

V 3123

**1999 Ford Econoline E-150 Cargo Van
into a Flat Frontal Barrier
TRC Test Number: 990223-2**

**Prepared by:
Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319**

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**Prepared For:
Vehicle Research and Test Center
P. O. Box 37
East Liberty, OH 43319**

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Section 1.0

Purpose and Test Procedure

Purpose and Test Summary

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

This test was conducted with a 1999 Ford Econoline E-150 Cargo Van 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 eight (8) accelerometers to measure longitudinal, lateral, and vertical axis accelerations. The vehicle's specified impact velocity range was 47.5 to 49.1 kph. The vehicle impacted a flat frontal barrier.

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

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

The thirty-eight (38) 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.

Test Results Summary

This flat frontal barrier test was conducted at TRC on February 23, 1999.

The test vehicle, a 1999 Ford Econoline E-150 Cargo Van, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 2443.1 kilograms. The vehicle's impact speed was 48.2 kph. The vehicle's maximum static crush was 447 millimeters.

The driver's 36 millisecond HIC was 188. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 52.1 g. The driver's chest deflection was 34.9 millimeters. The driver's left and right femur maximum compressive forces were 6198 N and 5775 N, respectively.

The right front passenger's 36 millisecond HIC was 288 (See Data Acquisition Explanations). The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 45.8 g. The passenger's chest deflection was 7.3 millimeters. The right front passenger's left and right femur maximum compressive forces were 6209 N and 8039 N, respectively.

Data Acquisition Explanations

The driver dummy's X-axis shear force data channel, NEKXF1, produced a data spike at approximately 144 milliseconds.

The driver dummy's Y-axis shear force data channel, NEKYF1, produced a data spike at approximately 144 milliseconds.

The driver dummy's Z-axis axial force data channel, NEKZF1, produced a data spike at approximately 144 milliseconds.

The right front passenger dummy's head Z-axis acceleration data channel, HEDZG2, recorded questionable data throughout the entire crash event. The passenger dummy's HIC as reported was calculated using X-axis and Y-axis acceleration data only.

The vehicle's left brake caliper X-axis acceleration data channel, BCLXG1, recorded questionable data throughout the entire crash event.

Table 1 Crash Test Summary

Test type:	Frontal barrier impact
Test date:	02/23/99
Test time:	2309
Ambient temperature at impact area:	22° C
Vehicle year/make/ model/body style:	1999/Ford/Econoline E-150/Cargo Van
Vehicle test weight:	2443.1 kg
Impact angle ¹ :	0°
Impact velocity ² :	
Primary:	48.2 kph
Secondary:	48.2 kph
Maximum static crush:	447 mm
Average rebound:	356 mm
Number of cameras:	
Real-time:	1
High-speed:	14
Door opening data:	
Left-front:	Easy
Right-front:	Easy

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

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1999/Ford/Econoline E-150/Cargo Van

Color: White

VIN: 1FTRE14W6XHA48806

Engine data:

Placement: Inline Vee

Cylinders: 8

Displacement: 4.6 liters

Transmission data: 3 speed, manual, X automatic, X overdrive

Final drive: fwd, X rwd, 4wd

Date vehicle received: 02/22/99

Odometer reading: 140

Dealer's name and address: Al Spitzer Ford Inc.
3737 State Road
Cuyahoga Falls, OH 44223

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by: Ford Motor Company

Date of manufacture: 10/98

VIN: 1FTRE14W6XHA48806

GVWR: 3039 kg

GAWR: Front: 1469 kg

Rear: 1723 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P235/75R15
Spare tire:	P235/75R15
Type of front seats:	Bucket, manually adjustable

Tire & capacity data from vehicle's label:

Recommended tire size:	P235/75R15XL
Recommended cold tire pressure:	
Front:	283 kPa
Rear:	283 kPa
Designated Seating Capacity:	
Front	N/A
Rear	N/A
Total	N/A
Vehicle Cargo Weight:	N/A kg

Test vehicle attitudes:

Delivered attitude:	LF: 840 mm	RF: 827 mm	LR: 873 mm	RR: 875 mm
Fully loaded attitude:	LF: 825 mm	RF: 810 mm	LR: 840 mm	RR: 840 mm
Pre-test attitude:	LF: 819 mm	RF: 822 mm	LR: 839 mm	RR: 835 mm
Post-test attitude:	LF: 944 mm	RF: 711 mm	LR: 948 mm	RR: 731 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	594.2 kg	Right rear	463.6 kg
Left front	621.9 kg	Left rear	481.7 kg
Total front weight	1216.1 kg	(56.3% of total vehicle weight)	
Total rear weight	945.3 kg	(43.7% of total vehicle weight)	
Total delivered weight	2161.4 kg		

Calculation of test vehicle's target test weight:

RCLW¹ = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (2161.4 kg)

VCW = Vehicle Capacity Weight (136.1 kg)

DSC² = Designated Seating Capacity (2)

RCLW³ = 136.1 kg

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

Target test weight = 2161.4 + 136.1 + 151.4 = 2448.9 kg

Weight of test vehicle with required dummies and 130.3 kg of cargo weight:

Right front	645.0 kg	Right rear	568.8 kg
Left front	652.7 kg	Left rear	576.6 kg
Total front weight	1297.7 kg	(53.1% of total vehicle weight)	
Total rear weight	1145.4 kg	(46.9% of total vehicle weight)	
Total test weight	2443.1 kg	(0.2% under target test weight)	

Weight of ballast secured in vehicle: 63.5 kg steel plate in cargo area

Components removed to meet target test weight: Tire jack and handle

CG rearward of front wheel centerline: 1642 mm

Vehicle Wheelbase: 3500 mm

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

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

³ From vehicle's tire label.

Table 3 Post-Impact Data

Test number: 990223-2
Test date: 02/23/99
Test time: 2309
Test type: Frontal barrier impact
Impact angle: 0°
Ambient temperature
at impact area: 22° C
Temperature in
occupant compartment: 21° C

Impact velocity:
Primary: 48.2 kph
Secondary: 48.2 kph
Specified range: 47.5 to 49.1 kph

Distance from vehicle to barrier:

Entering velocity trap: 660 mm
Exiting velocity trap: 51 mm

Test vehicle static crush:

Overall length of test vehicle:

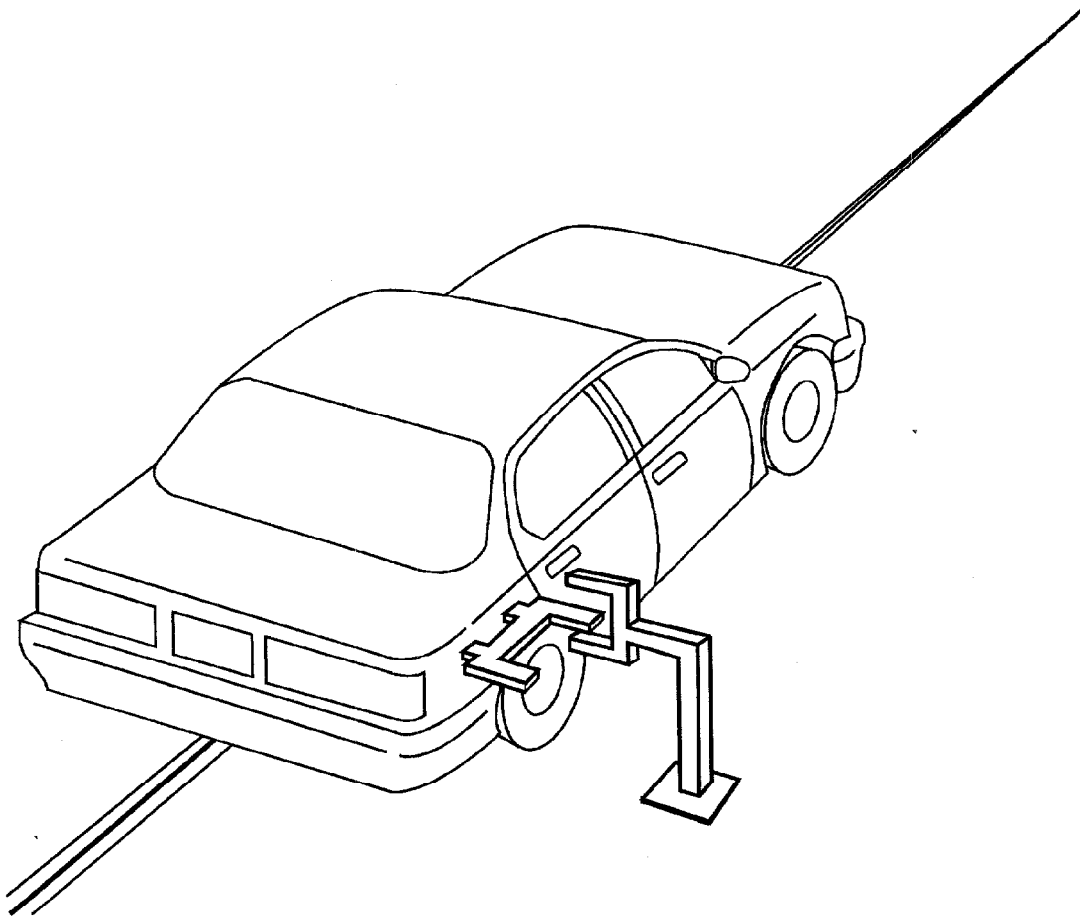
Pre-test:	L: 5686 mm	C: 5797 mm	R: 5688 mm
Post-test:	L: 5338 mm	C: 5350 mm	R: 5361 mm
Total crush:	L: 348 mm	C: 447 mm	R: 327 mm
Average crush:	374 mm		

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L: 377 mm	C: 342 mm	R: 349 mm
Average rebound:	356 mm		

Figure 1 Impact Velocity Measurement System



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

The vanes have 610-millimeter spacing.

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

Test date: 02/23/99
 Vehicle year/make/
 model/body style: 1999/Ford/Econoline E-150/Cargo Van
 VIN: 1FTRE14W6XHA48806
 Build date: 10/98
 Test weight: 2443.1 kg
 Vehicle wheelbase: 3500 mm
 Maximum width: 2010 mm
 Front overhang: 750 mm

Collision Deformation
 Classification (CDC) Code: 12FDEW4

Crush depth
 measurements:

C1:	348 mm
C2:	409 mm
C3:	440 mm
C4:	428 mm
C5:	370 mm
C6:	327 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged
 region: L: 1727 mm

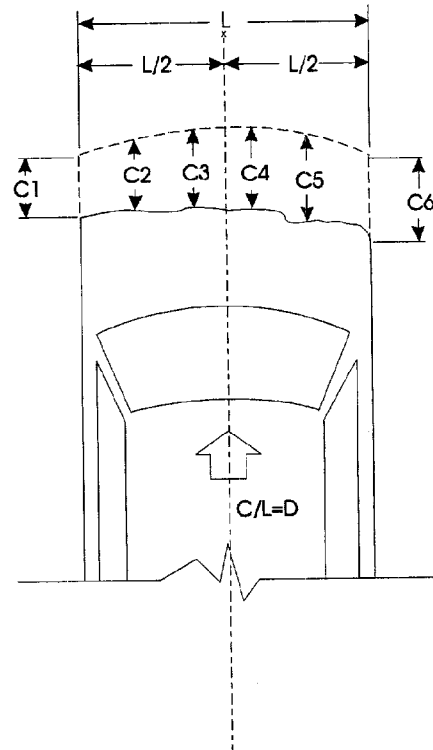


Figure 3 Vehicle Accelerometer Placement

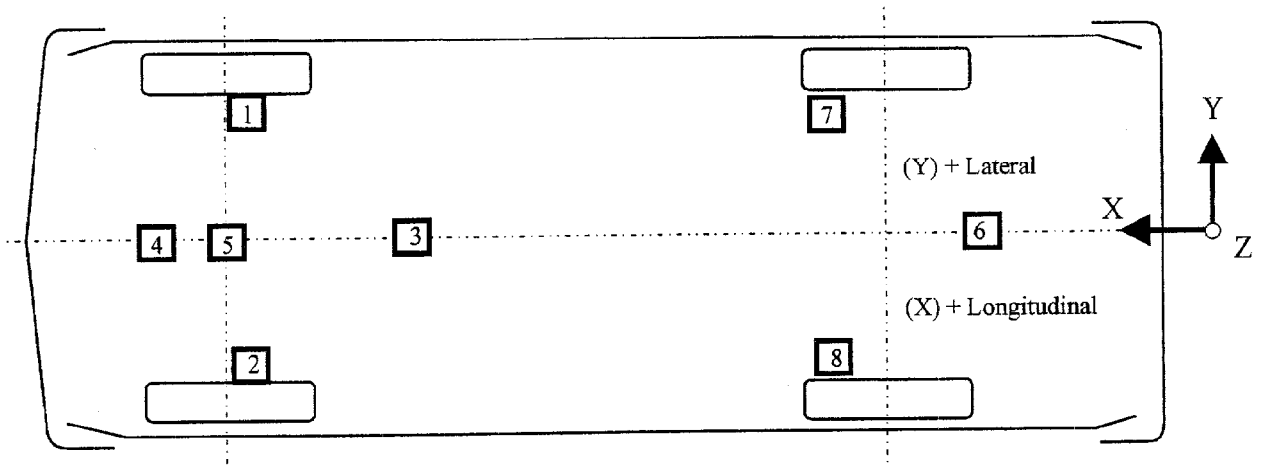
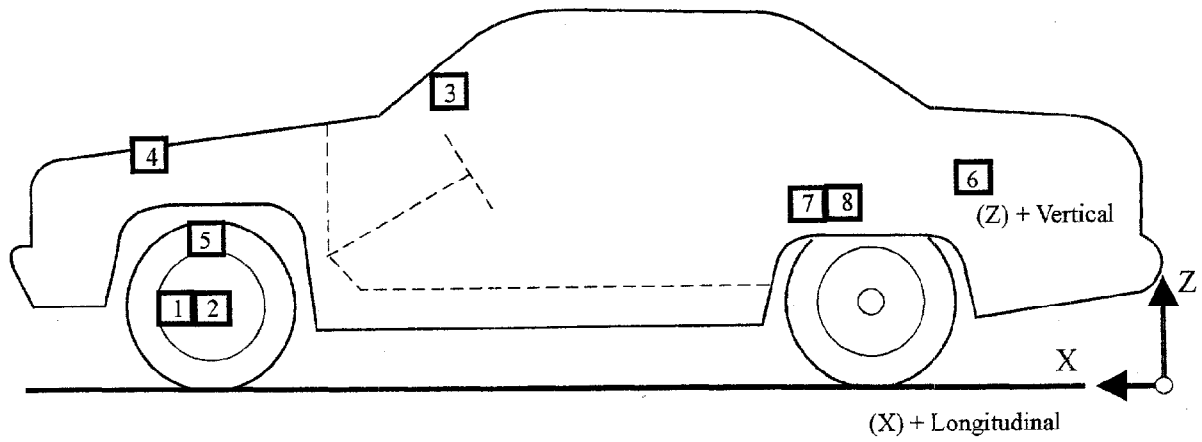


Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 990223-2 No. LOCATION	X		Y		Z		POSITIVE DIRECTION		NEGATIVE DIRECTION	
	PRE	POST	PRE	POST	PRE	POST	---	---	---	---
1 LEFT BRAKE CALIPER LONGITUDINAL ¹	4511 mm	4397 mm	790 mm	790 mm	355 mm	NA				
2 RIGHT BRAKE CALIPER LONGITUDINAL	4509 mm	4493 mm	-790 mm	-925 mm	253 mm	NA	31.7 g @ 45.6 ms	53.7 g @ 21.8 ms		
3 INSTRUMENT PANEL CENTER LONGITUDINAL	4184 mm	4206 mm	0 mm	0 mm	1416 mm	NA	8.1 g @ 46.5 ms	49.3 g @ 25.8 ms		
4 ENGINE TOP LONGITUDINAL	4190 mm	4129 mm	240 mm	240 mm	496 mm	NA	3.6 g @ 76.9 ms	40.4 g @ 28.2 ms		
5 ENGINE BOTTOM LONGITUDINAL	4300 mm	4239 mm	-115 mm	-115 mm	259 mm	NA	3.5 g @ 162.3 ms	44.9 g @ 23.8 ms		

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

TEST NUMBER: 990223-2									
No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION			
6 REAR VEHICLE CENTERLINE VERTICAL	PRE 273 mm	0 mm	657 mm						
	POST 273 mm	0 mm	NA	34.9 g	@ 10.8 ms	40.7 g	@ 14.5 ms		
7 LEFT REAR SEAT LONGITUDINAL	PRE 2626 mm	750 mm	617 mm						
	POST 2626 mm	750 mm	NA	1.4 g	@ 104.3 ms	28.6 g	@ 14.2 ms		
8 RIGHT REAR SEAT LONGITUDINAL	PRE 2600 mm	-465 mm	617 mm						
	POST 2600 mm	-465 mm	NA	1.4 g	@ 133.2 ms	27.9 g	@ 13.7 ms		

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

¹See DATA ACQUISITION EXPLANATIONS

Section 3.0

FMVSS 208 Data

Table 5 Dummy Injury Criteria

<u>Maximum Acceleration</u>							
	<u>Head</u>				<u>Chest</u>		
	X	Y	Z	R	X	Y	Z
Driver	-32.4 g	19.6 g	18.4 g	35.2 g	-51.7 g	7.5 g	10.3 g
Passenger	-51.2 g	-15.4 g	N/A ¹	N/A ¹	-43.0 g	8.1 g	21.4 g

<u>Maximum Femur Compressive Force</u>		
	<u>Left Femur</u>	<u>Right Femur</u>
Driver	6198 N	5775 N
Passenger	6209 N	8039 N

<u>Head Injury Criteria²</u>			
	<u>HIC</u>	<u>Time t₁</u>	<u>Time t₂</u>
Driver	188	66.3 ms	102.3 ms
Passenger ¹	288	71.3 ms	107.3 ms

<u>Chest Maximum Resultant Acceleration³</u>			
	<u>Acceleration</u>	<u>Time t₁</u>	<u>Time t₂</u>
Driver	52.1 g	80.6 ms	83.6 ms
Passenger	45.8 g	77.2 ms	80.2 ms

<u>Maximum Chest Deflection</u>	
Driver	34.9 mm
Passenger	7.3 mm

¹ See Data Acquisition Explanations

² As defined in FMVSS No. 208

³ Defined as equal to or exceeding 0.003 sec. duration

Dummy Kinematic Summary

Driver Dummy

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

Right Front Passenger Dummy

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

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

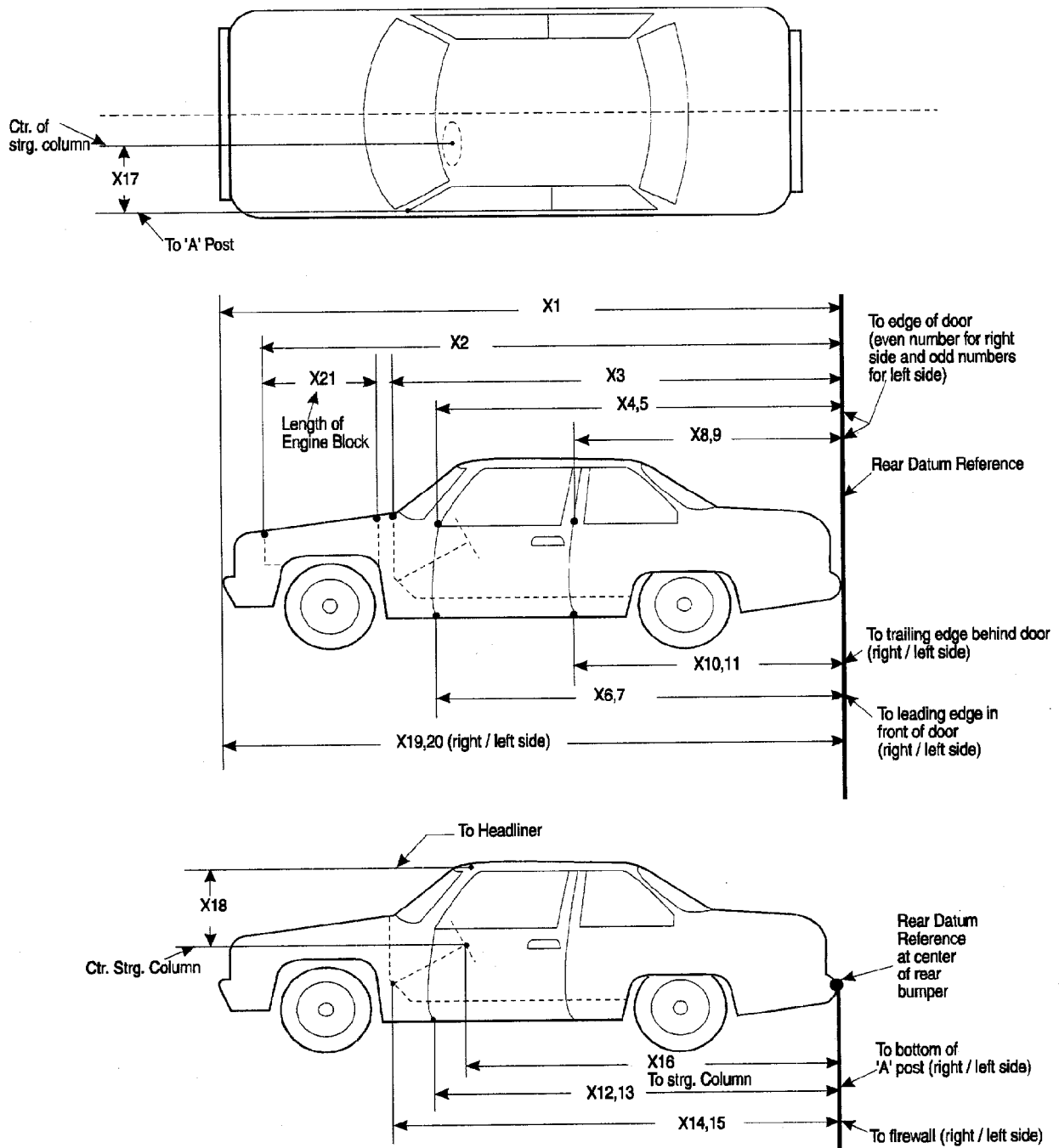


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1999/Ford/Econoline E-150/Cargo Van

Test Number: 990223-2

No.	Type of measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	5797 mm	5350 mm	447 mm
X2	Rear surface of vehicle to front of engine block	5387 mm	5180 mm	207 mm
X3	Rear surface of vehicle to firewall	5129 mm	5117 mm	12 mm
X4	Rear surface of vehicle to upper leading edge of right door	4613 mm	4585 mm	28 mm
X5	Rear surface of vehicle to upper leading edge of left door	4624 mm	4600 mm	24 mm
X6	Rear surface of vehicle to lower leading edge of right door	4500 mm	4468 mm	32 mm
X7	Rear surface of vehicle to lower leading edge of left door	4470 mm	4450 mm	20 mm
X8	Rear surface of vehicle to upper trailing edge of right door	3700 mm	3673 mm	27 mm
X9	Rear surface of vehicle to upper trailing edge of left door	3683 mm	3662 mm	21 mm
X10	Rear surface of vehicle to lower trailing edge of right door	3694 mm	3662 mm	32 mm
X11	Rear surface of vehicle to lower trailing edge of left door	3666 mm	3650 mm	16 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	4610 mm	4580 mm	30 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	4610 mm	4587 mm	23 mm
X14	Rear surface of vehicle to firewall - right side	5100 mm	5095 mm	5 mm
X15	Rear surface of vehicle to firewall - left side	5099 mm	5091 mm	8 mm
X16	Rear surface of vehicle to steering wheel center	4175 mm	4280 mm	-105 mm
X17	Center of steering column to "A" post	305 mm	260 mm	45 mm
X18	Center of steering column to headliner	515 mm	500 mm	15 mm
X19	Rear surface of vehicle to right side of front bumper	5688 mm	5361 mm	327 mm
X20	Rear surface of vehicle to left side of front bumper	5686 mm	5338 mm	348 mm
X21	Length of engine block	500 mm	500 mm	0 mm

Figure 5 Vehicle Target Locations

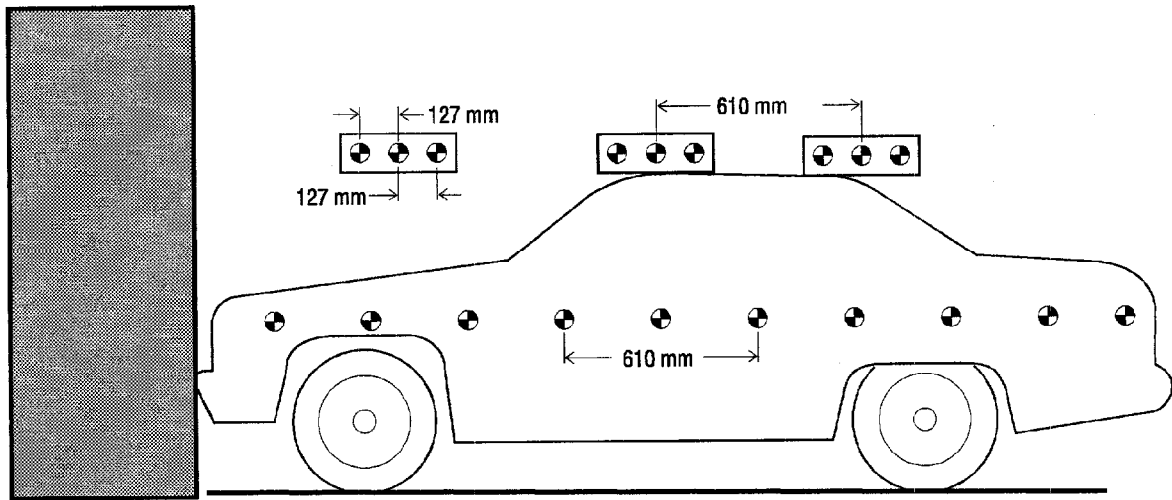


Figure 6 Dummy Measurement Locations for Front Seat Occupants

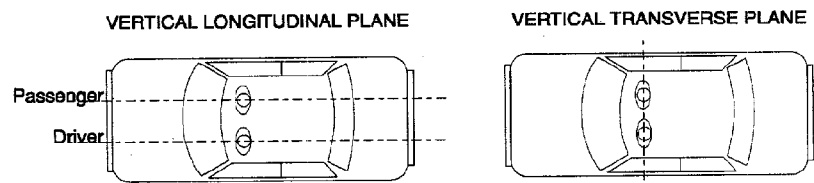
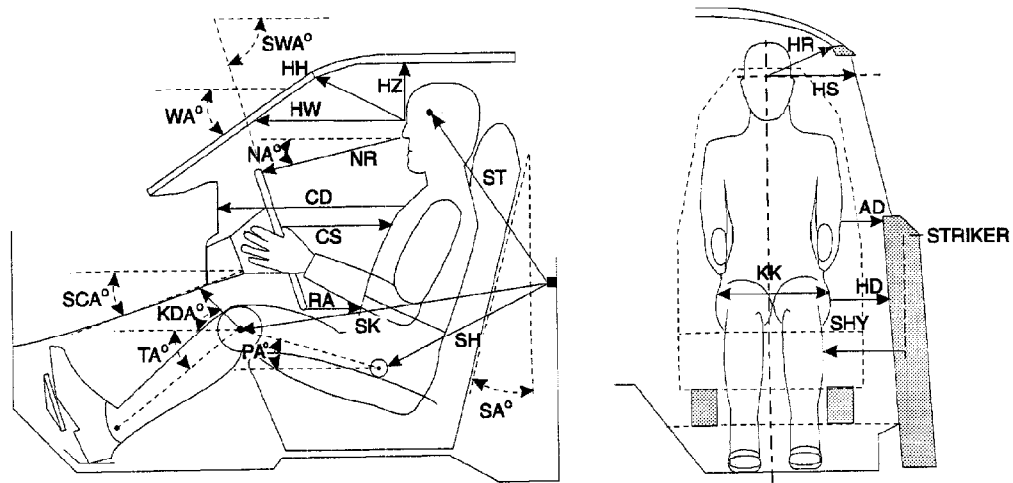


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #168)	Passenger (Serial #169)
WA	Windshield angle	44°	44°
SWA	Steering wheel angle	70°	N/A
SCA	Steering column angle	20°	N/A
SA	Seat back angle	18°	21°
HZ	Head to roof	280 mm	295 mm
HH	Head to header	482 mm	558 mm
HW	Head to windshield	650 mm	754 mm
HR	Head to side header	290 mm	310 mm
NR	Nose to rim	367 mm	N/A
NA	Nose to rim angle	13°	N/A
CD	Chest to dash	575 mm	570 mm
CS	Steering wheel to chest	291 mm	N/A
RA	Rim to abdomen	163 mm	N/A
KDL	Left knee to dash	140 mm	140 mm
KDR	Right knee to dash	130 mm	157 mm
KDA	Outboard knee to dash angle	26°	27°
PA	Pelvic angle	24°	24°
TA	Tibial angle	64°	54°
KK	Knee to knee	251 mm	270 mm
ST ¹	Striker to head	522 mm	514 mm
	Striker to head angle	-81°	-92°
SK	Striker to knee	596 mm	552 mm
	Striker to knee angle	5°	9°
SH ¹	Striker to H-point	252 mm	192 mm
	Striker to H-point angle	30°	44°
SHY	Striker to H-point (Y dir.)	192 mm	202 mm
HS	Head to side window	337 mm	367 mm
HD	H-point to door	147 mm	146 mm
AD	Arm to door	98 mm	113 mm

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

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

Figure 7 Camera Positions

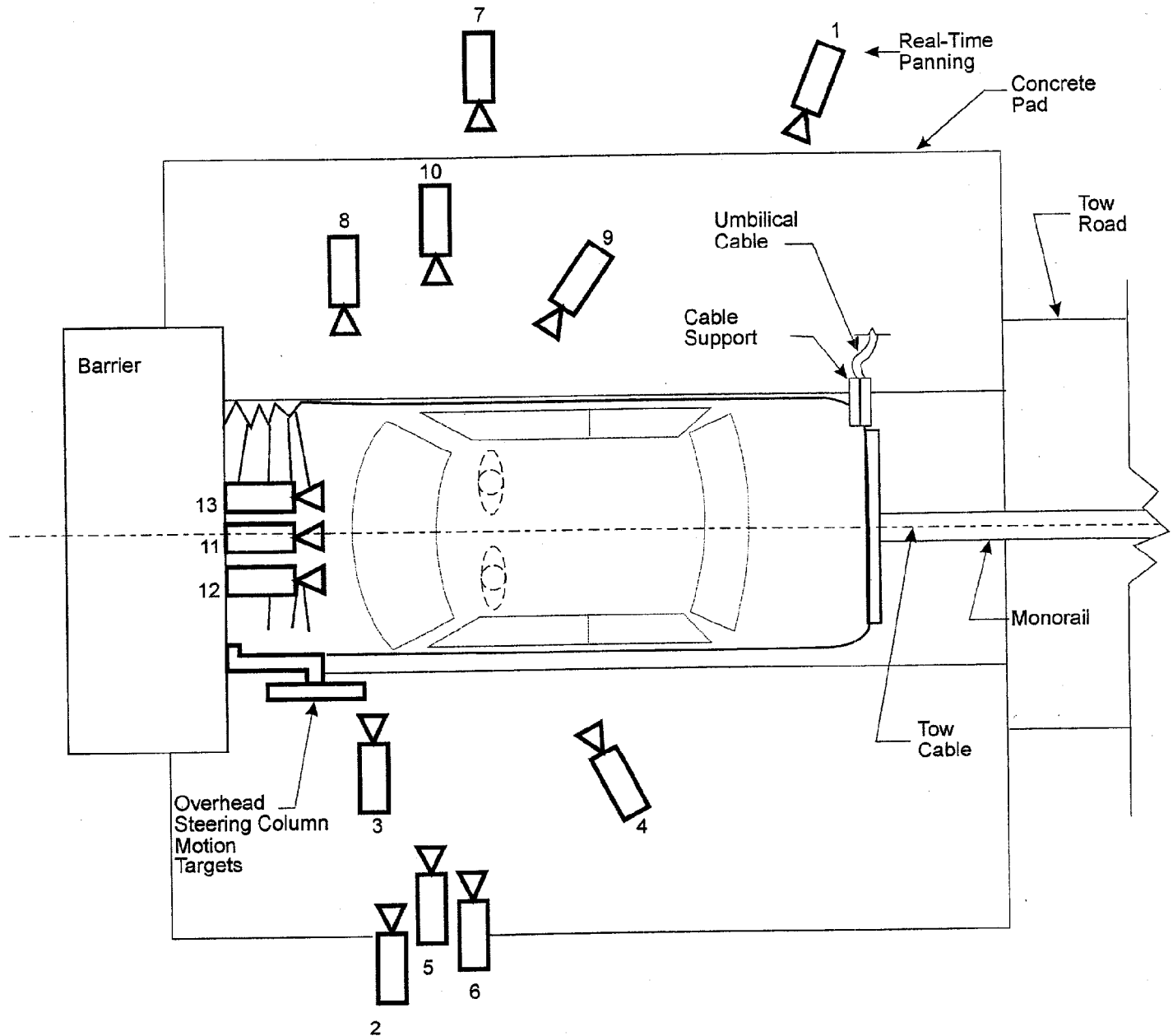


Figure 7 Camera Positions, Cont'd.

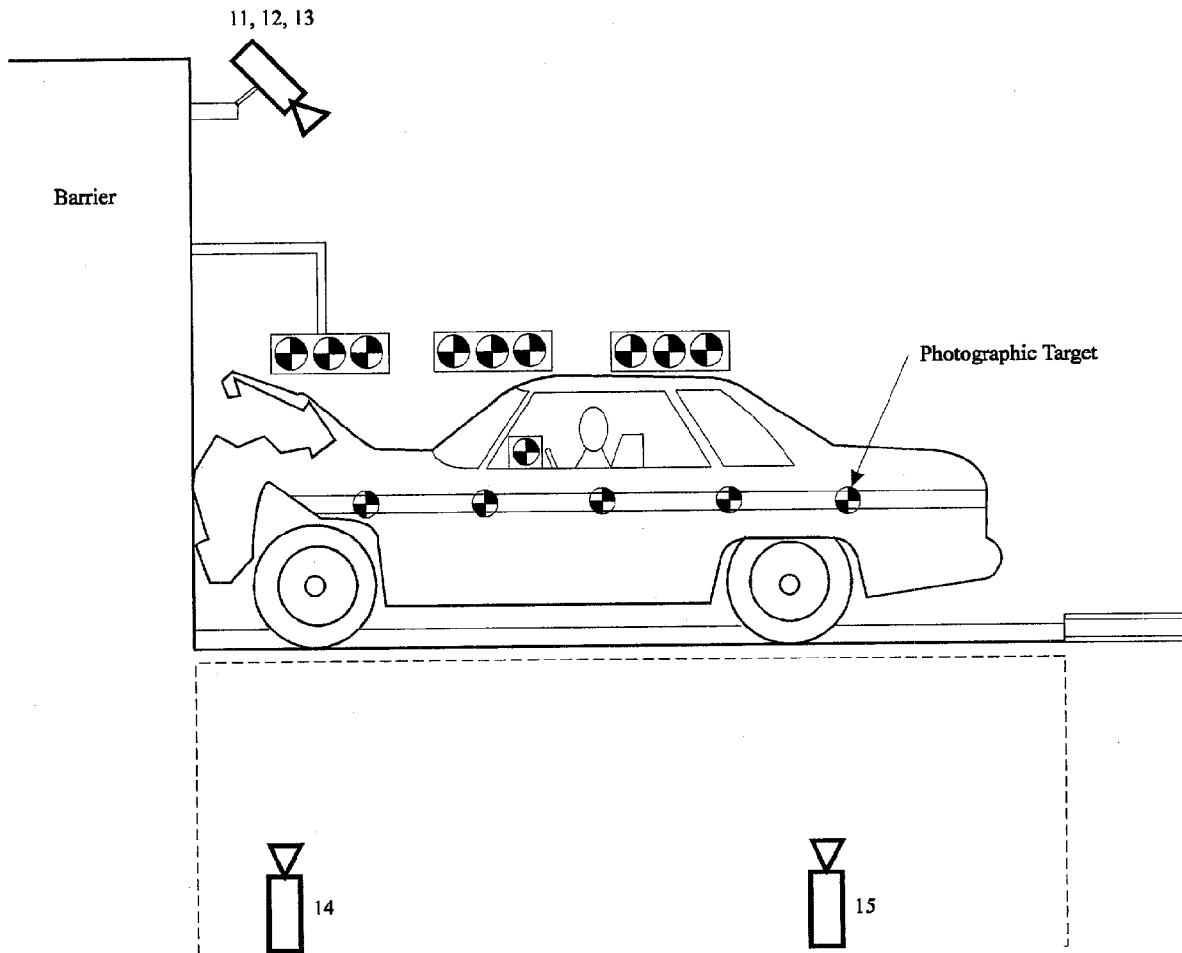


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1999/Ford/Econoline E-150/Cargo Van

Test number: 990223-2

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	N/A	N/A	N/A	N/A	N/A	16 mm	24 frames/s
2	Left vehicle crush	-1054 mm	7493 mm	1118 mm	0°	6920 mm	25 mm	995 frames/s
3	Left windshield intrusion	-906 mm	7984 mm	1530 mm	0°	N/A	50 mm	1000 frames/s
4	Driver kinematics	-3995 mm	2946 mm	2210 mm	-6°	3060 mm	25 mm	1002 frames/s
5	Steering column motion	-2775 mm	7264 mm	2930 mm	-11°	N/A	25 mm	998 frames/s
6	Steering column motion	-2775 mm	7264 mm	1908 mm	-4°	N/A	25 mm	1002 frames/s
7	Right overall	-2065 mm	-6767 mm	1120 mm	0°	N/A	13 mm	998 frames/s
8	Right windshield intrusion	-906 mm	-7984 mm	1530 mm	0°	N/A	50 mm	1005 frames/s
9	Passenger kinematics	-3863 mm	-2946 mm	2210 mm	-8°	3090 mm	25 mm	990 frames/s
10	Passenger kinematics	-986 mm	-7442 mm	1340 mm	0°	6874 mm	25 mm	998 frames/s
11	Windshield front view	-440 mm	0 mm	2350 mm	-69°	N/A	8.5 mm	1002 frames/s
12	Driver - front view	-440 mm	375 mm	2350 mm	-53°	N/A	17 mm	995 frames/s
13	Passenger - front view	-440 mm	-325 mm	2350 mm	-60°	N/A	17 mm	968 frames/s
14	Pit - front position	-340 mm	0 mm	-3320 mm	90°	N/A	13 mm	1012 frames/s
15	Pit - rear position	-1260 mm	0 mm	-3320 mm	90°	N/A	13 mm	1000 frames/s
	Real-time documentation	N/A	N/A	N/A	N/A	N/A	12-120 mm	24 frames/s

¹ +X: Film plane forward of barrier face

+Y: Film plane to left of monorail centerline

+Z: Film plane above ground level

² +Angle: Film plane angled upward from horizontal plane

Appendix A

Photographs



Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Side View



Figure A-4 Post-Test Left Side View



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



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



Figure A-7 Pre-Test Rear View



Figure A-8 Post-Test Rear View



Figure A-9 Pre-Test Right Side View



Figure A-10 Post-Test Right Side View



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



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

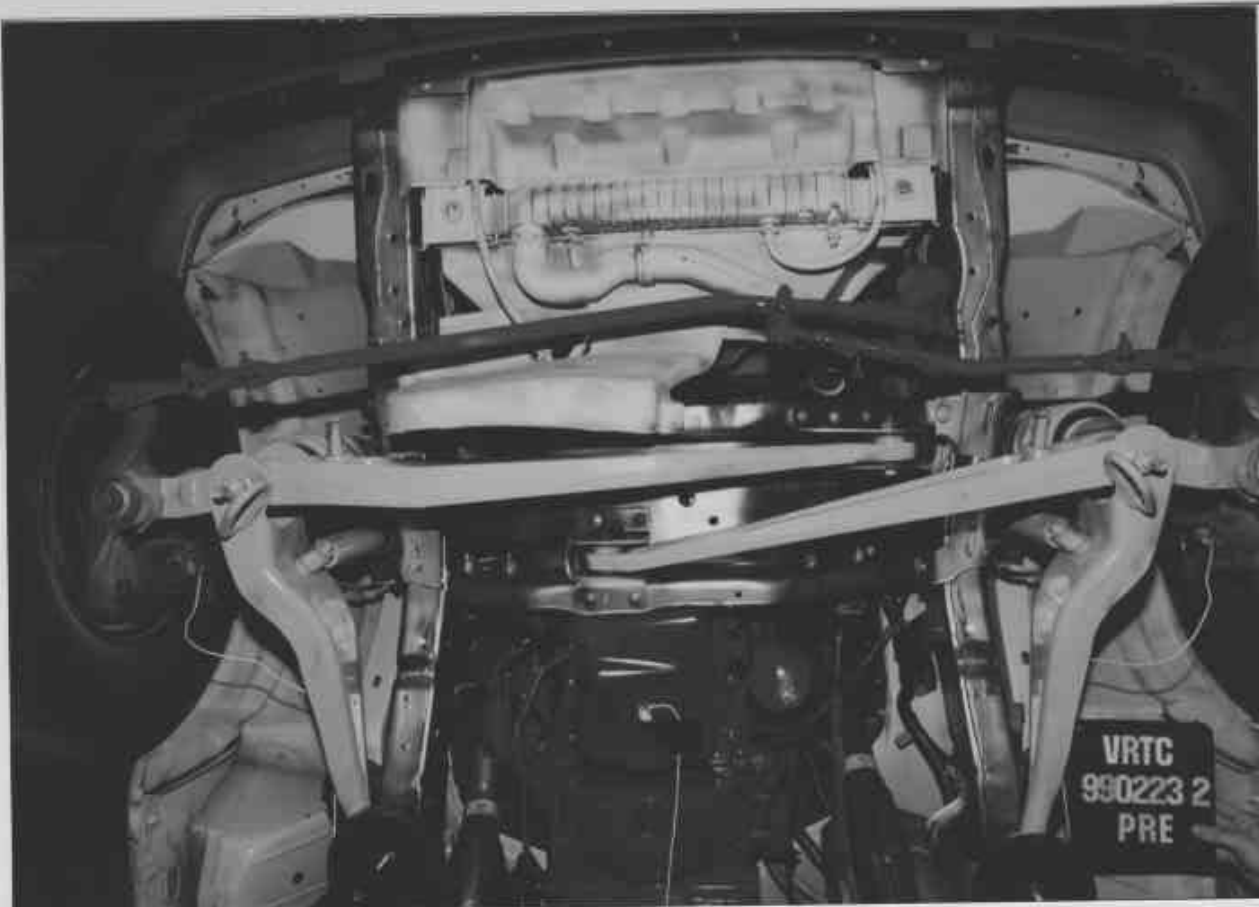


Figure A-13 Pre-Test Front Underbody View

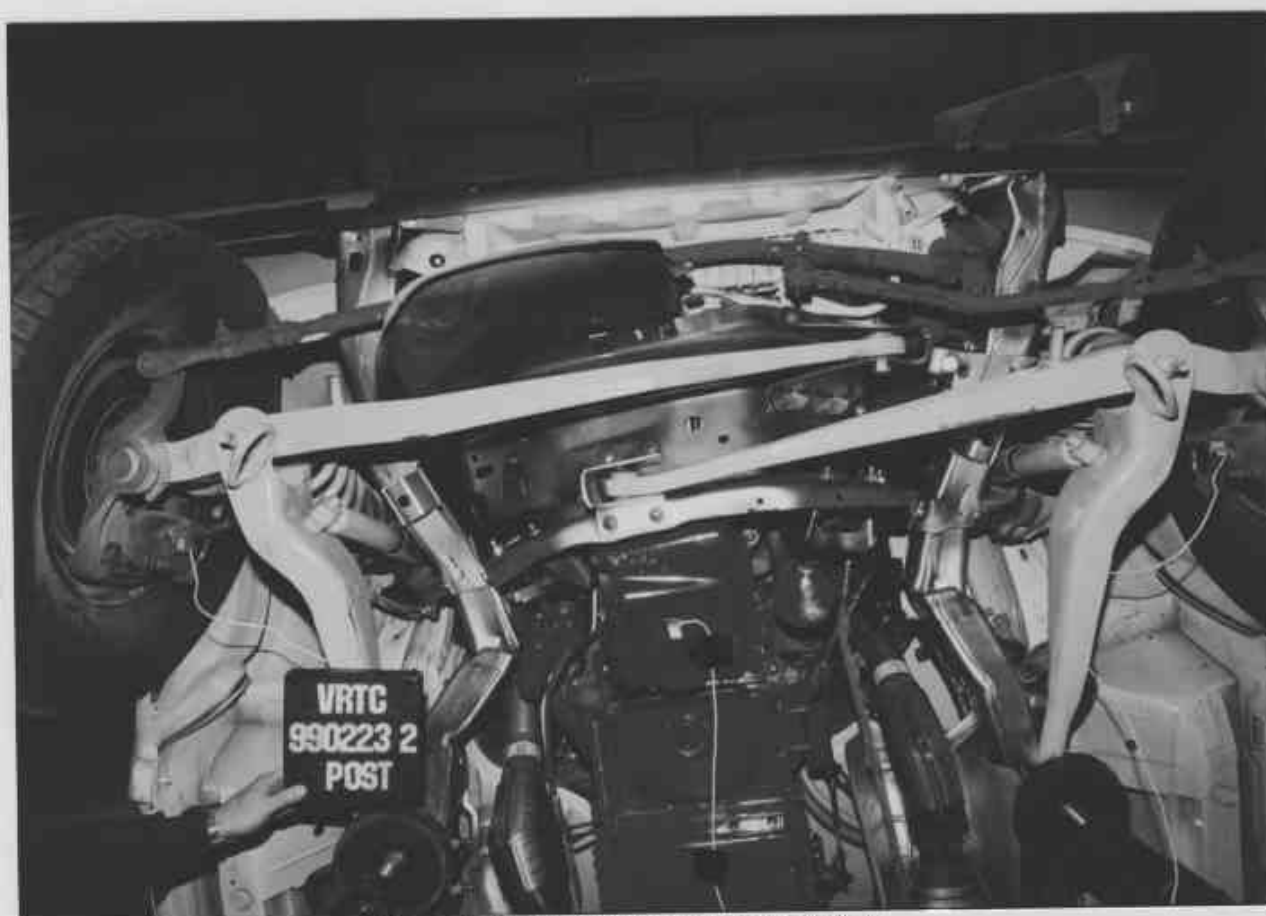


Figure A-14 Post-Test Front Underbody View

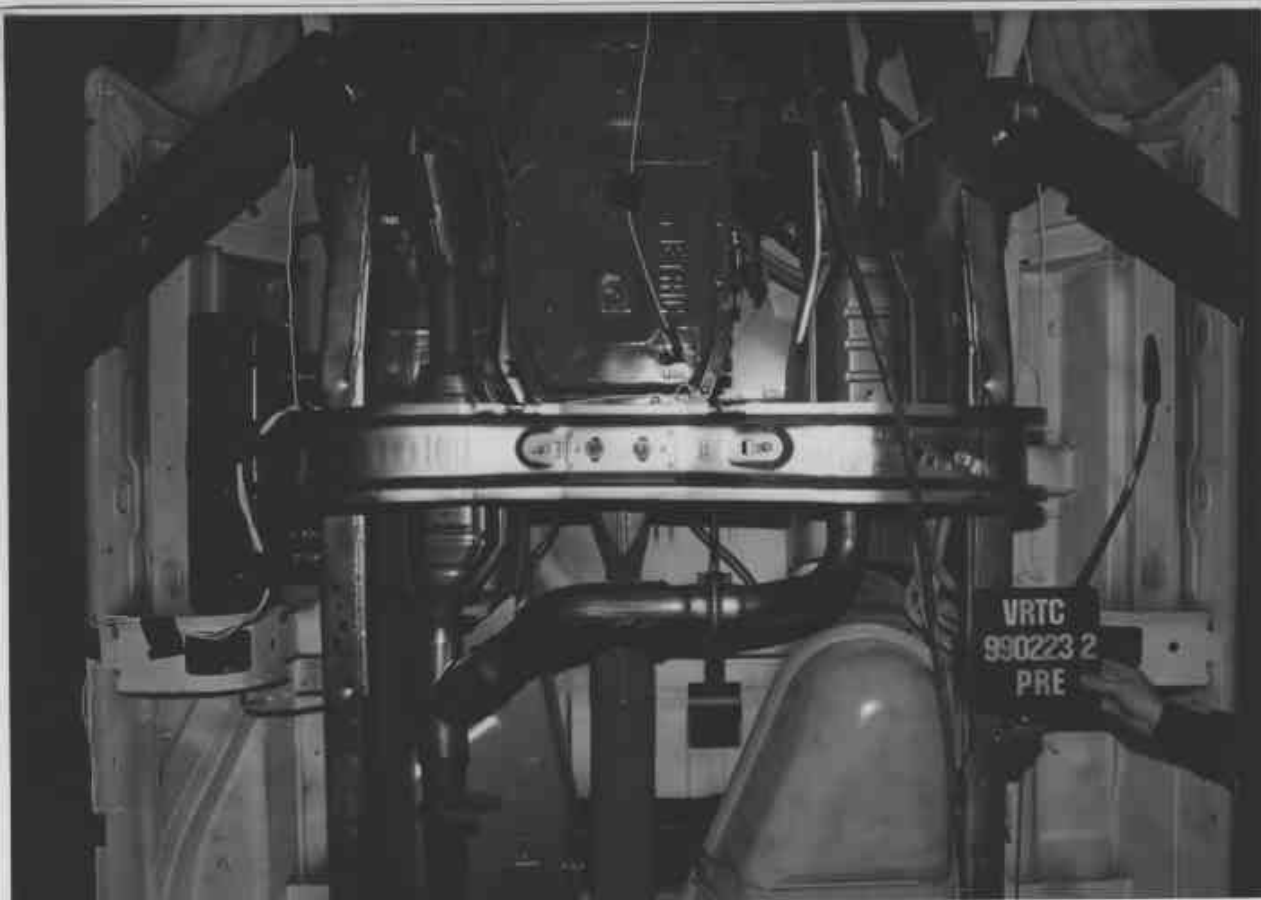


Figure A-15 Pre-Test Mid Underbody - View 1

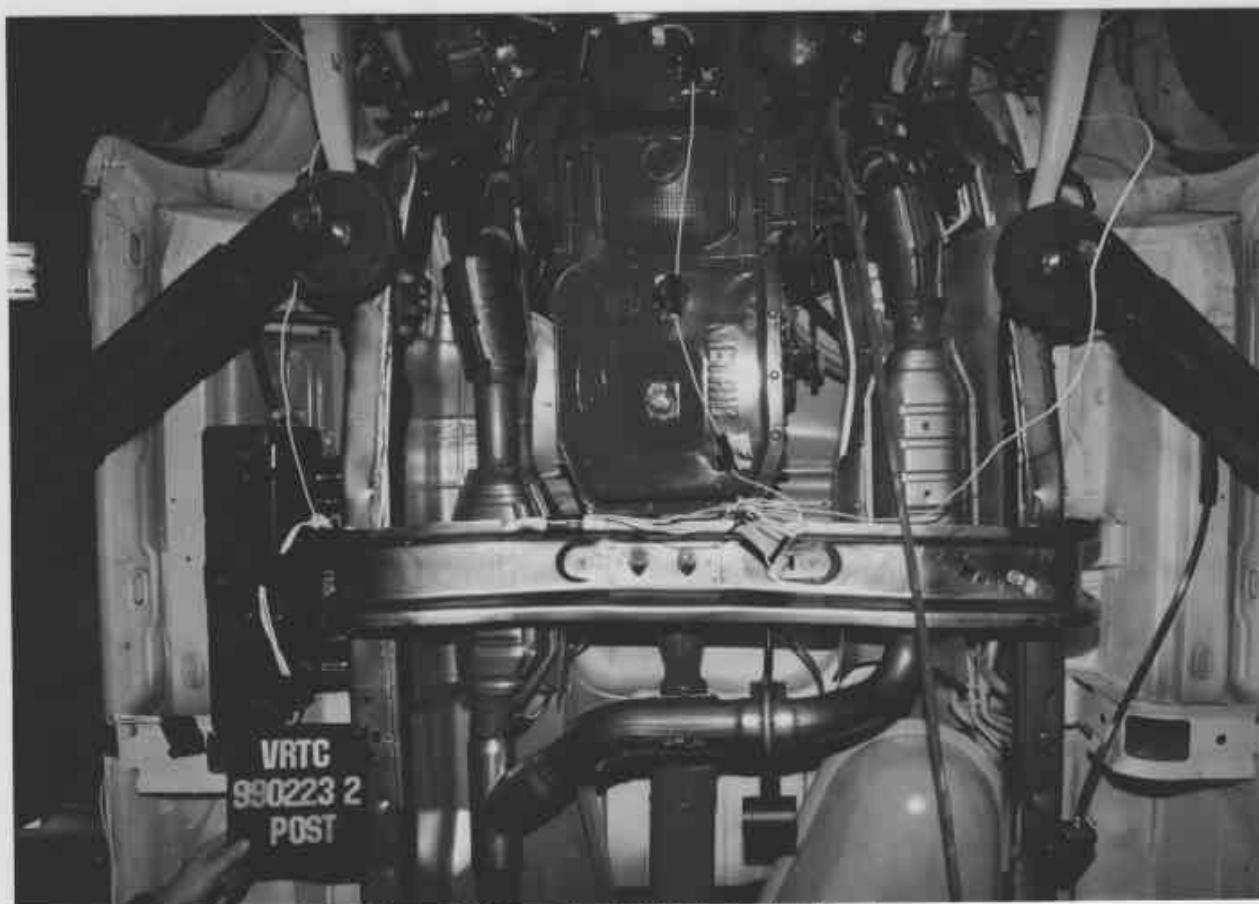


Figure A-16 Post-Test Mid Underbody - View 1



Figure A-17 Pre-Test Mid Underbody - View 2



Figure A-18 Post-Test Mid Underbody - View 2

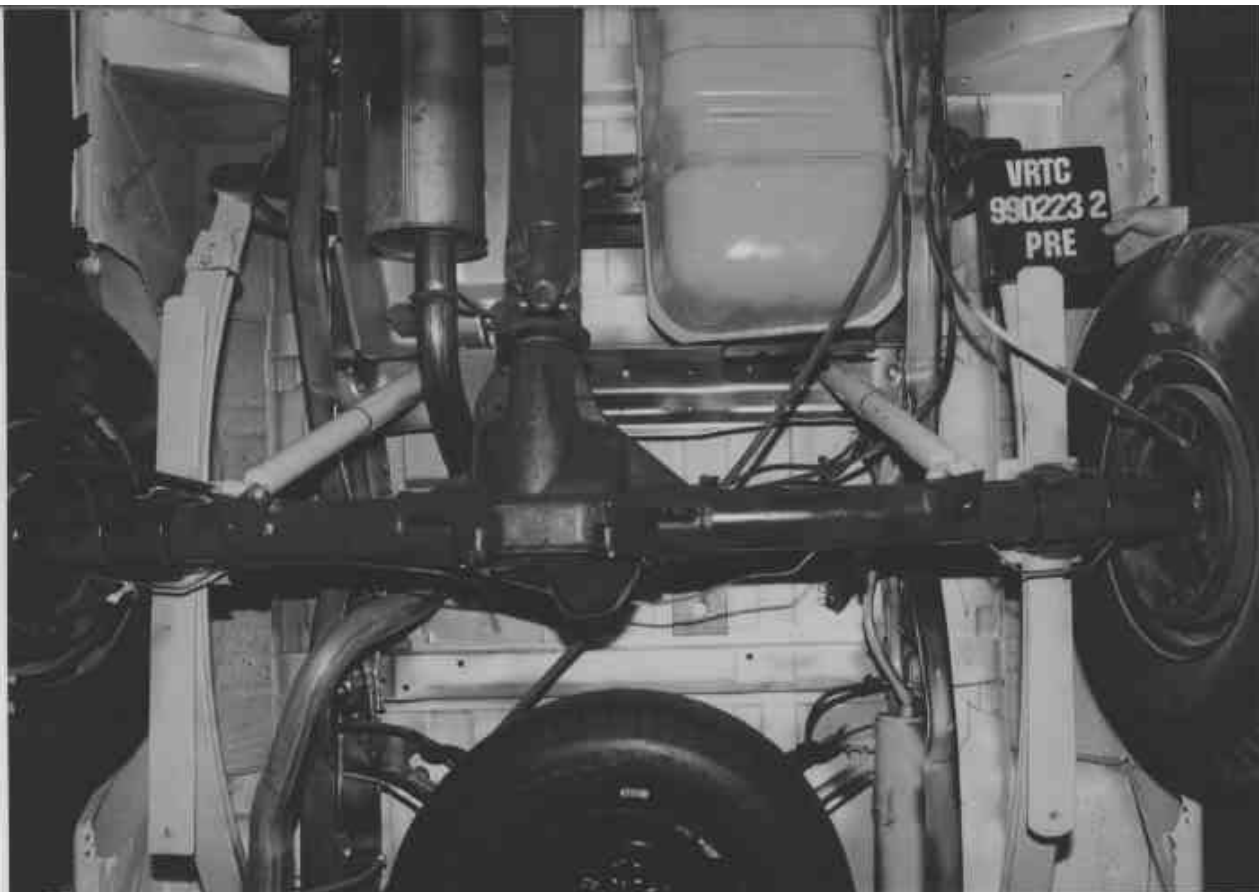


Figure A-19 Pre-Test Mid Underbody - View 3



Figure A-20 Post-Test Mid Underbody - View 3

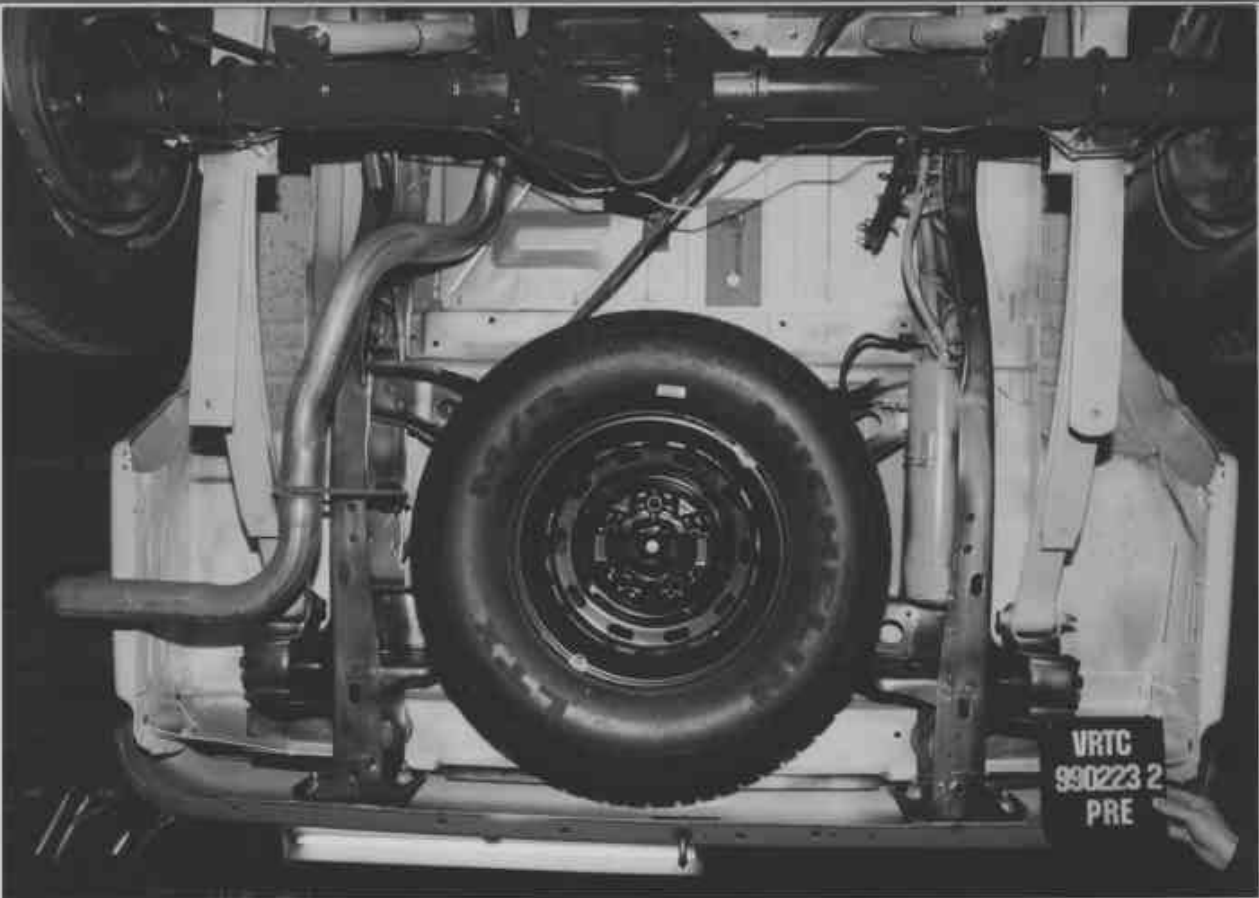


Figure A-21 Pre-Test Rear Underbody View



Figure A-22 Post-Test Rear Underbody View



Figure A-23 Pre-Test Engine Compartment View



Figure A-24 Post-Test Engine Compartment View



Figure A-25 Pre-Test Windshield - View 1



Figure A-26 Post-Test Windshield - View 1



Figure A-27 Pre-Test Windshield - View 2



Figure A-28 Post-Test Windshield - View 2

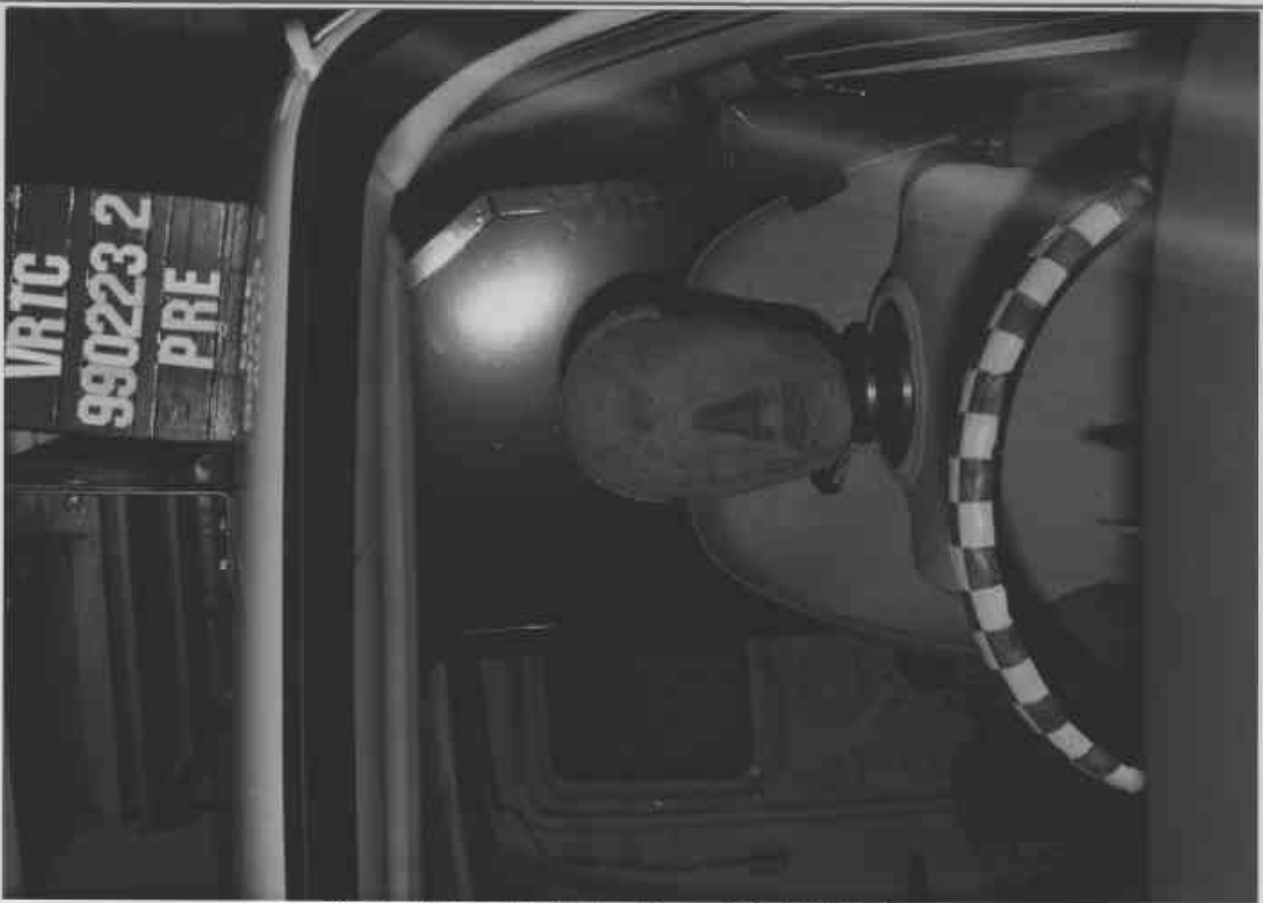


Figure A-29 Pre-Test Driver Dummy Windshield View



Figure A-30 Post-Test Driver Dummy Windshield View



Figure A-31 Pre-Test Passenger Dummy Windshield View



Figure A-32 Post-Test Passenger Dummy Windshield View



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



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



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



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



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



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



Figure A-39 Pre-Test Passenger Dummy Position - View 1



Figure A-40 Post-Test Passenger Dummy Position - View 1



Figure A-41 Pre-Test Passenger Dummy Position - View 2



Figure A-42 Post-Test Passenger Dummy Position - View 2



Figure A-43 Pre-Test Passenger Dummy Position - View 3



Figure A-44 Post-Test Passenger Dummy Position - View 3



Figure A-45 Post-Test Driver Dummy View



Figure A-46 Post-Test Driver Dummy Head Contact - View 1



Figure A-47 Post-Test Driver Dummy Head Contact - View 2



Figure A-48 Post-Test Driver Dummy Head Contact - View 3



Figure A-49 Post-Test Driver Dummy Knee Contact - View 1



Figure A-50 Post-Test Driver Dummy Knee Contact - View 2



Figure A-51 Post-Test Driver Footwell Deformation View



Figure A-52 Post-Test Passenger Dummy View



Figure A-53 Post-Test Passenger Dummy Head Contact - View 1



Figure A-54 Post-Test Passenger Dummy Head Contact - View 2



Figure A-55 Post-Test Passenger Dummy Knee Contact - View 1

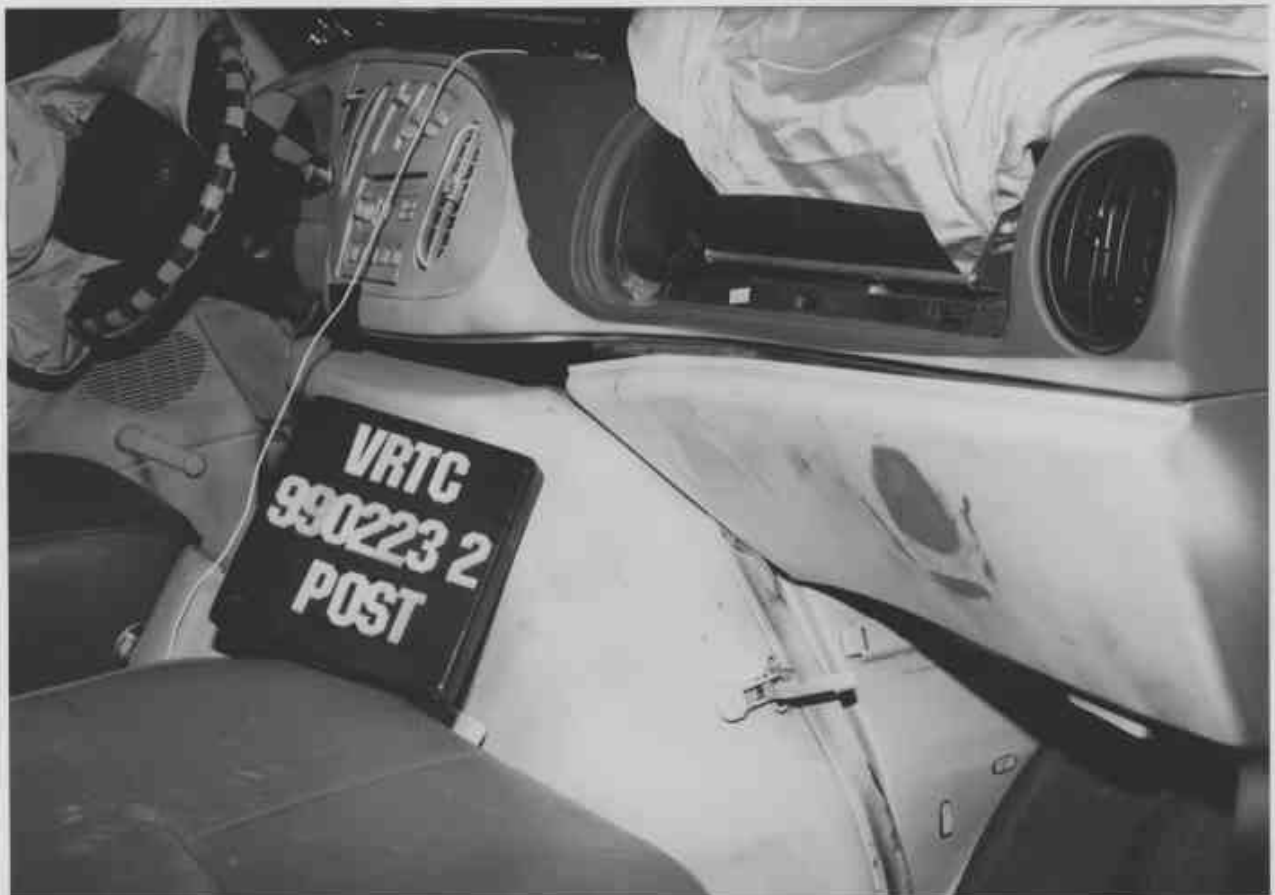


Figure A-56 Post-Test Passenger Dummy Knee Contact - View 2



Figure A-57 Post-Test Passenger Footwell Deformation View



Figure A-58 Pre-Test Ballast Location View



Figure A-59 Pre-Test Vehicle Certification/Tire Information Label View

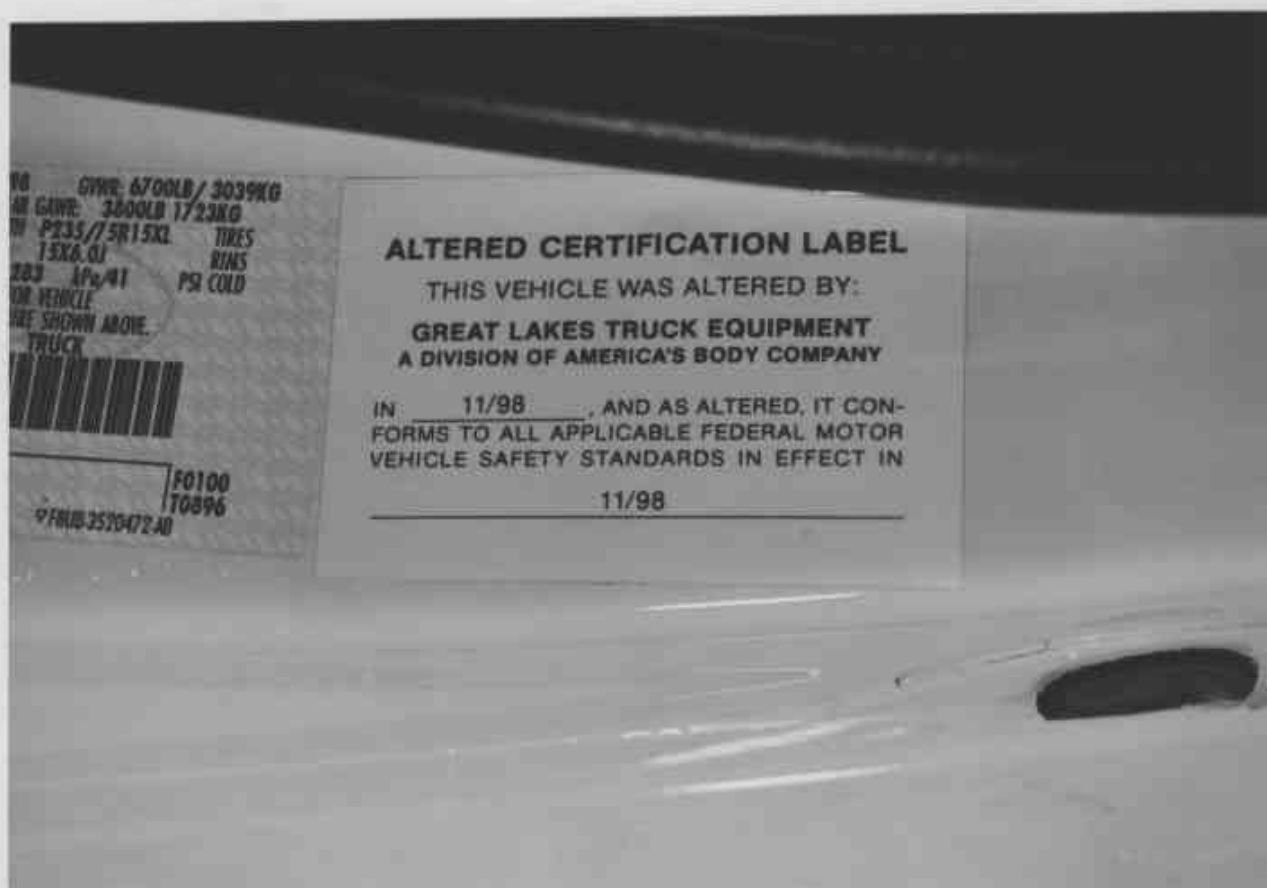


Figure A-60 Pre-Test Vehicle Altered Certification Label View

Appendix B

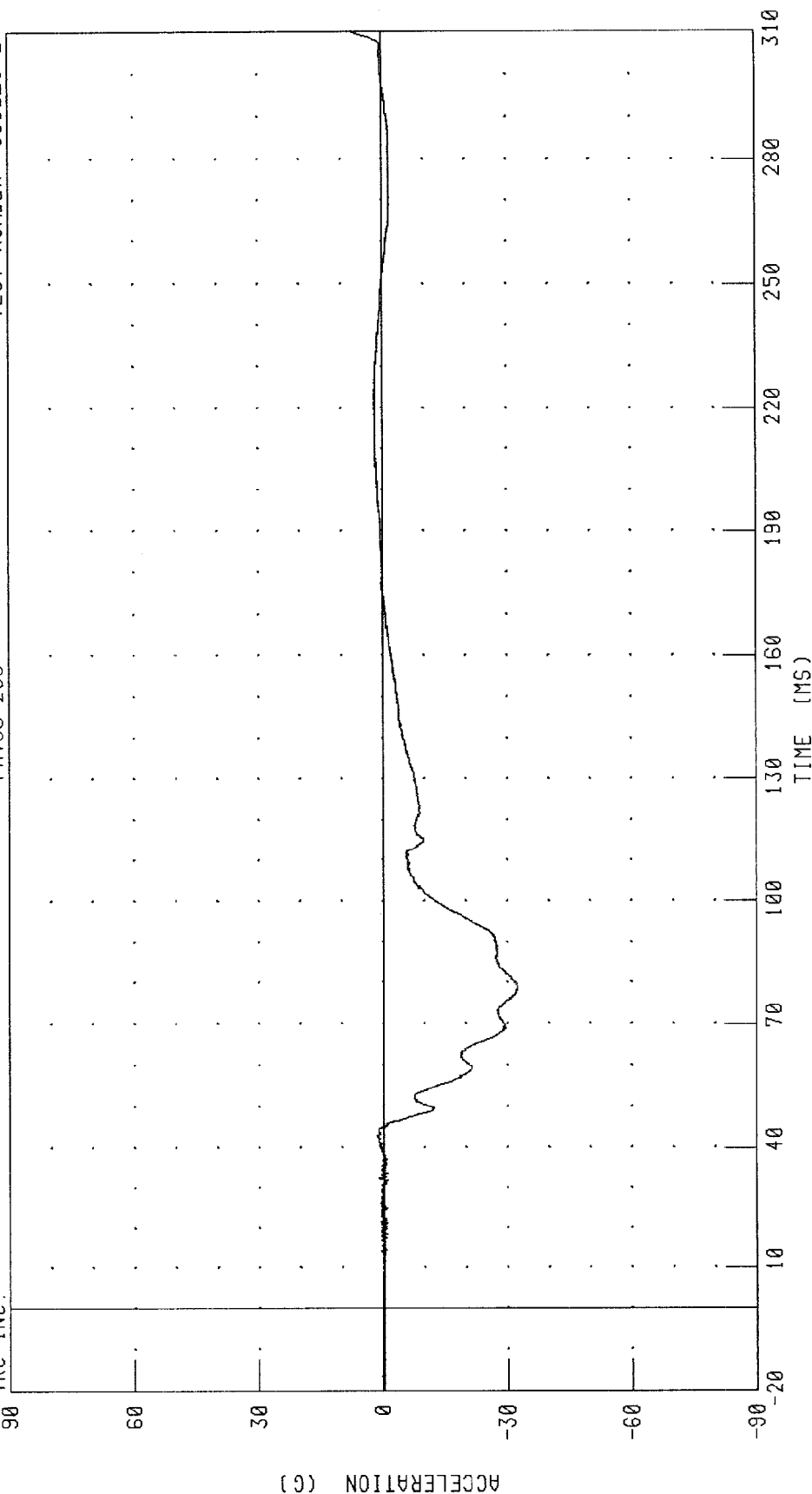
Data Plots

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: HEDXC1 FILTER: CH. CLASS 1000

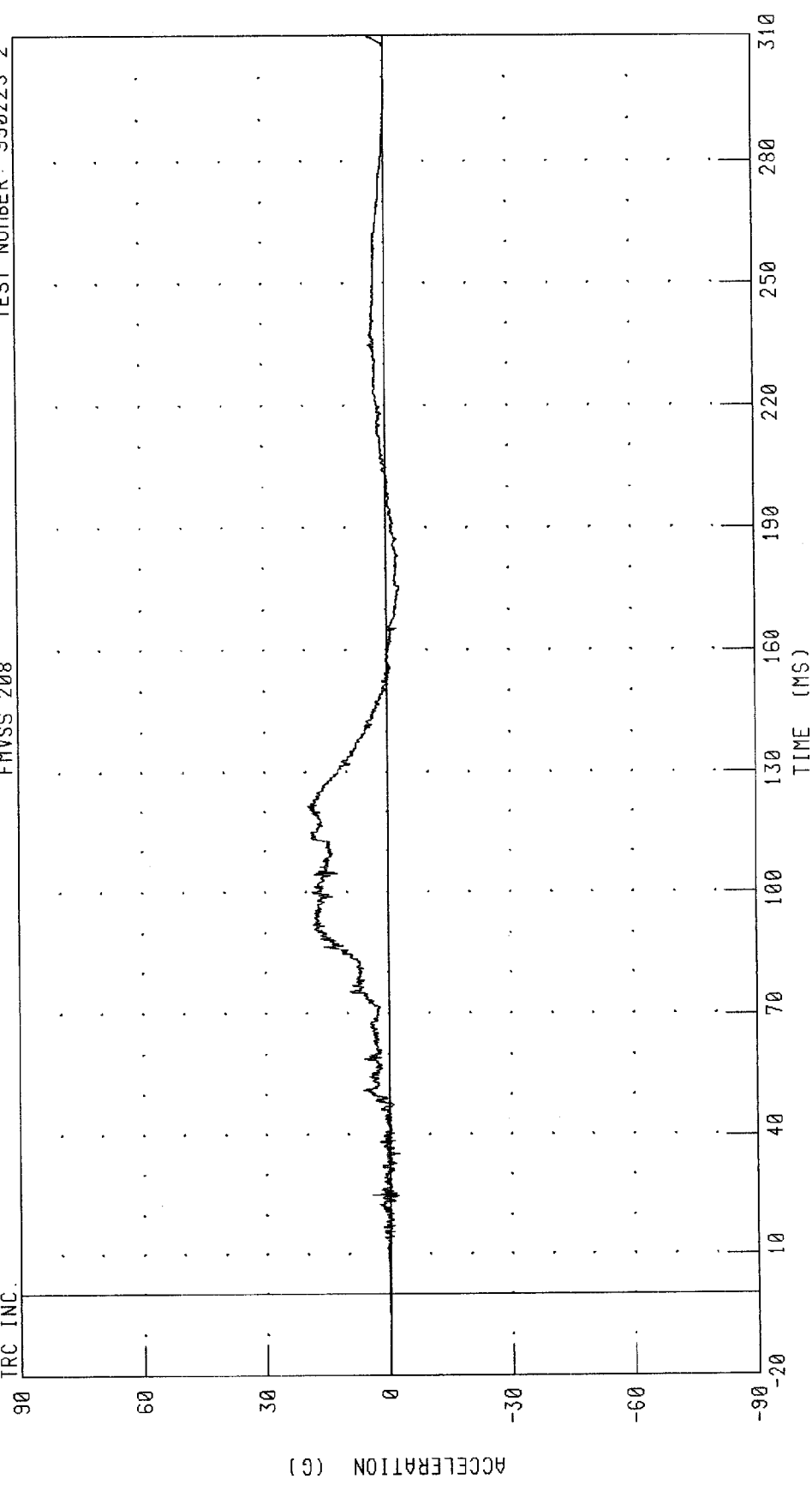
PEAK DATA: 7.81 G @ 310.00 MS, -32.42 G @ 78.40 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 19.56 G @ 121.36 MS; -3.20 G @ 175.12 MS

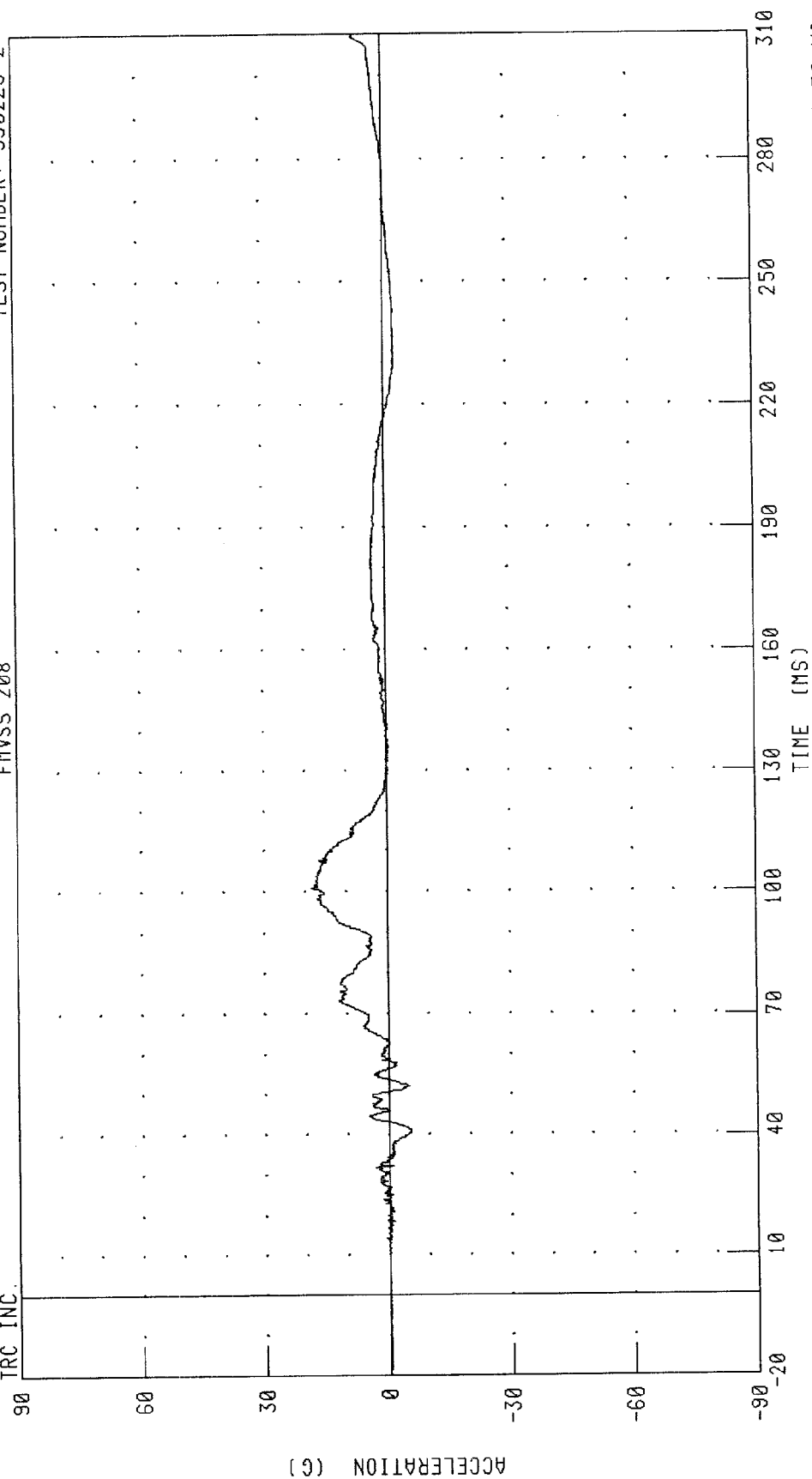
CHANNEL: HEDYC1 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: HEDZC1 FILTER: CH. CLASS 1000

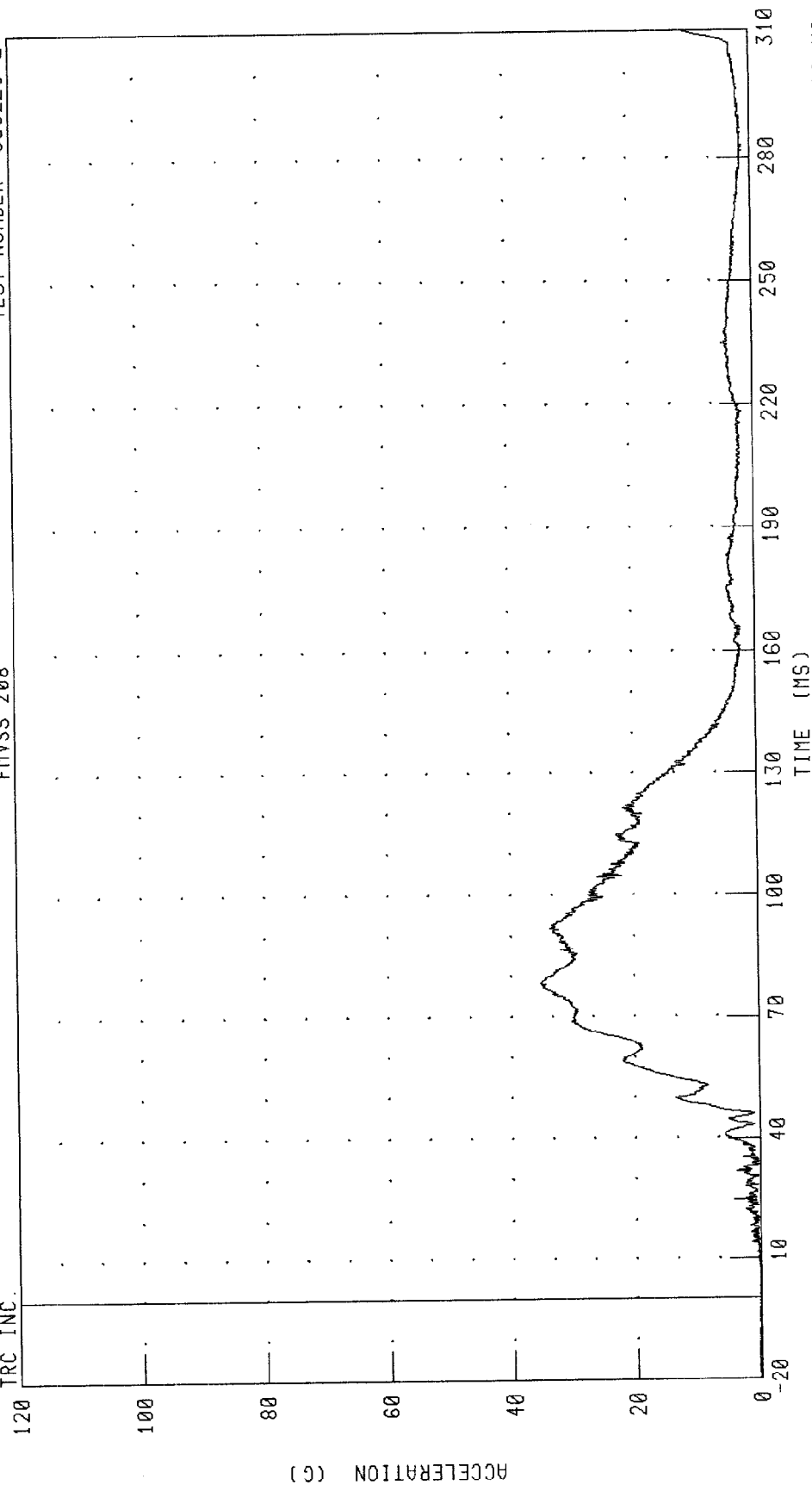
PEAK DATA: 18.40 G @ 100.88 MS; -5.50 G @ 40.56 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 35.24 G @ 78.56 MS; 0.07 G @ -20.00 MS

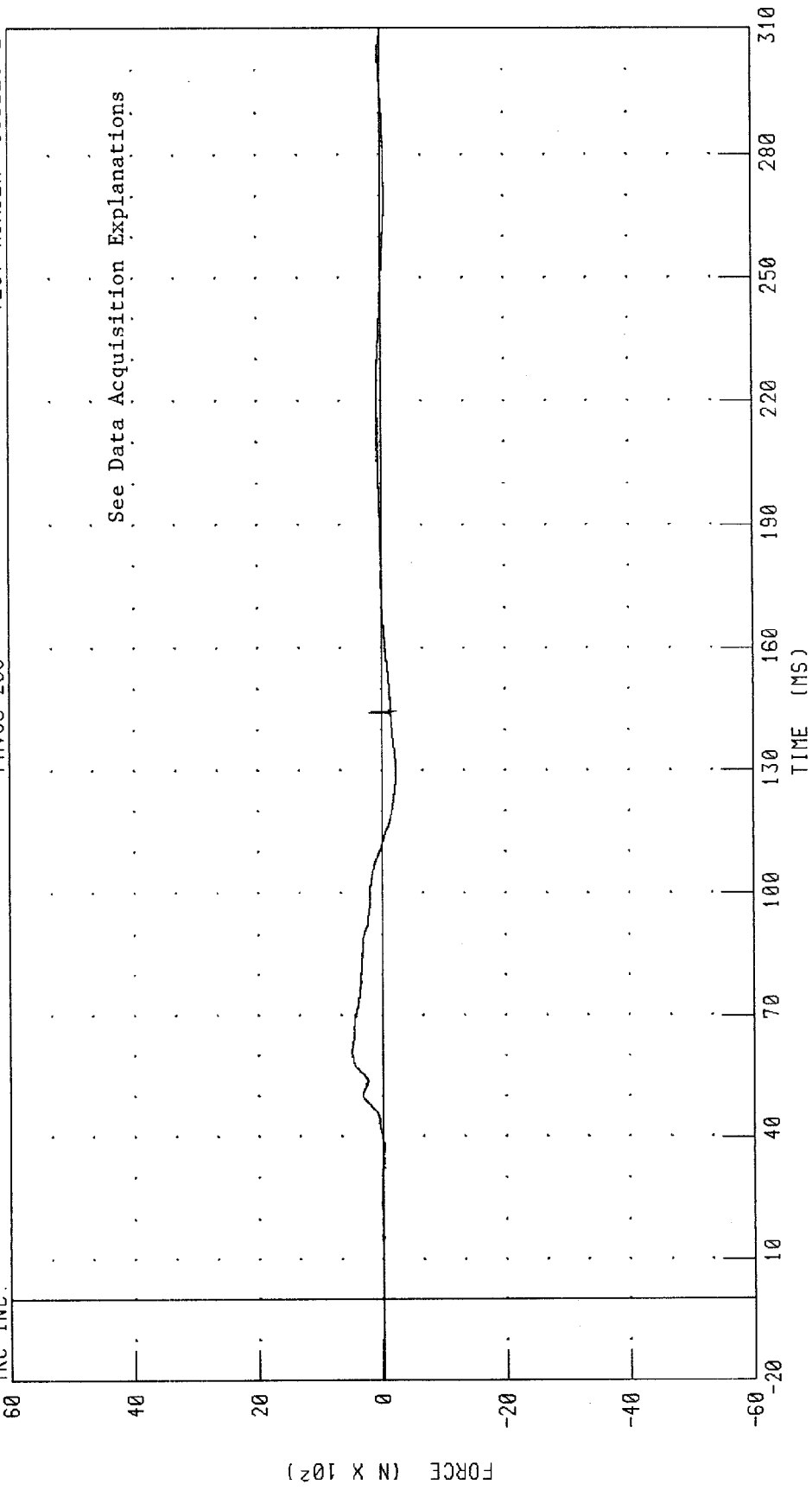
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
 DRIVER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 498.69 N @ 60.48 MS; -242.98 N @ 144.72 MS

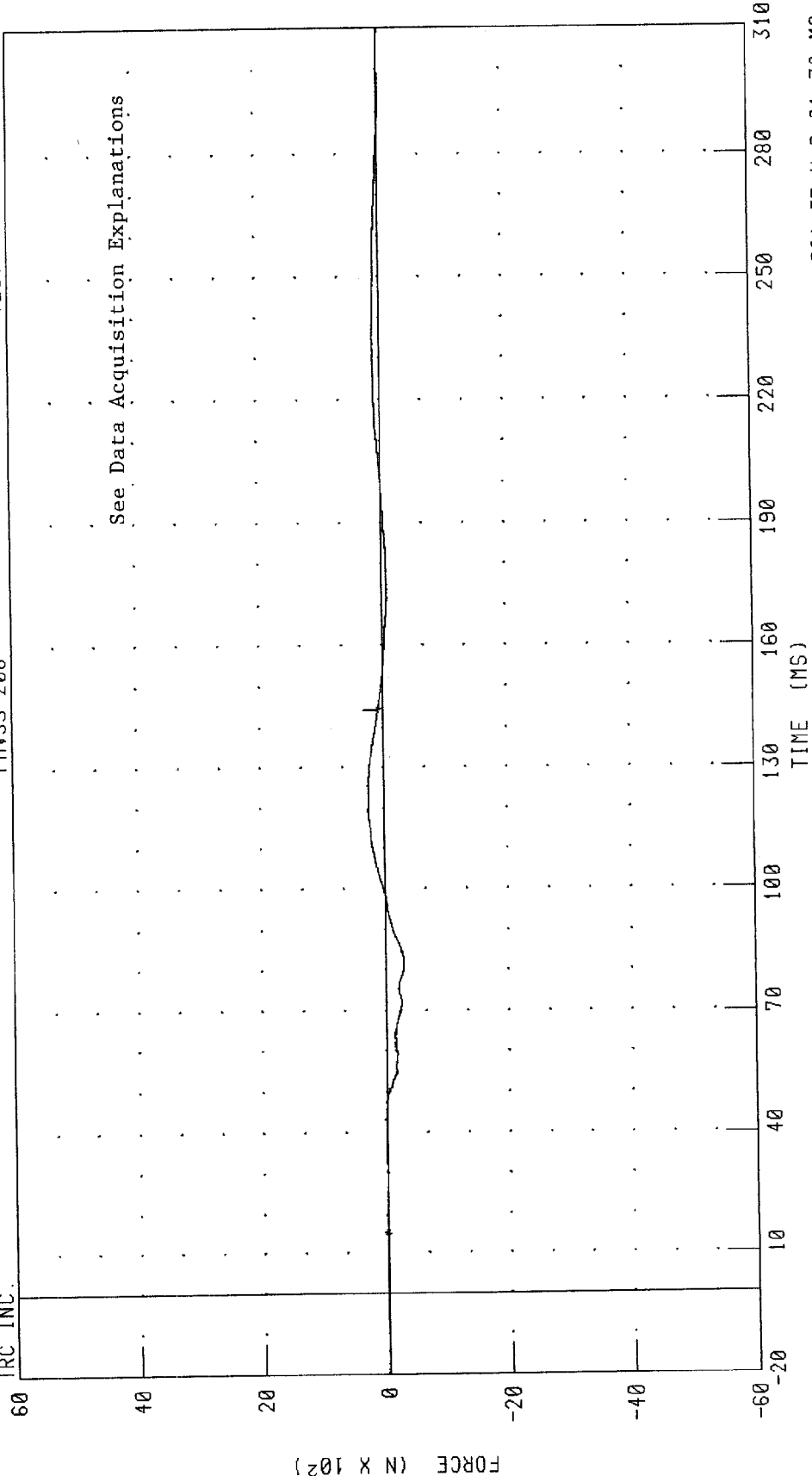
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 312.56 N @ 144.40 MS; -301.37 N @ 81.36 MS

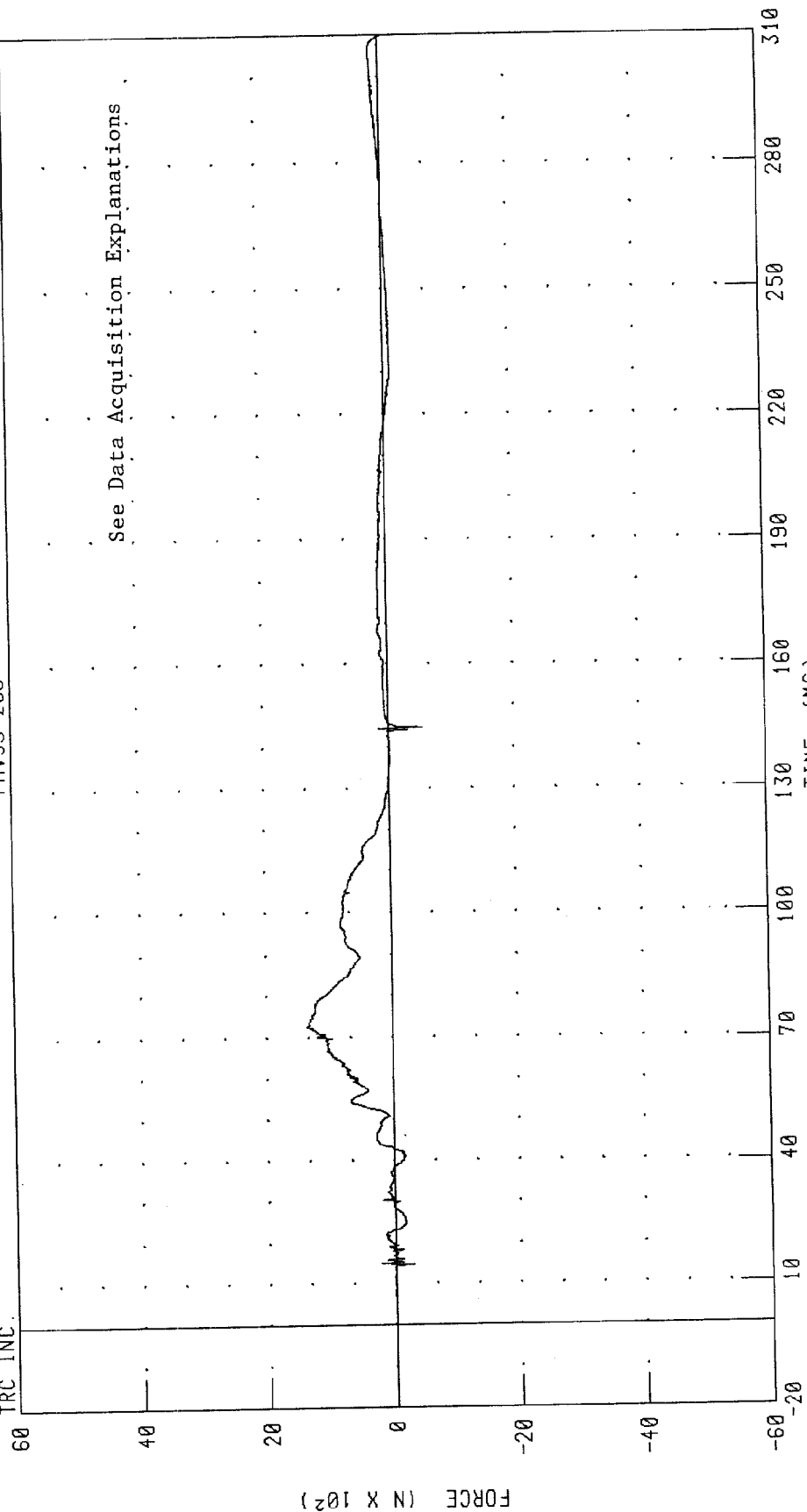
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 1357.47 N @ 72.72 MS, -544.29 N @ 144.88 MS

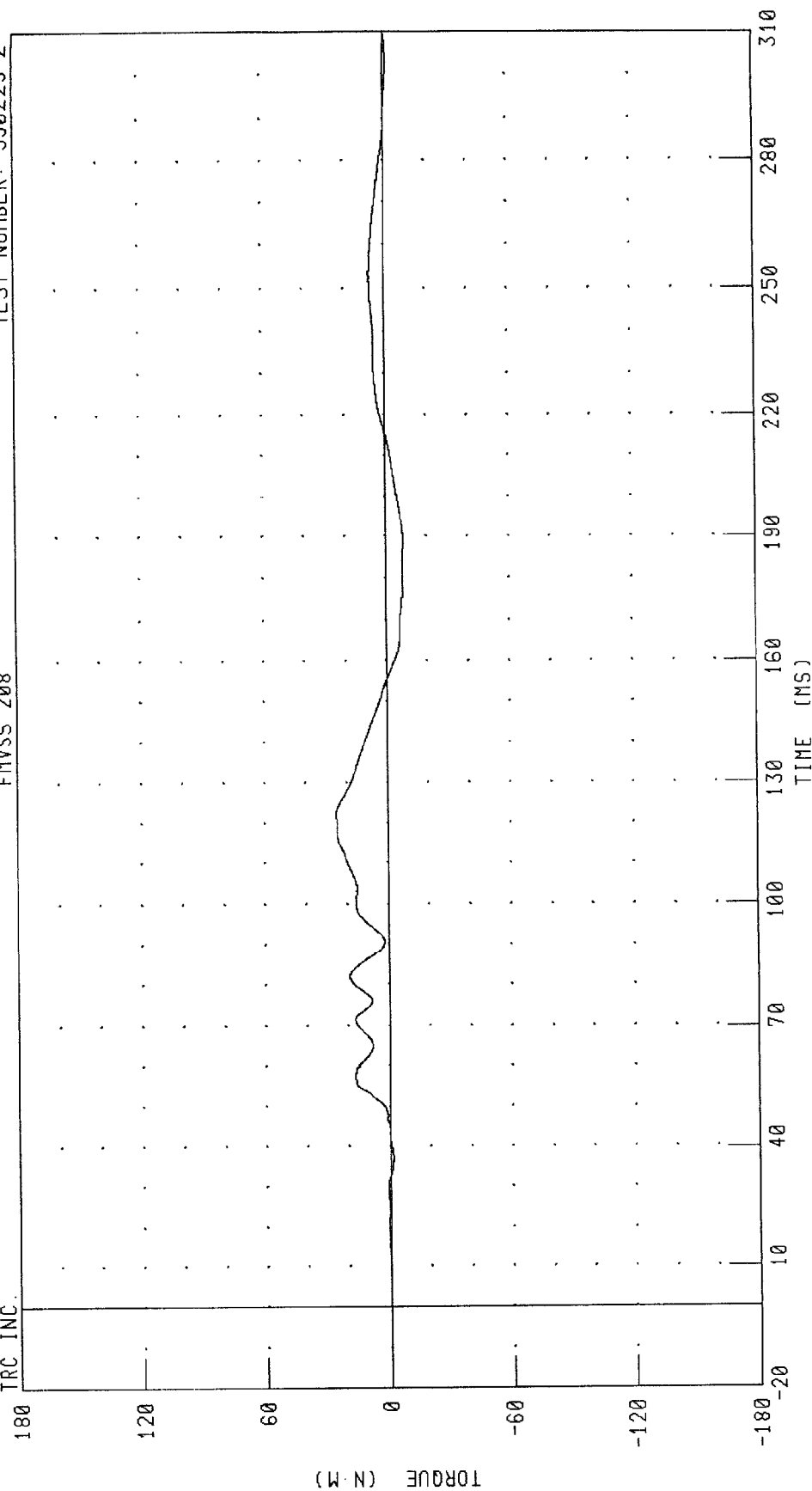
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 25.11 N·m @ 121.92 ms; -8.80 N·m @ 187.84 ms

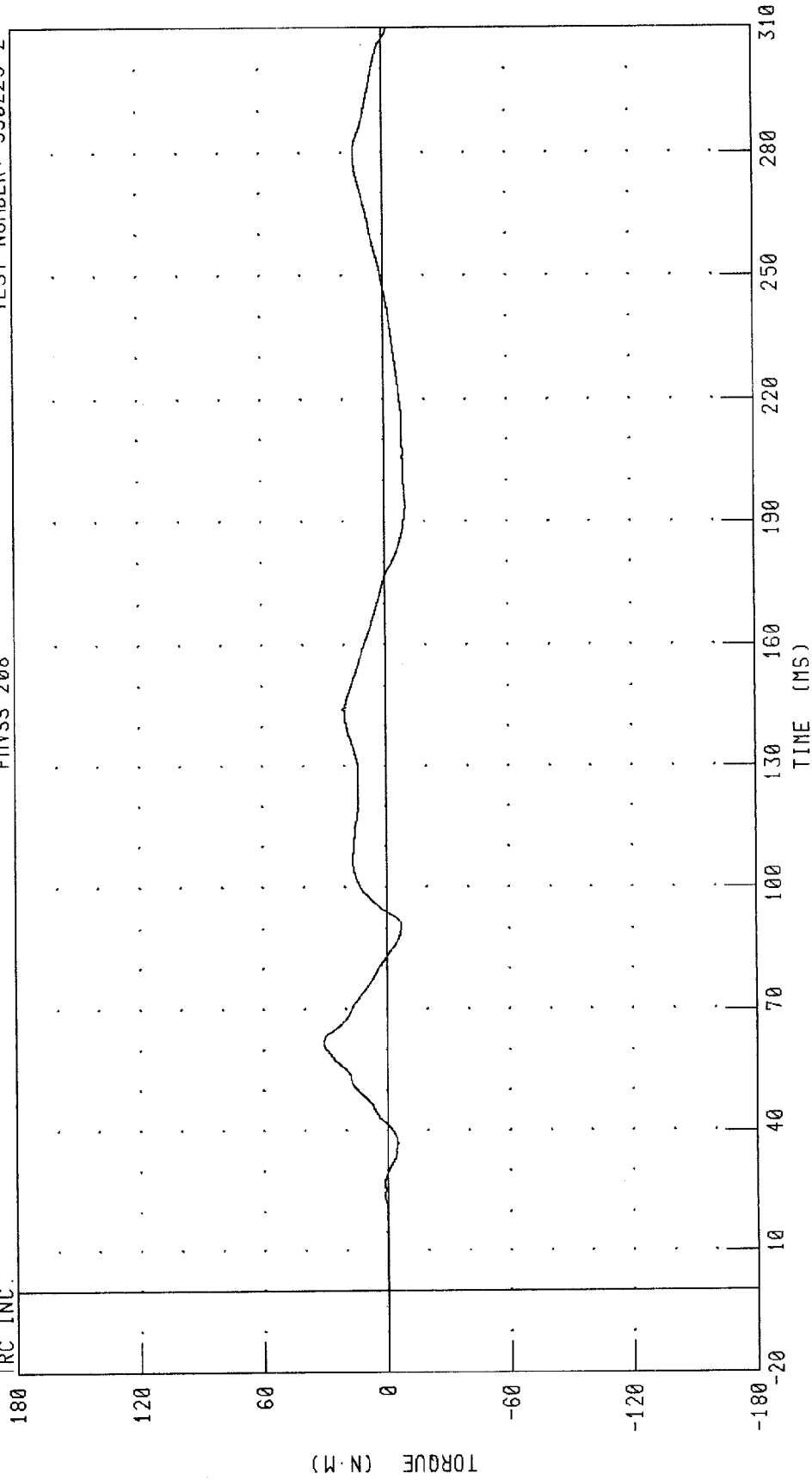
CHANNEL: NEKXM1 FILTER: CH. CLASS 600

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 990223-2

FMYSS 208

TRC INC.



