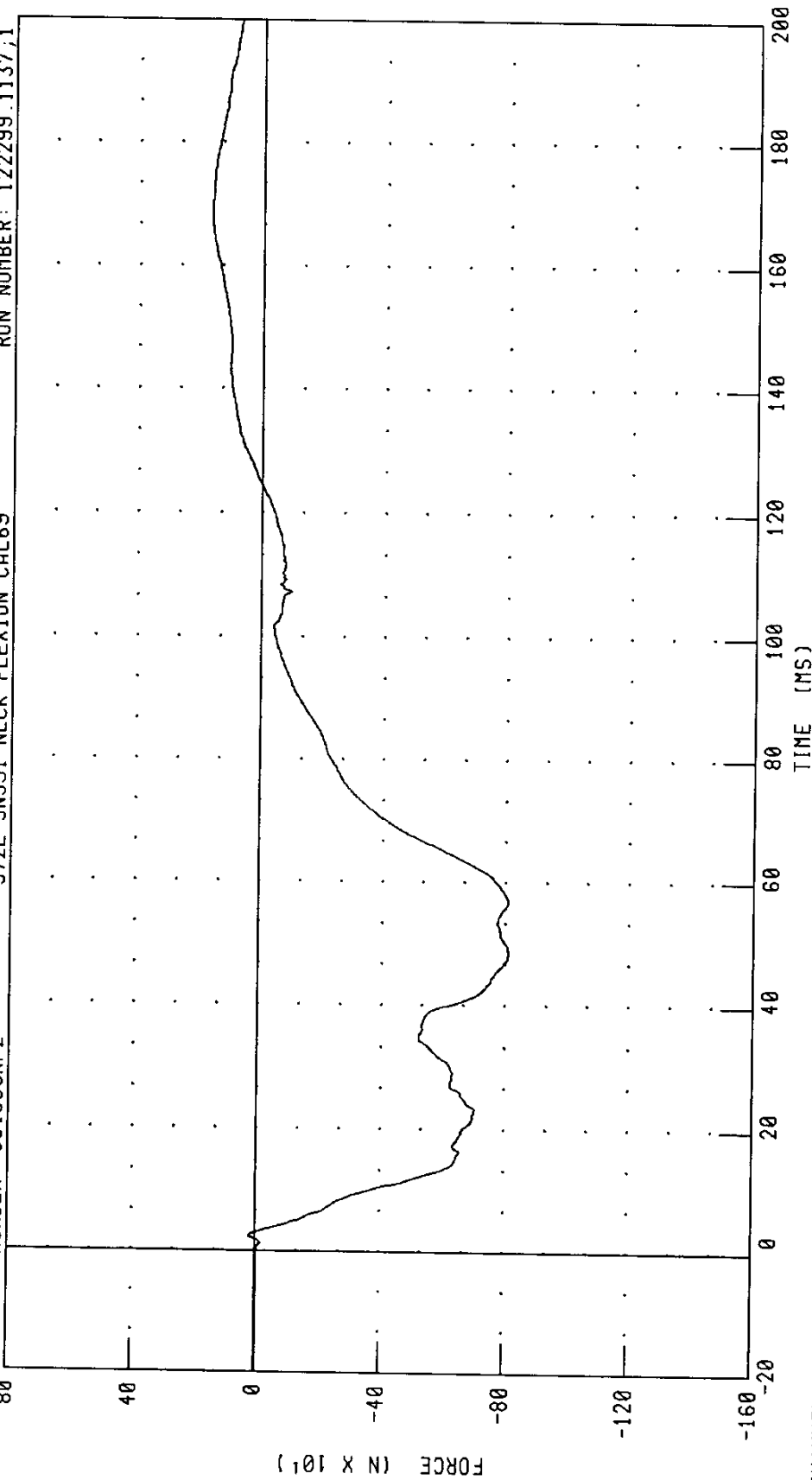
CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 168.65 N @ 166.40 MS; -812.57 N @ 48.32 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 591C69NF2 572E SN591 NECK FLEXION CAL69 RUN NUMBER: 122299.1137.1



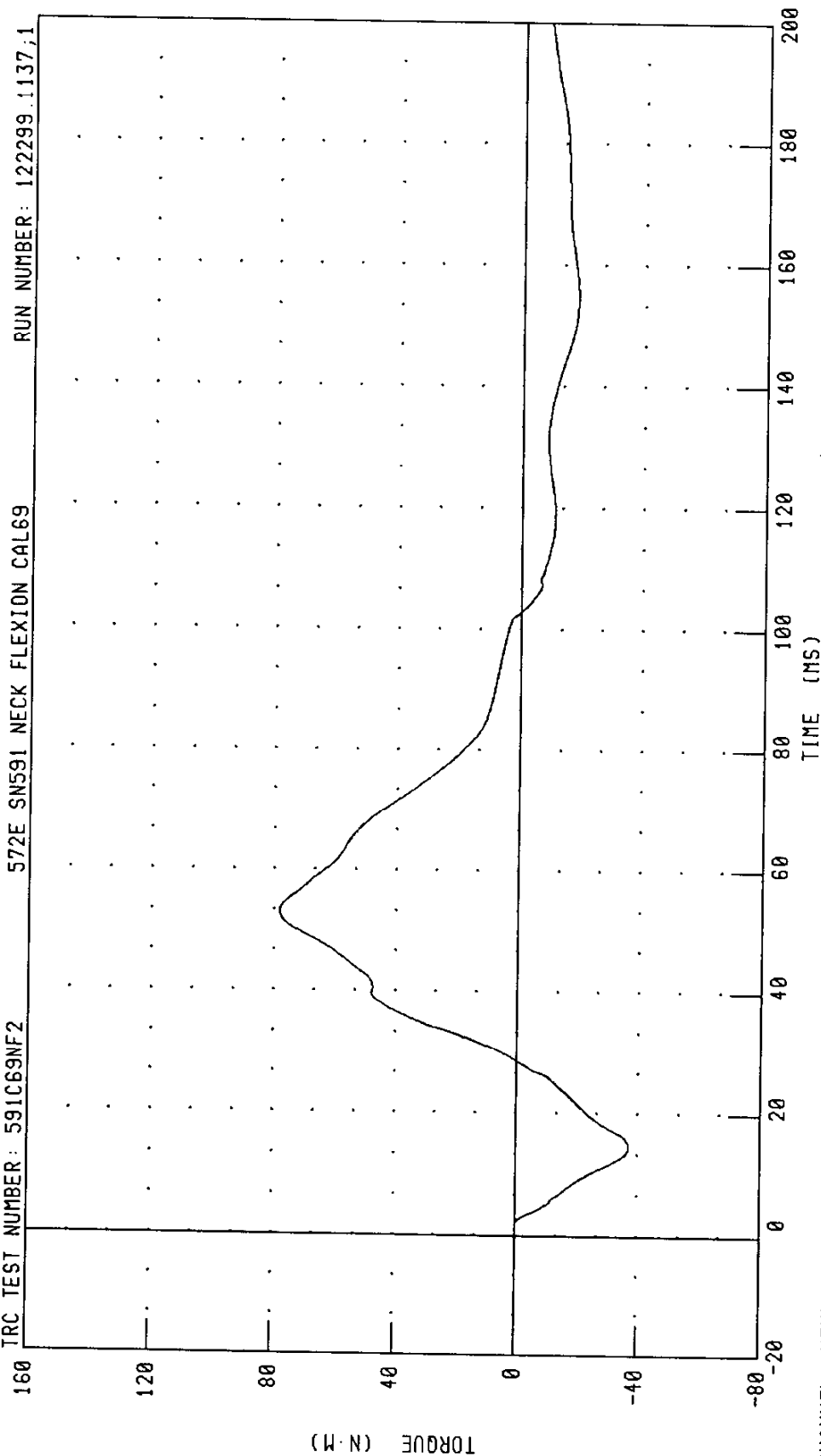
CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 168.72 N @ 169.12 MS; -812.59 N @ 48.56 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

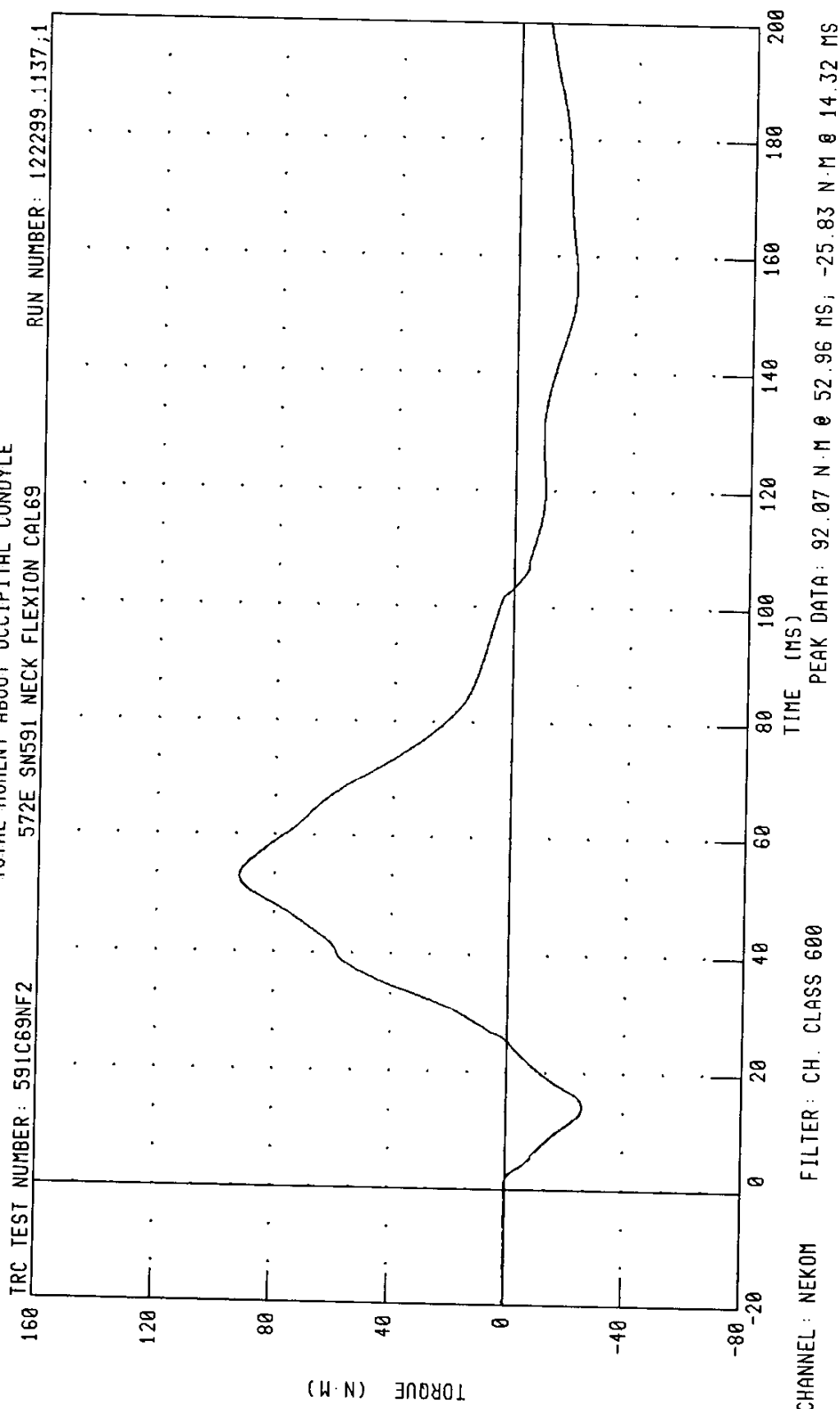
TRC TEST NUMBER: 591C69NF2 572E SN591 NECK FLEXION CAL69 RUN NUMBER: 122299.1137,1



CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 78.26 N·M @ 53.12 MS; -37.10 N·M @ 14.48 MS

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



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-DEC-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 591C69NE1 572E SN591 NECK EXT CAL69

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.20 G
	20 MS	14.00 - 19.00 G	16.41 G
	30 MS	11.00 - 16.00 G	14.73 G
MAX PENDULUM G		22 G MAX	18.68 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.68 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	42.56 MS
D PLANE	MAX	81 - 106 DEG.	97.20 DEG.
ROTATION	TIME	72 - 82 MS	78.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-62.43 NM
	TIME	65 - 79 MS	73.12 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	158.96 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	144.56 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Wallman RUN NUMBER: 122299.1248;1

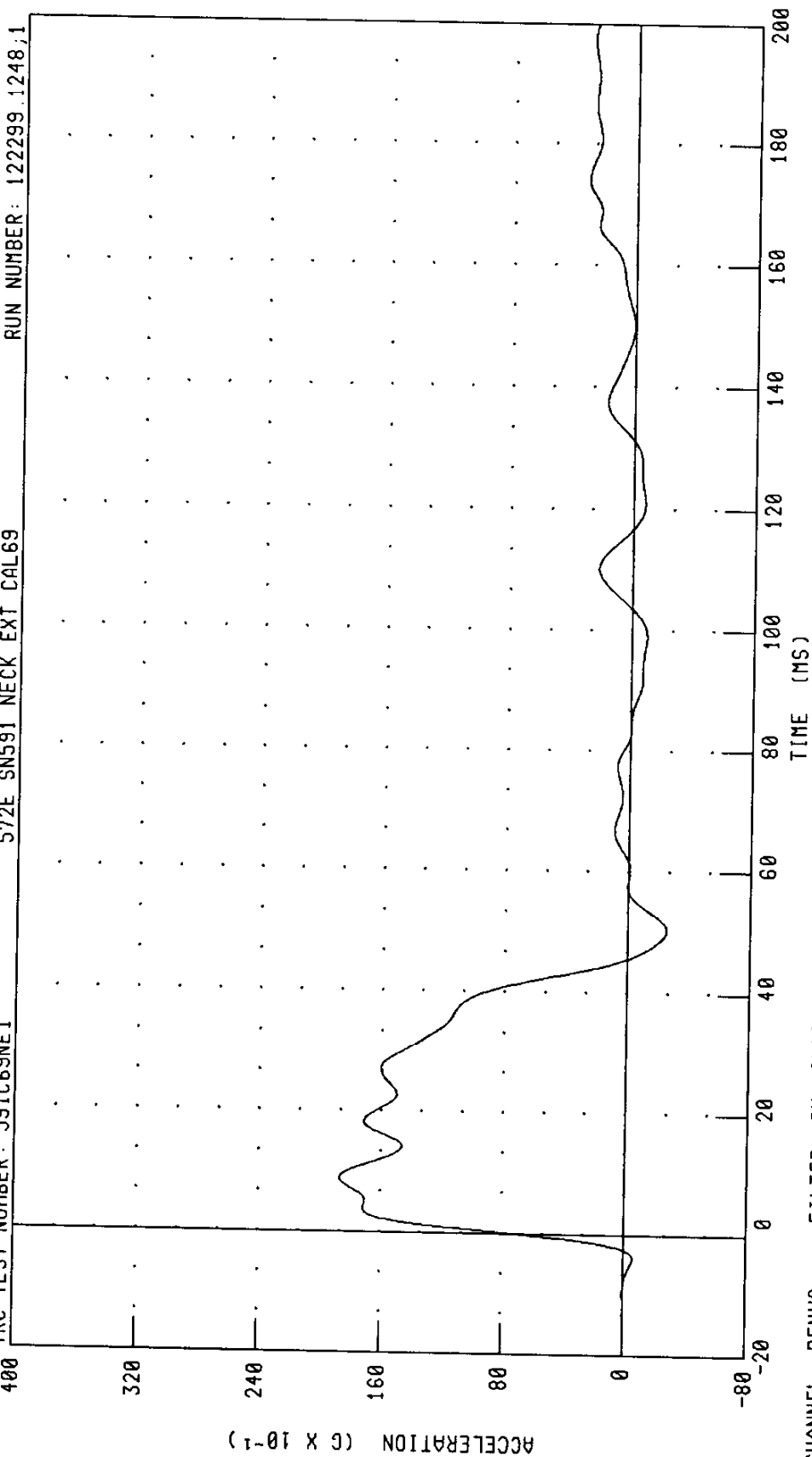
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 591C69NE1

572E SN591 NECK EXT CAL69

RUN NUMBER: 122299.1248,1



CHANNEL: PENXC

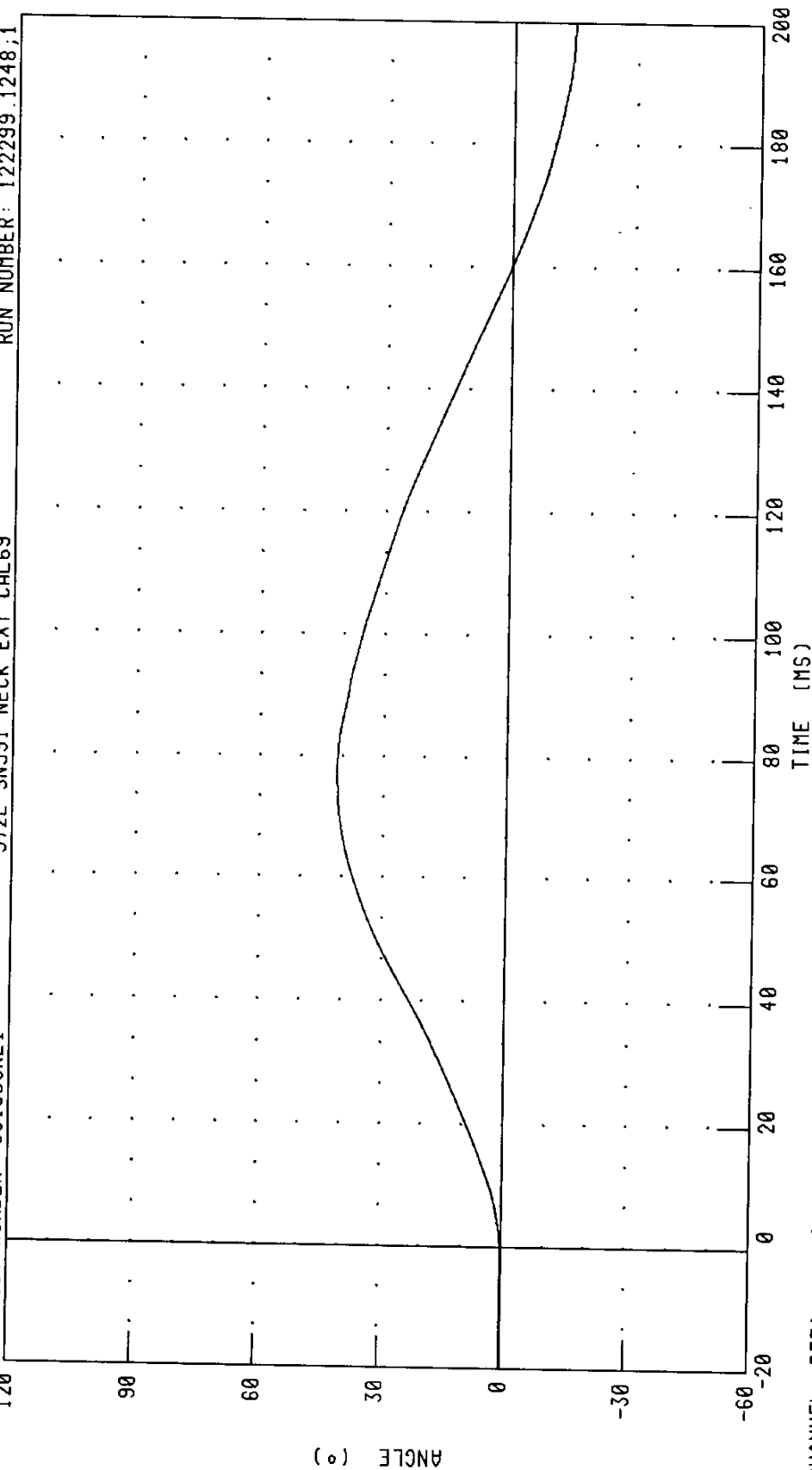
FILTER: CH. CLASS 60

PEAK DATA: 18.68 C @ 8.80 MS, -2.55 C @ 50.40 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

