**REPORT NUMBER TR-P23001-03-NC**

# NEW CAR ASSESSMENT PROGRAM
# FRONTAL BARRIER IMPACT TEST

**NISSAN MOTOR COMPANY**
**2003 NISSAN FRONTIER XE**
**4 DOOR PICKUP**

**NHTSA NUMBER: M35203**

**PREPARED BY:**
**KARCO ENGINEERING, LLC**
**9270 HOLLY ROAD**
**ADELANTO, CALIFORNIA 92301**

**DECEMBER 19, 2002**

**FINAL REPORT**

**PREPARED FOR:**
**U.S. DEPARTMENT OF TRANSPORTATION**
**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**
**RULEMAKING**
**OFFICE OF CRASHWORTHINESS STANDARDS**
**MAIL CODE: NVS-111**
**400 SEVENTH STREET, SW, ROOM 5311**
**WASHINGTON, D.C. 20590**

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Prepared by: _____ Date: December 31, 2002
Mr. James E. Gorth, Project Engineer
KARCO Engineering, LLC

Reviewed by: _____ Date: December 31, 2002
Mr. Jerry L. Kratzke, Director of Operations
KARCO Engineering, LLC

Approved by: _____ Date: December 31, 2002
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

FINAL REPORT ACCEPTED BY:

_____
Manager, New Car Assessment Program

_____
Date of Acceptance

_____
COTR, NCAP Frontal Impact Program

_____
Date of Acceptance

# Technical Report Documentation Page

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**15. Supplementary Notes**

**16. Abstract**

A 35mph (56.3 km/h) frontal barrier impact was conducted on a 2003 Nissan Frontier XE 4 Door Pickup at KARCO Engineering, LLC on 12/19/02. This test was conducted to obtain data indicant of FVMSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 55.59 km/h. The ambient temperature at the barrier face at the time of impact is 11.1 degrees Celcius. The test vehicle sustained post-impact maximum static crush of 521 mm at the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and second generation supplemental airbags in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:

| Measurement Description | Units | Threshold | Driver ATD | Pass. ATD |
|---|---|---|---|---|
| Head Injury Criteria (HIC) | N/A | 1000 | 595.0 | 679.0 |
| Max. Thorax Accel. (3 msec clip) | G's | 60 | 52.5 | 51.4 |
| Left Femur Force | Newtons | 10009 | -267.6 | -448.6 |
| Right Femur Force | Newtons | 10009 | -1409.0 | -1251.0 |

| 17. Key Words | 18. Distribution Statement |
|---|---|
| 56.3 km/h NCAP Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)<br>2003 Nissan Frontier XE 4 Door Pickup<br>NHTSA No. M35203 | Copies of this report available from:<br>NHTSA Technical Reference Division<br>National Highway Traffic Safety Admin.<br>400 Seventh St., SW, Room 5108<br>Washington, D.C. 20590 |

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TABLE OF CONTENTS


| Section | Description | Page |
|---|---|---|
| 1 | Purpose and Summary of Test M35203 | 1 |
| 2 | Occupant and Vehicle Information/Data Sheets | 3 |

| Data Sheet | Description | Page |
|---|---|---|
| 1 | Crash Test Summary | 4 |
| 2 | General Test and Vehicle Parameter Data | 5 |
| 3 | Post Impact Data | 8 |
| 4 | Test Vehicle Information | 9 |
| 5 | Dummy Positioning in Vehicle | 11 |
| 6 | Seatbelt Positioning Data | 13 |
| 7 | Vehicle Accelerometer Location and Data Summary | 14 |
| 8 | Hybrid III ATD Injury Criteria and Sensor Data | 15 |
| 9 | Seatbelt Assessment Test Data | 18 |
| 10 | Summary of FMVSS 212 Data | 19 |
| 11 | Windshield Zone Intrusion FMVSS 219 Data (Partial) | 20 |
| 12 | FMVSS 301 Fuel System Integrity Post Impact Data | 21 |
| 13 | FMVSS 301 Static Rollover Data | 22 |
| 14 | Vehicle Measurements | 24 |
| 15 | Camera Locations | 27 |
| 16 | Photographic Reference Target Locations | 28 |
| 17 | Vehicle Intrusion Measurements | 29 |
| 18 | Fixed Barrier Load Cell Locations | 33 |
| 19 | Accident Investigation Division Data | 34 |
| 20 | Dummy/Vehicle Temperature Stabilization | 35 |

| Appendix | Description | Appendix |
|---|---|---|
| A | Photographs | A |
| B | Dummy and Vehicle Response Data Traces | B |
| C | Load Cell Barrier Data Traces | C |
| D | Instrumentation and Data Channel Assignments | D |
| E | Dummy Calibration Data Traces and Tables | E |
| F | Child Restraint System | F |

# SECTION 1
# PURPOSE AND SUMMARY OF TEST M35203

## 1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-01-D-02005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph (48.3 km/h) requirements.

The 35 mph (56.3 km/h) frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test procedure.

## 1.2 SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2003 Nissan Frontier XE 4 Door Pickup at a velocity of 55.59 km/h. The test was performed at Karco Engineering, LLC on December 19, 2002. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time and 17 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50$^{th}$ percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head (primary and redundant), chest (primary and redundant) and pelvis triaxial accelerometers, chest displacement potentiometers, six-axis upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also placed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 34) and the right-front passenger (position 2) ATD (Serial No. 35) were calibrated two tests prior to this test.

Ninety seven (97) channels of data were recorded using an on-board data acquisition system. Appendix A contains Photographs. Appendix B contains the vehicle and dummy response data traces. Appendix C contains Load Cell Barrier information. Appendix D contains the Instrumentation Data Channel assignments. Appendix E contains the Dummy Calibration Data and Appendix F contains the Child Restraint System (CRS).

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the impact event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 521 mm and both the driver and the passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD head contacted the airbag and headrest, its chest and abdomen had no contact and both knees contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger ATD head contacted the airbag and headrest. The chest and abdomen contacted the airbag. Both knees contacted the glove box.

Occupant injury data is contained in table below.

**OCCUPANT DATA SUMMARY**

| ATD Position | HIC | Clip (g) | Chest Disp (mm) | Left Femur (N) | Right Femur (N) | Belt Spool (mm) |
|---|---|---|---|---|---|---|
| Driver | 595.0 | 52.5 | -33.5 | -267.6 | -1409.0 | 93.4 |
| Passenger | 679.0 | 51.4 | -29.8 | -448.6 | -1251.0 | 170.1 |

## SECTION 2
## OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### CONVERSION FACTORS USED IN THIS REPORT*

| Quantity | Typical Application | Std Units | Metric Unit | Multiply By |
|---|---|---|---|---|
| Mass | Vehicle Weight | lb | kg | 0.4536 |
| Linear Velocity | Impact Velocity | mile/h | km/h | 1.609 |
| Length or Distance | Measurements | in | mm | 25.4 |
| Volume | Fuel Systems | gal | liter | 3.785 |
| Volume | Small Fluids | oz | mL | 29.573 |
| Pressure | Tire Pressures | $lbf/in^2$ | kPa | 7.0 |
| Volume | Liquid | gal | liter | 3.785 |
| Temperature | General Use | $^oF$ | $^oC$ | =(tf -32)/1.8 |
| Force | Dynamic Forces | lbf | N | 4.448 |
| Moment | Torque | lbf/ft | Nm | 1.355 |

* Based on the Recommended Practice in SAE J916, May 85

## DATA SHEET NO. 1
## CRASH TEST SUMMARY

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### PRIMARY IMPACT DATA

| Measured Parameter | Units | Value |
|---|---|---|
| Velocity at Impact | km/h | 55.59 |
| Test Weight | kg | 1998 |
| Impact Angle | degrees | 0 |
| Average Rebound | mm | 925 |
| Maximum Static Crush | mm | 521 |

### DOOR OPENING AND SEAT TRACK INFORMATION

| Description | Driver | Passenger |
|---|---|---|
| Front Door Opening | Remained closed, opened w/o tools | Remained Closed, opened w/o tools |
| Rear Door Opening | Remained closed, opened w/o tools | Remained Closed, opened w/o tools |
| Seat Track Shift (mm) | 10mm | 12mm |
| Seat Back Failure | None | None |

### TEST DUMMY INFORMATION

| Description | Driver | Passenger |
|---|---|---|
| Dummy Type / Serial No. | 50% Male Hybrid III / No. 34 | 50% Male Hybrid III / No. 35 |
| Head Contact | Headrest/Airbag | Headrest/Airbag |
| Chest Contact | None | Airbag |
| Abdomen Contact | None | Aibag |
| Left Knee Contact | Knee Bolster | Glove Box |
| Right Knee Contact | Knee Bolster | Glove Box |

### 16mm MOVIE COVERAGE

| | |
|---|---|
| High Speed | 17 |
| Real Time | 1 |
| Total | 18 |

### DATA CHANNELS

| | |
|---|---|
| Driver ATD Sensors | 40 |
| Passenger ATD Sensors | 40 |
| Belt Assessment Sensors | 8 |
| Vehicle Structure Accelerometers | 9 |
| Rigid Barrier Load Cells | 36 |
| Total | 133 |

## DATA SHEET NO. 2
## GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### TEST VEHICLE INFORMATION

| | |
|---|---|
| Make | Nissan |
| Model | Frontier XE |
| Body Style | 4 Door Pickup |
| NHTSA No. | M35203 |
| VIN | 1N6ED27T93C401035 |
| Color | Silver |
| Delivery Date | 11/13/2002 |
| Odometer Reading (mi.) | 144 |
| Dealer | Corona Nissan |
| Transmission | 5 Speed Manual |
| Final Drive | Rear |
| Type/No. Cylinders | V-6 |
| Engine Displacement (L) | 3.3 |
| Engine Placement | Longitudinal |
| Roof Rack | No |
| Sunroof/T-Top | No |
| Tinted Glass | Yes |
| Traction Control | No |
| Power Brakes | Yes |
| Front Disc | Yes |
| Rear Disc | No |

### TEST VEHICLE OPTIONS

| | |
|---|---|
| Anti-Lock Brakes (ABS) | Yes |
| All Wheel Drive | No |
| Power Steering | Yes |
| Driver Airbag | Yes |
| Driver Side Bag | No |
| Driver Head Bag | No |
| Pass. Airbag | Yes |
| Pass. Side Bag | No |
| Pass. Head Bag | No |
| Pre-tensioners | Yes |
| Load Limiters | Yes |
| Bucket Seats | Yes |
| Center Console | Yes |
| Air Cond. | Yes |
| AM/Fm Cassette | Yes |
| Tilt Steering | No |
| Power Door Locks | No |
| Power Windows | No |
| Power Seats | No |
| Other | 0 |
| | 0 |

### DATA FROM CERTIFICATION LABEL

| | |
|---|---|
| Manufactured By | Nissan Motor Co. |
| Date of Manufacture | September-02 |

| | |
|---|---|
| GVWR (kg) | 2268 |
| GAWR Front (kg) | 1243 |
| GAWR Rear (kg) | 1293 |

### VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

| Measured Parameter | Front | Rear | Third | Total |
|---|---|---|---|---|
| Type of Seats | Bucket | Bench | None | |
| Number of Occupants | 2 | 3 | N/A | 5 |
| Capacity Wt. *(VCW)* (kg) | | | | 553 |
| Cargo Weight (RCLW) (kg) | | | | 136 |

**DATA SHEET NO. 2…..(CONTINUED)**
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**TIRE INFORMATION**

| Measured Parameter | Front | Rear |
|---|---|---|
| Max. Tire Pressure (kPa) | 245 | 245 |
| Cold Pressure (kPa) | 245 | 245 |
| Recommend Tire Size | P265/70R15 | P265/70R15 |
| Tire Size on Vehicle | P265/70R15 | P265/70R15 |
| Tire Manufacturer | B.F. Goodrich | B.F. Goodrich |
| Treadwear | 440 | 440 |
| Traction | B | B |
| Temperature Grades | B | B |
| Tire Plies Sidewall | 2 | 2 |
| Tire Plies Body | 4 | 4 |
| Load Index/Speed Symbol | 110 S | 110 S |
| Tire Material | Steel/ployester | Steel/ployester |
| DOT Safety Code Right | APTRHK-71-3402 | APTRHK-71-3402 |
| DOT Safety Code Left | APTRHK-71-3402 | APTRHK-71-3402 |

## DATA SHEET NO. 2…(CONTINUED)
## GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

-

### TEST VEHICLE WEIGHTS

| | Units | As Delivered *(UVW)* | | | As Tested *(ATW)* | | |
|---|---|---|---|---|---|---|---|
| | | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 474 | 376 | | 523 | 476 | |
| Right | kg | 474 | 391 | | 538 | 461 | |
| Ratio | % | 55.2 | 44.8 | | 53.1 | 46.9 | |
| Totals | kg | 948 | 767 | 1715 | 1061 | 937 | 1998 |

### TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value |
|---|---|---|
| Total Delivered Weight *(UVW)* | kg | 1715 |
| Weight of 2 P572 ATD's | kg | 152 |
| Rated Cargo/Luggage Weight *(RCLW)* | kg | 136 |
| Calculated Vehicle Target Weight *(TVTW)* | kg | 2003 |

### TEST VEHICLE ATTITUDE AND CG

| | Units | LF | RF | LR | RR | CG (aft of front axle) |
|---|---|---|---|---|---|---|
| As Delivered | mm | 863 | 864 | 881 | 883 | 1324 |
| As Tested | mm | 847 | 840 | 847 | 835 | 1386 |

Vehicle Wheel base (mm): 2955

Weight of Ballast secured in cargo area (kg): 63

Vehicle Components Removed: Spare Tire

* Ballast weight does not include cameras, instrumentation, and brake abort system.

### FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 73.4

Usable Capacity Figure Furnished by COTR (L): 73.4

Actual Test Volume with entire fuel System Filled (L): 68.3

Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.764

Kinematic Viscosity: as per ASTM Standard D484-71 ; Color: Purple

Is Vehicle Fuel Pump Electric or Mechanical?: Electric

If electric, does pump operate with ignition switch "ON" & engine "OFF"? Yes

Fuel System Particulars: Driver side filler door, tank mounted at rear.

**DATA SHEET NO. 3**
**POST IMPACT DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**SPEED TRAP DATA**

| Measured Parameter | Units | Requirement | Value |
|---|---|---|---|
| Trap No. 1 Velocity (Primary) | km/h | 55.51 to 57.12 | 55.59 |
| Trap No. 1 Entry Distance | mm | < 1524 | 1524 |
| Trap No. 1 Exit Distance | mm | < 1524 | 305 |
| Trap No. 2 Velocity (Redundant) | km/h | 55.51 to 57.12 | 55.61 |
| Trap No. 2 Entry Distance | mm | < 1524 | 1524 |
| Trap No. 2 Exit Distance | mm | < 1524 | 305 |

**VEHICLE STATIC CRUSH**

| Measured Parameter | Units | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|
| Left Side | mm | 4962 | 4613 | -349 |
| Center | mm | 5070 | 4549 | -521 |
| Right Side | mm | 4962 | 4620 | -342 |

**VEHICLE REBOUND FROM BARRIER**

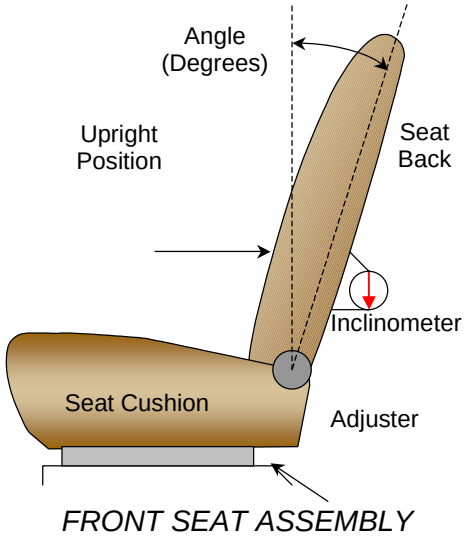
| Measured Parameter | Units | Value |
|---|---|---|
| Left Side | mm | 940 |
| Center | mm | 970 |
| Right Side | mm | 865 |
| Average | mm | 925 |

**DATA SHEET NO. 4**
**TEST VEHICLE INFORMATION**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**NOMINAL DESIGN RIDING POSITION**

The driver and passenger seat backs are positioned to the manufacturers designated angle. The procedure is as follows: A special application tool with pointed probes is inserted through the fabric to make contact with the rigid portion of the lower seat frame assembly, approximately 13 inches above the pivot point of the seat back. An inclinometer is placed against the flat surface of the tool and the seat back angle is measured directly from the dial face.



*FRONT SEAT ASSEMBLY*

**SEAT BACK ANGLES**

| | Deg. |
|---|---|
| Driver w/seated Dummy | 14 |
| Passenger w/seated Dummy | 14 |

**SEAT FORE/AFT POSITIONS**

The first or forward most position is counted as number one (1). The fore/aft position is set aft of the middle position for both the driver and passenger.

**SEAT FORE/AFT POSITIONING**

| | Total Fore/Aft Travel | Placed in Position # |
|---|---|---|
| Driver Seat | 13 | 7 |
| Passenger Seat | 20 | 11 |

**SEAT BELT UPPER ANCHORAGE**

Position number one (1) is the uppermost position.

**SEAT BELT UPPER ANCHORAGE**

| | Total # of Positions | Placed in Position # |
|---|---|---|
| Driver Seat | 4 | 1 |
| Passenger Seat | 4 | 1 |

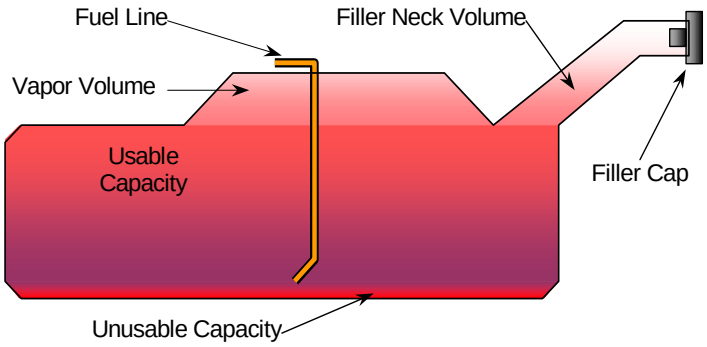
## DATA SHEET NO. 4…(CONTINUED)
## TEST VEHICLE INFORMATION

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### FUEL TANK CAPACITY DATA

| | Liters |
|---|---|
| Usable Capacity of "Standard Tank" | 73.4 |
| Usable Capacity of "Optional Tank" | N/A |
| Usable Capacity used for FMVSS 301 | 67.53 to 69.01 |
| Actual Amount of Solvent Used | 68.3 |

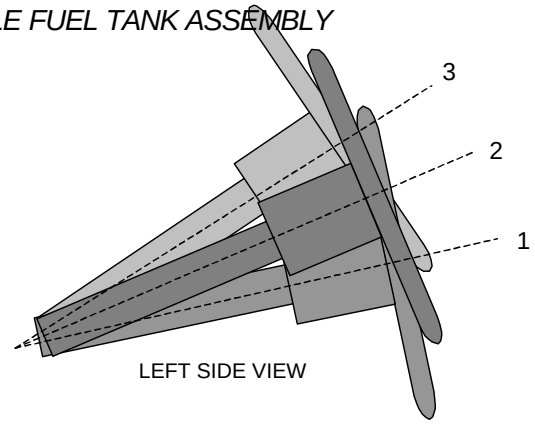
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area under the rear seat. Fuel lines run inside the right frame rail to the engine compartment.




*VEHICLE FUEL TANK ASSEMBLY*

### STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.




*STEERING COLUMN ASSEMBLY*

### STEERING COLUMN POSITIONS

| | Degrees |
|---|---|
| Lowermost; position No. 1 | Fixed |
| Geometric center; position No. 2 | 25 |
| Uppermost; position No. 3 | Fixed |

**DATA SHEET NO. 5**
**DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

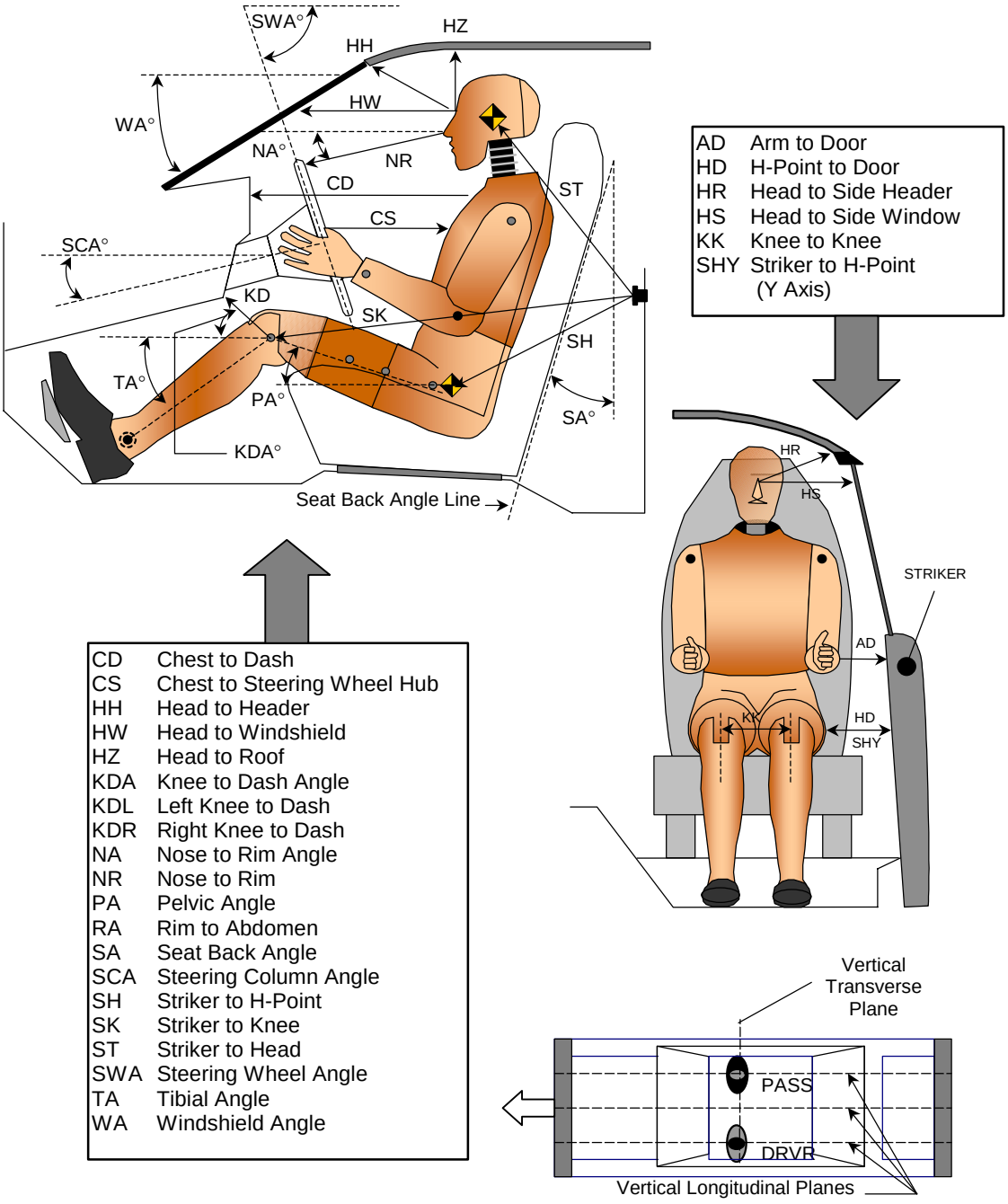
**TEST DUMMY POSITION MEASUREMENTS**

| Code | Measurement Description | Driver | | Passenger | |
|---|---|---|---|---|---|
| | | Length (mm) | Angle ($^o$) | Length (mm) | Angle ($^o$) |
| WA | Windshield Angle | | 54 | | |
| SWA | Steering Wheel Angle | | 65 | | |
| SCA | Steering Column Angle | | 25 | | |
| SA | Seat Back Angle | | 14 | | 14 |
| HZ | Head to Roof (Z) | 196 | 90 | 196 | 90 |
| HH | Head to Header | 465 | | 405 | |
| HW | Head to Windshield | 625 | | 600 | |
| HR | Head to Side Header (Y) | 250 | | 256 | |
| NR | Nose to Rim | 450 | 13 | | |
| CD | Chest to Dash | 655 | | 565 | |
| CS | Chest to Steering Hub | 315 | | | |
| RA | Rim to Abdomen | 220 | | | |
| KDL | Left Knee to Dash | 195 | 21 | 175 | |
| KDR | Right Knee to Dash | 200 | | 178 | 19 |
| PA | Pelvic Angle | | 24 | | 25 |
| TA | Tibia Angle | | 39 | | 41 |
| KK | Knee to Knee (Y) | 290 | | 270 | |
| ST | Striker to Head | 650 | 1 | 680 | 2 |
| SK | Striker to Knee | 280 | 78 | 593 | 75 |
| SH | Striker to H-Point | 242 | | 282 | |
| SHY | Striker to H-Point (Y) | 212 | | 210 | |
| HS | Head to Side Window | 305 | | 315 | |
| HD | H-Point to Door (Y) | 140 | | 135 | |
| AD | Arm to Door (Y) | 85 | | 14 | |

## DATA SHEET NO. 5…(CONTINUED)
## DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

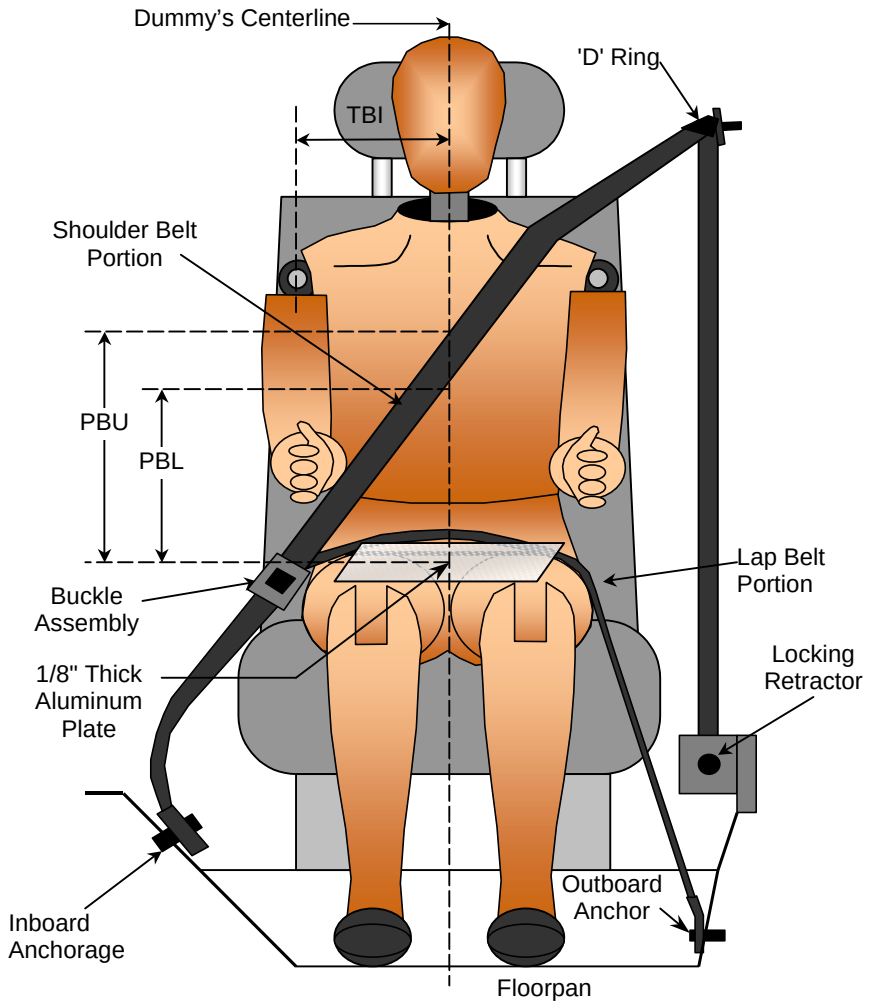
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02




**DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS**

**DATA SHEET NO. 6**
**SEATBELT POSITIONING DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02




**SEAT BELT POSITIONING MEASUREMENTS**

| Measurement Description | Units | Driver | Passenger |
|---|---|---|---|
| TBI - Dummy C/L to Lap/Shoulder Belt Intersect | mm | 235 | 240 |
| PBU -Top surface of reference to belt upper edge | mm | 340 | 295 |
| PBL - Top surface of reference to belt lower edge | mm | 270 | 215 |
| Lap Belt tension | Newton's | 10 | 10 |
| Shoulder Belt tension | N/A | Retractor | Retractor |

## DATA SHEET NO. 7 - VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

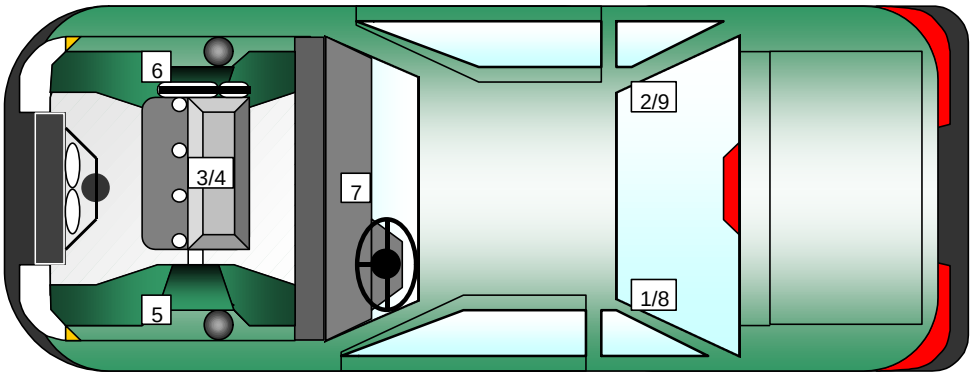
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

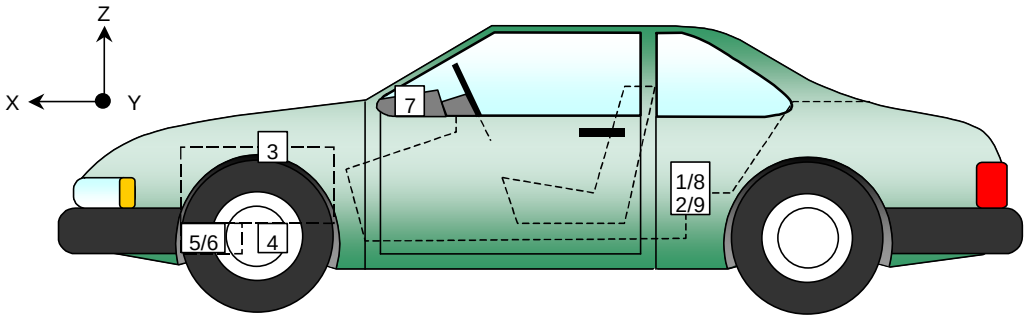
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

| No. | Accelerometer Location | Measurements (mm) | | | Peak Values | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | Units | Max | Time | Min | Time |
| 1 | Left Rear X-Member | 2120 | -680 | 560 | G's | 1.6 | 166.1 | -42.0 | 59.2 |
| 2 | Right Rear X-Member | 2190 | 680 | 555 | G's | 2.3 | 166.8 | -39.7 | 59.4 |
| 3 | Engine Top | 4210 | -55 | 1075 | G's | 51.5 | 51.5 | -119.4 | 39.7 |
| 4 | Engine Bottom | 4050 | -50 | 310 | G's | 22.4 | 50.4 | -98.8 | 40.2 |
| 5 | Left Brake Caliper | 4070 | -670 | 330 | G's | 36.4 | 64.4 | -136.7 | 41.5 |
| 6 | Right Brake Caliper | 4070 | 670 | 330 | G's | 30.1 | 61.8 | -108.5 | 53.9 |
| 7 | Instrument Panel | 3530 | 0 | 1260 | G's | 10.9 | 65.8 | -55.2 | 57.2 |
| 8 | Left Rear X-Member (Z-Axis) | 2190 | -680 | 560 | G's | 9.9 | 77.8 | -8.1 | 57.0 |
| 9 | Right Rear X-Member (Z-Axis) | 2190 | 680 | 560 | G's | 14.0 | 46.9 | -8.9 | 37.9 |

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane



## DATA SHEET NO. 8 - HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### HEAD PRIMARY PEAK ACCELERATIONS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Head CG | X | G's | 18.1 | 214.6 | -70.5 | 75.7 | 9.2 | 241.3 | -57.4 | 78.6 |
| Head CG | Y | G's | 4.5 | 122.6 | -4.8 | 212.7 | 4.7 | 108.2 | -20.5 | 68.8 |
| Head CG | Z | G's | 20.5 | 62.2 | -2.1 | 90.1 | 45.5 | 77.2 | -5.4 | 115.5 |
| Head CG Resultant | N/A | G's | 71.0 | 75.7 | | | 73.5 | 77.2 | | |

### CHEST PRIMARY PEAK ACCELERATIONS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Chest CG | X | G's | 3.8 | 247.9 | -53.0 | 72.9 | 2.7 | 154.2 | -54.1 | 71.7 |
| Chest CG | Y | G's | 11.3 | 72.0 | -5.3 | 44.3 | 3.5 | 37.2 | -9.7 | 86.9 |
| Chest CG | Z | G's | 5.4 | 48.9 | -8.6 | 90.8 | 12.4 | 63.6 | -12.9 | 105.0 |
| Chest CG Resultant | N/A | G's | 54.3 | 72.8 | | | 54.9 | 71.7 | | |

### FEMUR PEAK FORCES

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Left Femur | Z | Newtons | 1123.0 | 52.2 | -267.6 | 61.4 | 1254.6 | 57.4 | -448.6 | 99.6 |
| Right Femur | Z | Newtons | 1546.6 | 47.9 | -1409.0 | 61.0 | 1545.3 | 51.8 | -1251.0 | 61.3 |

### SEAT BELT SENSOR PEAK VALUES

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Shoulder Belt Pullout | N/A | MM | 93.4 | 84.5 | -51.1 | 44.9 | 170.1 | 93.6 | -31.4 | 40.7 |
| Shoulder Belt Stretch | N/A | MM/CM | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 [1] |
| Lap Belt Force | N/A | Newtons | 9666.6 | 63.8 | -25.3 | 249.4 | * | * | * | * [2] |
| Shoulder Belt Force | N/A | Newtons | 6082.5 | 51.5 | -36.2 | 13.6 | 4849.5 | 73.9 | -23.1 | 13.4 |

1.) Not used with pre-tensioner

2.) Passenger side failed, see plot for failure time

| | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|
| Location | HIC | $T^1$ | $T^2$ | Avg G | HIC | $T^1$ | $T^2$ | Avg G |
| Head CG Primary | 595.0 | 60.7 | 87.6 | 54.6 | 679.0 | 59.3 | 95.2 | 51.3 |

### PRIMARY CHEST CLIP (3MSEC)

| | Driver | | | Passenger | | |
|---|---|---|---|---|---|---|
| Location | CLIP | $T^1$ | $T^2$ | CLIP | $T^1$ | $T^2$ |
| Chest CG Primary | 52.5 | 70.8 | 73.8 | 51.4 | 69.6 | 72.6 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

## PELVIC PEAK ACCELERATIONS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Pelvis | X | G's | 6.1 | 100.8 | -53.6 | 61.2 | 12.0 | 97.4 | -56.2 | 63.1 |
| Pelvis | Y | G's | 11.6 | 75.6 | -3.9 | 24.1 | 8.0 | 63.7 | -7.8 | 74.3 |
| Pelvis | Z | G's | 2.3 | 234.7 | -31.3 | 65.6 | 4.6 | 249.0 | -29.2 | 73.2 |
| Pelvis Resultant | N/A | G's | 60.6 | 61.2 | | | 61.6 | 63.1 | | |

## UPPER NECK PEAK FORCES AND MOMENTS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Neck Force | X | Newtons | 488.3 | 70.6 | -477.9 | 131.1 | 463.5 | 68.3 | -958.0 | 112.9 |
| Neck Force | Y | Newtons | 150.9 | 123.4 | -82.2 | 217.4 | 186.3 | 88.6 | -322.3 | 71.1 |
| Neck Force | Z | Newtons | 1798.7 | 67.9 | -421.9 | 243.6 | 770.3 | 43.2 | -1559.8 | 73.6 |
| Neck Force Resultant | N/A | Newtons | 1853.4 | 67.9 | | | 1589.0 | 73.6 | | |
| Neck Moment | X | N•m | 9.4 | 132.2 | -12.4 | 89.2 | 33.2 | 71.5 | -7.4 | 189.0 |
| Neck Moment | Y | N•m | 40.0 | 120.2 | -33.1 | 238.1 | 57.3 | 118.9 | -35.4 | 284.1 |
| Neck Moment | Z | N•m | 4.4 | 123.6 | -3.2 | 88.8 | 10.3 | 105.3 | -5.4 | 71.6 |
| Neck Moment Resultant | N/A | N•m | 40.6 | 120.3 | | | 58.0 | 118.8 | | |

## FOOT PEAK ACCELERATIONS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Left Foot Aft | X | G's | 4.7 | 106.6 | -62.6 | 37.9 | 47.1 | 48.8 | -82.7 | 41.8 |
| Left Foot Aft | Z | G's | 3.5 | 288.3 | -62.2 | 40.2 | 16.6 | 71.9 | -112.4 | 47.5 |
| Left Foot Fore | Z | G's | 7.4 | 36.0 | -60.7 | 43.3 | 92.5 | 51.9 | -155.9 | 38.5 |
| Right Foot Aft | X | G's | 37.6 | 56.5 | -106.8 | 47.5 | 15.7 | 43.3 | -52.2 | 33.2 |
| Right Foot Aft | Z | G's | 10.9 | 67.6 | -119.3 | 48.1 | 11.0 | 79.2 | -51.6 | 37.8 |
| Right Foot Fore | Z | G's | 125.8 | 52.8 | -253.5 | 44.5 | 9.0 | 100.6 | -62.8 | 37.3 |

## UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Left Upper Moment | X | N•m | 83.5 | 41.4 | -21.3 | 126.2 | 13.2 | 143.0 | -76.0 | 48.4 |
| Left Upper Moment | Y | N•m | 26.9 | 38.8 | -27.4 | 56.2 | 17.4 | 66.8 | -125.1 | 45.0 |
| Right Upper Moment | X | N•m | 176.4 | 54.1 | -31.7 | 121.0 | 35.7 | 81.0 | -34.0 | 38.0 |
| Right Upper Moment | Y | N•m | 27.0 | 58.0 | -62.3 | 48.9 | 34.8 | 200.8 | -90.1 | 52.1 |
| Left Lower Moment | X | N•m | 56.8 | 50.1 | -19.2 | 38.2 | 45.7 | 53.3 | -36.6 | 47.8 |
| Left Lower Moment | Y | N•m | 24.5 | 47.1 | -23.9 | 59.2 | 36.6 | 97.5 | -47.3 | 40.9 |
| Left Lower Force | Z | Newtons | 81.3 | 123.8 | -2238.3 | 45.9 | 211.2 | 136.7 | -4576.9 | 46.6 |
| Right Lower Moment | X | N•m | 24.0 | 48.3 | -88.2 | 55.2 | 11.8 | 34.0 | -52.9 | 48.4 |
| Right Lower Moment | Y | N•m | 96.4 | 60.7 | -56.2 | 46.0 | 38.7 | 94.1 | -25.4 | 52.1 |
| Right Lower Force | Z | Newtons | 350.4 | 38.6 | -5942.1 | 54.2 | 204.8 | 136.2 | -2167.8 | 40.8 |

## DATA SHEET NO. 8…(continued)

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### CHEST PEAK DISPLACEMENTS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Chest CG | X | MM | 0.0 | 0.2 | -33.5 | 70.1 | 0.1 | 0.7 | -29.8 | 67.9 |

### HEAD REDUNDANT PEAK ACCELERATIONS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Head CG | X | G's | 17.5 | 212.1 | -70.8 | 75.7 | 8.2 | 240.1 | -56.4 | 78.3 |
| Head CG | Y | G's | 4.7 | 68.9 | -5.1 | 215.3 | 4.1 | 109.3 | -21.5 | 68.5 |
| Head CG | Z | G's | 20.1 | 61.7 | -2.4 | 126.4 | 44.4 | 76.8 | -4.9 | 113.4 |
| Head CG Resultant | N/A | G's | 71.4 | 76.1 | | | 72.7 | 77.3 | | |

### CHEST REDUNDANT PEAK ACCELERATIONS

| | | | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Chest CG | X | G's | 3.4 | 245.1 | -53.4 | 72.9 | 2.4 | 135.8 | -55.0 | 71.5 |
| Chest CG | Y | G's | 11.4 | 72.2 | -3.7 | 44.4 | 3.4 | 75.7 | -7.9 | 87.2 |
| Chest CG | Z | G's | 5.8 | 43.5 | -8.1 | 72.1 | 11.7 | 63.6 | -13.0 | 72.2 |
| Chest CG Resultant | N/A | G's | 54.9 | 72.8 | | | 56.1 | 71.6 | | |

### REDUNDANT HEAD INJURY CRITERA (HIC)

| | Driver | | | | Passenger | | | |
|---|---|---|---|---|---|---|---|---|
| Location | HIC | $T^1$ | $T^2$ | Avg G | HIC | $T^1$ | $T^2$ | Avg G |
| Head CG Redundant | 593.1 | 60.4 | 87.6 | 54.3 | 670.1 | 59.3 | 95.2 | 51.0 |

### REDUNDANT CHEST CLIP (3MSEC)

| | Driver | | | Passenger | | |
|---|---|---|---|---|---|---|
| Location | CLIP | $T^1$ | $T^2$ | CLIP | $T^1$ | $T^2$ |
| Chest CG Redundant | 53.0 | 70.7 | 73.7 | 52.3 | 69.6 | 72.6 |

## DATA SHEET NO. 9
## SEATBELT ASSESSMENT TEST DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### SEAT BELT PLACEMENT MEASUREMENTS

| Measurement Description | Units | Driver | Passenger |
|---|---|---|---|
| TBI - Dummy C/L to Lap/Shoulder Belt Intersect | mm | 235 | 240 |
| PBU -Top surface of reference to belt upper edge | mm | 340 | 295 |
| PBL - Top surface of reference to belt lower edge | mm | 270 | 215 |
| Lap Belt tension | Newton's | 10 | 10 |
| Shoulder Belt tension | N/A | Retractor | Retractor |

### BELT LENGTH DATA

| Measurement Description | Units | Driver | Passenger |
|---|---|---|---|
| Retractor reel to 'D' ring | mm | 695 | 695 |
| Shoulder belt length as measured on ATD | mm | 845 | 885 |
| Lap belt length as measured on ATD | mm | 875 | 875 |
| Remainder of belt on reel | mm | 635 | 640 |
| Total belt length for continuous webbing systems | mm | 3050 | 3095 |

### SHOULDER BELT SPOOL-OFF DATA

| Measurement Description | Units | Driver | Passenger |
|---|---|---|---|
| As determined mechanically | mm | 45.0 | 145.0 |
| As determined electronically | mm | 93.4 | 170.1 |

### BELT STRETCH DATA

| Measurement Description | Units | Driver | Passenger |
|---|---|---|---|
| Electronically between shoulder belt load cell and "D" ring | mm/cm | * | * |
| Mechanically | mm/cm | 0.00 | 0.00 |

*Not used with shoulder belt pre-tensioner systems.

**DATA SHEET NO. 10**
**SUMMARY OF FMVSS 212 DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

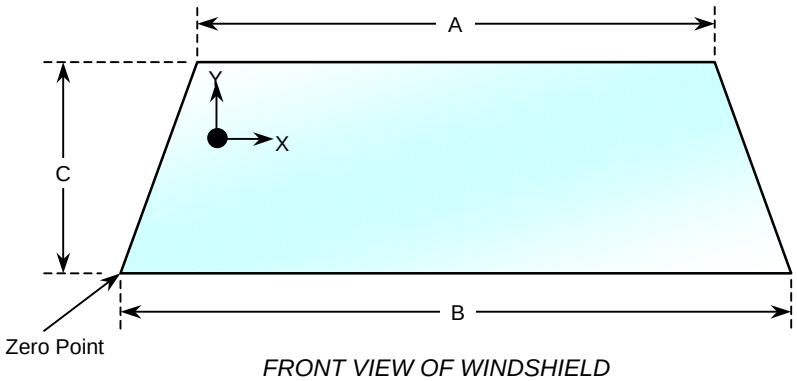
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. No molding covers the windshield periphery at any point.

The standard requires that the posttest retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles that are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.1 °C

**WINDSHIELD PERIPHERY MEASUREMENTS**

| Measurement | Pre-Test(mm) | Post-Test (mm) | % of Retention |
|---|---|---|---|
| Left Side | 1995.0 | 1995.0 | 100 |
| Right Side | 1995.0 | 1995.0 | 100 |
| Total | 3990.0 | 3990.0 | 100 |



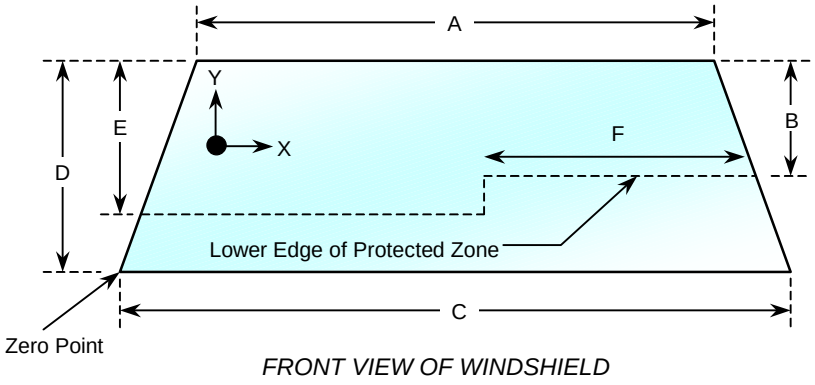

*FRONT VIEW OF WINDSHIELD*

**WINDSHIELD DIMENSIONS**

| Item | Units | Segment Length | Molding Width |
|---|---|---|---|
| A | mm | 1220 | 10 |
| B | mm | 1470 | 10 |
| C | mm | 792 | 30 |
| C | mm | 650 | 15 |

**DATA SHEET NO. 11**
**WINDSHIELD ZONE INTRUSION FMVSS 219 DATA (PARTIAL)**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02



*FRONT VIEW OF WINDSHIELD*

**WINDSHIELD AND PROTECTED ZONE**

| Item | Units | Value |
|---|---|---|
| A | mm | 1220 |
| B | mm | 510 |
| C | mm | 1470 |
| D | mm | 650 |
| E | mm | 430 |
| F | mm | 490 |

**AREA OF PROTECTED ZONE FAILURES**

A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 in. by a vehicle component other than one that is normally in contact with the windshield.

| X | Y |
|---|---|
| N/A | N/A |
| N/A | N/A |
| N/A | N/A |
| N/A | N/A |

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

| X | Y |
|---|---|
| N/A | N/A |
| N/A | N/A |
| N/A | N/A |
| N/A | N/A |

**DATA SHEET NO. 12**
**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

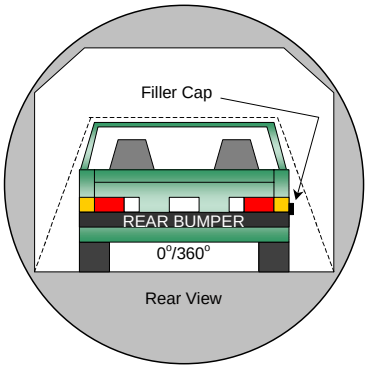
Test Time: 1:34 PM Temperature at Test Time: 11.1 Deg. C

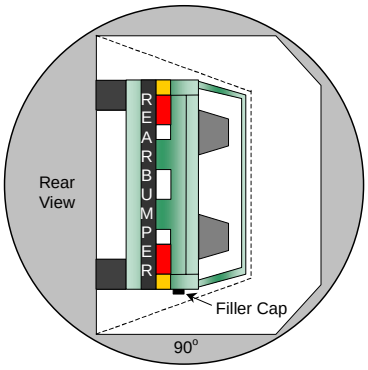
**STODDARD SOLVENT SPILLAGE MEASUREMENTS**

| | | | |
|---|---|---|---|
| A. | From impact until vehicle motion ceases: (Maximum Allowable = 1 ounce) | 0.0 | oz. |
| B. | For the 5 minute period after motion ceases: (Maximum Allowable = 5 ounces) | 0.0 | oz. |
| C. | For the following 25 minutes: (Maximum Allowable = 1 oz./minute) | 0.0 | oz. |
| D. | Spillage Location Details: | No leakage occurred | |

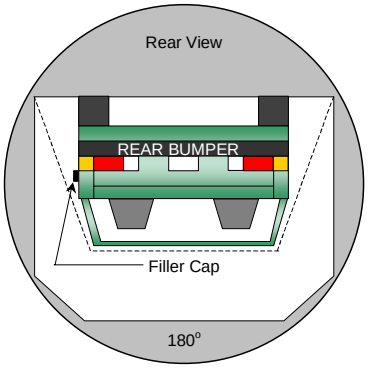
**DATA SHEET NO. 13**
**FMVSS 301 STATIC ROLLOVER DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

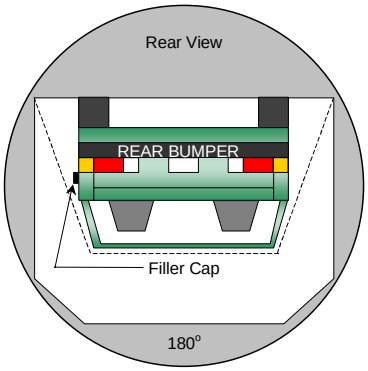


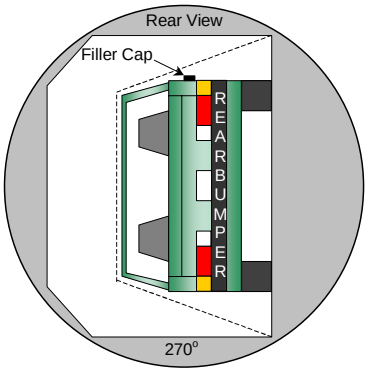

**0° to 90°**

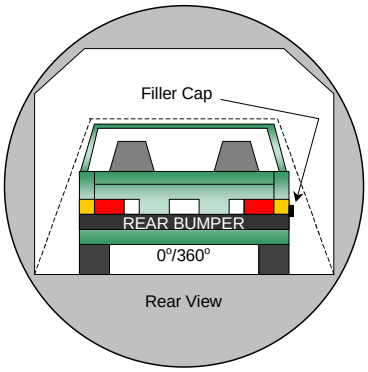



**90° to 180°**




**180° to 270°**




**270° to 360°**

1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. No solvent leakage occurred during rollover.

**DATA SHEET NO. 13….(CONTINUED)**
**FMVSS 301 STATIC ROLLOVER DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**SOLVENT COLLECTION TIME TABLE IN SECONDS**

| Test Phase | Rotation Time | Hold Time | Total Time |
|---|---|---|---|
| 0° to 90° | 82 | 300 | 382 |
| 90° to 180° | 80 | 300 | 380 |
| 180° to 270° | 78 | 300 | 378 |
| 270° to 360° | 79 | 300 | 379 |

**FMVSS 301 SPILLAGE REQUIREMENT TABLE (oz.)**

| | |
|---|---|
| First 5 minutes | 5.0 |
| Sixth Minute | 1.0 |
| Seventh minute | 1.0 |
| Eighth Minute | 1.0 |

**ACTUAL TEST VEHICLE SOLVENT SPILLAGE (oz.)**

| Test Phase | First 5 Minutes | Sixth Minute | Seventh Minute | Eighth Minute |
|---|---|---|---|---|
| 0° to 90° | 0 | 0 | 0 | 0 |
| 90° to 180° | 0 | 0 | 0 | 0 |
| 180° to 270° | 0 | 0 | 0 | 0 |
| 270° to 360° | 0 | 0 | 0 | 0 |

**SOLVENT SPILLAGE LOCATION TABLE**

| Test Phase | SPILLAGE LOCATION |
|---|---|
| 0° to 90° | None |
| 90° to 180° | None |
| 180° to 270° | None |
| 270° to 360° | None |

**DATA SHEET NO. 14**
**VEHICLE MEASUREMENTS**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

| No. | Measurement Description | Units | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|---|
| 1 | Total length of vehicle at centerline | mm | 5070 | 4549 | -521 |
| 2 | RSOV to front of engine | mm | 4223 | 4190 | -33 |
| 3 | RSOV to firewall centerline | mm | 3940 | 3932 | -8 |
| 4 | RSOV to leading edge of right door | mm | 3722 | 3744 | 22 |
| 5 | RSOV to leading edge of left door | mm | 3718 | 3758 | 40 |
| 6 | RSOV to lower leading edge of right door | mm | 3634 | 3640 | 6 |
| 7 | RSOV to lower leading edge of left door | mm | 3628 | 3655 | 27 |
| 8 | RSOV to upper trailing edge of right door | mm | 2550 | 2577 | 27 |
| 9 | RSOV to upper trailing edge of left door | mm | 2555 | 2590 | 35 |
| 10 | RSOV to lower trailing edge of right door | mm | 2538 | 2537 | -1 |
| 11 | RSOV to lower trailing edge of left door | mm | 2533 | 2564 | 31 |
| 12 | RSOV to bottom of right ‘A’ pillar | mm | 3693 | 3719 | 26 |
| 13 | RSOV to bottom of left ‘A’ pillar | mm | 3690 | 3719 | 29 |
| 14 | RSOV to firewall on right side | mm | 3935 | 3956 | 21 |
| 15 | RSOV to firewall of left side | mm | 3935 | 3942 | 7 |
| 16 | RSOV to steering column | mm | 3208 | 3220 | 12 |
| 17 | Center of steering column to left ‘A’ pillar | mm | 350 | 340 | -10 |
| 18 | Center of steering column to headlining | mm | 438 | 435 | -3 |
| 19 | RSOV to right side of front bumper | mm | 4962 | 4620 | -342 |
| 20 | RSOV to left side of front bumper | mm | 4962 | 4613 | -349 |
| 21 | Length of engine block | mm | 385 | 385 | 0 |
| RD | RSOV to right side of dash panel | mm | 3443 | 3476 | 33 |
| CD | RSOV to center of dash panel | mm | 3435 | 3430 | -5 |
| LD | RSOV to left side of dash panel | mm | 3446 | 3461 | 15 |

**DATA SHEET NO. 14…..(CONTINUED)**
**VEHICLE STRUCTURAL MEASUREMENTS**

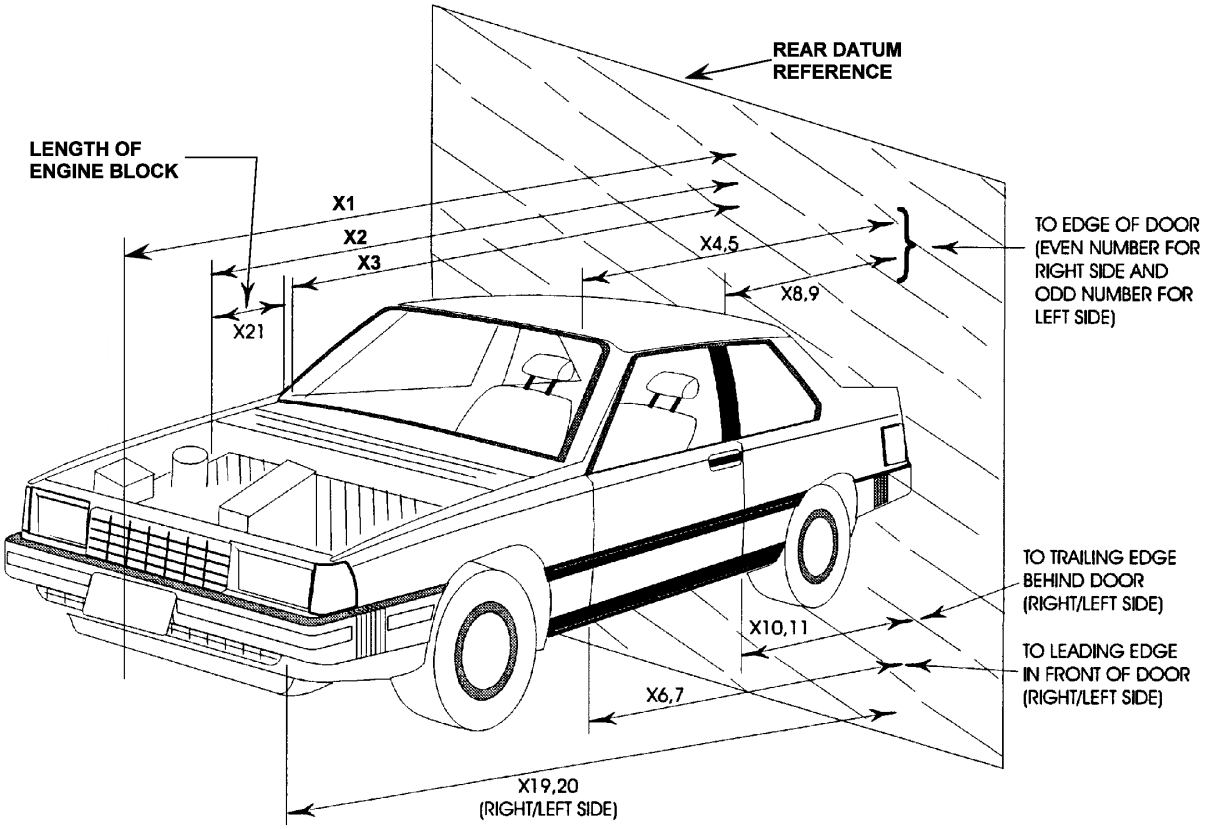
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

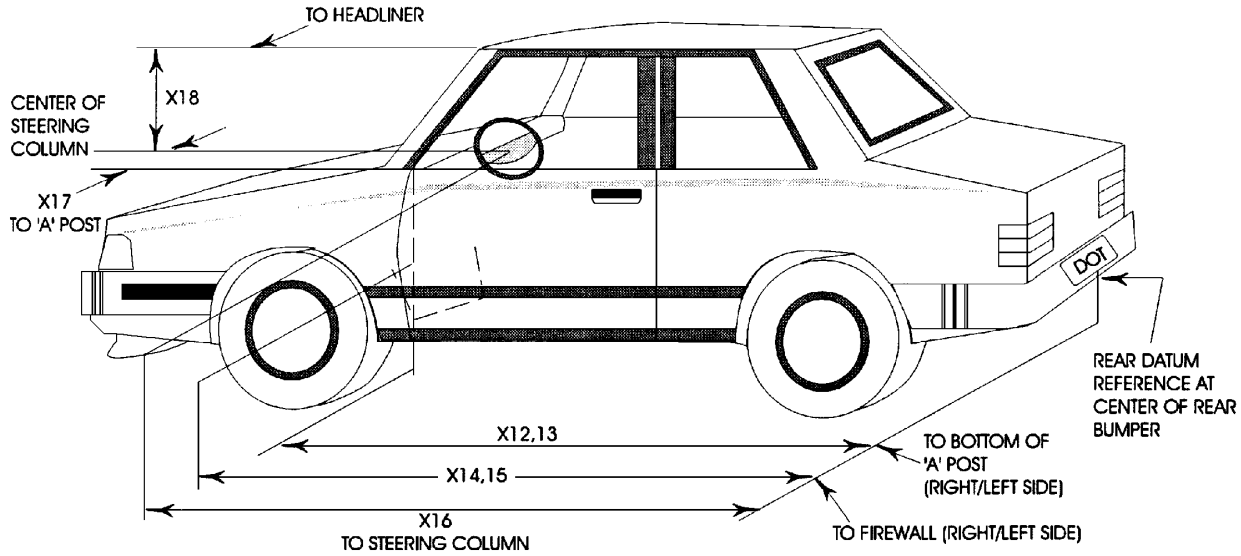
| No. | Measurement Description | Units | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|---|
| 1 | Total Length | mm | 5070 | 4549 | -521 |
| 2 | Total Width | mm | 1685 | 1685 | 0 |
| 3 | Bumper Top Height | mm | 800 | 785 | -15 |
| 4 | Bumper Bottom Height | mm | 395 | 338 | -57 |
| 5 | Longitudinal Member Top Height | mm | 470 | 449 | -21 |
| 6 | Longitudinal Member Bottom Height | mm | 710 | 750 | 40 |
| 7 | Distance Between Longitudinal Members | mm | 55 | 68 | 13 |
| 8 | Longitudinal Member Width | mm | 1070 | 1097 | 27 |
| 9 | Engine Top Height | mm | 275 | 304 | 29 |
| 10 | Engine Bottom Height | mm | 550 | 700 | 150 |
| 11 | Engine and Gear Box Width | mm | 654 | 335 | -319 |
| 12 | Front Bumper to Engine Distance | mm | 385 | 451 | 66 |
| 13 | Front Shock Absorber Fixing Width | mm | 970 | 1015 | 45 |
| 14 | Bonnet Leading Edge Height | mm | 780 | 1060 | 280 |
| 15 | Front Shock Absorber Fixing Width | mm | 875 | 432 | -443 |
| 16 | Front Bumper to Front Axle Distance | mm | 510 | 420 | -90 |
| 17 | Front Axle to A-Pillar Distance | mm | 1125 | 1175 | 50 |
| 18 | A-Pillar to B-Pillar Distance | mm | 1320 | 1316 | -4 |
| 19 | B-Pillar to Rear Axla Distance | mm | 480 | 793 | 313 |
| 20 | B-Pillar to C-Pillar Distance | mm | 1570 | 1567 | -3 |
| 21 | Roof Sill Bottom Height | mm | 1650 | 1598 | -52 |
| 22 | Roof Sill Top Heigth | mm | 410 | 365 | -45 |
| 23 | Floor Sill Bottom Height | mm | 530 | 470 | -60 |

All Measurements in millimeters

**DATA SHEET NO. 14…(CONTINUED)**
**VEHICLE MEASUREMENTS**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02



**DATA SHEET NO. 15**
**CAMERA LOCATIONS**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35MPH NCAP Test Date: 12/19/02

| No. | Camera View | Location (mm) | | | Angle (Deg.) | Film Plane to Head | Lens (mm) | Speed (fps) |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | |
| 1 | Right Side, Real Time | 18288 | -22860 | 2540 | 10 | N/A | 12-70 | 24 |
| 2 | Driver Overall | 1930 | 8357 | 1321 | 4 | 7849 | 13 | 900 |
| 2B | Driver Overall | 1626 | 8230 | 1092 | 4 | 7747 | 17 | 920 |
| 3 | Driver Close-up | 1727 | 8230 | 1600 | 4 | 7722 | 35 | 1000 |
| 4 | 3/4 Driver (Shoulder) | 6477 | 10185 | 4648 | 13 | 10947 | 35-80 | 1000 |
| 5 | Driver Steering Column | 1524 | 8230 | 3404 | 20 | 7950 | 19 | 1040 |
| 6 | Driver Steering Column | 1524 | 8230 | 2997 | 16 | 7874 | 19 | 1040 |
| 7 | Passenger Overall | 2057 | -8306 | 1600 | 6 | 7772 | 24 | 1020 |
| 8 | Passenger Close-up | 1676 | -8052 | 1600 | 4 | 7544 | 35 | 1030 |
| 9 | 3/4 Passenger (Shoulder) | 8026 | -8941 | 2947 | 9 | 10236 | 80 | 910 |
| 10 | Passenger Door | 2540 | -8306 | 1600 | 4 | 7772 | 35 | 900 |
| 11 | Overhead | 610 | 0 | 6172 | 90 | N/A | 13 | 1120 |
| 12 | Driver Front | -610 | 381 | 2743 | 40 | N/A | 13 | 930 |
| 13 | Passenger Front | -610 | -432 | 2743 | 40 | N/A | 12 | 990 |
| 14 | Pit Engine | 610 | 0 | -499 | 90 | N/A | 19 | 820 |
| 15 | Pit Gas Tank | 2743 | 0 | -1499 | 90 | N/A | 24 | 700 |
| 16 | Rear Child Driver Side | 2946 | -711 | 1676 | 25 | 1092 | 13 | 700 |
| 17 | Rear Child Passenger Side | 2946 | 711 | 1676 | 25 | 1092 | 13 | 880 |

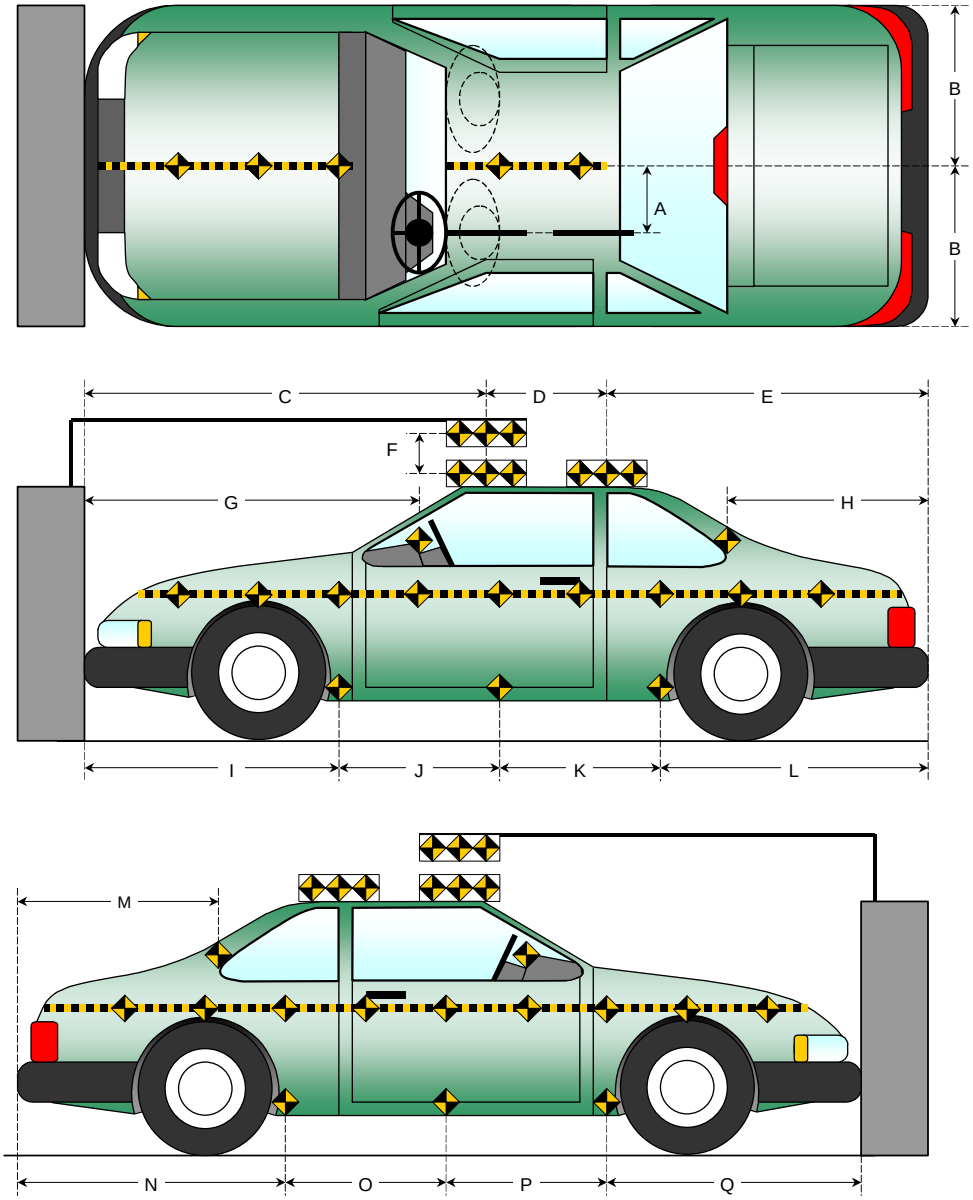
X - Barrier Face Y - Monorail Centerline Z - Ground

**DATA SHEET NO. 16**
**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

All Dimensions in mm

| Item | Value |
|---|---|
| A | 355 |
| B | 894 |
| C | 2125 |
| D | 610 |
| E | 2342 |
| F | 155 |
| G | 1690 |
| H | 1761 |
| I | 1472 |
| J | 936 |
| K | 936 |
| L | 1720 |
| M | 1760 |
| N | 1713 |
| O | 941 |
| P | 941 |
| Q | 1473 |



## DATA SHEET NO. 17
## VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

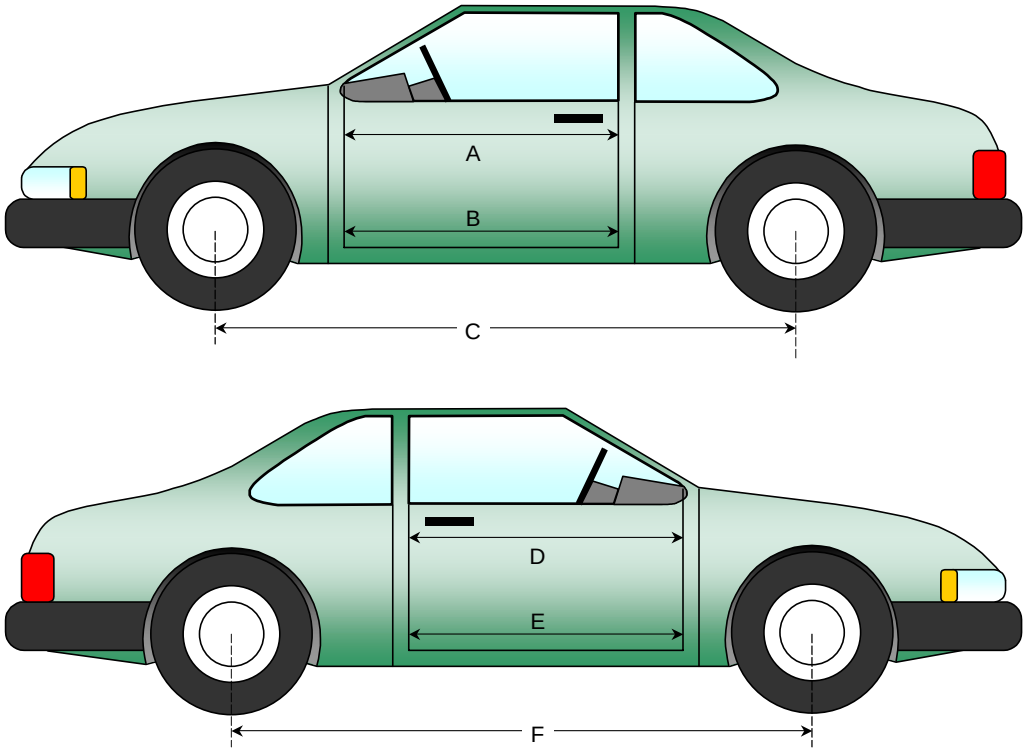
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### DOOR OPENING WIDTH

| Item | Description | Units | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|---|
| A | Left Side Upper | mm | 1091 | 1079 | -12 |
| B | Left Side Lower | mm | 1080 | 1076 | -4 |
| D | Right Side Upper | mm | 1084 | 1080 | -4 |
| E | Right Side Lower | mm | 1070 | 1069 | -1 |

### WHEELBASE MEASUREMENTS

| Item | Description | Units | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|---|
| C | Left Side Wheel base | mm | 2955 | 2908 | -47 |
| F | Right Side Wheel base | mm | 2955 | 2908 | -47 |



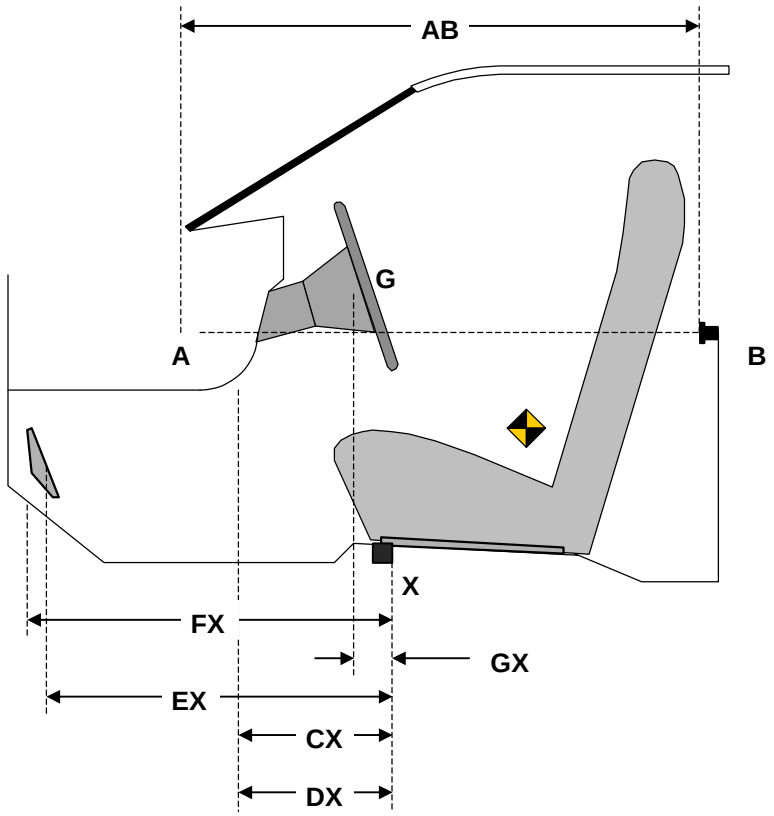
**DATA SHEET NO. 17…(CONTINUED)**
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**DRIVER COMPARTMENT INTRUSION**

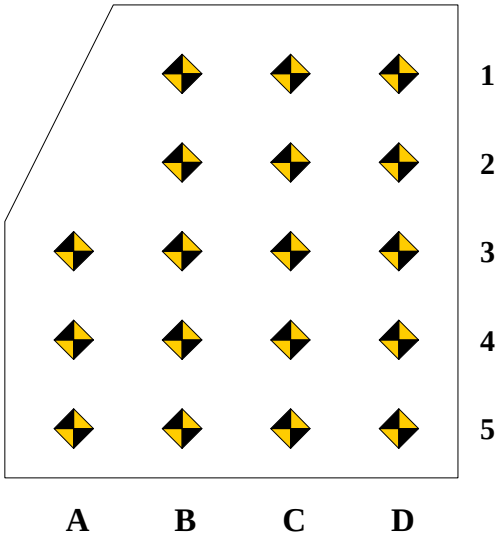
| Item | Description | Units | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|---|
| AB | Door Opening (Inside window jam) | mm | 1091 | 1079 | -12 |
| CX | Left Knee Bolster to X | mm | 332 | 301 | -31 |
| DX | Right Knee Bolster to X | mm | 298 | 304 | 6 |
| EX | Brake Pedal to X | mm | 568 | 557 | -11 |
| FX | Foot Rest to X | mm | 575 | 565 | -10 |
| GX | Center of Steering Wheel Hub to X | mm | 42 | 51 | 9 |

X = Left Front Seat Outboard Anchor Bolt Head



**DATA SHEET NO. 17…(CONTINUED)**
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02




Measurement reference point for X and Z-axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3,4 and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.

**DRIVER FLOOR PAN X-AXIS**

| | Pre-Test | | | | Post-Test | | | | Difference | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| 1 | | 700 | 718 | 716 | | 677 | 684 | 675 | | -23 | -34 | -41 |
| 2 | | 639 | 650 | 641 | | 628 | 624 | 612 | | -11 | -26 | -29 |
| 3 | 543 | 541 | 540 | 540 | 545 | 537 | 533 | 522 | 2 | -4 | -7 | -18 |
| 4 | 448 | 444 | 445 | 441 | 447 | 440 | 440 | 437 | -1 | -4 | -5 | -4 |
| 5 | 348 | 344 | 342 | 339 | 345 | 338 | 337 | 334 | -3 | -6 | -5 | -5 |

**DRIVER FLOOR PAN Z-AXIS**

| | Pre-Test | | | | Post-Test | | | | Difference | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| 1 | | 13 | -10 | 3 | | 33 | 11 | 20 | | 20 | 21 | 17 |
| 2 | | -40 | -70 | -60 | | -30 | -59 | -41 | | 10 | 11 | 19 |
| 3 | -78 | -77 | -78 | -90 | -87 | -97 | -94 | -75 | -9 | -20 | -16 | 15 |
| 4 | -75 | -75 | -75 | -85 | -88 | -97 | -94 | -80 | -13 | -22 | -19 | 5 |
| 5 | -75 | -75 | -80 | -78 | -83 | -87 | -92 | -77 | -8 | -12 | -12 | 1 |

**DATA SHEET NO. 17…(CONTINUED)**
**VEHICLE INTRUSION MEASUREMENTS**

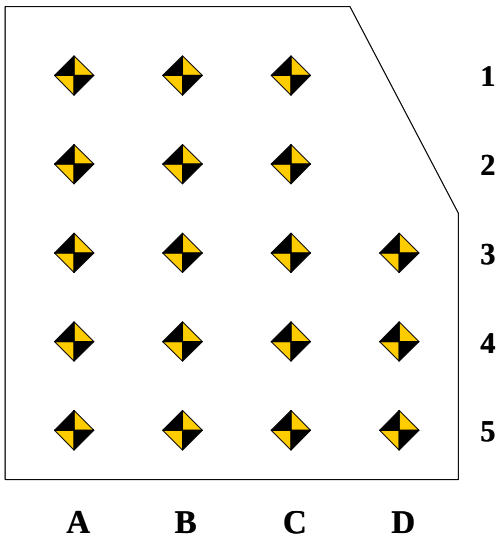
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3,4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.




**PASSENGER FLOOR PAN X-AXIS**

| | Pre-Test | | | | Post-Test | | | | Difference | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| 1 | 699 | 700 | 680 | | 624 | 645 | 648 | | -75 | -55 | -32 | |
| 2 | 528 | 630 | 611 | | 599 | 593 | 594 | | 71 | -37 | -17 | |
| 3 | 526 | 529 | 529 | 535 | 509 | 520 | 515 | 520 | -17 | -9 | -14 | -15 |
| 4 | 429 | 430 | 483 | 438 | 419 | 420 | 423 | 427 | -10 | -10 | -60 | -11 |
| 5 | 330 | 330 | 333 | 333 | 324 | 320 | 320 | 320 | -6 | -10 | -13 | -13 |

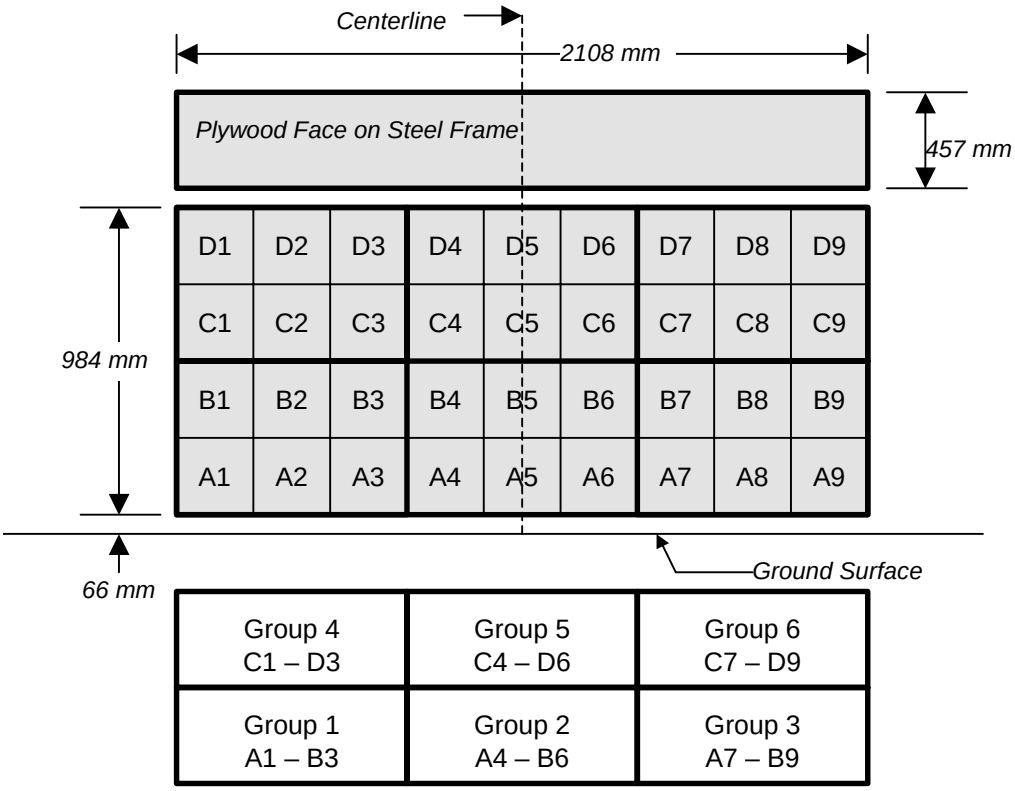
**PASSENGER FLOOR PAN Z-AXIS**

| | Pre-Test | | | | Post-Test | | | | Difference | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| 1 | 20 | 20 | 55 | | 80 | 55 | 65 | | 60 | 35 | 10 | |
| 2 | -55 | -48 | -82 | | -20 | -28 | -30 | | 35 | 20 | 52 | |
| 3 | -77 | -78 | -80 | -80 | -70 | -79 | -88 | -85 | 7 | -1 | -8 | -5 |
| 4 | -70 | -70 | -75 | -80 | -25 | -48 | -85 | -88 | 45 | 22 | -10 | -8 |
| 5 | -72 | -73 | -79 | -75 | -43 | -55 | -65 | -75 | 29 | 18 | 14 | 0 |

**DATA SHEET NO. 18**
**FIXED BARRIER LOAD CELL LOCATIONS**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**36 Load Cell Rigid Barrier (NHTSA Standard)**
**Load Cell Locations on Fixed Barrier**




6 Groups of 6 Load Cells Each

The Data is presented in Appendix C with the following requirements:

1.) Data from 36 individual load cells

2.) Sum data from 6 groupings shown above (6 cells/group)

3.) Total or sum of all 36 individual load cells

4.) Sum of all 36 individual load cells vs. vehicle dynamic crush

## DATA SHEET NO. 19
## ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### VEHICLE INFORMATION

VIN: 1N6ED27T93C401035 Wheel base (mm): 2955
Vehicle Size Category: 4 Door Pickup Test Weight (kg): 1998

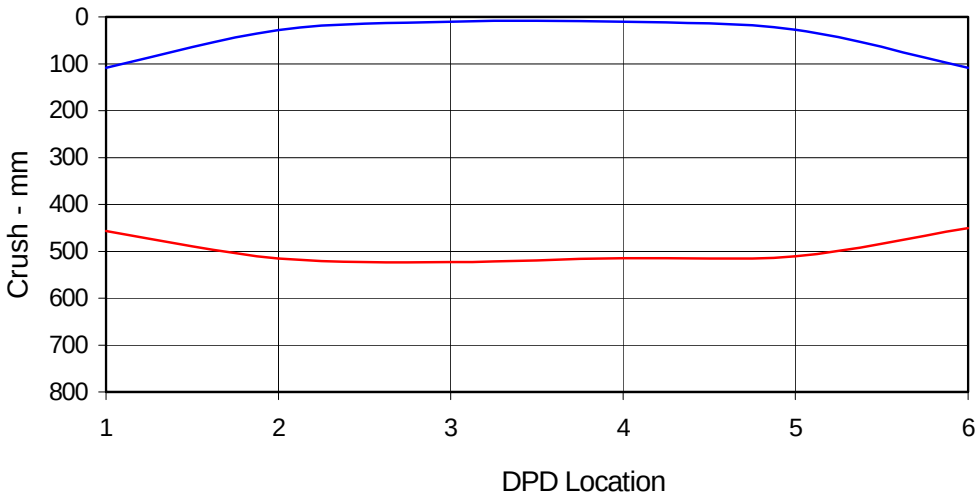
### ACCELEROMETER DATA

Accelerometer Location: Left rear floor pan
Cal. Procedure/Interval: 6 months / drop test
Integration Algorithm: NHTSA Standard Linearity: Good
Impact Velocity (km/h): 55.59
Velocity Change (km/h): 69.7 Time of Separation (msec): 64.0

### CRUSH PROFILE

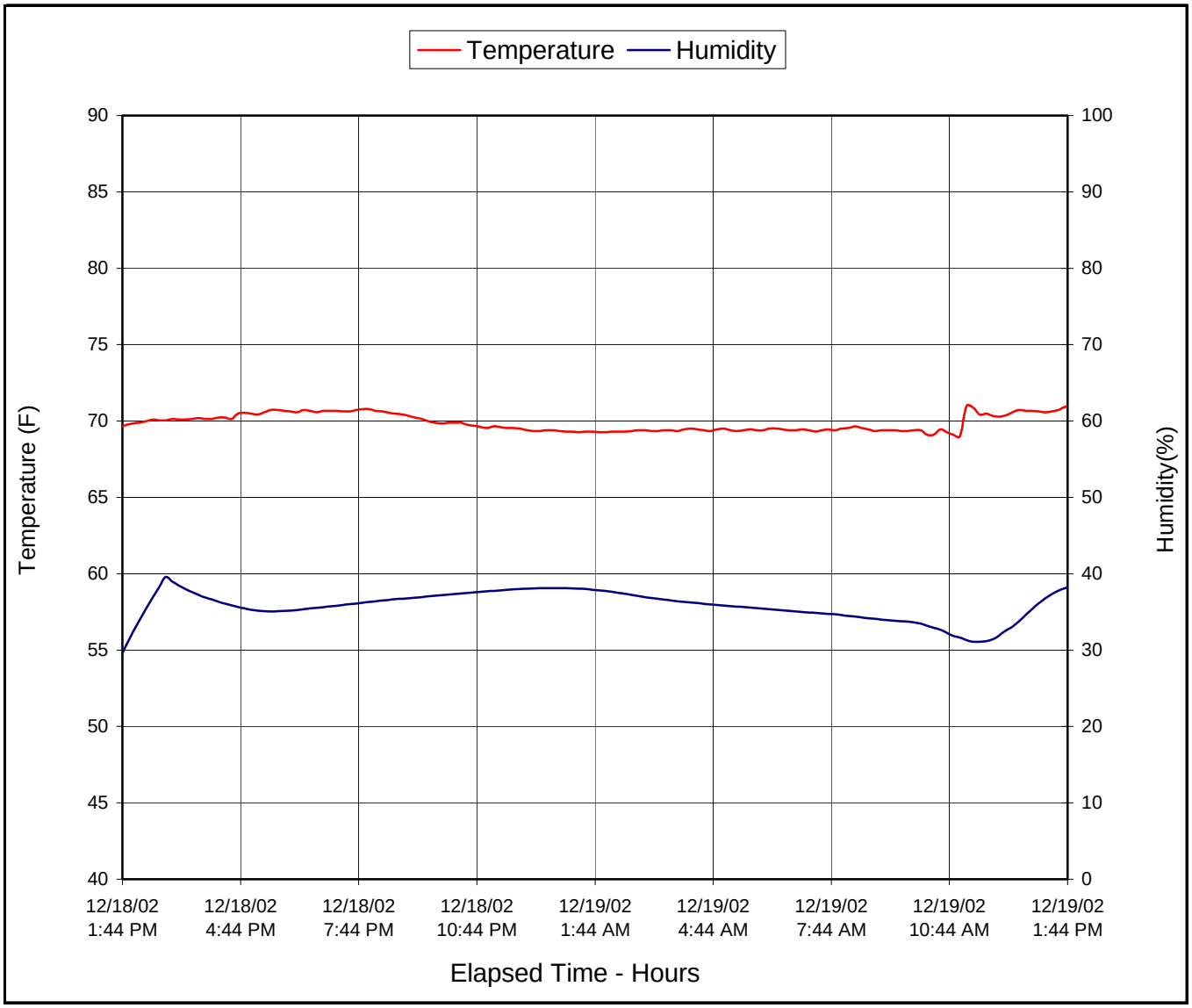
Collision Deformation Classification: 12FDEW6 Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1236 Impact Mode: Full Frontal

| No. | Measurement Description | Units | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|---|
| C1 | Crush zone 1 at left side | mm | 108 | 457 | -349 |
| C2 | Crush zone 2 on left side | mm | 28 | 515 | -487 |
| C3 | Crush zone 3 on left side | mm | 10 | 523 | -513 |
| C4 | Crush zone 4 on right side | mm | 10 | 514 | -504 |
| C5 | Crush zone 5 on right side | mm | 27 | 510 | -483 |
| C6 | Crush zone 6 at right side | mm | 108 | 450 | -342 |



**DATA SHEET NO. 20**
**DUMMY/VEHICLE TEMPERATURE STABILIZATION**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203
Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02



# APPENDIX A

# PHOTOGRAPHS

LIST OF PHOTOGRAPHS


| Figure | | Page |
|---|---|---|
| A-1 | Load Cell Location | A-1 |
| A-2 | Vehicle Certification Label | A-2 |
| A-3 | Vehicle Tire Label | A-3 |
| A-4 | Right Front ¾ View, As Received | A-4 |
| A-5 | Left Rear ¾ View, As Received | A-5 |
| A-6 | Pre-Test Front View | A-6 |
| A-7 | Post-Test Front View | A-7 |
| A-8 | Pre-Test Left Side View | A-8 |
| A-9 | Post-Test Left Side View | A-9 |
| A-10 | Pre-Test Right Side View | A-10 |
| A-11 | Post-Test Right Side View | A-11 |
| A-12 | Pre-Test Right Front 3/4 View | A-12 |
| A-13 | Post-Test Right Front 3/4 View | A-13 |
| A-14 | Pre-Test Left Rear 3/4 View | A-14 |
| A-15 | Post-Test Left Rear 3/4 View | A-15 |
| A-16 | Left Rear 3/4 View of Doors After Impact | A-16 |
| A-17 | Right Rear 3/4 View of Doors After Impact | A-17 |
| A-18 | Pre-Test Windshield | A-18 |
| A-19 | Post-Test Windshield | A-19 |
| A-20 | Pre-Test Engine Compartment | A-20 |
| A-21 | Post-Test Engine Compartment | A-21 |
| A-22 | Pre-Test Fuel Cap | A-22 |
| A-23 | Post-Test Fuel Cap | A-23 |
| A-24 | Pre-Test Front Underbody View | A-24 |
| A-25 | Post-Test Front Underbody View | A-25 |
| A-26 | Pre-Test Mid Underbody View | A-26 |
| A-27 | Post-Test Mid Underbody View | A-27 |
| A-28 | Pre-Test Rear Underbody View | A-28 |
| A-29 | Post-Test Rear Underbody View | A-29 |
| A-30 | Pre-Test Driver Dummy Front View (Head Position) | A-30 |
| A-31 | Post-Test Driver Dummy Front View (Head Position) | A-31 |
| A-32 | Pre-Test Driver Dummy Front Through Window | A-32 |
| A-33 | Post-Test Driver Dummy Front Through Window | A-33 |
| A-34 | Pre-Test Driver Dummy Door Open | A-34 |
| A-35 | Post-Test Driver Dummy Door Open | A-35 |

LIST OF PHOTOGRAPHS...(Continued)


| Figure | | Page |
|---|---|---|
| A-36 | Pre-Test Driver Dummy Feet | A-36 |
| A-37 | Post-Test Driver Dummy Feet | A-37 |
| A-38 | Pre-Test Driver Side Knee Bolster | A-38 |
| A-39 | Post-Test Driver Side Knee Bolster | A-39 |
| A-40 | Pre-Test Driver Side Floor Pan | A-40 |
| A-41 | Post-Test Driver Side Floor Pan | A-41 |
| A-42 | Post-Test Driver Dummy Head | A-42 |
| A-43 | Post-Test Driver Dummy Contact to Air Bag | A-43 |
| A-44 | Pre-Test  Driver Dummy Front View (Head Position) | A-44 |
| A-45 | Post-Test Passenger Dummy Front View (Head Position) | A-45 |
| A-46 | Pre-Test Passenger Dummy Front Through Window | A-46 |
| A-47 | Post-Test Passenger Dummy Front Through Window | A-47 |
| A-48 | Pre-Test Passenger Dummy Door Open | A-48 |
| A-49 | Post-Test Passenger Dummy Door Open | A-49 |
| A-50 | Pre-Test Passenger Dummy Feet | A-50 |
| A-51 | Post-Test Passenger Dummy Feet | A-51 |
| A-52 | Pre-Test Passenger Side Floor Pan | A-52 |
| A-53 | Post-Test Passenger Side Floor Pan | A-53 |
| A-54 | Pre-Test Passenger Side Knee Bolster | A-54 |
| A-55 | Post-Test Passenger Side Knee Bolster | A-55 |
| A-56 | Post-Test Passenger Dummy Head | A-56 |
| A-57 | Post-Test Passenger Dummy Contact to Air Bag | A-57 |
| A-58 | Vehicle on Rollover Device | A-58 |
| A-59 | Vehicle During Impact | A-59 |

Figure A-1: Load Cell Location

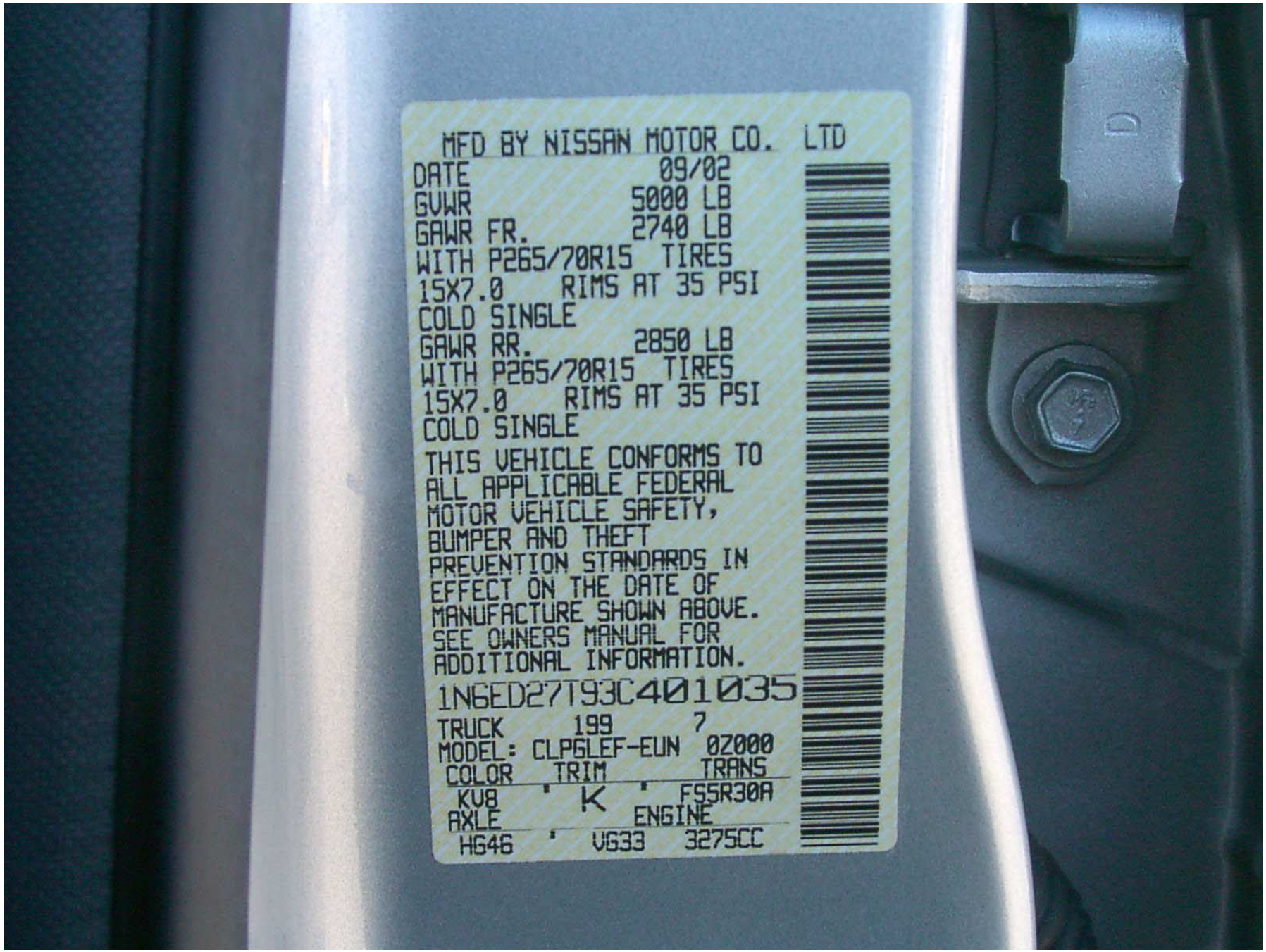



Figure A-2: Vehicle Certification Label

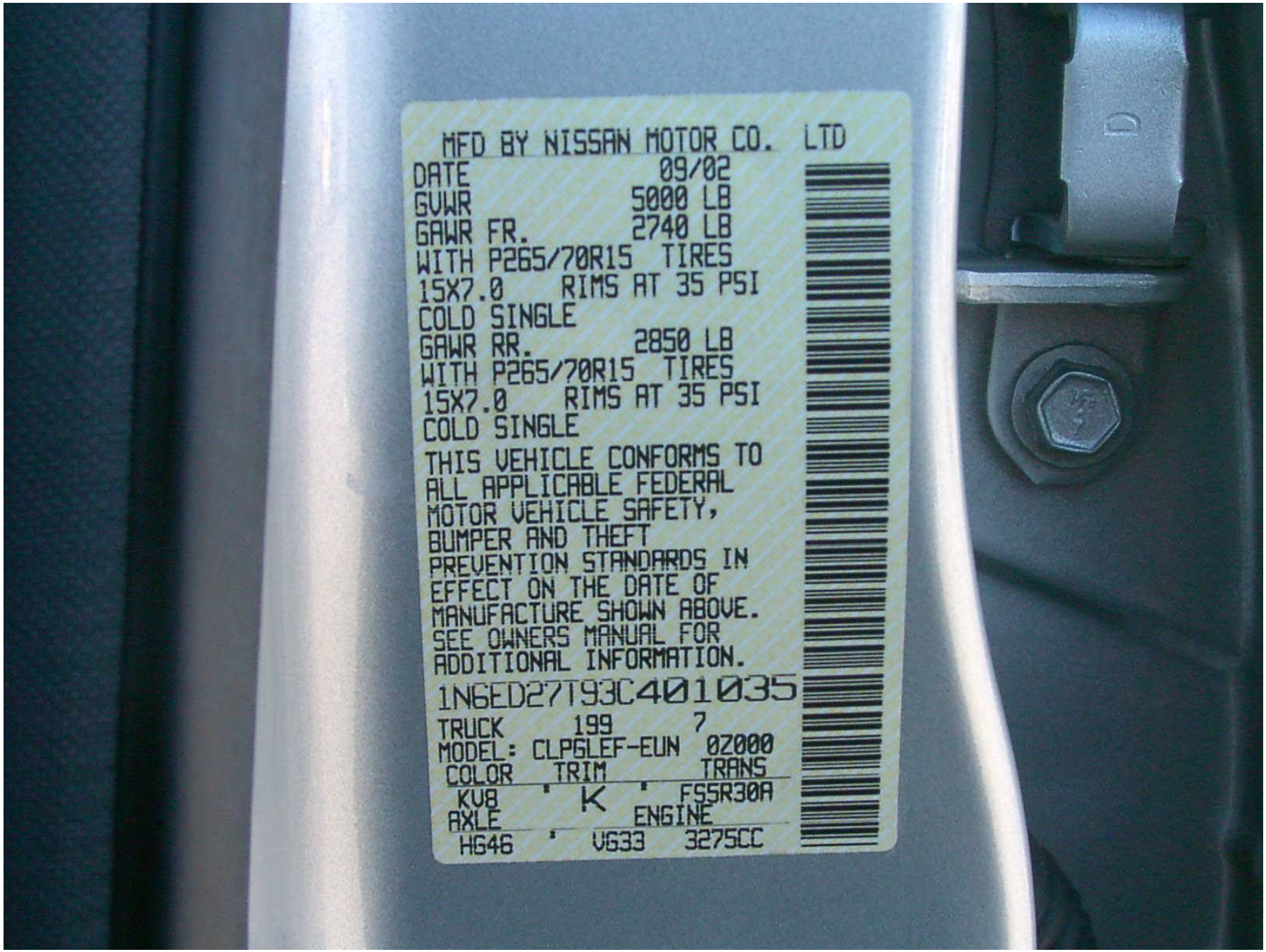



Figure A-3: Vehicle Tire Label

Figure A-4: Right Front ¾ View, As Received

Figure A-5: Left Rear ¾ View, as Received

Figure A-6: Pre-Test Front View

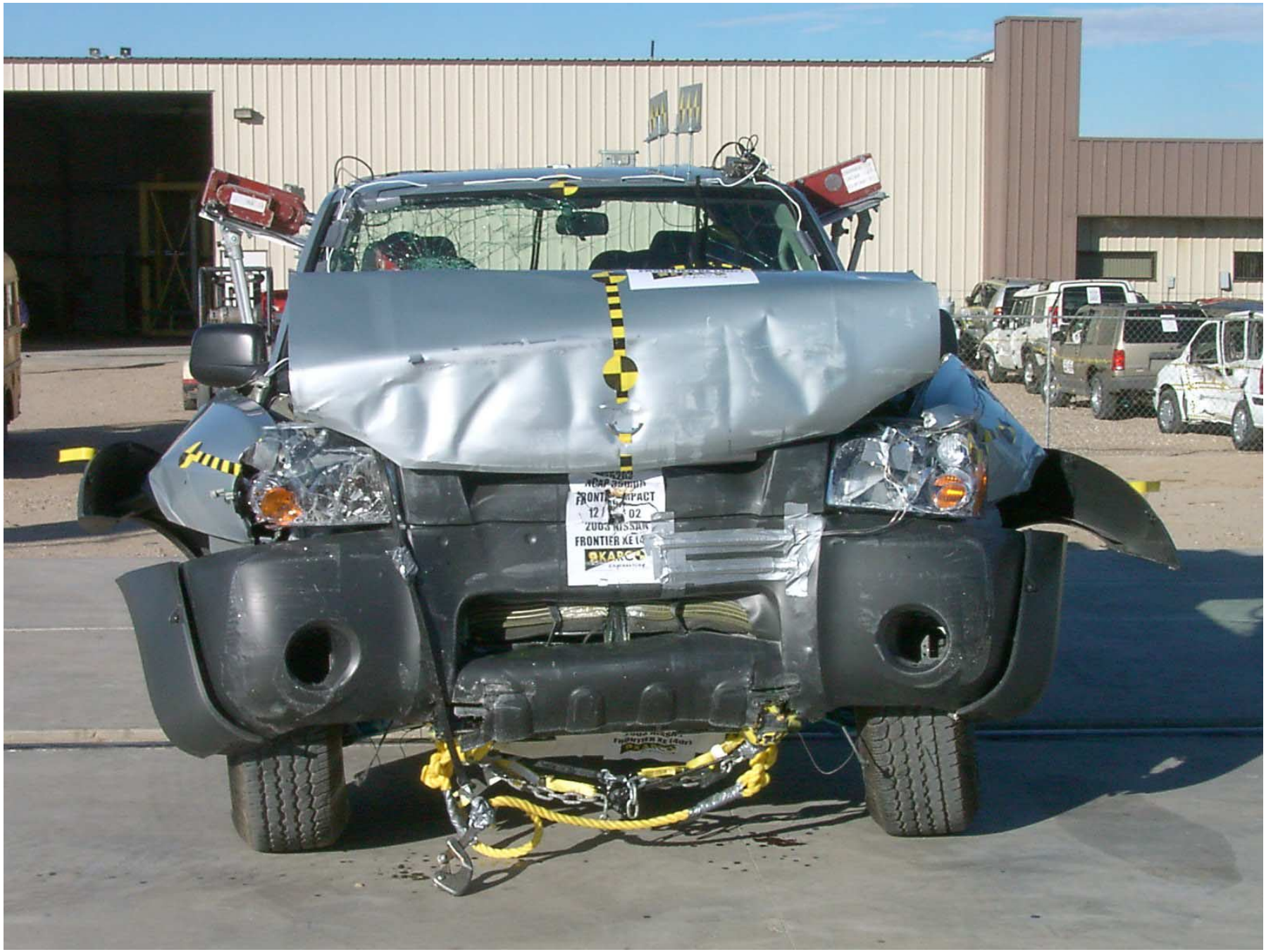



Figure A-7: Post-Test Front View

Figure A-8: Pre-Test Left Side View

Figure A-9: Post-Test Left Side View

Figure A-10: Pre-Test Right Side View

Figure A-11: Post-Test Right Side View

Figure A-12: Pre-Test Right Front ¾ View

Figure A-13: Post-Test Right Front ¾ View

Figure A-14: Pre-Test Left Rear ¾ View

Figure A-15: Post-Test Left Rear ¾ View

Figure A-16: Left Rear ¾ View of Doors After Impact

Figure A-17: Right Rear ¾ View of Doors After Impact

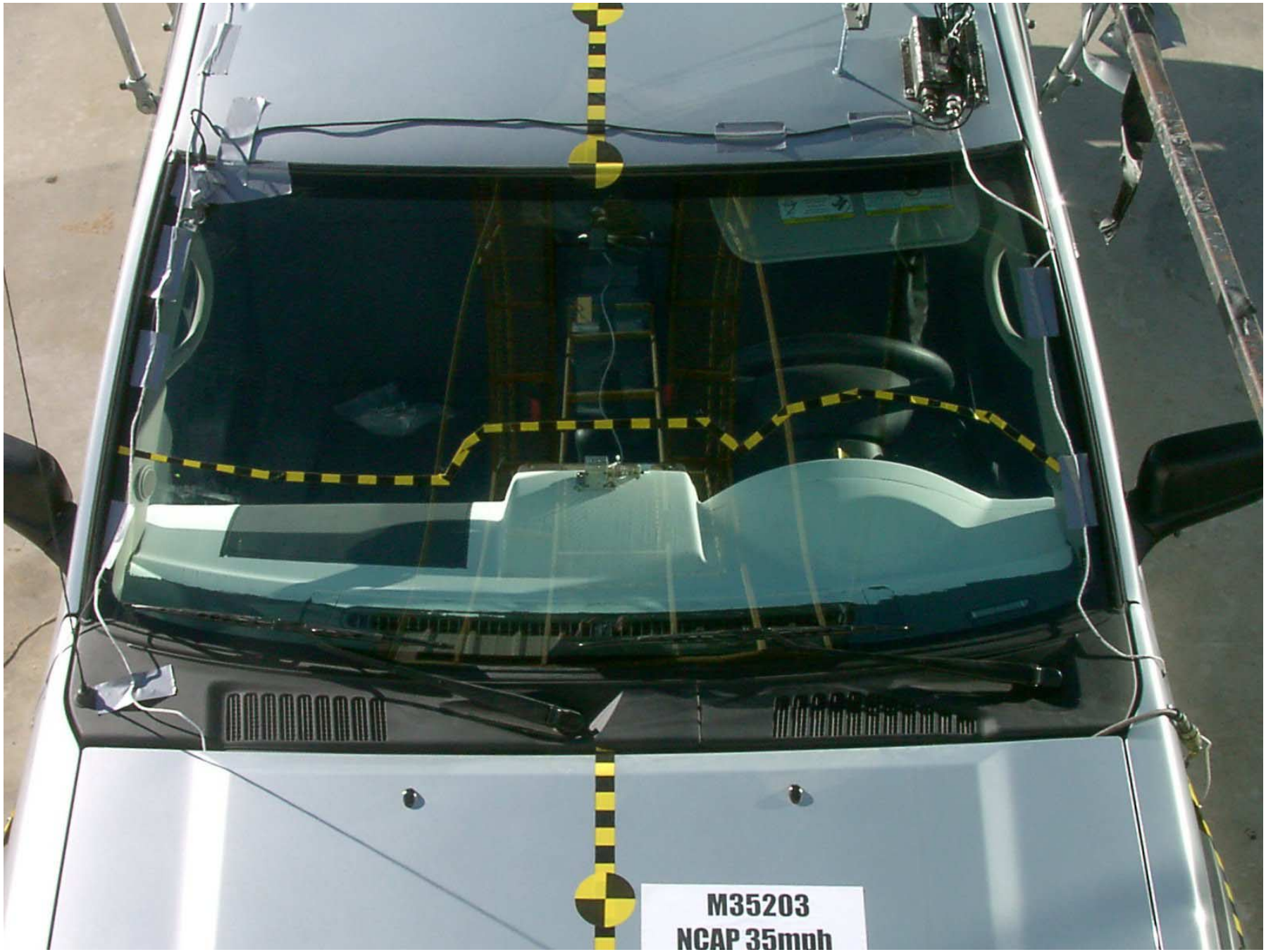



Figure A-18: Pre-Test Windshield View

Figure A-19: Post-Test Windshield View

Figure A-20: Pre-Test Engine Compartment

Figure A-21: Post-Test Engine Compartment

Figure A-22: Pre-Test Fuel Cap

Figure A-23: Post-Test Fuel Cap

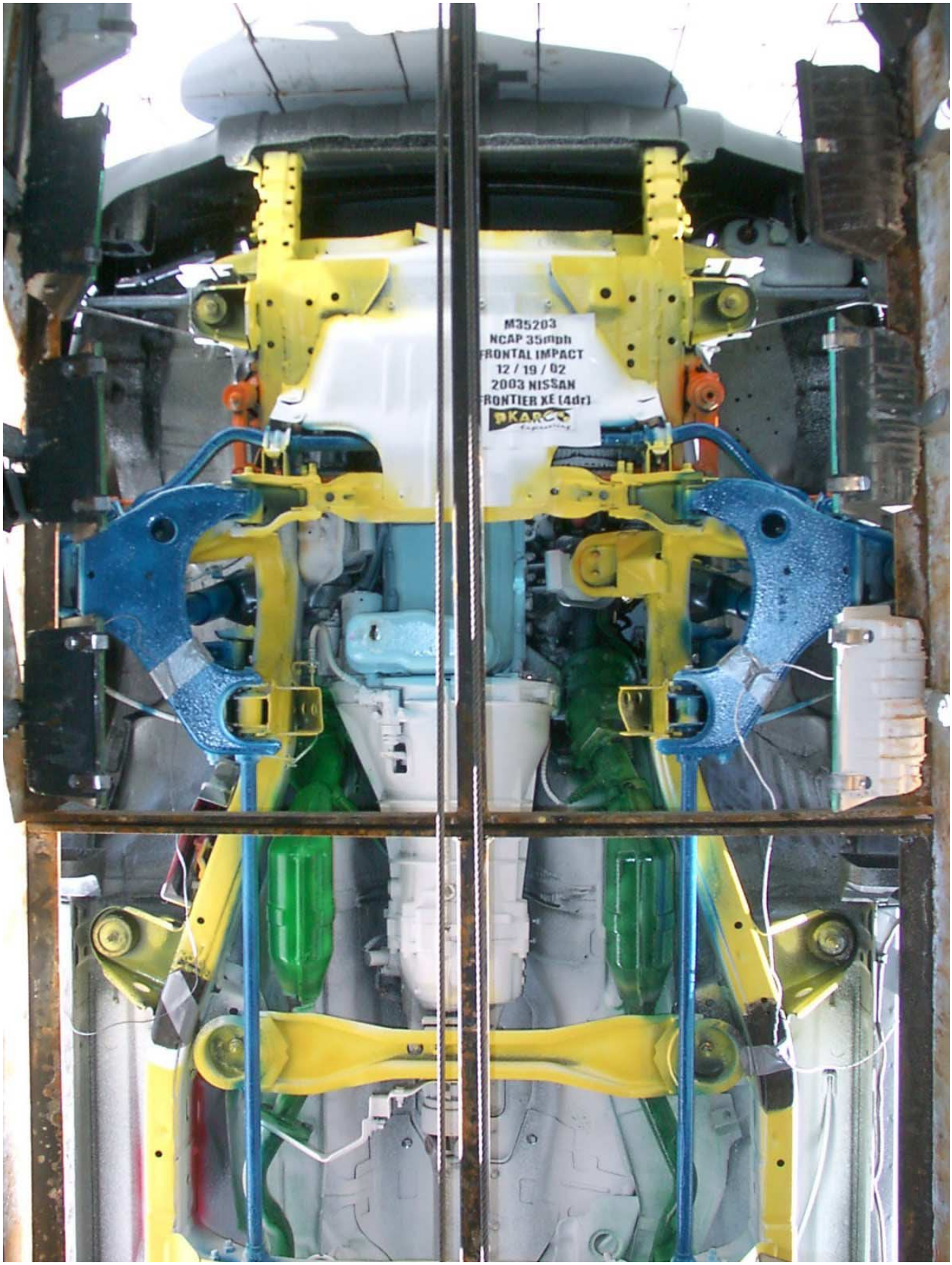



Figure A-24: Pre-Test Front Underbody View

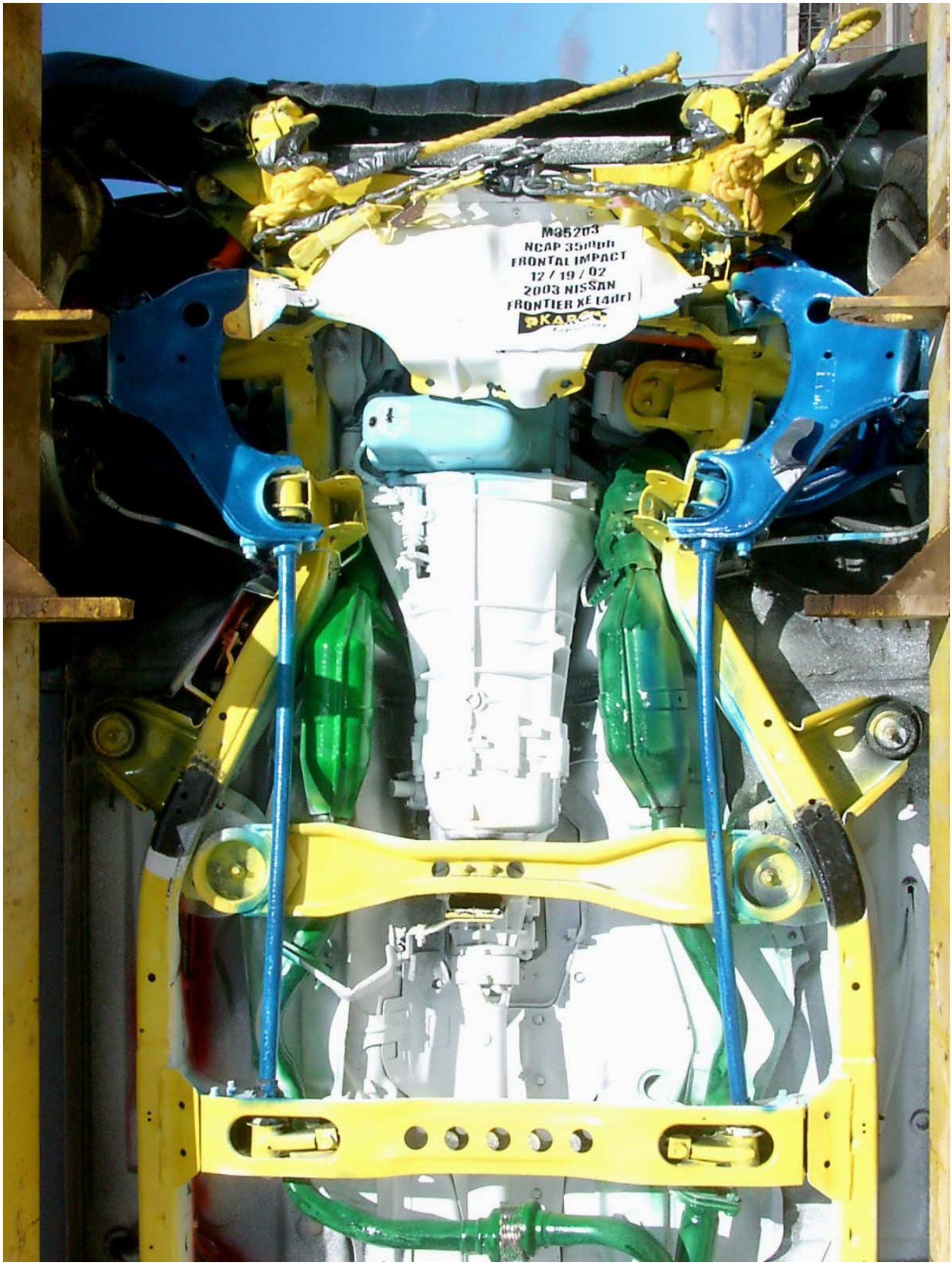



Figure A-25: Post-Test Front Underbody View

Figure A-26: Pre-Test Mid Underbody View

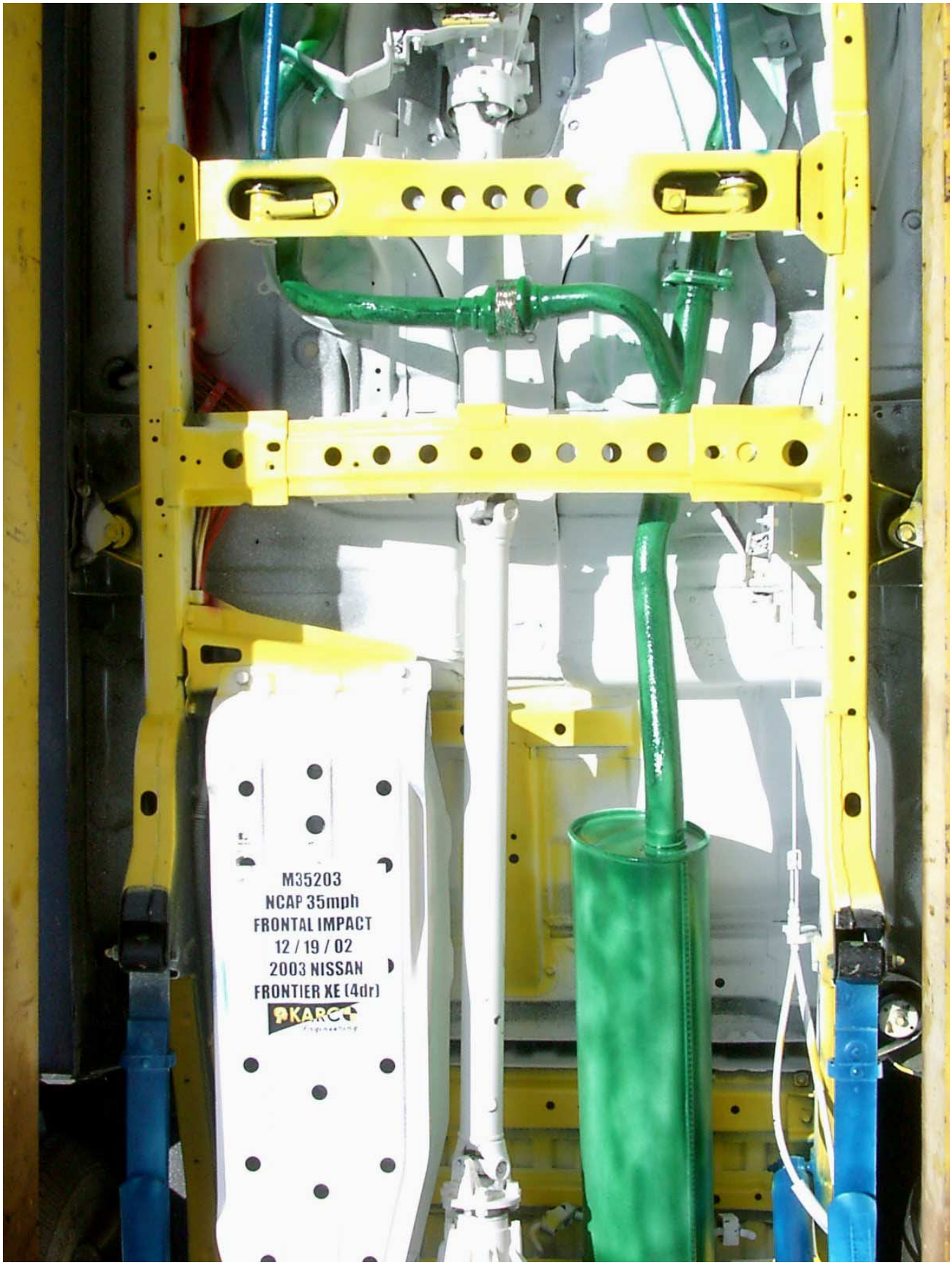



Figure A-27: Post-Test Mid Underbody View

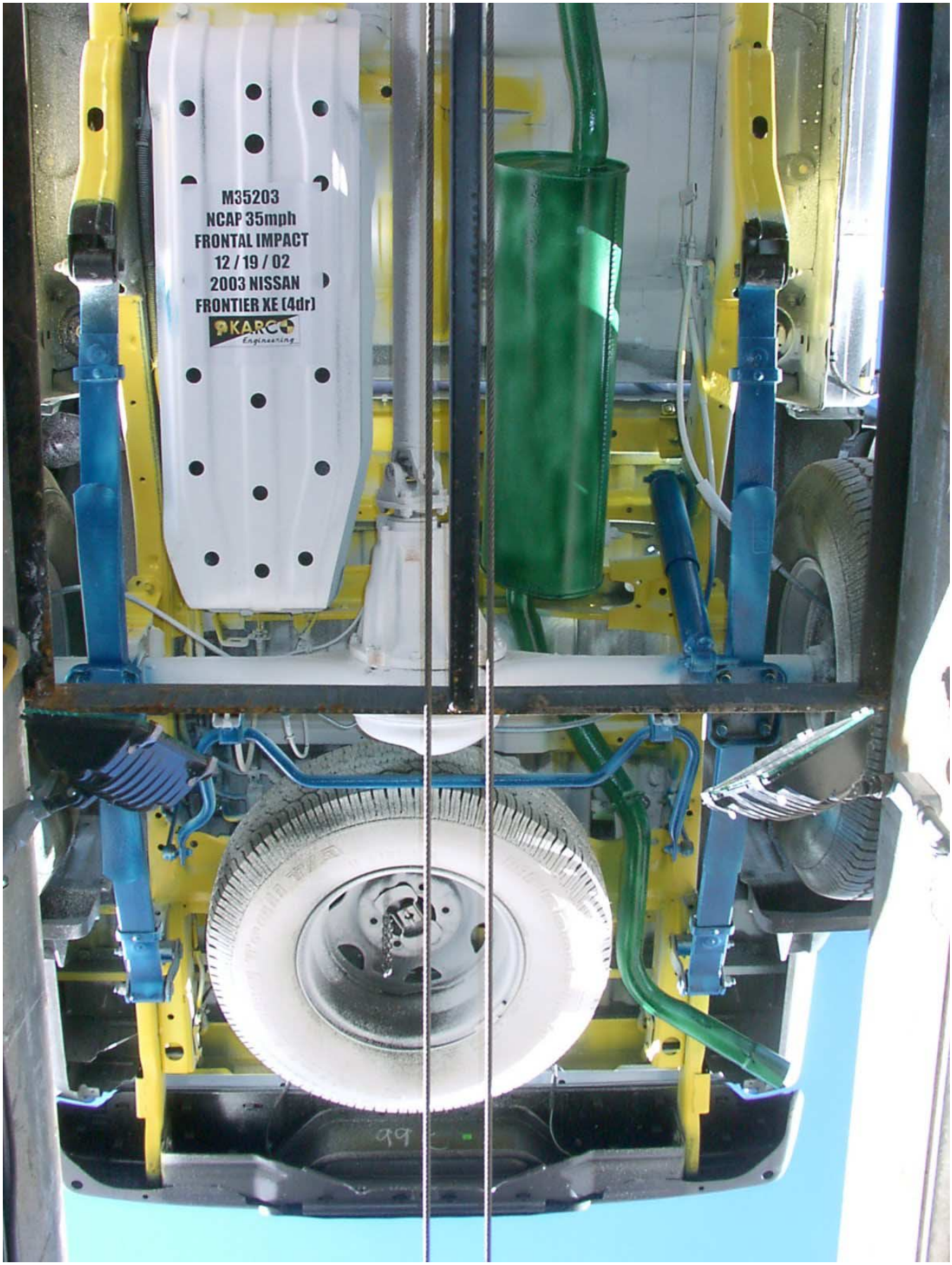



Figure A-28: Pre-Test Rear Underbody View

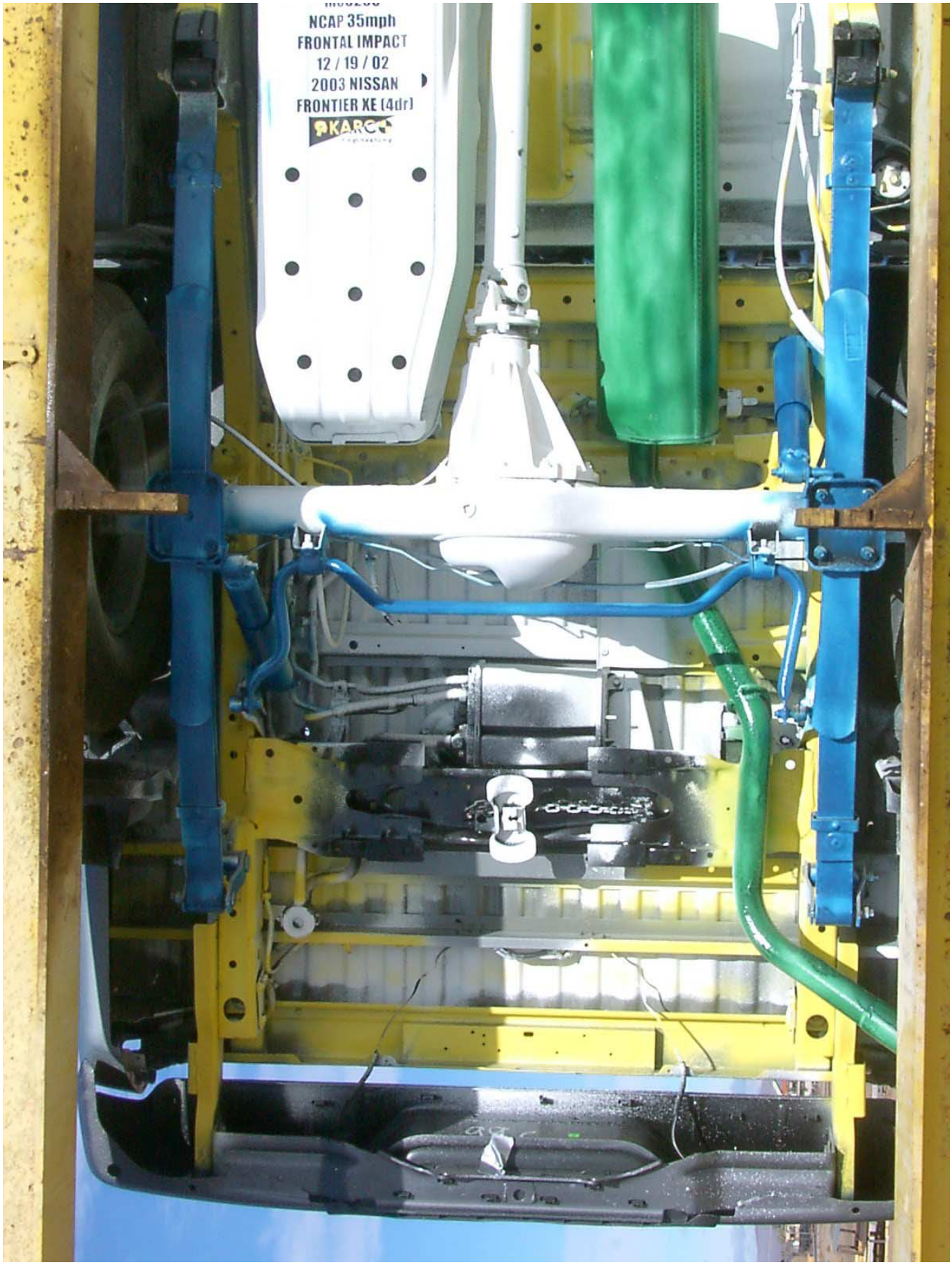



Figure A-29: Post-Test Rear Underbody View

Figure A-30: Pre-Test Driver Dummy Front View (Head Position)

Figure A-31: Post-Test Driver Dummy Front View (Head Position)

Figure A-32: Pre-Test Driver Dummy Front Through Window

Figure A-33: Post-Test Driver Dummy Front Through Window

Figure A-34: Pre-Test Driver Dummy Door Open

Figure A-35: Post-Test Driver Dummy Door Open

Figure A-36: Pre-Test Driver Dummy Feet

Figure A-37: Post-Test Driver Dummy Feet

Figure A-38: Pre-Test Driver Side Knee Bolster

Figure A-39: Post-Test Driver Side Knee Bolster

Figure A-40: Pre-Test Driver Side Floor Pan

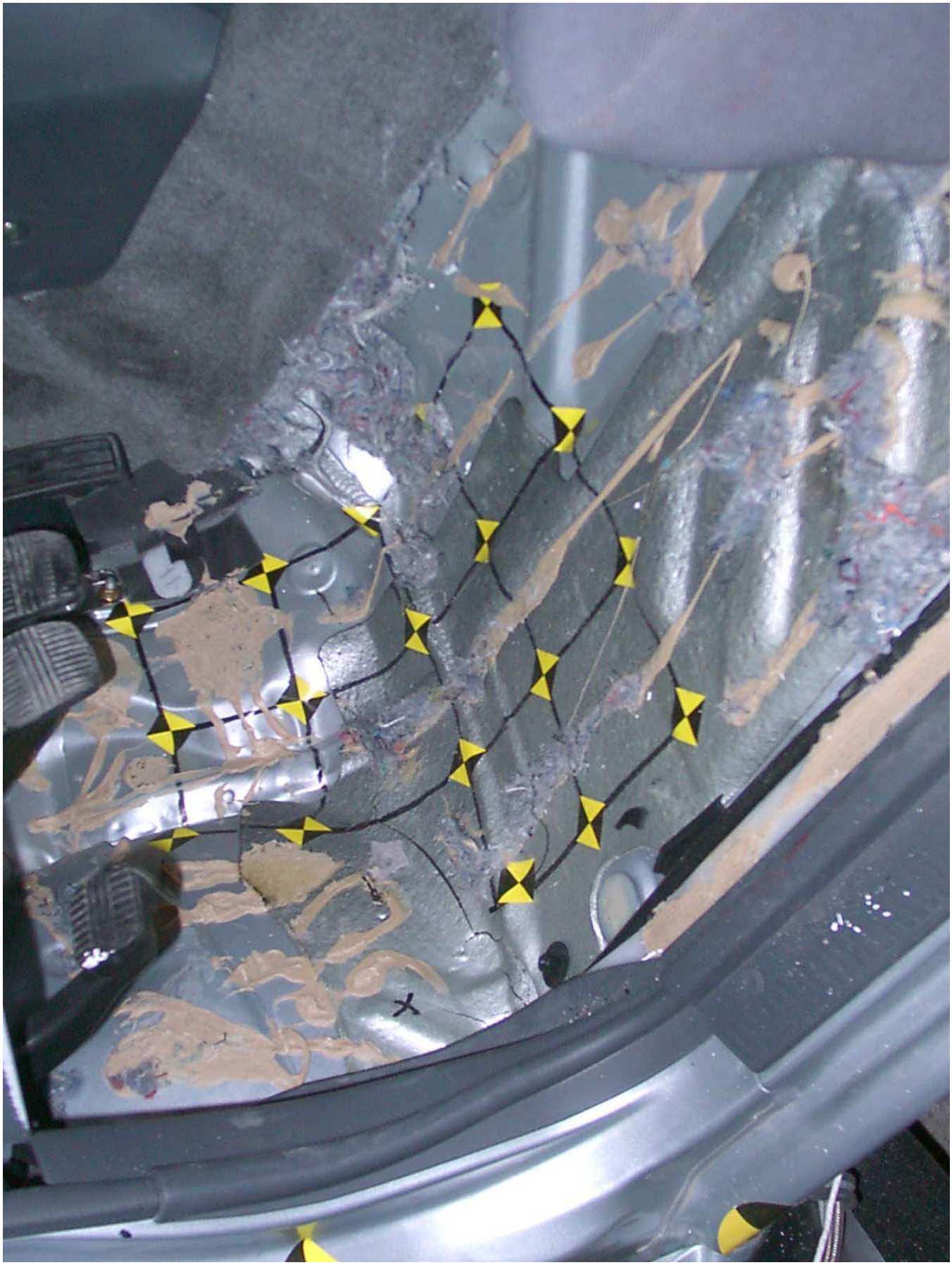


Figure A-41: Post-Test Driver Side Floor Pan

Figure A-42: Post-Test Driver Dummy Head

Figure A-43: Post-Test Driver Dummy Contact to Air Bag

Figure A-44: Pre-Test Passenger Dummy Front View (Head Position)

Figure A-45: Post-Test Passenger Dummy Front View (Head Position)

Figure A-46: Pre-Test Passenger Dummy Front Through Window

Figure A-47: Post-Test Passenger Dummy Front Through Window

Figure A-48: Pre-Test Passenger Dummy Door Open

Figure A-49: Post-Test Passenger Dummy Door Open

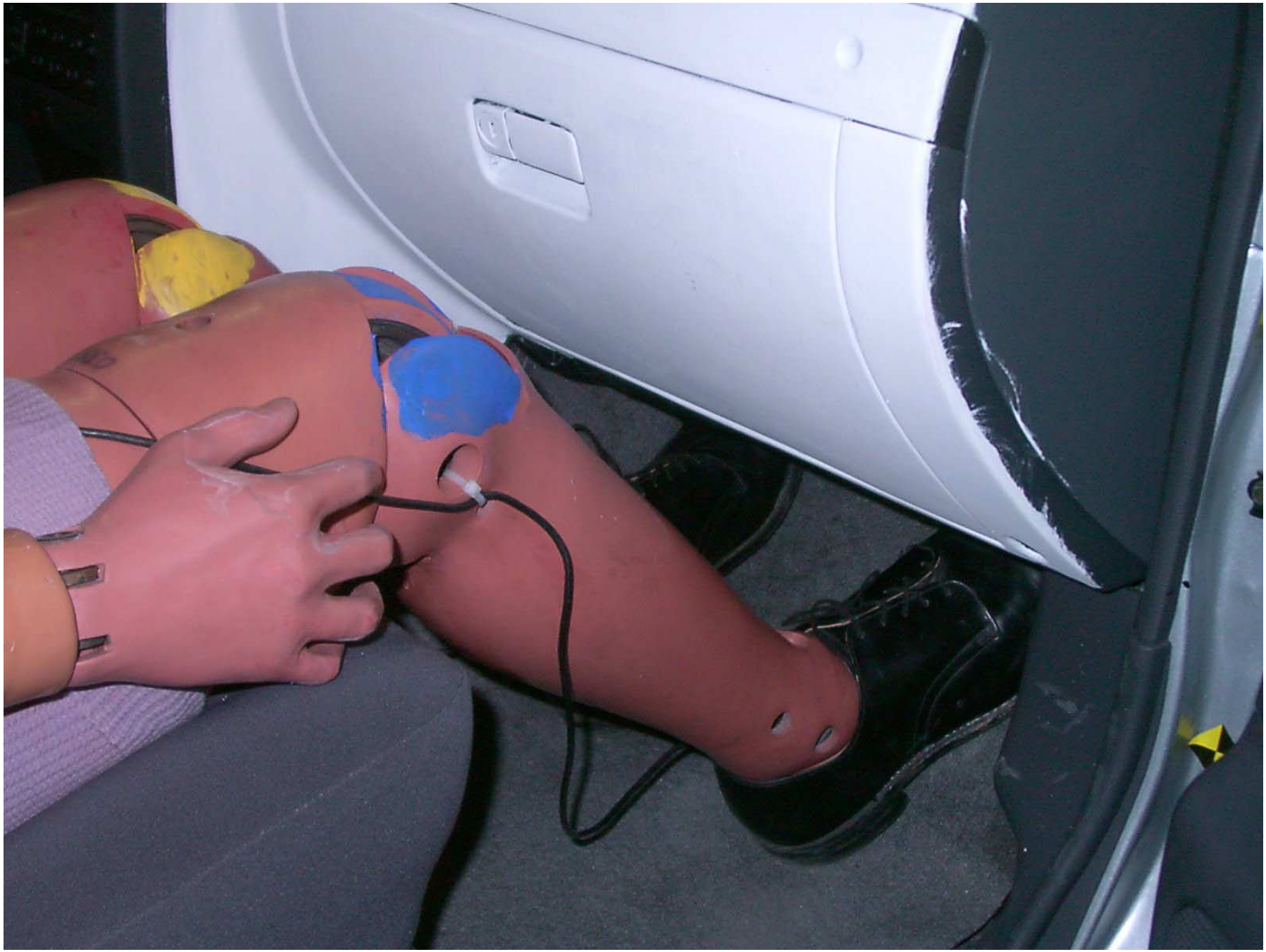


Figure A-50: Pre-Test Passenger Dummy Feet

Figure A-51: Post-Test Passenger Dummy Feet

Figure A-52: Pre-Test Passenger Side Floor Pan

Figure A-53: Post-Test Passenger Side Floor Pan

Figure A-54: Pre-Test Passenger Side Knee Bolster

Figure A-55: Post-Test Passenger Side Knee Bolster

Figure A-56: Post-Test Passenger Dummy Head

Figure A-57: Post-Test Passenger Dummy Contact to Air Bag

Figure A-58: Vehicle on Rollover Device

Figure A-59: Vehicle During Impact

# APPENDIX B

# DATA PLOTS

LIST OF DATA PLOTS

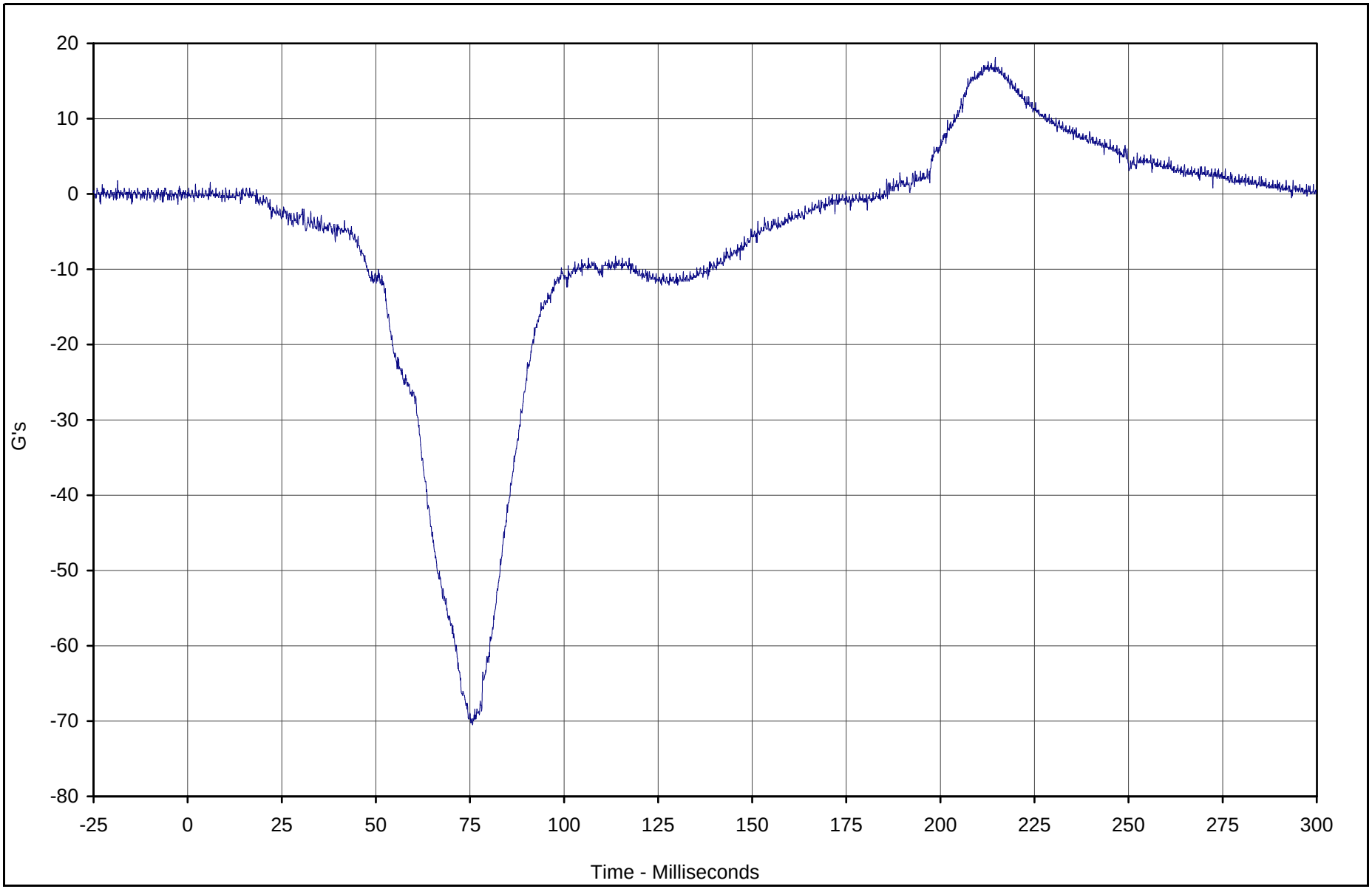

| Data Plot | | Page |
|---|---|---|
| B-1 | Driver Head Primary X | B-1 |
| B-2 | Driver Head Primary X Velocity | B-2 |
| B-3 | Driver Head Primary X Displacement | B-3 |
| B-4 | Driver Head Primary Y | B-4 |
| B-5 | Driver Head Primary Z | B-5 |
| B-6 | Driver Head Resultant Primary | B-6 |
| B-7 | Driver Head Redundant X | B-7 |
| B-8 | Driver Head Redundant X Velocity | B-8 |
| B-9 | Driver Head Redundant X Displacement | B-9 |
| B-10 | Driver Head Redundant Y | B-10 |
| B-11 | Driver Head Redundant Z | B-11 |
| B-12 | Driver Head Resultant Redundant | B-12 |
| B-13 | Driver Neck Force X | B-13 |
| B-14 | Driver Neck Force Y | B-14 |
| B-15 | Driver Neck Force Z | B-15 |
| B-16 | Driver Neck Force Resultant | B-16 |
| B-17 | Driver Neck Moment X | B-17 |
| B-18 | Driver Neck Moment Y | B-18 |
| B-19 | Driver Neck Moment Z | B-19 |
| B-20 | Driver Neck Moment Resultant | B-20 |
| B-21 | Driver Chest Primary X | B-21 |
| B-22 | Driver Chest Primary X Velocity | B-22 |
| B-23 | Driver Chest Primary X Displacement | B-23 |
| B-24 | Driver Chest Primary Y | B-24 |
| B-25 | Driver Chest Primary Z | B-25 |
| B-26 | Driver Chest Primary Resultant | B-26 |
| B-27 | Driver Chest Redundant X | B-27 |
| B-28 | Driver Chest Redundant X Velocity | B-28 |
| B-29 | Driver Chest Redundant X Displacement | B-29 |
| B-30 | Driver Chest Redundant Y | B-30 |
| B-31 | Driver Chest Redundant Z | B-31 |
| B-32 | Driver Chest Redundant Resultant | B-32 |
| B-33 | Driver Chest Displacement X | B-33 |

| Data Plot | | Page |
|---|---|---|
| B-34 | Driver Pelvis X | B-34 |
| B-35 | Driver Pelvis X Velocity | B-35 |
| B-36 | Driver Pelvis X Displacement | B-36 |
| B-37 | Driver Pelvis Y | B-37 |
| B-38 | Driver Pelvis Z | B-38 |
| B-39 | Driver Pelvis Resultant | B-39 |
| B-40 | Driver Left Femur Force | B-40 |
| B-41 | Driver Right Femur Force | B-41 |
| B-42 | Driver Left Upper Tibia Moment X | B-42 |
| B-43 | Driver Left Upper Tibia Moment Y | B-43 |
| B-44 | Driver Right Upper Tibia Moment X | B-44 |
| B-45 | Driver Right Upper Tibia Moment Y | B-45 |
| B-46 | Driver Left Lower Tibia Moment X | B-46 |
| B-47 | Driver Left Lower Tibia Moment Y | B-47 |
| B-48 | Driver Left Lower Tibia Force Z | B-48 |
| B-49 | Driver Right Lower Tibia Moment X | B-49 |
| B-50 | Driver Right Lower Tibia Moment Y | B-50 |
| B-51 | Driver Right Lower Tibia Force Z | B-51 |
| B-52 | Driver Left Foot Aft X | B-52 |
| B-53 | Driver Left Foot Aft Z | B-53 |
| B-54 | Driver Left Foot Fore Z | B-54 |
| B-55 | Driver Right Foot Aft X | B-55 |
| B-56 | Driver Right Foot Aft Z | B-56 |
| B-57 | Driver Right Foot Fore Z | B-57 |
| B-58 | Driver Lap Belt Force | B-58 |
| B-59 | Driver Shoulder Belt Force | B-59 |
| B-60 | Driver Shoulder Belt Pullout | B-60 |
| B-61 | Driver Shoulder Belt Elongation | B-61 |
| B-62 | Passenger Head Primary X | B-62 |
| B-63 | Passenger Head Primary X Velocity | B-63 |
| B-64 | Passenger Head Primary X Displacement | B-64 |
| B-65 | Passenger Head Primary Y | B-65 |
| B-66 | Passenger Head Primary Z | B-66 |
| B-67 | Passenger Head Resultant Primary | B-67 |

| Data Plot | | Page |
|---|---|---|
| B-68 | Passenger Head Redundant X | B-68 |
| B-69 | Passenger Head Redundant X Velocity | B-69 |
| B-70 | Passenger Head Redundant X Displacement | B-70 |
| B-71 | Passenger Head Redundant Y | B-71 |
| B-72 | Passenger Head Redundant Z | B-72 |
| B-73 | Passenger Head Resultant Redundant | B-73 |
| B-74 | Passenger Neck Force X | B-74 |
| B-75 | Passenger Neck Force Y | B-75 |
| B-76 | Passenger Neck Force Z | B-76 |
| B-77 | Passenger Neck Force Resultant | B-77 |
| B-78 | Passenger Neck Moment X | B-78 |
| B-79 | Passenger Neck Moment Y | B-79 |
| B-80 | Passenger Neck Moment Z | B-80 |
| B-81 | Passenger Neck Moment Resultant | B-81 |
| B-82 | Passenger Chest Primary X | B-82 |
| B-83 | Passenger Chest Primary X Velocity | B-83 |
| B-84 | Passenger Chest Primary X Displacement | B-84 |
| B-85 | Passenger Chest Primary Y | B-85 |
| B-86 | Passenger Chest Primary Z | B-86 |
| B-87 | Passenger Chest Primary Resultant | B-87 |
| B-88 | Passenger Chest Redundant X | B-88 |
| B-89 | Passenger Chest Redundant X Velocity | B-89 |
| B-90 | Passenger Chest Redundant X Displacement | B-90 |
| B-91 | Passenger Chest Redundant Y | B-91 |
| B-92 | Passenger Chest Redundant Z | B-92 |
| B-93 | Passenger Chest Redundant Resultant | B-93 |
| B-94 | Passenger Chest Displacement X | B-94 |
| B-95 | Passenger Pelvis X | B-95 |
| B-96 | Passenger Pelvis X Velocity | B-96 |
| B-97 | Passenger Pelvis X Displacement | B-97 |
| B-98 | Passenger Pelvis Y | B-98 |
| B-99 | Passenger Pelvis Z | B-99 |
| B-100 | Passenger Pelvis Resultant | B-100 |
| B-101 | Passenger Left Femur Force | B-101 |

| Data Plot | | Page |
|---|---|---|
| B-102 | Passenger Right Femur Force | B-102 |
| B-103 | Passenger Left Upper Tibia Moment X | B-103 |
| B-104 | Passenger Left Upper Tibia Moment Y | B-104 |
| B-105 | Passenger Right Upper Tibia Moment X | B-105 |
| B-106 | Passenger Right Upper Tibia Moment Y | B-106 |
| B-107 | Passenger Left Lower Tibia Moment X | B-107 |
| B-108 | Passenger Left Lower Tibia Moment Y | B-108 |
| B-109 | Passenger Left Lower Tibia Force Z | B-109 |
| B-110 | Passenger Right Lower Tibia Moment X | B-110 |
| B-111 | Passenger Right Lower Tibia Moment Y | B-111 |
| B-112 | Passenger Right Lower Tibia Force Z | B-112 |
| B-113 | Passenger Left Foot Aft X | B-113 |
| B-114 | Passenger Left Foot Aft Z | B-114 |
| B-115 | Passenger Left Foot Fore Z | B-115 |
| B-116 | Passenger Right Foot Aft X | B-116 |
| B-117 | Passenger Right Foot Aft Z | B-117 |
| B-118 | Passenger Right Foot Fore Z | B-118 |
| B-119 | Passenger Lap Belt Force | B-119 |
| B-120 | Passenger Shoulder Belt Force | B-120 |
| B-121 | Passenger Shoulder Belt Pullout | B-121 |
| B-122 | Passenger Shoulder Belt Elongation | B-122 |
| B-123 | Vehicle Left Rear X | B-123 |
| B-124 | Vehicle Left Rear X Velocity | B-124 |
| B-125 | Vehicle Left Rear X Displacement | B-125 |
| B-126 | Vehicle Right Rear X | B-126 |
| B-127 | Vehicle Right Rear X Velocity | B-127 |
| B-128 | Vehicle Right Rear X Displacement | B-128 |
| B-129 | Vehicle Engine Top | B-129 |
| B-130 | Vehicle Engine Top Velocity | B-130 |
| B-131 | Vehicle Engine Top Displacement | B-131 |
| B-132 | Vehicle Engine Bottom | B-132 |
| B-133 | Vehicle Engine Bottom Velocity | B-133 |
| B-134 | Vehicle Engine Bottom Displacement | B-134 |
| B-135 | Vehicle Left Brake Caliper | B-135 |
| B-136 | Vehicle Left Brake Caliper Velocity | B-136 |

| Data Plot | | Page |
|---|---|---|
| B-137 | Vehicle Left Brake Caliper Displacement | B-137 |
| B-138 | Vehicle Right Brake Caliper | B-138 |
| B-139 | Vehicle Right Brake Caliper Velocity | B-139 |
| B-140 | Vehicle Right Brake Caliper Displacement | B-140 |
| B-141 | Vehicle Instrument Panel | B-141 |
| B-142 | Vehicle Instrument Panel Velocity | B-142 |
| B-143 | Vehicle Instrument Panel Displacement | B-143 |
| B-144 | Vehicle Left Rear Z | B-144 |
| B-145 | Vehicle Left Rear Z Velocity | B-145 |
| B-146 | Vehicle Left Rear Z Displacement | B-146 |
| B-147 | Vehicle Right Rear Z | B-147 |
| B-148 | Vehicle Right Rear Z Velocity | B-148 |
| B-149 | Vehicle Right Rear Z Displacement | B-149 |




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Primary X | 001 | FIL | G's | 18.1 | 214.6 | -70.5 | 75.7 | 1000 |

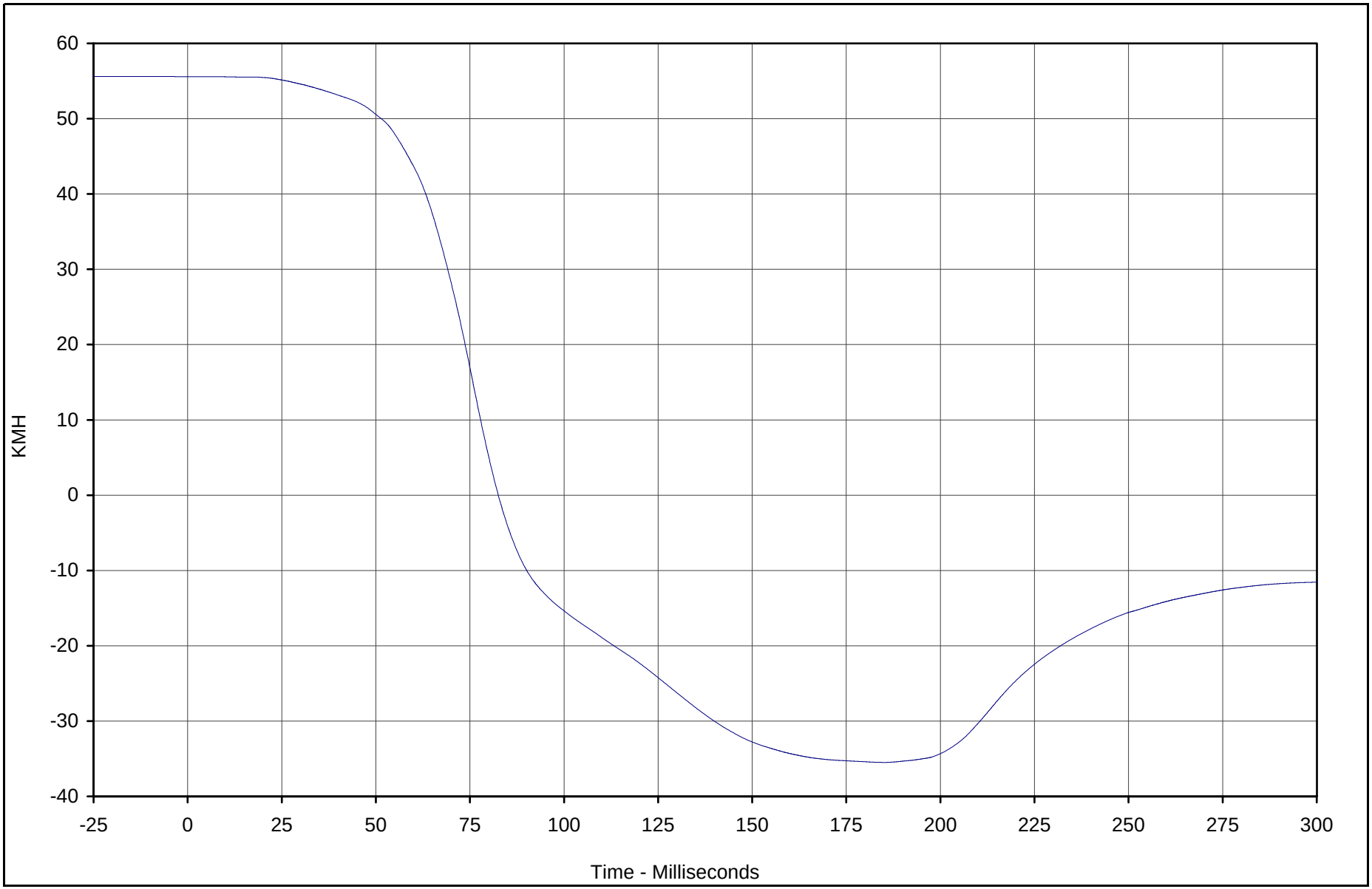
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203

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|---|---|---|---|---|---|---|---|---|
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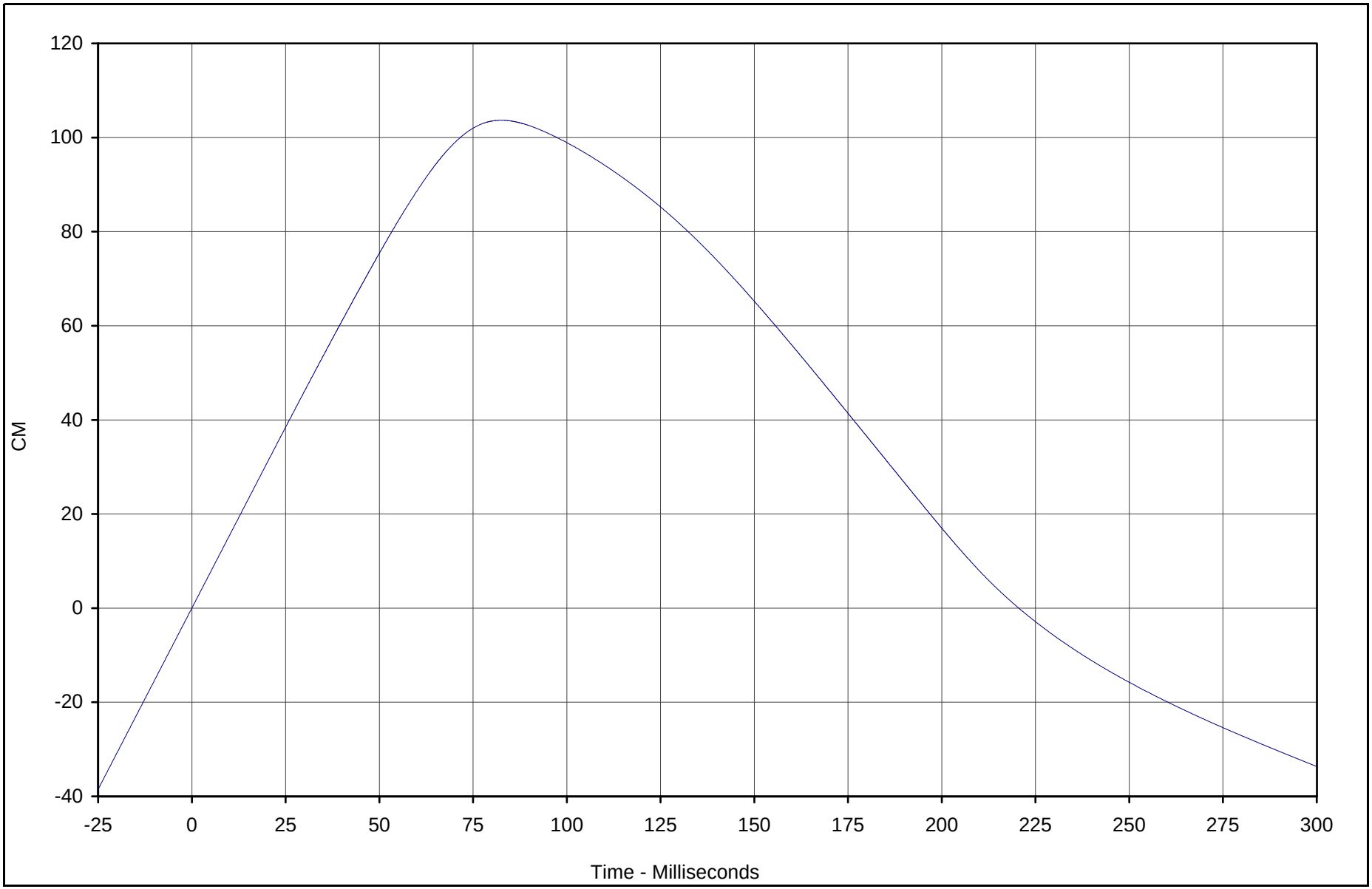
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Primary X Displ. | 001 | IN2 | CM | 103.7 | 82.5 | -33.6 | 299.9 | 180 |

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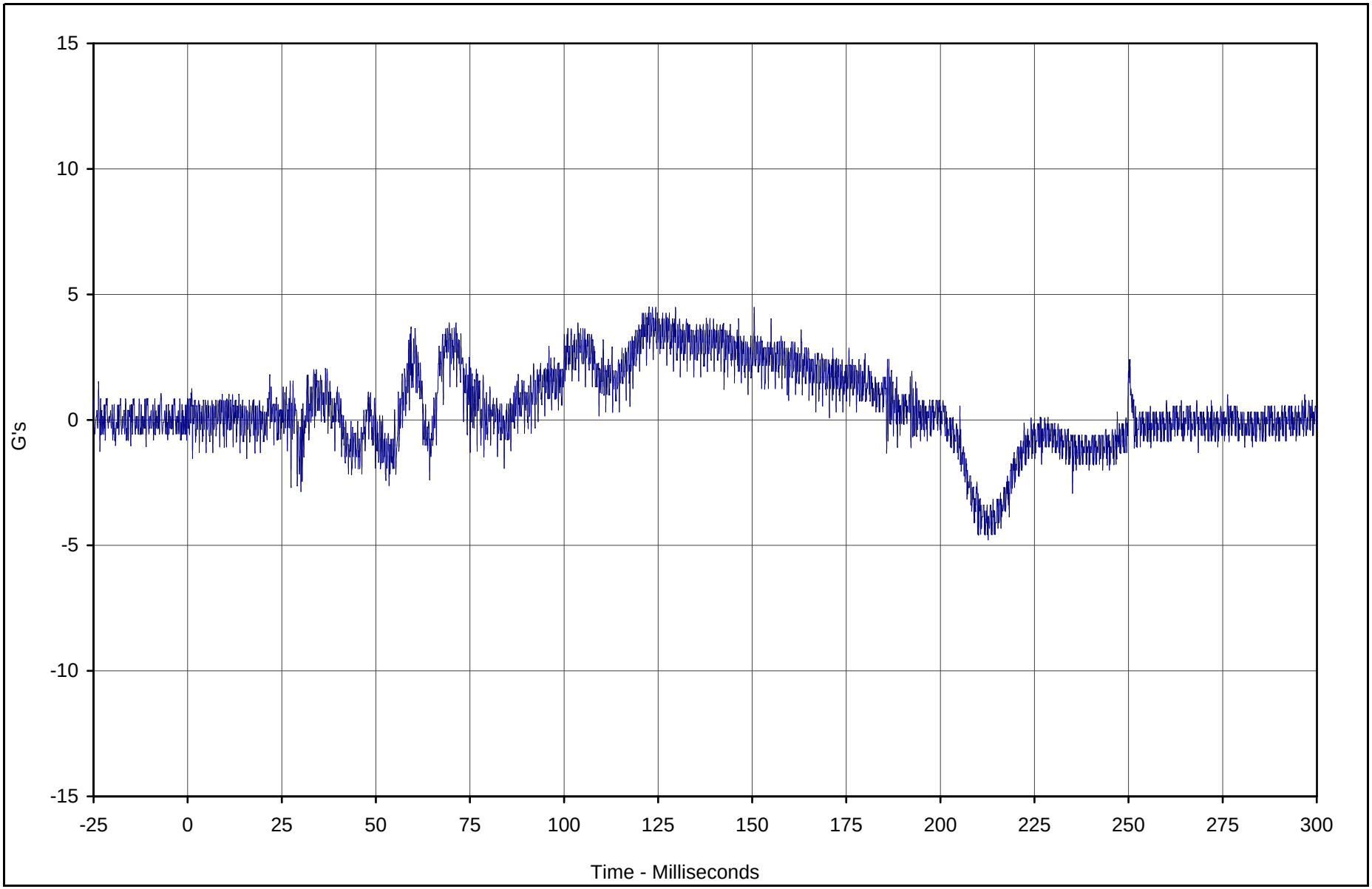
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203

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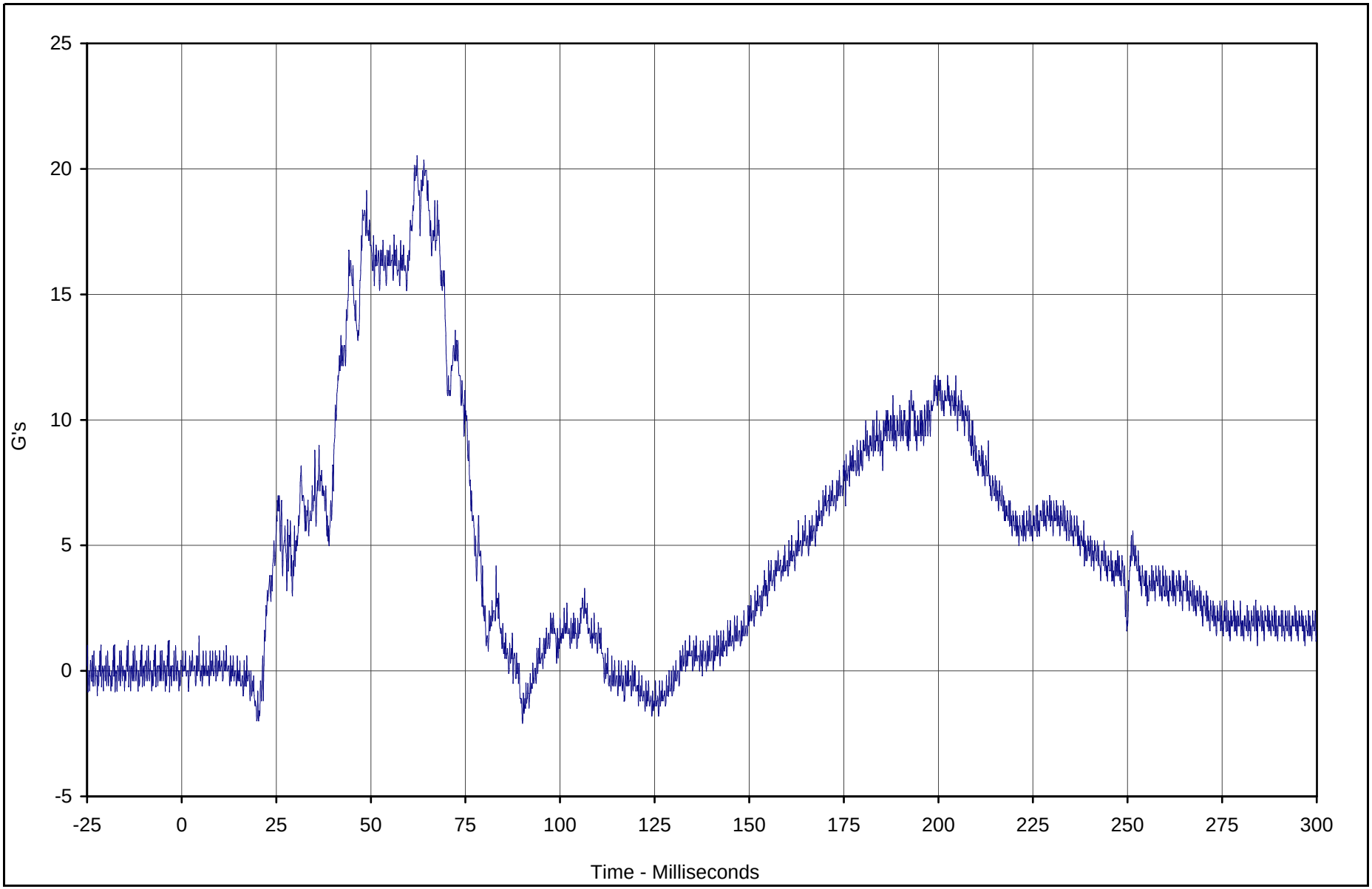
|---|---|---|---|---|---|---|---|---|
| Driver Head Primary Y | 002 | FIL | G's | 4.5 | 122.6 | -4.8 | 212.7 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Primary Z | 003 | FIL | G's | 20.5 | 62.2 | -2.1 | 90.1 | 1000 |

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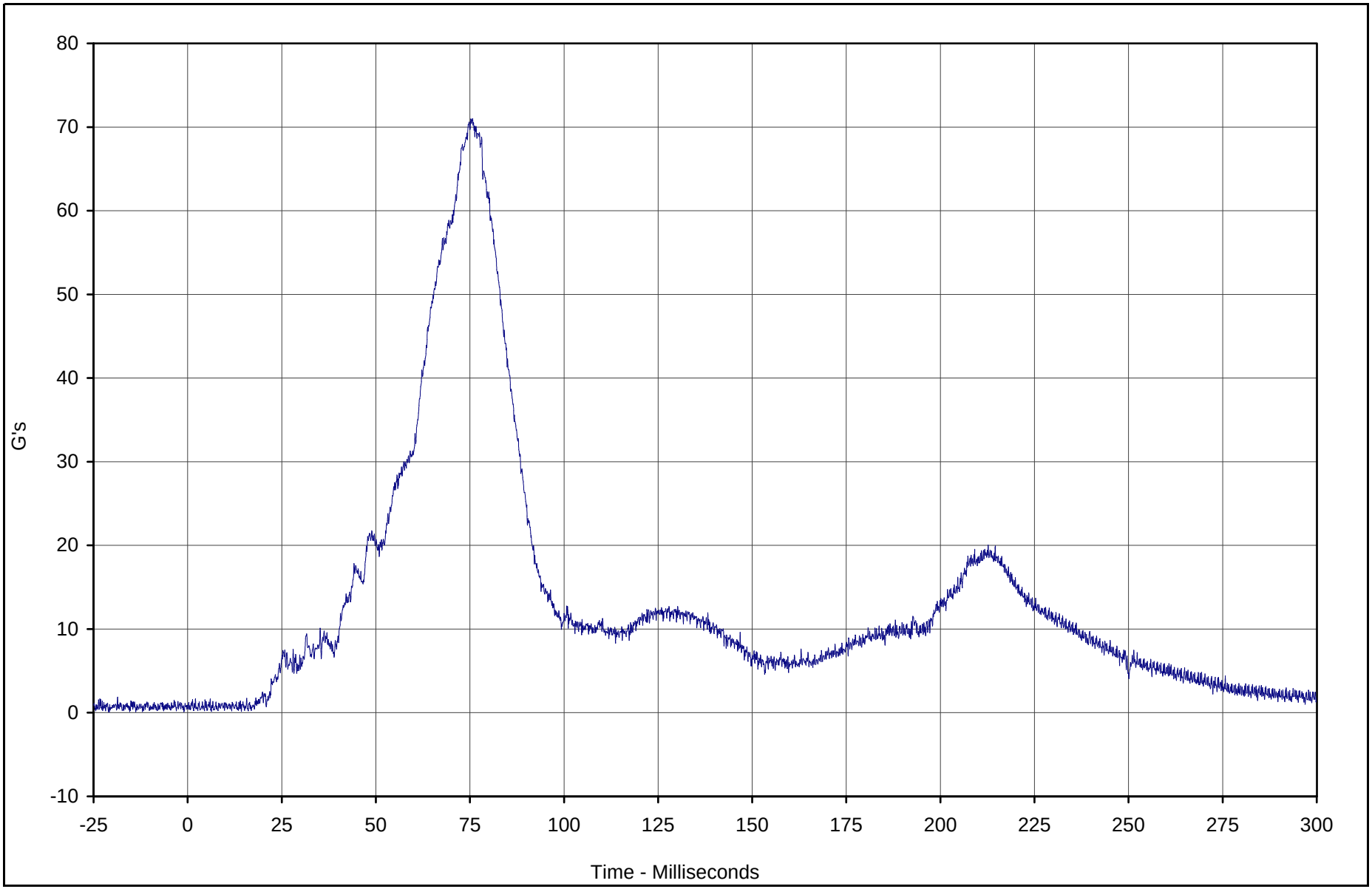
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Resultant Primary | 001 | RES | G's | 71.0 | 75.7 | 0.2 | 6.3 | 1000 |

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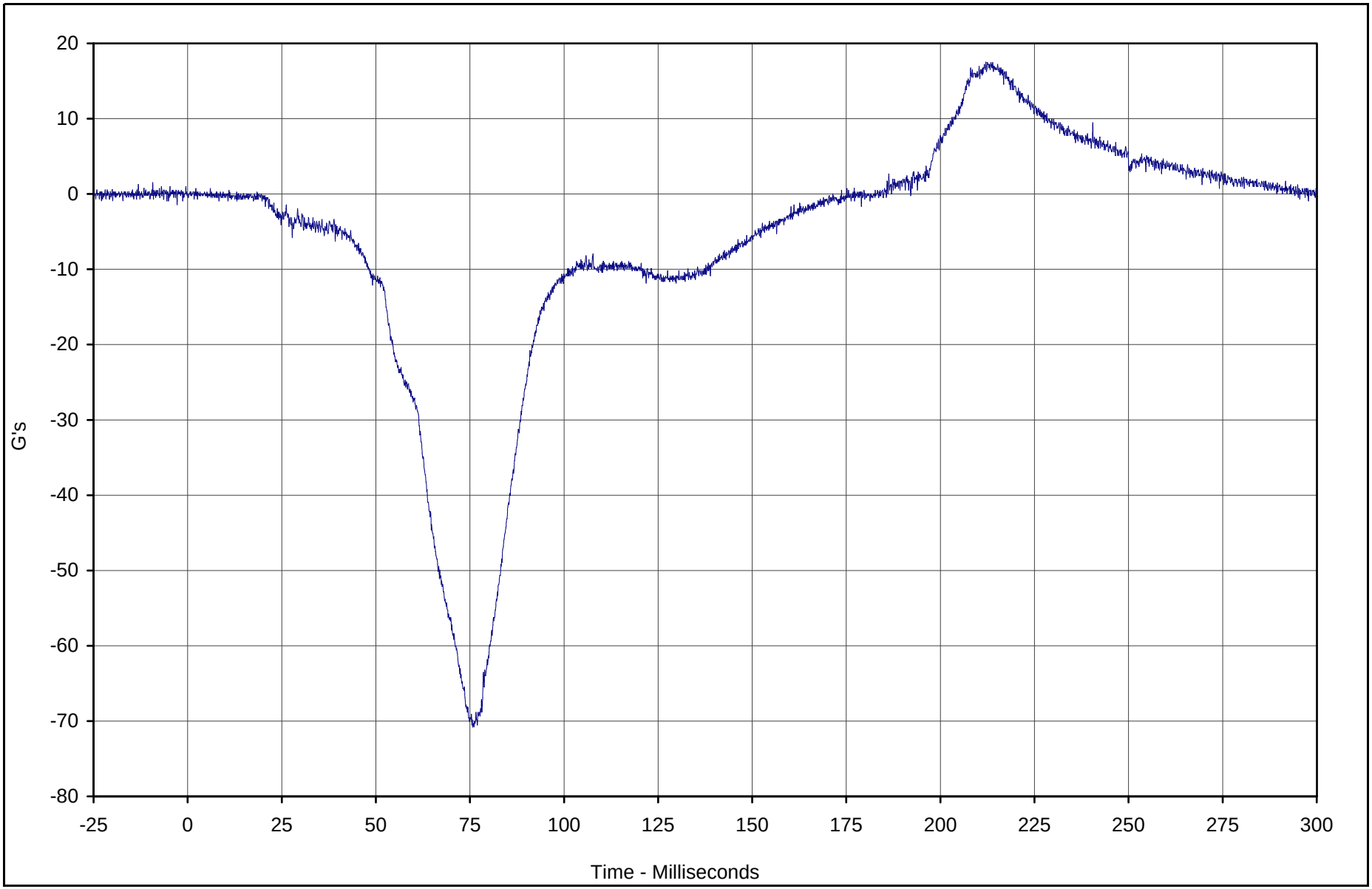
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Redundant X | 004 | FIL | G's | 17.5 | 212.1 | -70.8 | 75.7 | 1000 |

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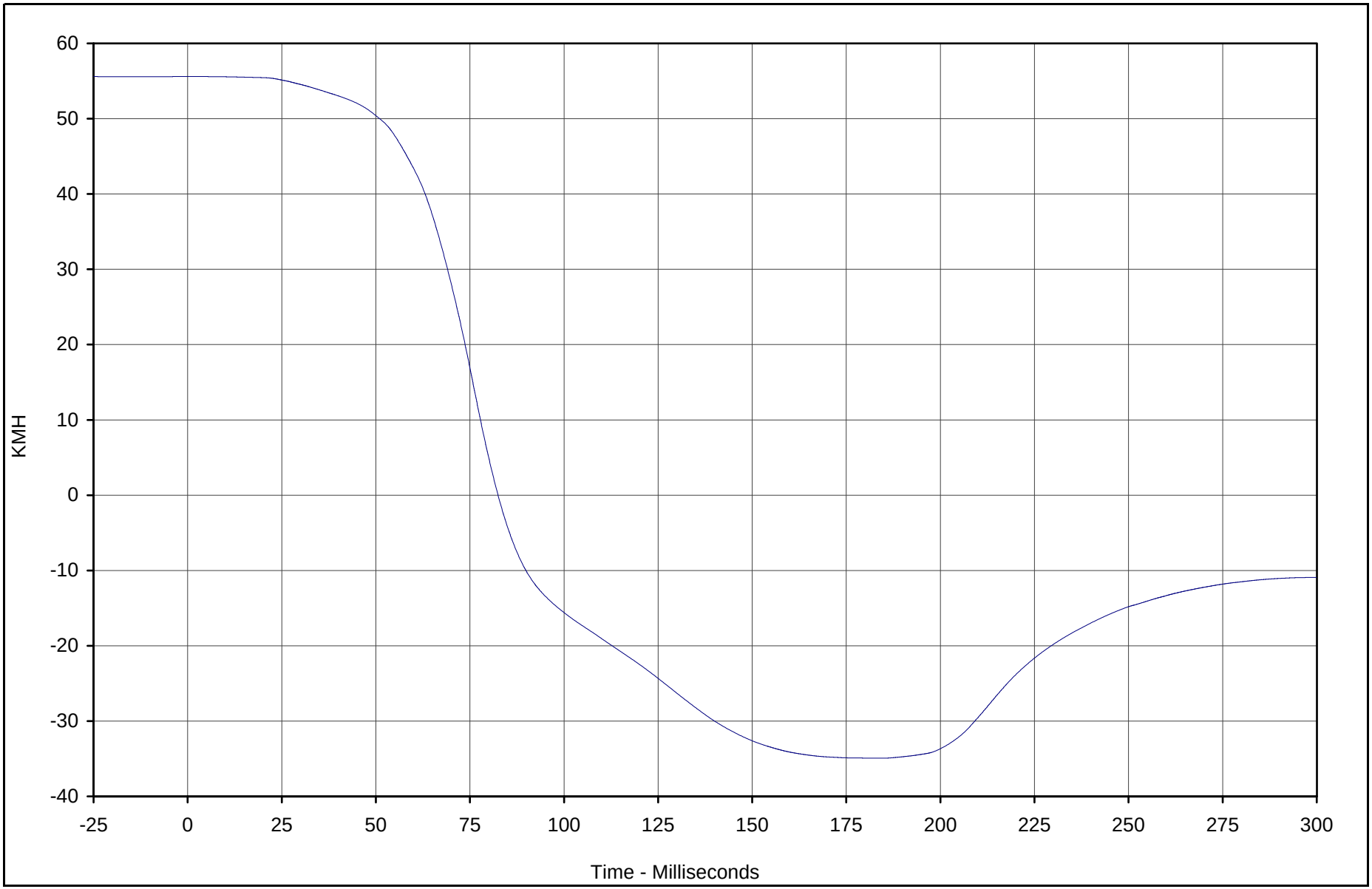
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Redundant X Velocity | 004 | IN1 | KMH | 55.6 | 2.5 | -34.9 | 183.3 | 180 |

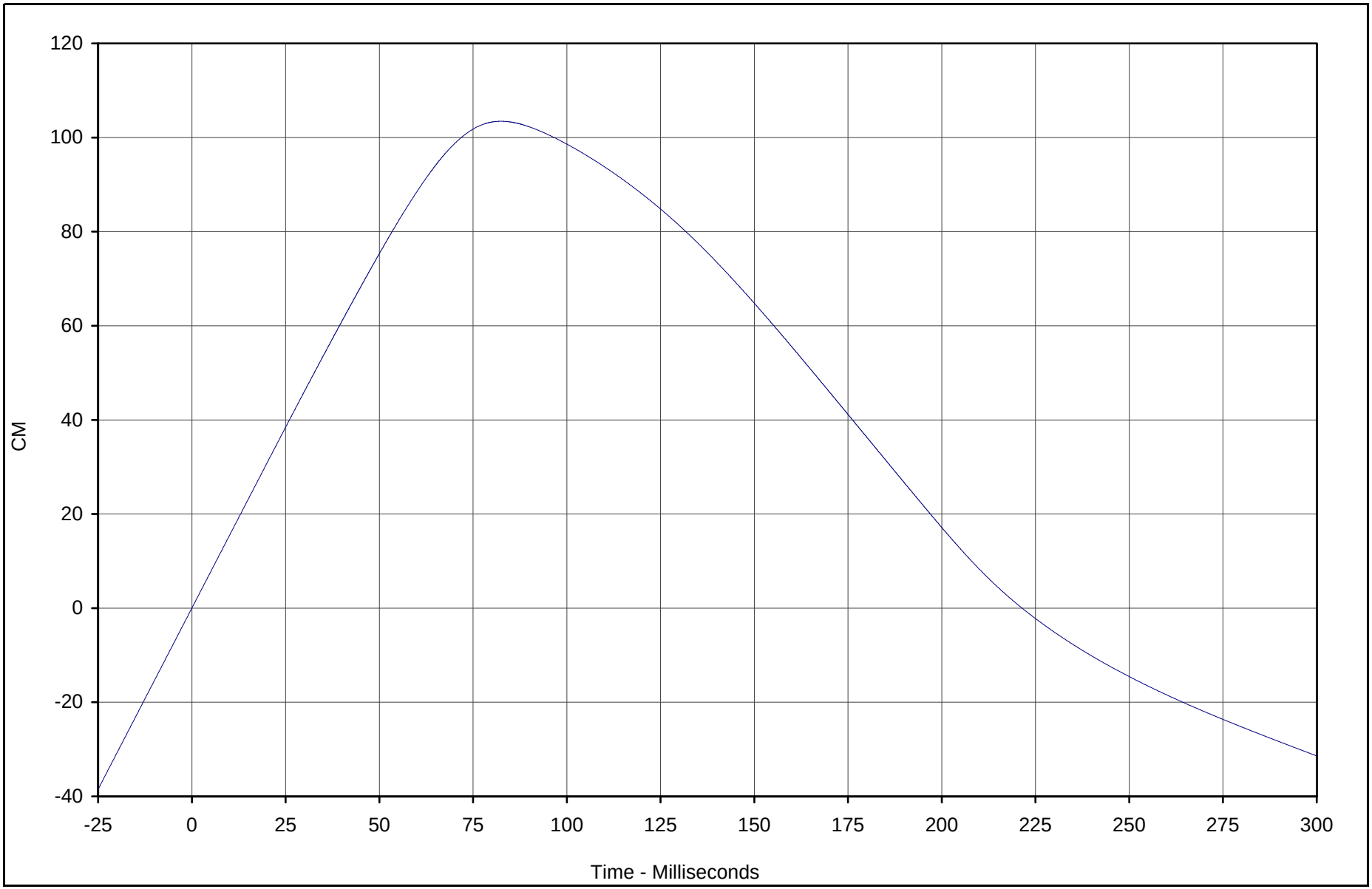
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Redundant X Displ. | 004 | IN2 | CM | 103.5 | 82.5 | -31.4 | 299.9 | 180 |