PEAK DATA: 30.75 N.M @ 61.44 MS, -10.20 N.M @ 193.92 MS

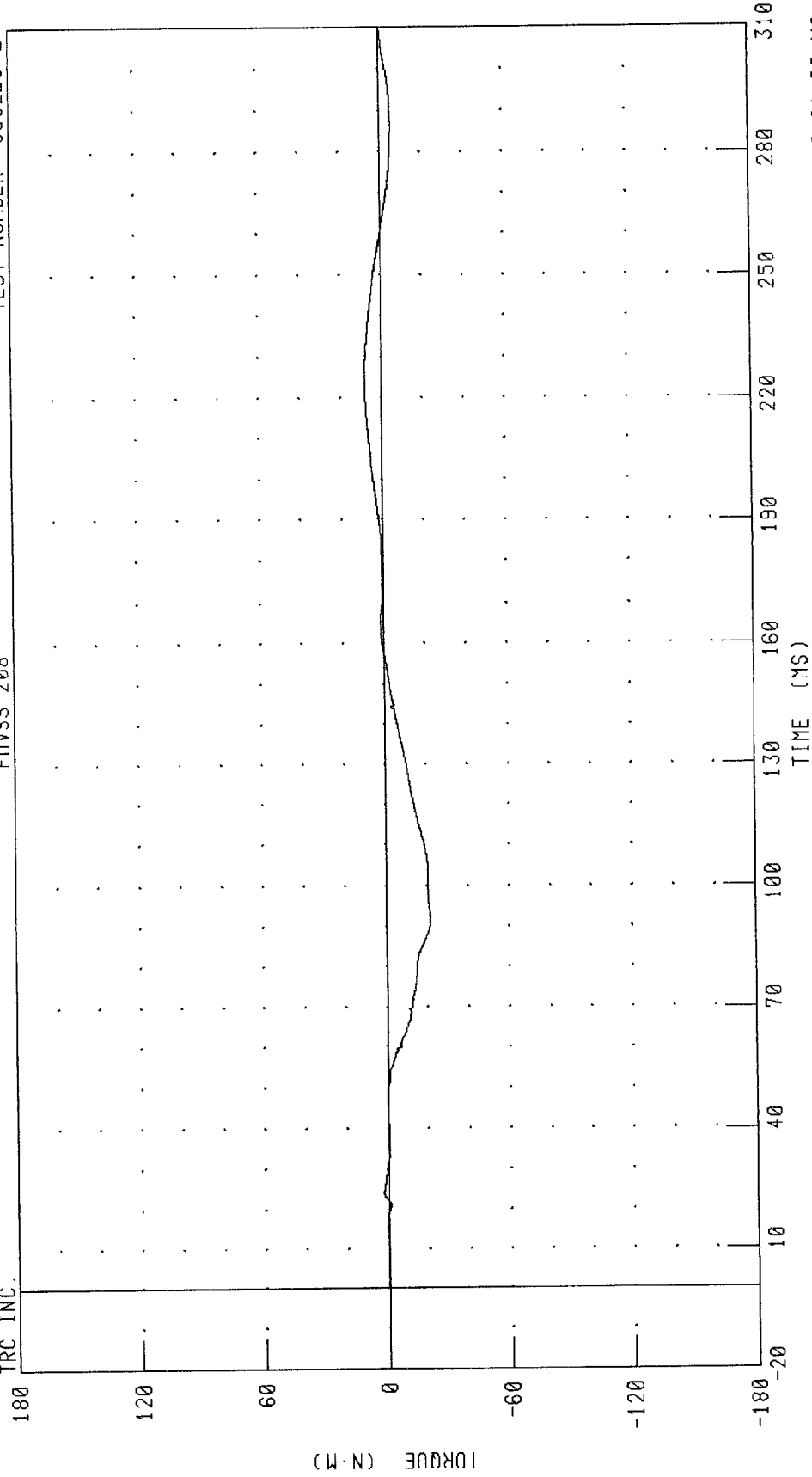
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: NEKZM1 FILTER: CH. CLASS 600

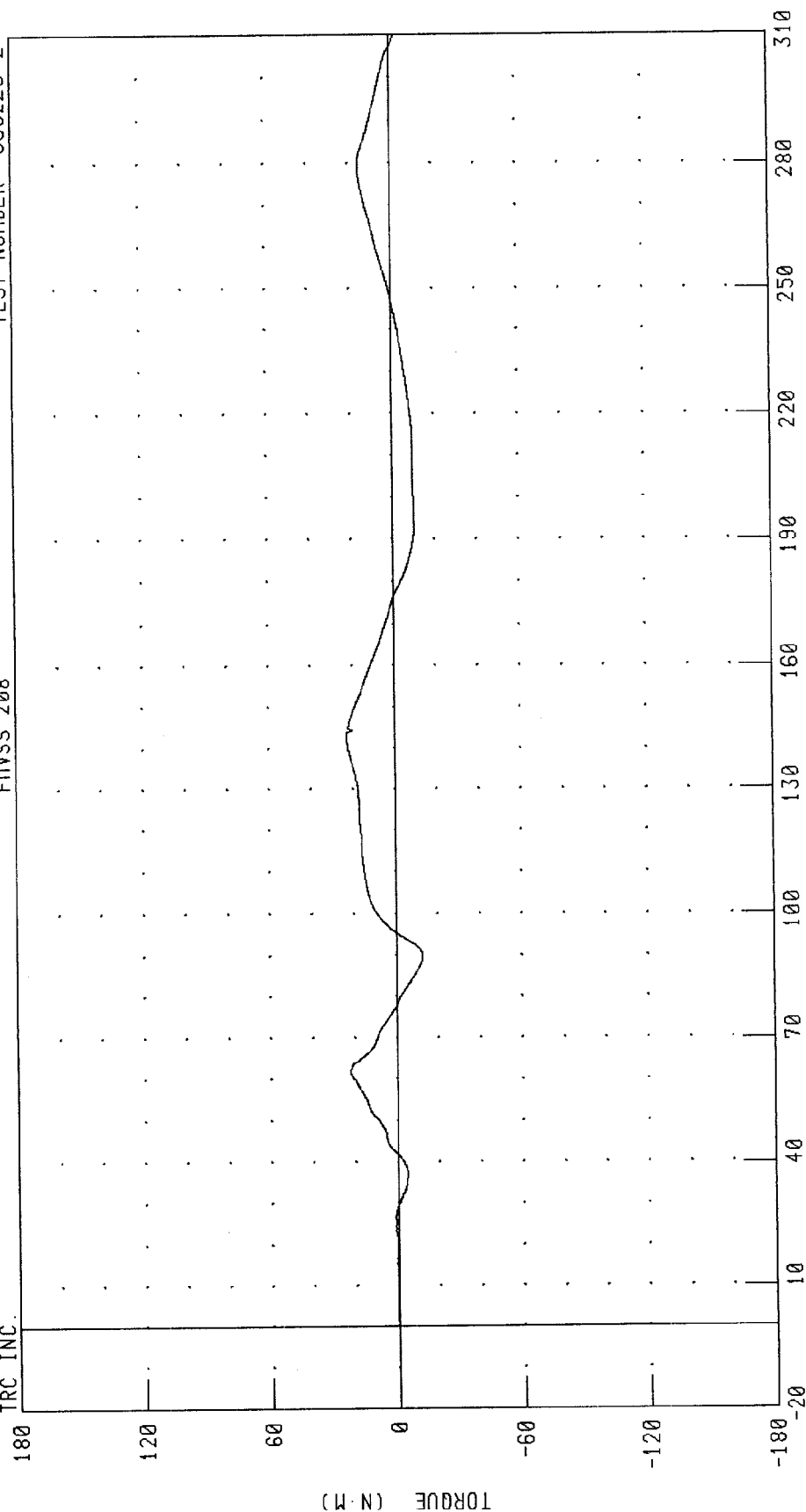
PEAK DATA: 7.94 N-M @ 224.40 MS; -21.77 N-M @ 91.68 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK OCCIPITAL CONDYLE

TEST NUMBER: 990223-2

FMYSS 208

TRC INC.



PEAK DATA: 22.51 N·m @ 142.64 ms; -12.55 N·m @ 89.92 ms

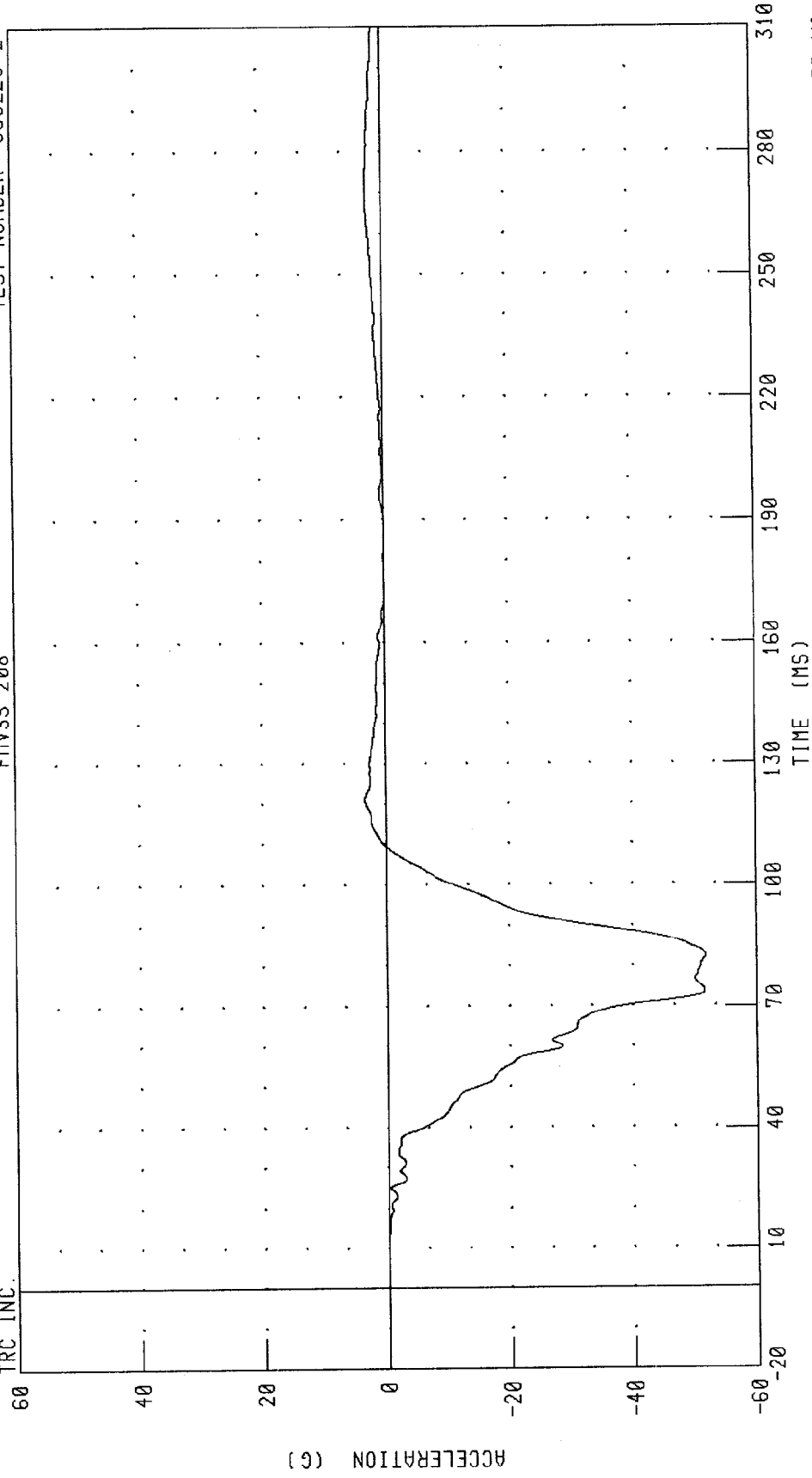
CHANNEL: NEKOM1 FILTER: CH. CLASS 600

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 3.29 G @ 121.12 MS, -51.75 G @ 82.32 MS

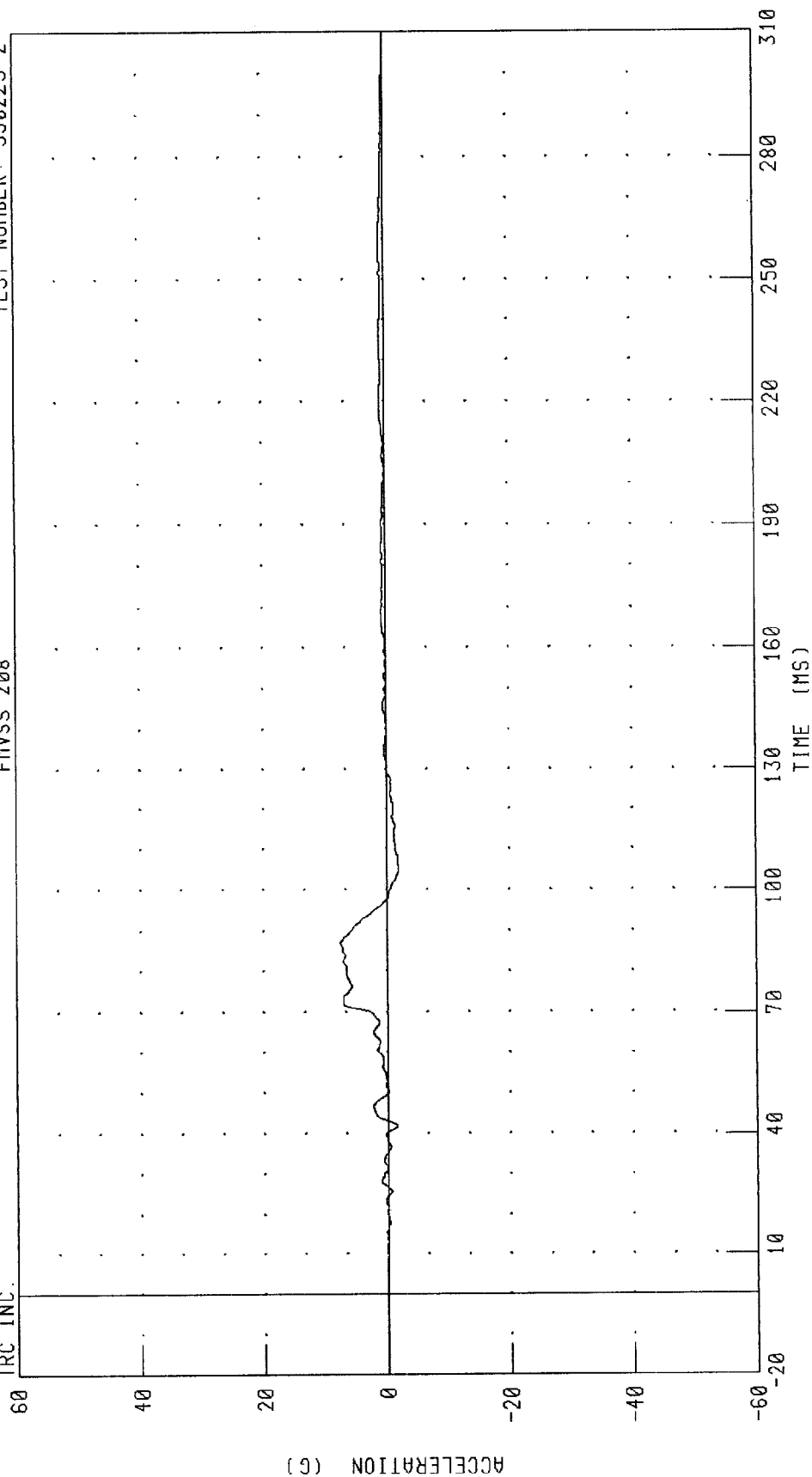
CHANNEL: CSTXG1 FILTER: CH. CLASS 180

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: CSTYC1 FILTER: CH. CLASS 180

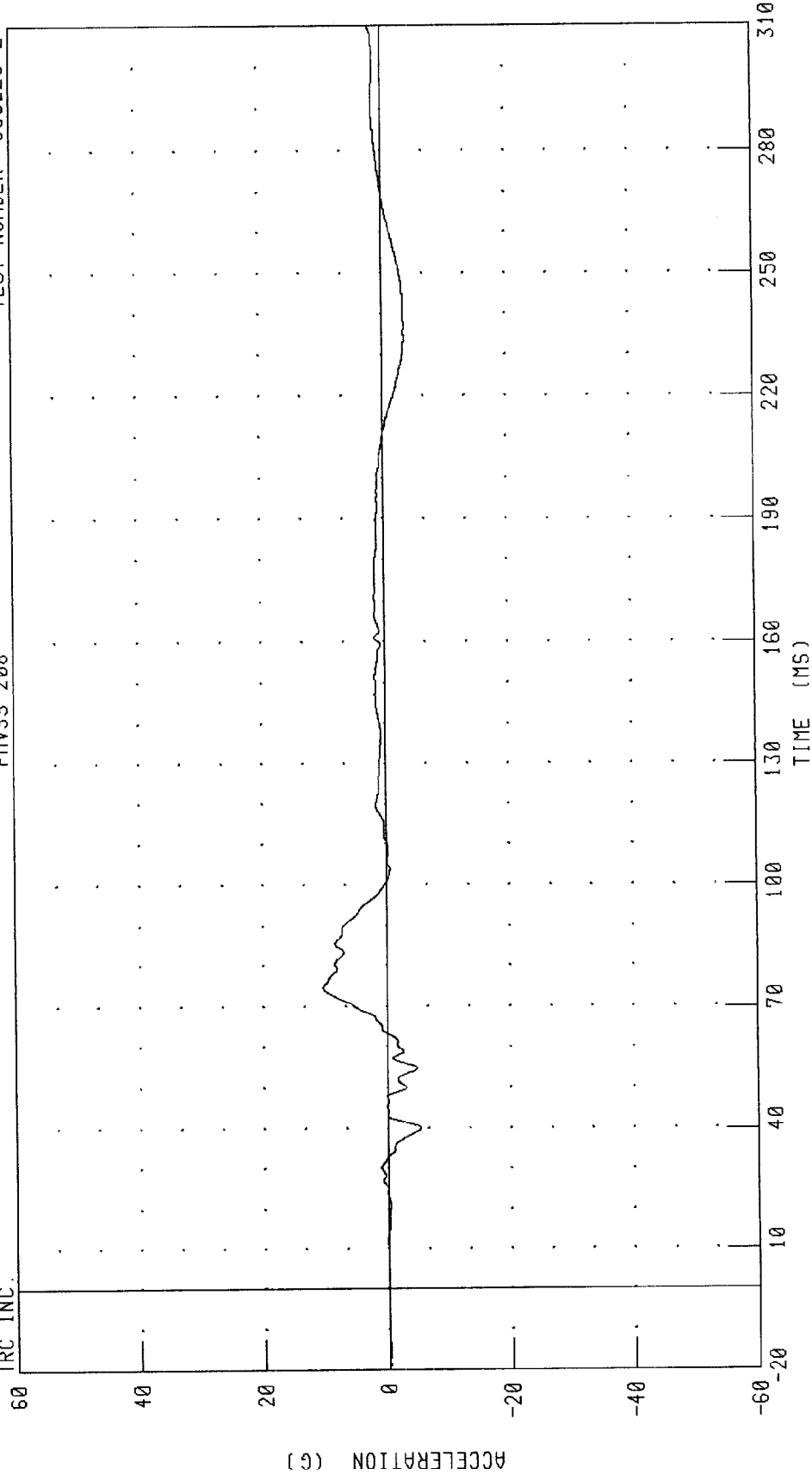
PEAK DATA: 7.55 G @ 86.88 MS; -1.93 G @ 104.64 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMYSS 208

TRC INC.



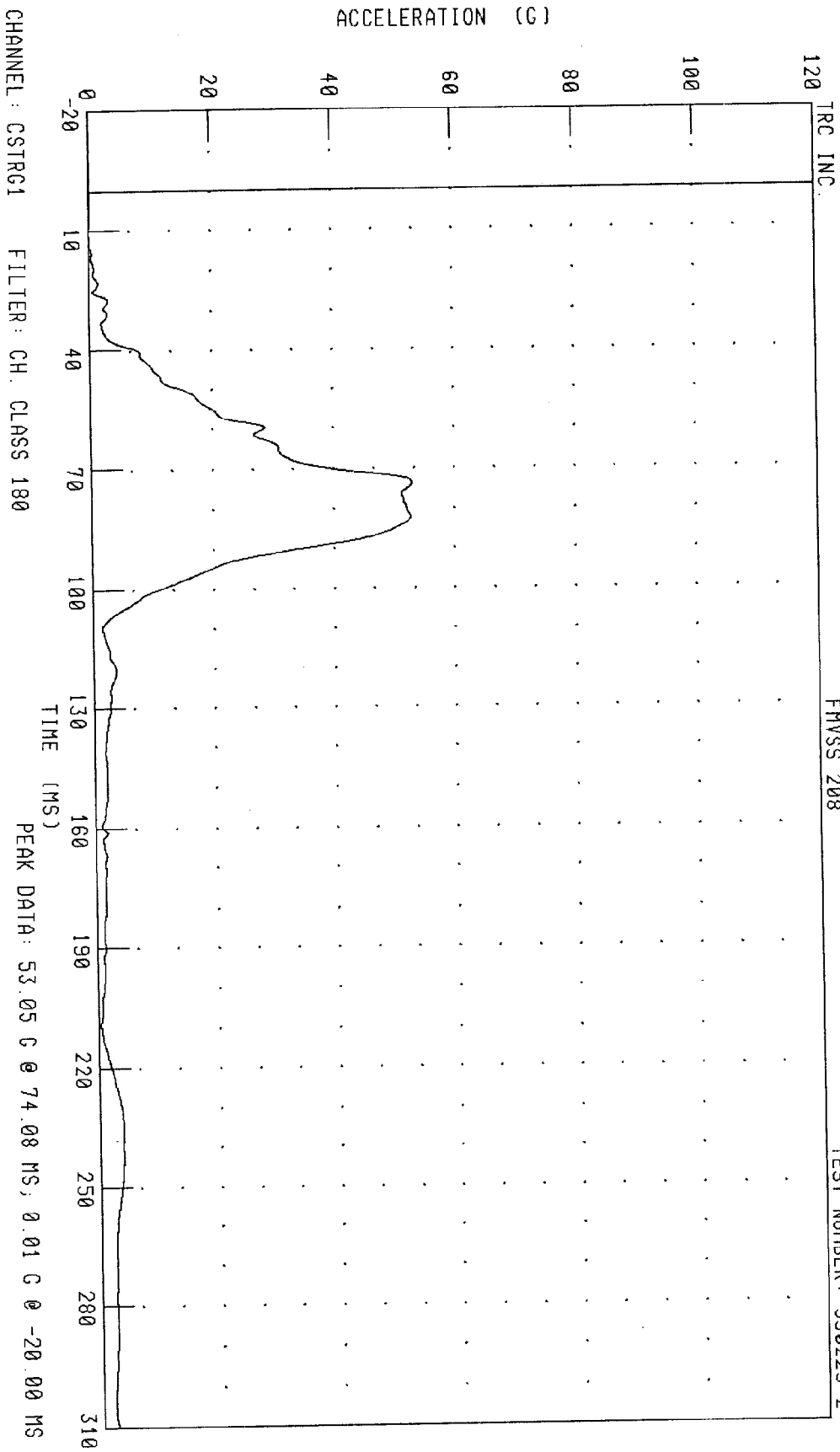
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 10.34 G @ 74.64 MS; -5.35 G @ 40.24 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST RESULTANT ACCELERATION

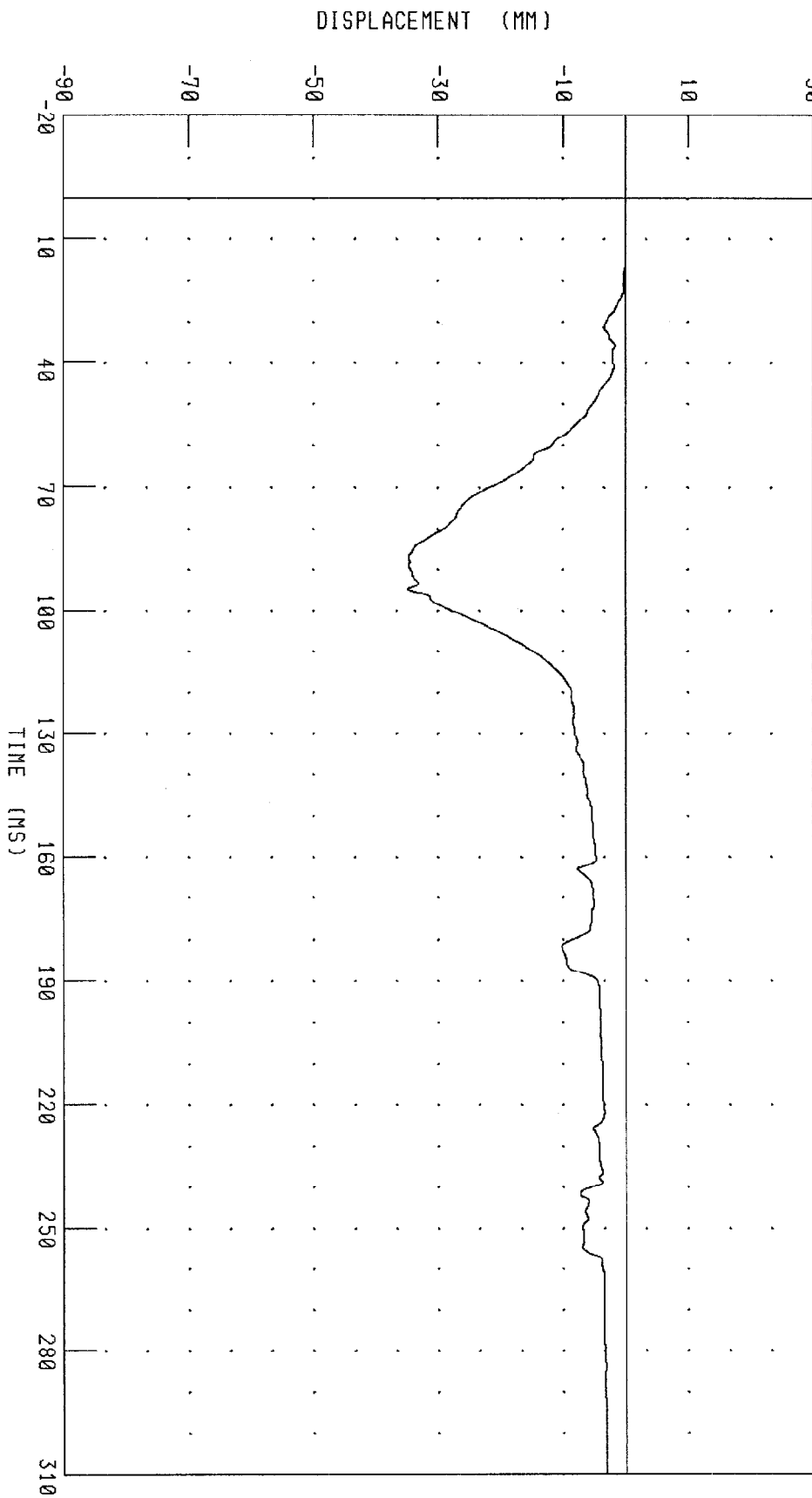
FHVS 208

TEST NUMBER: 990223-2



1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST DEFLECTION

TRC INC. FMVSS 208 TEST NUMBER: 990223-2



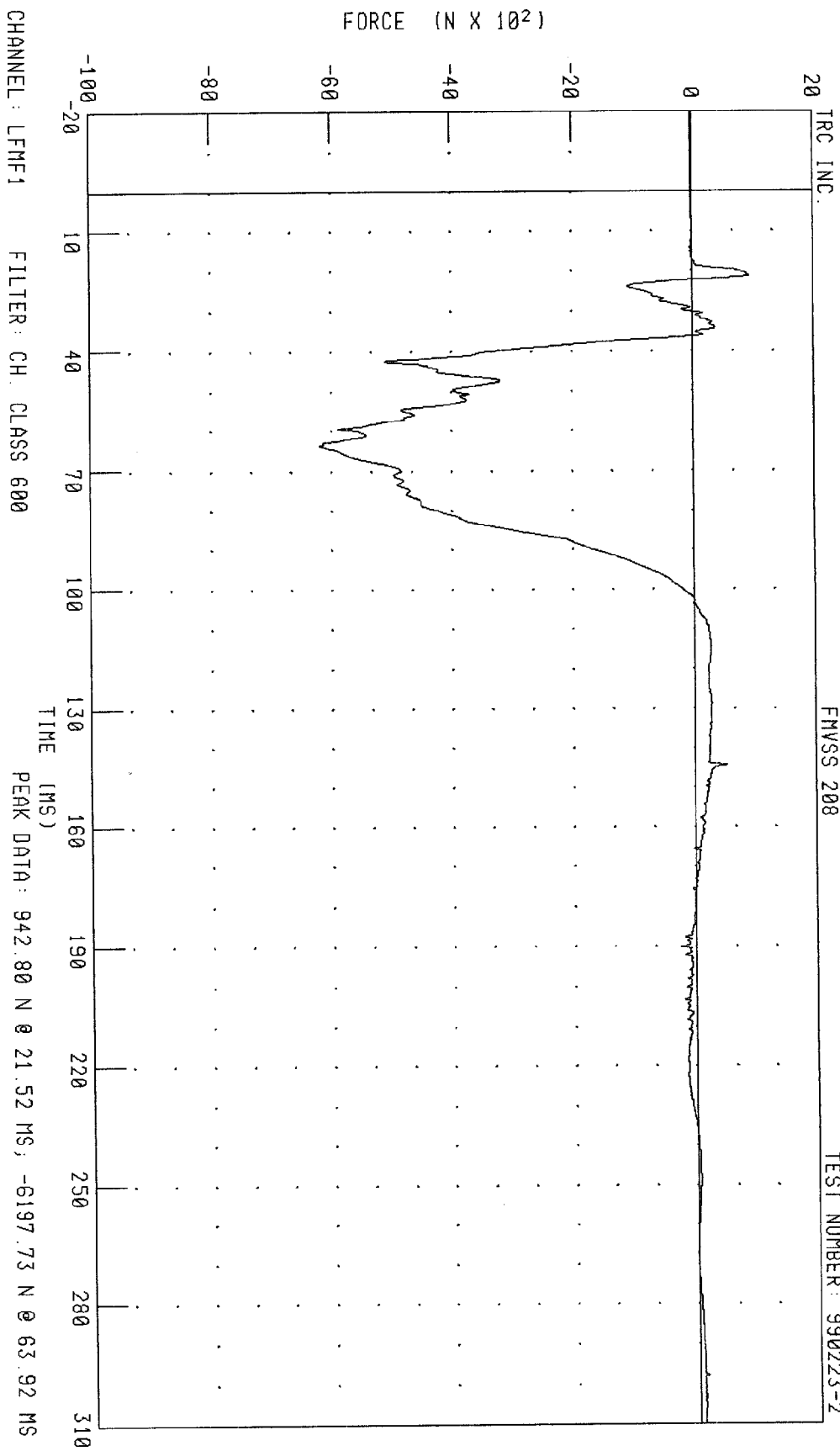
CHANNEL: CSTXD1 FILTER: CH. CLASS 180

PEAK DATA: 0.02 MM @ 3.04 MS, -34.86 MM @ 94.88 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER LEFT FEMUR FORCE

FMVSS 208

TEST NUMBER: 990223-2

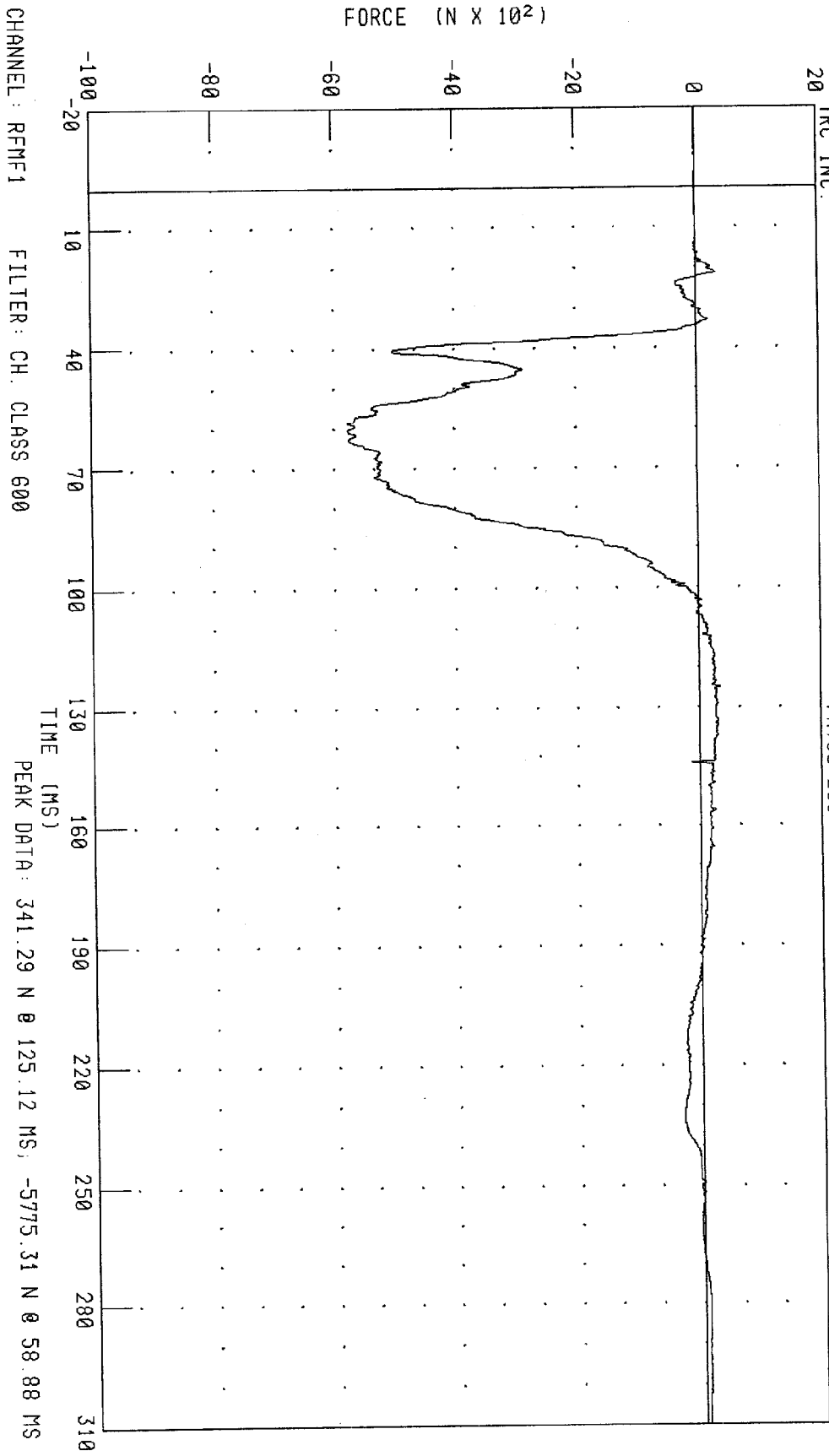


1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER RIGHT FEMUR FORCE

FMVSS 208

TEST NUMBER: 990223-2

TRC INC.

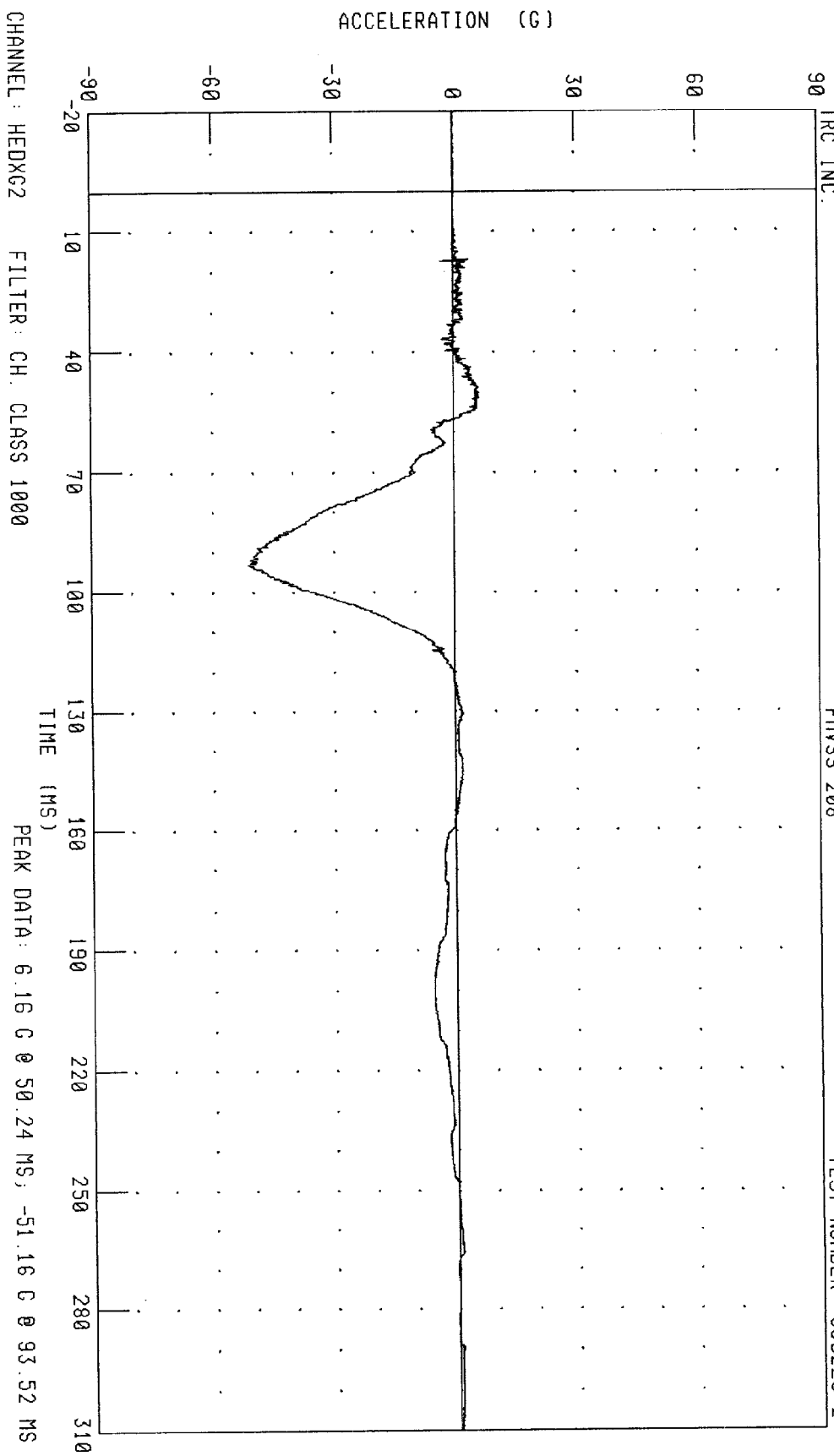


1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

FMVSS 208

TEST NUMBER: 990223-2

TRC INC.



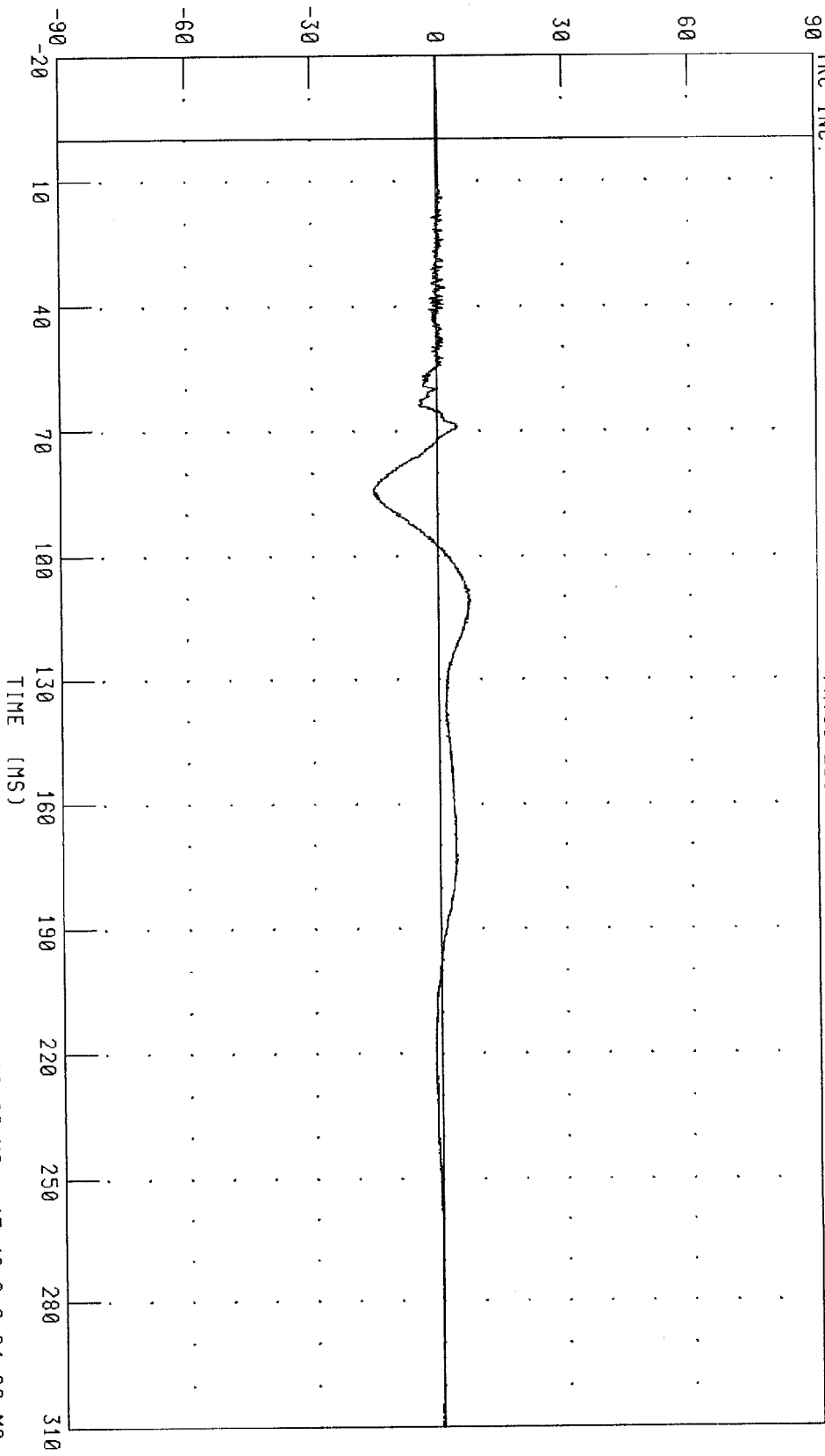
TRC INC.

FHVS 208

TEST NUMBER: 990223-2

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

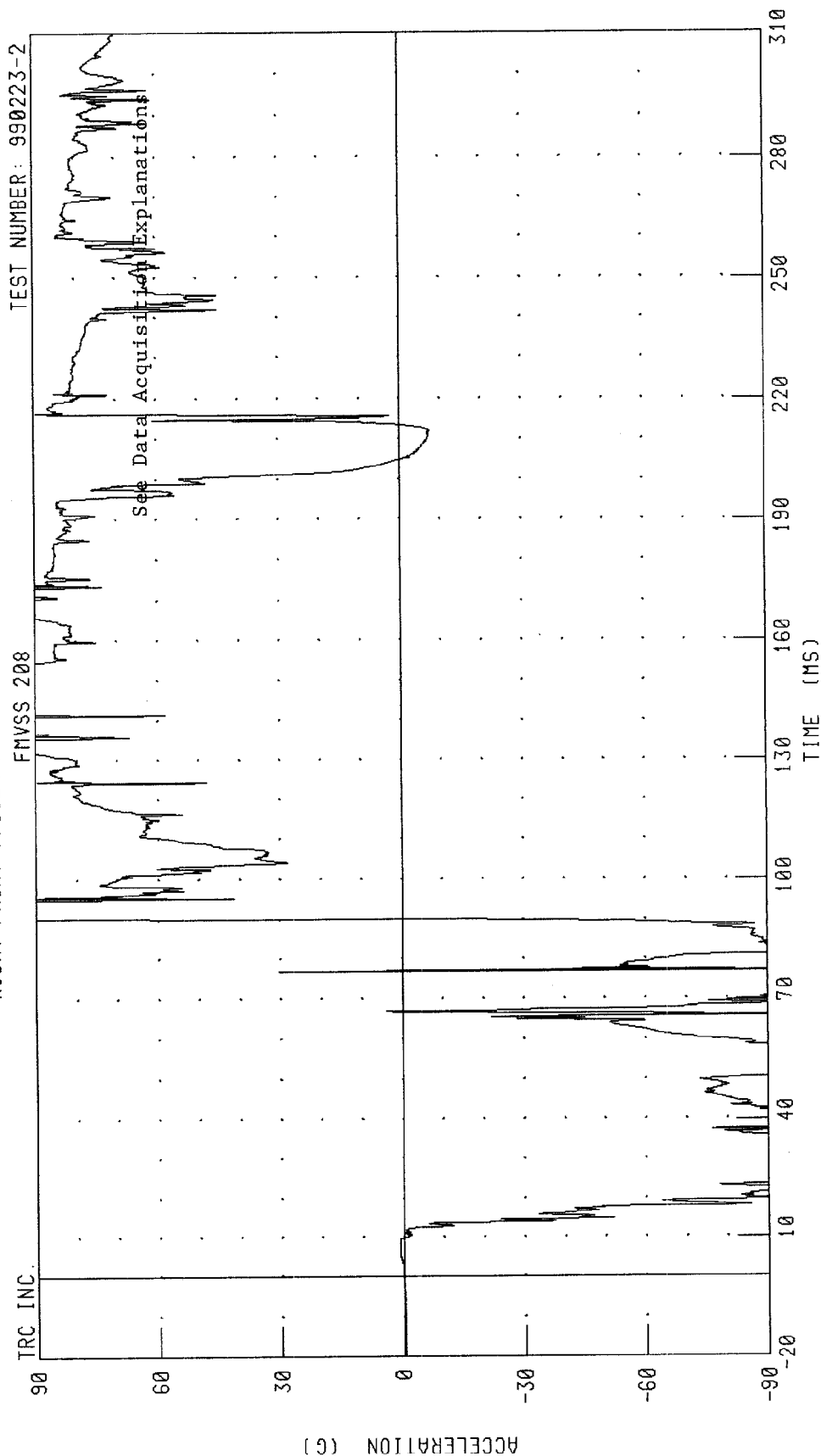
ACCELERATION (G)



CHANNEL: HEDYC2 FILTER: CH. CLASS 1000

PEAK DATA: 7.51 G @ 110.80 MS, -15.42 G @ 84.08 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
 RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION



CHANNEL: HEDZC2 FILTER: CH. CLASS 1000

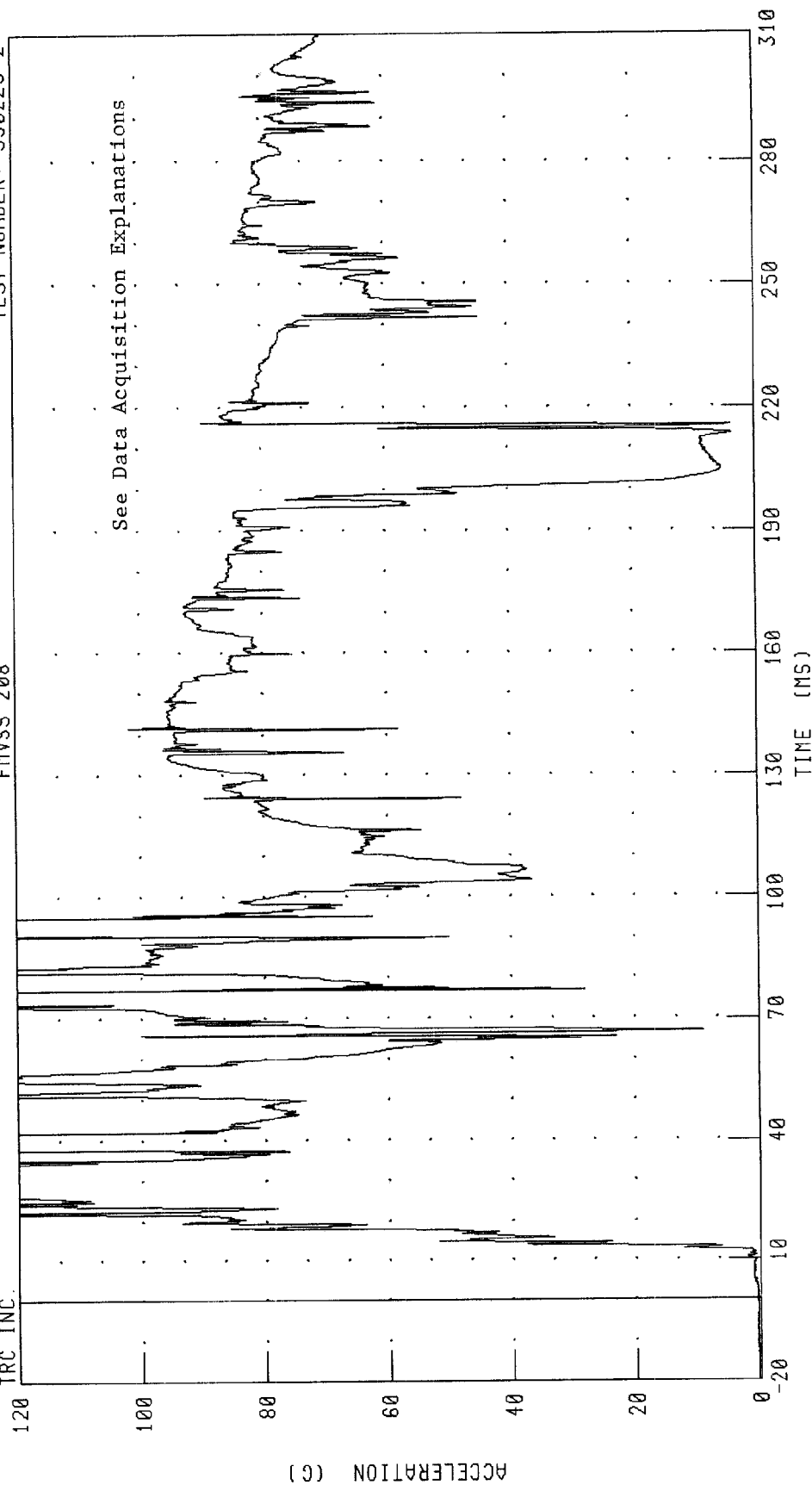
PEAK DATA: 302.92 G @ 92.48 MS; -396.48 G @ 96.40 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 397.28 G @ 76.80 MS; 0.17 G @ -15.84 MS

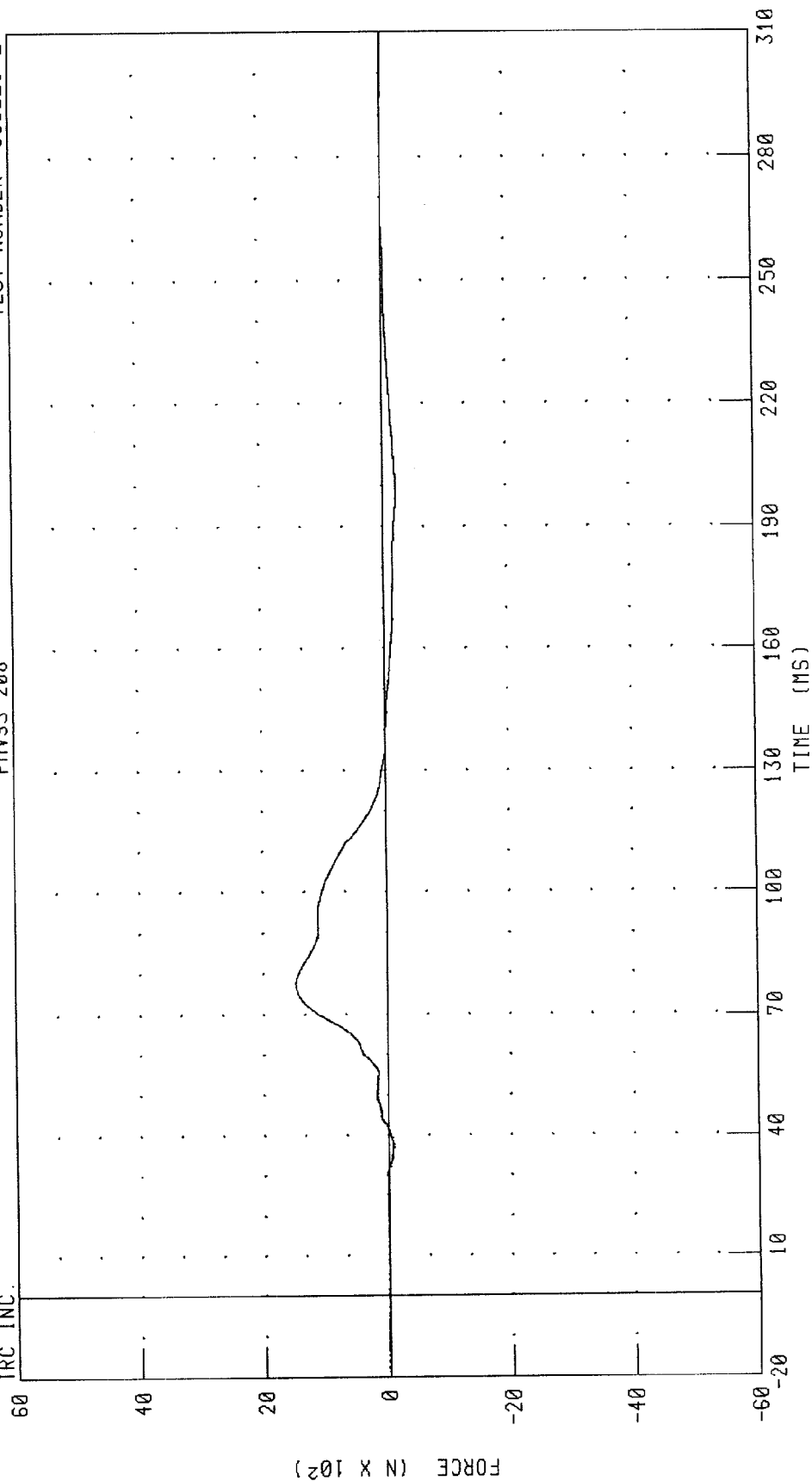
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 1478.36 N @ 76.80 MS, -206.03 N @ 195.44 MS

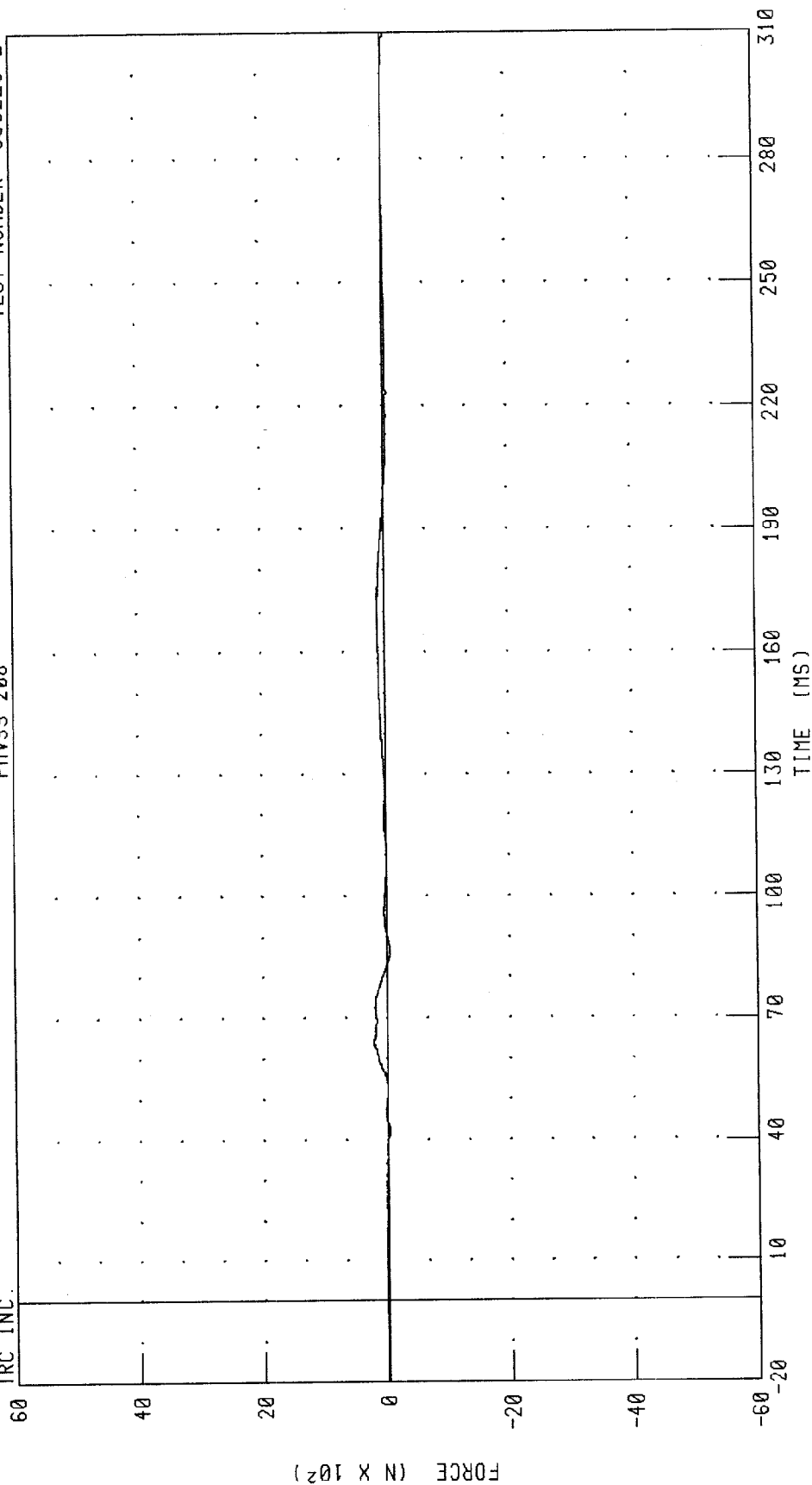
CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 990223-2

FMYSS 208

TRC INC.



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

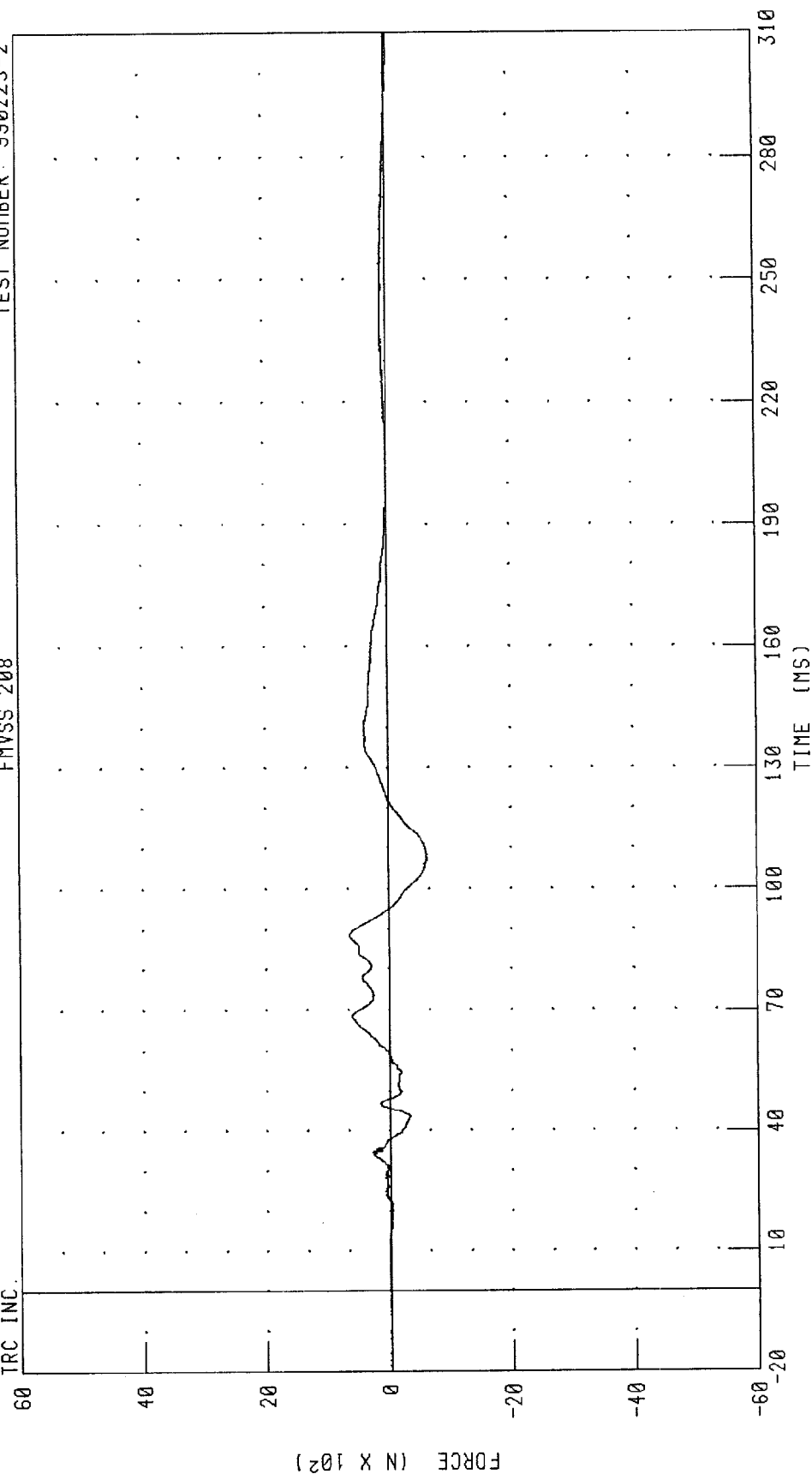
PEAK DATA: 212.16 N @ 63.84 MS; -74.75 N @ 310.00 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 630.06 N @ 88.32 MS; -634.29 N @ 108.48 MS

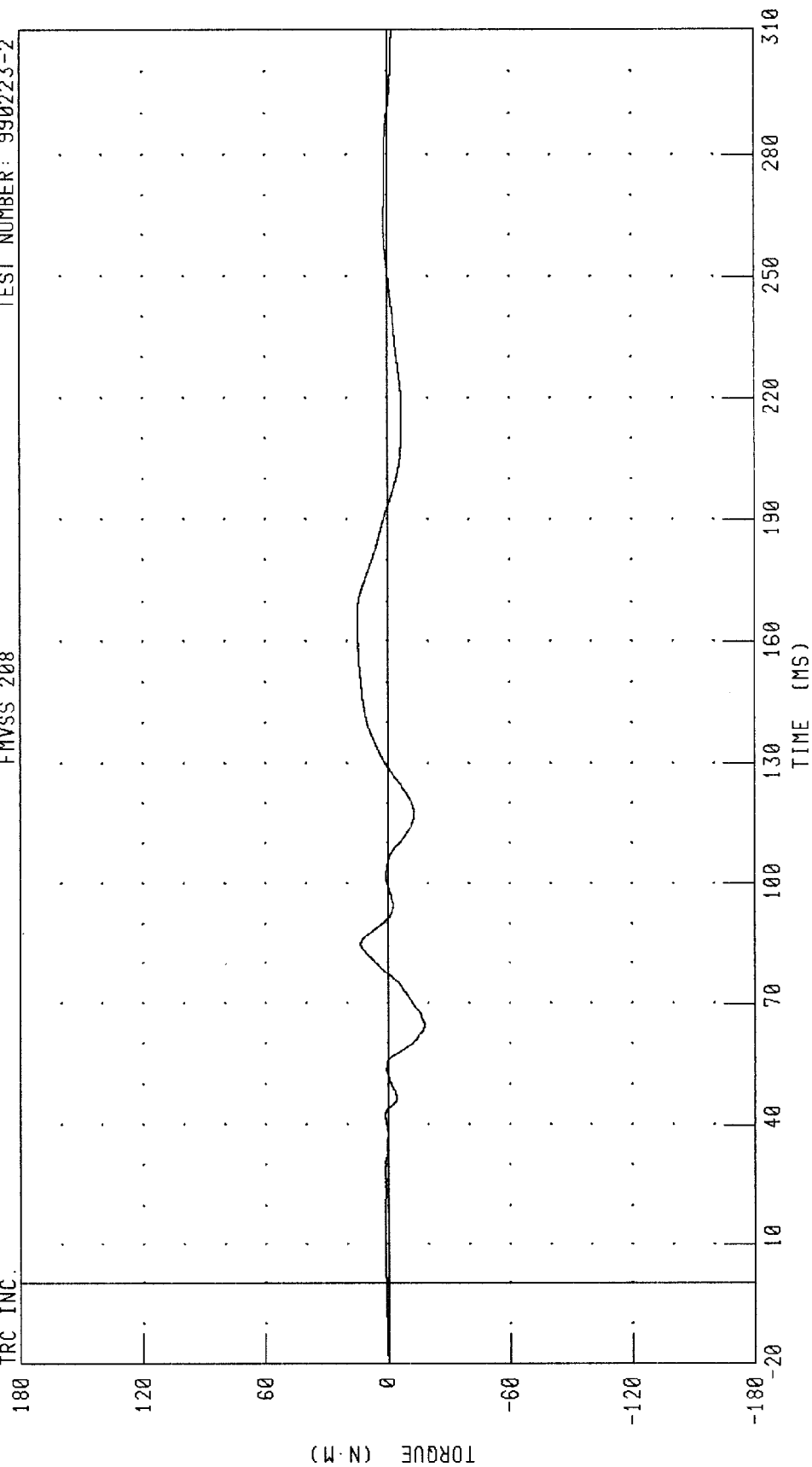
CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



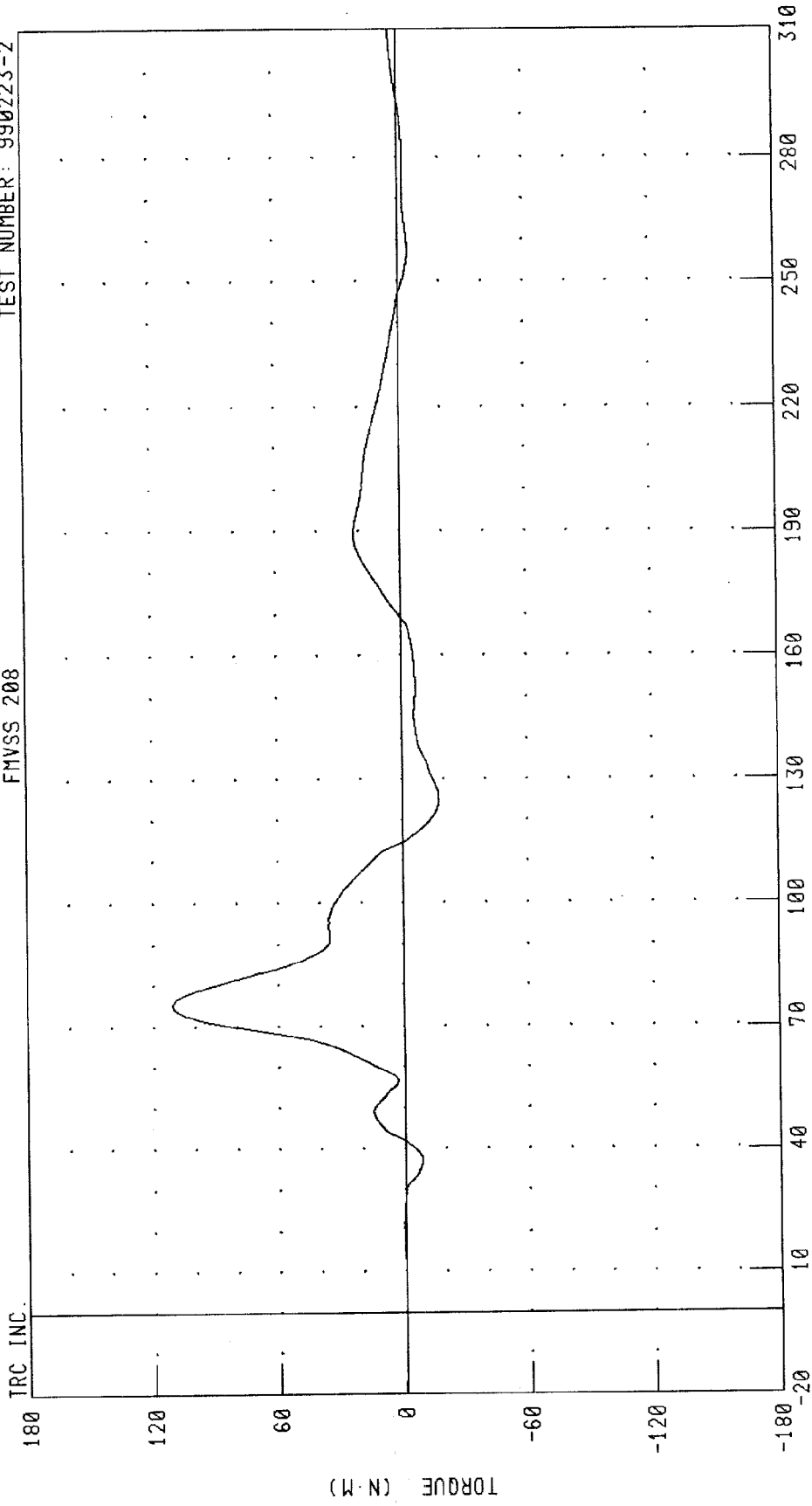
CHANNEL: NEKXM2 FILTER: CH. CLASS 600

PEAK DATA: 14.63 N·m @ 167.68 ms; -18.05 N·m @ 64.48 ms

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 990223-2

FMVSS 208



PEAK DATA: 110.86 N·M @ 75.28 MS; -17.73 N·M @ 125.92 MS

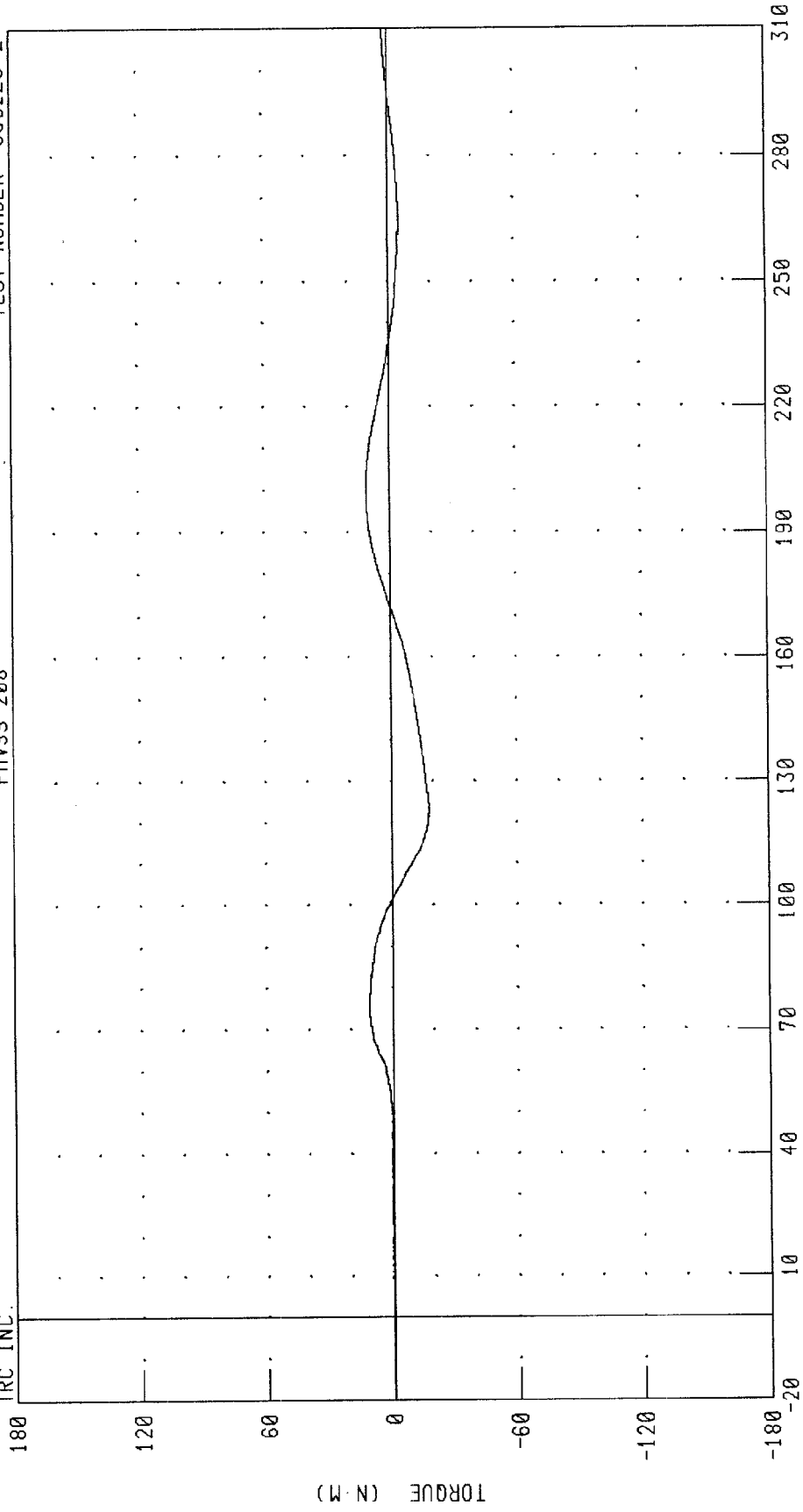
CHANNEL: NEKYM2 FILTER: CH. CLASS 600

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



TIME (MS)

PEAK DATA: 11.13 N-M @ 200.48 MS; -17.88 N-M @ 122.48 MS

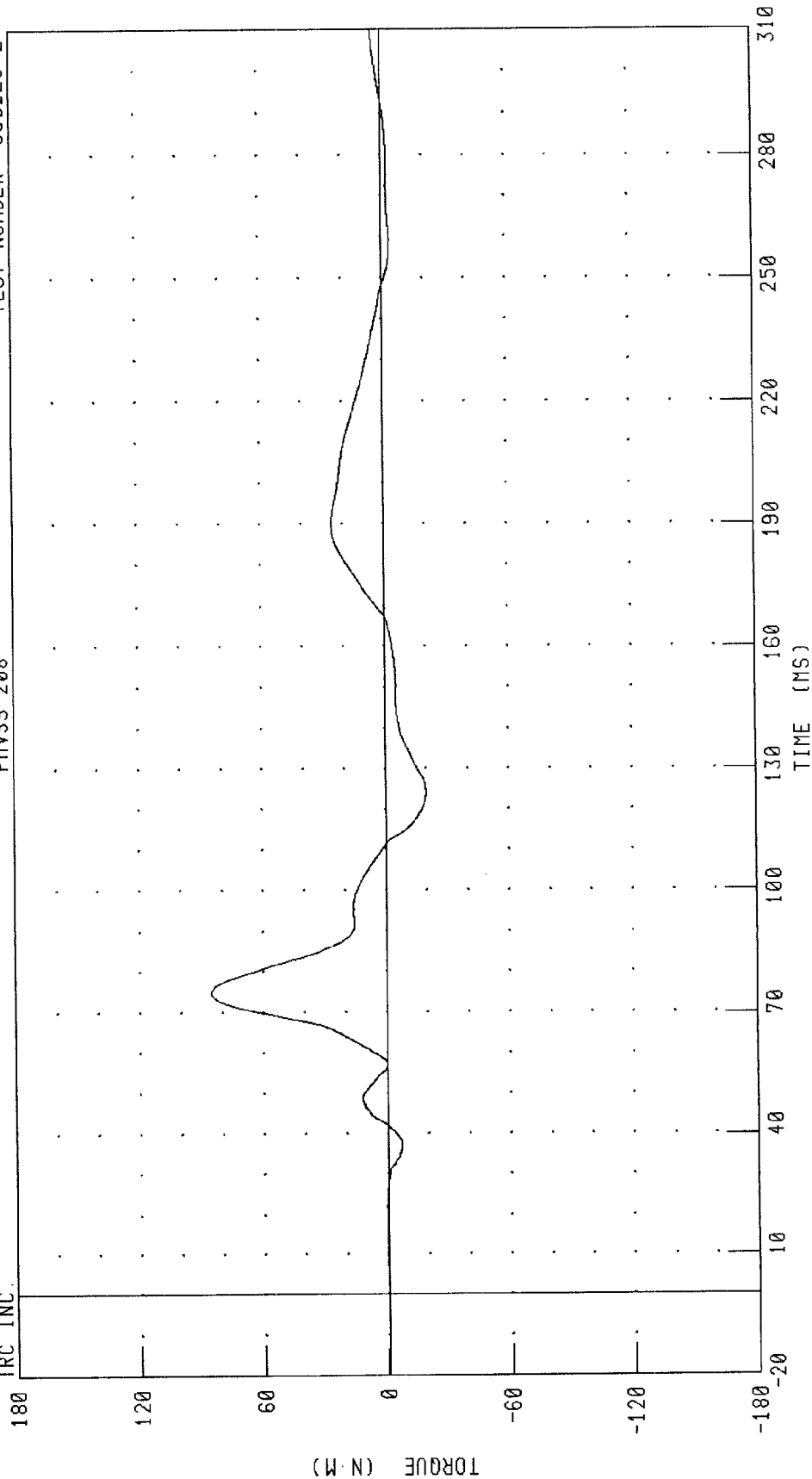
CHANNEL: NEKZM2 FILTER: CH. CLASS 600

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 85.13 N·M @ 75.04 MS; -19.98 N·M @ 123.92 MS

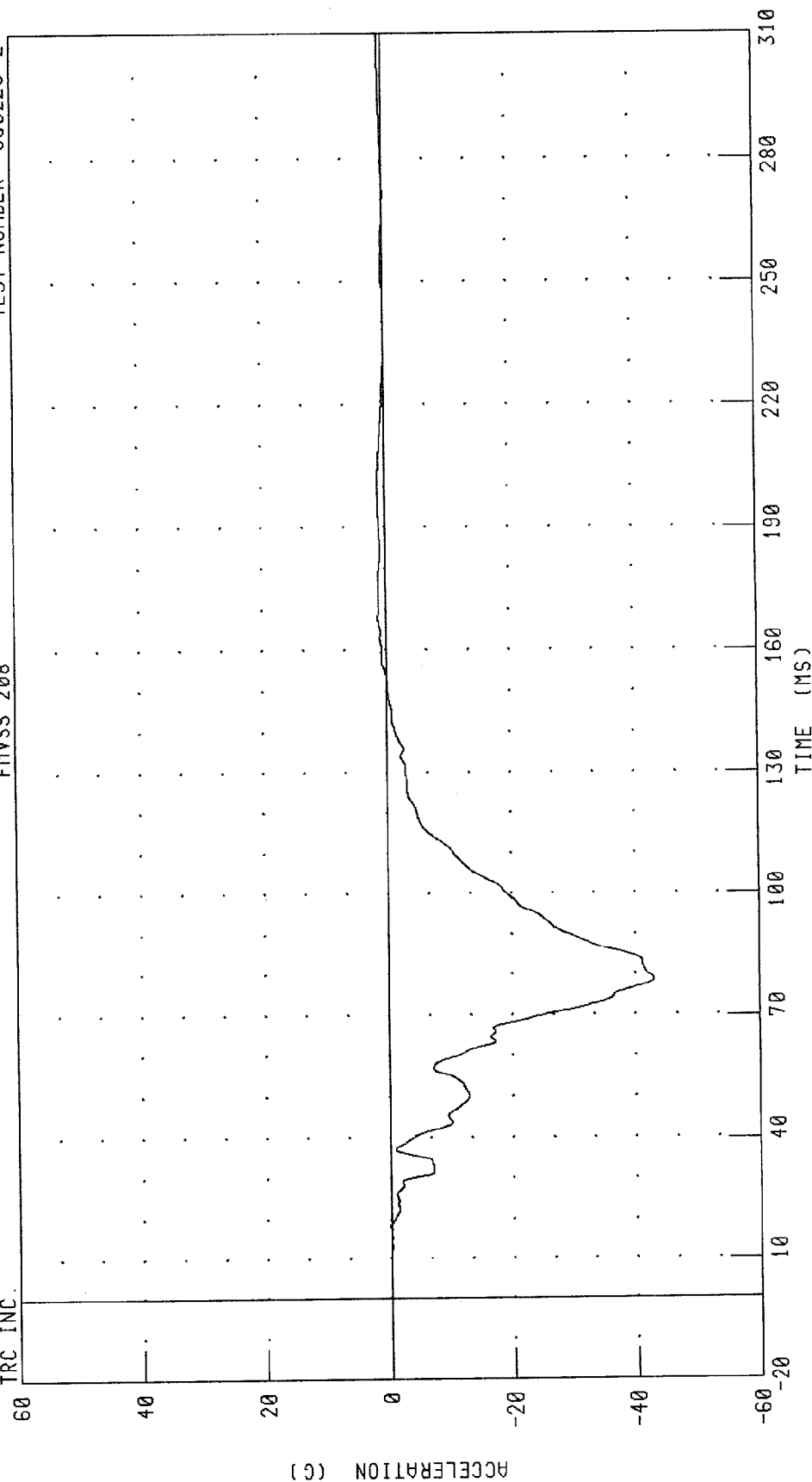
CHANNEL: NEKOM2 FILTER: CH. CLASS 600

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 1.21 G @ 167.92 MS; -43.03 G @ 78.80 MS

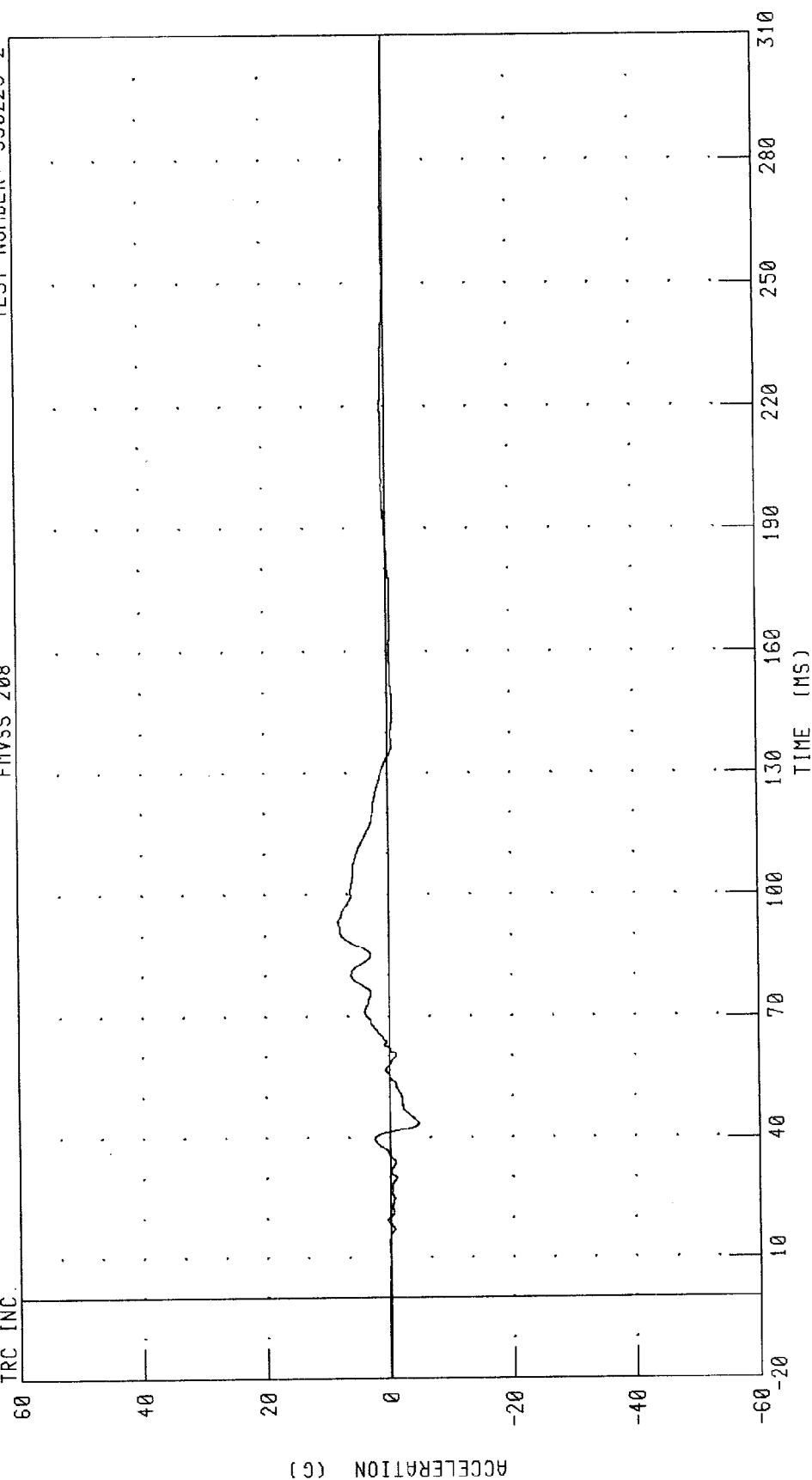
CHANNEL: CSTXG2 FILTER: CH. CLASS 180

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 8.14 G @ 93.36 MS; -4.76 G @ 43.60 MS

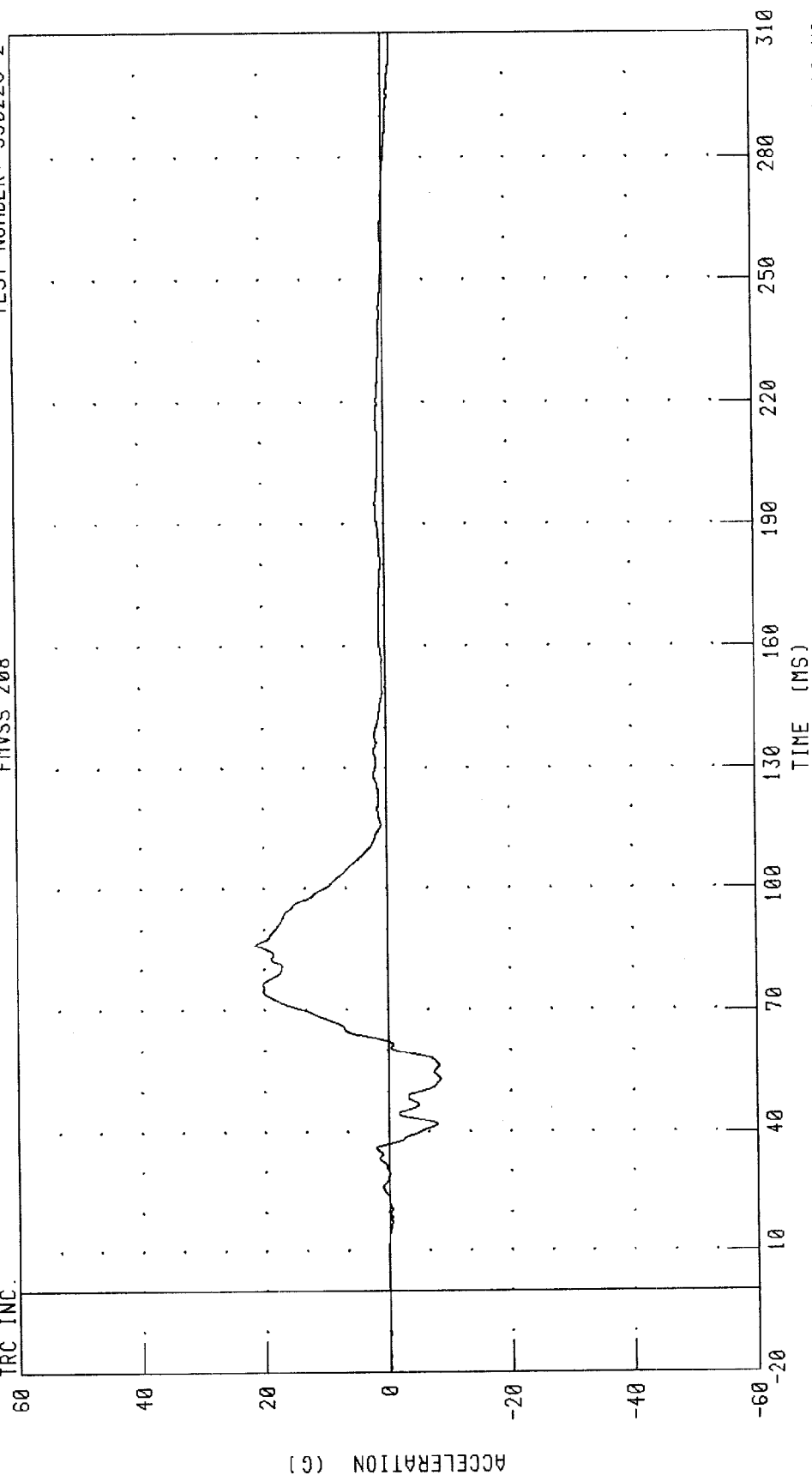
CHANNEL: CSTYC2 FILTER: CH. CLASS 180

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: CSTZC2 FILTER: CH. CLASS 180

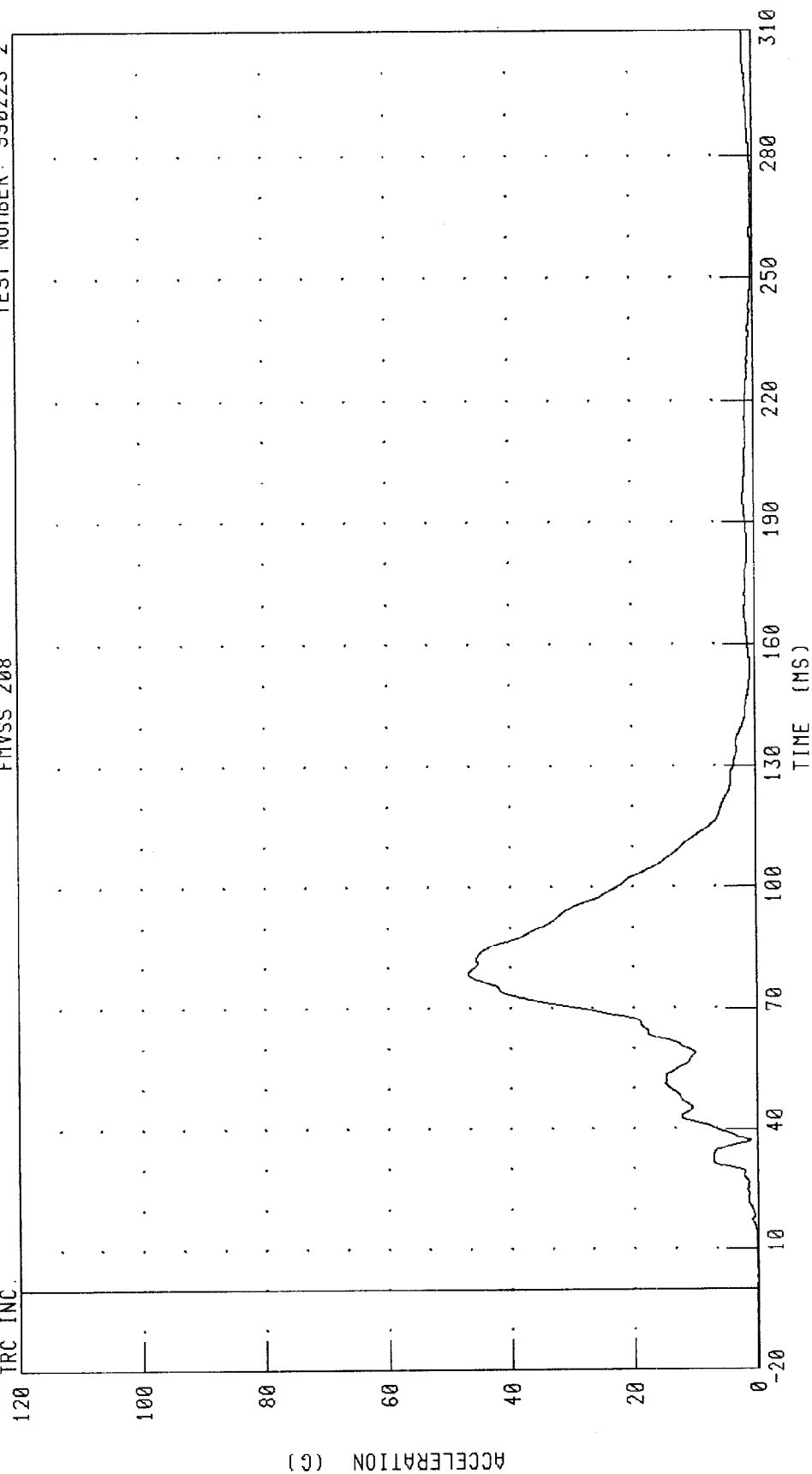
PEAK DATA: 21.36 G @ 86.16 MS; -8.49 G @ 53.12 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 46.91 G @ 78.48 MS; 0.02 G @ -20.00 MS

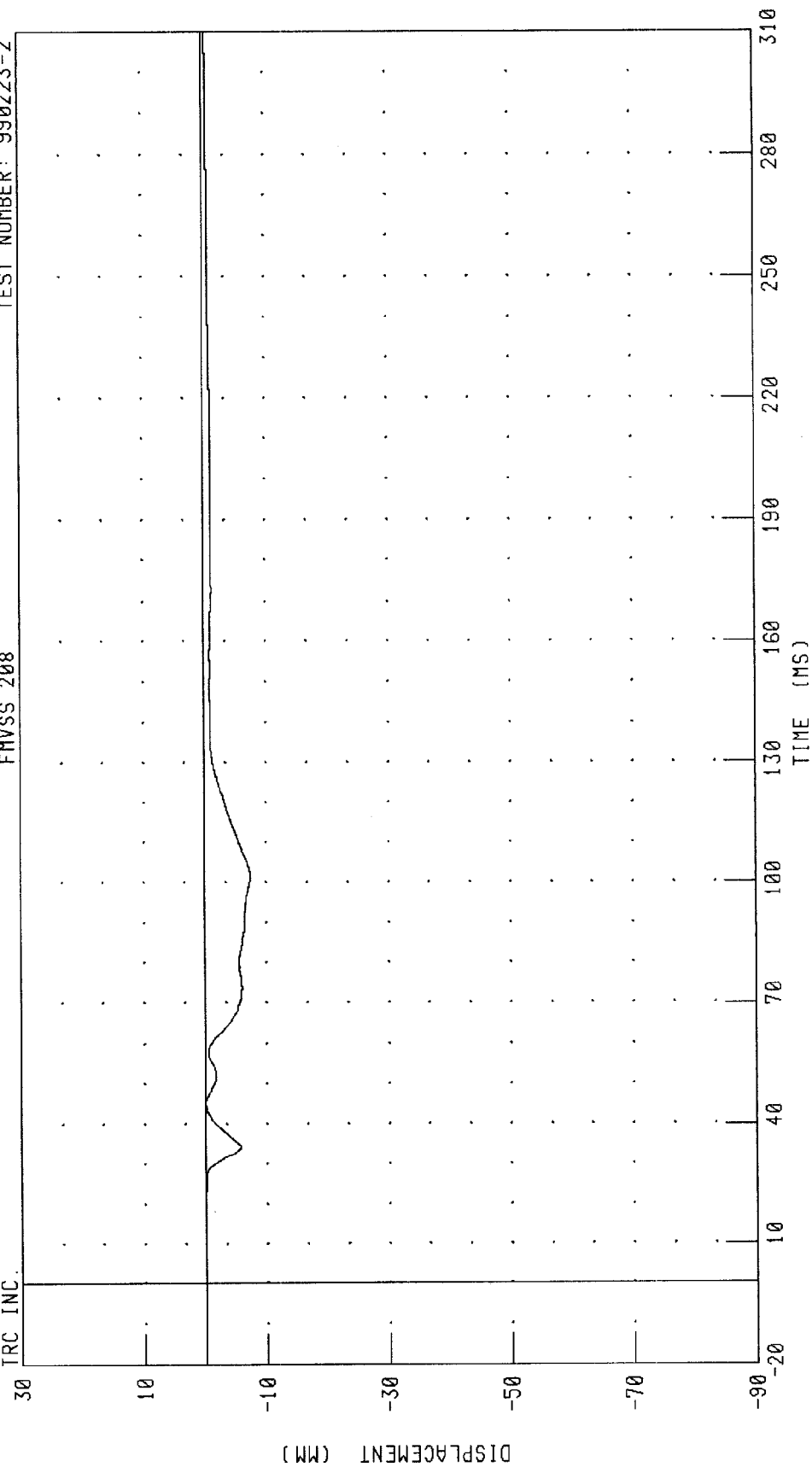
CHANNEL: CSTRC2 FILTER: CH. CLASS 180

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 0.02 MM @ 18.56 MS, -7.33 MM @ 101.44 MS

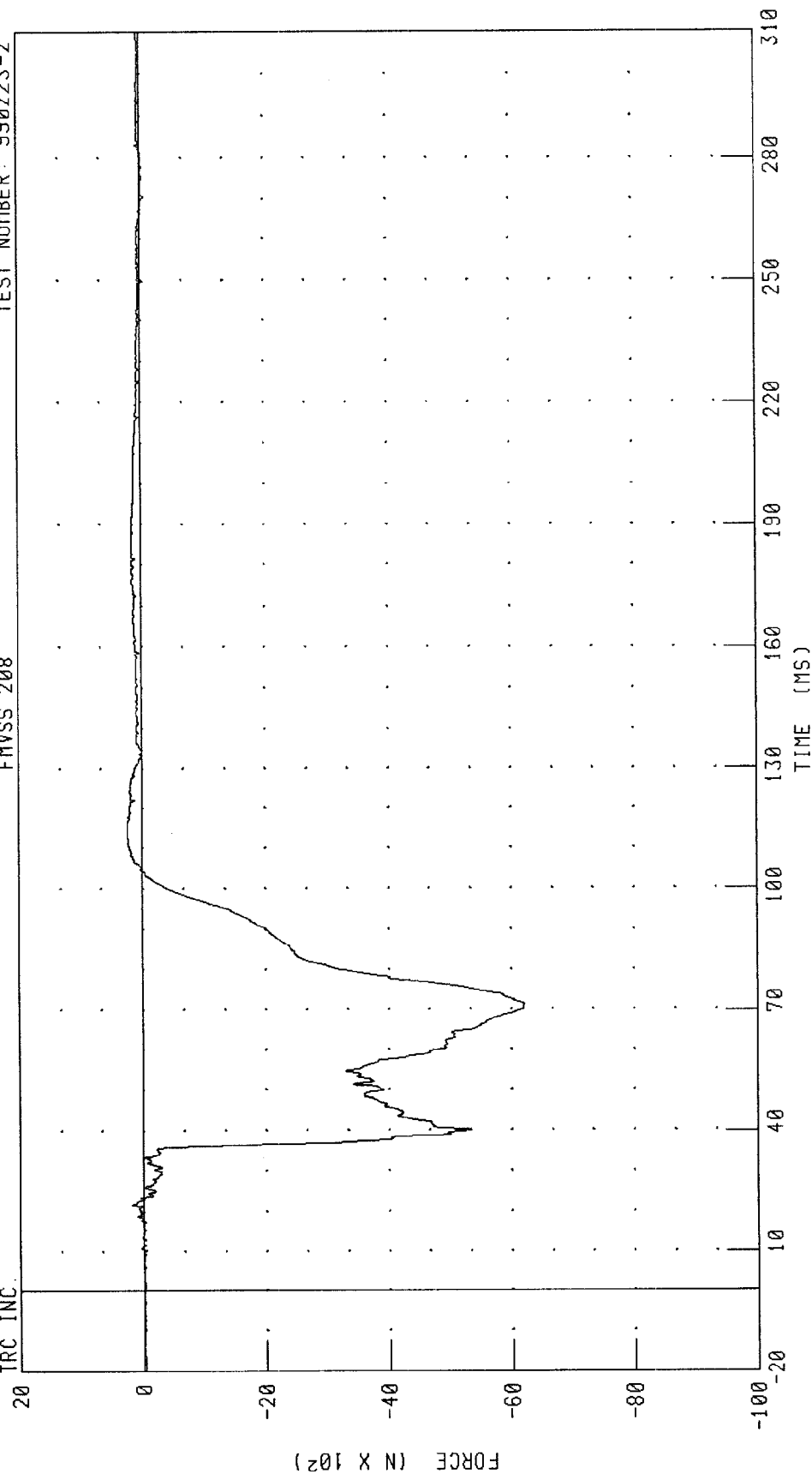
CHANNEL: CSTXD2 FILTER: CH. CLASS 180

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.