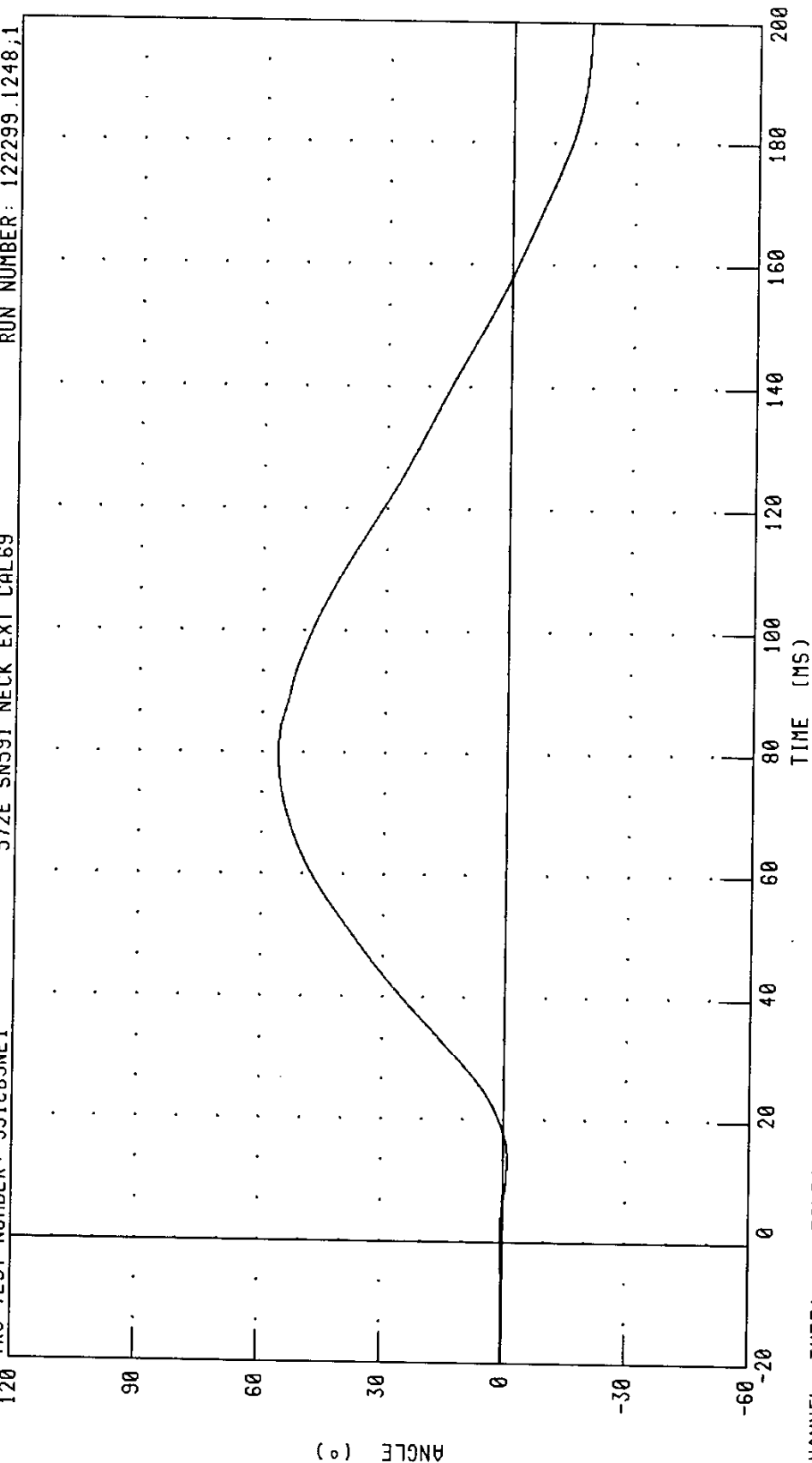
TRC TEST NUMBER: 591C69NE1 572E SN591 NECK EXT CAL69 RUN NUMBER: 122299.1248,1



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 41.24 ° @ 77.52 MS, -14.83 ° @ 200.00 MS

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

TRC TEST NUMBER: 591C69NE1 572E SN591 NECK EXT CAL69 RUN NUMBER: 122299.1248,1

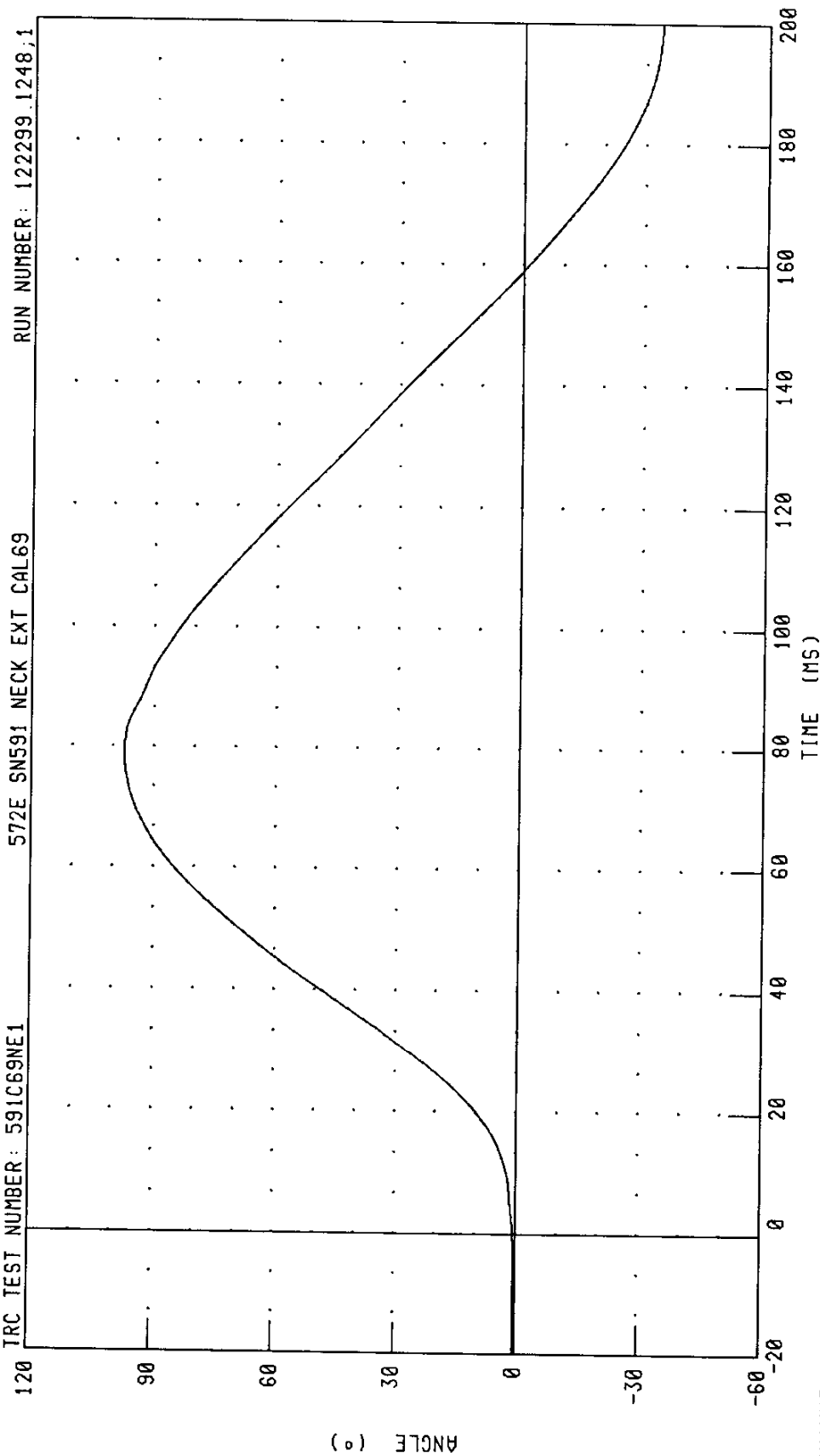


CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 56.00 ° @ 80.08 MS; -19.09 ° @ 200.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 591C69NE1 572E SN591 NECK EXT CAL69 RUN NUMBER: 122299.1248,1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 97.20 ° @ 78.88 MS; -33.92 ° @ 200.00 MS

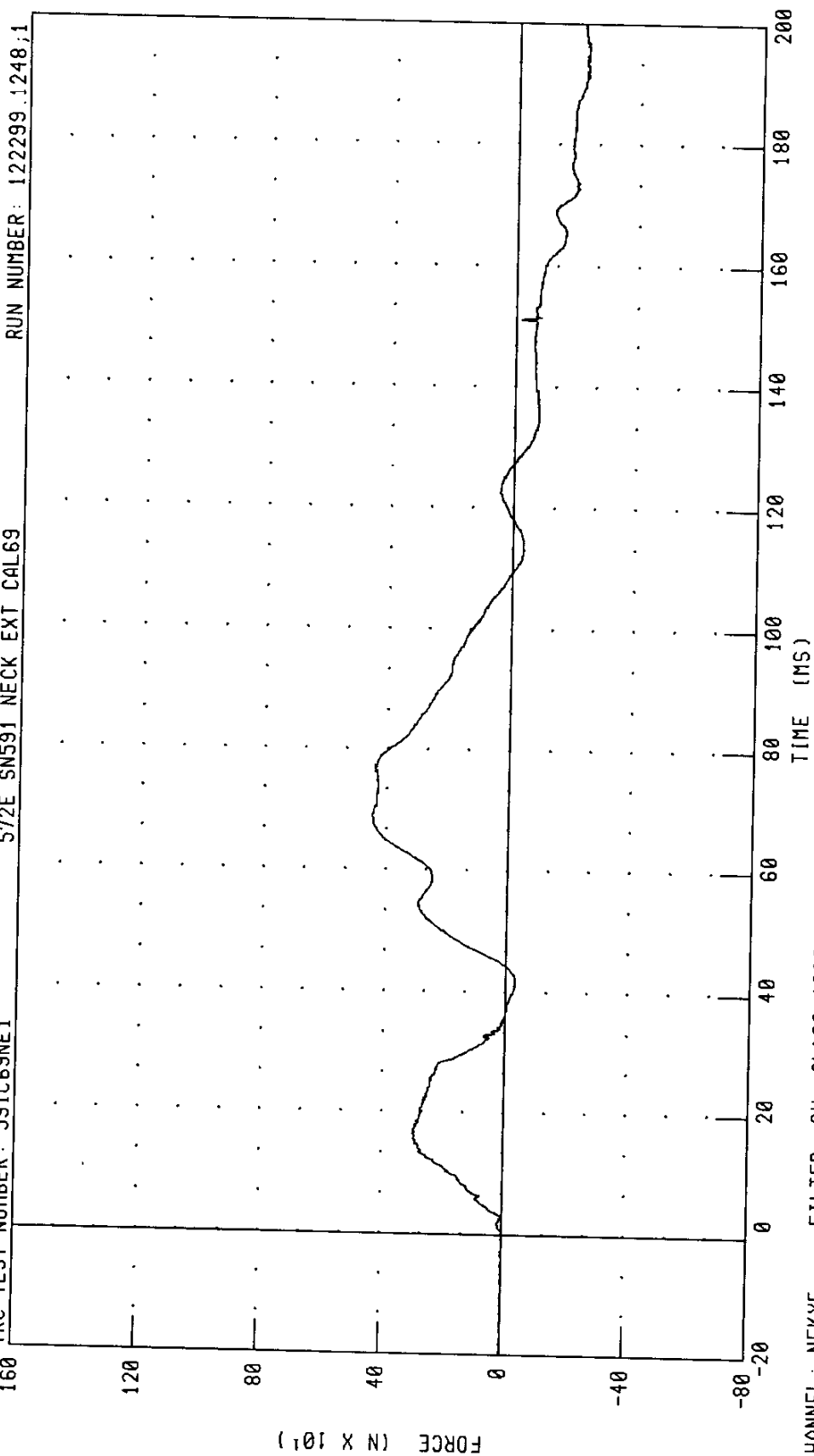
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 591C69NE1

