

**REPORT NUMBER KAR21001-09**

**NEW CAR ASSESSMENT PROGRAM  
FRONTAL BARRIER IMPACT TEST**

**GENERAL MOTORS CORPORATION  
2001 PONTIAC GRAND PRIX SE  
4 DOOR SEDAN  
NHTSA NUMBER: M10116**

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



**FEBRUARY 21, 2001**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
SAFETY PERFORMANCE STANDARDS  
OFFICE OF CRASHWORTHINESS STANDARDS  
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400 SEVENTH STREET, SW, ROOM 5313  
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## Technical Report Documentation Page

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                               |                                                                                                                                                                                                                       |                                                 |
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| 16. Abstract<br><br>A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2001 Pontiac Grand Prix 4 Door Sedan at KARCO Engineering on 1/30/01. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 55.80 km/h. The ambient temperature at the barrier face at the time of impact is 6.6 degrees Celcius. The vehicle's maximum post test static crush is 485 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                                      |
| Head Injury Criteria (HIC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/A                                                                                                           | 1000                                                                                                                                                                                                                  | 696.4                                           |
| Max. Thorax Accel. (3 msec Clip)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | G's                                                                                                           | 60                                                                                                                                                                                                                    | 47.2                                            |
| Left Femur force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Newtons                                                                                                       | 10009                                                                                                                                                                                                                 | -3978.5                                         |
| Right Femur Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Newtons                                                                                                       | 10009                                                                                                                                                                                                                 | -4899.5                                         |
| 17. Key Words<br><br>56.3 km/h NCAP Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)<br>2001 Pontiac Grand Prix SE 4 Door Sedan<br>NHTSA No. M10116                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                               | 18. Distribution Statement<br><br>Copies of this report are available from:<br>NHTSA Technical Reference Division<br>National Highway Traffic Safety Admin.<br>400 Seventh St., SW, Room 5108<br>Washington, DC 20590 |                                                 |
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## **SECTION 1**

### **PURPOSE, TEST PROCEDURE AND SUMMARY OF TEST M10116**

#### **1.1 PURPOSE**

The purpose of this 35 mph (56.3 km/h) frontal barrier impact test is to obtain vehicle crashworthiness, occupant restraint system performance, and lower leg data for frontal barrier impacts. The impact velocity used in this test is in excess of the current 30 mph (48.3 km/h) FMVSS 208/212/219/301 requirements.

#### **1.2 TEST PROCEDURE**

This 56.3-km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated 01 October 1996 and the corresponding KARCO Engineering Test Procedure KTP-001, dated October 18, 1996. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

The test was conducted at KARCO Engineering on January 30, 2001 at a speed of 55.80 km/h. The test vehicle was instrumented with eight (8) accelerometers to measure longitudinal axis accelerations. The driver and passenger's restraint systems were instrumented with four (4) seat belt load cells to measure lap and shoulder belt tension. The specified impact velocity range was 55.5 to 57.1 km/h. The frontal barrier impact event was documented by one (1) real-time panning motion picture camera and seventeen (17) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The test vehicle contained two (2) part 572E 50th percentile adult male anthropomorphic test devices (ATDs). Both ATDs were instrumented with head, chest, and pelvic tri-axial accelerometers, left and right femur load cells, upper and lower tibia sensors, and foot accelerometers. In addition, chest displacement and upper neck six-axis force and moment sensors were utilized. The ATDs were positioned in the front outboard seating positions according to the dummy placement procedures specified in the Laboratory Indicant Test Procedure. Ninety-six (96) channels of data were recorded with a PC based (TDAS) on-board data acquisition system. The data was digitally sampled at 10,000 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The Driver ATD (Serial No. 34) and the right-front passenger ATD (Serial No. 35) were calibrated two tests prior to this test. FMVSS 208 "Occupant Crash Protection" injury criteria were not exceeded by either ATD during this frontal barrier impact test.

### **1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST**

A rigid load cell barrier was impacted by a 2001 Pontiac Grand Prix SE 4 Door Sedan at a velocity of 55.80 km/h. The test vehicle weight is 1741 kilograms with two (2) part 572E 50th percentile adult male ATDs. Twenty-four (24) load cell barrier data channels were obtained in conducting the January 30, 2001 NCAP test. The test vehicle is a gasoline vehicle, equipped with a transverse mounted, 6-cylinder engine and a 4-speed automatic transmission.

The driver Head Injury Criteria (HIC) is 696.4. The maximum resultant chest deceleration over three (3) milliseconds is 47.2 g's. The left and right femur loads are -3978.5 and -4899.5 Newton's, respectively. Chest deflection for the driver ATD peaked at -27.4 mm. The driver ATD head contacted the airbag/headrest, its chest and abdomen contacted the seat belt, and both knees contacted the dash.

The right front passenger's HIC is 766.4. The maximum resultant chest deceleration over three (3) milliseconds is 44.4 g's. The left and right femur loads are -5102.1 and -4017.0 Newton's respectively. Chest deflection for the passenger ATD peaked at -23.6 mm. The passenger ATD head contacted the airbag and headrest, the chest and abdomen contacted the airbag and both knees contacted the glove box.

Maximum shoulder belt spool out as measured by on-board potentiometers is 221.7 mm for the driver ATD and 203.4 for the passenger ATD. Shoulder belt stretch not measured with pretensioners.

There was 100 percent windshield retention (minimum 50 percent required for passive restraint systems). No intrusion occurred into the protected or unprotected zone of the windshield. No Stoddard solvent leakage occurred after impact or during any phase of the rollover.

The test vehicle sustained a maximum static crush of 485 mm located at the vehicle centerline. Both the driver and passenger side doors opened without the aid of tools.

### **1.4 GENERAL COMMENTS**

The 2001 Pontiac Grand Prix SE 4 Door Sedan passed the requirements of FMVSS 208, FMVSS 212, FMVSS 219 and FMVSS 301-75. Data pertaining to these standards are presented in the data sheets.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. Appendix B contains the dummy and vehicle 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 owner's manual instructions for the occupant seating and restraint systems.

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

**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 <sup>2</sup> | kPa         | 7.0               |
| Volume             | Liquid              | gal                 | liter       | 3.785             |
| Temperature        | General Use         | °F                  | °C          | $=(t_f - 32)/1.8$ |
| 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: 2001 Pontiac Grand Prix SE 4 Door Coupe  
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10116  
Test Date: 01/30/01

**PRIMARY IMPACT DATA**

| Measured Parameter   | Units   | Value |
|----------------------|---------|-------|
| Velocity at Impact   | km/h    | 55.80 |
| Test Weight          | kg      | 1741  |
| Impact Angle         | degrees | 0     |
| Average Rebound      | mm      | 1198  |
| Maximum Static Crush | mm      | 485   |

**DOOR OPENING AND SEAT TRACK INFORMATION**

| Description           | Driver | Passenger |
|-----------------------|--------|-----------|
| Front Door Opening    | Opened | Opened    |
| Rear Door Opening     | Opened | Opened    |
| Seat Track Shift (mm) | None   | None      |
| 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            | Airbag/Headrest              | Airbag/Headrest              |
| Chest Contact           | Airbag/Belt                  | Airbag/Belt                  |
| Abdomen Contact         | Belt                         | Airbag/Belt                  |
| Left Knee Contact       | Dash                         | Glove Box                    |
| Right Knee Contact      | Dash                         | 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 | 8   |
| Rigid Barrier Load Cells         | 24  |
| Total                            | 120 |

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Coupe

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

**TEST VEHICLE INFORMATION**

|                         |                   |
|-------------------------|-------------------|
| Make                    | Pontiac           |
| Model                   | Grand Prix SE     |
| Body Style              | 4 Door Sedan      |
| NHTSA No.               | M10116            |
| VIN                     | 1G2WK525X1F147968 |
| Color                   | Silver            |
| Delivery Date           | 1/23/01           |
| Odometer Reading (mile) | 89                |
| Dealer                  | Rally Pontiac     |
| Transmission            | 4-Speed Automatic |
| Final Drive             | Front             |
| Number of Cylinders     | 6                 |
| Engine Displacement (L) | 3.1               |
| Engine Placement        | Transverse        |

**TEST VEHICLE OPTIONS**

|                    |     |
|--------------------|-----|
| Driver Airbag      | Yes |
| Passenger Airbag   | Yes |
| Power Windows      | Yes |
| Power Steering     | Yes |
| Power Door Locks   | Yes |
| Tilt Wheel         | Yes |
| Air Conditioning   | Yes |
| Power Brakes       | Yes |
| Disc Brakes, Front | Yes |
| Disc Brakes, Rear  | Yes |
| Anti-lock Brakes   | Yes |
| AM/FM/Cassette     | Yes |
| Anti-Theft System  | No  |
| Cruise Control     | No  |

**DATA FROM CERTIFICATION LABEL**

|                     |                            |                 |      |
|---------------------|----------------------------|-----------------|------|
| Manufactured By     | General Motors Corporation | GVWR (kg)       | 1958 |
| Date of Manufacture | September-00               | GAWR Front (kg) | 1085 |
|                     |                            | GAWR Rear (kg)  | 873  |

**DATA FROM TIRE PLACARD**

| Measured Parameter          | Front          | Rear           |
|-----------------------------|----------------|----------------|
| Maximum Tire Pressure (kPa) | 210            | 210            |
| Cold Pressure (kPa)         | 210            | 210            |
| Recommend Tire Size         | P205/70/R15    | P205/70/R15    |
| Tire Size on Vehicle        | P205/70/R15    | P205/70/R15    |
| Tire Manufacturer           | B. F. Goodrich | B. F. Goodrich |

**VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION**

| Measured Parameter       | Front  | Rear  | Third | Total |
|--------------------------|--------|-------|-------|-------|
| Type of Seats            | Bucket | Bench | None  |       |
| Number of Occupants      | 2      | 3     | 0     | 5     |
| Capacity Wt. (VCW) (kg)  |        |       |       | 440   |
| Cargo Weight (RCLW) (kg) |        |       |       | 76    |

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Coupe  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10116  
 Test Date: 01/30/01

**TEST VEHICLE WEIGHTS**

|        | Units | As Delivered (UVW) |           |       | As Tested (ATW) |           |       |
|--------|-------|--------------------|-----------|-------|-----------------|-----------|-------|
|        |       | Front Axle         | Rear Axle | Total | Front Axle      | Rear Axle | Total |
| Left   | kg    | 480                | 275       |       | 512             | 344       |       |
| Right  | kg    | 495                | 268       |       | 534             | 351       |       |
| Ratio  | %     | 64.2               | 35.8      |       | 60.1            | 39.9      |       |
| Totals | kg    | 975                | 543       | 1518  | 1046            | 695       | 1741  |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                      | Units | Value |
|-----------------------------------------|-------|-------|
| Total Delivered Weight (UVW)            | kg    | 1518  |
| Weight of 2 P572 ATD's                  | kg    | 152   |
| Rated Cargo/Luggage Weight (RCLW)       | kg    | 76    |
| Calculated Vehicle Target Weight (TVTW) | kg    | 1746  |

**TEST VEHICLE ATTITUDE AND CG**

|              | Units | LF  | RF  | LR  | RR  | CG (aft of front axle) |
|--------------|-------|-----|-----|-----|-----|------------------------|
| As Delivered | mm    | 735 | 729 | 753 | 743 | 1005                   |
| As Tested    | mm    | 702 | 702 | 702 | 702 | 1120                   |

Vehicle Wheel base (mm): 2808

Weight of Ballast secured in cargo area (kg): 0

Vehicle Components Removed: Side mirrors, jack, tools, spare tire and paneling.

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

**FUEL SYSTEM DATA**

Fuel System Capacity From Owner's Manual (L): 68.1

Usable Capacity Figure Furnished by COTR (L): N/A

Actual Test Volume with entire fuel System Filled (L): 63.3

Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.764

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

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: 2001 Pontiac Grand Prix SE 4 Door Coupe

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

**SPEED TRAP DATA**

| Measured Parameter              | Units | Requirement    | Value |
|---------------------------------|-------|----------------|-------|
| Trap No. 1 Velocity (Primary)   | km/h  | 55.51 to 57.12 | 55.80 |
| 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 | 55.93 |
| 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    | 4631     | 4228      | -403       |
| Center             | mm    | 5005     | 4520      | -485       |
| Right Side         | mm    | 4631     | 4270      | -361       |

**VEHICLE REBOUND FROM BARRIER**

| Measured Parameter | Units | Value |
|--------------------|-------|-------|
| Left Side          | mm    | 1280  |
| Center             | mm    | 1040  |
| Right Side         | mm    | 1275  |
| Average            | mm    | 1198  |

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

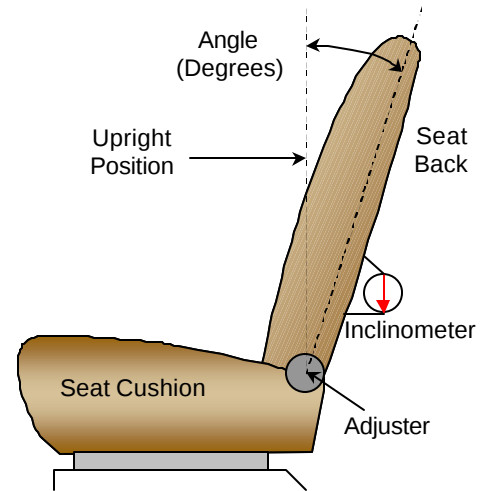
Test Date: 01/30/01

**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.

Driver seat back angle: 29.5° with a seated dummy

Passenger seat back angle: 29.5° with a seated dummy



*FRONT SEAT ASSEMBLY*

**SEAT FORE/AFT POSITIONS**

Driver seat has 25 seat detents and the passenger seat has 25 detents. 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 driver and passenger.

Driver seat fore/aft total travel: 25 seating positions or detents

Passenger seat fore/aft total travel: 25 seating positions or detents

Driver seat fore/aft position: 13th detent from forward most

Passenger seat fore/aft position: 13th detent from forward most

**SEAT BELT UPPER ANCHORAGE**

The test vehicle is equipped with adjustable anchorages for both driver and passenger seat positions. Both driver and passenger anchorages have 4 positions; each is set in the 2<sup>nd</sup> position from the top.

## DATA SHEET NO. 4...(continued)

### TEST VEHICLE INFORMATION

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

### FUEL TANK CAPACITY DATA

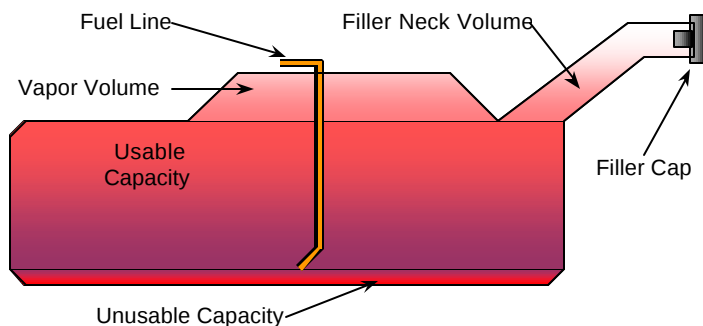
The "Usable Capacity" of the standard equipment fuel tank is: 68.1 liters

The "Usable Capacity" of any optional equipment fuel tank is: N/A liters

"Usable Capacity" used for certification tests FMVSS 301 requirements: 62.6 to 64.0 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 63.3 liters

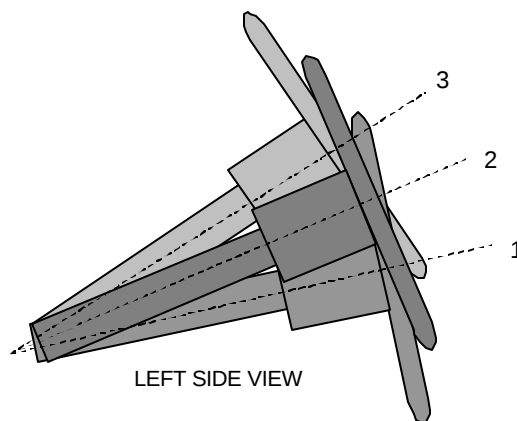
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed to the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat. Fuel lines run along the left side of the body 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 it is moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed onto the plate and the angle is measured. The tested vehicle has its steering column set to the geometric center, or position 2.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 21°

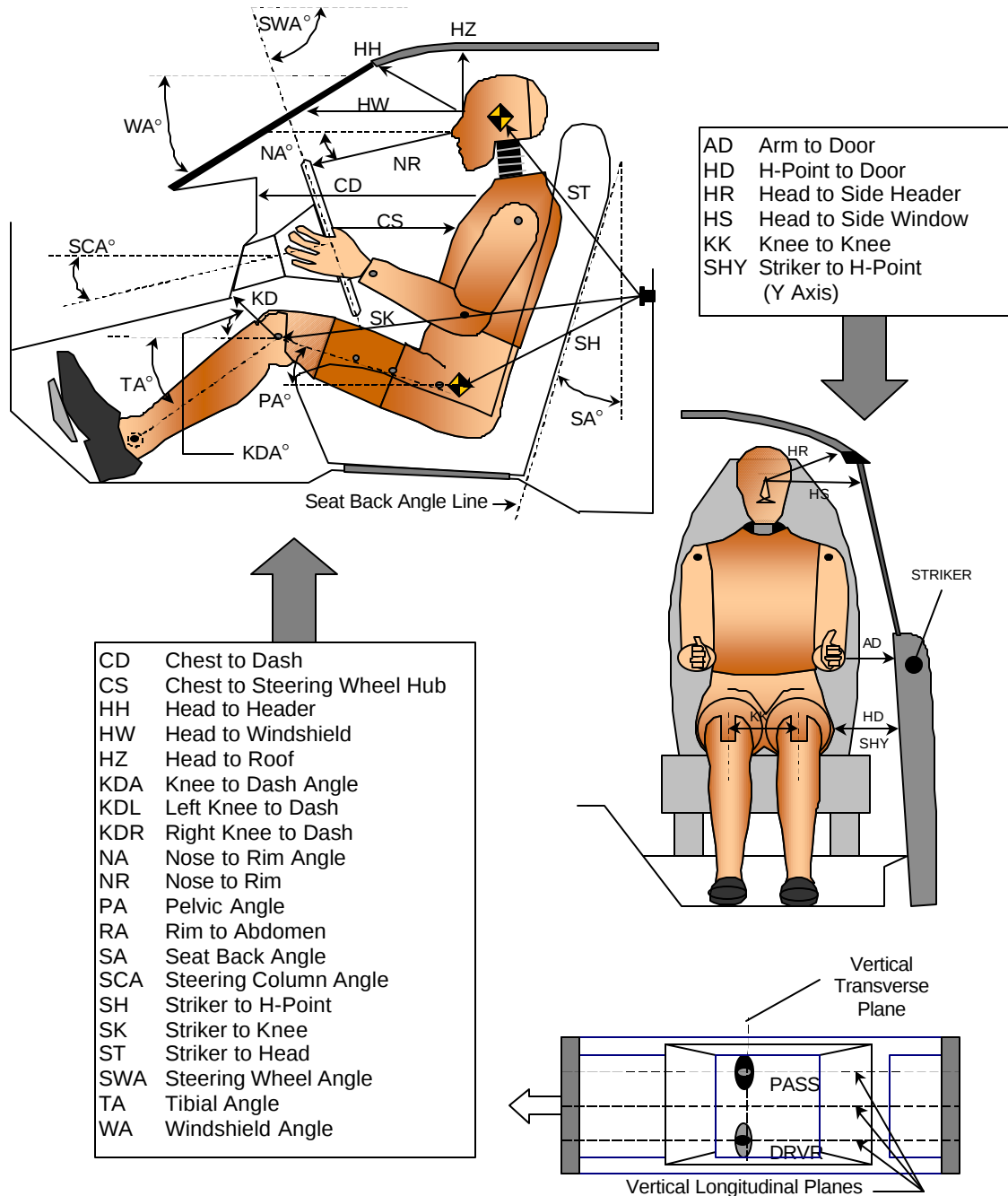
Geometric center, position 2: 26°

Uppermost, position 3: 31°

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10116  
 Test Date: 01/30/01



**DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS**

**DATA SHEET NO. 5...(continued)**  
**DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Coupe

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

**TEST DUMMY POSITION MEASUREMENTS**

| Code | Measurement Description | Driver      |           | Passenger   |           |
|------|-------------------------|-------------|-----------|-------------|-----------|
|      |                         | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| WA   | Windshield Angle        |             | 25        |             |           |
| SWA  | Steering Wheel Angle    |             | 64        |             |           |
| SCA  | Steering Column Angle   |             | 26        |             |           |
| SA   | Seat Back Angle         |             | 29        |             | 29        |
| HZ   | Head to Roof (Z)        | 162         | 90        | 156         | 90        |
| HH   | Head to Header          | 339         | 0         | 335         | 0         |
| HW   | Head to Windshield      | 643         | 0         | 652         | 0         |
| HR   | Head to Side Header (Y) | 215         |           | 205         |           |
| NR   | Nose to Rim             | 400         | 10        |             |           |
| CD   | Chest to Dash           | 520         |           | 511         |           |
| CS   | Chest to Steering Hub   | 340         | 0         |             |           |
| RA   | Rim to Abdomen          | 210         | 0         |             |           |
| KDL  | Left Knee to Dash       | 180         | 27        | 154         |           |
| KDR  | Right Knee to Dash      | 186         |           | 158         | 41        |
| PA   | Pelvic Angle            |             | 24        |             | 24        |
| TA   | Tibia Angle             |             | 36        |             | 40        |
| KK   | Knee to Knee (Y)        | 205         |           | 190         |           |
| SK   | Striker to Head         | 560         | 2         | 585         | 5         |
| ST   | Striker to Knee         | 525         | 1         | 527         | 6         |
| SH   | Striker to H-Point      | 207         | 38        | 217         | 37        |
| SHY  | Striker to H-Point (Y)  | 230         |           | 224         |           |
| HS   | Head to Side Window     | 335         |           | 312         |           |
| HD   | H-Point to Door (Y)     | 147         |           | 146         |           |
| AD   | Arm to Door (Y)         | 124         |           | 35          |           |

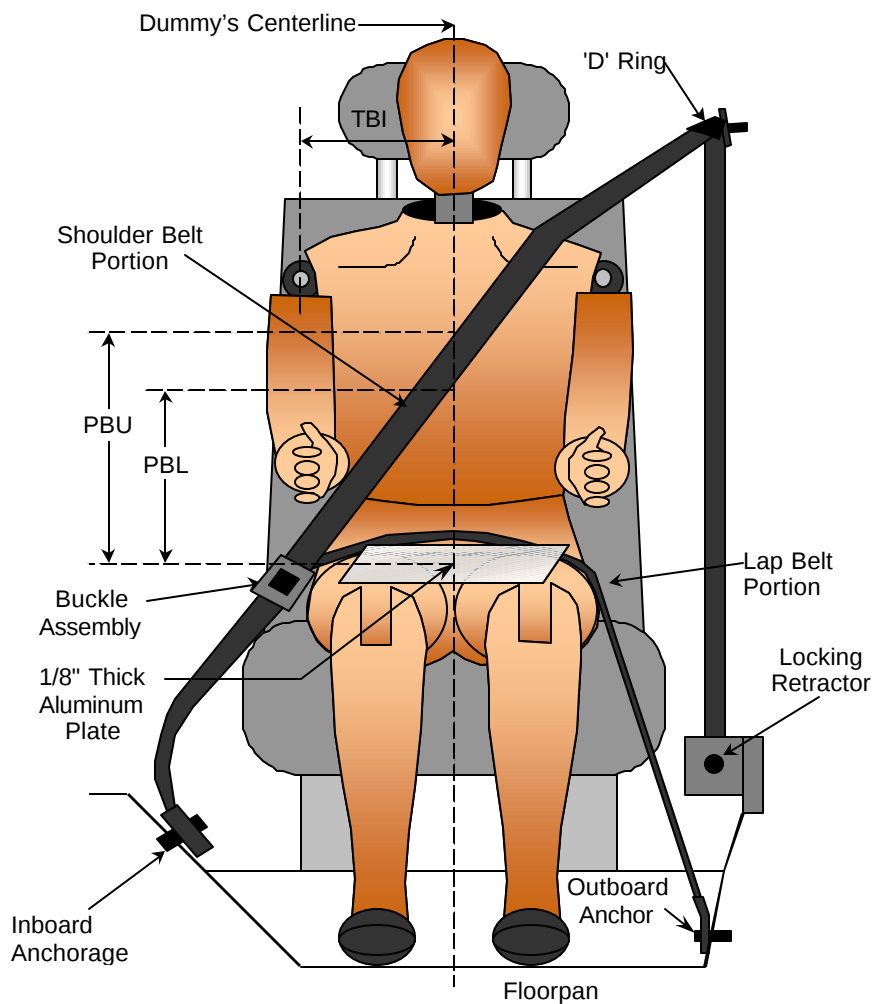
**DATA SHEET NO. 6**  
**SEAT BELT POSITIONING DATA**

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01



**SEAT BELT POSITIONING MEASUREMENTS**

| Measurement Description                           | Units    | Driver    | Passenger |
|---------------------------------------------------|----------|-----------|-----------|
| TBI - Dummy CL to Lap/Shoulder Belt Intersect     | mm       | 205       | 210       |
| PBU - Top surface of reference to belt upper edge | mm       | 365       | 345       |
| PBL - Top surface of reference to belt lower edge | mm       | 263       | 260       |
| 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: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

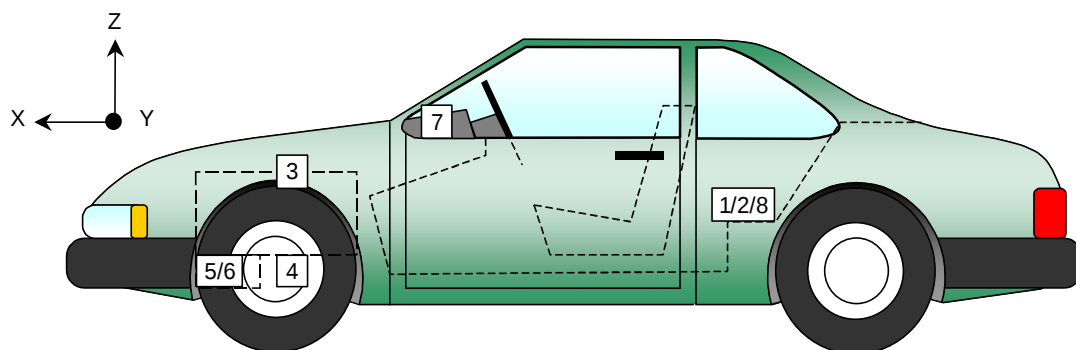
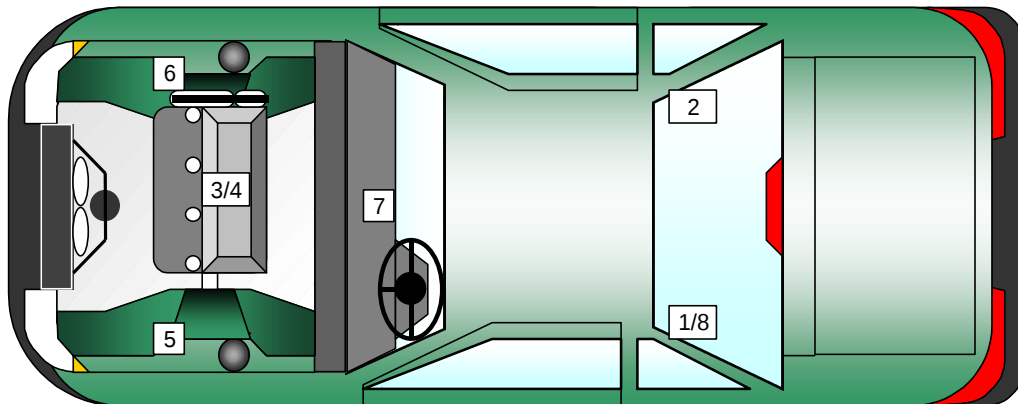
Test Program: 2001 NHTSA 35mph NCAP

Test Date: 01/30/01

## VEHICLE X-AXIS 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 (Pri.)   | 1890              | -650 | 350 | G's         | 1.8  | 166.3 | -32.8  | 58.4 |
| 2   | Right Rear X-Member (Pri.)  | 1890              | 690  | 350 | G's         | 2.3  | 147.5 | -37.1  | 63.5 |
| 3   | Engine Top                  | 4140              | 130  | 830 | G's         | 42.3 | 49.3  | -106.3 | 29.8 |
| 4   | Engine Bottom               | 4085              | -120 | 145 | G's         | 38.6 | 55.6  | -120.5 | 41.0 |
| 5   | Left Brake Caliper          | 4030              | -790 | 280 | G's         | 37.1 | 77.9  | -90.3  | 56.9 |
| 6   | Right Brake Caliper         | 4030              | 790  | 280 | G's         | 21.3 | 68.4  | -93.2  | 49.0 |
| 7   | Instrument Panel            | 3190              | 0    | 900 | G's         | 22.8 | 29.3  | -74.0  | 75.2 |
| 8   | Left Rear X-Member (Rednt.) | 1890              | -690 | 350 | G's         | 1.6  | 165.8 | -33.4  | 58.4 |

Reference Points 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: 2001 Pontiac Grand Prix SE 4 Door SedanNHTSA No.: M10116Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/30/01**HEAD PRIMARY PEAK ACCELERATIONS**

| Location          | Axis | Units | Driver |       |       |      | Passenger |       |       |       |
|-------------------|------|-------|--------|-------|-------|------|-----------|-------|-------|-------|
|                   |      |       | Max    | Time  | Min   | Time | Max       | Time  | Min   | Time  |
| Head CG           | X    | G's   | 9.4    | 238.3 | -64.5 | 84.6 | 16.0      | 217.7 | -67.2 | 81.1  |
| Head CG           | Y    | G's   | 3.3    | 132.5 | -3.0  | 42.1 | 9.1       | 62.6  | -8.2  | 90.6  |
| Head CG           | Z    | G's   | 19.6   | 67.2  | -7.1  | 97.7 | 26.5      | 81.6  | -7.1  | 105.4 |
| Head CG Resultant | N/A  | G's   | 66.4   | 84.6  |       |      | 72.1      | 81.1  |       |       |

**CHEST PRIMARY PEAK ACCELERATIONS**

| Location           | Axis | Units | Driver |       |       |       | Passenger |       |       |       |
|--------------------|------|-------|--------|-------|-------|-------|-----------|-------|-------|-------|
|                    |      |       | Max    | Time  | Min   | Time  | Max       | Time  | Min   | Time  |
| Chest CG           | X    | G's   | 3.1    | 269.3 | -47.5 | 74.1  | 3.9       | 242.8 | -44.5 | 87.2  |
| Chest CG           | Y    | G's   | 2.4    | 131.8 | -3.5  | 71.2  | 3.2       | 65.8  | -5.5  | 91.1  |
| Chest CG           | Z    | G's   | 7.0    | 82.8  | -5.1  | 106.6 | 10.6      | 81.2  | -7.3  | 101.9 |
| Chest CG Resultant | N/A  | G's   | 47.9   | 74.0  |       |       | 45.0      | 86.9  |       |       |

**FEMUR PEAK FORCES**

| Location    | Axis | Units   | Driver |      |         |      | Passenger |      |         |      |
|-------------|------|---------|--------|------|---------|------|-----------|------|---------|------|
|             |      |         | Max    | Time | Min     | Time | Max       | Time | Min     | Time |
| Left Femur  | Z    | Newtons | 303.1  | 52.3 | -3978.5 | 67.3 | 445.9     | 54.1 | -5102.1 | 64.3 |
| Right Femur | Z    | Newtons | 199.8  | 45.4 | -4899.5 | 67.4 | 414.9     | 55.0 | -4017.0 | 64.3 |

**SEAT BELT SENSOR PEAK VALUES**

| Location              | Axis | Units   | Driver |      |       |       | Passenger |      |       |       |
|-----------------------|------|---------|--------|------|-------|-------|-----------|------|-------|-------|
|                       |      |         | Max    | Time | Min   | Time  | Max       | Time | Min   | Time  |
| Lap Belt Force        | N/A  | Newtons | 4740.4 | 70.3 | -3.9  | 4.6   | 6223.5    | 66.7 | -24.1 | 243.5 |
| Shoulder Belt Force   | N/A  | Newtons | 5004.7 | 85.6 | -13.6 | 164.5 | 4770.6    | 78.4 | -4.8  | 210.1 |
| Shoulder Belt Pullout | N/A  | MM      | 221.7  | 93.9 | 0.1   | 2.2   | 203.4     | 94.9 | 0.4   | 5.8   |
| Shoulder Belt Stretch | N/A  | MM/CM   | 0.000  | 0.0  | 0.000 | 0.0   | 0.000     | 0.0  | 0.000 | 0.0   |

\* Not used with pre-tensioners.

**HEAD INJURY CRITERIA (HIC)**

| Location        | Driver |       |                |                | Passenger |       |                |                |
|-----------------|--------|-------|----------------|----------------|-----------|-------|----------------|----------------|
|                 | HIC    | Avg G | T <sup>1</sup> | T <sup>2</sup> | HIC       | Avg G | T <sup>1</sup> | T <sup>2</sup> |
| Head CG Primary | 696.4  | 53.5  | 61.2           | 94.4           | 766.4     | 53.9  | 61.7           | 97.6           |

**CHEST CLIP (3MSEC)**

| Location         | Driver |                |                | Passenger |                |                |
|------------------|--------|----------------|----------------|-----------|----------------|----------------|
|                  | CLIP   | T <sup>1</sup> | T <sup>2</sup> | CLIP      | T <sup>1</sup> | T <sup>2</sup> |
| Chest CG Primary | 47.2   | 72.6           | 75.6           | 44.4      | 86.3           | 89.3           |

# DATA SHEET NO. 8...(continued)

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35mph NCAP

Test Date: 01/30/01

## PELVIC PEAK ACCELERATIONS

| Location | Axis | Units | Driver |       |       |      | Passenger |       |       |      |
|----------|------|-------|--------|-------|-------|------|-----------|-------|-------|------|
|          |      |       | Max    | Time  | Min   | Time | Max       | Time  | Min   | Time |
| Pelvis   | X    | G's   | 3.1    | 138.4 | -68.8 | 67.5 | 3.0       | 138.8 | -67.7 | 64.7 |
| Pelvis   | Y    | G's   | 6.1    | 97.0  | -10.9 | 67.9 | 1.5       | 61.3  | -6.9  | 70.7 |
| Pelvis   | Z    | G's   | 2.8    | 271.6 | -22.5 | 83.6 | 3.8       | 258.2 | -22.0 | 66.9 |

## UPPER NECK PEAK FORCES AND MOMENTS

| Location    | Axis | Units   | Driver |       |        |       | Passenger |       |        |       |
|-------------|------|---------|--------|-------|--------|-------|-----------|-------|--------|-------|
|             |      |         | Max    | Time  | Min    | Time  | Max       | Time  | Min    | Time  |
| Neck Force  | X    | Newtons | 984.8  | 73.6  | -217.7 | 57.3  | 1038.8    | 85.3  | -164.6 | 245.3 |
| Neck Force  | Y    | Newtons | 157.5  | 82.6  | -157.5 | 115.2 | 169.5     | 55.5  | -233.1 | 70.1  |
| Neck Force  | Z    | Newtons | 1160.9 | 67.3  | -135.4 | 5.7   | 1616.4    | 69.4  | -305.8 | 248.8 |
| Neck Moment | X    | N•m     | 5.1    | 230.8 | -10.2  | 132.6 | 18.7      | 85.2  | -10.1  | 128.9 |
| Neck Moment | Y    | N•m     | 81.7   | 73.3  | -23.6  | 113.3 | 101.6     | 74.0  | -20.3  | 239.0 |
| Neck Moment | Z    | N•m     | 3.8    | 196.4 | -2.9   | 152.8 | 15.9      | 102.9 | -7.5   | 161.8 |

## FOOT PEAK ACCELERATIONS

| Location        | Axis | Units | Driver |       |       |      | Passenger |      |       |      |
|-----------------|------|-------|--------|-------|-------|------|-----------|------|-------|------|
|                 |      |       | Max    | Time  | Min   | Time | Max       | Time | Min   | Time |
| Left Foot Aft   | X    | G's   | 4.5    | 172.7 | -73.0 | 75.4 | 5.0       | 80.6 | -36.8 | 63.9 |
| Left Foot Aft   | Z    | G's   | 4.8    | 132.1 | -39.4 | 68.9 | 20.4      | 88.3 | -40.5 | 36.7 |
| Left Foot Fore  | Z    | G's   | 16.4   | 132.0 | -64.1 | 30.4 | 26.2      | 67.1 | -54.4 | 36.5 |
| Right Foot Aft  | X    | G's   | 15.2   | 33.4  | -81.1 | 64.5 | 3.4       | 84.4 | -40.0 | 64.2 |
| Right Foot Aft  | Z    | G's   | 13.0   | 87.5  | -40.4 | 56.7 | 9.5       | 89.7 | -37.2 | 37.7 |
| Right Foot Fore | Z    | G's   | 45.1   | 30.8  | -89.5 | 42.9 | 12.5      | 92.0 | -71.1 | 46.3 |

## UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

| Location           | Axis | Units   | Driver |       |         |      | Passenger |       |         |      |
|--------------------|------|---------|--------|-------|---------|------|-----------|-------|---------|------|
|                    |      |         | Max    | Time  | Min     | Time | Max       | Time  | Min     | Time |
| Left Lower Moment  | X    | N•m     | 82.4   | 82.4  | -10.3   | 68.9 | 10.7      | 108.5 | -30.0   | 70.7 |
| Left Lower Moment  | Y    | N•m     | 26.4   | 35.4  | -31.1   | 70.3 | 26.6      | 45.4  | -44.1   | 62.2 |
| Left Lower Force   | Z    | Newtons | 121.9  | 153.0 | -2224.9 | 40.2 | 92.3      | 203.3 | -3414.8 | 38.1 |
| Left Upper Moment  | X    | N•m     | 13.3   | 47.2  | -56.5   | 68.1 | 8.5       | 252.3 | -65.8   | 76.2 |
| Left Upper Moment  | Y    | N•m     | 52.2   | 129.8 | -61.8   | 79.4 | 18.9      | 135.6 | -103.3  | 71.4 |
| Right Lower Moment | X    | N•m     | 66.7   | 70.9  | -15.1   | 92.3 | 12.9      | 62.5  | -53.3   | 78.0 |
| Right Lower Moment | Y    | N•m     | 32.8   | 32.3  | -46.6   | 67.2 | 25.8      | 82.5  | -36.5   | 63.2 |
| Right Lower Force  | Z    | Newtons | 152.8  | 160.3 | -4811.5 | 70.7 | 177.8     | 163.8 | -2350.1 | 38.7 |
| Right Upper Moment | X    | N•m     | 31.8   | 71.3  | -32.0   | 91.8 | 28.9      | 61.9  | -16.0   | 46.3 |
| Right Upper Moment | Y    | N•m     | 14.1   | 162.4 | -218.6  | 69.5 | 21.5      | 149.8 | -100.4  | 62.6 |

**DATA SHEET NO. 8...(continued)**Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door SedanNHTSA No.: M10116Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/30/01**CHEST PEAK DISPLACEMENTS**

| Location | Axis | Units | Driver |      |       |      | Passenger |      |       |      |
|----------|------|-------|--------|------|-------|------|-----------|------|-------|------|
|          |      |       | Max    | Time | Min   | Time | Max       | Time | Min   | Time |
| Chest CG | X    | MM    | 0.2    | 1.9  | -27.4 | 79.5 | 0.7       | 38.5 | -23.6 | 79.5 |

**HEAD REDUNDANT PEAK ACCELERATIONS**

| Location          | Axis | Units | Driver |       |       |       | Passenger |       |       |       |
|-------------------|------|-------|--------|-------|-------|-------|-----------|-------|-------|-------|
|                   |      |       | Max    | Time  | Min   | Time  | Max       | Time  | Min   | Time  |
| Head CG           | X    | G's   | 9.4    | 236.4 | -63.8 | 83.6  | 15.8      | 218.3 | -67.5 | 80.6  |
| Head CG           | Y    | G's   | 3.6    | 132.6 | -3.0  | 131.8 | 7.0       | 63.5  | -8.1  | 92.4  |
| Head CG           | Z    | G's   | 22.7   | 71.4  | -6.8  | 99.4  | 28.2      | 82.1  | -6.2  | 105.2 |
| Head CG Resultant | N/A  | G's   | 66.3   | 80.0  |       |       | 72.8      | 82.5  |       |       |

**CHEST REDUNDANT PEAK ACCELERATIONS**

| Location           | Axis | Units | Driver |       |       |       | Passenger |       |       |       |
|--------------------|------|-------|--------|-------|-------|-------|-----------|-------|-------|-------|
|                    |      |       | Max    | Time  | Min   | Time  | Max       | Time  | Min   | Time  |
| Chest CG           | X    | G's   | 3.0    | 268.9 | -47.3 | 74.0  | 3.8       | 249.1 | -45.0 | 87.3  |
| Chest CG           | Y    | G's   | 2.8    | 131.9 | -3.2  | 71.2  | 5.3       | 65.9  | -4.4  | 91.2  |
| Chest CG           | Z    | G's   | 7.5    | 82.0  | -4.9  | 106.8 | 11.5      | 81.5  | -6.1  | 102.0 |
| Chest CG Resultant | N/A  | G's   | 47.7   | 74.0  |       |       | 45.6      | 86.9  |       |       |

**REDUNDANT HEAD INJURY CRITERA (HIC)**

| Location          | Driver |       |                |                | Passenger |       |                |                |
|-------------------|--------|-------|----------------|----------------|-----------|-------|----------------|----------------|
|                   | HIC    | Avg G | T <sup>1</sup> | T <sup>2</sup> | HIC       | Avg G | T <sup>1</sup> | T <sup>2</sup> |
| Head CG Redundant | 703.5  | 54.0  | 61.4           | 94.2           | 738.9     | 55.4  | 64.9           | 97.1           |

**REDUNDANT CHEST CLIP (3MSEC)**

| Location           | Driver |                |                | Passenger |                |                |
|--------------------|--------|----------------|----------------|-----------|----------------|----------------|
|                    | CLIP   | T <sup>1</sup> | T <sup>2</sup> | CLIP      | T <sup>1</sup> | T <sup>2</sup> |
| Chest CG Redundant | 47.1   | 72.6           | 75.6           | 44.9      | 86.1           | 89.1           |

**DATA SHEET NO. 9****SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door SedanNHTSA No.: M10116Test Program: 2001 NHTSA 35 mph NCAPTest Date: 01/30/01**SEAT BELT PLACEMENT MEASUREMENTS**

| Measurement Description                           | Units    | Driver    | Passenger |
|---------------------------------------------------|----------|-----------|-----------|
| TCI - Dummy CL to Lap/Shoulder Belt Intersect     | mm       | 205       | 210       |
| PBU -Top surface of reference to belt upper edge  | mm       | 365       | 345       |
| PBL - Top surface of reference to belt lower edge | mm       | 263       | 260       |
| 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    | 675    | 675       |
| Shoulder belt length as measured on ATD          | mm    | 760    | 800       |
| Lap belt length as measured on ATD               | mm    | 645    | 660       |
| Remainder of belt on reel                        | mm    | 950    | 915       |
| Total belt length for continuous webbing systems | mm    | 3030   | 3050      |

**SHOULDER BELT SPOOL-OFF DATA**

| Measurement Description      | Units | Driver | Passenger |
|------------------------------|-------|--------|-----------|
| As determined mechanically   | mm    | 195.0  | 175.0     |
| As determined electronically | mm    | 221.7  | 203.4     |

**BELT STRETCH DATA**

| Measurement Description                                  | Units | Driver | Passenger |
|----------------------------------------------------------|-------|--------|-----------|
| Electronically from shoulder belt load cell and "D" ring | mm/cm | N/A    | N/A       |
| Mechanically                                             | mm/cm | N/A    | N/A       |

\*Not used with shoulder belt pre-tensioner systems.

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

**Windshield Mounting Details:**

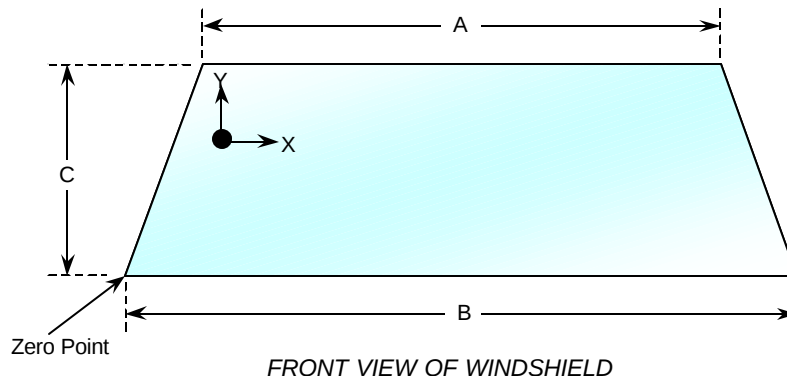
Windshield glass is secured to the vehicle frame with a rubber type adhesive. There is no molding that covers the windshield periphery at any point.

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   | 2211.5       | 2211.5         | 100            |
| Right Side  | 2211.5       | 2211.5         | 100            |
| Total       | 4423.0       | 4423.0         | 100            |



**WINDSHIELD DIMENSIONS**

| Item | Units | Segment Length | Molding Width |
|------|-------|----------------|---------------|
| A    | mm    | 1244           | 20            |
| B    | mm    | 1563           | N/A           |
| C    | mm    | 808            | 20            |

## DATA SHEET NO. 11

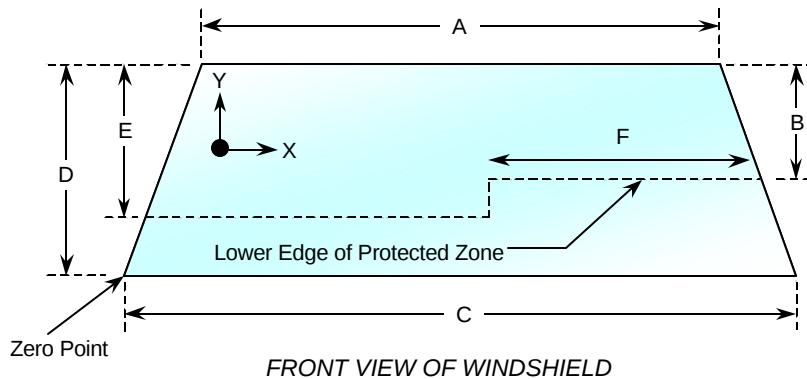
### WINDSHIELD ZONE INTRUSION FMVSS 219 (PARTIAL) DATA

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01



#### WINDSHIELD AND PROTECTED ZONE

| Item | Units | Value |
|------|-------|-------|
| A    | mm    | 1244  |
| B    | mm    | 405   |
| C    | mm    | 1563  |
| D    | mm    | 808   |
| E    | mm    | 540   |
| F    | mm    | 820   |

#### 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: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

Test Time: 11:51 AM

Temperature at Time of Impact: 6.6 °C

**STODDARD SOLVENT SPILLAGE MEASUREMENT**

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

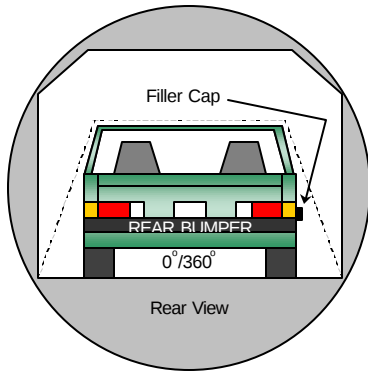
**DATA SHEET NO. 13**  
**FMVSS 301 STATIC ROLLOVER DATA SHEET**

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

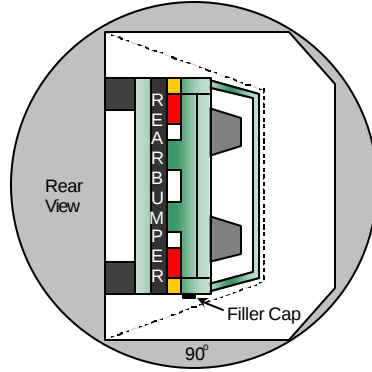
NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

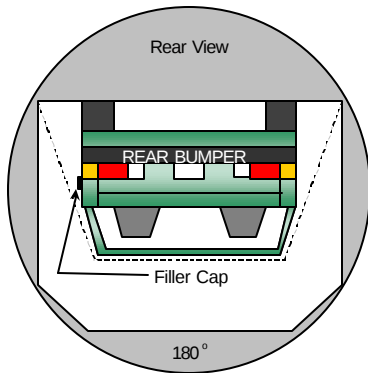
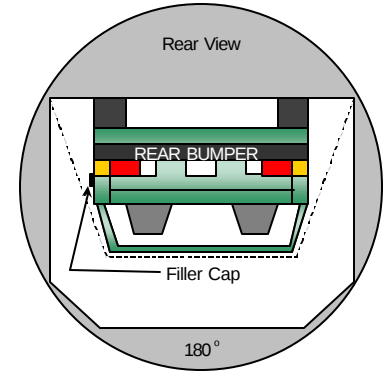
Test Date: 01/30/01



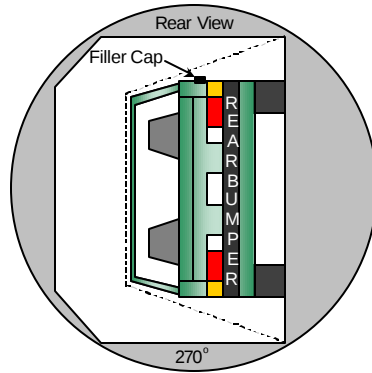
**0° TO 90°**



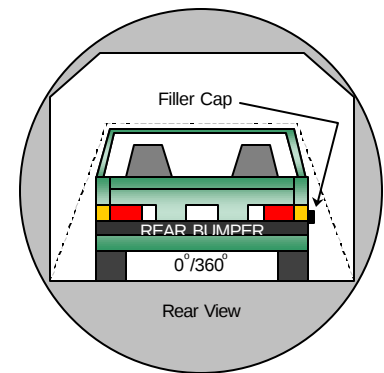
**90° TO 180°**



**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.

| Test Phase   | Rotation Time (sec.) | Hold Time (sec.) | Spillage (oz.) |
|--------------|----------------------|------------------|----------------|
| 0° TO 90°    | 80                   | 300              | 0.0            |
| 90° TO 180°  | 78                   | 300              | 0.0            |
| 180° TO 270° | 80                   | 300              | 0.0            |
| 270° TO 360° | 80                   | 300              | 0.0            |

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

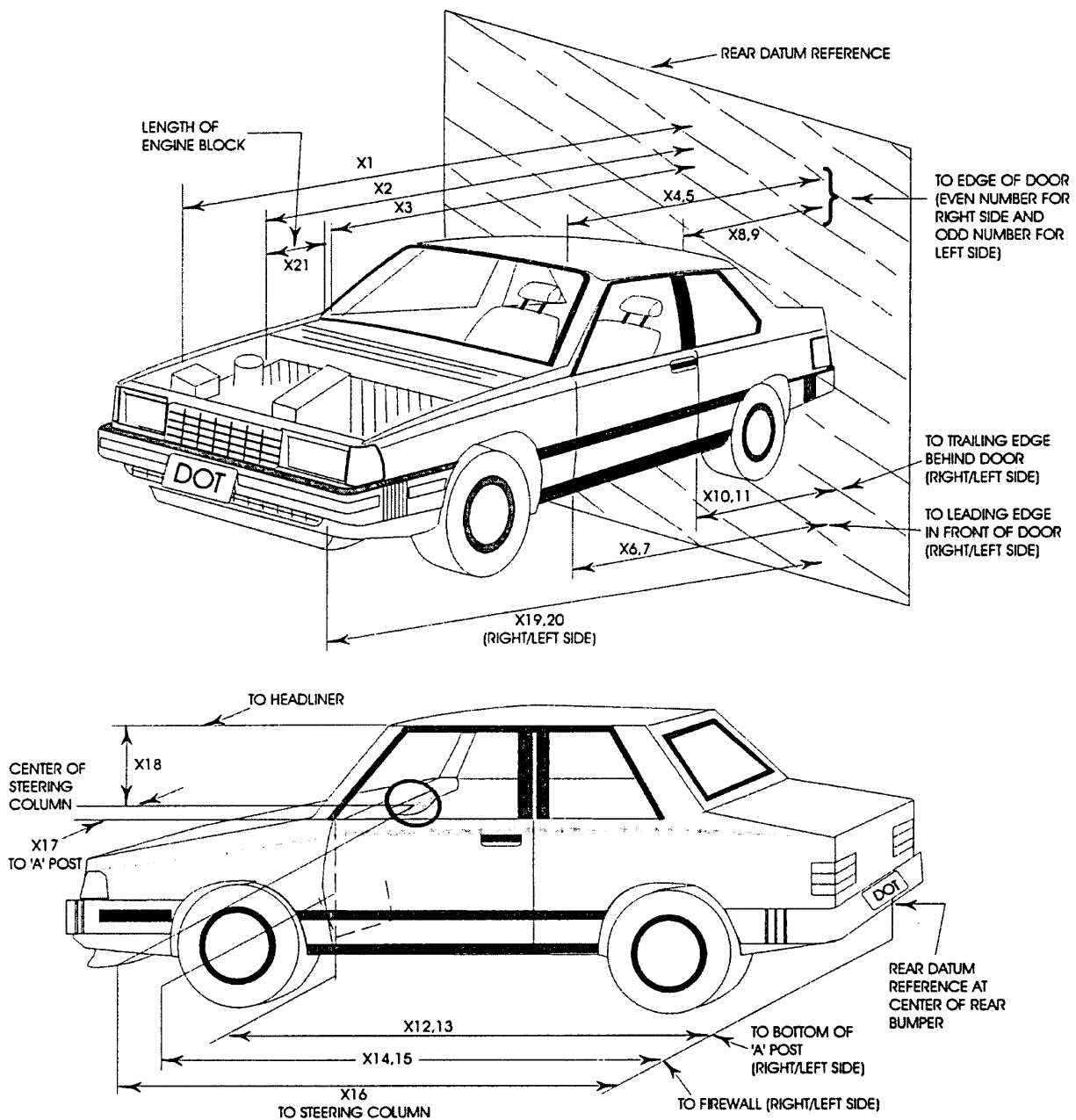
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

| No. | Measurement Description                      | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------------------------|-------|----------|-----------|------------|
| 1   | Total length of vehicle at centerline        | mm    | 5005     | 4520      | -485       |
| 2   | RSOV to front of engine                      | mm    | 4318     | 4053      | -265       |
| 3   | RSOV to firewall centerline                  | mm    | 3793     | 3750      | -43        |
| 4   | RSOV to leading edge of right door           | mm    | 3354     | 3347      | -7         |
| 5   | RSOV to leading edge of left door            | mm    | 3360     | 3349      | -11        |
| 6   | RSOV to lower leading edge of right door     | mm    | 3357     | 3355      | -2         |
| 7   | RSOV to lower leading edge of left door      | mm    | 3364     | 3349      | -15        |
| 8   | RSOV to upper trailing edge of right door    | mm    | 2318     | 2308      | -10        |
| 9   | RSOV to upper trailing edge of left door     | mm    | 2318     | 2308      | -10        |
| 10  | RSOV to lower trailing edge of right door    | mm    | 2332     | 2328      | -4         |
| 11  | RSOV to lower trailing edge of left door     | mm    | 2334     | 2334      | 0          |
| 12  | RSOV to bottom of right 'A' pillar           | mm    | 3356     | 3350      | -6         |
| 13  | RSOV to bottom of left 'A' pillar            | mm    | 3365     | 3348      | -17        |
| 14  | RSOV to firewall on right side               | mm    | 3743     | 3642      | -101       |
| 15  | RSOV to firewall of left side                | mm    | 3745     | 3692      | -53        |
| 16  | RSOV to steering column                      | mm    | 2894     | 2919      | 25         |
| 17  | Center of steering column to left 'A' pillar | mm    | 415      | 440       | 25         |
| 18  | Center of steering column to headlining      | mm    | 403      | 380       | -23        |
| 19  | RSOV to right side of front bumper           | mm    | 4631     | 4270      | -361       |
| 20  | RSOV to left side of front bumper            | mm    | 4631     | 4228      | -403       |
| 21  | Length of engine block                       | mm    | 468      | 468       | 0          |
| RD  | RSOV to right side of dash panel             | mm    | 3067     | 3056      | -11        |
| CD  | RSOV to center of dash panel                 | mm    | 3005     | 2997      | -8         |
| LD  | RSOV to left side of dash panel              | mm    | 3113     | 3095      | -18        |