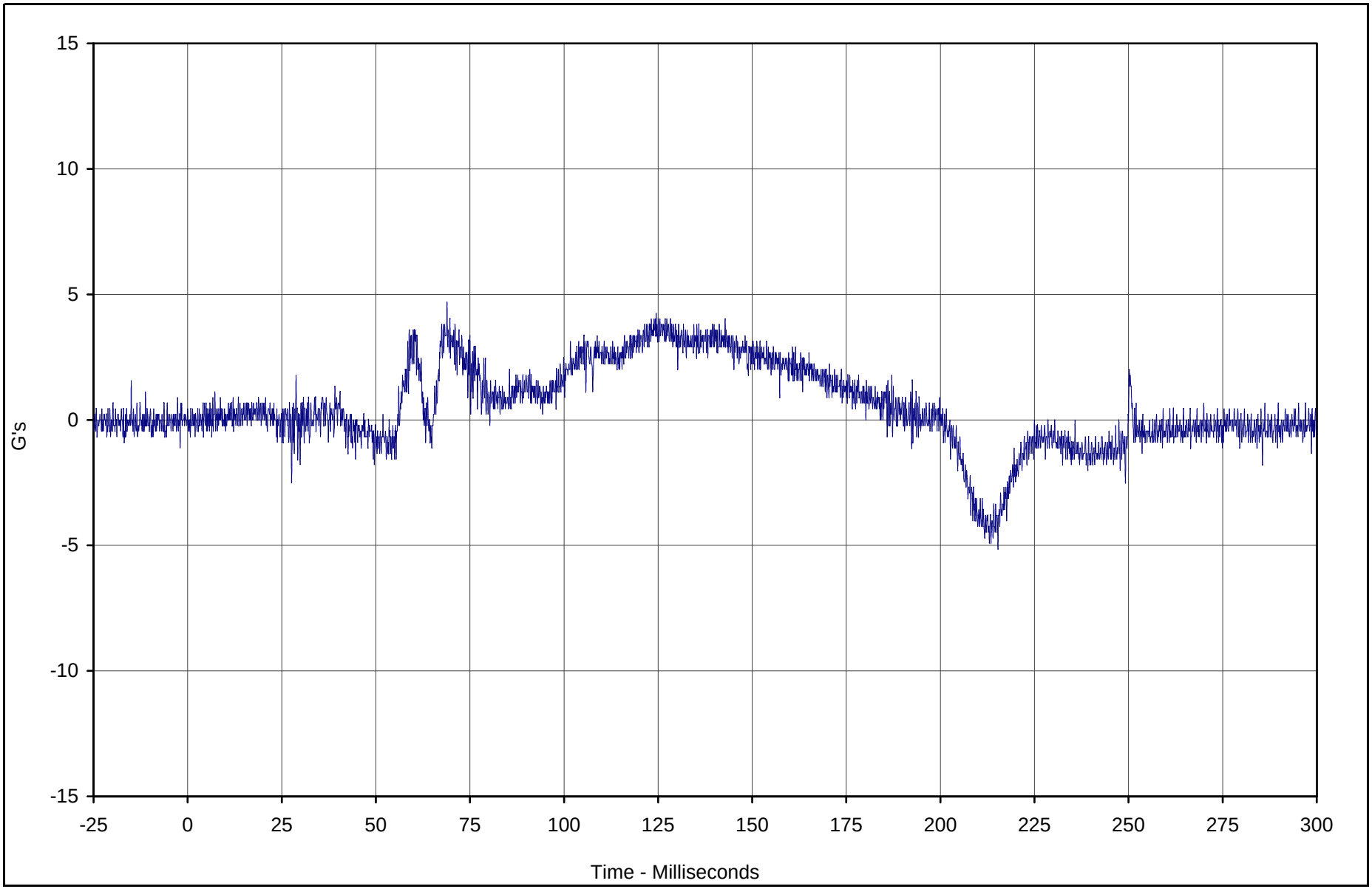
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



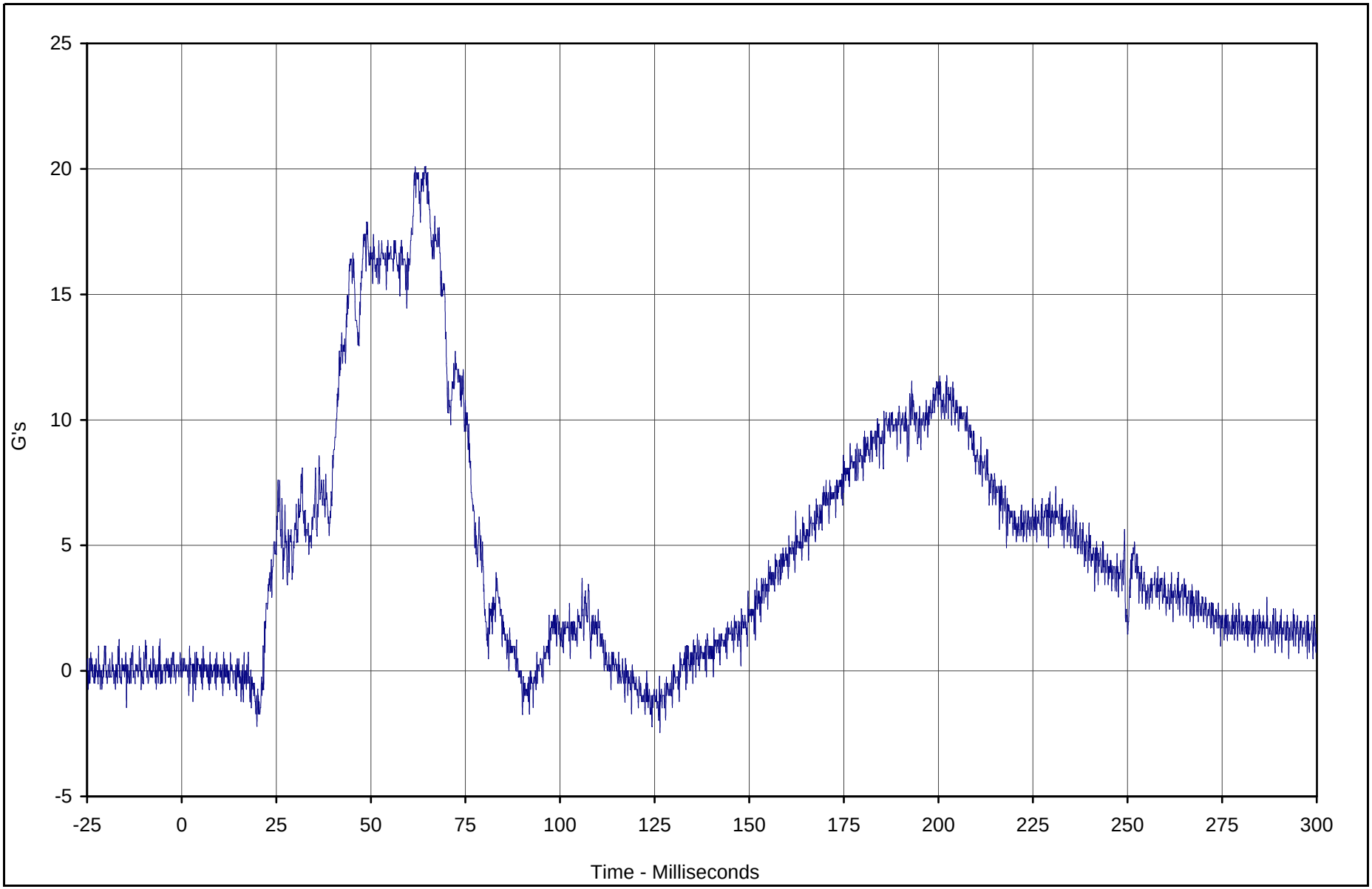

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Redundant Y | 005 | FIL | G's | 4.7 | 68.9 | -5.1 | 215.3 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



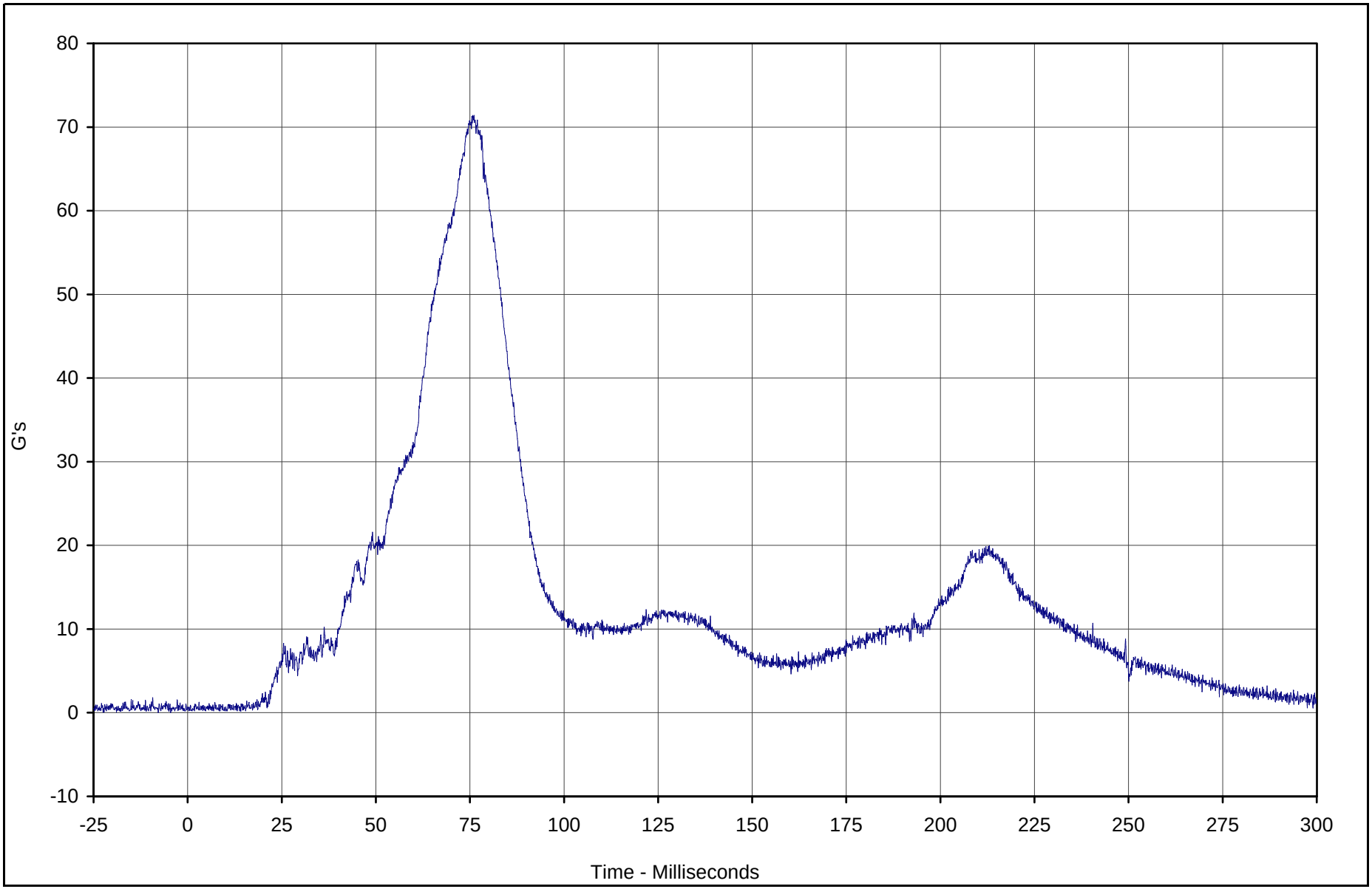

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Redundant Z | 006 | FIL | G's | 20.1 | 61.7 | -2.4 | 126.4 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Head Resultant Redundant | 004 | RES | G's | 71.4 | 76.1 | 0.2 | 0.3 | 1000 |

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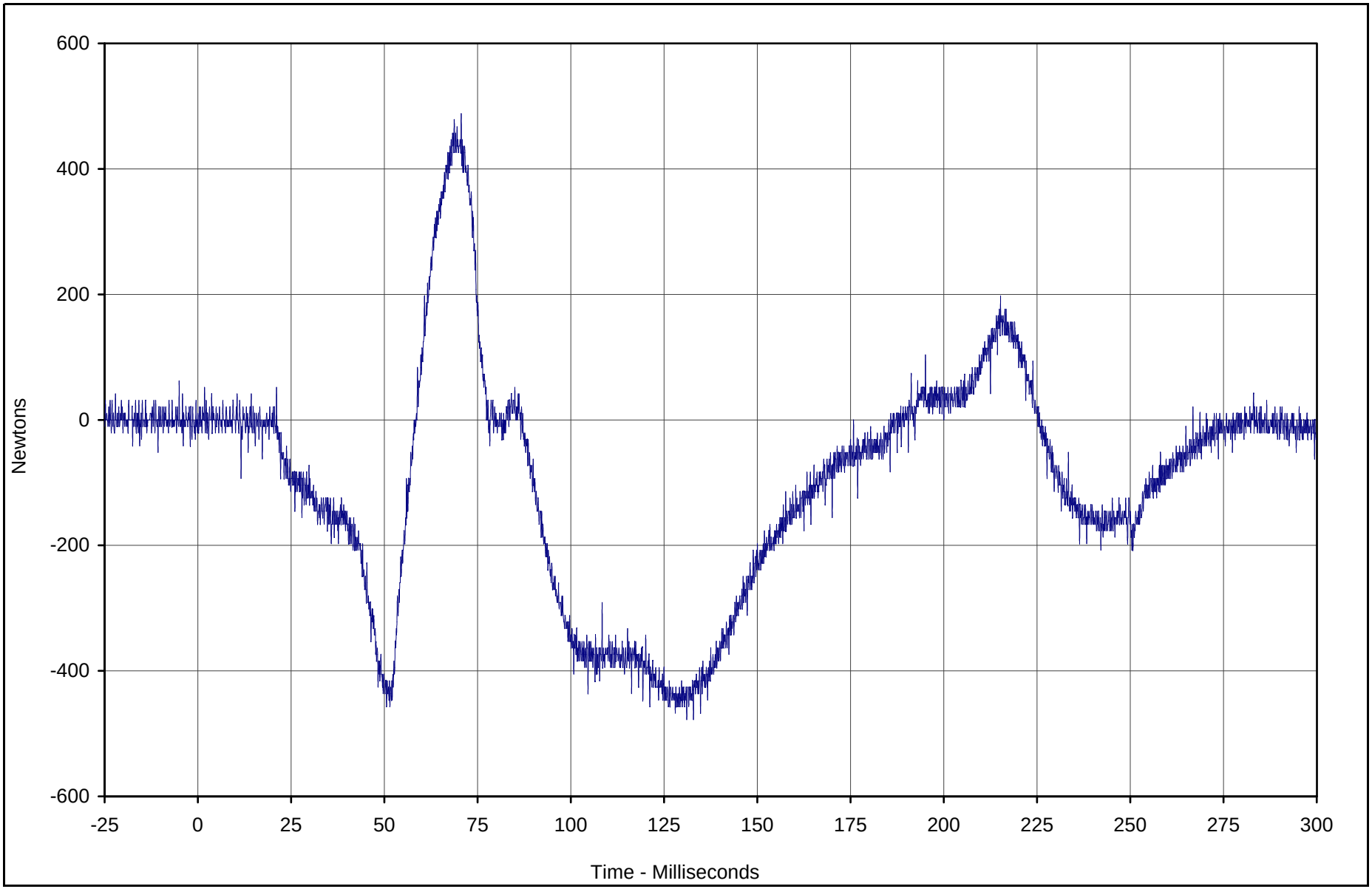
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
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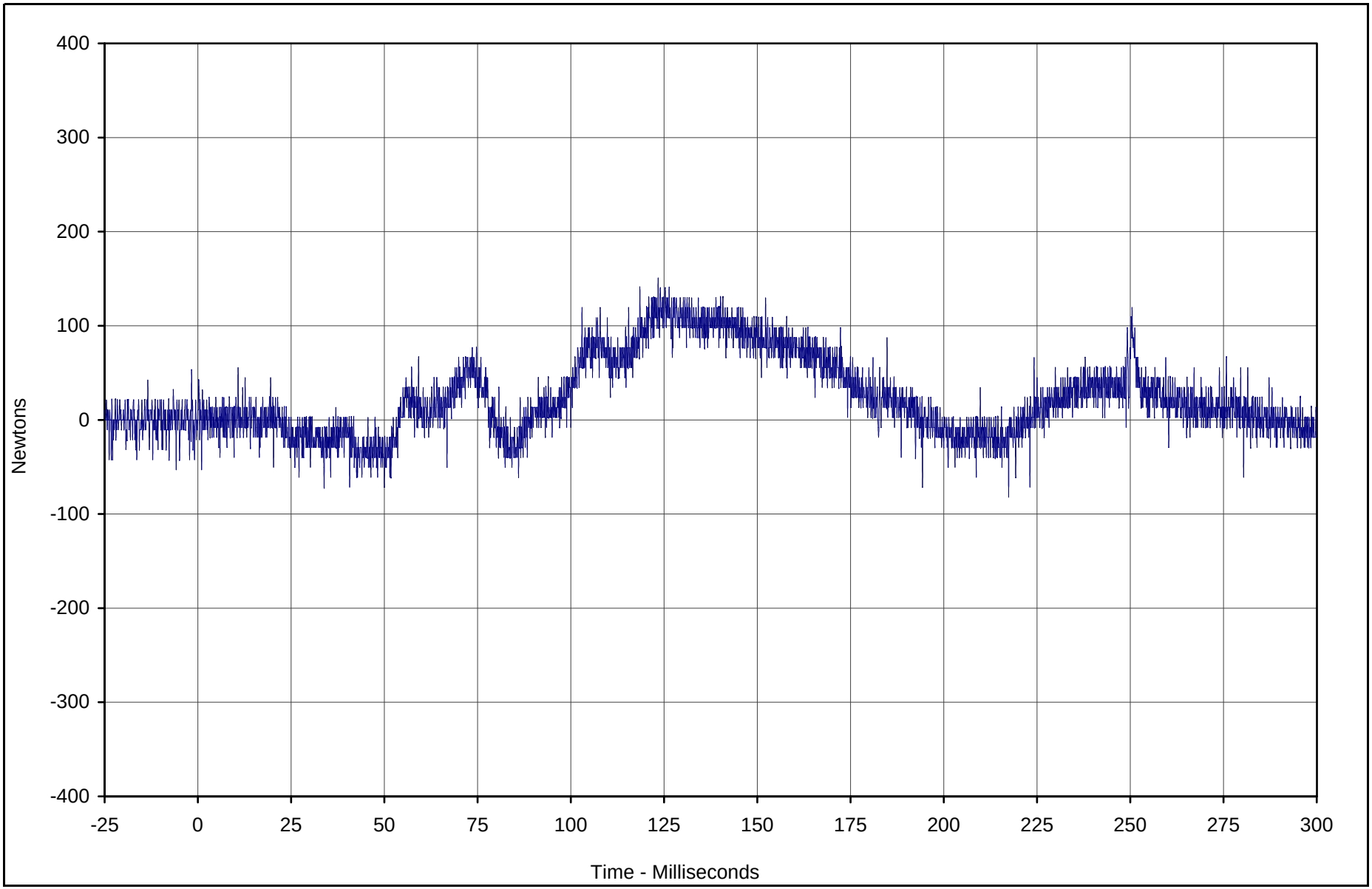
| Driver Neck Force X | 007 | FIL | Newtons | 488.3 | 70.6 | -477.9 | 131.1 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



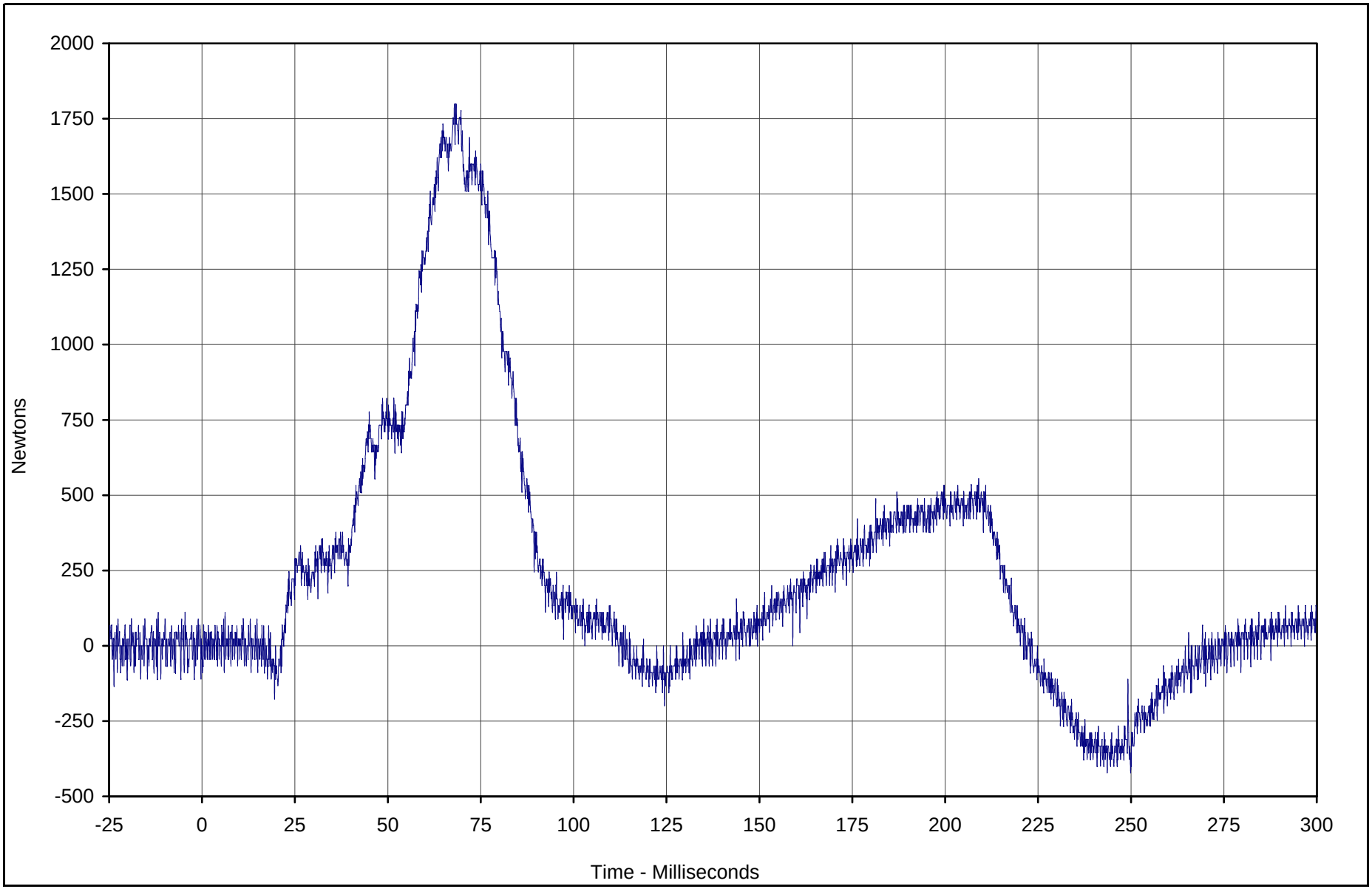

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Neck Force Y | 008 | FIL | Newtons | 150.9 | 123.4 | -82.2 | 217.4 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Neck Force Z | 009 | FIL | Newtons | 1798.7 | 67.9 | -421.9 | 243.6 | 1000 |

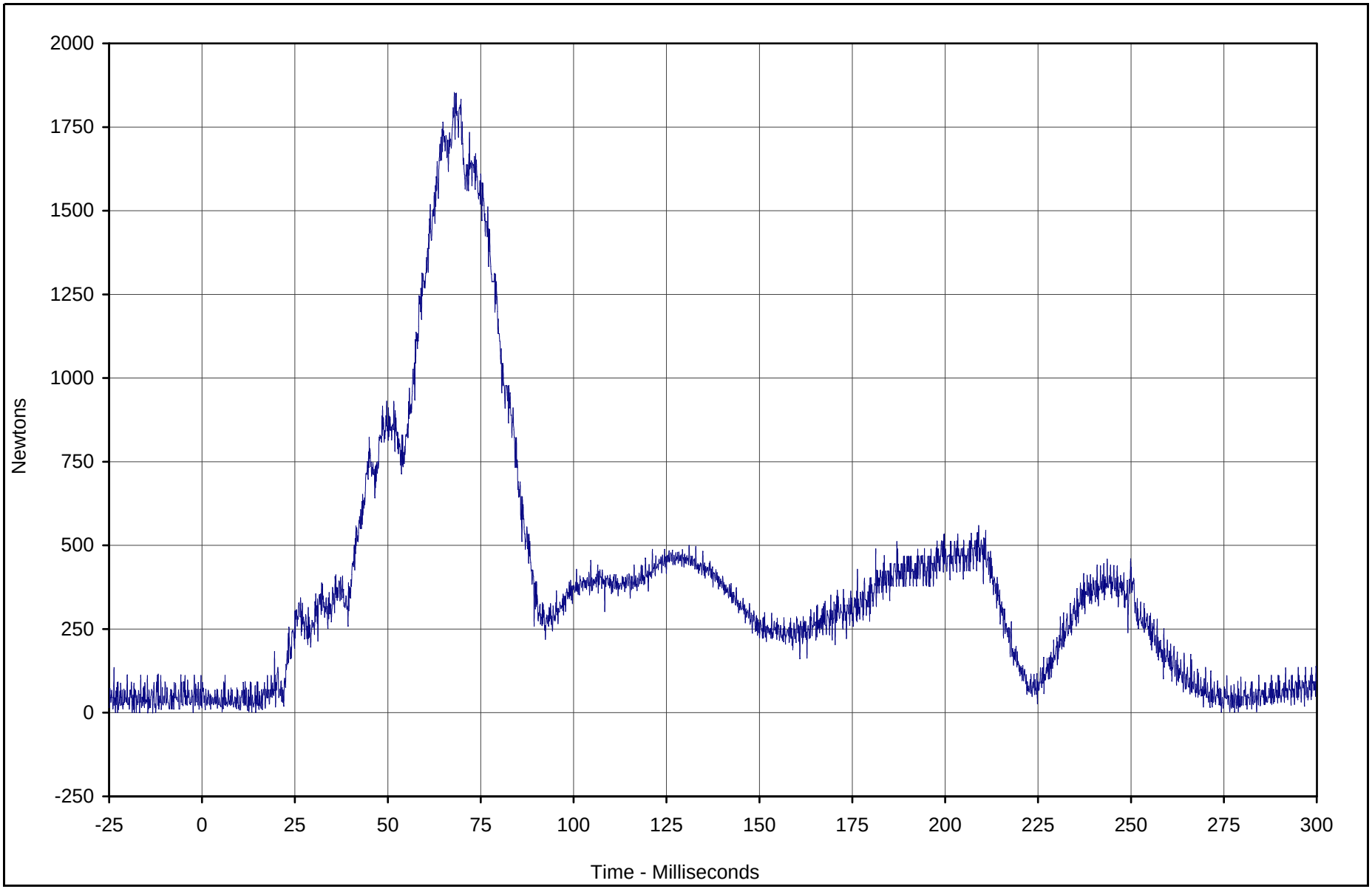
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Neck Force Resultant | 007 | RES | Newtons | 1853.4 | 67.9 | 2.6 | 5.4 | 1000 |

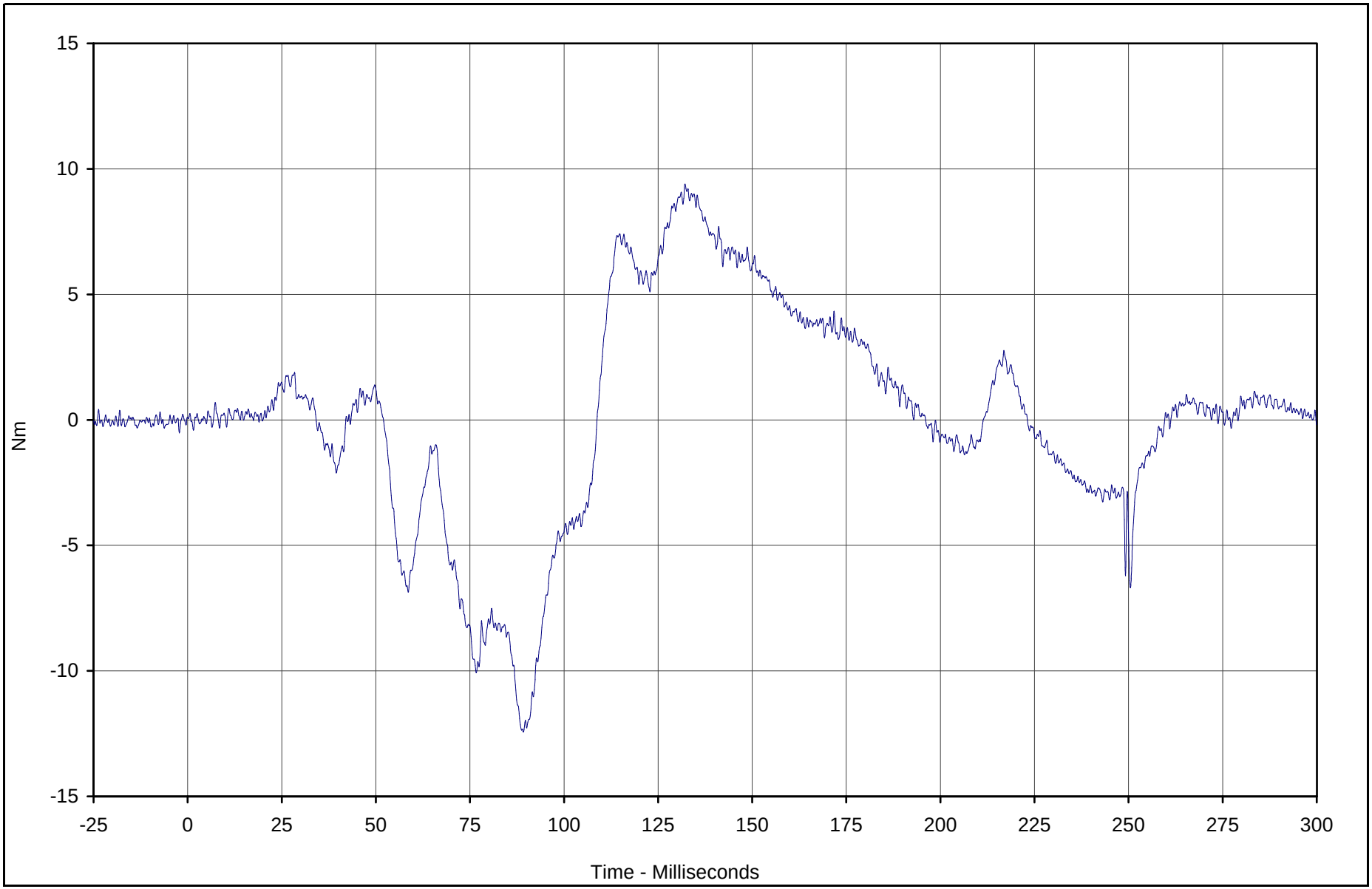
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



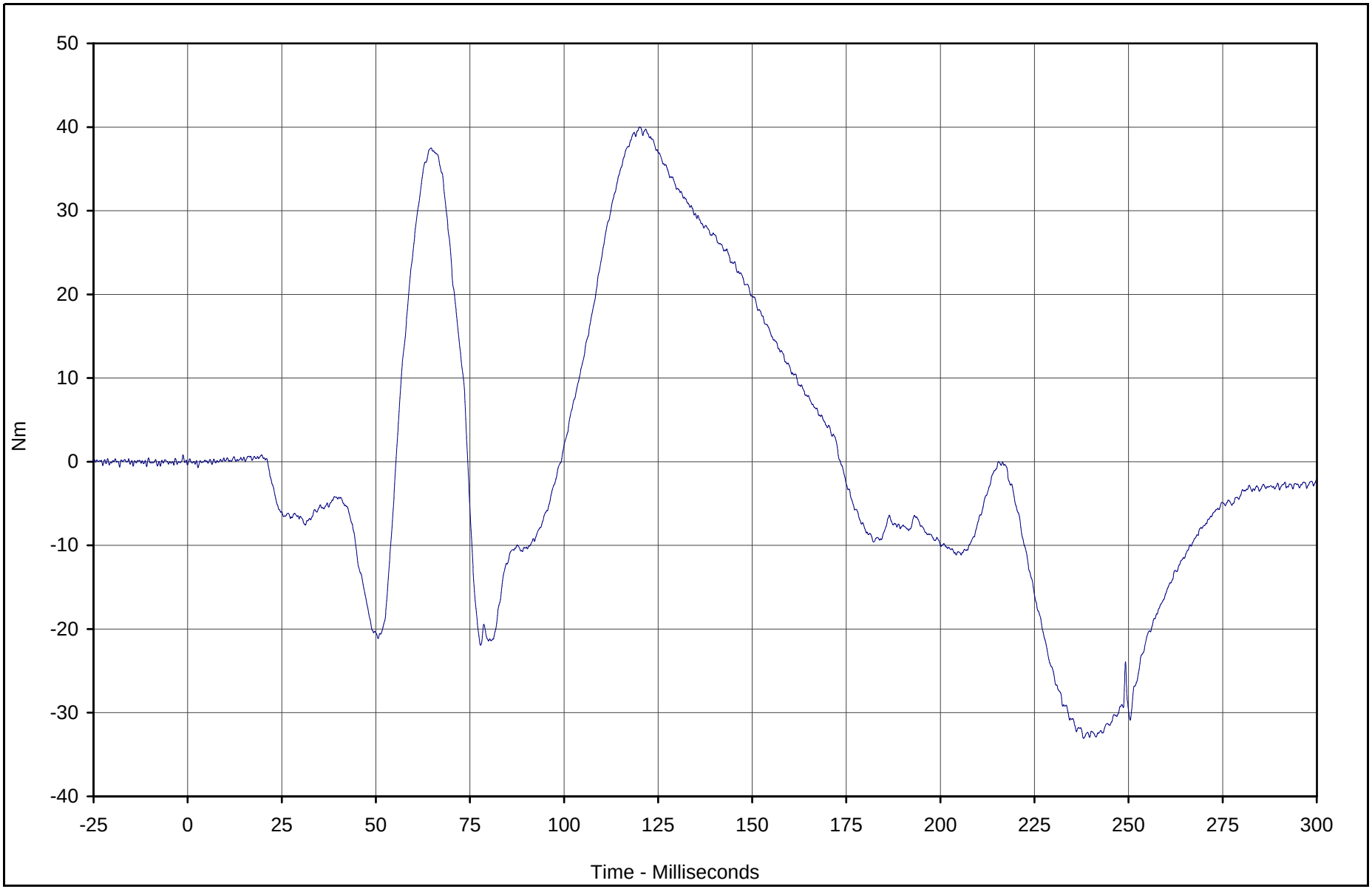

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Neck Moment X | 010 | FIL | Nm | 9.4 | 132.2 | -12.4 | 89.2 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Neck Moment Y | 011 | FIL | Nm | 40.0 | 120.2 | -33.1 | 238.1 | 600 |

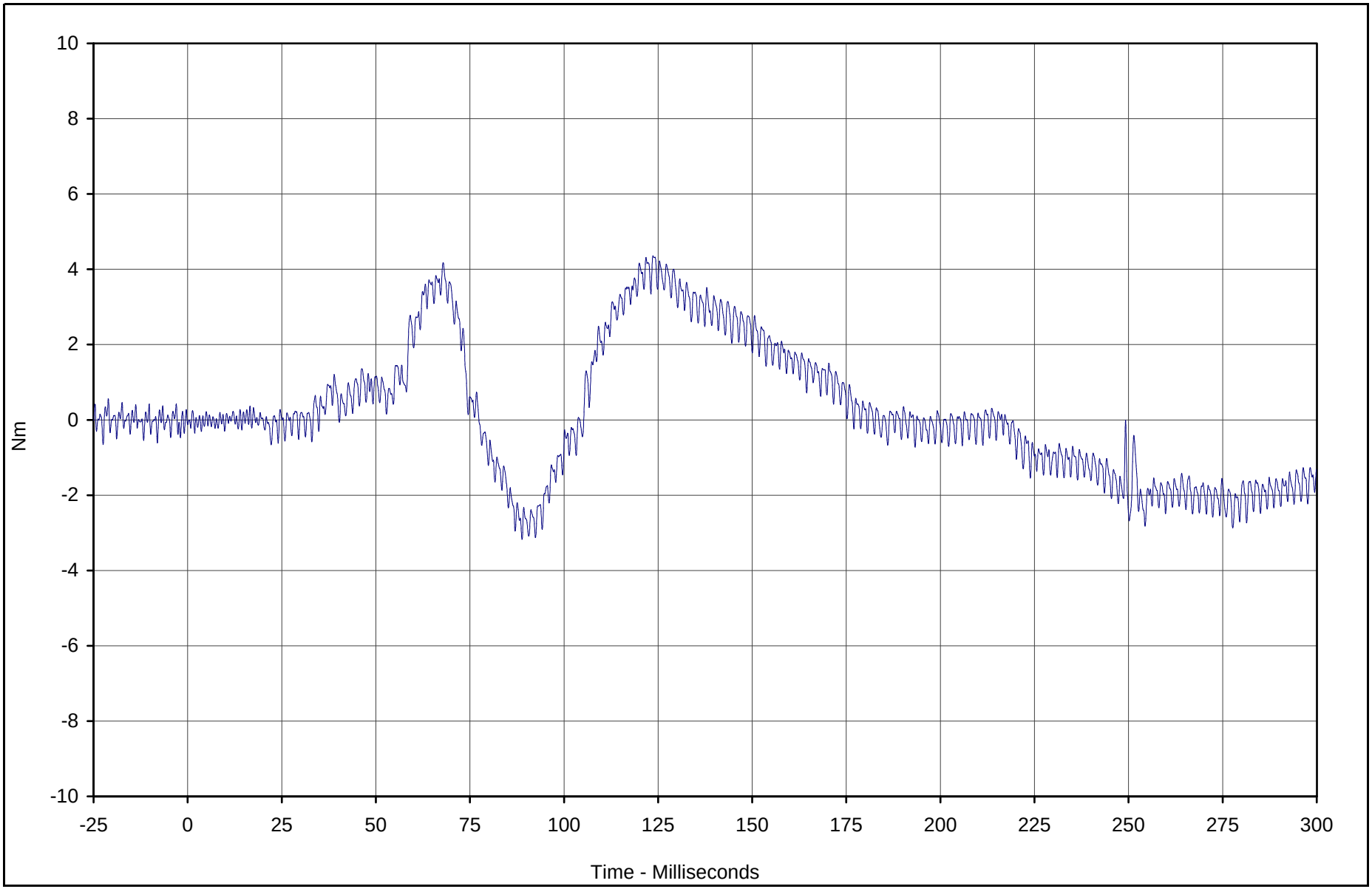
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



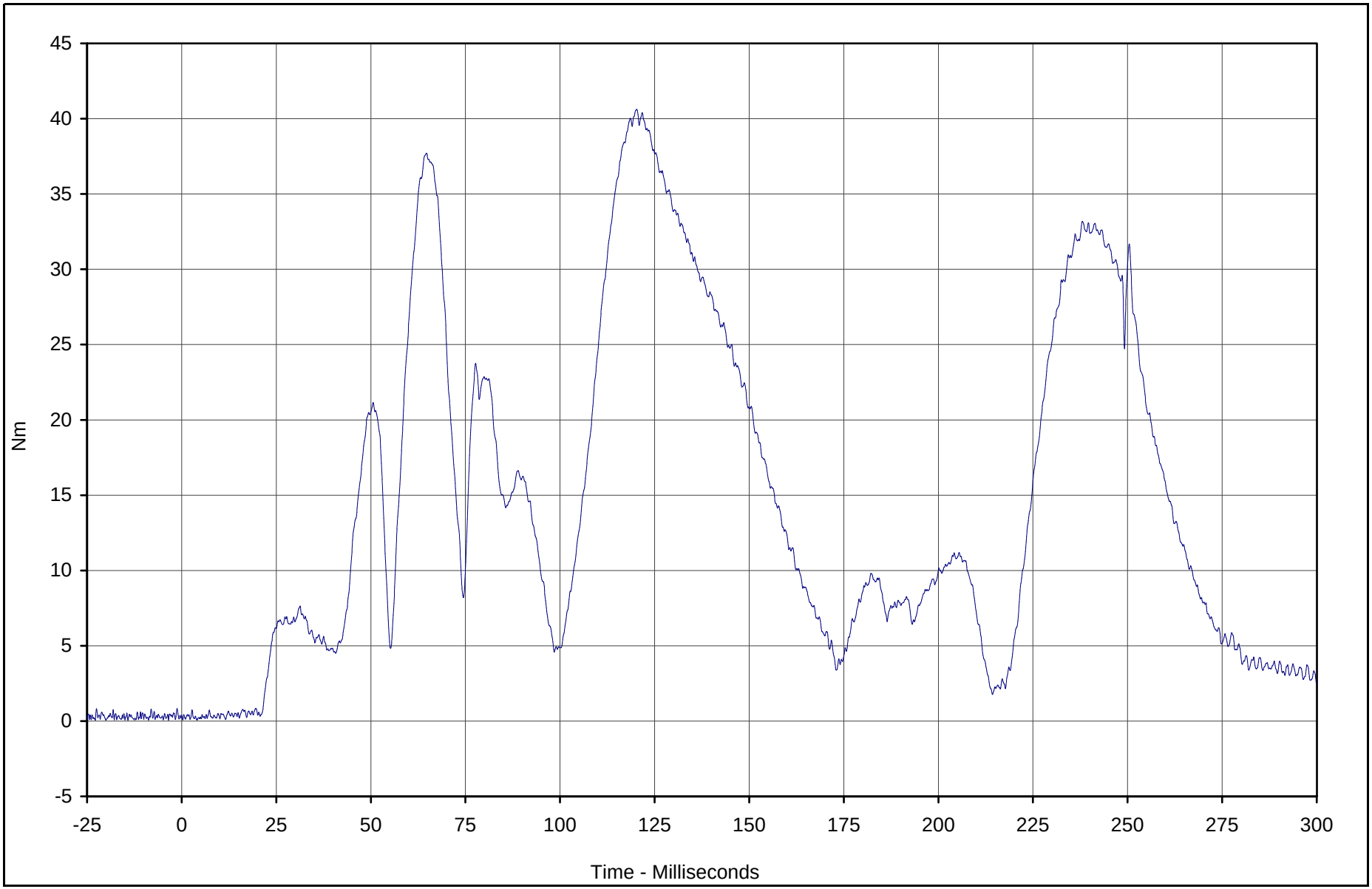

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Neck Moment Z | 012 | FIL | Nm | 4.4 | 123.6 | -3.2 | 88.8 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



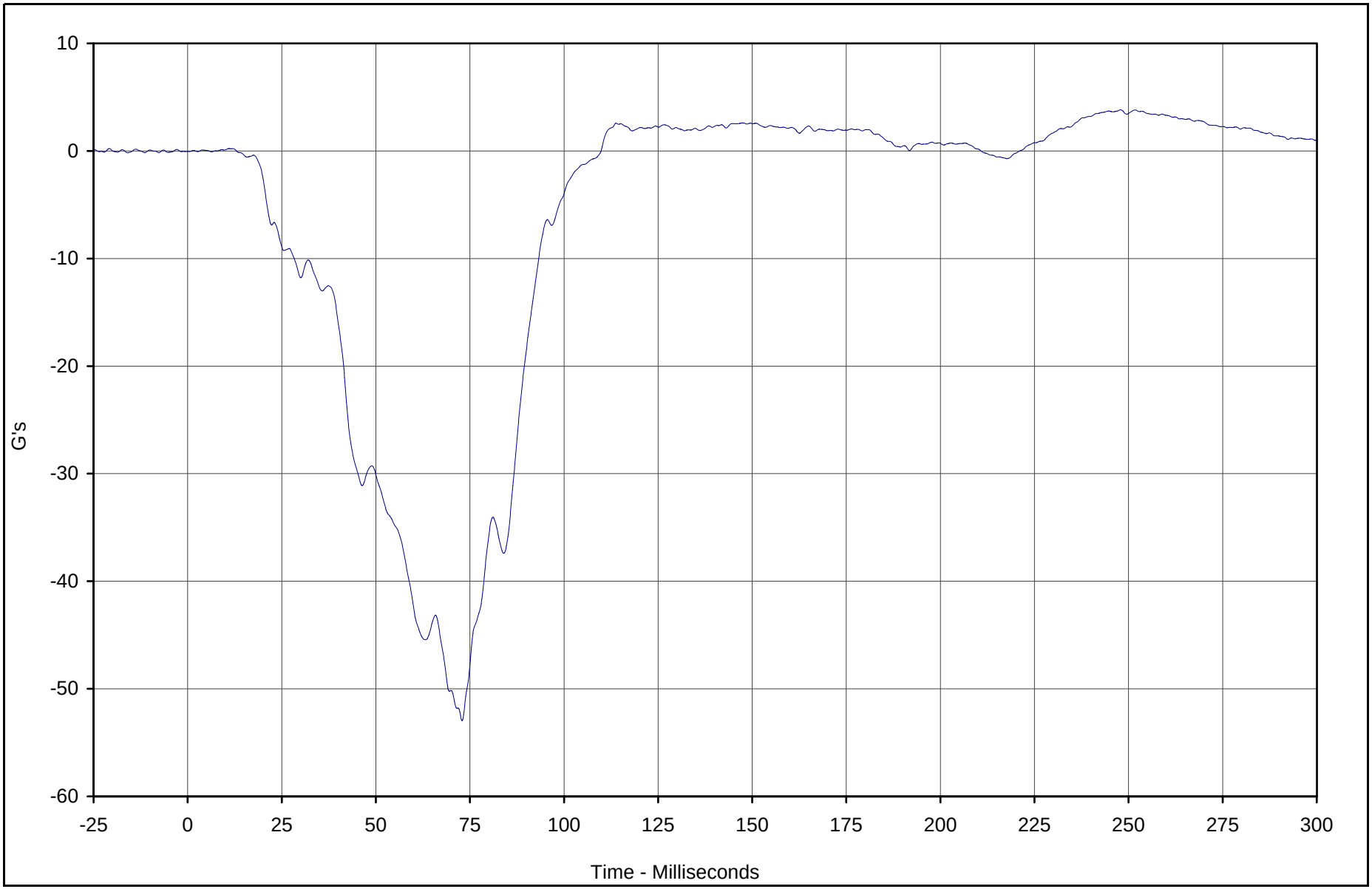

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Neck Moment Resultant | 010 | RES | Nm | 40.6 | 120.3 | 0.1 | 0.3 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Primary X | 013 | FIL | G's | 3.8 | 247.9 | -53.0 | 72.9 | 180 |

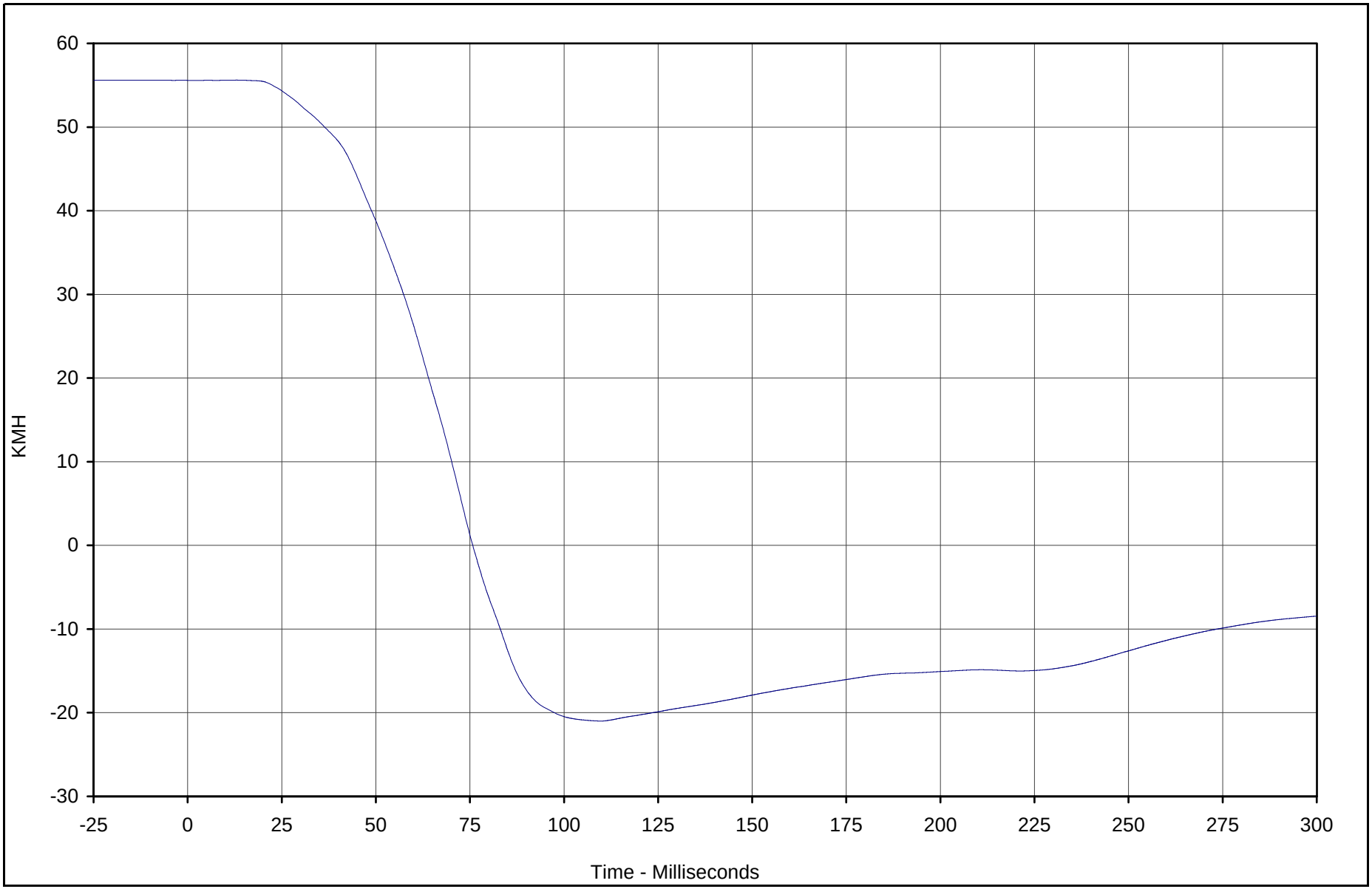
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



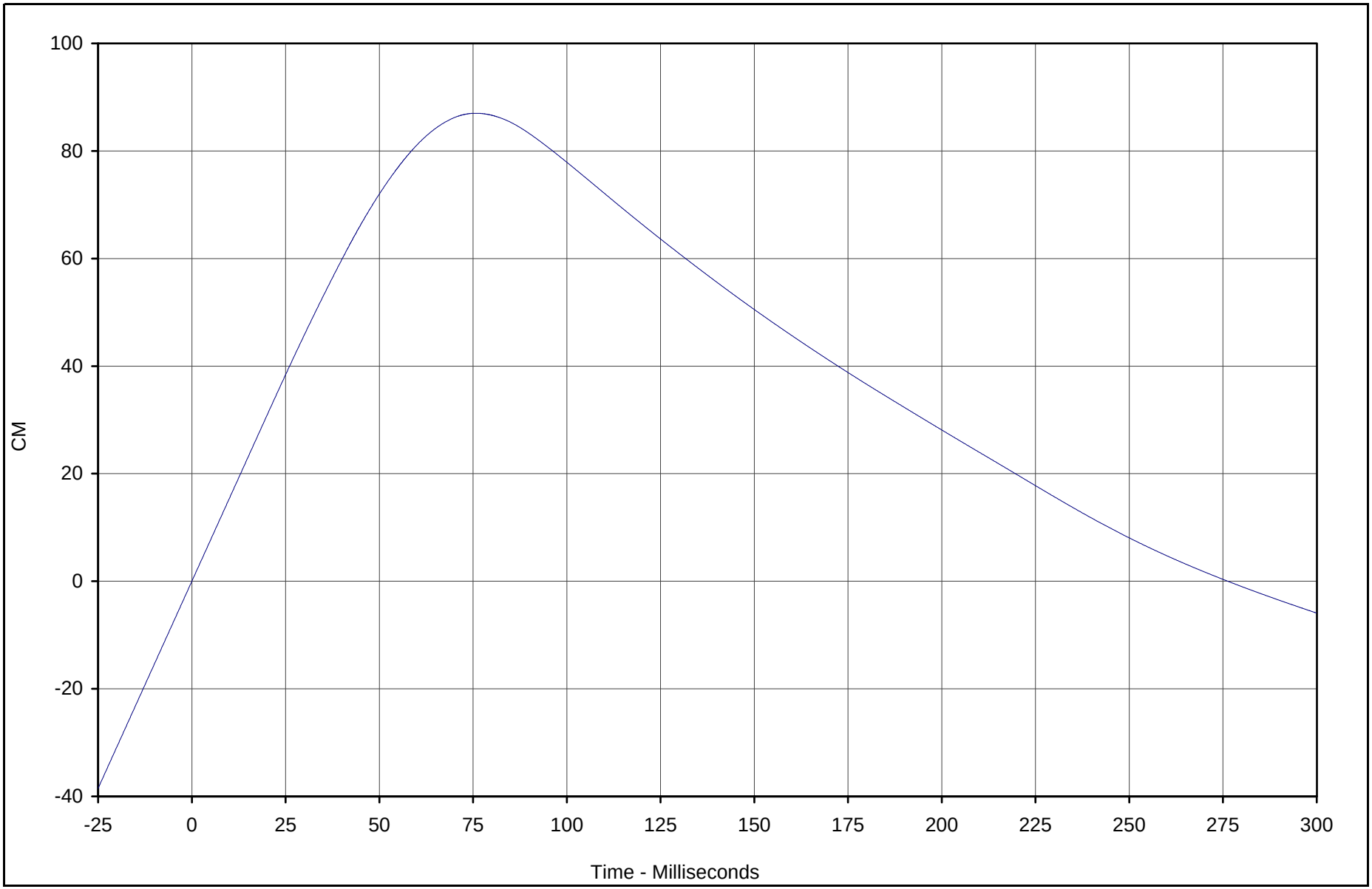

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Primary X Velocity | 013 | IN1 | KMH | 55.6 | 13.0 | -21.0 | 109.8 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



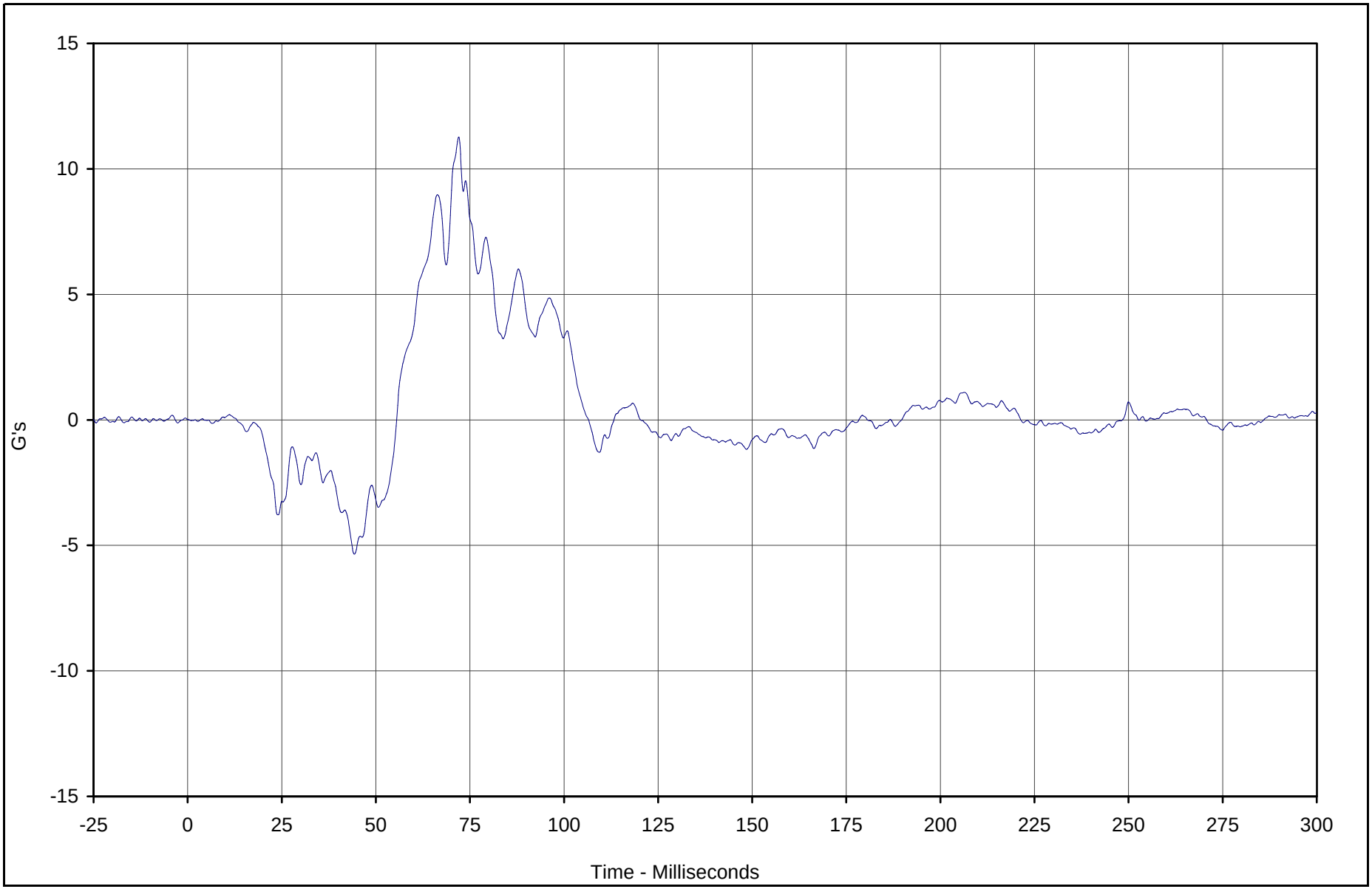

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Primary X Displ. | 013 | IN2 | CM | 87.0 | 75.7 | -5.9 | 299.9 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



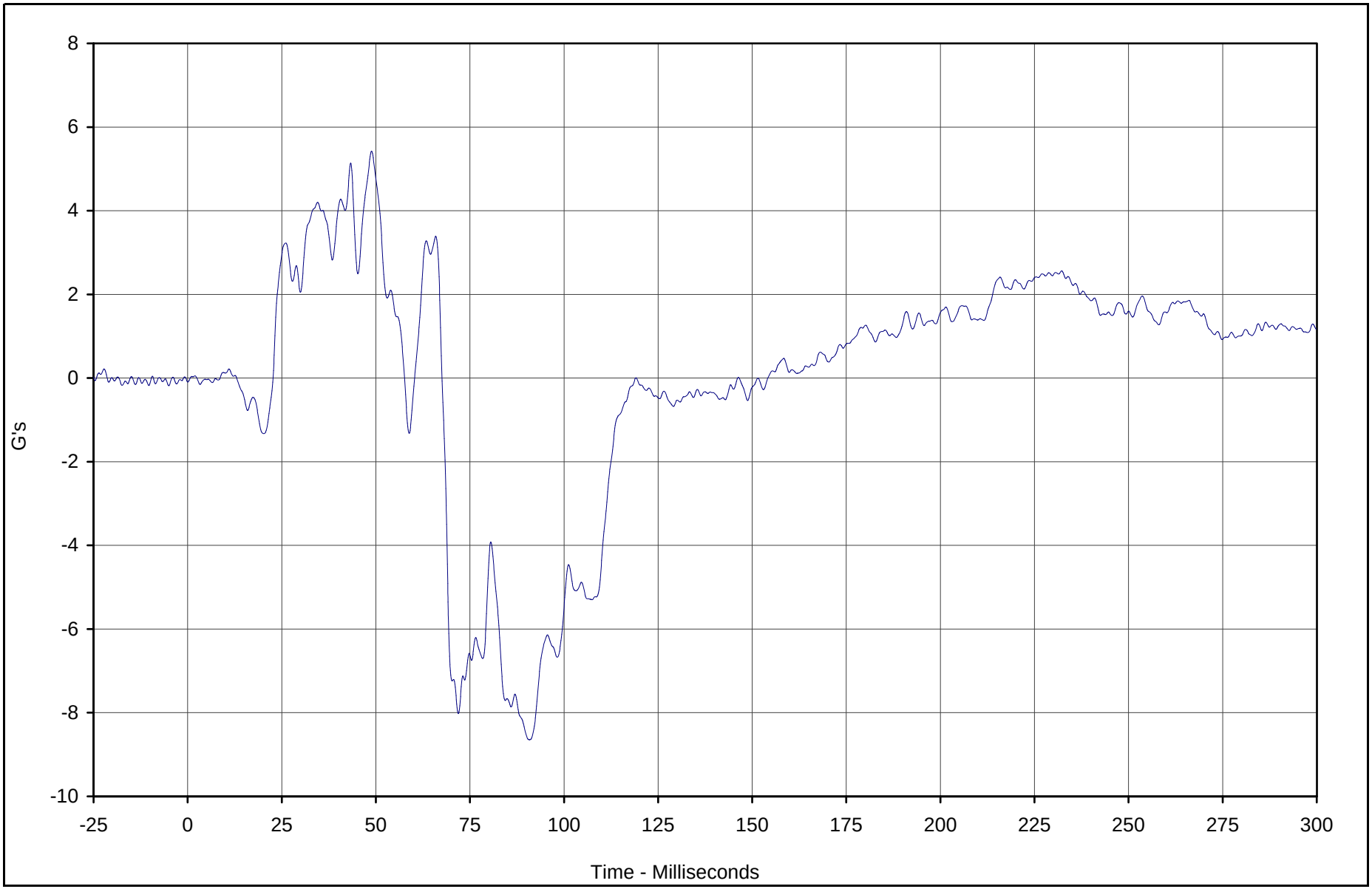

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Primary Y | 014 | FIL | G's | 11.3 | 72.0 | -5.3 | 44.3 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Primary Z | 015 | FIL | G's | 5.4 | 48.9 | -8.6 | 90.8 | 180 |

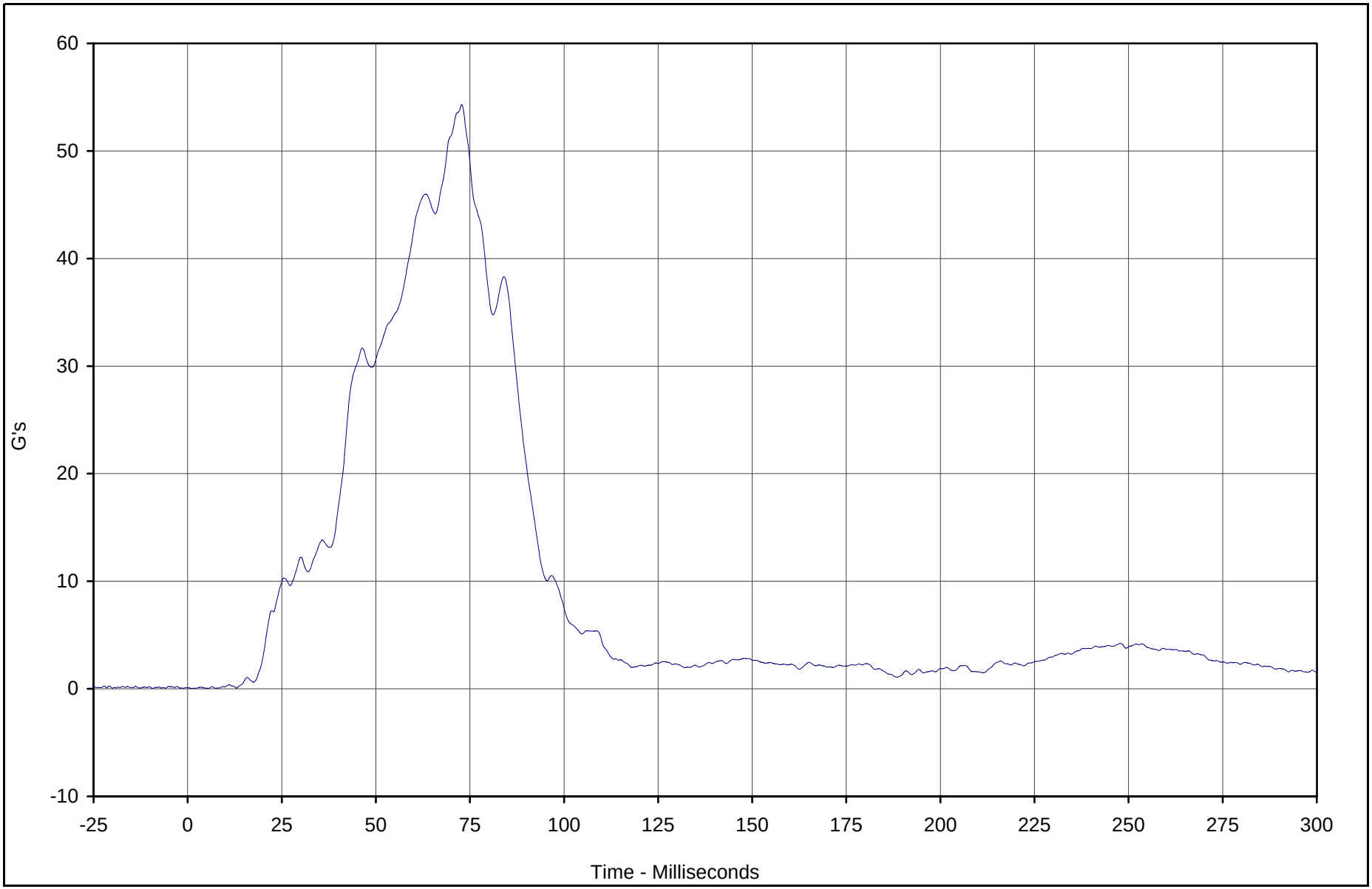
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



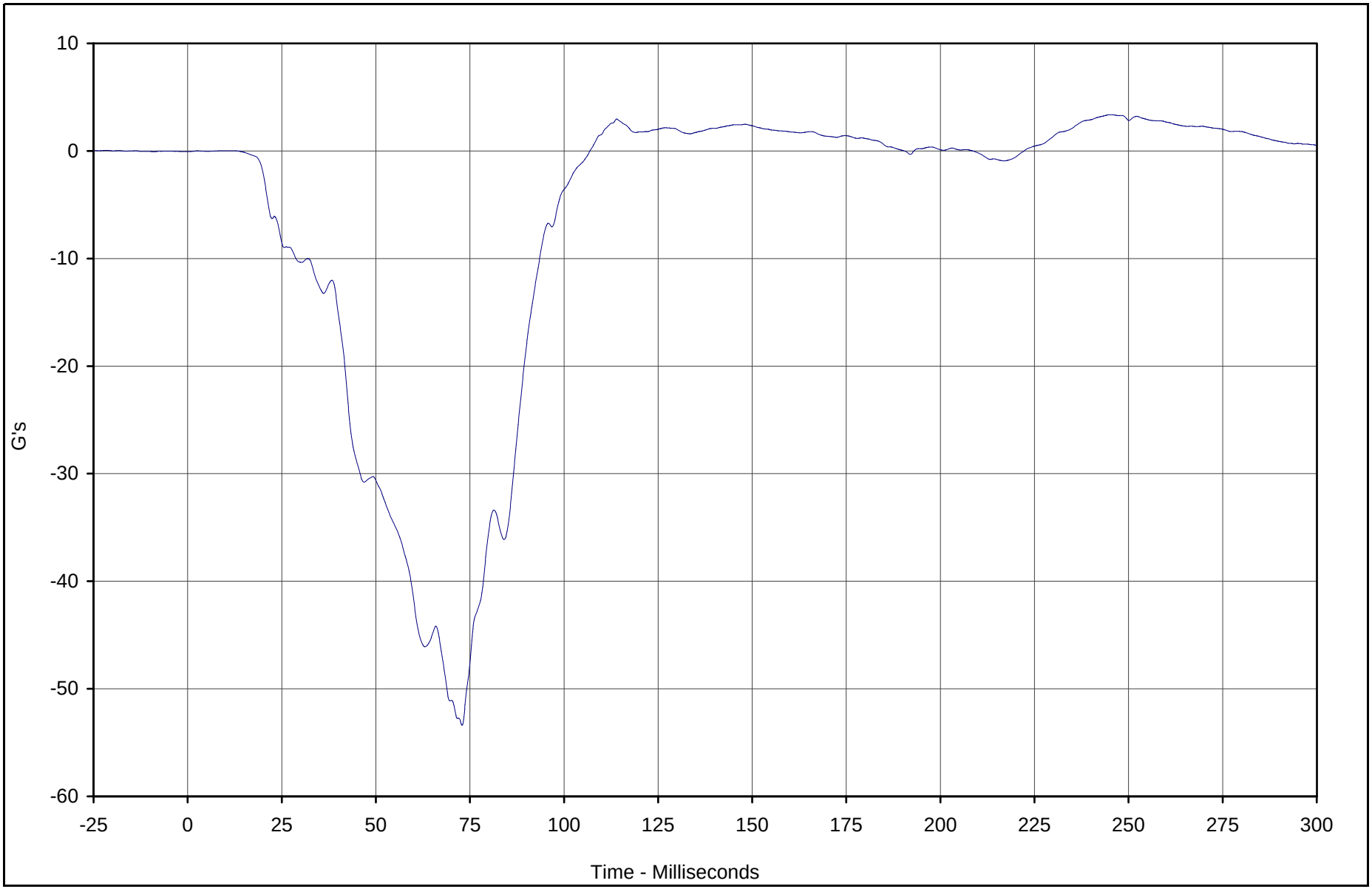

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Resultant Primary | 013 | RES | G's | 54.3 | 72.8 | 0.0 | 13.0 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Redundant X | 016 | FIL | G's | 3.4 | 245.1 | -53.4 | 72.9 | 180 |

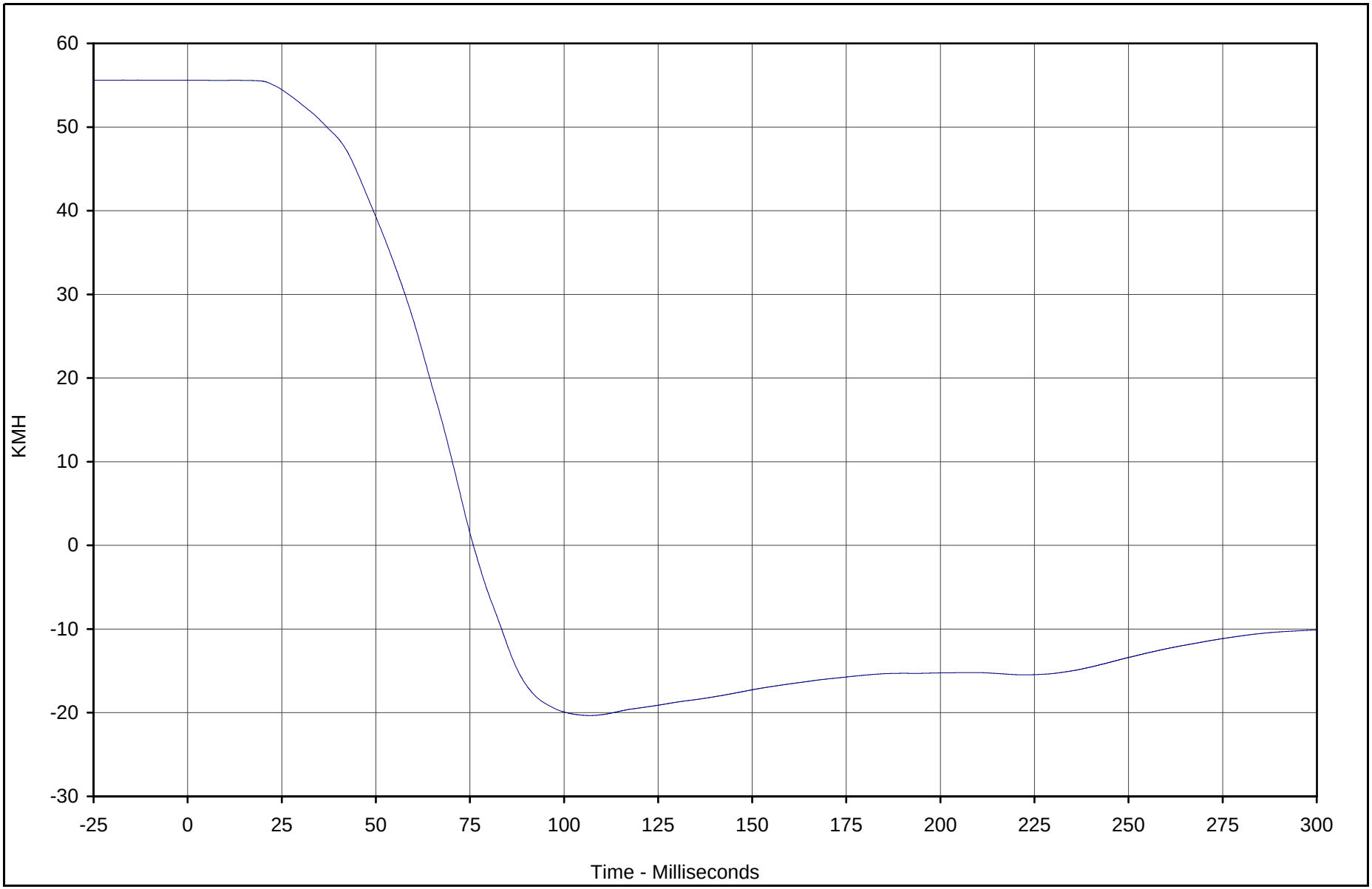
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



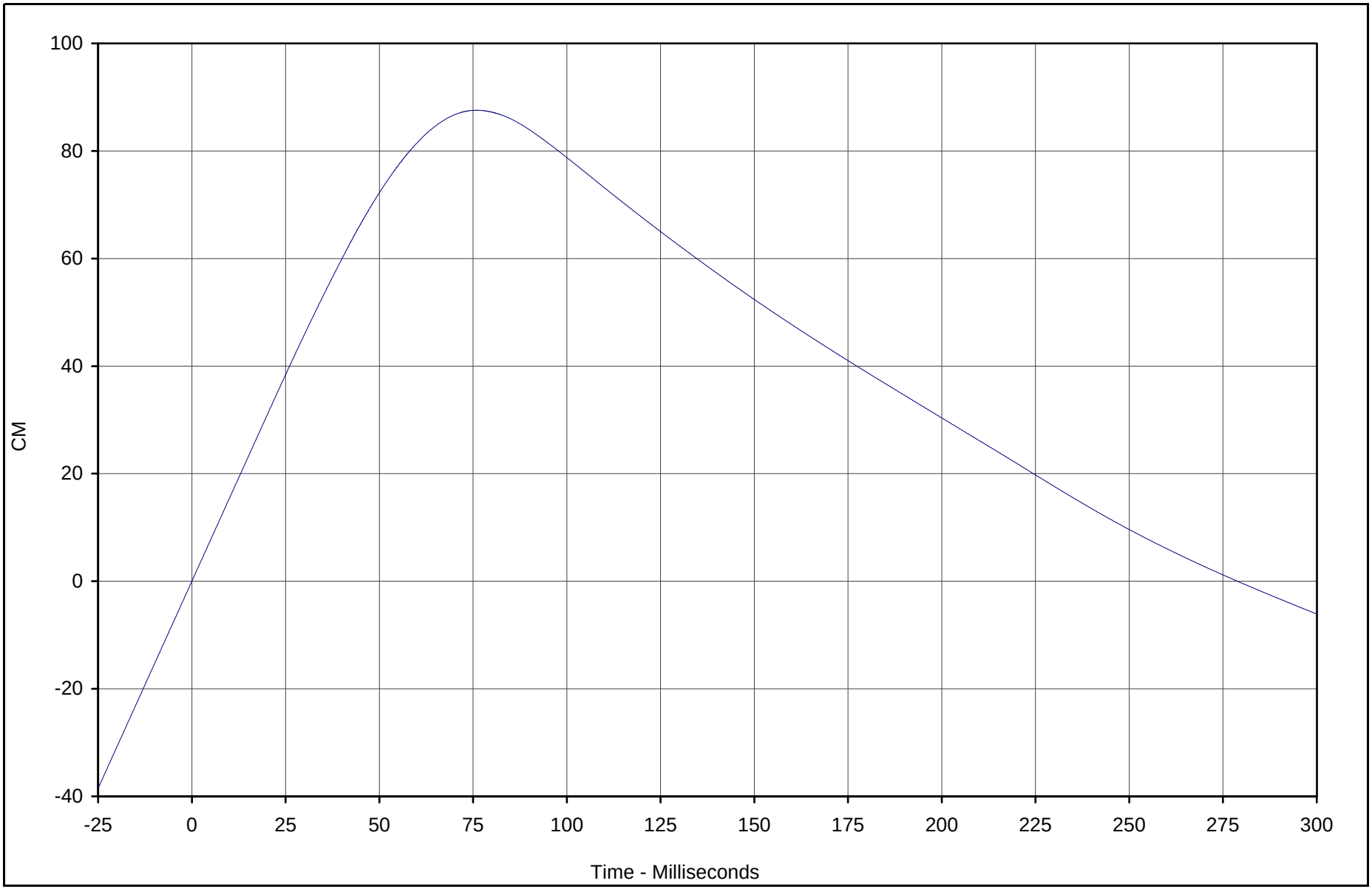

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Redundant X Velocity | 016 | IN1 | KMH | 55.6 | 0.0 | -20.3 | 106.9 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Redundant X Displ. | 016 | IN2 | CM | 87.6 | 75.9 | -6.1 | 299.9 | 180 |

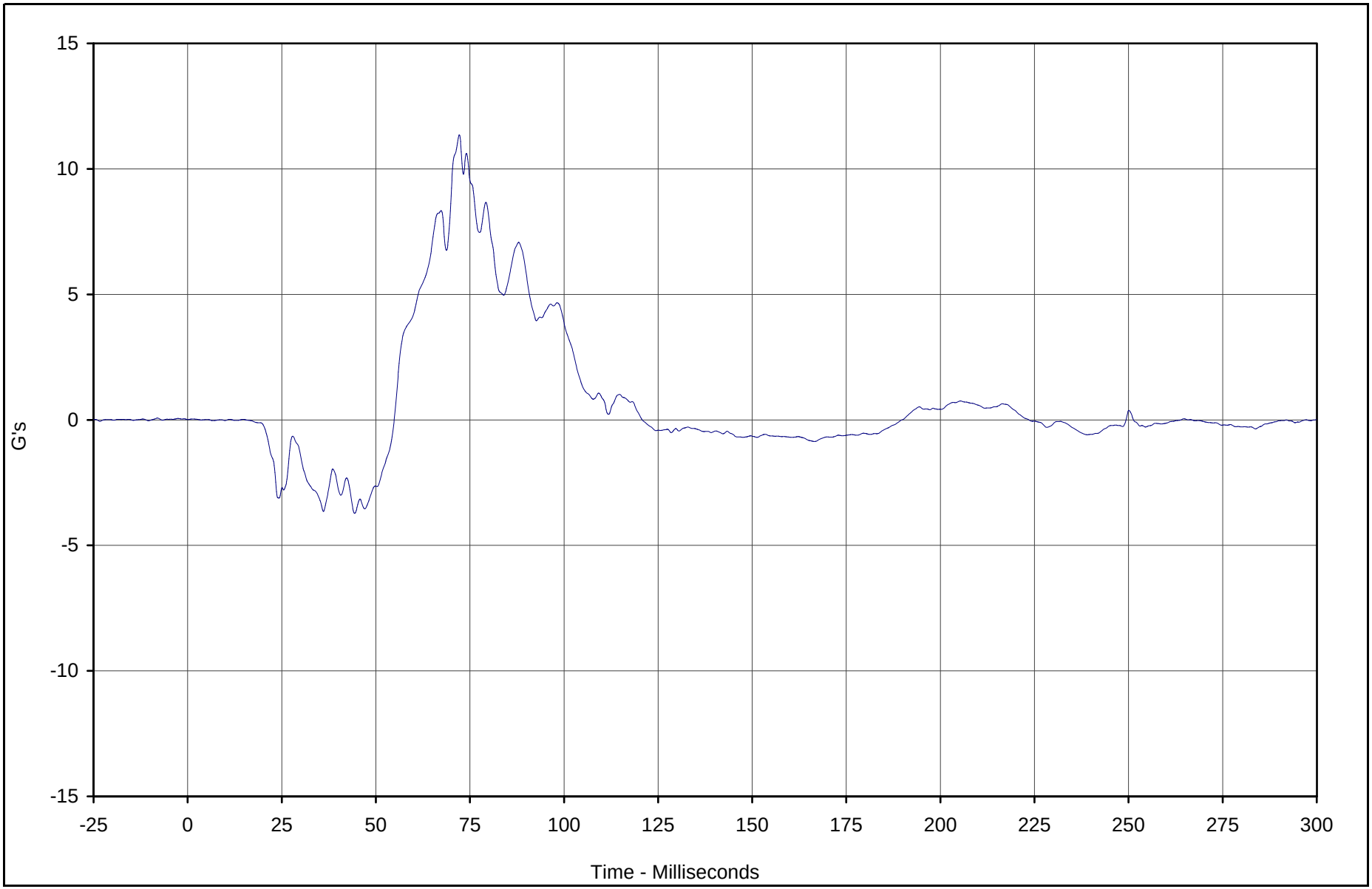
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Redundant Y | 017 | FIL | G's | 11.4 | 72.2 | -3.7 | 44.4 | 180 |

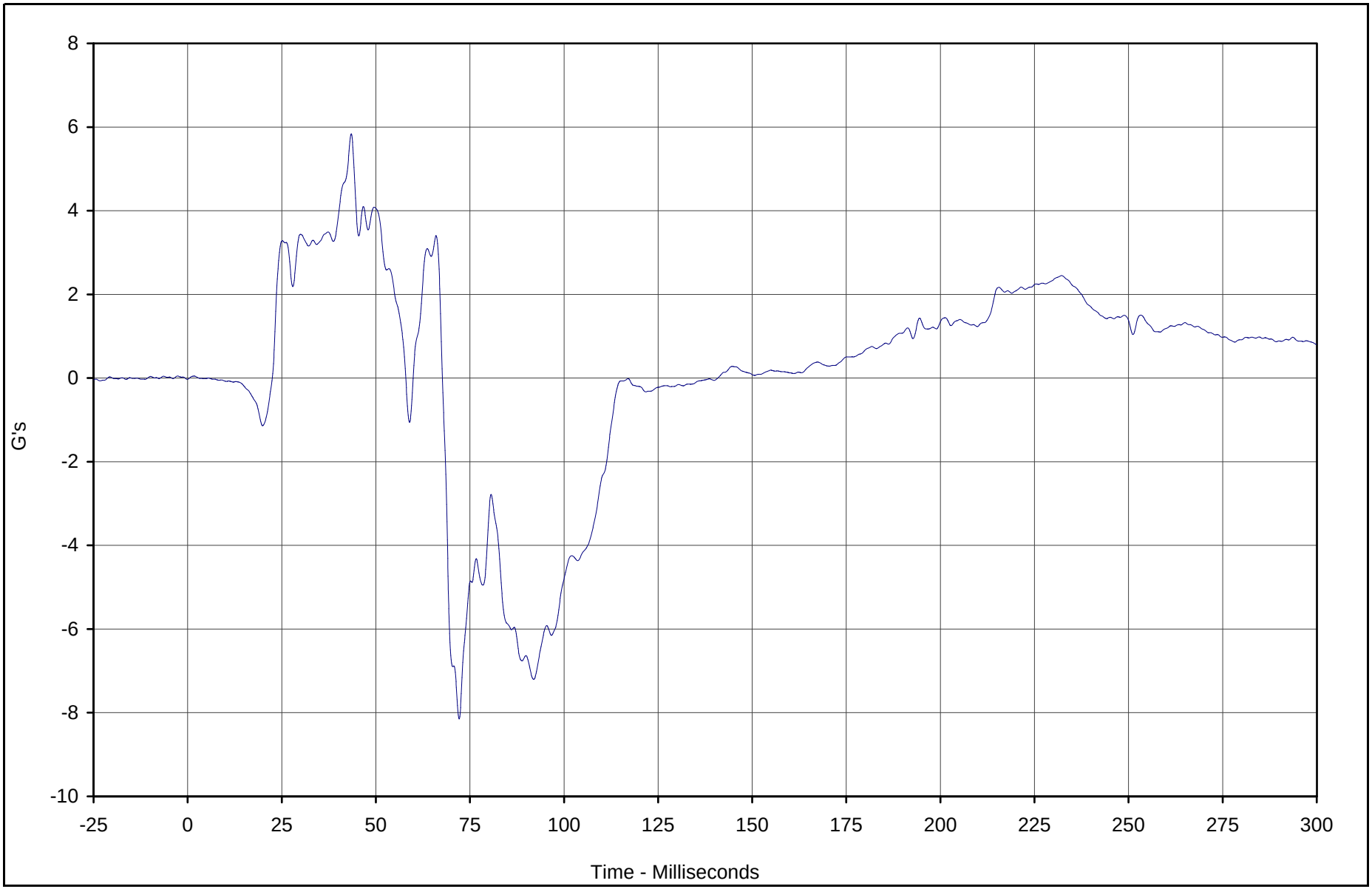
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Redundant Z | 018 | FIL | G's | 5.8 | 43.5 | -8.1 | 72.1 | 180 |

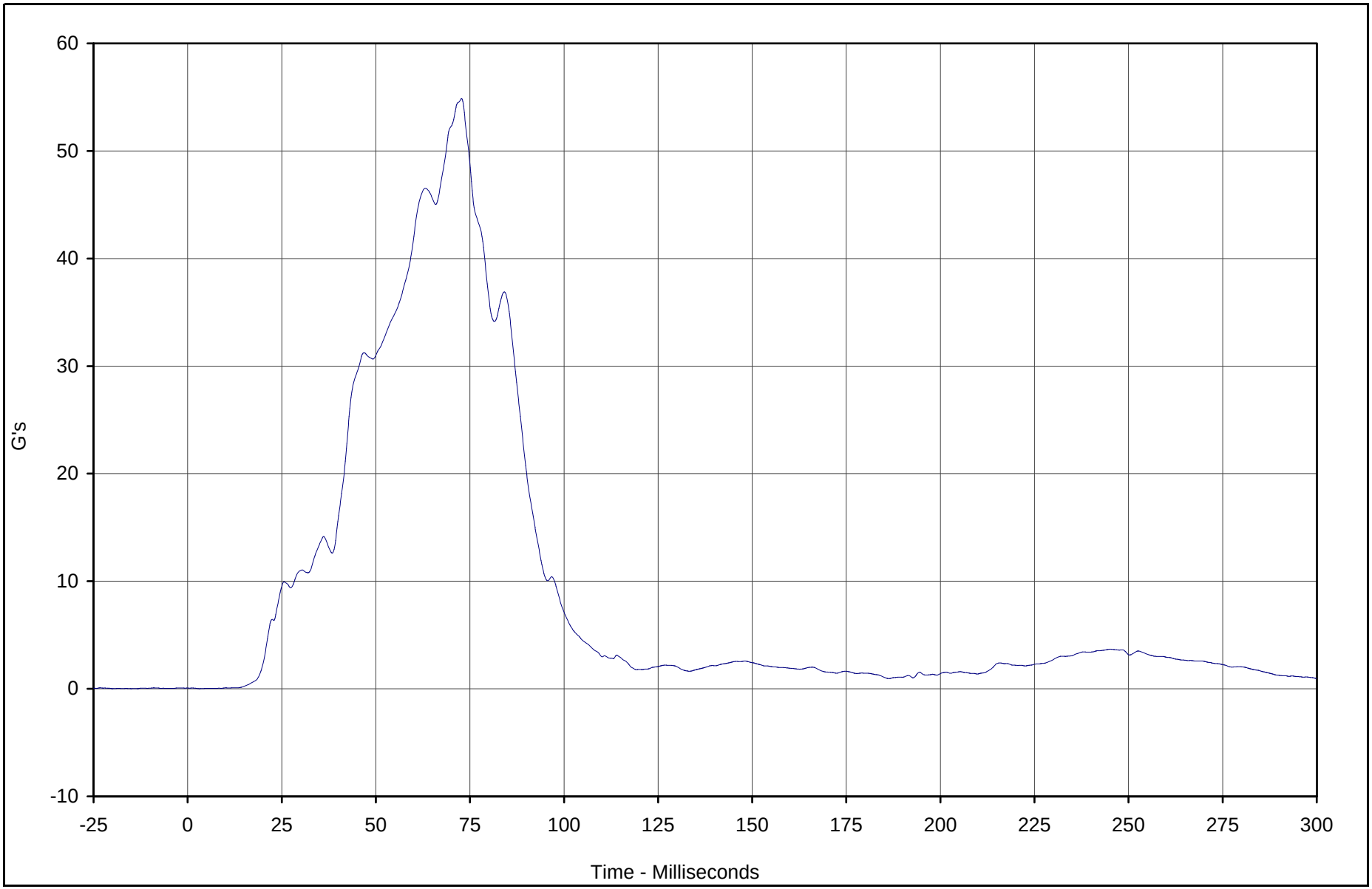
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Resultant Redundant | 016 | RES | G's | 54.9 | 72.8 | 0.0 | 3.1 | 180 |

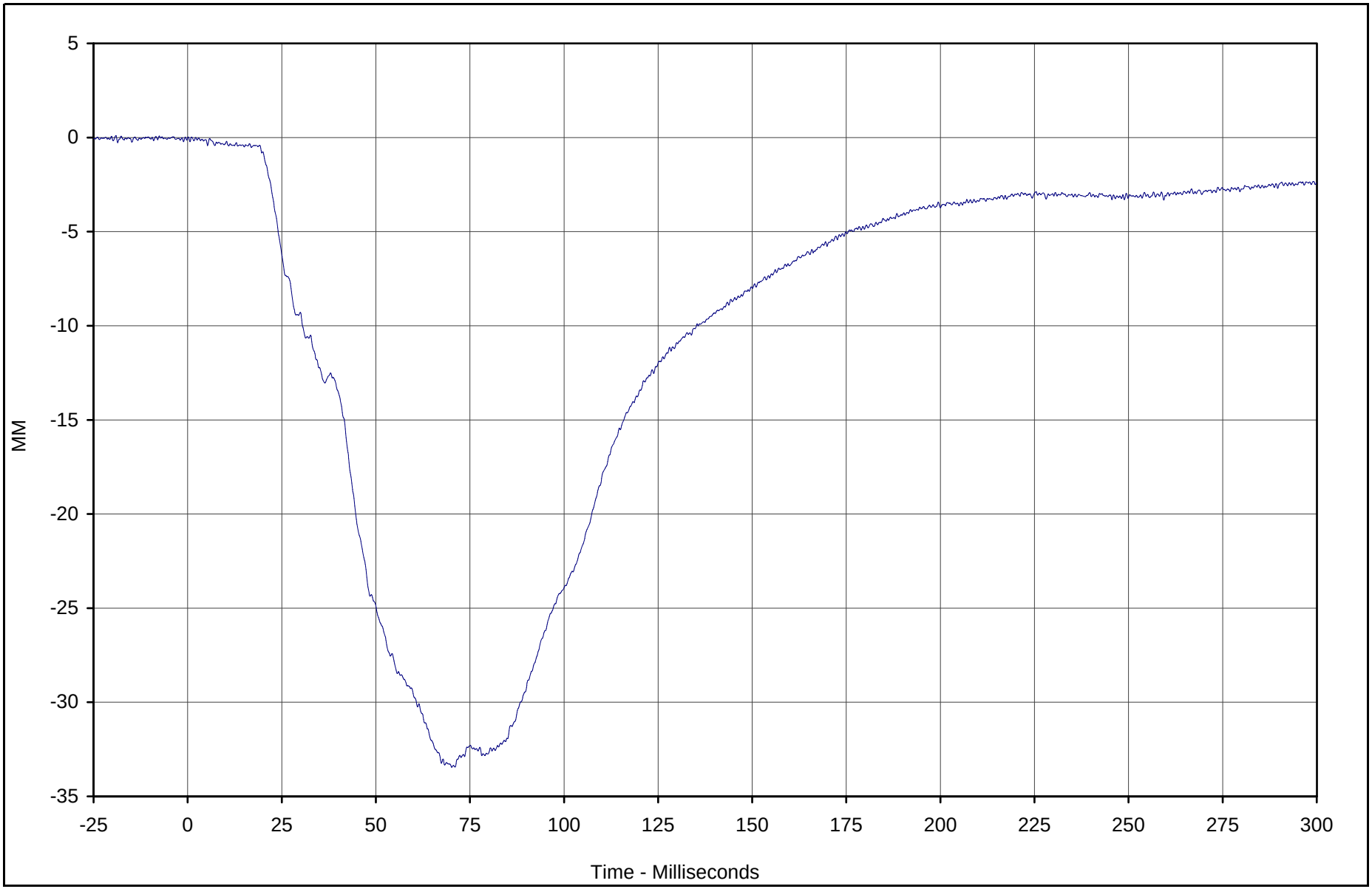
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



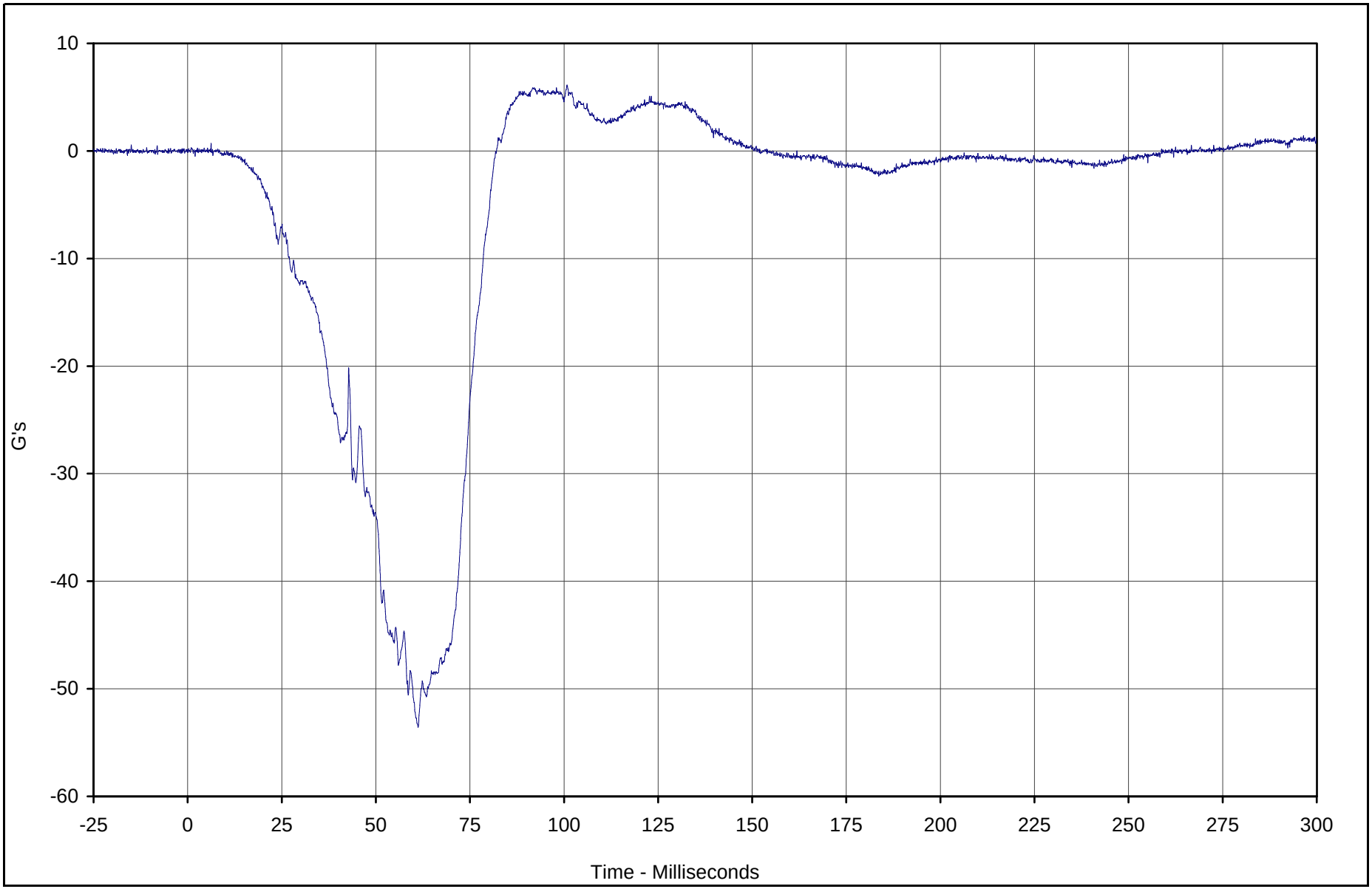

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Chest Displacement X | 019 | FIL | MM | 0.0 | 0.2 | -33.5 | 70.1 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Pelvis X | 020 | FIL | G's | 6.1 | 100.8 | -53.6 | 61.2 | 1000 |

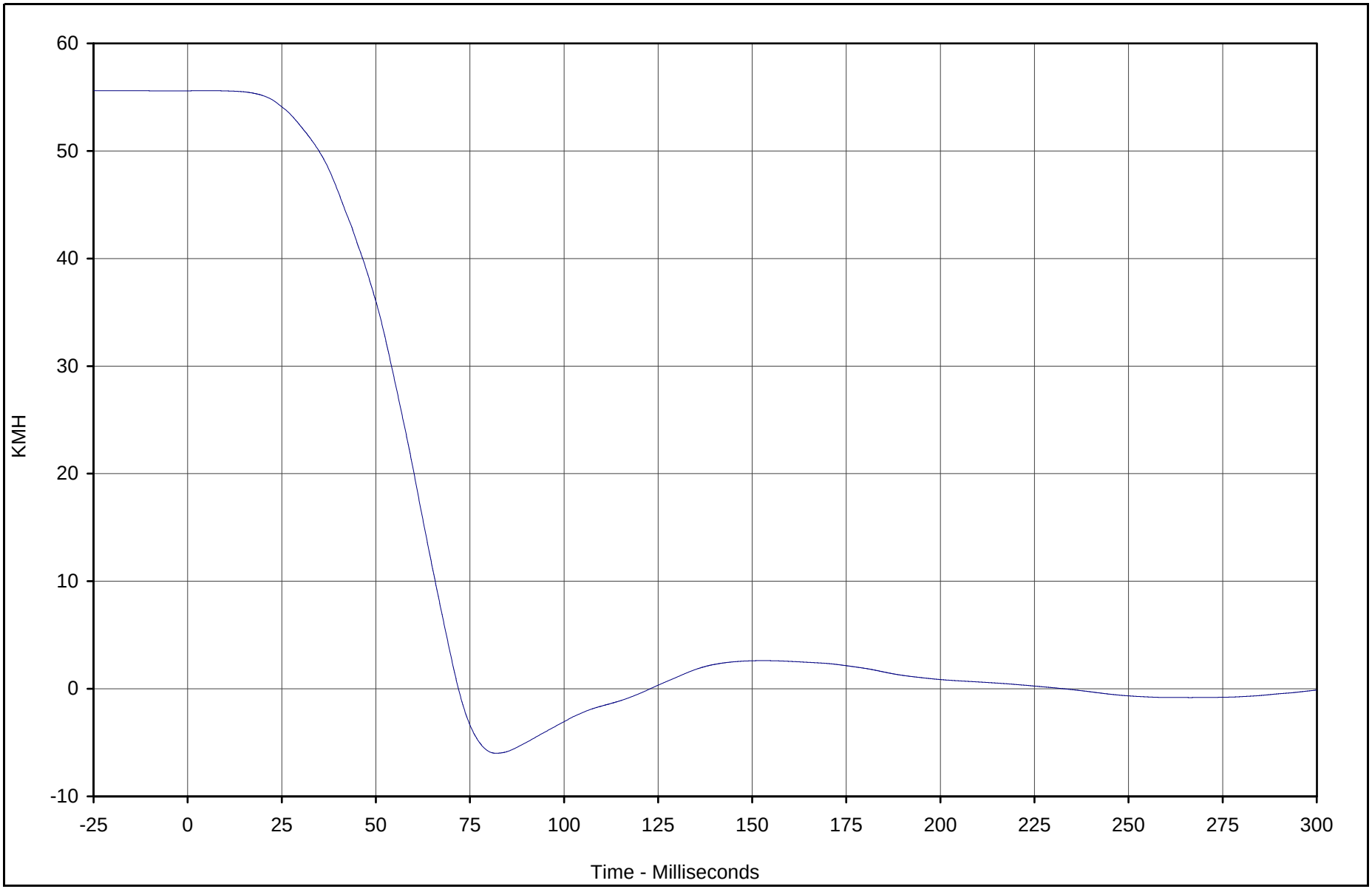
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



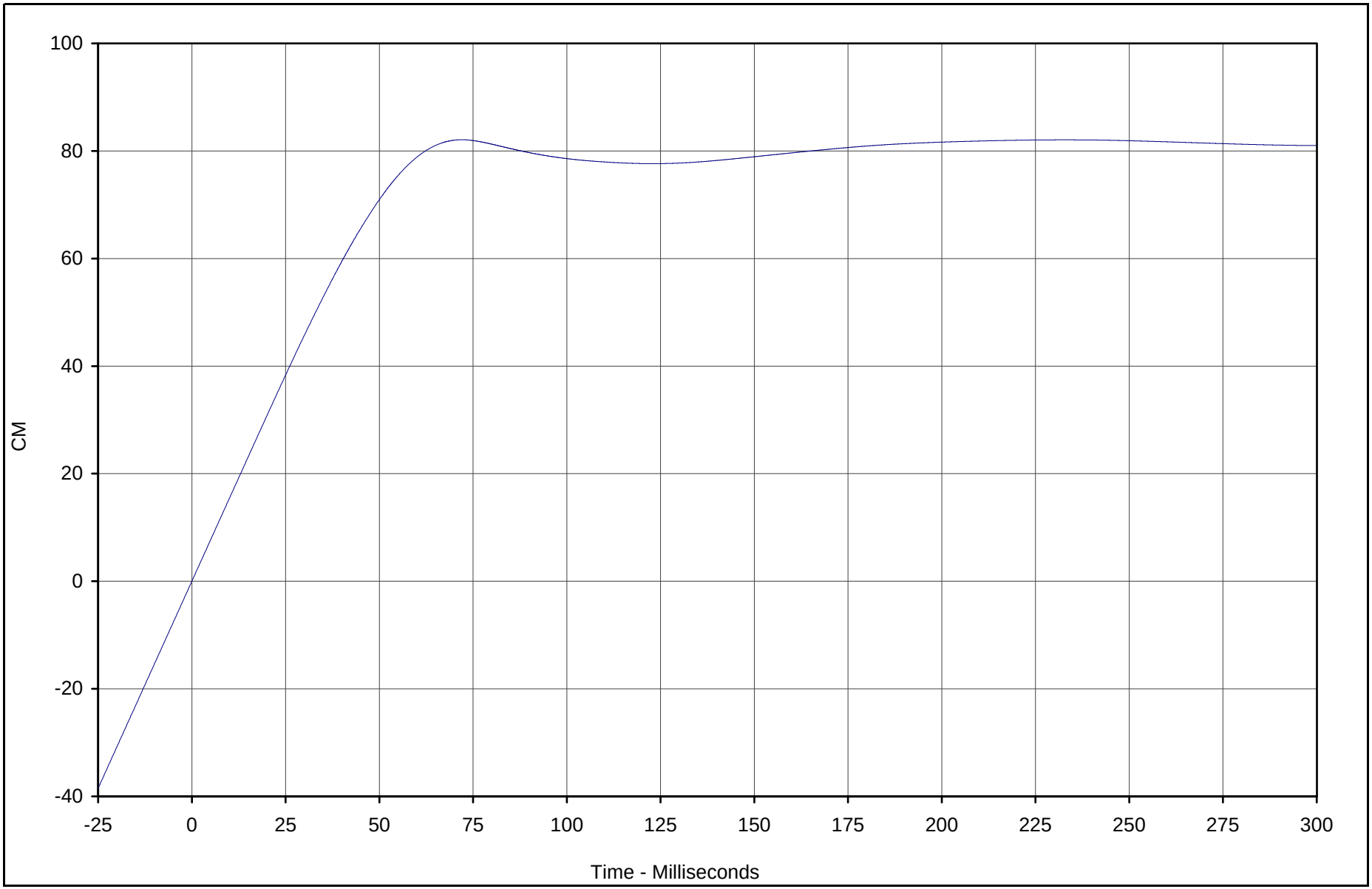

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Pelvis X Velocity | 020 | IN1 | KMH | 55.6 | 6.5 | -6.0 | 82.0 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



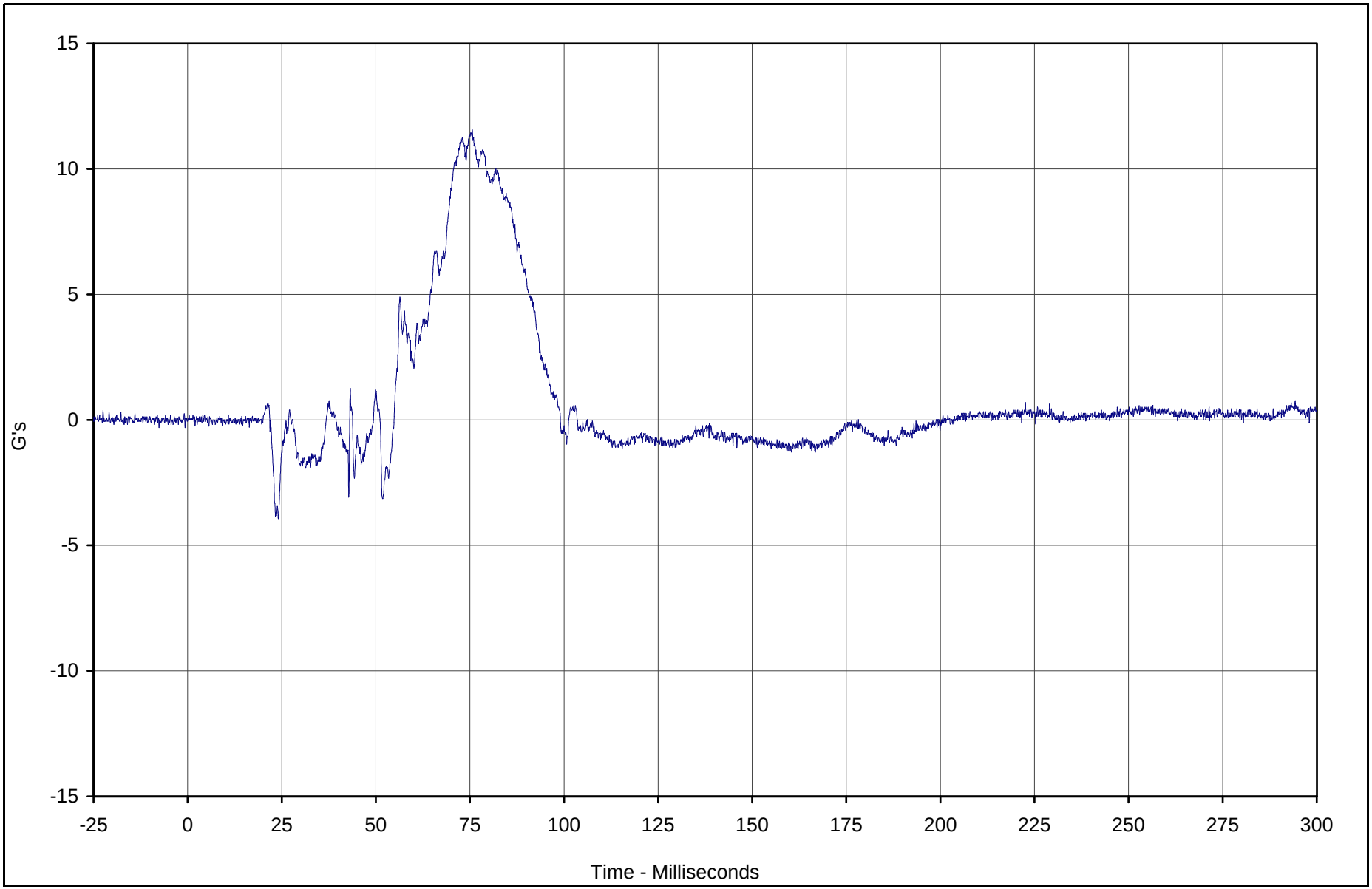

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Pelvis X Displ. | 020 | IN2 | CM | 82.1 | 71.9 | 0.0 | 0.0 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



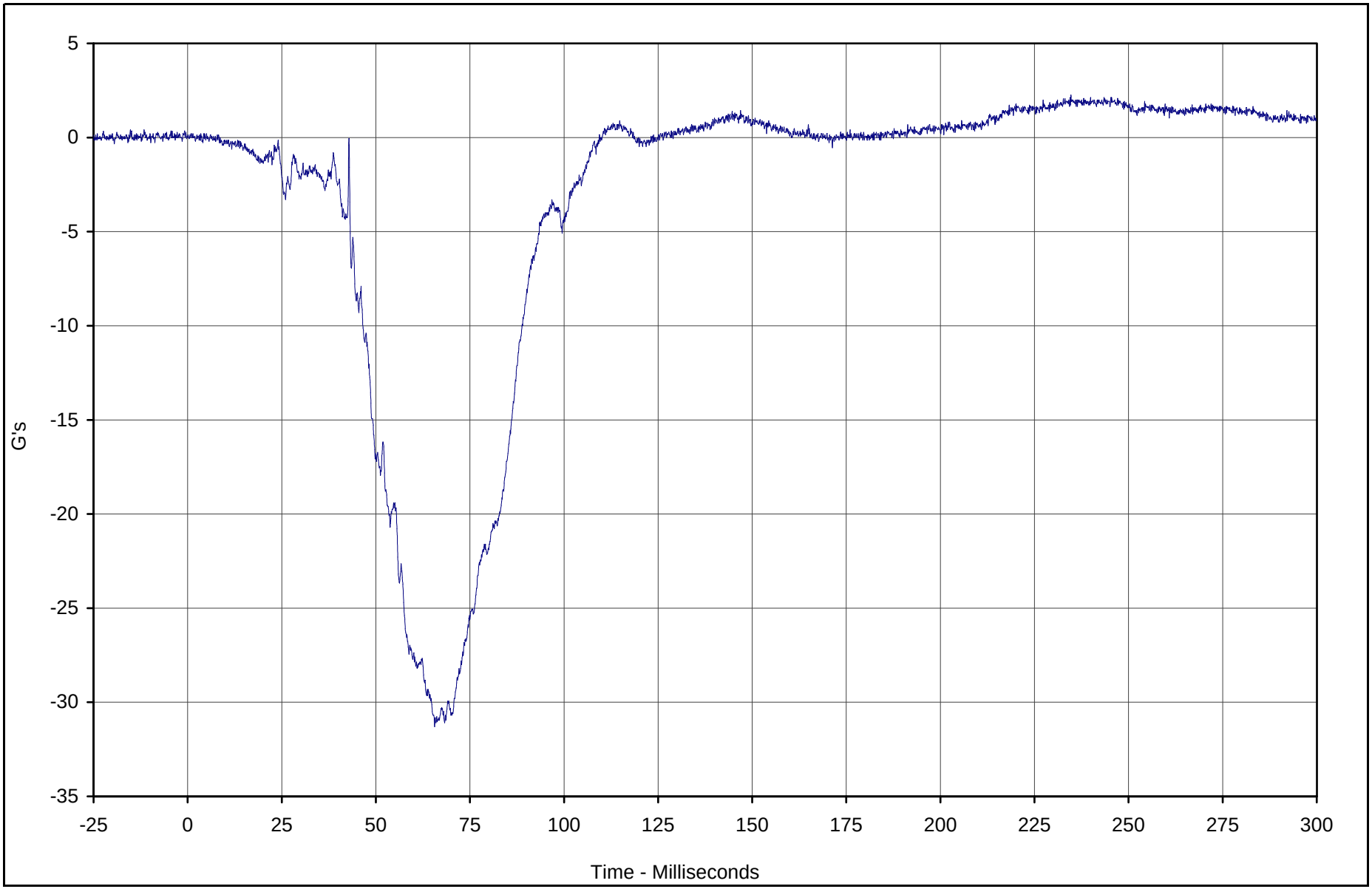

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Pelvis Y | 021 | FIL | G's | 11.6 | 75.6 | -3.9 | 24.1 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Pelvis Z | 022 | FIL | G's | 2.3 | 234.7 | -31.3 | 65.6 | 1000 |

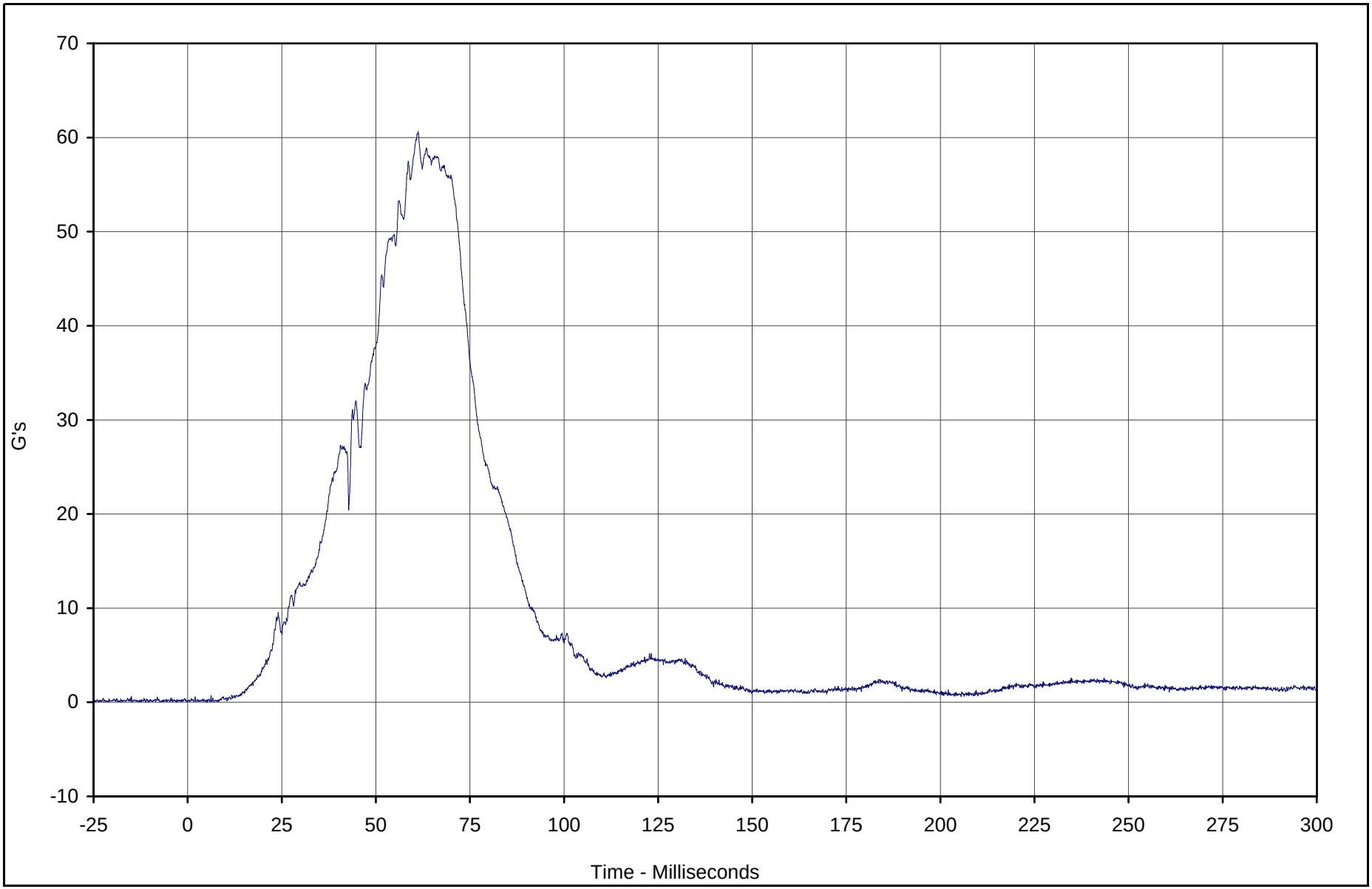
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Pelvis Resultant | 023 | RES | G's | 60.6 | 61.2 | 0.0 | 5.1 | 1000 |

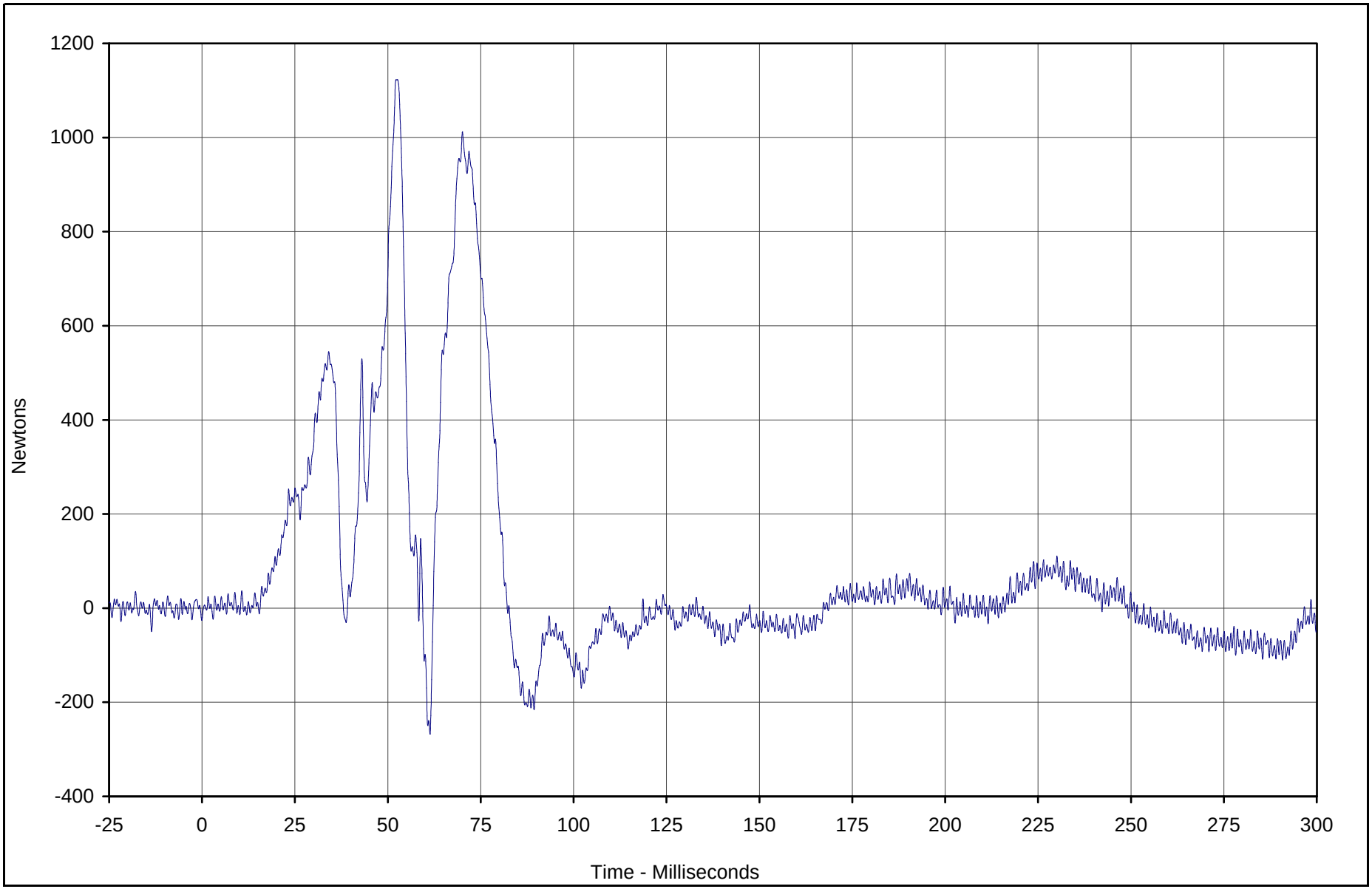
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Femur Force | 023 | FIL | Newtons | 1123.0 | 52.2 | -267.6 | 61.4 | 600 |

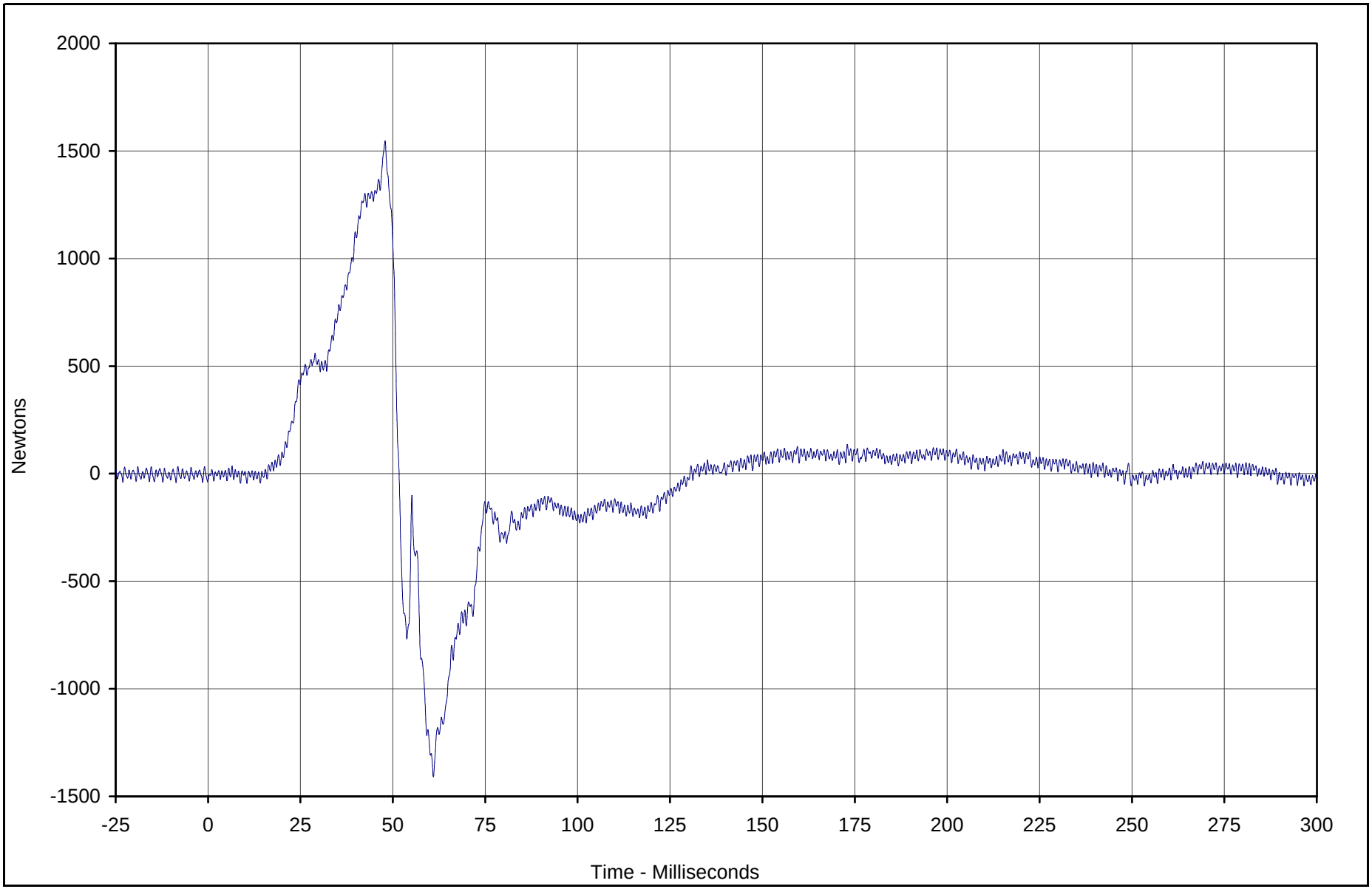
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Femur Force | 024 | FIL | Newtons | 1546.6 | 47.9 | -1409.0 | 61.0 | 600 |

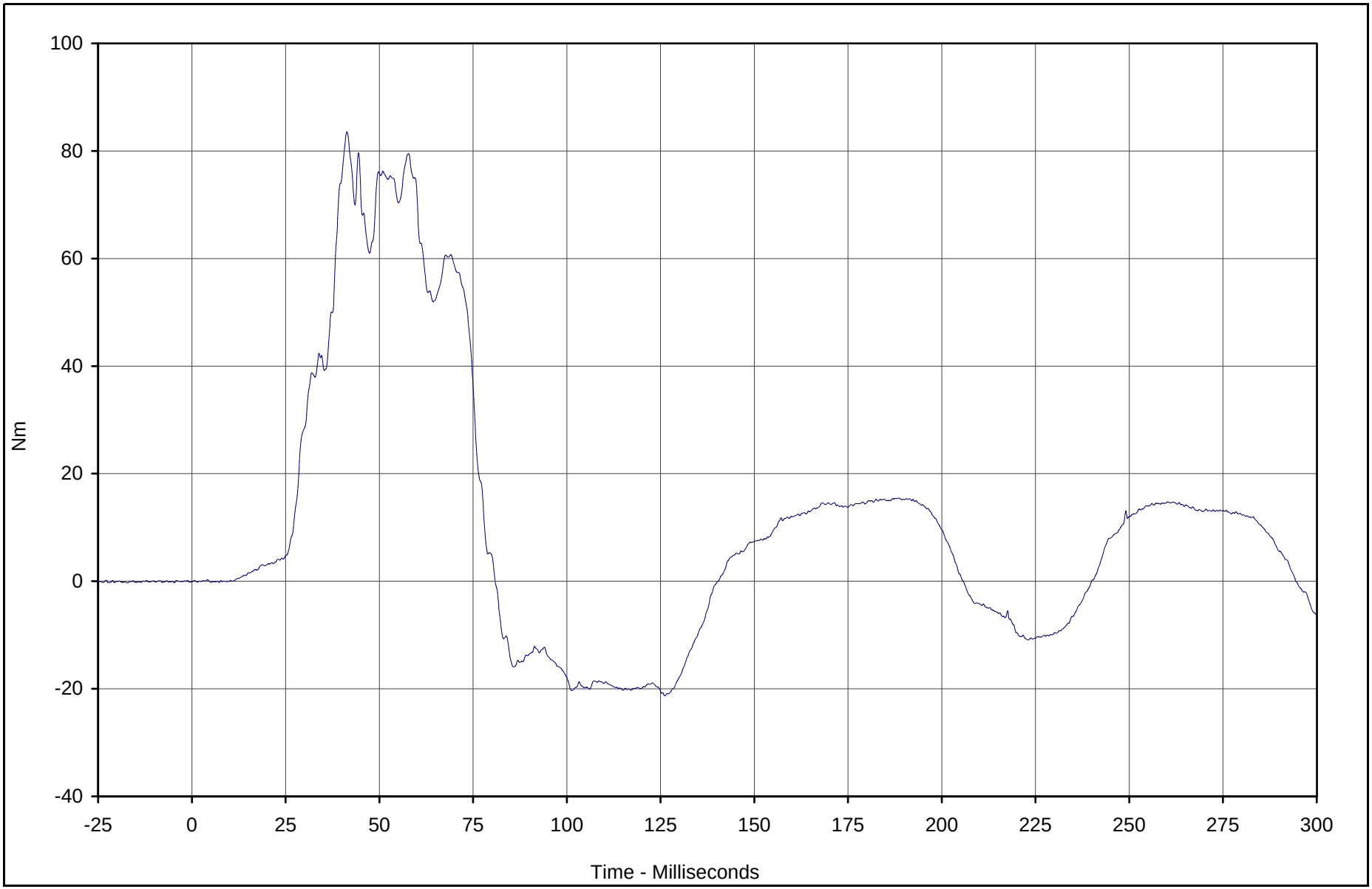
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Upper Tibia Moment X | 025 | FIL | Nm | 83.5 | 41.4 | -21.3 | 126.2 | 600 |

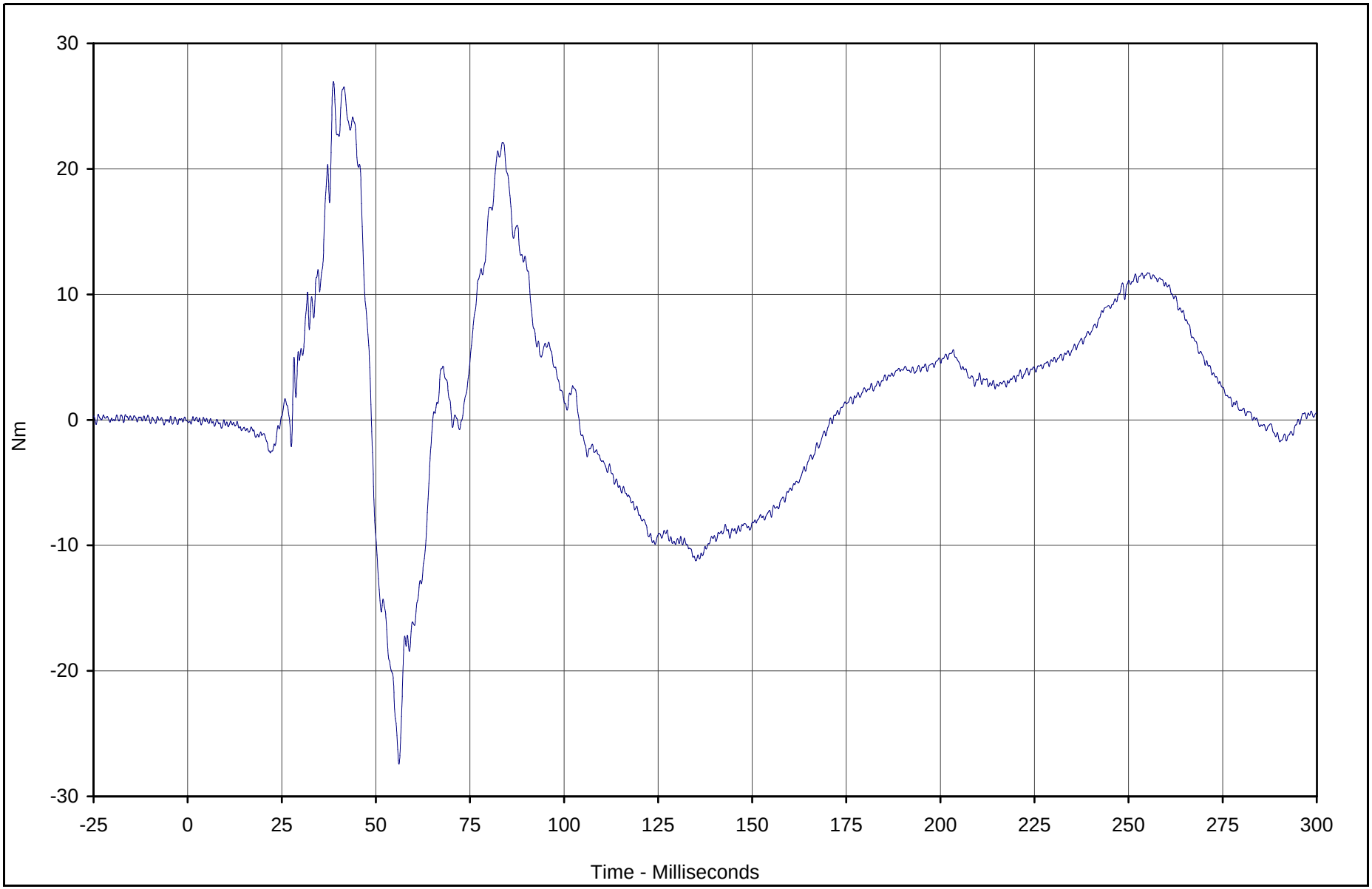
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Upper Tibia Moment Y | 026 | FIL | Nm | 26.9 | 38.8 | -27.4 | 56.2 | 600 |

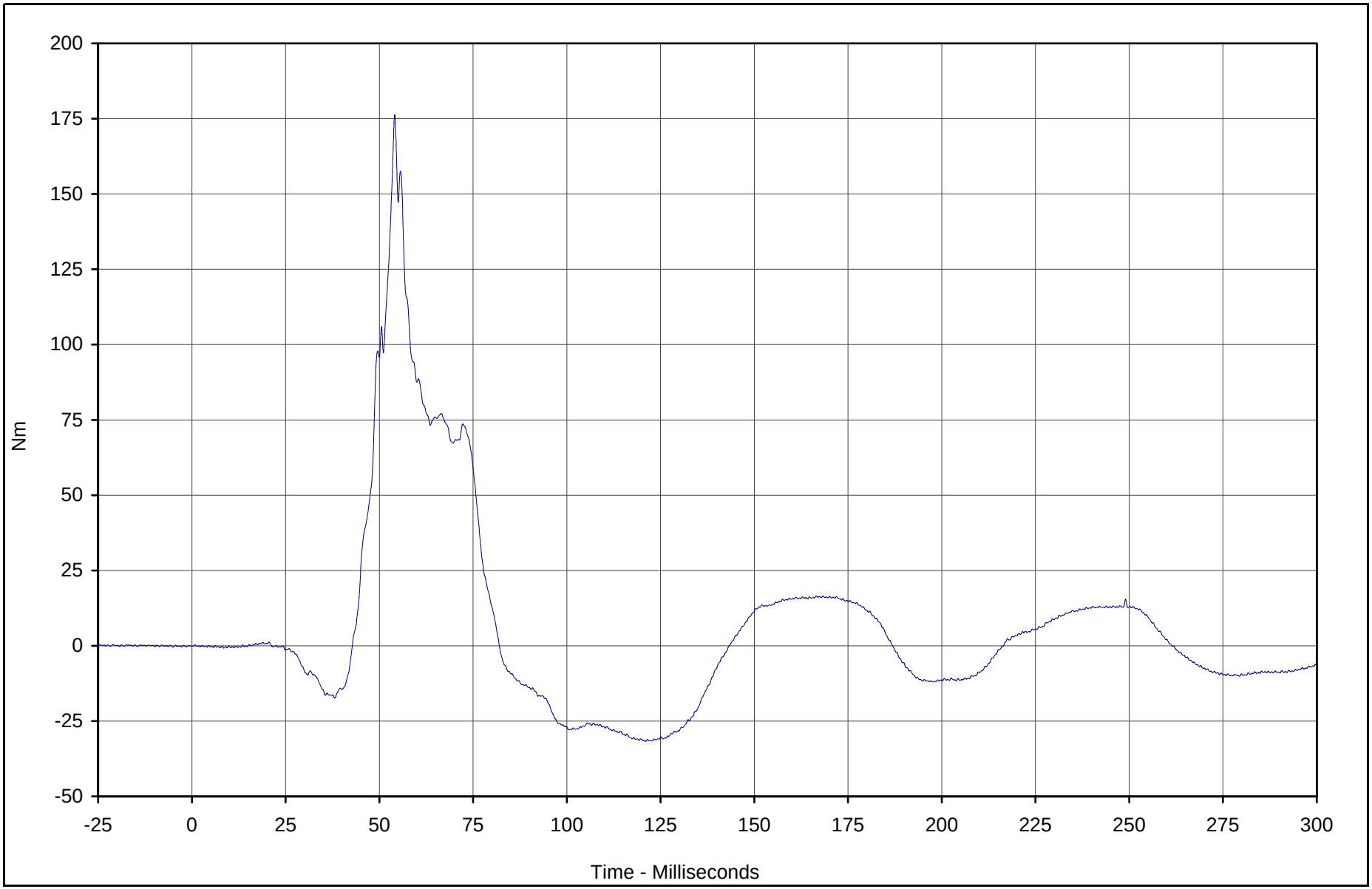
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



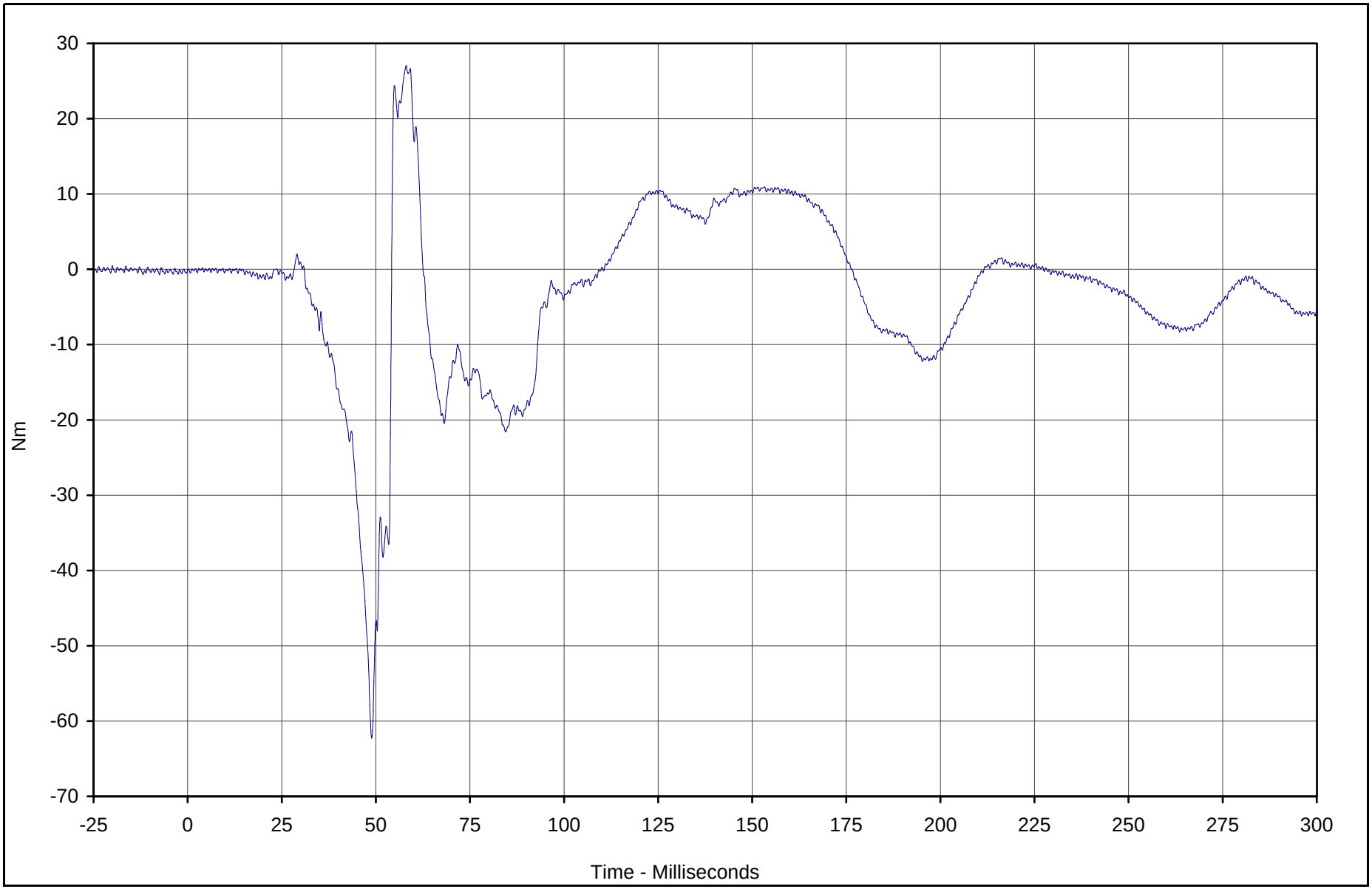

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Upper Tibia Moment X | 027 | FIL | Nm | 176.4 | 54.1 | -31.7 | 121.0 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Upper Tibia Moment Y | 028 | FIL | Nm | 27.0 | 58.0 | -62.3 | 48.9 | 600 |

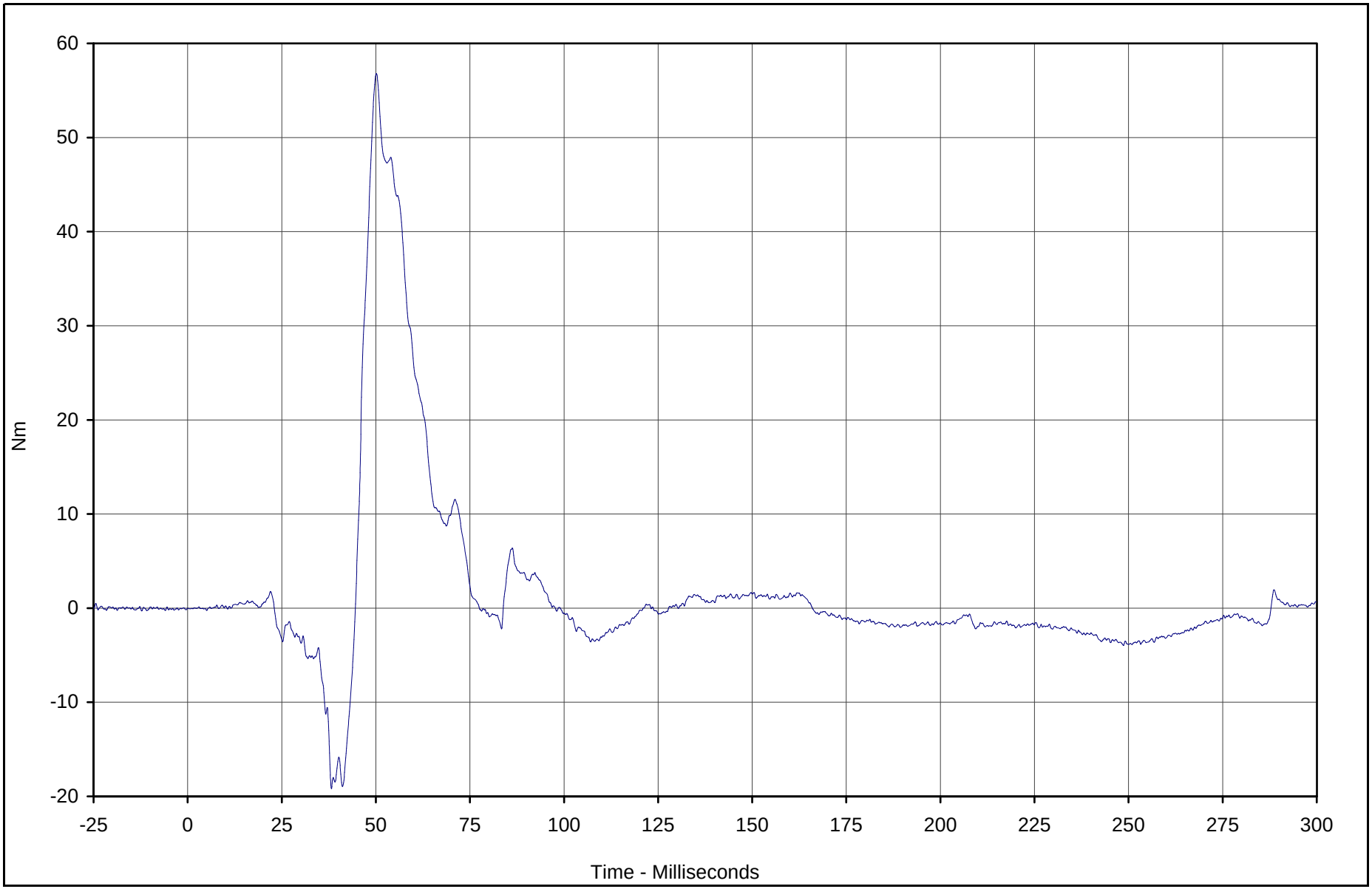
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Lower Tibia Moment X | 029 | FIL | Nm | 56.8 | 50.1 | -19.2 | 38.2 | 600 |

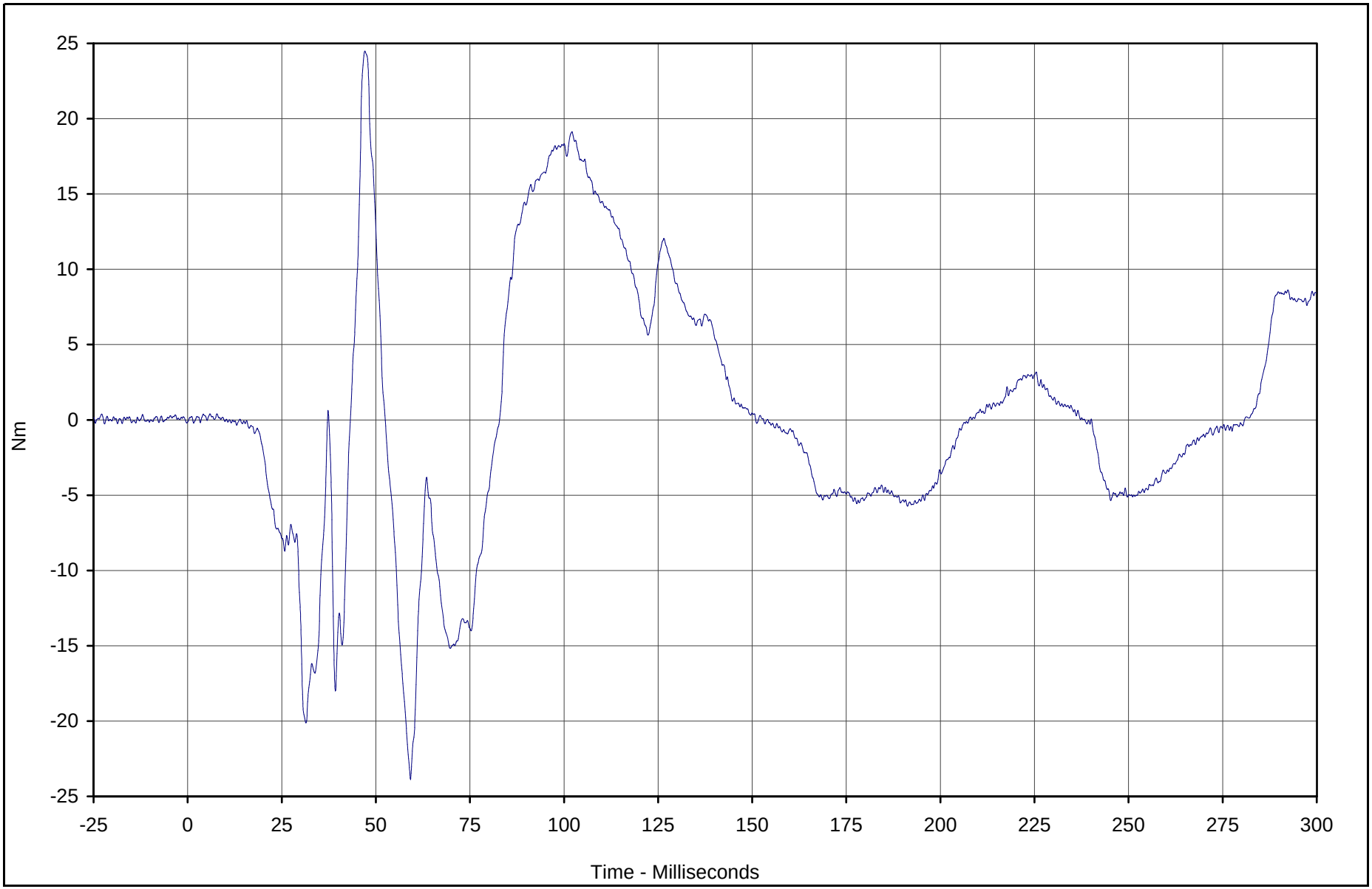
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Lower Tibia Moment Y | 030 | FIL | Nm | 24.5 | 47.1 | -23.9 | 59.2 | 600 |

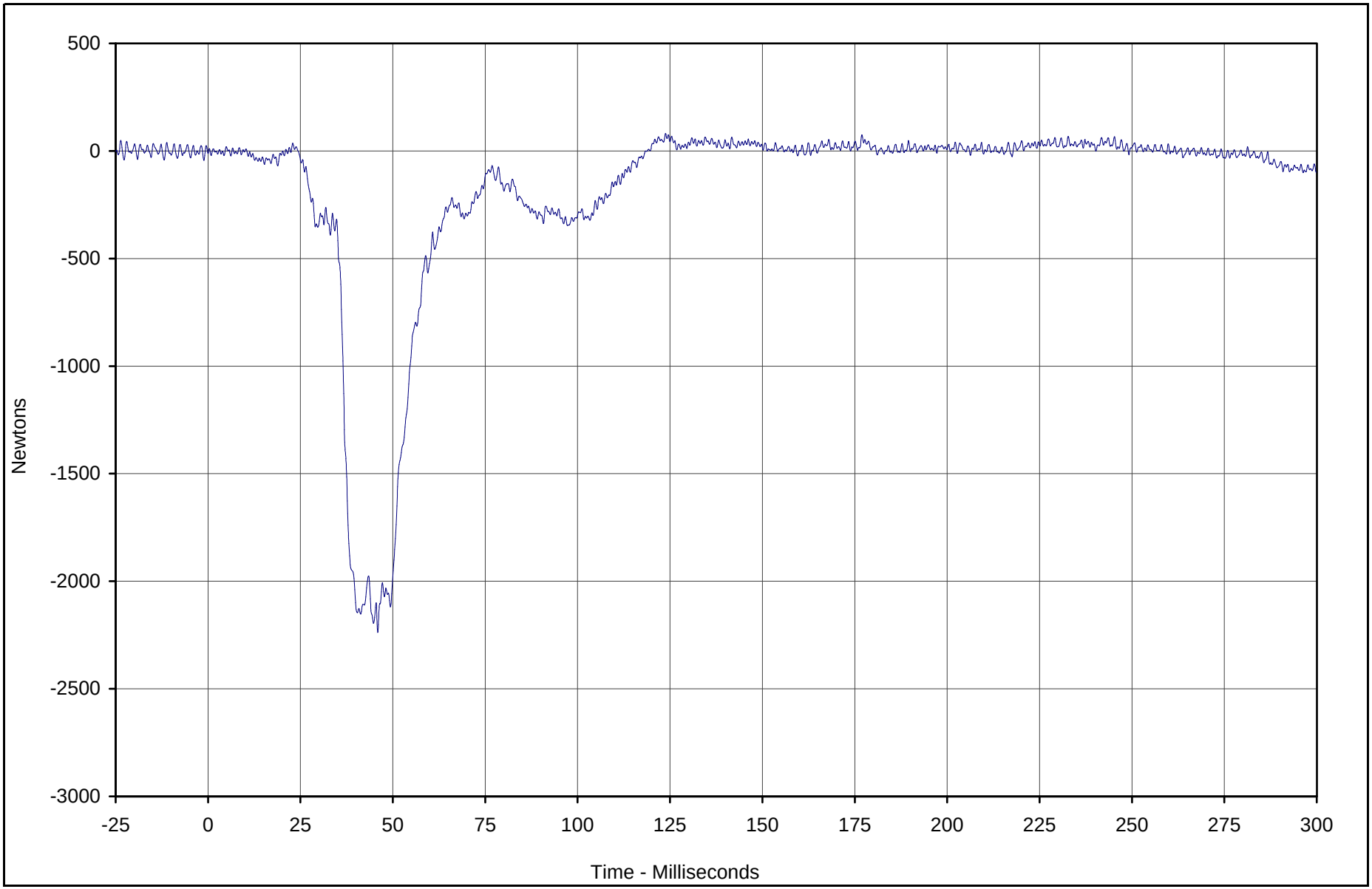
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Lower Tibia Force Z | 031 | FIL | Newtons | 81.3 | 123.8 | -2238.3 | 45.9 | 600 |

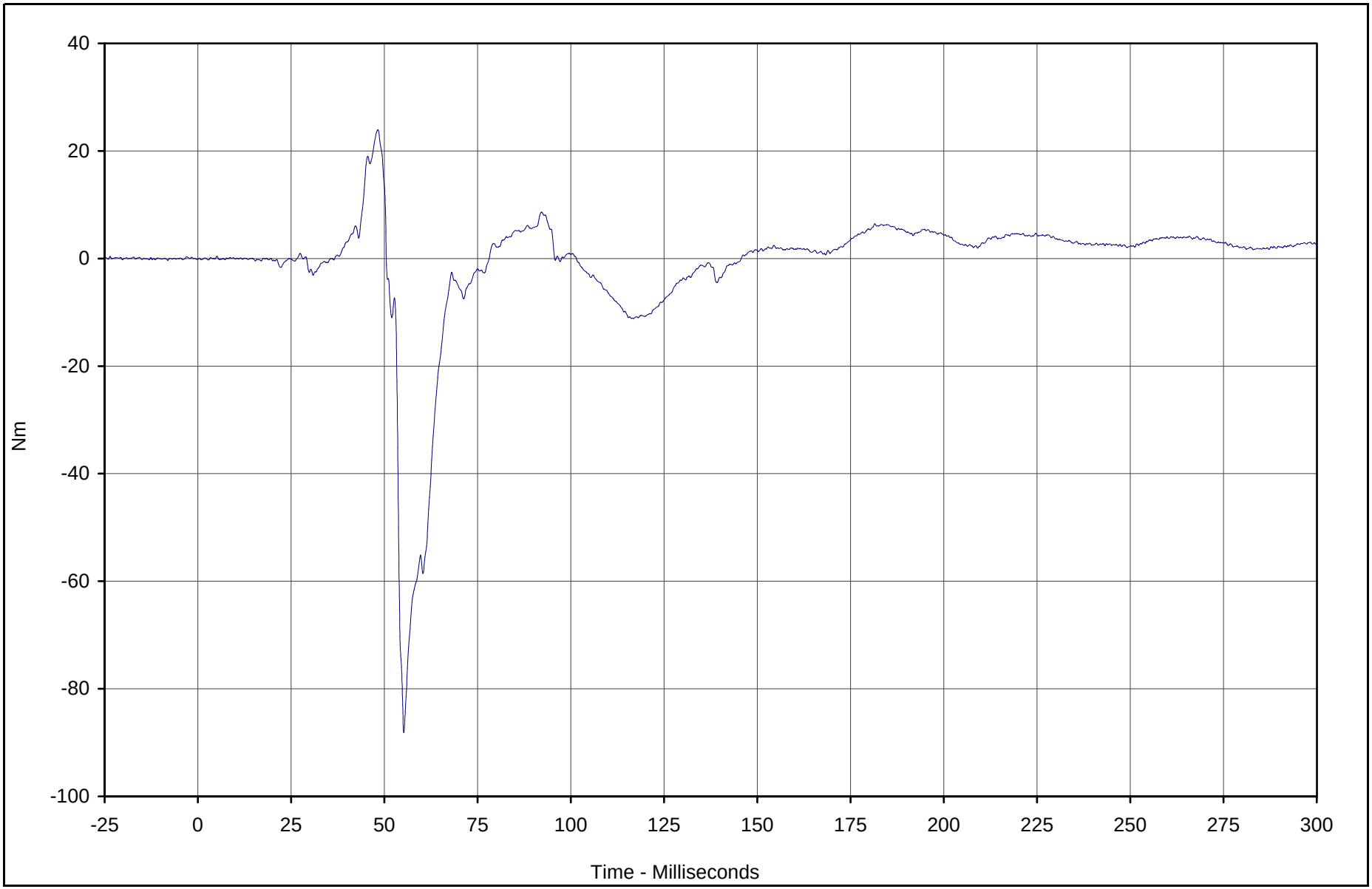
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



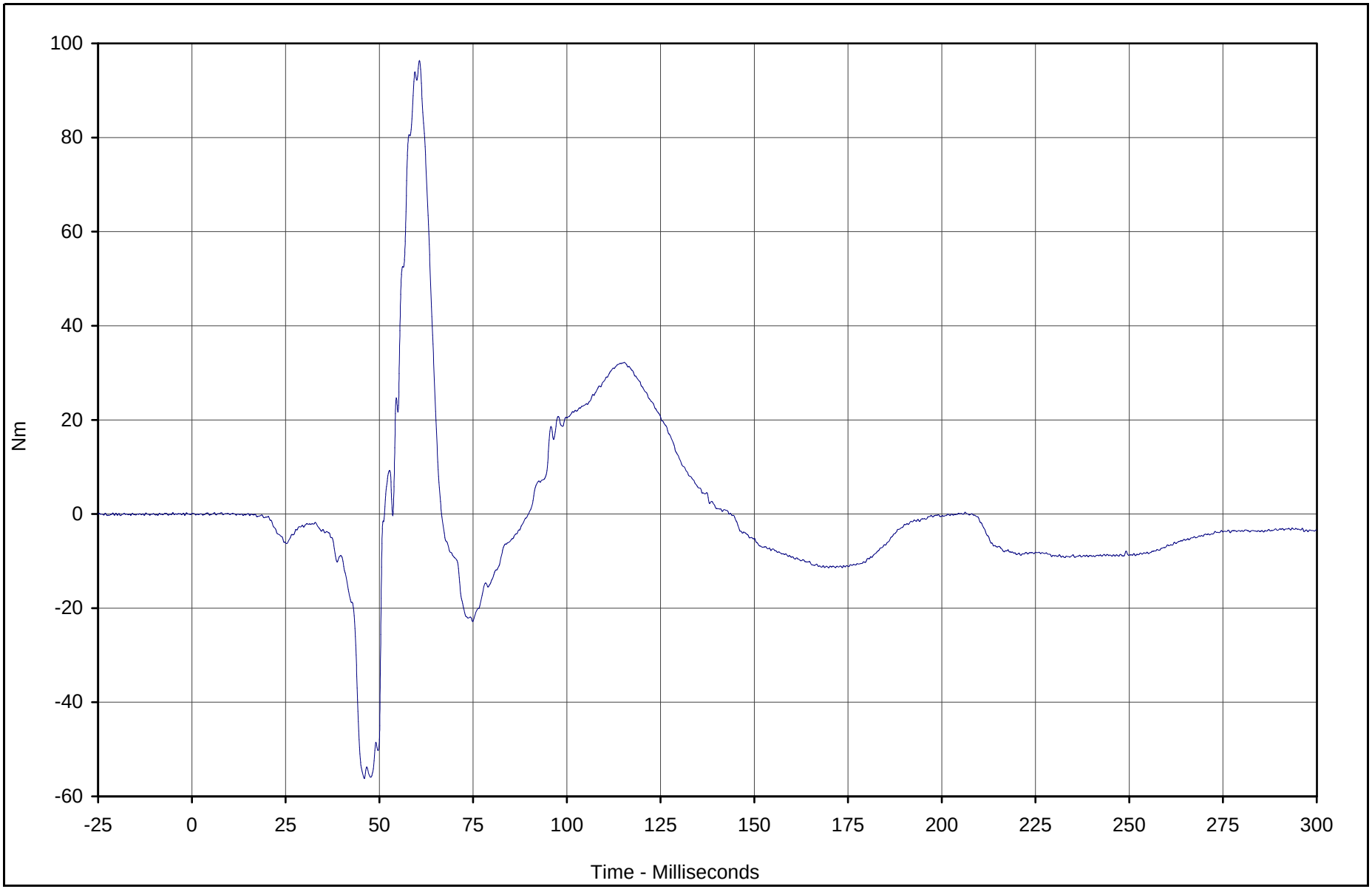

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Lower Tibia Moment X | 032 | FIL | Nm | 24.0 | 48.3 | -88.2 | 55.2 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



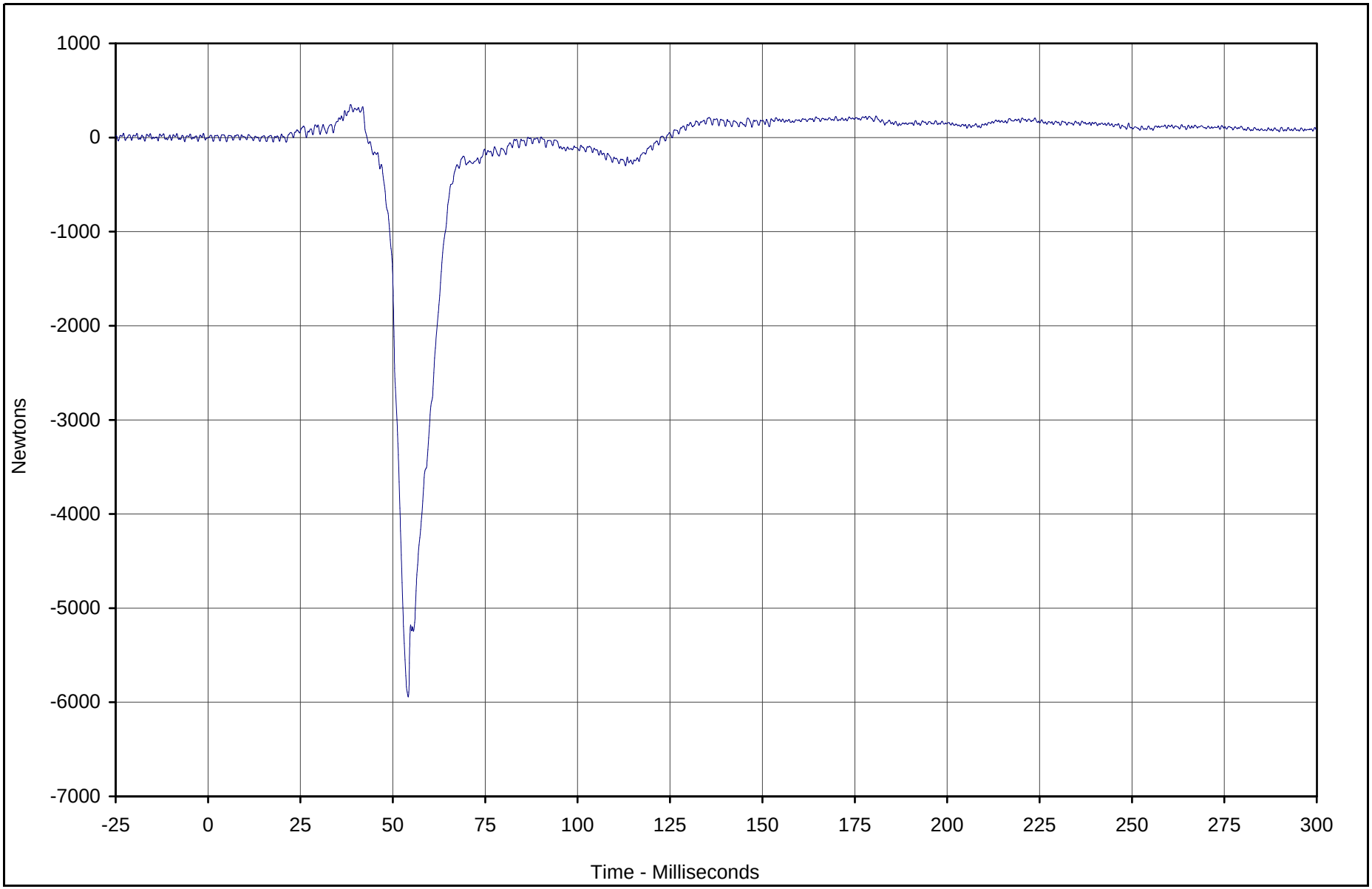

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Lower Tibia Moment Y | 033 | FIL | Nm | 96.4 | 60.7 | -56.2 | 46.0 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Lower Tibia Force Z | 034 | FIL | Newtons | 350.4 | 38.6 | -5942.1 | 54.2 | 600 |

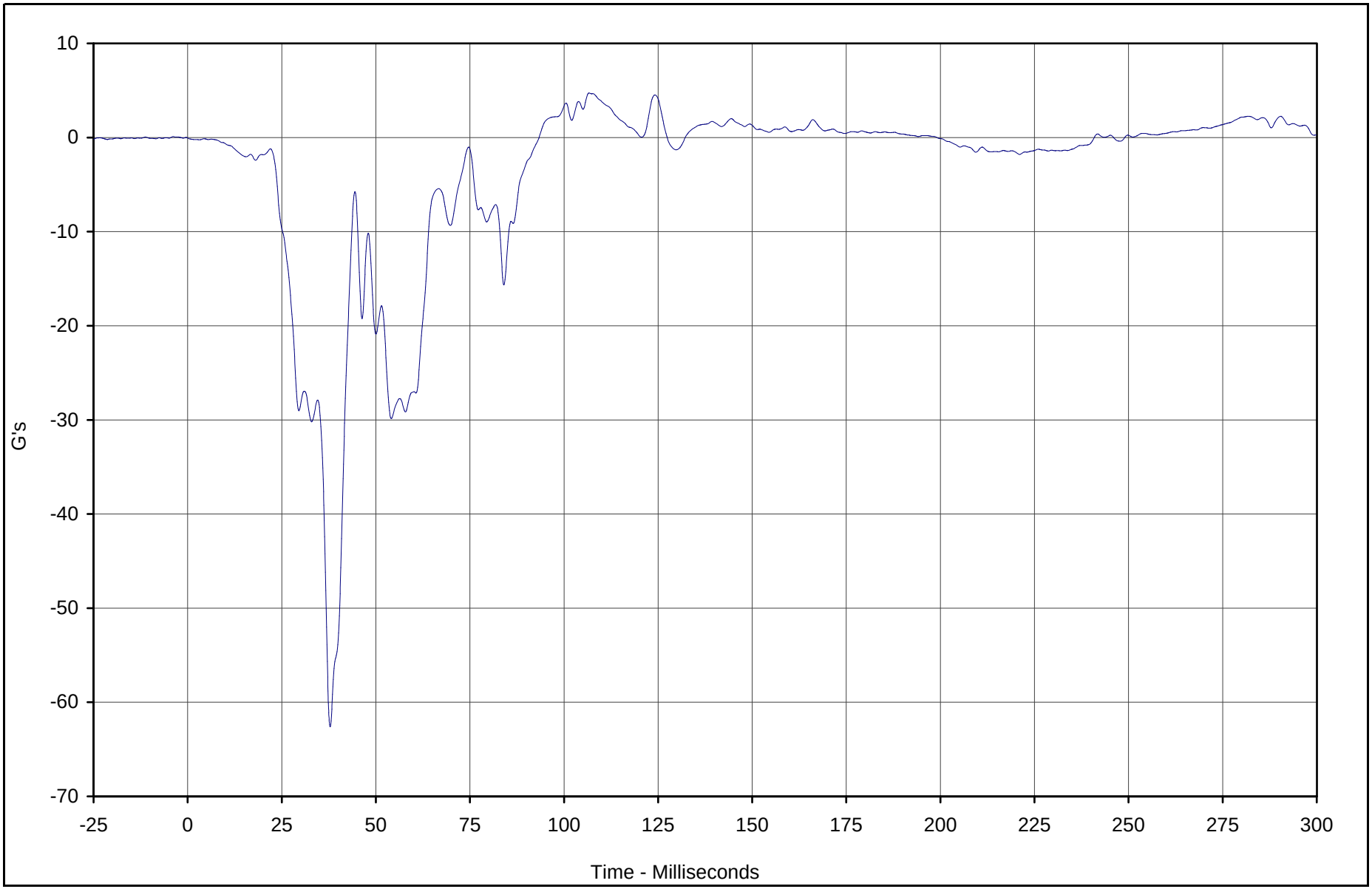
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Foot Aft X | 035 | FIL | G's | 4.7 | 106.6 | -62.6 | 37.9 | 180 |

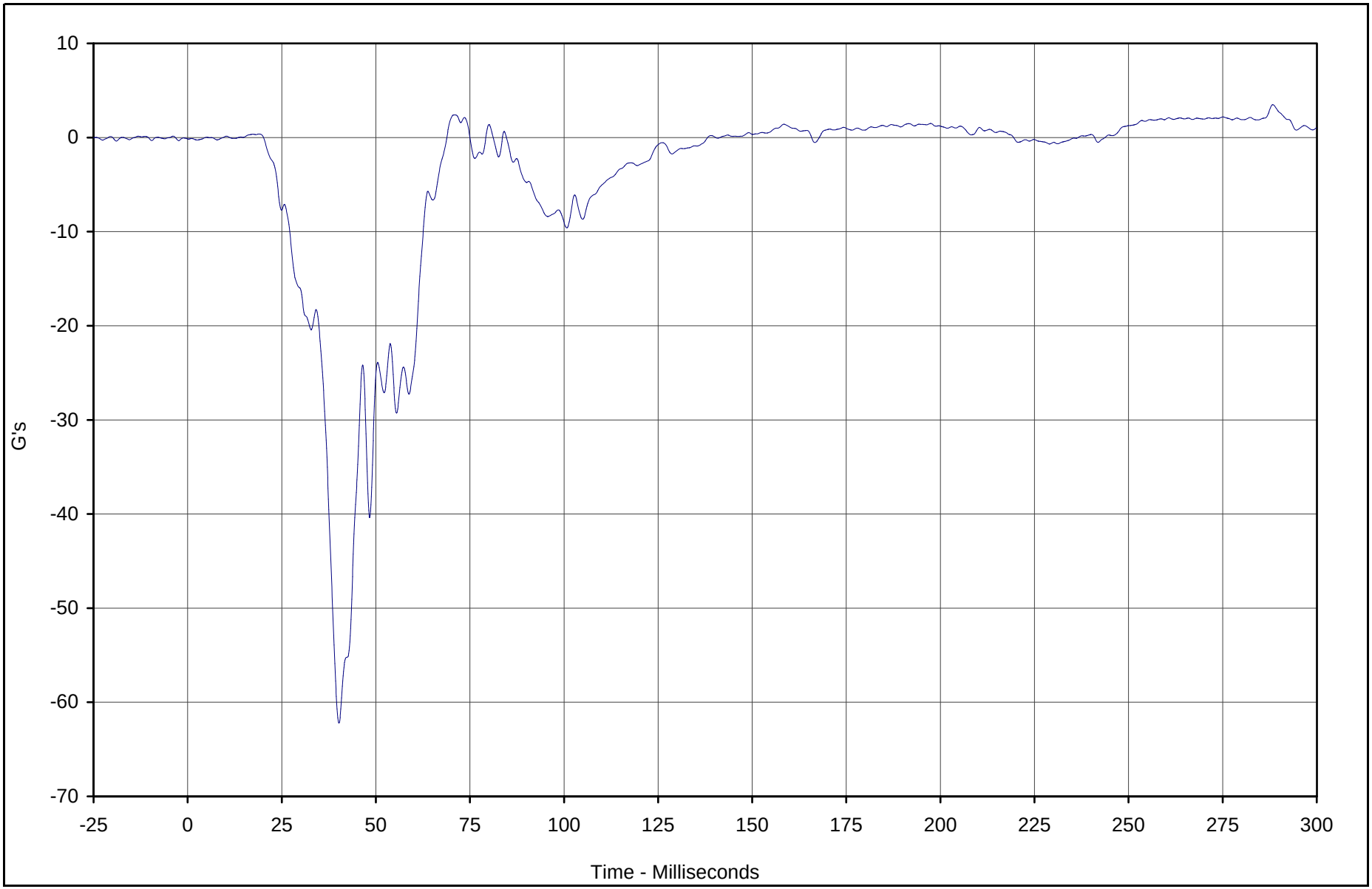
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Foot Aft Z | 036 | FIL | G's | 3.5 | 288.3 | -62.2 | 40.2 | 180 |

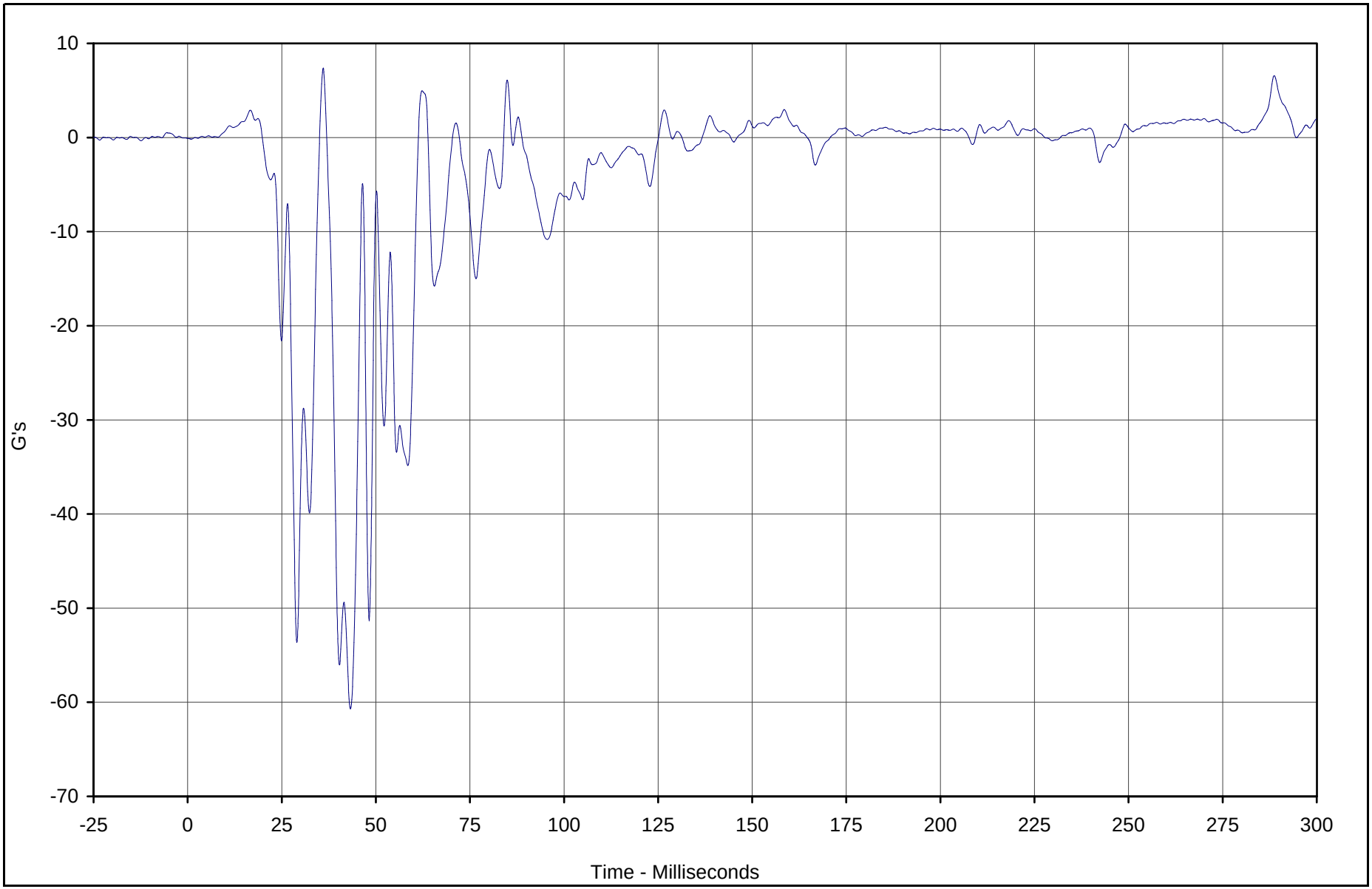
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Left Foot Fore Z | 037 | FIL | G's | 7.4 | 36.0 | -60.7 | 43.3 | 180 |

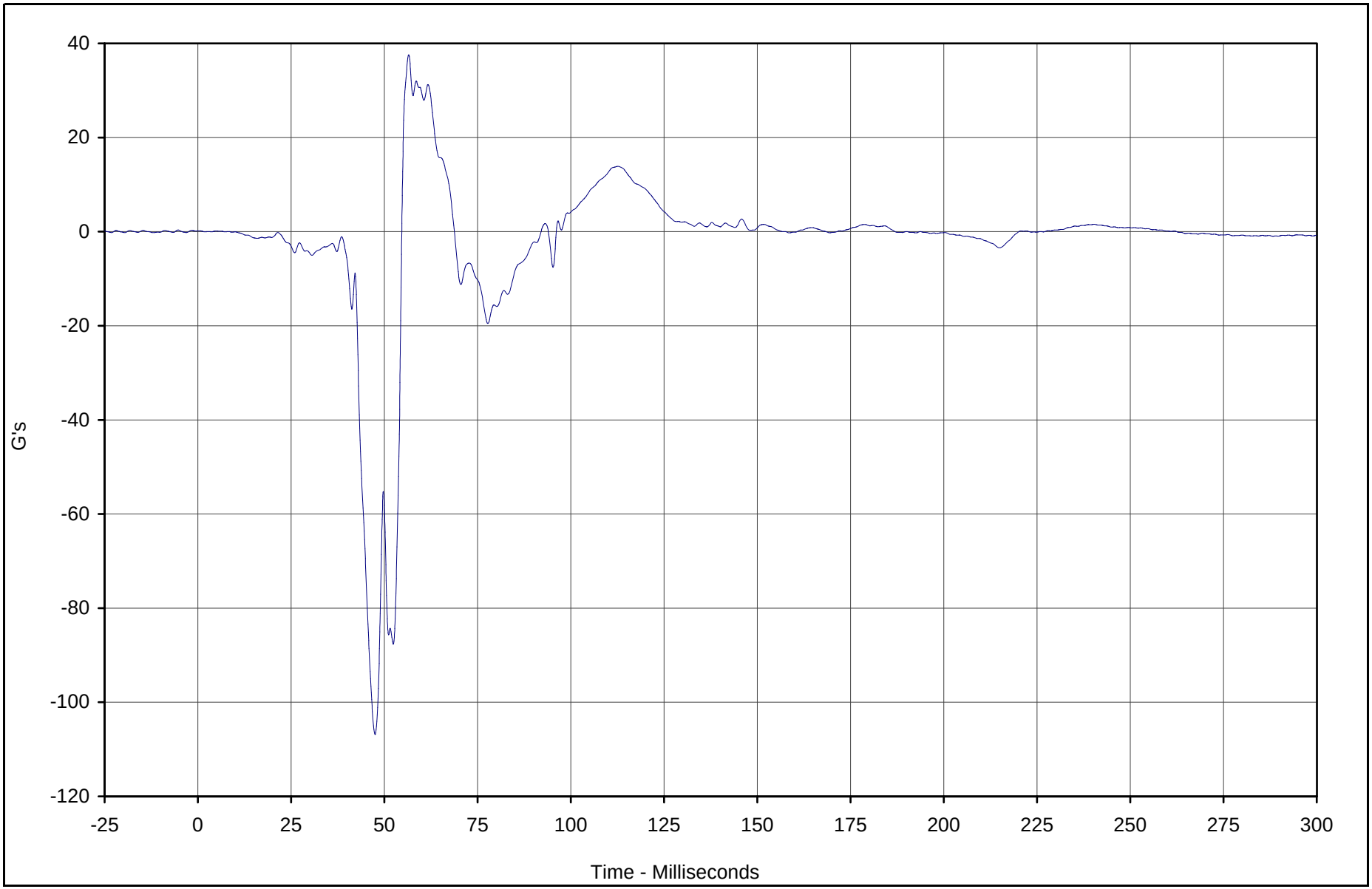
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Foot Aft X | 038 | FIL | G's | 37.6 | 56.5 | -106.8 | 47.5 | 180 |

