V3225

# 2000 Ford Taurus
# into a Flat Frontal Barrier
# TRC Test Number: 991209-1

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## Purpose and Test Summary

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

This test was conducted with a 2000 Ford Taurus that impacted a flat frontal barrier. The test vehicle contained two instrumented Hybrid III 5$^{th}$ percentile adult female dummies.

## Test Procedure

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

The test vehicle was instrumented with twelve (12) accelerometers to measure longitudinal, lateral, and vertical axis accelerations and four (4) airbag squib circuits to measure airbag fire times. The vehicle's specified impact velocity range was 43.5 to 45.1 km/h. The vehicle impacted a flat frontal barrier.

The test vehicle contained two (2) Hybrid III 5$^{th}$ percentile adult female anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to SAE's recommended practice (Hybrid III Small Female Dummy Seating Procedure).

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

The forty-six (46) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

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

## Test Results Summary

This flat frontal barrier test was conducted at TRC on December 9, 1999.

The test vehicle, a 2000 Ford Taurus, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 1655.6 kilograms. The vehicle's impact speed was 44.0 km/h. The vehicle's maximum static crush was 331 millimeters.

The driver's 15-millisecond HIC was 101 and its 36-millisecond HIC was 188. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.8 g. The driver's chest deflection was 45 millimeters. The driver's left and right femur maximum compressive forces were 4369 N and 5057 N, respectively.

The right front passenger's 15-millisecond HIC was 126 and its 36-millisecond HIC was 216. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47.8 g. The passenger's chest deflection was 10 millimeters. The right front passenger's left and right femur maximum compressive forces were 4037 N and 4692 N, respectively.

## Data Acquisition Explanation

The vehicle's Left Seat X-axis acceleration data channel, TLRXG1, exceeded the channel's full scale at approximately 50 milliseconds.

Table 1 Crash Test Summary

| | |
|---|---|
| Test type: | Frontal barrier impact |
| Test date: | 12/09/99 |
| Test time: | 1116 |
| Ambient temperature at impact area: | 21° C |
| Vehicle year/make/ model/body style: | 2000/Ford/Taurus/Sedan |
| Vehicle test weight: | 1655.6 kg |
| Impact angle[1]: | 0° |
| Impact velocity[2]: | |
| Primary: | 44.0 km/h |
| Secondary[3]: | N/A |
| Maximum static crush: | 331 mm |
| Average rebound: | 2082 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 (± .08 km/h accuracy)
[3] The secondary light trap did not work properly.

Table 1 Crash Test Summary, Cont'd.

| Dummies: | Driver #283 | Passenger #369 |
|---|---|---|
| Type: | Hybrid III 5th percentile adult female | Hybrid III 5th percentile adult female |
| Location: | Left front | Right front |
| Restraint: | Airbag | Airbag |
| Number of data channels: | 15 | 15 |
| Front seat data: | | |
| Seat track failure: | None | None |
| Seat back failure: | None | None |
| Visible dummy contact points: | | |
| Head: | Airbag/head rest | Airbag |
| Chest: | Airbag | Airbag |
| Abdomen: | Steering wheel rim | None |
| Left knee: | Instrument panel | Instrument panel |
| Right knee: | Instrument panel | Instrument panel |

Table 2 Test Vehicle Information

| | |
|---|---|
| Vehicle year/make/ model/body style: | 2000/Ford/Taurus/Sedan |
| Color: | White |
| VIN: | 1FAFP52U9YG108001 |
| Engine data: | |
| Placement: | Transverse |
| Cylinders: | V-6 |
| Displacement: | 3.0 liters |
| Transmission data: | _4_speed, ___manual, _X_automatic, _X_overdrive |
| Final drive: | _X_fwd, ___rwd, ___4wd |
| Date vehicle received: | 12/8/99 |
| Odometer reading: | 8 miles |
| Dealer's name and address: | Ricart Ford, Inc.<br>Columbus, OH 43227 |

Accessories:

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

Certification data from vehicle's label:

| | | |
|---|---|---|
| Vehicle manufactured by: | | Ford Motor Company |
| Date of manufacture: | | 11/99 |
| VIN: | | 1FAFP52U9YG108001 |
| GVWR: | | 2122 kg |
| GAWR: | Front: | 1165 kg |
| | Rear: | 968 kg |

Table 2 Test Vehicle Information, Cont'd.

| | |
|---|---|
| Size of tires on vehicle: | P215/60R16 |
| Spare tire: | Space saver |
| Type of front seats: | Split bench |

Tire & capacity data from vehicle's label:

| | |
|---|---|
| Recommended tire size: | P215/60TR16 |
| Recommended cold tire pressure: | |
| Front: | 30 psi |
| Rear: | 30psi |
| Designated Seating Capacity: | |
| Front | 3 |
| Rear | 3 |
| Total | 6 |
| Vehicle Cargo Weight: | 91 kg |

Test vehicle attitudes:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Delivered attitude: | LF: | 721 mm | RF: | 733 mm | LR: | 700 mm | RR: | 711 mm |
| Fully loaded attitude: | LF: | 713 mm | RF: | 725 mm | LR: | 660 mm | RR: | 670 mm |
| Pre-test attitude: | LF: | 705 mm | RF: | 715 mm | LR: | 654 mm | RR: | 662 mm |
| Post-test attitude: | LF: | 726 mm | RF: | 733 mm | LR: | 653 mm | RR: | 651 mm |

Table 2 Test Vehicle Information, Cont'd.

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

| | | | |
|---|---|---|---|
| Right front | 469.0 kg | Right rear | 266.7 kg |
| Left front | 479.4 kg | Left rear | 262.2 kg |
| Total front weight | 948.4 kg | (64.2% of total vehicle weight) | |
| Total rear weight | 528.9 kg | (35.8% of total vehicle weight) | |
| Total delivered weight | 1477.3 kg | | |

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1477.3 kg)

DSC = Designated Seating Capacity (6)

RCLW = 90.7 kg

Target test weight = UDW + RCLW + (number of Hybrid III Dummies x 47.6 kg per dummy)

Target test weight = 1477.3 + 90.7 + 95.2 = 1663.2 kg

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

| | | | |
|---|---|---|---|
| Right front | 497.1 kg | Right rear | 322.9 kg |
| Left front | 488.1 kg | Left rear | 347.5 kg |
| Total front weight | 985.2 kg | (59.5% of total vehicle weight) | |
| Total rear weight | 670.4 kg | (40.5% of total vehicle weight) | |
| Total test weight | 1655.6 kg | (0.5% under target test weight) | |

Weight of ballast secured in vehicle: 50 lbs behind the front passenger's seat

Components removed to meet target test weight: None

CG rearward of front wheel centerline: 1115 mm

Vehicle Wheelbase: 2755 mm

Table 3 Post-Impact Data

| | |
|---|---|
| Test number: | 991209-1 |
| Test date: | 12/9/99 |
| Test time: | 1116 |
| Test type: | Frontal barrier impact |
| Impact angle: | 0° |
| Ambient temperature at impact area: | 21° C |
| Temperature in occupant compartment: | 21° C |

Impact velocity:

| | |
|---|---|
| Primary: | 44.0 km/h |
| Secondary[1] | N/A |
| Specified range: | 43.5 to 45.1 km/h |

Distance from vehicle to barrier:

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

Test vehicle static crush:

Overall length of test vehicle:

| | | | | | |
|---|---|---|---|---|---|
| Pre-test: | L: | 4910 mm | C: 5110 mm | R: | 4910 mm |
| Post-test: | L: | 4704 mm | C: 4784 mm | R: | 4595 mm |
| Total crush: | L: | 206 mm | C 326 mm | R: | 315 mm |
| Average crush: | 282 mm | | | | |

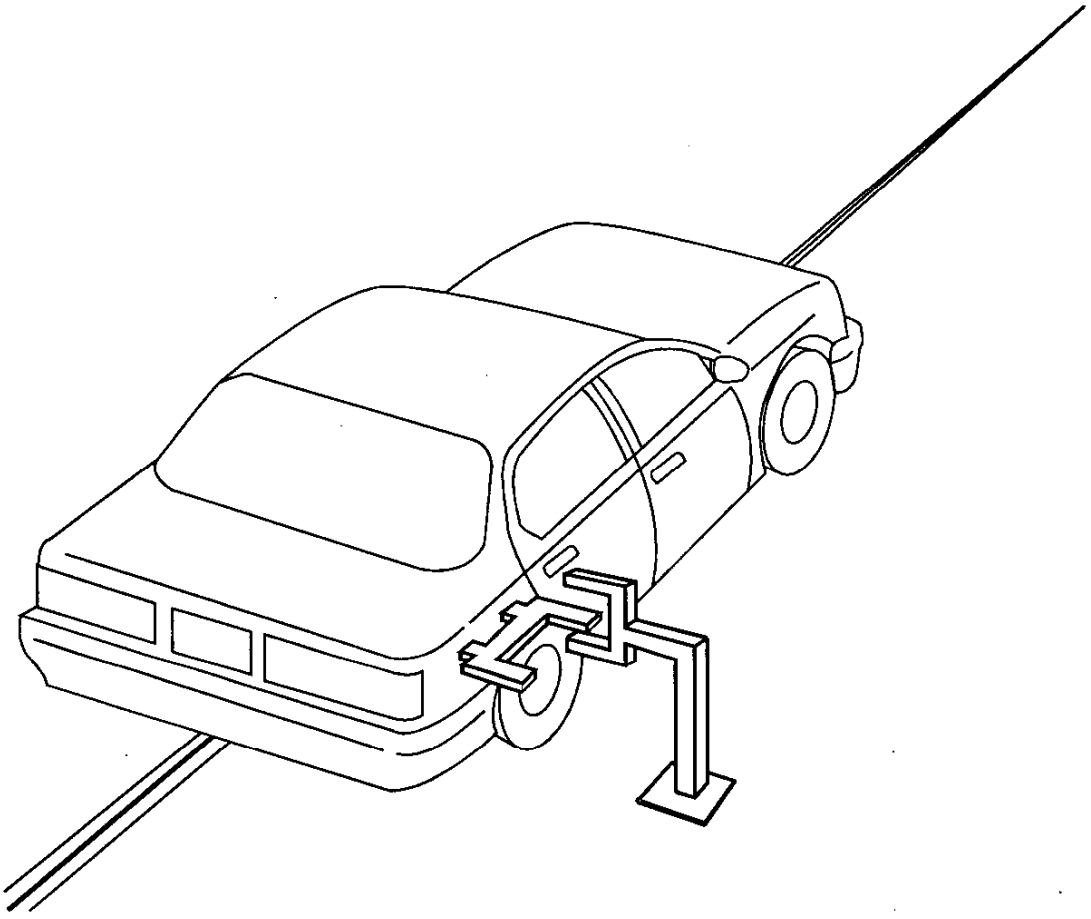
Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

| | | | | | |
|---|---|---|---|---|---|
| Post-test: | L: | 2040 mm | C: 2000 mm | R: | 2205 mm |
| Average rebound: | 2082 mm | | | | |

[1] The secondary light trap did not work properly.

Figure 1 Impact Velocity Measurement System

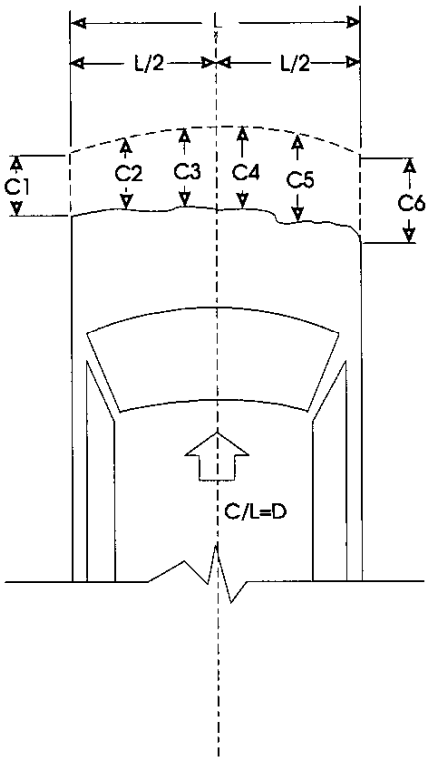


The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

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

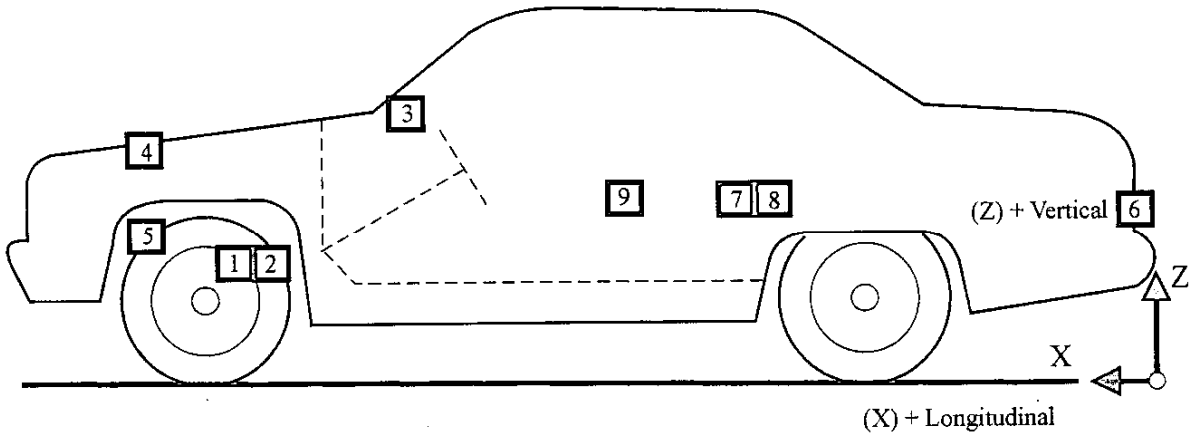
| | |
|---|---|
| Test date: | 12/9/99 |
| Vehicle year/make/ model/body style: | 2000/Ford/Taurus/Sedan |
| VIN: | 1FAFP52U9YG108001 |
| Build date: | 11/99 |
| Test weight: | 1655.6 kg |
| Vehicle wheelbase: | 2755 mm |
| Maximum width: | 1850 mm |
| Front overhang: | 1070 mm |



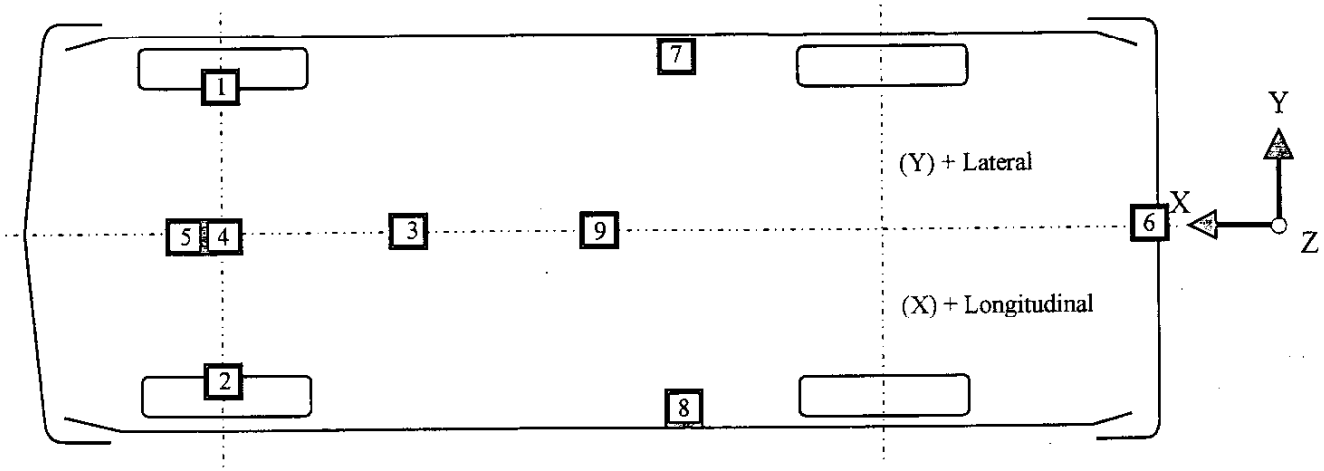

Collision Deformation Classification (CDC) Code: 12FDAW3

| | |
|---|---|
| Crush depth measurements: | C1: 206 mm |
| | C2: 297 mm |
| | C3: 321 mm |
| | C4: 331 mm |
| | C5: 310 mm |
| | C6: 315 mm |
| Midpoint of damage: | D: Vehicle Longitudinal Centerline |
| Length of damaged region: | L: 1524 mm |

Figure 3 Vehicle Accelerometer Placement




Side View




Bottom View

Table 4 Vehicle Accelerometer Locations and Data Summary

| TEST NUMBER: 991209-1<br>No. LOCATION | | X | Y | Z | POSITIVE DIRECTION | | NEGATIVE DIRECTION | |
|---|---|---|---|---|---|---|---|---|
| 1 LEFT BRAKE CALIPER | PRE | 4100 mm | 680 mm | 290 mm | | | | |
| | POST | 4062 mm | 728 mm | 283 mm | | | | |
| LONGITUDINAL | | | | | 19.6 g | @ 42.5 ms | 63.0 g | @ 48.2 ms |
| 2 RIGHT BRAKE CALIPER | PRE | 4100 mm | -680 mm | 285 mm | | | | |
| | POST | 4062 mm | -680 mm | 286 mm | | | | |
| LONGITUDINAL | | | | | 16.1 g | @ 54.6 ms | 68.1 g | @ 35.6 ms |
| 3 INSTRUMENT PANEL CENTER | PRE | 3340 mm | 0 mm | 1018 mm | | | | |
| | POST | 3330 mm | 0 mm | 980 mm | | | | |
| LONGITUDINAL | | | | | 12.6 g | @ 11.5 ms | 41.0 g | @ 35.8 ms |
| 4 ENGINE TOP | PRE | 4175 mm | -110 mm | 980 mm | | | | |
| | POST | 4013 mm | -110 mm | 848 mm | | | | |
| LONGITUDINAL | | | | | 7.7 g | @ 56.7 ms | 92.6 g | @ 31.5 ms |
| 5 ENGINE BOTTOM | PRE | 4200 mm | 0 mm | 183 mm | | | | |
| | POST | 4162 mm | 0 mm | 233 mm | | | | |
| LONGITUDINAL | | | | | 10.9 g | @ 58.5 ms | 78.3 g | @ 40.0 ms |

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

| TEST NUMBER: 991209-1<br>No. LOCATION | | X | Y | Z | POSITIVE DIRECTION | | NEGATIVE DIRECTION | |
|---|---|---|---|---|---|---|---|---|
| 6 REAR VEHICLE | PRE | 380 mm | 0 mm | 463 mm | | | | |
| CENTERLINE | POST | 380 mm | 0 mm | 442 mm | | | | |
| LONGITUDINAL | | | | | 13.7 g | @ 97.9 ms | 29.5 g | @ 49.9 ms |
| LATERAL | | | | | 3.7 g | @ 49.0 ms | 5.6 g | @ 66.3 ms |
| VERTICAL | | | | | 38.4 g | @ 97.9 ms | 20.5 g | @ 93.5 ms |
| RESULTANT | | | | | 40.9 g | @ 97.9 ms | | |
| 7 LEFT REAR SEAT | PRE | 2100 mm | 563 mm | 370 mm | | | | |
| | POST | 2100 mm | 563 mm | 347 mm | | | | |
| LONGITUDINAL[1] | | | | | 1.4 g | @ 141.3 ms | 424.9 g | @ 50.6 ms |
| 8 RIGHT REAR SEAT | PRE | 2040 mm | -694 mm | 312 mm | | | | |
| | POST | 2040 mm | -694 mm | 345 mm | | | | |
| LONGITUDINAL | | | | | 1.8 g | @ 104.0 ms | 31.1 g | @ 49.0 ms |
| 9 VEHICLE CENTER | PRE | 3090 mm | 20 mm | 335 mm | | | | |
| OF GRAVITY | POST | 3090 mm | 20 mm | 260 mm | | | | |
| LONGITUDINAL | | | | | 2.3 g | @ 112.7 ms | 31.1 g | @ 69.3 ms |
| LATERAL | | | | | 9.7 g | @ 61.8 ms | 18.3 g | @ 45.4 ms |

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

[1]See DATA ACQUISITION EXPLANATIONS

Table 5 Dummy Injury Criteria

Maximum Acceleration

| | Head | | | | Chest | | |
|---|---|---|---|---|---|---|---|
| | X | Y | Z | R | X | Y | Z |
| Driver | -35.4 g | -6.8 g | -10.0 g | 35.8 g | -52.8 g | 3.3 g | 8.6 g |
| Passenger | -37.6 g | -18.1 g | -26.2 g | 40.2 g | -48.0 g | -5.2 g | 17.8 g |

Maximum Femur Compressive Force

| | Left Femur | Right Femur |
|---|---|---|
| Driver | 4369 N | 5057 N |
| Passenger | 4037 N | 4692 N |

15-Millisecond Head Injury Criteria[1]

| | HIC | Time $t_1$ | Time $t_2$ |
|---|---|---|---|
| Driver | 101 | 62.4 ms | 77.4 ms |
| Passenger | 126 | 68.7 ms | 83.8 ms |

36 millisecond Head Injury Criteria

| | HIC | Time $t_1$ | Time $t_2$ |
|---|---|---|---|
| Driver | 188 | 54.7 ms | 90.7 ms |
| Passenger | 216 | 58.1 ms | 94.1 ms |

Chest Maximum Resultant Acceleration[2]

| | Acceleration | Time $t_1$ | Time $t_2$ |
|---|---|---|---|
| Driver | 51.8 g | 72.8 ms | 75.8 ms |
| Passenger | 47.8 g | 86.3 ms | 89.4 ms |

Maximum Chest Deflection

| | |
|---|---|
| Driver | 45 mm |
| Passenger | 10 mm |

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

## Dummy Kinematic Summary

### Driver Dummy

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

### 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 rotated to the left. The dummy's head and upper torso rotated rearward into the seat back. The dummy came to rest in a seated position.

Figure 4 Pre-test and Post-test Measurement Points

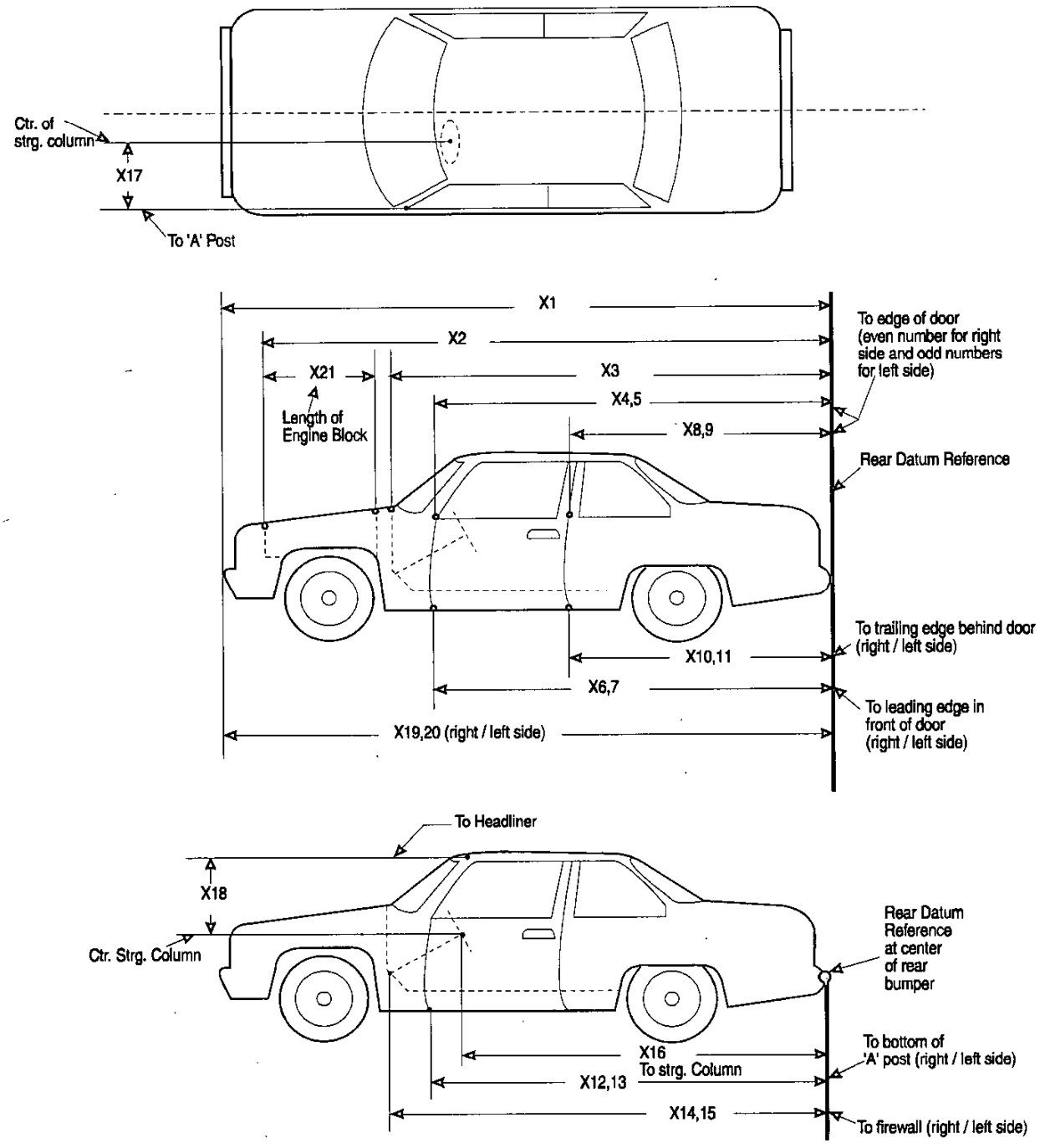


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 2000/Ford/Taurus/Sedan

Test Number: 991209-1

| No. | Type of measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|
| X1 | Total Length of Veh. at Centerline | 5110 | 4784 | 326 |
| X2 | Rear Surface of Veh. to Front of Engine Block | 4495 | 4362 | 133 |
| X3 | Rear Surface of Veh. to Firewall | 4025 | 3994 | 31 |
| X4 | Rear Surface of Veh. to Upper Leading Edge of Right Door | 3526 | 3515 | 11 |
| X5 | Rear Surface of Veh. to Upper Leading Edge of Left Door | 3526 | 3509 | 17 |
| X6 | Rear Surface of Veh. to Lower Leading Edge of Right Door | 3499 | 3483 | 16 |
| X7 | Rear Surface of Veh. to Lower Leading Edge of Left Door | 3495 | 3485 | 10 |
| X8 | Rear Surface of Veh. to Upper Trailing Edge of Right Door | 2496 | 2488 | 8 |
| X9 | Rear Surface of Veh. to Upper Trailing Edge of Left Door | 2496 | 2483 | 13 |
| X10 | Rear Surface of Veh. to Lower Trailing Edge of Right Door | 2474 | 2460 | 14 |
| X11 | Rear Surface of Veh. to Lower Trailing Edge of Left Door | 2472 | 2454 | 18 |
| X12 | Rear Surface of Veh. to Bottom of " A " Post on Right Side | 3500 | 3492 | 8 |
| X13 | Rear Surface of Veh. to Bottom of " A " Post on Left Side | 3500 | 3500 | 0 |
| X14 | Rear Surface of Veh. to Firewall--Right Side | 3960 | 3924 | 36 |
| X15 | Rear Surface of Vehicle to Firewall --Left Side | 3960 | 3934 | 26 |
| X16 | Rear Surface of Veh. to Steering Wheel Center | 3090 | 3124 | -34 |
| X17 | Center of Steering Column to " A " Post | 285 | 321 | -36 |
| X18 | Center of Steering Column to Headliner | 440 | 430 | 10 |
| X19 | Rear Surface of Veh. to Right Side of Front Bumper | 4910 | 4595 | 315 |
| X20 | Rear Surface of Veh. to Left Side of Front Bumper | 4910 | 4704 | 206 |
| X21 | Length of Engine Block | 400 | 400 | 0 |

Figure 5 Vehicle Target Locations

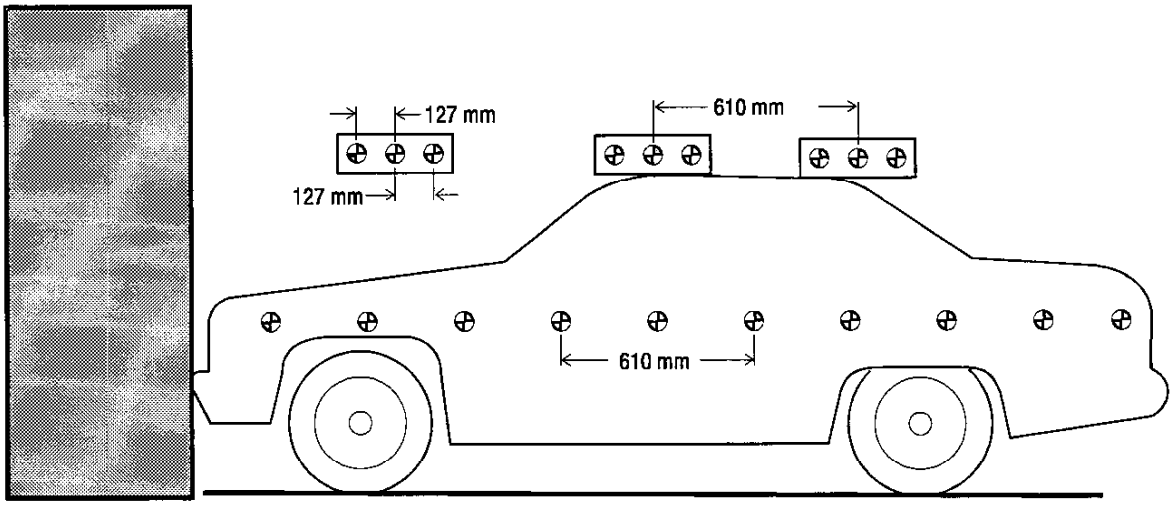


Figure 6 Dummy Measurement Locations for Front Seat Occupants

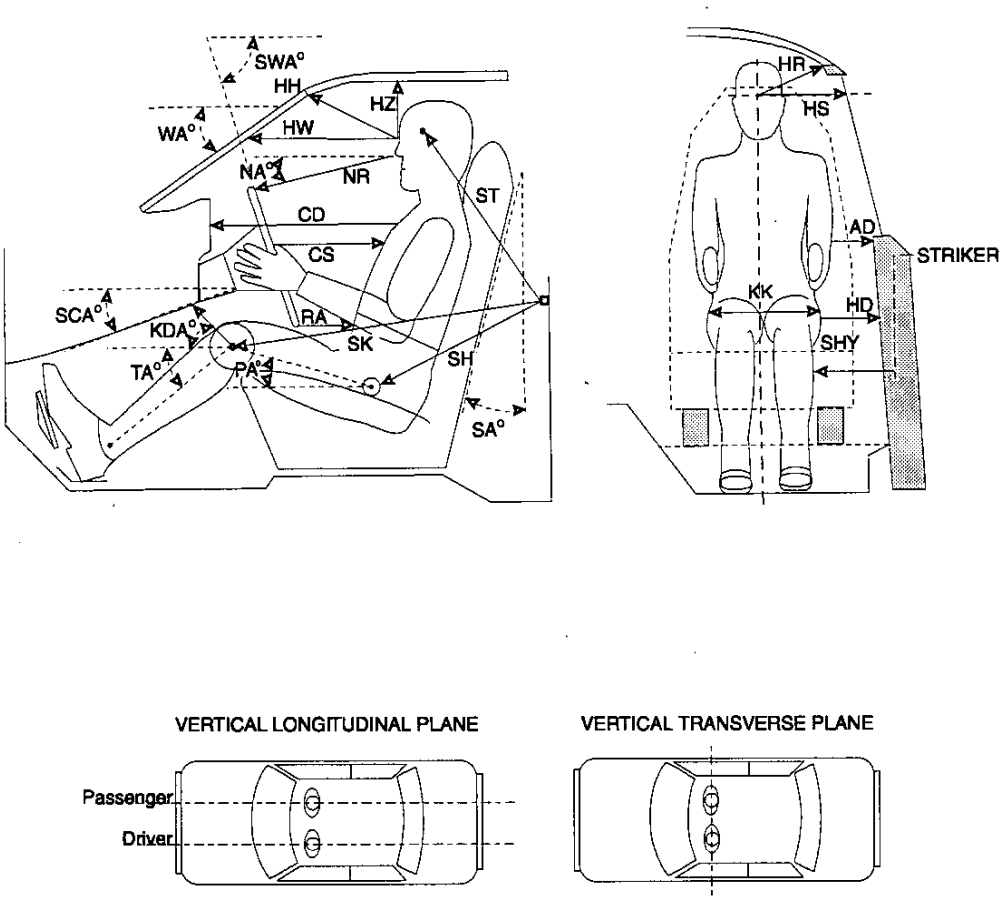


Table 7 Dummy Measurement Data For Front Seat Occupants

| Designation | Type of Measurement | Driver (Serial #283) | Passenger (Serial #369) |
|---|---|---|---|
| WA | Windshield angle | 25.4° | 25.4° |
| SWA | Steering wheel angle | 68.3° | N/A |
| SCA | Steering column angle | 21.7° | N/A |
| SA | Seat back angle | 31.1° | 31.1° |
| HZ | Head to roof | 186 mm | 188 mm |
| HH | Head to header | 253 mm | 278 mm |
| HW | Head to windshield | 630 mm | 560 mm |
| HR | Head to side header | 240 mm | 240 mm |
| NR | Nose to rim | 252 mm | N/A |
| NA | Nose to rim angle | 7.3° | N/A |
| CD | Chest to dash | 428 mm | 353 mm |
| CS | Steering wheel to chest | 181 mm | N/A |
| RA | Rim to abdomen | 154 mm | N/A |
| KDL | Left knee to dash | 105 mm | 110 mm |
| KDR | Right knee to dash | 88 mm | 95 mm |
| KDA | Outboard knee to dash angle | 40.1° | 38.3° |
| PA | Pelvic angle | 18.6° | 21.1° |
| TA | Tibial angle | 54.1° | 62.1° |
| KK | Knee to knee | 245 mm | 222 mm |
| ST[1] | Striker to head | 515 mm | 487 mm |
| | Striker to head angle | -68° | -71° |
| SK | Striker to knee | 690 mm | 670 mm |
| | Striker to knee angle | 1.2° | -1.2° |
| SH | Striker to H-point | 354 mm | 355 mm |
| | Striker to H-point angle | 12.6° | 10.7° |
| SHY | Striker to H-point (Y dir.) | 262 mm | 266 mm |
| HS | Head to side window | 372 mm | 363 mm |
| HD | H-point to door | 186 mm | 177 mm |
| AD | Arm to door | 150 mm | 143 mm |

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

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

Figure 7 Camera Positions

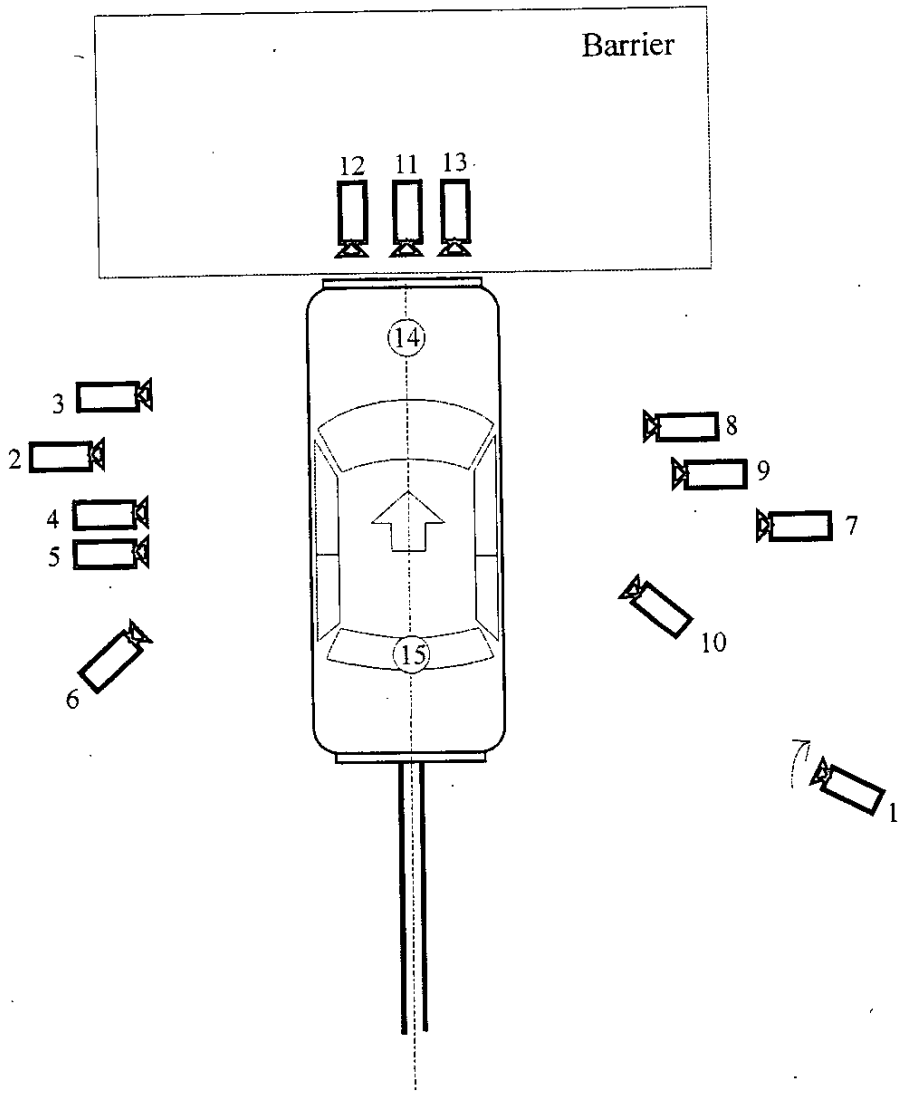


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 2000/Ford/Taurus/ Sedan

Test number: 991209-1

| Camera Number | View | Camera Positions[1] X | Y | Z | Camera Angle[2] | Film Plane to Head Target | Camera Lens | Film Speed |
|---|---|---|---|---|---|---|---|---|
| 1 | Real-time panning | NA | NA | NA | NA | NA | 16 mm | 24 frames/s |
| 2 | Left vehicle crush | 7328 mm | 1549 mm | 1461 mm | 0° | 6920 mm | 25 mm | 987 frames/s |
| 3 | Left windshield intrusion | 7328 mm | 927 mm | 1168 mm | 0° | 7340 mm | 50 mm | 950 frames/s |
| 4 | Steering column motion | 9627 mm | 2667 mm | 1740 mm | -13.6° | 6710 mm | 25 mm | 962 frames/s |
| 5 | Steering column motion | 9627 mm | 2667 mm | 2705 mm | -5.8° | 6600 mm | 25 mm | 1000 frames/s |
| 6 | Driver kinematics | 2438 mm | 3353 mm | 1981 mm | -20.4° | 3060 mm | 25 mm | 1000 frames/s |
| 7 | Right overall | 8306 mm | -2413 mm | 876 mm | 0° | 6130 mm | 13 mm | 1002 frames/s |
| 8 | Right windshield intrusion | 7087 mm | -1219 mm | 1156 mm | 0° | 7574 mm | 50 mm | 1000 frames/s |
| 9 | Passenger kinematics | 7188 mm | -1626 mm | 1461 mm | -15.8° | 3090 mm | 25 mm | 997 frames/s |
| 10 | Passenger kinematics | 2438 mm | -3708 mm | 2083 mm | -3.3° | 6874 mm | 25 mm | 1000 frames/s |
| 11 | Windshield front view | 381 mm | 0 mm | 2540 mm | -61.6 | NA | 8.5 mm | 1002 frames/s |
| 12 | Driver - front view | 381 mm | 305 mm | 2540 mm | -55.3° | NA | 17 mm | 1005 frames/s |
| 13 | Passenger - front view | 381 mm | -305 mm | 2540 mm | -58.4° | NA | 17 mm | 1000 frames/s |
| 14 | Pit - front position | 1295 mm | 0 mm | -3048 mm | 90° | NA | 13 mm | 1000 frames/s |
| 15 | Pit - rear position | 2946 mm | 0 mm | -3048 mm | 90° | NA | 13 mm | 1000 frames/s |

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

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


Figure A-1 Pre-Test Left Side View


Figure A-2 Post-Test Left Side View

Figure A-3 Pre-Test Left Rear Three-Quarter View

Figure A-4 Post-Test Left Rear Three-Quarter View

Figure A-5 Pre-Test Rear View

Figure A-6 Post-Test Rear View


Figure A-7 Pre-Test Right Side View


Figure A-8 Post-Test Right Side View

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

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

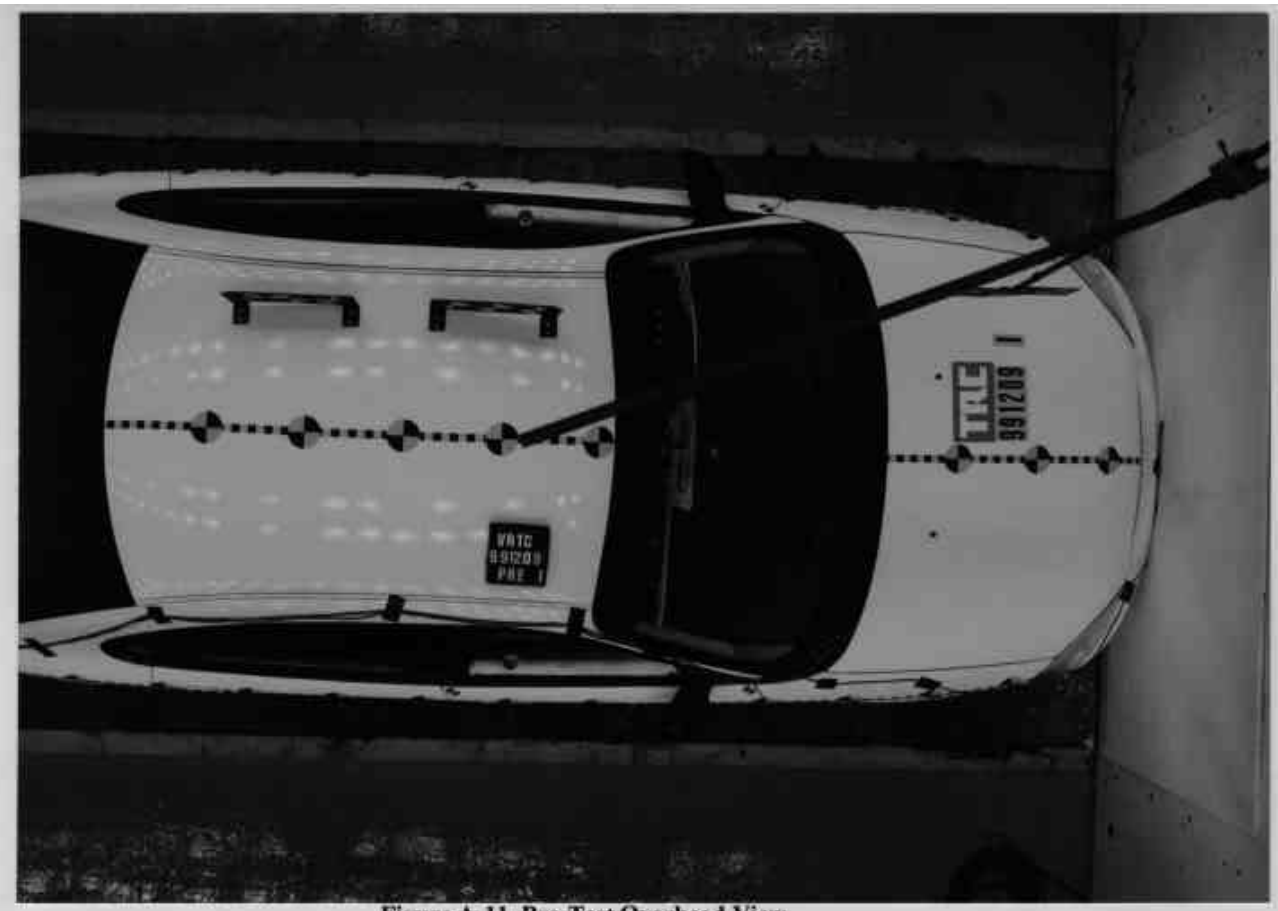



Figure A-11 Pre-Test Overhead View

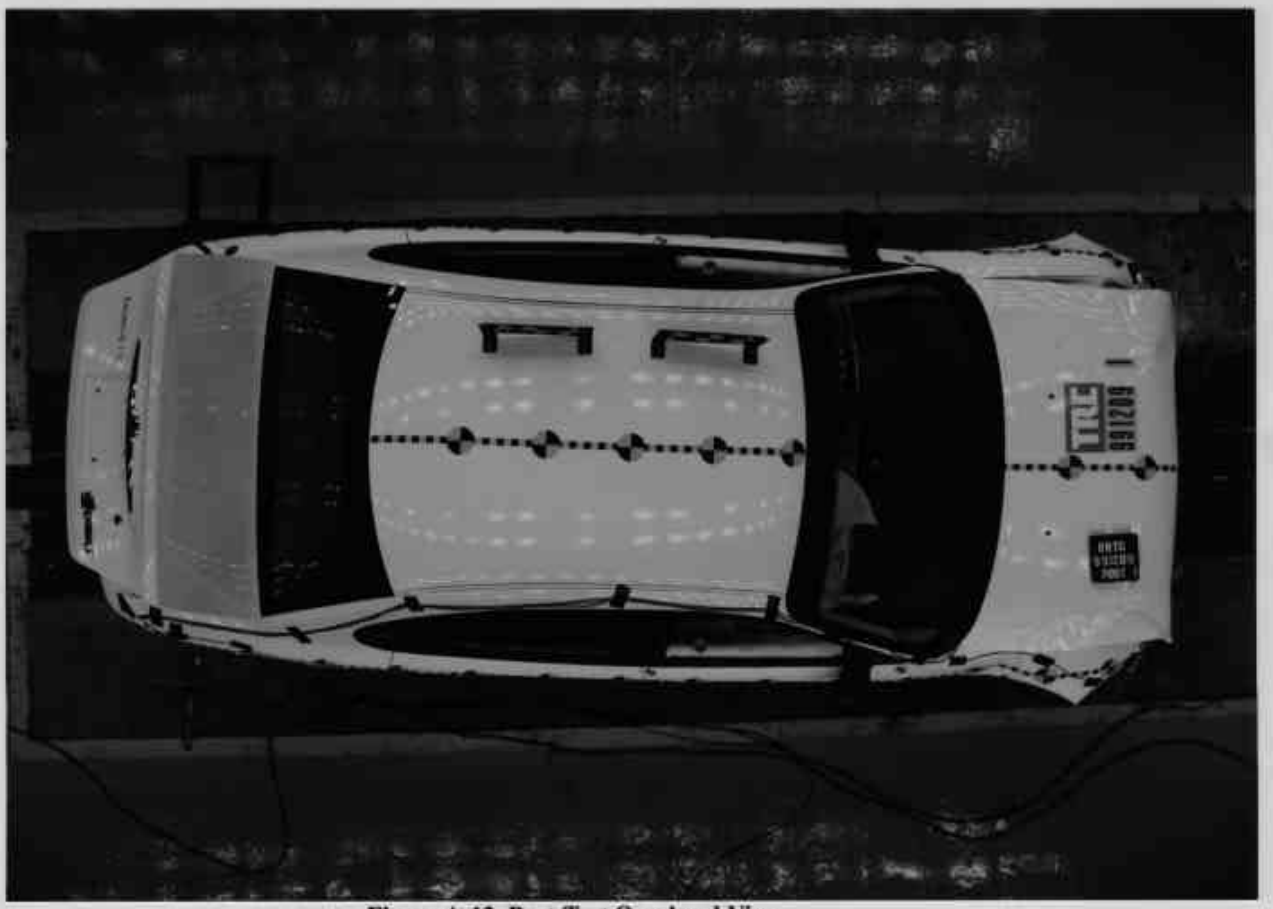



Figure A-12 Post-Test Overhead View

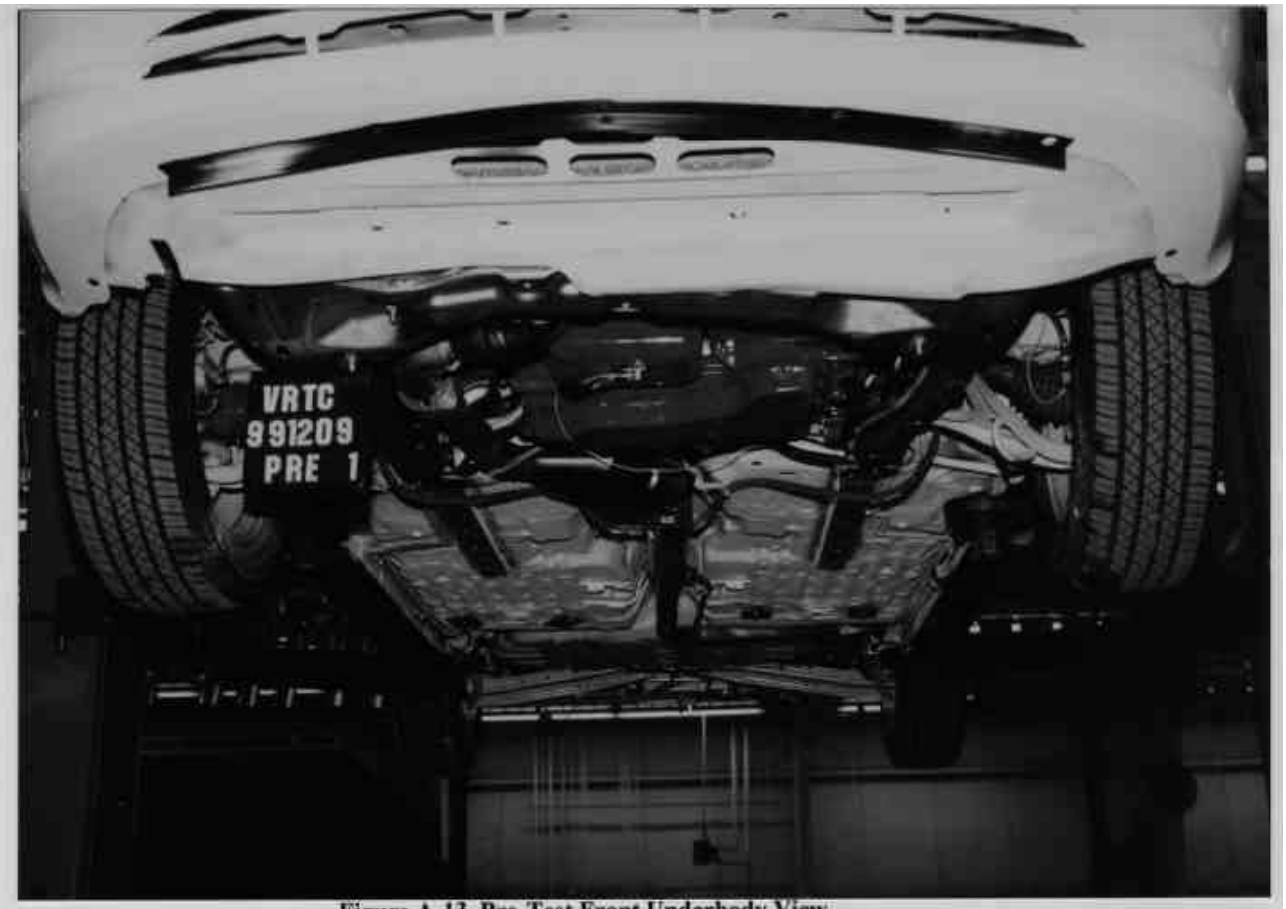



Figure A-13 Pre-Test Front Underbody View


Figure A-14 Post-Test Front Underbody View


Figure A-15 Pre-Test Rear Underbody View


Figure A-16 Post-Test Rear Underbody View


Figure A-17 Pre-Test Engine Compartment View


Figure A-18 Post-Test Engine Compartment View


Figure A-19 Pre-Test Front Windshield View


Figure A-20 Post-Test Front Windshield View


Figure A-21 Pre-Test Front Windshield Driver and Passenger Dummy View


Figure A-22 Post-Test Front Windshield Driver and Passenger Dummy View


Figure A-23 Pre-Test Driver Dummy Windshield View


Figure A-24 Post-Test Driver Dummy Windshield View


Figure A-25 Pre-Test Passenger Dummy Windshield View


Figure A-26 Post-Test Passenger Dummy Windshield View


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


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


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


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


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


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


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


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


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


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


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


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


Figure A-39 Post-Test Driver Dummy View


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


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


Figure A-42 Post-Test Driver Dummy Head Contact - View 3


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


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


Figure A-45 Post-Test Passenger Dummy View


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


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

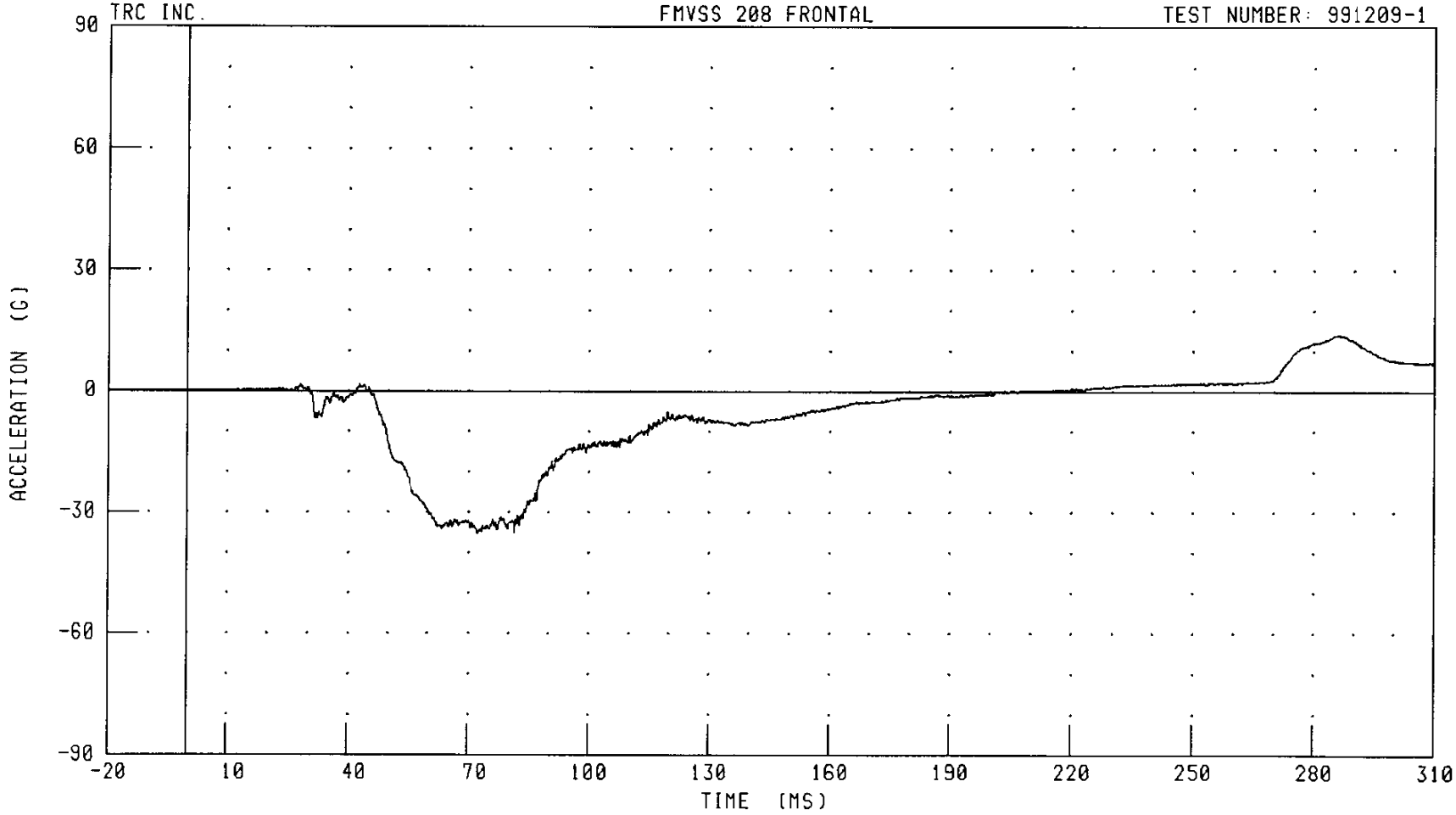

Figure A-48 Post-Test Passenger Dummy Head Contact - View 3


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


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

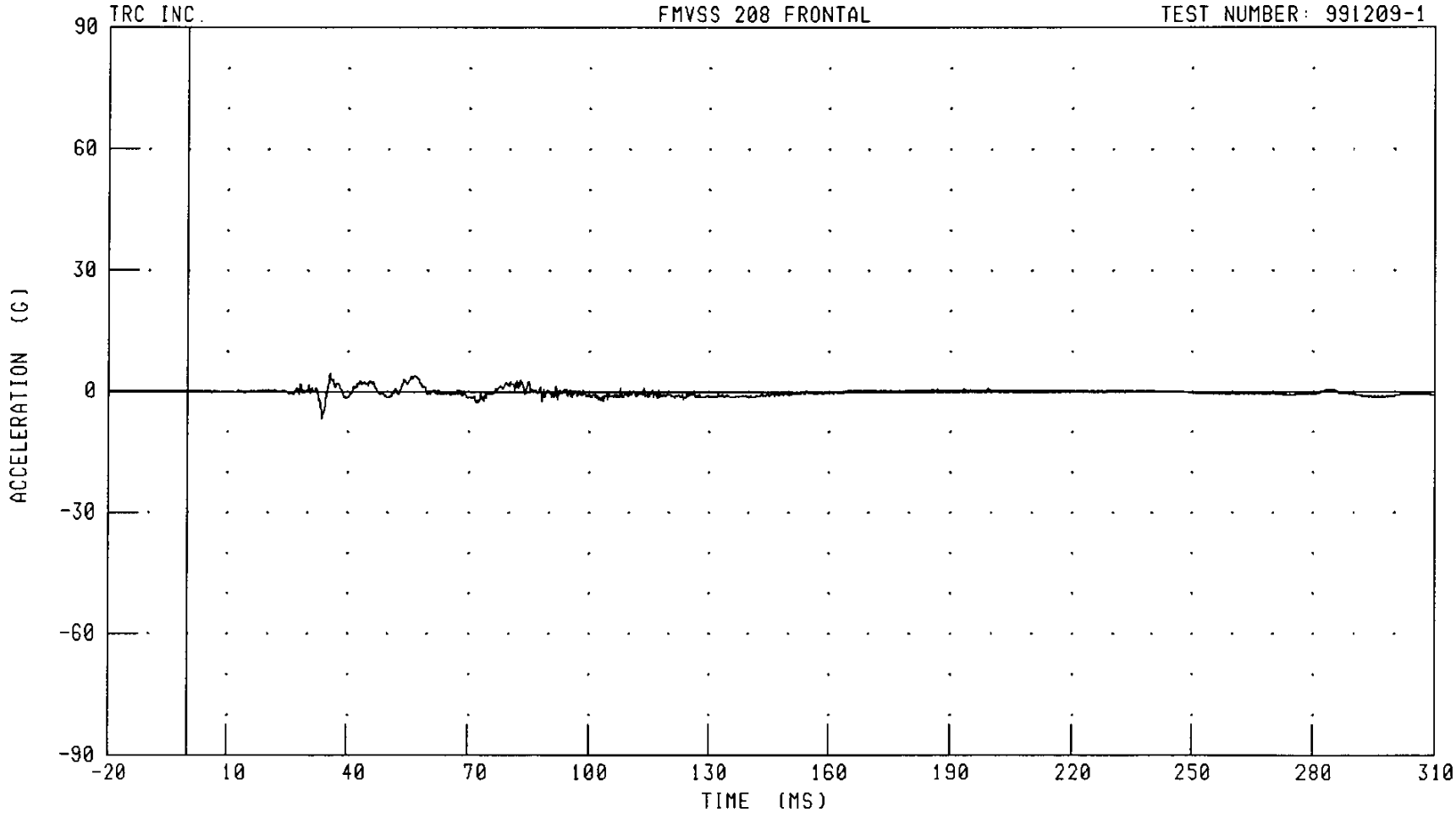

**Figure A-51 Pre-Test Certification and Tire Information Label View**

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD X-AXIS ACCELERATION



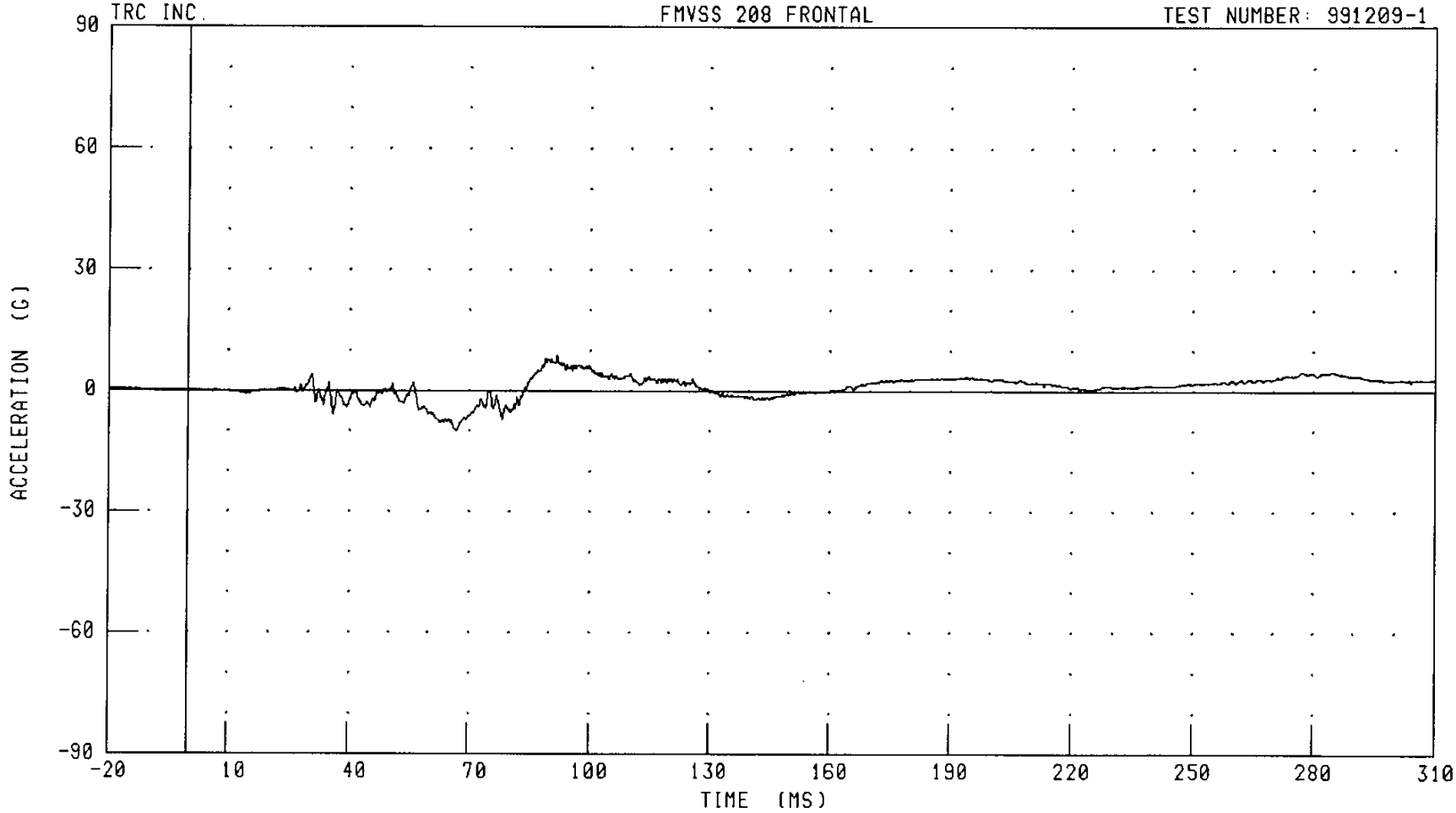

CHANNEL: HEDXG1 FILTER: CH. CLASS 1000 PEAK DATA: 14.12 G @ 286.00 MS; -35.45 G @ 72.32 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD Y-AXIS ACCELERATION



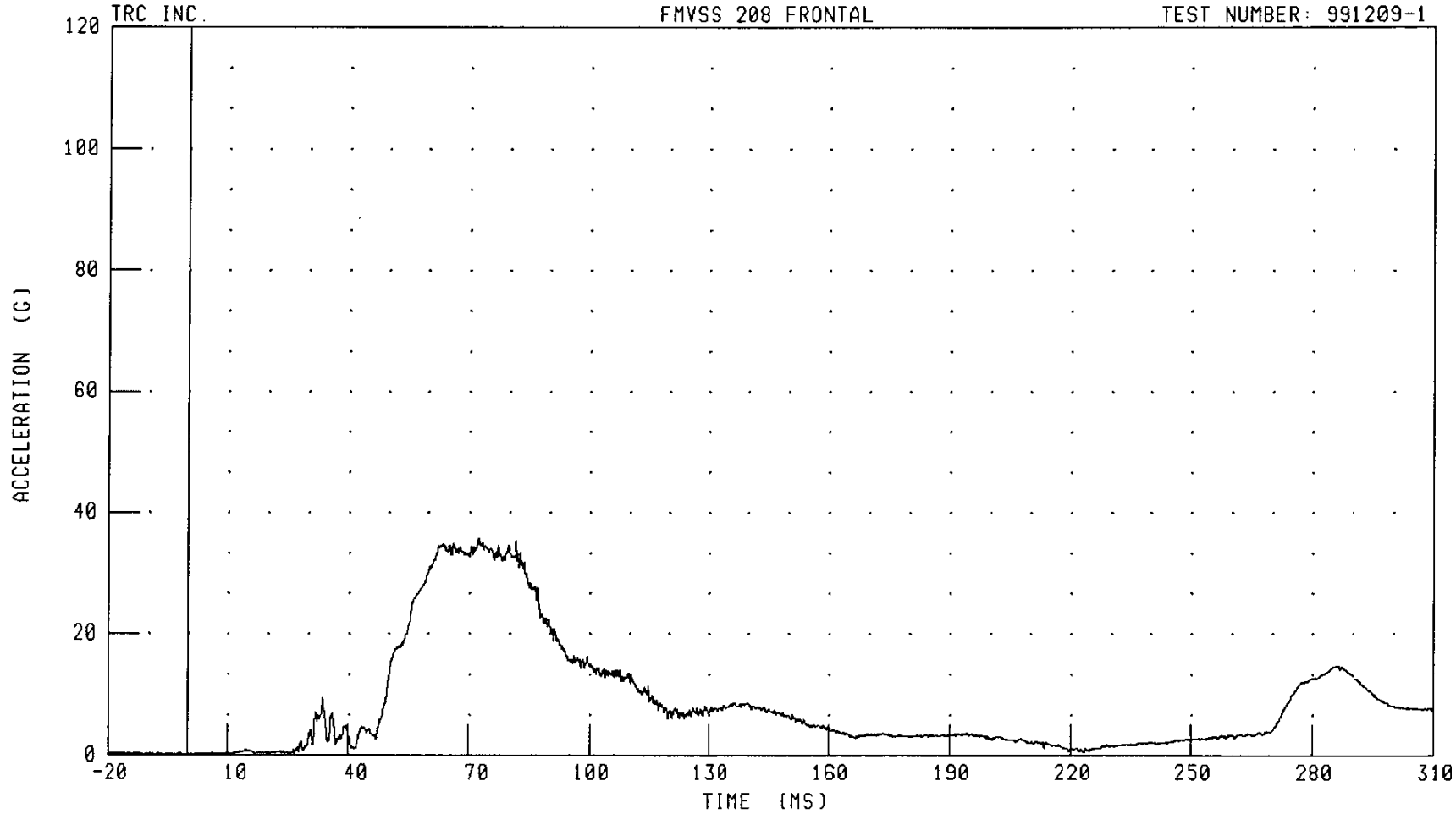

CHANNEL: HEDYG1 FILTER: CH. CLASS 1000 PEAK DATA: 4.39 G @ 35.76 MS; -6.78 G @ 33.68 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD Z-AXIS ACCELERATION



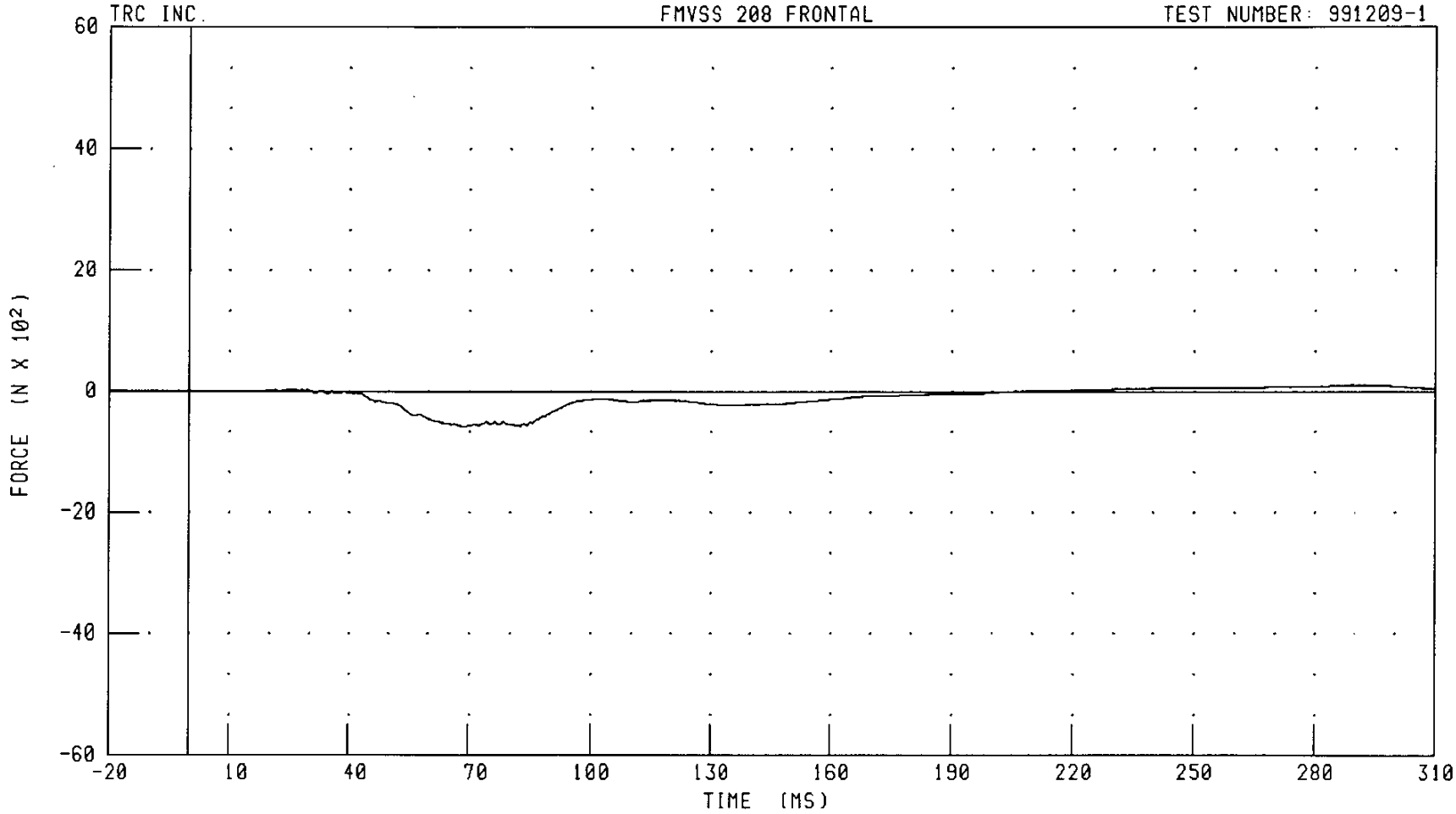

CHANNEL: HEDZG1 FILTER: CH. CLASS 1000 PEAK DATA: 8.85 G @ 92.00 MS; -10.01 G @ 66.72 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD RESULTANT ACCELERATION



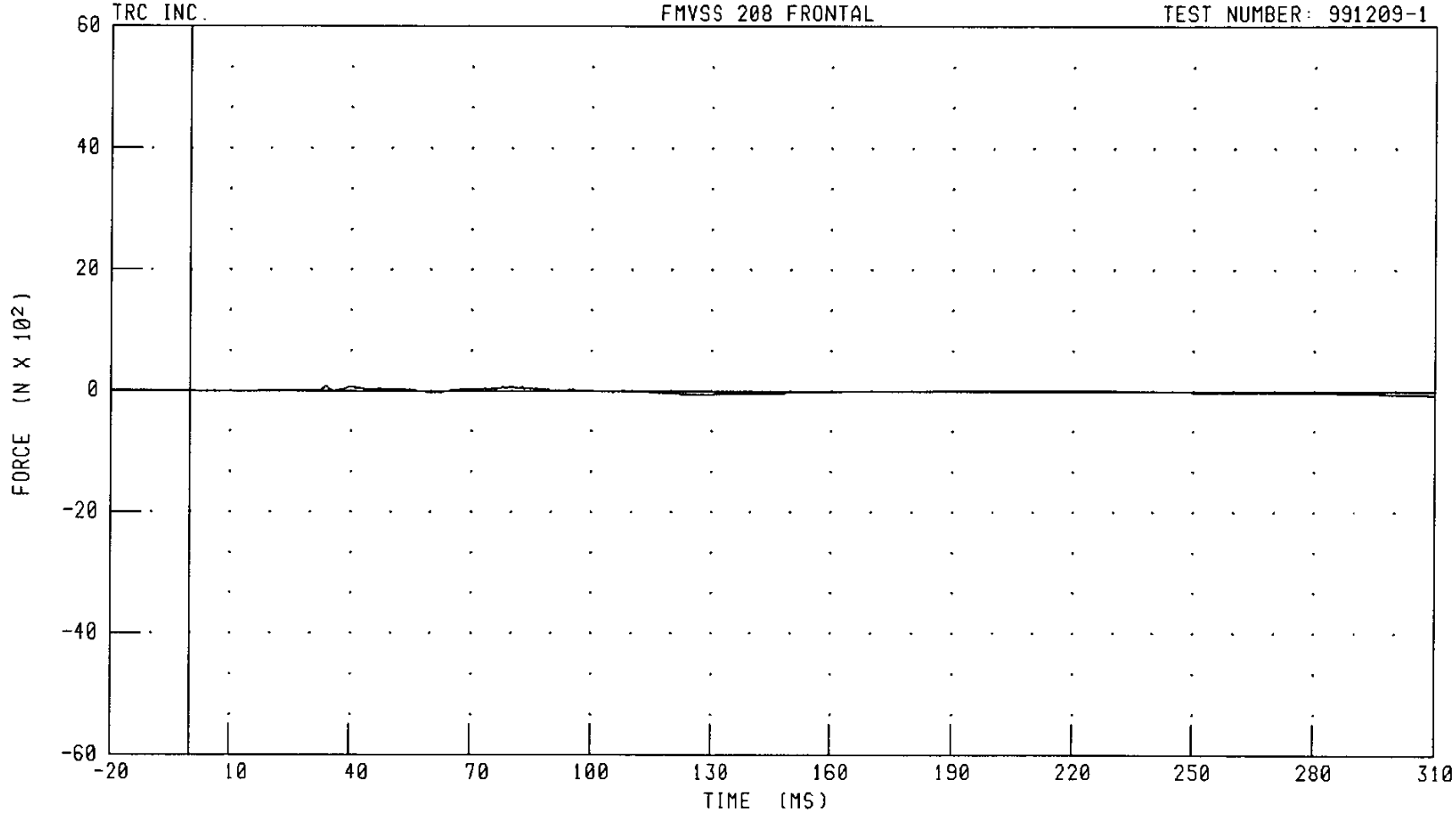

CHANNEL: HEDRC1 FILTER: CH. CLASS 1000 PEAK DATA: 35.79 G @ 72.32 MS; 0.13 G @ -2.80 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK X-AXIS SHEAR FORCE



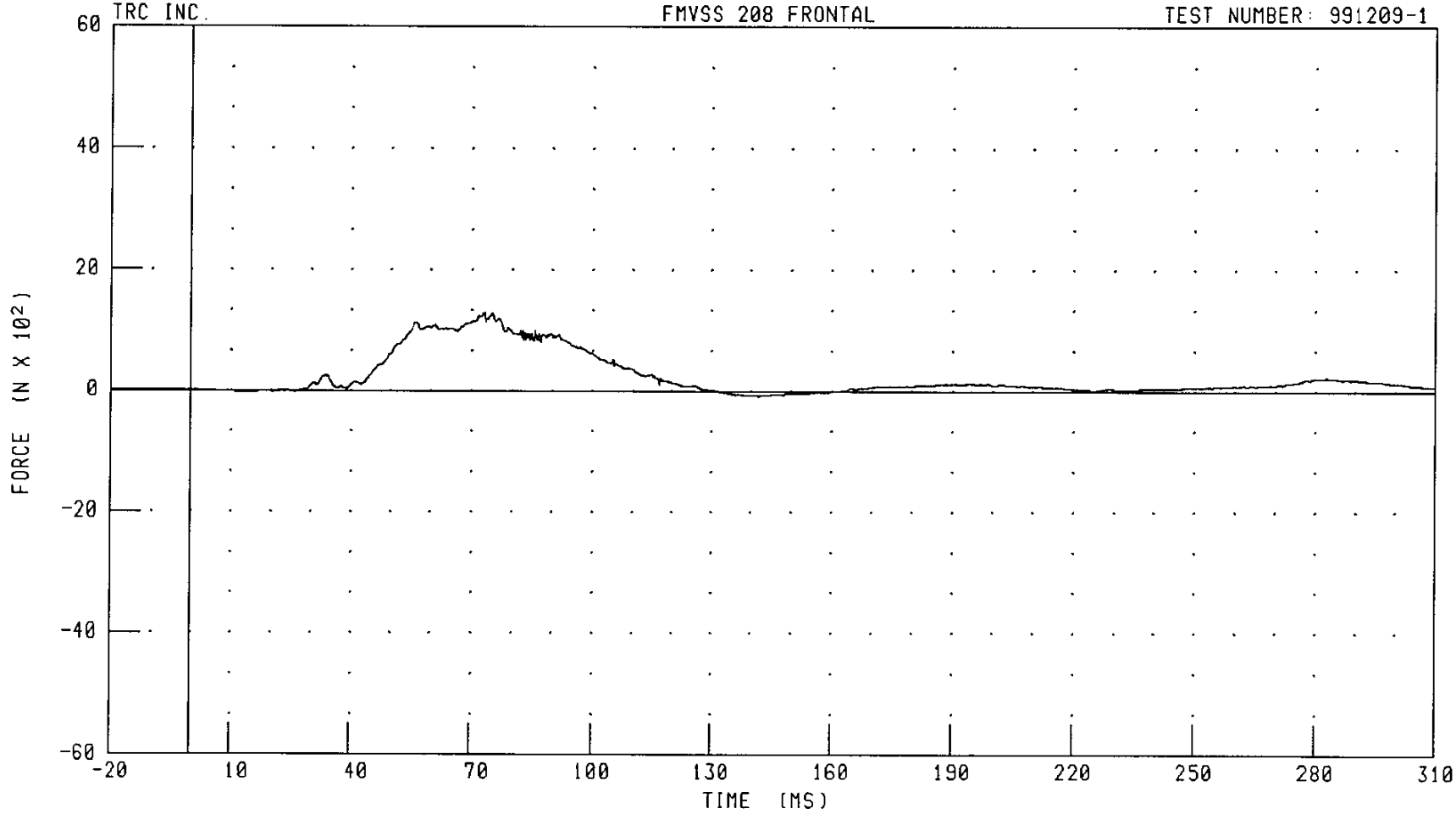

CHANNEL: NEKXF1 FILTER: CH. CLASS 1000 PEAK DATA: 105.75 N @ 288.96 MS; -584.44 N @ 68.48 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK Y-AXIS SHEAR FORCE



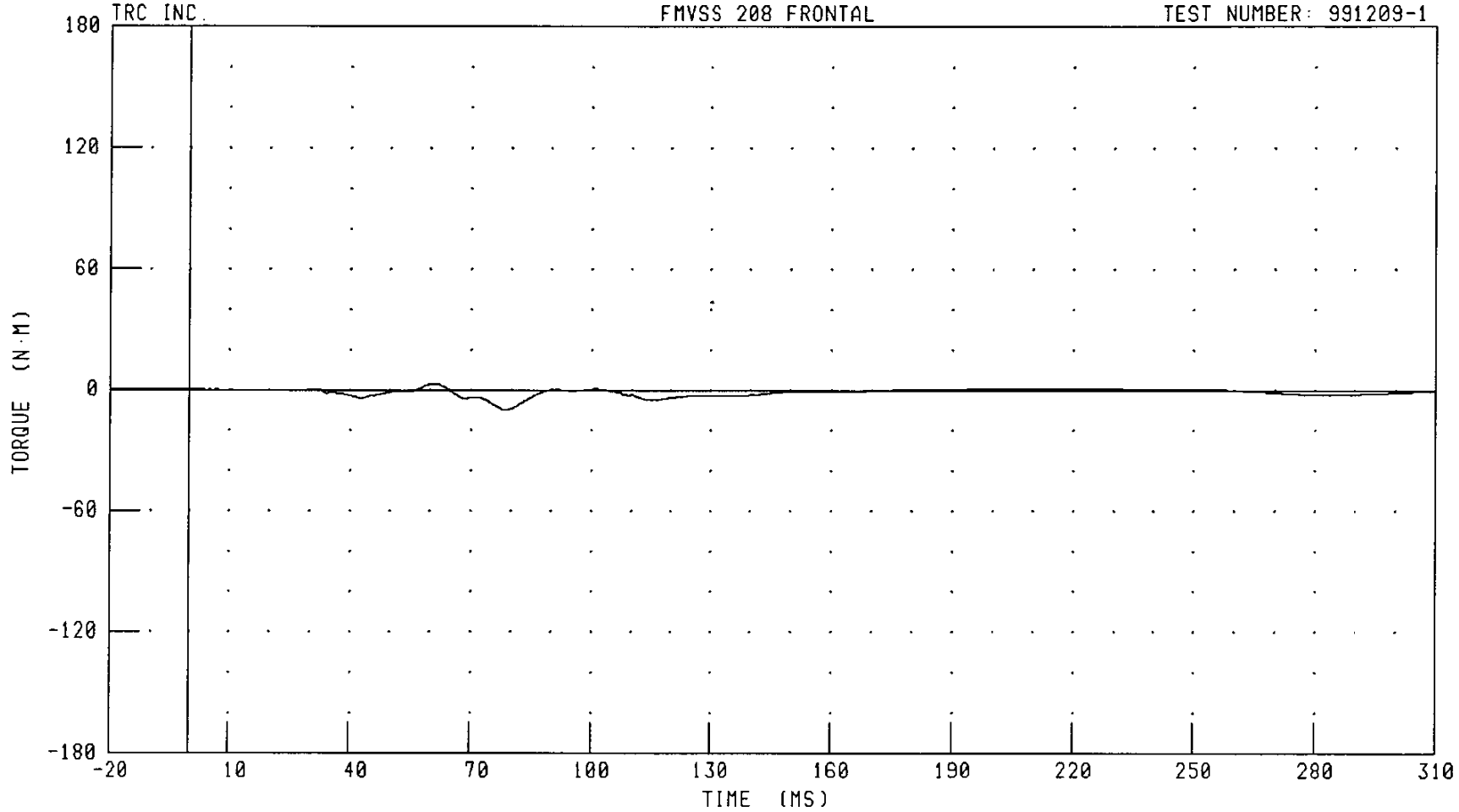

CHANNEL: NEKYF1 FILTER: CH. CLASS 1000 PEAK DATA: 74.04 N @ 33.92 MS; -69.35 N @ 308.16 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK Z-AXIS AXIAL FORCE



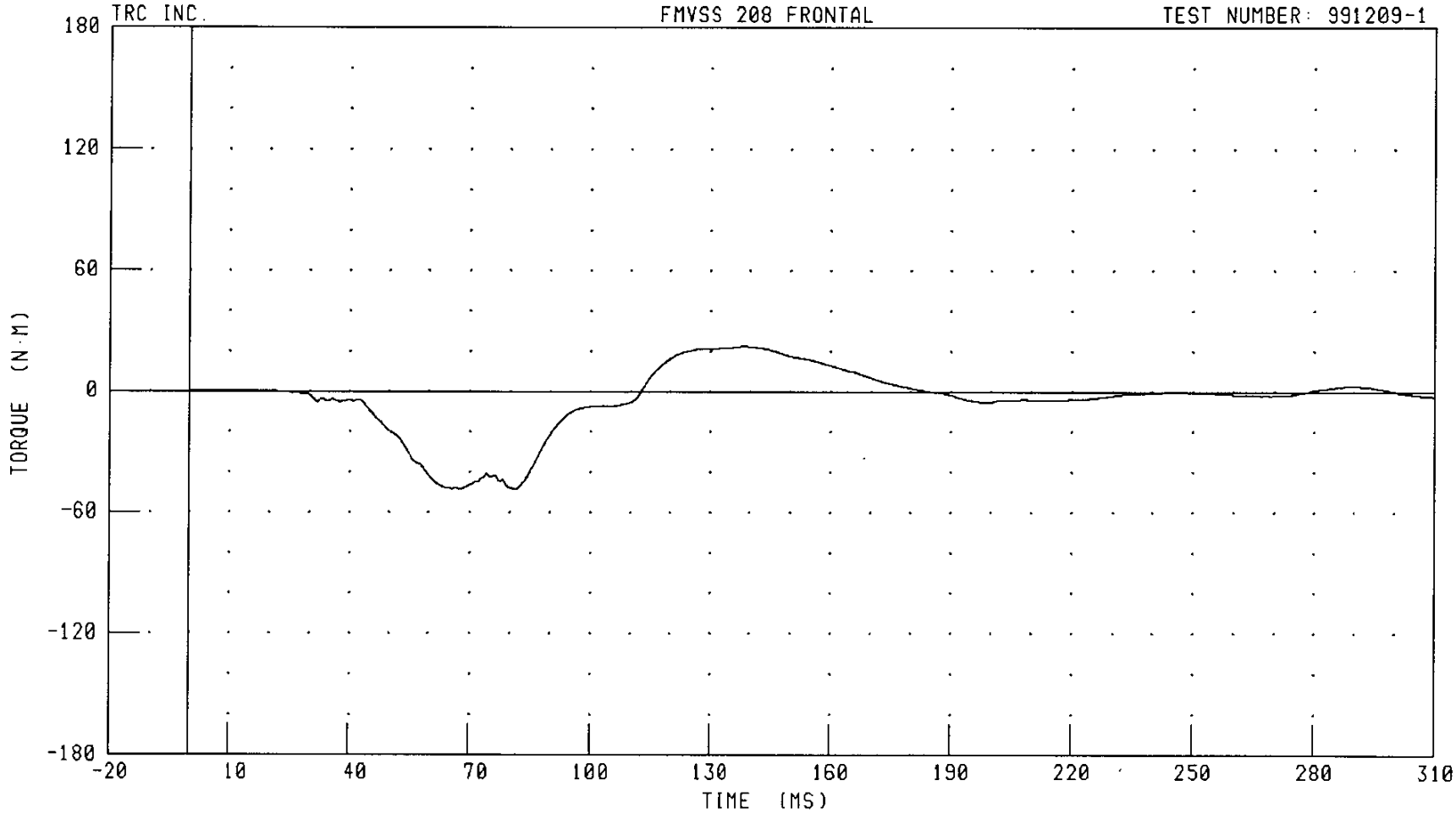

CHANNEL: NEKZF1 FILTER: CH. CLASS 1000 PEAK DATA: 1300.69 N @ 73.36 MS; -87.57 N @ 142.00 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK MOMENT ABOUT X AXIS



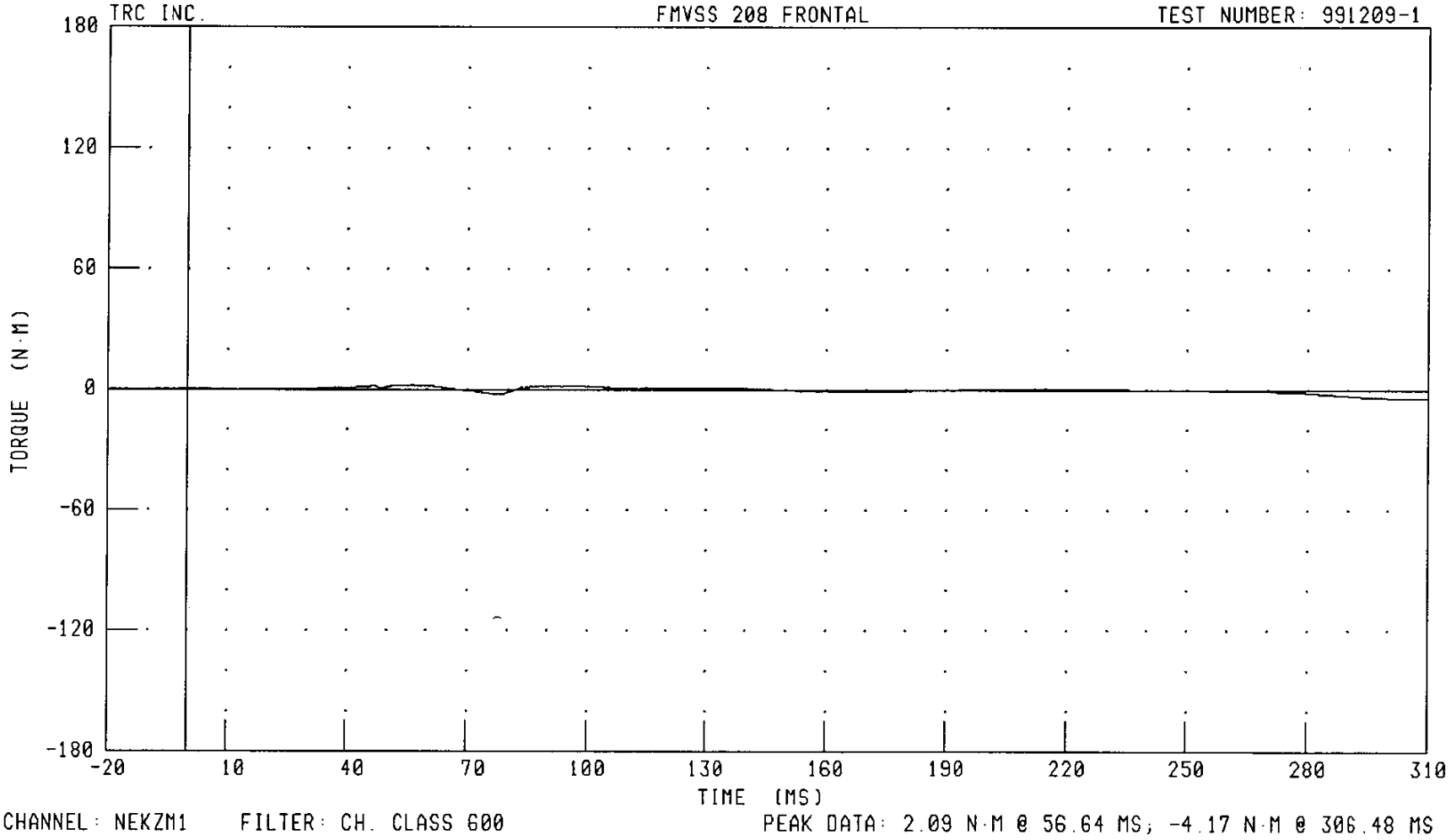

CHANNEL: NEKXM1 FILTER: CH. CLASS 600 PEAK DATA: 3.07 N·M @ 61.20 MS; -10.01 N·M @ 78.08 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK MOMENT ABOUT Y AXIS