572E SN591 NECK EXT CAL69

RUN NUMBER: 122299.1248;1

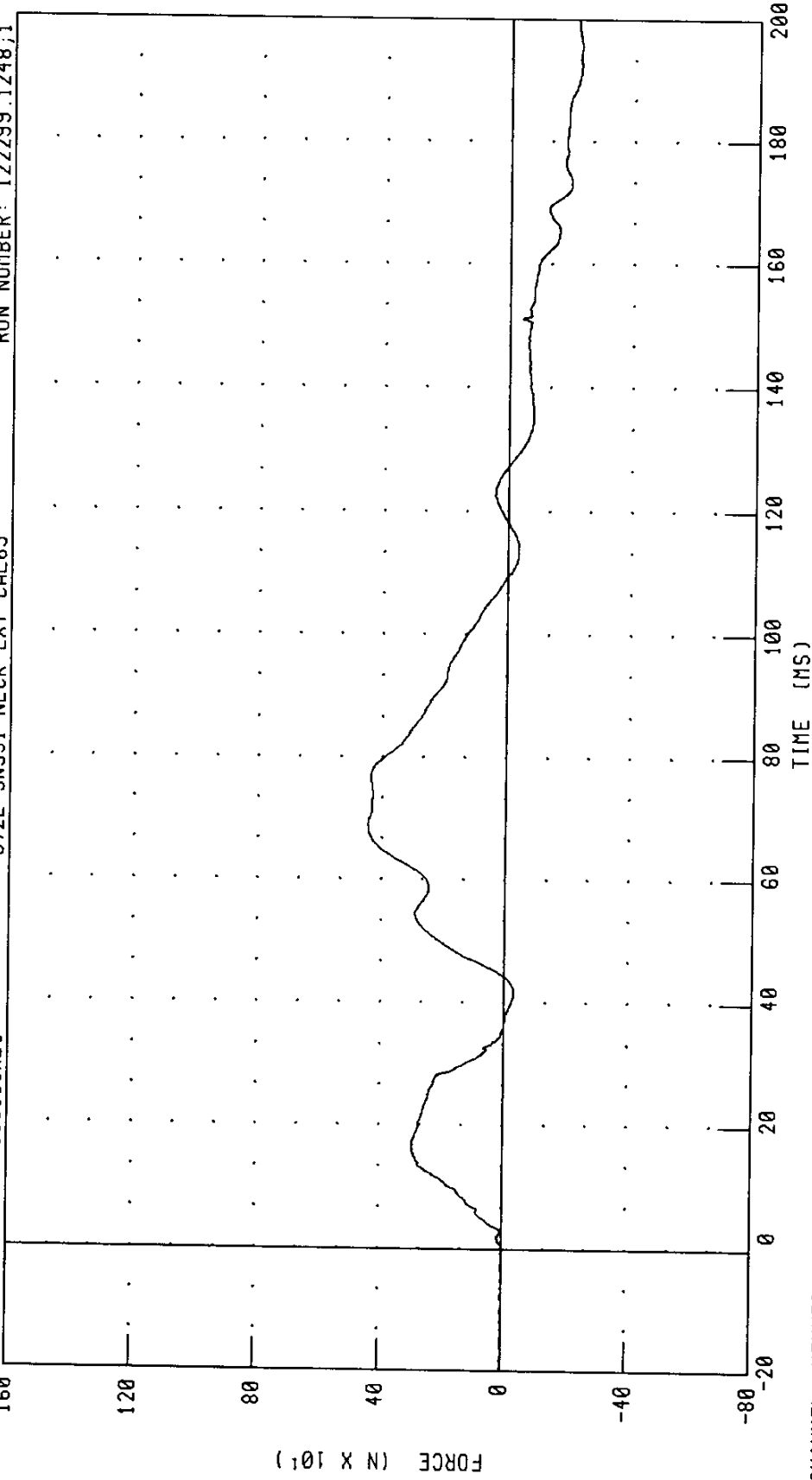


CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 445.58 N @ 68.64 MS; -226.82 N @ 191.12 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 591C69NE1 572E SN591 NECK EXT CAL69 RUN NUMBER: 122299.1248,1



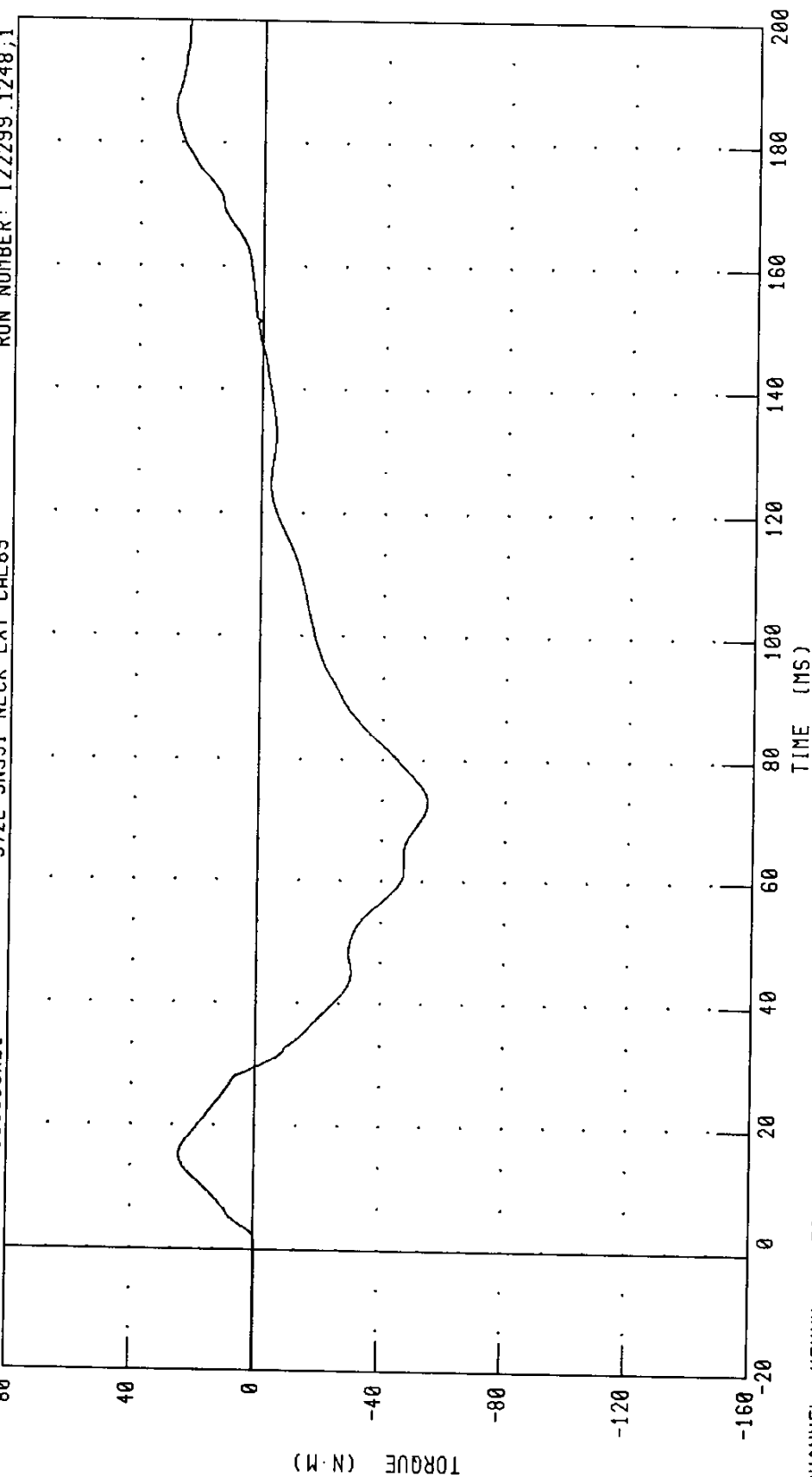
CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 445.62 N @ 68.88 MS; -226.98 N @ 192.56 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

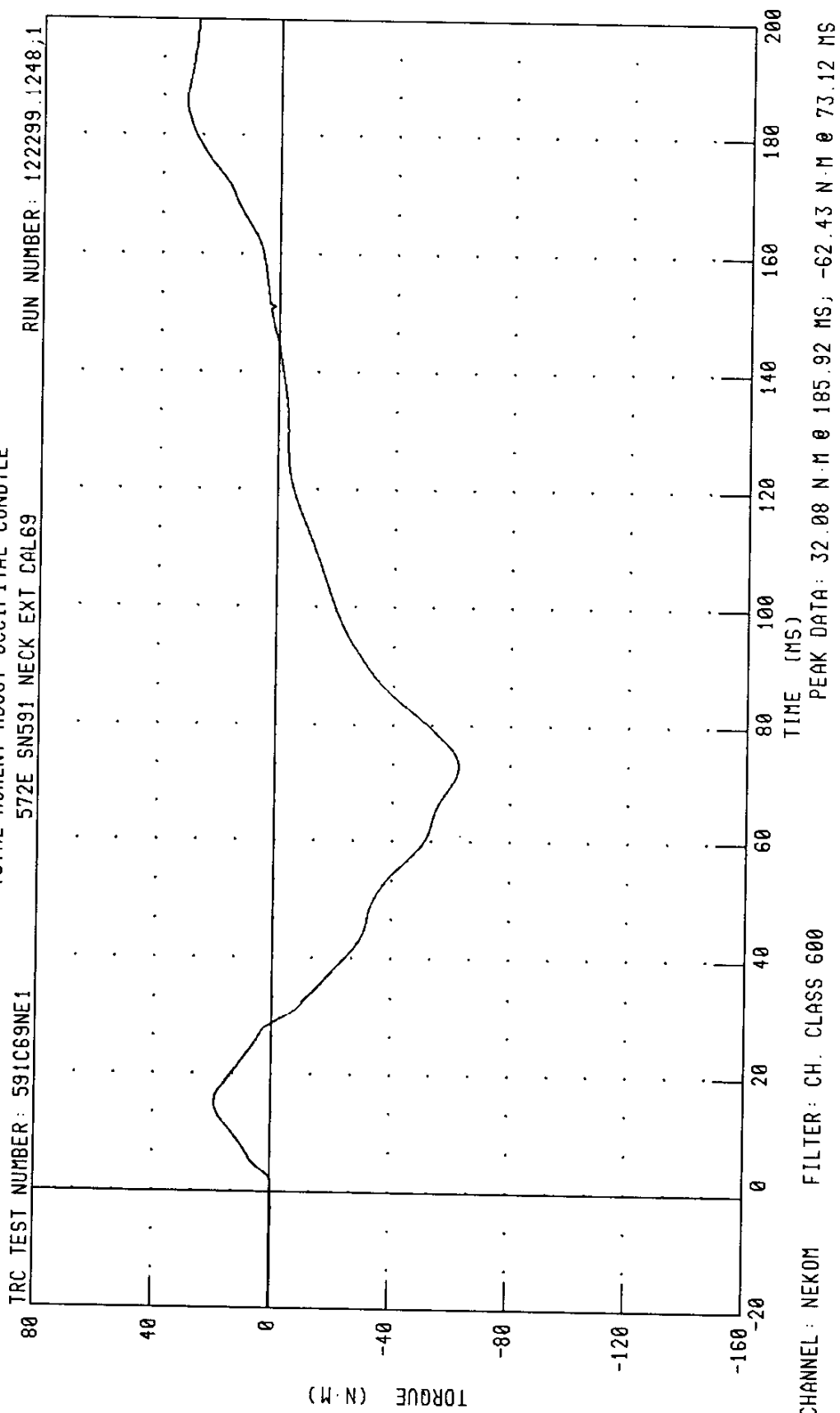
NECK MOMENT Y AXIS

TRC TEST NUMBER: 591C69NE1 572E SN591 NECK EXT CAL69 RUN NUMBER: 122299.1248,1



CHANNEL: NEKYM FILTER: CH. CLASS 600 PEAK DATA: 28.68 N·M @ 185.84 MS; -54.77 N·M @ 73.20 MS

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



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

22-DEC-99

TRC INC.