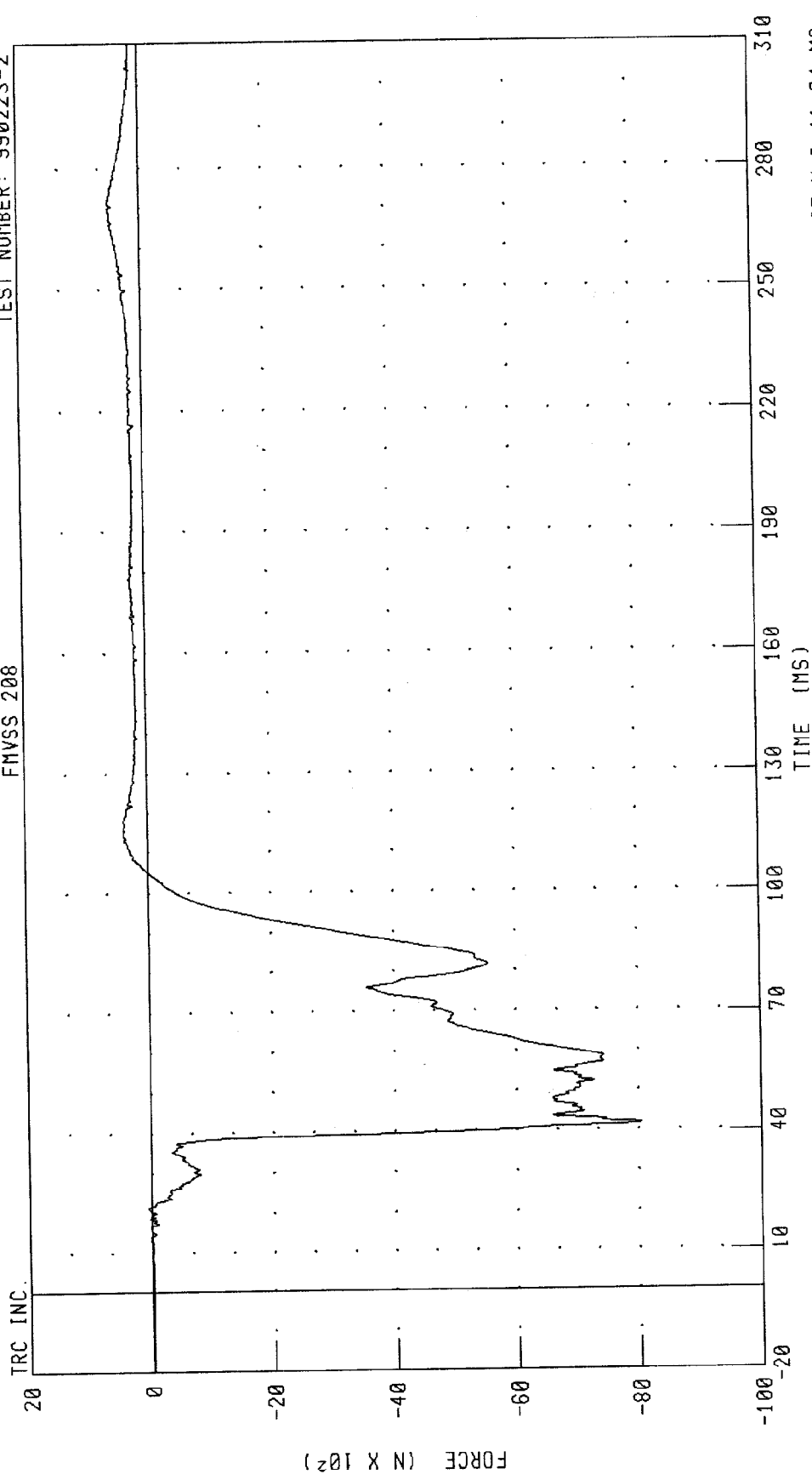


CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 246.68 N @ 114.80 MS; -6208.61 N @ 71.20 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
FMVSS 208

TEST NUMBER: 990223-2



PEAK DATA: 519.58 N @ 271.20 MS; -8038.95 N @ 41.84 MS

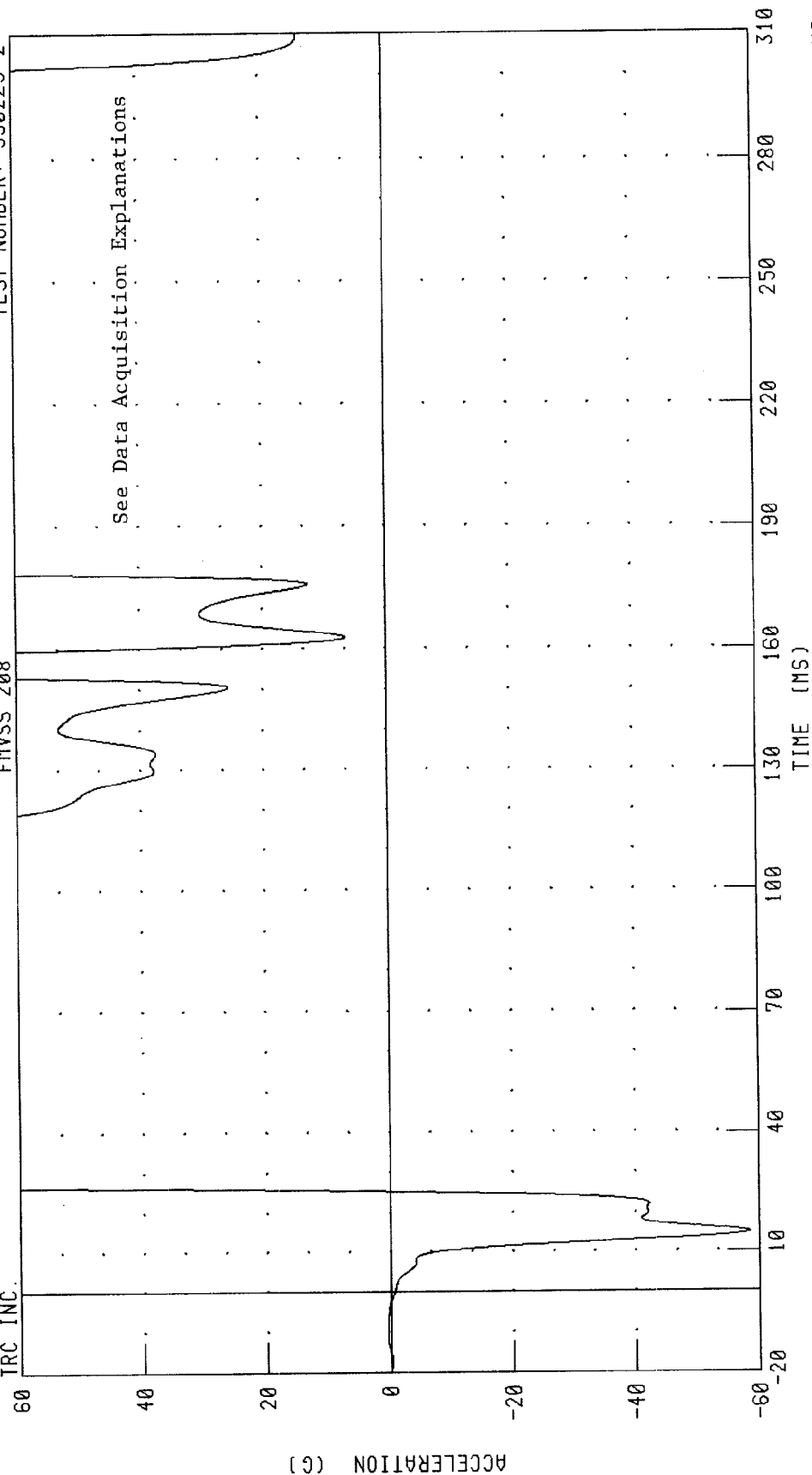
CHANNEL: RFMF2 FILTER: CH. CLASS 600

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 639.90 G @ 260.48 MS, -58.52 G @ 14.96 MS

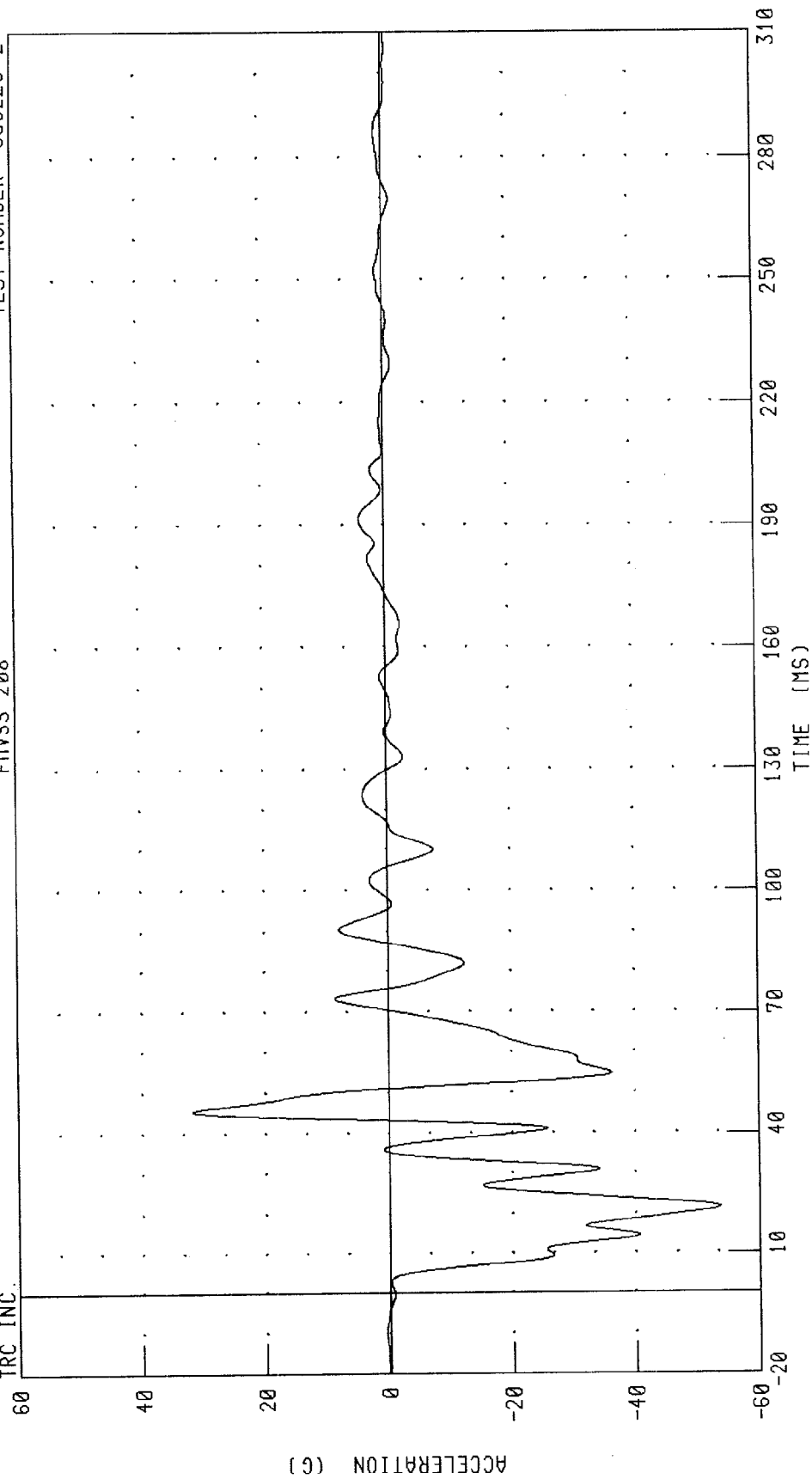
CHANNEL: BCLXC1 FILTER: CH. CLASS 60

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



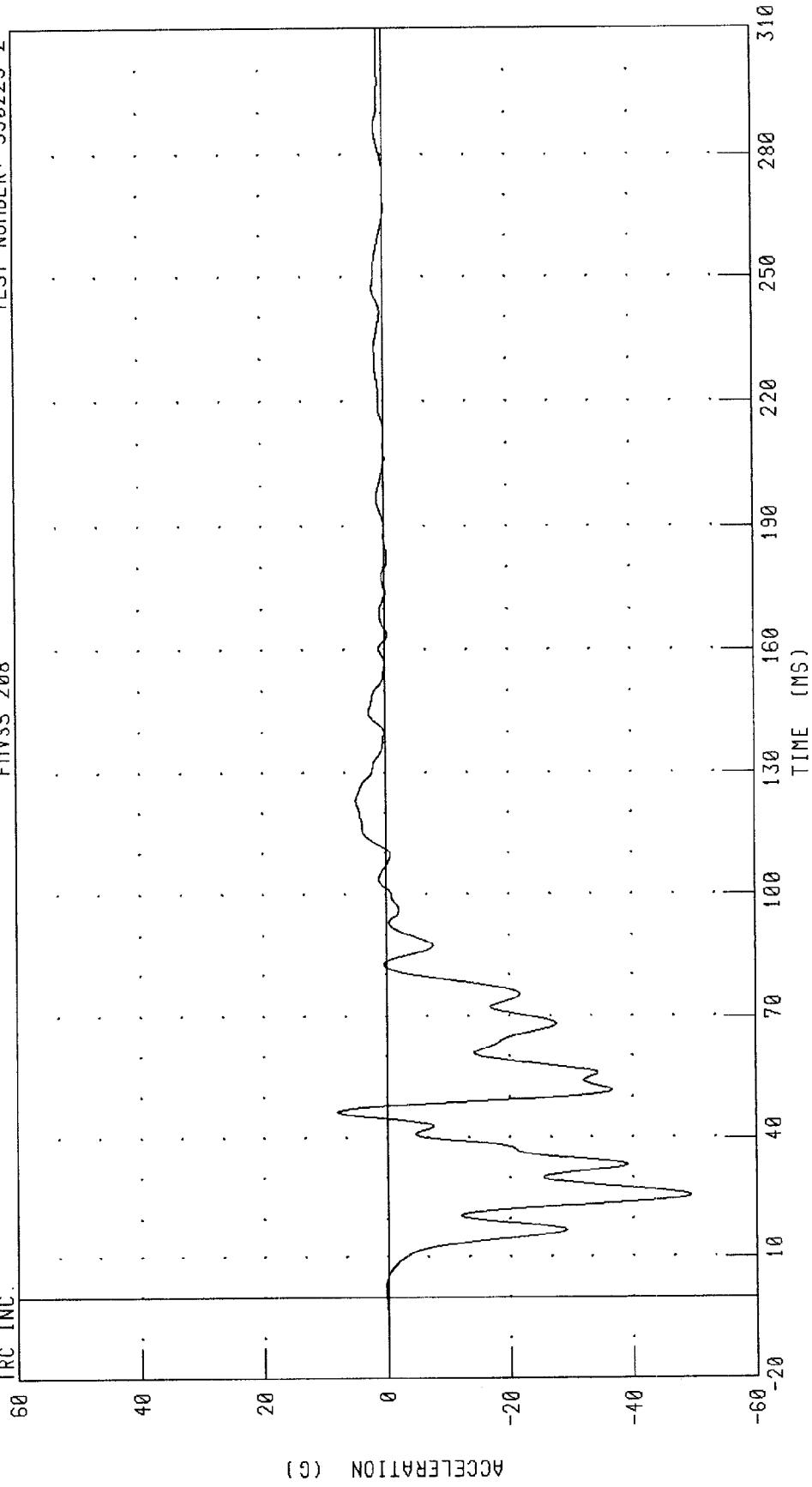
CHANNEL: BCRXG1 FILTER: CH. CLASS 60

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
DASH PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: DPCXG1 FILTER: CH. CLASS 60

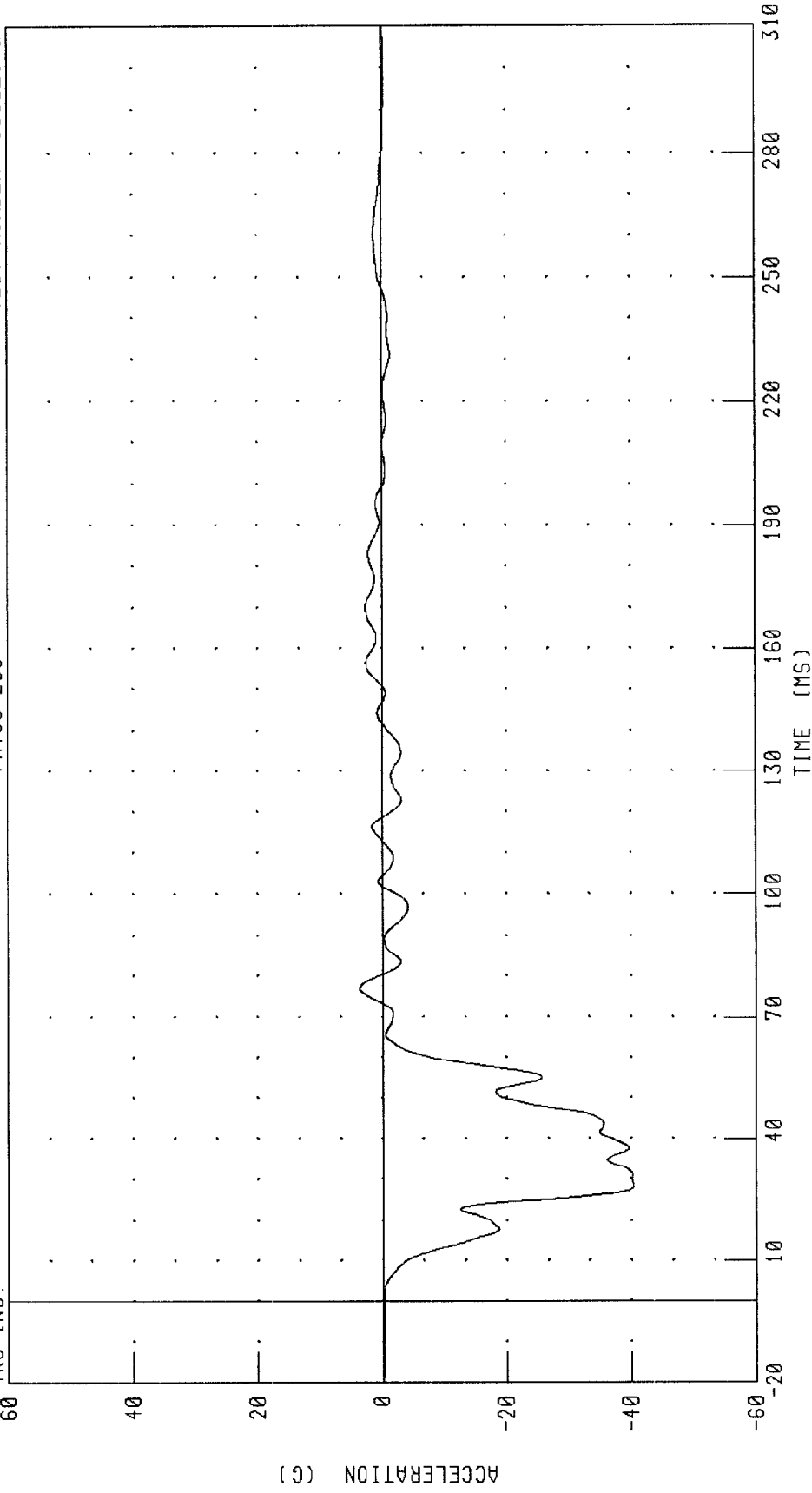
PEAK DATA: 8.05 G @ 46.48 MS, -49.31 G @ 25.76 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMYSS 208

TRC INC.



CHANNEL: ENGXC1 FILTER: CH. CLASS 60

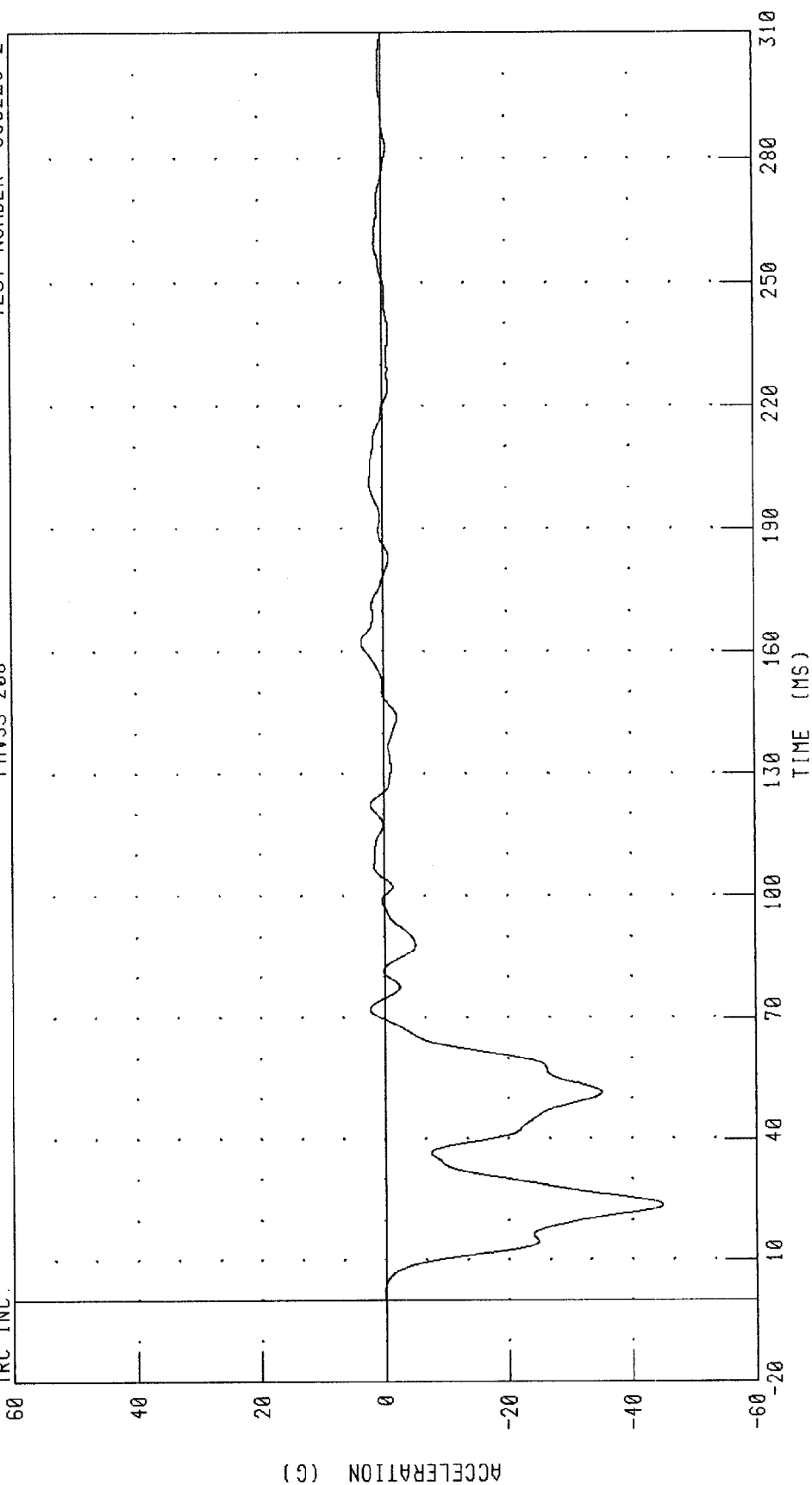
PEAK DATA: 3.61 G @ 76.88 MS; -40.45 G @ 28.24 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
ENGINE BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: ENGXC2 FILTER: CH. CLASS 60

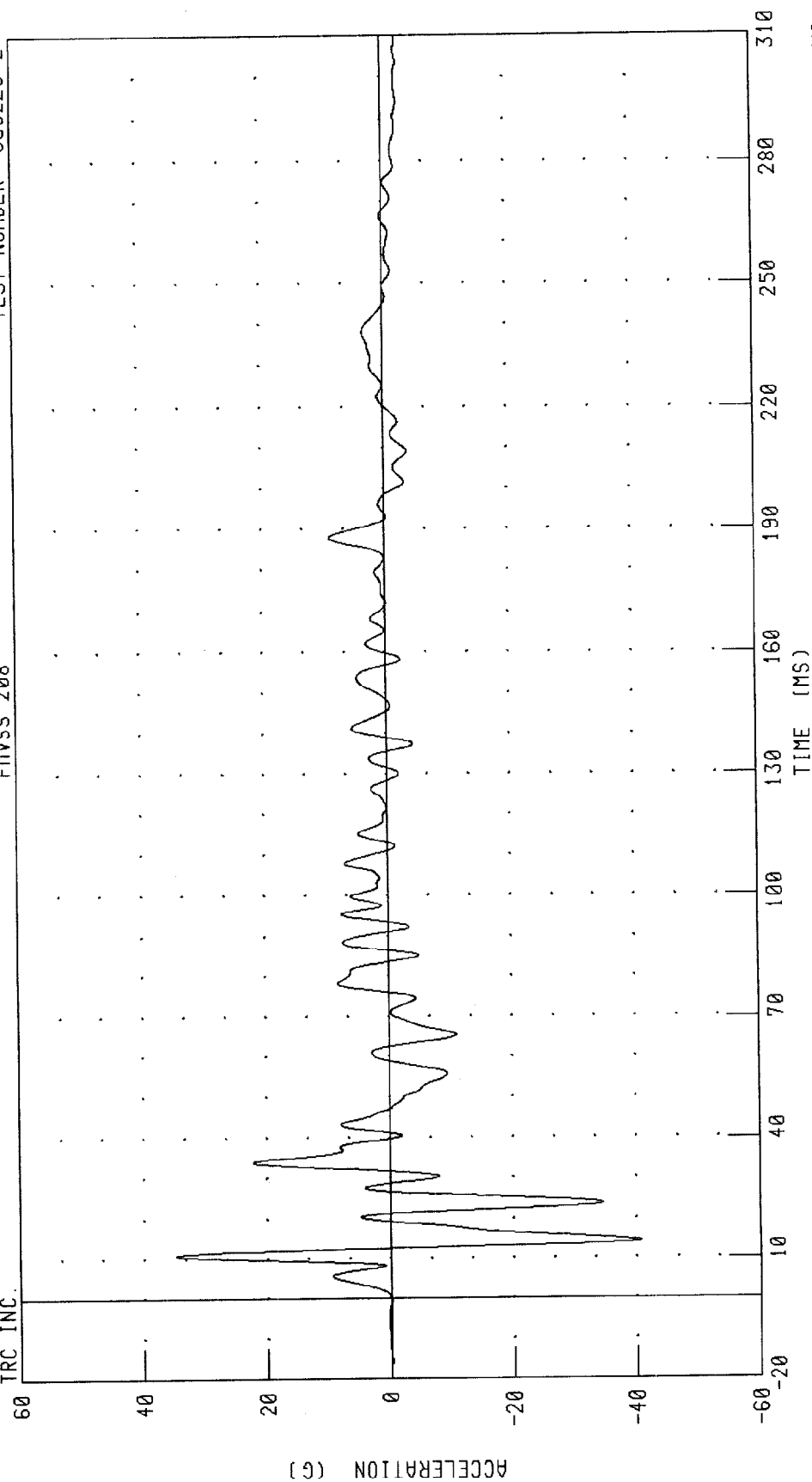
PEAK DATA: 3.53 G @ 162.32 MS; -44.95 G @ 23.84 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE REAR CENTER Z-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: RDKZG1

FILTER: CH. CLASS 60

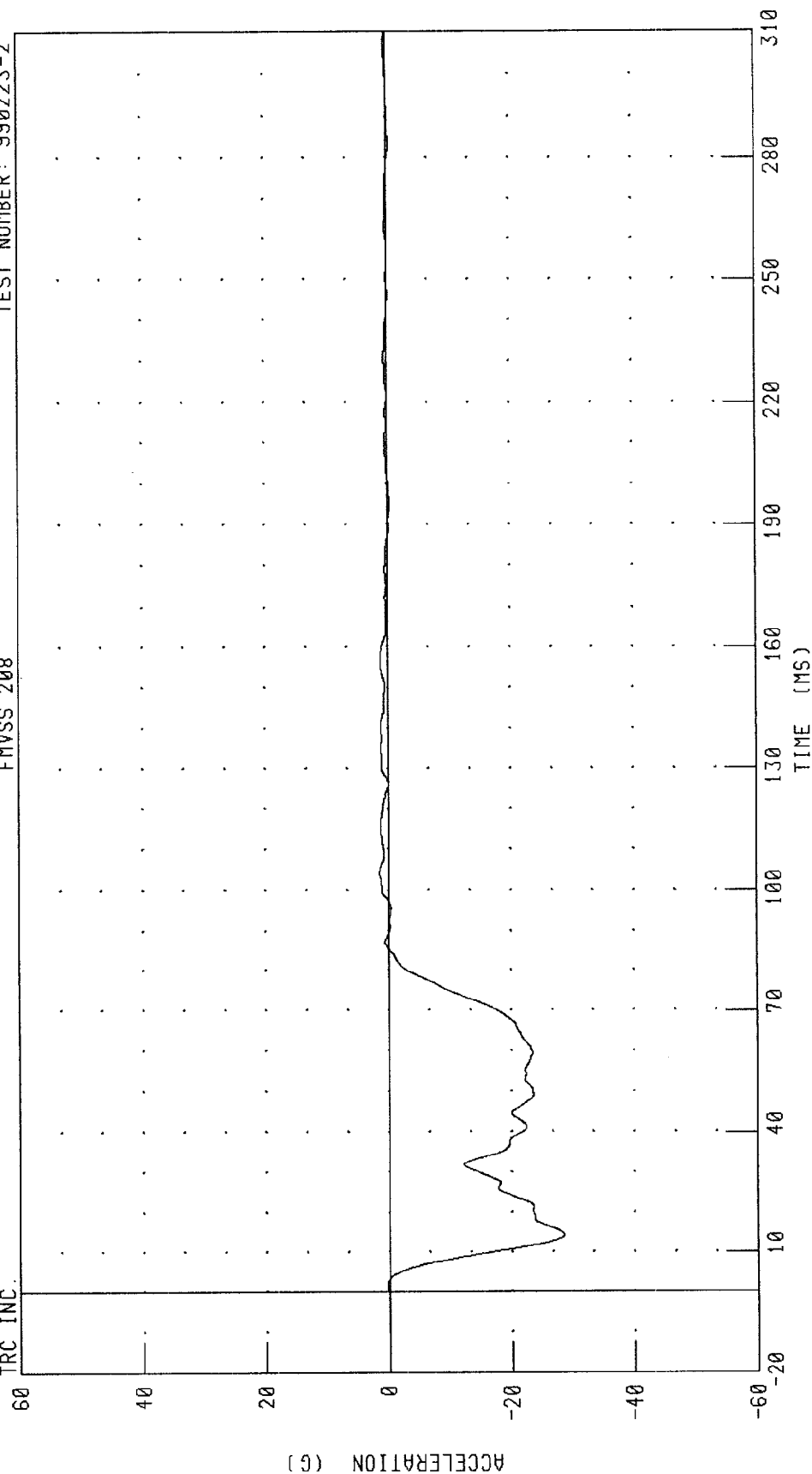
PEAK DATA: 34.89 G @ 10.80 MS, -40.66 G @ 14.48 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
LEFT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



CHANNEL: TLRXG1 FILTER: CH. CLASS 60

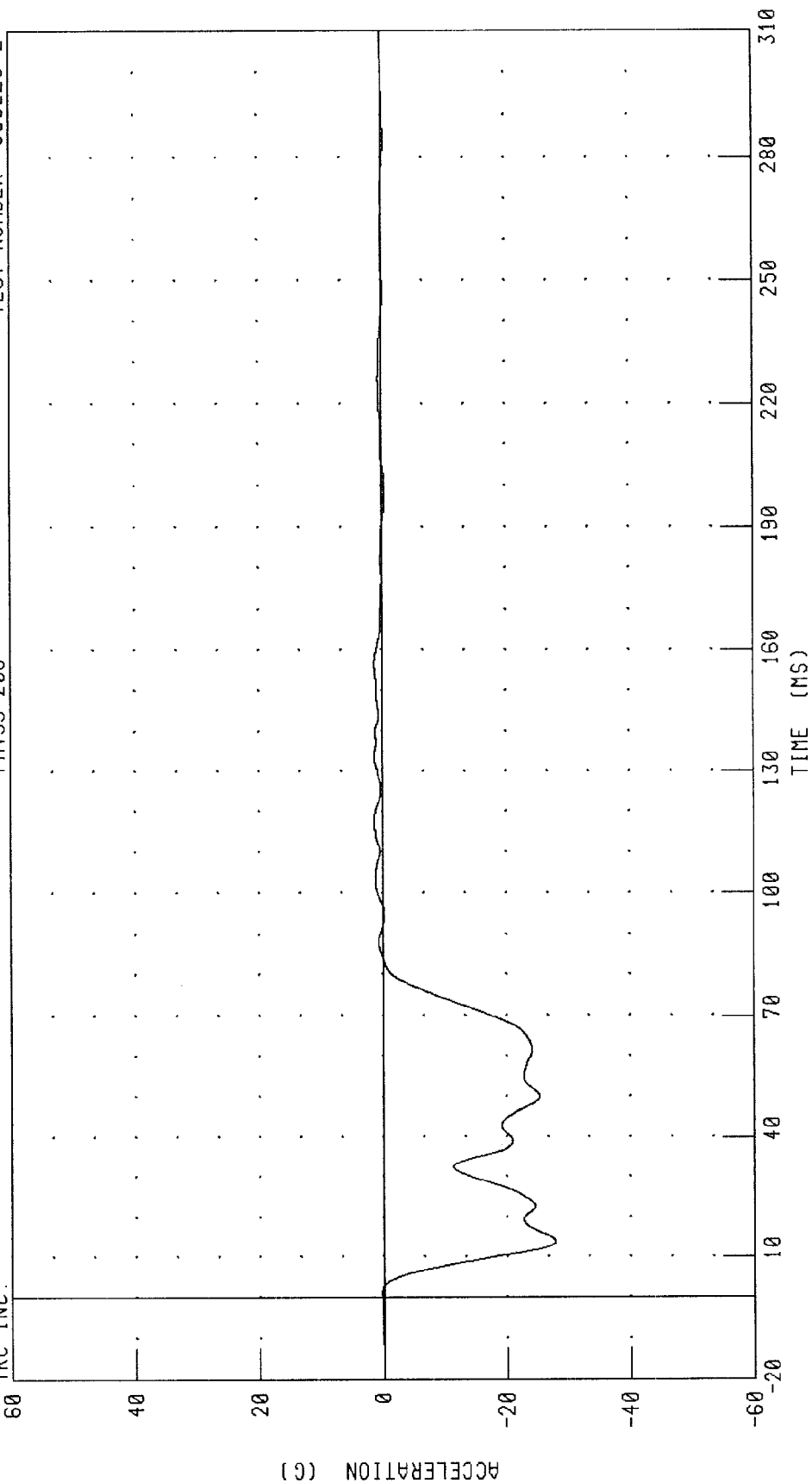
PEAK DATA: 1.42 G @ 104.32 MS; -28.58 G @ 14.16 MS

1999 FORD E-150 ECONOLINE VAN INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 990223-2

FMVSS 208

TRC INC.



PEAK DATA: 1.36 G @ 133.20 MS; -27.92 G @ 13.68 MS

CHANNEL: TRRXG1 FILTER: CH. CLASS 60

Appendix C

Dummy Certification

Pre-Test Dummy Certification

Driver Dummy S/N 168

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 168C7HD1

572E SN168 HEAD DROP CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	260.95 G
PEAK LATERAL ACCELERATION	15 G MAX	4.32 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN *Ry Calt*

RUN NUMBER: 022099.1150;1

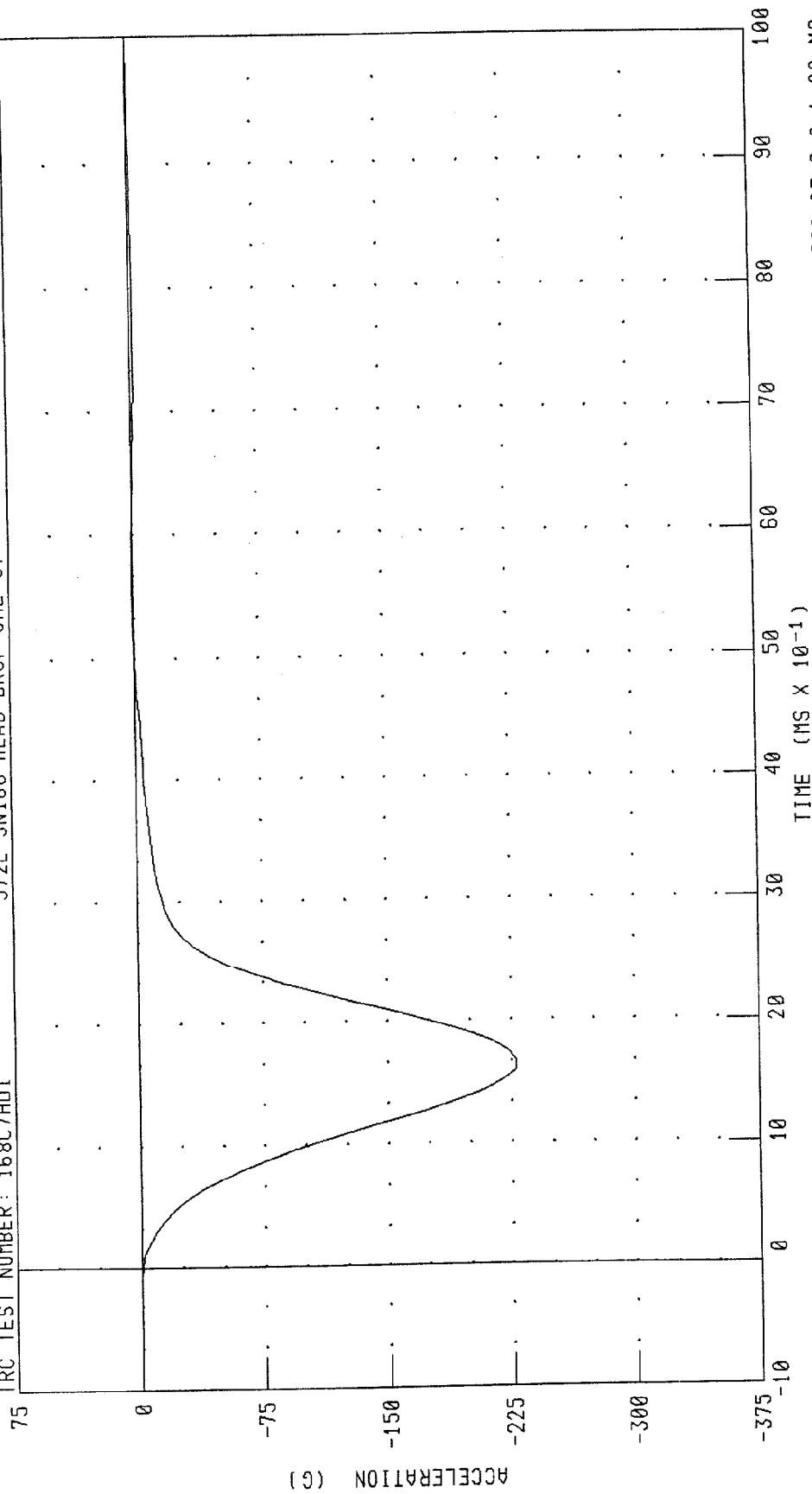
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

RUN NUMBER: 022099.1150;1

572E SN168 HEAD DROP CAL 07

TRC TEST NUMBER: 168C7HD1



CHANNEL: HEDXC

FILTER: CH. CLASS 1000

TIME (MS X 10⁻¹)

PEAK DATA: 0.79 G @ 5.52 MS; -228.07 G @ 1.68 MS

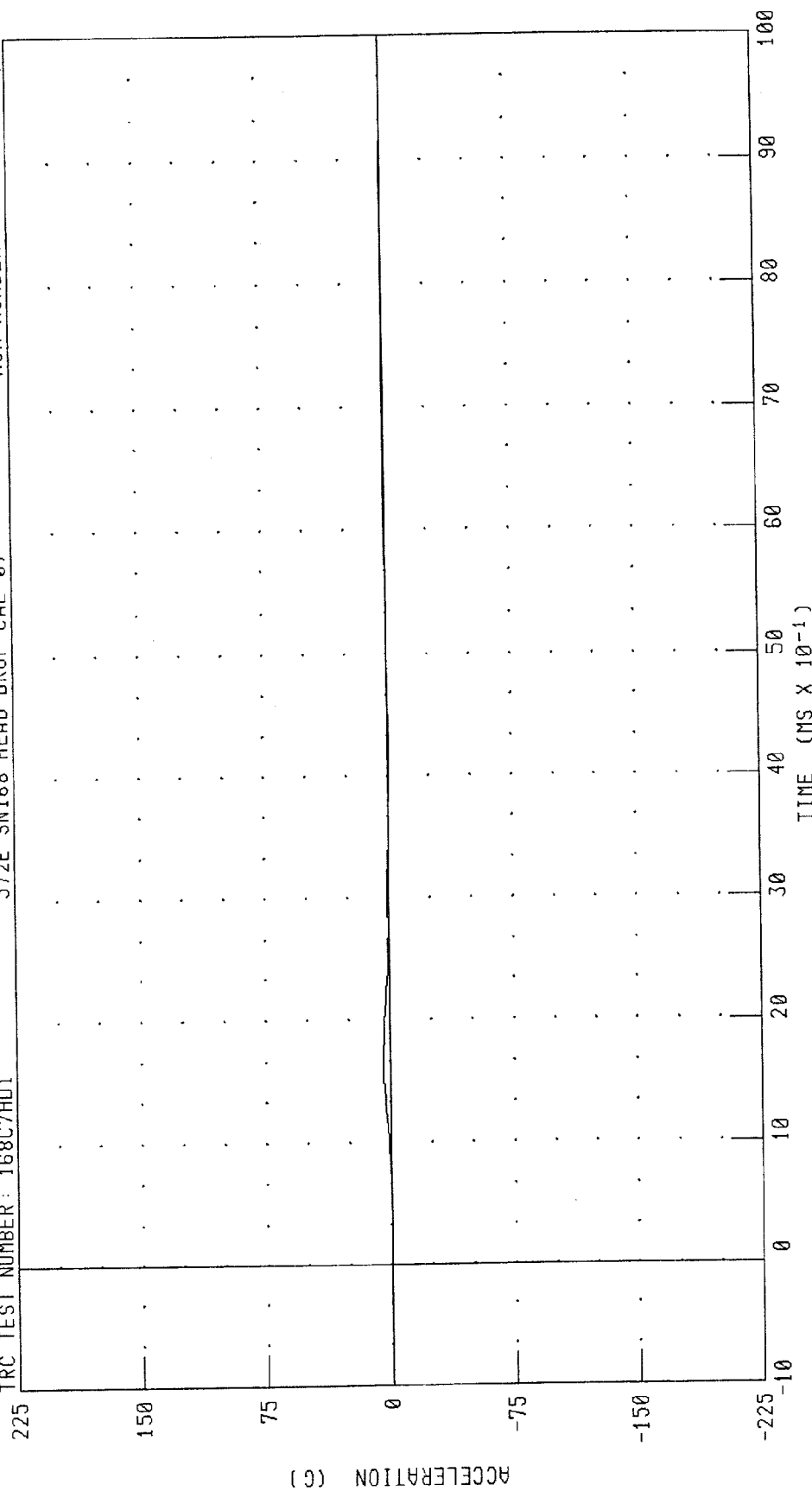
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572E SN168 HEAD DROP CAL 07

RUN NUMBER: 022099.1150;1

TRC TEST NUMBER: 168C7HD1



PEAK DATA: 4.33 G @ 1.60 MS; -0.78 G @ 3.92 MS

CHANNEL: HEDYC FILTER: CH. CLASS 1000

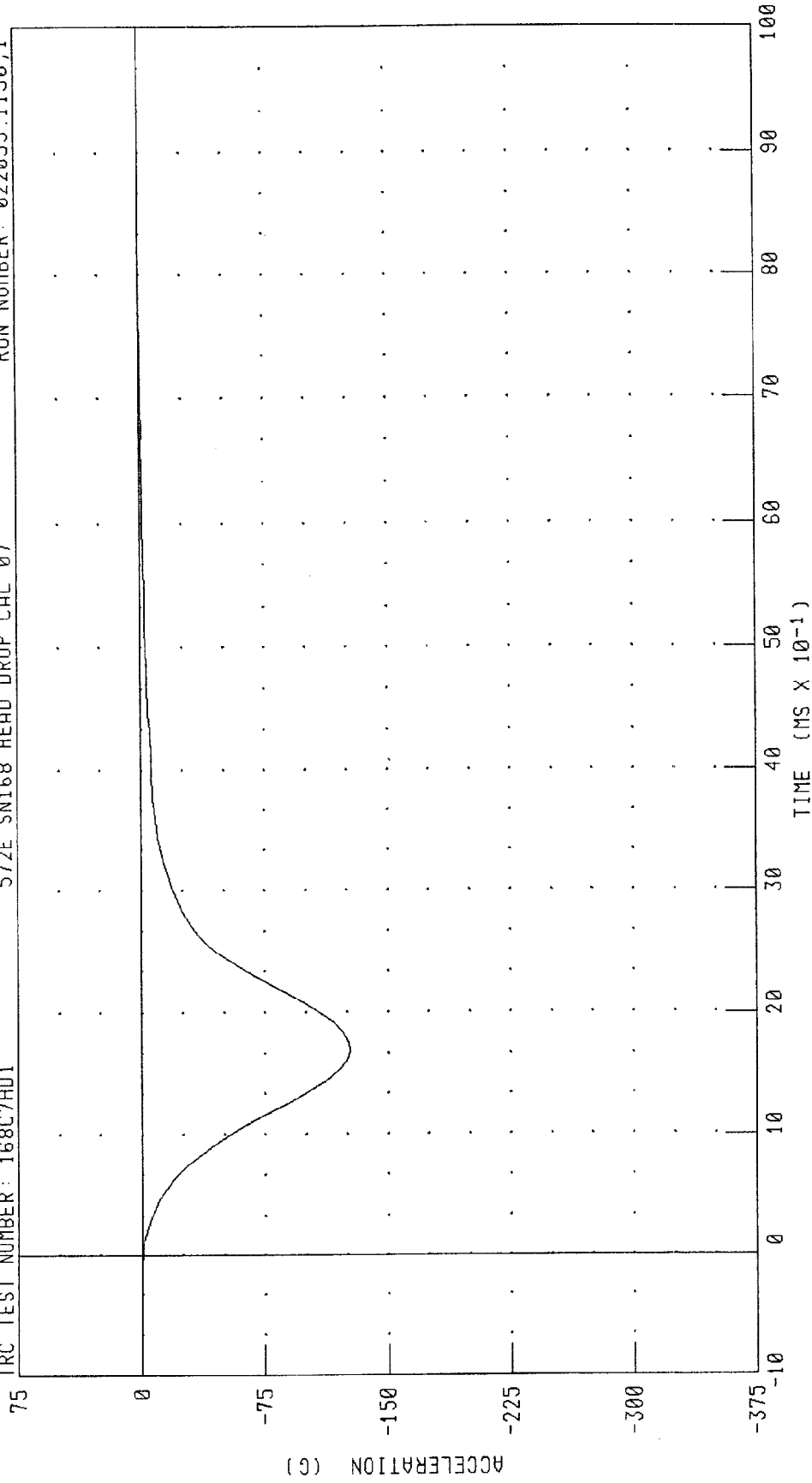
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572E SN168 HEAD DROP CAL 07

TRC TEST NUMBER: 168C7HD1

RUN NUMBER: 022099.1150;1



PEAK DATA: 0.20 G @ 10.00 MS; -126.75 G @ 1.68 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

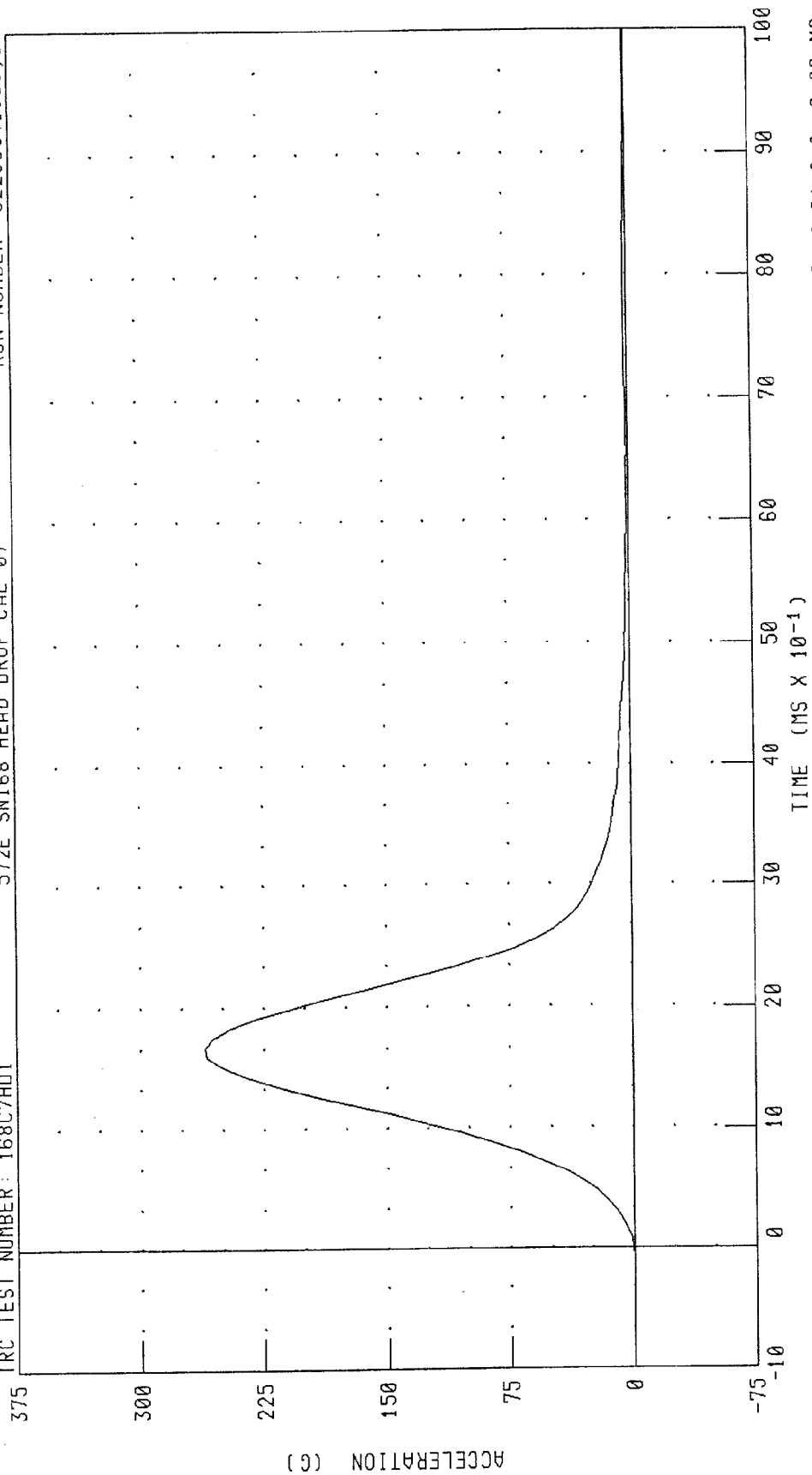
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN168 HEAD DROP CAL 07

RUN NUMBER: 022099.1150;1

TRC TEST NUMBER: 168C7HD1



CHANNEL: HEDRG

FILTER: CH. CLASS 1000

TIME (MS X 10⁻¹)

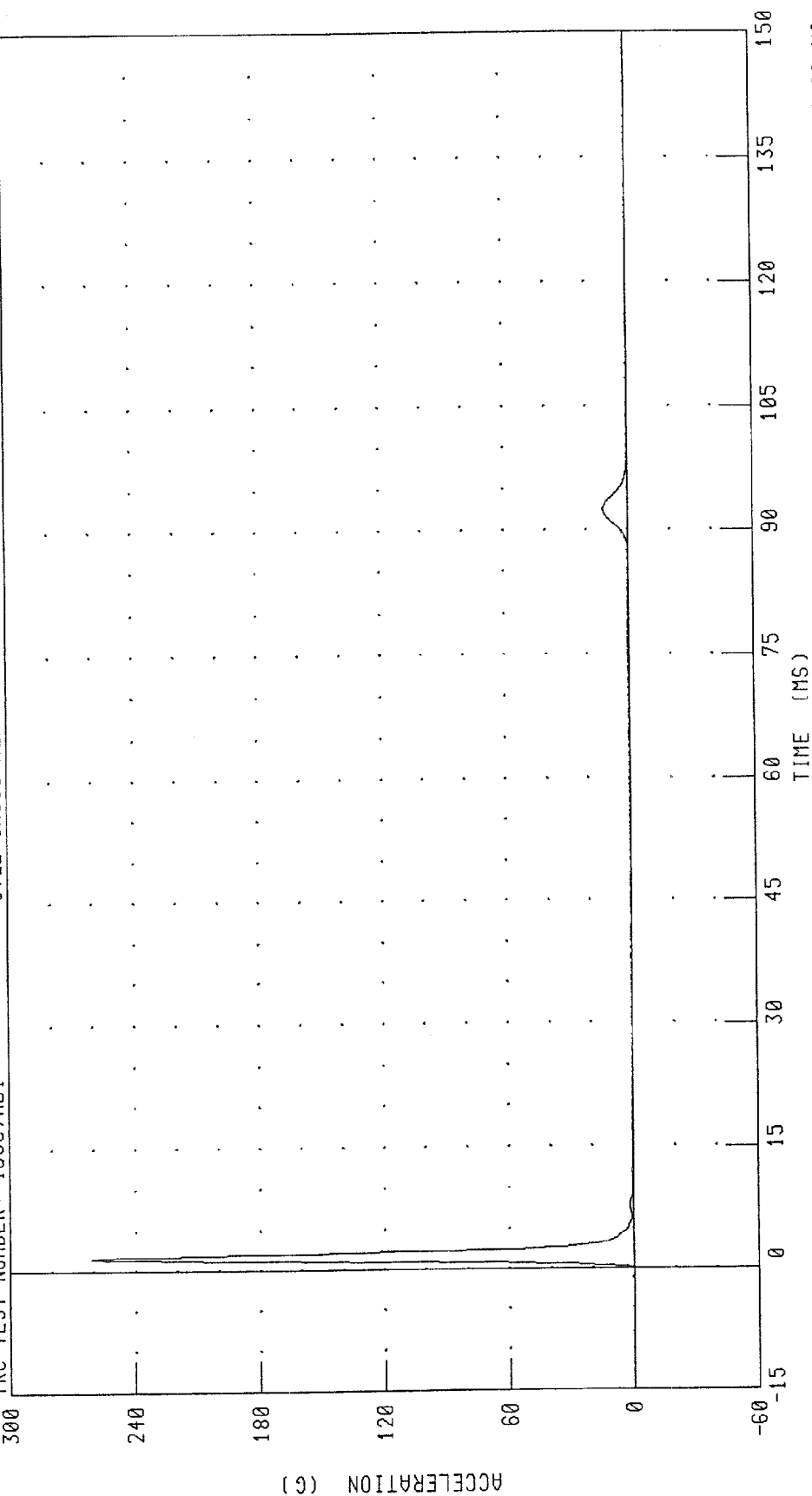
PEAK DATA: 260.95 G @ 1.68 MS; 0.01 G @ -0.96 MS

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

TRC TEST NUMBER: 168C7HD1

572E SN168 HEAD DROP CAL 07

RUN NUMBER: 022099.1150;1



CHANNEL: HEDRC FILTER: CH. CLASS 1000

PEAK DATA: 260.95 G @ 1.68 MS; 0.01 G @ -14.96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

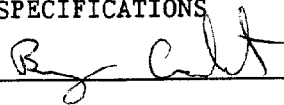
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C7NF1 572E SN168 NECK FLEXION CAL07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.87 G
	20 MS	17.60 - 22.60 G	21.33 G
	30 MS	12.50 - 18.50 G	13.41 G
MAX PENDULUM G		29 G MAX	24.38 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	13.38 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	40.88 MS
D PLANE	MAX	64 - 78 DEG.	72.71 DEG.
ROTATION	TIME	57 - 64 MS	60.64 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	90.95 NM
	TIME	47 - 58 MS	54.24 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.52 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.84 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 022299.1318;1

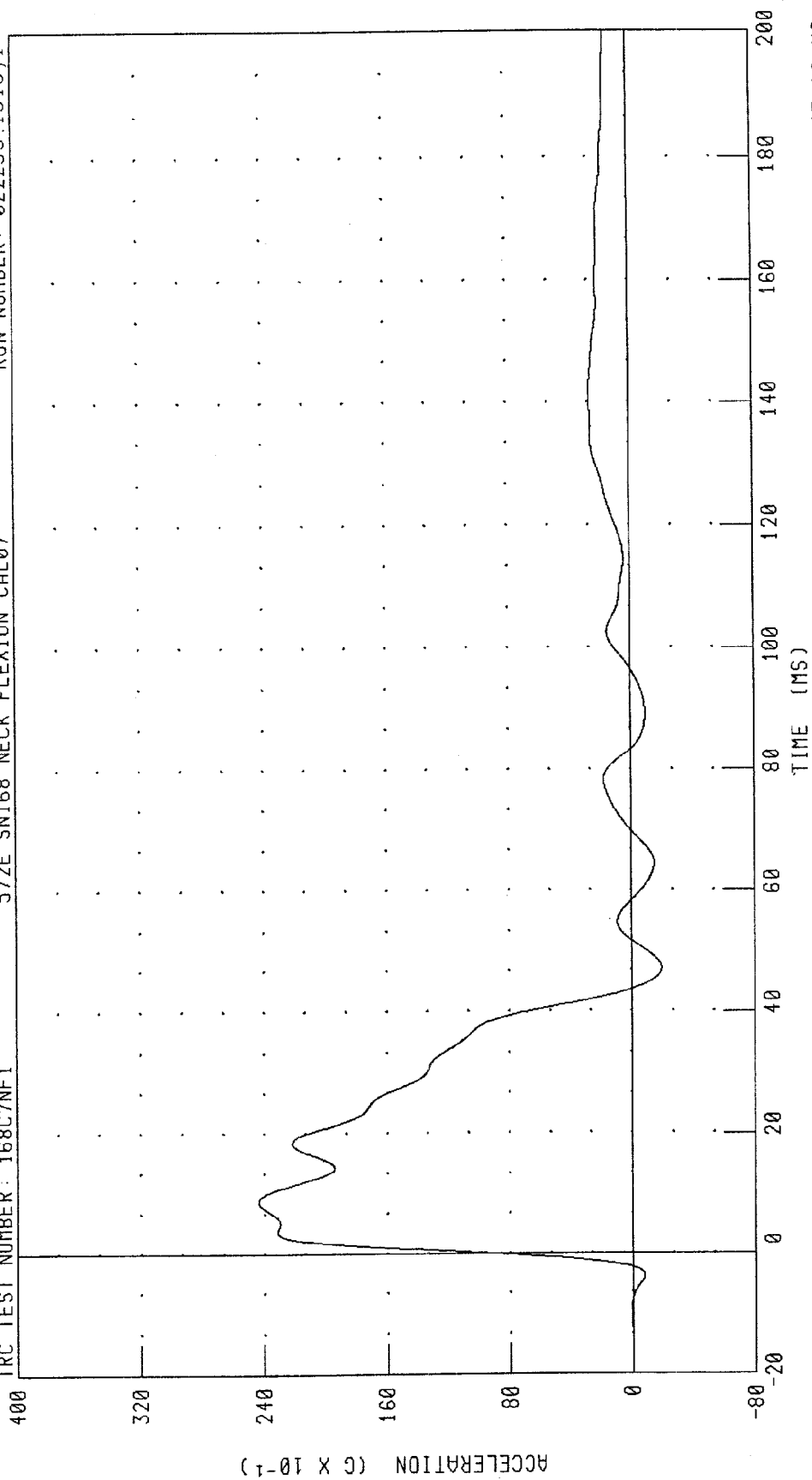
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 24.38 G @ 8.72 MS; -1.95 G @ 47.12 MS

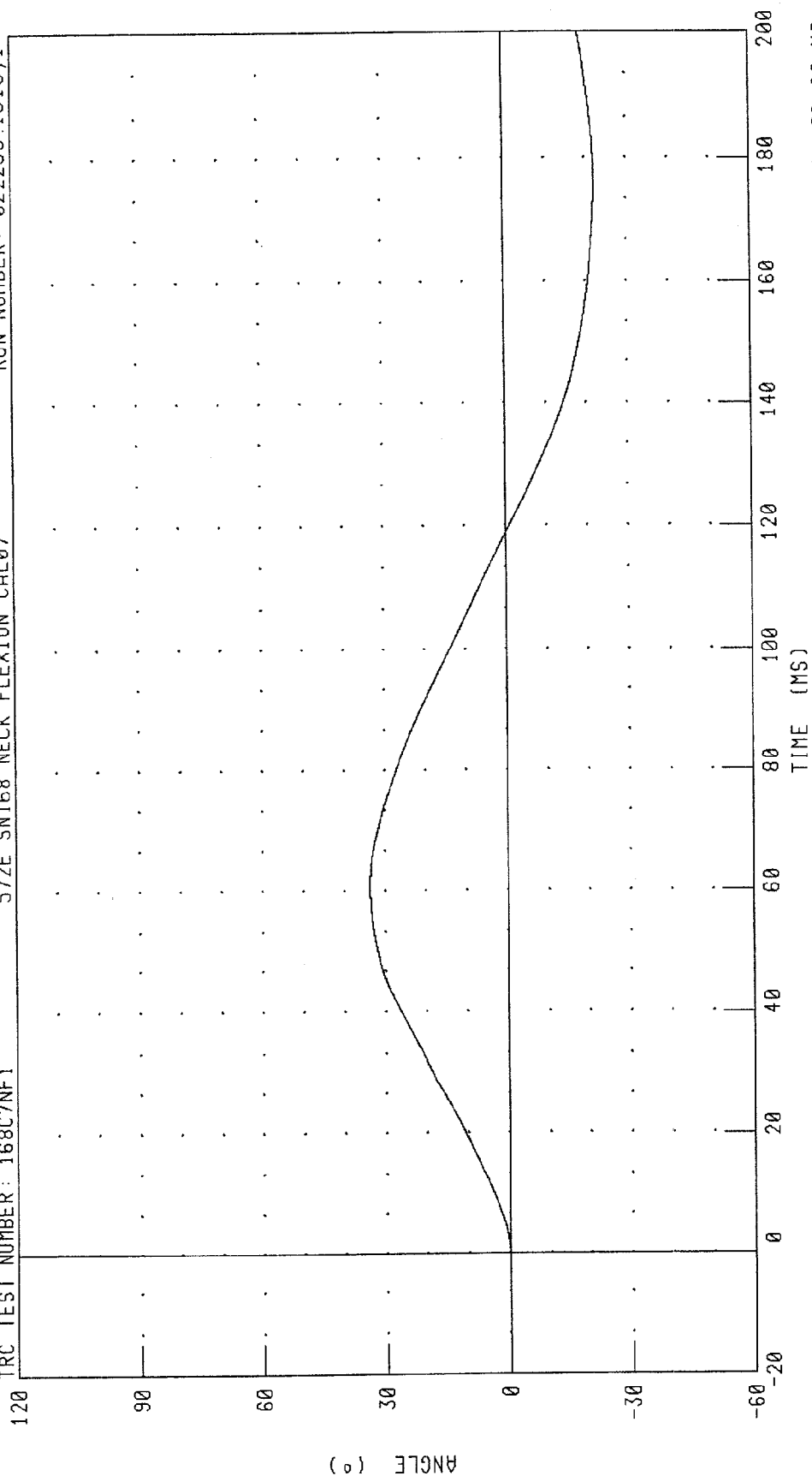
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN168 NECK FLEXION CAL07

TRC TEST NUMBER: 168C7NF1

RUN NUMBER: 0222299.1318;1



PEAK DATA: 33.64 ° @ 60.72 MS; -22.19 ° @ 176.80 MS

CHANNEL: BETA FILTER: CH. CLASS 60

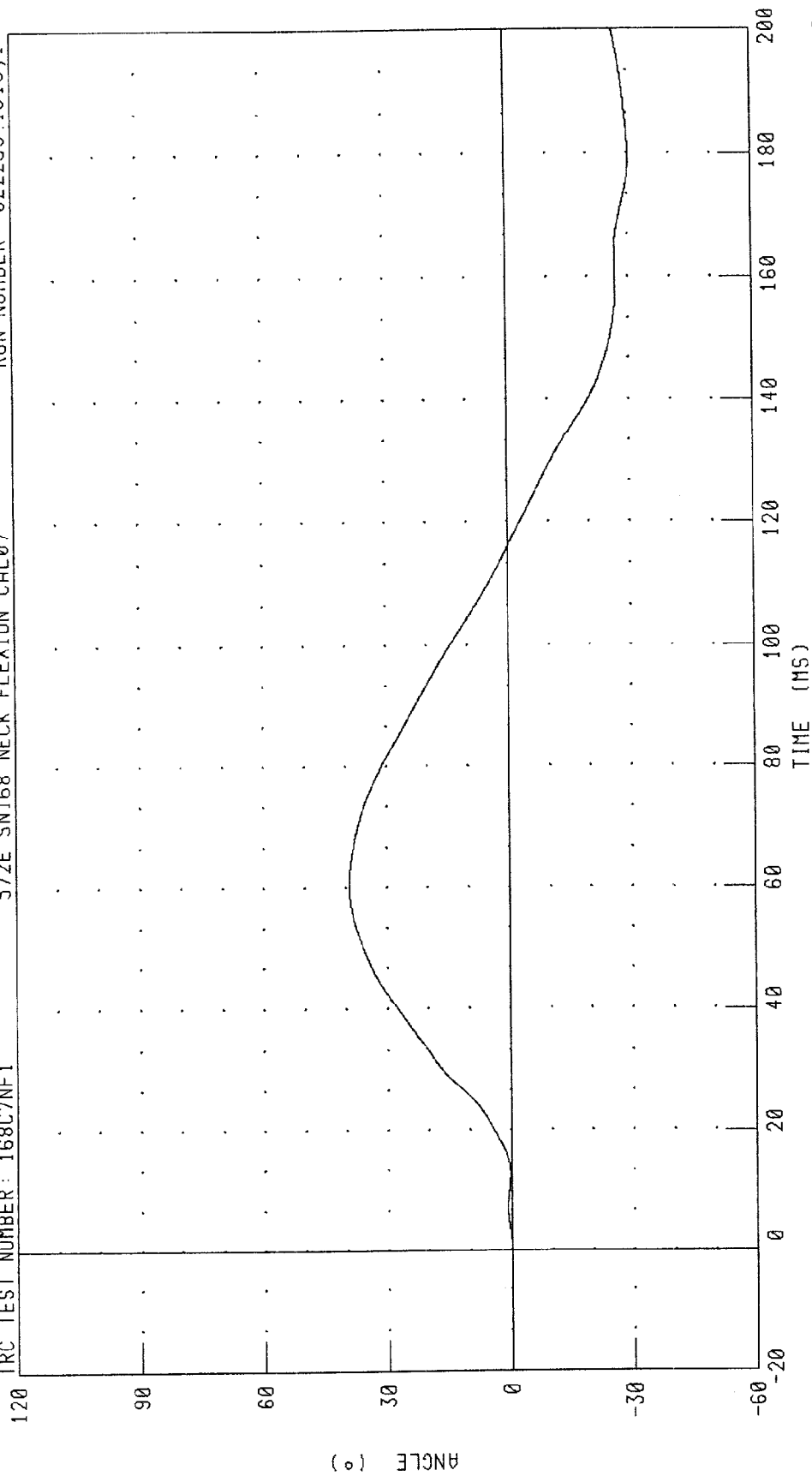
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 022299.1318;1

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07



PEAK DATA: 39.08 ° @ 60.56 MS; -30.27 ° @ 179.76 MS

CHANNEL: THETA FILTER: CH. CLASS 60

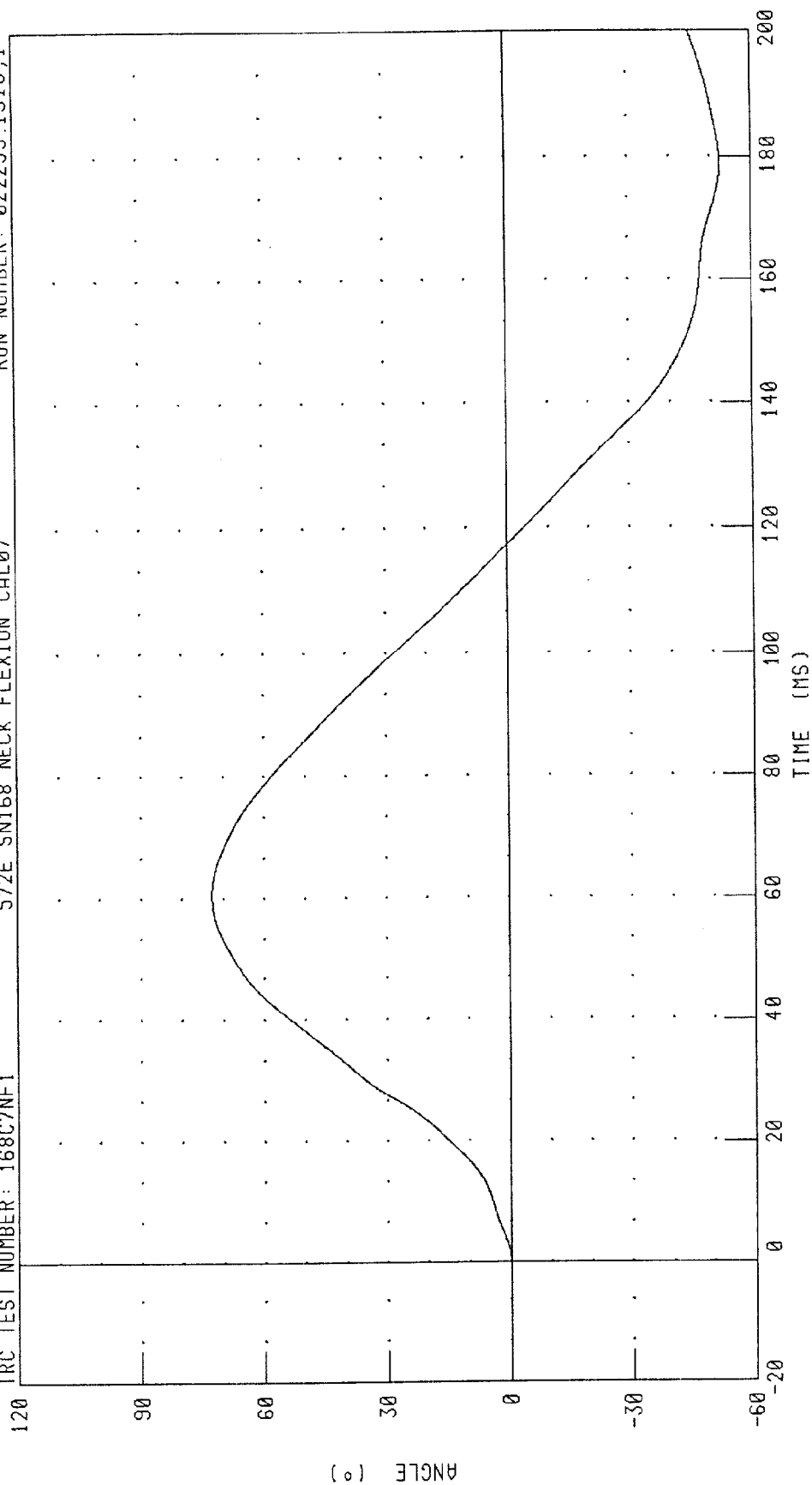
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1



PEAK DATA: 72.72 ° @ 60.64 MS, -52.41 ° @ 178.80 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

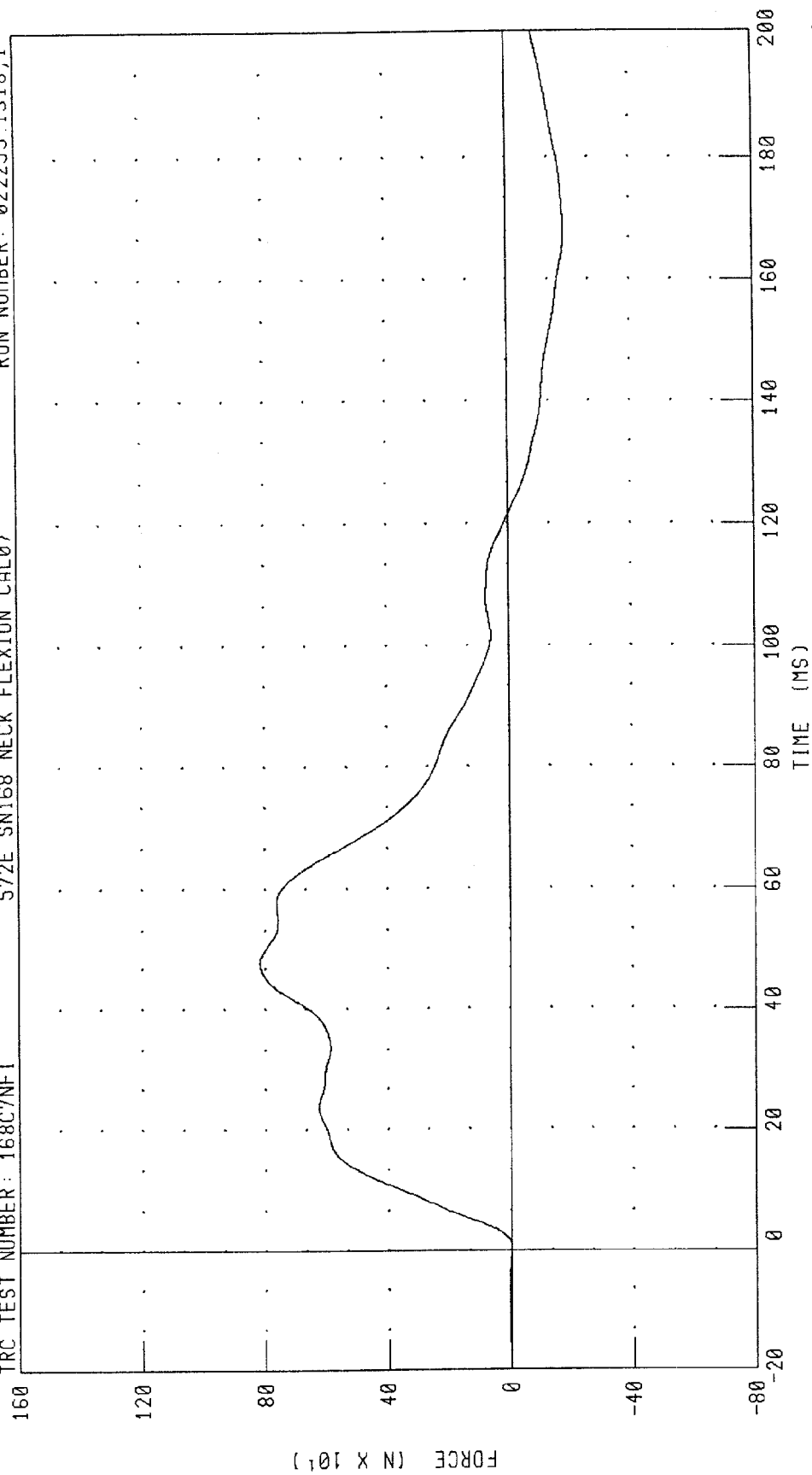
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 816.79 N @ 47.68 MS; -187.42 N @ 167.60 MS

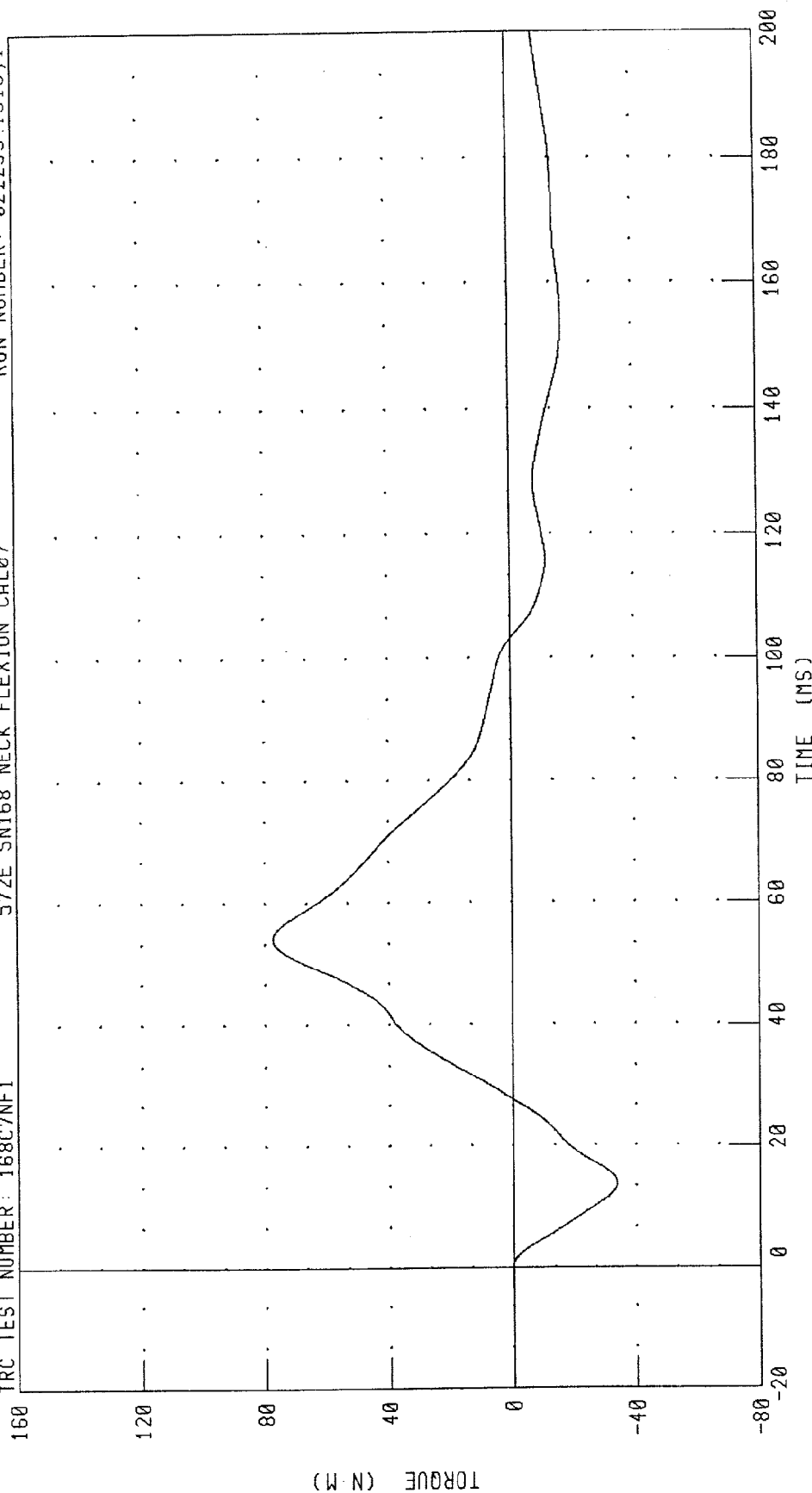
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 0222299.1318;1

572E SN168 NECK FLEXION CAL07

TRC TEST NUMBER: 168C7NF1



CHANNEL: NEKYM FILTER: CH. CLASS 60

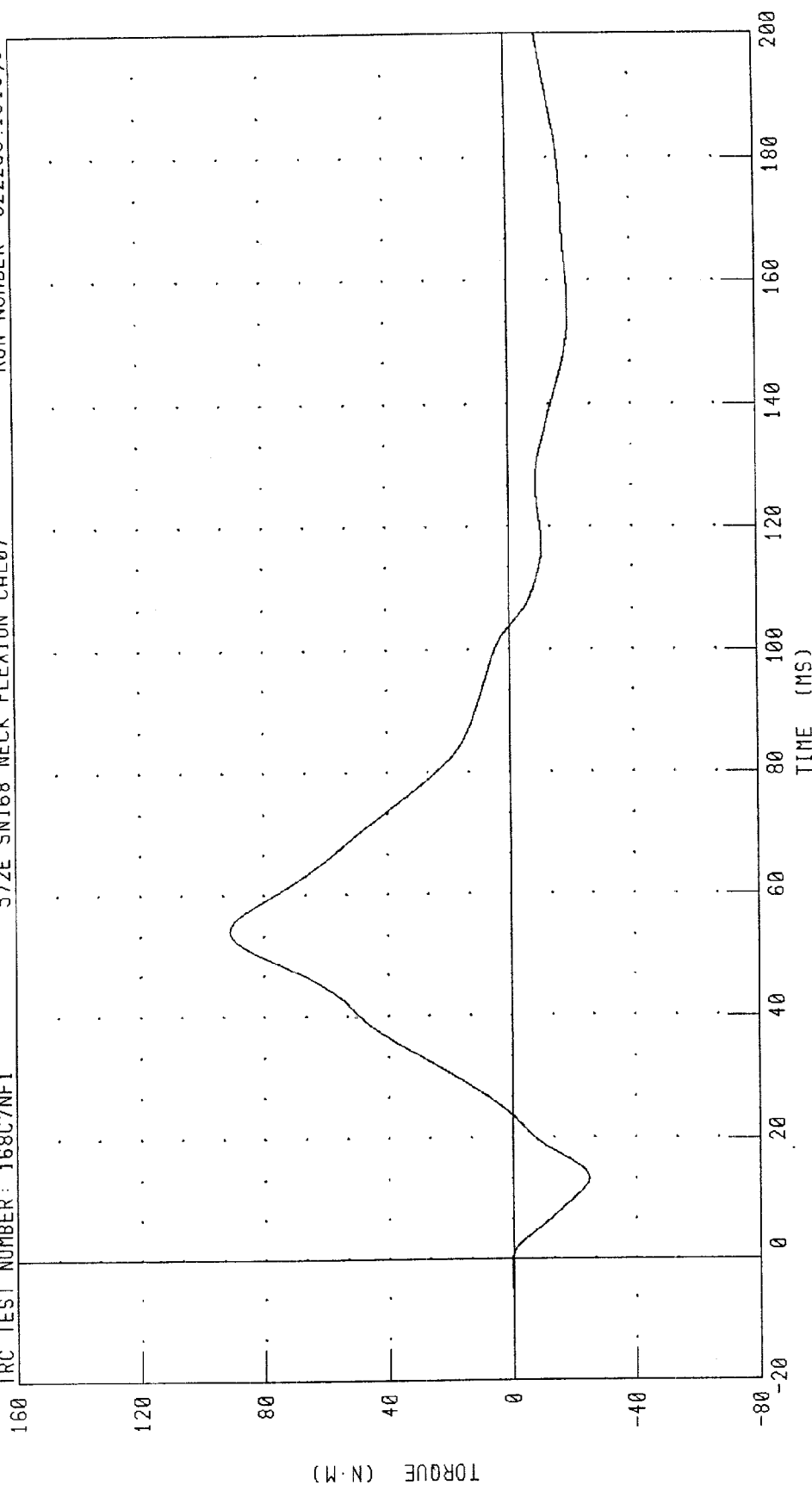
PEAK DATA: 77.50 N.M @ 54.24 MS; -33.74 N.M @ 13.84 MS

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

RUN NUMBER: 022299.1318;1

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07



PEAK DATA: 90.95 N·M @ 54.24 MS, -24.67 N·M @ 13.44 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C7NE2 572E SN168 NECK EXT CAL07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.71 G
	20 MS	14.00 - 19.00 G	17.20 G
	30 MS	11.00 - 16.00 G	15.45 G
MAX PENDULUM G		22 G MAX	18.99 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.45 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.88 MS
D PLANE	MAX	81 - 106 DEG.	98.22 DEG.
ROTATION	TIME	72 - 82 MS	77.28 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-67.56 NM
	TIME	65 - 79 MS	72.24 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	160.24 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	144.64 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 022299.1403;1