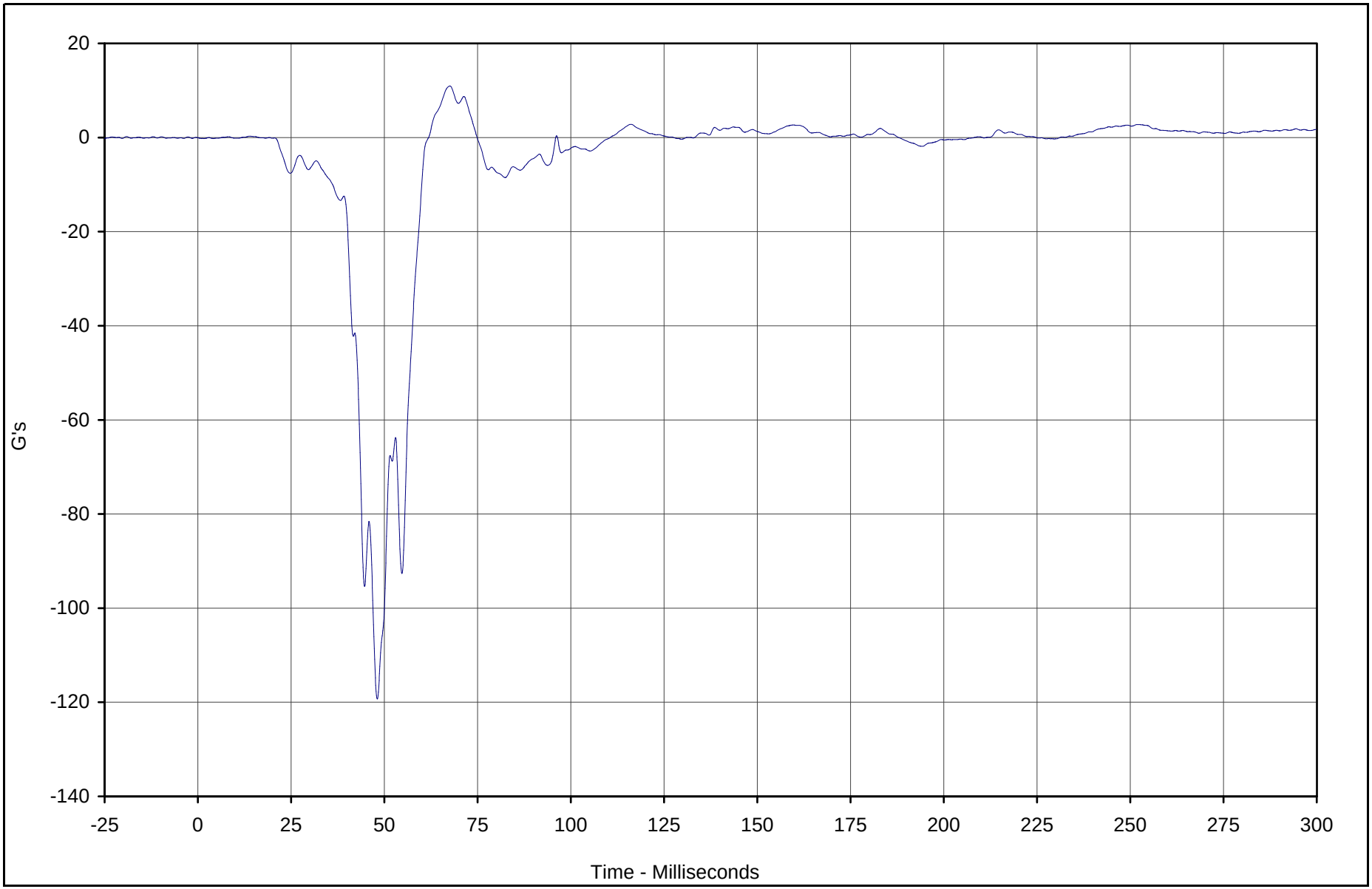
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



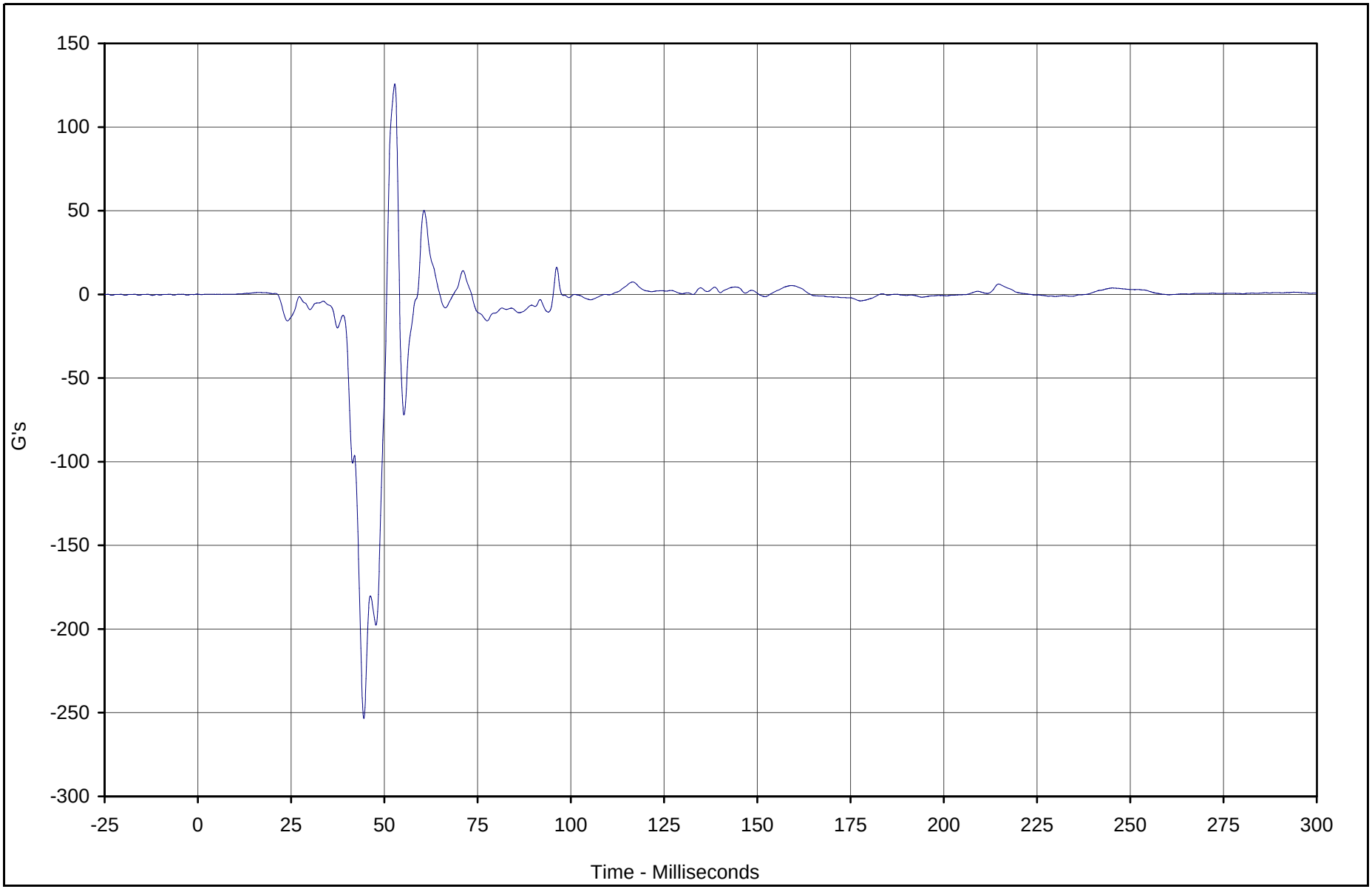

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Foot Aft Z | 039 | FIL | G's | 10.9 | 67.6 | -119.3 | 48.1 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Right Foot Fore Z | 040 | FIL | G's | 125.8 | 52.8 | -253.5 | 44.5 | 180 |

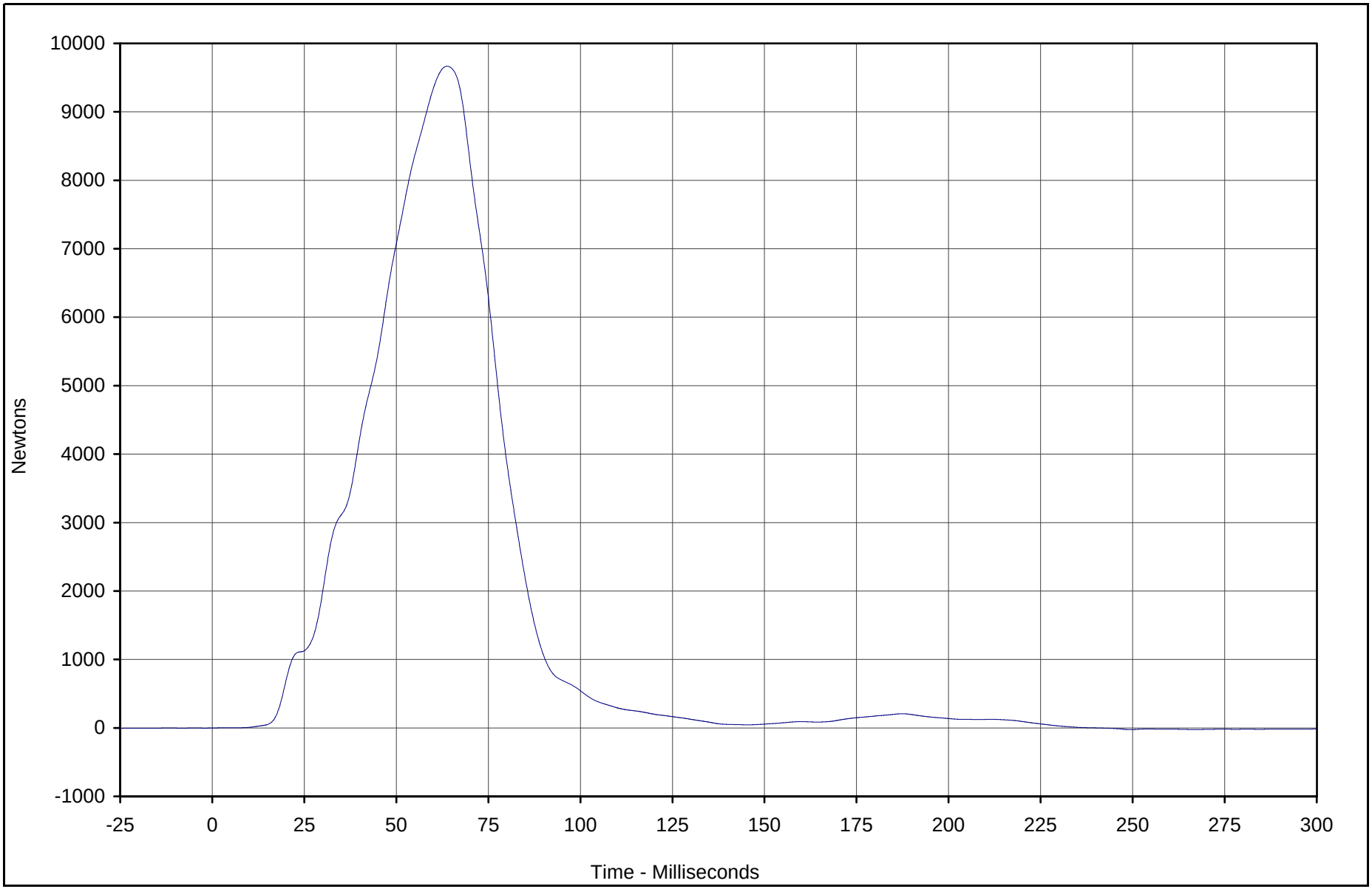
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Lap Belt Force | 041 | FIL | Newtons | 9666.6 | 63.8 | -25.3 | 249.4 | 60 |

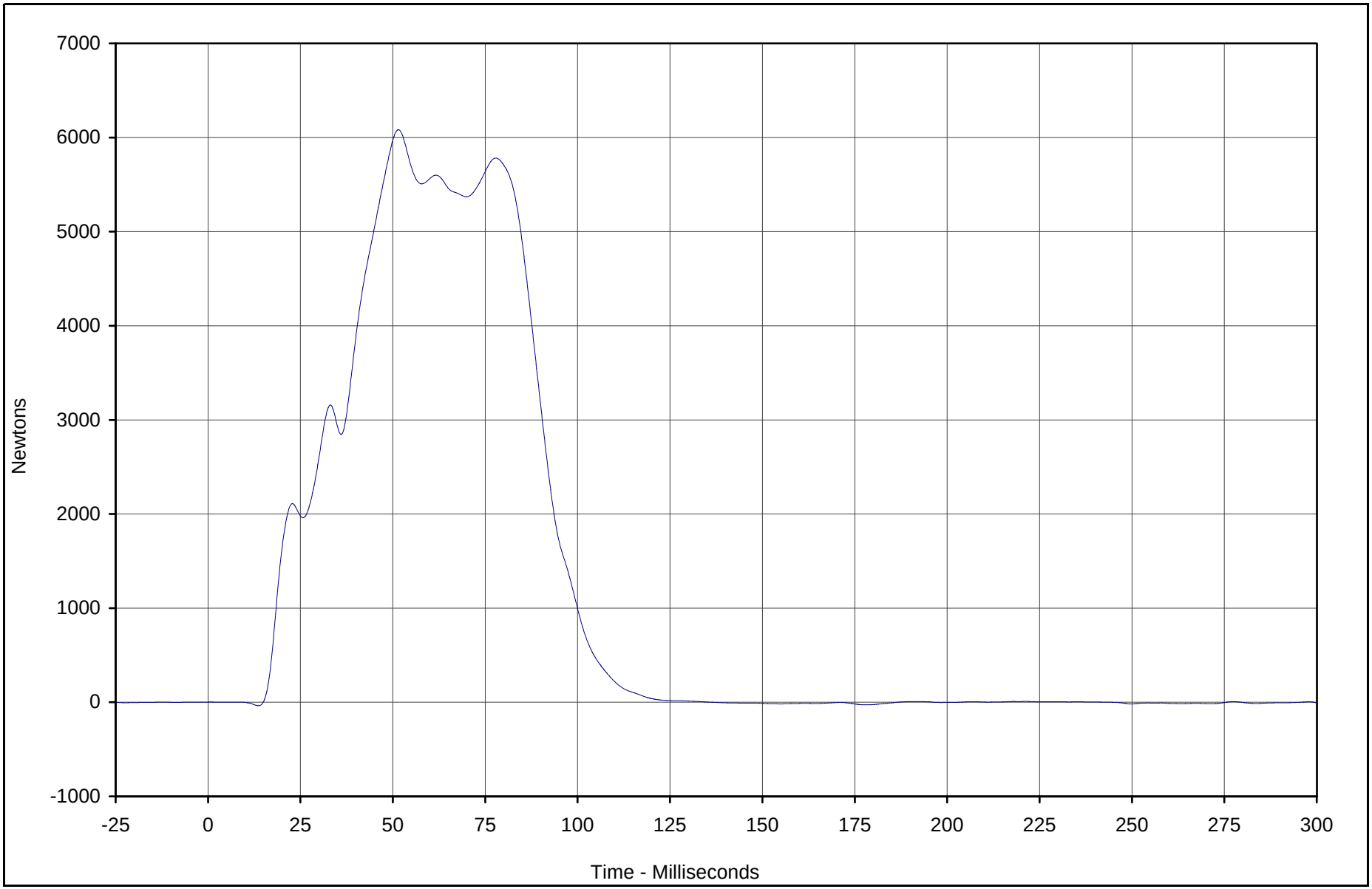
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Shoulder Belt Force | 042 | FIL | Newtons | 6082.5 | 51.5 | -36.2 | 13.6 | 60 |

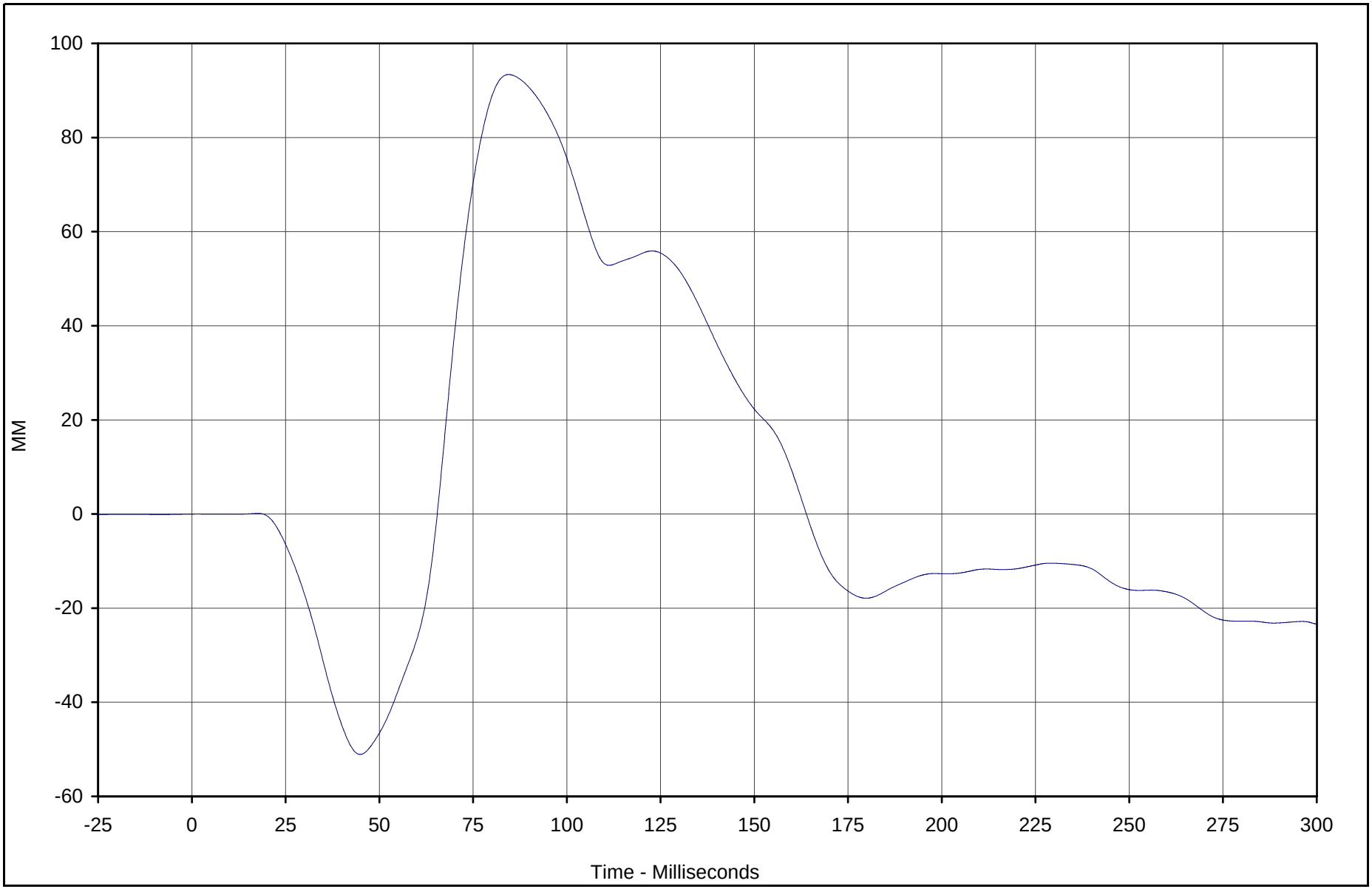
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



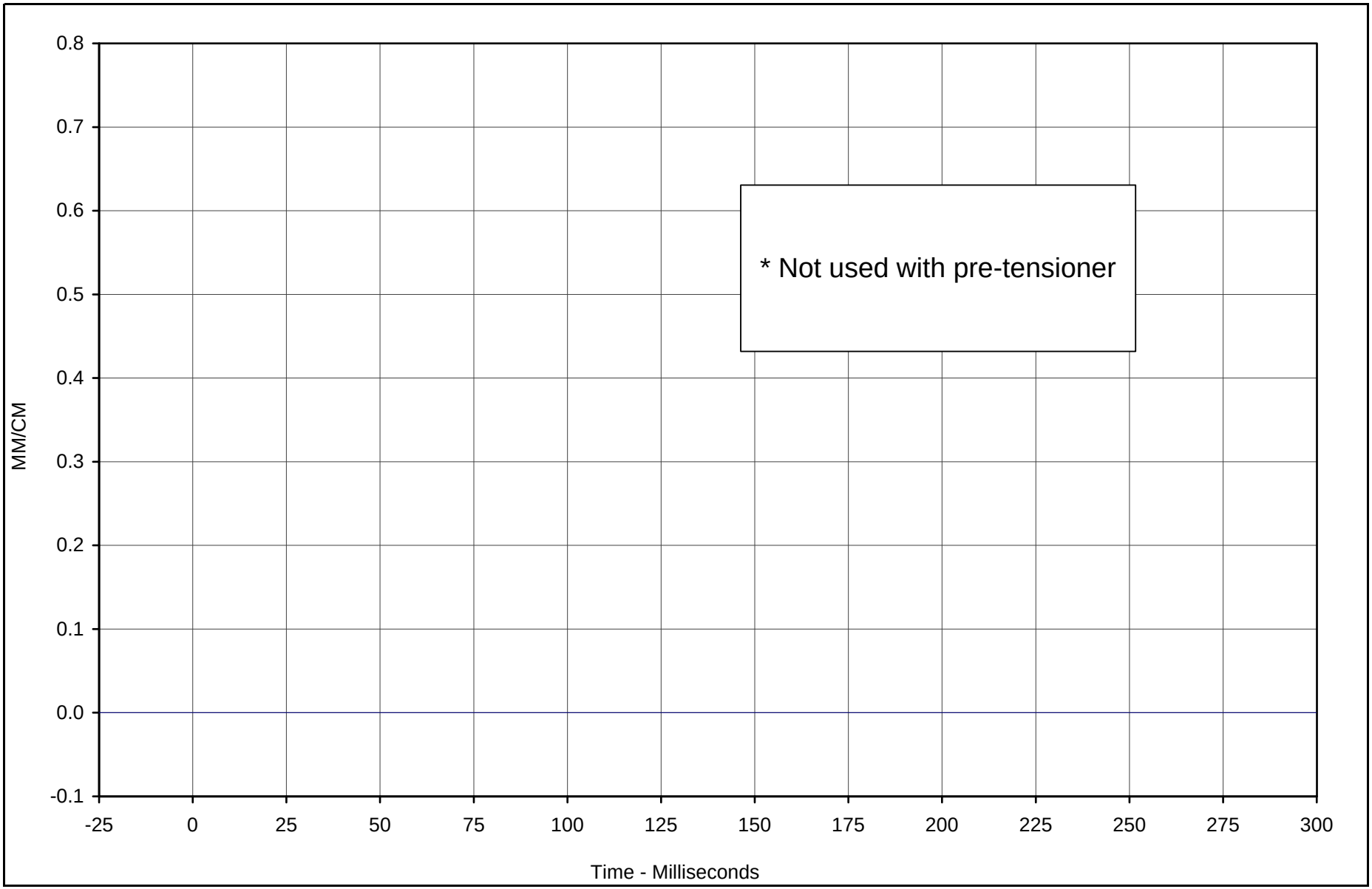

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Shoulder Belt Pullout | 043 | FIL | MM | 93.4 | 84.5 | -51.1 | 44.9 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




* Not used with pre-tensioner

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Driver Shoulder Belt Elongation | 044 | FIL | MM/CM | 0.00 | 0.0 | 0.00 | 0.0 | 60 |

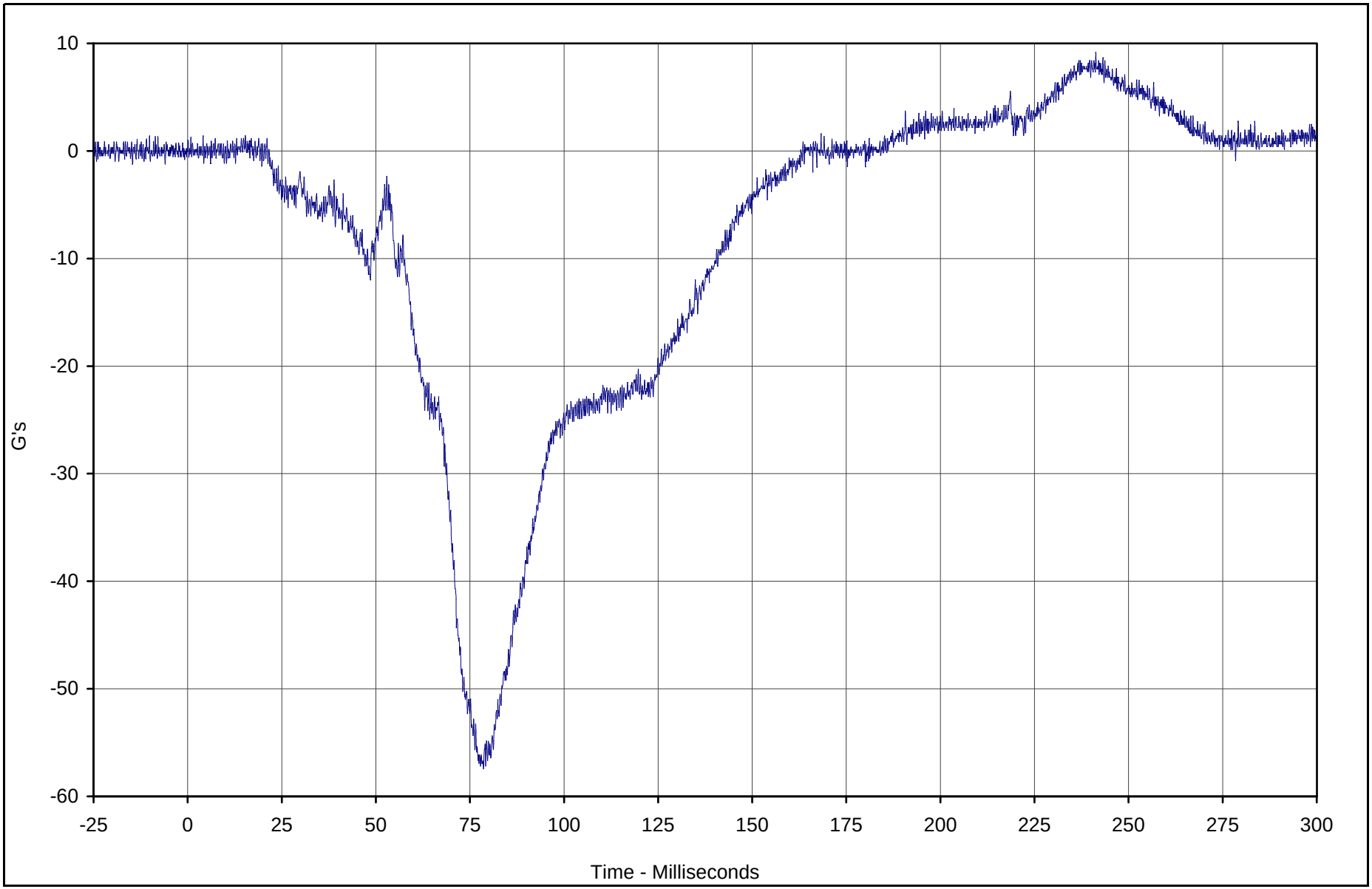
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Primary X | 045 | FIL | G's | 9.2 | 241.3 | -57.4 | 78.6 | 1000 |

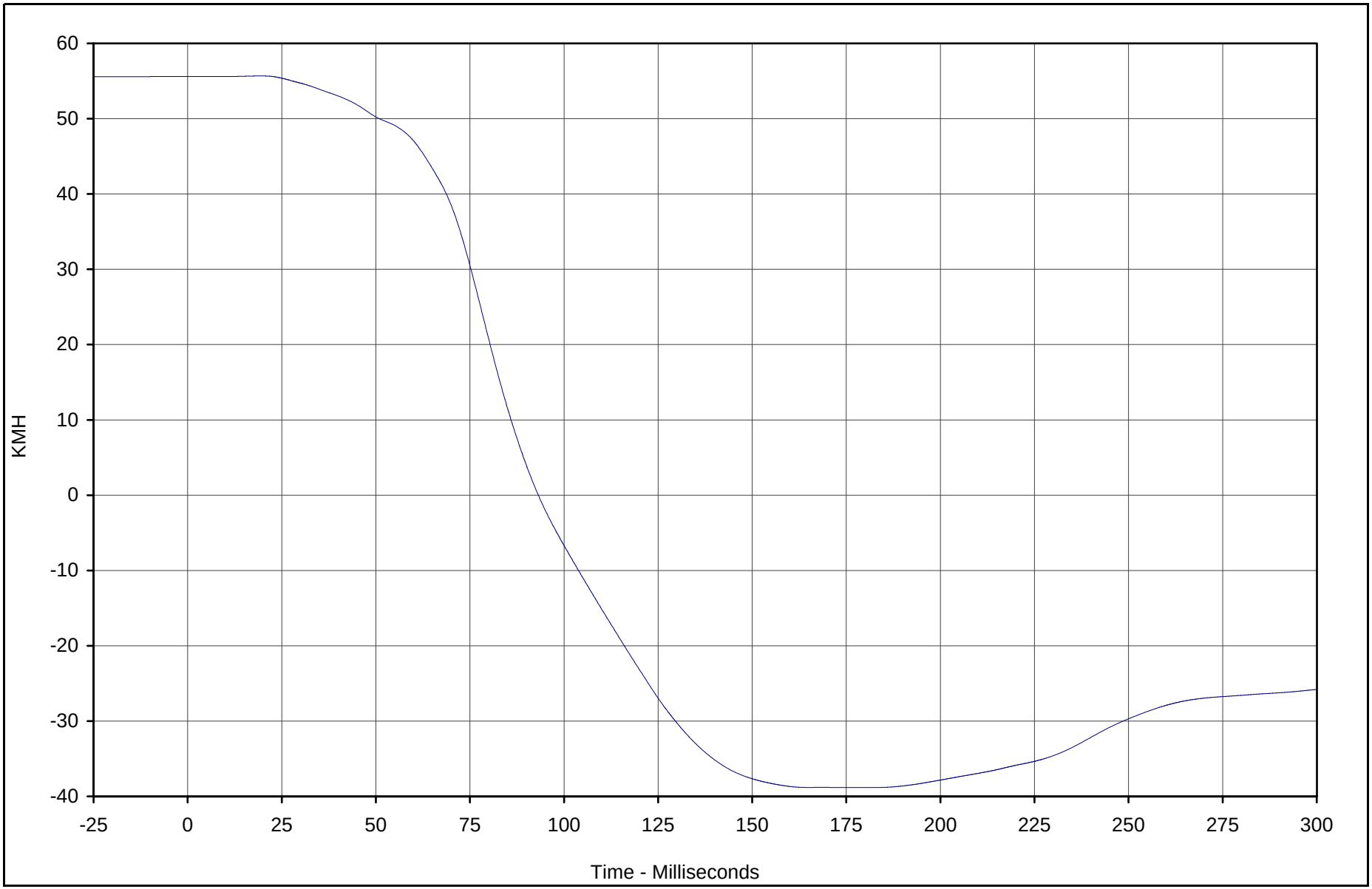
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



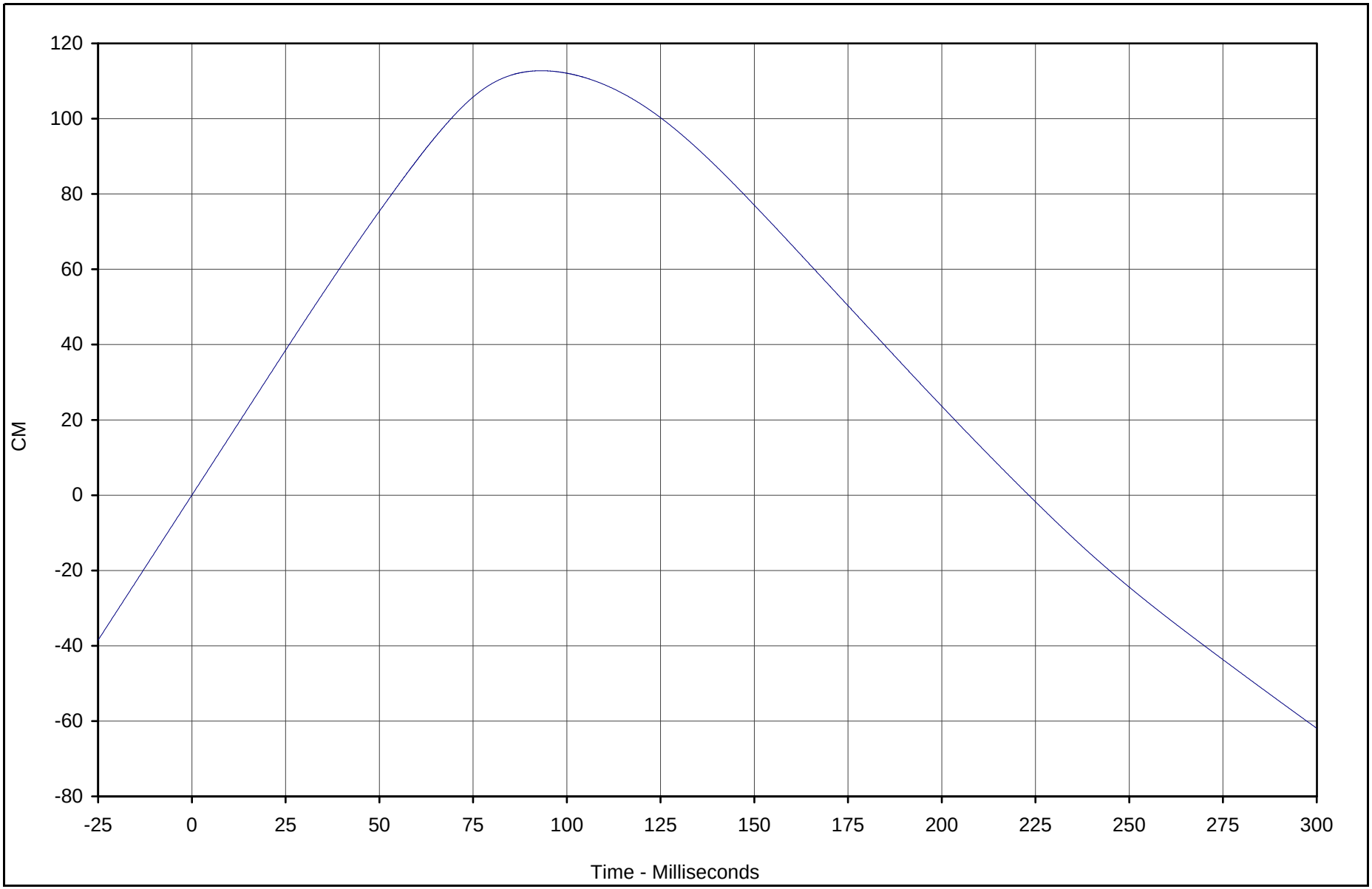

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Primary X Velocity | 045 | IN1 | KMH | 55.7 | 19.4 | -38.8 | 181.4 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Primary X Displ. | 045 | IN2 | CM | 112.7 | 93.2 | -61.8 | 299.9 | 60 |

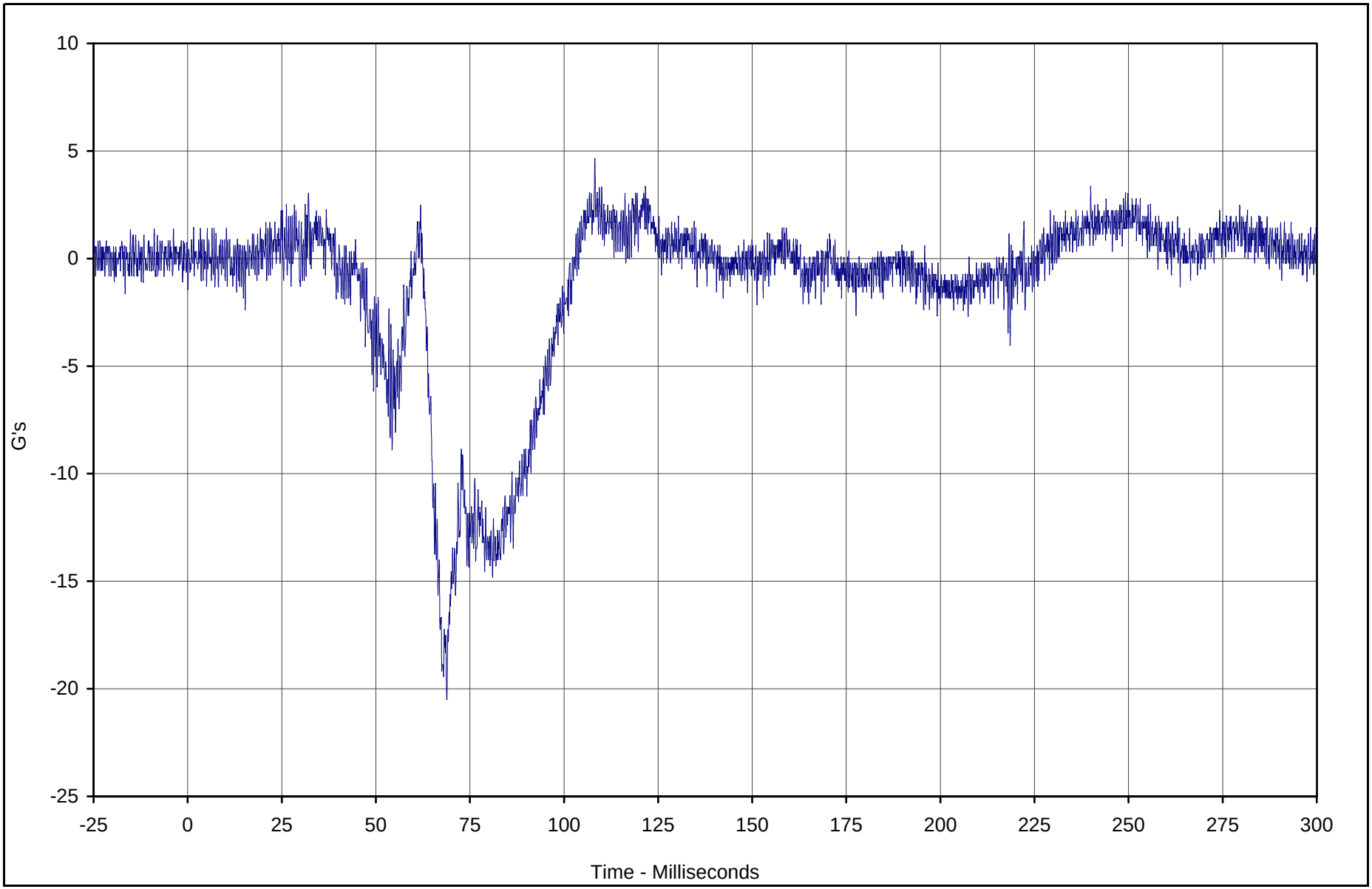
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Primary Y | 046 | FIL | G's | 4.7 | 108.2 | -20.5 | 68.8 | 1000 |

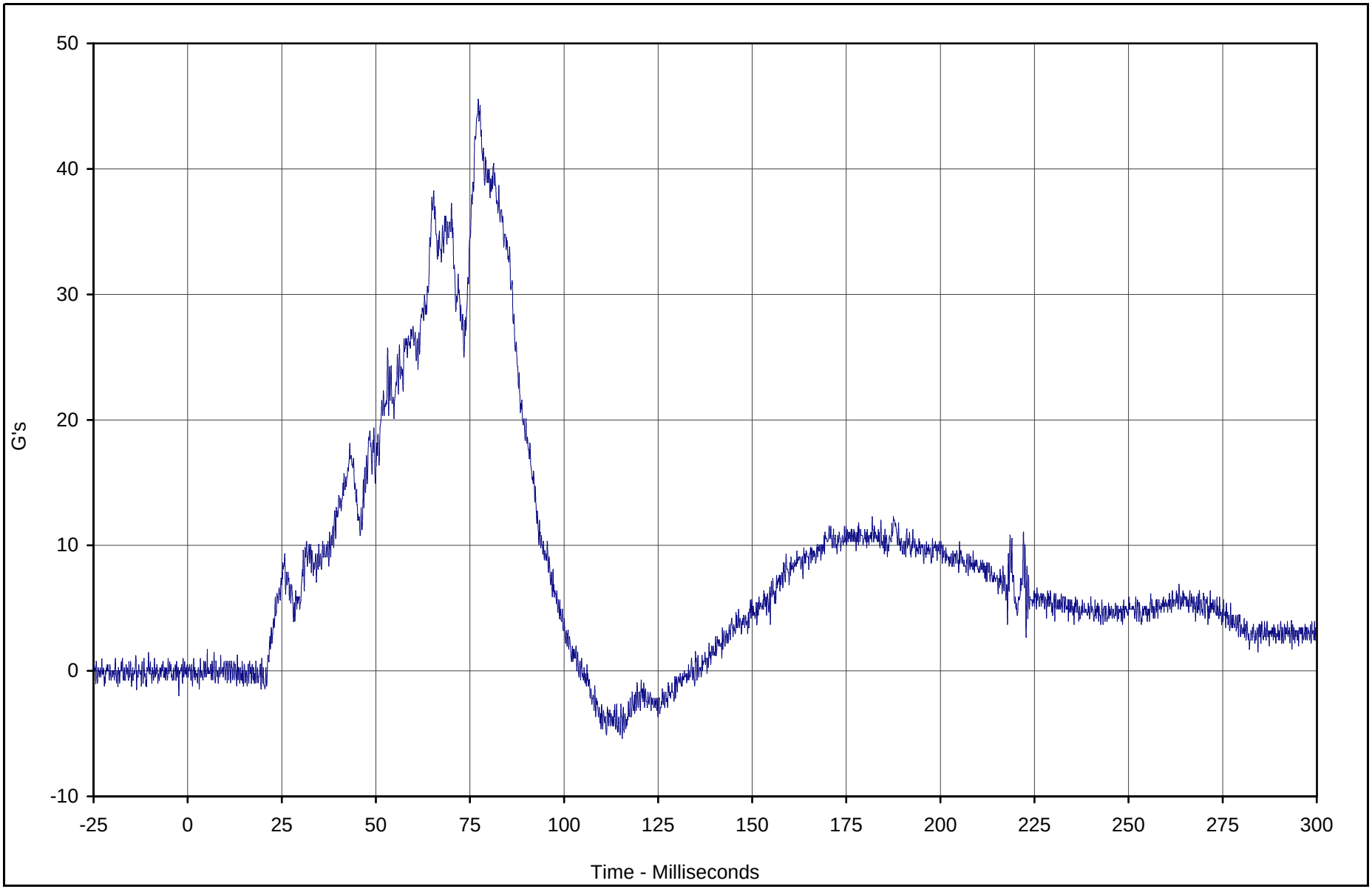
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Primary Z | 047 | FIL | G's | 45.5 | 77.2 | -5.4 | 115.5 | 1000 |

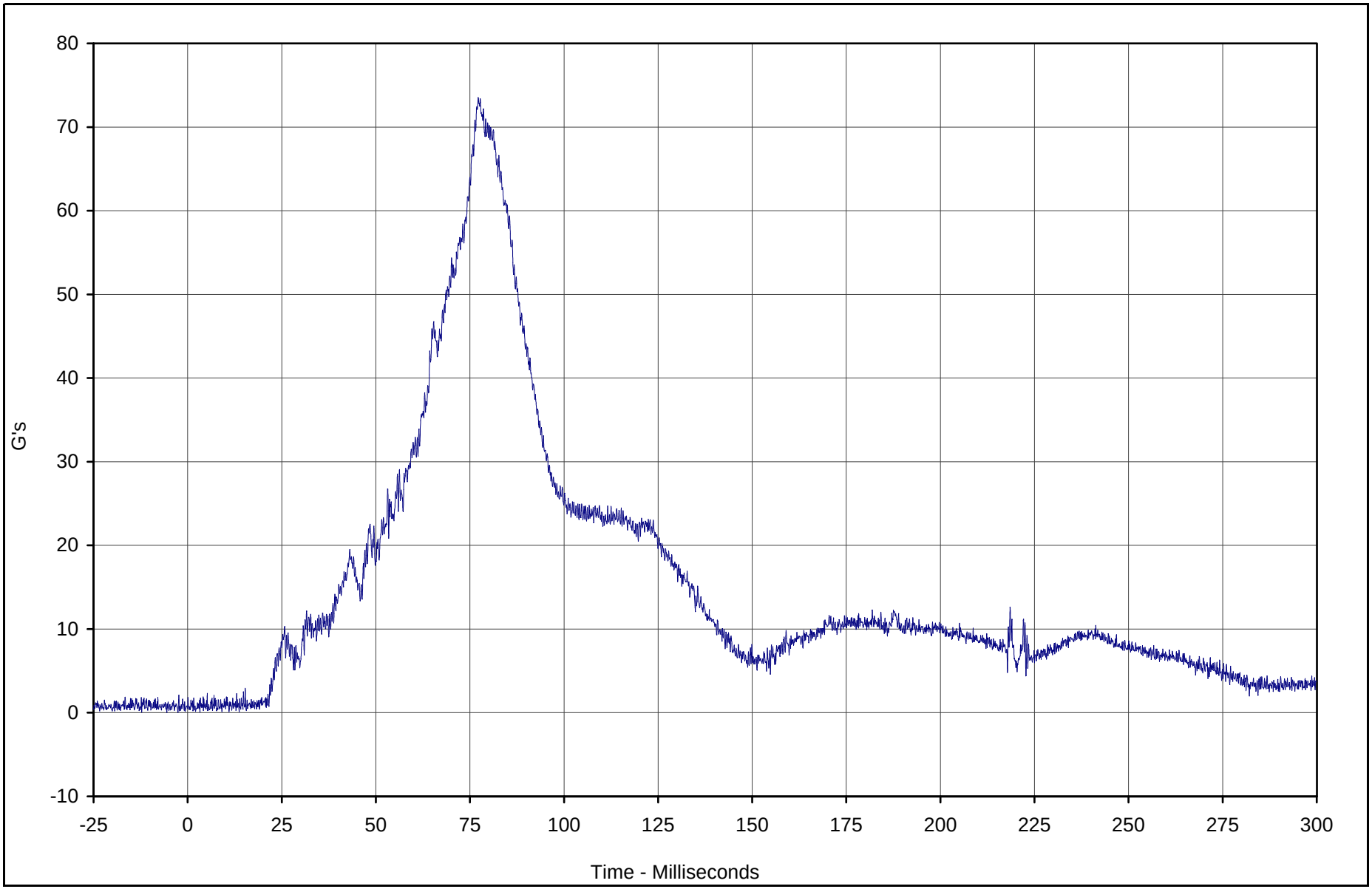
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



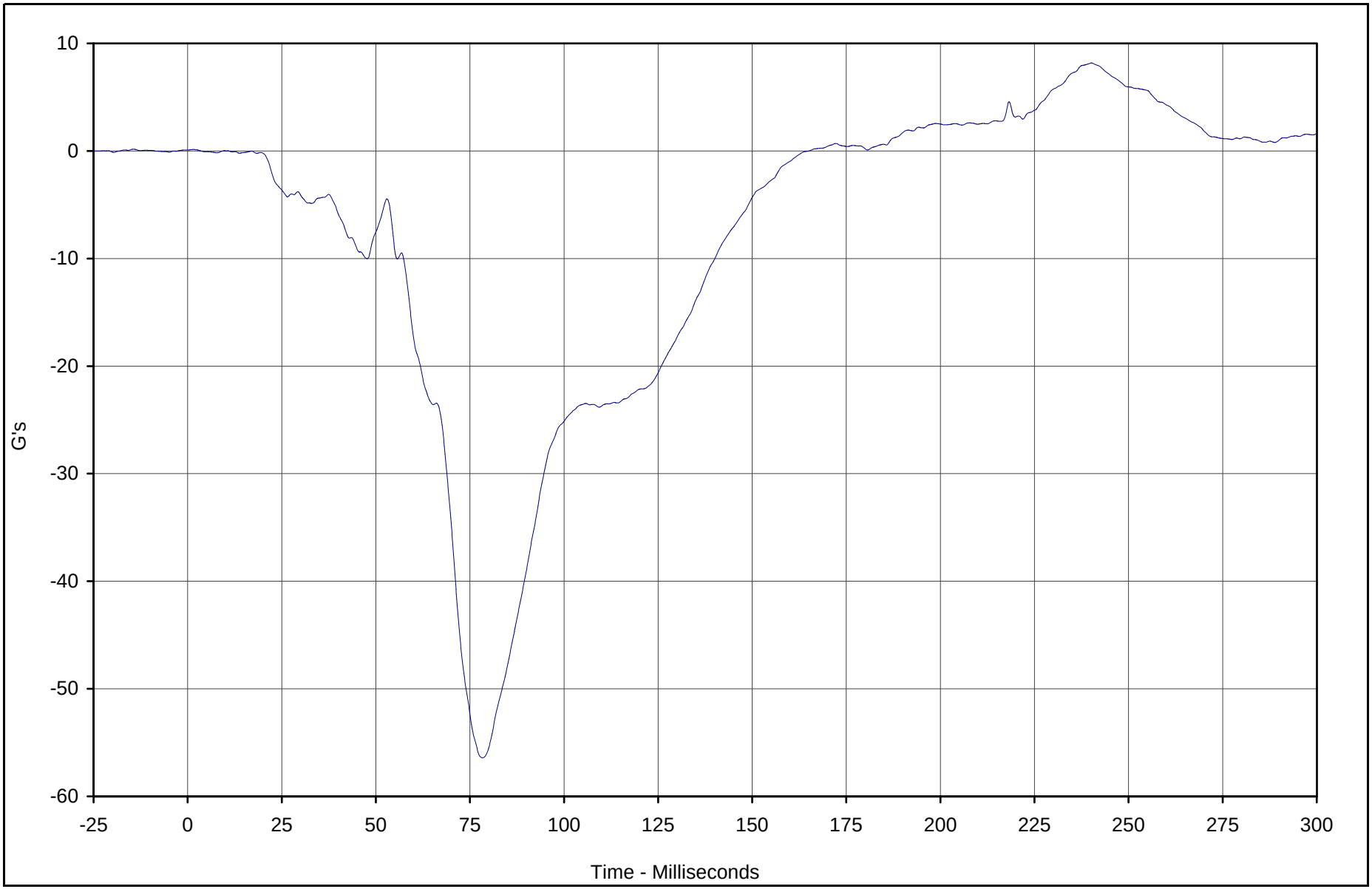

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Resultant Primary | 045 | RES | G's | 73.5 | 77.2 | 0.1 | 3.3 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Redundant X | 048 | FIL | G's | 8.2 | 240.1 | -56.4 | 78.3 | 1000 |

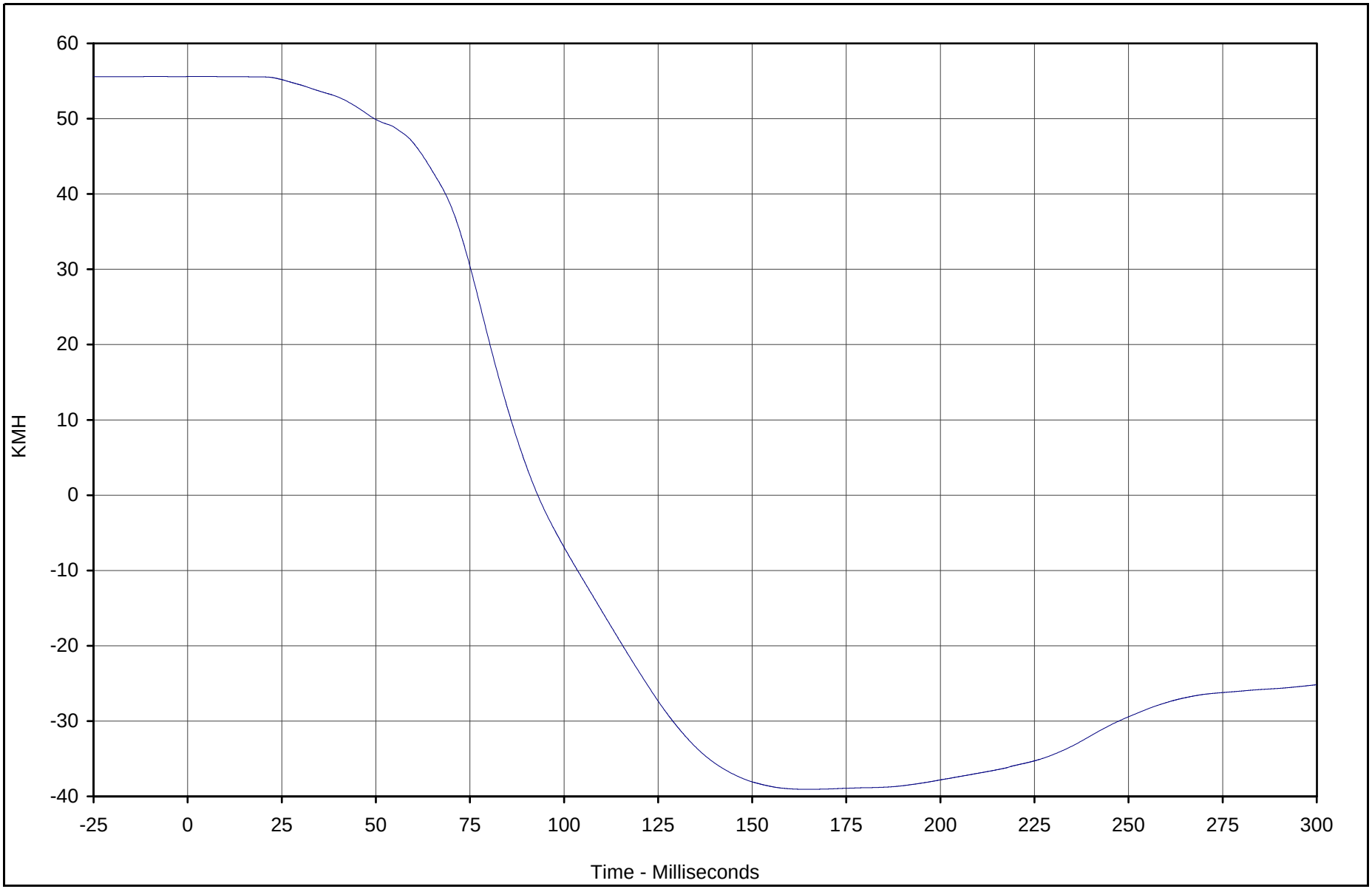
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Redundant X Velocity | 048 | IN1 | KMH | 55.6 | 3.5 | -39.1 | 165.1 | 180 |

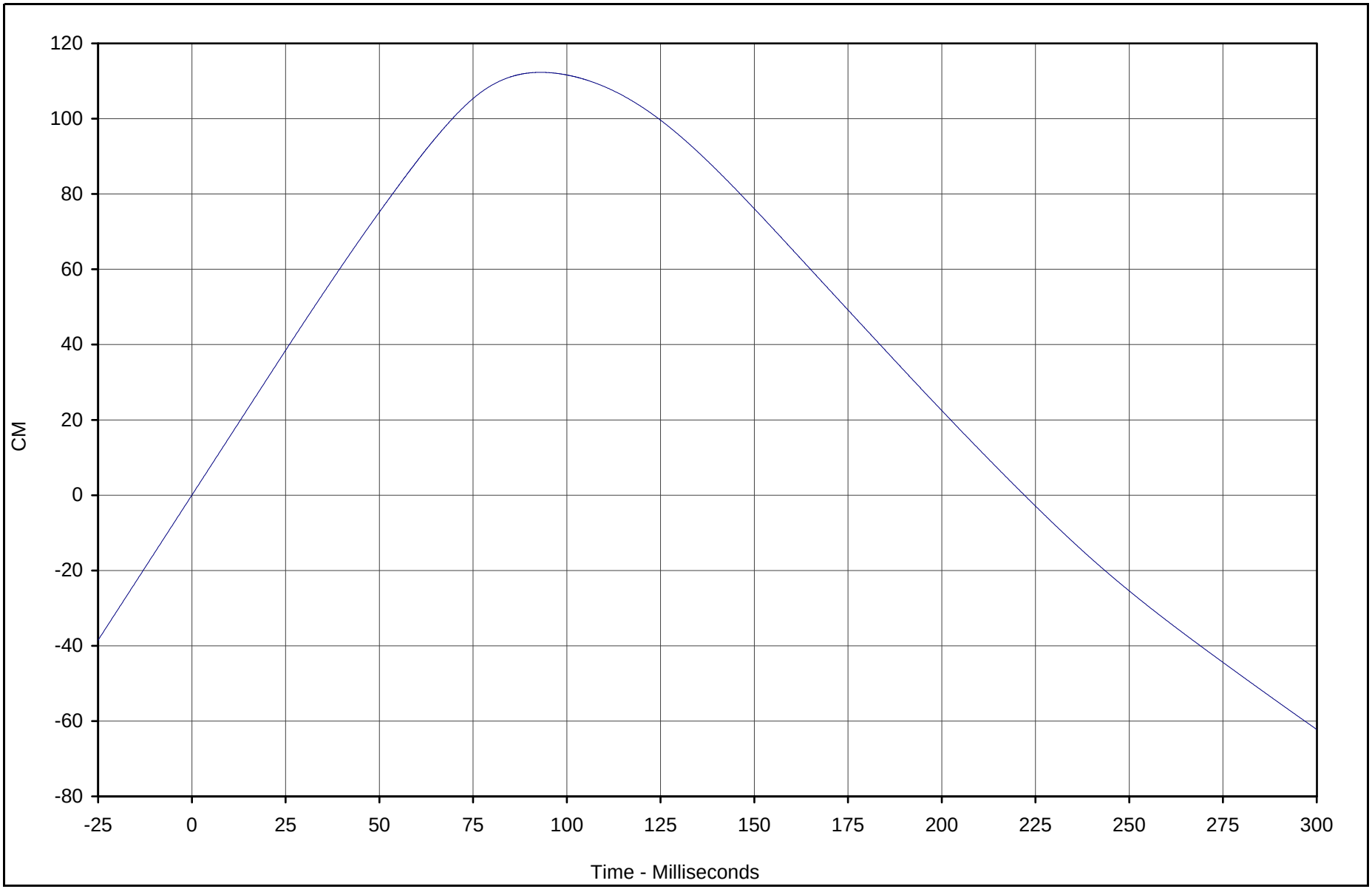
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Redundant X Displ. | 048 | IN2 | CM | 112.3 | 93.0 | -62.2 | 299.9 | 180 |

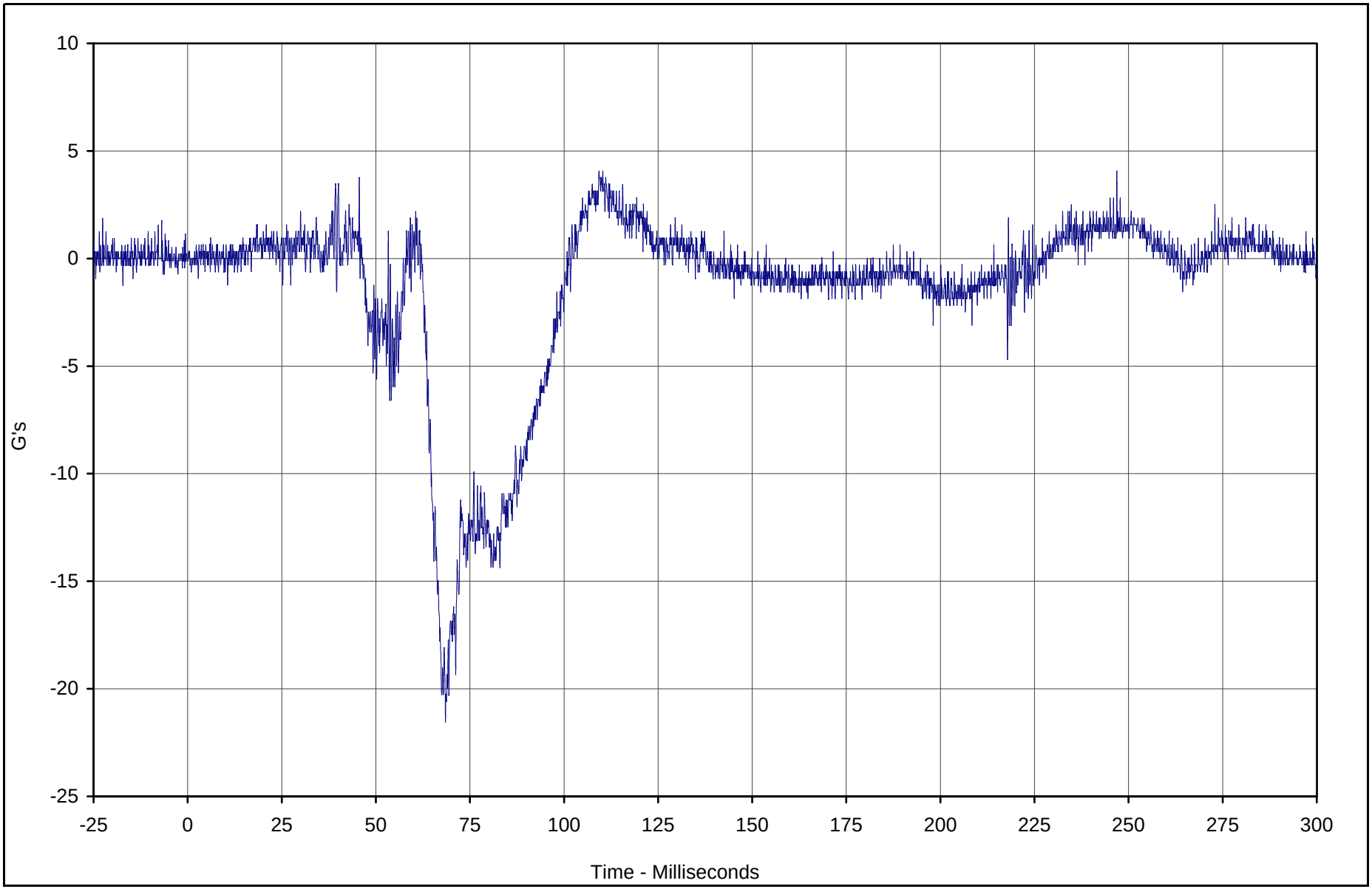
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Redundant Y | 049 | FIL | G's | 4.1 | 109.3 | -21.5 | 68.5 | 1000 |

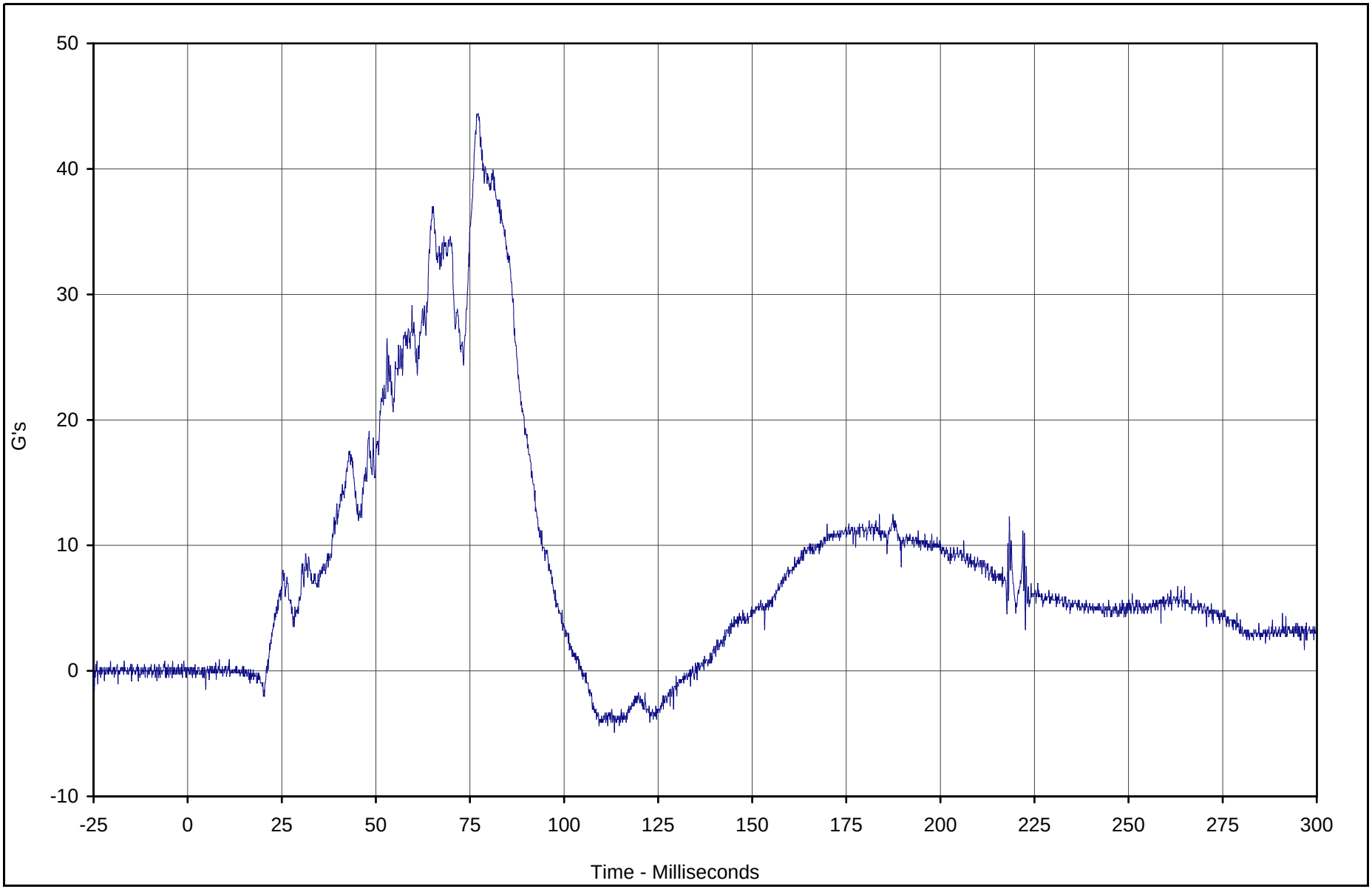
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Redundant Z | 050 | FIL | G's | 44.4 | 76.8 | -4.9 | 113.4 | 1000 |

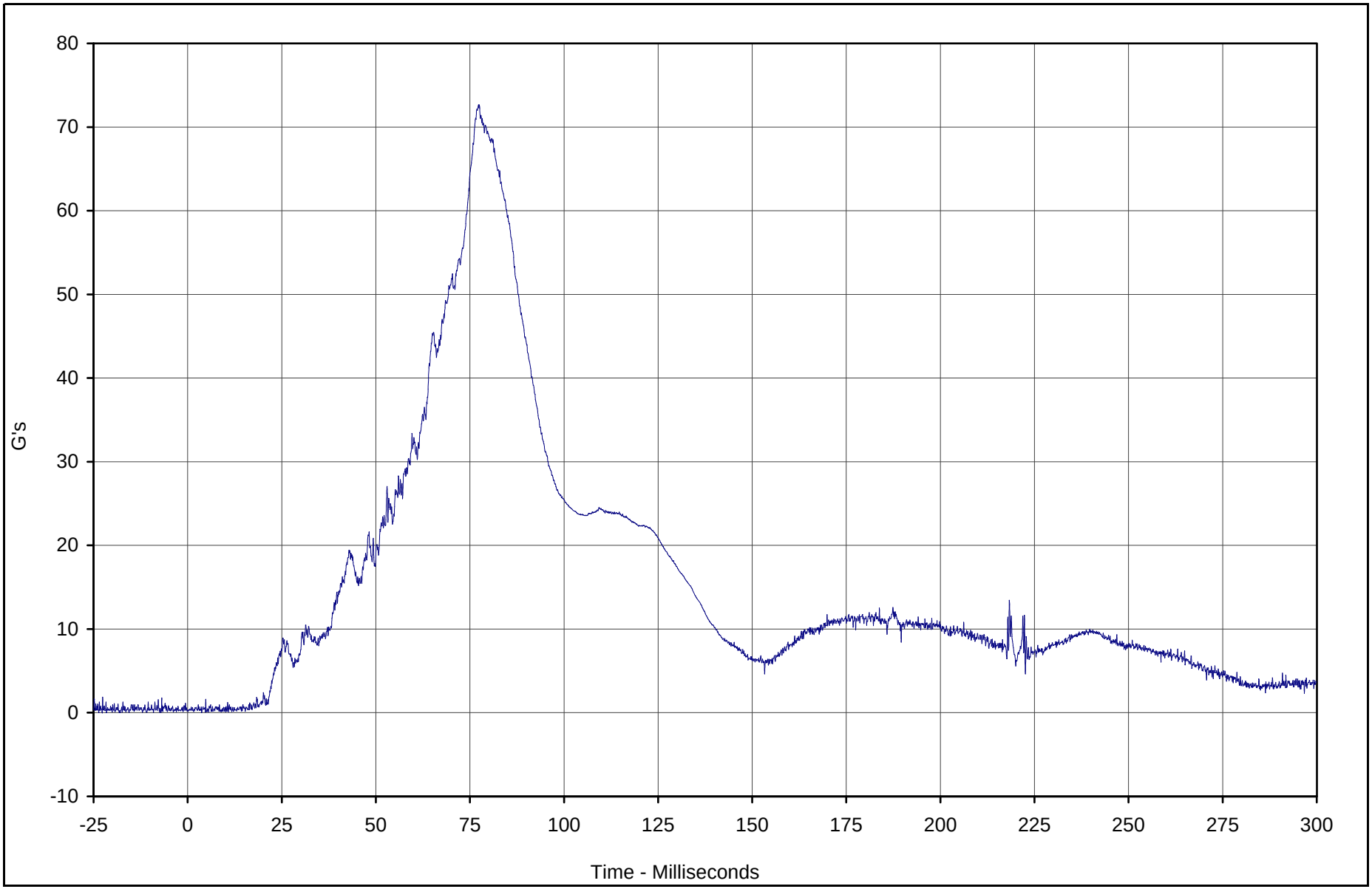
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Head Resultant Redundant | 048 | RES | G's | 72.7 | 77.3 | 0.0 | 3.7 | 180 |

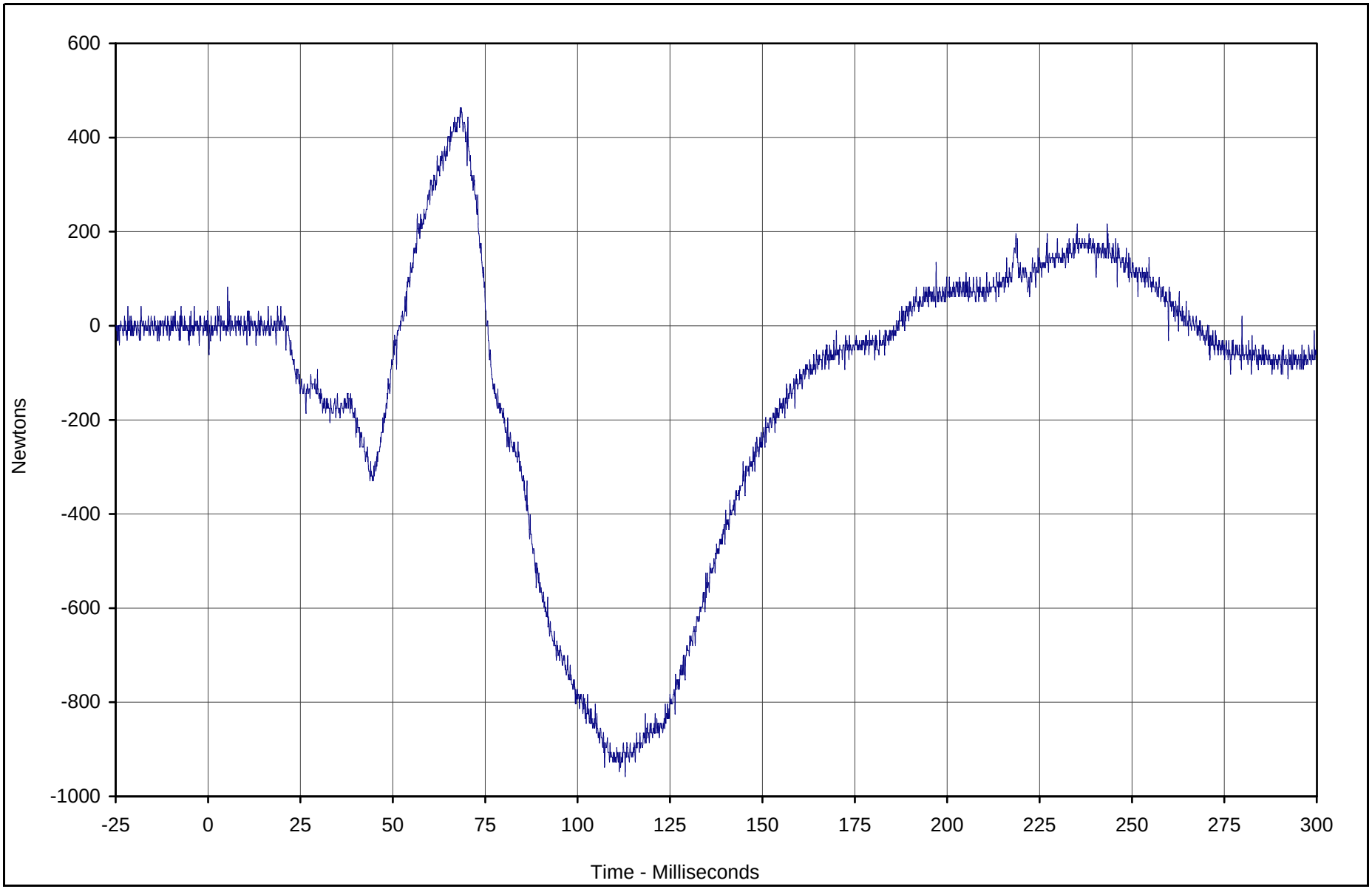
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



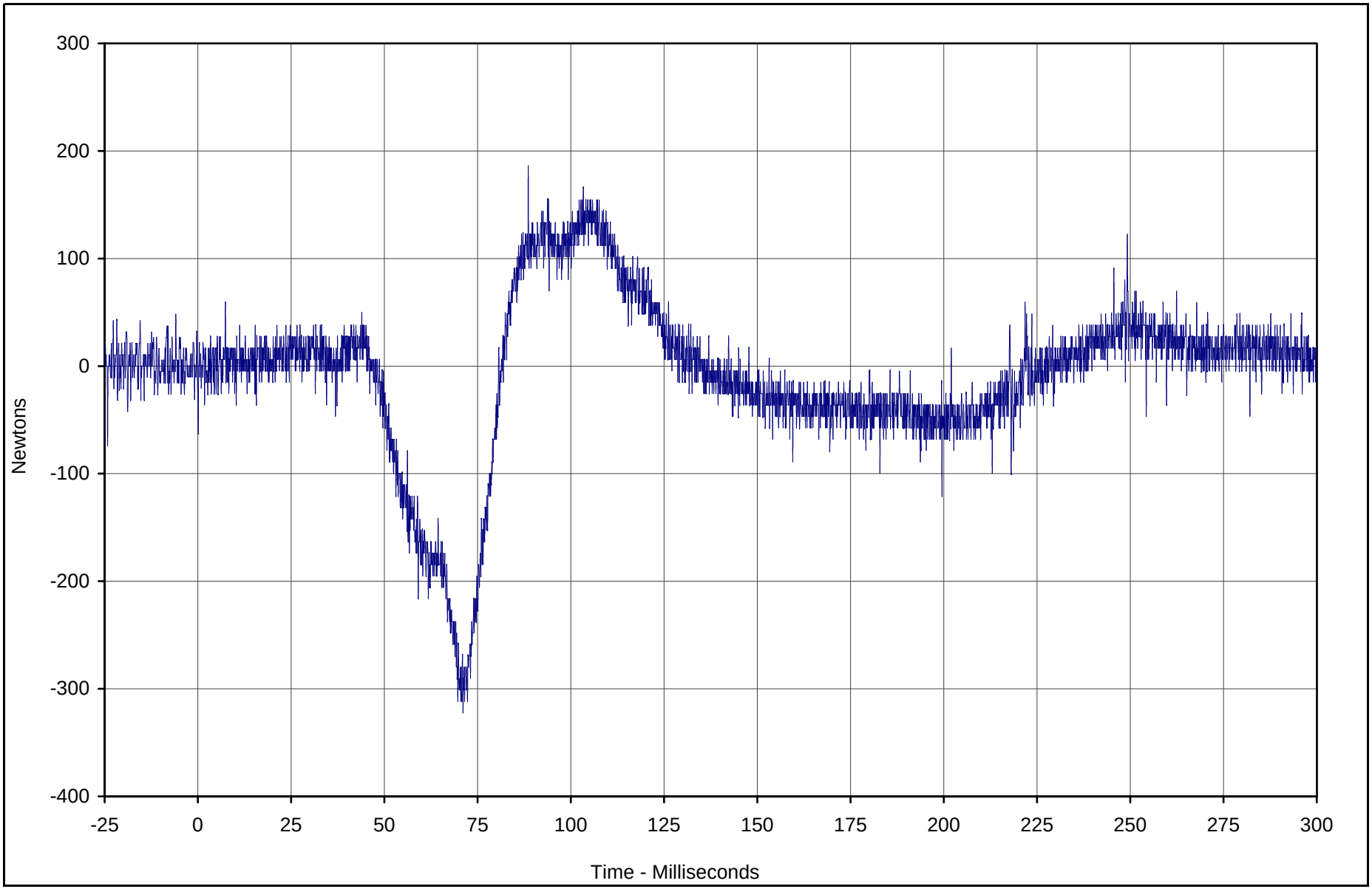

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Force X | 051 | FIL | Newtons | 463.5 | 68.3 | -958.0 | 112.9 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Force Y | 052 | FIL | Newtons | 186.3 | 88.6 | -322.3 | 71.1 | 1000 |

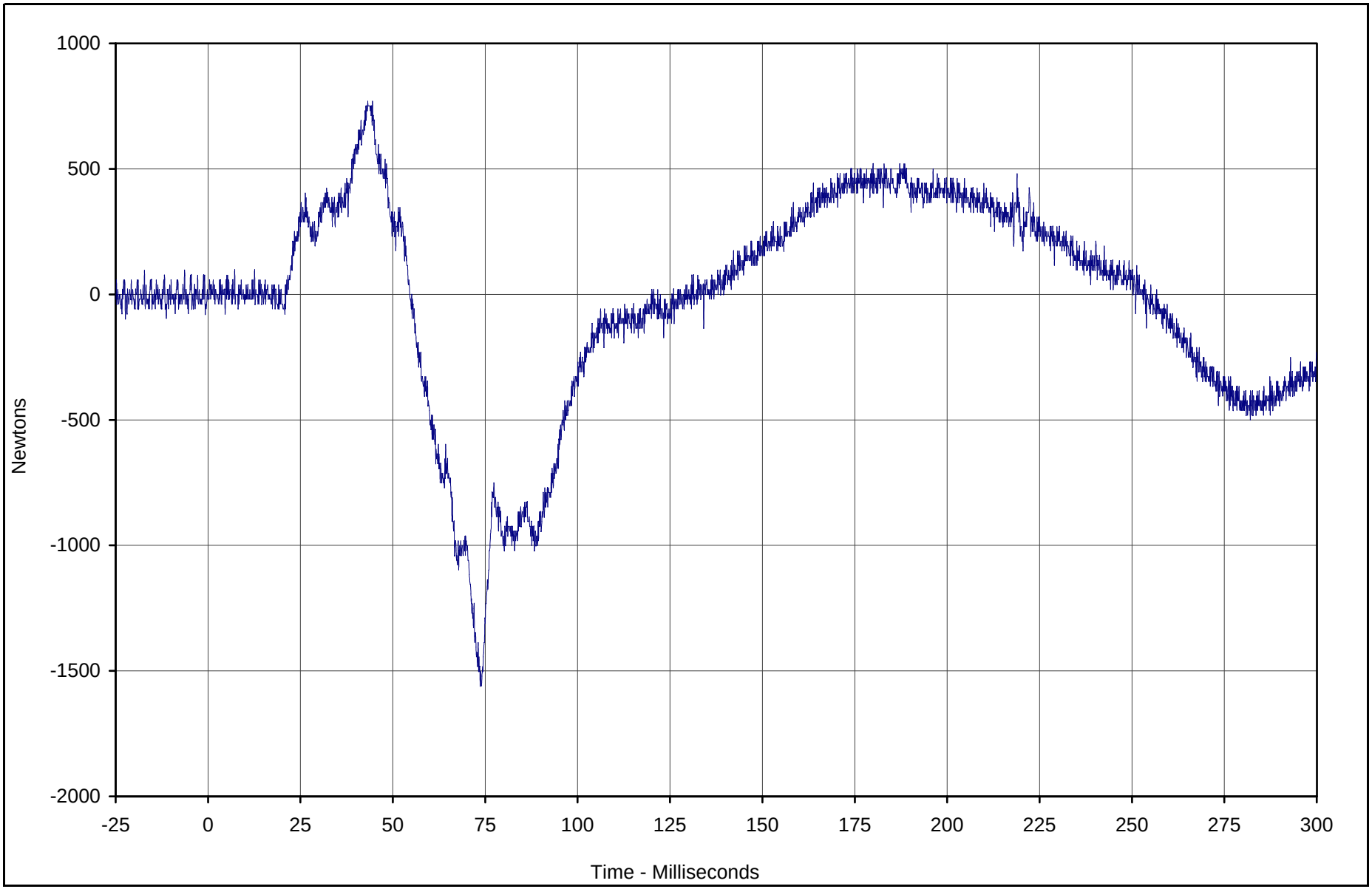
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Force Z | 053 | FIL | Newtons | 770.3 | 43.2 | -1559.8 | 73.6 | 1000 |

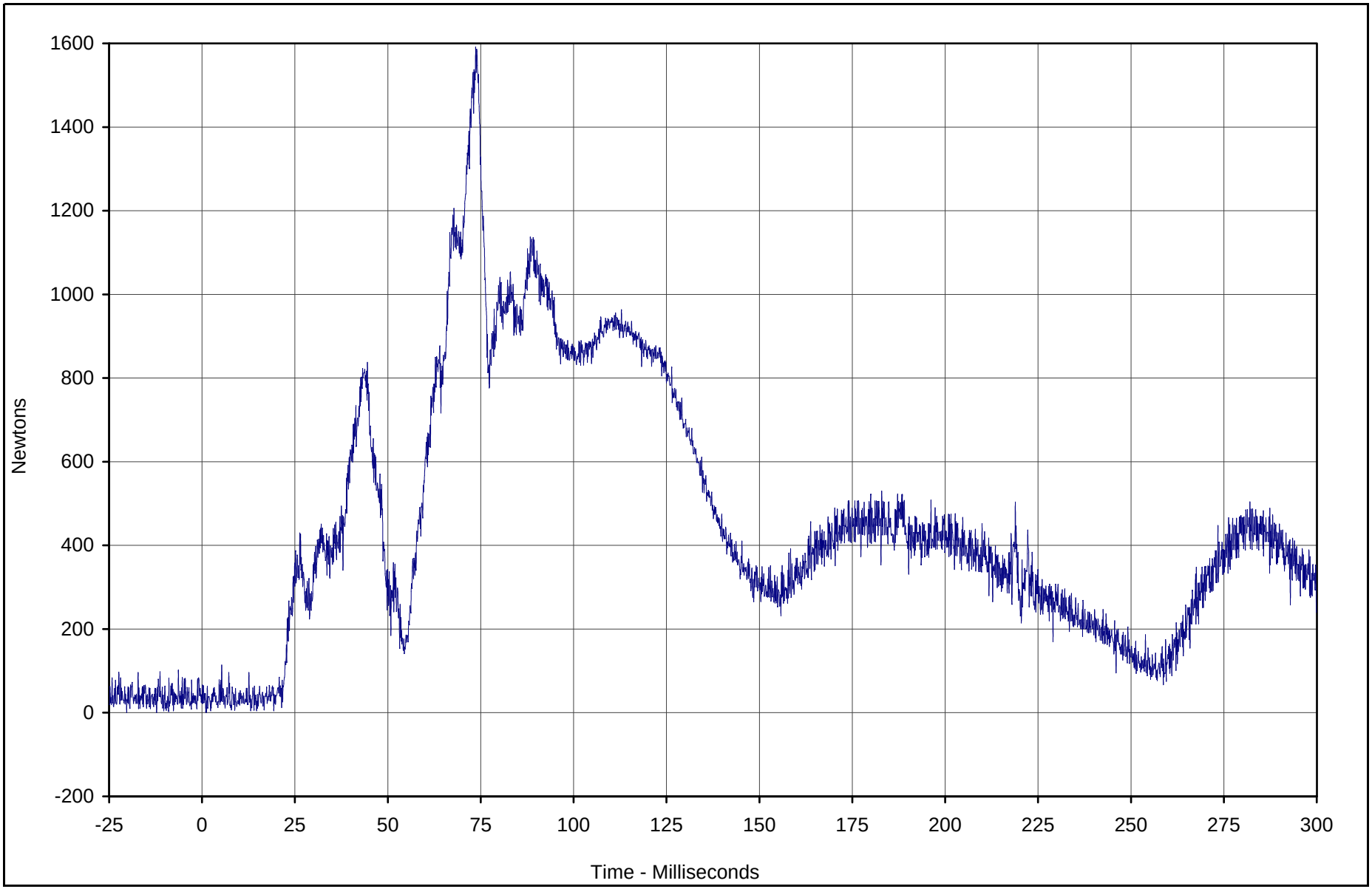
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Force Resultant | 051 | RES | Newtons | 1589.0 | 73.6 | 0.6 | 1.0 | 1000 |

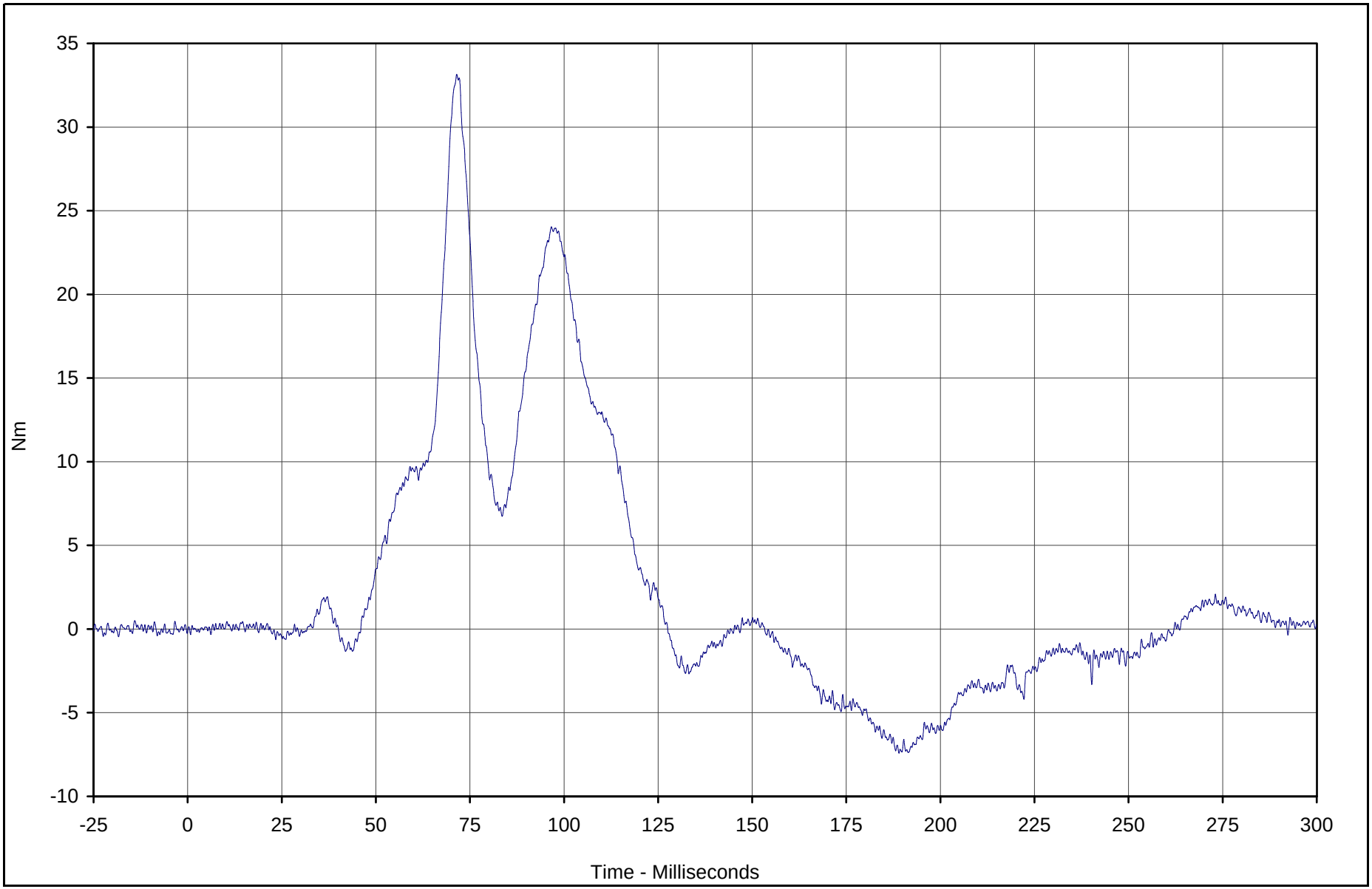
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Moment X | 054 | FIL | Nm | 33.2 | 71.5 | -7.4 | 189.0 | 600 |

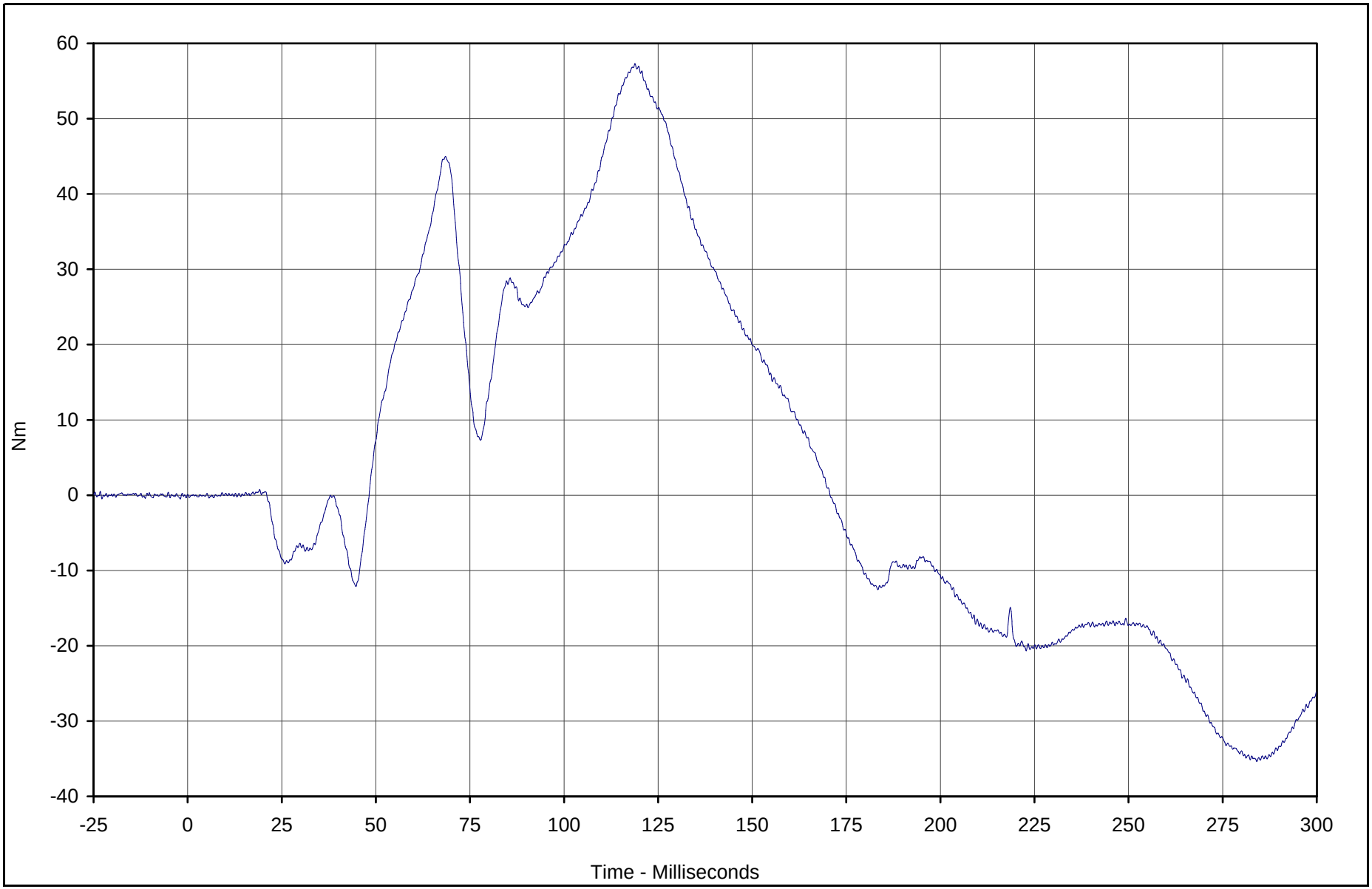
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



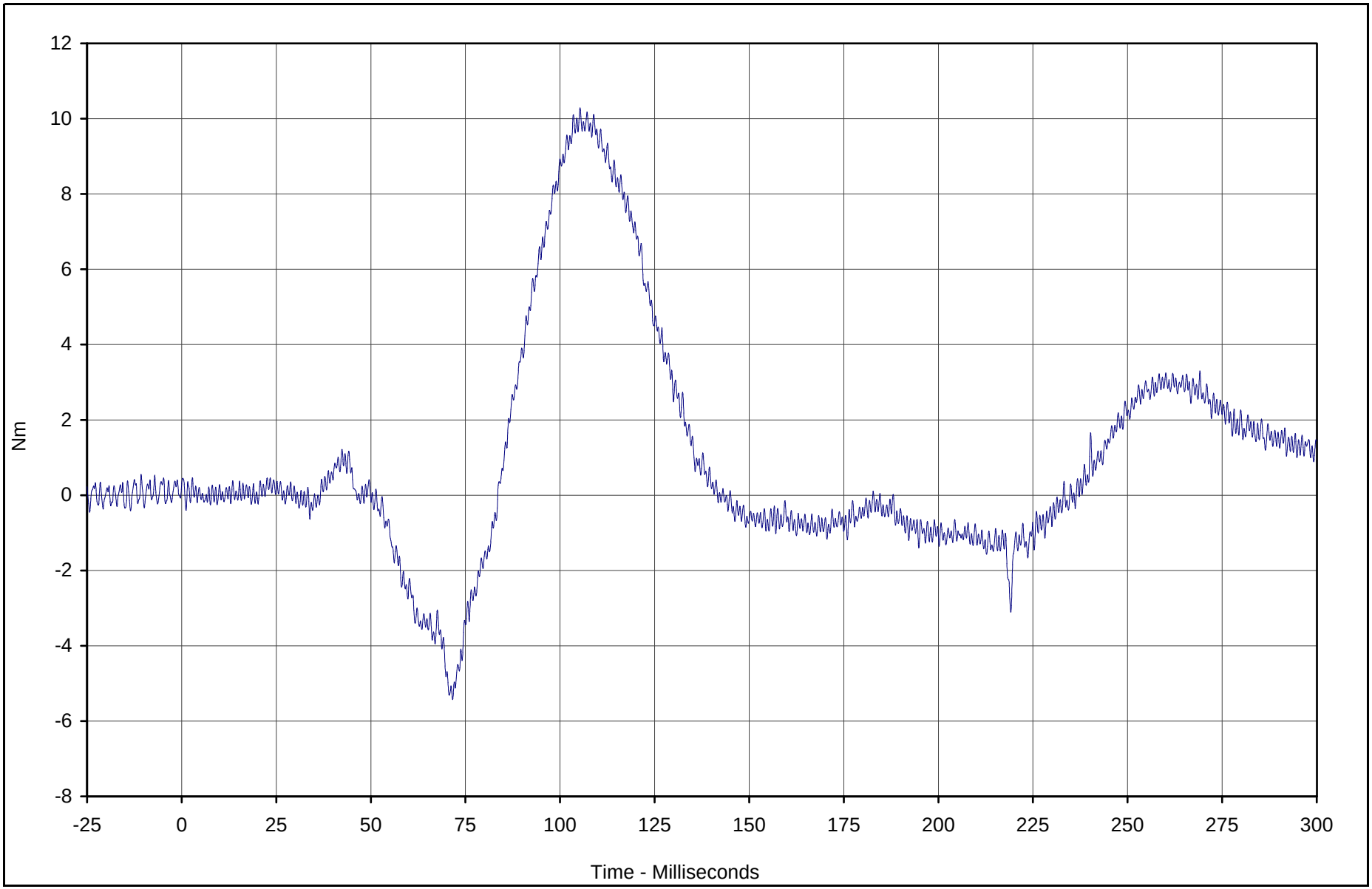

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Moment Y | 055 | FIL | Nm | 57.3 | 118.9 | -35.4 | 284.1 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Moment Z | 056 | FIL | Nm | 10.3 | 105.3 | -5.4 | 71.6 | 600 |

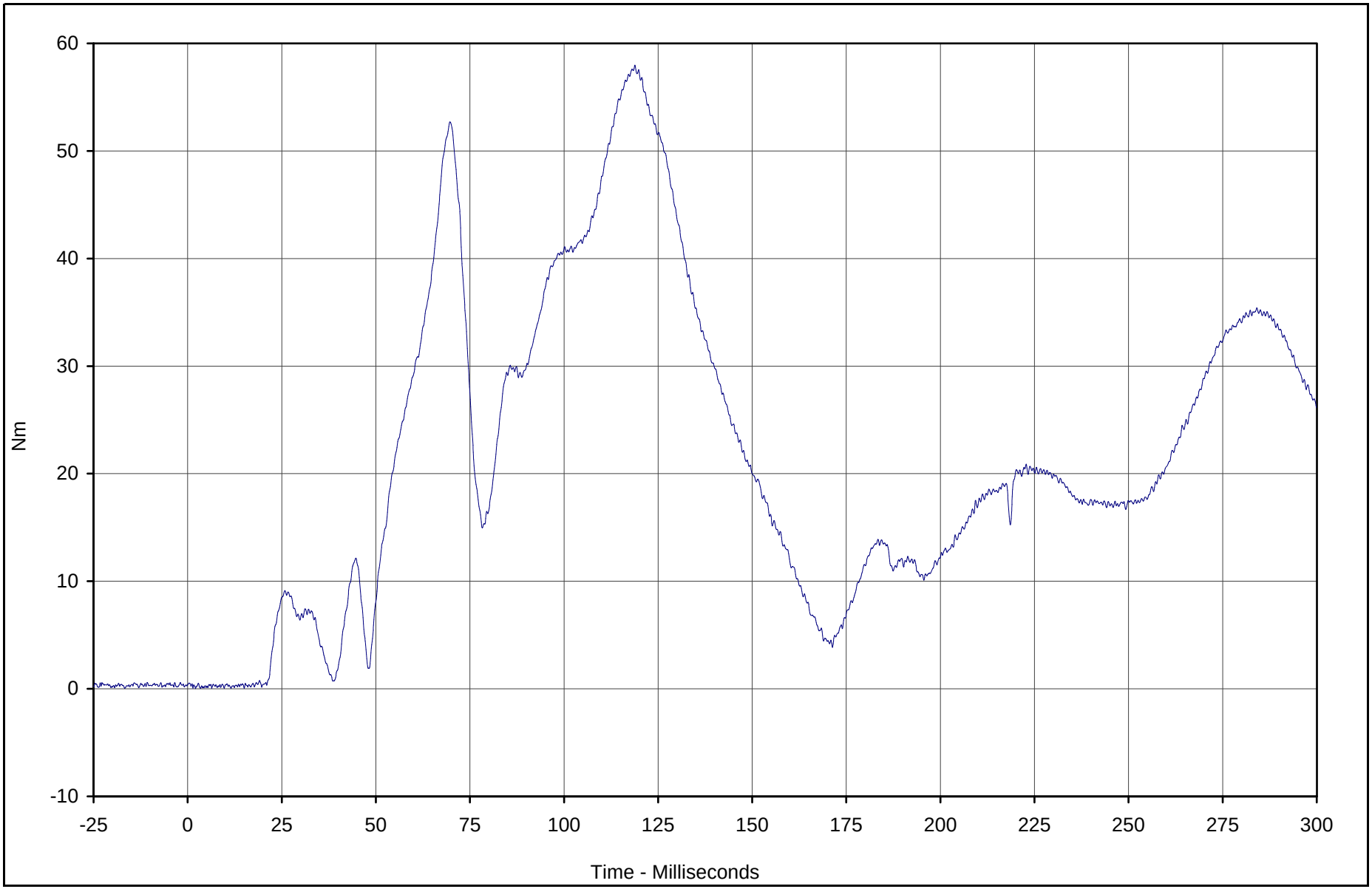
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Neck Moment Resultant | 054 | RES | Nm | 58.0 | 118.8 | 0.0 | 2.1 | 600 |

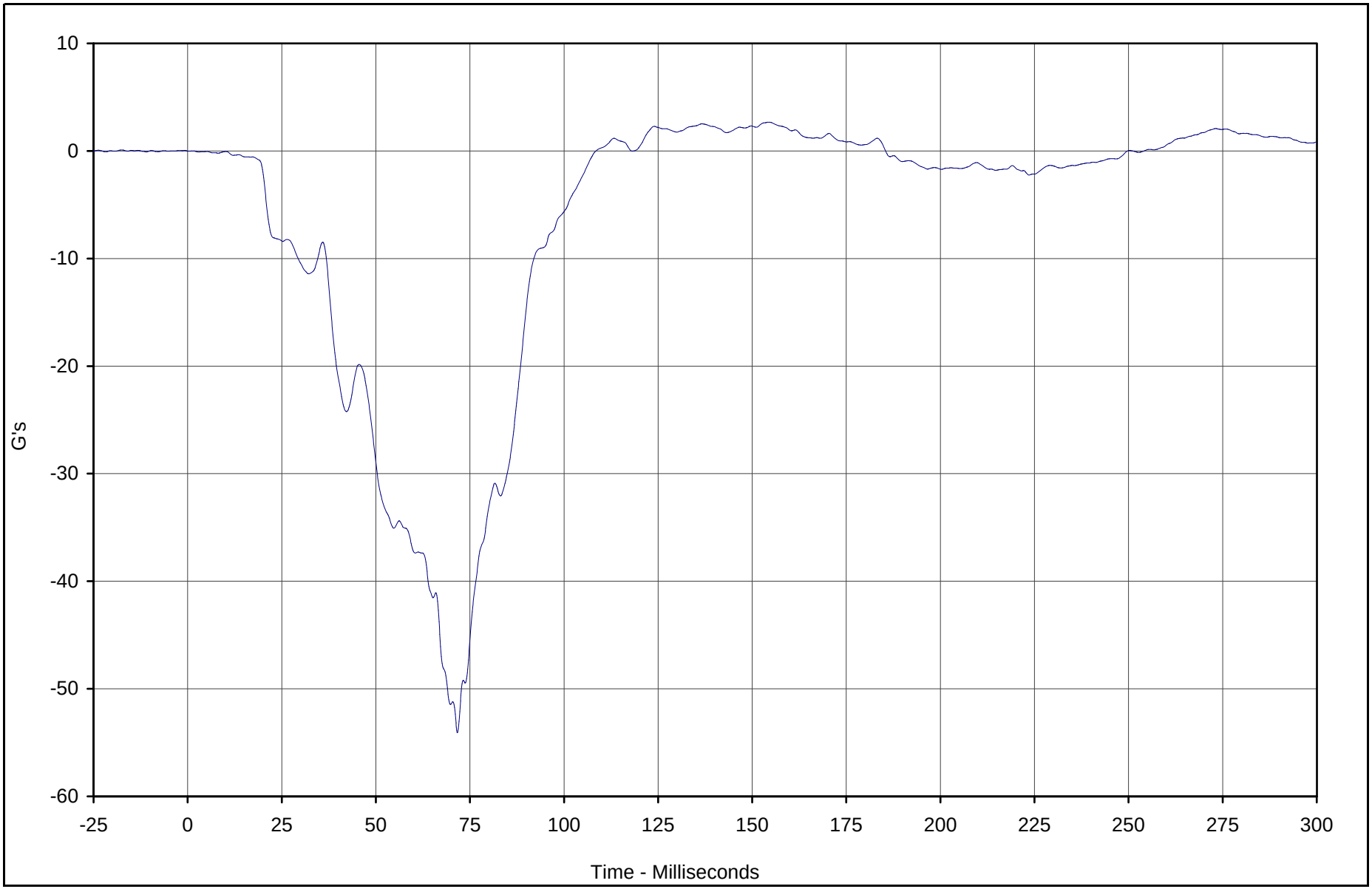
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Primary X | 057 | FIL | G's | 2.7 | 154.2 | -54.1 | 71.7 | 180 |

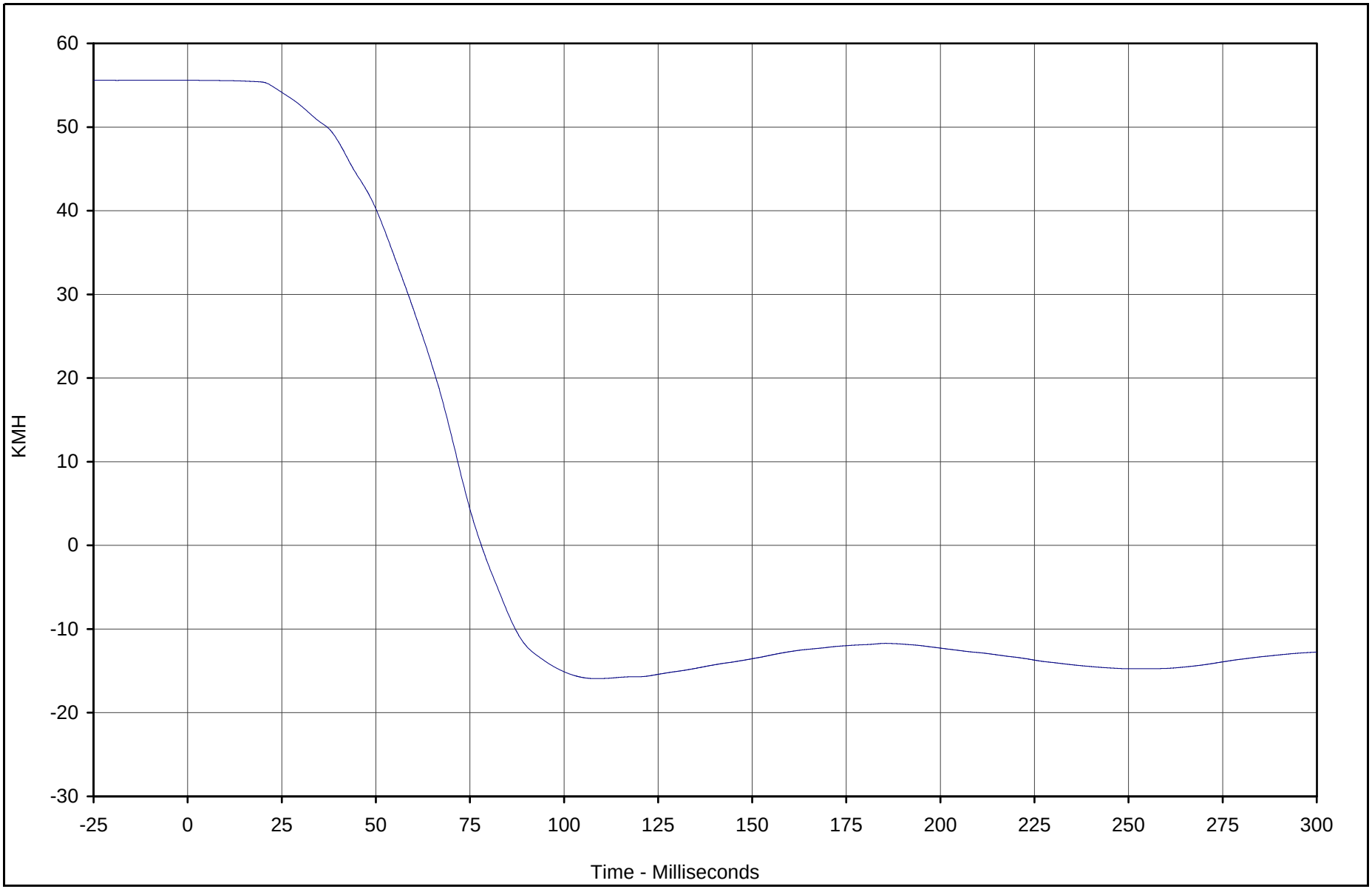
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Primary X Velocity | 057 | IN1 | KMH | 55.6 | 0.0 | -15.9 | 108.5 | 180 |

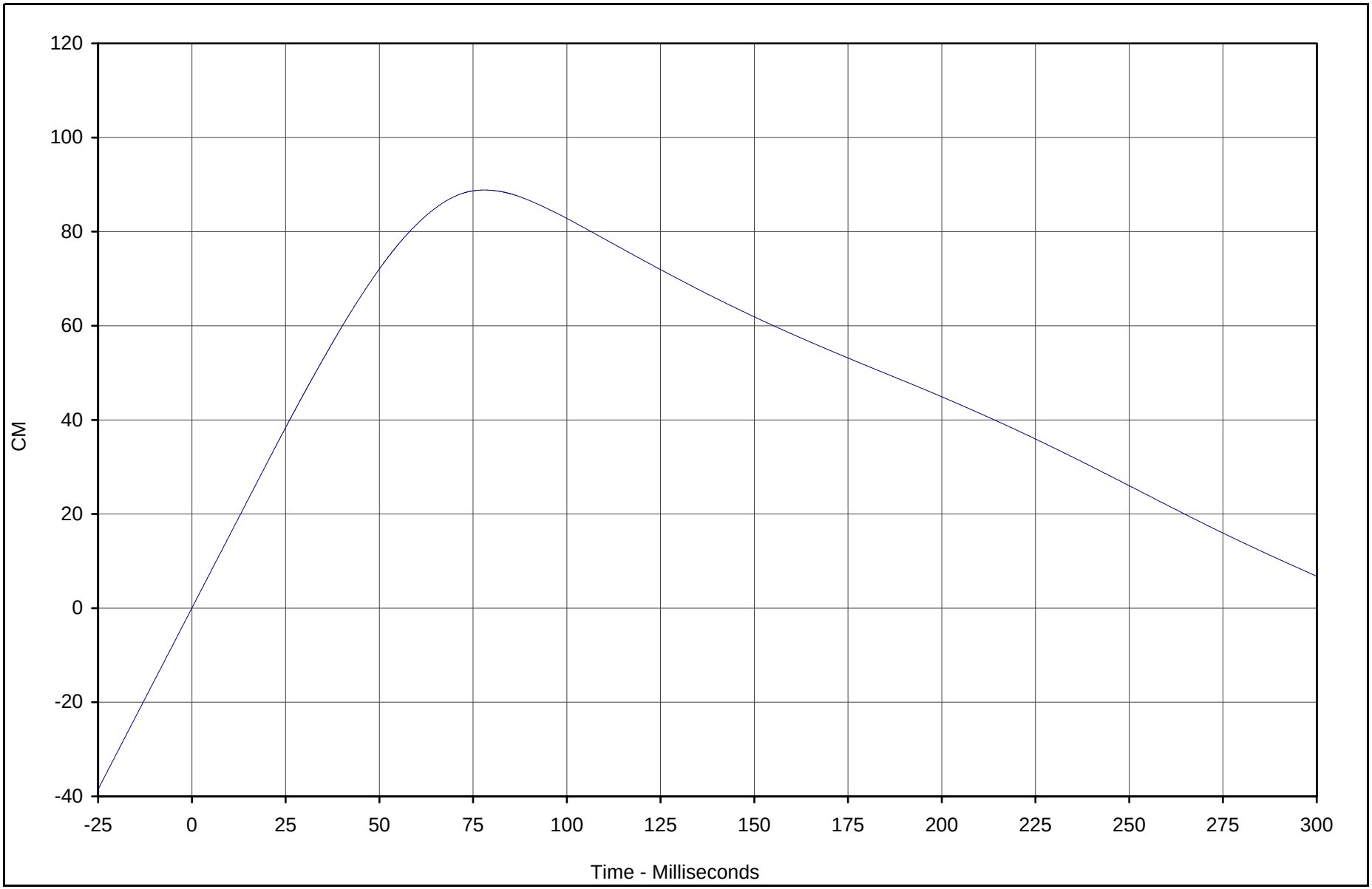
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



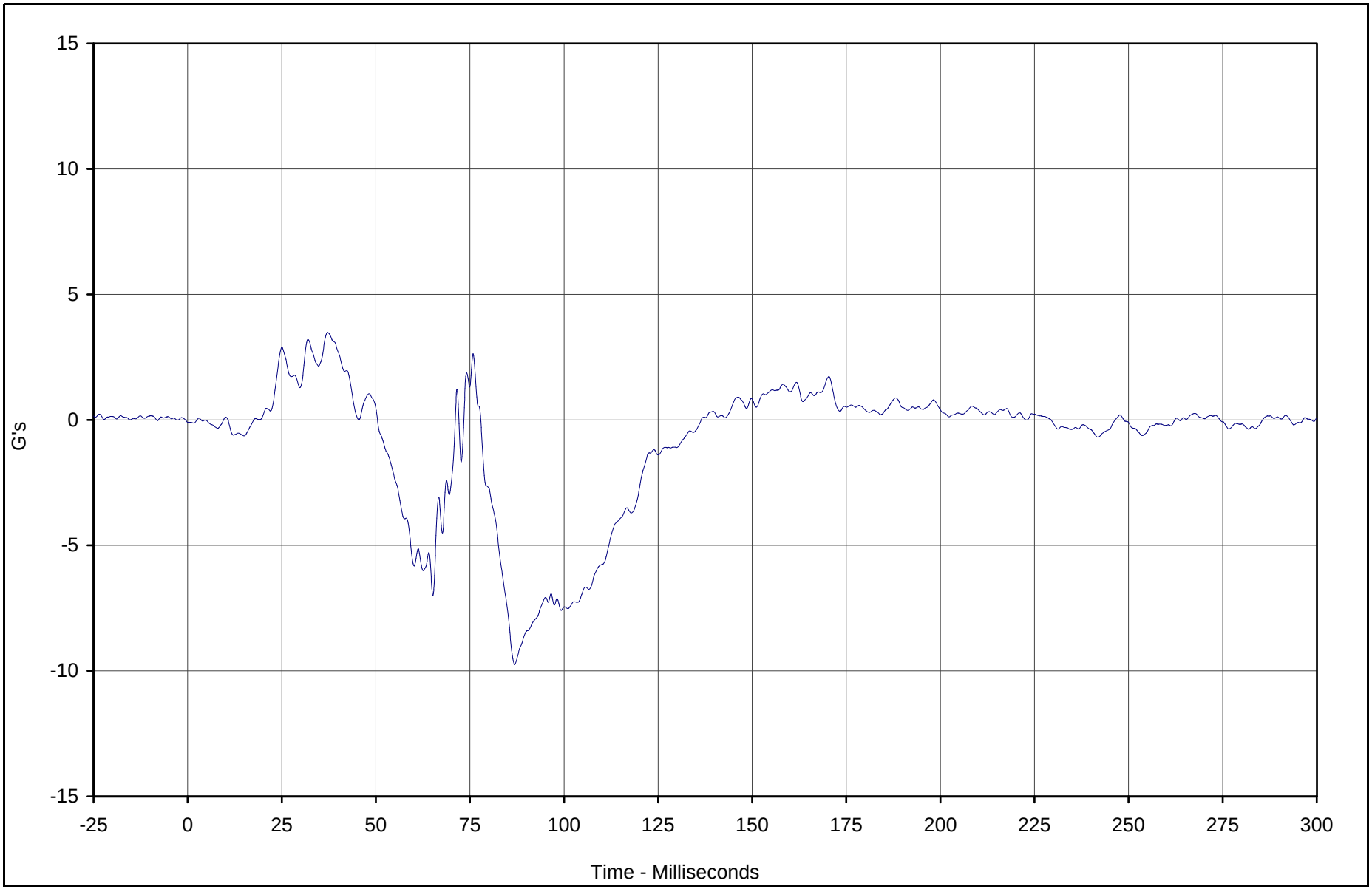

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Primary X Displ. | 057 | IN2 | CM | 88.8 | 78.0 | 0.0 | 0.0 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Primary Y | 058 | FIL | G's | 3.5 | 37.2 | -9.7 | 86.9 | 180 |

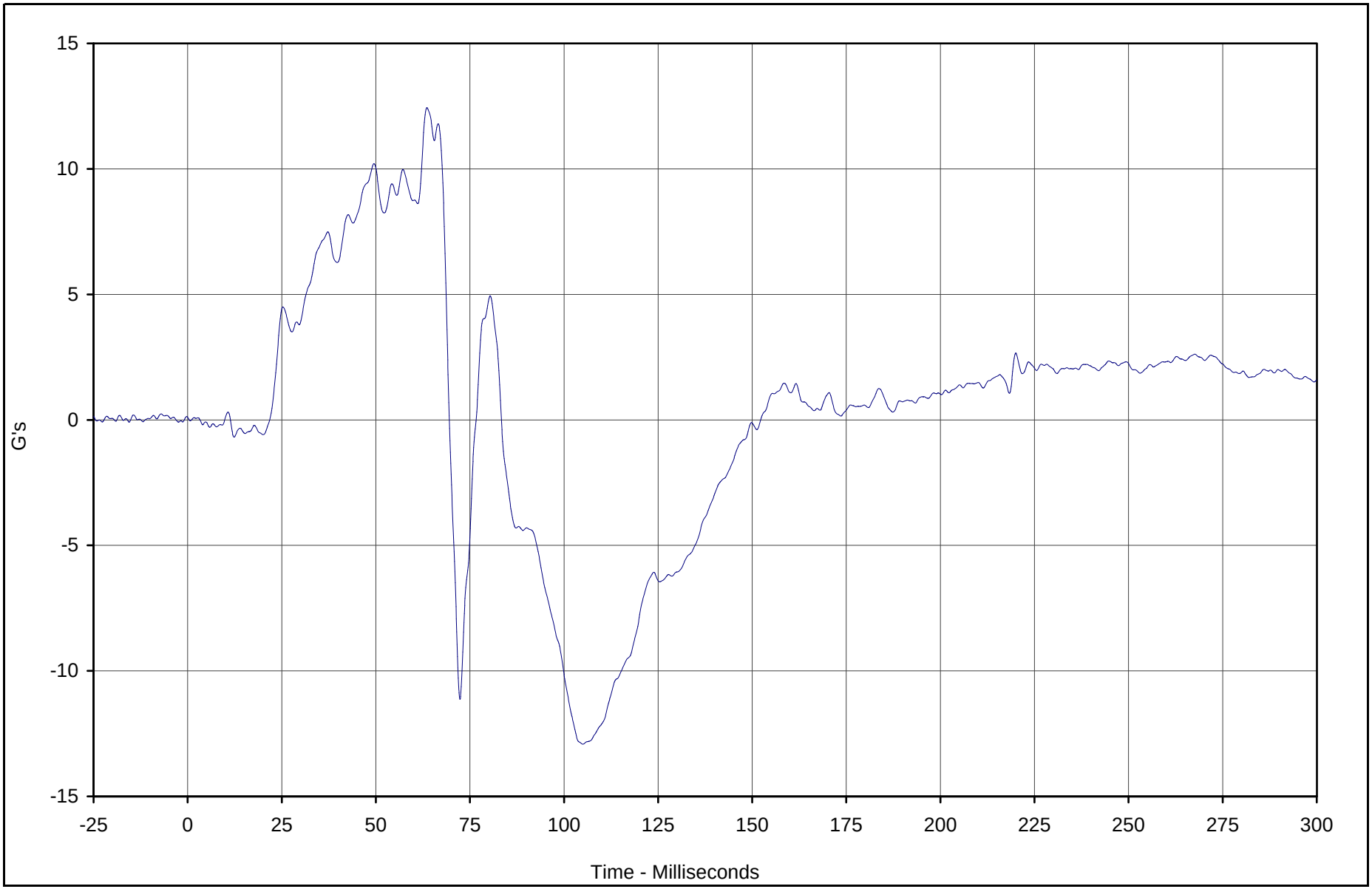
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Primary Z | 059 | FIL | G's | 12.4 | 63.6 | -12.9 | 105.0 | 180 |

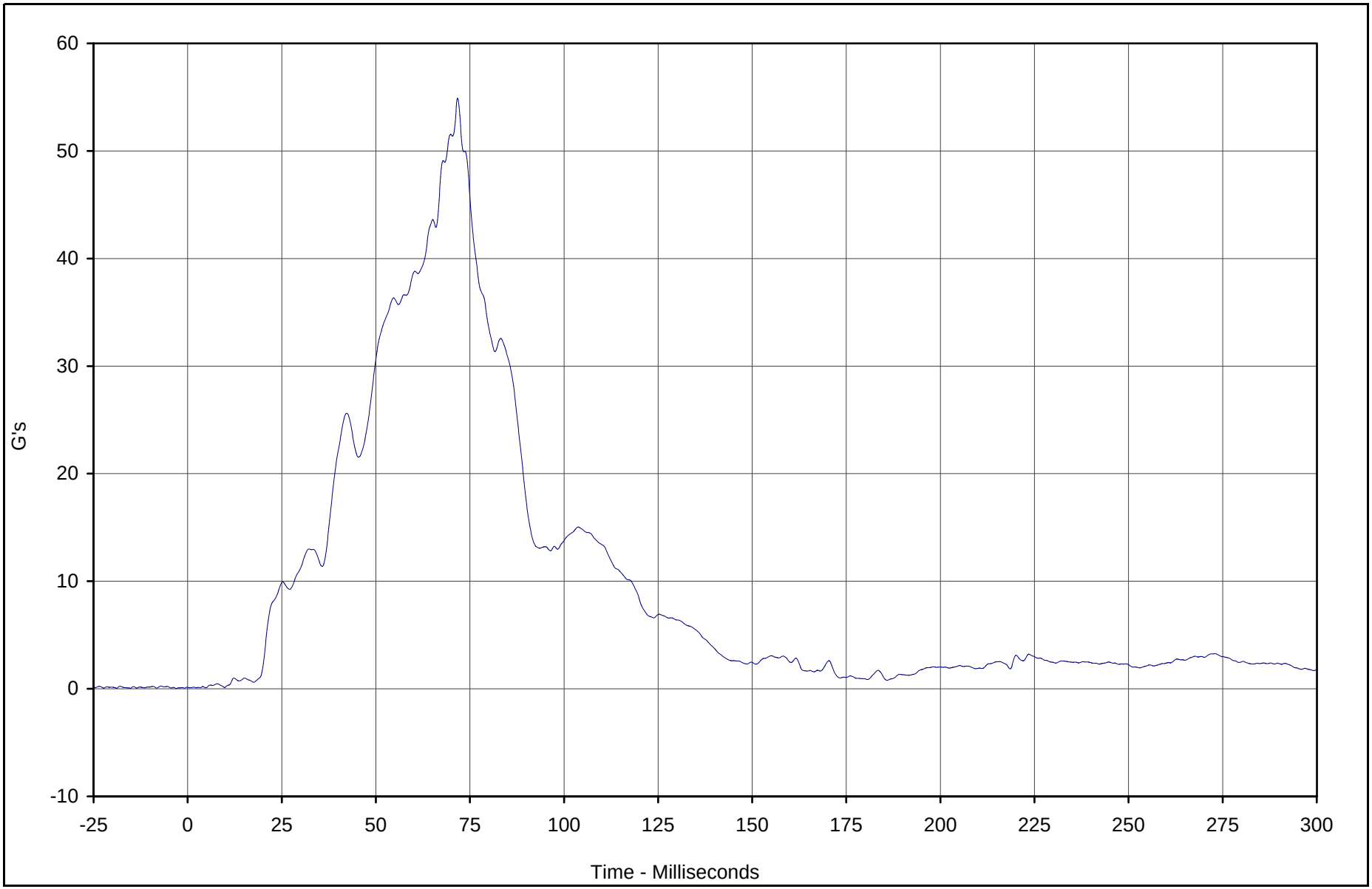
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



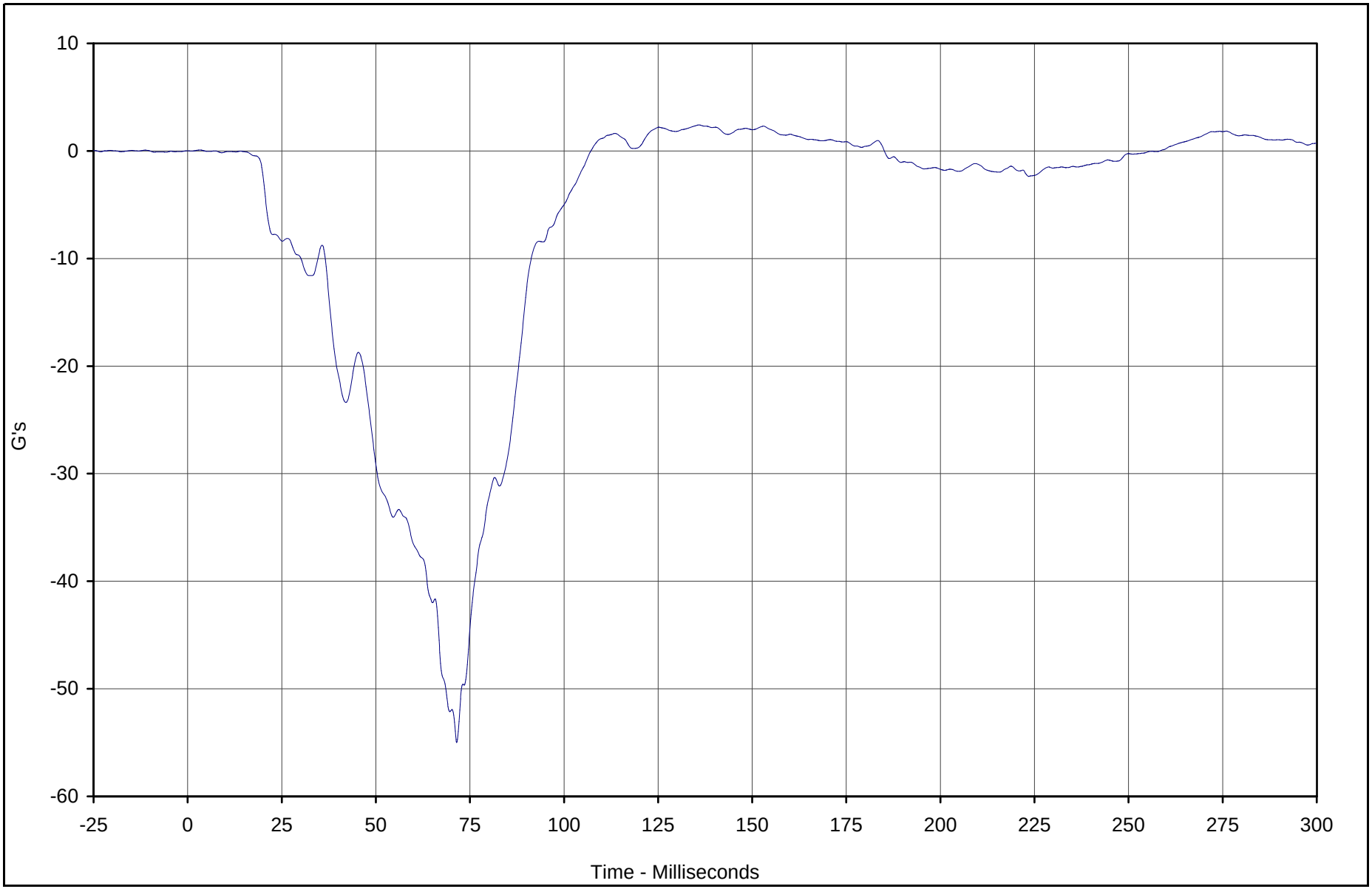

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Resultant Primary | 057 | RES | G's | 54.9 | 71.7 | 0.1 | 2.3 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



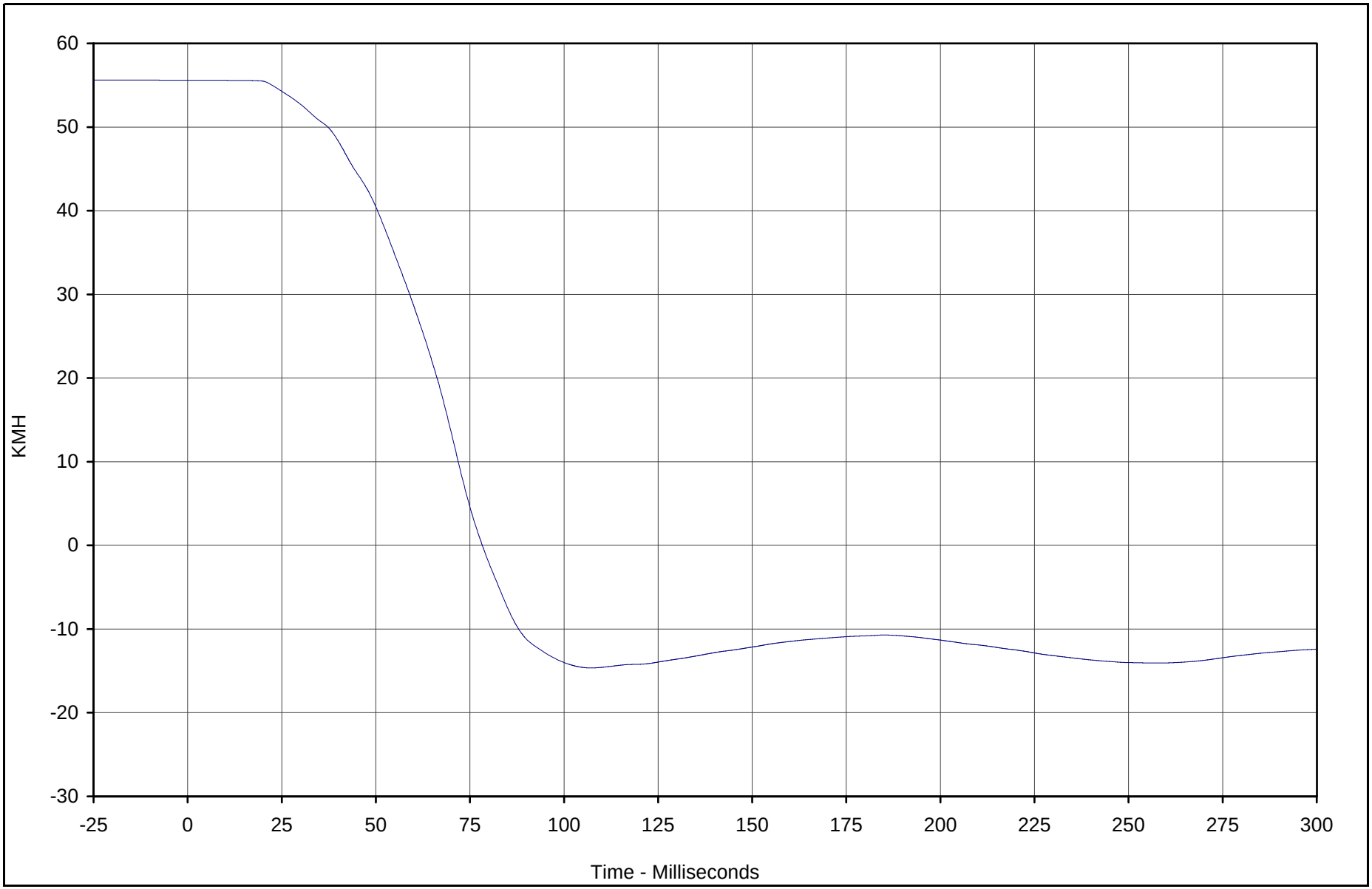

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Redundant X | 060 | FIL | G's | 2.4 | 135.8 | -55.0 | 71.5 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Redundant X Velocity | 060 | IN1 | KMH | 55.6 | 4.5 | -14.6 | 107.1 | 180 |

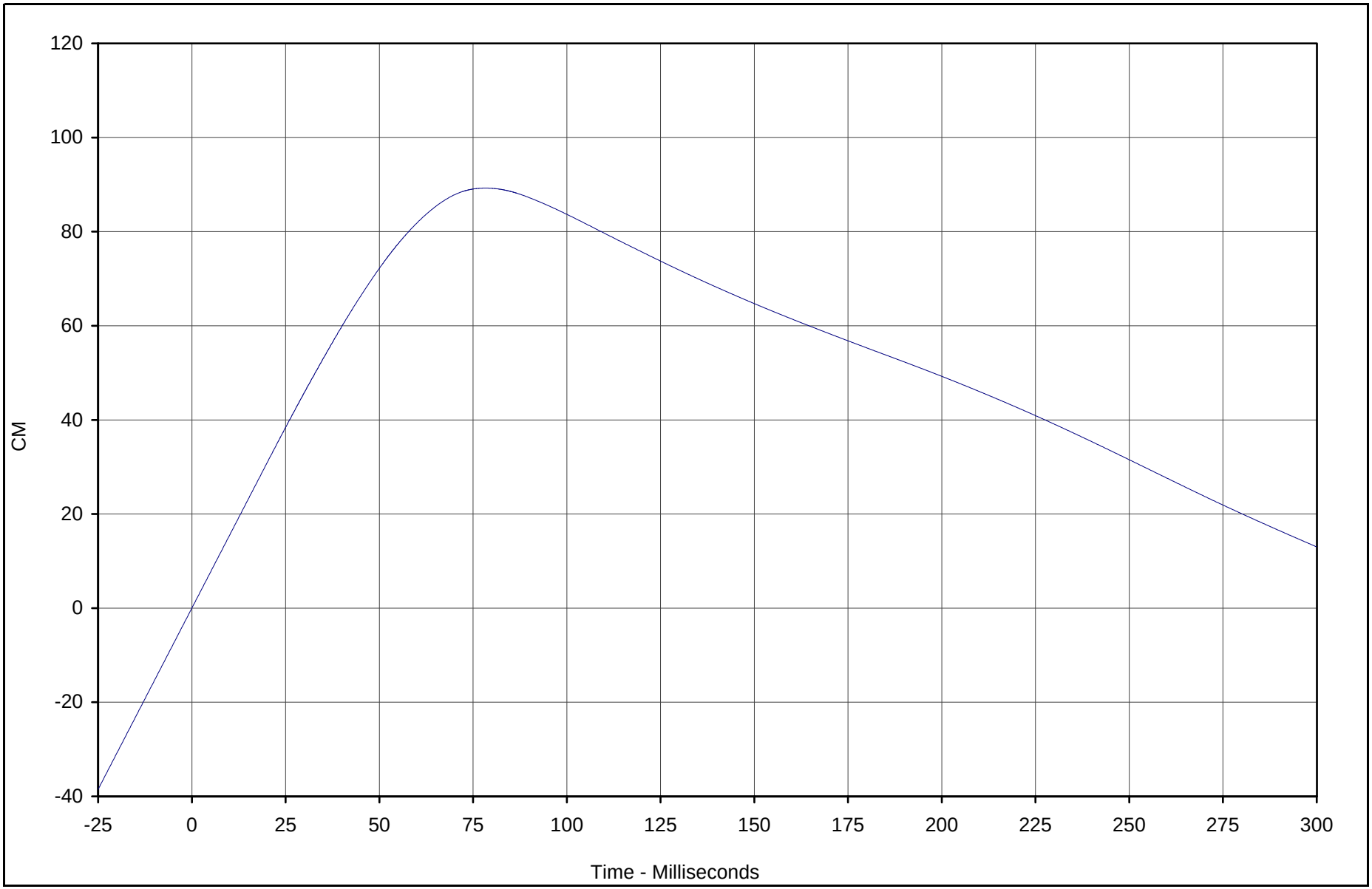
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Redundant X Displ. | 060 | IN2 | CM | 89.3 | 78.3 | 0.0 | 0.0 | 180 |

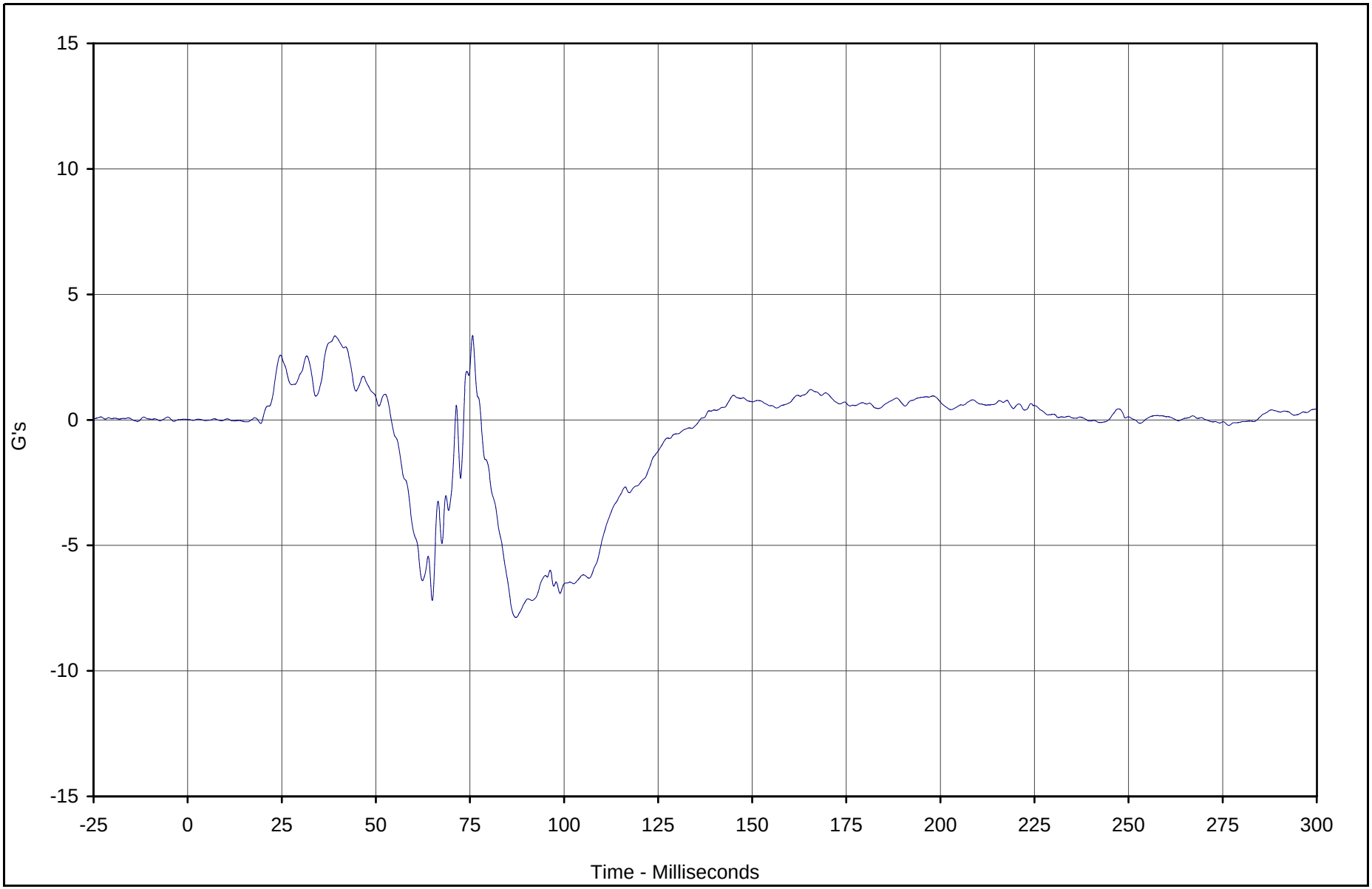
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Redundant Y | 061 | FIL | G's | 3.4 | 75.7 | -7.9 | 87.2 | 180 |

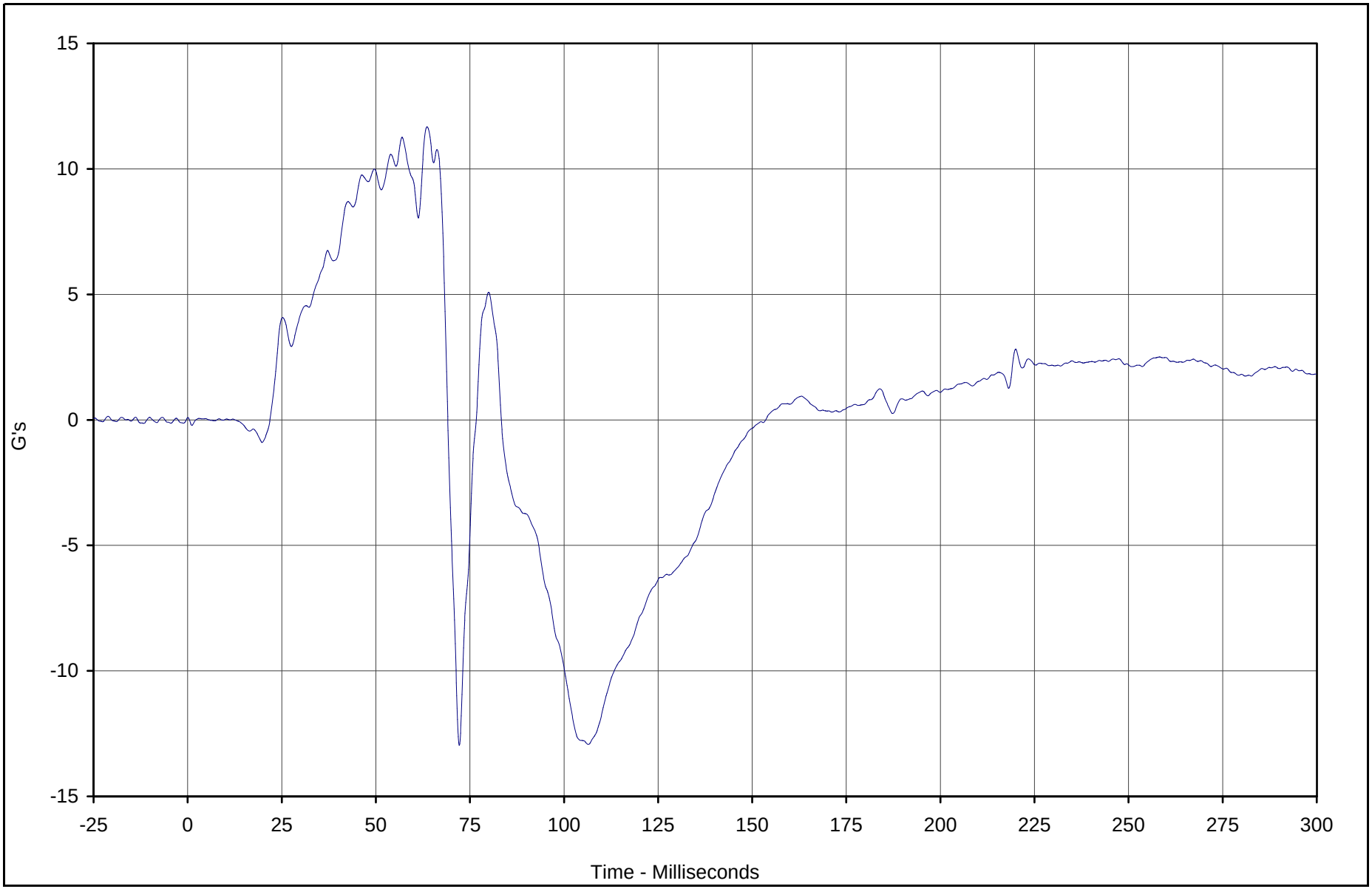
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Redundant Z | 062 | FIL | G's | 11.7 | 63.6 | -13.0 | 72.2 | 180 |

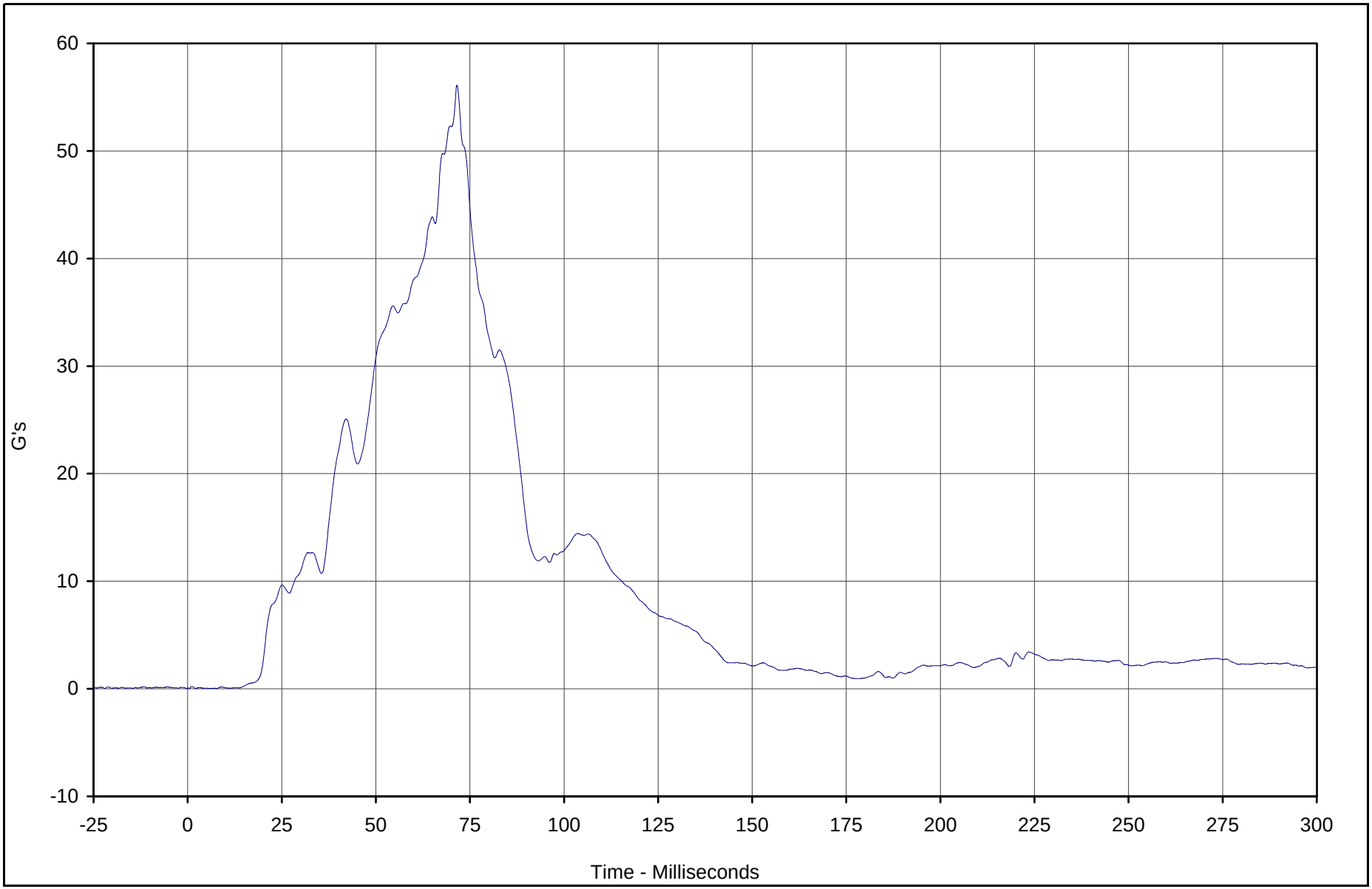
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Resultant Redundant | 060 | RES | G's | 56.1 | 71.6 | 0.0 | 0.5 | 180 |

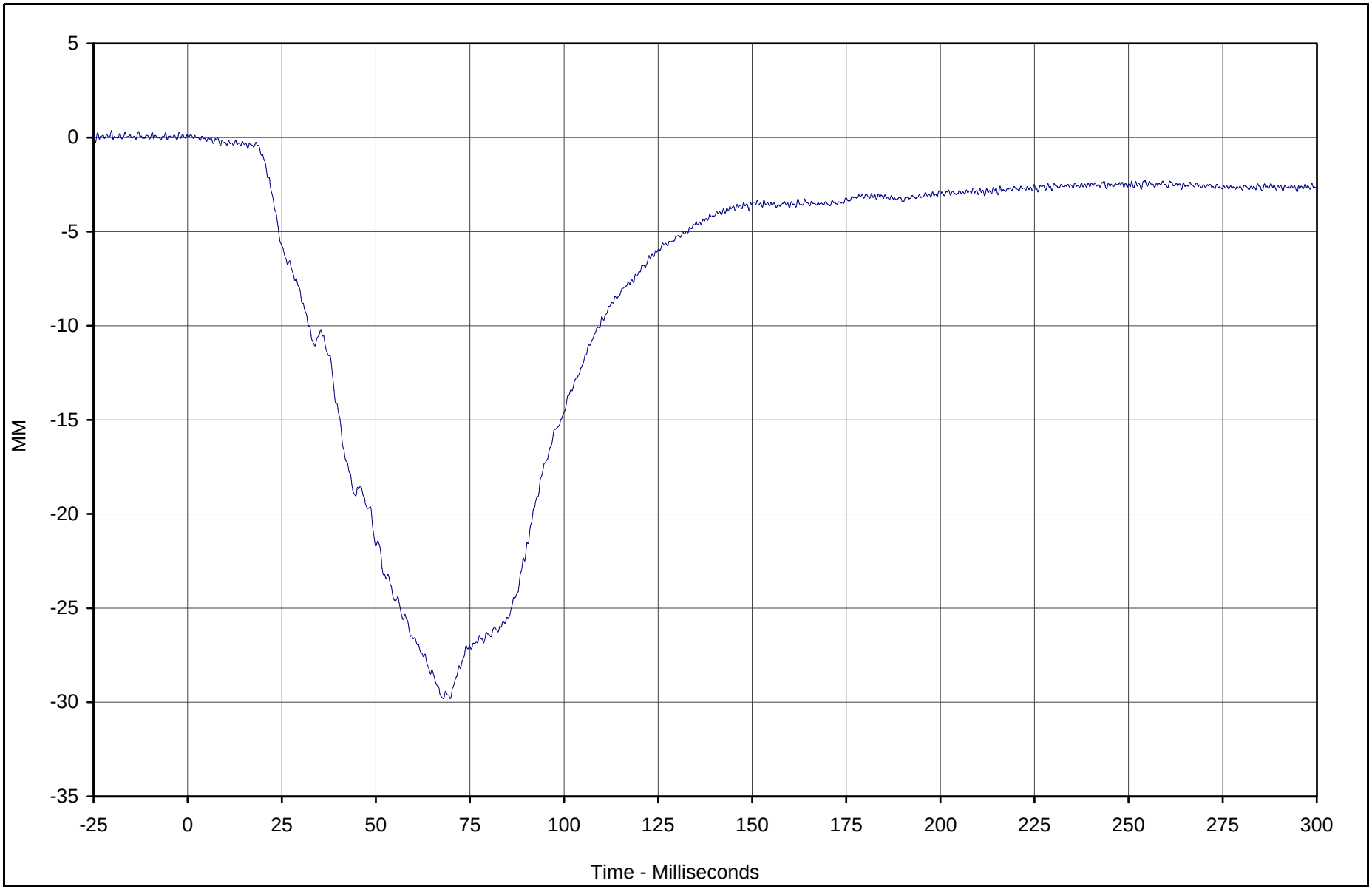
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



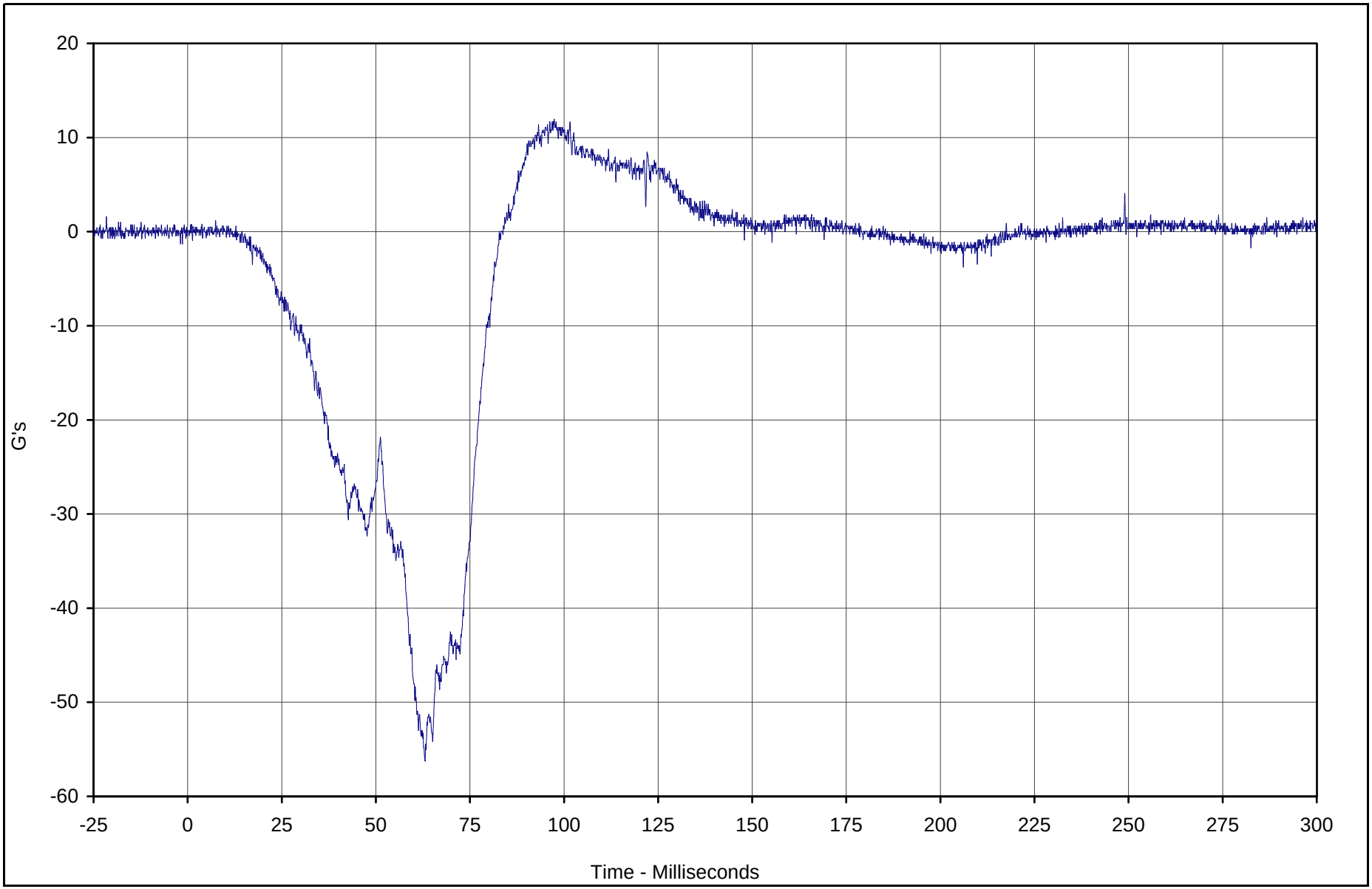

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Chest Displacement X | 063 | FIL | MM | 0.1 | 0.7 | -29.8 | 67.9 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Pelvis X | 064 | FIL | G's | 12.0 | 97.4 | -56.2 | 63.1 | 1000 |

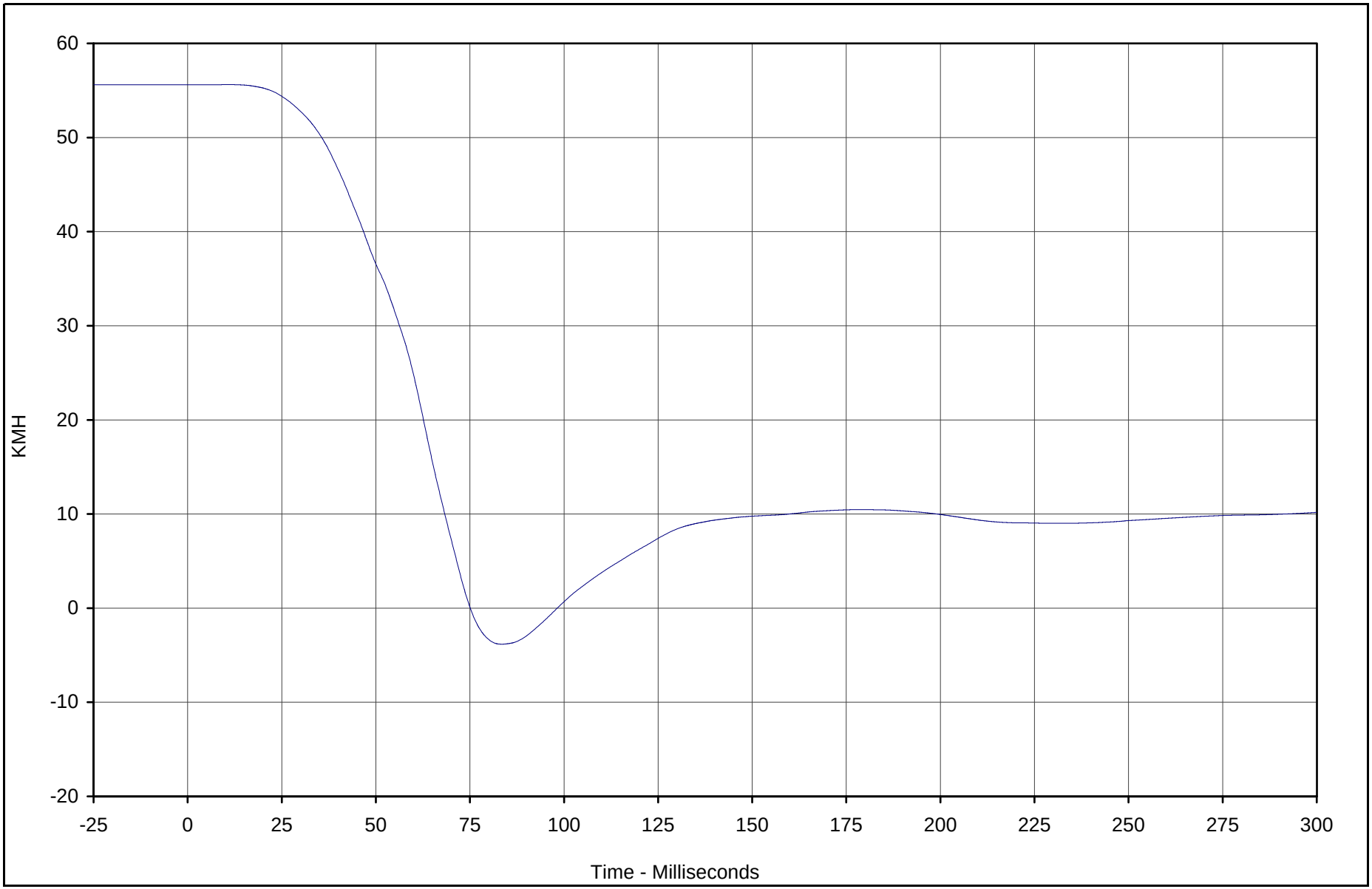
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



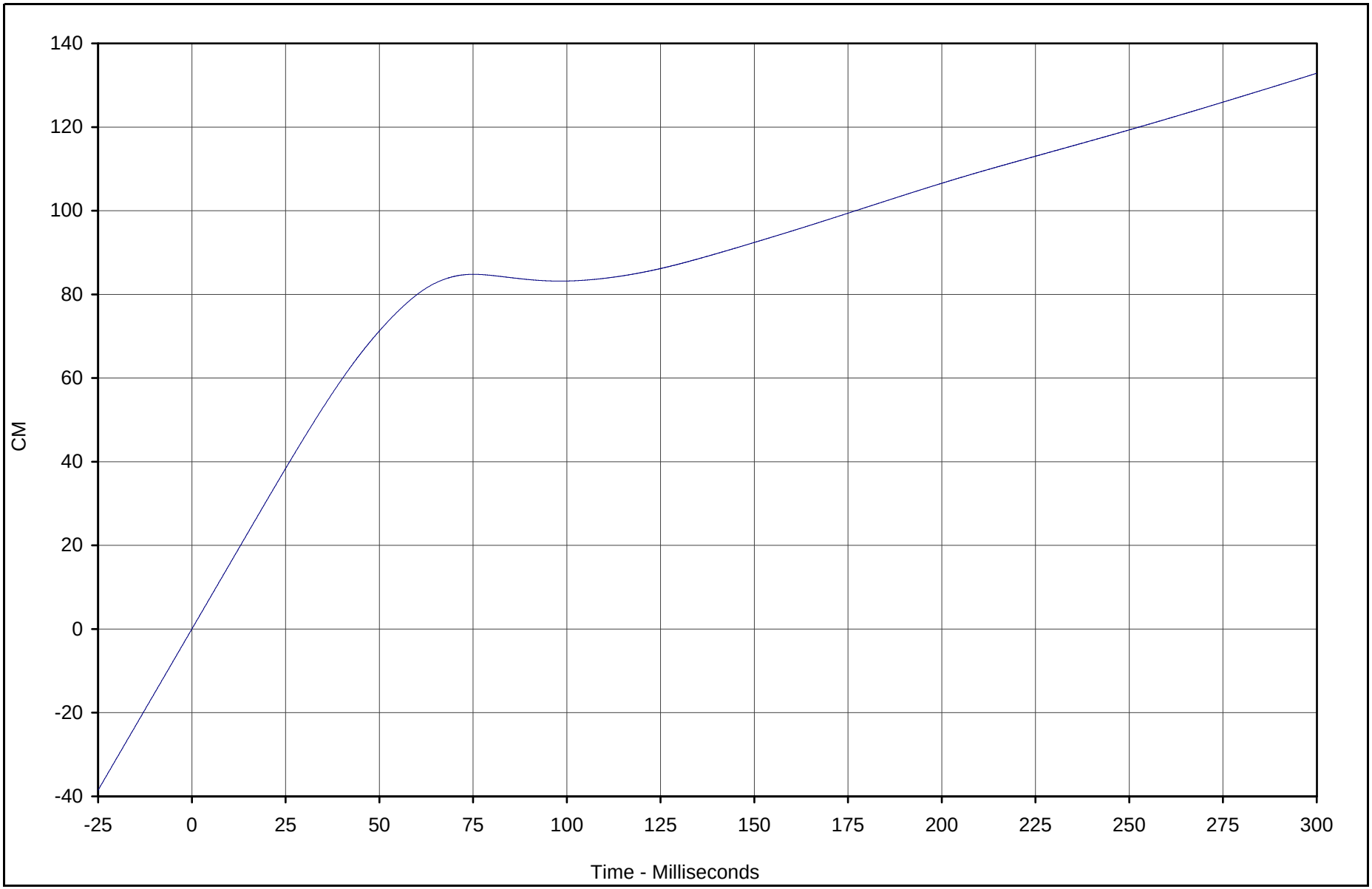

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Pelvis X Velocity | 064 | IN1 | KMH | 55.6 | 11.2 | -3.8 | 83.5 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



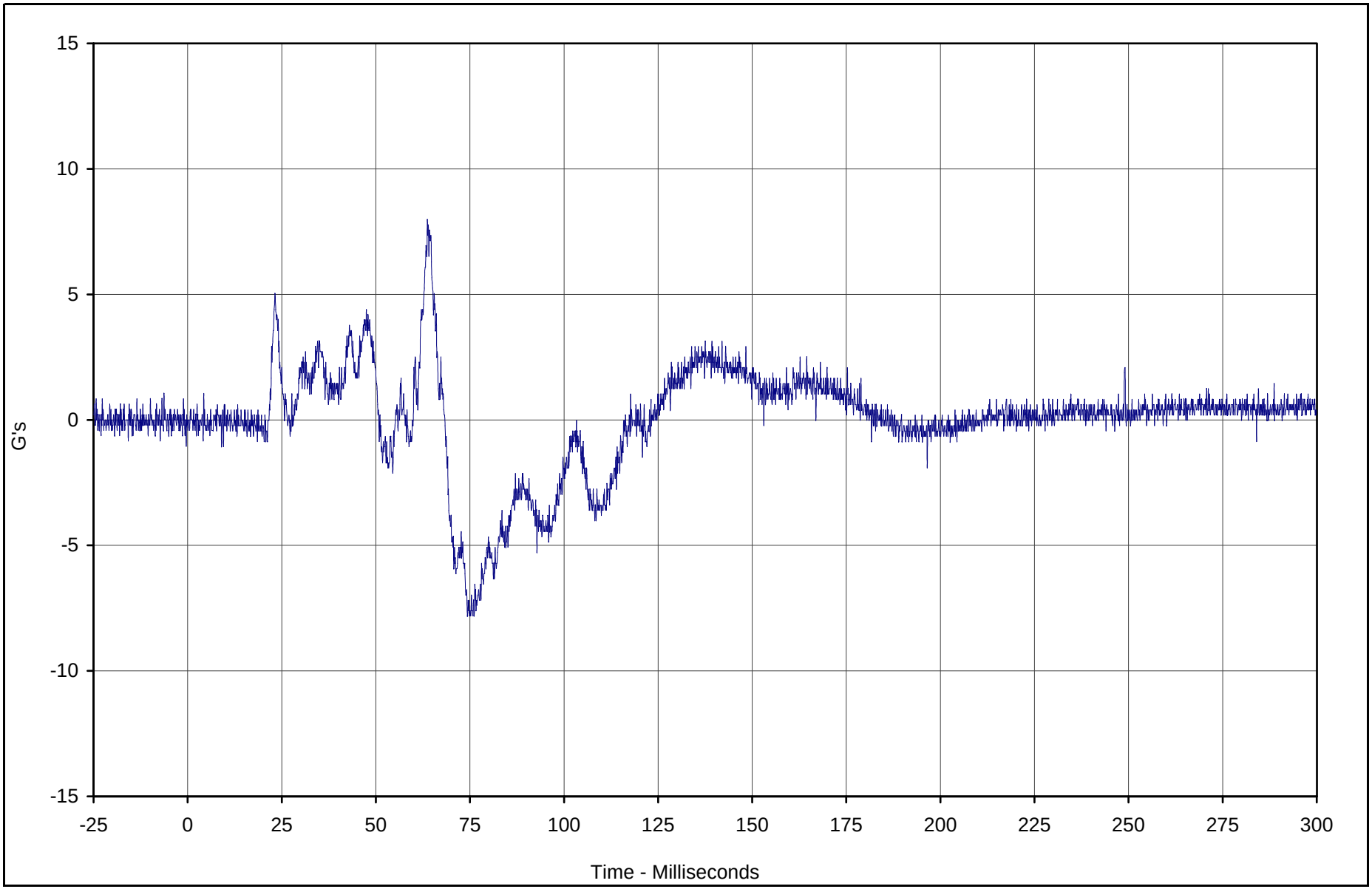

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Pelvis X Displ. | 064 | IN2 | CM | 132.8 | 299.9 | 0.0 | 0.0 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Pelvis Y | 065 | FIL | G's | 8.0 | 63.7 | -7.8 | 74.3 | 1000 |

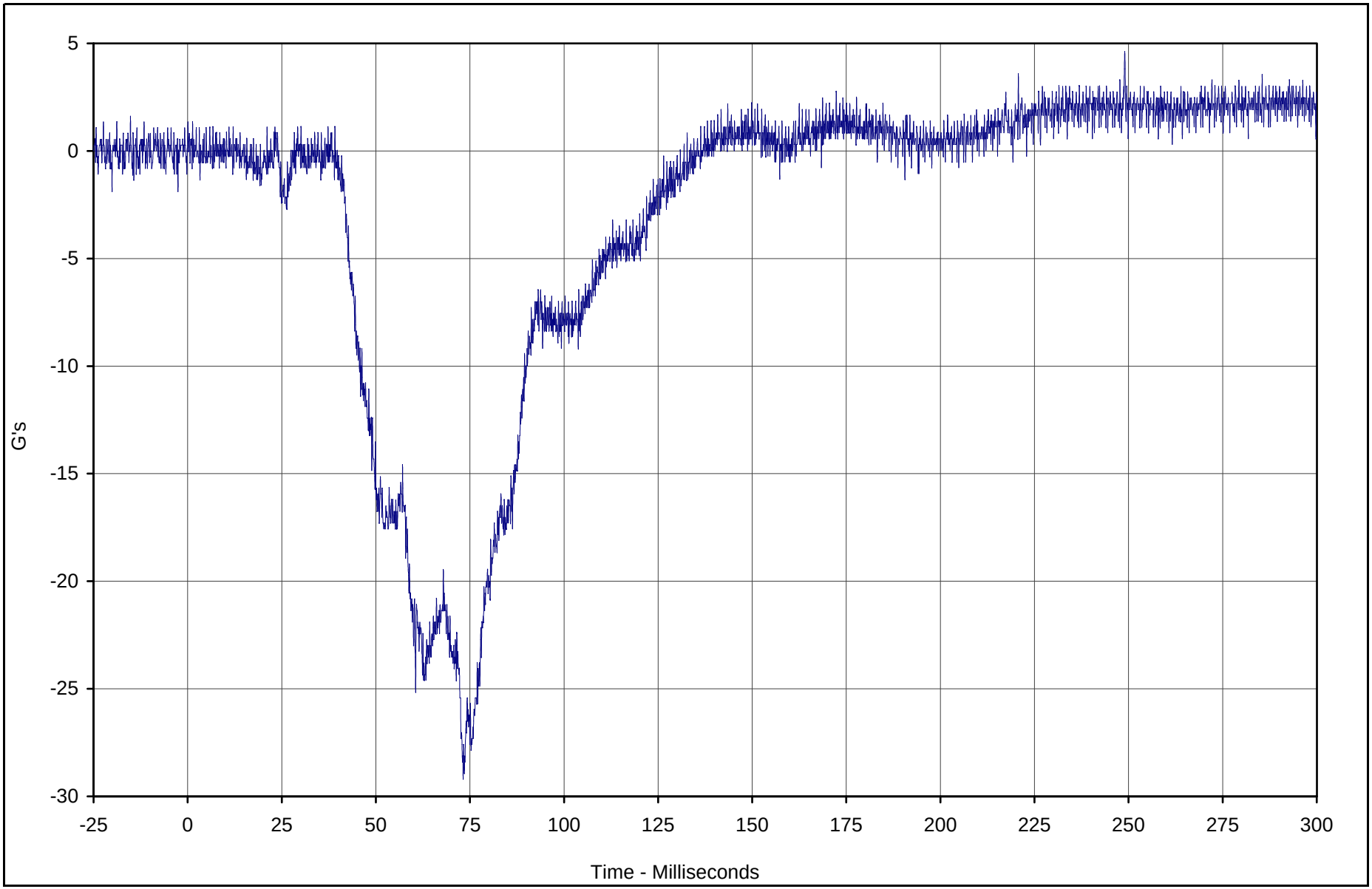
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Pelvis Z | 066 | FIL | G's | 4.6 | 249.0 | -29.2 | 73.2 | 1000 |

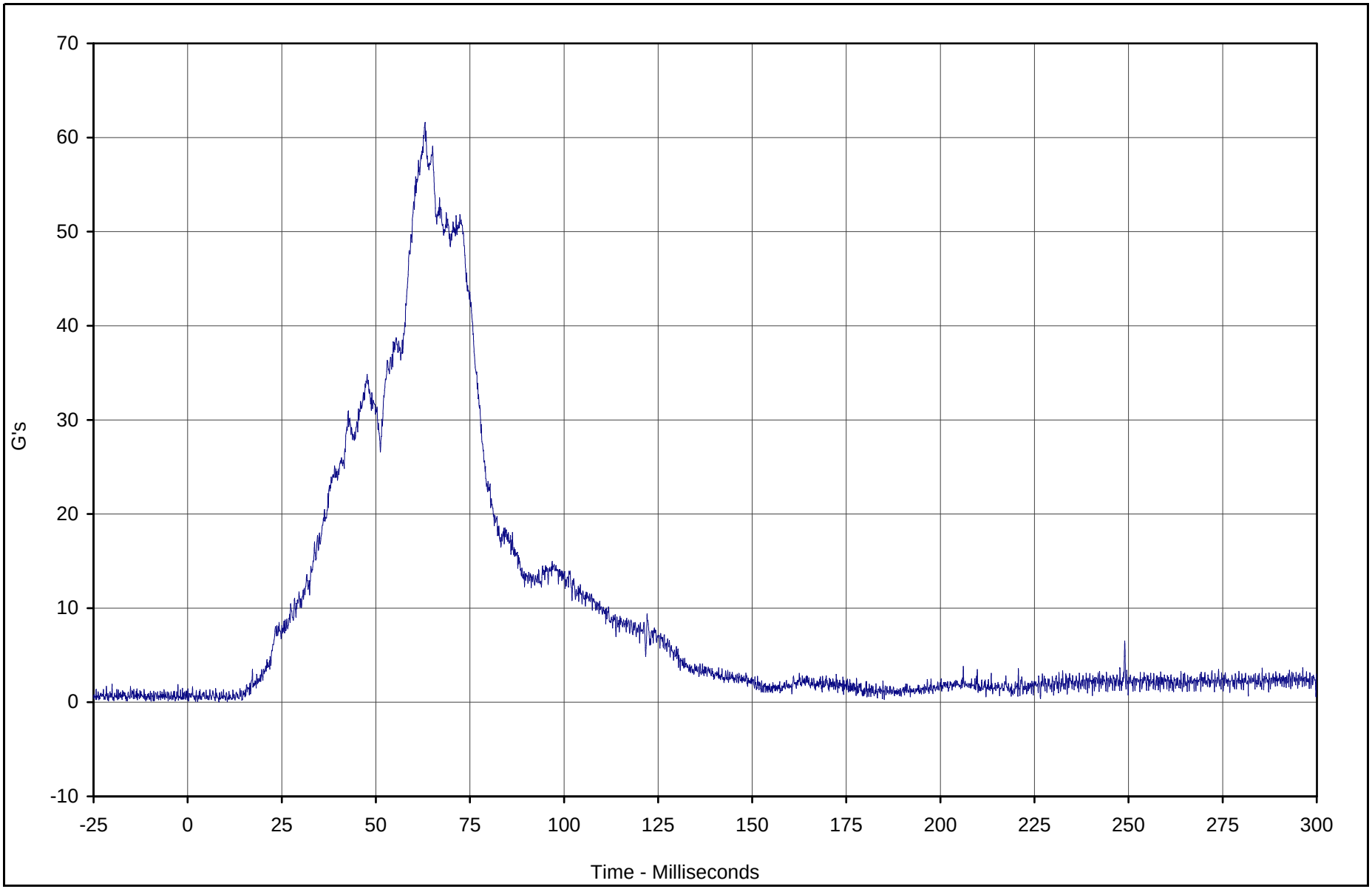
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Pelvis Resultant | 066 | RES | G's | 61.6 | 63.1 | 0.0 | 8.3 | 1000 |

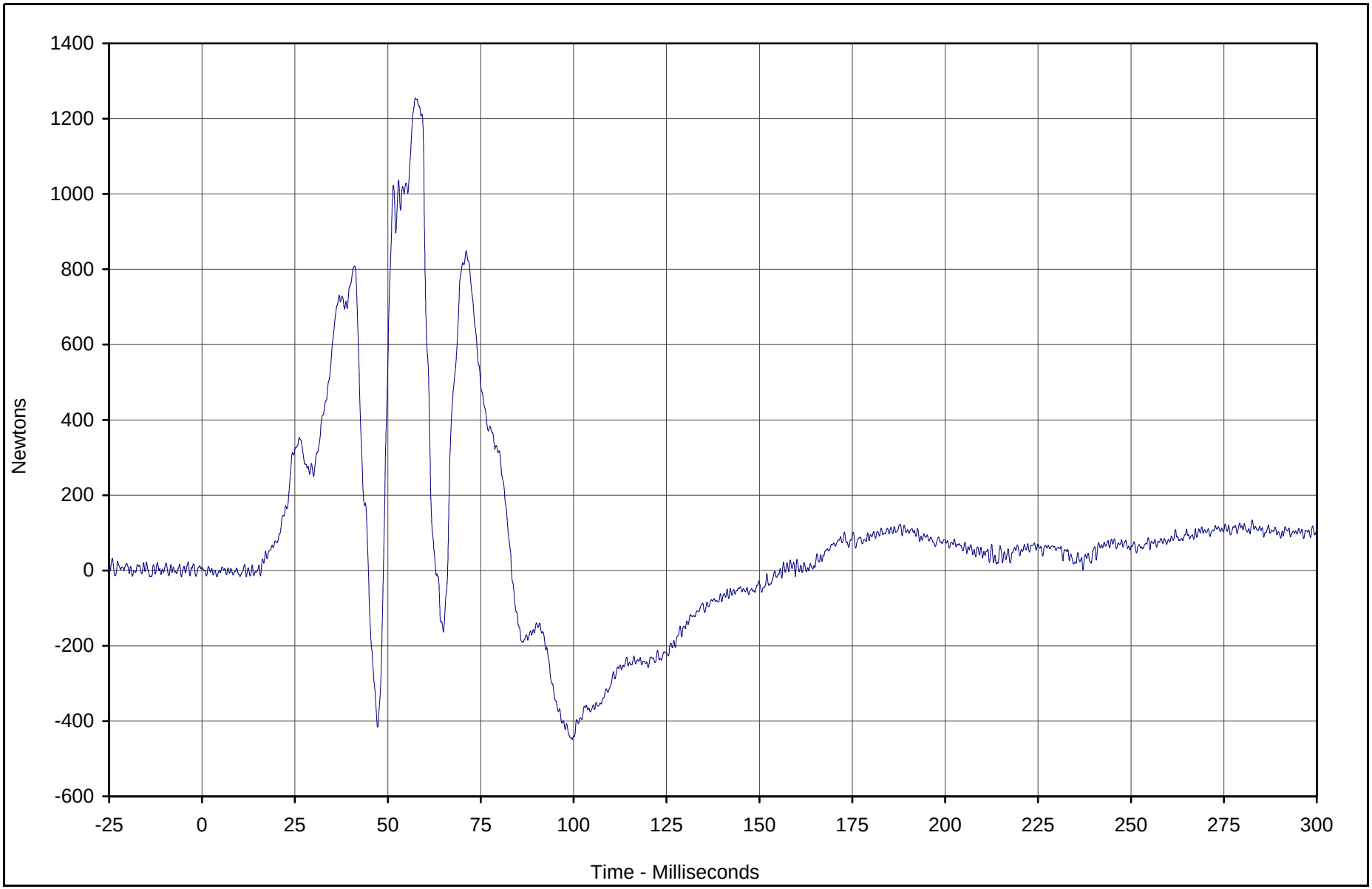
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Femur Force | 067 | FIL | Newtons | 1254.6 | 57.4 | -448.6 | 99.6 | 600 |

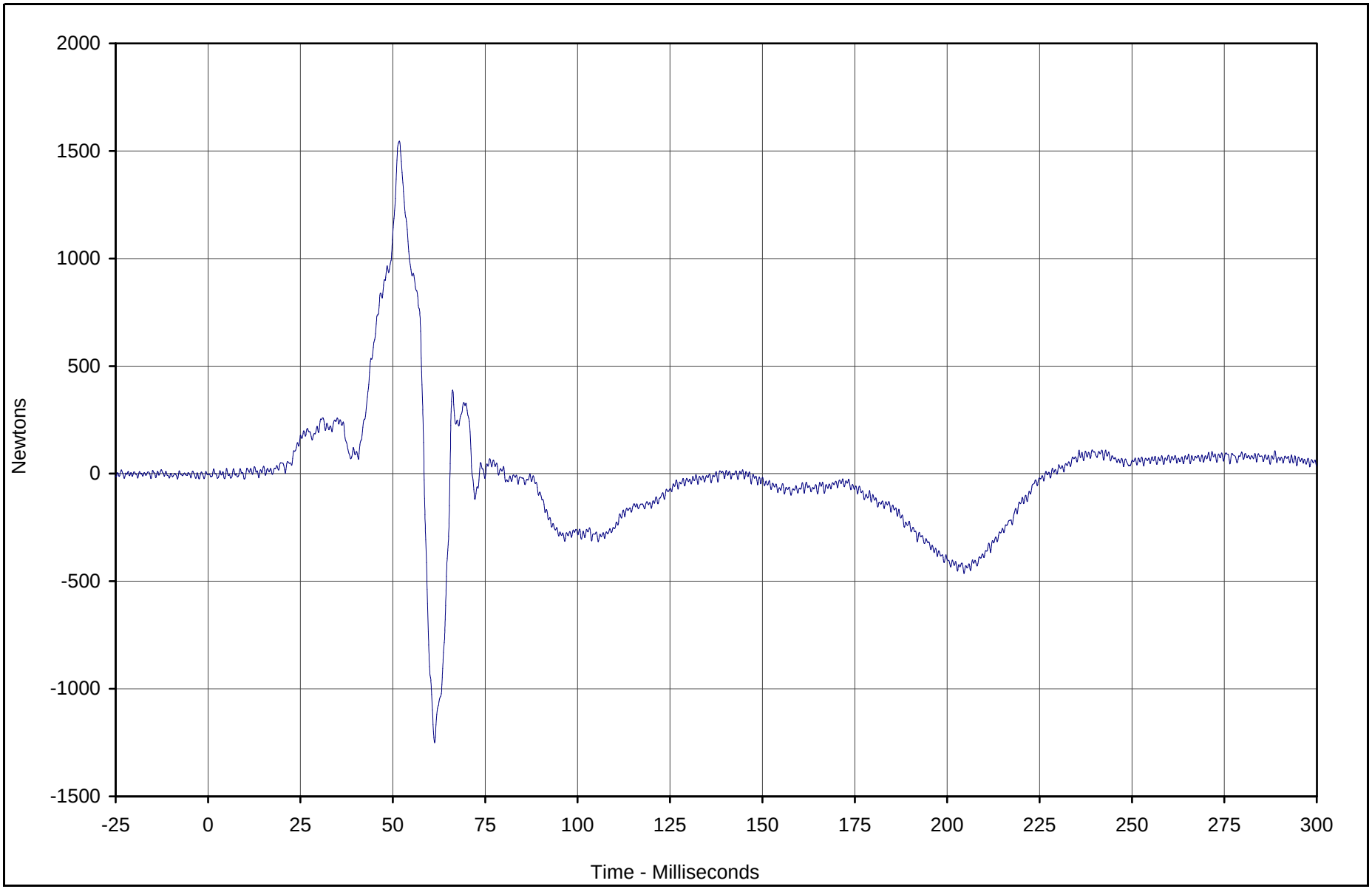
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Femur Force | 068 | FIL | Newtons | 1545.3 | 51.8 | -1251.0 | 61.3 | 600 |