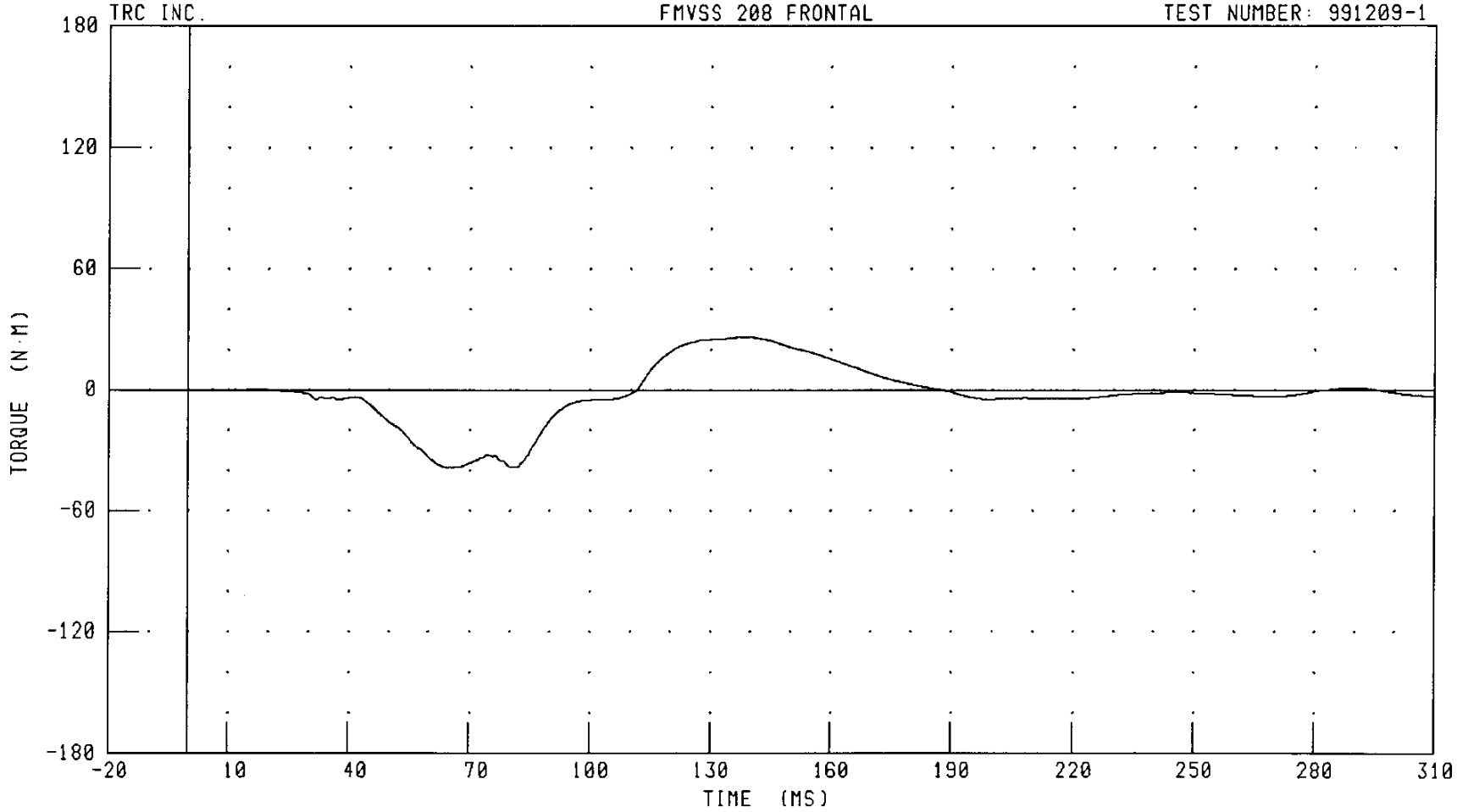

CHANNEL: NEKYM1 FILTER: CH. CLASS 600 PEAK DATA: 22.45 N·M @ 139.20 MS; -48.58 N·M @ 81.60 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK MOMENT ABOUT Z AXIS



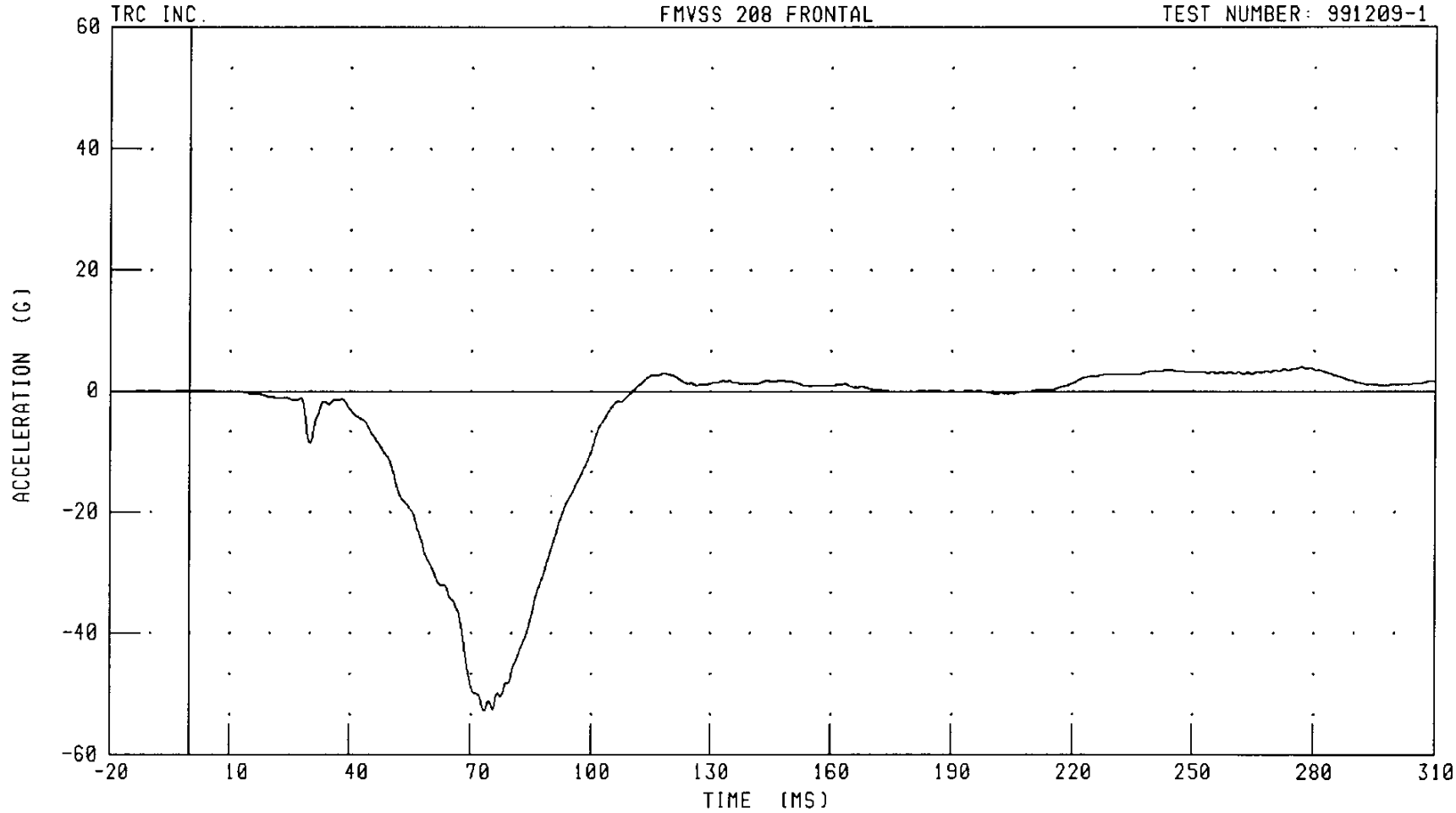

CHANNEL: NEKZM1 FILTER: CH. CLASS 600 PEAK DATA: 2.09 N·M @ 56.64 MS; -4.17 N·M @ 306.48 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS



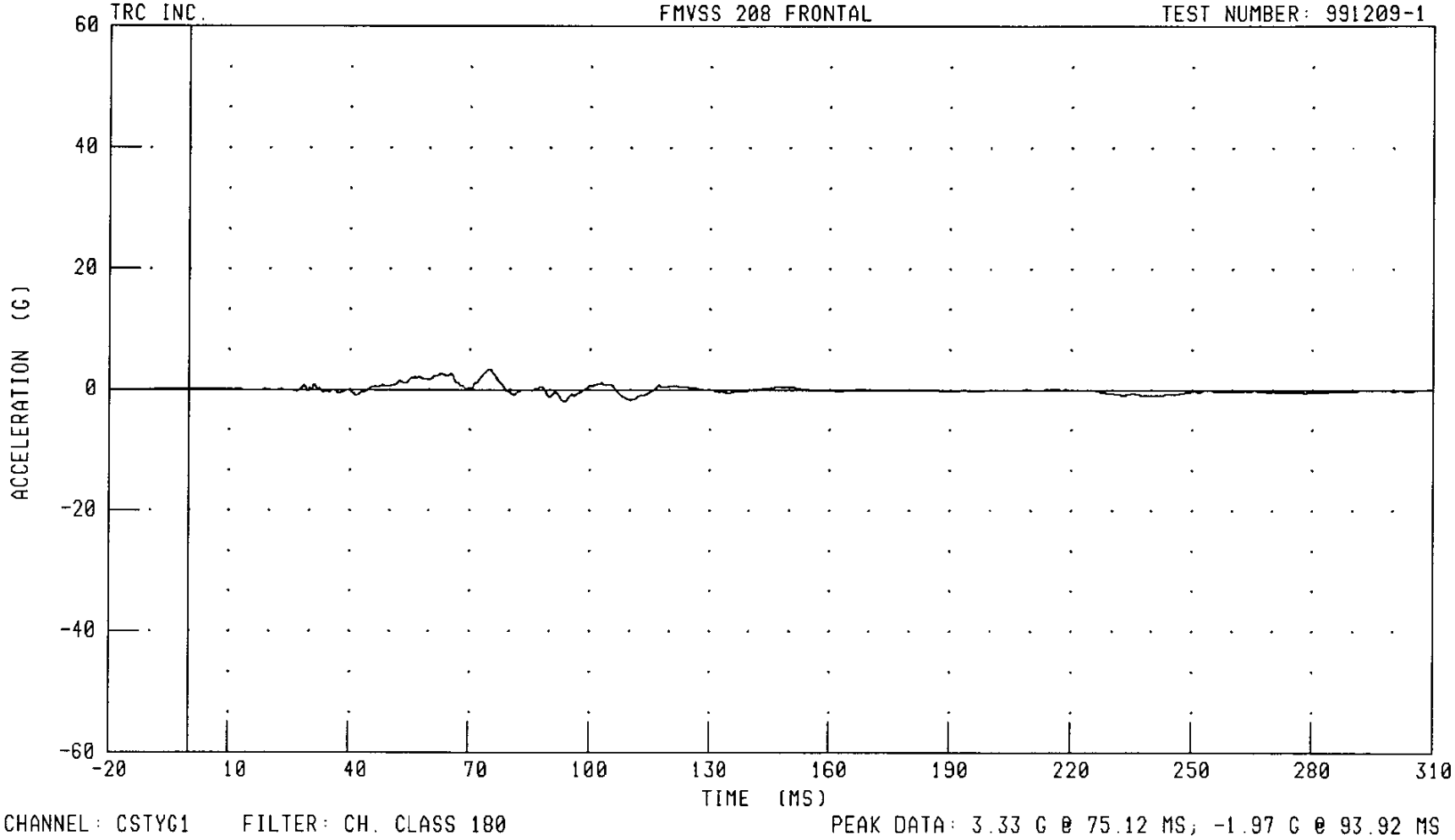

CHANNEL: NEKOM1 FILTER: CH. CLASS 600 PEAK DATA: 26.33 N-M @ 138.56 MS; -38.66 N-M @ 65.76 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST X-AXIS ACCELERATION



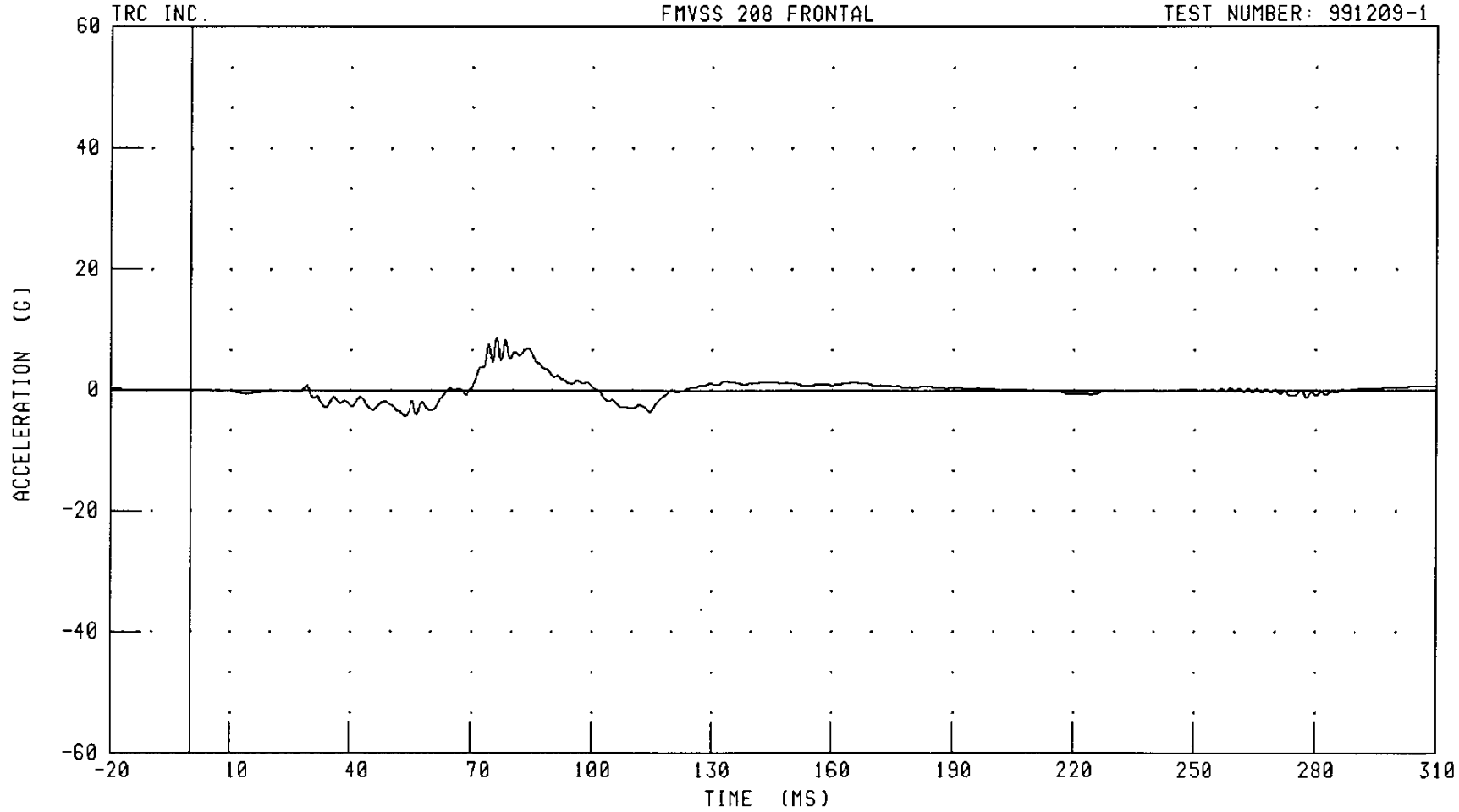

CHANNEL: CSTXG1 FILTER: CH. CLASS 180 PEAK DATA: 3.96 G @ 276.96 MS; -52.76 G @ 73.52 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST Y-AXIS ACCELERATION



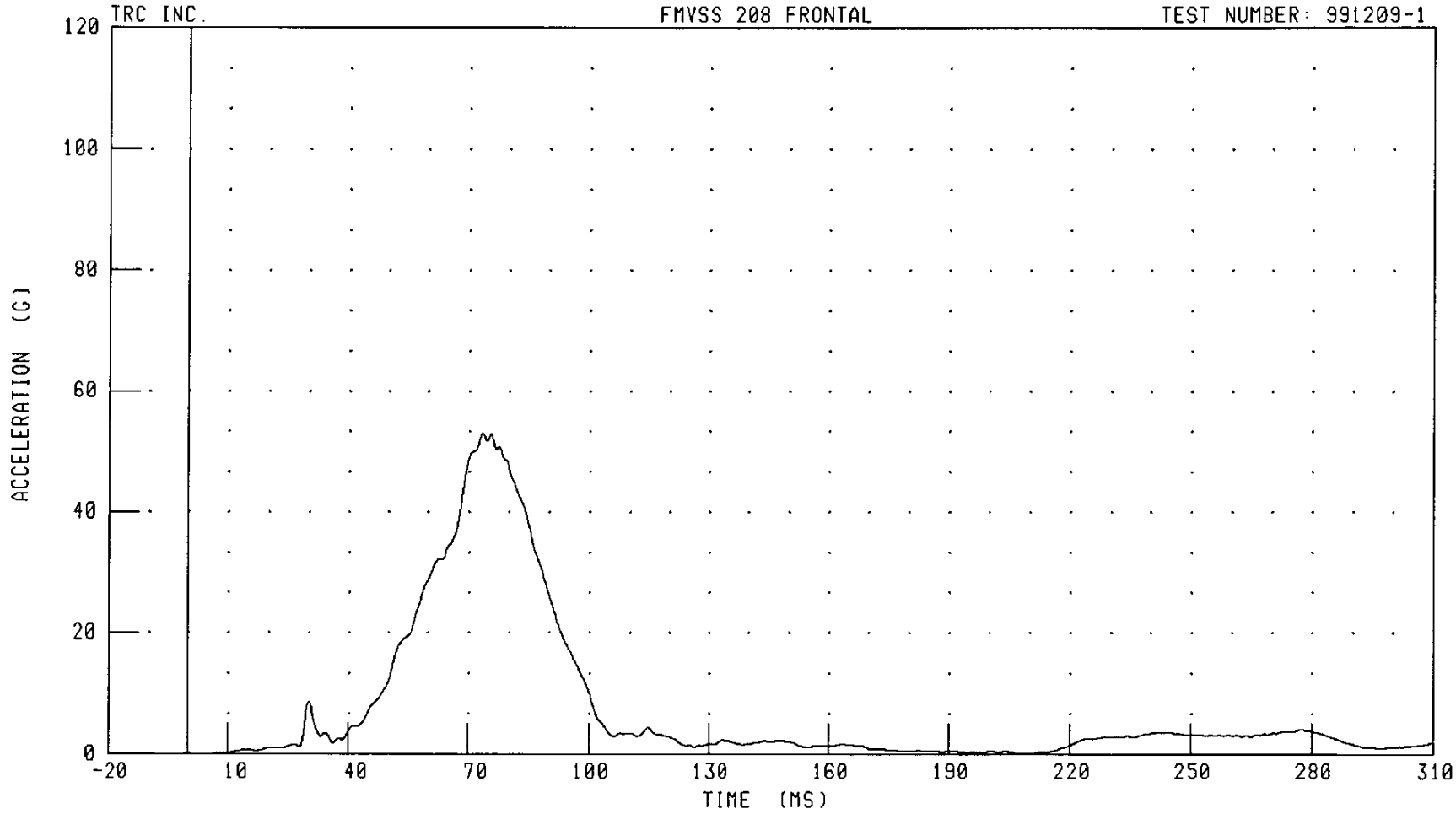

CHANNEL: CSTYG1 FILTER: CH. CLASS 180 PEAK DATA: 3.33 G @ 75.12 MS; -1.97 G @ 93.92 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST Z-AXIS ACCELERATION



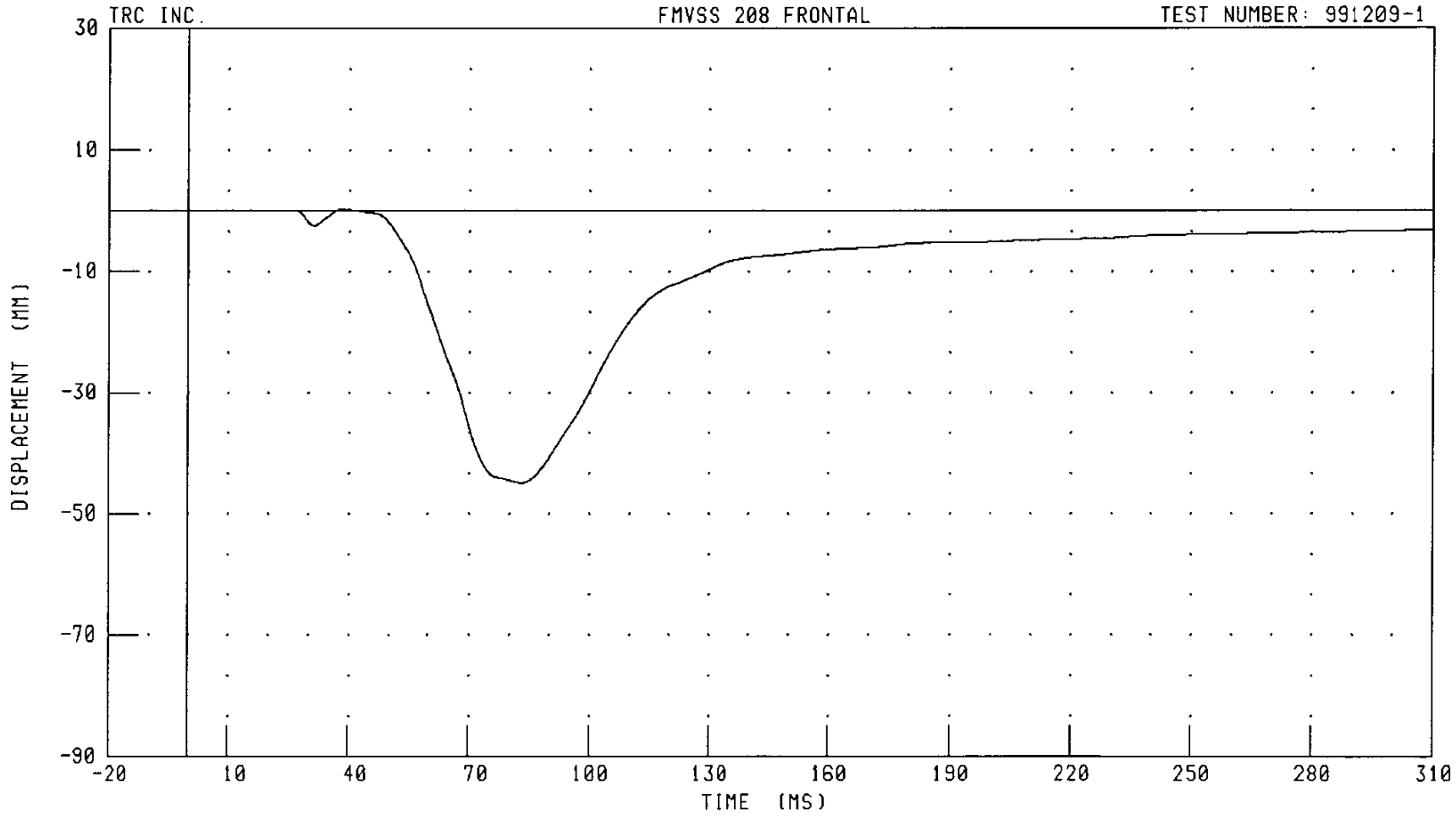

CHANNEL: CSTZG1 FILTER: CH. CLASS 180 PEAK DATA: 8.64 G @ 76.32 MS; -4.34 G @ 53.68 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST RESULTANT ACCELERATION



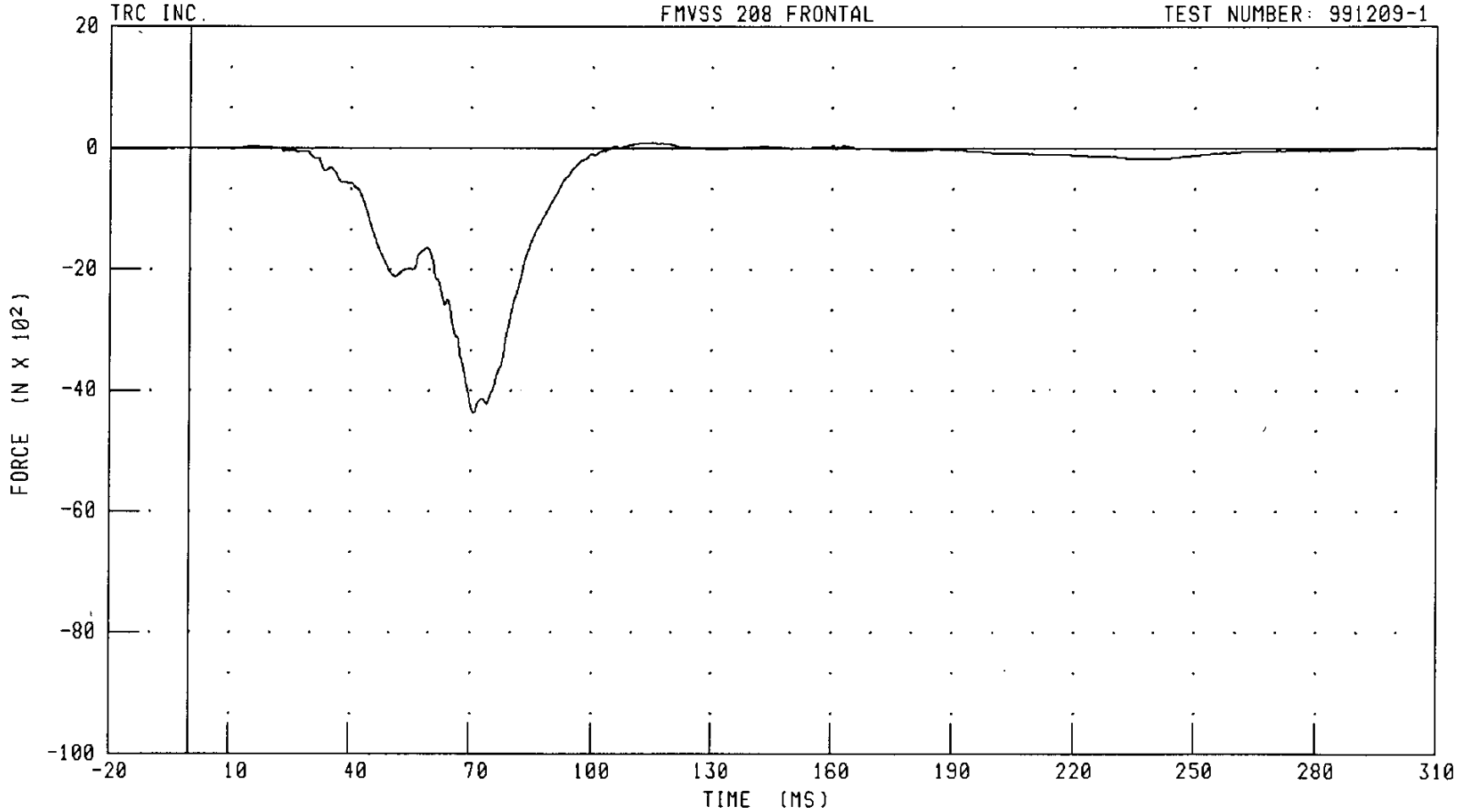

CHANNEL: CSTRG1 FILTER: CH. CLASS 180 PEAK DATA: 53.03 G @ 73.60 MS; 0.02 G @ -20.00 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST DEFLECTION



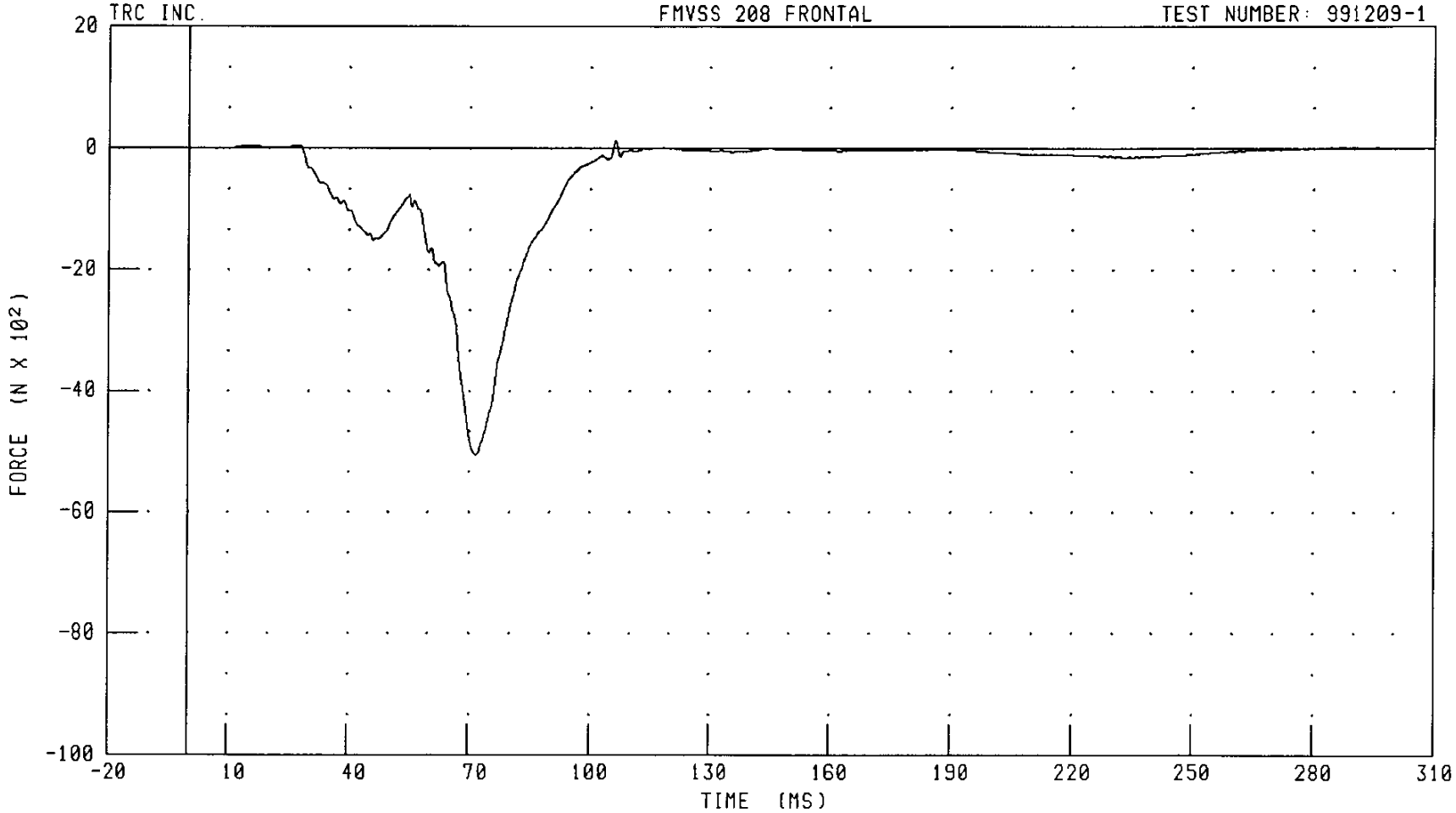

CHANNEL: CSTXD1 FILTER: CH. CLASS 180 PEAK DATA: 0.23 MM @ 38.56 MS; -44.95 MM @ 83.20 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER LEFT FEMUR FORCE



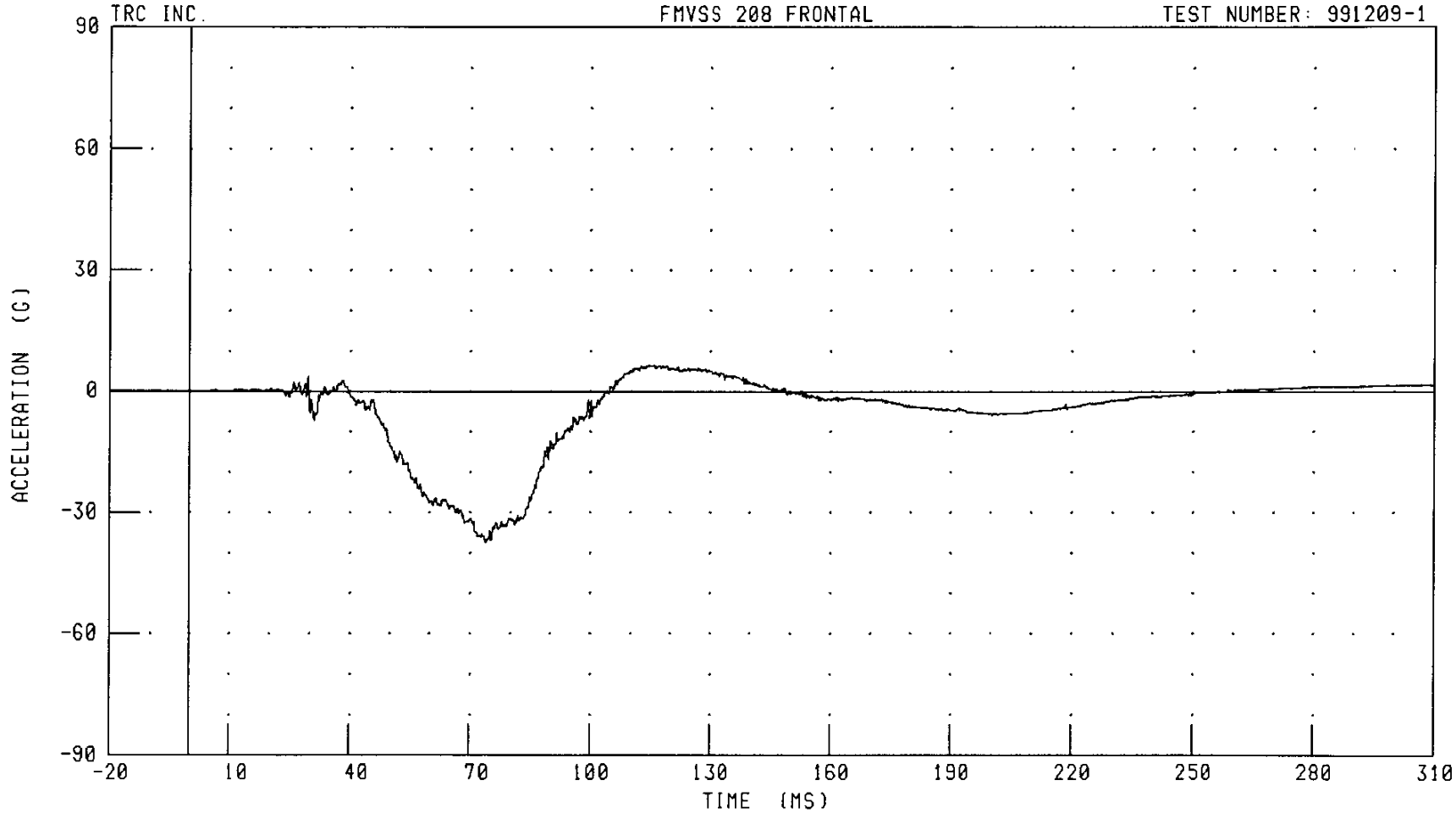

CHANNEL: LFMF1 FILTER: CH. CLASS 600 PEAK DATA: 97.25 N @ 117.68 MS; -4368.57 N @ 71.04 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER RIGHT FEMUR FORCE



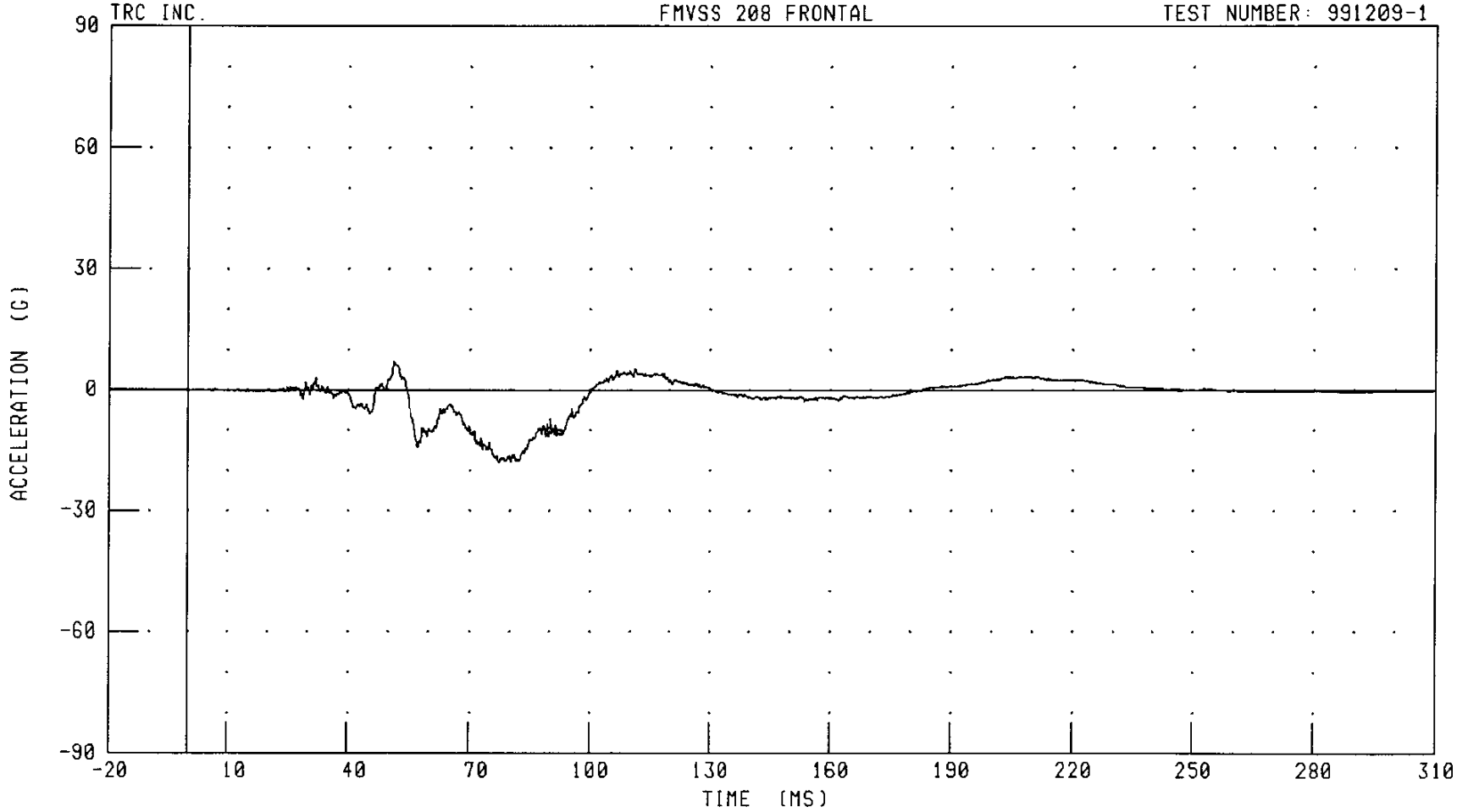

CHANNEL: RFMF1 FILTER: CH. CLASS 600 PEAK DATA: 127.90 N @ 106.32 MS; -5056.55 N @ 71.76 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION



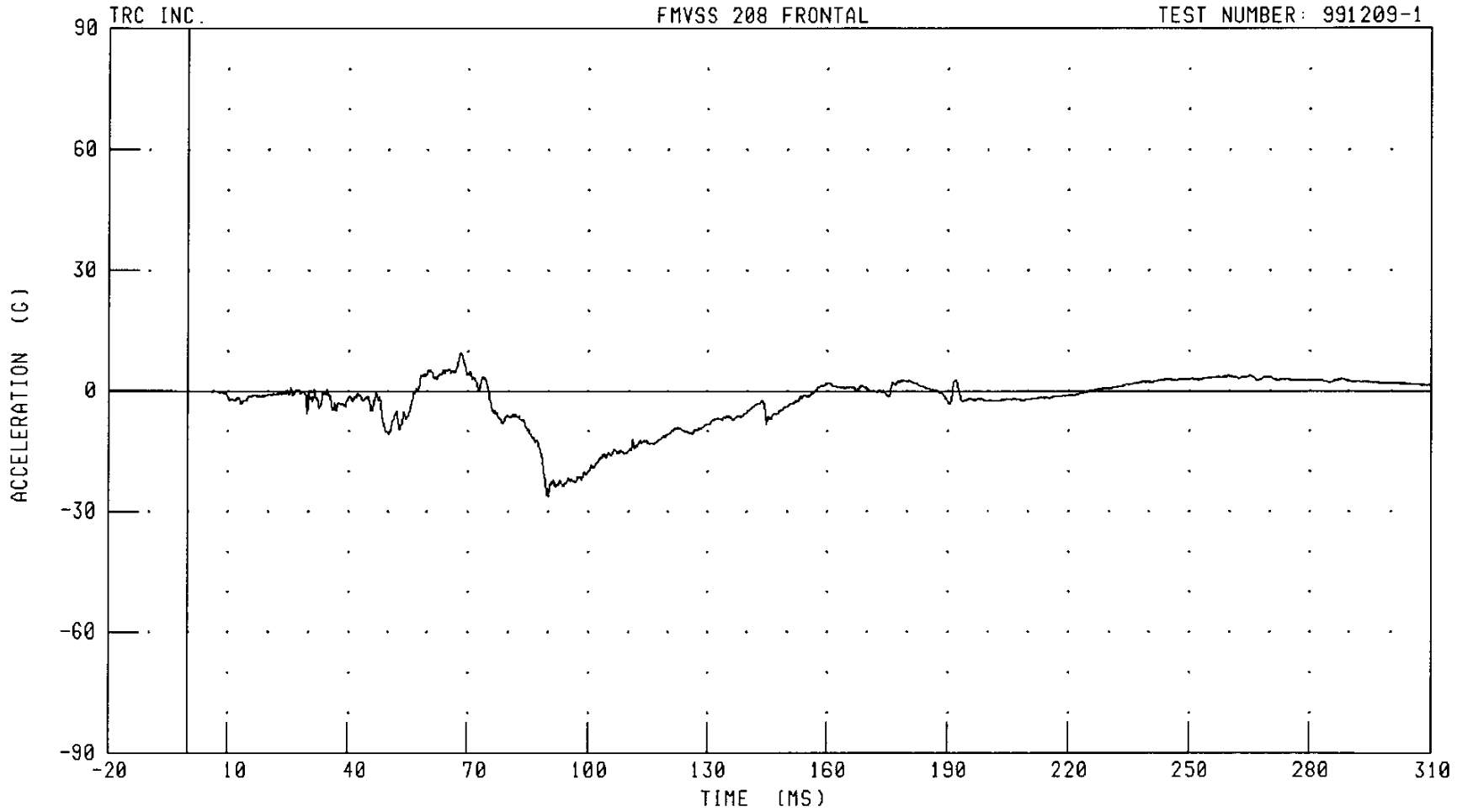

CHANNEL: HEDXC2 FILTER: CH. CLASS 1000 PEAK DATA: 6.53 G @ 114.72 MS; -37.56 G @ 74.00 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION



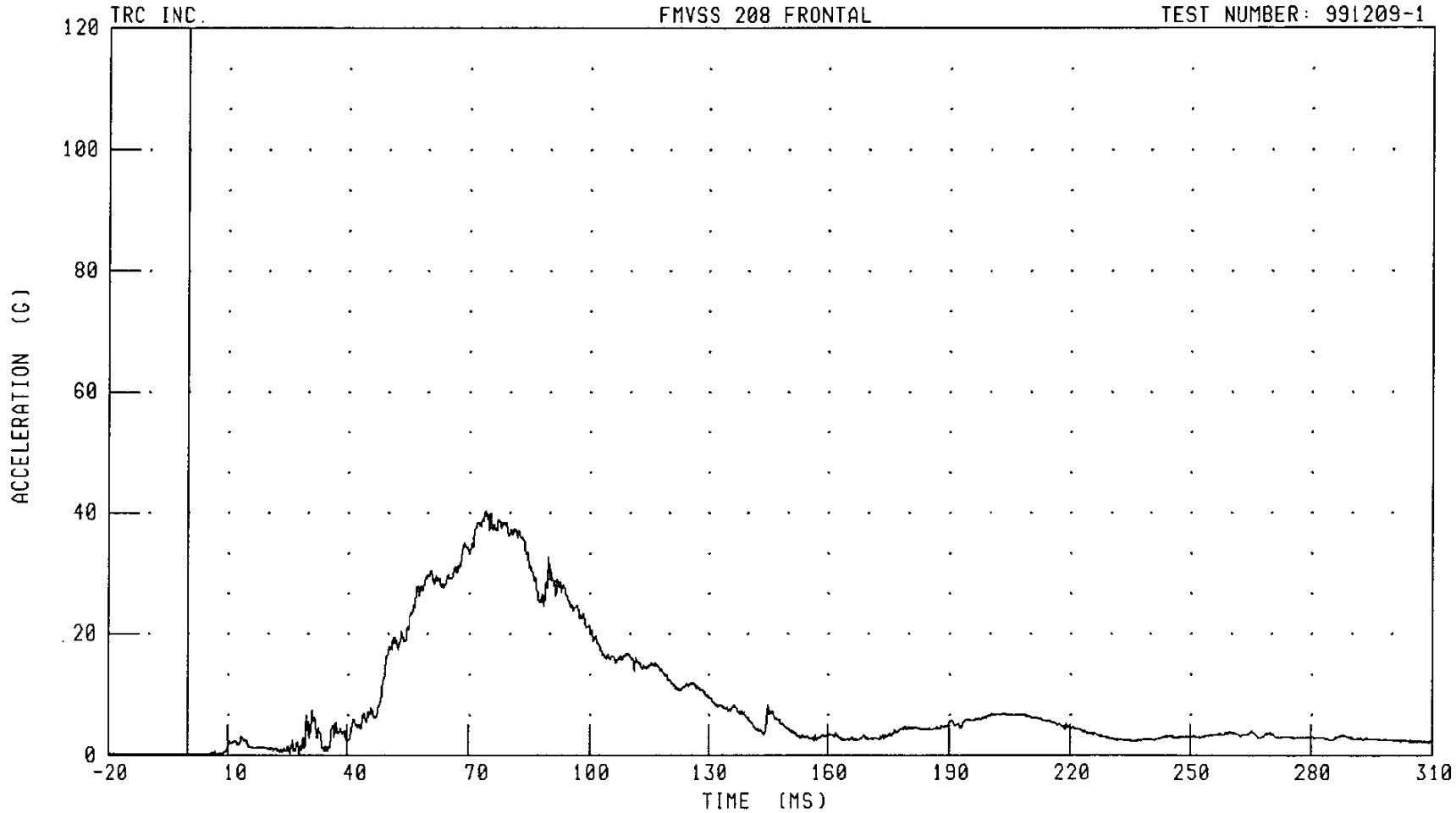

CHANNEL: HEDYC2 FILTER: CH. CLASS 1000 PEAK DATA: 7.01 G @ 51.44 MS, -18.10 G @ 77.52 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION



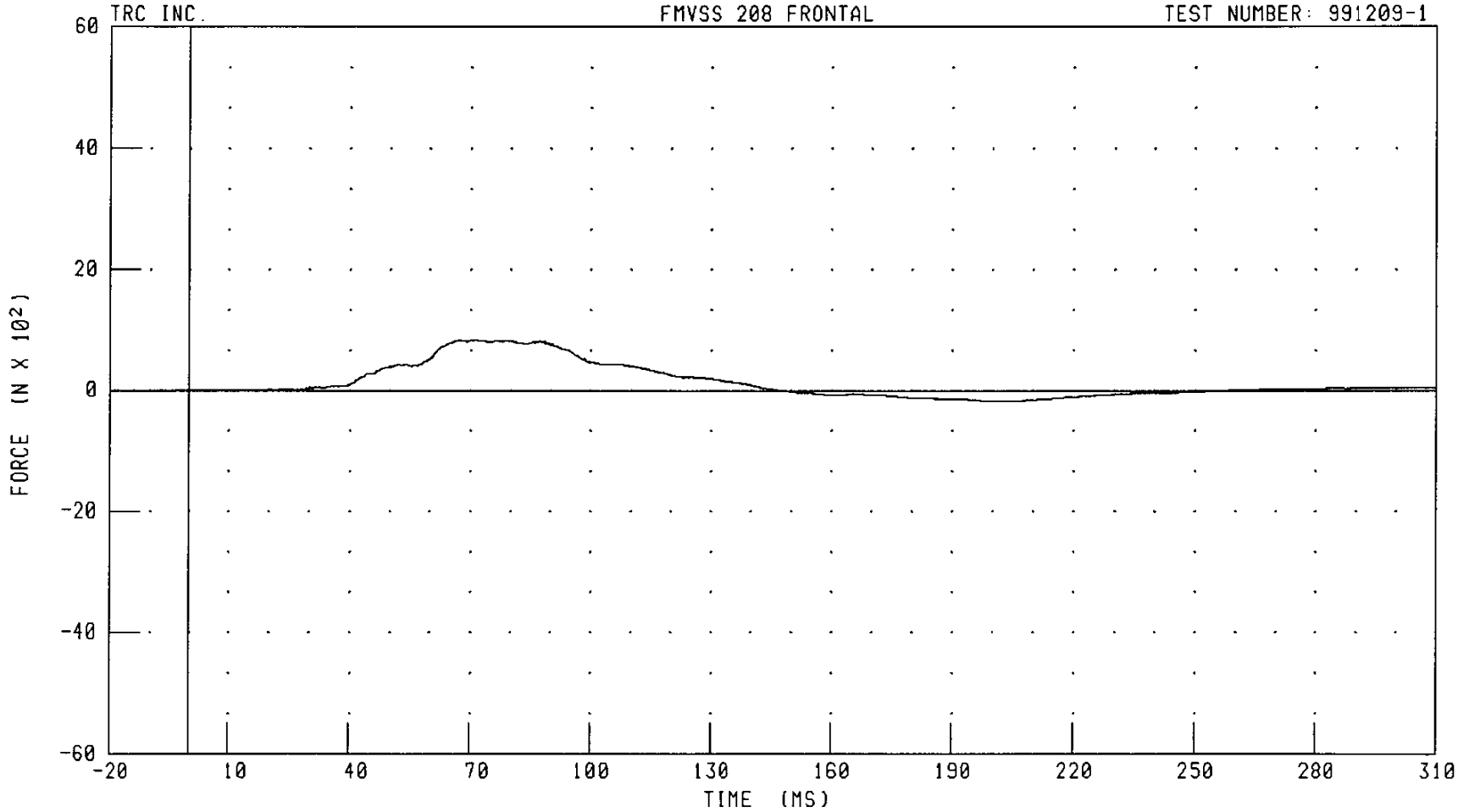

CHANNEL: HEDZG2 FILTER: CH. CLASS 1000 PEAK DATA: 9.59 G @ 68.24 MS; -26.23 G @ 90.24 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



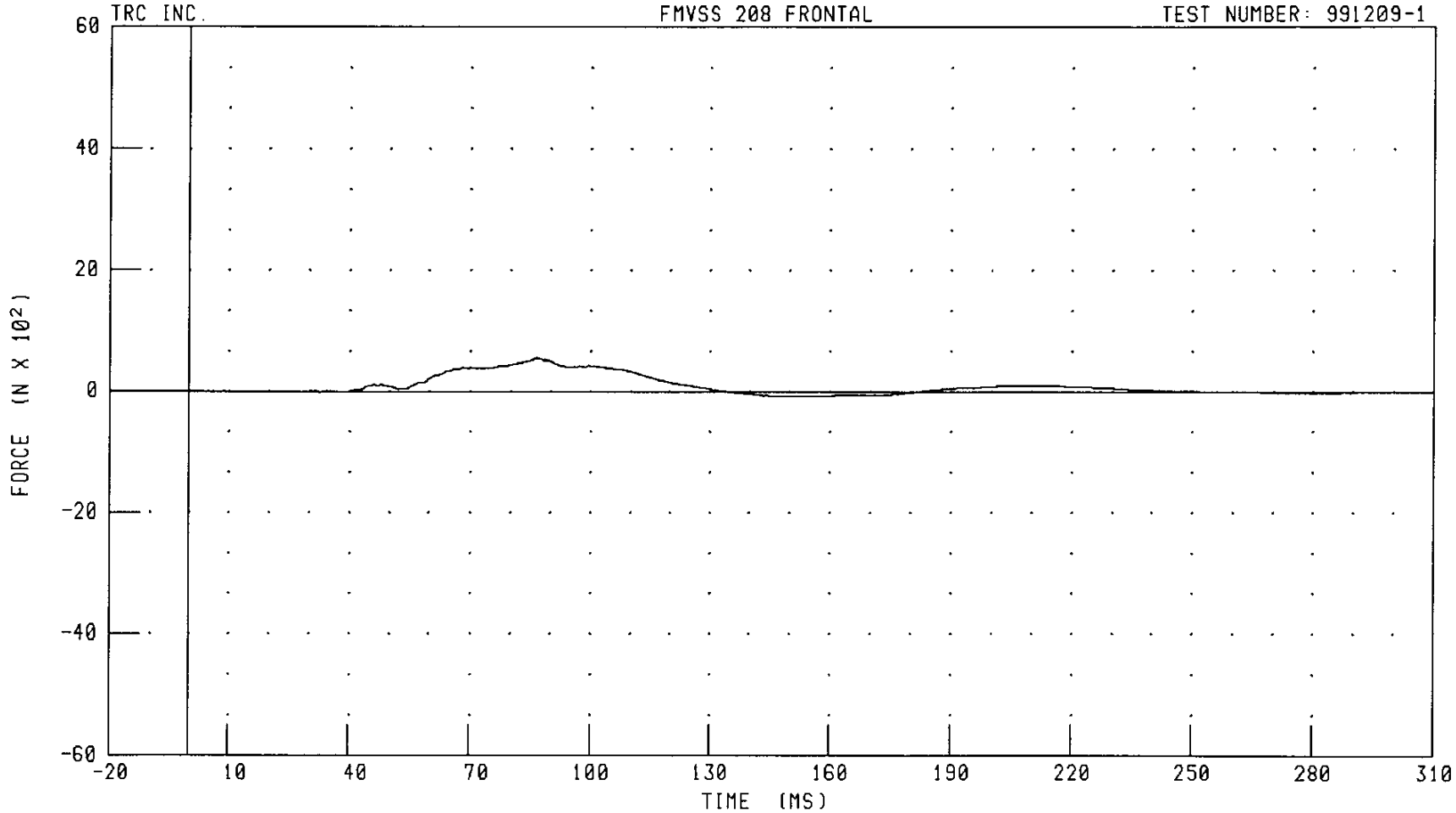

CHANNEL: HEDRC2 FILTER: CH. CLASS 1000 PEAK DATA: 40.23 G @ 74.08 MS; 0.12 G @ -12.40 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE



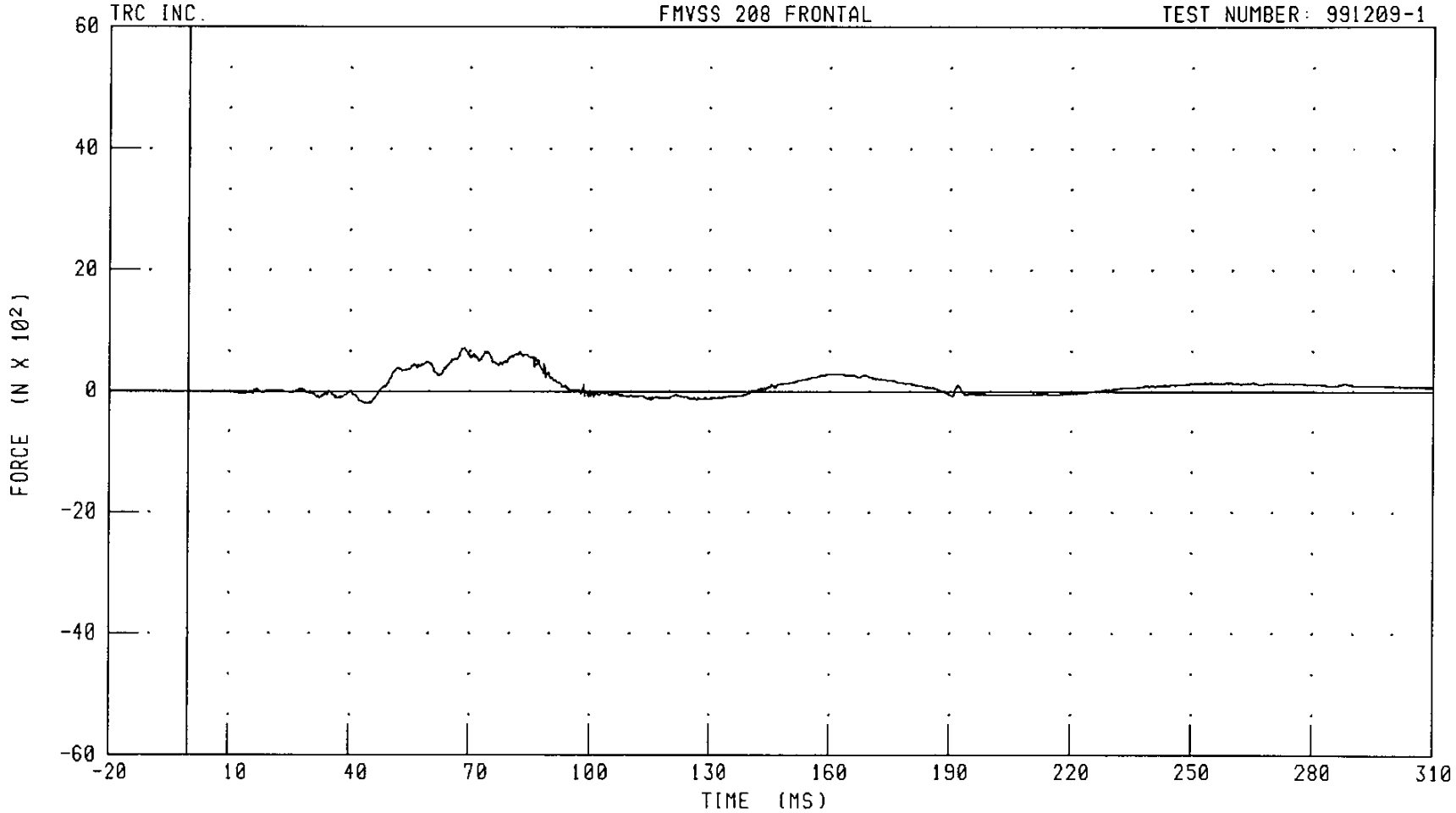

CHANNEL: NEKXF2 FILTER: CH. CLASS 1000 PEAK DATA: 838.80 N @ 70.16 MS; -177.22 N @ 199.76 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE



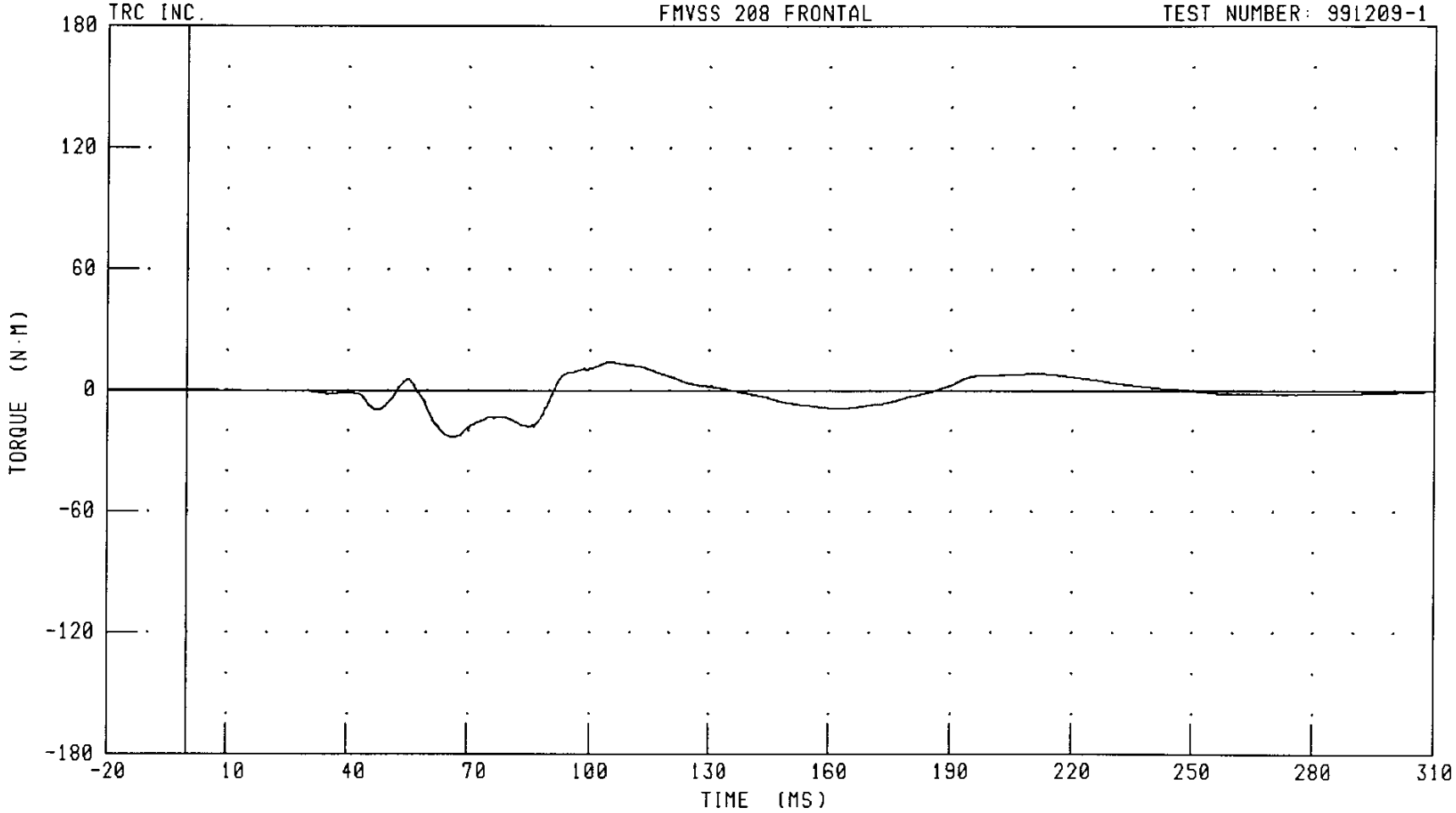

CHANNEL: NEKYF2 FILTER: CH. CLASS 1000 PEAK DATA: 565.11 N @ 86.56 MS; -78.08 N @ 149.04 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE



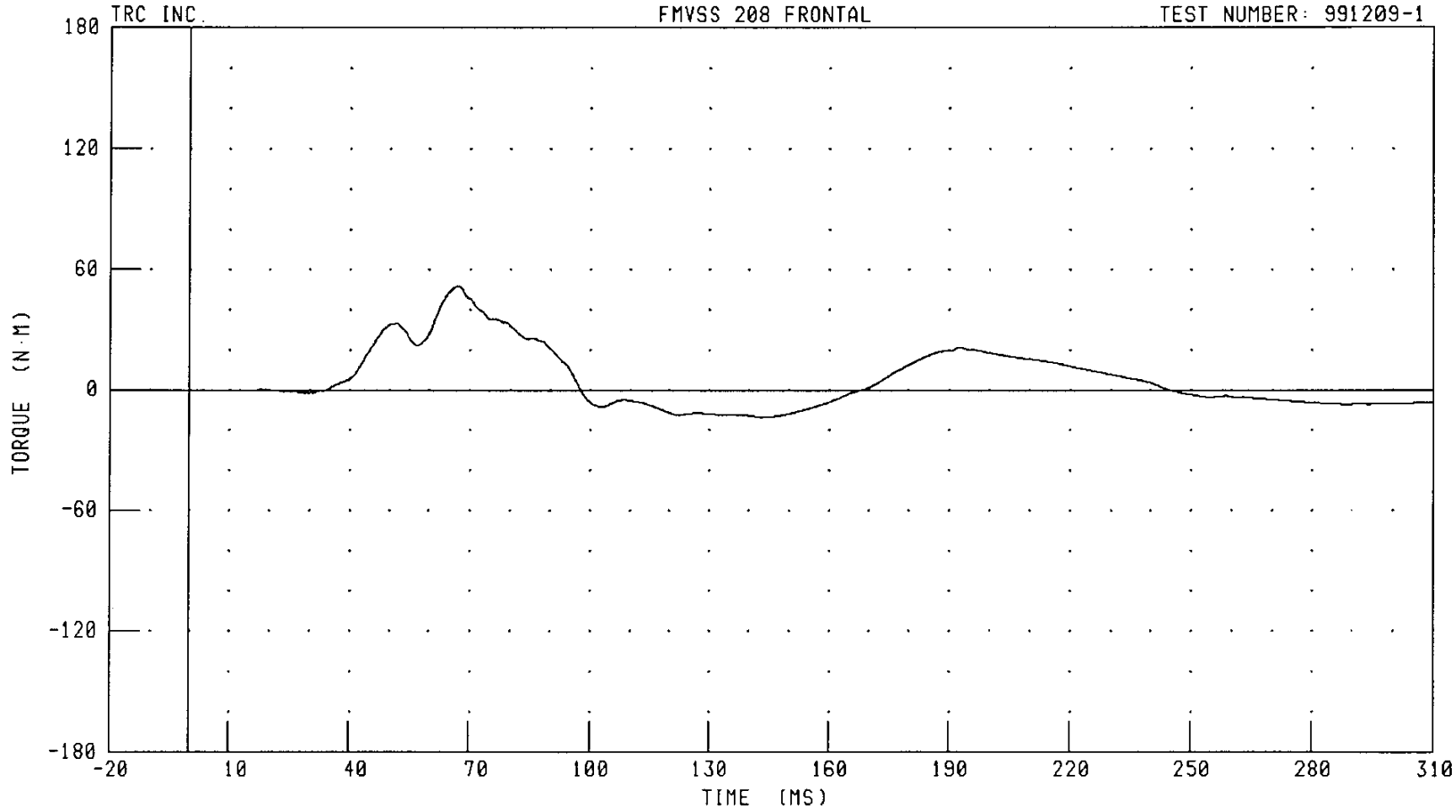

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000 PEAK DATA: 712.12 N @ 68.88 MS; -193.33 N @ 44.16 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS



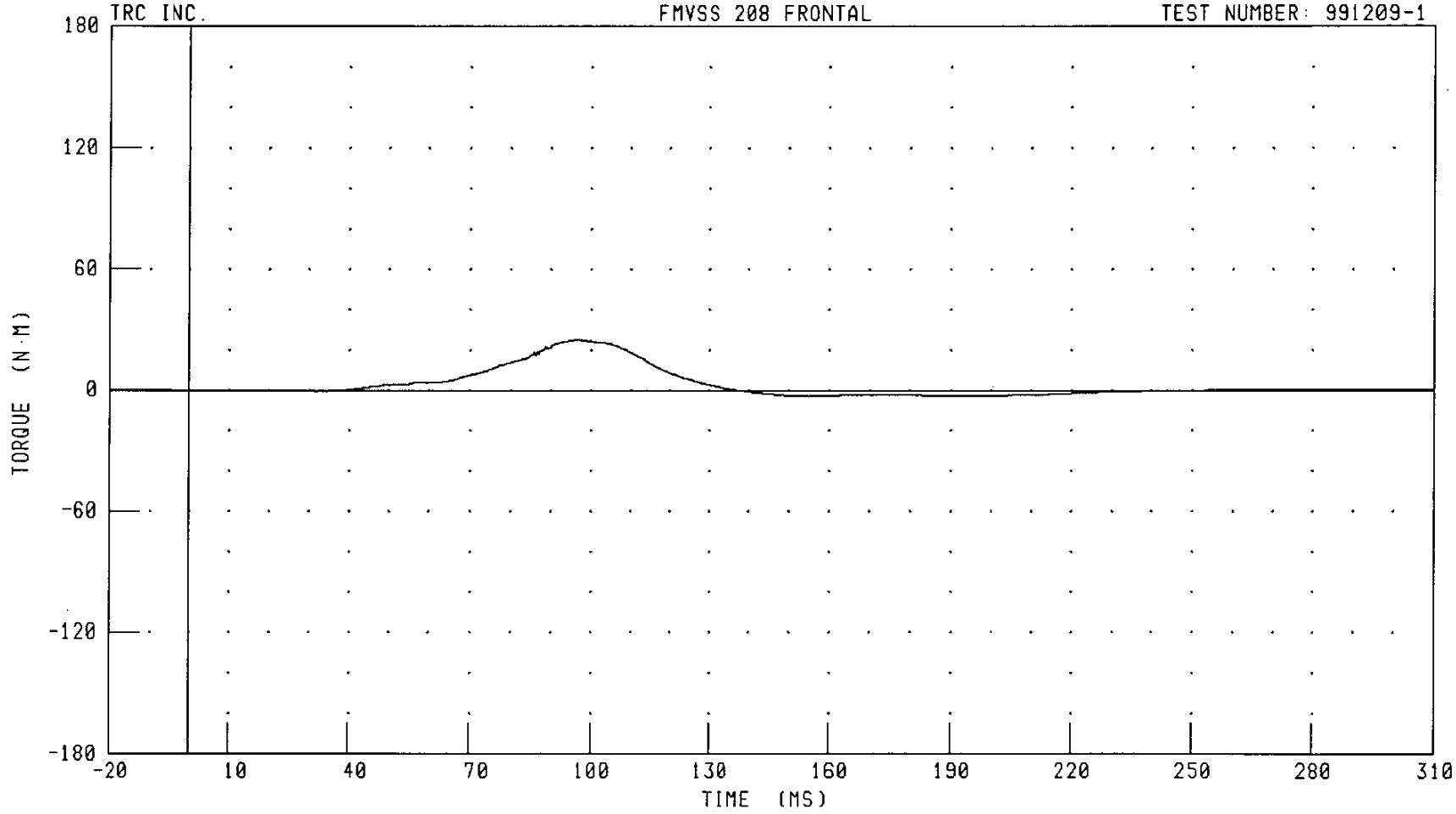

CHANNEL: NEKXM2 FILTER: CH. CLASS 600 PEAK DATA: 14.08 N-M @ 105.76 MS; -23.25 N-M @ 66.40 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS



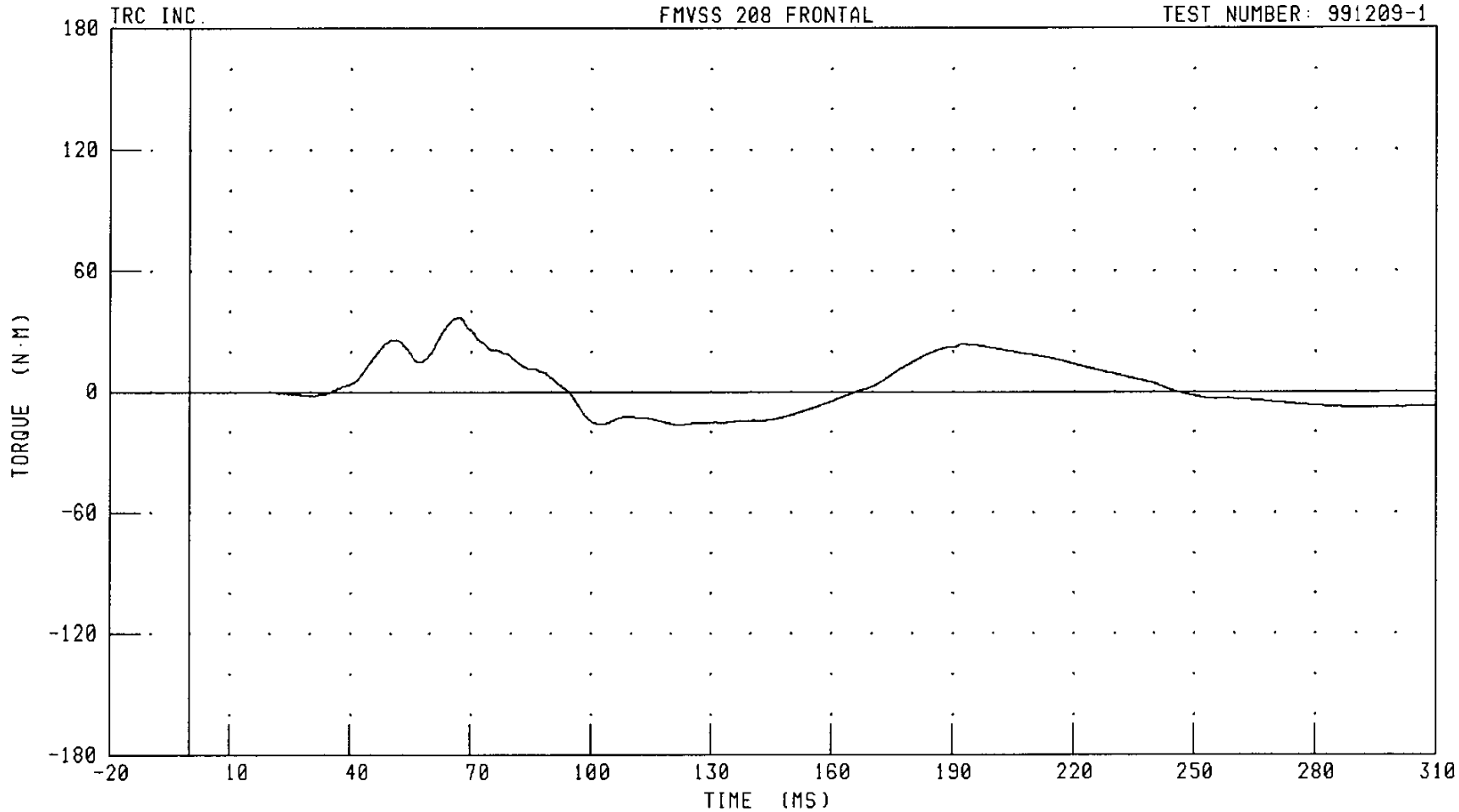

CHANNEL: NEKYM2 FILTER: CH. CLASS 600 PEAK DATA: 51.61 N-M @ 67.12 MS; -13.72 N-M @ 143.20 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS



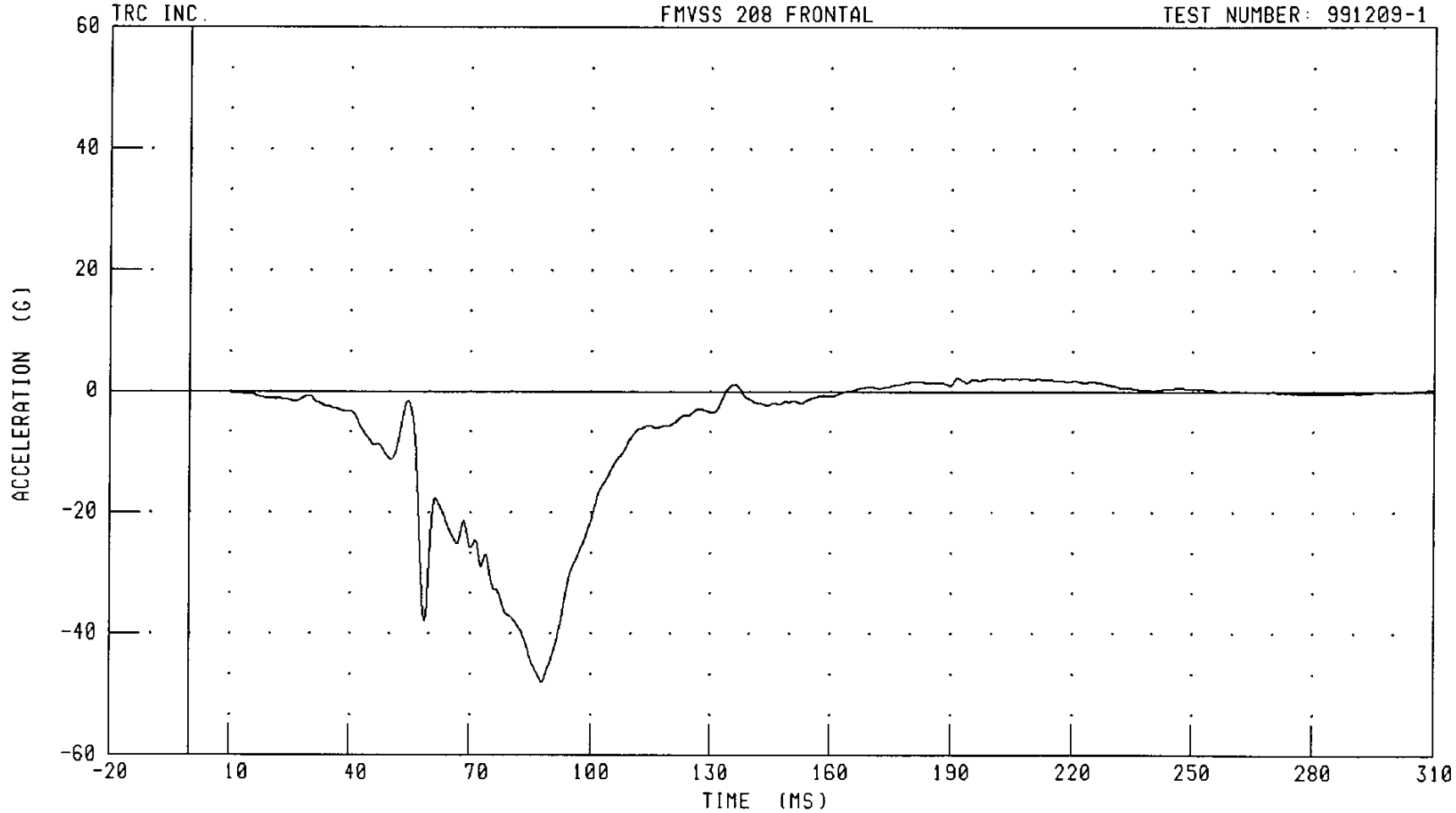

CHANNEL: NEKZM2 FILTER: CH. CLASS 600 PEAK DATA: 25.14 N-M @ 95.92 MS; -2.87 N-M @ 154.72 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS



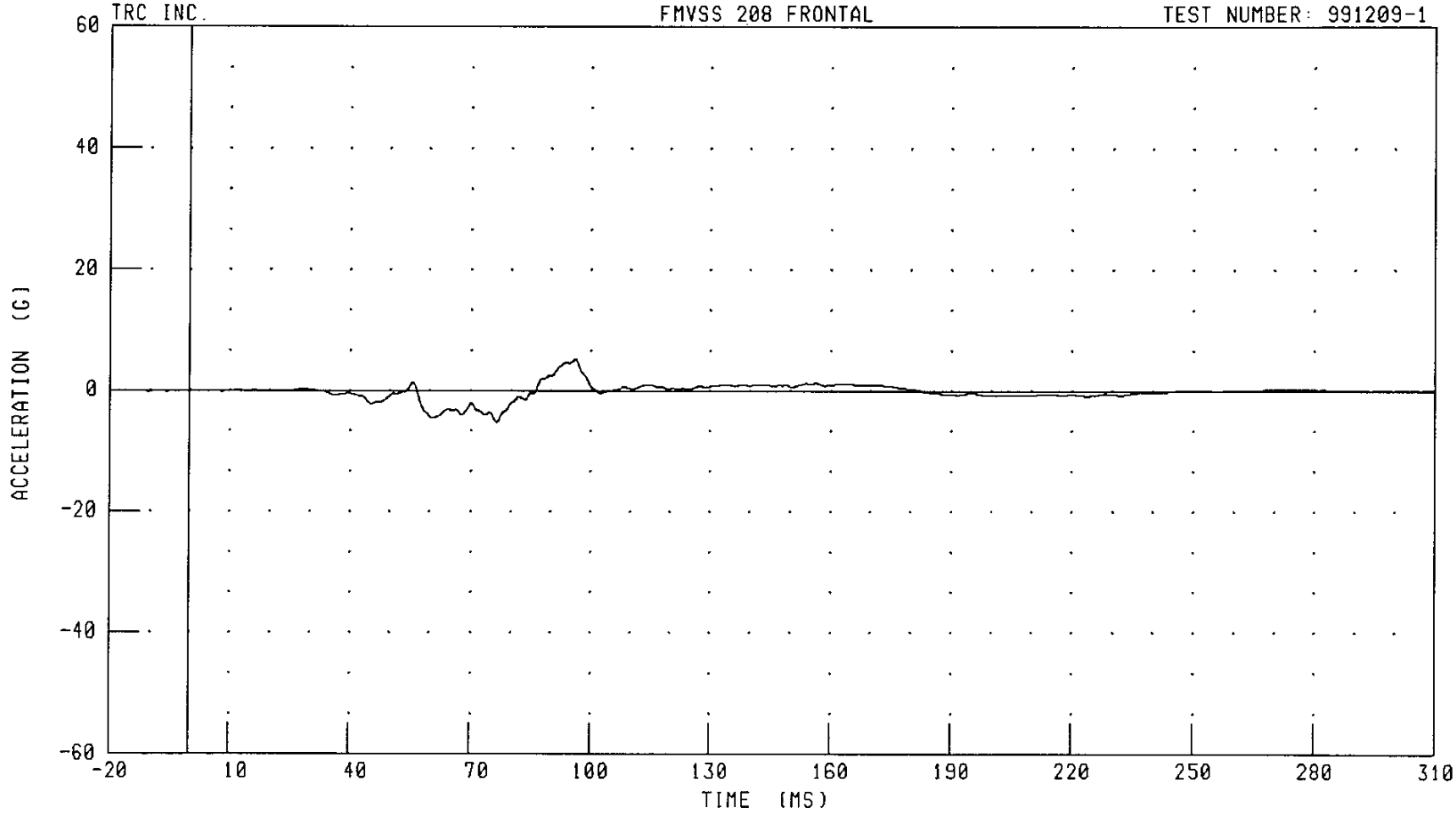

CHANNEL: NEKOM2 FILTER: CH. CLASS 600 PEAK DATA: 36.82 N-M @ 66.88 MS; -16.53 N-M @ 122.16 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION



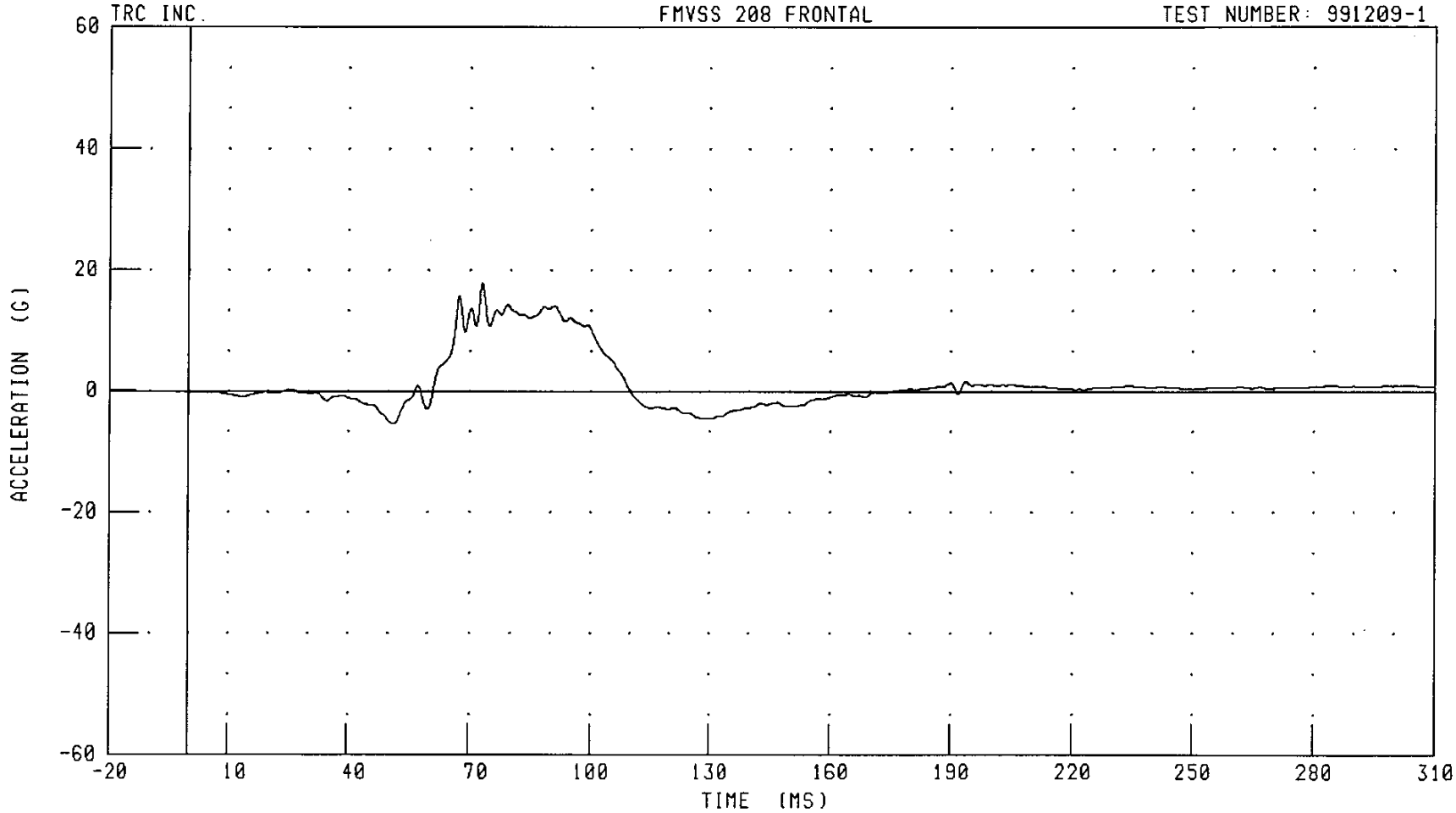

CHANNEL: CSTXG2 FILTER: CH. CLASS 180 PEAK DATA: 2.29 G @ 191.60 MS; -47.97 G @ 87.92 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION



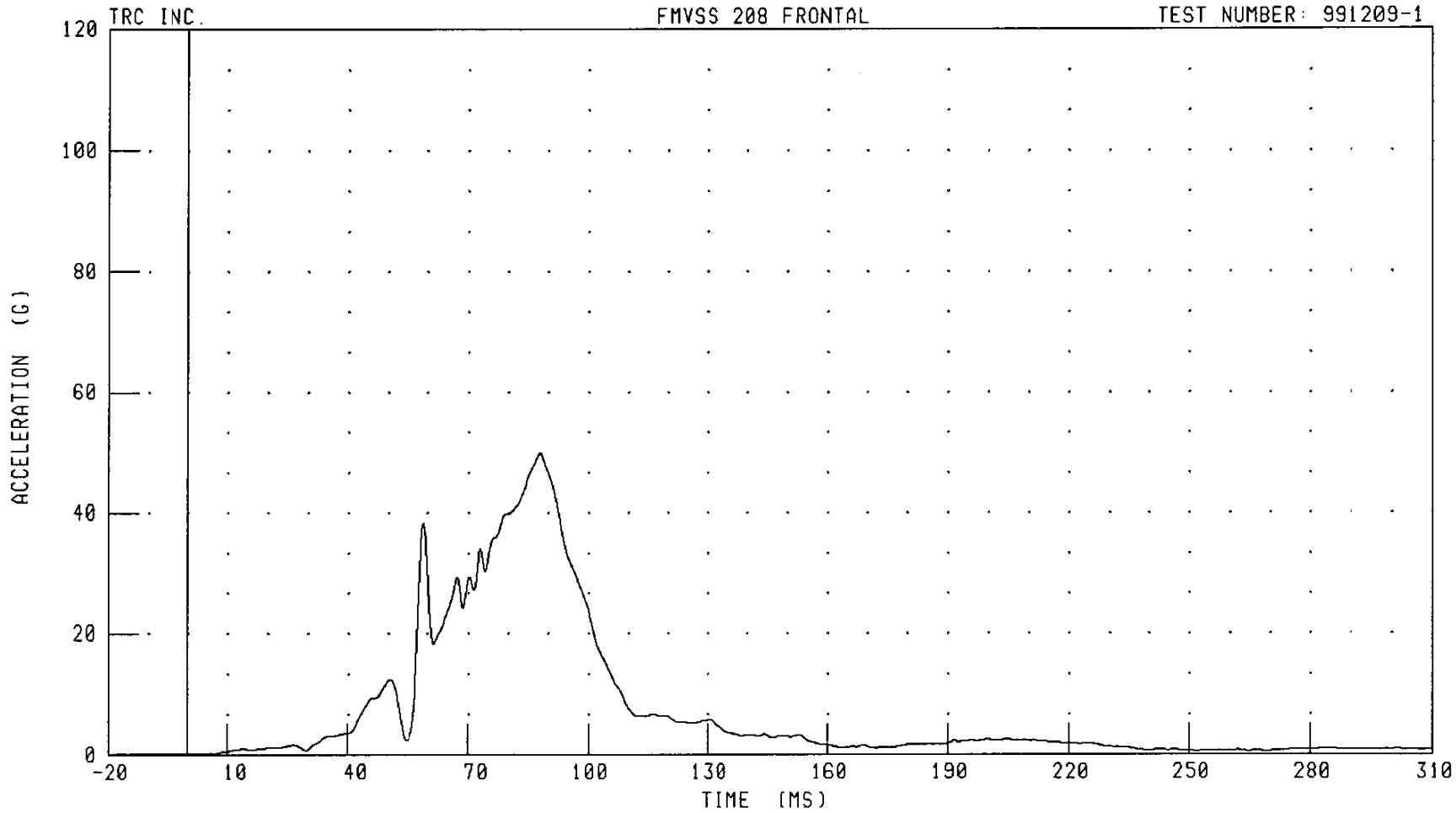

CHANNEL: CSTYC2 FILTER: CH. CLASS 180 PEAK DATA: 5.16 G @ 96.24 MS; -5.24 G @ 76.48 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION