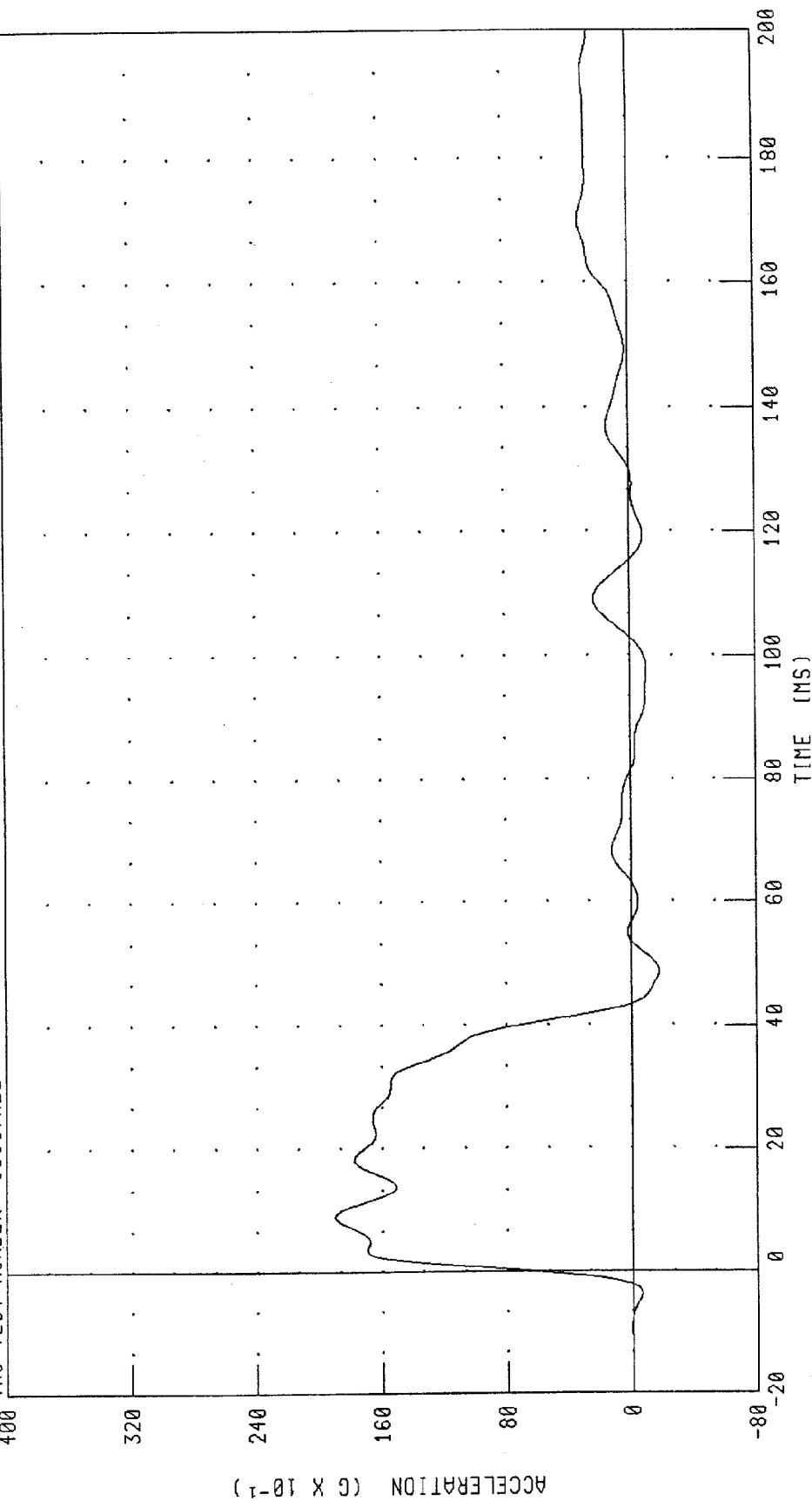
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C7NE2

572E SN168 NECK EXT CAL07

RUN NUMBER: 030899.1031,1



PEAK DATA: 18.99 G @ 9.20 MS, -1.78 G @ 48.88 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

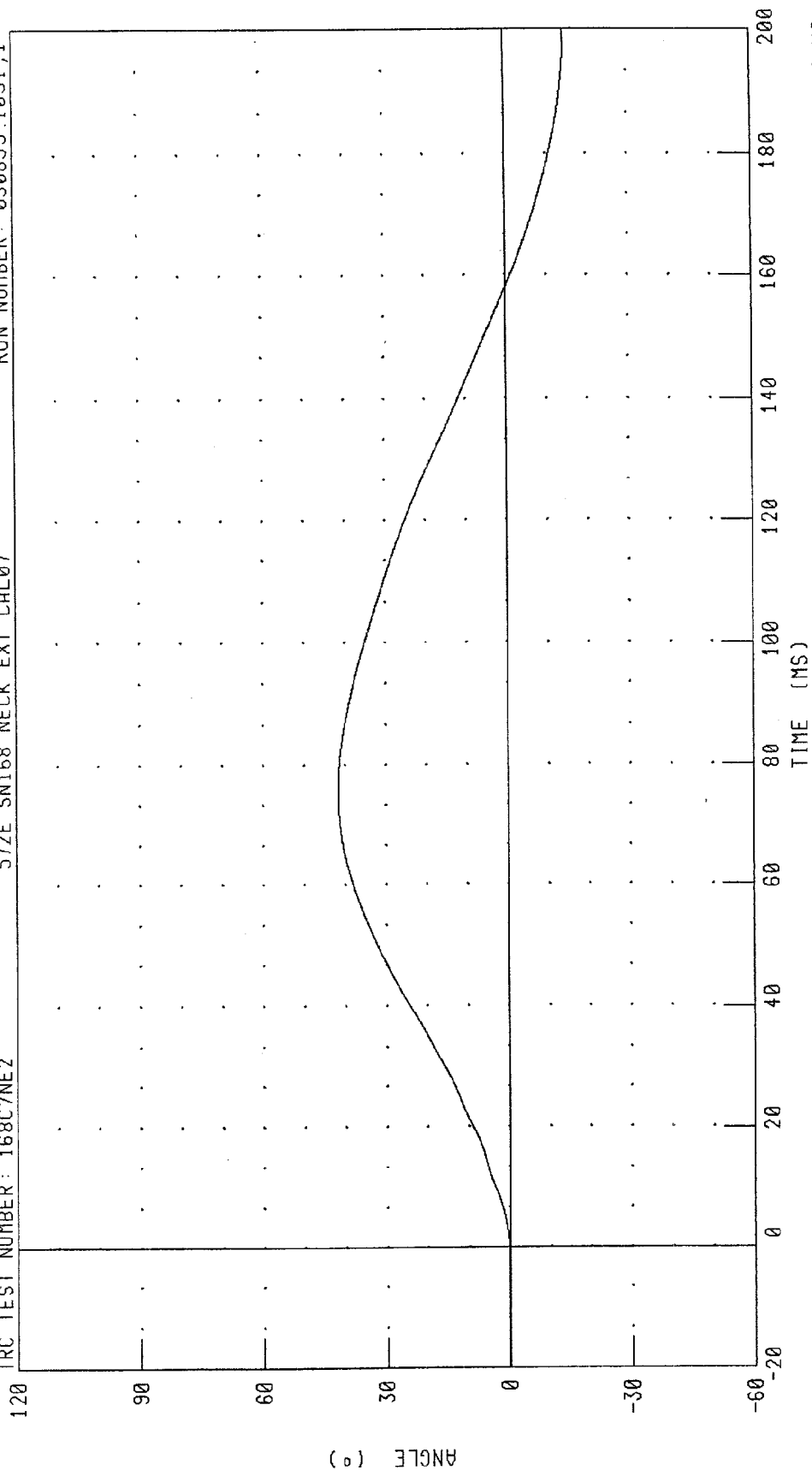
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 168C7NE2

572E SN168 NECK EXT CAL07

RUN NUMBER: 030899.1031;1



CHANNEL: BETA FILTER: CH. CLASS 60

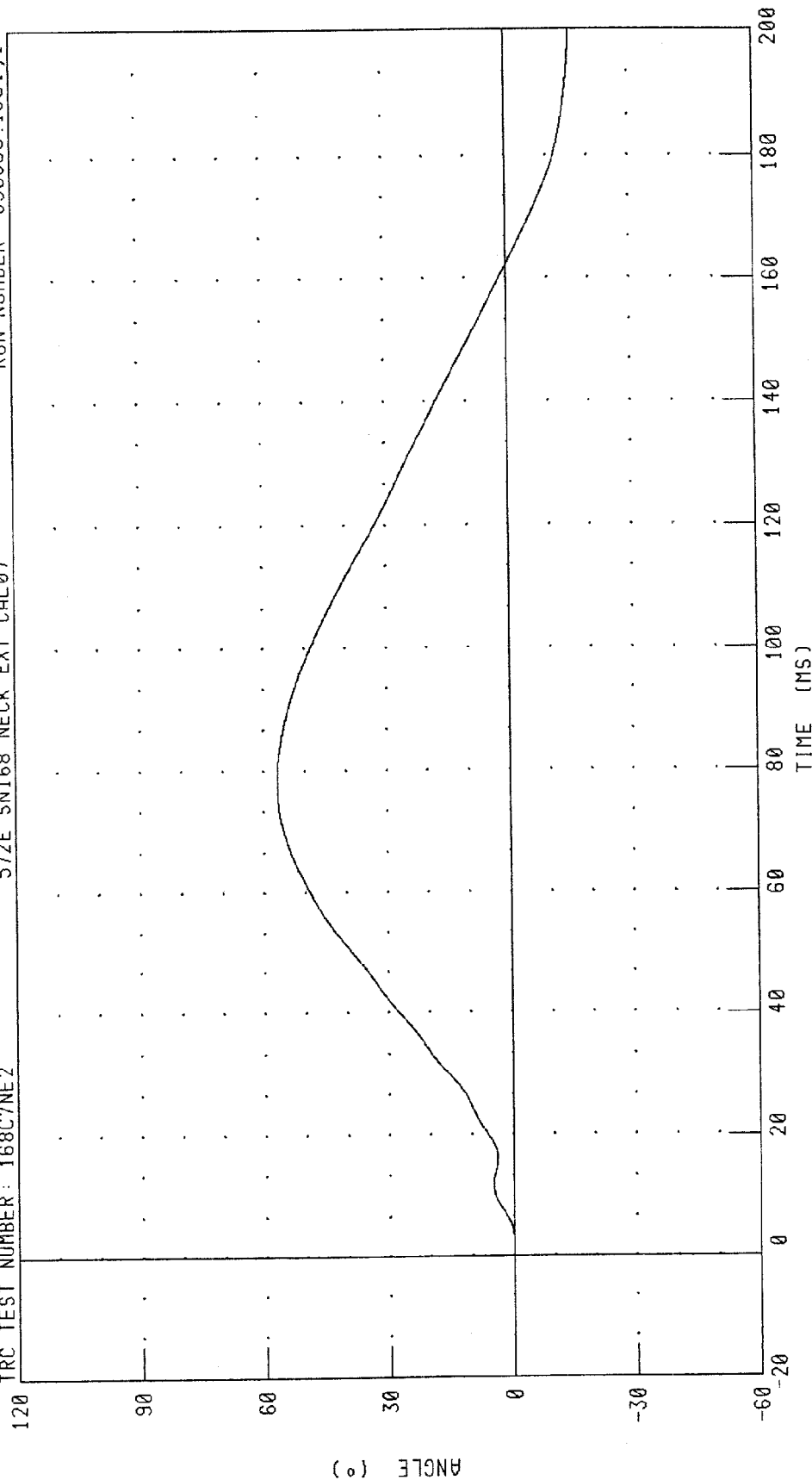
PEAK DATA: 41.65 ° @ 75.76 MS, -14.59 ° @ 199.20 MS

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

TRC TEST NUMBER: 168C7NE2

572E SN168 NECK EXT CAL07

RUN NUMBER: 030899.1031;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 56.64 ° @ 78.64 MS; -15.88 ° @ 200.00 MS

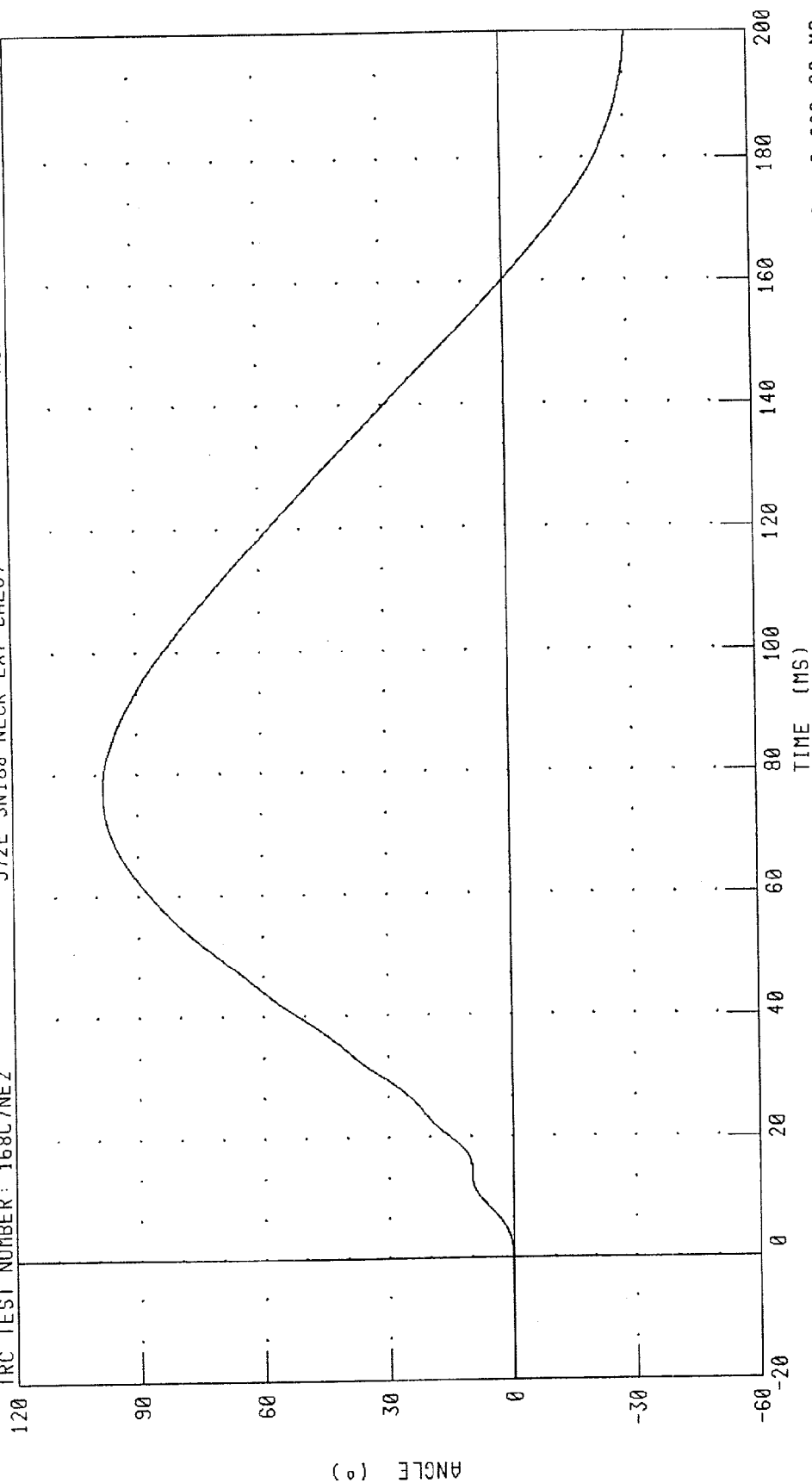
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

RUN NUMBER: 030899.1031;1

572E SN168 NECK EXT CAL07

TRC TEST NUMBER: 168C7NE2



PEAK DATA: 98.23 ° @ 77.28 MS, -30.46 ° @ 200.00 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

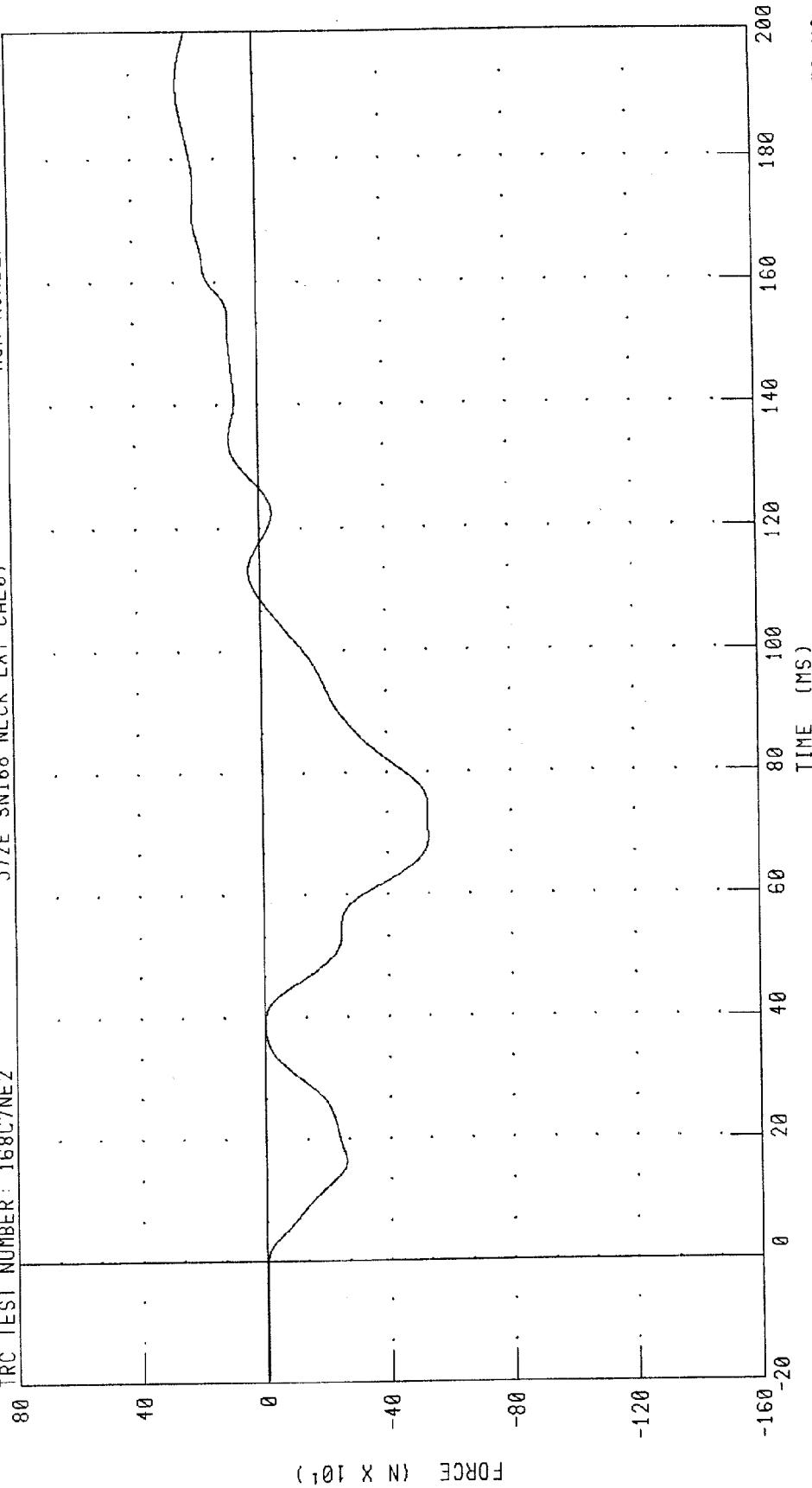
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 030899.1031,1

TRC TEST NUMBER: 168C7NE2

572E SN168 NECK EXT CAL07



CHANNEL: NEKXF FILTER: CH. CLASS 60

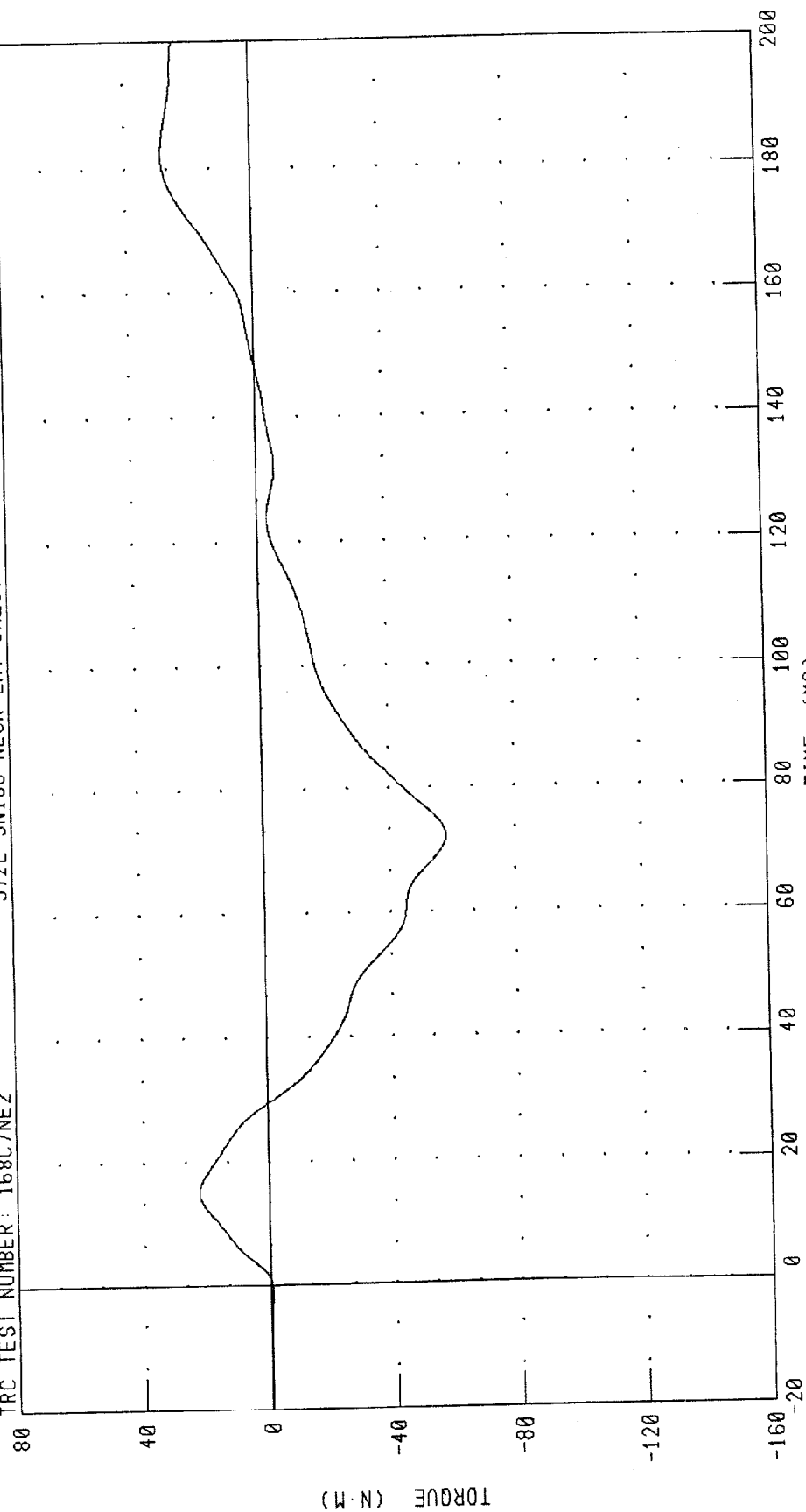
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 030899.1031;1

572E SN168 NECK EXT CAL07

TRC TEST NUMBER: 168C7NE2



TIME (MS)

PEAK DATA: 28.55 N-M @ 182.16 MS, -58.15 N-M @ 72.24 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

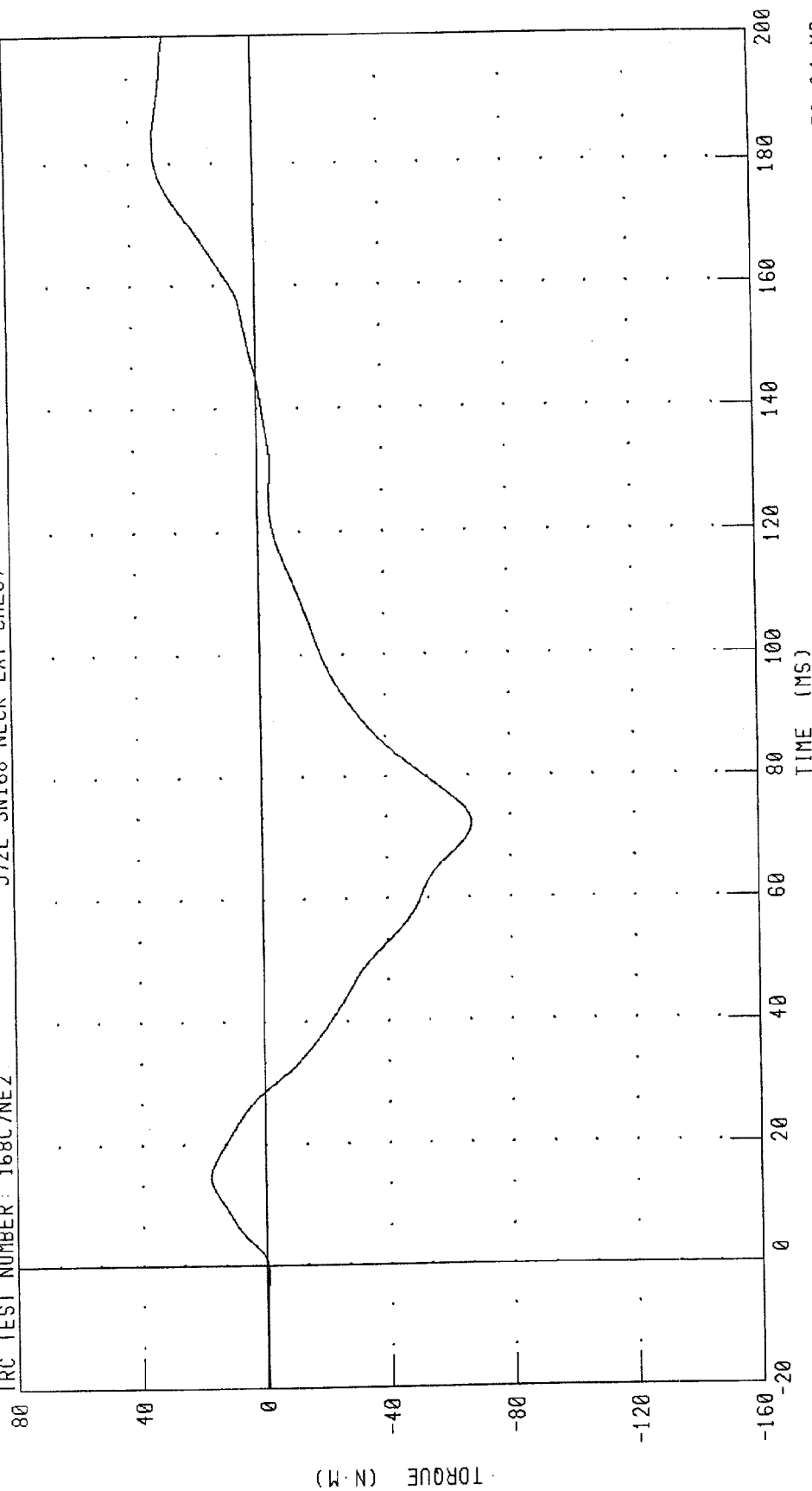
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 030899.1031;1

572E SNI68 NECK EXT CAL07

IRC TEST NUMBER: 168C7NE2



CHANNEL: NEKOM

FILTER: CH. CLASS 60

TIME (MS)

PEAK DATA: 32.47 N·M @ 182.80 MS; -67.56 N·M @ 72.24 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

22-FEB-99

TRC INC.

TEST NO: 168C7TH1

572E SN168 H.S.THORAX CAL07

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	22.2 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.2 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5773. N
INTERNAL HYSTERESIS	69% - 85%	69.0%

TEST MEETS SPECIFICATIONS

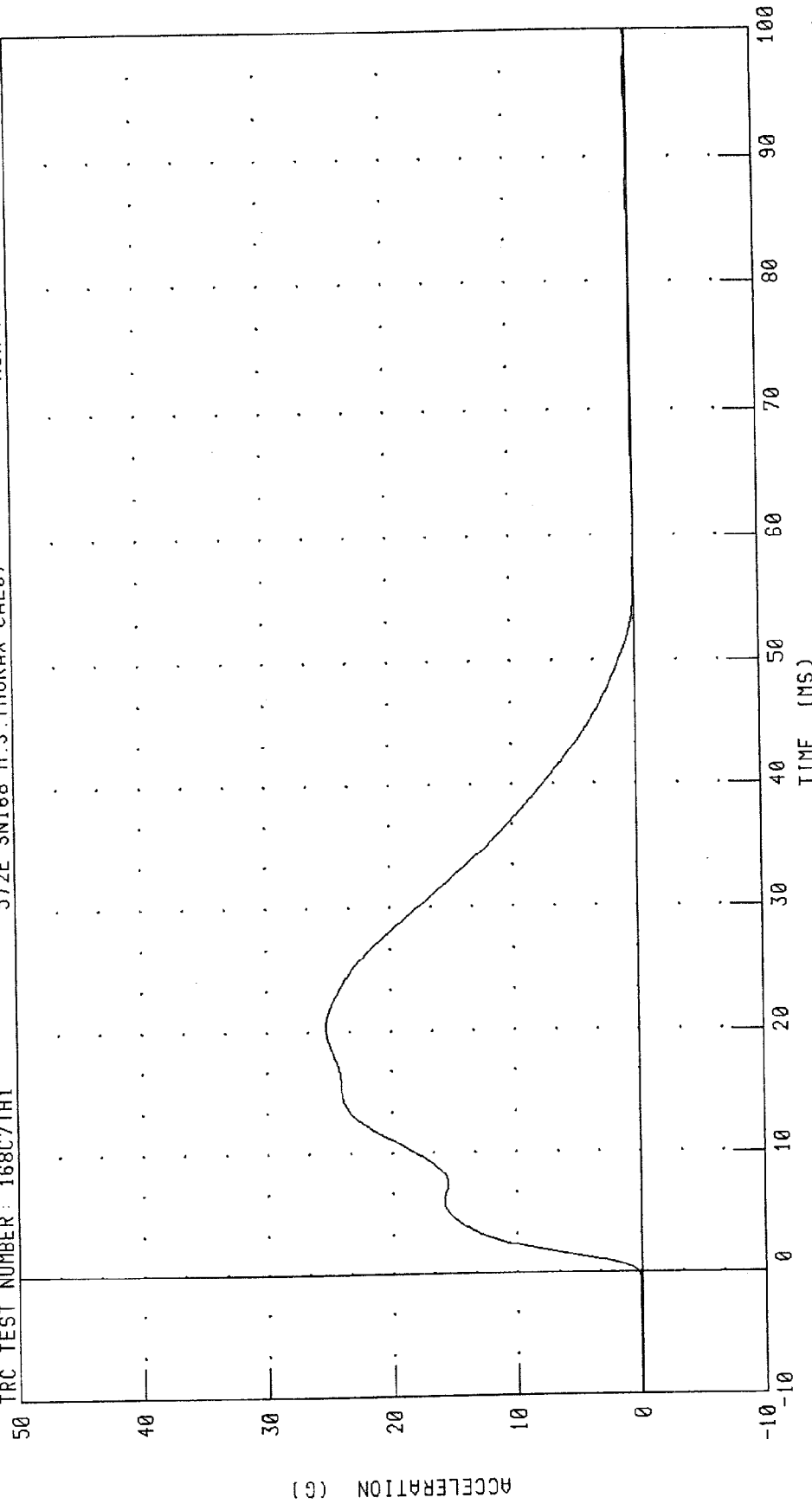
TECHNICIAN Bj. C. H.

RUN NUMBER: 022299.1601;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
572E SN168 H.S.THORAX CAL07

RUN NUMBER: 022299.1602;1

TRC TEST NUMBER: 16807TH1



PEAK DATA: 25.20 G @ 20.40 MS; -0.05 G @ 61.52 MS

FILTER: CH. CLASS 180

CHANNEL: PENXC

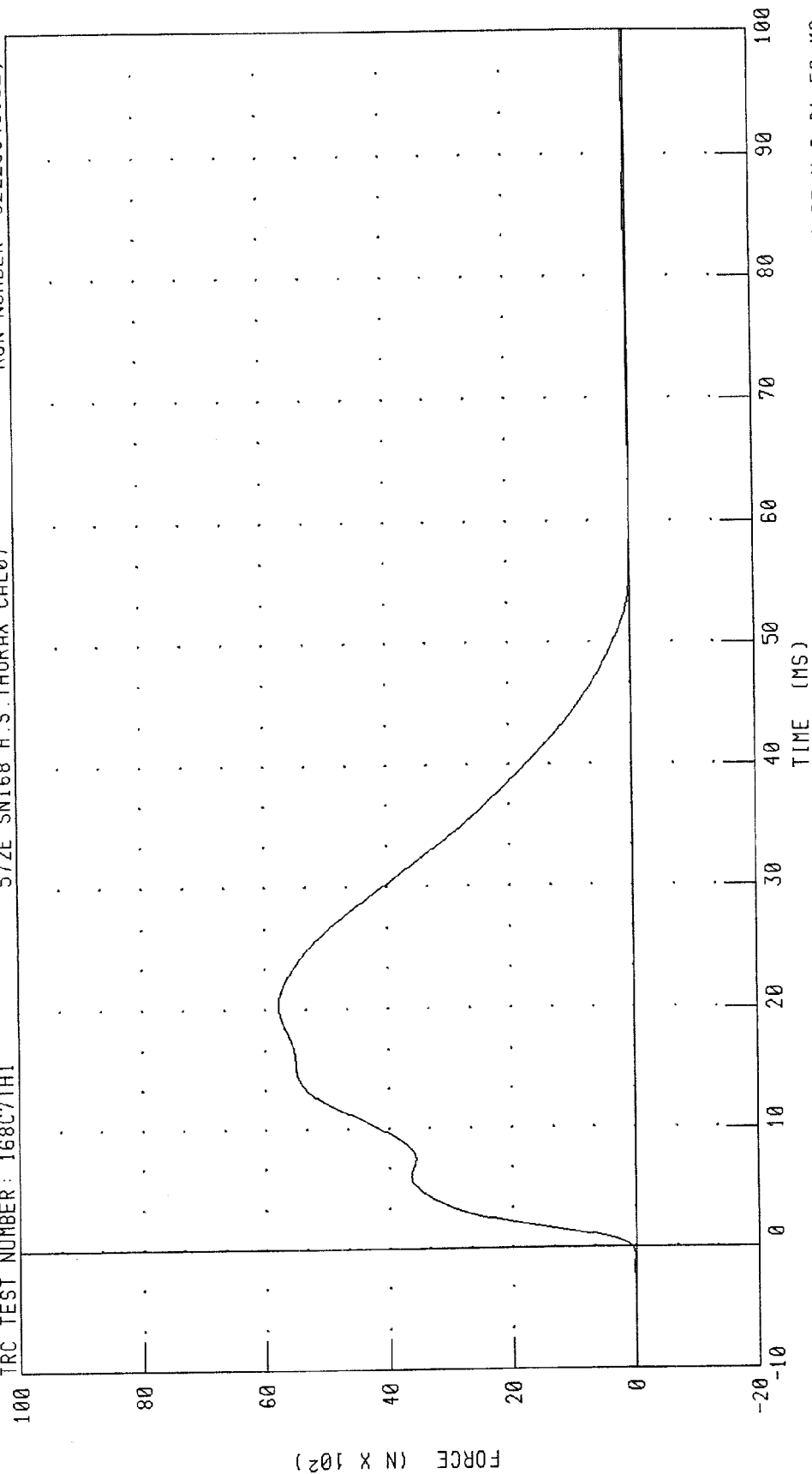
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

RUN NUMBER: 022299.1602;1

TRC TEST NUMBER: 168C7TH1

572E SN168 H.S. THORAX CAL07



PEAK DATA: 5773.94 N @ 20.40 MS; -10.87 N @ 61.52 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

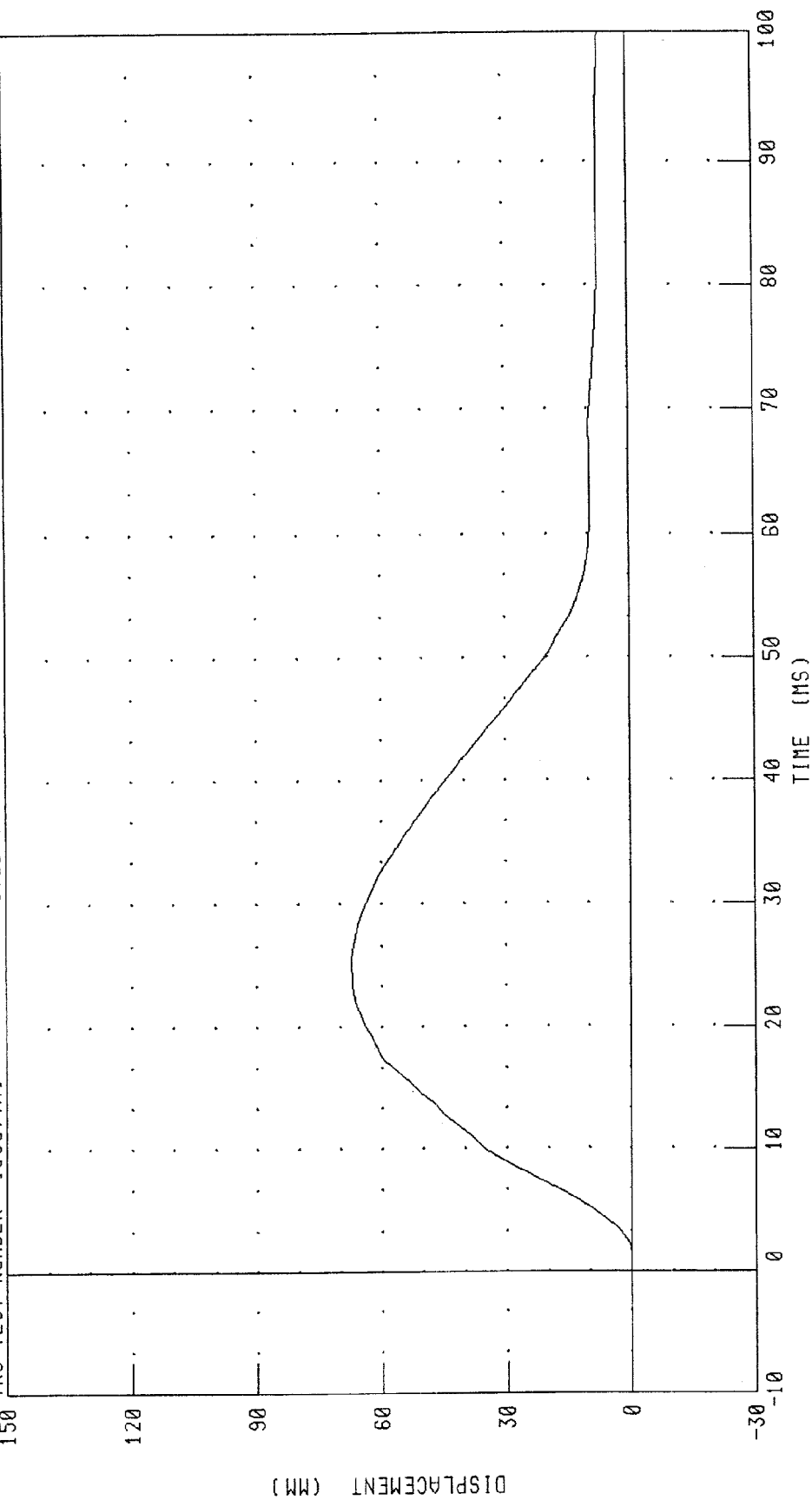
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 168C7TH1

572E SN168 H.S. THORAX CAL07

RUN NUMBER: 022299.1602,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

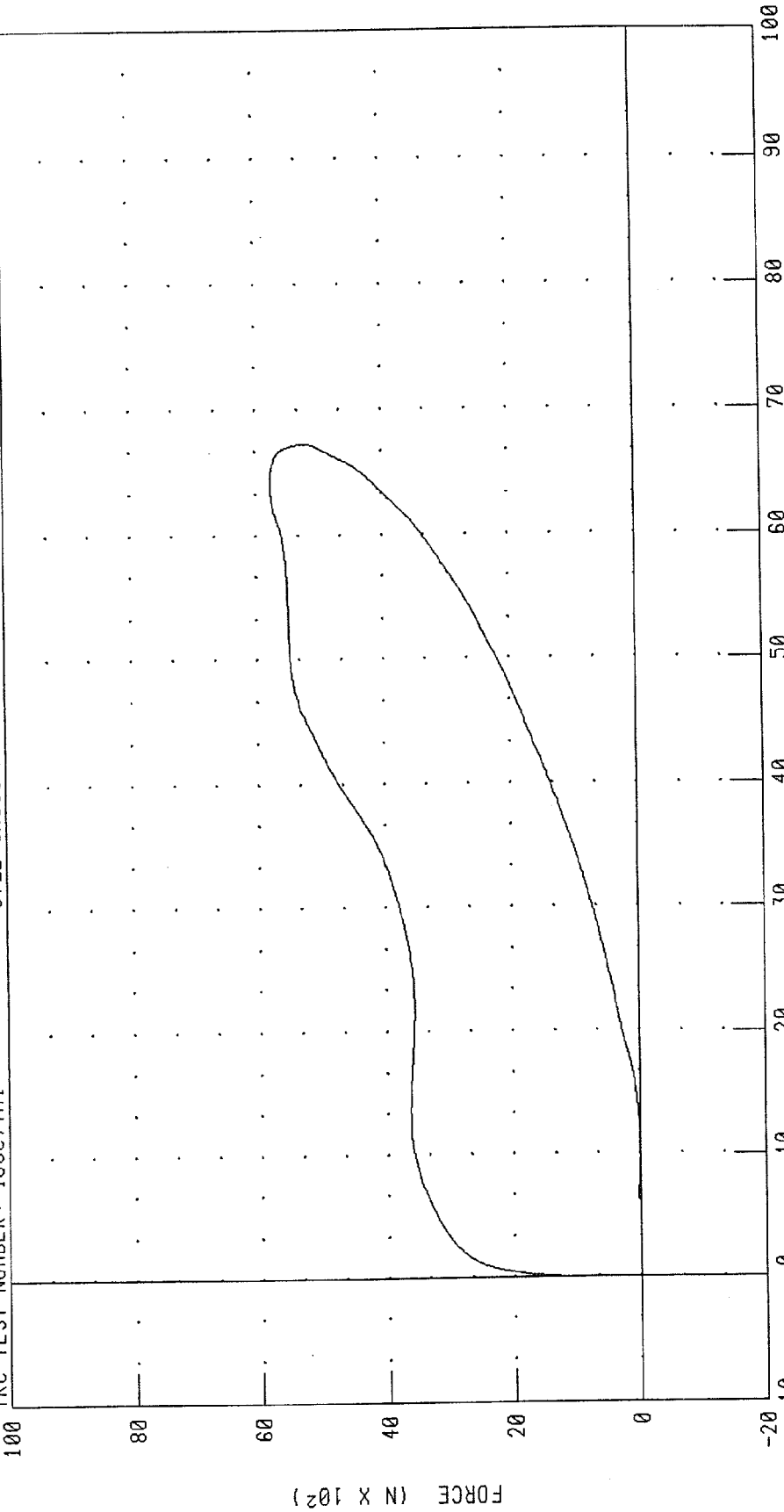
PEAK DATA: 67.23 MM @ 25.36 MS, -0.03 MM @ 0.96 MS

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

TRC TEST NUMBER: 168C7TH1

572E SN168 H.S. THORAX CAL07

RUN NUMBER: 0222299.1602;1



DISPLACEMENT (MM)

PEAK DATA: 67.23 MM @ 25.36 MS;
5773.94 N @ 20.40 MS; -10.87 N @ 61.52 MS

CHANNEL: CSTXD
PENXF

FILTER: CH: CLASS 180
CH: CLASS 180

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

20-FEB-99

TRC 3NC.

TEST NO: 168C7HR1

572E SN 168 HIPFLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.1 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. C. L. T.

RUN NUMBER: 022099.1203;3

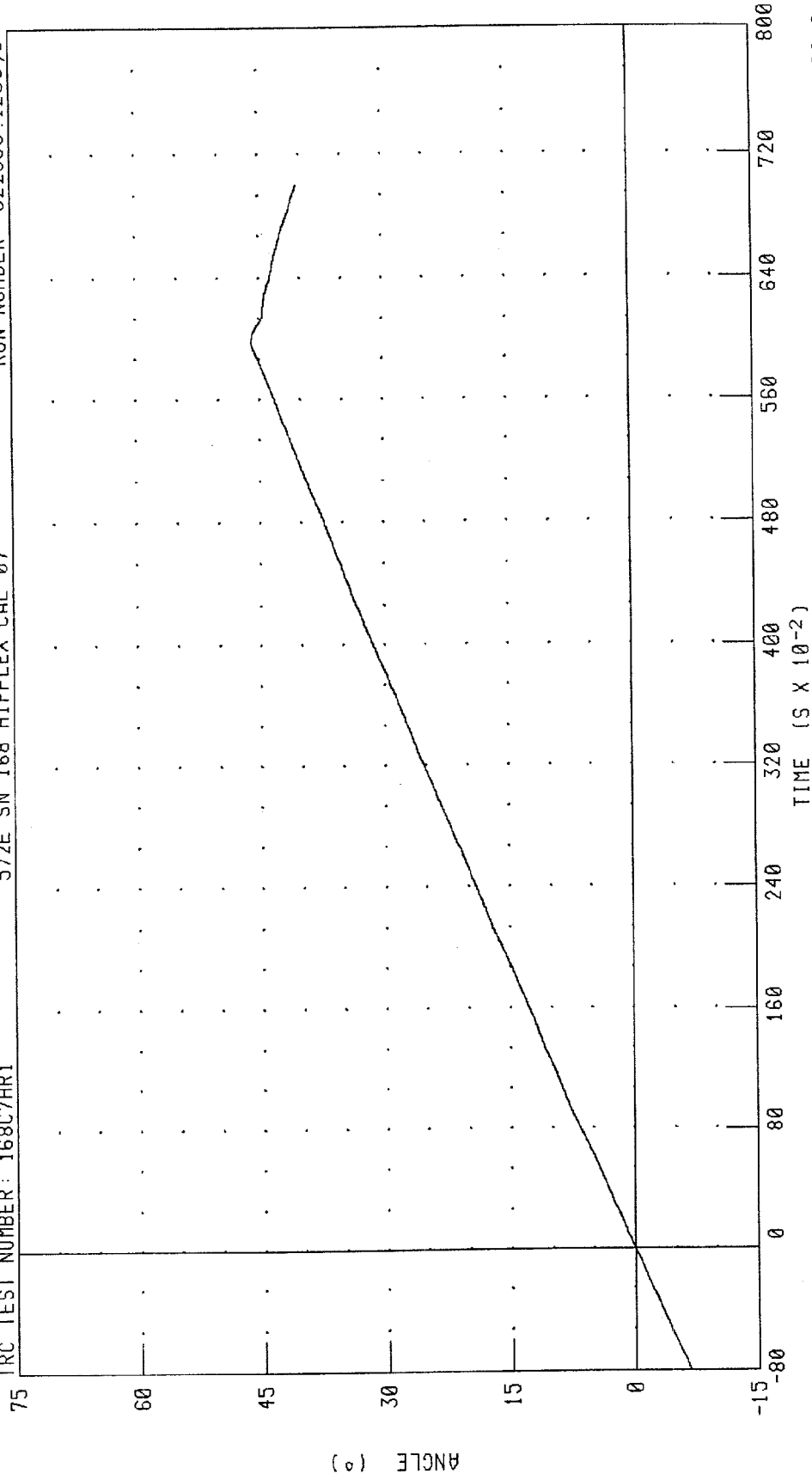
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1203;3

TRC TEST NUMBER: 168C7HR1



CHANNEL: RHPXD FILTER: CH. CLASS 60

PEAK DATA: 45.97 ° @ 5.99 S; -9.74 ° @ -1.00 S

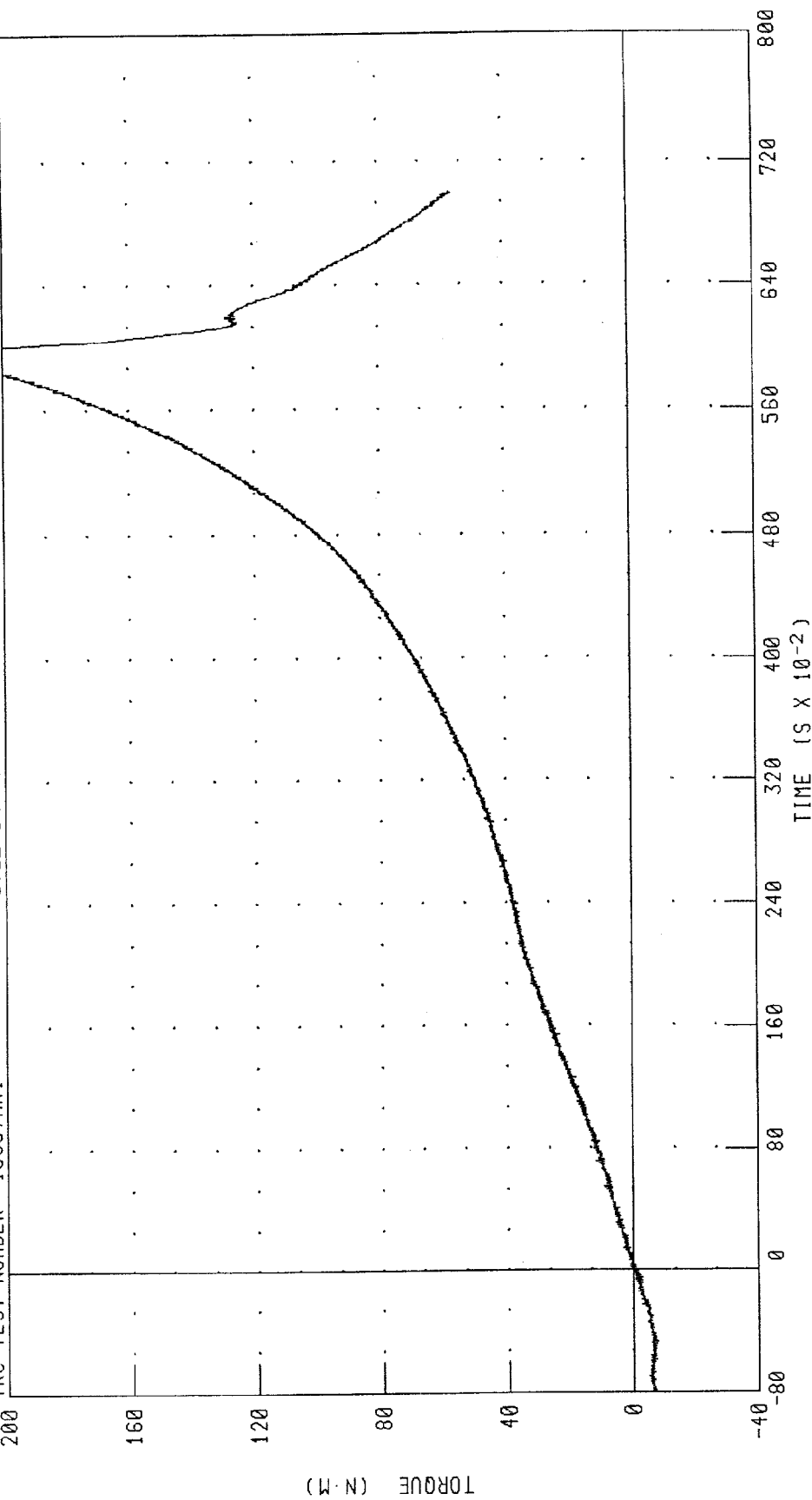
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

TRC TEST NUMBER: 168C7HR1

572E SN 168 HIPFLEX CAL 07

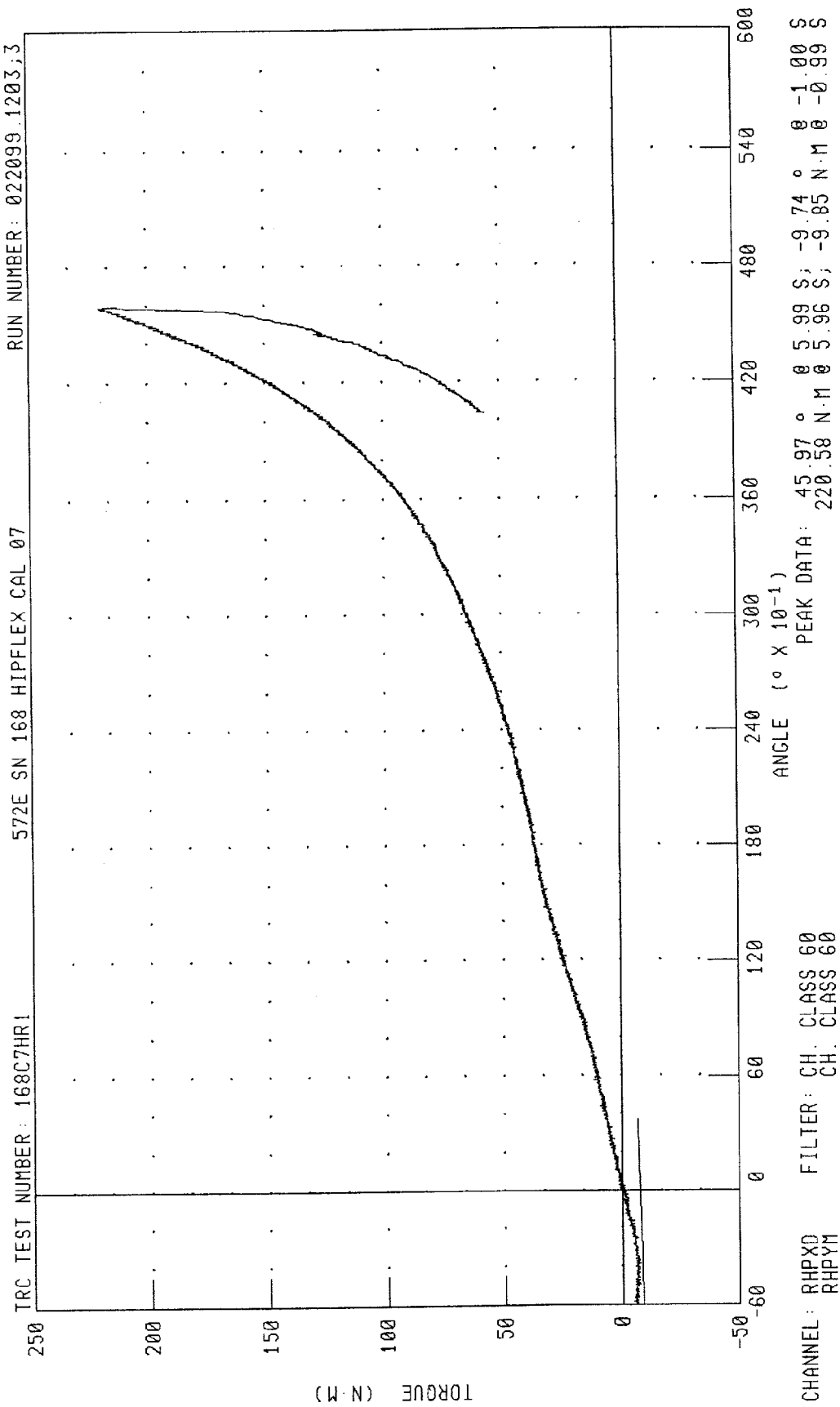
RUN NUMBER: 022099.1203,3



PEAK DATA: 220.58 N·M @ 5.96 S, -9.85 N·M @ -0.99 S

CHANNEL: RHPYM FILTER: CH. CLASS 60

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



TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

20-FEB-99

TRC INC.

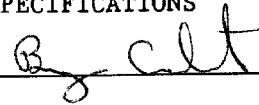
TEST NO: 168C7HL1

572E SN 168 HIPFLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.1 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 022099.1155;2

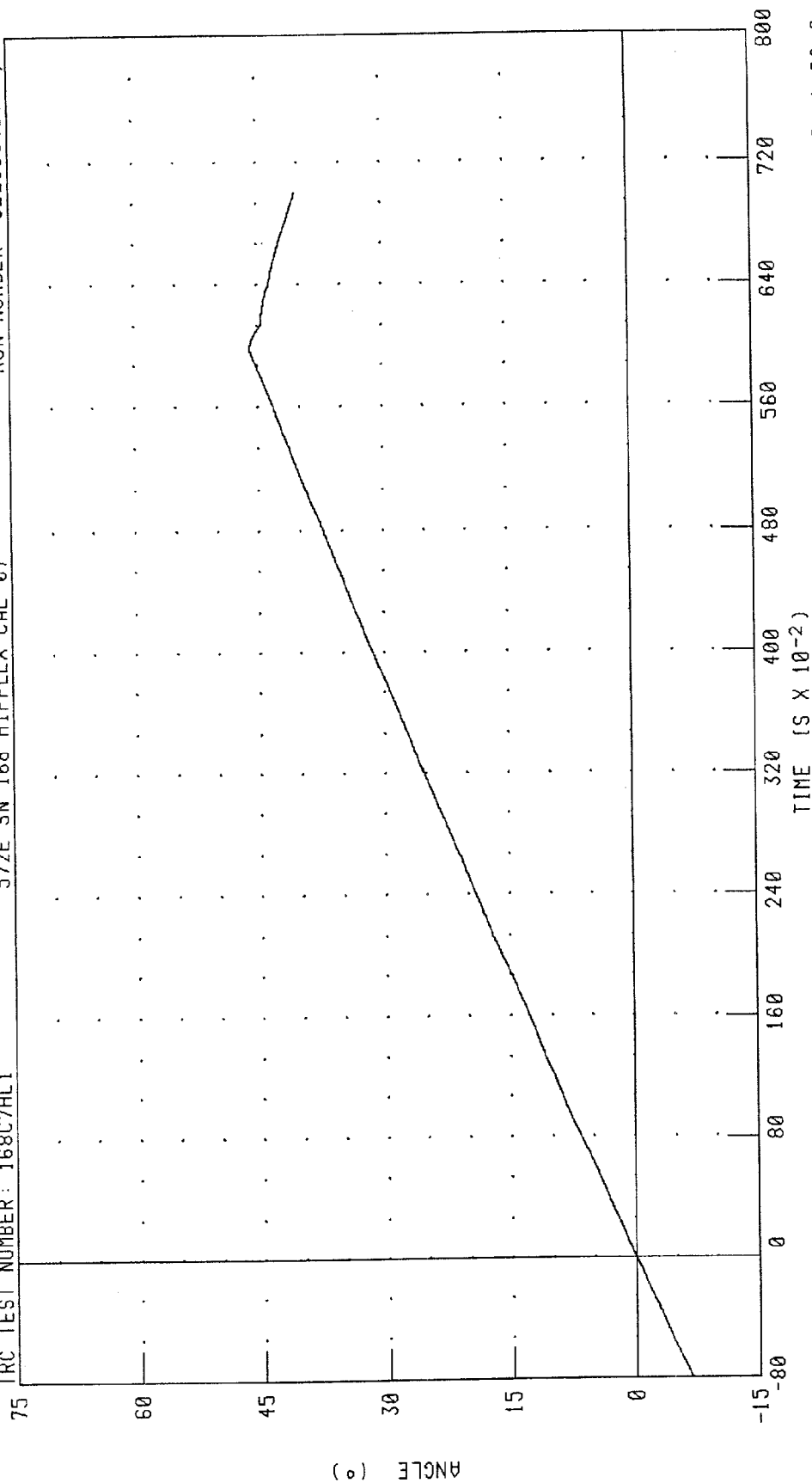
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION ROTATION

RUN NUMBER: 022099.1155;2

TRC TEST NUMBER: 168C7HL1

572E SN 168 HIPFLEX CAL 07



CHANNEL: LHPXD FILTER: CH. CLASS 60

TIME (S X 10⁻²)

PEAK DATA: 45.97 ° @ 5.99 S; -9.67 ° @ -1.00 S

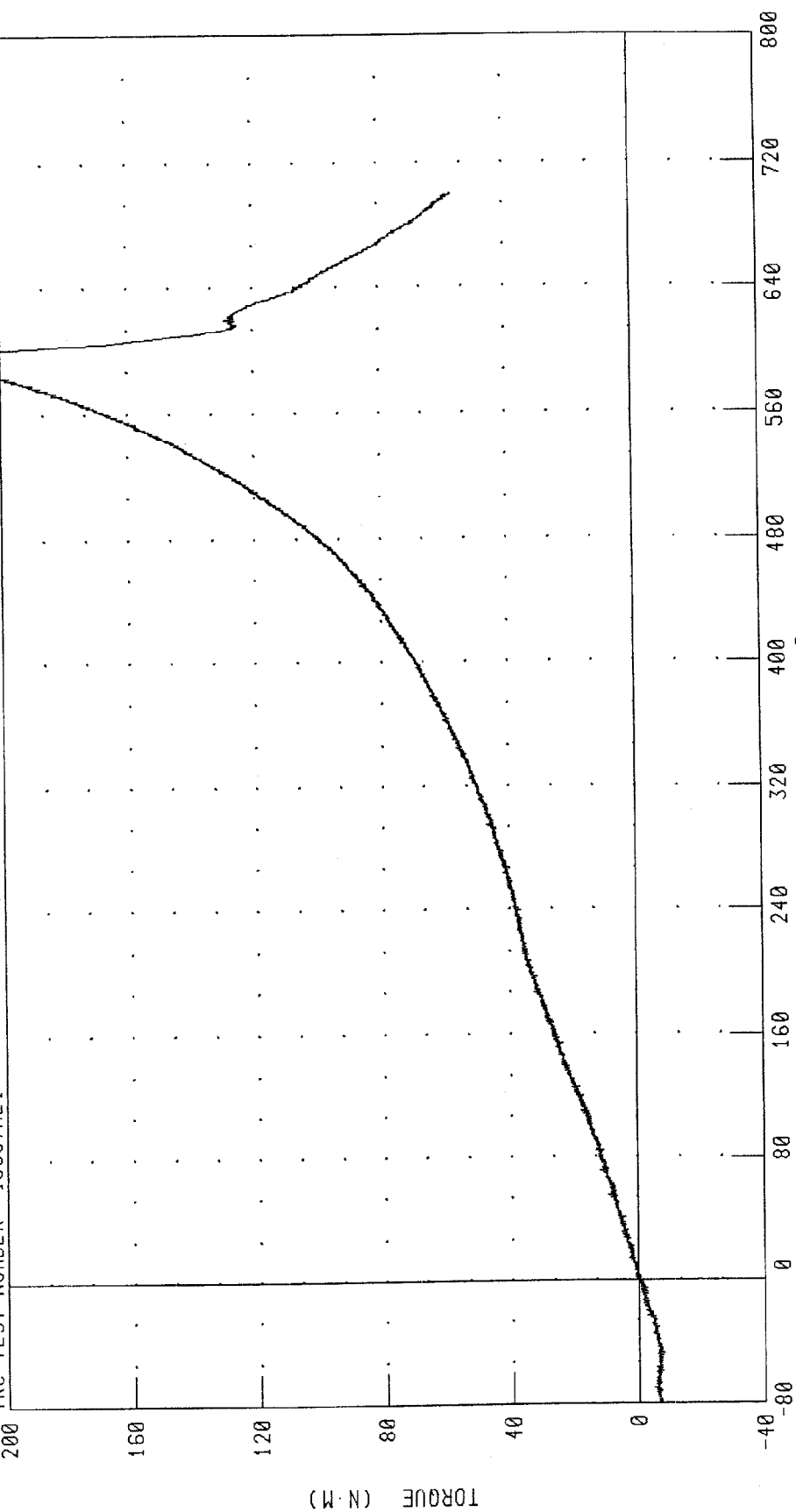
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT

572E SN 168 HIPFLEX CAL 07

TRC TEST NUMBER: 168C7HL1

RUN NUMBER: 022099.1155;2



TIME (S X 10⁻²)

PEAK DATA: 220.58 N·M @ 5.96 S; -9.85 N·M @ -0.99 S

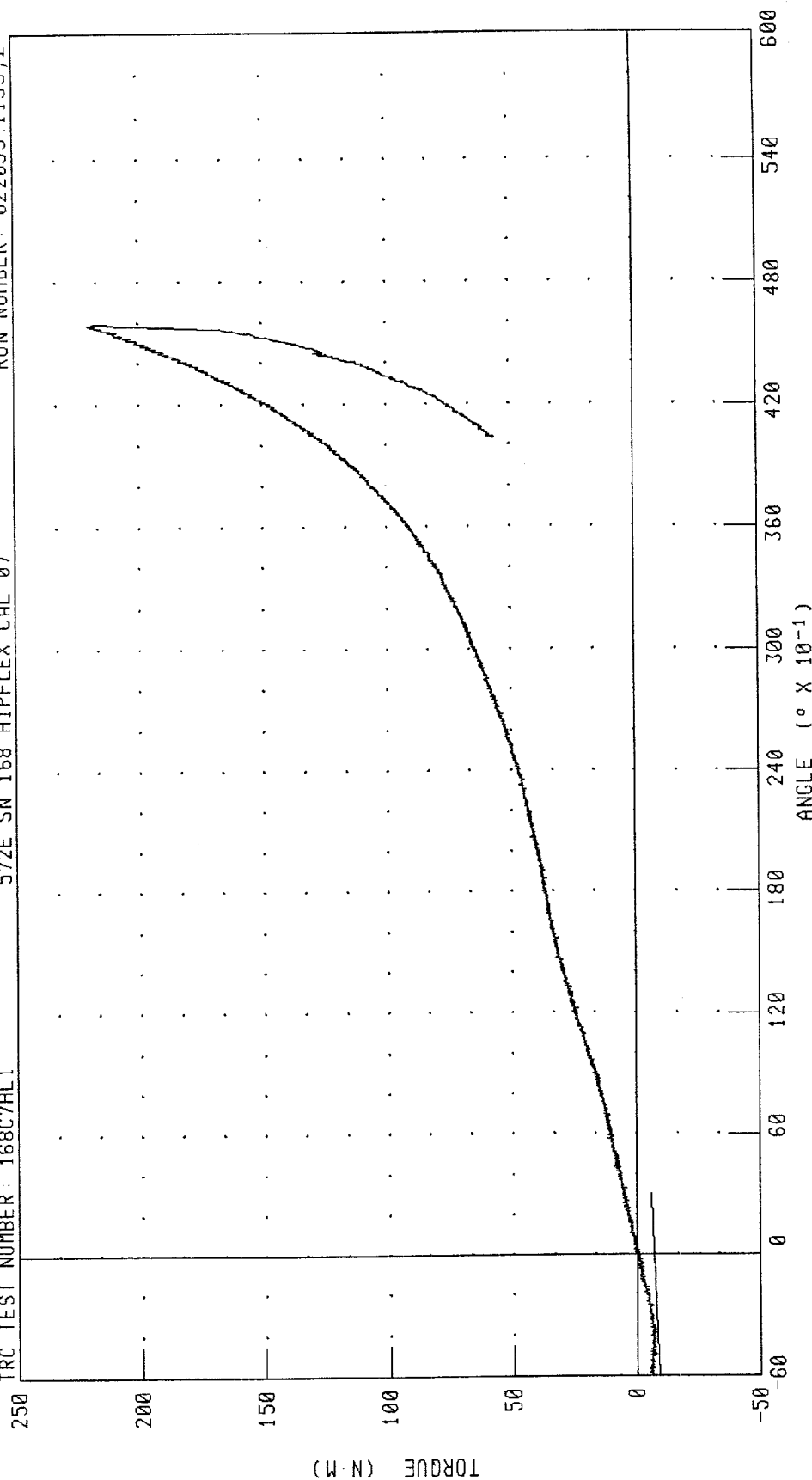
CHANNEL: LHPYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C7HL1

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1155;2



CHANNEL: LHPXD
LHPYH

FILTER: CH. CLASS 60
CH. CLASS 60

PEAK DATA:

45.97 ° 0 5.99 S; -9.67 ° 0 -1.00 S
220.58 N·M 0 5.96 S; -9.85 N·M 0 -0.99 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 168C7RK1

572E SN168 RIGHT KNEE CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5249.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

By Calt

RUN NUMBER: 022099.1057;1

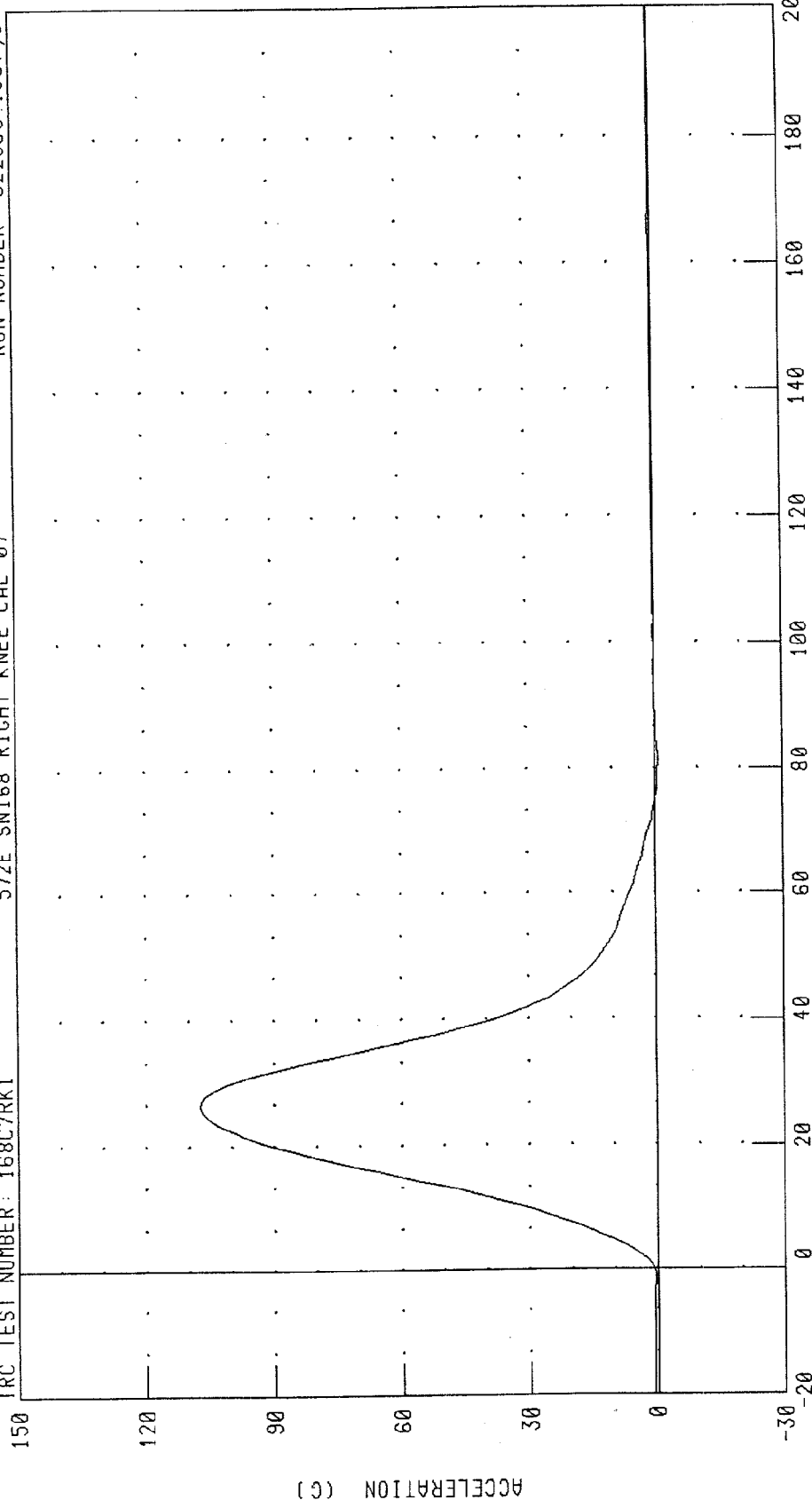
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

RUN NUMBER: 022099.1057;1

572E SN168 RIGHT KNEE CAL 07

TRC TEST NUMBER: 168C7RK1



TIME (MS X 10⁻¹)

PEAK DATA: 107.30 G @ 2.64 MS; -0.76 G @ 8.16 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

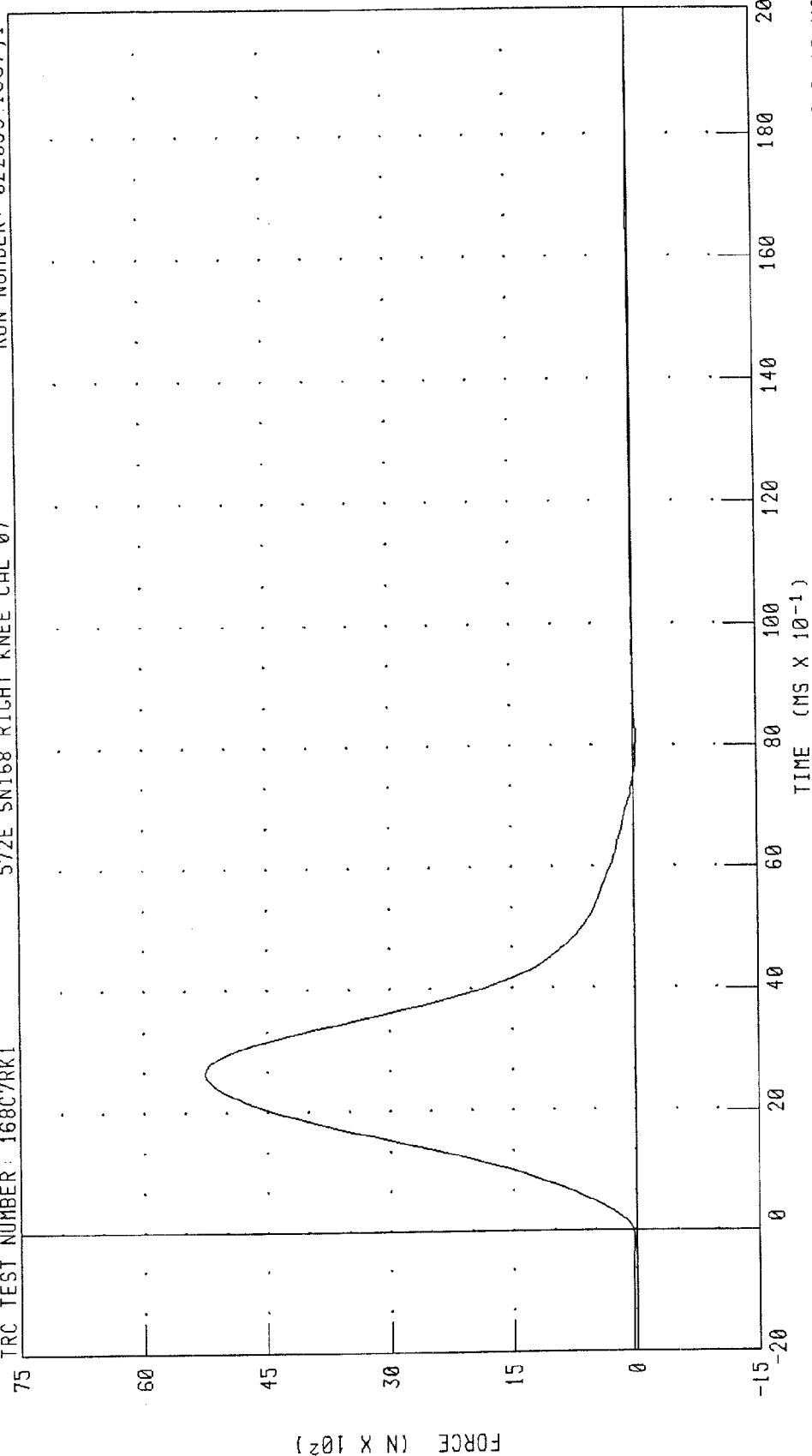
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 022099.1057.1

572E SN168 RIGHT KNEE CAL 07

TRC TEST NUMBER: 16807RK1



PEAK DATA: 5249.88 N @ 2.64 MS; -37.40 N @ 8.16 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

22-FEB-99

TRC INC.

TEST NO: 168C7LK3

572E SN168 LEFT KNEE CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4825.0 N

TEST MEETS SPECIFICATIONS

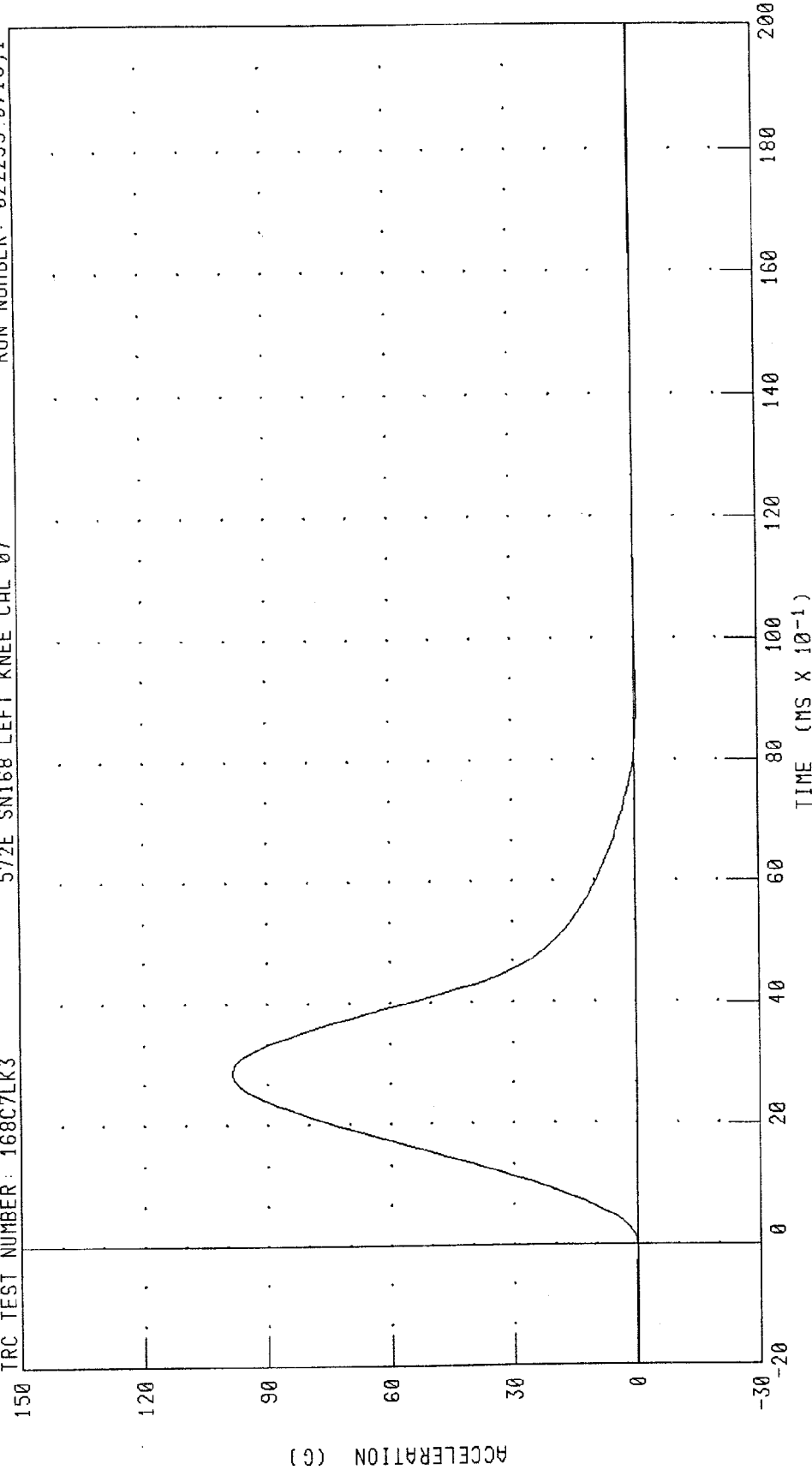
TECHNICIAN

[Signature]

RUN NUMBER: 022299.0716;1

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

TRC TEST NUMBER: 168C7LK3
572E SN168 LEFT KNEE CAL 07
RUN NUMBER: 022299.0716,1



CHANNEL: PENXC FILTER: CH. CLASS 600
PEAK DATA: 98.62 G @ 2.88 MS; -0.63 G @ 9.04 MS

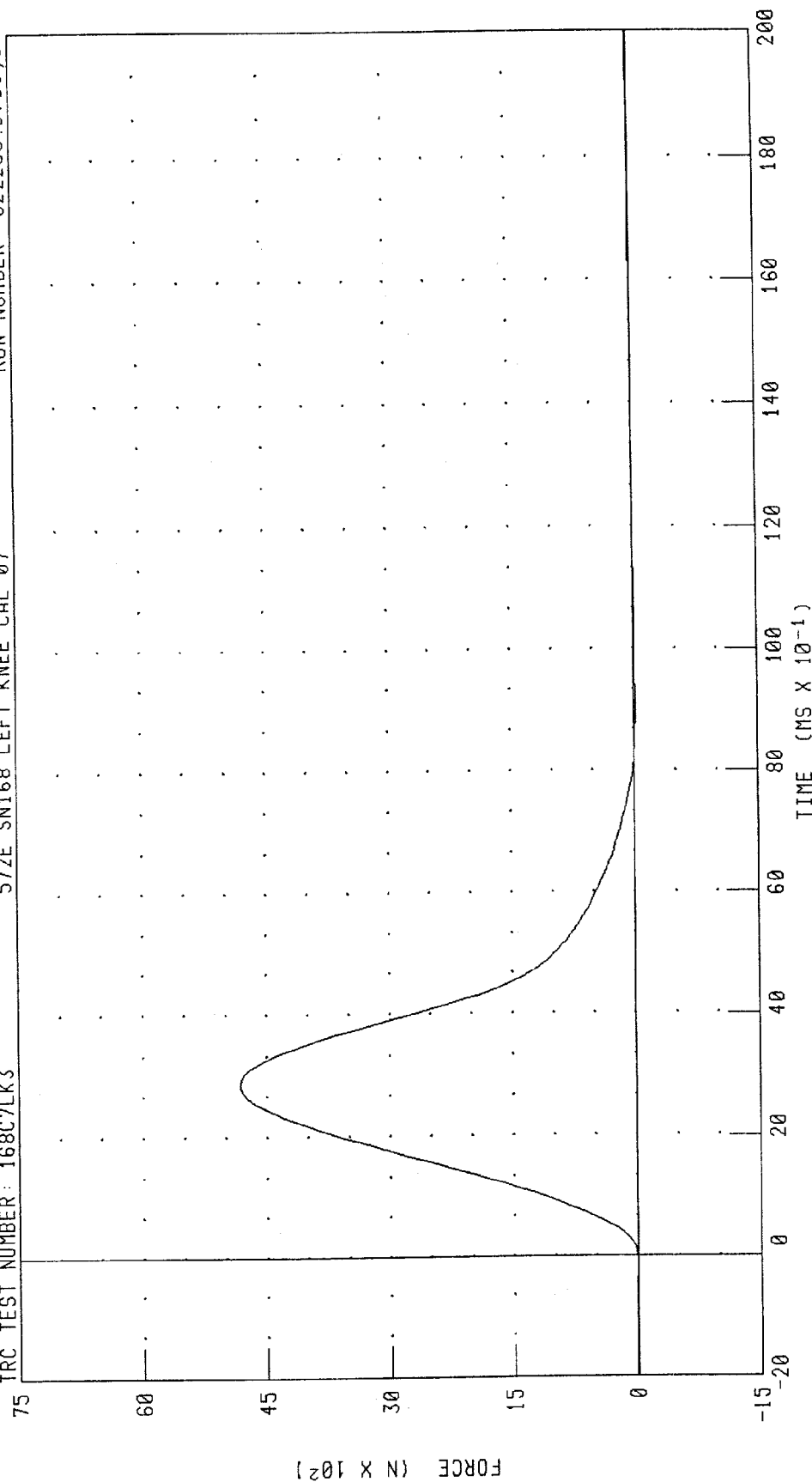
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN168 LEFT KNEE CAL 07

RUN NUMBER: 022299.0716;1

TRC TEST NUMBER: 168C7LK3



PEAK DATA: 4825.04 N @ 2.88 MS, -31.06 N @ 9.04 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Pre-Test Dummy Certification

Passenger Dummy S/N 169

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

22-FEB-99

TRC INC.

TEST NO: 169C5HD1

572E SN169 HEAD DROP CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	246.25 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.69 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

By Calt

RUN NUMBER: 022299.1306;1

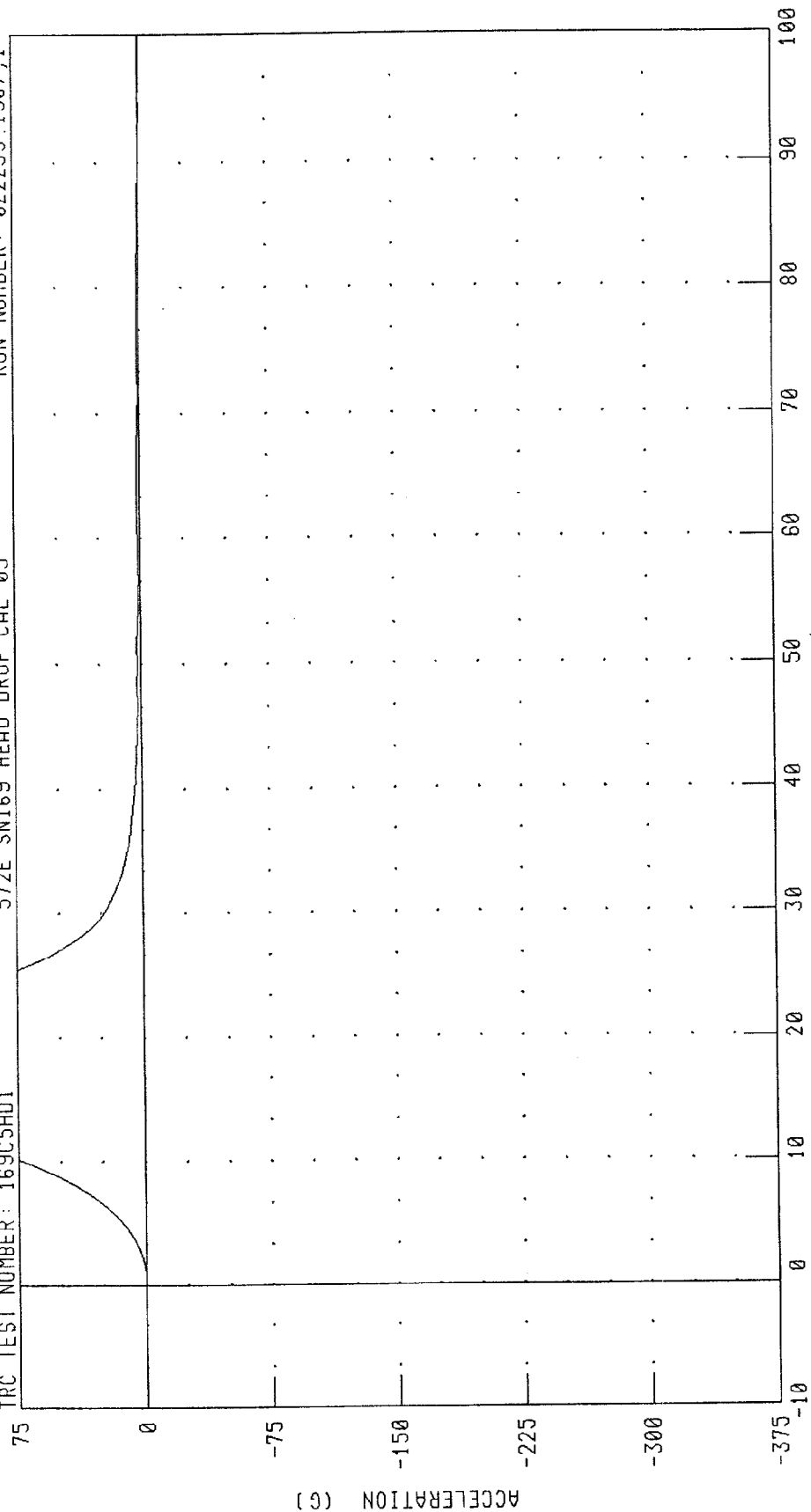
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN169 HEAD DROP CAL 05

RUN NUMBER: 022299.1307;1

TRC TEST NUMBER: 169C5HD1



PEAK DATA: 213.99 G @ 1.84 MS, -0.39 G @ 10.00 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION

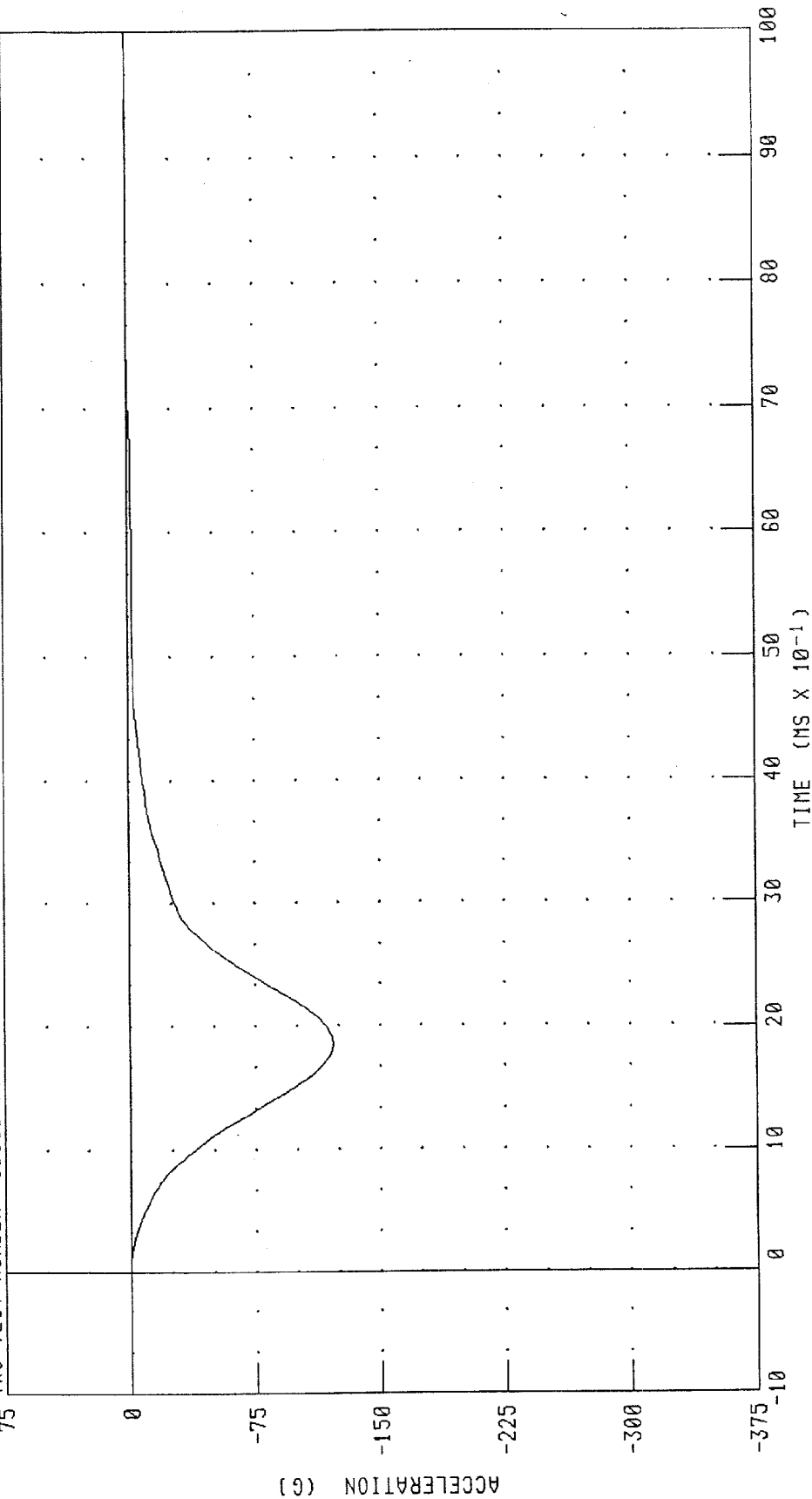
HEAD ACCELERATION Z AXIS

572E SN169 HEAD DROP CAL 05

TRC TEST NUMBER: 169C5H01

75

RUN NUMBER: 022299.1307.1



PEAK DATA: 0.57 G @ 10.00 MS, -121.77 G @ 1.84 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

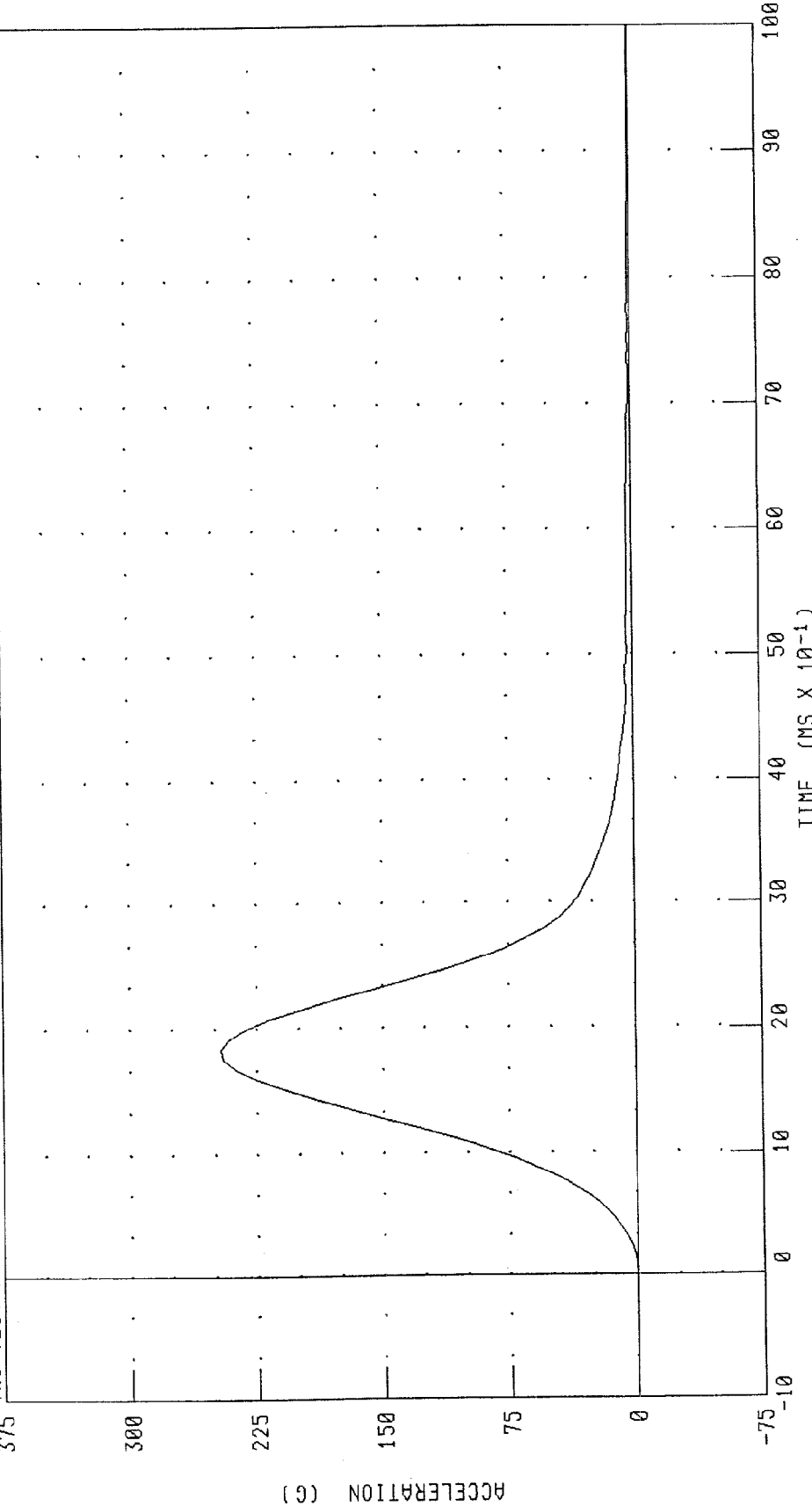
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 169C5HD1

572E SN169 HEAD DROP CAL 05

RUN NUMBER: 022299 1307;1



PEAK DATA: 246.25 G @ 1.84 MS; 0.02 G @ -0.56 MS

FILTER: CH. CLASS 1000

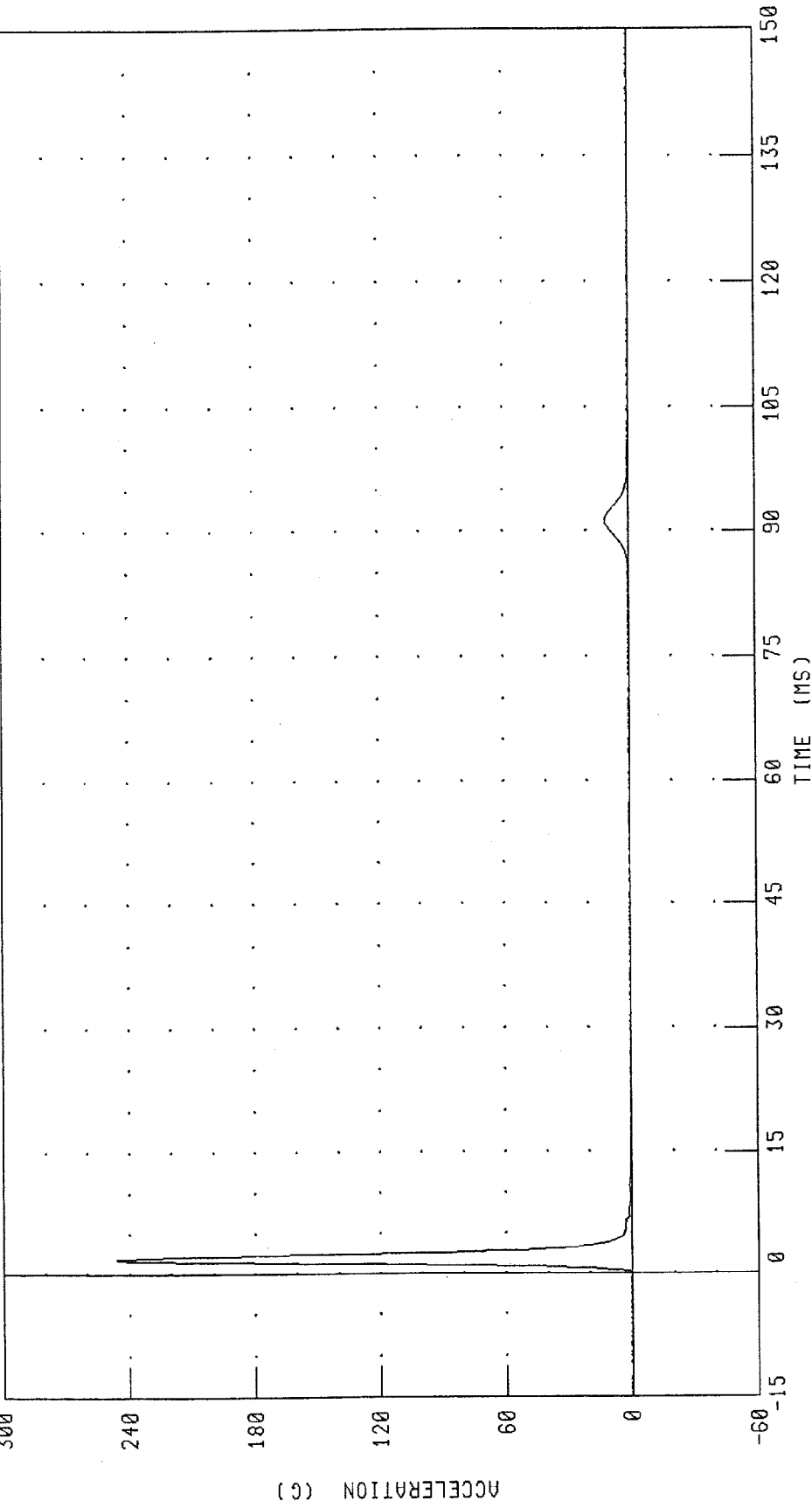
CHANNEL: HEDRG

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

572E SN169 HEAD DROP CAL 05

TRC TEST NUMBER: 169C5HD1

RUN NUMBER: 022299.1307;1



PEAK DATA: 246.25 G @ 1.84 MS; 0.02 G @ -14.96 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