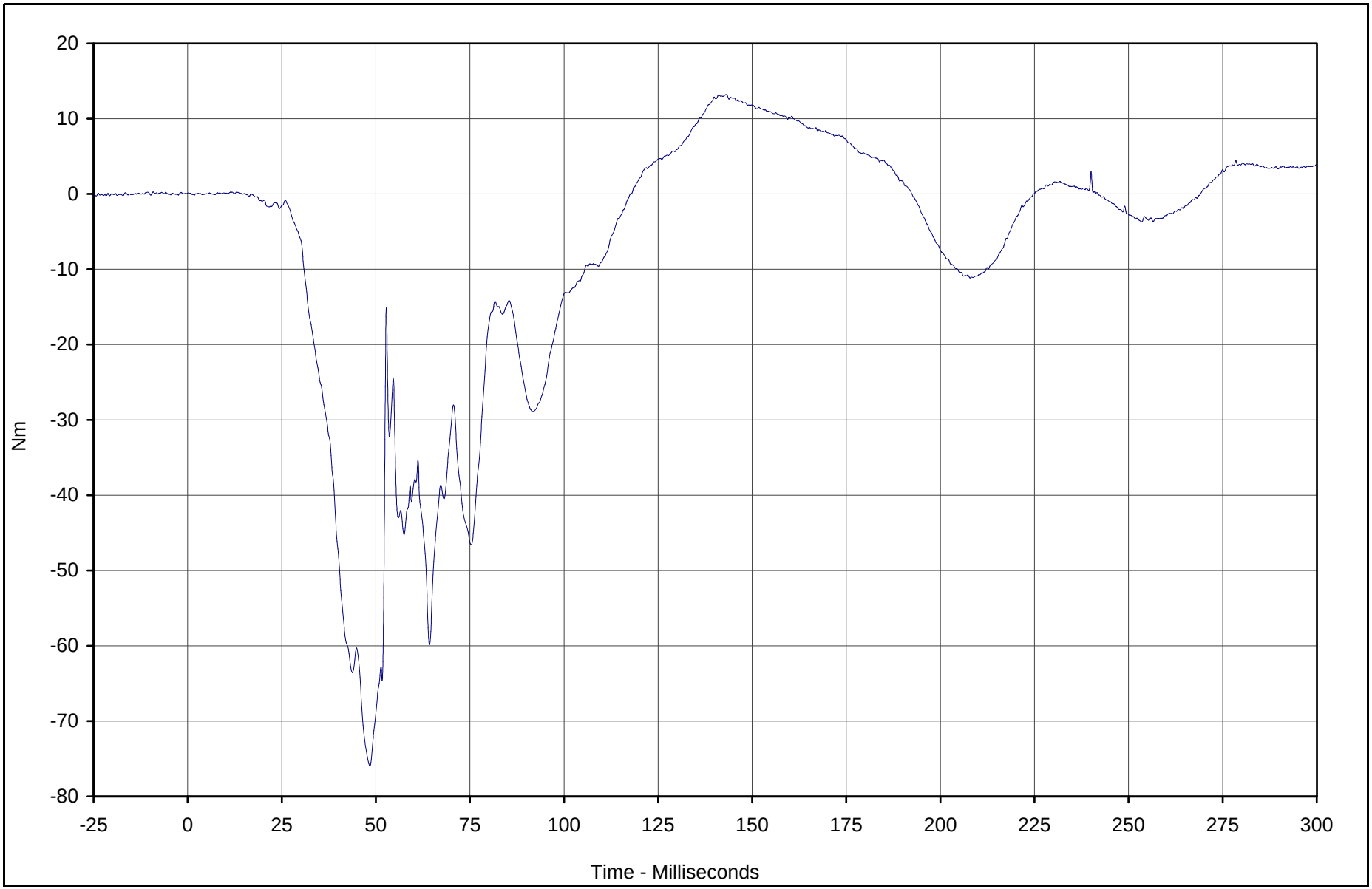
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Upper Tibia Moment X | 069 | FIL | Nm | 13.2 | 143.0 | -76.0 | 48.4 | 600 |

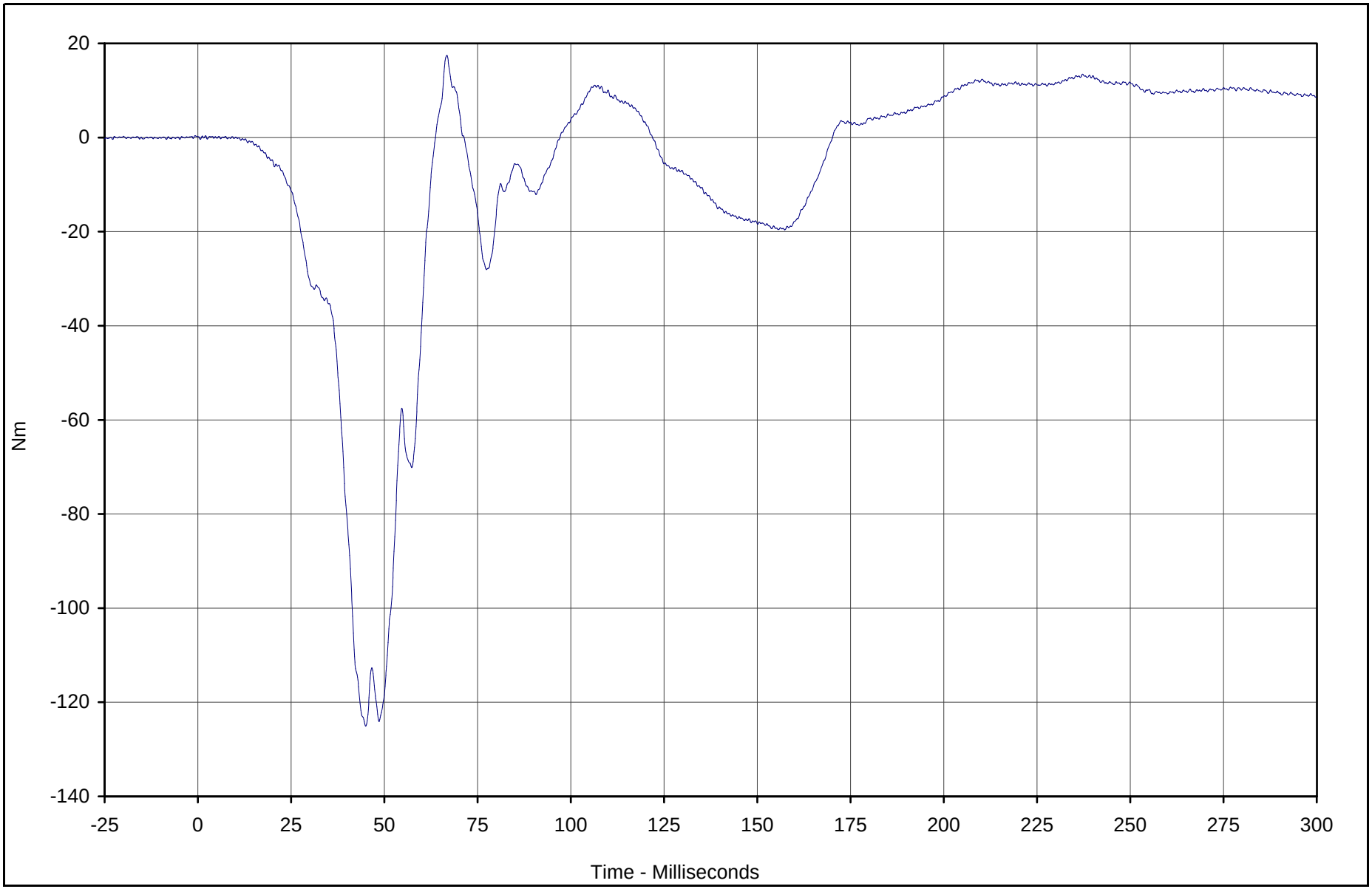
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Upper Tibia Moment Y | 070 | FIL | Nm | 17.4 | 66.8 | -125.1 | 45.0 | 600 |

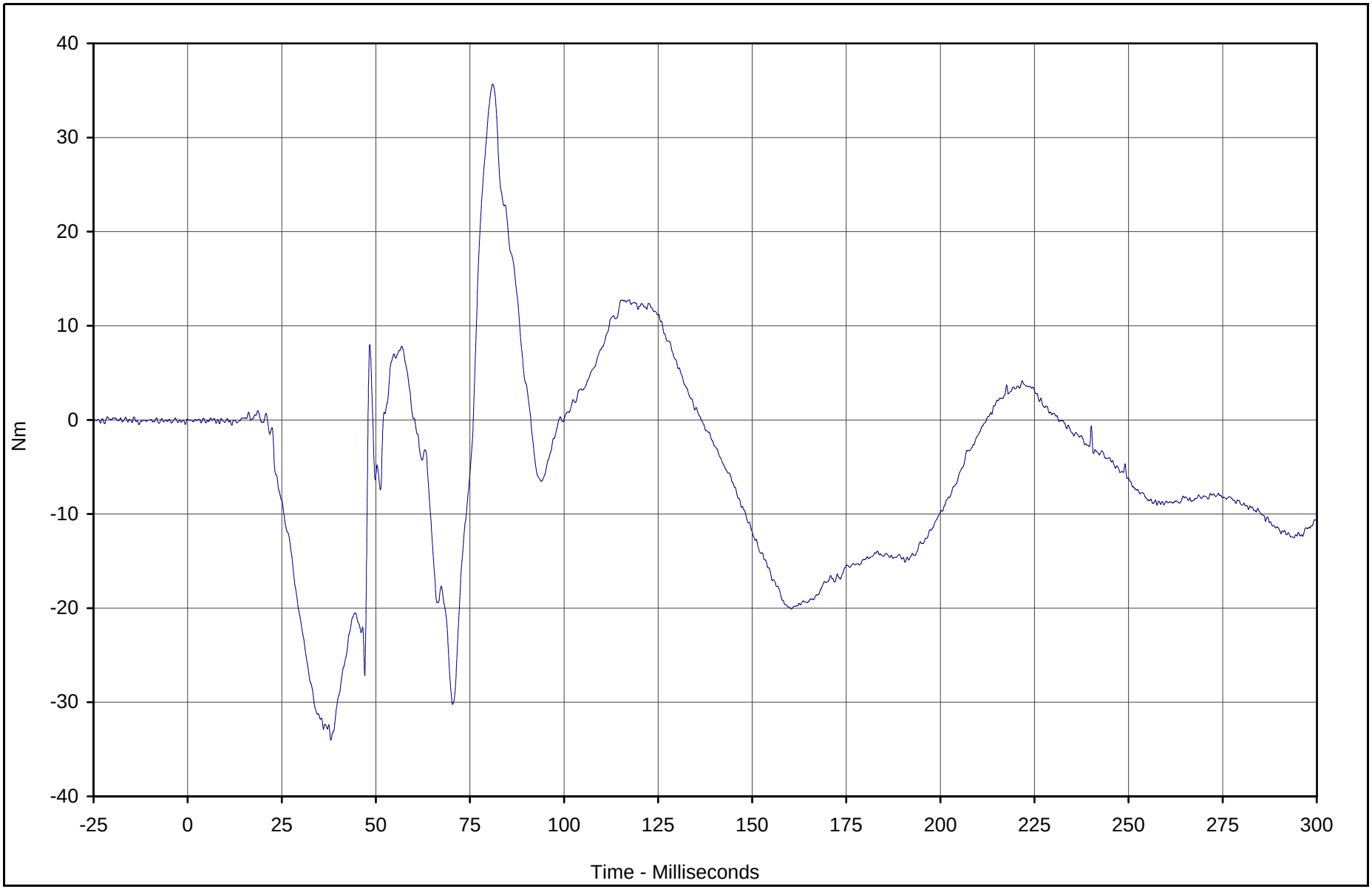
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Upper Tibia Moment X | 071 | FIL | Nm | 35.7 | 81.0 | -34.0 | 38.0 | 600 |

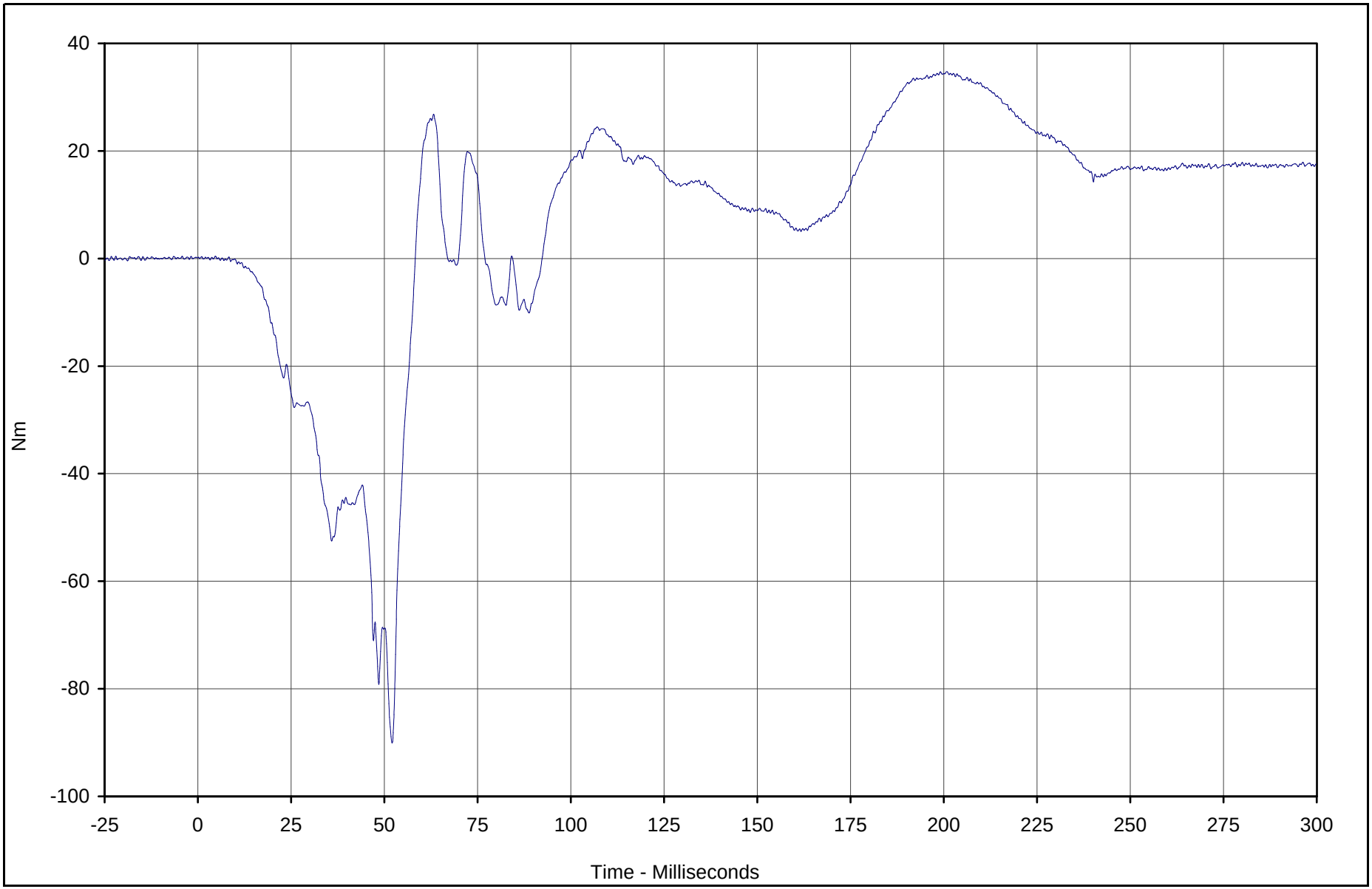
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Upper Tibia Moment Y | 072 | FIL | Nm | 34.8 | 200.8 | -90.1 | 52.1 | 600 |

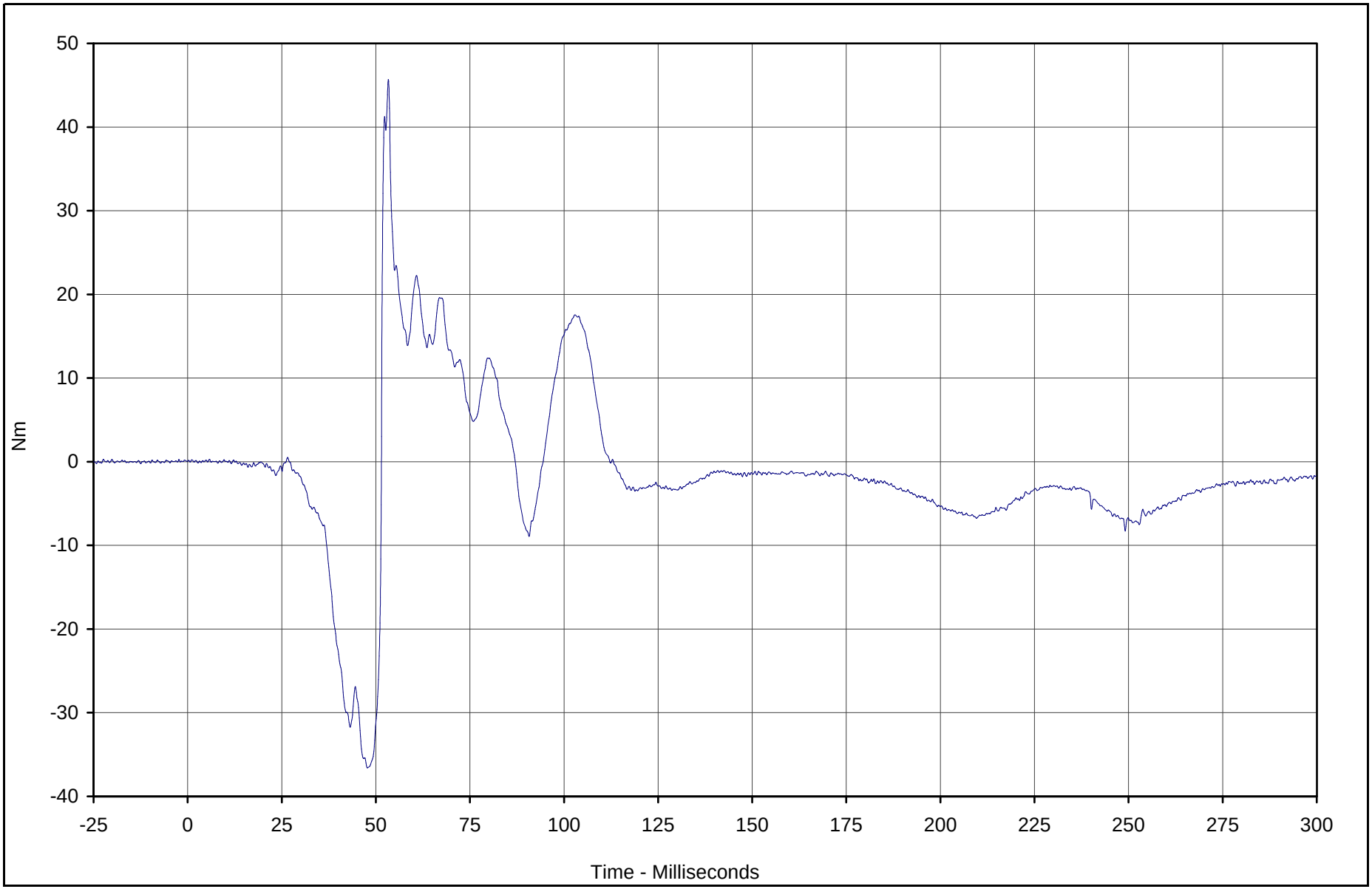
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Lower Tibia Moment X | 073 | FIL | Nm | 45.7 | 53.3 | -36.6 | 47.8 | 600 |

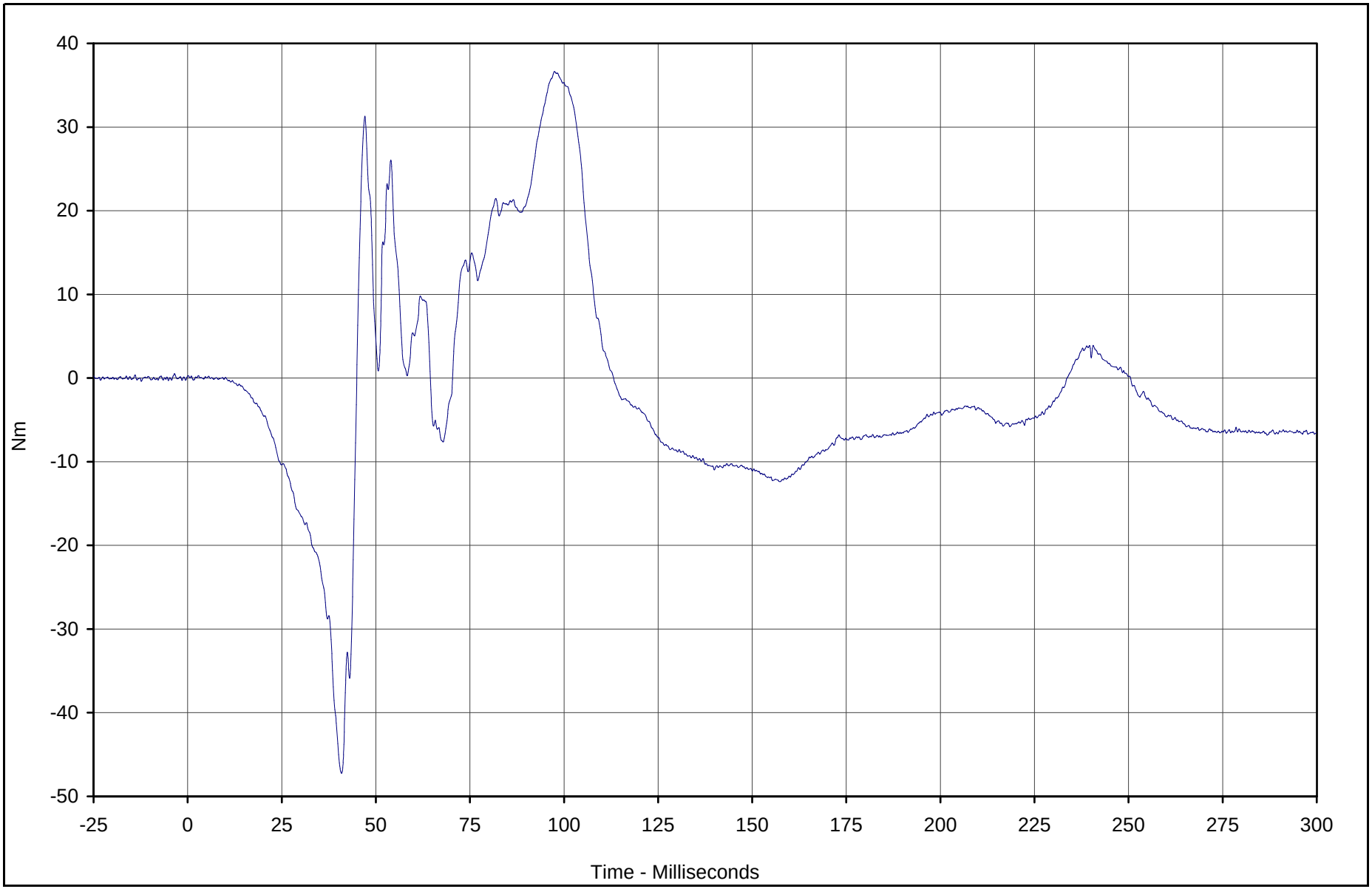
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Lower Tibia Moment Y | 074 | FIL | Nm | 36.6 | 97.5 | -47.3 | 40.9 | 600 |

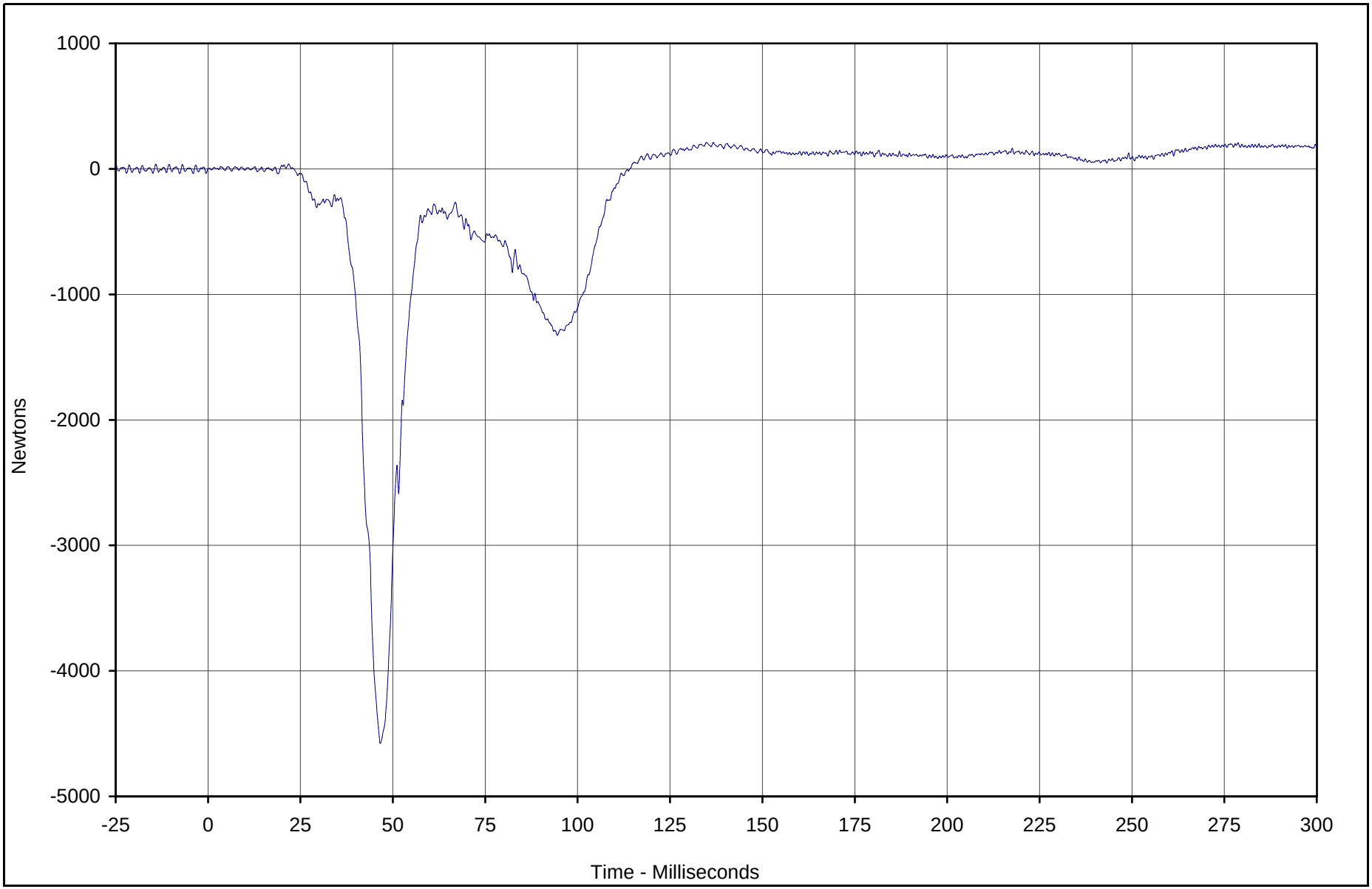
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Lower Tibia Force Z | 075 | FIL | Newtons | 211.2 | 136.7 | -4576.9 | 46.6 | 600 |

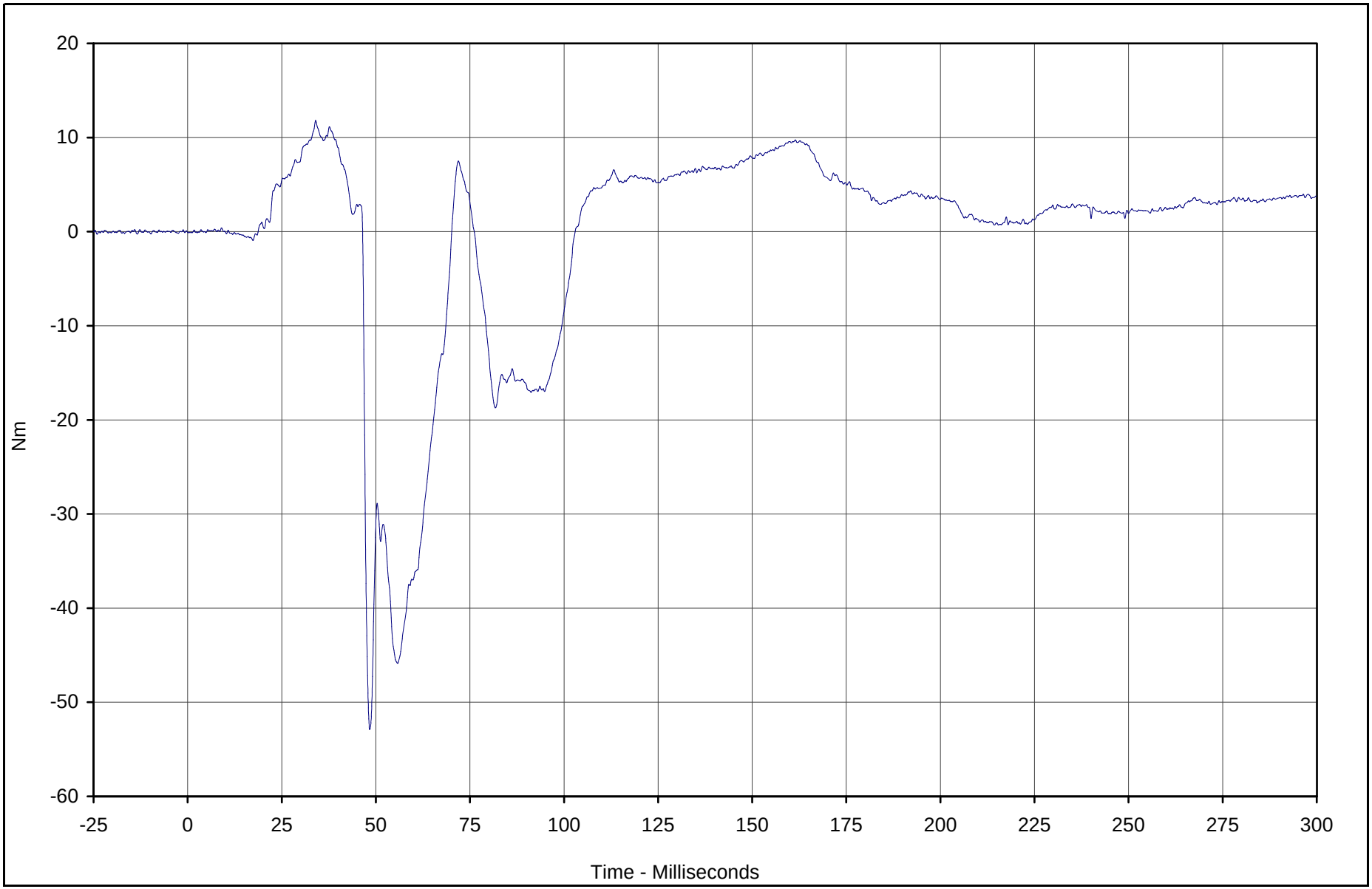
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Lower Tibia Moment X | 076 | FIL | Nm | 11.8 | 34.0 | -52.9 | 48.4 | 600 |

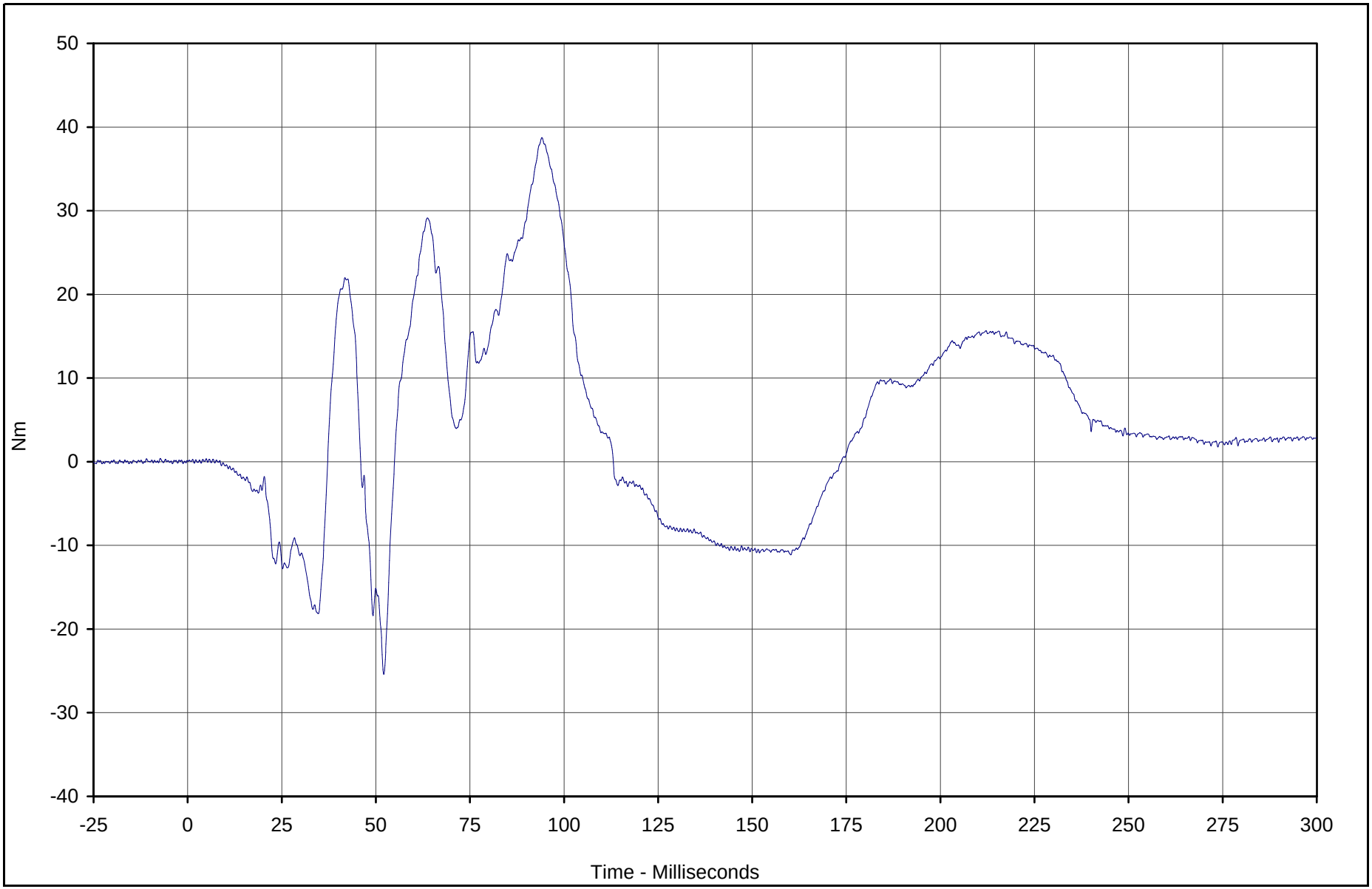
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Lower Tibia Moment Y | 077 | FIL | Nm | 38.7 | 94.1 | -25.4 | 52.1 | 600 |

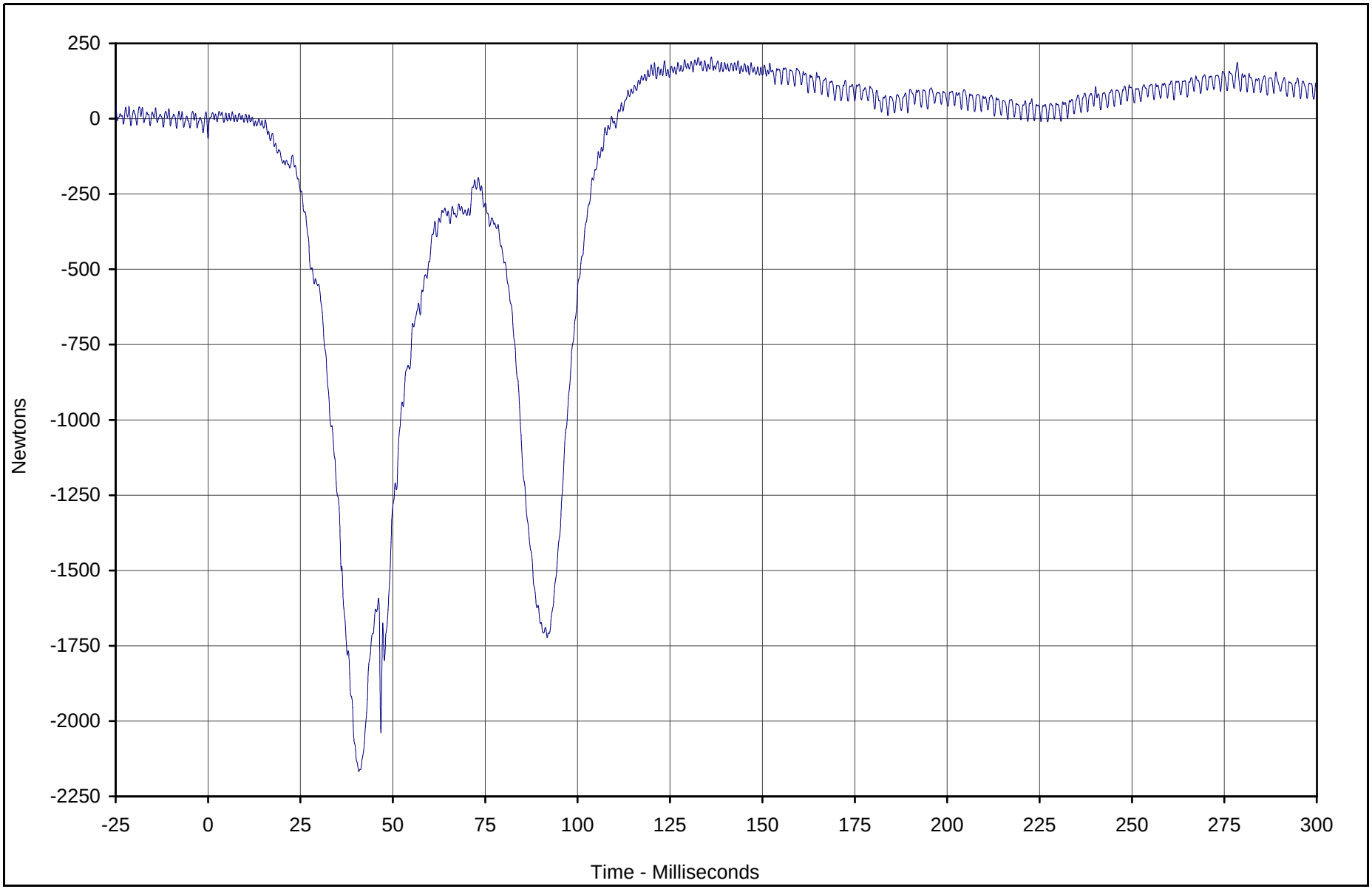
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right lower Tibia Force Z | 078 | FIL | Newtons | 204.8 | 136.2 | -2167.8 | 40.8 | 600 |

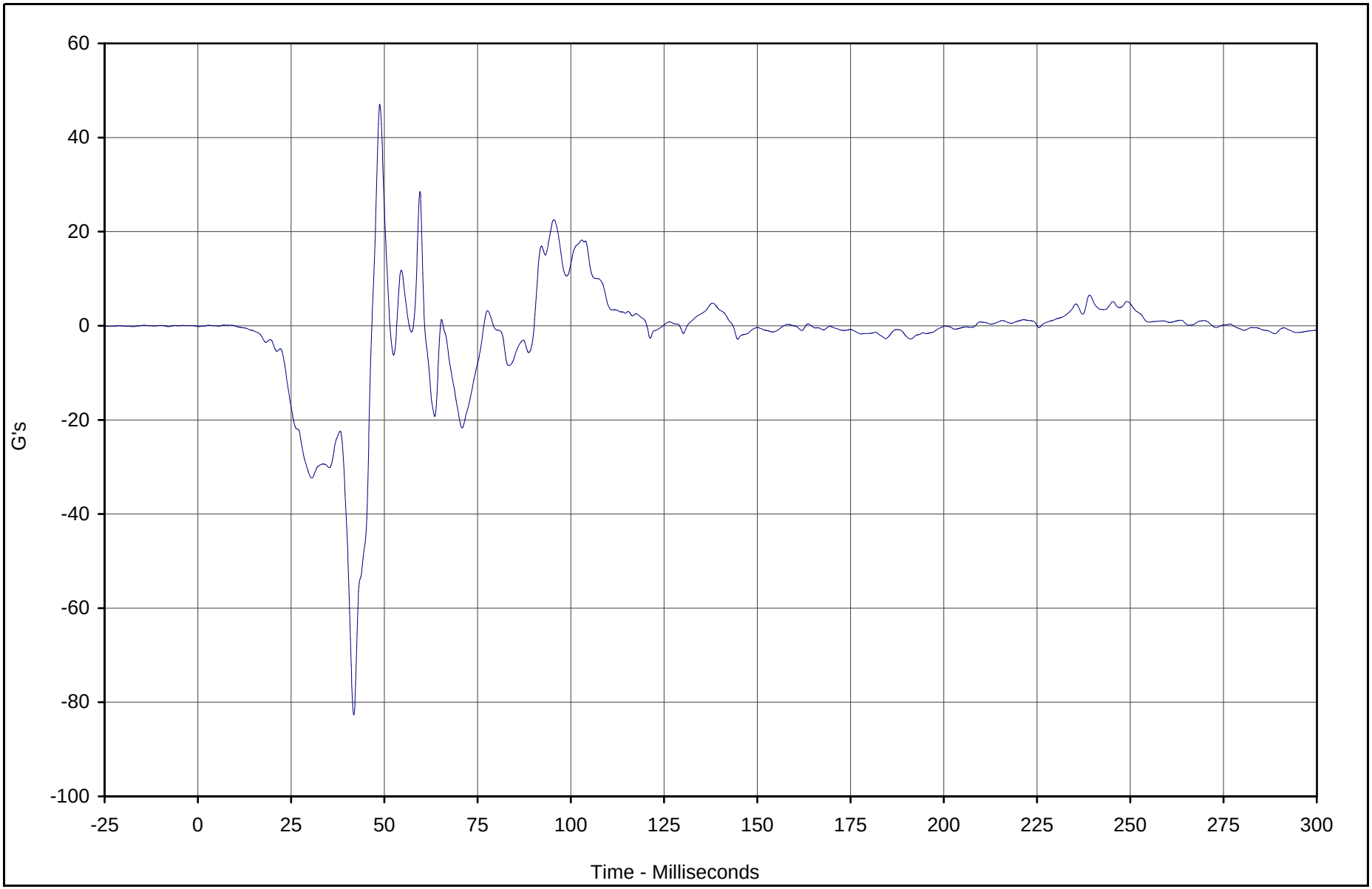
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Foot Aft X | 079 | FIL | G's | 47.1 | 48.8 | -82.7 | 41.8 | 180 |

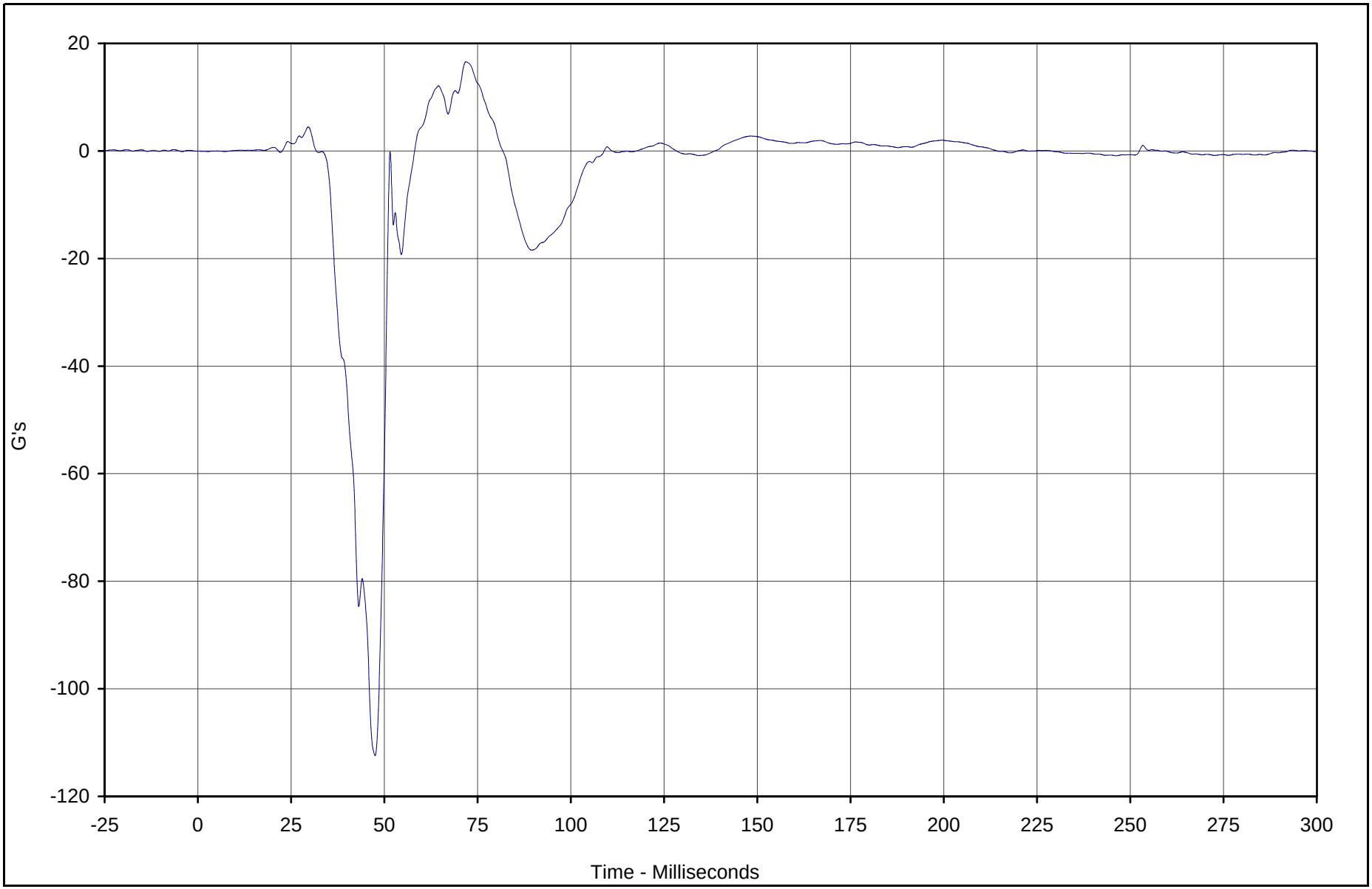
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Foot Aft Z | 080 | FIL | G's | 16.6 | 71.9 | -112.4 | 47.5 | 180 |

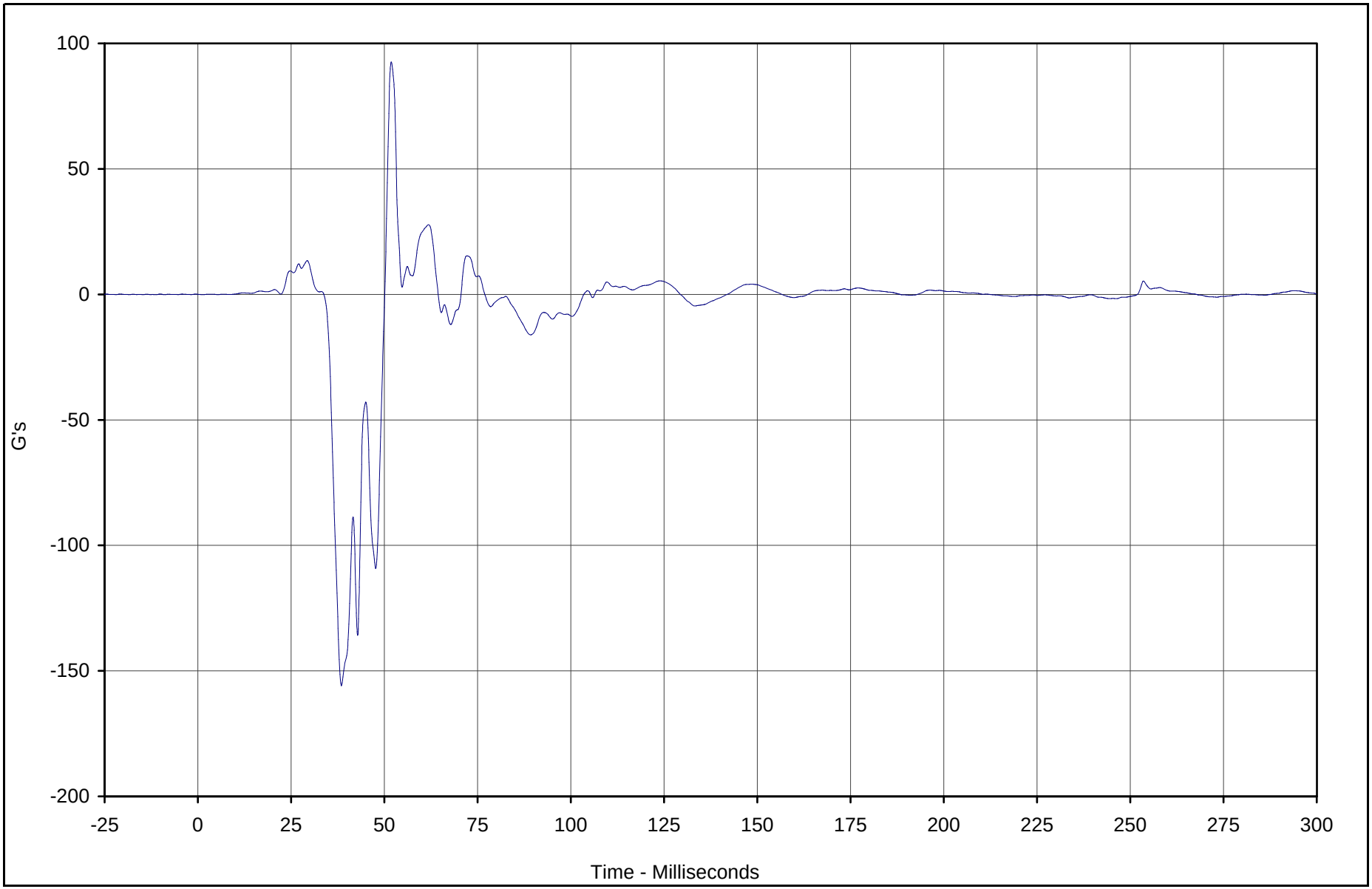
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Left Foot Fore Z | 081 | FIL | G's | 92.5 | 51.9 | -155.9 | 38.5 | 180 |

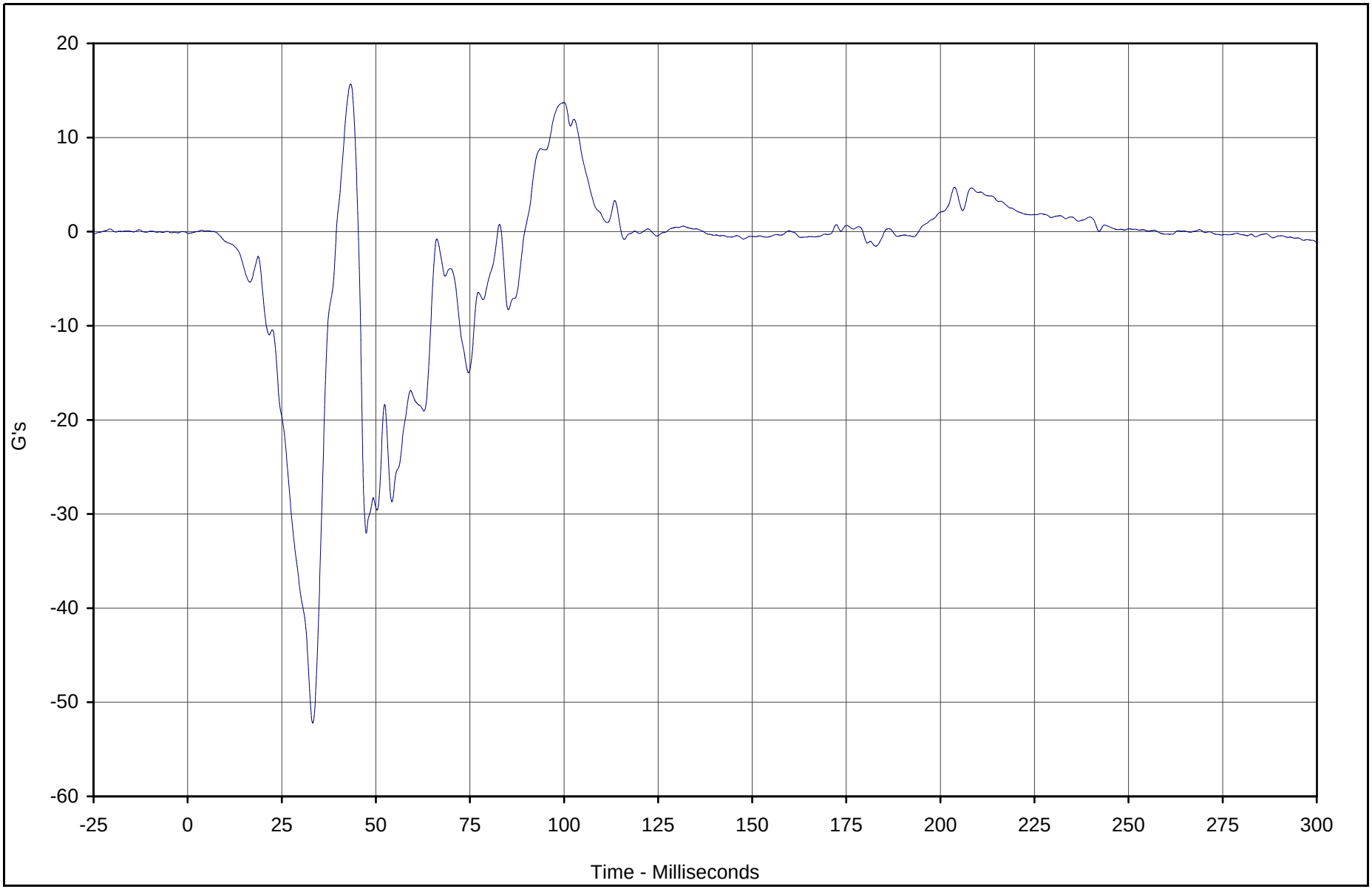
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Foot Aft X | 082 | FIL | G's | 15.7 | 43.3 | -52.2 | 33.2 | 180 |

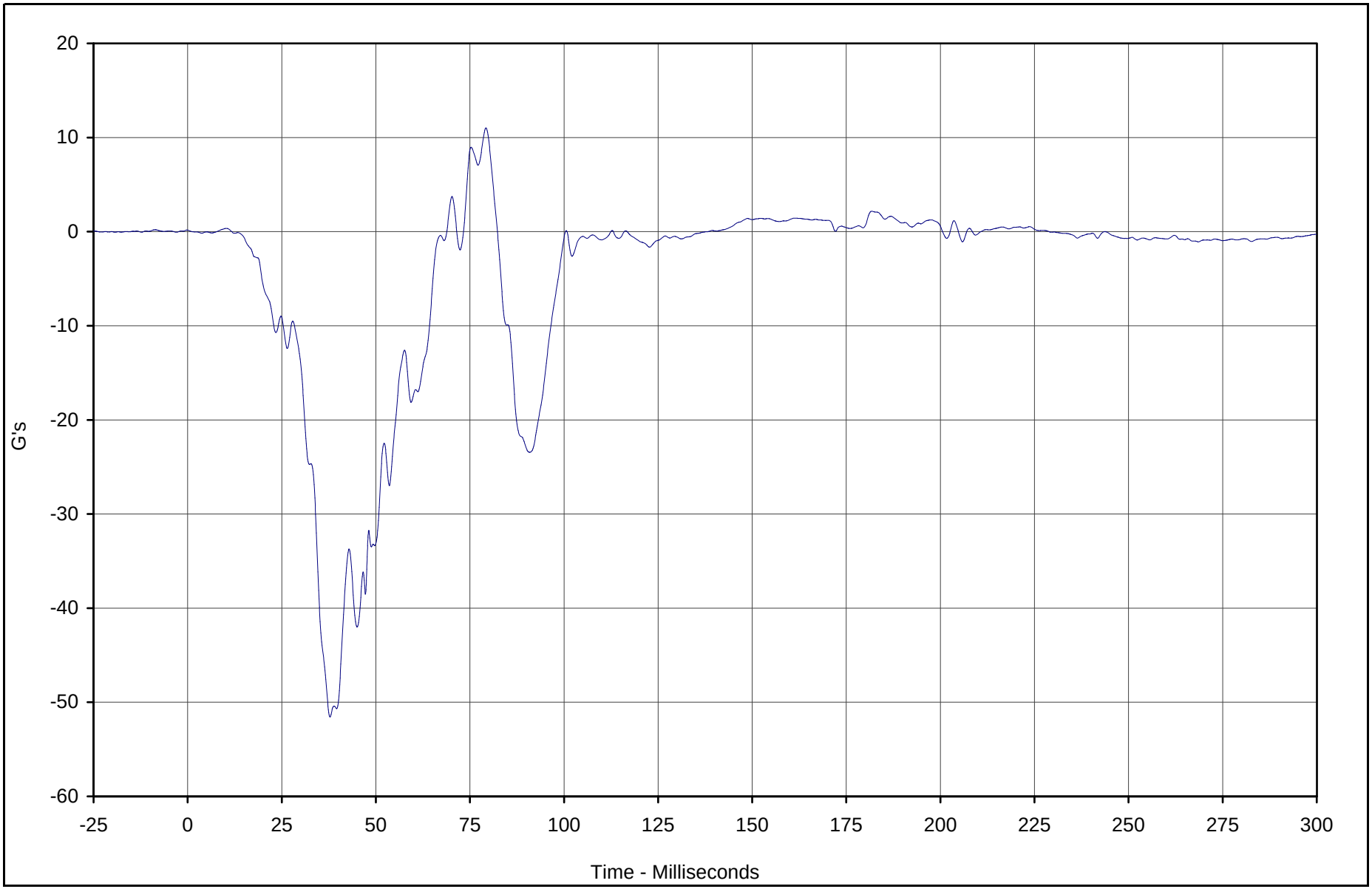
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Foot Aft Z | 083 | FIL | G's | 11.0 | 79.2 | -51.6 | 37.8 | 180 |

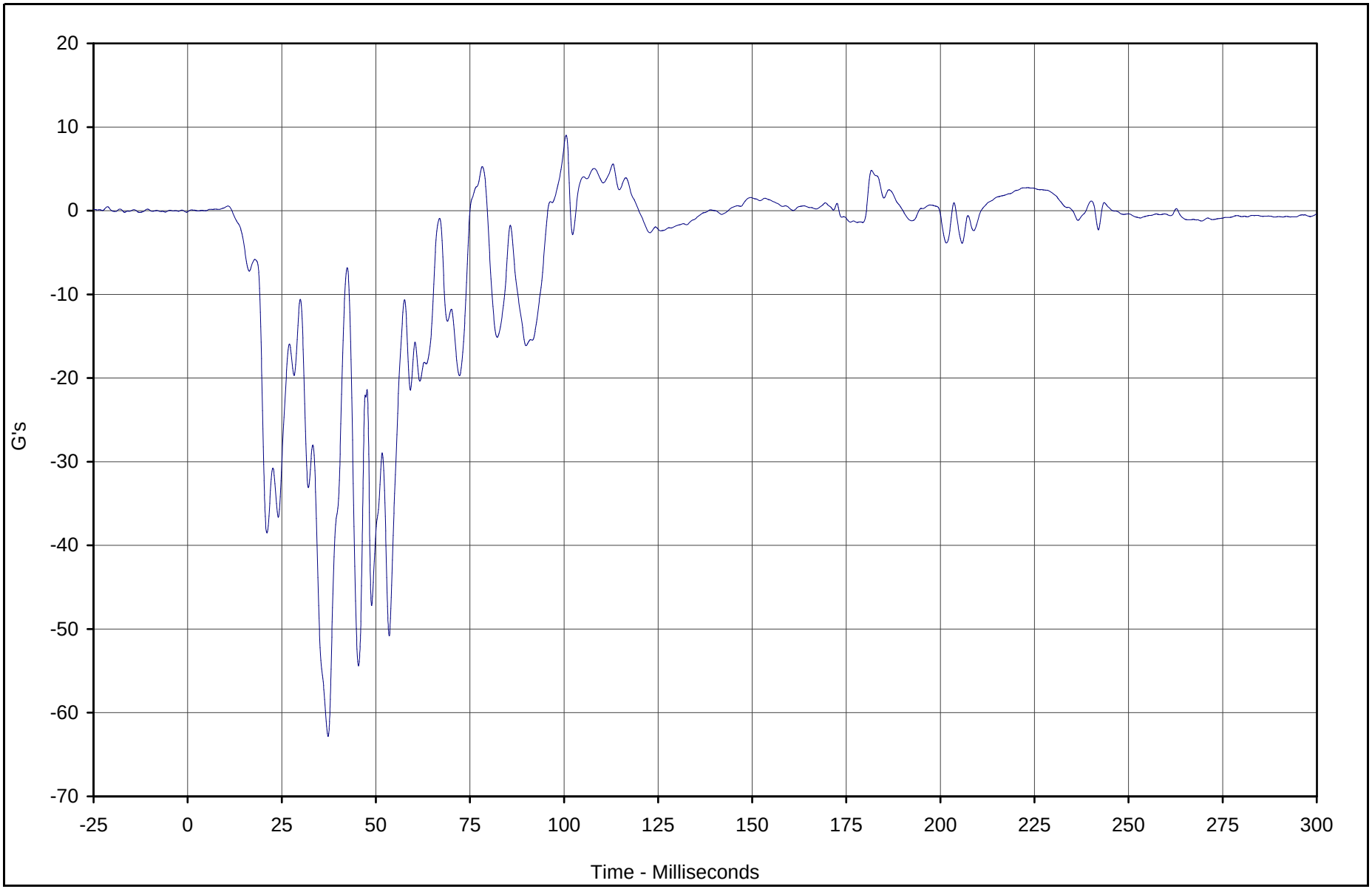
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Right Foot Fore Z | 084 | FIL | G's | 9.0 | 100.6 | -62.8 | 37.3 | 180 |

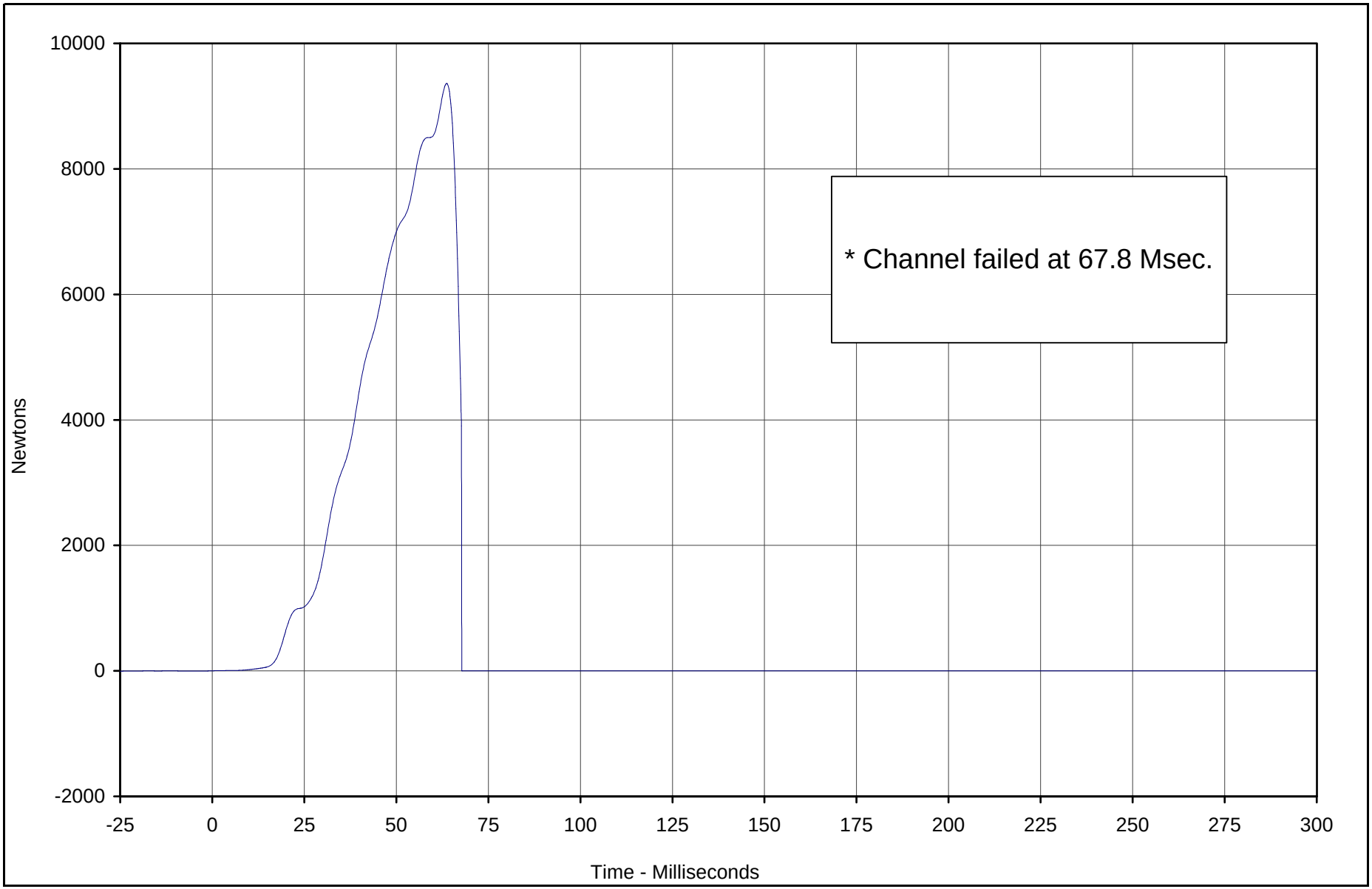
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




*Channel failed @ 67.8 Msec.

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Lap Belt Force | 085 | FIL | Newtons | 9361.3 | 63.7 | 0.0 | 67.8 | 60 |

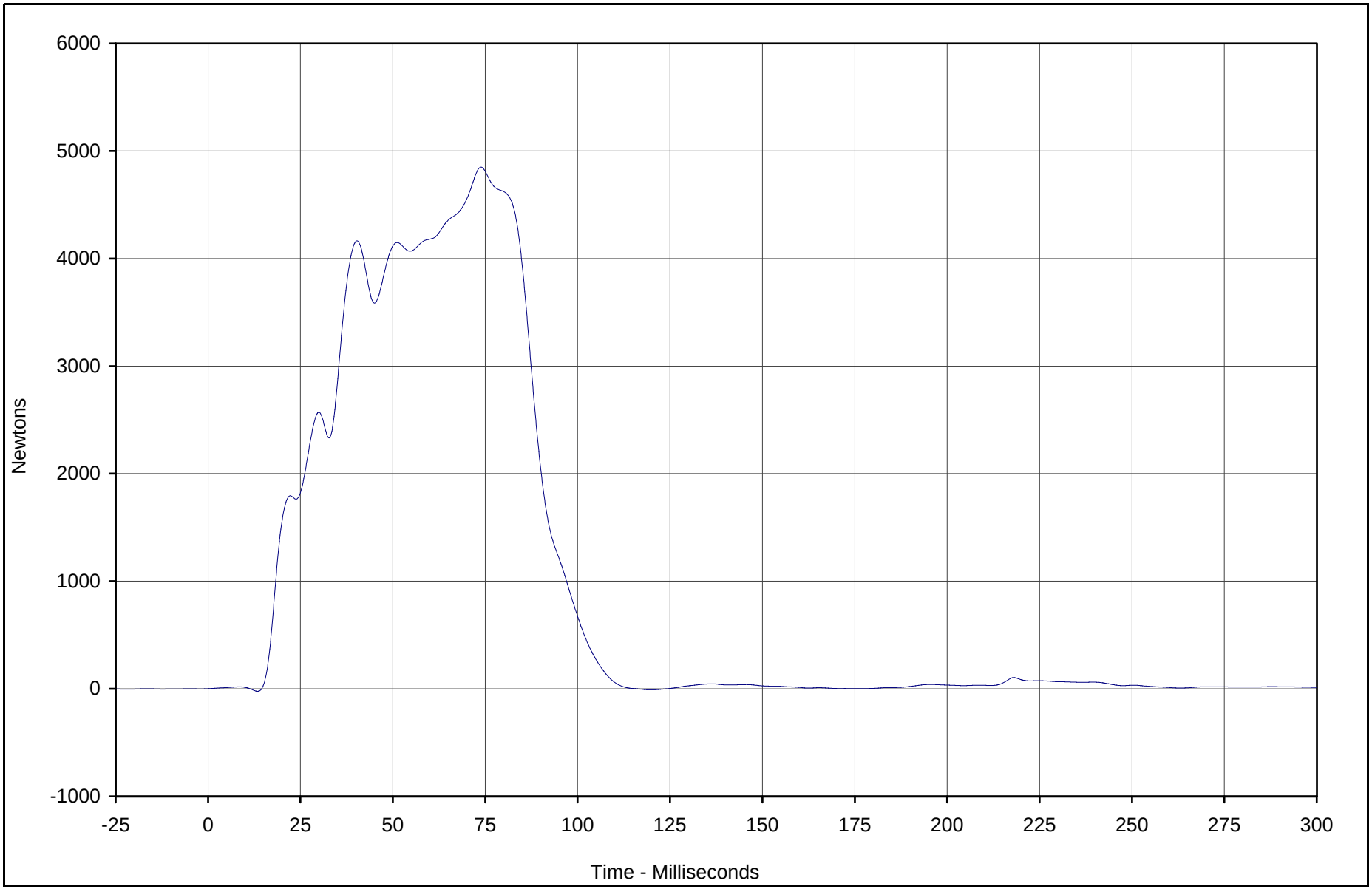
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Shoulder Belt Force | 086 | FIL | Newtons | 4849.5 | 73.9 | -23.1 | 13.4 | 60 |

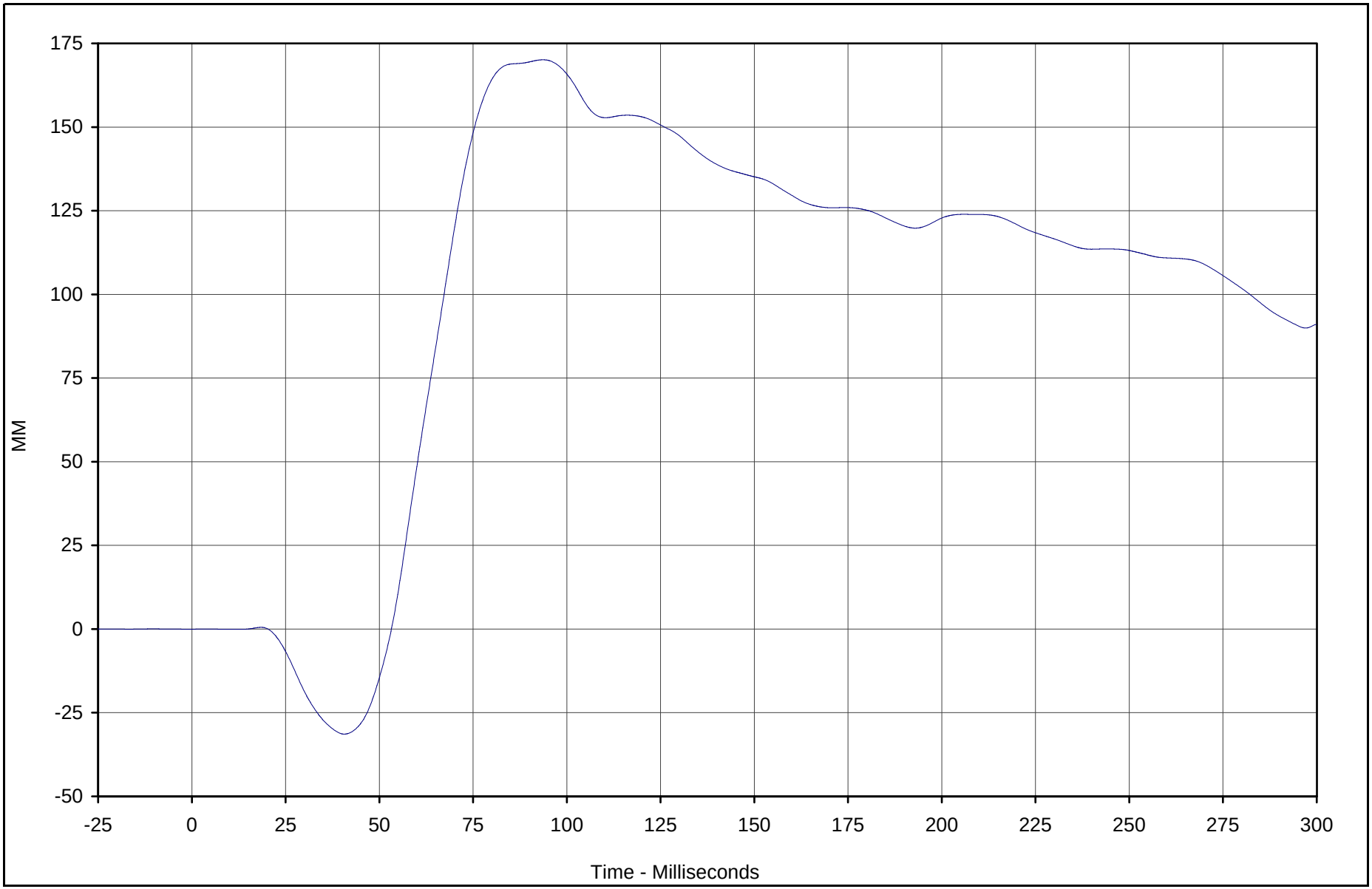
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Shoulder Belt Pullout | 087 | FIL | MM | 170.1 | 93.6 | -31.4 | 40.7 | 60 |

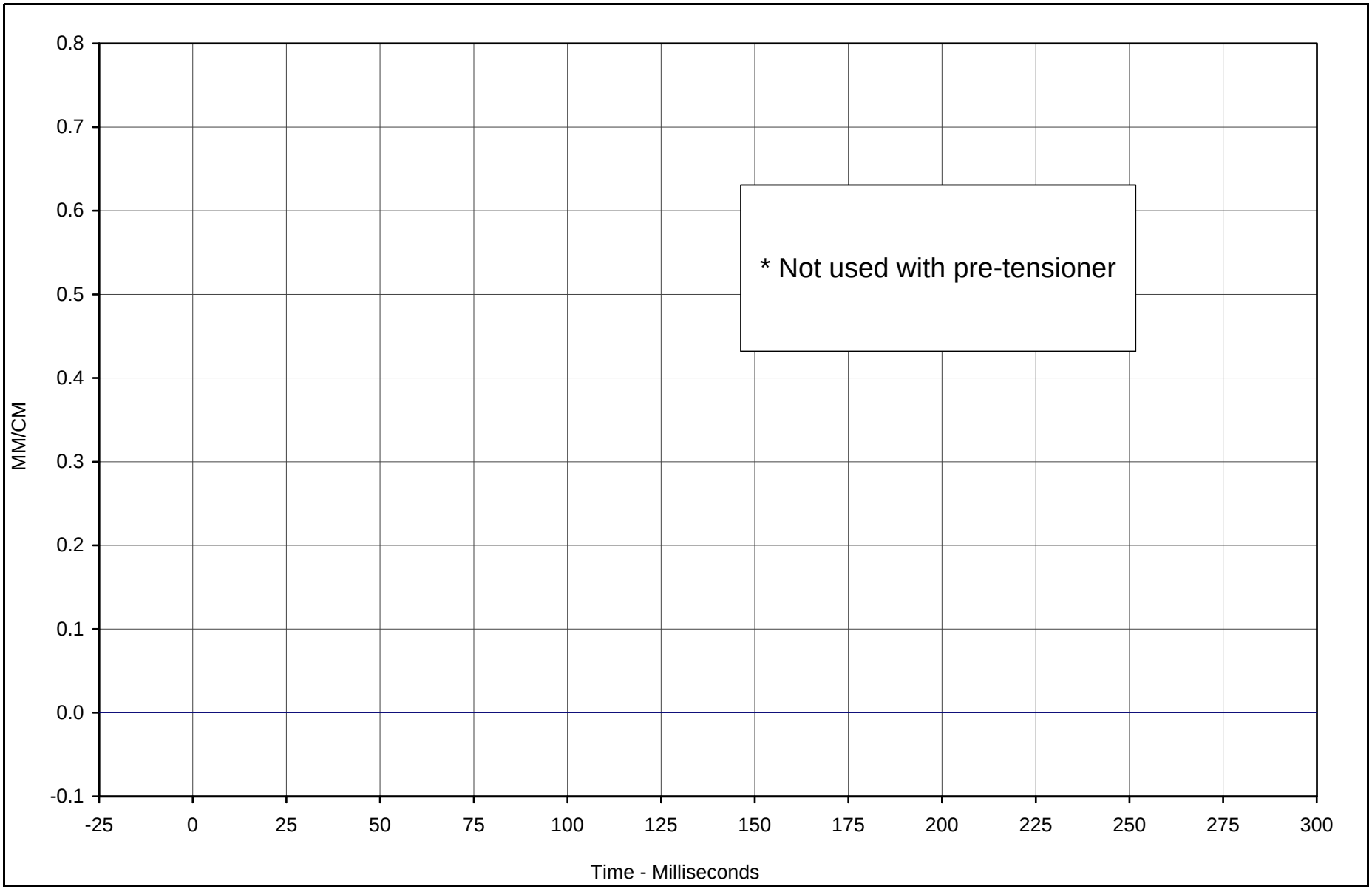
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




* Not used with pre-tensioner

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Passenger Shoulder Belt Elongation | 088 | FIL | MM/CM | 0.00 | 0.0 | 0.00 | 0.0 | 60 |

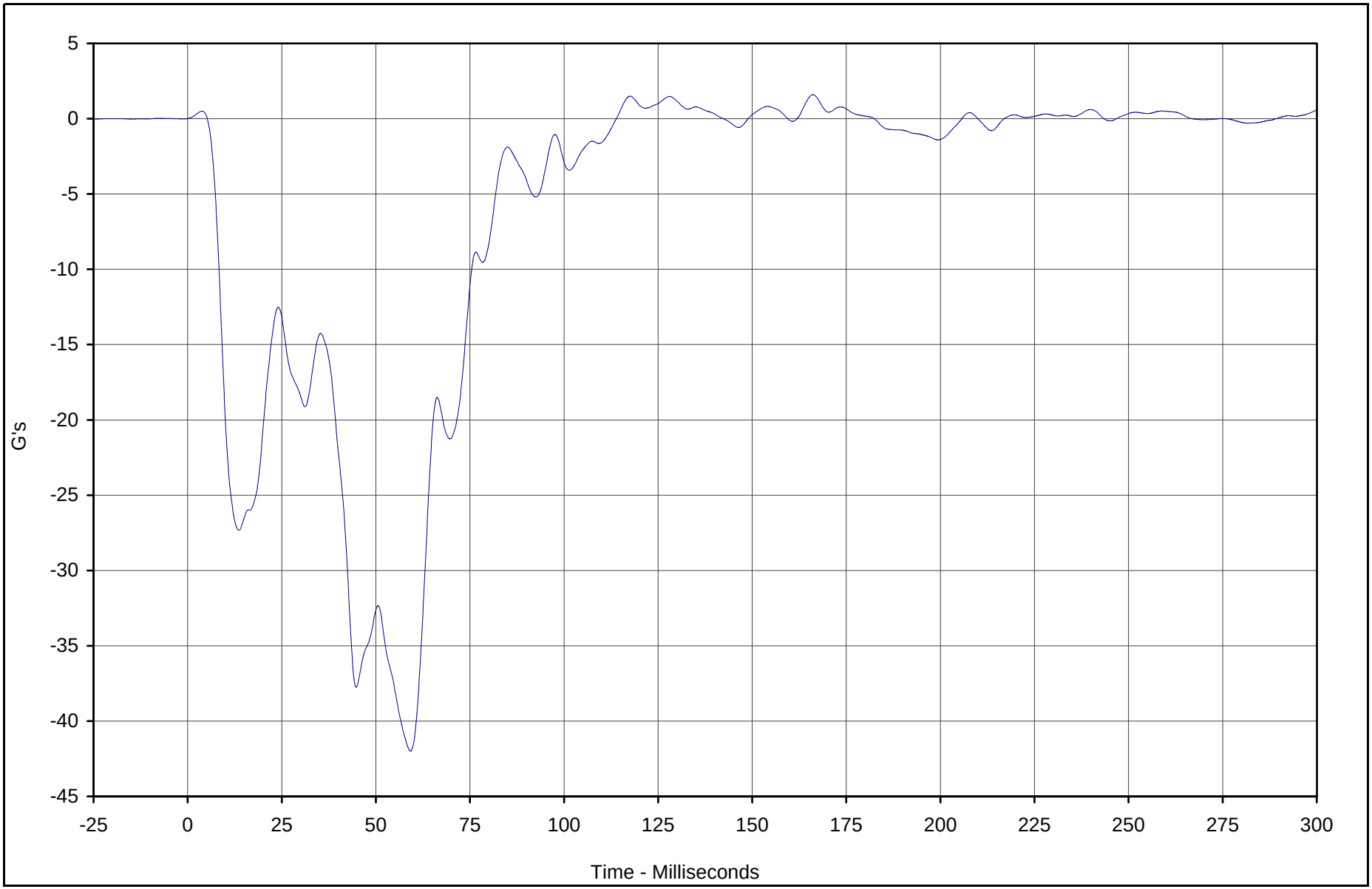
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



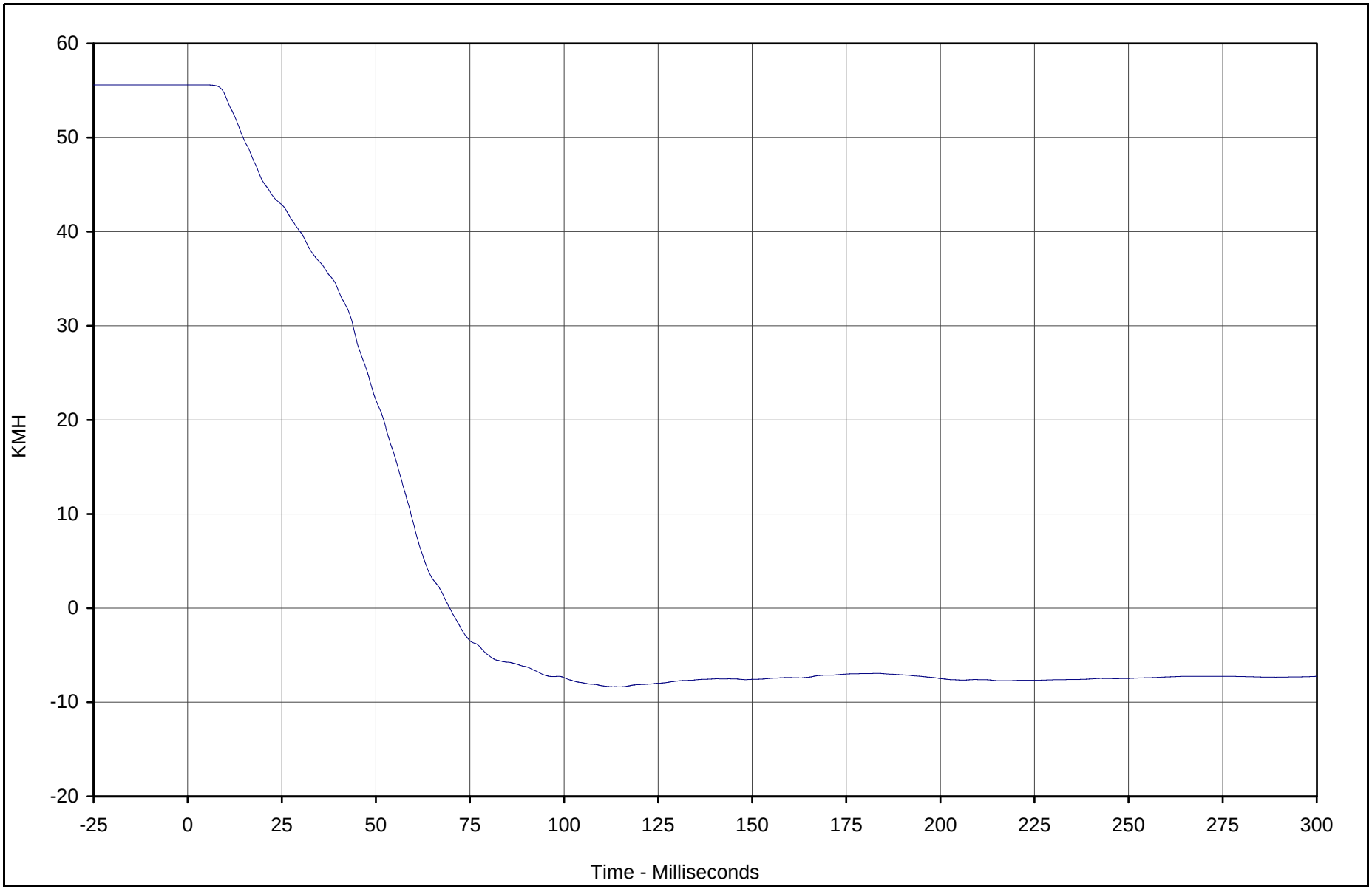

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Rear X | 089 | FIL | G's | 1.6 | 166.1 | -42.0 | 59.2 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Rear X Velocity | 089 | IN1 | KMH | 55.6 | 0.2 | -8.4 | 114.7 | 180 |

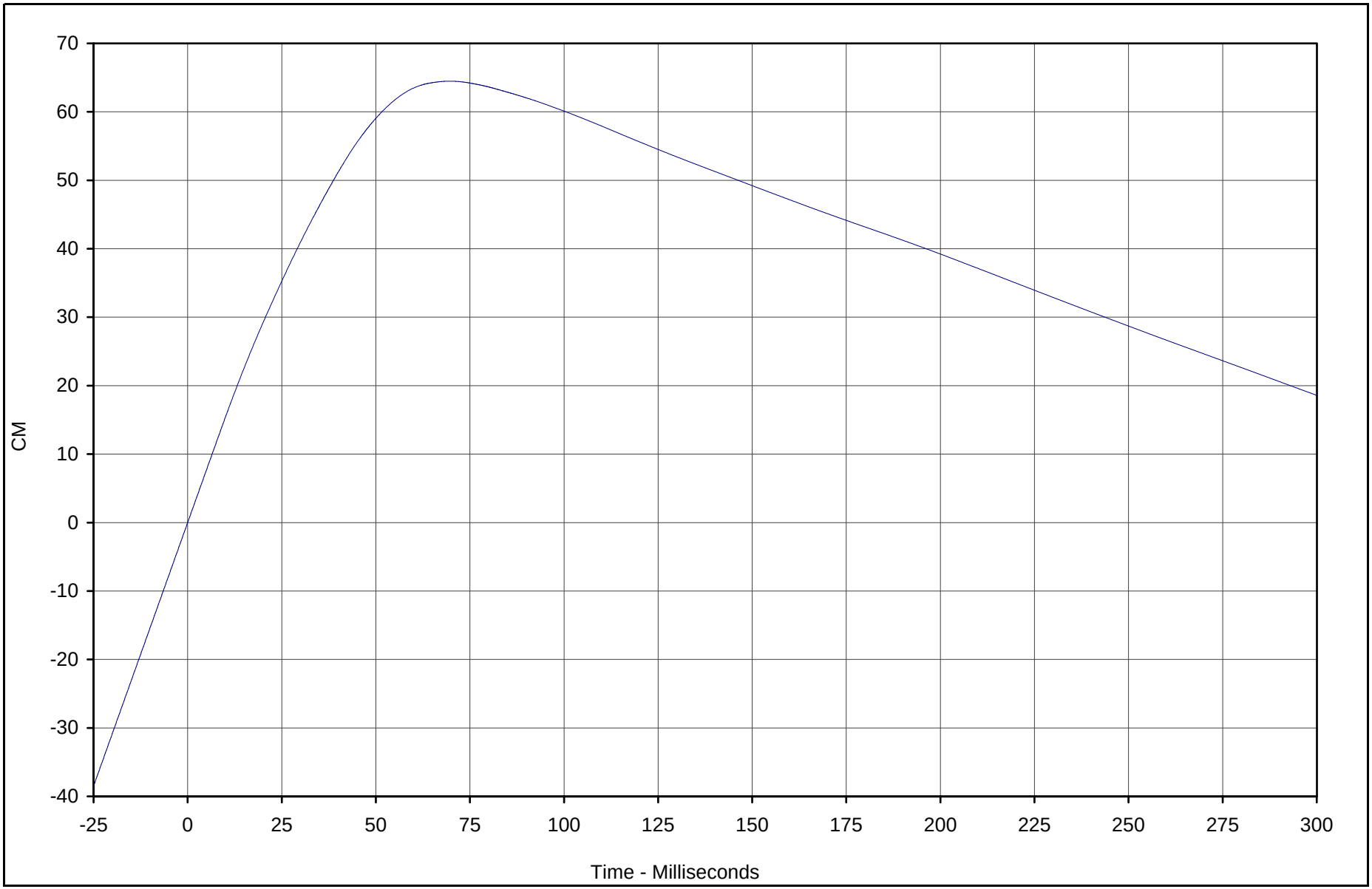
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



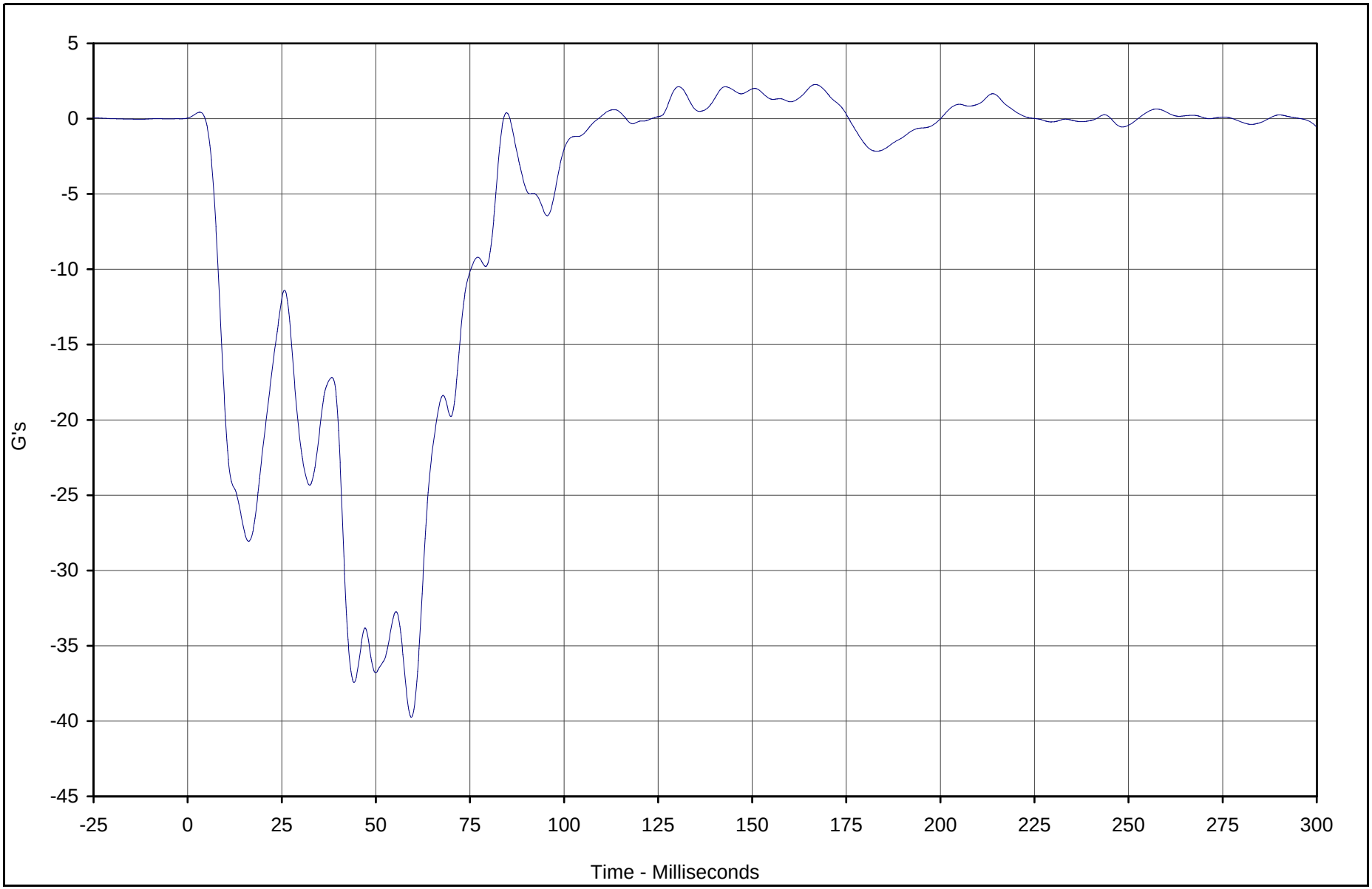

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Rear X Displ. | 089 | IN2 | CM | 64.5 | 69.6 | 0.0 | 0.0 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



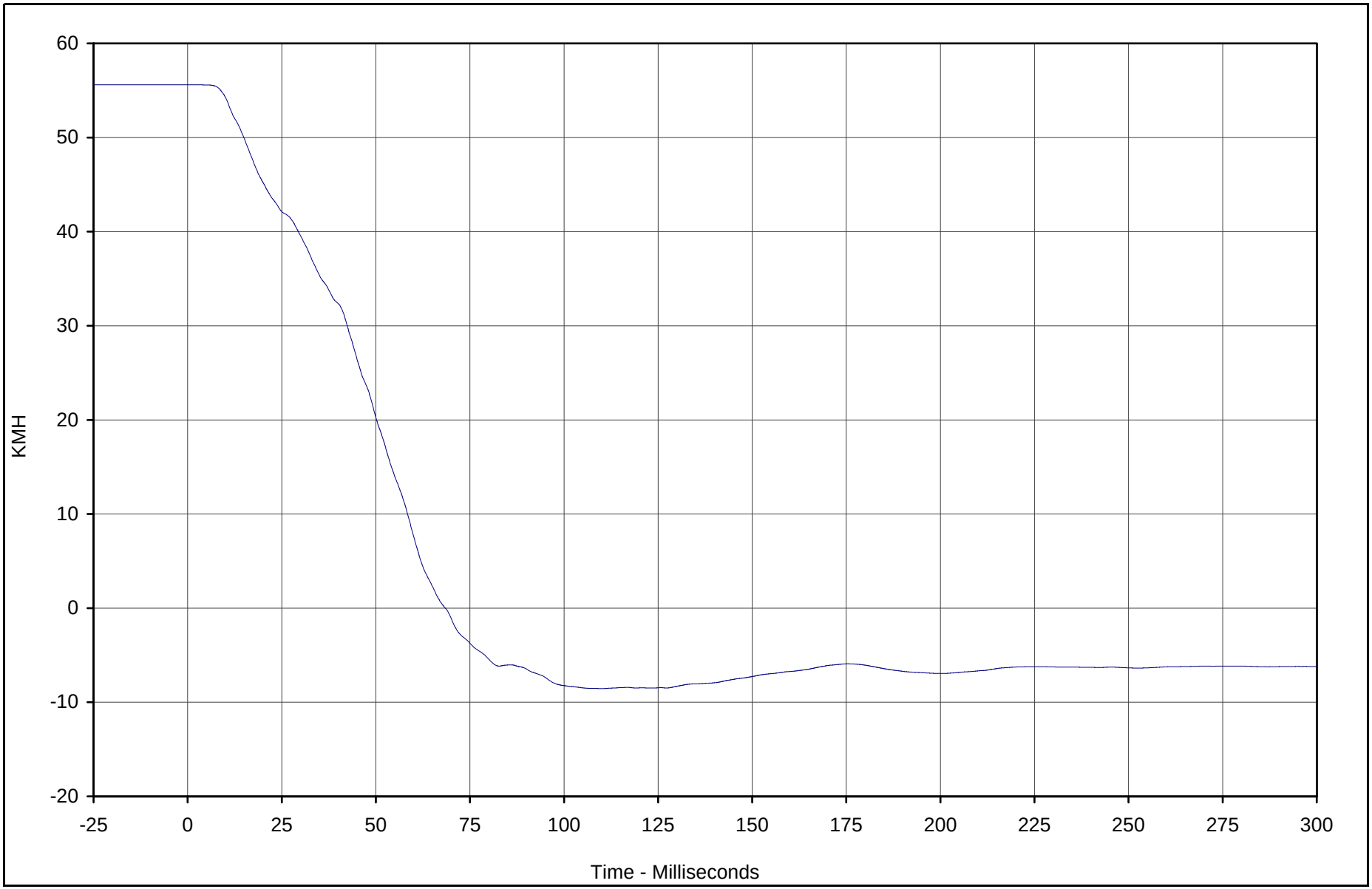

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Rear X | 090 | FIL | G's | 2.3 | 166.8 | -39.7 | 59.4 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



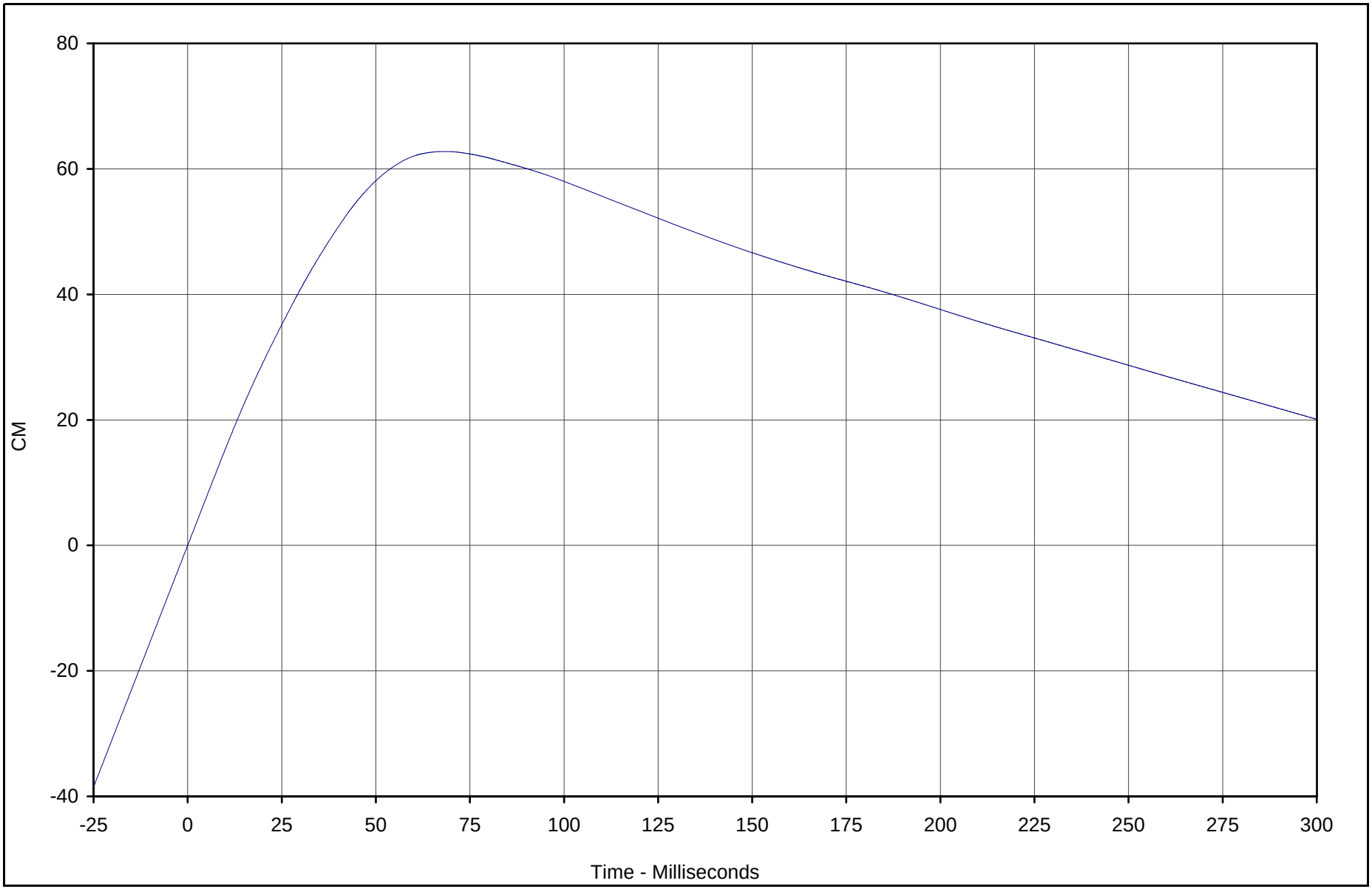

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Rear X Velocity | 090 | IN1 | KMH | 55.6 | 0.0 | -8.5 | 109.6 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



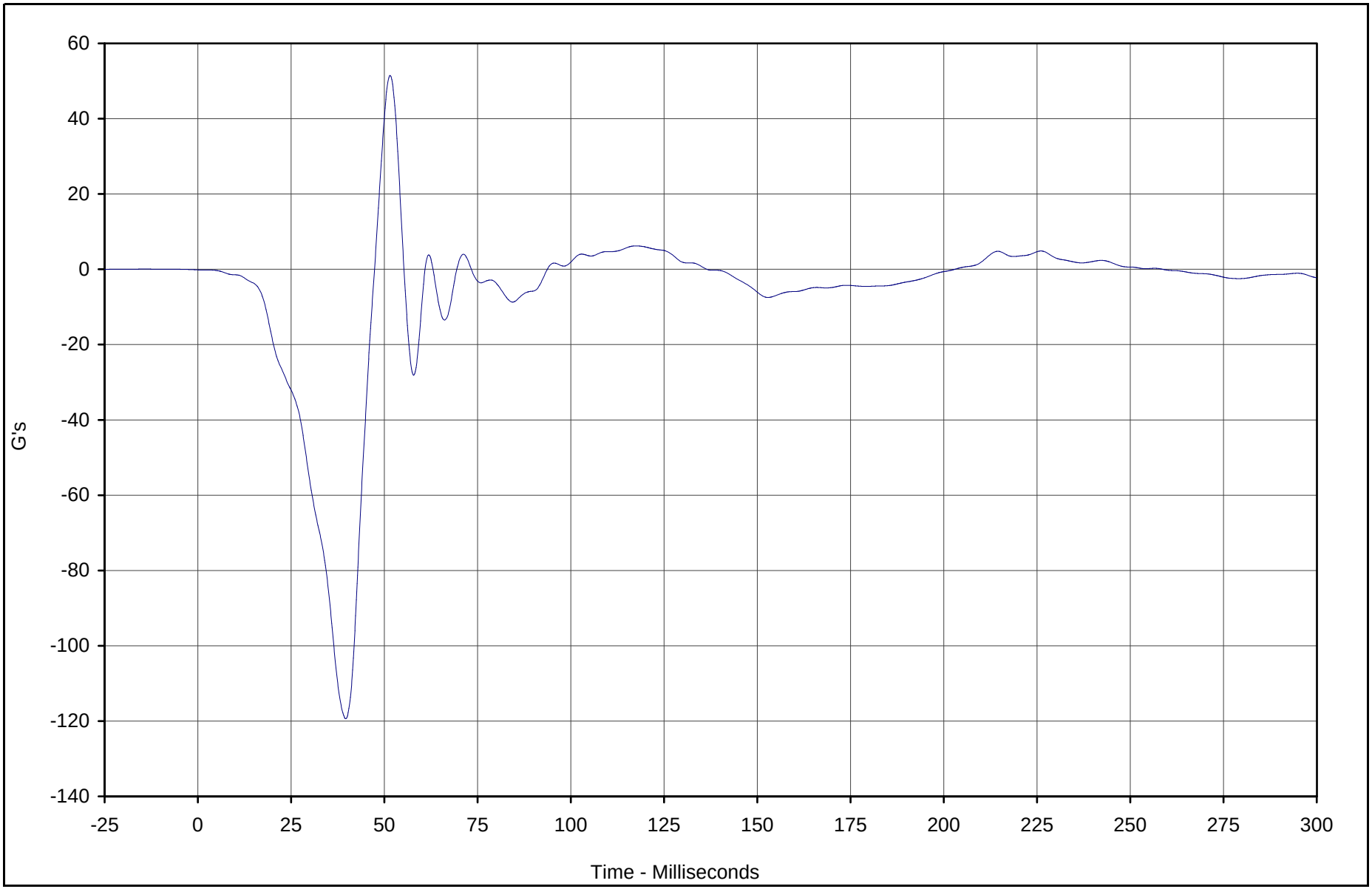

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Rear X Displ. | 090 | IN2 | CM | 62.8 | 68.5 | 0.0 | 0.0 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Engine Top | 091 | FIL | G's | 51.5 | 51.5 | -119.4 | 39.7 | 60 |

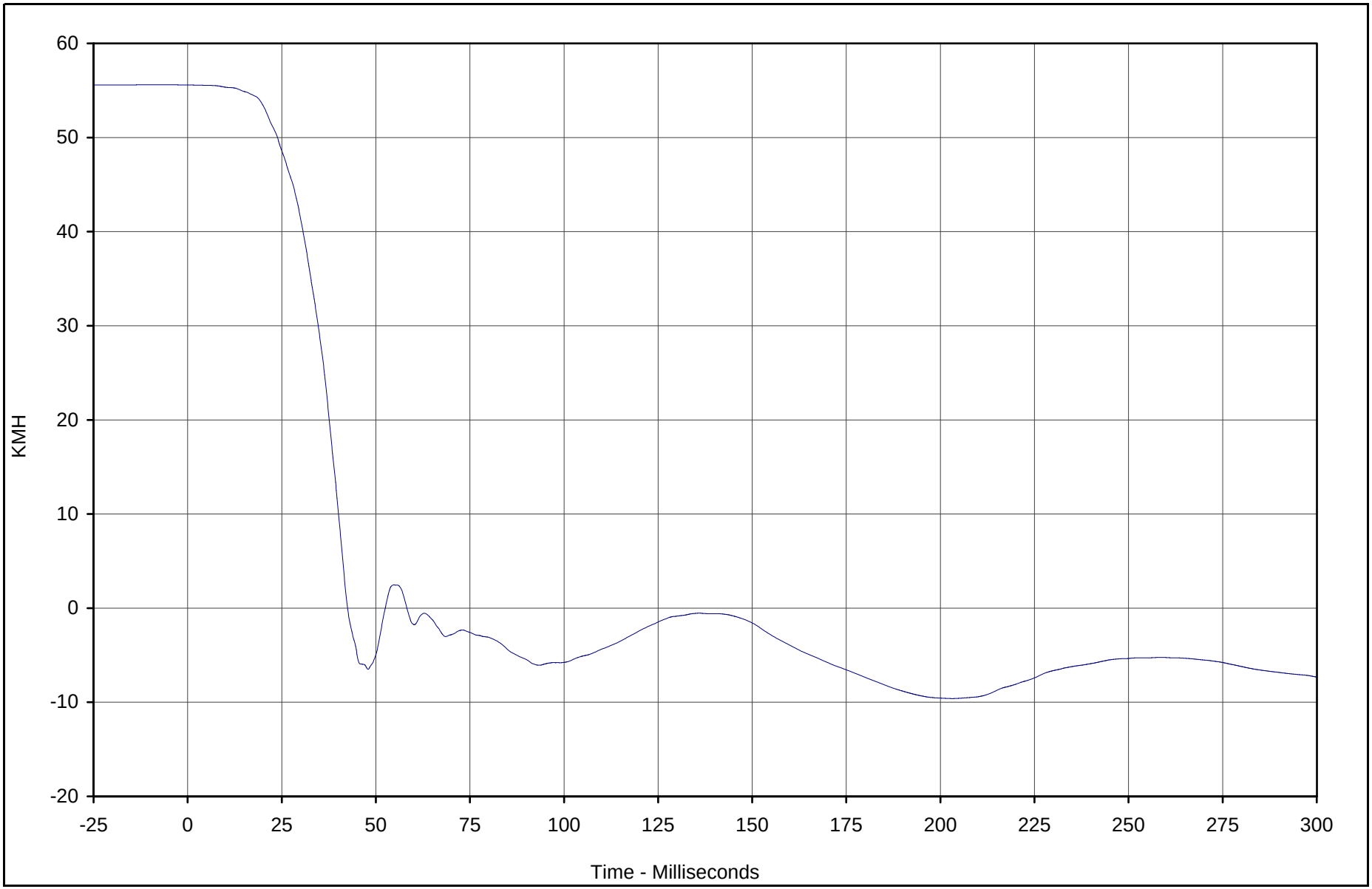
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Engine Top Velocity | 091 | IN1 | KMH | 55.6 | 0.0 | -9.6 | 203.2 | 180 |

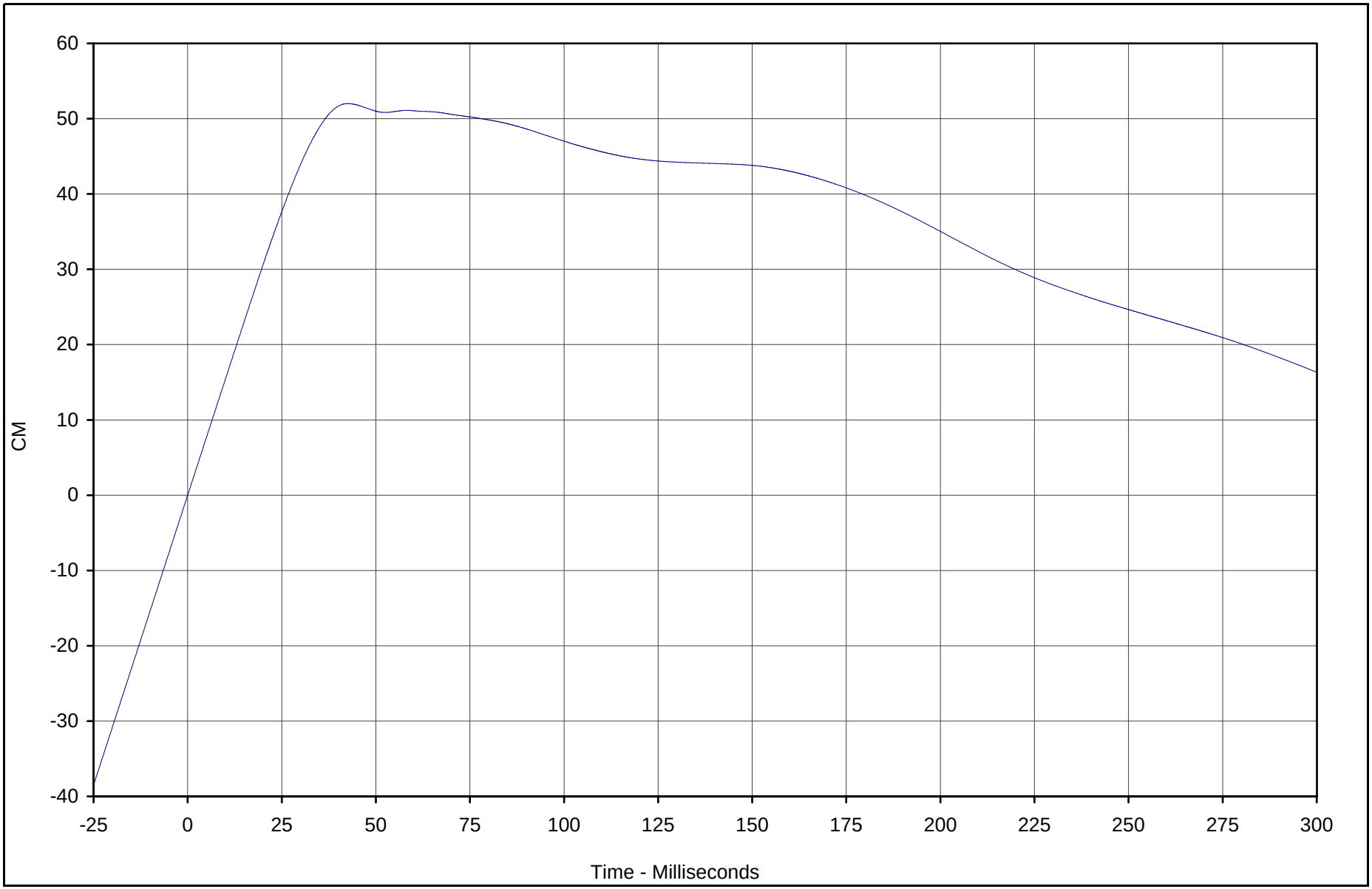
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Engine Top Displacement | 091 | IN2 | CM | 52.0 | 42.5 | 0.0 | 0.0 | 180 |

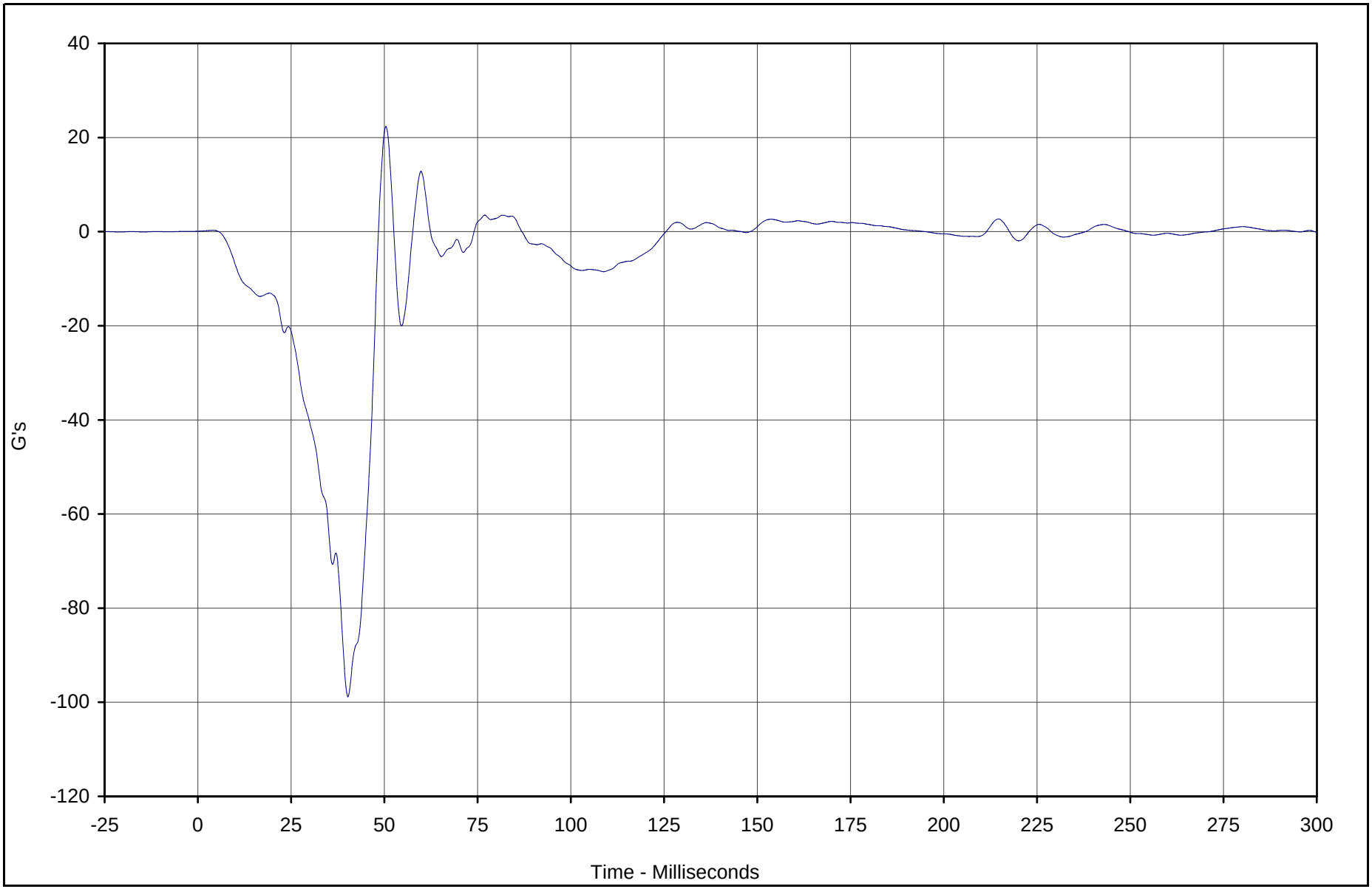
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Engine Bottom | 092 | FIL | G's | 22.4 | 50.4 | -98.8 | 40.2 | 60 |

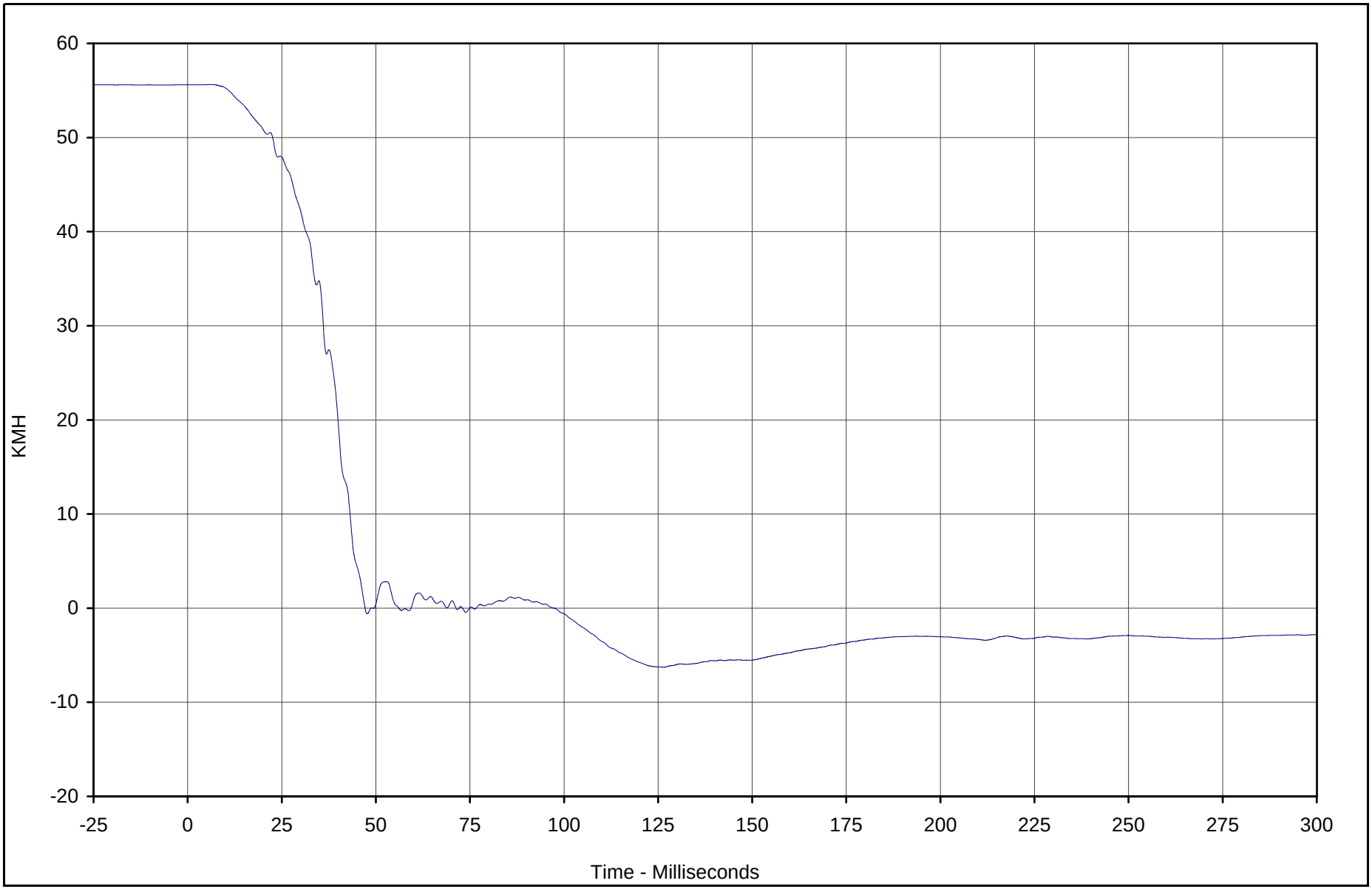
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Engine Bottom Velocity | 092 | IN1 | KMH | 55.6 | 6.6 | -6.3 | 126.5 | 180 |

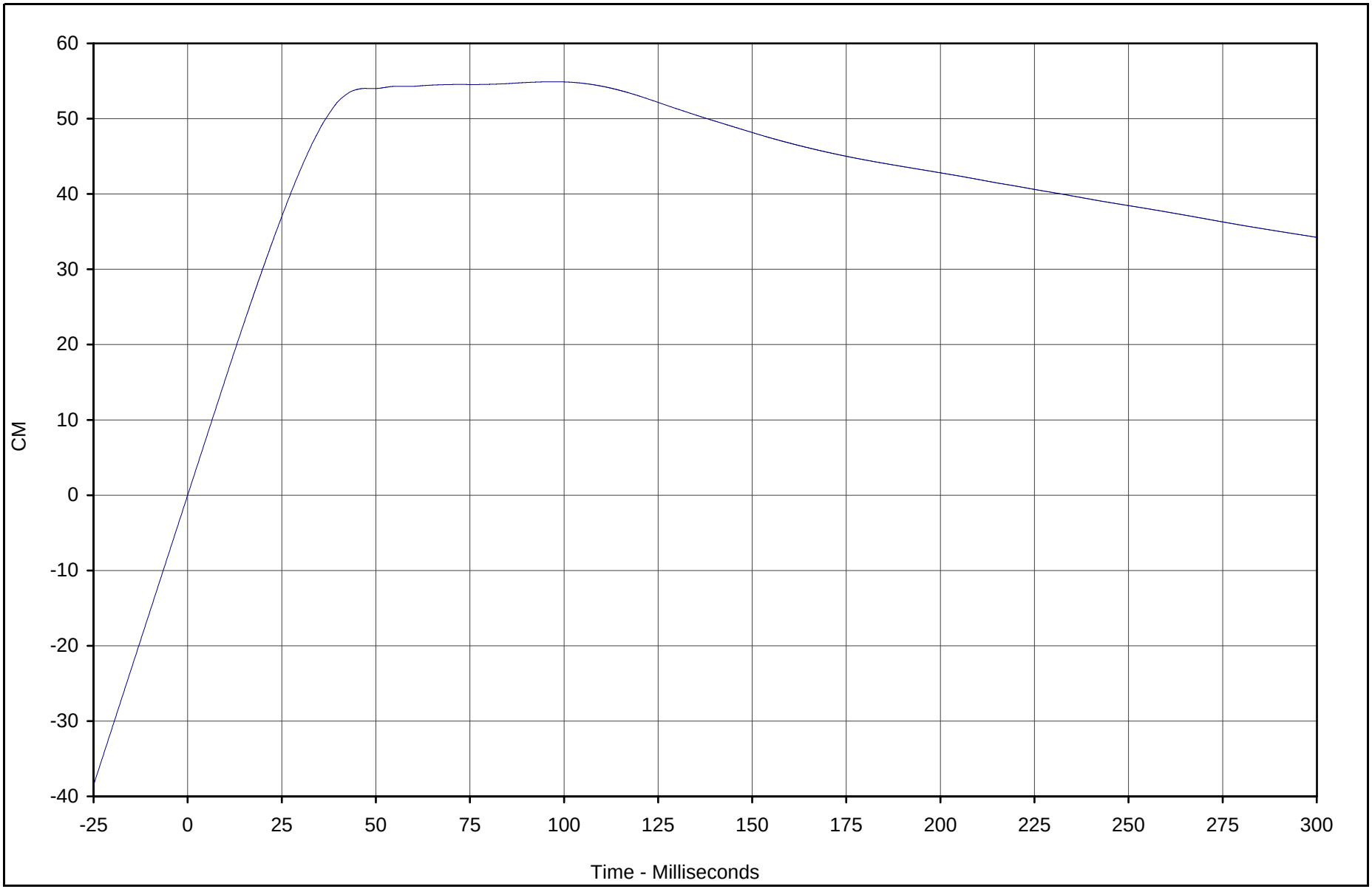
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Engine Bottom Displacement | 092 | IN2 | CM | 54.9 | 97.4 | 0.0 | 0.0 | 180 |

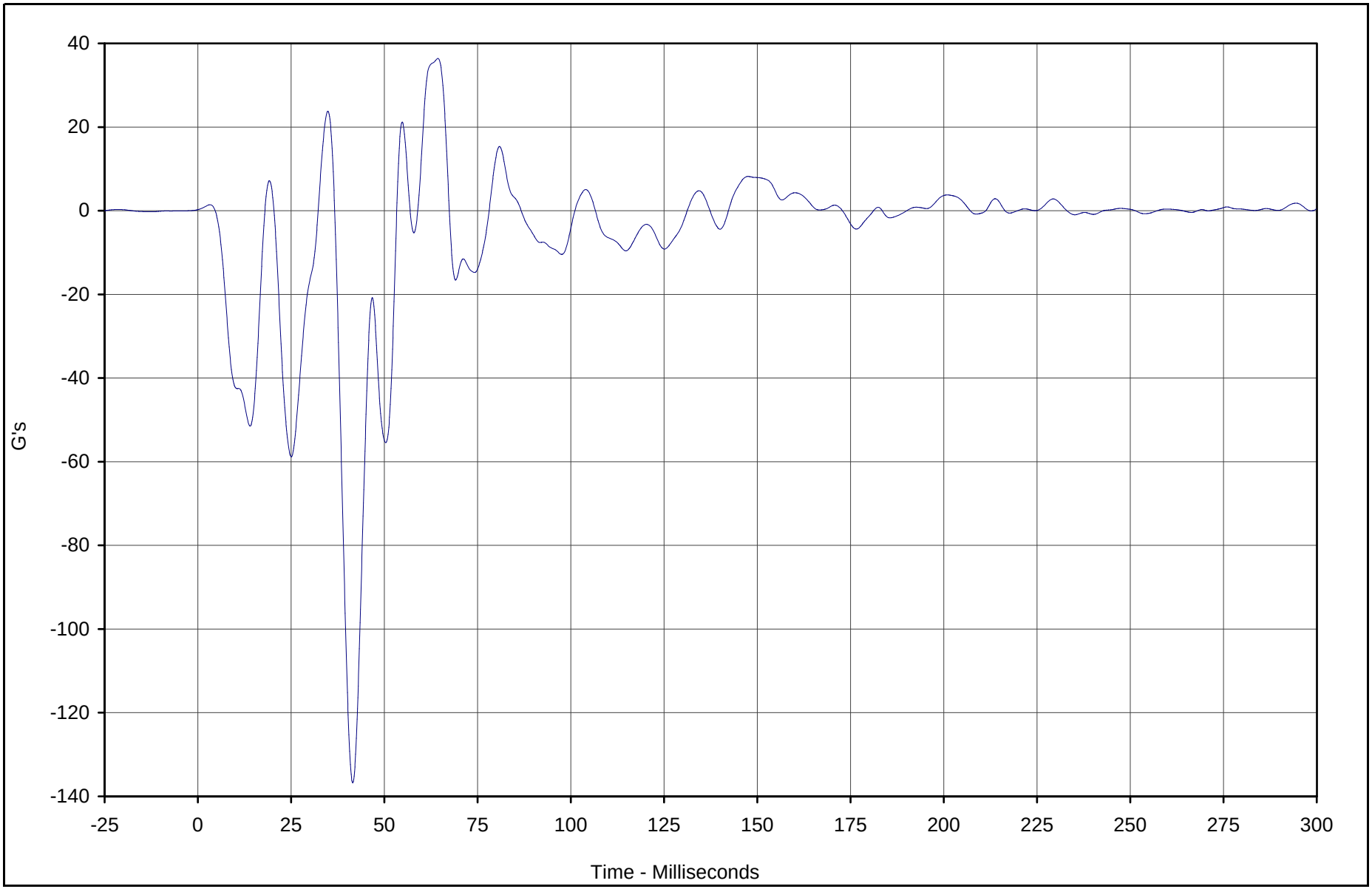
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Brake Caliper | 093 | FIL | G's | 36.4 | 64.4 | -136.7 | 41.5 | 60 |

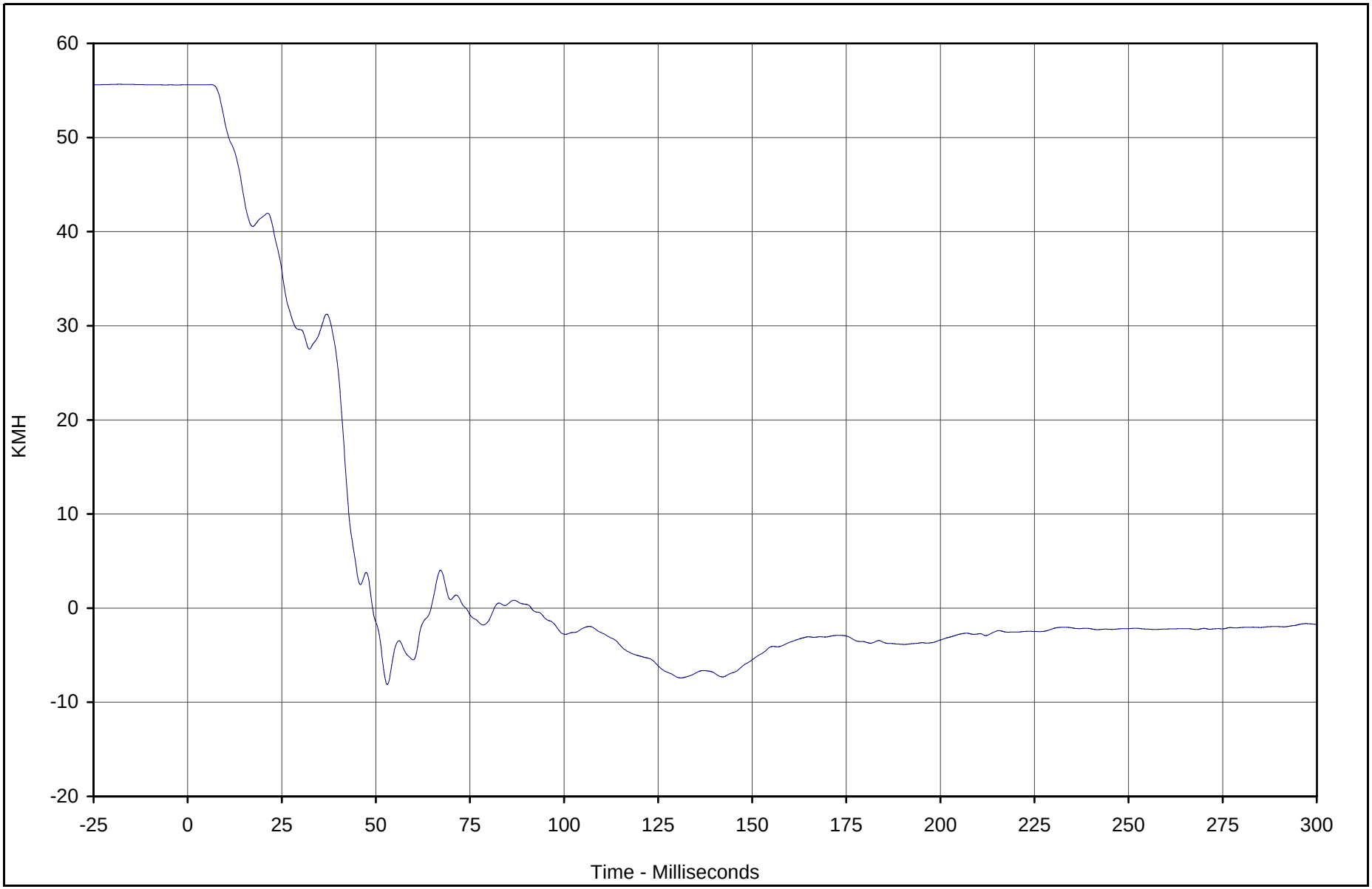
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Brake Caliper Velocity | 093 | IN1 | KMH | 55.6 | 6.2 | -8.1 | 53.0 | 180 |

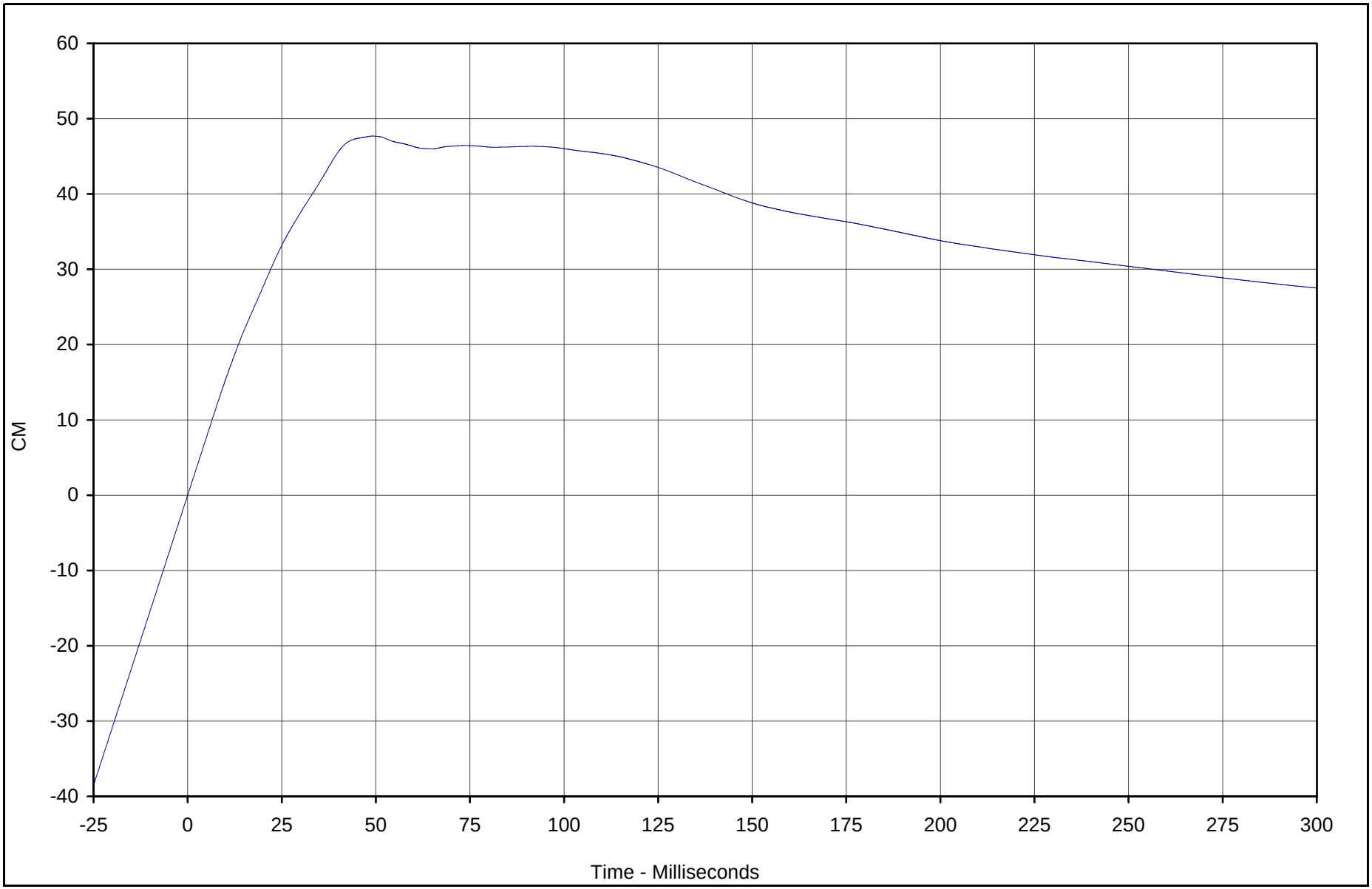
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Brake Caliper Displ. | 093 | IN2 | CM | 47.7 | 49.1 | 0.0 | 0.0 | 180 |

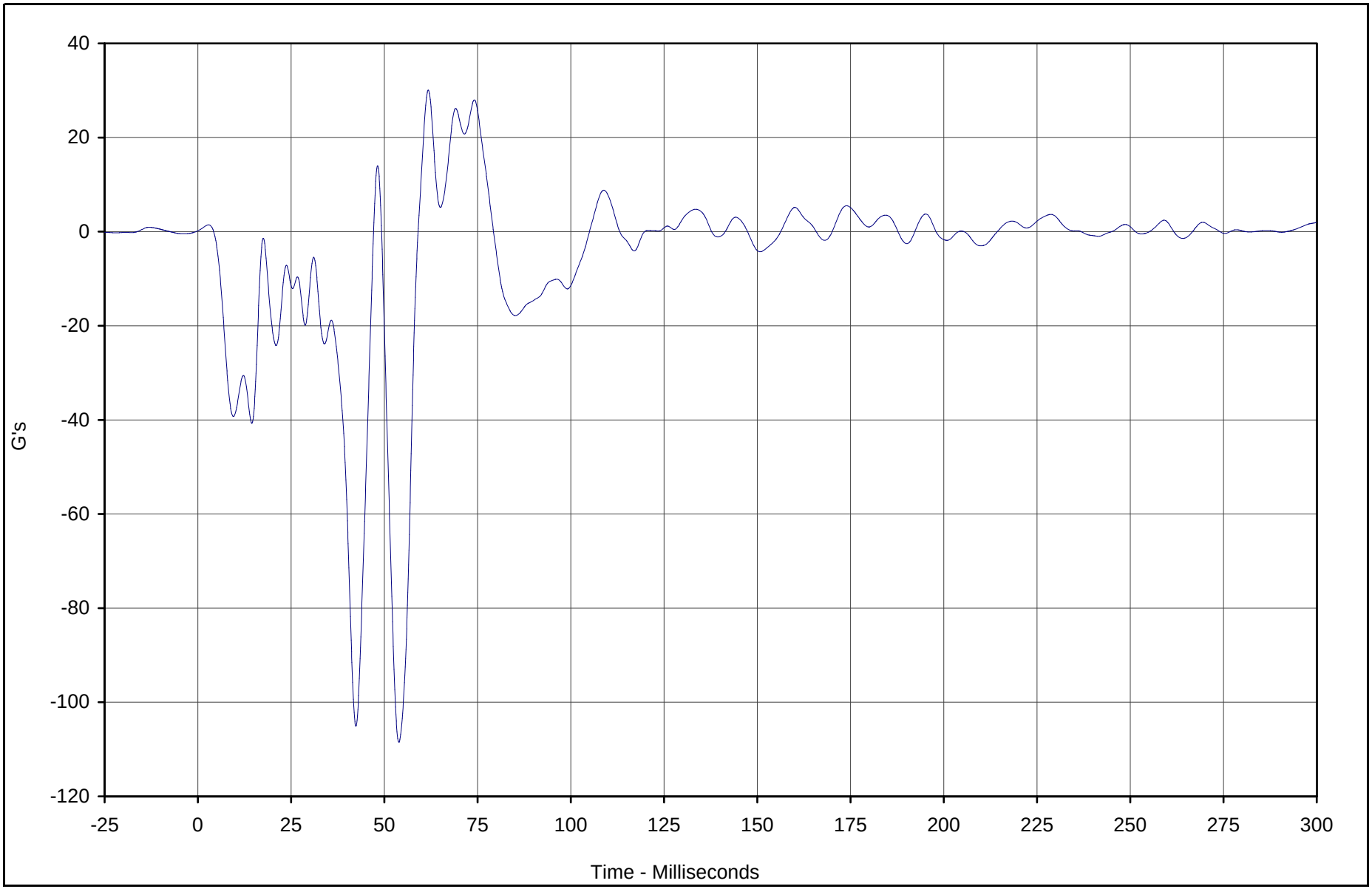
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Brake Caliper | 094 | FIL | G's | 30.1 | 61.8 | -108.5 | 53.9 | 60 |

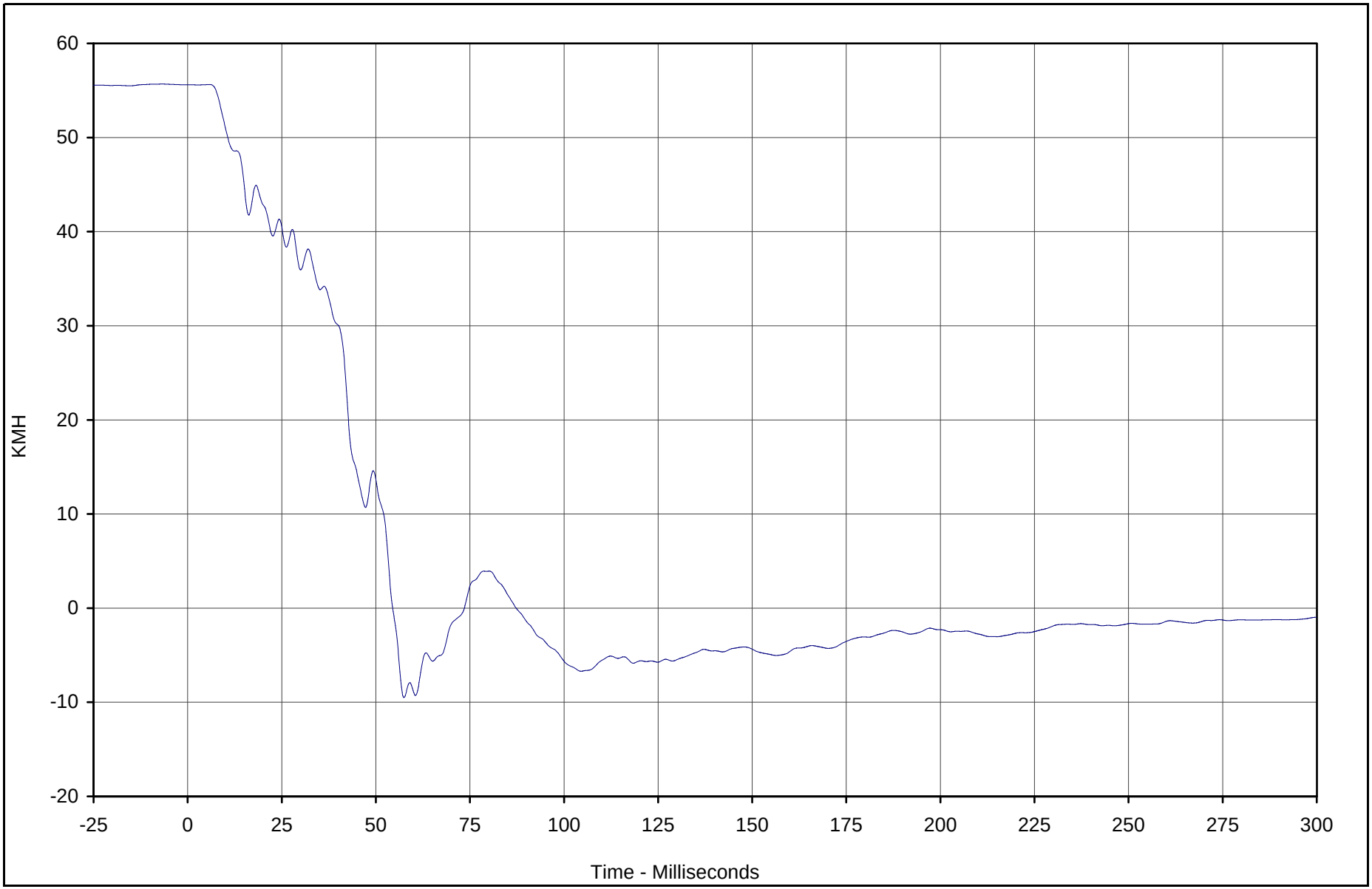
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Brake Caliper Velocity | 094 | IN1 | KMH | 55.6 | 5.8 | -9.5 | 57.5 | 180 |

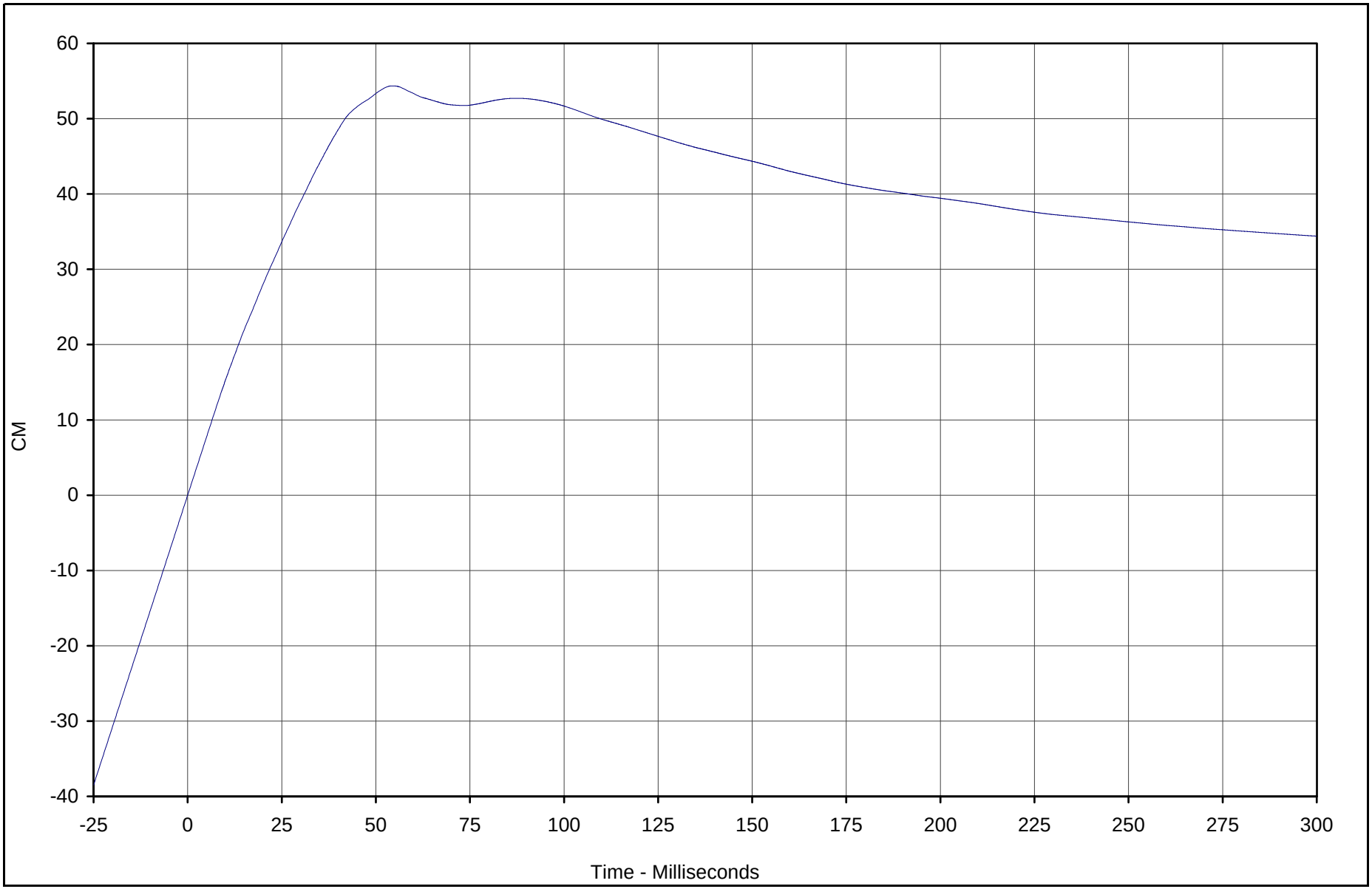
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Brake Caliper Displ. | 094 | IN2 | CM | 54.4 | 54.5 | 0.0 | 0.0 | 180 |

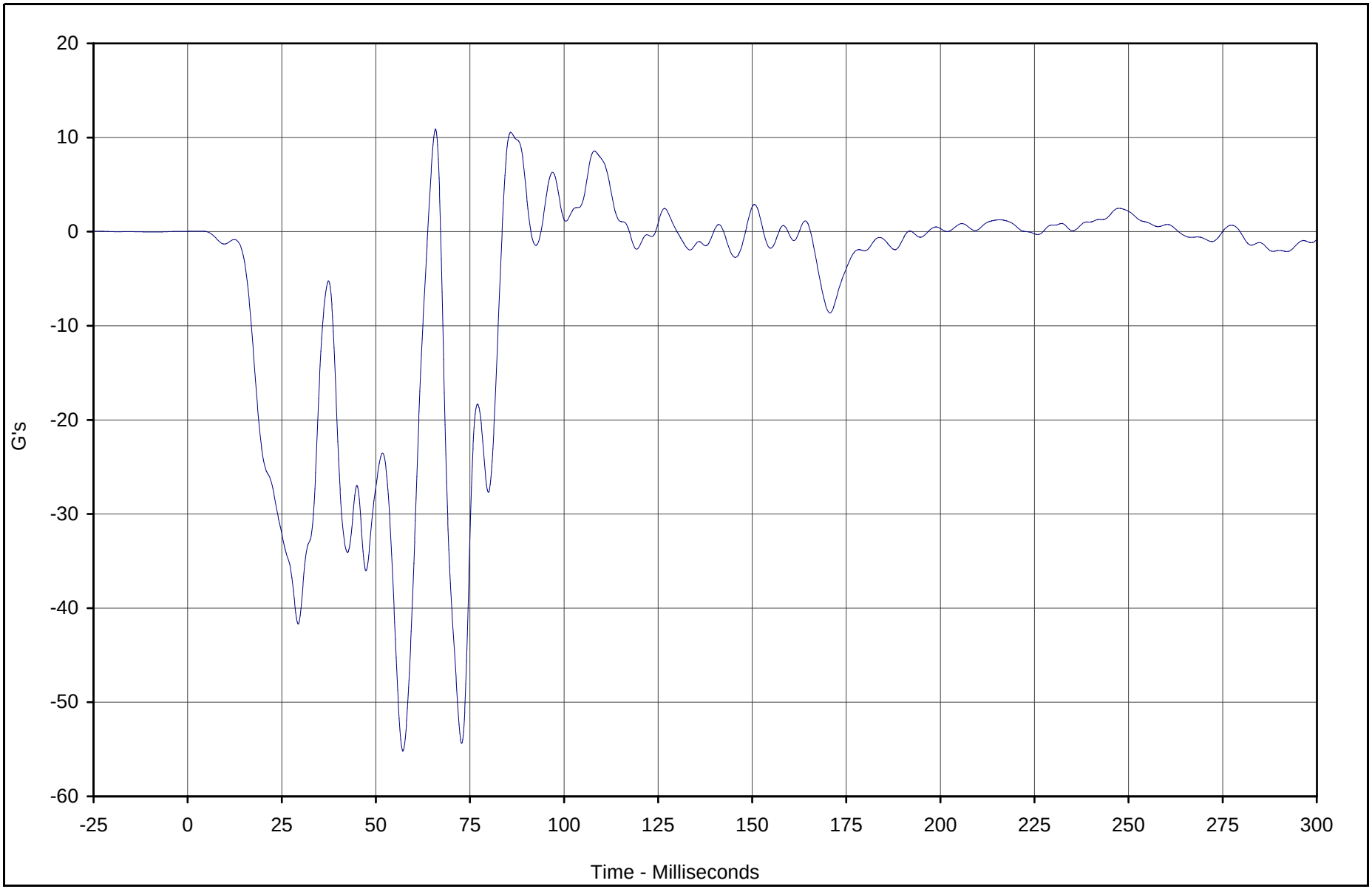
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Instrument Panel | 095 | FIL | G's | 10.9 | 65.8 | -55.2 | 57.2 | 60 |

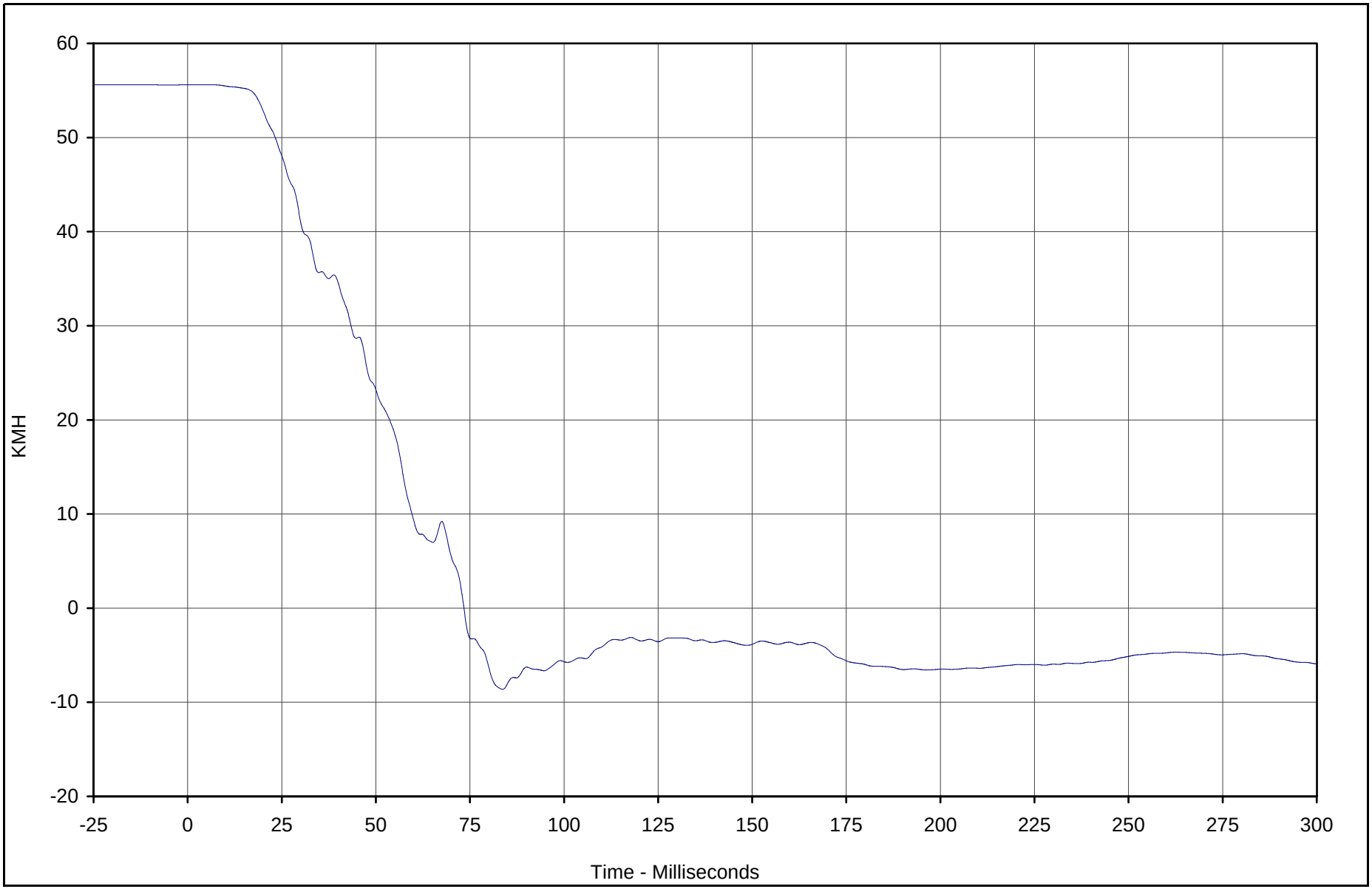
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Instrument Panel Velocity | 095 | IN1 | KMH | 55.6 | 6.7 | -8.6 | 83.7 | 180 |

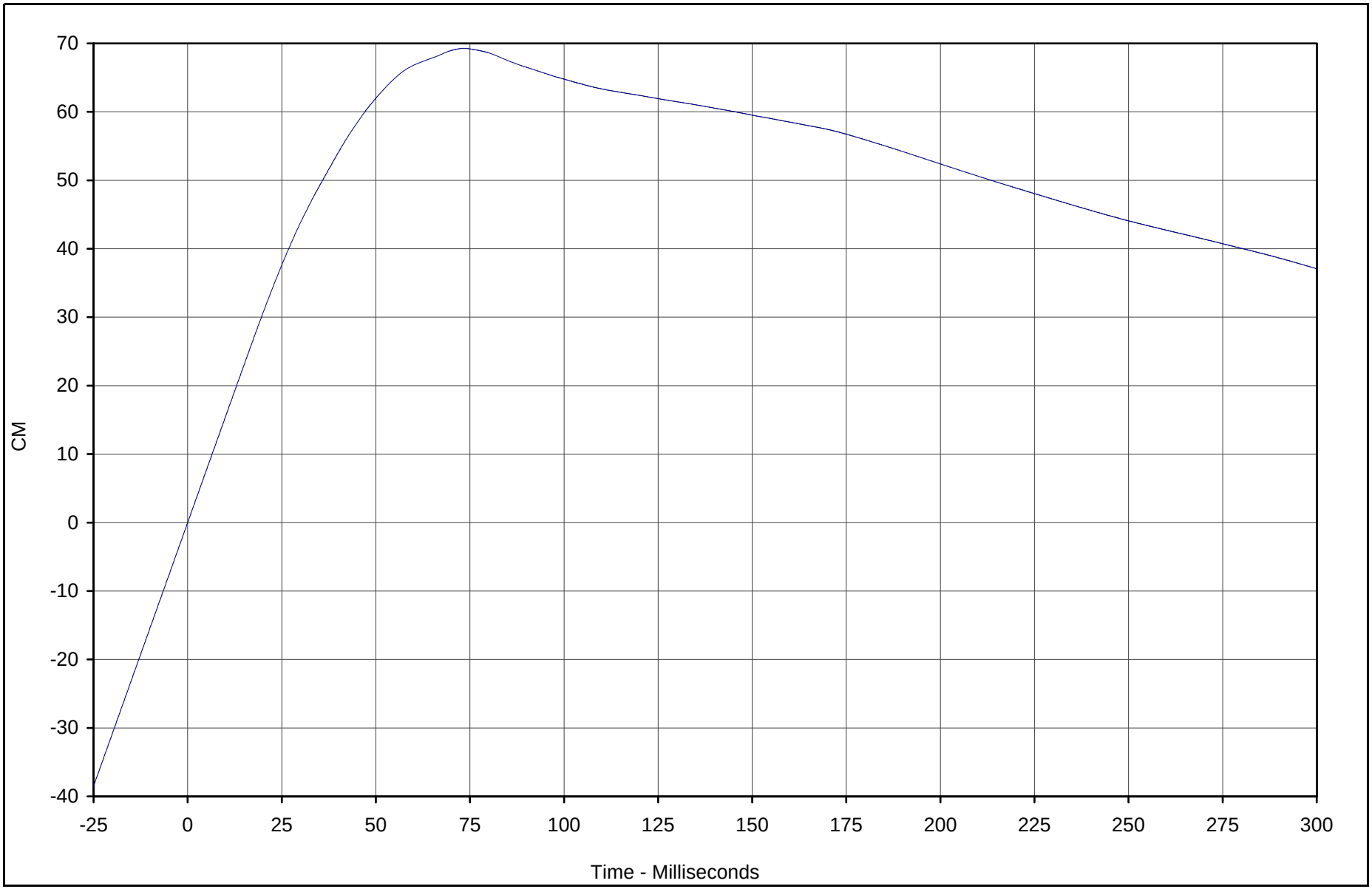
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Instrument Panel Displacement | 095 | IN2 | CM | 69.3 | 73.4 | 0.0 | 0.0 | 180 |

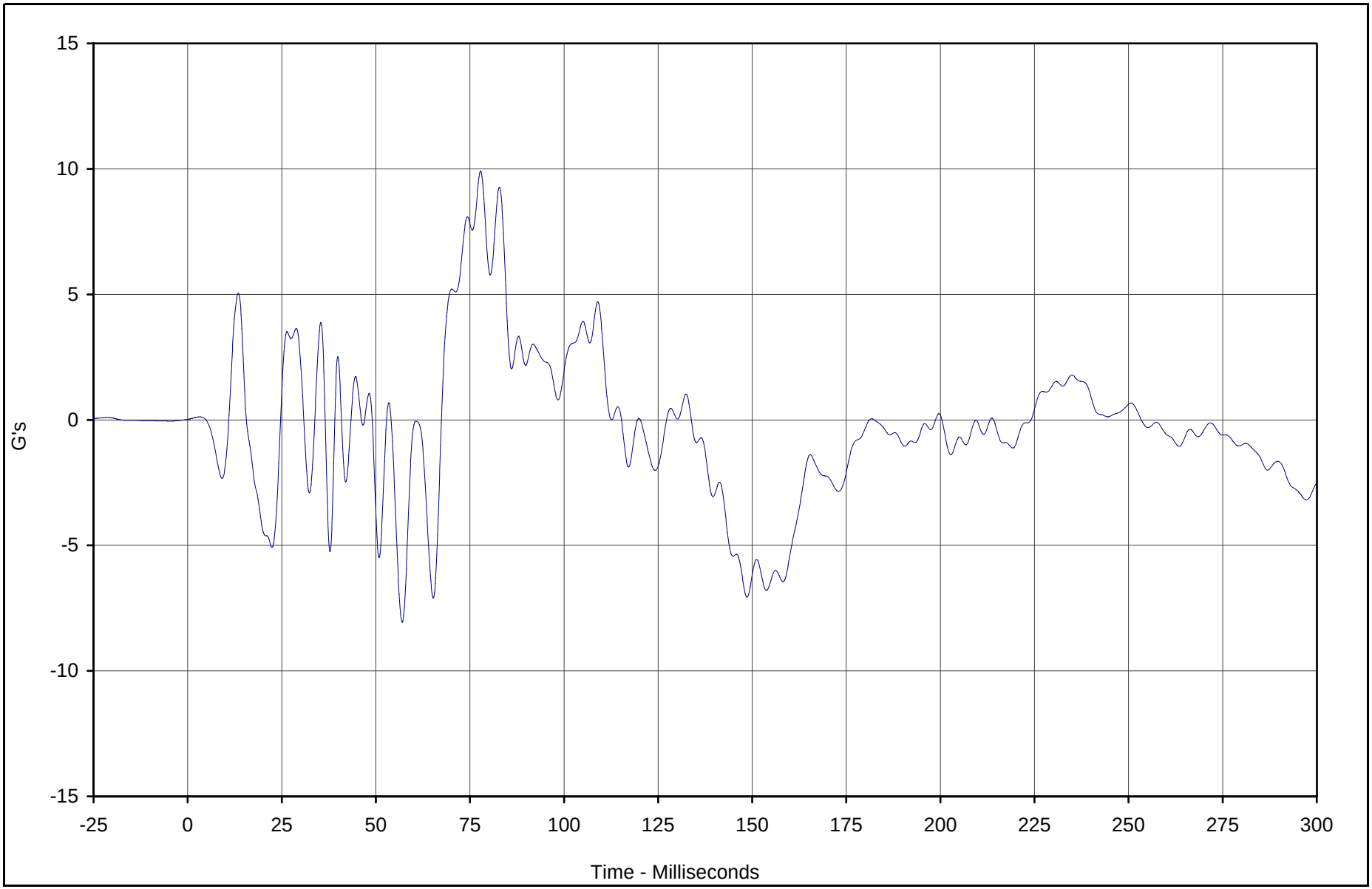
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Rear Z | 096 | FIL | G's | 9.9 | 77.8 | -8.1 | 57.0 | 60 |

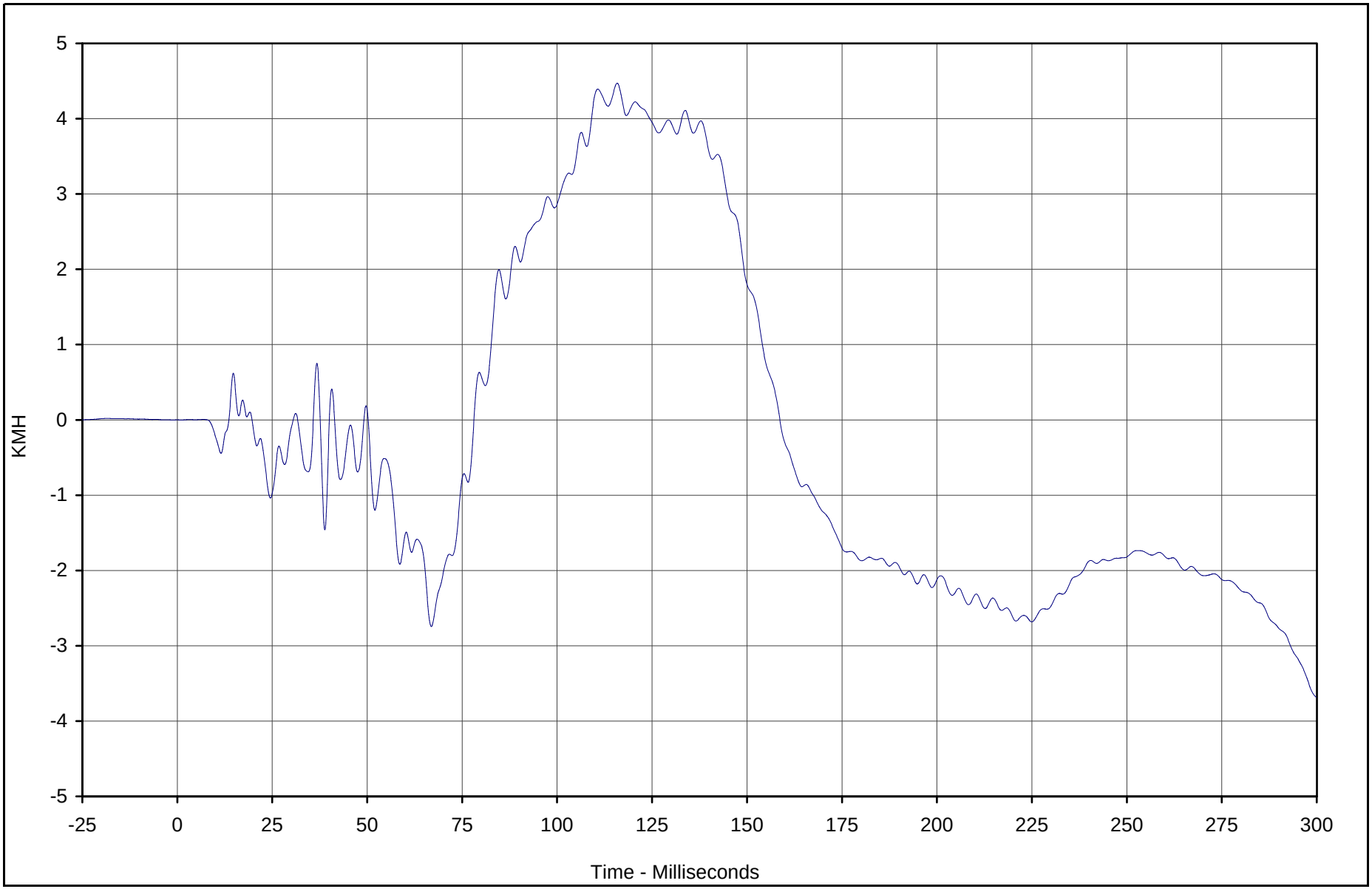
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Rear Z Velocity | 096 | IN1 | KMH | 4.5 | 115.8 | -3.7 | 299.9 | 180 |

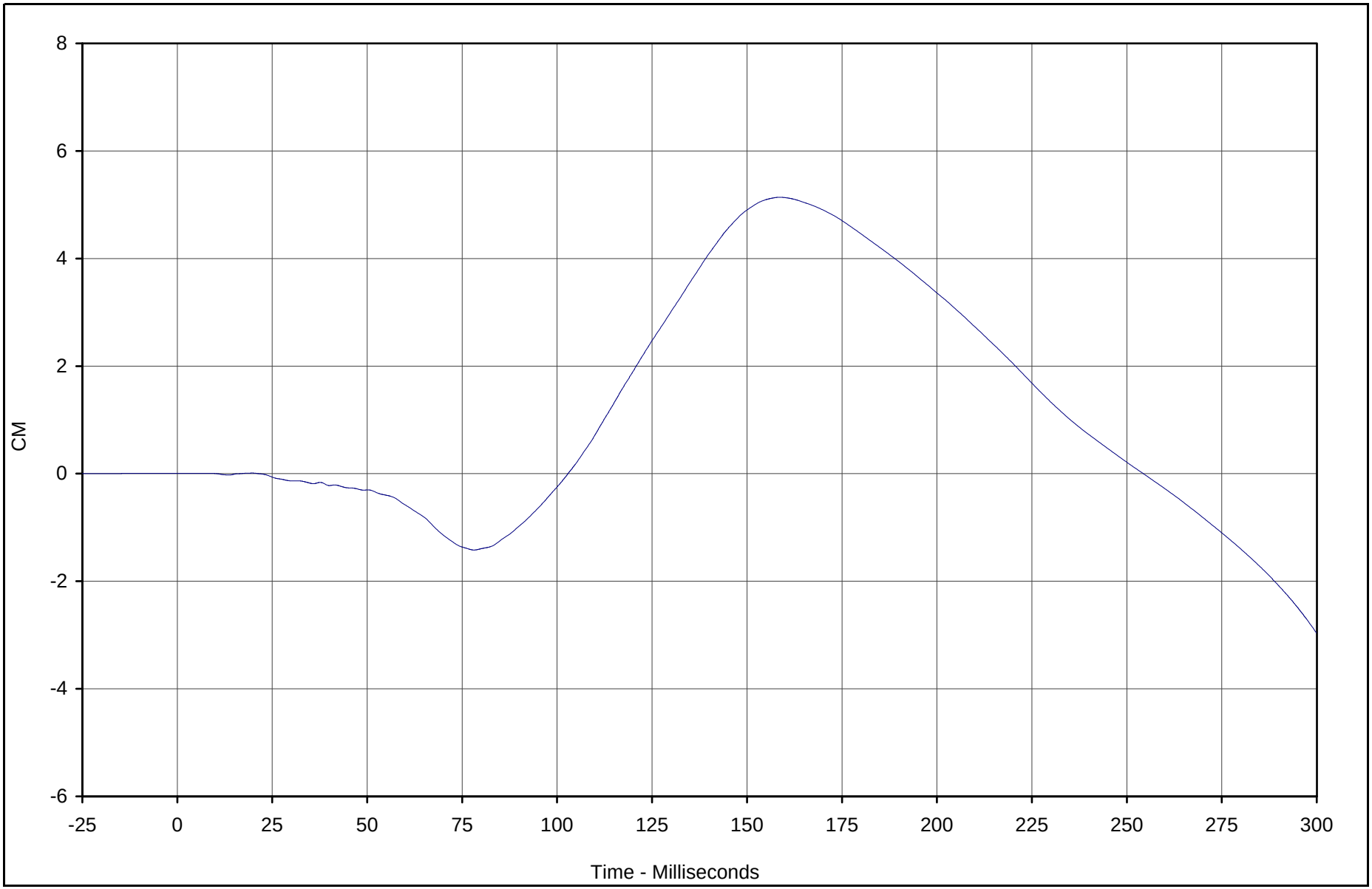
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Left Rear Z Displ. | 096 | IN2 | CM | 5.1 | 158.7 | -3.0 | 299.9 | 180 |

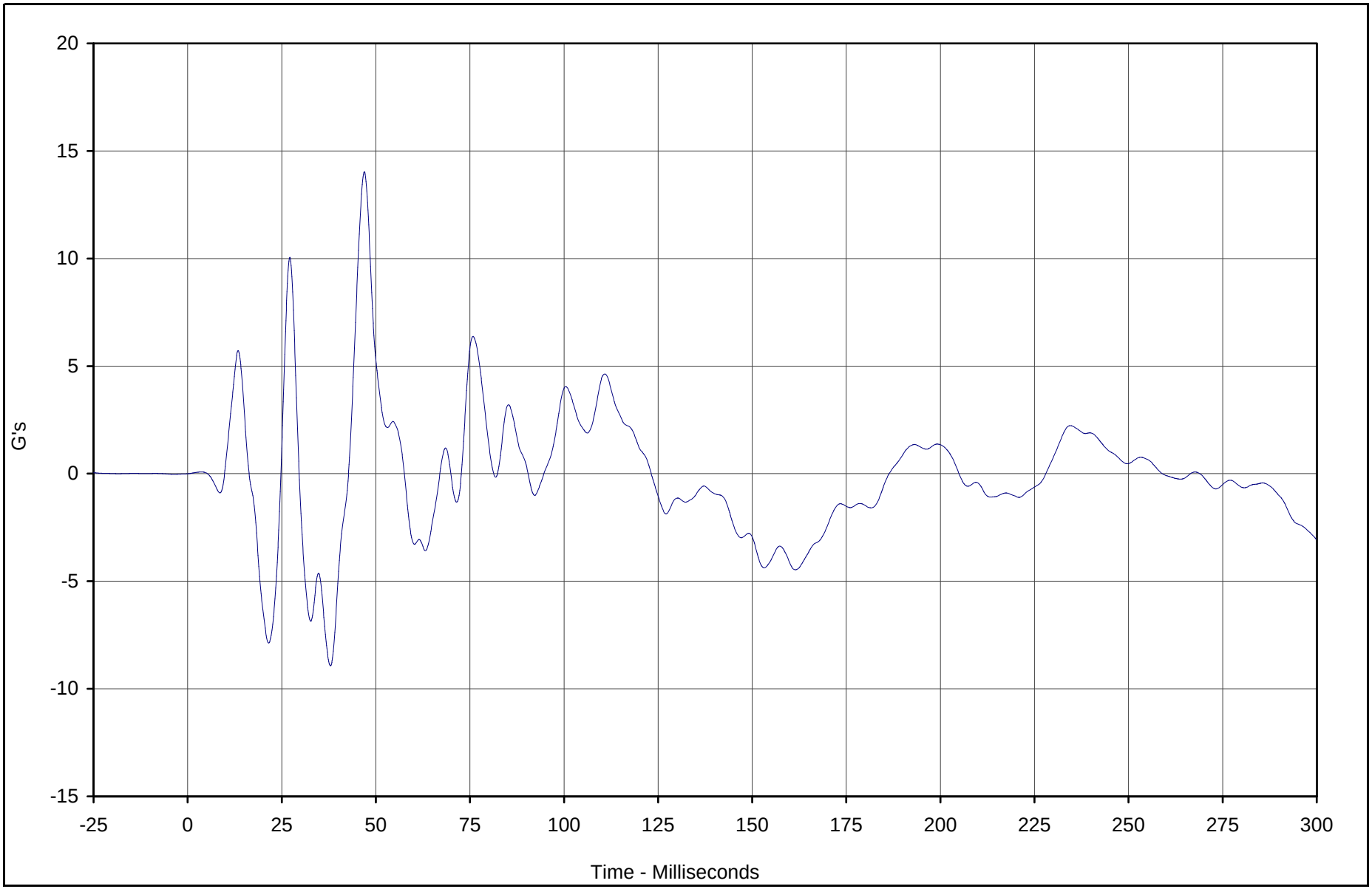
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



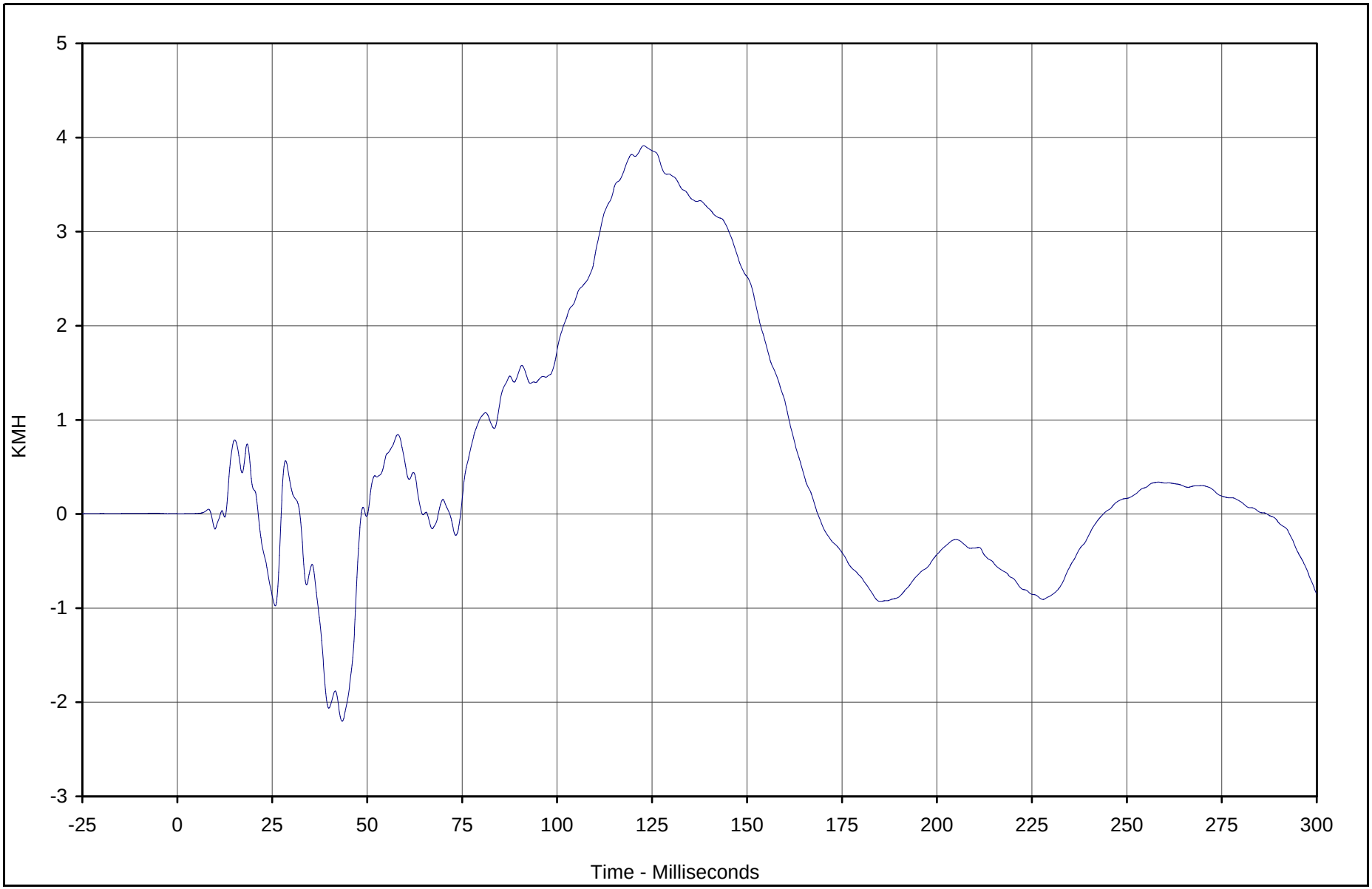

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Rear Z | 097 | FIL | G's | 14.0 | 46.9 | -8.9 | 37.9 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Rear Z Velocity | 097 | IN1 | KMH | 3.9 | 122.8 | -2.2 | 43.4 | 180 |