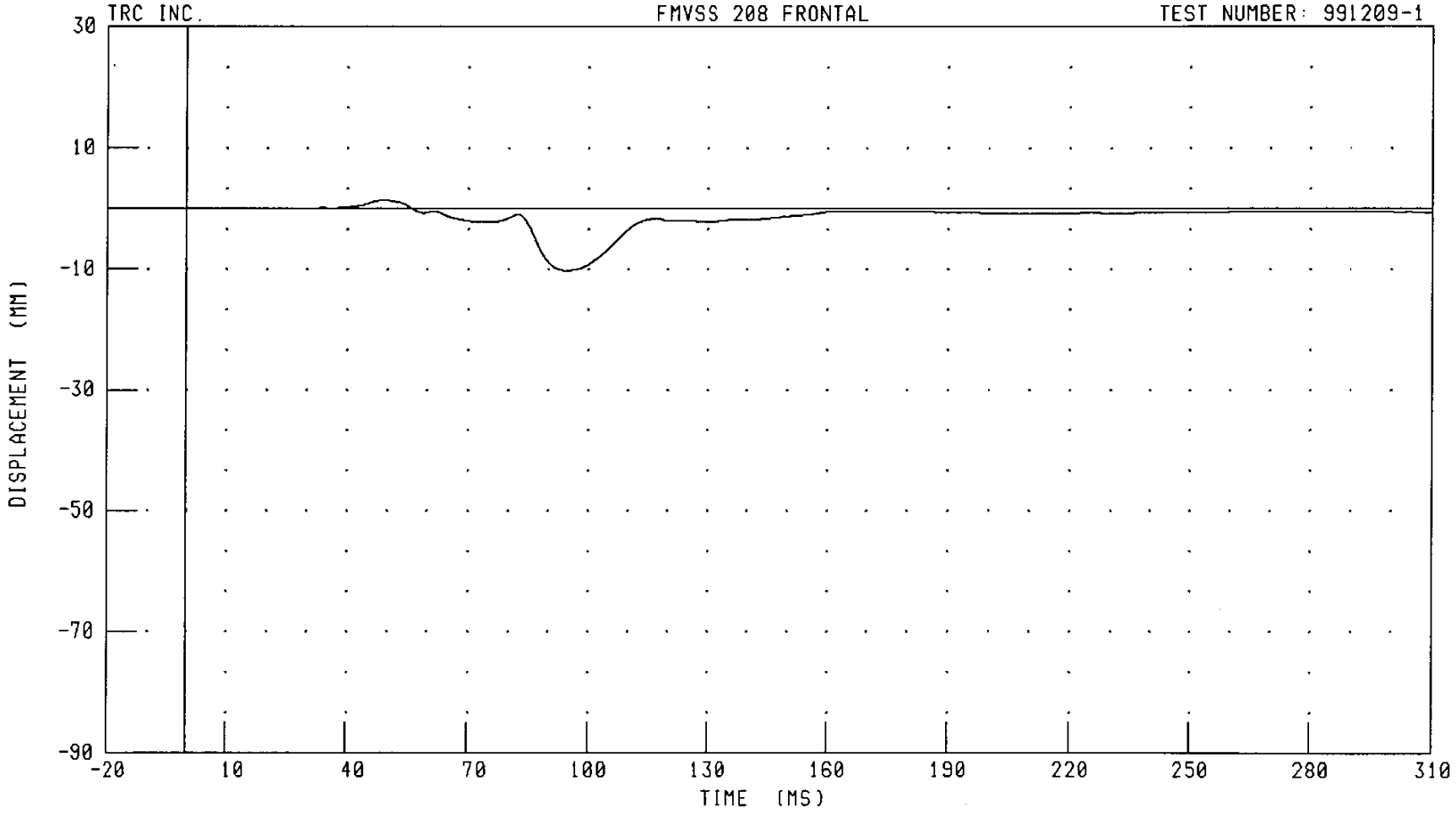

CHANNEL: CSTZC2 FILTER: CH. CLASS 180 PEAK DATA: 17.80 G @ 73.20 MS; -5.40 G @ 51.36 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



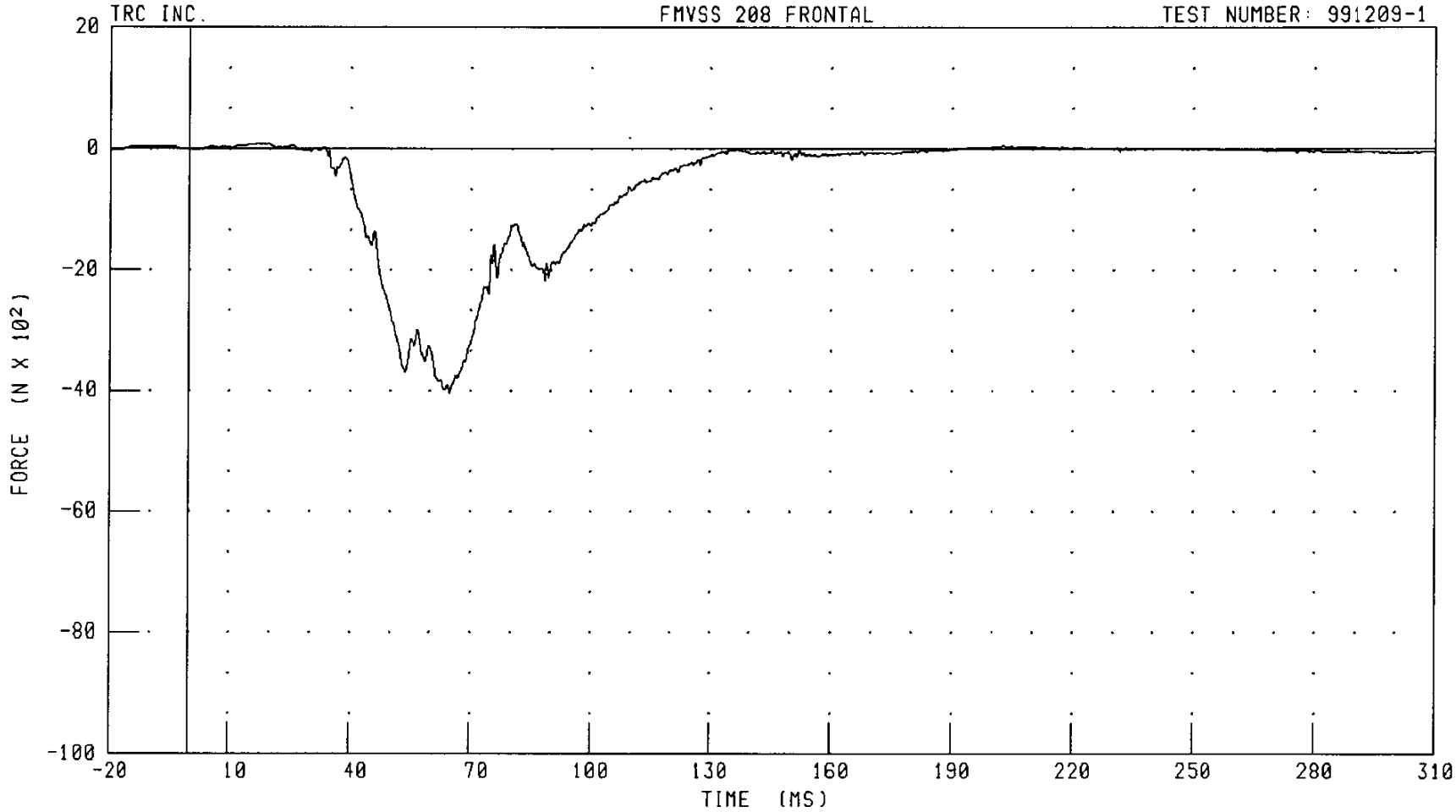

CHANNEL: CSTRG2 FILTER: CH. CLASS 180 PEAK DATA: 49.93 G @ 88.00 MS; 0.01 G @ -20.00 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST DEFLECTION



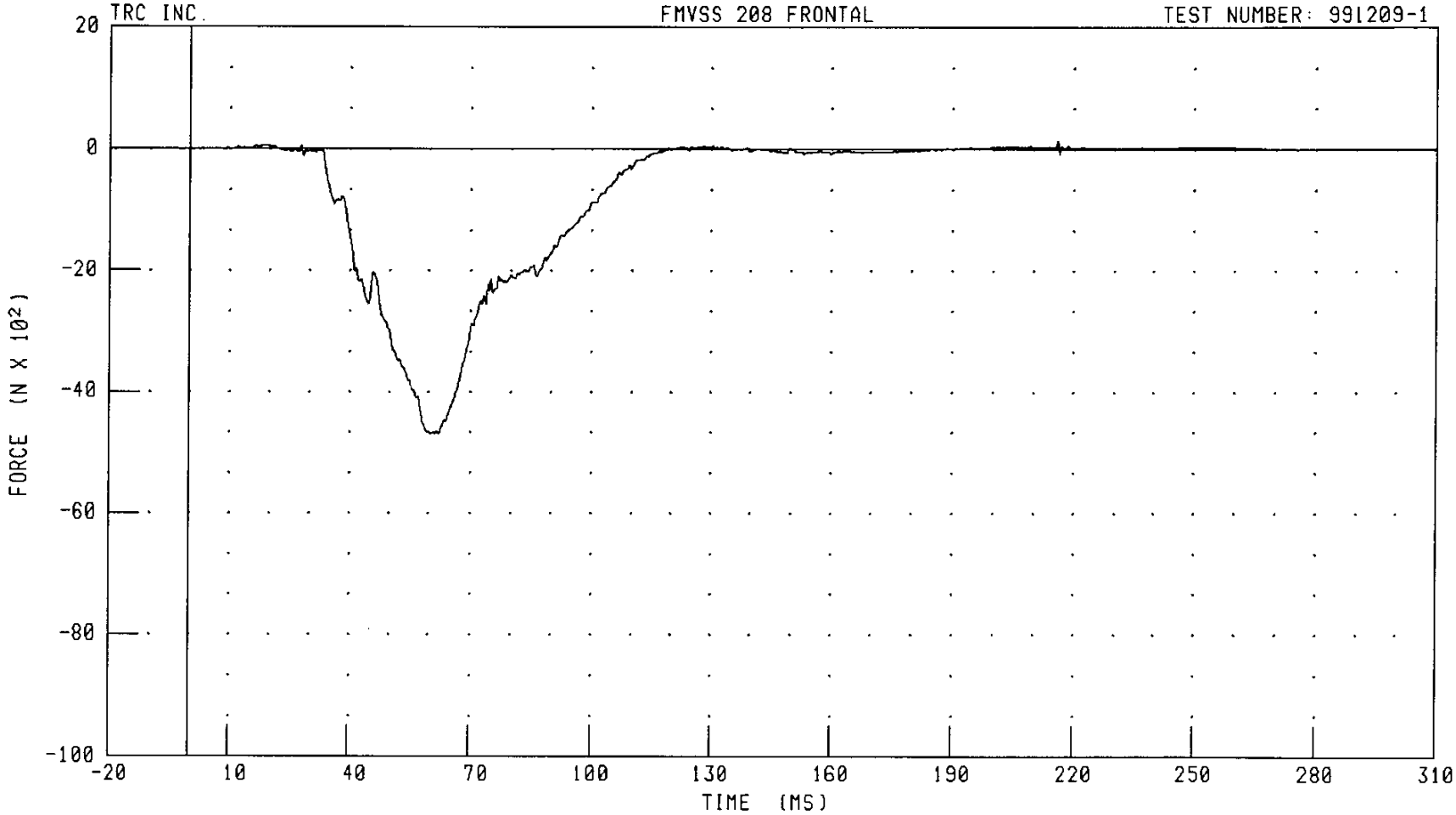

CHANNEL: CSTXD2 FILTER: CH. CLASS 180 PEAK DATA: 1.45 MM @ 49.20 MS; -10.21 MM @ 94.72 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER LEFT FEMUR FORCE



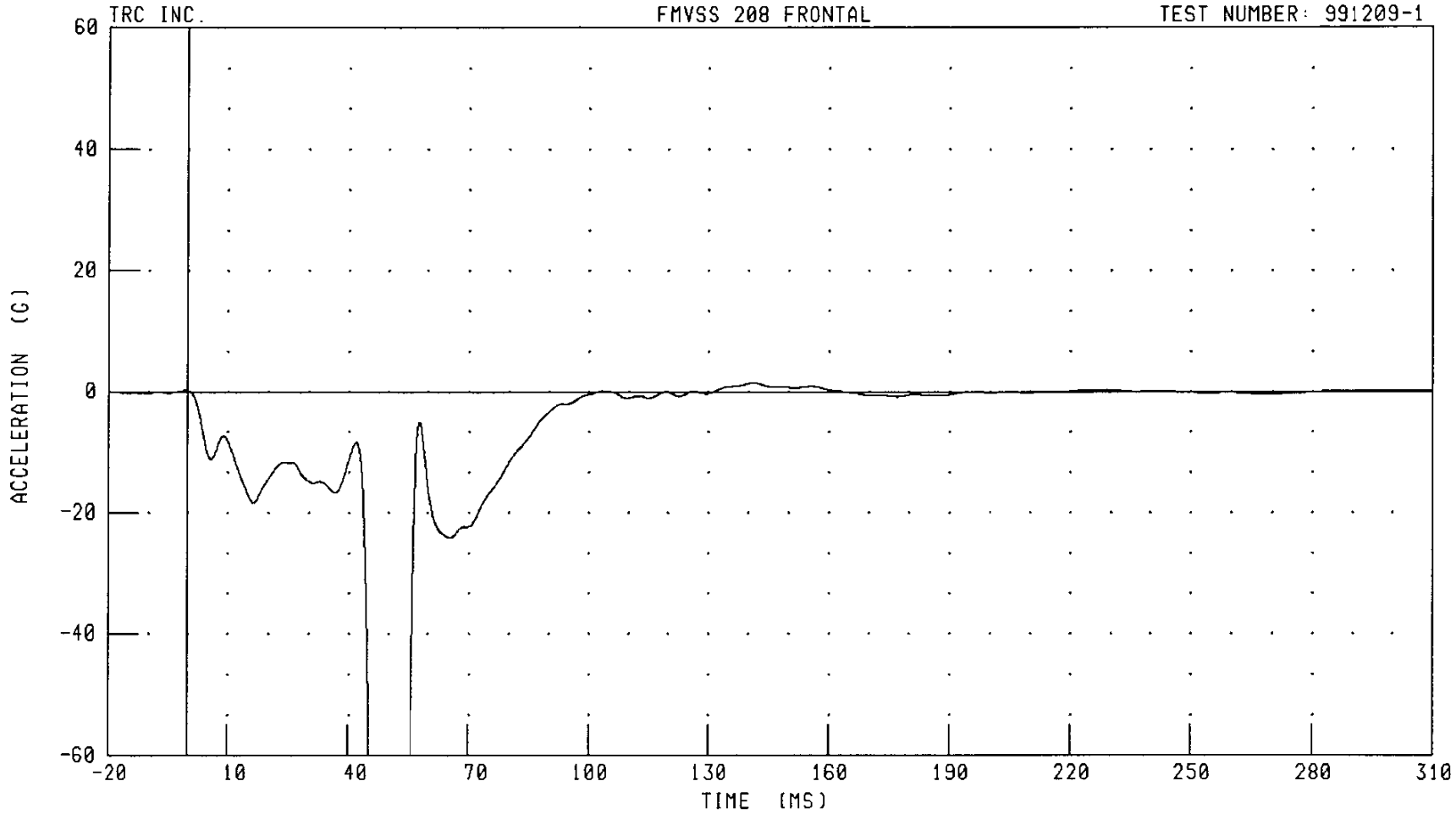

CHANNEL: LFMF2 FILTER: CH. CLASS 600 PEAK DATA: 93.76 N @ 18.40 MS; -4036.55 N @ 64.96 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



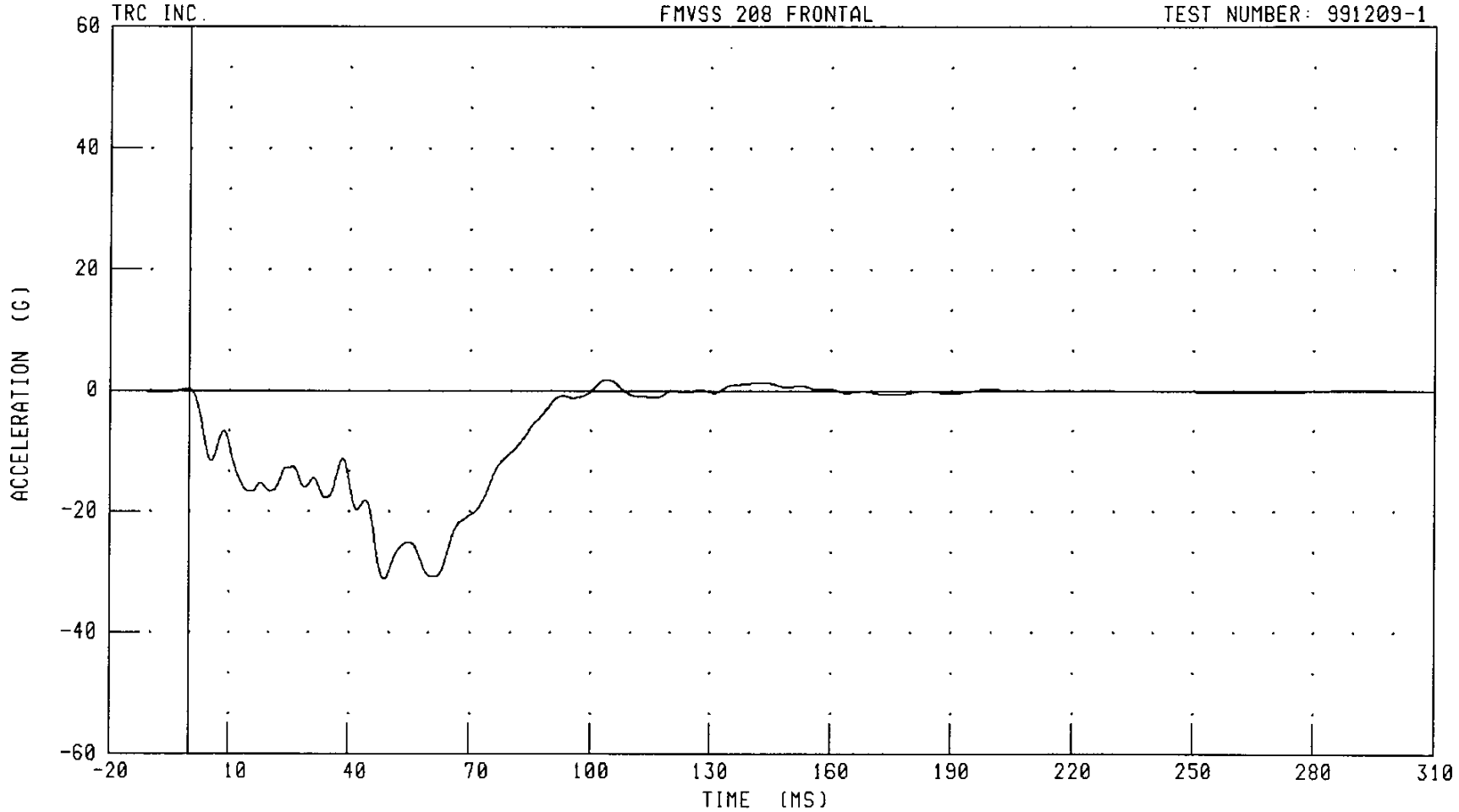

CHANNEL: RFMF2 FILTER: CH. CLASS 600 PEAK DATA: 133.73 N @ 215.92 MS; -4692.11 N @ 62.48 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
LEFT REAR SEAT X-AXIS ACCELERATION



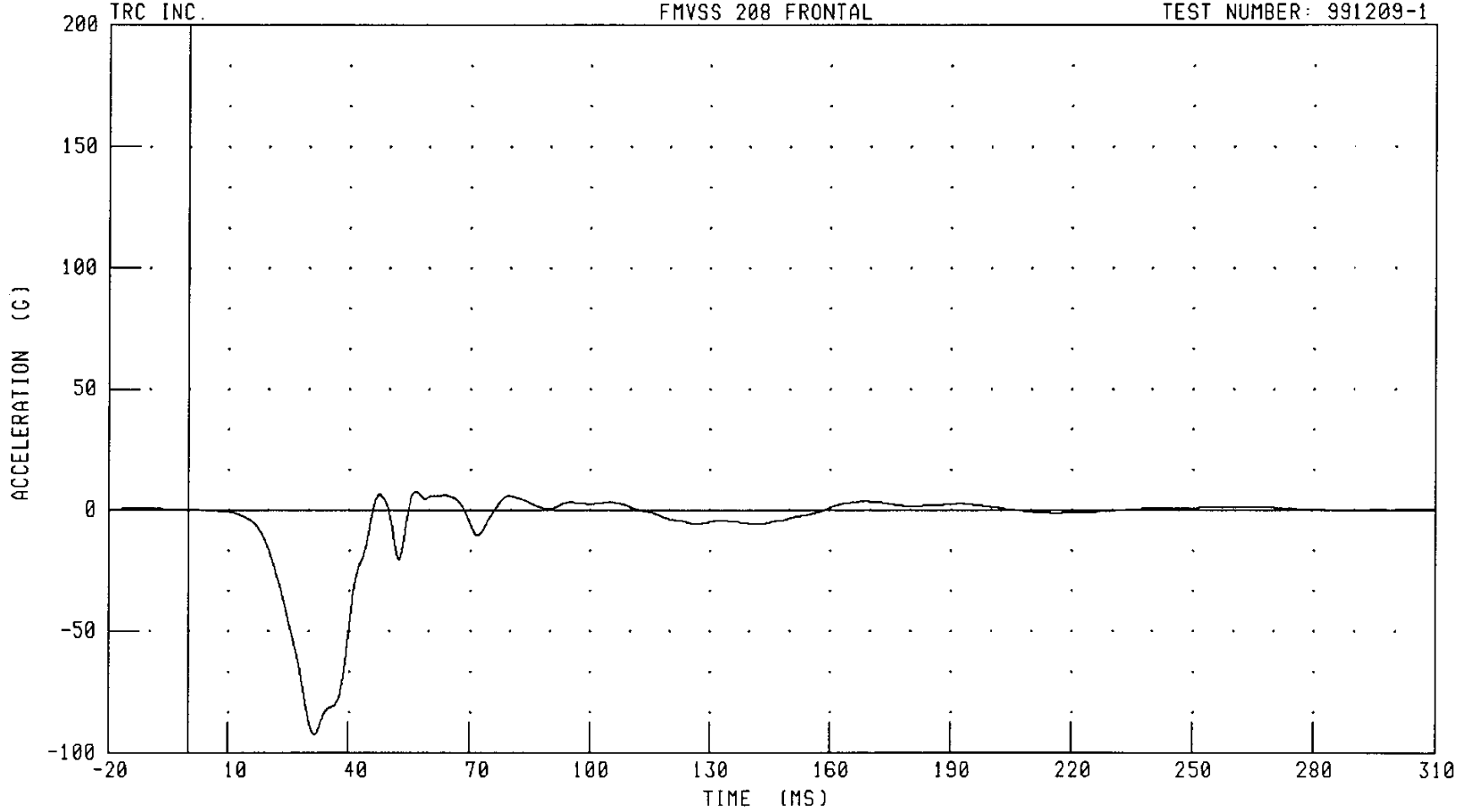

CHANNEL: TLRXC1 FILTER: CH. CLASS 60 PEAK DATA: 1.44 G @ 141.28 MS; -424.92 G @ 50.56 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT REAR SEAT X-AXIS ACCELERATION




CHANNEL: TRRXG1 FILTER: CH. CLASS 60 PEAK DATA: 1.84 G @ 104.00 MS; -31.10 G @ 48.96 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
ENGINE TOP X-AXIS ACCELERATION

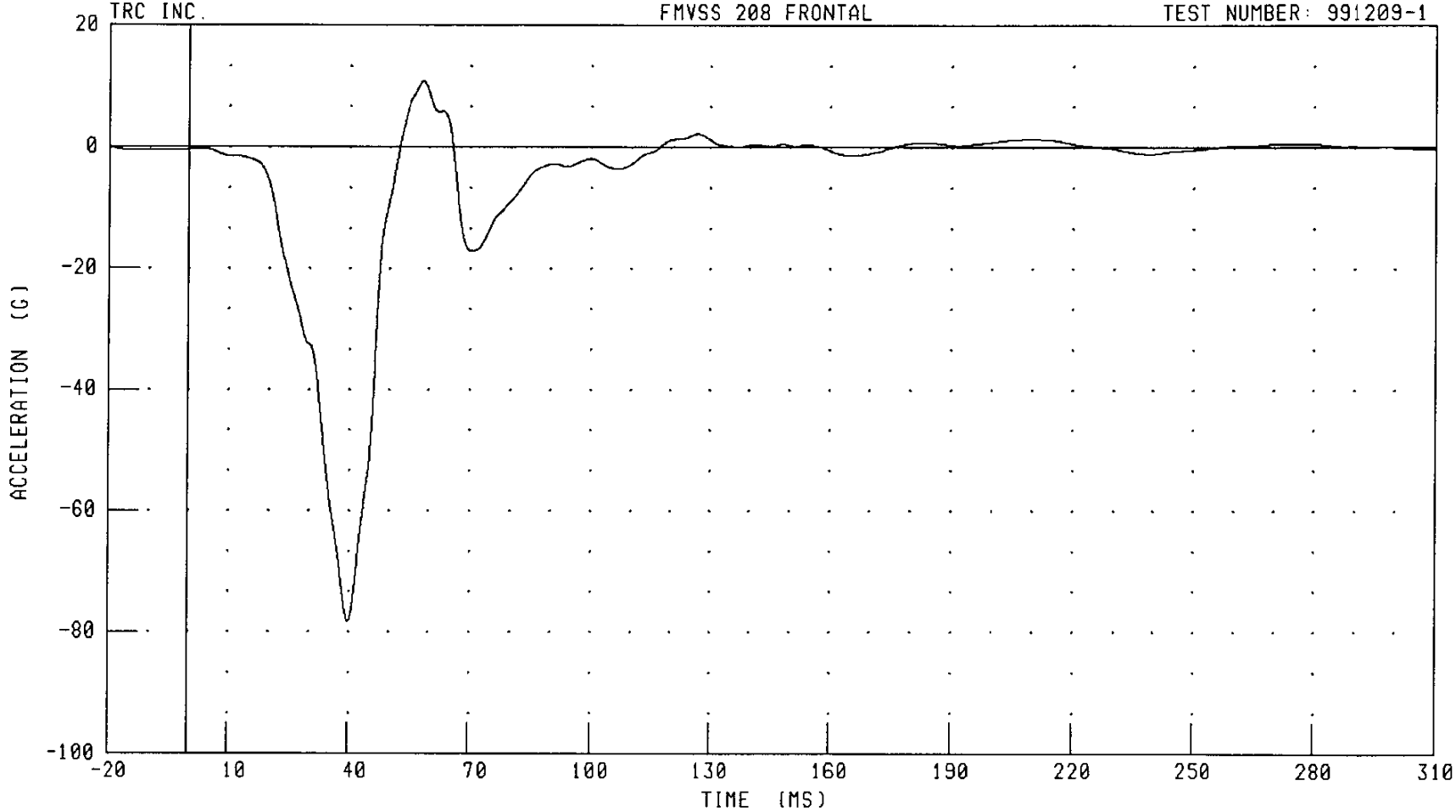



CHANNEL: ENGXG1 FILTER: CH. CLASS 60 PEAK DATA: 7.65 G @ 56.72 MS; -92.58 G @ 31.52 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH

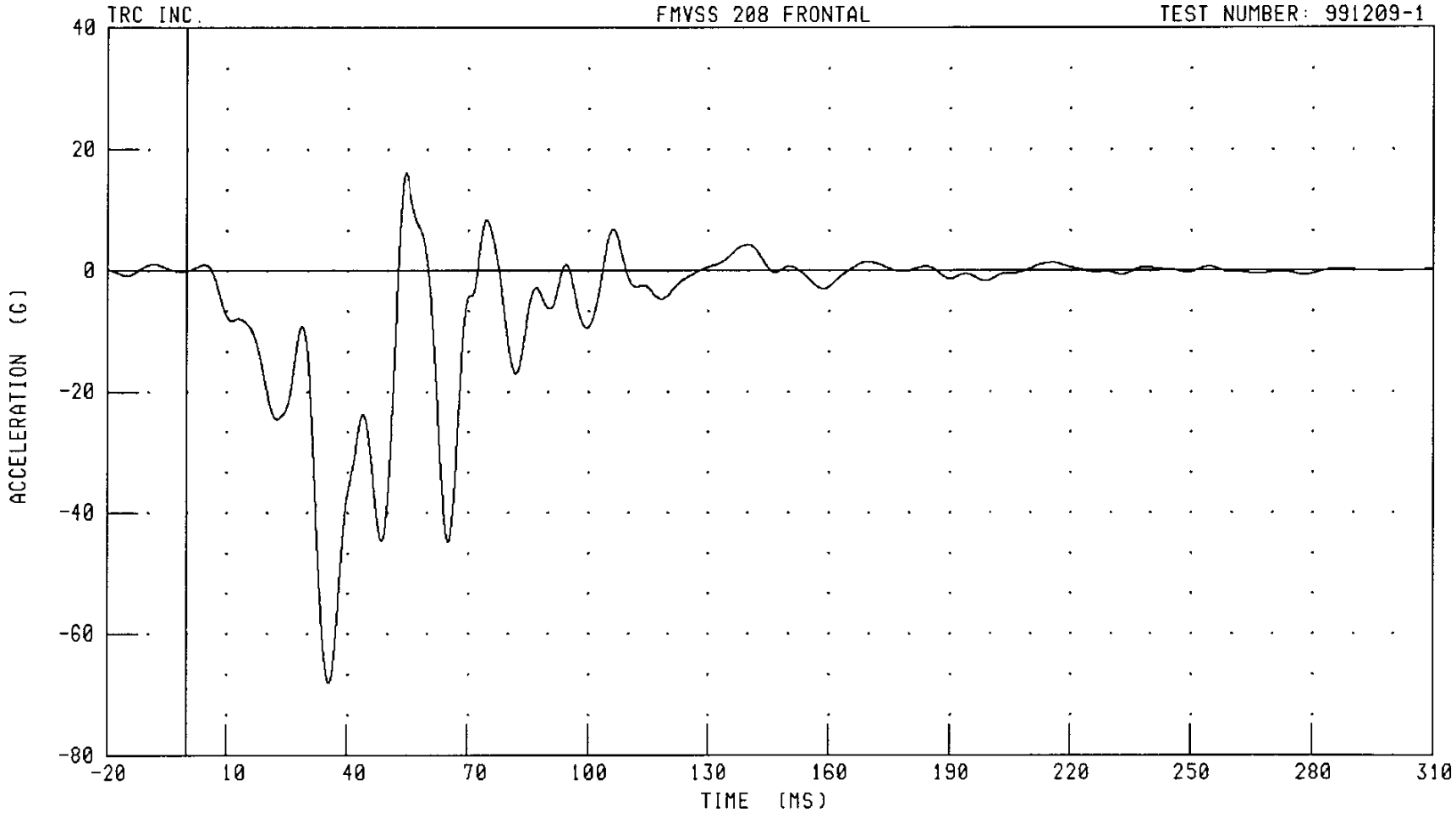
ENGINE BOTTOM X-AXIS ACCELERATION

TRC INC. FMVSS 208 FRONTAL TEST NUMBER: 991209-1

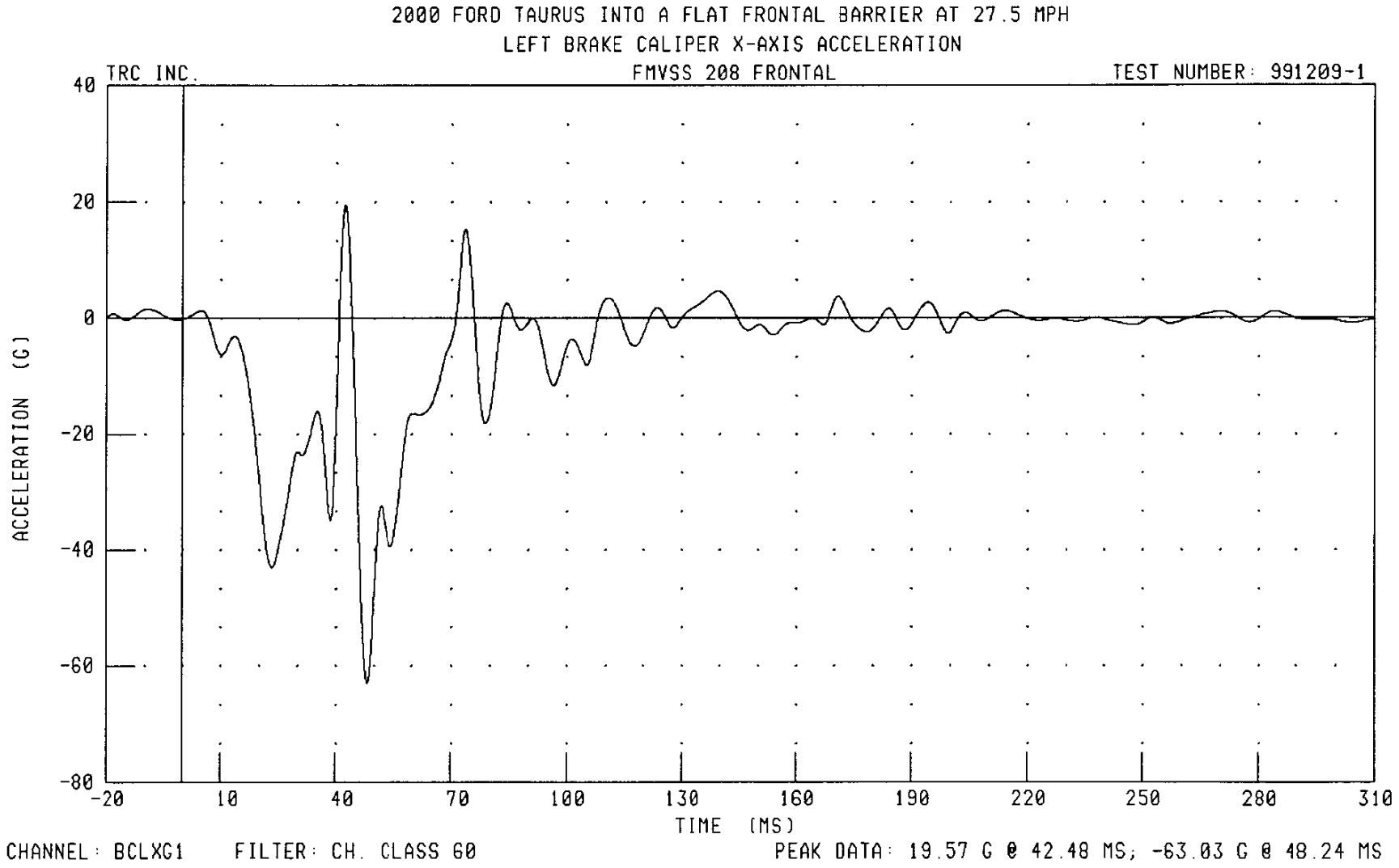



CHANNEL: ENGXC2 FILTER: CH. CLASS 60 PEAK DATA: 10.87 G @ 58.48 MS; -78.28 G @ 40.00 MS

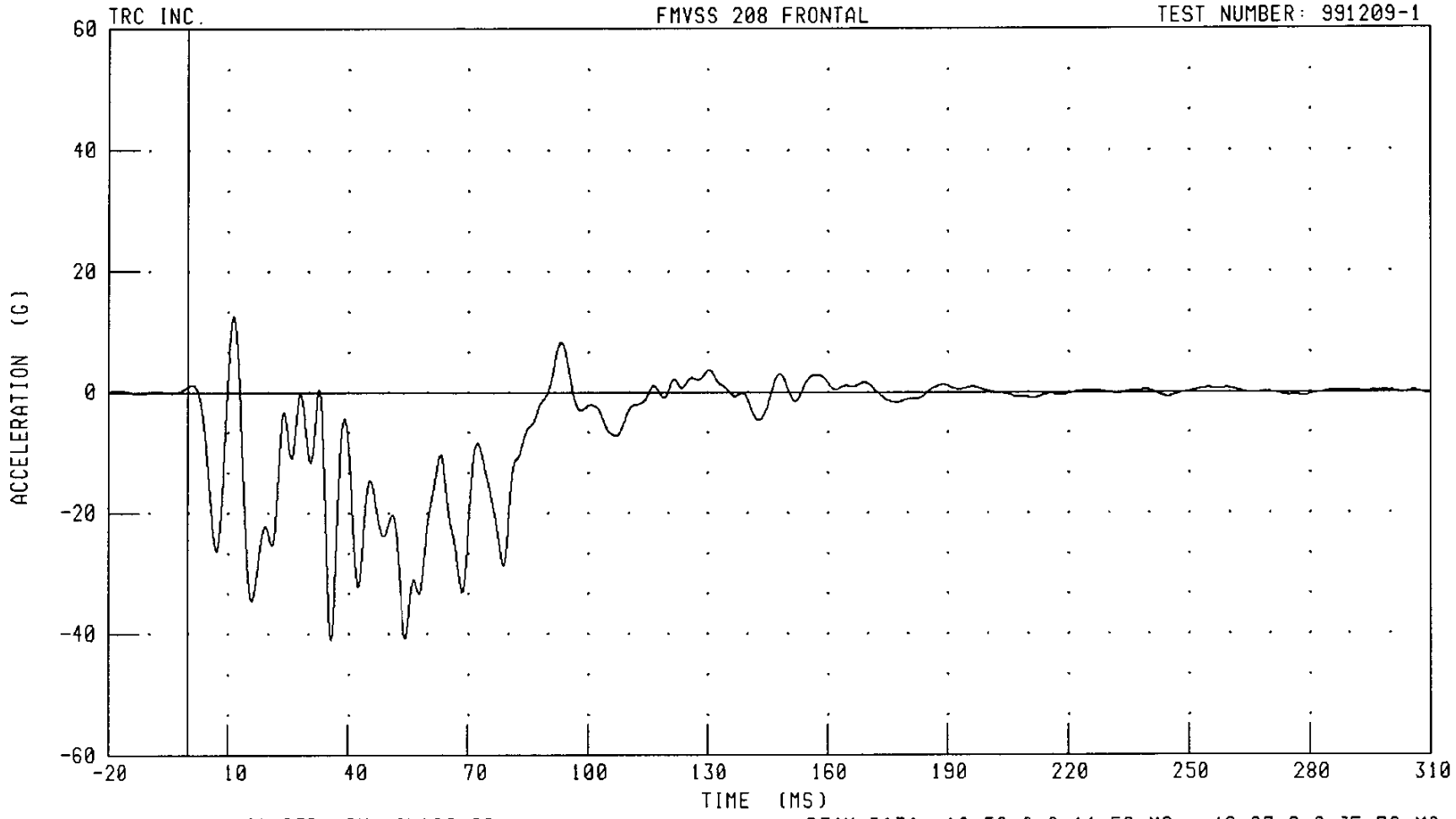
2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT BRAKE CALIPER X-AXIS ACCELERATION




CHANNEL: BCRXG1 FILTER: CH. CLASS 60 PEAK DATA: 16.14 G @ 54.64 MS; -68.07 G @ 35.60 MS

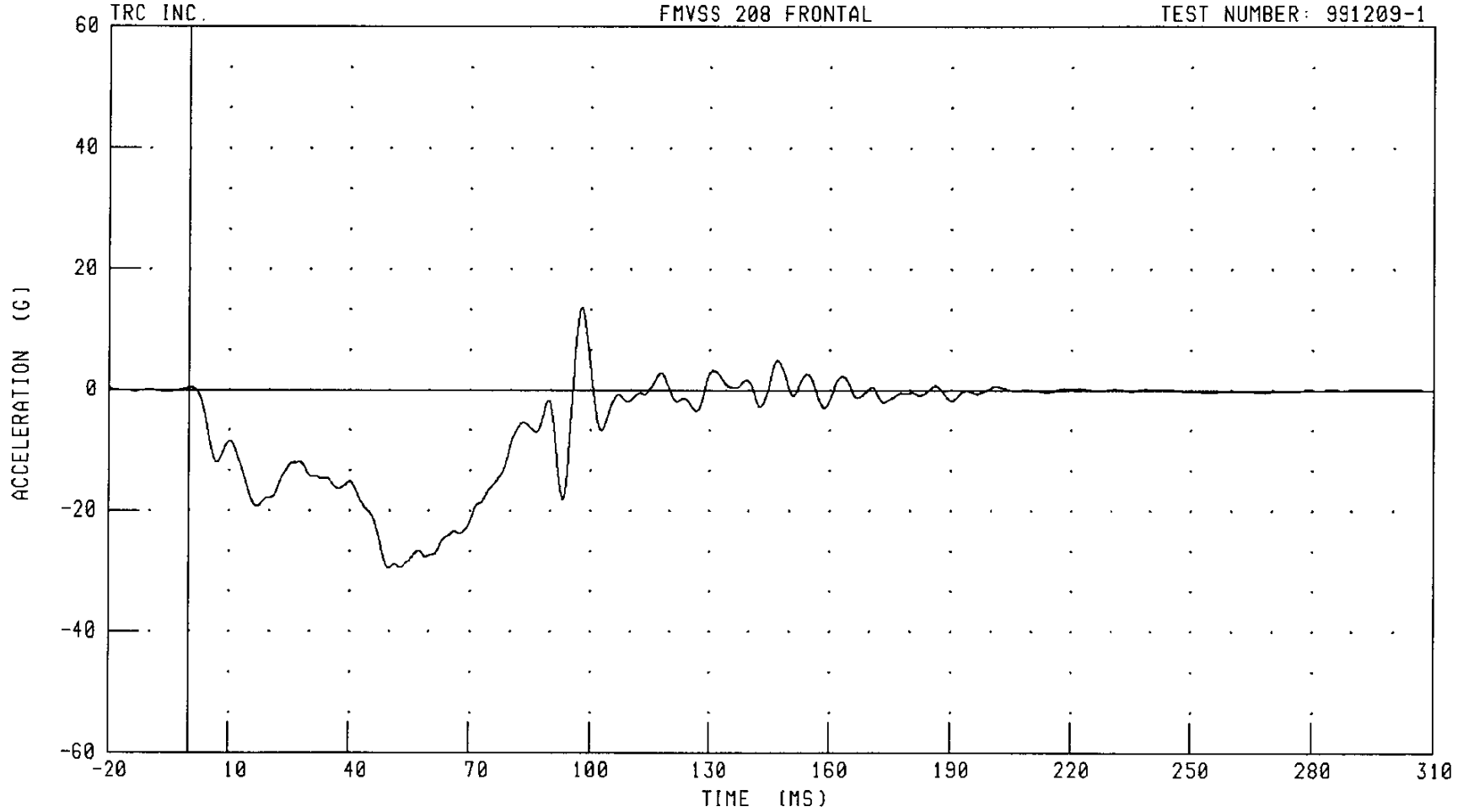

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
LEFT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
FMVSS 208 FRONTAL
TEST NUMBER: 991209-1
ACCELERATION (G)
40
20
0
-20
-40
-60
-80
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCLXG1
FILTER: CH. CLASS 60
PEAK DATA: 19.57 G @ 42.48 MS; -63.03 G @ 48.24 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION




CHANNEL: IPCXG1 FILTER: CH. CLASS 60 PEAK DATA: 12.59 G @ 11.52 MS; -40.97 G @ 35.76 MS

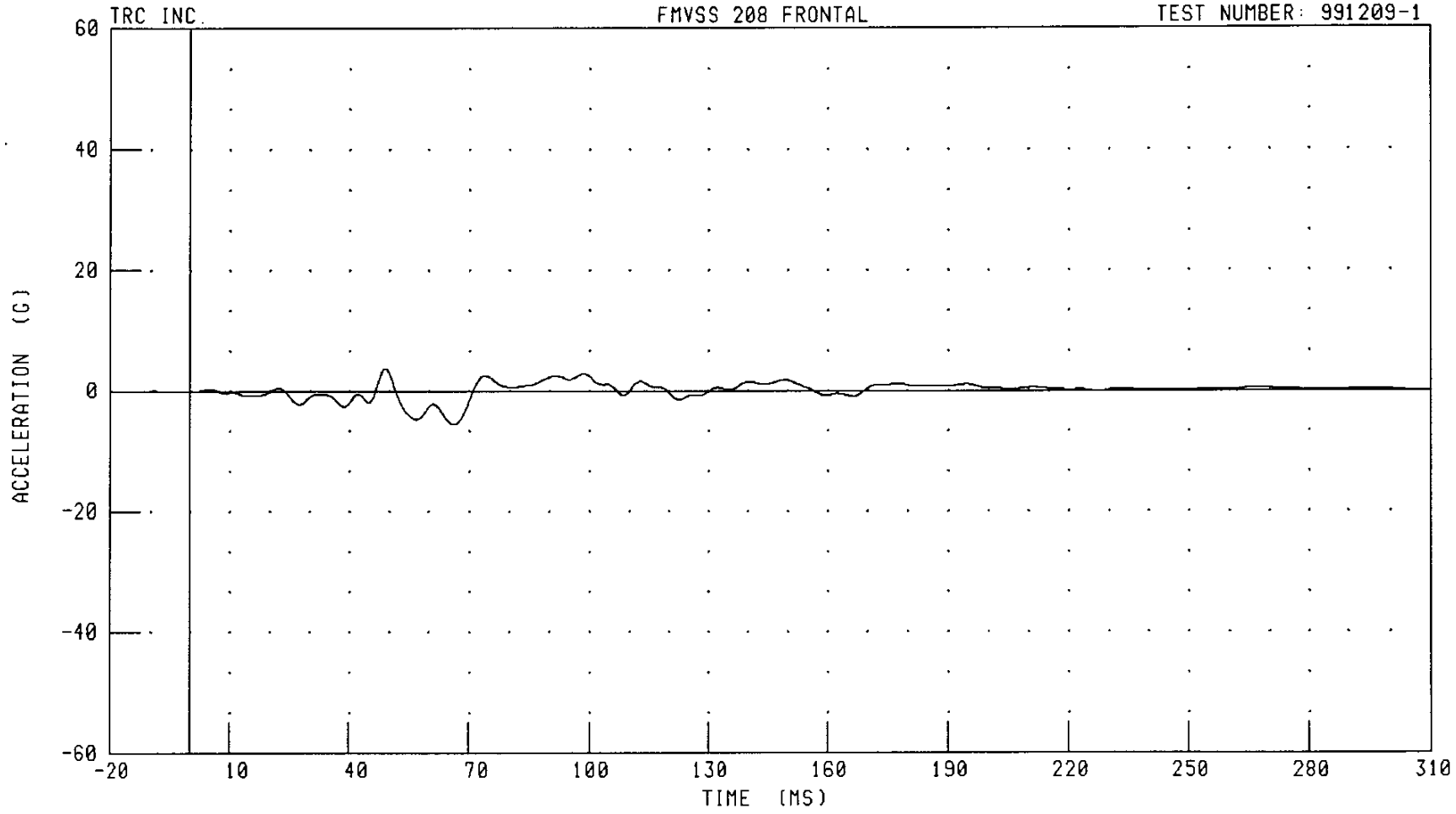
2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER X-AXIS ACCELERATION




CHANNEL: RDKXG1 FILTER: CH. CLASS 60 PEAK DATA: 13.69 G @ 97.92 MS; -29.51 G @ 49.92 MS

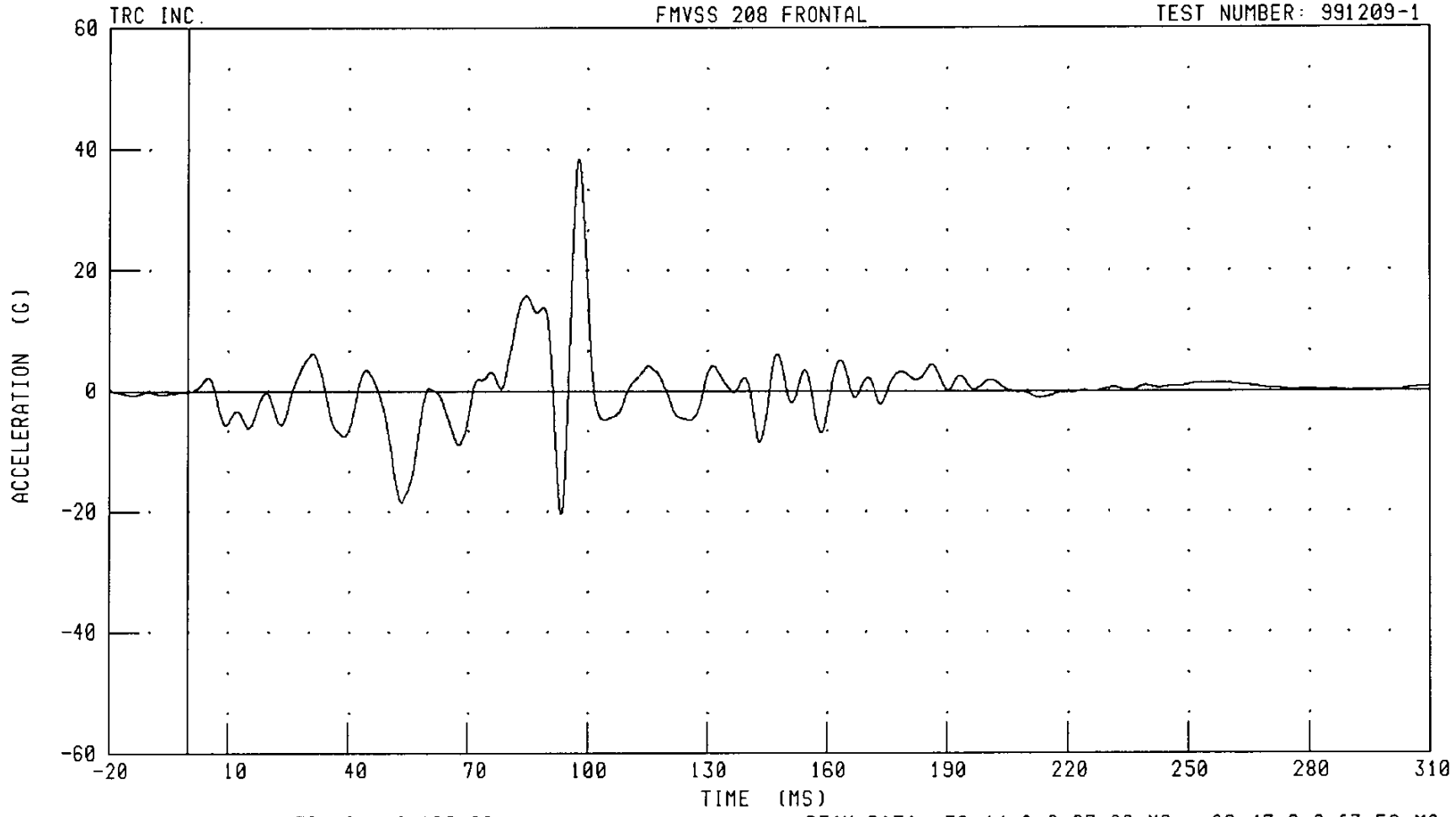
2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER Y-AXIS ACCELERATION

TRC INC. FMVSS 208 FRONTAL TEST NUMBER: 991209-1




CHANNEL: RDKYG1 FILTER: CH. CLASS 60 PEAK DATA: 3.72 G @ 49.04 MS; -5.57 G @ 66.32 MS

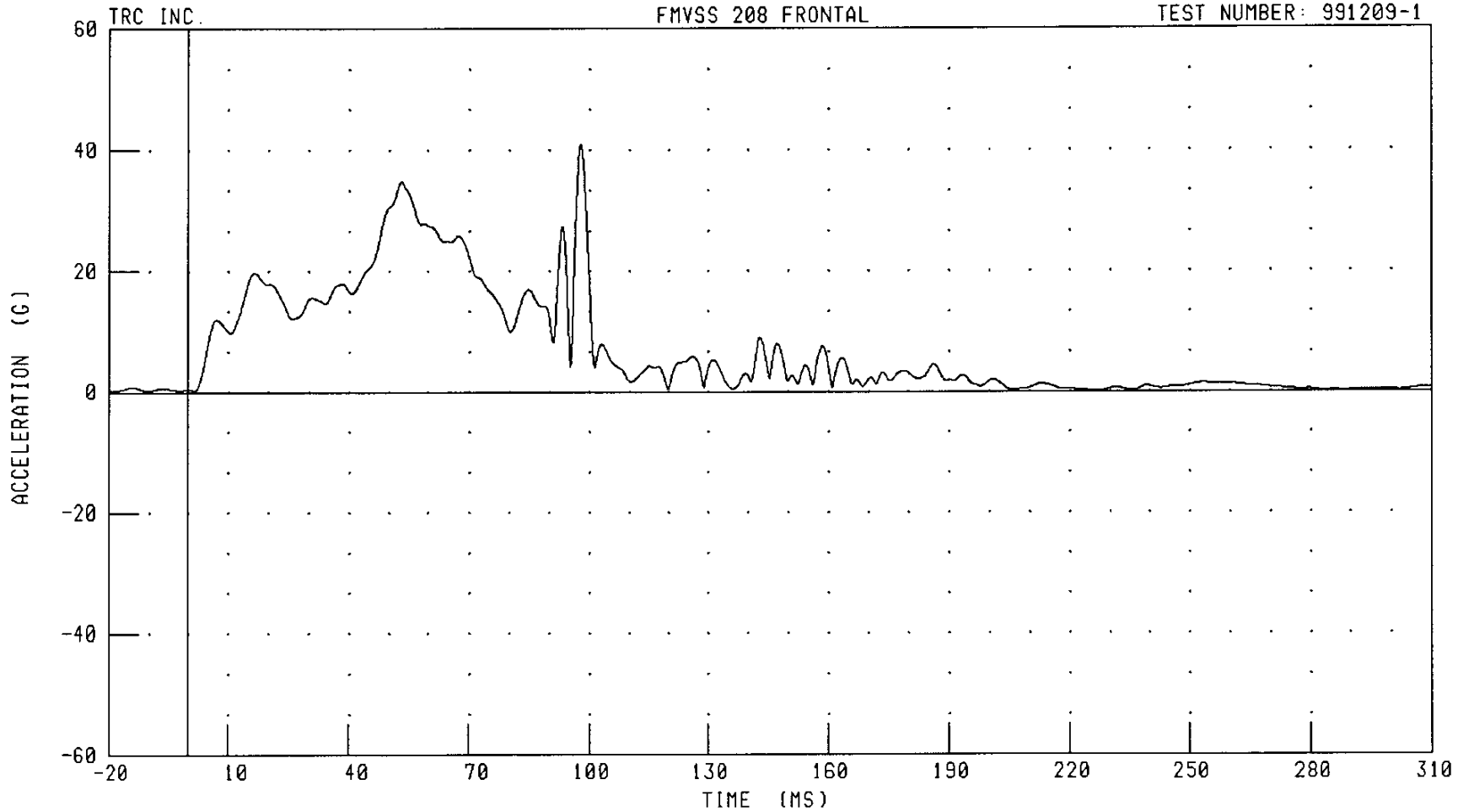
2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER Z-AXIS ACCELERATION




CHANNEL: RDKZG1 FILTER: CH. CLASS 60 PEAK DATA: 38.44 G @ 97.92 MS; -20.47 G @ 93.52 MS

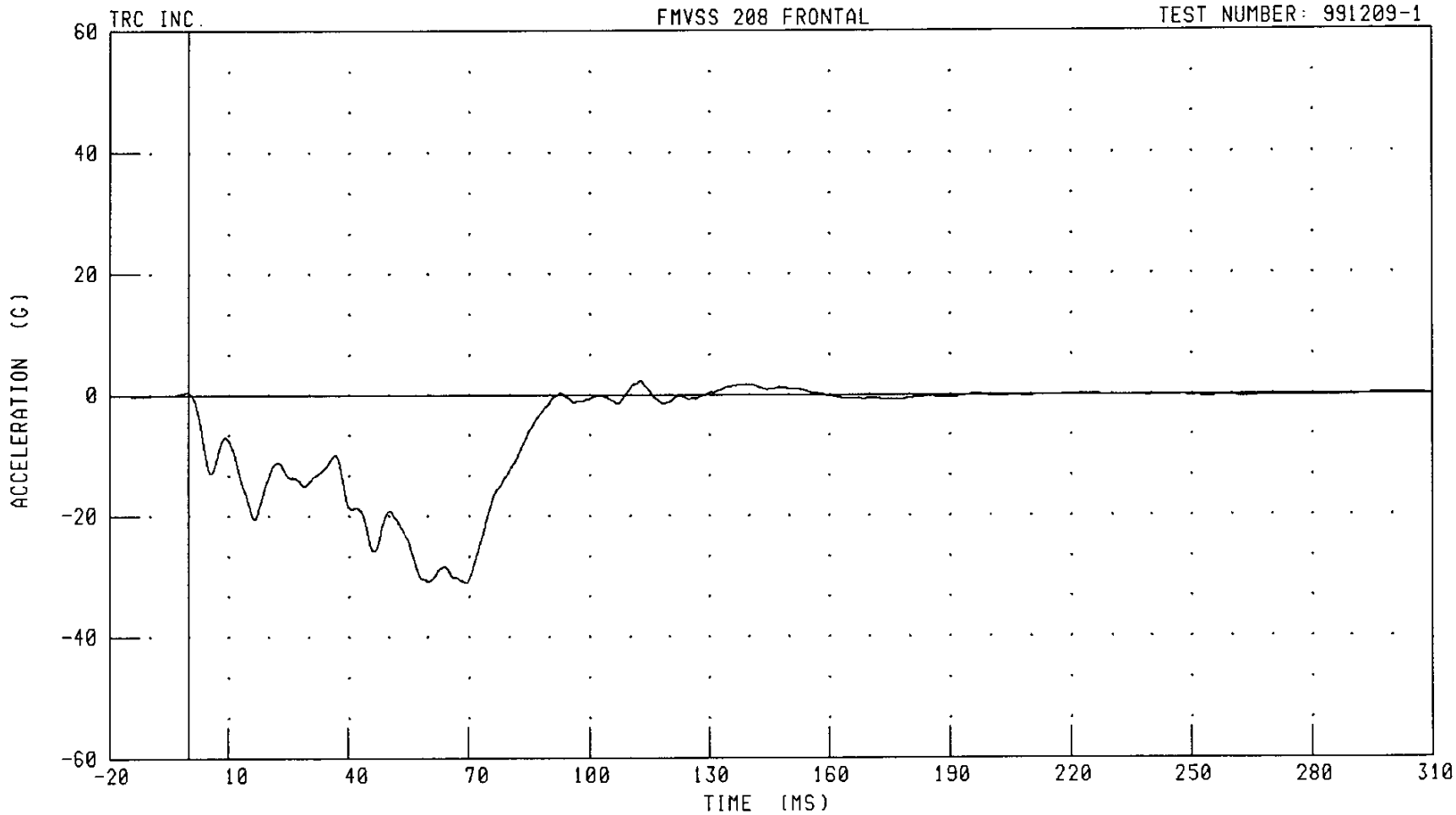
2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER RESULTANT ACCELERATION

TRC INC. FMVSS 208 FRONTAL TEST NUMBER: 991209-1




CHANNEL: RDKRG1 FILTER: CH. CLASS 60 PEAK DATA: 40.90 G @ 97.92 MS; 0.08 G @ 225.28 MS

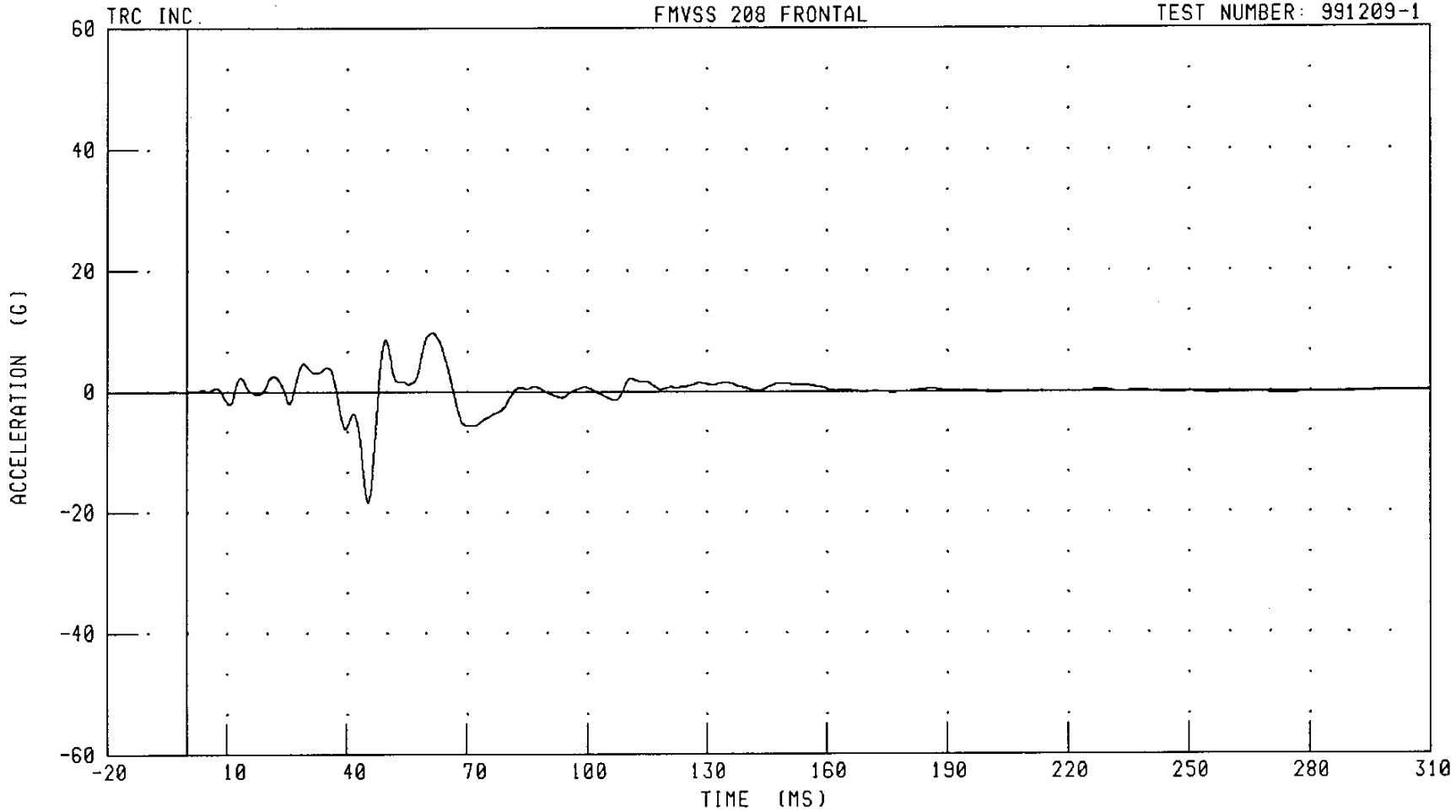
2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION




CHANNEL: VCGXG1 FILTER: CH. CLASS 60 PEAK DATA: 2.29 G @ 112.72 MS; -31.11 G @ 69.28 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

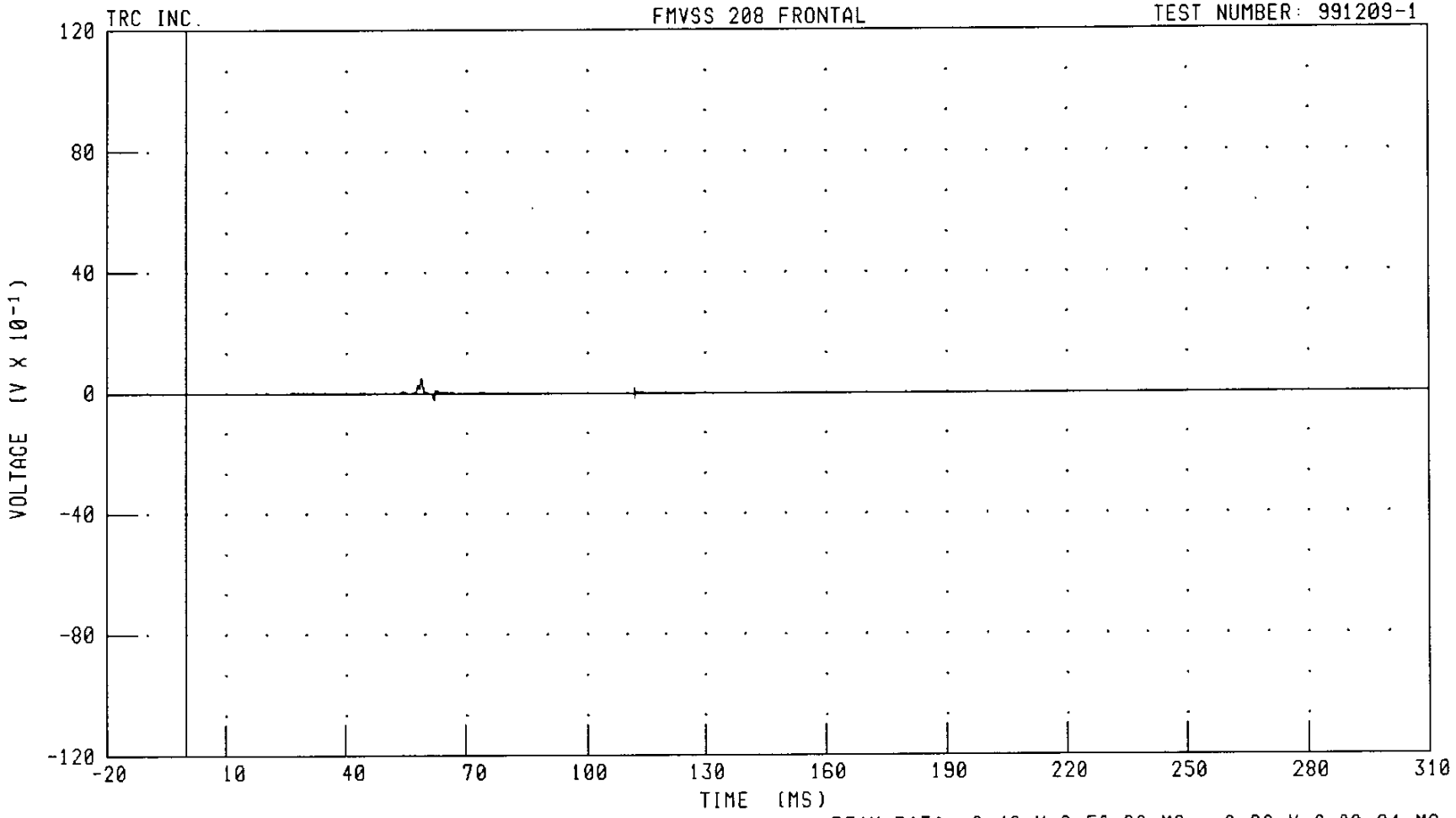
TRC INC. FMVSS 208 FRONTAL TEST NUMBER: 991209-1




CHANNEL: VCGYG1 FILTER: CH. CLASS 60 PEAK DATA: 9.73 G @ 61.76 MS; -18.33 G @ 45.44 MS

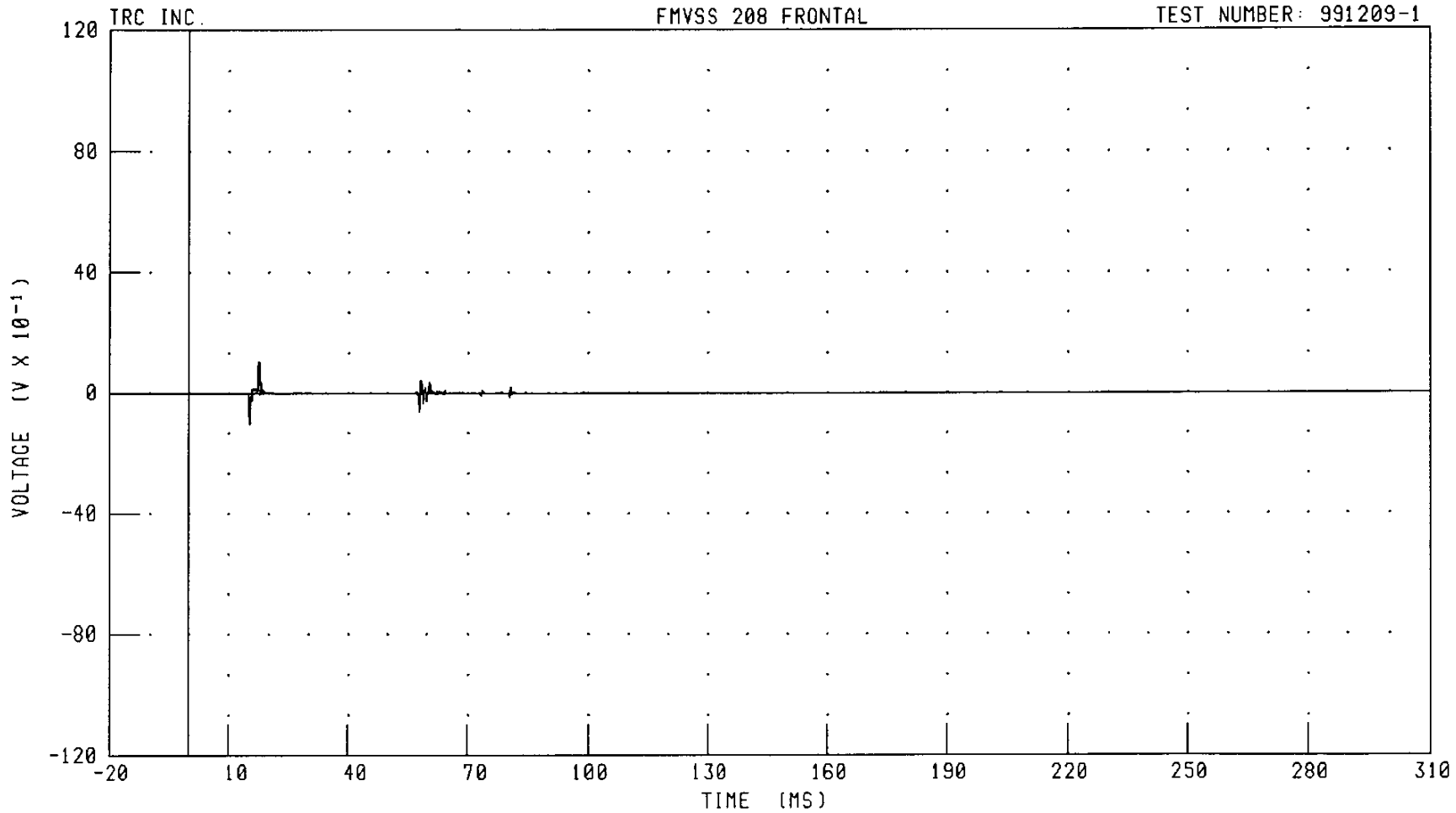
2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER STAGE 1

TRC INC. FMVSS 208 FRONTAL TEST NUMBER: 991209-1




CHANNEL: ABSG1 FILTER: CH. CLASS 1000 PEAK DATA: 0.49 V @ 59.20 MS; -0.20 V @ 62.24 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER STAGE 2

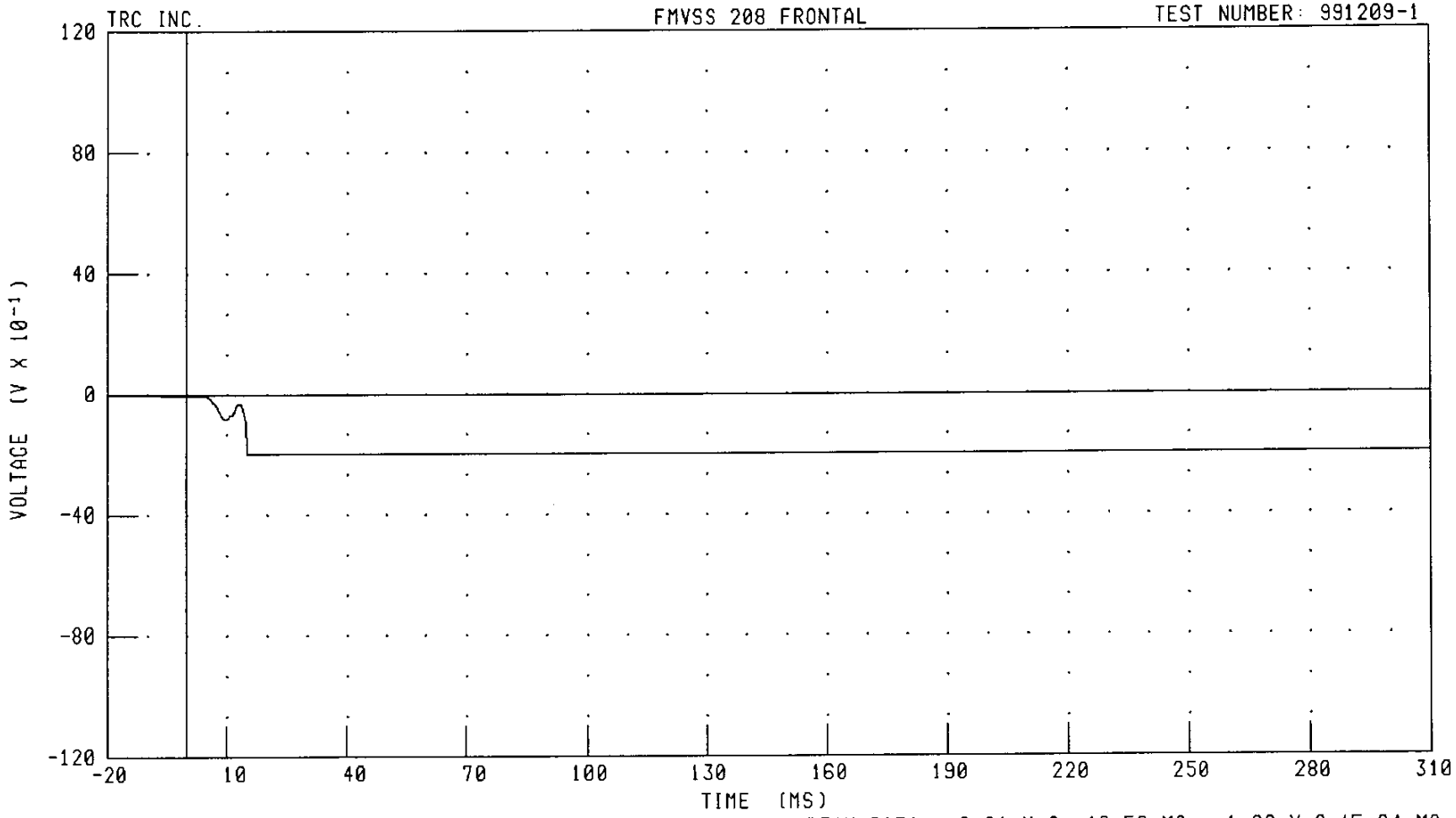



CHANNEL: ABSQA FILTER: CH. CLASS 1000 PEAK DATA: 1.02 V @ 17.44 MS; -1.02 V @ 15.20 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
PASSENGER STAGE 1
FMVSS 208 FRONTAL

TRC INC.

TEST NUMBER: 991209-1



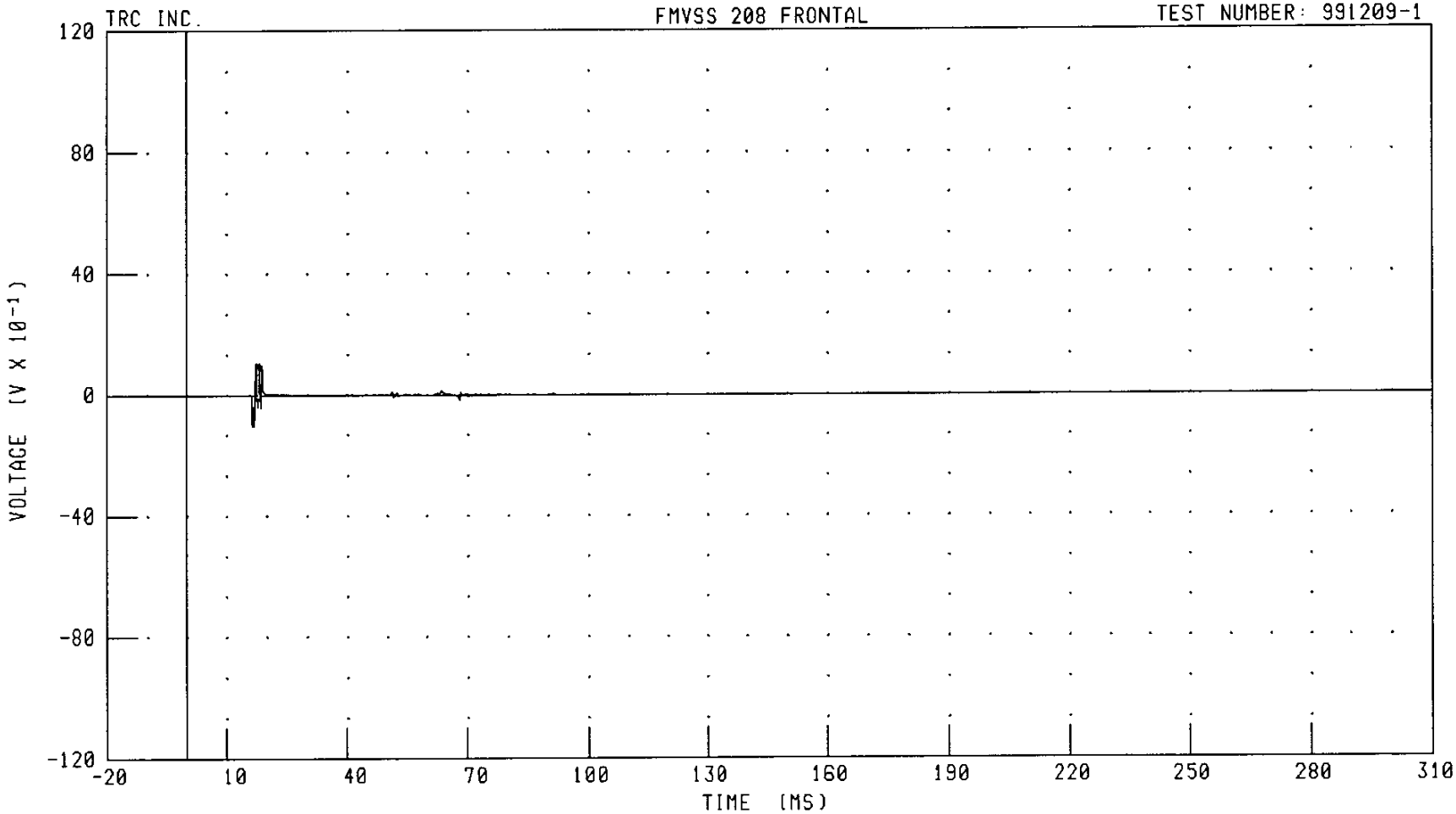

CHANNEL: ABSG2 FILTER: CH. CLASS 1000

PEAK DATA: -0.01 V @ -19.52 MS; -1.96 V @ 15.04 MS

2000 FORD TAURUS INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
PASSENGER STAGE 2
FMVSS 208 FRONTAL

TRC INC.

TEST NUMBER: 991209-1



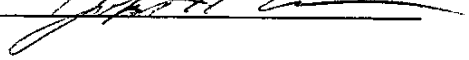

CHANNEL: ABSQB FILTER: CH. CLASS 1000

PEAK DATA: 1.02 V @ 17.28 MS; -1.02 V @ 16.48 MS

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS
TRC. SN283

TRC INC. TEST NO: 283C9ED 572 O SN283 EXT. DIMENSIONS 06-DEC-99

| TEST PARAMETER | (DIMEN.) | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| LOCATION FOR CHEST CIRCUMFERENCE | (AA) | 300 - 310 MM | 305. MM |
| LOCATION FOR WAIST CIRCUMFERENCE | (BB) | 160 - 170 MM | 163. MM |
| CHEST CIRCUMFERENCE | (X) | 851 - 881 MM | 871. MM |
| WAIST CIRCUMFERENCE | (Y) | 757 - 787 MM | 775. MM |
| CHEST DEPTH | (O) | 183 - 199 MM | 183. MM |
| H-POINT HEIGHT | (C) | 81.5 - 86.5 MM | 81. MM |
| H-POINT FROM SEATBACK | (D) | 144.5-149.5 MM | 147. MM |
| SKULL CAP TO BACKLINE | (H) | 43.2 - 48.2 MM | 45.7 MM |
| TOTAL SITTING HEIGHT | (A) | 775 - 800 MM | 775. MM |
| THIGH CLEARANCE | (F) | 114 - 130 MM | 127. MM |
| BUTTOCK KNEE LENGTH | (K) | 508.5-533.5 MM | 533. MM |
| BUTTOCK POPLITEAL LENGTH | (N) | 414.0-429.4 MM | 419. MM |
| POPLITEAL HEIGHT | (L) | 348.5-373.5 MM | 361. MM |
| KNEE TO FLOOR HEIGHT | (M) | 394 - 419 MM | 411. MM |
| FOOT LENGTH | (P) | 216 - 232 MM | 224. MM |
| FOOT BREADTH | (R) | 76 - 92 MM | 86.3. MM |
| SHOULDER PIVOT FROM BACKLINE | (E) | 71 - 81 MM | 79. MM |
| SHOULDER BREADTH | (V) | 348 - 364 MM | 361. MM |
| SHOULDER PIVOT HEIGHT | (B) | 434 - 450 MM | 434. MM |
| ELBOW REST HEIGHT | (J) | 183 - 203 MM | 183. MM |
| SHOULDER-ELBOW LENGTH | (I) | 279 - 297 MM | 284. MM |
| BACK OF ELBOW TO FINGER TIP | (G) | 244 - 259 MM | 251. MM |
| HIP WIDTH AT H-POINT | (W) | 272 - 287 MM | 279. MM |

HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS
DUMMY MEETS SPECIFICATIONS
TECHNICIAN 

RUN NUMBER: 121799.1050

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE 06-DEC-99

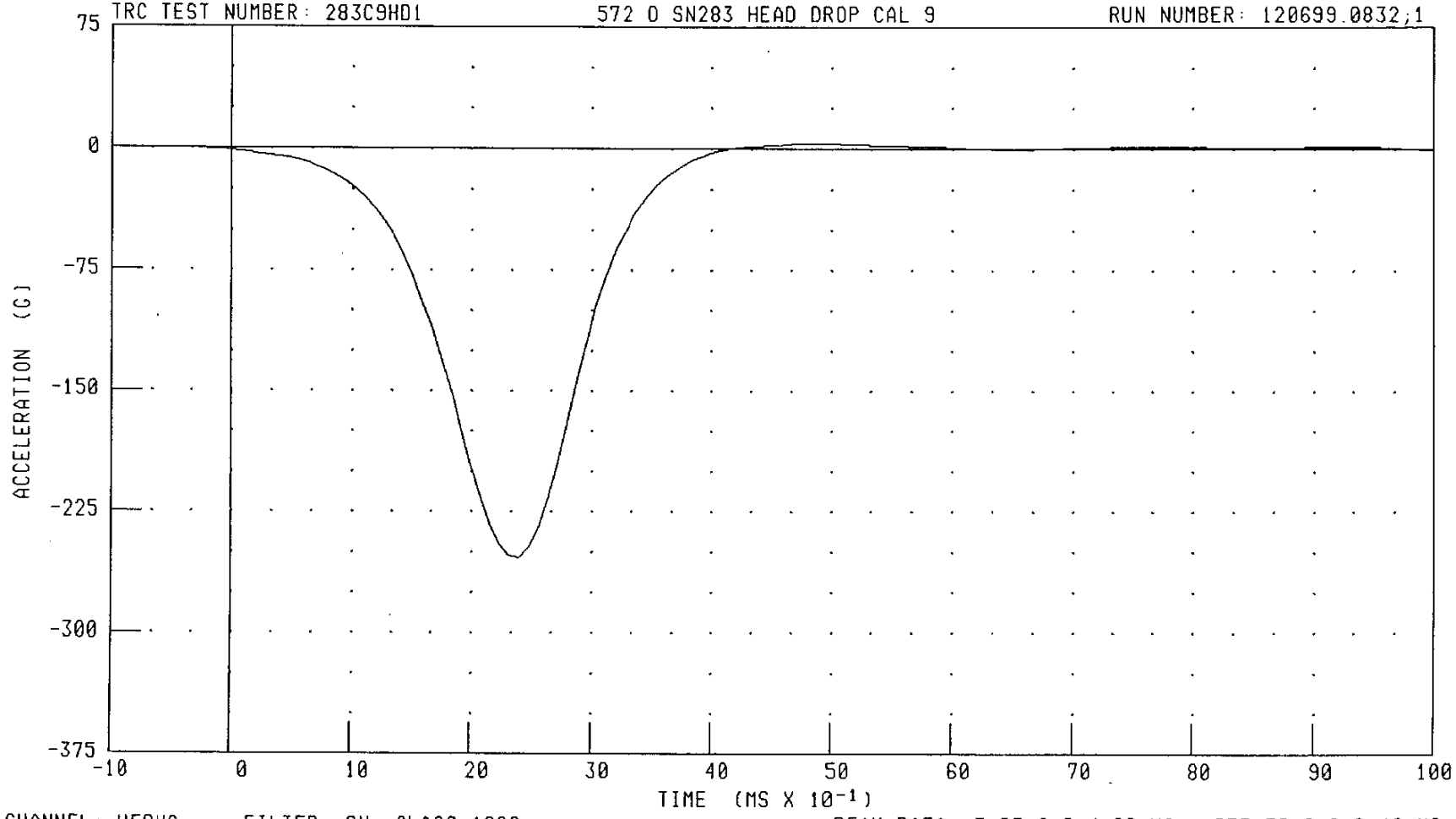
TRC INC. TEST NO: 283C9HD1 572 O SN283 HEAD DROP CAL 9

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PEAK RESULTANT ACCELERATION | 250 - 300 G | 291.78 G |
| PEAK LATERAL ACCELERATION | 15 G MAX | 5.64 G |
| IS ACCELERATION CURVE UNIMODAL? | YES | YES |

TEST MEETS SPECIFICATIONS

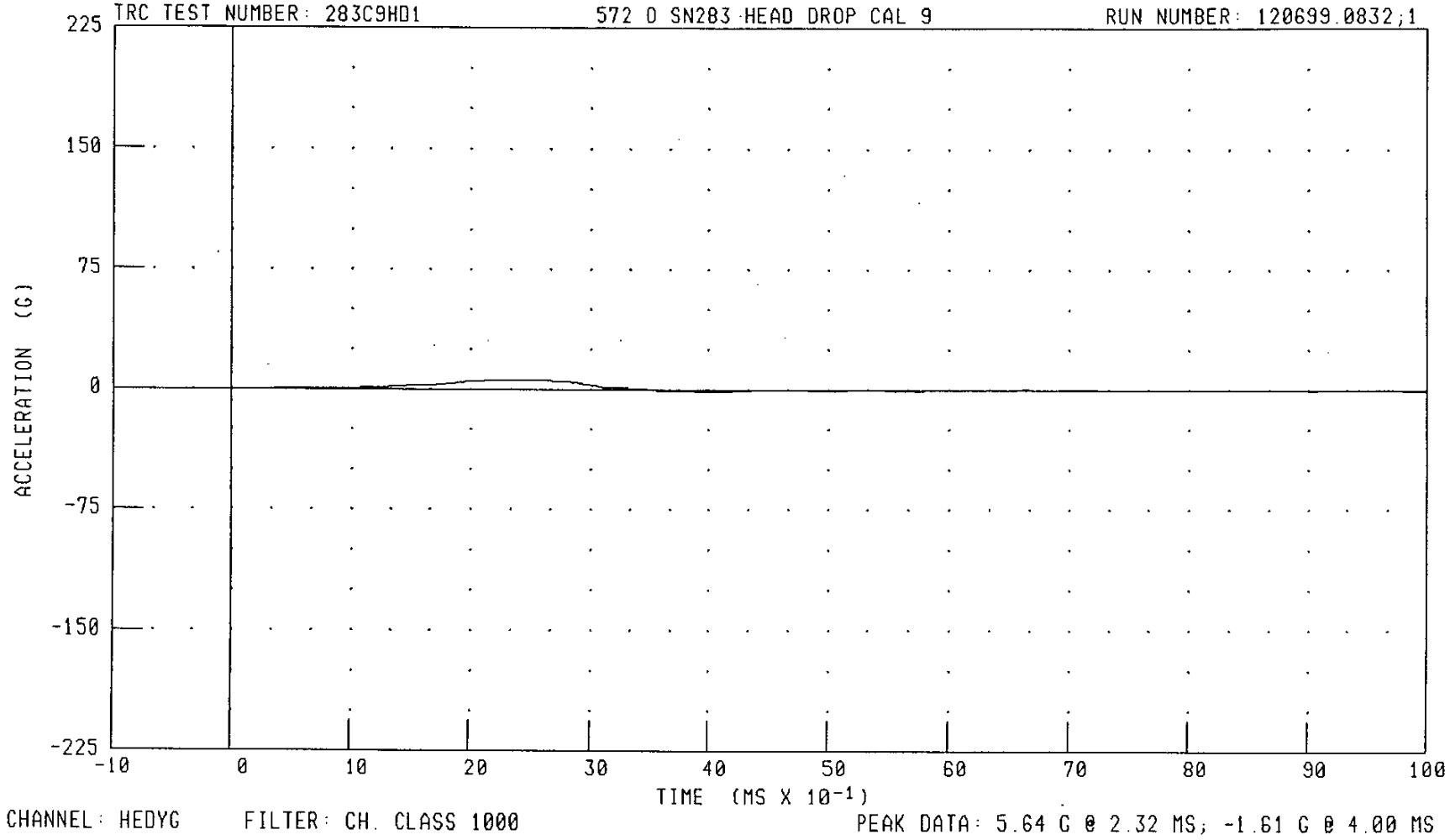
TECHNICIAN _____ RUN NUMBER: 120699.0831;1

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



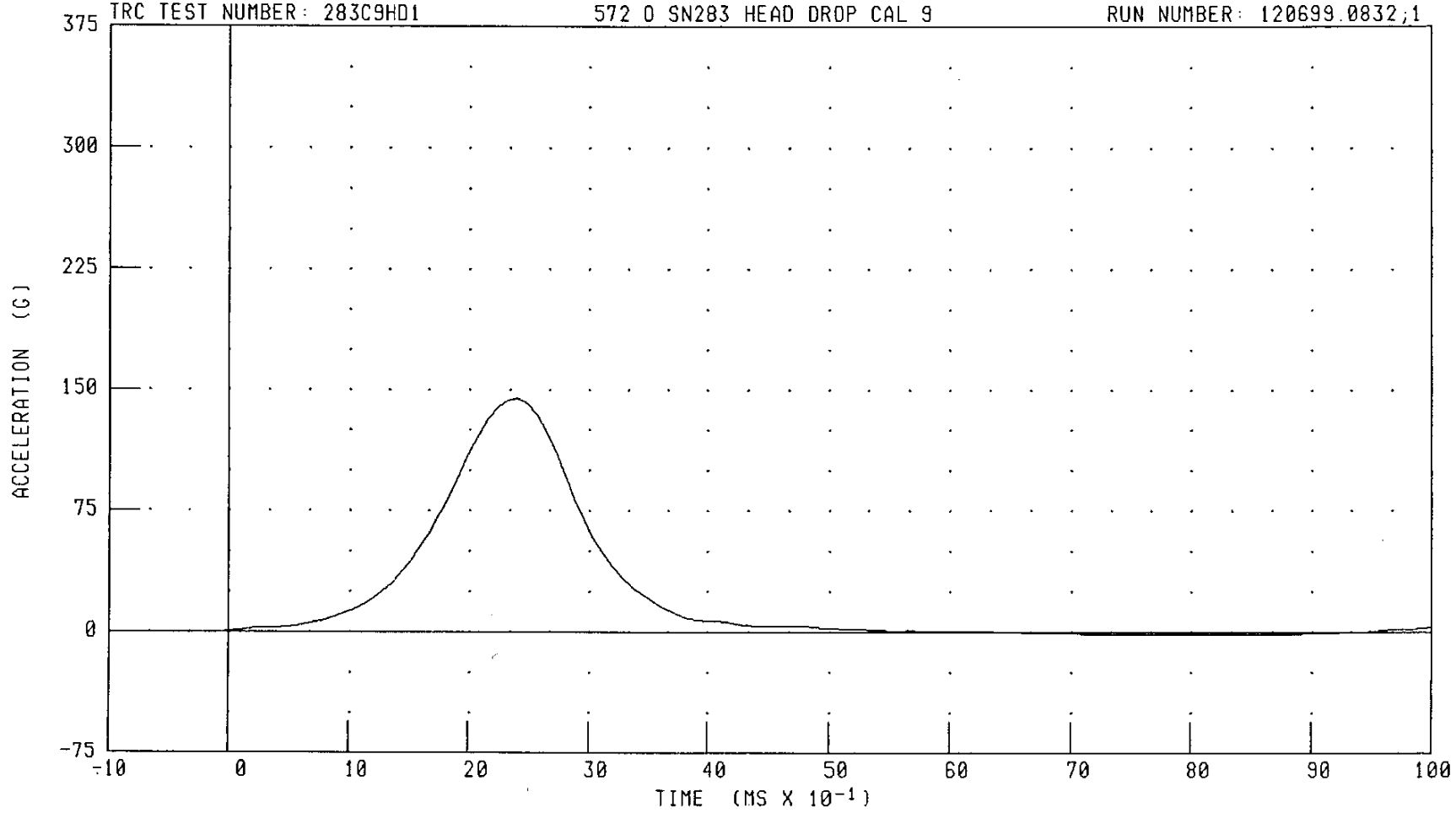

CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 3.63 G @ 4.96 MS; -253.52 G @ 2.40 MS