TEST NO: 591C69TH1

572E SN591 H.S.THORAX CAL69

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	70.2 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5876. N
INTERNAL HYSTERESIS	69% - 85%	73.5%

TEST MEETS SPECIFICATIONS

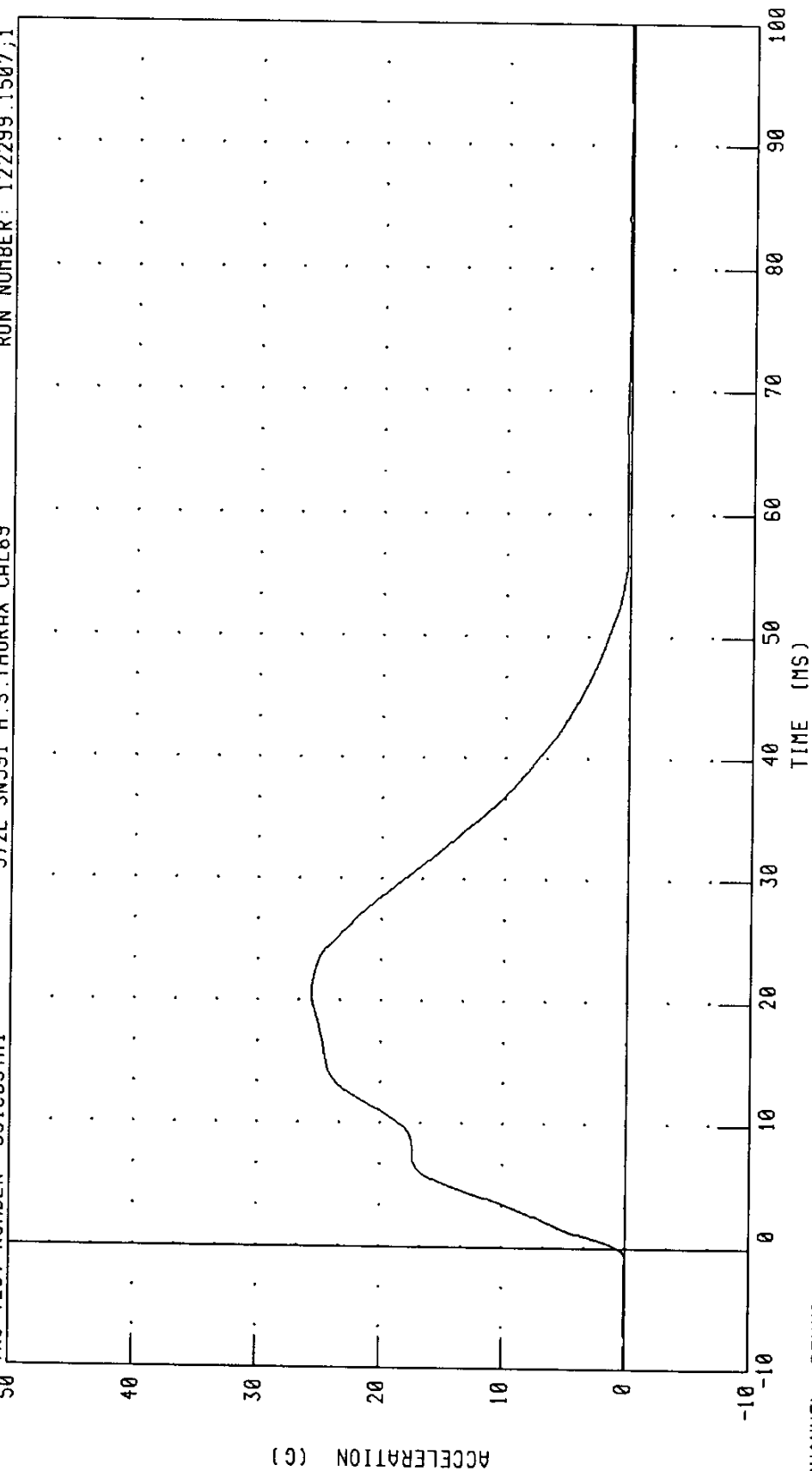
TECHNICIAN



RUN NUMBER: 122299.1507;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 591C69TH1 572E SN591 H.S. THORAX CAL69 RUN NUMBER: 122299.1507,1



CHANNEL: PENXC FILTER: CH. CLASS 180 PEAK DATA: 25.65 G @ 20.64 MS; 0.01 G @ -0.88 MS

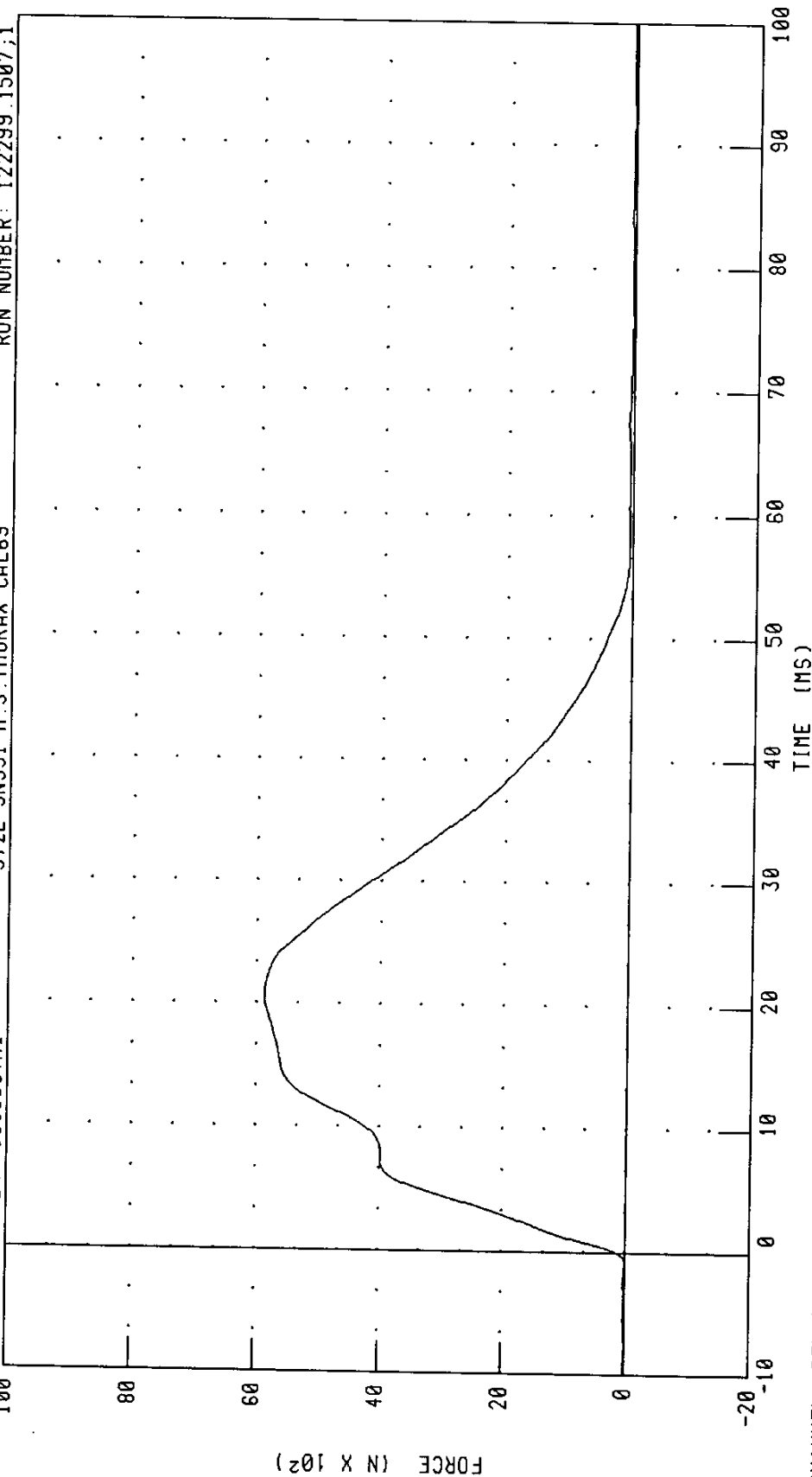
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 591C69TH1