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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

| No. | Camera View           | Location (mm) |        |      | Angle<br>(Deg.) | Film<br>Plane to<br>Head | Lens<br>(mm) | Speed<br>(fps) |
|-----|-----------------------|---------------|--------|------|-----------------|--------------------------|--------------|----------------|
|     |                       | X             | Y      | Z    |                 |                          |              |                |
| 1   | Right Side, Real Time | 3454          | 10973  | 1245 | 0               | 1651                     | Zoom         | 24             |
| 2   | Left Side, No. 1      | 1955          | -8250  | 880  | -1              | 7901                     | 13           | 1030           |
| 3   | Left Side, No. 2      | 1455          | -8250  | 1460 | -4              | 7953                     | 35           | 1020           |
| 4   | Left Side, No. 3      | 6495          | -10580 | 4640 | -16             | 11427                    | 70           | 1010           |
| 5   | Left Side, No. 4      | Did Not Run   |        |      |                 |                          |              |                |
| 6   | Left Side, No. 5      | 1455          | -8250  | 2700 | -13             | 8084                     | 19           | 990            |
| 7   | Right Side, No. 1     | 1955          | 8150   | 730  | -1              | 8575                     | 19           | 1020           |
| 8   | Right Side, No. 2     | 1655          | 8150   | 1450 | -4              | 8592                     | 35           | 1060           |
| 9   | Right Side, No. 3     | 7855          | 8900   | 2800 | -9              | N/A                      | 80           | 910            |
| 10  | Right Side, No. 4     | 970           | 12358  | 1150 | -2              | 12849                    | 50           | 980            |
| 11  | Overhead Overall      | 251           | 0      | 4460 | -86             | N/A                      | 13           | 1030           |
| 12  | Front View, Driver    | -525          | -380   | 2590 | -43             | N/A                      | 12           | 900            |
| 13  | Front View, Passenger | -525          | 380    | 2590 | -44             | N/A                      | 13           | 1010           |
| 14  | Pit Camera, Engine    | Did Not Run   |        |      |                 |                          |              |                |
| 15  | Pit Camera, Fuel Tank | Did Not Run   |        |      |                 |                          |              |                |
| 16  | Driver Belt           | 3461          | -335   | 1060 | -5              | 827                      | 13           | 650            |
| 17  | Passenger Belt        | 3461          | 320    | 1060 | -5              | 1100                     | 13           | 630            |
| 18  | Left Side Extra       | 800           | -6681  | 1450 | -2              | 6556                     | 24           | 1090           |

X - Barrier Face   Y - Monorail Centerline   Z - Ground

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

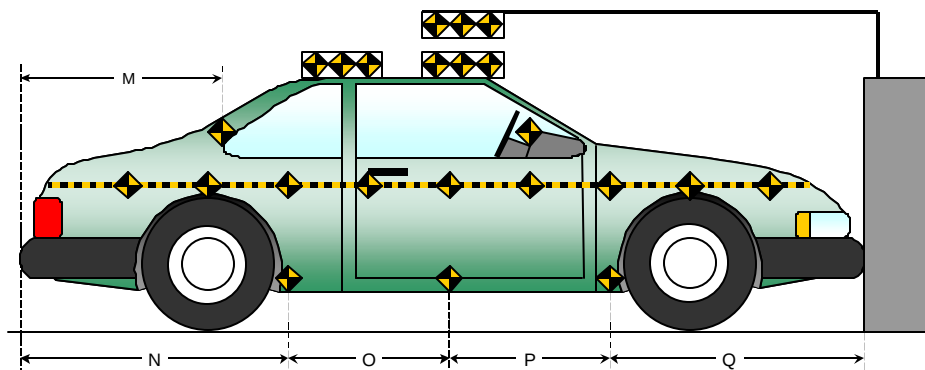
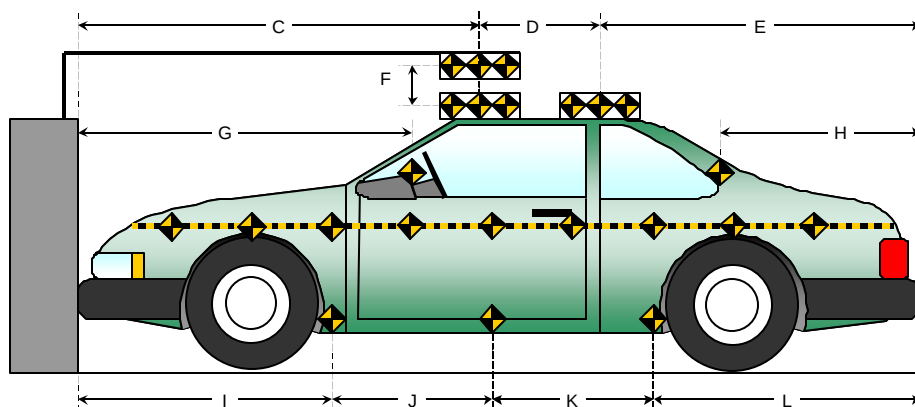
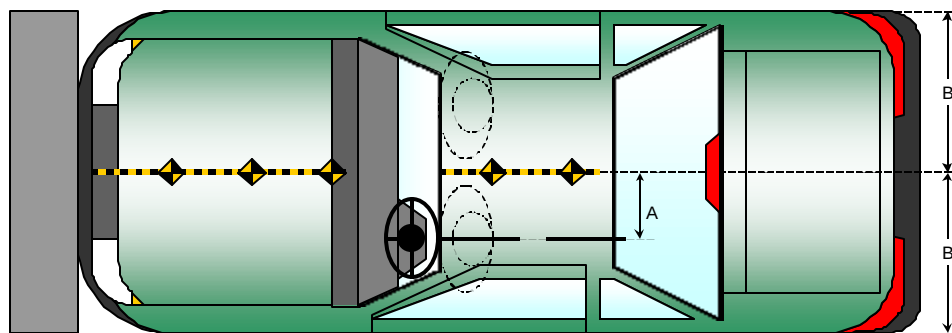
NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

All Dimensions  
in mm

| Item | Value |
|------|-------|
| A    | 397   |
| B    | 919.5 |
| C    | 2344  |
| D    | 609   |
| E    | 2054  |
| F    | 155   |
| G    | 1962  |
| H    | 1236  |
| I    | 1554  |
| J    | 973   |
| K    | 973   |
| L    | 1506  |
| M    | 1231  |
| N    | 1506  |
| O    | 971   |
| P    | 971   |
| Q    | 1559  |



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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

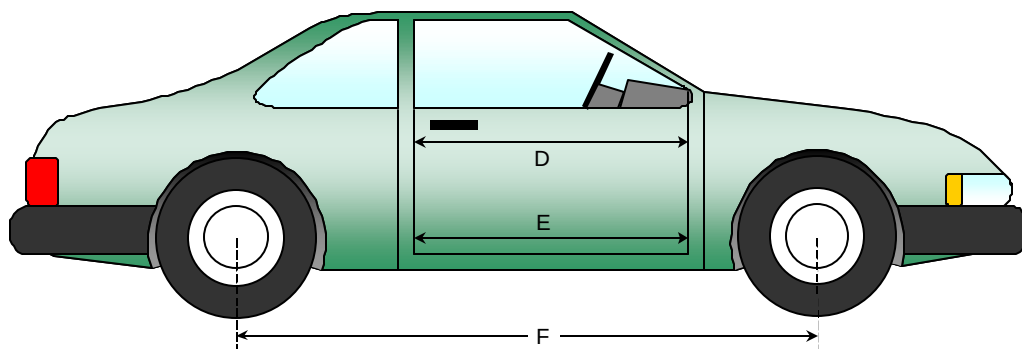
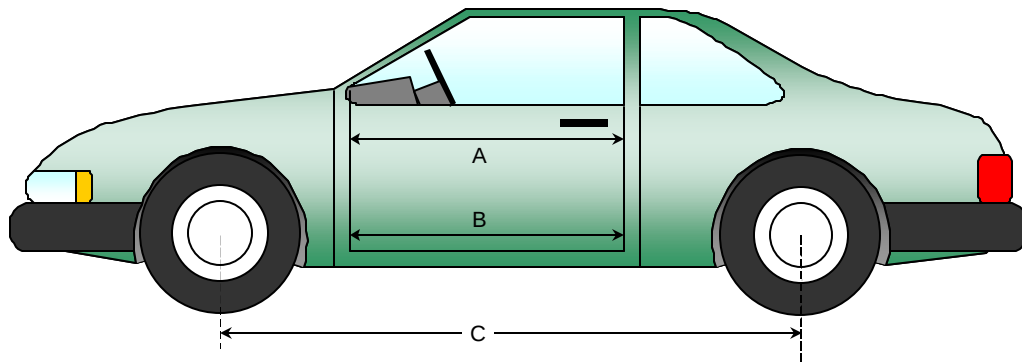
Test Date: 01/30/01

**DOOR OPENING WIDTH**

| Item | Description      | Units | Pre-Test | Post-Test | Difference |
|------|------------------|-------|----------|-----------|------------|
| A    | Left Side Upper  | mm    | 959      | 959       | 0          |
| B    | Left Side Lower  | mm    | 892      | 891       | -1         |
| D    | Right Side Upper | mm    | 955      | 949       | -6         |
| E    | Right Side Lower | mm    | 890      | 887       | -3         |

**WHEELBASE MEASUREMENTS**

| Item | Description           | Units | Pre-Test | Post-Test | Difference |
|------|-----------------------|-------|----------|-----------|------------|
| C    | Left Side Wheel base  | mm    | 2808     | 2739      | -69        |
| F    | Right Side Wheel base | mm    | 2808     | 2701      | -107       |



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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

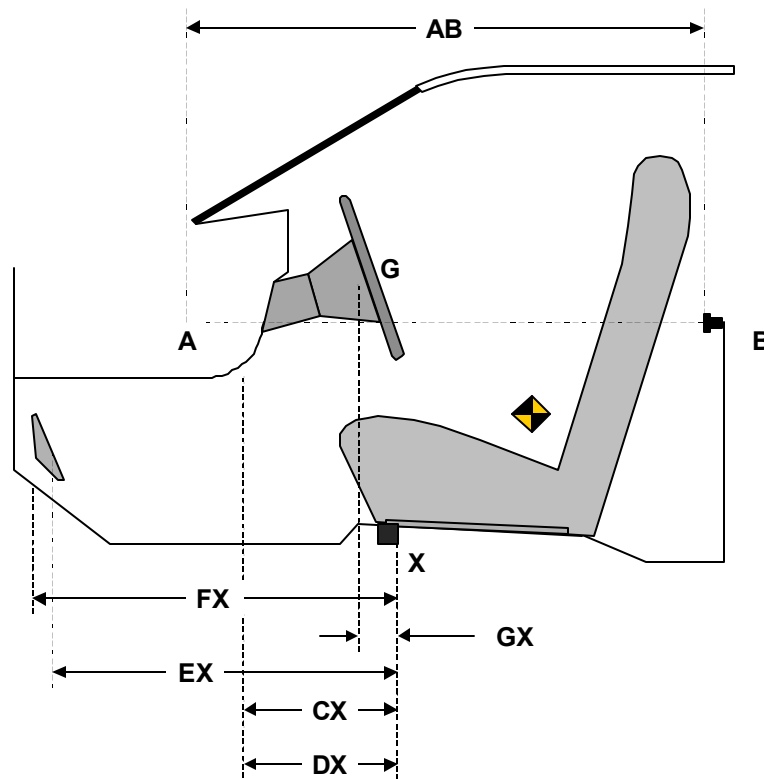
Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

**DRIVER COMPARTMENT INTRUSION**

| Item | Description                       | Units | Pre-Test | Post-Test | Difference |
|------|-----------------------------------|-------|----------|-----------|------------|
| AB   | Door Opening (Inside window jam)  | mm    | 959      | 959       | 0          |
| CX   | Left Knee Bolster to X            | mm    | 250      | 251       | 1          |
| DX   | Right Knee Bolster to X           | mm    | 275      | 250       | -25        |
| EX   | Brake Pedal to X                  | mm    | 620      | 526       | -94        |
| FX   | Foot Rest to X                    | mm    | 595      | 592       | -3         |
| GX   | Center of Steering Wheel Hub to X | mm    | 61       | 110       | 49         |

X = Left Front Seat Outboard Anchor Bolt Head



**DRIVER COMPARTMENT**

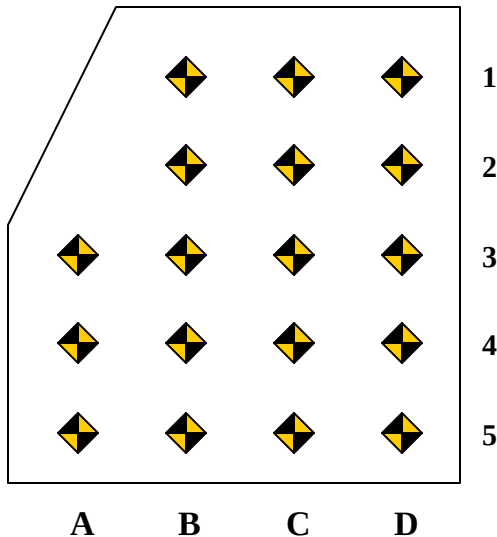
**DATA SHEET NO. 17...(CONTINUED)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01



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 |          | 722 | 734 | 732 |           | 693 | 685 | 672 |            | -29 | -49 | -60 |
| 2 |          | 645 | 656 | 656 |           | 602 | 599 | 593 |            | -43 | -57 | -63 |
| 3 | 538      | 542 | 546 | 544 | 522       | 515 | 490 | 485 | -16        | -27 | -56 | -59 |
| 4 | 442      | 440 | 444 | 445 | 421       | 420 | 426 | 421 | -21        | -20 | -18 | -24 |
| 5 | 339      | 339 | 338 | 338 | 331       | 323 | 324 | 324 | -8         | -16 | -14 | -14 |

**DRIVER FLOOR PAN Z-AXIS**

|   | Pre-Test |      |      |      | Post-Test |      |      |      | Difference |     |    |    |
|---|----------|------|------|------|-----------|------|------|------|------------|-----|----|----|
|   | A        | B    | C    | D    | A         | B    | C    | D    | A          | B   | C  | D  |
| 1 |          | -25  | -30  | -21  |           | 22   | 25   | 27   |            | 47  | 55 | 48 |
| 2 |          | -79  | -79  | -76  |           | -18  | -23  | -33  |            | 61  | 56 | 43 |
| 3 | -87      | -90  | -87  | -88  | -73       | -68  | -38  | -28  | 14         | 22  | 49 | 60 |
| 4 | -101     | -98  | -112 | -110 | -88       | -93  | -103 | -93  | 13         | 5   | 9  | 17 |
| 5 | -101     | -101 | -124 | -113 | -101      | -118 | -131 | -118 | 0          | -17 | -7 | -5 |

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

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

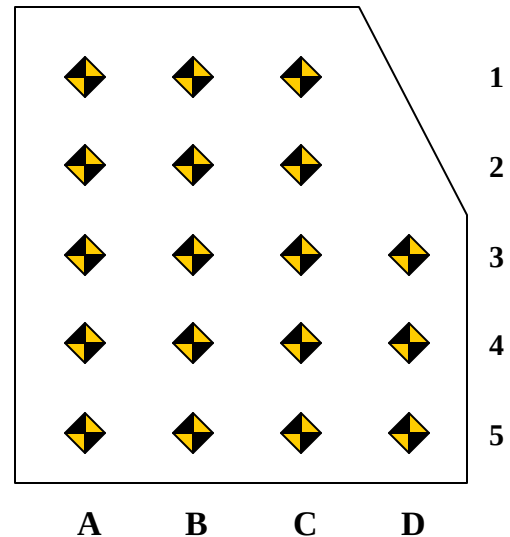
Test Date: 01/30/01

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 | 654      | 654 | 654 |     | 598       | 611 | 621 |     | -56        | -43 | -33 |     |
| 2 | 554      | 554 | 554 |     | 502       | 512 | 534 |     | -52        | -42 | -20 |     |
| 3 | 455      | 456 | 454 | 455 | 439       | 425 | 433 | 436 | -16        | -31 | -21 | -19 |
| 4 | 357      | 354 | 354 | 355 | 342       | 347 | 336 | 353 | -15        | -7  | -18 | -2  |
| 5 | 257      | 254 | 254 | 254 | 257       | 247 | 248 | 256 | 0          | -7  | -6  | 2   |

**PASSENGER FLOOR PAN Z-AXIS**

|   | Pre-Test |      |      |      | Post-Test |      |      |      | Difference |    |    |    |
|---|----------|------|------|------|-----------|------|------|------|------------|----|----|----|
|   | A        | B    | C    | D    | A         | B    | C    | D    | A          | B  | C  | D  |
| 1 | -70      | -69  | -63  |      | 9         | 9    | 9    |      | 79         | 78 | 72 |    |
| 2 | -83      | -85  | -83  |      | 9         | -17  | -54  |      | 92         | 68 | 29 |    |
| 3 | -113     | -96  | -88  | -120 | -54       | -49  | -81  | -78  | 59         | 47 | 7  | 42 |
| 4 | -116     | -108 | -110 | -113 | -94       | -108 | -99  | -100 | 22         | 0  | 11 | 13 |
| 5 | -126     | -113 | -110 | -108 | -108      | -95  | -102 | -97  | 18         | 18 | 8  | 11 |

**DATA SHEET NO. 18**  
**FIXED BARRIER TYPE**

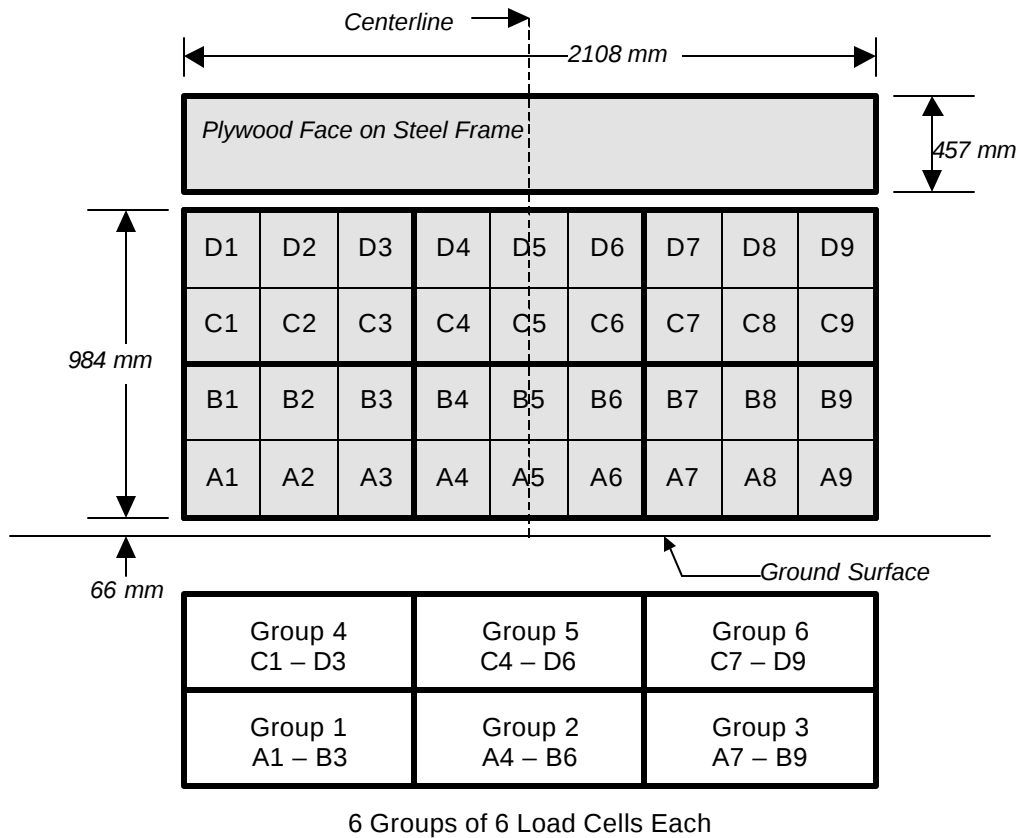
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01

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



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 DATA**

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Coupe  
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10116  
Test Date: 01/30/01

**VEHICLE INFORMATION**

VIN: 1G2WK525X1F147968  
Vehicle Size Category: 4 Door Sedan

Wheel base (mm): 2808  
Test Weight (kg): 1741

**ACCELEROMETER DATA**

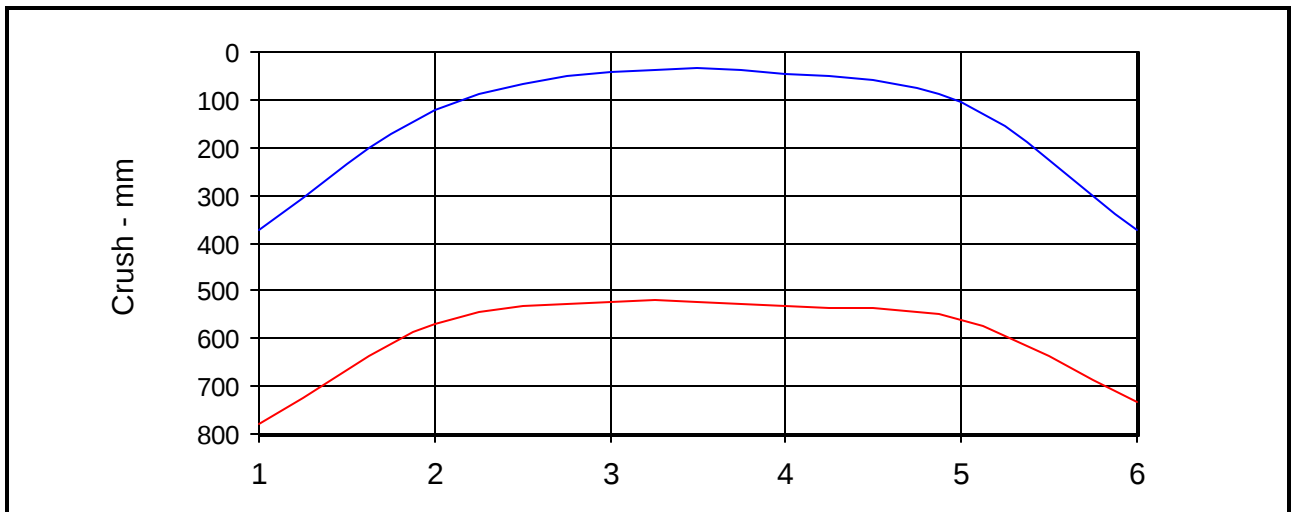
Accelerometer Location: Left rear floor pan  
Cal. Procedure/Interval: 6 months / drop test  
Integration Algorithm: NHTSA Standard  
Impact Velocity (km/h): 55.80  
Velocity Change (km/h): 64.74

Linearity: Good  
Time of Separation (msec): 82.5

**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW6 ; Midpoint of Damage: Vehicle Centerline  
Damage Region Length (mm): 1621 ; Impact Mode: Full Frontal

| No. | Measurement Description    | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------|-------|----------|-----------|------------|
| C1  | Crush zone 1 at left side  | mm    | 374      | 777       | -403       |
| C2  | Crush zone 2 on left side  | mm    | 123      | 570       | -447       |
| C3  | Crush zone 3 on left side  | mm    | 42       | 522       | -480       |
| C4  | Crush zone 4 on right side | mm    | 47       | 530       | -483       |
| C5  | Crush zone 5 on right side | mm    | 106      | 561       | -455       |
| C6  | Crush zone 6 at right side | mm    | 374      | 735       | -361       |



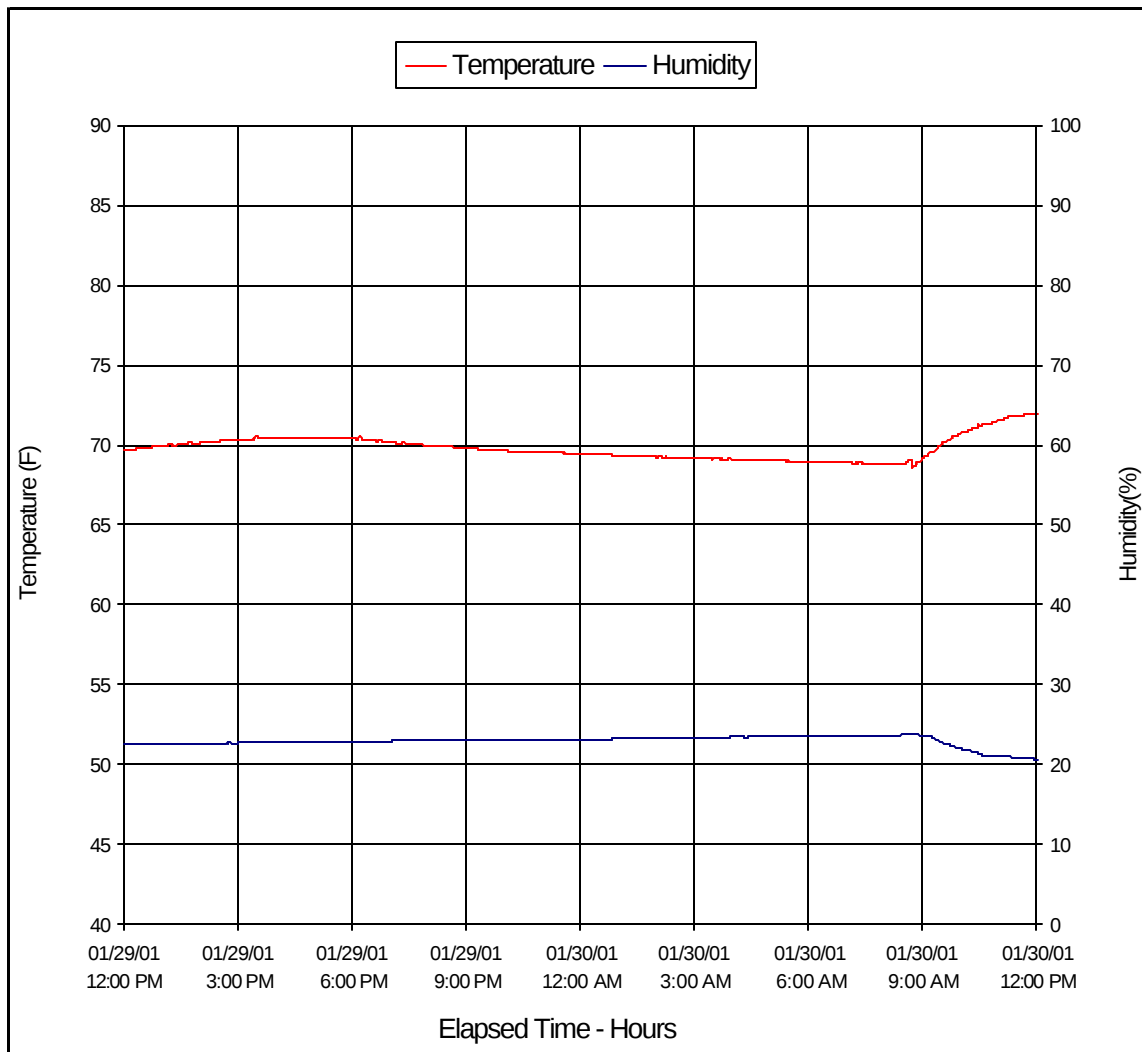
**DATA SHEET NO. 20**  
**DUMMY/VEHICLE TEMPERATURE STABILIZATION**

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

NHTSA No.: M10116

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/30/01



**APPENDIX A**  
**PHOTOGRAPHS**

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| A-58   | Vehicle During Impact                                   | A-58 |