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




CHANNEL: HEDYG FILTER: CH. CLASS 1000 PEAK DATA: 5.64 G @ 2.32 MS; -1.61 G @ 4.00 MS

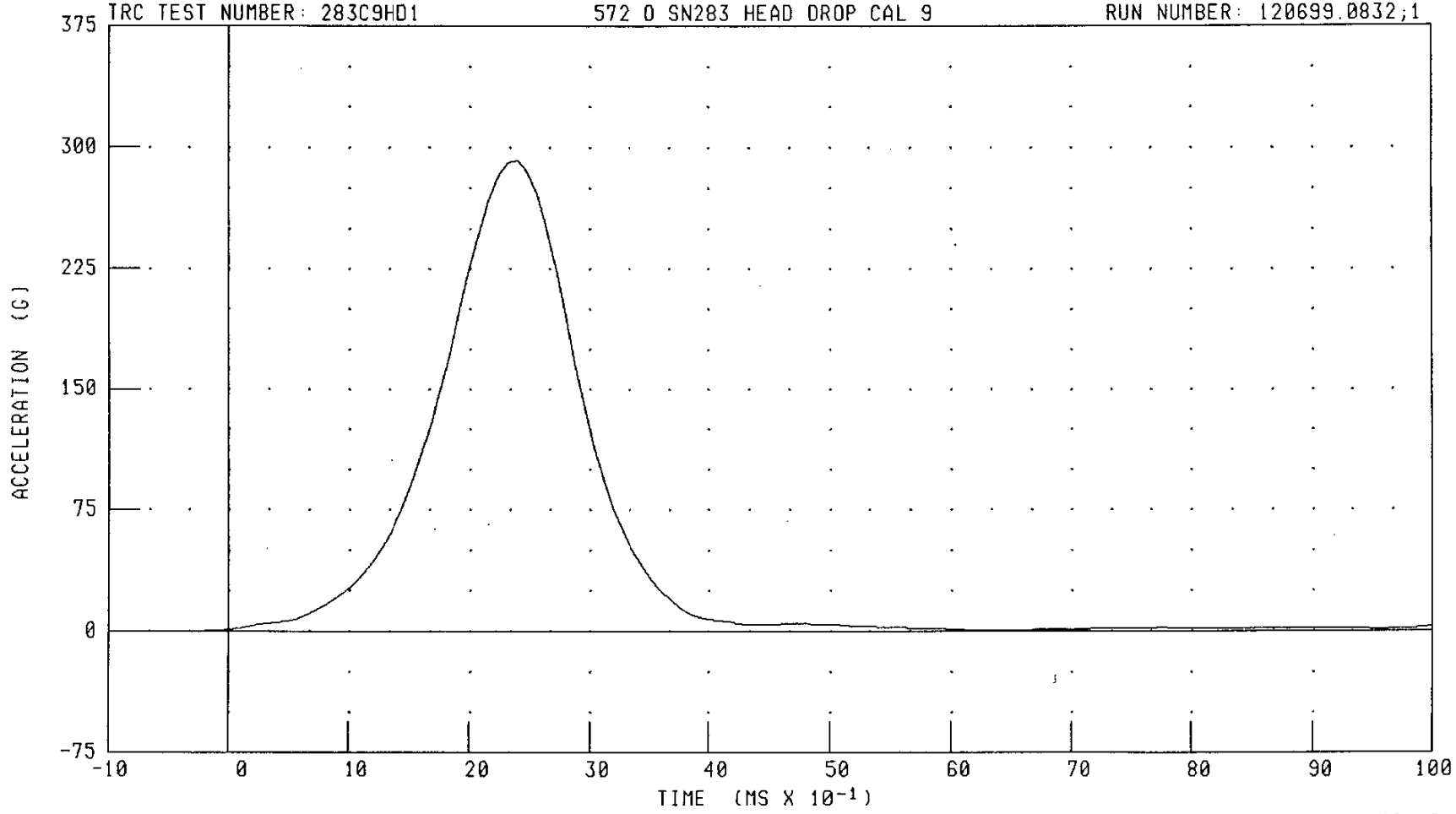
PART 572-O HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS




CHANNEL: HEDZG FILTER: CH. CLASS 1000 PEAK DATA: 144.34 G @ 2.40 MS; -1.65 G @ 7.44 MS

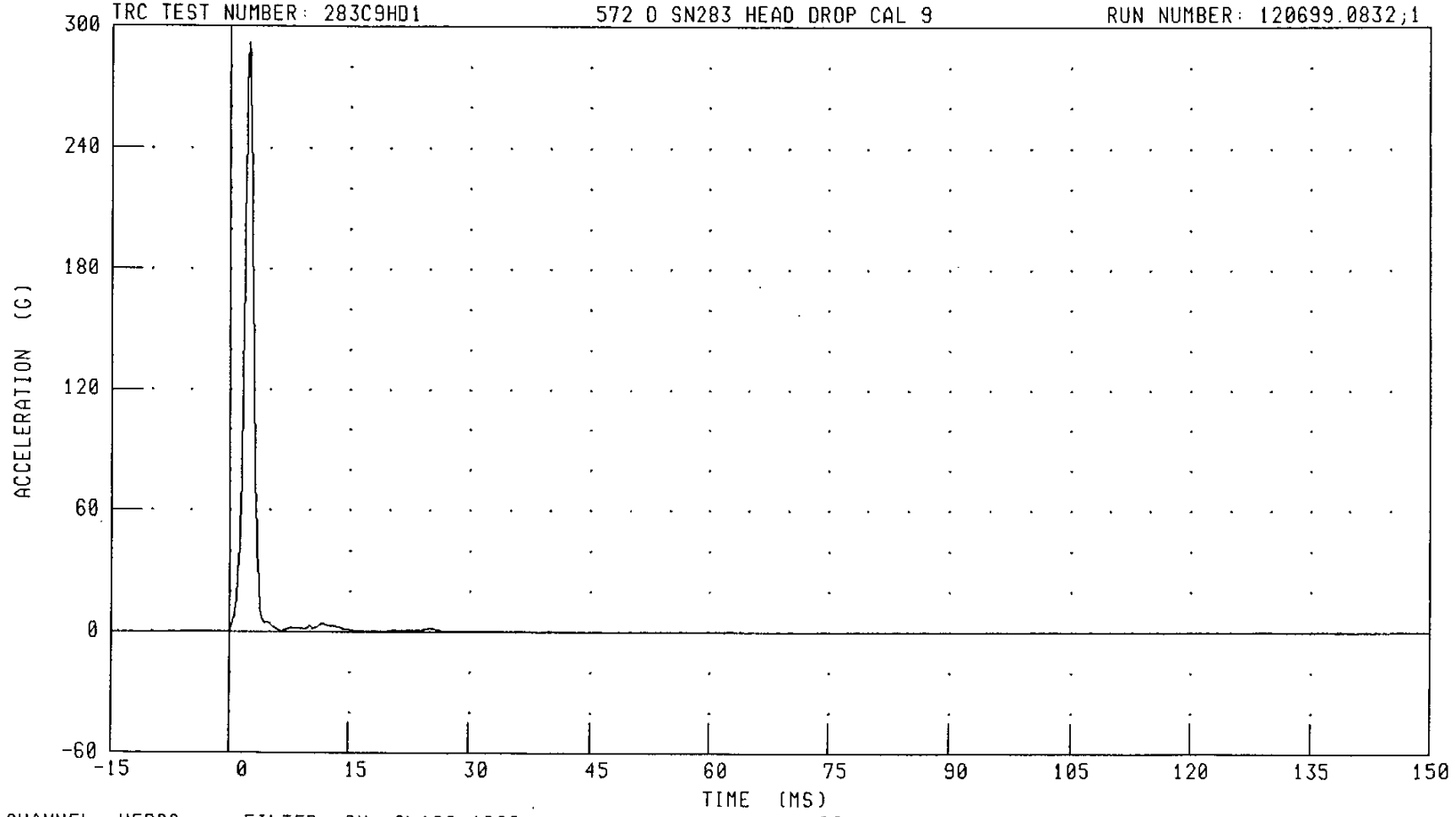
PART 572-O HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 283C9HD1 572 O SN283 HEAD DROP CAL 9 RUN NUMBER: 120699.0832;1




CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 291.78 G @ 2.40 MS; 0.04 G @ -0.96 MS

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




CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 291.78 G @ 2.40 MS; 0.04 G @ -14.96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE 06-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

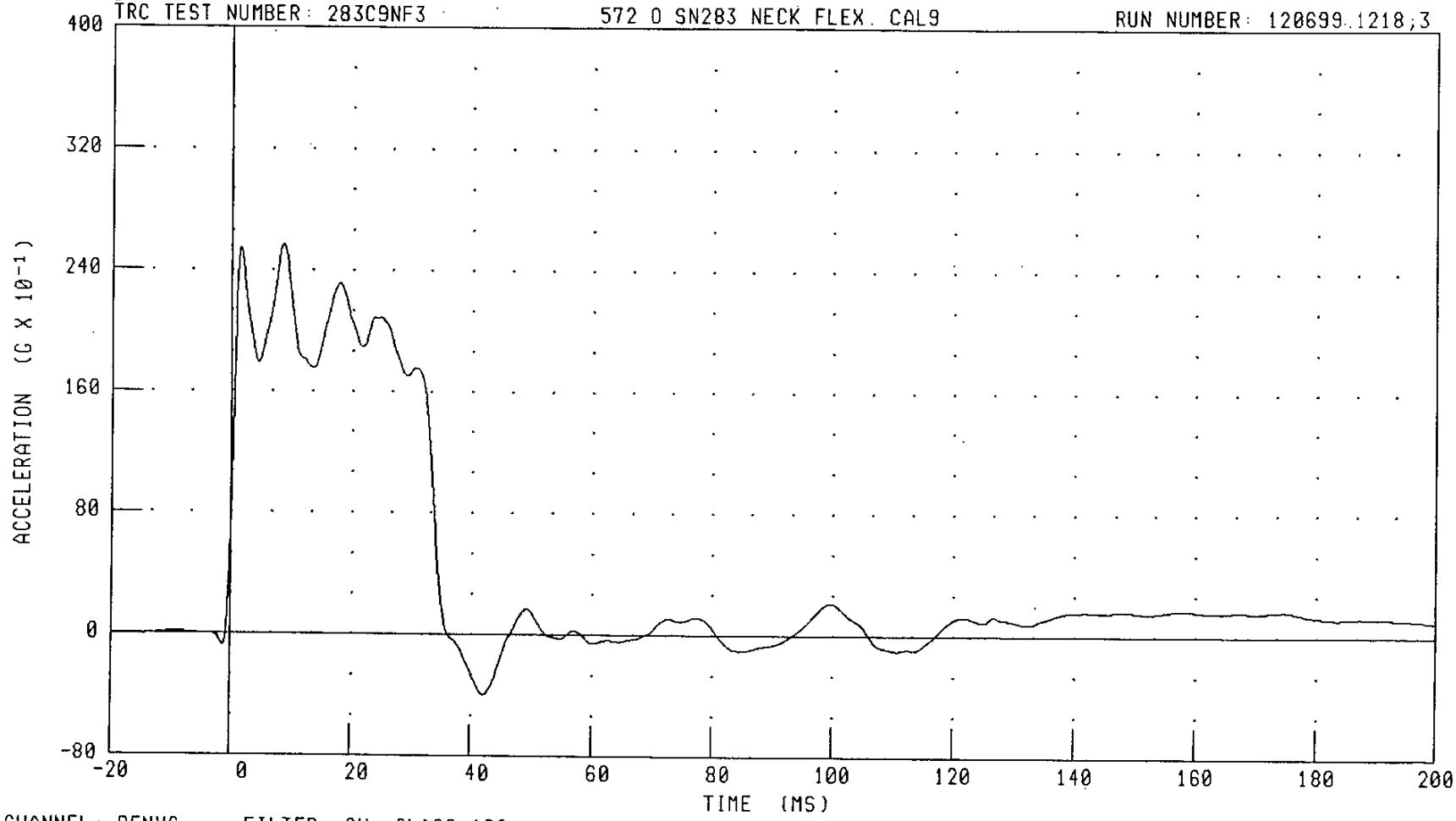
TRC INC. TEST NO: 283C9NF3 572 O SN283 NECK FLEX. CAL9

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 6.89 - 7.13 M/S | 7.06 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 2.1 - 2.5 M/S | 2.10 M/S |
| | 20 MS | 4.0 - 5.0 M/S | 4.07 M/S |
| | 30 MS | 5.8 - 7.0 M/S | 5.97 M/S |
| PEAK D-PLANE ROTATION | | 80 - 92 DEG. | 88.44 DEG. |
| PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT | | 69 - 83 NM | 73.10 NM |
| POSITIVE MOMENT DECAY TIME FROM TO / 10NM | | 80 - 100 MS | 92.24 MS |

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 120699.1217;3

PART 572-O HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

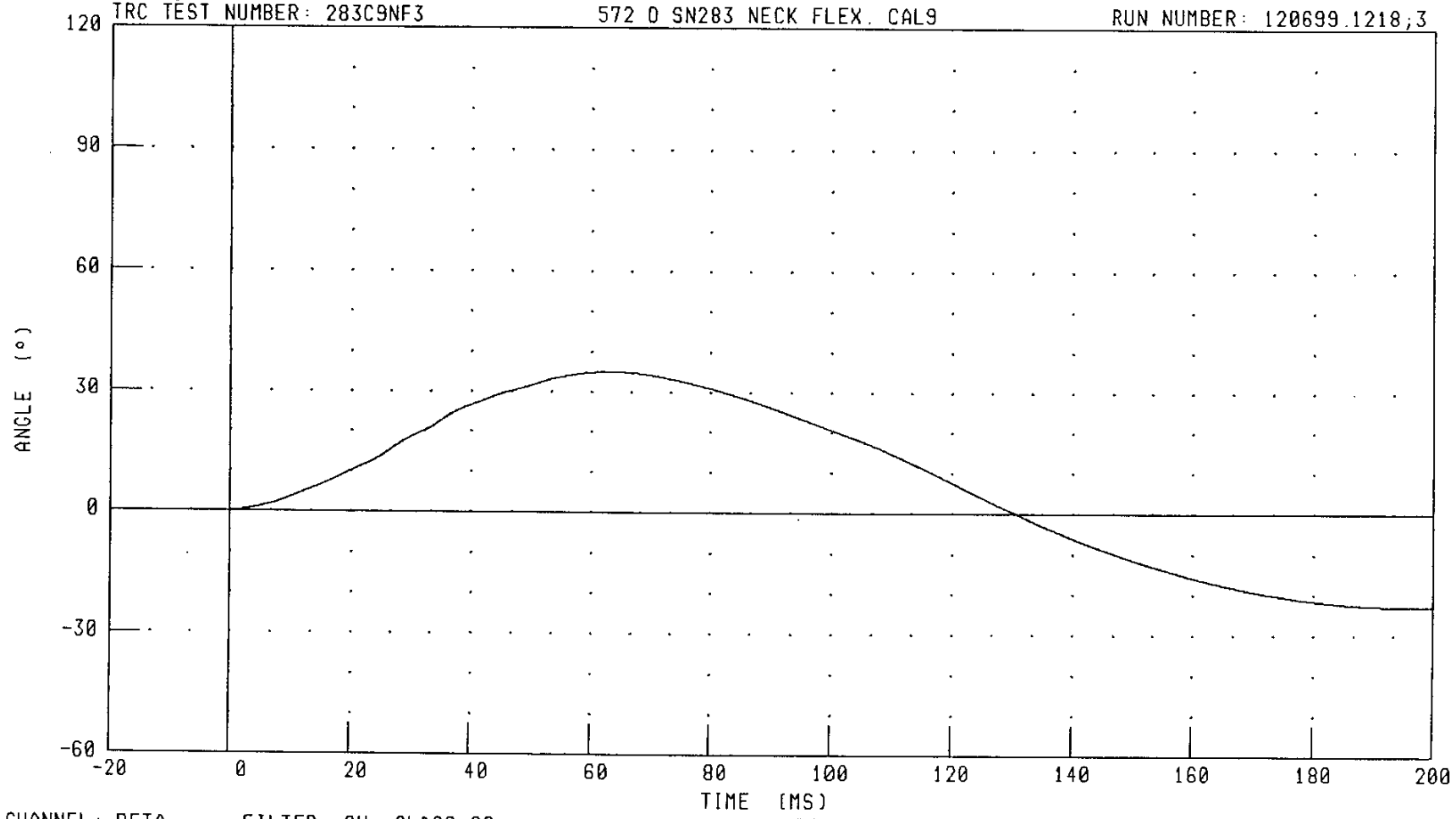



CHANNEL: PENXG FILTER: CH. CLASS 180

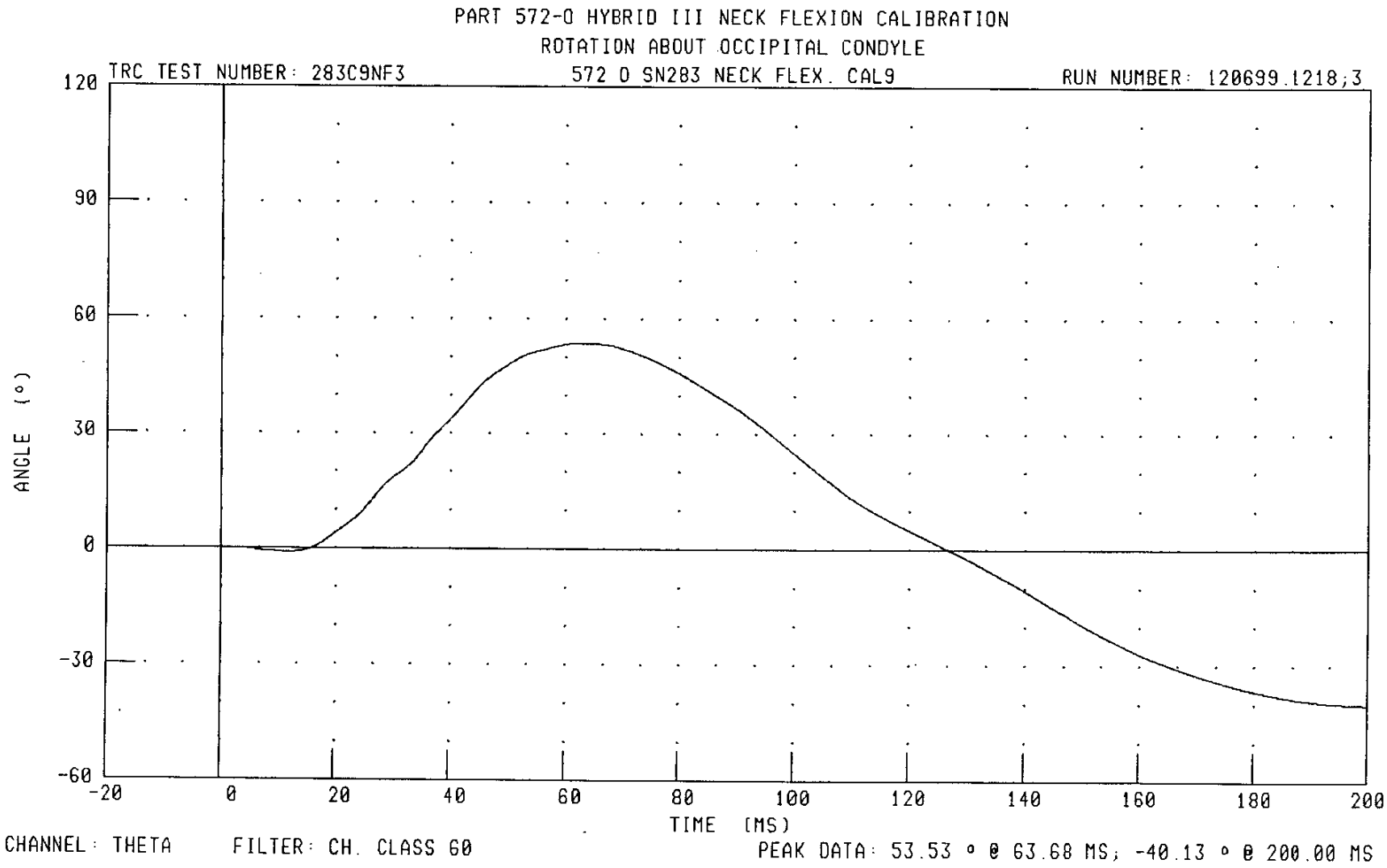
PEAK DATA: 25.71 G @ 8.56 MS; -3.98 G @ 42.08 MS

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

TRC TEST NUMBER: 283C9NF3
572 O SN283 NECK FLEX. CAL9
RUN NUMBER: 120699.1218;3



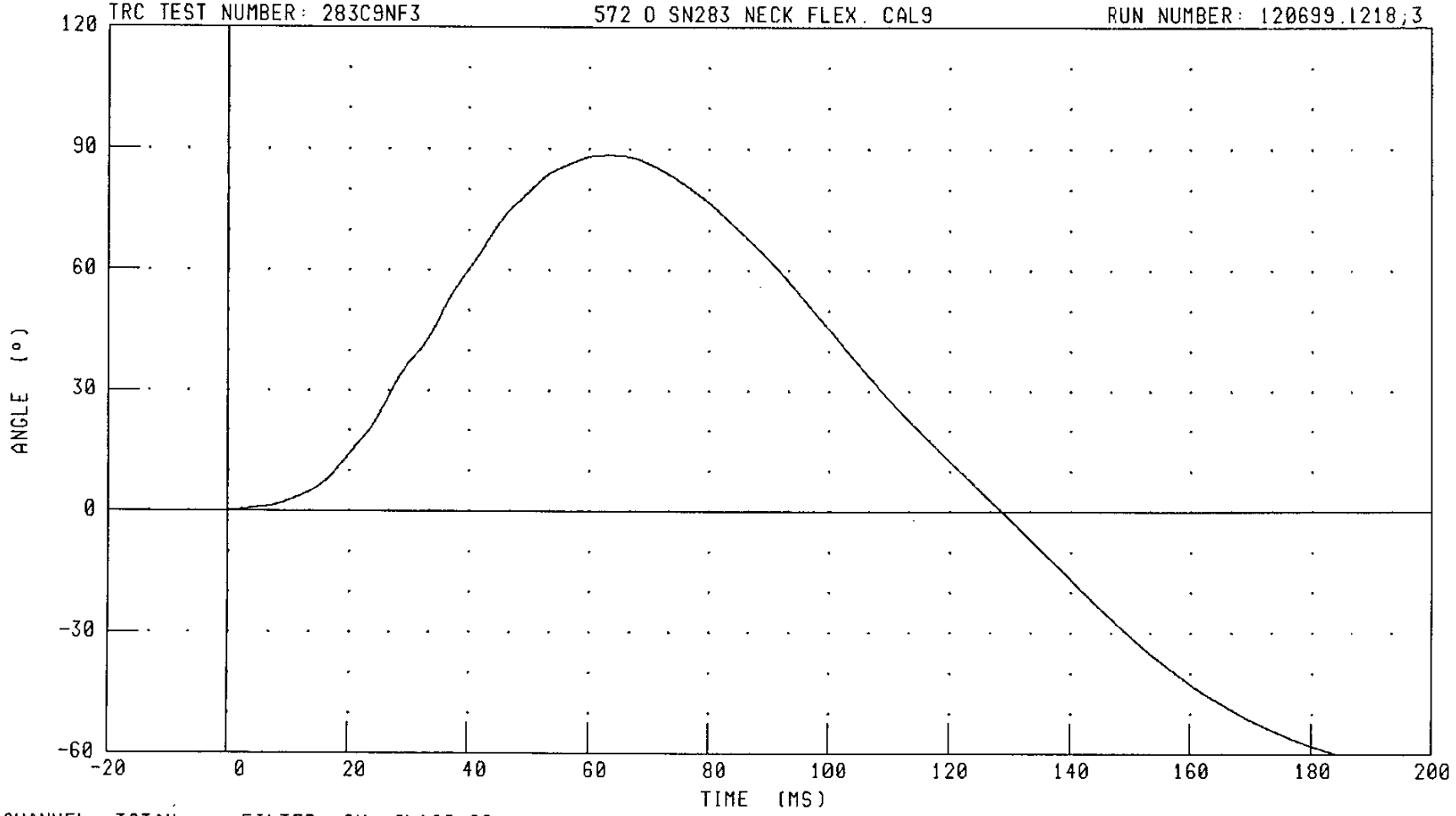

CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 34.92 ° @ 63.04 MS; -22.98 ° @ 199.68 MS


PART 572-0 HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 283C9NF3
572 0 SN283 NECK FLEX. CAL9
RUN NUMBER: 120699.1218;3
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 53.53 ° @ 63.68 MS; -40.13 ° @ 200.00 MS

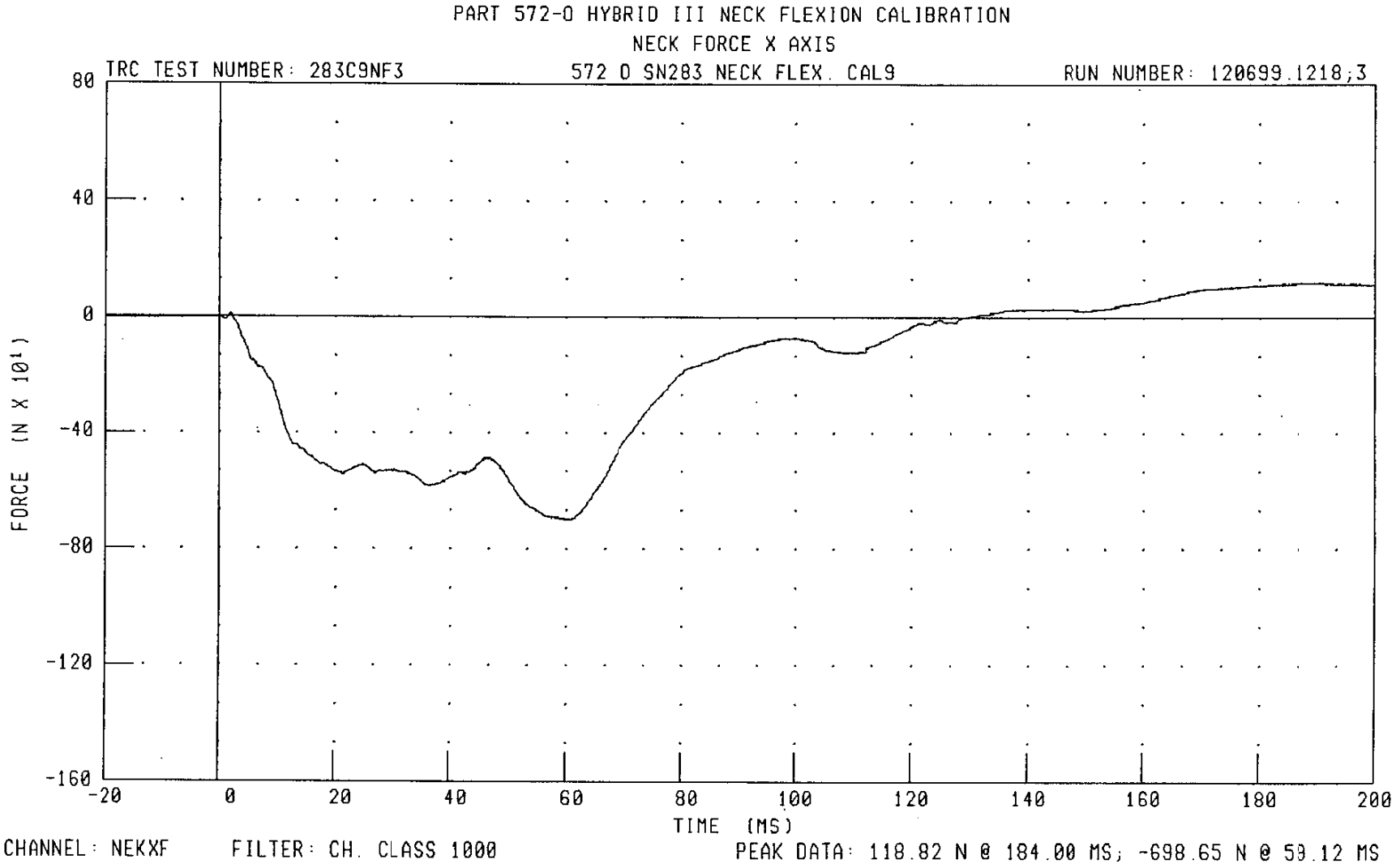
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C9NF3 572 0 SN283 NECK FLEX. CAL9 RUN NUMBER: 120699.1218;3

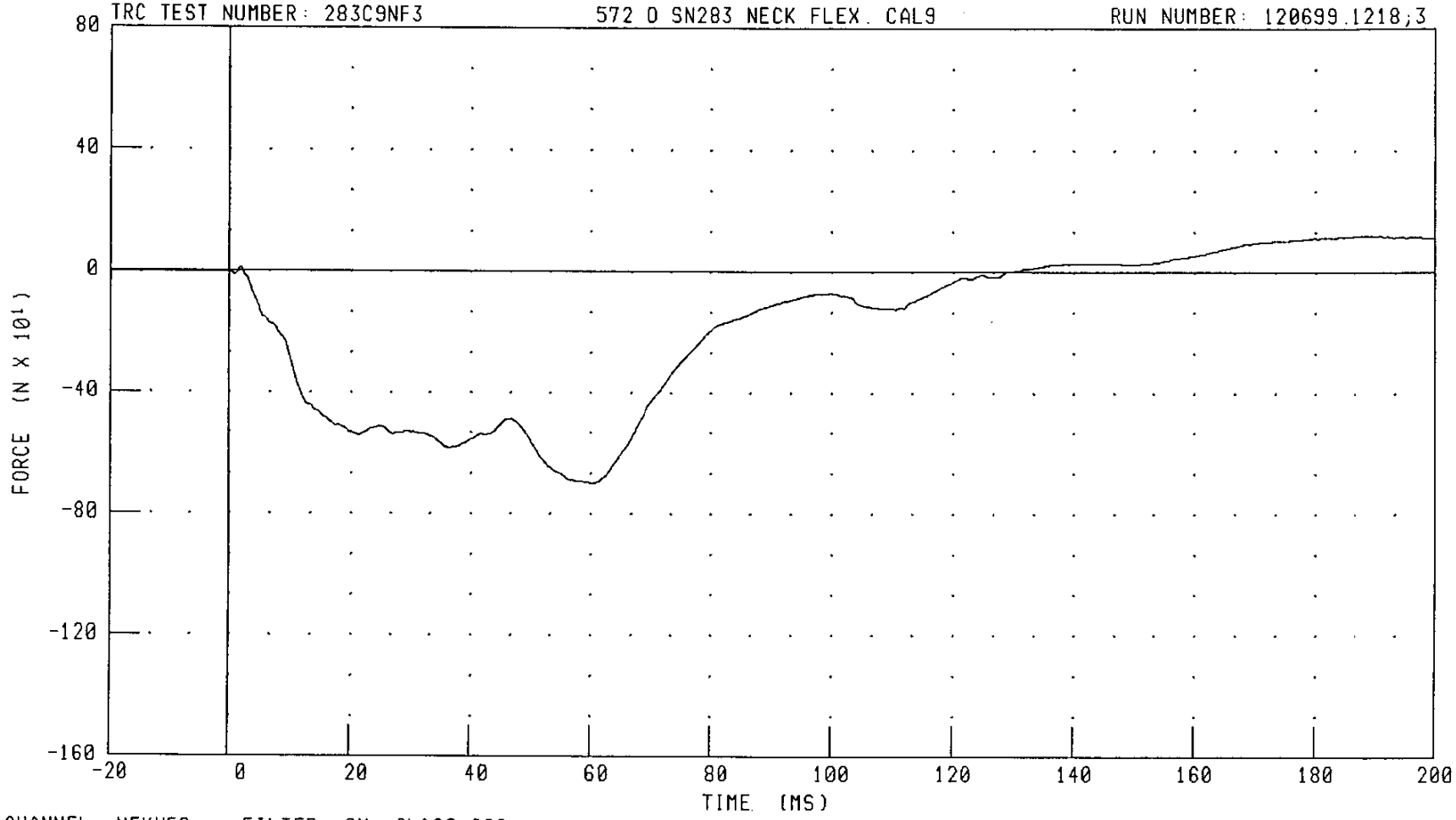



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 88.45 ° @ 63.44 MS; -63.12 ° @ 200.00 MS


PART 572-0 HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 283C9NF3
572 0 SN283 NECK FLEX. CAL9
RUN NUMBER: 120699.1218;3
80
40
0
-40
-80
-120
-160
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 1000
PEAK DATA: 118.82 N @ 184.00 MS; -698.65 N @ 59.12 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

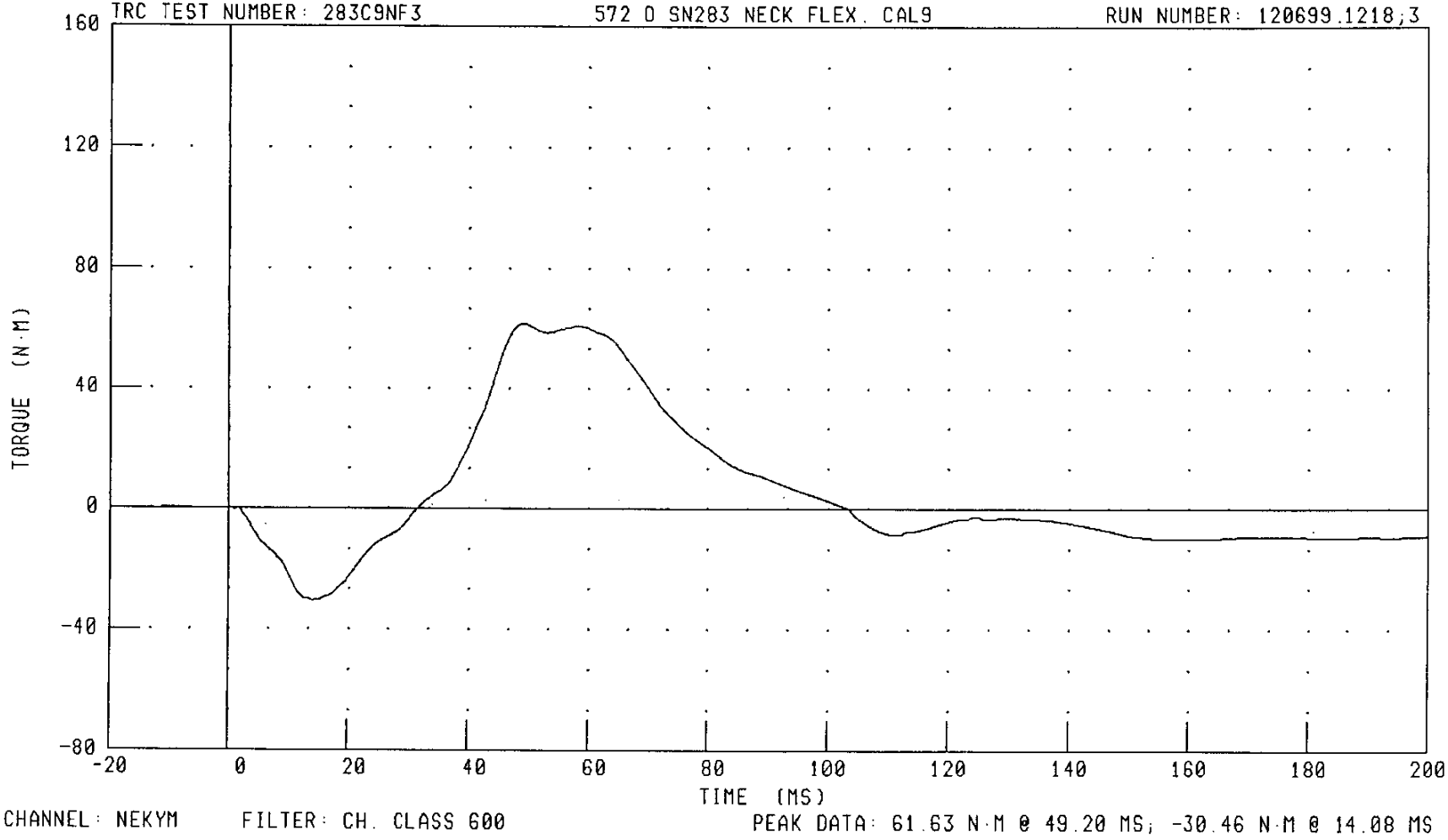



CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 118.92 N @ 191.12 MS; -698.80 N @ 60.72 MS

PART 572-O HYBRID III NECK FLEXION CALIBRATION

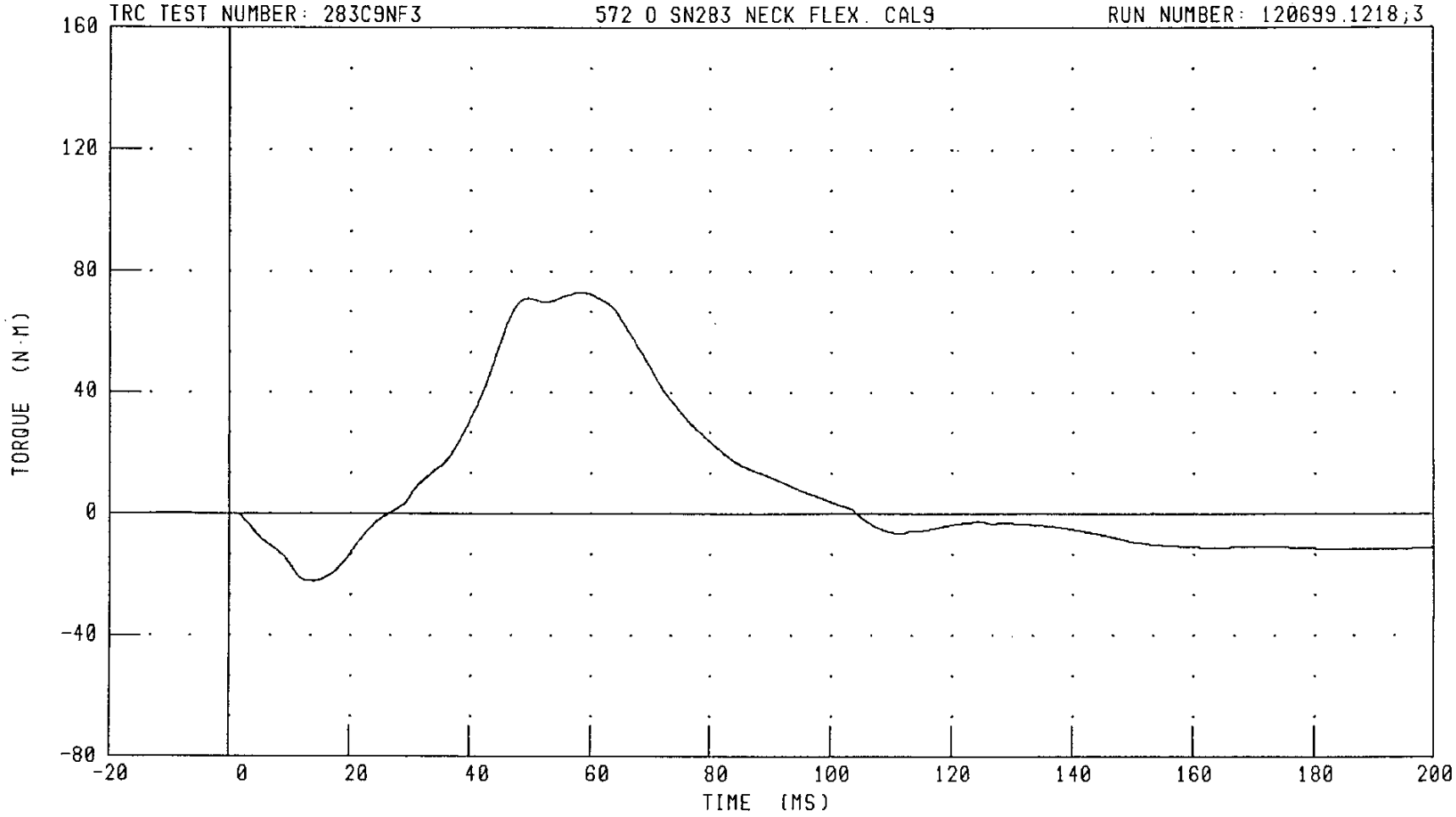
NECK MOMENT Y AXIS




CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 61.63 N·M @ 49.20 MS; -30.46 N·M @ 14.08 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE




CHANNEL: NEKOM FILTER: CH. CLASS 600

PEAK DATA: 73.10 N-M @ 58.32 MS; -22.31 N-M @ 14.00 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE 06-DEC-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

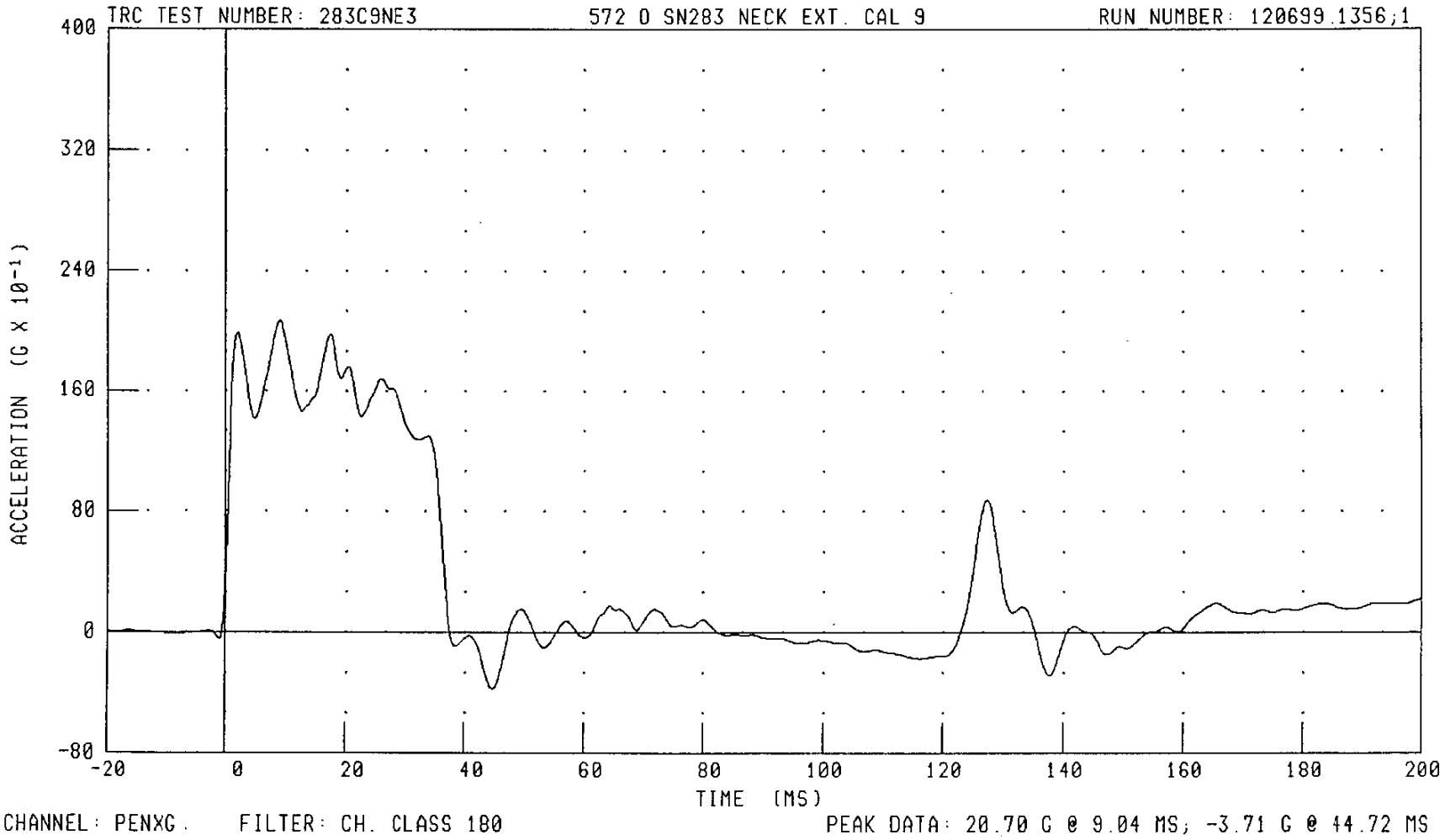
TRC INC. TEST NO: 283C9NE3 572 O SN283 NECK EXT. CAL 9

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6 - 22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 5.95 - 6.19 M/S | 6.05 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 1.5 - 1.9 M/S | 1.65 M/S |
| | 20 MS | 3.1 - 3.9 M/S | 3.31 M/S |
| | 30 MS | 4.6 - 5.6 M/S | 4.86 M/S |
| PEAK D-PLANE ROTATION | | 97 - 109 DEG. | 112.69 DEG. * |
| PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT | | -55 / -69 NM | -66.96 NM |
| NEGATIVE MOMENT DECAY TIME FROM TO / -10 NM | | 94 - 114 MS | 105.68 MS |

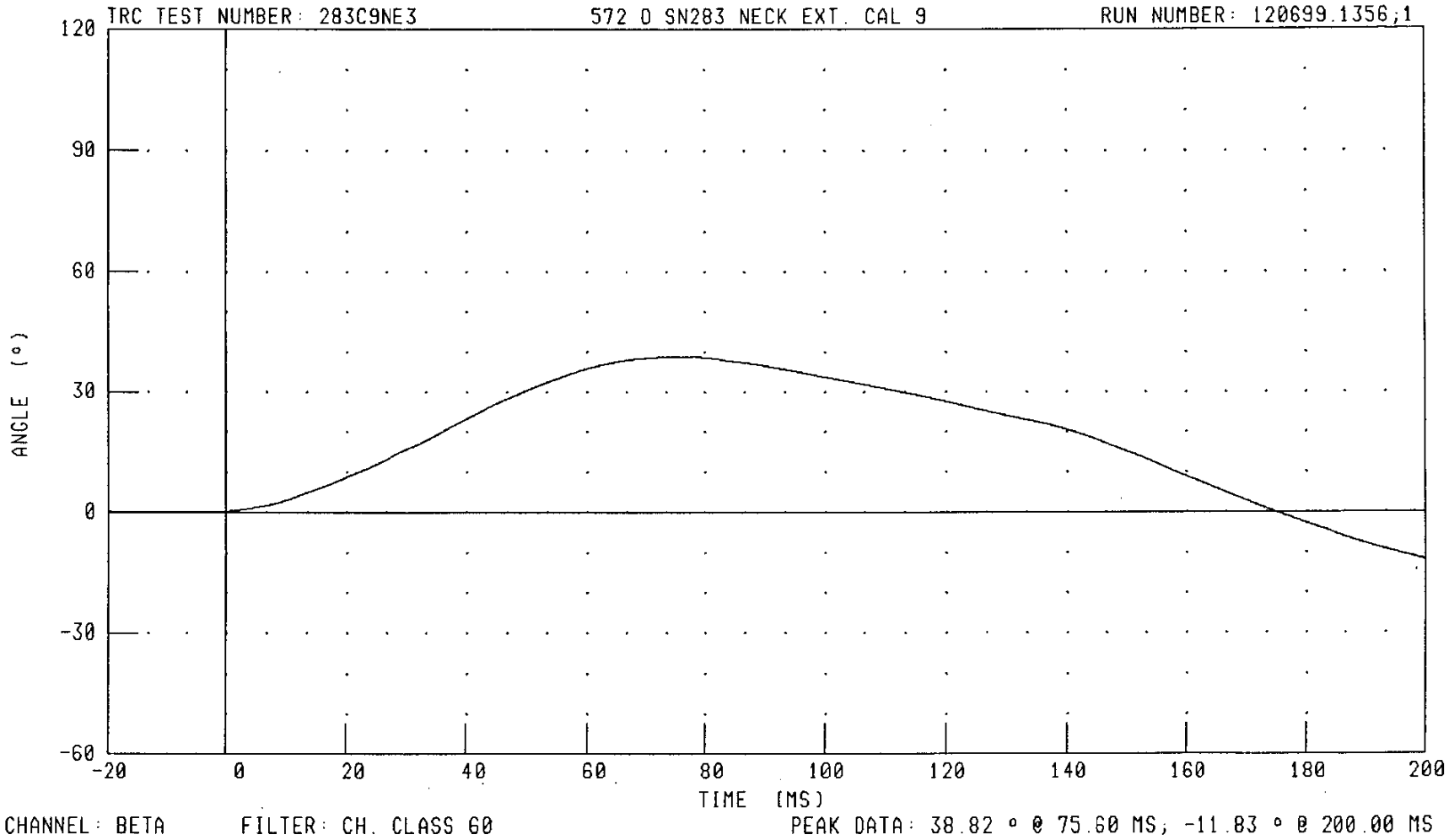
* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 120699.1341;1

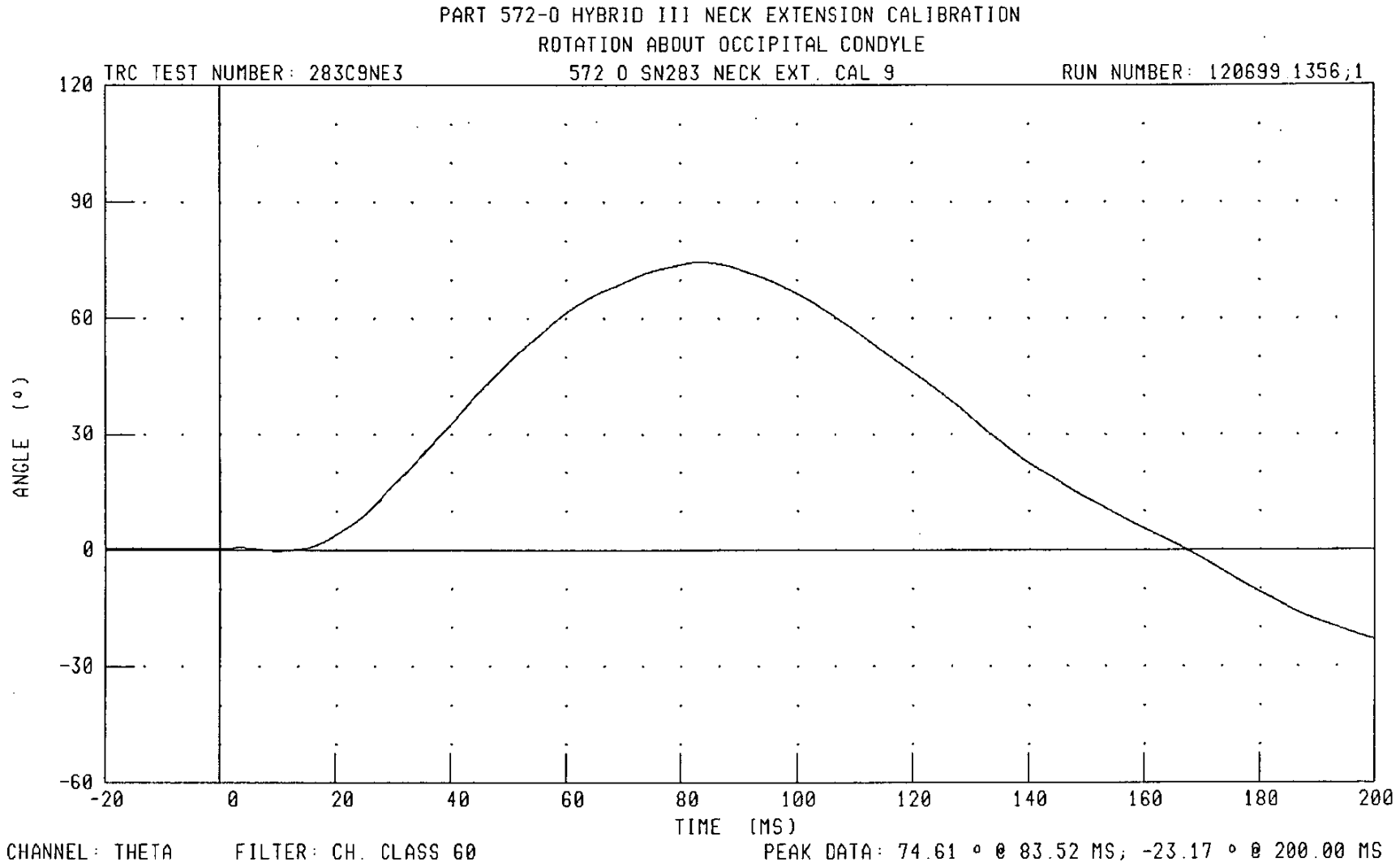
PART 572-O HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION



PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK



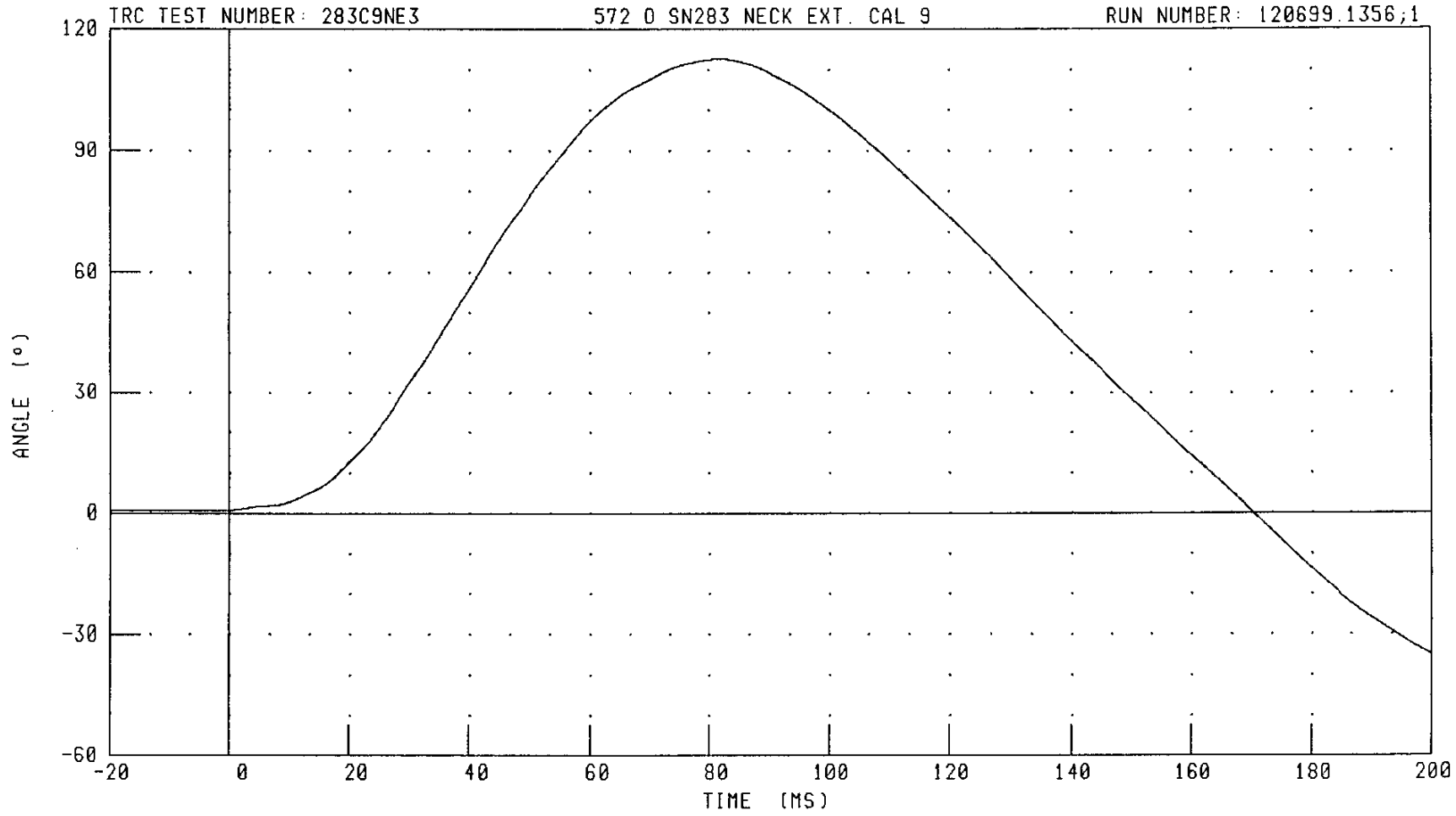

CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 38.82 ° @ 75.60 MS; -11.83 ° @ 200.00 MS


PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 283C9NE3
572 0 SN283 NECK EXT. CAL 9
RUN NUMBER: 120699 1356;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 74.61 ° @ 83.52 MS; -23.17 ° @ 200.00 MS

PART 572-O HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

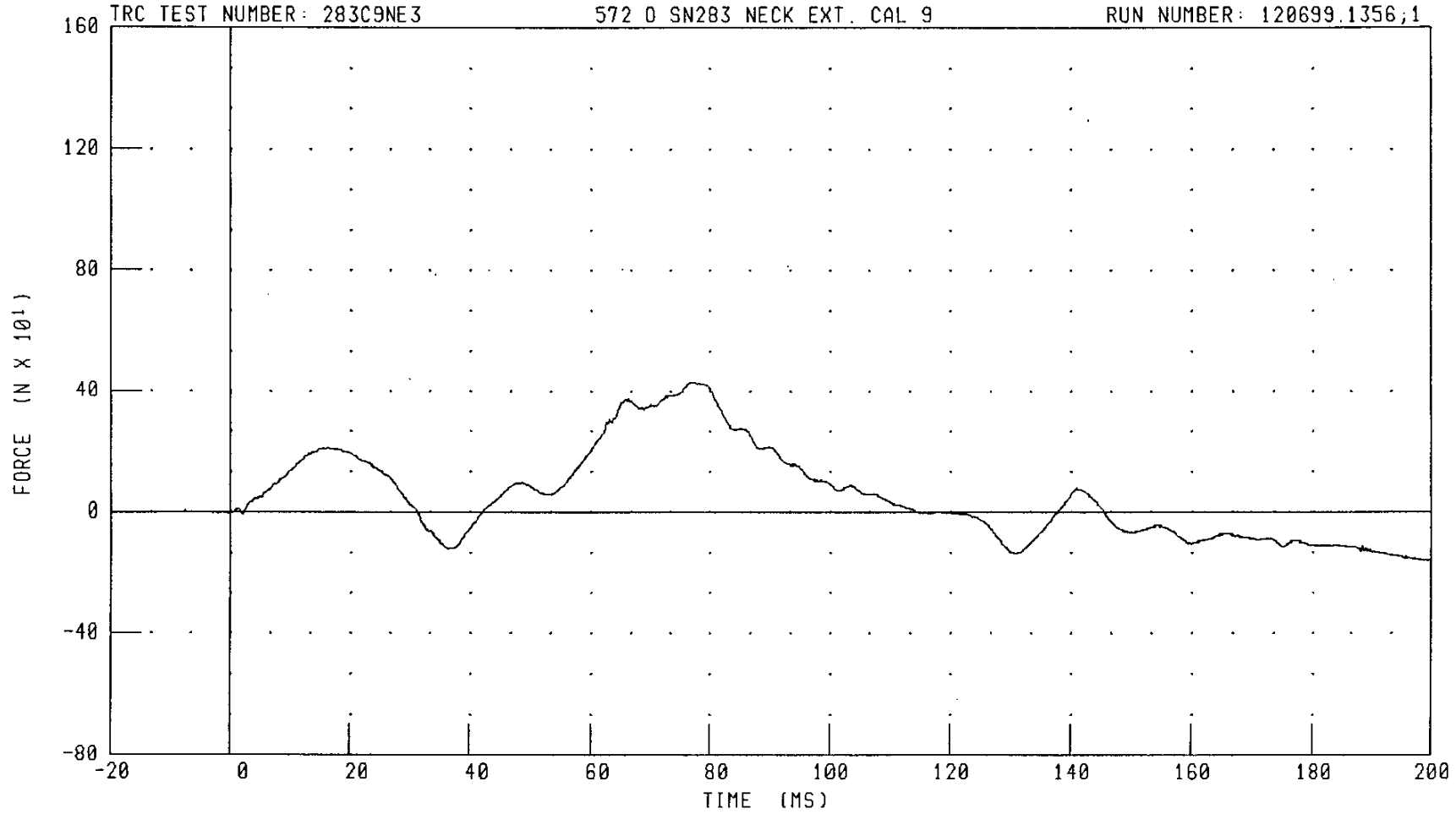
TRC TEST NUMBER: 283C9NE3 572 O SN283 NECK EXT. CAL 9 RUN NUMBER: 120699.1356;1




CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 112.69 ° @ 81.92 MS; -35.00 ° @ 200.00 MS

PART 572-D HYBRID III NECK EXTENSION CALIBRATION

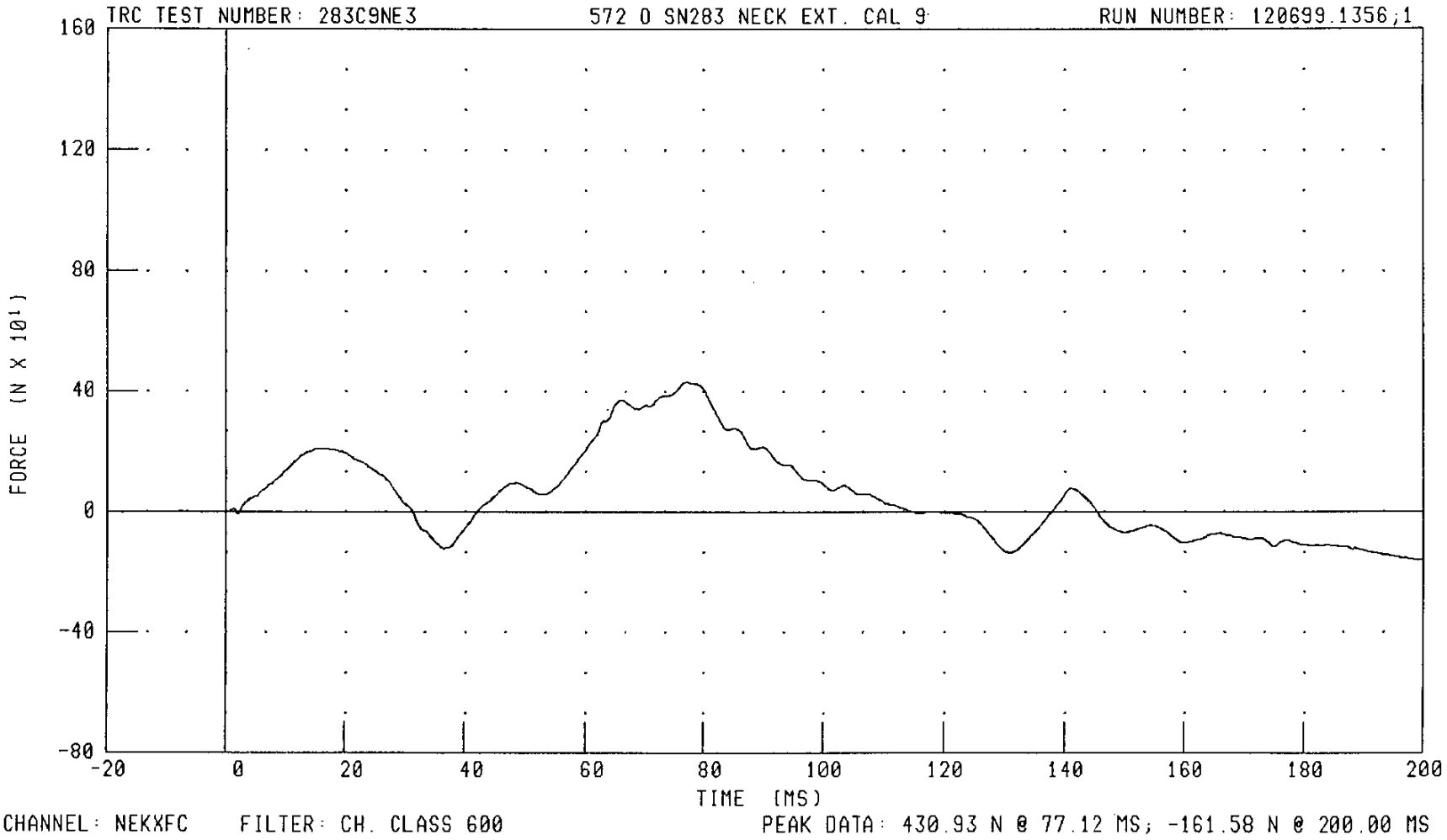
NECK FORCE X AXIS




CHANNEL: NEKXF FILTER: CH. CLASS 1000 PEAK DATA: 430.65 N @ 76.72 MS; -163.87 N @ 199.44 MS

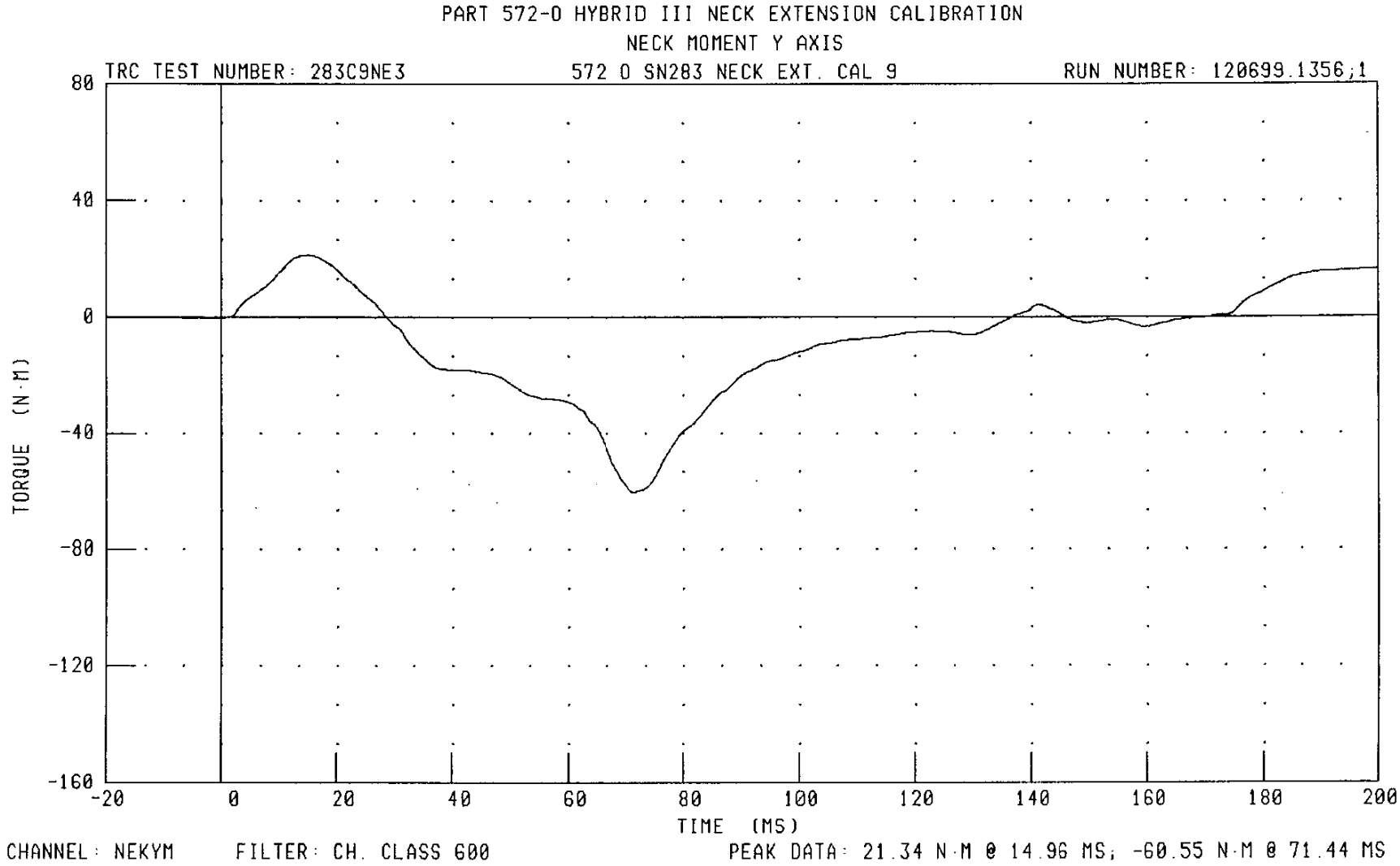
PART 572-D HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

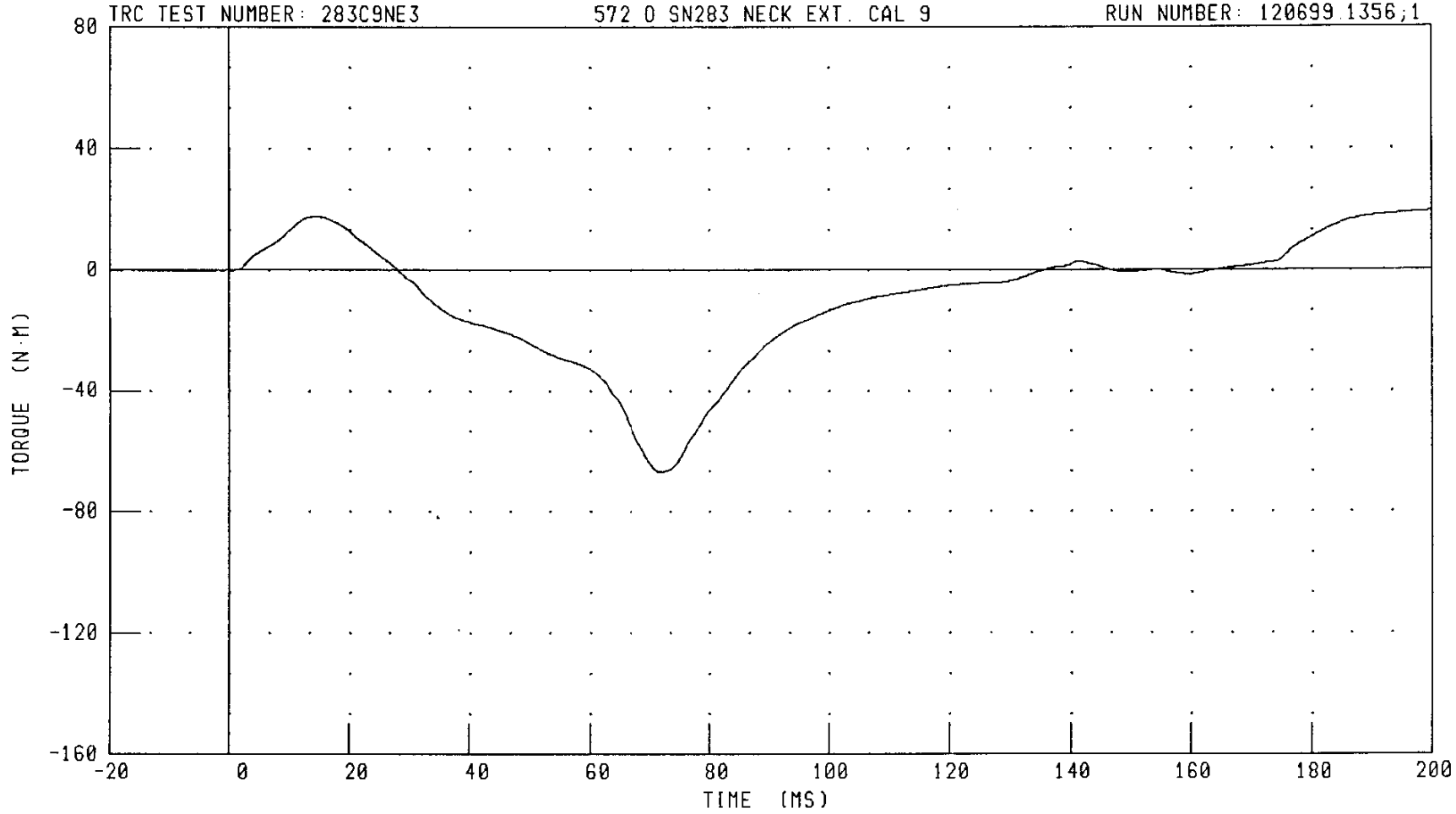



CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 430.93 N @ 77.12 MS; -161.58 N @ 200.00 MS


PART 572-O HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 283C9NE3
572 O SN283 NECK EXT. CAL 9
RUN NUMBER: 120699.1356;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 600
PEAK DATA: 21.34 N-M @ 14.96 MS; -60.55 N-M @ 71.44 MS

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




CHANNEL: NEKOM FILTER: CH. CLASS 600 PEAK DATA: 19.37 N-M @ 200.00 MS; -66.96 N-M @ 71.68 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE 07-DEC-99

TRC INC. TEST NO: 283C9TH2 572 O SN283 THORAX CAL9

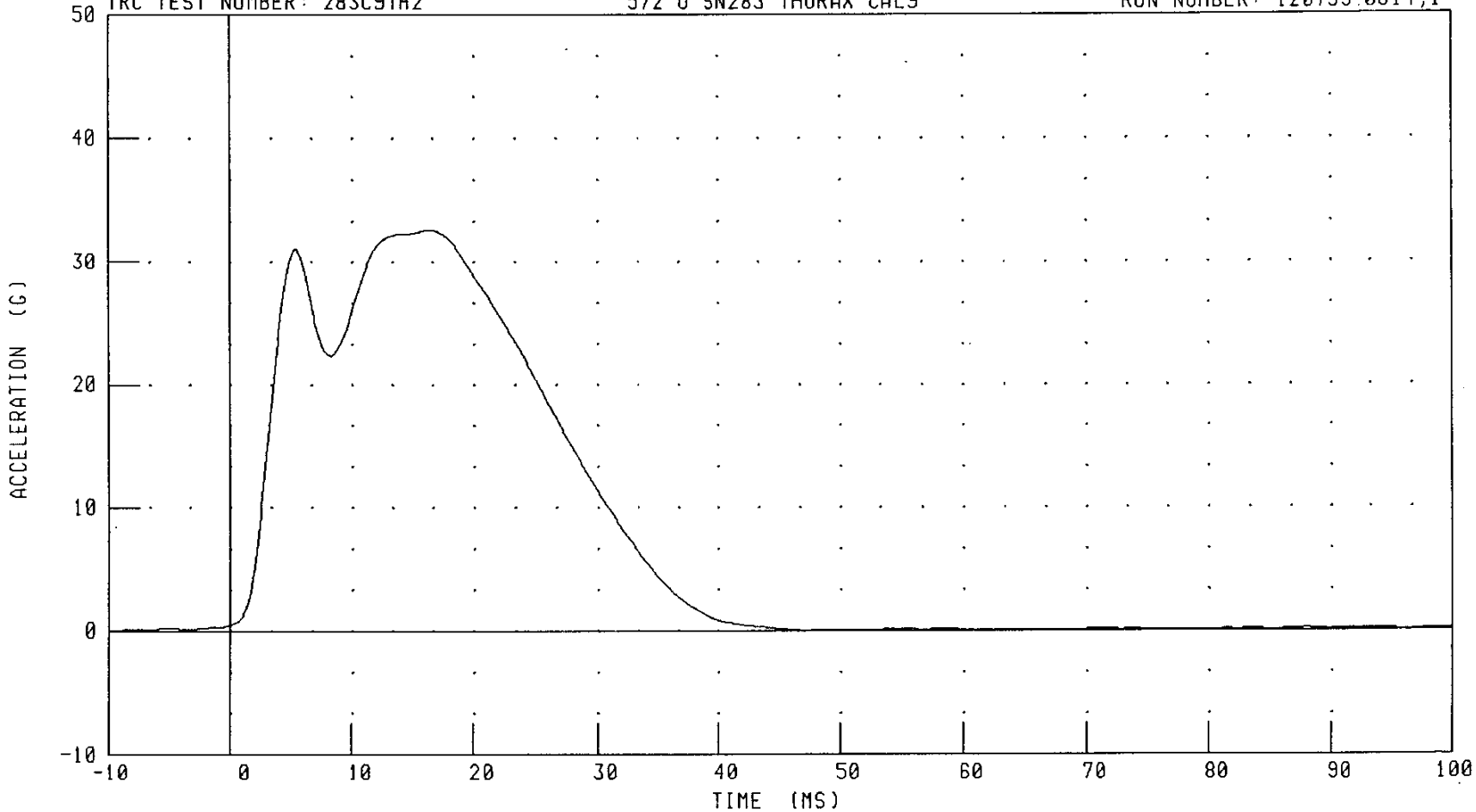
| TEST PARAMETER | HIGH SPEED TEST SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PENDULUM VELOCITY | 6.59 - 6.83 M/S | 6.62 M/S |
| MAXIMUM DEFLECTION | 48 - 55 MM | 49.1 MM |
| MAXIMUM RESISTIVE FORCE WITHIN DEFLECTION CORRIDOR | 3900 - 4400 N | 4472. N * |
| INTERNAL HYSTERESIS | 69% - 85% | 74.6% |

* TEST DOES NOT MEET SPECIFICATIONS

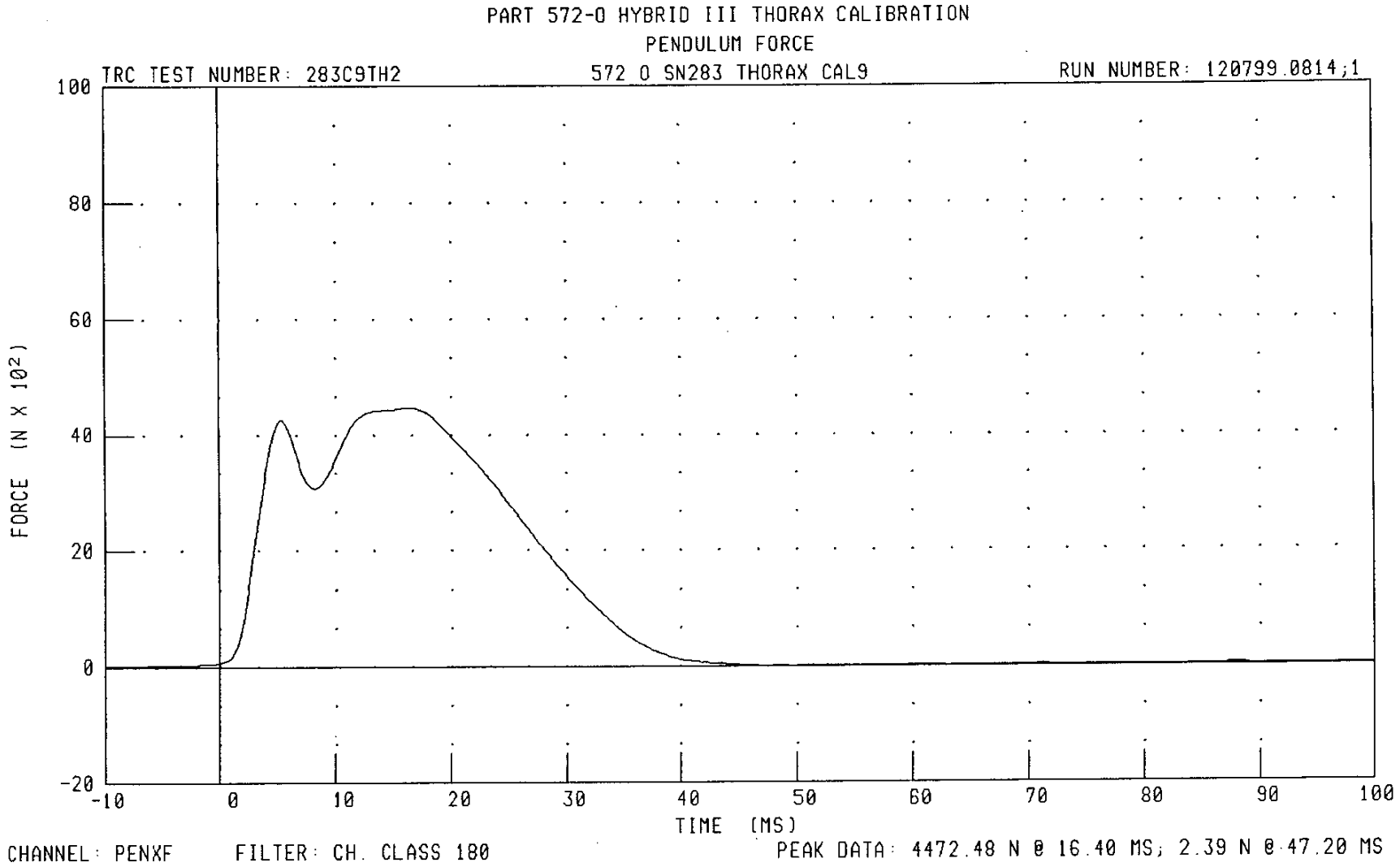
TECHNICIAN _____ RUN NUMBER: 120799.0720;1

PART 572-0 HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 283C9TH2 572 0 SN283 THORAX CAL9 RUN NUMBER: 120799.0814;1



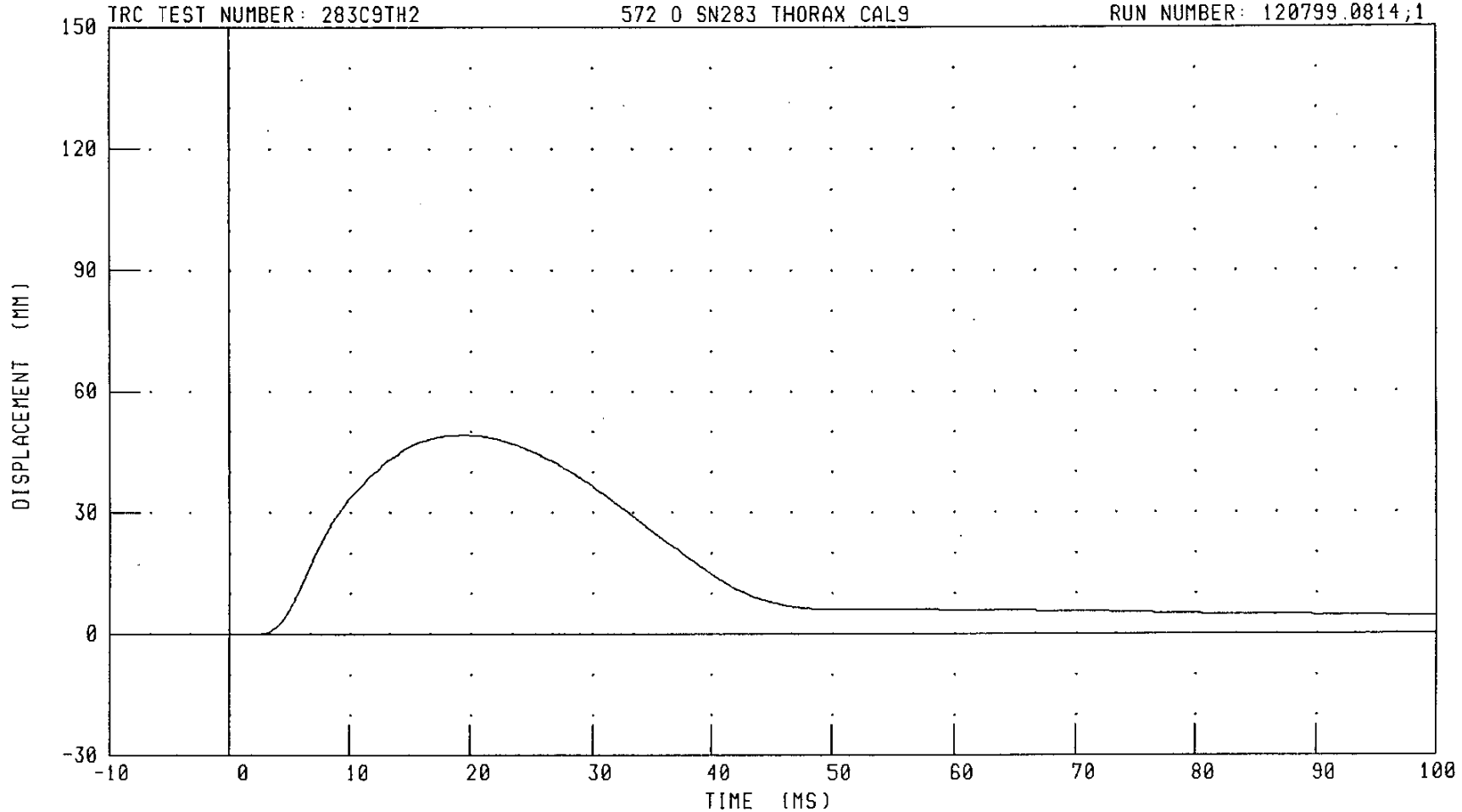

CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 32.59 G @ 16.40 MS; 0.02 G @ 47.20 MS


PART 572-0 HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 283C9TH2
572 0 SN283 THORAX CAL9
RUN NUMBER: 120799.0814;1
100
80
60
40
20
0
-20
FORCE (N X 10²)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 4472.48 N @ 16.40 MS; 2.39 N @ 47.20 MS

PART 572-O HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

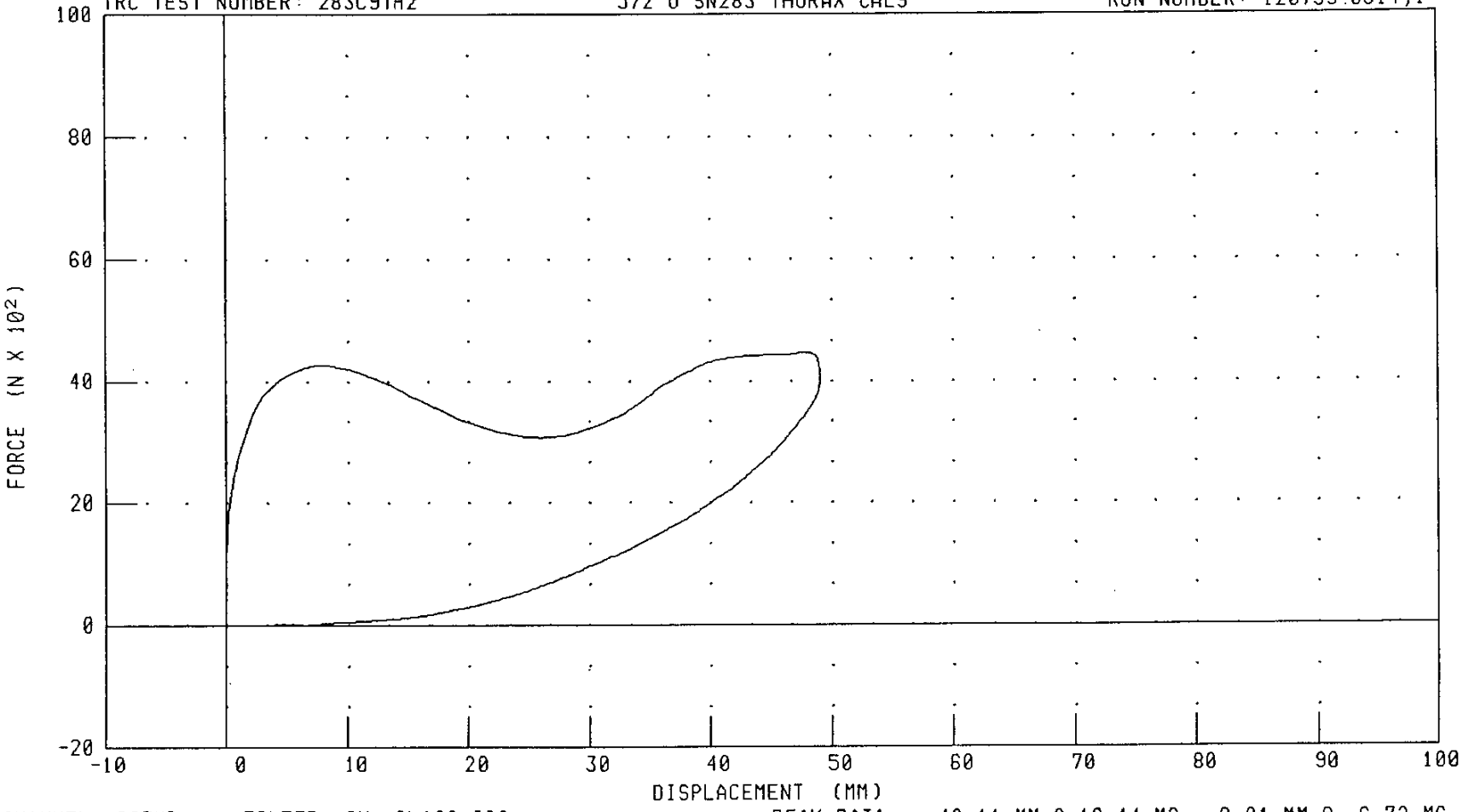
TRC TEST NUMBER: 283C9TH2 572 O SN283 THORAX CAL9 RUN NUMBER: 120799.0814;1




CHANNEL: CSTXD FILTER: CH. CLASS 600 PEAK DATA: 49.11 MM @ 19.44 MS; -0.01 MM @ -6.72 MS

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

TRC TEST NUMBER: 283C9TH2 572 O SN283 THORAX CAL9 RUN NUMBER: 120799.0814;1




CHANNEL: CSTXD FILTER: CH. CLASS 600
PENXF CH. CLASS 180

PEAK DATA: 49.11 MM @ 19.44 MS; -0.01 MM @ -6.72 MS
4472.48 N @ 16.40 MS; 2.39 N @ 47.20 MS

TRANSPORTATION RESEARCH CENTER INC.