572E SN591 H.S. THORAX CAL69

RUN NUMBER: 122299.1507;1



CHANNEL: PENXF

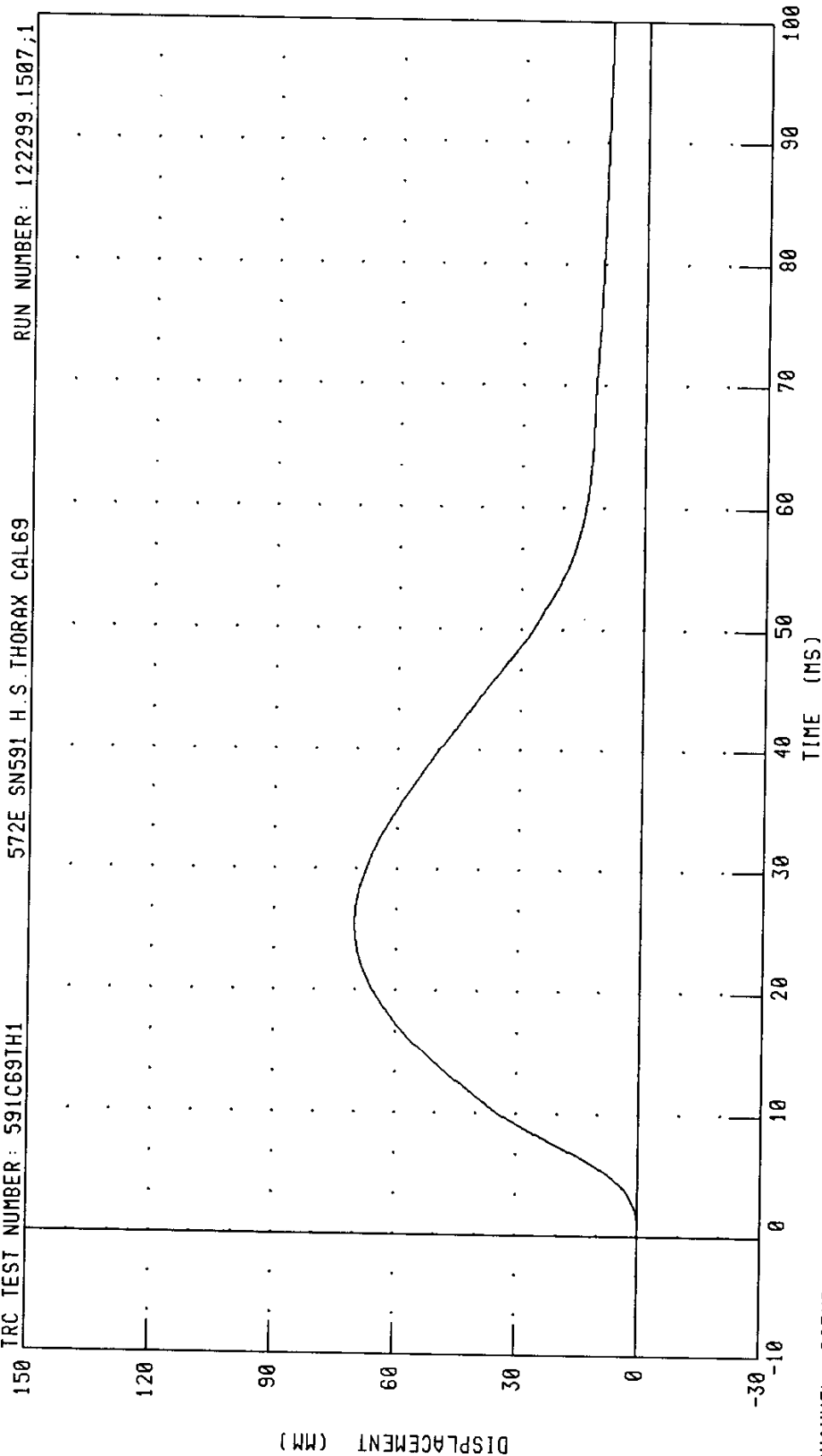
FILTER: CH. CLASS 180

PEAK DATA: 5876.39 N @ 20.64 MS, 1.81 N @ -0.88 MS

PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

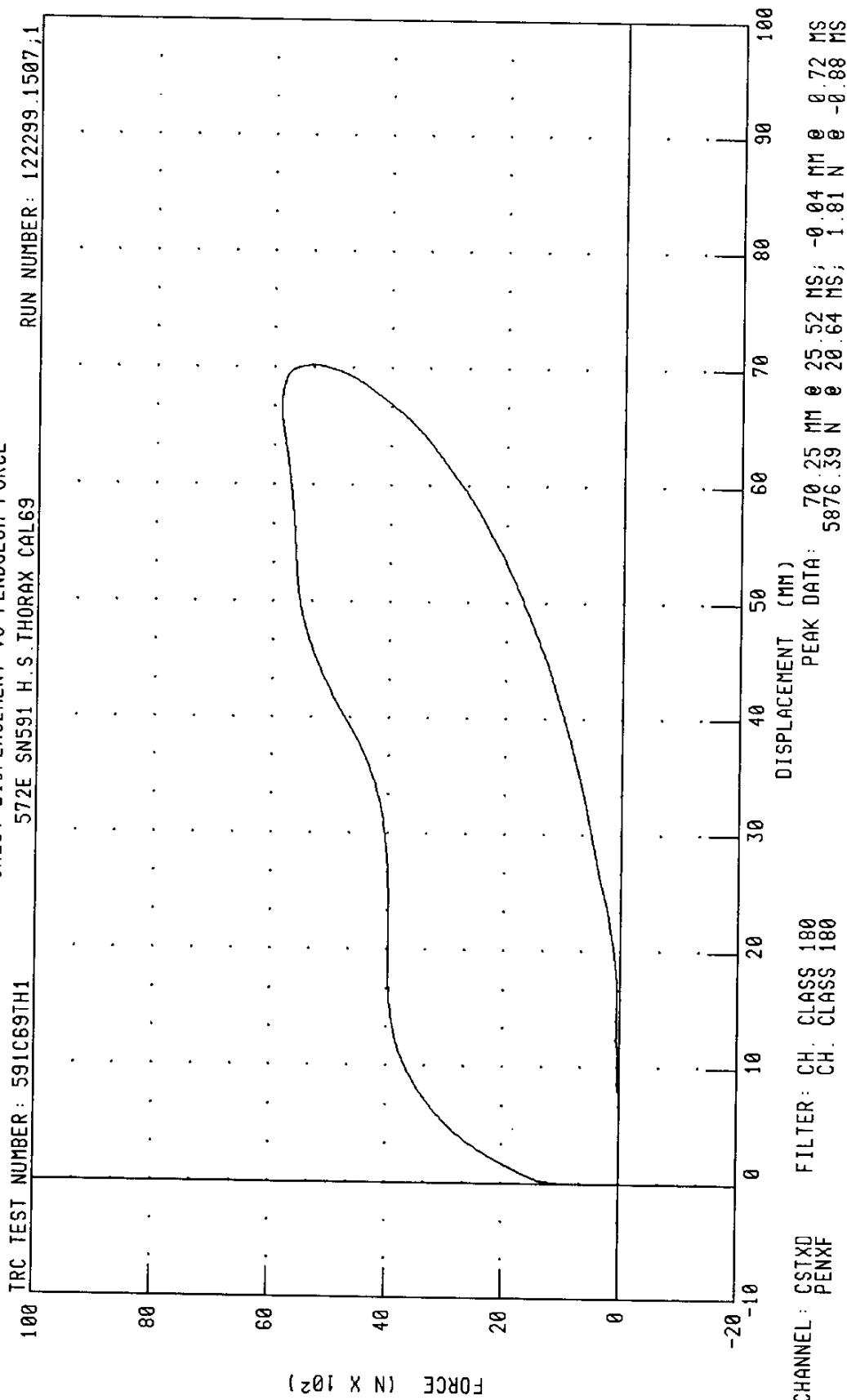
TRC TEST NUMBER: 591C69TH1 572E SN591 H.S. THORAX CAL69 RUN NUMBER: 122299.1507,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 70.25 MM @ 25.52 MS; -0.04 MM @ 0.72 MS

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



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

22-DEC-99

TRC INC.

TEST NO: 591C69RK1

572E SN591 RIGHT KNEE CAL 69

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5625.1 N

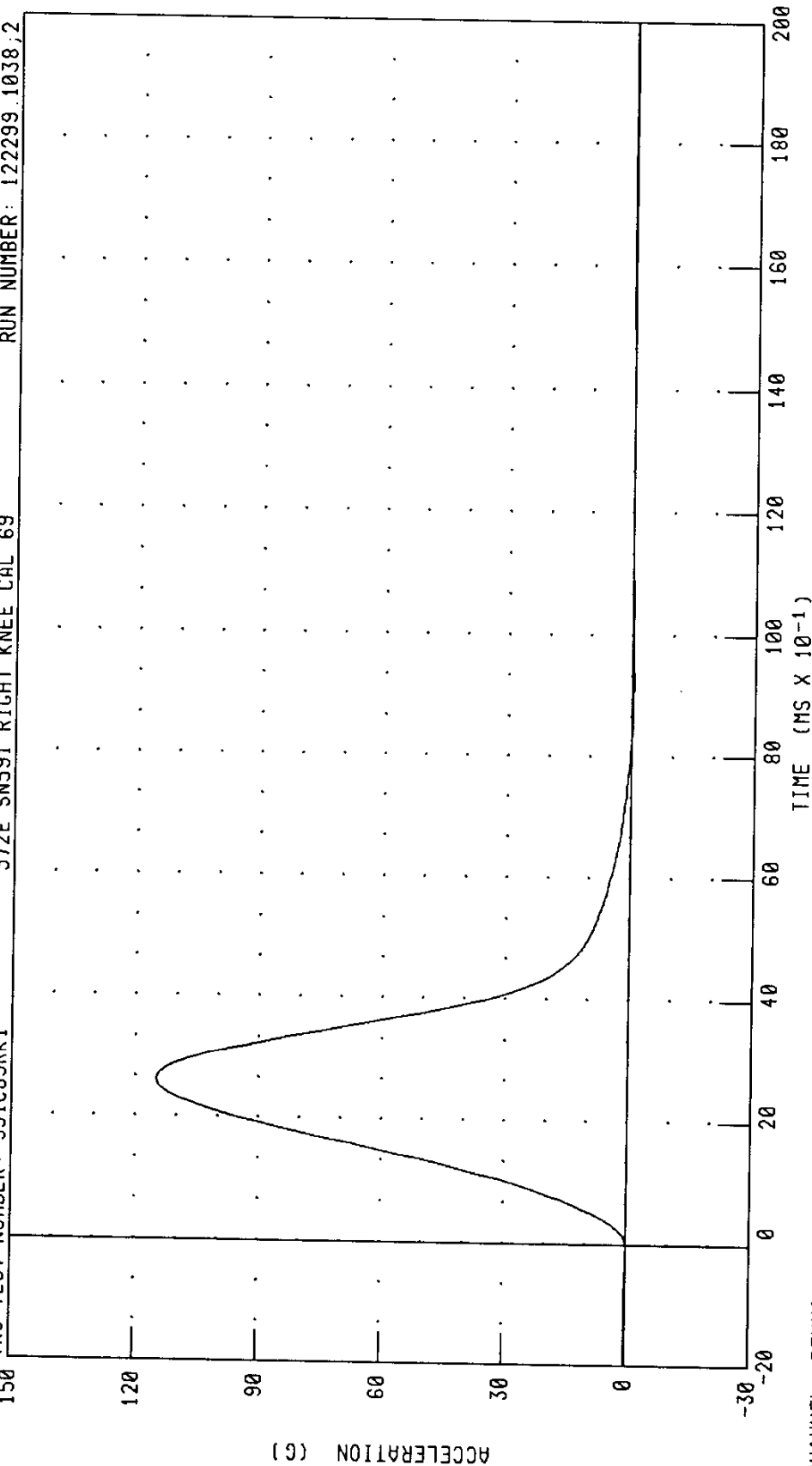
TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Walker

RUN NUMBER: 122299.1037;2

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

TRC TEST NUMBER: 591C69RK1 572E SN591 RIGHT KNEE CAL 69 RUN NUMBER: 122299 1038.2

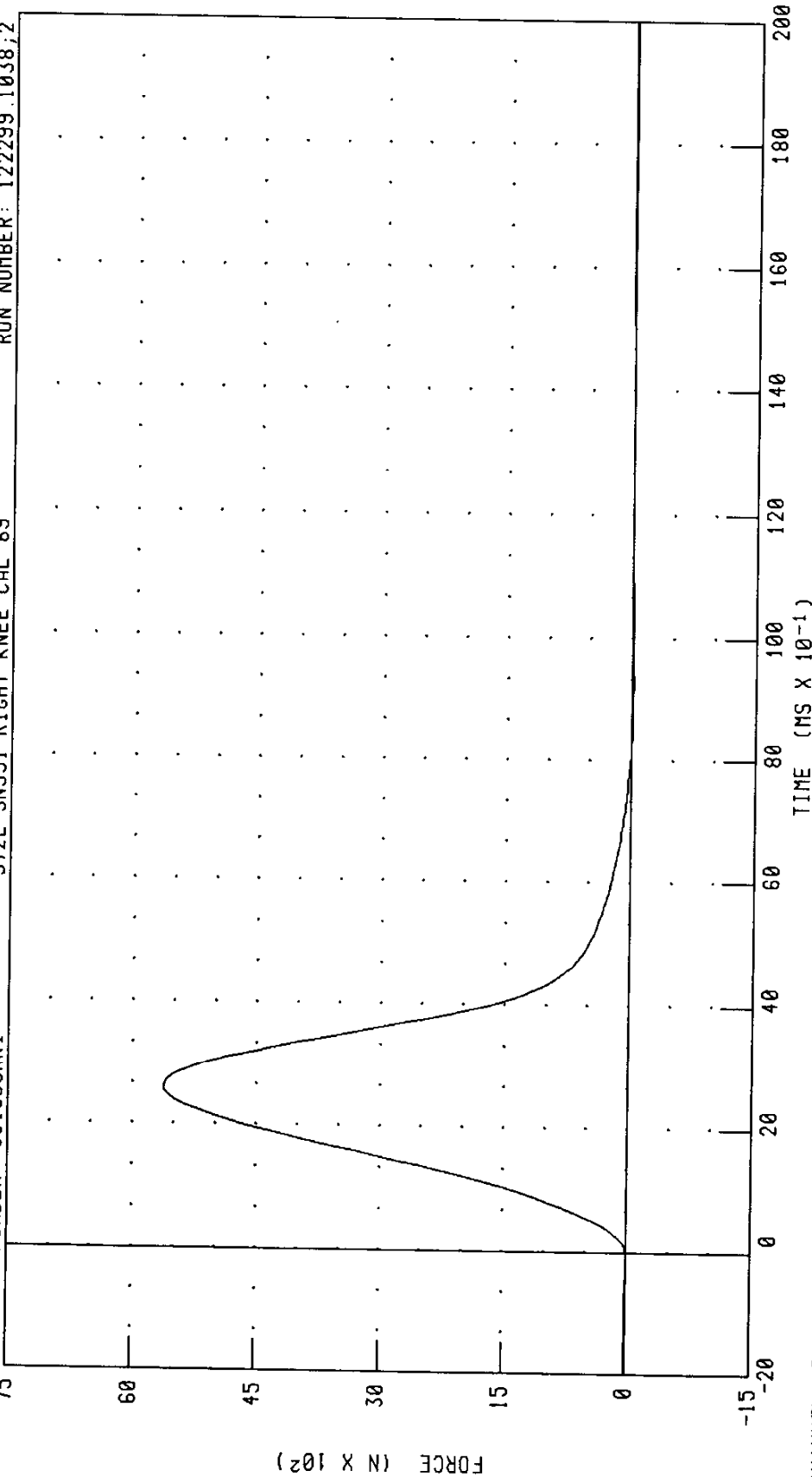


CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 114.97 G @ 2.64 MS, -0.45 G @ 9.28 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 591C69RK1 572E SN591 RIGHT KNEE CAL 69 RUN NUMBER: 122299.1038;2



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5625.14 N @ 2.64 MS; -22.15 N @ 9.28 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

22-DEC-99

TRC INC.