Figure A-1: Right Front, as Received



Figure A-2: Left Rear, as Received



Figure A-3: Vehicle Certification Label

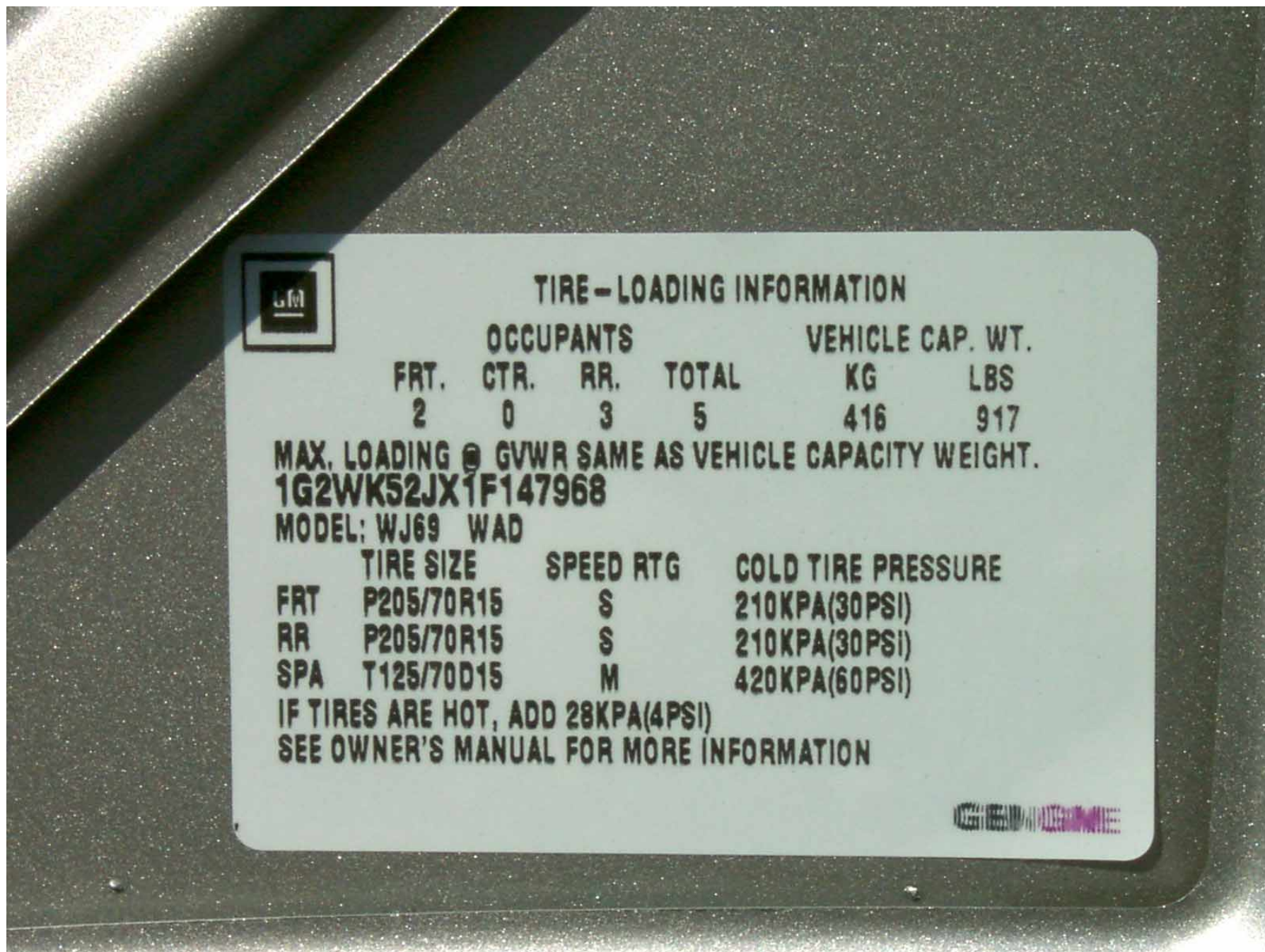


Figure A-4: Vehicle Tire Label



Figure A-5: Front View, Pre-Test



Figure A-6: Front View, Post-Test



Figure A-7: Left Side View, Pre-Test



Figure A-8: Left Side View, Post-Test



Figure A-9: Right Side View, Pre-Test



Figure A-10: Right Side View, Post-Test



Figure A-11: Right Front View, Pre-Test



Figure A-12: Right Front View, Post-Test



Figure A-13: Left Rear View, Pre-Test



Figure A-14: Left Rear View, Post-Test

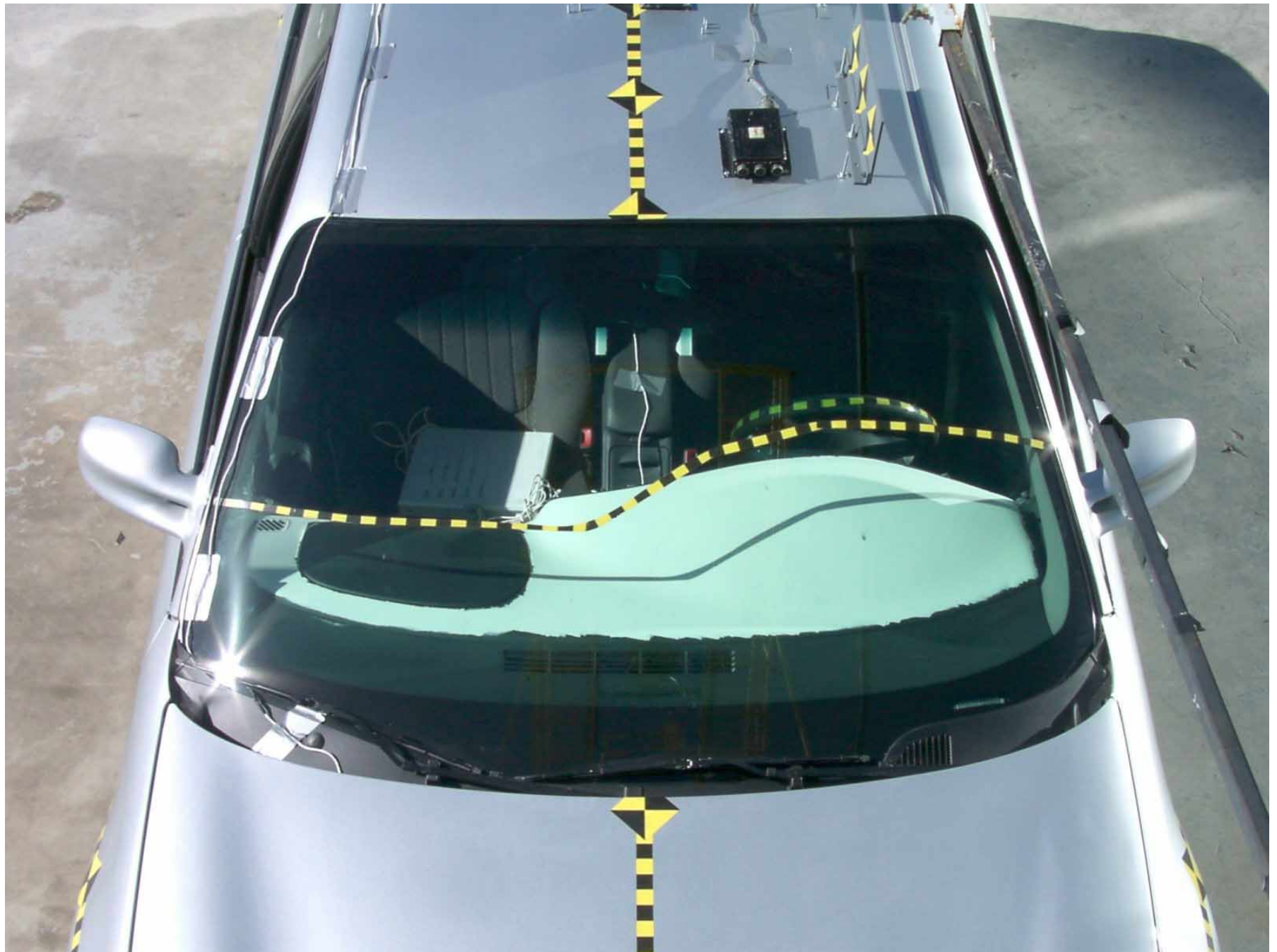


Figure A-15: Windshield, Pre-Test



Figure A-16: Windshield, Post-Test



Figure A-17: Engine Compartment, Pre-Test

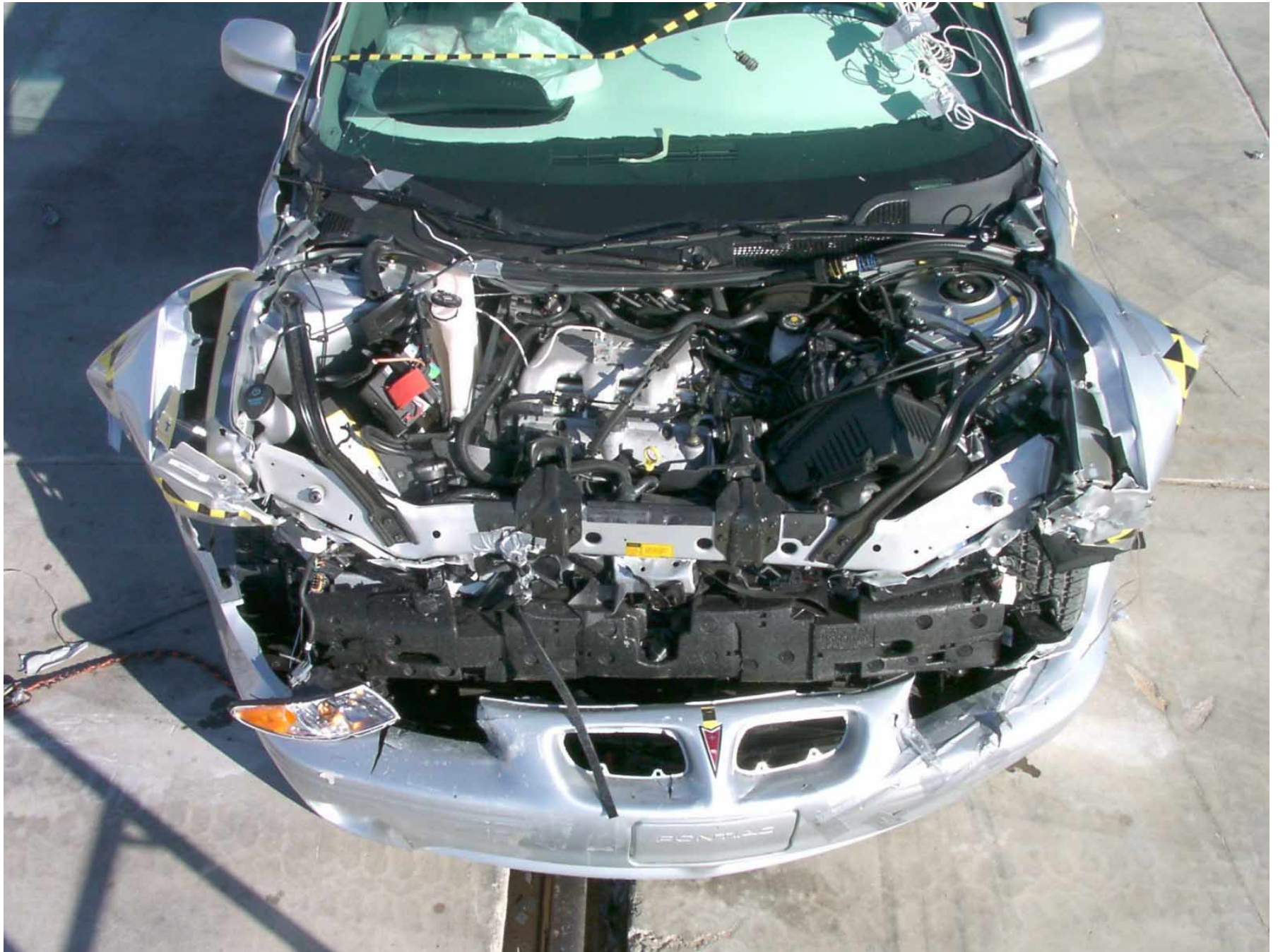


Figure A-18: Engine Compartment, Post-Test



Figure A-19: Fuel Cap, Pre-test



Figure A-20: Fuel Cap, Post-Test

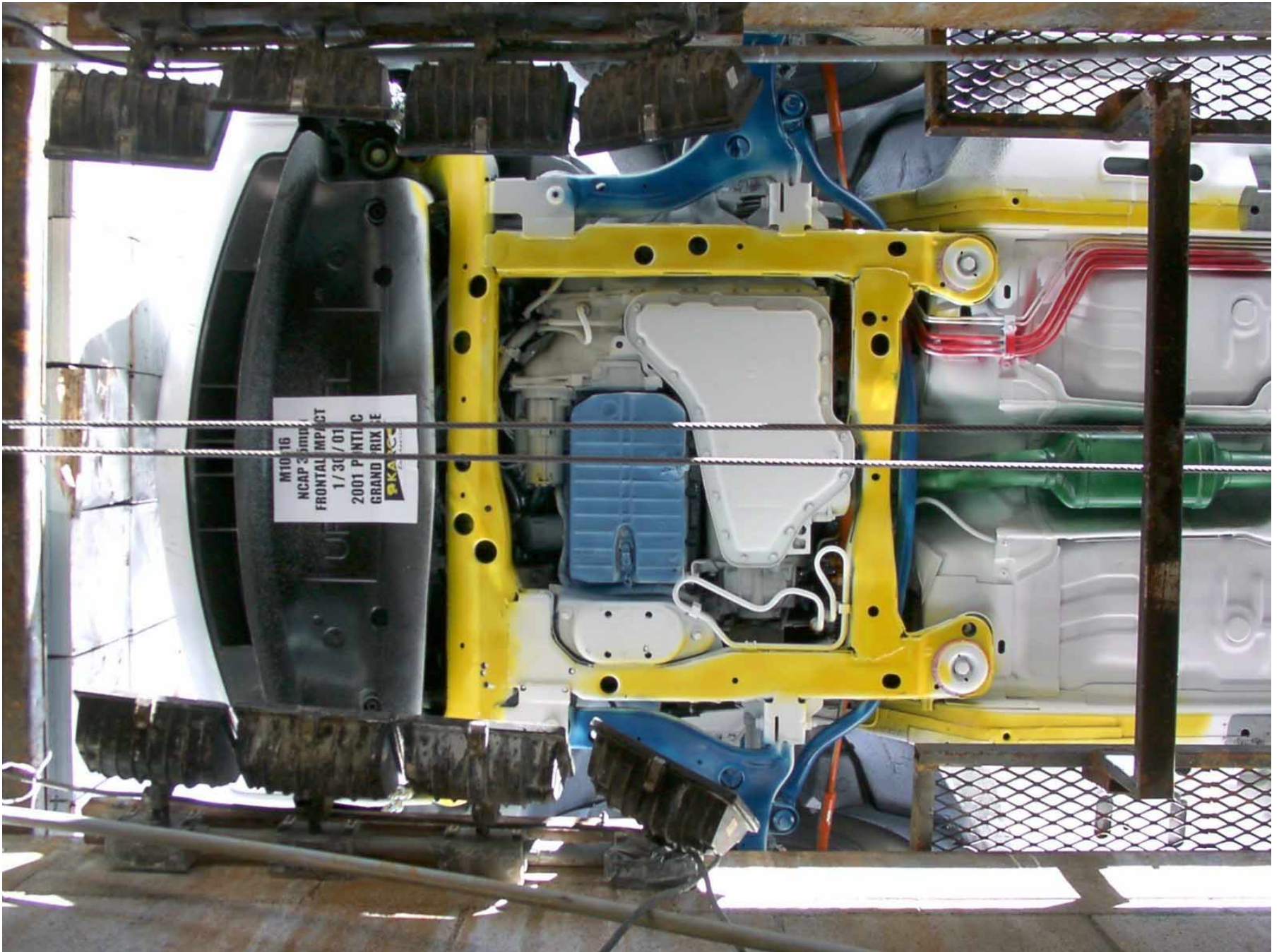


Figure A-21: Front Underside, Pre-Test

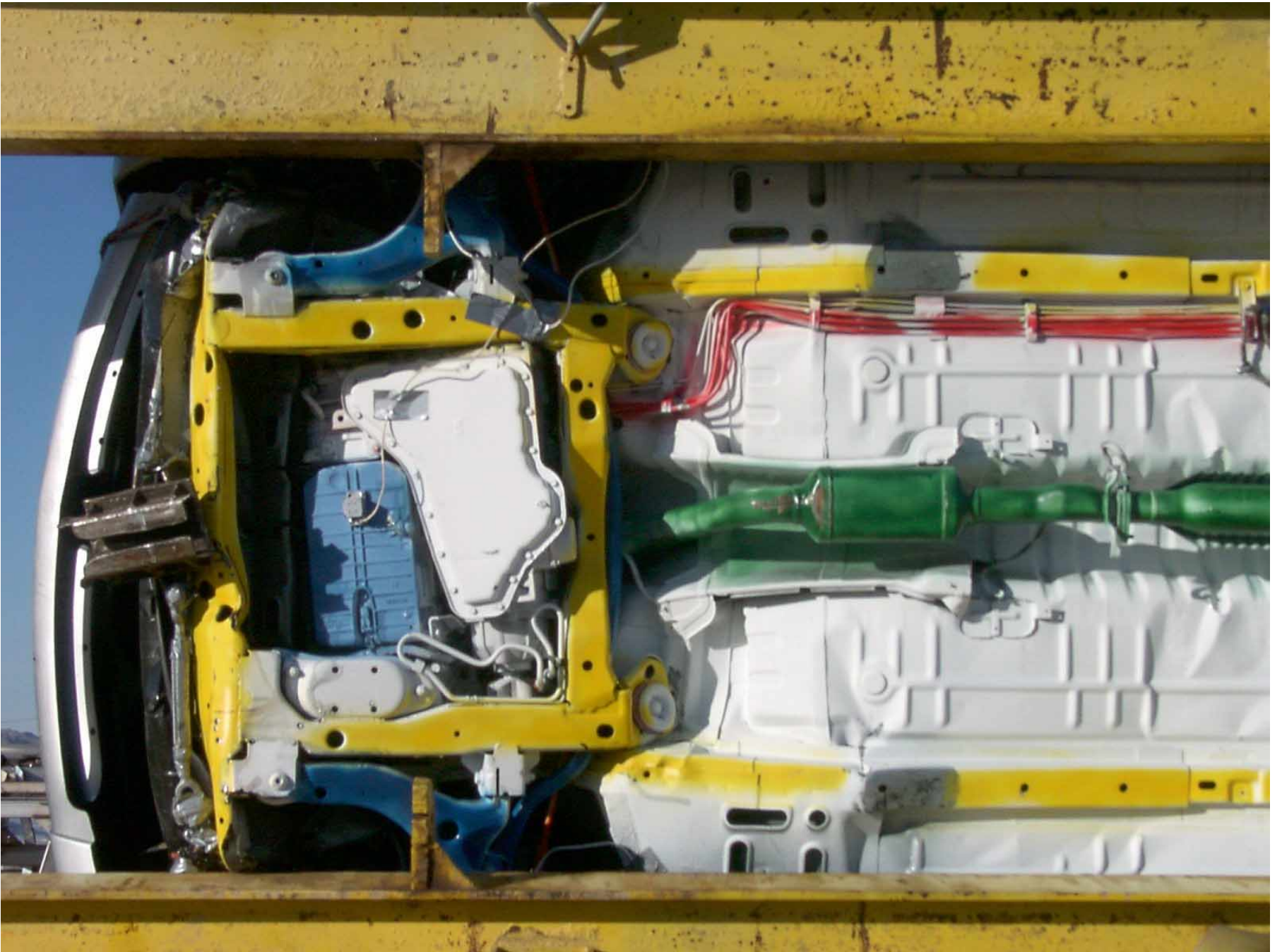


Figure A-22: Front Underside, Post-Test

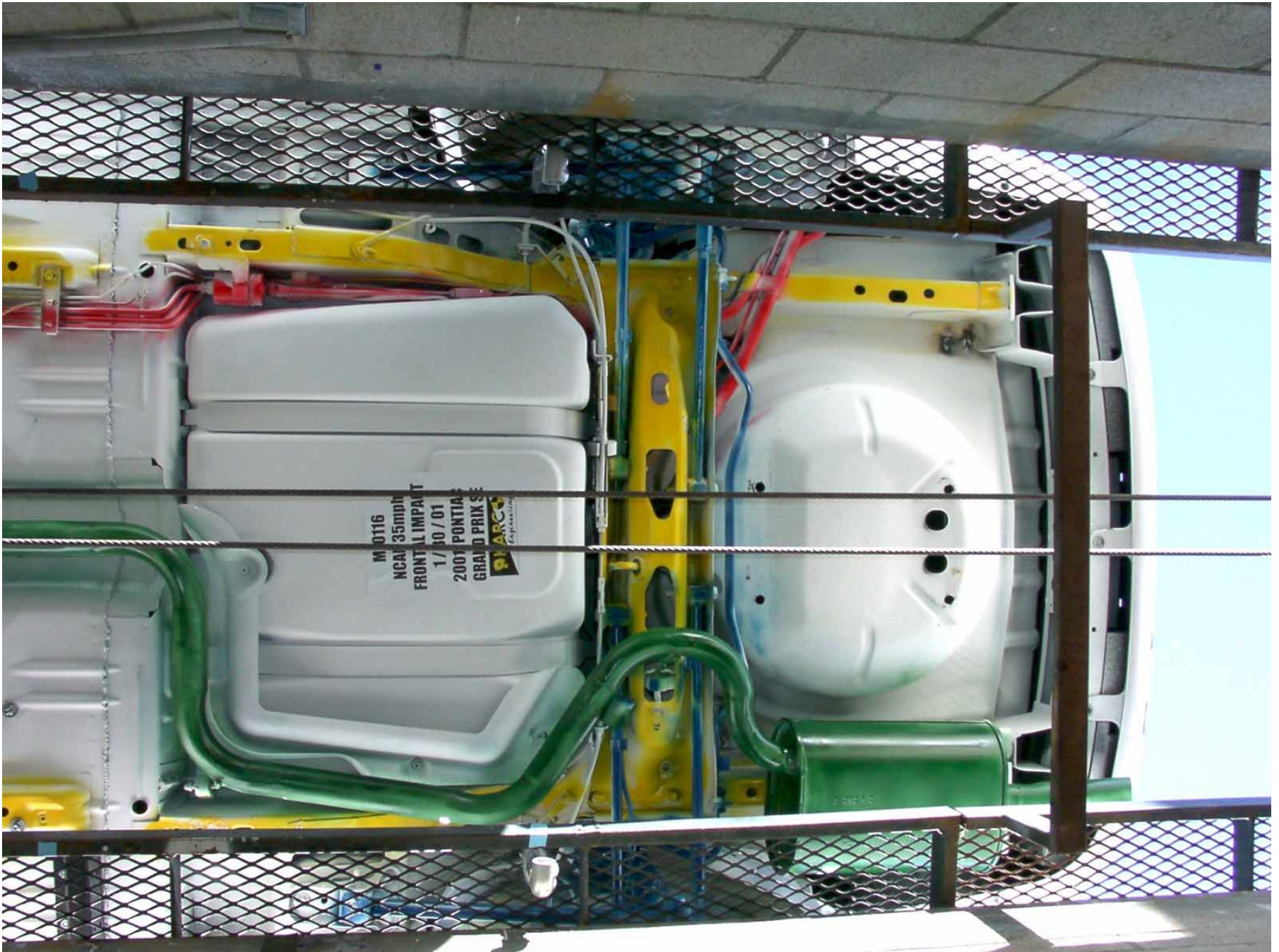


Figure A-23: Rear Underside, Pre-Test



Figure A-24: Rear Underside, Post-Test



Figure A-25: Driver Dummy Front View, Pre-Test



Figure A-26: Driver Dummy Front View, Post-Test

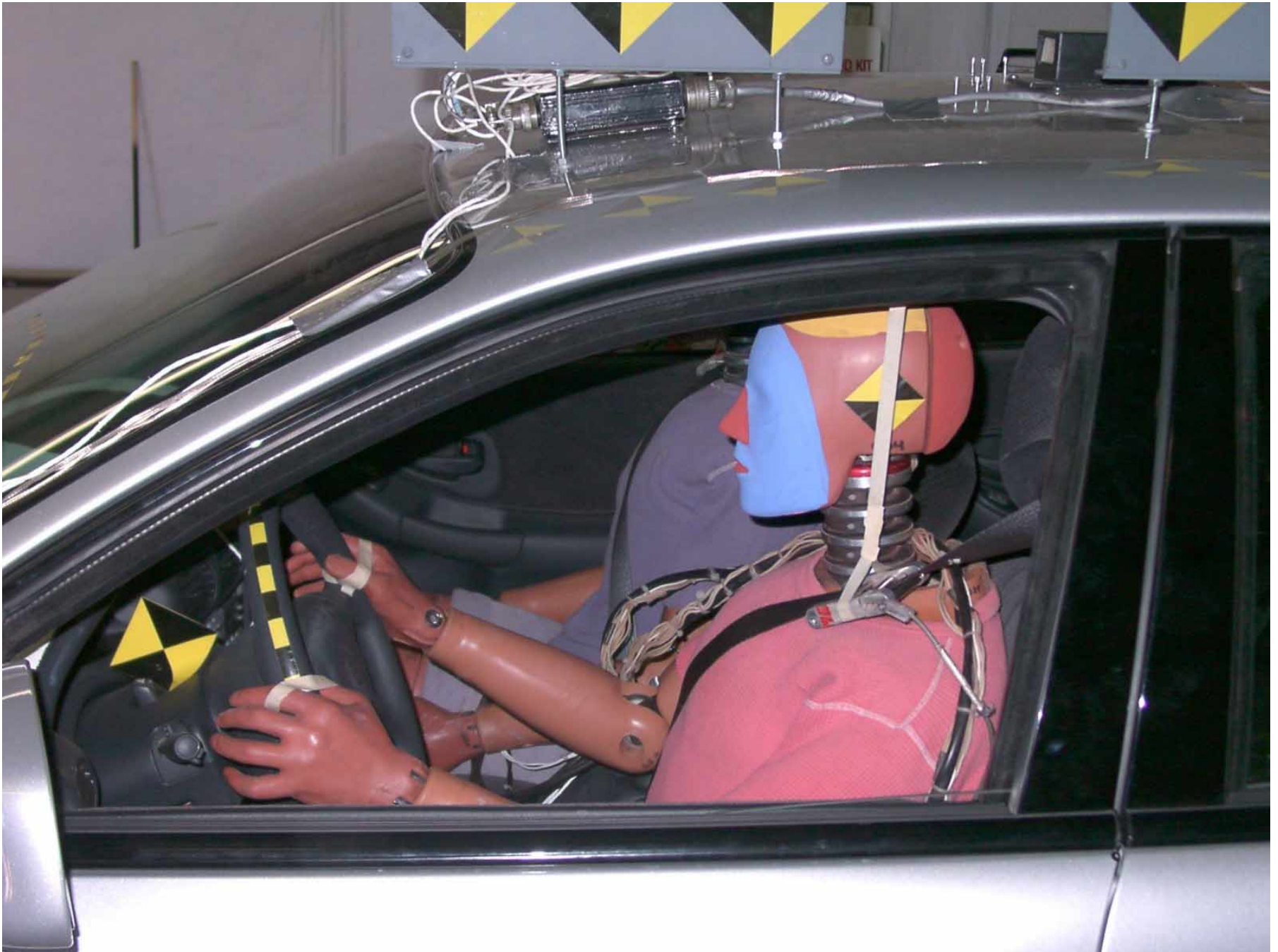


Figure A-27: Driver Dummy Through Window, Pre-Test



Figure A-28: Driver Dummy Through Window, Post-Test



Figure A-29: Driver Dummy Door Open, Pre-Test



Figure A-30: Driver Dummy Door Open, Post-Test



Figure A-31: Driver Dummy 90° To Vehicle, Pre-Test



Figure A-32: Driver Dummy 90° To Vehicle, Post-Test



Figure A-33: Driver Dummy Feet, Pre-Test



Figure A-34: Driver Dummy Feet and Knee Contact, Post-Test



Figure A-35: Driver Side Knee Bolster, Pre-Test



Figure A-36: Driver Side Knee Bolster, Post-Test



Figure A-37: Driver Side Floor Pan, Pre-Test



Figure A-38: Driver Side Floor Pan, Post-Test



Figure A-39: Driver Dummy Head, Post-Test



Figure A-40: Driver Dummy Contact, Post-Test



Figure A-41: Passenger Dummy Front View, Pre-Test

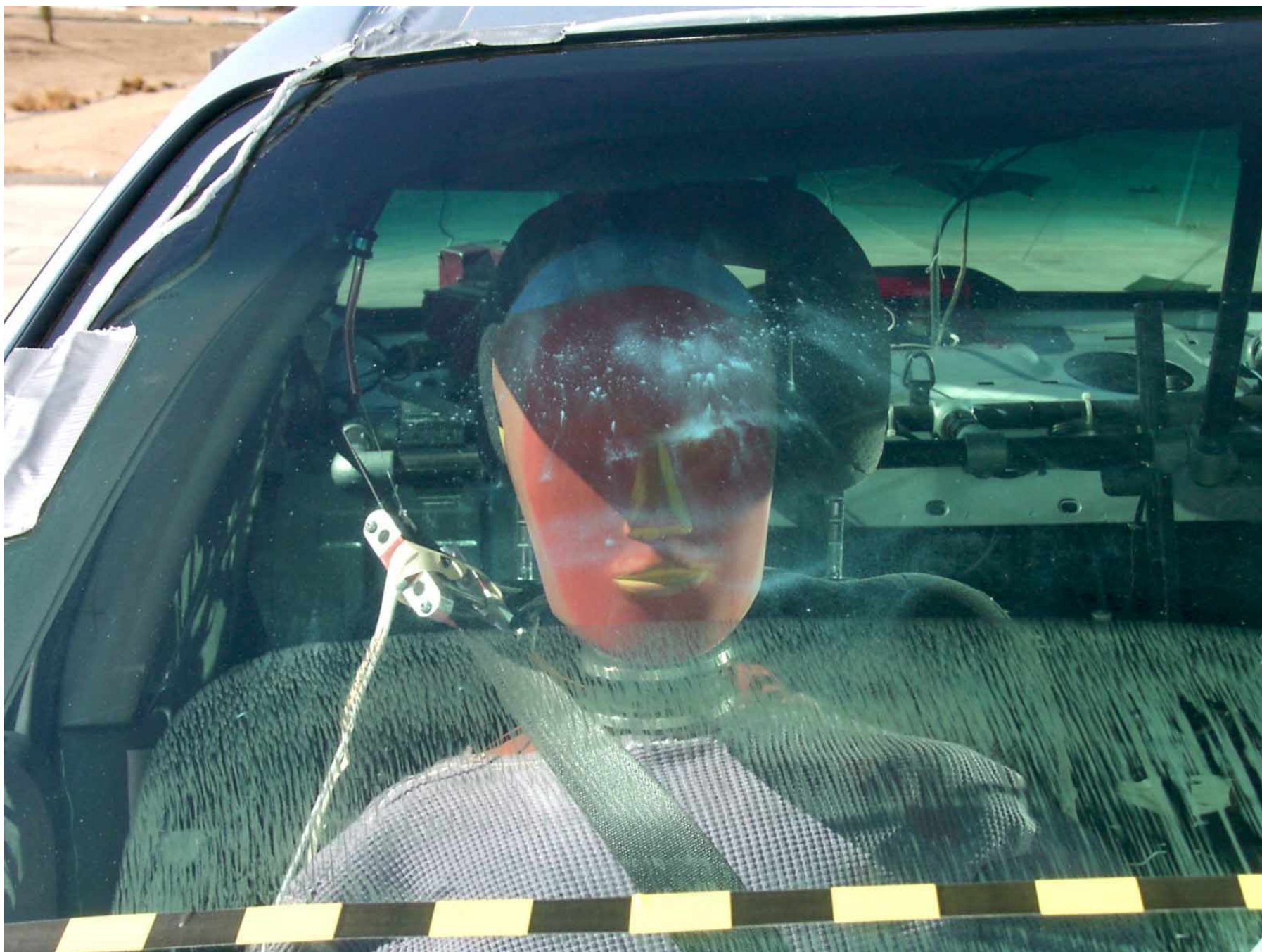


Figure A-42: Passenger Dummy Front View, Post-Test



Figure A-43: Passenger Dummy Through Window, Pre-Test



Figure A-44: Passenger Dummy Through Window, Post-Test



Figure A-45: Passenger Dummy Door Open, Pre-Test



Figure A-46: Passenger Dummy Door Open, Post-Test



Figure A-47: Passenger Dummy 90° To Vehicle, Pre-Test



Figure A-48: Passenger Dummy 90° To Vehicle, Post-Test



Figure A-49: Passenger Dummy Feet, Pre-Test



Figure A-50: Passenger Dummy Feet and Knee Contact, Post-Test



Figure A-51: Passenger Side Floor Pan, Pre-Test



Figure A-52: Passenger Side Floor Pan, Post-Test



Figure A-53: Passenger Side Knee Bolster, Pre-Test



Figure A-54: Passenger Side Knee Bolster, Post-Test

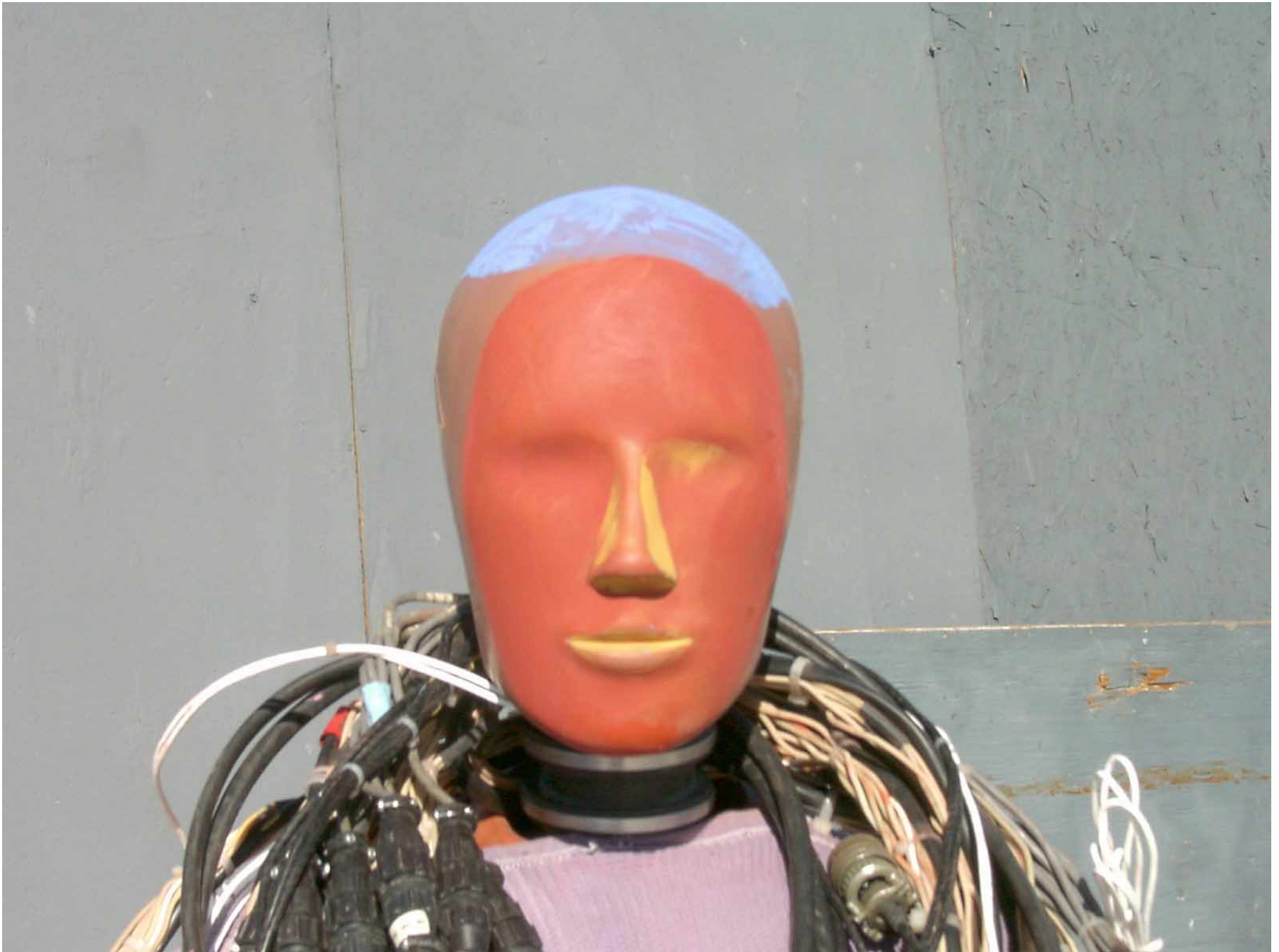


Figure A-55: Passenger Head, Post-Test



Figure A-56: Passenger Dummy Contact, Post-Test



Figure A-57: Vehicle on Rollover Device



Figure A-58: Vehicle During Impact

**APPENDIX B**

**DUMMY AND VEHICLE RESPONSE DATA TRACES**

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| B-60 Driver Shoulder Belt Pullout      | B-60 |
| B-61 Driver Shoulder Belt Elongation   | B-61 |

# LIST OF DATA PLOTS...(Continued)

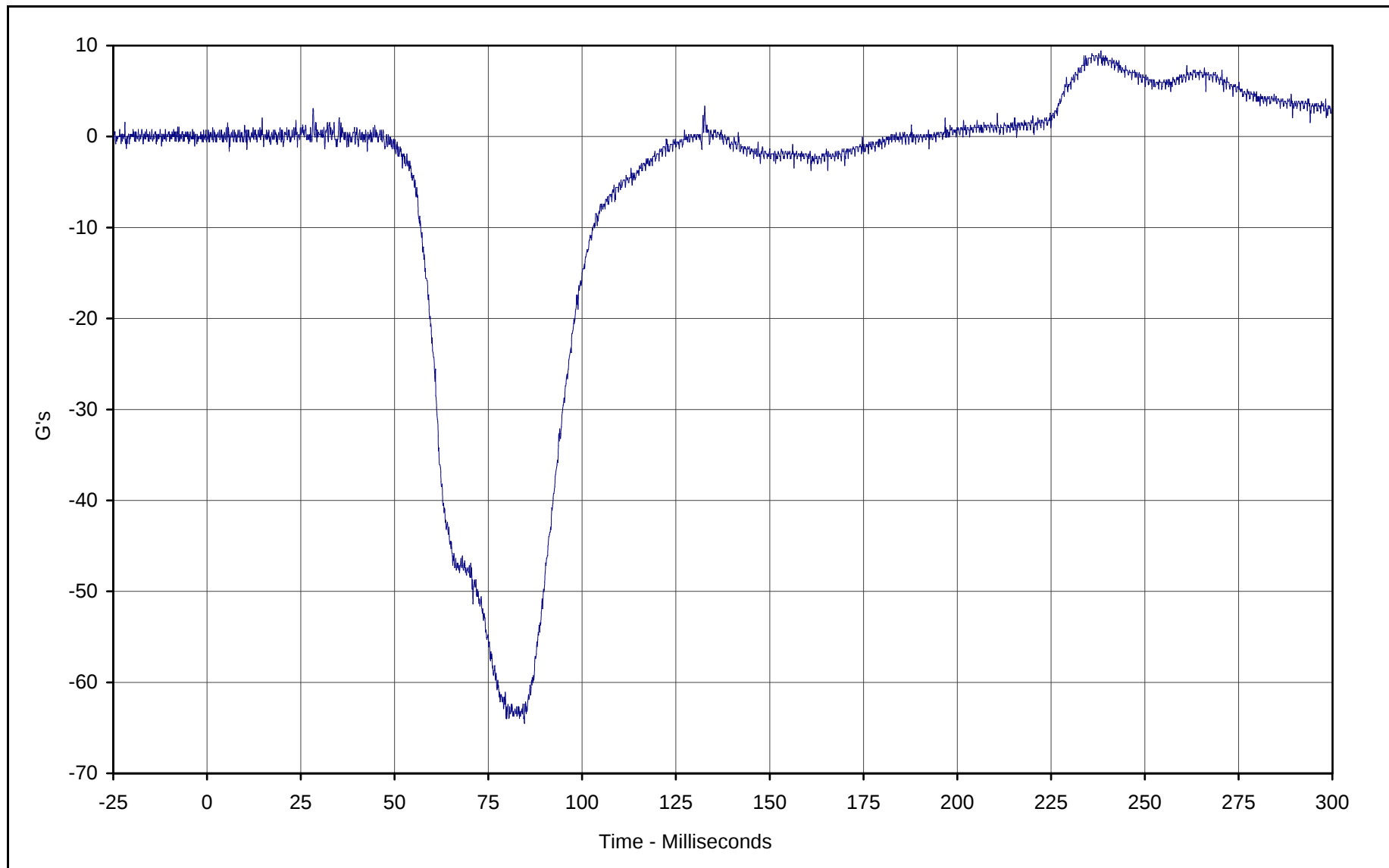
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| B-120 Passenger Shoulder Belt Force        | B-120 |
| B-121 Passenger Shoulder Belt Pullout      | B-121 |
| B-122 Passenger Shoulder Belt Elongation   | B-122 |

# LIST OF DATA PLOTS...(Continued)

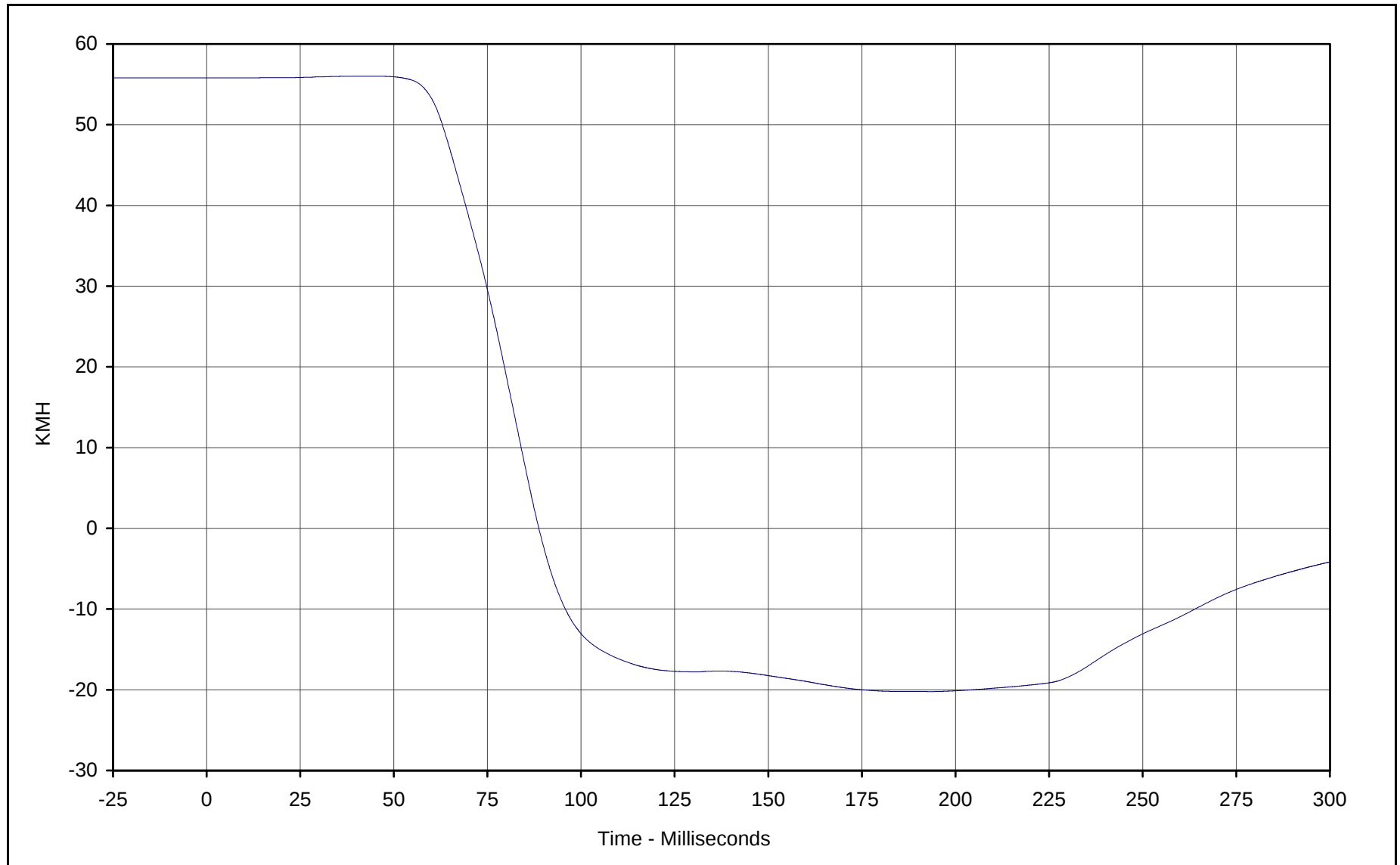
| Data Plot |                                          | Page  |
|-----------|------------------------------------------|-------|
| B-123     | Vehicle Left Rear Primary                | B-123 |
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Curve Description: Driver Head Primary X  
Maximum Value: 9.4 at 238.3 Milliseconds  
Minimum Value: -64.5 at 84.6 Milliseconds  
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Curve Number: FIL-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

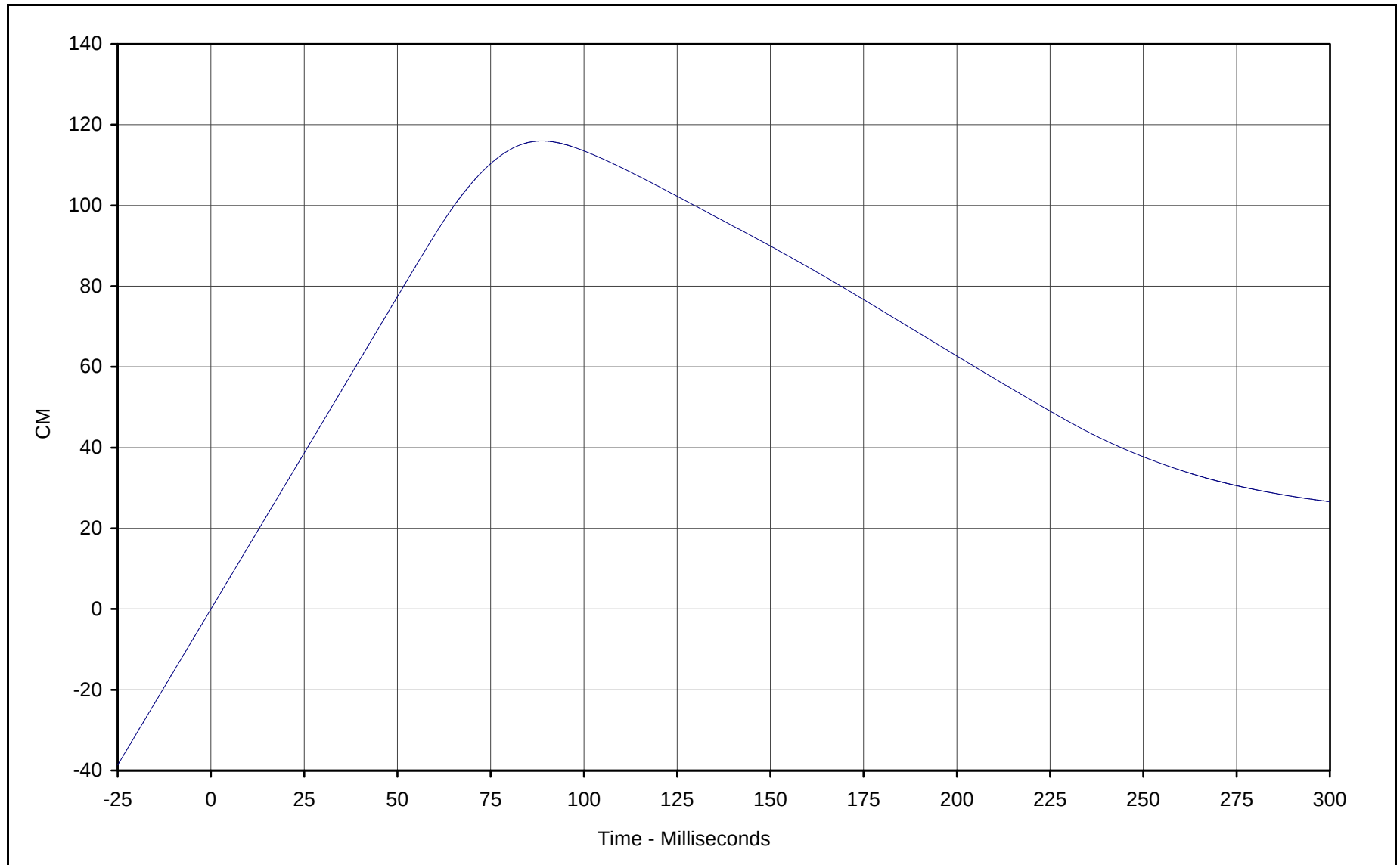




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Minimum Value: -20.2 at 193.5 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

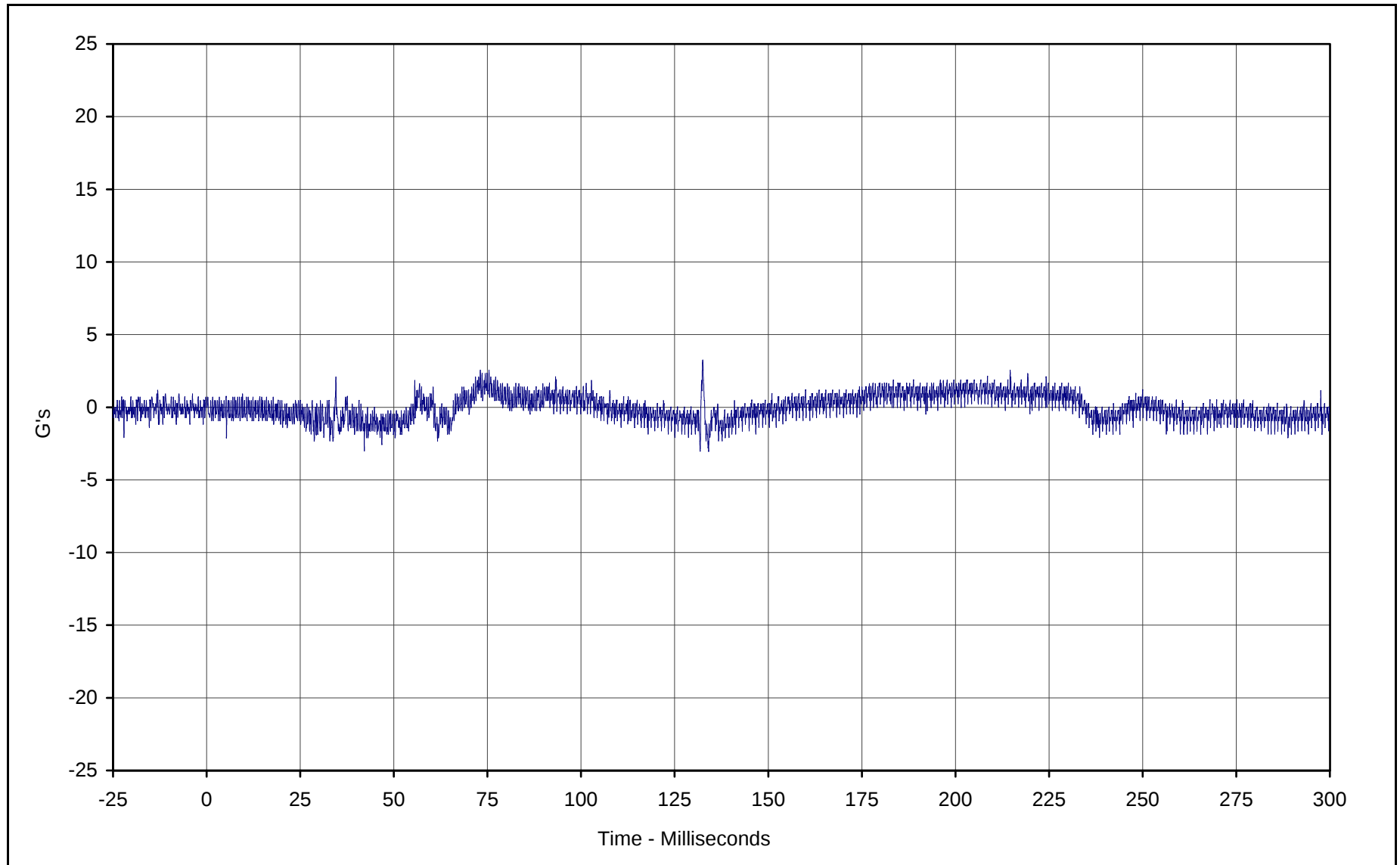




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Maximum Value: 116.0 at 88.7 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
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Curve Number: IN2-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

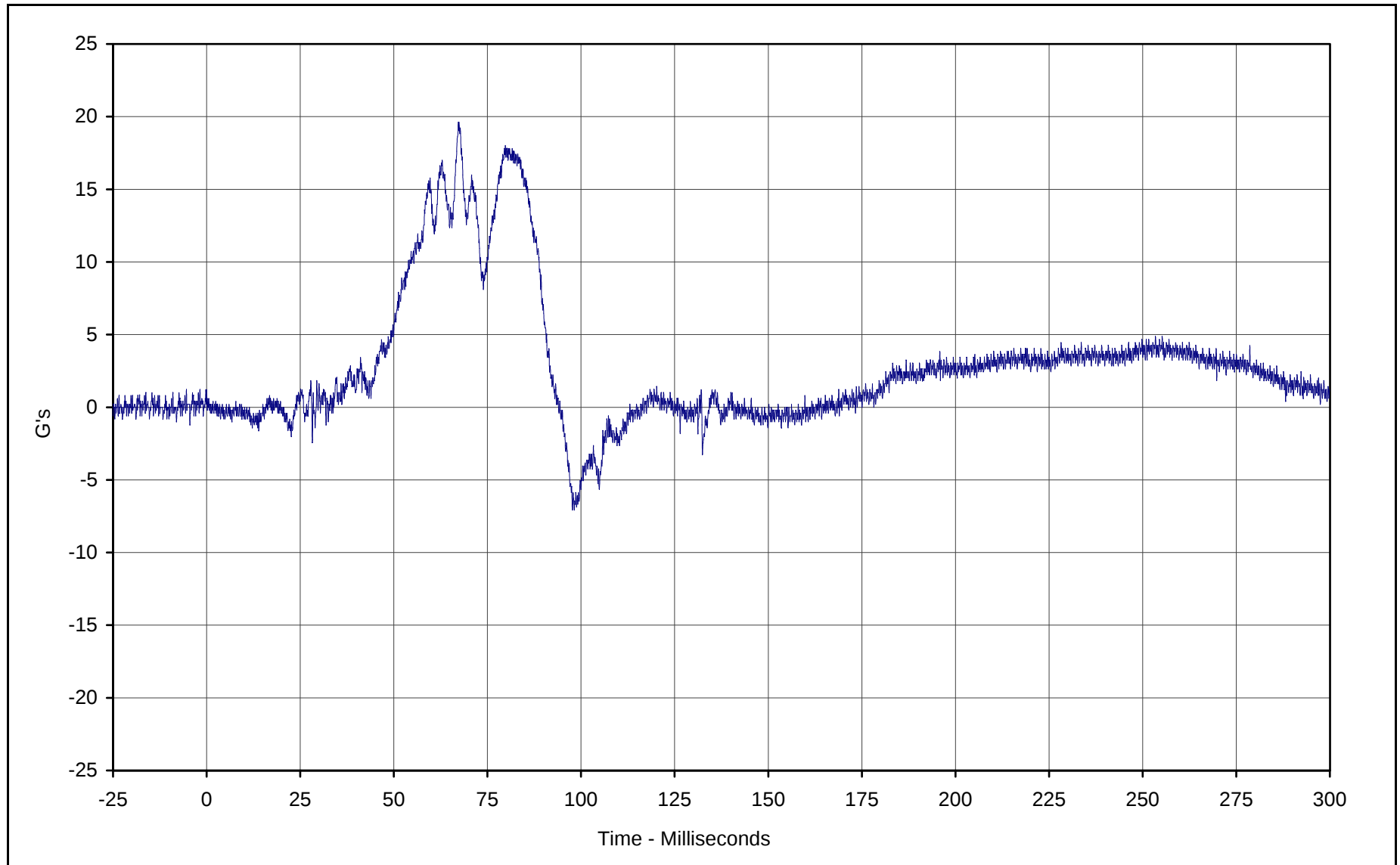




Curve Description: Driver Head Primary Y  
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Minimum Value: -3.0 at 42.1 Milliseconds  
SAE Filter Class: 1000  
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Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

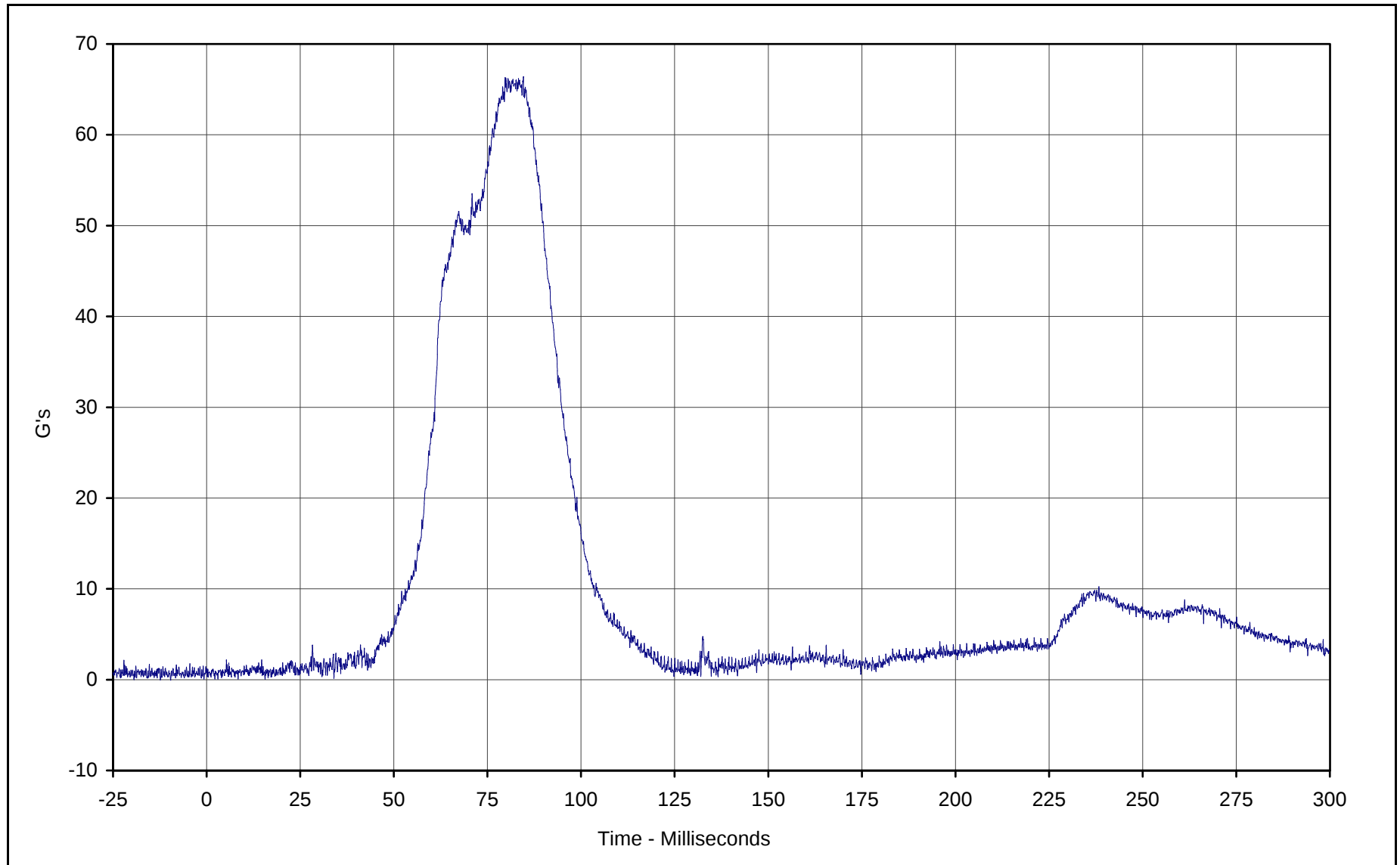




Curve Description: Driver Head Primary Z  
Maximum Value: 19.6 at 67.2 Milliseconds  
Minimum Value: -7.1 at 97.7 Milliseconds  
SAE Filter Class: 1000  
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Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

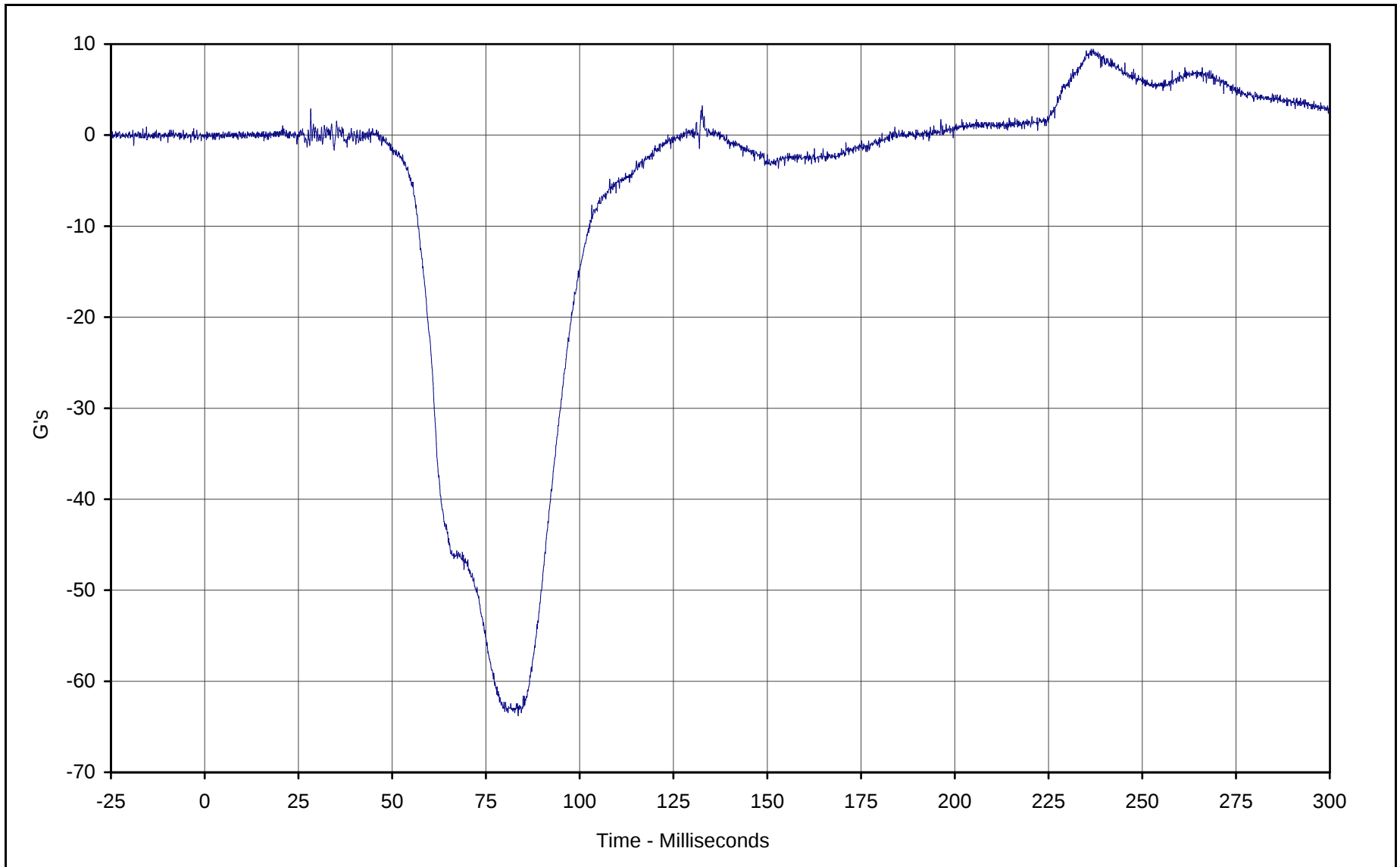




Curve Description: Driver Head Resultant Primary  
Maximum Value: 66.4 at 84.6 Milliseconds  
Minimum Value: 0.1 at 2.2 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: RES-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



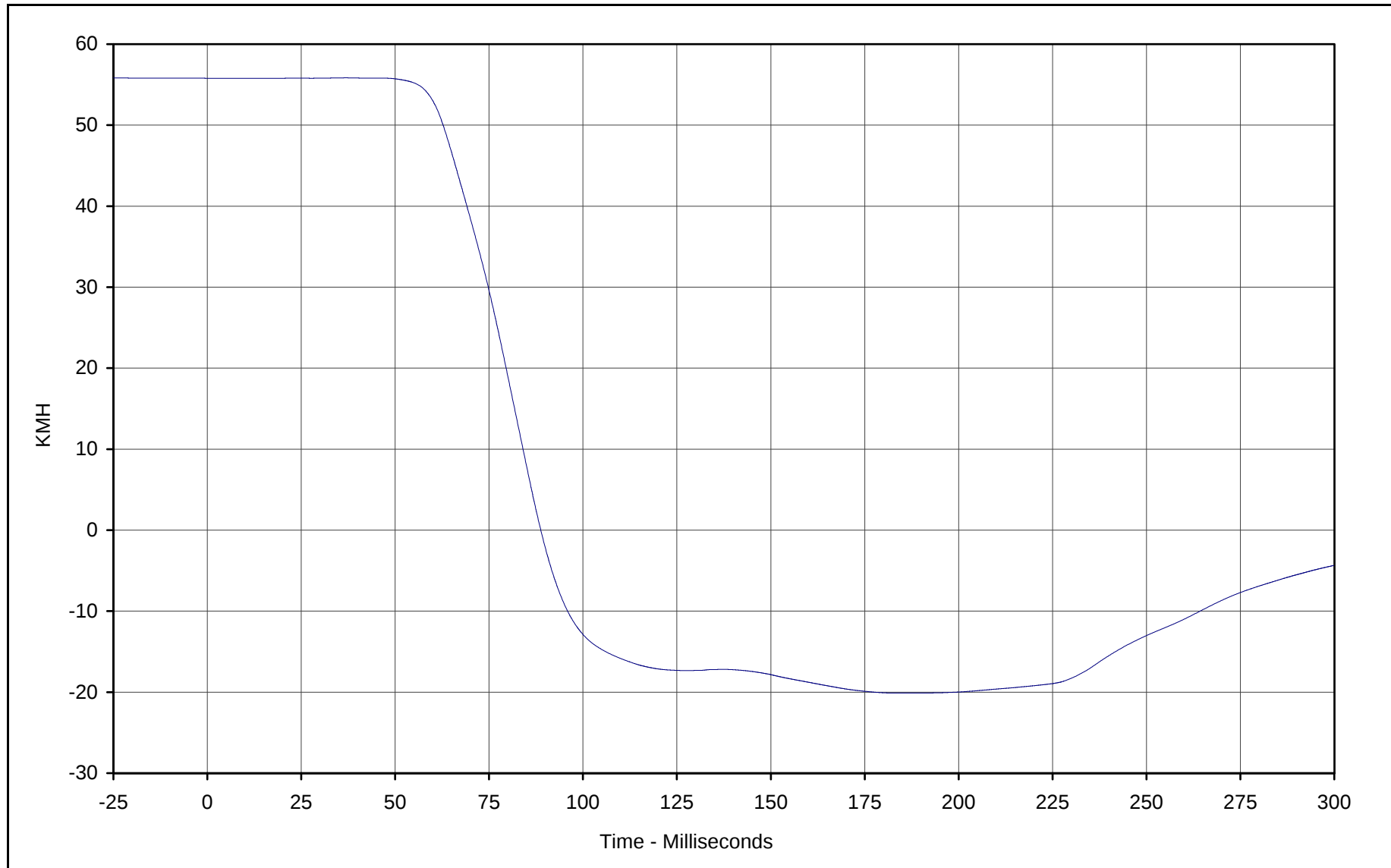


Curve Description: Driver Head Redundant X  
Maximum Value: 9.4 at 236.4 Milliseconds  
Minimum Value: -63.8 at 83.6 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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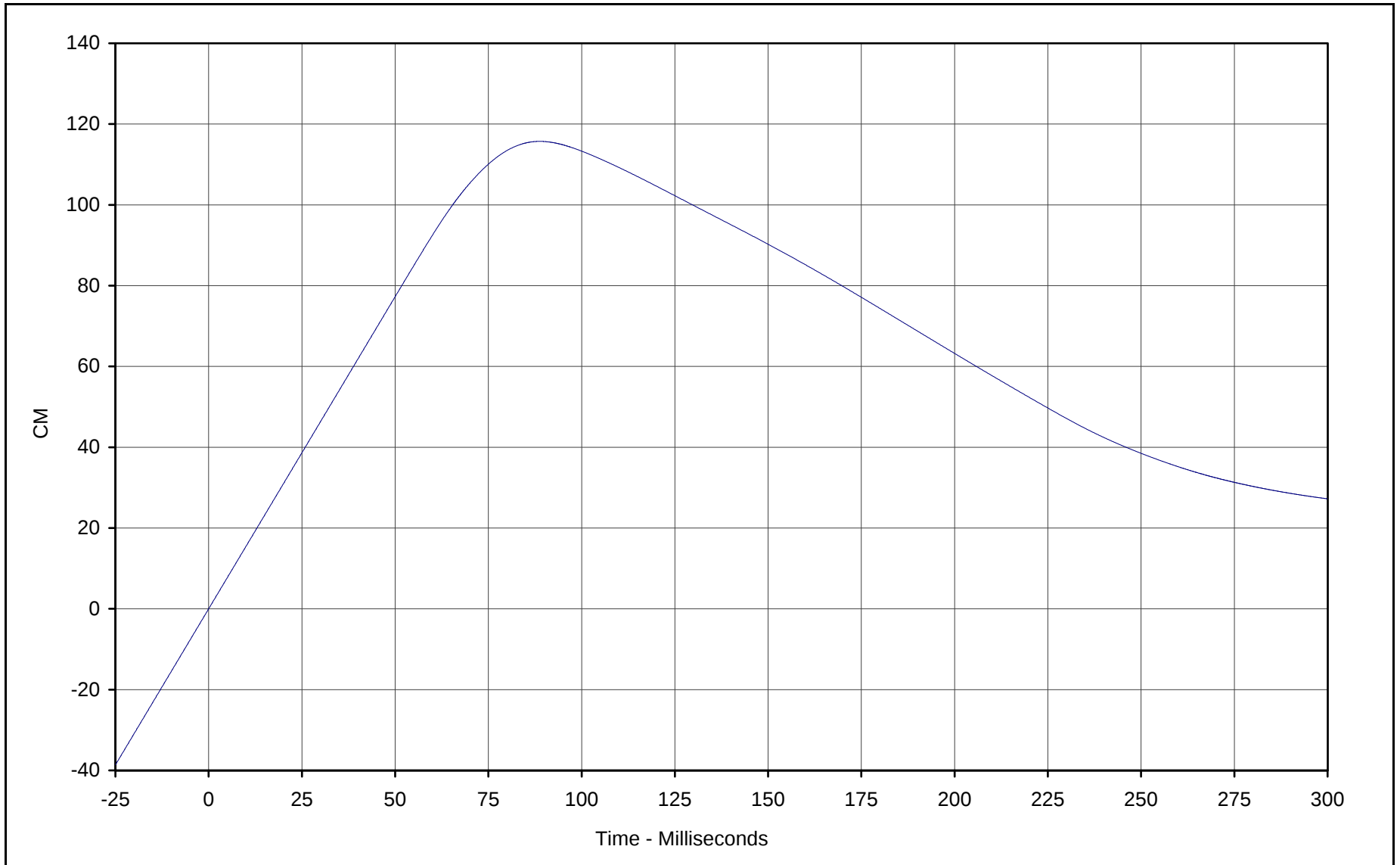


Curve Description: Driver Head Redundant X Velocity  
Maximum Value: 55.8 at 36.9 Milliseconds  
Minimum Value: -20.1 at 183.3 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



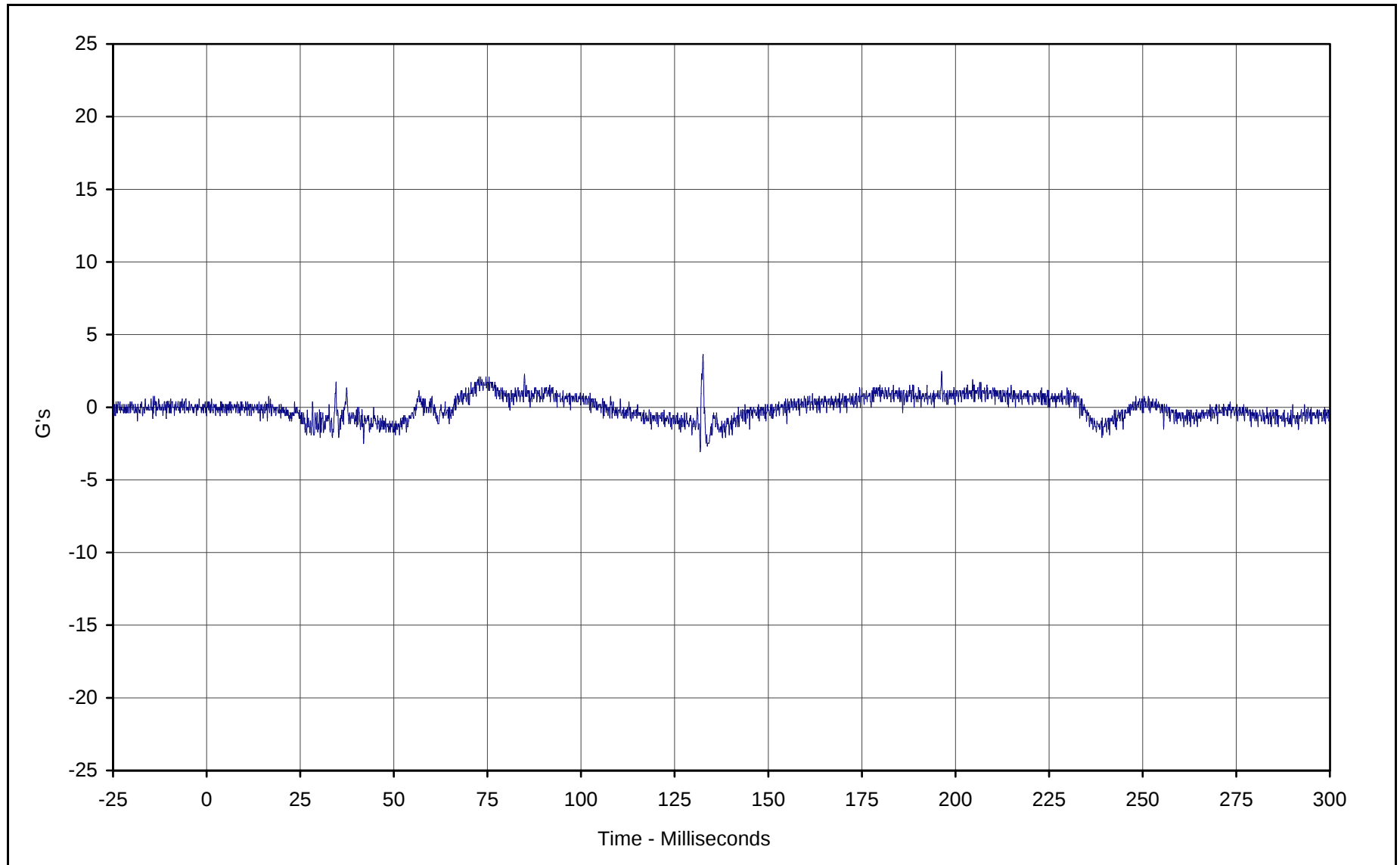
KAR21001-09



Curve Description: Driver Head Redundant X Displ.  
Maximum Value: 115.7 at 88.8 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

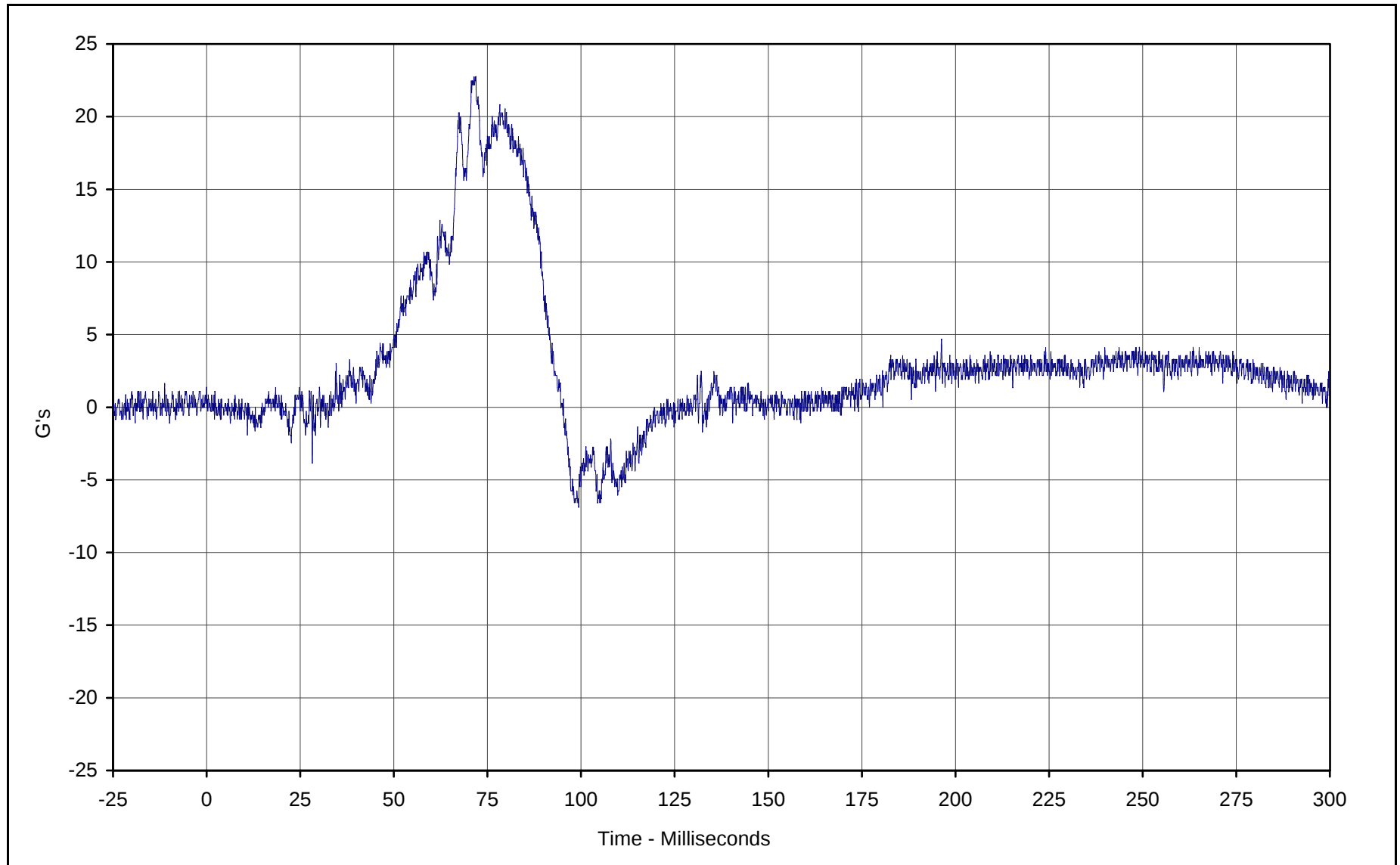




Curve Description: Driver Head Redundant Y  
Maximum Value: 3.6 at 132.6 Milliseconds  
Minimum Value: -3.0 at 131.8 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-005

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



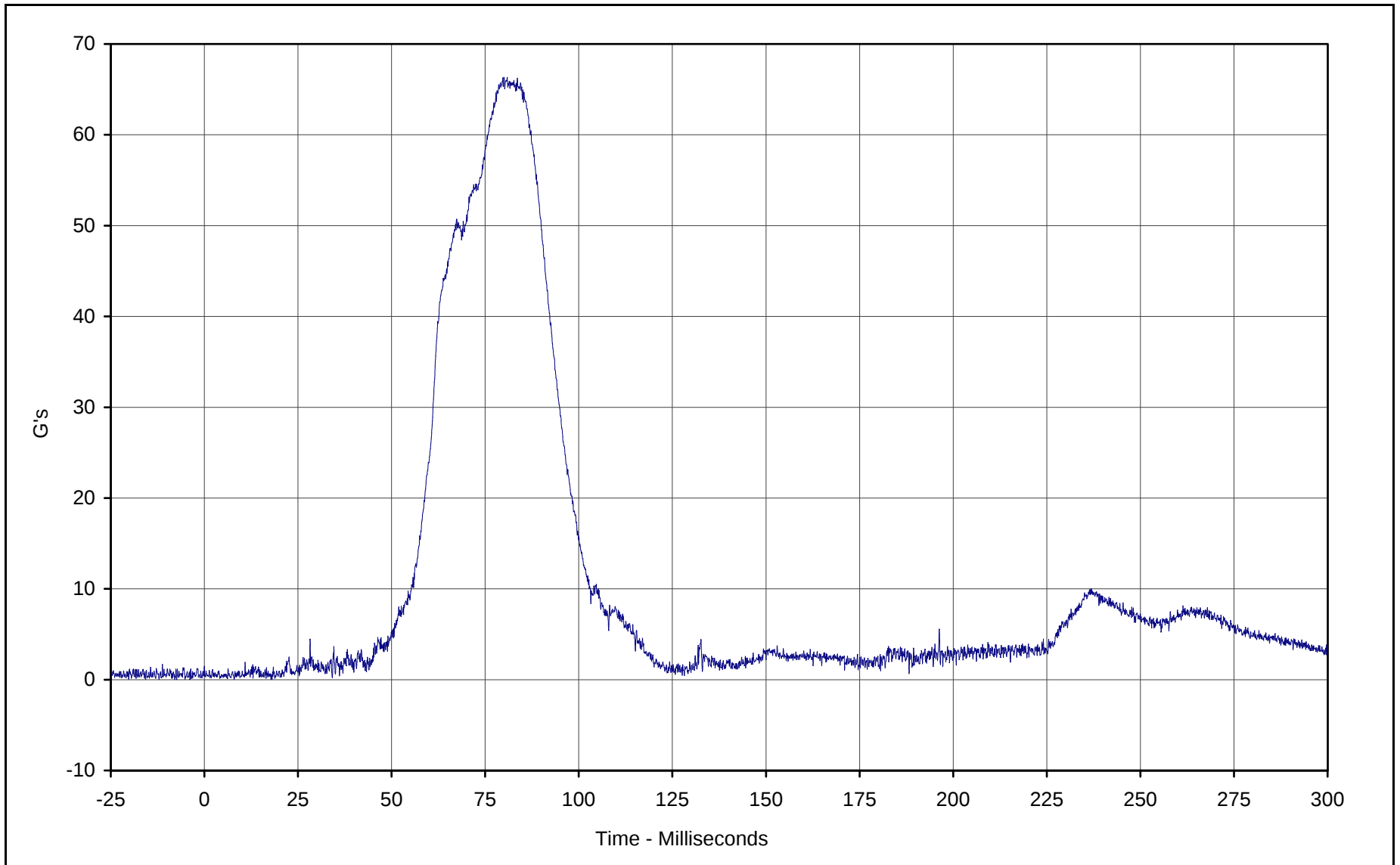


Curve Description: Driver Head Redundant Z  
Maximum Value: 22.7 at 71.4 Milliseconds  
Minimum Value: -6.8 at 99.4 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-006