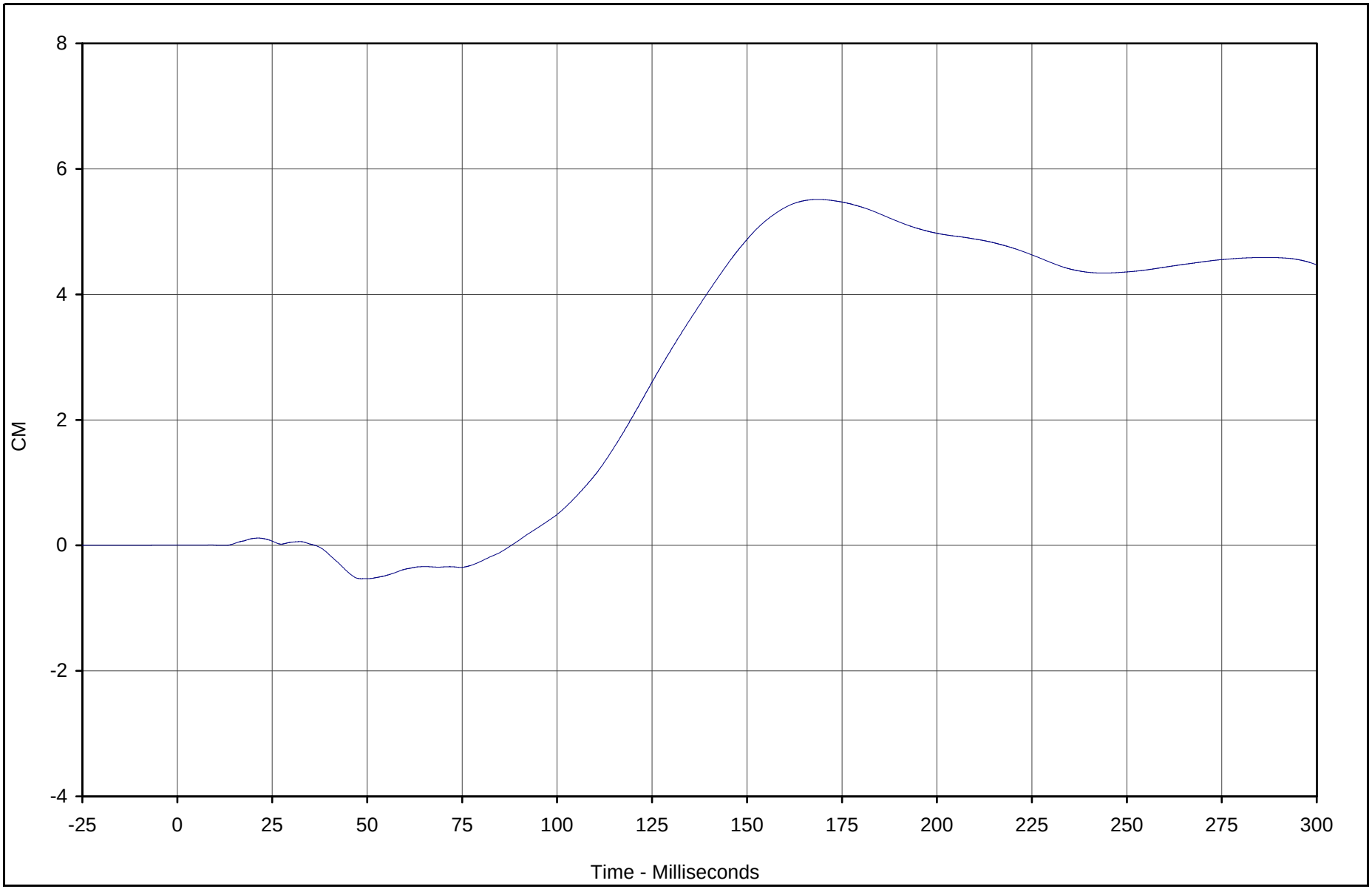
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Vehicle Right Rear Z Displ. | 097 | IN2 | CM | 5.5 | 168.6 | -0.5 | 48.4 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

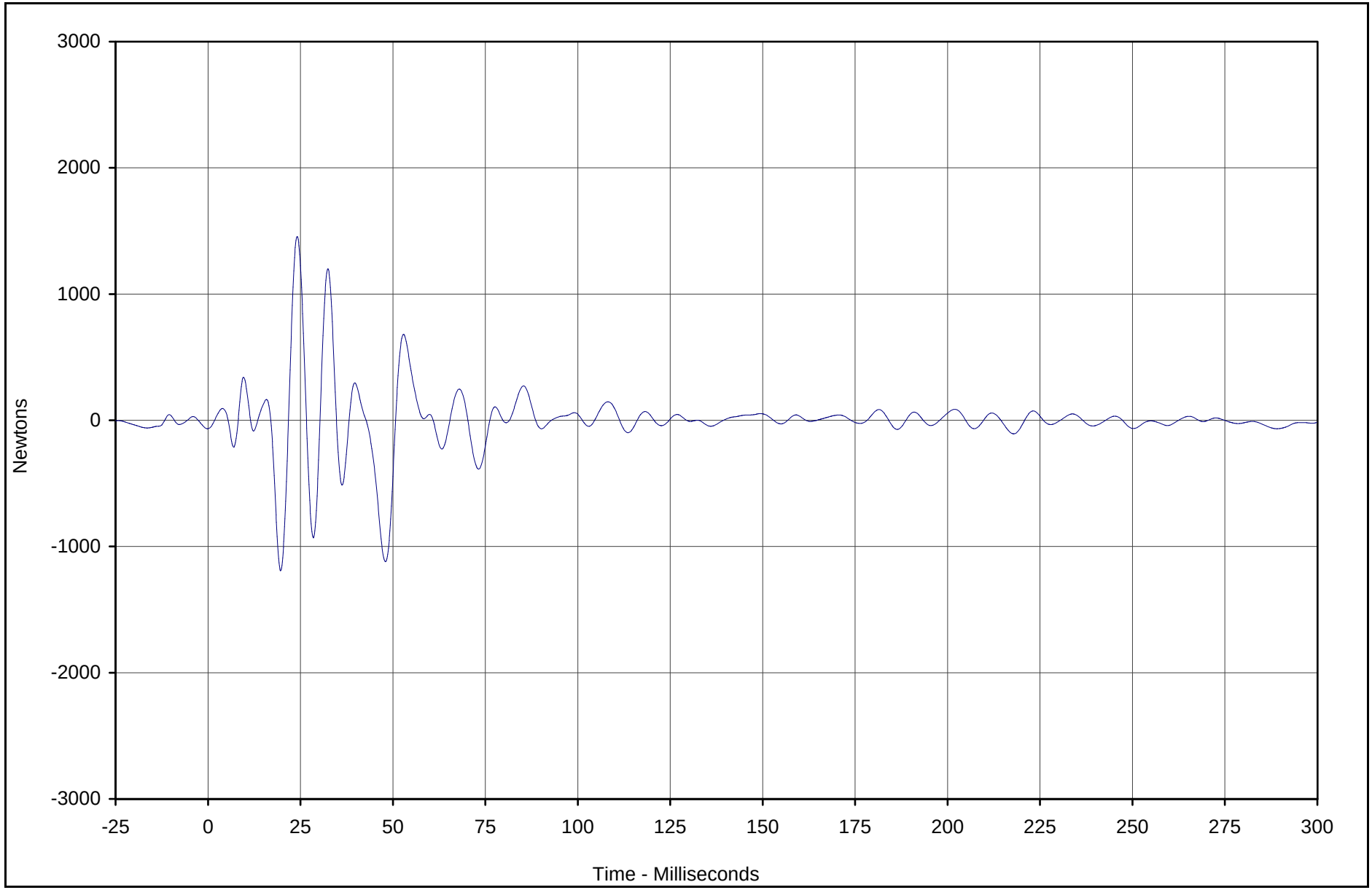
Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203

# APPENDIX C

# LOAD CELL BARRIER DATA PLOTS




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A1 | 098 | FIL | Newtons | 1455.9 | 24.1 | -1191.5 | 19.6 | 60 |

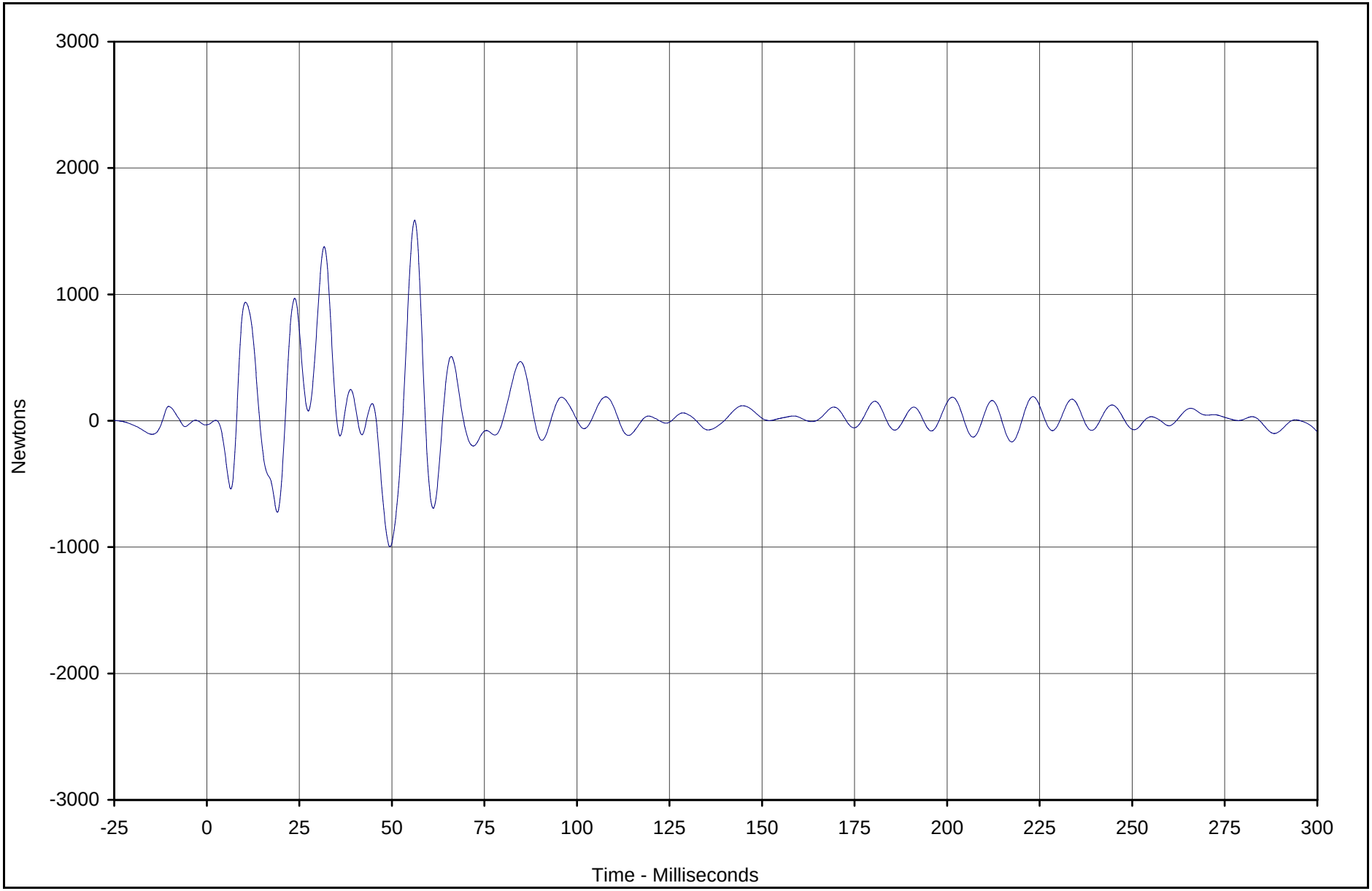
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A2 | 099 | FIL | Newtons | 1587.6 | 56.2 | -996.8 | 49.5 | 60 |

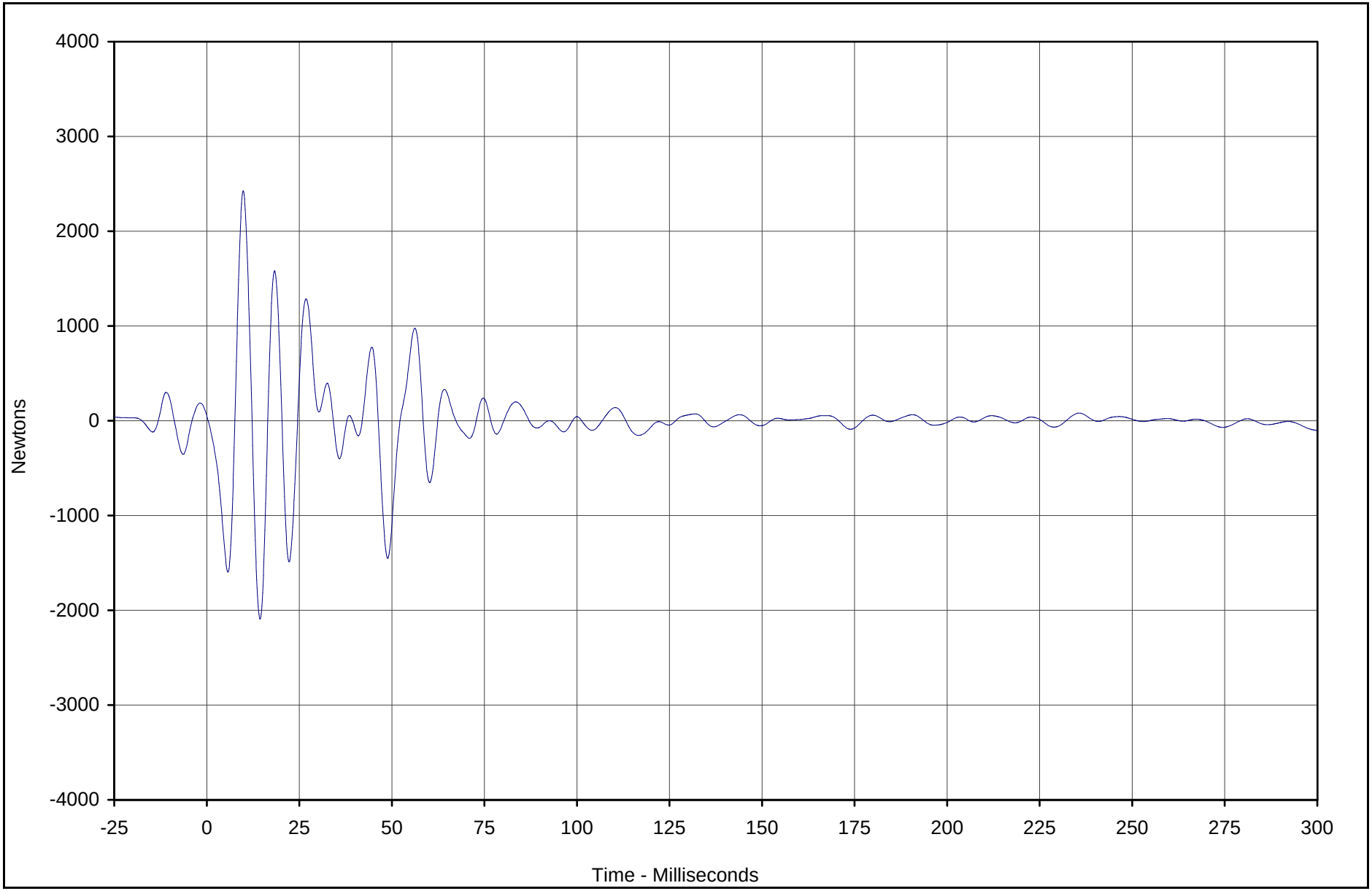
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A3 | 100 | FIL | Newtons | 2425.4 | 9.8 | -2094.4 | 14.4 | 60 |

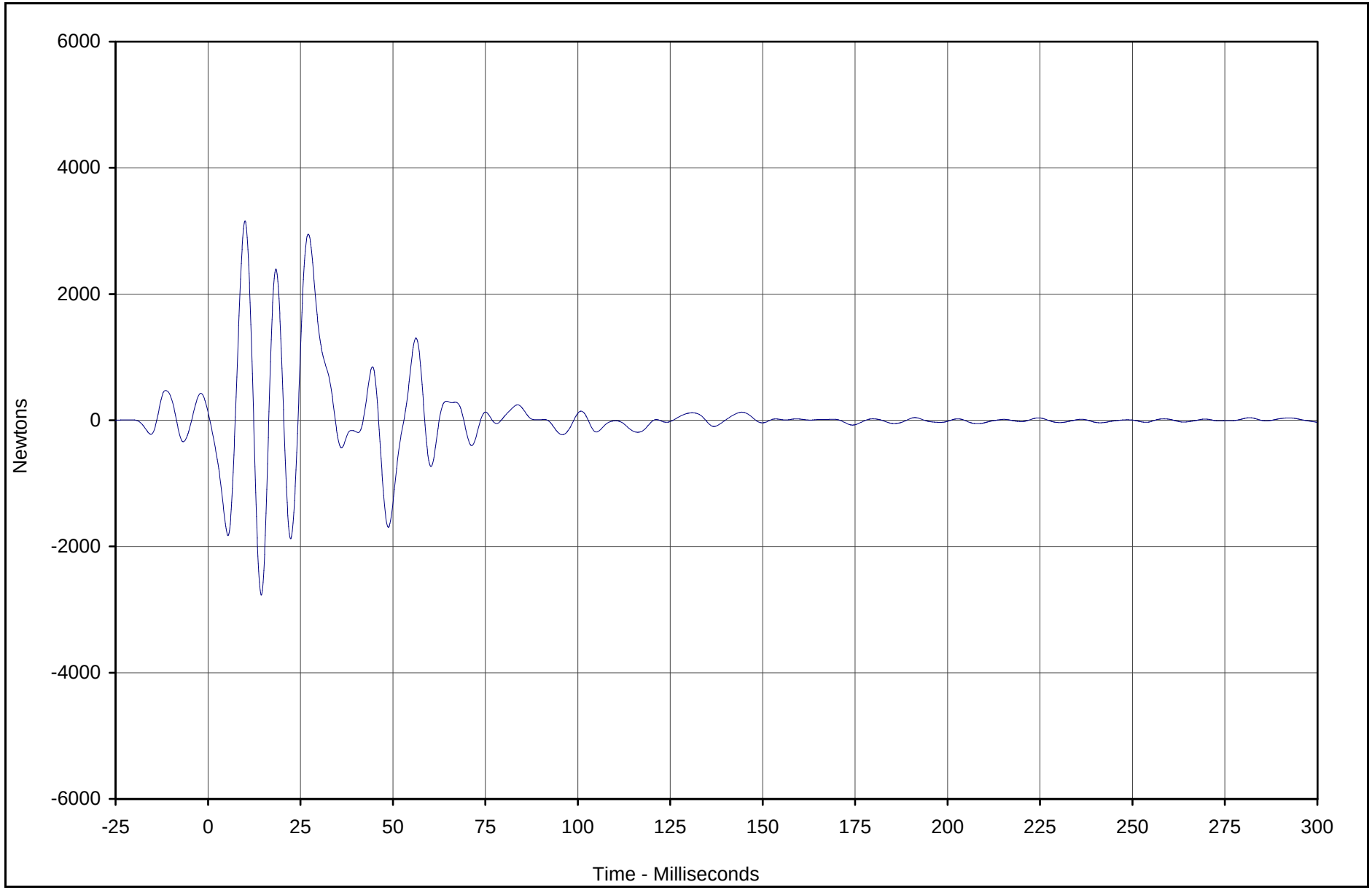
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A4 | 101 | FIL | Newtons | 3161.1 | 10.0 | -2768.0 | 14.4 | 60 |

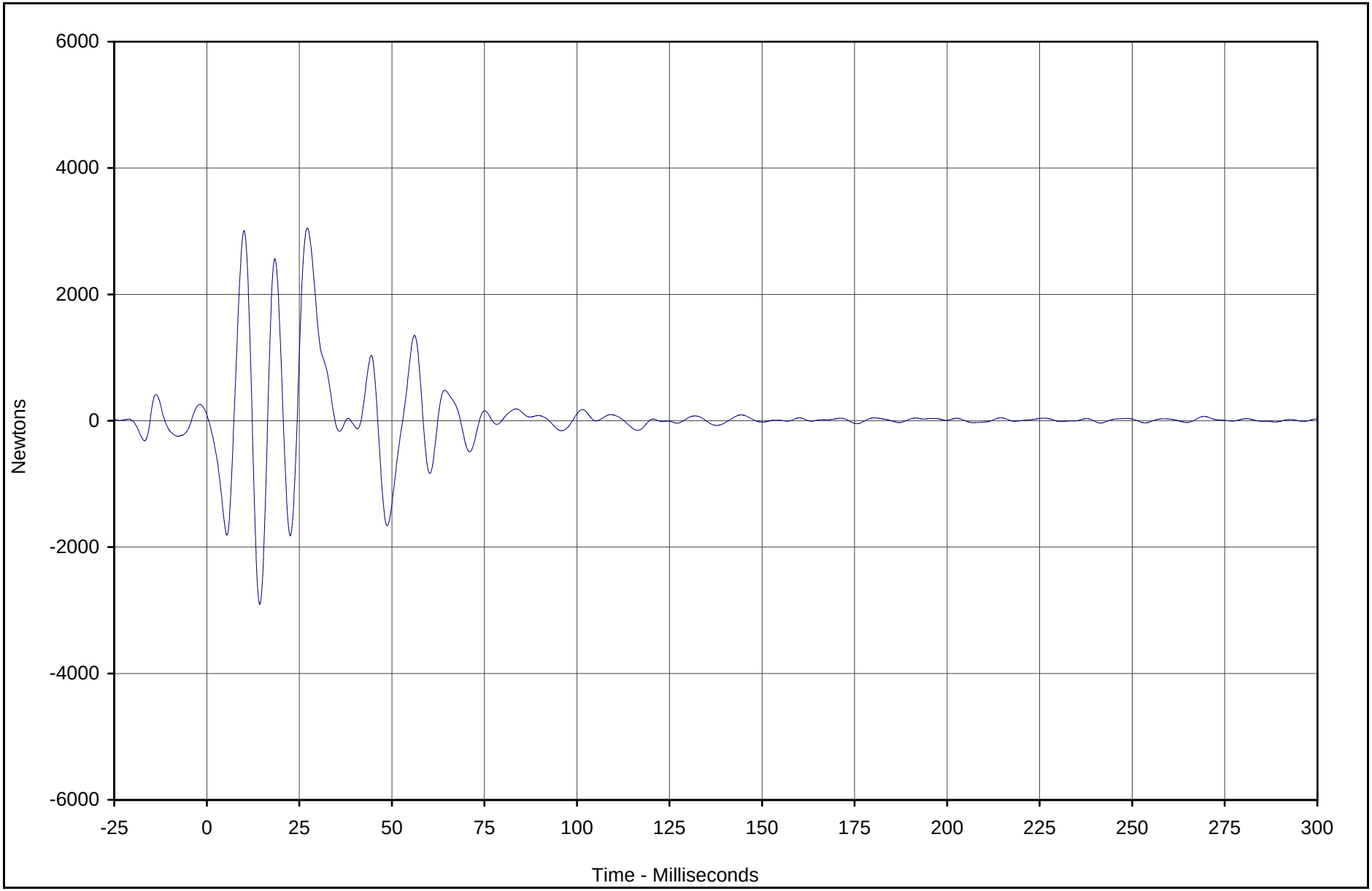
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A5 | 102 | FIL | Newtons | 3049.7 | 27.2 | -2906.7 | 14.3 | 60 |

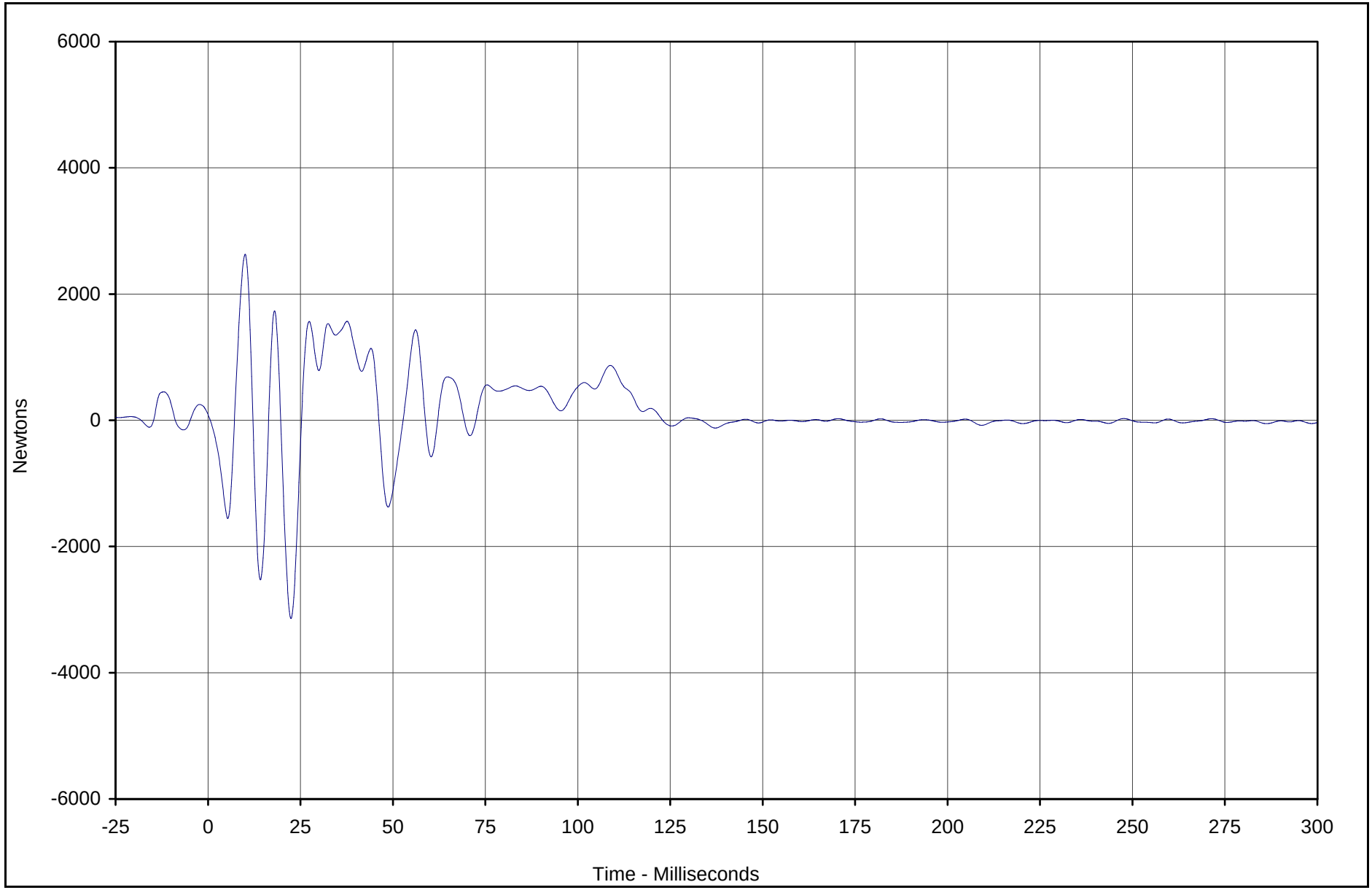
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A6 | 103 | FIL | Newtons | 2629.2 | 10.0 | -3143.0 | 22.4 | 60 |

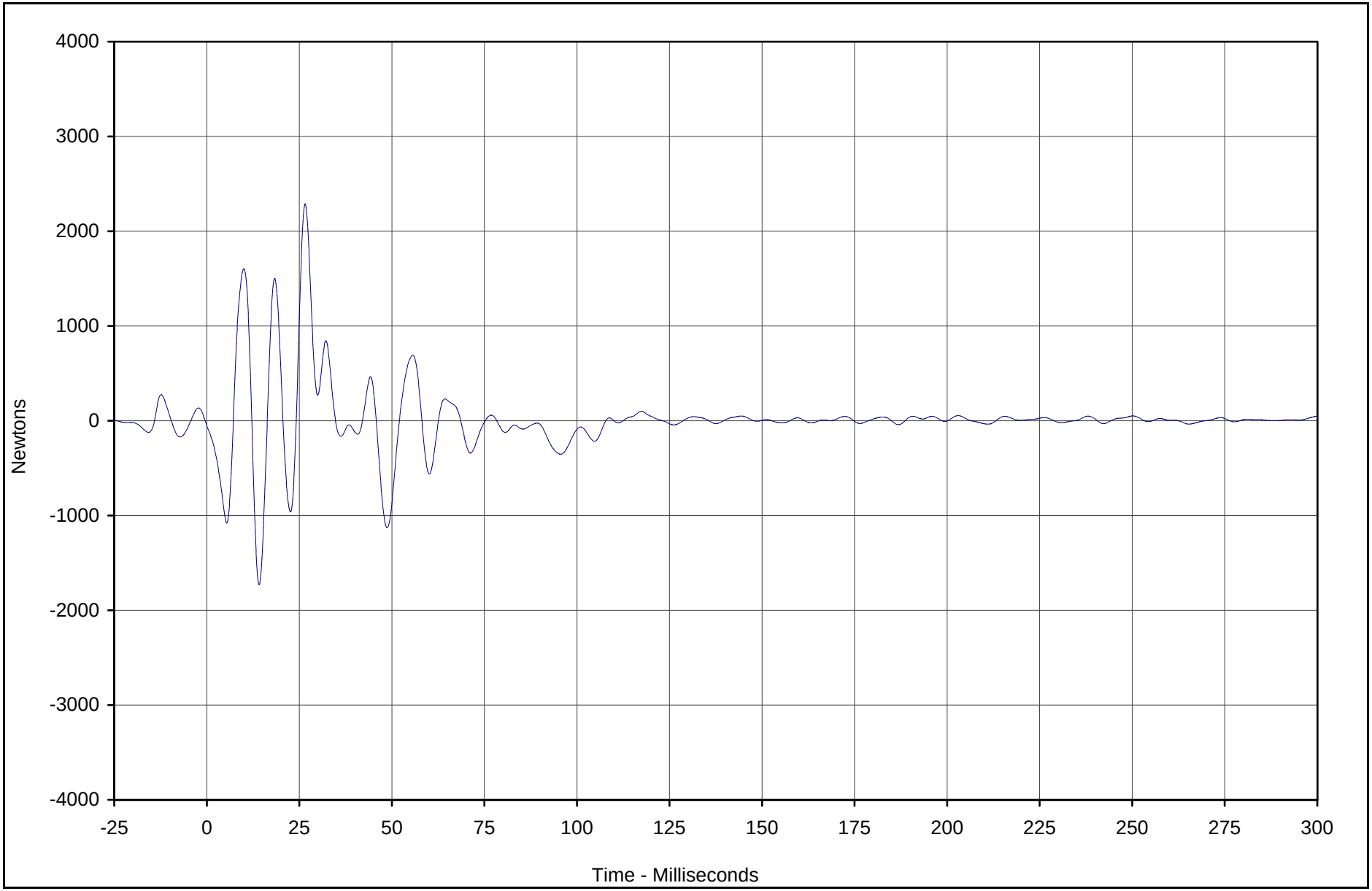
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A7 | 104 | FIL | Newtons | 2289.5 | 26.6 | -1729.9 | 14.1 | 60 |

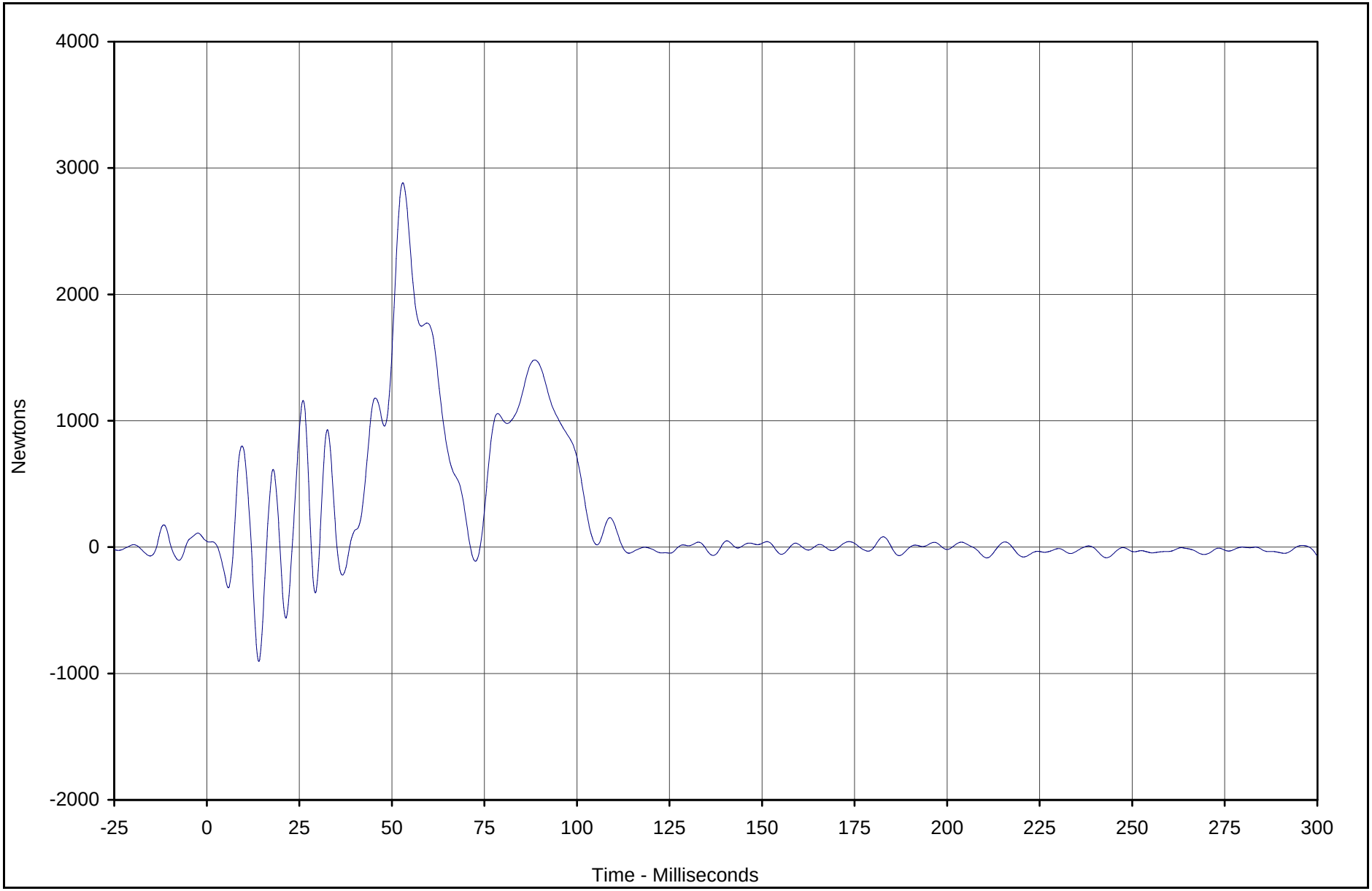
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



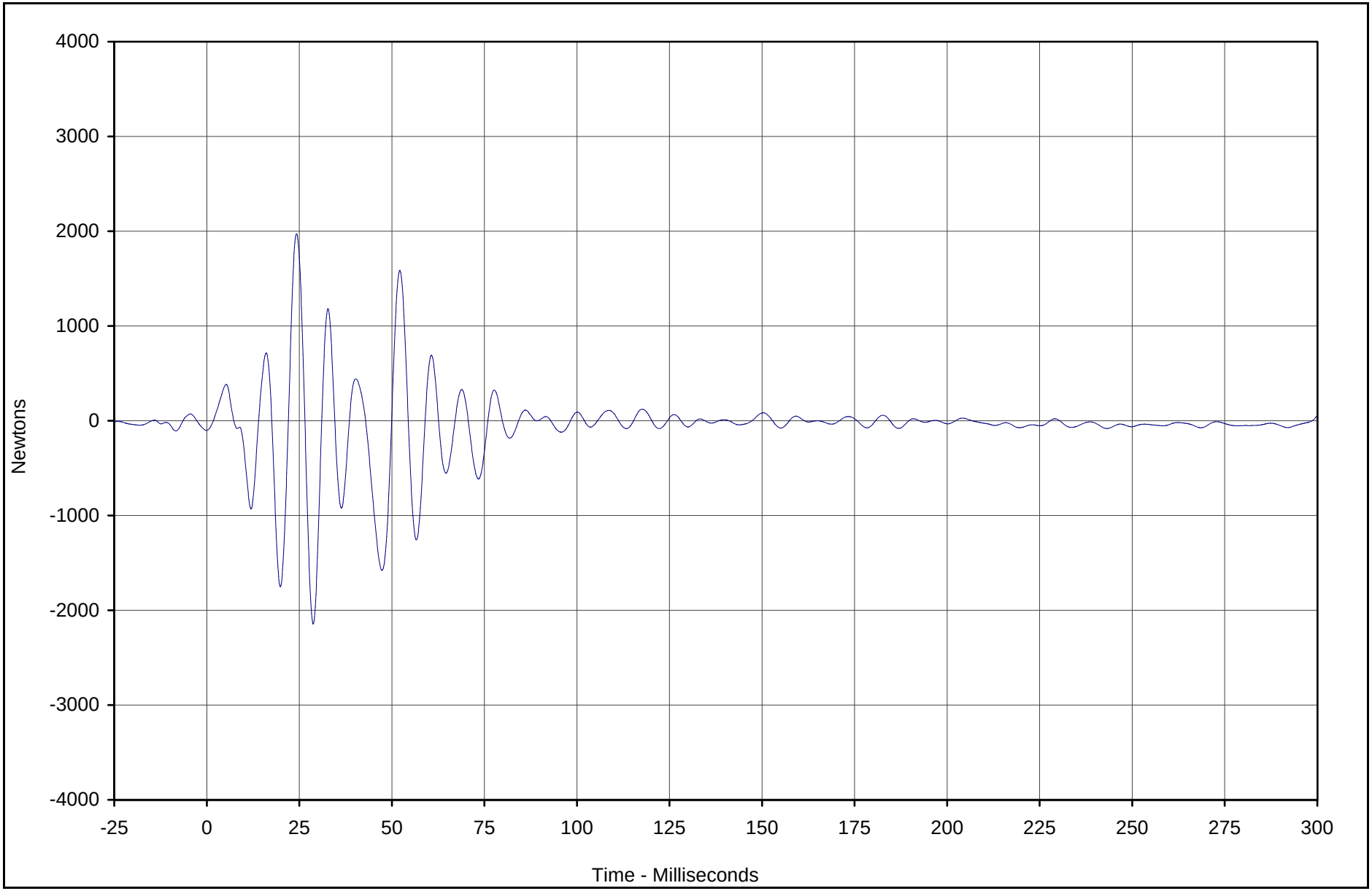

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A8 | 105 | FIL | Newtons | 2883.4 | 53.0 | -904.2 | 14.1 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force A9 | 106 | FIL | Newtons | 1971.9 | 24.2 | -2144.2 | 28.7 | 60 |

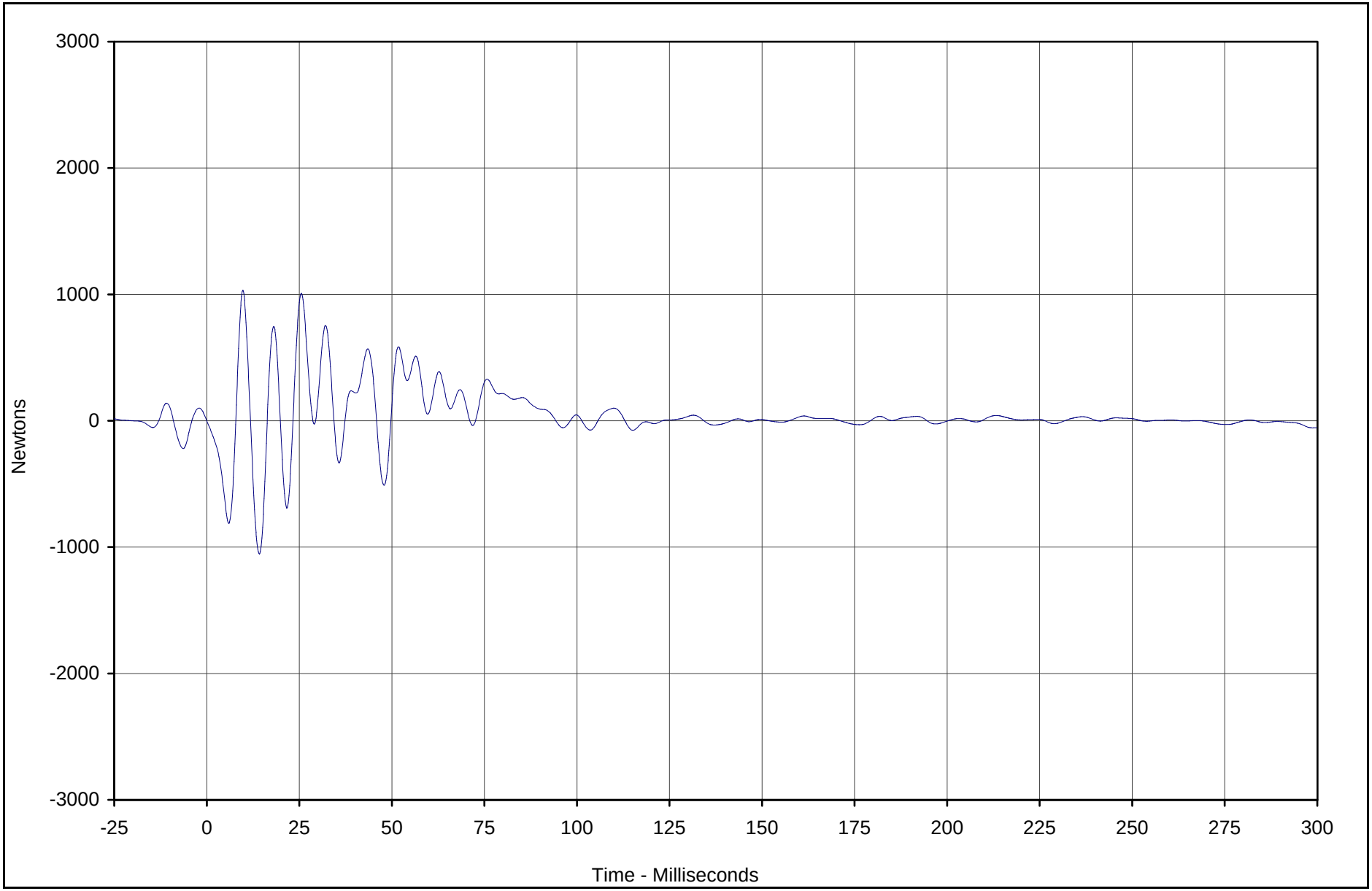
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B1 | 107 | FIL | Newtons | 1031.7 | 9.7 | -1054.3 | 14.2 | 60 |

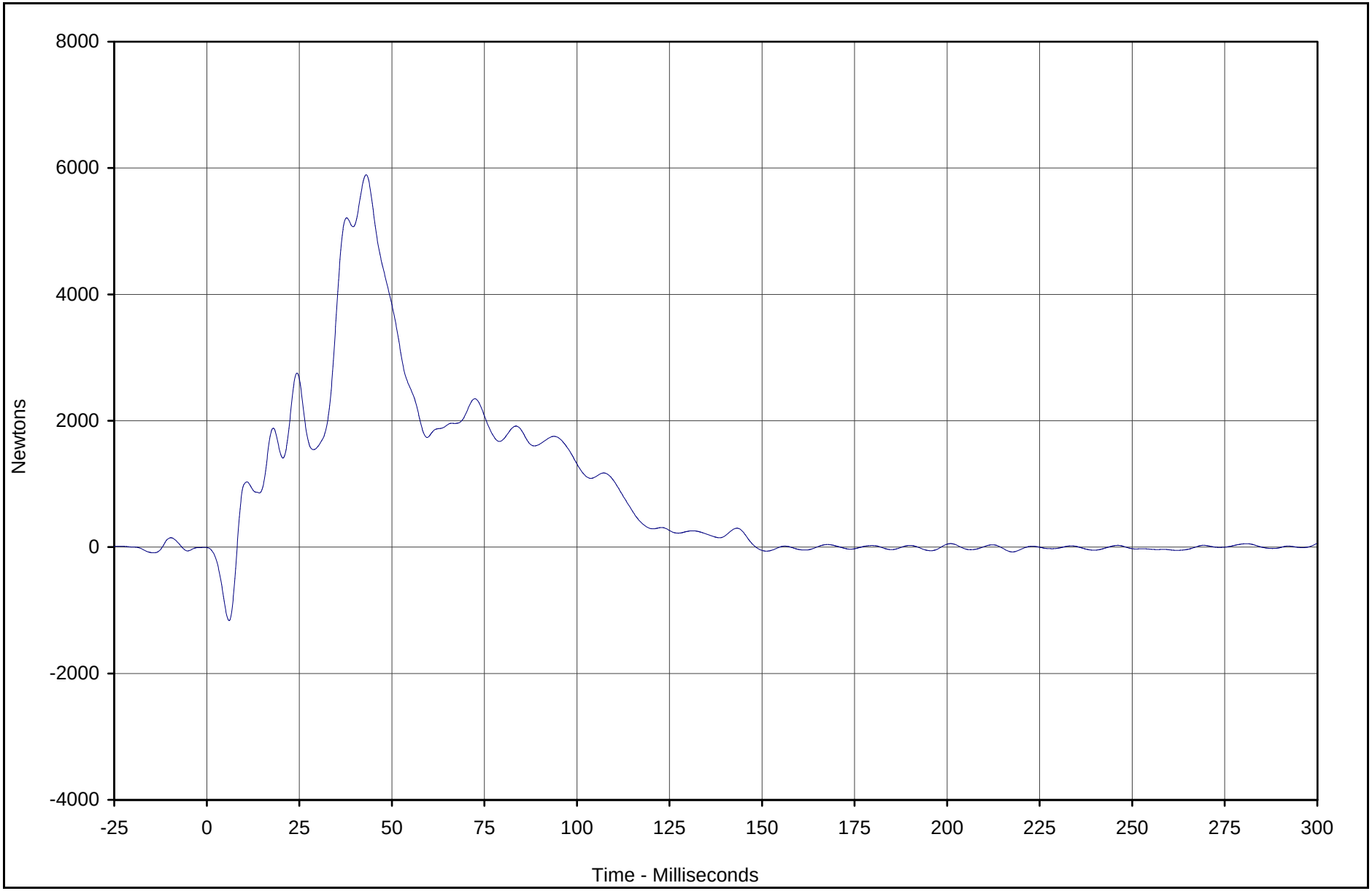
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B2 | 108 | FIL | Newtons | 5894.6 | 43.0 | -1163.9 | 6.1 | 60 |

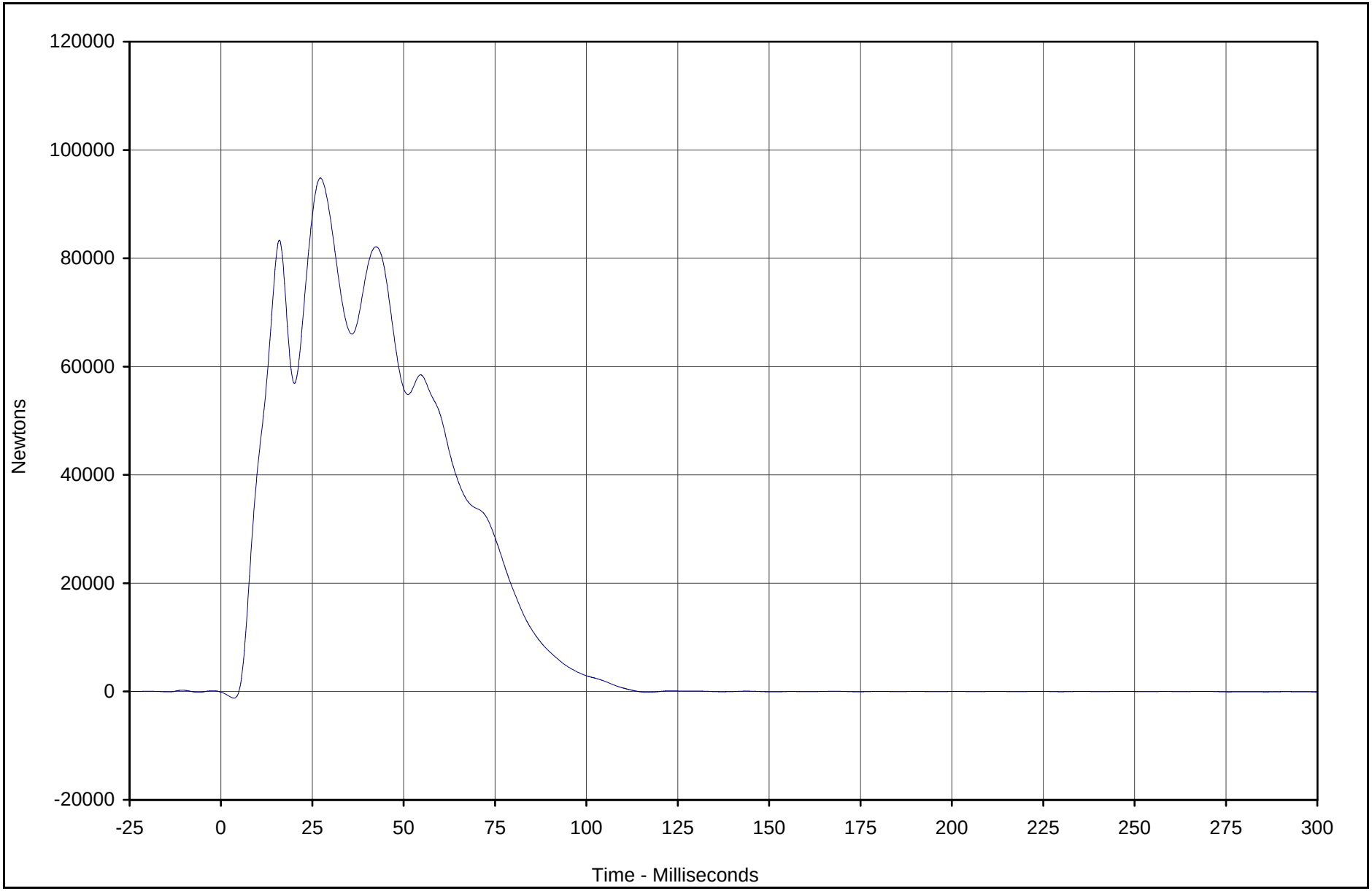
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B3 | 109 | FIL | Newtons | 94829.2 | 27.2 | -1217.7 | 3.5 | 60 |

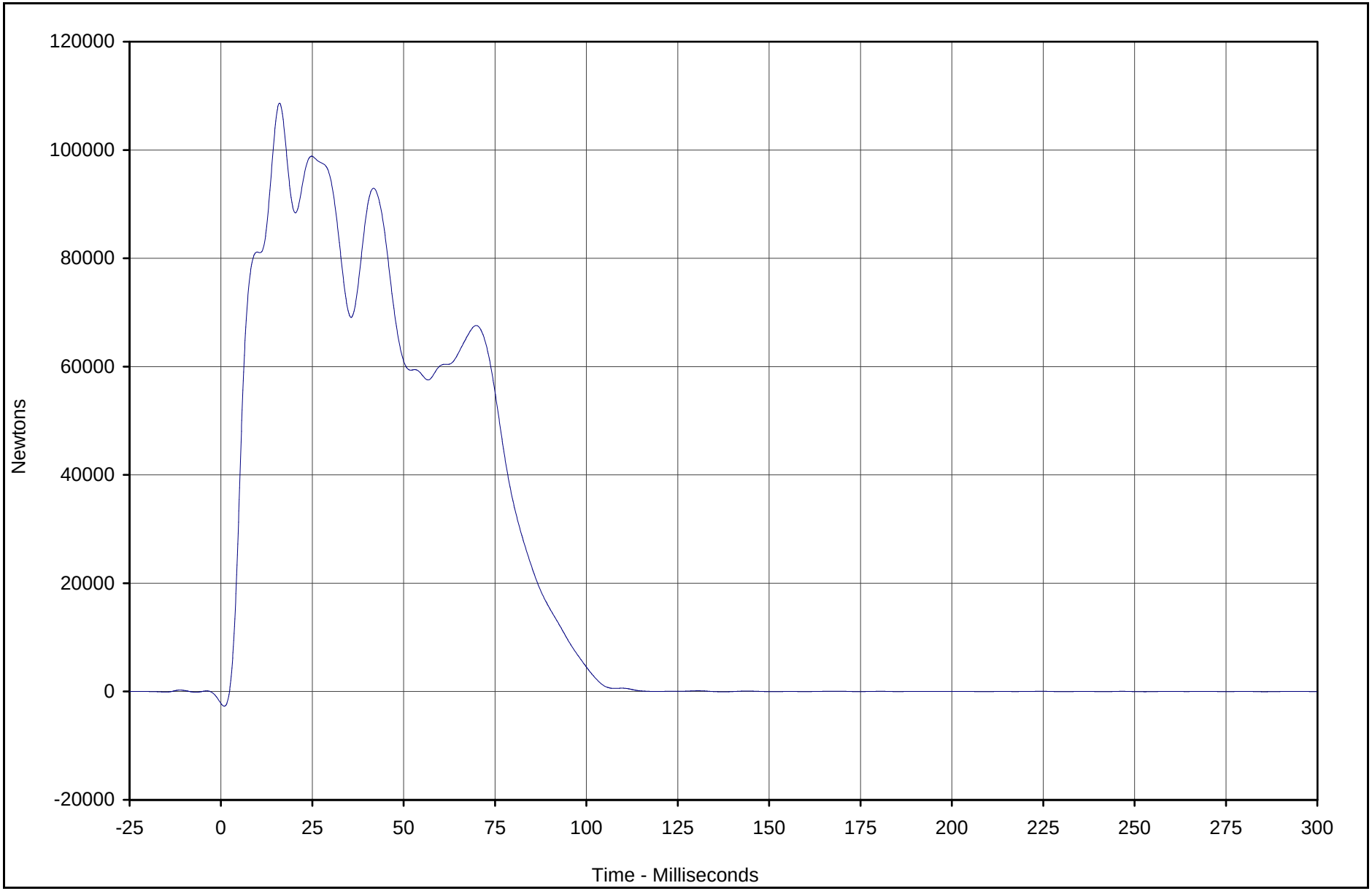
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B4 | 110 | FIL | Newtons | 108659.4 | 16.0 | -2705.9 | 0.9 | 60 |

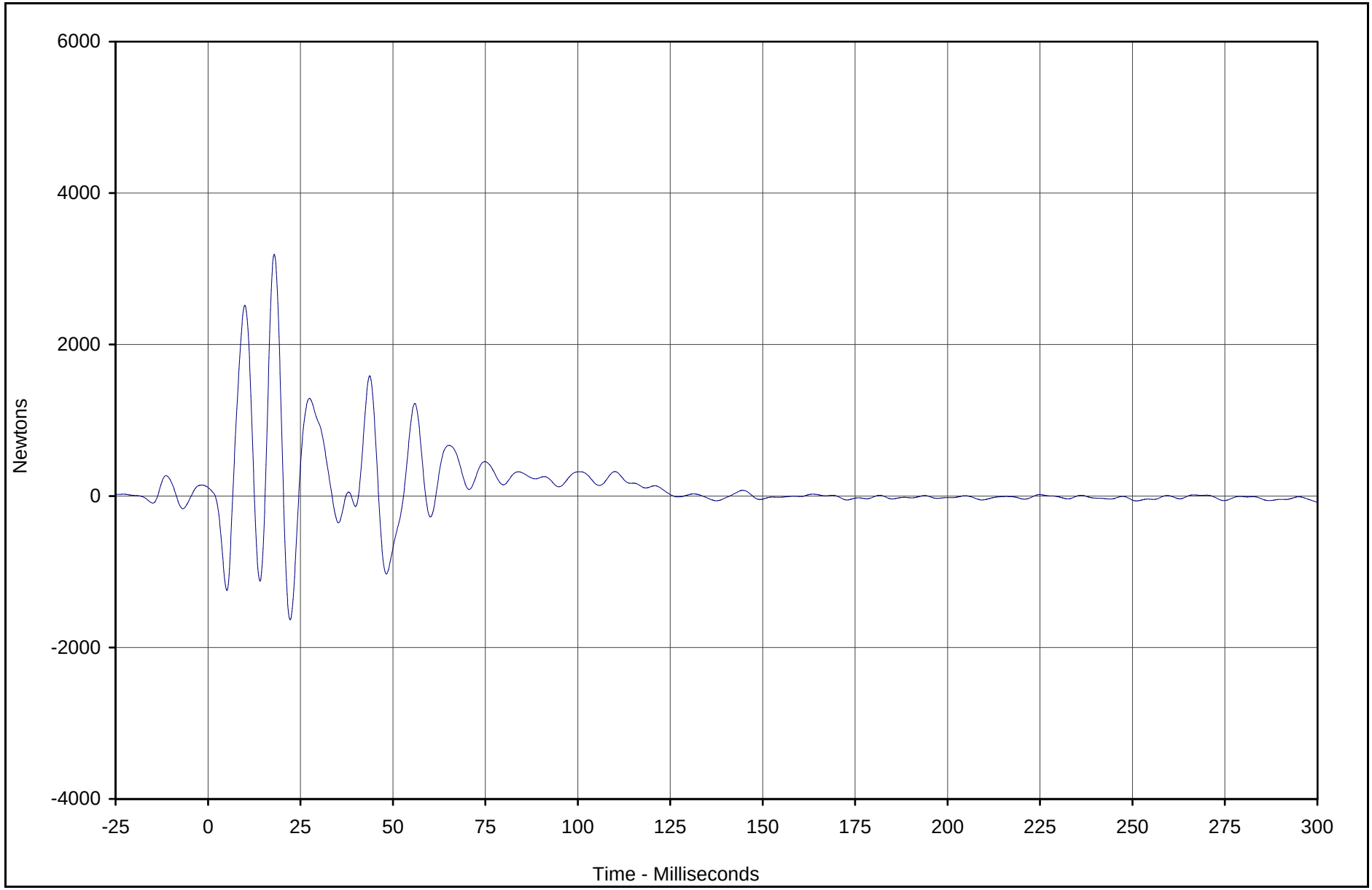
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



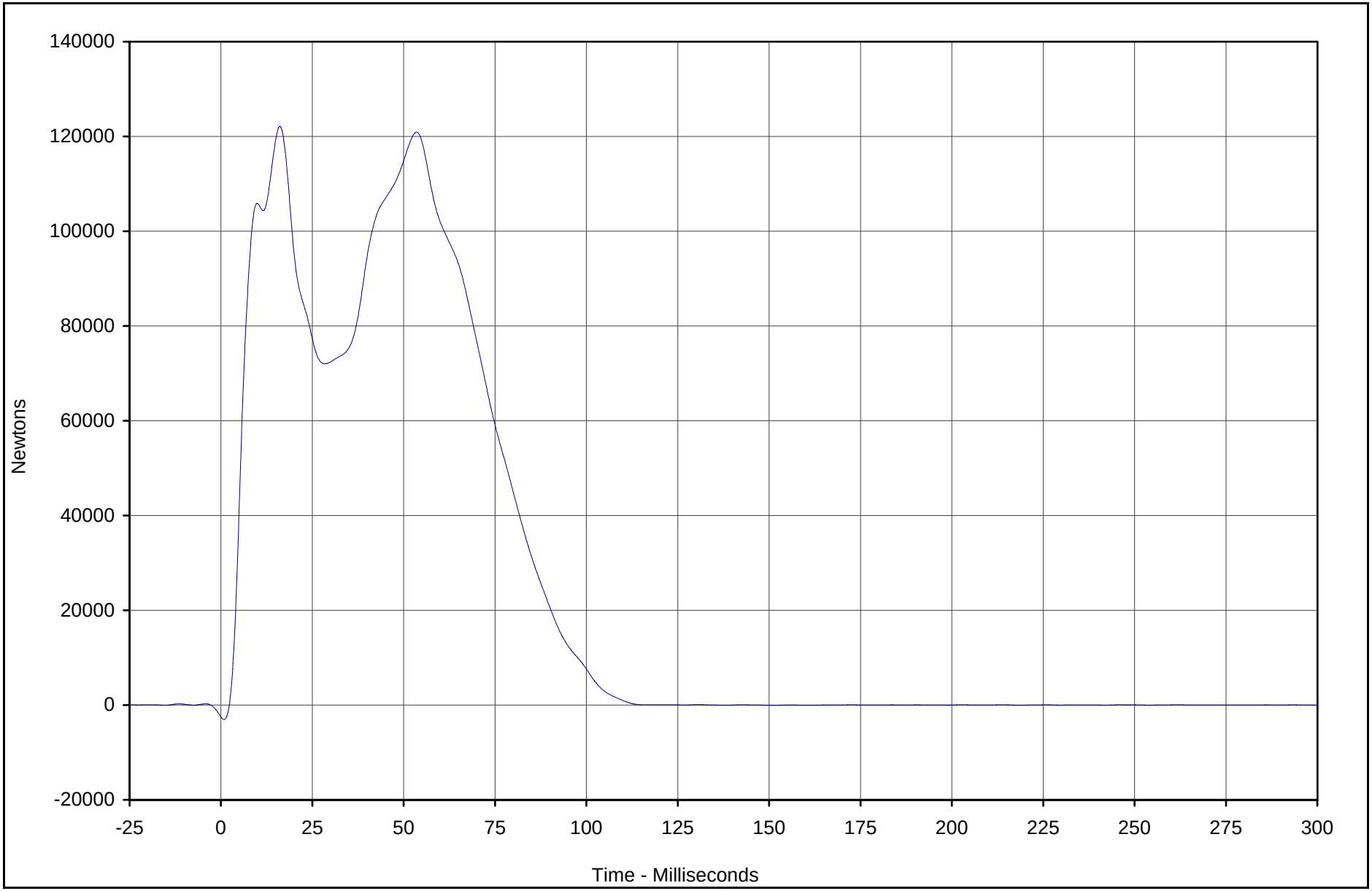

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B5 | 111 | FIL | Newtons | 3191.2 | 17.9 | -1634.1 | 22.2 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B6 | 112 | FIL | Newtons | 122120.6 | 16.1 | -3044.2 | 0.9 | 60 |

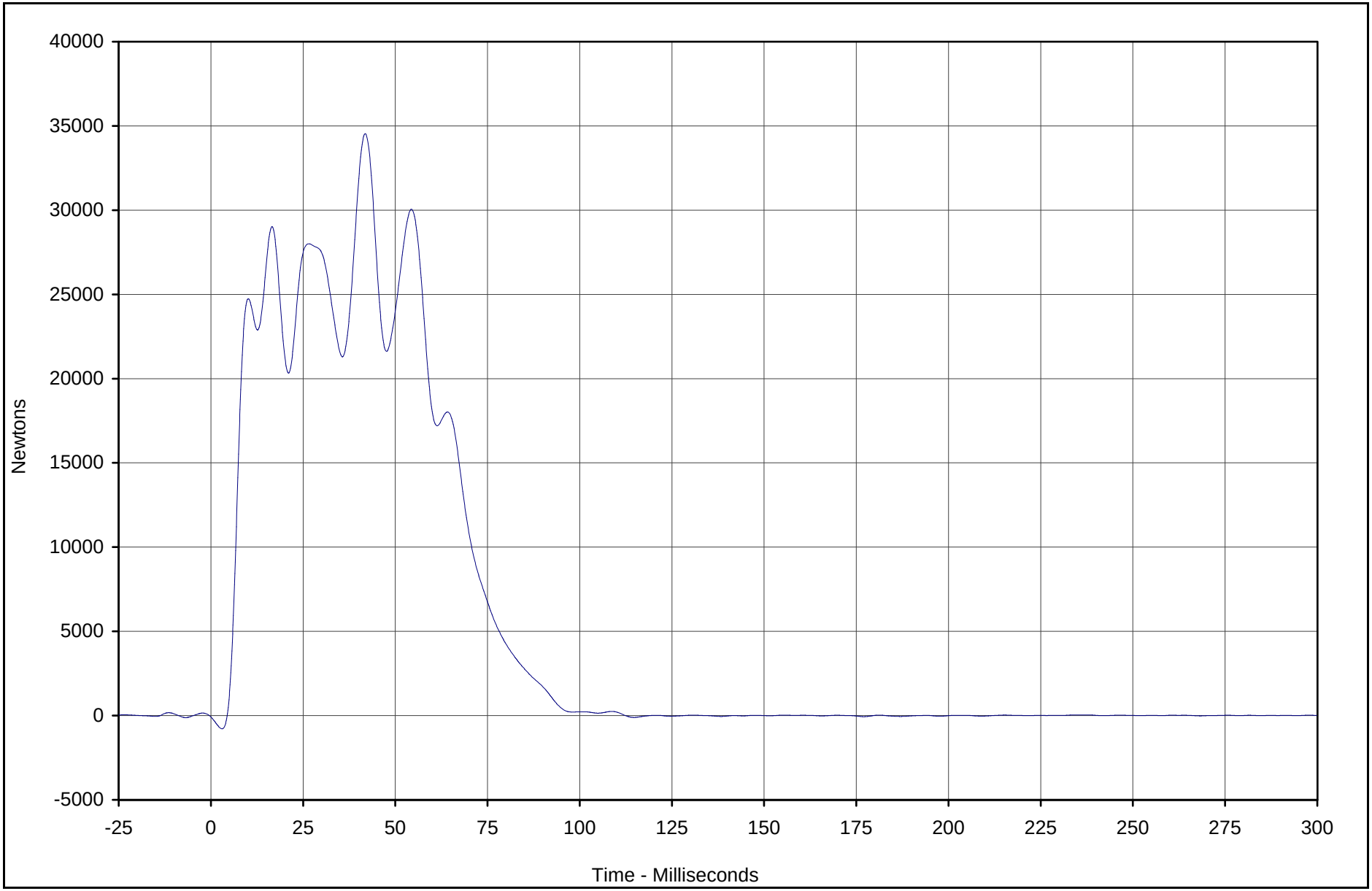
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B7 | 113 | FIL | Newtons | 34537.8 | 41.8 | -786.6 | 3.0 | 60 |

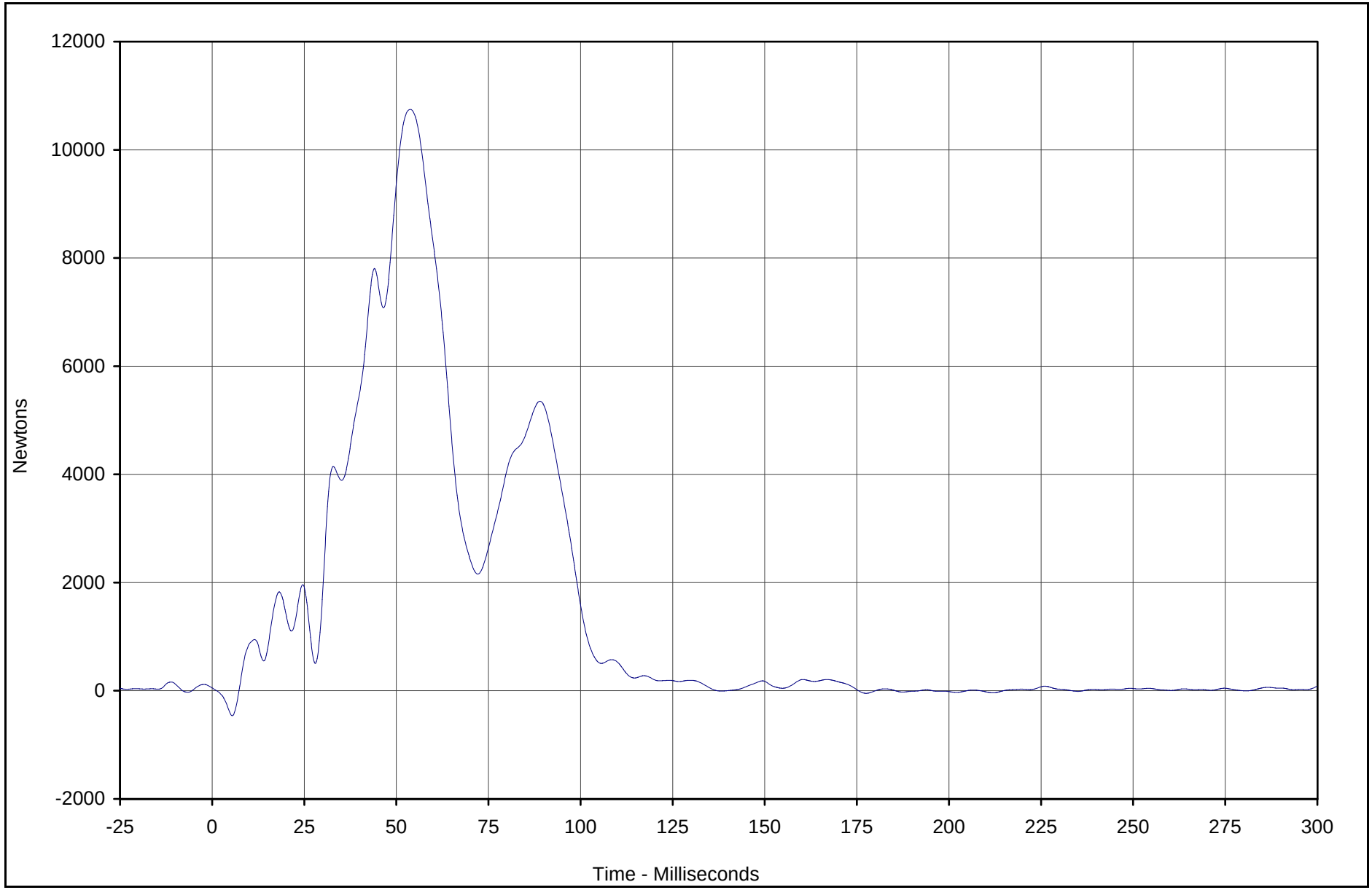
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



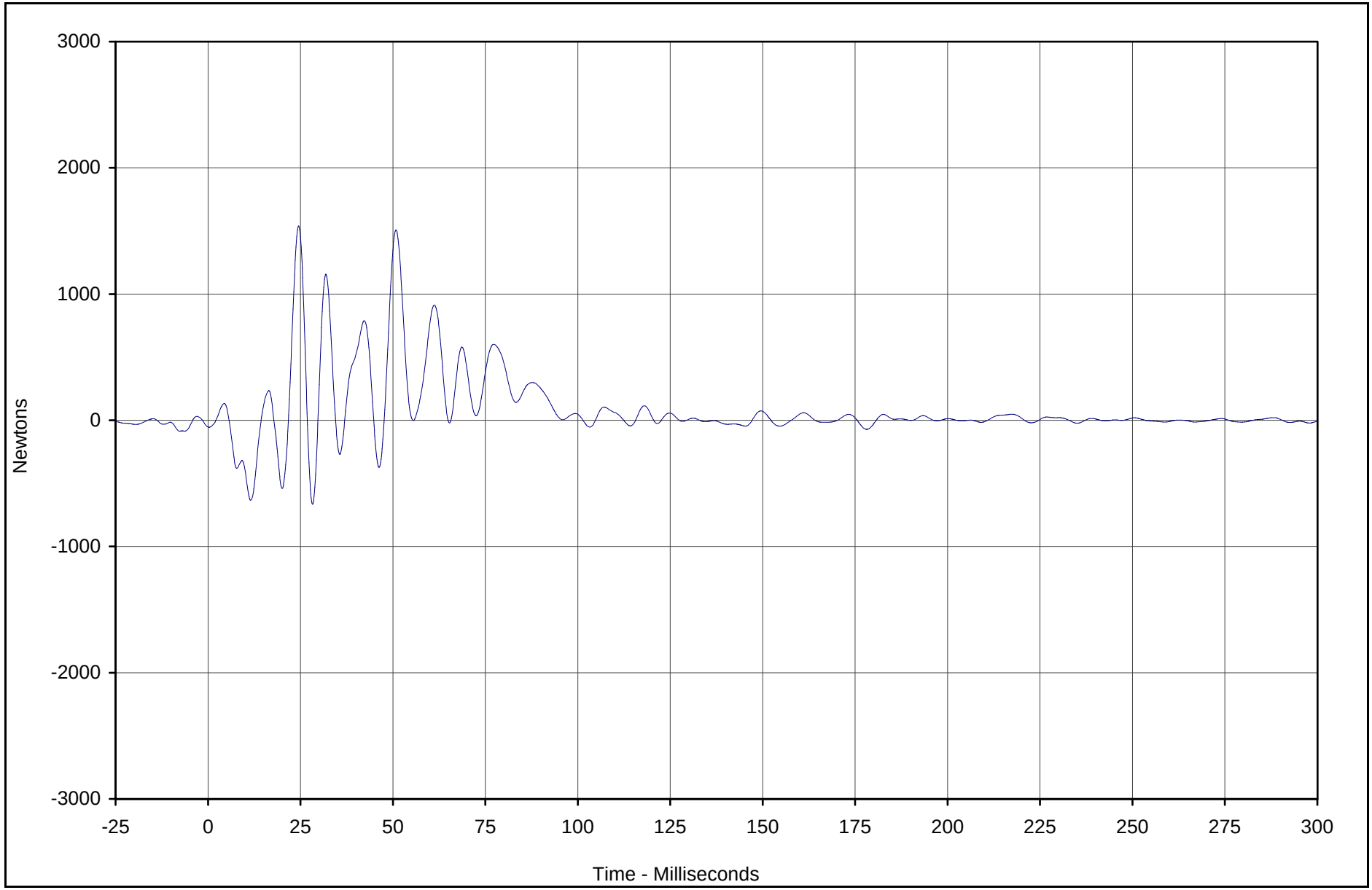

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B8 | 114 | FIL | Newtons | 10747.6 | 53.8 | -462.7 | 5.5 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force B9 | 115 | FIL | Newtons | 1539.5 | 24.5 | -665.1 | 28.3 | 60 |

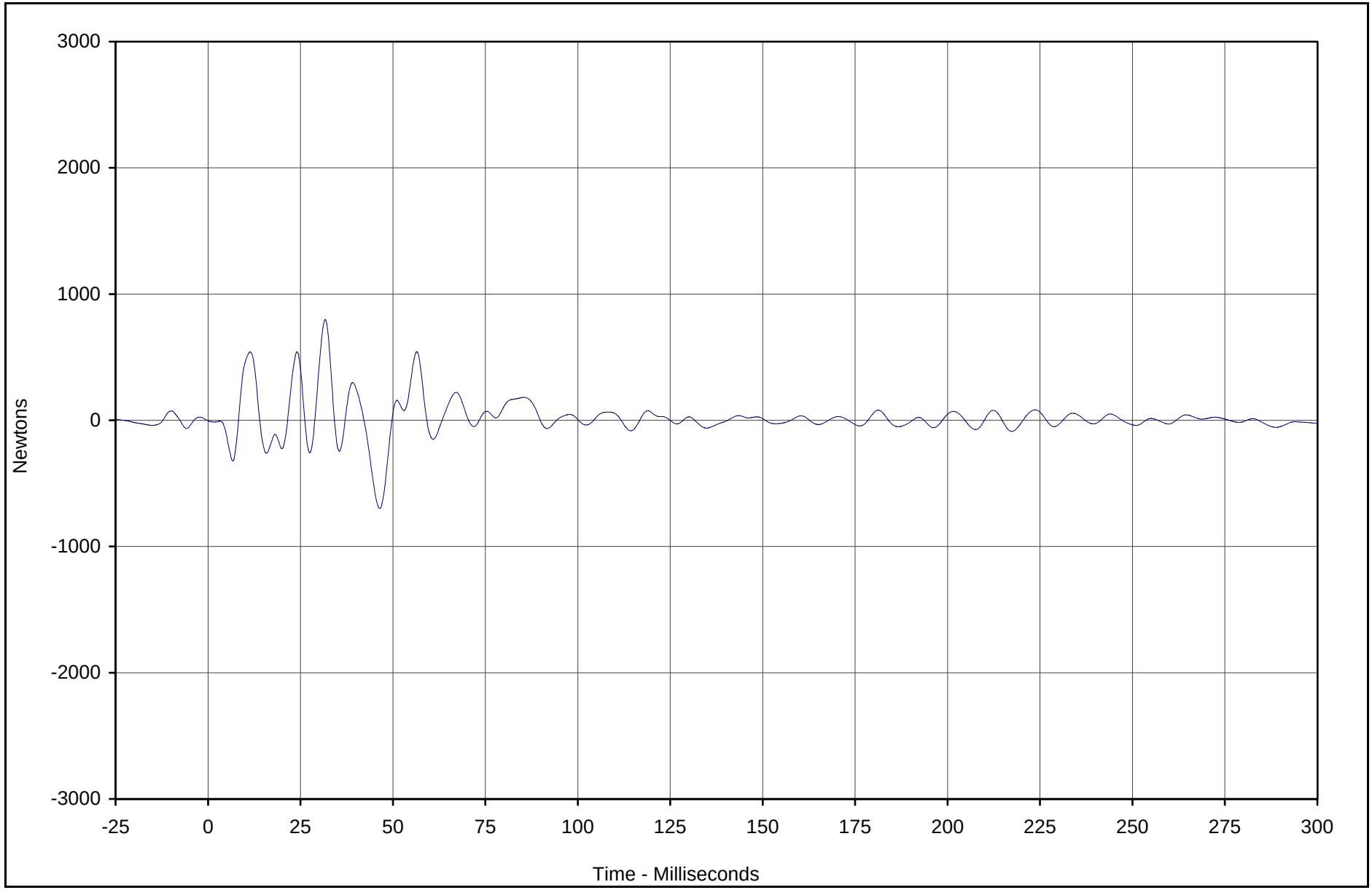
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C1 | 116 | FIL | Newtons | 798.8 | 31.7 | -699.4 | 46.4 | 60 |

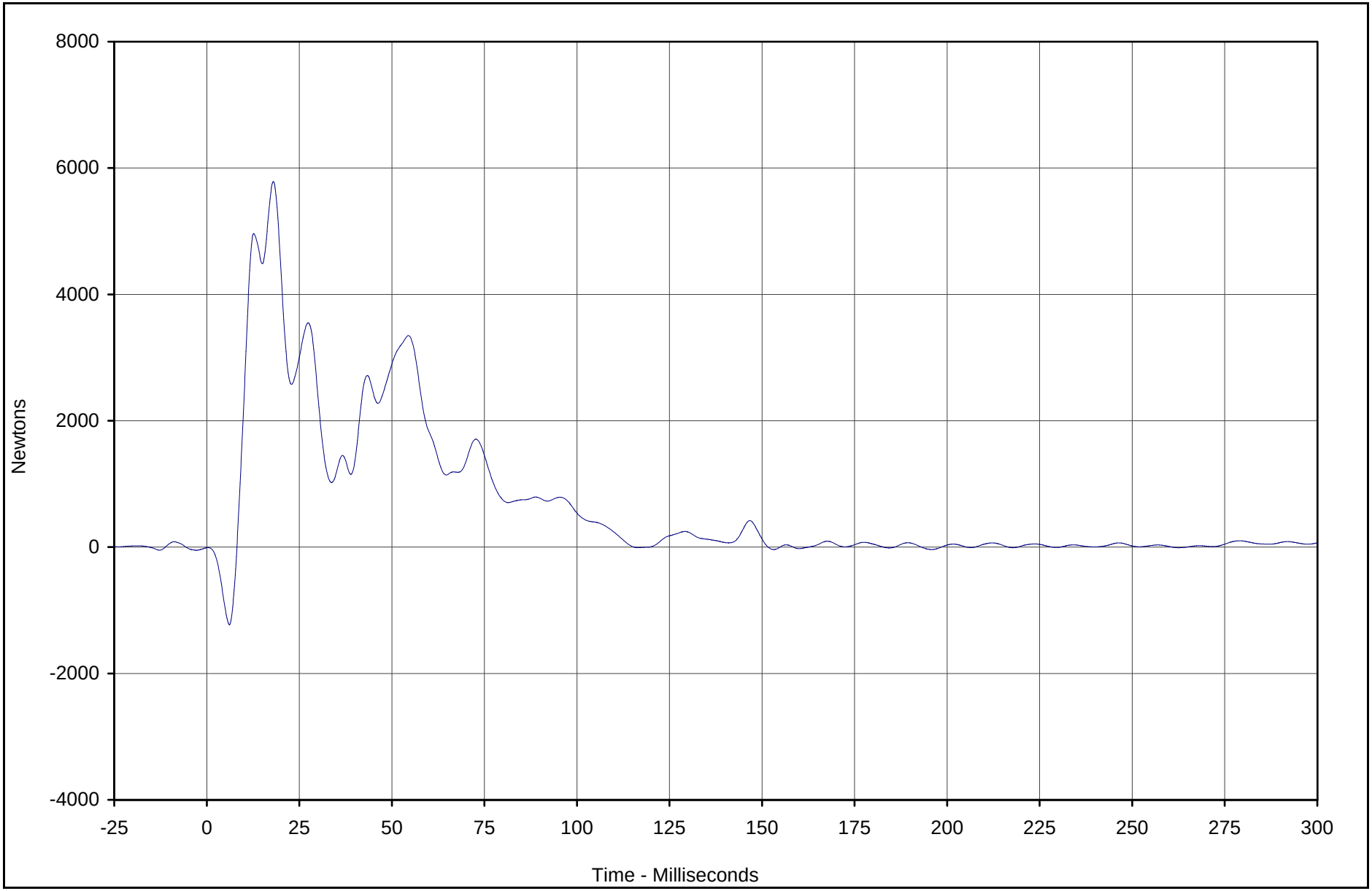
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



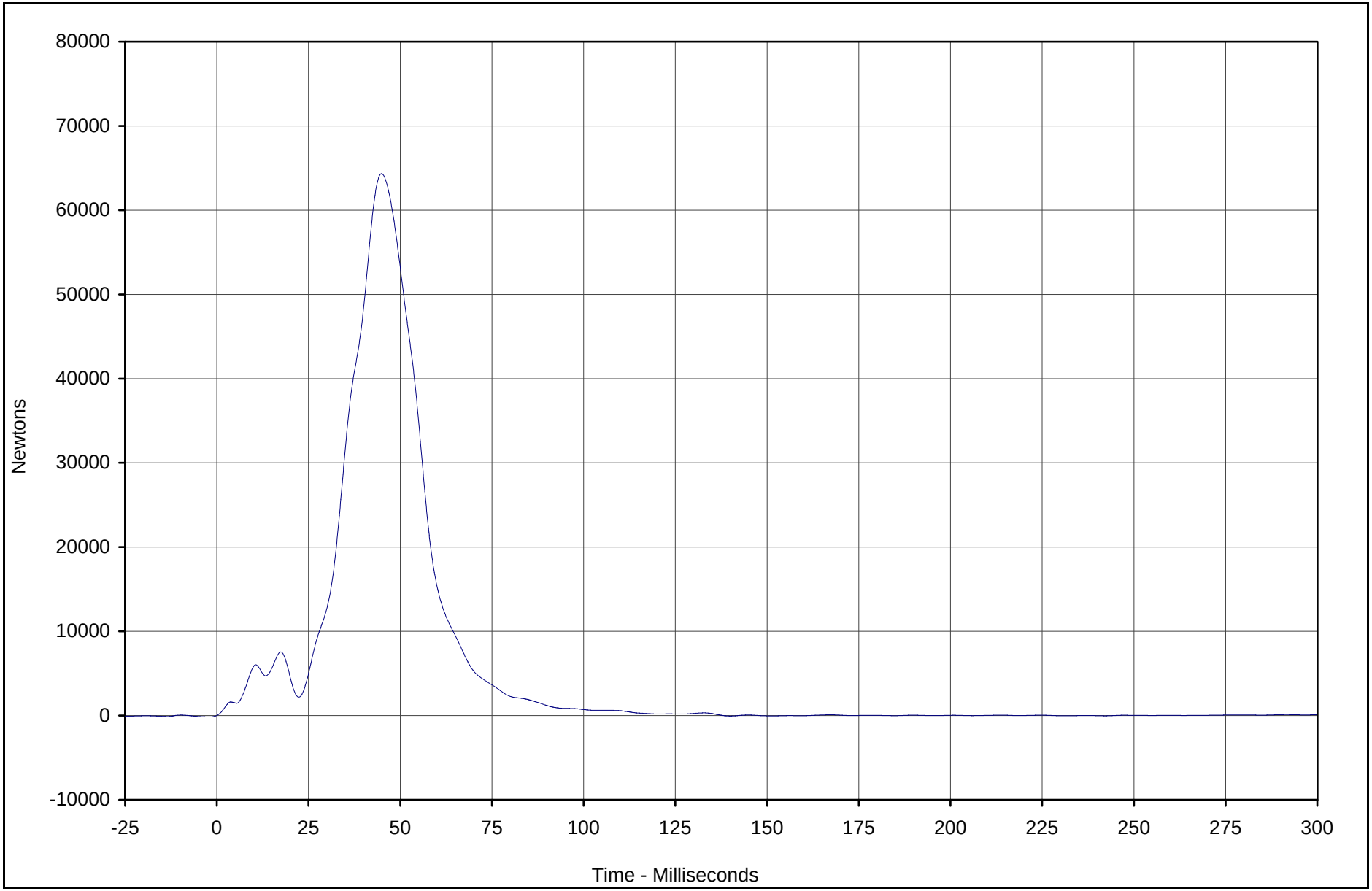

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C2 | 117 | FIL | Newtons | 5785.0 | 18.0 | -1229.5 | 6.1 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C3 | 118 | FIL | Newtons | 64333.3 | 44.9 | -57.1 | 140.0 | 60 |

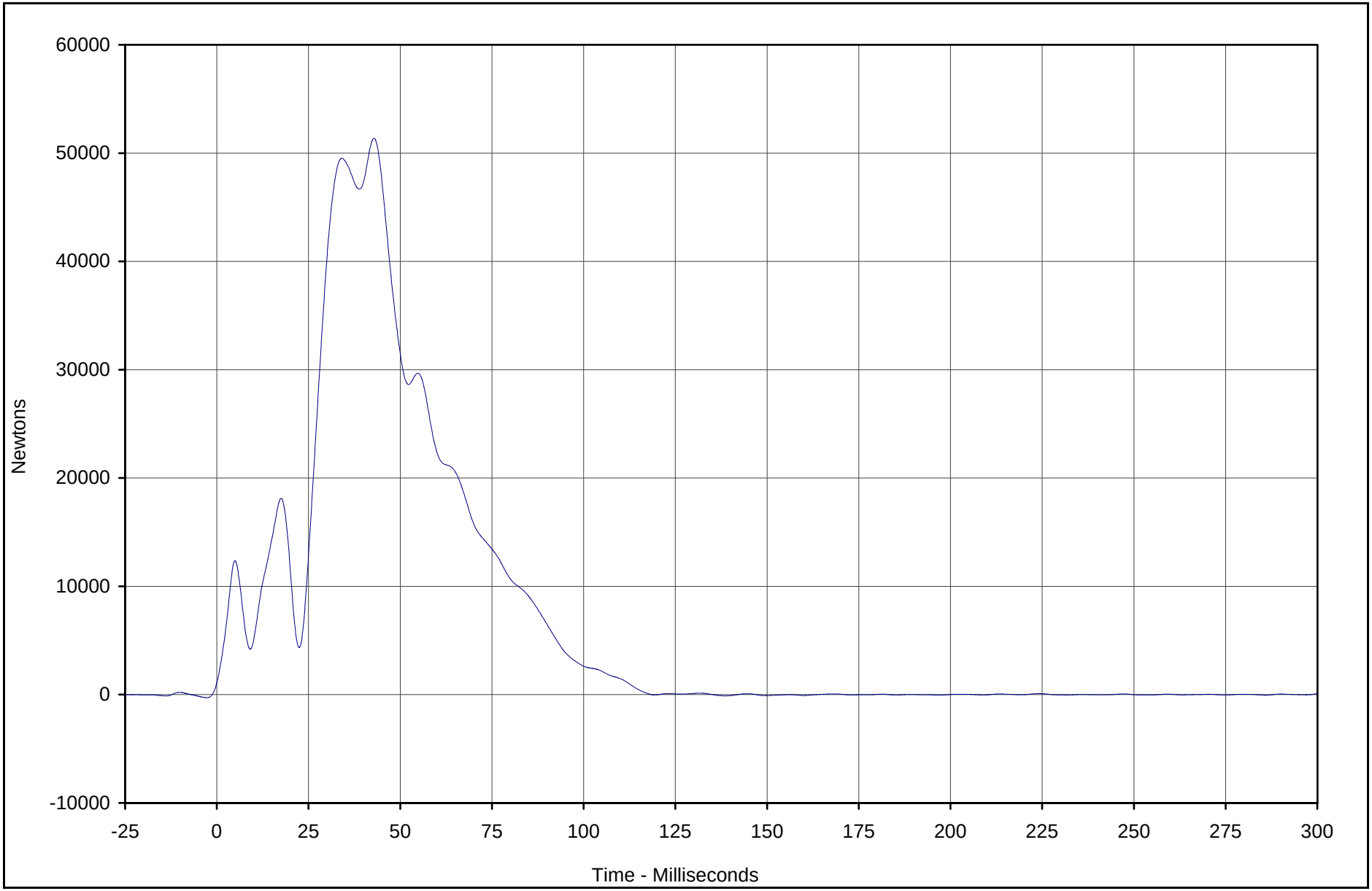
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C4 | 119 | FIL | Newtons | 51381.8 | 42.9 | -111.5 | 138.6 | 60 |

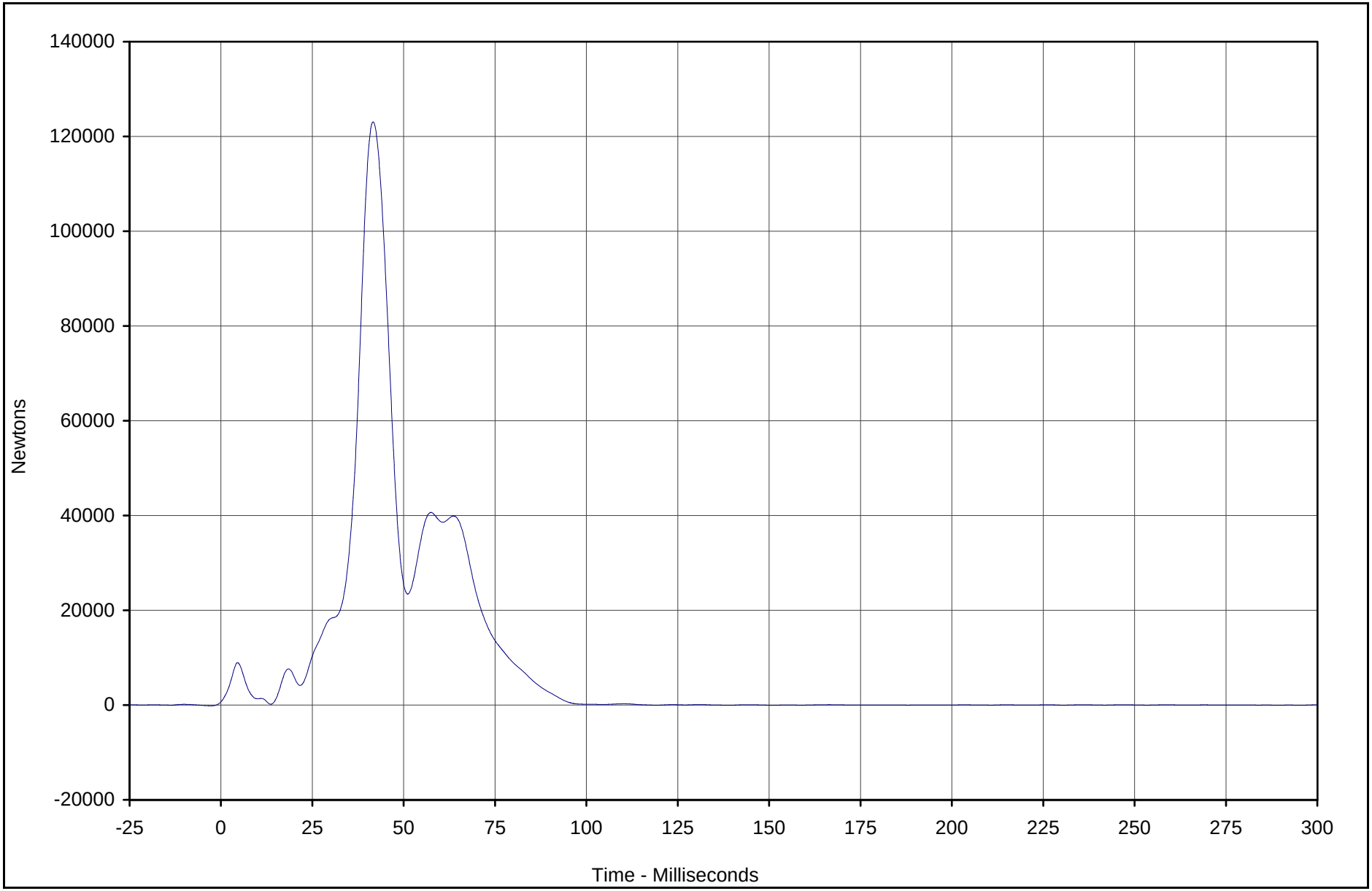
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C5 | 120 | FIL | Newtons | 123093.0 | 41.6 | -48.9 | 151.1 | 60 |

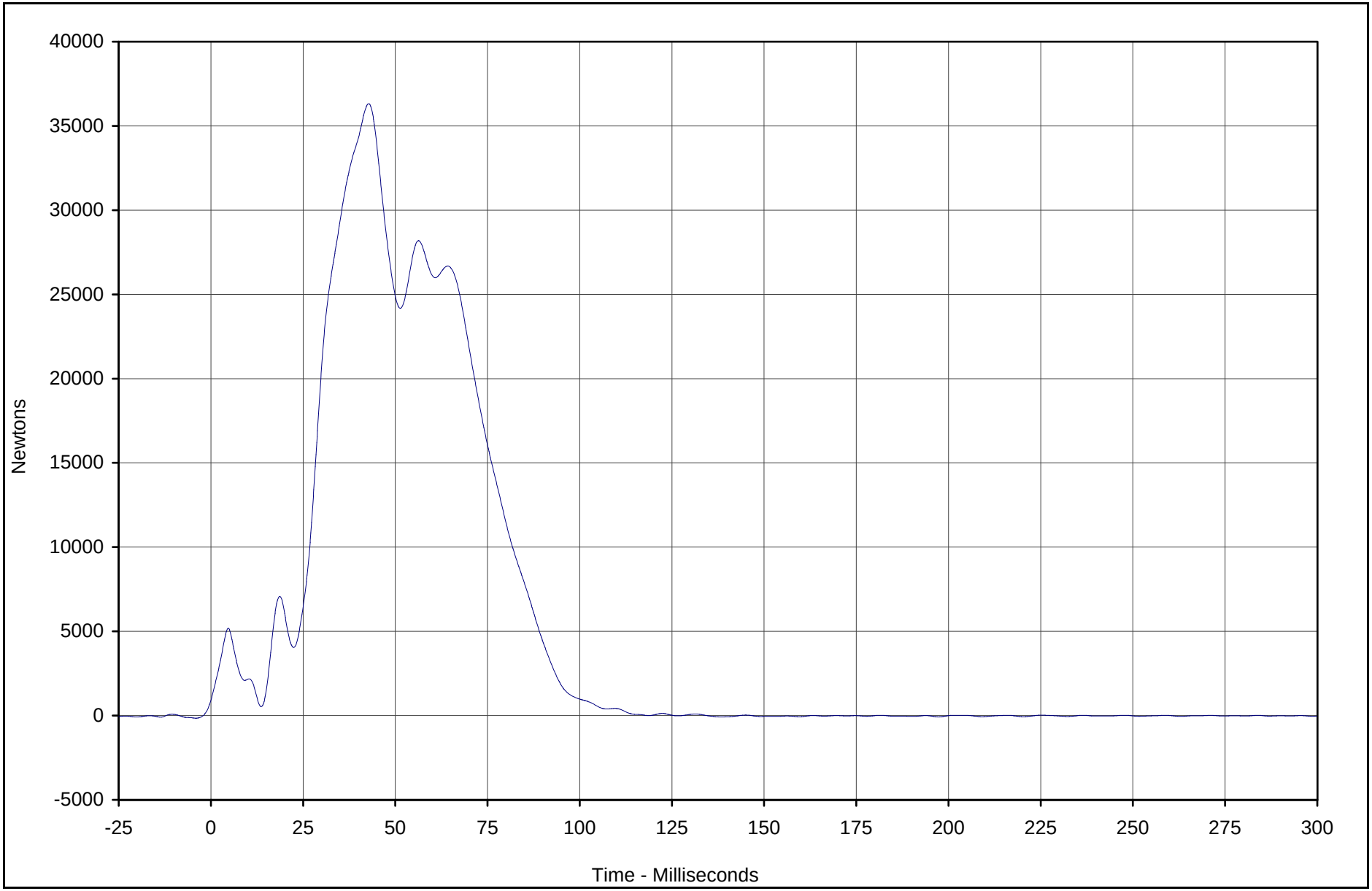
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C6 | 121 | FIL | Newtons | 36320.9 | 42.8 | -77.2 | 138.3 | 60 |

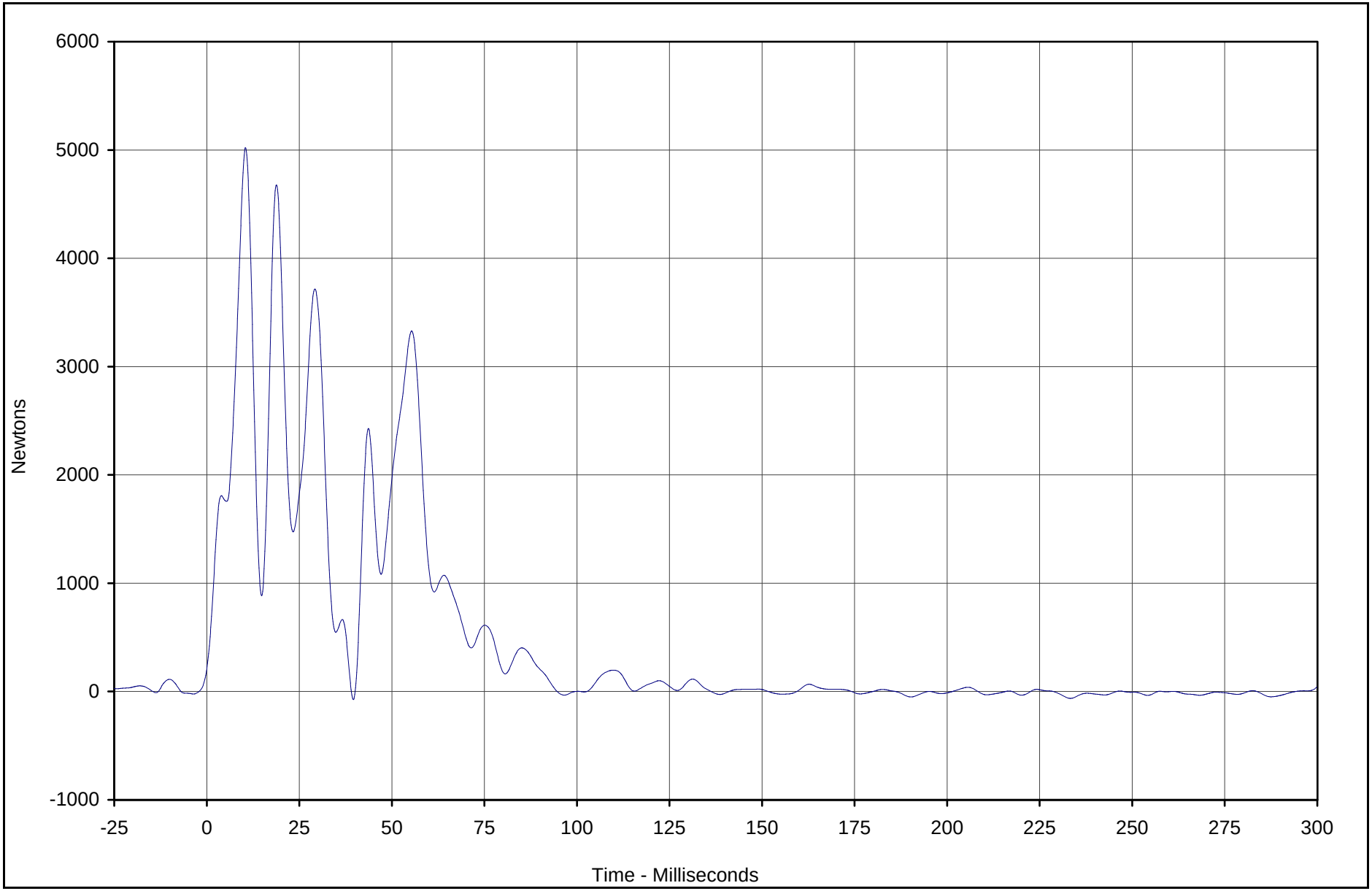
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



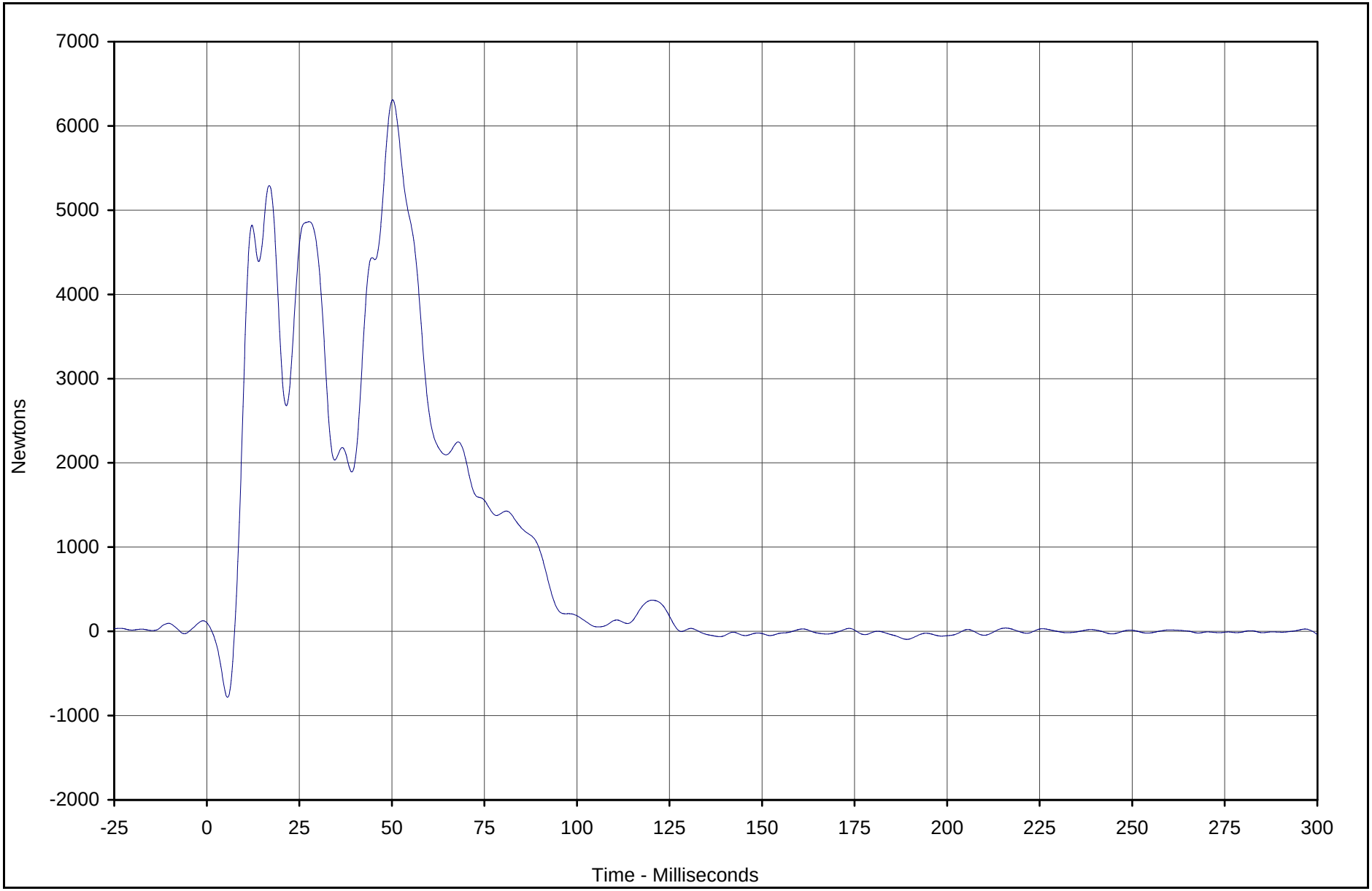

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C7 | 122 | FIL | Newtons | 5020.4 | 10.5 | -74.1 | 39.6 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C8 | 123 | FIL | Newtons | 6310.2 | 50.2 | -782.5 | 5.6 | 60 |

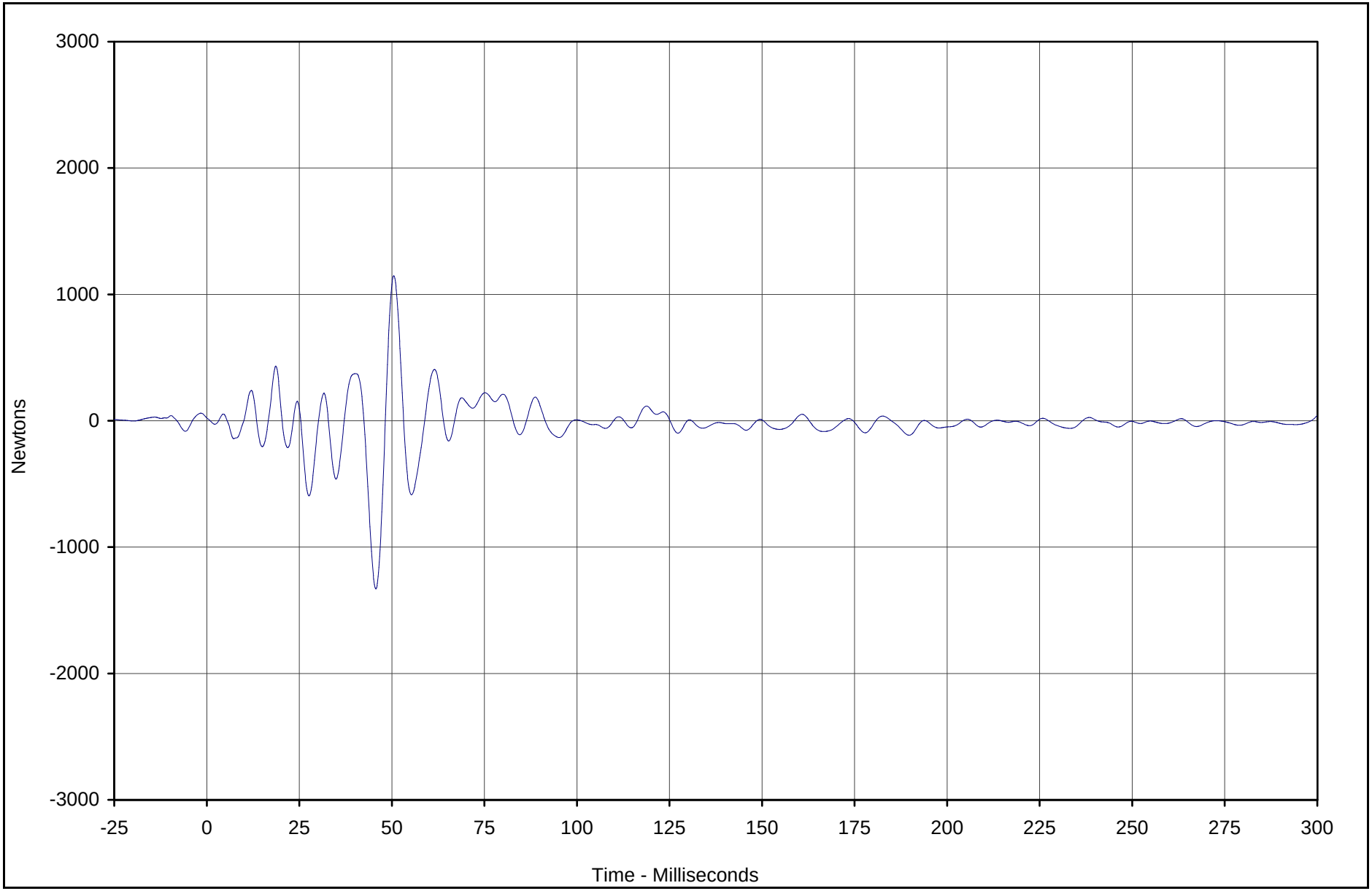
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force C9 | 124 | FIL | Newtons | 1147.5 | 50.5 | -1330.5 | 45.7 | 60 |

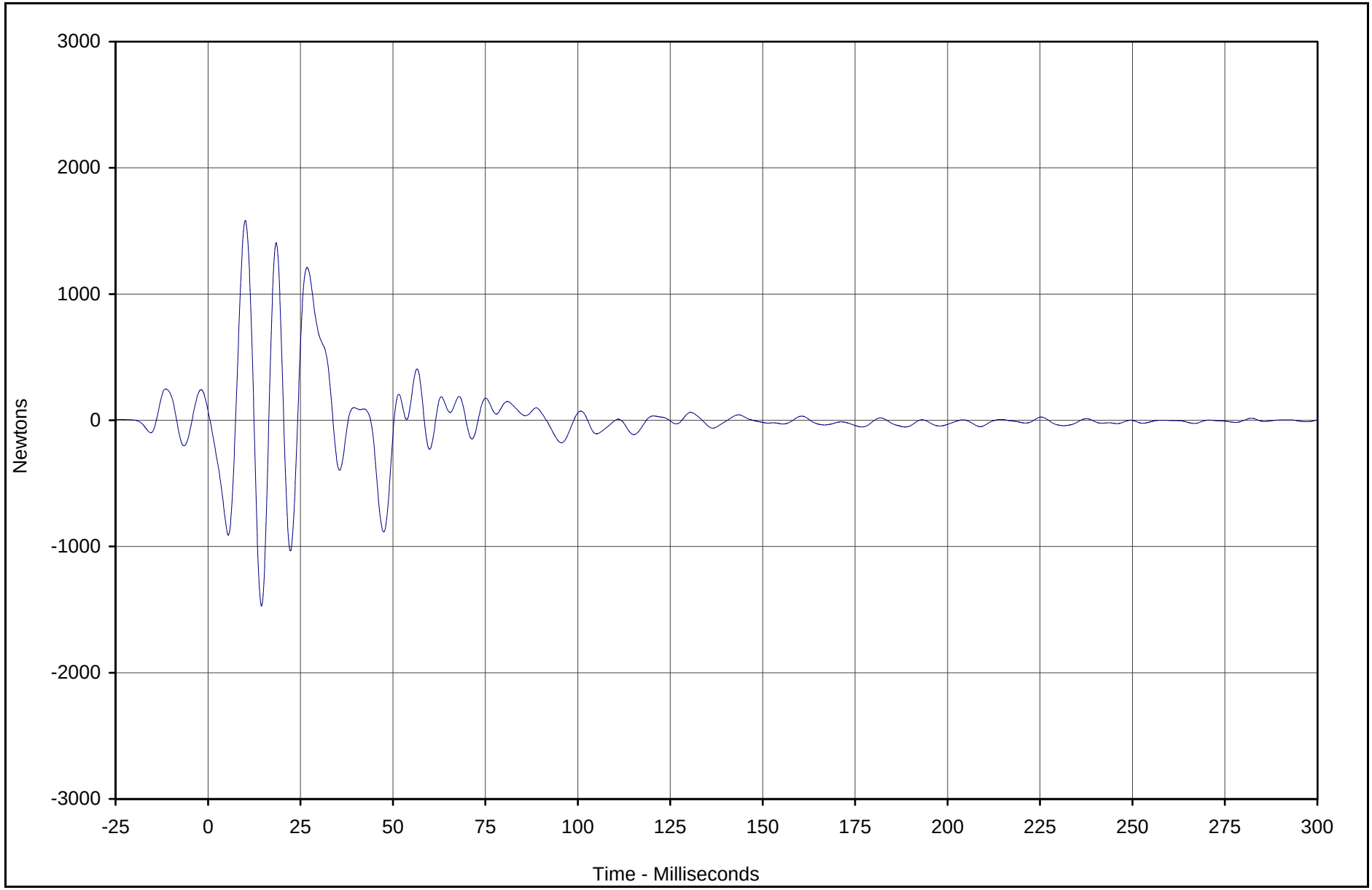
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D1 | 125 | FIL | Newtons | 1583.1 | 10.1 | -1472.6 | 14.5 | 60 |

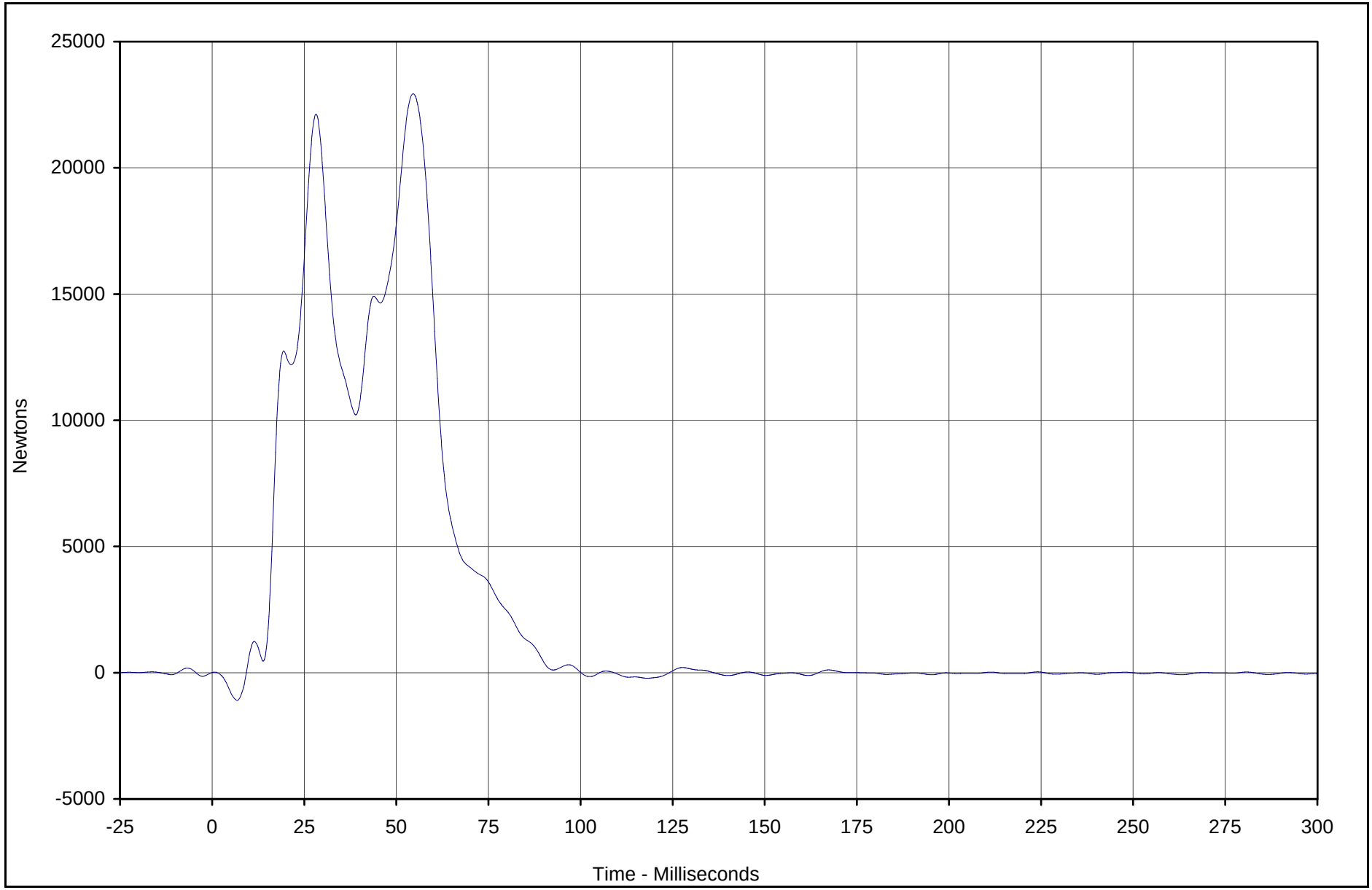
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D2 | 126 | FIL | Newtons | 22937.0 | 54.6 | -1095.1 | 6.8 | 60 |

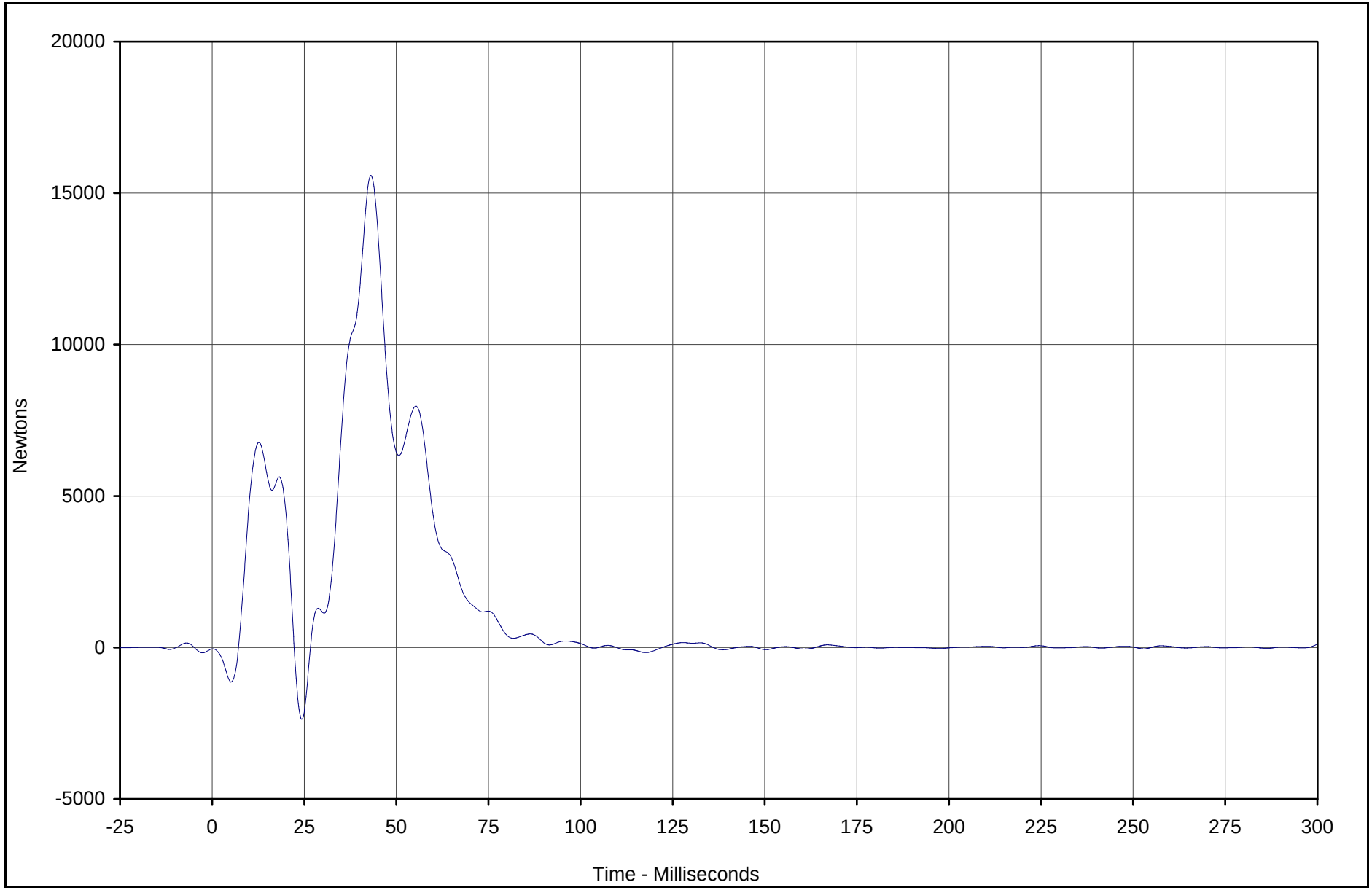
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D3 | 127 | FIL | Newtons | 15582.2 | 43.1 | -2371.6 | 24.3 | 60 |

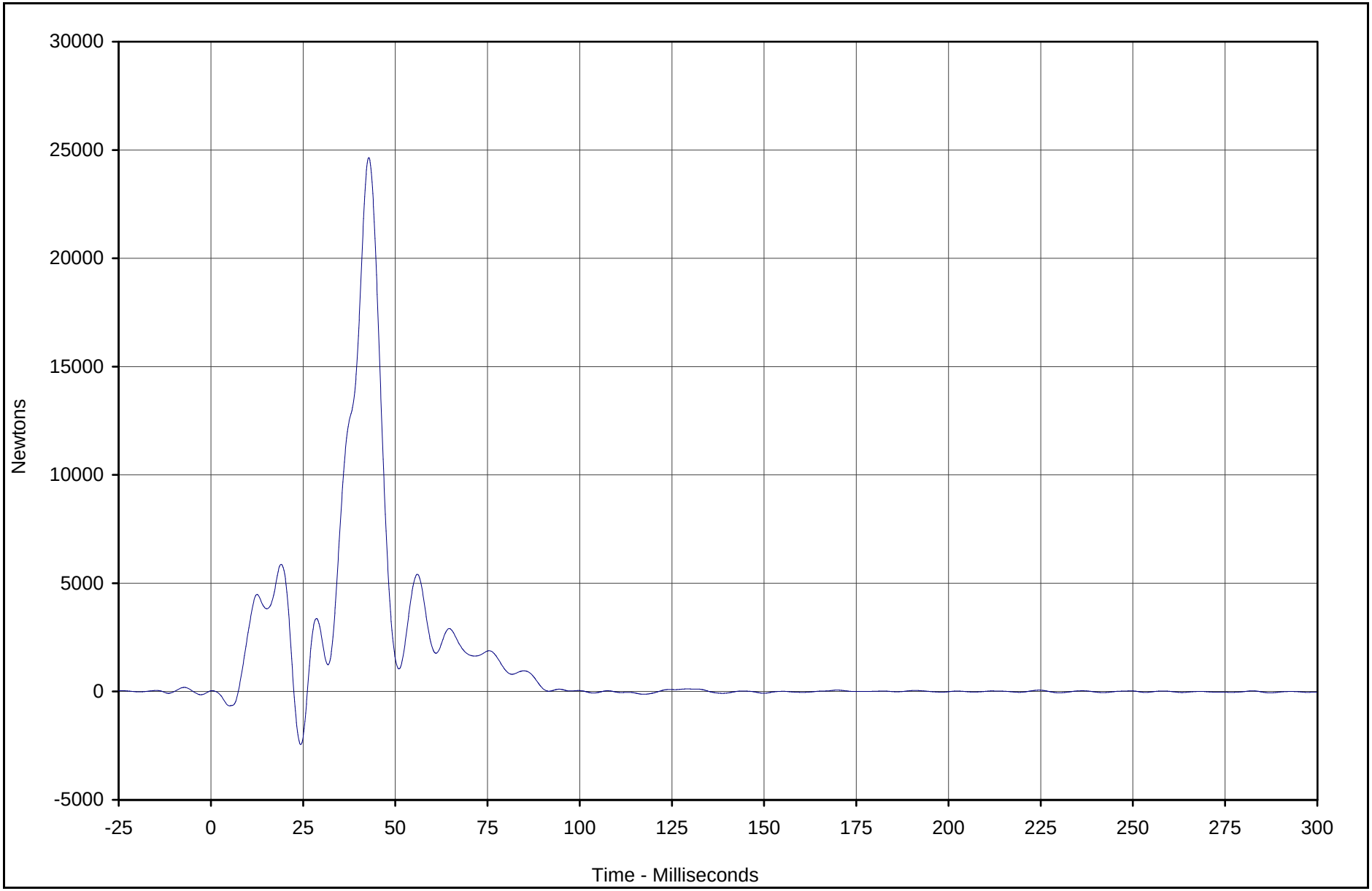
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D4 | 128 | FIL | Newtons | 24647.1 | 42.8 | -2447.6 | 24.4 | 60 |

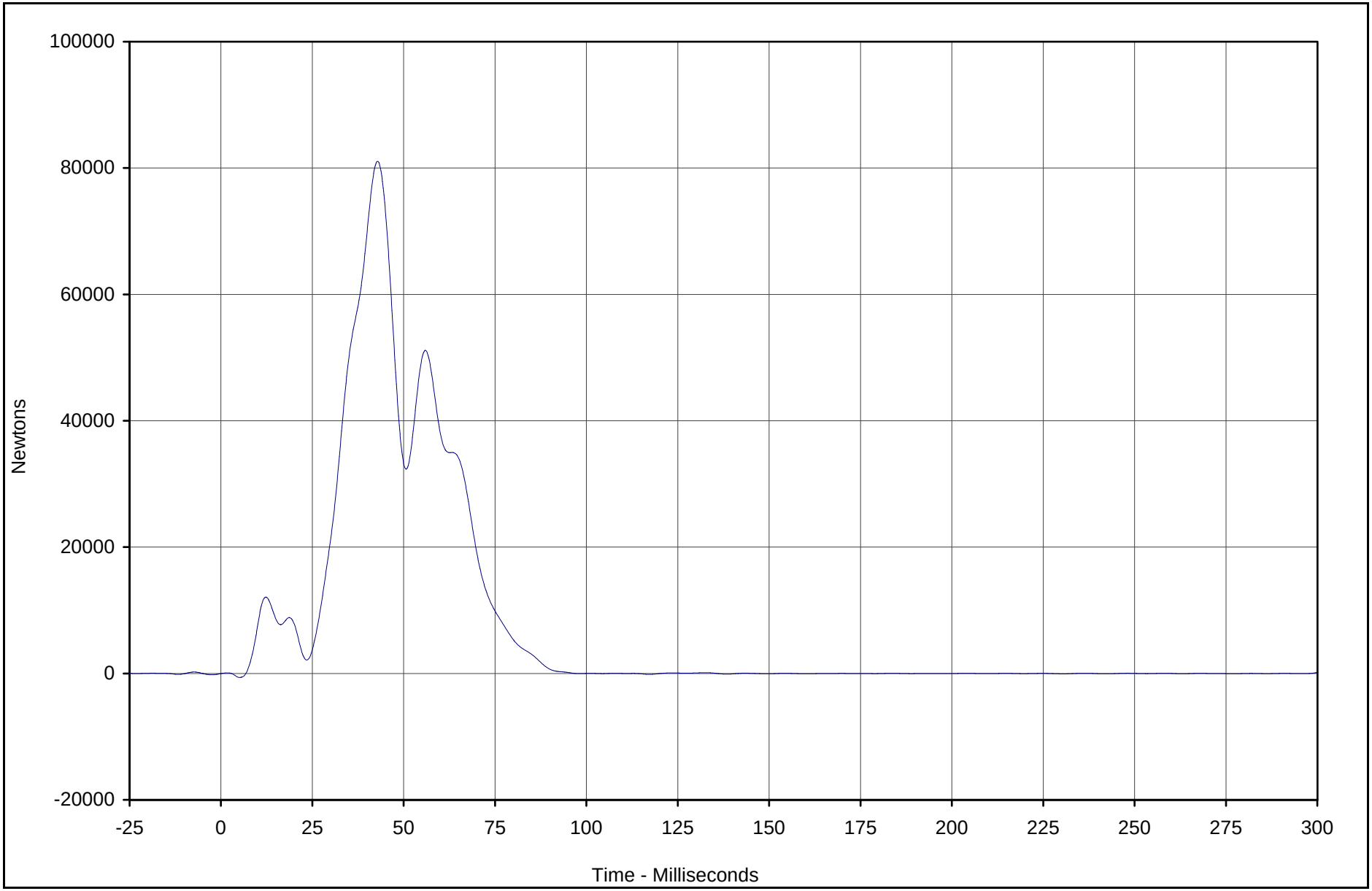
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D5 | 129 | FIL | Newtons | 81072.0 | 42.9 | -630.2 | 5.1 | 60 |

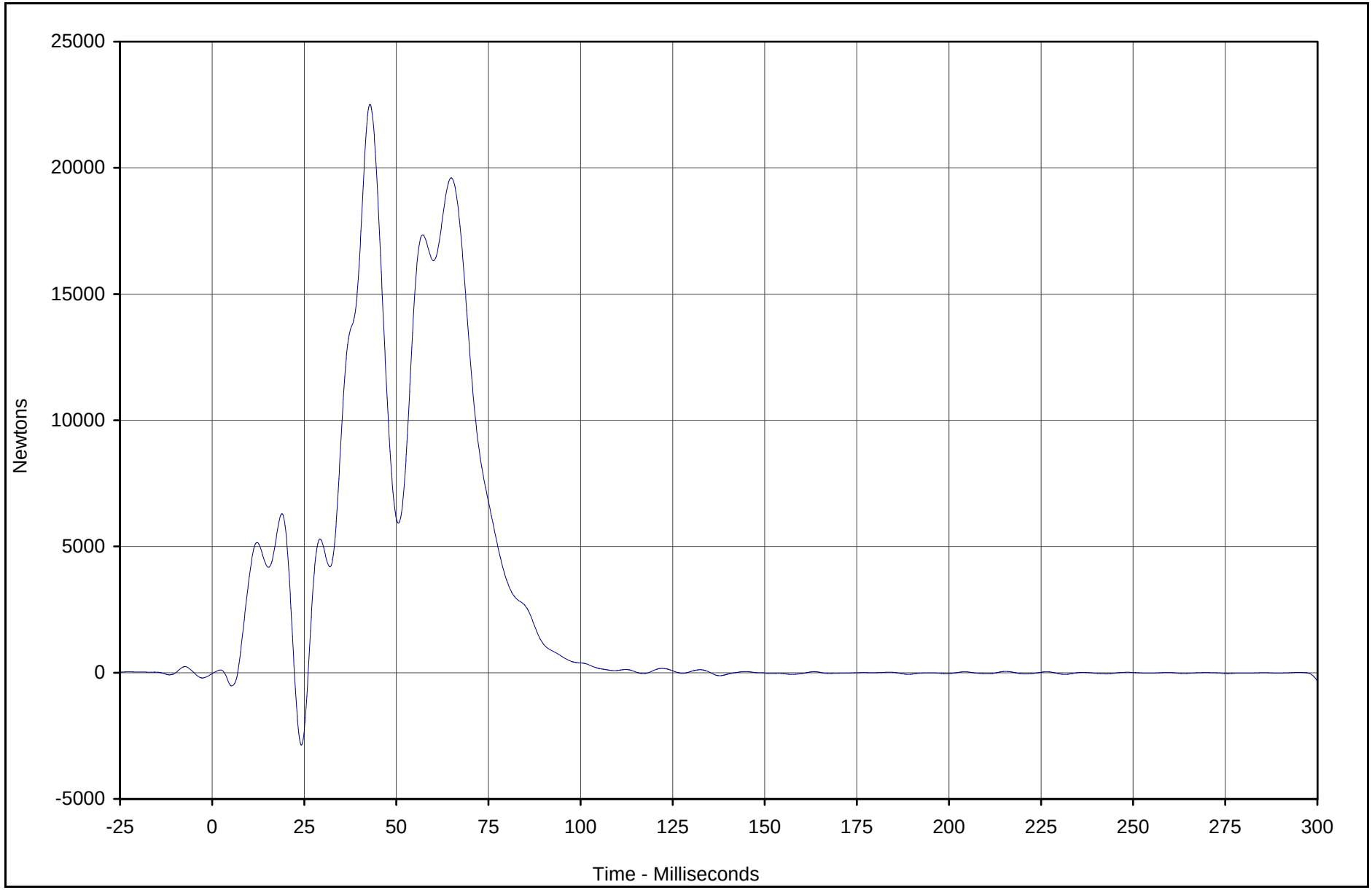
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



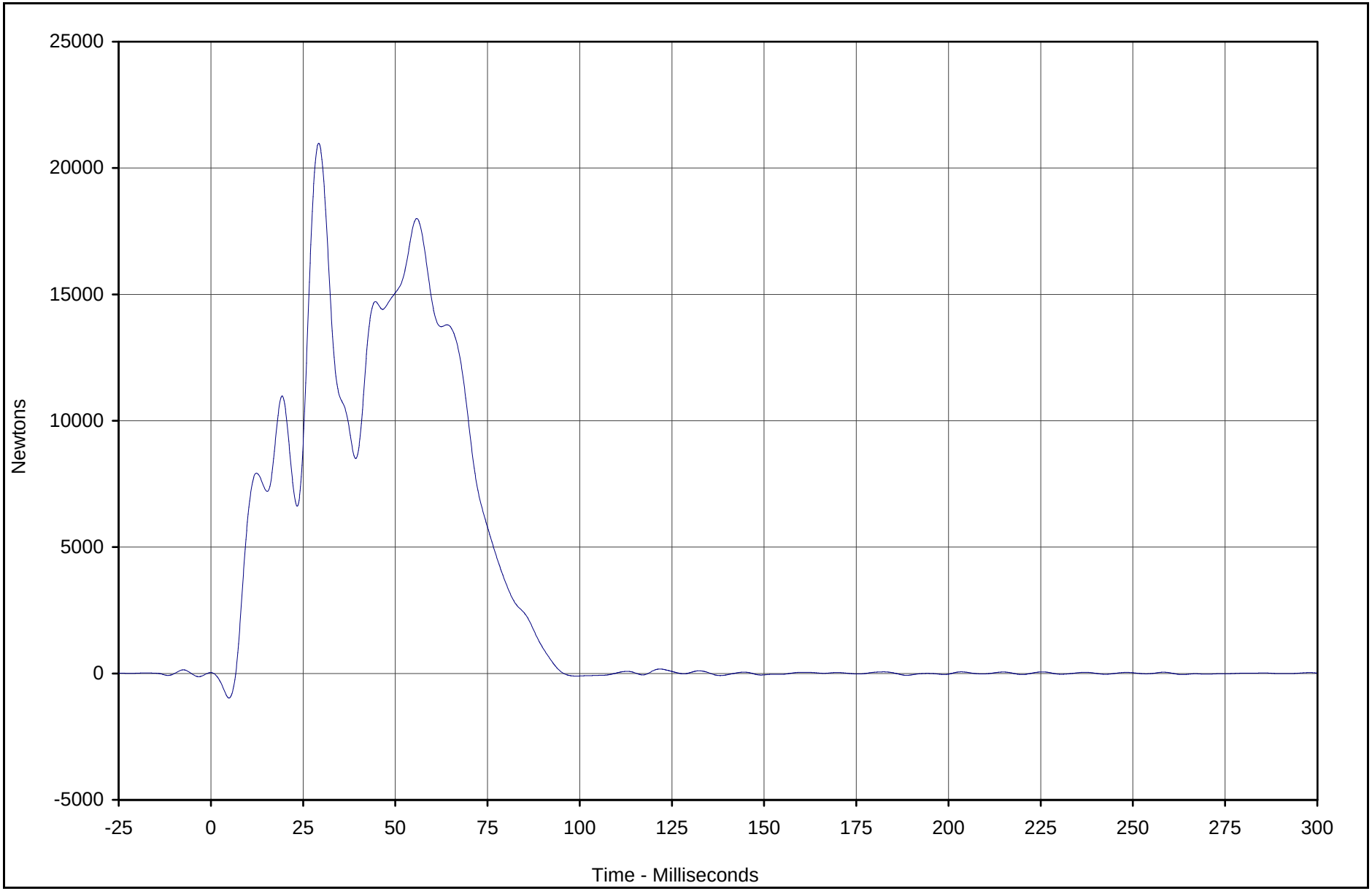

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D6 | 130 | FIL | Newtons | 22512.4 | 42.8 | -2866.2 | 24.2 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



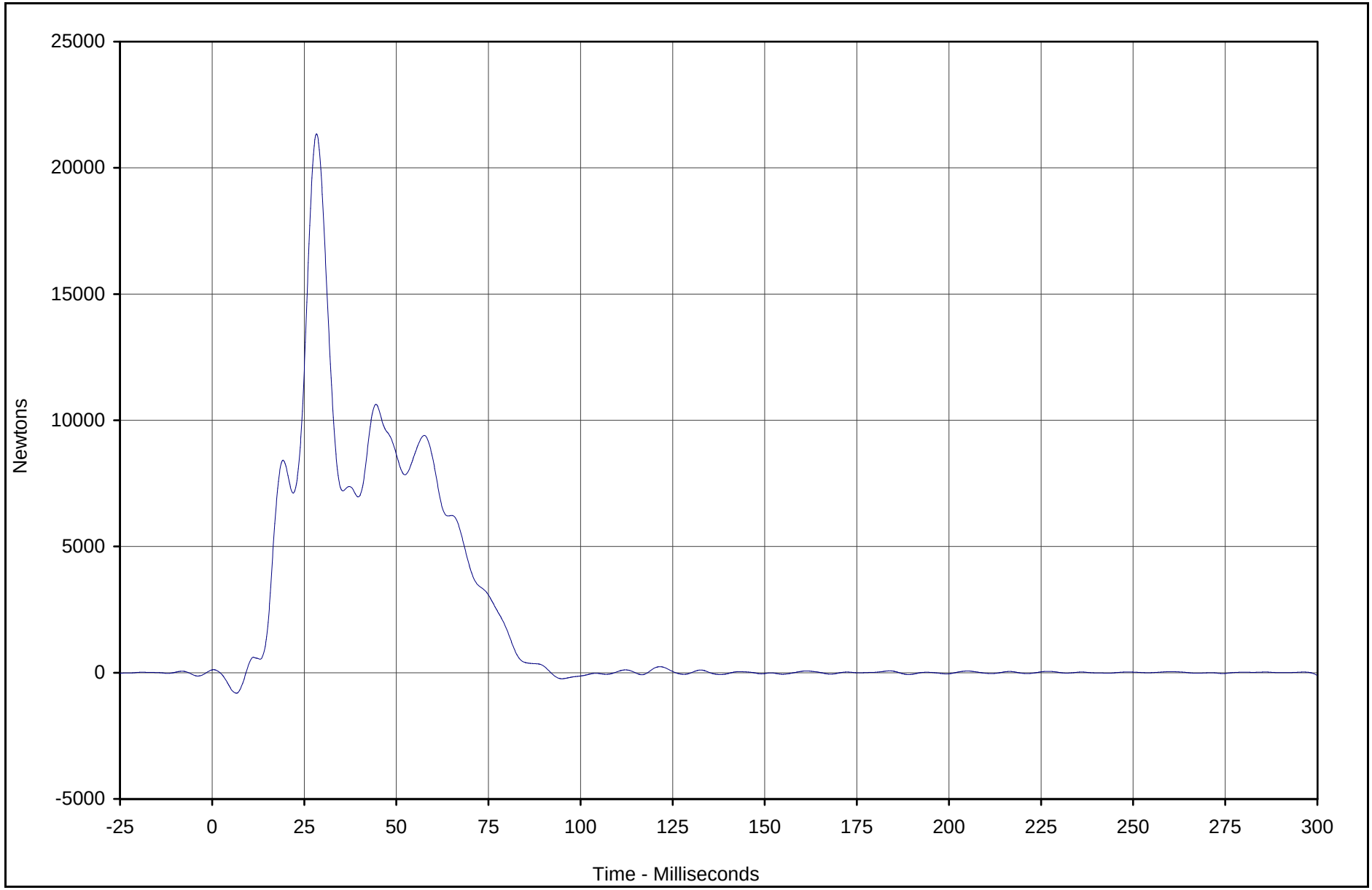

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D7 | 131 | FIL | Newtons | 20980.8 | 29.2 | -973.1 | 4.9 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



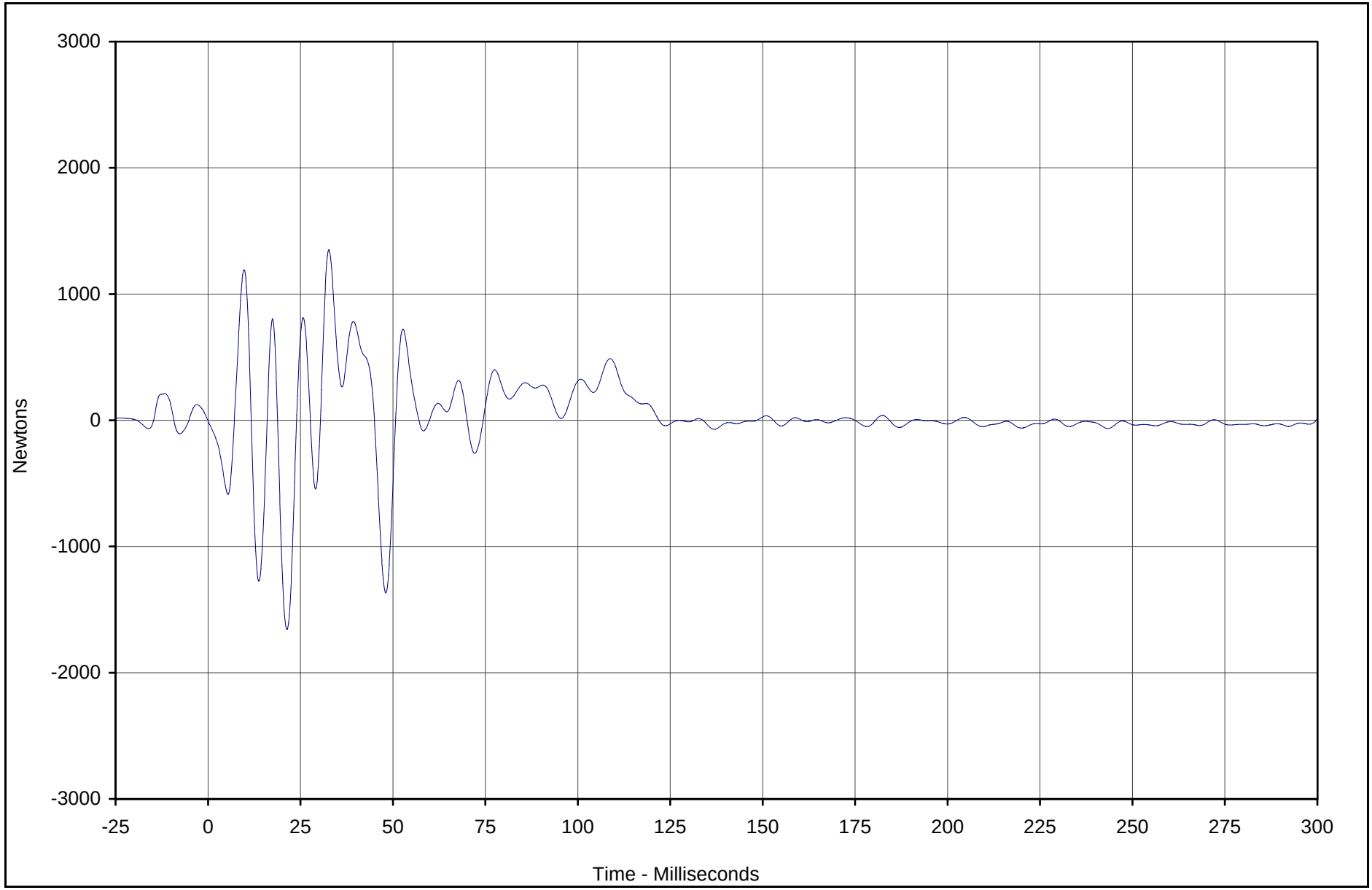

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D8 | 132 | FIL | Newtons | 21343.0 | 28.3 | -810.8 | 6.6 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force D9 | 133 | FIL | Newtons | 1351.6 | 32.7 | -1657.6 | 21.4 | 60 |

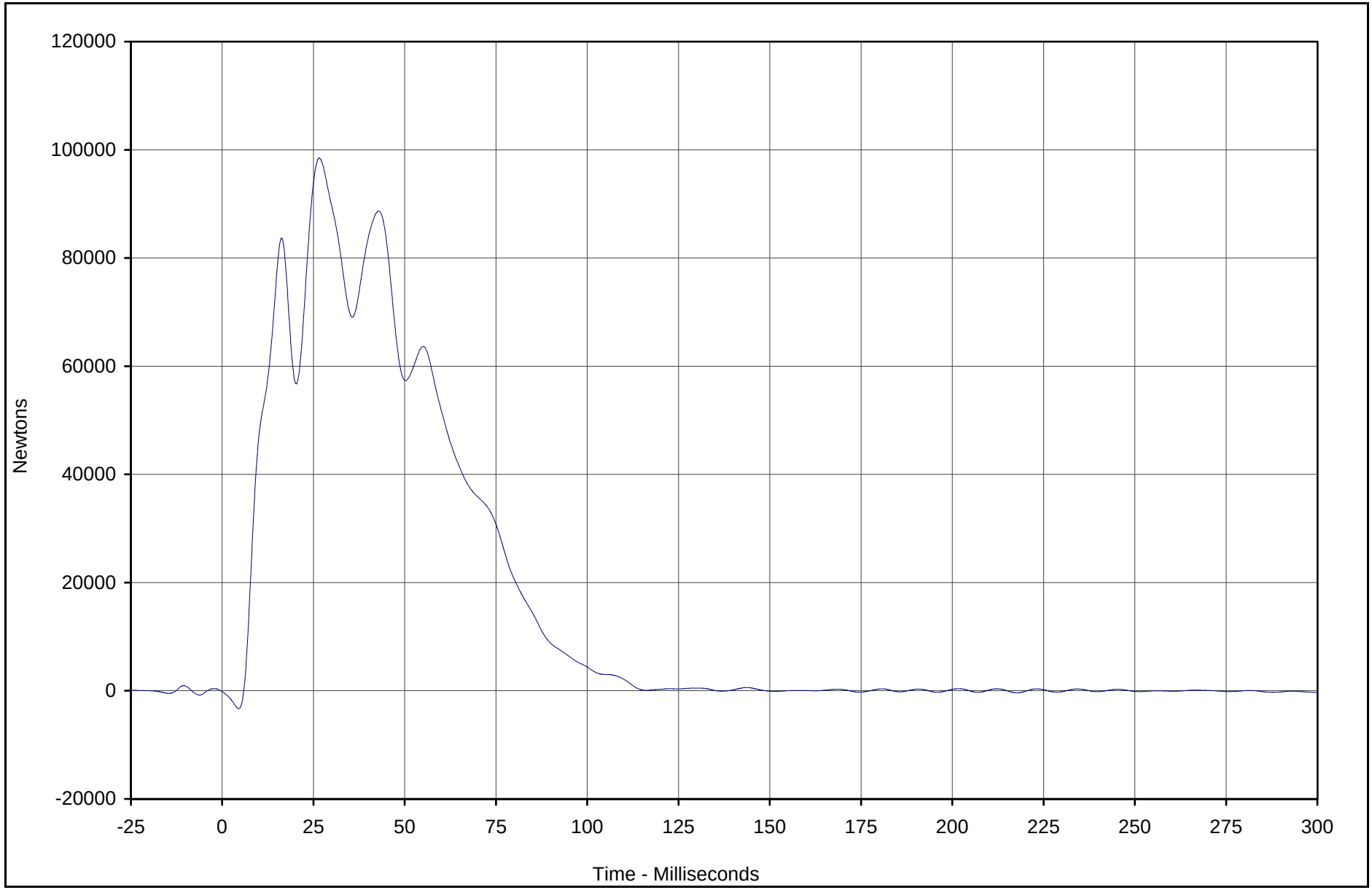
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force Sum Group 1 | 001 | SUM | Newtons | 98462.4 | 26.6 | -3319.0 | 4.5 | 60 |

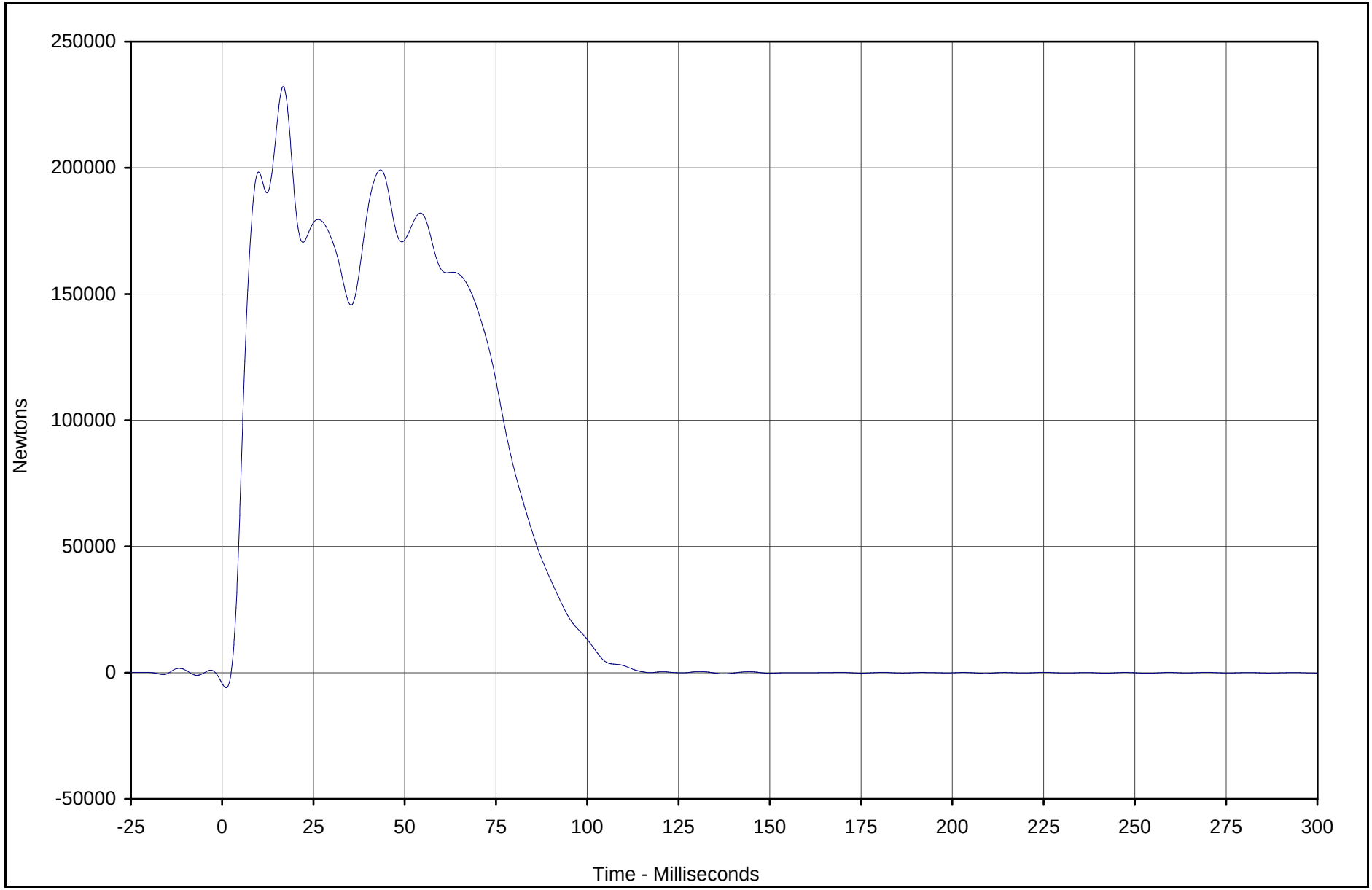
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force Sum Group 2 | 002 | SUM | Newtons | 232194.3 | 16.7 | -5979.3 | 1.1 | 60 |

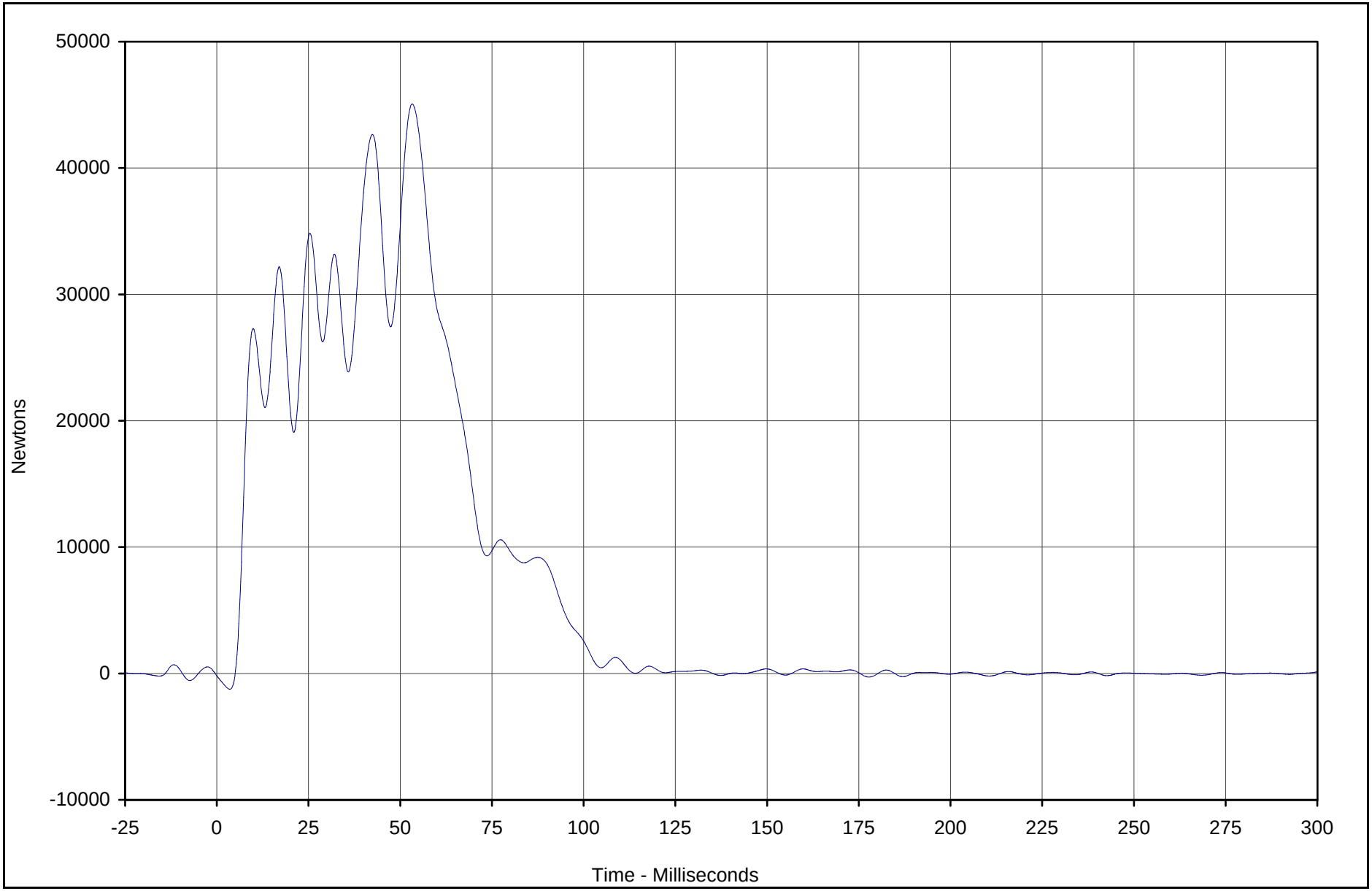
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force Sum Group 3 | 003 | SUM | Newtons | 45068.9 | 53.3 | -1248.1 | 3.5 | 60 |

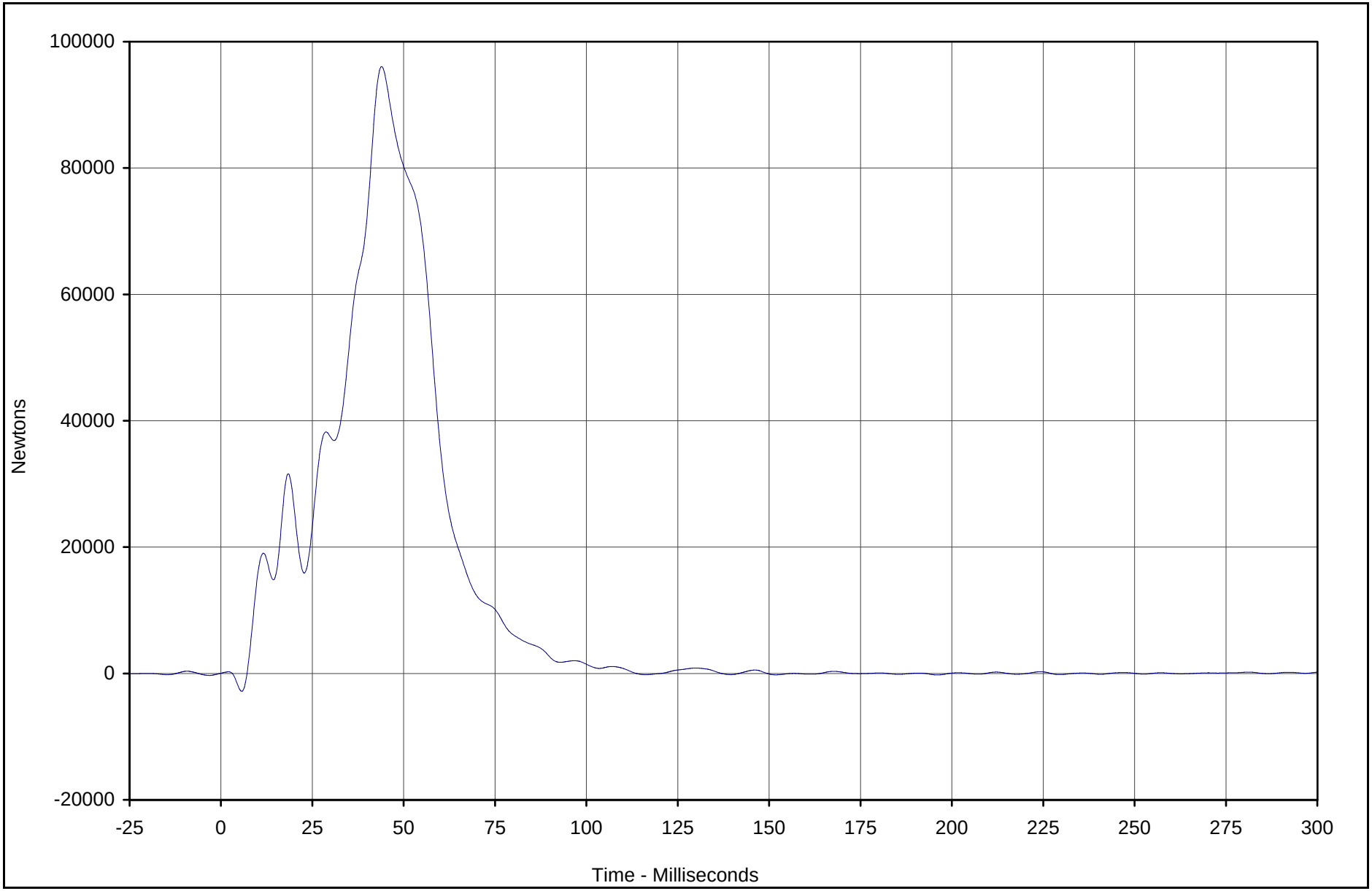
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force Sum Group 4 | 004 | SUM | Newtons | 96064.1 | 44.0 | -2826.7 | 5.7 | 60 |

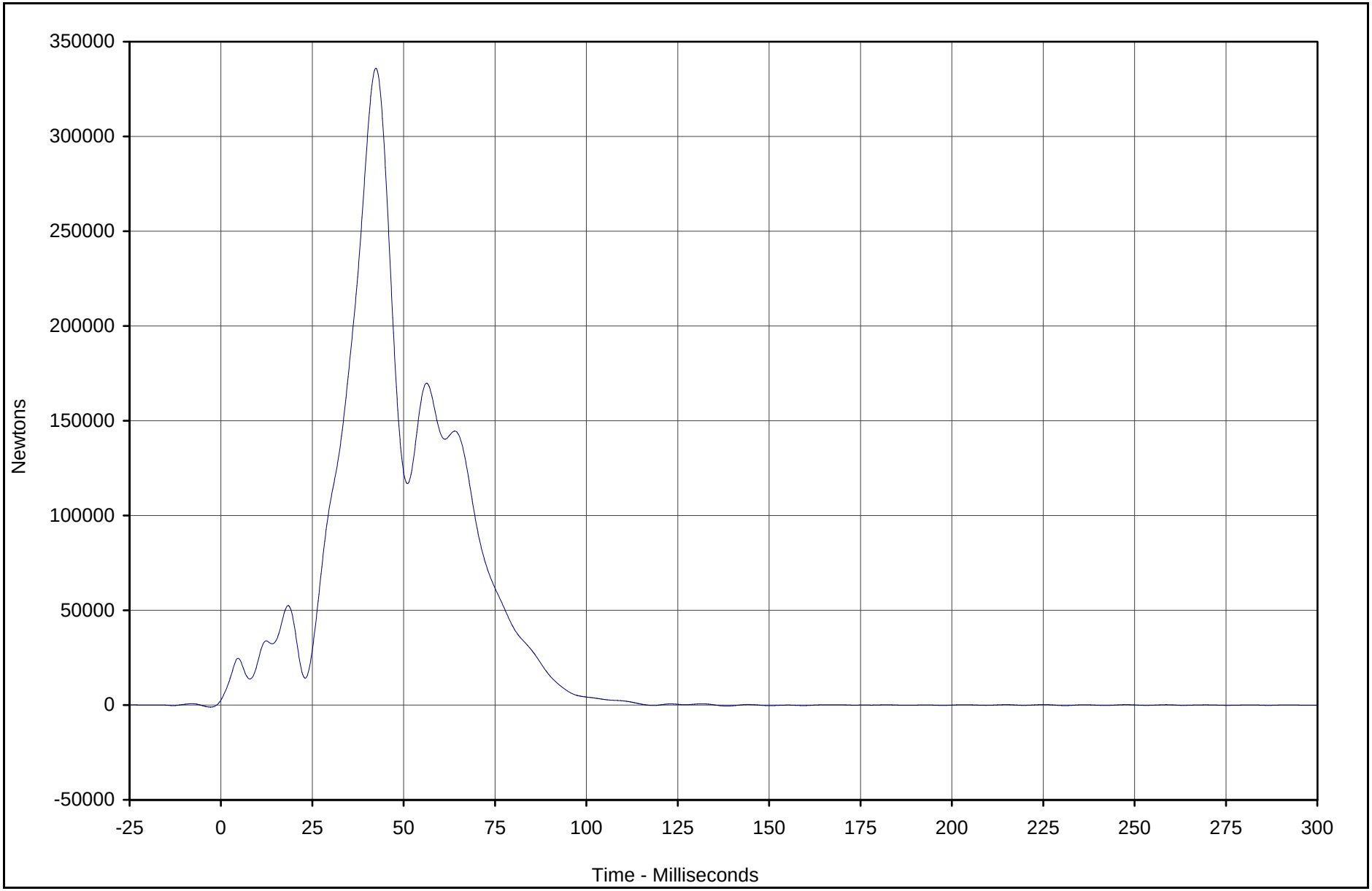
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force Sum Group 5 | 005 | SUM | Newtons | 336002.4 | 42.4 | -533.6 | 138.4 | 60 |

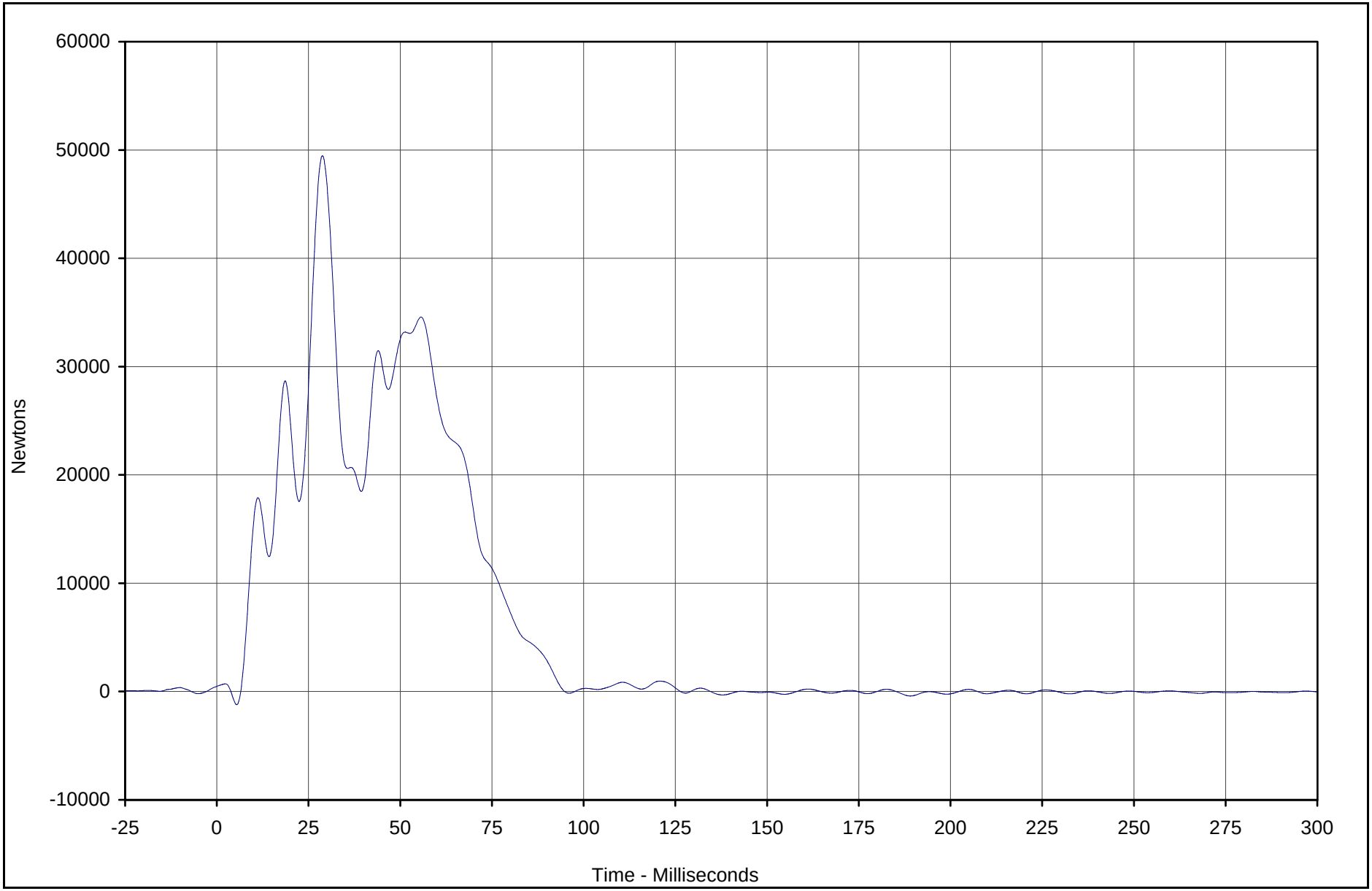
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force Sum Group 6 | 006 | SUM | Newtons | 49465.3 | 28.8 | -1207.4 | 5.4 | 60 |

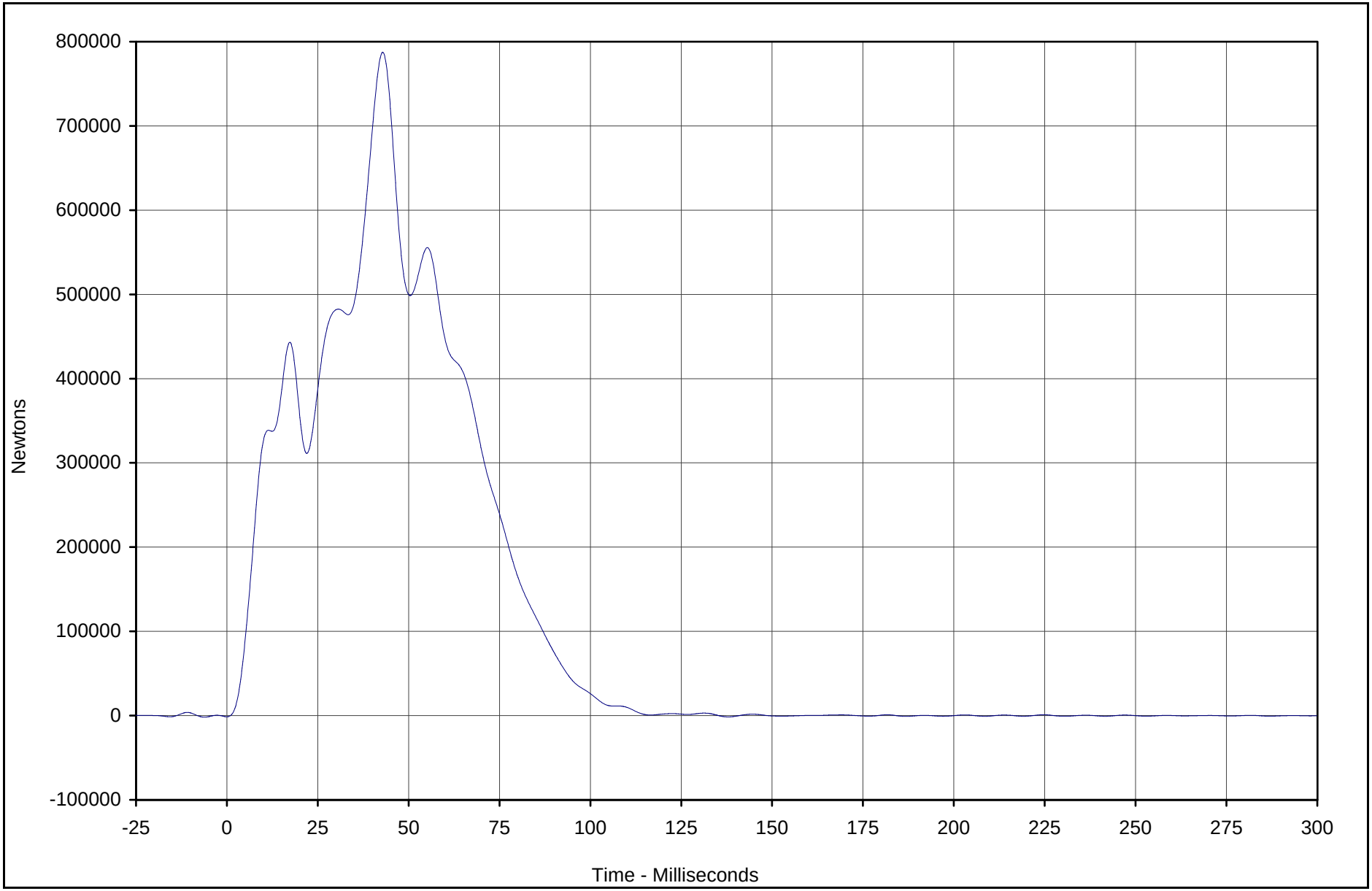
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Barrier Force Total Sum | 007 | SUM | Newtons | 787415 | 42.9 | -1554.6 | 137.9 | 60 |

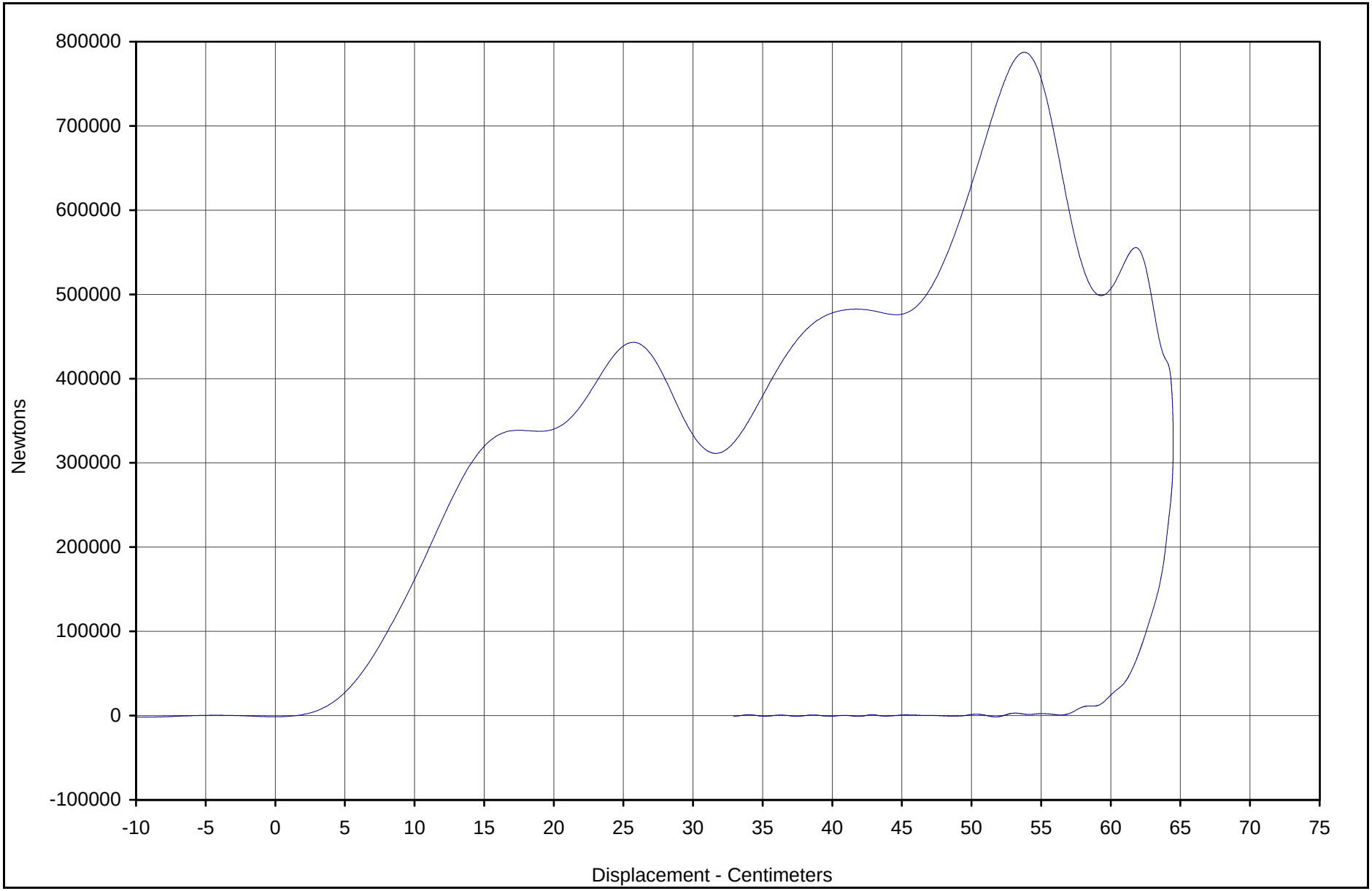
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | CM | Energy (Joules) | SAE Class |
|---|---|---|---|---|---|---|---|
| Barrier Force Total Sum vs. Displ. | 001 | XVY | Newtons | 787415 | 53.8 | 246116 | 60 |

KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203

## BARRIER LOAD CELL SUMMARY DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

| Location | Units | Max | Time | Min | Time |
|---|---|---|---|---|---|
| Barrier Force A1 | Newtons | 1455.9 | 24.1 | -1191.5 | 19.6 |
| Barrier Force A2 | Newtons | 1587.6 | 56.2 | -996.8 | 49.5 |
| Barrier Force A3 | Newtons | 2425.4 | 9.8 | -2094.4 | 14.4 |
| Barrier Force A4 | Newtons | 3161.1 | 10.0 | -2768.0 | 14.4 |
| Barrier Force A5 | Newtons | 3049.7 | 27.2 | -2906.7 | 14.3 |
| Barrier Force A6 | Newtons | 2629.2 | 10.0 | -3143.0 | 22.4 |
| Barrier Force A7 | Newtons | 2289.5 | 26.6 | -1729.9 | 14.1 |
| Barrier Force A8 | Newtons | 2883.4 | 53.0 | -904.2 | 14.1 |
| Barrier Force A9 | Newtons | 1971.9 | 24.2 | -2144.2 | 28.7 |
| Barrier Force B1 | Newtons | 1031.7 | 9.7 | -1054.3 | 14.2 |
| Barrier Force B2 | Newtons | 5894.6 | 43.0 | -1163.9 | 6.1 |
| Barrier Force B3 | Newtons | 94829.2 | 27.2 | -1217.7 | 3.5 |
| Barrier Force B4 | Newtons | 108659.4 | 16.0 | -2705.9 | 0.9 |
| Barrier Force B5 | Newtons | 3191.2 | 17.9 | -1634.1 | 22.2 |
| Barrier Force B6 | Newtons | 122120.6 | 16.1 | -3044.2 | 0.9 |
| Barrier Force B7 | Newtons | 34537.8 | 41.8 | -786.6 | 3.0 |
| Barrier Force B8 | Newtons | 10747.6 | 53.8 | -462.7 | 5.5 |
| Barrier Force B9 | Newtons | 1539.5 | 24.5 | -665.1 | 28.3 |
| Barrier Force C1 | Newtons | 798.8 | 31.7 | -699.4 | 46.4 |
| Barrier Force C2 | Newtons | 5785.0 | 18.0 | -1229.5 | 6.1 |
| Barrier Force C3 | Newtons | 64333.3 | 44.9 | -57.1 | 140.0 |
| Barrier Force C4 | Newtons | 51381.8 | 42.9 | -111.5 | 138.6 |
| Barrier Force C5 | Newtons | 123093.0 | 41.6 | -48.9 | 151.1 |
| Barrier Force C6 | Newtons | 36320.9 | 42.8 | -77.2 | 138.3 |
| Barrier Force C7 | Newtons | 5020.4 | 10.5 | -74.1 | 39.6 |
| Barrier Force C8 | Newtons | 6310.2 | 50.2 | -782.5 | 5.6 |
| Barrier Force C9 | Newtons | 1147.5 | 50.5 | -1330.5 | 45.7 |
| Barrier Force D1 | Newtons | 1583.1 | 10.1 | -1472.6 | 14.5 |
| Barrier Force D2 | Newtons | 22937.0 | 54.6 | -1095.1 | 6.8 |
| Barrier Force D3 | Newtons | 15582.2 | 43.1 | -2371.6 | 24.3 |
| Barrier Force D4 | Newtons | 24647.1 | 42.8 | -2447.6 | 24.4 |
| Barrier Force D5 | Newtons | 81072.0 | 42.9 | -630.2 | 5.1 |
| Barrier Force D6 | Newtons | 22512.4 | 42.8 | -2866.2 | 24.2 |
| Barrier Force D7 | Newtons | 20980.8 | 29.2 | -973.1 | 4.9 |
| Barrier Force D8 | Newtons | 21343.0 | 28.3 | -810.8 | 6.6 |
| Barrier Force D9 | Newtons | 1351.6 | 32.7 | -1657.6 | 21.4 |
| Barrier Force Sum Group 1 | Newtons | 98462.4 | 26.6 | -3319.0 | 4.5 |
| Barrier Force Sum Group 2 | Newtons | 232194.3 | 16.7 | -5979.3 | 1.1 |
| Barrier Force Sum Group 3 | Newtons | 45068.9 | 53.3 | -1248.1 | 3.5 |
| Barrier Force Sum Group 4 | Newtons | 96064.1 | 44.0 | -2826.7 | 5.7 |
| Barrier Force Sum Group 5 | Newtons | 336002.4 | 42.4 | -533.6 | 138.4 |
| Barrier Force Sum Group 6 | Newtons | 49465.3 | 28.8 | -1207.4 | 5.4 |
| Barrier Force Total Sum | Newtons | 787414.8 | 42.9 | -1554.6 | 137.9 |