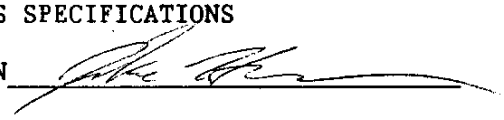
RIGHT KNEE IMPACT TEST

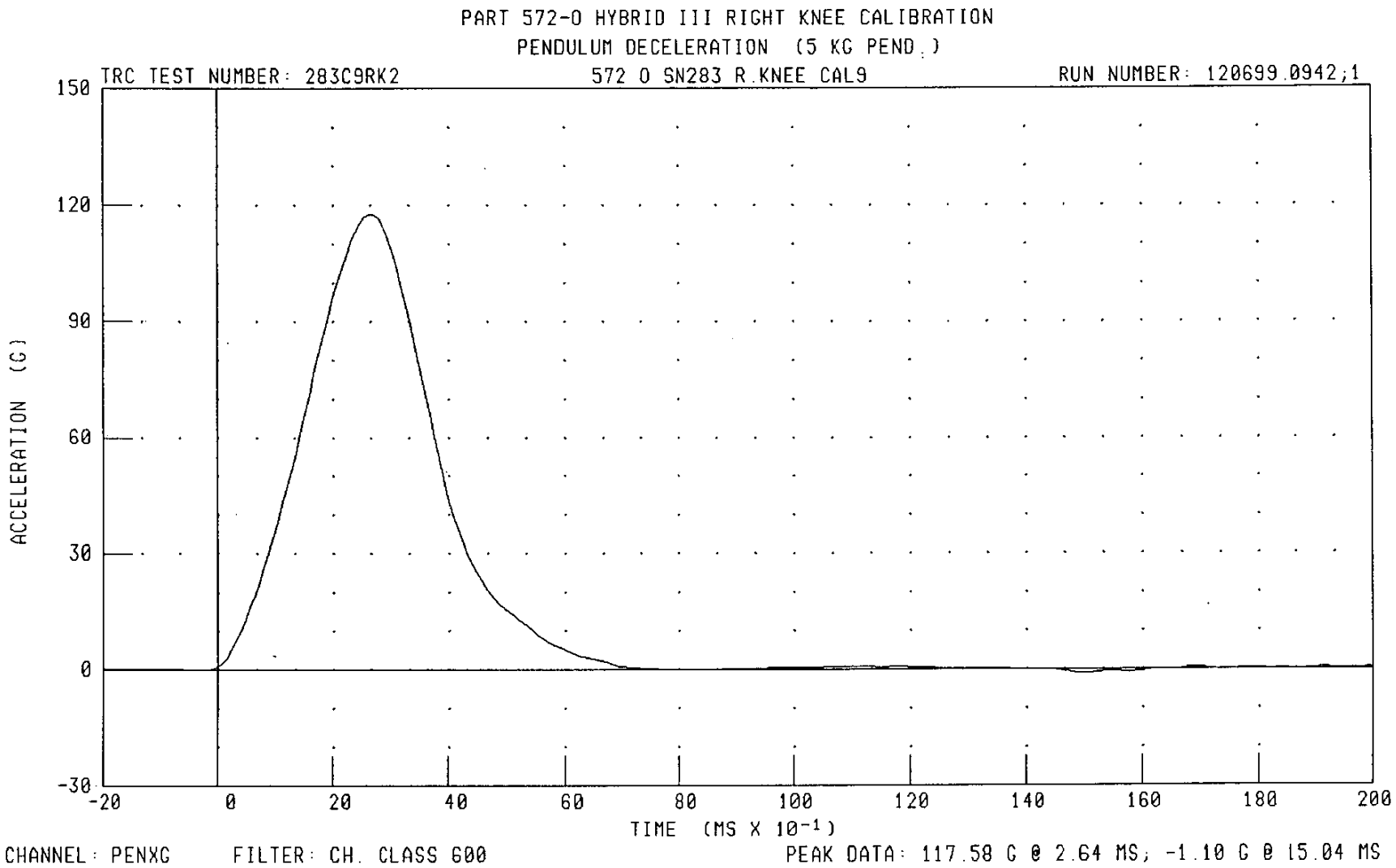
HYBRID III SMALL FEMALE 06-DEC-99

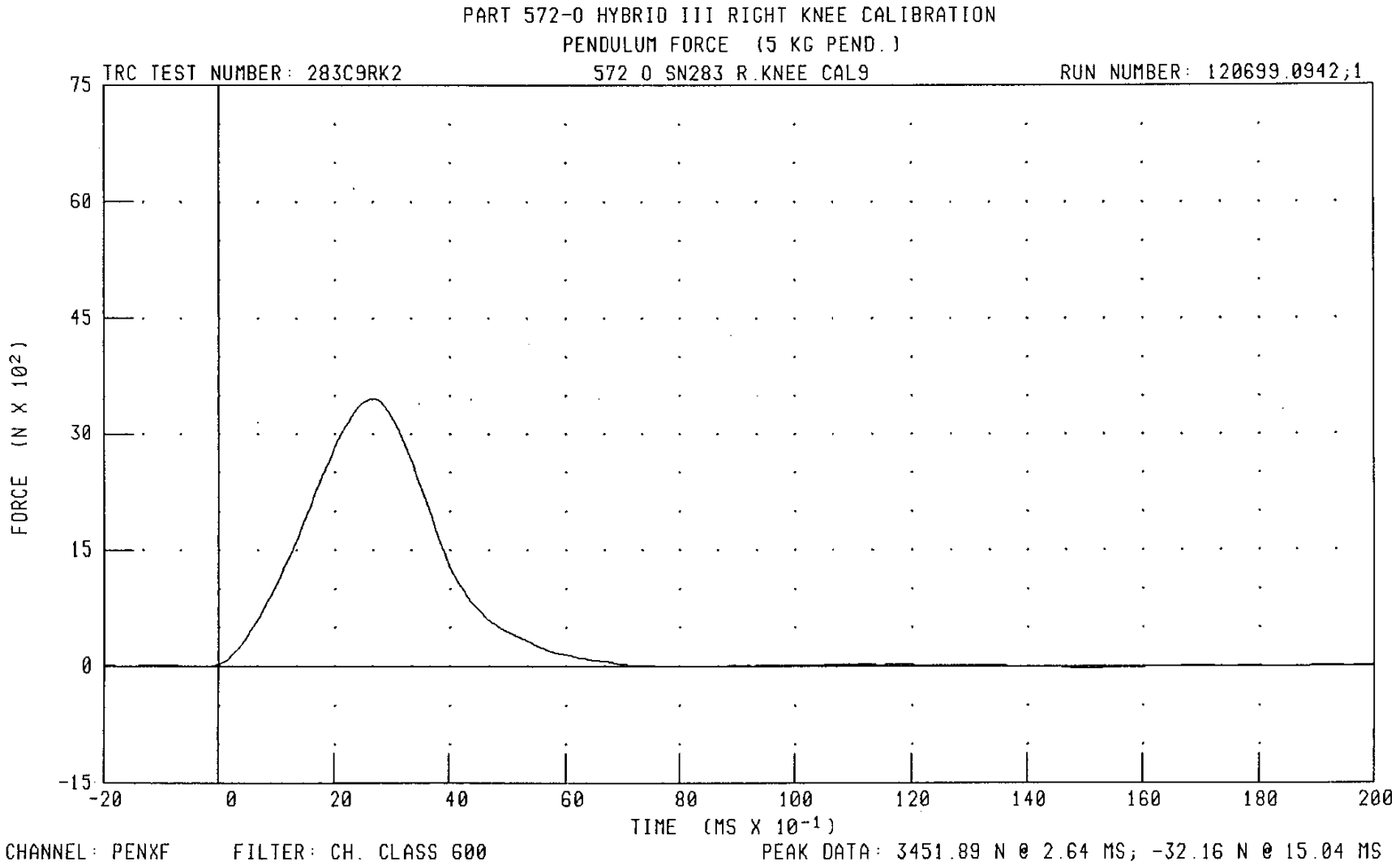
TRC INC. TEST NO: 283C9RK2 572 O SN283 R.KNEE CAL9

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.12 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3451.8 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 120699.0942;1


PART 572-O HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 283C9RK2
572 O SN283 R.KNEE CAL9
RUN NUMBER: 120699.0942;1
150
120
90
60
30
0
-30
ACCELERATION (G)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 117.58 G @ 2.64 MS; -1.10 G @ 15.04 MS


PART 572-0 HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 283C9RK2
572 0 SN283 R.KNEE CAL9
RUN NUMBER: 120699.0942;1
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 3451.89 N @ 2.64 MS; -32.16 N @ 15.04 MS

TRANSPORTATION RESEARCH CENTER INC.

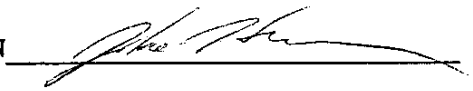
LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE 06-DEC-99

TRC INC. TEST NO: 283C9LK1 572 O SN283 LEFT KNEE CAL9

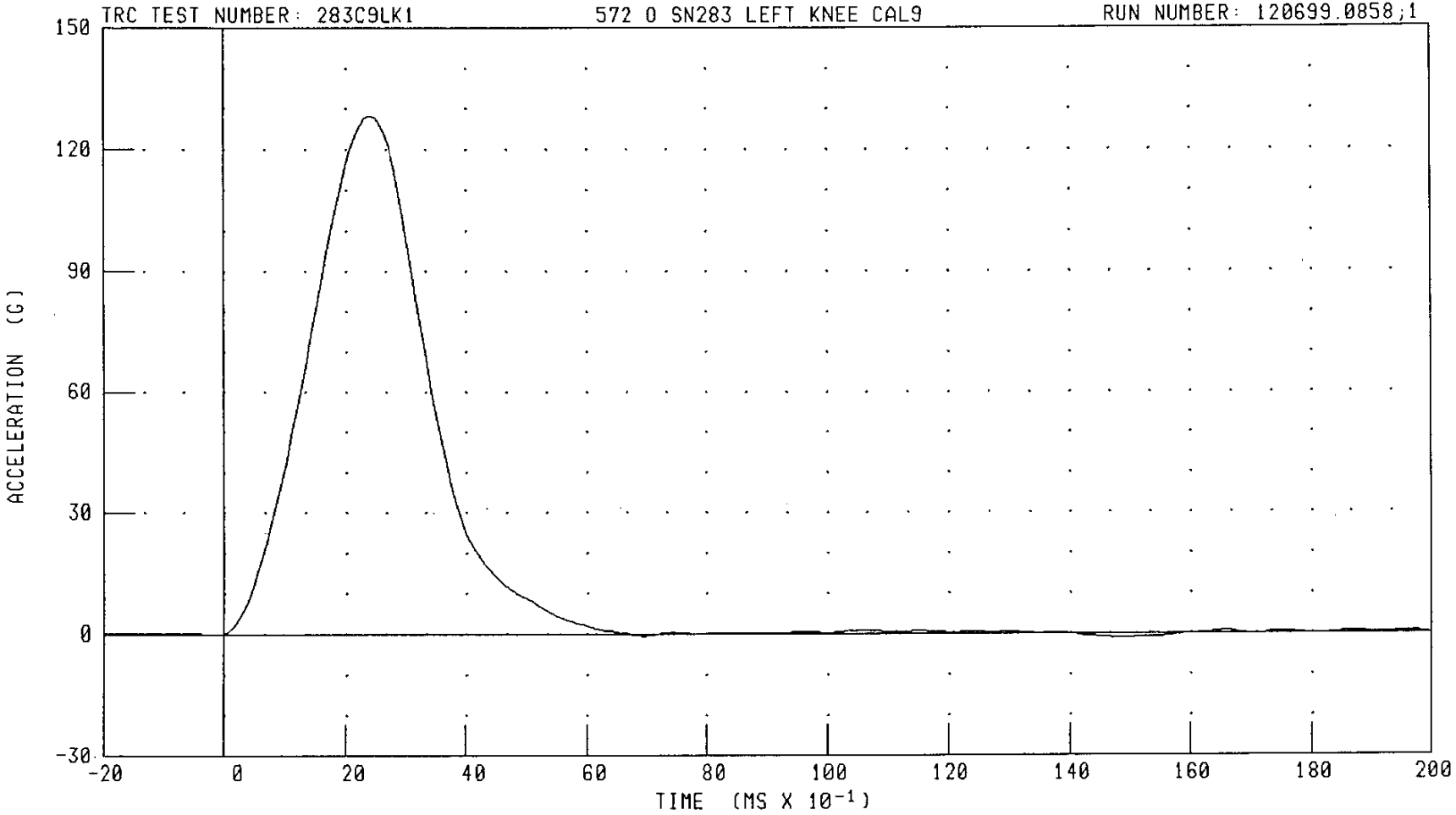
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.09 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3765.7 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 120699.0858;1

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

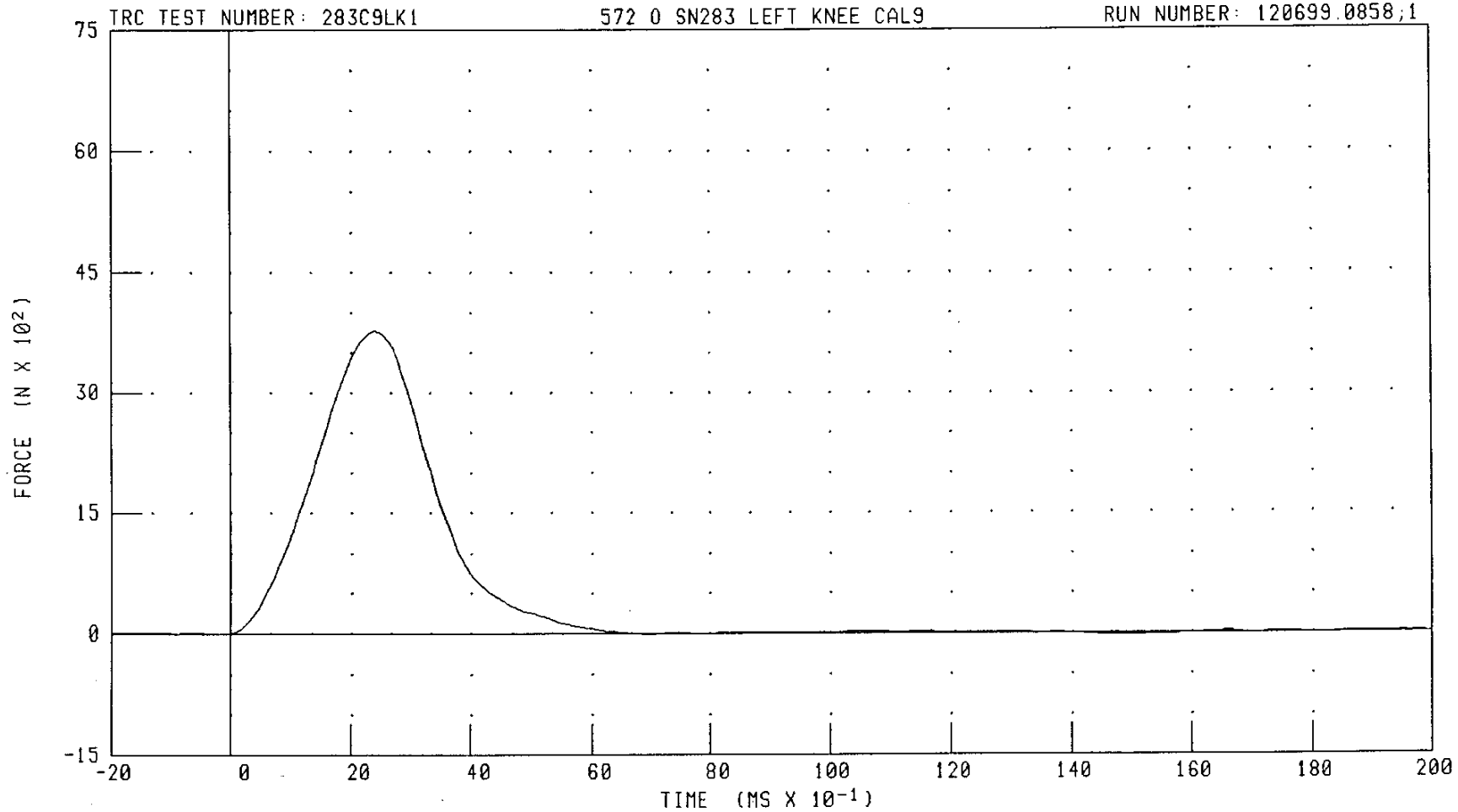
TRC TEST NUMBER: 283C9LK1 572 0 SN283 LEFT KNEE CAL9 RUN NUMBER: 120699.0858;1




CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 128.28 G @ 2.40 MS; -1.15 G @ 14.88 MS

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 283C9LK1
572 0 SN283 LEFT KNEE CAL9
RUN NUMBER: 120699.0858;1




CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 3765.74 N @ 2.40 MS; -33.71 N @ 14.88 MS

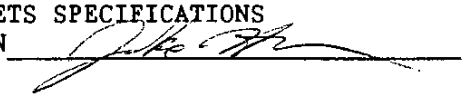
Pre-Test Dummy Certification

Passenger Dummy S/N 369

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS
SN369 TRC.

TRC INC. TEST NO: 369C8ED 06-DEC-99
570 0 SN369 EXT DIMENSION

| TEST PARAMETER | (DIMEN.) | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| LOCATION FOR CHEST CIRCUMFERENCE | (AA) | 300 - 310 MM | 305. MM |
| LOCATION FOR WAIST CIRCUMFERENCE | (BB) | 160 - 170 MM | 165. MM |
| CHEST CIRCUMFERENCE | (X) | 851 - 881 MM | 869. MM |
| WAIST CIRCUMFERENCE | (Y) | 757 - 787 MM | 775. MM |
| CHEST DEPTH | (O) | 183 - 199 MM | 183. MM |
| H-POINT HEIGHT | (C) | 81.5 - 86.5 MM | 81. MM |
| H-POINT FROM SEATBACK | (D) | 144.5-149.5 MM | 150. MM |
| SKULL CAP TO BACKLINE | (H) | 43.2 - 48.2 MM | 46. MM |
| TOTAL SITTING HEIGHT | (A) | 775 - 800 MM | 775. MM |
| THIGH CLEARANCE | (F) | 114 - 130 MM | 127. MM |
| BUTTOCK KNEE LENGTH | (K) | 508.5-533.5 MM | 528. MM |
| BUTTOCK POPLITEAL LENGTH | (N) | 414.0-429.4 MM | 427. MM |
| POPLITEAL HEIGHT | (L) | 348.5-373.5 MM | 366. MM |
| KNEE TO FLOOR HEIGHT | (M) | 394 - 419 MM | 406. MM |
| FOOT LENGTH | (P) | 216 - 232 MM | 226. MM |
| FOOT BREADTH | (R) | 76 - 92 MM | 86. MM |
| SHOULDER PIVOT FROM BACKLINE | (E) | 71 - 81 MM | 76. MM |
| SHOULDER BREADTH | (V) | 348 - 364 MM | 358. MM |
| SHOULDER PIVOT HEIGHT | (B) | 434 - 450 MM | 436.8. MM |
| ELBOW REST HEIGHT | (J) | 183 - 203 MM | 185. MM |
| SHOULDER-ELBOW LENGTH | (I) | 279 - 297 MM | 290. MM |
| BACK OF ELBOW TO FINGER TIP | (G) | 244 - 259 MM | 251. MM |
| HIP WIDTH AT H-POINT | (W) | 272 - 287 MM | 287. MM |

HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS
DUMMY MEETS SPECIFICATIONS
TECHNICIAN 

RUN NUMBER: 121799.1123

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE 06-DEC-99

TRC INC. TEST NO: 369C8HD1 572 O SN369 HEAD DROP CAL 8

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PEAK RESULTANT ACCELERATION | 250 - 300 G | 280.63 G |
| PEAK LATERAL ACCELERATION | 15 G MAX | 10.28 G |
| IS ACCELERATION CURVE UNIMODAL? | YES | YES |

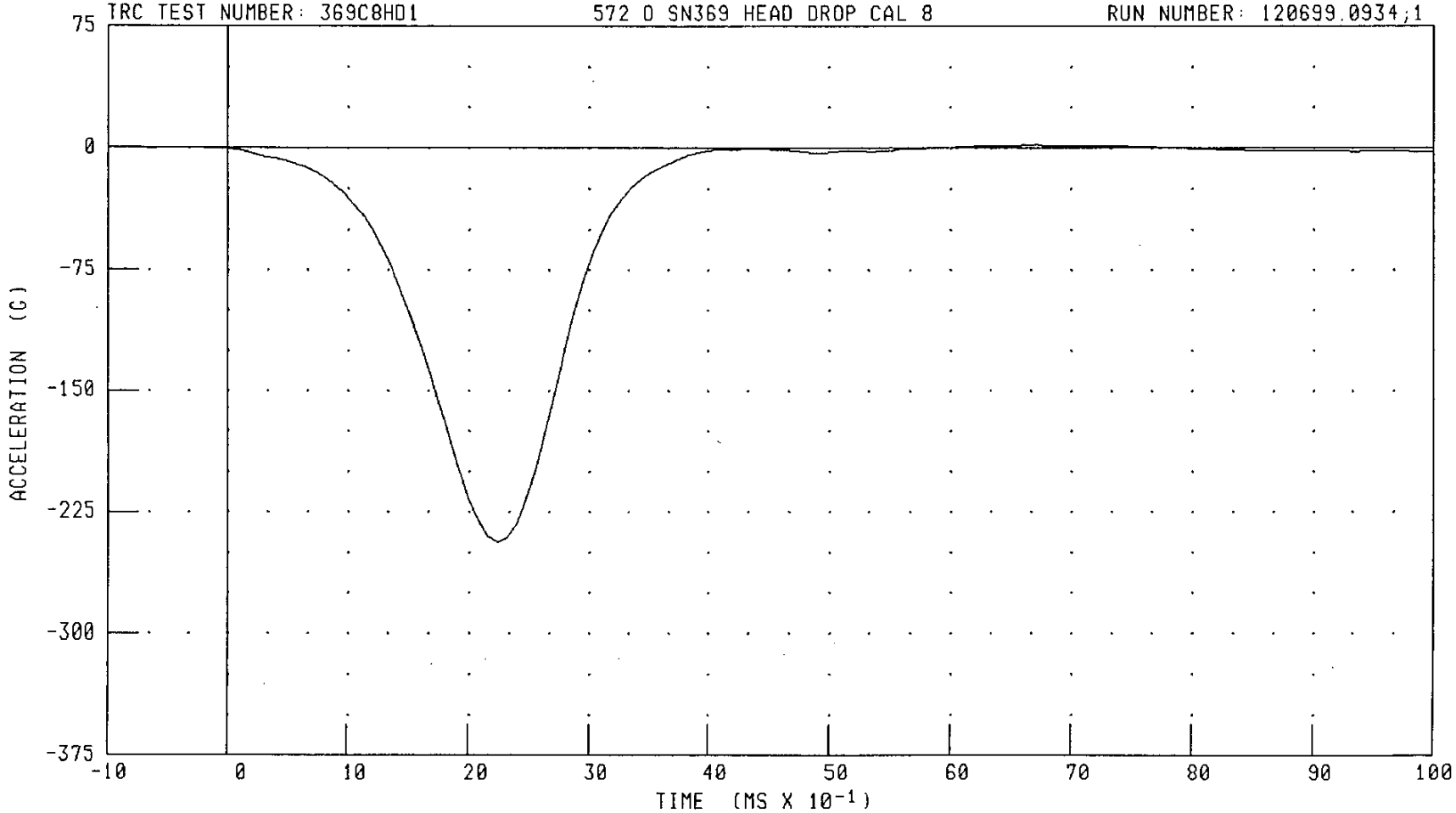
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 120699.0934;1

PART 572-0 HYBRID III HEAD CALIBRATION

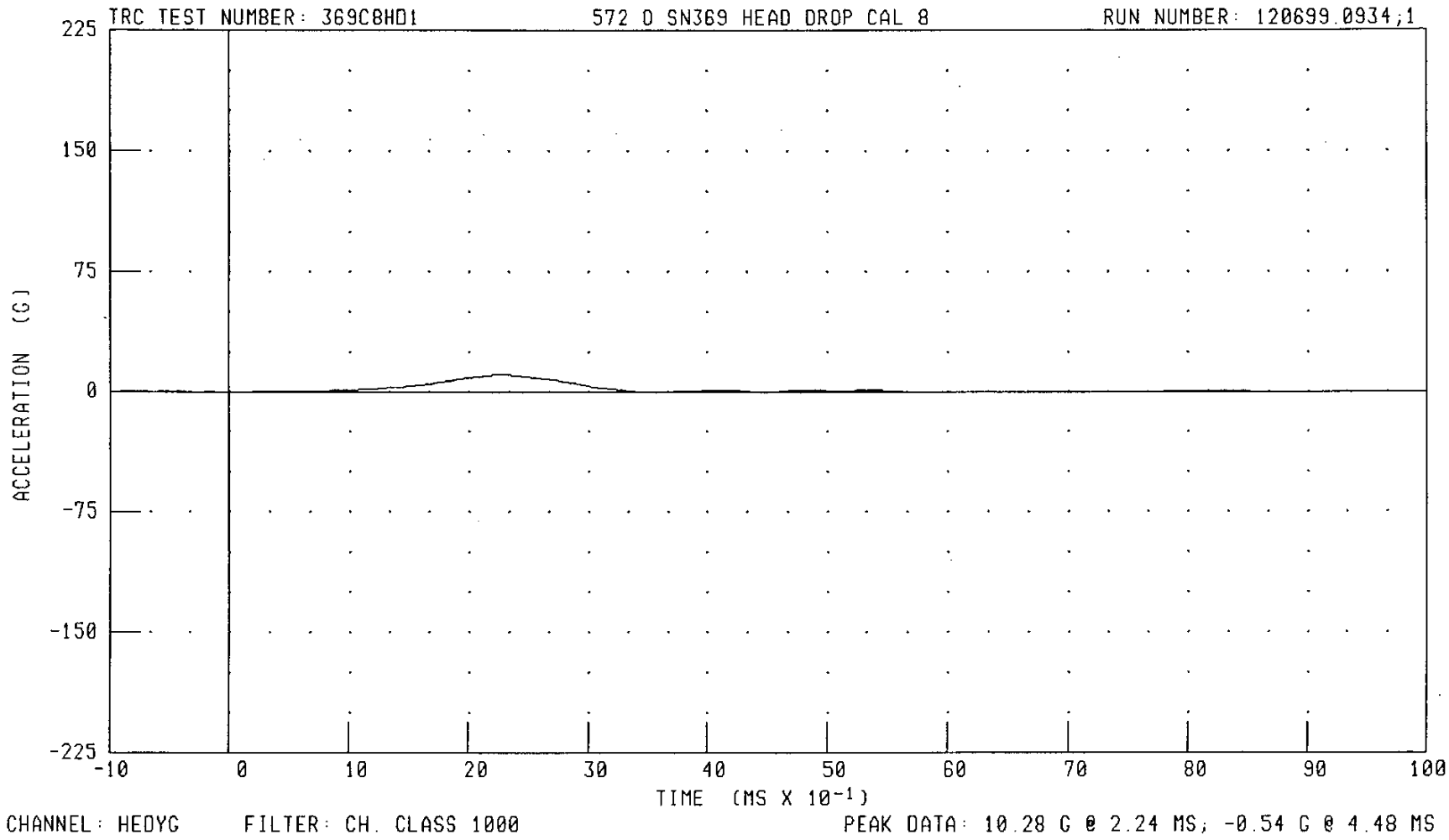
HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 369C8HD1 572 0 SN369 HEAD DROP CAL 8 RUN NUMBER: 120699.0934;1



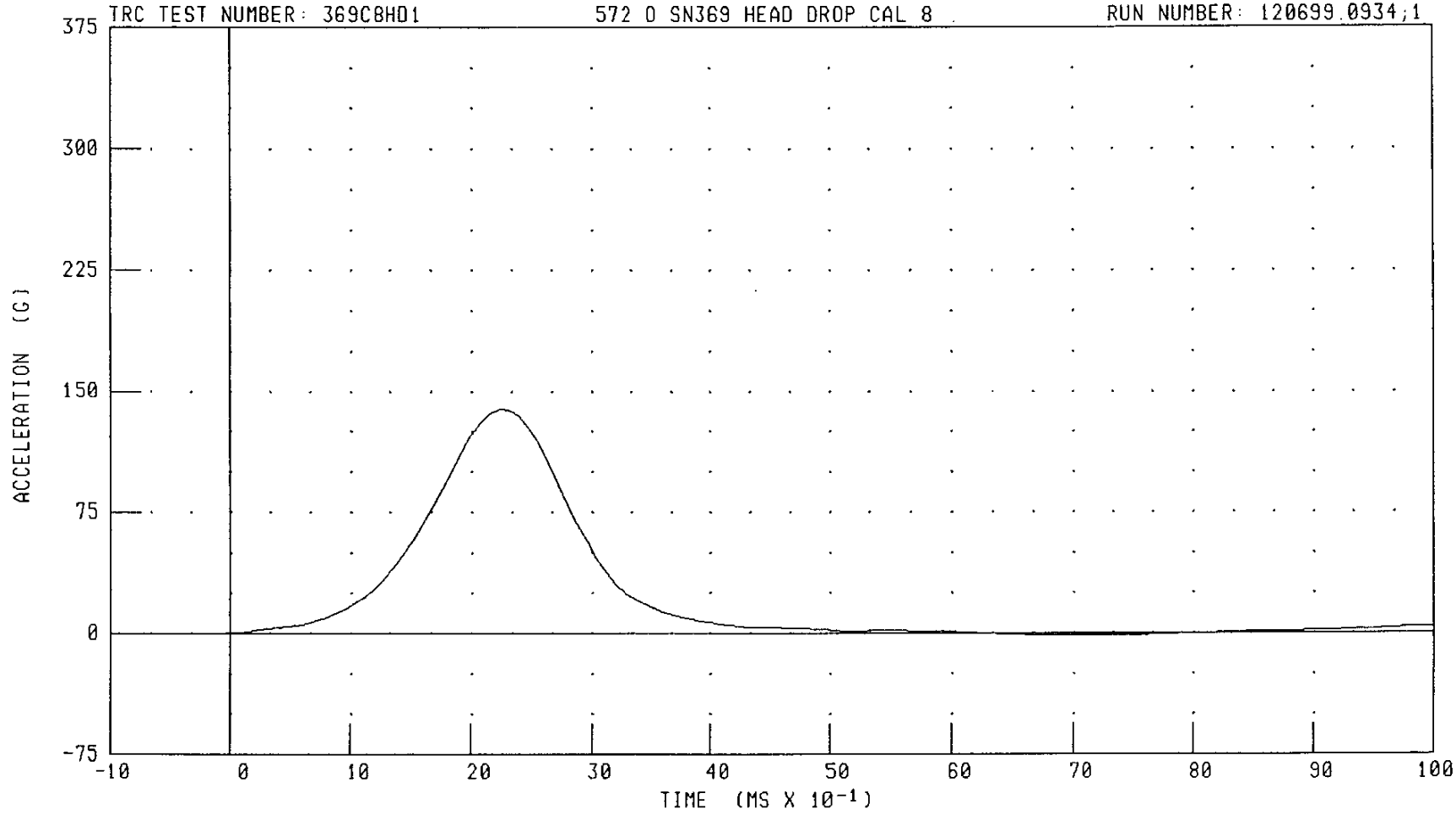

CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 1.89 G @ 6.64 MS; -243.61 G @ 2.24 MS

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



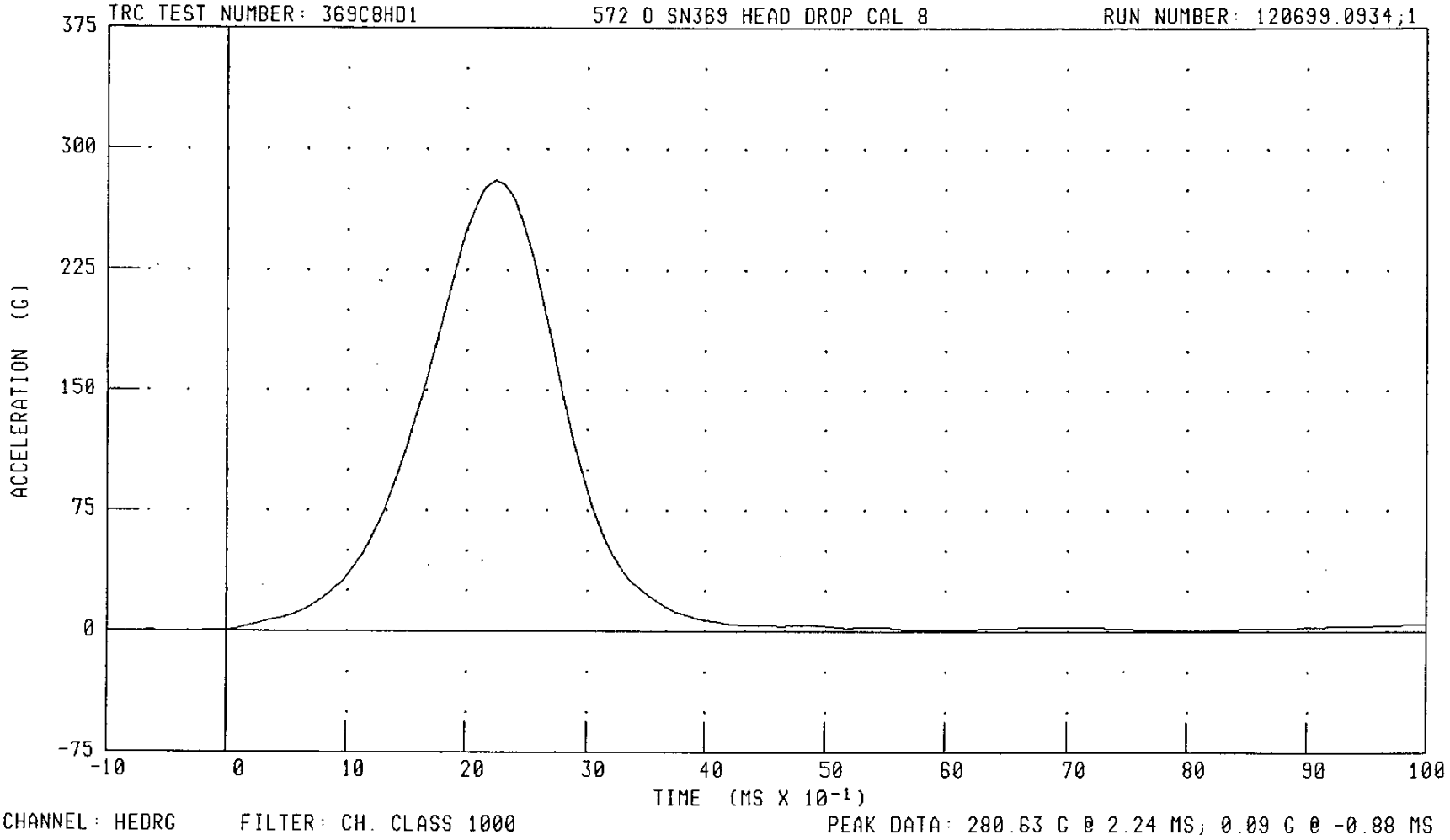

CHANNEL: HEDYG FILTER: CH. CLASS 1000 PEAK DATA: 10.28 G @ 2.24 MS; -0.54 G @ 4.48 MS

PART 572-0 HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS



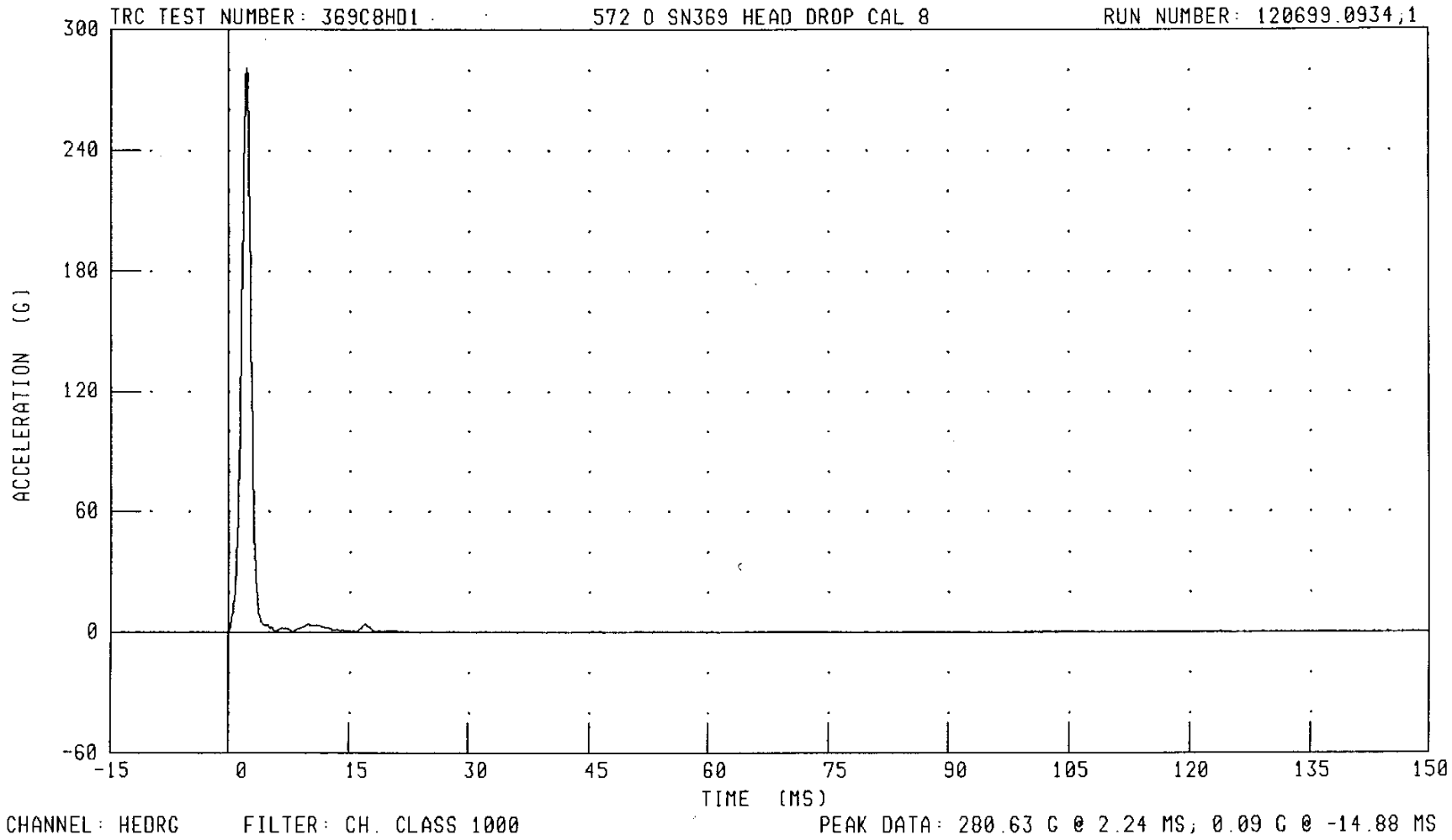

CHANNEL: HEDZC FILTER: CH. CLASS 1000 PEAK DATA: 138.93 G @ 2.24 MS; -1.46 G @ 7.04 MS

PART 572-O HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION




CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 280.63 G @ 2.24 MS; 0.09 G @ -0.88 MS

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




CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 280.63 G @ 2.24 MS; 0.09 G @ -14.88 MS

TRANSPORTATION RESEARCH CENTER INC.

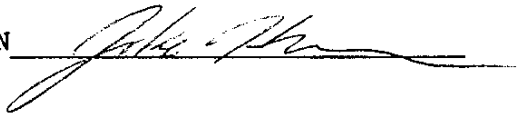
HYBRID III SMALL FEMALE 06-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

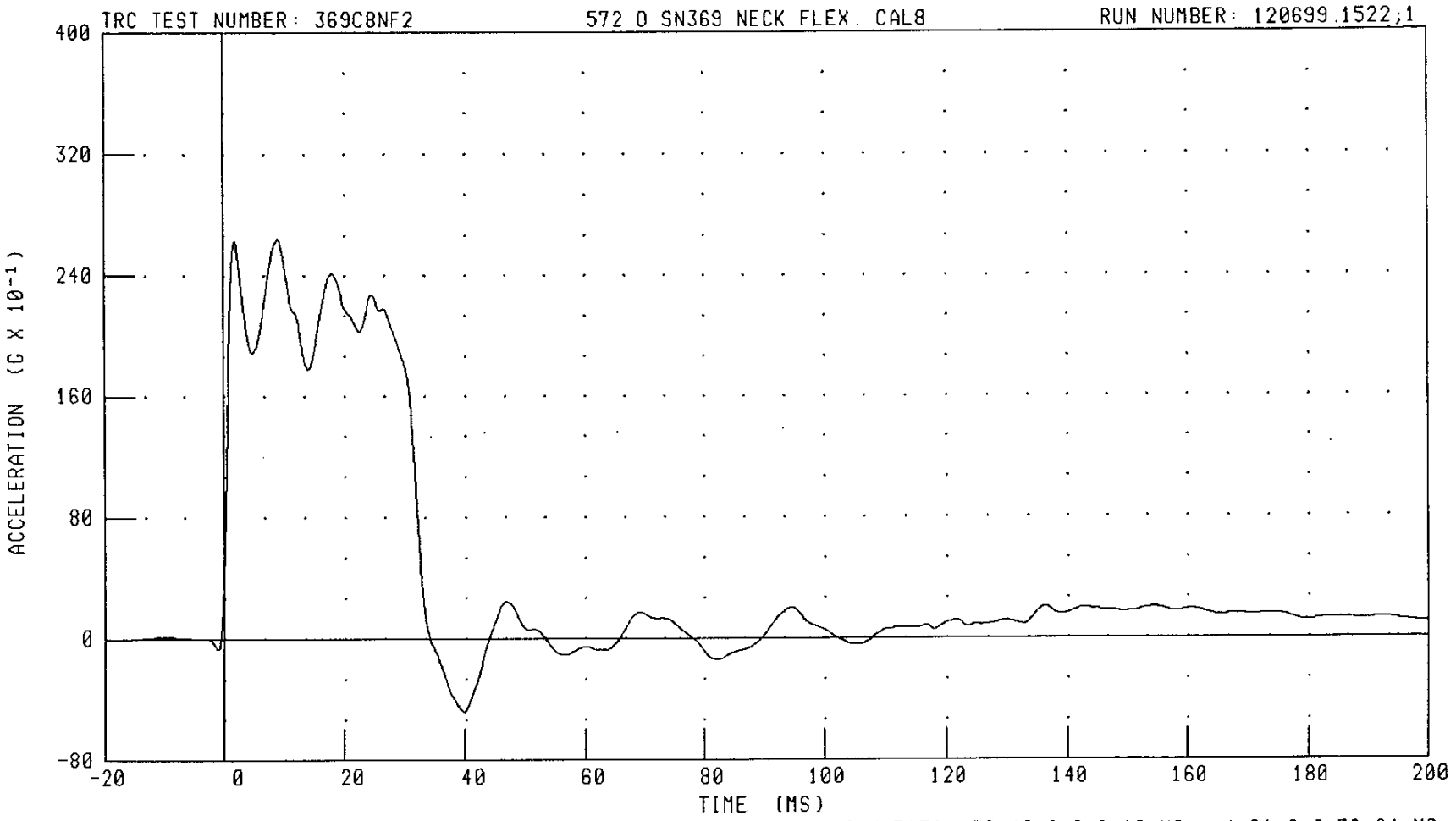
TRC INC. TEST NO: 369C8NF2 572 O SN369 NECK FLEX. CAL8

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 6.89 - 7.13 M/S | 7.12 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 2.1 - 2.5 M/S | 2.15 M/S |
| | 20 MS | 4.0 - 5.0 M/S | 4.26 M/S |
| | 30 MS | 5.8 - 7.0 M/S | 6.32 M/S |
| PEAK D-PLANE ROTATION | | 80 - 92 DEG. | 83.62 DEG. |
| PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT | | 69 - 83 NM | 78.16 NM |
| POSITIVE MOMENT DECAY TIME FROM TO / 10 NM | | 80 - 100 MS | 87.6 MS |

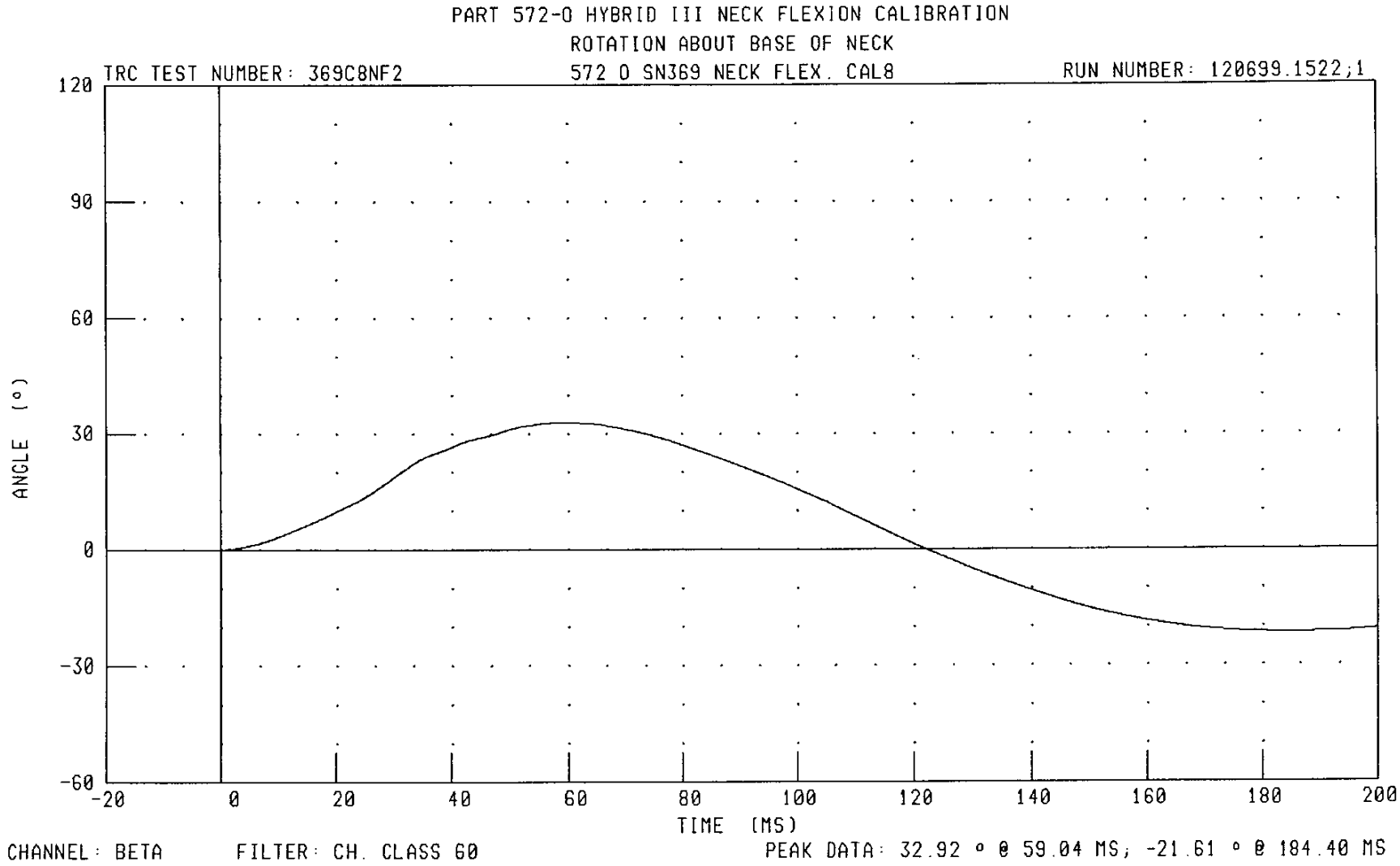
TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 120699.1515;1

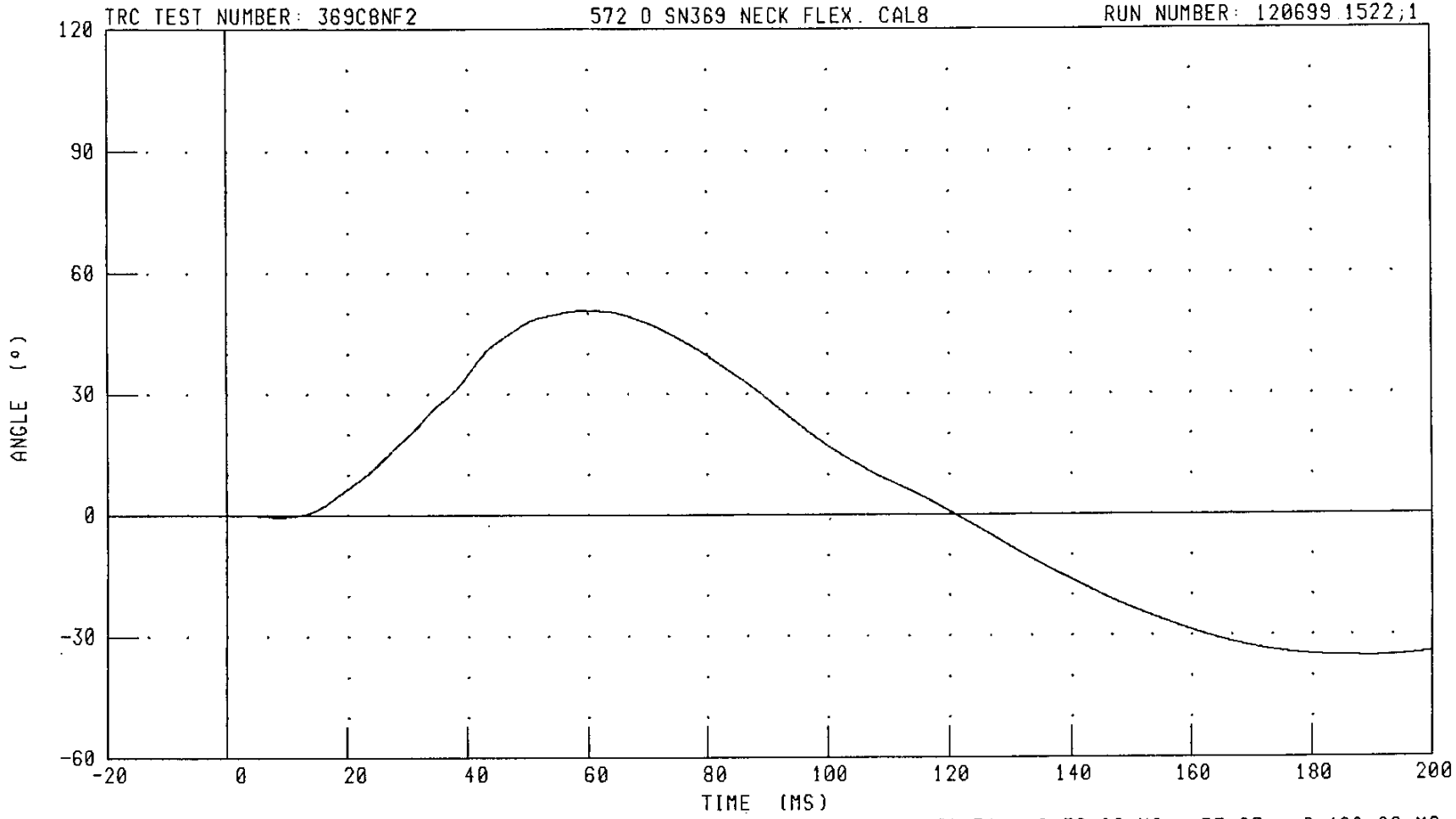
PART 572-O HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION




CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 26.46 G @ 9.12 MS; -4.81 G @ 39.84 MS


PART 572-O HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 369C8NF2
572 O SN369 NECK FLEX. CAL8
RUN NUMBER: 120699.1522;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 32.92 ° @ 59.04 MS; -21.61 ° @ 184.40 MS

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

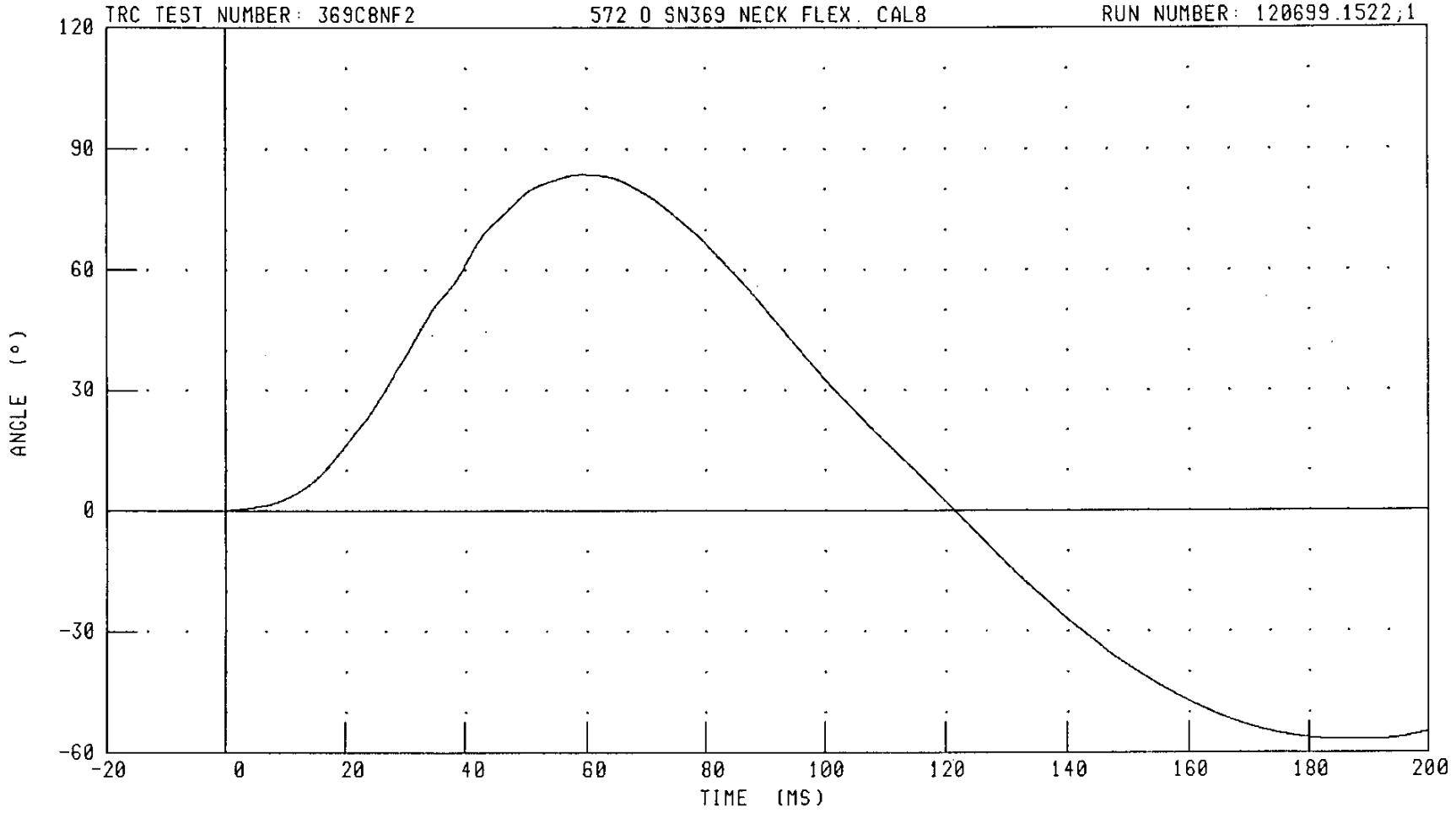



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 50.71 ° @ 59.60 MS; -35.27 ° @ 189.68 MS

PART 572-O HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 369C8NF2 572 O SN369 NECK FLEX. CAL8 RUN NUMBER: 120699.1522;1

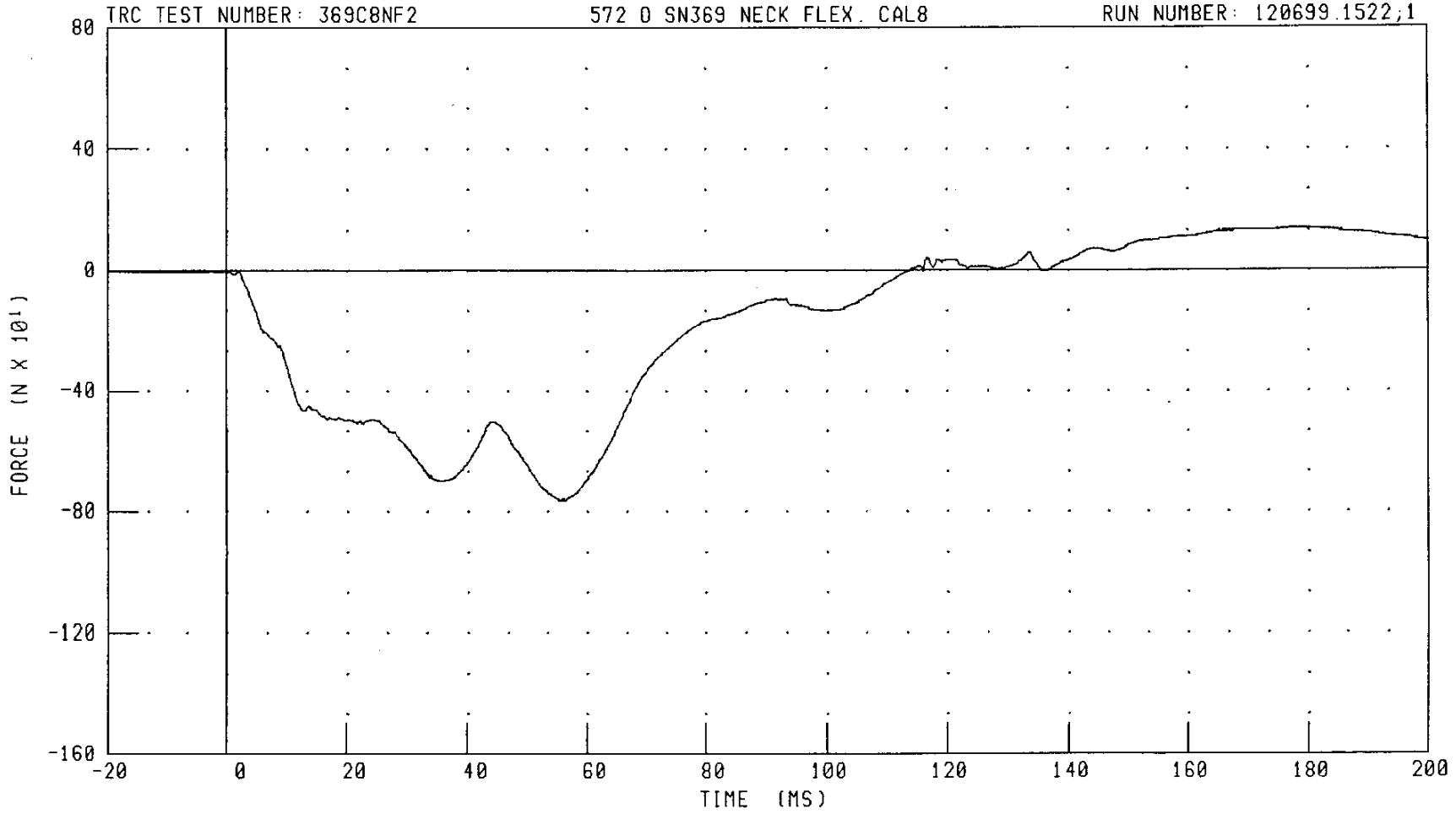



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 83.63 ° @ 59.36 MS; -56.82 ° @ 137.68 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

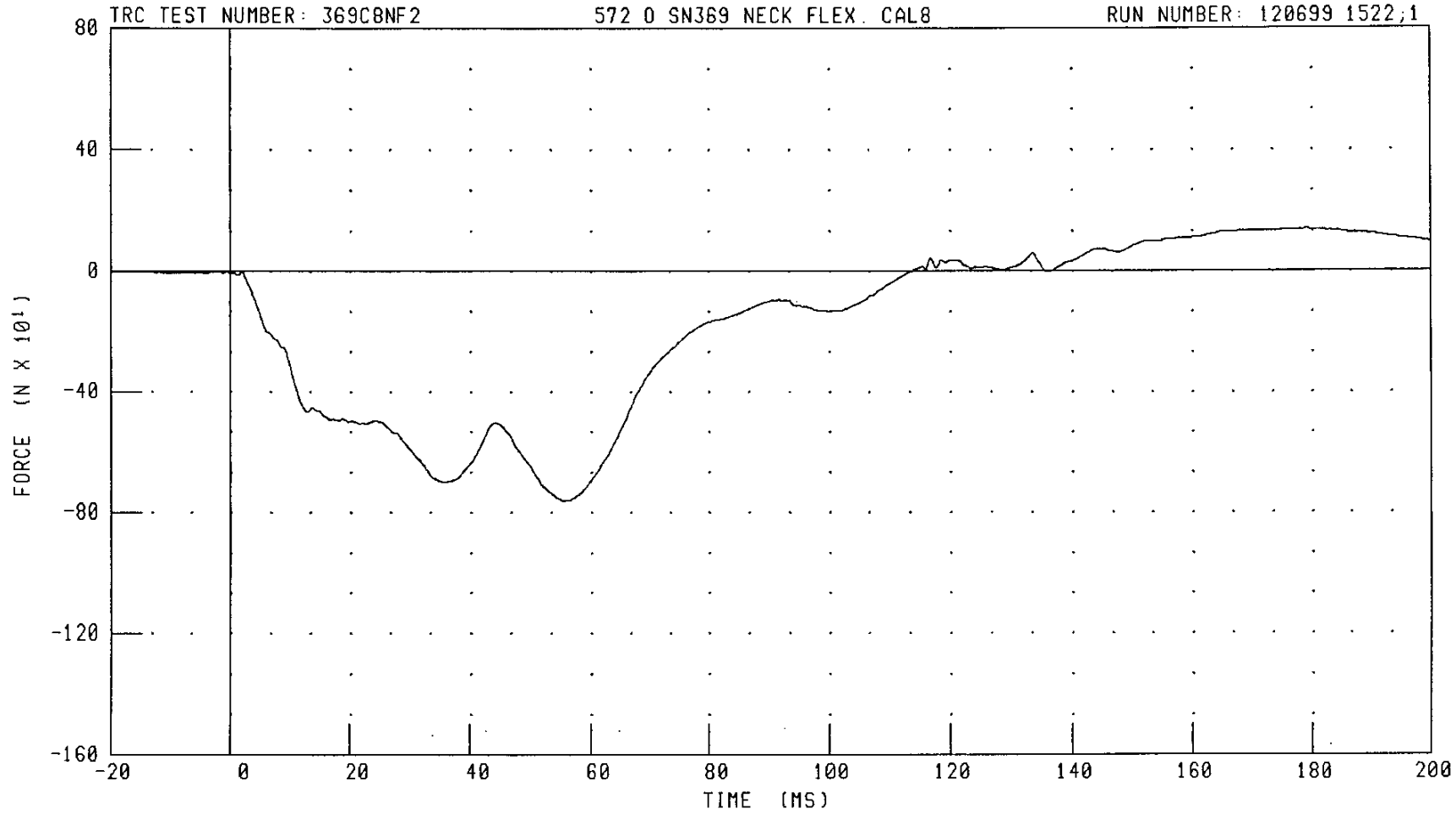
TRC TEST NUMBER: 369C8NF2 572 0 SN369 NECK FLEX. CAL8 RUN NUMBER: 120699.1522;1




CHANNEL: NEKXF FILTER: CH. CLASS 1000 PEAK DATA: 140.19 N @ 176.96 MS; -762.46 N @ 55.20 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

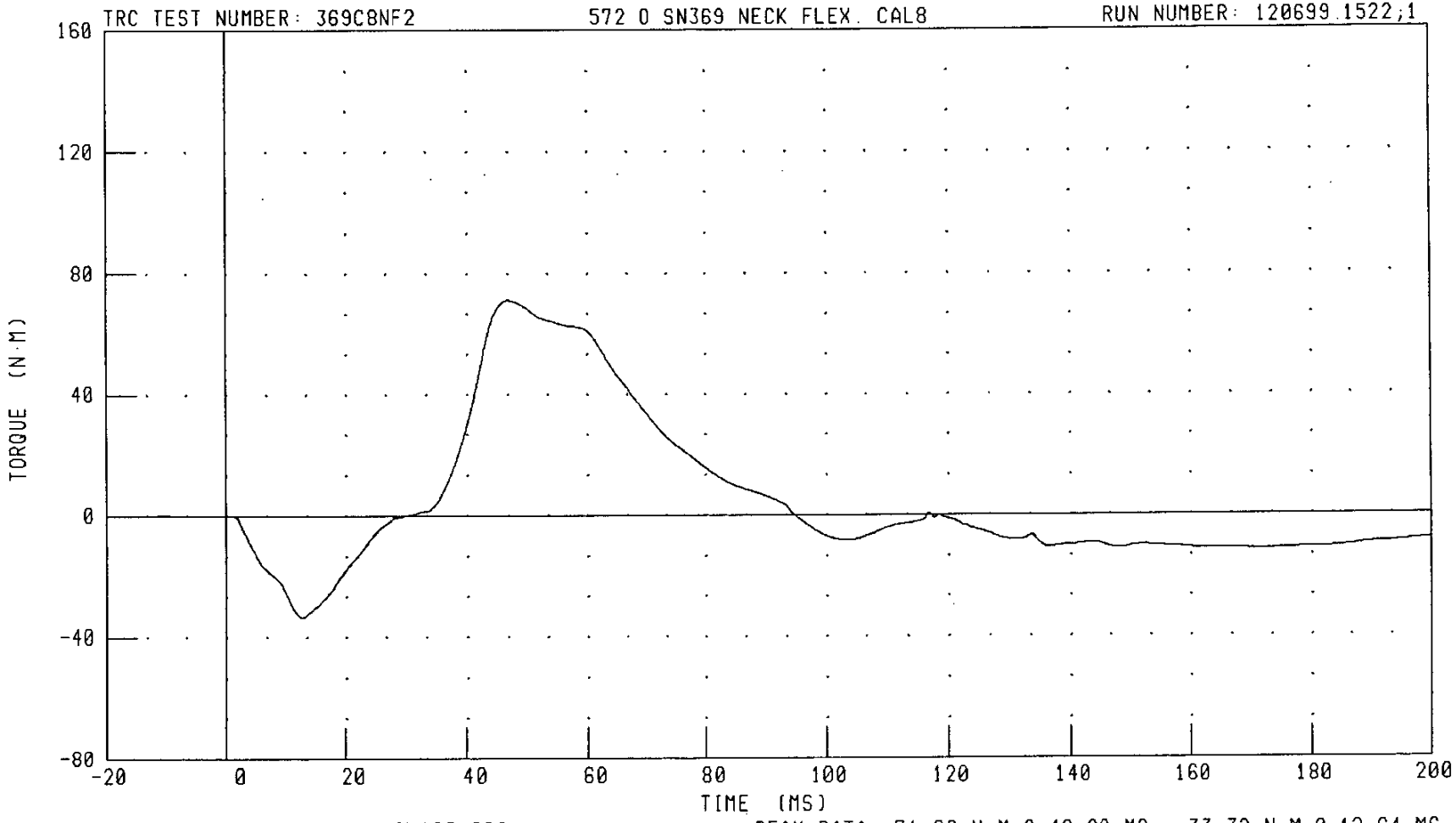
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION




CHANNEL: NEKXFC FILTER: CH. CLASS 600

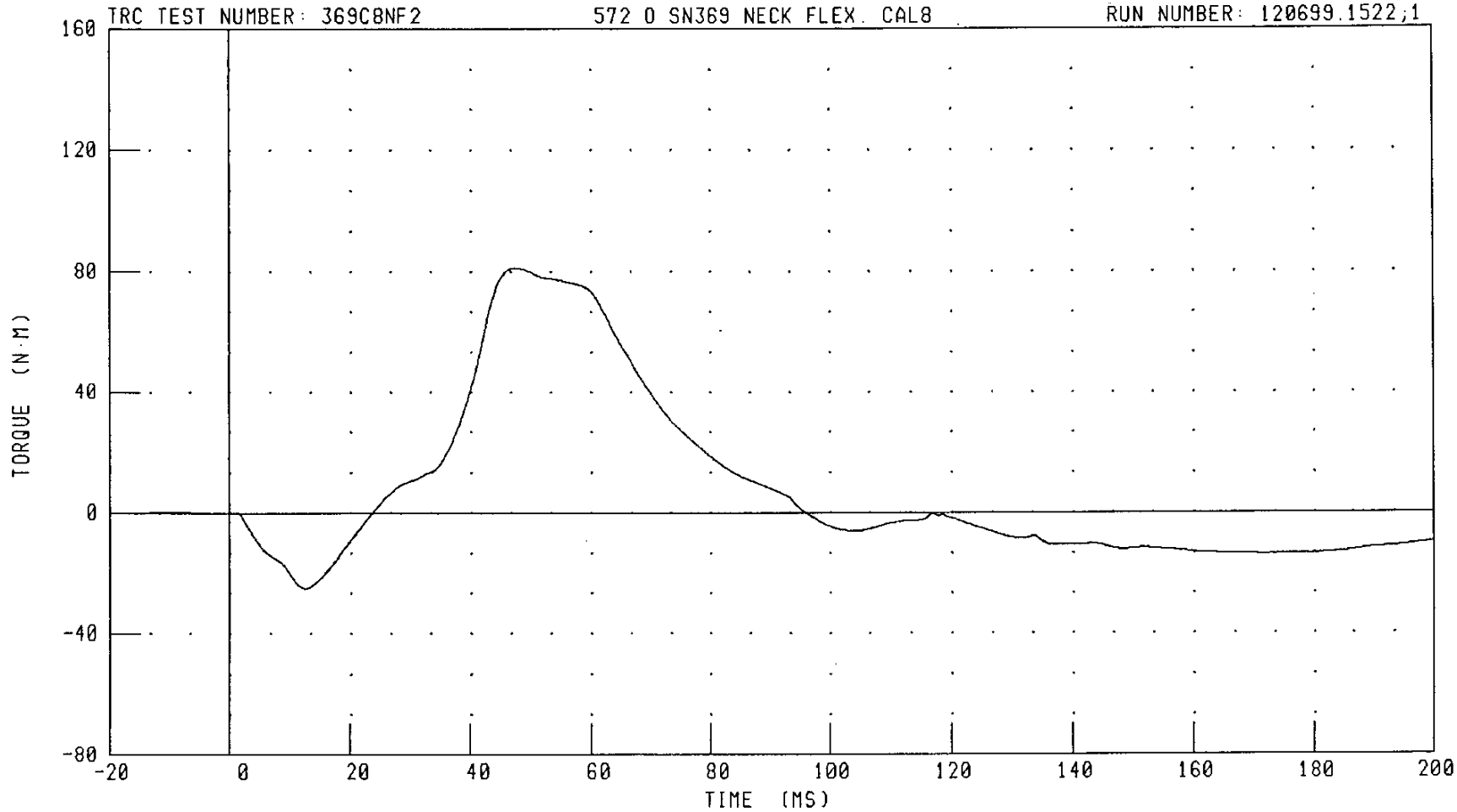
PEAK DATA: 139.56 N @ 179.20 MS; -762.55 N @ 55.44 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS




CHANNEL: NEKYM FILTER: CH. CLASS 600 PEAK DATA: 71.26 N-M @ 46.80 MS; -33.32 N-M @ 12.64 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE




CHANNEL: NEKDM FILTER: CH. CLASS 600

PEAK DATA: 81.25 N·M @ 47.76 MS; -25.10 N·M @ 12.56 MS

TRANSPORTATION RESEARCH CENTER INC.

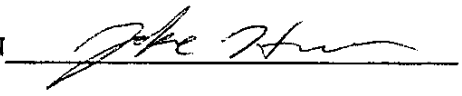
HYBRID III SMALL FEMALE 07-DEC-99

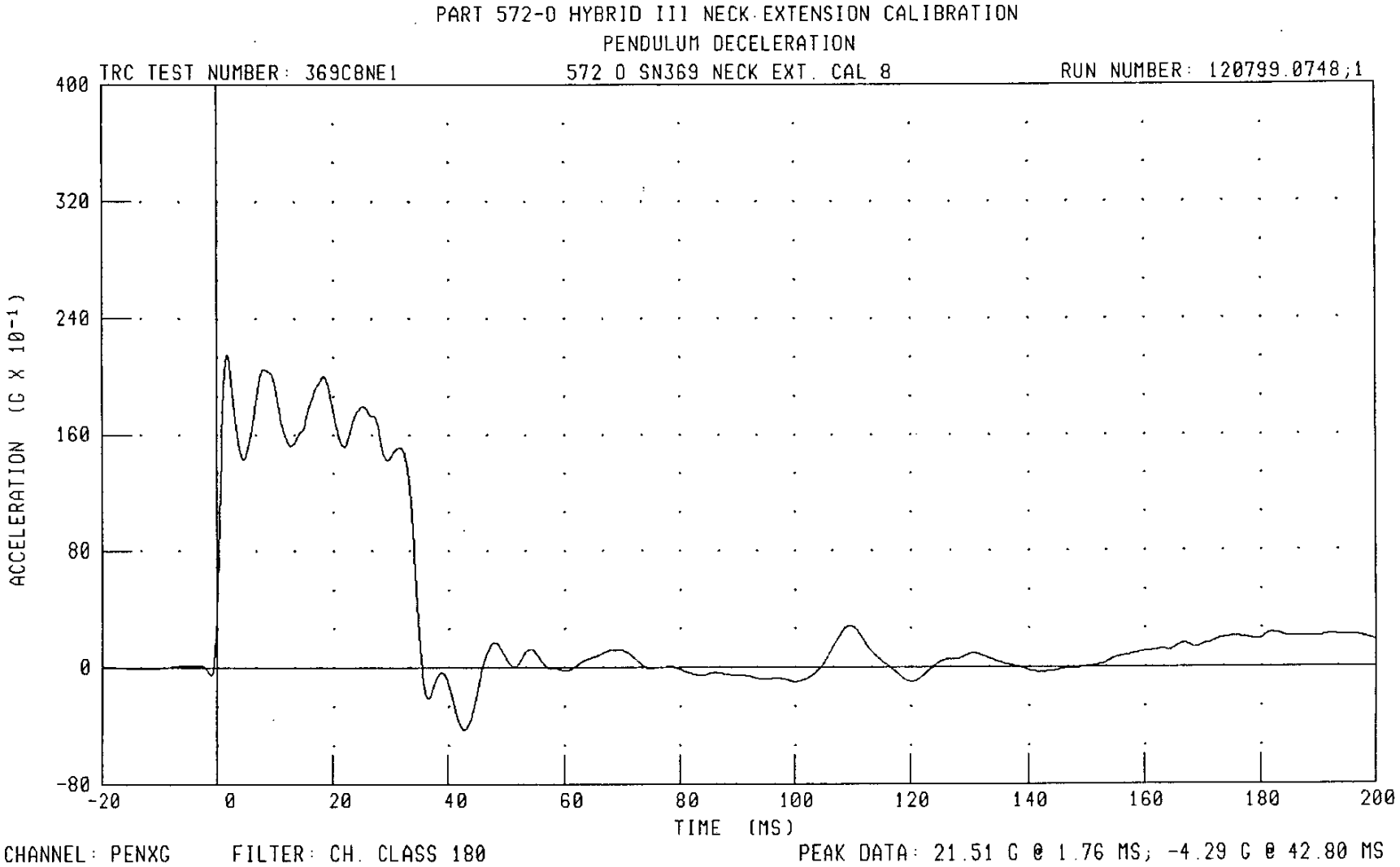
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 369C8NE1 572 O SN369 NECK EXT. CAL 8

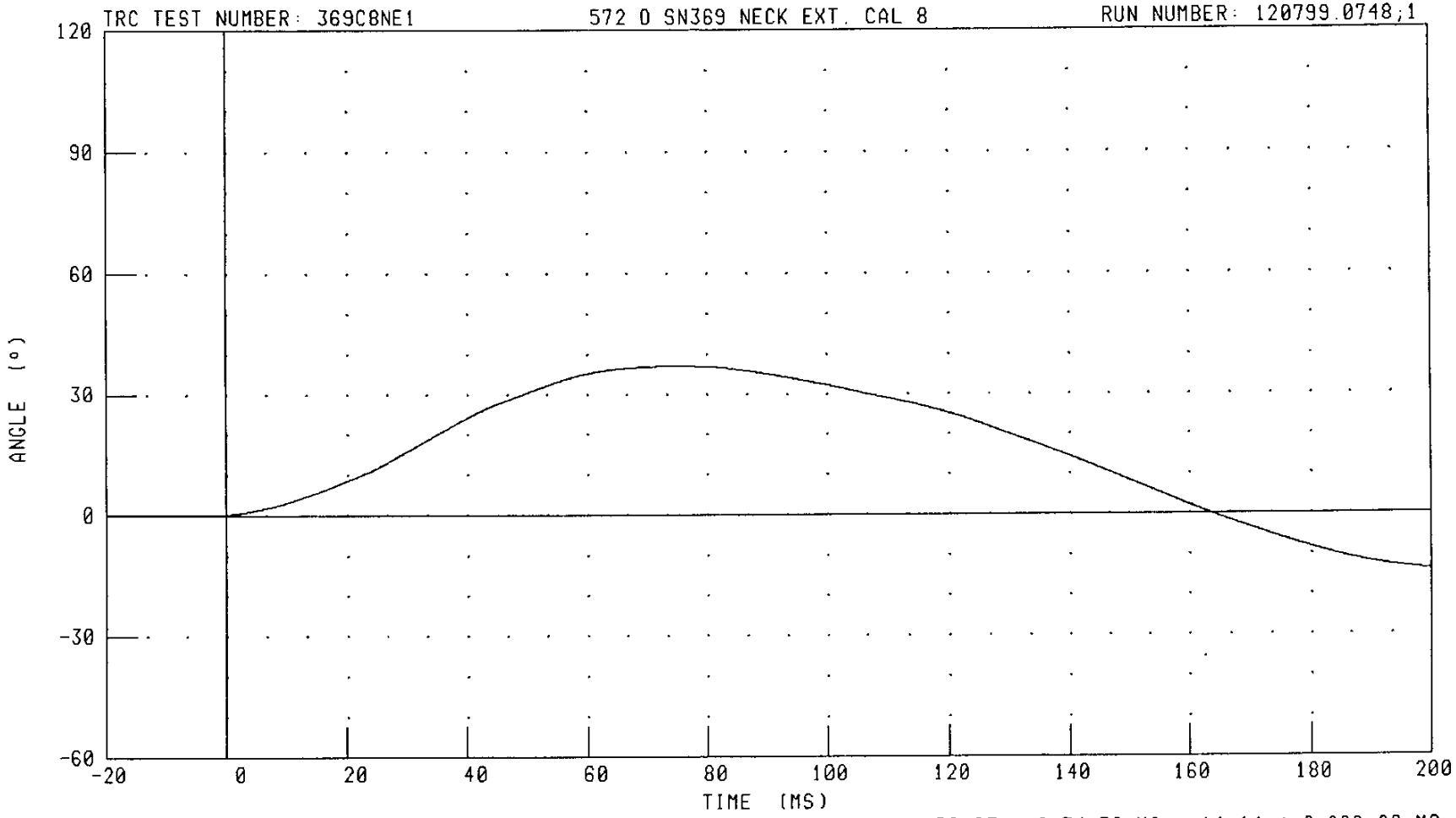
| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6 - 22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 5.95 - 6.19 M/S | 6.05 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 1.5 - 1.9 M/S | 1.71 M/S |
| | 20 MS | 3.1 - 3.9 M/S | 3.44 M/S |
| | 30 MS | 4.6 - 5.6 M/S | 5.05 M/S |
| PEAK D-PLANE ROTATION | | 97 - 109 DEG. | 103.24 DEG. |
| PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT | | -55 / -69 NM | -56.79 NM |
| NEGATIVE MOMENT DECAY TIME FROM TO \ -10 NM | | 94 - 114 MS | 107.2 MS |

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 120799.0741;1


PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 369C8NE1
572 0 SN369 NECK EXT. CAL 8
RUN NUMBER: 120799.0748;1
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 21.51 G @ 1.76 MS; -4.29 G @ 42.80 MS

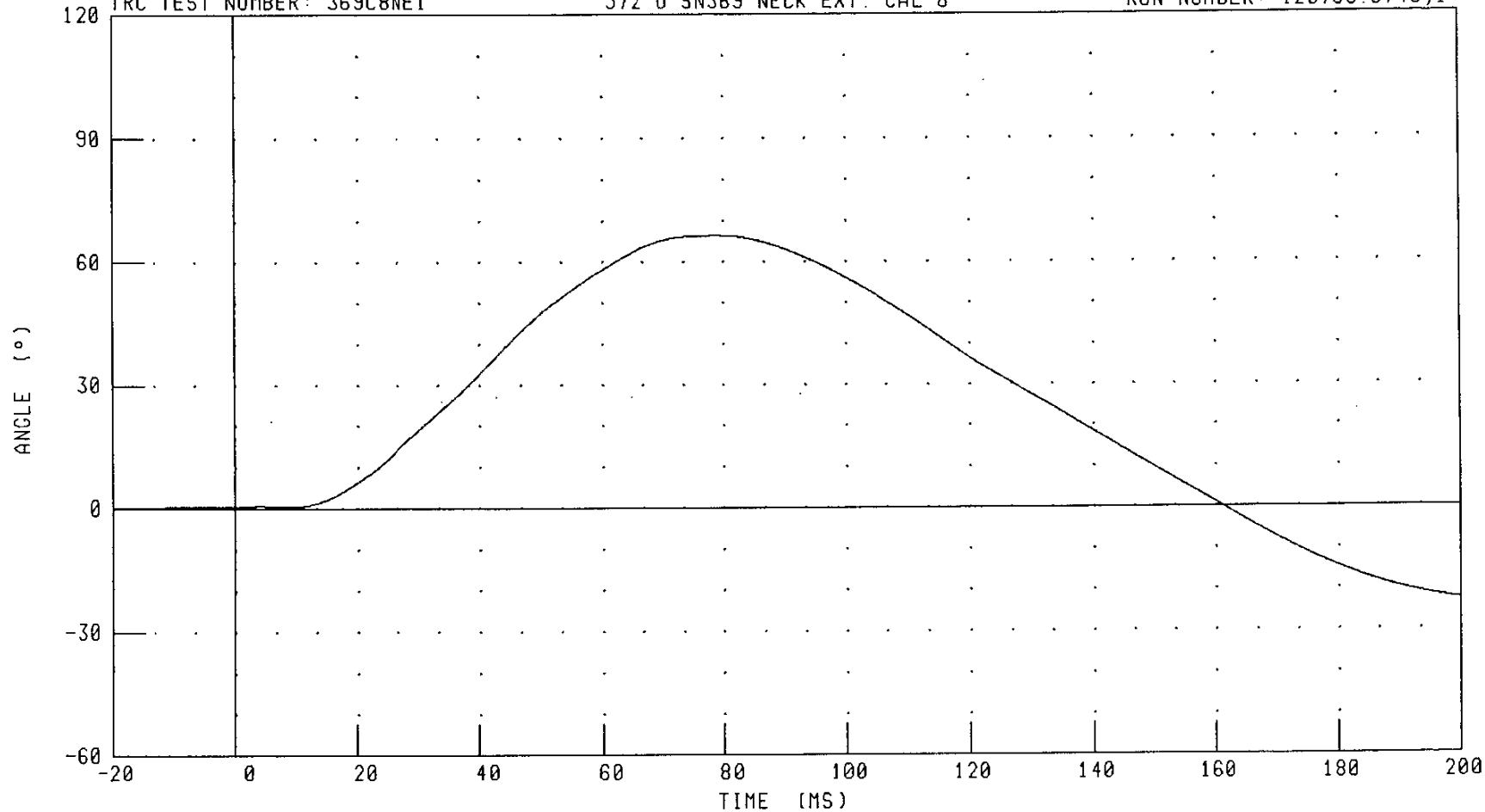
PART 572-O HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK




CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 36.97 ° @ 74.56 MS; -14.14 ° @ 200.00 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 369C8NE1
572 0 SN369 NECK EXT. CAL 8
RUN NUMBER: 120799.0748;1

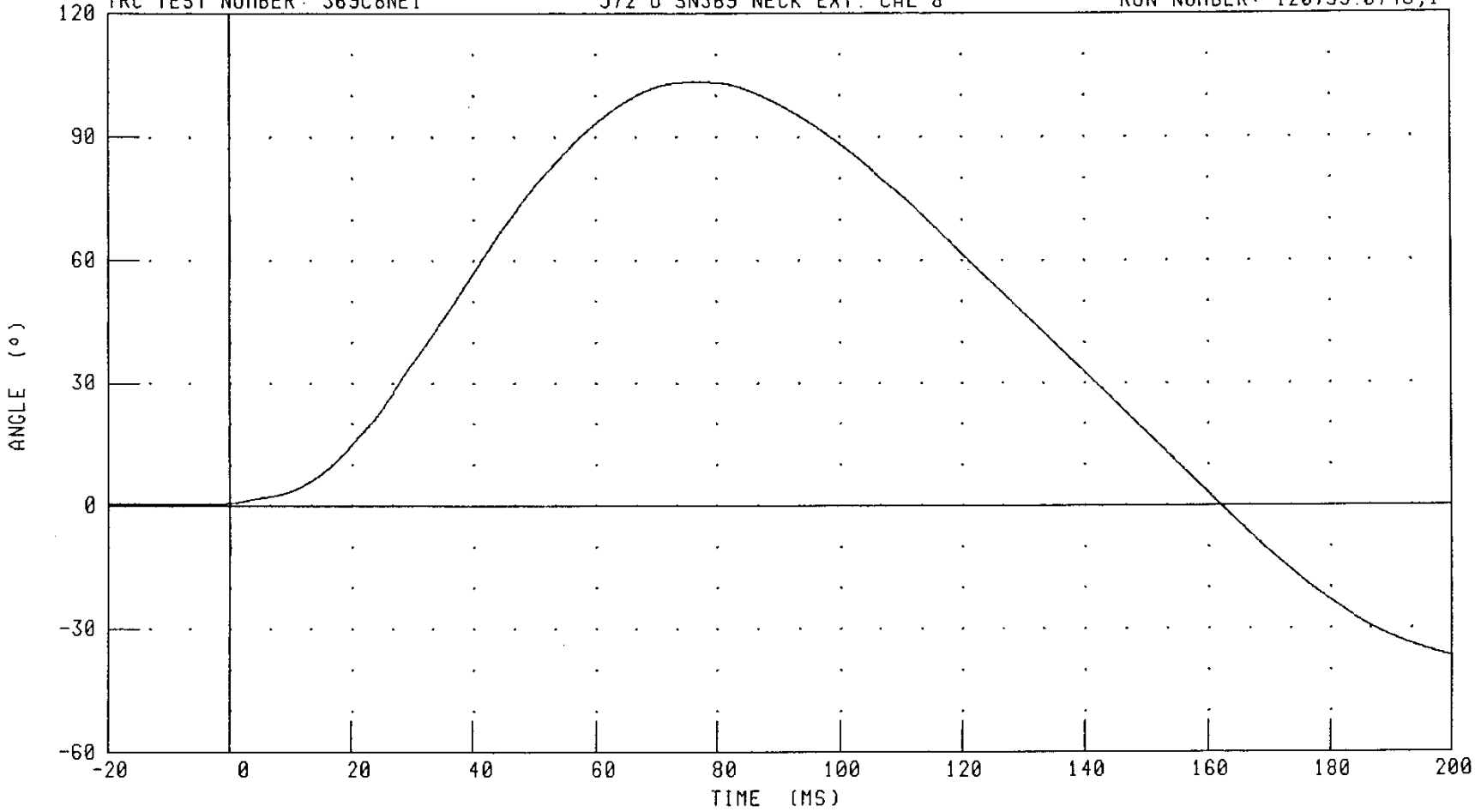



CHANNEL: THETA FILTER: CH. CLASS 60
PEAK DATA: 66.35 ° @ 78.64 MS; -22.62 ° @ 200.00 MS

PART 572-D HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 369C8NE1 572 D SN369 NECK EXT. CAL 8 RUN NUMBER: 120799.0748;1




CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 103.25 ° @ 76.56 MS; -36.76 ° @ 200.00 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

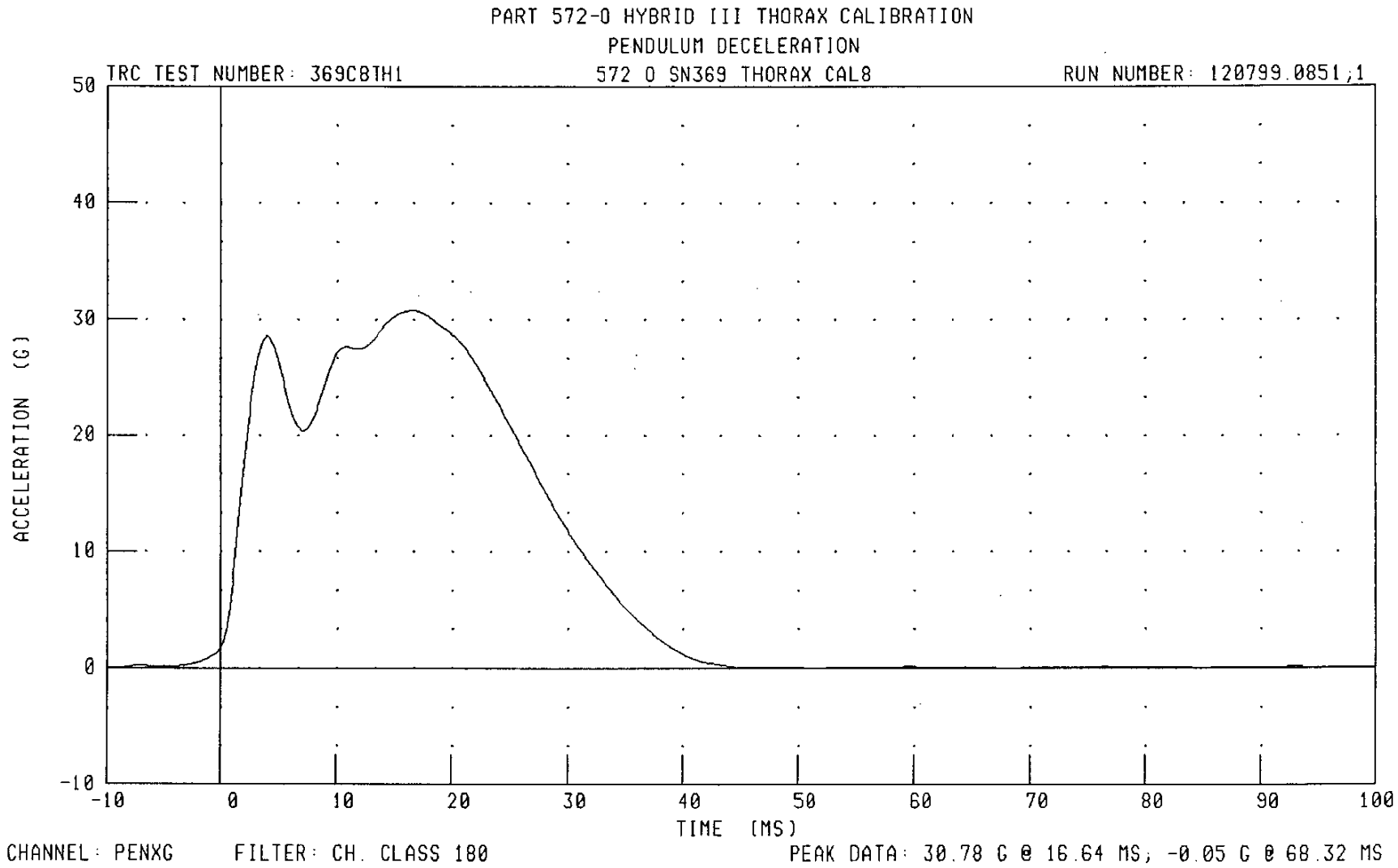
HYBRID III SMALL FEMALE 07-DEC-99

TRC INC. TEST NO: 369C8TH1 572 O SN369 THORAX CAL8

| TEST PARAMETER | HIGH SPEED TEST SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PENDULUM VELOCITY | 6.59 - 6.83 M/S | 6.59 M/S |
| MAXIMUM DEFLECTION | 48 - 55 MM | 51.3 MM |
| MAXIMUM RESISTIVE FORCE WITHIN DEFLECTION CORRIDOR | 3900 - 4400 N | 4224. N |
| INTERNAL HYSTERESIS | 69% - 85% | 70.9% |