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



B-12

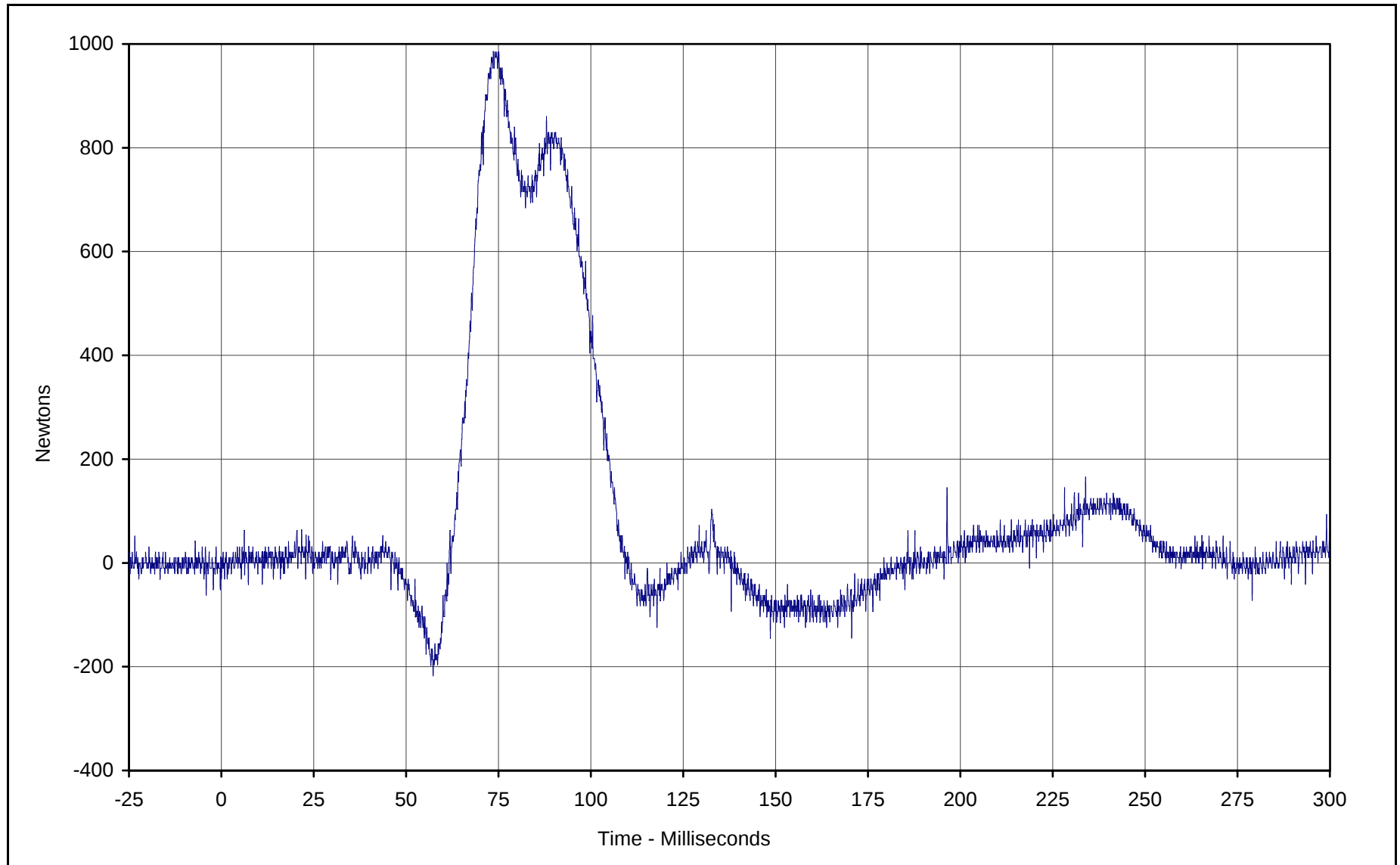


Curve Description: Driver Head Resultant Redundant  
Maximum Value: 66.3 at 80.0 Milliseconds  
Minimum Value: 0.0 at 7.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: RES-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



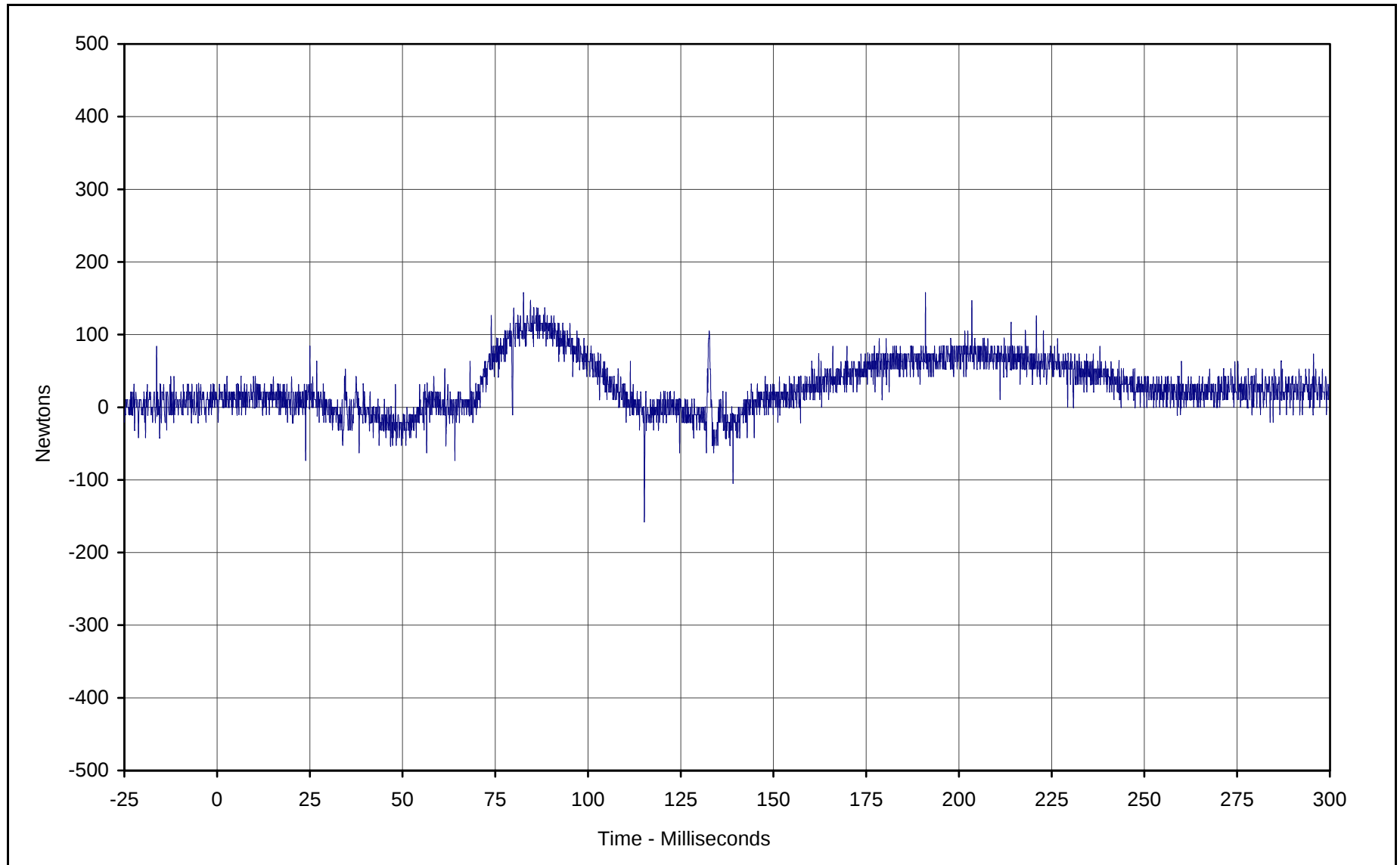
KAR21001-09



Curve Description: Driver Neck Force X  
Maximum Value: 984.8 at 73.6 Milliseconds  
Minimum Value: -217.7 at 57.3 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

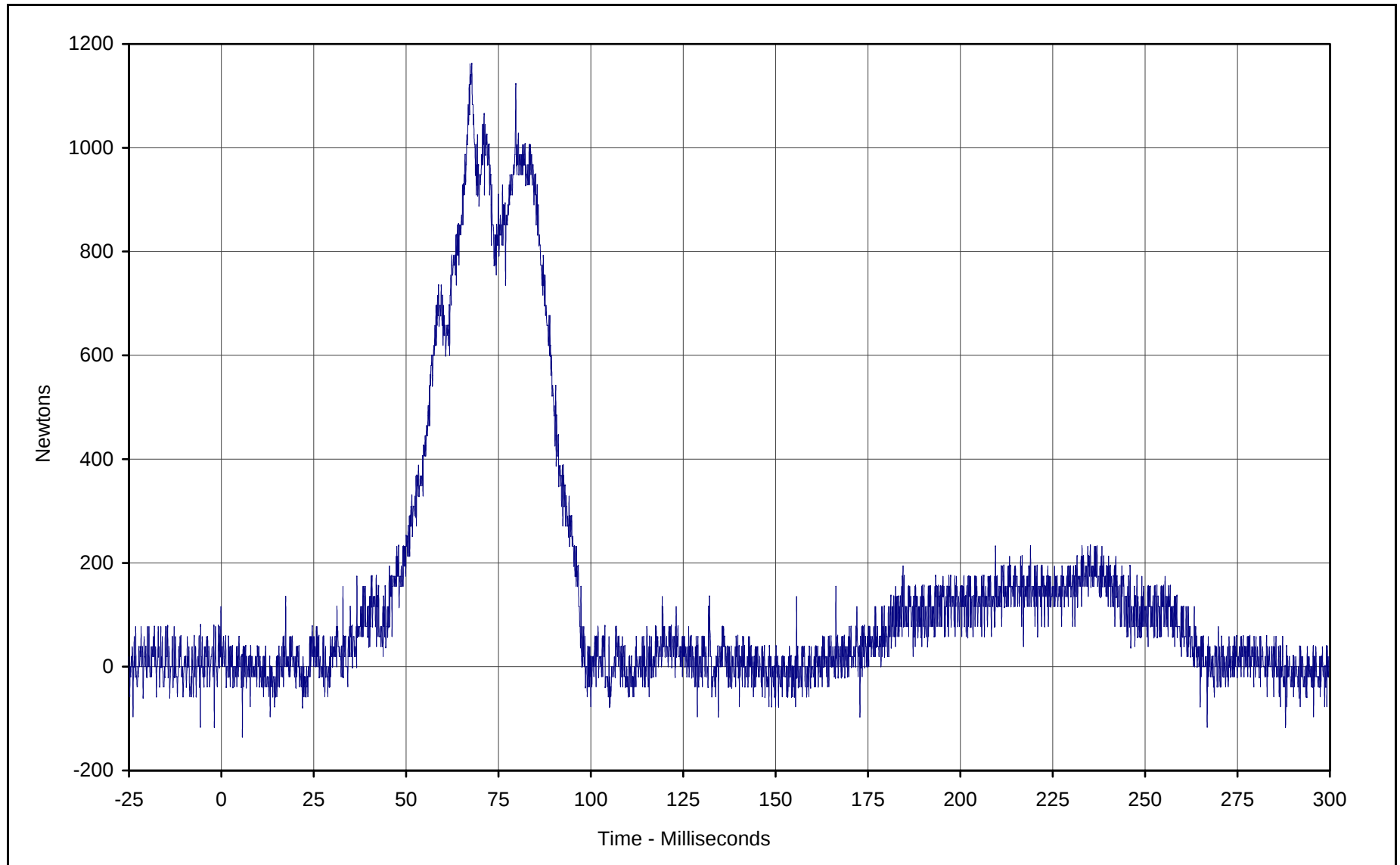




Curve Description: Driver Neck Force Y  
Maximum Value: 157.5 at 82.6 Milliseconds  
Minimum Value: -157.5 at 115.2 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-008

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

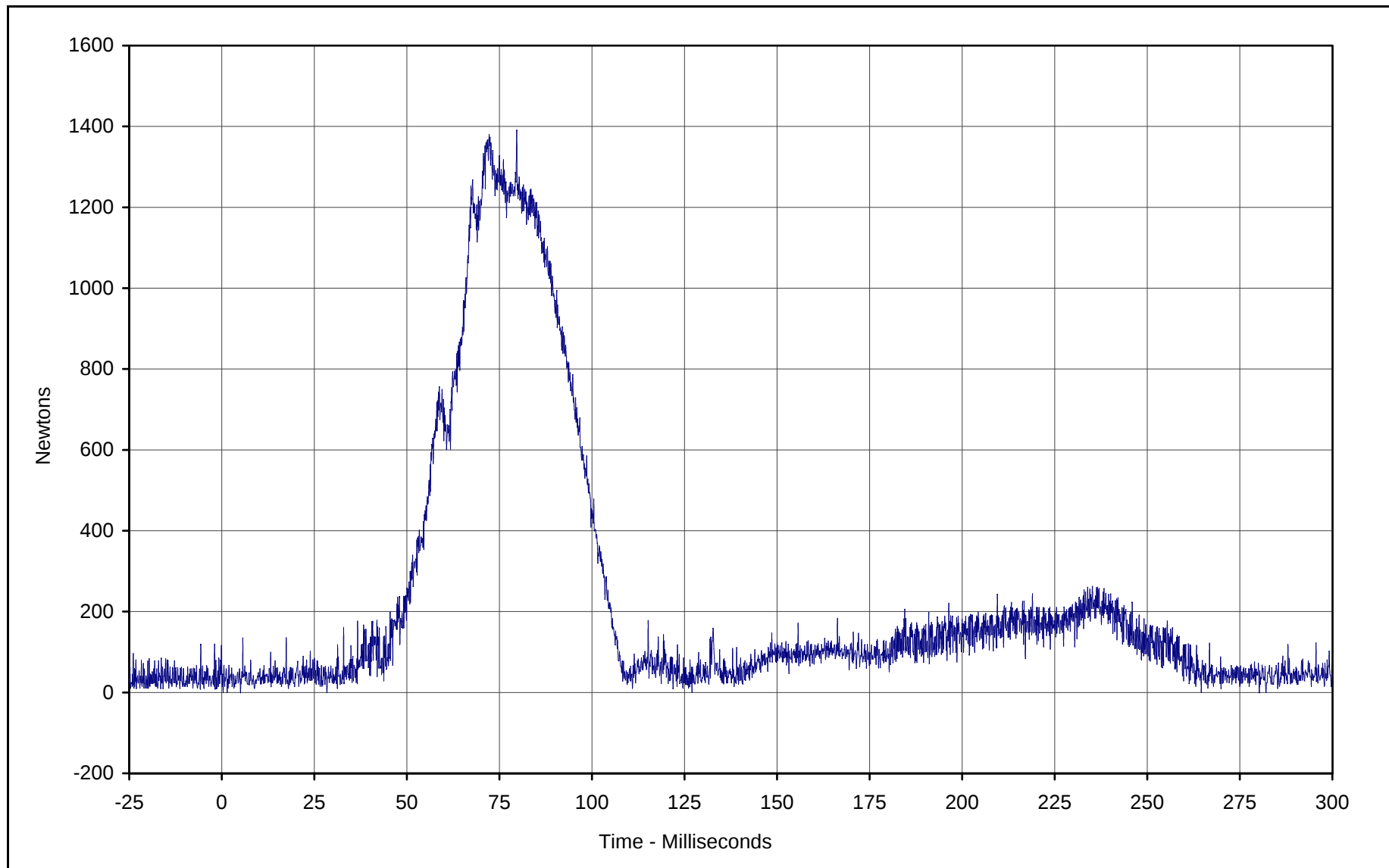




Curve Description: Driver Neck Force Z  
Maximum Value: 1160.9 at 67.3 Milliseconds  
Minimum Value: -135.4 at 5.7 Milliseconds  
SAE Filter Class: 1000  
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Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

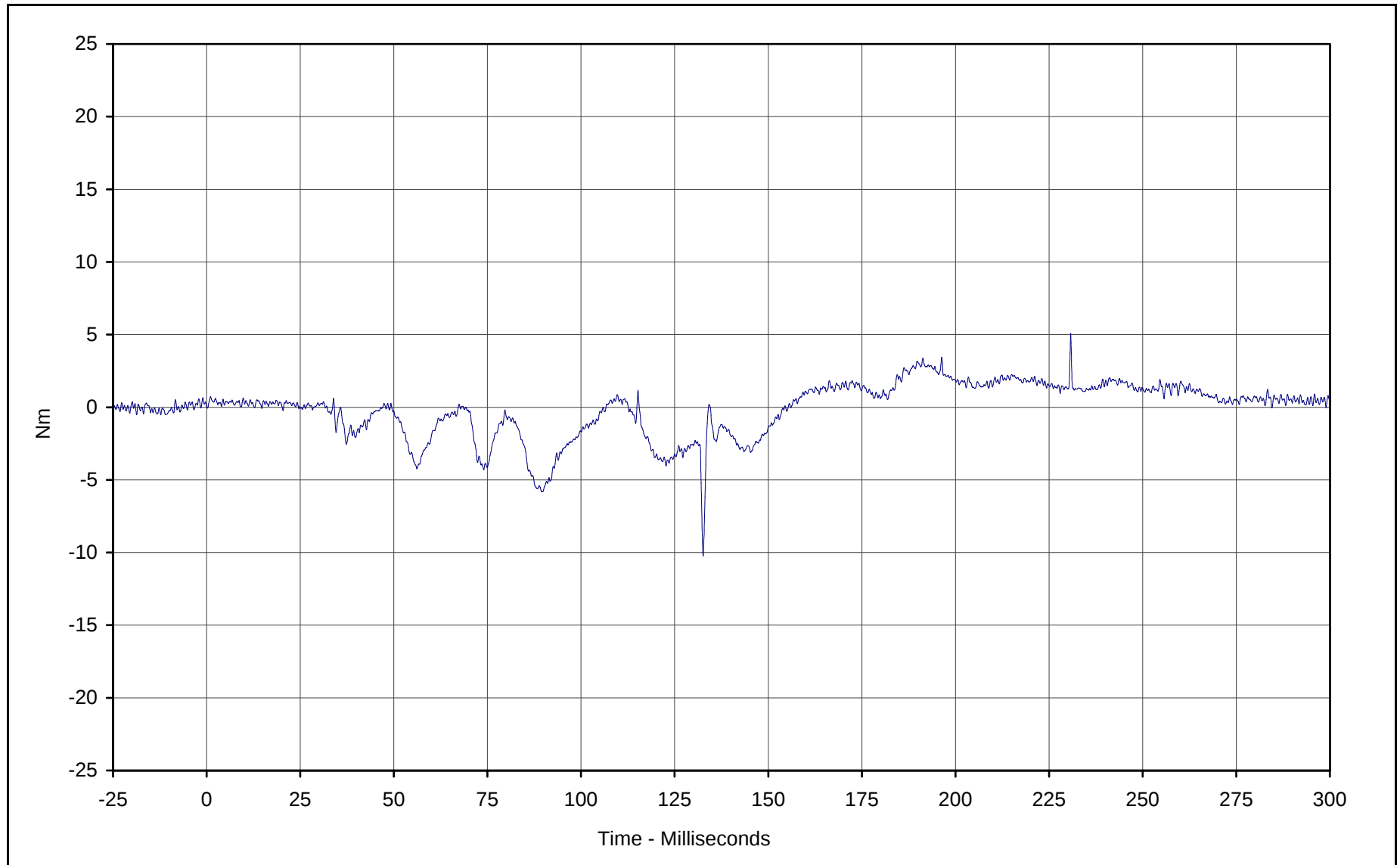




Curve Description: Driver Neck Force Resultant  
Maximum Value: 1389.3 at 79.7 Milliseconds  
Minimum Value: 0.0 at 0.4 Milliseconds  
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Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

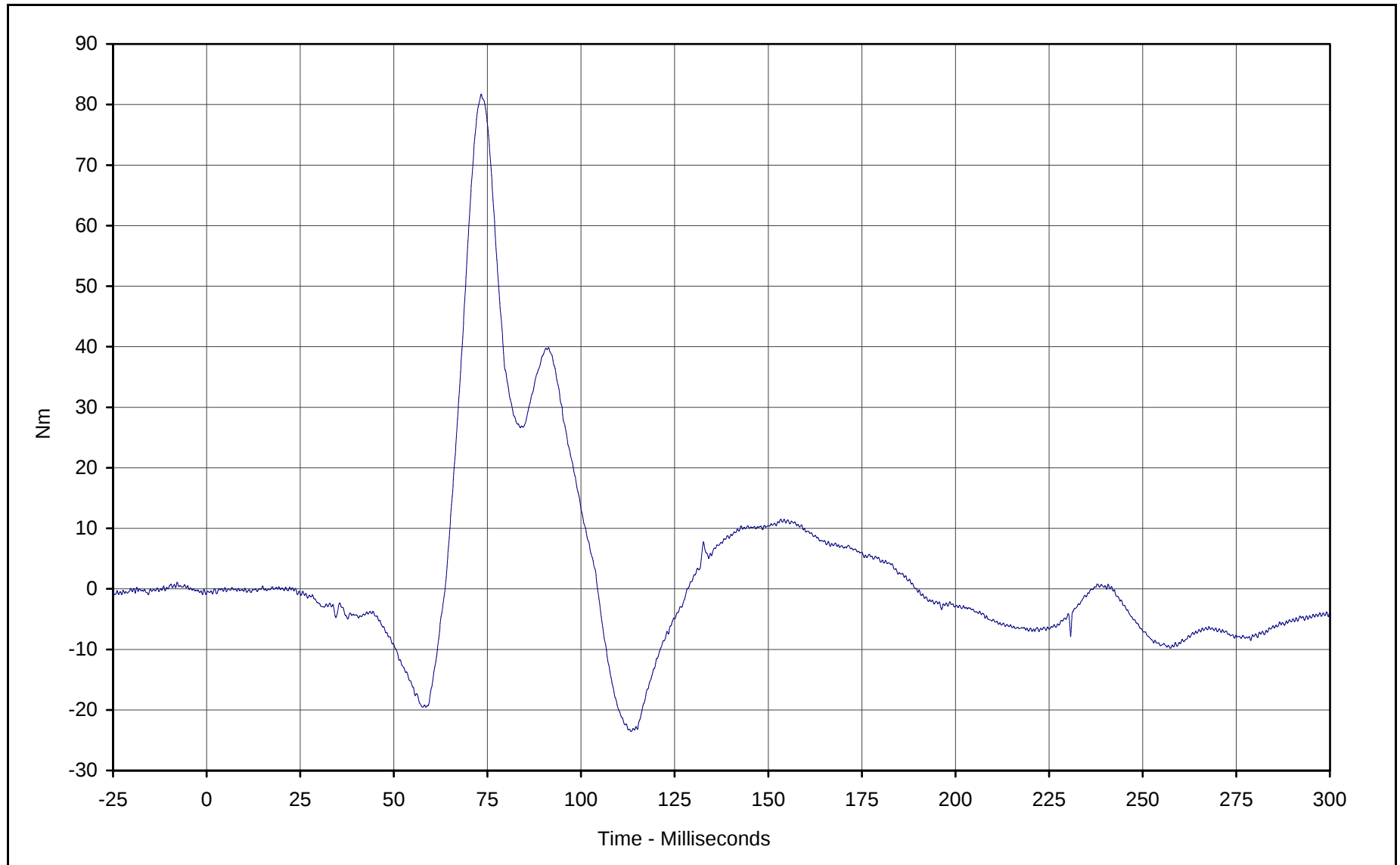




Curve Description: Driver Neck Moment X  
Maximum Value: 5.1 at 230.8 Milliseconds  
Minimum Value: -10.2 at 132.6 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-010

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

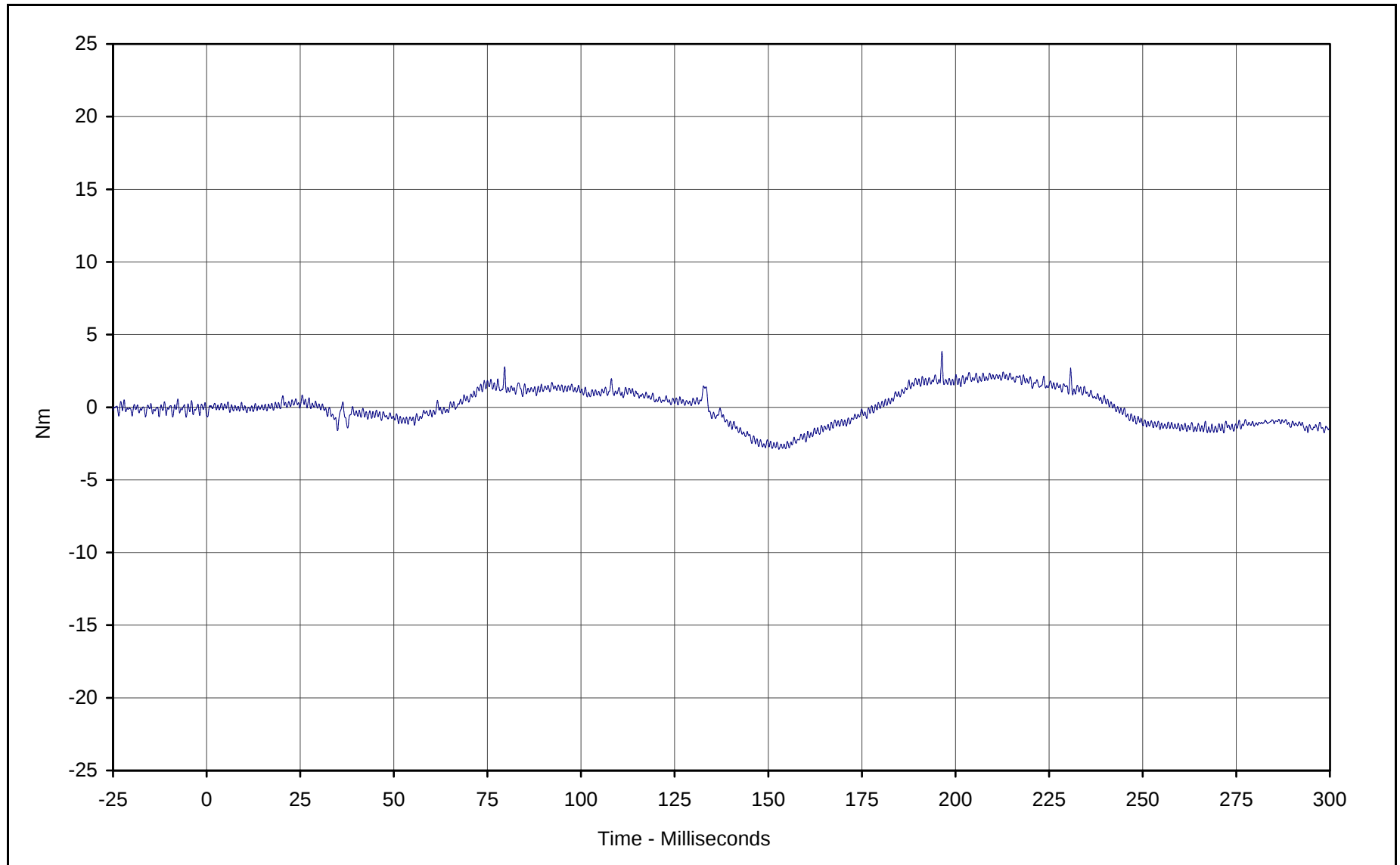




Curve Description: Driver Neck Moment Y  
Maximum Value: 81.7 at 73.3 Milliseconds  
Minimum Value: -23.6 at 113.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-011

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



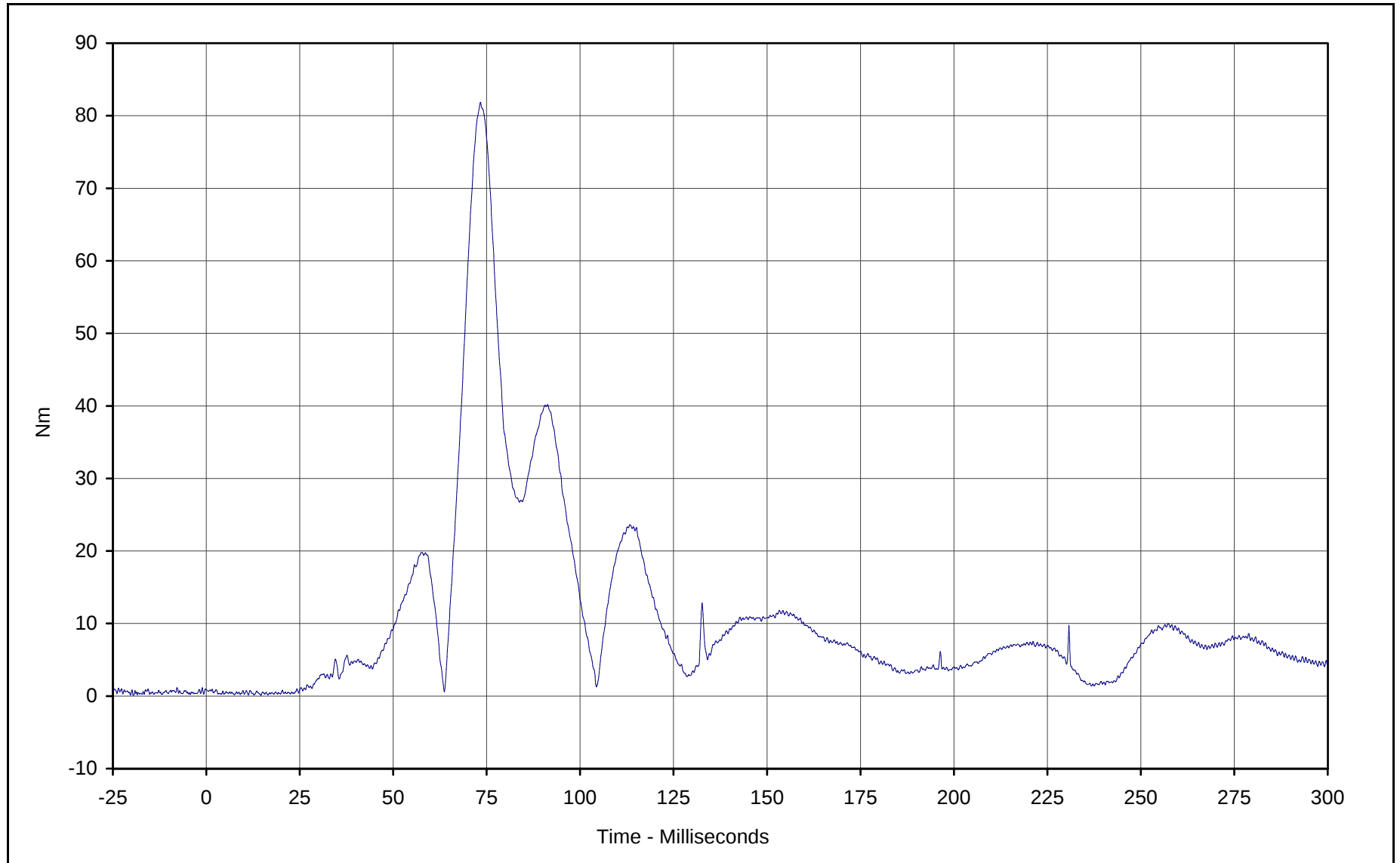


Curve Description: Driver Neck Moment Z  
Maximum Value: 3.8 at 196.4 Milliseconds  
Minimum Value: -2.9 at 152.8 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-012

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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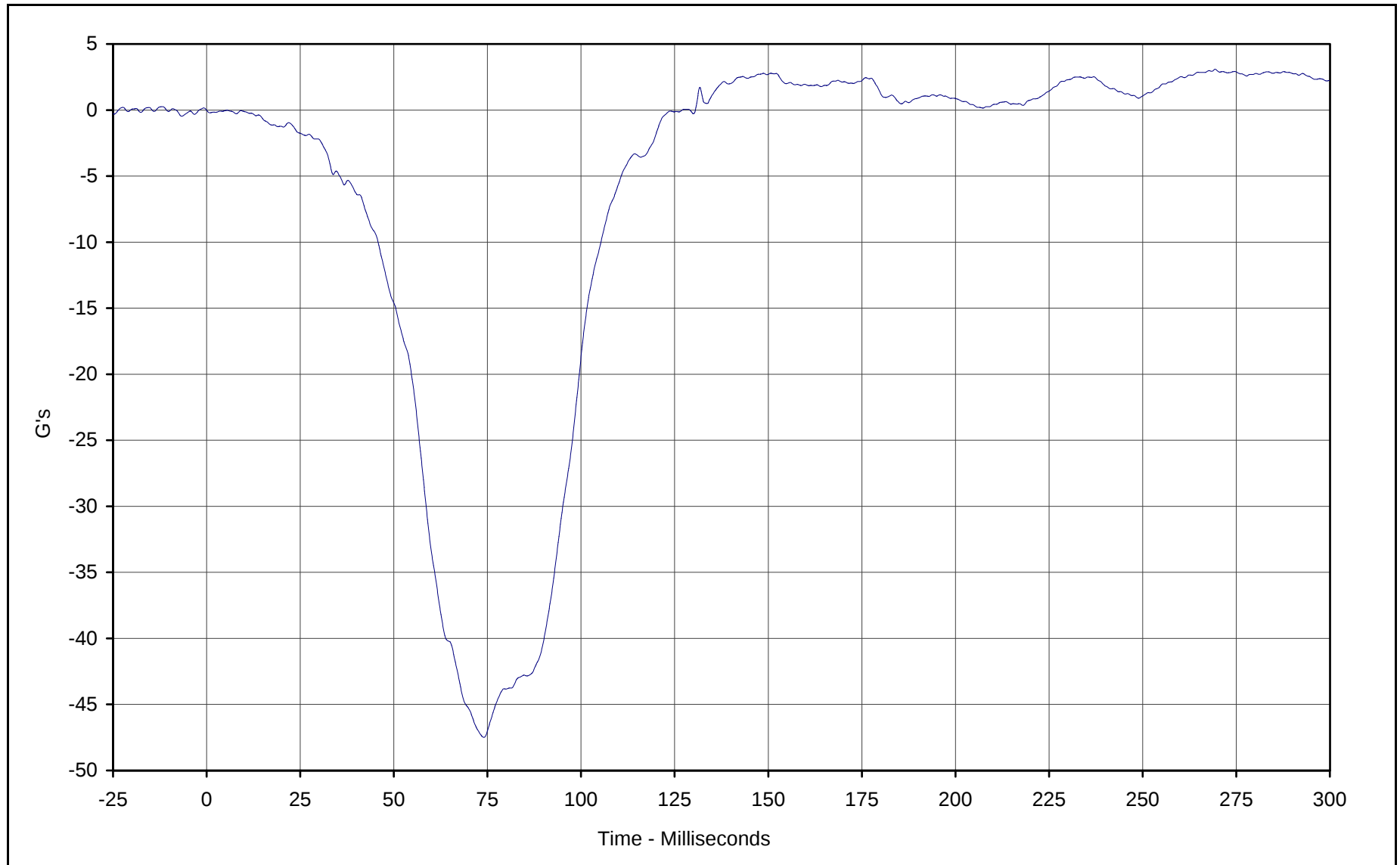


Curve Description: Driver Neck Moment Resultant  
Maximum Value: 81.9 at 73.3 Milliseconds  
Minimum Value: 0.1 at 14.6 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: RES-010

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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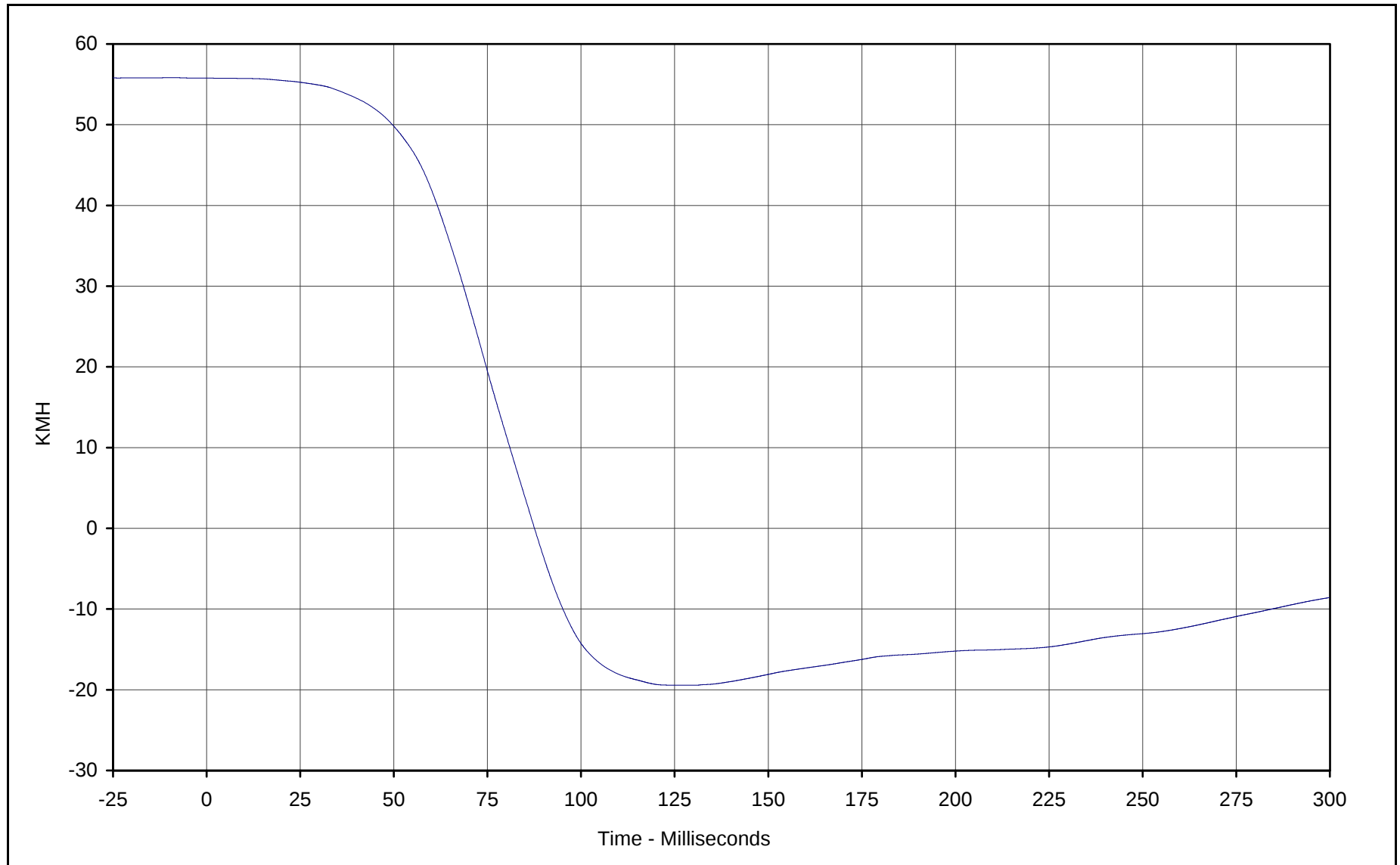


Curve Description: Driver Chest Primary X  
Maximum Value: 3.1 at 269.3 Milliseconds  
Minimum Value: -47.5 at 74.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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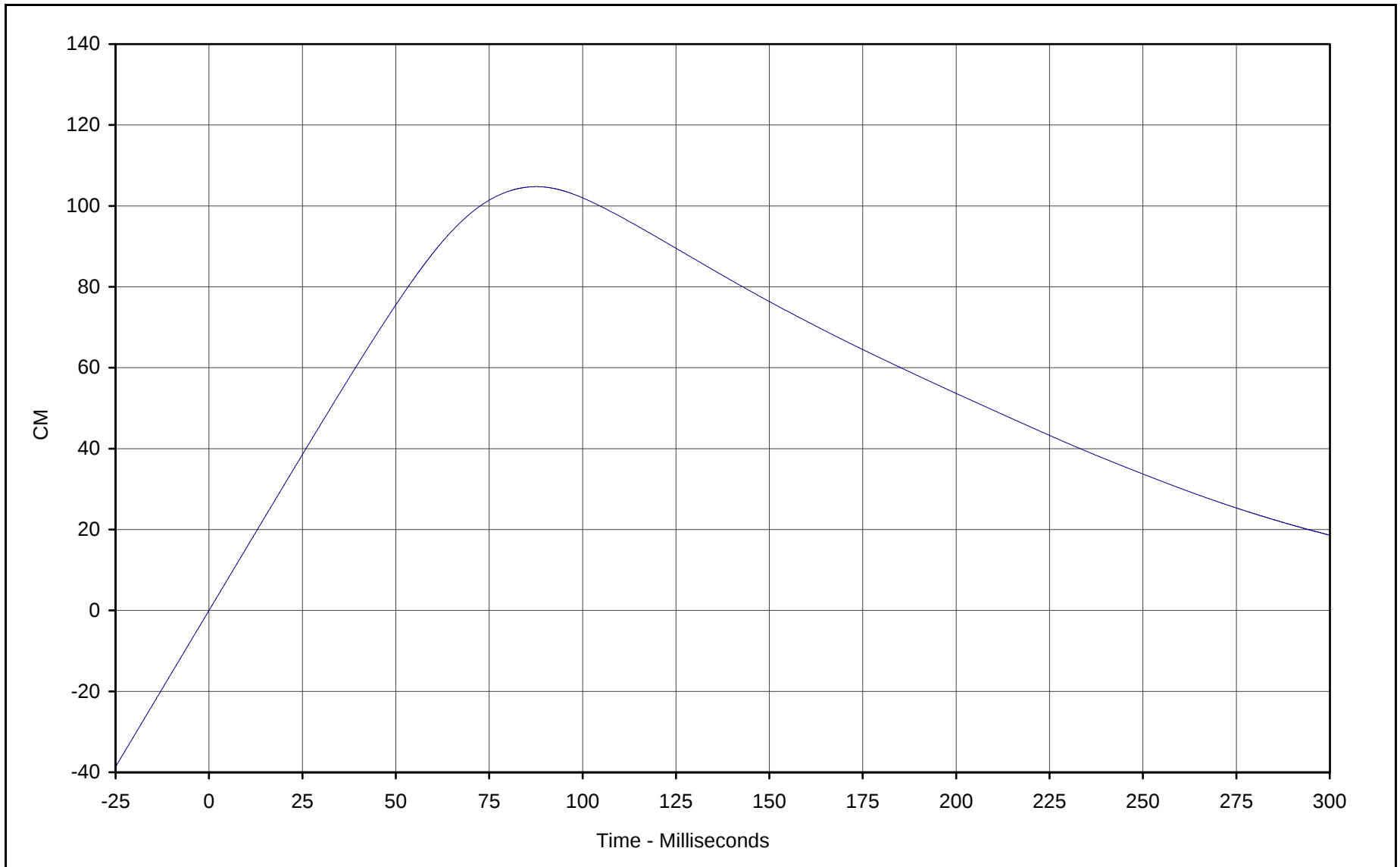
Curve Description: Driver Chest Primary X Velocity  
Maximum Value: 55.8 at 0.0 Milliseconds  
Minimum Value: -19.4 at 130.5 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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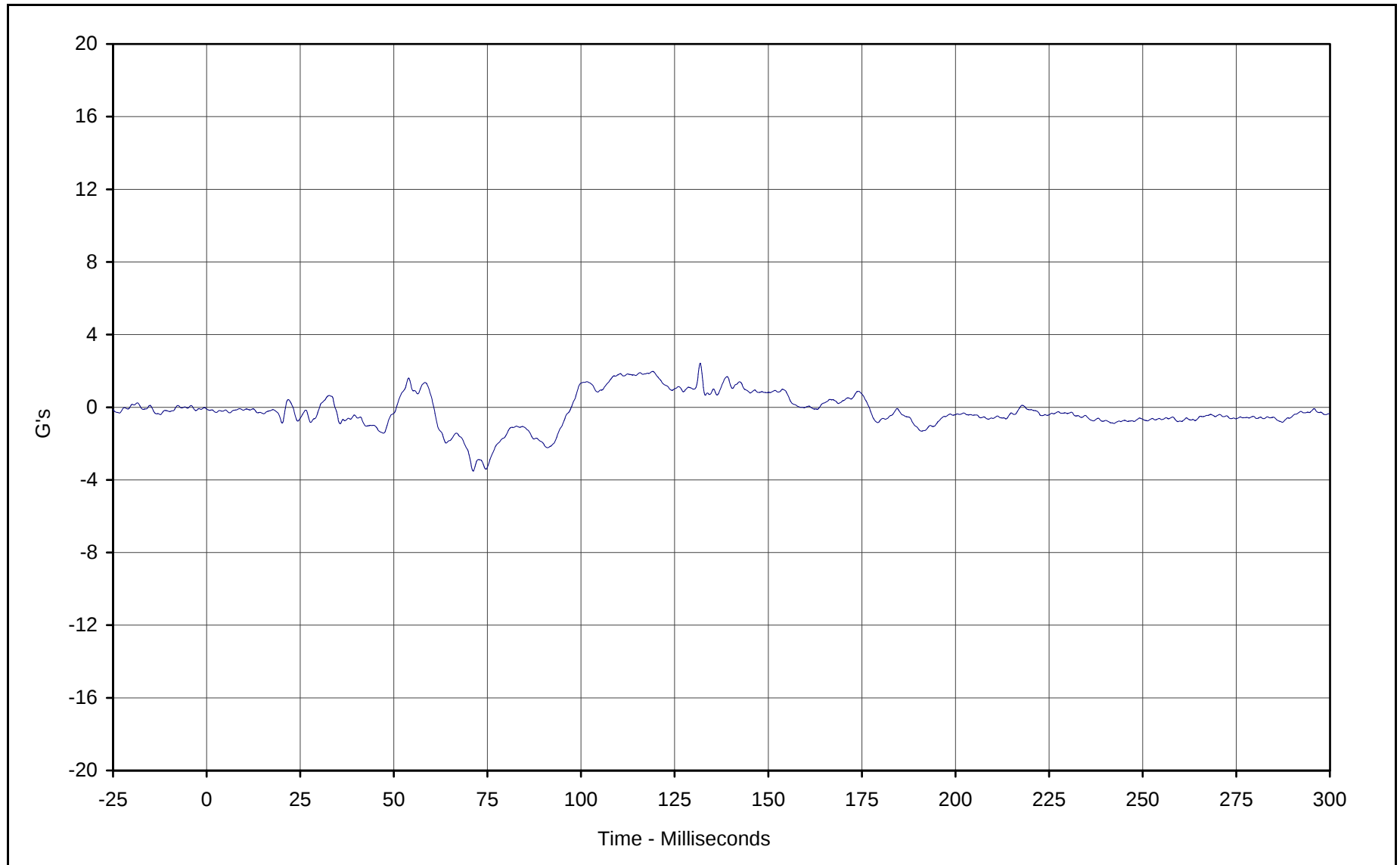


Curve Description: Driver Chest Primary X Displ.  
Maximum Value: 104.8 at 87.6 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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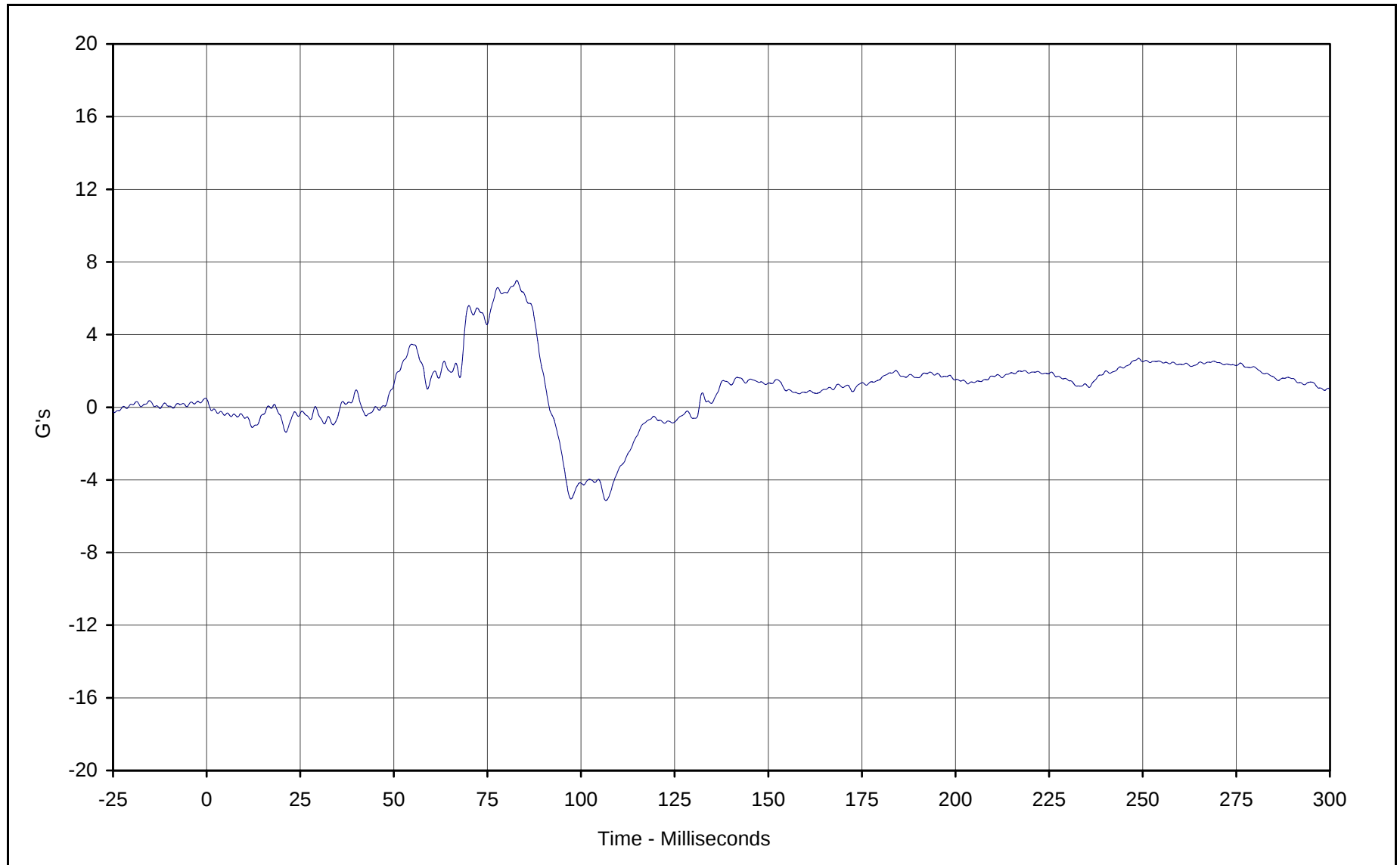


Curve Description: Driver Chest Primary Y  
Maximum Value: 2.4 at 131.8 Milliseconds  
Minimum Value: -3.5 at 71.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-014

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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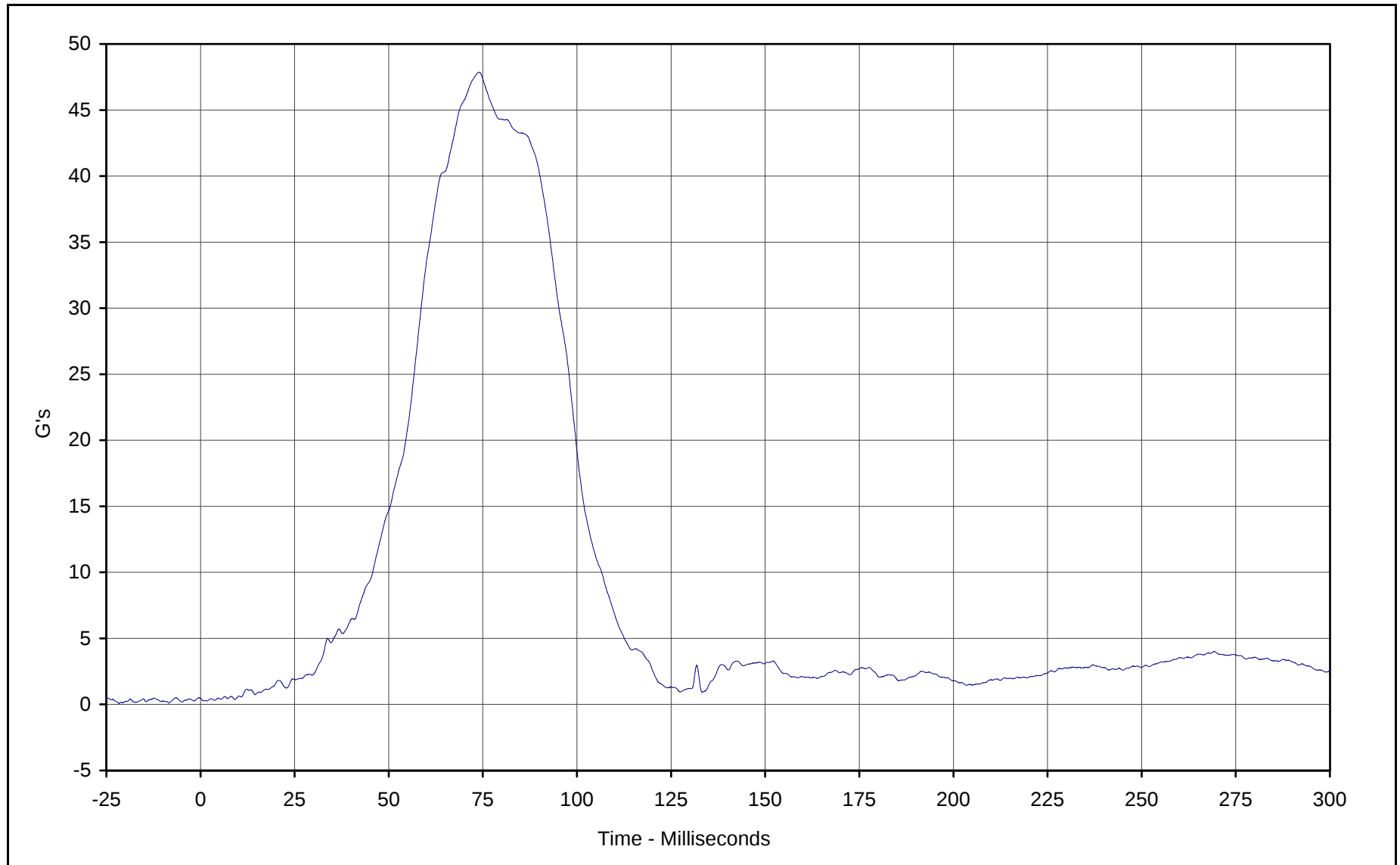


Curve Description: Driver Chest Primary Z  
Maximum Value: 7.0 at 82.8 Milliseconds  
Minimum Value: -5.1 at 106.6 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-015