# APPENDIX D

# INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Driver A.T.D. Serial Number 34**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 1 | HEAD, PRIMARY | X | KEAC039 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 2 | HEAD, PRIMARY | Y | KEAC038 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 3 | HEAD, PRIMARY | Z | KEAC027 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 4 | HEAD, REDUNDANT | X | KEAC031 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 5 | HEAD, REDUNDANT | Y | KEAC032 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 6 | HEAD, REDUNDANT | Z | KEAC026 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 7 | NECK FORCE | X | GPUN02FX | Load cell, six axis neck | R. A. Denton | 1716A | N |
| 8 | NECK FORCE | Y | GPUN02FY | Load cell, six axis neck | R. A. Denton | 1716A | N |
| 9 | NECK FORCE | Z | GPUN02FZ | Load cell, six axis neck | R. A. Denton | 1716A | N |
| 10 | NECK MOMENT | X | GPUN02MX | Load cell, six axis neck | R. A. Denton | 1716A | Nm |
| 11 | NECK MOMENT | Y | GPUN02MY | Load cell, six axis neck | R. A. Denton | 1716A | Nm |
| 12 | NECK MOMENT | Z | GPUN02MZ | Load cell, six axis neck | R. A. Denton | 1716A | Nm |
| 13 | CHEST , PRIMARY | X | GPAC031 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 14 | CHEST , PRIMARY | Y | GPAC024 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 15 | CHEST , PRIMARY | Z | GPAC029 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 16 | CHEST , REDUNDANT | X | KEAC023 | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 17 | CHEST , REDUNDANT | Y | KEAC022 | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 18 | CHEST , REDUNDANT | Z | KEAC024 | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 19 | CHEST DISPLACEMENT | X | GPCP001 | Rotary Pot Chest | Servo | 14CBI | MM |
| 20 | PELVIS, PRIMARY | X | KEAC019 | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 21 | PELVIS, PRIMARY | Y | KEAC020 | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 22 | PELVIS, PRIMARY | Z | KEAC021 | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 23 | LEFT FEMUR FORCE | Z | KEFF001 | Load cell, Femur | R.A. Denton | 2121 | N |
| 24 | RIGHT FEMUR FORCE | Z | KEFF002 | Load cell, Femur | R.A. Denton | 2121 | N |

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Driver A.T.D. Serial Number 34**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 25 | UP. TIBIA LEFT MOM. | X | GPUT09MX | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 26 | UP. TIBIA LEFT MOM. | Y | GPUT09MY | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 27 | UP. TIBIA RIGHT MOM. | X | GPUT09MX | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 28 | UP. TIBIA RIGHT MOM. | Y | GPUT09MY | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 29 | LWR. TIBIA LEFT MOM. | X | GPLT09MX | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 30 | LWR. TIBIA LEFT MOM. | Y | GPLT09MY | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 31 | LWR. TIBIA LEFT FORCE | Z | GPLT09FZ | 3 ch., lower tibia gage | R. A. Denton | 3093 | N |
| 32 | LWR. TIBIA RIGHT MOM. | X | GPLT09MX | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 33 | LWR. TIBIA RIGHT MOM. | Y | GPLT09MY | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 34 | LWR. TIBIA RIGHT FORCE | Z | GPLT09FZ | 3 ch., lower tibia gage | R. A. Denton | 3093 | N |
| 35 | FOOT LEFT, AFT | X | KEIC003X | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 36 | FOOT LEFT, AFT | Z | KEIC003Y | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 37 | FOOT LEFT, FORE | Z | KEIC003Z | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 38 | FOOT RIGHT, AFT | X | KEIC004X | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 39 | FOOT RIGHT, AFT | Z | KEIC004Y | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 40 | FOOT RIGHT, FORE | Z | KEIC004Z | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 41 | LAP BELT FORCE | X | KELC003 | Load cell, Seat belt | Lebow | 3371 | N |
| 42 | SHOULDER BELT FORCE | X | KELC004 | Load cell, Seat belt | Lebow | 3371 | N |
| 43 | SHOULDER BELT SPOOL | X | KEPP001 | Pullout pot | Celesco | PTX101-0030 | CM |
| 44 | SHOULDER BELT ELONG. | X | KEEP001 | Linear pot., belt stretch | E.T.I. | LCP8-10 10K | MM/CM |

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Passenger A.T.D. Serial Number 35**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 45 | HEAD, PRIMARY | X | GPAC027 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 46 | HEAD, PRIMARY | Y | GPAC002 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 47 | HEAD, PRIMARY | Z | GPAC003 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 48 | HEAD, REDUNDANT | X | GPAC032 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 49 | HEAD, REDUNDANT | Y | GPAC021 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 50 | HEAD, REDUNDANT | Z | GPAC026 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 51 | NECK FORCE | X | GPUN01FX | Load cell, six axis neck | R. A. Denton | 1716A | N |
| 52 | NECK FORCE | Y | GPUN01FY | Load cell, six axis neck | R. A. Denton | 1716A | N |
| 53 | NECK FORCE | Z | GPUN01FZ | Load cell, six axis neck | R. A. Denton | 1716A | N |
| 54 | NECK MOMENT | X | GPUN01MX | Load cell, six axis neck | R. A. Denton | 1716A | Nm |
| 55 | NECK MOMENT | Y | GPUN01MY | Load cell, six axis neck | R. A. Denton | 1716A | Nm |
| 56 | NECK MOMENT | Z | GPUN01MZ | Load cell, six axis neck | R. A. Denton | 1716A | Nm |
| 57 | CHEST , PRIMARY | X | GPAC005 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 58 | CHEST , PRIMARY | Y | GPAC011 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 59 | CHEST , PRIMARY | Z | GPAC010 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 60 | CHEST , REDUNDANT | X | GPAC034 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 61 | CHEST , REDUNDANT | Y | GPAC023 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 62 | CHEST , REDUNDANT | Z | GPAC020 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 63 | CHEST DISPLACEMENT | X | GPCP002 | Rotary Pot Chest | Servo | 14CBI | MM |
| 64 | PELVIS, PRIMARY | X | GPAC025 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 65 | PELVIS, PRIMARY | Y | GPAC022 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 66 | PELVIS, PRIMARY | Z | GPAC019 | Accel., 1/2 bridge | Endevco | 7264-2000 | G |
| 67 | LEFT FEMUR FORCE | Z | KEFF003 | Load cell, Femur | R.A. Denton | 2121 | N |
| 68 | RIGHT FEMUR FORCE | Z | KEFF004 | Load cell, Femur | R.A. Denton | 2121 | N |

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Passenger A.T.D. Serial Number 35**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 69 | UP. TIBIA LEFT MOM. | X | GPUT09MX | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 70 | UP. TIBIA LEFT MOM. | Y | GPUT09MY | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 71 | UP. TIBIA RIGHT MOM. | X | GPUT09MX | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 72 | UP. TIBIA RIGHT MOM. | Y | GPUT09MY | 2 ch., Upper tibia gage | R. A. Denton | 1583 | Nm |
| 73 | LWR. TIBIA LEFT MOM. | X | GPLT09MX | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 74 | LWR. TIBIA LEFT MOM. | Y | GPLT09MY | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 75 | LWR. TIBIA LEFT FORCE | Z | GPLT09FZ | 3 ch., lower tibia gage | R. A. Denton | 3093 | N |
| 76 | LWR. TIBIA RIGHT MOM. | X | GPLT09MX | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 77 | LWR. TIBIA RIGHT MOM. | Y | GPLT09MY | 3 ch., lower tibia gage | R. A. Denton | 3093 | Nm |
| 78 | LWR. TIBIA RIGHT FORCE | Z | GPLT09FZ | 3 ch., lower tibia gage | R. A. Denton | 3093 | N |
| 79 | FOOT LEFT, AFT | X | KEIC002X | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 80 | FOOT LEFT, AFT | Z | KEIC002Y | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 81 | FOOT LEFT, FORE | Z | KEIC002Z | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 82 | FOOT RIGHT, AFT | X | KEIC001X | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 83 | FOOT RIGHT, AFT | Z | KEIC001Y | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 84 | FOOT RIGHT, FORE | Z | KEIC001Z | Accel., Foot Triax | I.C. Sensor | 3031-500 | G |
| 85 | LAP BELT FORCE | X | KELC001 | Load cell, Seat belt | Lebow | 3371 | N |
| 86 | SHOULDER BELT FORCE | X | KELC002 | Load cell, Seat belt | Lebow | 3371 | N |
| 87 | SHOULDER BELT SPOOL | X | KEPP001 | Pullout pot | Celesco | PTX101-0030 | MM |
| 88 | SHOULDER BELT ELONG. | X | KEEP001 | Linear pot., belt stretch | E.T.I. | LCP8-10 10K | MM/CM |

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Vehicle Accelerometers**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 89 | Left Rear | X | KEVA002 | Accel., Pre-Amp | I.C.S/Karco | 3031-500 | G |
| 90 | Right Rear | X | KEVA006 | Accel., Vehicle block | I.C. Sensor | 3031-200 | G |
| 91 | Engine Top | X | KEVA009 | Accel., Vehicle block | I.C. Sensor | 3031-500 | G |
| 92 | Engine Bottom | X | KEVA007 | Accel., Vehicle block | I.C. Sensor | 3031-500 | G |
| 93 | Left Brake Caliper | X | KEVA008 | Accel., Vehicle block | I.C. Sensor | 3031-500 | G |
| 94 | Right Brake Caliper | X | KEVA012 | Accel., Vehicle block | I.C. Sensor | 3031-500 | G |
| 95 | Instrument Panel | X | KEVA011 | Accel., Vehicle block | I.C. Sensor | 3031-200 | G |
| 96 | Left Rear | Z | KEVA001 | Accel., Vehicle block | I.C. Sensor | 3031-500 | G |
| 97 | Right Rear | Z | KEVA010 | Accel., Vehicle block | I.C. Sensor | 3031-200 | G |

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Rigid Load Cell Barrier**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 98 | BARRIER FORCE A1 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 99 | BARRIER FORCE A2 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 100 | BARRIER FORCE A3 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 101 | BARRIER FORCE A4 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 102 | BARRIER FORCE A5 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 103 | BARRIER FORCE A6 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 104 | BARRIER FORCE A7 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 105 | BARRIER FORCE A8 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 106 | BARRIER FORCE A9 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 107 | BARRIER FORCE B1 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 108 | BARRIER FORCE B2 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 109 | BARRIER FORCE B3 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 110 | BARRIER FORCE B4 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 111 | BARRIER FORCE B5 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 112 | BARRIER FORCE B6 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 113 | BARRIER FORCE B7 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 114 | BARRIER FORCE B8 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 115 | BARRIER FORCE B9 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Rigid Load Cell Barrier**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 116 | BARRIER FORCE C1 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 117 | BARRIER FORCE C2 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 118 | BARRIER FORCE C3 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 119 | BARRIER FORCE C4 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 120 | BARRIER FORCE C5 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 121 | BARRIER FORCE C6 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 122 | BARRIER FORCE C7 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 123 | BARRIER FORCE C8 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 124 | BARRIER FORCE C9 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 125 | BARRIER FORCE D1 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 126 | BARRIER FORCE D2 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 127 | BARRIER FORCE D3 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 128 | BARRIER FORCE D4 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 129 | BARRIER FORCE D5 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 130 | BARRIER FORCE D6 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 131 | BARRIER FORCE D7 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 132 | BARRIER FORCE D8 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |
| 133 | BARRIER FORCE D9 | X | BARRIER | Load Cell, LCB | Interface | 1220-FS | N |

# APPENDIX E

# DUMMY CALIBRATION DATA

# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Knee Impact Test

ATD Serial No.: 034 Location: Left Knee Test I.D.: KK07A

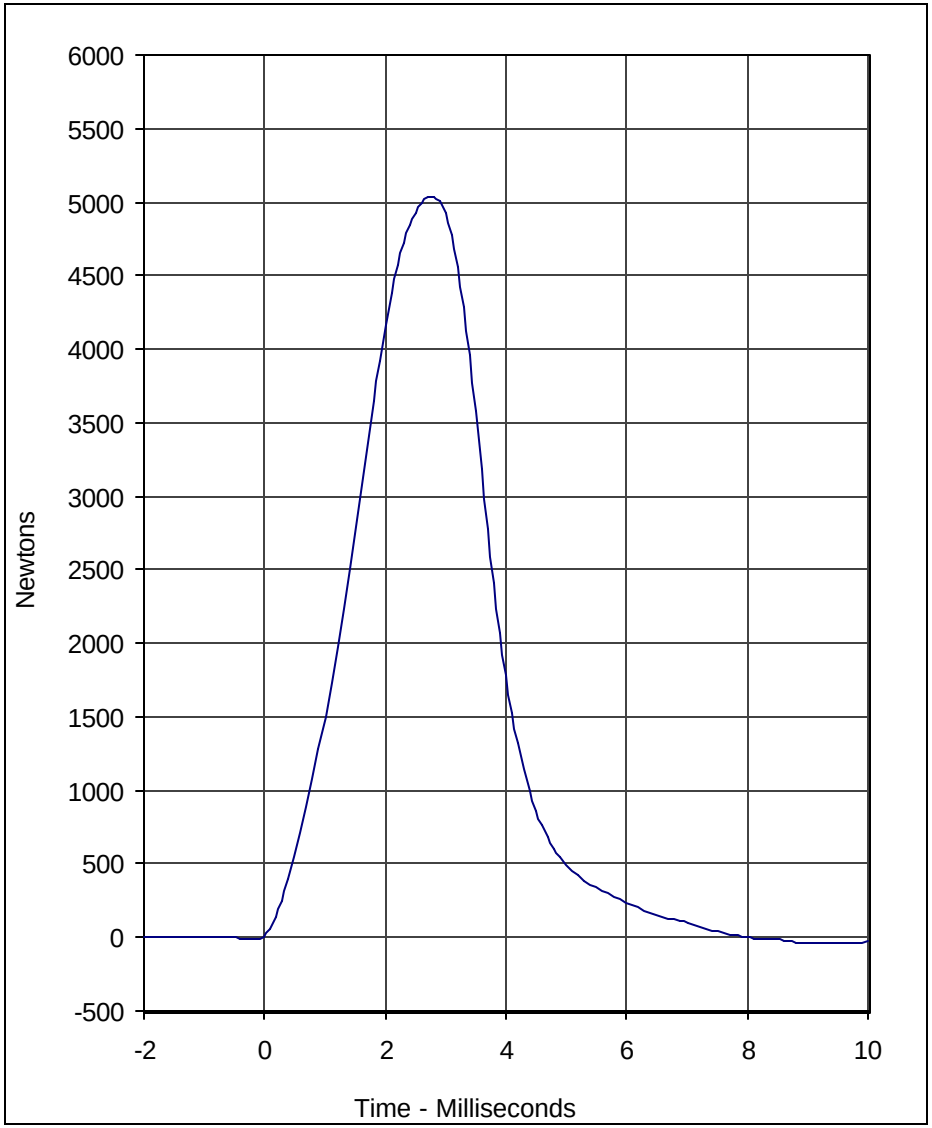
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | $^{o}$C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity at T=0 | m/sec | 2.07 to 2.13 | 2.13 | Pass |
| Peak Probe Force | N | 4715 to 5782 | 5038 | Pass |
| | | Overall Test Results | | Pass |

ATD Serial No.: 034 Location: Right Knee Test I.D.: KK07B

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | $^{o}$C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity at T=0 | m/sec | 2.07 to 2.13 | 2.12 | Pass |
| Peak Probe Force | N | 4715 to 5782 | 5218 | Pass |
| | | Overall Test Results | | Pass |

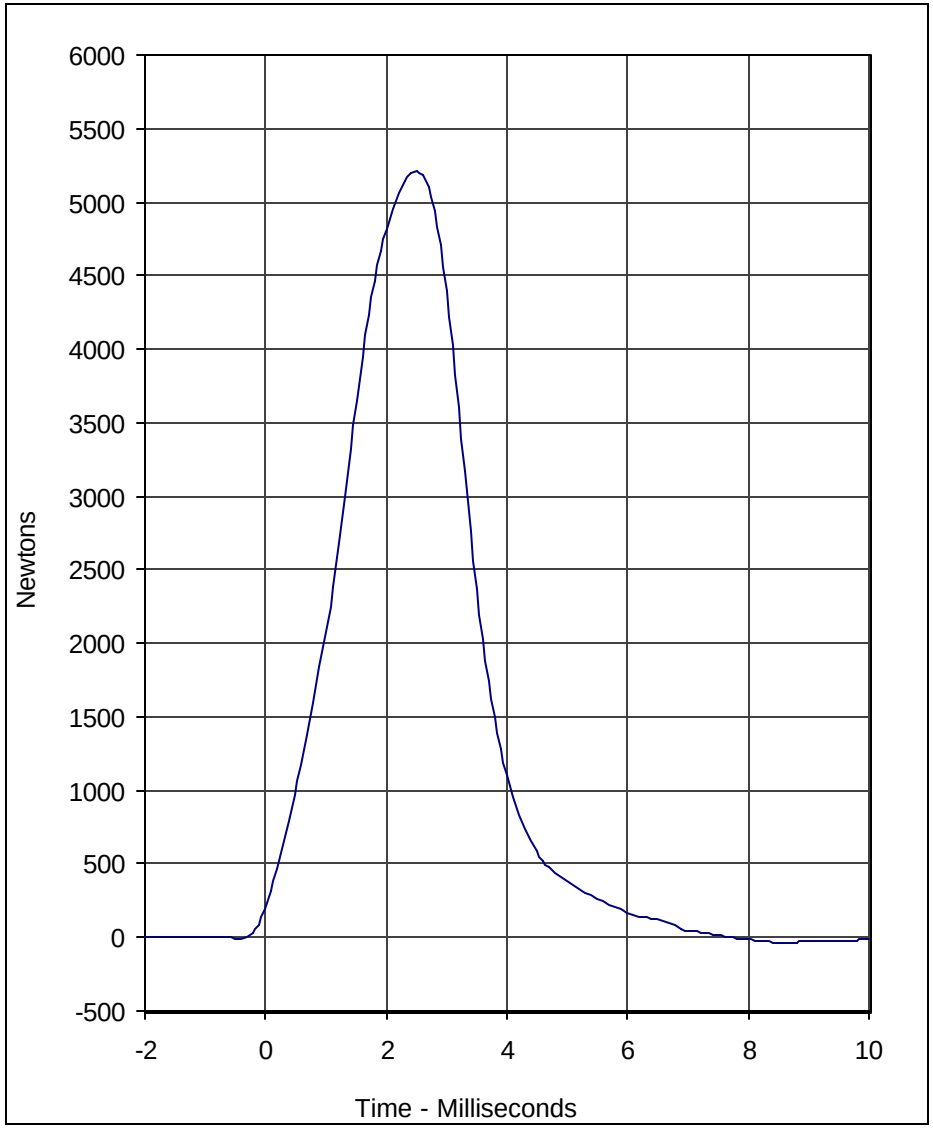
Laboratory Technician

December 2, 2002
Test Date




| Curve Description | Location | Test I.D. | CURNO | Type |
|---|---|---|---|---|
| Probe Force | Left Knee | KK07A | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 5038.0 | 2.8 | -37.9 | 9.1 | 600 |




| Curve Description | Location | Test I.D. | CURNO | Type |
|---|---|---|---|---|
| Probe Force | Right Knee | KK07B | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 5218.0 | 2.5 | -37.7 | 8.6 | 600 |

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 12/2/02

A.T.D. Serial No.: 034

KARCO Engineering

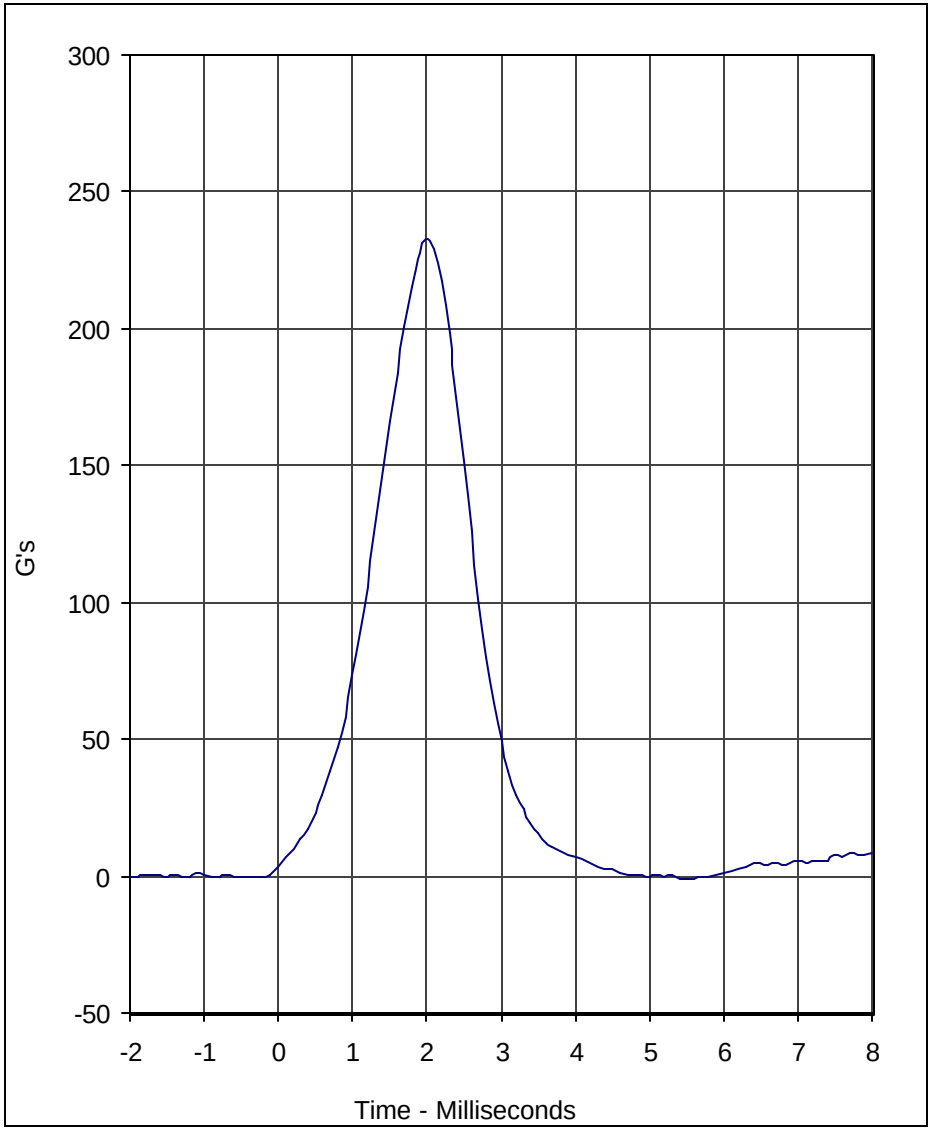
# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Head Drop Test

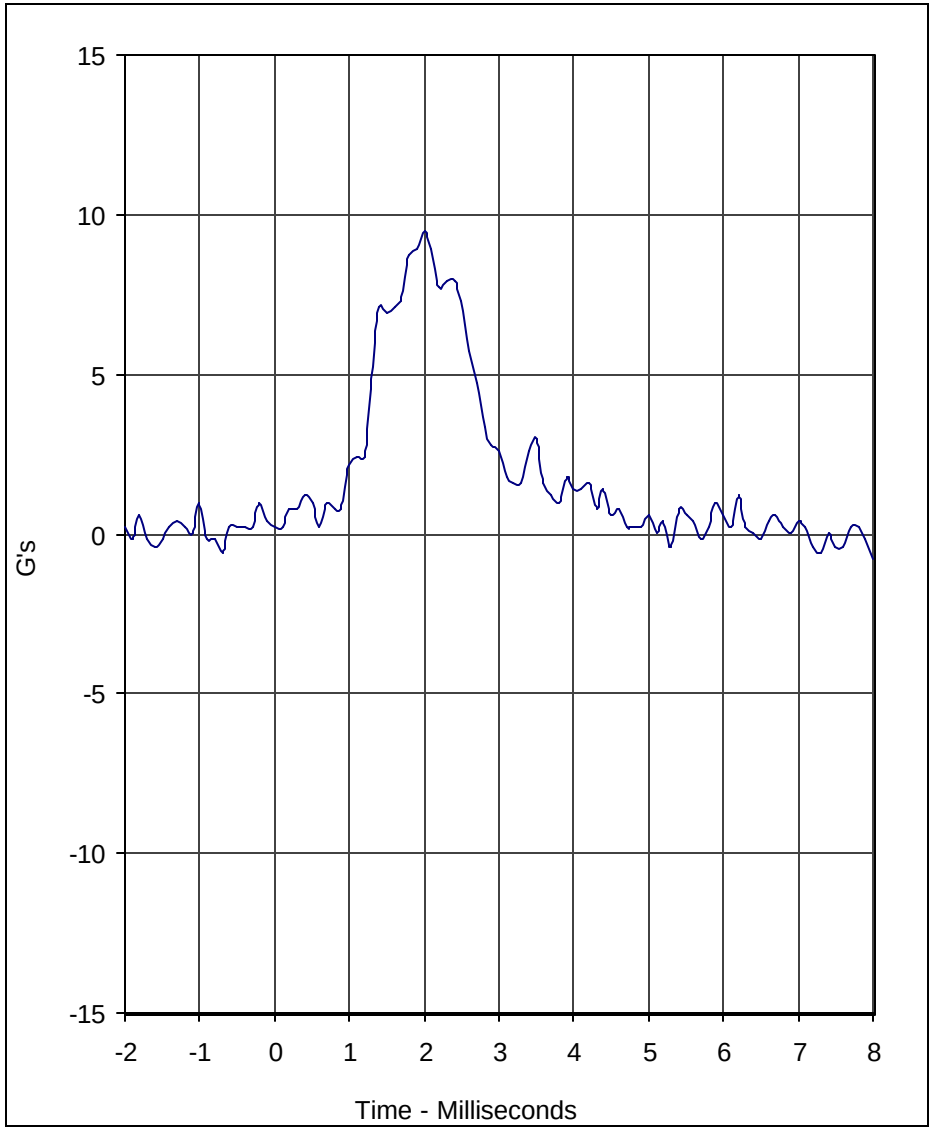
ATD Serial No.: 034 Test I.D.: HD10C

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 225.0 to 275.0 | 232.6 | Pass |
| Peak Lateral Acceleration | G's | ≤15.0 | 9.5 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 3, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Head Resultant | 001 | RES |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 232.6 | 2.0 | -0.8 | 5.4 | 1000 |

| Curve Description | CURNO | Type |
|---|---|---|
| Head Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 9.5 | 2.0 | -0.6 | -0.7 | 1000 |

Test Program: Hybrid III 50th Percentile Male Head Drop Test

Test Date: 12/3/02

A.T.D. Serial No.: 034

Test I.D.: HD10C

KARCO Engineering

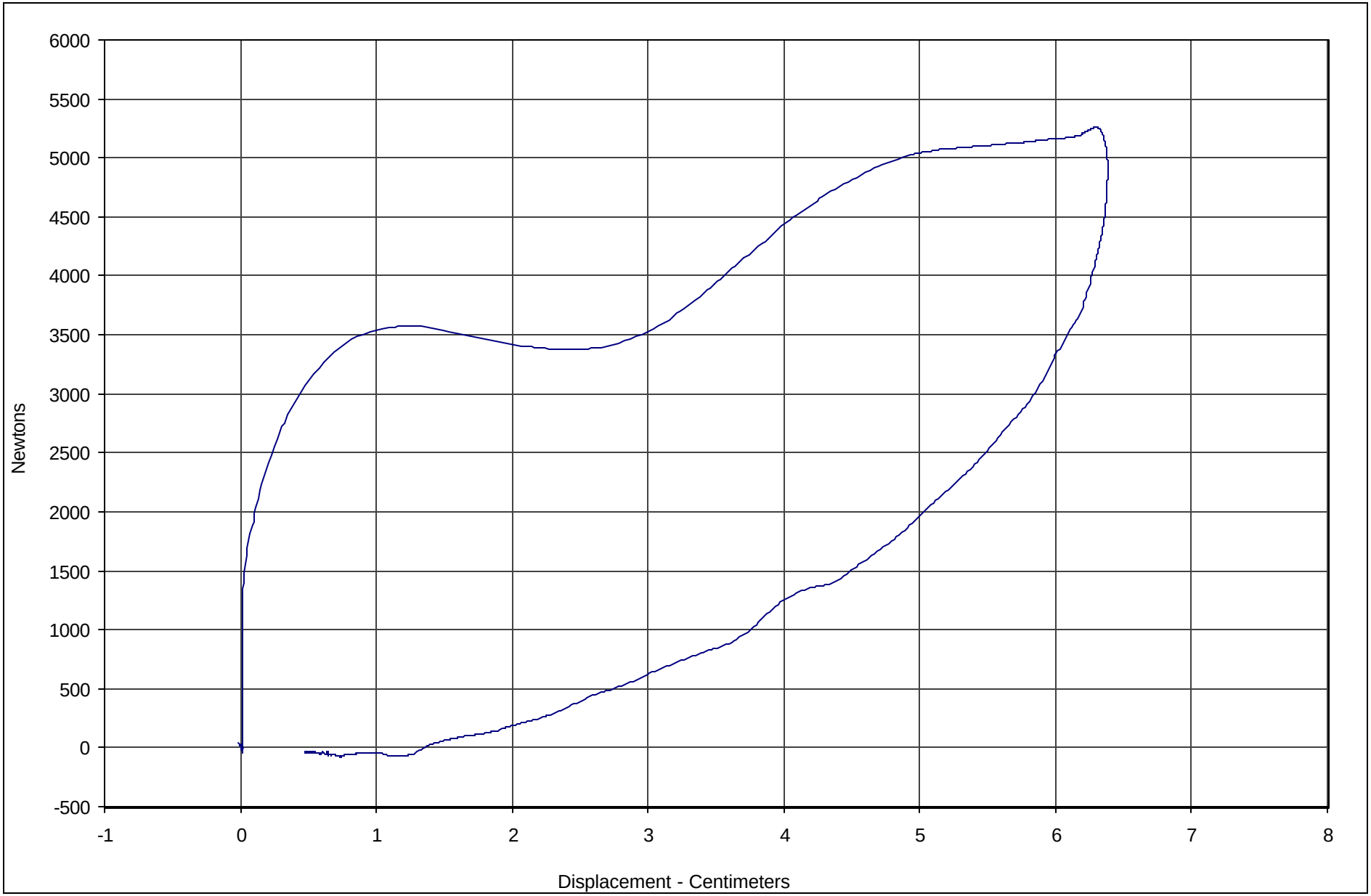
# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Thorax Impact Test

ATD Serial No.: 034 Test I.D.: CH06E

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | $^{o}$C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 6.58 to 6.82 | 6.77 | Pass |
| Peak Probe Force | Newtons | 5159 to 5893 | 5262 | Pass |
| Peak Sternum Displacement | CM | 6.35 to 7.26 | 6.38 | Pass |
| Internal Hysterysis | % | 69 to 85 | 73.2 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 4, 2002
Test Date




| Curve Description | CURNO | Type | Hysterysis | Peak Chest Displ. | Peak Probe Force | SAE Class |
|---|---|---|---|---|---|---|
| Probe Force vs. Chest Displacement | 001 | FIL | 73.2 | 6.38 | 5262.5 | 180 |

KARCO Engineering

Test Program: Hybrid III 50th Percentile Male Thorax Impact

A.T.D. Serial No.: 034

Test Date: 12/4/02

Test I.D.: CH06E

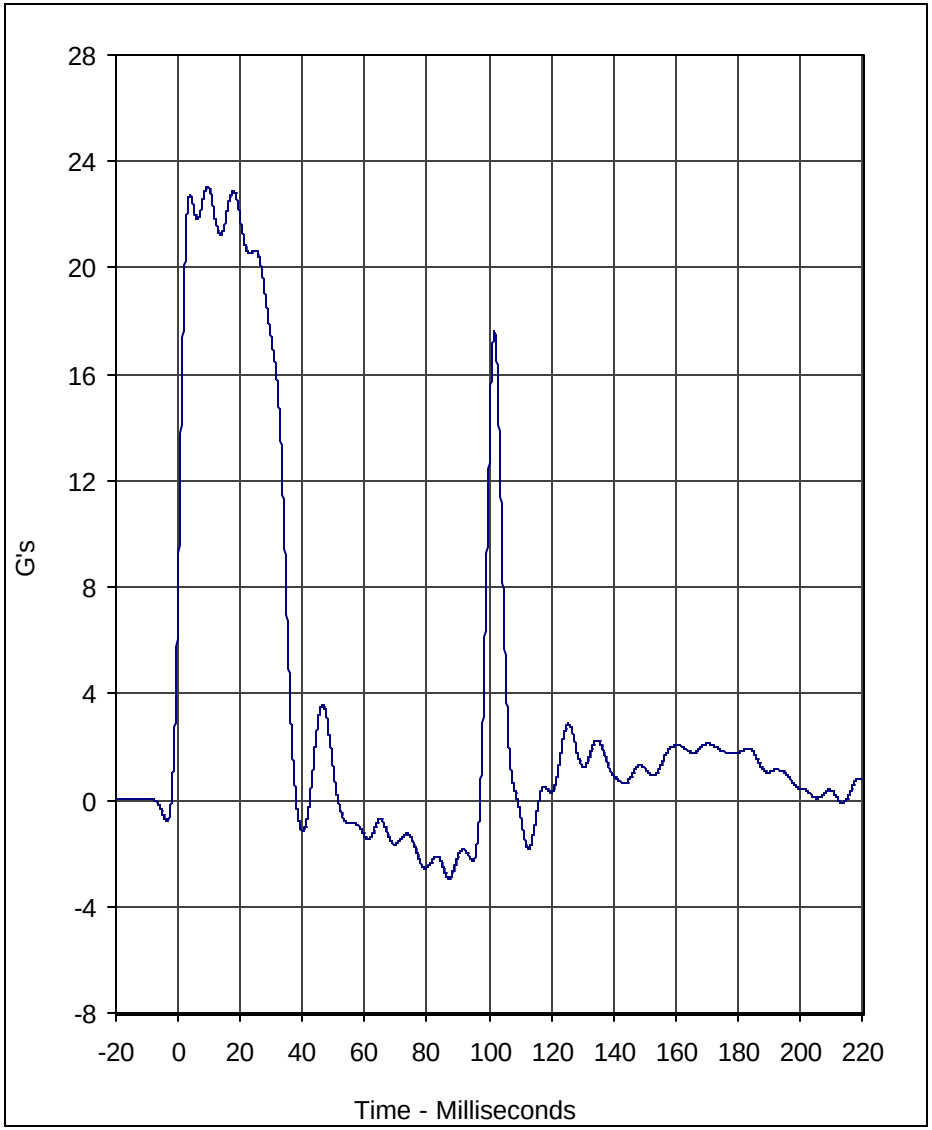
# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Neck Flexion Test

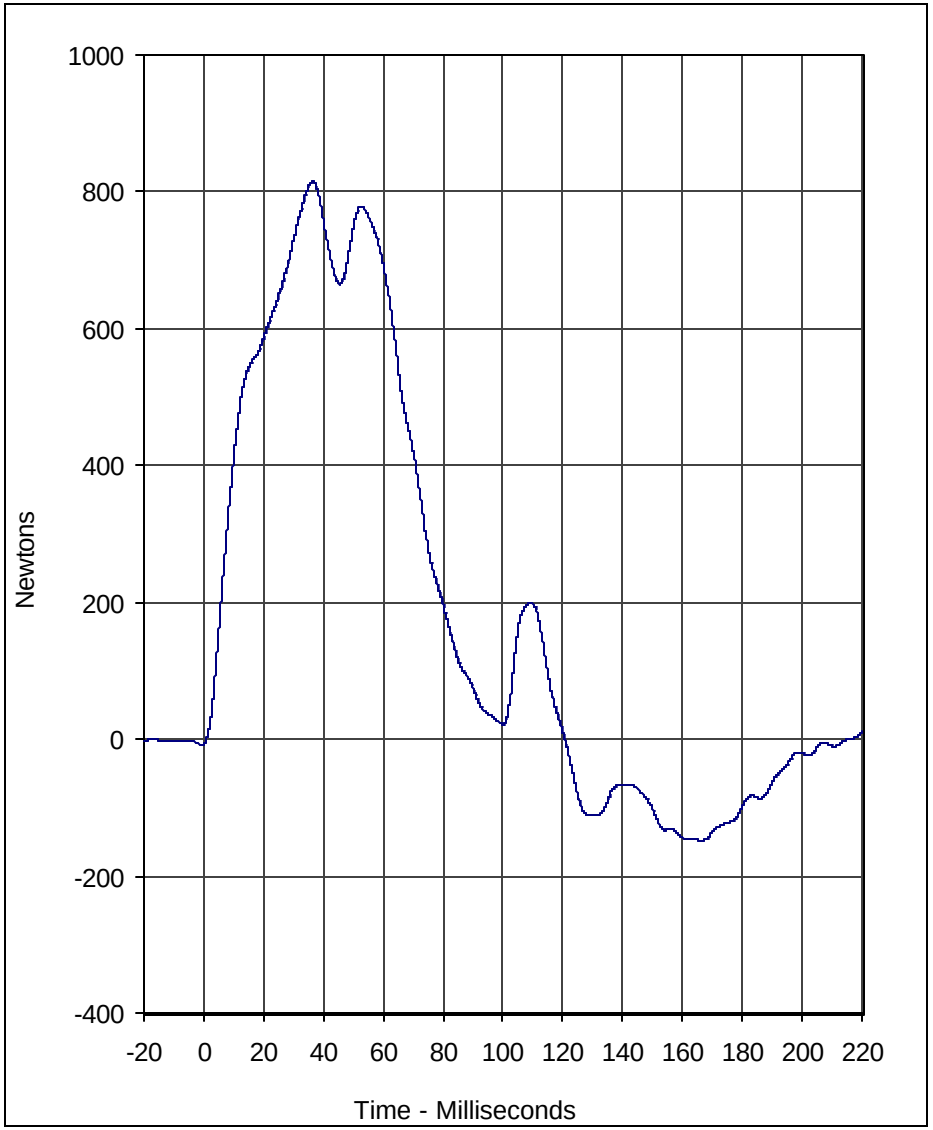
ATD Serial No.: 034 Test I.D.: NF07B

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 6.89 to 7.13 | 7.07 | Pass |
| Pendulum Deceleration | 10 Msec. | G's | 22.5 to 27.5 | 23.0 | Pass |
| | 20 Msec. | G's | 17.6 to 22.6 | 21.8 | Pass |
| | 30 Msec. | G's | 12.5 to 18.5 | 17.3 | Pass |
| Peak Pendulum Decel. after 30 Msec. | | G's | ≤ 29.0 | 17.6 | Pass |
| Deceleration Decay, Time to Cross 5 G's | | Msec. | 34.0 to 42.0 | 35.7 | Pass |
| Maximum "D" Plane Rotation | Maximum | Degrees | 64.0 to 78.0 | 64.7 | Pass |
| | Time | Msec. | 57.0 to 64.0 | 60.7 | Pass |
| "D" Plane Rotation Decay, Time To Zero Crossing | | Msec. | 113.0 to 128.0 | 117.5 | Pass |
| Moment About Occipital Condyle | Maximum | Nm | 84.1 to 108.5 | 84.9 | Pass |
| | Time | Msec. | 47.0 to 58.0 | 47.3 | Pass |
| Positive Moment Decay, Time To Zero Crossing | | Msec. | 97.0 to 107.0 | 102.8 | Pass |
| | | | Overall Test Results | | Pass |

Laboratory Technician

December 3, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Deceleration | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 23.1 | 9.4 | -2.9 | 87.1 | 60 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 815.1 | 36.4 | -148.4 | 166.4 | 60 |

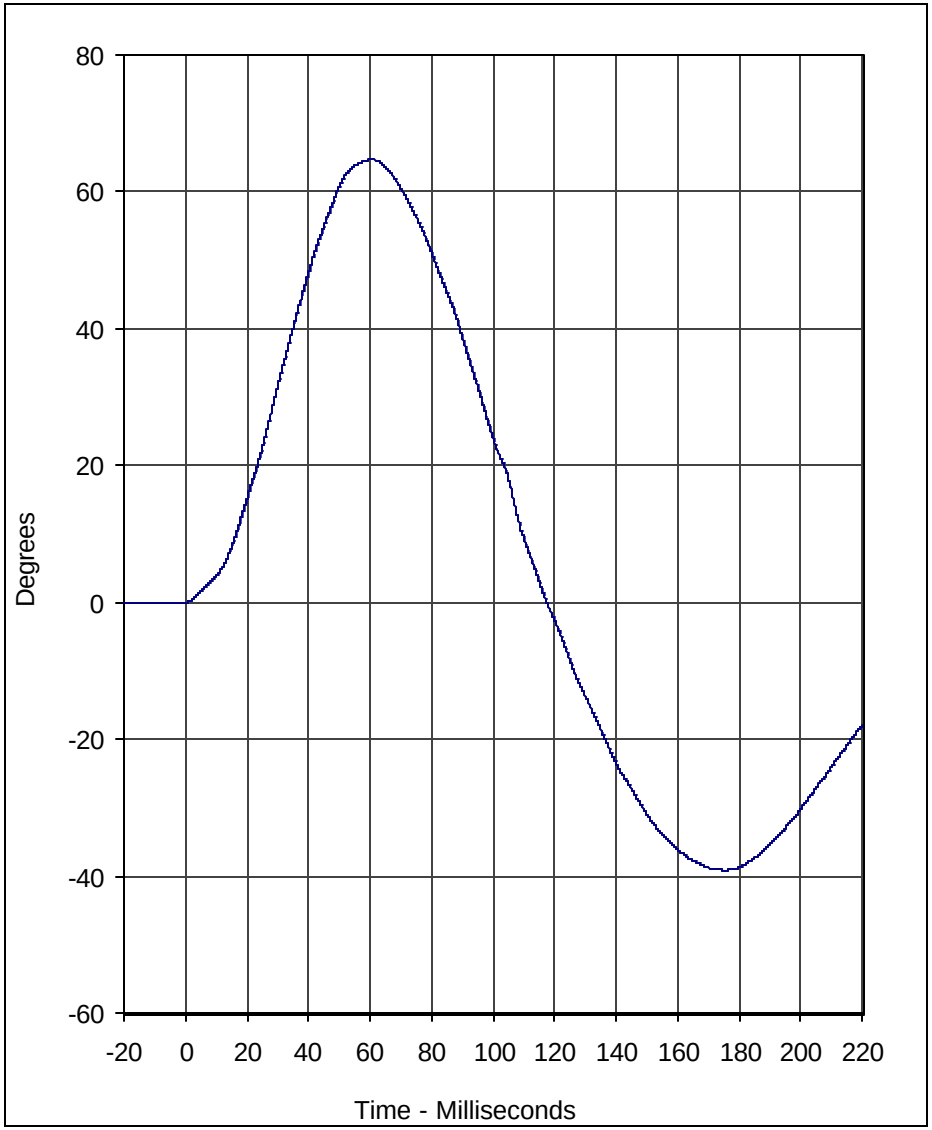
Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

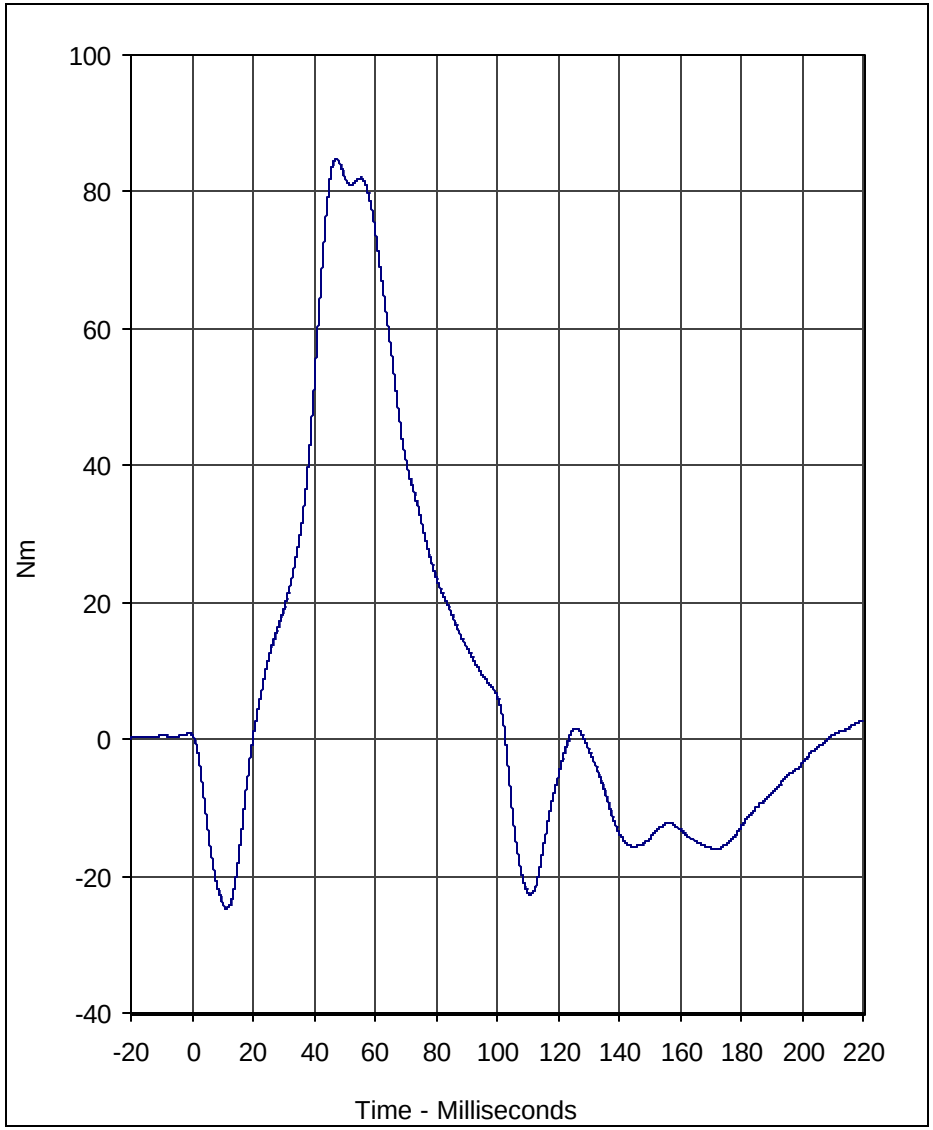
Test Date: 12/3/02

A.T.D. Serial No.: 034

Test I.D.: NF07B

KARCO Engineering




| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 64.7 | 60.7 | -39.1 | 175.6 | 60 |

| Curve Description | CURNO | Type |
|---|---|---|
| Moment About Occipital Condyle | 004 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 84.9 | 47.3 | -24.8 | 11.4 | 60 |

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

Test Date: 12/3/02

A.T.D. Serial No.: 034

Test I.D.: NF07B

KARCO Engineering

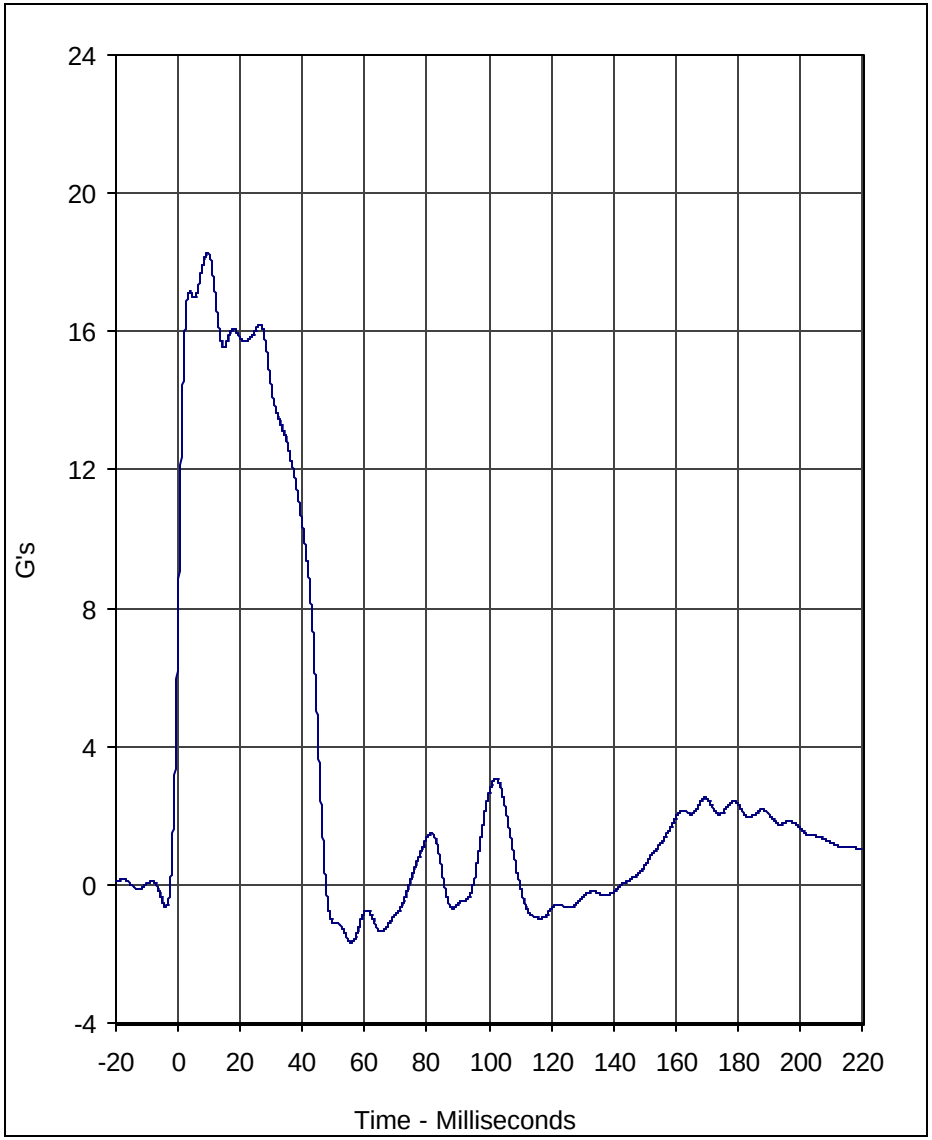
# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Neck Extension Test

ATD Serial No.: 034 Test I.D.: NE07B

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 5.94 to 6.19 | 6.16 | Pass |
| Pendulum Deceleration | 10 Msec. | G's | 17.2 to 21.2 | 18.2 | Pass |
| | 20 Msec. | G's | 14.0 to 19.0 | 15.8 | Pass |
| | 30 Msec. | G's | 11.0 to 16.0 | 14.4 | Pass |
| Peak Pendulum Decel. after 30 Msec. | | G's | ≤ 22.0 | 14.4 | Pass |
| Deceleration Decay, Time to Cross 5 G's | | Msec. | 38.0 to 46.0 | 44.7 | Pass |
| Maximum "D" Plane Rotation | Maximum | Degrees | 81.0 to 106.0 | 85.6 | Pass |
| | Time | Msec. | 72.0 to 82.0 | 80.6 | Pass |
| "D" Plane Rotation Decay, Time To Zero Crossing | | Msec. | 147.0 to 174.0 | 156.5 | Pass |
| Moment About Occipital Condyle | Maximum | Nm | -52.9 to- 79.9 | -60.7 | Pass |
| | Time | Msec. | 65.0 to 79.0 | 65.1 | Pass |
| Positive Moment Decay, Time To Zero Crossing | | Msec. | 120.0 to 148.0 | 135.9 | Pass |
| | | | Overall Test Results | | Pass |

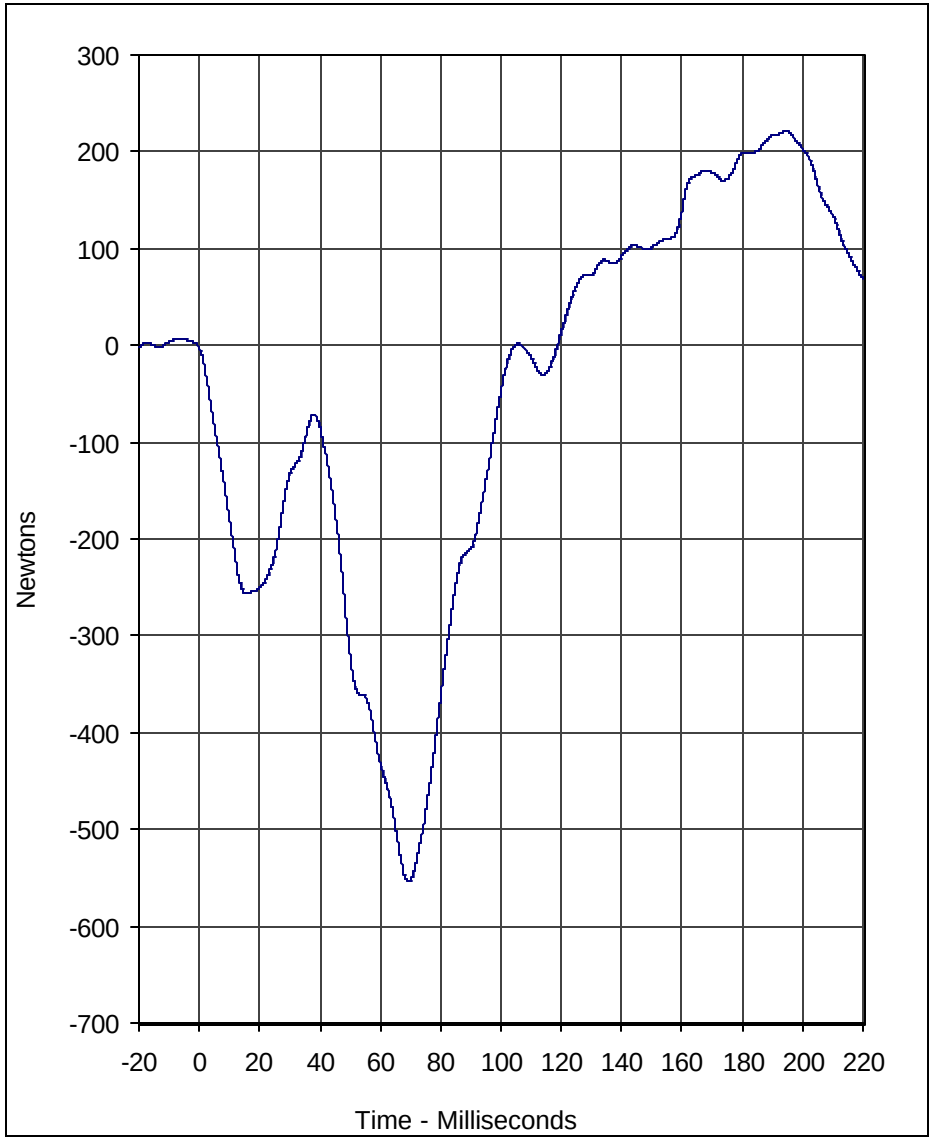
Laboratory Technician

December 3, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Deceleration | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 18.3 | 9.5 | -1.7 | 55.7 | 60 |




| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 221.8 | 194.9 | -554.2 | 69.4 | 60 |

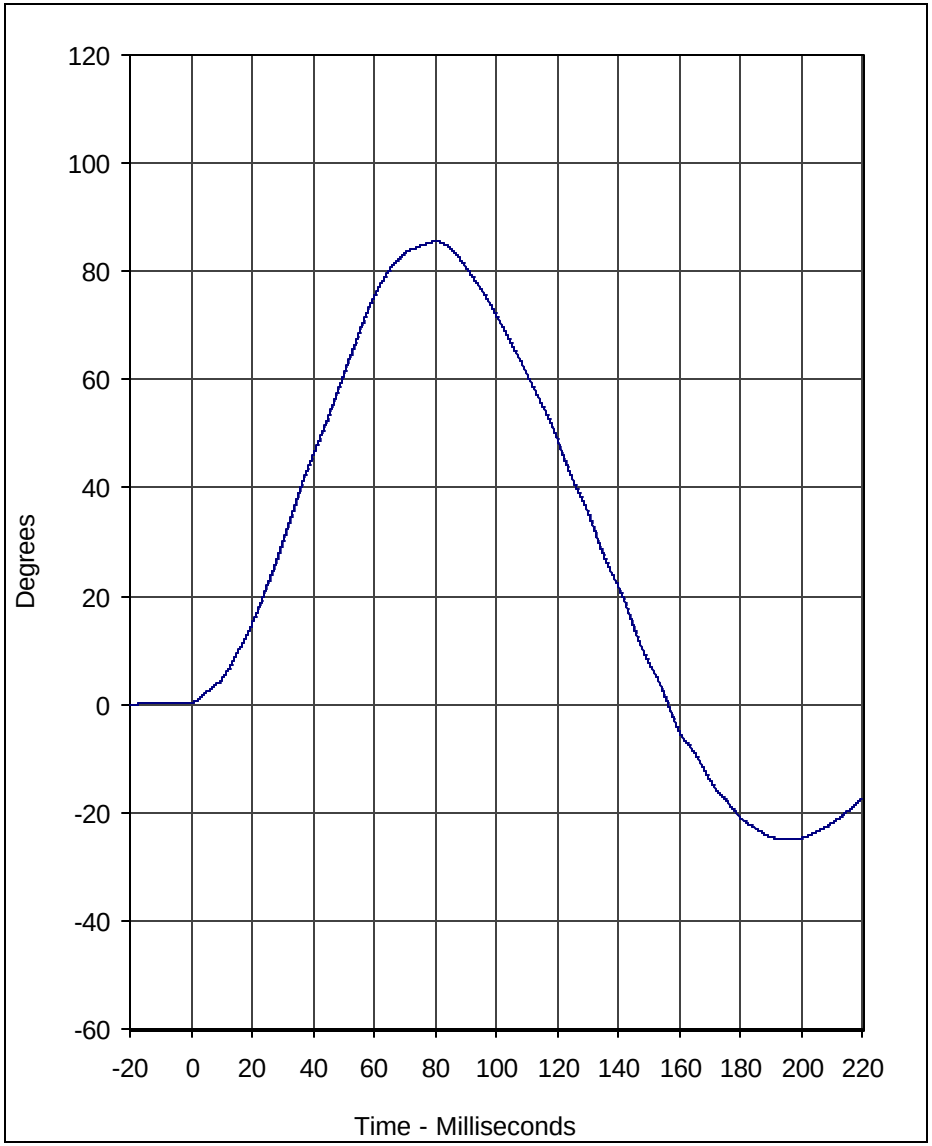
Test Program: Hybrid III 50th Percentile Male Neck Extension Test

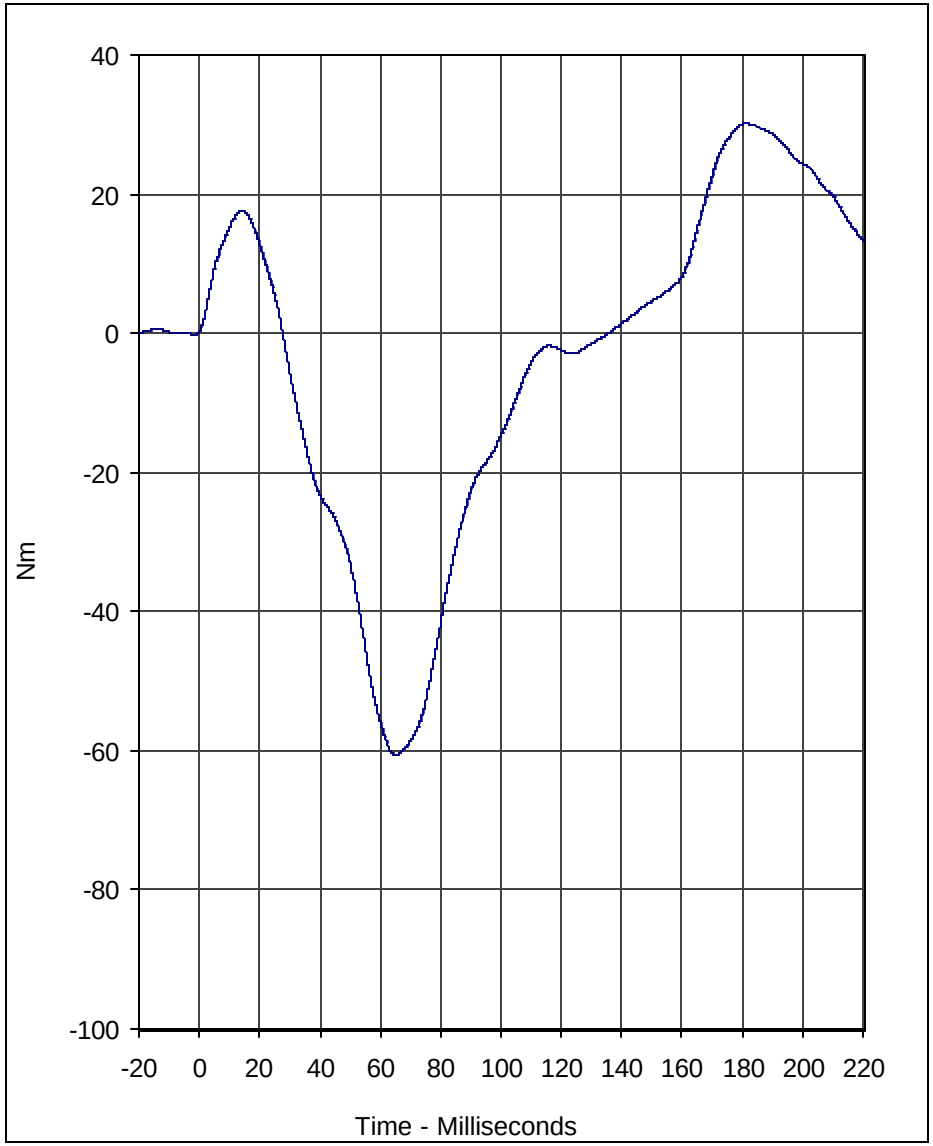
Test Date: 12/3/02

A.T.D. Serial No.: 034

Test I.D.: NE07B

KARCO Engineering




| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 85.6 | 80.6 | -25.0 | 196.5 | 60 |

| Curve Description | CURNO | Type |
|---|---|---|
| Moment About Occipital Condyle | 004 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 30.1 | 181.2 | -60.7 | 65.1 | 60 |

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

Test Date: 12/3/02

A.T.D. Serial No.: 034

Test I.D.: NE07B

KARCO Engineering

# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# External Measurements

ATD Serial No.: 034

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| A - Total sitting height | mm | 879 to 889 | 885 | Pass |
| B - Shoulder pivot height | mm | 505 to 521 | 515 | Pass |
| C - "H" point height | mm | 84 to 89 | 85 | Pass |
| D - "H" point from seat back | mm | 135 to 140 | 135 | Pass |
| E - Shoulder pivot from back | mm | 84 to 94 | 90 | Pass |
| F - Thigh clearance | mm | 140 to 155 | 150 | Pass |
| G - Elbow back to wrist pivot | mm | 290 to 305 | 295 | Pass |
| H - Skull cap to back line | mm | 41 to 46 | 45 | Pass |
| I - Shoulder to elbow length | mm | 330 to 345 | 340 | Pass |
| J - Elbow rest height | mm | 190 to 211 | 195 | Pass |
| K - Buttock to knee length | mm | 579 to 604 | 600 | Pass |
| L - Poplipteal length | mm | 429 to 455 | 445 | Pass |
| M - Knee pivot height | mm | 485 to 500 | 495 | Pass |
| N - Buttock poplipteal length | mm | 452 to 477 | 475 | Pass |
| O - Chest depth | mm | 213 to 229 | 220 | Pass |
| P - Foot length | mm | 251 to 267 | 260 | Pass |
| V - Shoulder breadth | mm | 422 to 437 | 430 | Pass |
| W - Foot breadth | mm | 91 to 107 | 100 | Pass |
| Y - Chest circumference | mm | 970 to 1001 | 990 | Pass |
| Z - Waist circumference | mm | 836 to 866 | 850 | Pass |
| AA - Location for chest circumference | mm | 429 to 434 | 430 | Pass |
| BB - Location for waist circumference | mm | 226 to 231 | 230 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 5, 2002
Test Date

# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Knee Impact Test

ATD Serial No.: 035 Location: Left Knee Test I.D.: KK07C

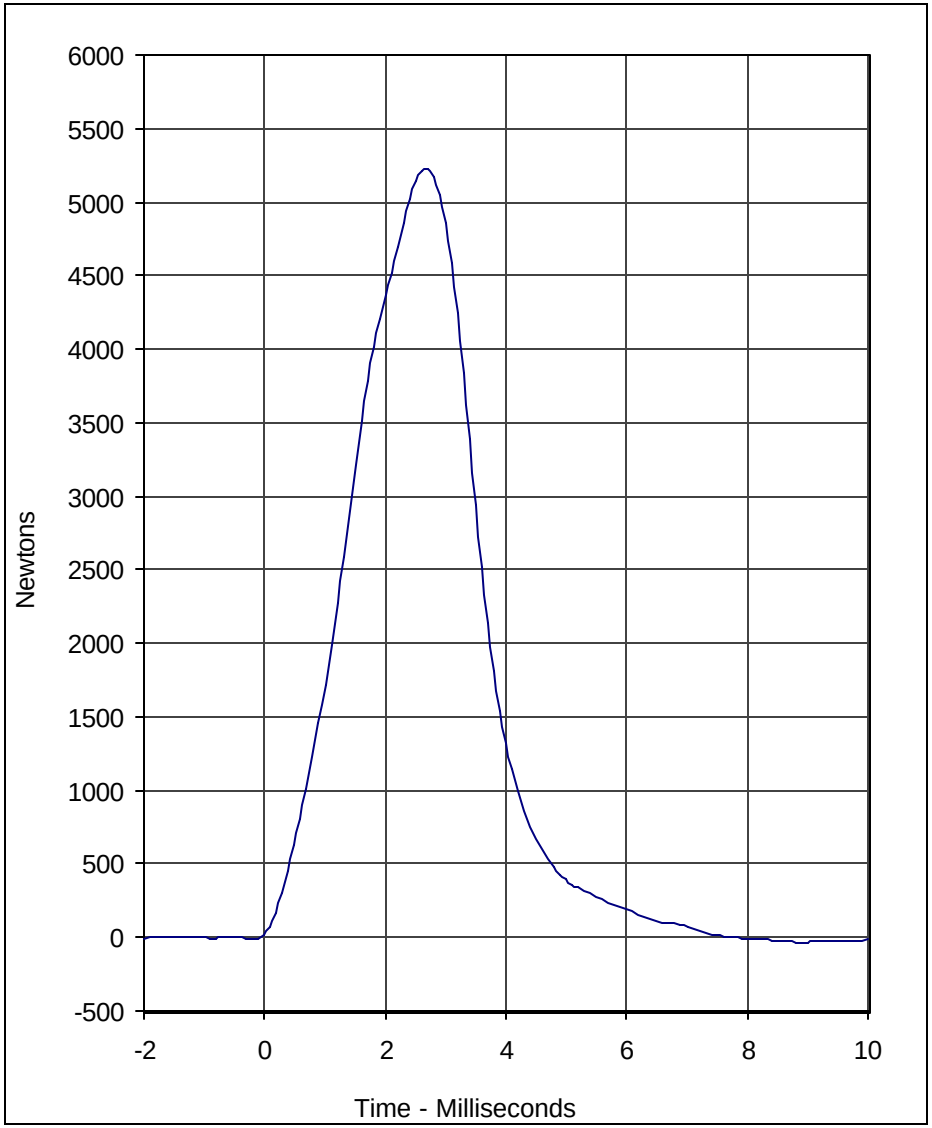
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | $^{o}$C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity at T=0 | m/sec | 2.07 to 2.13 | 2.10 | Pass |
| Peak Probe Force | N | 4715 to 5782 | 5220 | Pass |
| | | Overall Test Results | | Pass |

ATD Serial No.: 035 Location: Right Knee Test I.D.: KK07D

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | $^{o}$C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity at T=0 | m/sec | 2.07 to 2.13 | 2.11 | Pass |
| Peak Probe Force | N | 4715 to 5782 | 5343 | Pass |
| | | Overall Test Results | | Pass |

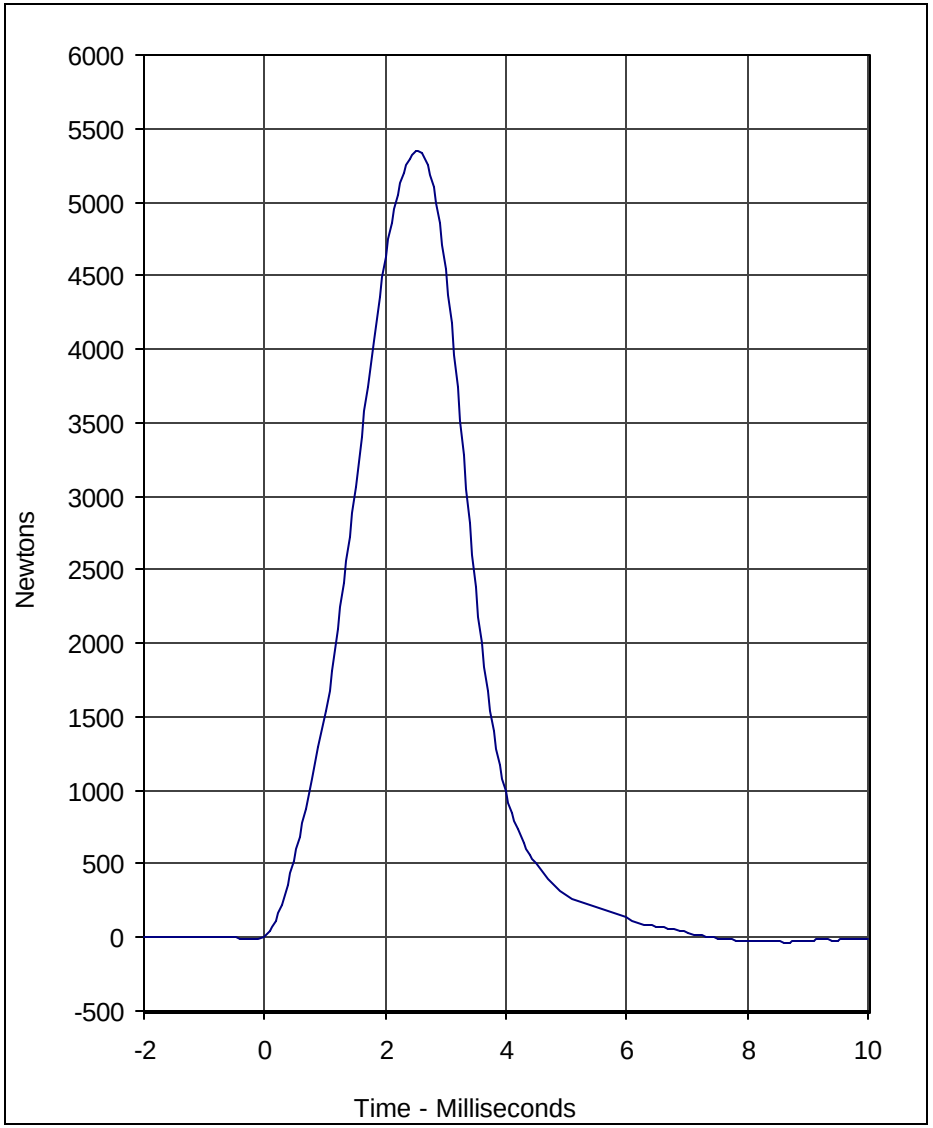
Laboratory Technician

December 2, 2002
Test Date




| Curve Description | Location | Test I.D. | CURNO | Type |
|---|---|---|---|---|
| Probe Force | Left Knee | KK07C | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 5220.4 | 2.7 | -32.8 | 8.9 | 600 |




| Curve Description | Location | Test I.D. | CURNO | Type |
|---|---|---|---|---|
| Probe Force | Right Knee | KK07D | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 5342.8 | 2.5 | -32.6 | 8.7 | 600 |

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

A.T.D. Serial No.: 035

Test Date: 12/2/02

KARCO Engineering

# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Head Drop Test

ATD Serial No.: 035 Test I.D.: HD10D

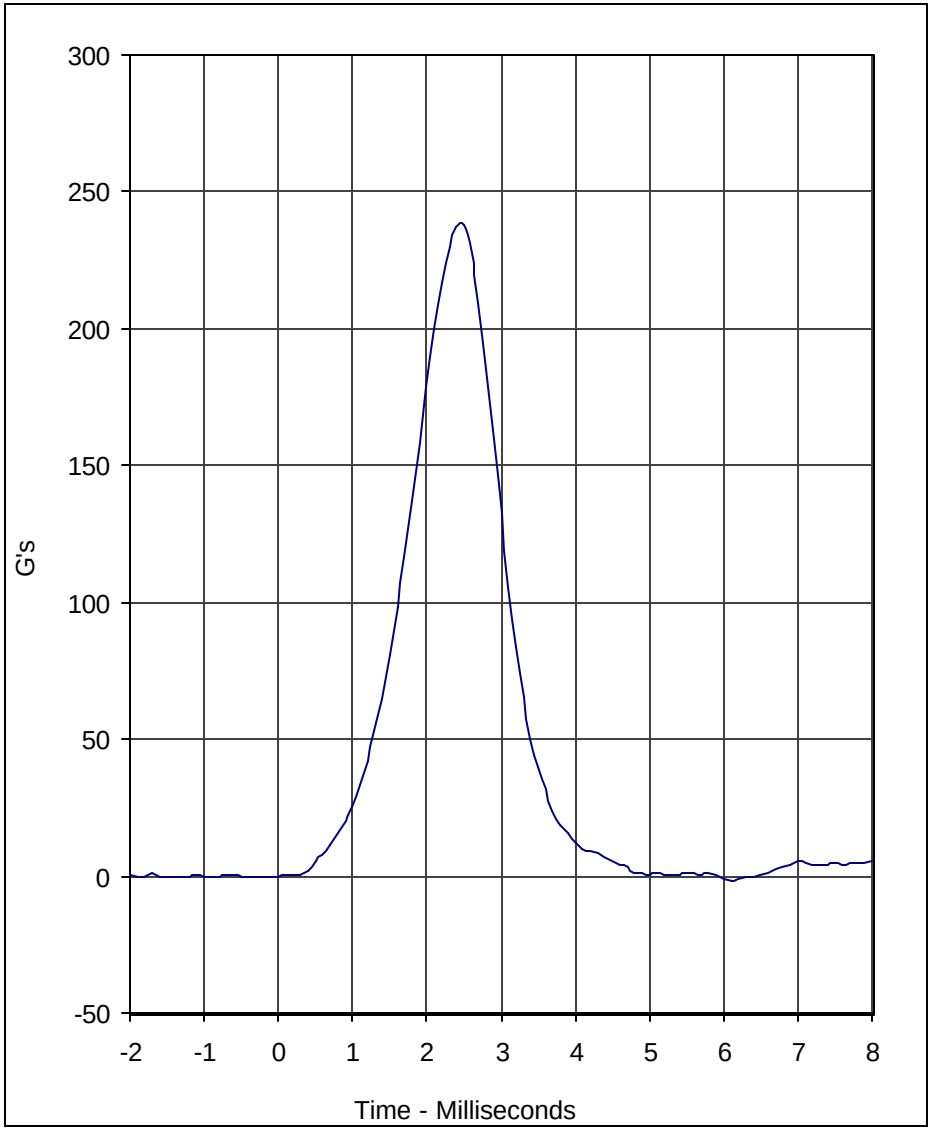
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 225.0 to 275.0 | 237.8 | Pass |
| Peak Lateral Acceleration | G's | ≤15.0 | 2.4 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| | | Overall Test Results | | Pass |





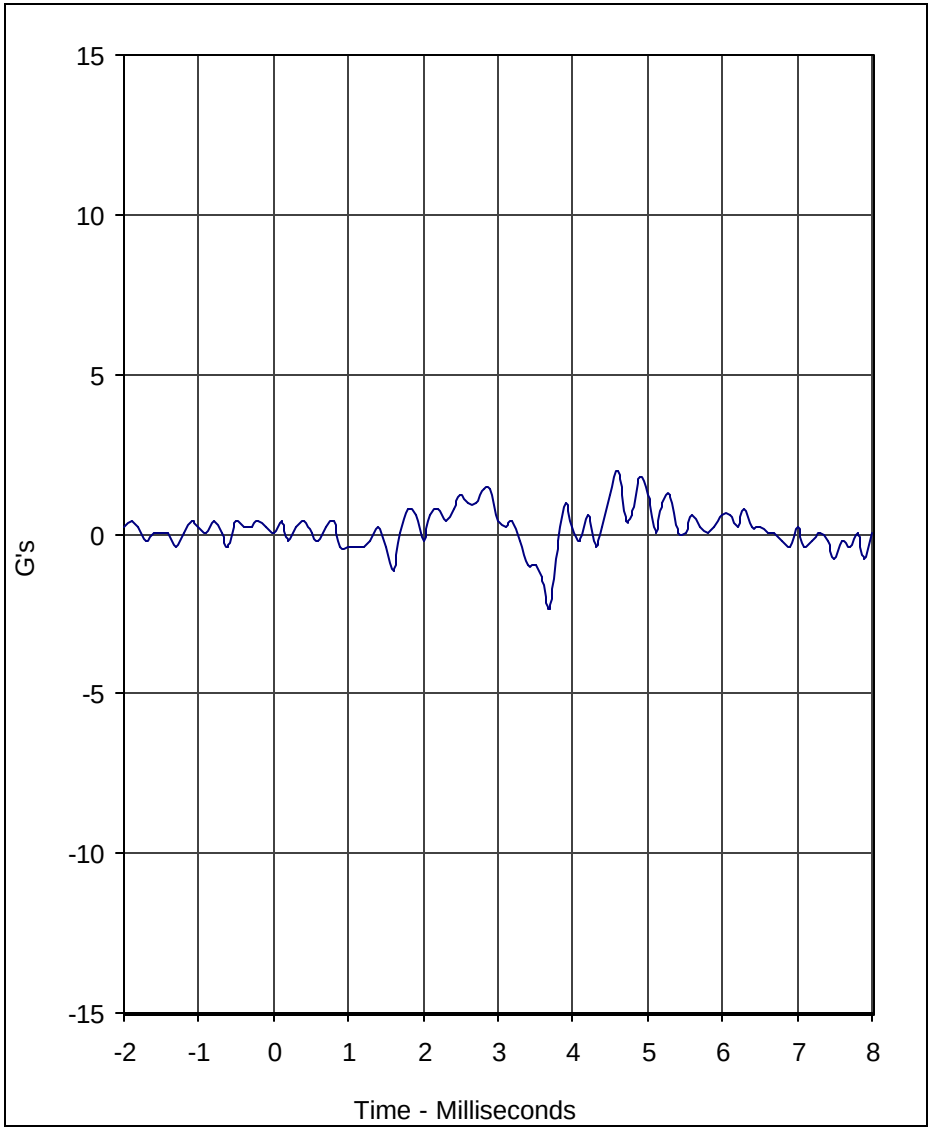
Laboratory Technician

December 3, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Head Resultant | 001 | RES |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 237.8 | 2.5 | -0.9 | 6.0 | 1000 |




| Curve Description | CURNO | Type |
|---|---|---|
| Head Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 2.0 | 4.6 | -2.4 | 3.7 | 1000 |

Test Program: Hybrid III 50th Percentile Male Head Drop Test

Test Date: 12/3/02

A.T.D. Serial No.: 035

Test I.D.: HD10D

KARCO Engineering

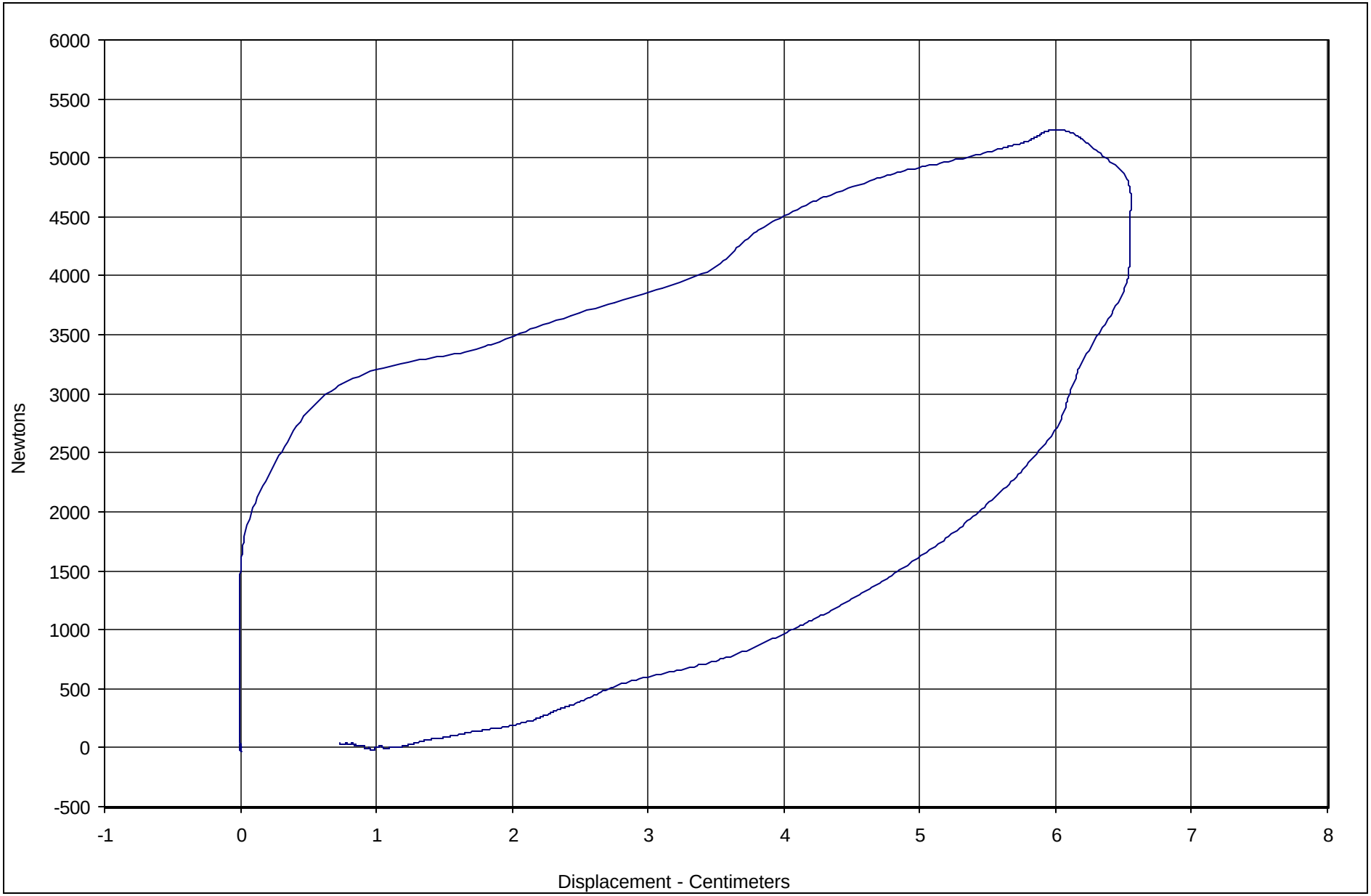
# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Thorax Impact Test

ATD Serial No.: 035 Test I.D.: CH07B

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | $^{o}$C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 6.58 to 6.82 | 6.64 | Pass |
| Peak Probe Force | Newtons | 5159 to 5893 | 5243 | Pass |
| Peak Sternum Displacement | CM | 6.35 to 7.26 | 6.55 | Pass |
| Internal Hysterysis | % | 69 to 85 | 75.4 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 4, 2002
Test Date




| Curve Description | CURNO | Type | Hysterysis | Peak Chest Displ. | Peak Probe Force | SAE Class |
|---|---|---|---|---|---|---|
| Probe Force vs. Chest Displacement | 001 | FIL | 75.4 | 6.55 | 5242.9 | 180 |

KARCO Engineering

Test Program: Hybrid III 50th Percentile Male Thorax Impact

A.T.D. Serial No.: 035

Test Date: 12/4/02

Test I.D.: CH07B

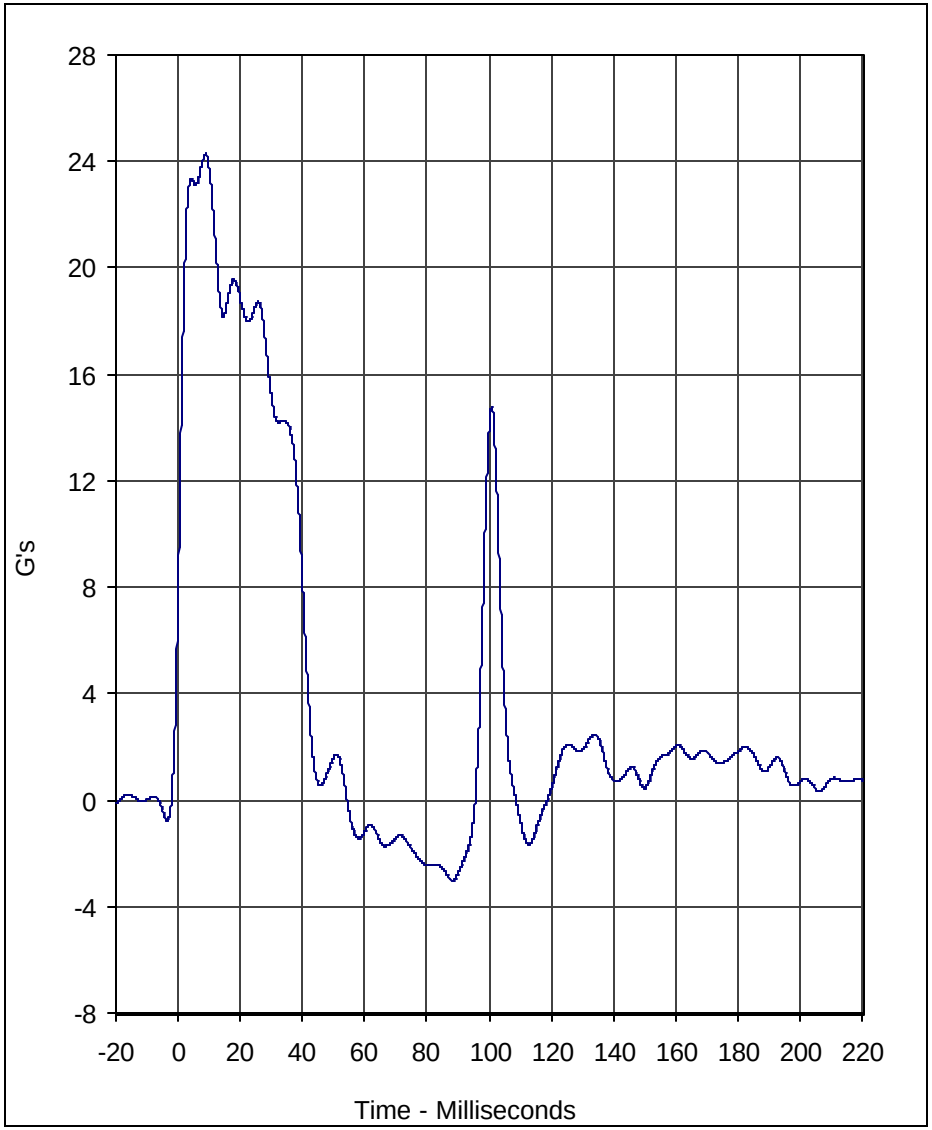
# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Neck Flexion Test

ATD Serial No.: 035 Test I.D.: NF10C

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 6.89 to 7.13 | 7.11 | Pass |
| Pendulum Deceleration | 10 Msec. | G's | 22.5 to 27.5 | 23.7 | Pass |
| | 20 Msec. | G's | 17.6 to 22.6 | 18.9 | Pass |
| | 30 Msec. | G's | 12.5 to 18.5 | 15.2 | Pass |
| Peak Pendulum Decel. after 30 Msec. | | G's | ≤ 29.0 | 15.2 | Pass |
| Deceleration Decay, Time to Cross 5 G's | | Msec. | 34.0 to 42.0 | 41.4 | Pass |
| Maximum "D" Plane Rotation | Maximum | Degrees | 64.0 to 78.0 | 69.1 | Pass |
| | Time | Msec. | 57.0 to 64.0 | 62.0 | Pass |
| "D" Plane Rotation Decay, Time To Zero Crossing | | Msec. | 113.0 to 128.0 | 119.1 | Pass |
| Moment About Occipital Condyle | Maximum | Nm | 84.1 to 108.5 | 86.0 | Pass |
| | Time | Msec. | 47.0 to 58.0 | 55.4 | Pass |
| Positive Moment Decay, Time To Zero Crossing | | Msec. | 97.0 to 107.0 | 103.4 | Pass |
| | | | Overall Test Results | | Pass |

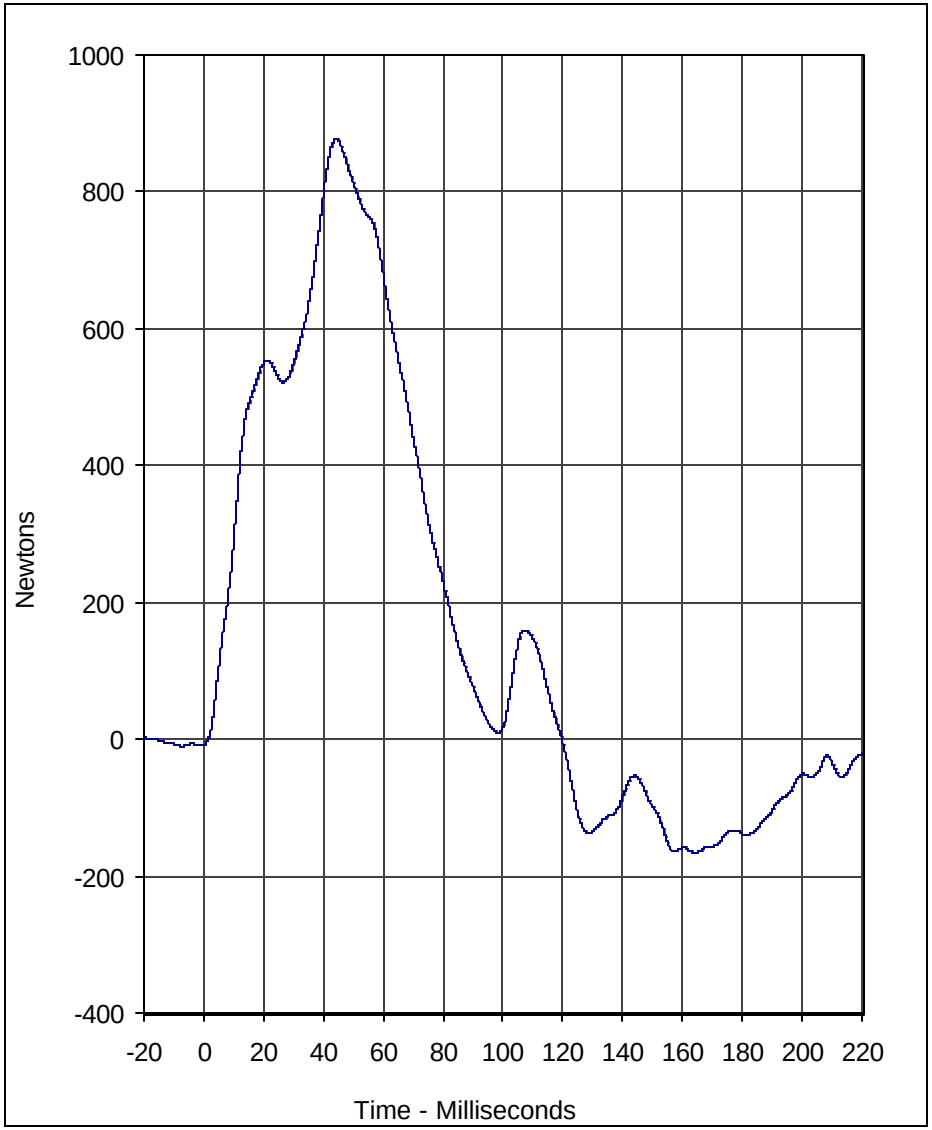
Laboratory Technician

December 3, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Deceleration | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 24.3 | 8.8 | -3.0 | 88.2 | 60 |




| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 877.0 | 44.2 | -166.3 | 164.2 | 60 |

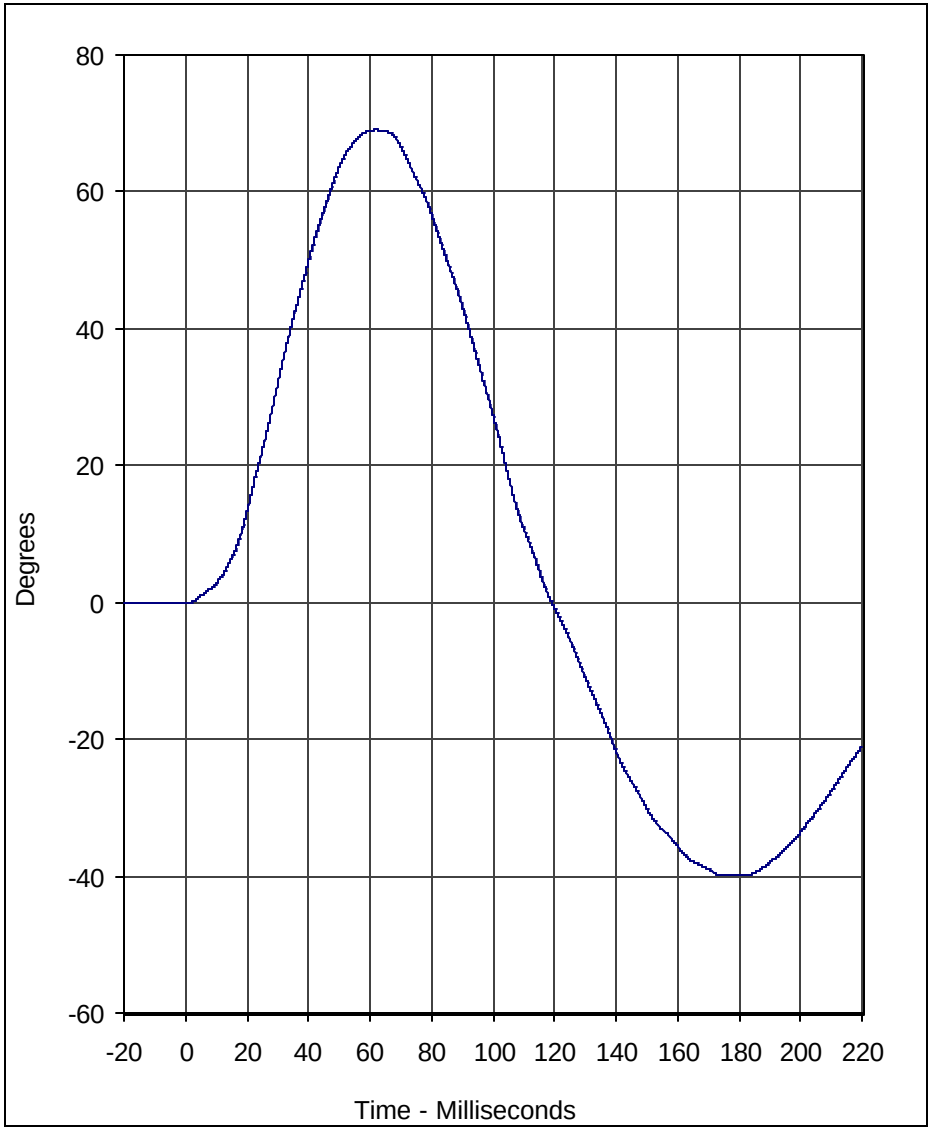
Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

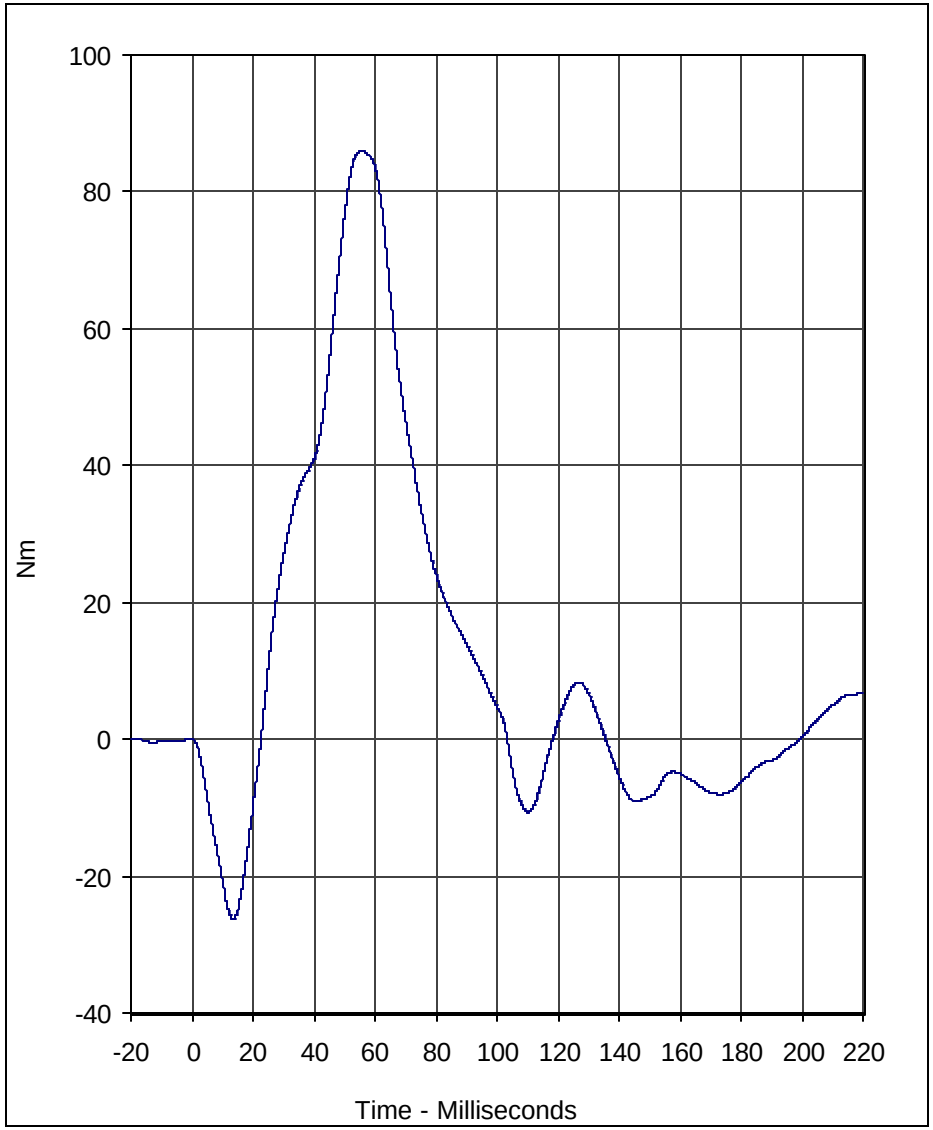
Test Date: 12/3/02

A.T.D. Serial No.: 035

Test I.D.: NF10C

KARCO Engineering




| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 69.1 | 62.0 | -40.0 | 175.9 | 60 |

| Curve Description | CURNO | Type |
|---|---|---|
| Moment About Occipital Condyle | 004 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 86.0 | 55.4 | -26.2 | 13.5 | 60 |

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

Test Date: 12/3/02

A.T.D. Serial No.: 035

Test I.D.: NF10C

KARCO Engineering

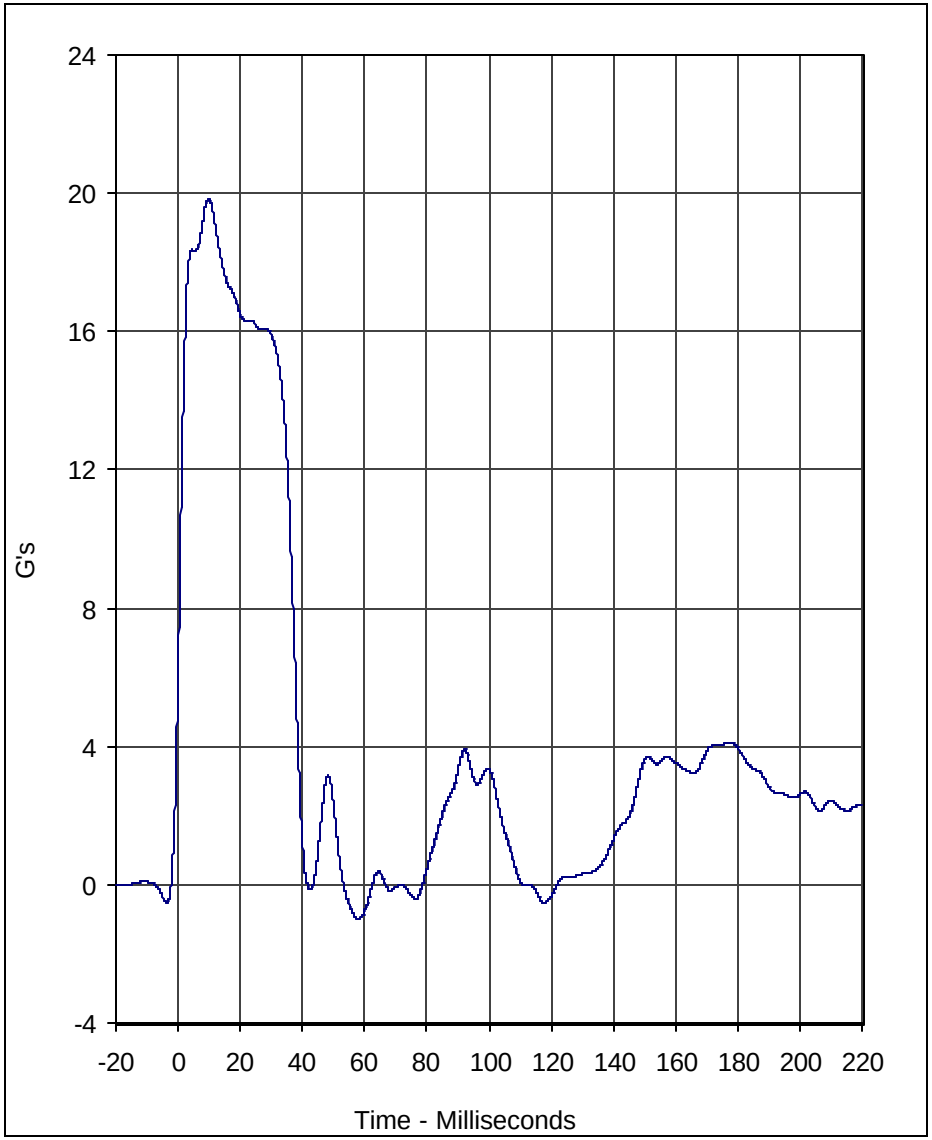
# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# Neck Extension Test

ATD Serial No.: 035 Test I.D.: NE10C

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 5.94 to 6.19 | 6.02 | Pass |
| Pendulum Deceleration | 10 Msec. | G's | 17.2 to 21.2 | 19.8 | Pass |
| | 20 Msec. | G's | 14.0 to 19.0 | 16.5 | Pass |
| | 30 Msec. | G's | 11.0 to 16.0 | 15.9 | Pass |
| Peak Pendulum Decel. after 30 Msec. | | G's | ≤ 22.0 | 15.9 | Pass |
| Deceleration Decay, Time to Cross 5 G's | | Msec. | 38.0 to 46.0 | 38.2 | Pass |
| Maximum "D" Plane Rotation | Maximum | Degrees | 81.0 to 106.0 | 100.2 | Pass |
| | Time | Msec. | 72.0 to 82.0 | 77.4 | Pass |
| "D" Plane Rotation Decay, Time To Zero Crossing | | Msec. | 147.0 to 174.0 | 149.8 | Pass |
| Moment About Occipital Condyle | Maximum | Nm | -52.9 to- 79.9 | -74.6 | Pass |
| | Time | Msec. | 65.0 to 79.0 | 67.4 | Pass |
| Positive Moment Decay, Time To Zero Crossing | | Msec. | 120.0 to 148.0 | 139.0 | Pass |
| | | | Overall Test Results | | Pass |

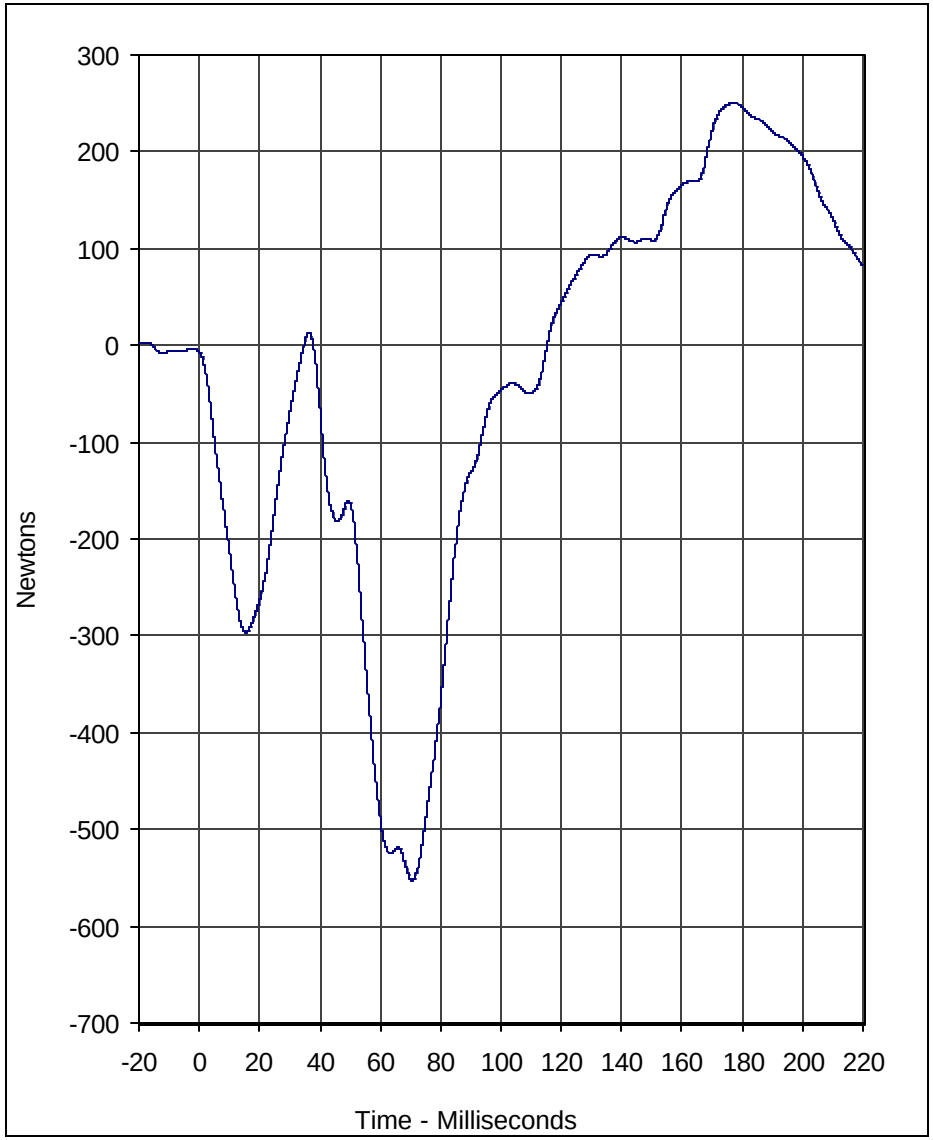
Laboratory Technician

December 3, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Deceleration | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 19.8 | 9.8 | -1.0 | 58.0 | 60 |




| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 250.3 | 177.2 | -552.5 | 70.6 | 60 |

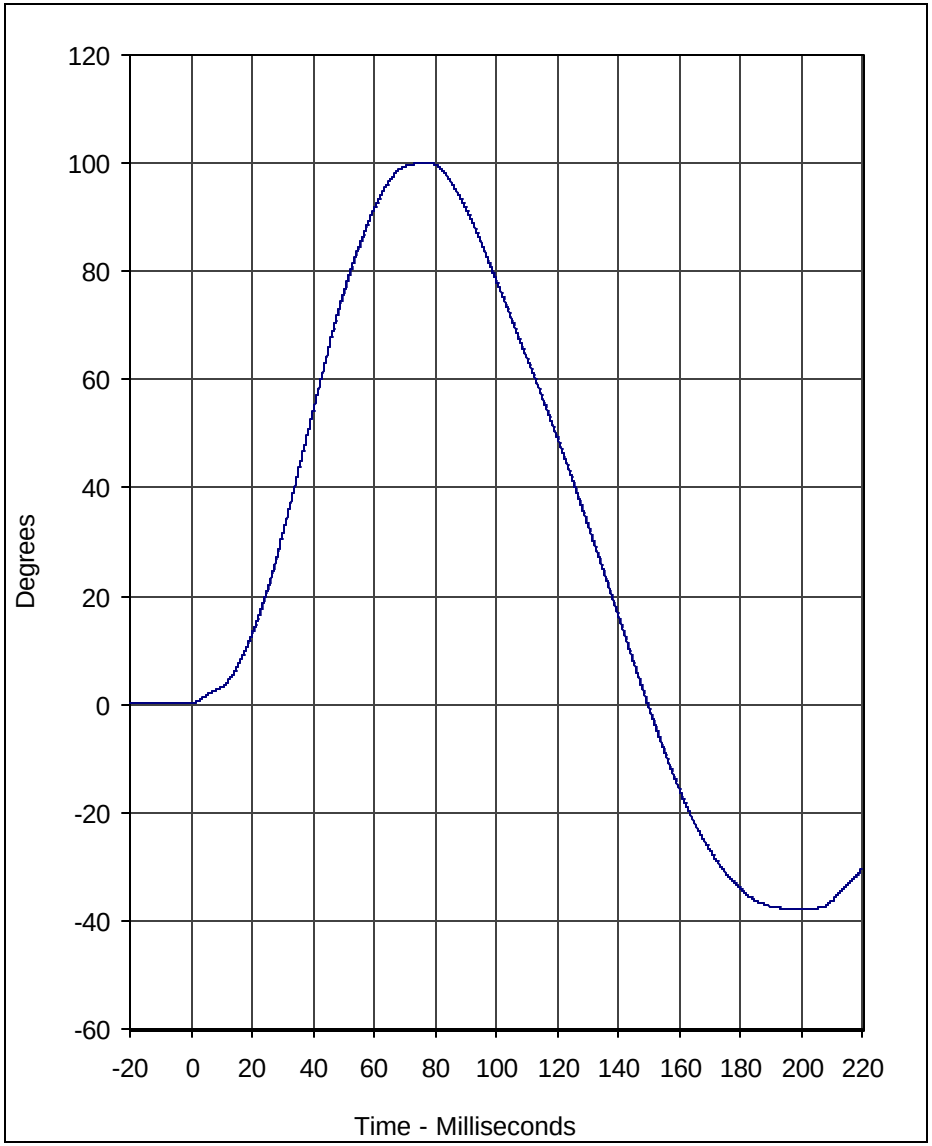
Test Program: Hybrid III 50th Percentile Male Neck Extension Test

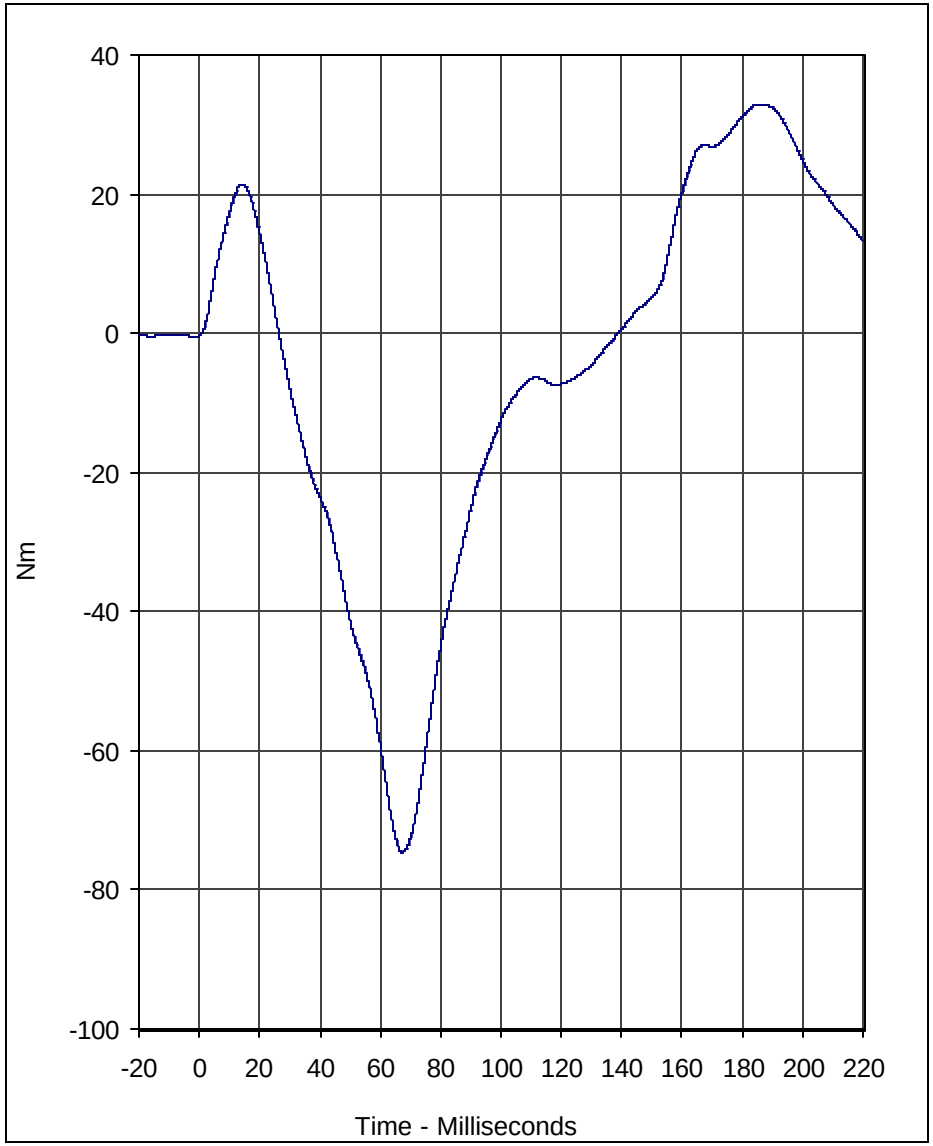
Test Date: 12/3/02

A.T.D. Serial No.: 035

Test I.D.: NE10C

KARCO Engineering




| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 100.2 | 77.4 | -37.9 | 199.6 | 60 |

| Curve Description | CURNO | Type |
|---|---|---|
| Moment About Occipital Condyle | 004 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 32.9 | 186.1 | -74.6 | 67.4 | 60 |

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

Test Date: 12/3/02

A.T.D. Serial No.: 035

Test I.D.: NE10C

KARCO Engineering

# Calibration Data Sheet
# Hybrid III 50th Percentile Male
# External Measurements

ATD Serial No.: 035

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| A - Total sitting height | mm | 879 to 889 | 880 | Pass |
| B - Shoulder pivot height | mm | 505 to 521 | 505 | Pass |
| C - "H" point height | mm | 84 to 89 | 85 | Pass |
| D - "H" point from seat back | mm | 135 to 140 | 135 | Pass |
| E - Shoulder pivot from back | mm | 84 to 94 | 90 | Pass |
| F - Thigh clearance | mm | 140 to 155 | 145 | Pass |
| G - Elbow back to wrist pivot | mm | 290 to 305 | 300 | Pass |
| H - Skull cap to back line | mm | 41 to 46 | 45 | Pass |
| I - Shoulder to elbow length | mm | 330 to 345 | 335 | Pass |
| J - Elbow rest height | mm | 190 to 211 | 200 | Pass |
| K - Buttock to knee length | mm | 579 to 604 | 585 | Pass |
| L - Poplipteal length | mm | 429 to 455 | 440 | Pass |
| M - Knee pivot height | mm | 485 to 500 | 495 | Pass |
| N - Buttock poplipteal length | mm | 452 to 477 | 460 | Pass |
| O - Chest depth | mm | 213 to 229 | 225 | Pass |
| P - Foot length | mm | 251 to 267 | 255 | Pass |
| V - Shoulder breadth | mm | 422 to 437 | 435 | Pass |
| W - Foot breadth | mm | 91 to 107 | 100 | Pass |
| Y - Chest circumference | mm | 970 to 1001 | 990 | Pass |
| Z - Waist circumference | mm | 836 to 866 | 850 | Pass |
| AA - Location for chest circumference | mm | 429 to 434 | 430 | Pass |
| BB - Location for waist circumference | mm | 226 to 231 | 230 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 5, 2002
Test Date

# APPENDIX F

# CHILD RESTRAINT SYSYTEM

**REPORT NUMBER TR-P23001-03-NC**

# NEW CAR ASSESSMENT PROGRAM
# FRONTAL BARRIER IMPACT TEST

**NISSAN MOTOR COMPANY**
**2003 NISSAN FRONTIER XE**
**4 DOOR PICKUP**

**NHTSA NUMBER: M35203**

**PREPARED BY:**
**KARCO ENGINEERING, LLC**
**9270 HOLLY ROAD**
**ADELANTO, CALIFORNIA 92301**

**DECEMBER 19, 2002**

**FINAL REPORT**

**PREPARED FOR:**
**U.S. DEPARTMENT OF TRANSPORTATION**
**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**
**RULEMAKING**
**OFFICE OF CRASHWORTHINESS STANDARDS**
**MAIL CODE: NVS-111**
**400 SEVENTH STREET, SW, ROOM 5311**
**WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-01-D-02005.

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Prepared by: _____ Date: December 31, 2002
Mr. James E. Gorth, Project Engineer
KARCO Engineering, LLC

Reviewed by: _____ Date: December 31, 2002
Mr. Jerry L. Kratzke, Director of Operations
KARCO Engineering, LLC

Approved by: _____ Date: December 31, 2002
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

FINAL REPORT ACCEPTED BY:

_____
Manager, New Car Assessment Program

_____
Date of Acceptance

_____
COTR, NCAP Frontal Impact Program

_____
Date of Acceptance

# Technical Report Documentation Page

| 1. Report No. | 2. Government Accession No. | 3. Recipients Catalog No. |
|---|---|---|
| TR-P23001-03-NC | | |

| 4. Title and Subtitle | 5. Report Date |
|---|---|
| Final Report of Evenflo Vanguard Latch<br>Final Report of Graco Platinum Cargo Latch<br>NHTSA No. M35203 | December 31, 2002 |
| | **6. Performing Organization Code**<br>KAR |
| **7. Authors**<br>Mr. James E. Gorth, Project Engineer, Karco<br>Mr. Frank Richardson, Project Manager, Karco | **8. Performing Organization Report No.**<br>TR-P23001-03-NC |
| **9. Performing Organization Name and Address**<br>KARCO Engineering, LLC<br>9270 Holly Road<br>Adelanto, CA 92301 | **10. Work Unit No.** |
| | **11. Contract or Grant No.**<br>DTNH22-01-D-02005 |
| **12. Sponsoring Agency Name and Address**<br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Rulemaking<br>Office of Crashworthiness Standards<br>Mail Code: NVS-111<br>400 Seventh Street, SW, Room 5311<br>Washington, D.C 20590 | **13. Type of Report and Period Covered**<br>Final Test Report<br>Option Year 2 |
| | **14. Sponsoring Agency Code**<br>DOT/NHTSA/NRM/OCS |

**15. Supplementary Notes**

**16. Abstract**

The subject CRS Evenflo Vanguard V and Graco Platinum Cargo was conducted in conjunction with a full vehicle frontal load cell barrier test conducted in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at Karco Engineering, LLC on DECEMBER 19, 2002.

| Measurement Description | Units | Driver ATD | Pass. ATD |
|---|---|---|---|
| Head Injury Criteria (HIC36) | N/A | 1231.3 | 1679.7 |
| Head Injury Criteria (HIC15) | N/A | 1111.9 | 1619.0 |
| Max. Thorax Accel. (3 msec clip) | G's | 62.9 | 56.8 |
| Peak Chest Displacment | mm | -16.3 | -14.2 |

| 17. Key Words | 18. Distribution Statement |
|---|---|
| 56.3 km/h NCAP Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)<br>2003 Nissan Frontier XE 4 Door Pickup<br>NHTSA No. M35203 | Copies of this report available from:<br>NHTSA Technical Reference Division<br>National Highway Traffic Safety Admin.<br>400 Seventh St., SW, Room 5108<br>Washington, D.C. 20590 |

| 19. Security Classification (this report) | 20. Security Classification (this page) | 21. No. Pages | 22. Price |
|---|---|---|---|
| Unclassified | Unclassified | 151 | |

## TABLE OF CONTENTS


| Section | Description | Page |
|---|---|---|
| F-1 | Purpose and Summary of Test M35112 | F1-1 |
| | Data Sheets: | |
| | 1. Crash Test Summary | F1-24 |
| | 2. CRS Parameter Data | F1-35 |
| | 3. Child Dummy Positioning In Vehicle | F1-46 |
| | 4. 3 Year Old Hybrid III ATD Injury Criteria and Sensor Data | F1-68 |
| | 5. CRS Performance Data | F1-810 |
| | 6. CRS Camera Data | F1-911 |
| F-2 | Photographs | F2-1 thru F2-31 |
| F-3 | Child Dummy Response and CRS Data Traces | F3-1 thru F3-68 |
| F-4 | Child Dummy Instrumentation Information | F4-1 thru F4-2 |
| F-5 | Child Dummy Calibration Information | F5-1 thru F5-26 |

## SECTION F-1

## PURPOSE AND SUMMARY OF TEST M35203

The purpose of this test is to obtain CRS performance data during an NCAP (35mph) frontal impact test.

The 55.59 km/h NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

### SUMMARY

The three year old child dummy was instrumented with head, chest, and pelvic triaxial accelerometers. In addition, redundant head z acceleration, chest displacement and upper and lower six axial neck force and moment load cell sensors were utilized. Triaxial accelerometers were installed on the CRS and a load cell on the upper tether.

The right rear (Position 3) child dummy (Serial No. 139) and the left rear (Position 4) child dummy (Serial No. 082) were calibrated prior to this test. Child dummy certification information is found in Section F-5.

**CHILD DUMMY VALUES**

| | HIC36 Values | HIC15 Values | 3 Msec Chest Clip | Peak Chest Disp. |
|---|---|---|---|---|
| Left Rear Child | 1231.3 | 1111.9 | 62.9 | -16.3 |
| Right Rear Child | 1679.7 | 1619.0 | 56.8 | -14.2 |

## SECTION F-1

## DATA SHEET NO.1.....CRASH TEST SUMMARY

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### TEST DUMMY INFORMATION

| Description | Position # 3 CRS | Position # 4 CRS |
|---|---|---|
| Manufacturer | Evenflo | Graco |
| Model Name | Vanguard 5 | Platinum Cargo |
| Serial No. | 3691331 P1 | 8489ALE |
| Type | Latch | Latch |
| Forward/Rearward | Forward | Forward |

### VISIBLE DUMMY CONTACT POINTS

| Description | Position # 3 CRS | Position # 4 CRS |
|---|---|---|
| Head Contact | Chin to retaing clip, seatback, headrest | Chin to retaing clip, seatback, headrest |
| Chest Contact | Harness | Harness |
| Abdomen Contact | Harness | Harness |
| Left Knee Contact | Seatback | Seatback |
| Right Knee Contact | None | Seatback |
| Left Toe Contact | Seatback | Seatback |
| Right Toe Contact | Seatback | Seatback |

### POST TEST DOOR OPENING

| Description | Front | Rear |
|---|---|---|
| Left Side Doors | Remained closed, opend w/o tools | Remained closed, opend w/o tools |
| Right Side Doors | Remained closed, opend w/o tools | Remained closed, opend w/o tools |
| Hatch/Other Door | N/A | N/A |

### POST TEST SEAT DATA

| Location | Seat Movement (mm) | Seat Back Failure |
|---|---|---|
| Left Front | 10 | None |
| Right Front | 12 | None |
| Left Rear | None | None |
| Right Rear | None | None |

### CAMERA COVERAGE

| | |
|---|---|
| High Speed | 2 |
| Real Time | 0 |
| Total | 2 |

## SECTION F-1

## DATA SHEET NO. 2…..CRS PARAMETER DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### TEST VEHICLE WEIGHTS

| | | As Delivered | | | As Tested | | |
|---|---|---|---|---|---|---|---|
| | Units | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 474 | 376 | | 523 | 476 | |
| Right | kg | 474 | 391 | | 538 | 461 | |
| Ratio | % | 55.3 | 44.7 | | 53.1 | 46.9 | |
| Totals | kg | 948 | 767 | 1715 | 1061 | 937 | 1998 |

### TARGET TEST WEIGHT CALCULATION

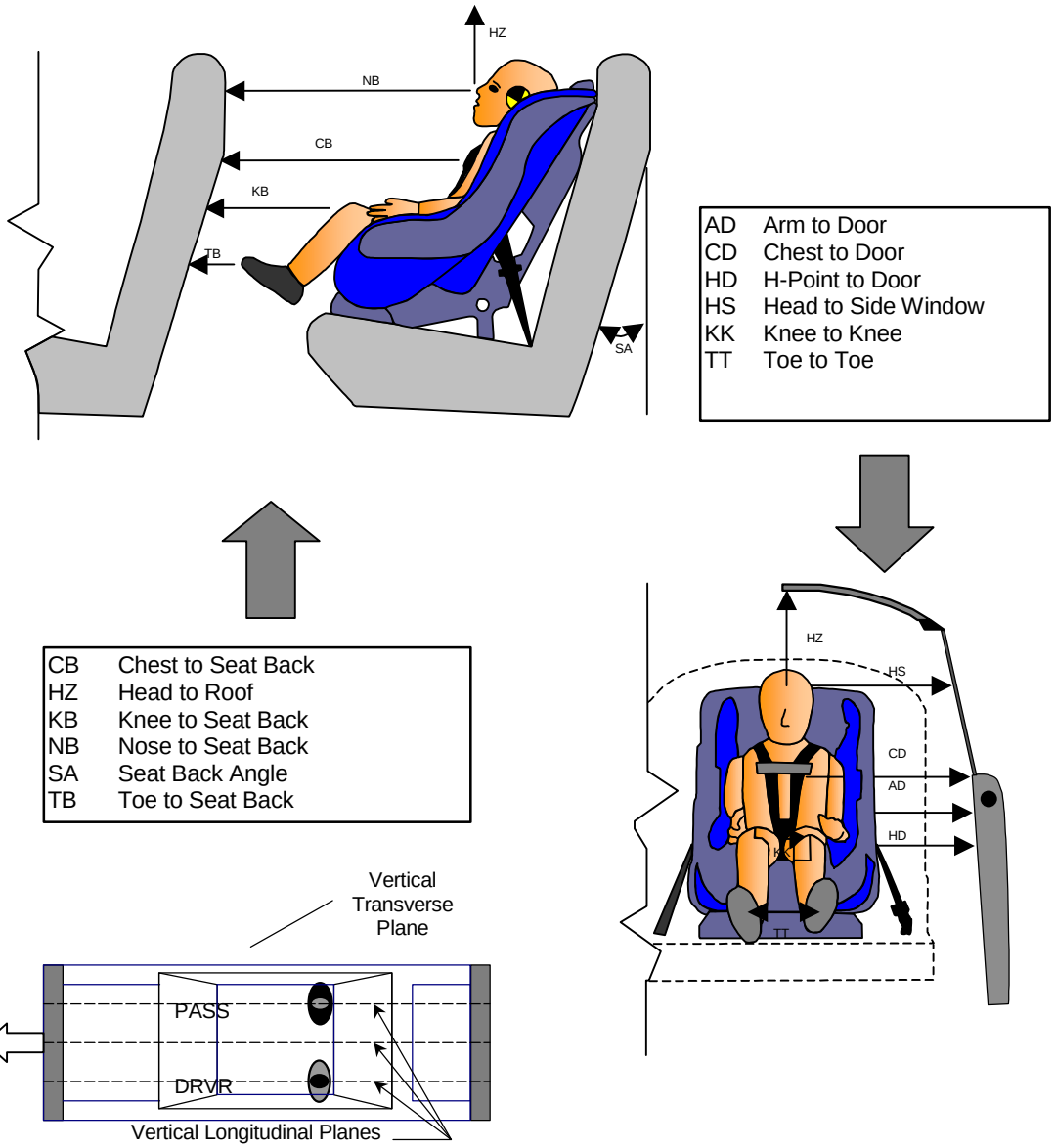
| Measured Parameter | Units | Value |
|---|---|---|
| Total Delivered Weight *(UVW)* | kg | 1715 |
| Weight of 2 P572 ATD's | kg | 152 |
| Rated Cargo/Luggage Weight *(RCLW)* | kg | 136 |
| Calculated Vehicle Target Weight *(TVTW)* | kg | 2003 |

## SECTION F-1

## DATA SHEET NO. 3 .....CHILD DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02




DUMMY MEASUREMENTS FOR REAR SEAT OCCUPANTS

**SECTION F-1**

**DATA SHEET NO. 3 …..CHILD DUMMY POSITIONING IN VEHICLE…(continued)**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**CHILD DUMMY POSITION MEASUREMENTS**

| Code | Measurement | P3 CRS (139) | | P4 CRS (082) | |
|---|---|---|---|---|---|
| | | Pre-Test | Post-test | Pre-Test | Post-test |
| SA | Seat Back Angle | 22 | 22 | 22 | 22 |
| HZ | Head to Roof (Z) | 340 | 300 | 375 | 375 |
| CD | Chest to Dash | 370 | 340 | 341 | 360 |
| KK | Knee to Knee (Y) | 201 | 165 | 210 | 225 |
| HS | Head to Side Window | 266 | 230 | 270 | 310 |
| HD | H-Point to Door (Y) | 310 | 300 | 380 | 380 |
| AD | Arm to Door (Y) | 410 | 400 | 392 | 380 |
| NB | Nose to Seat Back | 410 | 415 | 395 | 365 |
| CB | Chest to Seat Back | 180 | 195 | 150 | 130 |
| FF | Foot to Foot | 180 | 240 | 160 | 130 |
| KB-LEFT | Knee to Seat Back | 235 | 220 | 160 | 155 |
| KB-RIGHT | Knee to Seat Back | 225 | 195 | 160 | 200 |
| TB-LEFT | Toe to Seat Back | 10 | 0 | 2 | 0 |
| TB-RIGHT | Toe to Seat Back | 7 | 25 | 8 | 1 |

## DATA SHEET NO. 4 - 3 YEAR OLD HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### HEAD PRIMARY PEAK ACCELERATIONS

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Head CG | X | G's | 28.1 | 215.8 | -86.7 | 87.5 | 17.7 | 221.1 | -139.6 | 85.0 |
| Head CG | Y | G's | 24.2 | 86.8 | -10.1 | 216.3 | 6.4 | 224.2 | -14.7 | 88.2 |
| Head CG | Z | G's | 89.5 | 83.5 | -2.8 | 280.4 | 133.3 | 84.3 | -2.9 | 45.0 |
| Head CG Resultant | N/A | G's | 121.0 | 87.0 | | | 178.4 | 84.6 | | |

### PRIMARY HEAD INJURY CRITERAS (HIC)

| | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|
| Location | HIC | $T^1$ | $T^2$ | Avg G | HIC | $T^1$ | $T^2$ | Avg G |
| Head CG Primary (HIC36) | 1231.3 | 69.7 | 93.6 | 76.6 | 1679.7 | 73.9 | 92.9 | 95.0 |
| Head CG Primary (HIC15) | 1111.9 | 76.3 | 91.3 | | 1619.0 | 76.2 | 91.2 | |

### CHEST PRIMARY PEAK ACCELERATIONS

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Chest CG | X | G's | 14.1 | 240.1 | -48.7 | 63.9 | 8.0 | 230.7 | -63.0 | 85.6 |
| Chest CG | Y | G's | 4.7 | 125.8 | -6.6 | 86.6 | 3.6 | 230.0 | -10.2 | 98.3 |
| Chest CG | Z | G's | 16.8 | 87.6 | -42.2 | 65.7 | 30.2 | 85.2 | -23.2 | 66.2 |
| Chest CG Resultant | N/A | G's | 64.0 | 64.8 | | | 69.4 | 85.5 | | |

### PRIMARY CHEST CLIP (3MSEC)

| | Left Rear Child | | | Right Rear Child | | |
|---|---|---|---|---|---|---|
| Location | CLIP | $T^1$ | $T^2$ | CLIP | $T^1$ | $T^2$ |
| Chest CG Primary | 62.9 | 63.4 | 66.4 | 56.8 | 71.8 | 74.8 |

### CHEST PEAK DISPLACEMENTS

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Chest CG | X | MM | 0.0 | 20.3 | -16.3 | 87.3 | 0.0 | 13.5 | -14.2 | 68.1 |

### PELVIC PEAK ACCELERATIONS

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Pelvis | X | G's | 27.4 | 102.9 | -73.1 | 60.9 | 15.1 | 107.8 | -66.6 | 63.2 |
| Pelvis | Y | G's | 13.1 | 69.1 | -8.8 | 78.1 | 3.3 | 194.1 | -8.0 | 73.9 |
| Pelvis | Z | G's | 12.1 | 89.1 | -49.4 | 67.5 | 24.3 | 86.4 | -30.5 | 74.3 |
| Pelvis Resultant | N/A | G's | 85.3 | 65.7 | | | 70.0 | 63.3 | | |

## DATA SHEET NO. 4…(continued)

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

### UPPER NECK PEAK FORCES AND MOMENTS

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Neck Force | X | Newtons | 31.7 | 280.4 | -1072.7 | 88.9 | 76.3 | 262.7 | -867.8 | 81.0 |
| Neck Force | Y | Newtons | 89.1 | 236.0 | -175.4 | 99.4 | 37.6 | 125.3 | -147.5 | 227.4 |
| Neck Force | Z | Newtons | 1958.2 | 81.5 | -213.6 | 237.6 | 2214.2 | 81.2 | -121.2 | 43.0 |
| Neck Force Resultant | N/A | Newtons | 2039.7 | 81.9 | | | 2380.6 | 81.2 | | |
| Neck Moment | X | Nm | 5.3 | 146.0 | -10.0 | 103.1 | 7.5 | 100.6 | -5.7 | 84.6 |
| Neck Moment | Y | Nm | 5.0 | 100.1 | -20.3 | 88.7 | 10.0 | 104.3 | -28.4 | 79.5 |
| Neck Moment | Z | Nm | 7.9 | 98.8 | -6.4 | 270.5 | 4.4 | 109.4 | -3.8 | 91.5 |
| Neck Moment Resultant | N/A | Nm | 21.2 | 88.7 | | | 28.4 | 79.5 | | |

### LOWER NECK PEAK FORCES AND MOMENTS

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Neck Force | X | Newtons | 133.3 | 209.0 | -1442.9 | 83.4 | 158.0 | 210.5 | -792.6 | 83.0 |
| Neck Force | Y | Newtons | 119.3 | 82.9 | -60.9 | 286.0 | 86.2 | 162.6 | -91.7 | 229.2 |
| Neck Force | Z | Newtons | 1289.0 | 80.3 | -310.2 | 119.2 | 2246.5 | 80.9 | -343.5 | 117.0 |
| Neck Force Resultant | N/A | Newtons | 1919.0 | 82.9 | | | 2378.0 | 80.9 | | |
| Neck Moment | X | Nm | 9.8 | 179.2 | -25.2 | 101.1 | 4.4 | 124.6 | -23.3 | 87.3 |
| Neck Moment | Y | Nm | 105.8 | 85.5 | -13.2 | 209.9 | 7.8 | 124.5 | -17.7 | 85.9 |
| Neck Moment | Z | Nm | 3.9 | 151.3 | -9.5 | 75.8 | 51.1 | 113.2 | -7.9 | 210.1 |
| Neck Moment Resultant | N/A | Nm | 105.9 | 85.5 | | | 54.1 | 84.0 | | |

### CHILD SEAT TETHER BELT SENSOR PEAK VALUES

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Tether Belt Force | N/A | Newtons | 52.2 | 112.3 | -35.4 | 37.8 | 2019.8 | 74.2 | -30.6 | 184.8 |

### CHILD SEAT ACCELEROMETER PEAK VALUES

| | | | Left Rear Child | | | | Right Rear Child | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Axis | Units | Max | Time | Min | Time | Max | Time | Min | Time |
| Child Seat | X | G's | 27.0 | 94.3 | -71.9 | 62.8 | 9.8 | 94.2 | -56.7 | 61.1 |
| Child Seat | Y | G's | 28.6 | 64.9 | -33.0 | 98.2 | 7.5 | 64.6 | -9.7 | 96.1 |
| Child Seat | Z | G's | 17.6 | 105.5 | -19.2 | 113.6 | 20.5 | 62.3 | -21.1 | 80.8 |
| Child Seat Resultant | N/A | G's | 76.7 | 63.4 | | | 60.1 | 61.5 | | |

**SECTION F-1**

**DATA SHEET NO. 5…..CRS PERFORMANCE DATA**

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

**CRS PERFORMANCE DATA**

| Location | Serial # Position # 3 | | Serial # Position # 4 | |
|---|---|---|---|---|
| | Damage | Remarks | Damage | Remarks |
| Upper Tether Strap | No | None | No | None |
| Upper Tether Buckle | Yes | Cover missing | No | None |
| Upper Tether Hook | No | None | No | None |
| Veh. Upper Tether Anchor | No | None | No | None |
| Lower Anchor Strap | No | None | No | None |
| Lower Anchor Buckle | No | None | No | None |
| Lower Anchor Hooks | No | None | No | None |
| Veh. Lower CRS Anchors | No | None | No | None |
| 5 Point Harness Connections | No | None | No | None |
| Cracks on CRS | No | None | Yes | 2 @harness slots |
| Fabric Tears on CRS | No | None | No | None |
| Vehicle Seat Structure | No | None | No | None |
| Vehicle Seat Fabric Tears | No | None | No | None |
| Child Dummy | No | None | No | None |

## SECTION F-1

## DATA SHEET NO. 6…..CRS CAMERA DATA

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup NHTSA No.: M35203

Test Program: 2003 NHTSA 35mph NCAP Test Date: 12/19/02

| No. | Camera View | Location (mm) | | | Angle (Deg.) | Film Plane to Head | Lens (mm) | Speed (fps) |
|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | |
| 1 | Rear Child Driver View | 2921 | -635 | 1575 | 20 | 991 | 13 | 820 |
| 2 | Rear Child Pass. View | 2921 | 635 | 1575 | 20 | 991 | 13 | 820 |

X - Barrier Face Y - Monorail Centerline Z - Ground

**SECTION F-2**

**PHOTOGRAPHS**

## LIST OF PHOTOGRAPHS CRS #3


| Figure | | Page |
|---|---|---|
| F2-1 | Close-up View Position 3 CRS Label | F2-1 |
| F2-2 | Pre-Test Frontal View of Position 3 CRS | F2-2 |
| F2-3 | Post-Test Frontal View of Position 3 CRS | F2-3 |
| F2-4 | Pre-Test Rear View of Position 3 CRS | F2-4 |
| F2-5 | Post-Test Rear View of Position 3CRS | F2-5 |
| F2-6 | Pre-Test Left Side View of Position 3 CRS | F2-6 |
| F2-7 | Post-Test Left Side View of Position 3 CRS | F2-7 |
| F2-8 | Pre-Test Right Side View of Position 3 CRS | F2-8 |
| F2-9 | Post-Test Right Side View of Position 3 CRS | F2-9 |
| F2-10 | Pre-Test position 3 Front View | F2-10 |
| F2-11 | Post-Test Position 3 Front View | F2-11 |
| F2-12 | Pre-Test Position 3 Left Side View | F2-12 |
| F2-13 | Post-Test Position 3 Left Side View | F2-13 |
| F2-14 | Pre-Test Position 3 Right Side View | F2-14 |
| F2-15 | Post-Test Position 3 Right Side View | F2-15 |


## LIST OF PHOTOGRAPHS CRS #4


| Figure | | Page |
|---|---|---|
| F2-16 | Close-up View Position 4 CRS Label | F2-16 |
| F2-17 | Pre-Test Frontal View of Position 4 CRS | F2-17 |
| F2-18 | Post-Test Frontal View of Position 4 CRS | F2-18 |
| F2-19 | Pre-Test Rear View of Position 4 CRS | F2-19 |
| F2-20 | Post-Test Rear View of Position 4 CRS | F2-20 |
| F2-21 | Pre-Test Left Side View of Position 4 CRS | F2-21 |
| F2-22 | Post-Test Left Side View of Position 4 CRS | F2-22 |
| F2-23 | Pre-Test Right Side View of Position 4 CRS | F2-23 |
| F2-24 | Post-Test Right Side View of Position 4 CRS | F2-24 |
| F2-25 | Pre-Test position 4 Front View | F2-25 |
| F2-26 | Post-Test Position 4 Front View | F2-26 |
| F2-27 | Pre-Test Position 4 Left Side View | F2-27 |
| F2-28 | Post-Test Position 4 Left Side View | F2-28 |
| F2-29 | Pre-Test Position 4 Right Side View | F2-29 |
| F2-30 | Post-Test Position 4 Right Side View | F2-30 |

## LIST OF PHOTOGRAPHS CRS


| Figure | | Page |
|---|---|---|
| F2-31 | Post-Test Position 4 Child Seat, Damage to Right Side Shoulder Strap Guide | F2-31 |
| F2-32 | Post-Test Position 4 Child Seat, Damage to Right Side Shoulder Strap Guide | F2-32 |
| F2-33 | Post-Test Position 4 Child Seat, Damage to Left Side Shoulder Strap Guide | F2-33 |
| F2-34 | Post-Test Position 4 Child Seat, Damage to Left Side Shoulder Strap Guide | F2-34 |

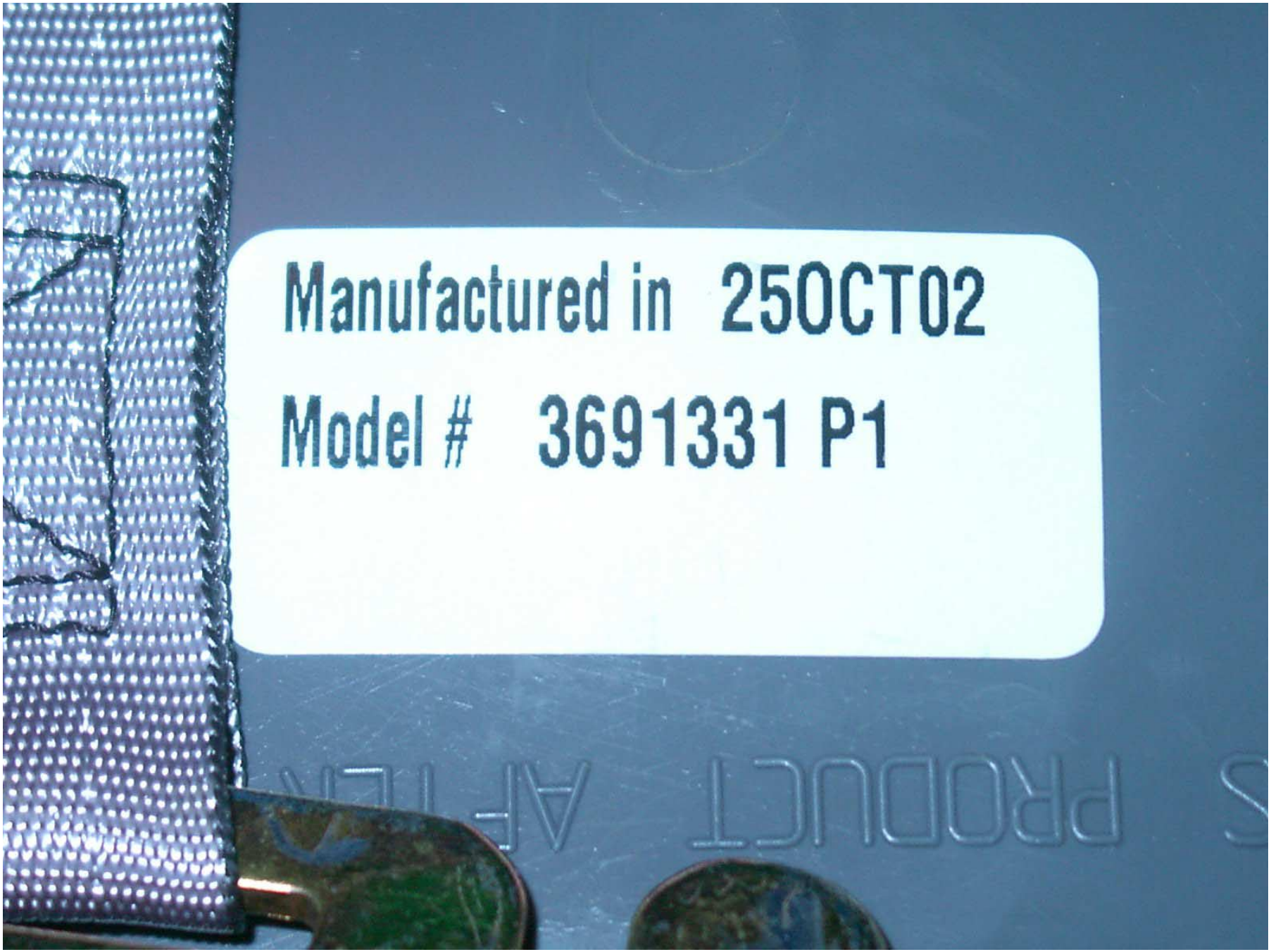



Figure F2-1: Close-up View Position 3 CRS Label

Figure F2-2: Pre-Test Frontal View of Position 3 CRS

Figure F2-3: Post-Test Frontal View of Position 3 CRS

Figure F2-4: Pre-Test Rear View of Position 3 CRS

Figure F2-5: Post-Test Rear View of Position 3 CRS

Figure F2-6: Pre-Test Left Side View of Position 3 CRS

Figure F2-7: Post-Test Left Side View of Position 3 CRS

Figure F2-8: Pre-Test Right Side View of Position 3 CRS

Figure F2-9: Post-Test Right Side View of Position 3 CRS

Figure F2-10: Pre-Test Position 3 Front View

Figure F2-11: Post-Test Position 3 Front View

Figure F2-12: Pre-Test Position 3 Left Side View

Figure F2-13: Post-Test Position 3 Left Side View

Figure F2-14: Pre-Test Position 3 Right Side View

Figure F2-16: Post-Test Position 3 Right Side View

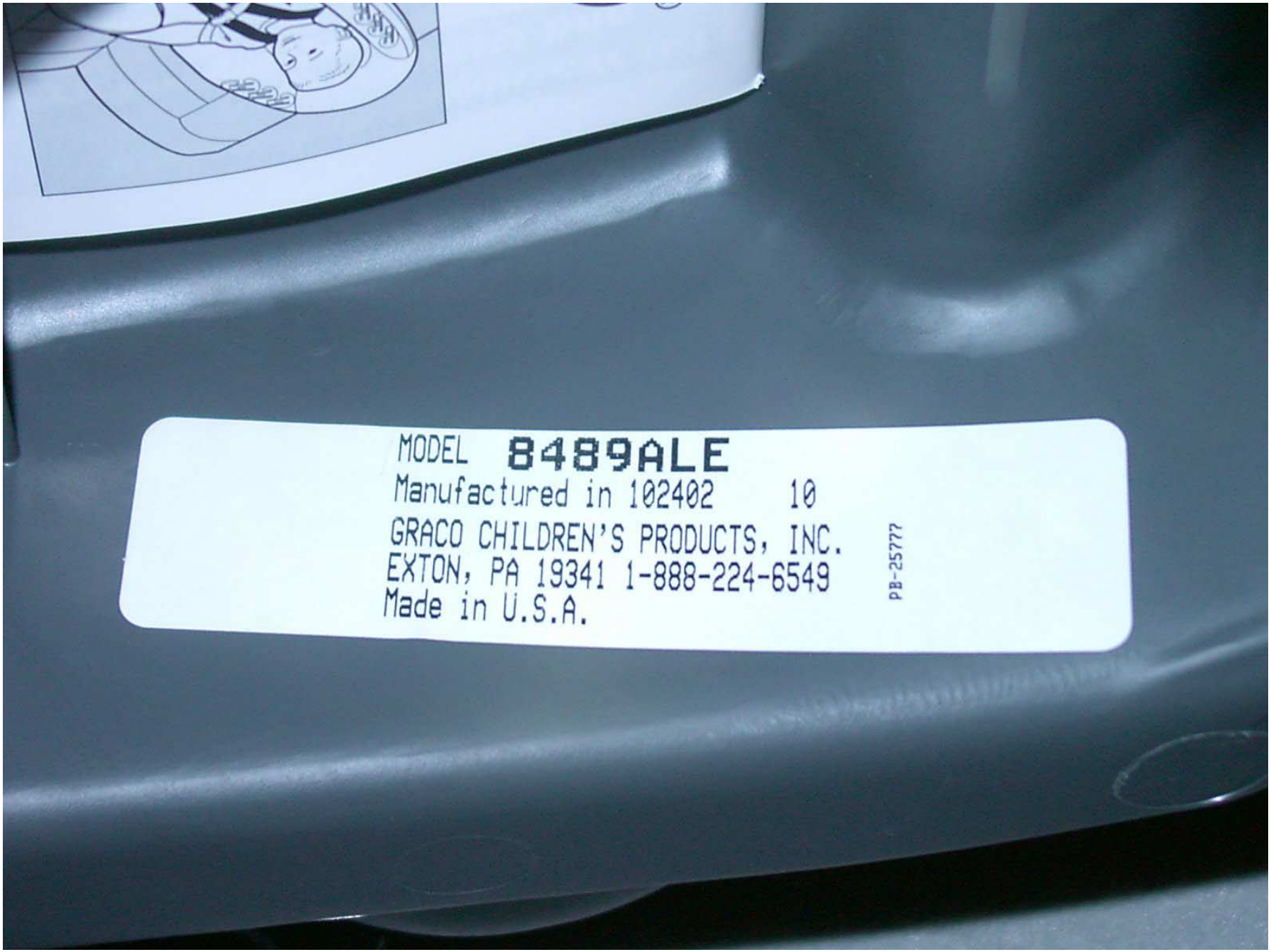



Figure F2-16: Close-up View Position 4 CRS Label

Figure F2-17: Pre-Test Frontal View of Position 4 CRS

Figure F2-18: Post-Test Frontal View of Position 4 CRS

Figure F2-19: Pre-Test Rear View of Position 4 CRS

Figure F2-20: Post-Test Rear View of Position 4 CRS

Figure F2-21: Pre-Test Left Side View of Position 4 CRS

Figure F2-22: Post-Test Left Side View of Position 4 CRS

Figure F2-23: Pre-Test Right Side View of Position 4 CRS

Figure F2-24: Post-Test Right Side View of Position 4 CRS

Figure F2-25: Pre-Test Position 4 Front View

Figure F2-26: Post-Test Position 4 Front View

Figure F2-27: Pre-Test Position 4 Left Side View

Figure F2-28: Post-Test Position 4 Left Side View

Figure F2-29: Pre-Test Position 4 Right Side View

Figure F2-30: Post-Test Position 4 Right Side View

Figure F2-31: Post-Test Position 4 Child Seat, Damage to Right Side Shoulder Strap Guild (Front View)

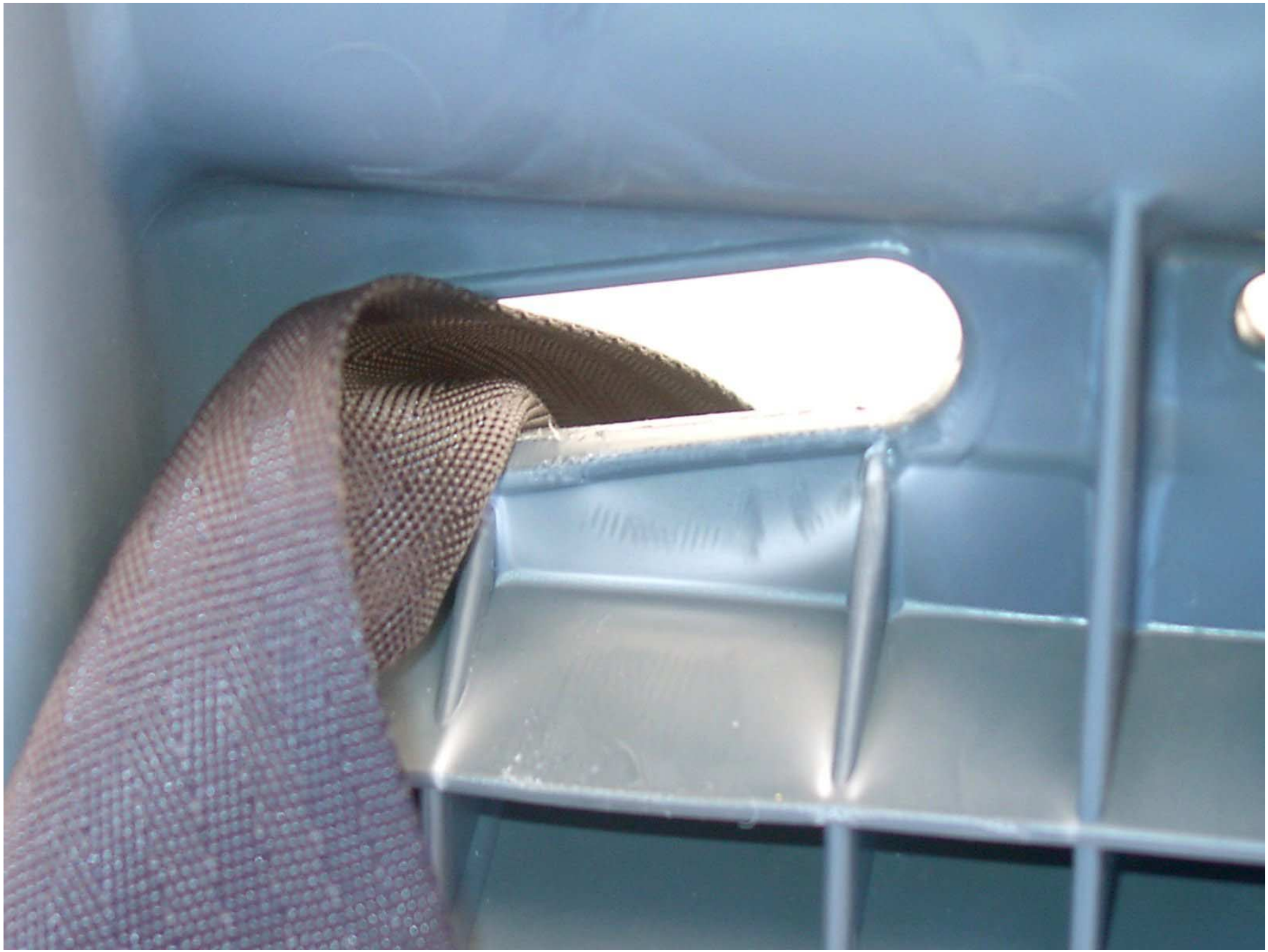


Figure F2-32: Post-Test Position 4 Child Seat, Damage to Right Side Shoulder Strap Guild (Rear View)

Figure F2-33: Post-Test Position 4 Child Seat, Damage to Left Side Shoulder Strap Guild (Front View)

Figure F2-34: Post-Test Position 4 Child Seat, Damage to Left Side Shoulder Strap Guild (Rear View)

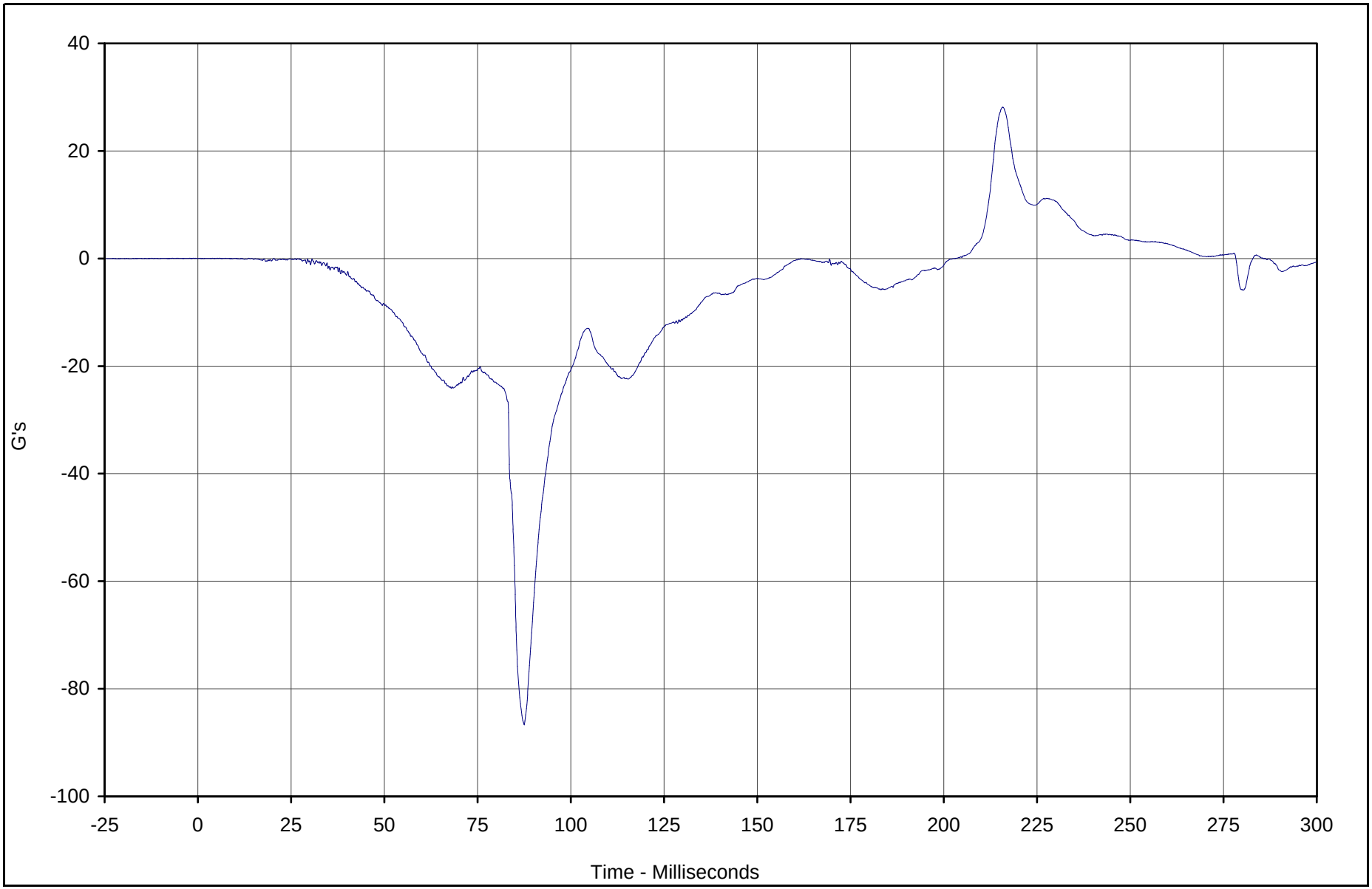
## SECTION F-3

## CHILD DUMMY RESPONSE AND CRS DATA TRACES

LIST OF DATA PLOTS CRS #4


| Data Plot | | Page |
|---|---|---|
| F3-1 | Left Rear Child Head X | F3-1 |
| F3-2 | Left Rear Child Head Y | F3-2 |
| F3-3 | Left Rear Child Head Z | F3-3 |
| F3-4 | Left Rear Child Head Resultant | F3-4 |
| F3-5 | Left Rear Child Upper Neck Force X | F3-5 |
| F3-6 | Left Rear Child Upper Neck Force Y | F3-6 |
| F3-7 | Left Rear Child Upper Neck Force Z | F3-7 |
| F3-8 | Left Rear Child Upper Neck Force Resultant | F3-8 |
| F3-9 | Left Rear Child Upper Neck Moment X | F3-9 |
| F3-10 | Left Rear Child Upper Neck Moment Y | F3-10 |
| F3-11 | Left Rear Child Upper Neck Moment Z | F3-11 |
| F3-12 | Left Rear Child Upper Neck Moment Resultant | F3-12 |
| F3-13 | Left Rear Child Lower Neck Force X | F3-13 |
| F3-14 | Left Rear Child Lower Neck Force Y | F3-14 |
| F3-15 | Left Rear Child Lower Neck Force Z | F3-15 |
| F3-16 | Left Rear Child Lower Neck Force Resultant | F3-16 |
| F3-17 | Left Rear Child Lower Neck Moment X | F3-17 |
| F3-18 | Left Rear Child Lower Neck Moment Y | F3-18 |
| F3-19 | Left Rear Child Lower Neck Moment Z | F3-19 |
| F3-20 | Left Rear Child Lower Neck Moment Resultant | F3-20 |
| F3-21 | Left Rear Child Chest X | F3-21 |
| F3-22 | Left Rear Child Chest Y | F3-22 |
| F3-23 | Left Rear Child Chest Z | F3-23 |
| F3-24 | Left Rear Child Chest Resultant | F3-24 |
| F3-25 | Left Rear Child Chest Deflection | F3-25 |
| F3-26 | Left Rear Child Pelvis X | F3-26 |
| F3-27 | Left Rear Child Pelvis Y | F3-27 |
| F3-28 | Left Rear Child Pelvis Z | F3-28 |
| F3-29 | Left Rear Child Pelvis Resultant | F3-29 |
| F3-30 | Left Rear Child Child Seat Tether Load | F3-30 |
| F3-31 | Left Rear Child Car Seat X | F3-31 |
| F3-32 | Left Rear Child Car Seat Y | F3-32 |
| F3-33 | Left Rear Child Car Seat Z | F3-33 |
| F3-34 | Left Rear Child Car Seat Resultant | F3-34 |

| Data Plot | | Page |
|---|---|---|
| F3-35 | Right Rear Child Head X | F3-35 |
| F3-36 | Right Rear Child Head Y | F3-36 |
| F3-37 | Right Rear Child Head Z | F3-37 |
| F3-38 | Right Rear Child Head Resultant | F3-38 |
| F3-39 | Right Rear Child Upper Neck Force X | F3-39 |
| F3-40 | Right Rear Child Upper Neck Force Y | F3-40 |
| F3-41 | Right Rear Child Upper Neck Force Z | F3-41 |
| F3-42 | Right Rear Child Upper Neck Force Resultant | F3-42 |
| F3-43 | Right Rear Child Upper Neck Moment X | F3-43 |
| F3-44 | Right Rear Child Upper Neck Moment Y | F3-44 |
| F3-45 | Right Rear Child Upper Neck Moment Z | F3-45 |
| F3-46 | Right Rear Child Upper Neck Moment Resultant | F3-46 |
| F3-47 | Right Rear Child Lower Neck Force X | F3-47 |
| F3-48 | Right Rear Child Lower Neck Force Y | F3-48 |
| F3-49 | Right Rear Child Lower Neck Force Z | F3-49 |
| F3-50 | Right Rear Child Lower Neck Force Resultant | F3-50 |
| F3-51 | Right Rear Child Lower Neck Moment X | F3-51 |
| F3-52 | Right Rear Child Lower Neck Moment Y | F3-52 |
| F3-53 | Right Rear Child Lower Neck Moment Z | F3-53 |
| F3-54 | Right Rear Child Lower Neck Moment Resultant | F3-54 |
| F3-55 | Right Rear Child Chest X | F3-55 |
| F3-56 | Right Rear Child Chest Y | F3-56 |
| F3-57 | Right Rear Child Chest Z | F3-57 |
| F3-58 | Right Rear Child Chest Resultant | F3-58 |
| F3-59 | Right Rear Child Chest Deflection | F3-59 |
| F3-60 | Right Rear Child Pelvis X | F3-60 |
| F3-61 | Right Rear Child Pelvis Y | F3-61 |
| F3-62 | Right Rear Child Pelvis Z | F3-62 |
| F3-63 | Right Rear Child Pelvis Resultant | F3-63 |
| F3-64 | Right Rear Child Seat Tether Load | F3-64 |
| F3-65 | Right Rear Child Car Seat X | F3-65 |
| F3-66 | Right Rear Child Car Seat Y | F3-66 |
| F3-67 | Right Rear Child Car Seat Z | F3-67 |
| F3-68 | Right Rear Child Car Seat Resultant | F3-68 |




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Head X | 134 | FIL | G's | 28.1 | 215.8 | -86.7 | 87.5 | 1000 |

KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

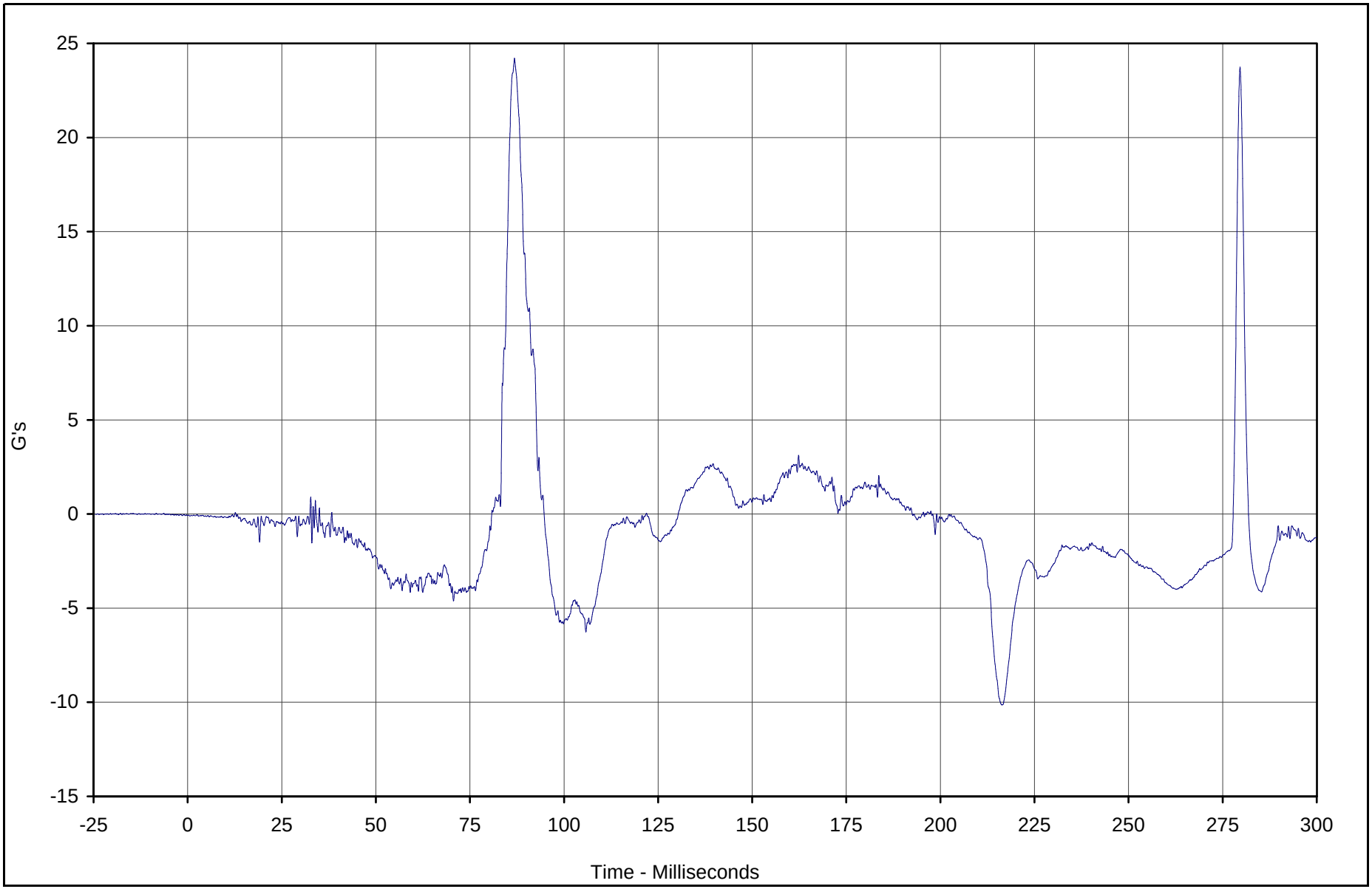
Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203

F3-1

TR-P23001-03-NC




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Head Y | 135 | FIL | G's | 24.2 | 86.8 | -10.1 | 216.3 | 1000 |

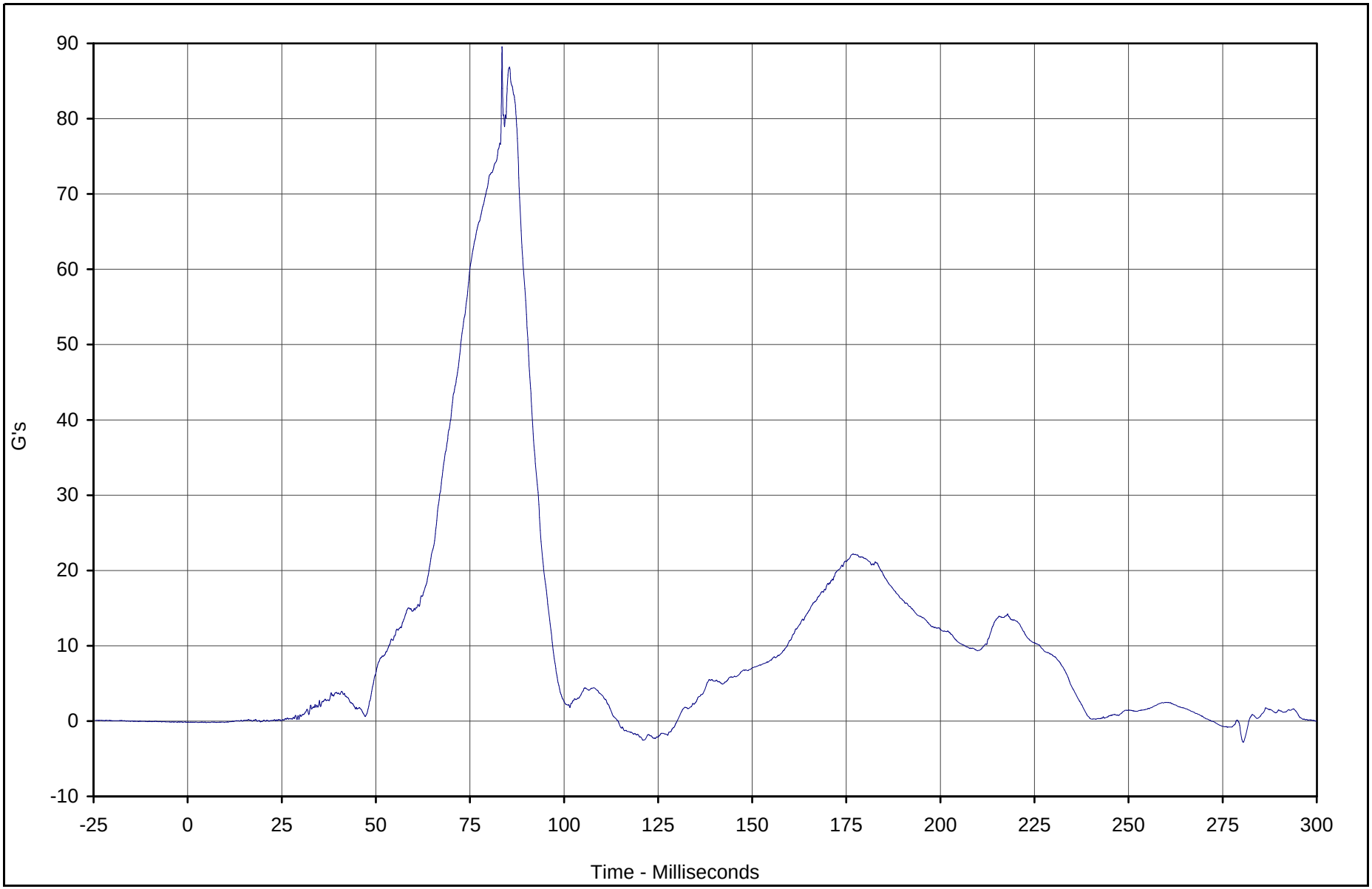
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Head Z | 136 | FIL | G's | 89.5 | 83.5 | -2.8 | 280.4 | 1000 |

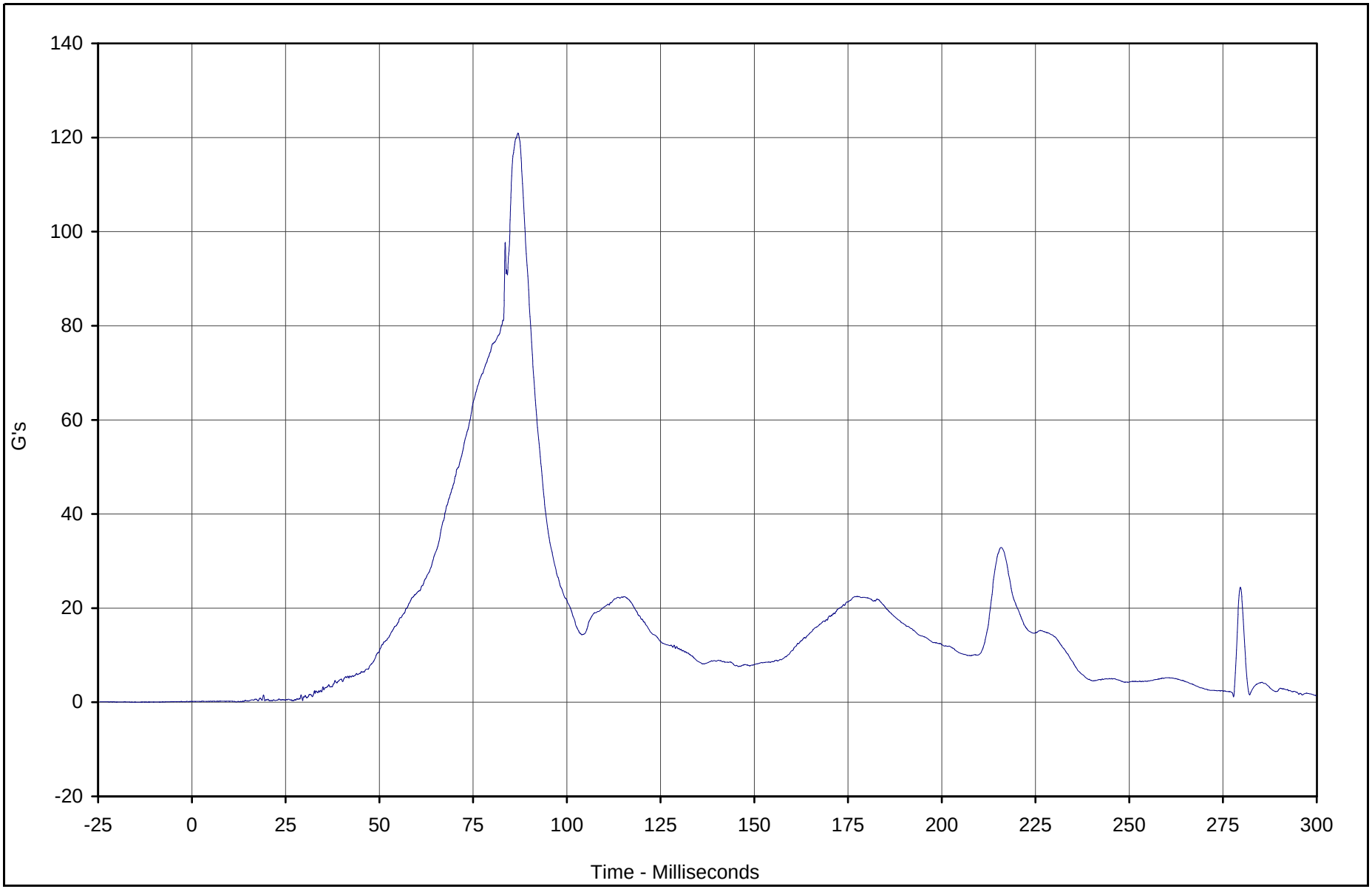
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



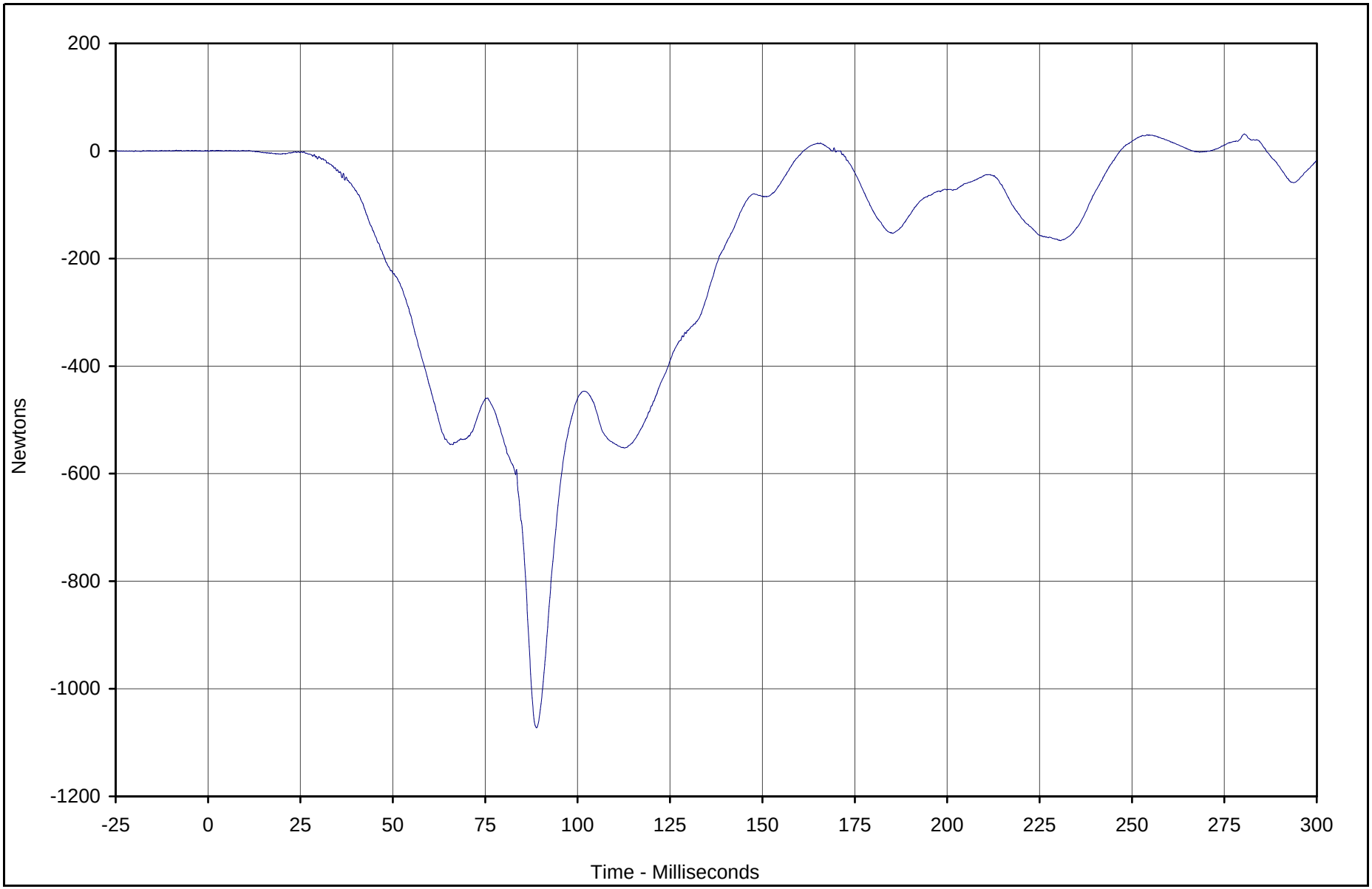

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Head Resultant | 134 | RES | G's | 121.0 | 87.0 | 0.1 | 11.9 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