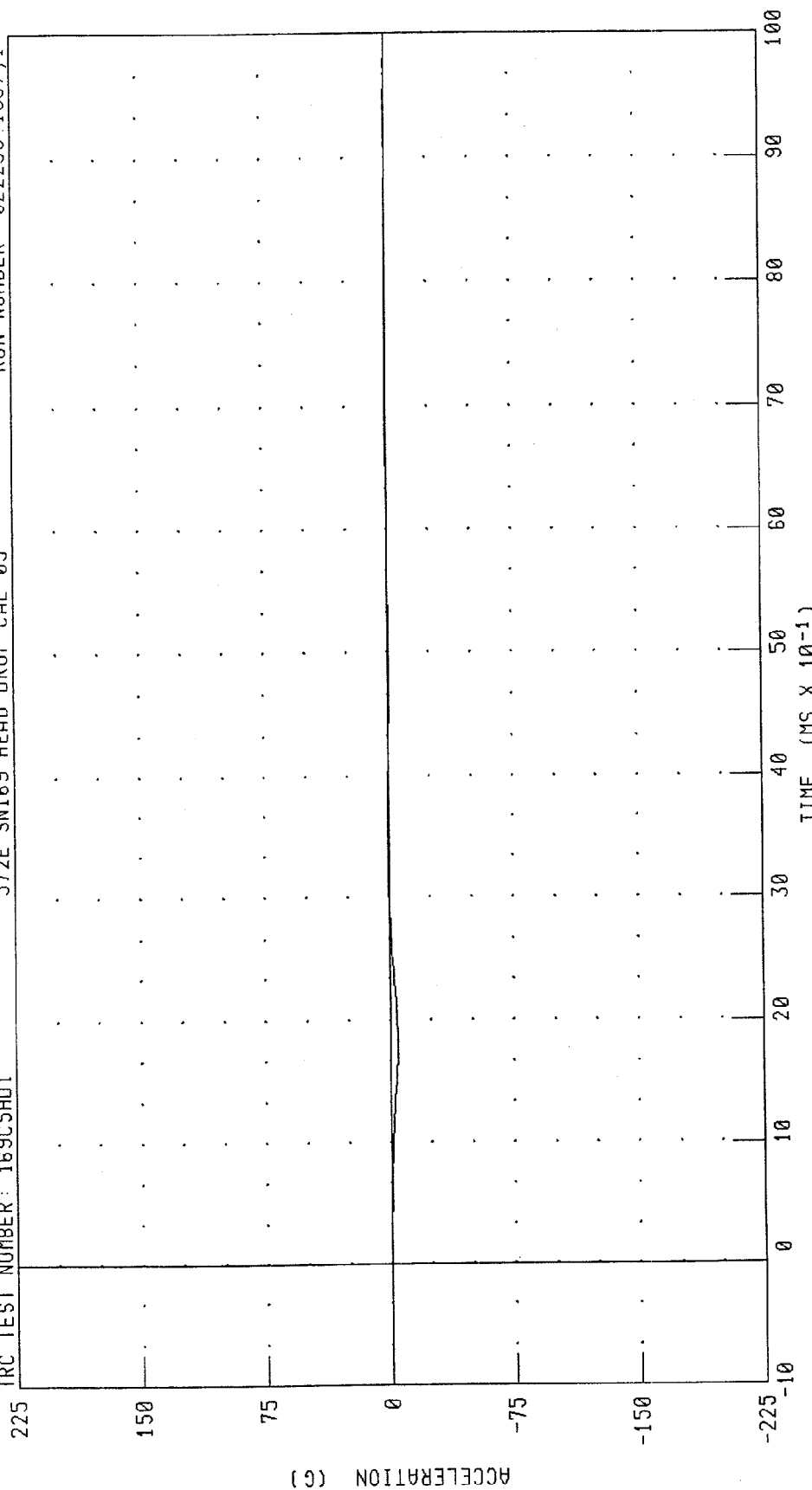
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572E SN169 HEAD DROP CAL 05

RUN NUMBER: 022299.1307,1

TRC TEST NUMBER: 169C5HD1



PEAK DATA: 0.59 G @ 3.84 MS; -4.70 G @ 1.76 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C5NF1 572E SN169 NECK FLEXION CAL5

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.62 G
	20 MS	17.60 - 22.60 G	20.78 G
	30 MS	12.50 - 18.50 G	16.40 G
MAX PENDULUM G		29 G MAX	24.25 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.37 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	39.28 MS
D PLANE	MAX	64 - 78 DEG.	74.81 DEG.
ROTATION	TIME	57 - 64 MS	59.52 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	90.55 NM
	TIME	47 - 58 MS	52.80 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	118.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	106.24 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Bj Calt

RUN NUMBER: 022299.1500;1

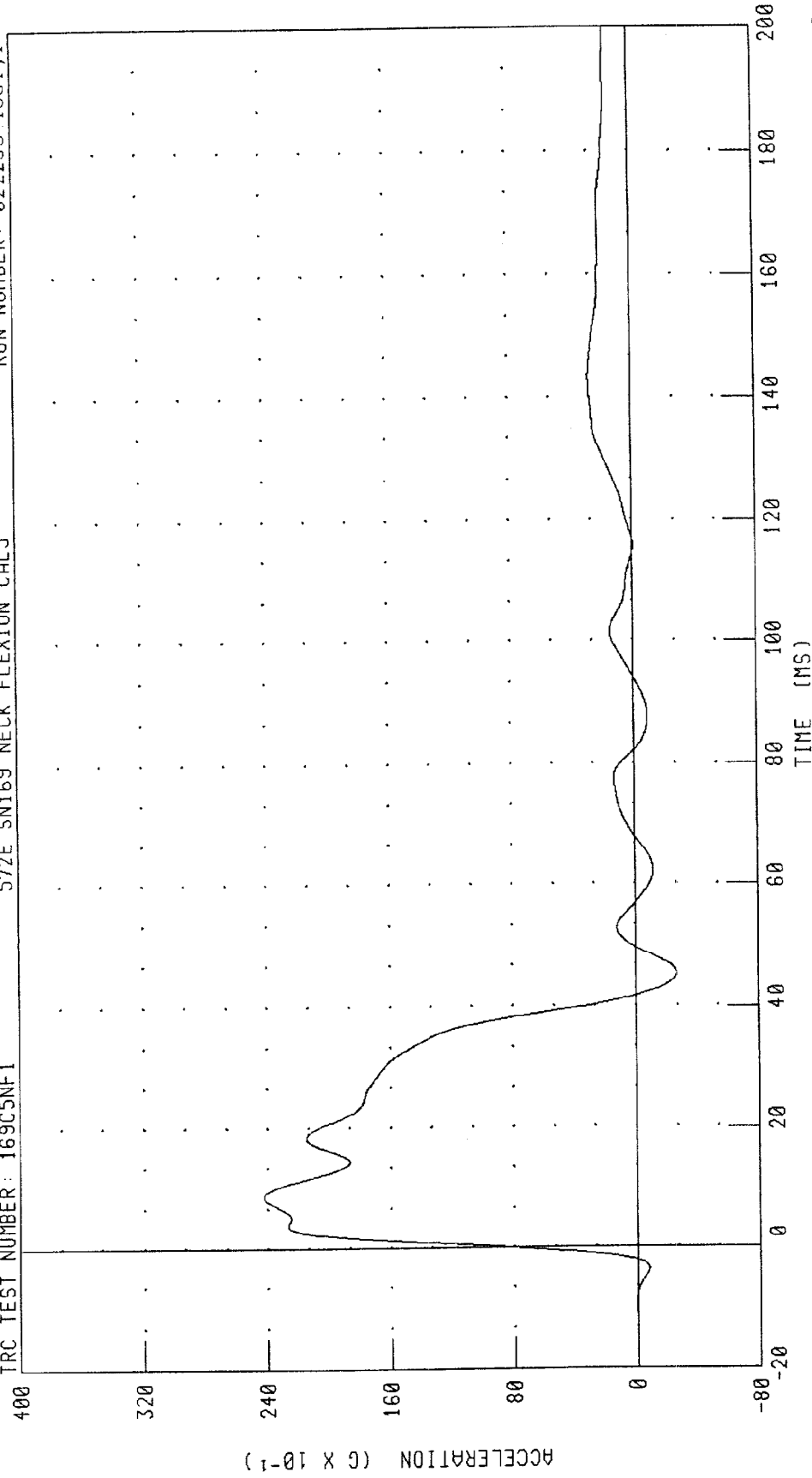
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 169C5NF1

572E SN169 NECK FLEXION CAL5

RUN NUMBER: 022299 1501;1



PEAK DATA: 24.26 G @ 8.80 MS; -2.67 G @ 45.28 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

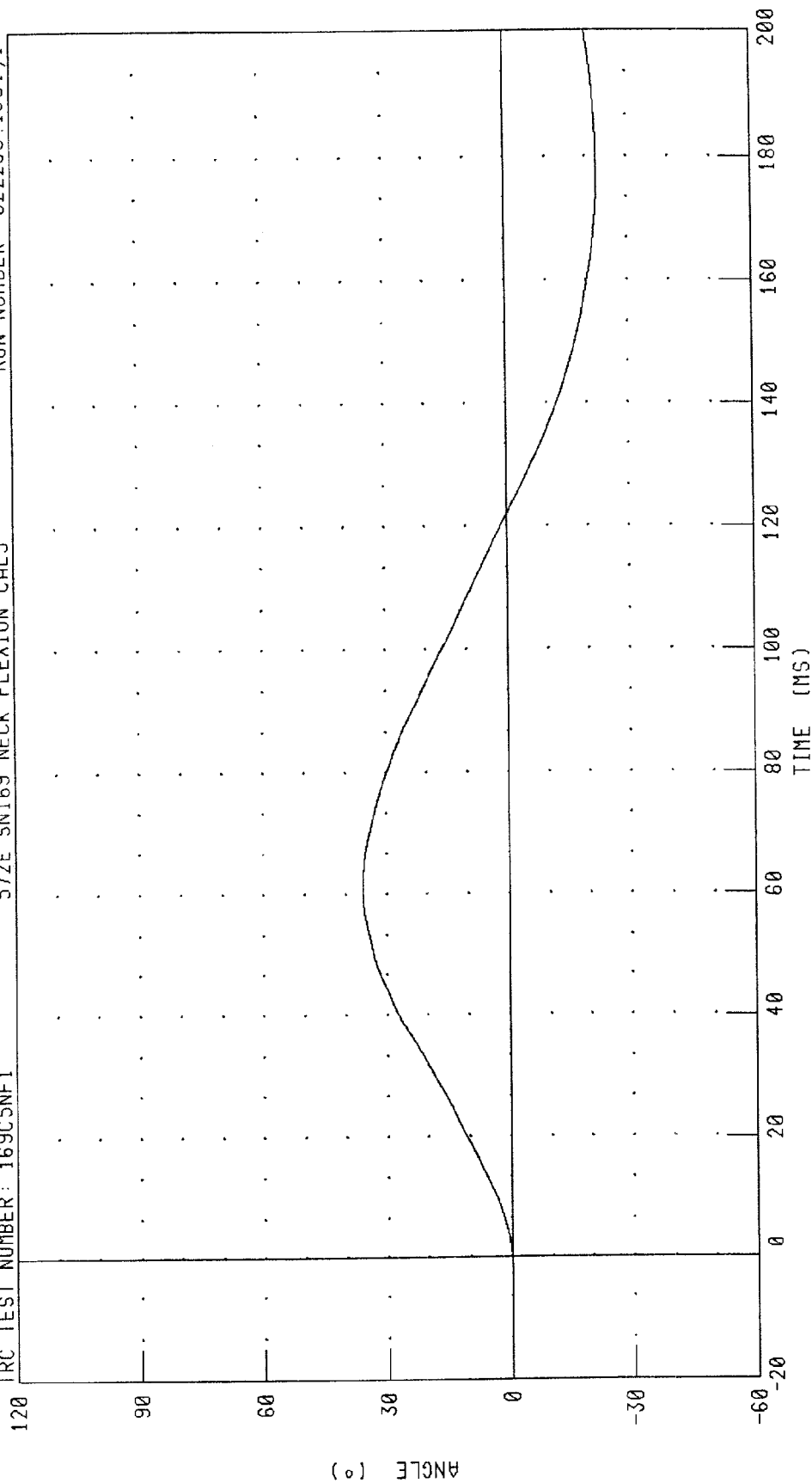
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN169 NECK FLEXION CAL5

IRC TEST NUMBER: 169C5NF1

RUN NUMBER: 022299.1501;1



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 35.79 ° @ 60.40 MS; -22.75 ° @ 178.16 MS

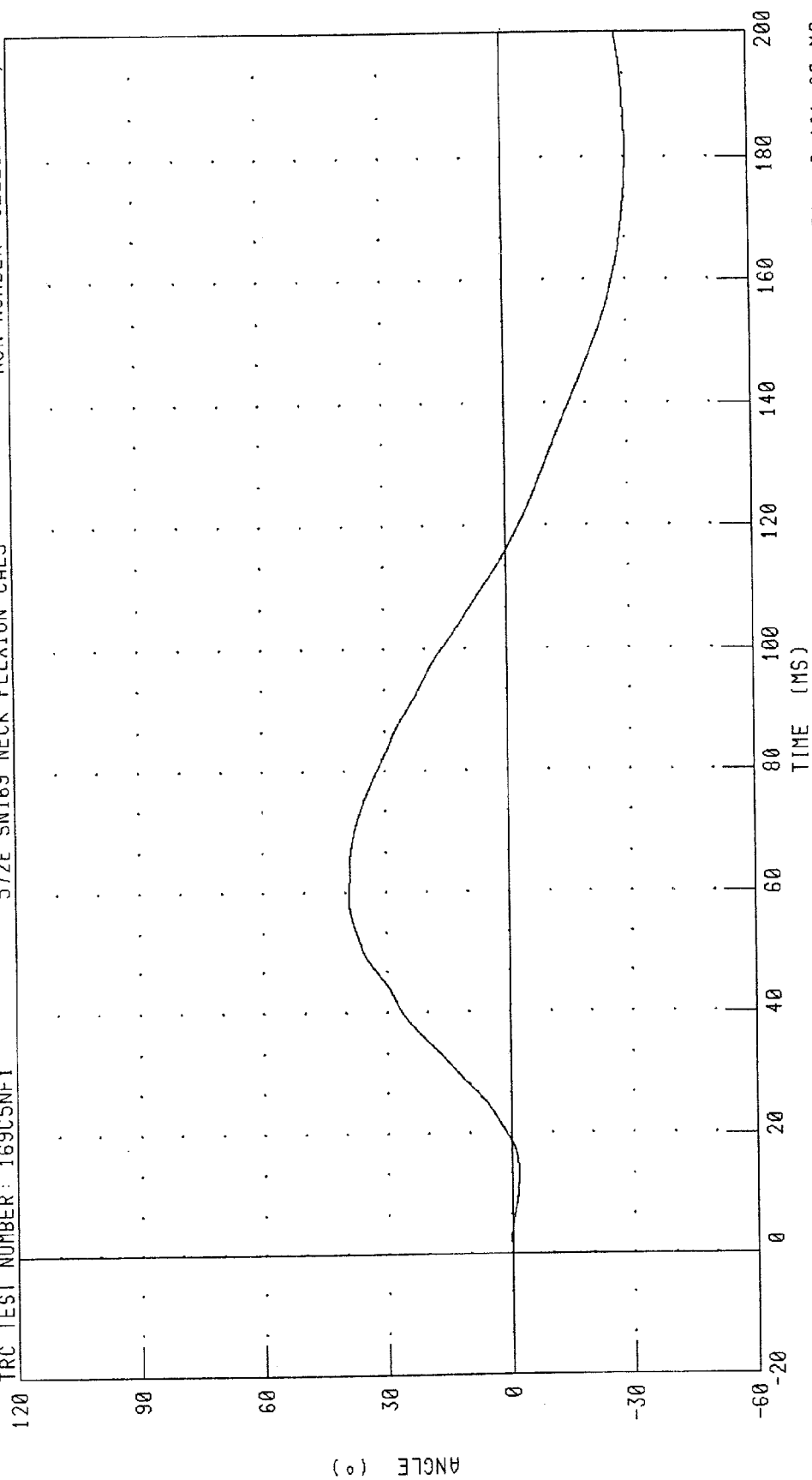
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

572E SN169 NECK FLEXION CAL5

TRC TEST NUMBER: 169C5NF1

RUN NUMBER: 022299.1501.1

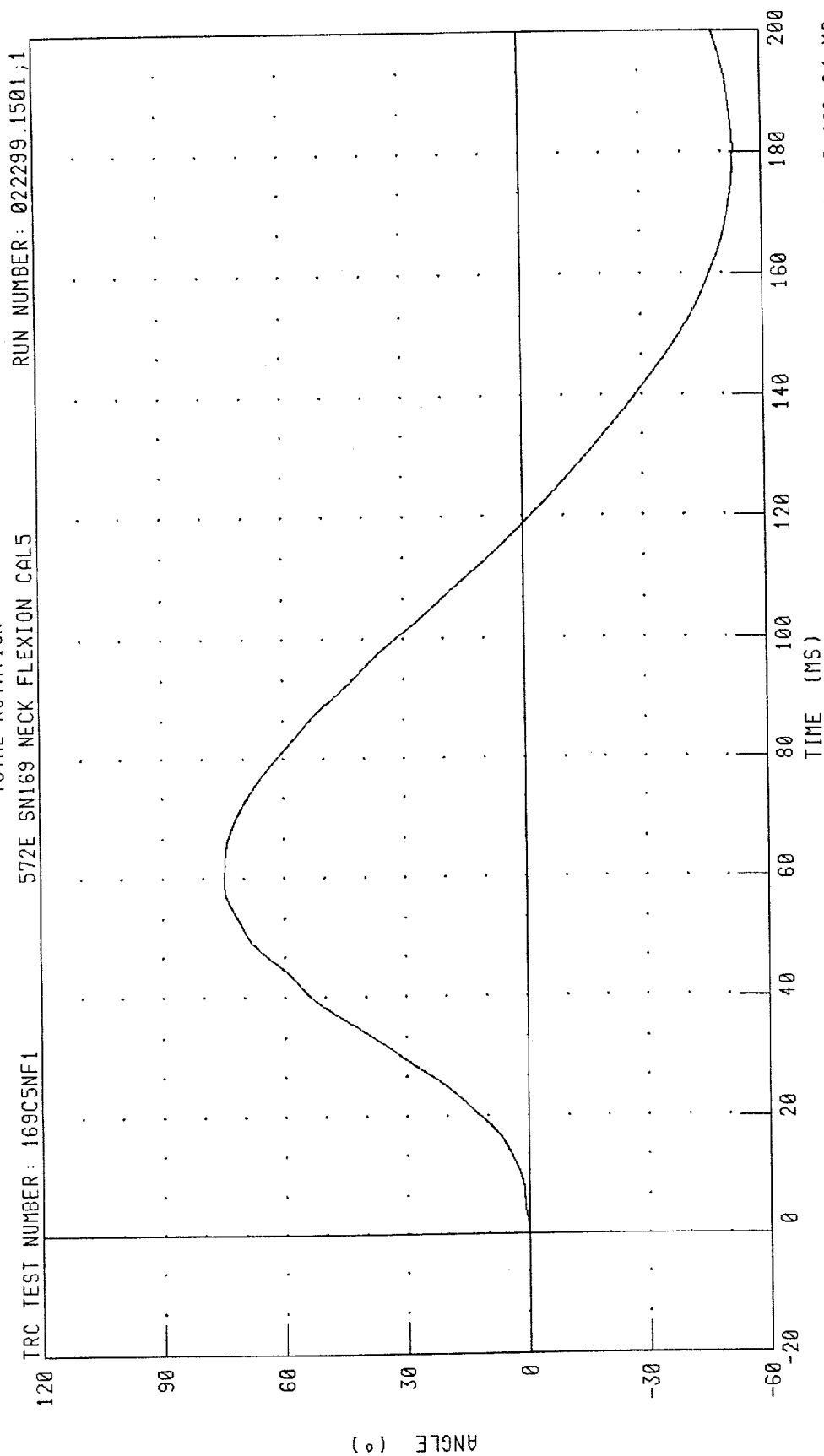


PEAK DATA: 39.05 ° @ 58.96 MS; -30.34 ° @ 181.20 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION



CHANNEL: TOTAL

FILTER: CH. CLASS 60

PEAK DATA: 74.81 ° @ 59.52 MS; -53.05 ° @ 180.64 MS

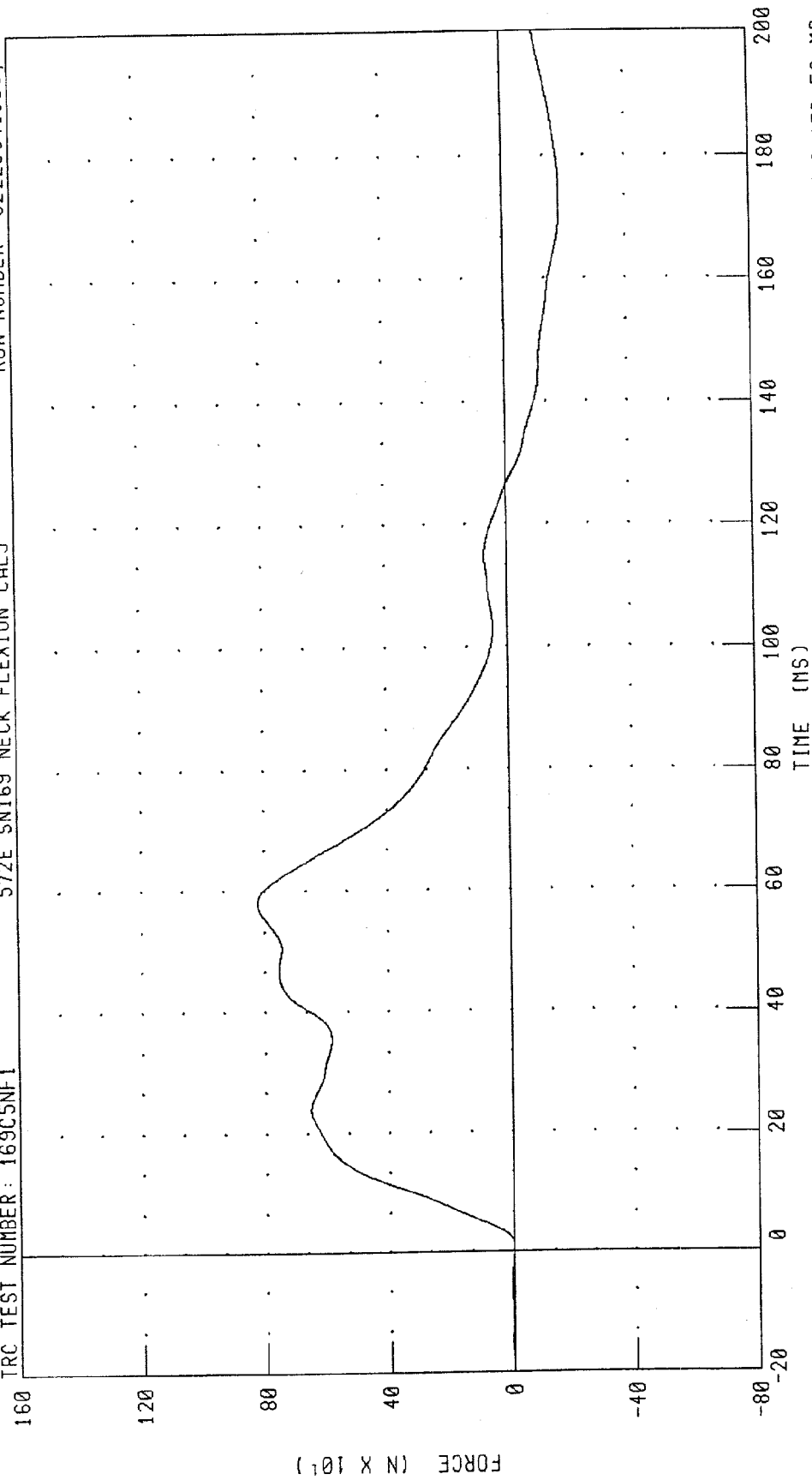
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 022299.1501,1

TRC TEST NUMBER: 169CSNF1

572E SN169 NECK FLEXION CAL5



PEAK DATA: 823.33 N @ 58.08 MS; -183.47 N @ 170.56 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

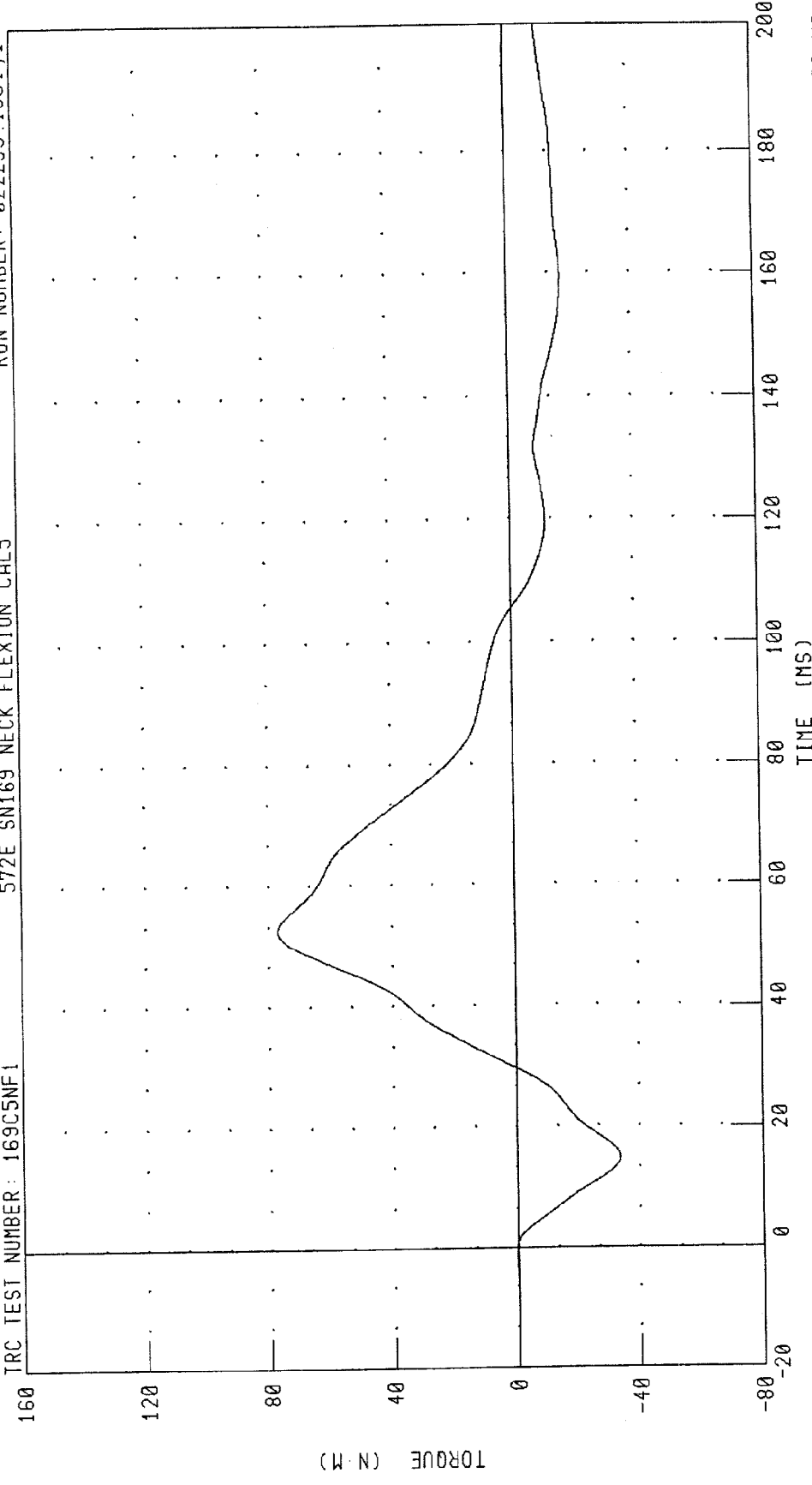
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 022299.1501.1

TRC TEST NUMBER: 169C5NF1

572E SN169 NECK FLEXION CAL5



PEAK DATA: 77.05 N·M @ 52.64 MS; -33.73 N·M @ 14.96 MS

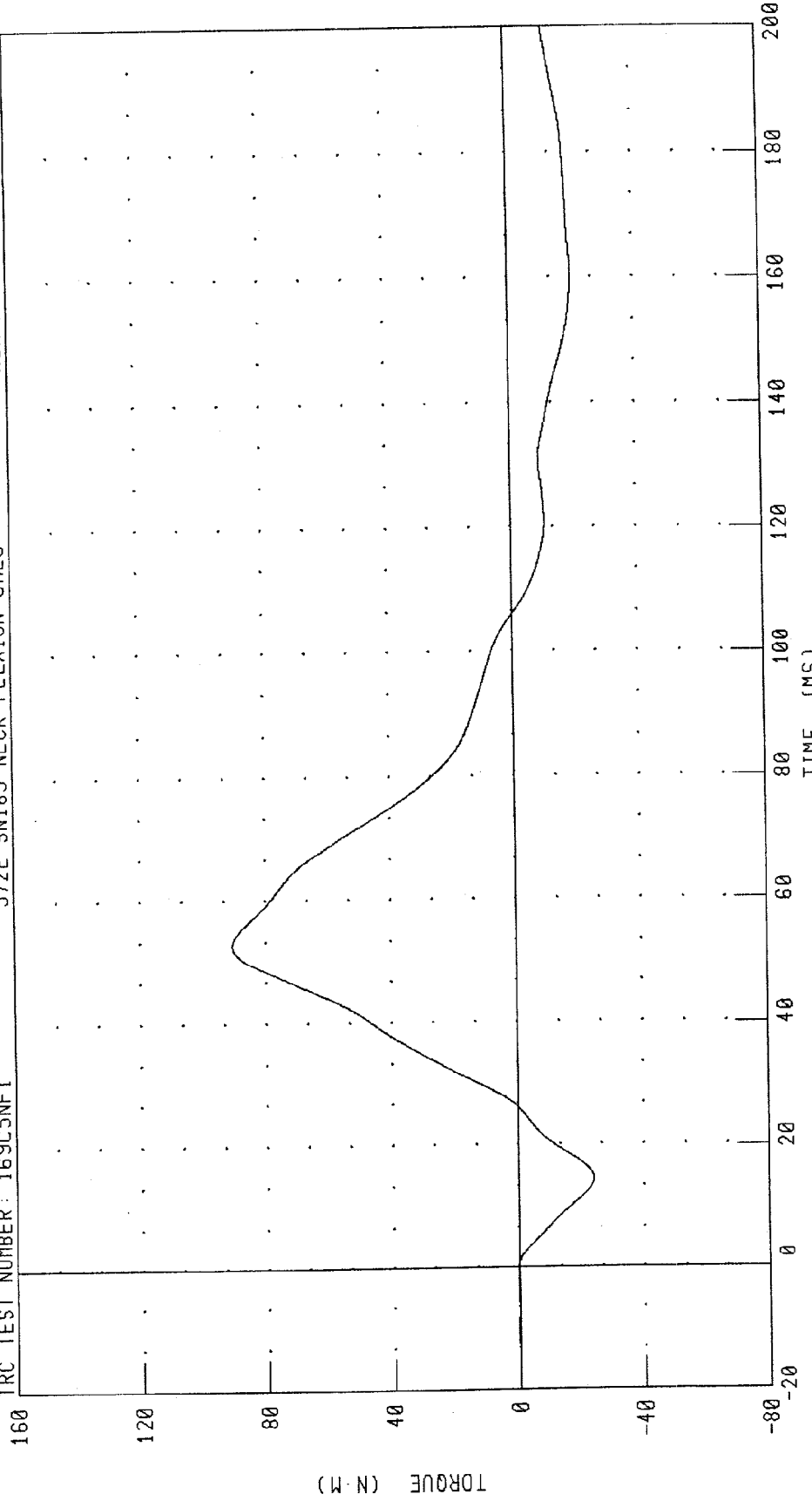
FILTER: CH. CLASS 60

CHANNEL: NEKYM

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
572E SN169 NECK FLEXION CAL5

RUN NUMBER: 022299.1501;1

TRC TEST NUMBER: 169C5NF1



PEAK DATA: 90.55 N-M @ 52.80 MS; -24.21 N-M @ 14.56 MS

CHANNEL: NEXOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C5NE3 572E SN 169 NECK EXT CAL5

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.21 G
	20 MS	14.00 - 19.00 G	17.55 G
	30 MS	11.00 - 16.00 G	14.23 G
MAX PENDULUM G		22 G MAX	19.25 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.48 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.72 MS
D PLANE	MAX	81 - 106 DEG.	103.66 DEG.
ROTATION	TIME	72 - 82 MS	76.72 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-72.77 NM
	TIME	65 - 79 MS	70.64 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	159.60 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	148.00 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. Calt

RUN NUMBER: 022299.1647;2

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

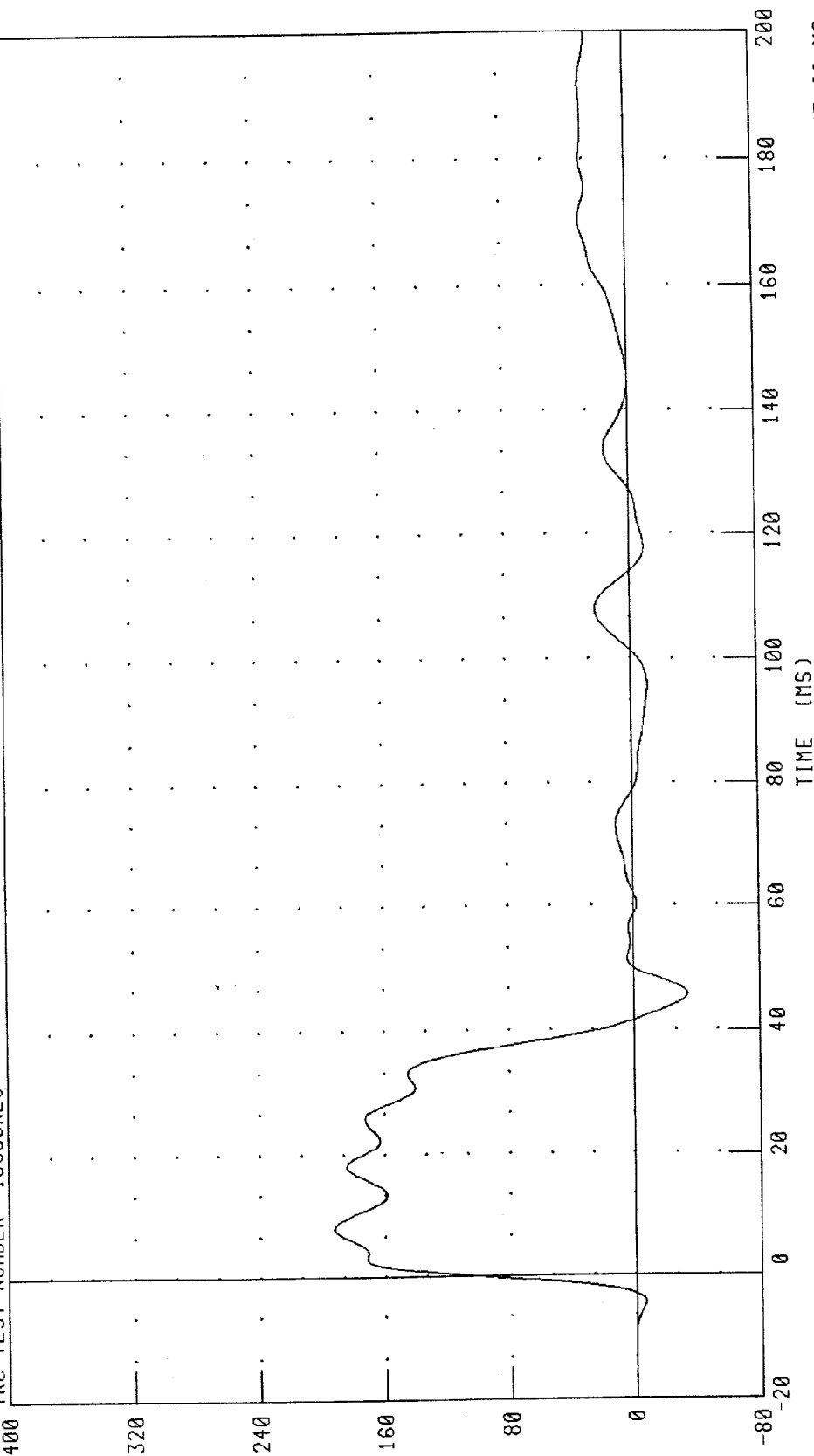
PENDULUM DECELERATION

RUN NUMBER: 022299.1647;2

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5

ACCELERATION ($G \times 10^{-1}$)



CHANNEL: PENXC

FILTER: CH. CLASS 60

TIME (MS)

PEAK DATA: 19.26 G @ 8.08 MS, -3.44 G @ 45.68 MS

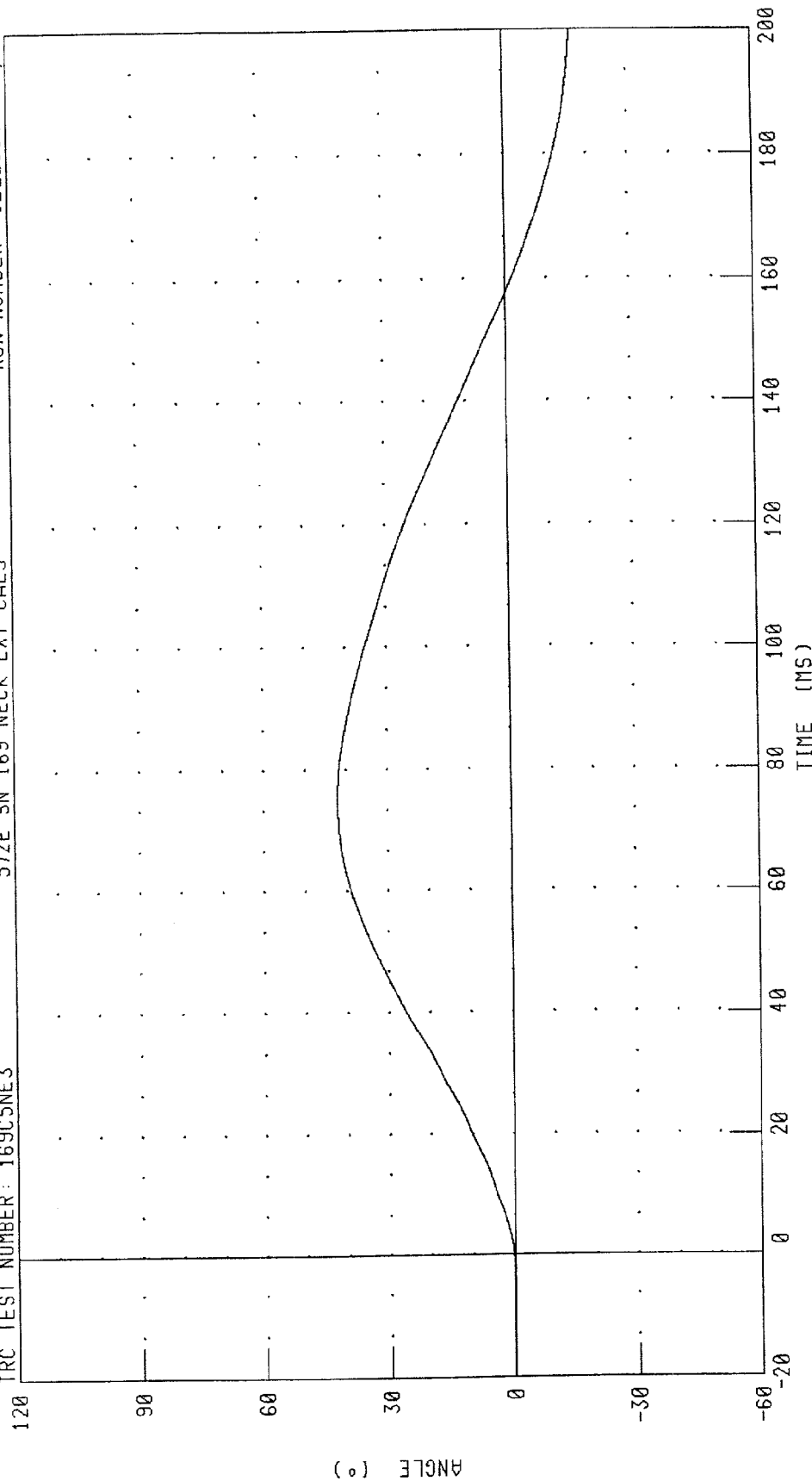
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

RUN NUMBER: 022299.1647;2

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5



PEAK DATA: 42.03 ° @ 75.20 MS; -16.28 ° @ 200.00 MS

FILTER: CH. CLASS 60

CHANNEL: BETA

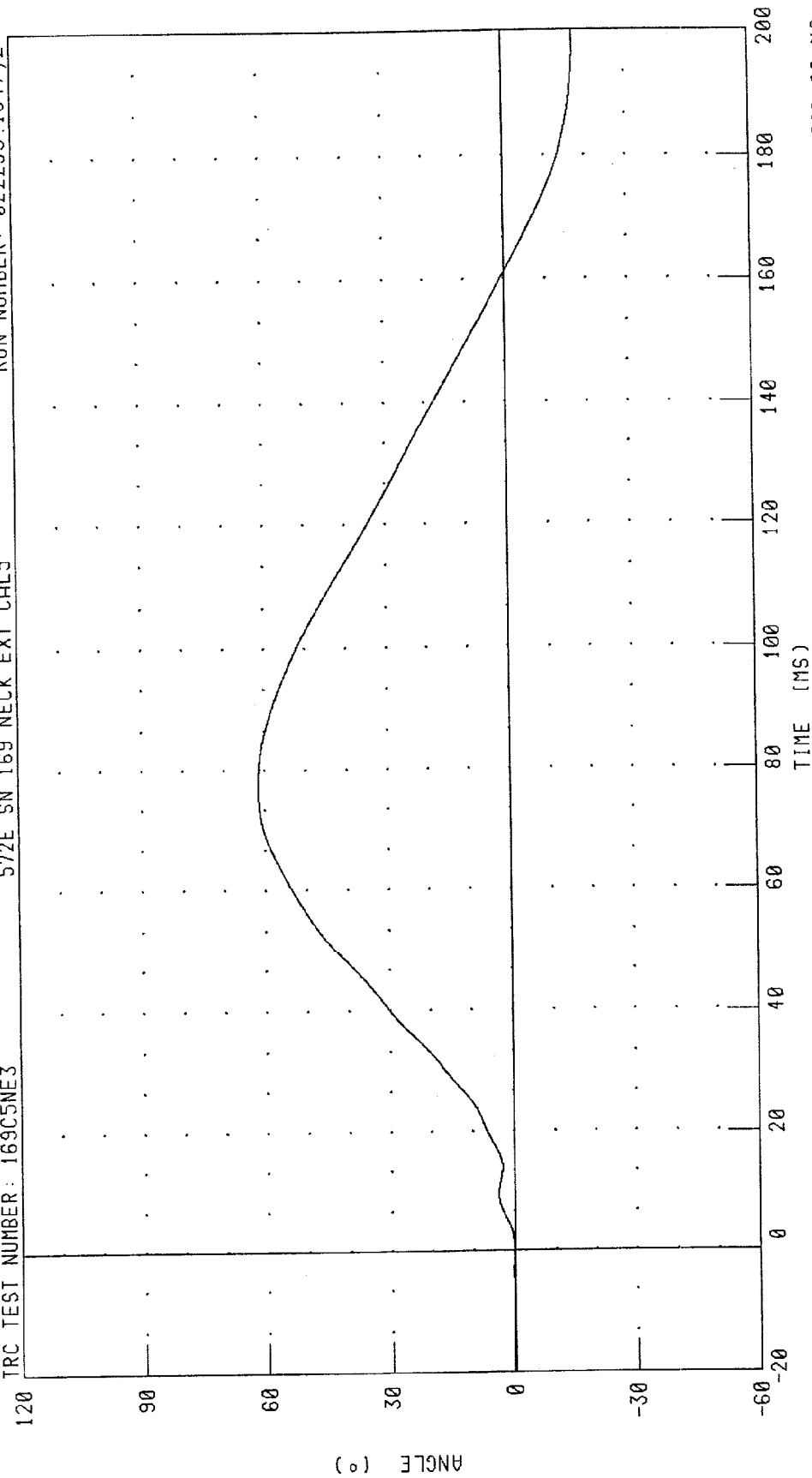
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 61.67 ° @ 77.28 MS; -17.40 ° @ 200.00 MS

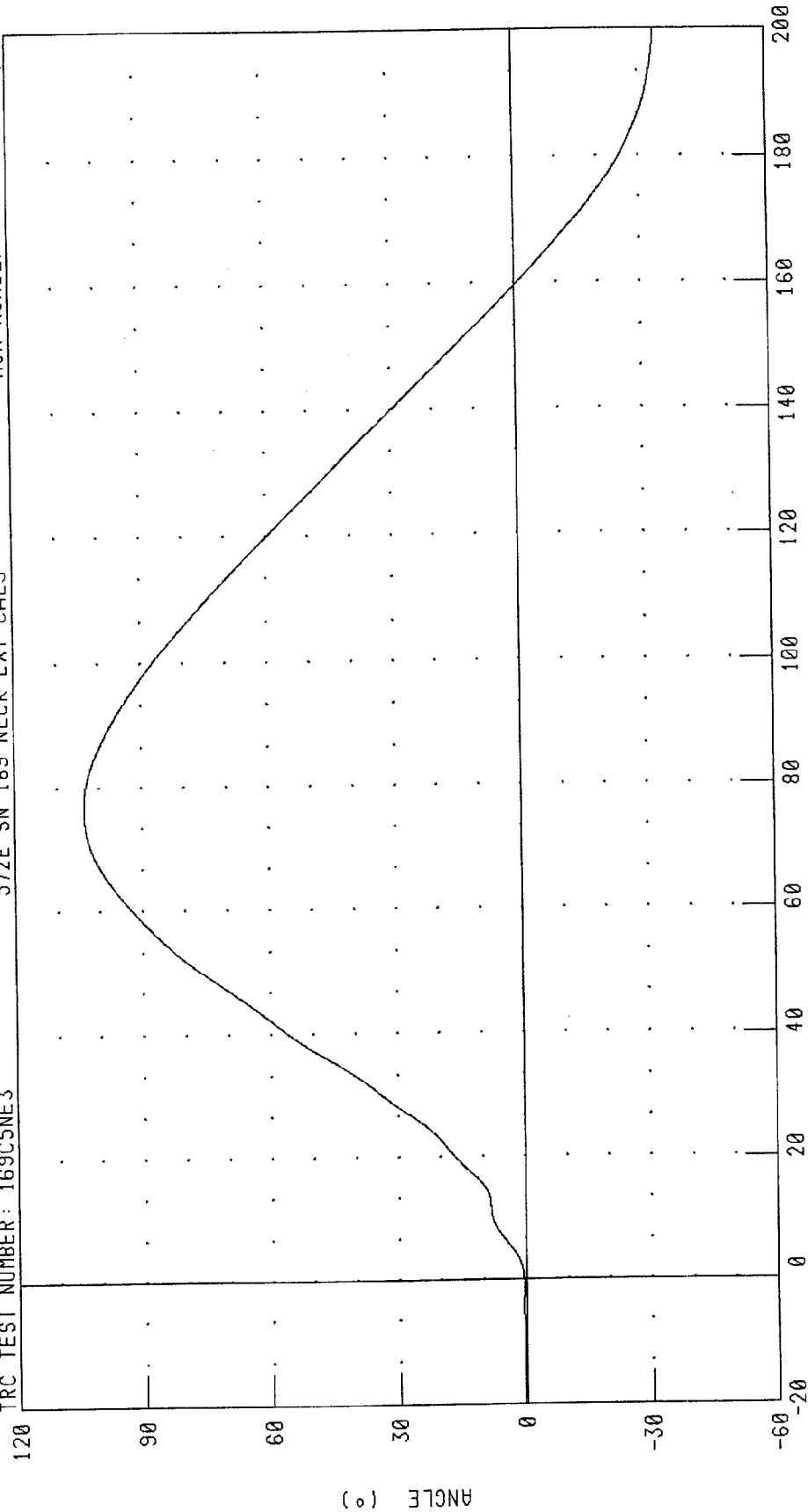
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

RUN NUMBER: 0222299.1647;2

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5



PEAK DATA: 103.66 ° @ 76.72 MS, -33.68 ° @ 200.00 MS

FILTER: CH. CLASS 60

CHANNEL: TOTAN

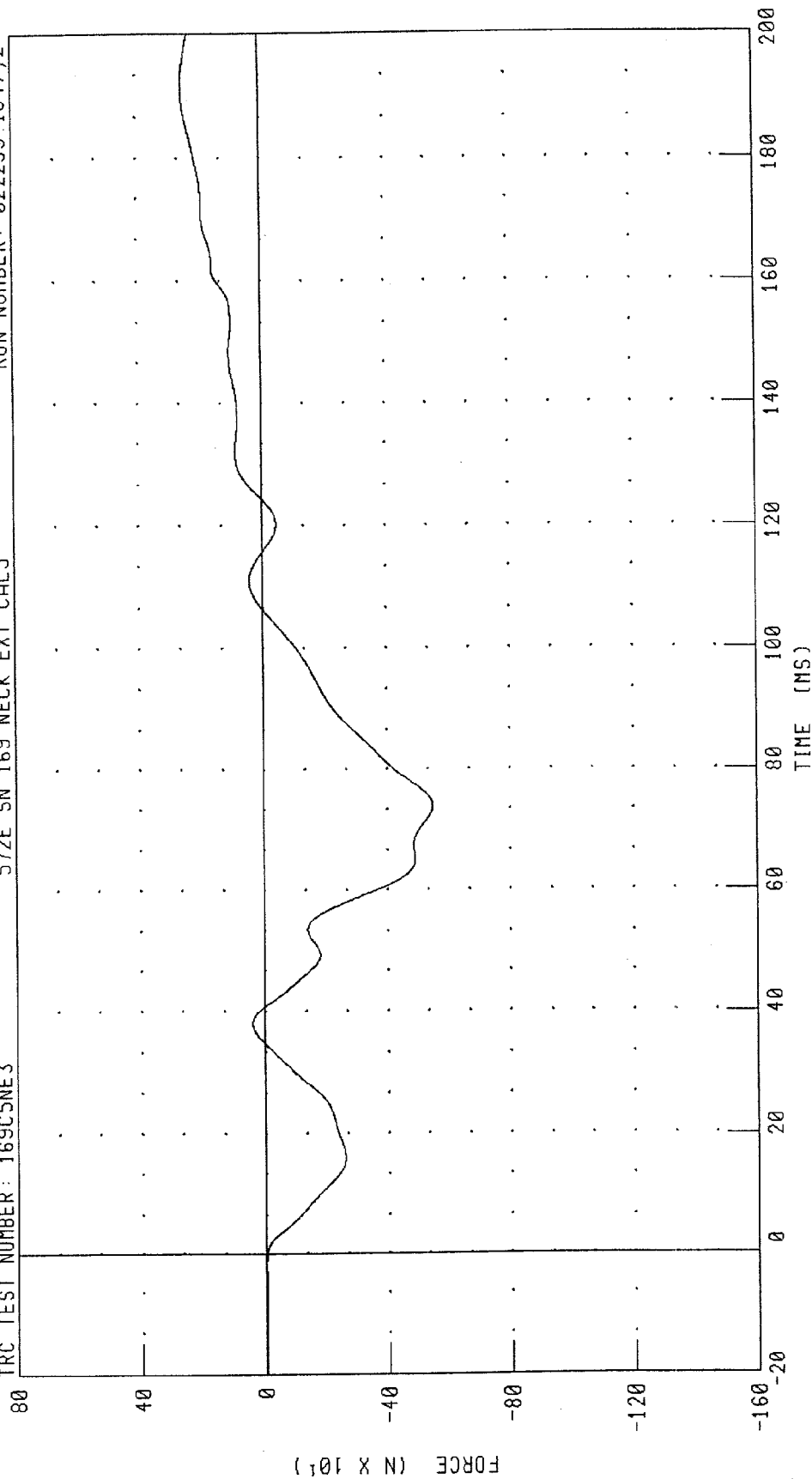
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 253.49 N @ 191.60 MS; -548.59 N @ 73.92 MS

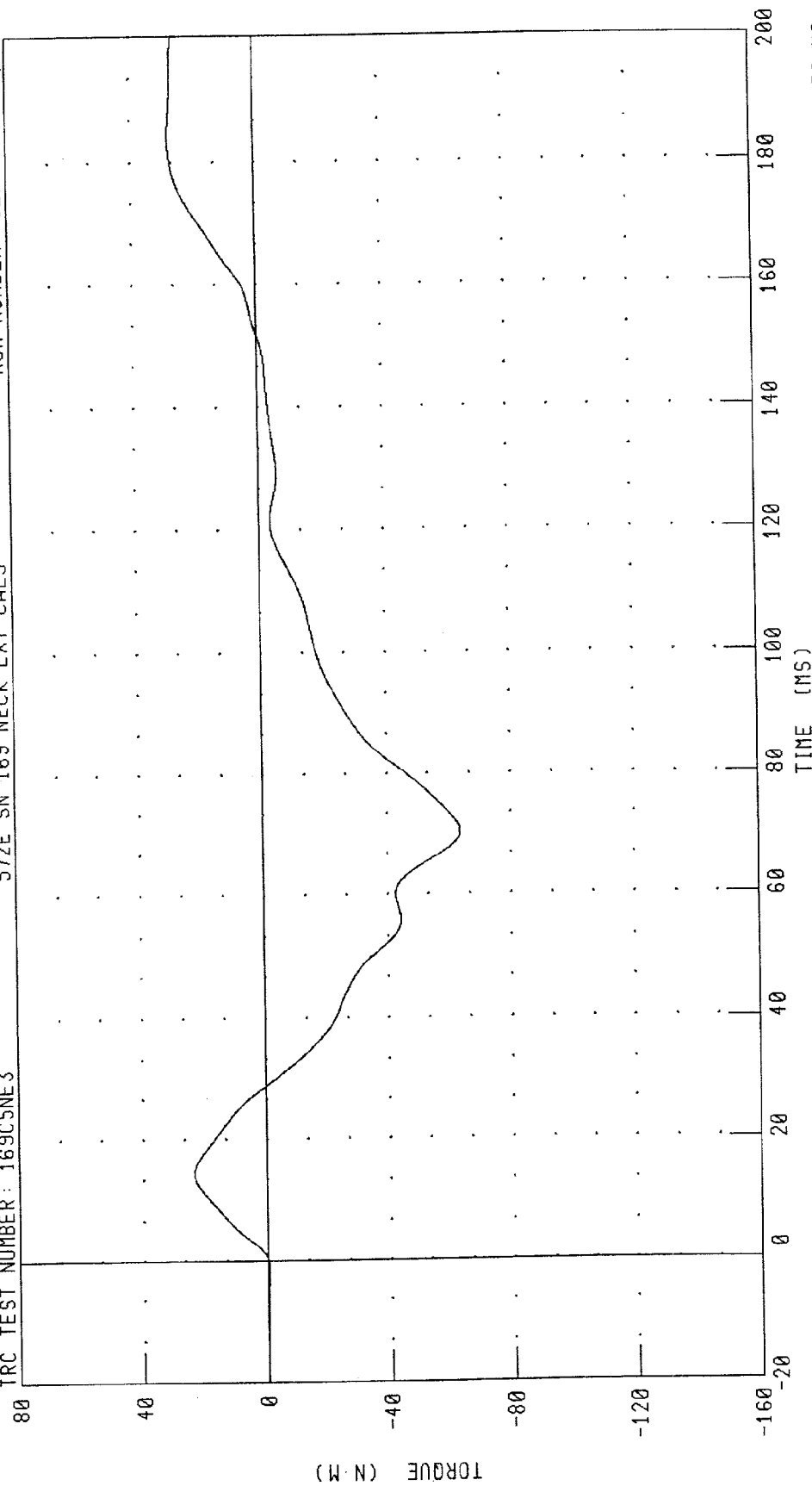
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 0222299.1647;2

TRC TEST NUMBER: 169CSNE3

572E SN 169 NECK EXT CAL5



PEAK DATA: 27.88 N·M @ 183.76 MS; -63.68 N·M @ 70.32 MS

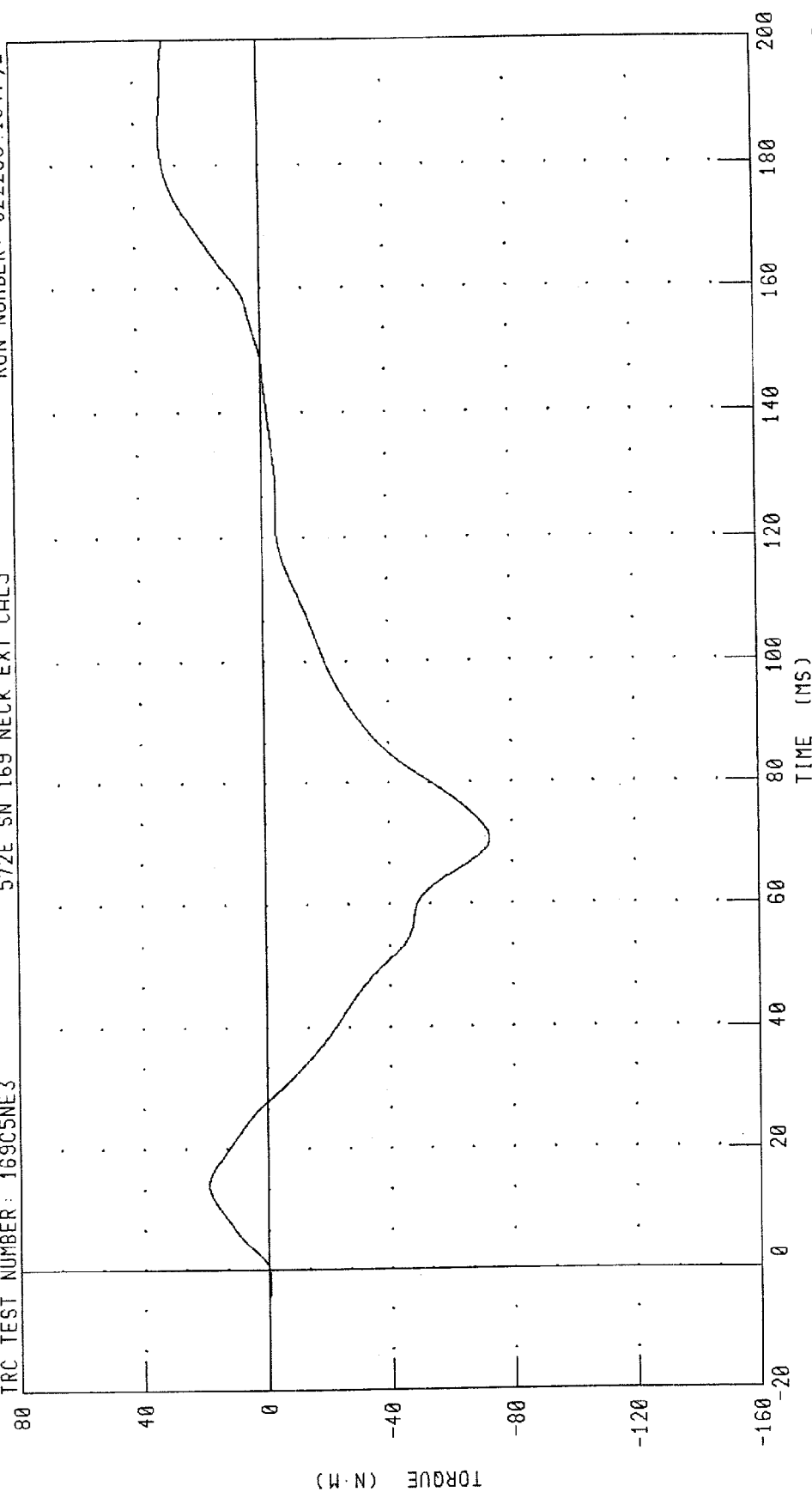
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169CSNE3

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2



PEAK DATA: 32.00 N·M @ 185.12 MS, -72.77 N·M @ 70.64 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

23-FEB-99

TRC INC.

TEST NO: 169C5TH5

572E SN169 H.S.THORAX CAL05

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	64.1 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5564. N
INTERNAL HYSTERESIS	69% - 85%	73.2%

TEST MEETS SPECIFICATIONS

TECHNICIAN B. Calt

RUN NUMBER: 022399.0843;1

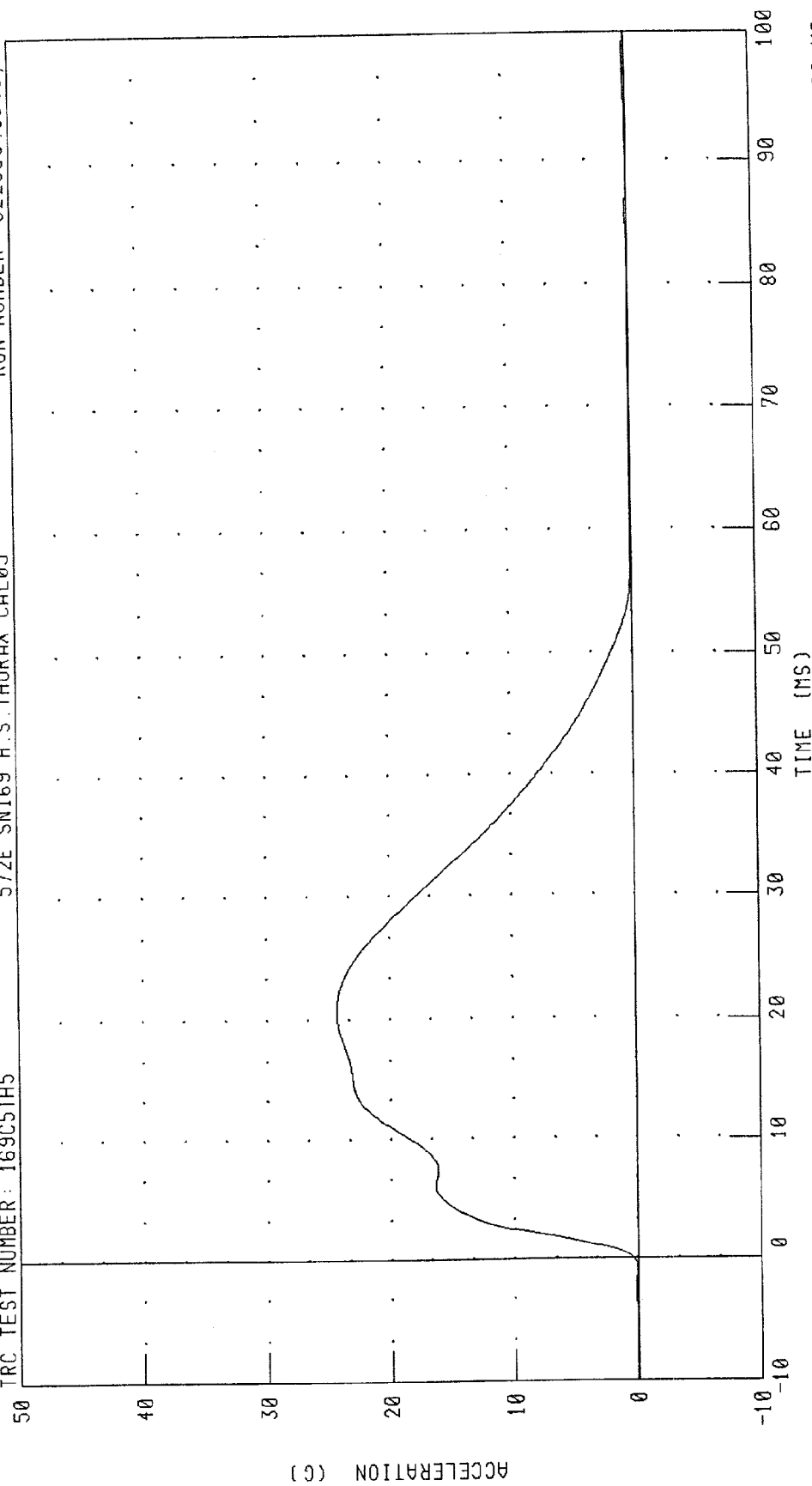
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 169C5TH5

572E SN169 H.S. THORAX CAL05

RUN NUMBER: 022399.0843;1



CHANNEL: PENXG FILTER: CH. CLASS 180

PEAK DATA: 24.29 G @ 20.64 MS; 0.04 G @ 73.68 MS

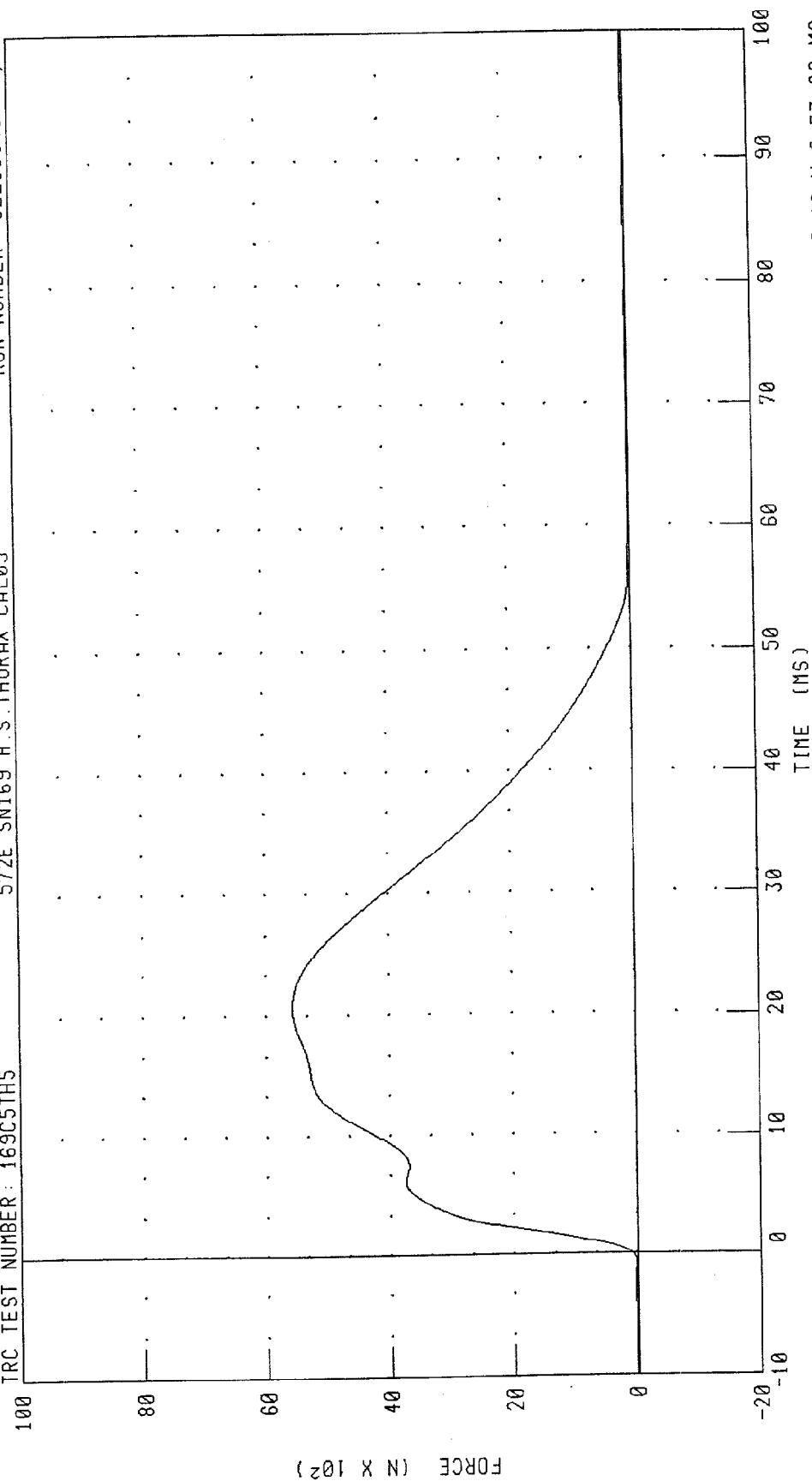
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 169C5TH5

572E SN169 H.S. THORAX CAL05

RUN NUMBER: 022399.0843;1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5564.22 N @ 20.64 MS; 8.10 N @ 73.68 MS

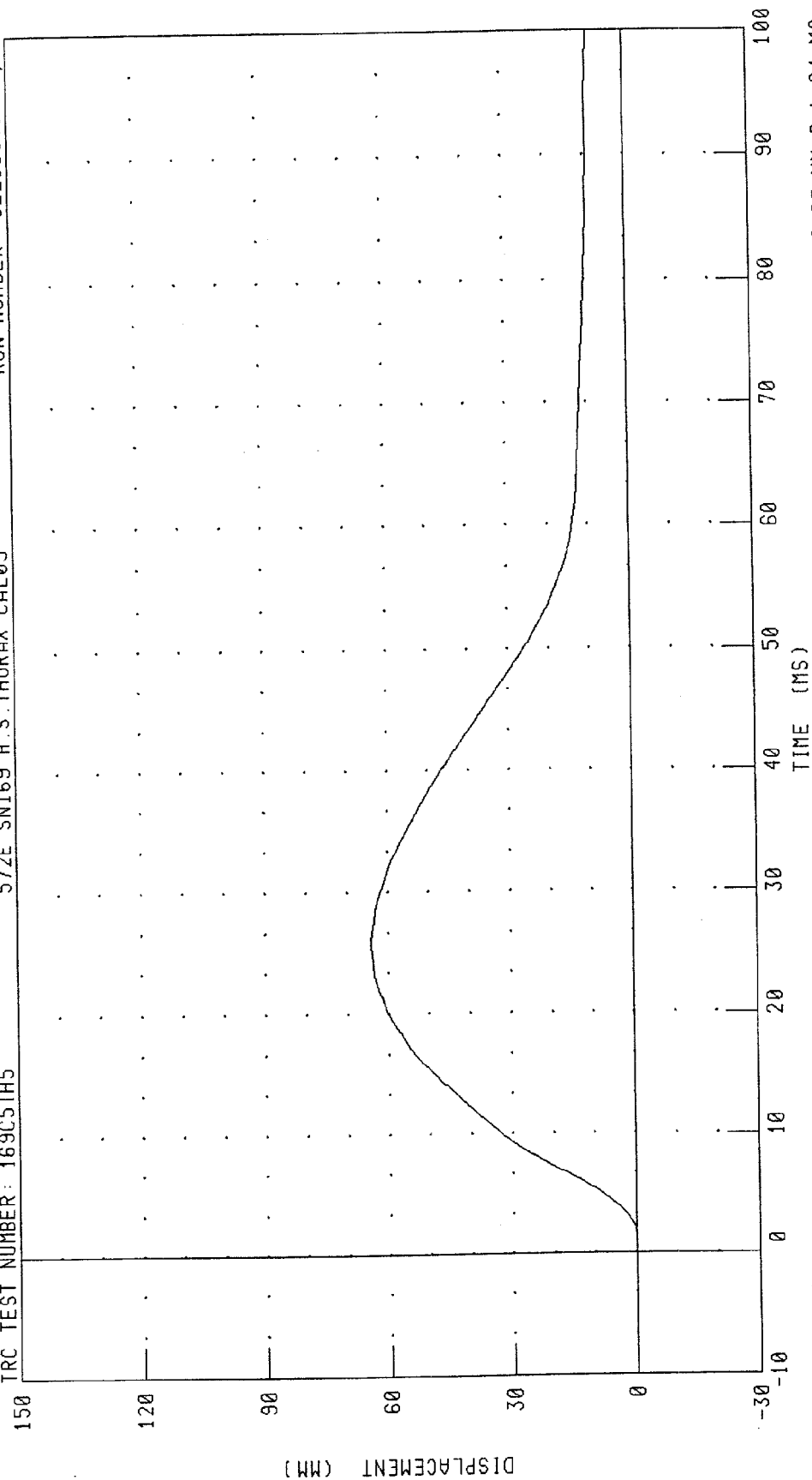
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 169C5TH5

572E SN169 H.S. THORAX CAL05

RUN NUMBER: 022399.0843;1



PEAK DATA: 64.20 MM @ 25.84 MS; -0.03 MM @ 1.04 MS

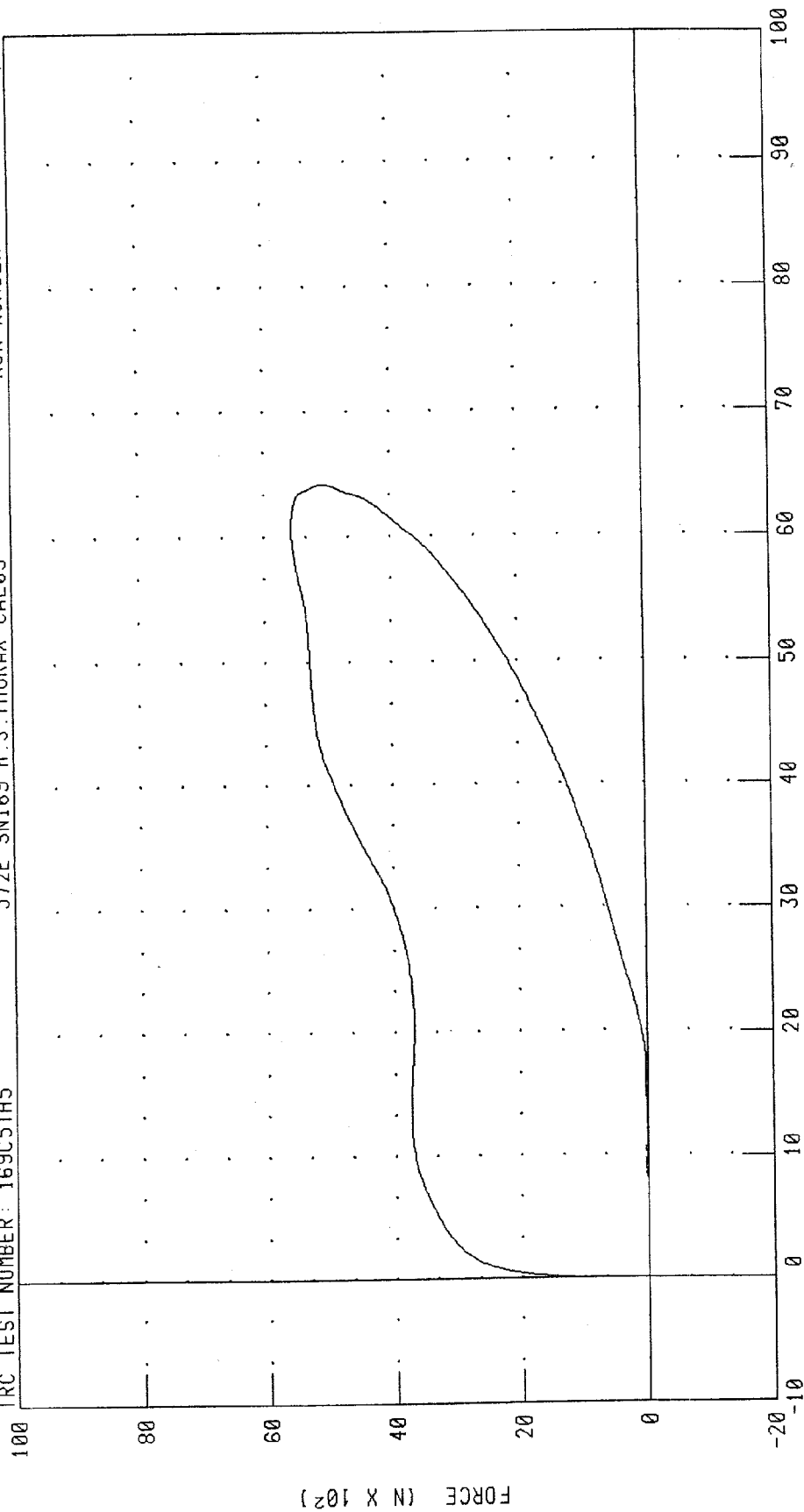
CHANNEL: CSTXD FILTER: CH. CLASS 180

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

TRC TEST NUMBER: 169C5TH5

572E SN169 H.S. THORAX CAL05

RUN NUMBER: 022399.0843;1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA:

64.20 MM @ 25.84 MS; -0.03 MM @ 1.04 MS
5564.22 N @ 20.64 MS; 8.10 N @ 73.68 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

22-FEB-99

TRC INC.

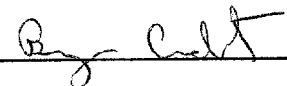
TEST NO: 169C5HR1

572E SN 169 HIPFLEX CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	67.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.7 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 022299.1314;1

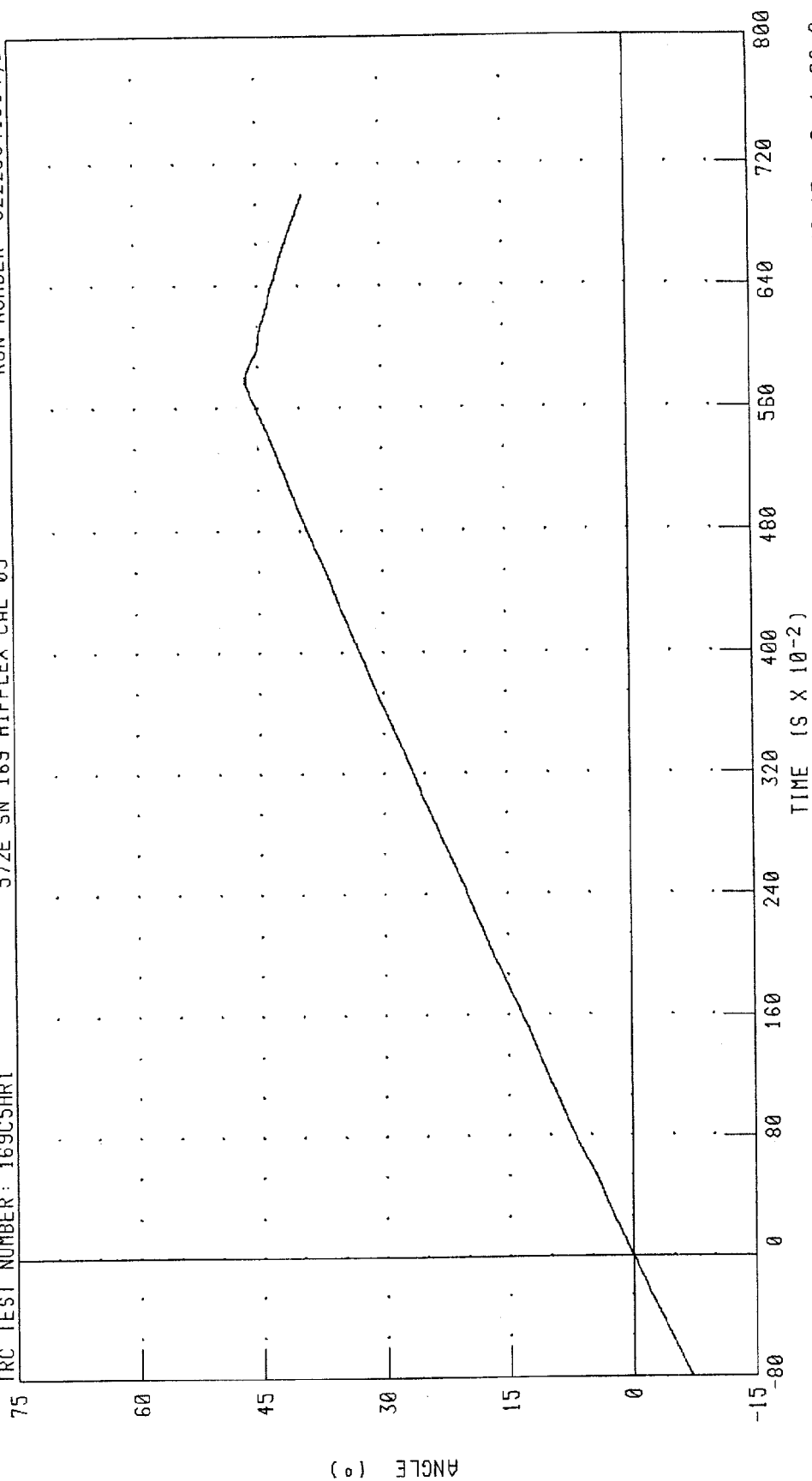
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

TRC TEST NUMBER: 169C5HR1

572E SN 169 HIPFLEX CAL 05

RUN NUMBER: 022299.1314;1



CHANNEL: RHPXD FILTER: CH. CLASS 60

PEAK DATA: 46.54 ° @ 5.80 S; -10.15 ° @ -1.00 S

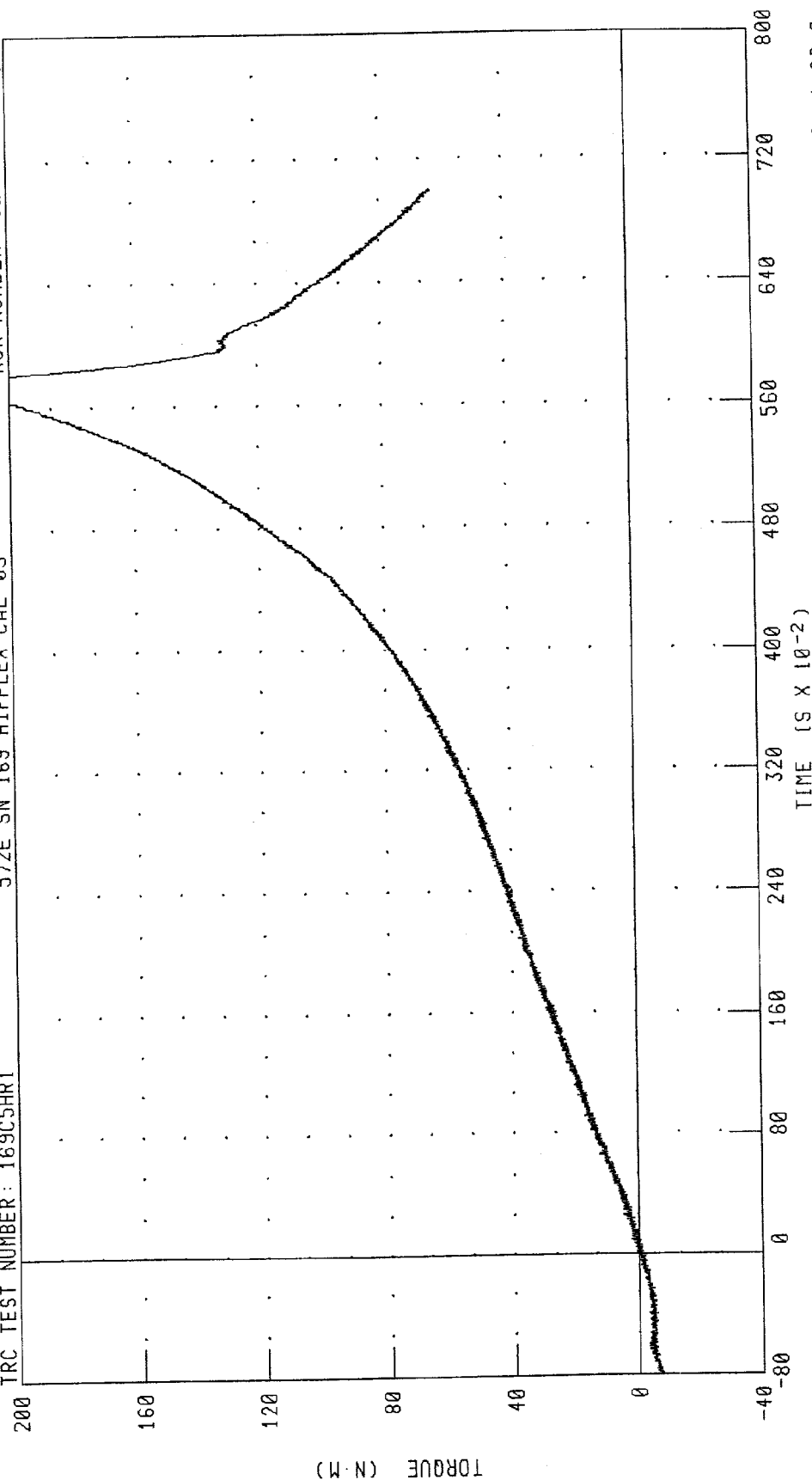
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

572E SN 169 HIPFLEX CAL 05

TRC TEST NUMBER: 169C5HR1

RUN NUMBER: 022299.1314;1



PEAK DATA: 218.97 N·M @ 5.76 S; -11.32 N·M @ -1.00 S

CHANNEL: RHPYM FILTER: CH. CLASS 60

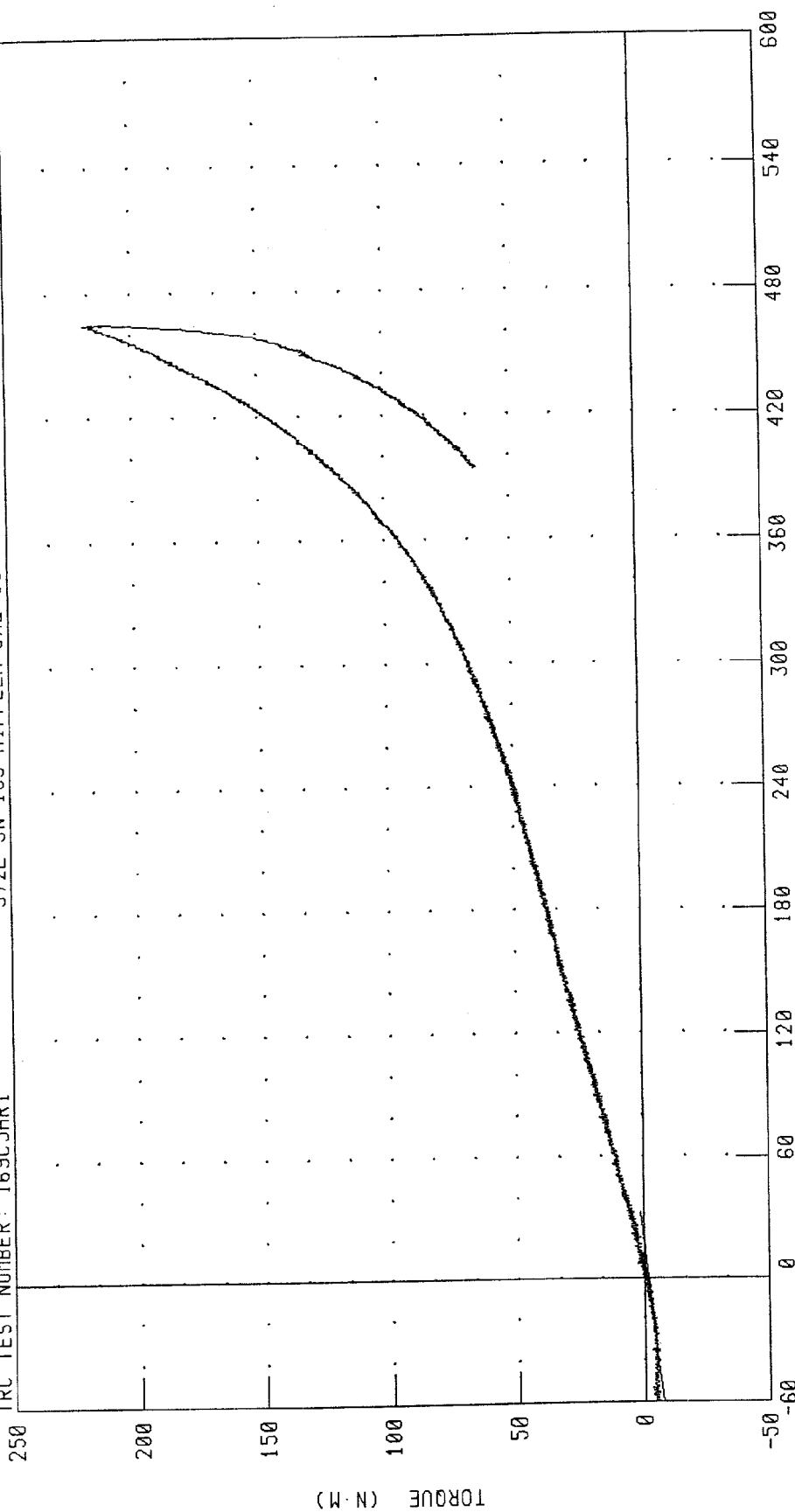
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE

RUN NUMBER: 022299.1314;1

572E SN 169 HIPFLEX CAL 05

TRC TEST NUMBER: 169C5HR1



CHANNEL: RHPXD
RHPYM

FILTER: CH. CLASS 60
CH. CLASS 60

ANGLE (° X 10⁻¹)

PEAK DATA: 46.54 ° 0 5.80 S; -10.15 ° 0 -1.00 S
218.97 N-M 0 5.76 S; -11.32 N-M 0 -1.00 S

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

22-FEB-99

TRC INC.

TEST NO: 169C5HL1

572E SN 169 HIPFLEX CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.4 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN B. J. C. H. T.