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



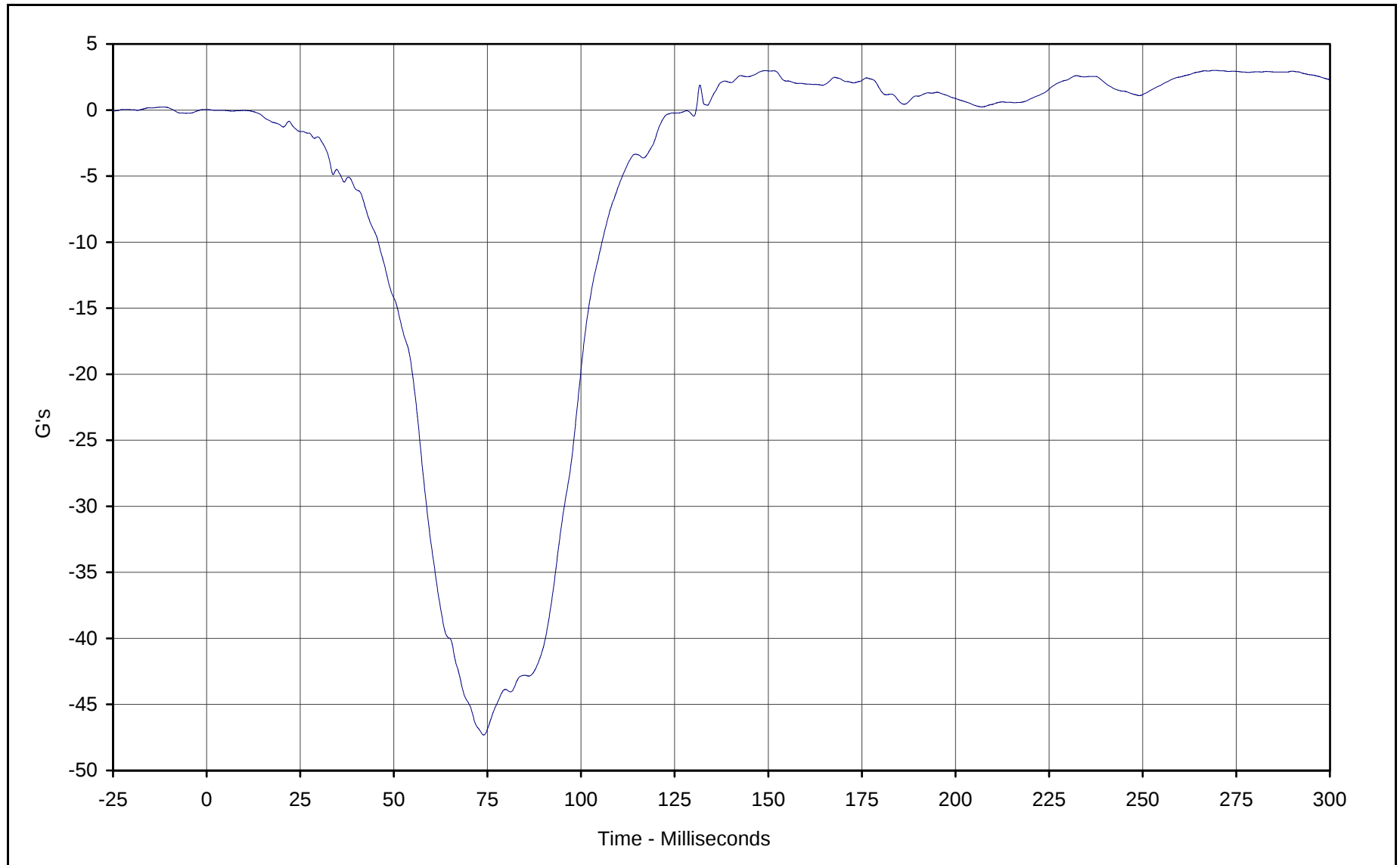
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Curve Description: Driver Chest Resultant Primary  
Maximum Value: 47.9 at 74.0 Milliseconds  
Minimum Value: 0.3 at 1.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: RES-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

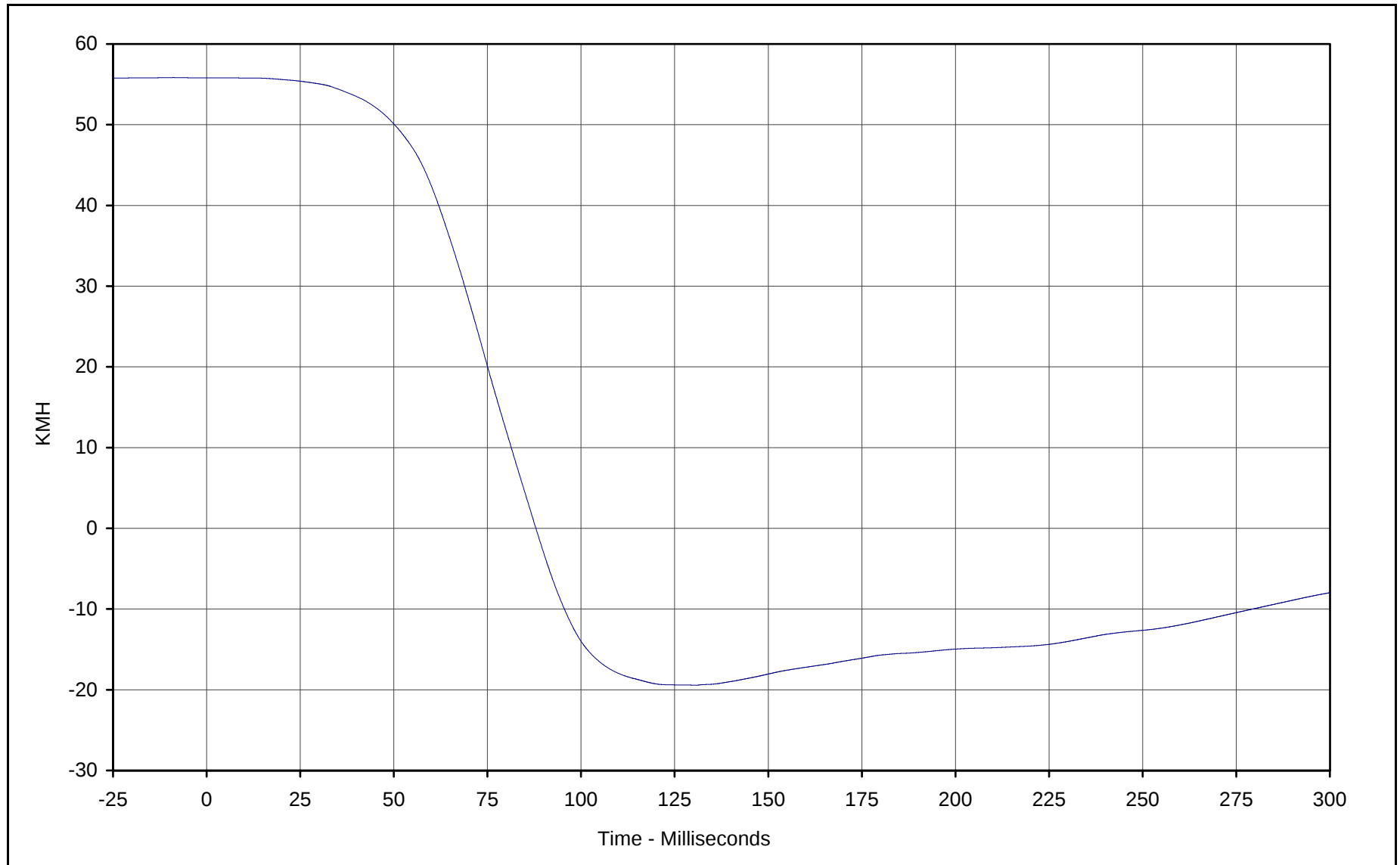




Curve Description: Driver Chest Redundant X  
Maximum Value: 3.0 at 268.9 Milliseconds  
Minimum Value: -47.3 at 74.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

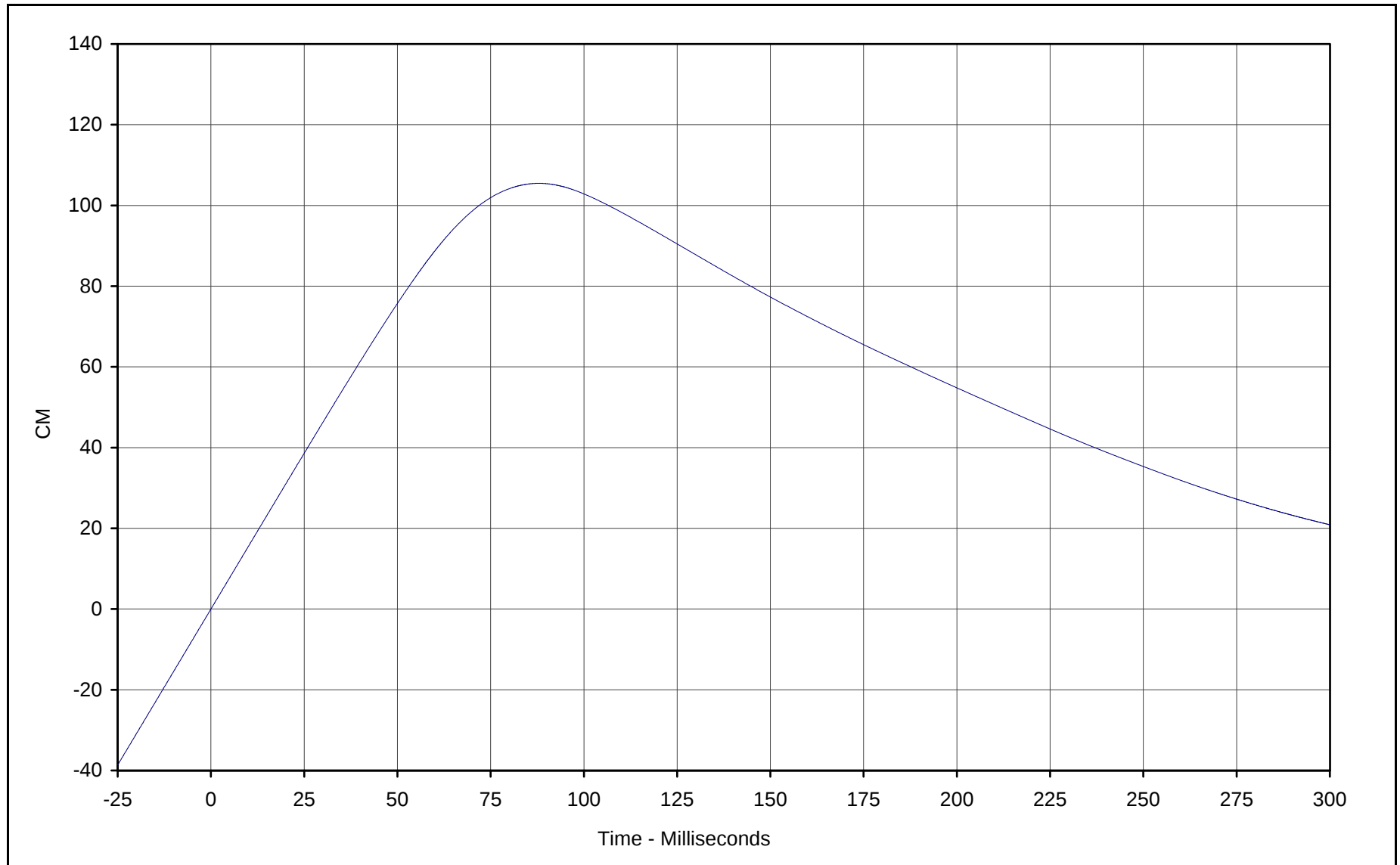




Curve Description: Driver Chest Redundant X Velocity  
Maximum Value: 55.8 at 1.4 Milliseconds  
Minimum Value: -19.4 at 130.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



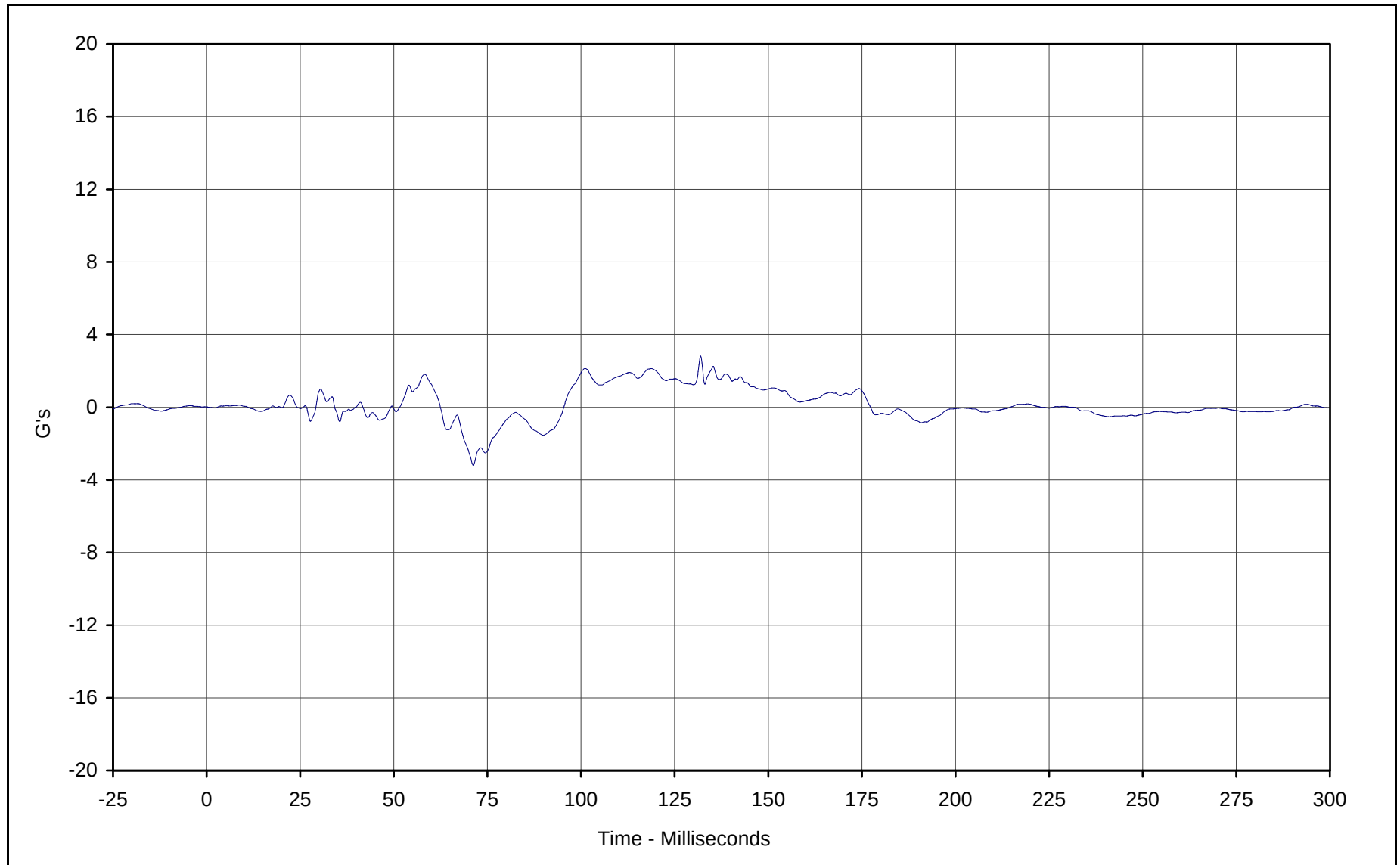


Curve Description: Driver Chest Redundant X Displ.  
Maximum Value: 105.5 at 87.9 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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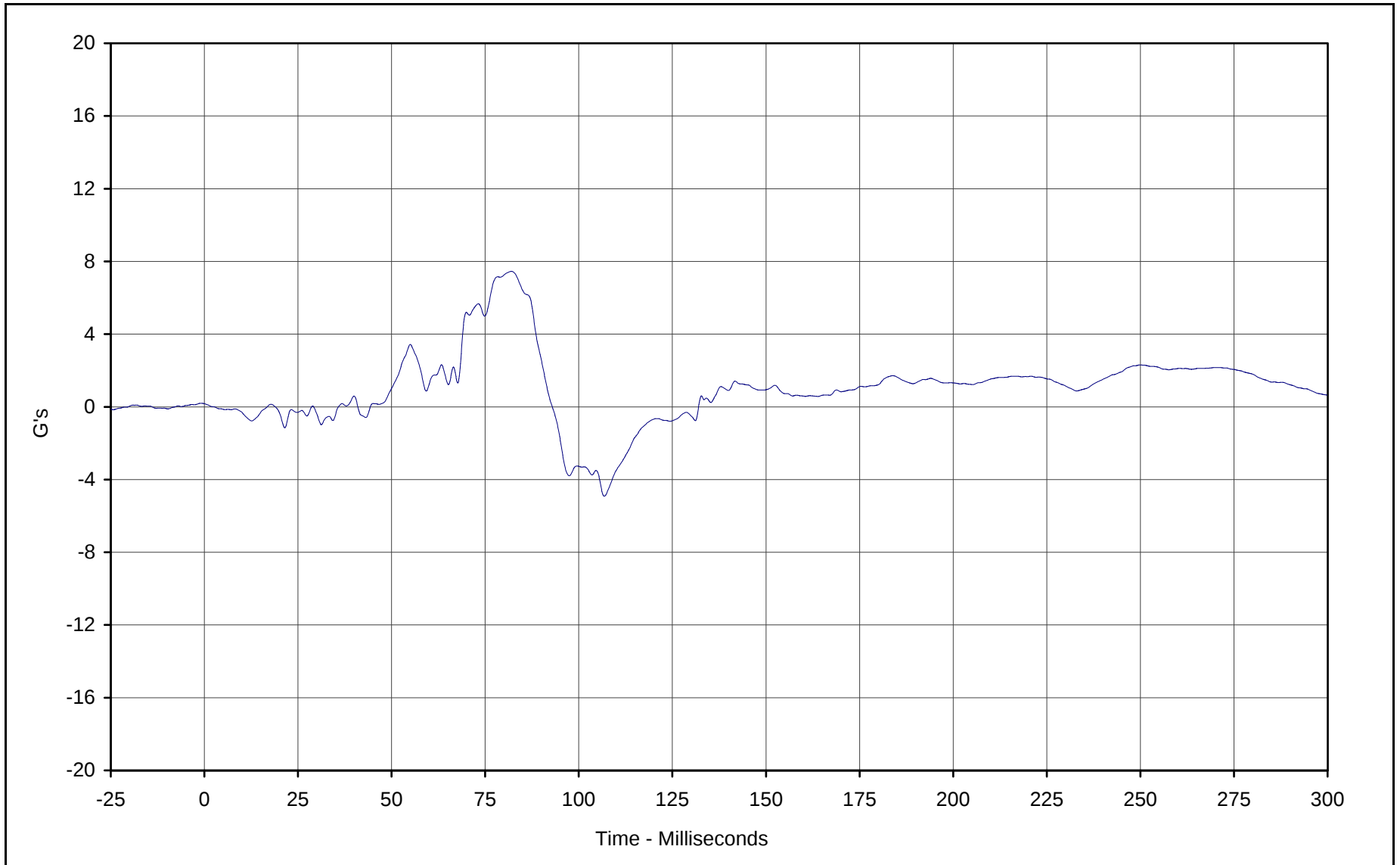


Curve Description: Driver Chest Redundant Y  
Maximum Value: 2.8 at 131.9 Milliseconds  
Minimum Value: -3.2 at 71.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-017

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



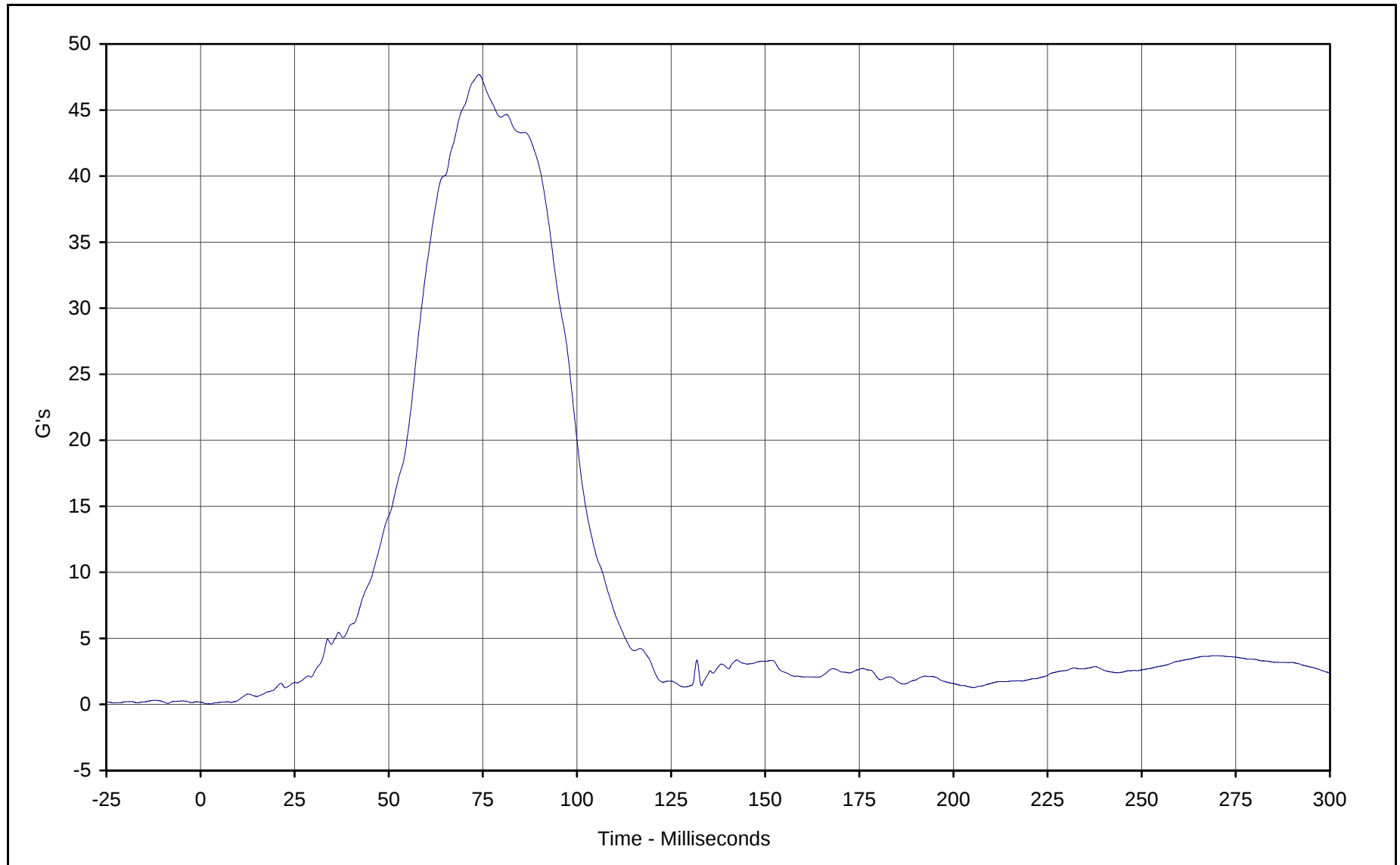
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Curve Description: Driver Chest Redundant Z  
Maximum Value: 7.5 at 82.0 Milliseconds  
Minimum Value: -4.9 at 106.8 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-018

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

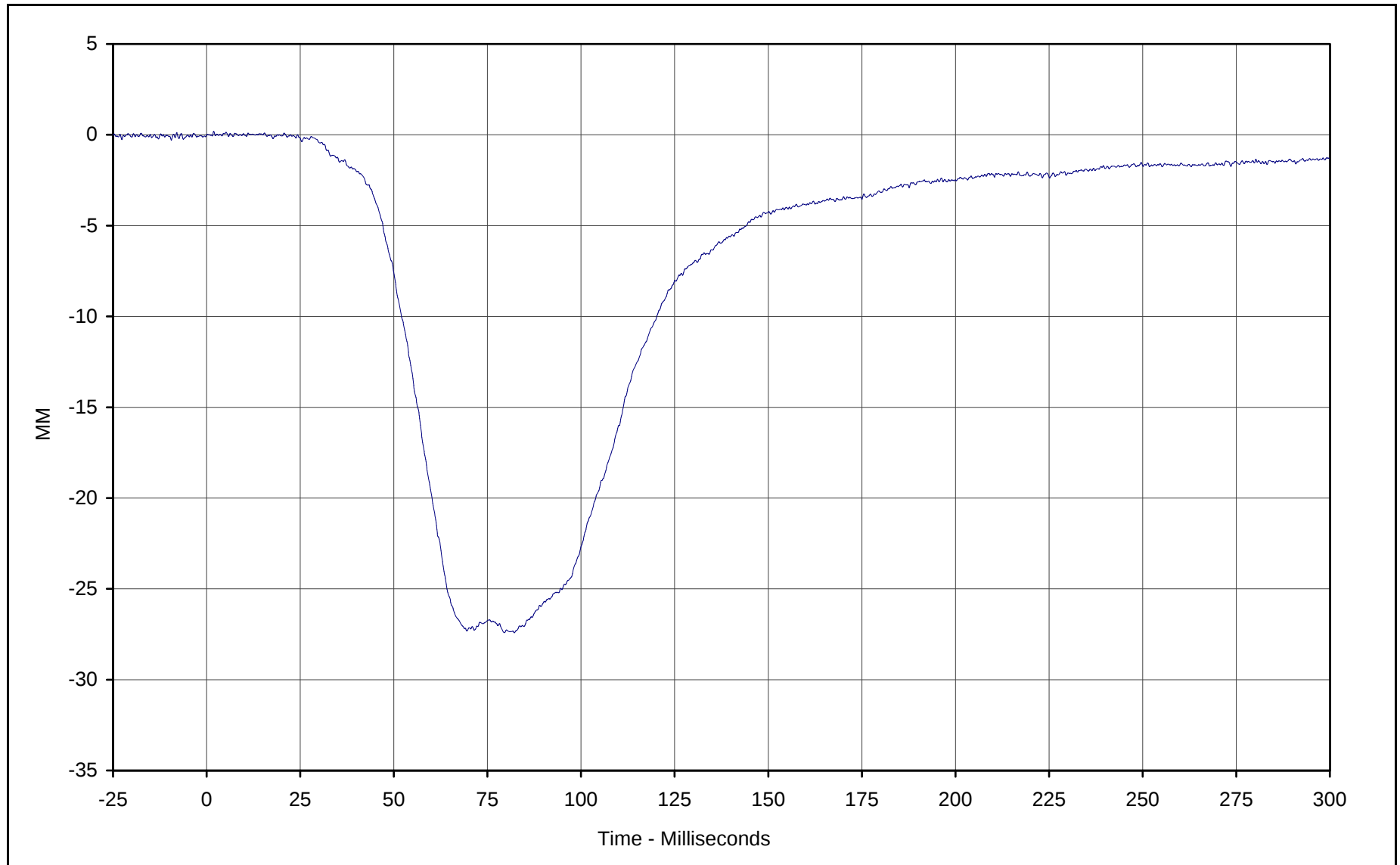




Curve Description: Driver Chest Resultant Redundant  
Maximum Value: 47.7 at 74.0 Milliseconds  
Minimum Value: 0.0 at 2.8 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: RES-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

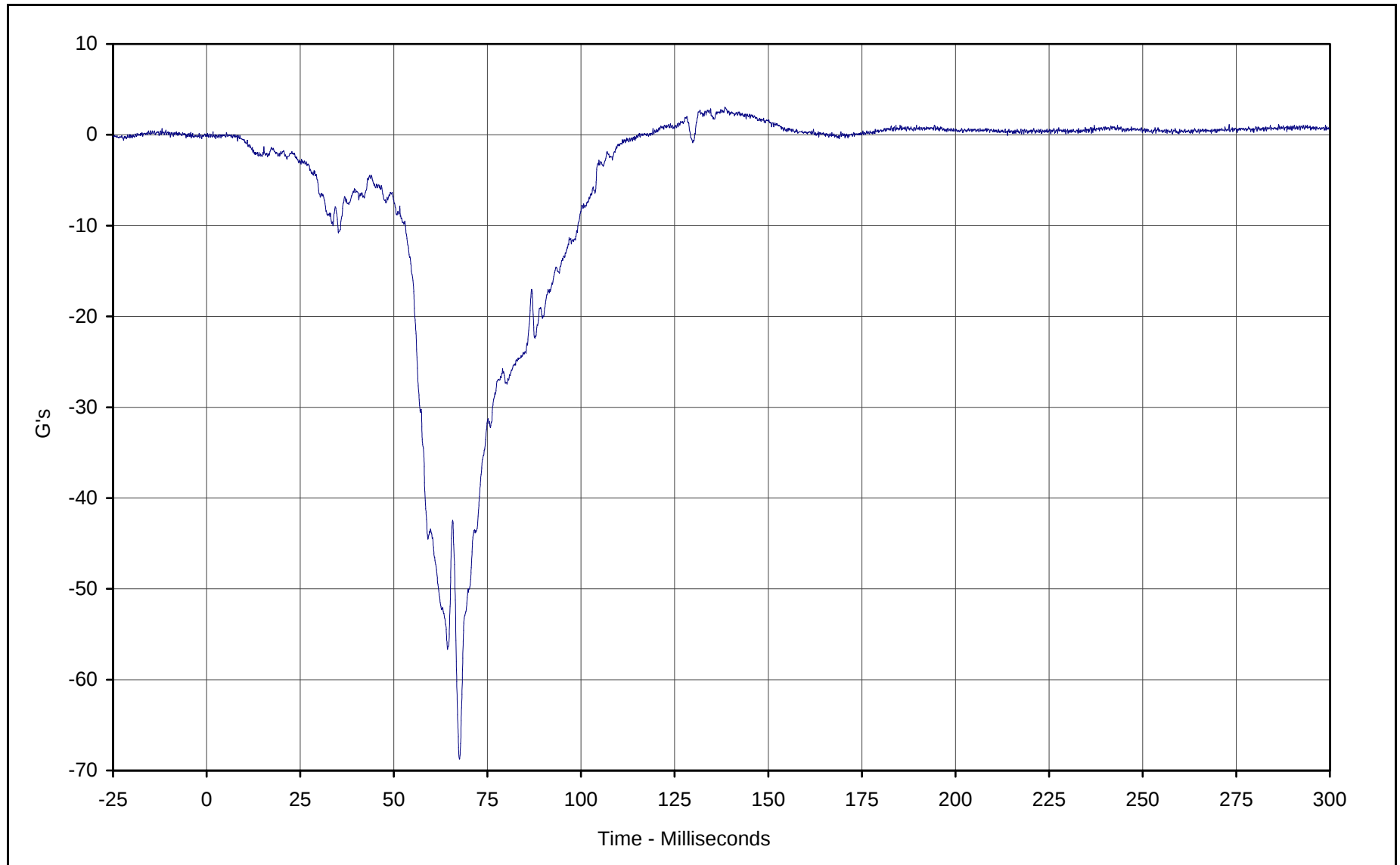




Curve Description: Driver Chest Displacement X  
Maximum Value: 0.2 at 1.9 Milliseconds  
Minimum Value: -27.4 at 79.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-019

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan





Curve Description: Driver Pelvis X

Maximum Value: 3.1 at 138.4 Milliseconds

Minimum Value: -68.8 at 67.5 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/30/01

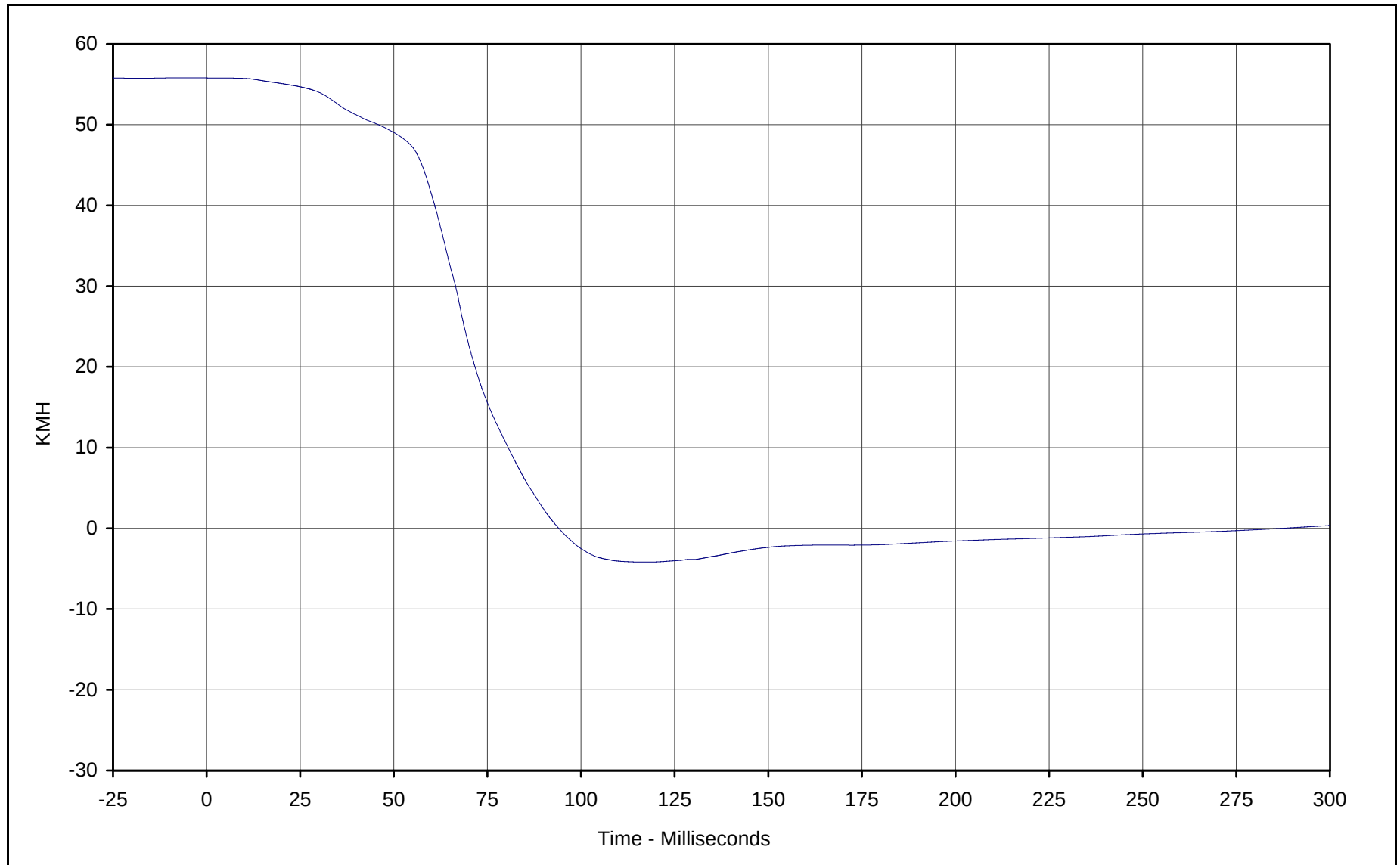
Curve Number: FIL-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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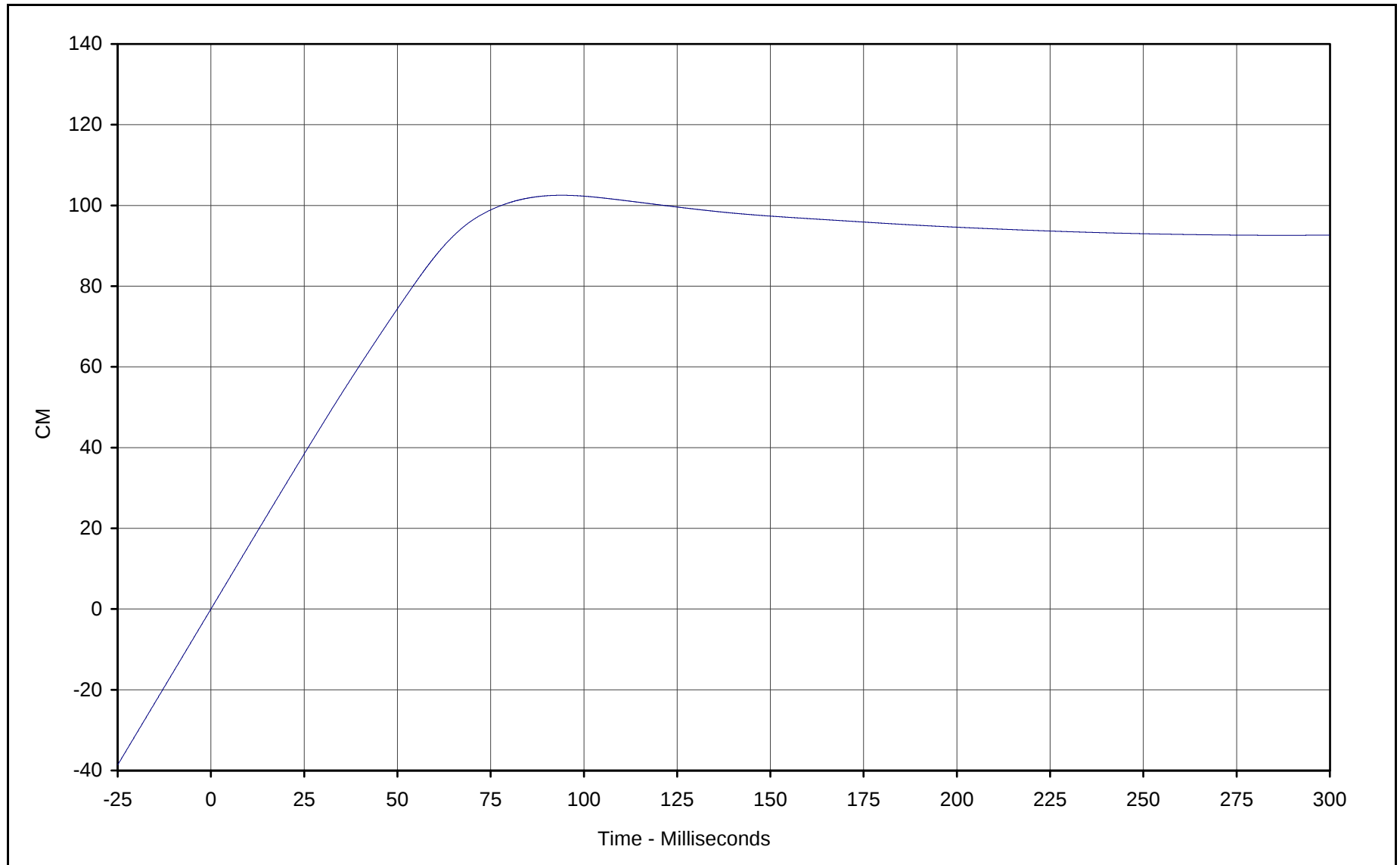


Curve Description: Driver Pelvis X Velocity  
Maximum Value: 55.8 at 0.0 Milliseconds  
Minimum Value: -4.2 at 116.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



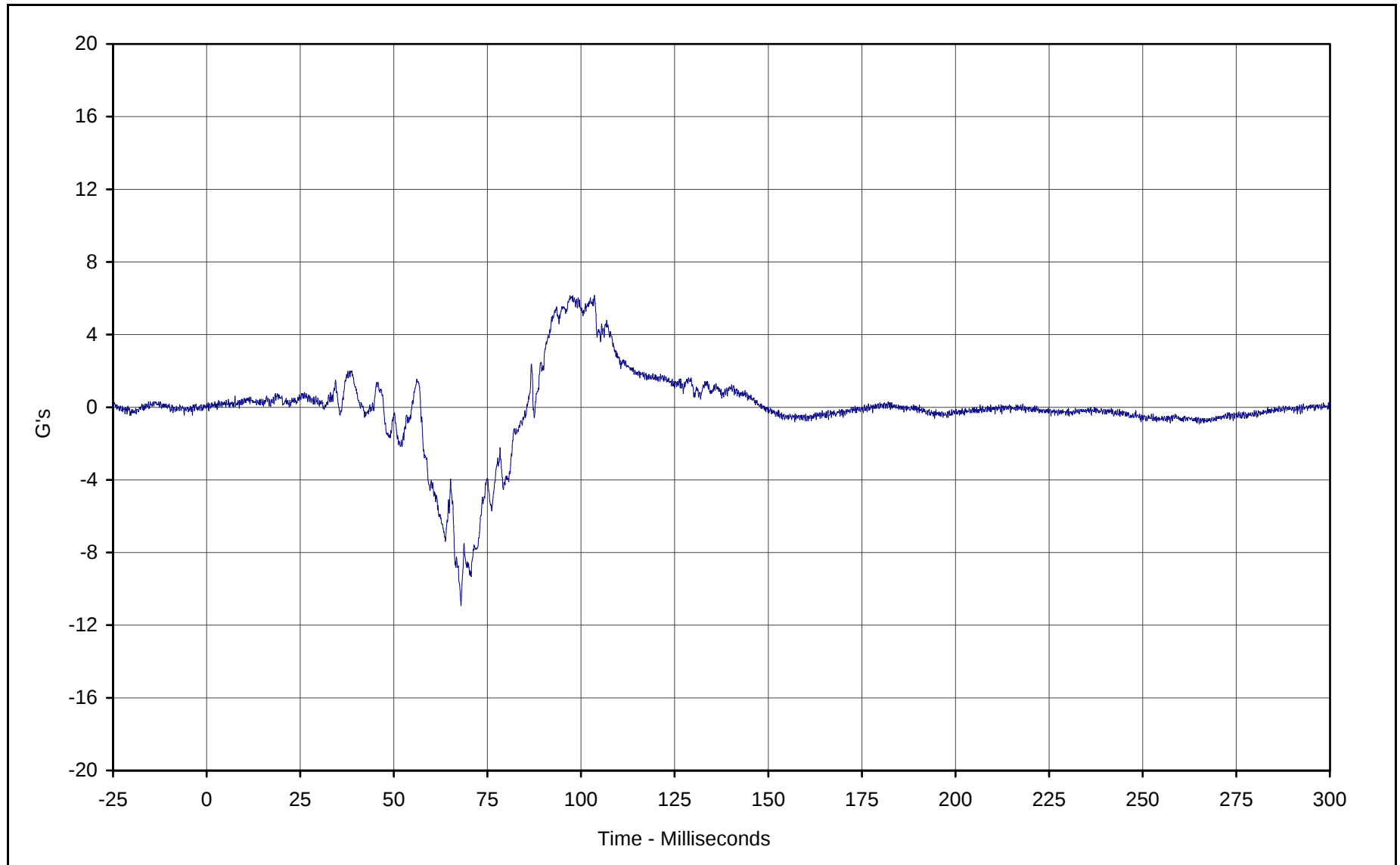
KAR21001-09



Curve Description: Driver Pelvis X Displ.  
Maximum Value: 102.5 at 94.0 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

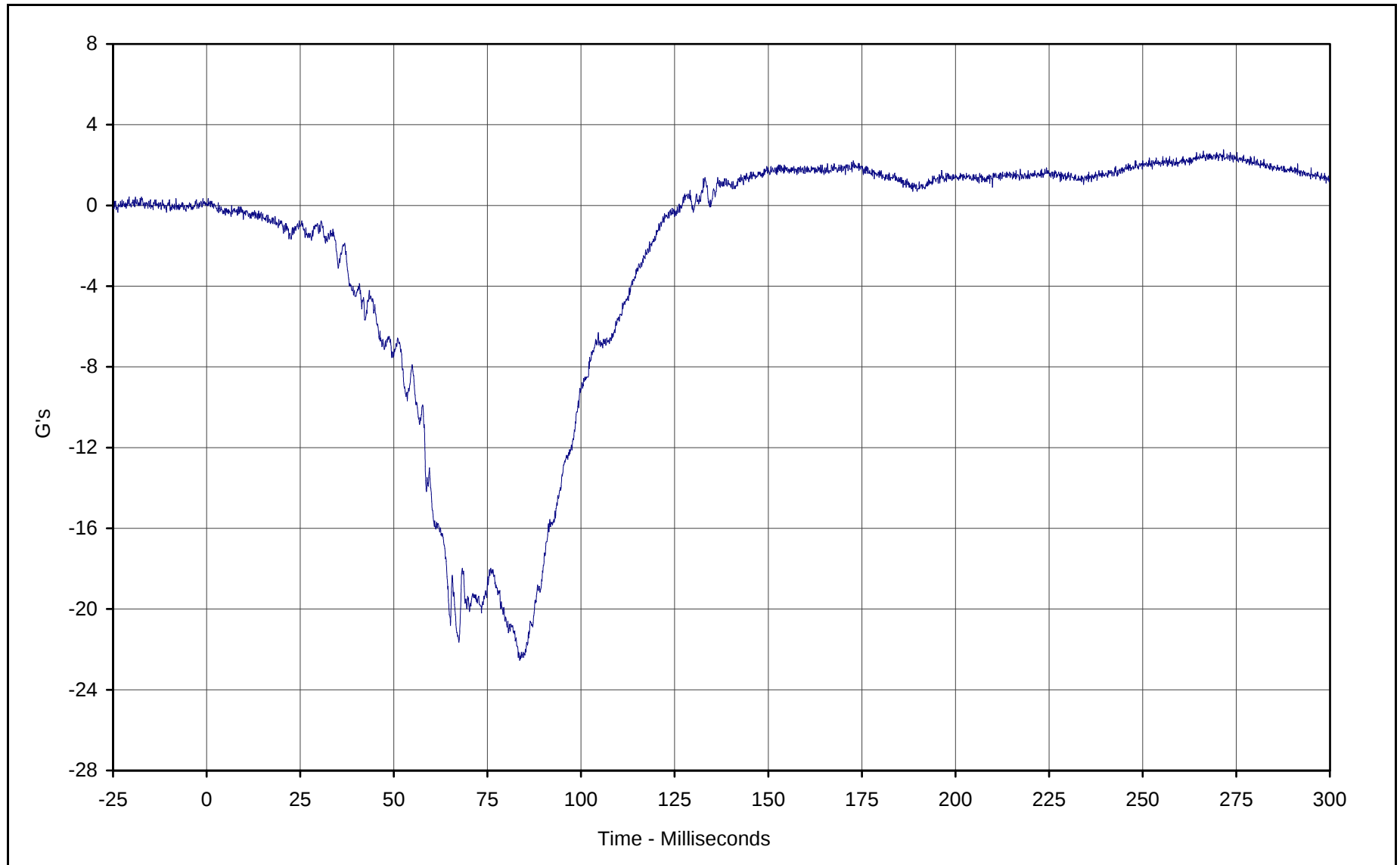




Curve Description: Driver Pelvis Y  
Maximum Value: 6.1 at 97.0 Milliseconds  
Minimum Value: -10.9 at 67.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-021

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

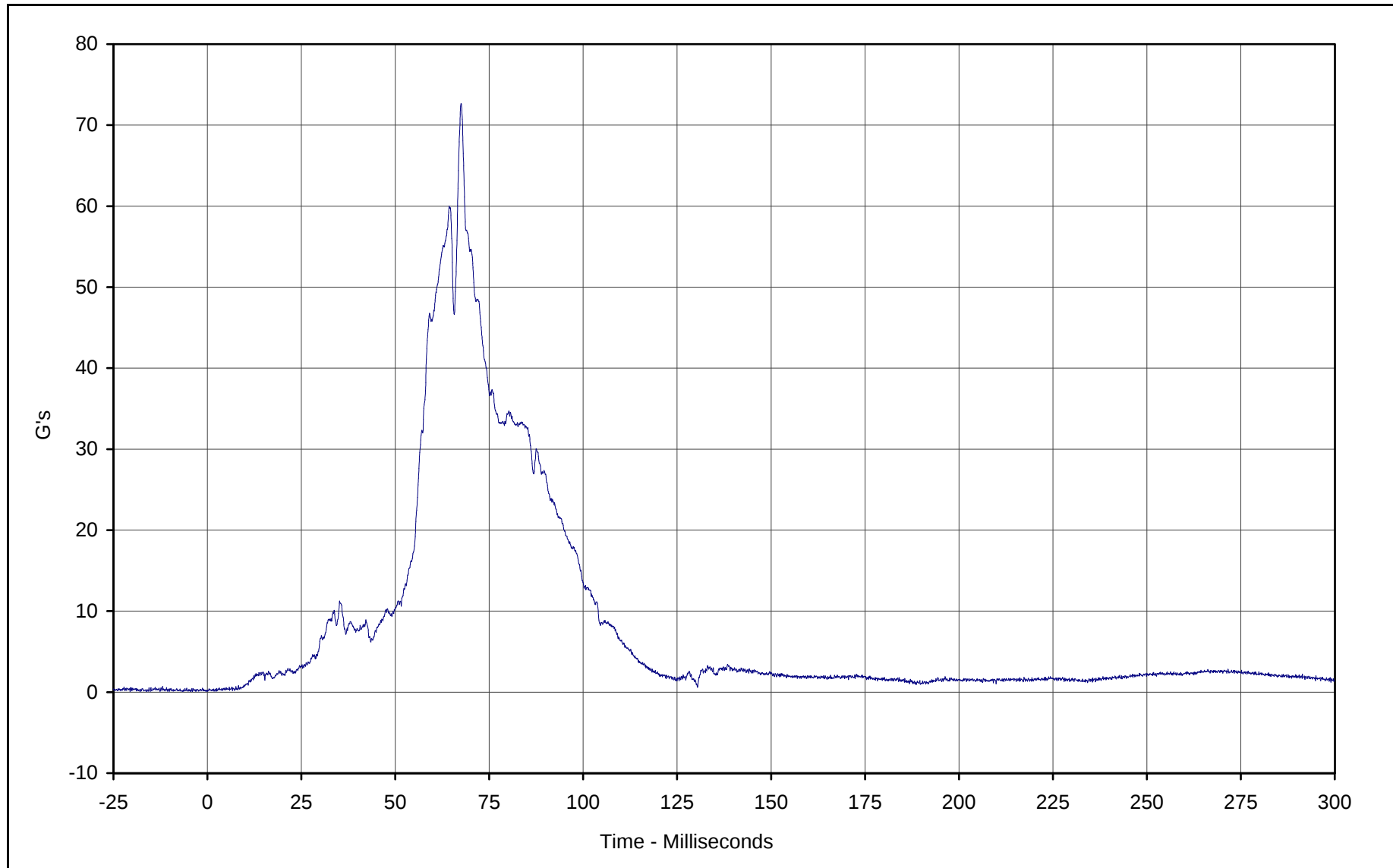




Curve Description: Driver Pelvis Z  
Maximum Value: 2.8 at 271.6 Milliseconds  
Minimum Value: -22.5 at 83.6 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-022

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



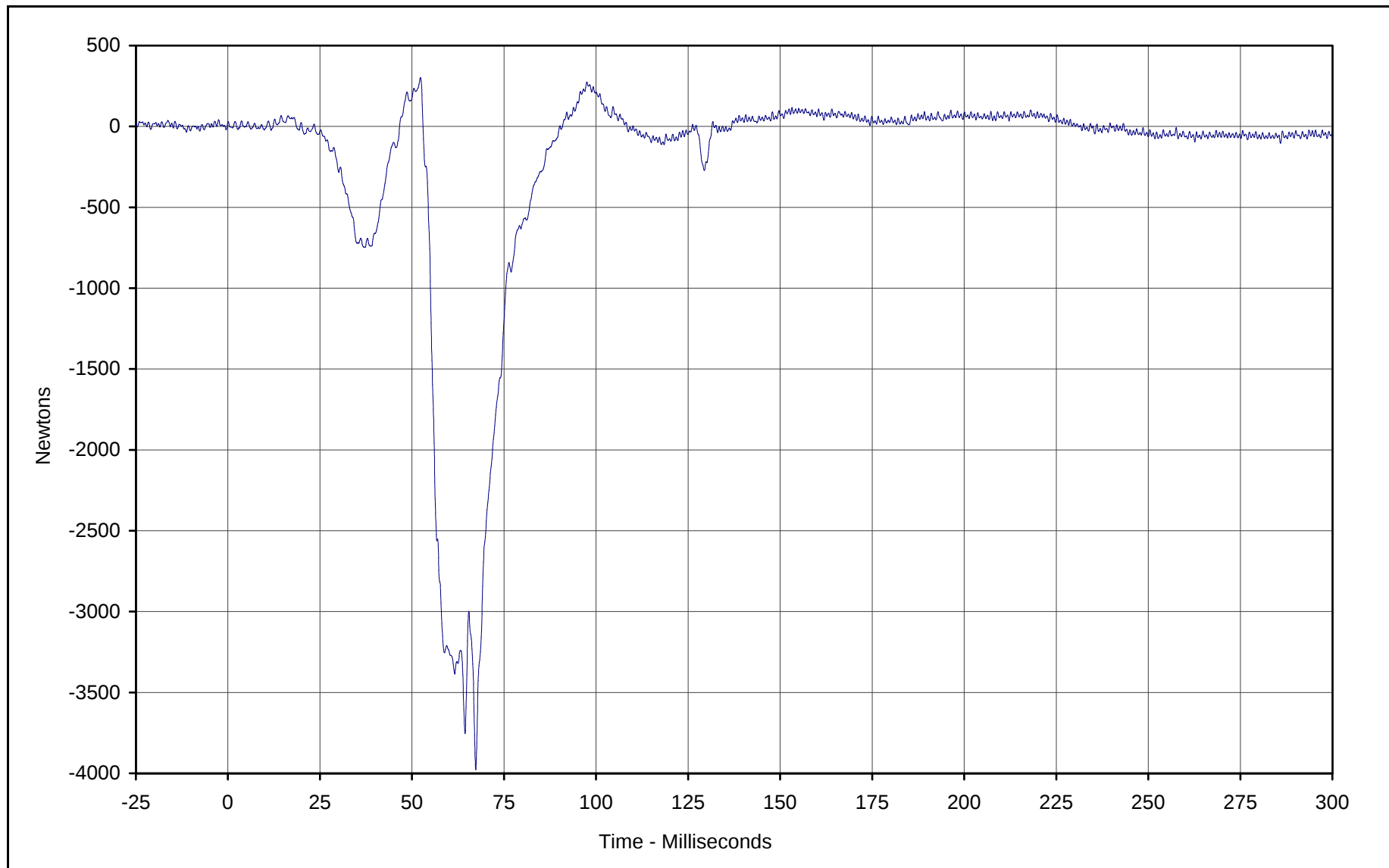


Curve Description: Driver Pelvis Resultant  
Maximum Value: 72.7 at 67.5 Milliseconds  
Minimum Value: 0.1 at 2.3 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: RES-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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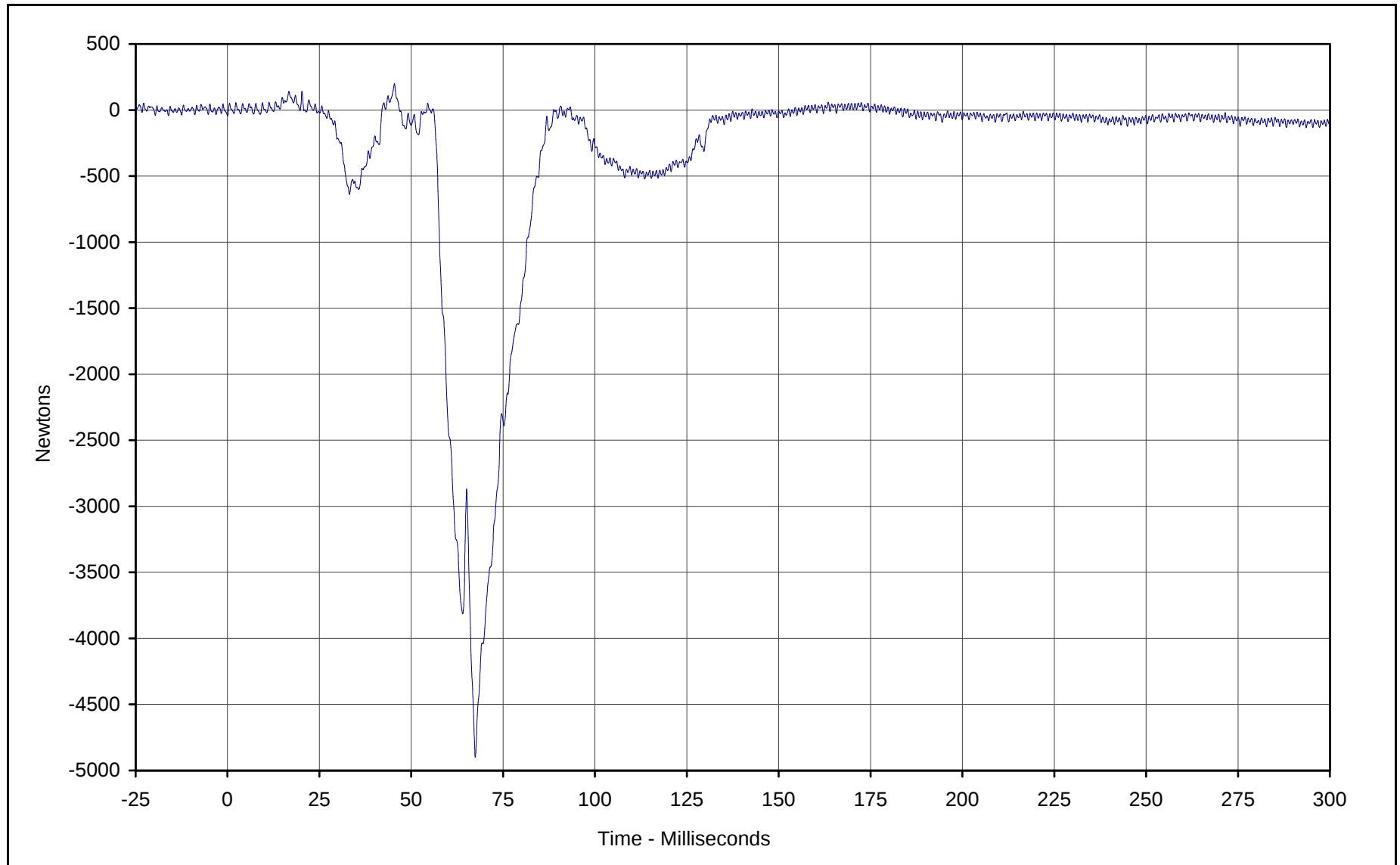