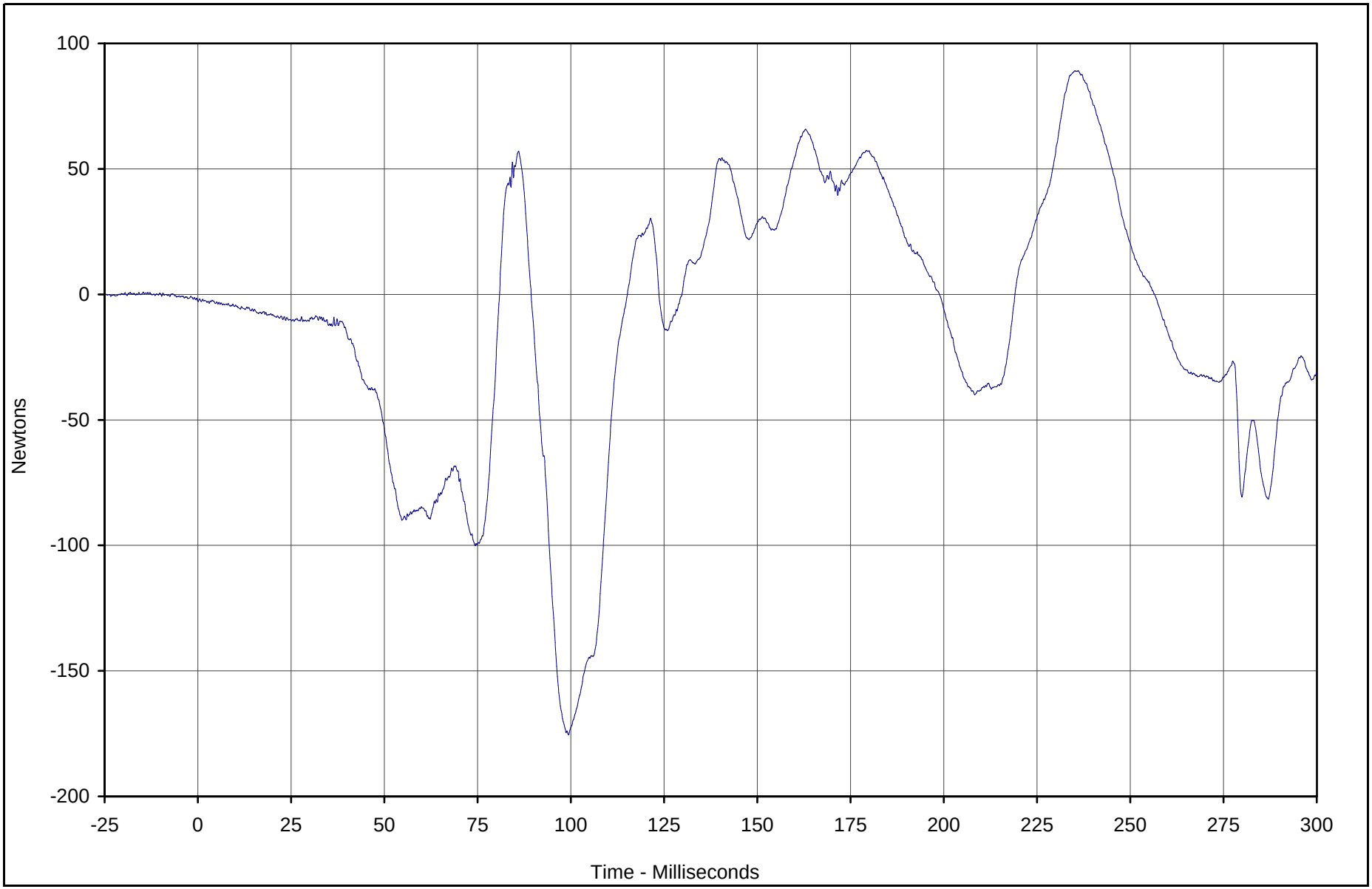

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Force X | 137 | FIL | Newtons | 31.7 | 280.4 | -1072.7 | 88.9 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



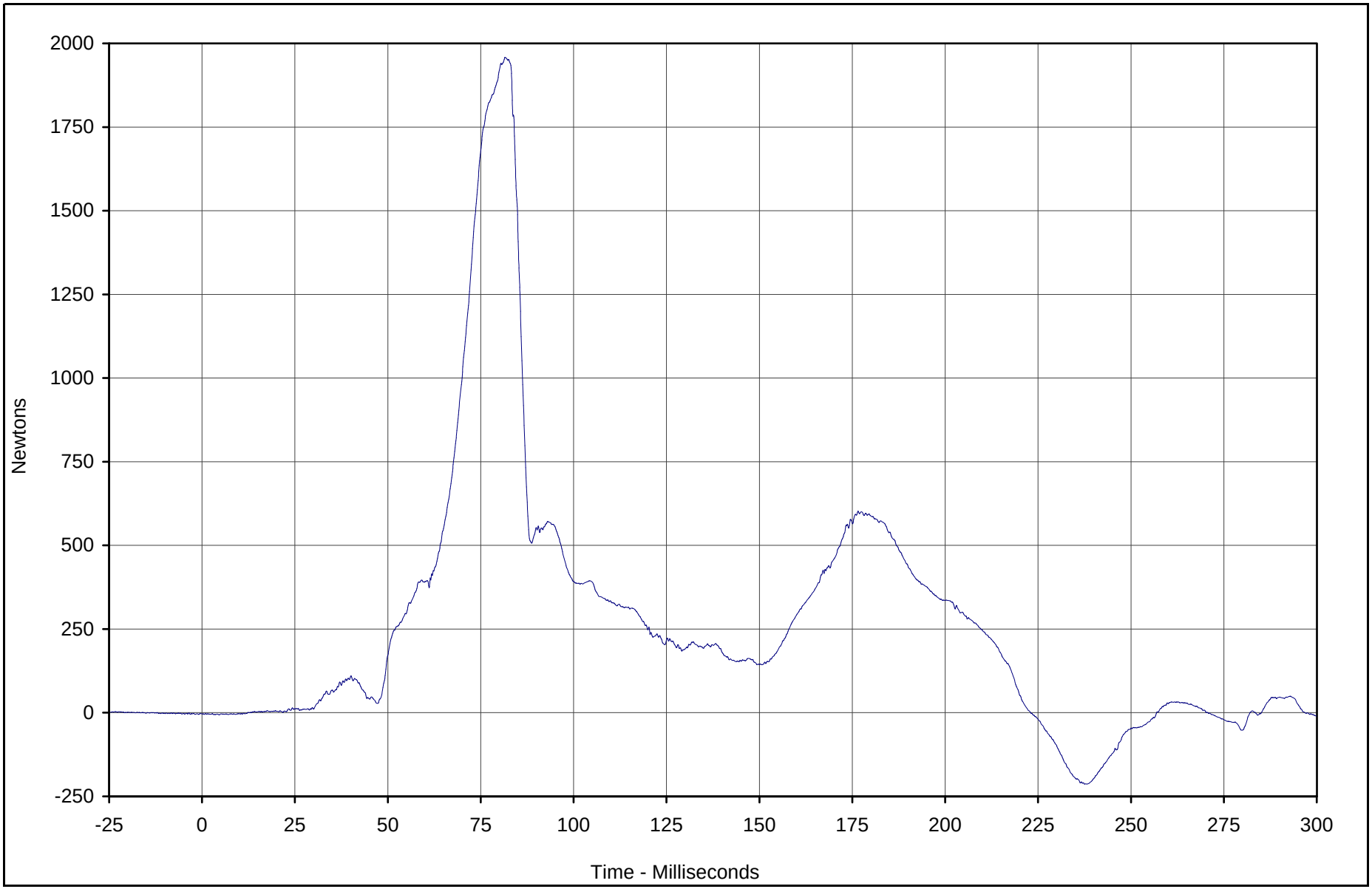

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Force Y | 138 | FIL | Newtons | 89.1 | 236.0 | -175.4 | 99.4 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Force Z | 139 | FIL | Newtons | 1958.2 | 81.5 | -213.6 | 237.6 | 1000 |

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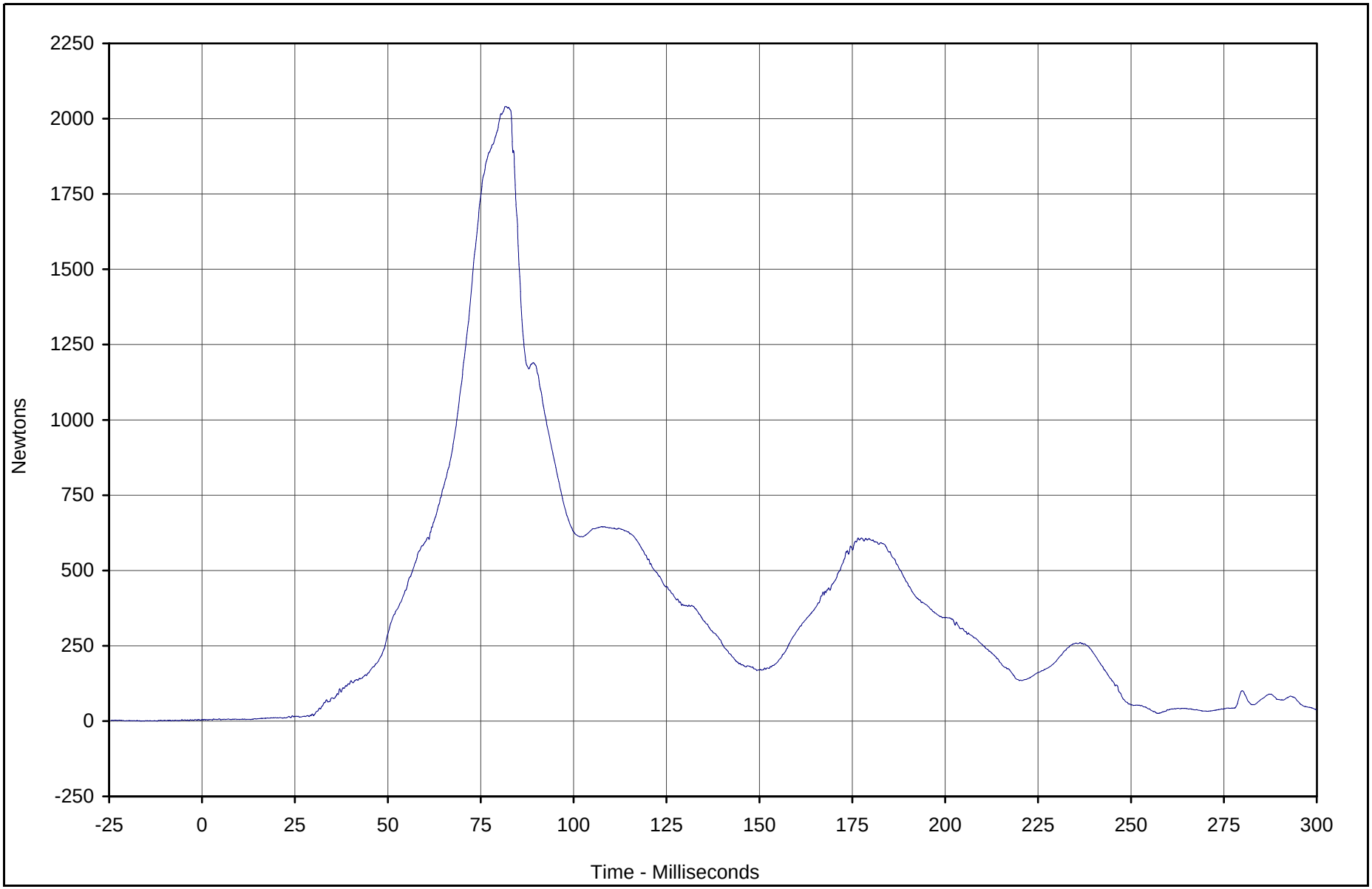
Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



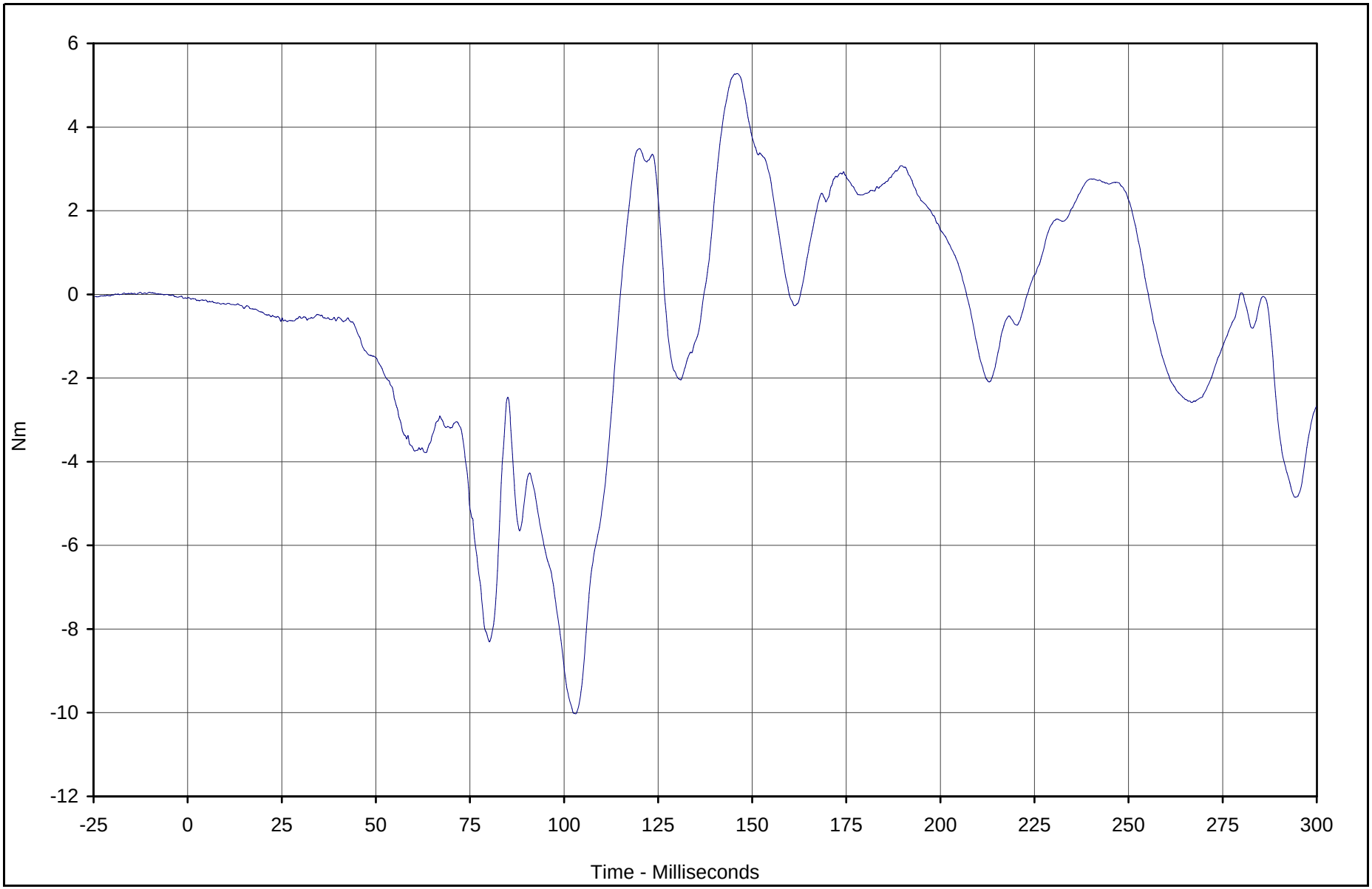

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Force Res. | 137 | RES | Newtons | 2039.7 | 81.9 | 3.9 | 0.9 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Moment X | 140 | FIL | Nm | 5.3 | 146.0 | -10.0 | 103.1 | 600 |

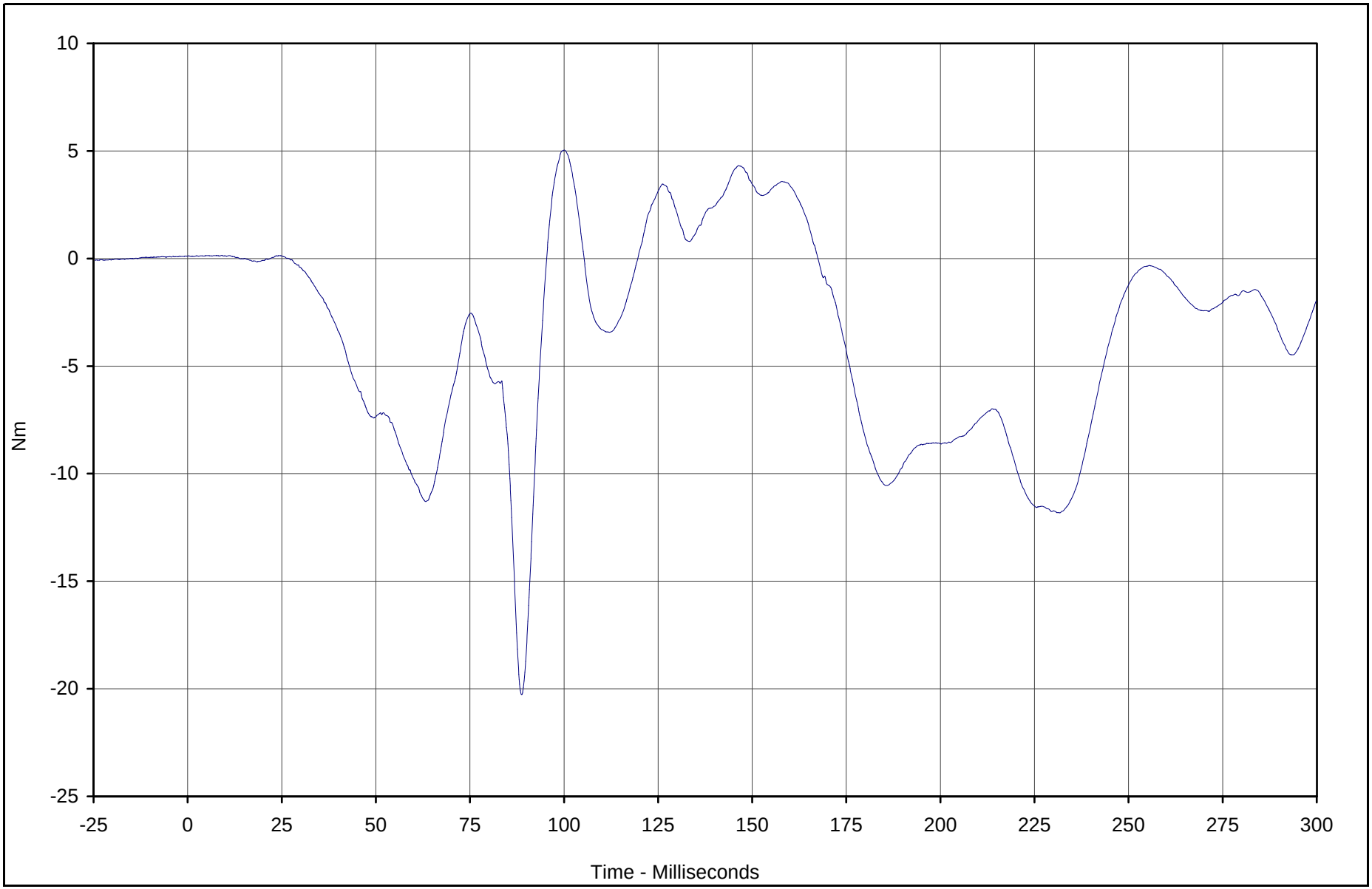
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



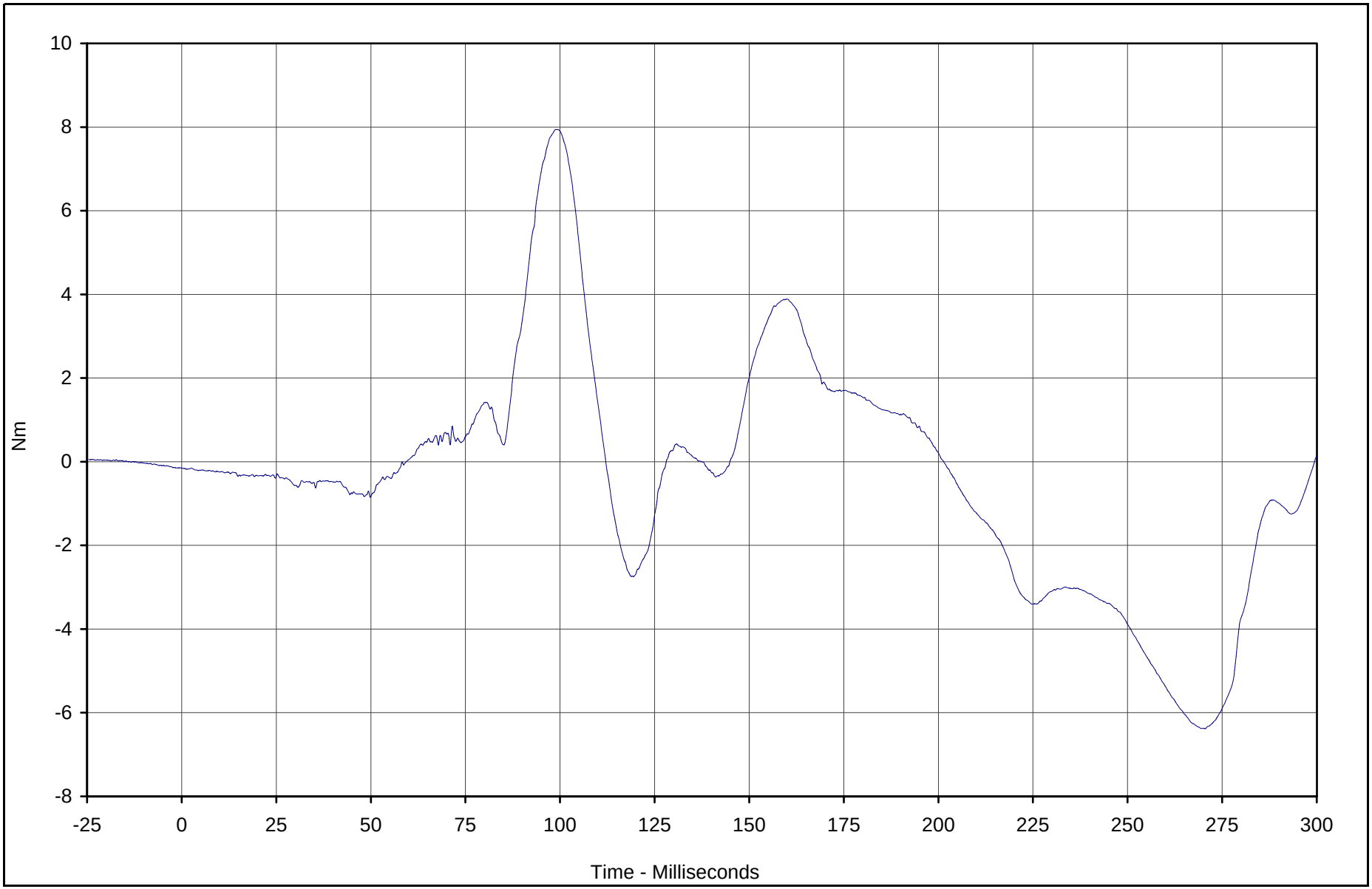

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Moment Y | 141 | FIL | Nm | 5.0 | 100.1 | -20.3 | 88.7 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Moment Z | 142 | FIL | Nm | 7.9 | 98.8 | -6.4 | 270.5 | 600 |

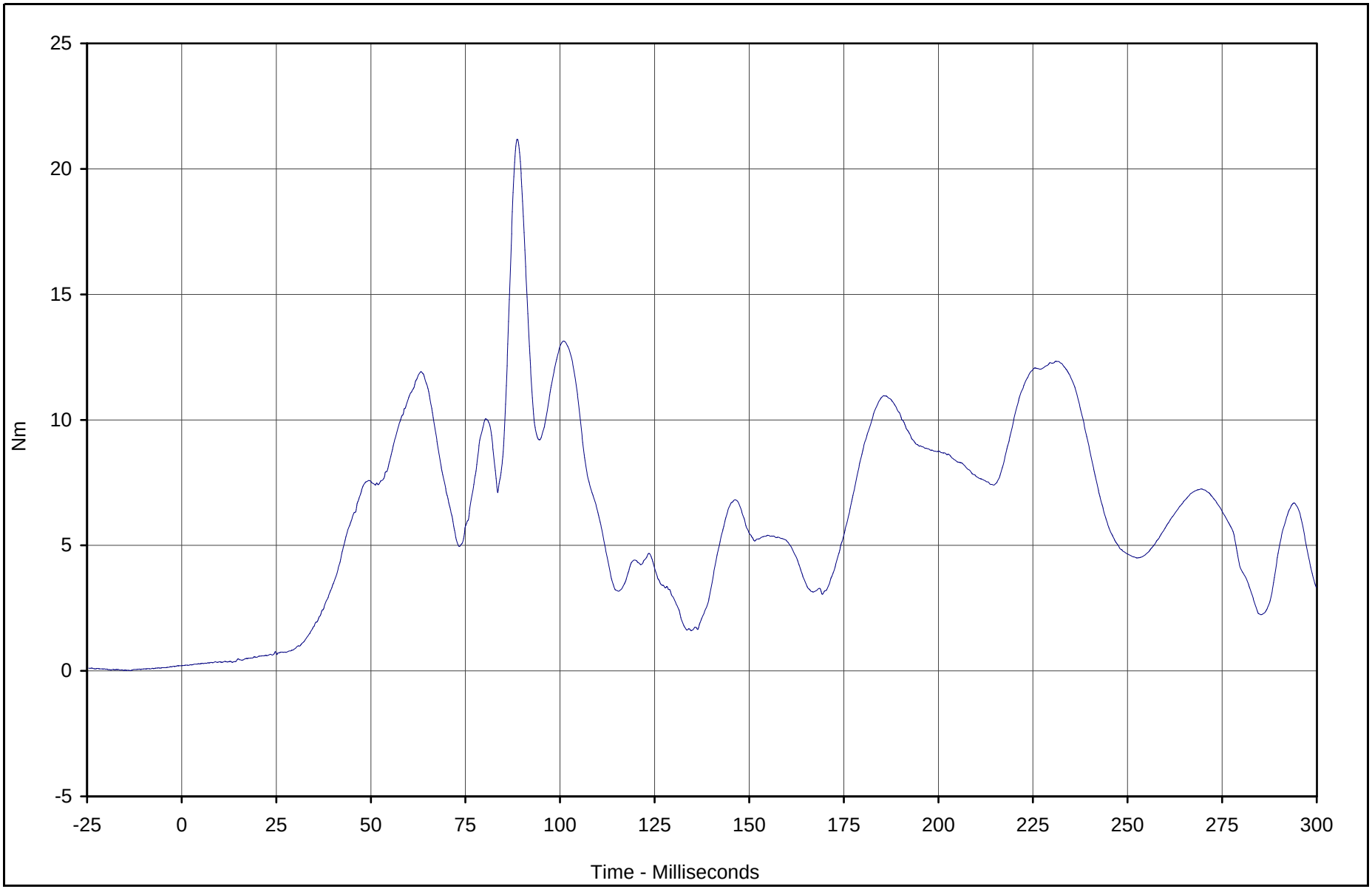
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Upper Neck Mom Res. | 140 | RES | Nm | 21.2 | 88.7 | 0.2 | 0.0 | 600 |

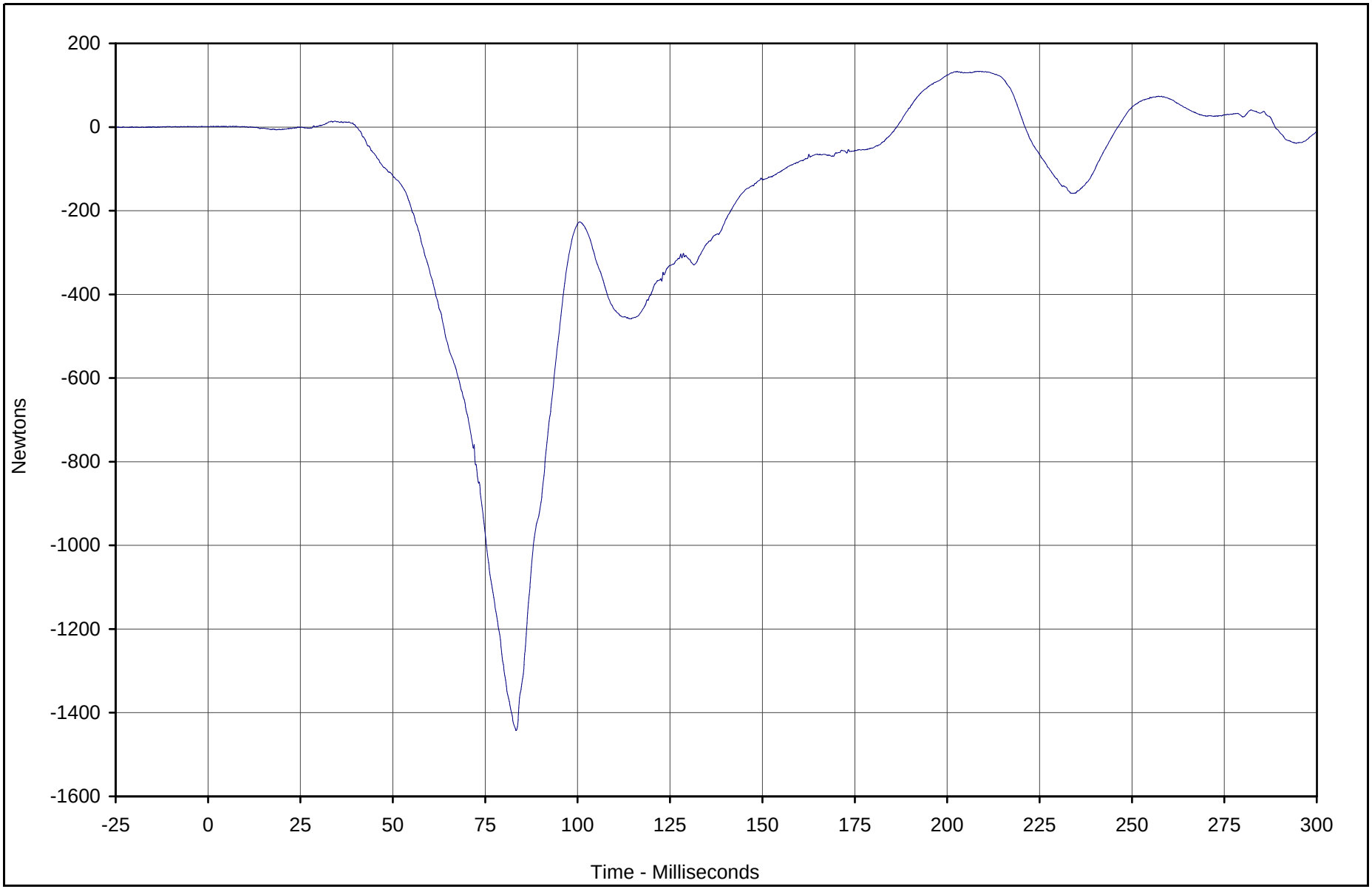
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



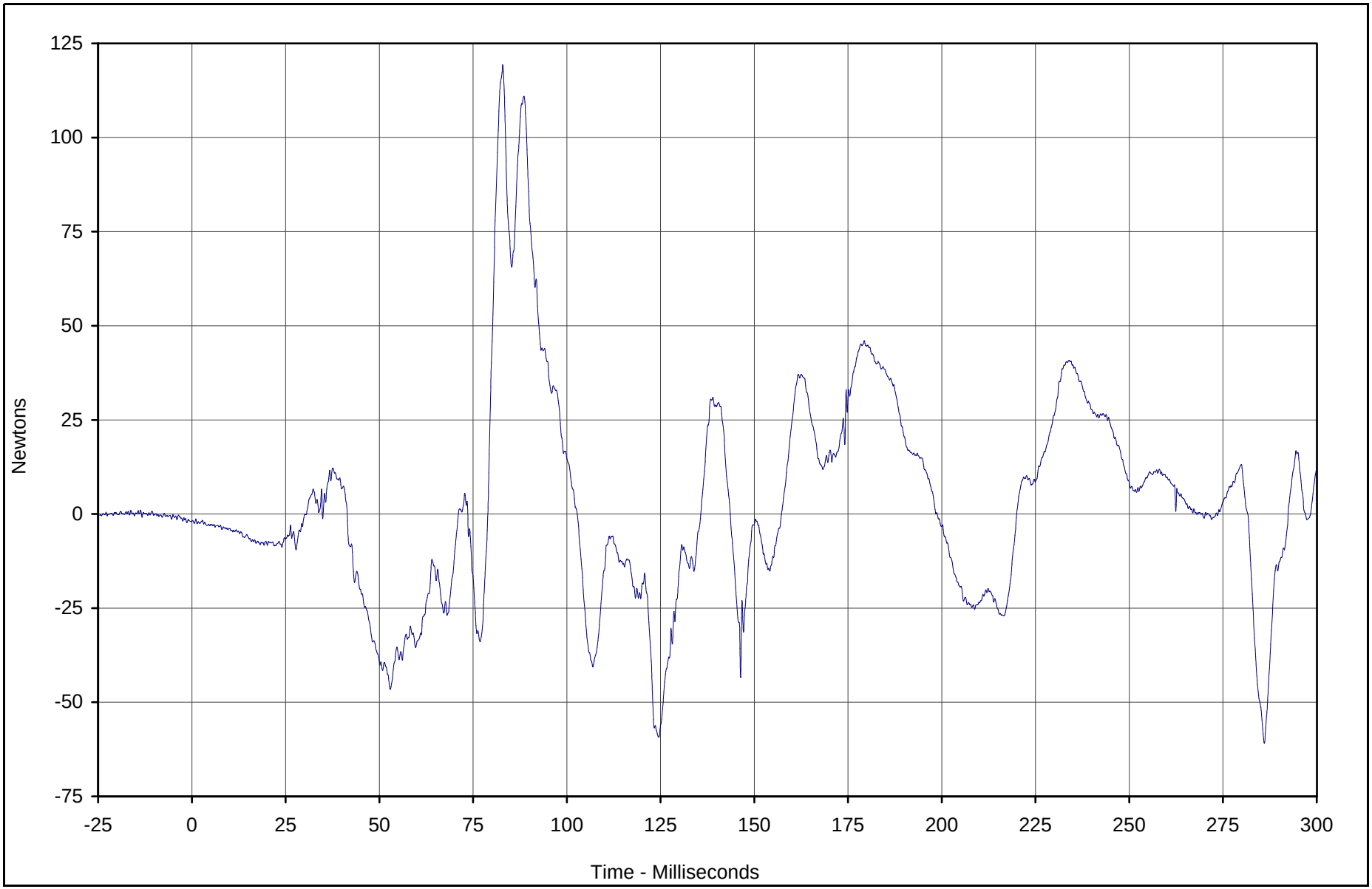

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Force X | 143 | FIL | Newtons | 133.3 | 209.0 | -1442.9 | 83.4 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Force Y | 144 | FIL | Newtons | 119.3 | 82.9 | -60.9 | 286.0 | 1000 |

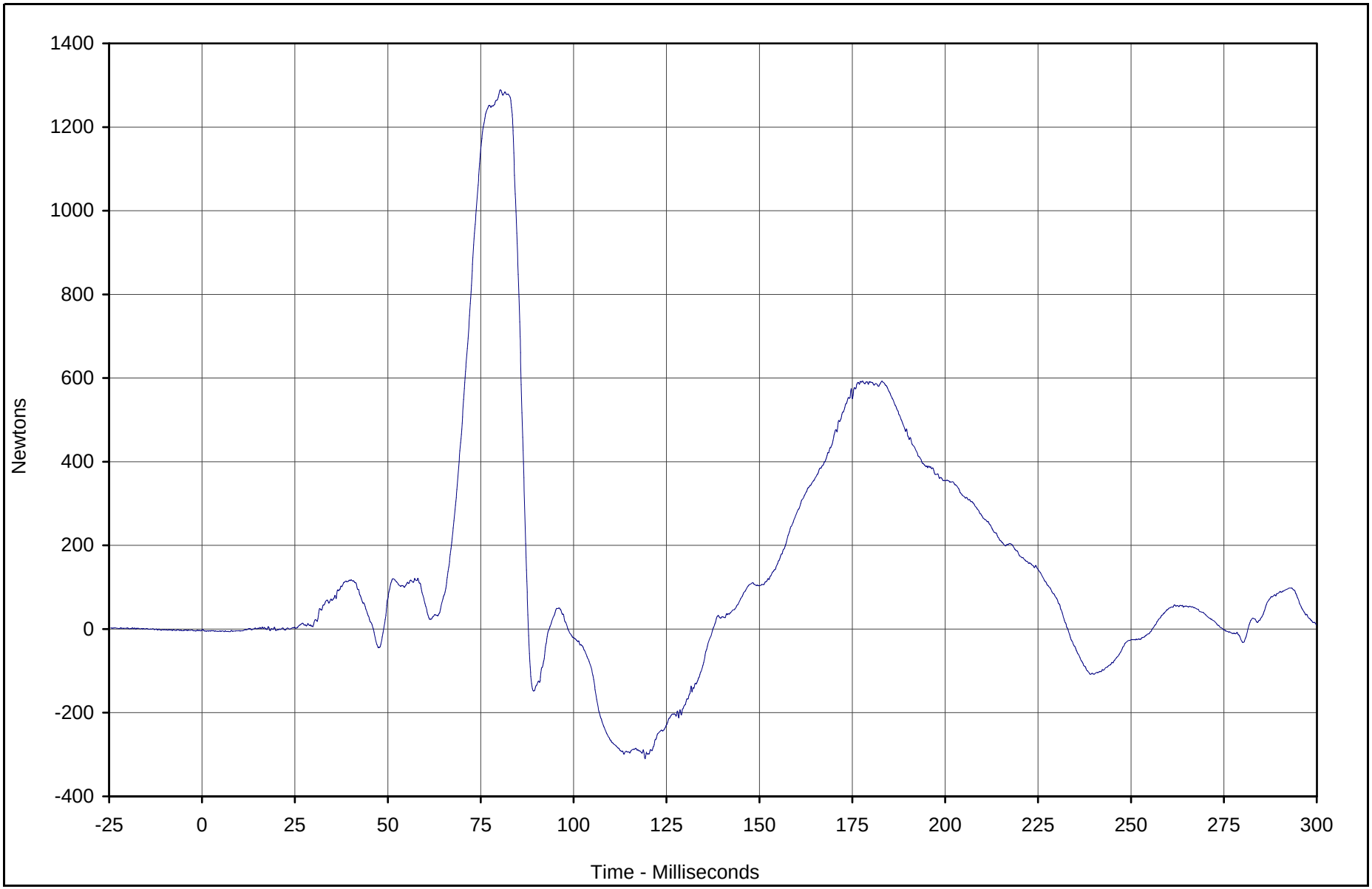
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Force Z | 145 | FIL | Newtons | 1289.0 | 80.3 | -310.2 | 119.2 | 1000 |

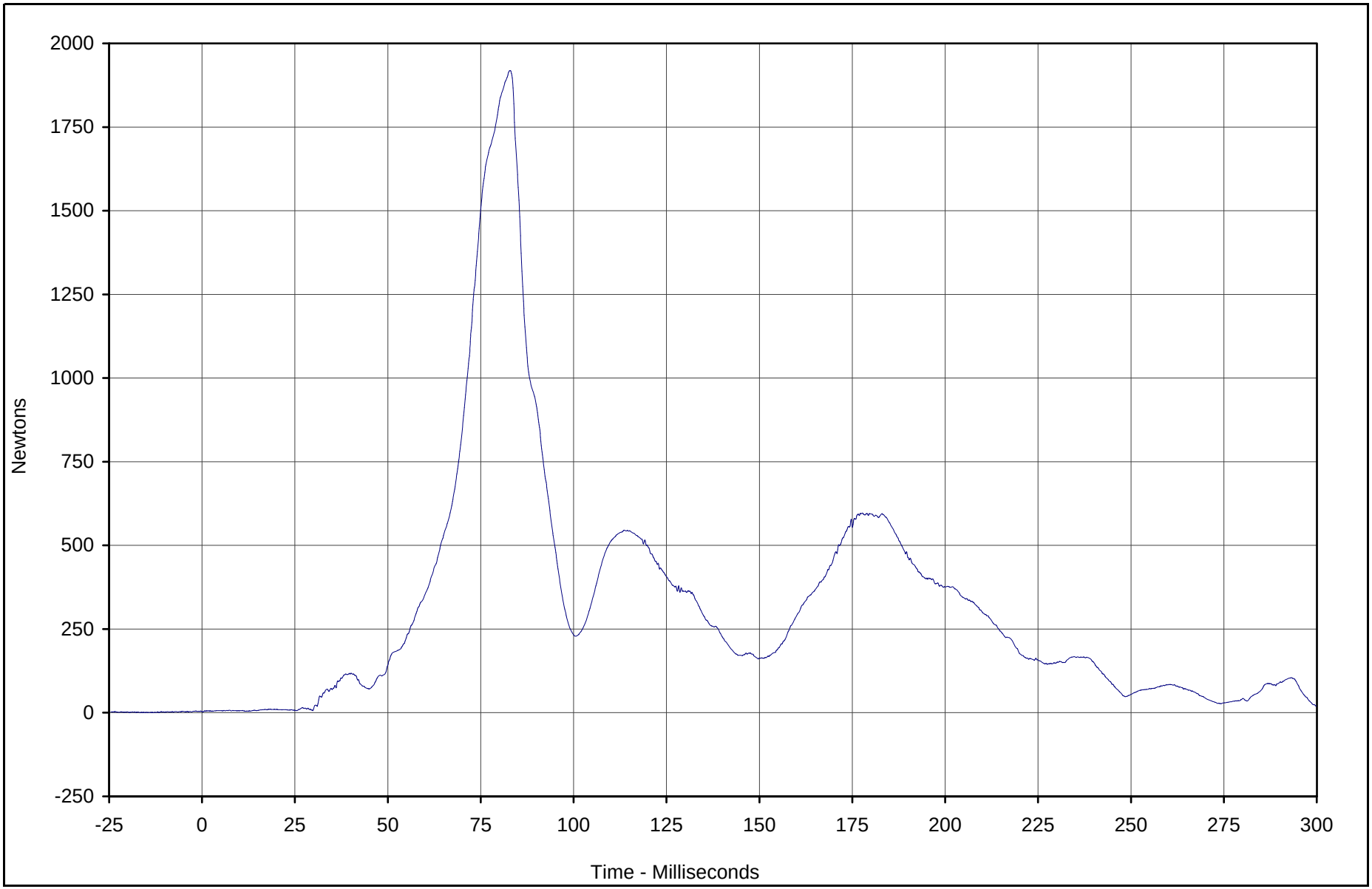
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Force Res. | 143 | RES | Newtons | 1919.0 | 82.9 | 2.1 | 0.2 | 1000 |

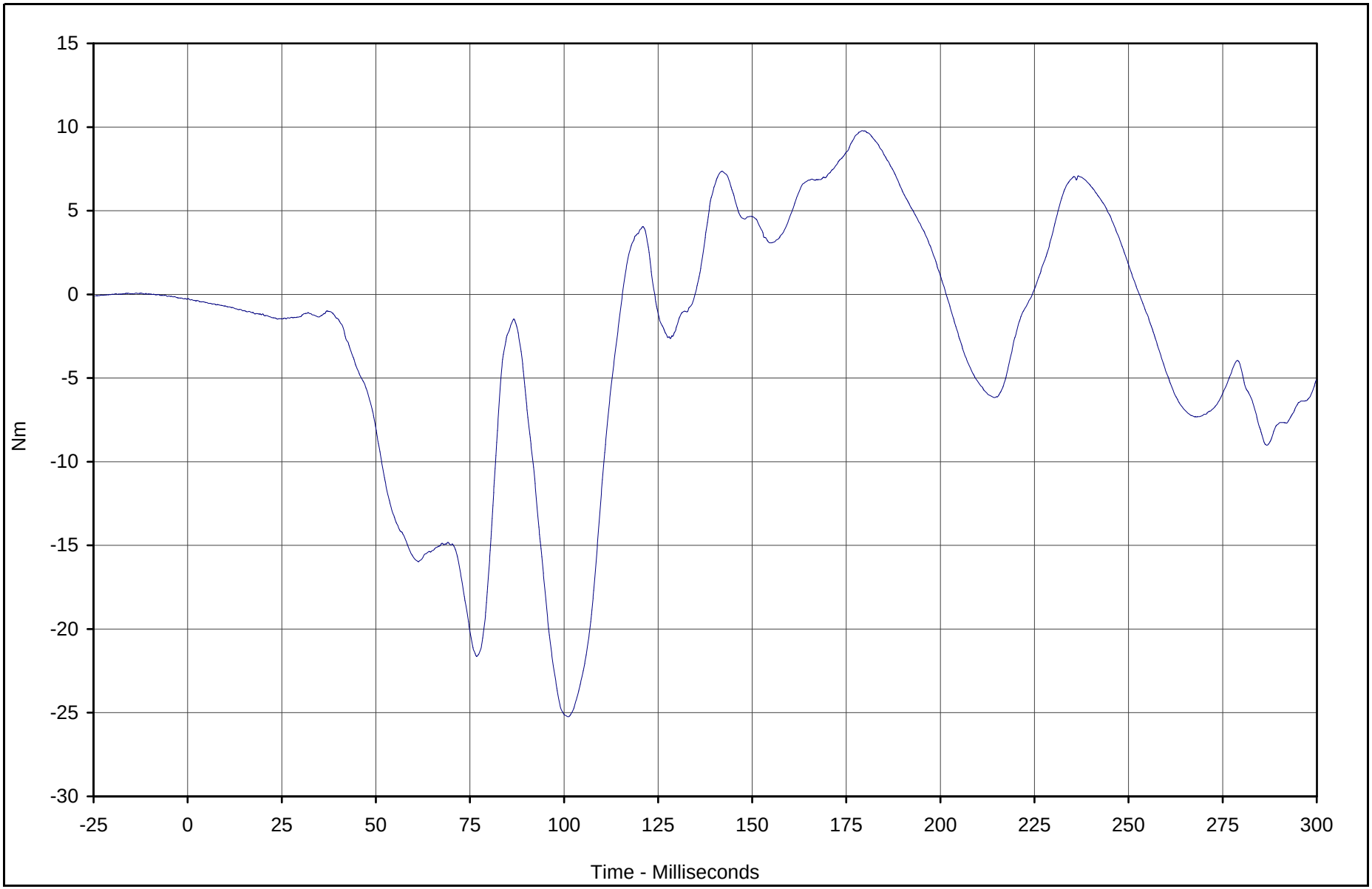
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Moment X | 146 | FIL | Nm | 9.8 | 179.2 | -25.2 | 101.1 | 600 |

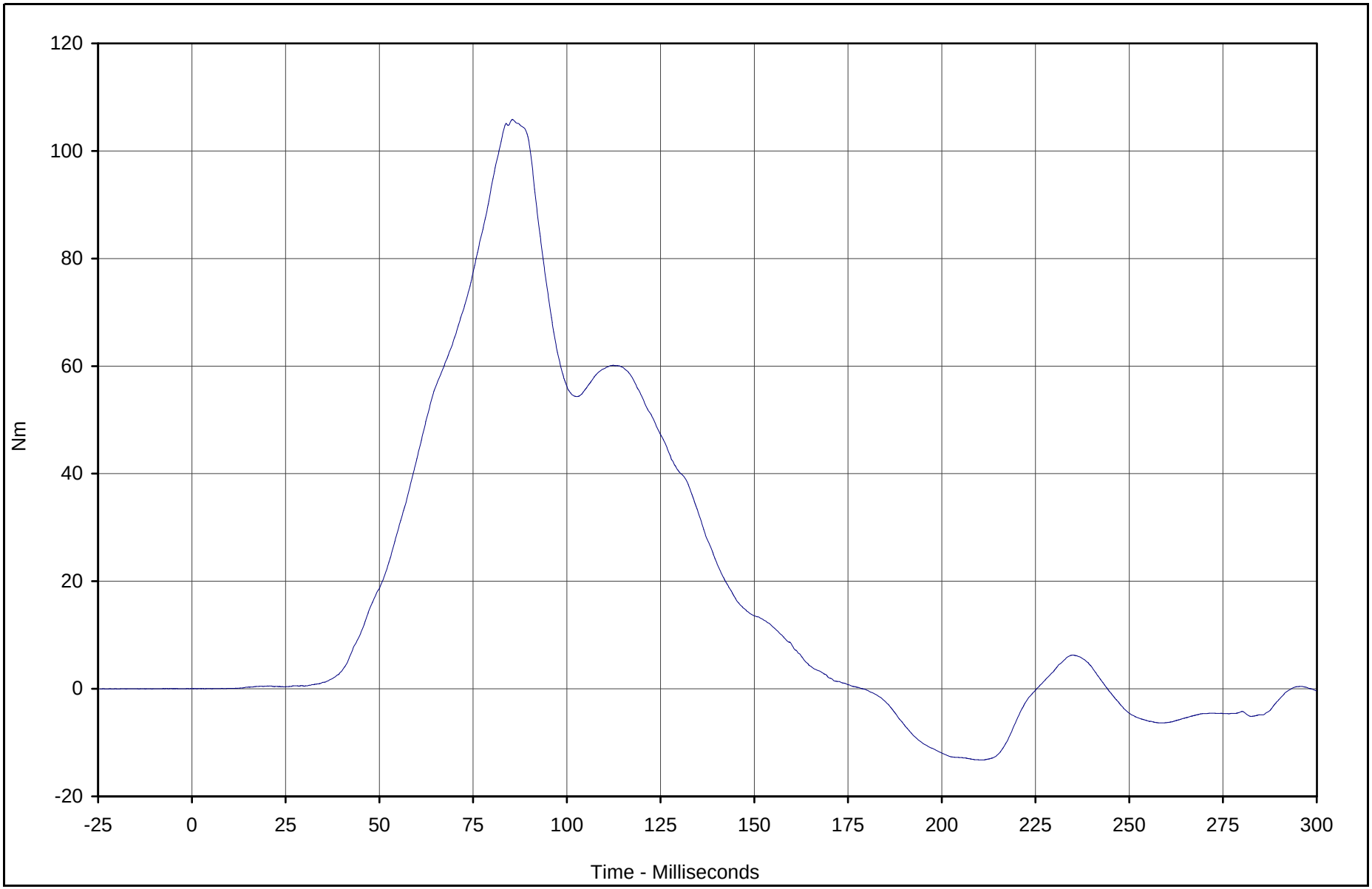
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Moment Y | 147 | FIL | Nm | 105.8 | 85.5 | -13.2 | 209.9 | 600 |

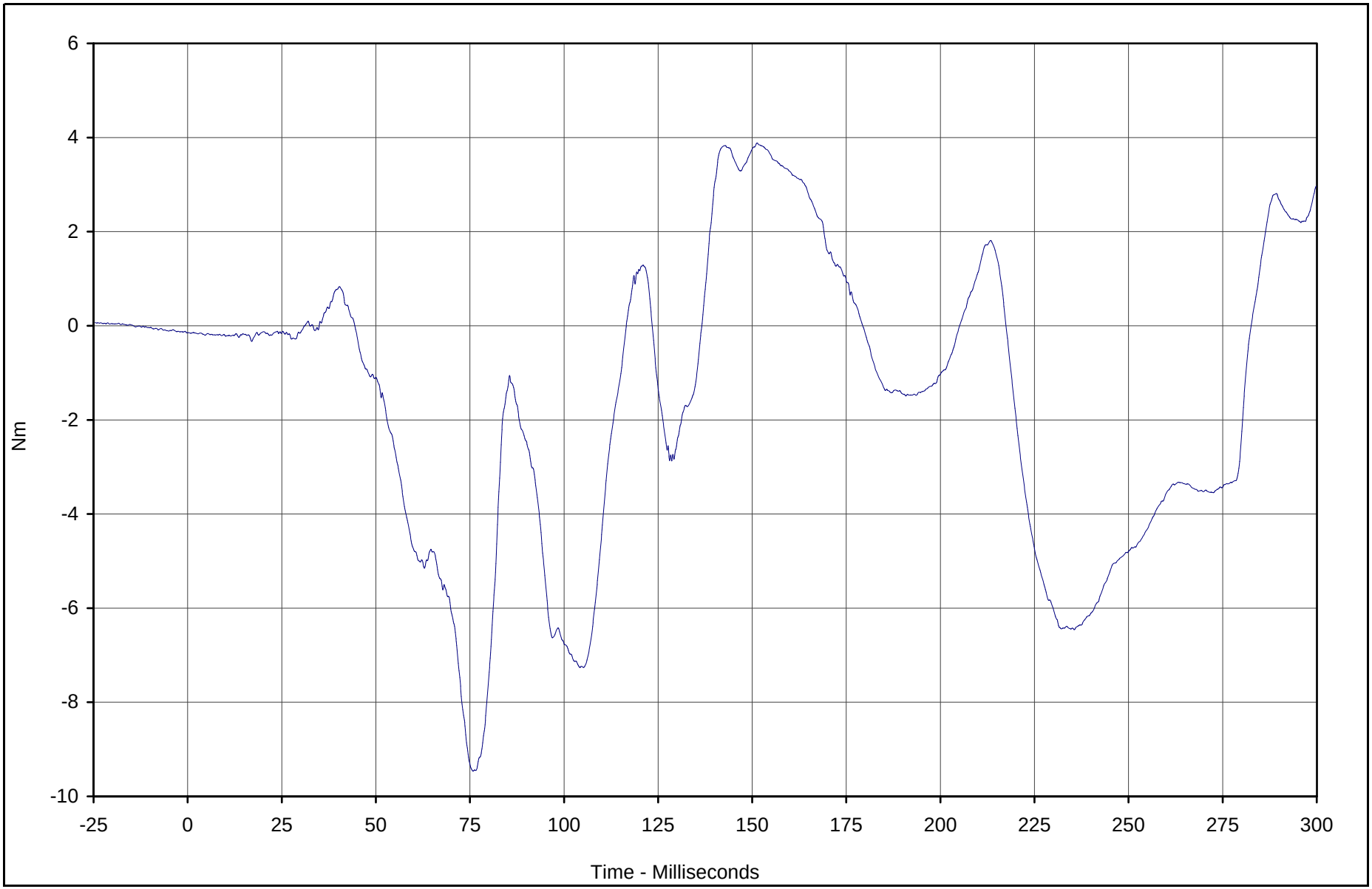
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



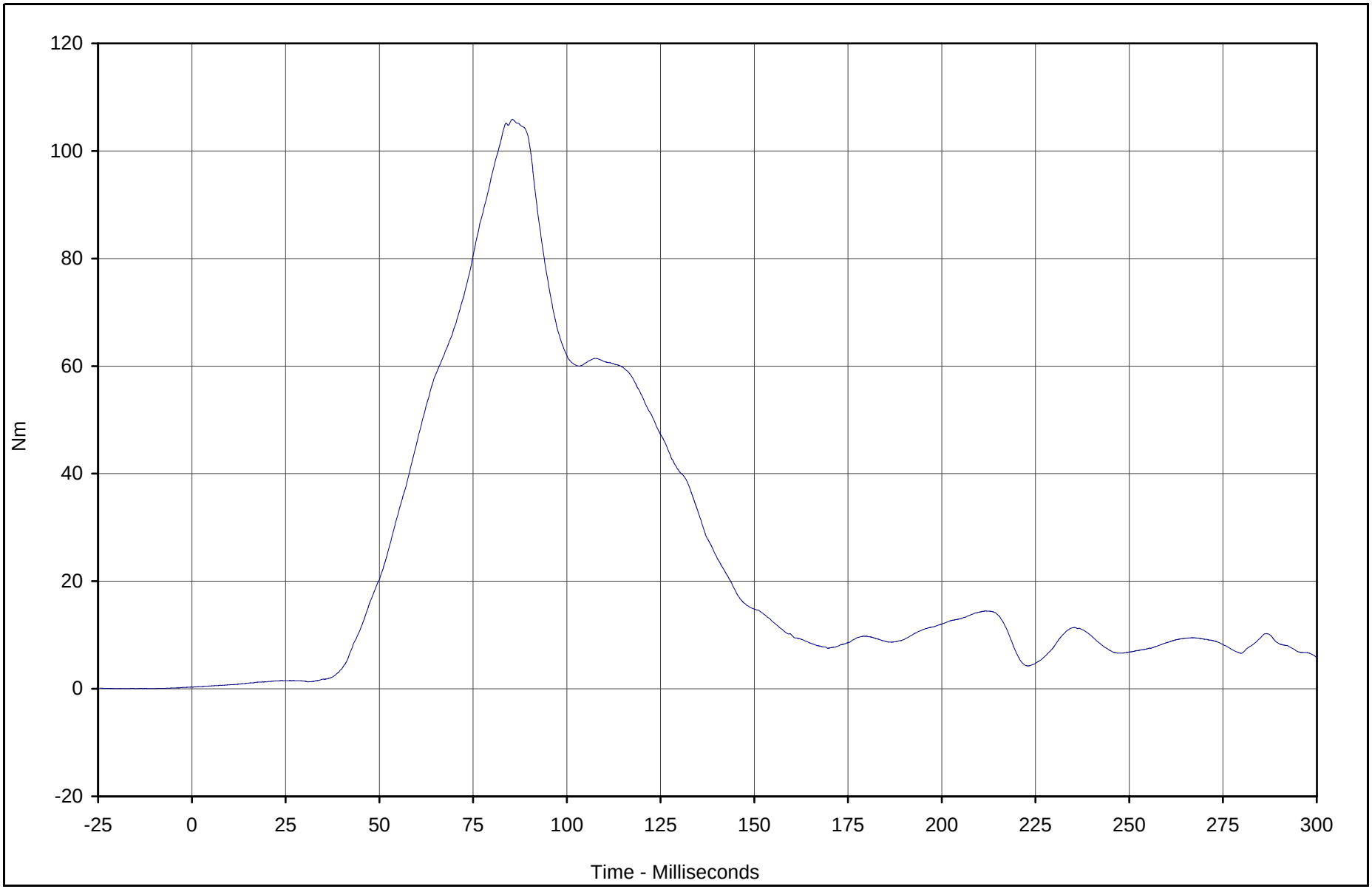

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Moment Z | 148 | FIL | Nm | 3.9 | 151.3 | -9.5 | 75.8 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Lower Neck Mom Res. | 146 | RES | Nm | 105.9 | 85.5 | 0.3 | 0.2 | 600 |

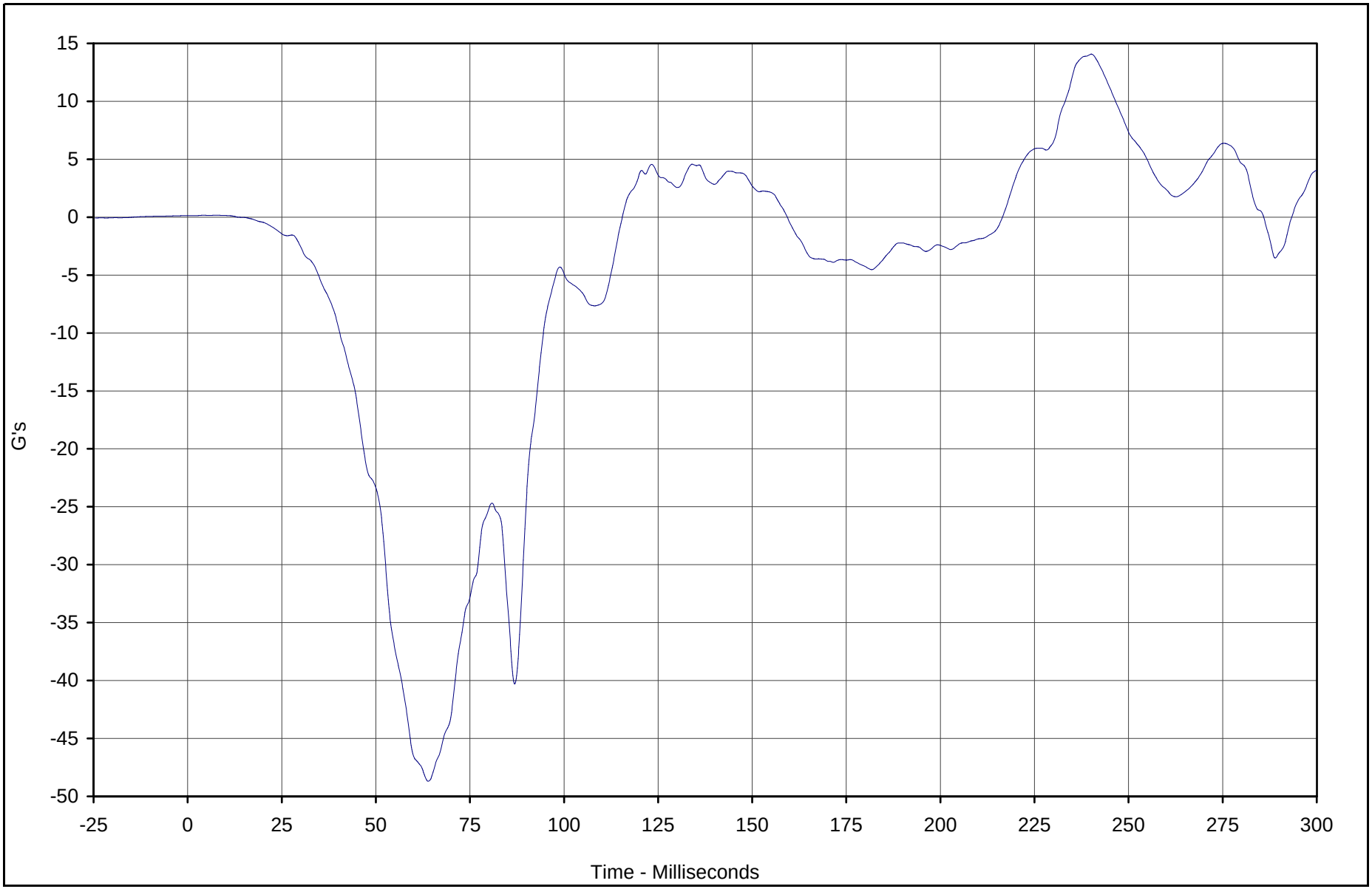
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Chest X | 149 | FIL | G's | 14.1 | 240.1 | -48.7 | 63.9 | 180 |

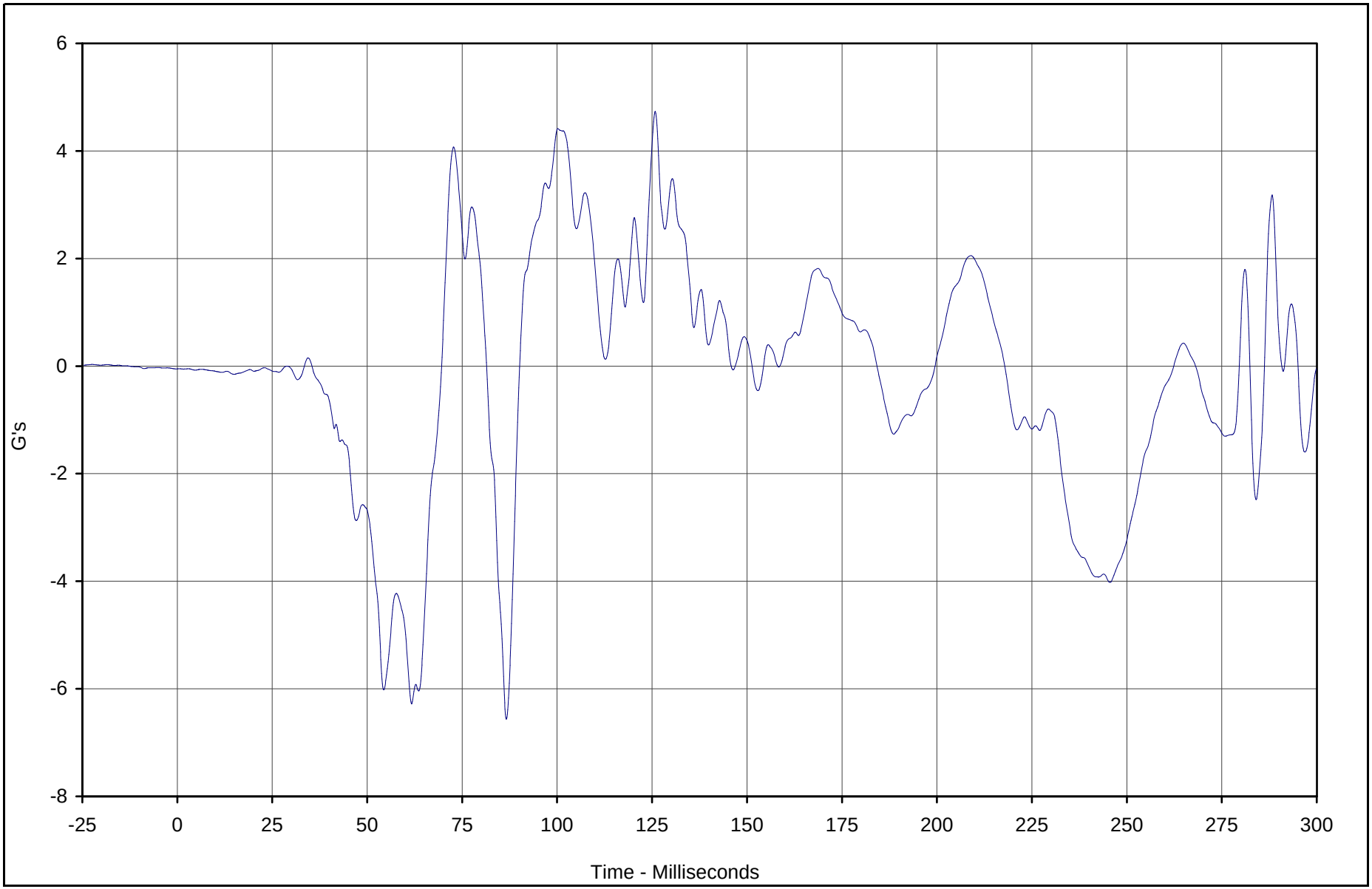
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



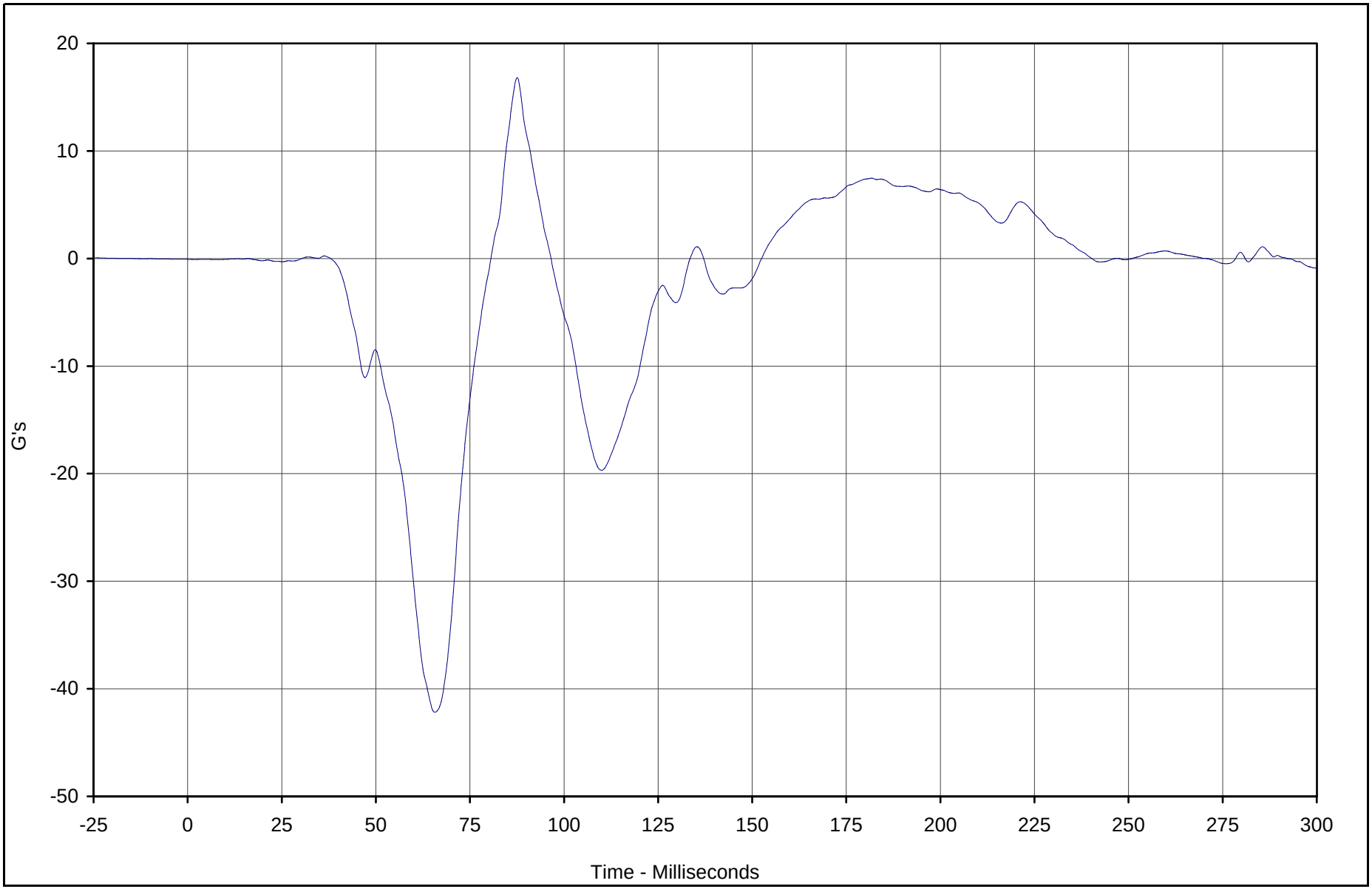

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Chest Y | 150 | FIL | G's | 4.7 | 125.8 | -6.6 | 86.6 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Chest Z | 151 | FIL | G's | 16.8 | 87.6 | -42.2 | 65.7 | 180 |

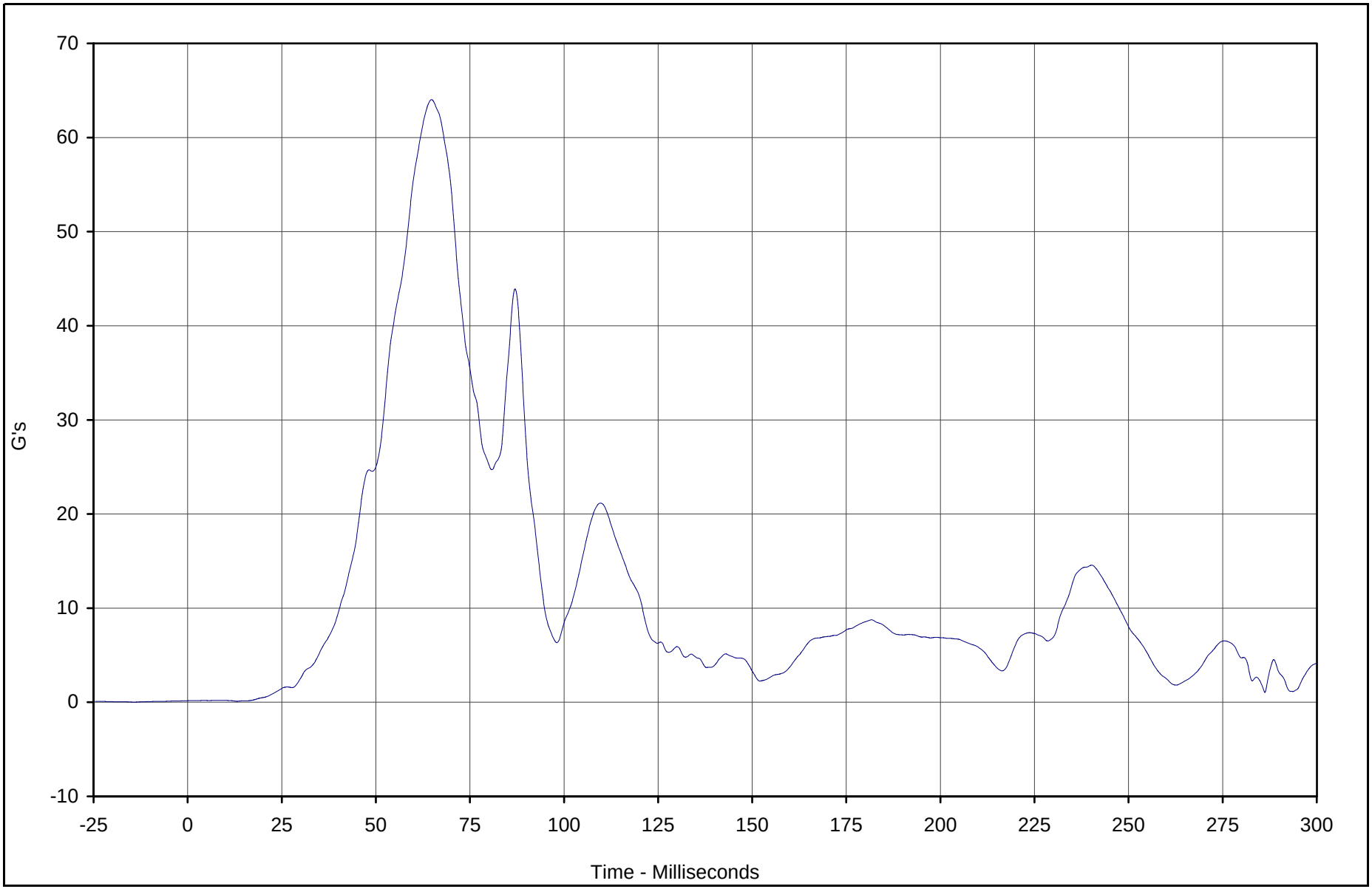
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



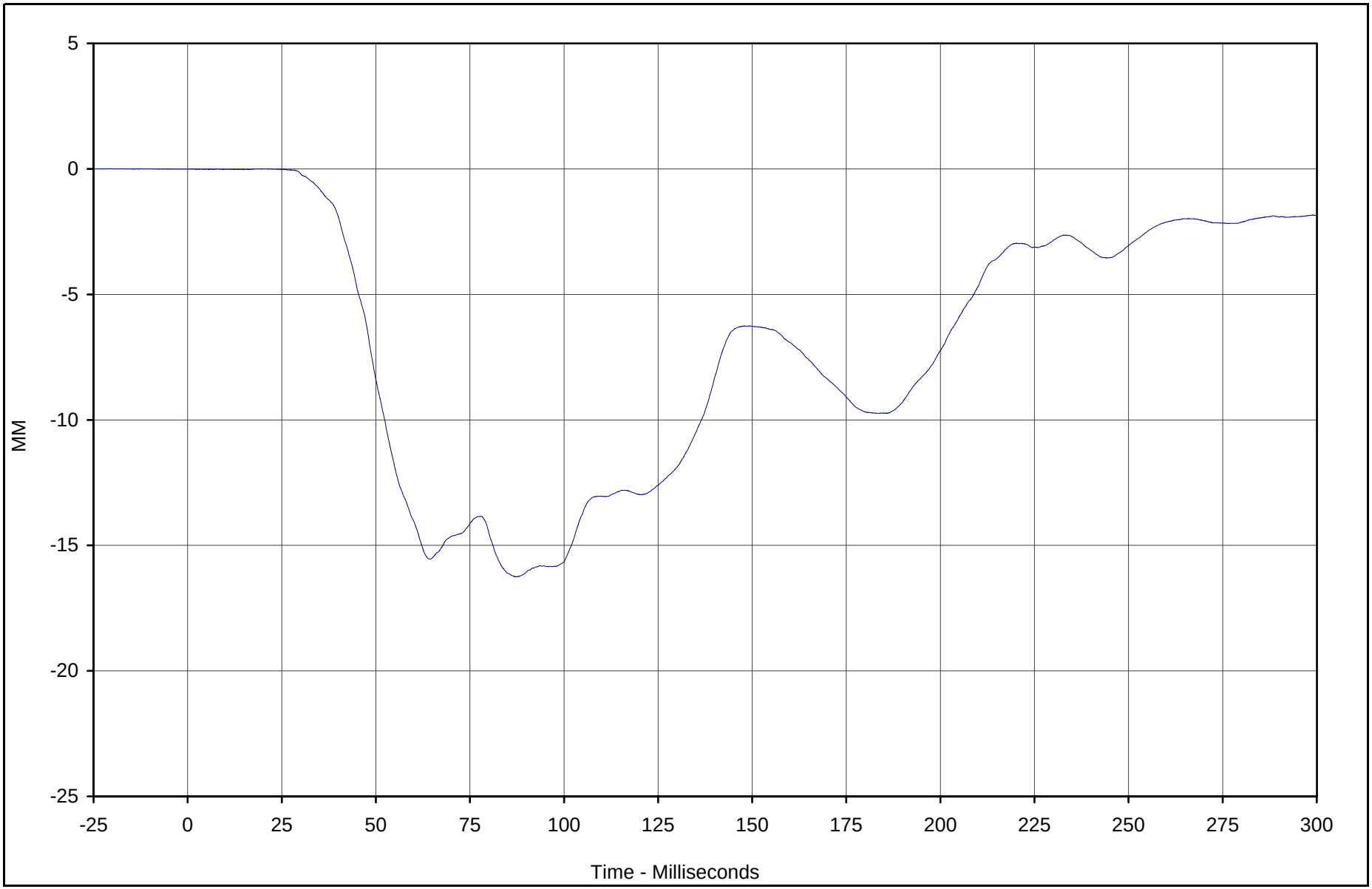

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Chest Resultant | 149 | RES | G's | 64.0 | 64.8 | 0.1 | 13.1 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



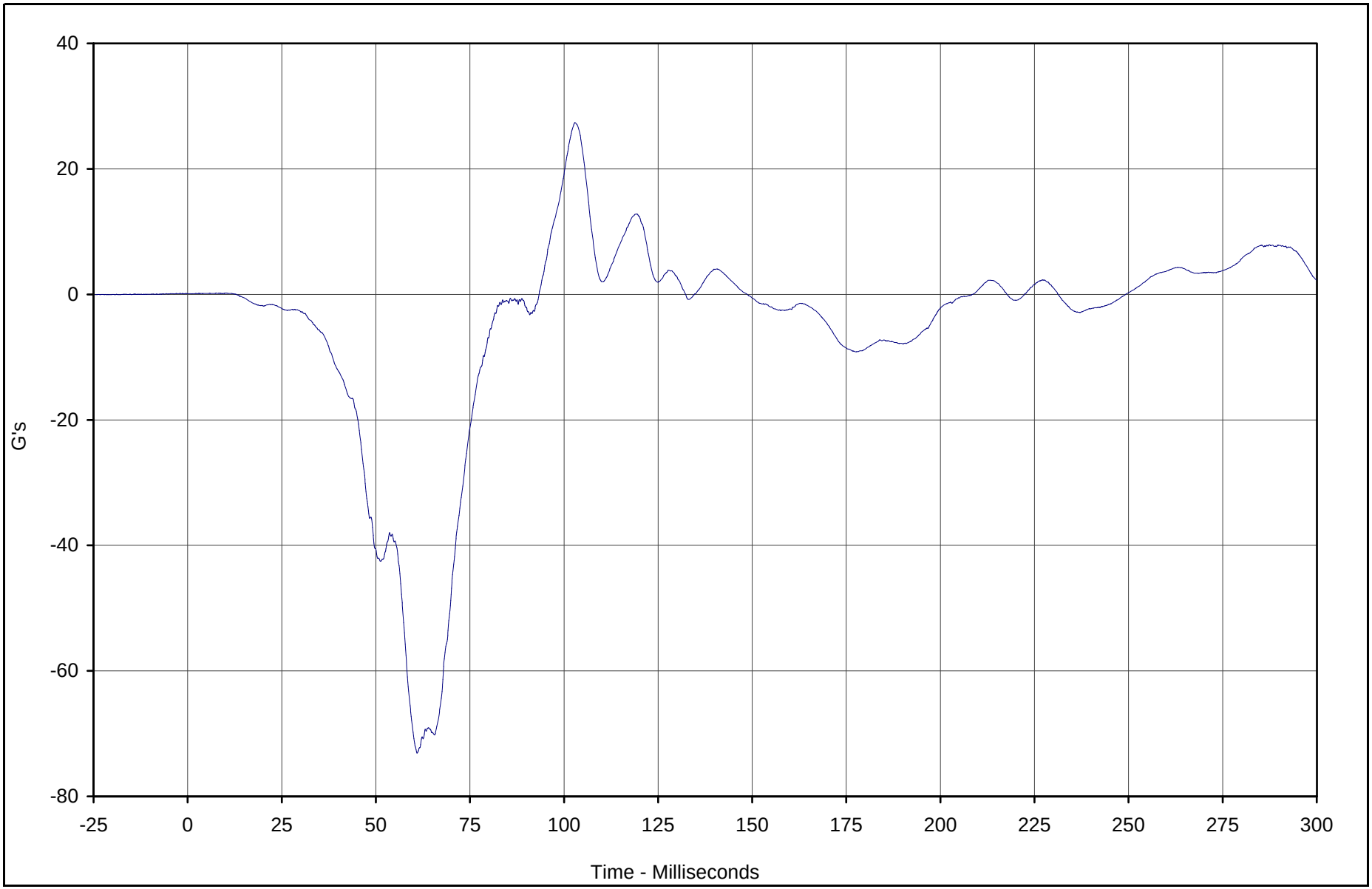

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Chest Deflection | 152 | FIL | MM | 0.0 | 20.3 | -16.3 | 87.3 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Pelvis X | 153 | FIL | G's | 27.4 | 102.9 | -73.1 | 60.9 | 1000 |

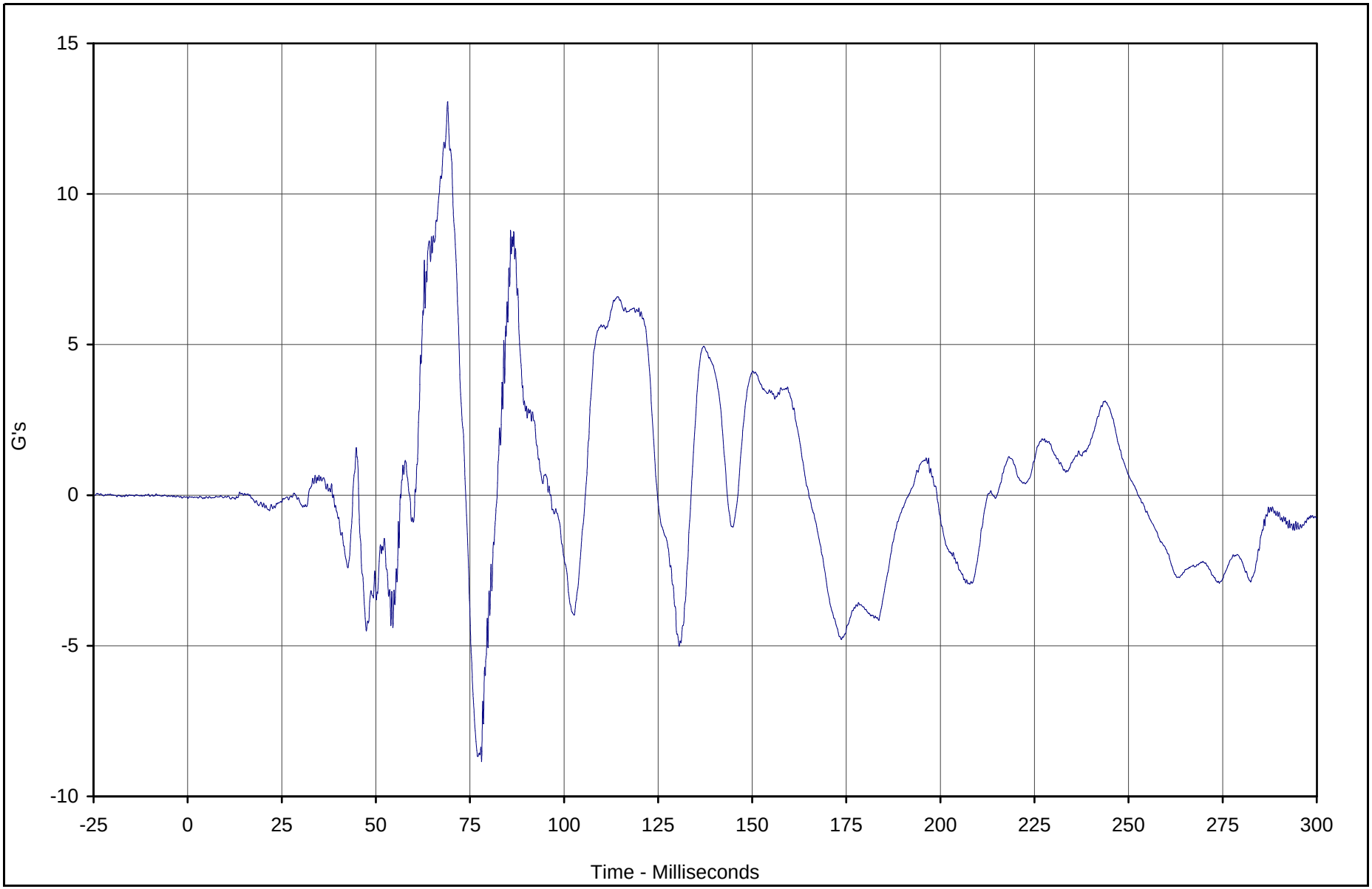
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Pelvis Y | 154 | FIL | G's | 13.1 | 69.1 | -8.8 | 78.1 | 1000 |

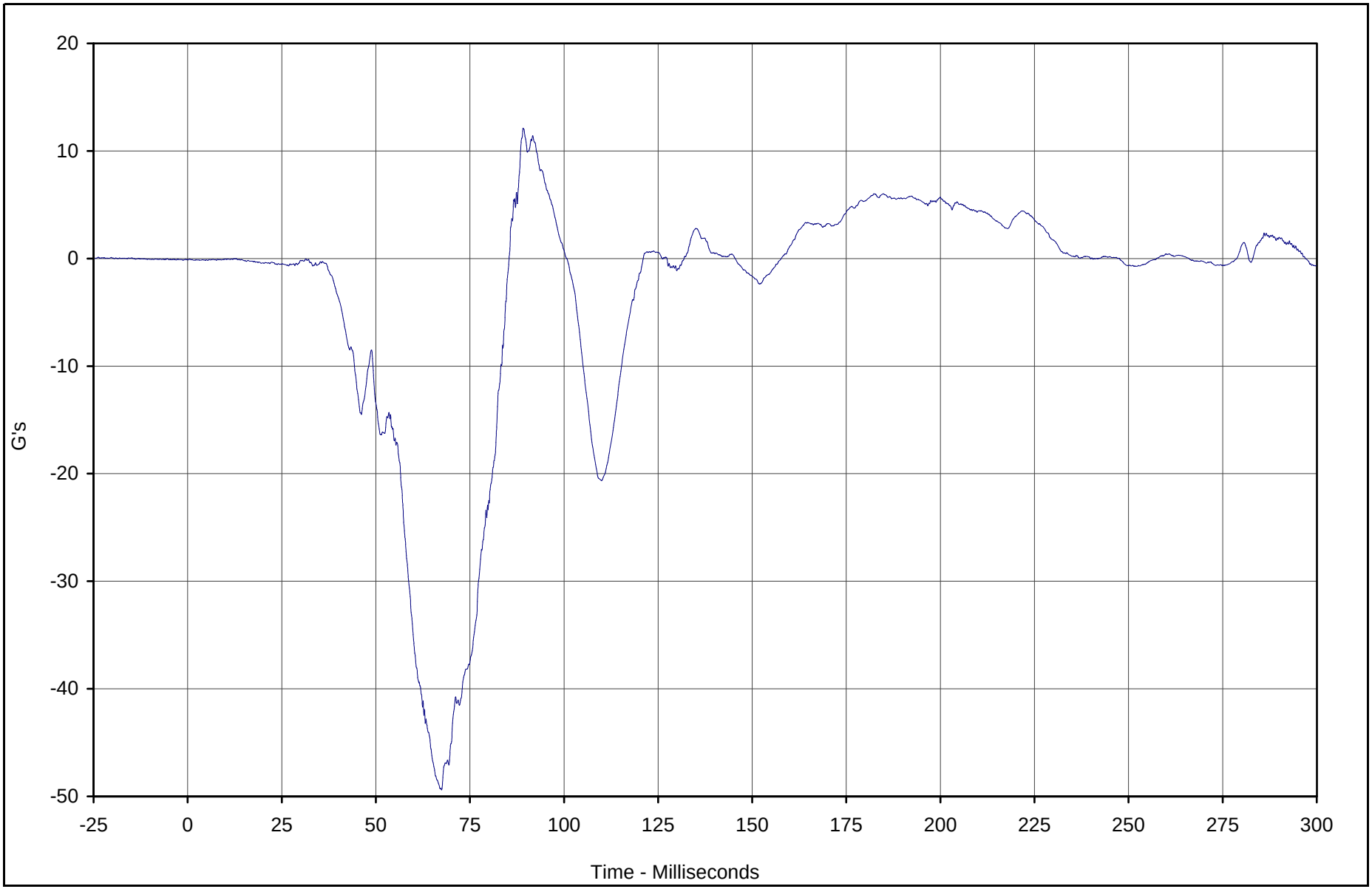
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Pelvis Z | 155 | FIL | G's | 12.1 | 89.1 | -49.4 | 67.5 | 1000 |

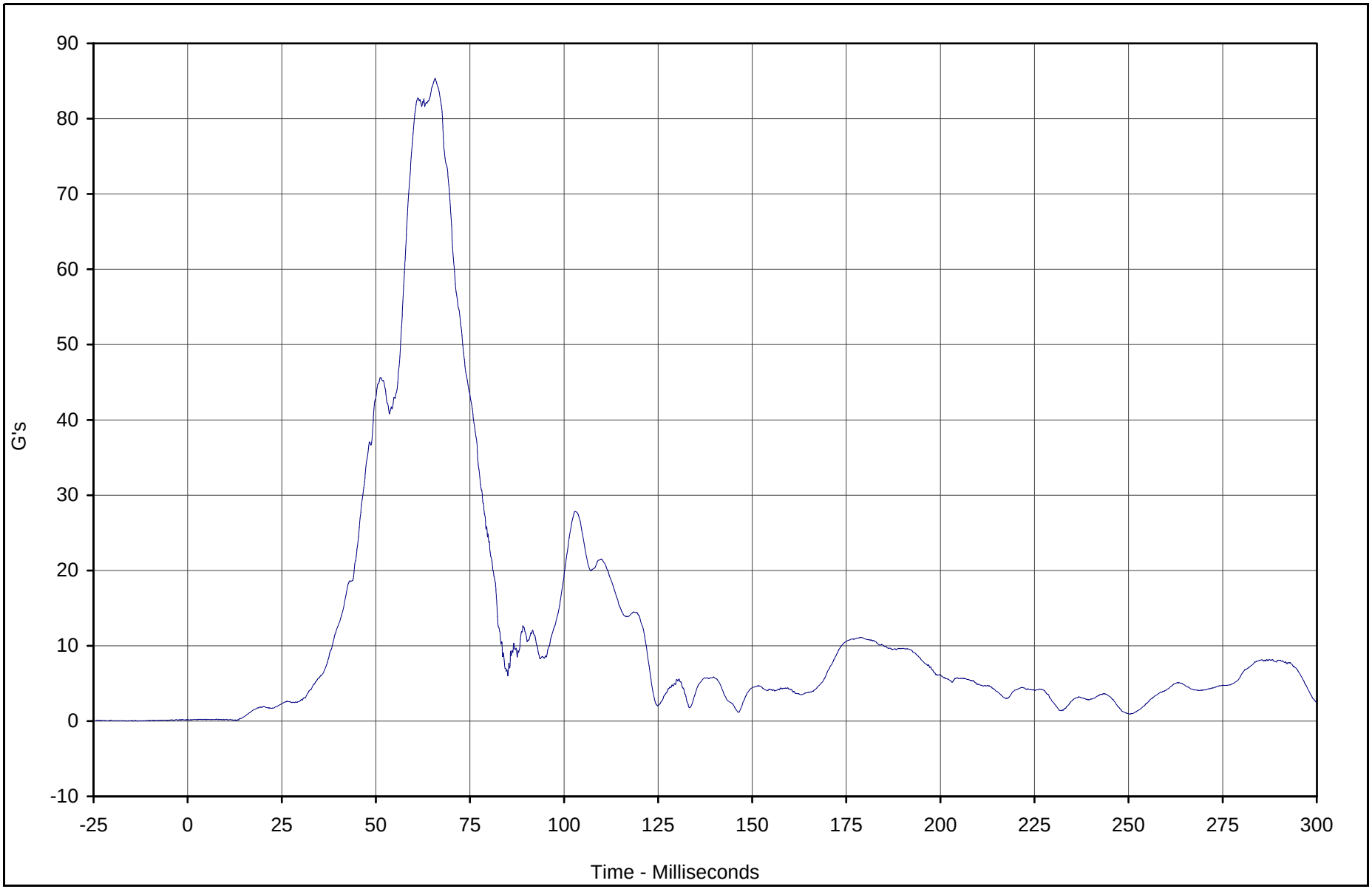
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Pelvis Resultant | 153 | RES | G's | 85.3 | 65.7 | 0.1 | 13.0 | 1000 |

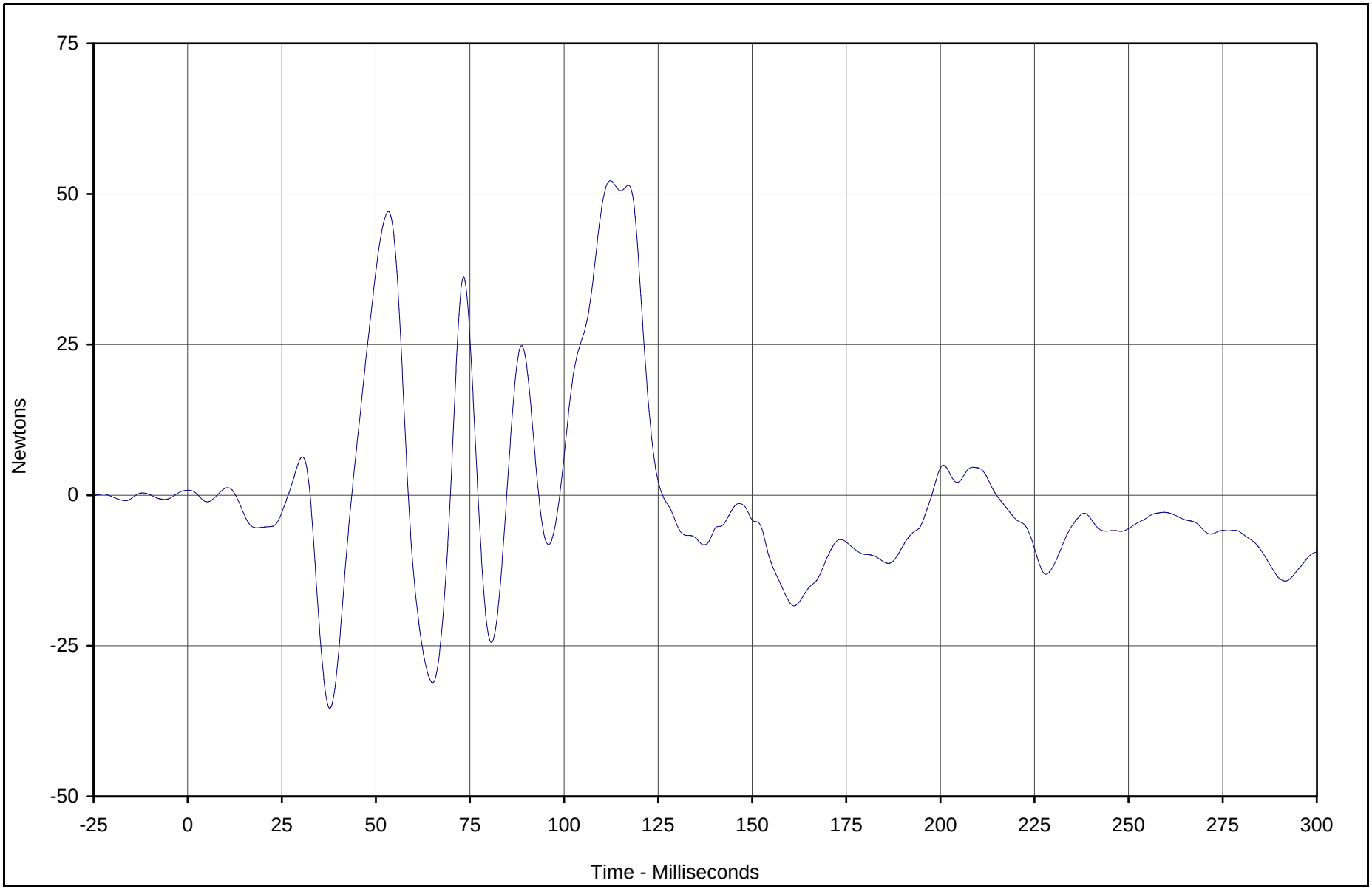
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Seat Tether Load | 156 | FIL | Newtons | 52.2 | 112.3 | -35.4 | 37.8 | 60 |

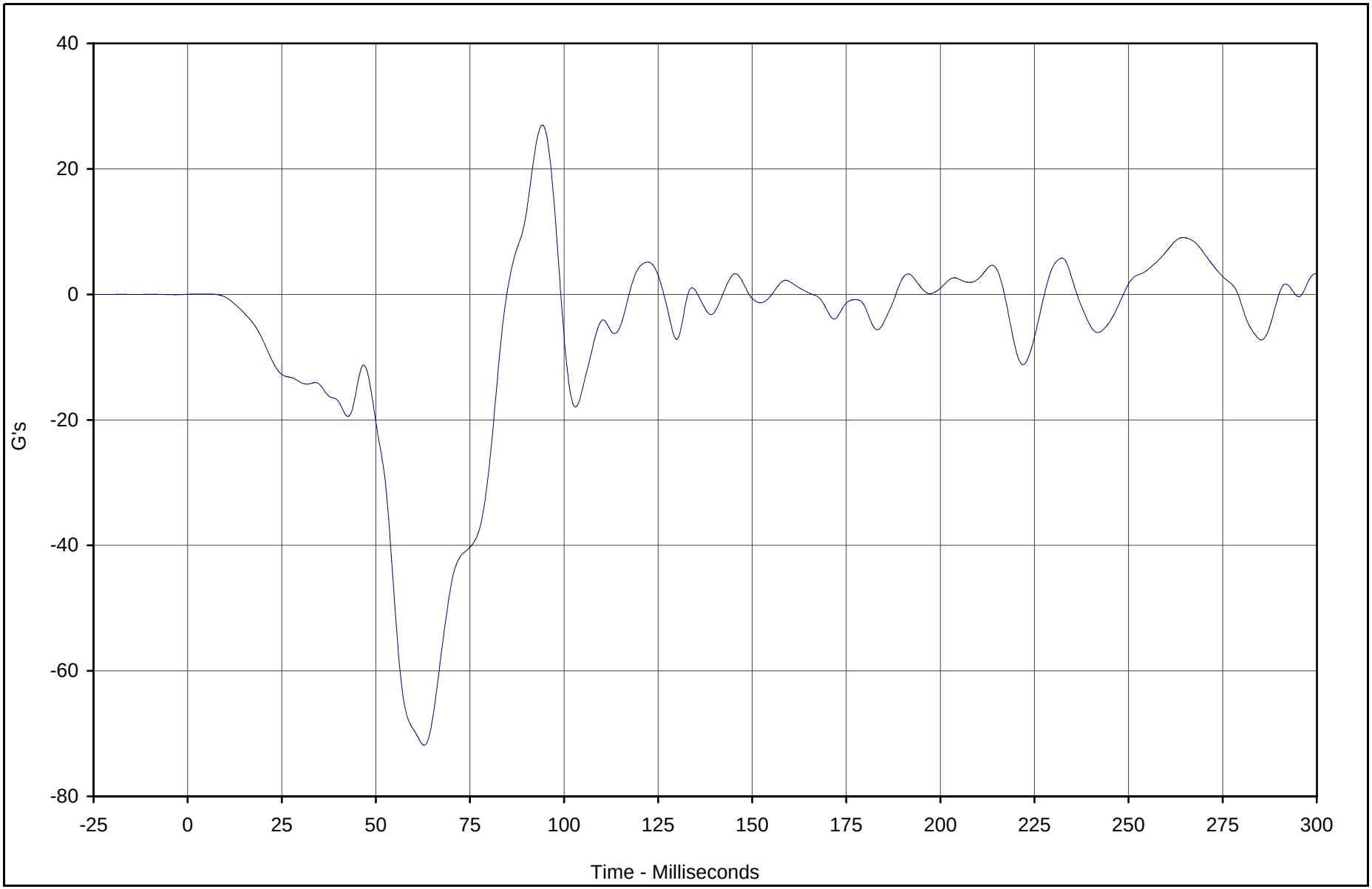
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Car Seat X | 157 | FIL | G's | 27.0 | 94.3 | -71.9 | 62.8 | 60 |

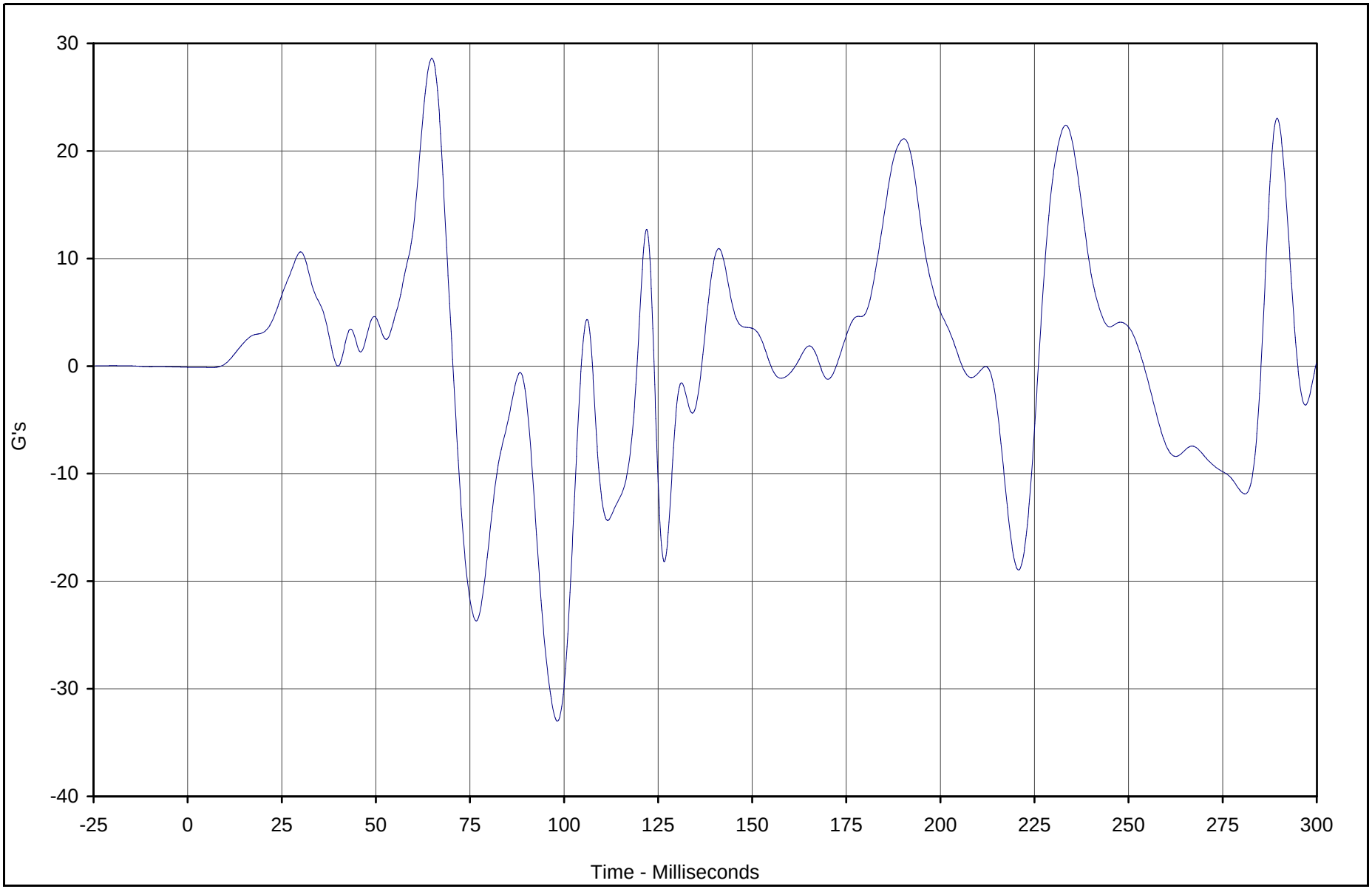
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Car Seat Y | 158 | FIL | G's | 28.6 | 64.9 | -33.0 | 98.2 | 60 |

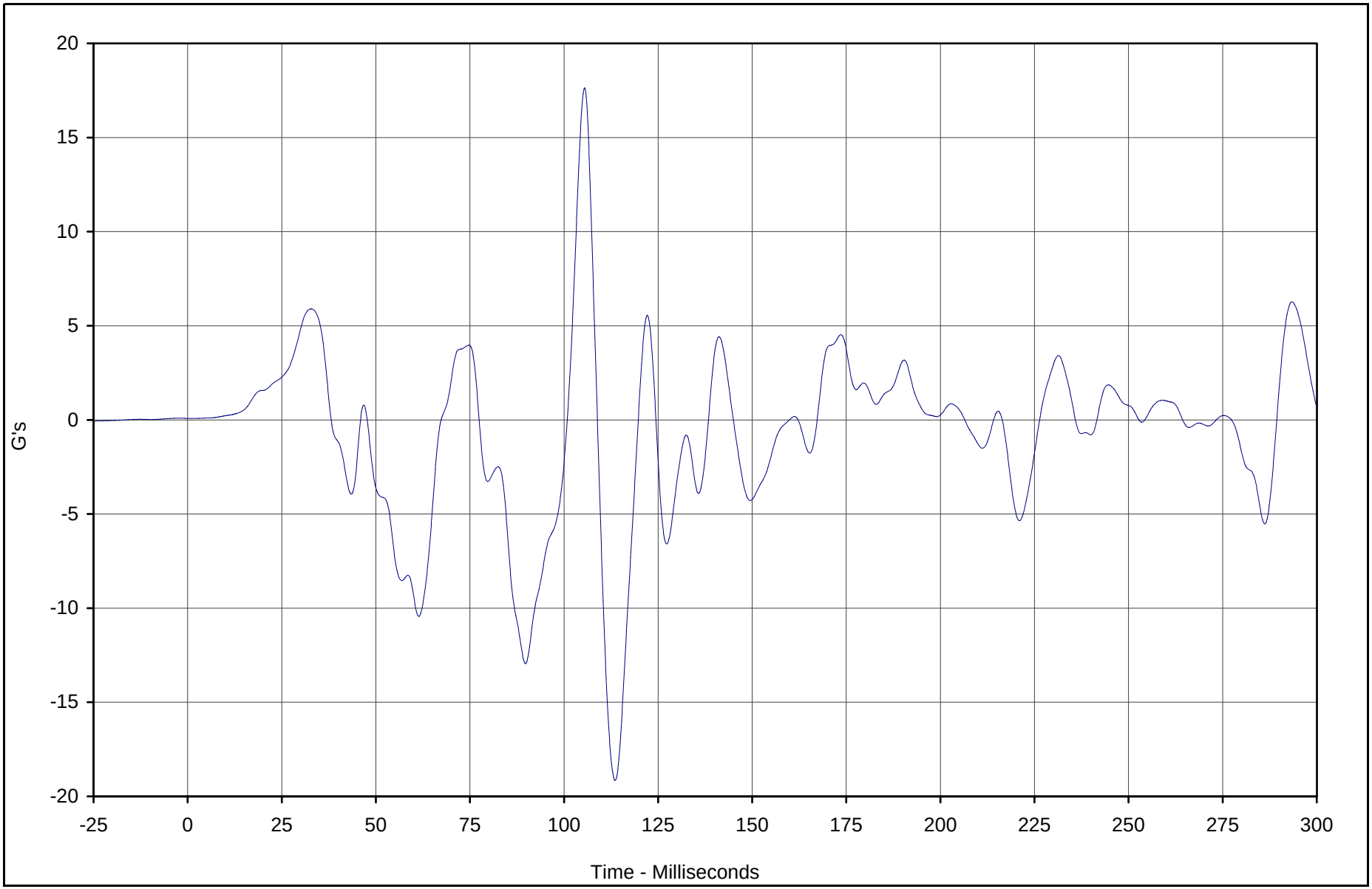
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



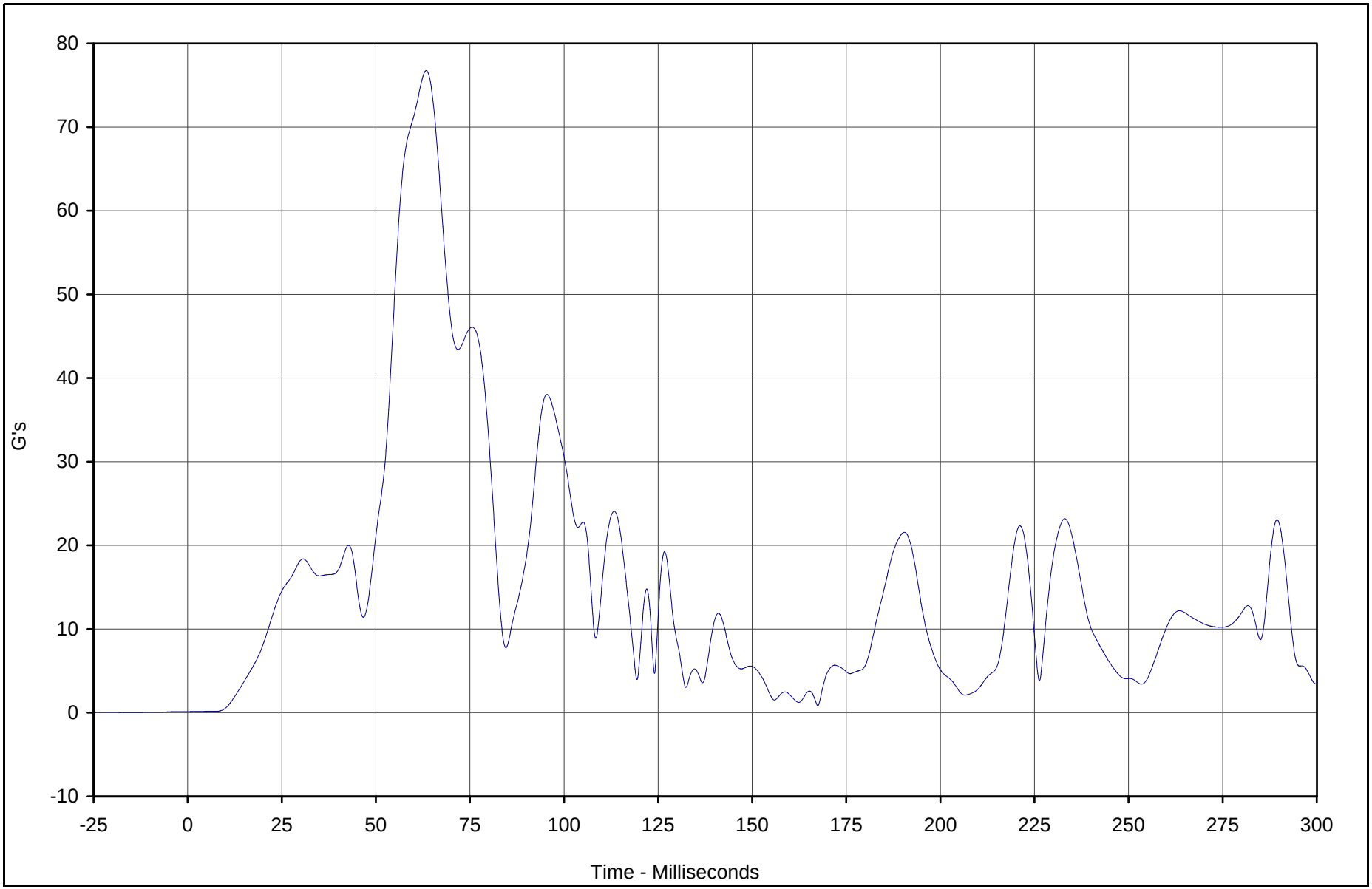

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Car Seat Z | 159 | FIL | G's | 17.6 | 105.5 | -19.2 | 113.6 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



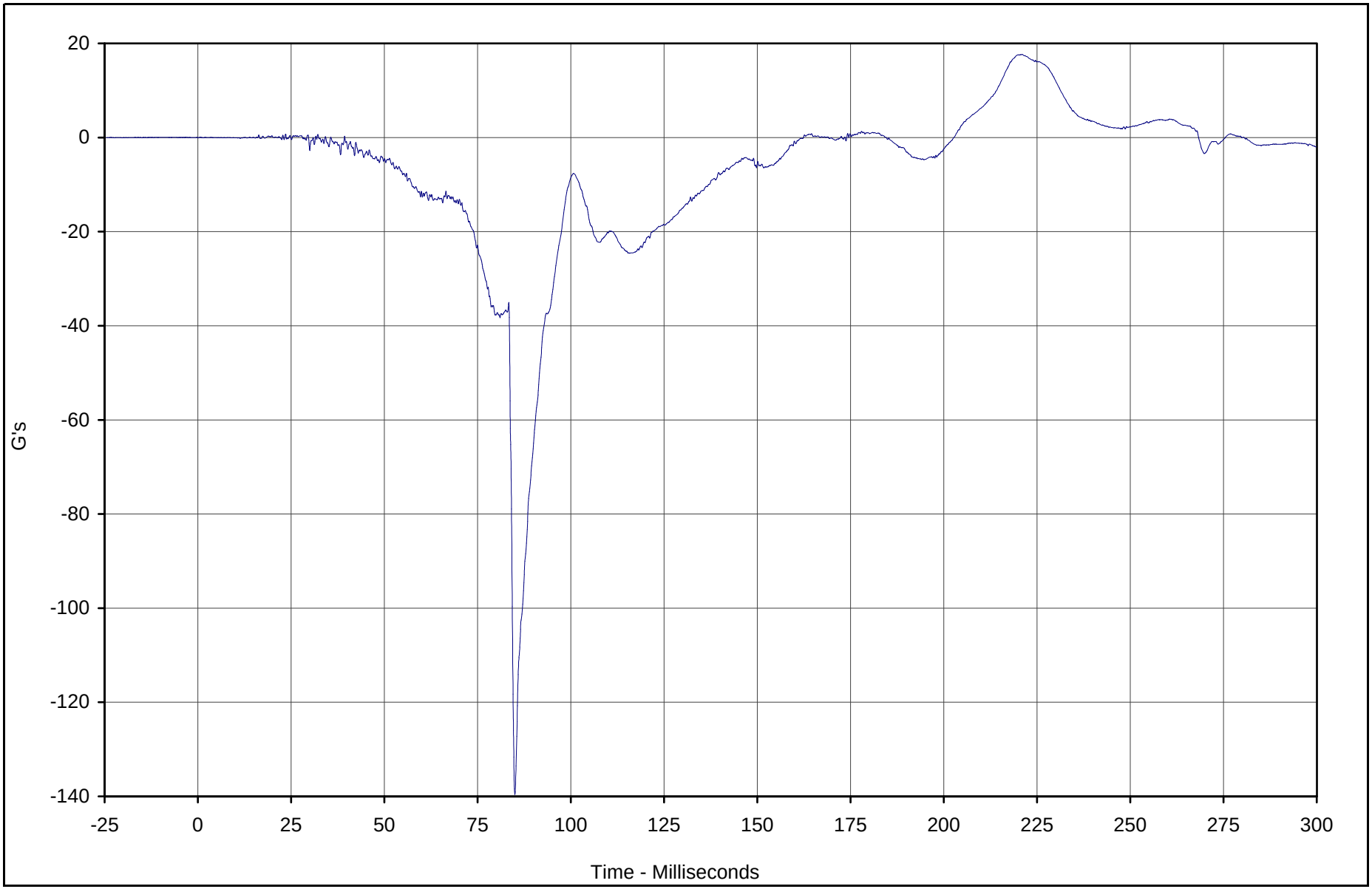

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Left Rear Child Car Seat Resultant | 157 | RES | G's | 76.7 | 63.4 | 0.1 | 0.0 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



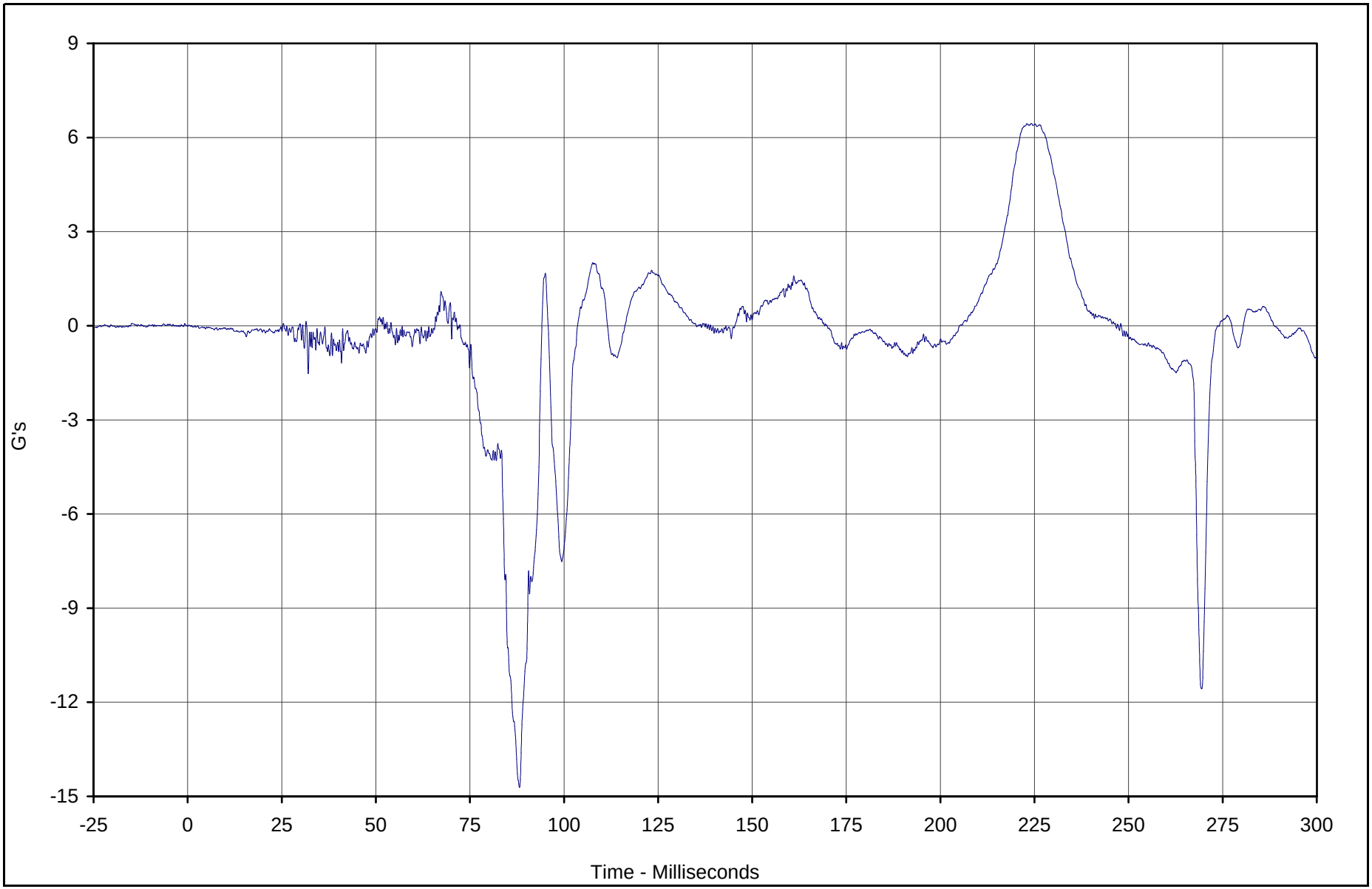

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Head X | 160 | FIL | G's | 17.7 | 221.1 | -139.6 | 85.0 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



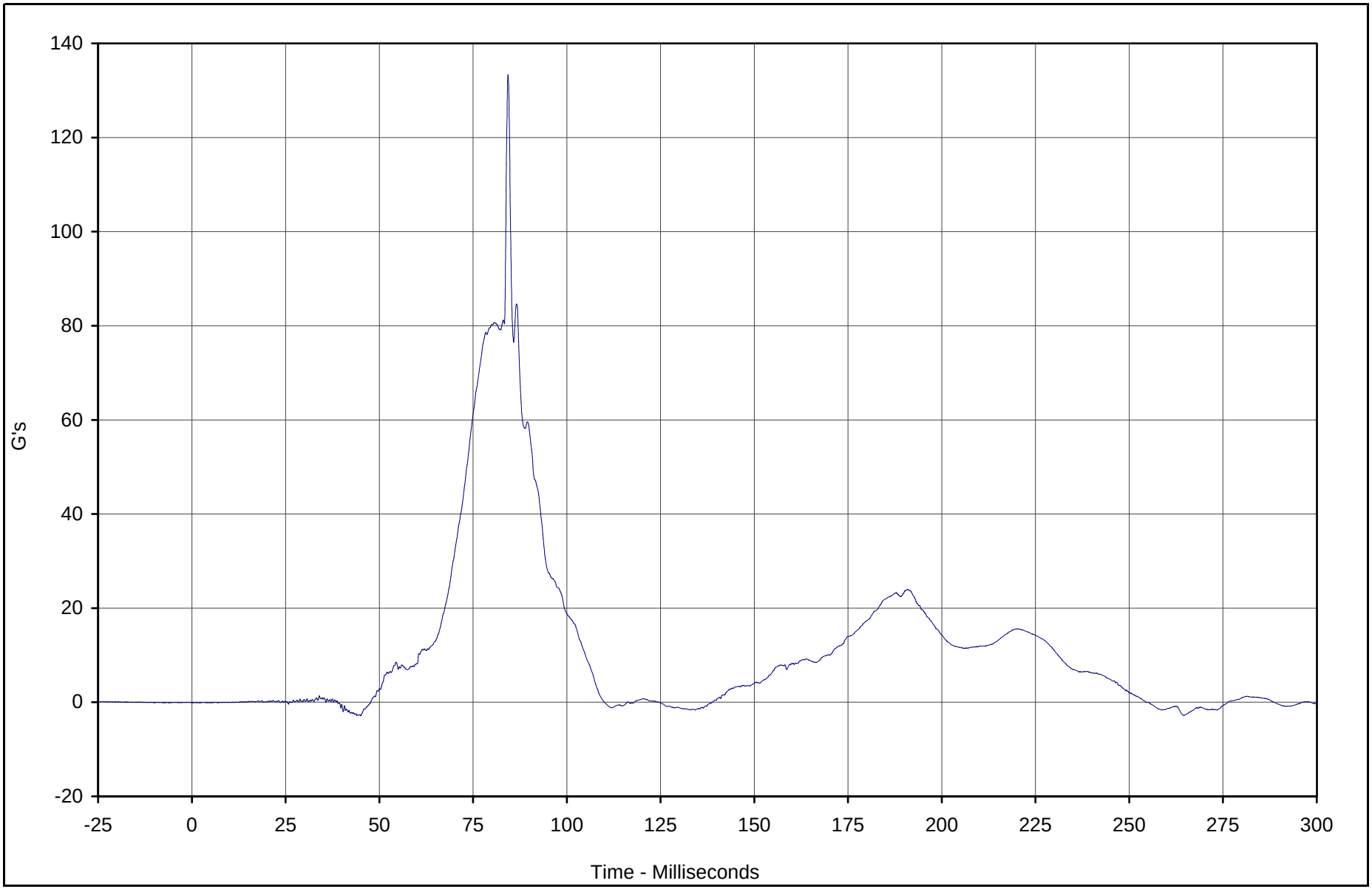

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Head Y | 161 | FIL | G's | 6.4 | 224.2 | -14.7 | 88.2 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Head Z | 162 | FIL | G's | 133.3 | 84.3 | -2.9 | 45.0 | 1000 |

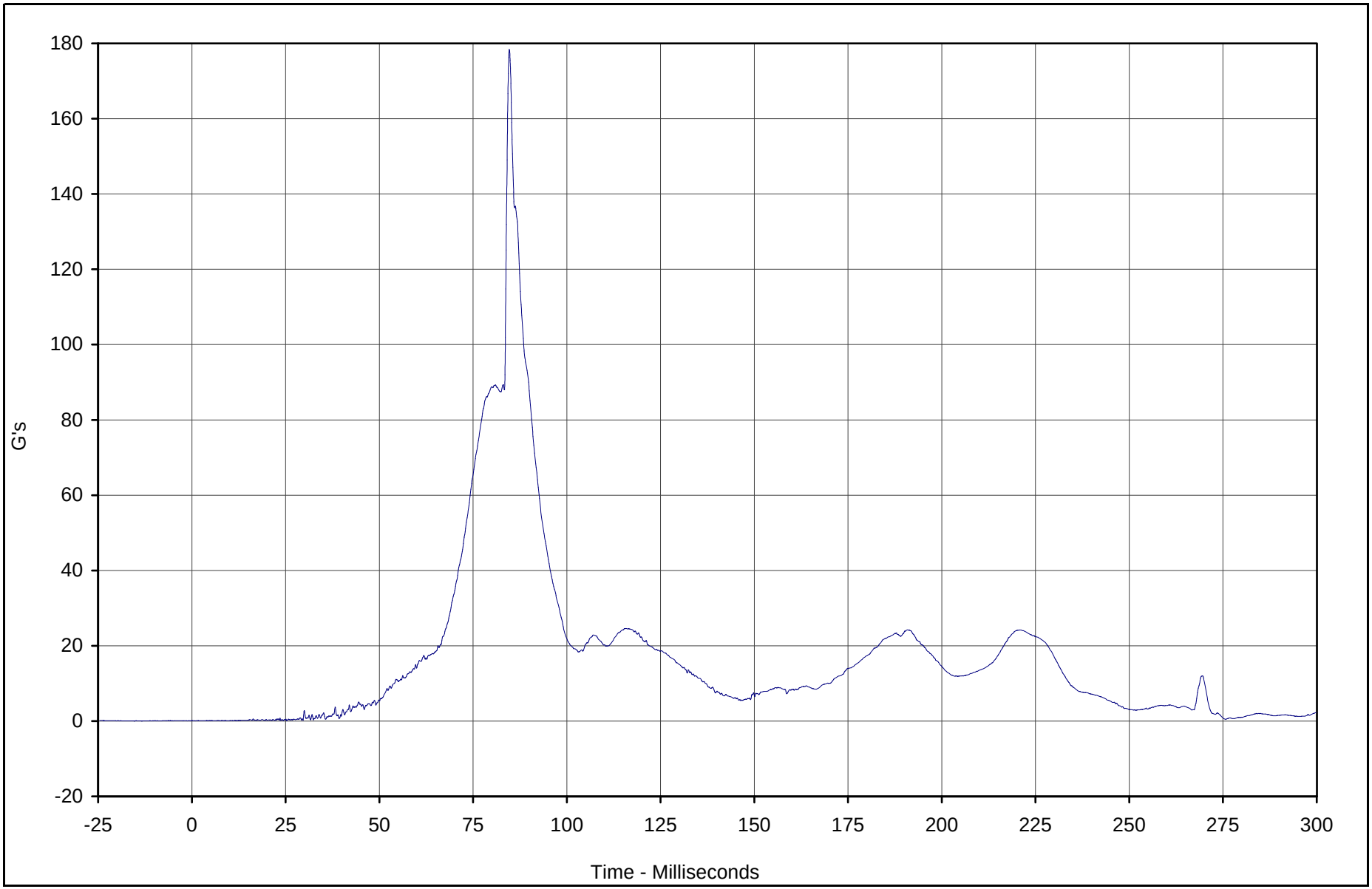
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



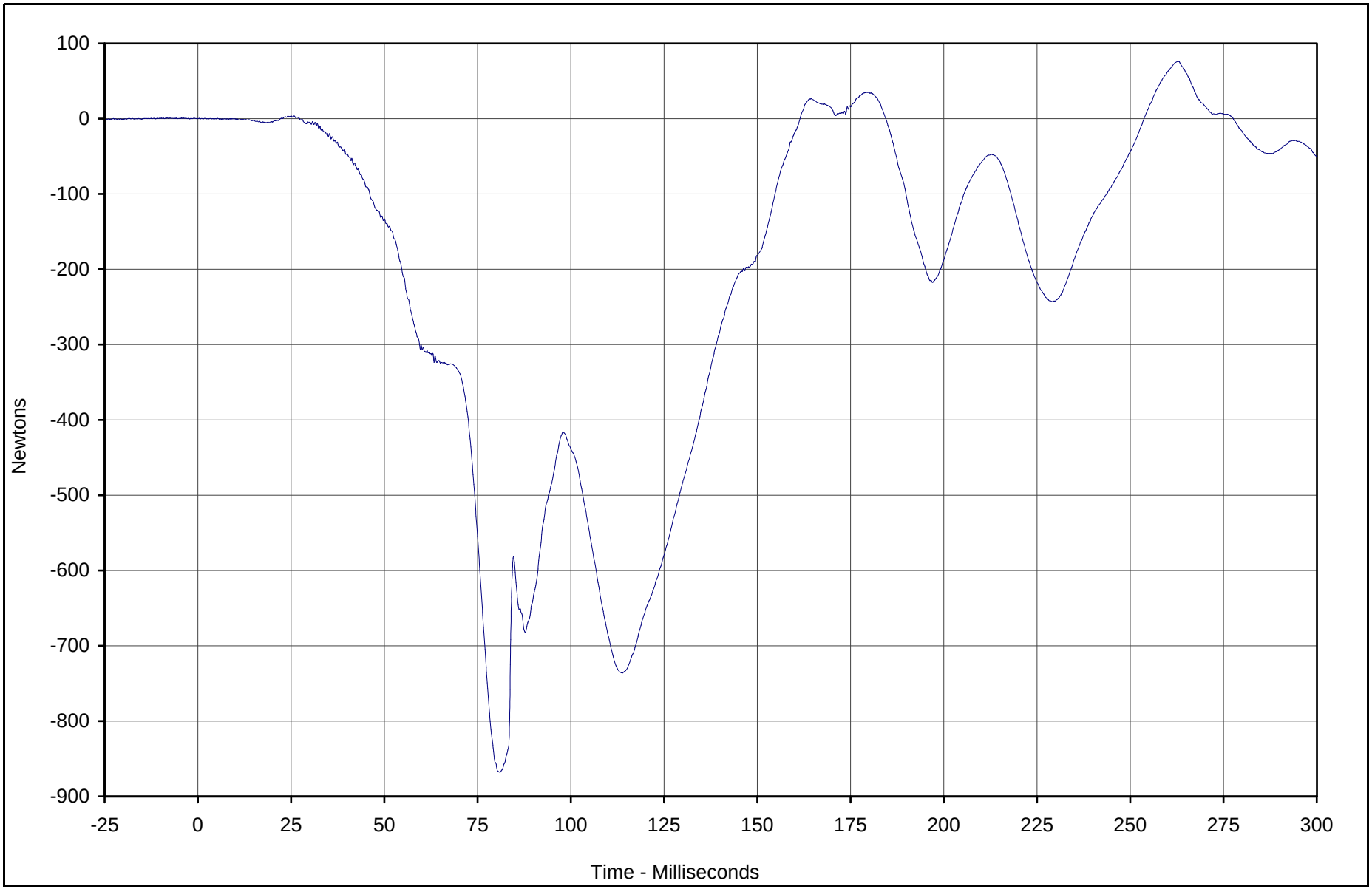

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Head Resultant | 160 | RES | G's | 178.4 | 84.6 | 0.0 | 0.9 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Force X | 163 | FIL | Newtons | 76.3 | 262.7 | -867.8 | 81.0 | 1000 |

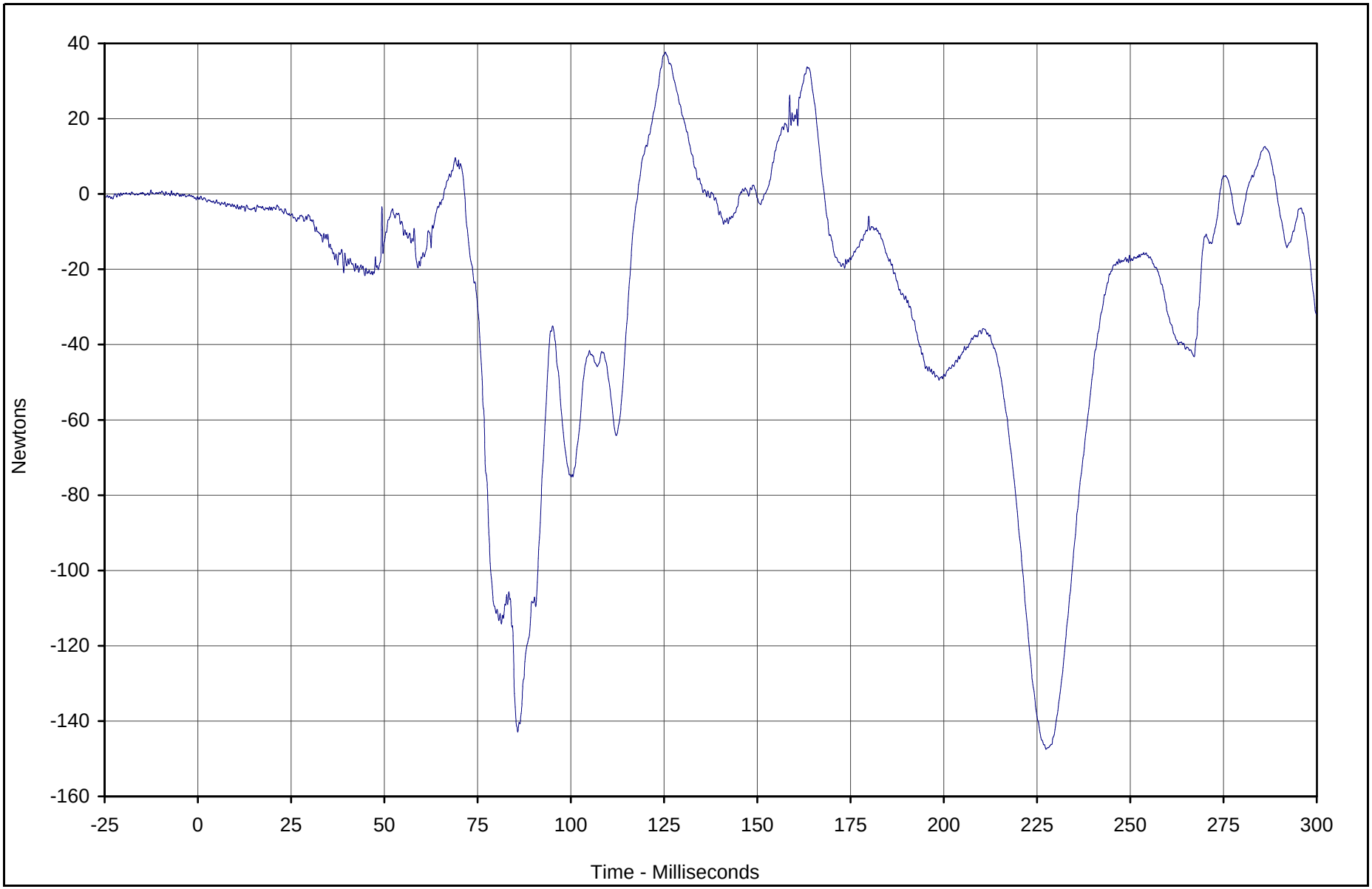
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Force Y | 164 | FIL | Newtons | 37.6 | 125.3 | -147.5 | 227.4 | 1000 |

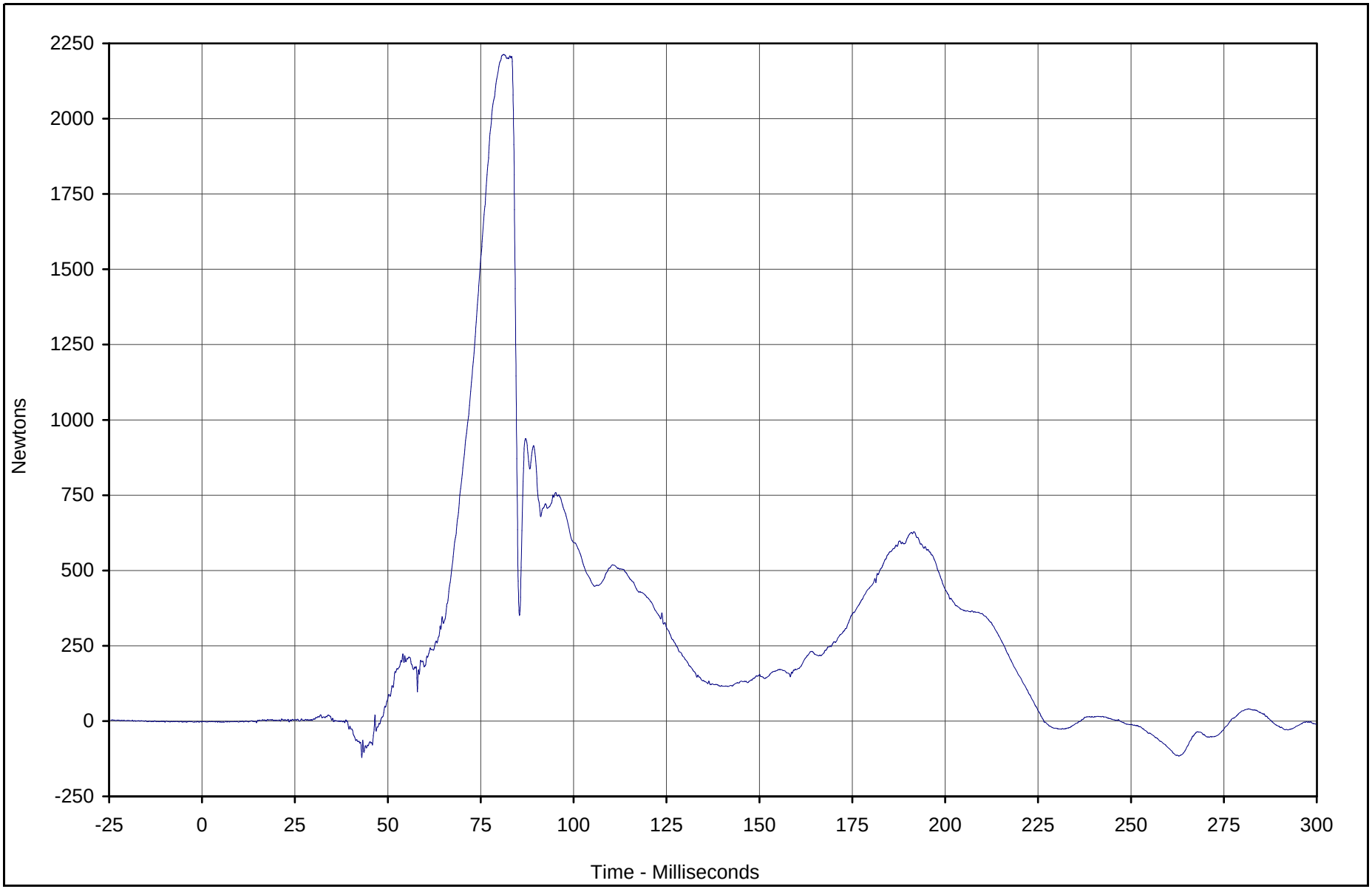
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



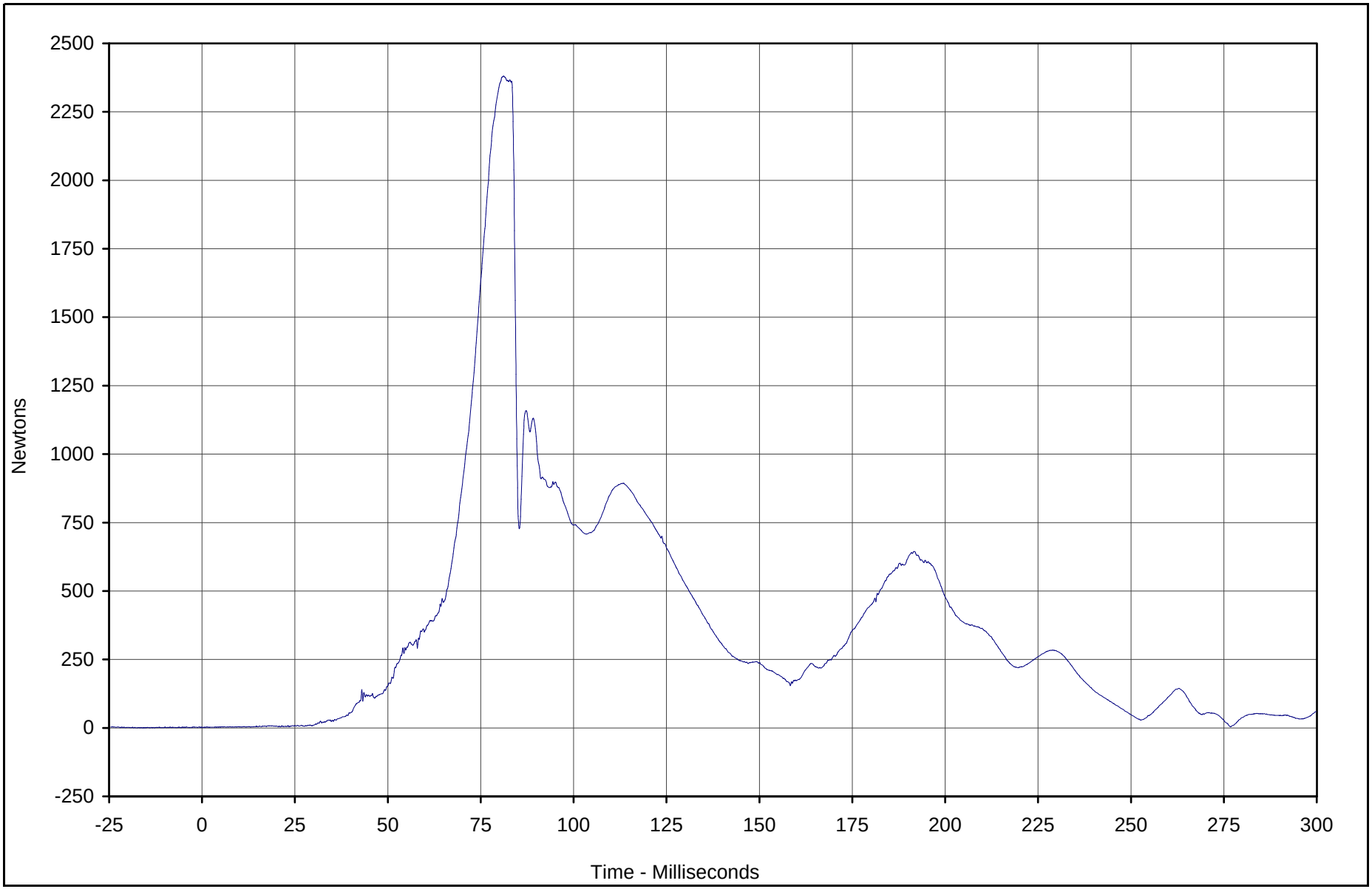

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Force Z | 165 | FIL | Newtons | 2214.2 | 81.2 | -121.2 | 43.0 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Force Res. | 163 | RES | Newtons | 2380.6 | 81.2 | 1.7 | 0.2 | 1000 |

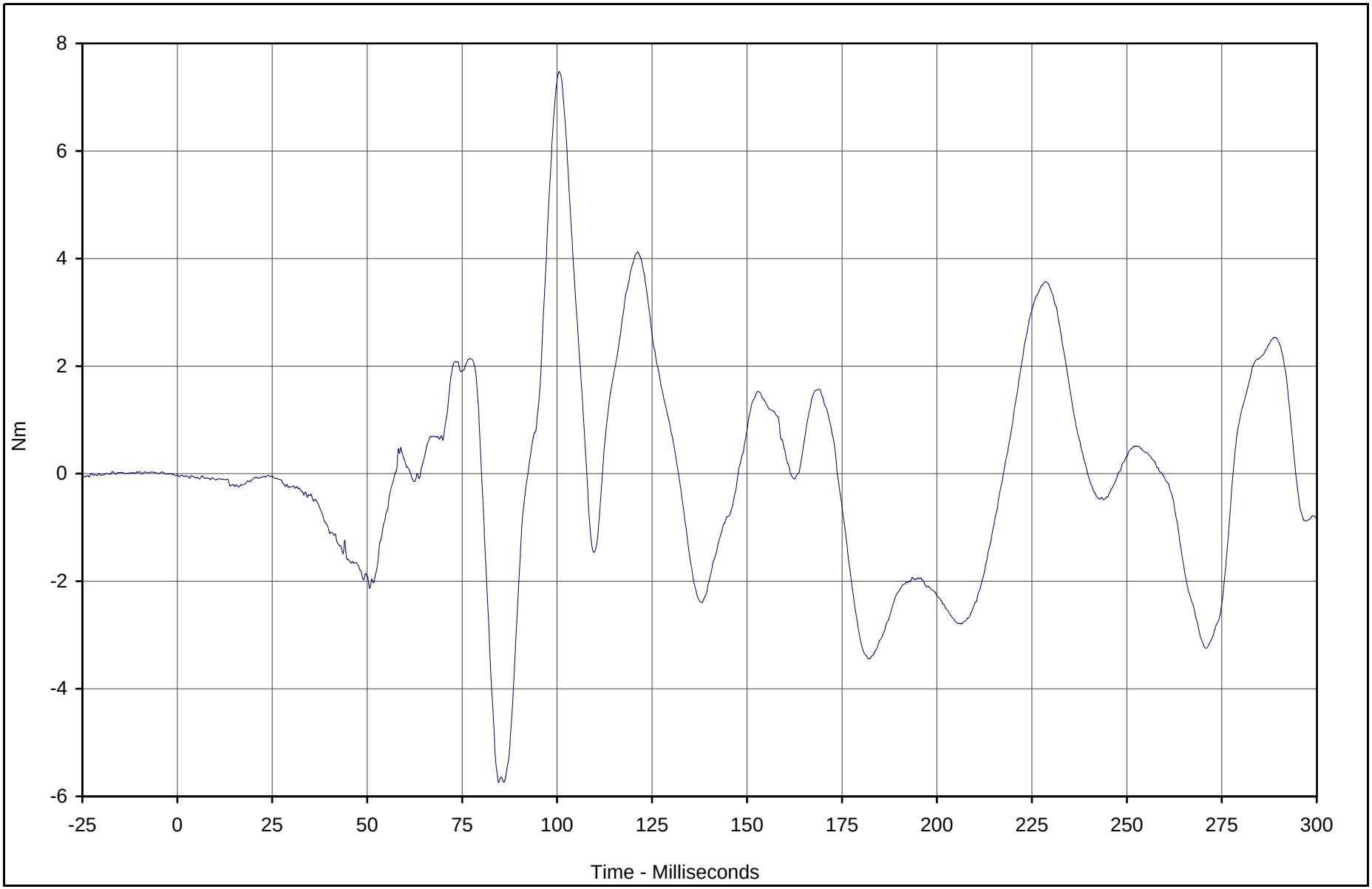
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



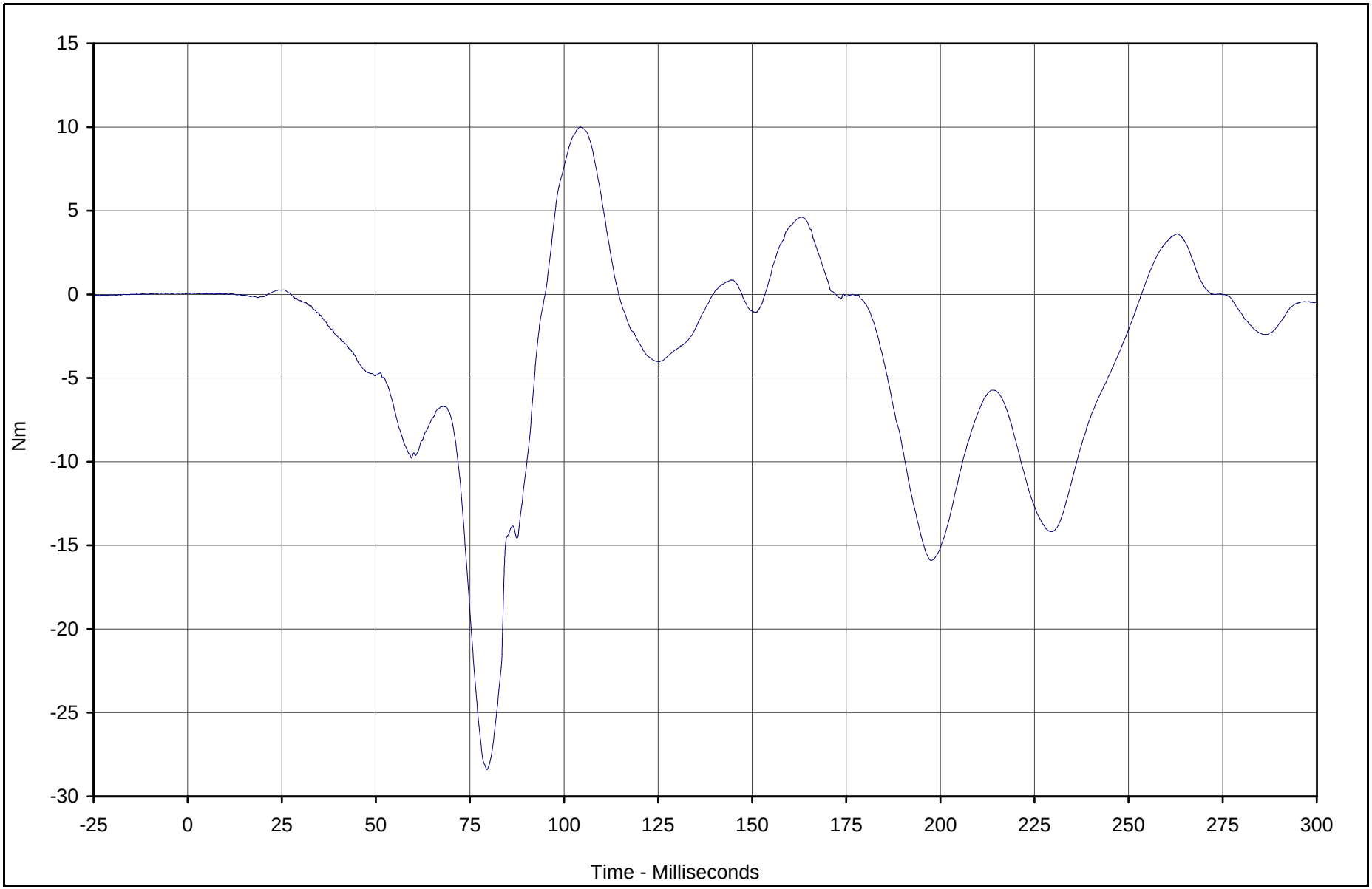

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Moment X | 166 | FIL | Nm | 7.5 | 100.6 | -5.7 | 84.6 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Moment Y | 167 | FIL | Nm | 10.0 | 104.3 | -28.4 | 79.5 | 600 |

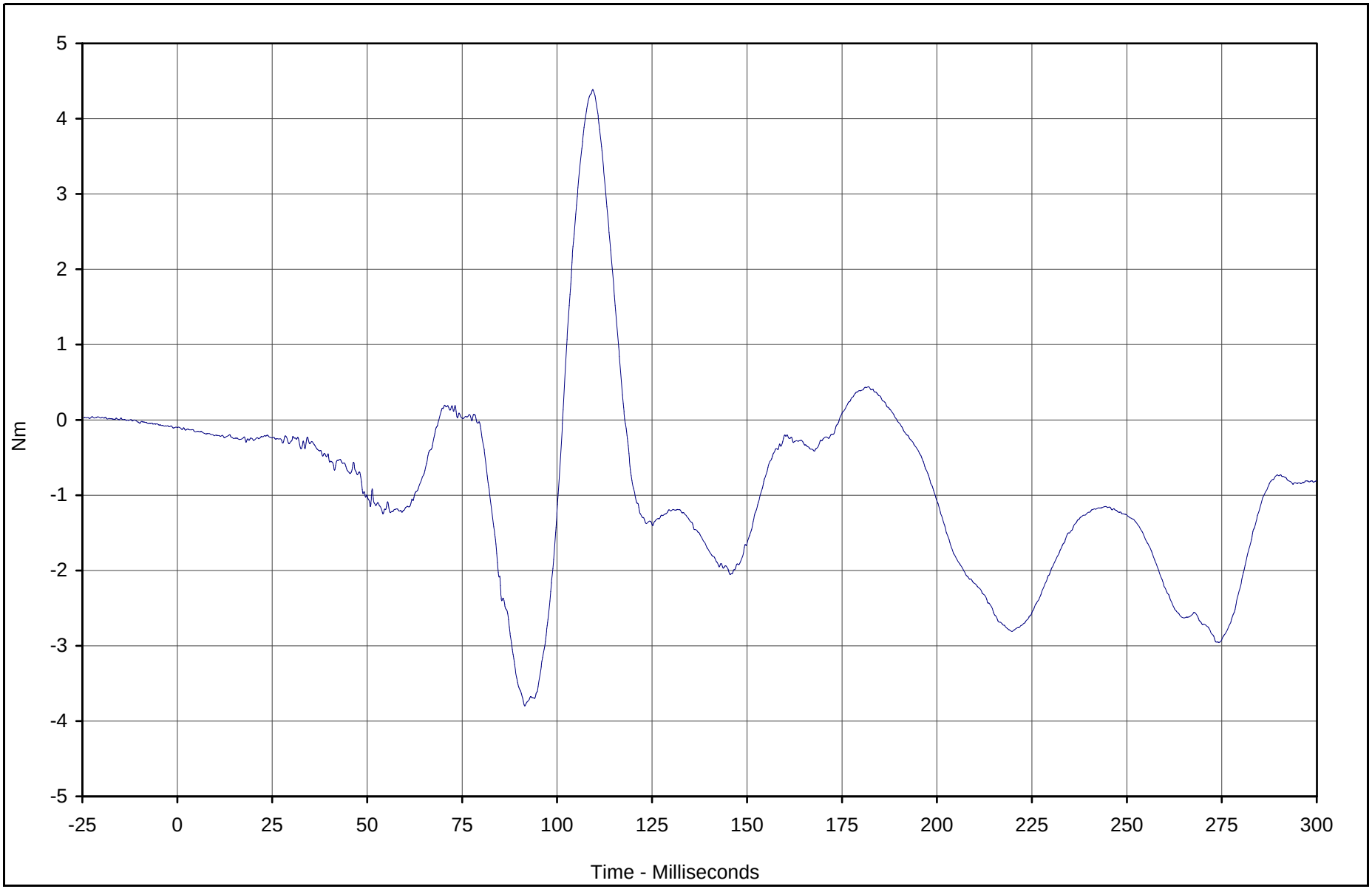
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Moment Z | 168 | FIL | Nm | 4.4 | 109.4 | -3.8 | 91.5 | 600 |

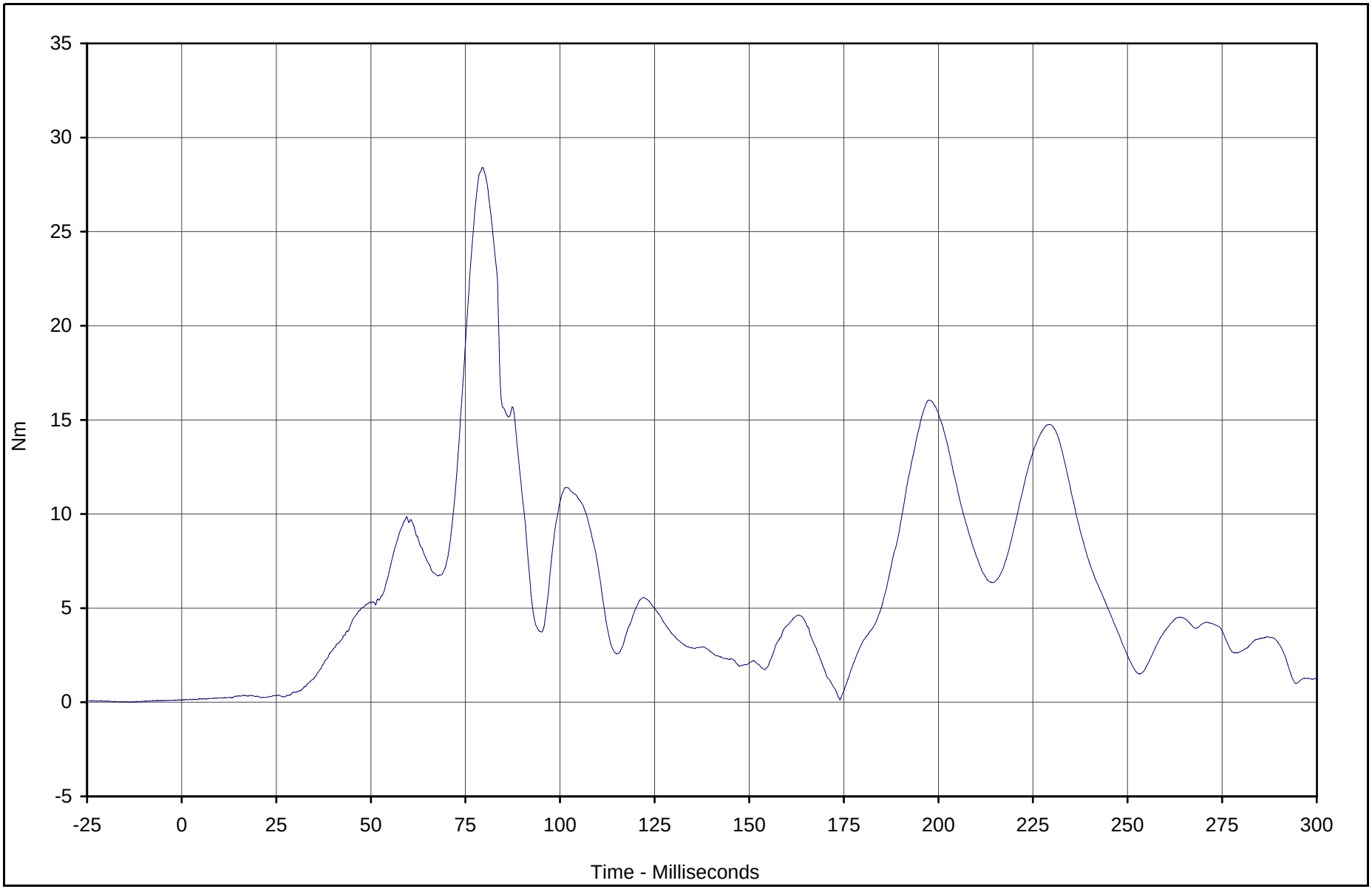
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



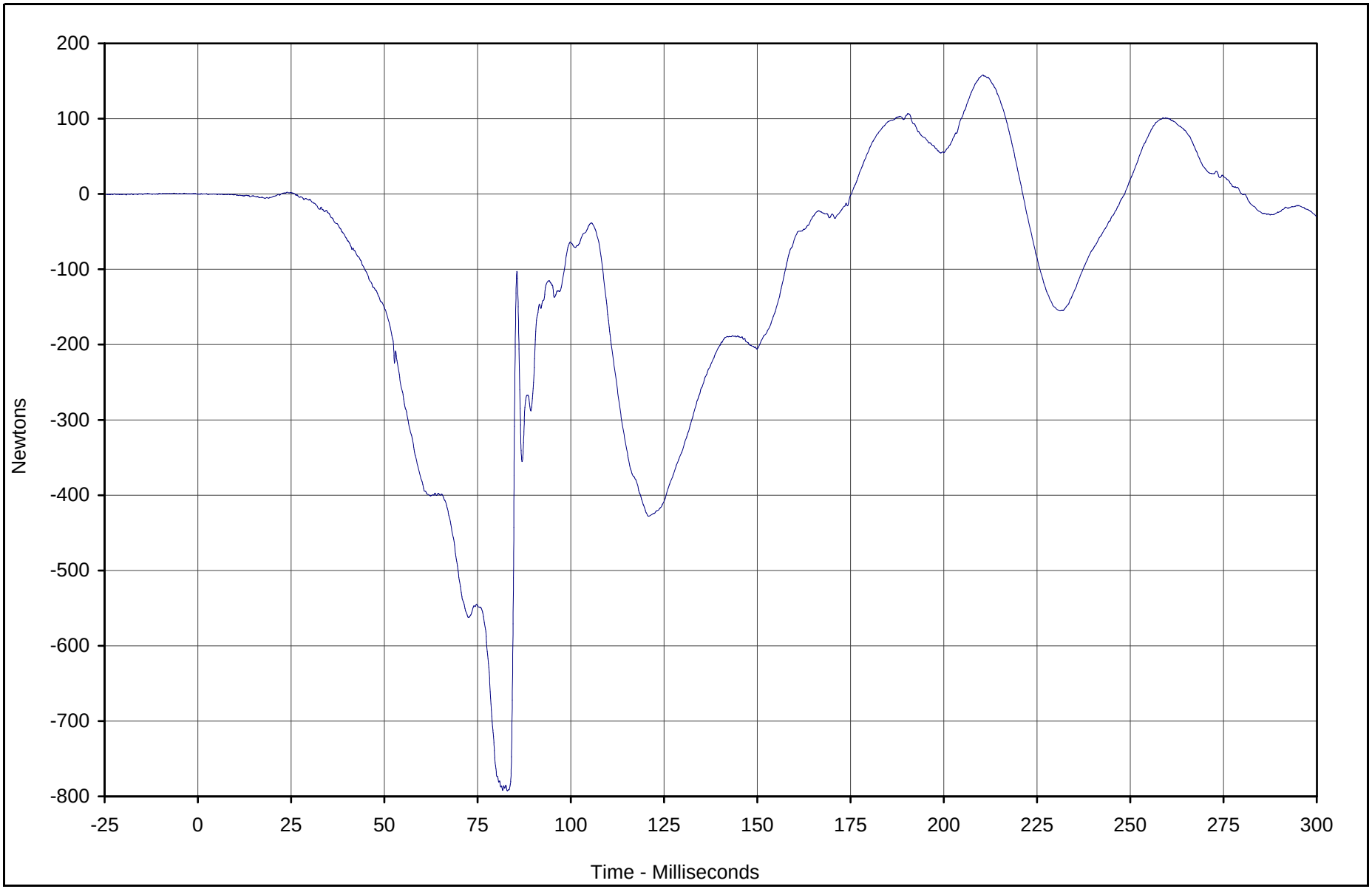

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Upper Neck Mom Res. | 166 | RES | Nm | 28.4 | 79.5 | 0.1 | 174.0 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Force X | 169 | FIL | Newtons | 158.0 | 210.5 | -792.6 | 83.0 | 1000 |

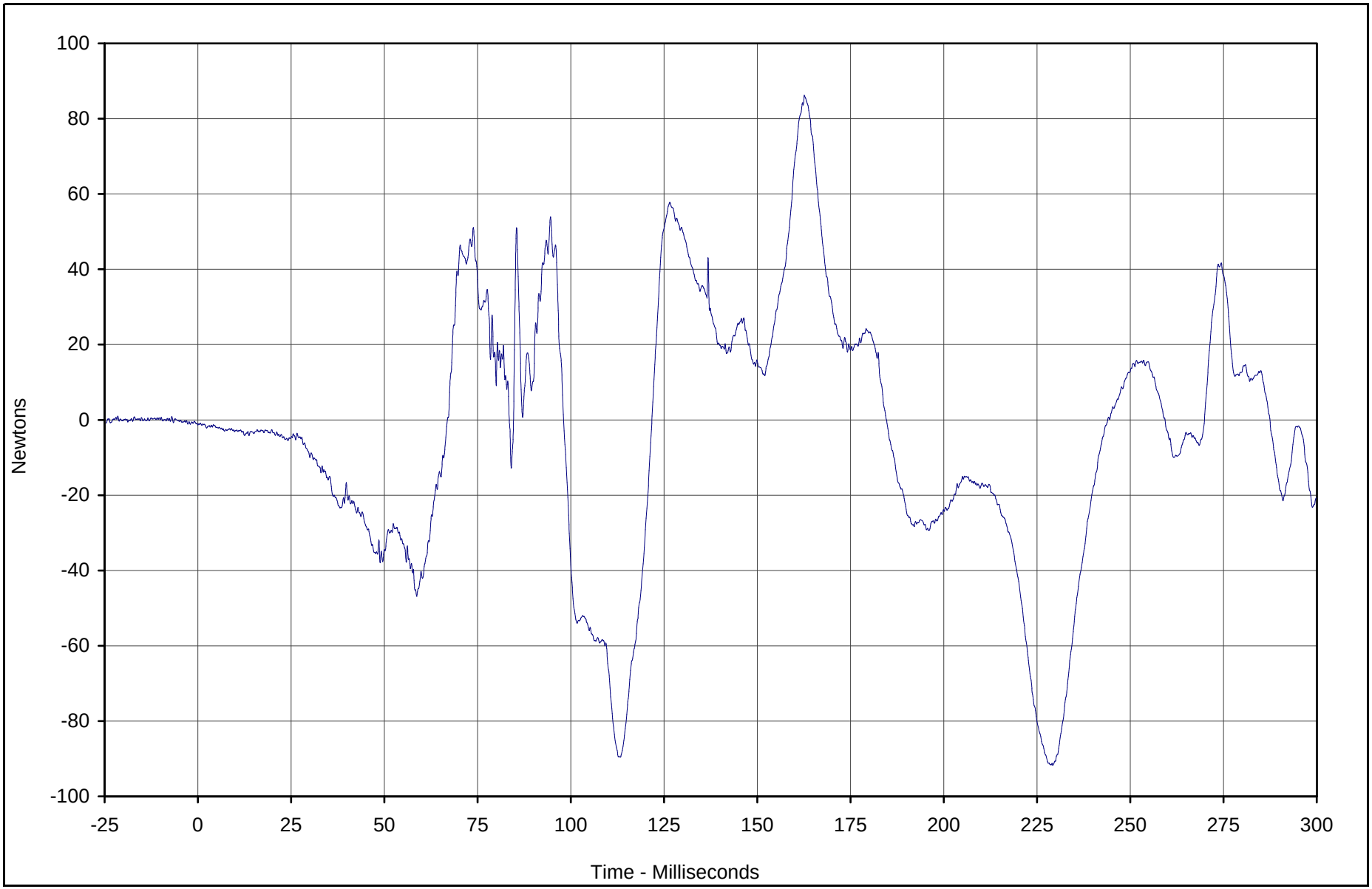
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



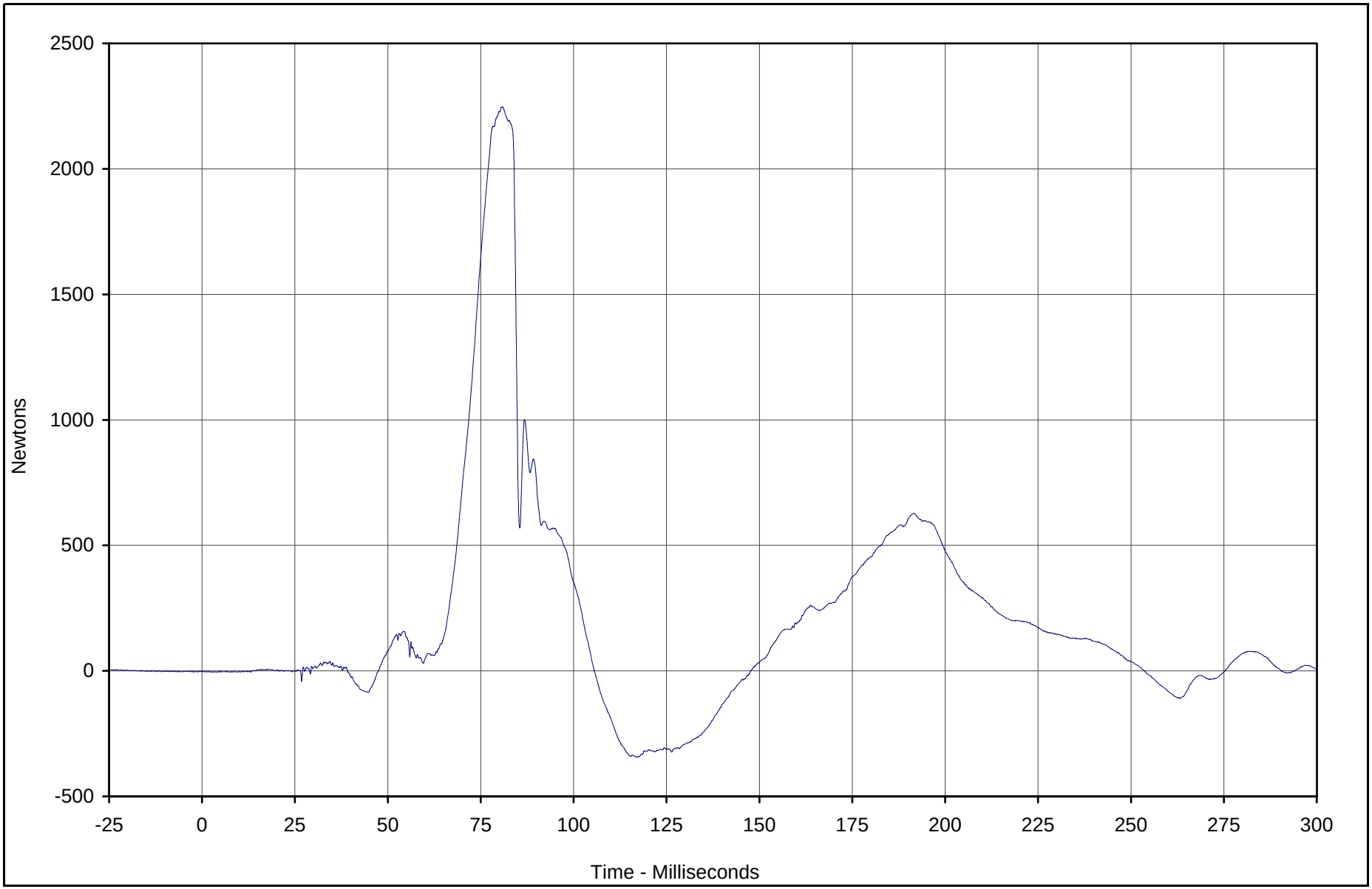

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Force Y | 170 | FIL | Newtons | 86.2 | 162.6 | -91.7 | 229.2 | 1000 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Force Z | 171 | FIL | Newtons | 2246.5 | 80.9 | -343.5 | 117.0 | 1000 |

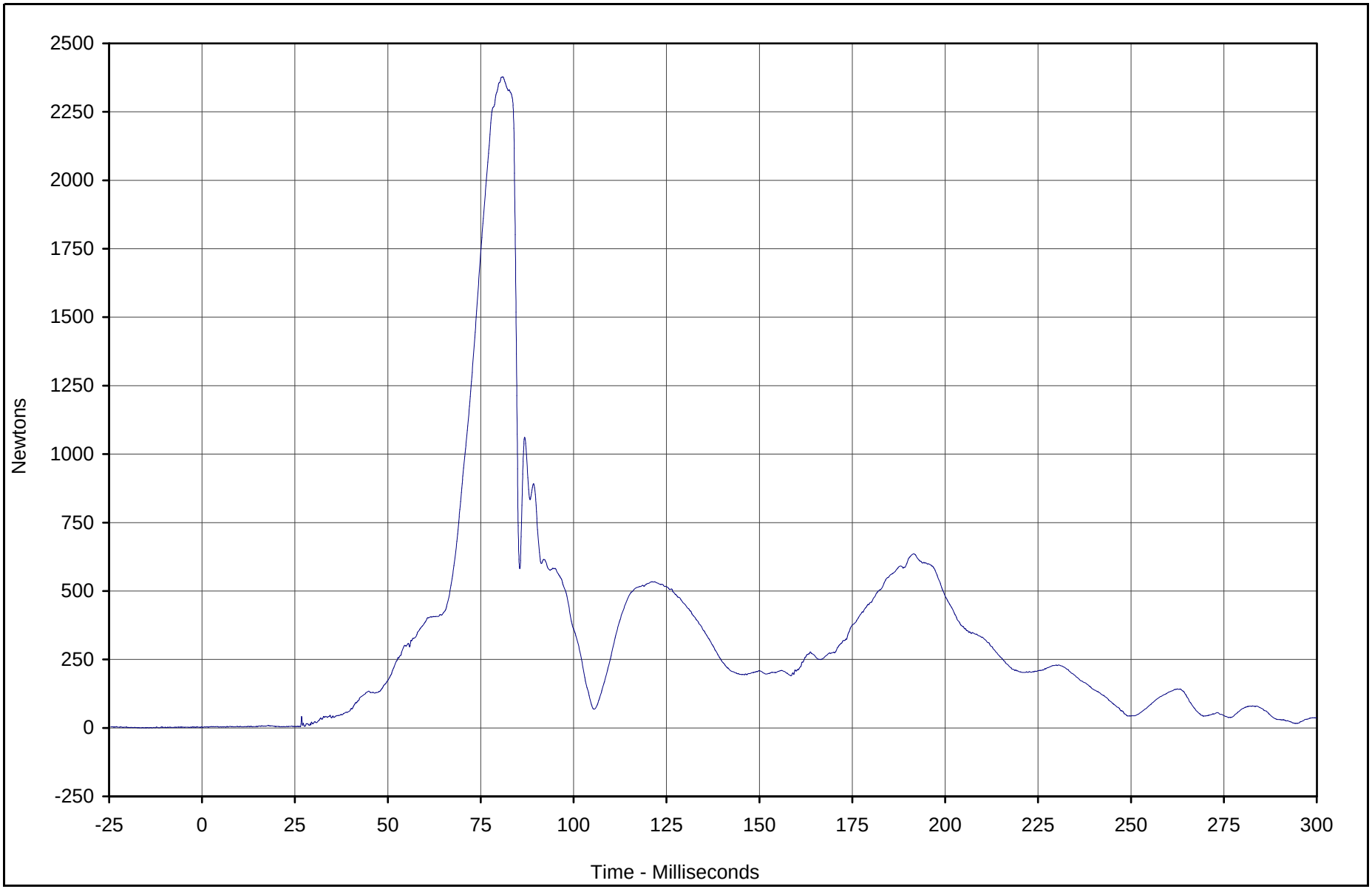
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Force Res. | 169 | RES | Newtons | 2378.0 | 80.9 | 2.0 | 0.2 | 1000 |

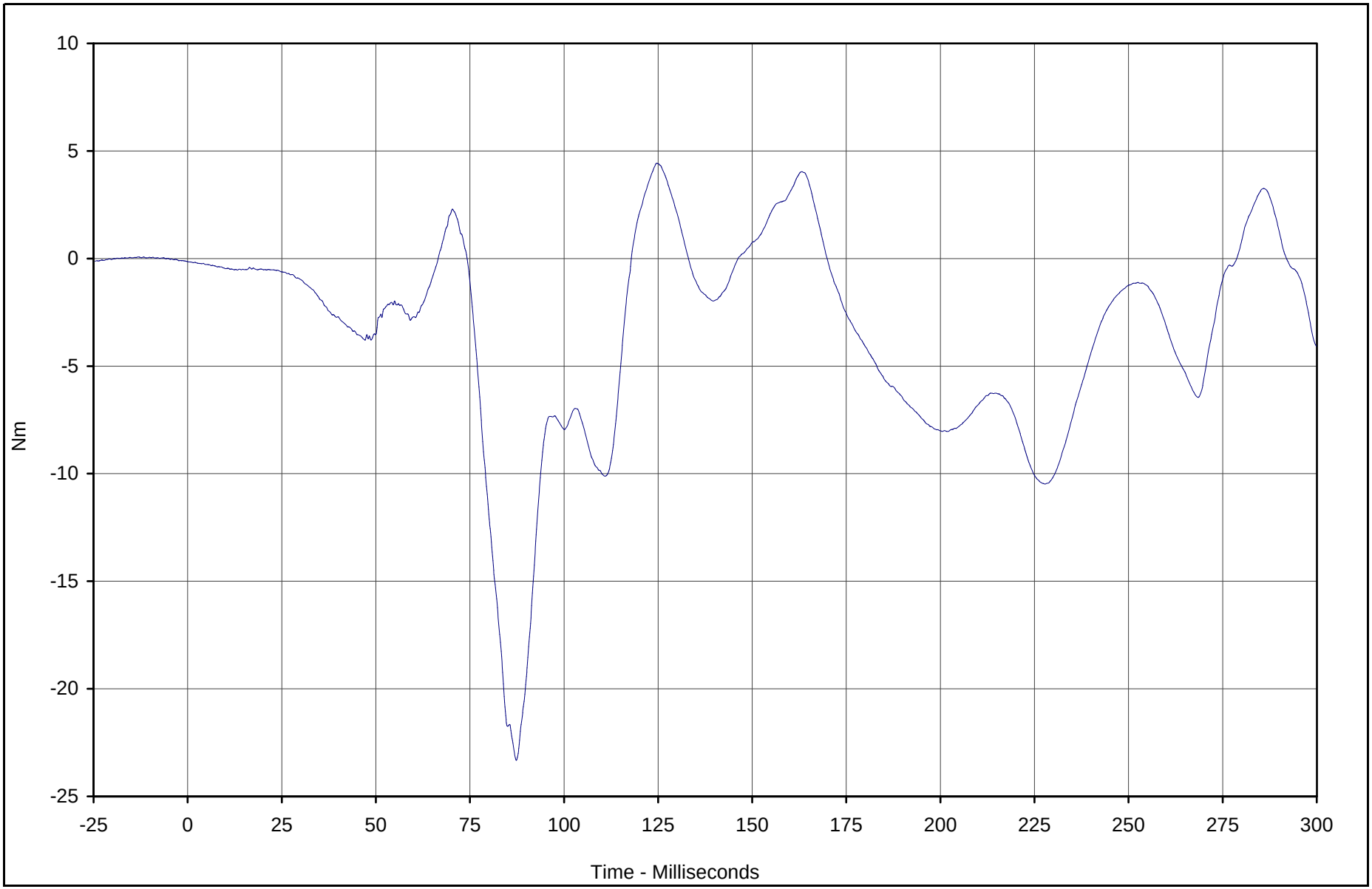
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Moment X | 172 | FIL | Nm | 4.4 | 124.6 | -23.3 | 87.3 | 600 |

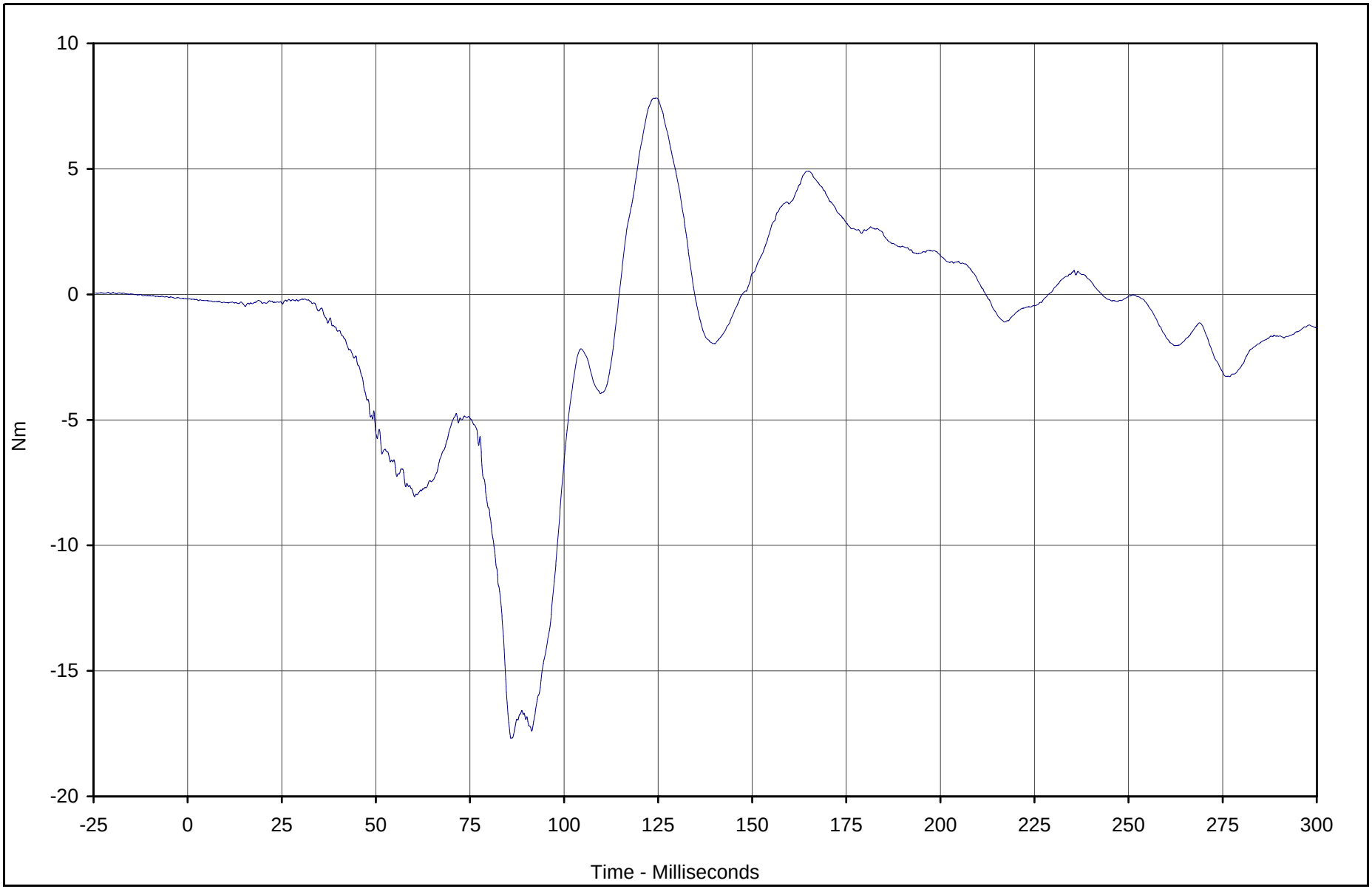
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Moment Y | 173 | FIL | Nm | 7.8 | 124.5 | -17.7 | 85.9 | 600 |