TEST MEETS SPECIFICATIONS

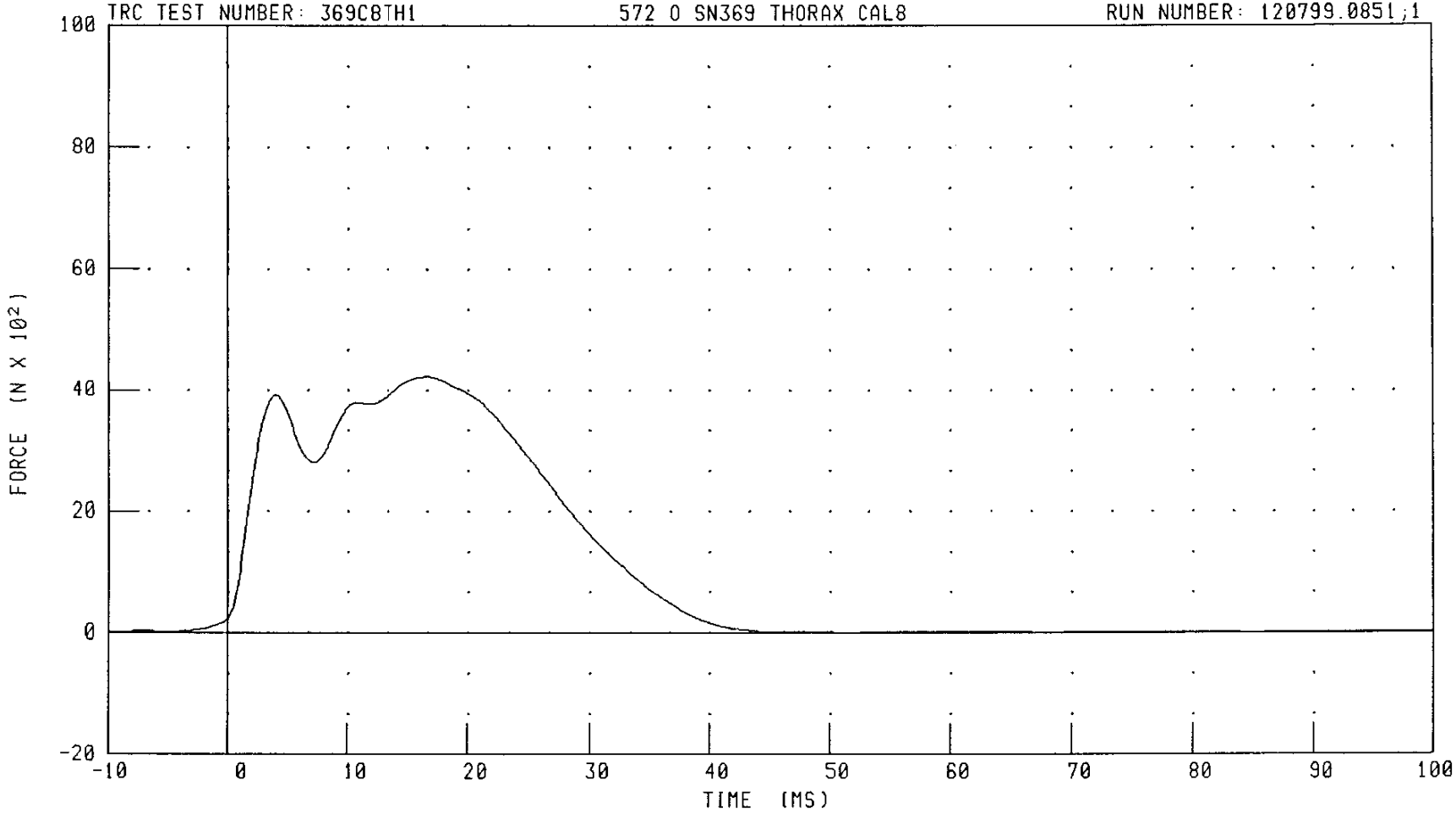
TECHNICIAN _____ RUN NUMBER: 120799.0848;1


PART 572-0 HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 369C8TH1
572 0 SN369 THORAX CAL8
RUN NUMBER: 120799.0851;1
ACCELERATION (G)
50
40
30
20
10
0
-10
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 30.78 G @ 16.64 MS; -0.05 G @ 68.32 MS

PART 572-O HYBRID III THORAX CALIBRATION

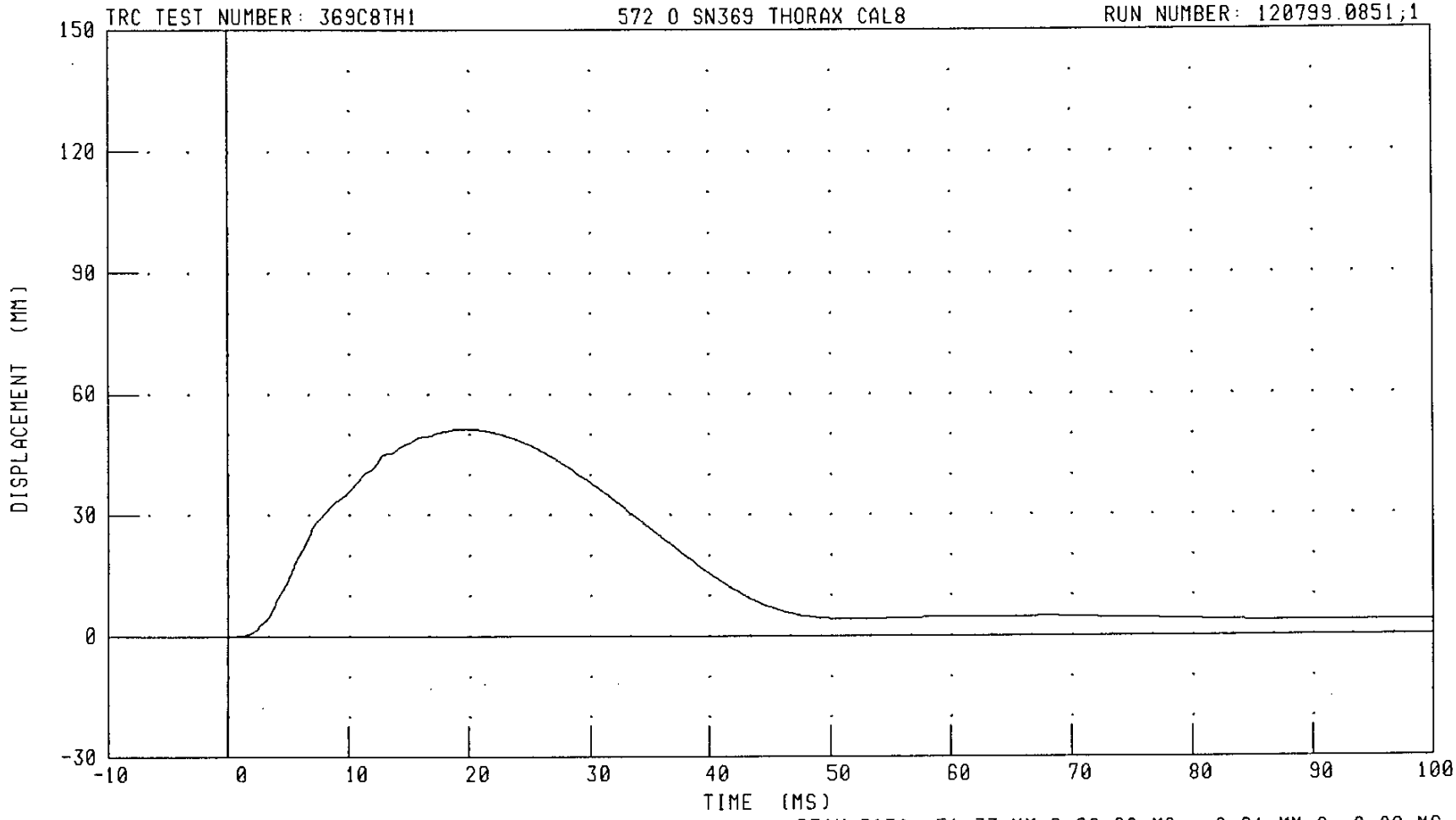
PENDULUM FORCE

TRC TEST NUMBER: 369C8TH1 572 O SN369 THORAX CAL8 RUN NUMBER: 120799.0851;1




CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 4224.46 N @ 16.64 MS; -7.09 N @ 68.32 MS

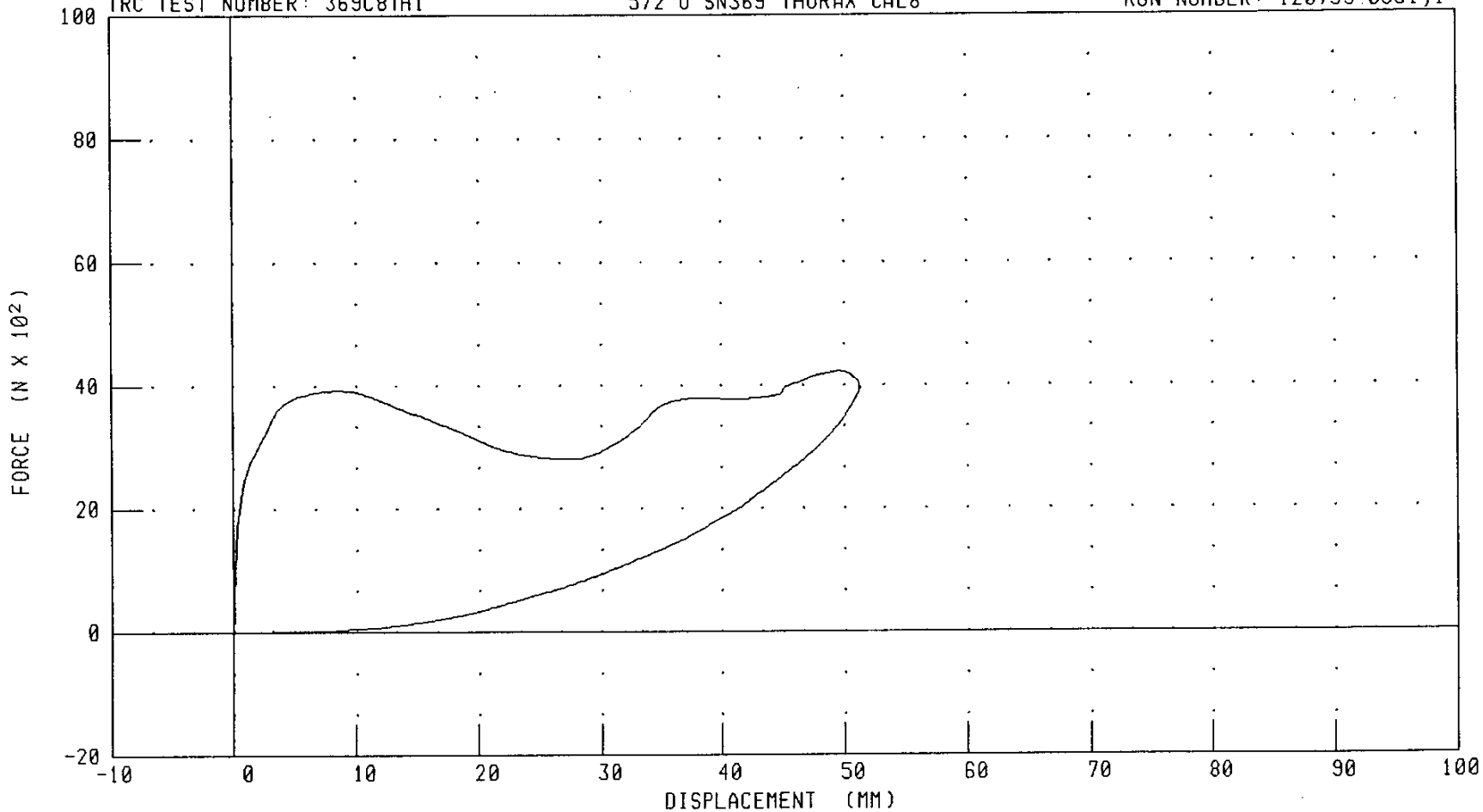
PART 572-0 HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT




CHANNEL: CSTXD FILTER: CH. CLASS 600 PEAK DATA: 51.33 MM @ 20.00 MS; -0.01 MM @ -6.08 MS

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

TRC TEST NUMBER: 369C8TH1 — 572 O SN369 THORAX CAL8 — RUN NUMBER: 120799.0851;1




CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 600
CH. CLASS 180

PEAK DATA: 51.33 MM @ 20.00 MS; -0.01 MM @ -6.08 MS
4224.46 N @ 16.64 MS; -7.09 N @ 68.32 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

TRC INC. TEST NO: 369C8RK1 06-DEC-99

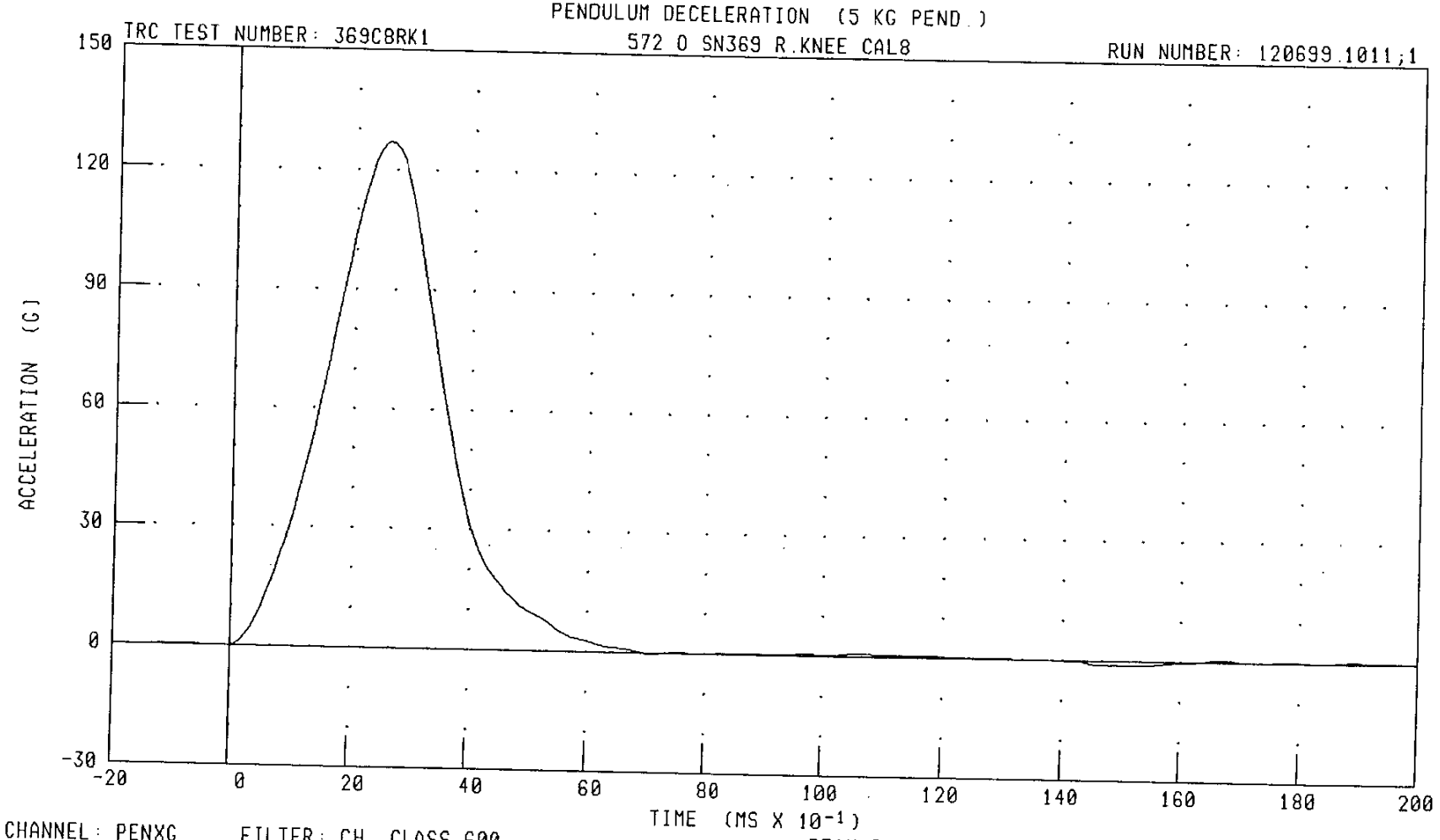
572 O SN369 R.KNEE CAL8

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.10 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3725.1 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 120699.1011;1

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

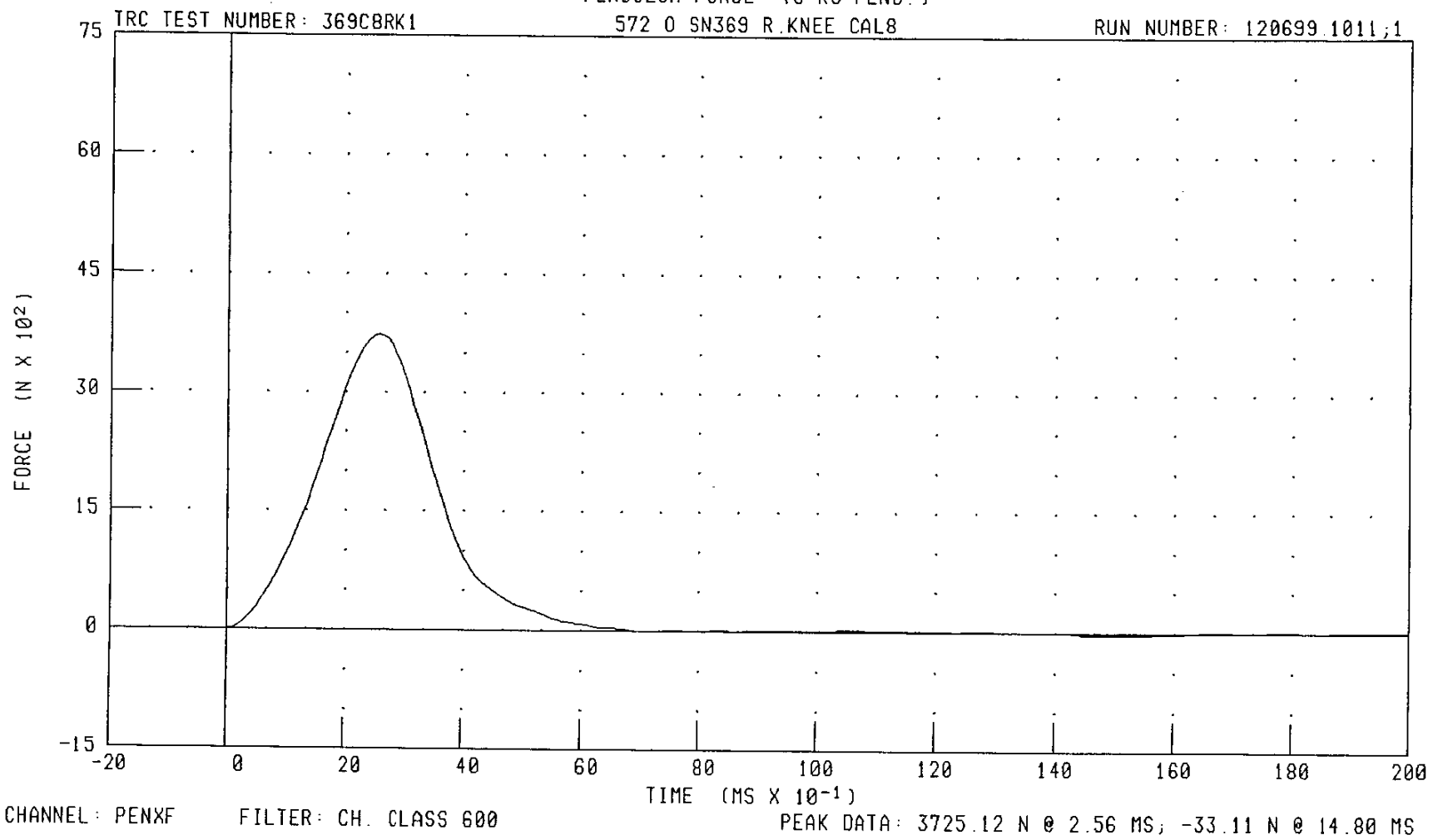



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 126.89 G @ 2.56 MS; -1.13 G @ 14.80 MS

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)




CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 3725.12 N @ 2.56 MS; -33.11 N @ 14.80 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE 06-DEC-99

TRC INC. TEST NO: 369C8LK1 572 O SN369 LEFT KNEE CAL8

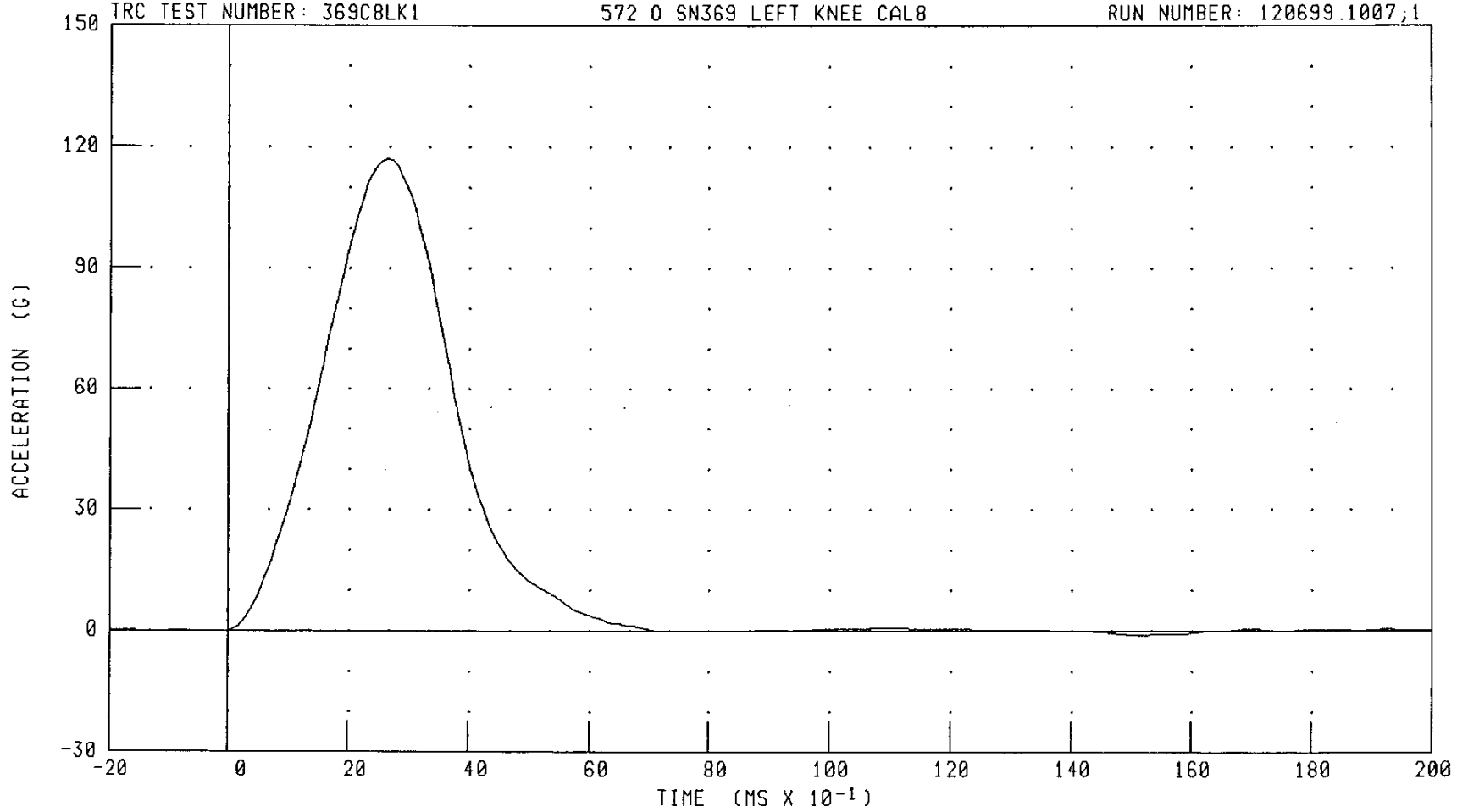
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.10 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3435.4 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 120699.1006;1

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 369C8LK1 572 0 SN369 LEFT KNEE CAL8 RUN NUMBER: 120699.1007;1

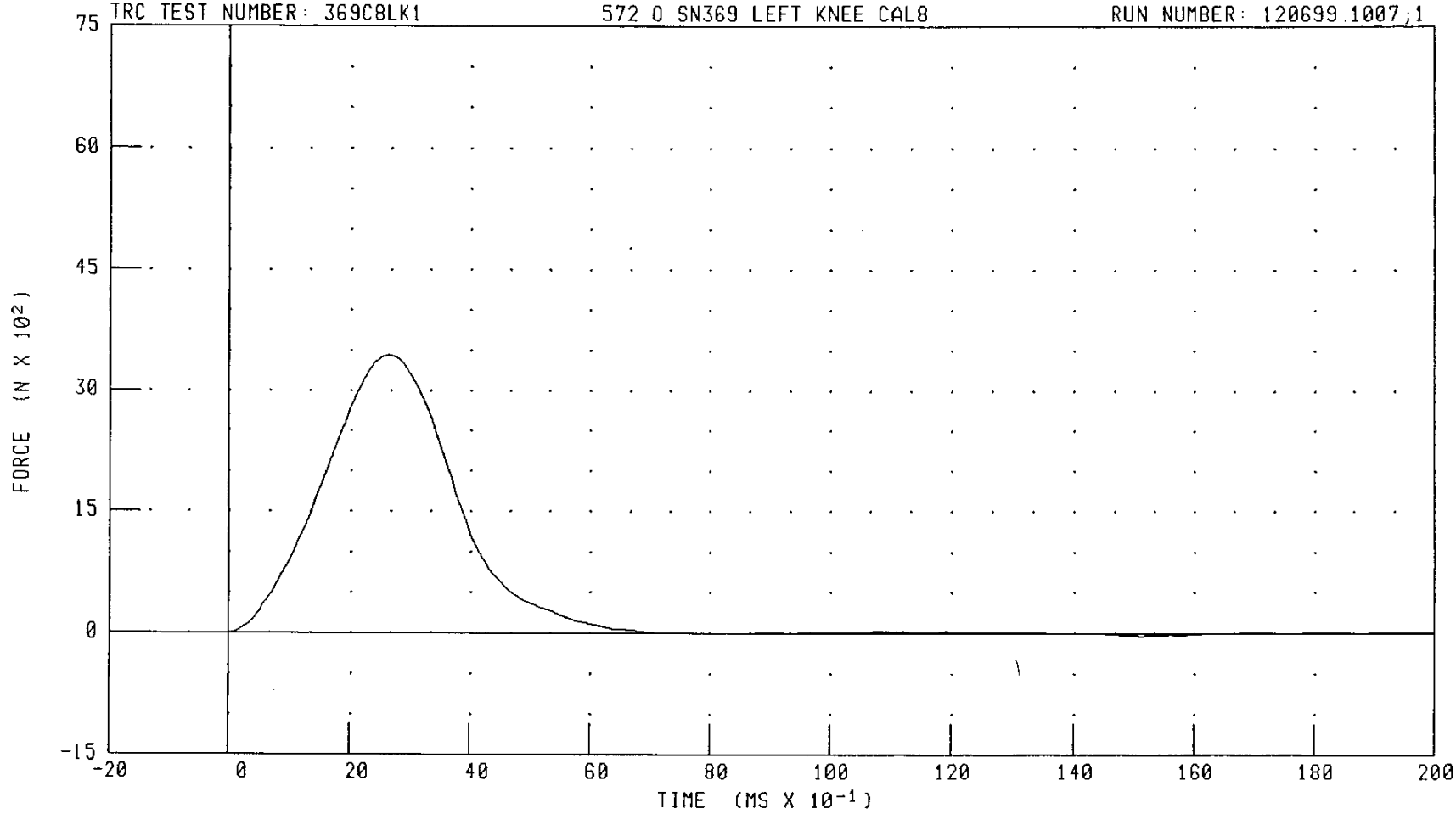



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 117.02 G @ 2.64 MS; -1.17 G @ 15.12 MS

PART 572-0 HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 369C8LK1 572 0 SN369 LEFT KNEE CAL8 RUN NUMBER: 120699.1007;1




CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 3435.44 N @ 2.64 MS; -34.32 N @ 15.12 MS

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE 23-DEC-99

TRC INC. TEST NO: 283C10HD2 572 O SN283 HEAD DROP CAL 10

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PEAK RESULTANT ACCELERATION | 250 - 300 G | 293.25 G |
| PEAK LATERAL ACCELERATION | 15 G MAX | 5.01 G |
| IS ACCELERATION CURVE UNIMODAL? | YES | YES |

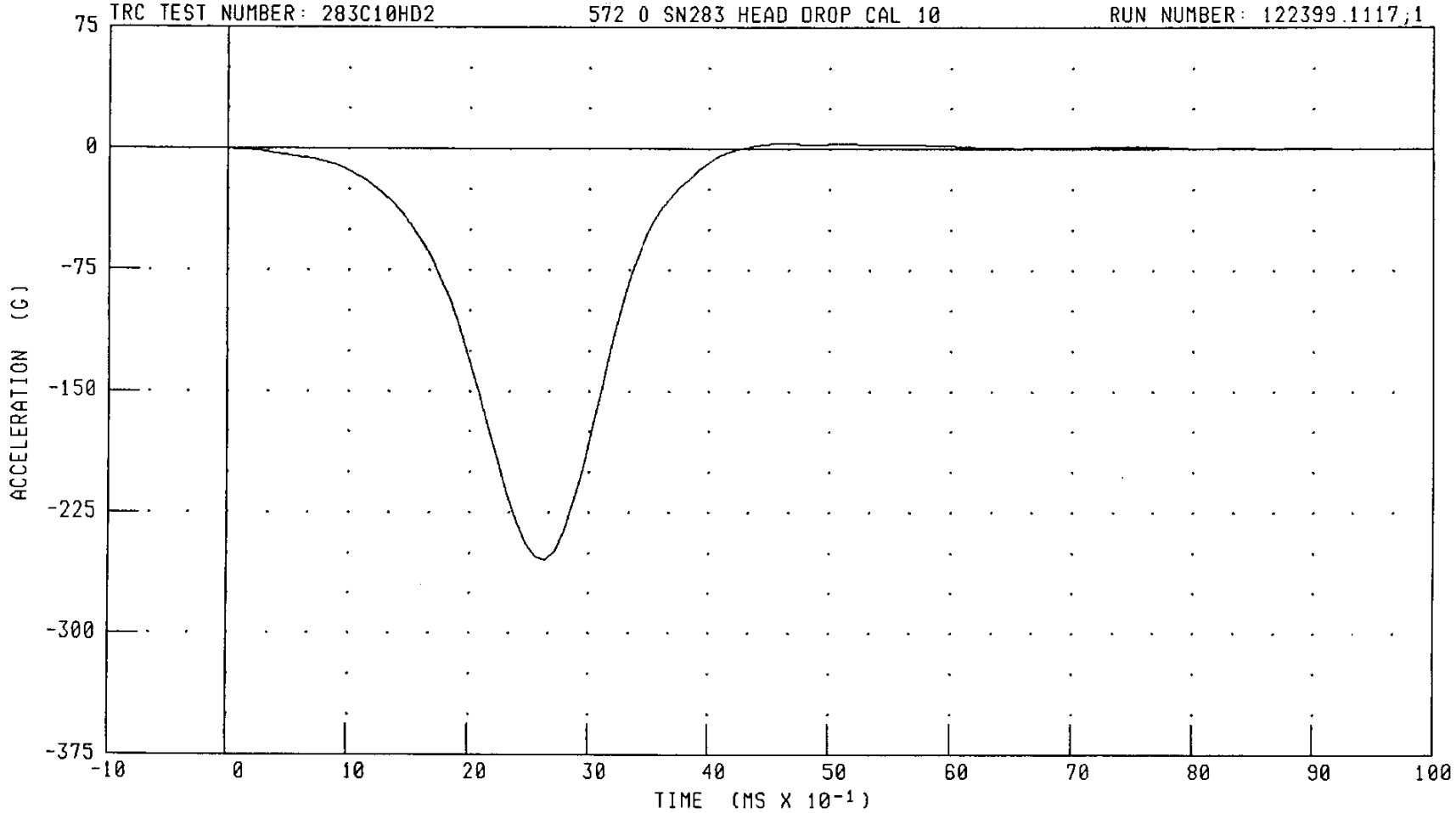
TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 122399.1116;1

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

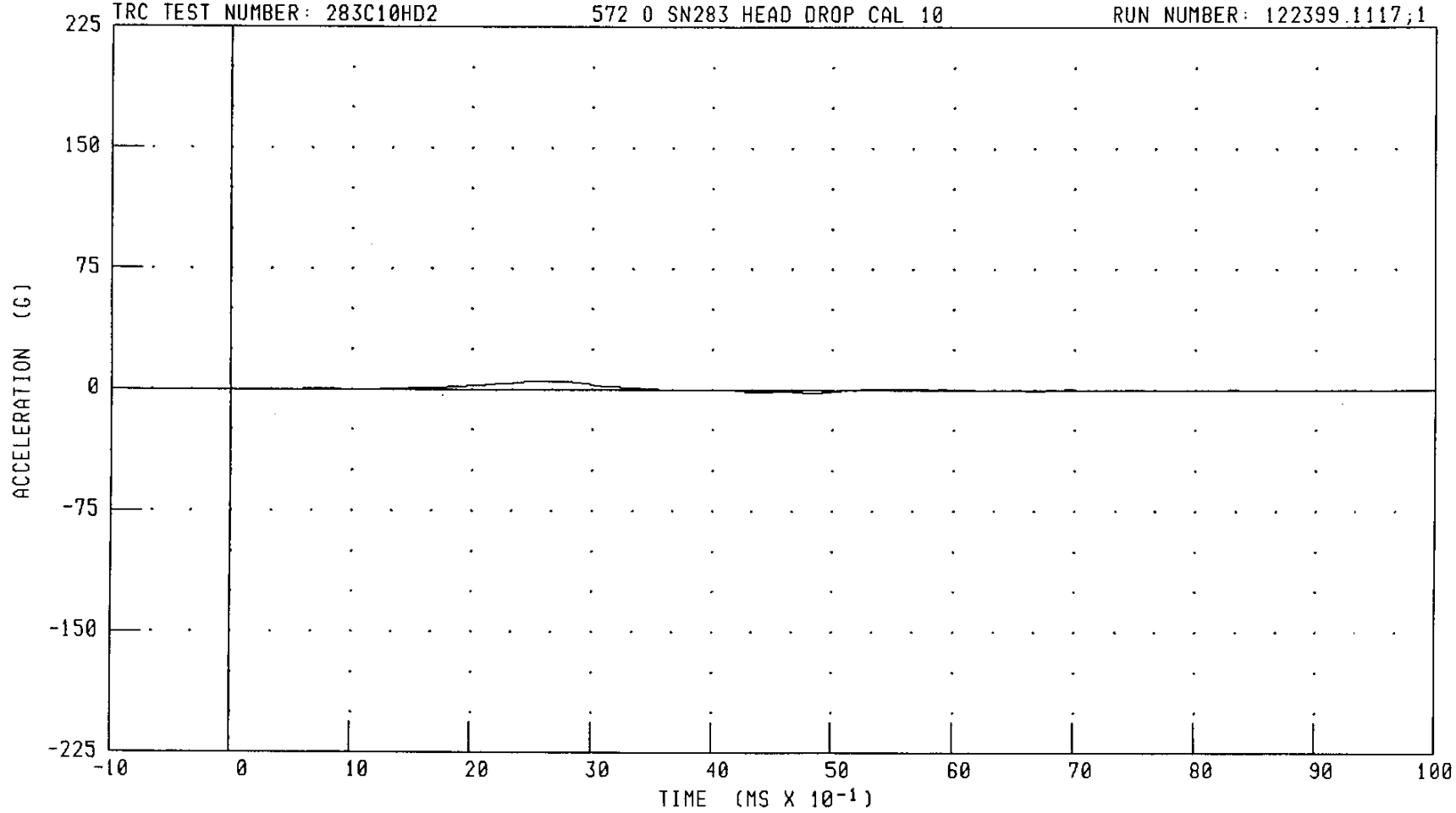
TRC TEST NUMBER: 283C10HD2 572 0 SN283 HEAD DROP CAL 10 RUN NUMBER: 122399.1117;1




CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 3.63 G @ 4.64 MS; -254.12 G @ 2.64 MS

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

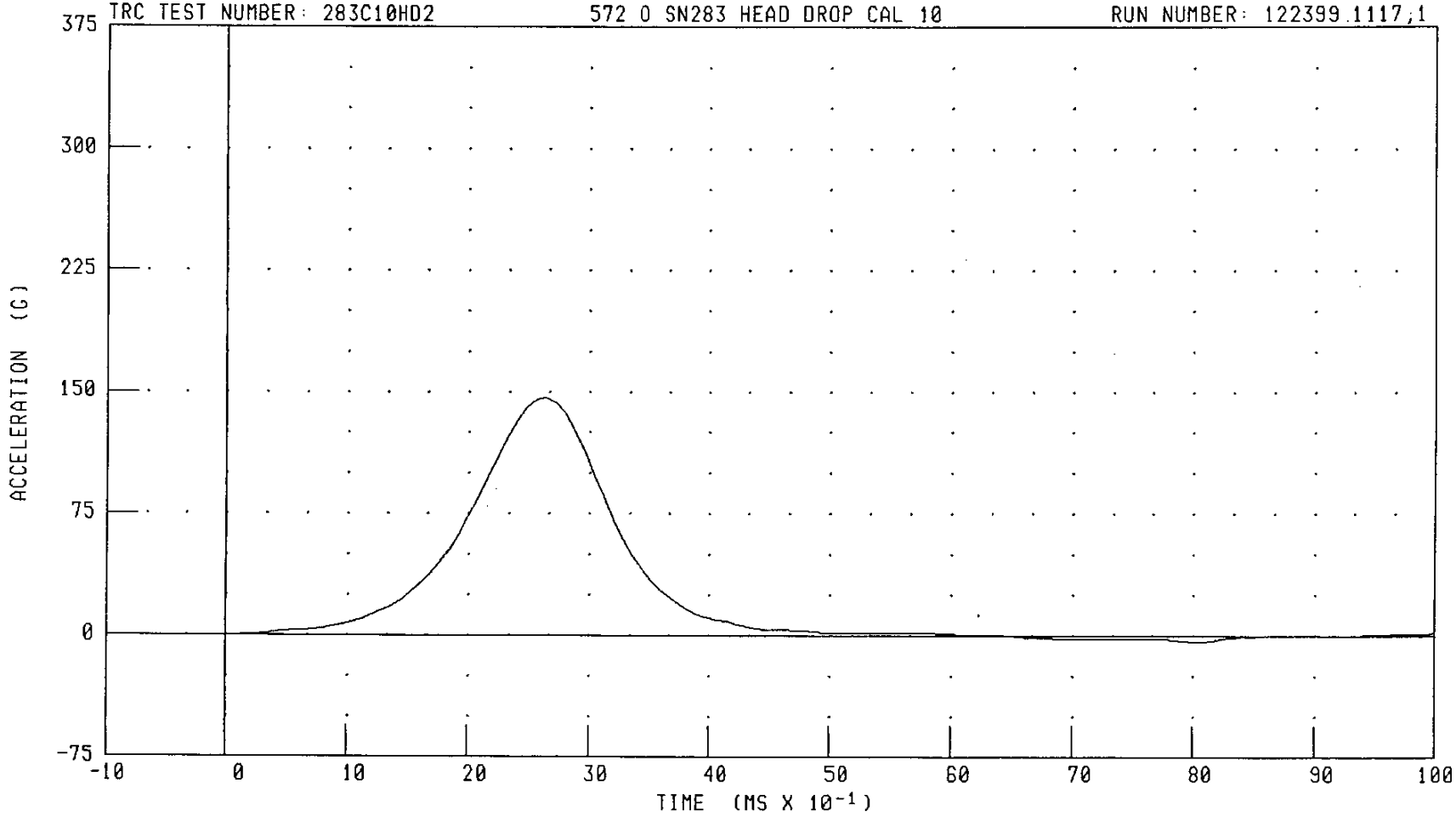
TRC TEST NUMBER: 283C10HD2 572 O SN283 HEAD DROP CAL 10 RUN NUMBER: 122399.1117;1




CHANNEL: HEDYG FILTER: CH. CLASS 1000 PEAK DATA: 5.01 G @ 2.64 MS; -2.06 G @ 4.80 MS

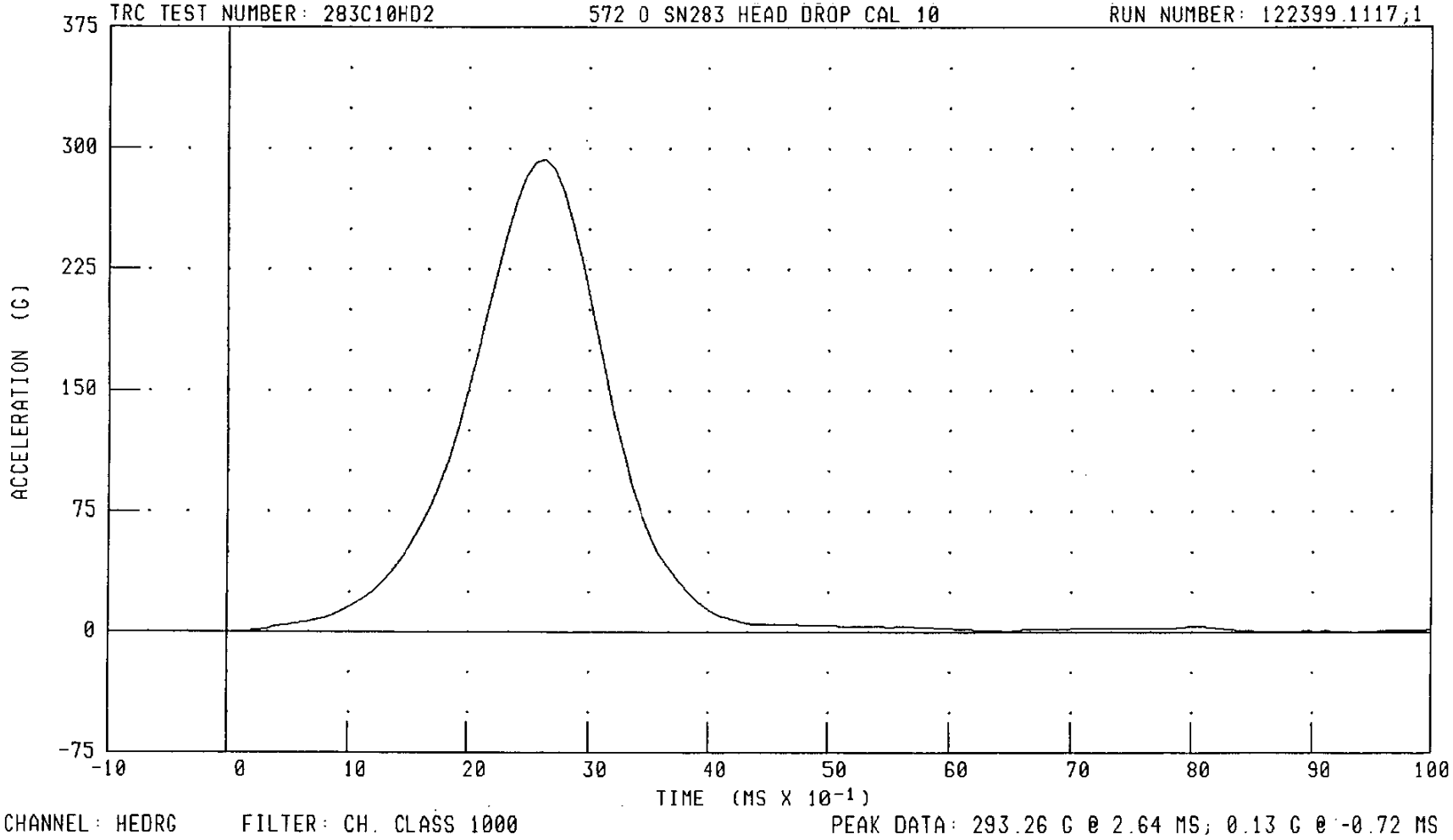
PART 572-0 HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 283C10HD2
572 0 SN283 HEAD DROP CAL 10
RUN NUMBER: 122399.1117;1

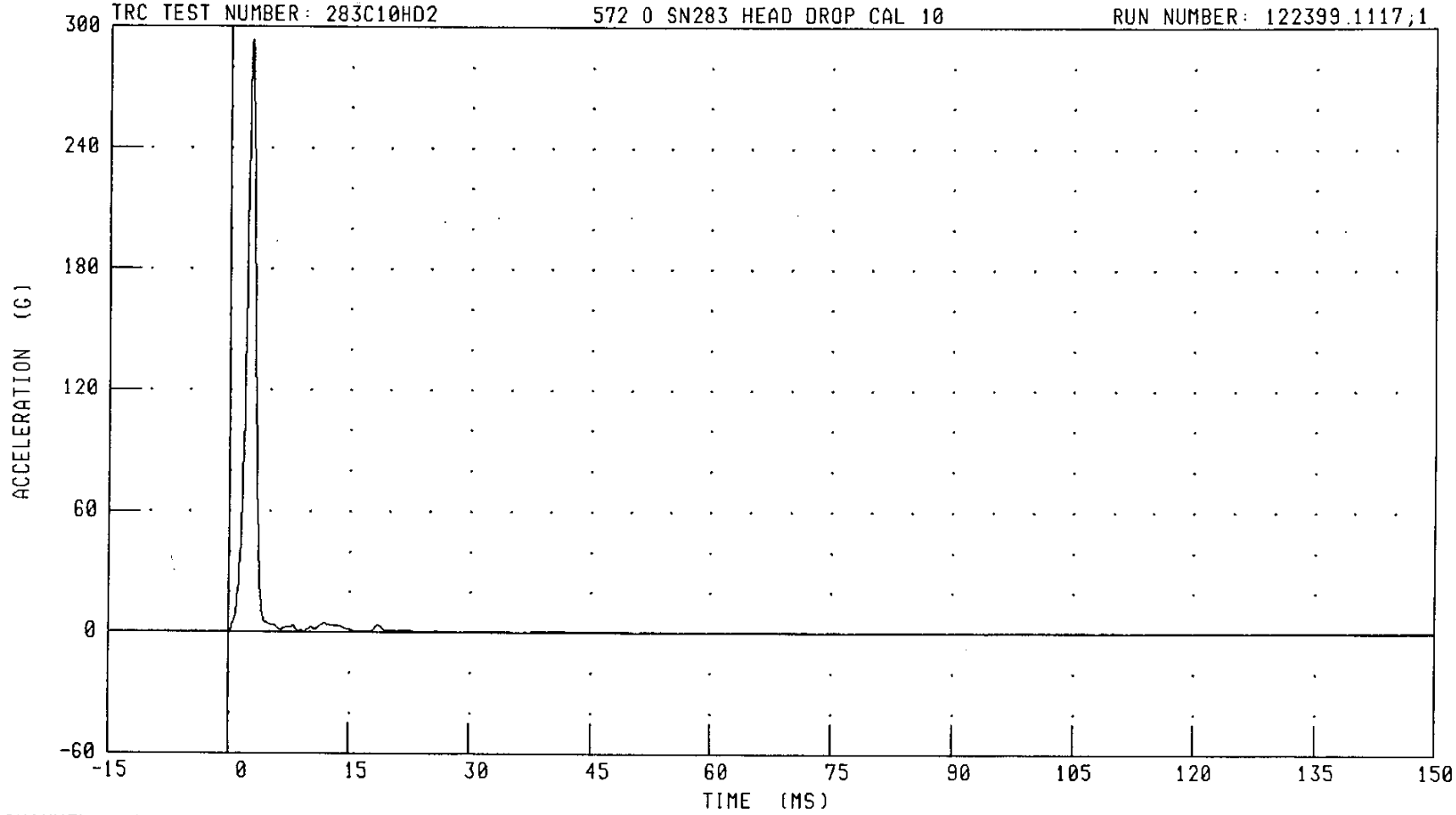



CHANNEL: HEDZC
FILTER: CH. CLASS 1000
PEAK DATA: 146.29 G @ 2.64 MS; -3.65 G @ 8.00 MS

PART 572-0 HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION



PART 572-0 HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION




CHANNEL: HEDRC FILTER: CH. CLASS 1000 PEAK DATA: 293.26 G @ 2.64 MS; 0.13 G @ -14.48 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE 23-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

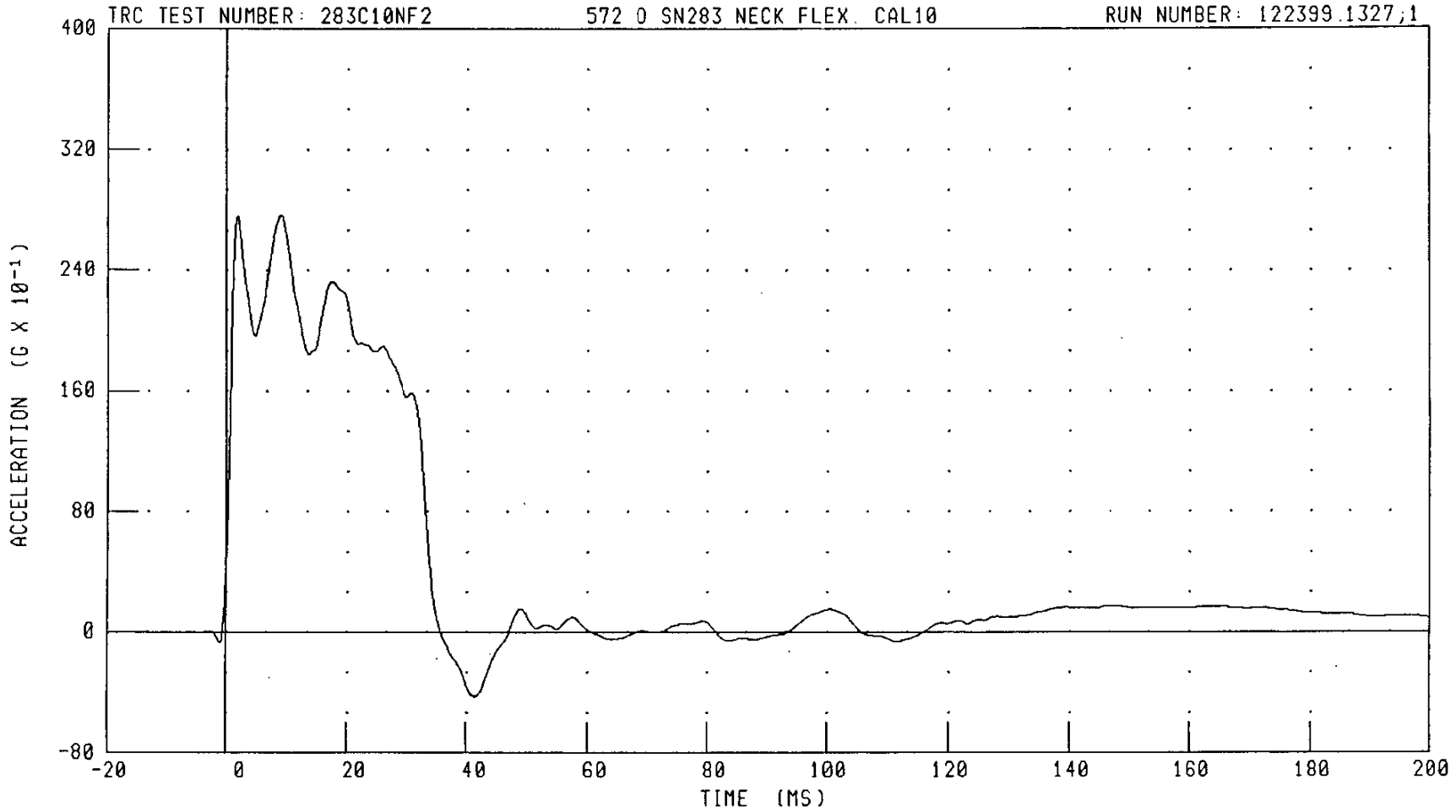
TRC INC. TEST NO: 283C10NF2 572 O SN283 NECK FLEX. CAL10

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 6.89 - 7.13 M/S | 7.12 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 2.1 - 2.5 M/S | 2.25 M/S |
| | 20 MS | 4.0 - 5.0 M/S | 4.36 M/S |
| | 30 MS | 5.8 - 7.0 M/S | 6.18 M/S |
| PEAK D-PLANE ROTATION | | 80 - 92 DEG. | 88.30 DEG. |
| PEAK MOMENT DURING ROTATION INTERVAL | | 69 - 83 NM | 74.55 NM |
| MOMENT DECAY TIME FROM TO TO 10NM | | 80 - 100 MS | 90.56 MS |

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 122399.1322;1

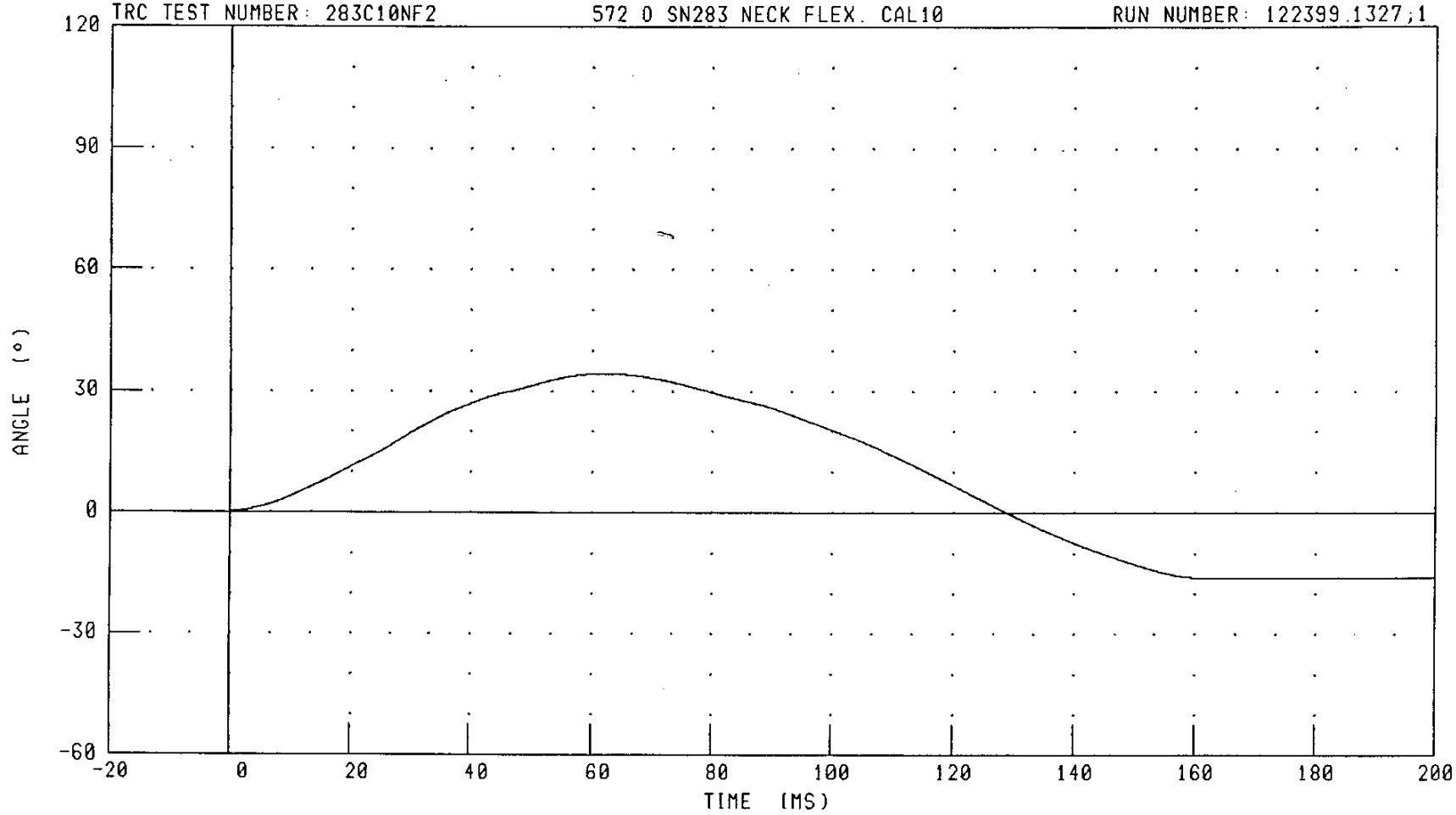
PART 572-0 HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION




CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 27.65 G @ 9.12 MS; -4.26 G @ 41.52 MS

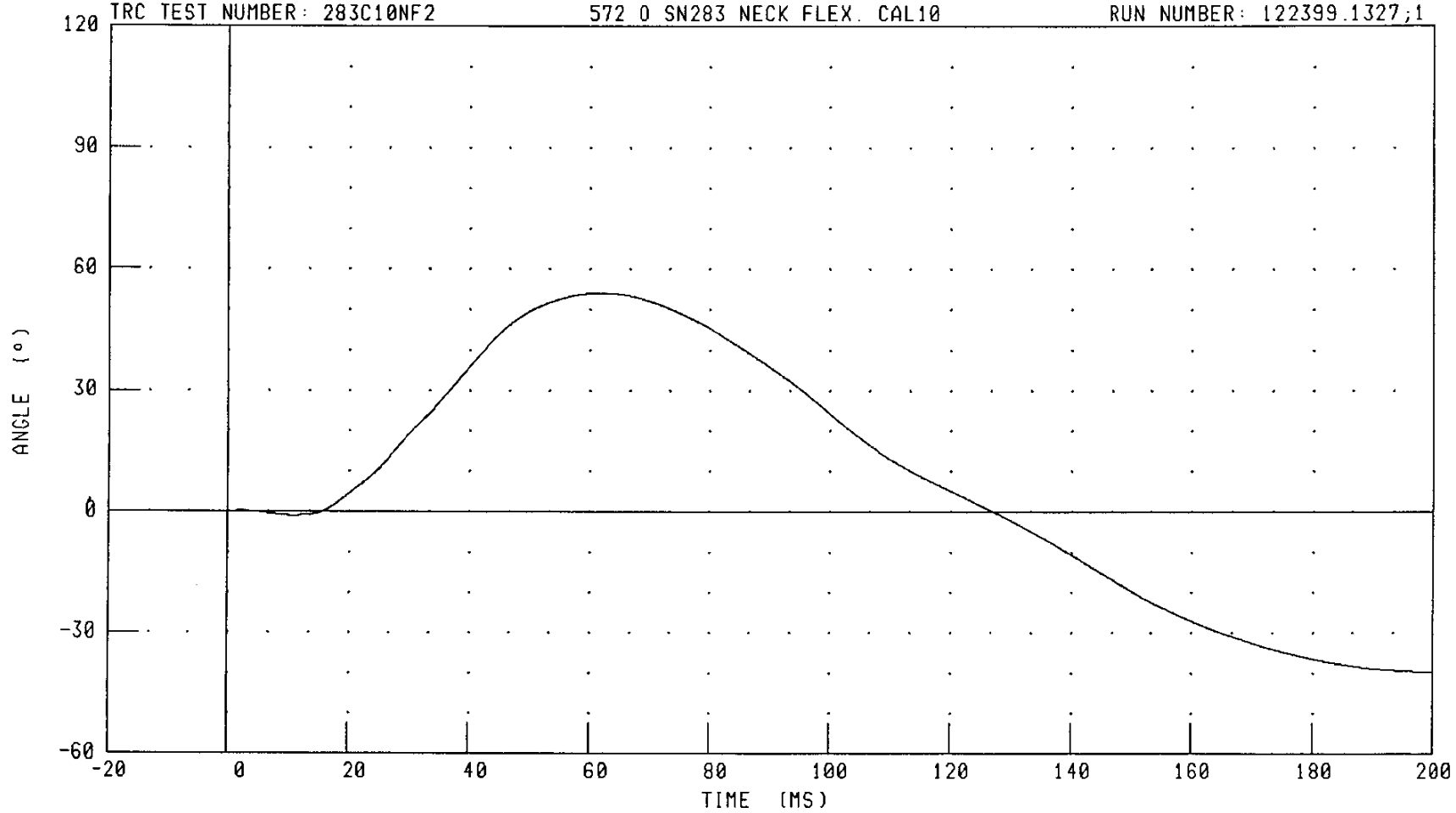
PART 572-0 HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 283C10NF2 572 0 SN283 NECK FLEX. CAL10 RUN NUMBER: 122399.1327;1




CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 34.25 ° @ 62.40 MS; -16.09 ° @ 162.72 MS

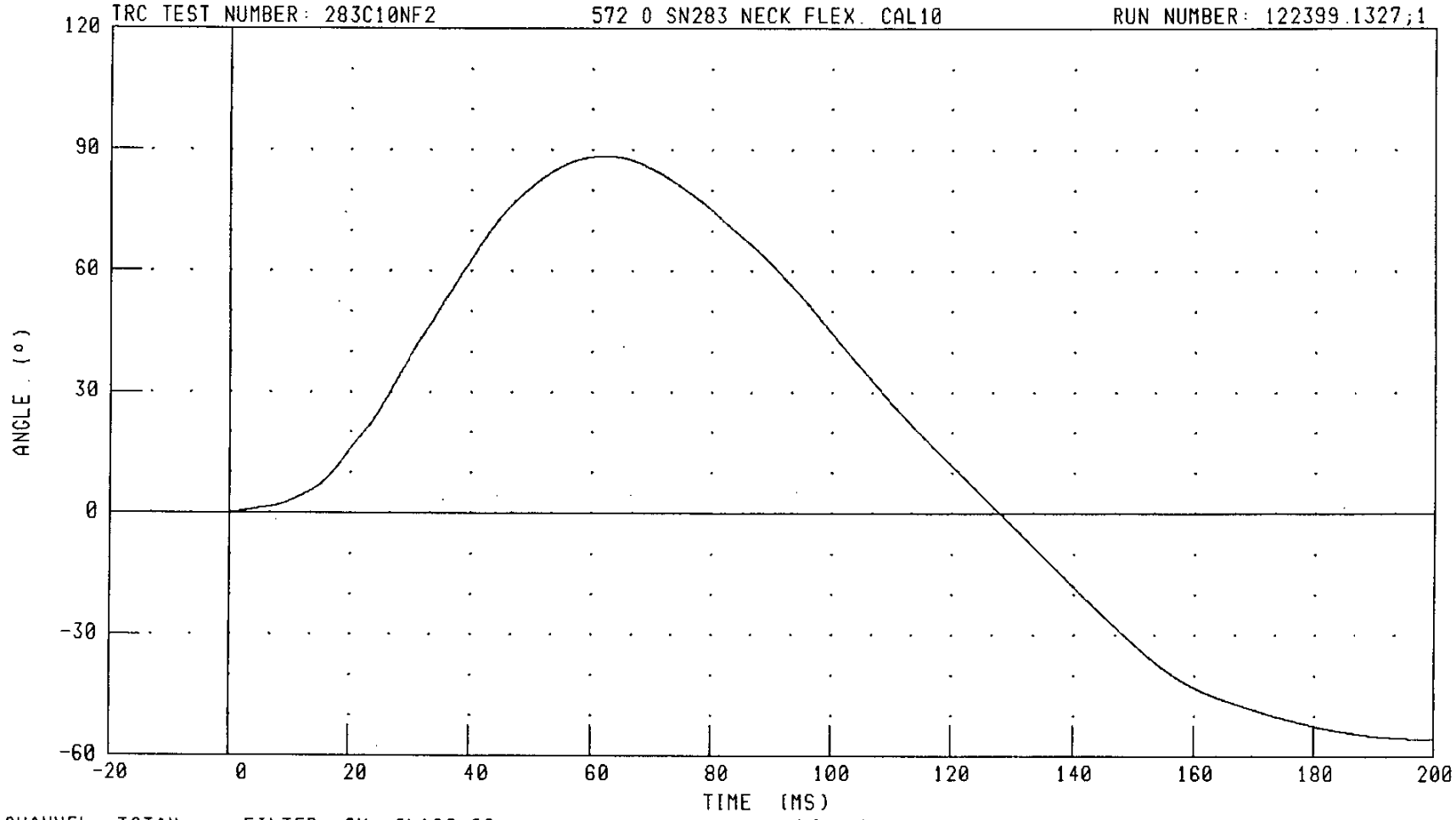
PART 572-0 HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE




CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 54.05 ° @ 62.16 MS; -39.72 ° @ 200.00 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

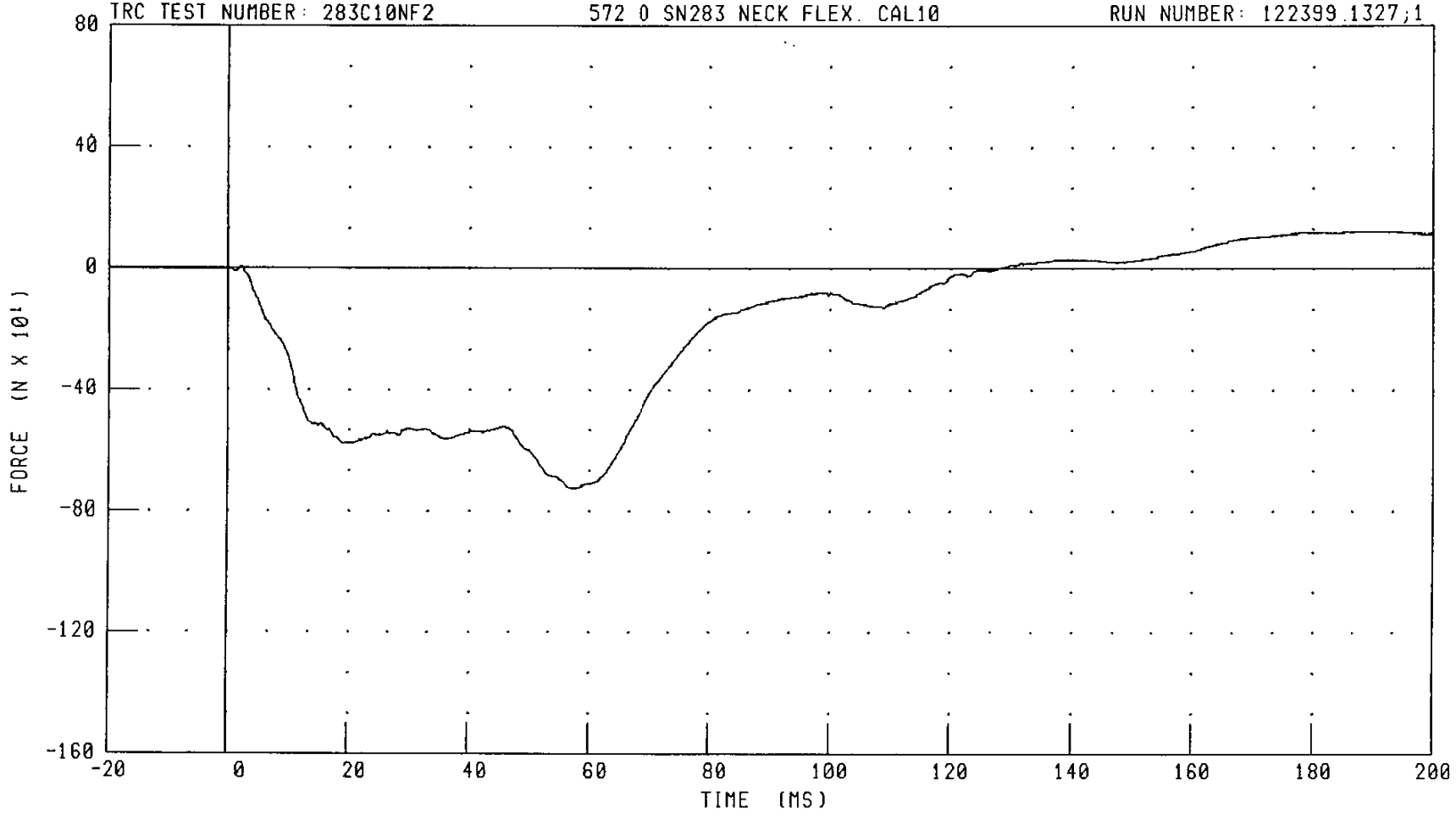



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 88.30 ° @ 62.24 MS; -55.79 ° @ 200.00 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

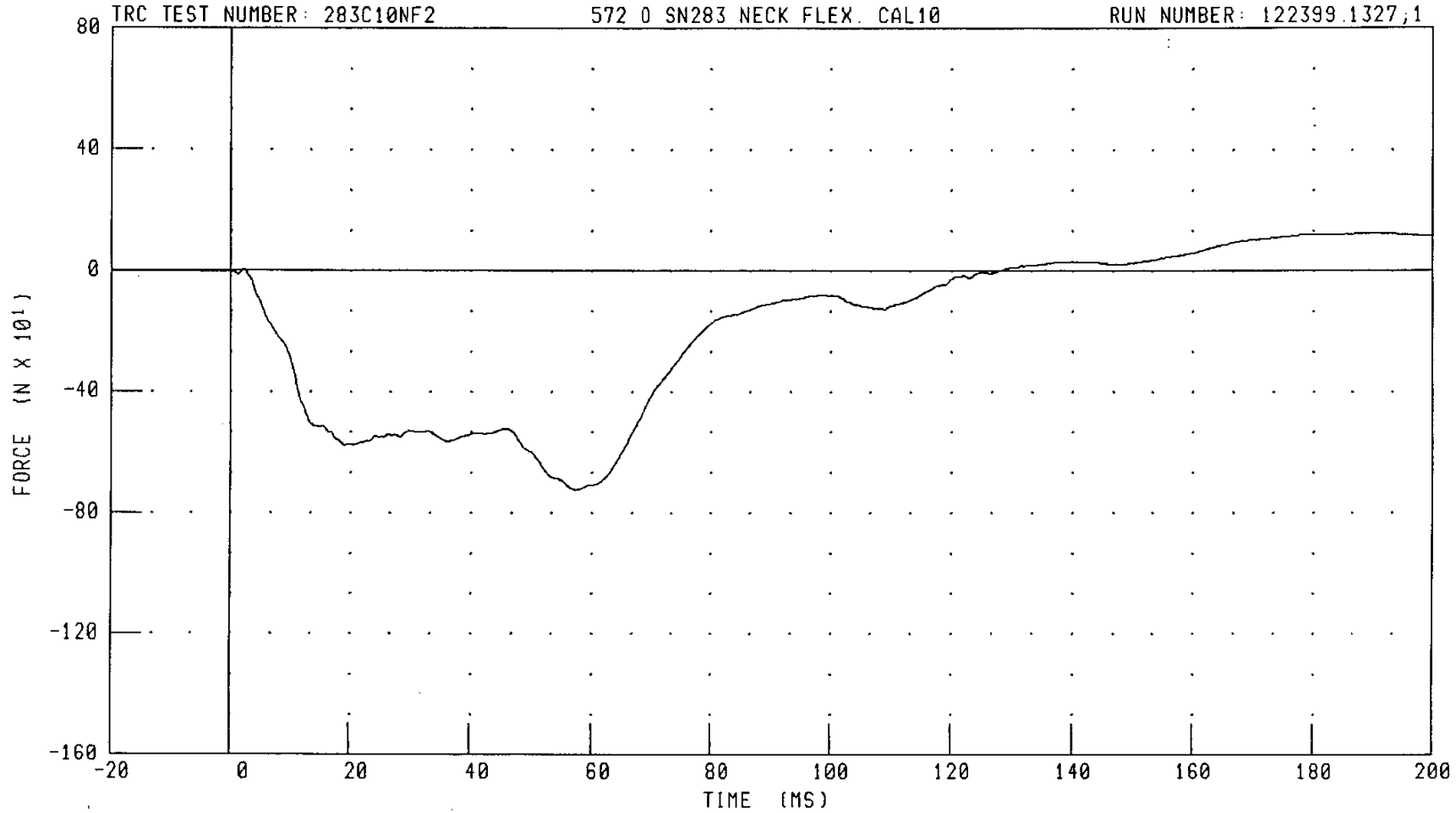



CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 122.73 N @ 184.80 MS; -726.03 N @ 57.12 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION



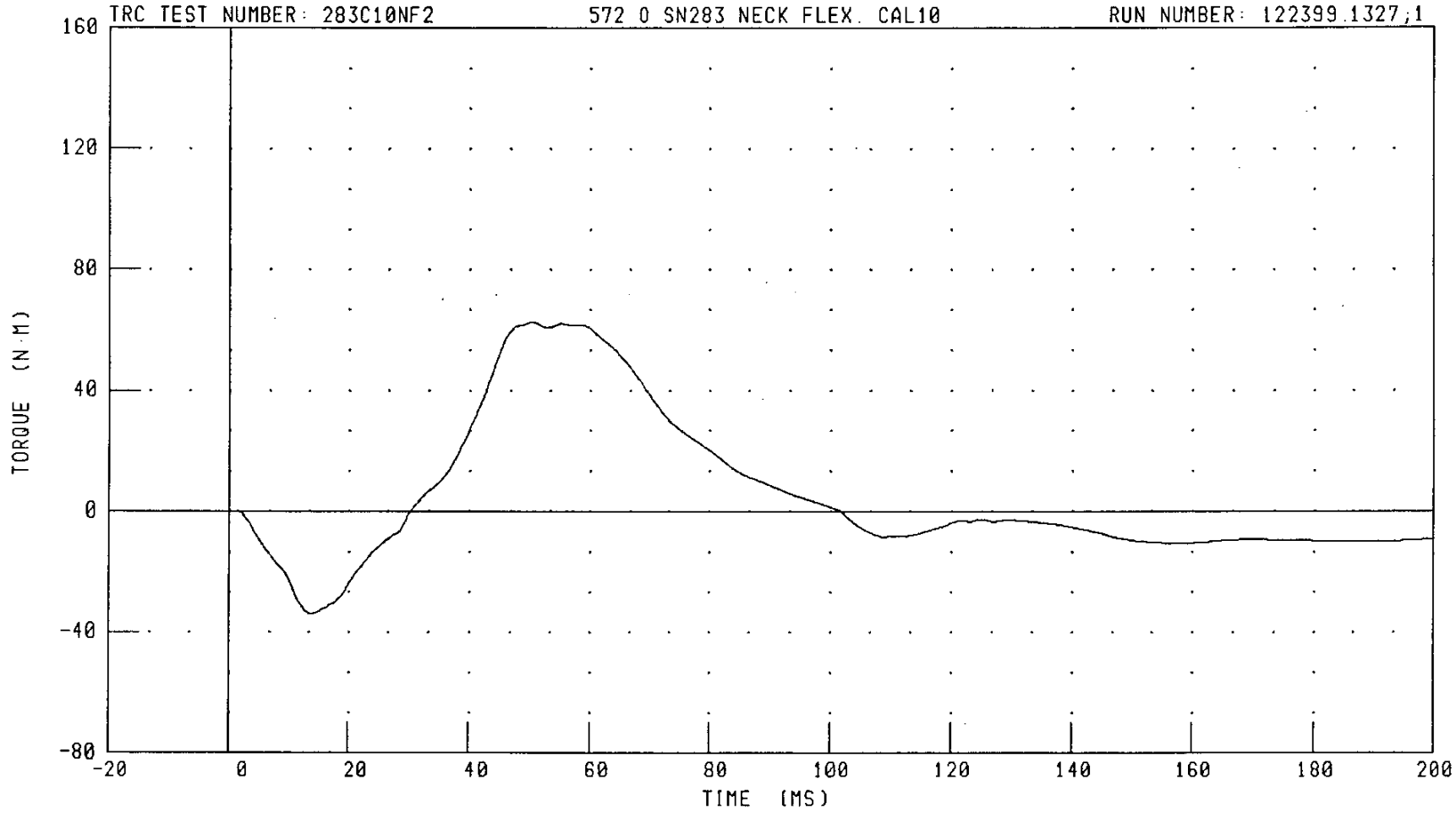

CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 122.88 N @ 185.60 MS; -725.35 N @ 57.28 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 283C10NF2 572 0 SN283 NECK FLEX. CAL10 RUN NUMBER: 122399.1327;1

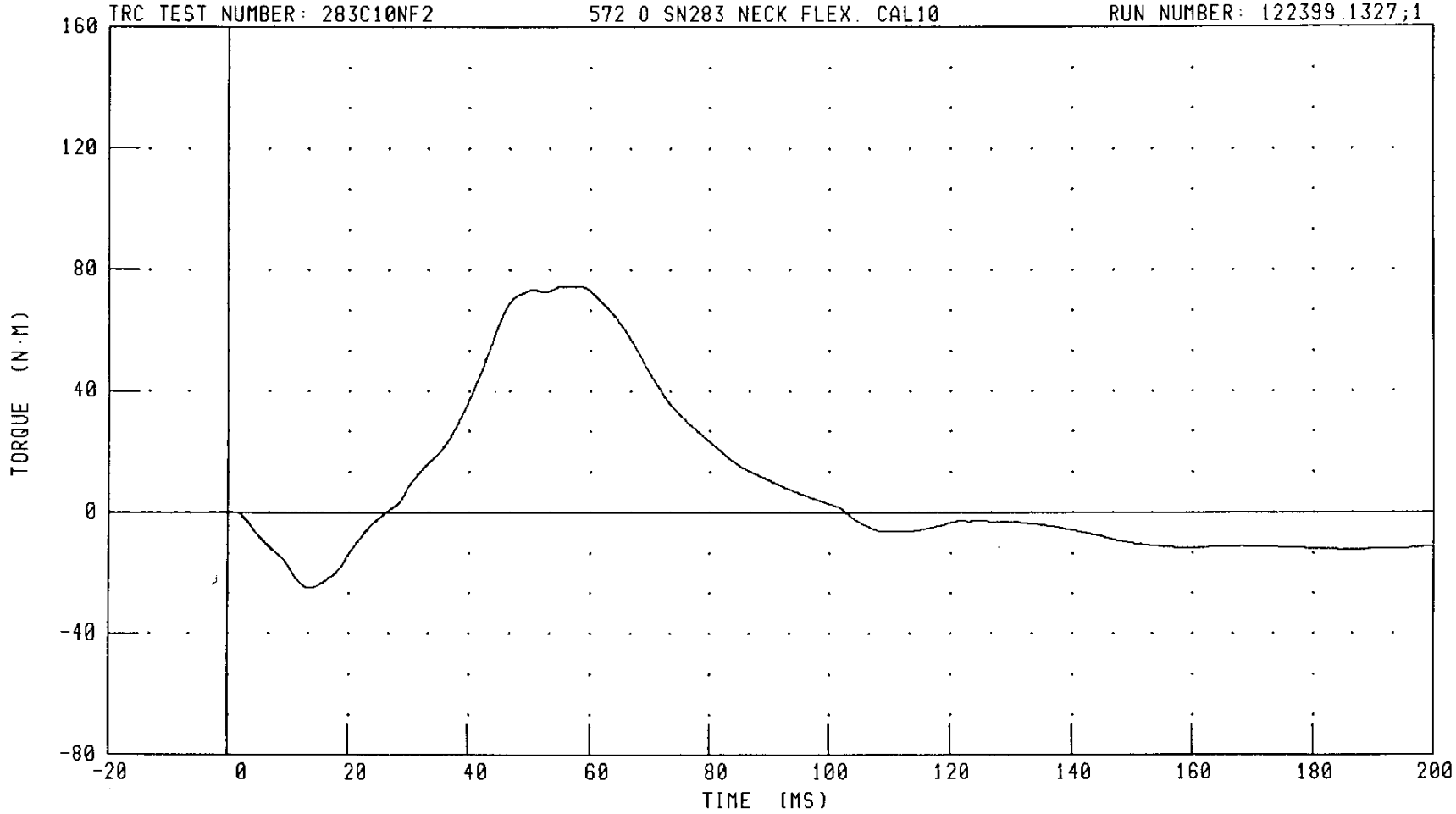



CHANNEL: NEKYM FILTER: CH. CLASS 600 PEAK DATA: 62.58 N·M @ 50.24 MS; -33.99 N·M @ 13.76 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C10NF2 572 0 SN283 NECK FLEX. CAL10 RUN NUMBER: 122399.1327;1




CHANNEL: NEKOM FILTER: CH. CLASS 600 PEAK DATA: 74.55 N·M @ 58.00 MS; -24.93 N·M @ 13.60 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE 23-DEC-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 283C10NE1 572 O SN283 NECK EXT. CAL 10

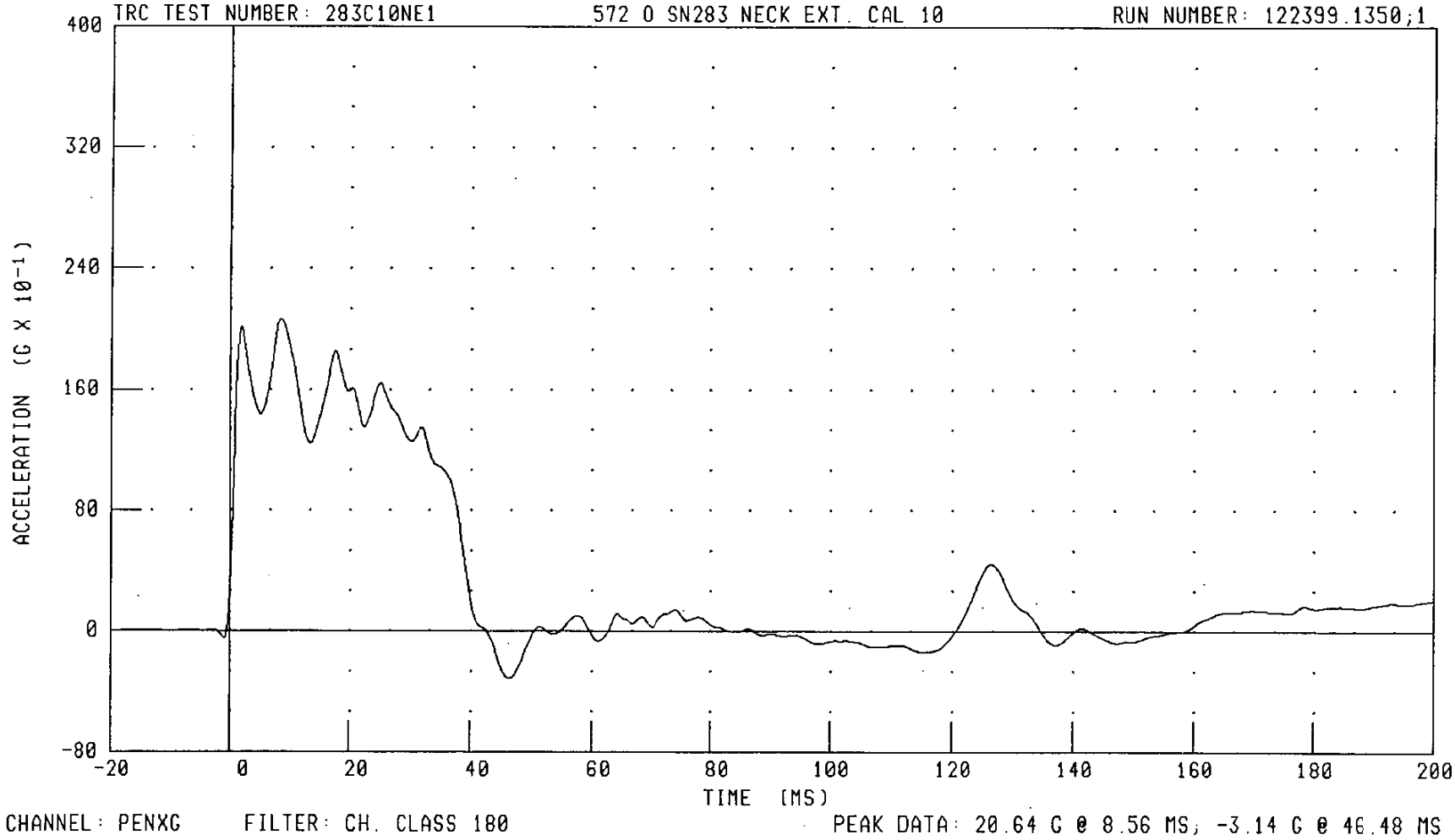
| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6 - 22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 5.95 - 6.19 M/S | 6.00 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 1.5 - 1.9 M/S | 1.65 M/S |
| | 20 MS | 3.1 - 3.9 M/S | 3.18 M/S |
| | 30 MS | 4.6 - 5.6 M/S | 4.63 M/S |
| PEAK D-PLANE ROTATION | | 97 - 109 DEG. | 108.59 DEG. |
| PEAK MOMENT DURING ROTAION INTERVAL | | -55 / -69 NM | -60.60 NM |
| MOMENT DECAY TIME FROM PEAK TO -10 NM LEVEL | | 94 - 114 MS | 106.32 MS |

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 122399.1345;1

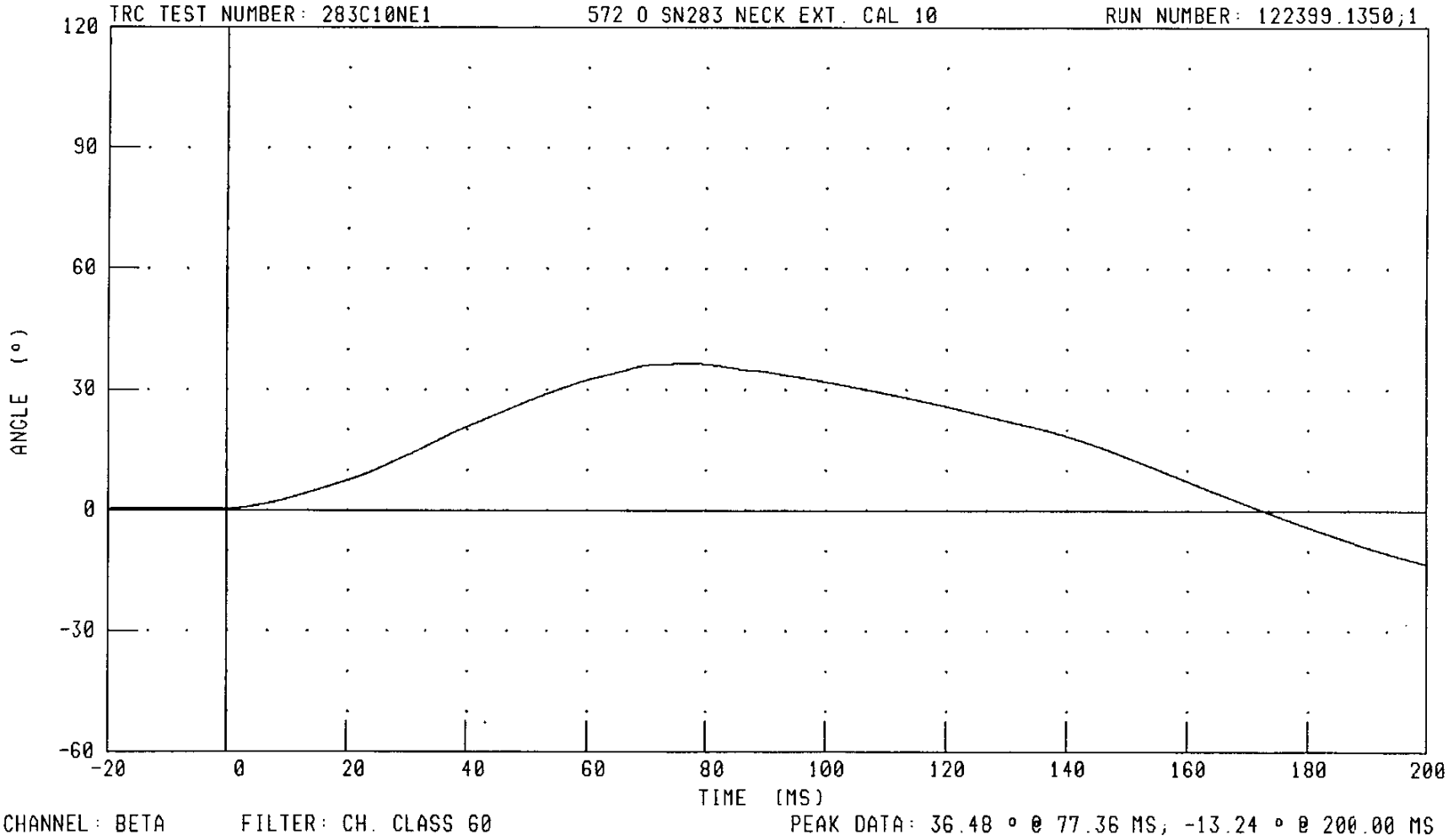
PART 572-D HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION




CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 20.64 G @ 8.56 MS; -3.14 G @ 46.48 MS

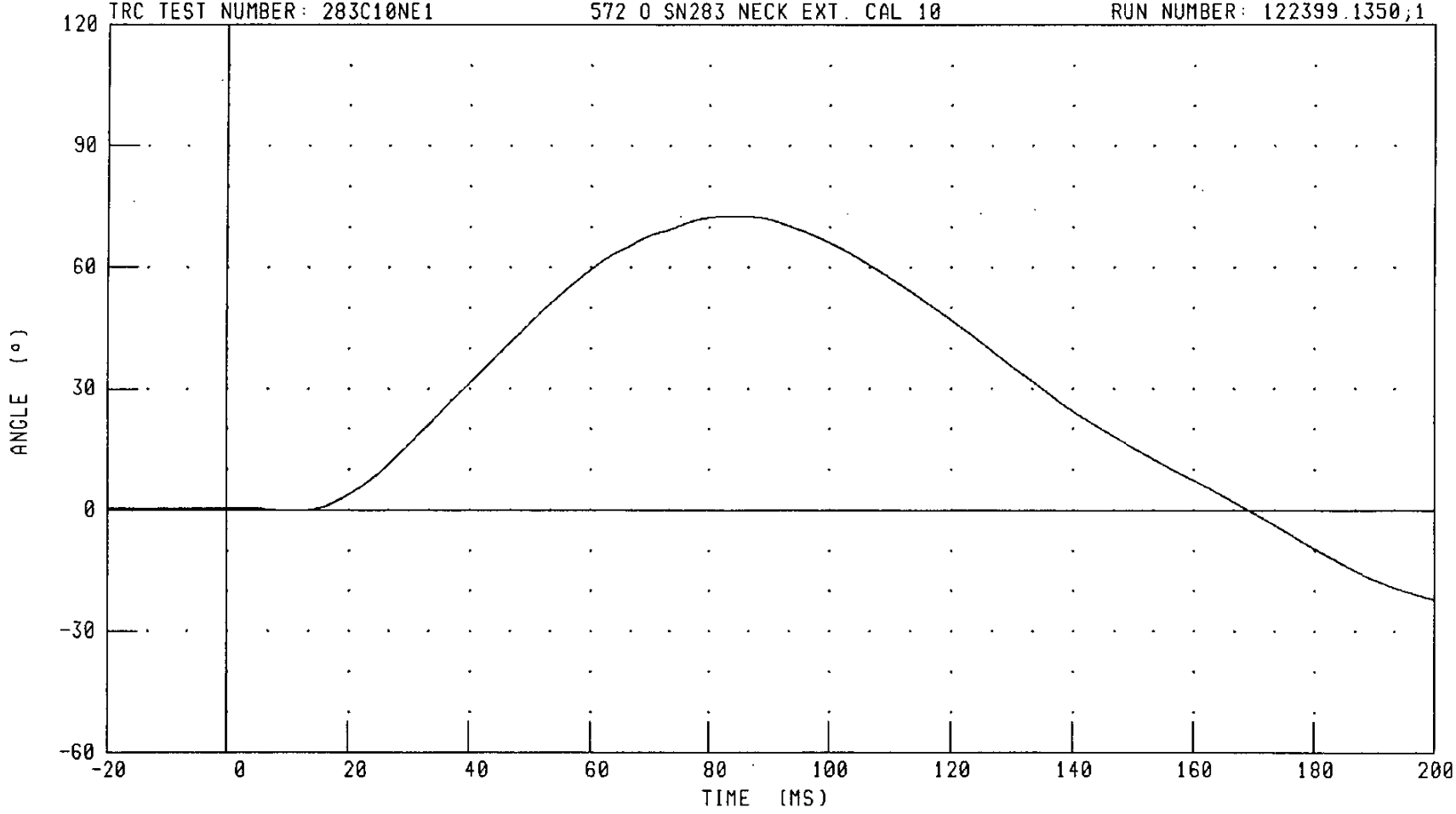
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK




CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 36.48 ° @ 77.36 MS; -13.24 ° @ 200.00 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C10NE1 572 0 SN283 NECK EXT. CAL 10 RUN NUMBER: 122399.1350;1