RUN NUMBER: 022299.1311;1

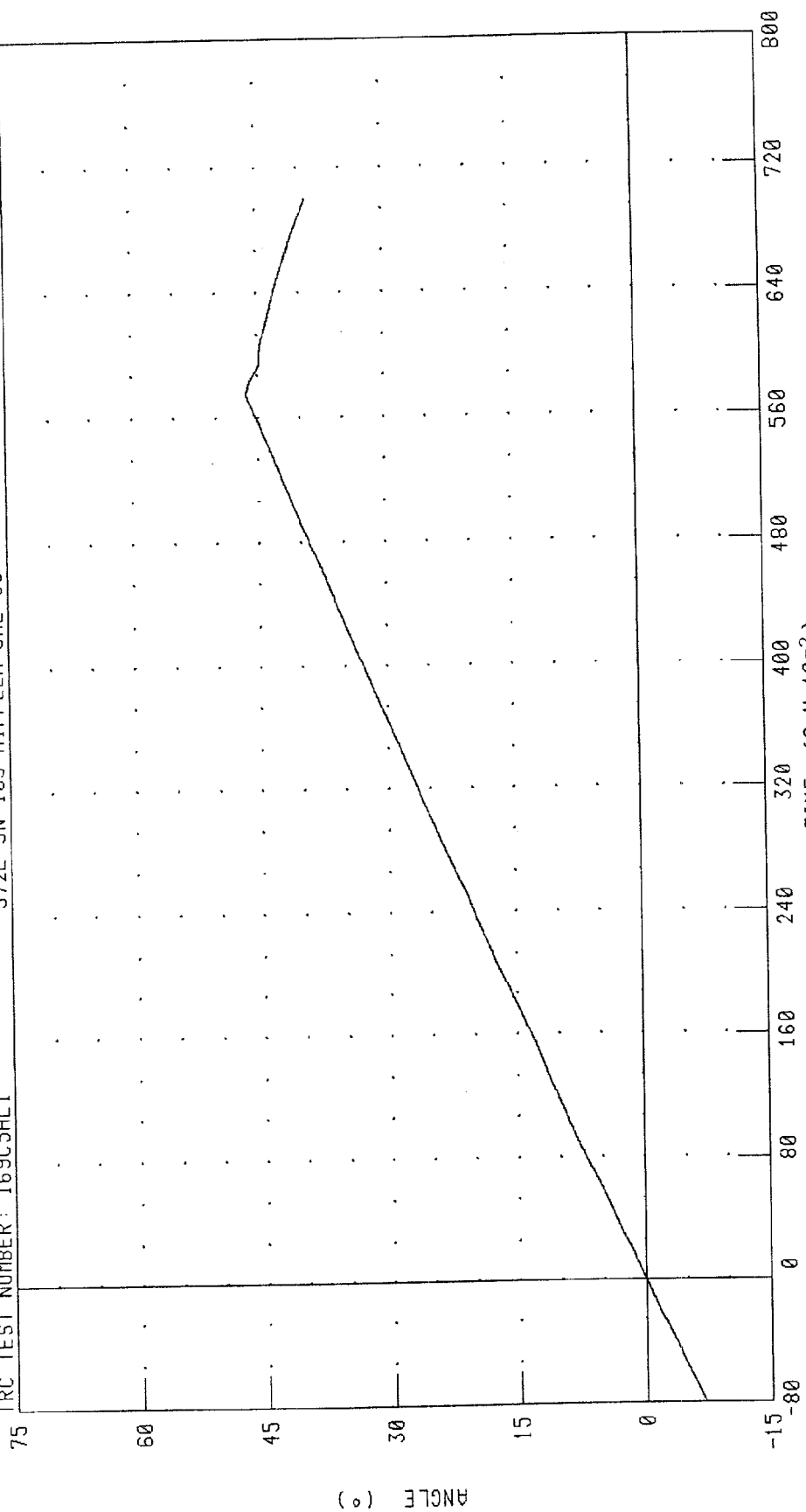
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION ROTATION

572E SN 169 HIPFLEX CAL 05

RUN NUMBER: 022299.1311.1

TRC TEST NUMBER: 169C5HL1



PEAK DATA: 46.31 ° @ 5.74 S; -10.22 ° @ -1.00 S

CHANNEL: LHPXD FILTER: CH. CLASS 60

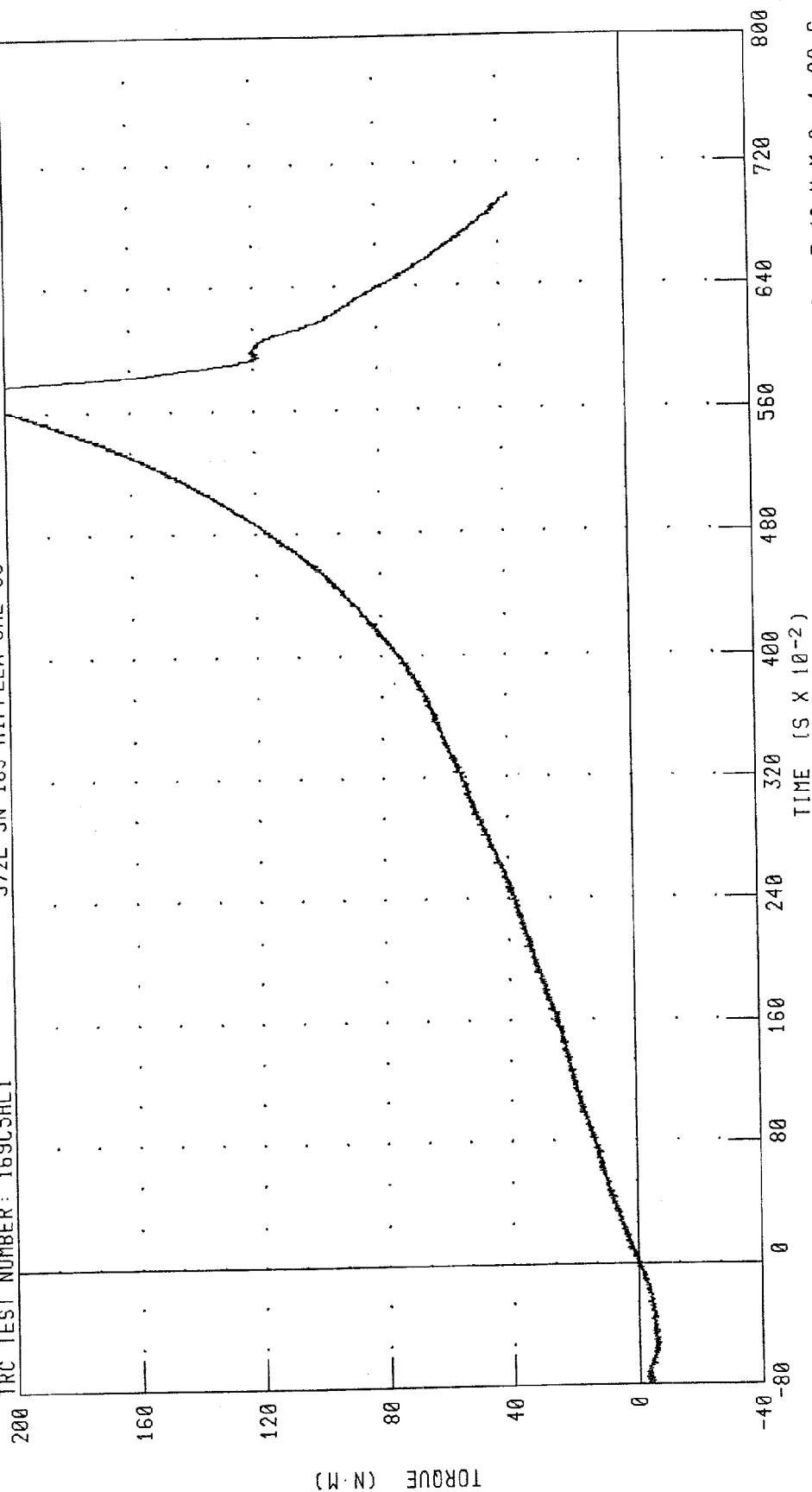
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT

572E SN 169 HIPFLEX CAL 05

TRC TEST NUMBER: 169C5HL1

RUN NUMBER: 0222299.1311,1



PEAK DATA: 218.34 N·M @ 5.72 S; -7.42 N·M @ -1.00 S

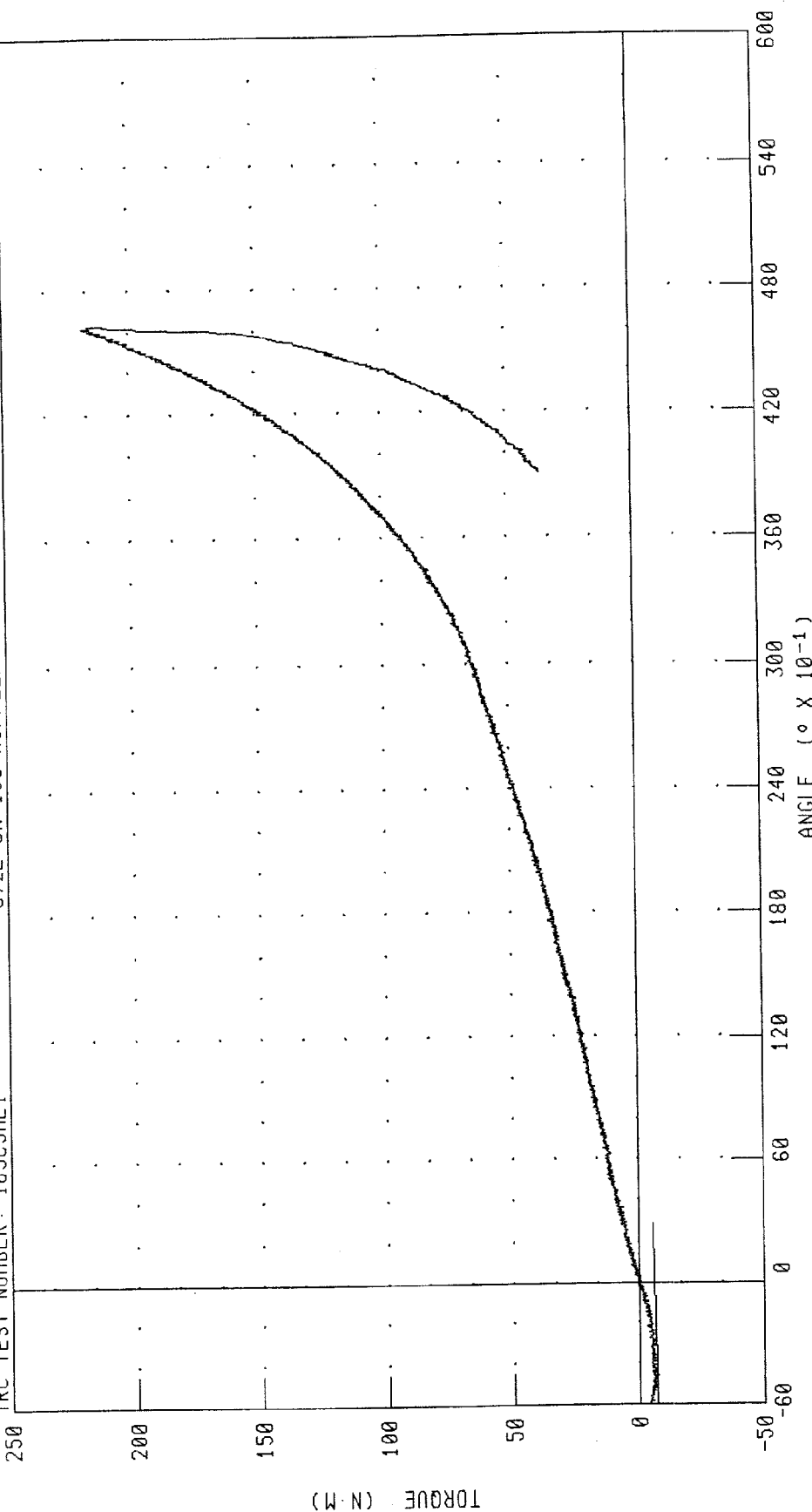
CHANNEL: LHPYH FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169C5HL1

572E SN 169 HIPFLEX CAL 05

RUN NUMBER: 0222299.1311;1



CHANNEL: LHPXD
LHPYM

FILTER: CH. CLASS 60
CH. CLASS 60

PEAK DATA: 46.31 ° @ 5.74 S; -10.22 ° @ -1.00 S
218.34 N·M @ 5.72 S; -7.42 N·M @ -1.00 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 169C5RK2

572E SN169 RIGHT KNEE CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5116.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Bj Calt

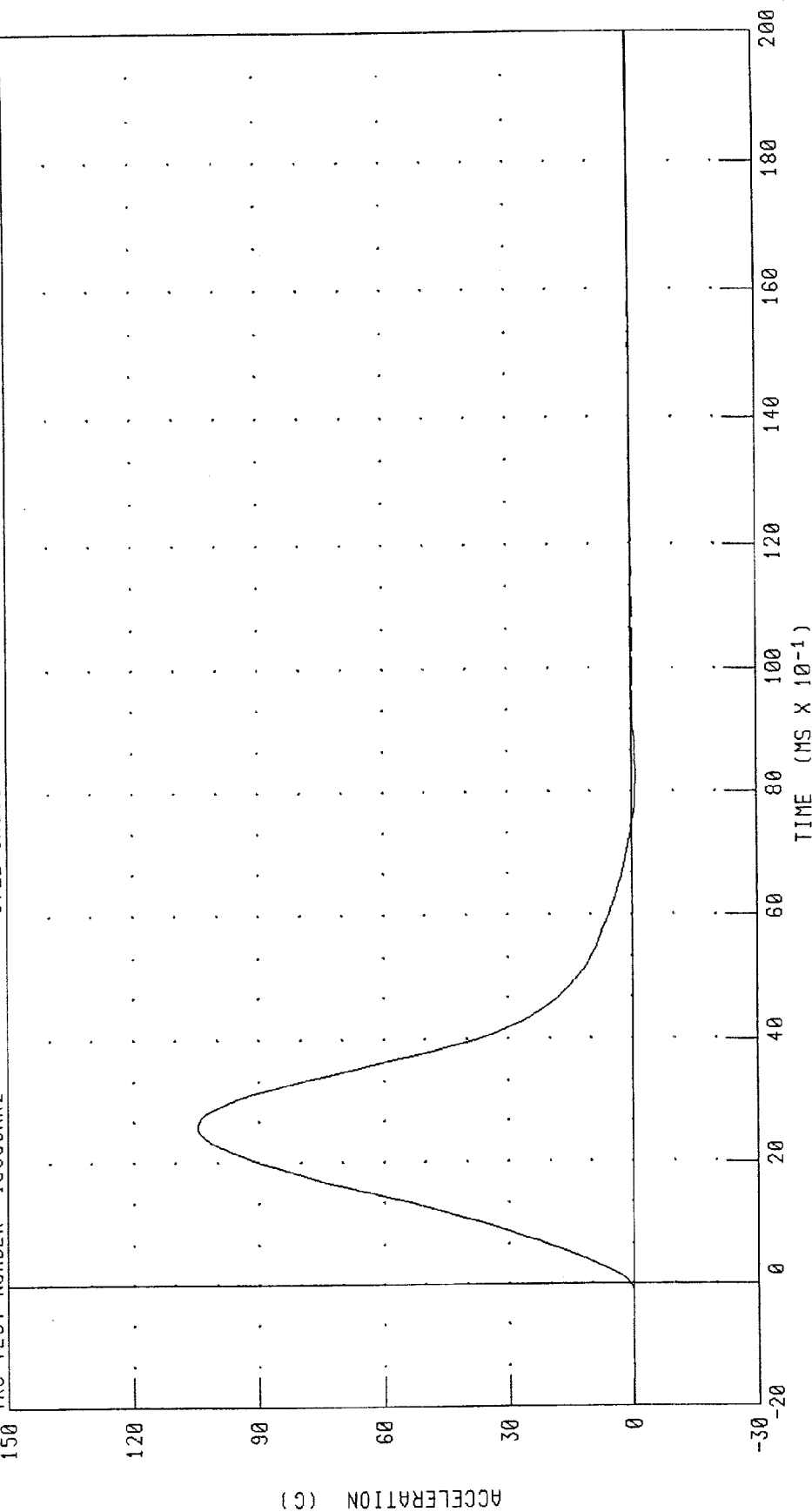
RUN NUMBER: 022099.1154;1

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

TRC TEST NUMBER: 169C5RK2

572E SN169 RIGHT KNEE CAL 5

RUN NUMBER: 022099.1155;1



CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 104.58 G @ 2.56 MS; -1.13 G @ 8.32 MS

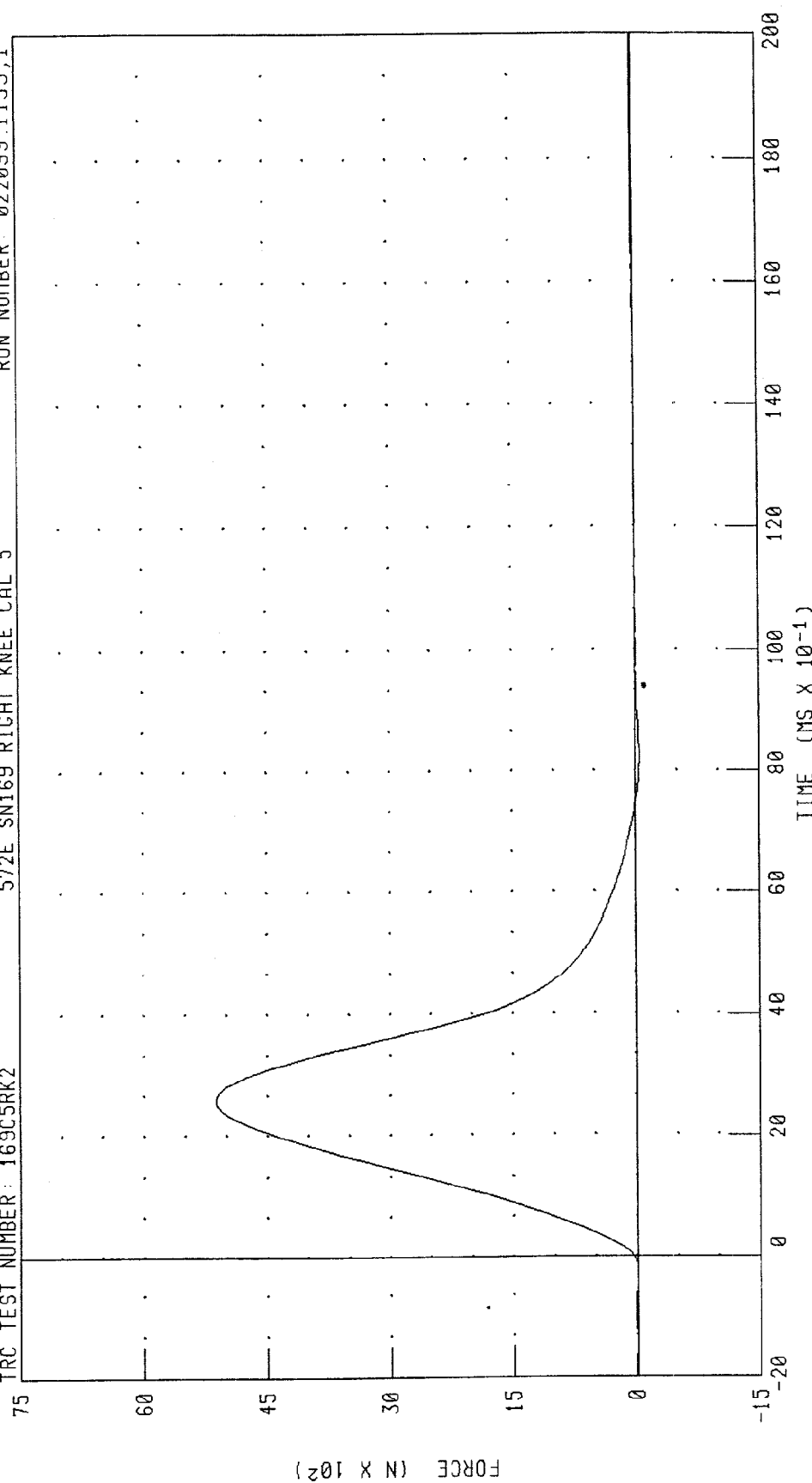
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 022099.1155;1

TRC TEST NUMBER: 169C5RK2

572E SN169 RIGHT KNEE CAL 5



PEAK DATA: 5116.65 N @ 2.56 MS; -55.39 N @ 8.32 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 169C5LK1

572E SN169 LEFT KNEE CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5670.1 N

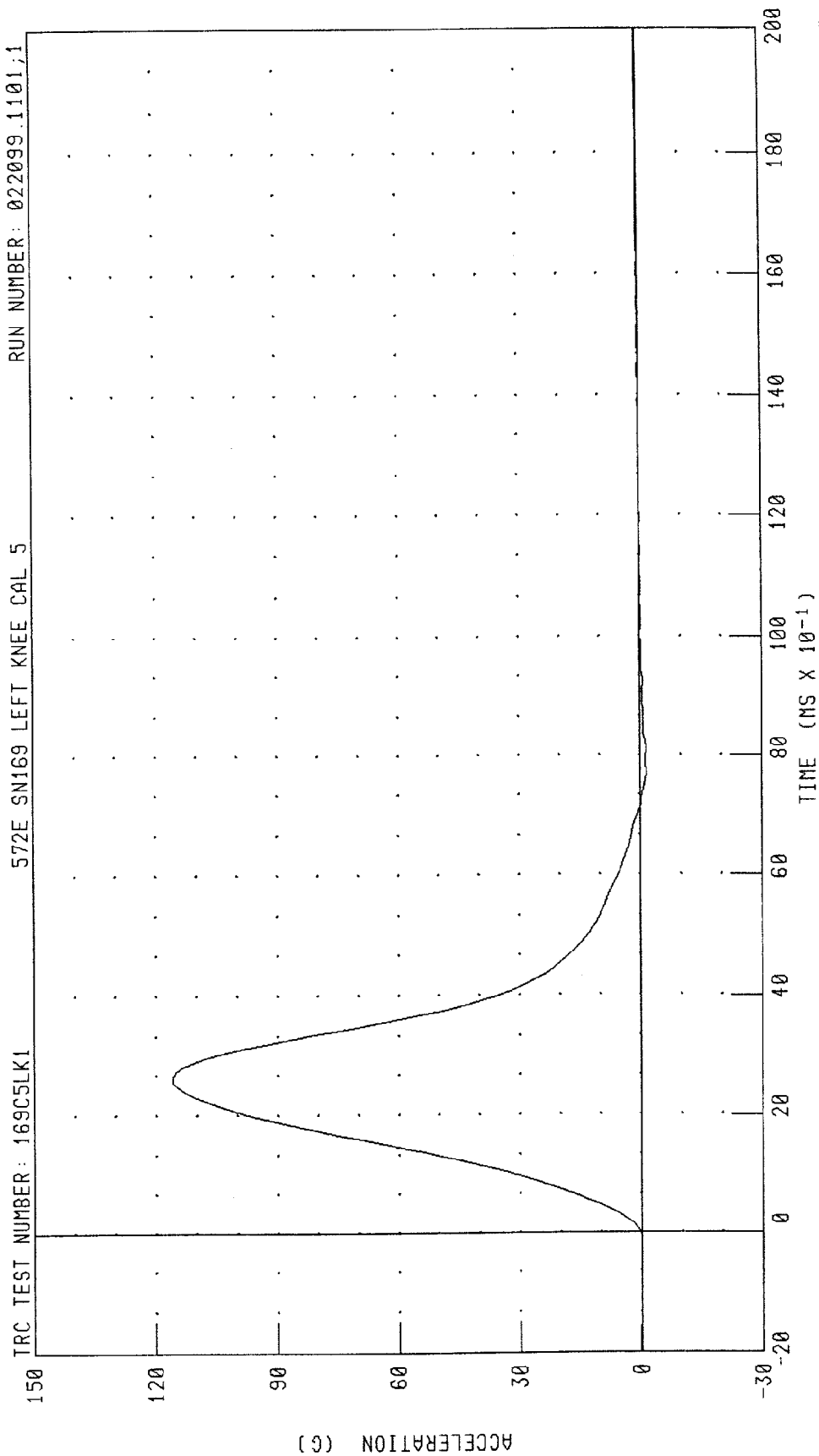
TEST MEETS SPECIFICATIONS

TECHNICIAN

By Calt

RUN NUMBER: 022099.1100;1

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



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 115.89 G @ 2.64 MS; -1.55 G @ 7.68 MS

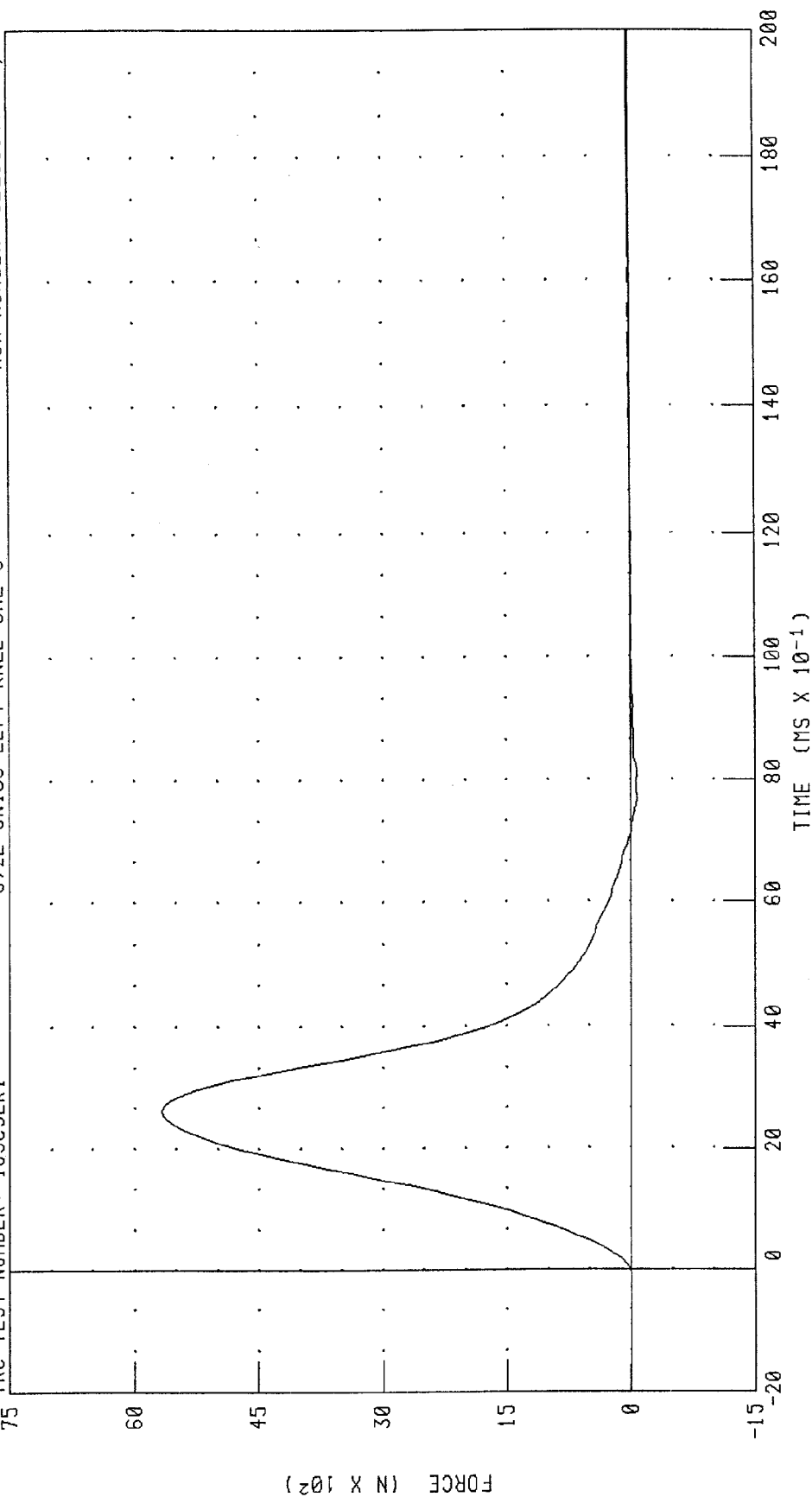
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 169C5LK1

572E SN169 LEFT KNEE CAL 5

RUN NUMBER: 022099.1101.1



PEAK DATA: 5670.14 N @ 2.64 MS, -76.02 N @ 7.68 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Post-Test Dummy Certification

Driver Dummy S/N 168

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

03-MAR-99

TRC INC.

TEST NO: 169C6HD1

572E SN169 HEAD DROP CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.14 G
PEAK LATERAL ACCELERATION	15 G MAX	1.66 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN By Cult

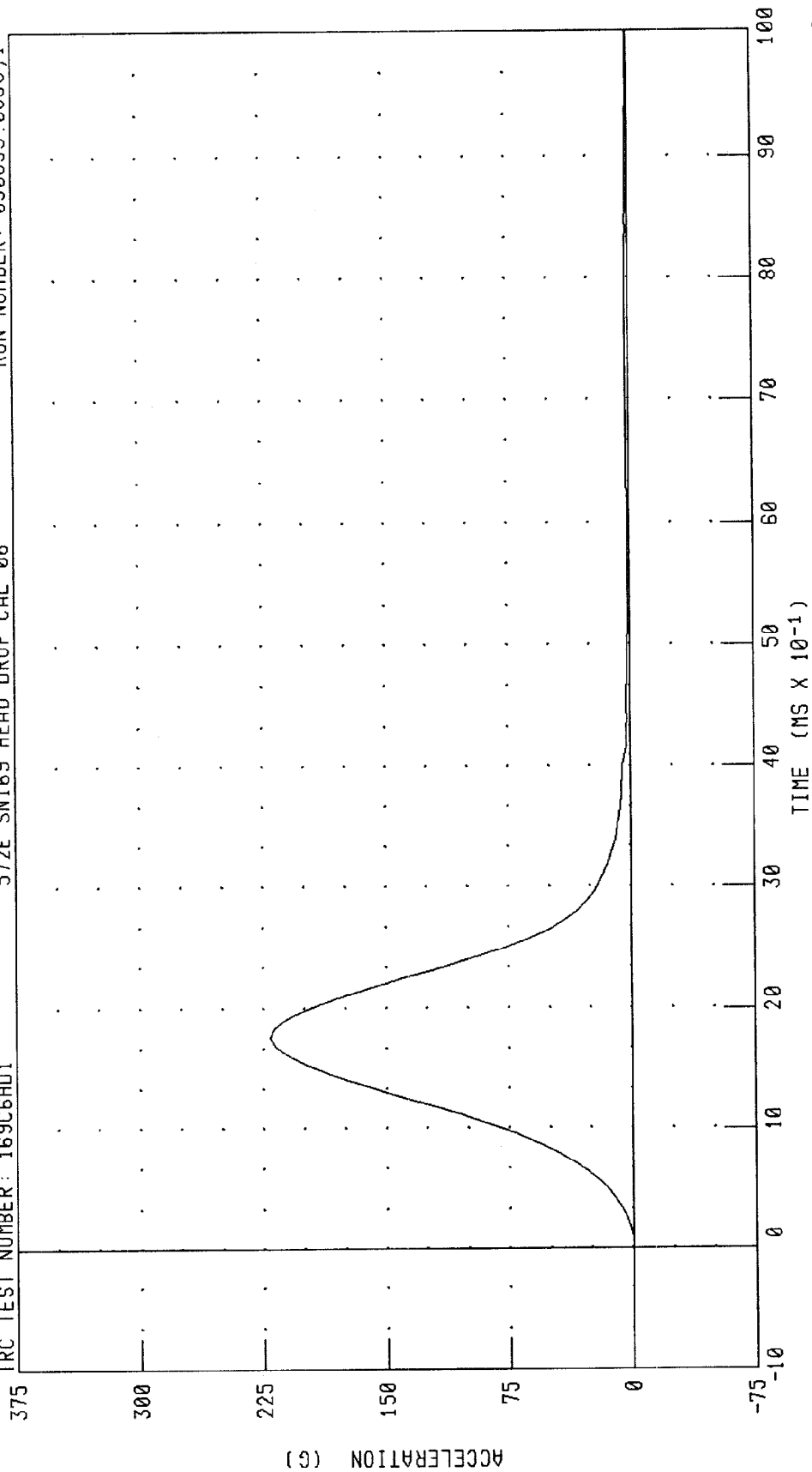
RUN NUMBER: 030399.1014;1

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

TRC TEST NUMBER: 169C6H01

572E SN169 HEAD DROP CAL 06

RUN NUMBER: 030699.0836;1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

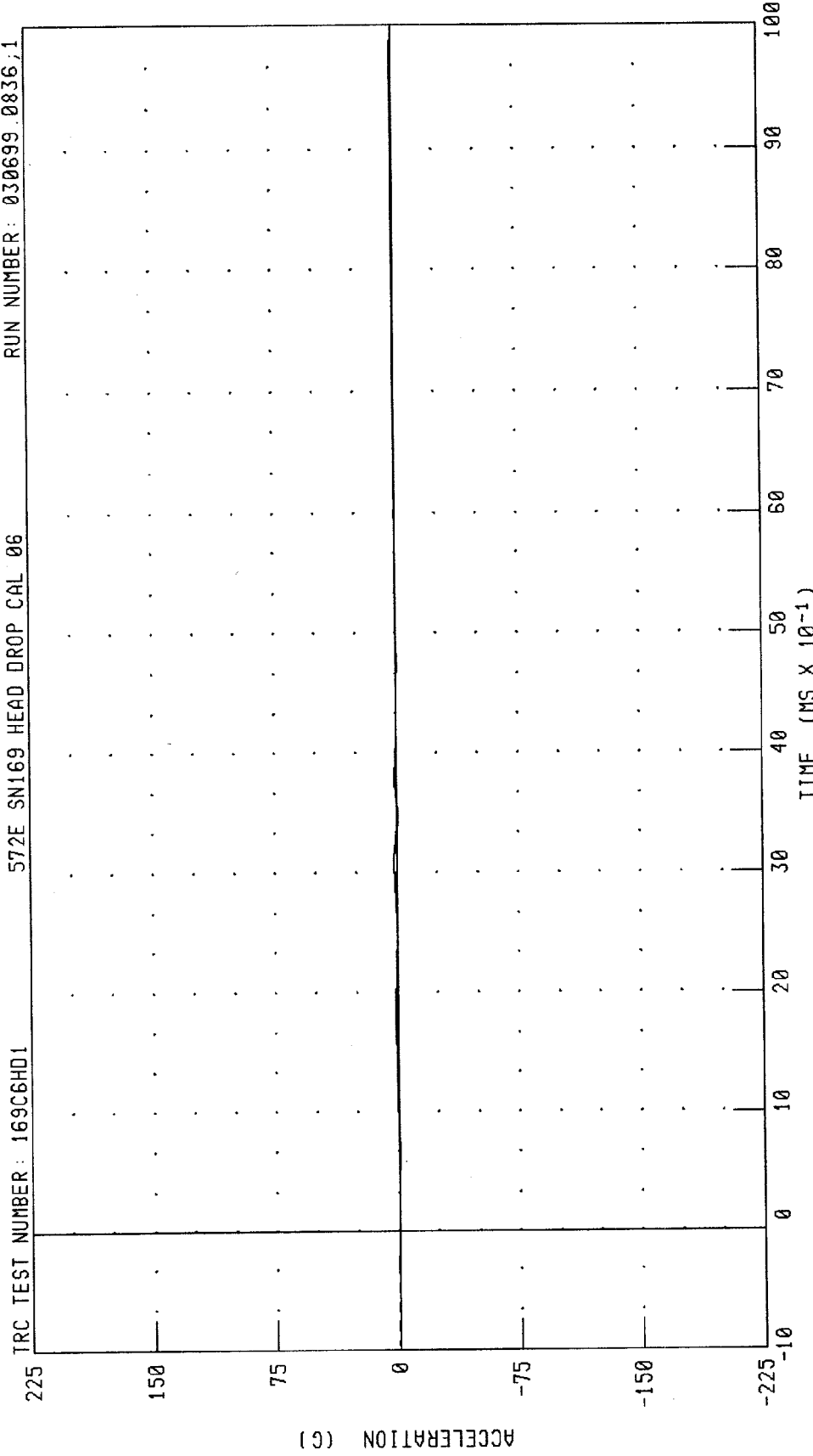
PEAK DATA: 220.53 G @ 1.76 MS, -0.10 G @ -0.96 MS

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

TRC TEST NUMBER: 169C6HD1

572E SN169 HEAD DROP CAL 06

RUN NUMBER: 030699 0836;1



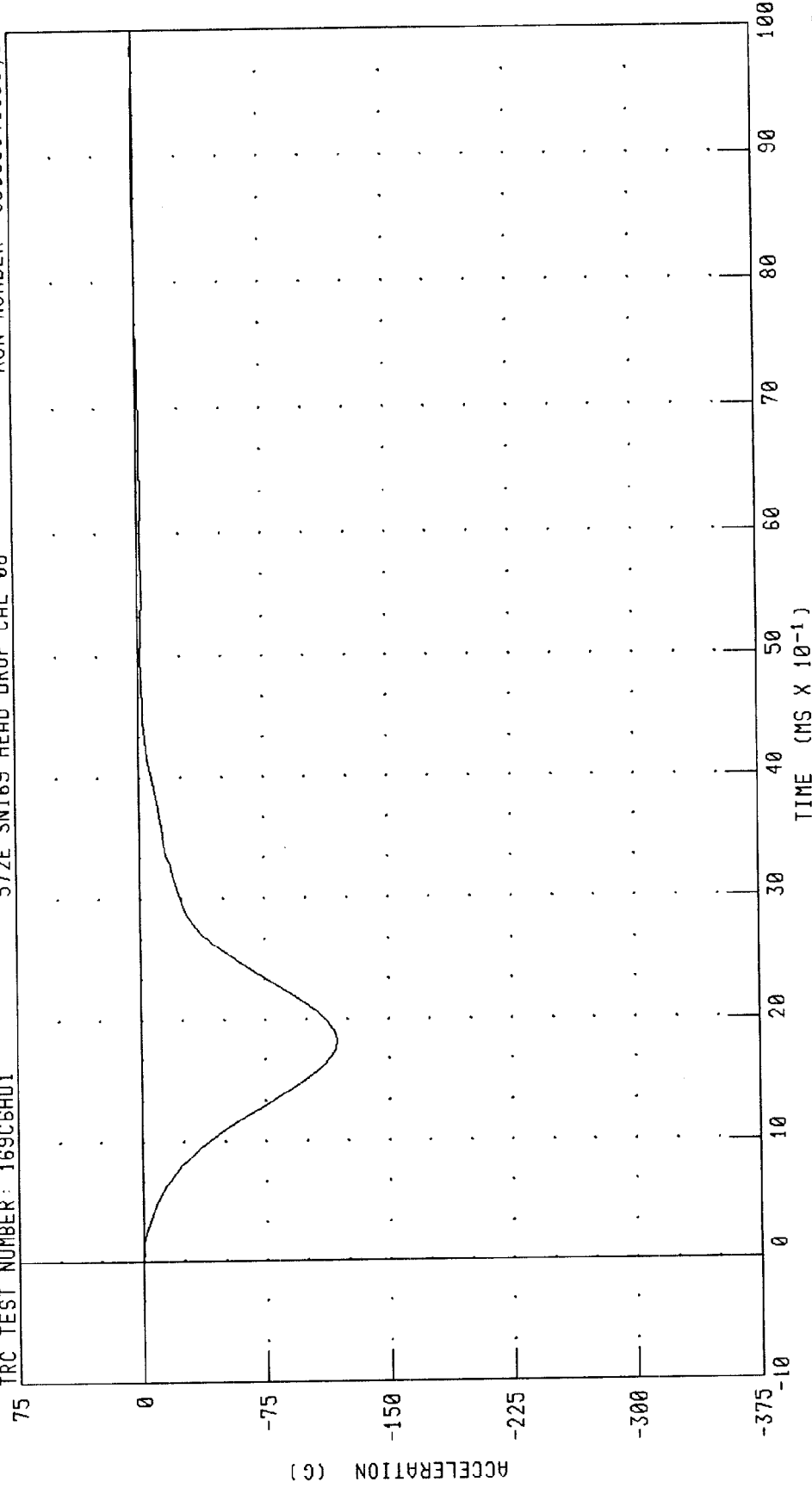
PEAK DATA: 1.67 G @ 3.04 MS; -0.88 G @ 3.44 MS

CHANNEL: HEDYC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
572E SN169 HEAD DROP CAL 06

RUN NUMBER: 030699.0836;1

TRC TEST NUMBER: 169CSHD1



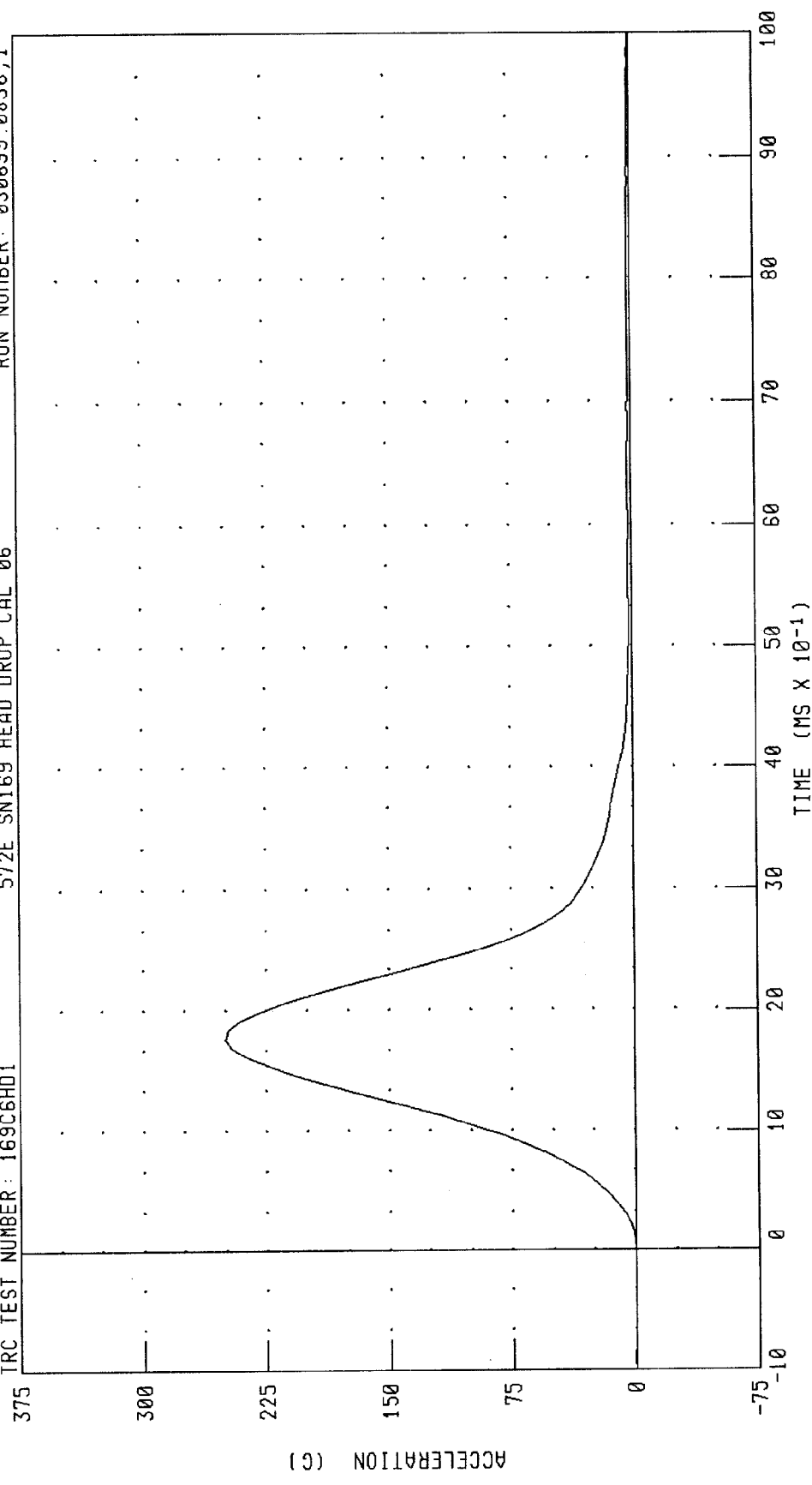
PEAK DATA: 0.93 G @ 8.88 MS; -118.66 G @ 1.84 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
572E SN169 HEAD DROP CAL 06

RUN NUMBER: 030699 0836;1

TRC TEST NUMBER: 169C6HD1



PEAK DATA: 250.15 G @ 1.76 MS; 0.14 G @ -0.72 MS

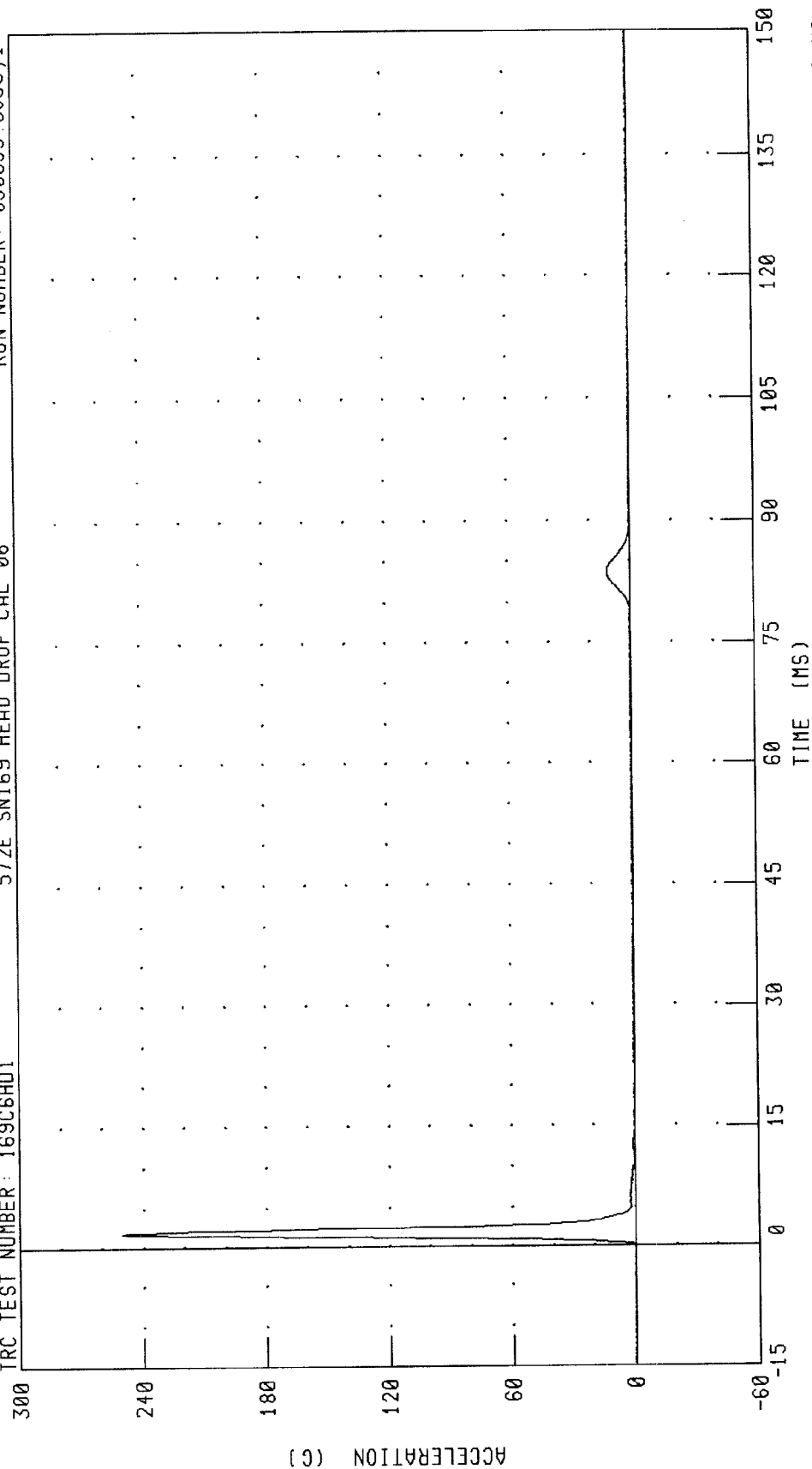
CHANNEL: HEDRC FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 169C6HD1

572E SN169 HEAD DROP CAL 06

RUN NUMBER: 030699.0836;1



PEAK DATA: 250.15 G @ 1.76 MS; 0.14 G @ -13.92 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

03-MAR-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C6NF1 572E SN169 NECK FLEXION CAL6

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.93 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.22 G
	20 MS	17.60 - 22.60 G	20.62 G
	30 MS	12.50 - 18.50 G	15.18 G
MAX PENDULUM G		29 G MAX	24.78 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.14 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	40.00 MS
D PLANE	MAX	64 - 78 DEG.	71.43 DEG.
ROTATION	TIME	57 - 64 MS	61.60 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	92.55 NM
	TIME	47 - 58 MS	53.44 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	118.00 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	105.60 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 030399.1052;1

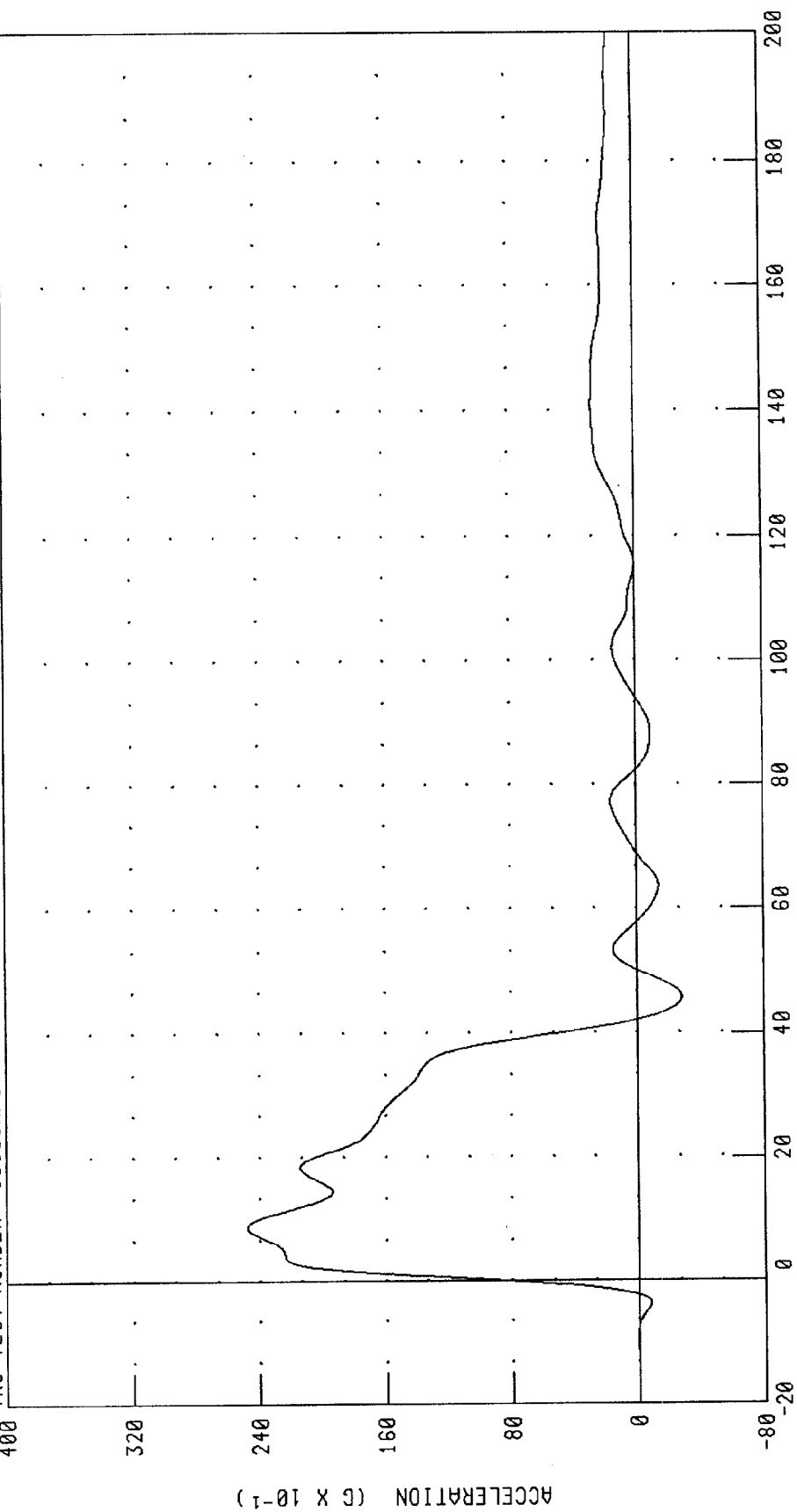
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 169CSNF1

572E SN169 NECK FLEXION CAL6

RUN NUMBER: 030399.1052,1



PEAK DATA: 24.79 G @ 8.80 MS; -2.83 G @ 45.84 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

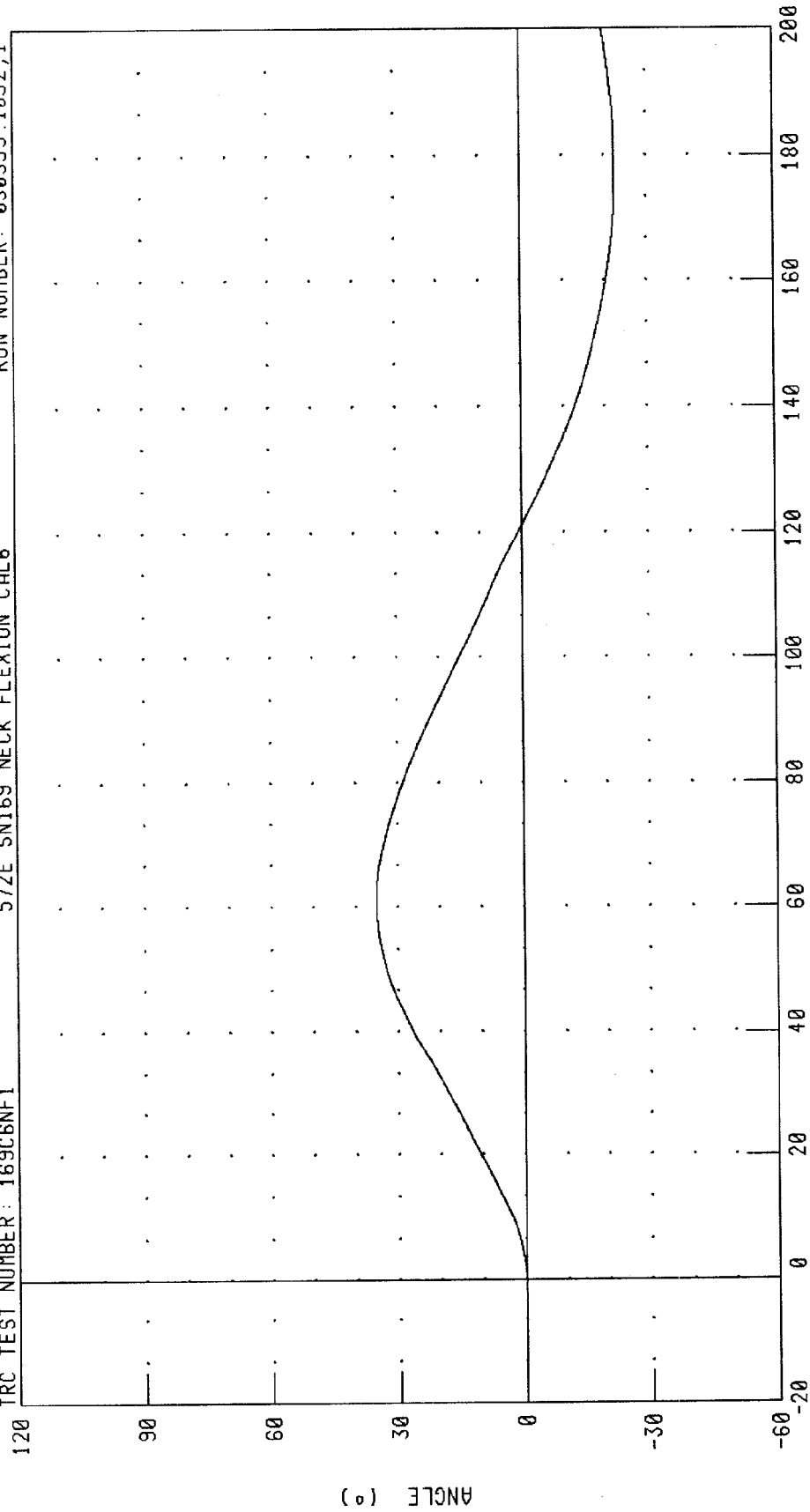
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN169 NECK FLEXION CAL6

RUN NUMBER: 030399.1052,1

TRC TEST NUMBER: 169C6NF1



PEAK DATA: 35.02 ° @ 61.20 MS; -22.55 ° @ 178.16 MS

FILTER: CH. CLASS 60

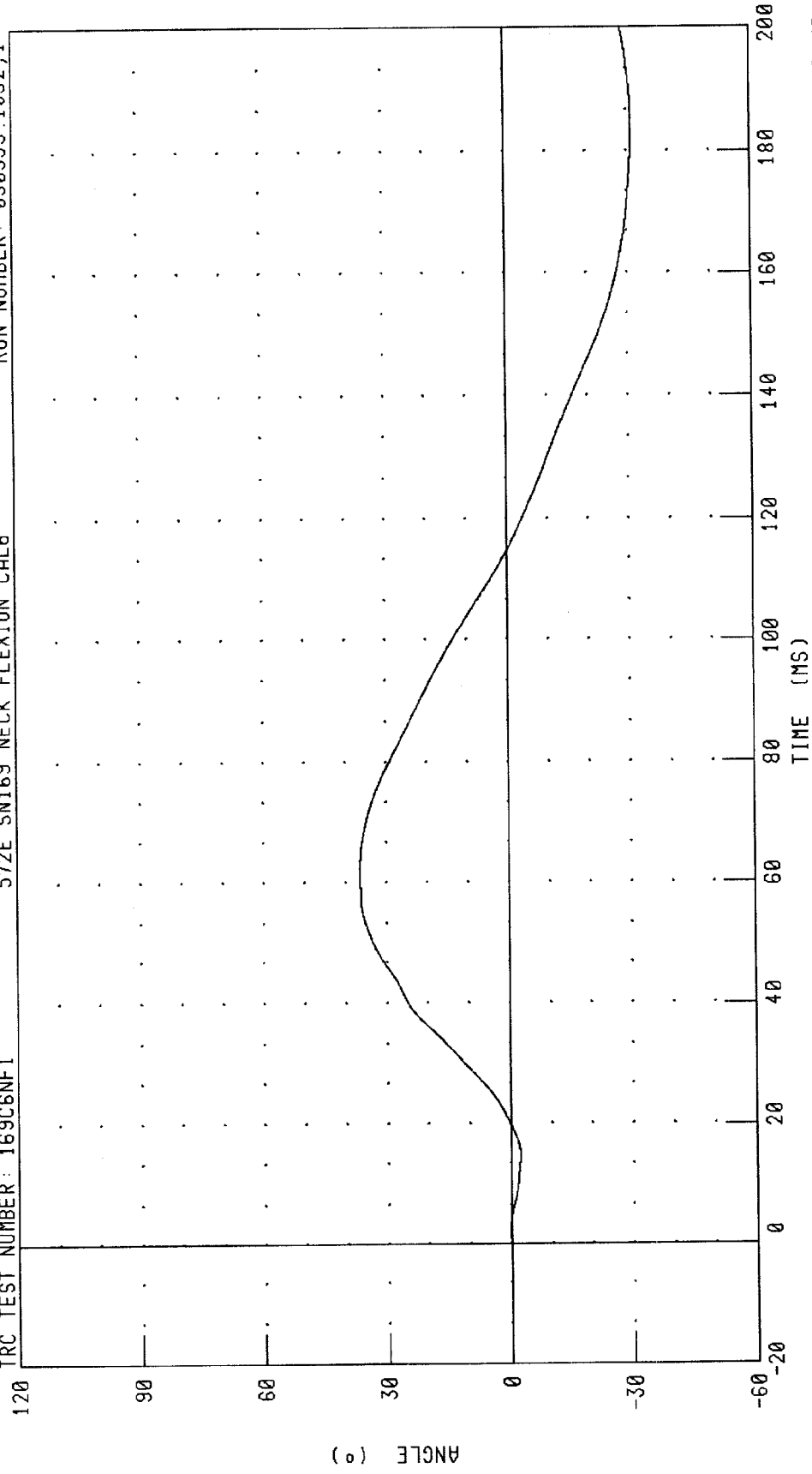
CHANNEL: BETA

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

TRC TEST NUMBER: 169C6NF1

572E SN169 NECK FLEXION CAL6

RUN NUMBER: 030399.1052,1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 36.42 ° @ 62.16 MS, -31.14 ° @ 183.28 MS

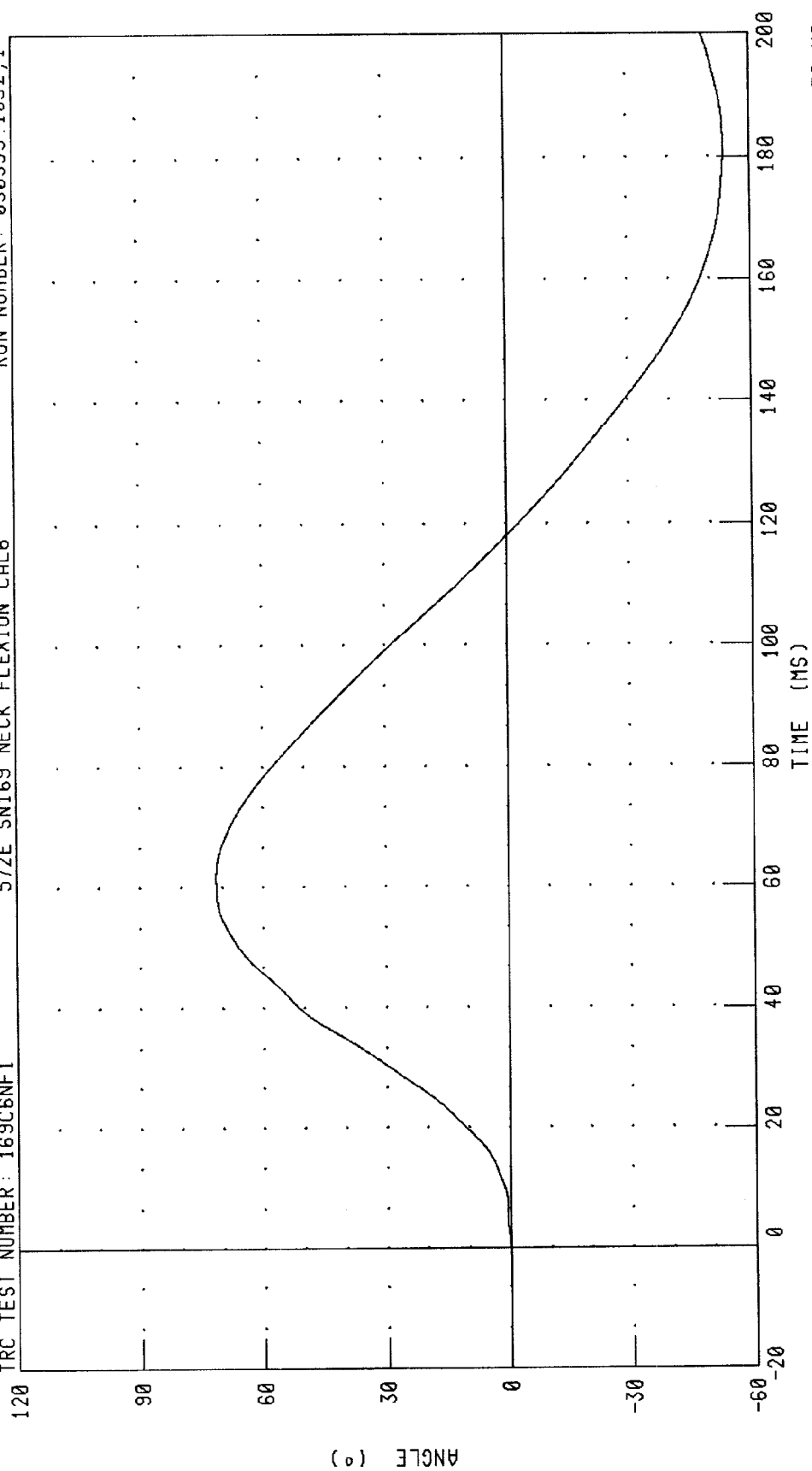
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 169CSNF1

572E SN169 NECK FLEXION CAL6

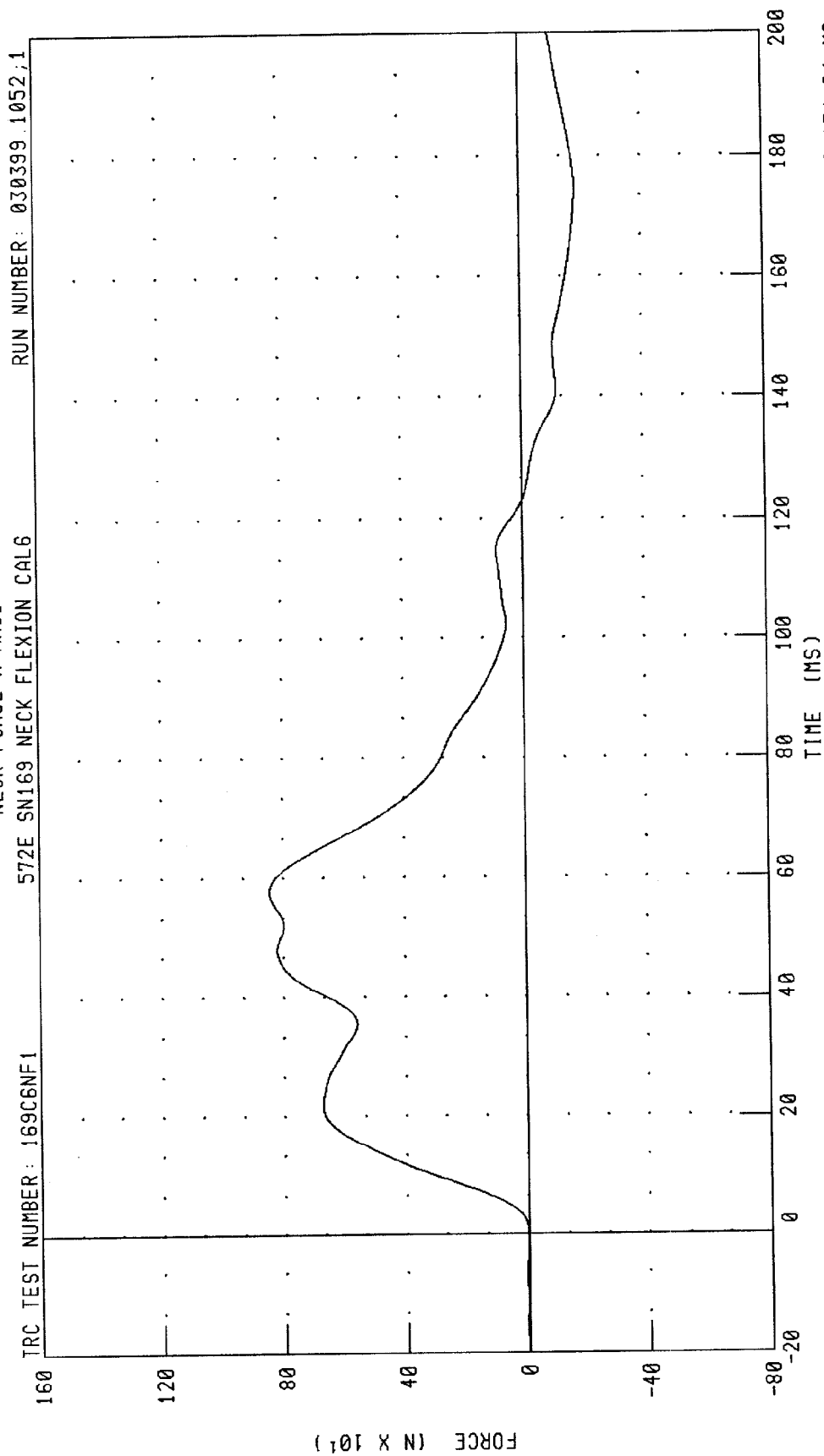
RUN NUMBER: 030399.1052,1



PEAK DATA: 71.44 ° @ 61.60 MS, -53.62 ° @ 181.52 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

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



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 845.37 N @ 57.76 MS; -183.26 N @ 174.64 MS

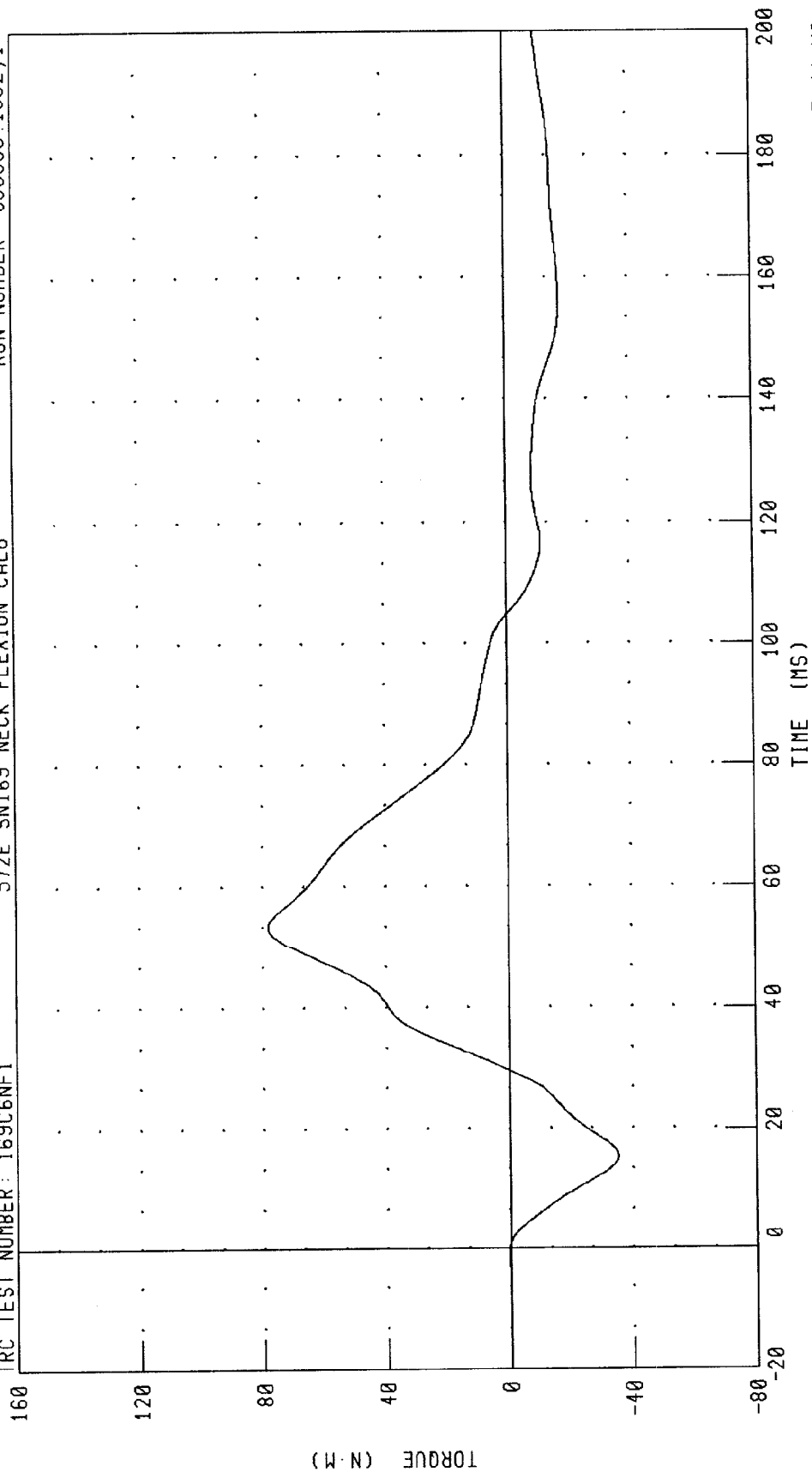
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 030399.1052;1

TRC TEST NUMBER: 169C6NF1

572E SN169 NECK FLEXION CAL6



PEAK DATA: 78.25 N-M @ 53.36 MS; -35.25 N-M @ 15.44 MS

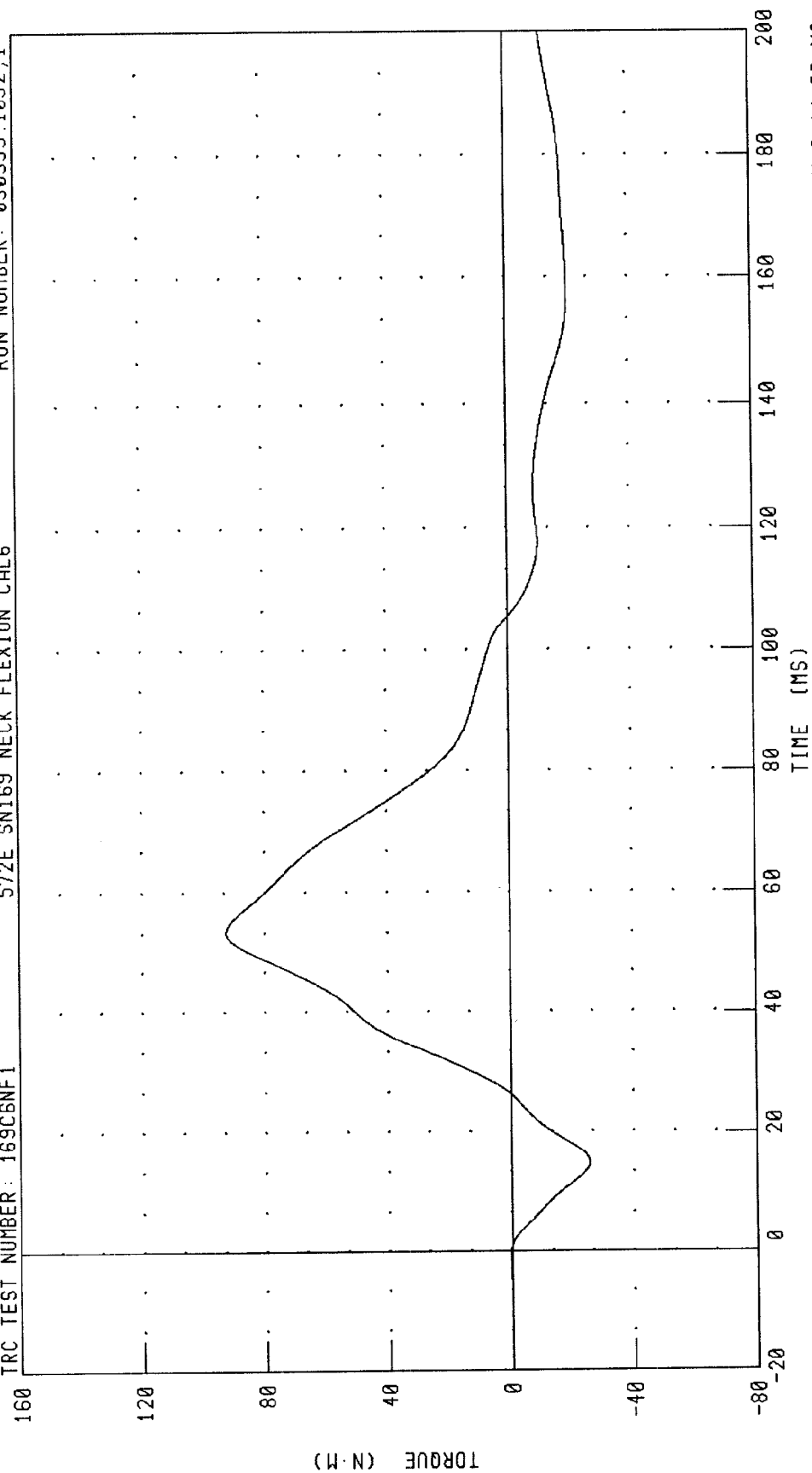
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

RUN NUMBER: 030399.1052;1

572E SN169 NECK FLEXION CAL6

TRC TEST NUMBER: 169CBNF1



PEAK DATA: 92.55 N·M @ 53.44 MS; -25.64 N·M @ 14.88 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

03-MAR-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C6NE1 572E SN 169 NECK EXT CAL6

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.52 G
	20 MS	14.00 - 19.00 G	17.40 G
	30 MS	11.00 - 16.00 G	14.19 G
MAX PENDULUM G		22 G MAX	18.65 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.13 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.04 MS
D PLANE	MAX	81 - 106 DEG.	98.30 DEG.
ROTATION	TIME	72 - 82 MS	78.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-67.31 NM
	TIME	65 - 79 MS	71.84 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	158.08 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	147.52 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 030399.1223;1

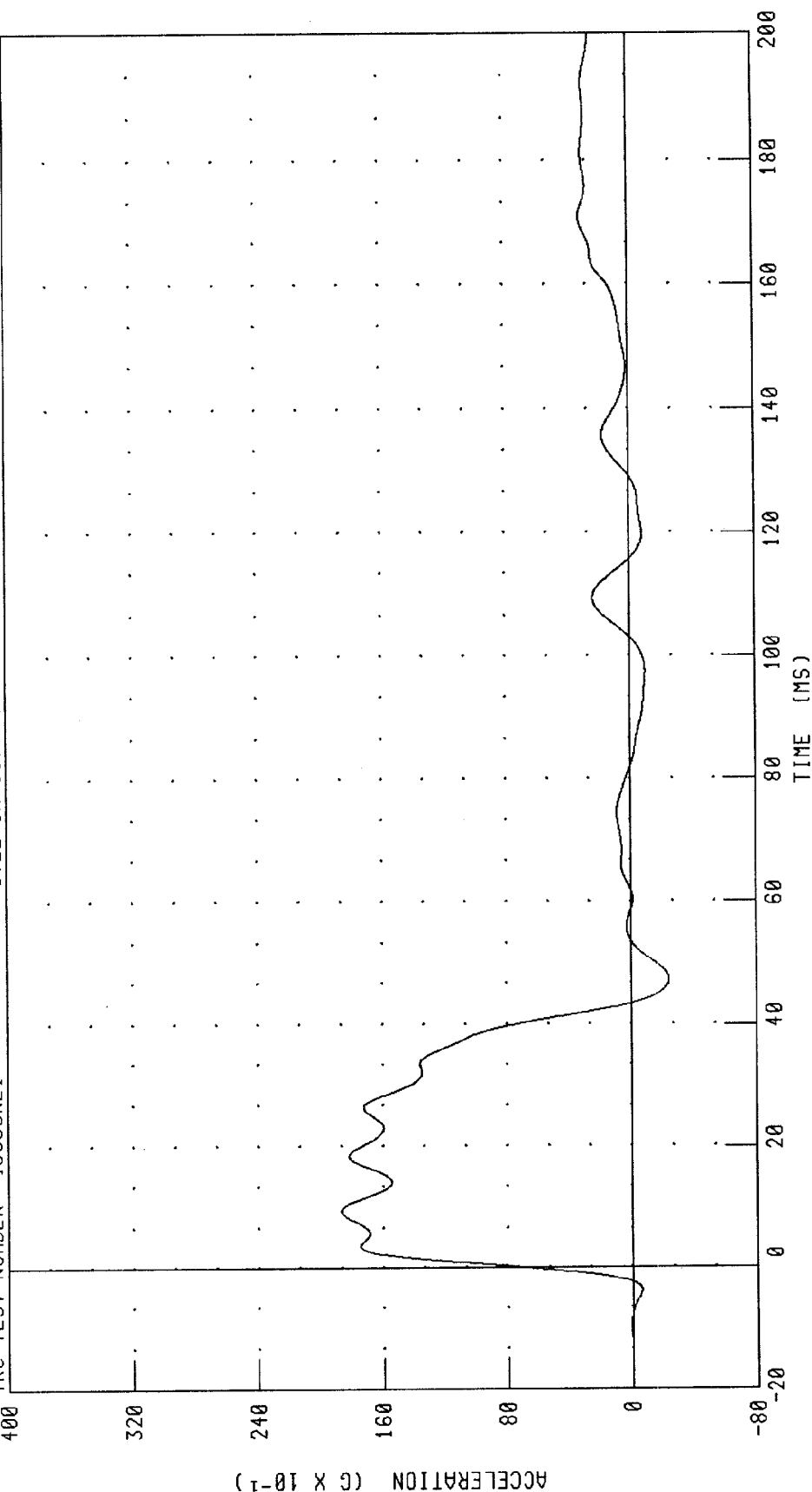
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 169C6NE1

572E SN 169 NECK EXT CAL6

RUN NUMBER: 030399.1223;1



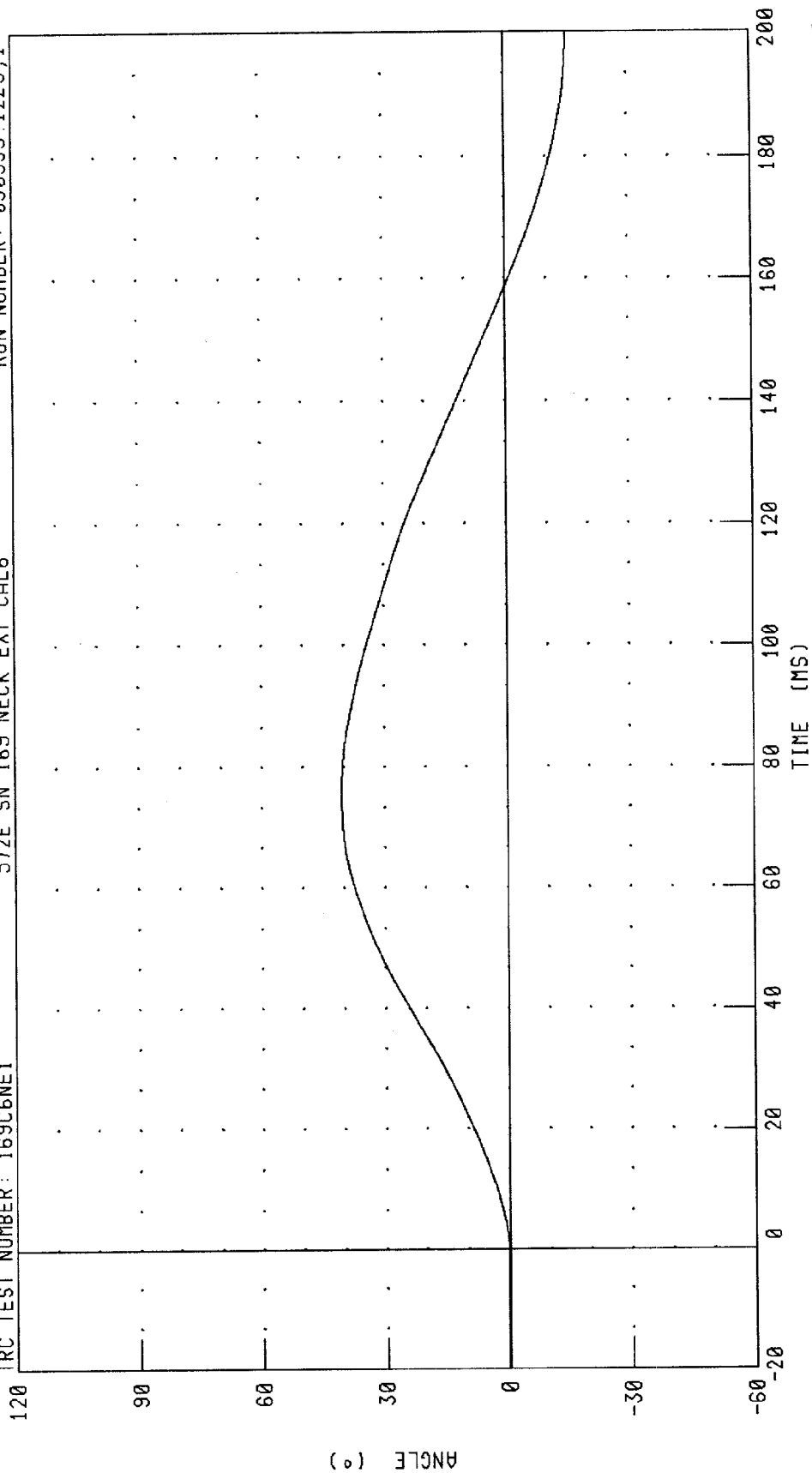
PEAK DATA: 18.66 G @ 9.44 MS; -2.41 G @ 47.28 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK
572E SN 169 NECK EXT CAL6

TRC TEST NUMBER: 169C6NE1

RUN NUMBER: 030399.1223;1



PEAK DATA: 40.50 ° @ 75.68 MS, -15.33 ° @ 200.00 MS

CHANNEL: BETA

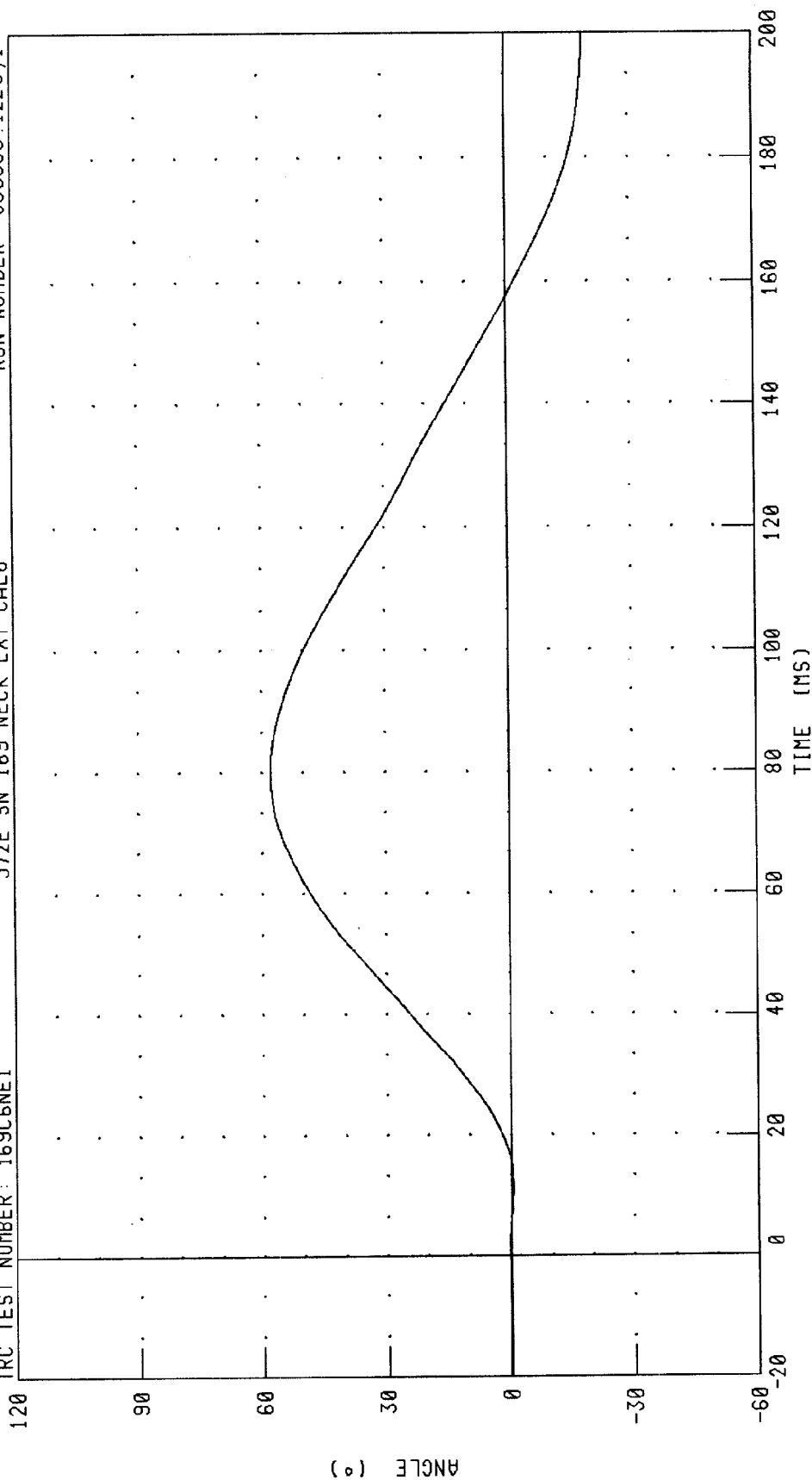
FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169C6NE1

572E SN 169 NECK EXT CAL6

RUN NUMBER: 030399.1223,1



PEAK DATA: 57.92 ° @ 80.00 MS, -18.85 ° @ 200.00 MS

CHANNEL: THETA FILTER: CH. CLASS 60

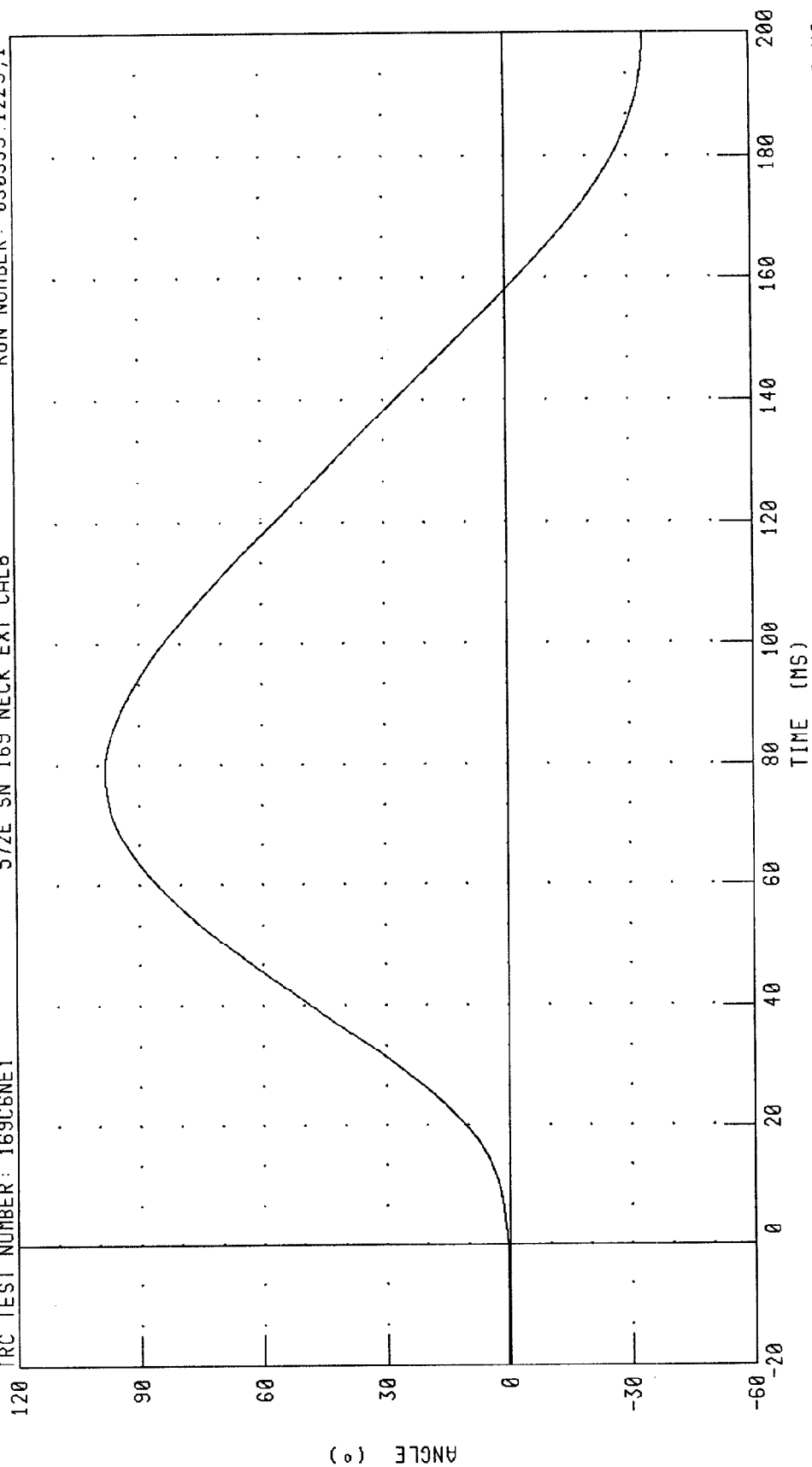
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

RUN NUMBER: 030399.1223;1

572E SN 169 NECK EXT CAL6

TRC TEST NUMBER: 169C6NE1



PEAK DATA: 98.31 ° @ 78.88 MS; -34.17 ° @ 200.00 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

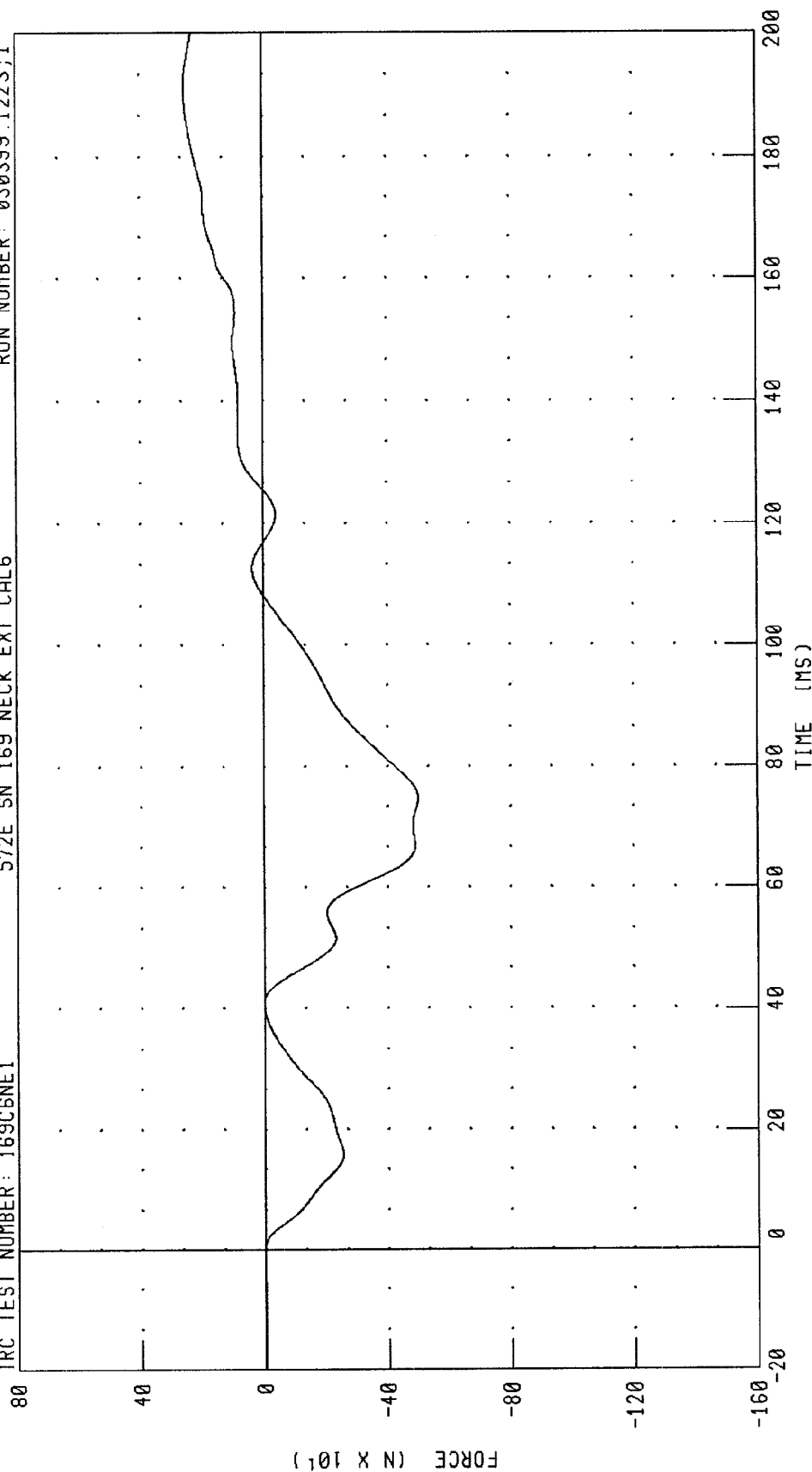
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 169C6NE1

572E SN 169 NECK EXT CAL6

RUN NUMBER: 030399.1223,1

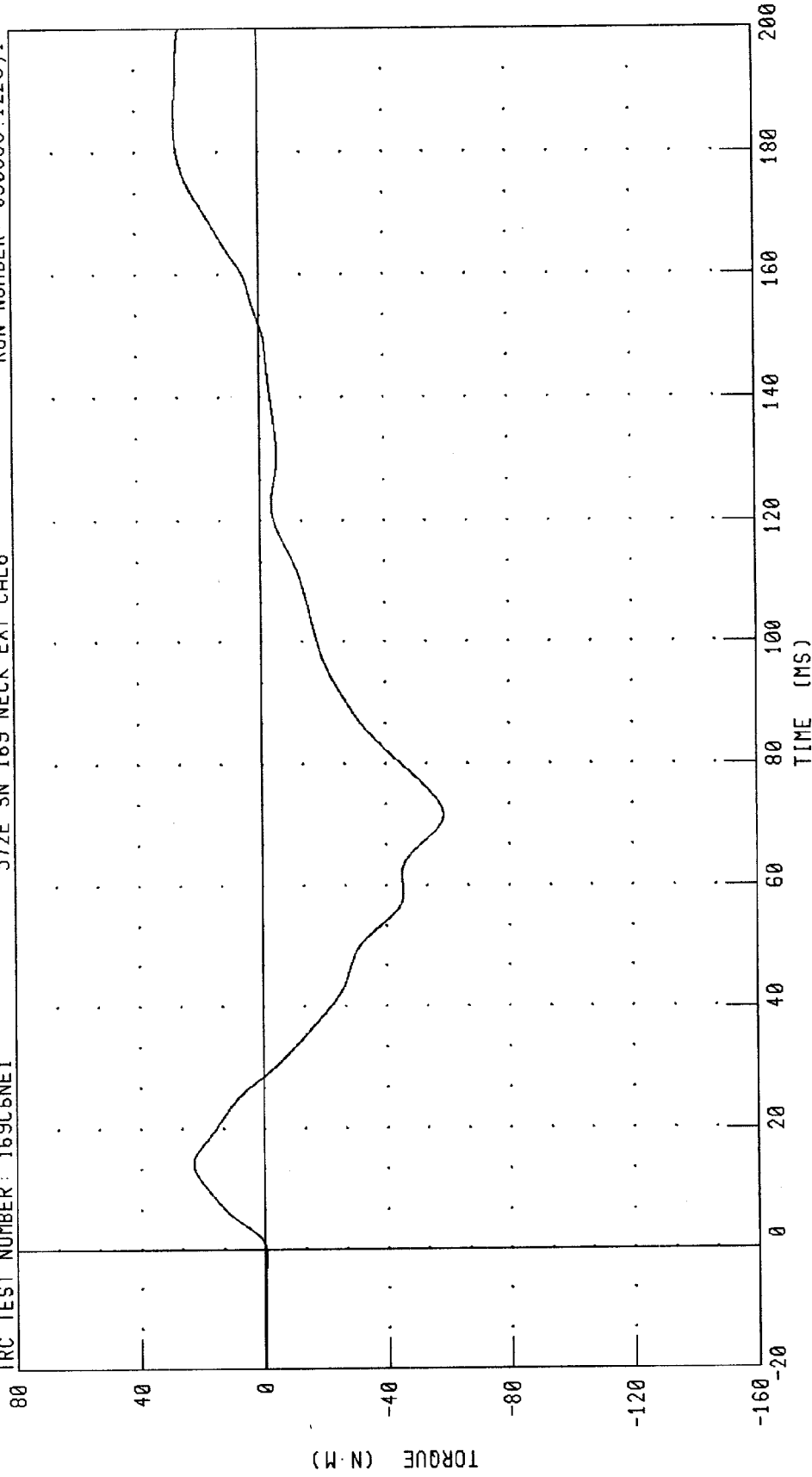


PEAK DATA: 256.38 N @ 191.44 MS; -499.56 N @ 74.80 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169C6NE1 572E SN 169 NECK EXT CAL6 RUN NUMBER: 030399.1223;1



PEAK DATA: 27.36 N·M @ 185.04 MS, -58.69 N·M @ 71.68 MS

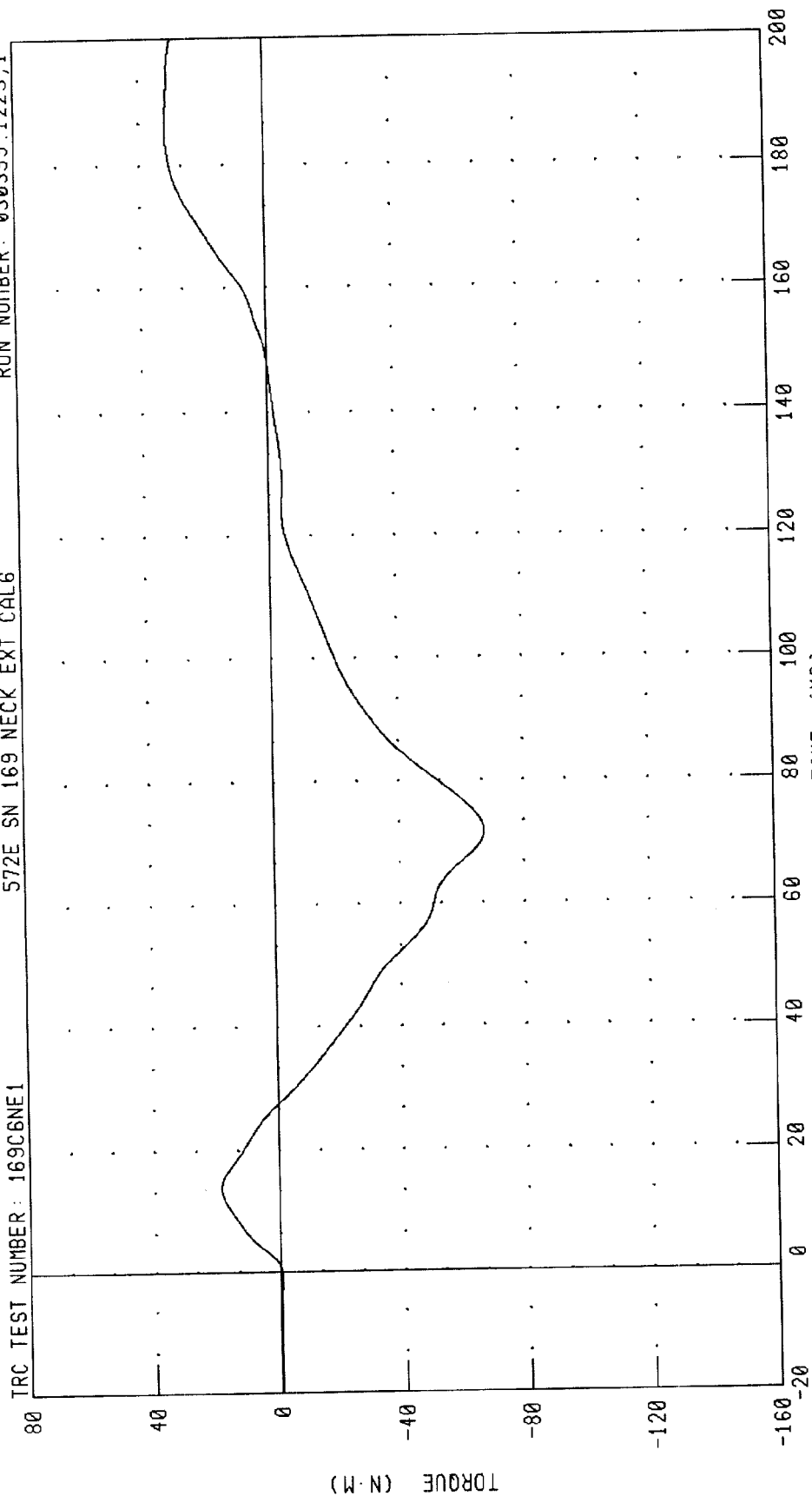
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169C6NE1

572E SN 169 NECK EXT CAL6

RUN NUMBER: 030399.1223;1



PEAK DATA: 31.73 N-M @ 186.08 MS; -67.31 N-M @ 71.84 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

04-MAR-99

TRC INC.