Curve Description: Driver Left Femur Force  
Maximum Value: 303.1 at 52.3 Milliseconds  
Minimum Value: -3978.5 at 67.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-023

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



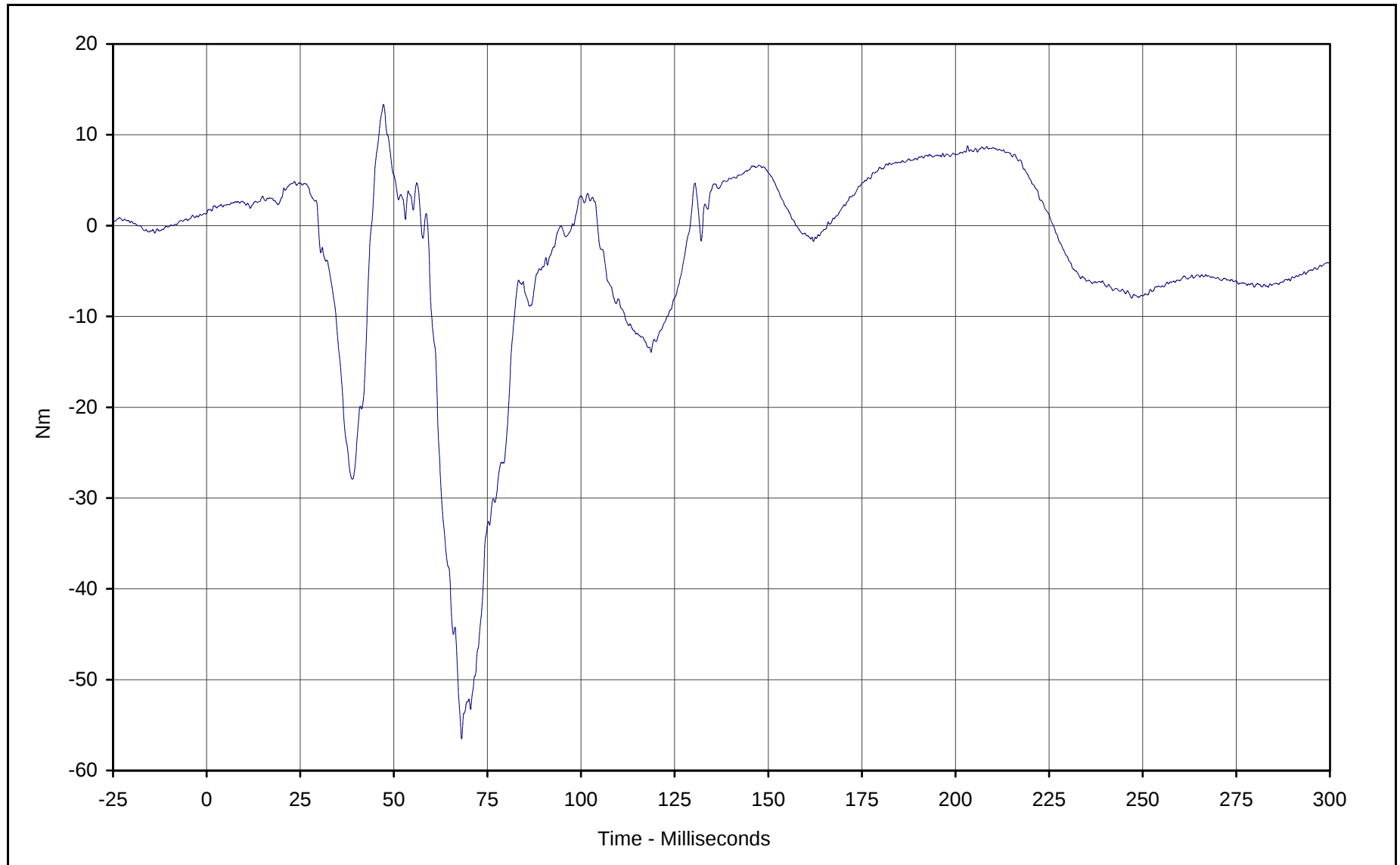
KAR21001-09



Curve Description: Driver Right Femur Force  
Maximum Value: 199.8 at 45.4 Milliseconds  
Minimum Value: -4899.5 at 67.4 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-024

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



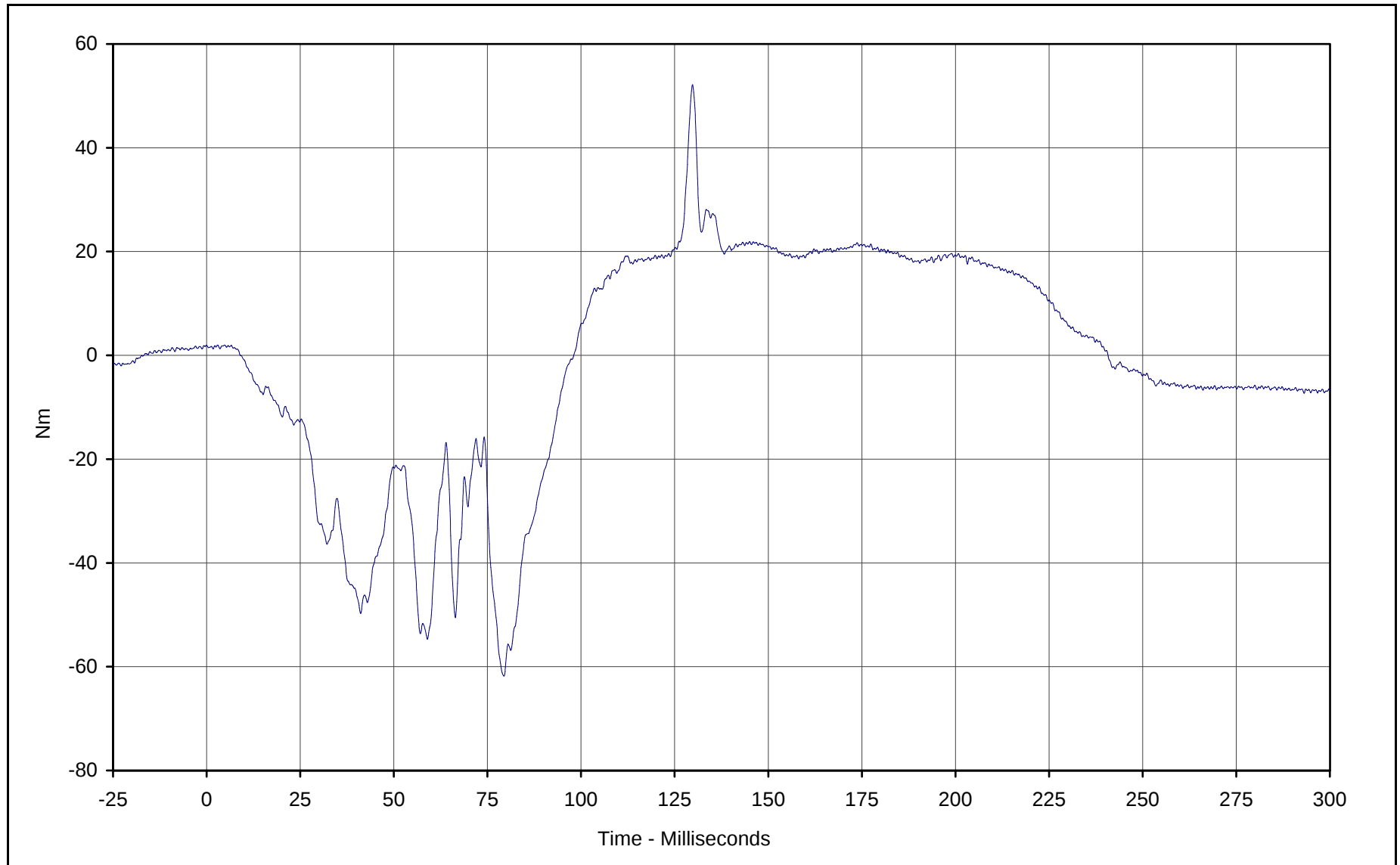


Curve Description: Driver Left Upper Tibia Moment X  
Maximum Value: 13.3 at 47.2 Milliseconds  
Minimum Value: -56.5 at 68.1 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-025

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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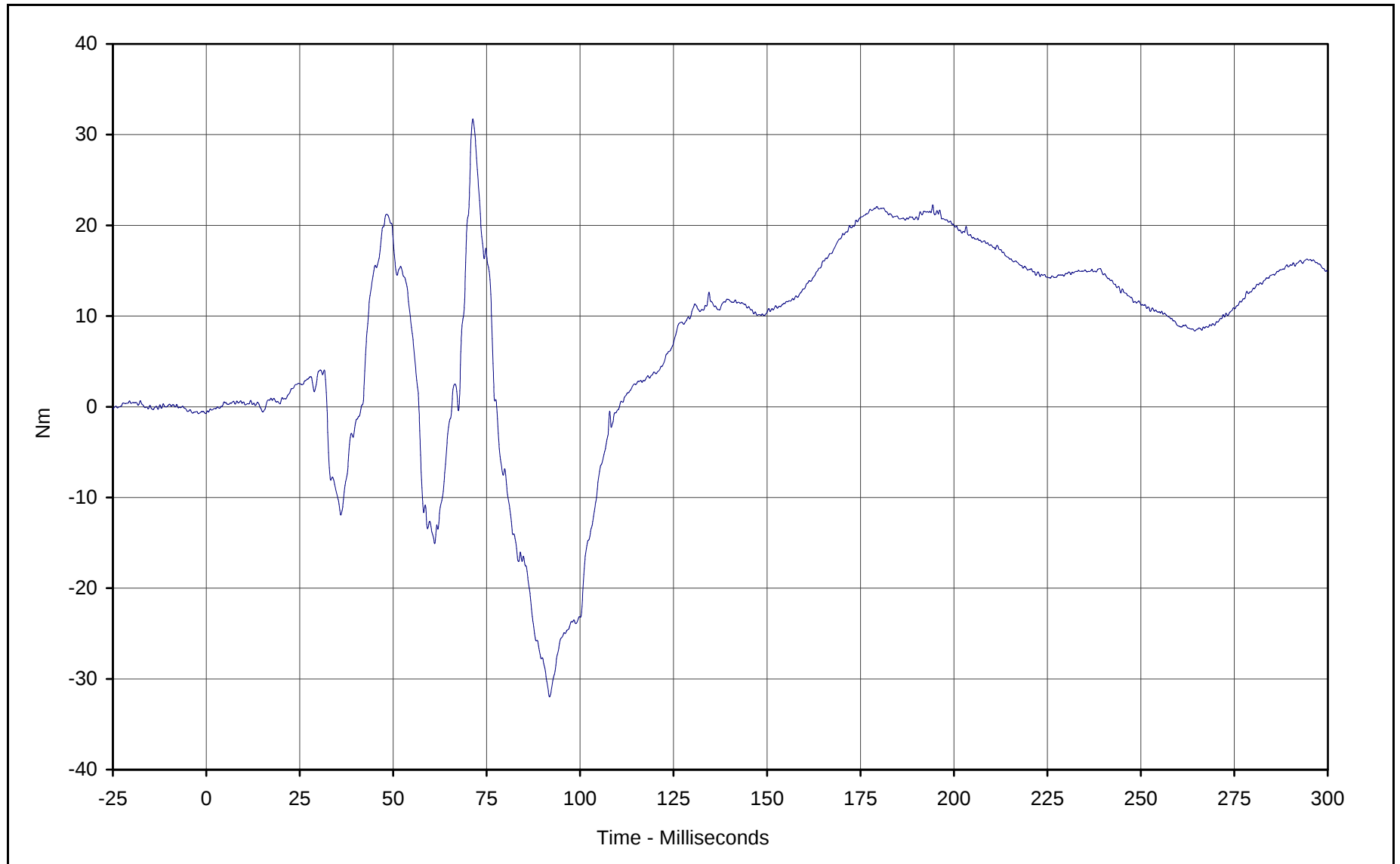


Curve Description: Driver Left Upper Tibia Moment Y  
Maximum Value: 52.2 at 129.8 Milliseconds  
Minimum Value: -61.8 at 79.4 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-026

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

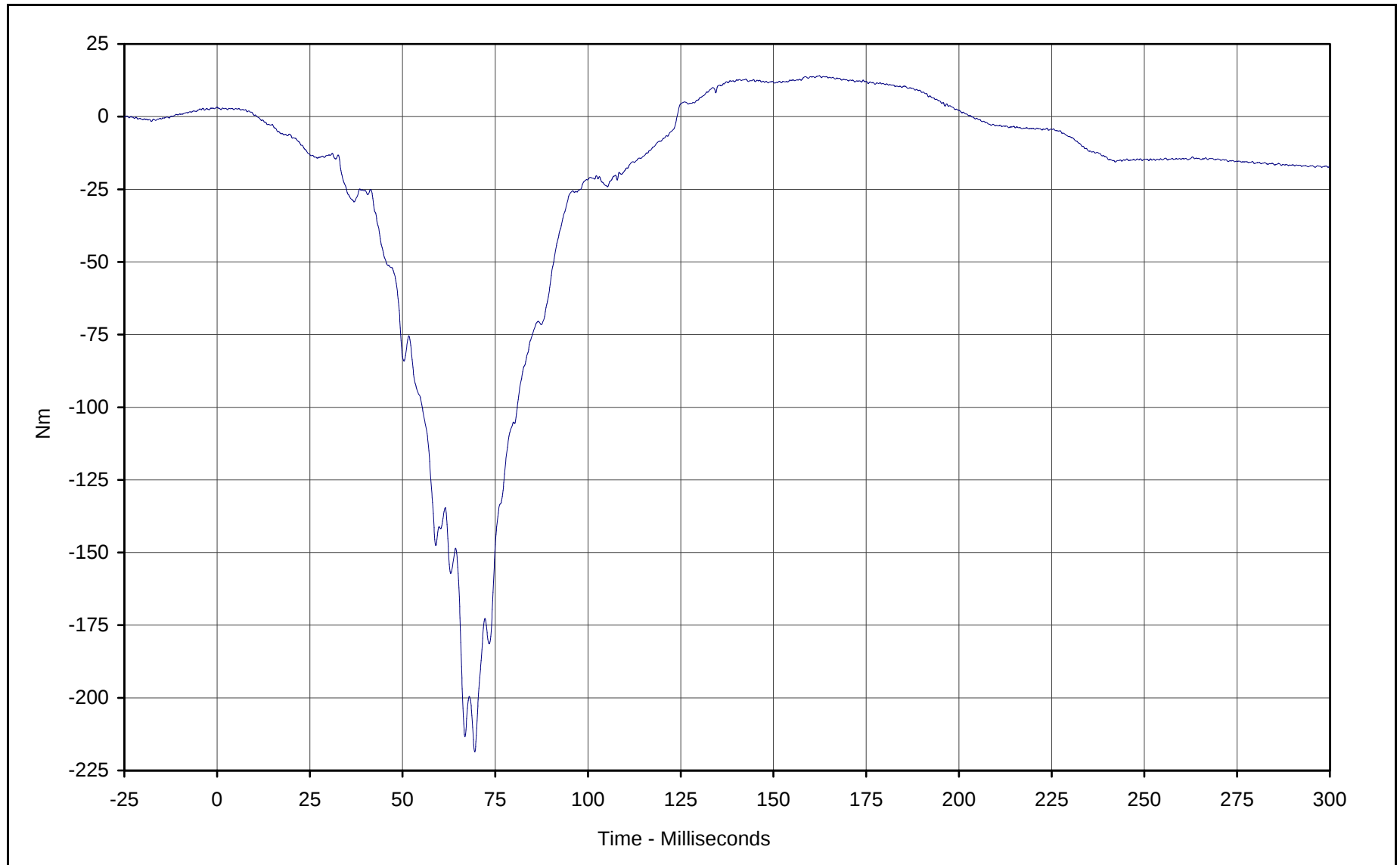


Curve Description: Driver Right Upper Tibia Moment X  
Maximum Value: 31.8 at 71.3 Milliseconds  
Minimum Value: -32.0 at 91.8 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-027

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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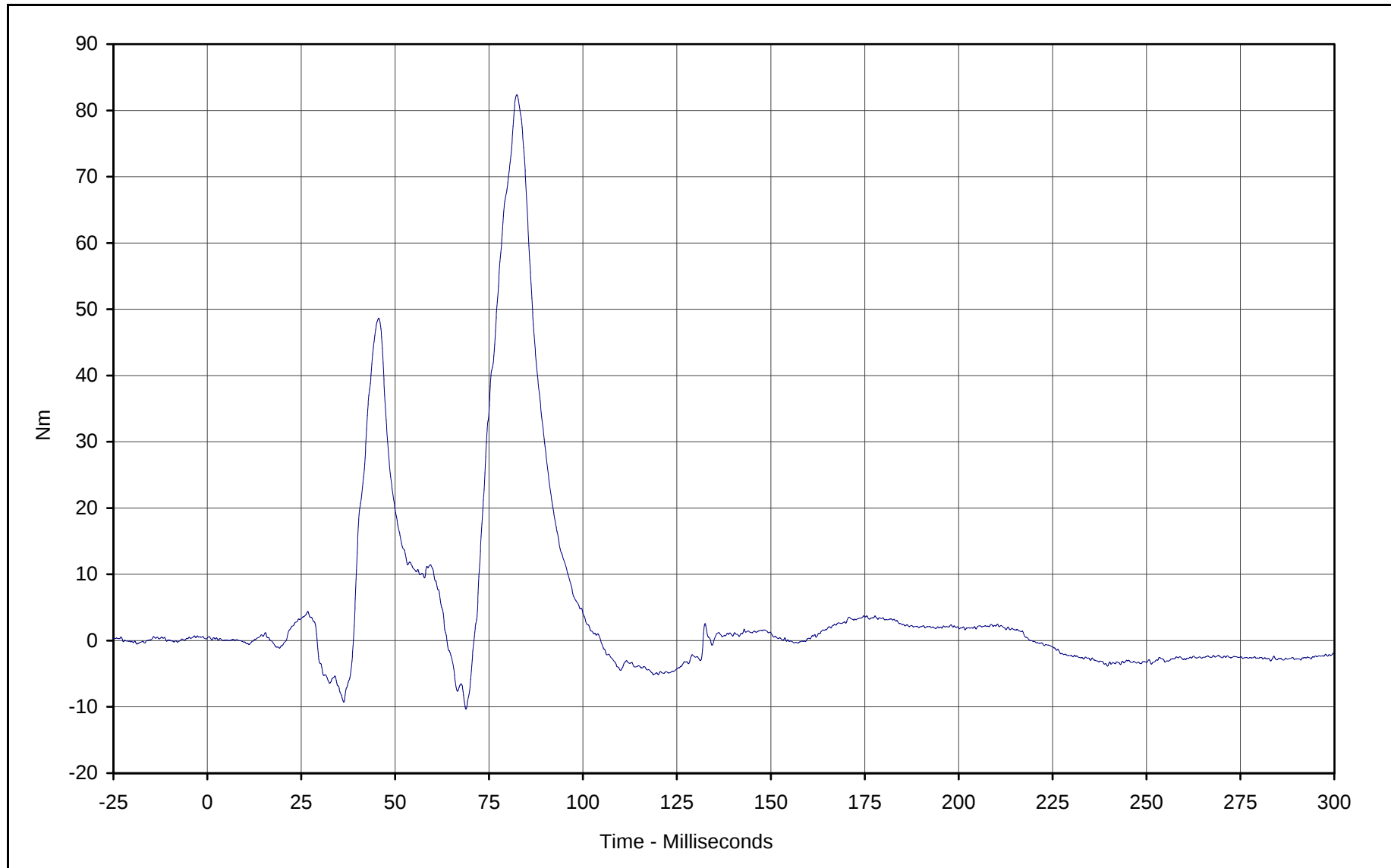


Curve Description: Driver Right Upper Tibia Moment Y  
Maximum Value: 14.1 at 162.4 Milliseconds  
Minimum Value: -218.6 at 69.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-028

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



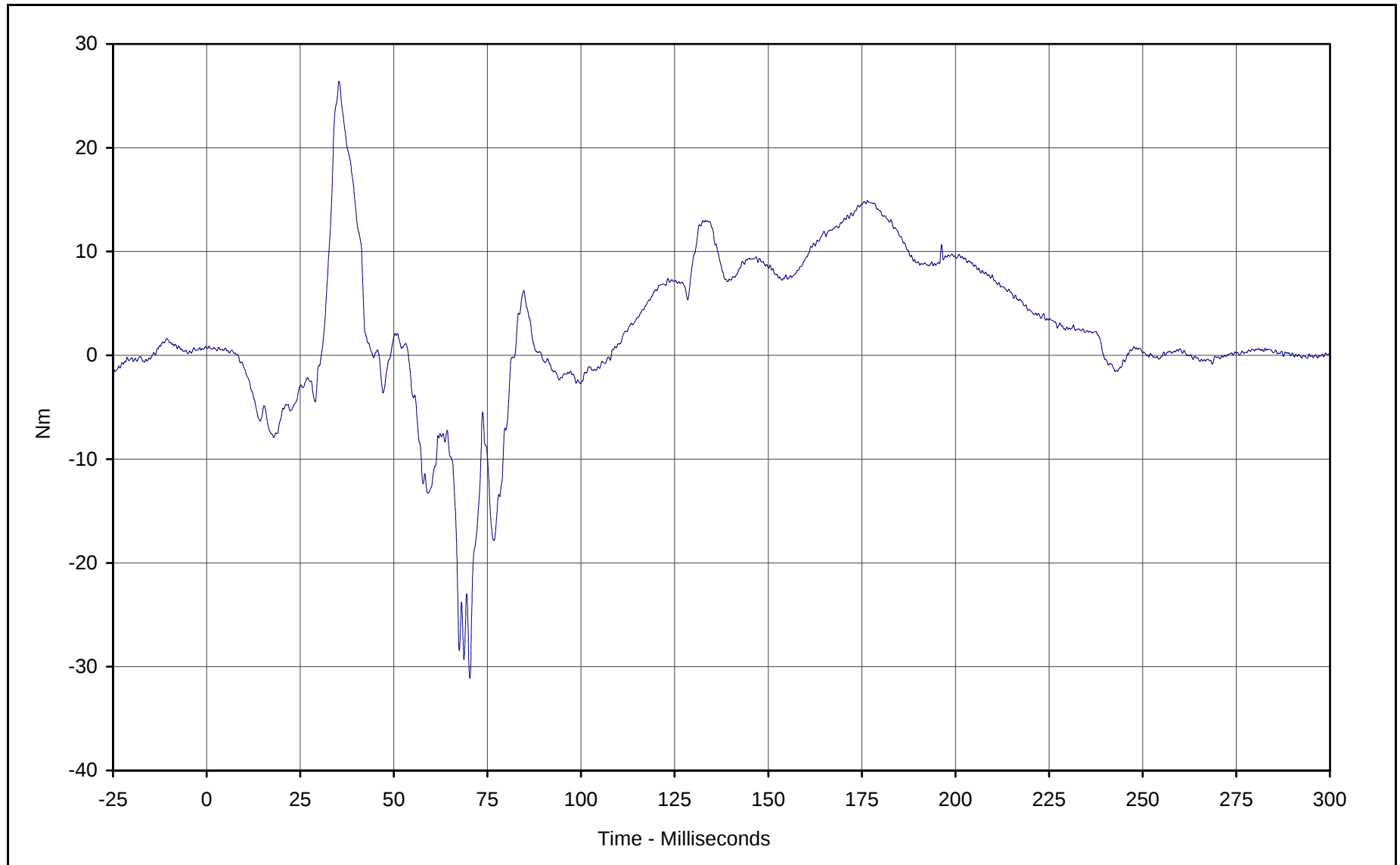
KAR21001-09



Curve Description: Driver Left Lower Tibia Moment X  
Maximum Value: 82.4 at 82.4 Milliseconds  
Minimum Value: -10.3 at 68.9 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-029

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

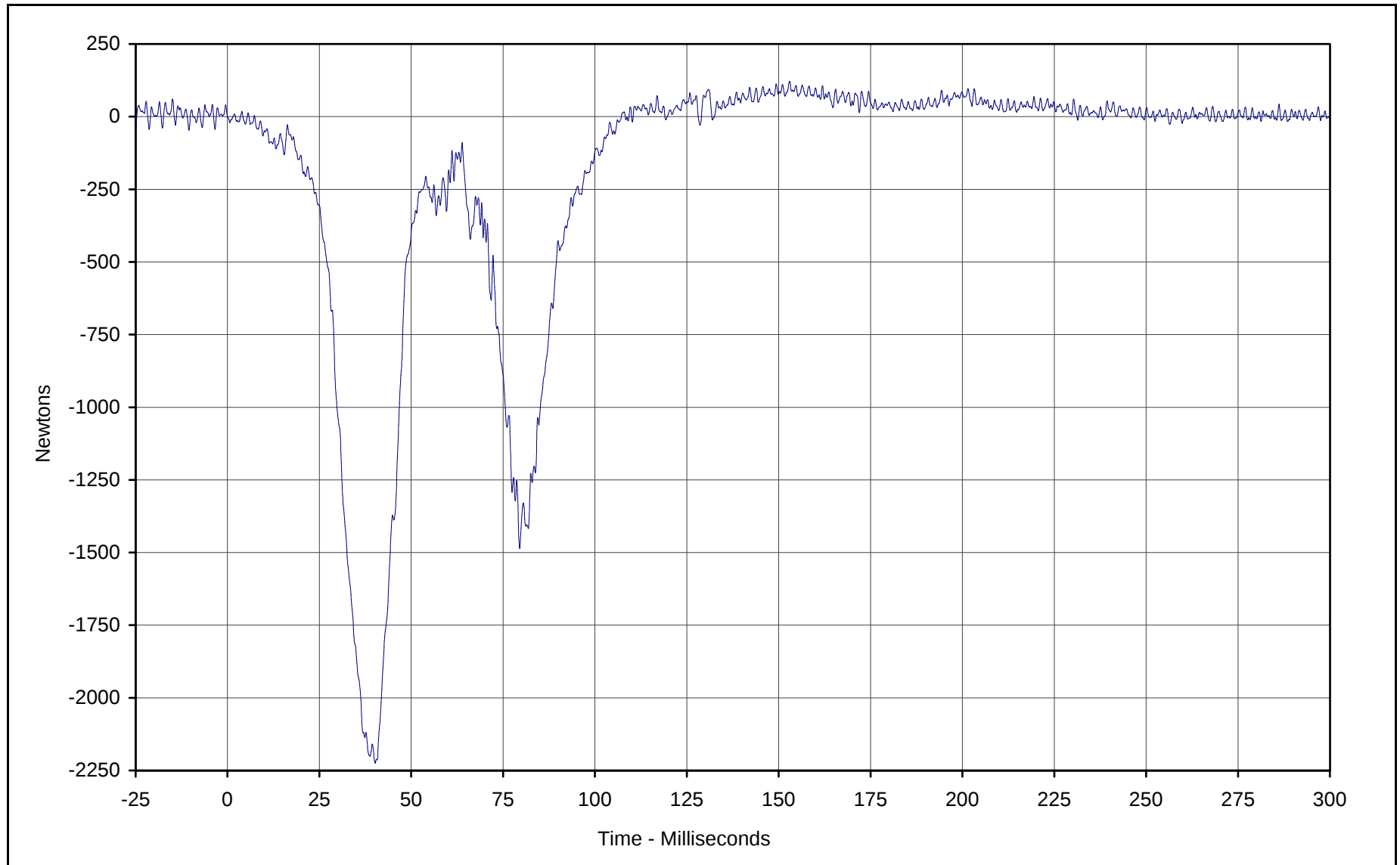




Curve Description: Driver Left Lower Tibia Moment Y  
Maximum Value: 26.4 at 35.4 Milliseconds  
Minimum Value: -31.1 at 70.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-030

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

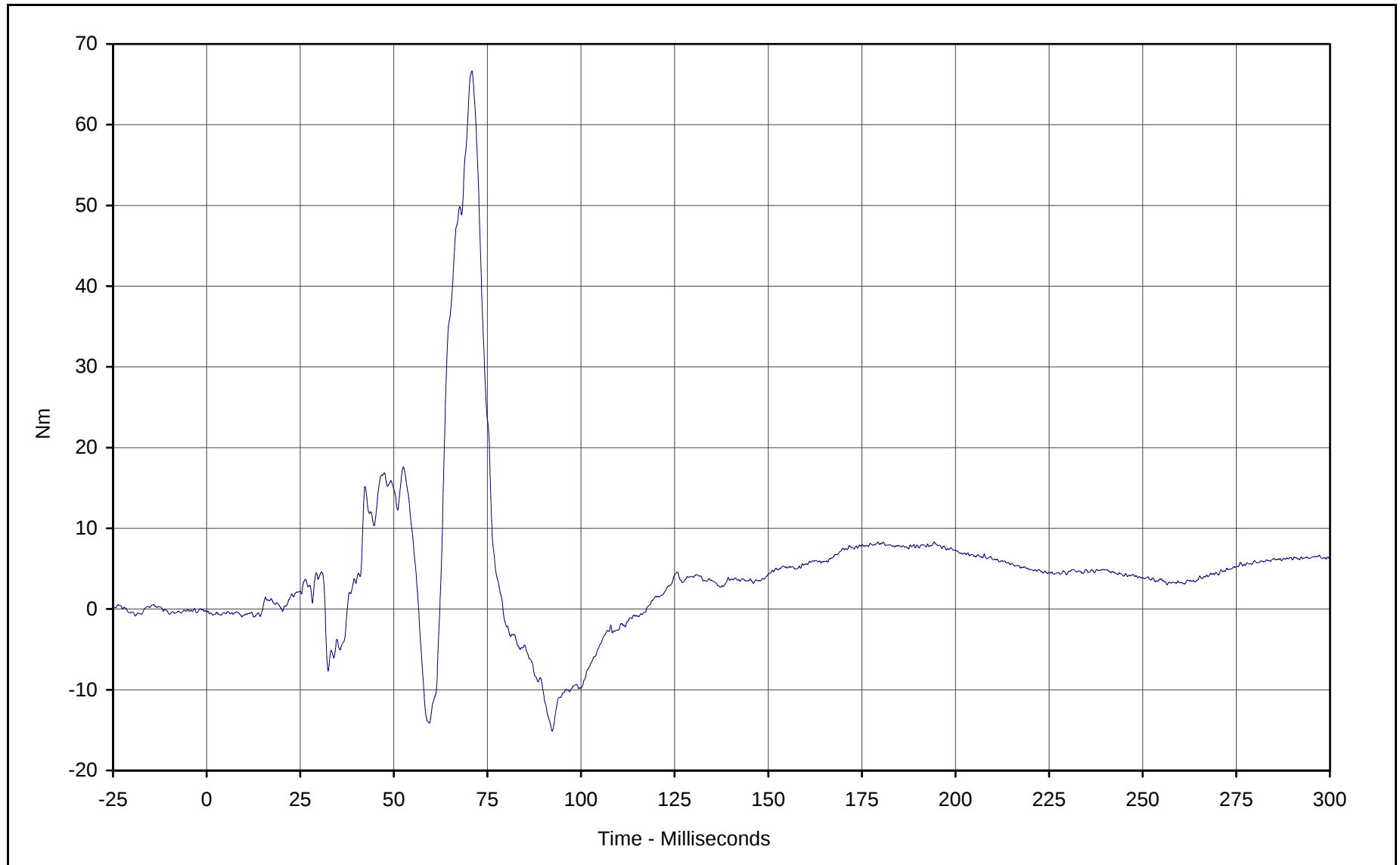




Curve Description: Driver Left Lower Tibia Force Z  
Maximum Value: 121.9 at 153.0 Milliseconds  
Minimum Value: -2224.9 at 40.2 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-031

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



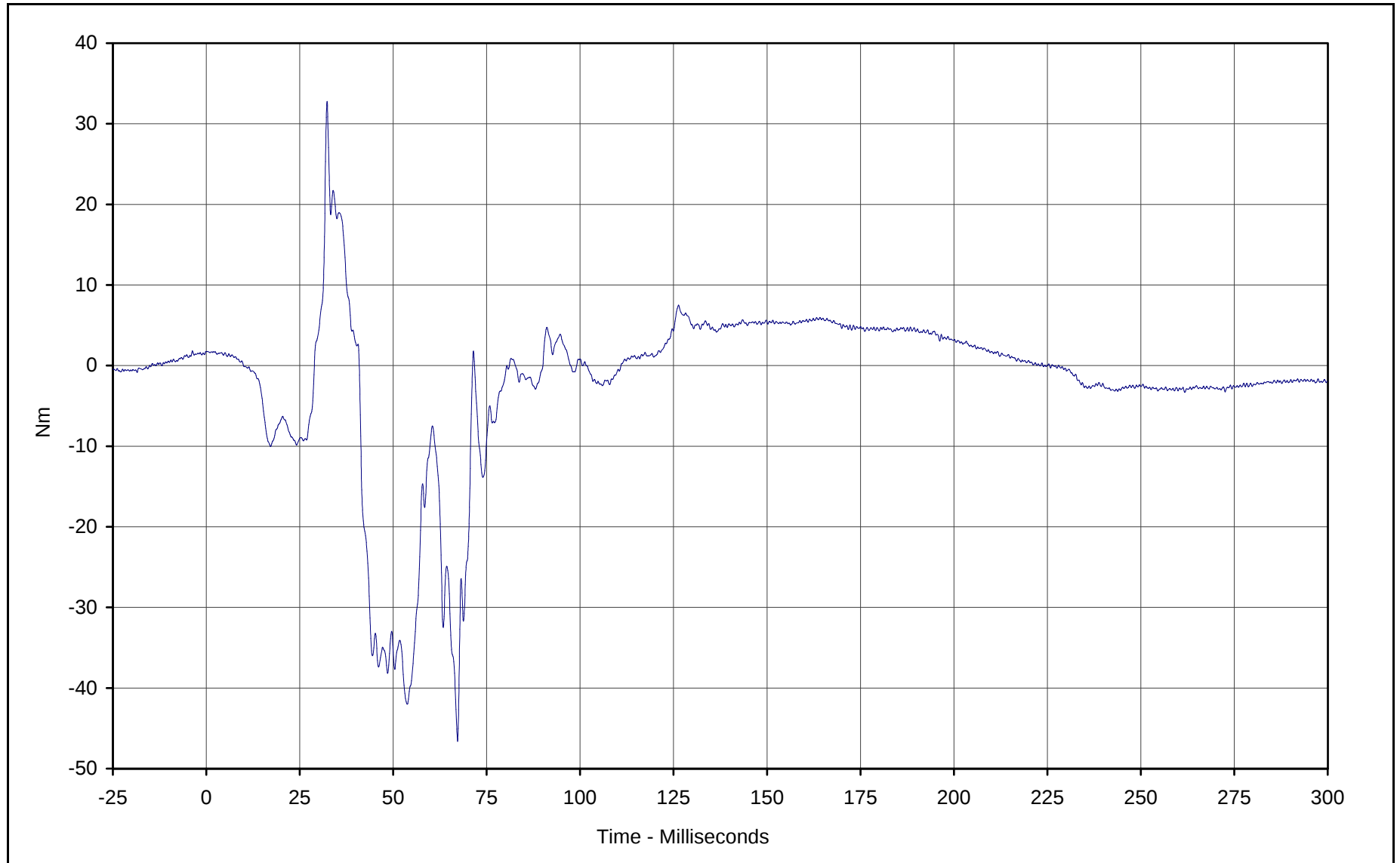


Curve Description: Driver Right Lower Tibia Moment X  
Maximum Value: 66.7 at 70.9 Milliseconds  
Minimum Value: -15.1 at 92.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-032

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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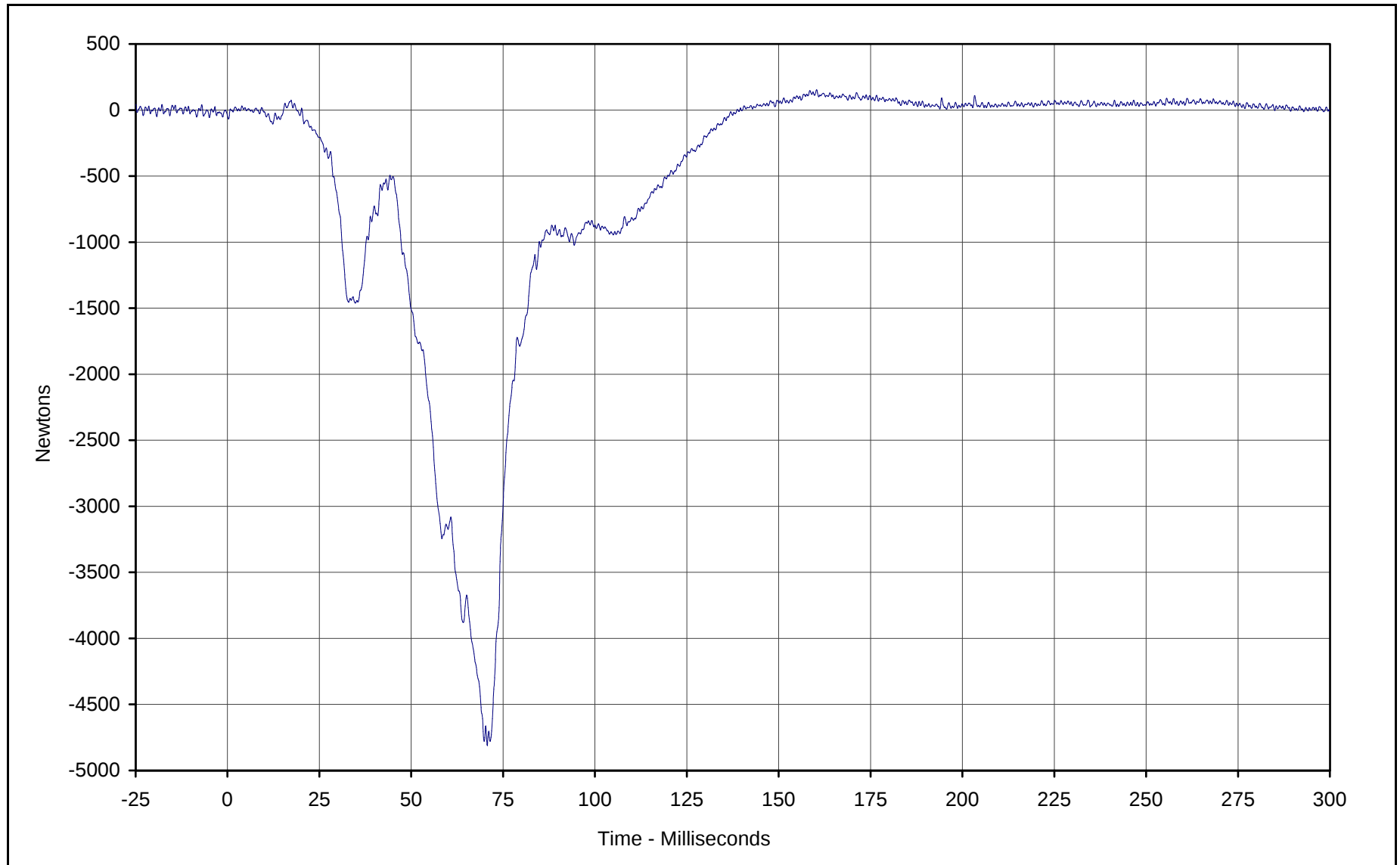


Curve Description: Driver Right Lower Tibia Moment Y  
Maximum Value: 32.8 at 32.3 Milliseconds  
Minimum Value: -46.6 at 67.2 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-033

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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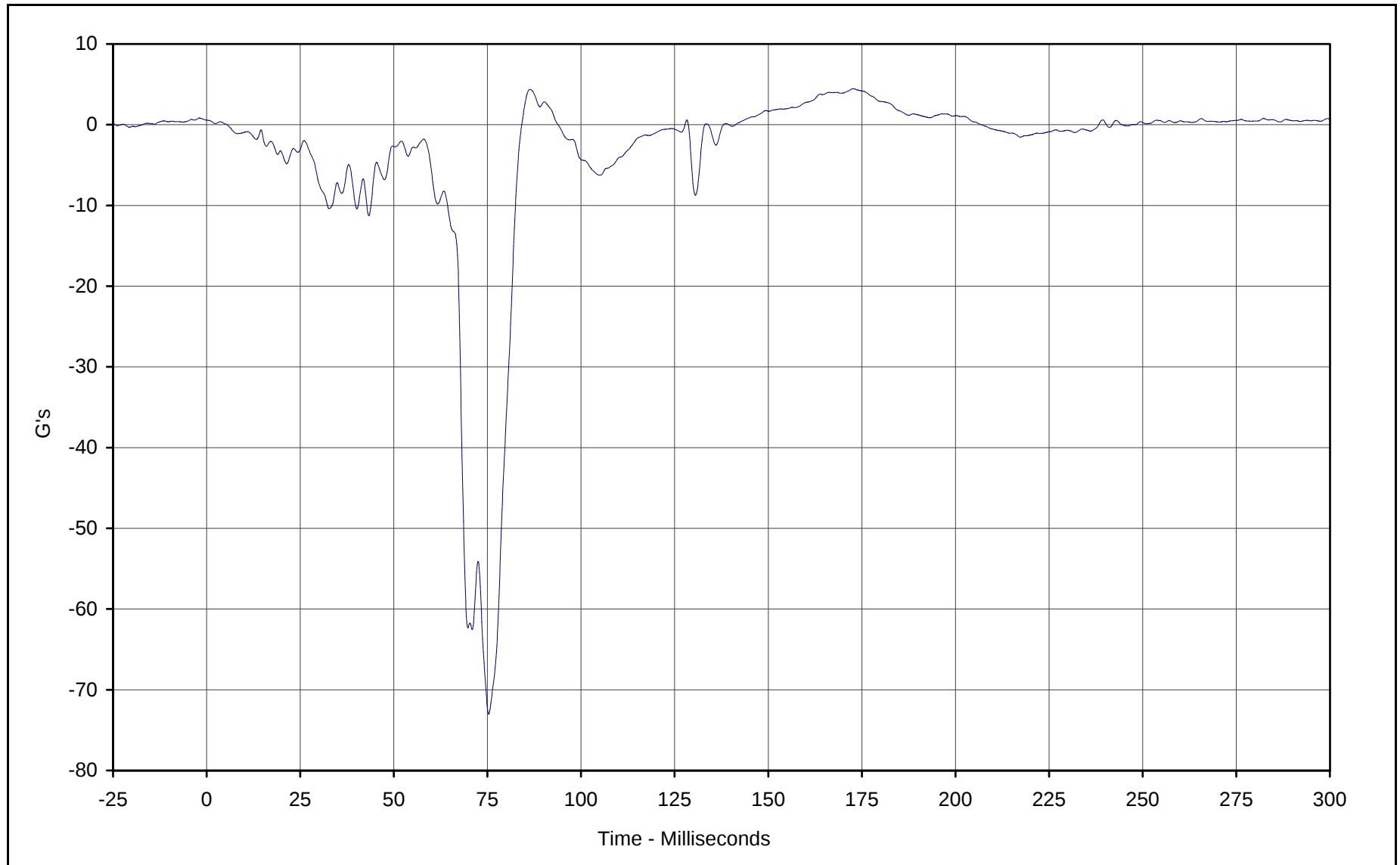


Curve Description: Driver Right Lower Tibia Force Z  
Maximum Value: 152.8 at 160.3 Milliseconds  
Minimum Value: -4811.5 at 70.7 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-034

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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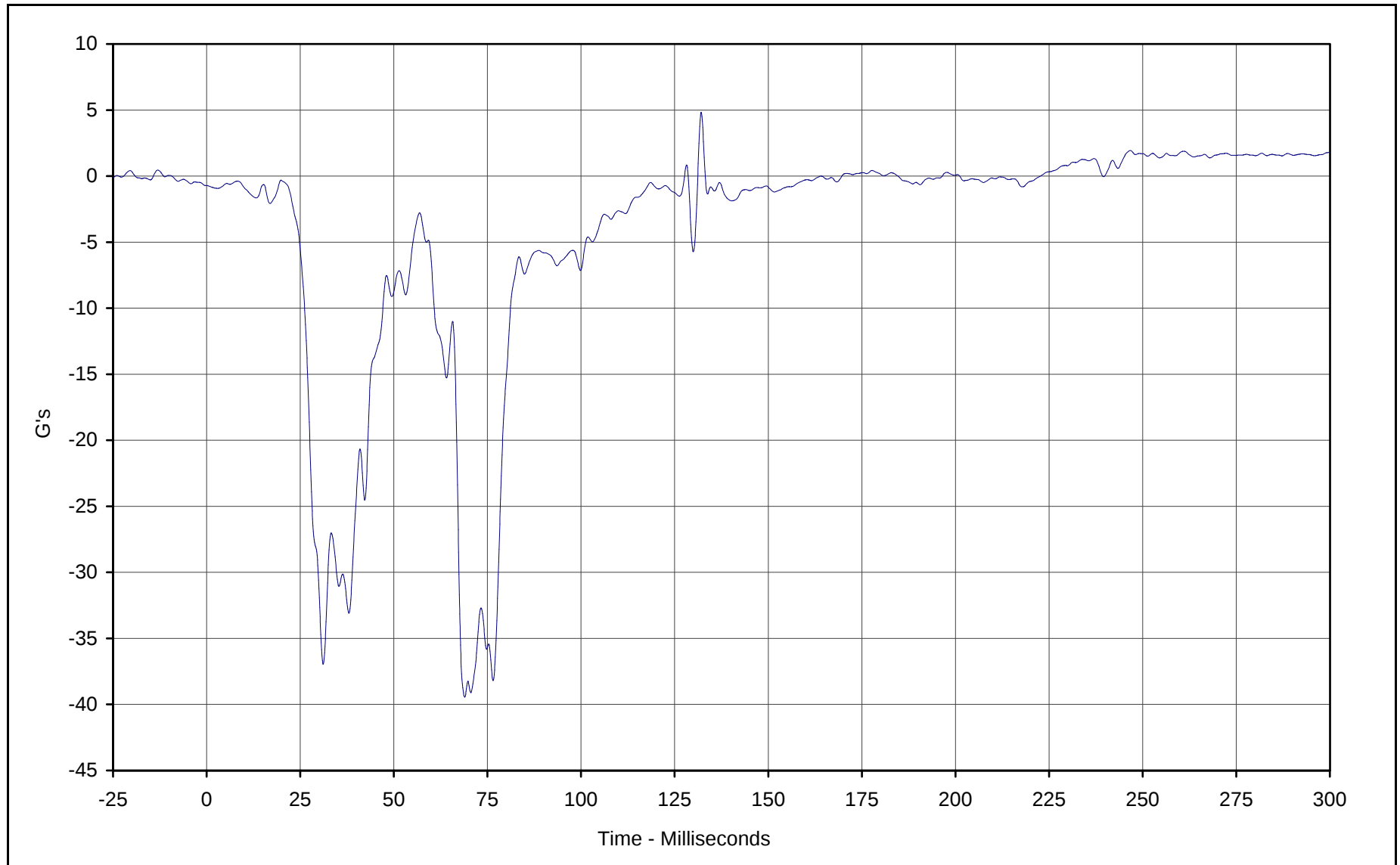
Curve Description: Driver Left Foot Aft X  
Maximum Value: 4.5 at 172.7 Milliseconds  
Minimum Value: -73.0 at 75.4 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-035

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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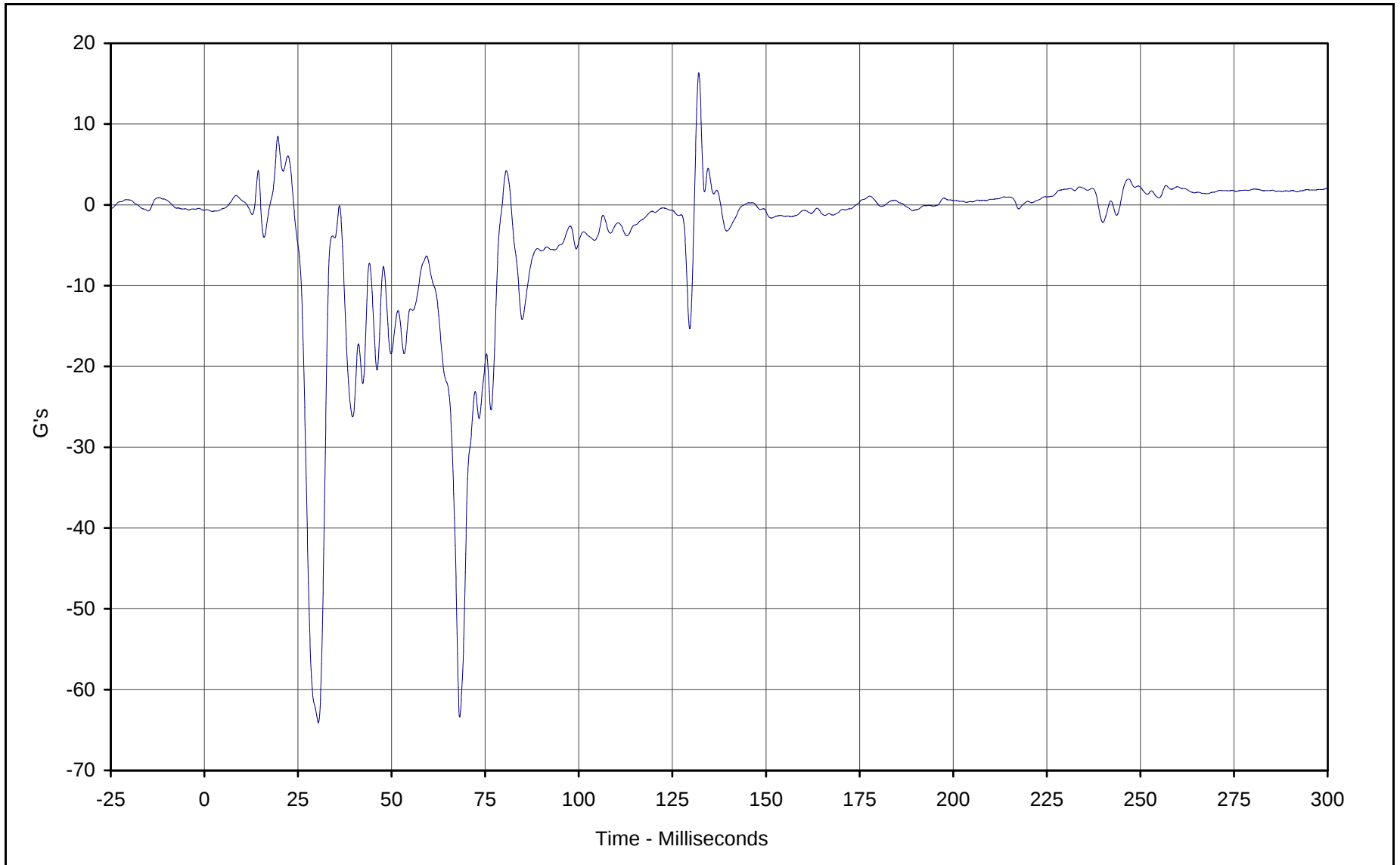
Curve Description: Driver Left Foot Aft Z  
Maximum Value: 4.8 at 132.1 Milliseconds  
Minimum Value: -39.4 at 68.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-036

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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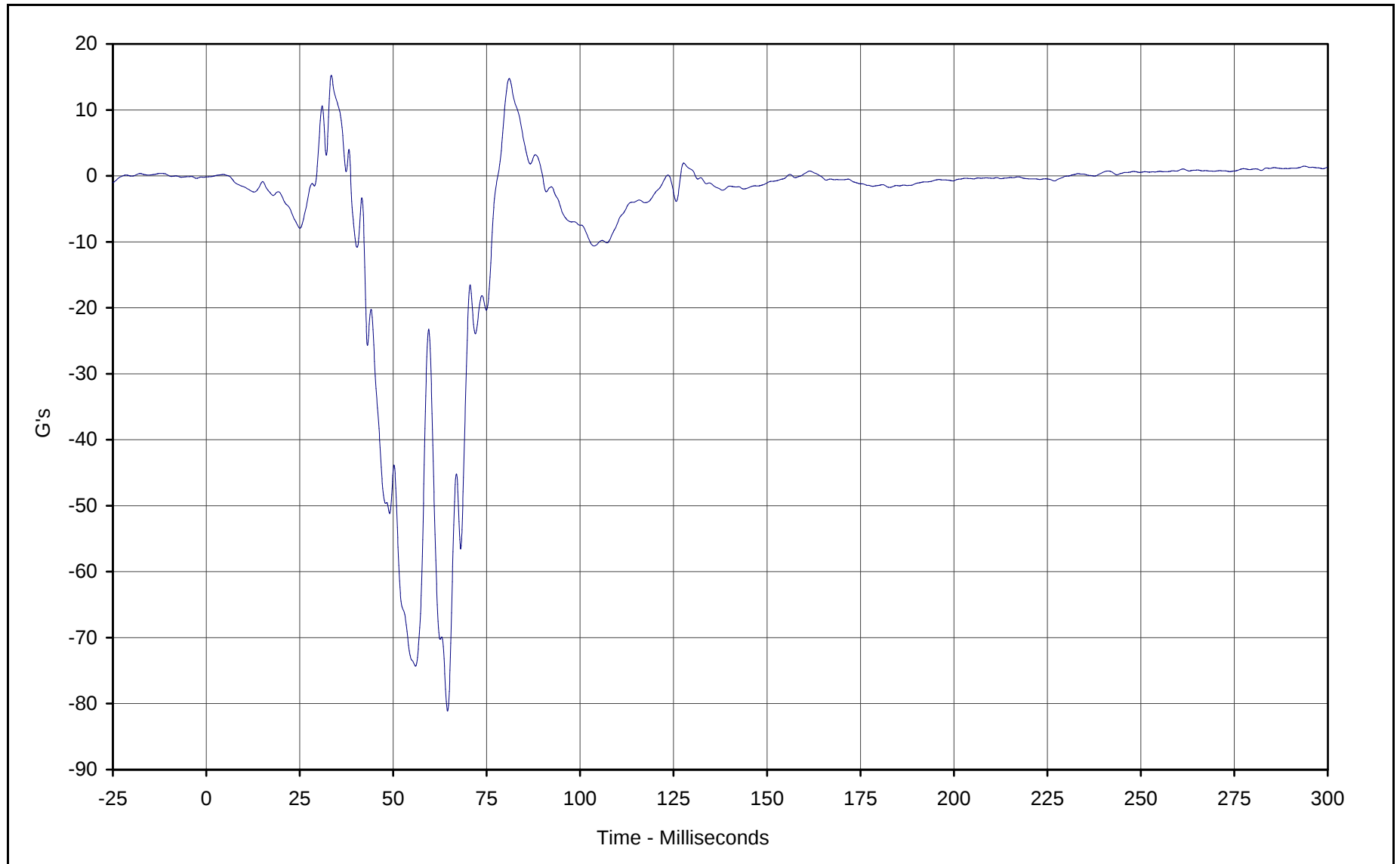
Curve Description: Driver Left Foot Fore Z  
Maximum Value: 16.4 at 132.0 Milliseconds  
Minimum Value: -64.1 at 30.4 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-037