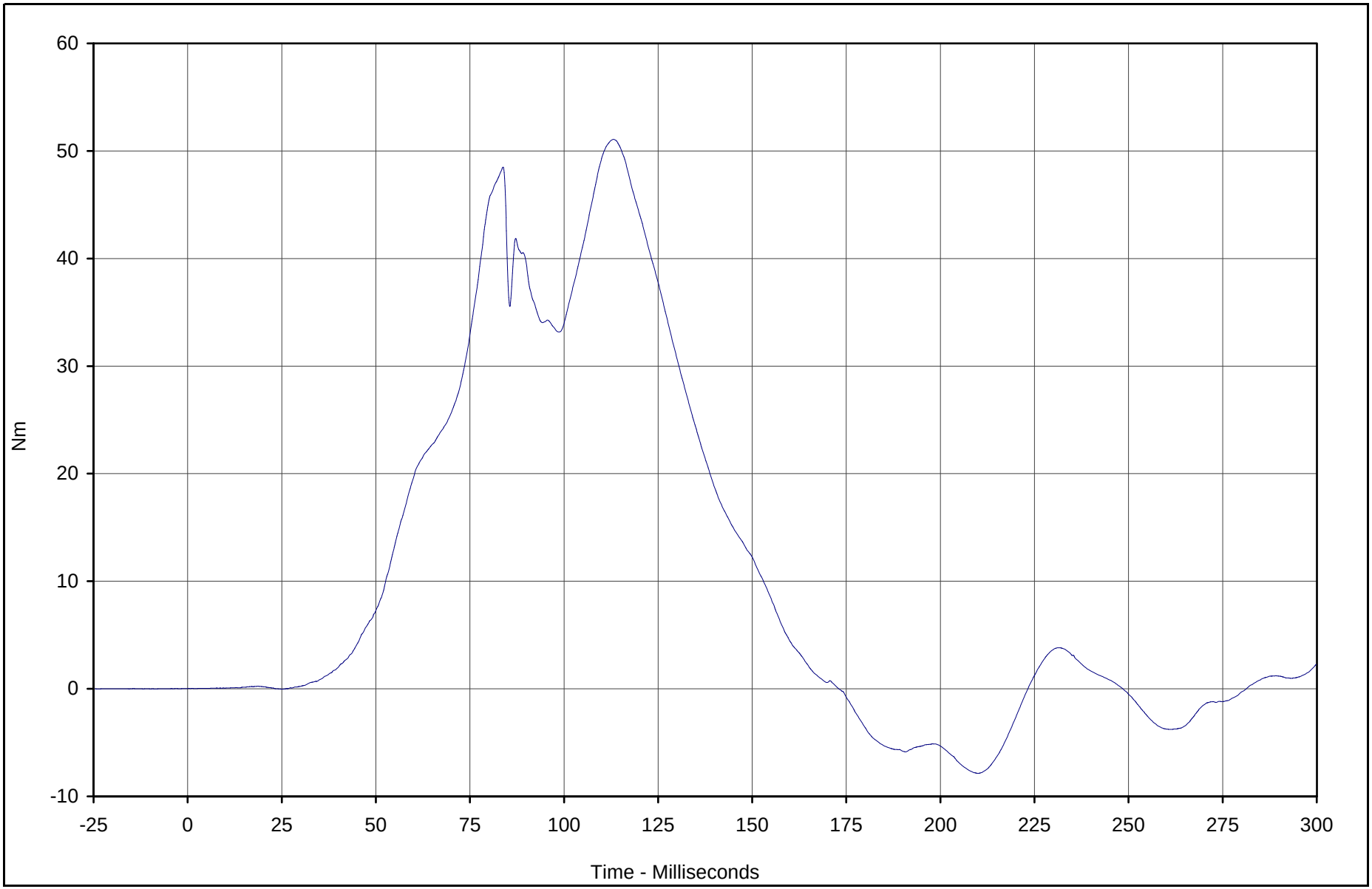
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Moment Z | 174 | FIL | Nm | 51.1 | 113.2 | -7.9 | 210.1 | 600 |

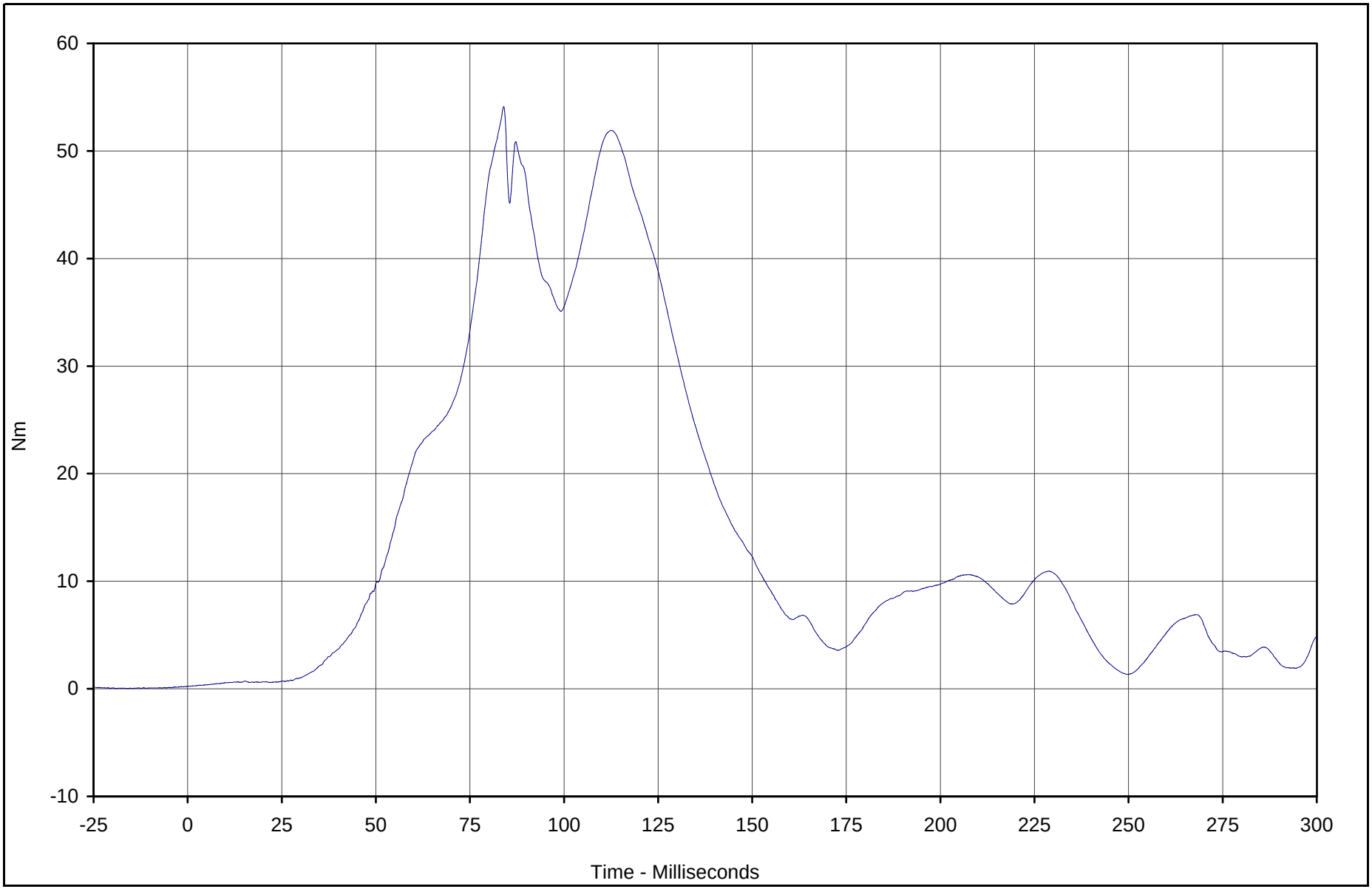
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Lower Neck Mom Res. | 172 | RES | Nm | 54.1 | 84.0 | 0.2 | 0.0 | 600 |

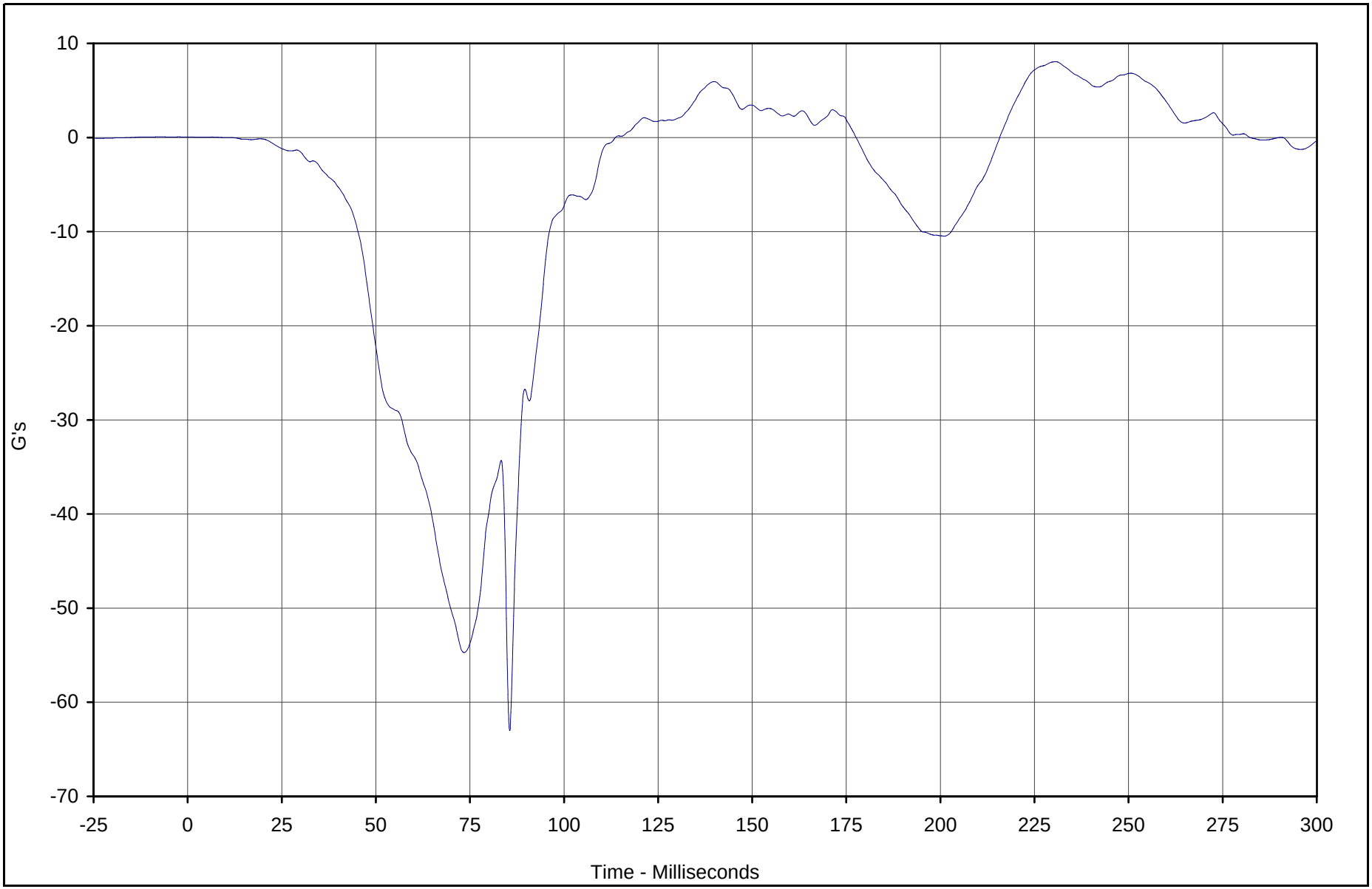
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Chest X | 175 | FIL | G's | 8.0 | 230.7 | -63.0 | 85.6 | 180 |

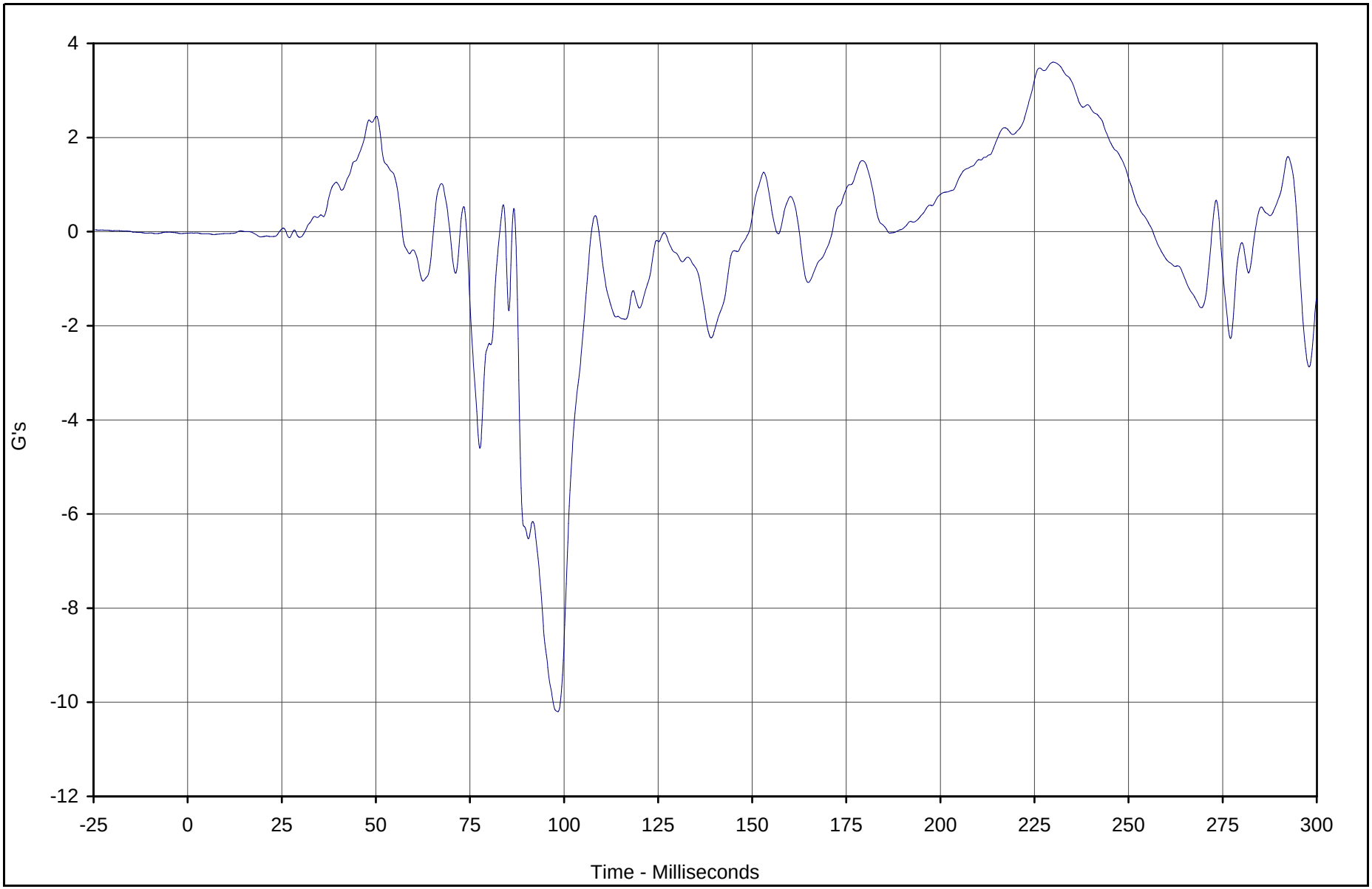
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



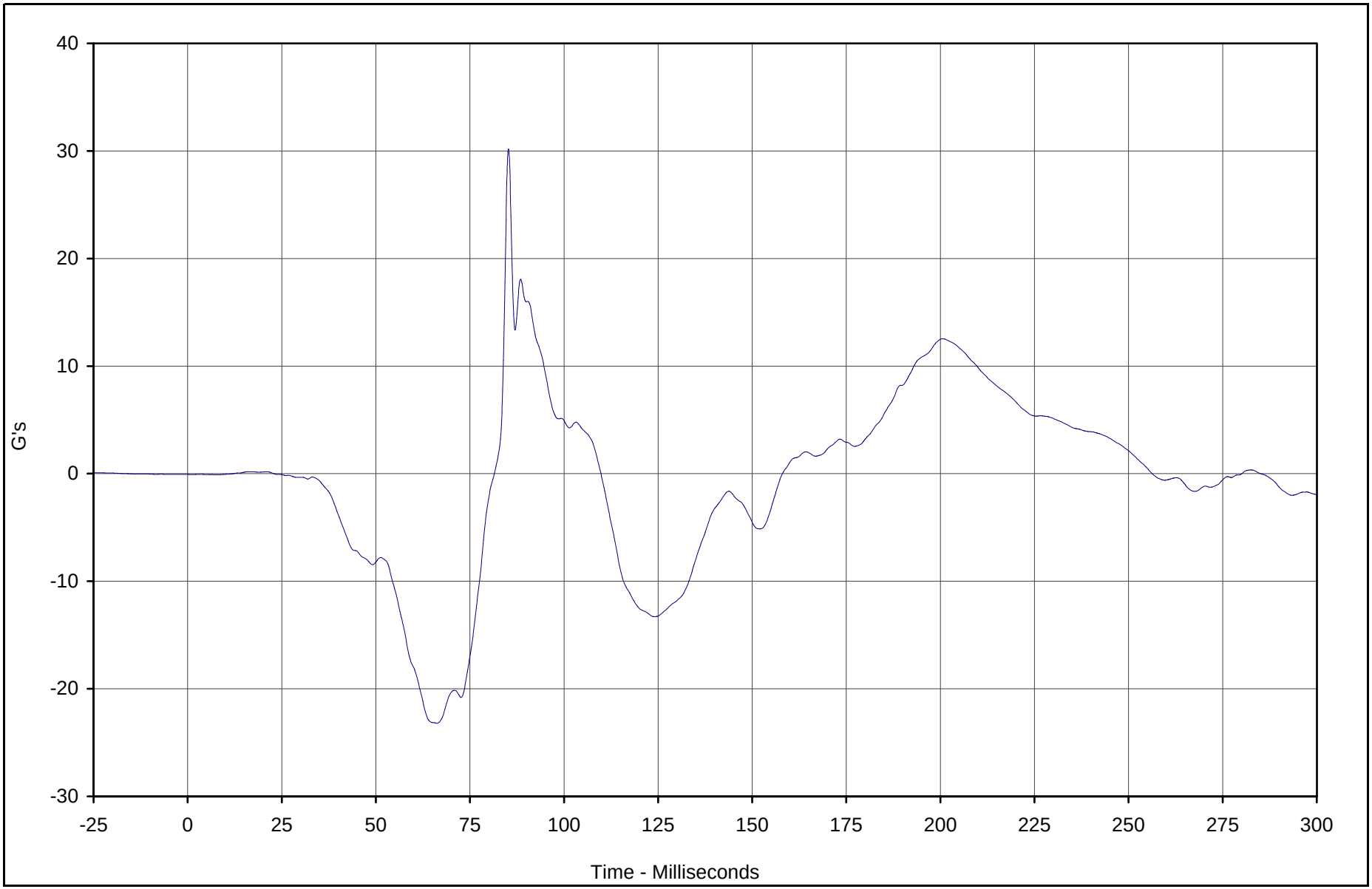

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Chest Y | 176 | FIL | G's | 3.6 | 230.0 | -10.2 | 98.3 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Chest Z | 177 | FIL | G's | 30.2 | 85.2 | -23.2 | 66.2 | 180 |

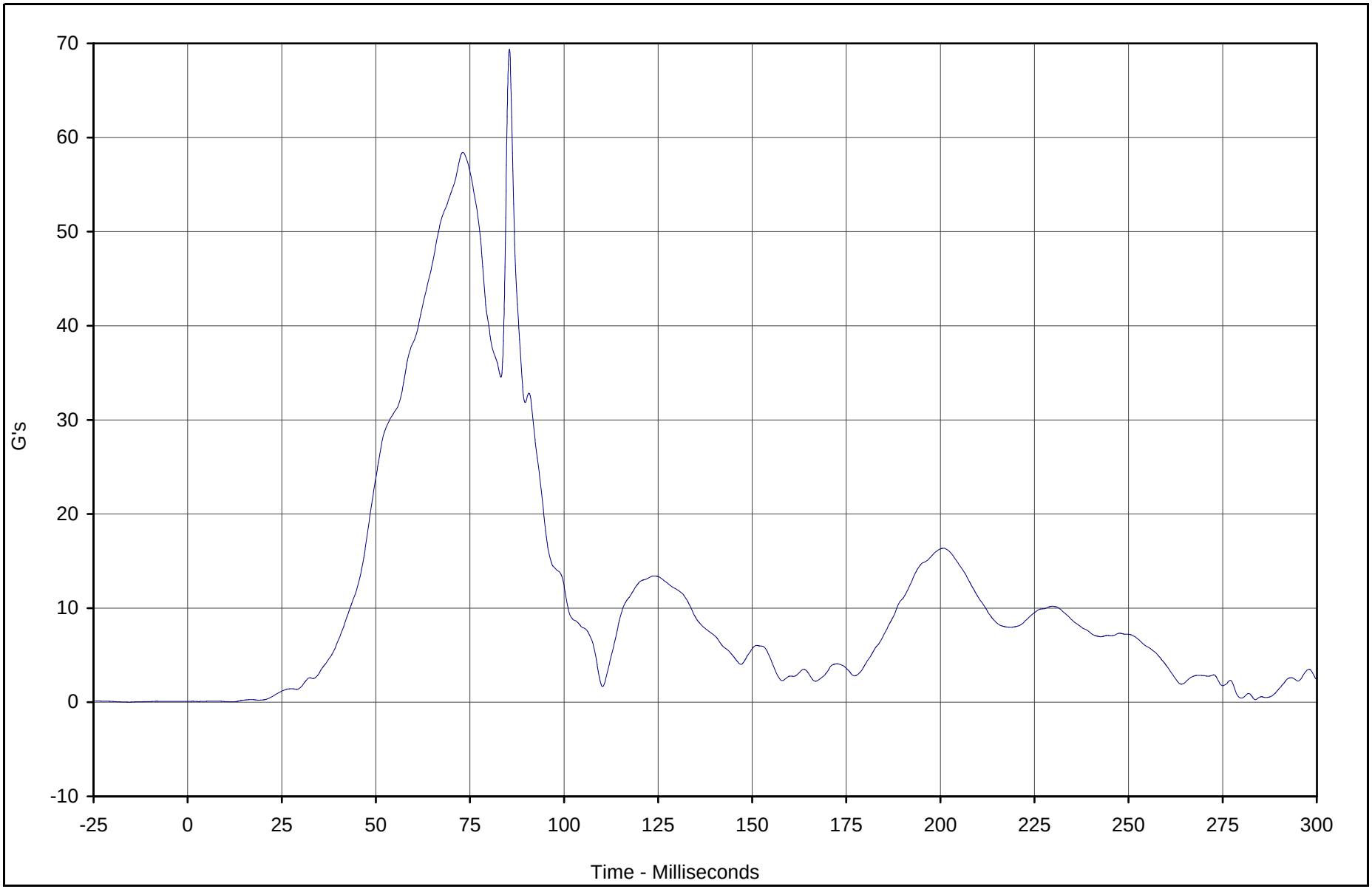
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



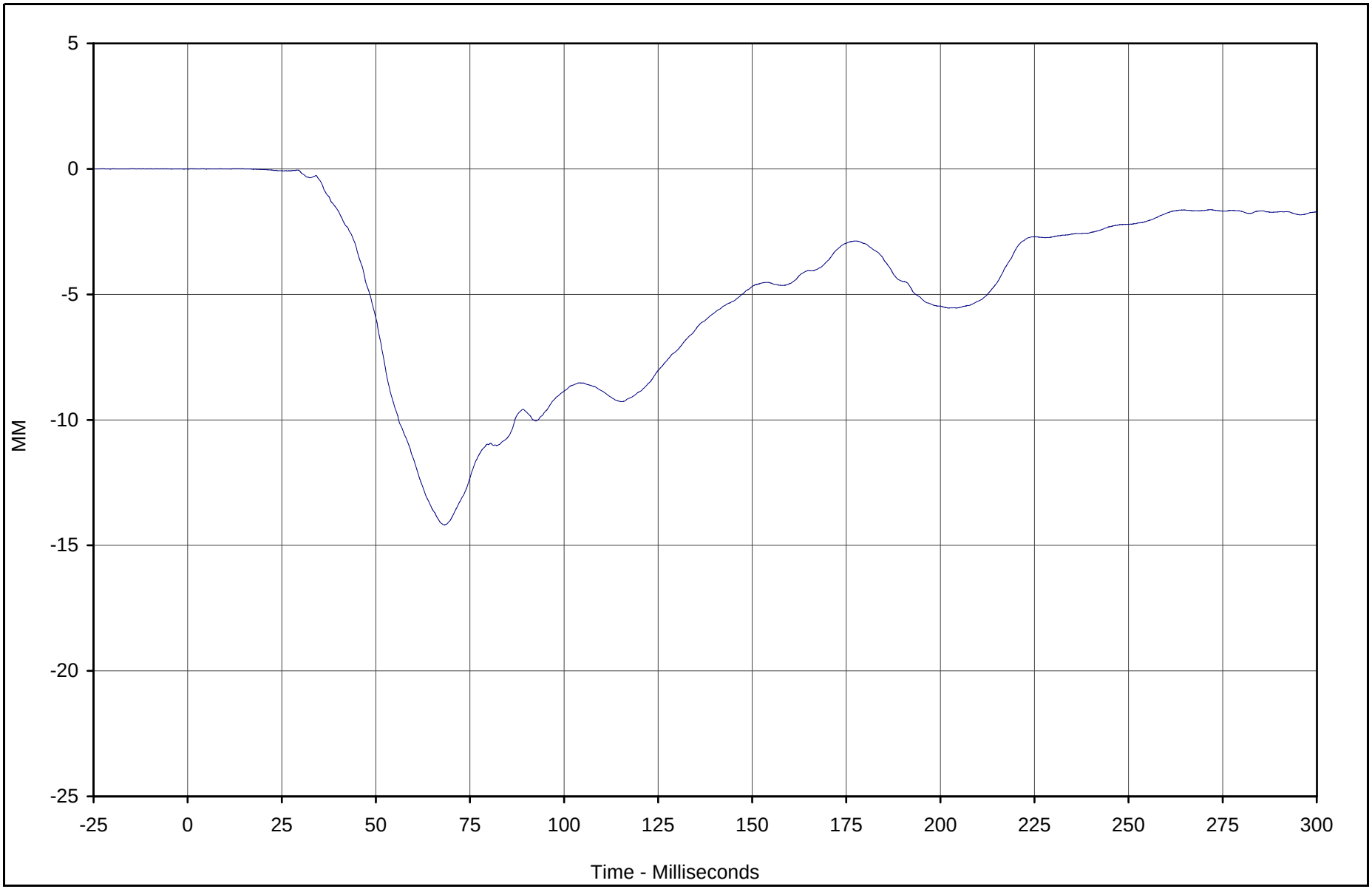

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Chest Resultant | 177 | RES | G's | 69.4 | 85.5 | 0.0 | 11.9 | 180 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203



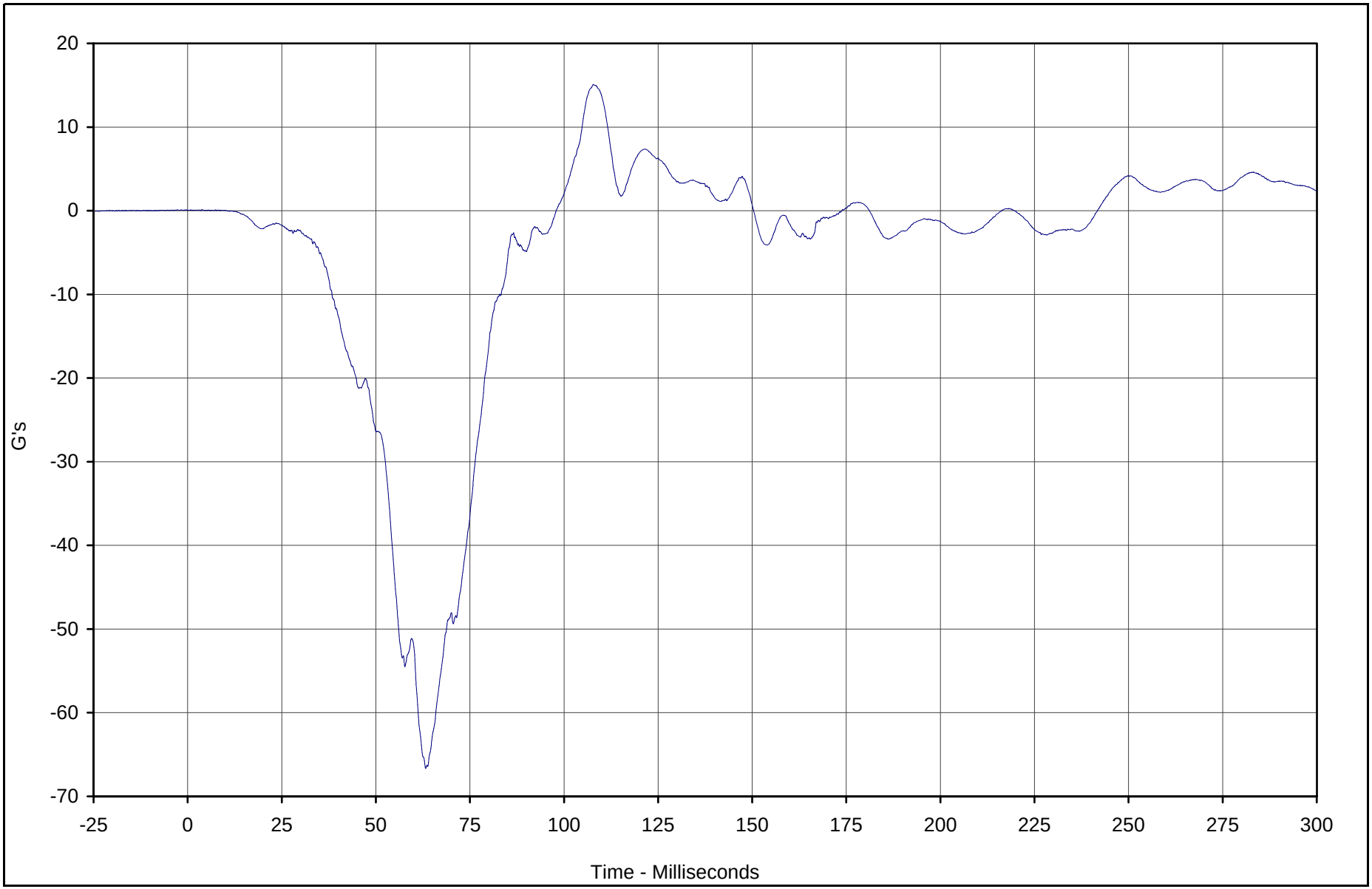

| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Chest Deflection | 178 | FIL | MM | 0.0 | 13.5 | -14.2 | 68.1 | 600 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Pelvis X | 179 | FIL | G's | 15.1 | 107.8 | -66.6 | 63.2 | 1000 |

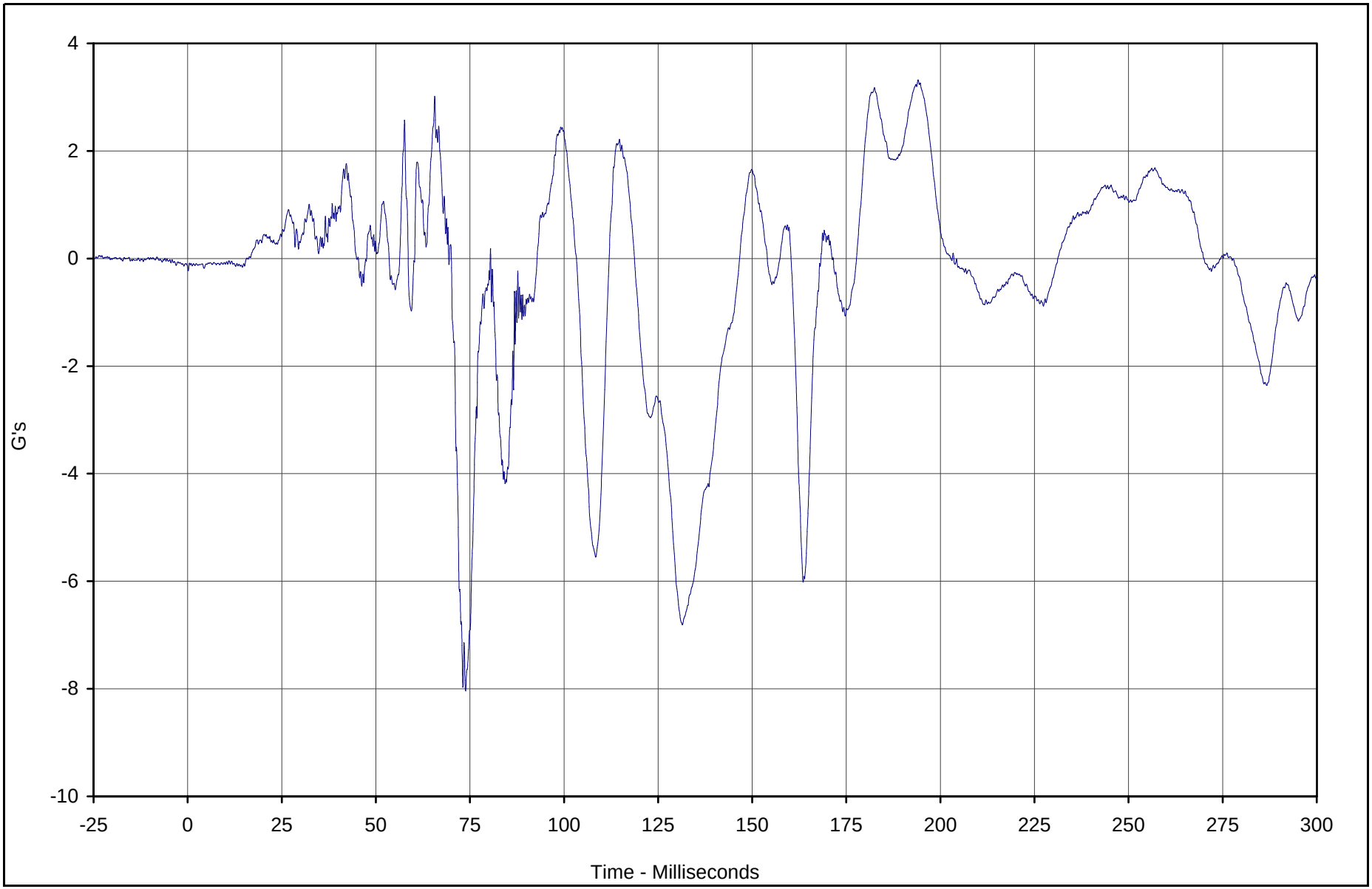
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Pelvis Y | 180 | FIL | G's | 3.3 | 194.1 | -8.0 | 73.9 | 1000 |

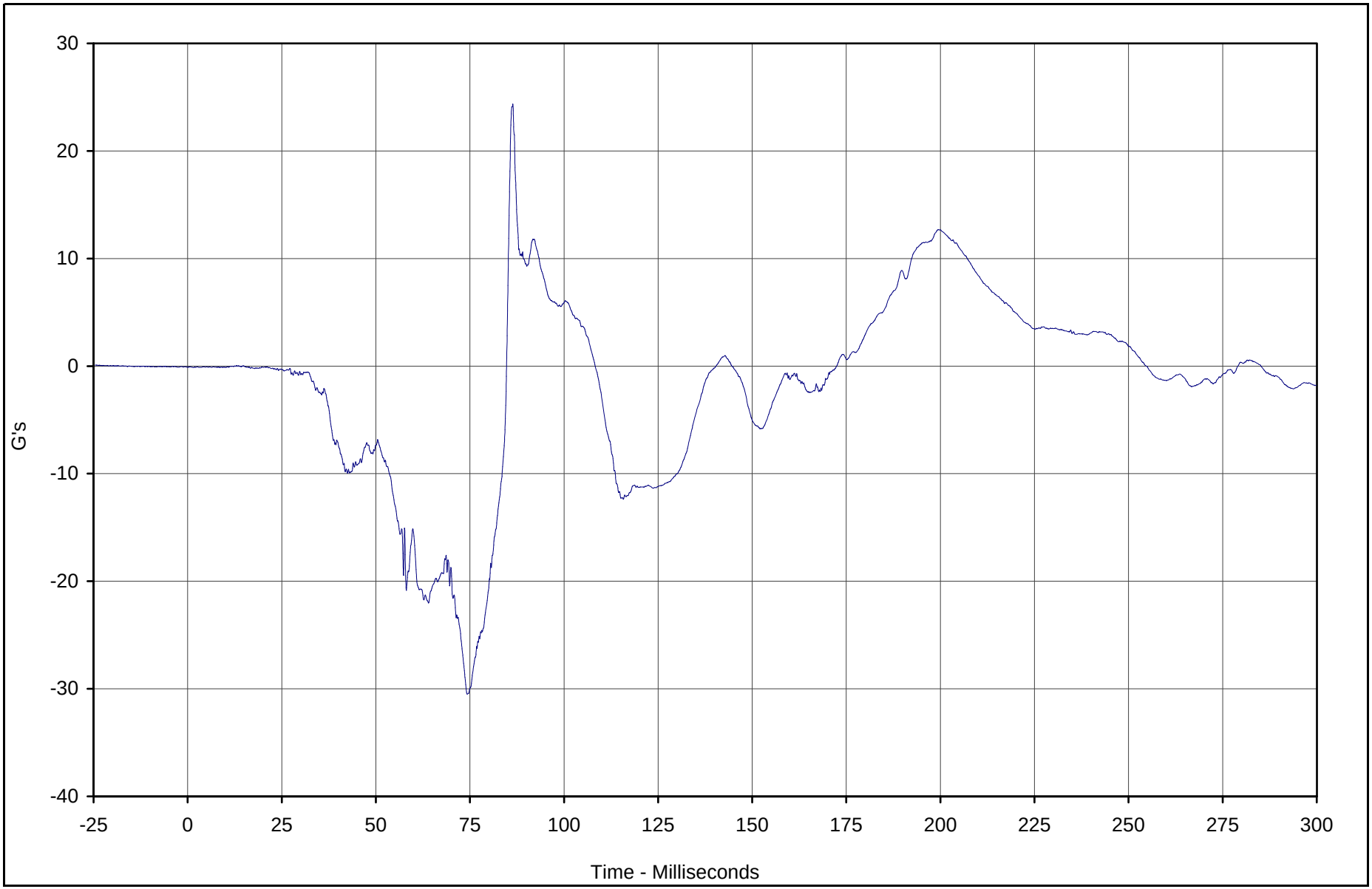
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Pelvis Z | 181 | FIL | G's | 24.3 | 86.4 | -30.5 | 74.3 | 1000 |

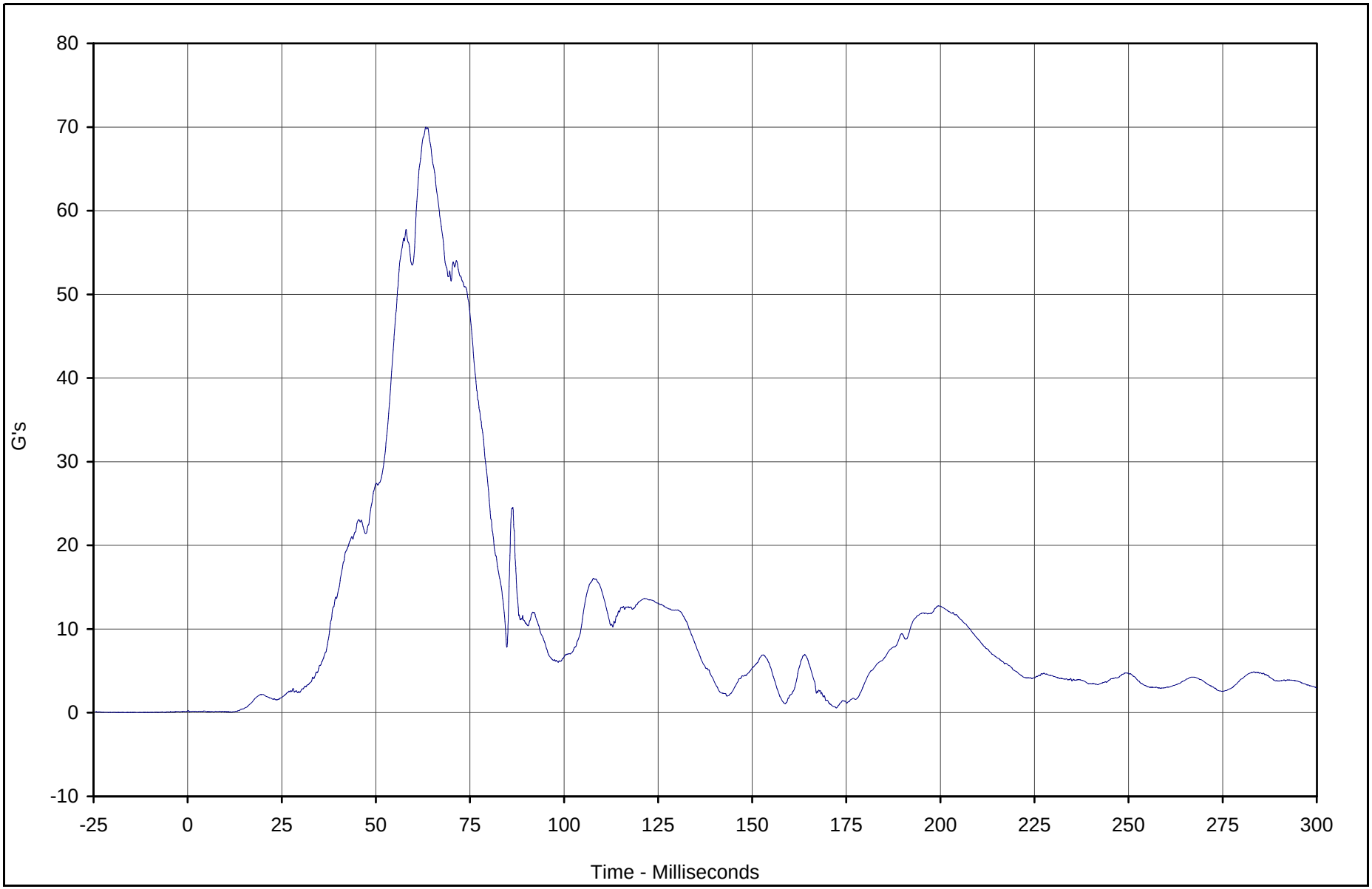
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Pelvis Resultant | 179 | RES | G's | 70.0 | 63.3 | 0.1 | 11.7 | 1000 |

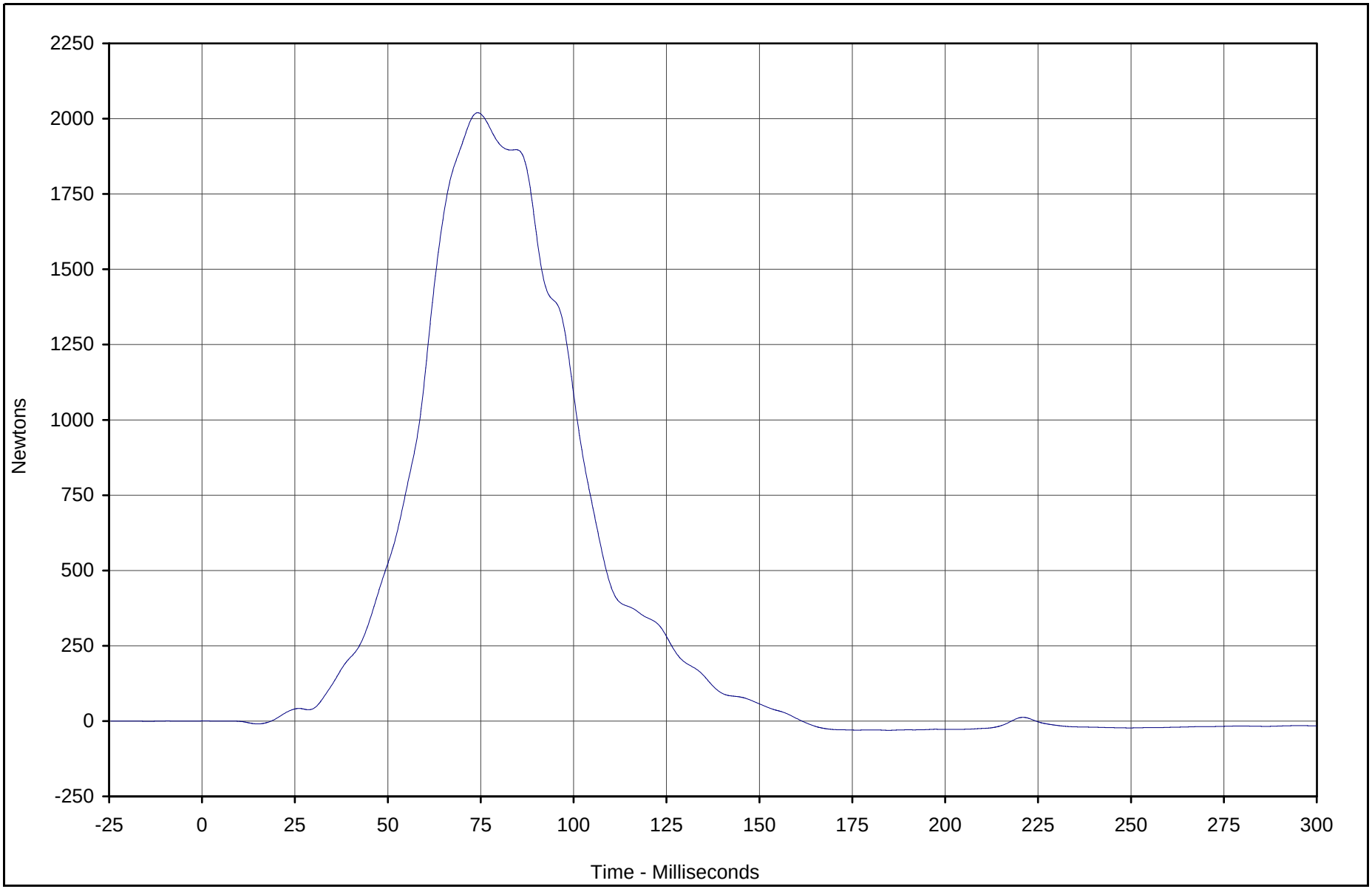
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Seat Tether Load | 182 | FIL | Newtons | 2019.8 | 74.2 | -30.6 | 184.8 | 60 |

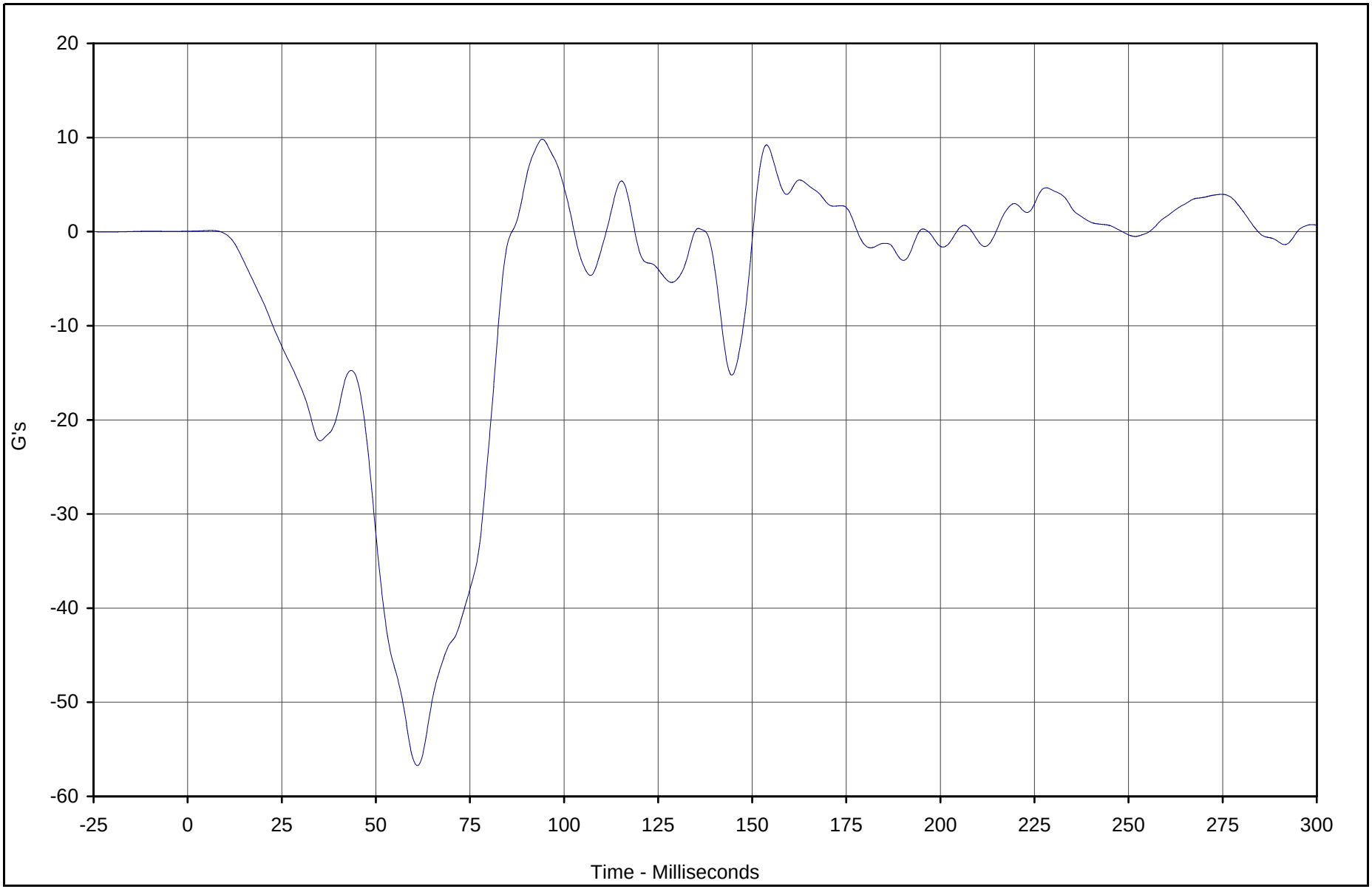
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Car Seat X | 183 | FIL | G's | 9.8 | 94.2 | -56.7 | 61.1 | 60 |

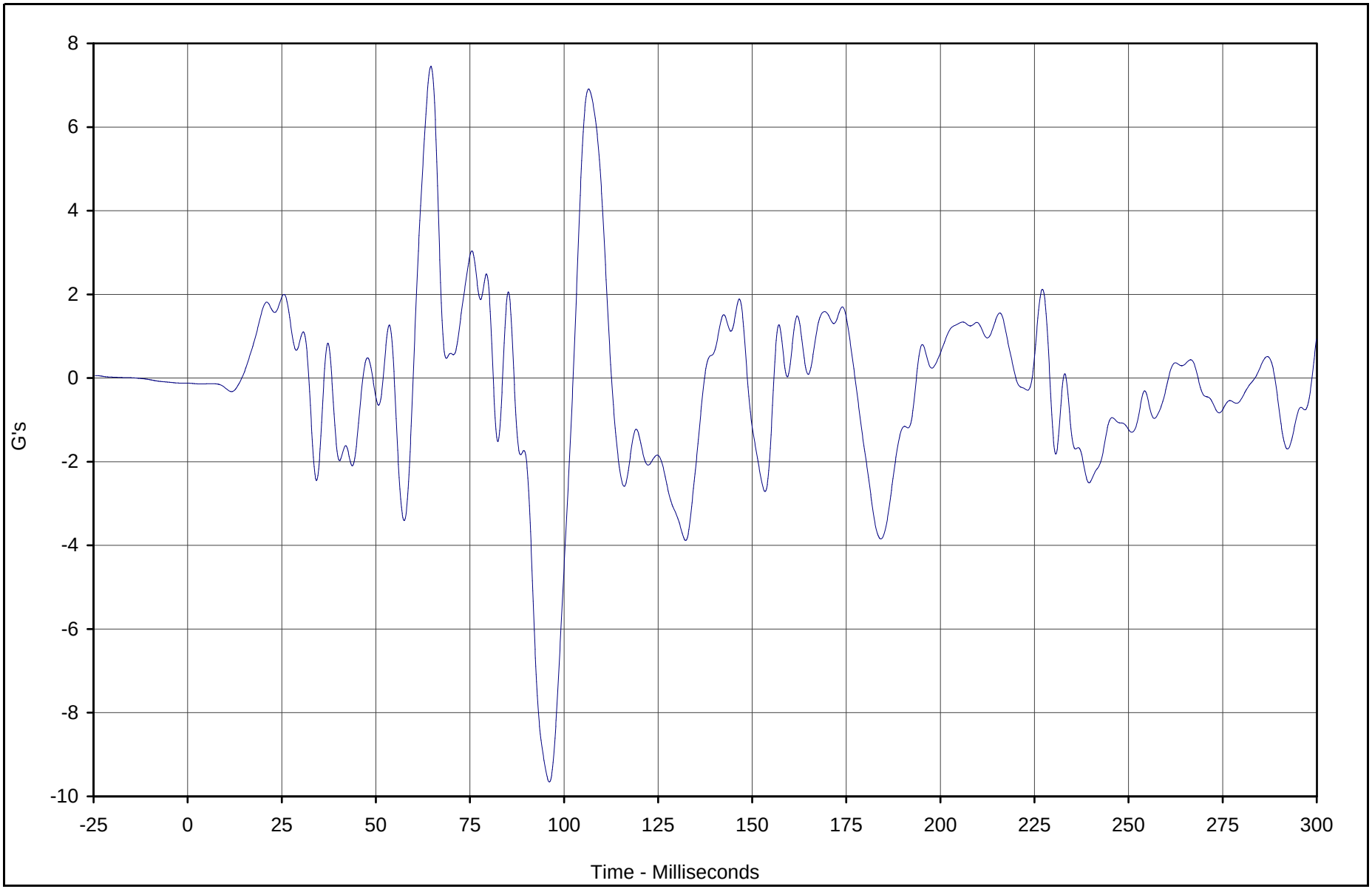
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Car Seat Y | 184 | FIL | G's | 7.5 | 64.6 | -9.7 | 96.1 | 60 |

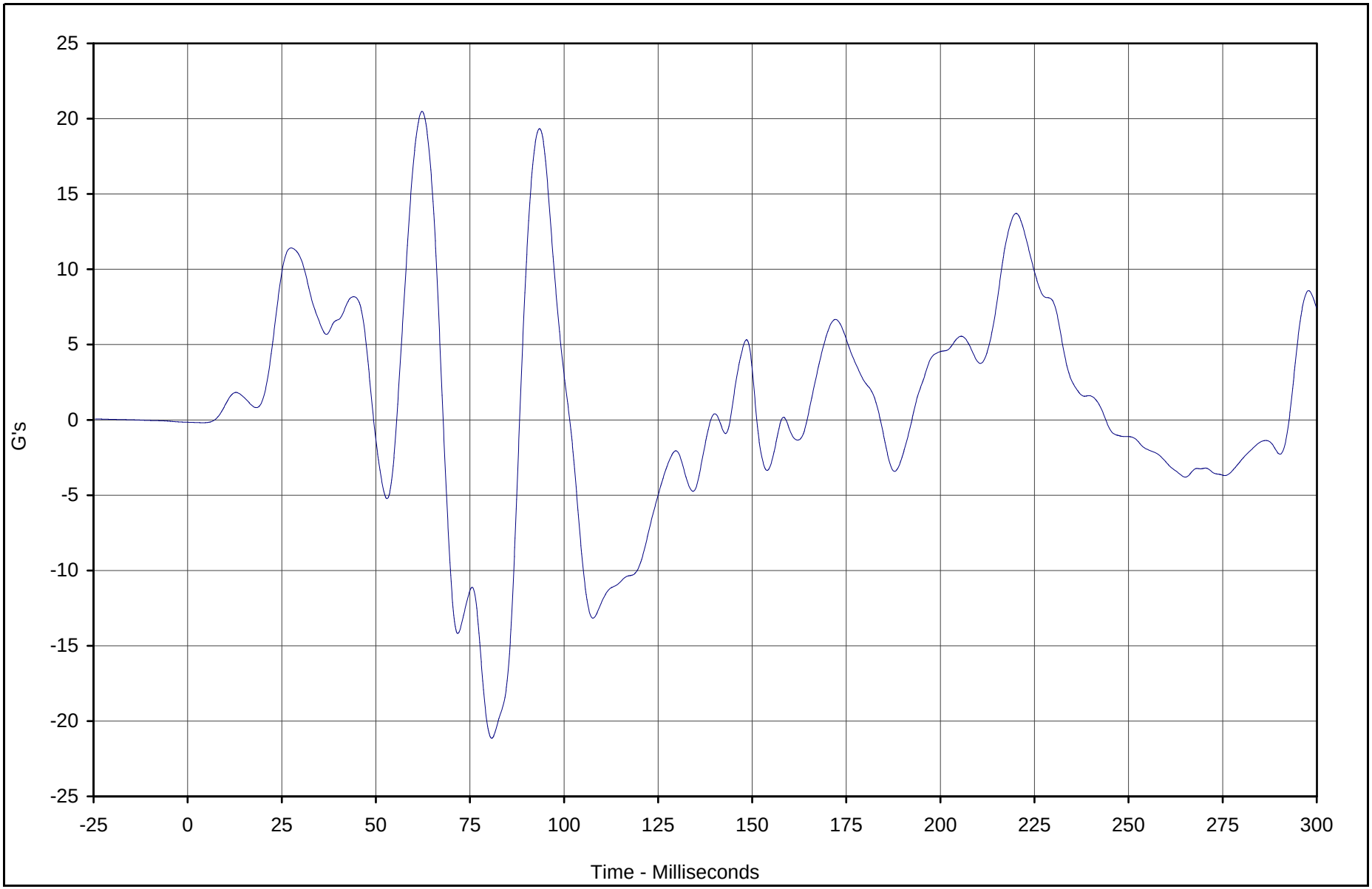
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Car Seat Z | 185 | FIL | G's | 20.5 | 62.3 | -21.1 | 80.8 | 60 |

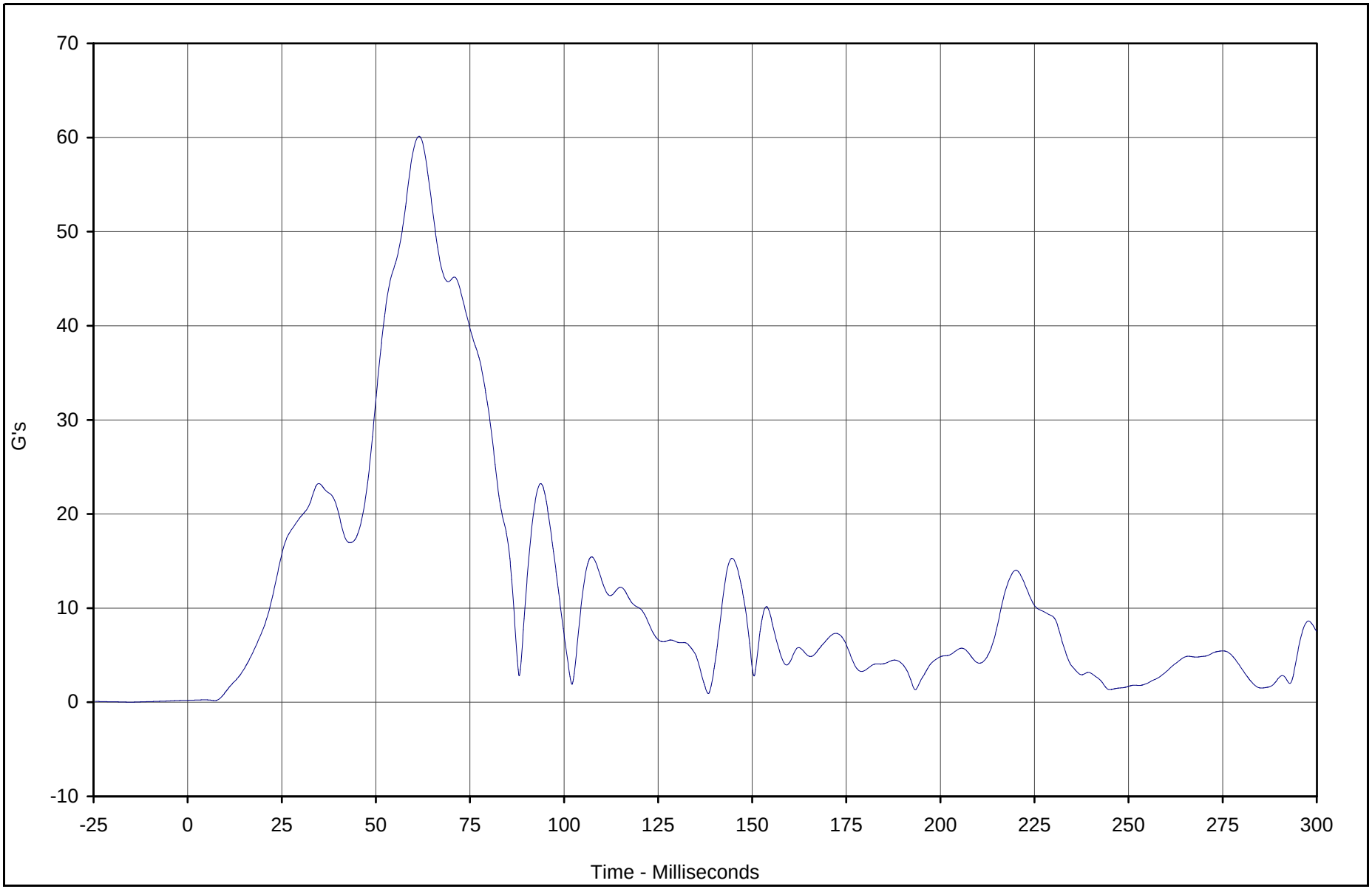
KARCO Engineering

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203




| Curve Description | CURNO | Type | Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|---|---|---|
| Right Rear Child Car Seat Resultant | 183 | RES | G's | 60.1 | 61.5 | 0.2 | 7.3 | 60 |

Test Vehicle: 2003 Nissan Frontier XE 4 Door Pickup

Test Date: 12/19/02

Test Program: 2003 NHTSA 35mph NCAP

NHTSA No.: M35203

## SECTION F-4

## CHILD DUMMY INSTRUMENTATION INFORMATION

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Left Rear Child A.T.D. Serial Number 082**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 134 | HEAD, PRIMARY | X | GPAC050 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 135 | HEAD, PRIMARY | Y | GPAC051 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 136 | HEAD, PRIMARY | Z | GPAC052 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 137 | UPPER NECK FORCE | X | 082UNFX | Load cell, six axis neck | R. A. Denton | IF-234 | N |
| 138 | UPPER NECK FORCE | Y | 082UNFY | Load cell, six axis neck | R. A. Denton | IF-234 | N |
| 139 | UPPER NECK FORCE | Z | 082UNFZ | Load cell, six axis neck | R. A. Denton | IF-234 | N |
| 140 | UPPER NECK MOMENT | X | 082UNMX | Load cell, six axis neck | R. A. Denton | IF-234 | Nm |
| 141 | UPPER NECK MOMENT | Y | 082UNMY | Load cell, six axis neck | R. A. Denton | IF-234 | Nm |
| 142 | UPPER NECK MOMENT | Z | 082UNMZ | Load cell, six axis neck | R. A. Denton | IF-234 | Nm |
| 143 | LOWER NECK FORCE | X | 082LNFX | Load cell, six axis neck | R. A. Denton | 3303 | N |
| 144 | LOWER NECK FORCE | Y | 082LNFY | Load cell, six axis neck | R. A. Denton | 3303 | N |
| 145 | LOWER NECK FORCE | Z | 082LNFZ | Load cell, six axis neck | R. A. Denton | 3303 | N |
| 146 | LOWER NECK MOMENT | X | 082LNMX | Load cell, six axis neck | R. A. Denton | 3303 | Nm |
| 147 | LOWER NECK MOMENT | Y | 082LNMY | Load cell, six axis neck | R. A. Denton | 3303 | Nm |
| 148 | LOWER NECK MOMENT | Z | 082LNMZ | Load cell, six axis neck | R. A. Denton | 3303 | Nm |
| 149 | CHEST , PRIMARY | X | 2116-A11 | Accel., Full Bridge | Entran | 2000JF | G |
| 150 | CHEST , PRIMARY | Y | 2116-A14 | Accel., Full Bridge | Entran | 2000JF | G |
| 151 | CHEST , PRIMARY | Z | 2116-A23 | Accel., Full Bridge | Entran | 2000JF | G |
| 152 | CHEST DISPLACEMENT | X | 082CP | Rotary Pot Chest | Servo | 14CBI | MM |
| 153 | PELVIS, PRIMARY | X | 2116-A12 | Accel., Full Bridge | Entran | 2000JF | G |
| 154 | PELVIS, PRIMARY | Y | 2116-A19 | Accel., Full Bridge | Entran | 2000JF | G |
| 155 | PELVIS, PRIMARY | Z | 2116-A17 | Accel., Full Bridge | Entran | 2000JF | G |
| 156 | CAR SEAT TETHER | X | BL112 | Load cell, Seat belt | FGP | FN4060 | N |
| 157 | CAR SEAT | X | KETX1A | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 158 | CAR SEAT | Y | KETX1B | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 159 | CAR SEAT | Z | KETX1C | Accel.,1/2 bridge | Endevco | 7264-200 | G |

**2003 NHTSA 35mph NCAP**
**Instrumentation Data Channel Assignments**
**Right Rear Child A.T.D. Serial Number 139**
**12/19/02**
**2003 Nissan Frontier XE 4 Door Pickup**

| CH. | LOCATION | AXIS | IDENT. NO. | DESCRIPTION | MFR | MODEL | UNITS |
|---|---|---|---|---|---|---|---|
| 160 | HEAD, PRIMARY | X | GPAC047 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 161 | HEAD, PRIMARY | Y | GPAC048 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 162 | HEAD, PRIMARY | Z | GPAC049 | Accel.,1/2 bridge | Endevco | 7264-2000 | G |
| 163 | UPPER NECK FORCE | X | 139UNFX | Load cell, six axis neck | R. A. Denton | IF-234 | N |
| 164 | UPPER NECK FORCE | Y | 139UNFY | Load cell, six axis neck | R. A. Denton | IF-234 | N |
| 165 | UPPER NECK FORCE | Z | 139UNFZ | Load cell, six axis neck | R. A. Denton | IF-234 | N |
| 166 | UPPER NECK MOMENT | X | 139UNMX | Load cell, six axis neck | R. A. Denton | IF-234 | Nm |
| 167 | UPPER NECK MOMENT | Y | 139UNMY | Load cell, six axis neck | R. A. Denton | IF-234 | Nm |
| 168 | UPPER NECK MOMENT | Z | 139UNMZ | Load cell, six axis neck | R. A. Denton | IF-234 | Nm |
| 169 | LOWER NECK FORCE | X | 139LNFX | Load cell, six axis neck | R. A. Denton | 3303 | N |
| 170 | LOWER NECK FORCE | Y | 139LNFY | Load cell, six axis neck | R. A. Denton | 3303 | N |
| 171 | LOWER NECK FORCE | Z | 139LNFZ | Load cell, six axis neck | R. A. Denton | 3303 | N |
| 172 | LOWER NECK MOMENT | X | 139LNMX | Load cell, six axis neck | R. A. Denton | 3303 | Nm |
| 173 | LOWER NECK MOMENT | Y | 139LNMY | Load cell, six axis neck | R. A. Denton | 3303 | Nm |
| 174 | LOWER NECK MOMENT | Z | 139LNMZ | Load cell, six axis neck | R. A. Denton | 3303 | Nm |
| 175 | CHEST , PRIMARY | X | 2116-A01 | Accel., Full Bridge | Entran | 2000JF | G |
| 176 | CHEST , PRIMARY | Y | 2116-A06 | Accel., Full Bridge | Entran | 2000JF | G |
| 177 | CHEST , PRIMARY | Z | 2116-A07 | Accel., Full Bridge | Entran | 2000JF | G |
| 178 | CHEST DISPLACEMENT | X | 139CP | Rotary Pot Chest | Servo | 14CBI | MM |
| 179 | PELVIS, PRIMARY | X | 2116-N07 | Accel., Full Bridge | Entran | 2000JF | G |
| 180 | PELVIS, PRIMARY | Y | 2116-A03 | Accel., Full Bridge | Entran | 2000JF | G |
| 181 | PELVIS, PRIMARY | Z | 2116-A17 | Accel., Full Bridge | Entran | 2000JF | G |
| 182 | CAR SEAT TETHER | X | BL113 | Load cell, Seat belt | FGP | FN4060 | N |
| 183 | CAR SEAT | X | KETX4A | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 184 | CAR SEAT | Y | KETX4B | Accel.,1/2 bridge | Endevco | 7264-200 | G |
| 185 | CAR SEAT | Z | KETX4C | Accel.,1/2 bridge | Endevco | 7264-200 | G |

## SECTION F-5

## CHILD DUMMY CALIBRATION INFORMATION

# Calibration Data Sheet
# Hybrid III 3 Year Old
# Head Drop Test

ATD Serial No.: 082 Test I.D.: 3H01A

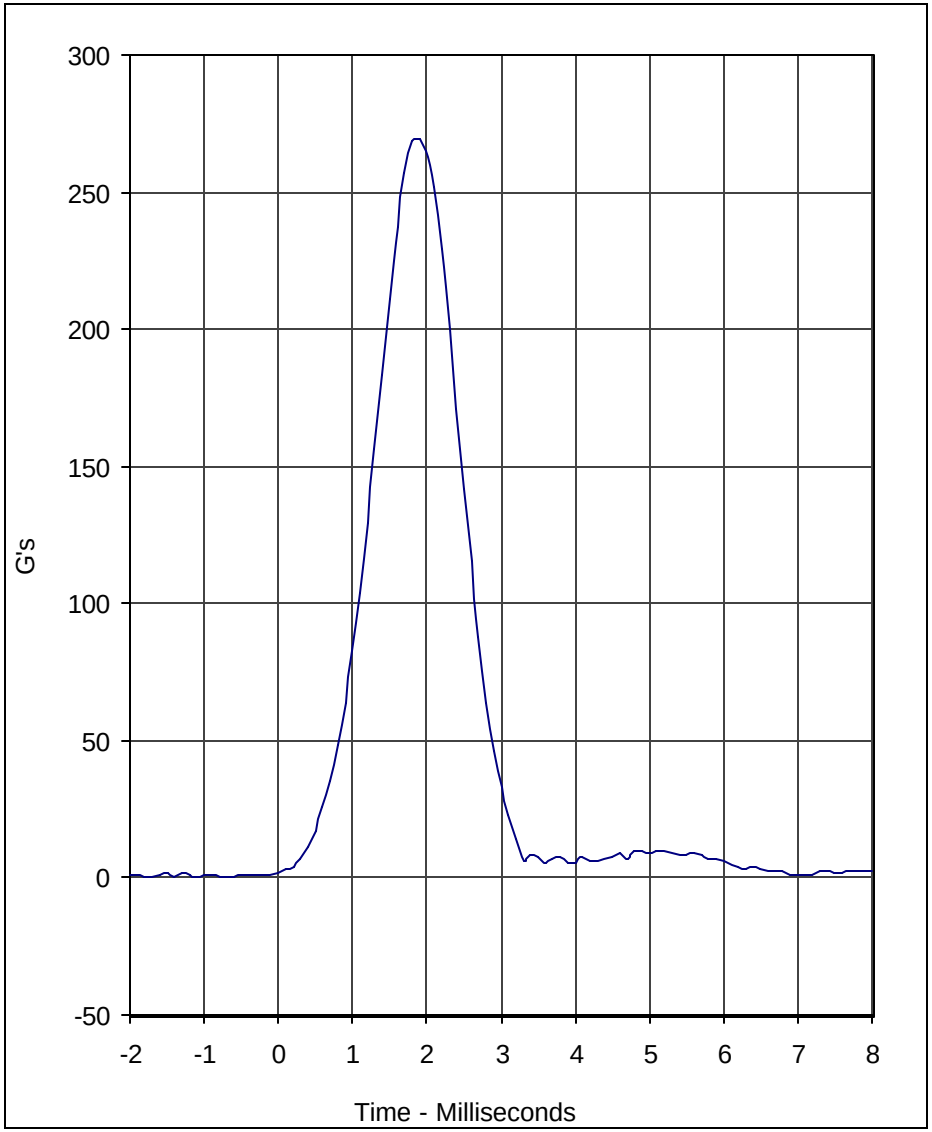
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 250.0 to 280.0 | 269.6 | Pass |
| Peak Lateral Acceleration | G's | ≤15.0 | 7.0 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <10 | 3.7 | Pass |
| | | Overall Test Results | | Pass |

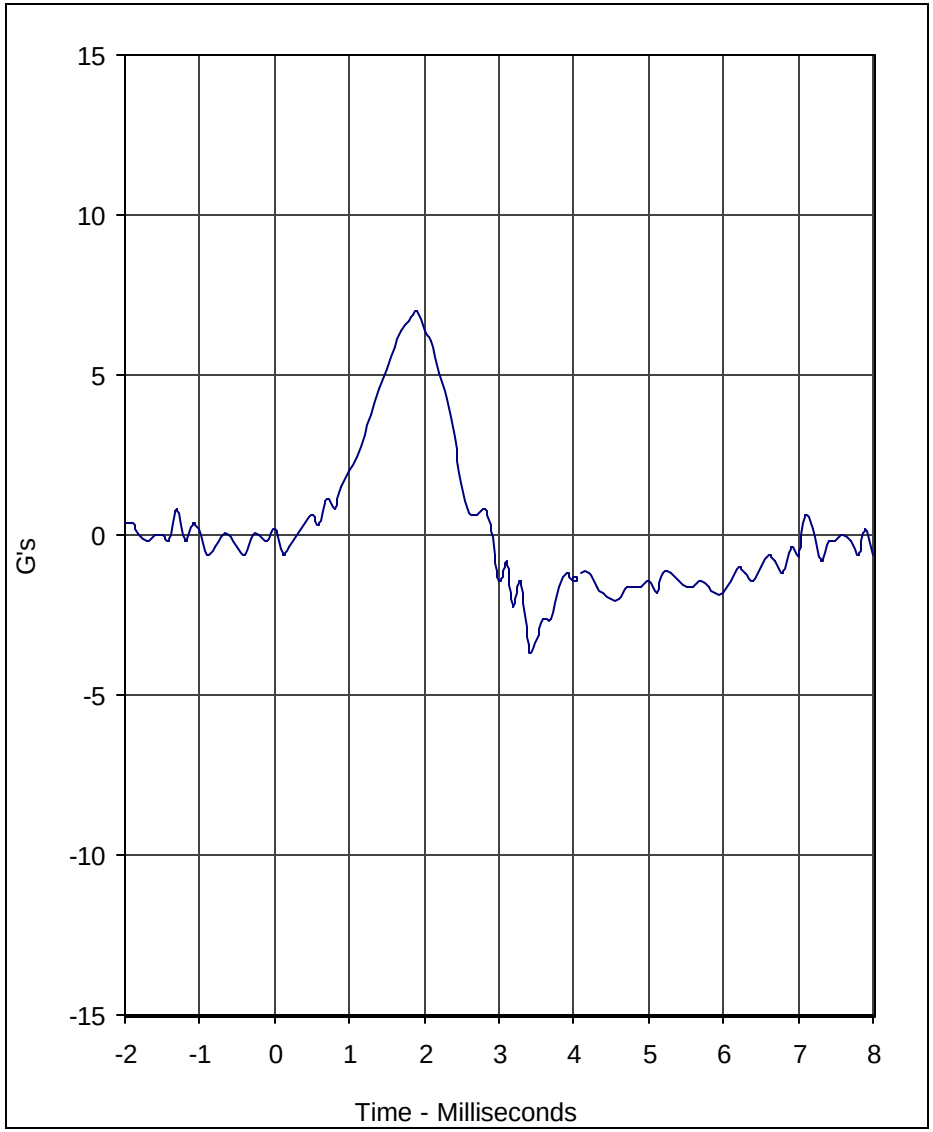




Laboratory Technician

December 4, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Head Resultant | 001 | RES |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 269.6 | 1.9 | 0.4 | -0.7 | 1000 |

| Curve Description | CURNO | Type |
|---|---|---|
| Head Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 7.0 | 1.9 | -3.6 | 3.4 | 1000 |

Test Program: Hybrid III 3 Year Old Head Drop Test

Test Date: 12/4/02

A.T.D. Serial No.: 082

Test I.D.: 3H01A

KARCO Engineering

F5-2

TR-P23001-03-NC

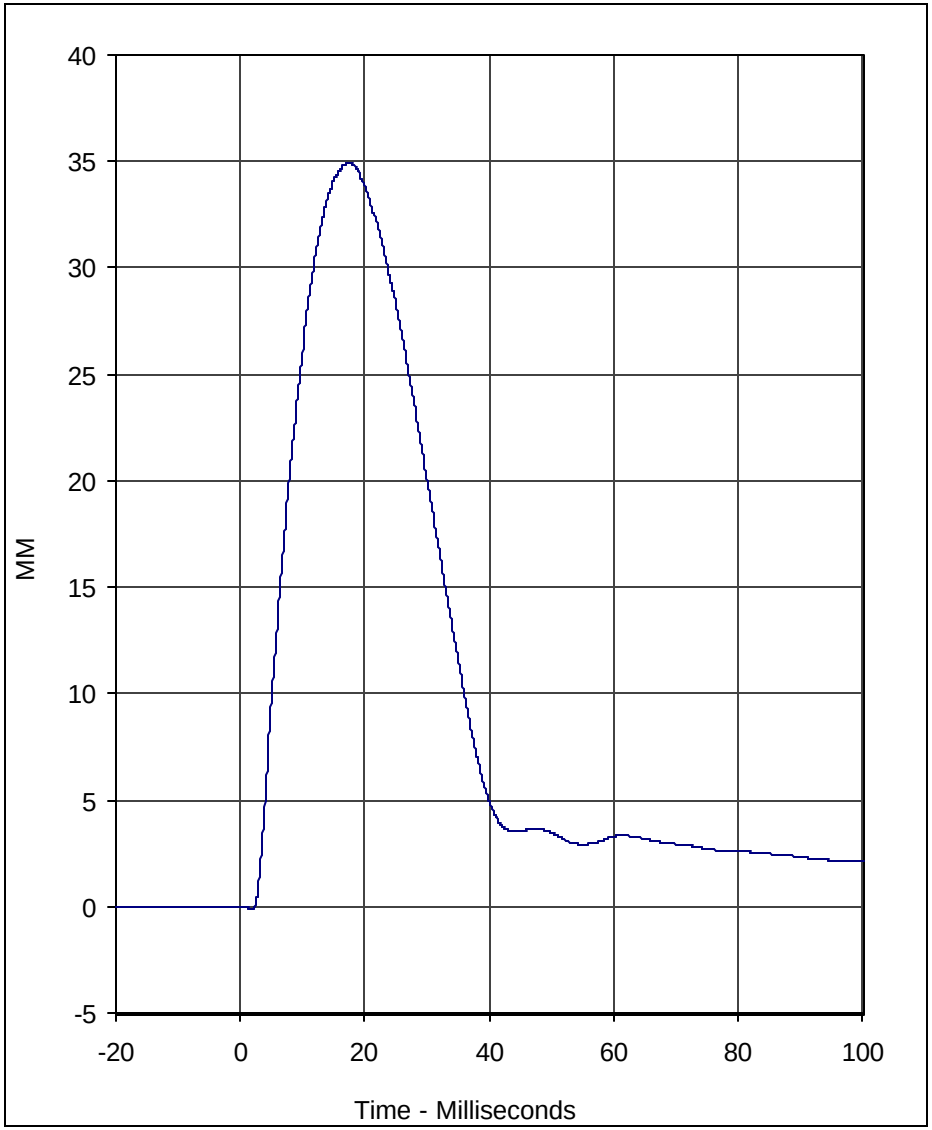
# Calibration Data Sheet
# Hybrid III 3 Year Old
# Thorax Impact Test

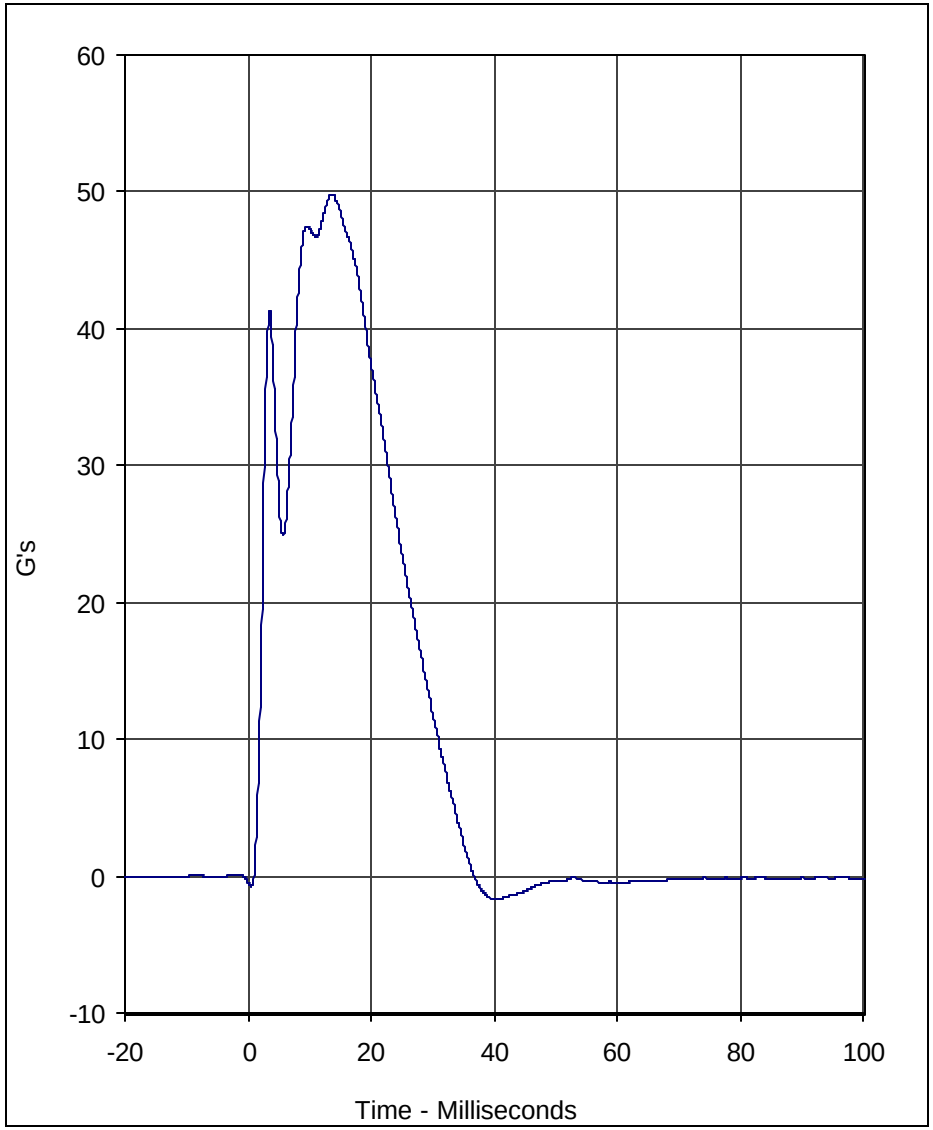
ATD Serial No.: 082 Test I.D.: CH12A

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 5.9 to 6.1 | 5.96 | Pass |
| Peak Chest Compression | MM | 32 to 38 | 34.9 | Pass |
| Peak Probe Force Between 32 and 38 MM | Newtons | 680 to 810 | 775.2 | Pass |
| Peak Probe Force Between 12.5 and 32 MM | Newtons | ≤860 | 770.6 | Pass |
| Internal Hysterysis | % | 65 to 85 | 69.3 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 6, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Chest Compression | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| MM | 34.9 | 17.5 | -0.1 | 1.8 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Probe Acceleration | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 49.8 | 13.7 | -1.7 | 40.2 | 180 |

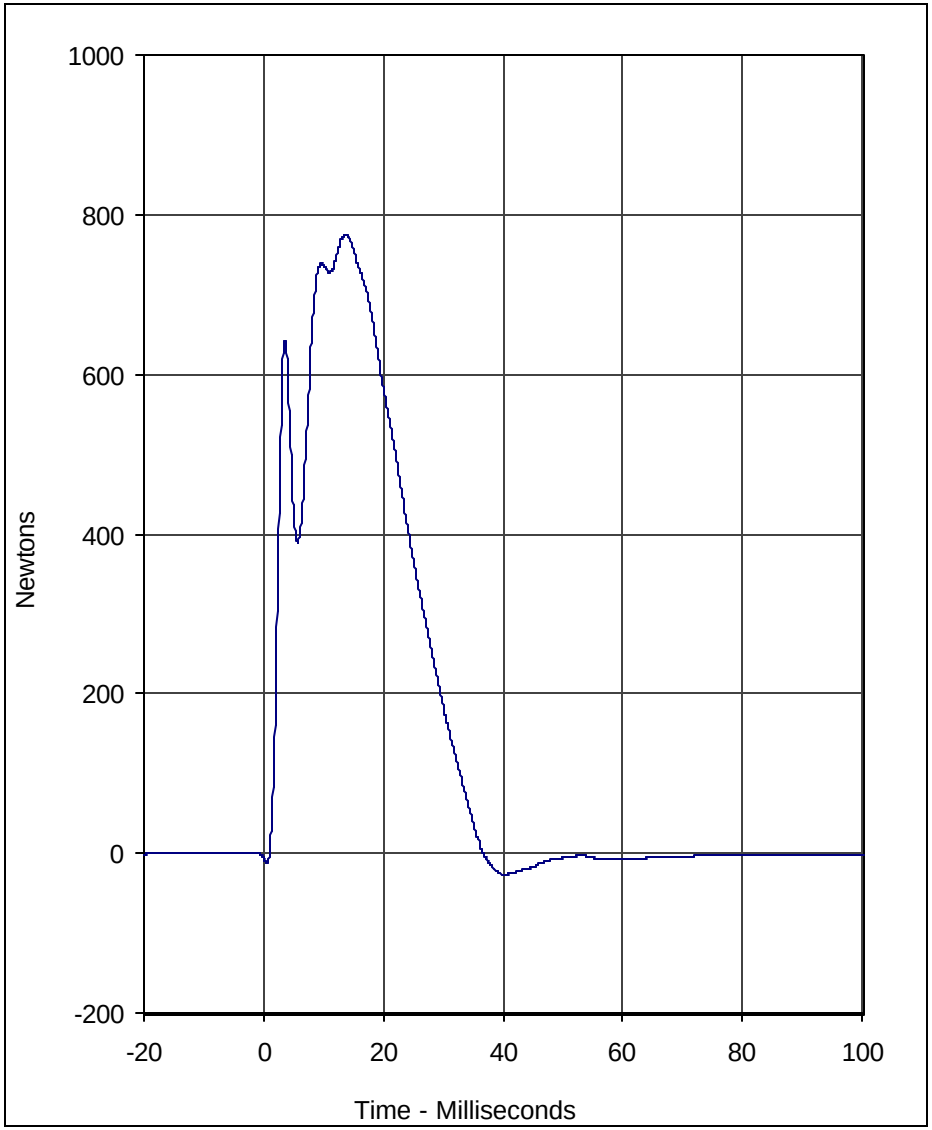
Test Program: Hybrid III 3 Year Old Thorax Impact

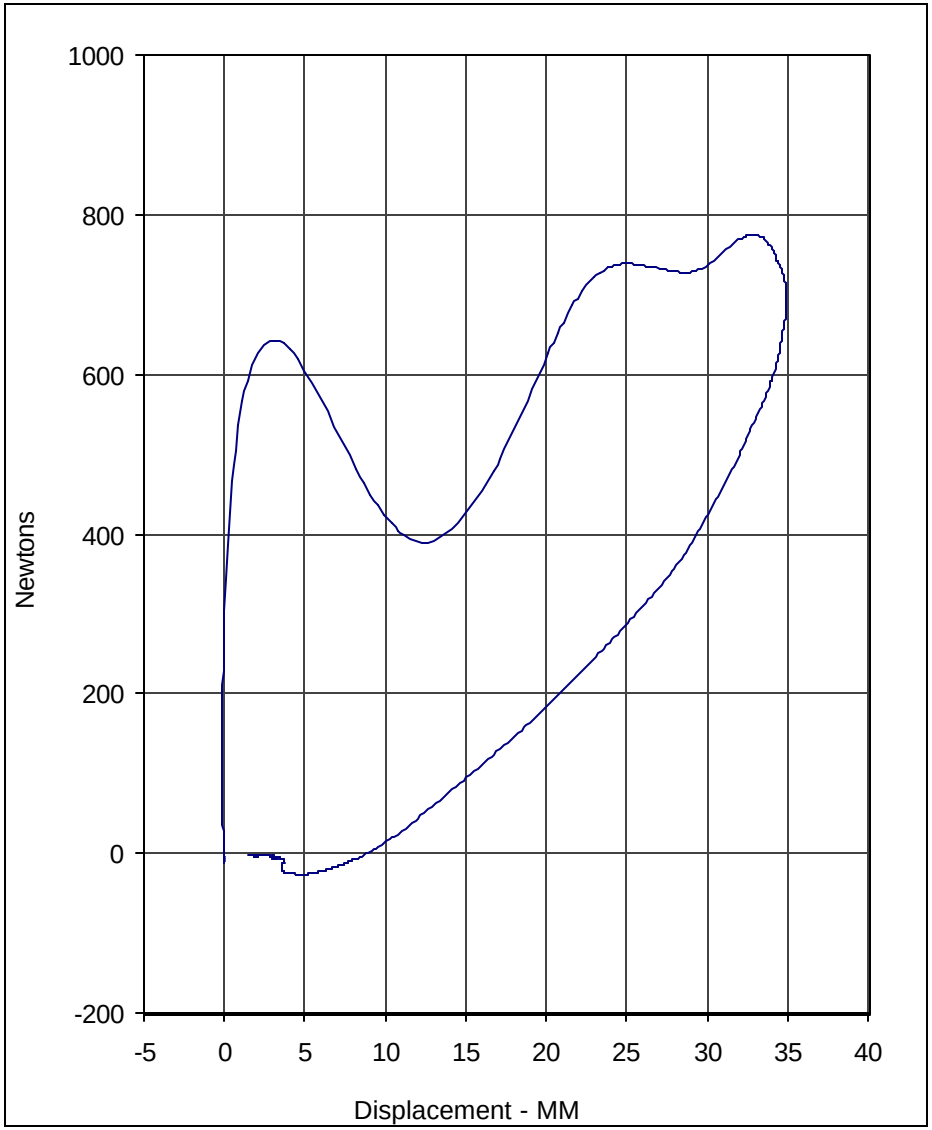
Test Date: 12/6/02

A.T.D. Serial No.: 082

Test I.D.: CH12A

KARCO Engineering




| Curve Description | CURNO | Type |
|---|---|---|
| Probe Force | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 775.2 | 13.7 | -26.7 | 40.2 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Probe Force vs. Chest Displacement | 004 | FIL |

| Units | Hysterysis | SAE Class |
|---|---|---|
| % | 69.3 | 180 |

Test Program: Hybrid III 3 Year Old Thorax Impact

Test Date: 12/6/02

A.T.D. Serial No.: 082

Test I.D.: CH12A

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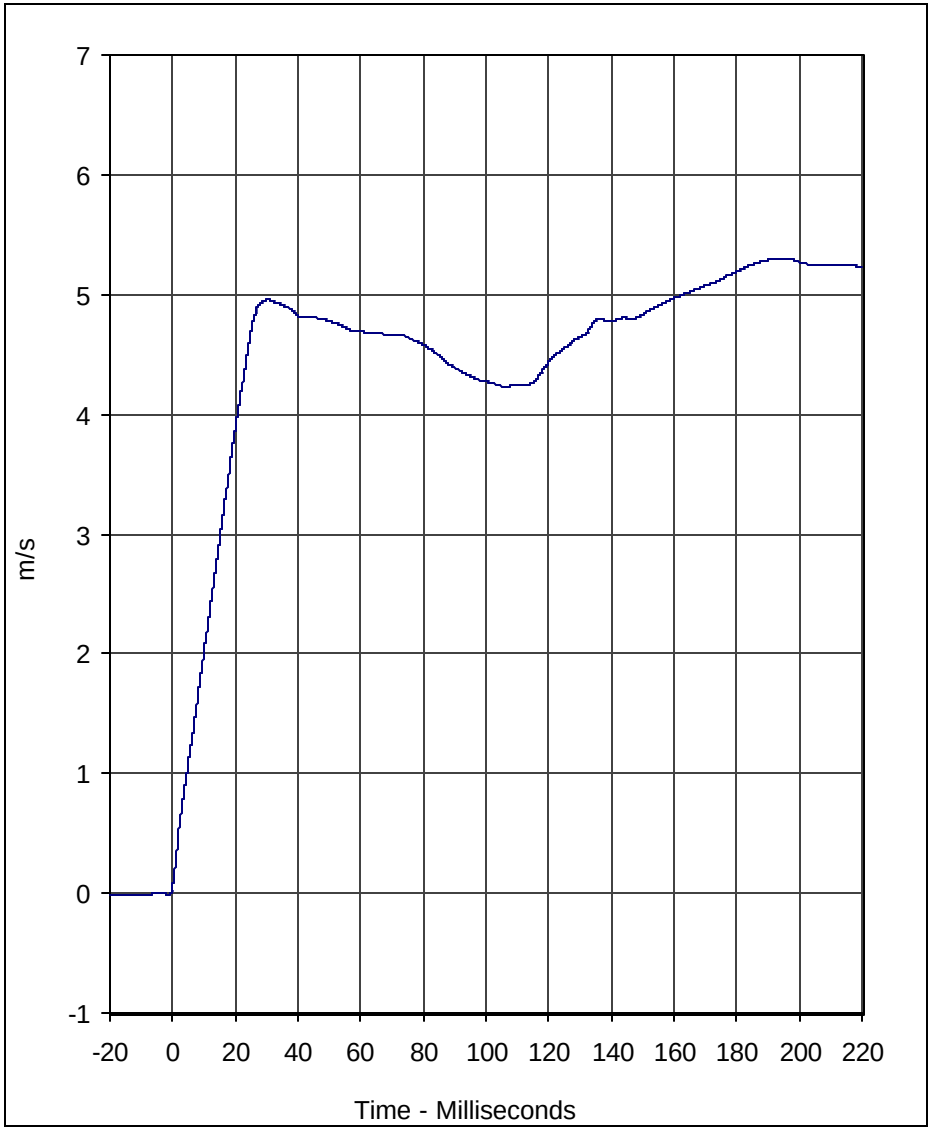
# Calibration Data Sheet
# Hybrid III 3 Year Old
# Neck Flexion Test

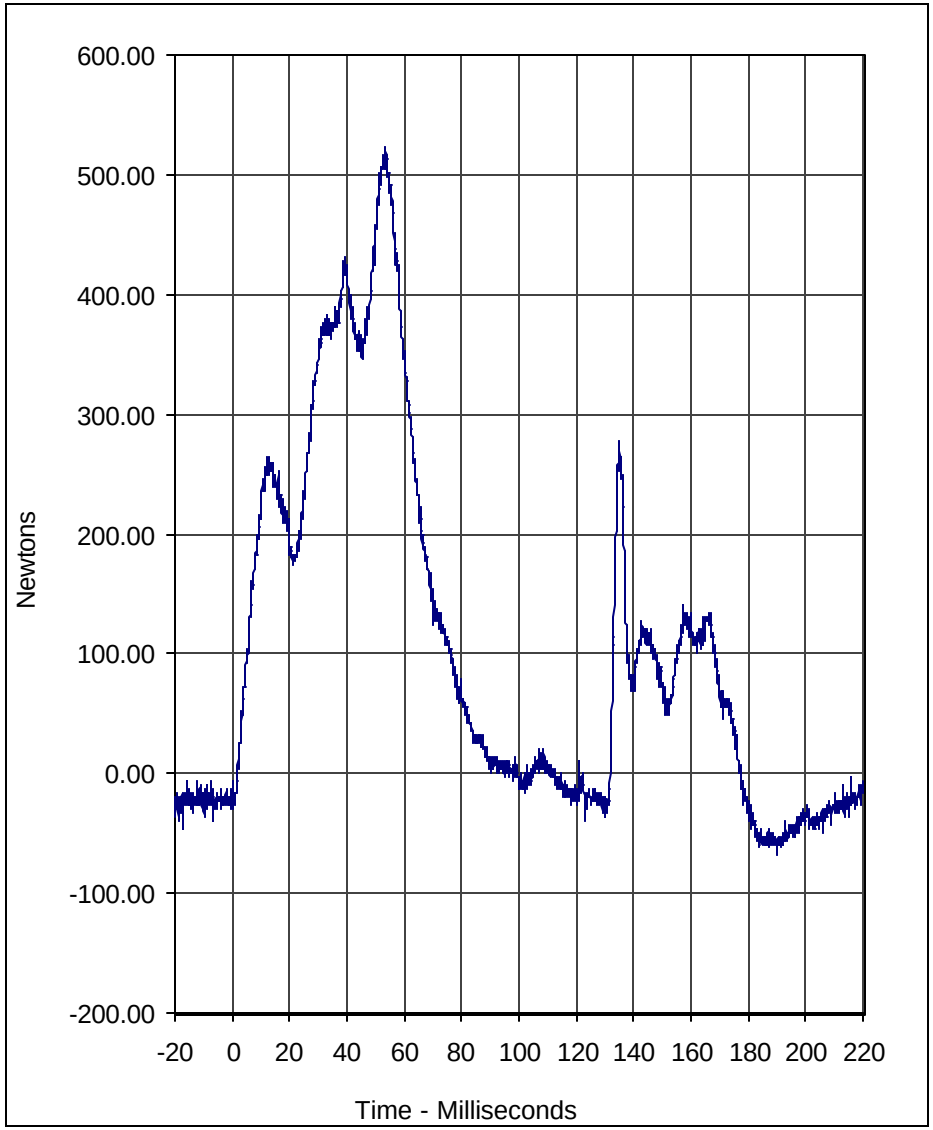
ATD Serial No.: 082 Test I.D.: 3F01A

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 5.40 to 5.60 | 5.43 | Pass |
| Pendulum Deceleration | 10 Msec. | m/s | 2.0 to 2.7 | 2.01 | Pass |
| | 20 Msec. | m/s | 3.0 to 4.0 | 3.9 | Pass |
| | 30 Msec. | m/s | 4.0 to 5.1 | 5.0 | Pass |
| "D" Plane Rotation | Maximum | Degrees | 70.0 to 82.0 | 75.9 | Pass |
| Peak Moment in Rotation | Maximum | Nm | 42.0 to 53.0 | 44.4 | Pass |
| Positive Moment Decay, Time to 10Nm | | Msec. | 60.0 to 80.0 | 75.6 | Pass |
| | | | Overall Test Results | | Pass |

Laboratory Technician

December 5, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Velocity | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| m/s | 5.3 | 196.0 | 0.0 | -1.2 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 523.6 | 53.1 | -68.7 | 190.0 | 1000 |

Test Program: 3 Year Old Hybrid III Neck Flexion Test

Test Date: 12/5/02

A.T.D. Serial No.: 082

Test I.D.: 3F01A

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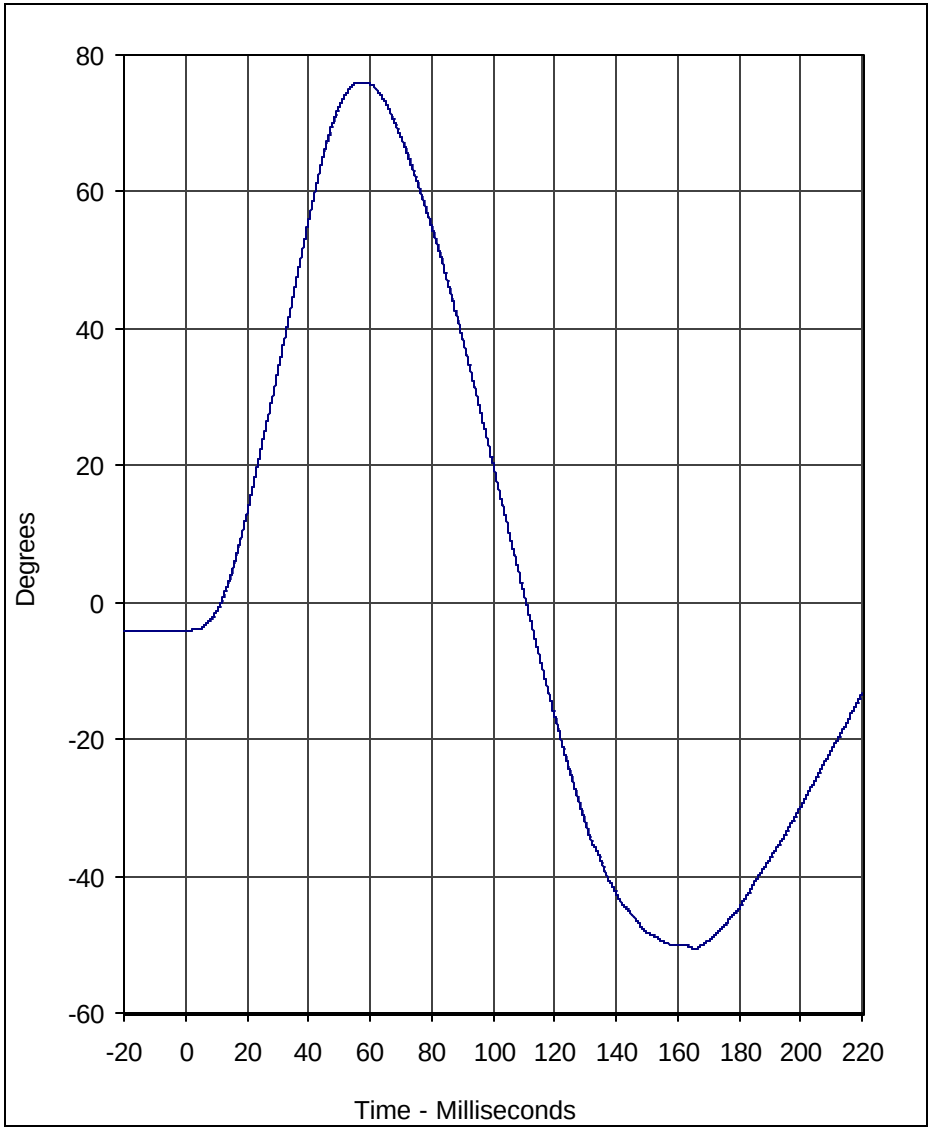
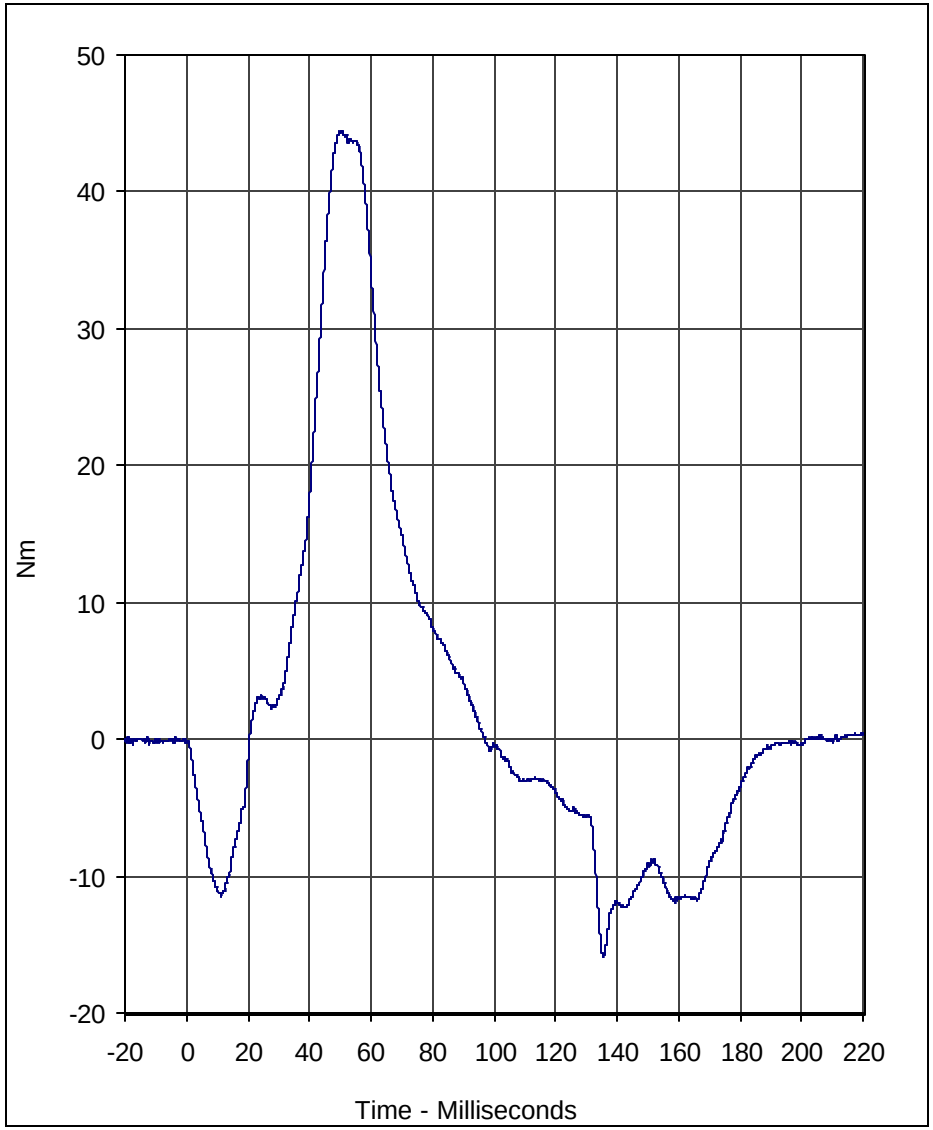



| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 75.9 | 56.5 | -50.6 | 165.7 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Moment Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 44.4 | 49.7 | -15.8 | 135.7 | 600 |

Test Program: 3 Year Old Hybrid III Neck Flexion Test

Test Date: 12/5/02

A.T.D. Serial No.: 082

Test I.D.: 3F01A

KARCO Engineering

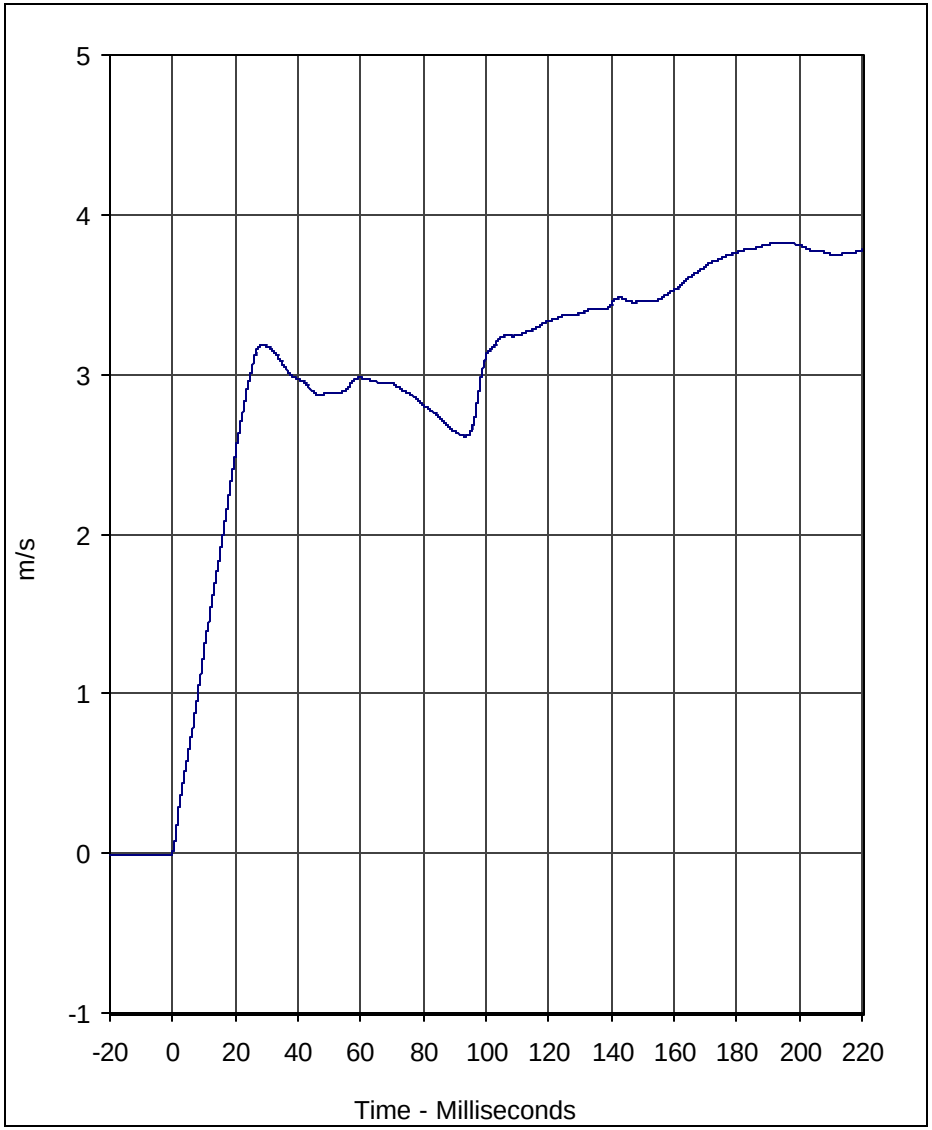
# Calibration Data Sheet
# Hybrid III 3 Year Old
# Neck Extension Test

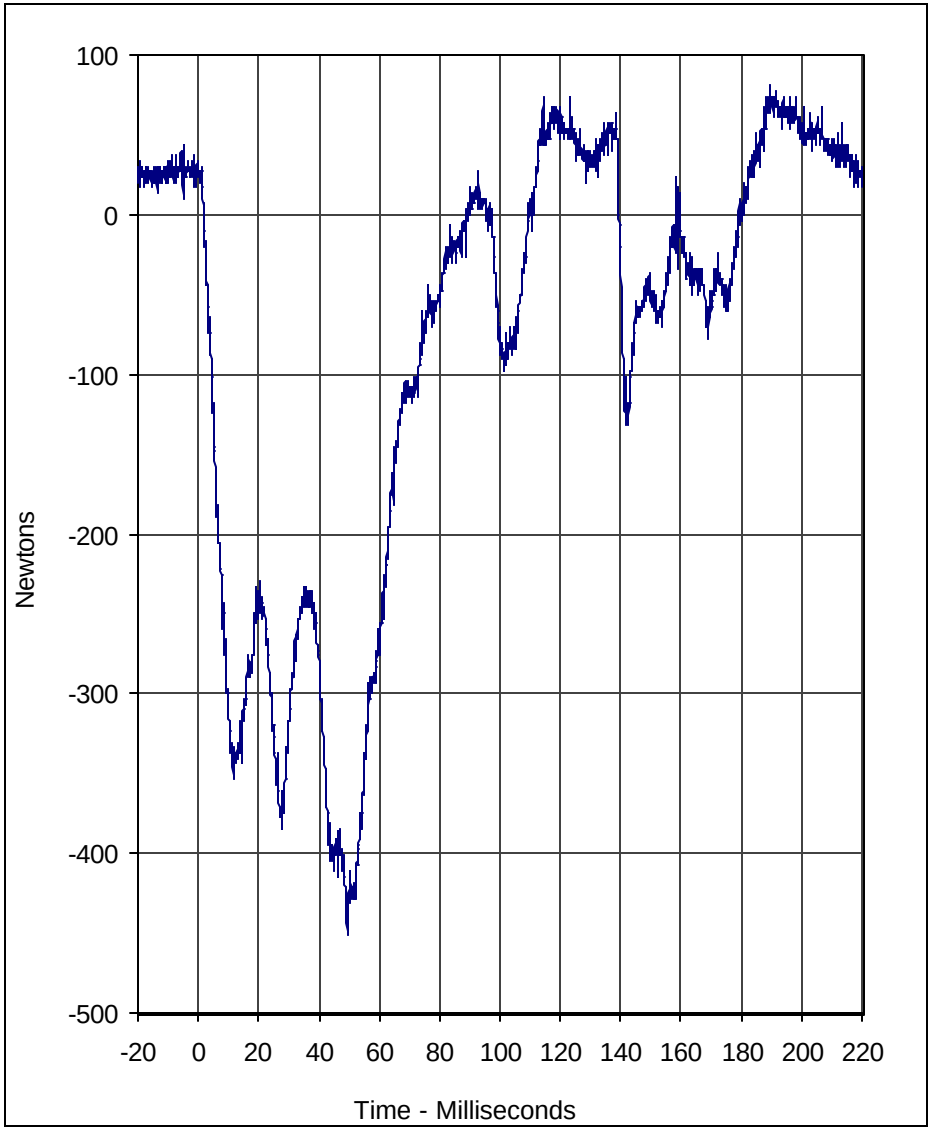
ATD Serial No.: 082 Test I.D.: 3E01B

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 3.55 to 3.75 | 3.60 | Pass |
| Pendulum Deceleration | 10 Msec. | m/s | 1.0 to 1.4 | 1.3 | Pass |
| | 20 Msec. | m/s | 1.9 to 2.5 | 2.5 | Pass |
| | 30 Msec. | m/s | 2.8 to 3.5 | 3.2 | Pass |
| "D" Plane Rotation | Maximum | Degrees | 83.0 to 93.0 | 84.2 | Pass |
| Peak Moment in Rotation | Maximum | Nm | -43.7 to -53.3 | -47.0 | Pass |
| Positive Moment Decay, Time to 10Nm | | Msec. | 60.0 to 80.0 | 77.8 | Pass |
| | | | Overall Test Results | | Pass |

Laboratory Technician

December 5, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Velocity | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| m/s | 3.8 | 194.0 | 0.0 | -0.6 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 80.9 | 189.4 | -451.7 | 49.3 | 1000 |

Test Program: 3 Year Old Hybrid III Neck Extension Test

Test Date: 12/5/02

A.T.D. Serial No.: 082

Test I.D.: 3E01B

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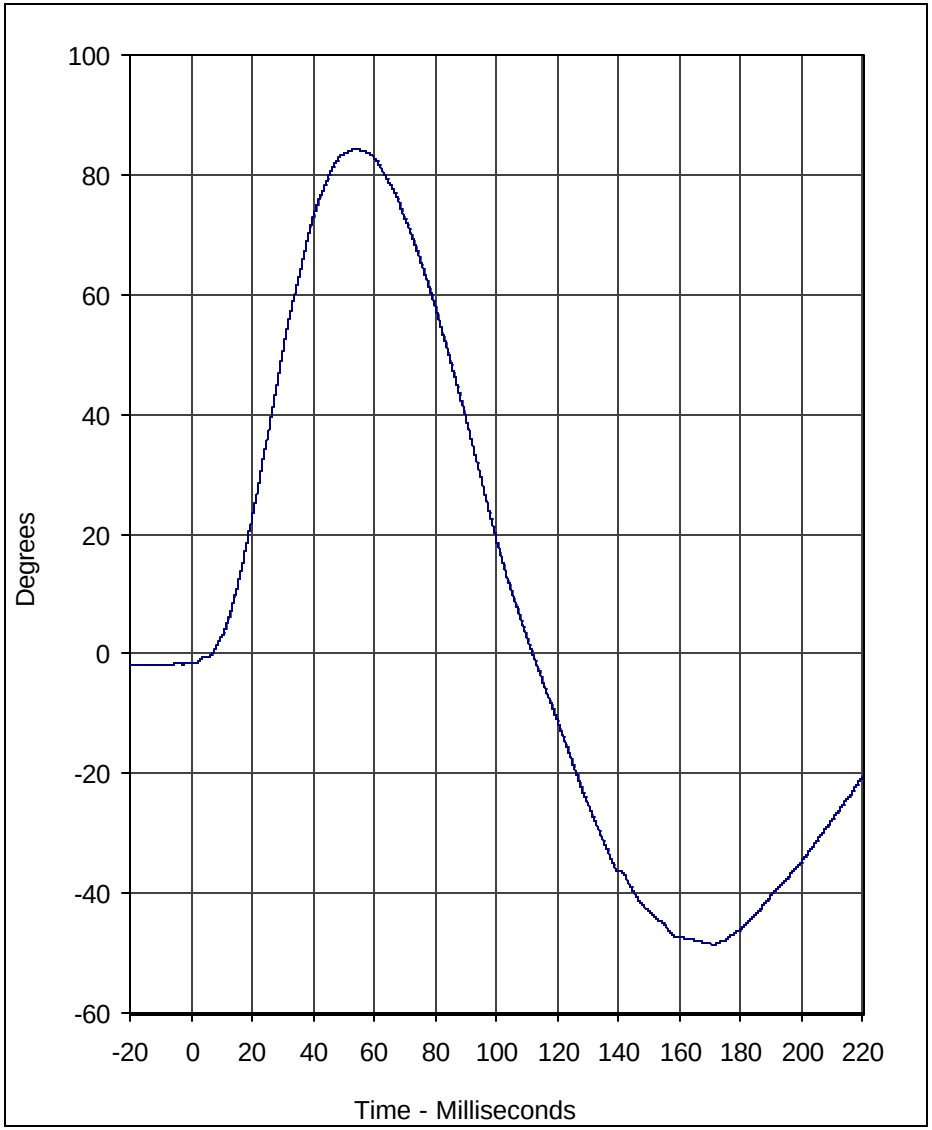
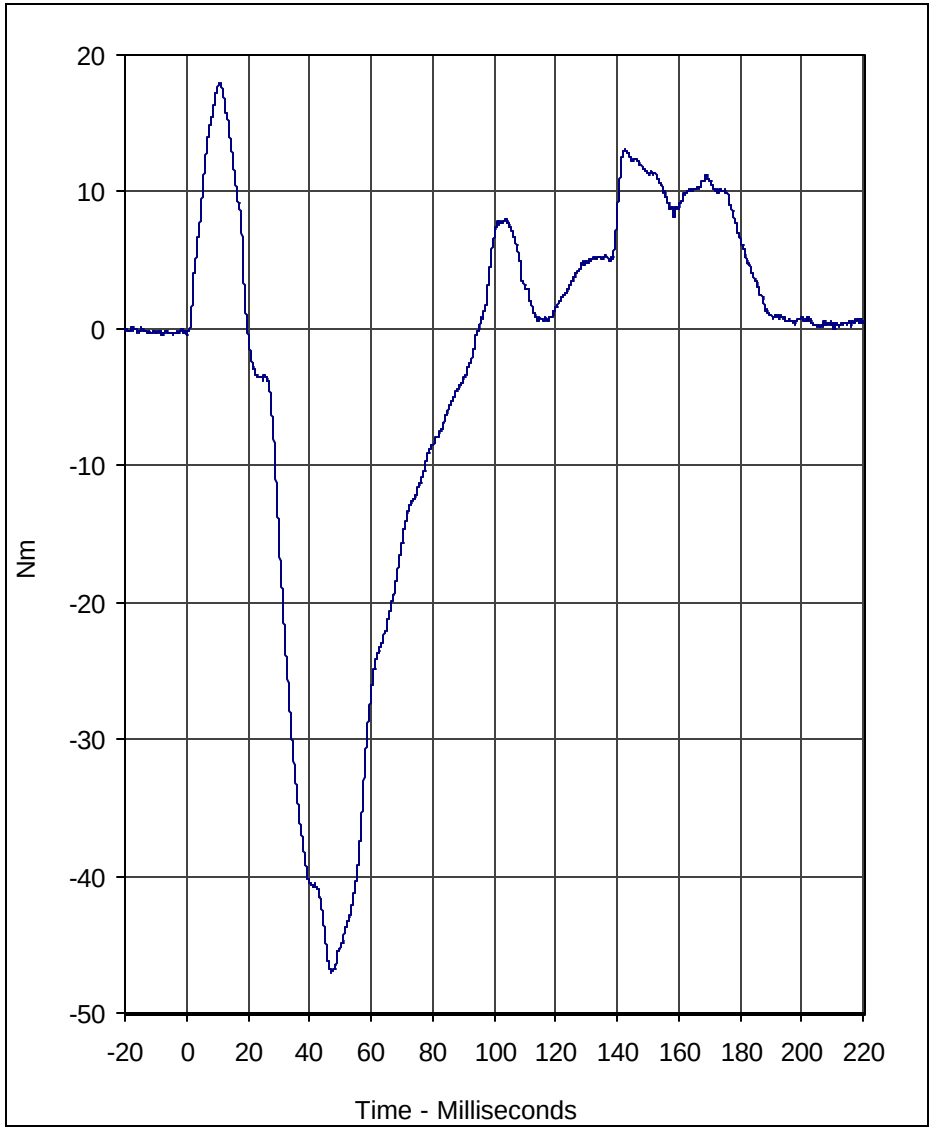



| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 84.2 | 53.7 | -48.6 | 171.3 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Moment Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 18.0 | 10.6 | -47.0 | 47.1 | 600 |

Test Program: 3 Year Old Hybrid III Neck Extension Test

Test Date: 12/5/02

A.T.D. Serial No.: 082

Test I.D.: 3E01B

KARCO Engineering

F5-11

TR-P23001-03-NC

# Calibration Data Sheet
# Hybrid III 3 Year Old
# Torso Flexion Test

ATD Serial No.: 082 Test I.D.: TF001

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Initial reference plane angle | Degrees | ≤15.0 | 3.7 | Pass |
| Peak Force at 45 +/-0.5 degrees | Newtons | 130.0 to 180.0 | 151.7 | Pass |
| Torso rotation rate | deg/sec | 0.5 to 1.5 | 1.0 | Pass |
| Final reference plane angle | Degrees | +/-10 | 3.1 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 6, 2002
Test Date

# Calibration Data Sheet
# Hybrid III 3 Year Old
# External Measurements

ATD Serial No.: 082

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| A - Total sitting height | mm | 539 to 554 | 545 | Pass |
| B - Shoulder pivot height | mm | 307 to 323 | 320 | Pass |
| C - "H" point height | mm | 34 to 45 | 40 | Pass |
| D - "H" point from backline | mm | 57 to 67 | 60 | Pass |
| E - Shoulder pivot from back | mm | 61 to 71 | 65 | Pass |
| F - Thigh clearance | mm | 81 to 91 | 85 | Pass |
| G - Elbow back to wrist pivot | mm | 247 to 263 | 255 | Pass |
| H - Skull cap to back line | mm | 48 to 58 | 50 | Pass |
| I - Shoulder to elbow length | mm | 185 to 201 | 190 | Pass |
| J - Elbow rest height | mm | 134 to 149 | 135 | Pass |
| K - Buttock to knee length | mm | 285 to 300 | 295 | Pass |
| L - Poplipteal length | mm | 219 to 234 | 225 | Pass |
| M - Knee pivot height | mm | 242 to 257 | 250 | Pass |
| N - Buttock poplipteal length | mm | 218 to 233 | 230 | Pass |
| O - Chest depth with jacket | mm | 139 to 154 | 145 | Pass |
| P - Foot length | mm | 138 to 148 | 140 | Pass |
| R - Buttock to knee pivot length | mm | 251 to 262 | 255 | Pass |
| S - Head Breadth | mm | 128 to 144 | 140 | Pass |
| T - Head Depth | mm | 167 to 183 | 175 | Pass |
| U - Hip breadth | mm | 201 to 216 | 210 | Pass |
| V - Shoulder breadth | mm | 237 to 252 | 250 | Pass |
| W - Foot breadth | mm | 54 to 64 | 60 | Pass |
| X - Head circumference | mm | 500 to 516 | 515 | Pass |
| Y - Chest circumference with jacket | mm | 527 to 553 | 545 | Pass |
| Z - Waist circumference | mm | 527 to 553 | 535 | Pass |
| AA - Location for chest circumference | mm | 249 to 259 | 255 | Pass |
| BB - Location for waist circumference | mm | 160 to 170 | 165 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 6, 2002
Test Date

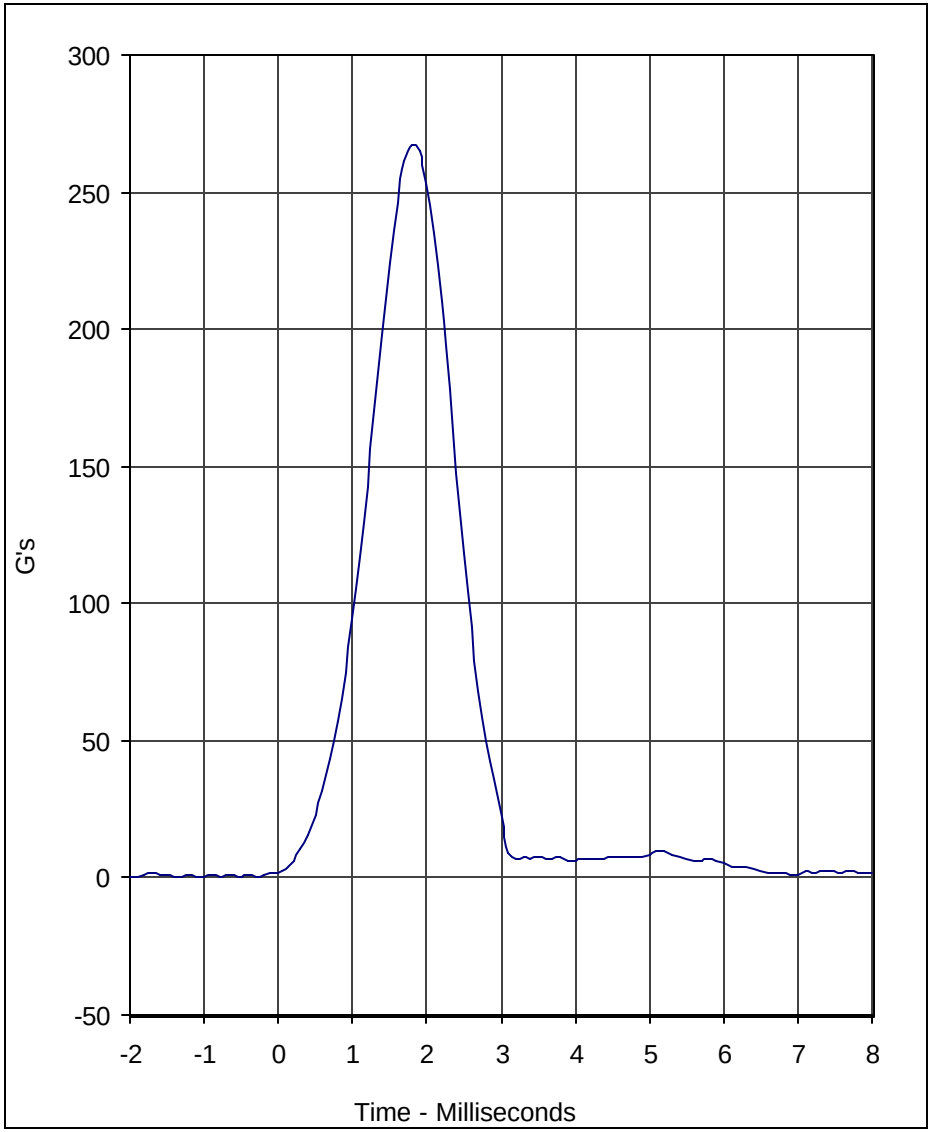
# Calibration Data Sheet
# Hybrid III 3 Year Old
# Head Drop Test

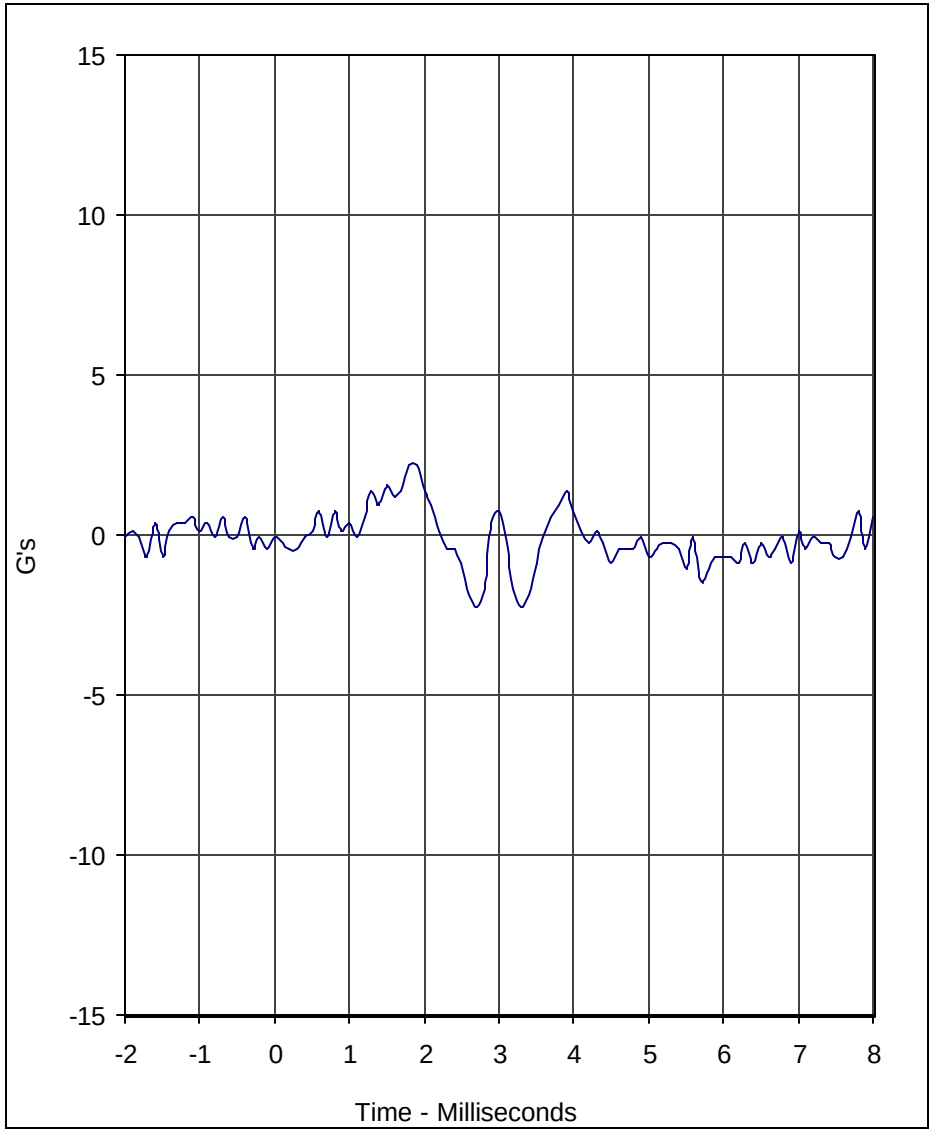
ATD Serial No.: 139 Test I.D.: 3H01B

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 250.0 to 280.0 | 267.2 | Pass |
| Peak Lateral Acceleration | G's | ≤15.0 | 2.3 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <10 | 3.6 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 4, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Head Resultant | 001 | RES |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 267.2 | 1.8 | 0.2 | -1.9 | 1000 |

| Curve Description | CURNO | Type |
|---|---|---|
| Head Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 2.2 | 1.8 | -2.3 | 2.7 | 1000 |

Test Program: Hybrid III 3 Year Old Head Drop Test

Test Date: 12/4/02

A.T.D. Serial No.: 139

Test I.D.: 3H01B

KARCO Engineering

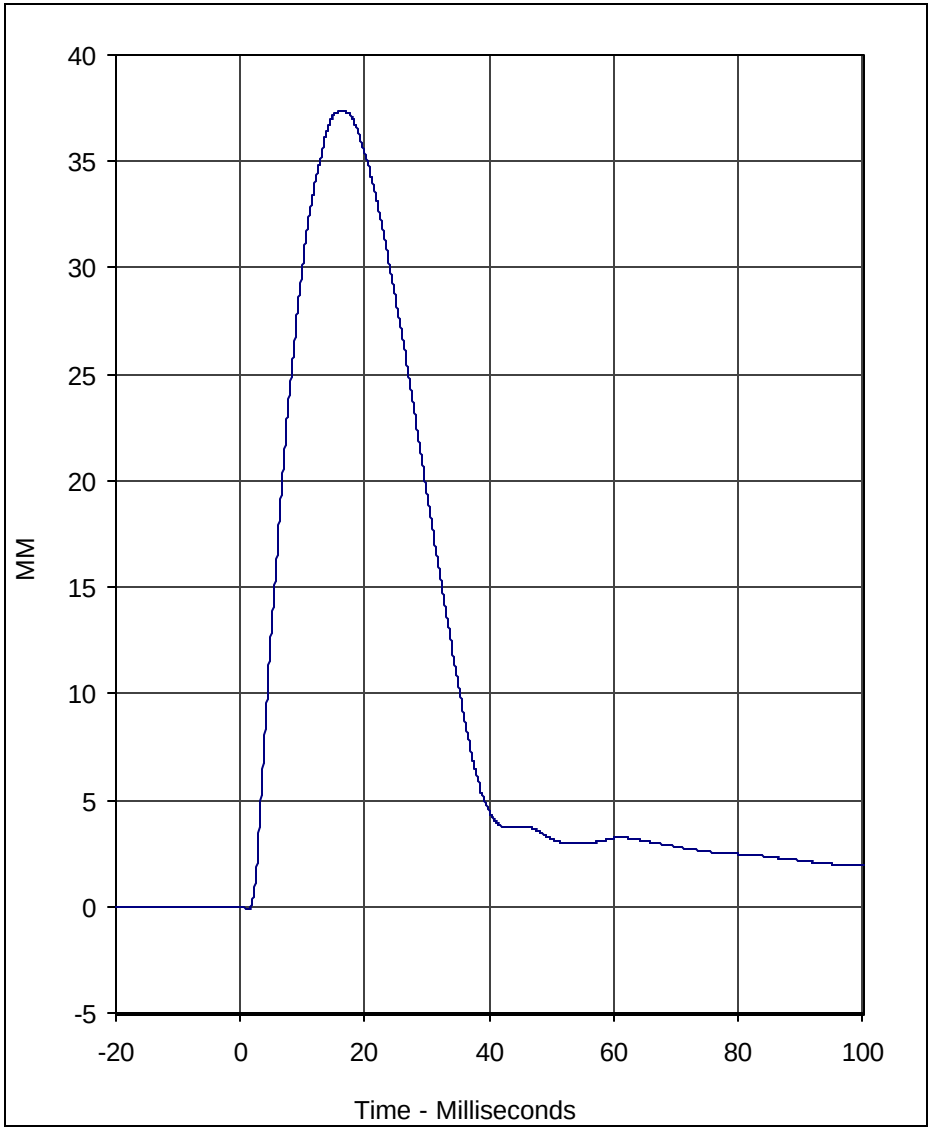
# Calibration Data Sheet
# Hybrid III 3 Year Old
# Thorax Impact Test

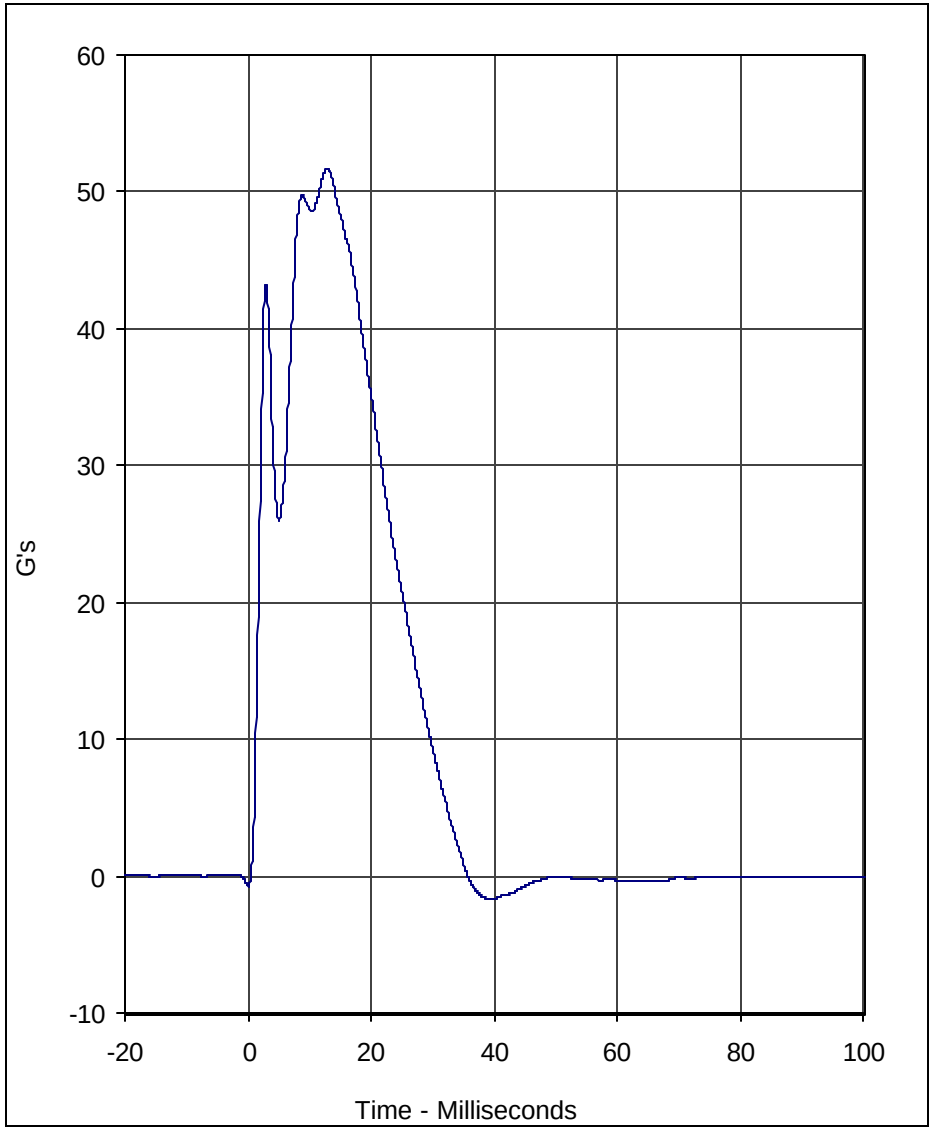
ATD Serial No.: 139 Test I.D.: CH12B

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | $^{o}$C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 5.9 to 6.1 | 5.93 | Pass |
| Peak Chest Compression | MM | 32 to 38 | 37.3 | Pass |
| Peak Probe Force Between 32 and 38 MM | Newtons | 680 to 810 | 804.8 | Pass |
| Peak Probe Force Between 12.5 and 32 MM | Newtons | ≤860 | 774.1 | Pass |
| Internal Hysterysis | % | 65 to 85 | 70.7 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 5, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Chest Compression | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| MM | 37.3 | 16.4 | -0.1 | 1.3 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Probe Acceleration | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| G's | 51.7 | 12.9 | -1.7 | 39.5 | 180 |

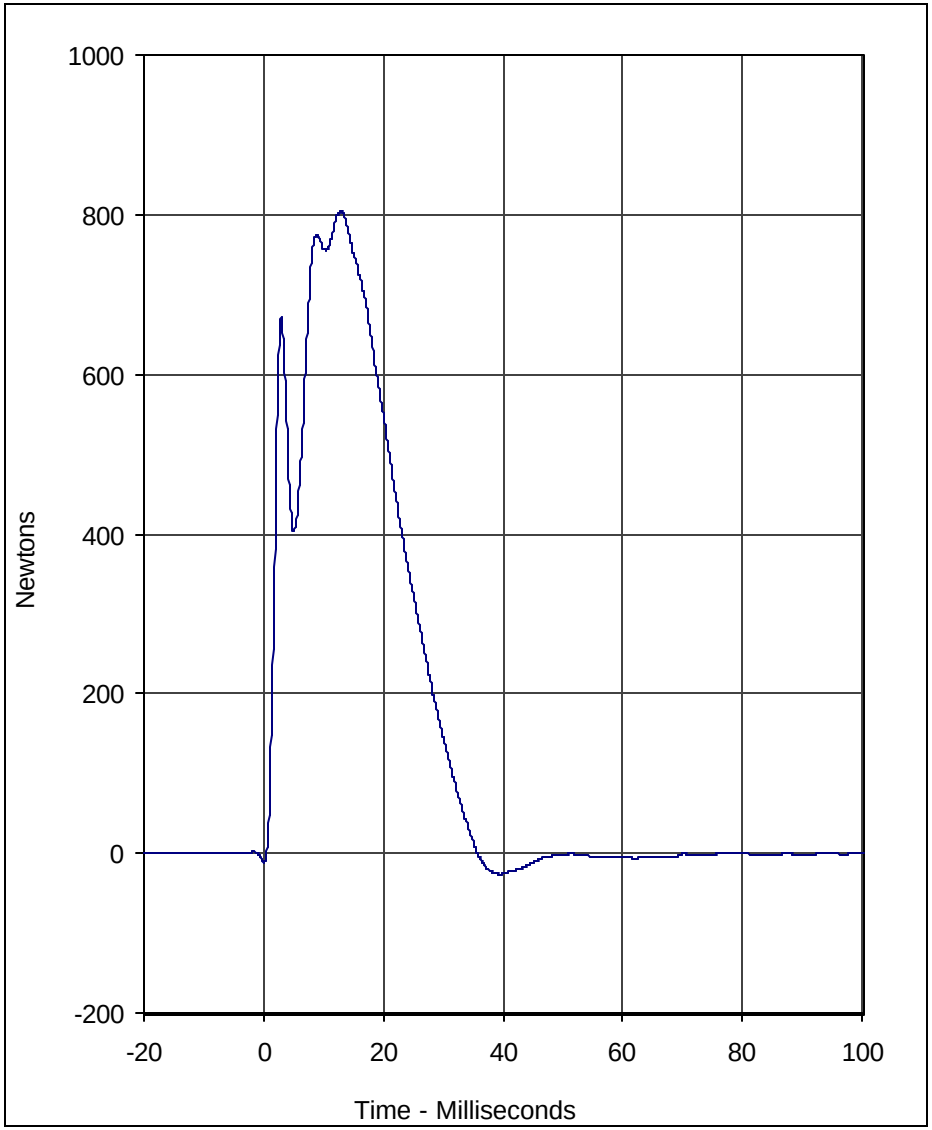
Test Program: Hybrid III 3 Year Old Thorax Impact

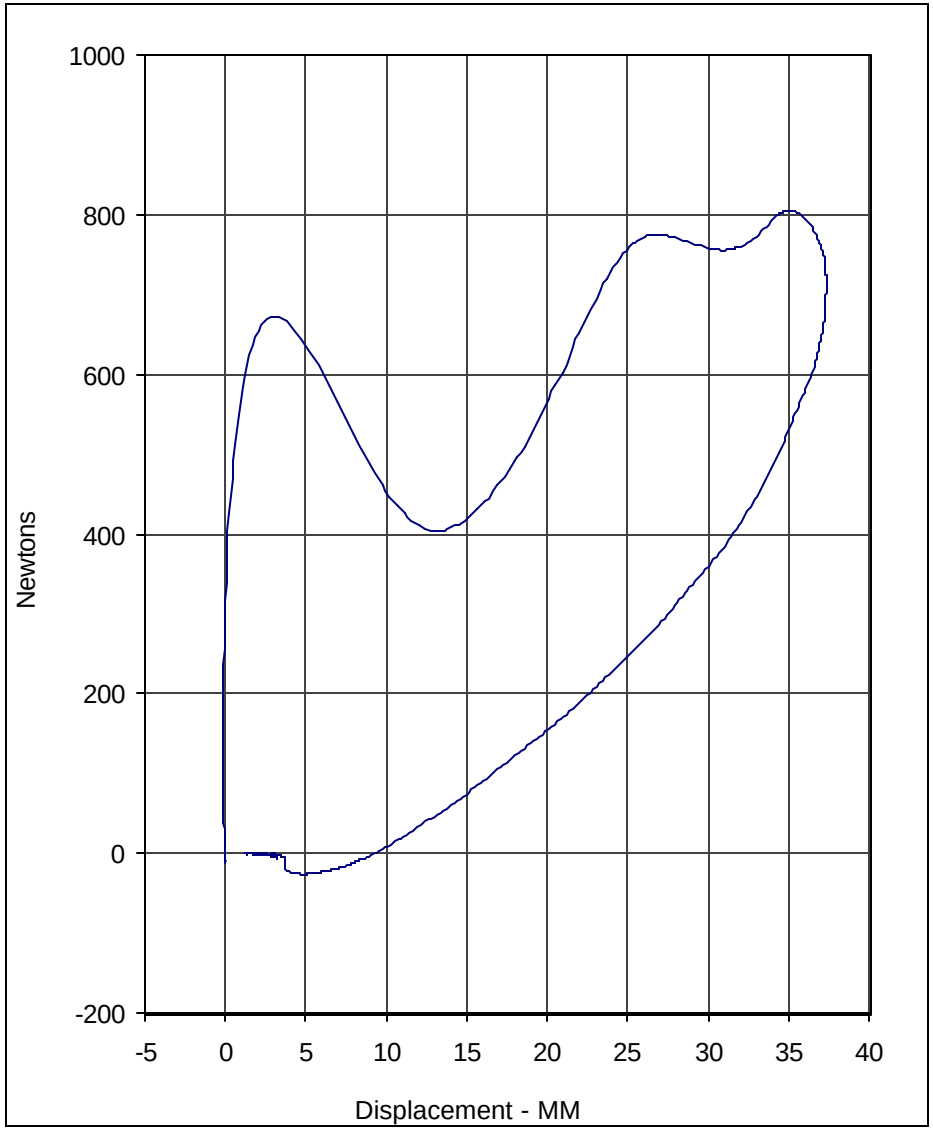
Test Date: 12/5/02

A.T.D. Serial No.: 139

Test I.D.: CH12B

KARCO Engineering




| Curve Description | CURNO | Type |
|---|---|---|
| Probe Force | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 804.8 | 12.9 | -26.0 | 39.5 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Probe Force vs. Chest Displacement | 004 | FIL |

| Units | Hysterysis | SAE Class |
|---|---|---|
| % | 70.7 | 180 |

Test Program: Hybrid III 3 Year Old Thorax Impact

Test Date: 12/5/02

A.T.D. Serial No.: 139

Test I.D.: CH12B

KARCO Engineering

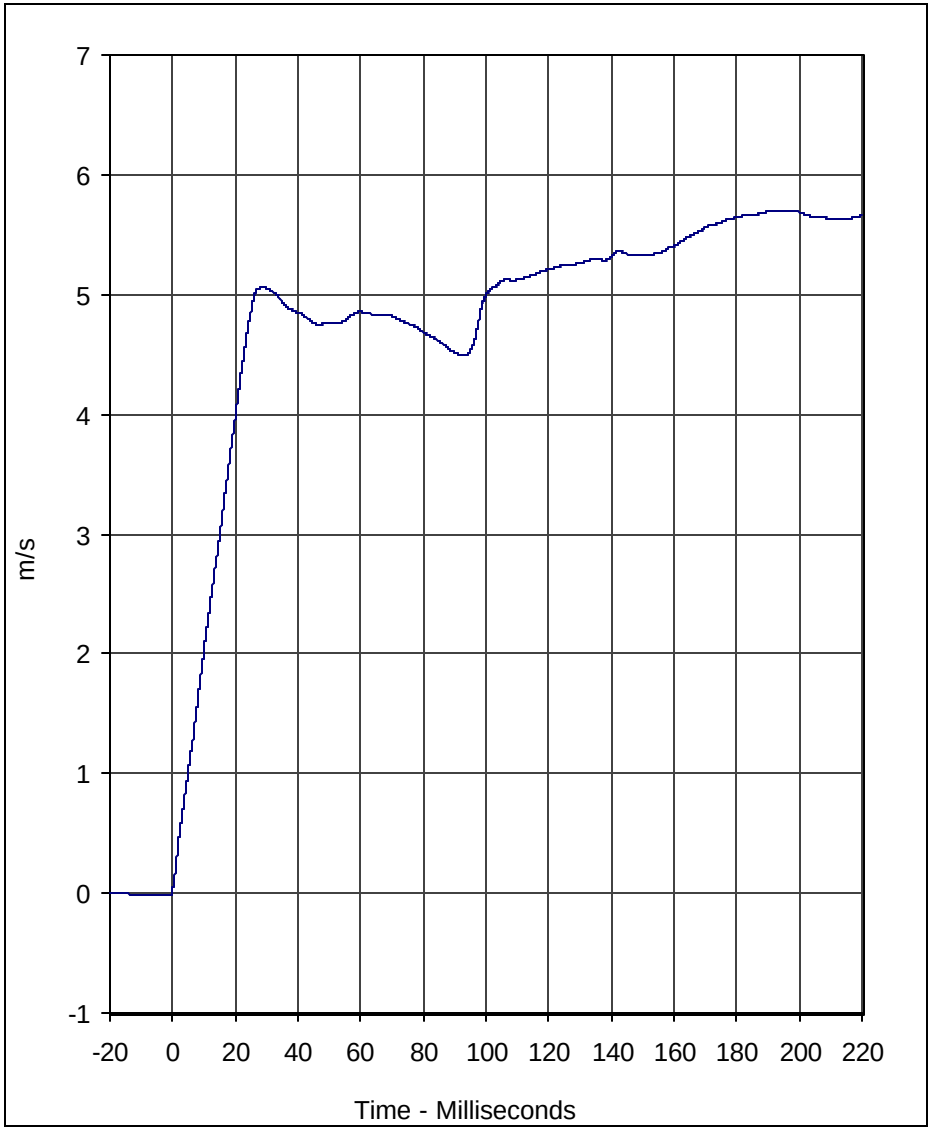
# Calibration Data Sheet
# Hybrid III 3 Year Old
# Neck Flexion Test

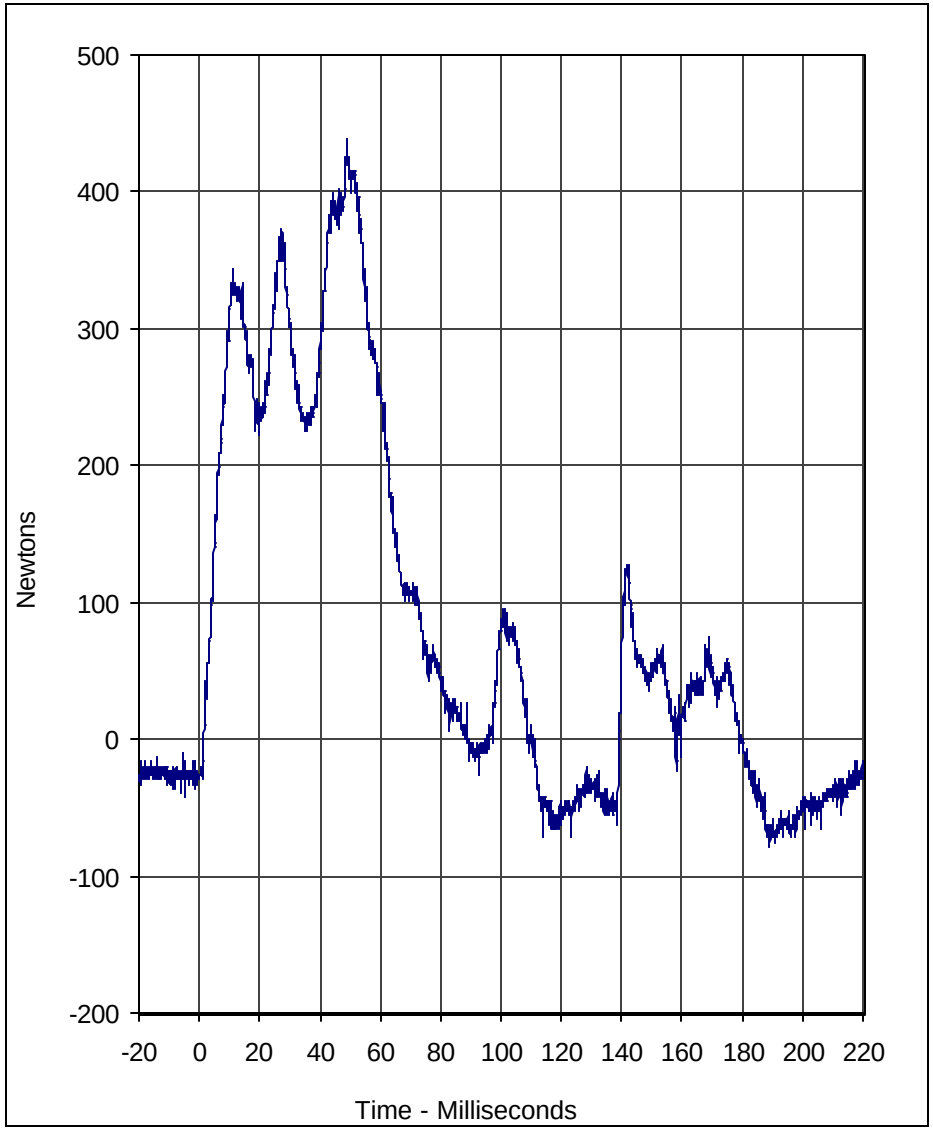
ATD Serial No.: 139 Test I.D.: 3F01B

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 5.40 to 5.60 | 5.55 | Pass |
| Pendulum Deceleration | 10 Msec. | m/s | 2.0 to 2.7 | 2.0 | Pass |
| | 20 Msec. | m/s | 3.0 to 4.0 | 4.0 | Pass |
| | 30 Msec. | m/s | 4.0 to 5.1 | 5.1 | Pass |
| "D" Plane Rotation | Maximum | Degrees | 70.0 to 82.0 | 75.9 | Pass |
| Peak Moment in Rotation | Maximum | Nm | 42.0 to 53.0 | 45.7 | Pass |
| Positive Moment Decay, Time to 10Nm | | Msec. | 60.0 to 80.0 | 77.4 | Pass |
| | | | Overall Test Results | | Pass |

Laboratory Technician

December 5, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Velocity | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| m/s | 5.7 | 193.8 | 0.0 | -0.9 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 438.5 | 49.0 | -78.5 | 189.1 | 1000 |

Test Program: 3 Year Old Hybrid III Neck Flexion Test

Test Date: 12/5/02

A.T.D. Serial No.: 139

Test I.D.: 3F01B

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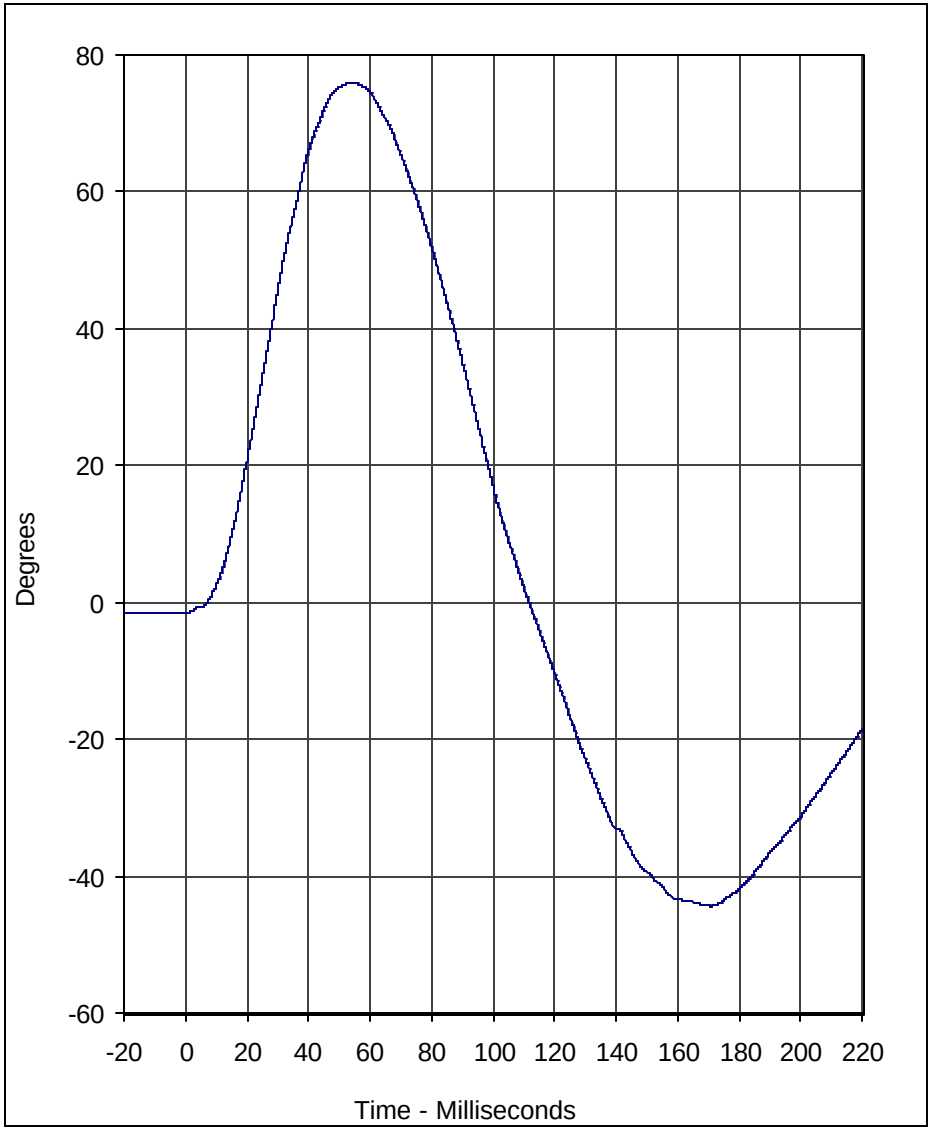


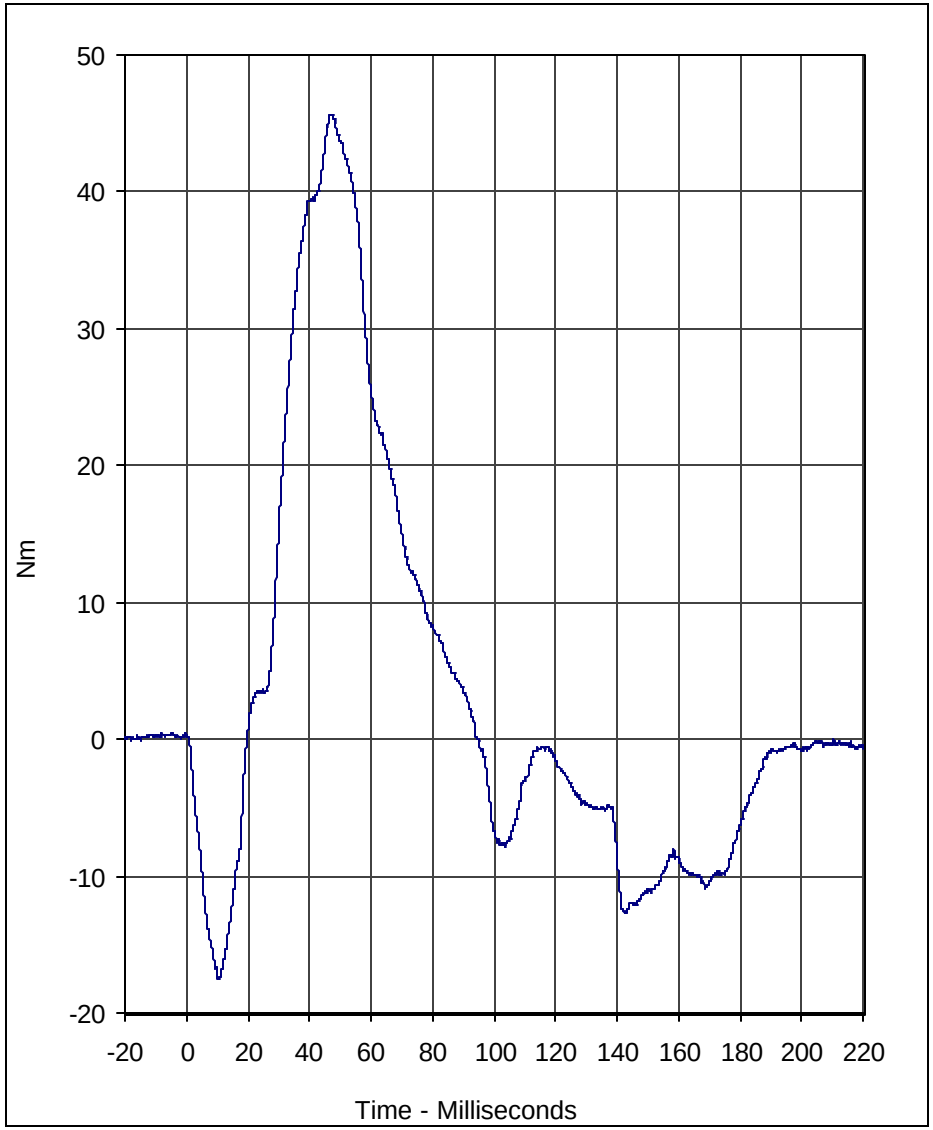


| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 75.9 | 53.6 | -44.4 | 171.1 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Moment Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 45.7 | 46.9 | -17.5 | 10.4 | 600 |

Test Program: 3 Year Old Hybrid III Neck Flexion Test

Test Date: 12/5/02

A.T.D. Serial No.: 139

Test I.D.: 3F01B

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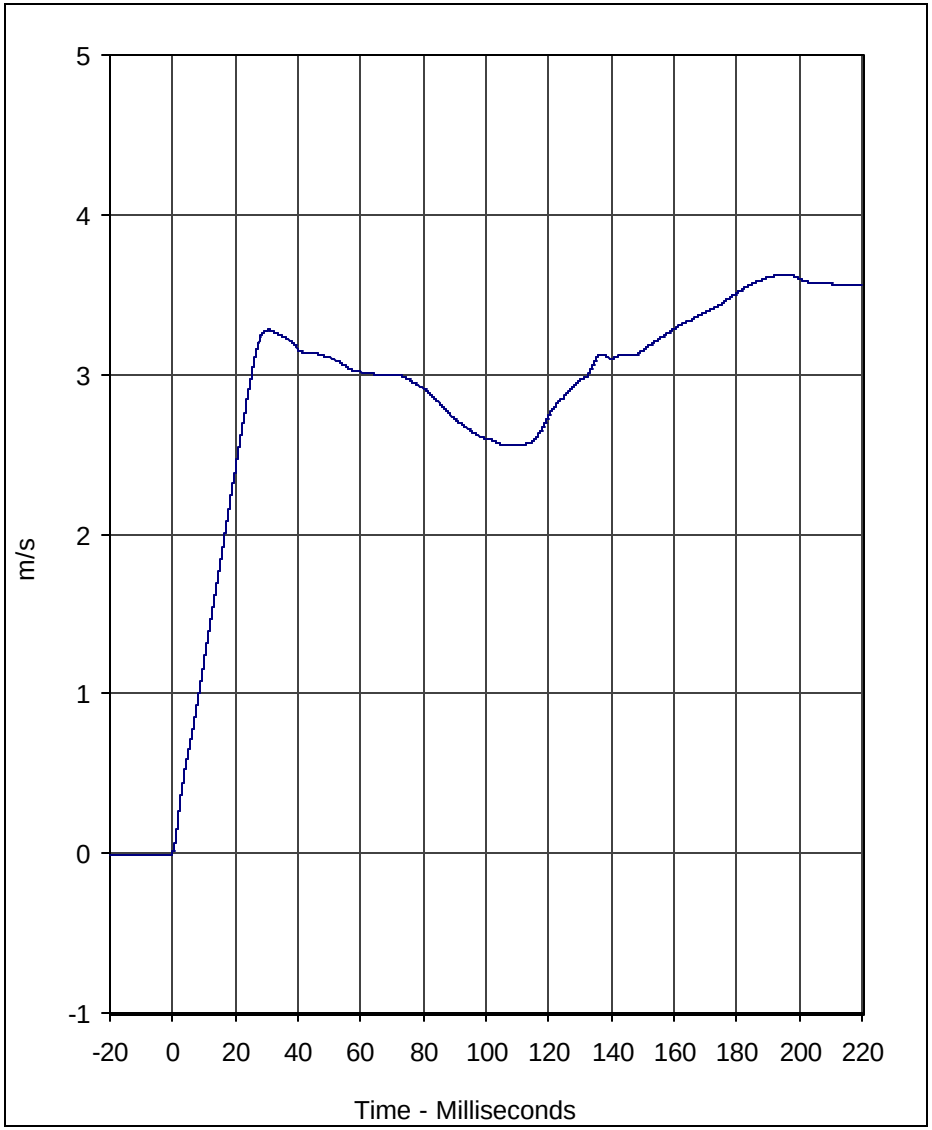
# Calibration Data Sheet
# Hybrid III 3 Year Old
# Neck Extension Test

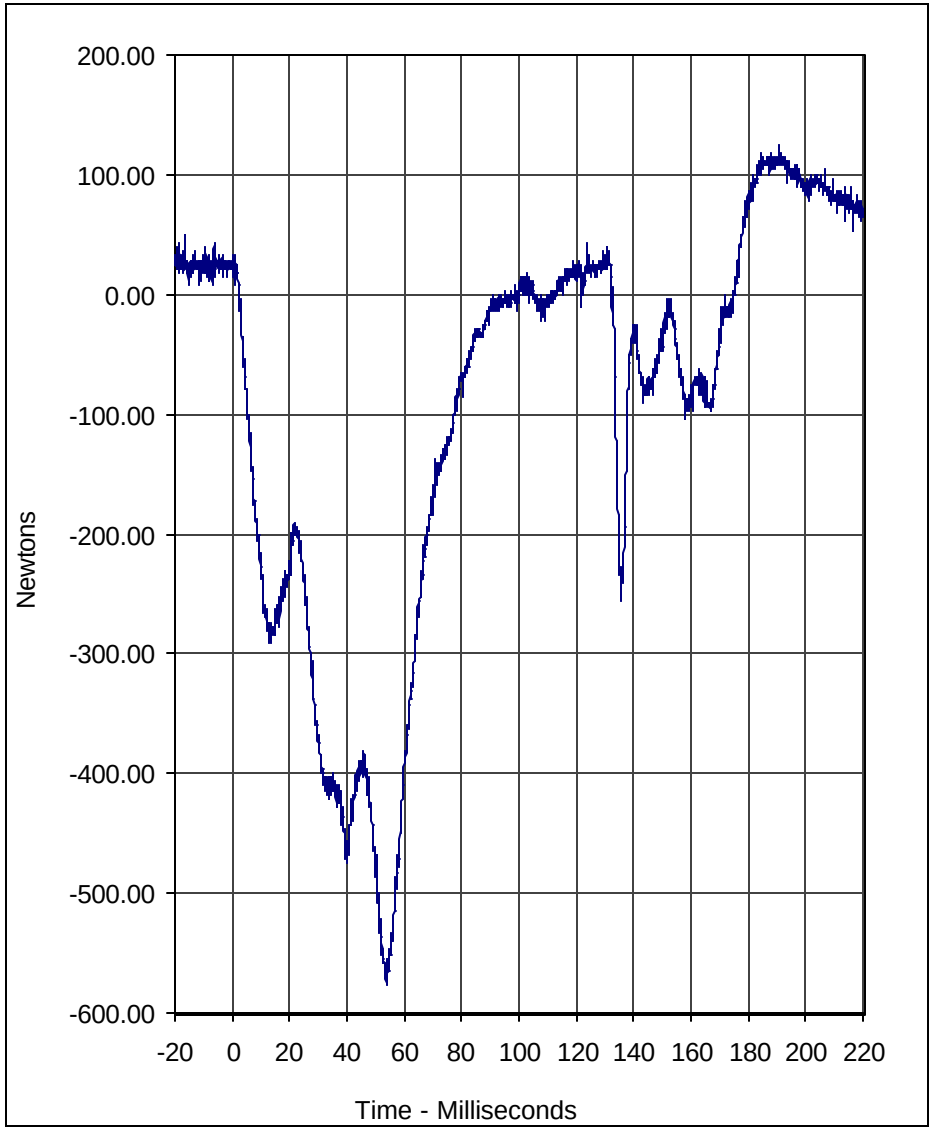
ATD Serial No.: 139 Test I.D.: 3E01A

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Laboratory Temperature | | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | | m/s | 3.55 to 3.75 | 3.60 | Pass |
| Pendulum Deceleration | 10 Msec. | m/s | 1.0 to 1.4 | 1.2 | Pass |
| | 20 Msec. | m/s | 1.9 to 2.5 | 2.4 | Pass |
| | 30 Msec. | m/s | 2.8 to 3.5 | 3.3 | Pass |
| "D" Plane Rotation | Maximum | Degrees | 83.0 to 93.0 | 83.5 | Pass |
| Peak Moment in Rotation | Maximum | Nm | -43.7 to -53.3 | -50.2 | Pass |
| Positive Moment Decay, Time to 10Nm | | Msec. | 60.0 to 80.0 | 79.7 | Pass |
| | | | Overall Test Results | | Pass |

Laboratory Technician

December 5, 2002
Test Date




| Curve Description | CURNO | Type |
|---|---|---|
| Pendulum Velocity | 001 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| m/s | 3.6 | 196.6 | 0.0 | -17.2 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Force X | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Newtons | 125.6 | 190.6 | -576.0 | 53.7 | 1000 |

Test Program: 3 Year Old Hybrid III Neck Extension Test

Test Date: 12/5/02

A.T.D. Serial No.: 139

Test I.D.: 3E01A

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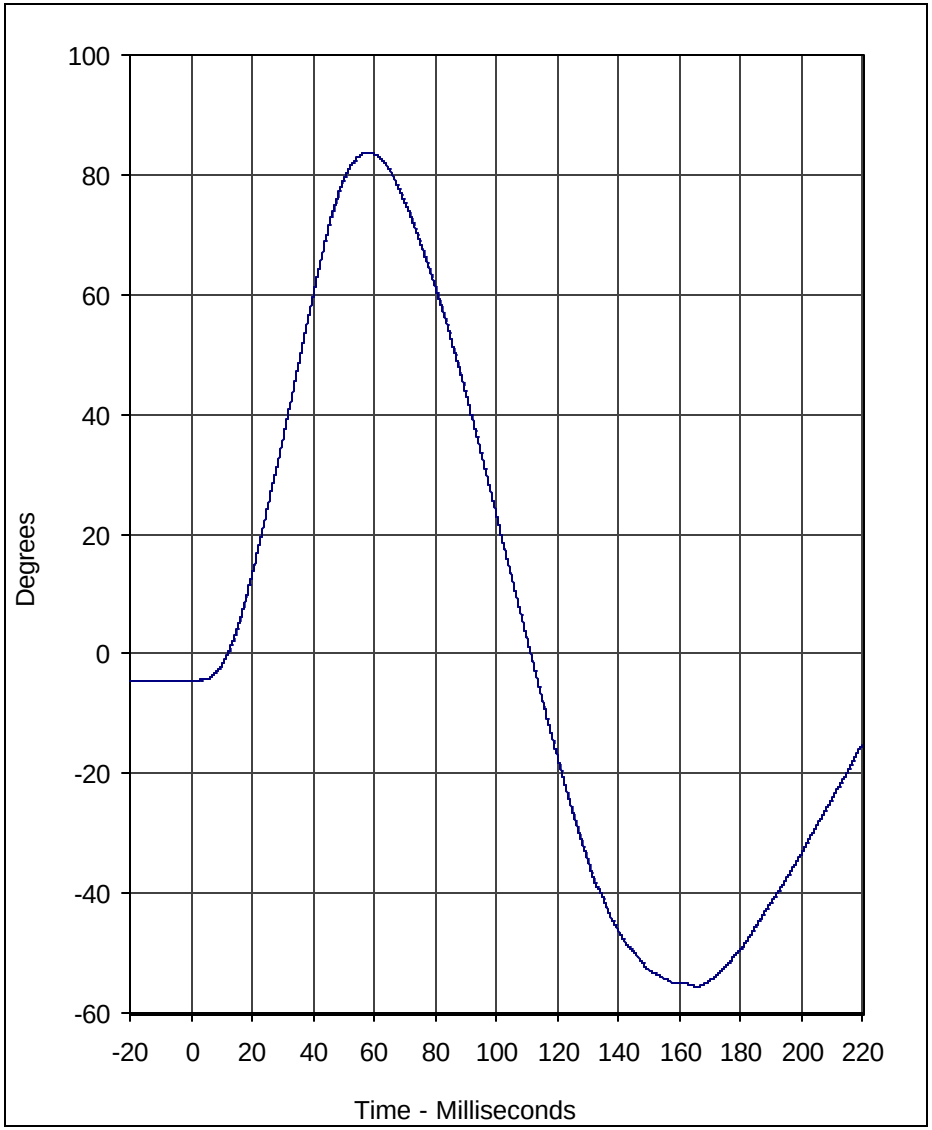


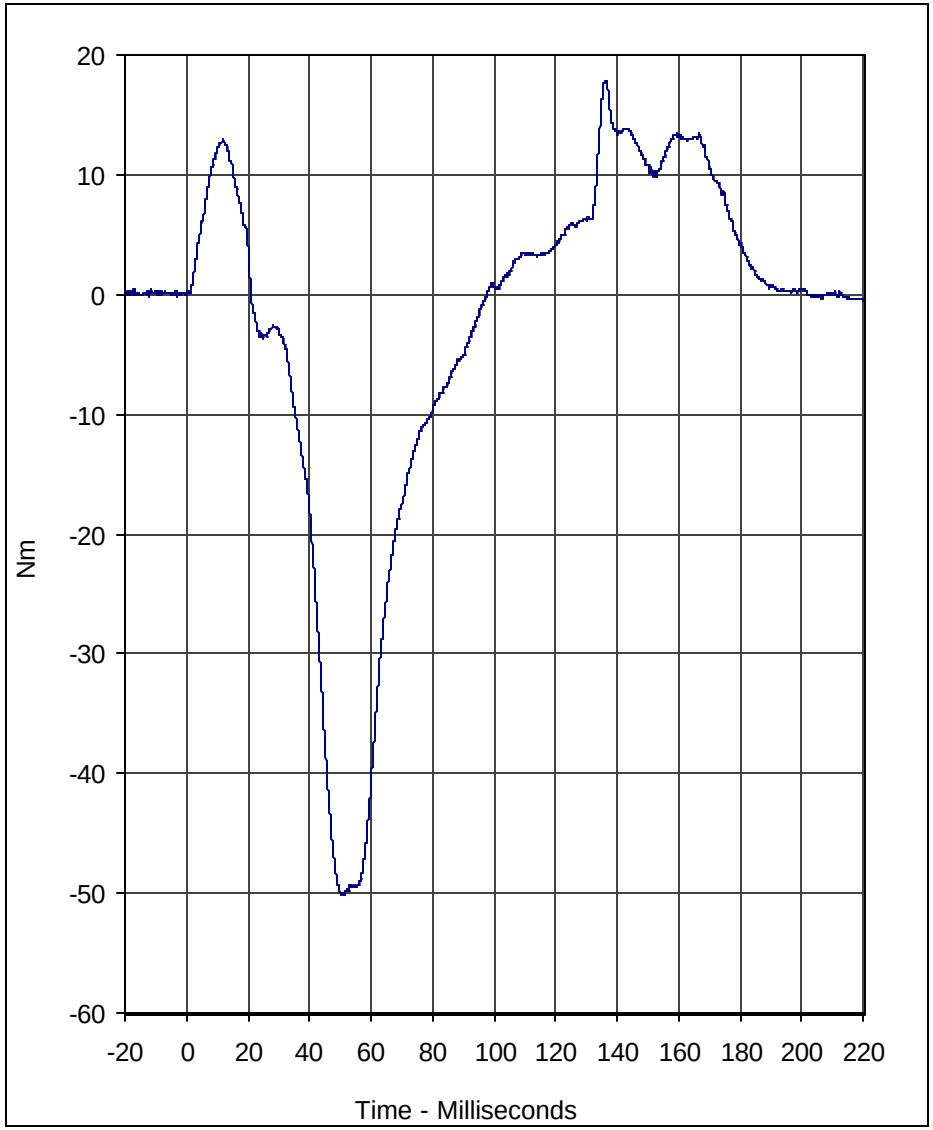


| Curve Description | CURNO | Type |
|---|---|---|
| "D" Plane Rotation | 003 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Degrees | 83.5 | 57.1 | -55.7 | 166.3 | 180 |

| Curve Description | CURNO | Type |
|---|---|---|
| Neck Moment Y | 002 | FIL |

| Units | Max | Time | Min | Time | SAE Class |
|---|---|---|---|---|---|
| Nm | 17.9 | 136.3 | -50.2 | 50.3 | 600 |

Test Program: 3 Year Old Hybrid III Neck Extension Test

Test Date: 12/5/02

A.T.D. Serial No.: 139

Test I.D.: 3E01A

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# Calibration Data Sheet
# Hybrid III 3 Year Old
# Torso Flexion Test

ATD Serial No.: 082 Test I.D.: TF001

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Initial reference plane angle | Degrees | ≤15.0 | 4.2 | Pass |
| Peak Force at 45 +/-0.5 degrees | Newtons | 130.0 to 180.0 | 162.4 | Pass |
| Torso rotation rate | deg/sec | 0.5 to 1.5 | 1.2 | Pass |
| Final reference plane angle | Degrees | +/-10 | 6.2 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 6, 2002
Test Date

# Calibration Data Sheet
# Hybrid III 3 Year Old
# External Measurements

ATD Serial No.: 139

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| A - Total sitting height | mm | 539 to 554 | 550 | Pass |
| B - Shoulder pivot height | mm | 307 to 323 | 315 | Pass |
| C - "H" point height | mm | 34 to 45 | 40 | Pass |
| D - "H" point from backline | mm | 57 to 67 | 60 | Pass |
| E - Shoulder pivot from back | mm | 61 to 71 | 65 | Pass |
| F - Thigh clearance | mm | 81 to 91 | 85 | Pass |
| G - Elbow back to wrist pivot | mm | 247 to 263 | 260 | Pass |
| H - Skull cap to back line | mm | 48 to 58 | 50 | Pass |
| I - Shoulder to elbow length | mm | 185 to 201 | 195 | Pass |
| J - Elbow rest height | mm | 134 to 149 | 140 | Pass |
| K - Buttock to knee length | mm | 285 to 300 | 290 | Pass |
| L - Poplipteal length | mm | 219 to 234 | 230 | Pass |
| M - Knee pivot height | mm | 242 to 257 | 250 | Pass |
| N - Buttock poplipteal length | mm | 218 to 233 | 225 | Pass |
| O - Chest depth with jacket | mm | 139 to 154 | 150 | Pass |
| P - Foot length | mm | 138 to 148 | 140 | Pass |
| R - Buttock to knee pivot length | mm | 251 to 262 | 260 | Pass |
| S - Head Breadth | mm | 128 to 144 | 135 | Pass |
| T - Head Depth | mm | 167 to 183 | 180 | Pass |
| U - Hip breadth | mm | 201 to 216 | 215 | Pass |
| V - Shoulder breadth | mm | 237 to 252 | 245 | Pass |
| W - Foot breadth | mm | 54 to 64 | 60 | Pass |
| X - Head circumference | mm | 500 to 516 | 510 | Pass |
| Y - Chest circumference with jacket | mm | 527 to 553 | 550 | Pass |
| Z - Waist circumference | mm | 527 to 553 | 545 | Pass |
| AA - Location for chest circumference | mm | 249 to 259 | 255 | Pass |
| BB - Location for waist circumference | mm | 160 to 170 | 160 | Pass |
| | | Overall Test Results | | Pass |

Laboratory Technician

December 6, 2002
Test Date