TEST NO: 169C6TH1

572E SN169 H.S.THORAX CAL06

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.2 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5489. N
INTERNAL HYSTERESIS	69% - 85%	73.7%

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

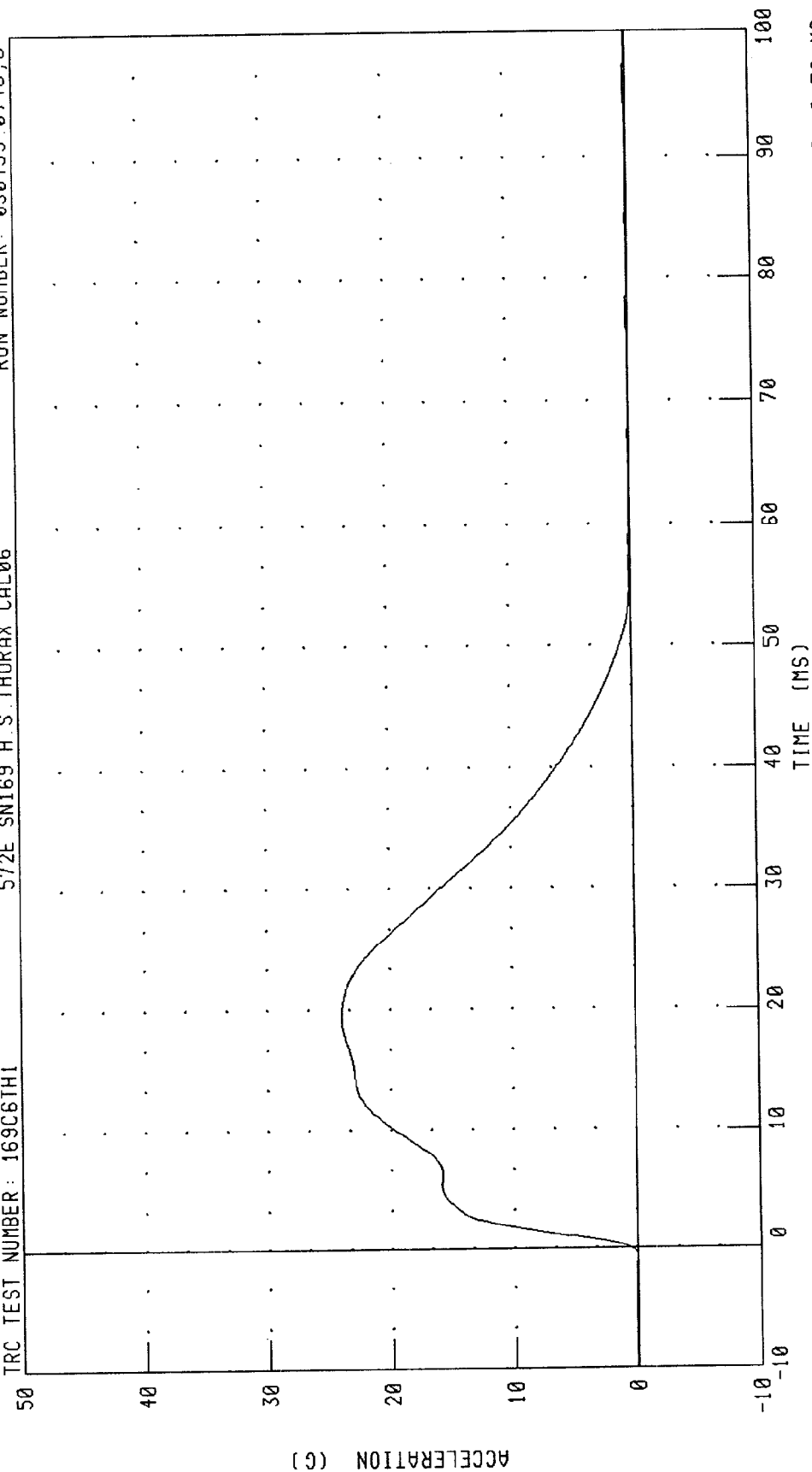
RUN NUMBER: 030499.0746;6

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 169C6TH1

572E SN169 H.S. THORAX CAL06

RUN NUMBER: 030499 0746;6



CHANNEL: PENXC FILTER: CH. CLASS 180 PEAK DATA: 23.96 G @ 19.44 MS; -0.05 G @ -0.72 MS

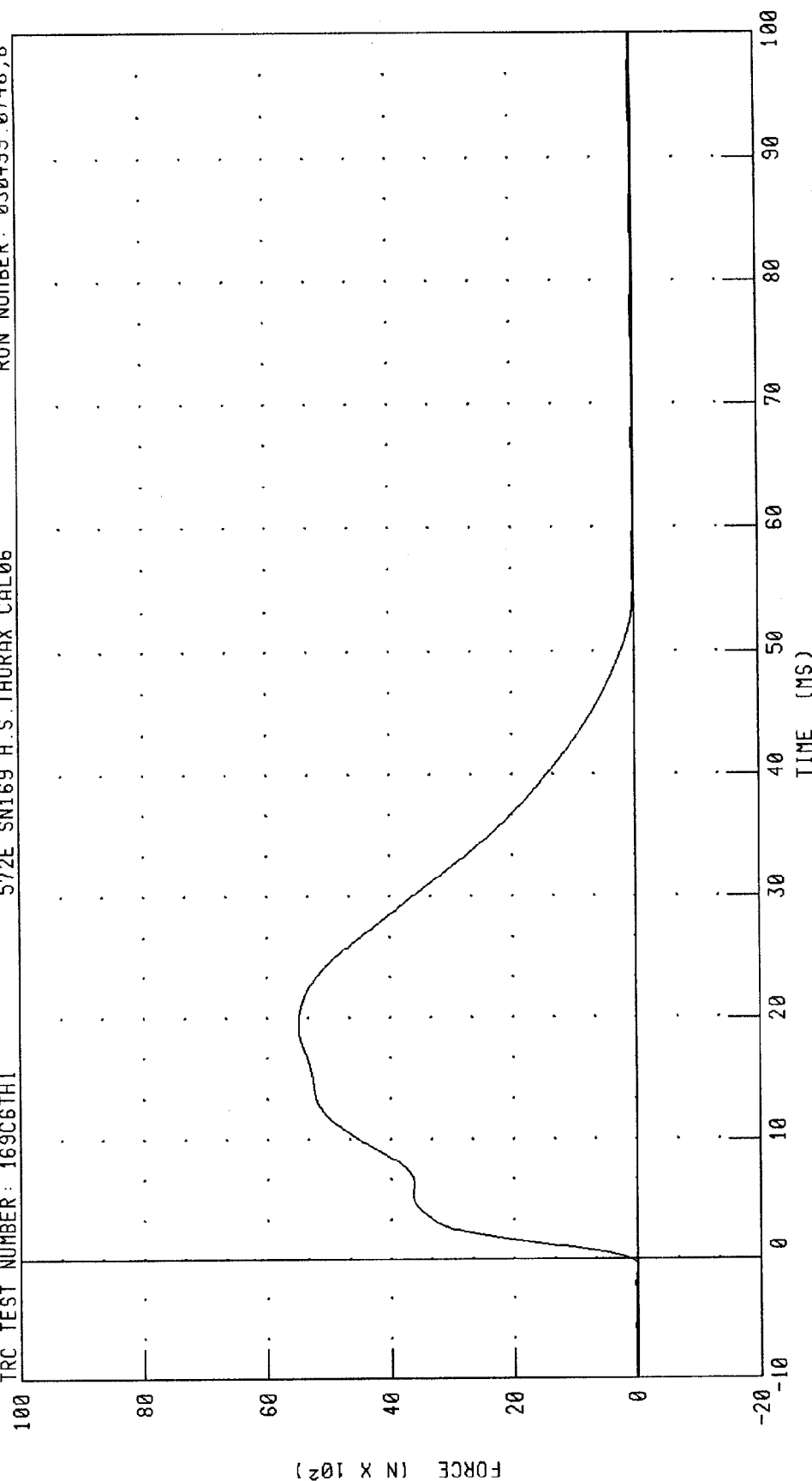
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 169C6TH1

572E SN169 H.S. THORAX CAL06

RUN NUMBER: 030499 0746;6

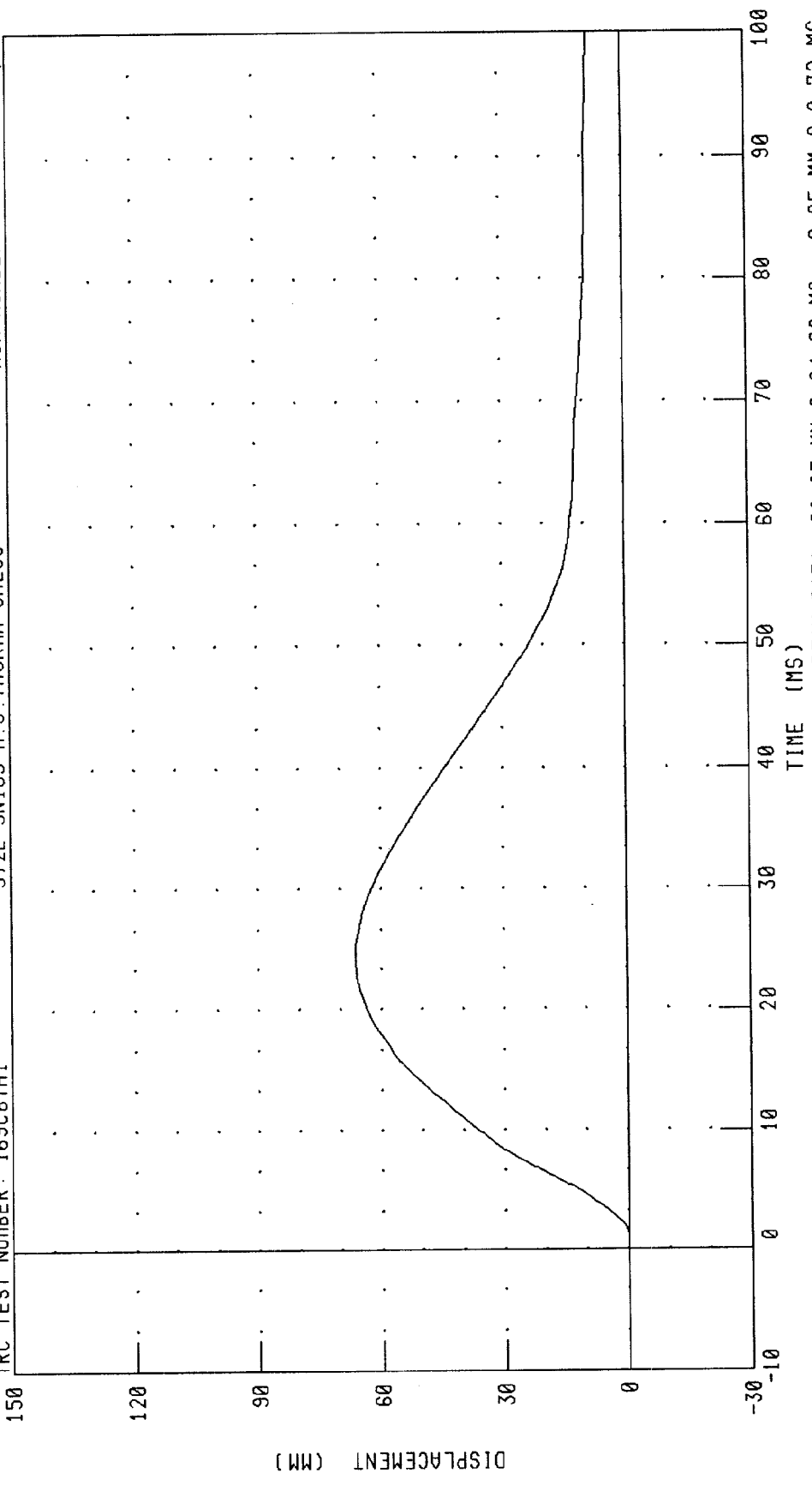


PEAK DATA: 5489.43 N @ 19.44 MS, -10.37 N @ -0.72 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 169C6TH1 572E SN169 H.S. THORAX CAL06 RUN NUMBER: 030499 0746;6



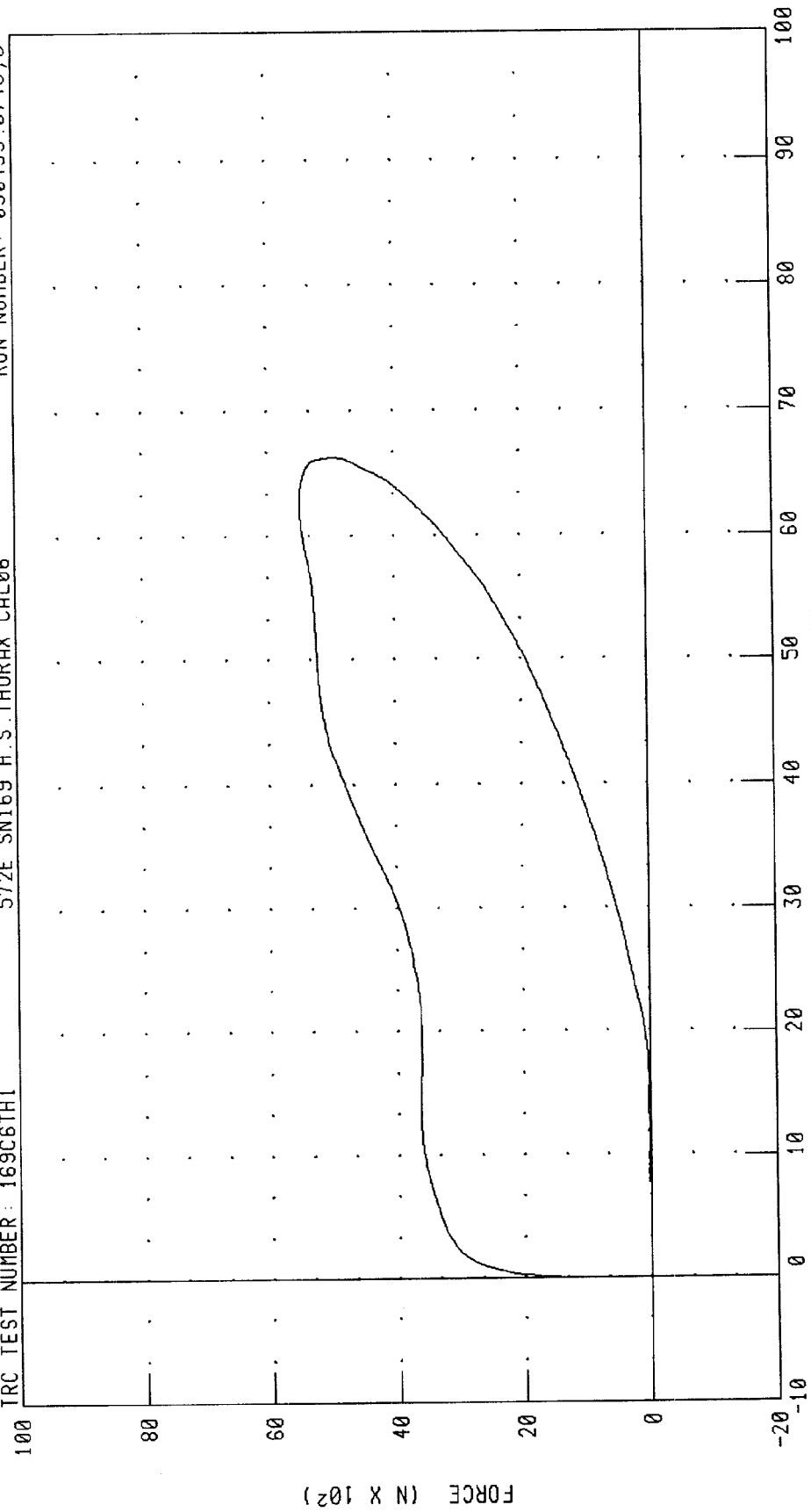
CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 66.25 MM @ 24.80 MS; -0.05 MM @ 0.72 MS

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

TRC TEST NUMBER: 169CSTH1

572E SN169 H.S. THORAX CAL06

RUN NUMBER: 030499.0746,6



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA: 66.25 MM @ 24.80 MS, -0.05 MM @ 0.72 MS
5489.43 N @ 19.44 MS, -10.37 N @ -0.72 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-MAR-99

TRC INC.

TEST NO: 169C6HR1

572E SN 169 HIPFLEX CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	66.7 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.8 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 030399.1026;1

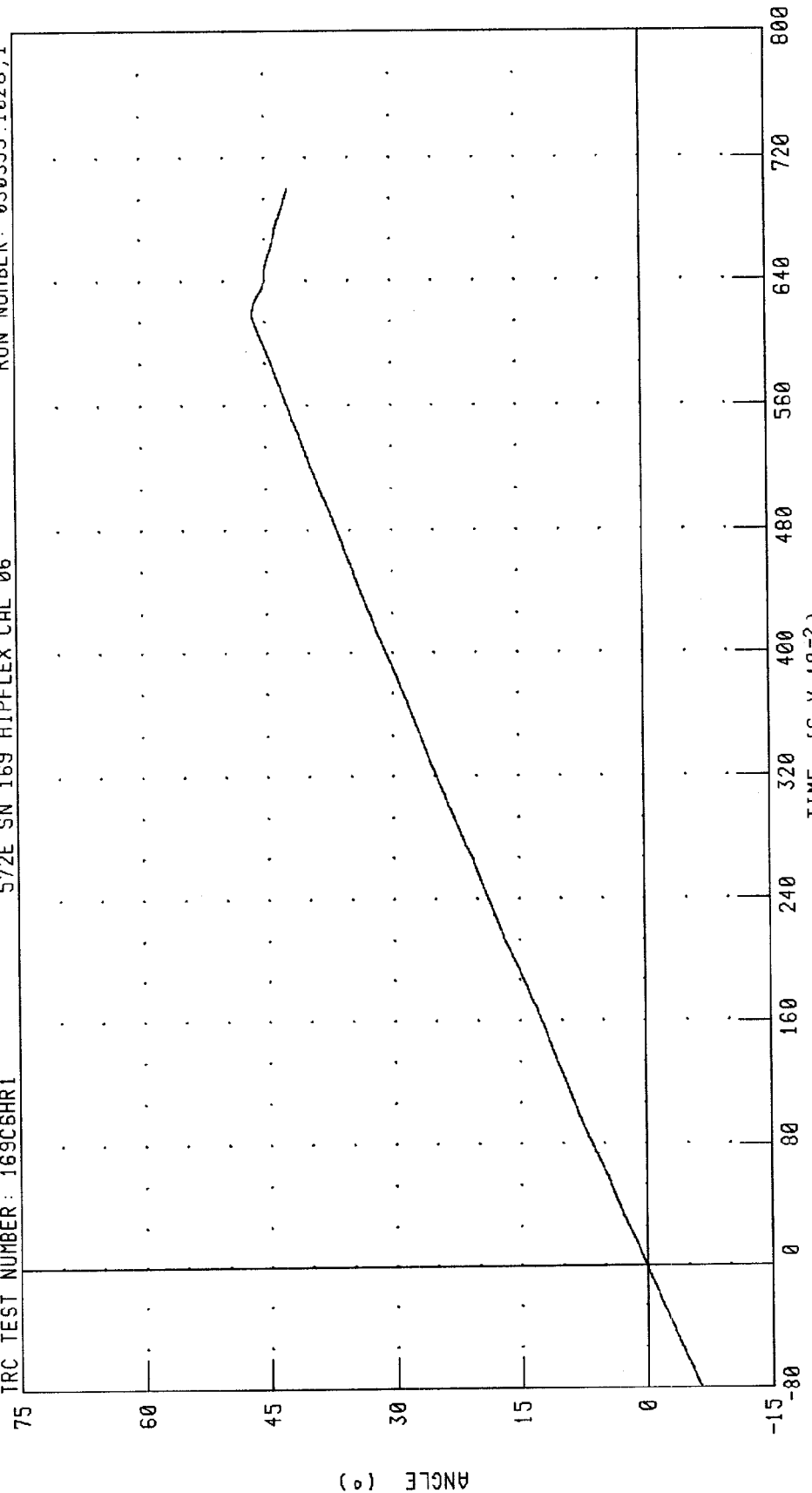
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

572E SN 169 HIPFLEX CAL 06

RUN NUMBER: 030399.1026;1

TRC TEST NUMBER: 169C6HR1



PEAK DATA: 46.58 ° @ 6.21 S; -9.40 ° @ -1.00 S

CHANNEL: RHPXD FILTER: CH. CLASS 60

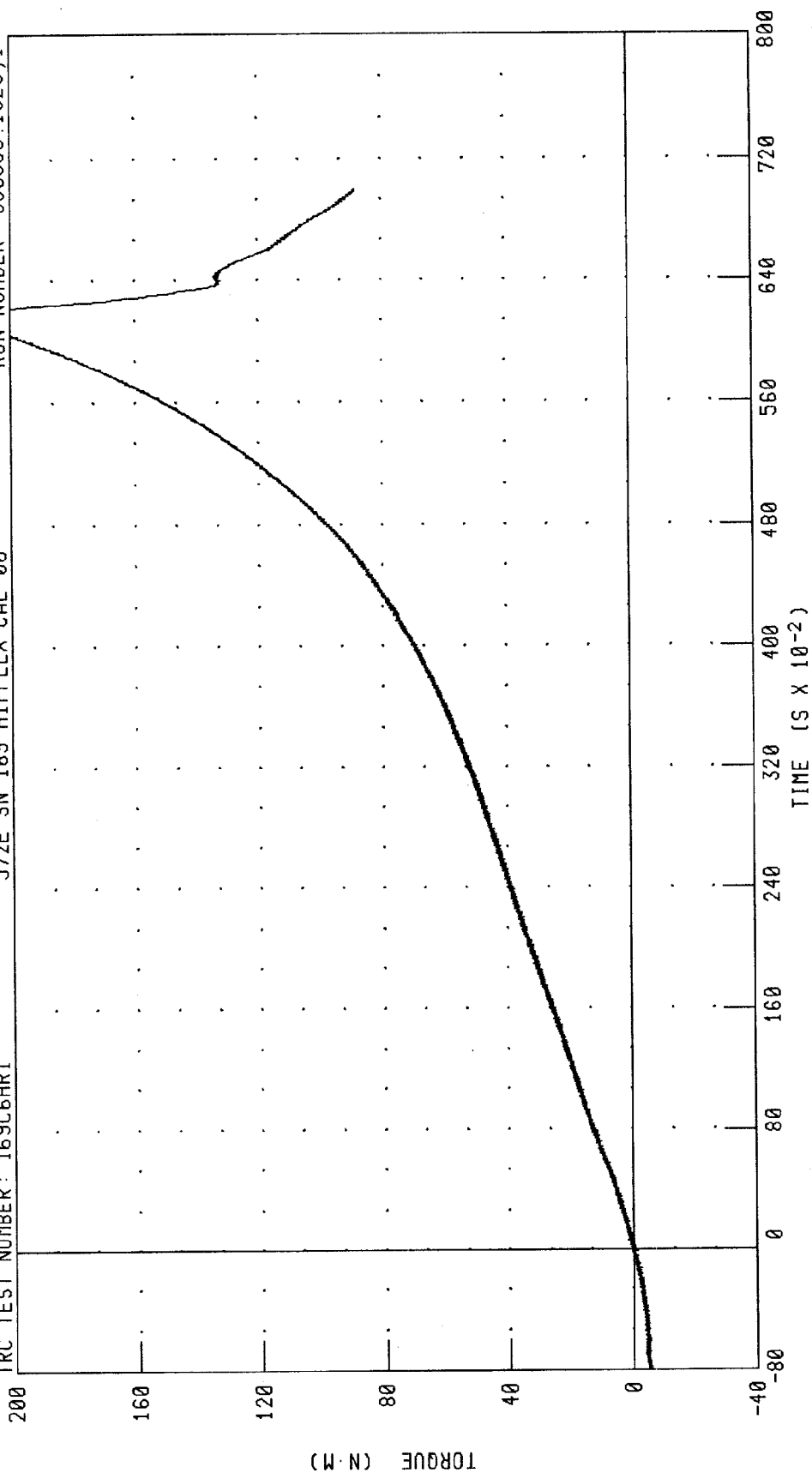
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

TRC TEST NUMBER: 169C6HR1

572E SN 169 HIPFLEX CAL 06

RUN NUMBER: 030399.1026;1

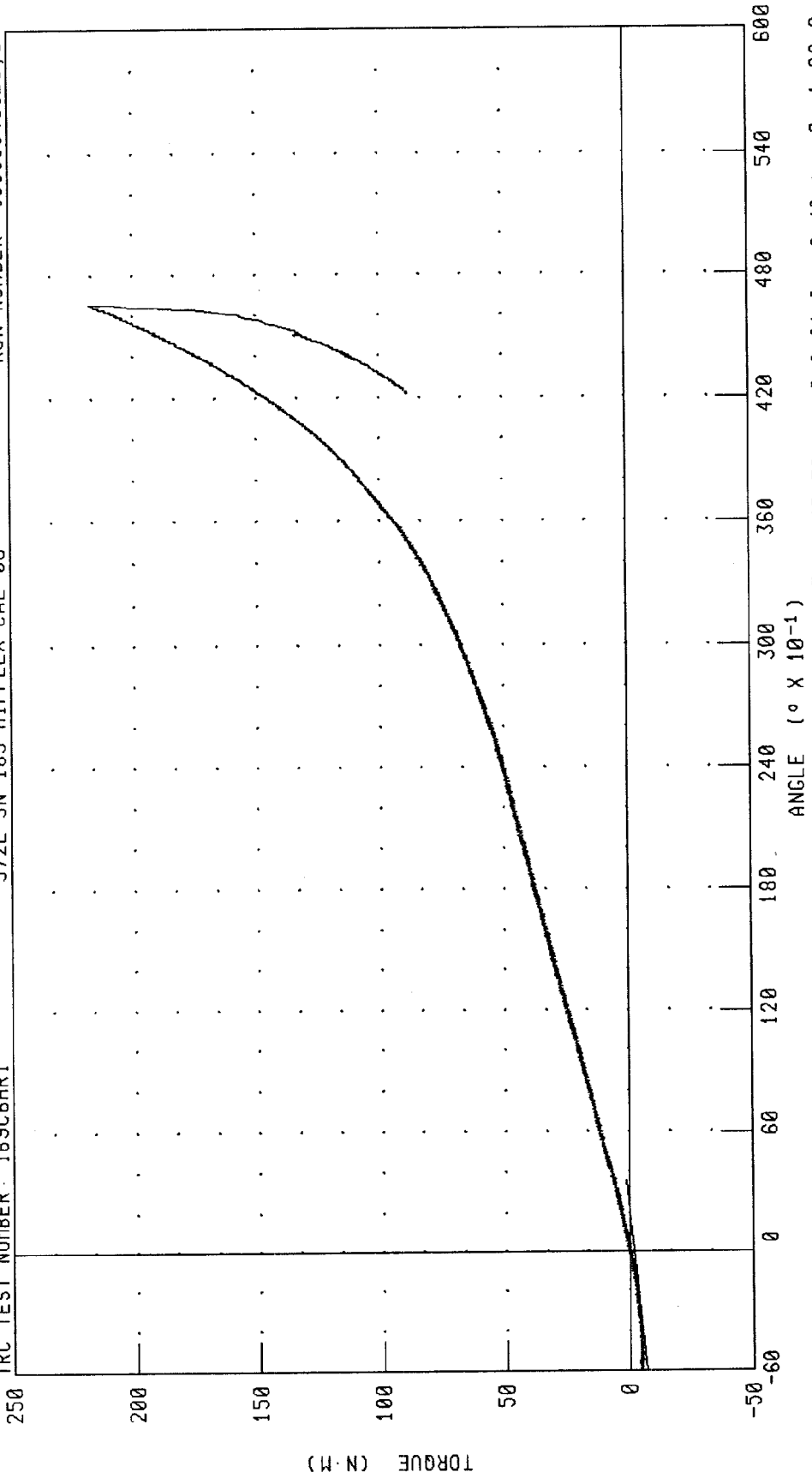


PEAK DATA: 217.33 N·M @ 6.17 S; -9.84 N·M @ -1.00 S

CHANNEL: RHPYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169CSHR1 572E SN 169 HIPFLEX CAL 06 RUN NUMBER: 030399.1026;1



CHANNEL: RHPXD FILTER: CH. CLASS 60 PEAK DATA: 46.58 ° 6.21 S; -9.40 ° -1.00 S
 RHPYM CH. CLASS 60 217.33 N·m 6.17 S; -9.84 N·m -1.00 S

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-MAR-99

TRC INC.

TEST NO: 169C6HL1

572E SN 169 HIPFLEX CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	59.8 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	46.0 deg.

TEST MEETS SPECIFICATIONS

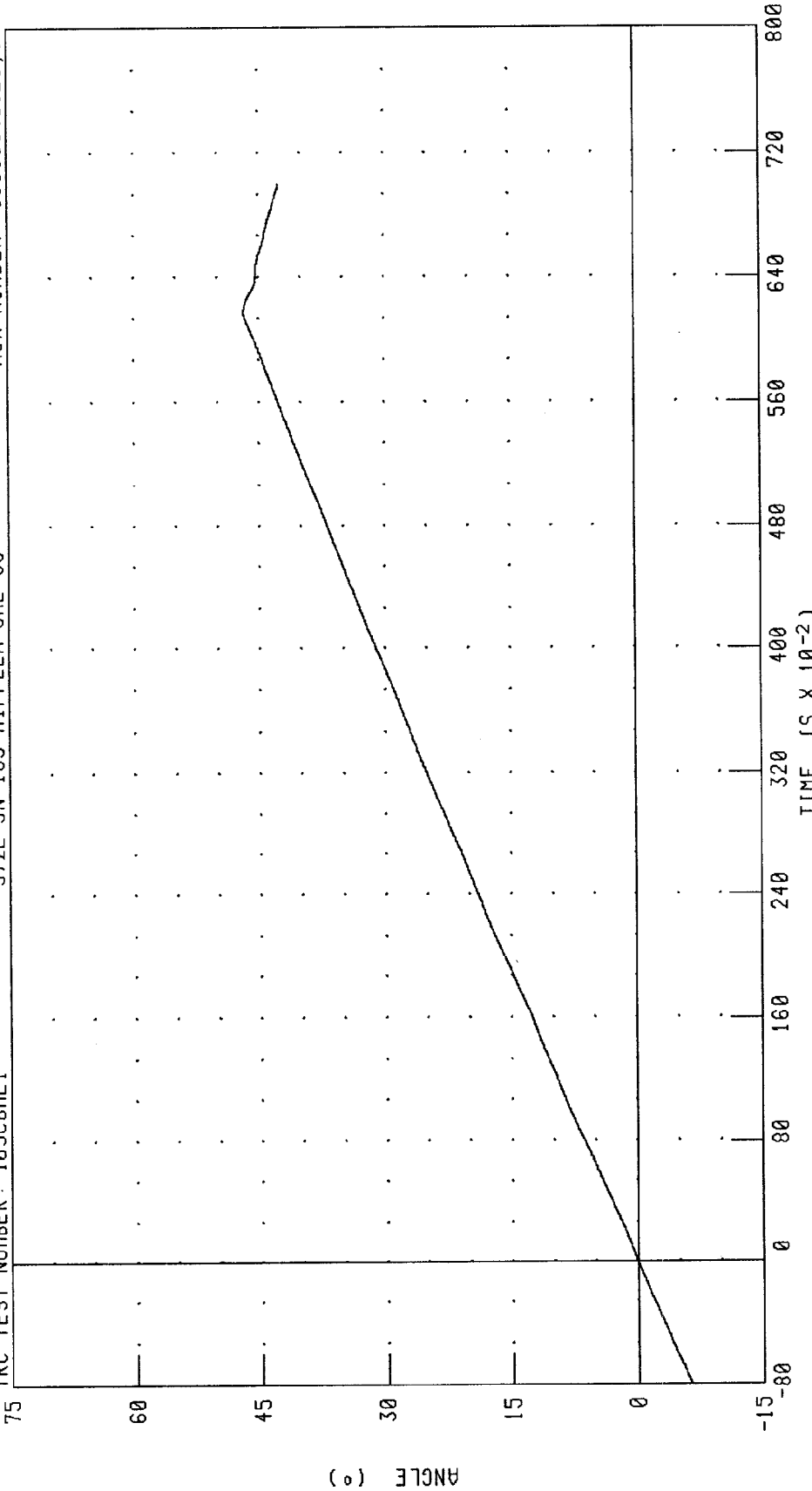
TECHNICIAN

Kevin Watkins

RUN NUMBER: 030399.1028;1

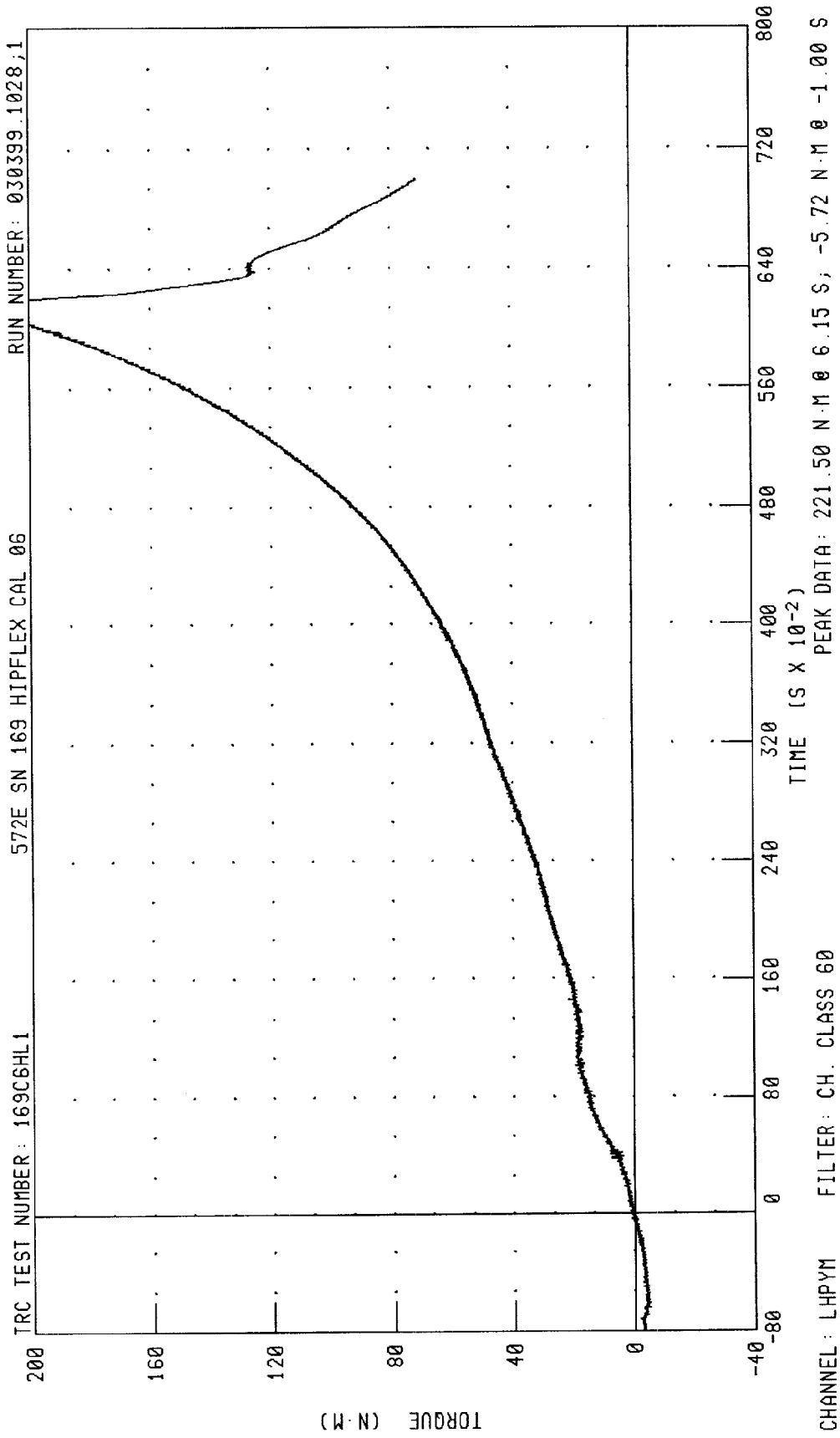
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION ROTATION

TRC TEST NUMBER: 169C6HL1 572E SN 169 HIPFLEX CAL 06 RUN NUMBER: 030399.1028;1



CHANNEL: LHPXD FILTER: CH. CLASS 60 PEAK DATA: 46.85 ° @ 6.18 S; -9.26 ° @ -1.00 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT

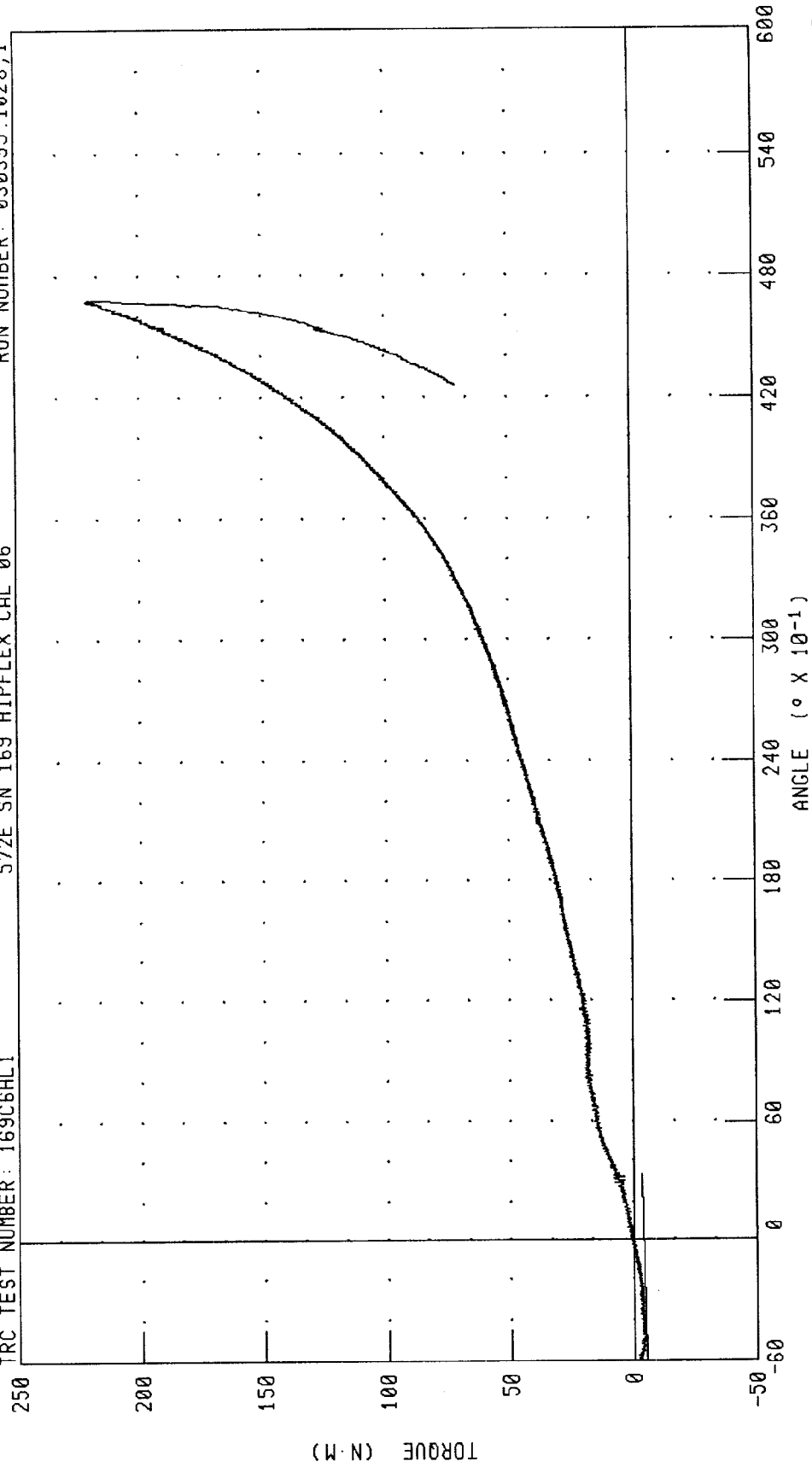


HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 169C6HL1

572E SN 169 HIPFLEX CAL 06

RUN NUMBER: 030399.1028,1



PEAK DATA: 46.85 ° 0 6.18 S; -9.26 ° 0 -1.00 S
221.50 N·M 0 6.15 S; -5.72 N·M 0 -1.00 S

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

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

03-MAR-99

TRC INC.

TEST NO: 169C6RK1

572E SN169 RIGHT KNEE CAL 6

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5177.3 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

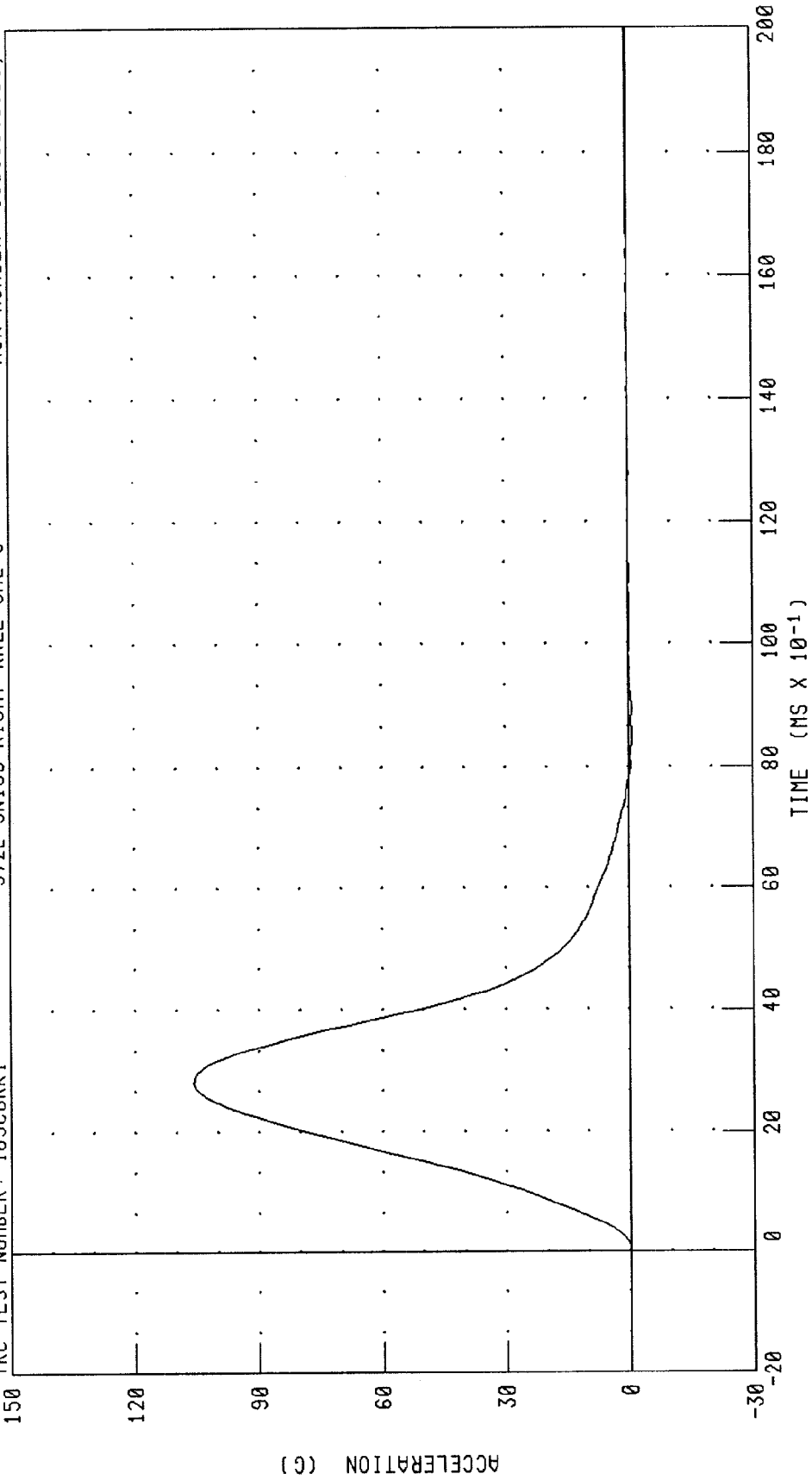
RUN NUMBER: 030399.1009;1

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

TRC TEST NUMBER: 169C6RK1

572E SN169 RIGHT KNEE CAL 6

RUN NUMBER: 030399.1010,1



CHANNEL: PENXC FILTER: CH. CLASS 600

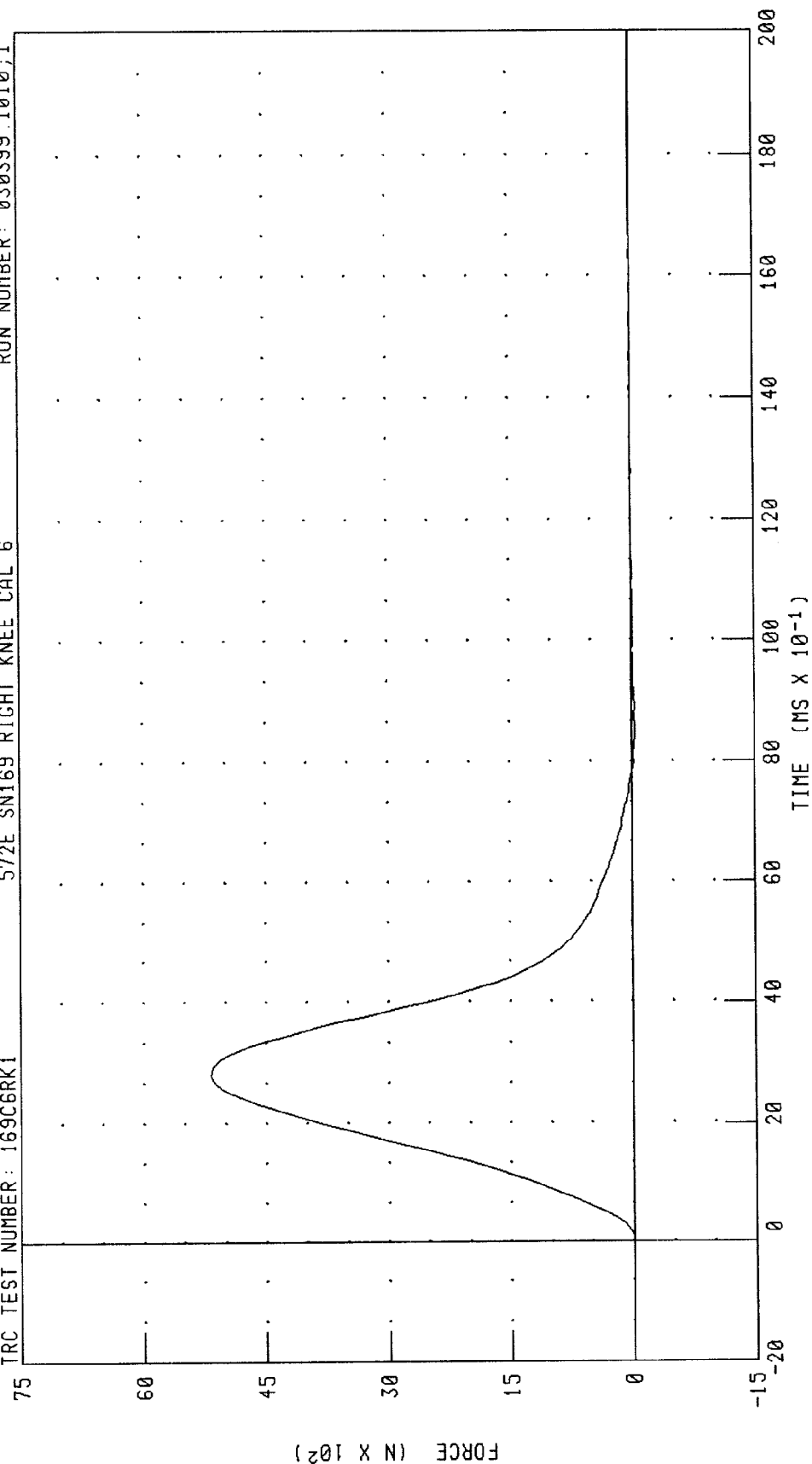
PEAK DATA: 105.82 G @ 2.80 MS, -0.91 G @ 8.48 MS

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

TRC TEST NUMBER: 169C6RK1

572E SN169 RIGHT KNEE CAL 6

RUN NUMBER: 030399.1010;1



CHANNEL: PENXF

FILTER: CH. CLASS 600

PEAK DATA: 5177.34 N @ 2.80 MS;

-44.29 N @ 8.48 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

03-MAR-99

TRC INC.

TEST NO: 169C6LK1

572E SN169 LEFT KNEE CAL 6

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5586.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

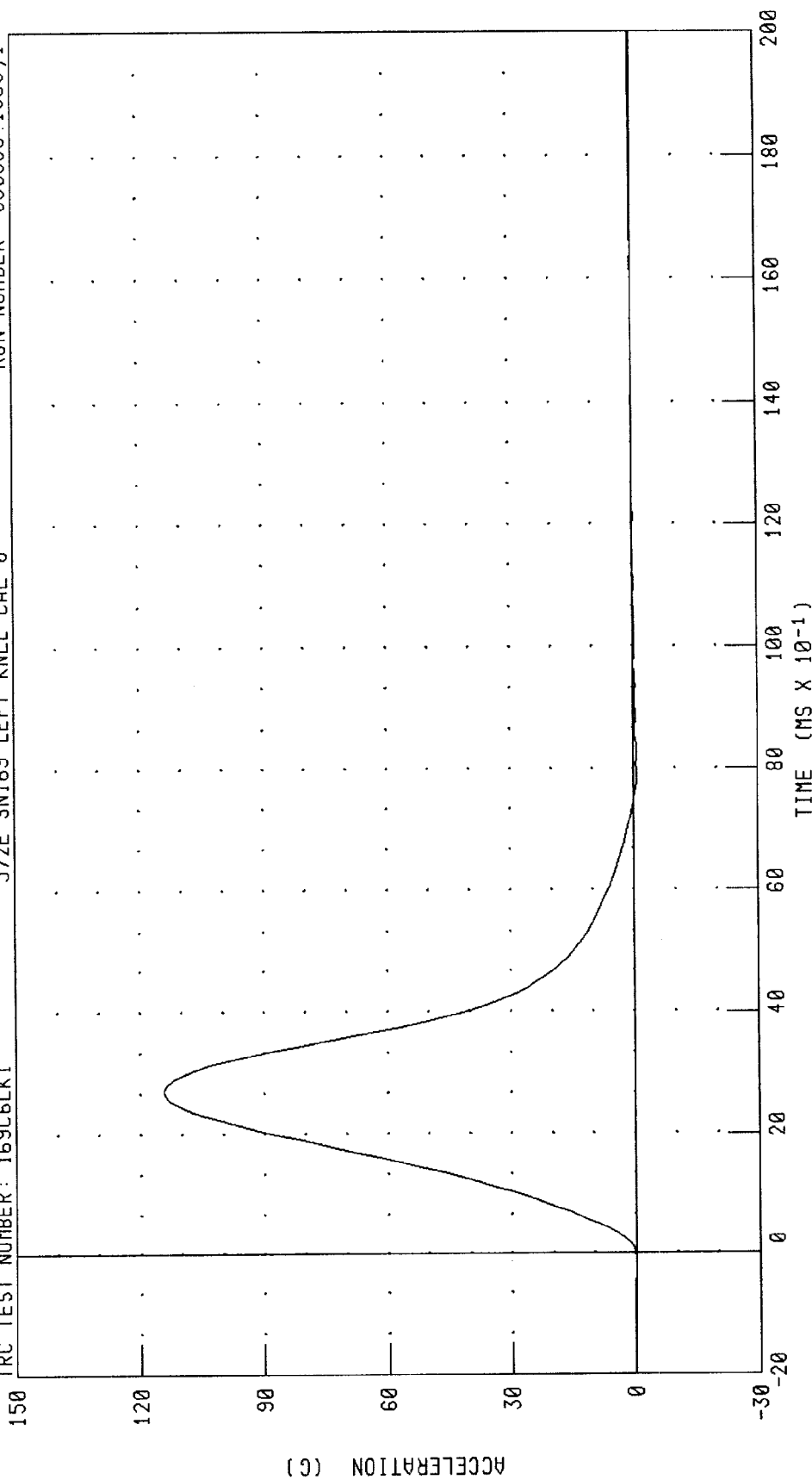
RUN NUMBER: 030399.0927;1

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

TRC TEST NUMBER: 169C6LK1

572E SN169 LEFT KNEE CAL 6

RUN NUMBER: 030399.1006;1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 114.18 G @ 2.72 MS, -0.85 G @ 8.32 MS

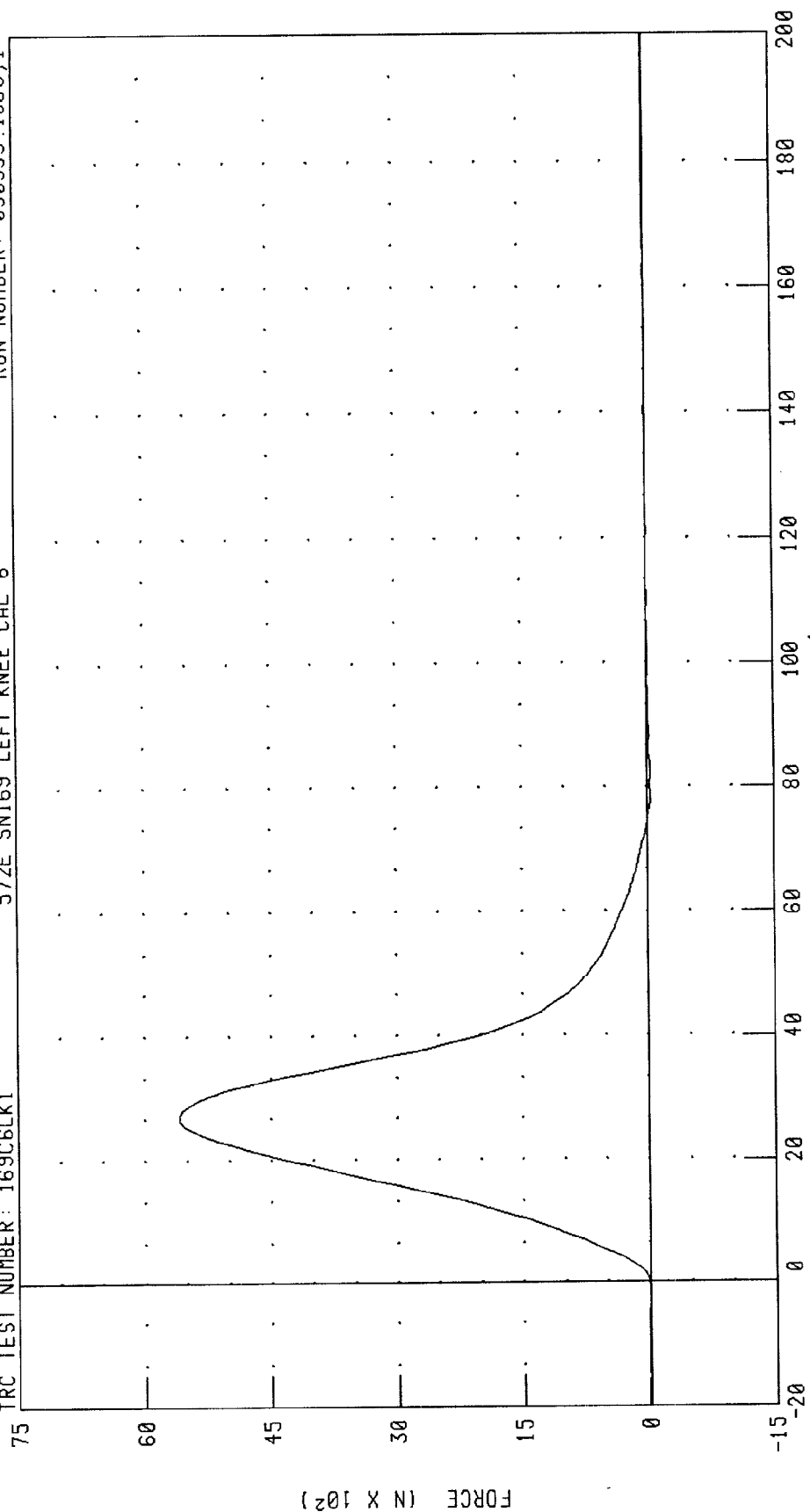
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 030399.1006,1

572E SN169 LEFT KNEE CAL 6

TRC TEST NUMBER: 169C6LK1



TIME ($\text{ms} \times 10^{-1}$)

PEAK DATA: 5586.83 N @ 2.72 MS; -41.52 N @ 8.32 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Post-Test Dummy Certification

Passenger Dummy S/N 169

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

03-MAR-99

TRC INC.

TEST NO: 168C8HD1

572E SN168 HEAD DROP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	264.44 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.33 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

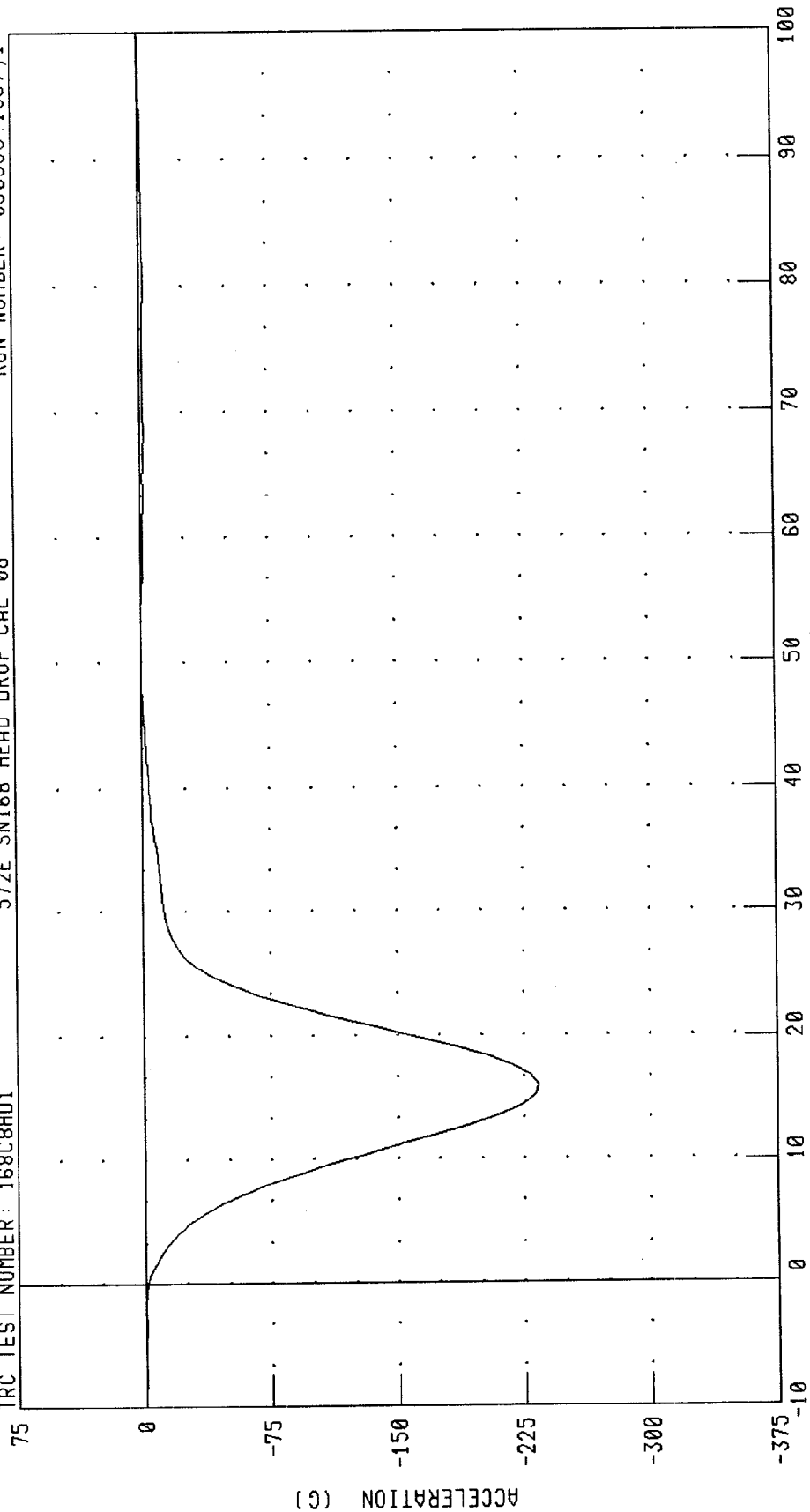
TECHNICIAN Kevin Watkins

RUN NUMBER: 030399.1507;1

PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION X AXIS
 572E SN168 HEAD DROP CAL 08

RUN NUMBER: 030399.1507;1

TRC TEST NUMBER: 168C8H01



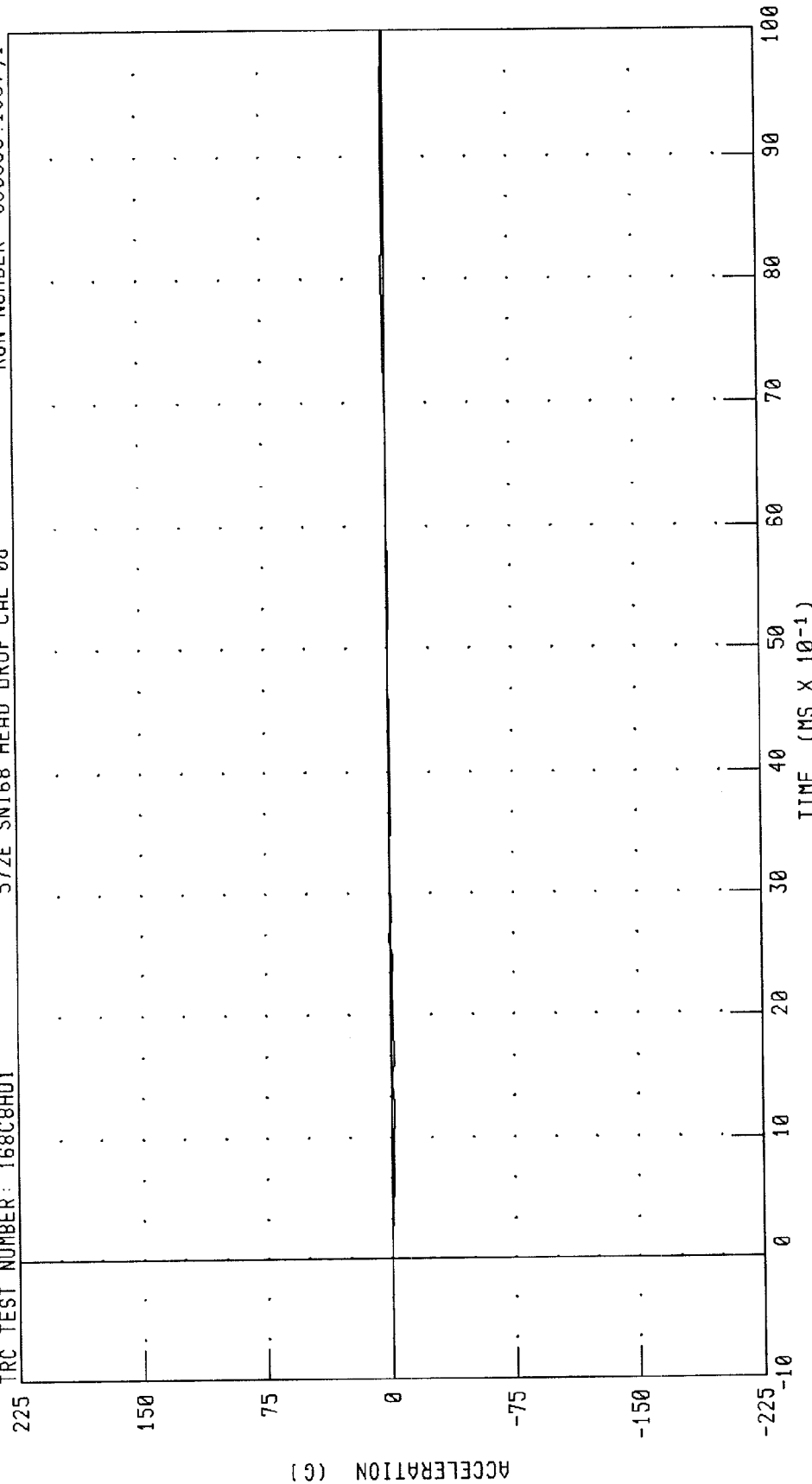
PEAK DATA: 0.41 G @ 4.96 MS; -233.70 G @ 1.60 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

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

572E SN168 HEAD DROP CAL 08 RUN NUMBER: 030399.1507;1

TRC TEST NUMBER: 168C8HD1



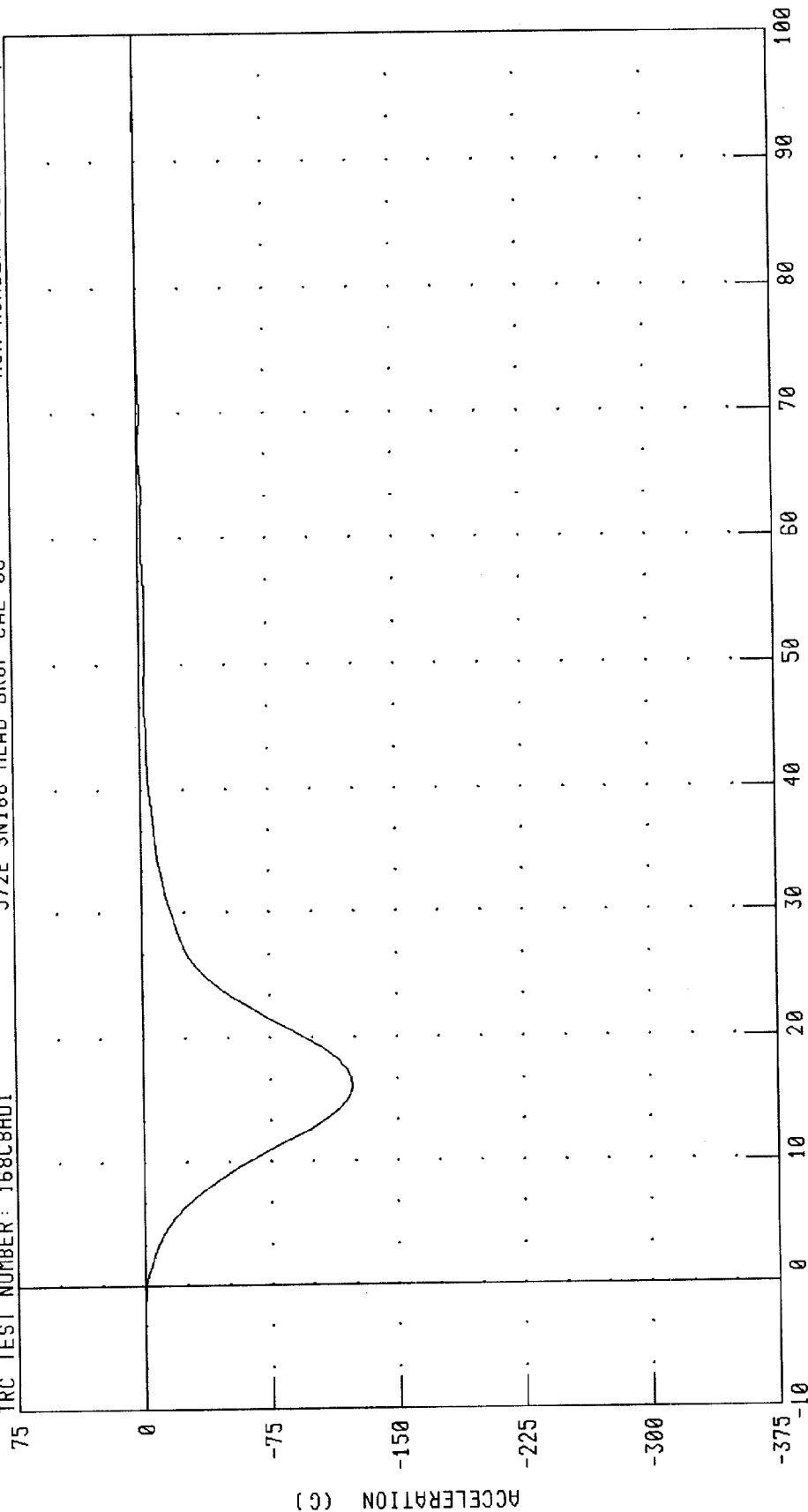
PEAK DATA: 1.58 G @ 8.00 MS; -2.34 G @ 1.68 MS

CHANNEL: HEDYC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION Z AXIS
 572E SN168 HEAD DROP CAL 08

RUN NUMBER: 030399.1507;1

TRC TEST NUMBER: 168C8HD1



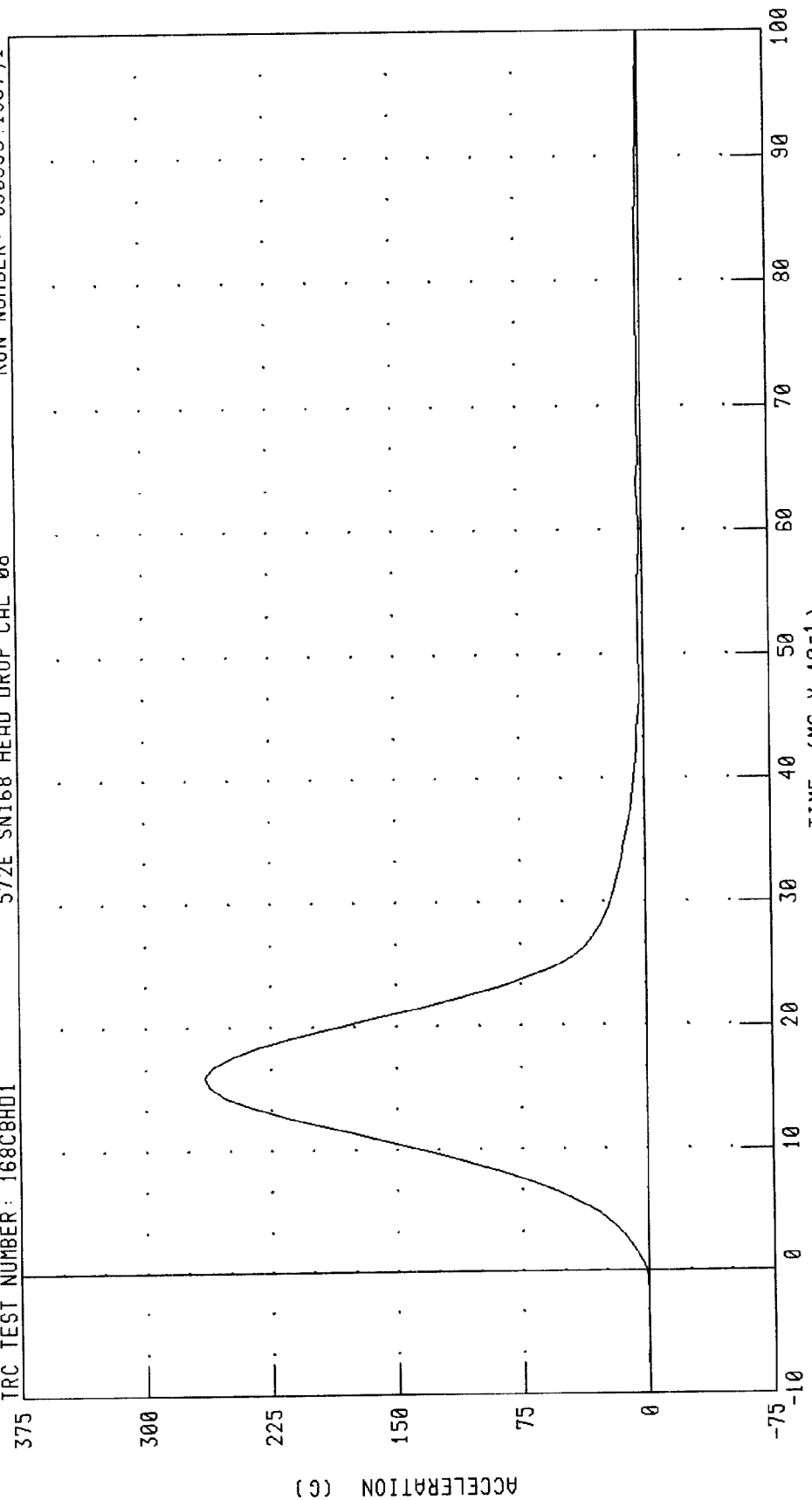
PEAK DATA: 0.57 G @ 9.28 MS; -123.74 G @ 1.60 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
572E SN168 HEAD DROP CAL 08

RUN NUMBER: 030399.1507;1

TRC TEST NUMBER: 168C8HD1



PEAK DATA: 264.45 G @ 1.60 MS; 0.03 G @ -0.96 MS

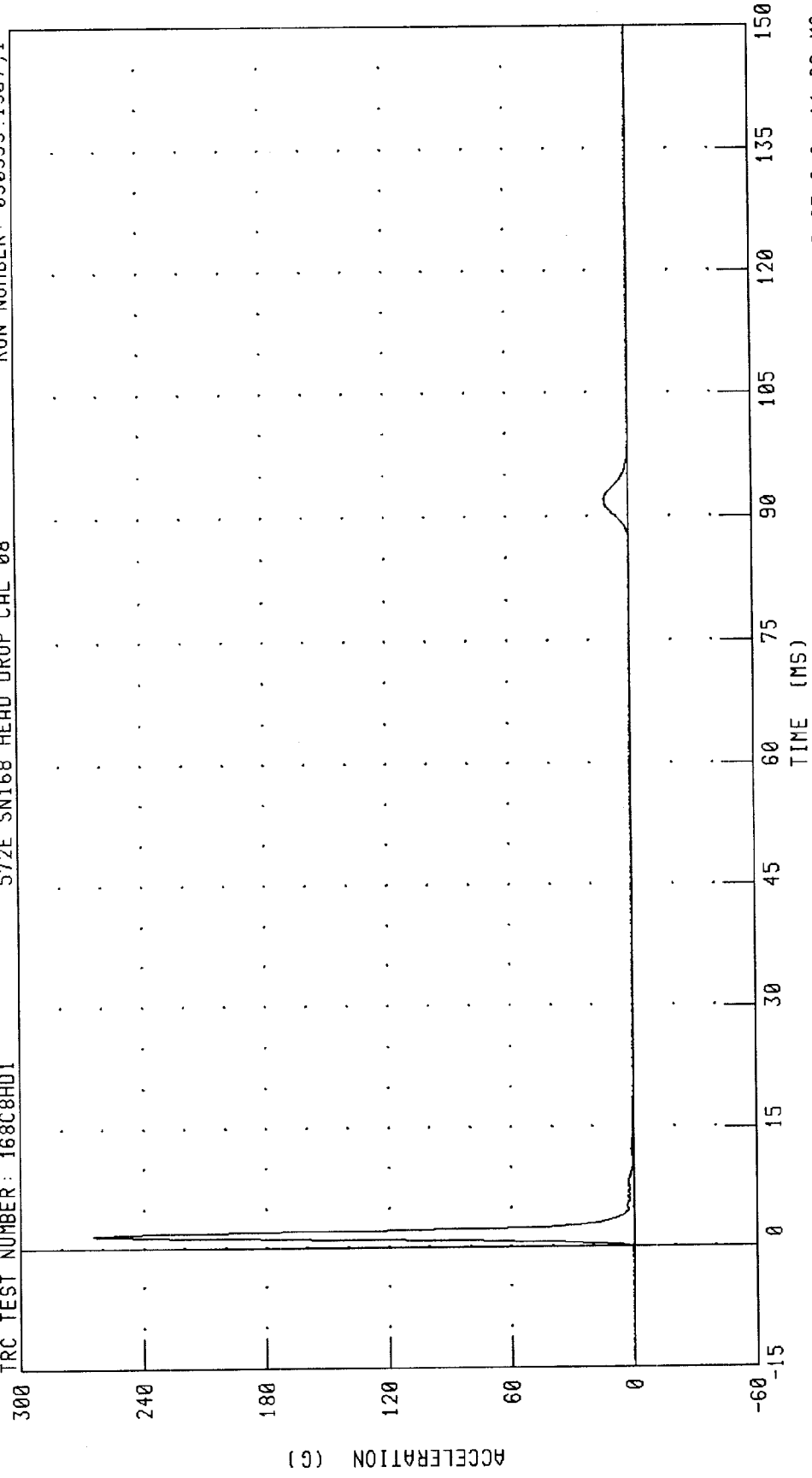
CHANNEL: HEDRG FILTER: CH. CLASS 1000

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

572E SN168 HEAD DROP CAL 08

TRC TEST NUMBER: 168C8HD1

RUN NUMBER: 030399.1507;1



CHANNEL: HEDRC FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

03-MAR-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C8NF1 572E SN168 NECK FLEXION CAL08

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.62 G
	20 MS	17.60 - 22.60 G	22.02 G
	30 MS	12.50 - 18.50 G	12.80 G
MAX PENDULUM G		29 G MAX	24.34 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	12.73 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	41.60 MS
D PLANE	MAX	64 - 78 DEG.	70.19 DEG.
ROTATION	TIME	57 - 64 MS	60.08 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	91.65 NM
	TIME	47 - 58 MS	54.48 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 Kevin Watkins

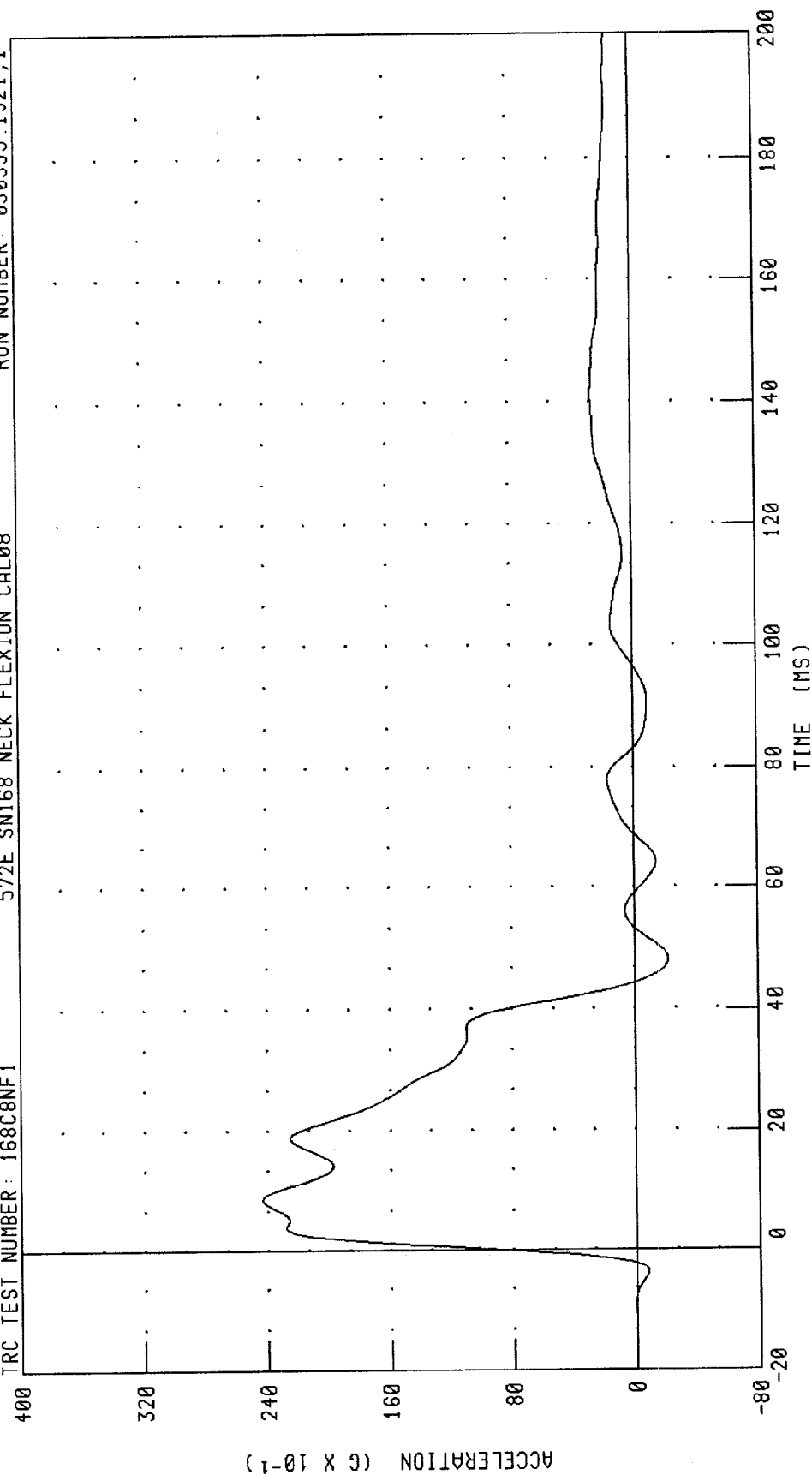
RUN NUMBER: 030399.1520;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 168C8NF1

572E SN168 NECK FLEXION CAL08

RUN NUMBER: 030399.1521;1

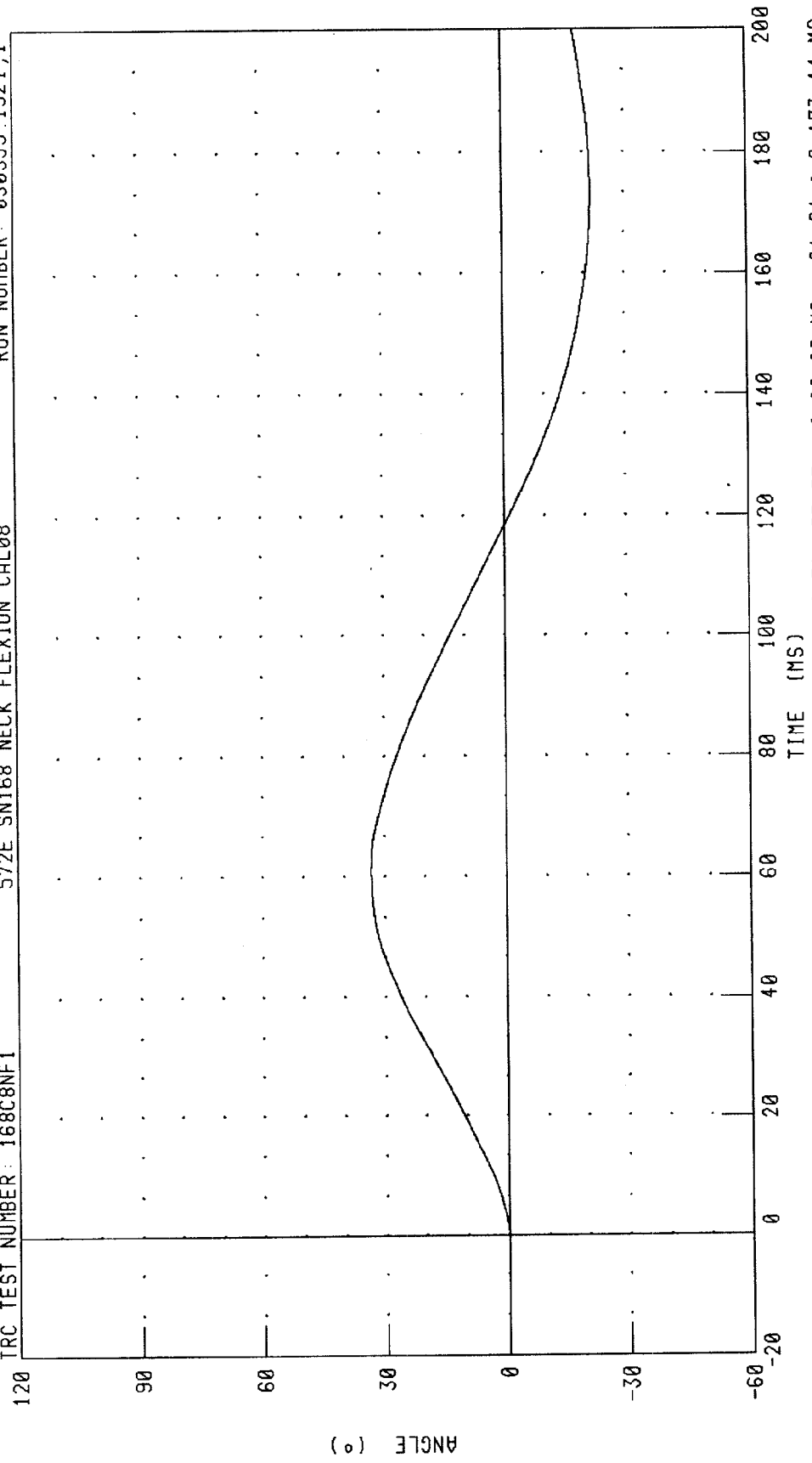


CHANNEL: PENXC FILTER: CH. CLASS 60 PEAK DATA: 24.35 G @ 8.72 MS; -2.19 G @ 48.08 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
572E SN168 NECK FLEXION CAL08

TRC TEST NUMBER: 168C8NF1

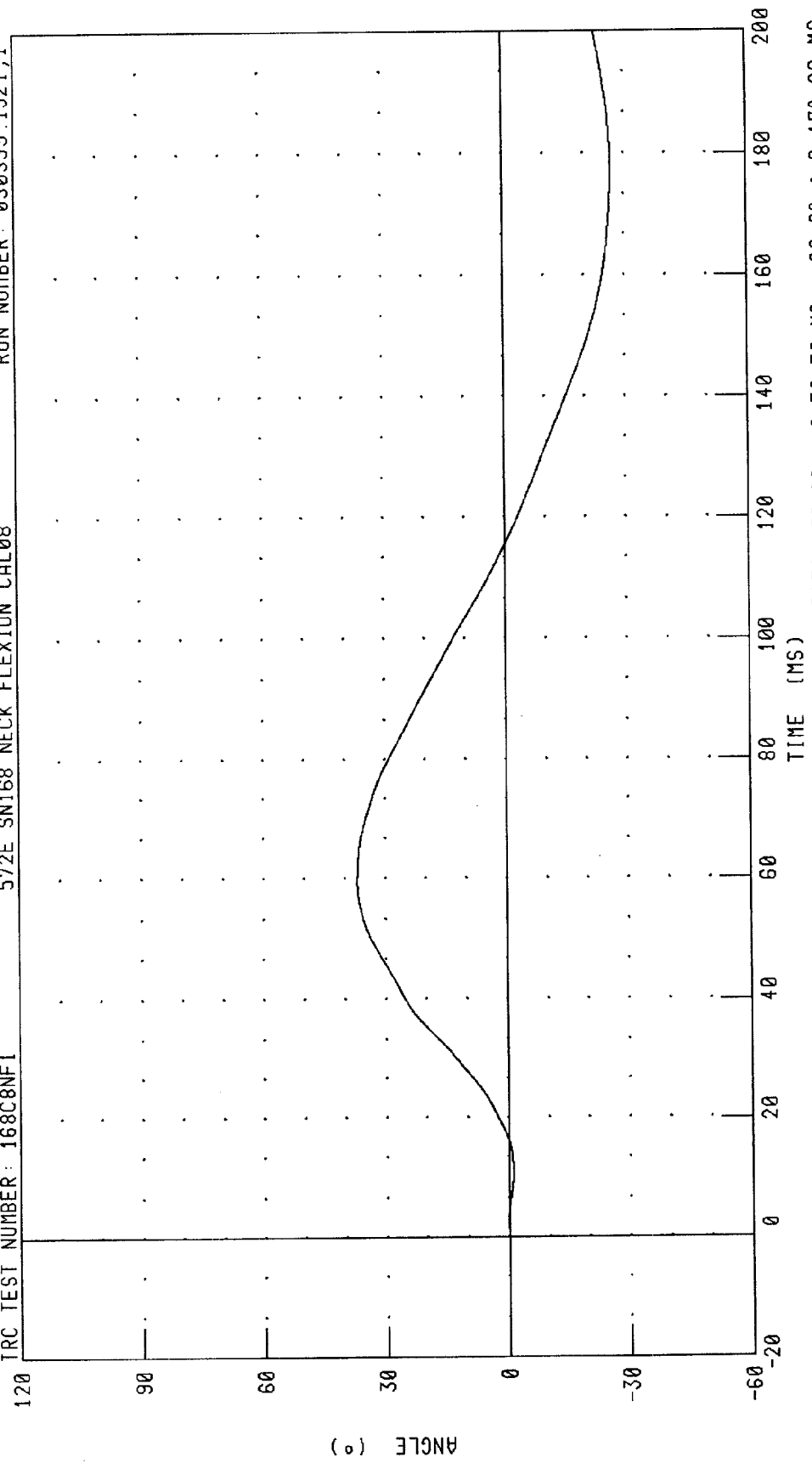
RUN NUMBER: 030399.1521,1



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 33.33 ° @ 60.88 MS; -21.84 ° @ 173.44 MS

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

TRC TEST NUMBER: 168C8NF1 572E SN168 NECK FLEXION CAL08 RUN NUMBER: 030399.1521;1



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 36.88 ° @ 59.52 MS; -26.80 ° @ 178.08 MS

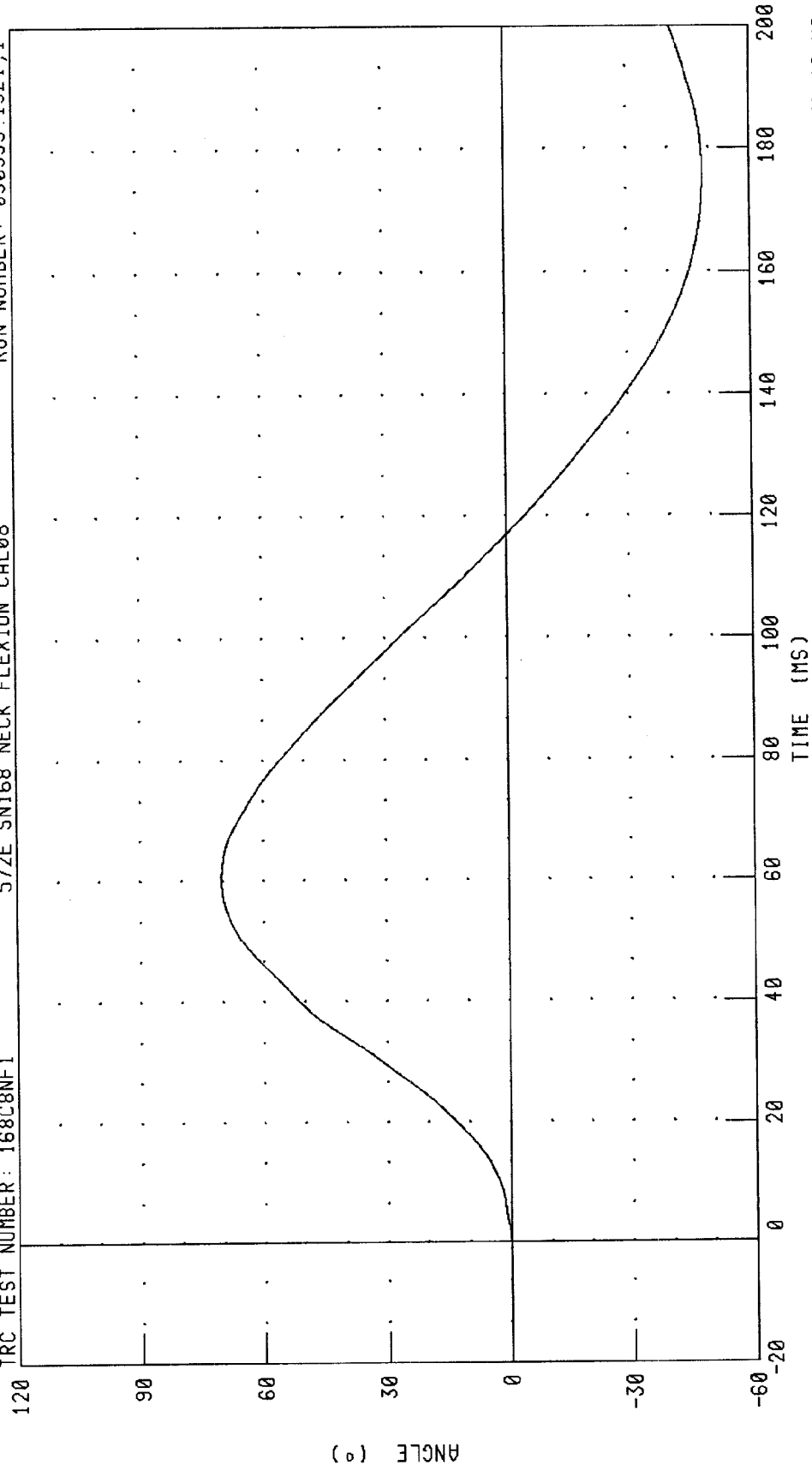
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C8NF1

572E SN168 NECK FLEXION CAL08

RUN NUMBER: 030399.1521;1



PEAK DATA: 70.20 ° @ 60.08 MS; -48.55 ° @ 176.16 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

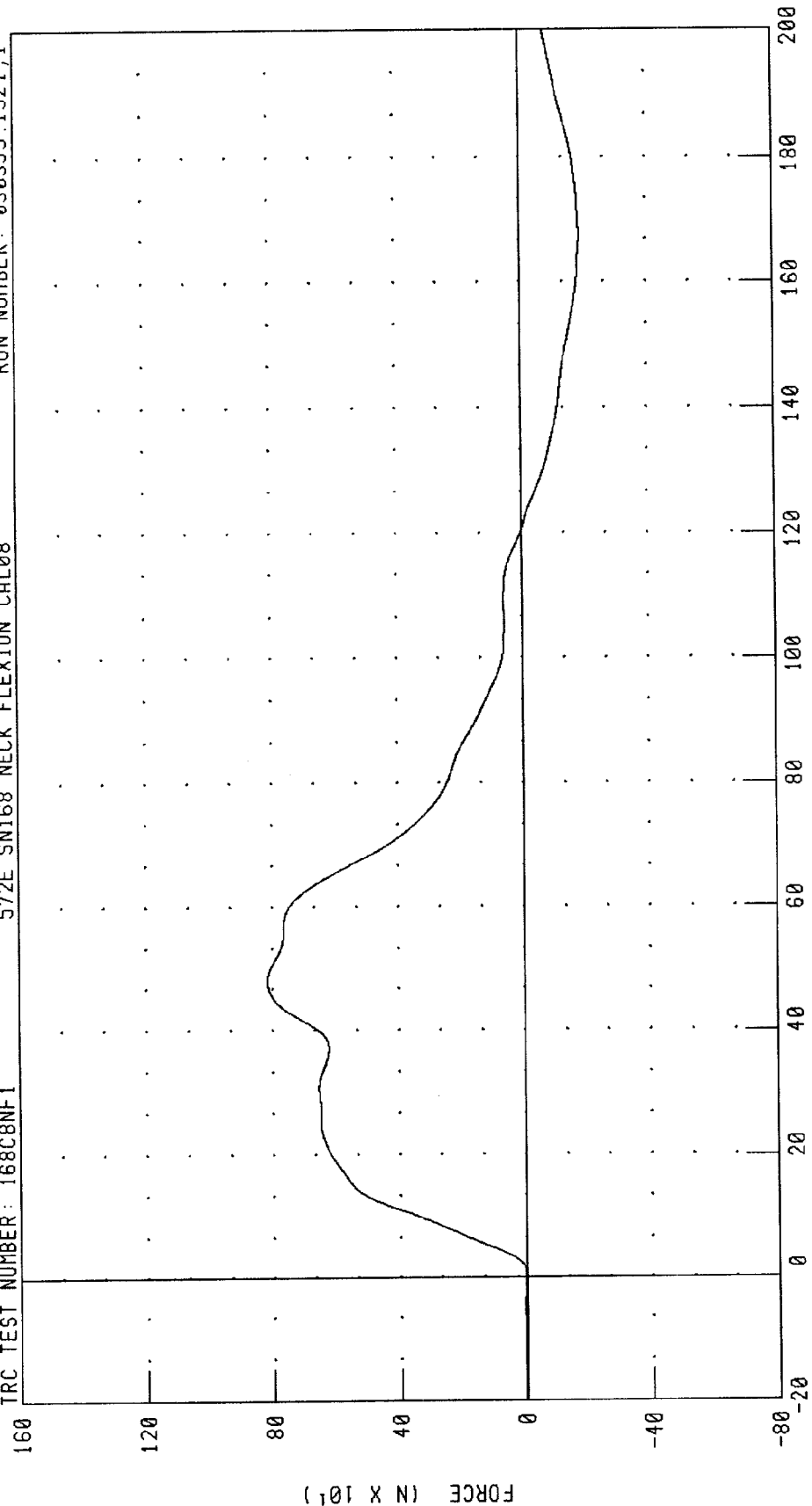
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 030399.1521;1

572E SN168 NECK FLEXION CAL08

TRC TEST NUMBER: 168C8NF1



PEAK DATA: 815.61 N @ 47.92 MS, -189.56 N @ 167.36 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 030399.1521;1

TRC TEST NUMBER: 168C8NF1

572E SN168 NECK FLEXION CAL08

160

120

80

40

0

-40

-80

TORQUE (N·M)

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

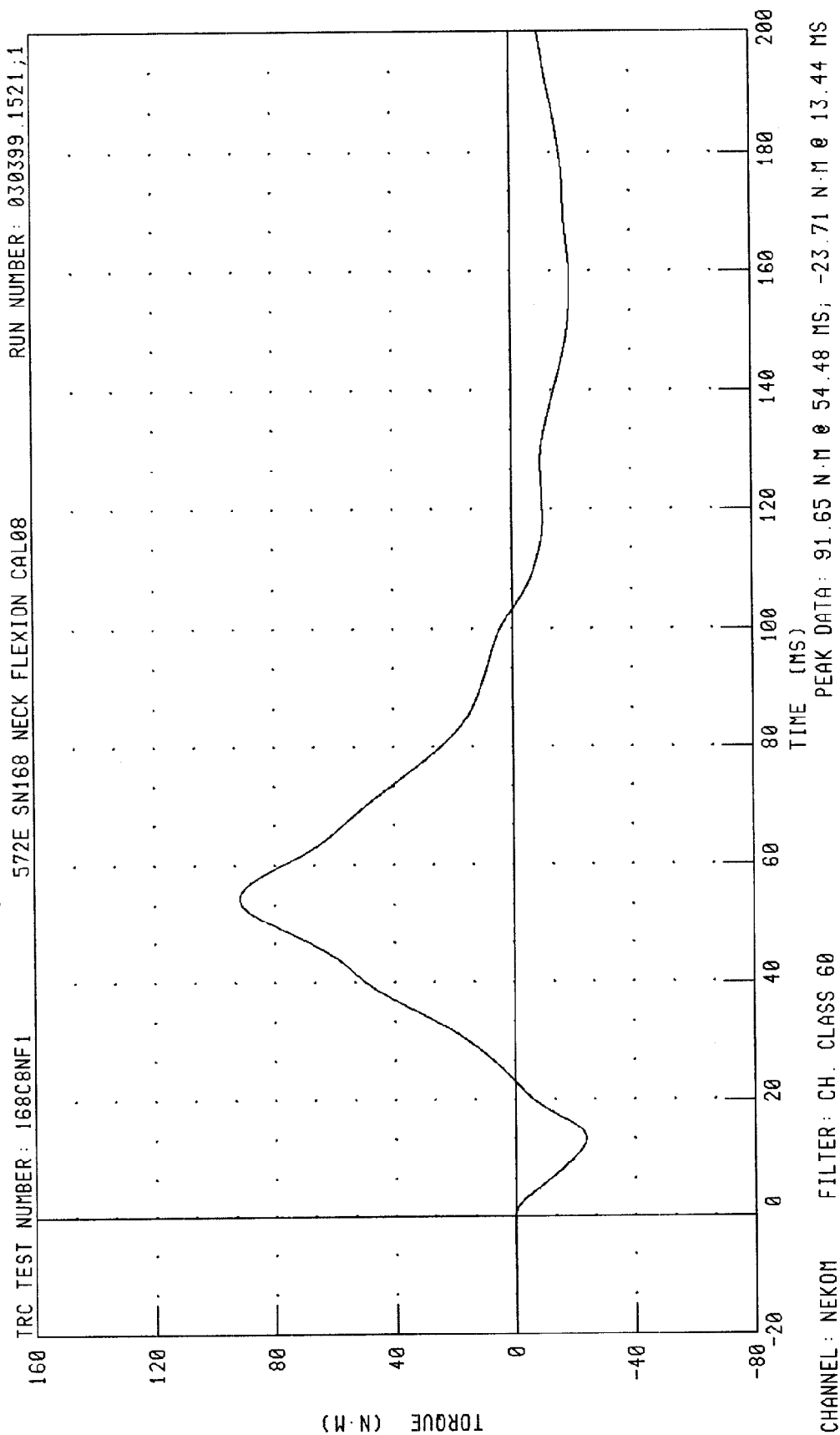
-20

PEAK DATA: 78.02 N·M @ 54.56 MS, -32.88 N·M @ 13.84 MS

FILTER: CH. CLASS 60

CHANNEL: NEKYM

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



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

04-MAR-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C8NE1 572E SN168 NECK EXT CAL08