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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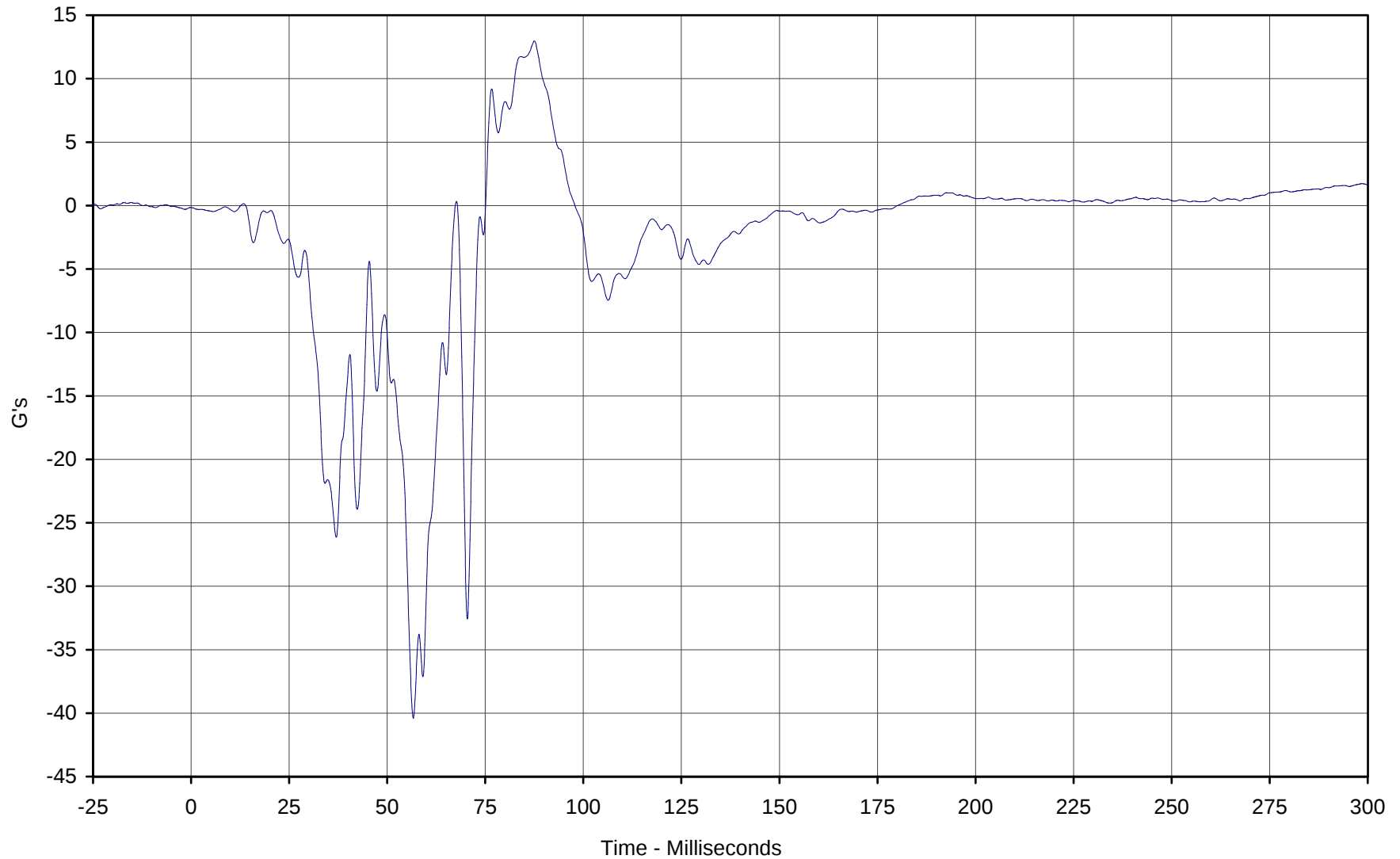
Curve Description: Driver Right Foot Aft X  
Maximum Value: 15.2 at 33.4 Milliseconds  
Minimum Value: -81.1 at 64.5 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-038

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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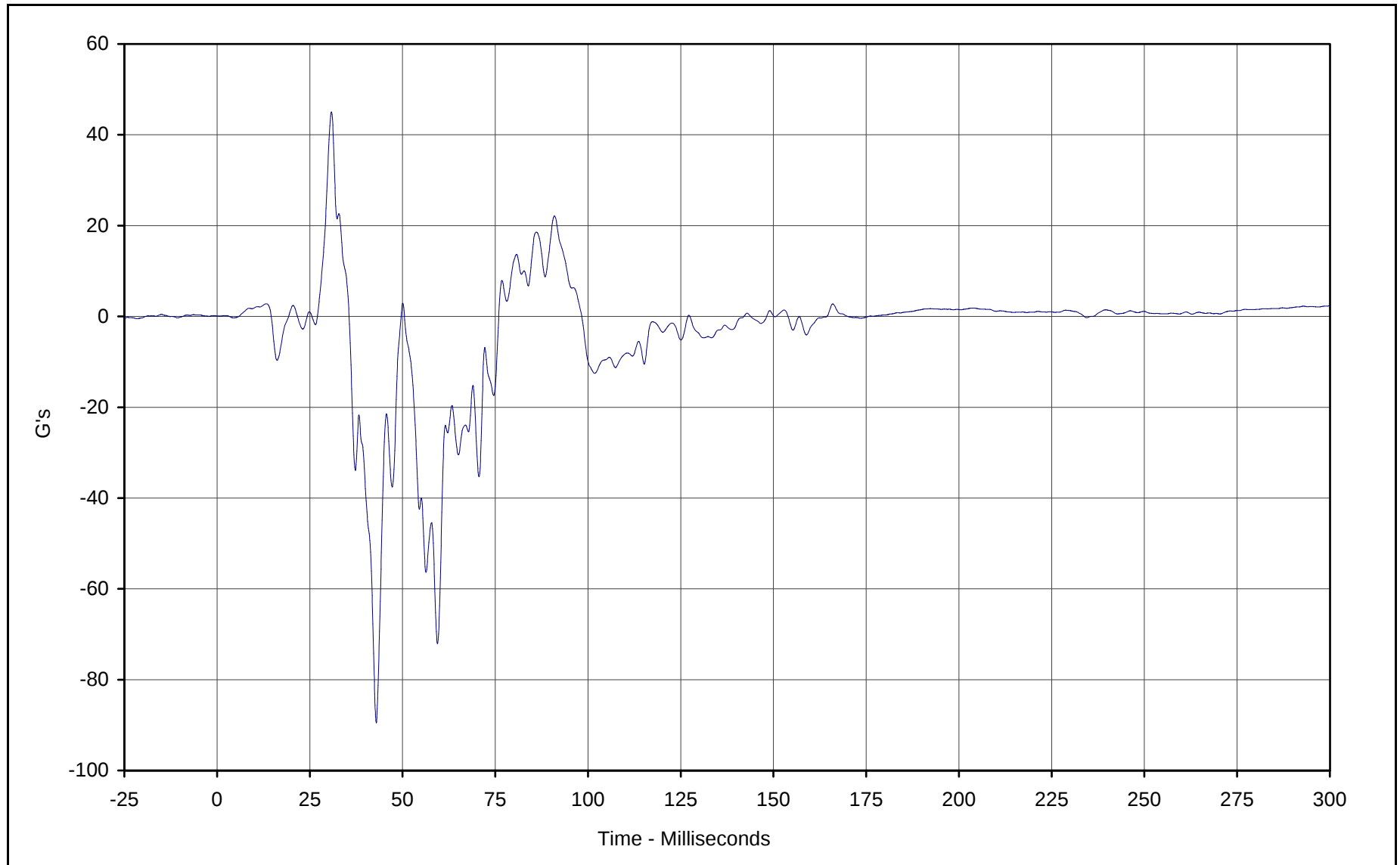


Curve Description: Driver Right Foot Aft Z  
Maximum Value: 13.0 at 87.5 Milliseconds  
Minimum Value: -40.4 at 56.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-039

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

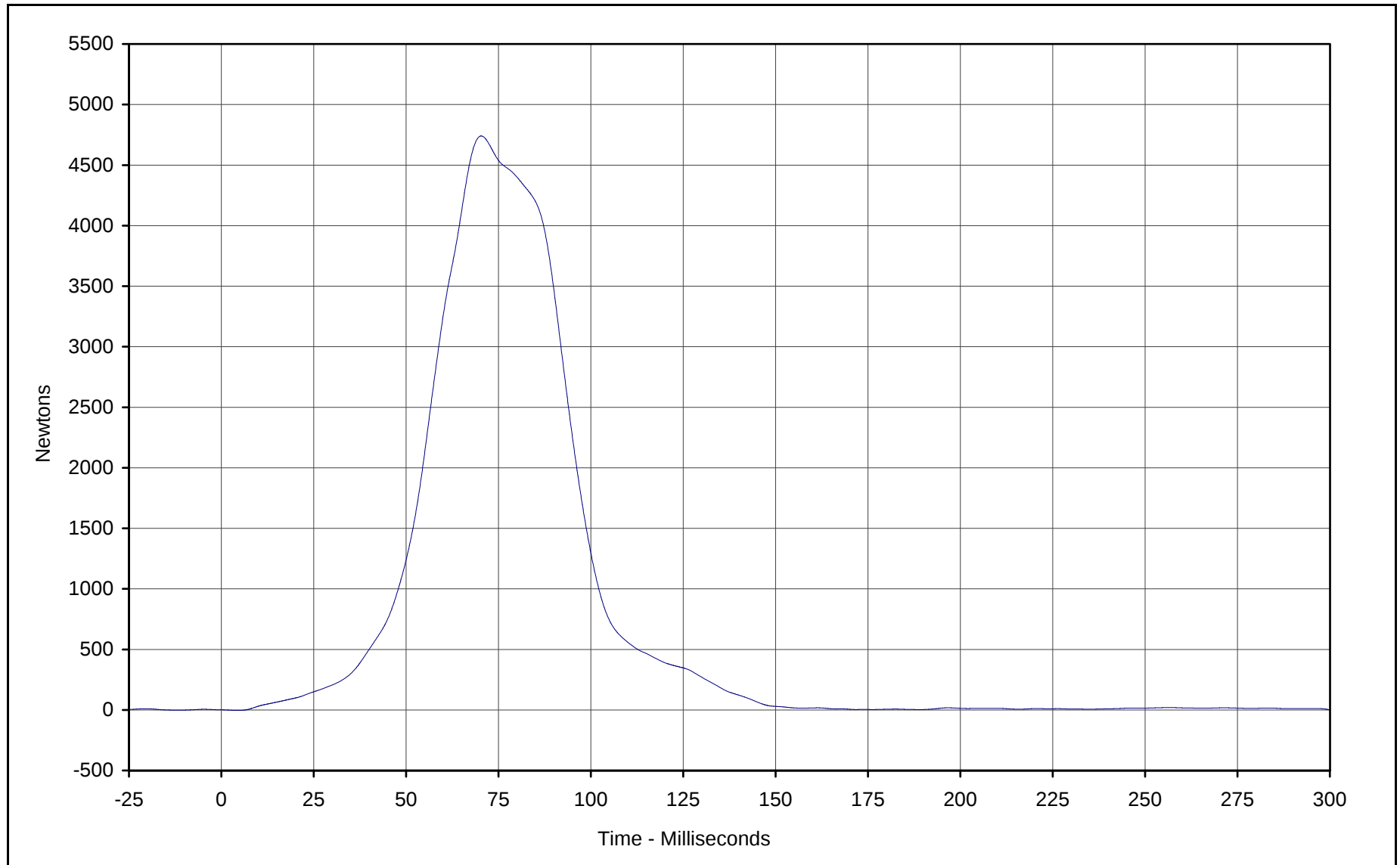


Curve Description: Driver Right Foot Fore Z  
Maximum Value: 45.1 at 30.8 Milliseconds  
Minimum Value: -89.5 at 42.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-040

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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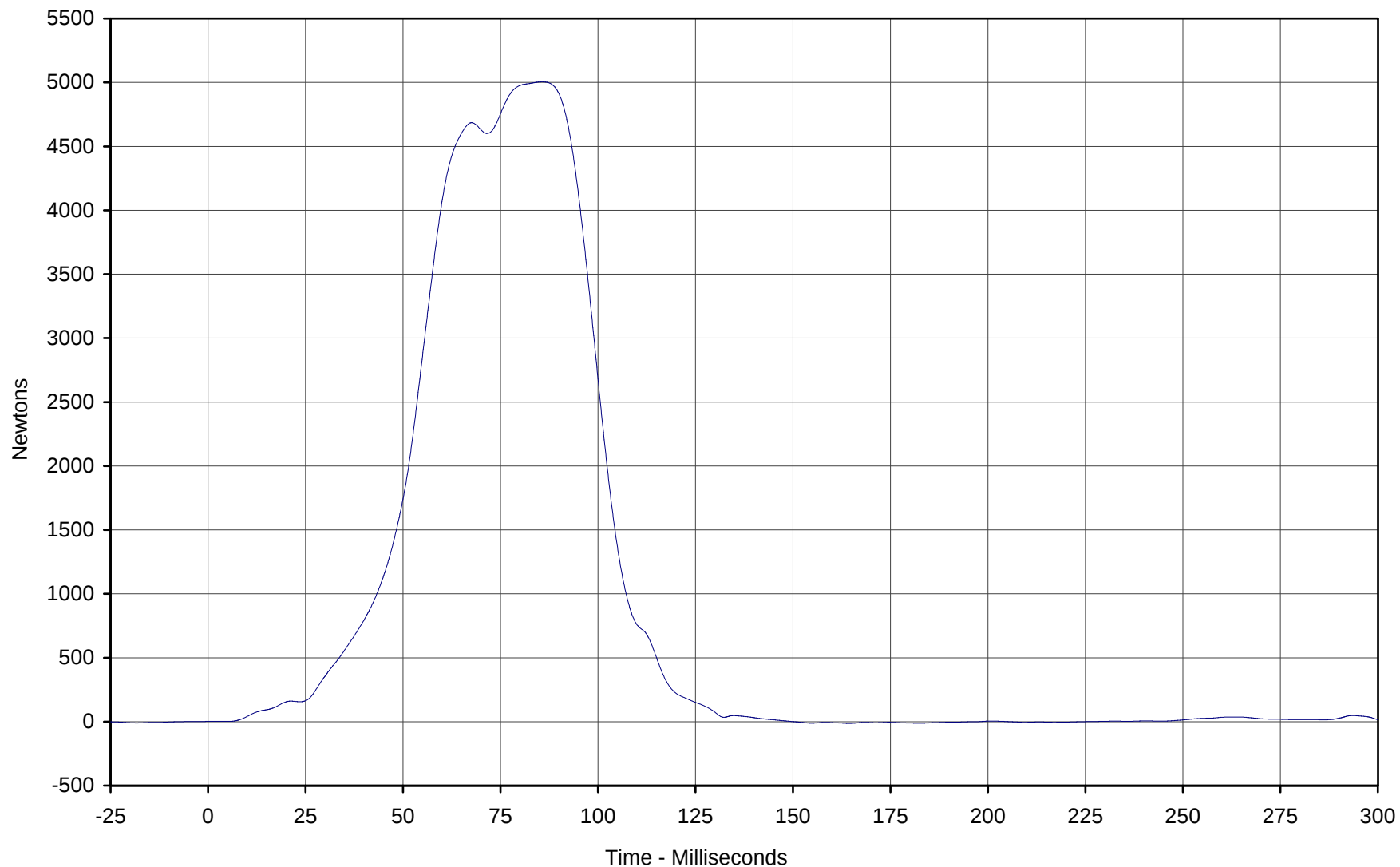
Curve Description: Driver Lap Belt Force  
Maximum Value: 4740.4 at 70.3 Milliseconds  
Minimum Value: -3.9 at 4.6 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-041

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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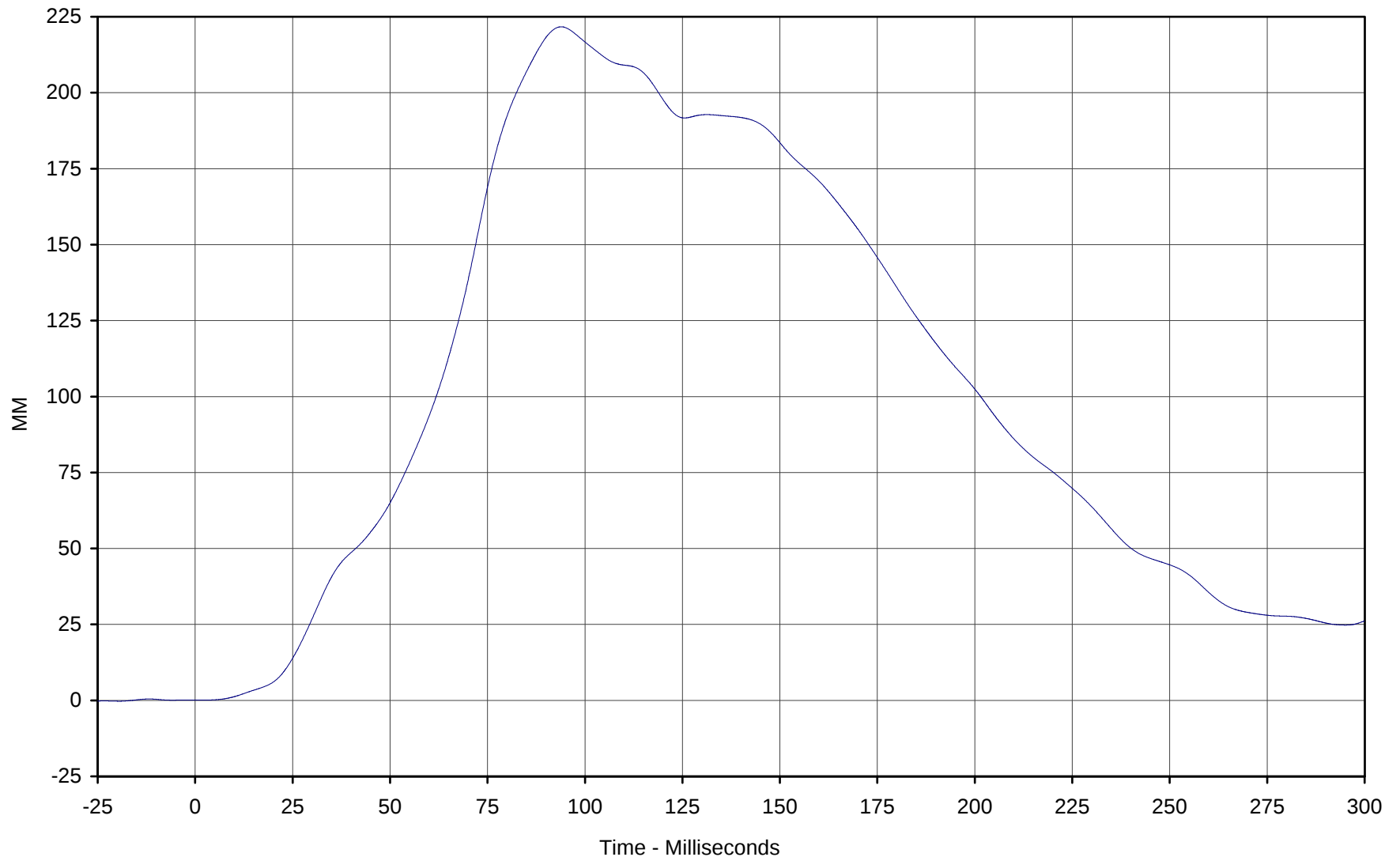
Curve Description: Driver Shoulder Belt Force  
Maximum Value: 5004.7 at 85.6 Milliseconds  
Minimum Value: -13.6 at 164.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-042

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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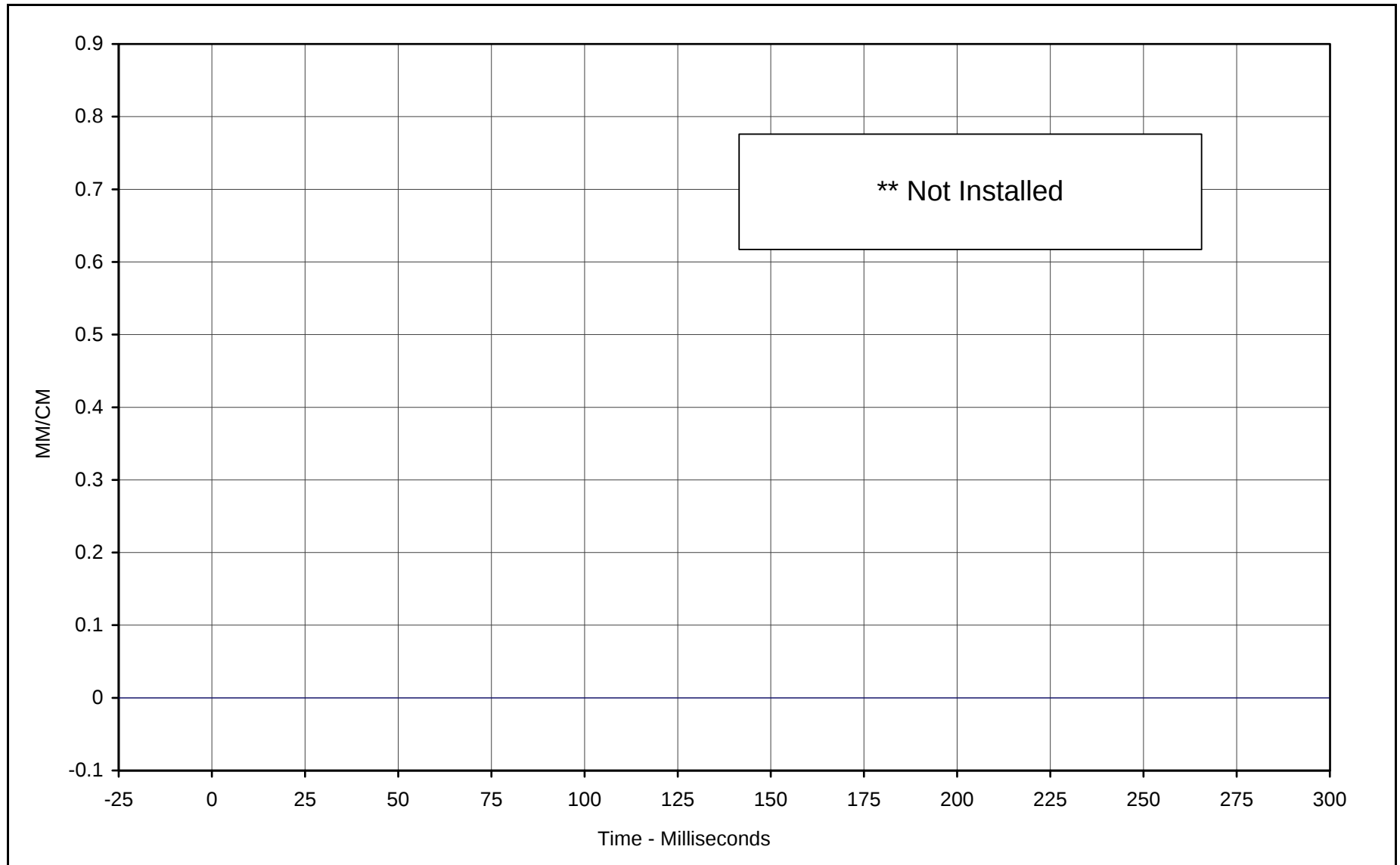


Curve Description: Driver Shoulder Belt Pullout  
Maximum Value: 221.7 at 93.9 Milliseconds  
Minimum Value: 0.1 at 2.2 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-043

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Driver Shoulder Belt Elongation \*\*

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Maximum Value: 0.0 at 0.0 Milliseconds

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

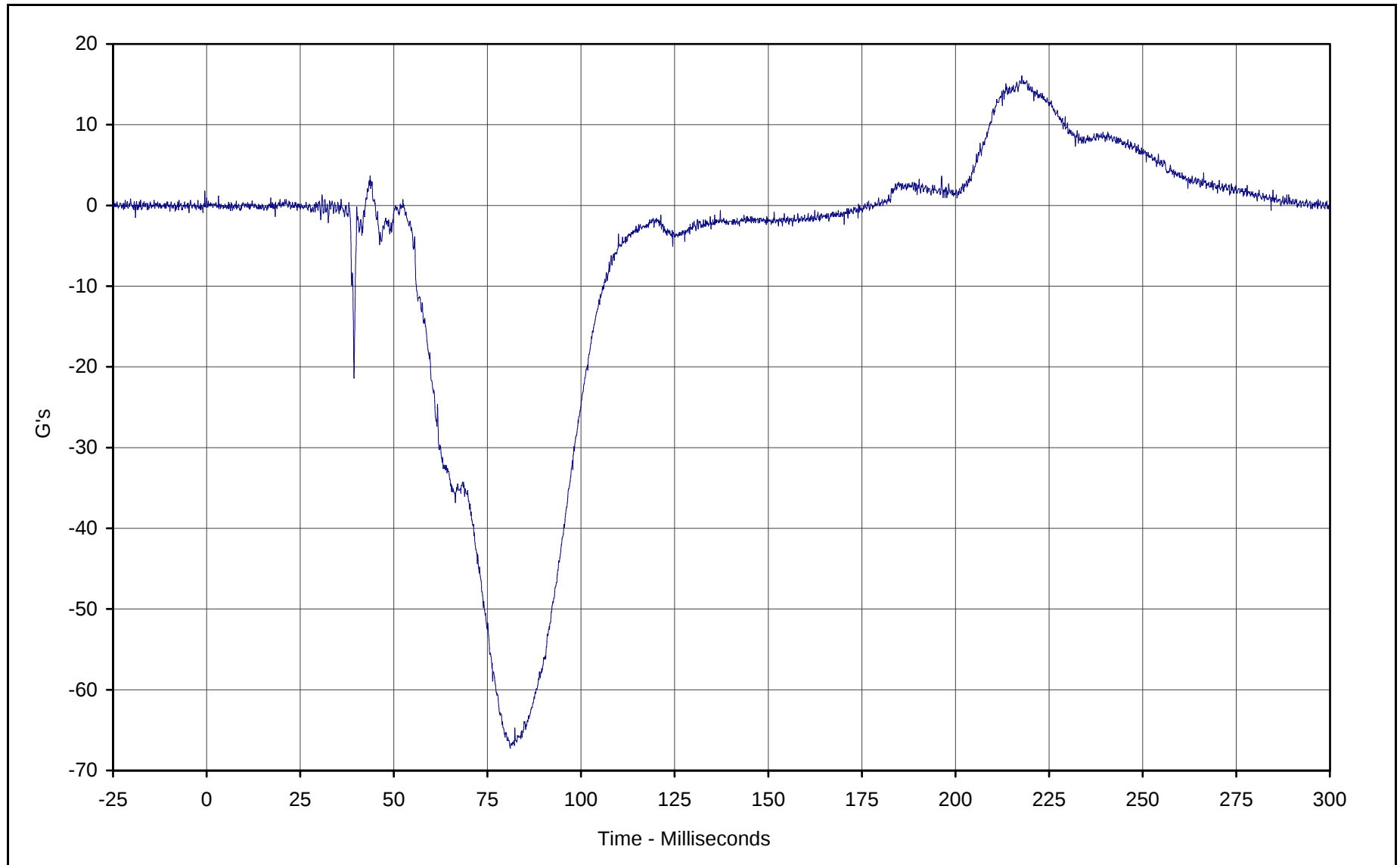
Date of Test: 01/30/01

Curve Number: FIL-044

\*\* Not installed



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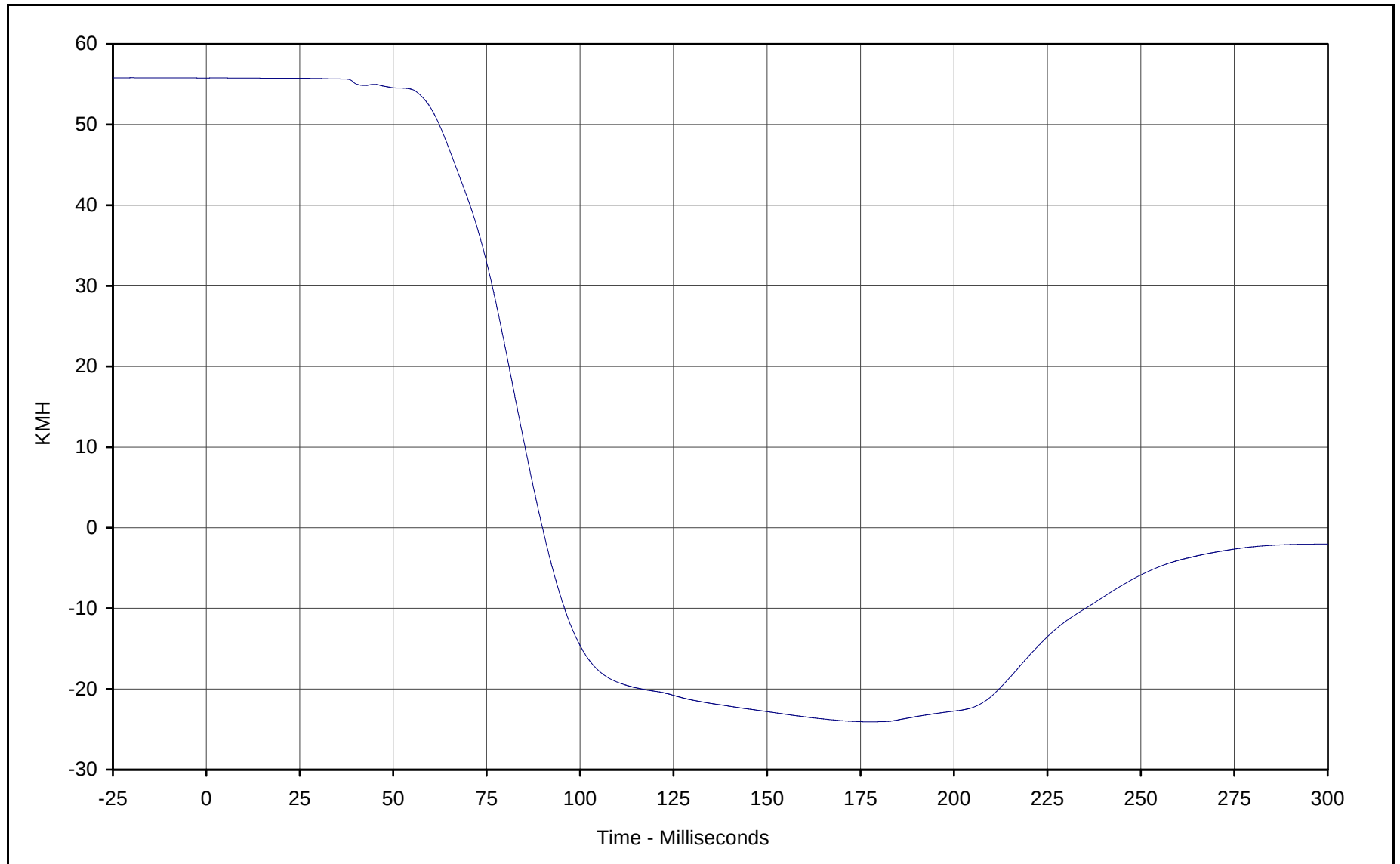
Curve Description: Passenger Head Primary X  
Maximum Value: 16.0 at 217.7 Milliseconds  
Minimum Value: -67.2 at 81.1 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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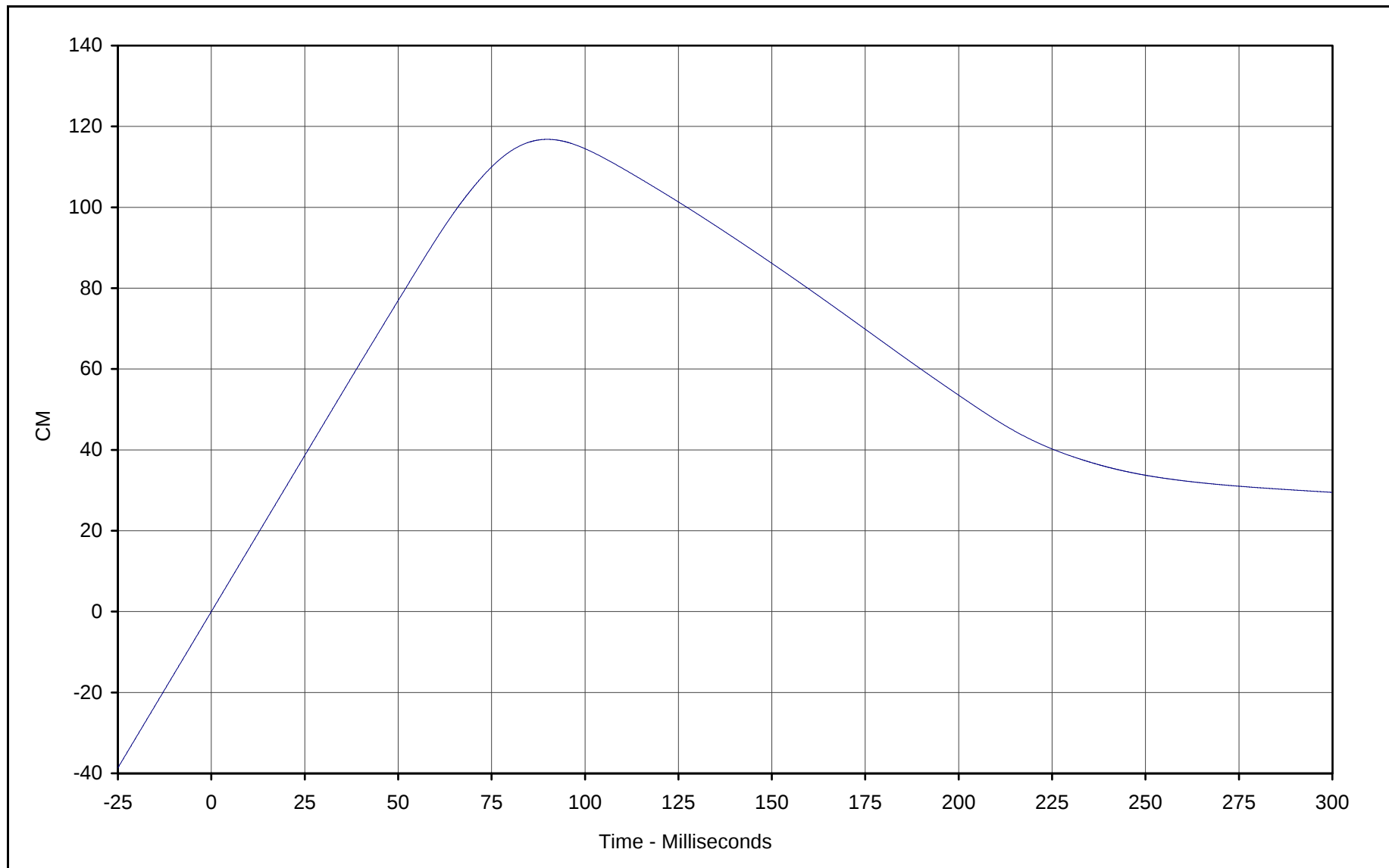


Curve Description: Passenger Head Primary X Velocity  
Maximum Value: 55.8 at 3.6 Milliseconds  
Minimum Value: -24.1 at 178.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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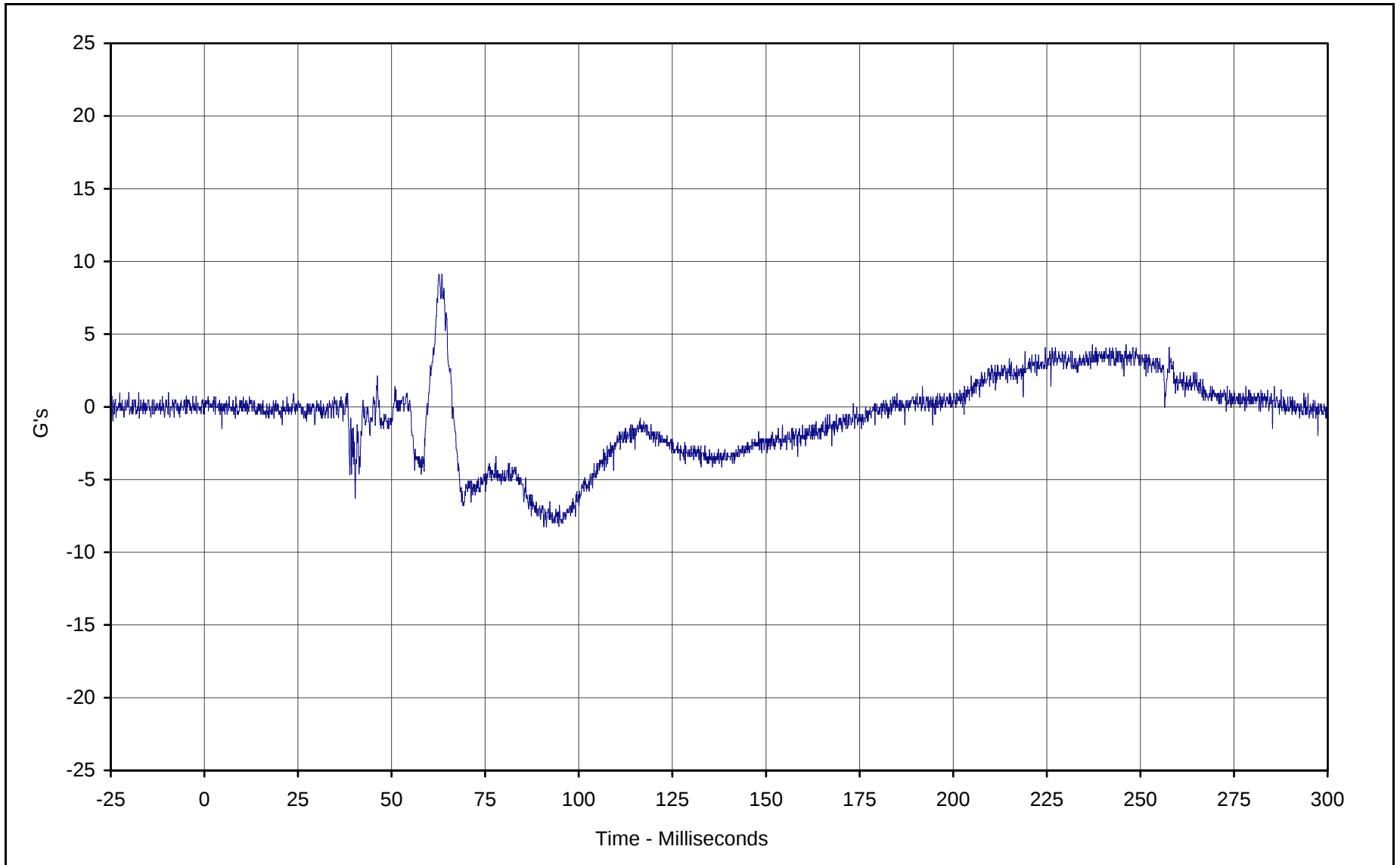


Curve Description: Passenger Head Primary X Displ.  
Maximum Value: 116.8 at 89.9 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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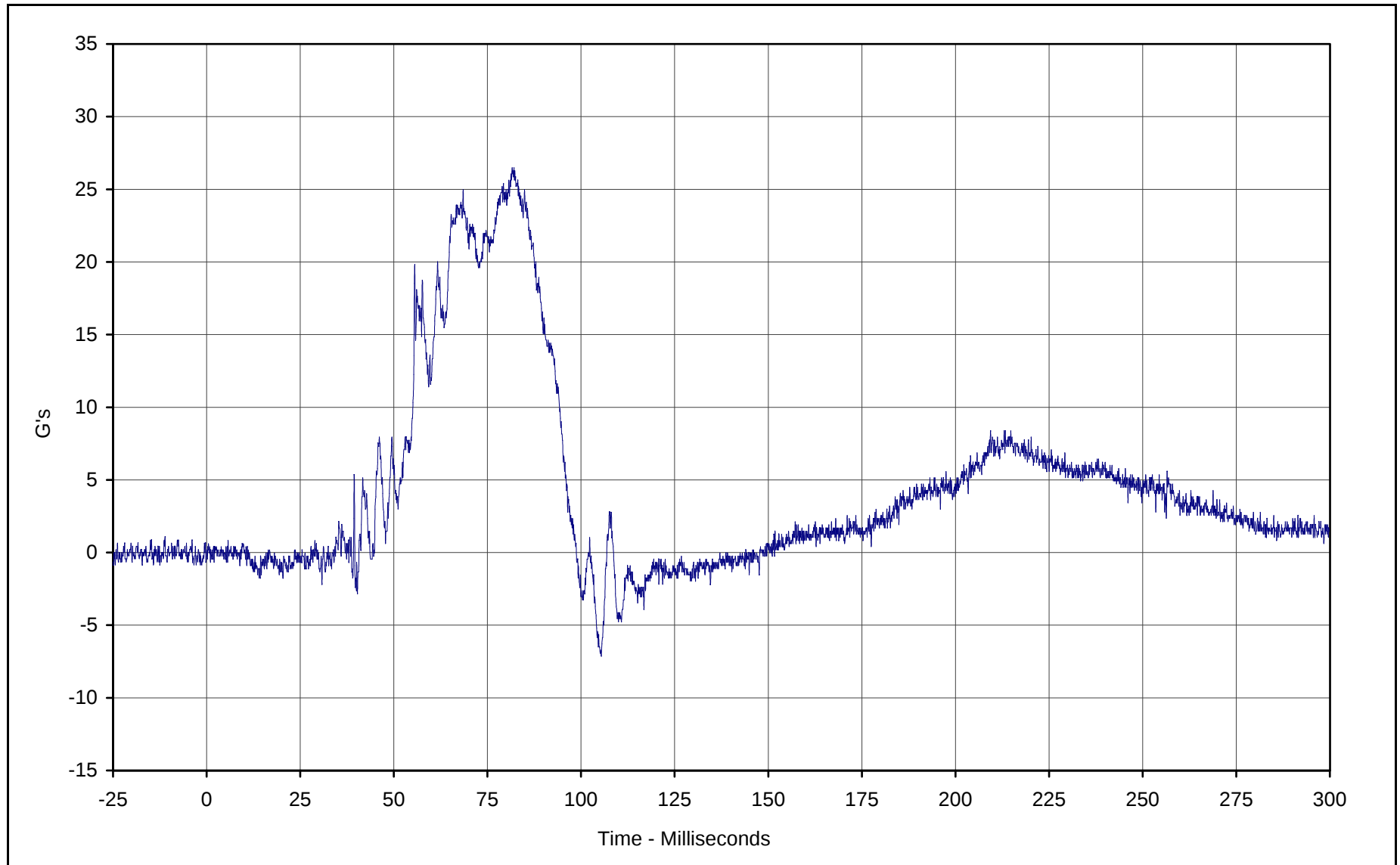


Curve Description: Passenger Head Primary Y  
Maximum Value: 9.1 at 62.6 Milliseconds  
Minimum Value: -8.2 at 90.6 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-046

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



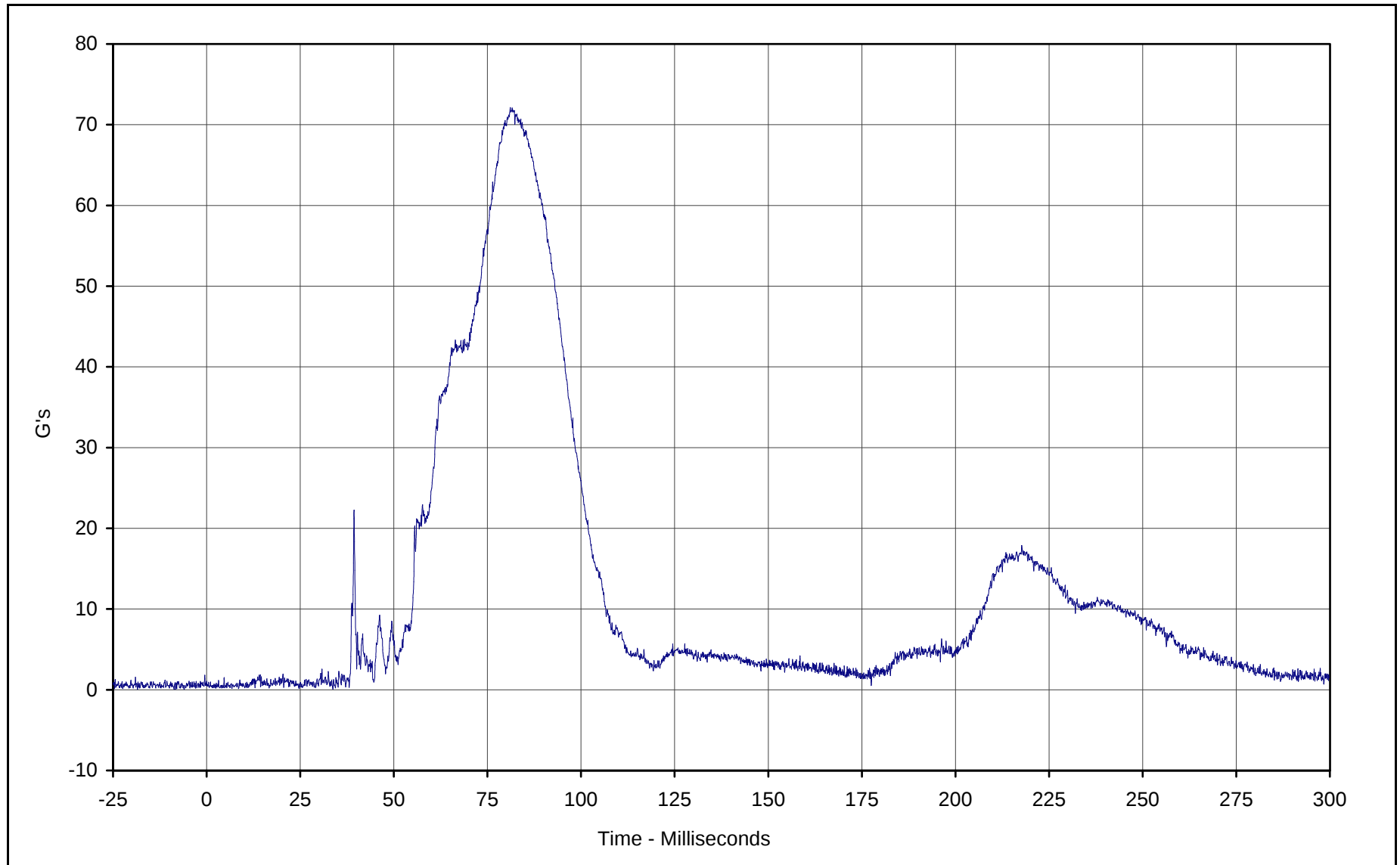
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Curve Description: Passenger Head Primary Z  
Maximum Value: 26.5 at 81.6 Milliseconds  
Minimum Value: -7.1 at 105.4 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-047

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan





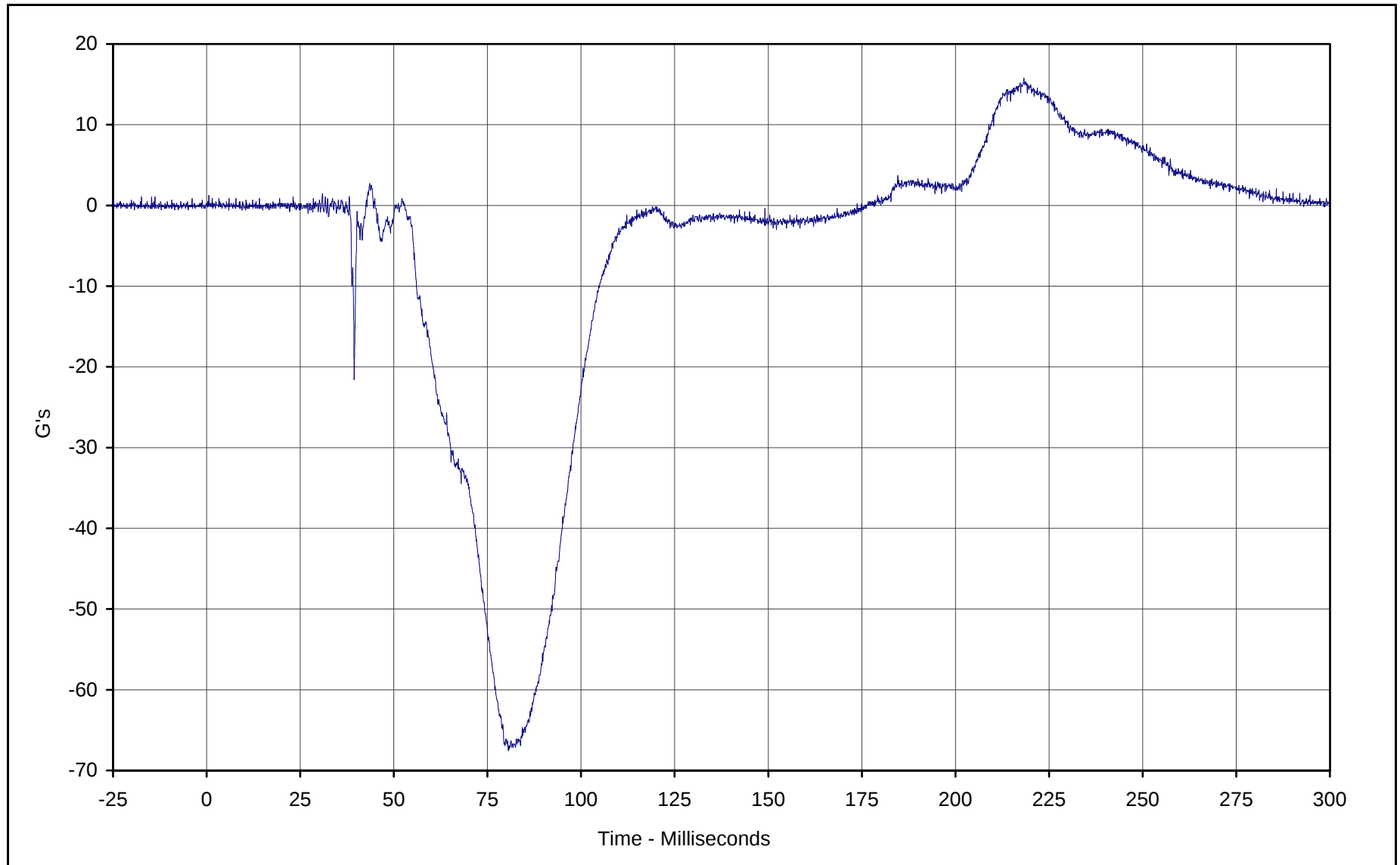
Curve Description: Passenger Head Resultant Primary  
Maximum Value: 72.1 at 81.1 Milliseconds  
Minimum Value: 0.1 at 33.7 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: RES-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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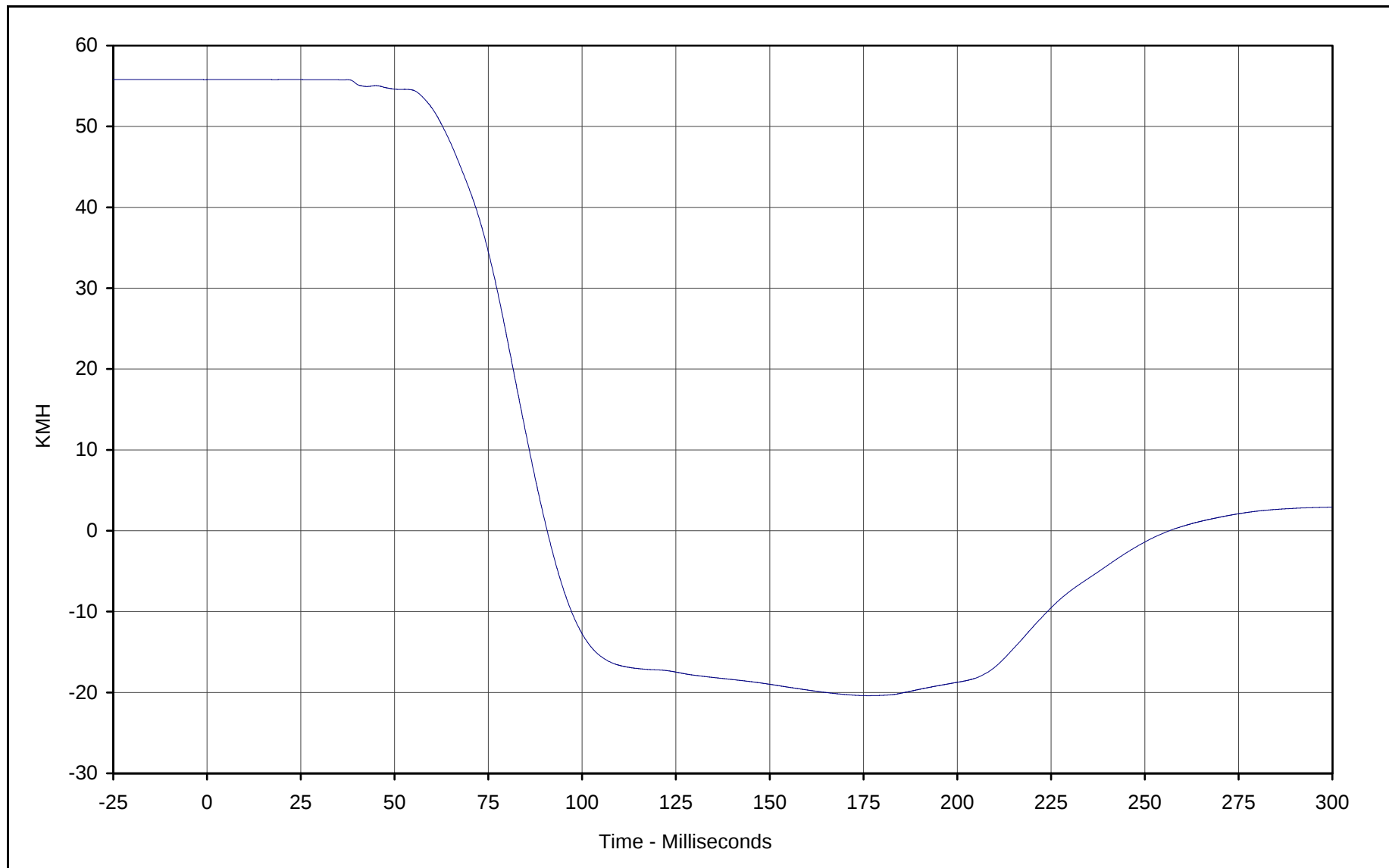
Curve Description: Passenger Head Redundant X  
Maximum Value: 15.8 at 218.3 Milliseconds  
Minimum Value: -67.5 at 80.6 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-048

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Head Redundant X Velocity

Maximum Value: 55.8 at 7.8 Milliseconds

Minimum Value: -20.4 at 176.4 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

Curve Number: IN1-048

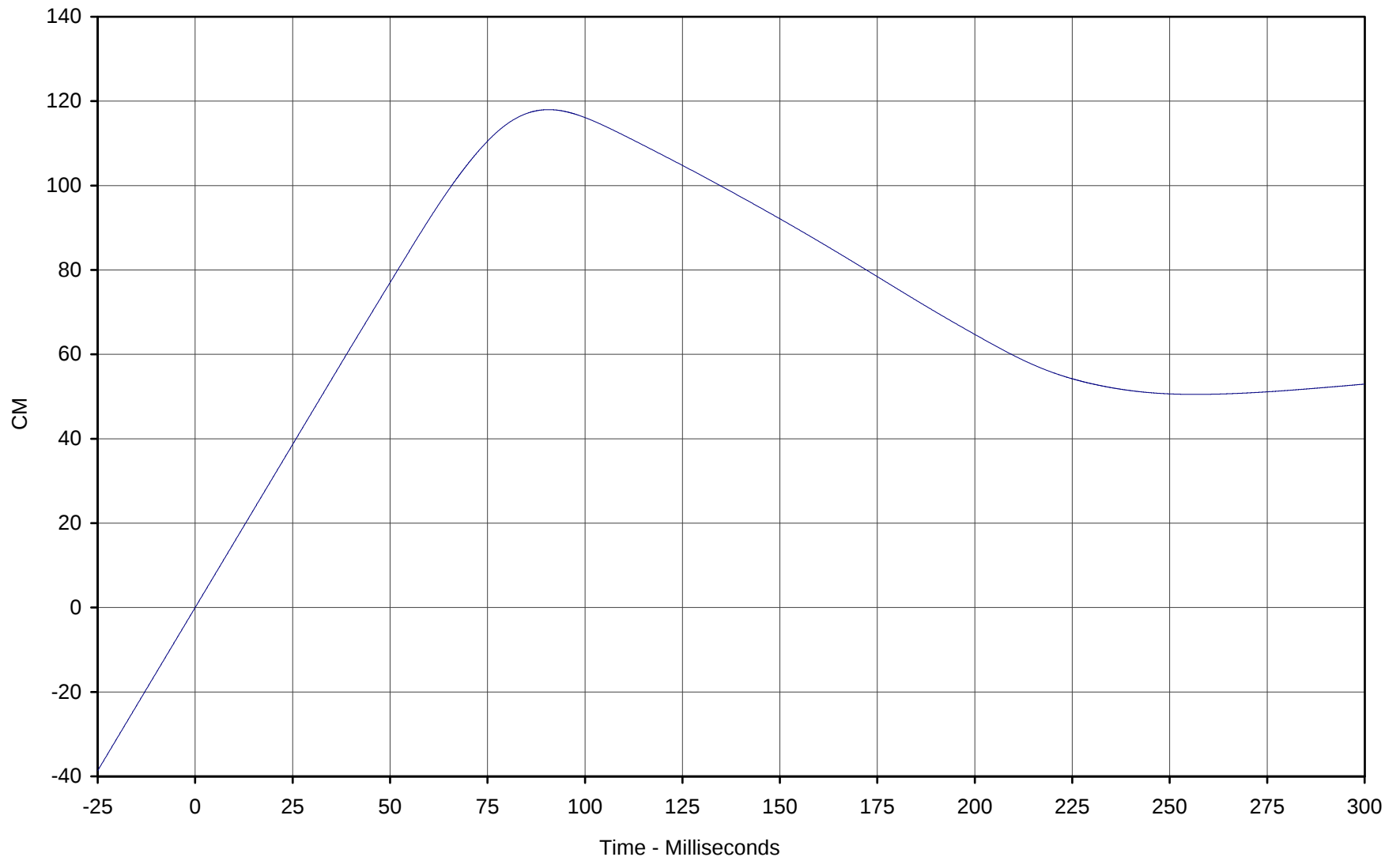
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Head Redundant X Displ.