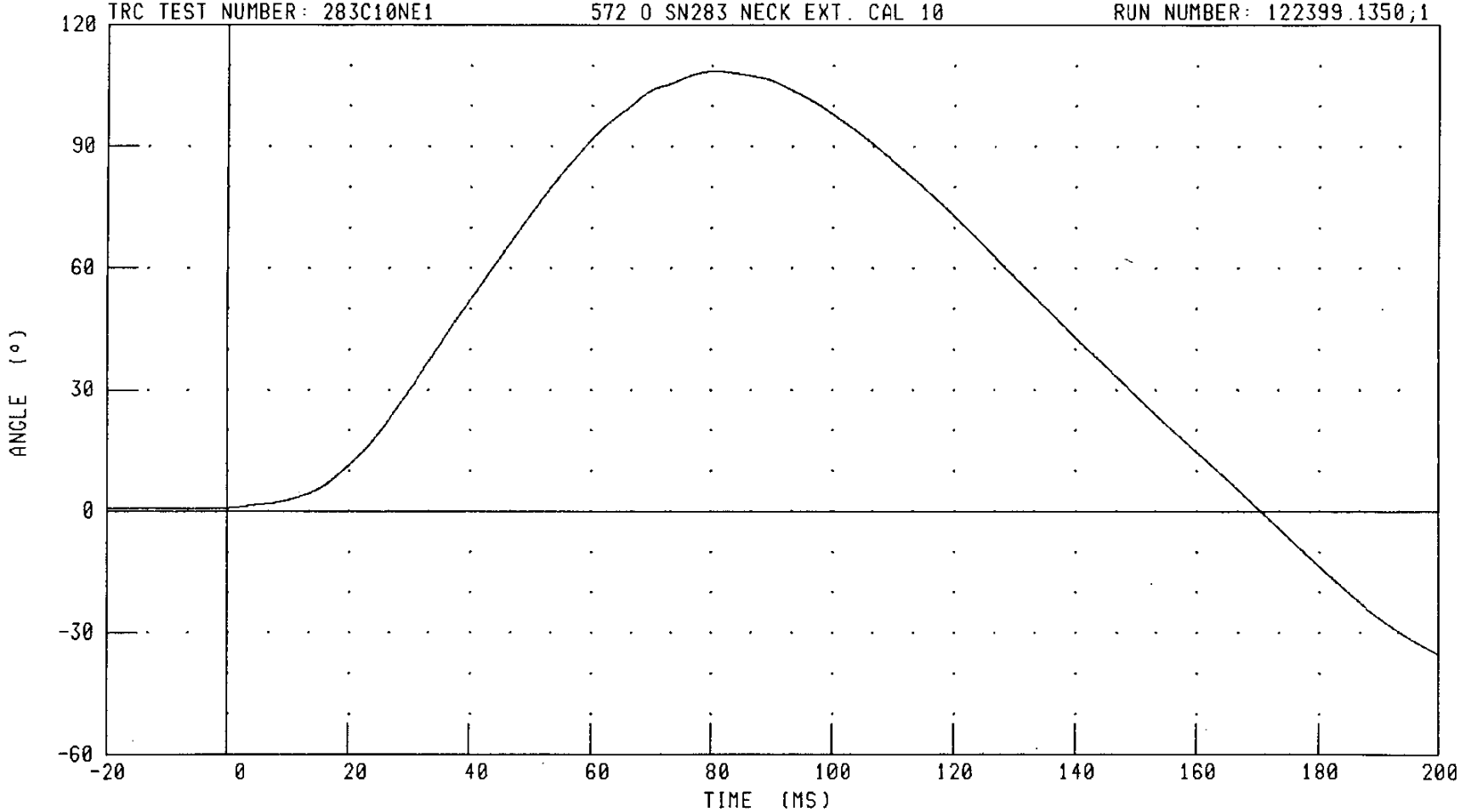



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 72.62 ° @ 84.40 MS; -22.16 ° @ 200.00 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

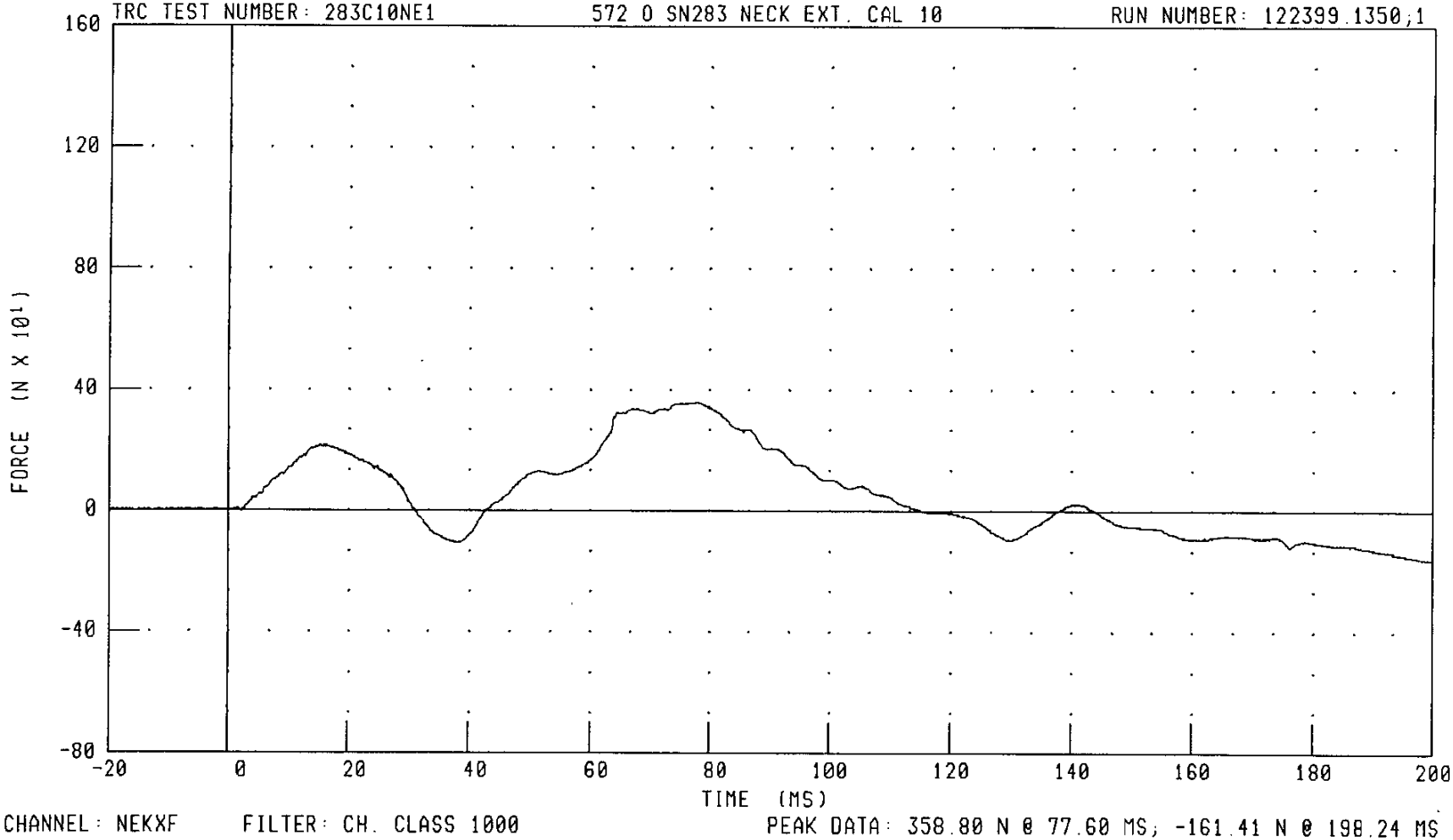
TRC TEST NUMBER: 283C10NE1 572 0 SN283 NECK EXT. CAL 10 RUN NUMBER: 122399.1350;1




CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 108.60 ° @ 80.64 MS; -35.40 ° @ 200.00 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

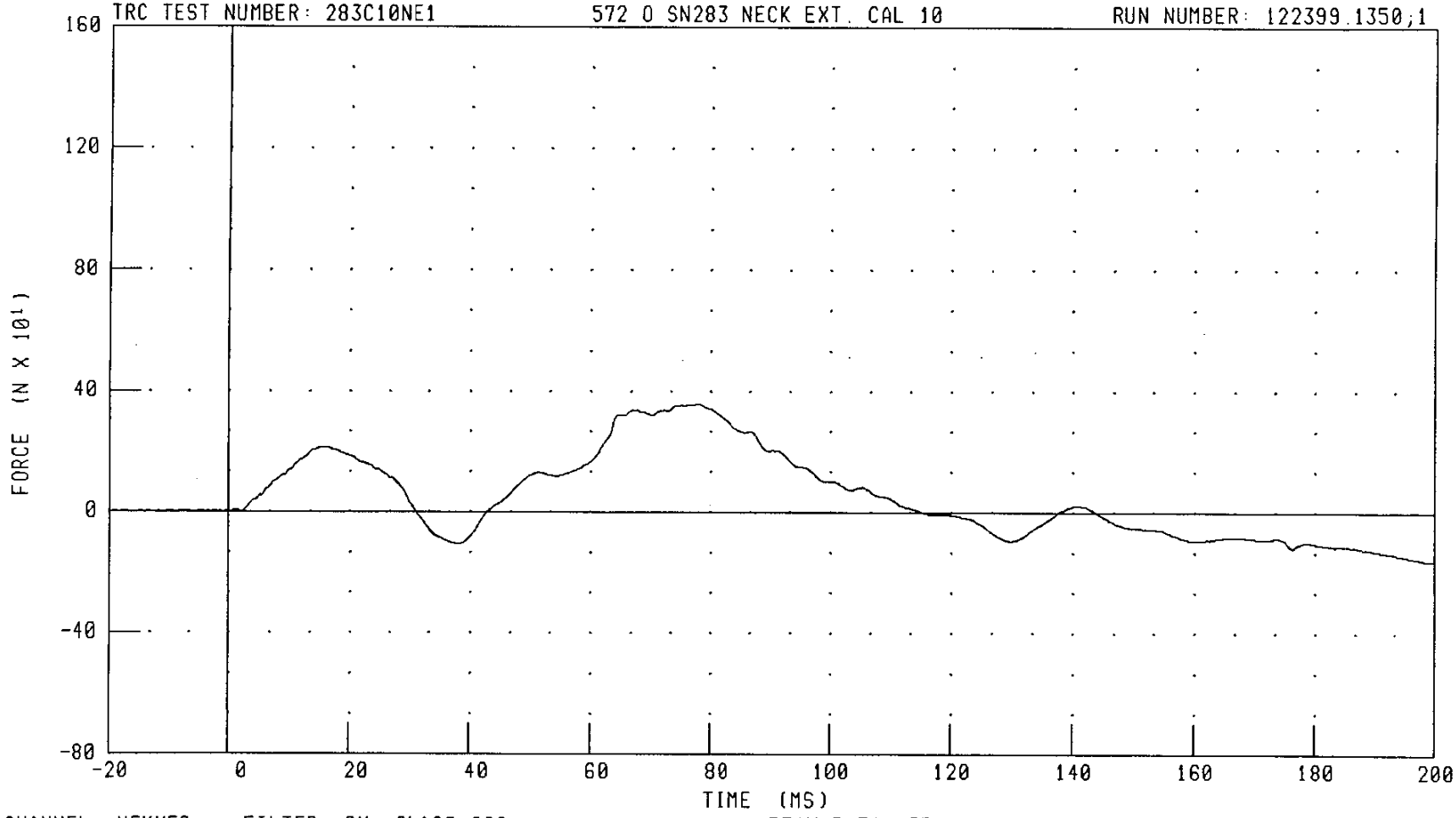



CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 358.80 N @ 77.60 MS; -161.41 N @ 198.24 MS

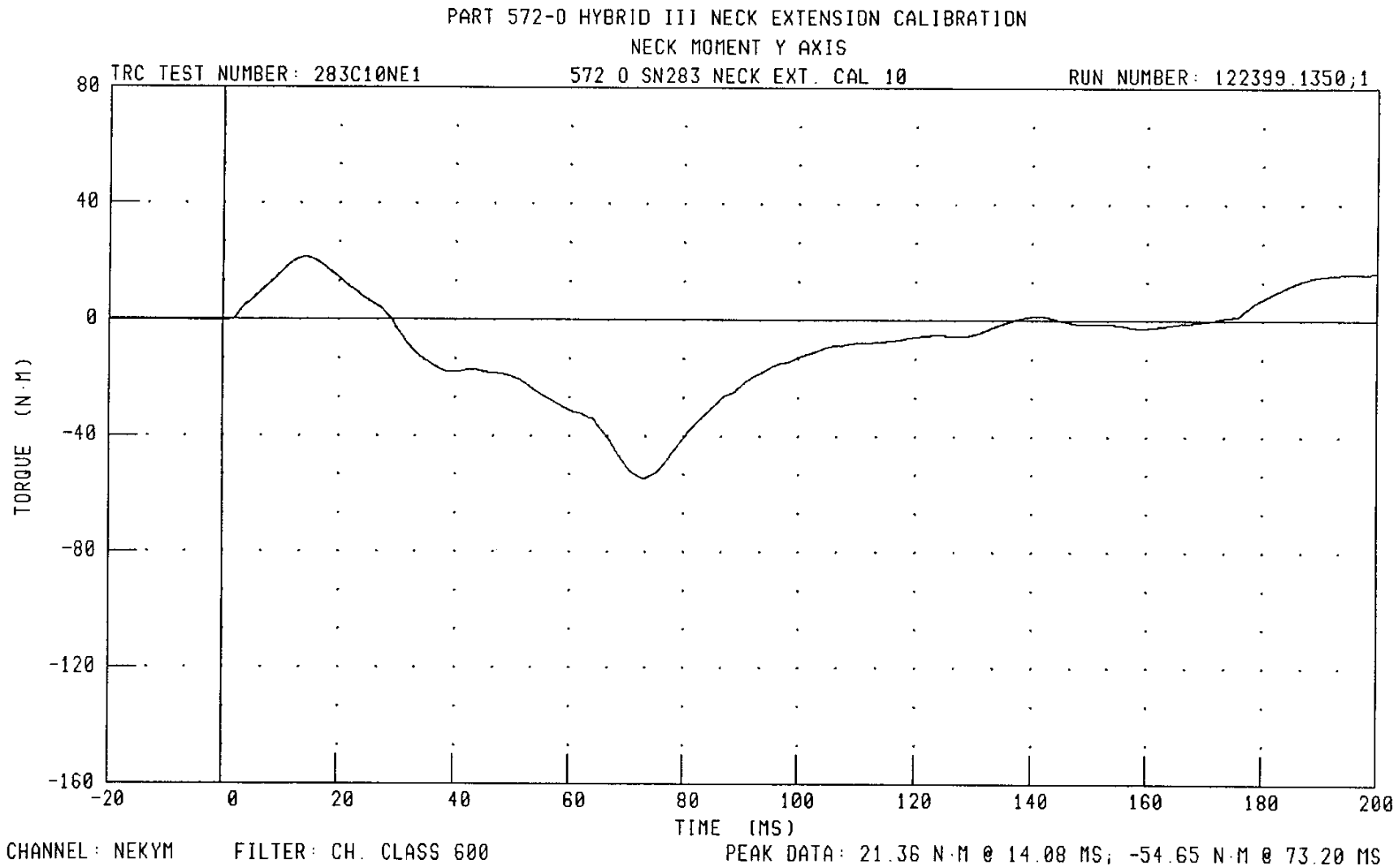
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

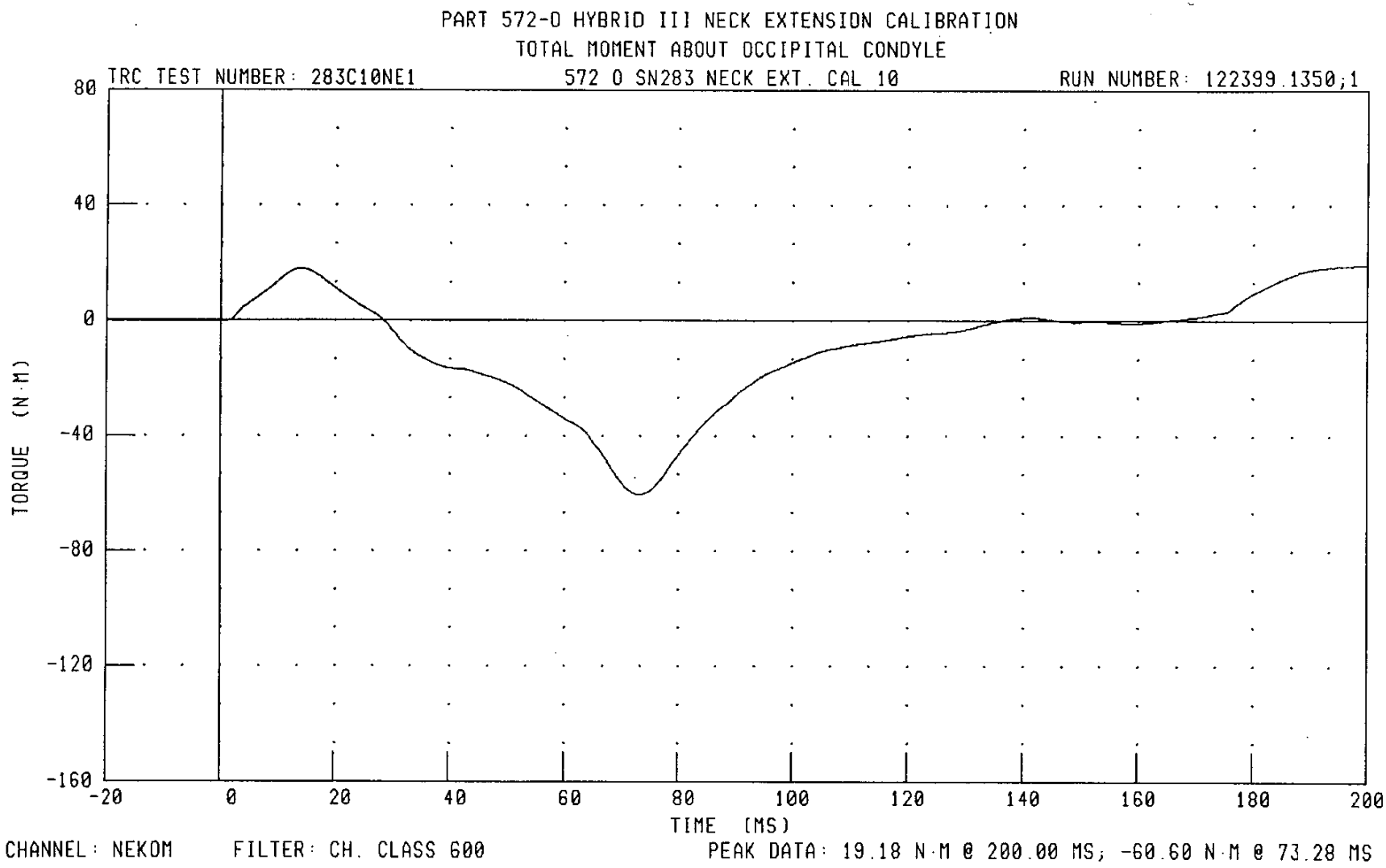
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION




CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 358.50 N @ 77.92 MS; -162.20 N @ 200.00 MS


PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 283C10NE1
572 0 SN283 NECK EXT. CAL 10
RUN NUMBER: 122399.1350;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 600
PEAK DATA: 21.36 N-M @ 14.08 MS; -54.65 N-M @ 73.20 MS


PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 283C10NE1
572 0 SN283 NECK EXT. CAL 10
RUN NUMBER: 122399.1350;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 600
PEAK DATA: 19.18 N-M @ 200.00 MS; -60.60 N-M @ 73.28 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE 23-DEC-99

TRC INC. TEST NO: 283C10TH2 572 O SN283 THORAX CAL10

| TEST PARAMETER | HIGH SPEED TEST SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PENDULUM VELOCITY | 6.59 - 6.83 M/S | 6.59 M/S |
| MAXIMUM DEFLECTION | 48 - 55 MM | 49.2 MM |
| MAXIMUM RESISTIVE FORCE | 3900 - 4400 N | 4474. N * |
| INTERNAL HYSTERESIS | 69% - 85% | 74.4% |

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 122399.1519;1

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE 23-DEC-99

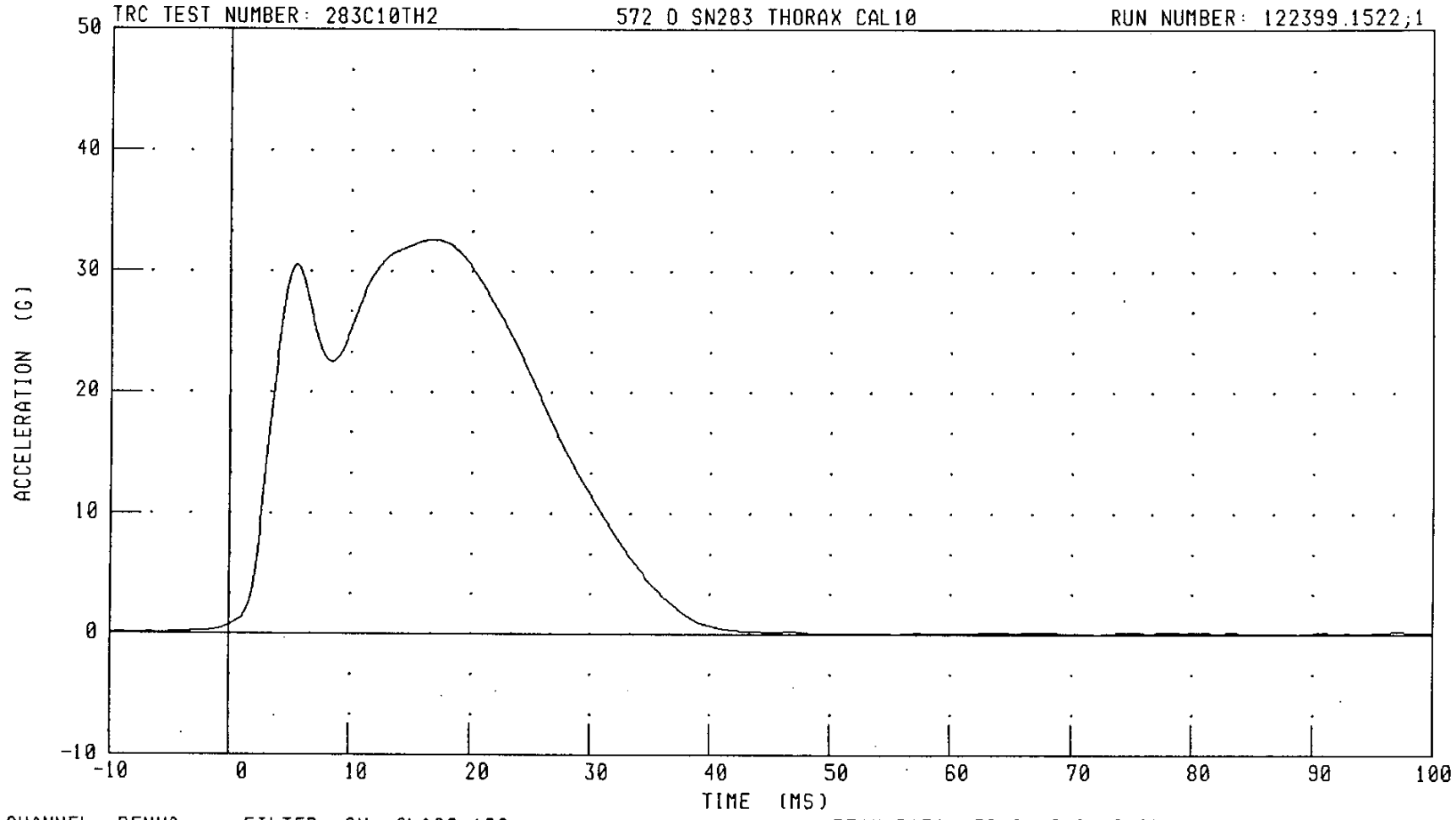
TRC INC. TEST NO: 283C10TH2 572 O SN283 THORAX CAL10

| TEST PARAMETER | HIGH SPEED TEST SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PENDULUM VELOCITY | 6.59 - 6.83 M/S | 6.59 M/S |
| MAXIMUM DEFLECTION | 48-55 ~~51 - 58~~ MM | 49.2 MM ✓ |
| MAXIMUM RESISTIVE FORCE | 3900 - 4400 ~~3800 - 4300~~ N | 4474. N * |
| INTERNAL HYSTERESIS | 69% - 85% | 74.4% |

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN_____ RUN NUMBER: 122399.1519;1

PART 572-O HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

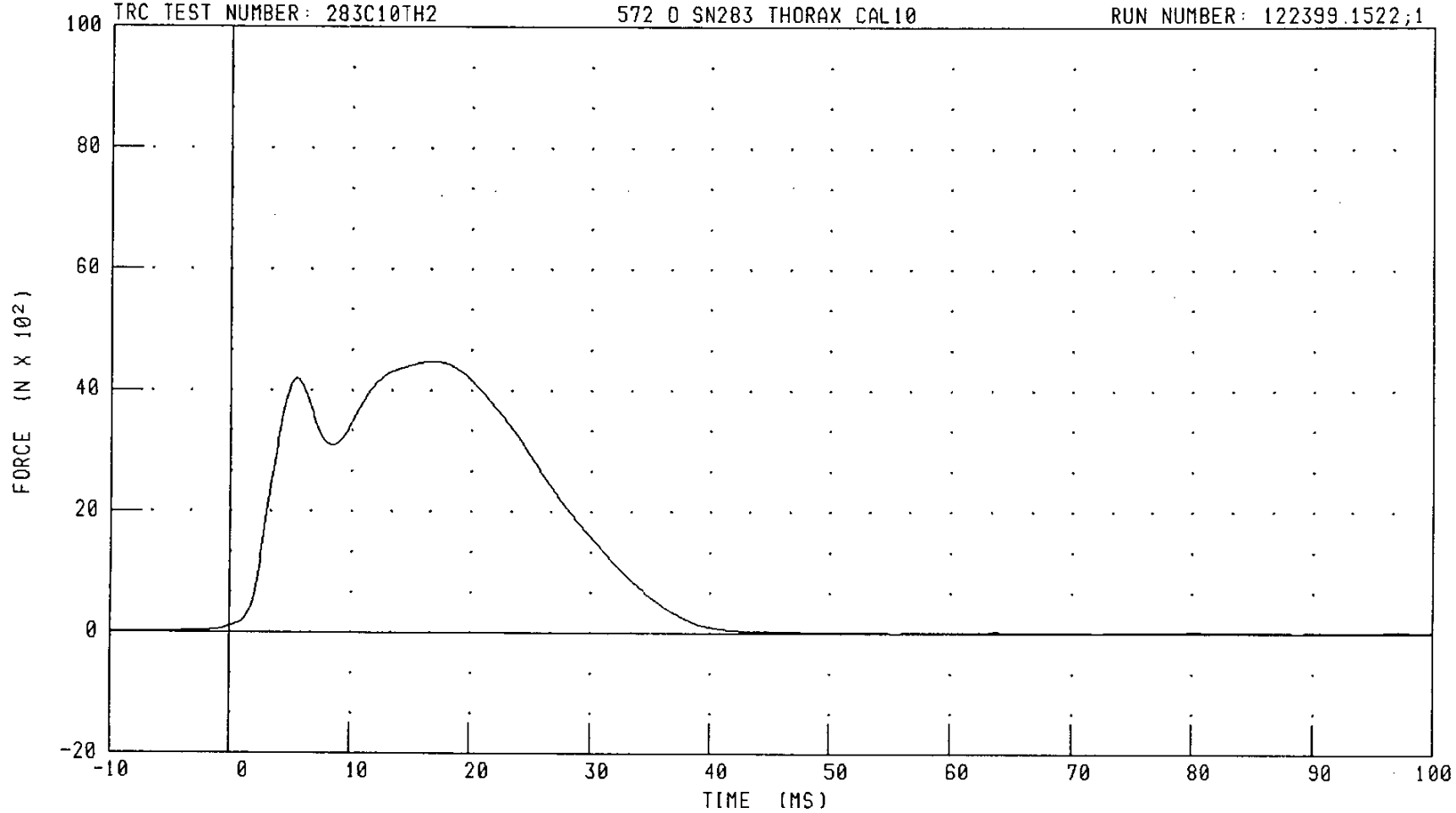



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 32.61 G @ 16.88 MS; 0.01 G @ 55.60 MS

PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 283C10TH2 572 0 SN283 THORAX CAL10 RUN NUMBER: 122399.1522;1

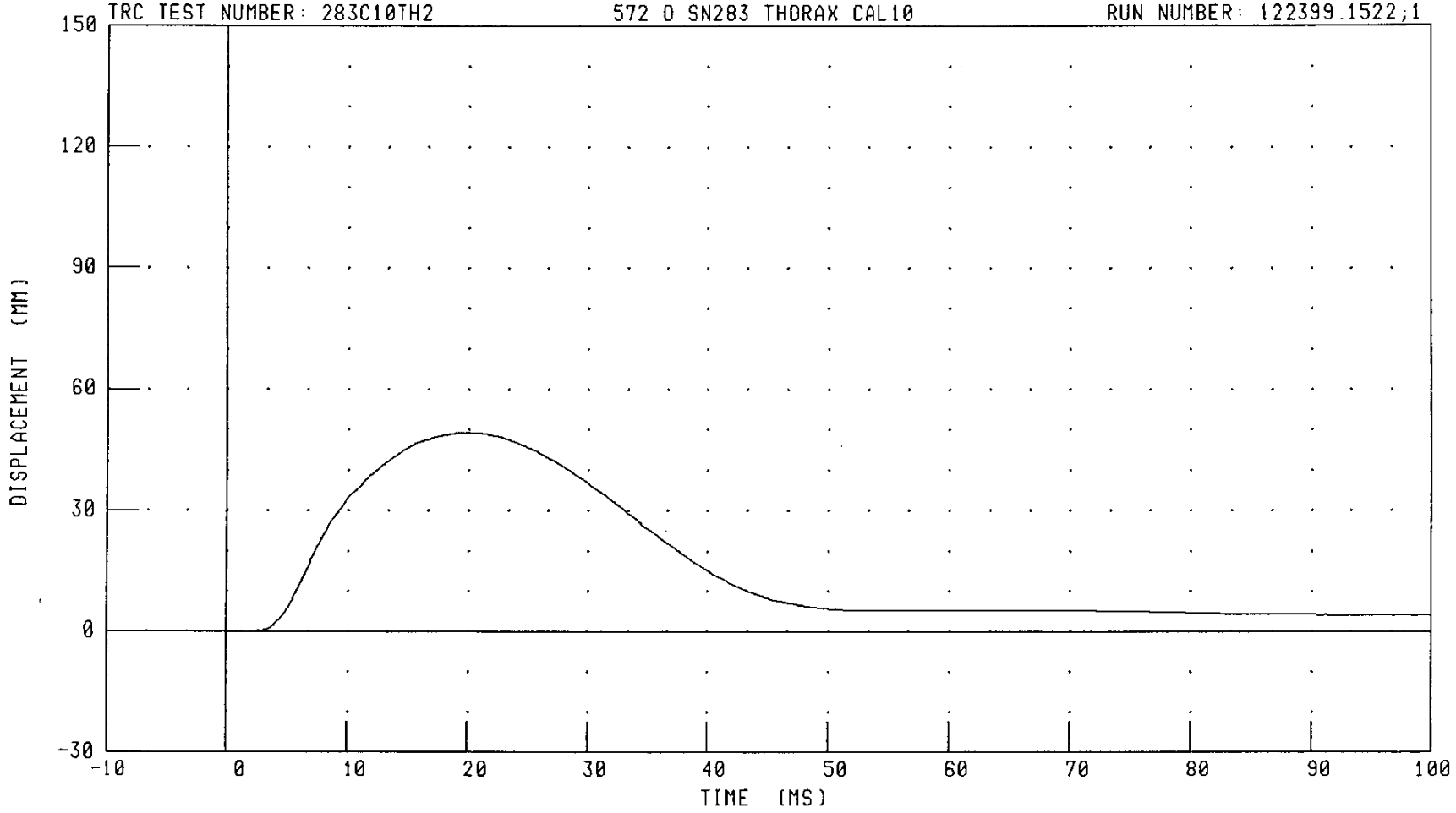



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 4474.85 N @ 16.88 MS; 1.97 N @ 55.60 MS

PART 572-O HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

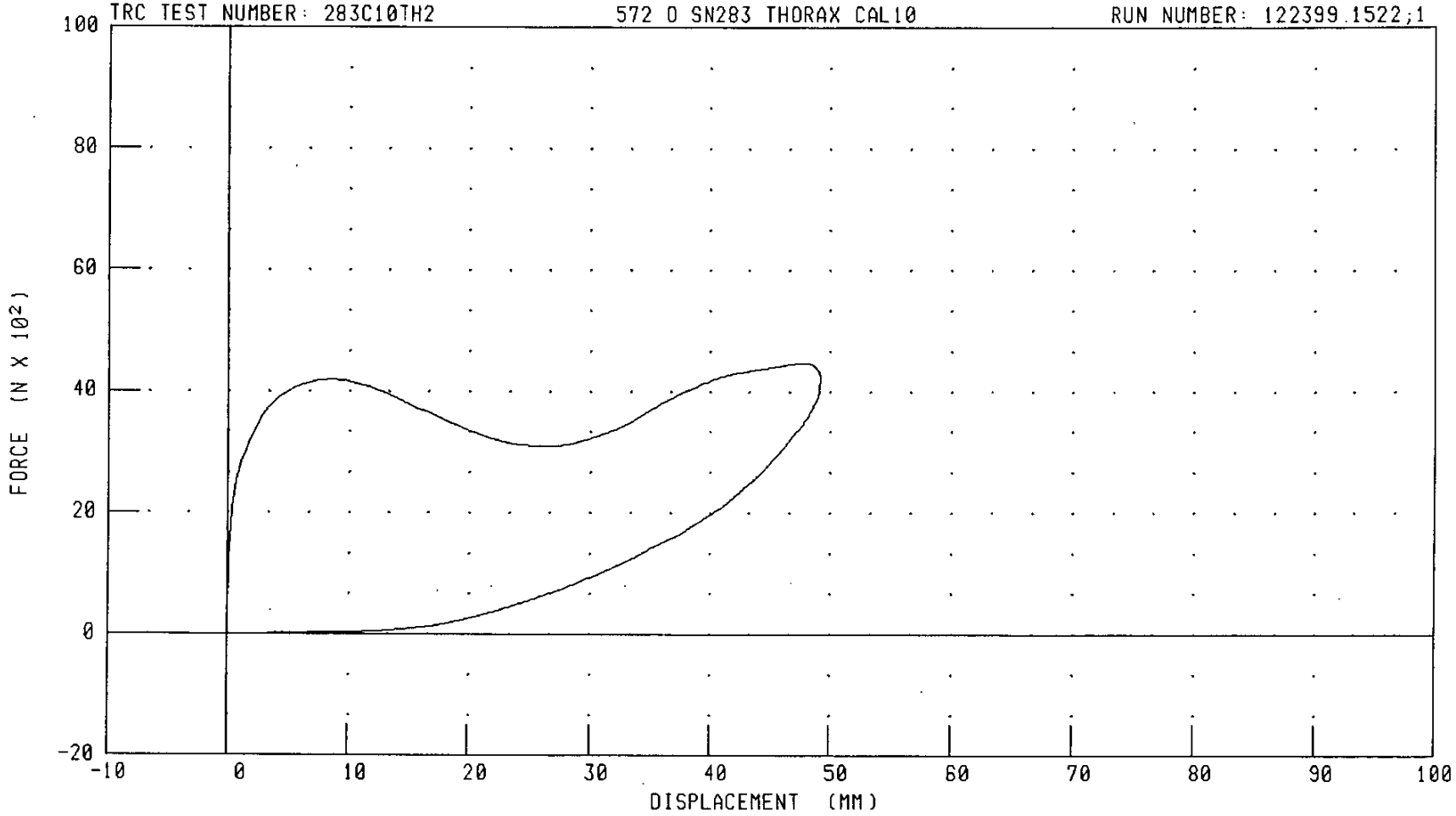
TRC TEST NUMBER: 283C10TH2 572 O SN283 THORAX CAL10 RUN NUMBER: 122399.1522;1




CHANNEL: CSTXD FILTER: CH. CLASS 600 PEAK DATA: 49.25 MM @ 19.68 MS; 0.00 MM @ 1.68 MS

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

TRC TEST NUMBER: 283C10TH2 572 O SN283 THORAX CAL10 RUN NUMBER: 122399.1522;1




CHANNEL: CSTXD FILTER: CH. CLASS 600
PENXF CH. CLASS 180

PEAK DATA: 49.25 MM @ 19.68 MS; 0.00 MM @ 1.68 MS
4474.85 N @ 16.88 MS; 1.97 N @ 55.60 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE 23-DEC-99

TRC INC. TEST NO: 283C10RK1 572 O SN283 R.KNEE CAL10

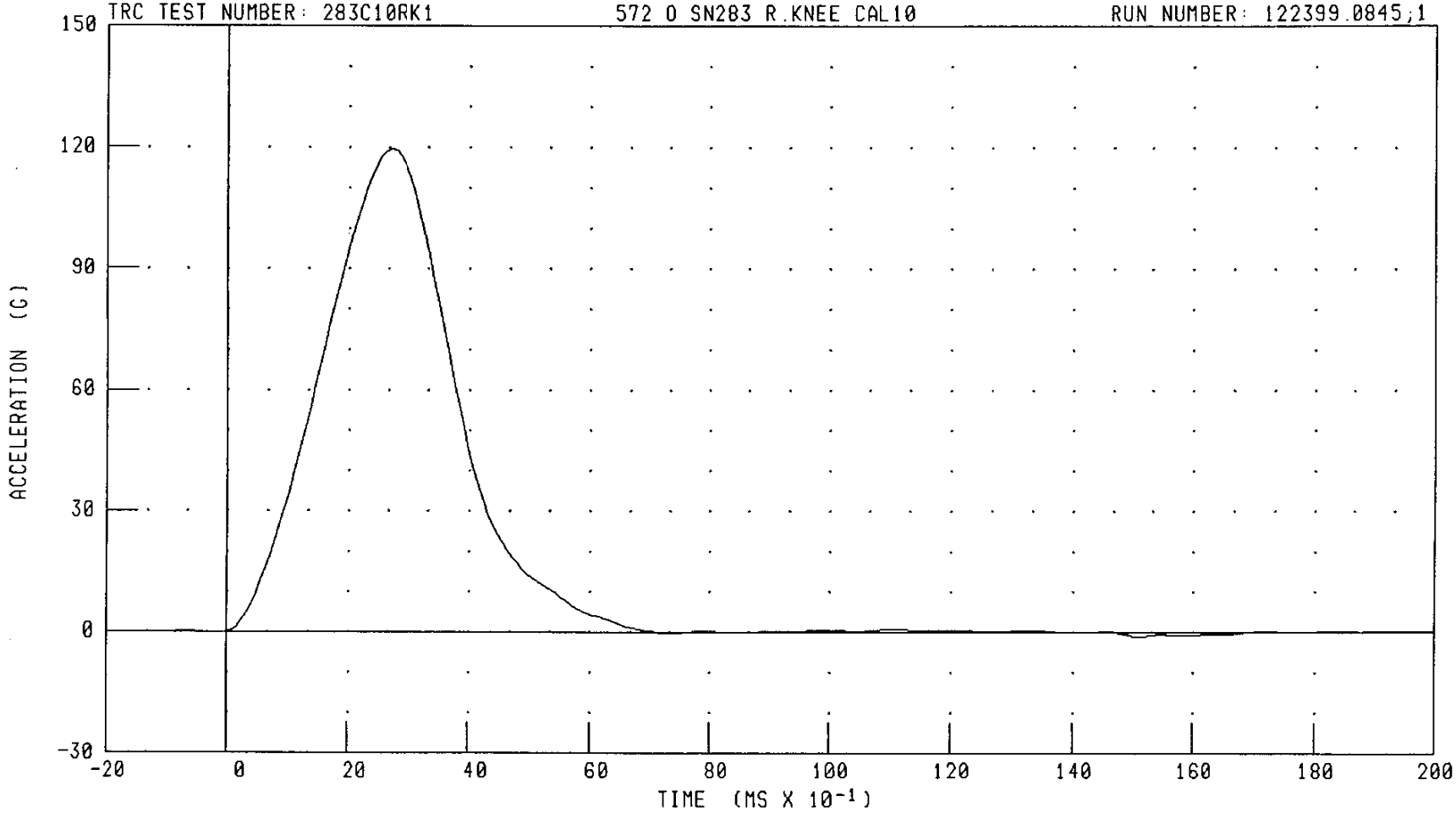
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.13 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3513.0 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 122399.0845;1

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

TRC TEST NUMBER: 283C10RK1 572 O SN283 R.KNEE CAL10 RUN NUMBER: 122399.0845;1

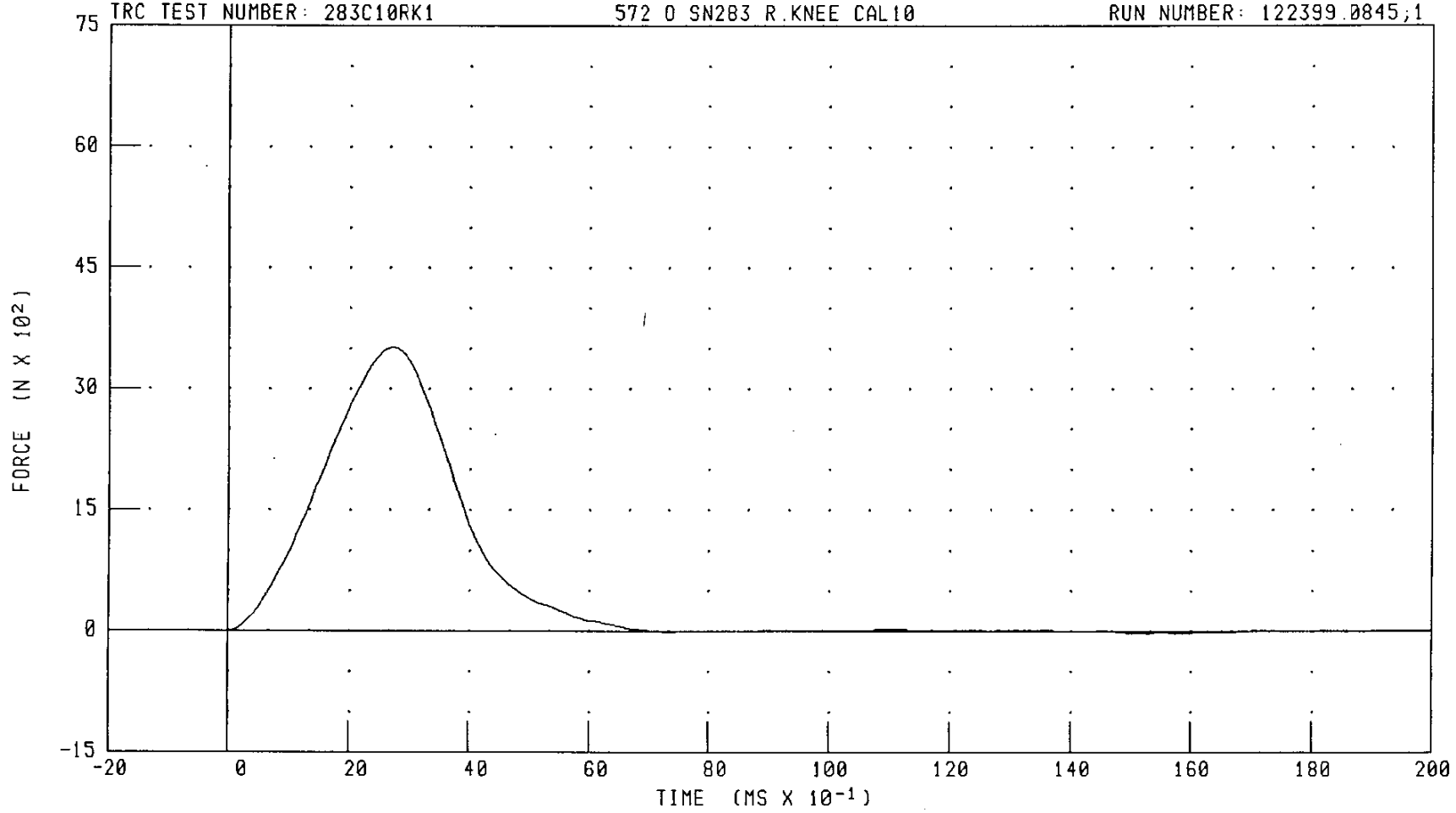



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 119.67 G @ 2.72 MS; -1.10 G @ 15.12 MS

PART 572-O HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 283C10RK1 572 O SN283 R.KNEE CAL10 RUN NUMBER: 122399.0845;1




CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 3513.01 N @ 2.72 MS; -32.25 N @ 15.12 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE 23-DEC-99

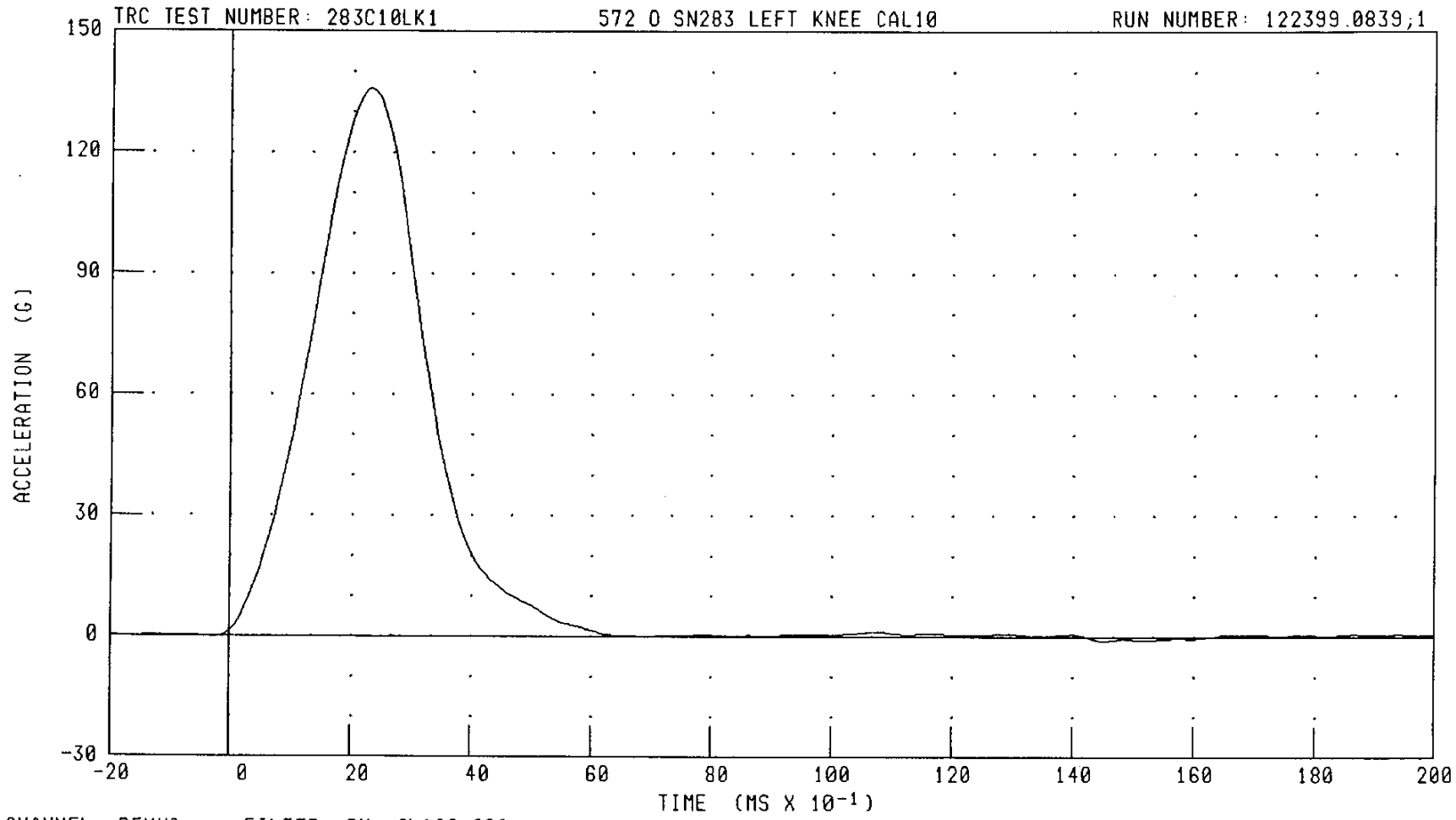
TRC INC. TEST NO: 283C10LK1 572 O SN283 LEFT KNEE CAL10

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.13 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3984.9 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 122399.0838;1

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

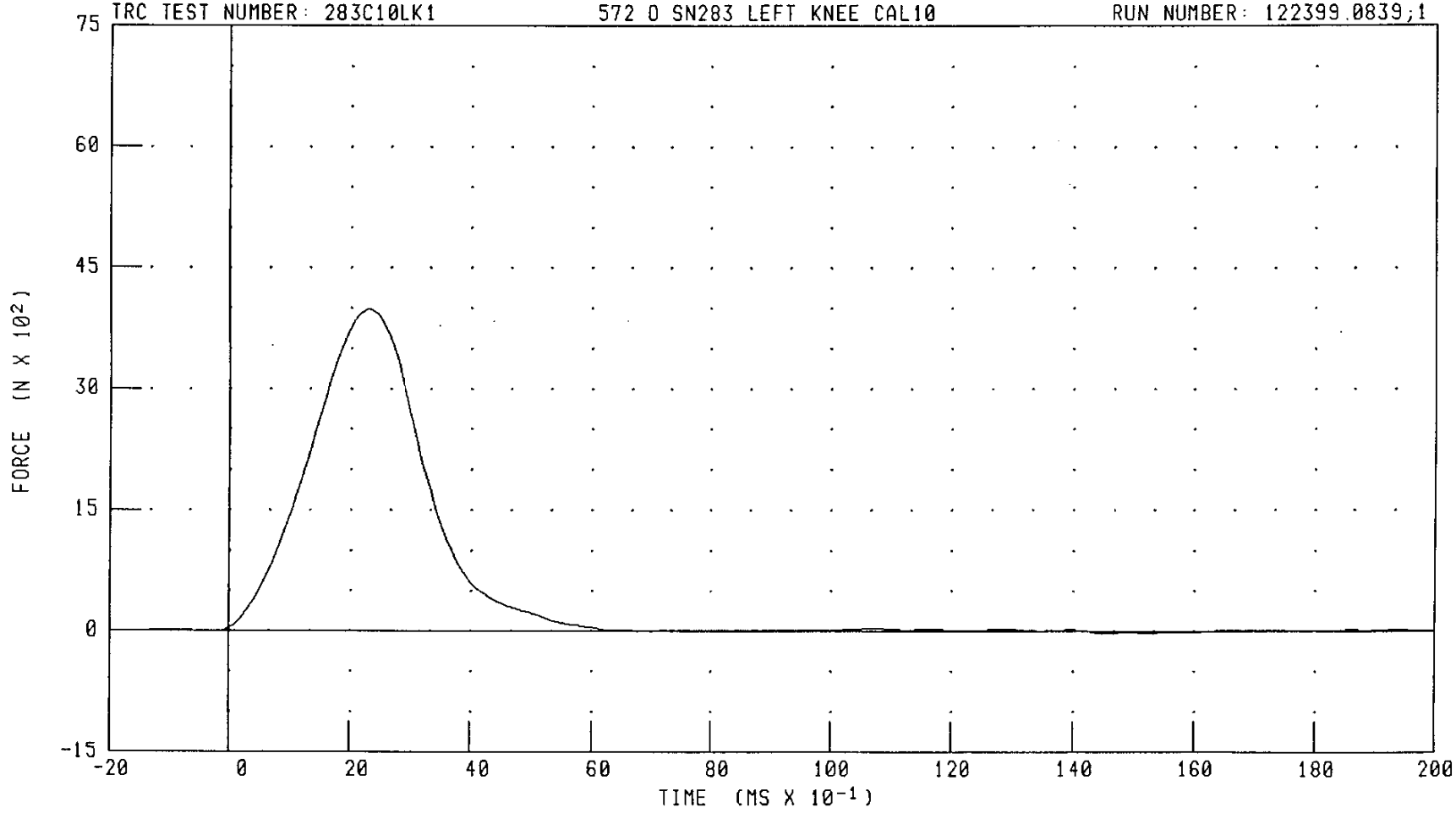



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 135.74 G @ 2.32 MS; -1.04 G @ 14.56 MS

PART 572-O HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 283C10LK1 572 O SN283 LEFT KNEE CAL10 RUN NUMBER: 122399.0839;1




CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 3984.97 N @ 2.32 MS; -30.55 N @ 14.56 MS

Post-Test Dummy Certification

Passenger Dummy S/N 369

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

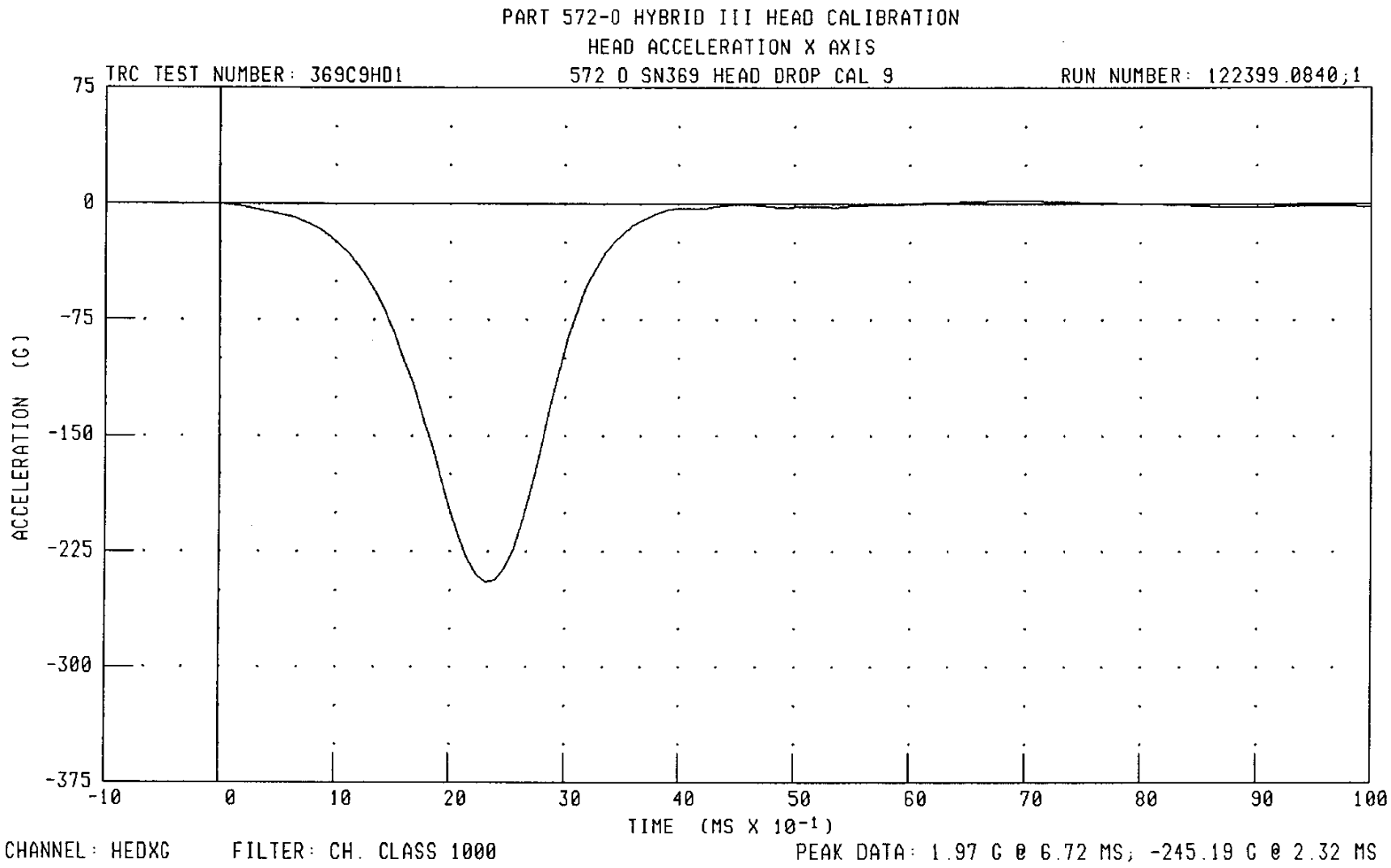
HYBRID III SMALL FEMALE 23-DEC-99

TRC INC. TEST NO: 369C9HD1 572 O SN369 HEAD DROP CAL 9

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PEAK RESULTANT ACCELERATION | 250 - 300 G | 280.17 G |
| PEAK LATERAL ACCELERATION | 15 G MAX | 4.78 G |
| IS ACCELERATION CURVE UNIMODAL? | YES | YES |

TEST MEETS SPECIFICATIONS

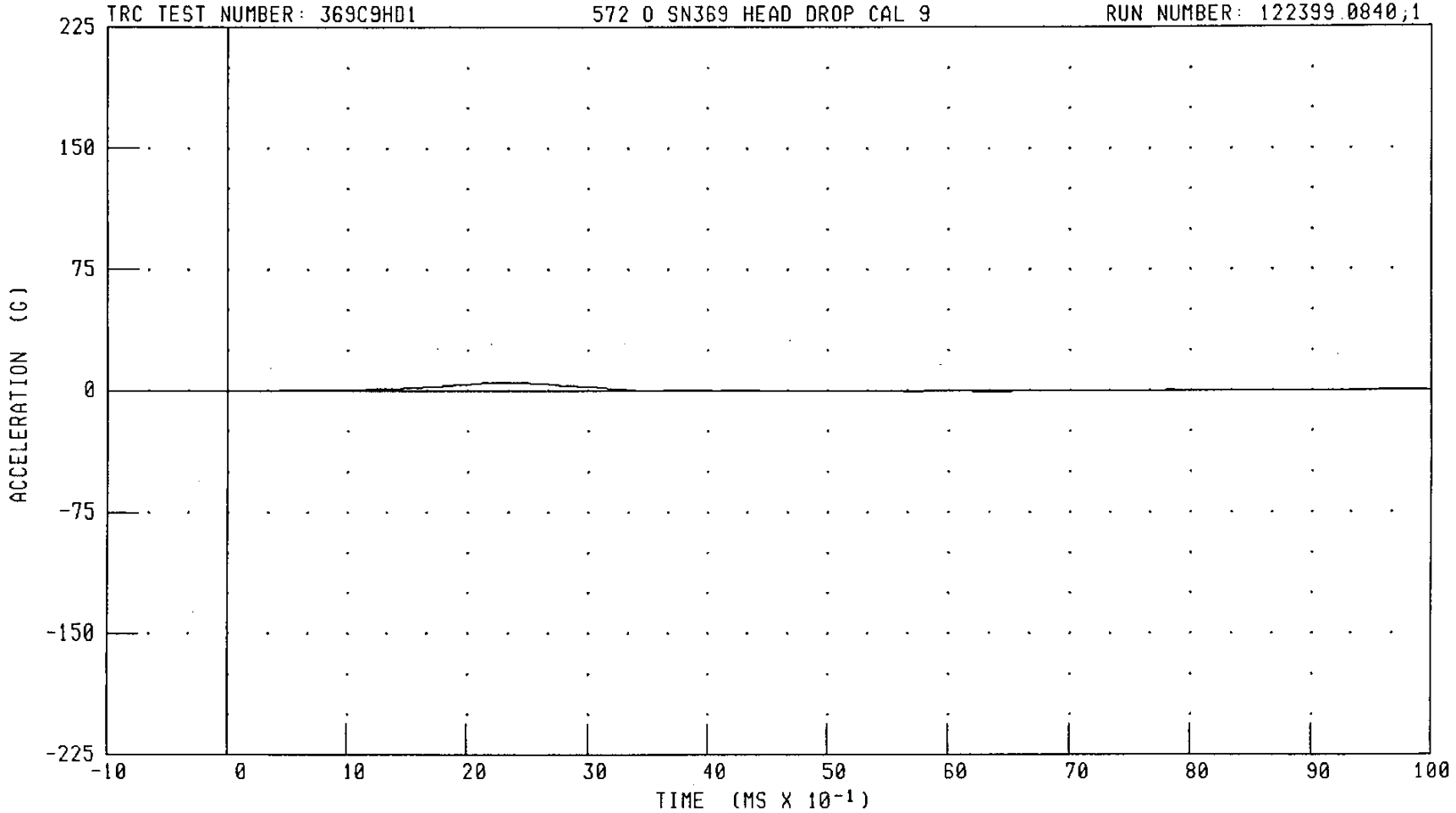
TECHNICIAN Dustin Walton RUN NUMBER: 122399.0840;1


PART 572-O HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER: 369C9HD1
572 O SN369 HEAD DROP CAL 9
RUN NUMBER: 122399.0840;1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDXG
FILTER: CH. CLASS 1000
PEAK DATA: 1.97 G @ 6.72 MS; -245.19 G @ 2.32 MS

PART 572-O HYBRID III HEAD CALIBRATION

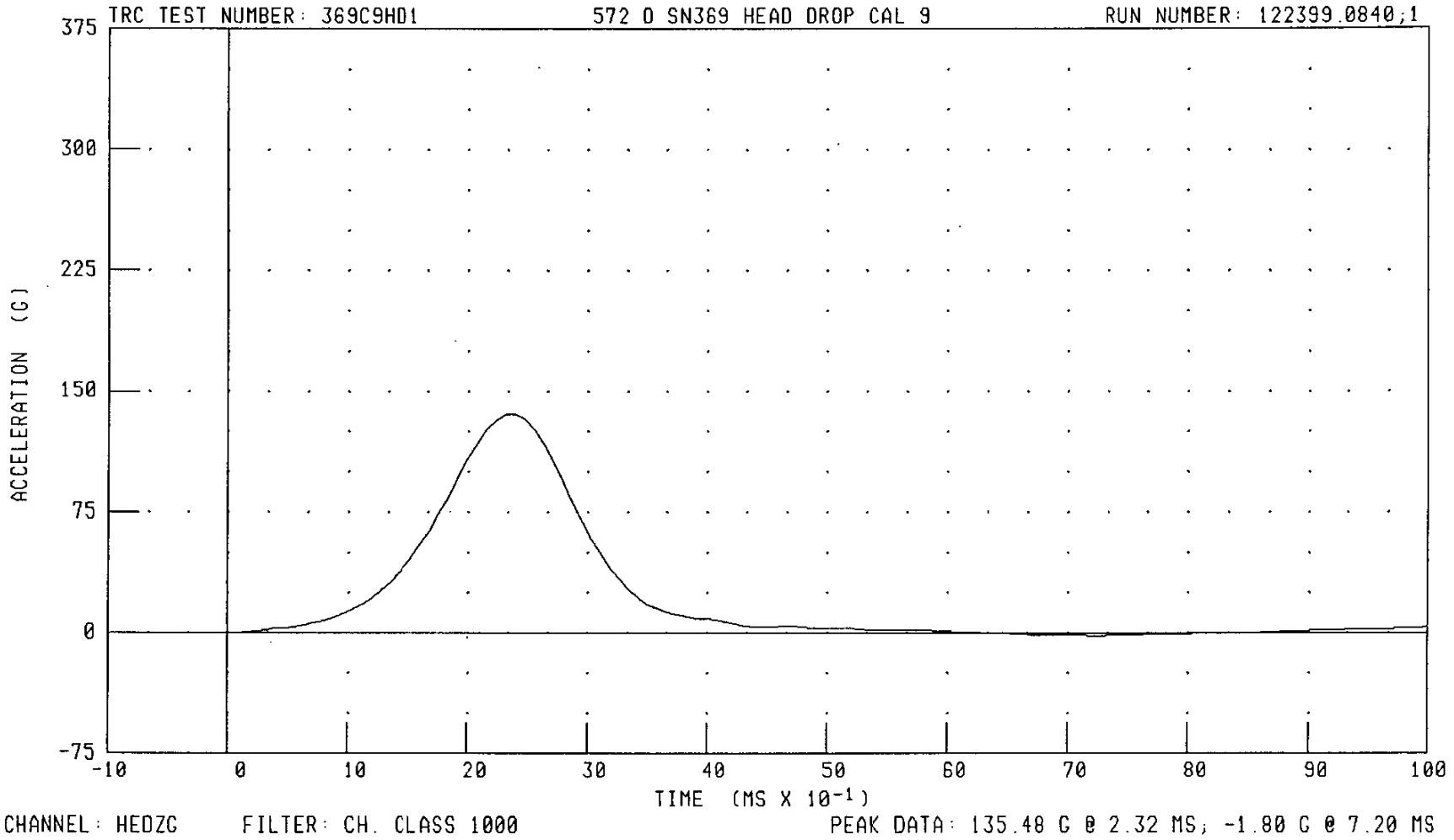
HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 369C9HD1 572 O SN369 HEAD DROP CAL 9 RUN NUMBER: 122399.0840;1




CHANNEL: HEDYG FILTER: CH. CLASS 1000 PEAK DATA: 4.79 G @ 2.24 MS; -0.62 G @ 5.68 MS

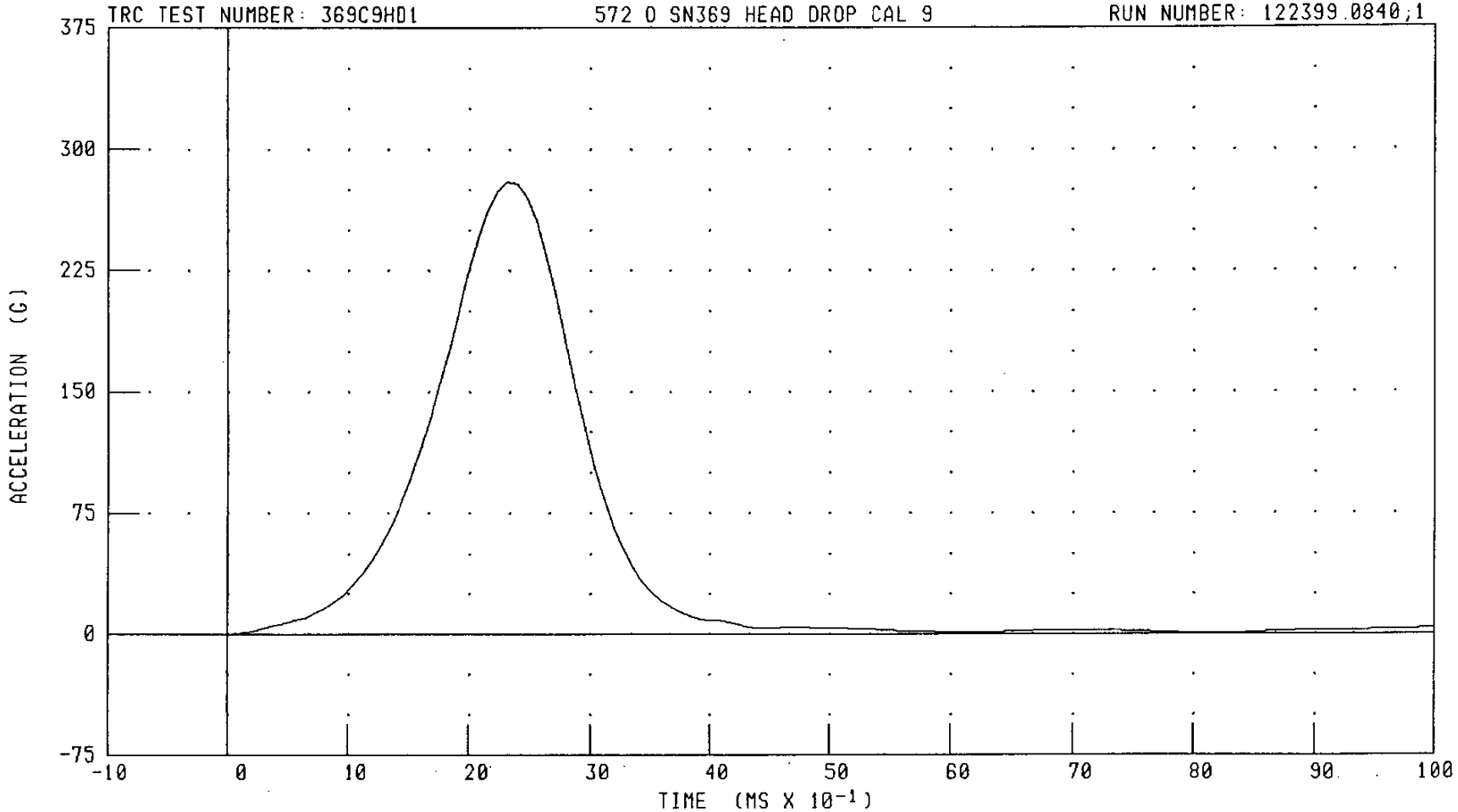
PART 572-O HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS




CHANNEL: HEDZC FILTER: CH. CLASS 1000 PEAK DATA: 135.48 G @ 2.32 MS; -1.80 G @ 7.20 MS

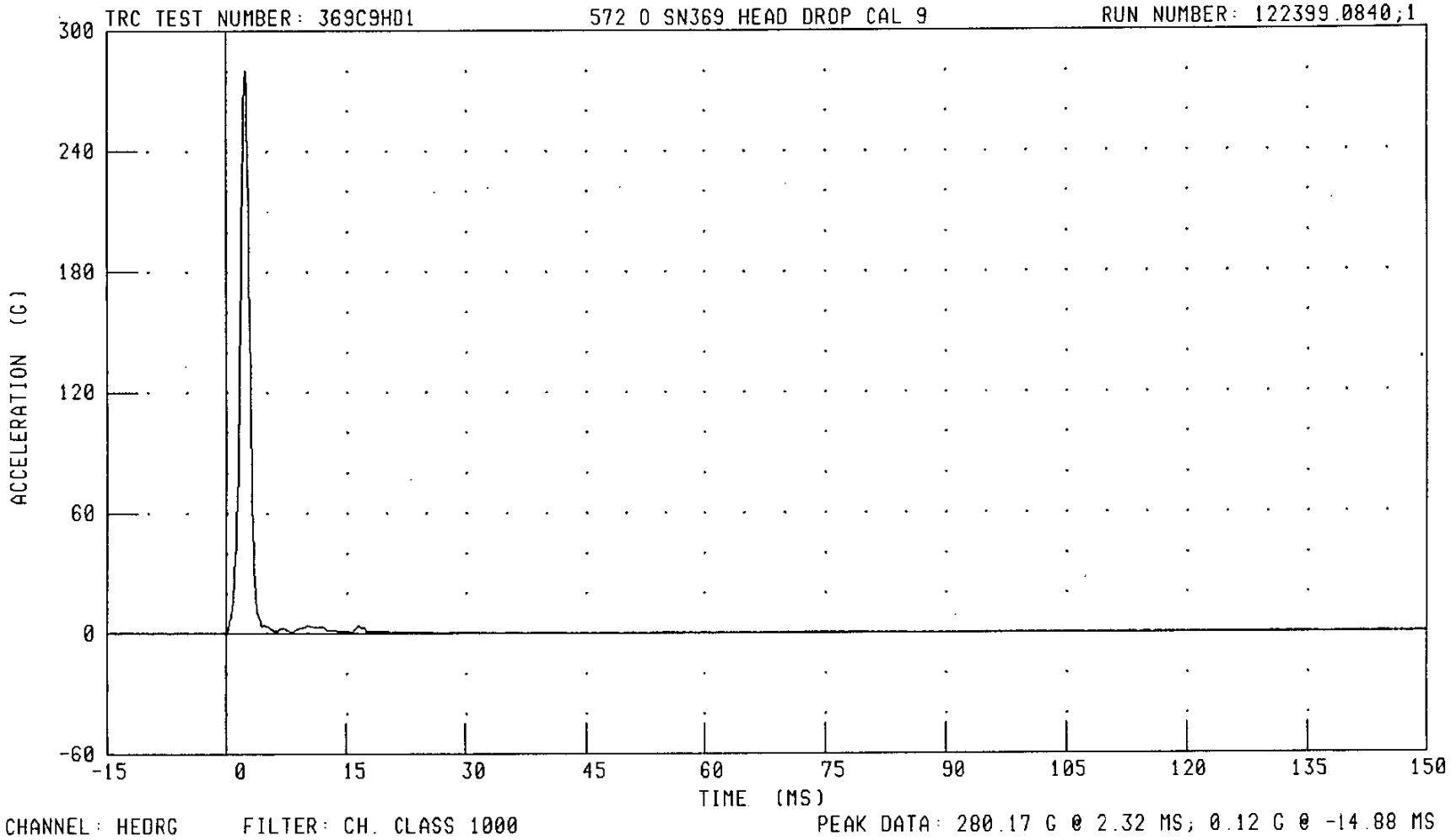
PART 572-O HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 369C9HD1 572 O SN369 HEAD DROP CAL 9 RUN NUMBER: 122399.0840;1




CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 280.17 G @ 2.32 MS; 0.12 G @ -0.96 MS

PART 572-0 HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION




CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 280.17 G @ 2.32 MS; 0.12 G @ -14.88 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE 23-DEC-99

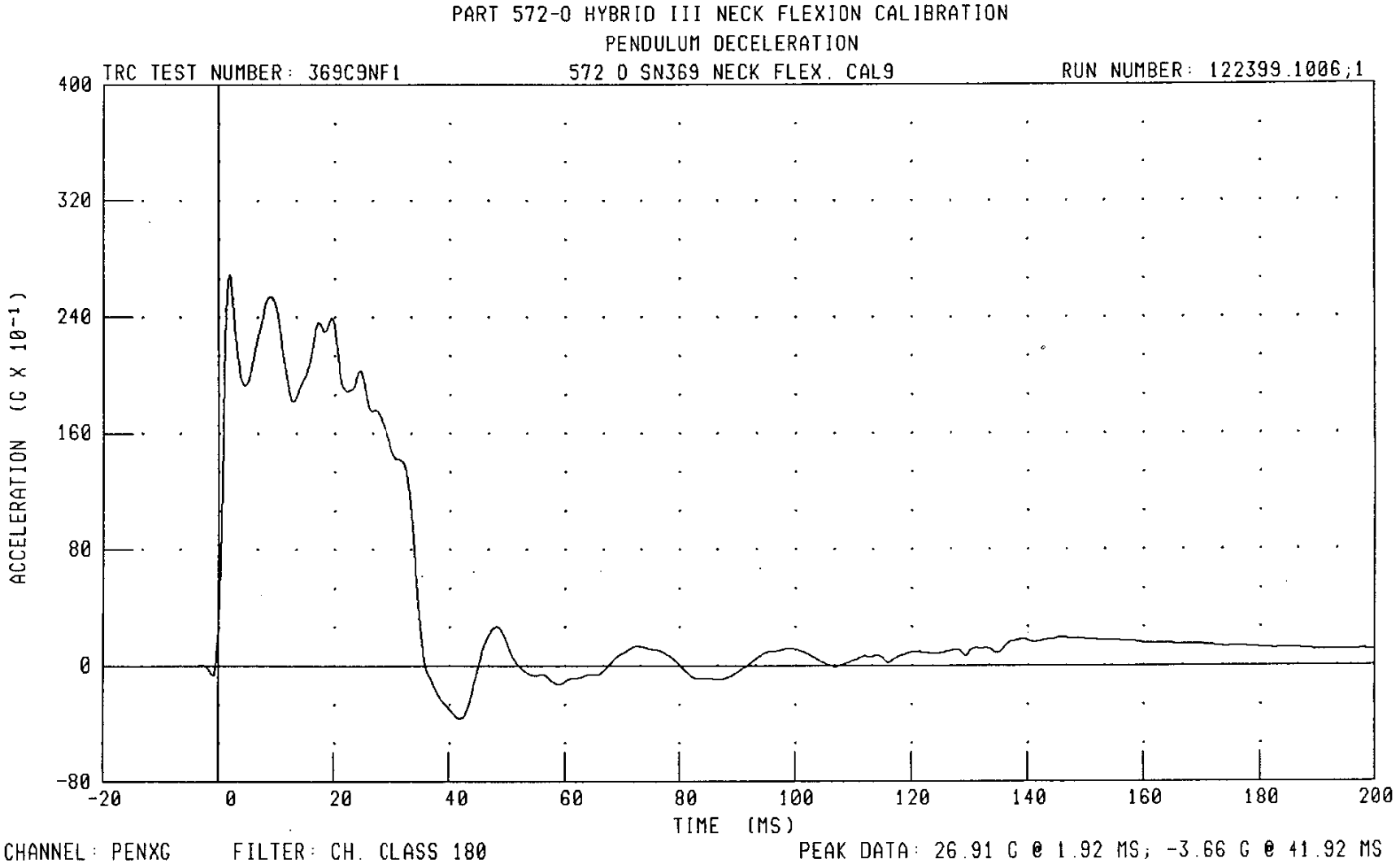
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

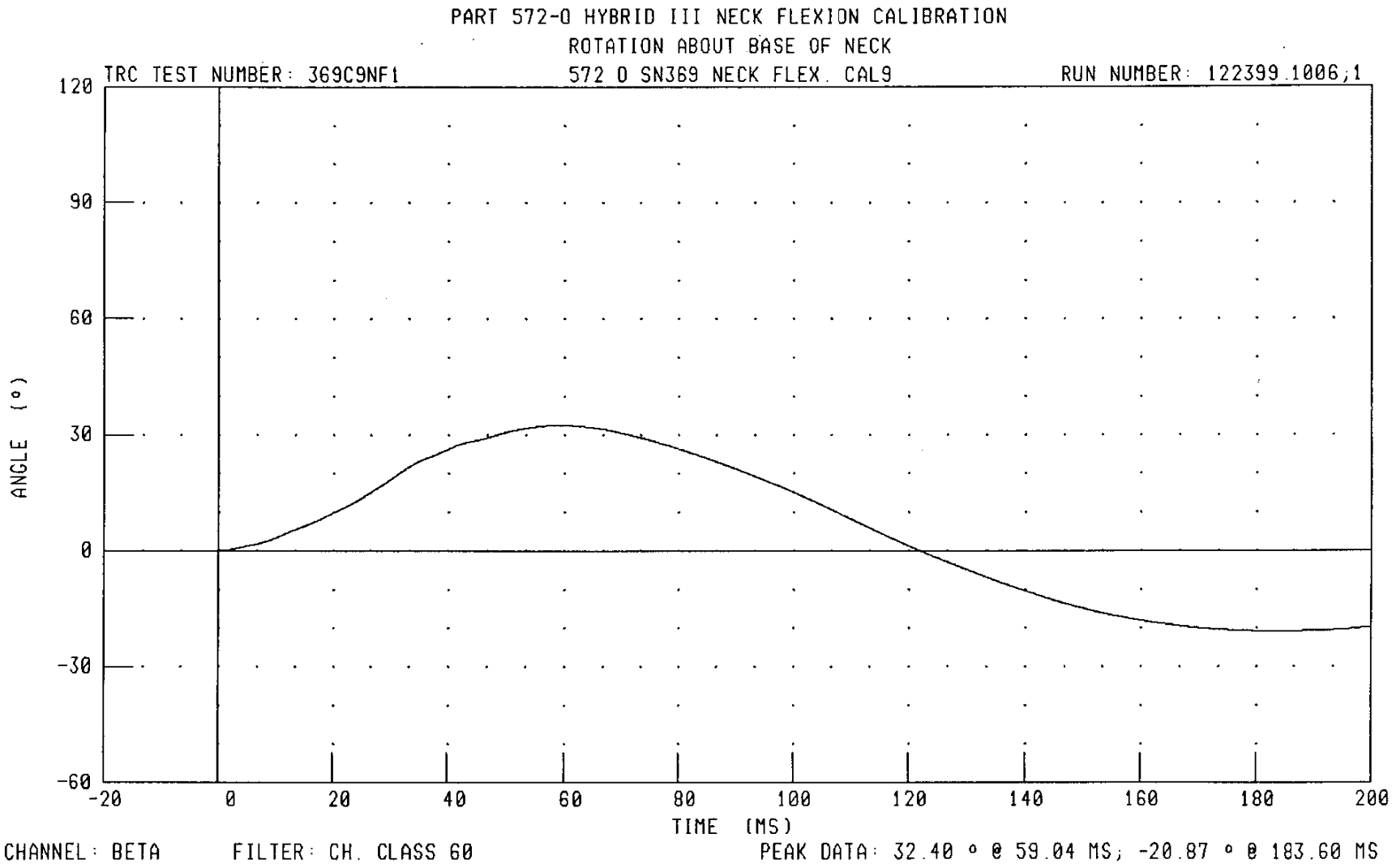
TRC INC. TEST NO: 369C9NF1 572 O SN369 NECK FLEX. CAL9

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 6.89 - 7.13 M/S | 7.12 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 2.1 - 2.5 M/S | 2.13 M/S |
| | 20 MS | 4.0 - 5.0 M/S | 4.23 M/S |
| | 30 MS | 5.8 - 7.0 M/S | 6.05 M/S |
| PEAK D-PLANE ROTATION | | 80 - 92 DEG. | 80.06 DEG. |
| PEAK MOMENT DURING ROTATION INTERVAL | | 69 - 83 NM | 71.95 NM |
| MOMENT DECAY TIME FROM TO TO 10NM | | 80 - 100 MS | 86.72 MS |

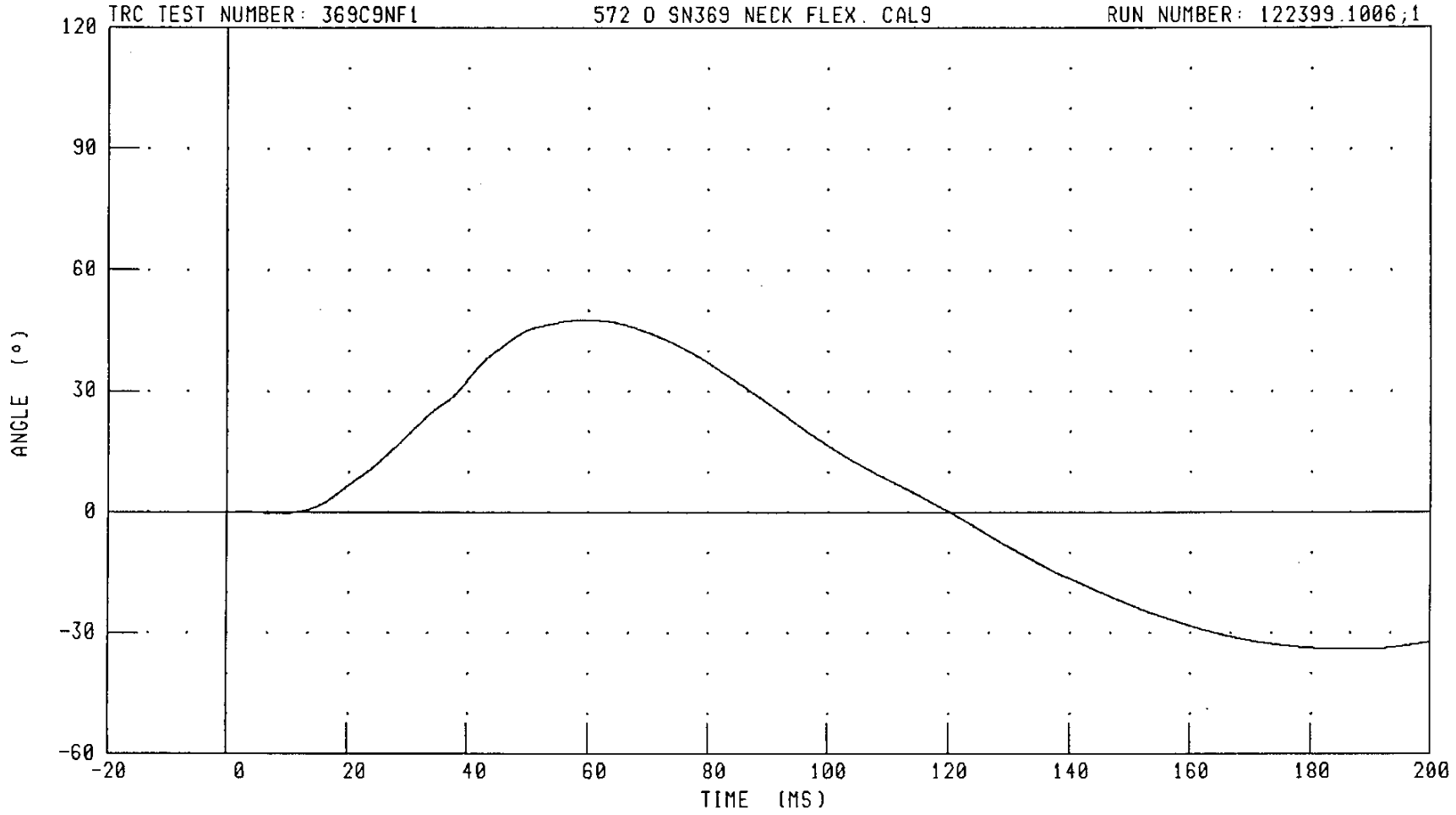
TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Wallace RUN NUMBER: 122399.1006;1


PART 572-0 HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 369C9NF1
572 0 SN369 NECK FLEX. CAL9
RUN NUMBER: 122399.1006;1
ACCELERATION (G X 10⁻¹)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 26.91 G @ 1.92 MS; -3.66 G @ 41.92 MS


PART 572-0 HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 369C9NF1
572 0 SN369 NECK FLEX. CAL9
RUN NUMBER: 122399.1006;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 32.40 ° @ 59.04 MS; -20.87 ° @ 183.60 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

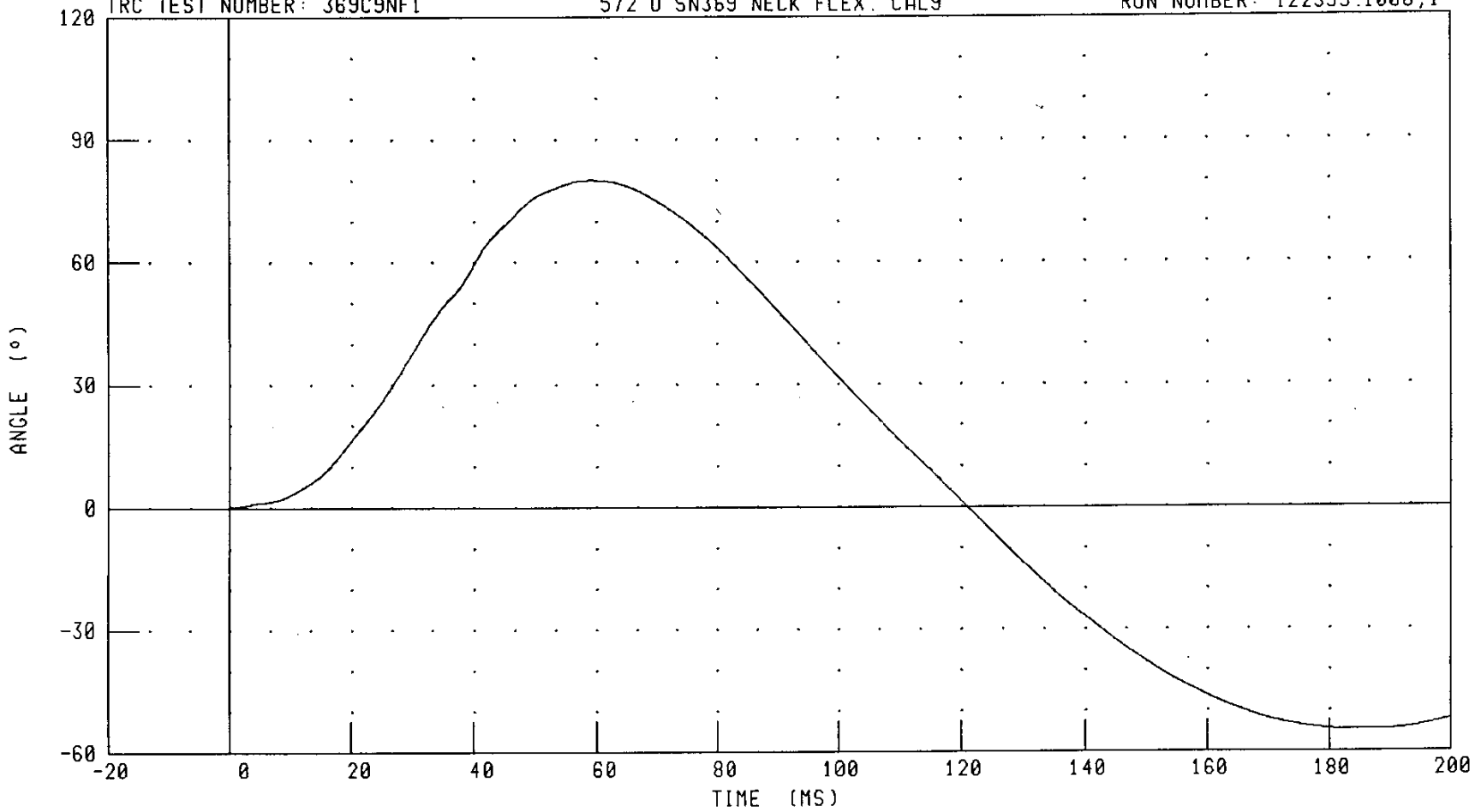



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 47.67 ° @ 59.36 MS; -33.93 ° @ 186.48 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 369C9NF1 572 0 SN369 NECK FLEX. CAL9 RUN NUMBER: 122399.1006;1

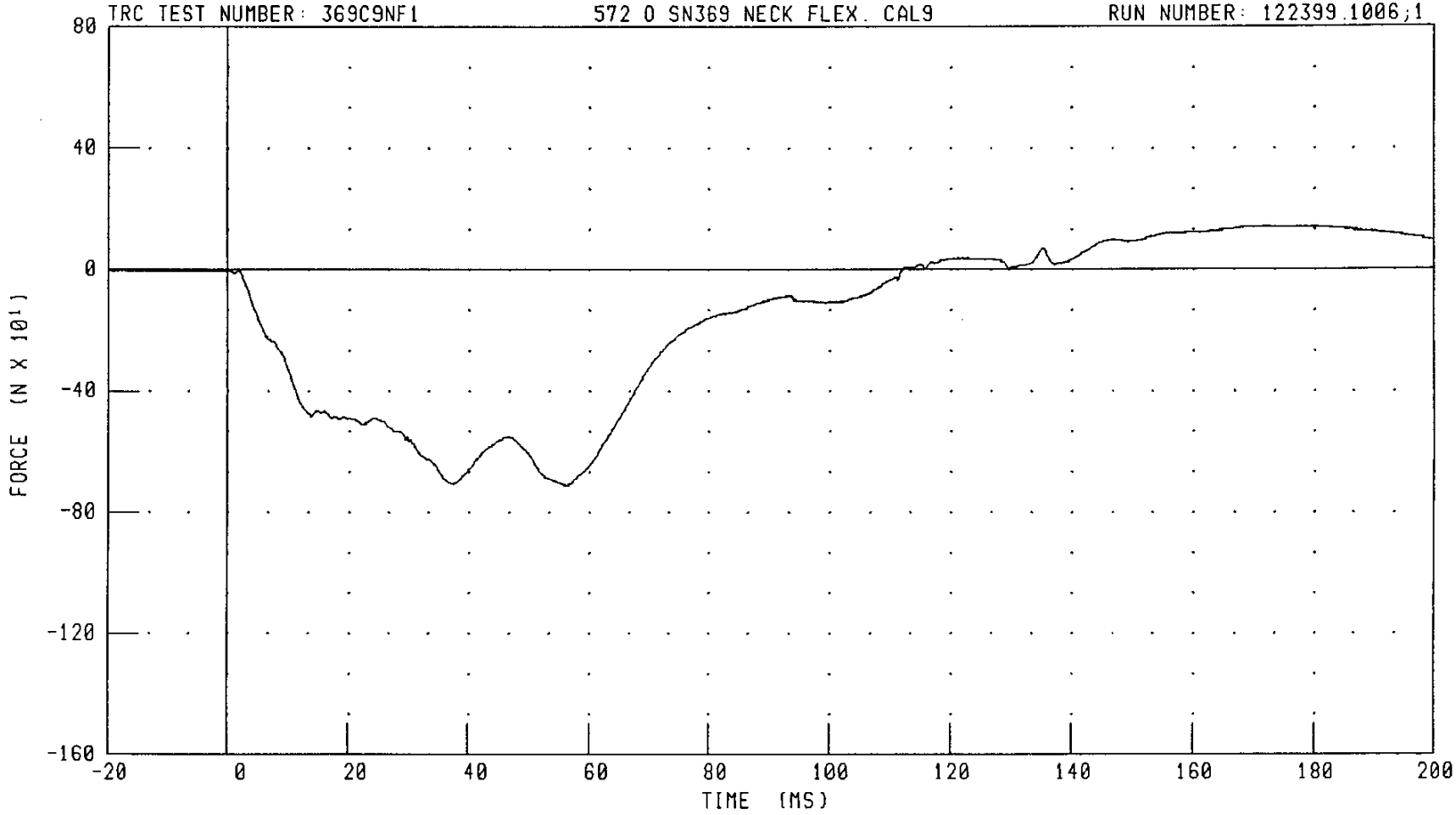



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 80.06 ° @ 59.20 MS; -54.78 ° @ 185.04 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