TEST NO: 591C69LK1

572E SN591 LEFT KNEE CAL 69

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5290.3 N

TEST MEETS SPECIFICATIONS

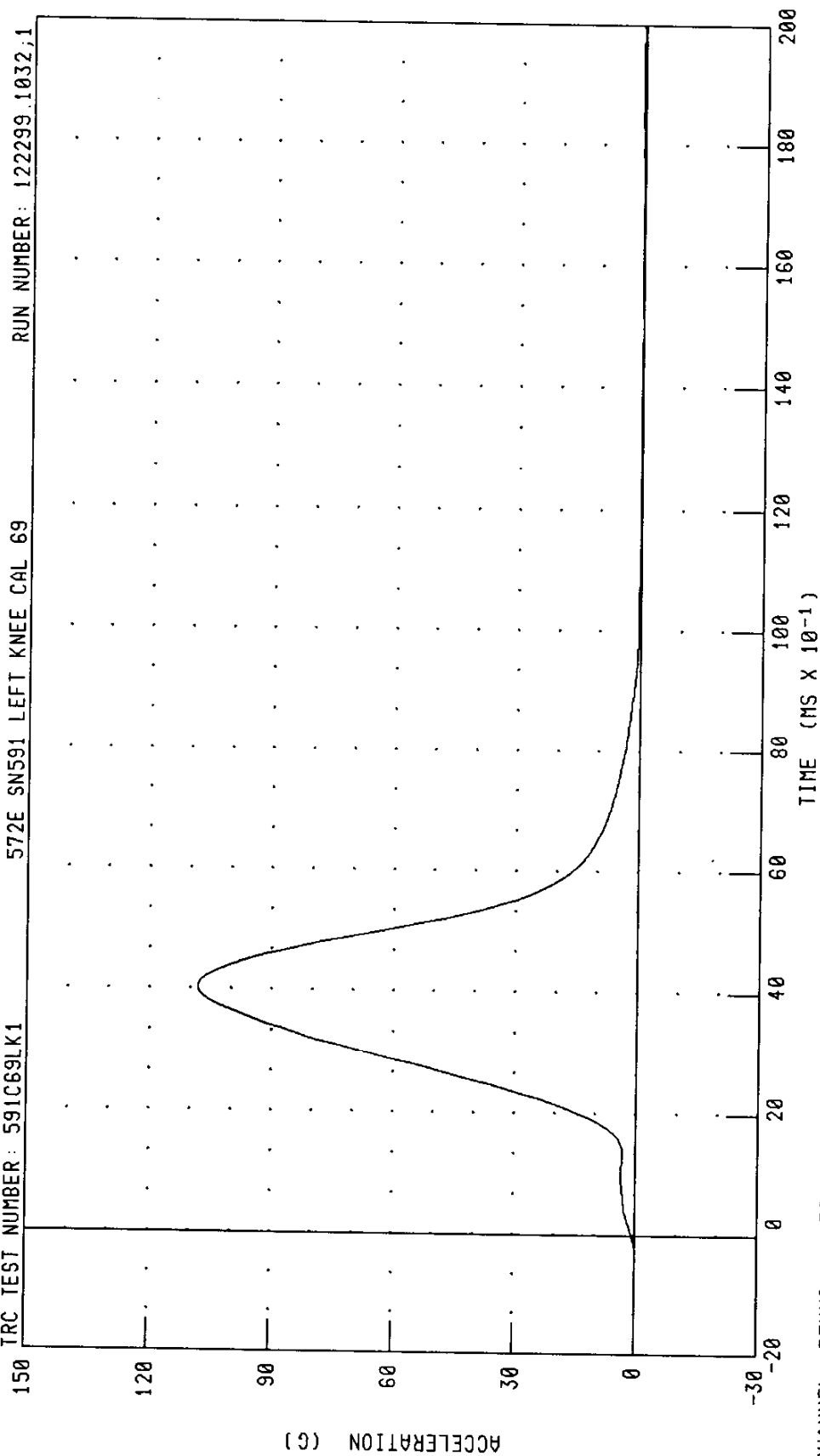
TECHNICIAN

Dustin Walker

RUN NUMBER: 122299.1031;1

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

TRC TEST NUMBER: 591C69LK1 572E SN591 LEFT KNEE CAL 69 RUN NUMBER: 122299.1032,1



CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 108.12 G @ 4.00 MS; -0.01 G @ -0.40 MS

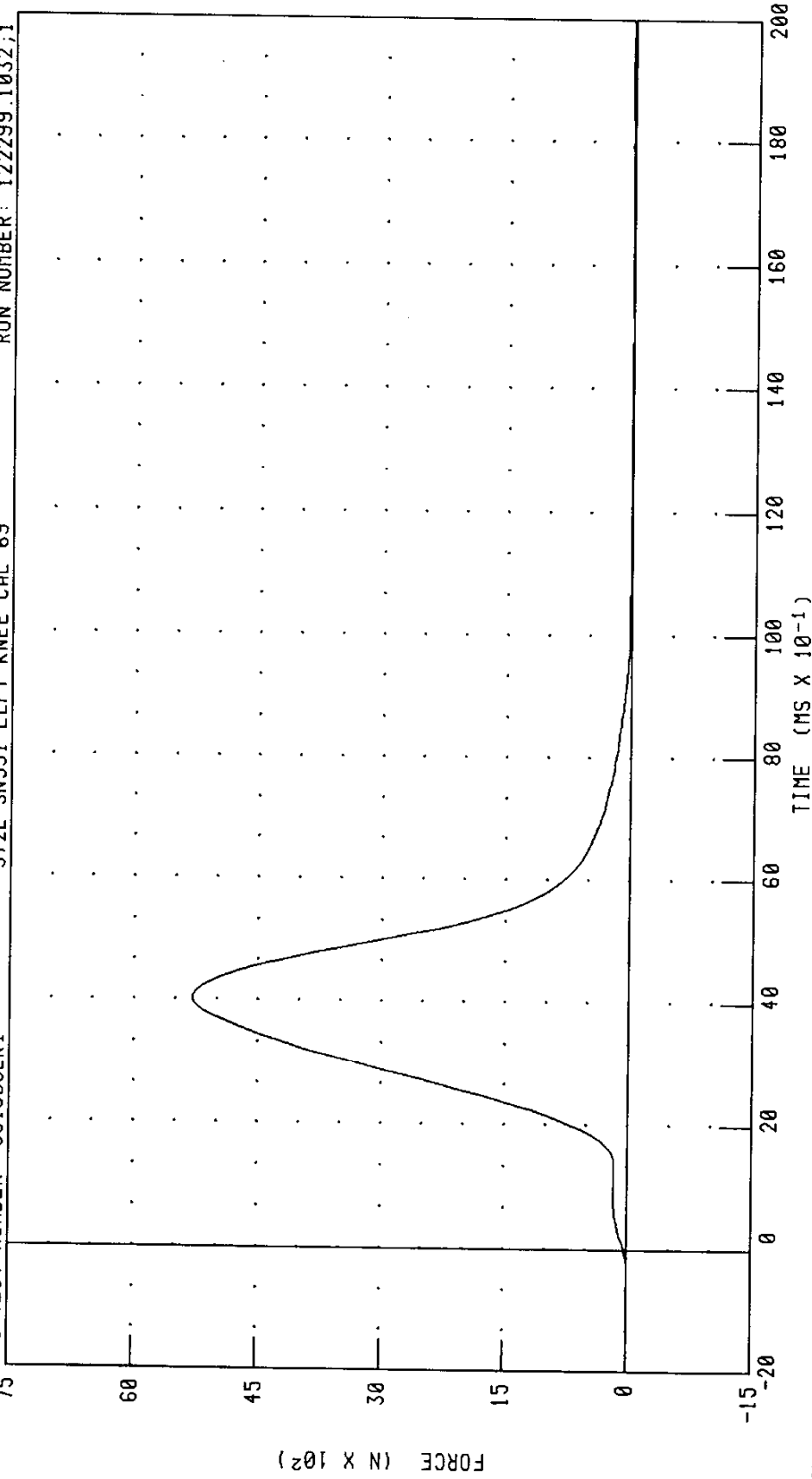
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 591C69LK1

572E SN591 LEFT KNEE CAL 69

RUN NUMBER: 122299.1032,1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5290.31 N @ 4.00 MS; -0.48 N @ -0.40 MS

Accelerometer Information

Engineer: Dresback
 Test Date: 12/15/99-2
 Dummy S/N: 551
 Manufacturer: FTSS
 Type: Hybrid III 50th female
 Seating Position: Driver

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity Mv/g @10 Volts	Cal Due Date	Full- Scale Desired G	Direction Of Positive Polarity
HEDXG	Head X	7231C	GB86	Endevco	0.1950	05/16/00	400	Rear
HEDYG	Head Y	7231C	GB77	Endevco	0.1917	05/16/00	400	Left
HEDZG	Head Z	7231C	A54F	Endevco	0.1967	05/16/00	400	Up
CSTXG	Chest X	7231C	A01E	Endevco	0.2008	05/16/00	400	Forward
CSTYG	Chest Y	7231C	A28A	Endevco	0.1951	05/16/00	400	Left
CSTZG	Chest Z	7231C	FC02	Endevco	0.1843	05/16/00	400	Down

Accelerometer Information

Engineer: Dresback
 Test Date: 12/15/99-2
 Dummy S/N: 551
 Manufacturer: FTSS
 Type: Hybrid III 50th female
 Seating Position: Driver