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.34 G
	20 MS	14.00 - 19.00 G	17.37 G
	30 MS	11.00 - 16.00 G	15.43 G
MAX PENDULUM G		22 G MAX	18.75 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.37 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.52 MS
D PLANE	MAX	81 - 106 DEG.	94.94 DEG.
ROTATION	TIME	72 - 82 MS	76.16 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-64.58 NM
	TIME	65 - 79 MS	70.48 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.72 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	141.84 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 030499.0804;1

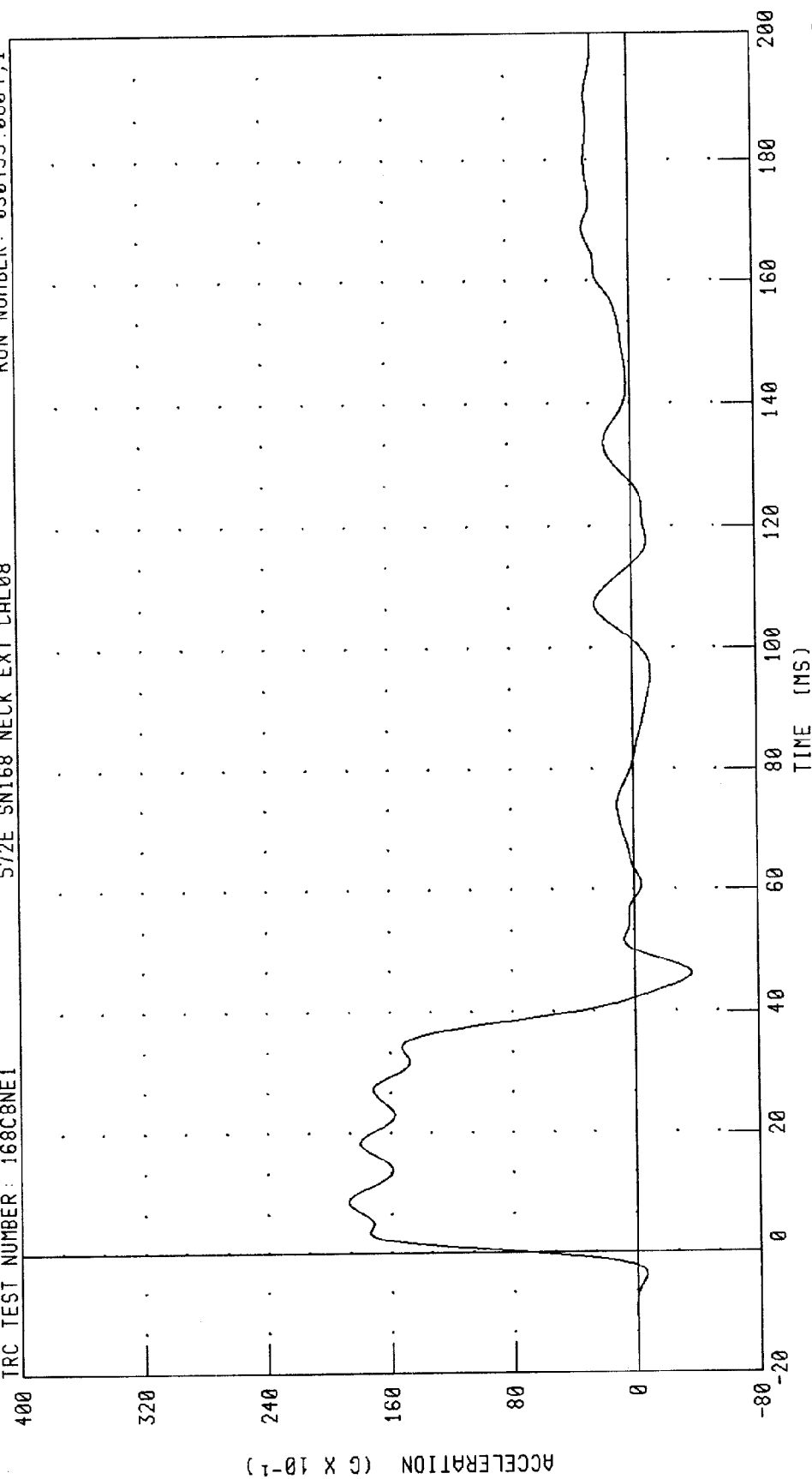
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

RUN NUMBER: 030499.0804;1

572E SN168 NECK EXT CAL08

TRC TEST NUMBER: 168C8NE1



PEAK DATA: 18.75 G @ 8.80 MS; -3.68 G @ 46.16 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

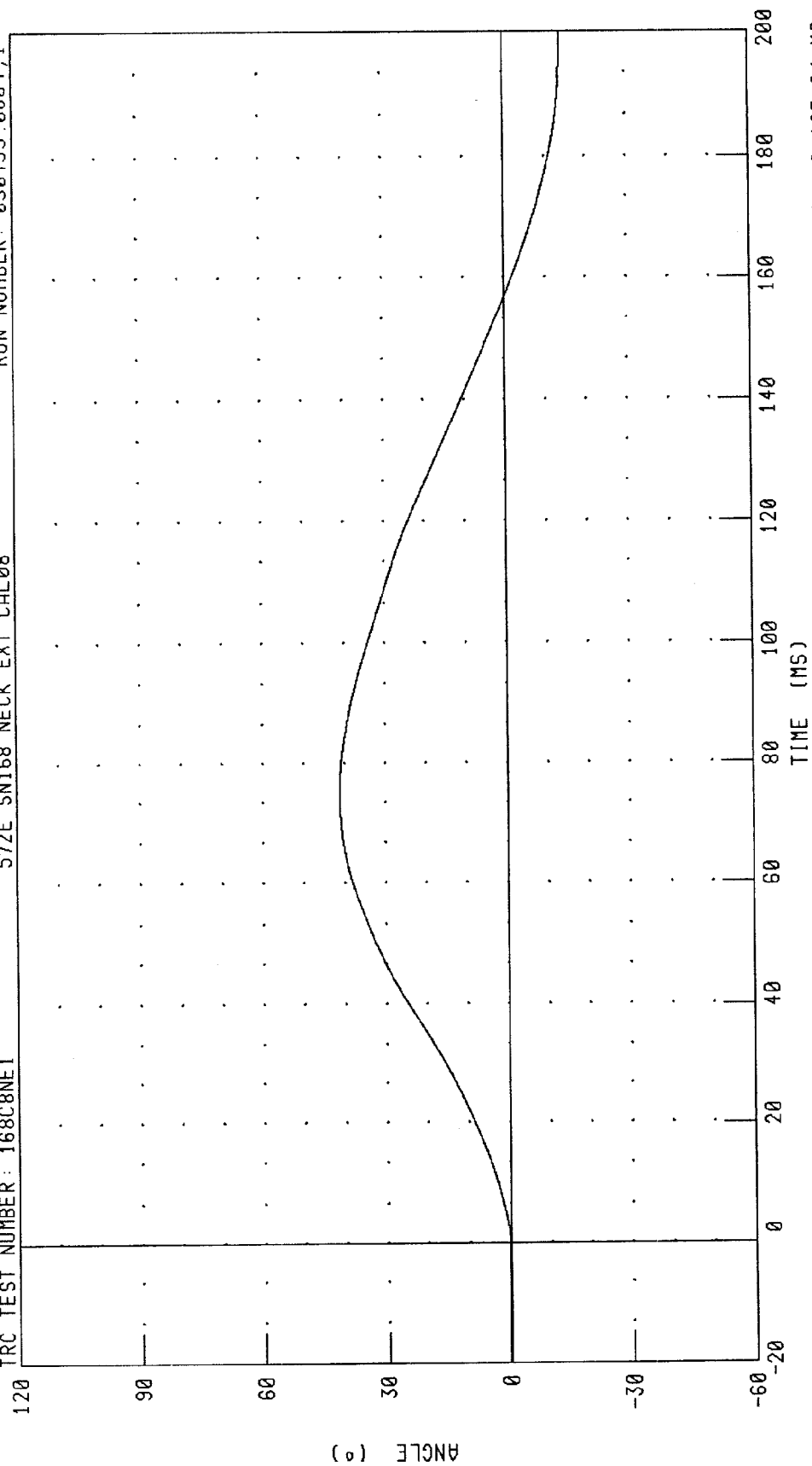
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN168 NECK EXT CAL08

TRC TEST NUMBER: 168C8NE1

RUN NUMBER: 030499 0804;1



PEAK DATA: 41.14 ° @ 74.88 MS; -14.03 ° @ 197.84 MS

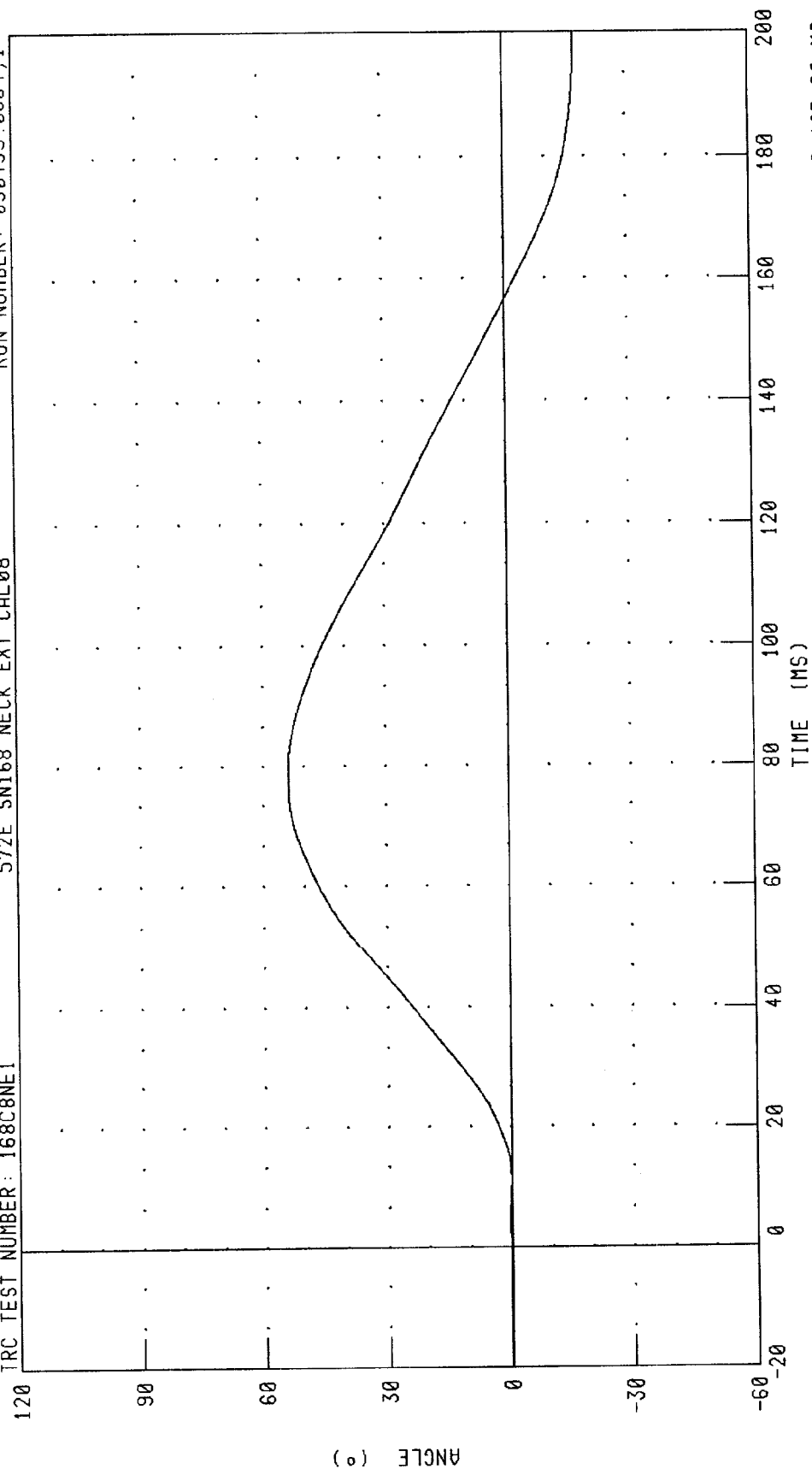
CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C8NE1

572E SN168 NECK EXT CAL08

RUN NUMBER: 030499 0804;1



PEAK DATA: 53.85 ° @ 78.48 MS; -17.36 ° @ 197.92 MS

CHANNEL: THETA FILTER: CH. CLASS 60

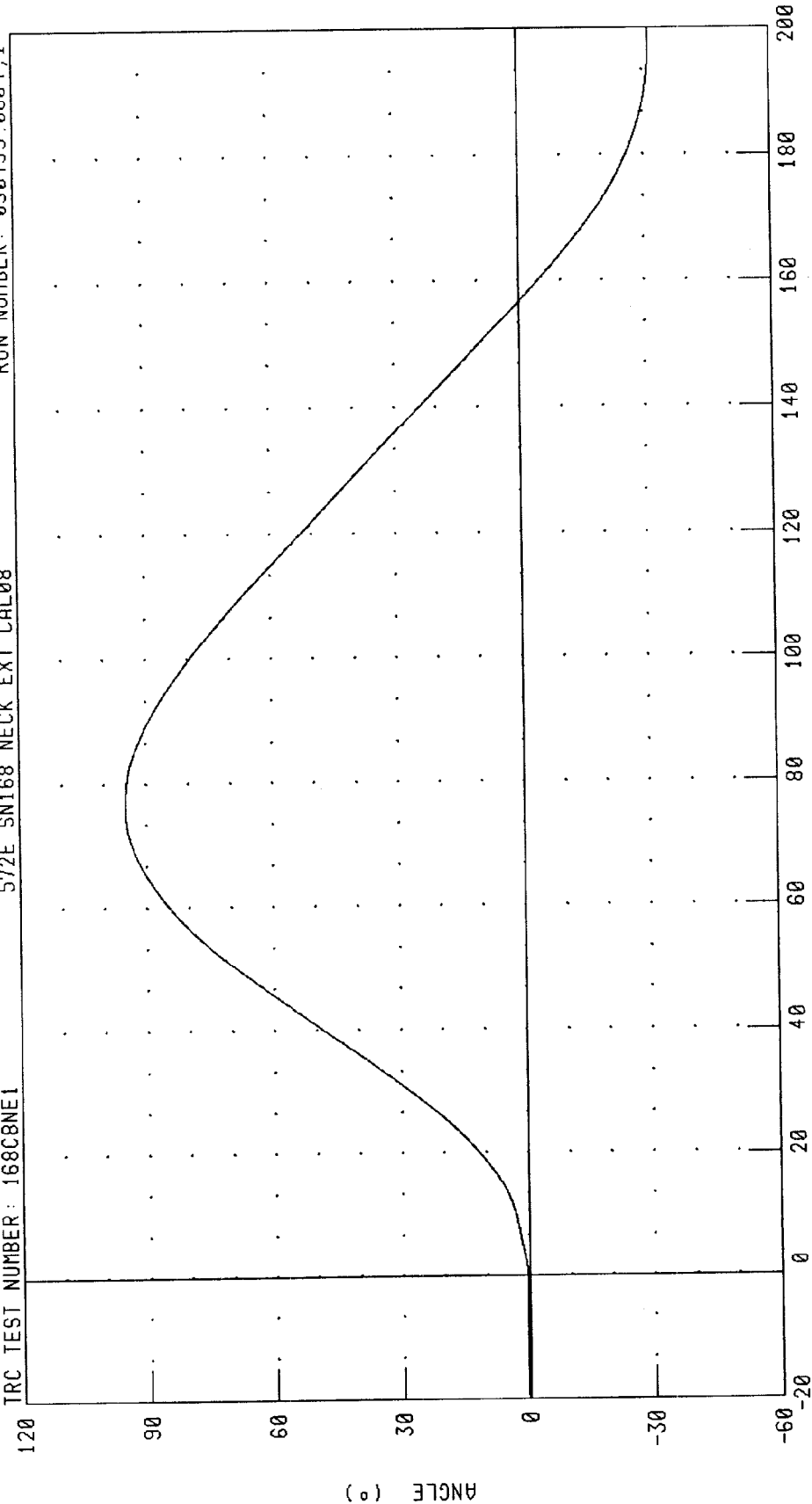
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

RUN NUMBER: 030499.0804;1

572E SN168 NECK EXT CAL08

TRC TEST NUMBER: 168C8NE1



PEAK DATA: 94.94 ° @ 76.16 MS; -31.39 ° @ 197.84 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

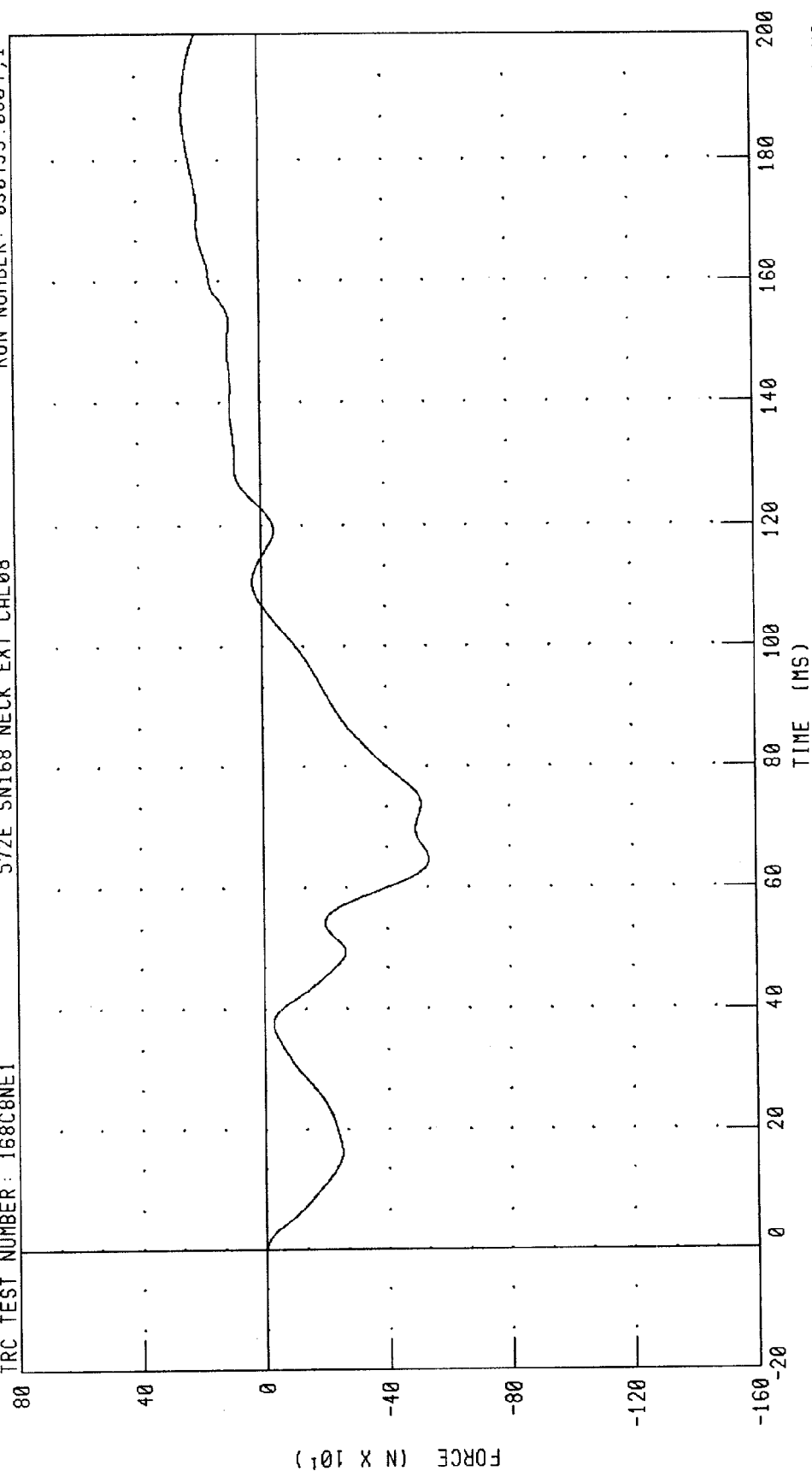
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 030499.0804;1

TRC TEST NUMBER: 168C8NE1

572E SN168 NECK EXT CAL08



PEAK DATA: 250.51 N @ 188.16 MS, -536.81 N @ 64.64 MS

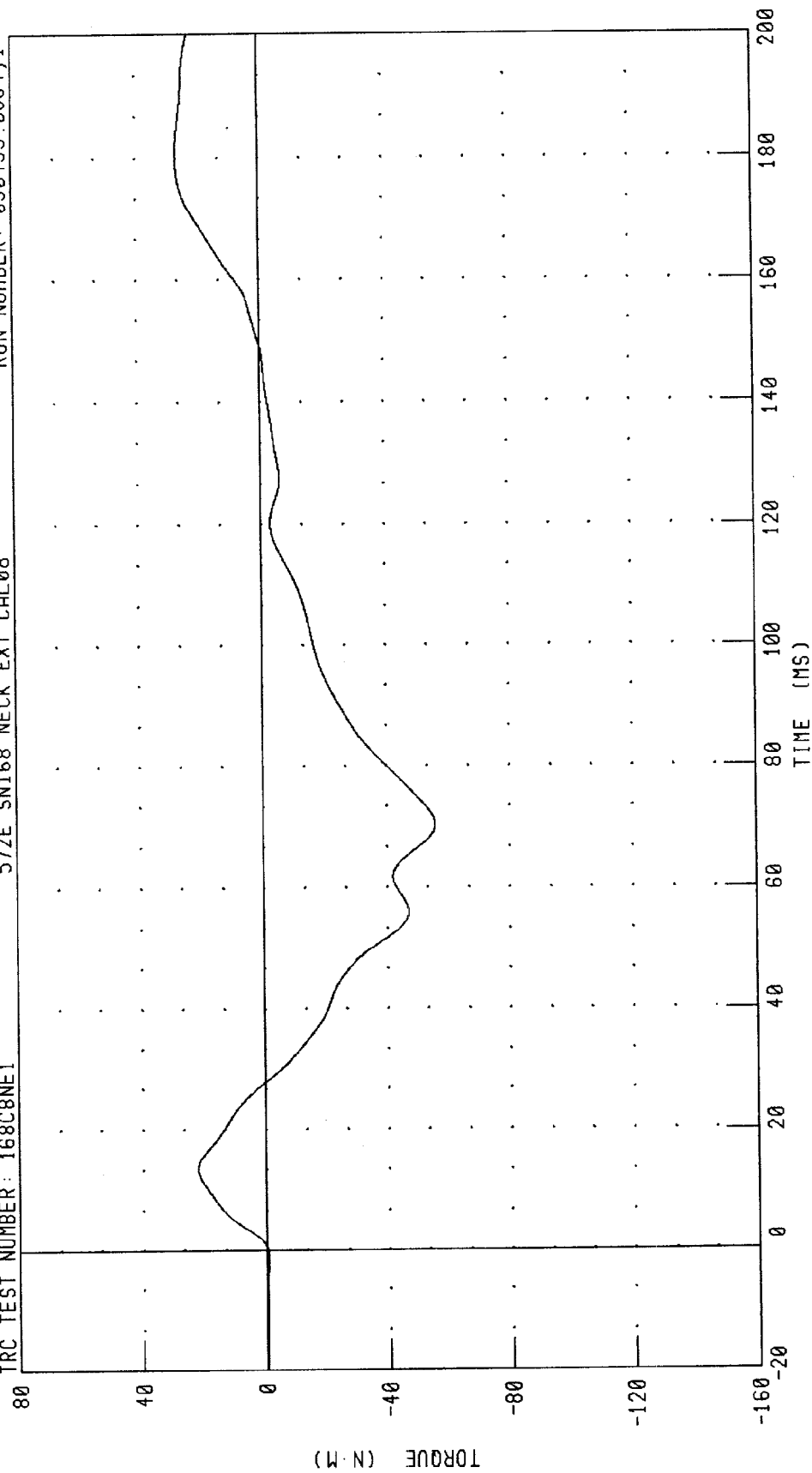
CHANNEL: NEKXF FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C8NE1

572E SN168 NECK EXT CAL08

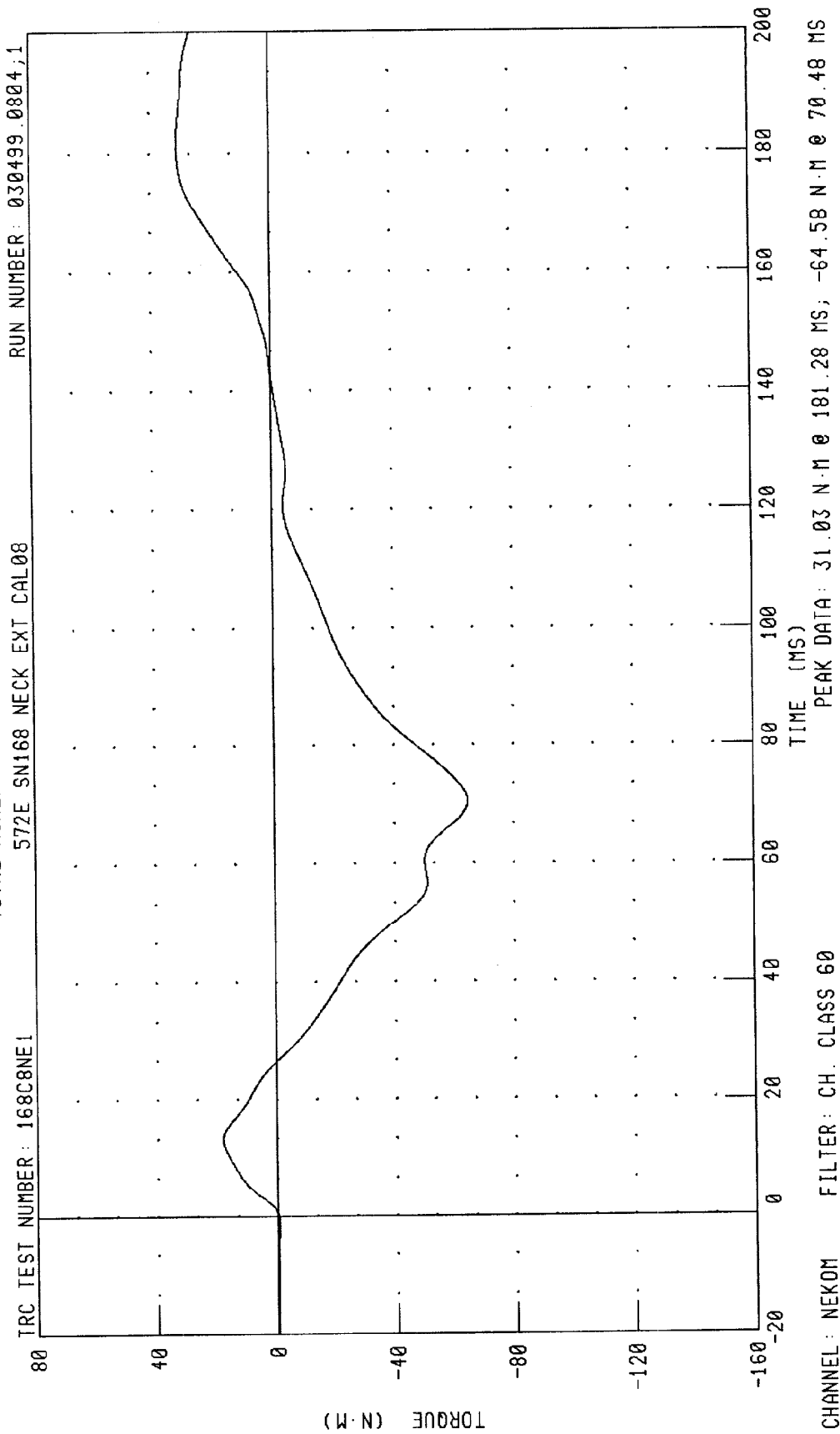
RUN NUMBER: 030499.0804;1



PEAK DATA: 26.92 N·M @ 180.40 MS; -55.79 N·M @ 70.40 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

04-MAR-99

TRC INC.

TEST NO: 168C8TH2

572E SN168 H.S.THORAX CAL08

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	64.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5864. N
INTERNAL HYSTERESIS	69% - 85%	69.6%

TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

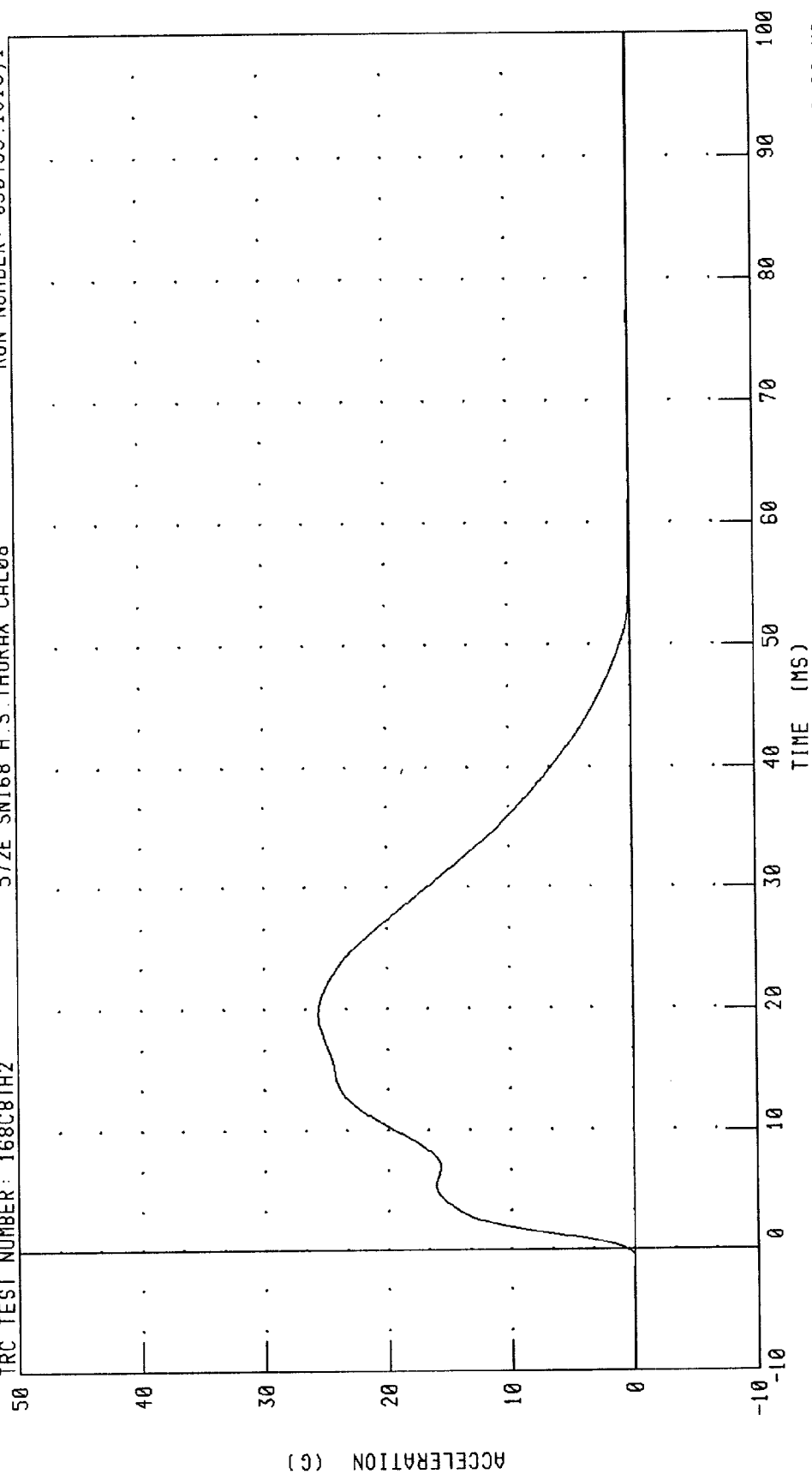
RUN NUMBER: 030499.1313;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 168C8TH2

572E SN168 H.S. THORAX CAL08

RUN NUMBER: 030499.1313;1



CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 25.60 G @ 19.60 MS; -0.05 G @ -0.88 MS

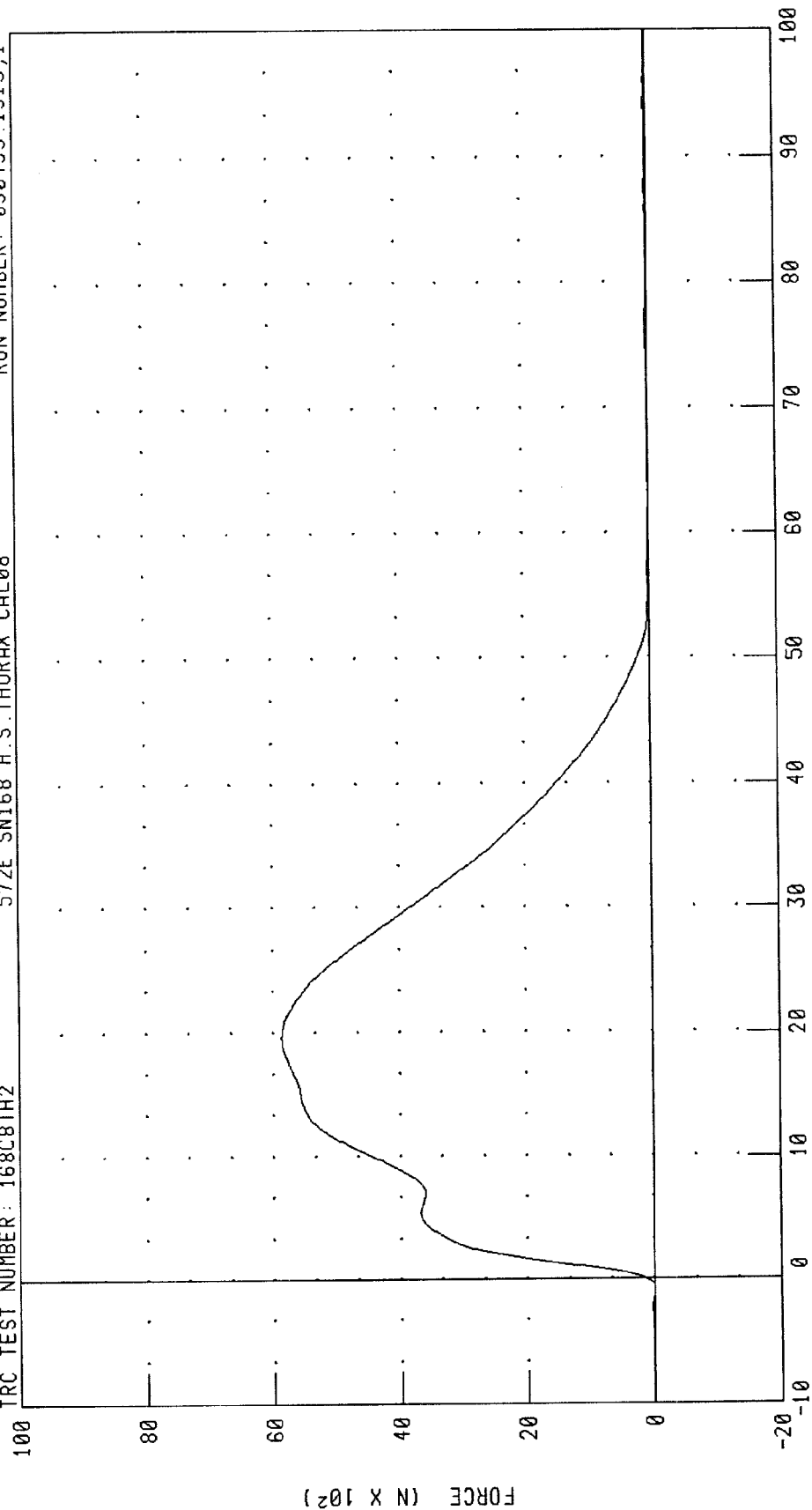
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 168C8TH2

572E SN168 H.S. THORAX CAL08

RUN NUMBER: 030499 1313,1



CHANNEL: PENXF FILTER: CH. CLASS 180

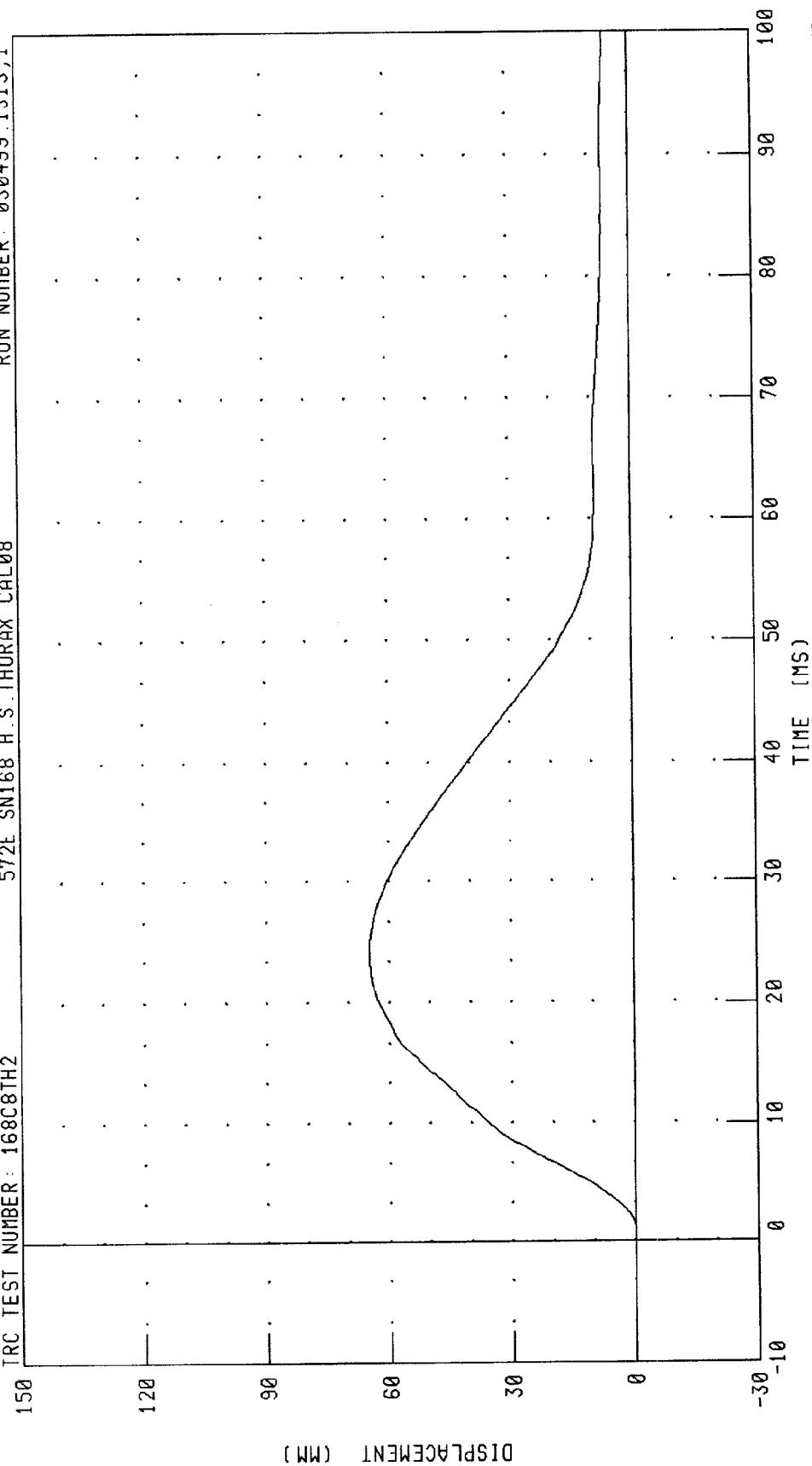
PEAK DATA: 5864.53 N @ 19.60 MS, -10.69 N @ -0.88 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 168C8TH2

572E SN168 H.S. THORAX CAL08

RUN NUMBER: 030499.1313,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

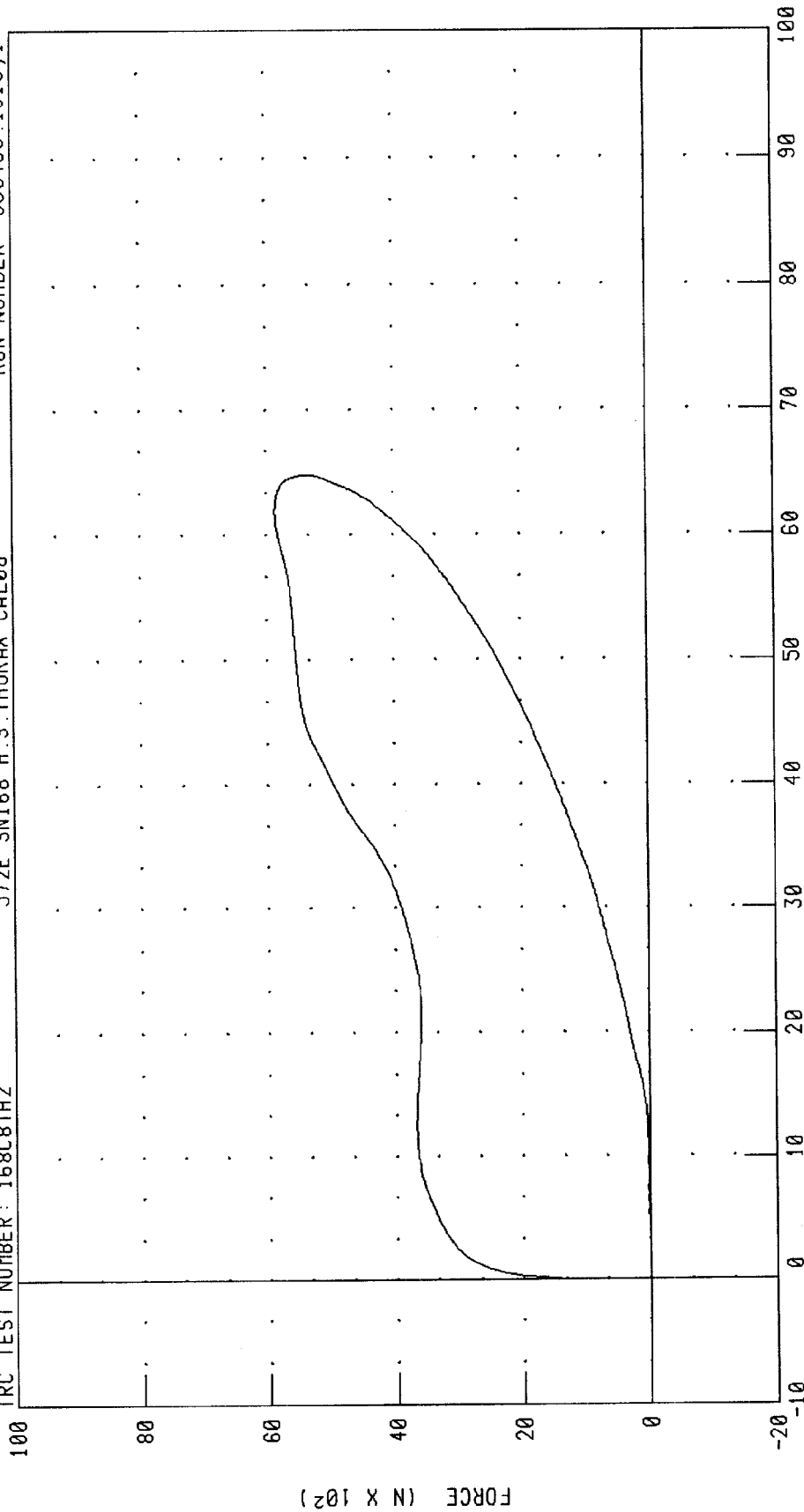
PEAK DATA: 64.77 MM @ 24.24 MS; -0.04 MM @ 0.64 MS

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

TRC TEST NUMBER: 168C8TH2

572E SN168 H.S. THORAX CAL08

RUN NUMBER: 030499.1313;1



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

PEAK DATA:

64.77 MM @ 24.24 MS; -0.04 MM @ 0.64 MS
5864.53 N @ 19.60 MS; -10.69 N @ -0.88 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-MAR-99

TRC 3NC.

TEST NO: 168C8HR1

572E SN 168 HIPFLEX CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.6 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	46.8 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 030399.1454;1

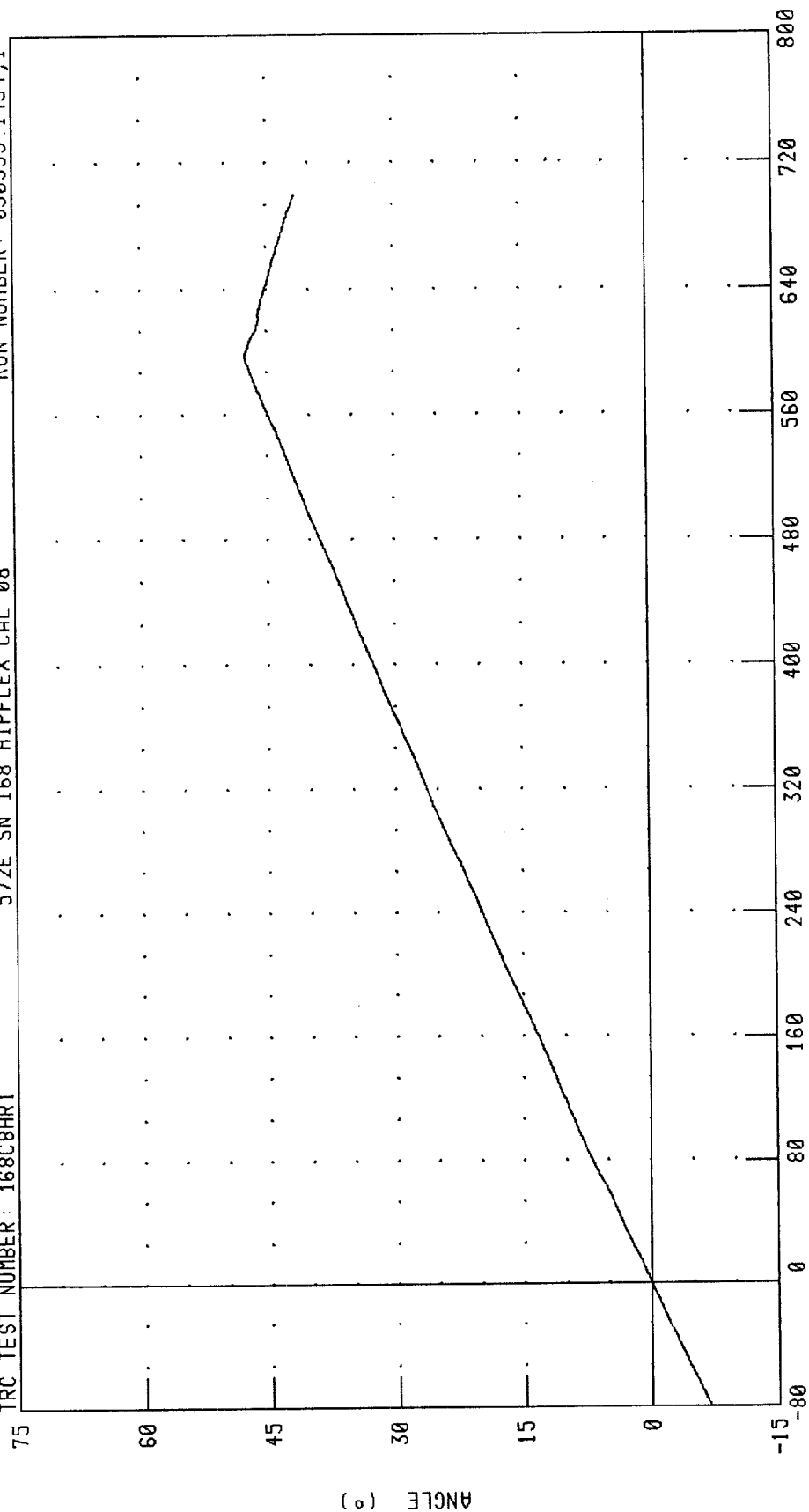
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

572E SN 168 HIPFLEX CAL 08

RUN NUMBER: 030399.1454;1

TRC TEST NUMBER: 168C8HR1



PEAK DATA: 47.55 ° @ 5.97 S; -10.01 ° @ -1.00 S

CHANNEL: RHPXD FILTER: CH. CLASS 60

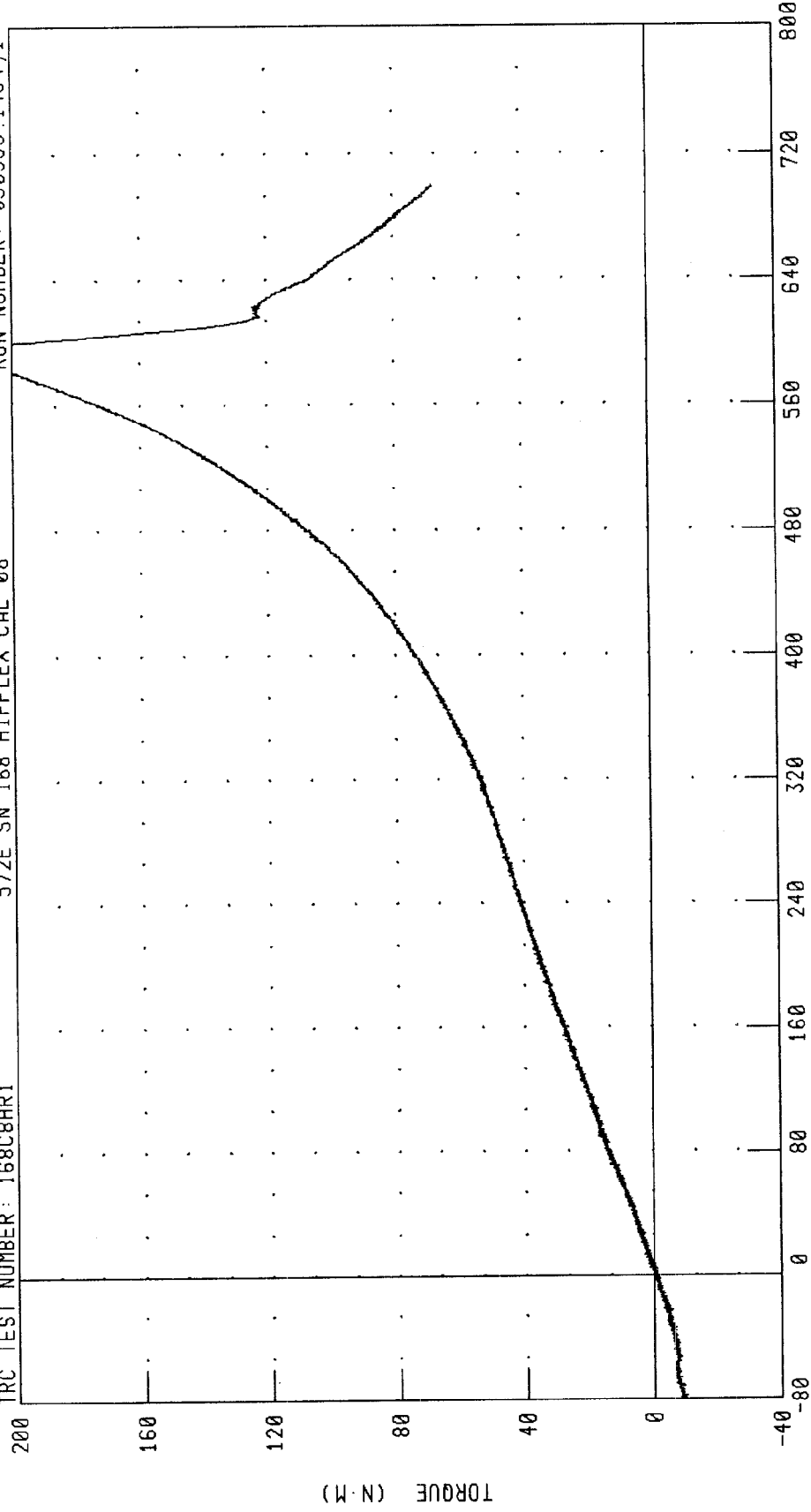
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

572E SN 168 HIPFLEX CAL 08

TRC TEST NUMBER: 168C8HR1

RUN NUMBER: 030399.1454;1



TIME (S X 10⁻²)

PEAK DATA: 216.20 N·M @ 5.94 S; -13.84 N·M @ -0.99 S

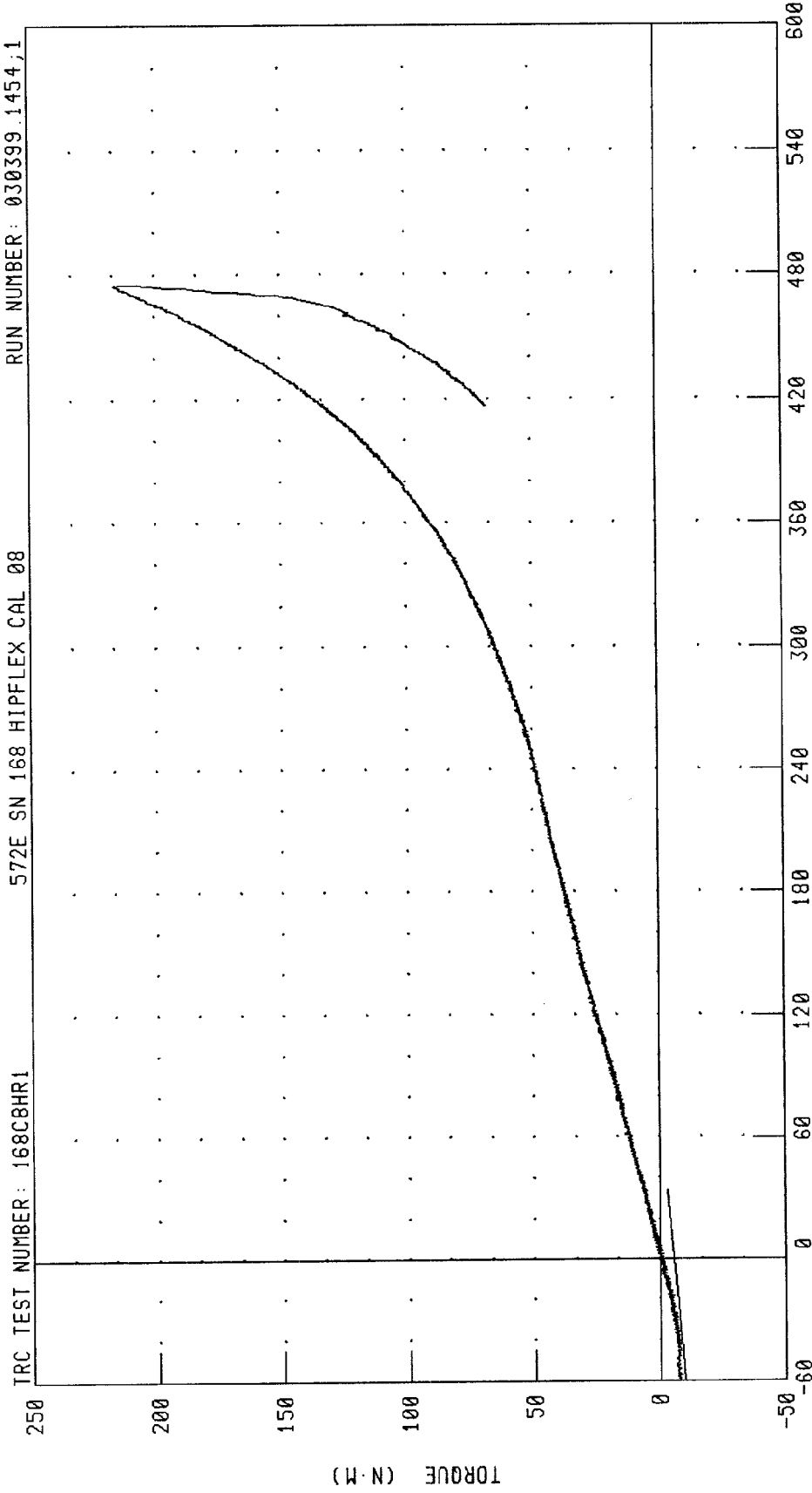
CHANNEL: RHPYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C8HR1

572E SN 168 HIPFLEX CAL 08

RUN NUMBER: 030399.1454;1



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

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-MAR-99

TRC INC.

TEST NO: 168C8HL1

572E SN 168 HIPFLEX CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.7 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.0 deg.

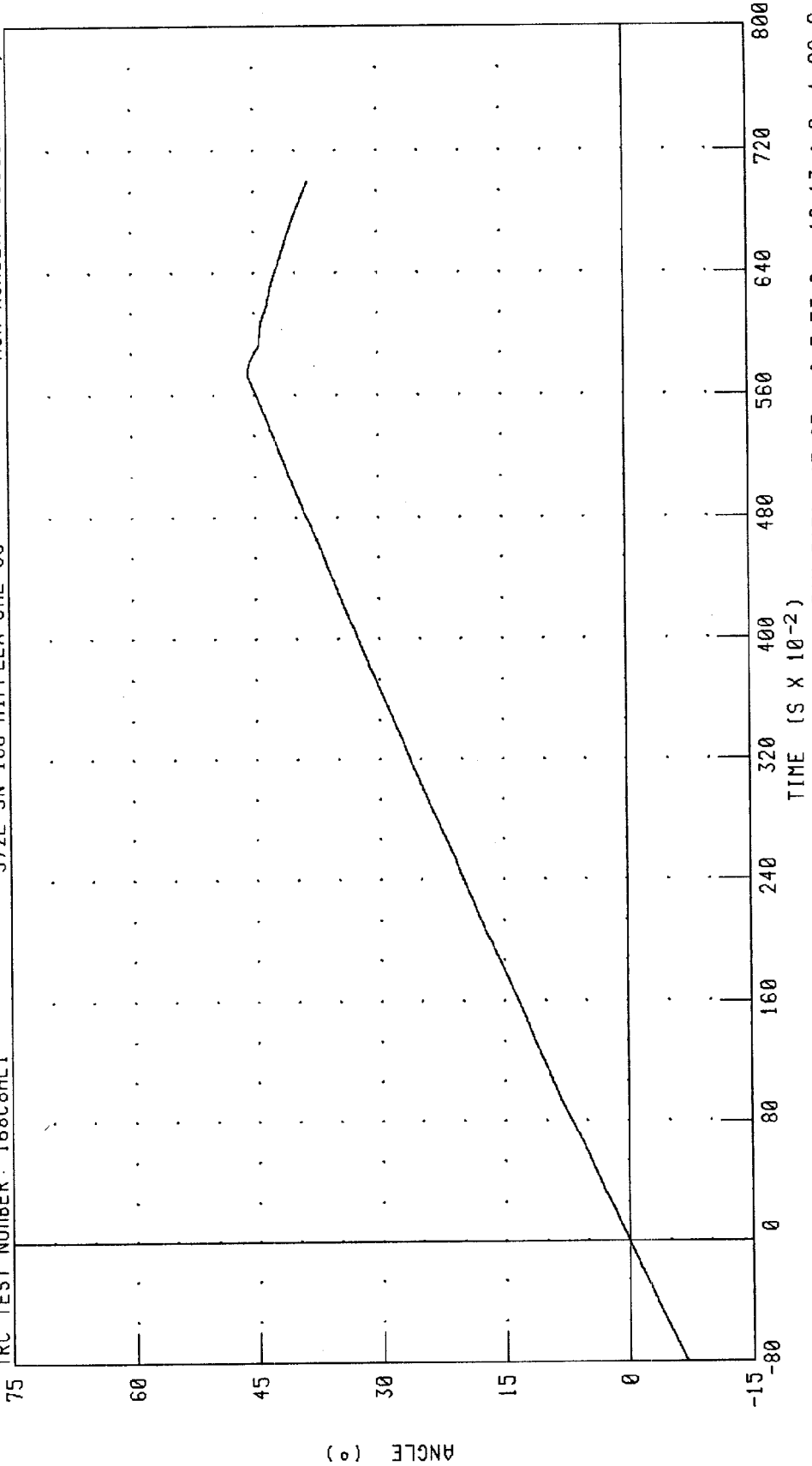
TEST MEETS SPECIFICATIONS.

TECHNICIAN Kevin Watkins

RUN NUMBER: 030399.1446;1

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

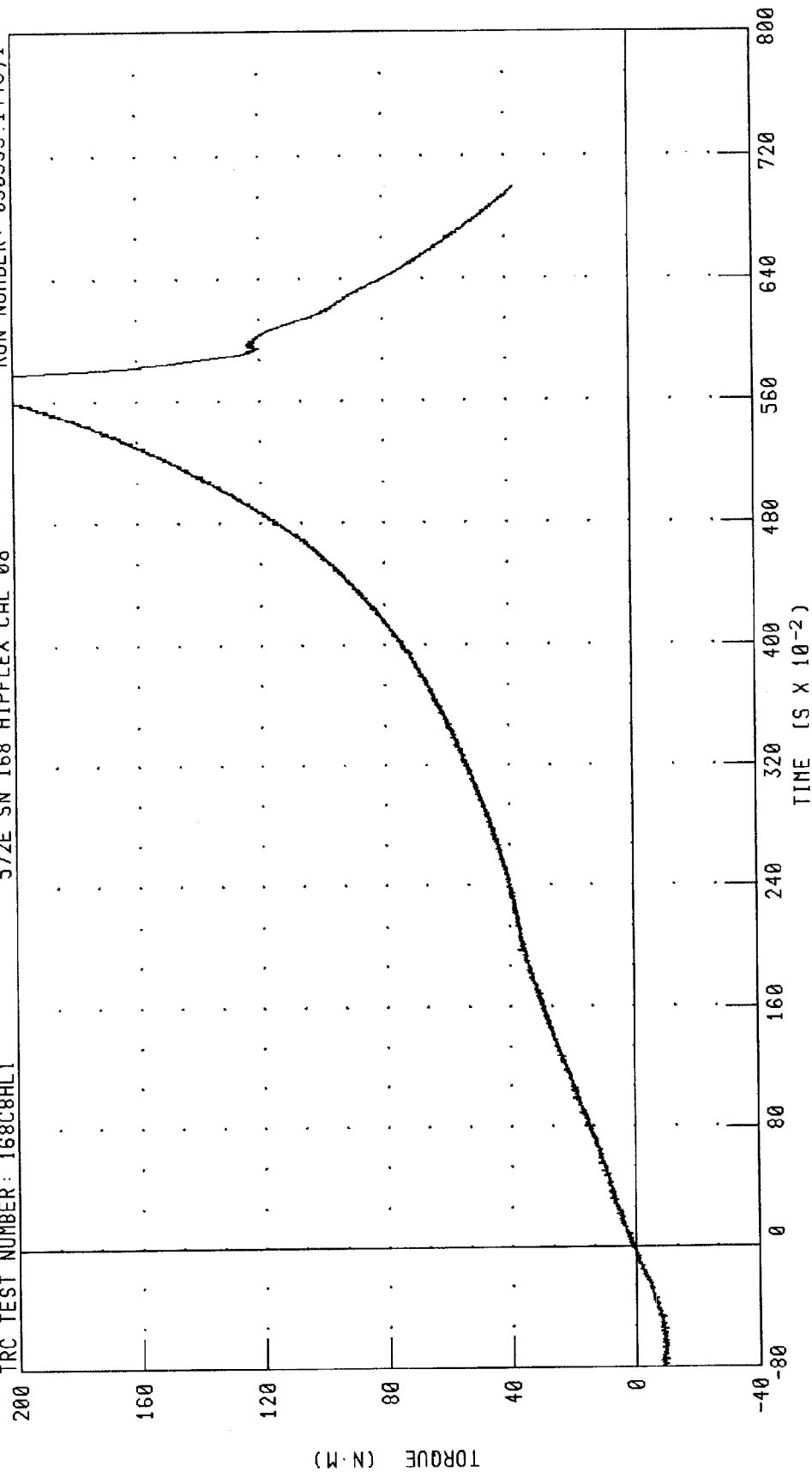
TRC TEST NUMBER: 168C8HL1 572E SN 168 HIPFLEX CAL 08 RUN NUMBER: 030399.1446;1



CHANNEL: LHPXD FILTER: CH. CLASS 60 PEAK DATA: 45.87 ° @ 5.73 S; -10.13 ° @ -1.00 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT

TRC TEST NUMBER: 168C8HL1 572E SN 168 HIPFLEX CAL 08 RUN NUMBER: 030399.1446;1



PEAK DATA: 220.35 N·M @ 5.72 S; -11.15 N·M @ -1.00 S

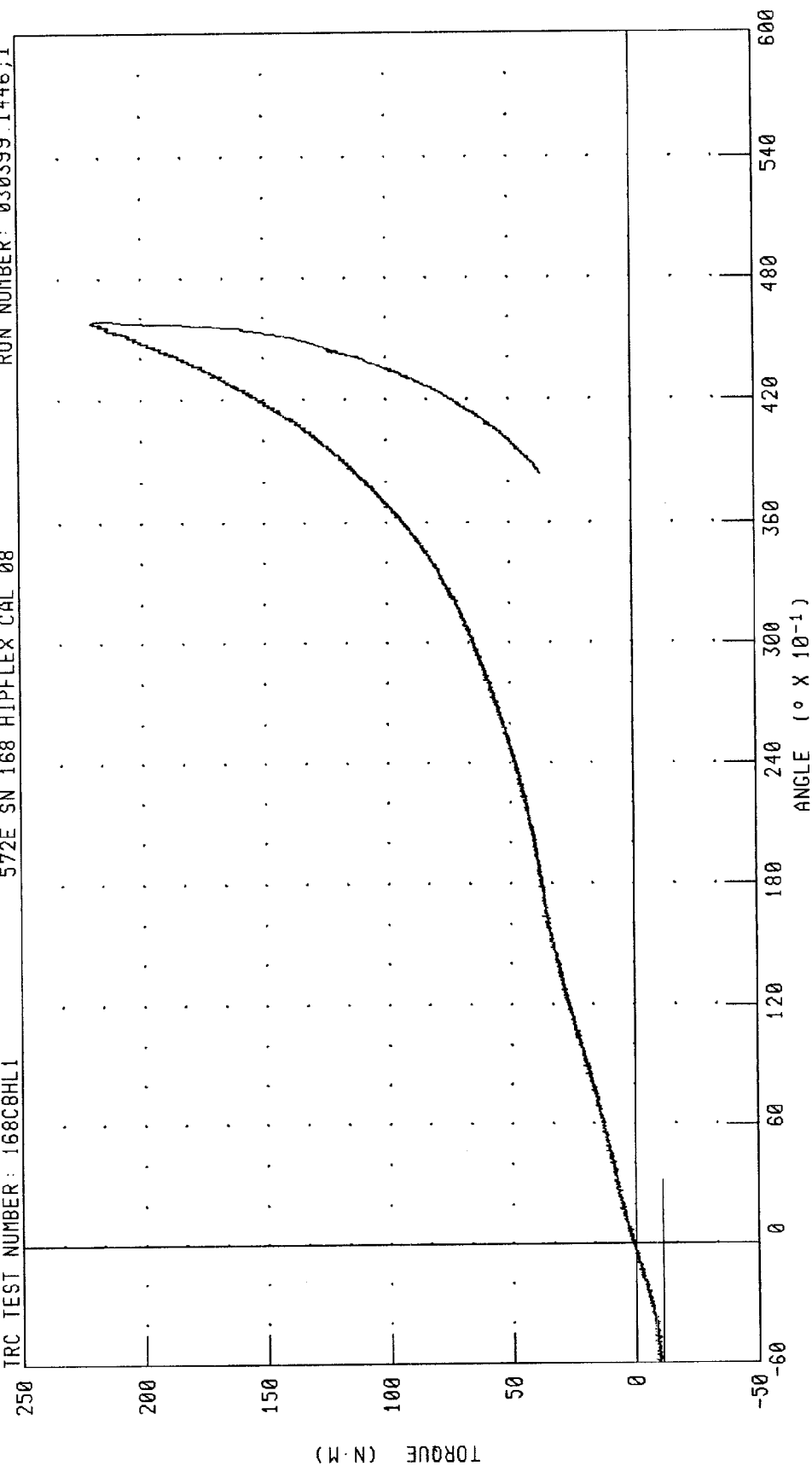
CHANNEL: LHPYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C8HL1

572E SN 168 HIPFLEX CAL 08

RUN NUMBER: 030399.1446;1



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

PEAK DATA:

45.87 ° 0 5.73 S; -10.13 ° 0 -1.00 S
220.35 N-M 0 5.72 S; -11.15 N-M 0 -1.00 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

03-MAR-99

TRC INC.

TEST NO: 168C8RK1

572E SN168 RIGHT KNEE CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5437.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

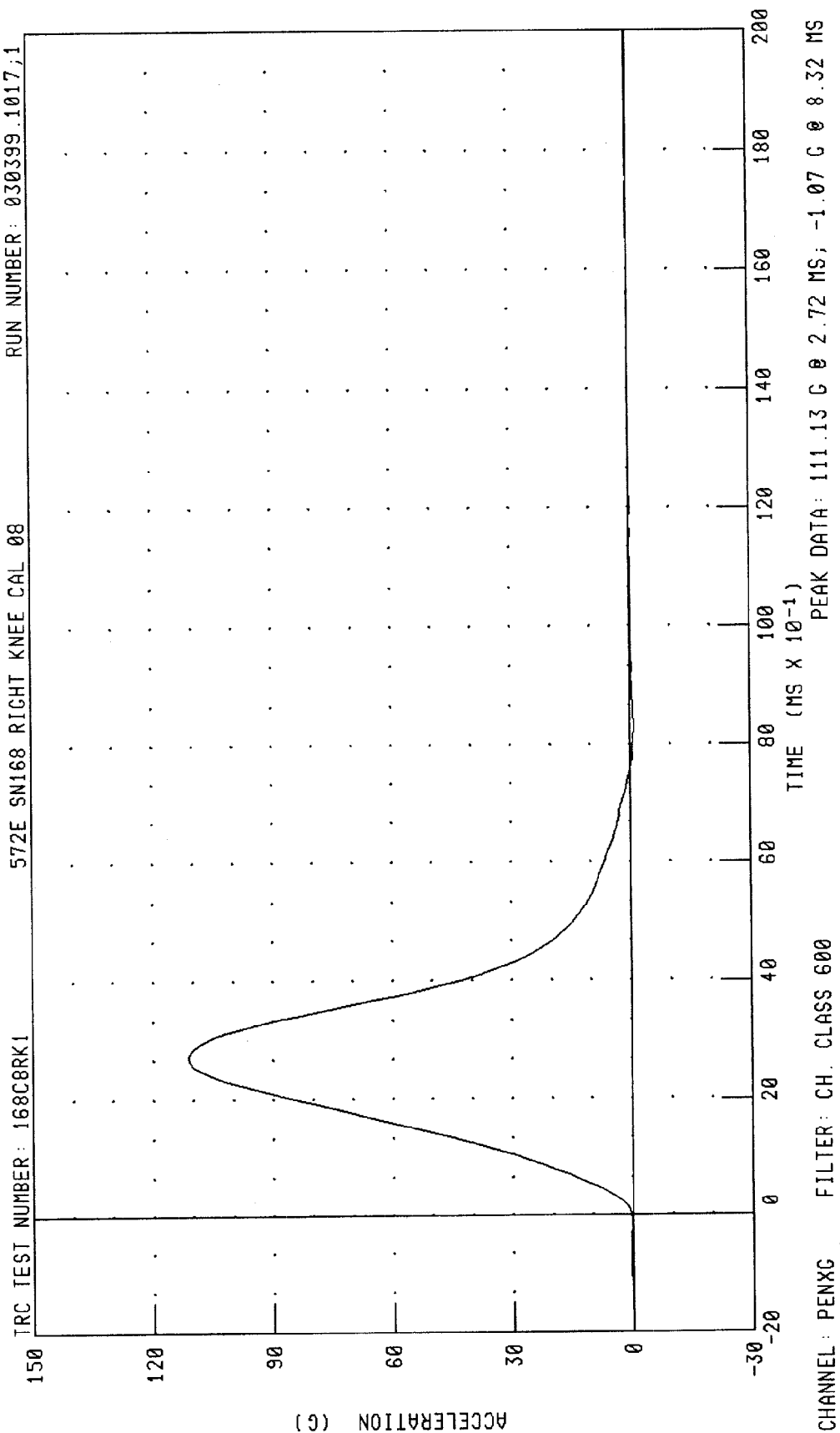
RUN NUMBER: 030399.1016;1

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

TRC TEST NUMBER: 168C8RK1

572E SNI68 RIGHT KNEE CAL 08

RUN NUMBER: 030399.1017,1



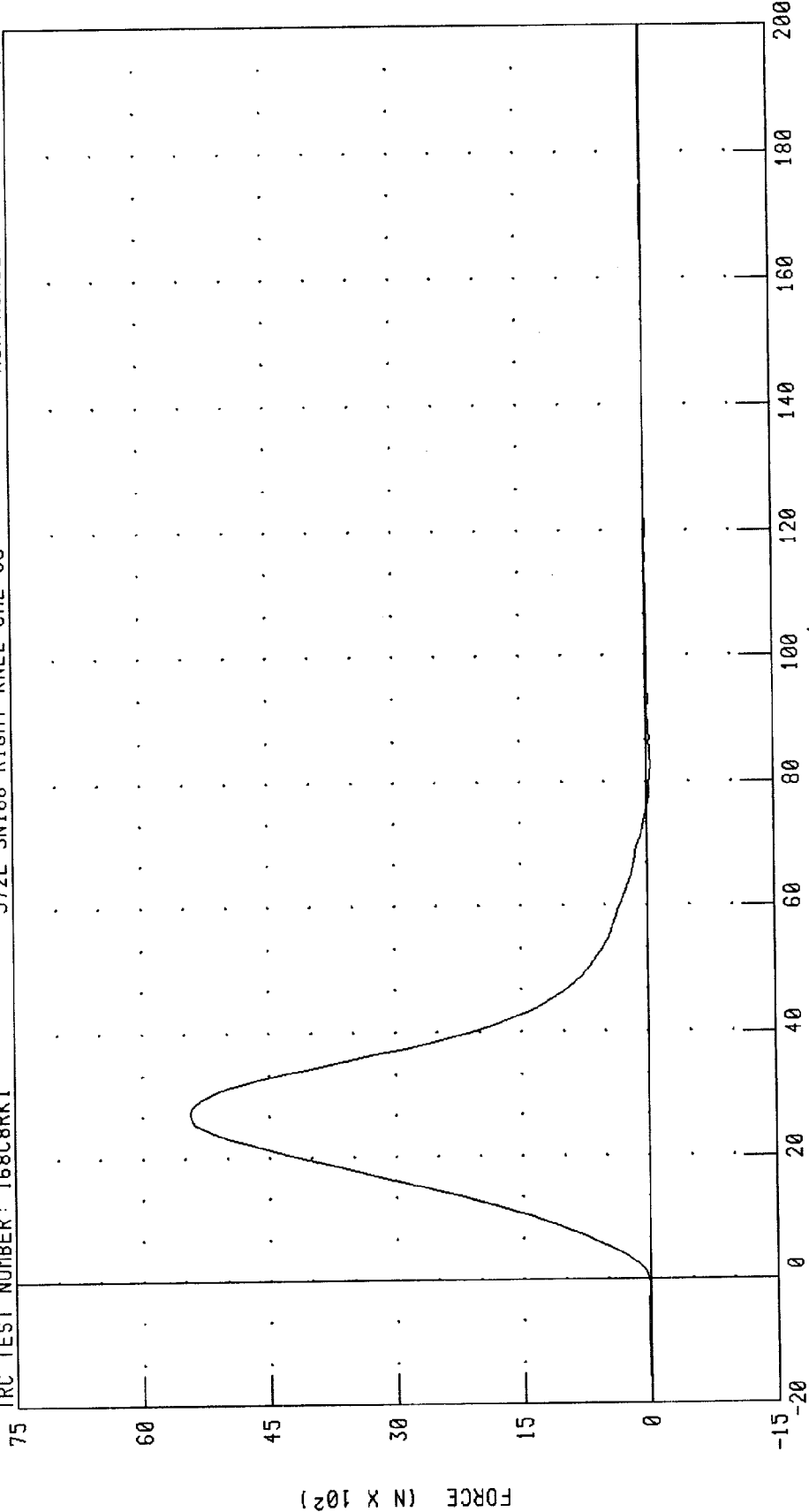
CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 111.13 G @ 2.72 MS; -1.07 G @ 8.32 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
572E SNI68 RIGHT KNEE CAL 08

RUN NUMBER: 030399.1017;1

TRC TEST NUMBER: 168C8RK1



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 5437.61 N @ 2.72 MS; -52.33 N @ 8.32 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

03-MAR-99

TRC INC.

TEST NO: 168C8LK1

572E SN168 LEFT KNEE CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4839.0 N

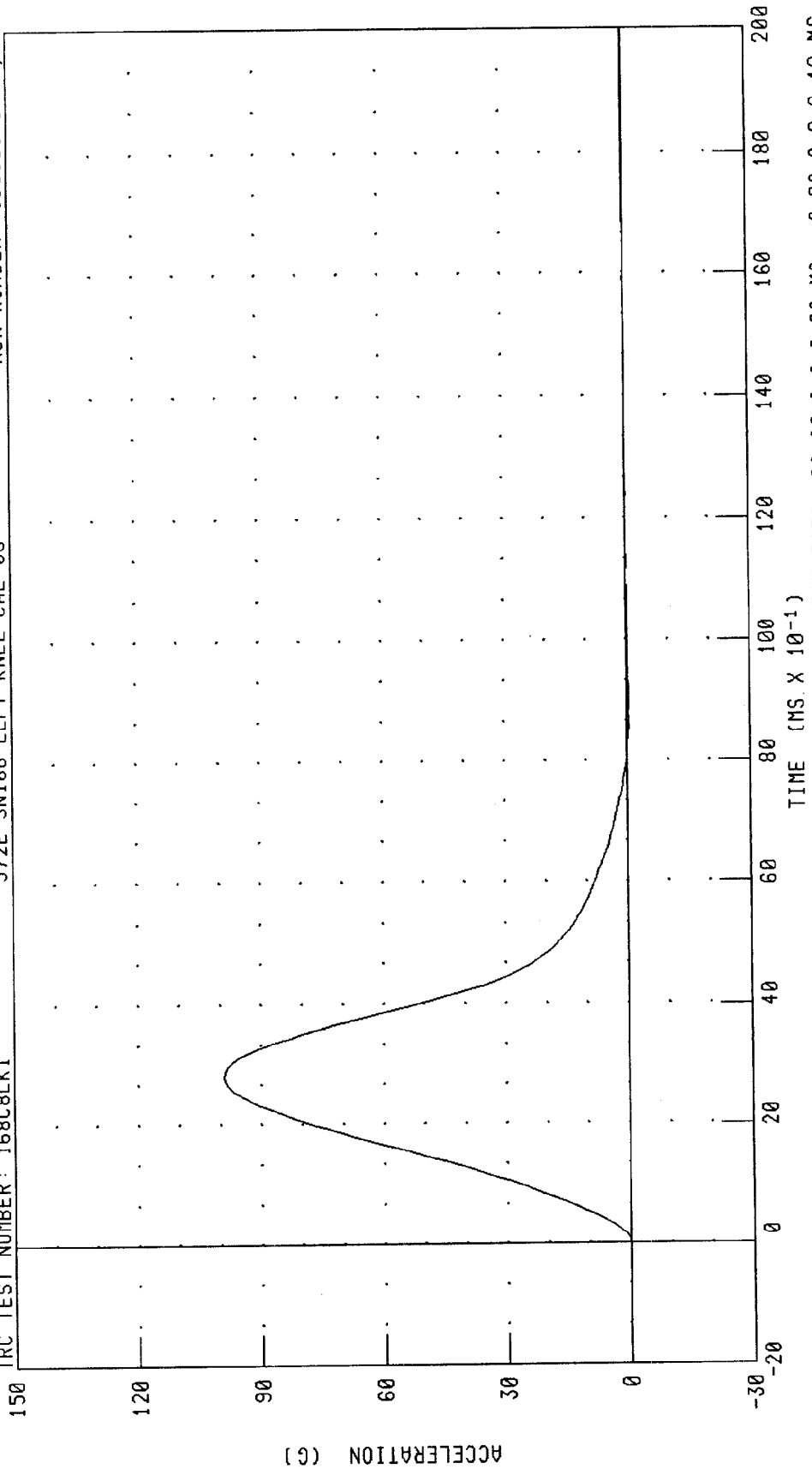
TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 030399.1012;1

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

TRC TEST NUMBER: 168C8LK1 572E SN168 LEFT KNEE CAL 08 RUN NUMBER: 030399.1012;1

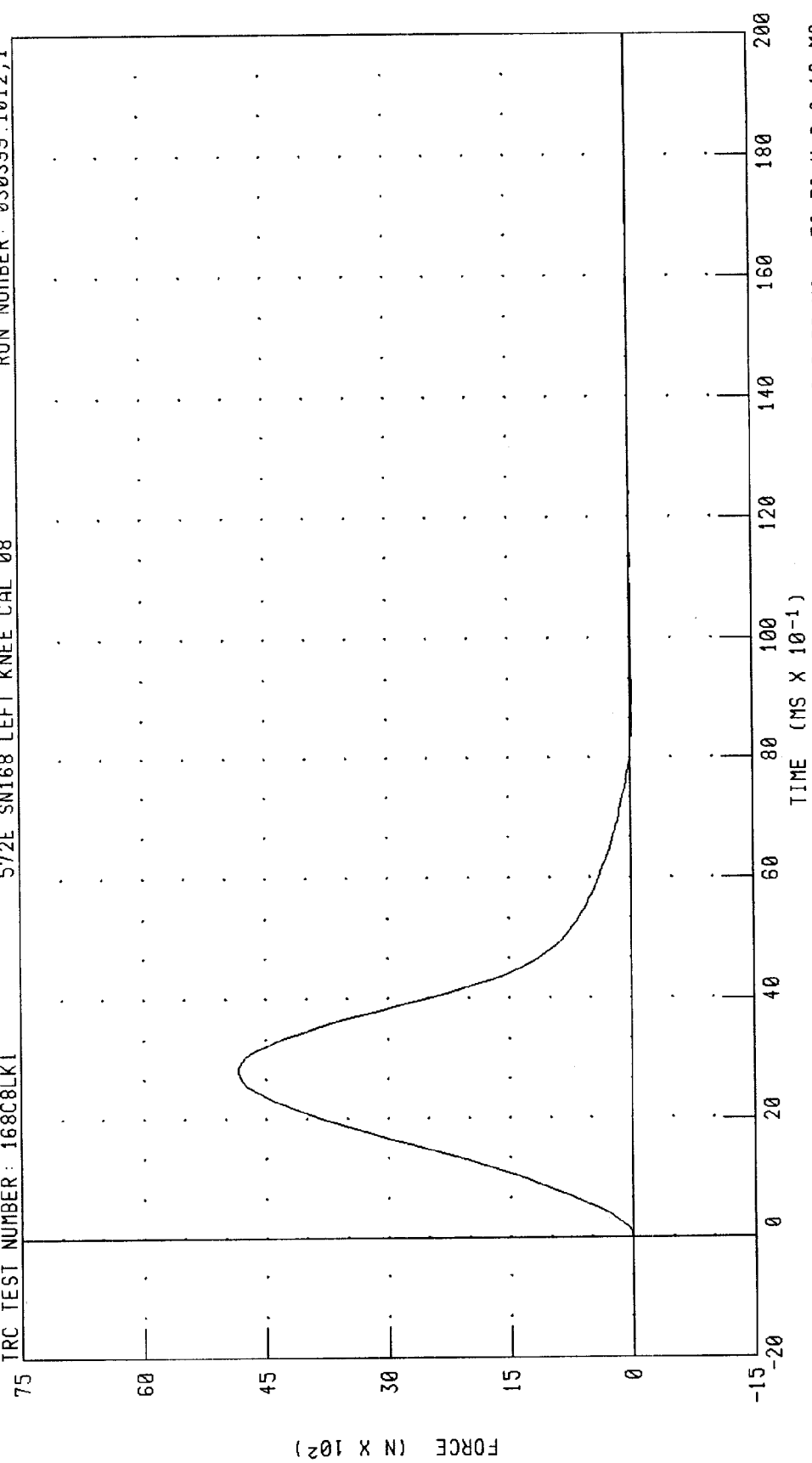


CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 98.90 G @ 2.80 MS; -0.66 G @ 9.12 MS

PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
572E SN168 LEFT KNEE CAL 08

TRC TEST NUMBER: 168C8LK1

RUN NUMBER: 030399.1012,1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 4839.09 N @ 2.80 MS, -32.32 N @ 9.12 MS

Appendix D

Miscellaneous Test Information

Vehicle Instrumentation Placement

Test Number 990223-2

Number	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
1	Left Brake Caliper	X	Entran	EGE-73BE0QT	A28-Z22	Rearward
2	Right Brake Caliper	X	Entran	EGE-73BE0QT	A28-Z09	Rearward
3	Instrument Panel Center	X	Entran	EGE-73BE0QT	A28-Z23	Forward
4	Engine Top	X	Entran	EGE-73BE0QT	A28-Z20	Forward
5	Engine Bottom	X	Entran	EGE-73BE0QT	A28-Z06	Forward
6	Vehicle Rear Center	Z	Entran	EGE-73BE0QT	A28-Z24	Up
7	Left Rear Seat Crossmember	X	Entran	EGE-73BE0QT	A28-Z16	Forward
8	Right Rear Seat Crossmember	X	Entran	EGE-73BE0QT	A28-Z04	Forward

Transducer Information

Hybrid III Dummy Serial No.: 168v

Manufacturer: Humanoid

Seating Position: Driver

Project/Segment No.: 096017-5630

Engineer: M. Postle

Test Date: February 23, 1999

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR. UNITS) DESIRED ACTUAL	DIRECTION OF POSITIVE POLARITY	CABLE NO.
HEDXG HAP	HEAD X-AXIS ACCEL.	7264	J19535	End.	.2649 mv/g at 10 volts	8-3- 1999	400 g	Rear	J19535
HEDYG HLR	HEAD Y-AXIS ACCEL.	"	J19548	"	.2192 mv/g at 10 volts	"	400 g	Left	J19548
HEDZG HIS	HEAD Z-AXIS ACCEL.	"	J20026	"	.2527 mv/g at 10 volts	"	400 g	Up	J20026
NEKXF NFX*	NECK X-AXIS SHEAR FORCE	1716A	0853	Dento n.	1.7387 MV/V @ 2000 LBS	"	900 Kg 2,000 lbs. 9,000 N		FX
NEKYF NFY*	NECK Y-AXIS SHEAR FORCE	"	"	"	1.6587 MV/V @2000 LBS	"	900 Kg 2,000 lbs. 9,000 N		FY
NEKZF NFZ*	NECK Z-AXIS AXIAL FORCE	"	"	"	1.2806 MV/V @3000 LBS	"	1300 Kg 3,000 lbs. 13,500 N		FZ
NEKXM NMX*	NECK MOMENT ABOUT X AXIS	"	"	"	1.6595 MV/V @2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m		MX
NEKYM NMY*	NECK MOMENT ABOUT Y AXIS	"	"	"	1.6596 MV/V @2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m		MY
NEKZM NMZ*	NECK MOMENT ABOUT Z AXIS	"	"	"	2.3663 MV/V @2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m		MZ

Transducer Information

Hybrid III Dummy Serial No.: 168v

Manufacturer: Humanoid

Seating Position: Driver

Project/Segment No.: 096017-5630

Engineer: M. Postle

Test Date: February 23, 1999

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR UNITS) DESIRED	ACTUAL	DIRECTION OF POSITIVE POLARITY	CABLE NO.
CSTXG CAP	CHEST X-AXIS ACCEL.	7264	J20011	End.	.2324 mv/g at 10 volts	8-3- 1999	400 g		Forward	J20011
CSTYG CLR	CHEST Y-AXIS ACCEL.	"	J20001	"	.2709 mv/g at 10 volts	"	400 g		Left	J20001
CSTZG CIS	CHEST Z-AXIS ACCEL.	"	J20438	"	.2313 mv/g at 10 volts	"	400 g		Up	J20438
CSTXD CAPD	CHEST DEFLECTION	14CB1- 2847	168	SERV	27.89 mv/v /in	8-3- 1999	6 inch 150 mm			168
PEVXG PAP	PELVIS X-AXIS ACCEL.						400 g			
PEVYG PLR	PELVIS Y-AXIS ACCEL.						400 g			
PEVZG PIS	PELVIS Z-AXIS ACCEL.						400 g			
LFMF LF	LEFT FEMUR FORCE	2430	726	DENT	0.9495 mv/v at 3000 lbs.	8-3- 1999	1300 Kg 3,000 lbs. 13,500 N			726
RFMF RF	RIGHT FEMUR FORCE	"	741	"	0.9030 mv/v at 3000 lbs.	"	1300 Kg 3,000 lbs. 13,500 N			741

Transducer Information

Hybrid III Dummy Serial No.: 169v
 Project/Segment No.: 096017-5630
 Manufacturer: Humanoid
 Engineer: M. Postle
 Seating Position: Passenger
 Test Date: February 23, 1999

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR. UNITS) DESIRED ACTUAL	DIRECTION OF POSITIVE POLARITY	CABLE NO.
HEDXG HAP	HEAD X-AXIS ACCEL.	7264	J21935	End.	.2409 mv/g at 10 volts	8-3- 1999	400 g	Rear	J21935
HEDYG HLR	HEAD Y-AXIS ACCEL.	"	J23912	"	.2827 mv/g at 10 volts	"	400 g	Left	J23912
HEDZG HIS	HEAD Z-AXIS ACCEL.	"	J23810	"	.2826 mv/g at 10 volts	"	400 g	Up	J23810
NEKXF NFX*	NECK X-AXIS SHEAR FORCE	1716	0106	Dento n.	1.7167 MV/V @ 2000 LBS	8-3- 1999	900 Kg 2,000 lbs. 9,000 N		FX
NEKYF NFY*	NECK Y-AXIS SHEAR FORCE	"	"	"	1.6802 MV/V @ 2000 LBS	"	900 Kg 2,000 lbs. 9,000 N		FY
NEKZF NFZ*	NECK Z-AXIS AXIAL FORCE	"	"	"	1.2943 MV/V @ 3000 LBS	"	1300 Kg 3,000 lbs. 13,500 N		FZ
NEKXM NMX*	NECK MOMENT ABOUT X AXIS	"	"	"	1.6148 MV/V @ 2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m		MX
NEKYM NMY*	NECK MOMENT ABOUT Y AXIS	"	"	"	1.6205 MV/V @ 2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m		MY
NEKZM NMZ*	NECK MOMENT ABOUT Z AXIS	"	"	"	2.2982 MV/V @ 2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m		MZ

Transducer Information

Hybrid III Dummy Serial No.: 169v Manufacturer: Humanoid Seating Position: Passenger
 Project/Segment No.: 096017-5630 Engineer: M. Postle Test Date: February 23, 1999

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR. UNITS) DESIRED ACTUAL		DIRECTION OF POSITIVE POLARITY	CABLE NO.
CSTXG CAP	CHEST X-AXIS ACCEL.	7264	J23914	End.	.2528 mv/g at 10 volts	8-3- 1999	400 g		Forward	J23914
CSTYG CLR	CHEST Y-AXIS ACCEL.	"	J23808	"	.2843 mv/g at 10 volts	"	400 g		Left	J23808
CSTZG CIS	CHEST Z-AXIS ACCEL.	"	J23774	"	.2405 mv/g at 10 volts	"	400 g		Up	J23774
CSTXD CAPD	CHEST DEFLECTION	14CB1- 2847	169	SERV	28.26 mv/v /in	8-3- 1999	6 inch 150 mm			169
PEVXG PAP	PELVIS X-AXIS ACCEL.						400 g			
PEVYG PLR	PELVIS Y-AXIS ACCEL.						400 g			
PEVZG PIS	PELVIS Z-AXIS ACCEL.						400 g			
LFMF LF	LEFT FEMUR FORCE	2430	96661	GSE	0.8816 mv/v at 3000 lbs.	8-3- 1999	1300 Kg 3,000 lbs. 13,500 N			D105
RFMF RF	RIGHT FEMUR FORCE	"	96662	"	0.8605 mv/v at 3000 lbs.	"	1300 Kg 3,000 lbs. 13,500 N			709

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

Description Of Timing Marks On TRC High-Speed Film

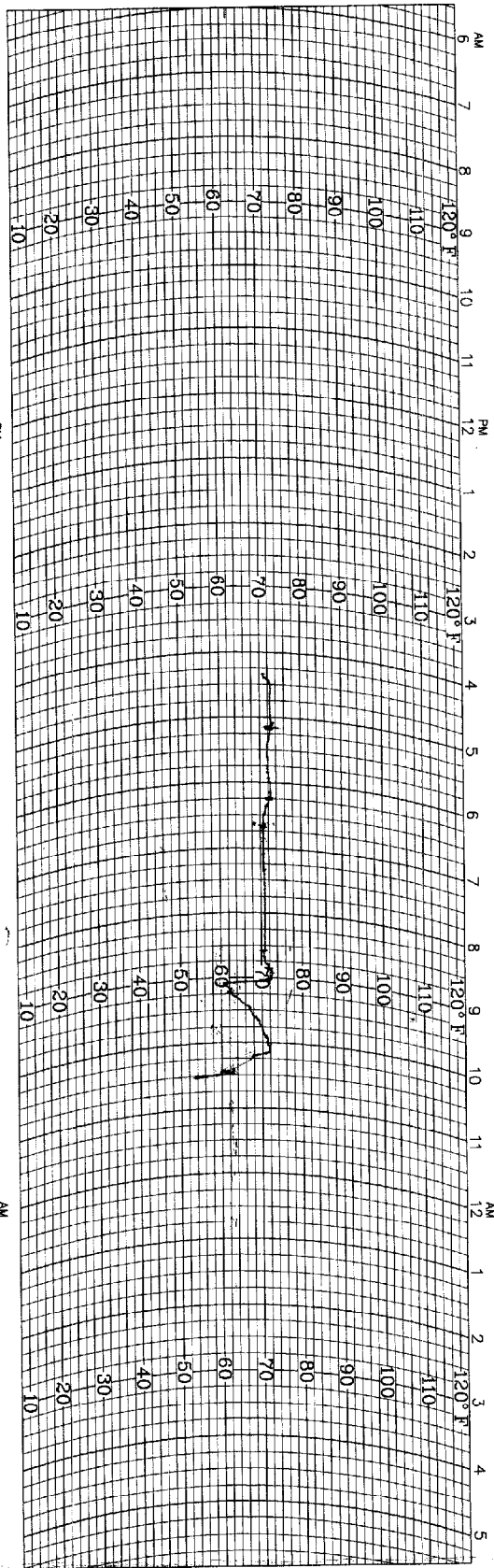
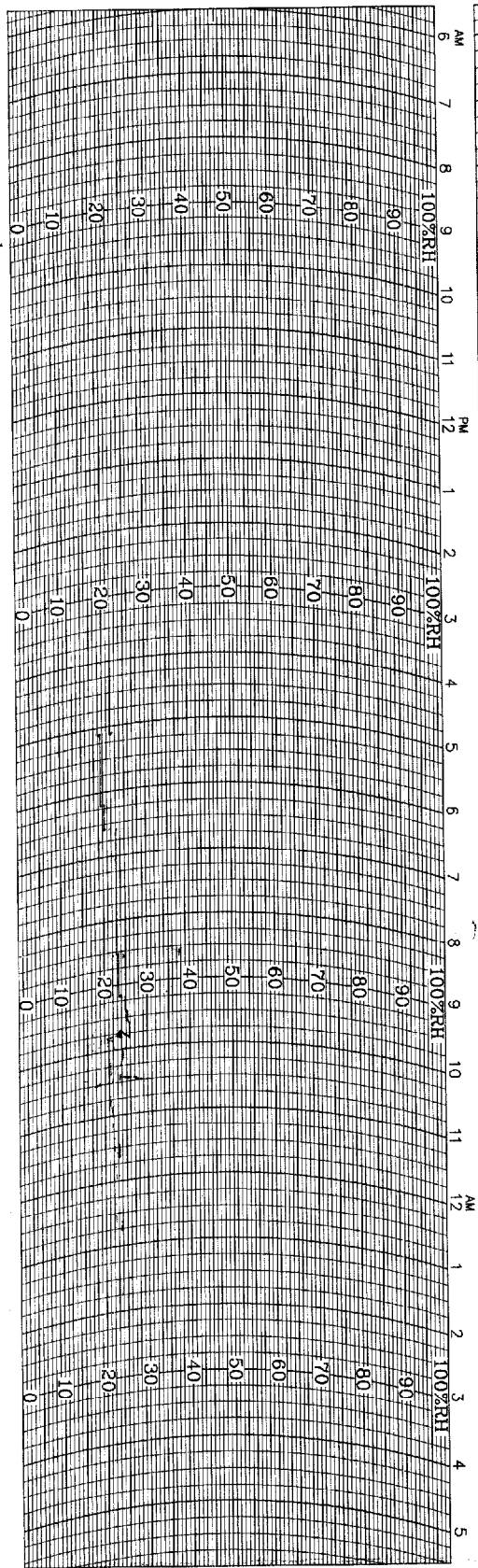
All TRC high-speed cameras are equipped with red LED's,, which put timing marks on the right edge of the film. TRC uses a single timing generator to generate the timing for all cameras.

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** LED's appear in it. These indicate a *millisecond* pulse plus a *hundredth of a second* pulse.
3. Every one hundred frames will have **three** LED's appear in it. These indicate a *millisecond* pulse, a *hundredth of a second* pulse, and a *tenth of a second* pulse.



WeatherMeasure
WEATHERtronic
 Division of QUALIMETRICS, Inc.

P.O. BOX 41039
 SACRAMENTO, CA 95841
 PHONE: (916) 923-0055

HYGROTHERMOGRAPH
 1 DAY

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

STATION _____ DATE ON _____ DATE OFF _____