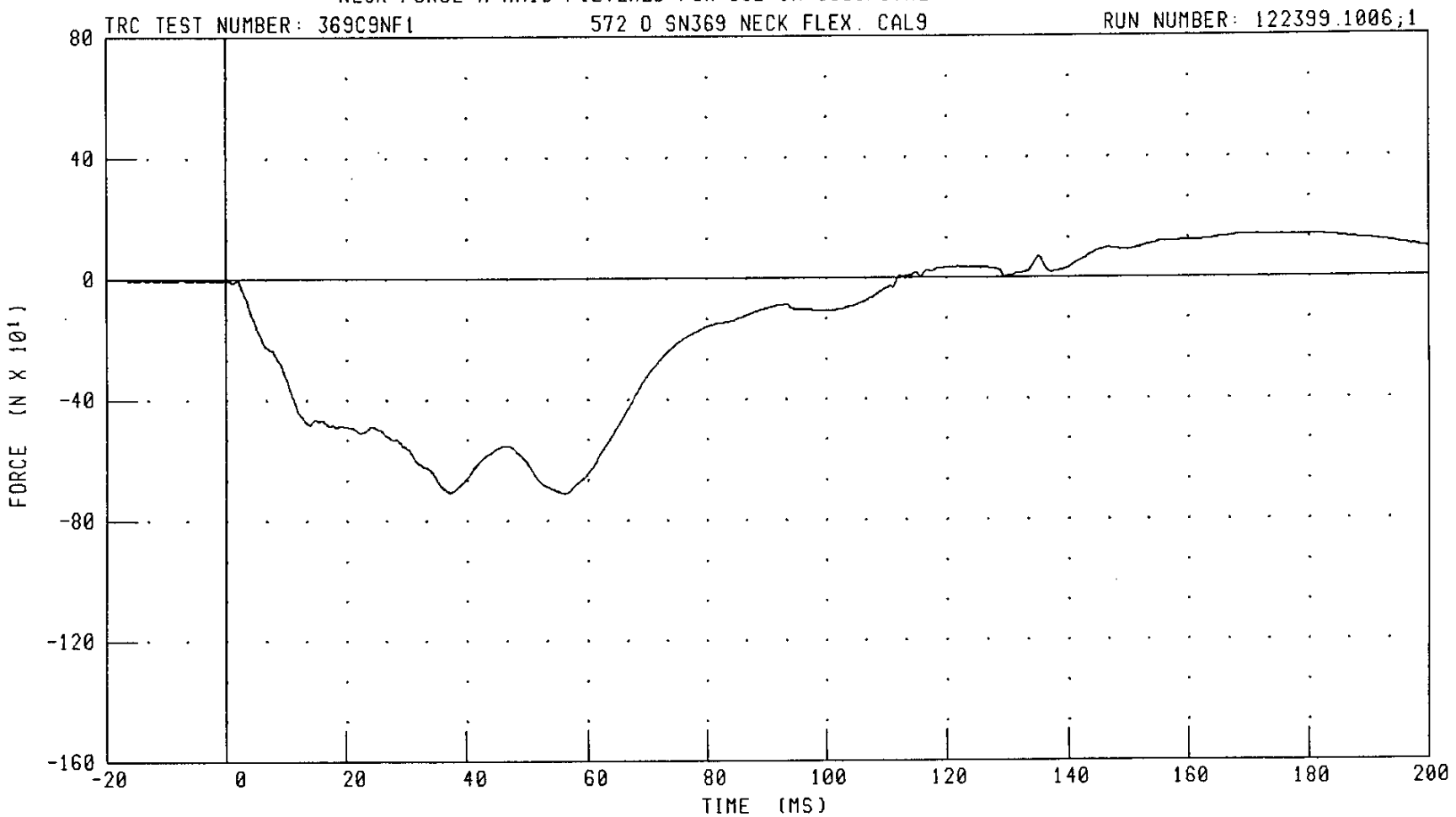
TRC TEST NUMBER: 369C9NF1 572 0 SN369 NECK FLEX. CAL9 RUN NUMBER: 122399.1006;1




CHANNEL: NEKXF FILTER: CH. CLASS 1000 PEAK DATA: 144.00 N @ 171.44 MS; -711.76 N @ 55.76 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION



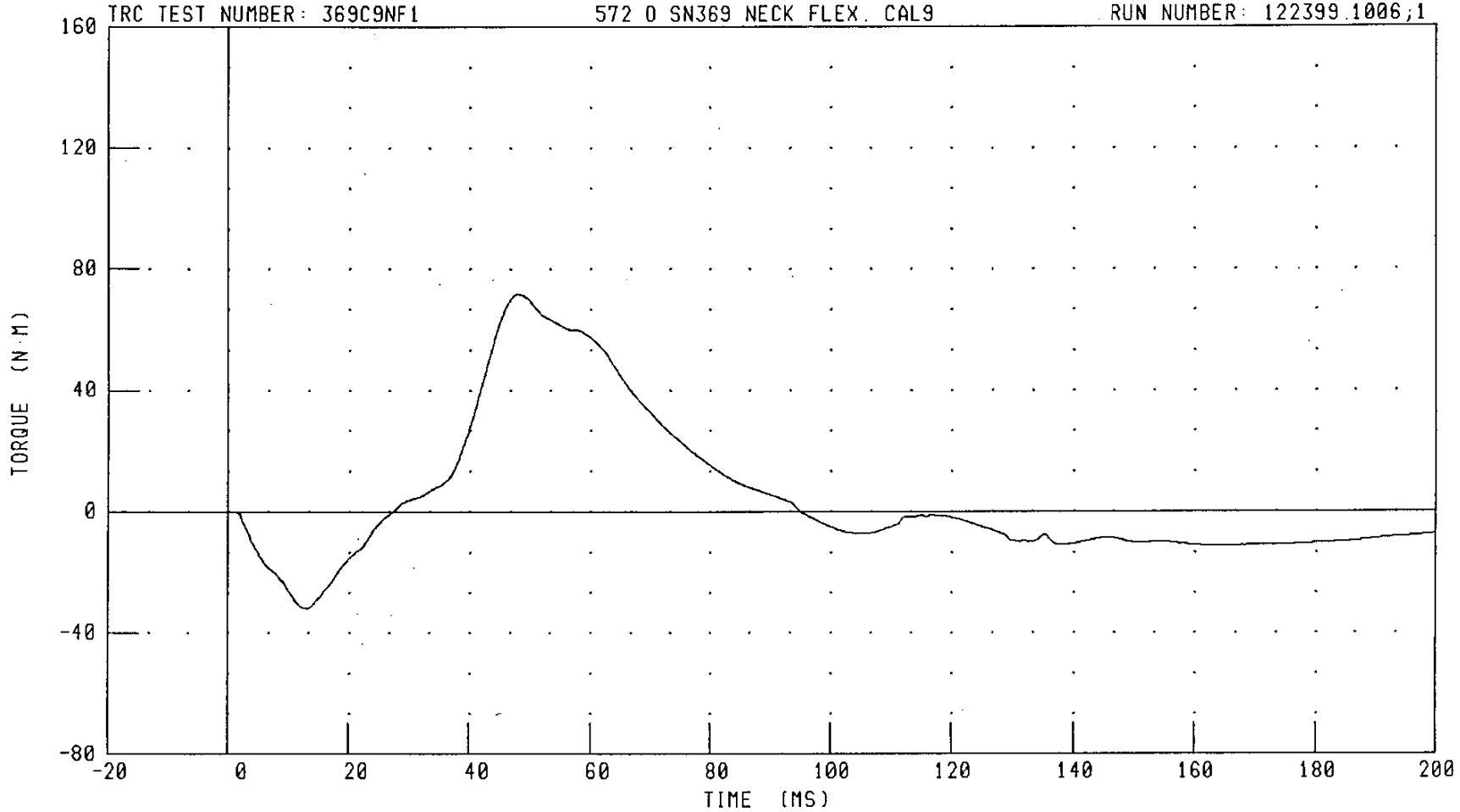

CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 142.55 N @ 171.60 MS; -711.58 N @ 56.24 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

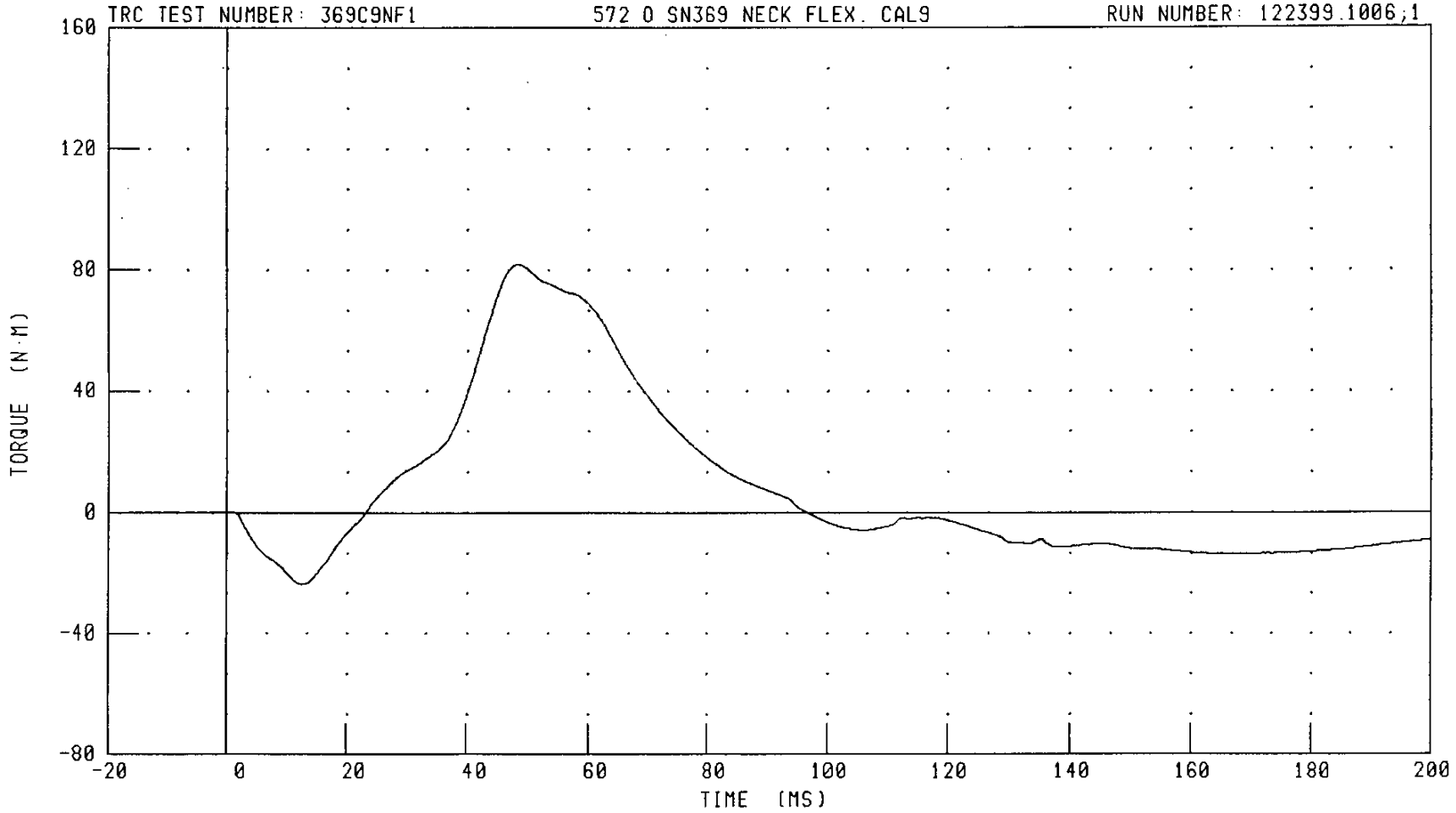
TRC TEST NUMBER: 369C9NF1 572 0 SN369 NECK FLEX. CAL9 RUN NUMBER: 122399.1006;1




CHANNEL: NEKYM FILTER: CH. CLASS 600 PEAK DATA: 71.61 N·M @ 48.00 MS; -31.81 N·M @ 13.20 MS

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

TRC TEST NUMBER: 369C9NF1 572 O SN369 NECK FLEX. CAL9 RUN NUMBER: 122399.1006;1




CHANNEL: NEKOM FILTER: CH. CLASS 600 PEAK DATA: 81.78 N-M @ 48.48 MS; -23.65 N-M @ 12.48 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE 23-DEC-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

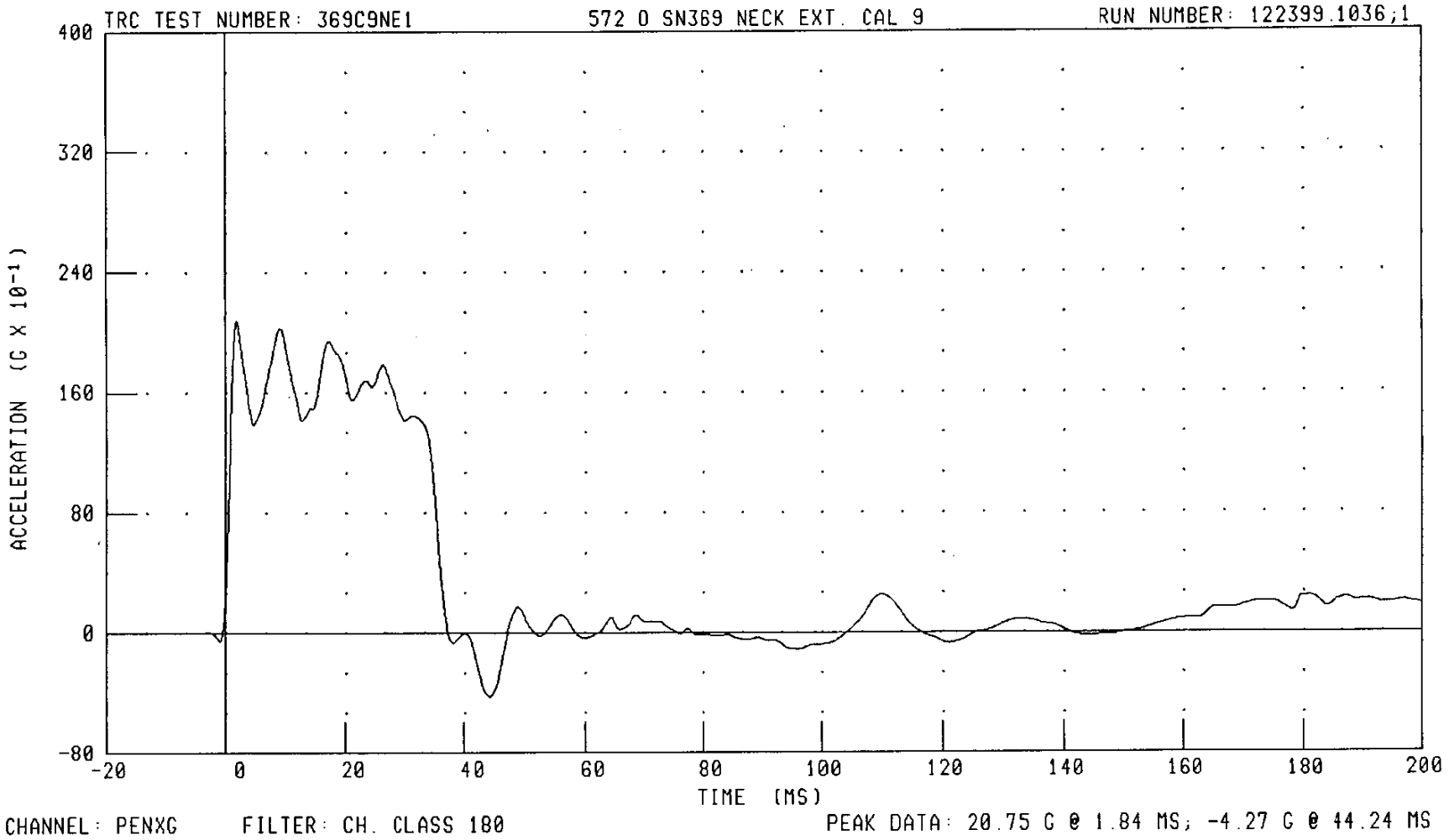
TRC INC. TEST NO: 369C9NE1 572 O SN369 NECK EXT. CAL 9

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| TEMPERATURE | | 20.6 - 22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | | 10 - 70 % | 44.0 % |
| IMPACT VELOCITY | | 5.95 - 6.19 M/S | 6.00 M/S |
| INTEGRATED PENDULUM VELOCITY | 10 MS | 1.5 - 1.9 M/S | 1.62 M/S |
| | 20 MS | 3.1 - 3.9 M/S | 3.27 M/S |
| | 30 MS | 4.6 - 5.6 M/S | 4.87 M/S |
| PEAK D-PLANE ROTATION | | 97 - 109 DEG. | 104.62 DEG. |
| PEAK MOMENT DURING ROTATION INTERVAL | | -55 /-69 NM | -59.42 NM |
| MOMENT DECAY TIME FROM TO TO -10 NM LEVEL | | 94 - 114 MS | 106.4 MS |

TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Wallace RUN NUMBER: 122399.1033;1

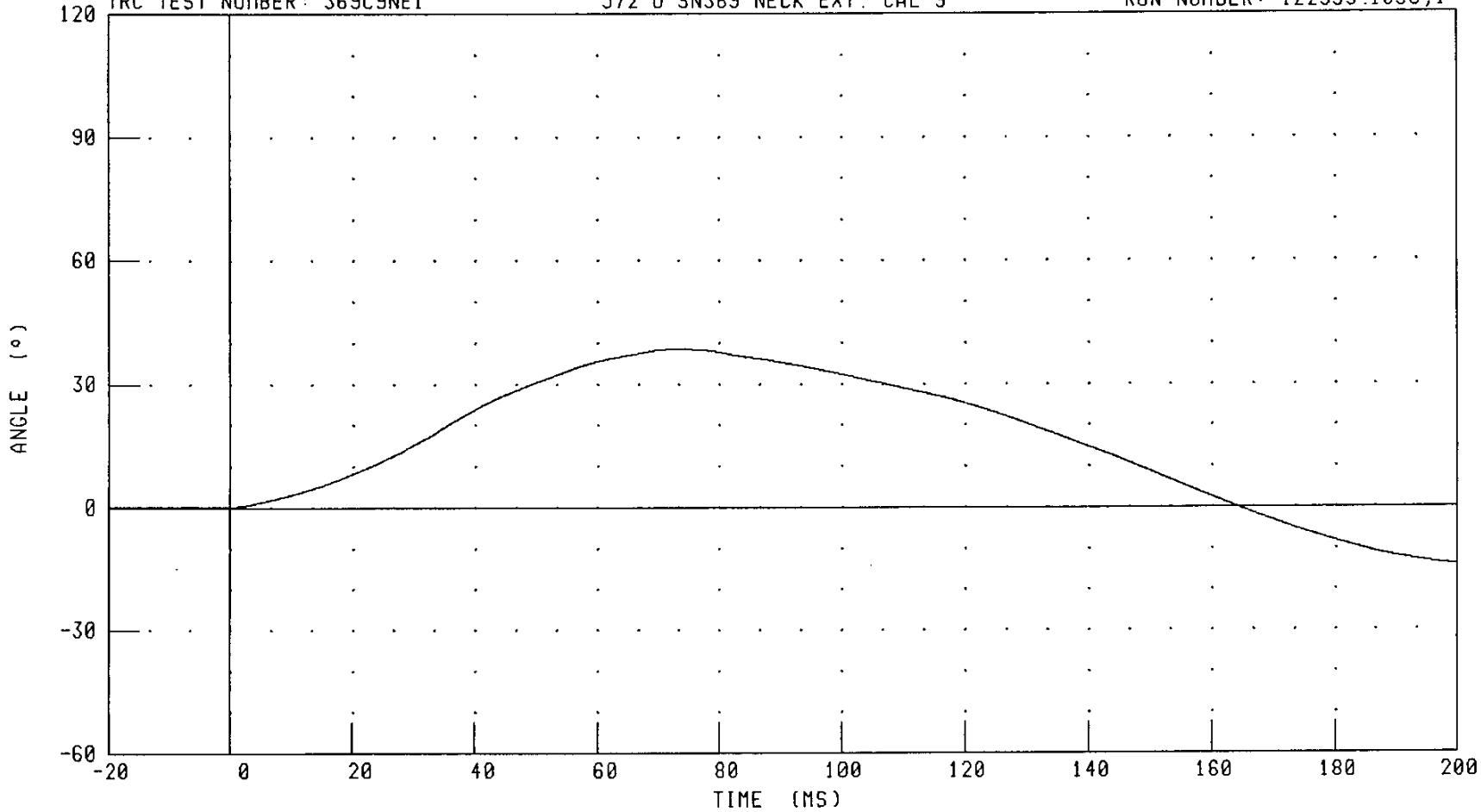
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION




CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 20.75 G @ 1.84 MS; -4.27 G @ 44.24 MS

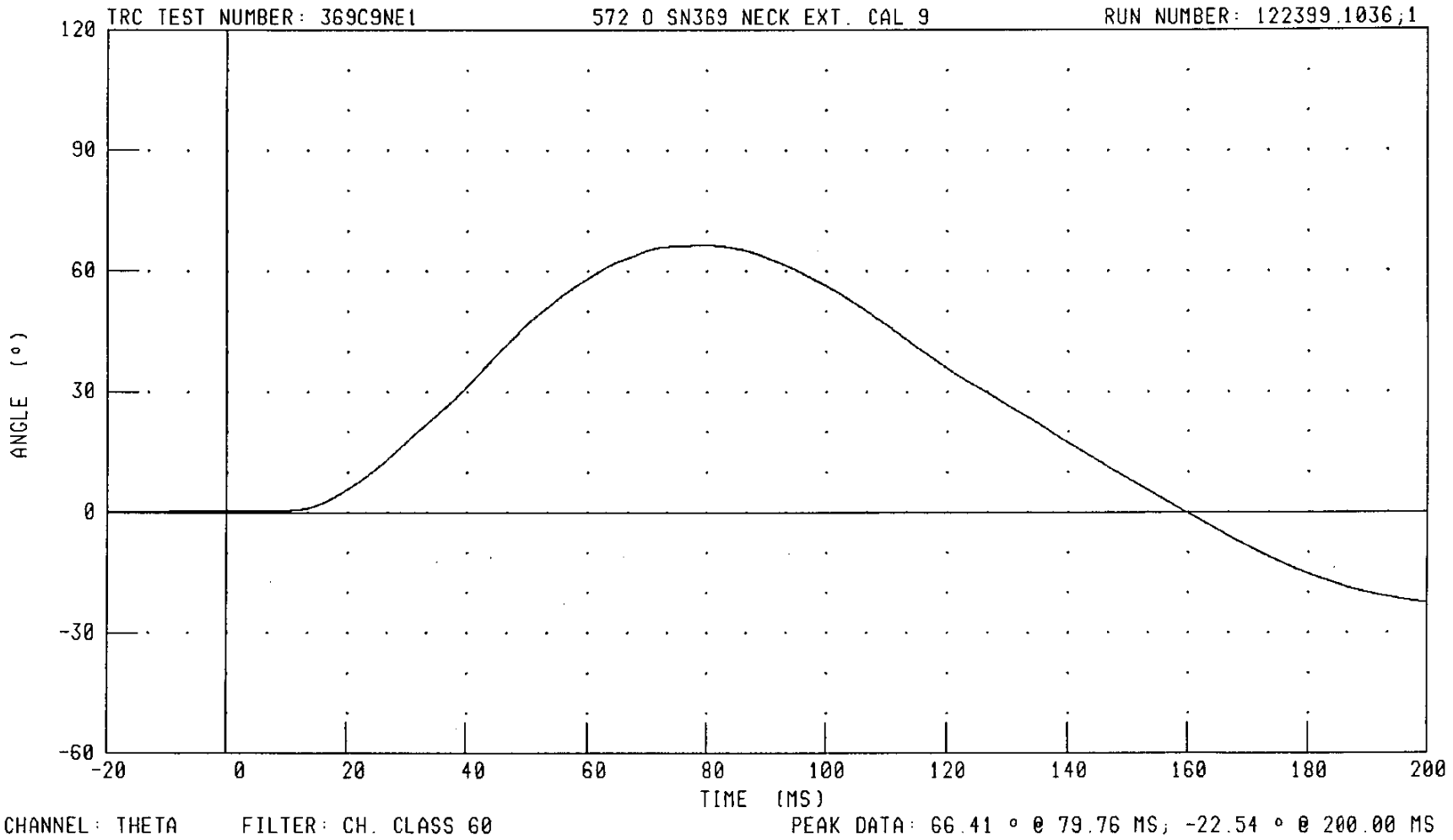
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 369C9NE1
572 0 SN369 NECK EXT. CAL 9
RUN NUMBER: 122399.1036;1




CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 38.45 ° @ 73.28 MS; -14.11 ° @ 200.00 MS

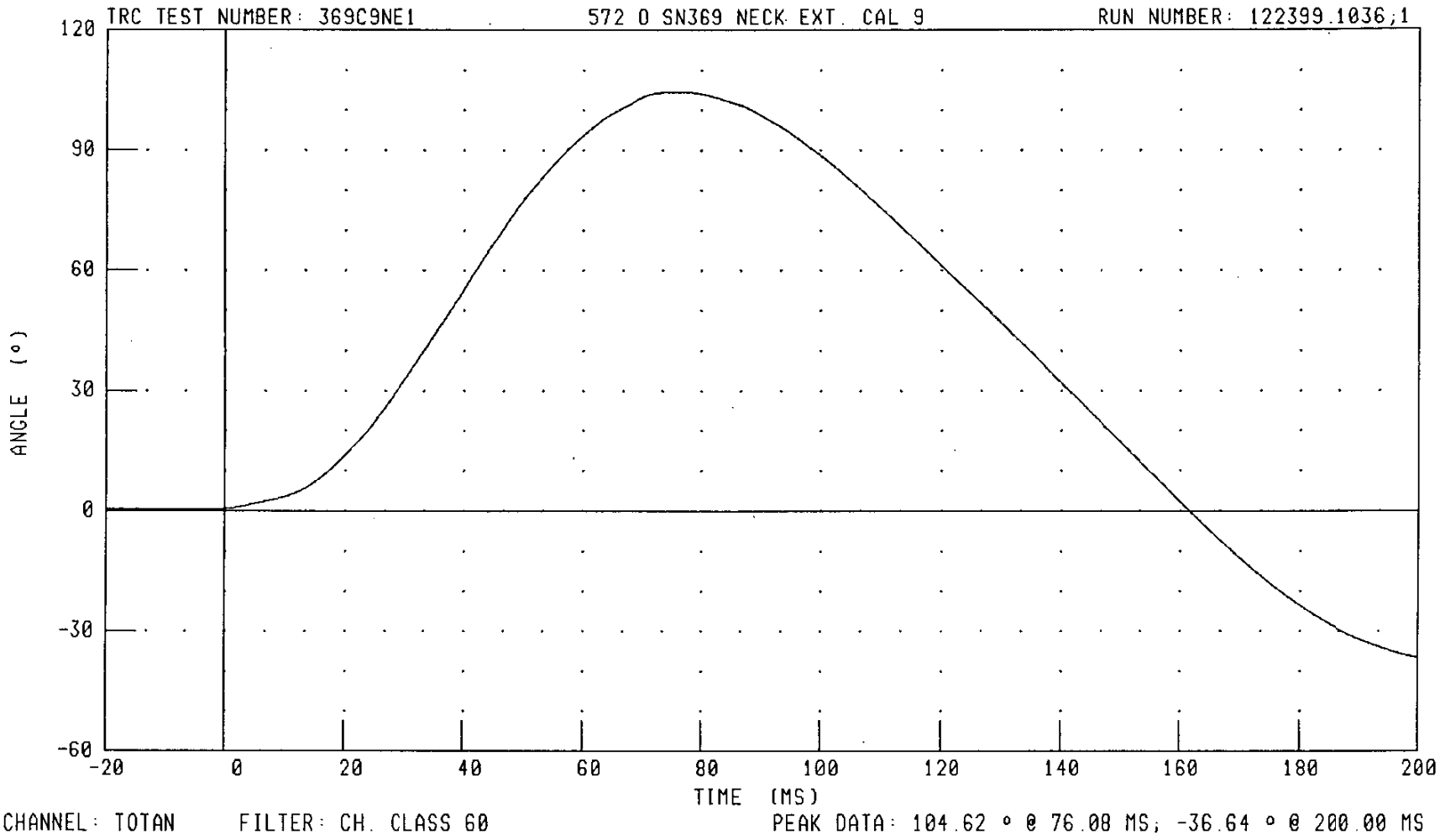
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE




CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 66.41 ° @ 79.76 MS; -22.54 ° @ 200.00 MS

PART 572-O HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

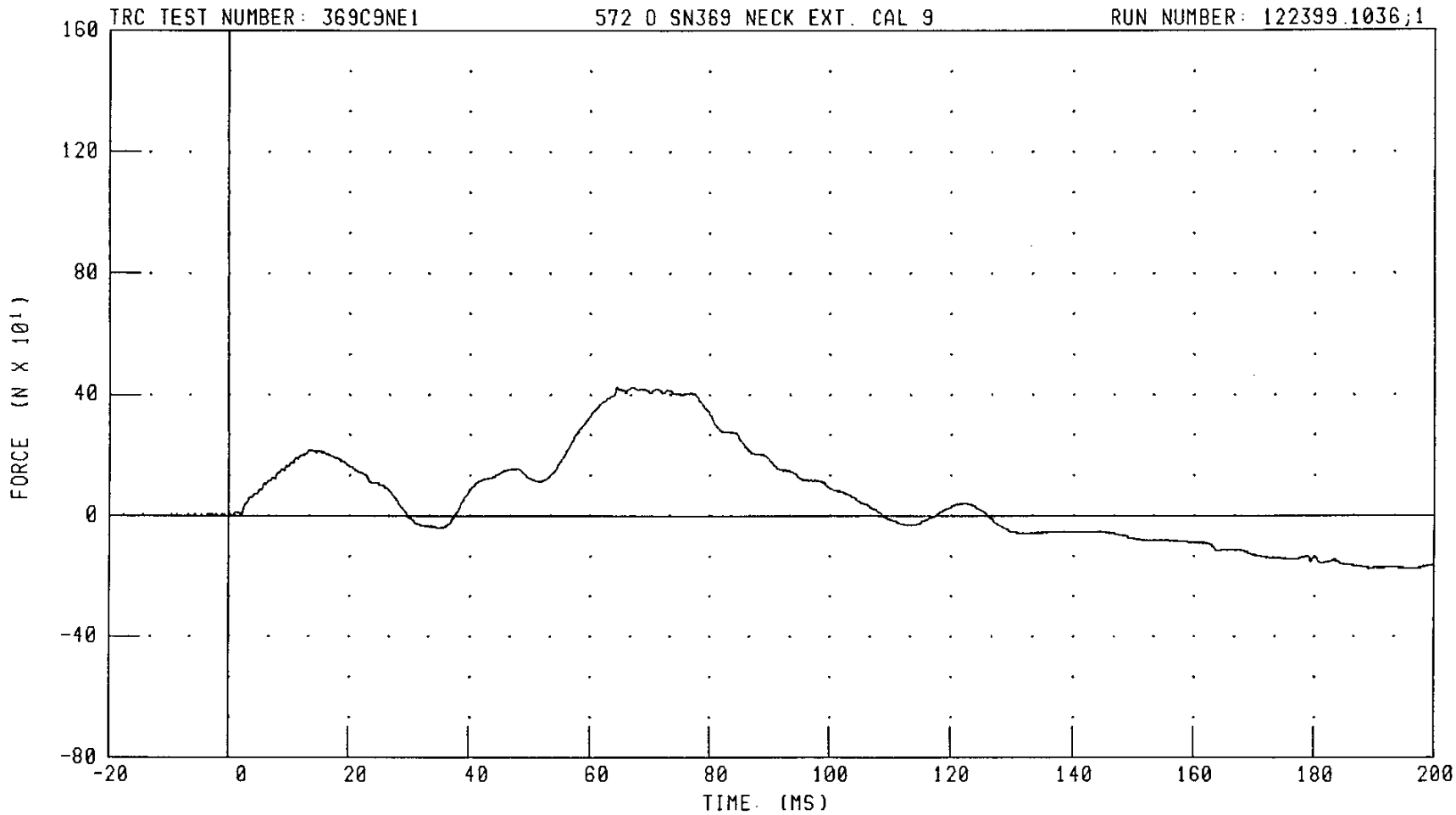



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 104.62 ° @ 76.08 MS; -36.64 ° @ 200.00 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

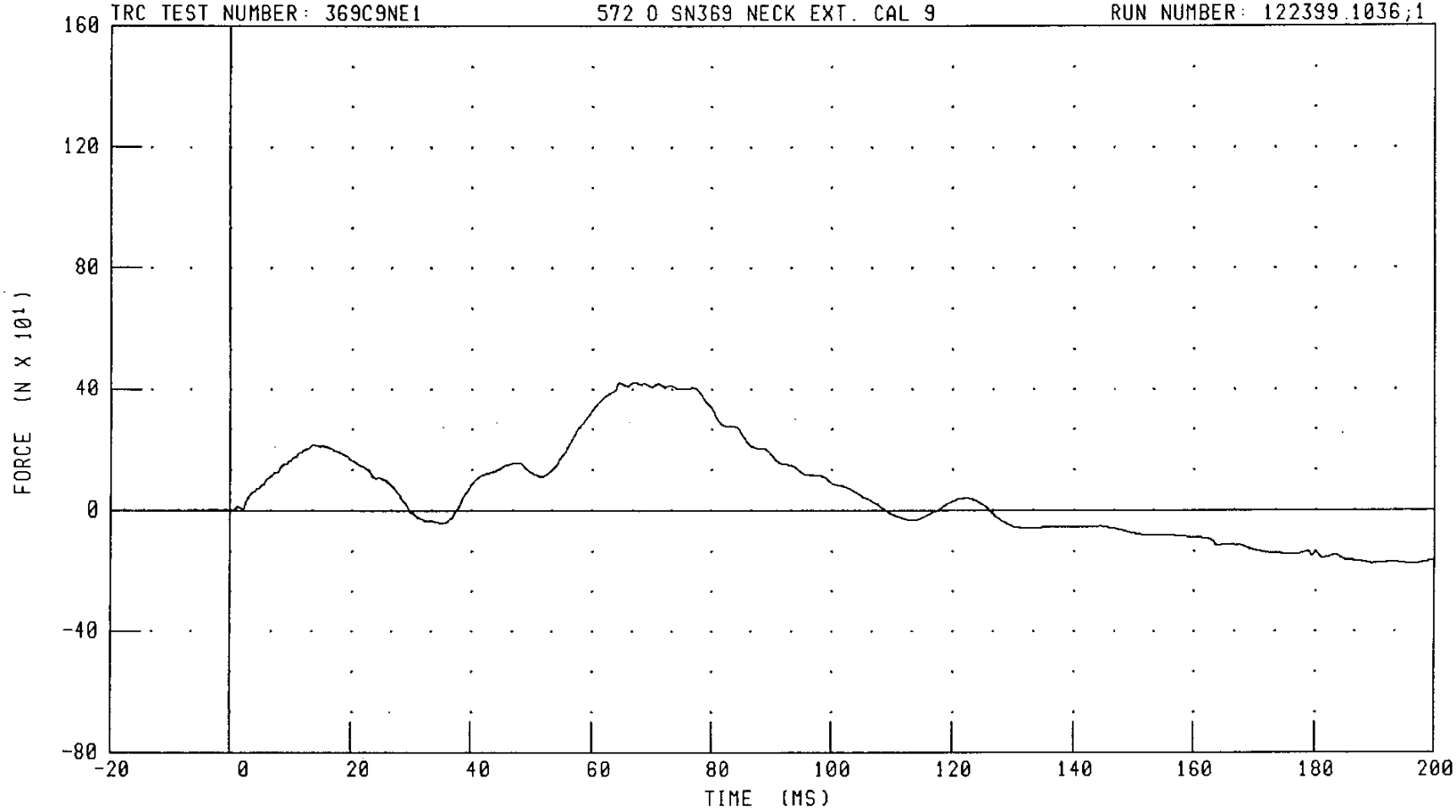
NECK FORCE X AXIS




CHANNEL: NEKXF FILTER: CH. CLASS 1000 PEAK DATA: 426.00 N @ 64.40 MS; -175.77 N @ 189.04 MS

PART 572-D HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION



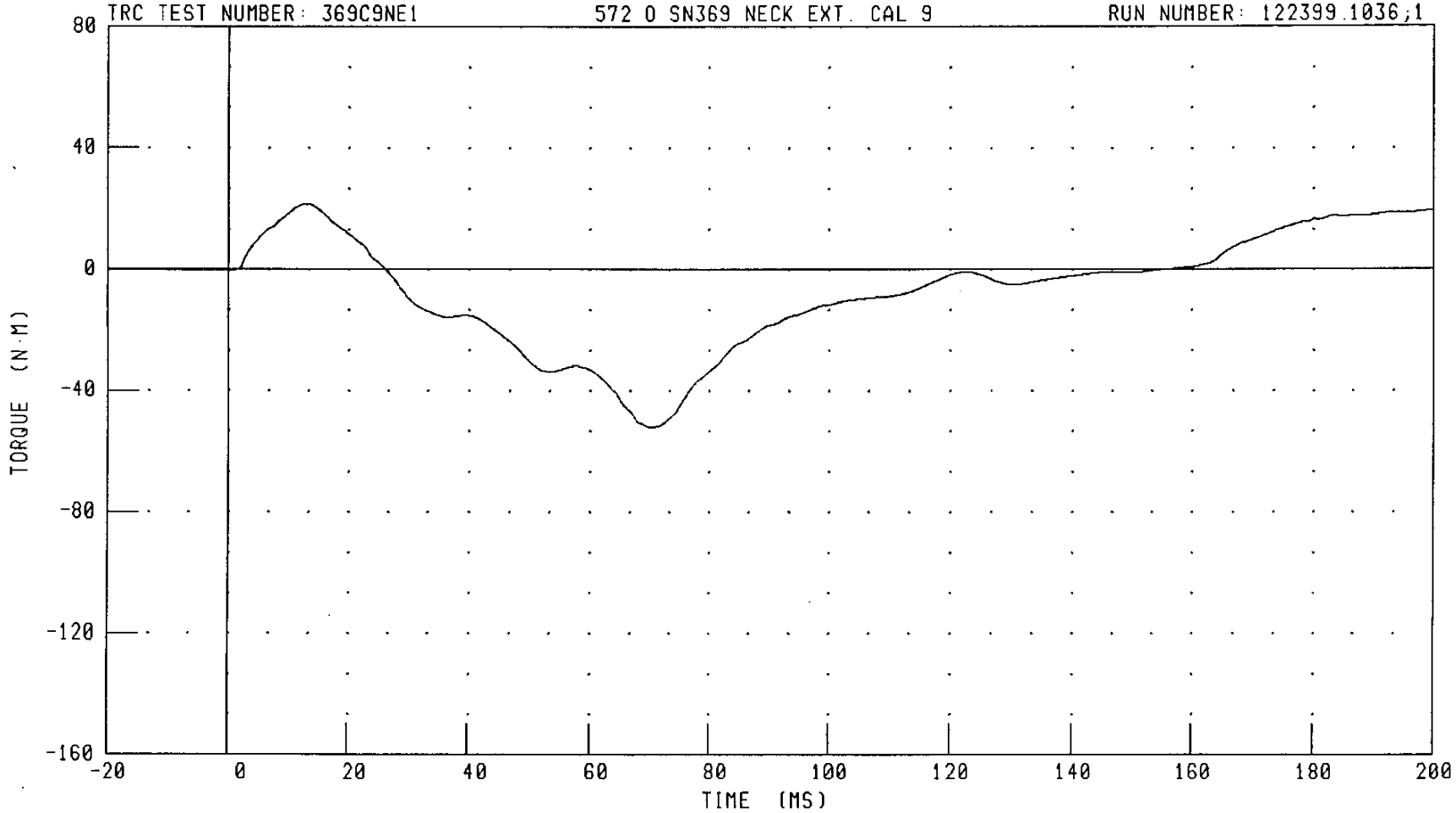

CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 422.40 N @ 67.12 MS; -175.97 N @ 189.68 MS

PART 572-O HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 369C9NE1 572 O SN369 NECK EXT. CAL 9 RUN NUMBER: 122399.1036;1

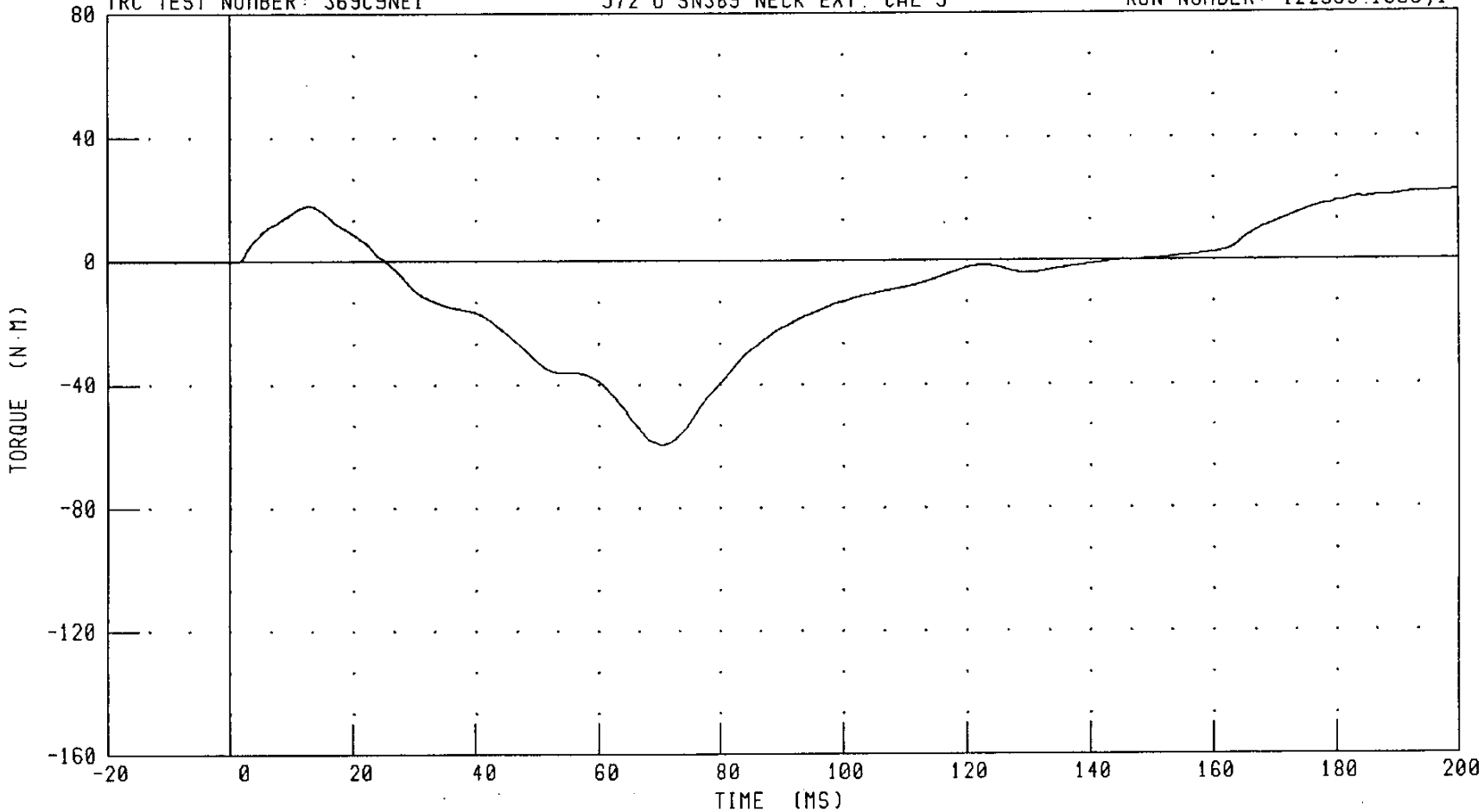



CHANNEL: NEKYM FILTER: CH. CLASS 600 PEAK DATA: 21.64 N-M @ 13.28 MS; -52.15 N-M @ 70.40 MS

PART 572-O HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 369C9NE1 572 O SN369 NECK EXT. CAL 9 RUN NUMBER: 122399.1036;1




CHANNEL: NEKOM FILTER: CH. CLASS 600 PEAK DATA: 22.53 N-M @ 200.00 MS; -59.42 N-M @ 70.48 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE 23-DEC-99

TRC INC. TEST NO: 369C9TH1 572 O SN369 THORAX CAL9

| TEST PARAMETER | HIGH SPEED TEST SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 20.6-22.2 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PENDULUM VELOCITY | 6.59 - 6.83 M/S | 6.59 M/S |
| MAXIMUM DEFLECTION | 48 - 55 MM | 51.8 MM |
| MAXIMUM RESISTIVE FORCE | 3900 - 4400 N | 4279. N |
| INTERNAL HYSTERESIS | 69% - 85% | 71.5% |

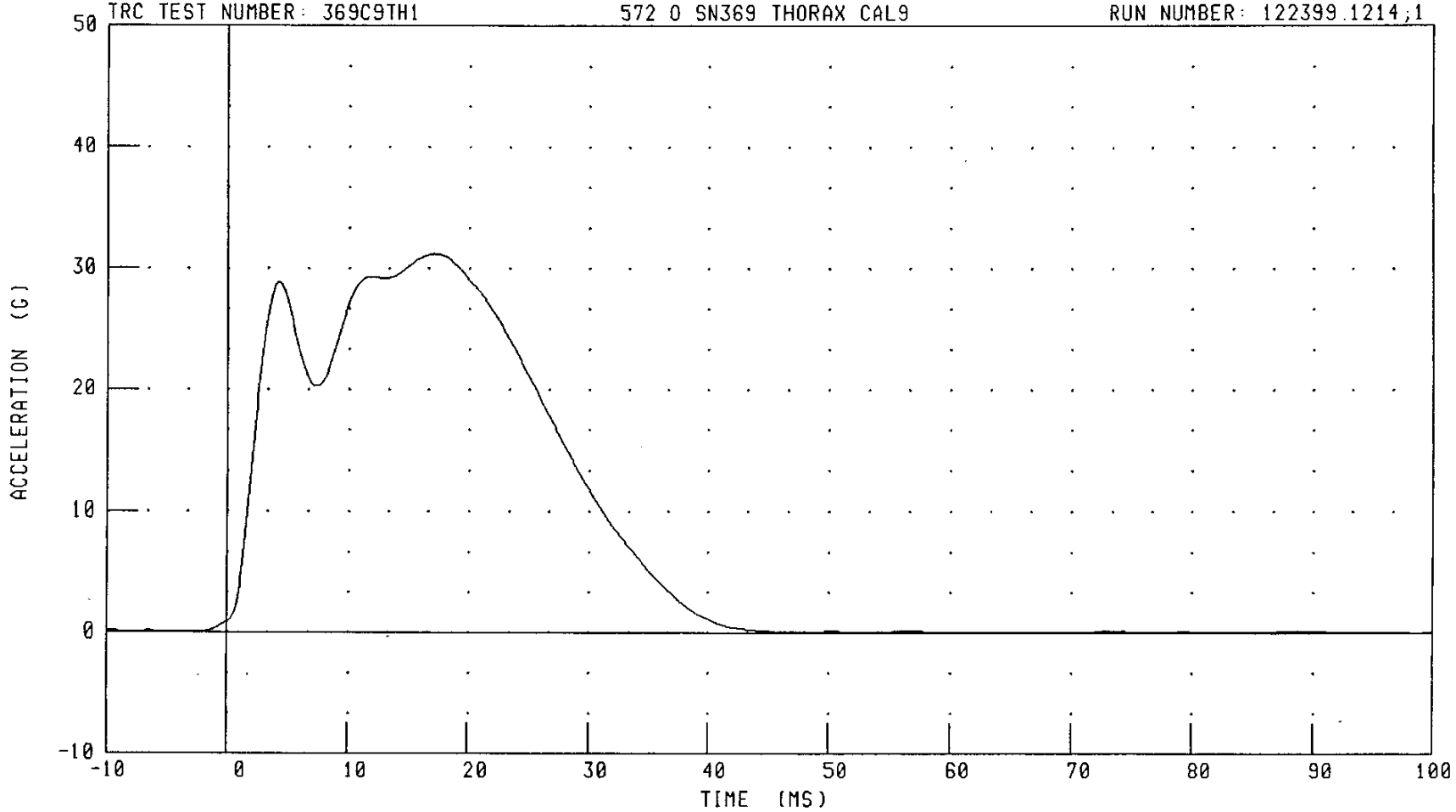
TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Wallace RUN NUMBER: 122399.1126;1

PART 572-O HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 369C9TH1 572 O SN369 THORAX CAL9 RUN NUMBER: 122399.1214;1

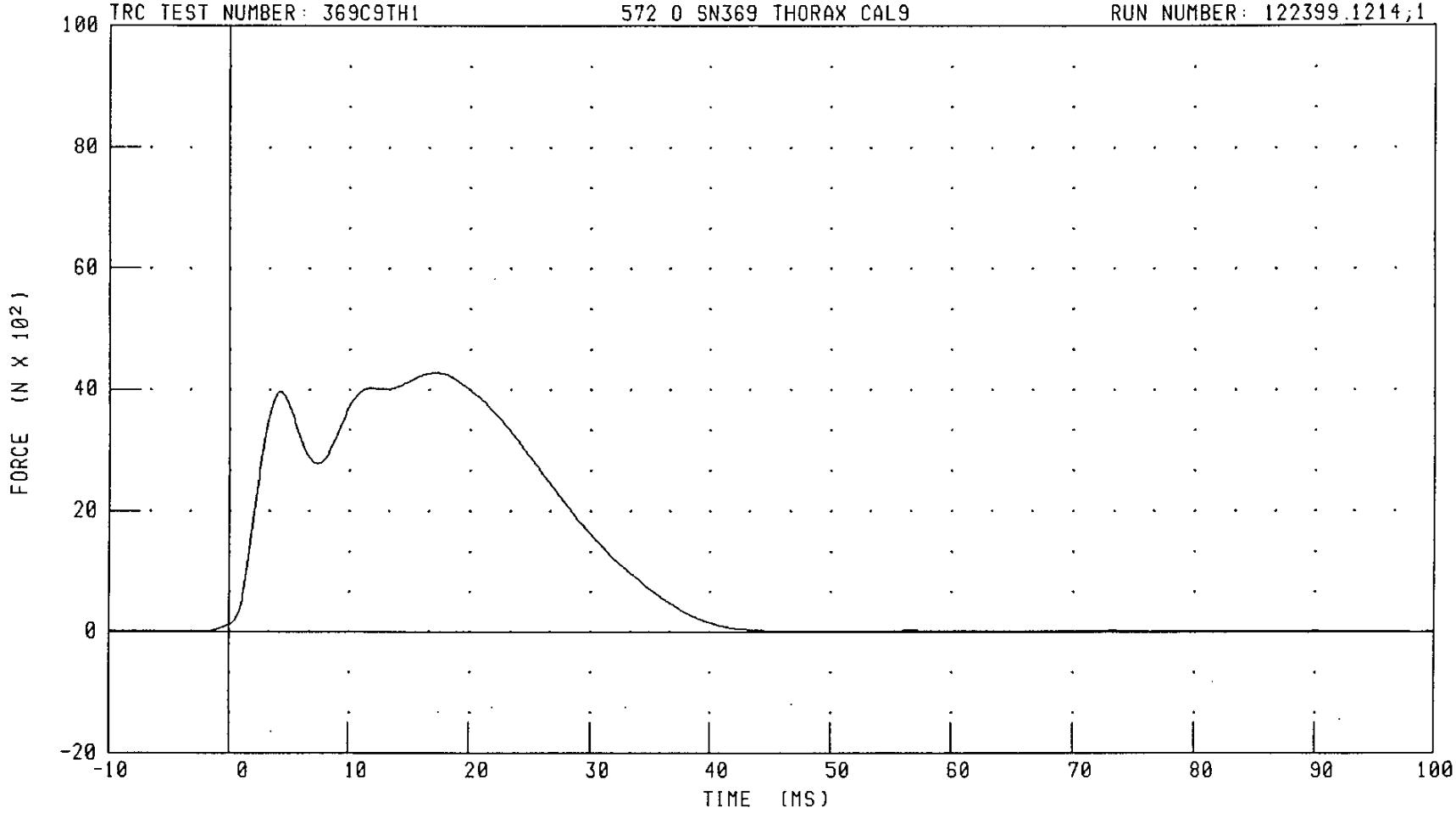



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 31.18 G @ 17.20 MS; 0.00 G @ 98.72 MS

PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM FORCE

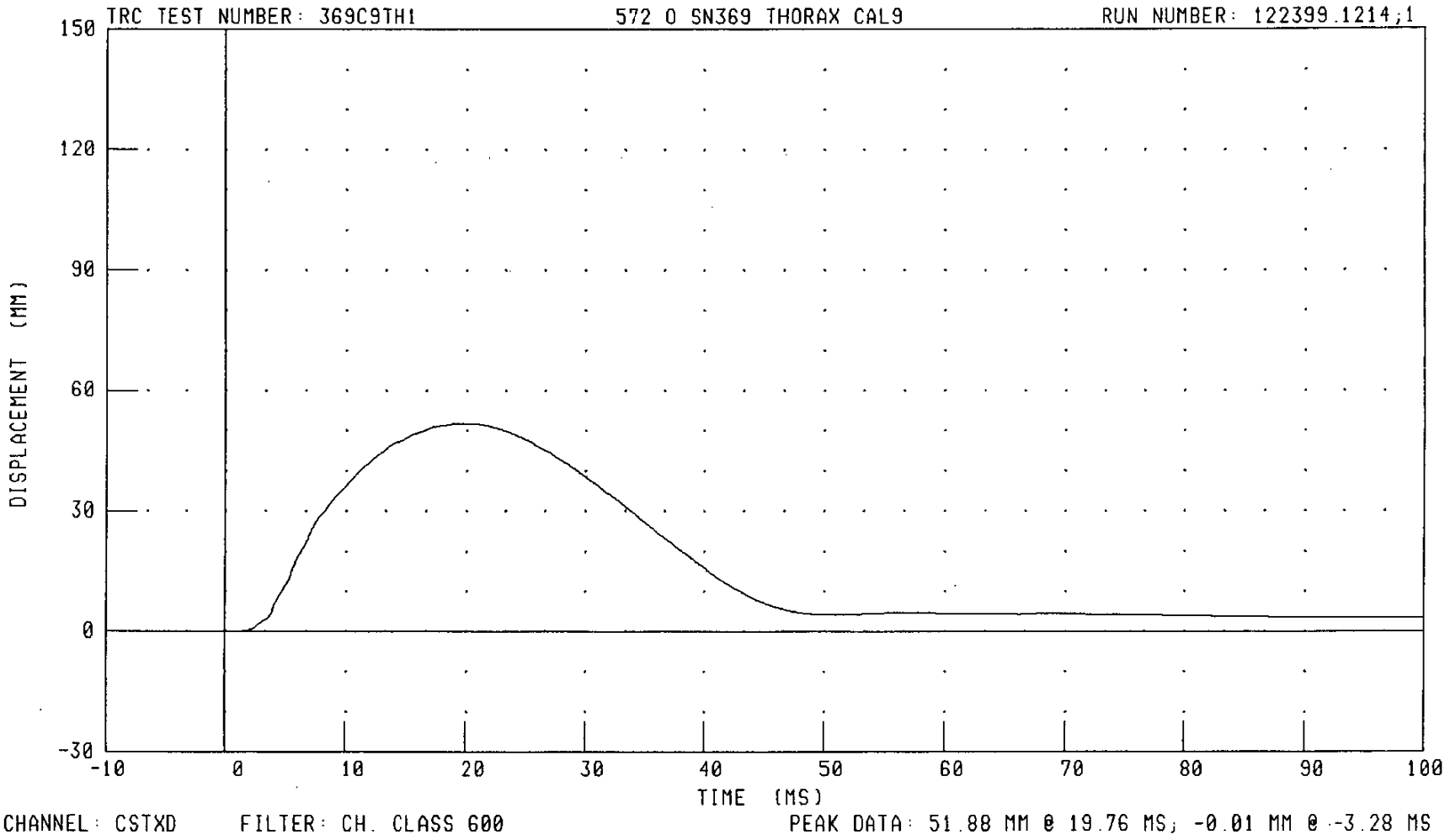
TRC TEST NUMBER: 369C9TH1 572 0 SN369 THORAX CAL9 RUN NUMBER: 122399.1214;1




CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 4279.00 N @ 17.20 MS; -0.11 N @ 98.72 MS

PART 572-O HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

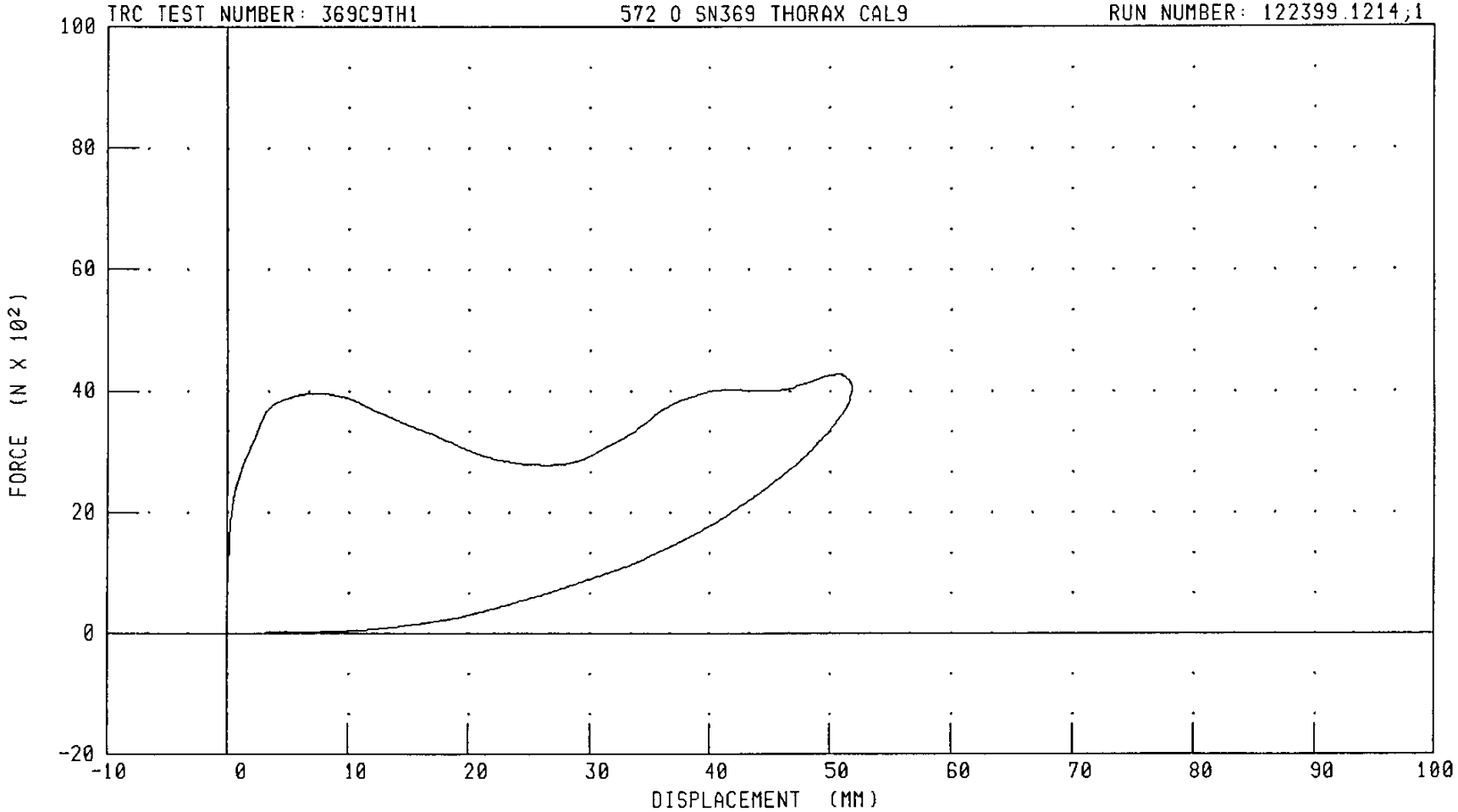



CHANNEL: CSTXD FILTER: CH. CLASS 600 PEAK DATA: 51.88 MM @ 19.76 MS; -0.01 MM @ -3.28 MS

PART 572-0 HYBRID III THORAX CALIBRATION

CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 369C9TH1 572 0 SN369 THORAX CAL9 RUN NUMBER: 122399.1214;1




CHANNEL: CSTXD FILTER: CH. CLASS 600 PEAK DATA: 51.88 MM @ 19.76 MS; -0.01 MM @ -3.28 MS

PENXF CH. CLASS 180 4279.00 N @ 17.20 MS; -0.11 N @ 98.72 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE 23-DEC-99

TRC INC. TEST NO: 369C9RK1 572 O SN369 R.KNEE CAL9

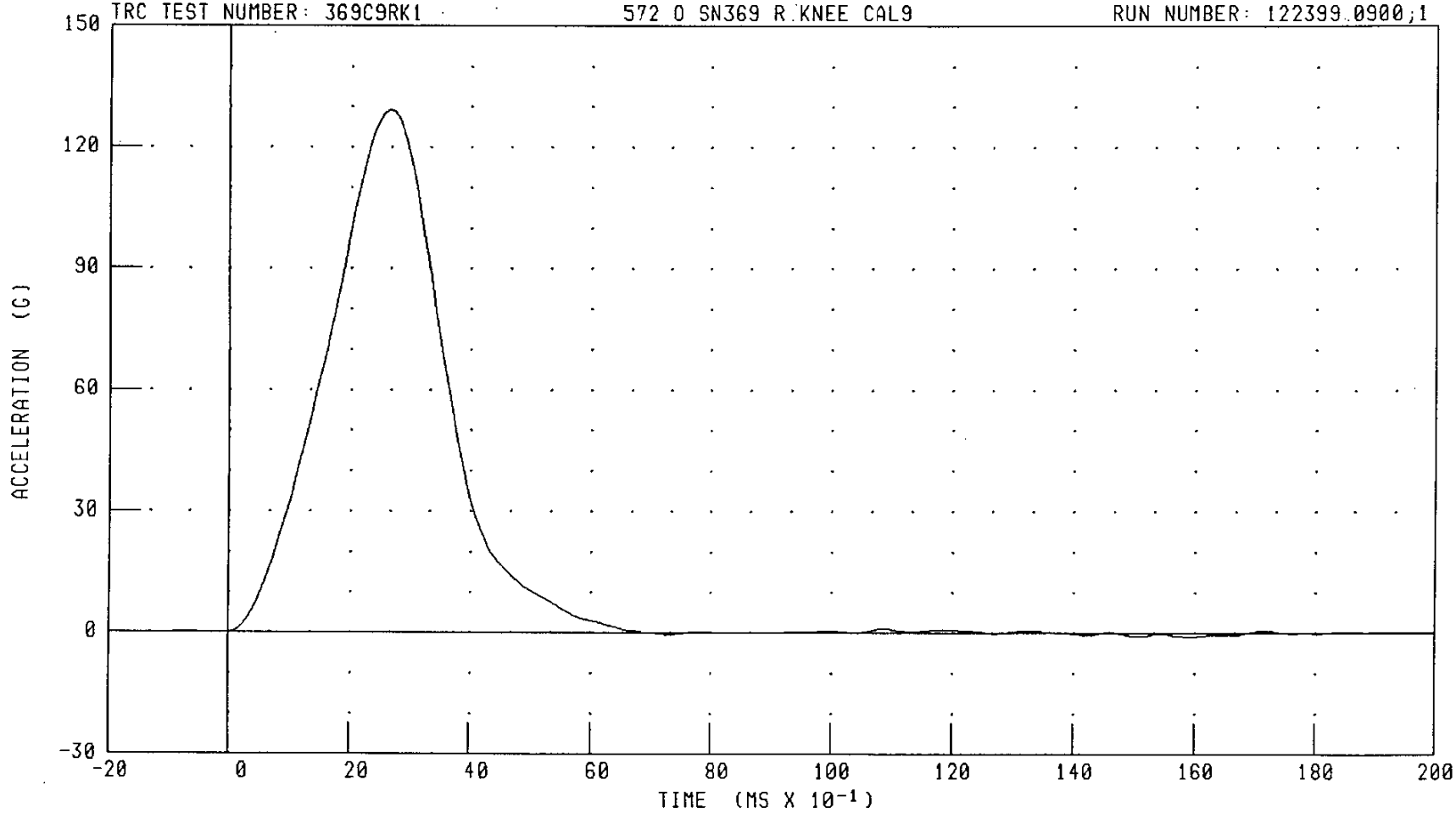
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.12 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3791.3 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Vallam RUN NUMBER: 122399.0900;1

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

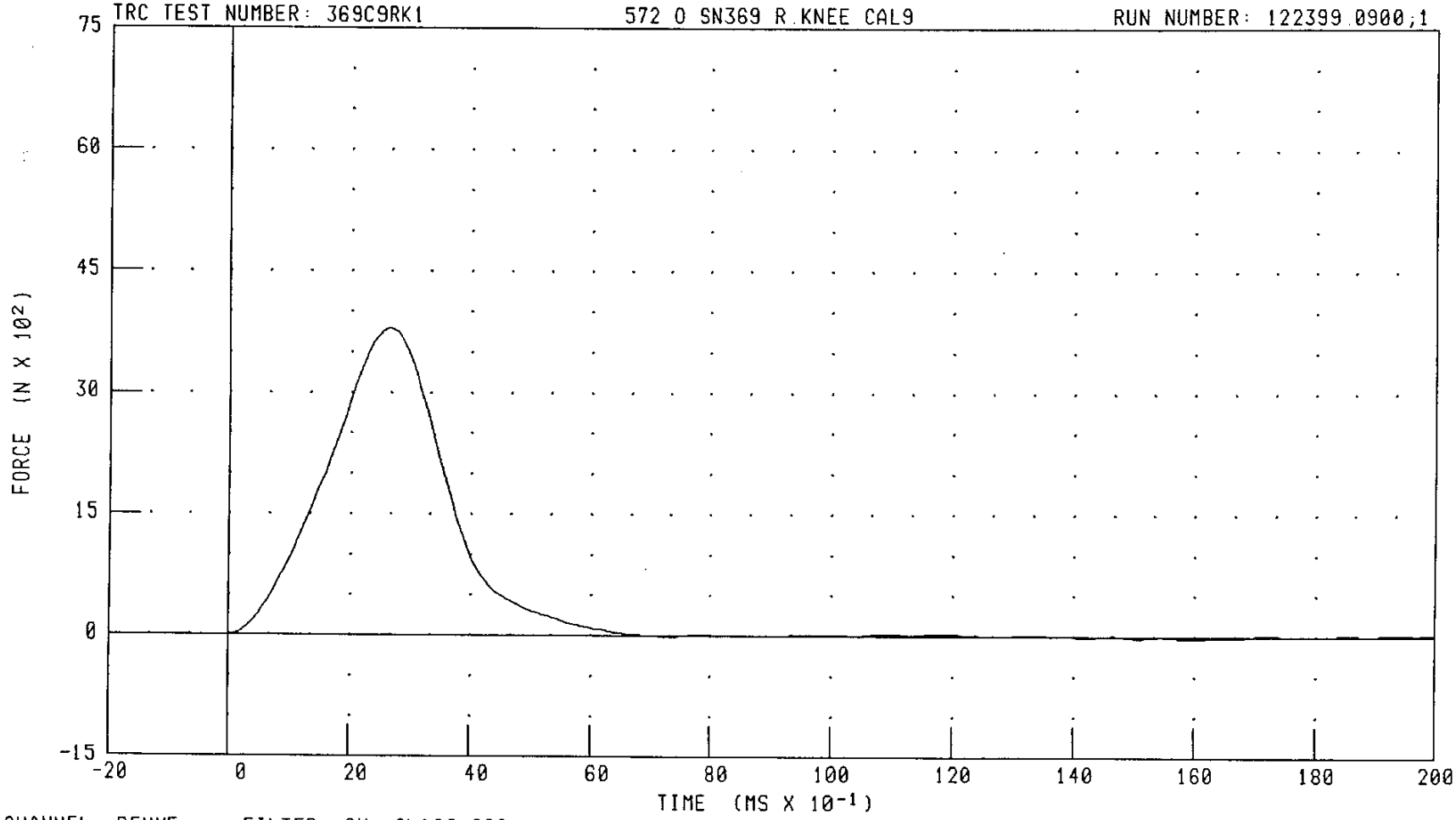
TRC TEST NUMBER: 369C9RK1 572 O SN369 R.KNEE CAL9 RUN NUMBER: 122399.0900;1




CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 129.15 G @ 2.64 MS; -1.08 G @ 15.92 MS

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)




CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 3791.35 N @ 2.64 MS; -31.66 N @ 15.92 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE 23-DEC-99

TRC INC. TEST NO: 369C9LK2 572 O SN369 LEFT KNEE CAL9

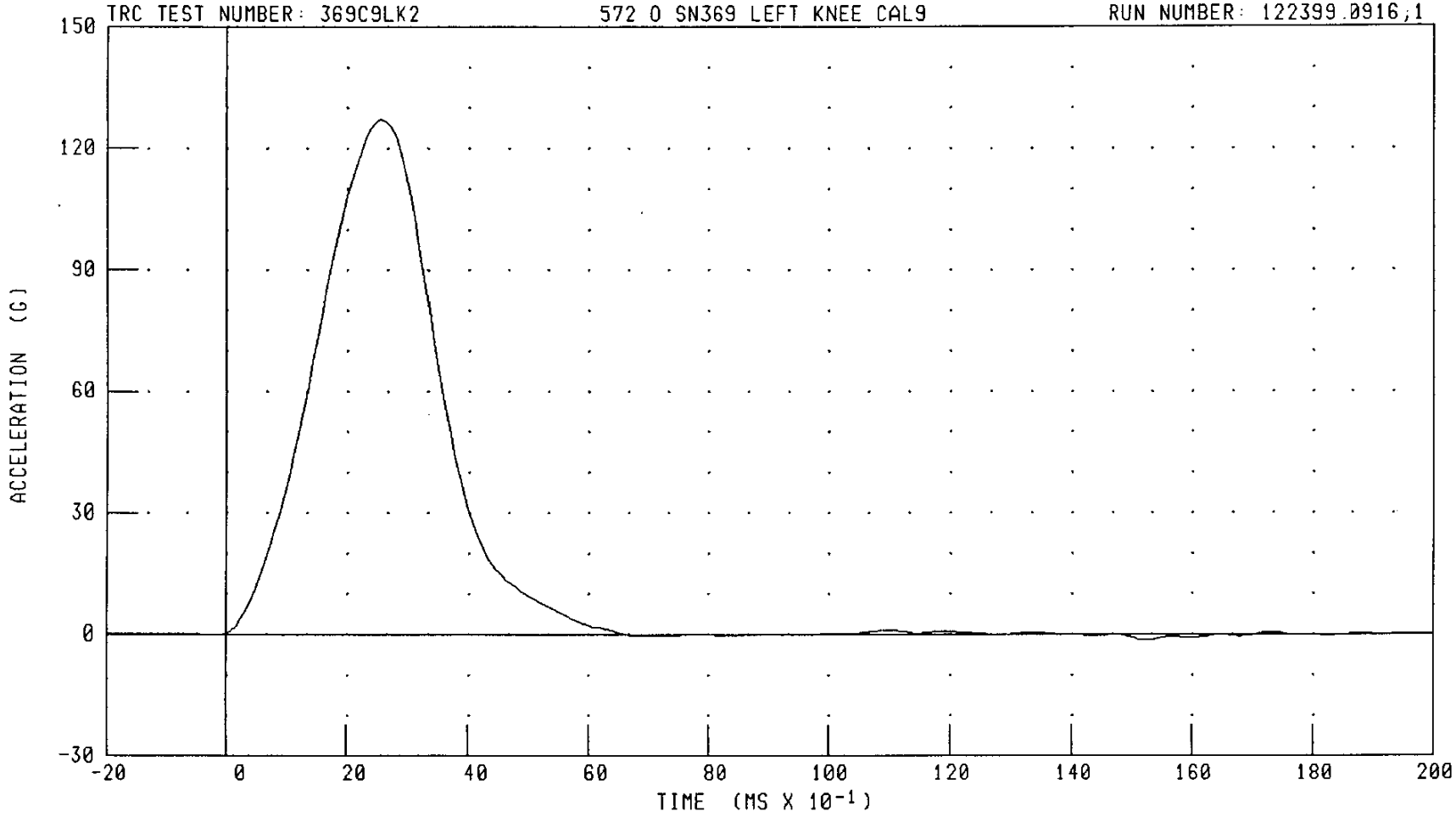
| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| TEMPERATURE | 18.9-25.6 DEG. C | 21.1 DEG. C |
| RELATIVE HUMIDITY | 10 - 70 % | 44.0 % |
| PROBE VELOCITY | 2.07 - 2.13 M/S | 2.12 M/S |
| PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM | 3360 - 4080 N | 3732.9 N |

TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Wallace RUN NUMBER: 122399.0914;1

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 369C9LK2 572 0 SN369 LEFT KNEE CAL9 RUN NUMBER: 122399.0916;1

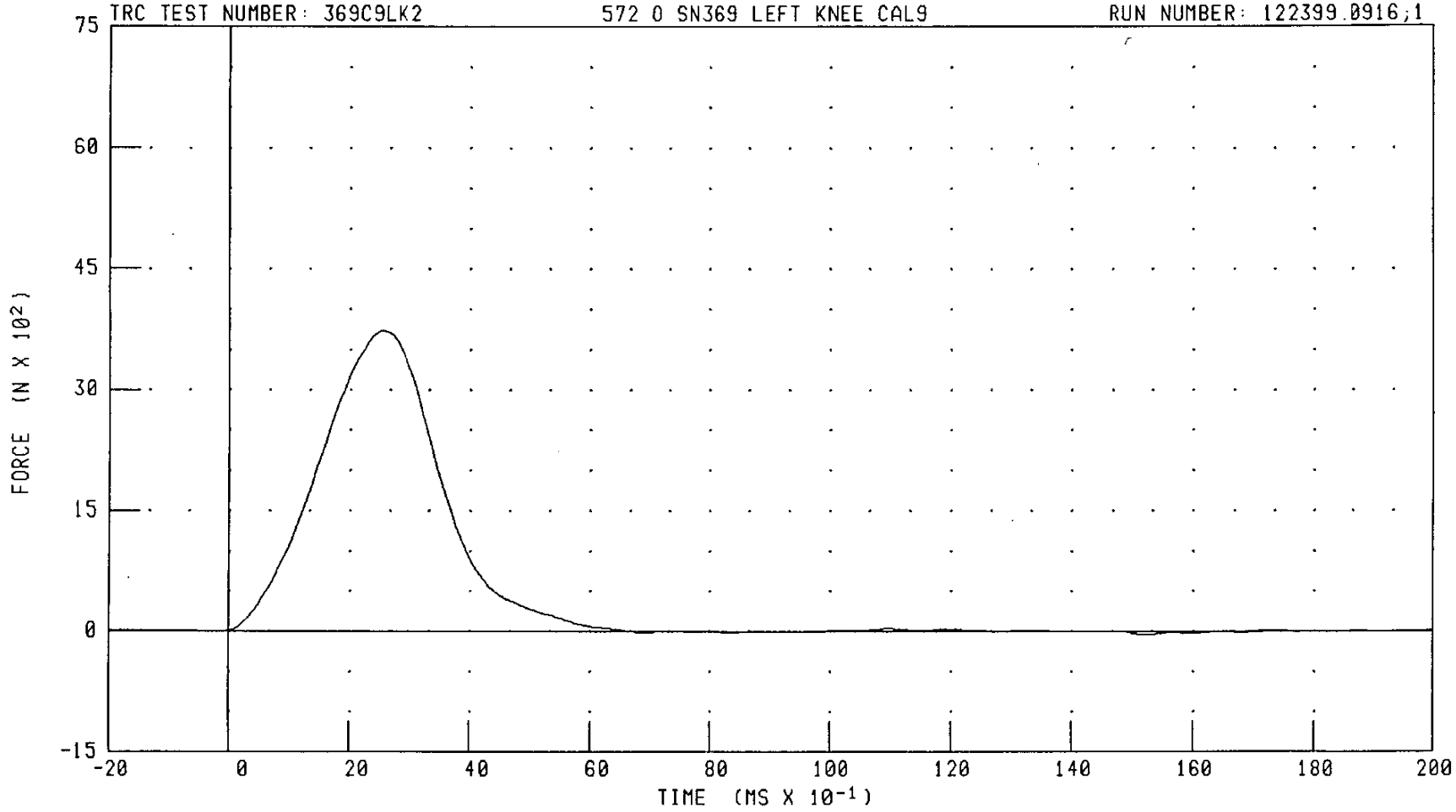



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 127.16 G @ 2.56 MS; -1.43 G @ 15.28 MS

PART 572-0 HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 369C9LK2 572 0 SN369 LEFT KNEE CAL9 RUN NUMBER: 122399.0916;1




CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 3732.95 N @ 2.56 MS; -42.03 N @ 15.28 MS

Accelerometer Information

Engineer: Dresback
Test Date: 12/09/99-1
Dummy S/N: 283
Manufacturer: FTSS
Type: Hybrid III 5th female
Seating Position: Driver

| Mnemonic Parameter Being Measured | Description | Model Number | Serial Number | Mfr. | Sensitivity Mv/g @10 Volts | Cal Due Date | Full-Scale Desired G | Direction Of Positive Polarity |
|---|---|---|---|---|---|---|---|---|
| HEDXG | Head X | 7264 | J26498 | Endevco | 0.2385 | 03/30/00 | 400 | Rear |
| HEDYG | Head Y | 7264 | J26491 | Endevco | 0.2527 | 03/30/00 | 400 | Left |
| HEDZG | Head Z | 7264 | J26499 | Endevco | 0.2571 | 03/30/00 | 400 | Up |
| CSTXG | Chest X | 7264 | J27111 | Endevco | 0.2109 | 03/30/00 | 400 | Forward |
| CSTYG | Chest Y | 7264 | J20561 | Endevco | 0.2433 | 03/30/00 | 400 | Left |
| CSTZG | Chest Z | 7264 | J22046 | Endevco | 0.2684 | 03/30/00 | 400 | Up |

Accelerometer Information

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Test Date: 12/09/99-1
Dummy S/N: 283
Manufacturer: FTSS
Type: Hybrid III 5th female
Seating Position: Driver

| Mnemonic Parameter Being Measured | Description | Model Number | Serial Number | Mfr. | Sensitivity (mV/V) | Cal Due Date | Full-Scale Desired | Direction Of Positive Polarity |
|---|---|---|---|---|---|---|---|---|
| | **Neck Load Cells** | | | | | | | |
| NEKXF | Neck X-force | 1716 | 0235 | Denton | 1.7310 @ 2,000 lbs | 03/30/00 | 2000 lbs | Head forward/chest rearward |
| NEKYF | Neck Y-force | 1716 | 0235 | Denton | 1.6646 @ 2,000 lbs | 03/30/00 | 2000 lbs | Head left/chest right |
| NEKZF | Neck Z-force | 1716 | 0235 | Denton | 1.2439 @ 3,000 lbs | 03/30/00 | 3000 lbs | Head up/chest down |
| NEKXM | Neck X-moment | 1716 | 0235 | Denton | 1.6240 @ 2500 in-lbs | 03/30/00 | 200 ft-lbs | Right ear to right shoulder |
| NEKYM | Neck Y-moment | 1716 | 0235 | Denton | 1.6485 @ 2500 in-lbs | 03/30/00 | 200 ft-lbs | Chin forward to sternum |
| NEKZM | Neck Z-moment | 1716 | 0235 | Denton | 2.3120 @ 2500 in-lbs | 03/30/00 | 200 ft-lbs | Chin to left shoulder |
| | | | | | | | | |
| | **Femur Load Cells** | | | | | | | |
| | Left femur | | | | | | | |
| LFMF | Left femur force | 2121 | 0169 | GSE | 1.3102 @ 3000 lbs | 03/30/00 | 3000 lbs | Knee upward/upper femur down |
| | | | | | | | | |
| | Right femur | | | | | | | |
| RFMF | Right femur force | 2121 | 0170 | GSE | 1.3078 @ 3000 lbs | 03/30/00 | 3000 lbs | Knee upward/upper femur down |
| | | | | | | | | |

Accelerometer Information

Engineer: Dresback
Test Date: 12/09/99-1
Dummy S/N: 283
Manufacturer: FTSS
Type: Hybrid III 5th female
Seating Position: Driver

| Mnemonic Parameter Being Measured | Description | Model Number | Serial Number | Mfr. | Sensitivity | Cal Due Date | Full-Scale Desired | Direction Of Positive Polarity |
|---|---|---|---|---|---|---|---|---|
| | **Chest Pot** | | | | | | | |
| CSTXD | Chest deflection | 14CB1-2897 | 283 | Servo | 42.84 mV/V/inch | 03/30/00 | 6 inch | Extension |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Accelerometer Information

Engineer: Dresback
Test Date: 12/09/99-1
Dummy S/N: 369
Manufacturer: FTSS
Type: Hybrid III 5th female
Seating Position: Passenger

| Mnemonic Parameter Being Measured | Description | Model Number | Serial Number | Mfr. | Sensitivity Mv/g @10 Volts | Cal Due Date | Full-Scale Desired G | Direction Of Positive Polarity |
|---|---|---|---|---|---|---|---|---|
| HEDXG | Head X | 7264 | A20FJ | Endevco | 0.2563 | 12/02/99 | 400 | Rear |
| HEDYG | Head Y | 7264 | A31FJ | Endevco | 0.2683 | 12/02/99 | 400 | Left |
| HEDZG | Head Z | 7264 | CL95H | Endevco | 0.2822 | 12/02/99 | 400 | Up |
| CSTXG | Chest X | 7264 | A72JJ | Endevco | 0.2773 | 12/02/99 | 400 | Forward |
| CSTYG | Chest Y | 7264 | A69JJ | Endevco | 0.2702 | 12/02/99 | 400 | Left |
| CSTZG | Chest Z | 7264 | A34FJ | Endevco | 0.2565 | 12/02/99 | 400 | Up |

Accelerometer Information

Engineer: Dresback
Test Date: 12/09/99-1
Dummy S/N: 369
Manufacturer: FTSS
Type: Hybrid III 5th female
Seating Position: Passenger

| Mnemonic Parameter Being Measured | Description | Model Number | Serial Number | Mfr. | Sensitivity (mV/V) | Cal Due Date | Full-Scale Desired | Direction Of Positive Polarity |
|---|---|---|---|---|---|---|---|---|
| | **Neck Load Cells** | | | | | | | |
| NEKXF | Neck X-force | 1716A | 0534 | Denton | 1.7247 @ 2,000 lbs | 12/02/99 | 2000 lbs | Head forward/chest rearward |
| NEKYF | Neck Y-force | 1716A | 0534 | Denton | 1.6643 @ 2,000 lbs | 12/02/99 | 2000 lbs | Head left/chest right |
| NEKZF | Neck Z-force | 1716A | 0534 | Denton | 1.1561 @ 3,000 lbs | 12/02/99 | 3000 lbs | Head up/chest down |
| NEKXM | Neck X-moment | 1716A | 0534 | Denton | 1.6355 @ 2500 in-lbs | 12/02/99 | 200 ft-lbs | Right ear to right shoulder |
| NEKYM | Neck Y-moment | 1716A | 0534 | Denton | 1.6430 @ 2500 in-lbs | 12/02/99 | 200 ft-lbs | Chin forward to sternum |
| NEKZM | Neck Z-moment | 1716A | 0534 | Denton | 2.3186 @ 2500 in-lbs | 12/02/99 | 200 ft-lbs | Chin to left shoulder |
| | | | | | | | | |
| | **Femur Load Cells** | | | | | | | |
| | Left femur | | | | | | | |
| LFMF | Left femur force | 2430 | 1006 | GSE | 0.9459 @ 3000 lbs | 12/02/99 | 3000 lbs | Knee upward/upper femur down |
| | | | | | | | | |
| | Right femur | | | | | | | |
| RFMF | Right femur force | 2430 | 1007 | GSE | 0.9114 @ 3000 lbs | 12/02/99 | 3000 lbs | Knee upward/upper femur down |
| | | | | | | | | |

Accelerometer Information

Engineer: Dresback
Test Date: 12/09/99-1
Dummy S/N: 369
Manufacturer: FTSS
Type: Hybrid III 5th female
Seating Position: Passenger

| Mnemonic Parameter Being Measured | Description | Model Number | Serial Number | Mfr. | Sensitivity | Cal Due Date | Full-Scale Desired | Direction Of Positive Polarity |
|---|---|---|---|---|---|---|---|---|
| | **Chest Pot** | | | | | | | |
| CSTXD | Chest deflection | 14CB1-2897 | 1188 | Servo | 43.6 mV/V/inch | 12/02/99 | 6 inch | Extension |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Dummy Sign Convention

| | | |
|---|---|---|
| Accelerometers: | +X: Forward | |
| | +Y: Rightward | |
| | +Z: Downward | |
| Potentiometers: | +Chest longitudinal deflection: | Outward |
| Load cells: | +Femur force: | Tension |
| Neck load cells: | +X force: | Head rearward |
| | +Y force: | Head leftward |
| | +Z force: | Head upward (tension on neck) |
| | +X moment: | Left ear rotating toward left shoulder |
| | +Y moment: | Chin rotating toward chest |
| | +Z moment: | Chin rotating toward left shoulder |

## Filtering Data

J211 MAR95

Load Cell Barrier Forces Class 60

Vehicle Structural Accelerations Class 60

Occupant

Head Accelerometer Class 1000

Neck Class 60

Chest Accelerometer Class 180

Chest Deflection Class 180

Femur Force Class 600

Sternum Accelerometer Class 180

Lower Leg Class 600

## Vehicle Instrumentation Placement

### Test Number 991209-1

| Number | Location | Axis | Manufacturer | Model | S/N | Orientation (+ Sensing) |
|---|---|---|---|---|---|---|
| 1 | Left Brake Caliper | X | Endevco | 7264-2000T | AHRN6 | Rearward |
| 2 | Right Brake Caliper | X | Endevco | 7264-2000T | J25991 | Forward |
| 3 | Instrument Panel Center | X | Endevco | 7264-2000T | J27684 | Forward |
| 4 | Engine Top | X | Endevco | 7264-2000T | J29214 | Rearward |
| 5 | Engine Bottom | X | Endevco | 7264-2000T | J30474 | Forward |
| 6 | Vehicle Rear Center | X | Endevco | 7264-2000T | J30379 | Forward |
| | | Y | Endevco | 7264-2000T | J25921 | Left |
| | | Z | Endevco | 7264-2000T | J29566 | Up |
| 7 | Left Rear Seat Crossmember | X | Endevco | 7264-2000T | J27846 | Forward |
| 8 | Right Rear Seat Crossmember | X | Endevco | 7264-2000T | J27370 | Forward |
| 9 | Vehicle Center of Gravity | X | Endevco | 7264-2000T | J27659 | Forward |
| | | Y | Endevco | 7264-2000T | J27868 | Left |

## Report Sign Convention and NHTSA Data Tape Reference Guide

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

## Description Of Timing Marks On TRC High-Speed Film

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

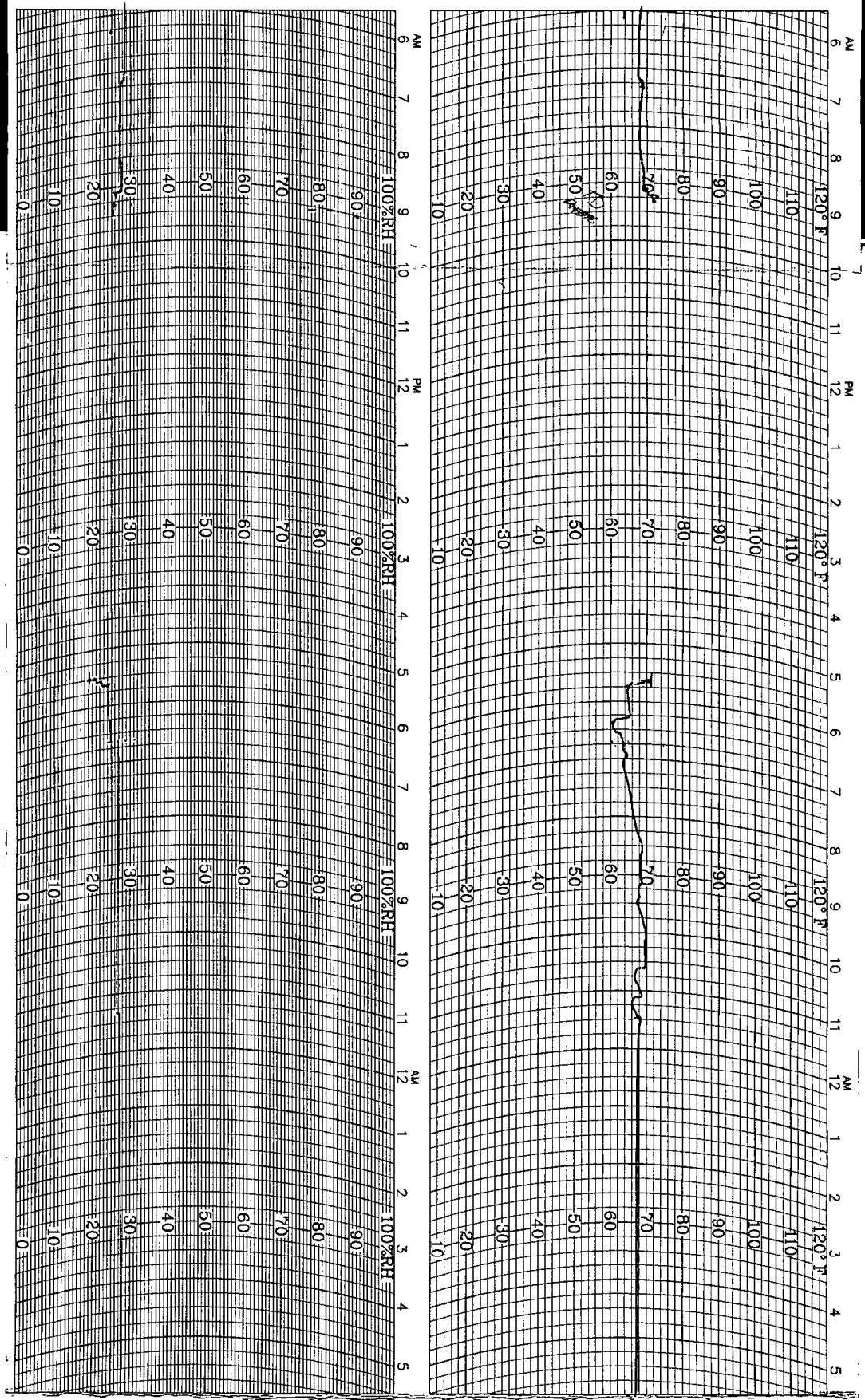
The timing marks appear on the film as small red marks on the right edge of the film. Round marks are left by the Photo-Sonics and Stalex cameras while horizontal bars are left by the Hycam, Locam, and Fastax II cameras.

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

1. Every frame will have **one** LED appear in it. This indicates a *millisecond* pulse.

2. Every ten frames will have **two** LEDs appear in it. These indicate a *millisecond* pulse plus a *hundredth of a second* pulse.

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




WeatherMeasure
WEATHERtronics
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HYGROTHERMOGRAPH
1 DAY

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

VATC 096017-1630 12-09-99

STATION _____ DATE ON _____ DATE OFF _____