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity (mV/V)	Cal Due Date	Full-Scale Desired	Direction Of Positive Polarity
Neck Load Cells								
NEKXF	Neck X-force	1716A	0532	Denton	1.7170 @ 2,000 lbs	05/16/00	2000 lbs	Head forward/chest rearward
NEKYF	Neck Y-force	1716A	0532	Denton	1.6381 @ 2,000 lbs	05/16/00	2000 lbs	Head left/chest right
NEKZF	Neck Z-force	1716A	0532	Denton	1.1558 @ 3,000 lbs	05/16/00	3000 lbs	Head up/chest down
NEKXM	Neck X-moment	1716A	0532	Denton	1.6334 @ 2500 in-lbs	05/16/00	200 ft-lbs	Right ear to right shoulder
NEKYM	Neck Y-moment	1716A	0532	Denton	1.6476 @ 2500 in-lbs	05/16/00	200 ft-lbs	Chin forward to sternum
NEKZM	Neck Z-moment	1716A	0532	Denton	2.3098 @ 2500 in-lbs	05/16/00	200 ft-lbs	Chin to left shoulder
Femur Load Cells								
Left femur								
LFMF	Left femur force	2121	0171	GSE	1.3140 @ 3000 lbs	05/16/00	3000 lbs	Knee upward/upper femur down
Right femur								
RFMF	Right femur force	2121	0172	GSE	1.3003 @ 3000 lbs	05/16/00	3000 lbs	Knee upward/upper femur down

Accelerometer Information

Engineer: Dresback
 Test Date: 12/15/99-2
 Dummy S/N: 551
 Manufacturer: FTSS
 Type: Hybrid III 50th female
 Seating Position: Driver

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity	Cal Due Date	Full- Scale Desired	Direction Of Positive Polarity
	Chest Pot							
CSTXD	Chest deflection	14CB1-2897	CP84413	Servo	28.42 mV/V/inch	05/16/00	6 inch	Extension

Accelerometer Information

Engineer: Dresback
 Test Date: 12/15/99-2
 Dummy S/N: 591
 Manufacturer: FTSS
 Type: Hybrid III 50th female
 Seating Position: Passenger

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity Mv/g @10 Volts	Cal Due Date	Full- Scale Desired G	Direction Of Positive Polarity
HEDXG	Head X	7231C	C14398	Endevco	0.2759	05/11/00	400	Rear
HEDYG	Head Y	7231C	AH5F6	Endevco	0.2038	05/11/00	400	Left
HEDZG	Head Z	7231C	AH5K7	Endevco	0.1901	05/11/00	400	Up
CSTXG	Chest X	7231C	C13124	Endevco	0.2588	05/11/00	400	Forward
CSTYG	Chest Y	7231C	AH484	Endevco	0.1913	05/11/00	400	Left
CSTZG	Chest Z	7231C	ACTTO	Endevco	0.1939	05/11/00	400	Down

Accelerometer Information

Engineer: Dresback
 Test Date: 12/15/99-2
 Dummy S/N: 591
 Manufacturer: FTSS
 Type: Hybrid III 50th female
 Seating Position: Passenger

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity (mV/V)	Cal Due Date	Full- Scale Desired	Direction Of Positive Polarity
	Neck Load Cells							
NEKXF	Neck X-force	1716	0104	Denton	1.6673 @ 2,000 lbs	05/11/00	2000 lbs	Head forward/chest rearward
NEKYF	Neck Y-force	1716	0104	Denton	1.6037 @ 2,000 lbs	05/11/00	2000 lbs	Head left/chest right
NEKZF	Neck Z-force	1716	0104	Denton	1.2882 @ 3,000 lbs	05/11/00	3000 lbs	Head up/chest down
NEKXM	Neck X-moment	1716	0104	Denton	1.5815 @ 2500 in-lbs	05/11/00	200 ft-lbs	Right ear to right shoulder
NEKYM	Neck Y-moment	1716	0104	Denton	1.5839 @ 2500 in-lbs	05/11/00	200 ft-lbs	Chin forward to sternum
NEKZM	Neck Z-moment	1716	0104	Denton	2.2292 @ 2500 in-lbs	05/11/00	200 ft-lbs	Chin to left shoulder
	Femur Load Cells							
	Left femur							
LFMF	Left femur force	2121	0224	GSE	1.2983 @ 3000 lbs	05/11/00	3000 lbs	Knee upward/upper femur down
	Right femur							
RFMF	Right femur force	2121	0124	GSE	1.3120 @ 3000 lbs	05/11/00	3000 lbs	Knee upward/upper femur down

Accelerometer Information

Engineer: Dresback
 Test Date: 12/15/99-2
 Dummy S/N: 591
 Manufacturer: FTSS
 Type: Hybrid III 50th female
 Seating Position: Passenger

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity	Cal Due Date	Full- Scale Desired	Direction Of Positive Polarity
CSTXD	Chest Pot Chest deflection	14CB1-2897	233	Servo	29.13 mV/V/inch	05/11/00	6 inch	Extension

Dummy Sign Convention

Accelerometers:

+X: Forward
+Y: Rightward
+Z: Downward

Potentiometers:

+Chest longitudinal deflection: Outward

Load cells:

+Femur force: Tension

Neck load cells:

+X force: Head rearward
+Y force: Head leftward
+Z force: Head upward (tension on neck)
+X moment: Left ear rotating toward left shoulder
+Y moment: Chin rotating toward chest
+Z moment: Chin rotating toward left shoulder

Filtering Data

J211 MAR95

Load Cell Barrier Forces Class 60

Vehicle Structural Accelerations Class 60

Occupant

Head Accelerometer Class 1000

Neck Class 60

Chest Accelerometer Class 180

Chest Deflection Class 180

Femur Force Class 600

Sternum Accelerometer Class 180

Lower Leg Class 600

Vehicle Instrumentation Placement

Test Number 991215-2

Number	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
1	Left Brake Caliper	X	Endevco	7264-2000T	J14362	Rearward
2	Right Brake Caliper	X	Endevco	7264-2000T	J30380	Forward
3	Instrument Panel Center	X	Endevco	7264-2000T	J27728	Forward
4	Engine Top	X	Endevco	7264-2000T	J27410	Rearward
5	Engine Bottom	X	Endevco	7264-2000T	J27846	Rearward
6	Vehicle Rear Center	X	Endevco	7264-2000T	J30403	Forward
		Y	Endevco	7264-2000T	J29154	Left
7	Left Rear Seat Crossmember	X	Endevco	7264-2000T	J27794	Forward
8	Right Rear Seat Crossmember	X	Endevco	7264-2000T	J29367	Forward
9	Vehicle Center of Gravity	X	Endevco	7264-2000T	J30423	Forward
		Y	Endevco	7264-2000T	J30493	Left
		Z	Endevco	7264-2000T	J30458	Up

Report Sign Convention and NHTSA Data Tape Reference Guide

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

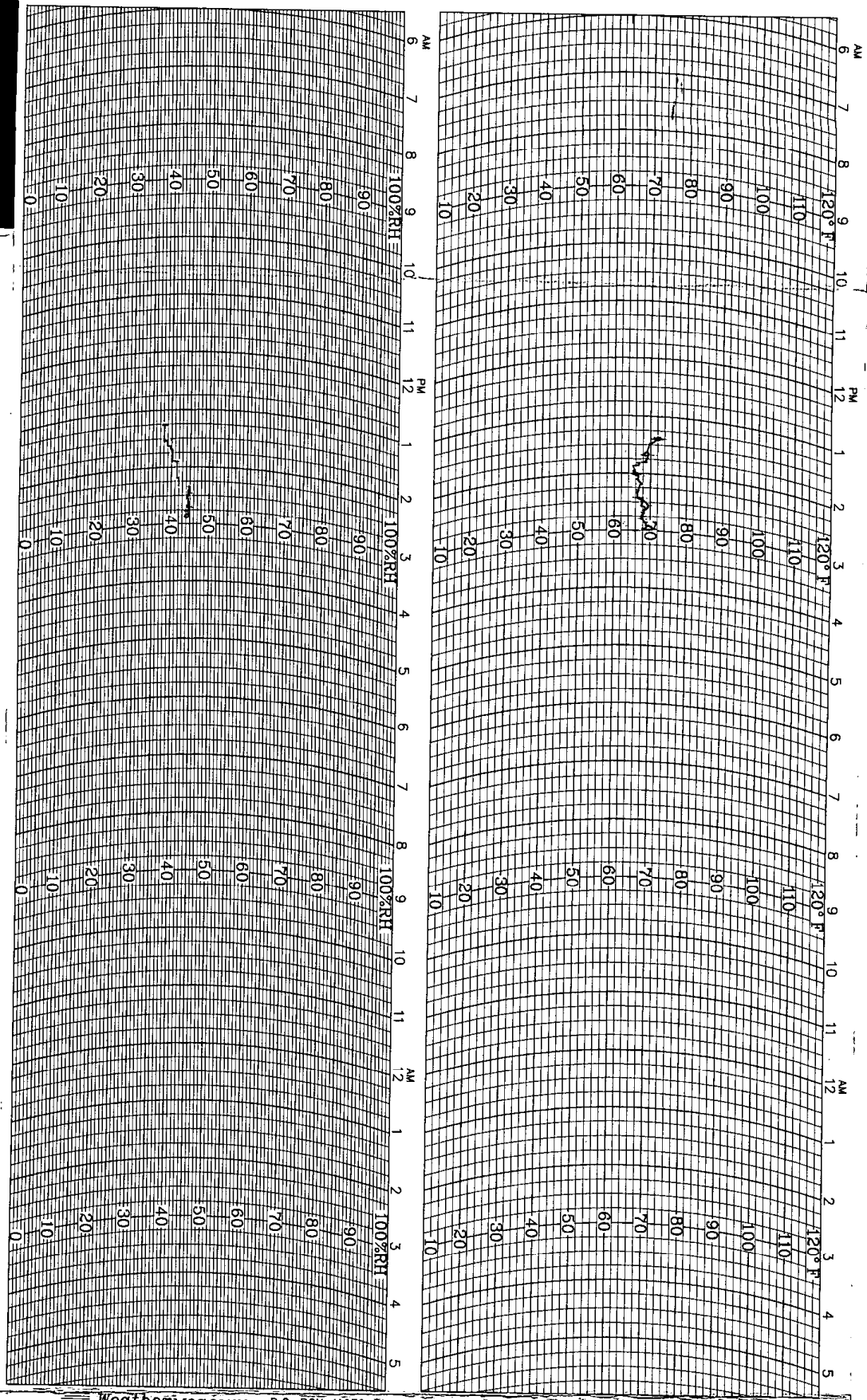
Description Of Timing Marks On TRC High-Speed Film

All TRC high-speed cameras are equipped with red LEDs which put timing marks on the right edge of the film. TRC uses a single timing generator to generate the timing for all cameras. This allows the timing marks to be common to all cameras. The timing marks can be used to measure camera speed (frames per second) or to locate a point in time before or after the time-zero event.

The timing marks appear on the film as small red marks on the right edge of the film. Round marks are left by the Photo-Sonics and Stalex cameras while horizontal bars are left by the Hycam, Locam, and Fastax II cameras.

The timing generator puts out a pulse for every millisecond plus it generates additional pulses for hundredths and tenths of seconds. To explain this further, we can use an example of a camera running at 1000 frames per second.

1. Every frame will have **one** LED appear in it. This indicates a *millisecond* pulse.
2. Every ten frames will have **two** LEDs appear in it. These indicate a *millisecond* pulse plus a *hundredth of a second* pulse.
3. Every one hundred frames will have **three** LEDs appear in it. These indicate a *millisecond* pulse, a *hundredth of a second* pulse, and a *tenth of a second* pulse.



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HYGROTHERMOGRAPH
1 DAY

CHART NO. M699123
C311-D-HF
ECN 2717
6-9-87

STATION VKTC 09/19/40 DATE ON 12/15 DATE OFF 12/15