Maximum Value: 118.0 at 90.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

Curve Number: IN2-048

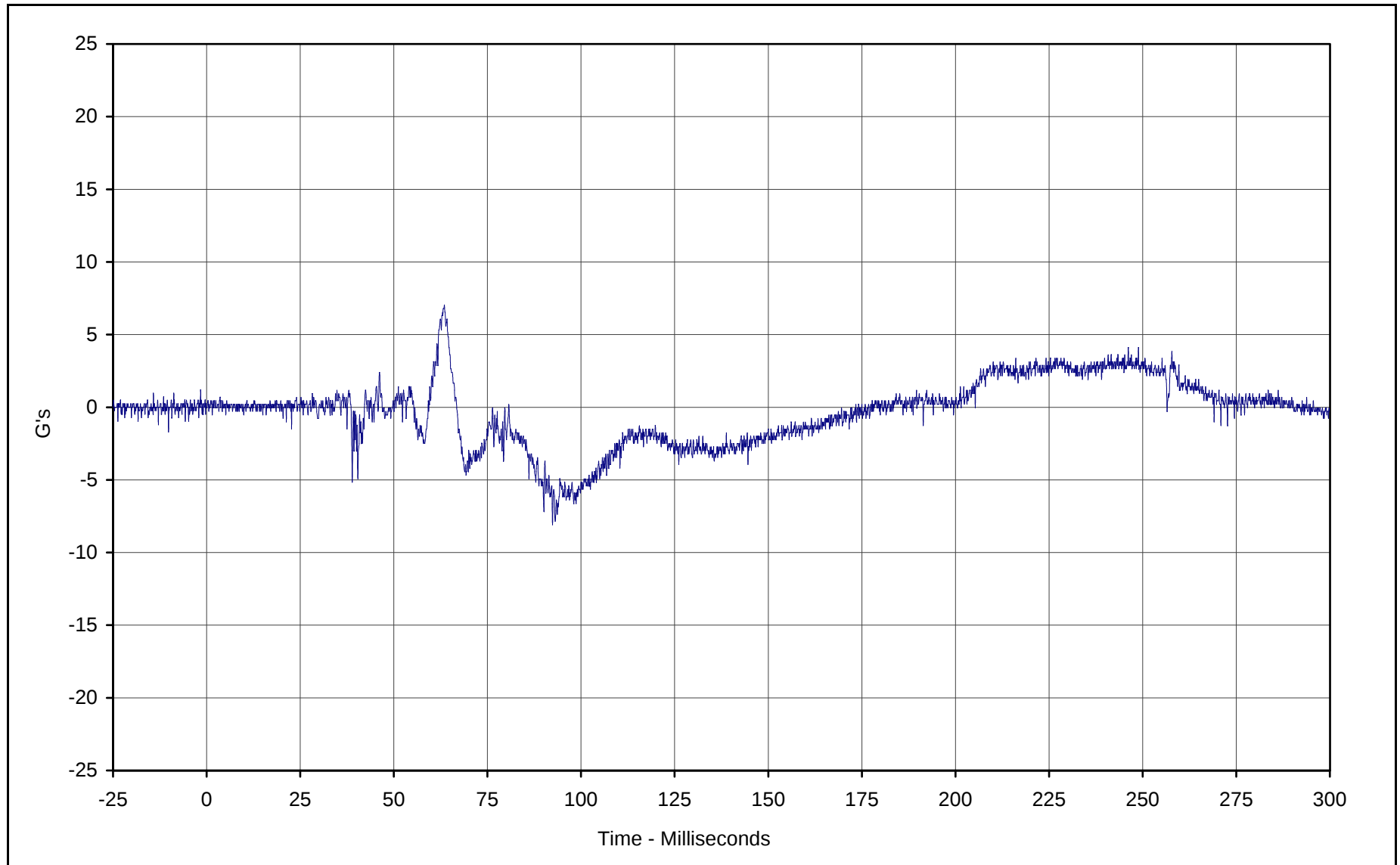
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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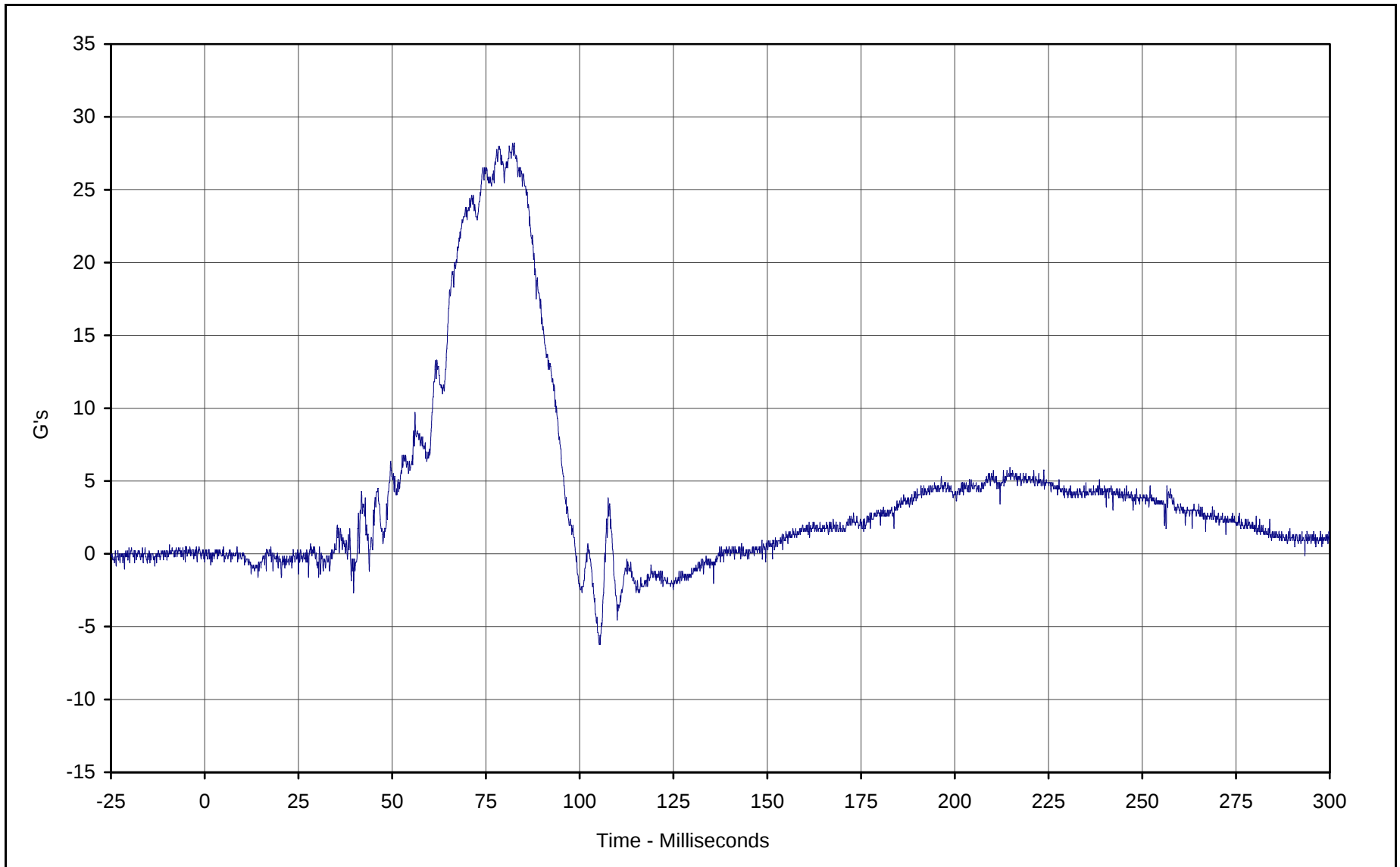
Curve Description: Passenger Head Redundant Y  
Maximum Value: 7.0 at 63.5 Milliseconds  
Minimum Value: -8.1 at 92.4 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-049

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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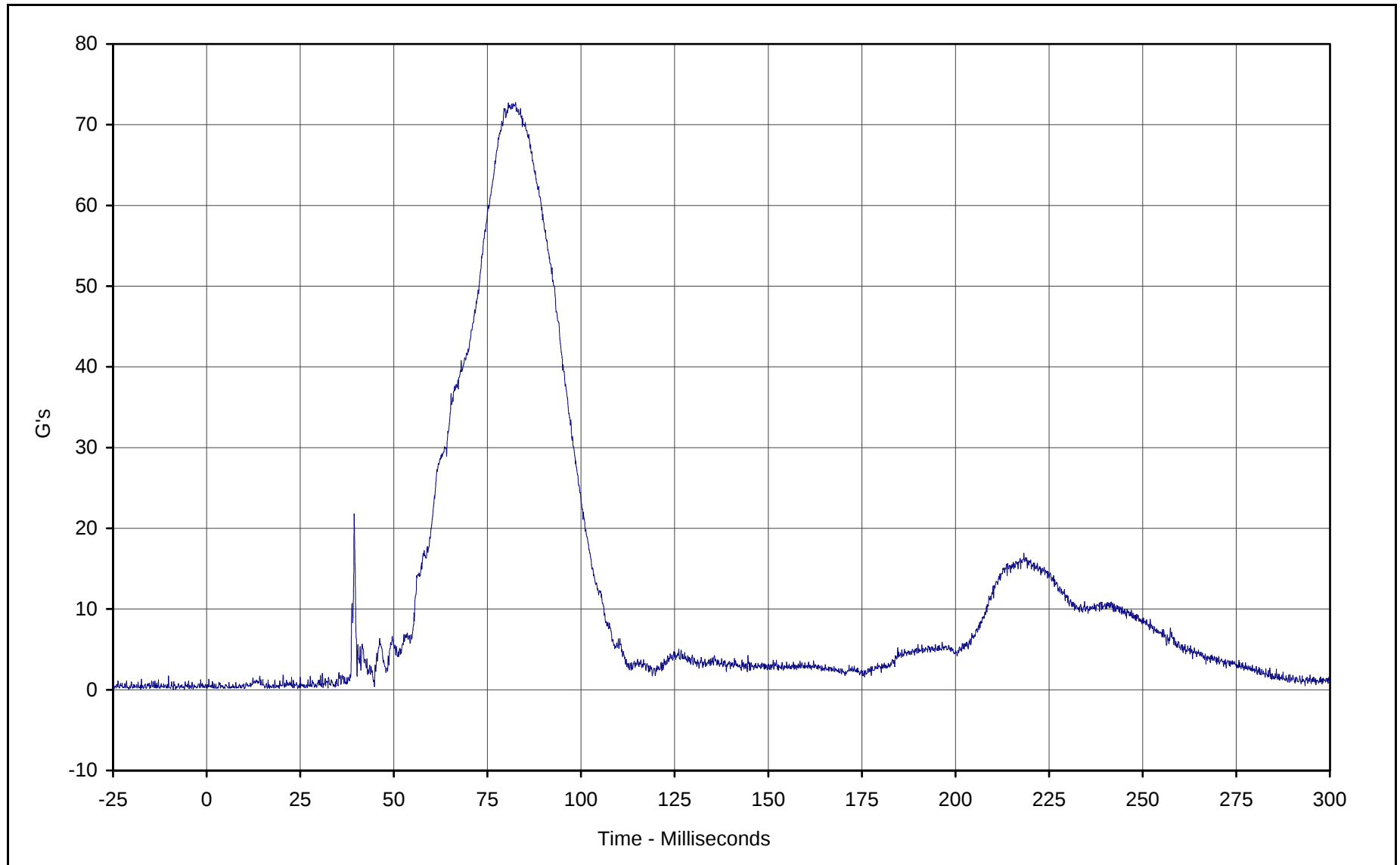
Curve Description: Passenger Head Redundant Z  
Maximum Value: 28.2 at 82.1 Milliseconds  
Minimum Value: -6.2 at 105.2 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-050

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Head Resultant Redundant

Maximum Value: 72.8 at 82.5 Milliseconds

Minimum Value: 0.2 at 0.1 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/30/01

Curve Number: RES-048

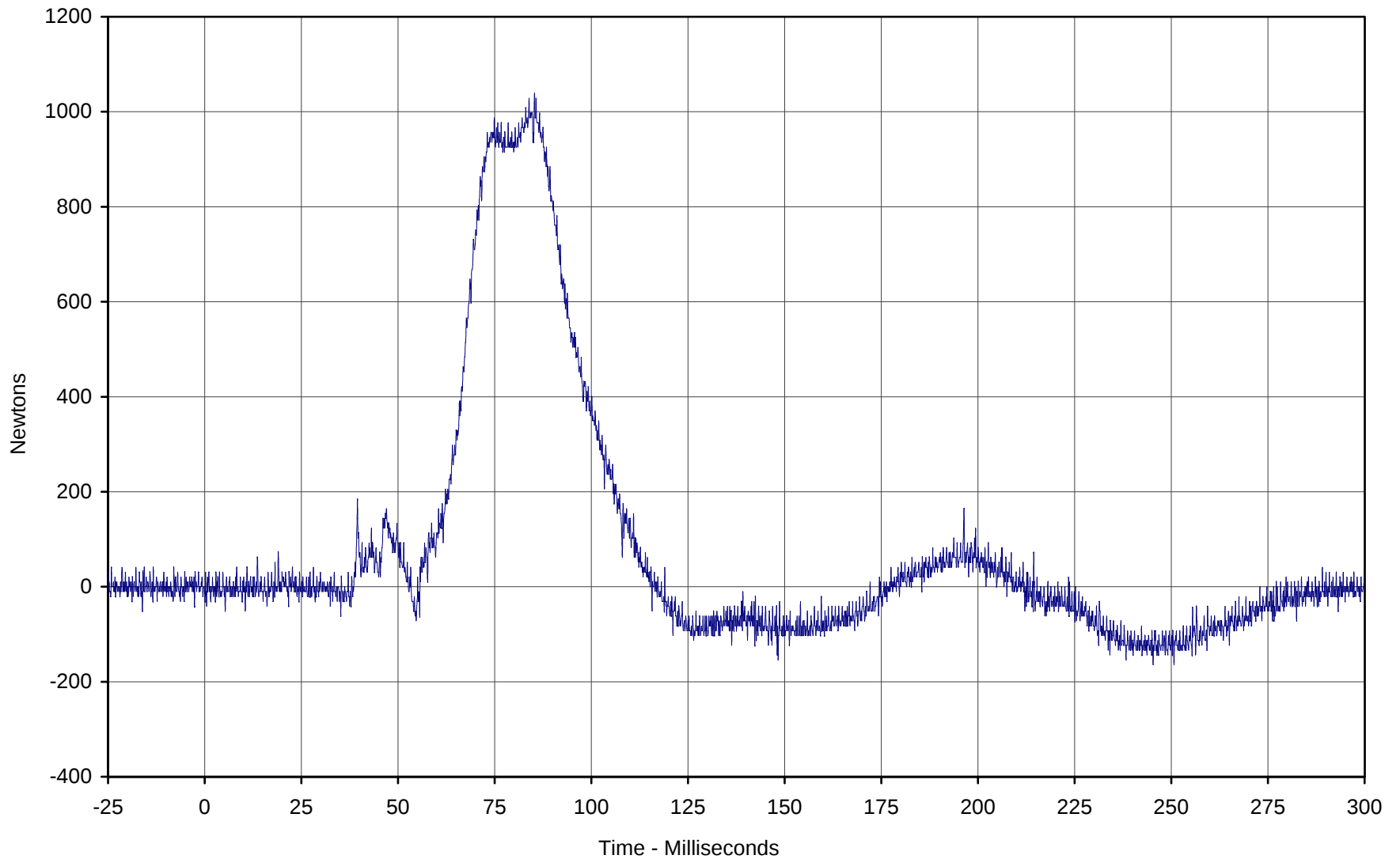
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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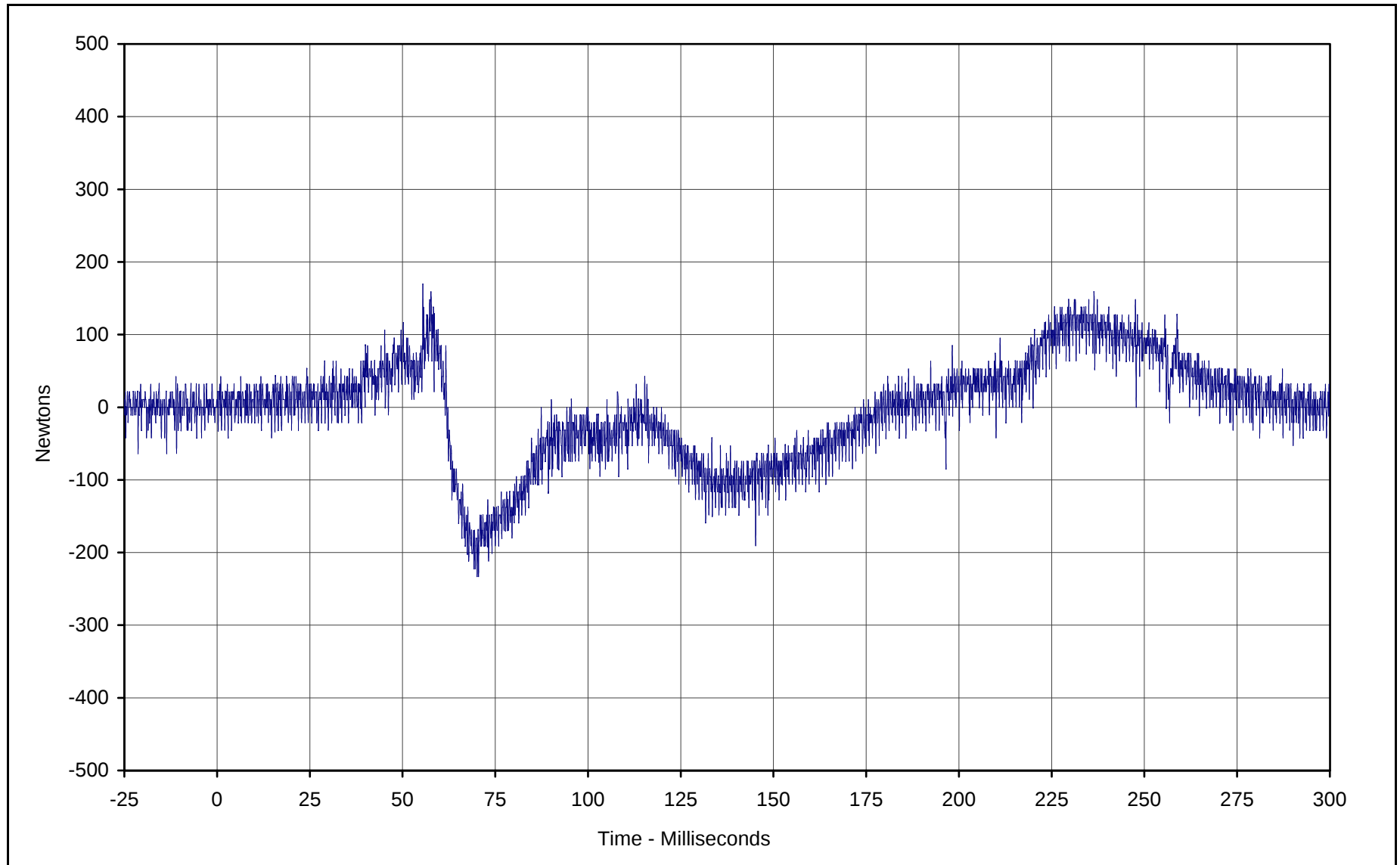
Curve Description: Passenger Neck Force X  
Maximum Value: 1038.8 at 85.3 Milliseconds  
Minimum Value: -164.6 at 245.3 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-051

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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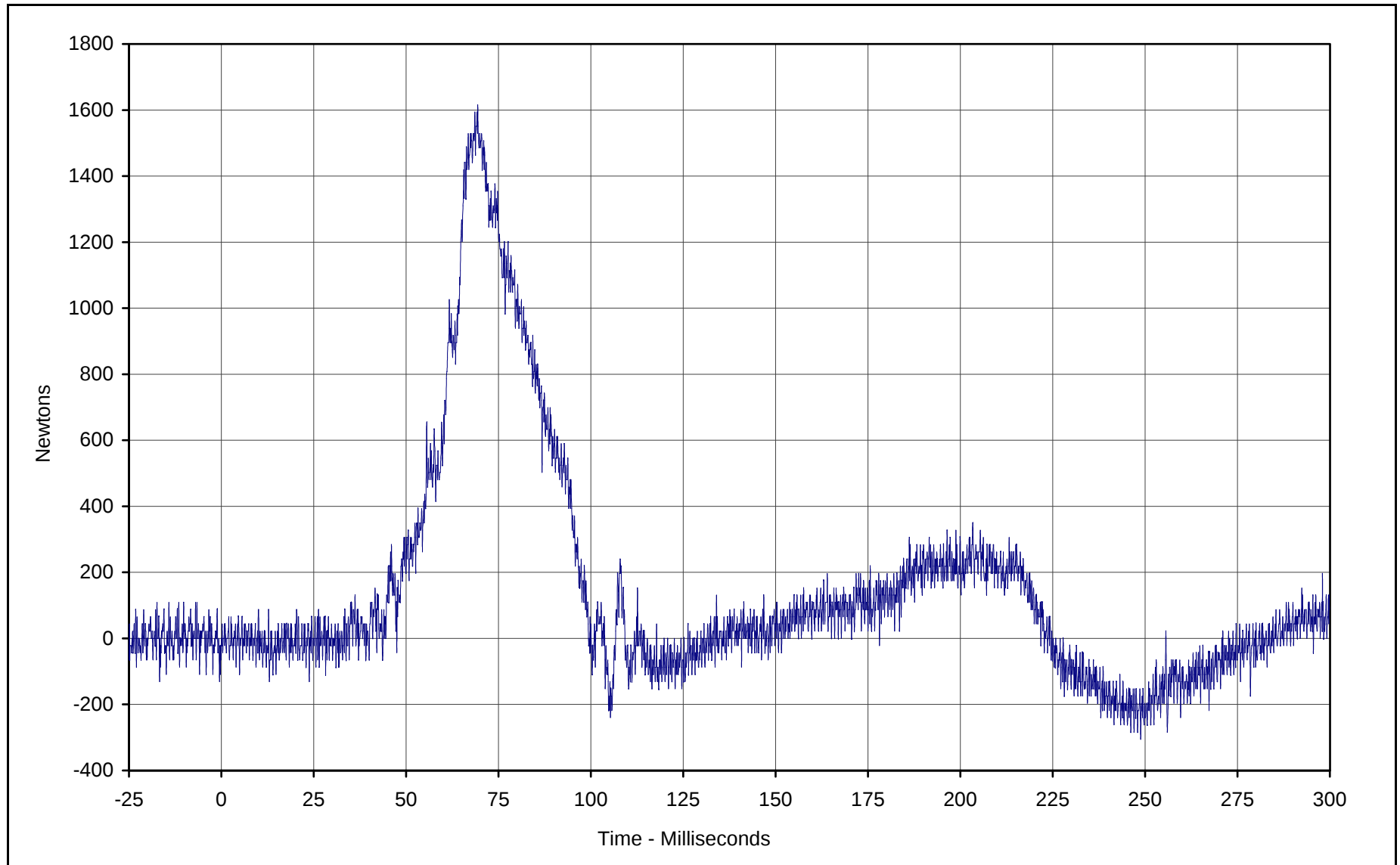


Curve Description: Passenger Neck Force Y  
Maximum Value: 169.5 at 55.5 Milliseconds  
Minimum Value: -233.1 at 70.1 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-052

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



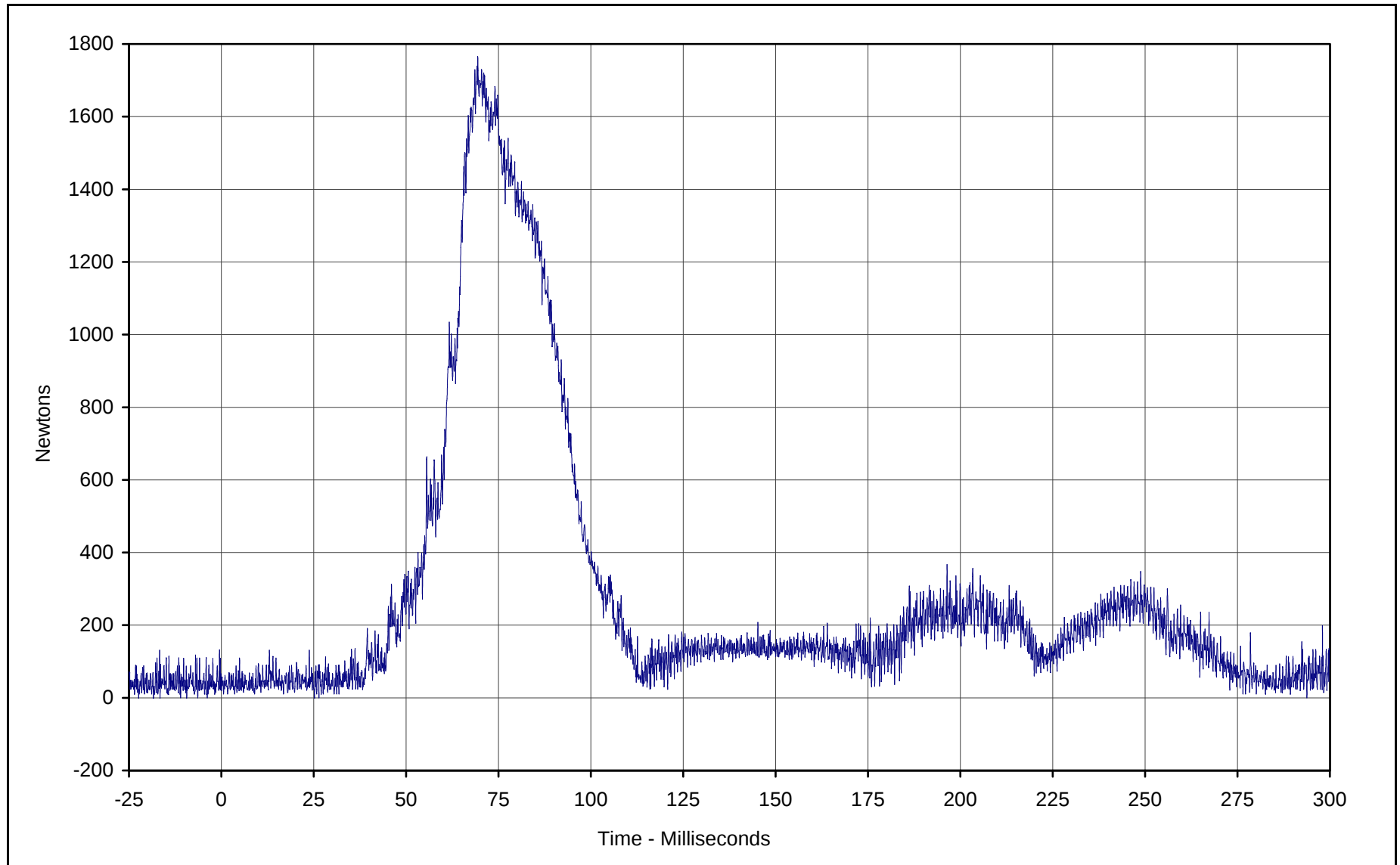
KAR21001-09



Curve Description: Passenger Neck Force Z  
Maximum Value: 1616.4 at 69.4 Milliseconds  
Minimum Value: -305.8 at 248.8 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-053

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

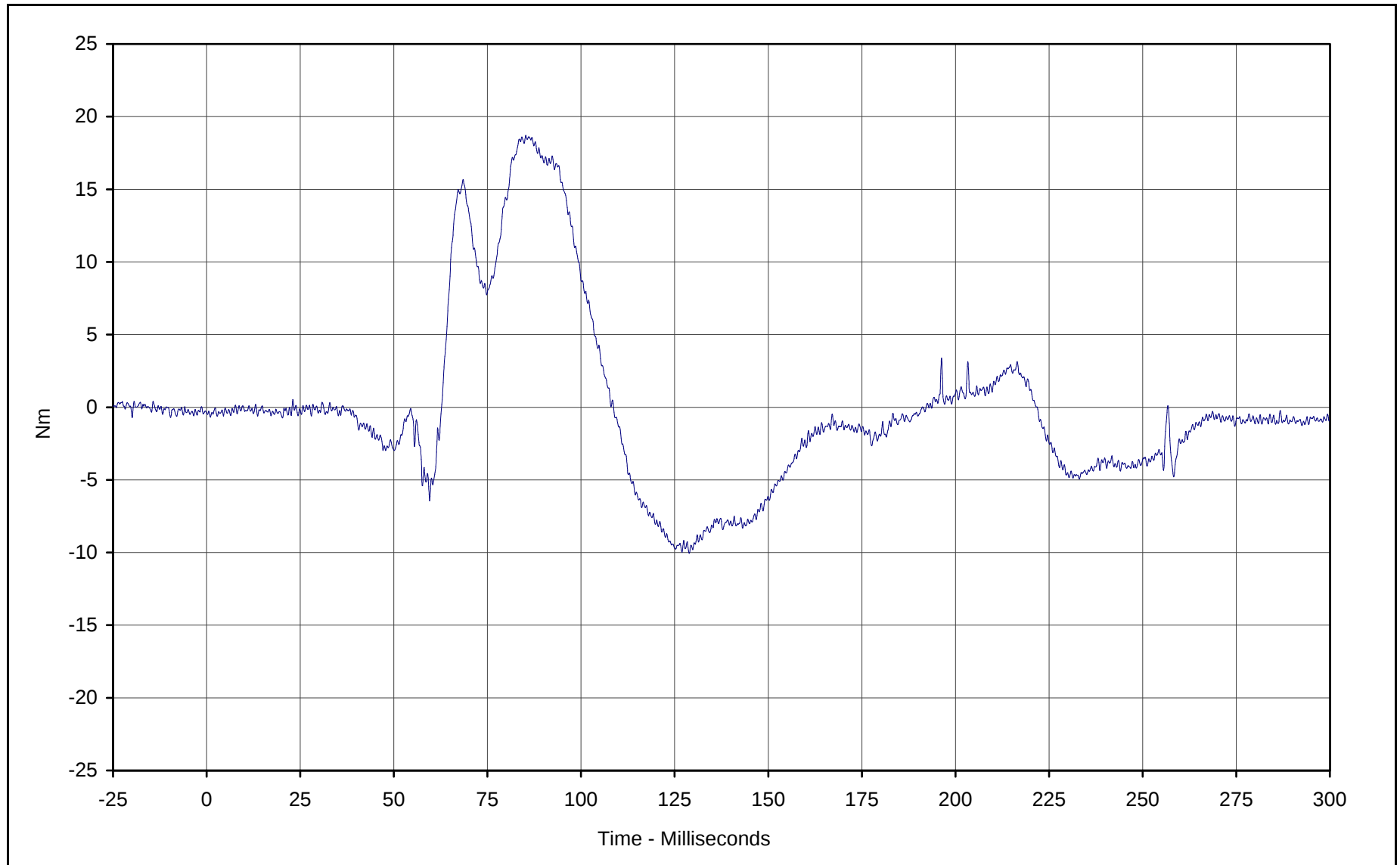




Curve Description: Passenger Neck Force Resultant  
Maximum Value: 1765.3 at 69.4 Milliseconds  
Minimum Value: 0.0 at 25.2 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: RES-051

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



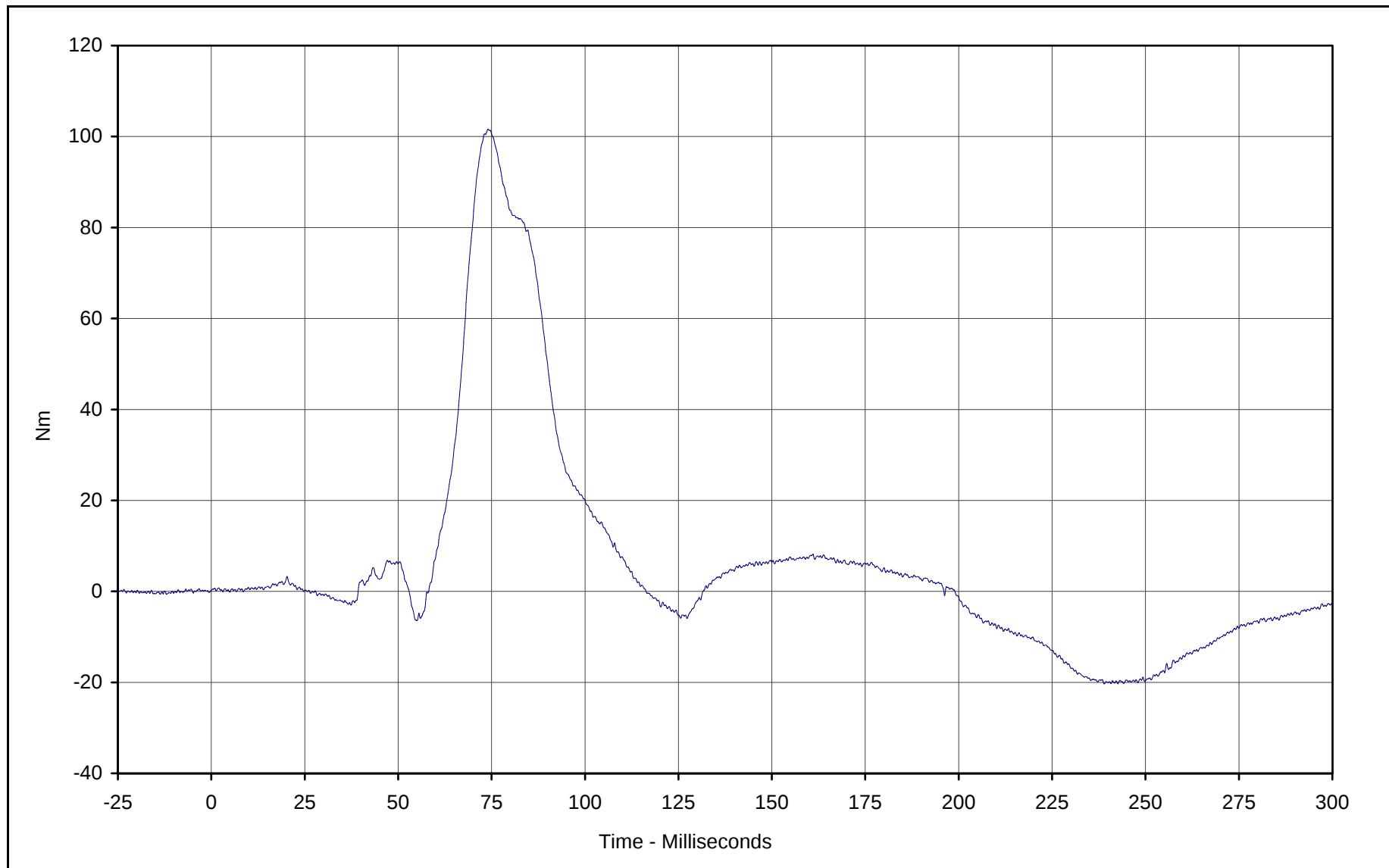


Curve Description: Passenger Neck Moment X  
Maximum Value: 18.7 at 85.2 Milliseconds  
Minimum Value: -10.1 at 128.9 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-054

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Neck Moment Y  
Maximum Value: 101.6 at 74.0 Milliseconds  
Minimum Value: -20.3 at 239.0 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-055

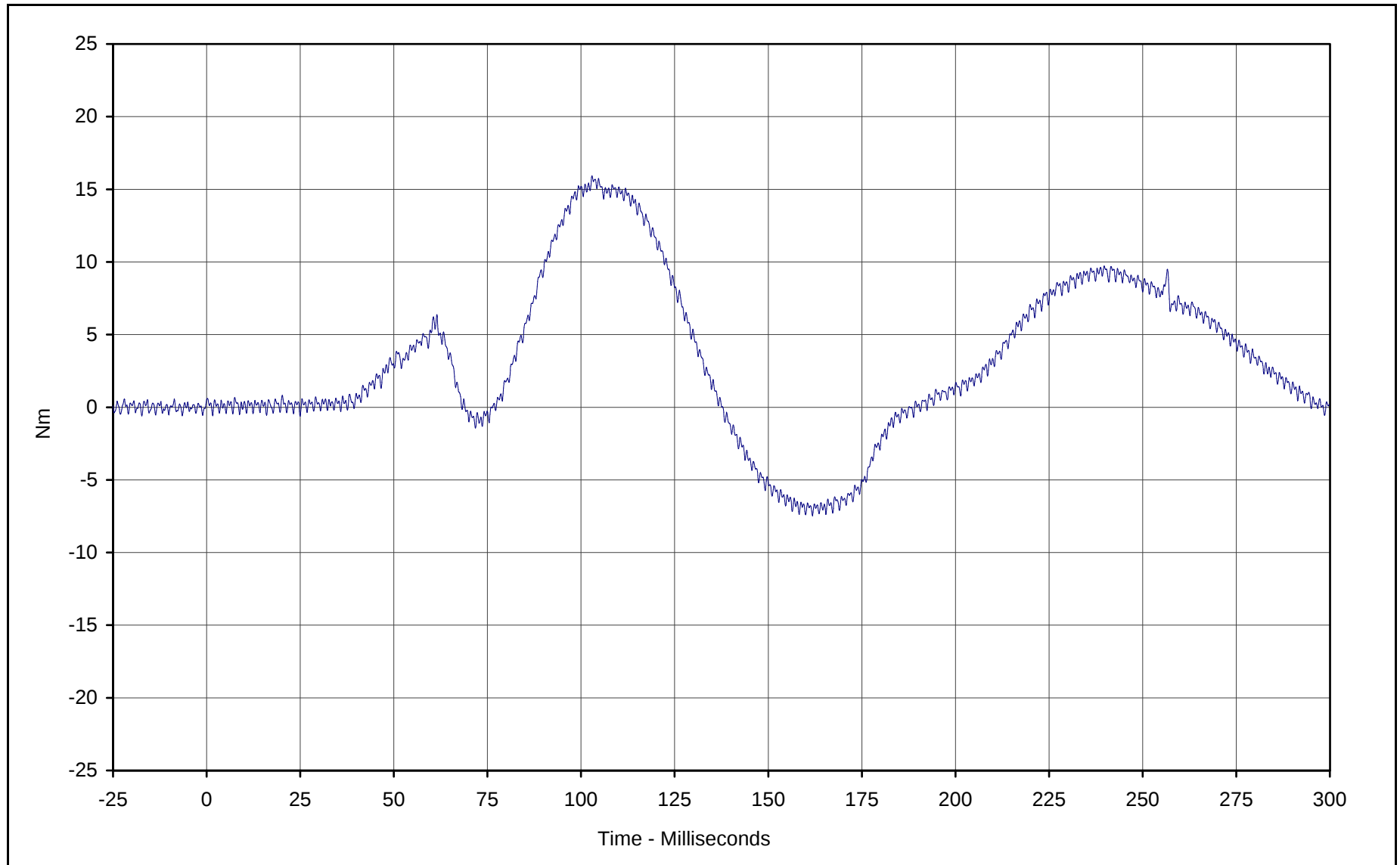
Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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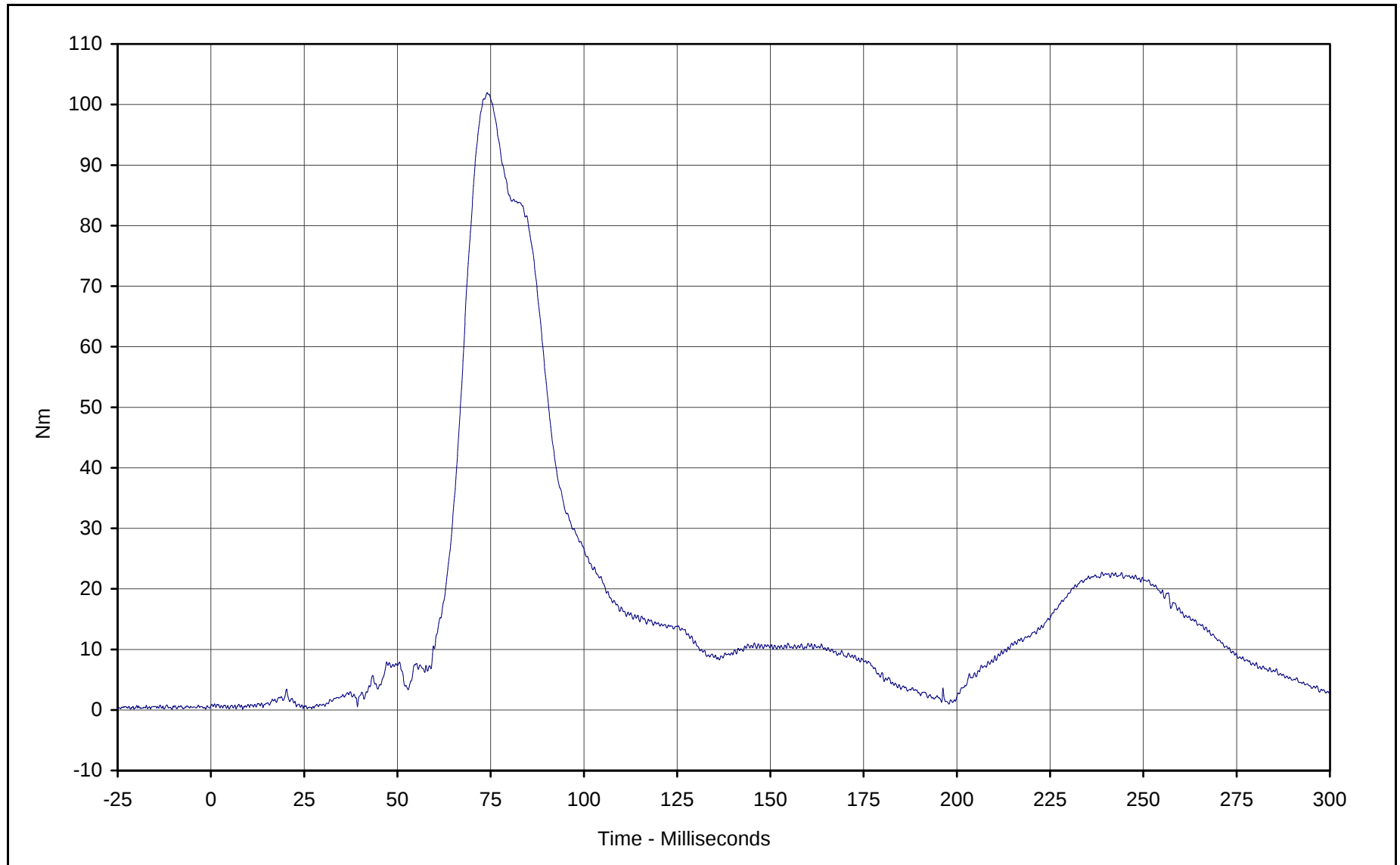
KAR21001-09



Curve Description: Passenger Neck Moment Z  
Maximum Value: 15.9 at 102.9 Milliseconds  
Minimum Value: -7.5 at 161.8 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-056

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



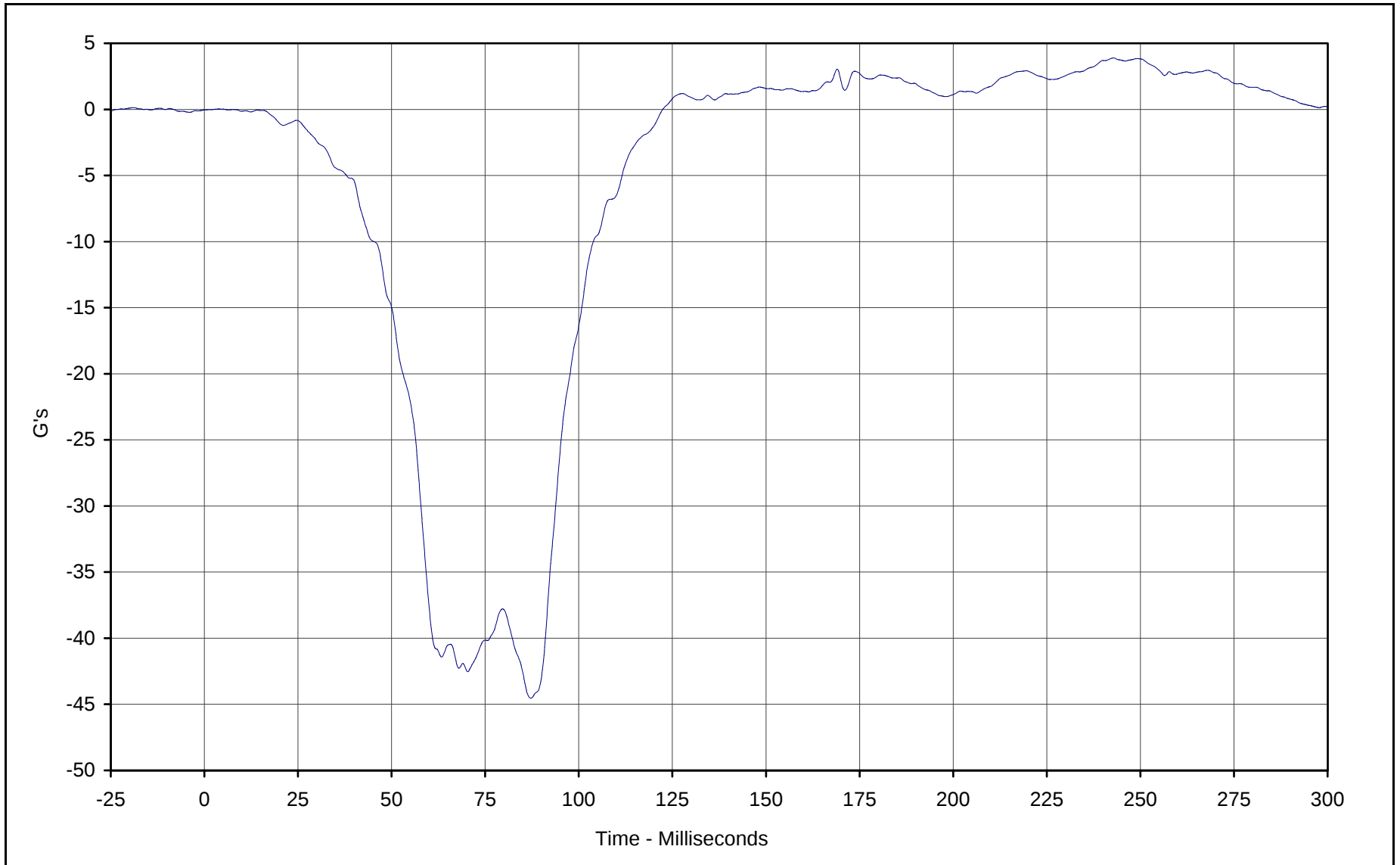


Curve Description: Passenger Neck Moment Resultant  
Maximum Value: 101.9 at 74.0 Milliseconds  
Minimum Value: 0.1 at 8.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: RES-054

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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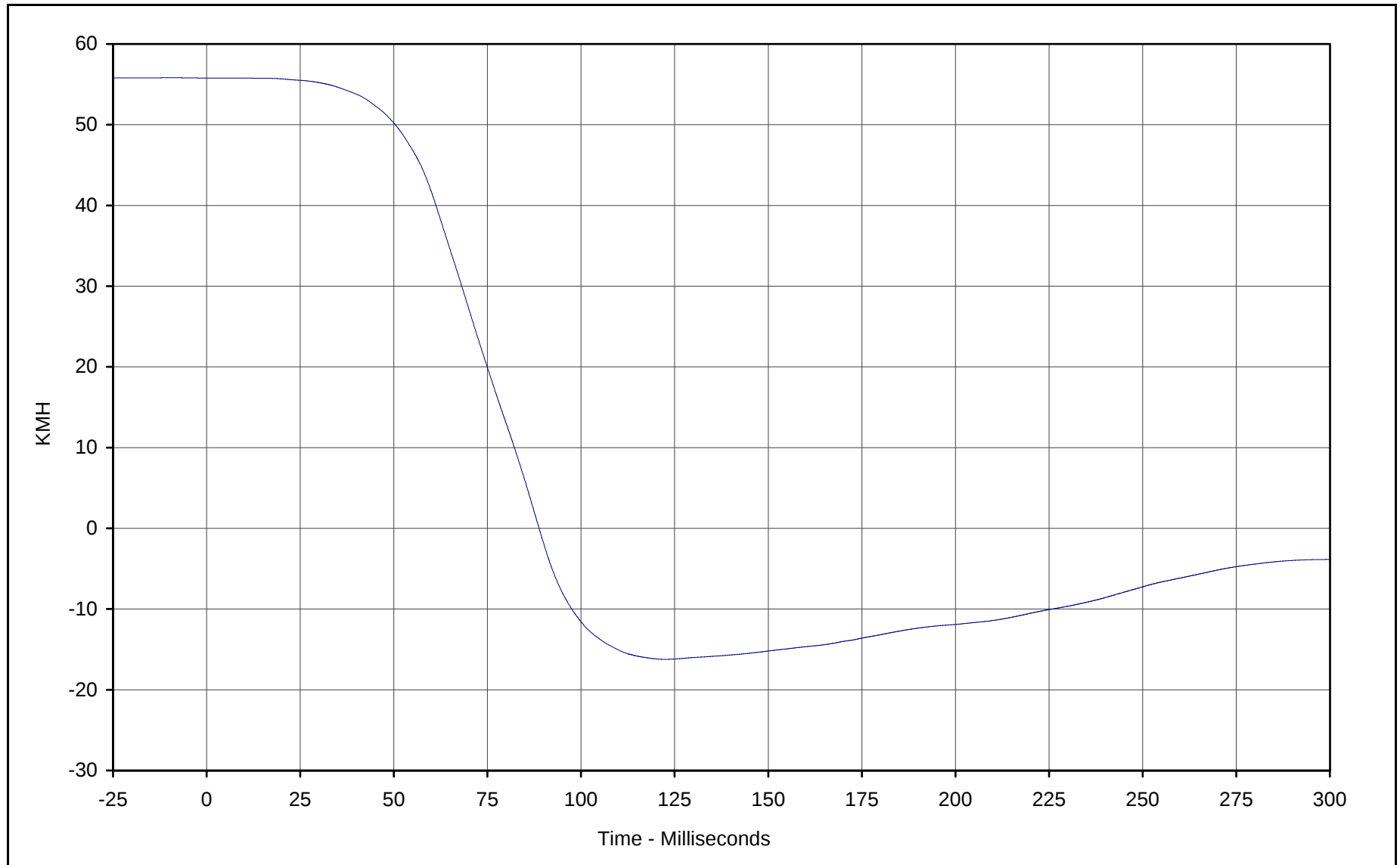


Curve Description: Passenger Chest Primary X  
Maximum Value: 3.9 at 242.8 Milliseconds  
Minimum Value: -44.5 at 87.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Chest Primary X Velocity

Maximum Value: 55.8 at 5.5 Milliseconds

Minimum Value: -16.2 at 122.4 Milliseconds

SAE Filter Class: 180

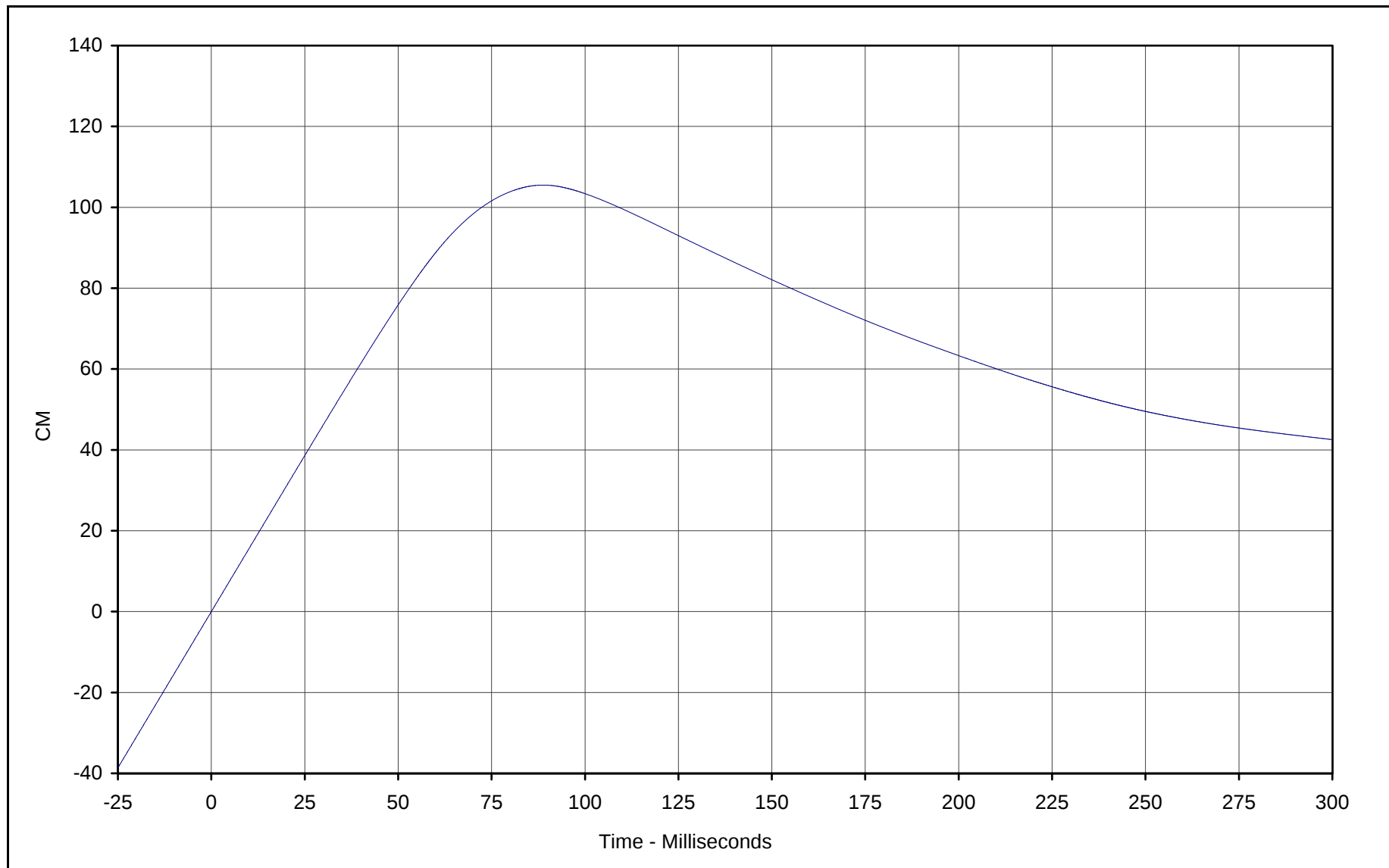
Date of Test: 01/30/01

Curve Number: IN1-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



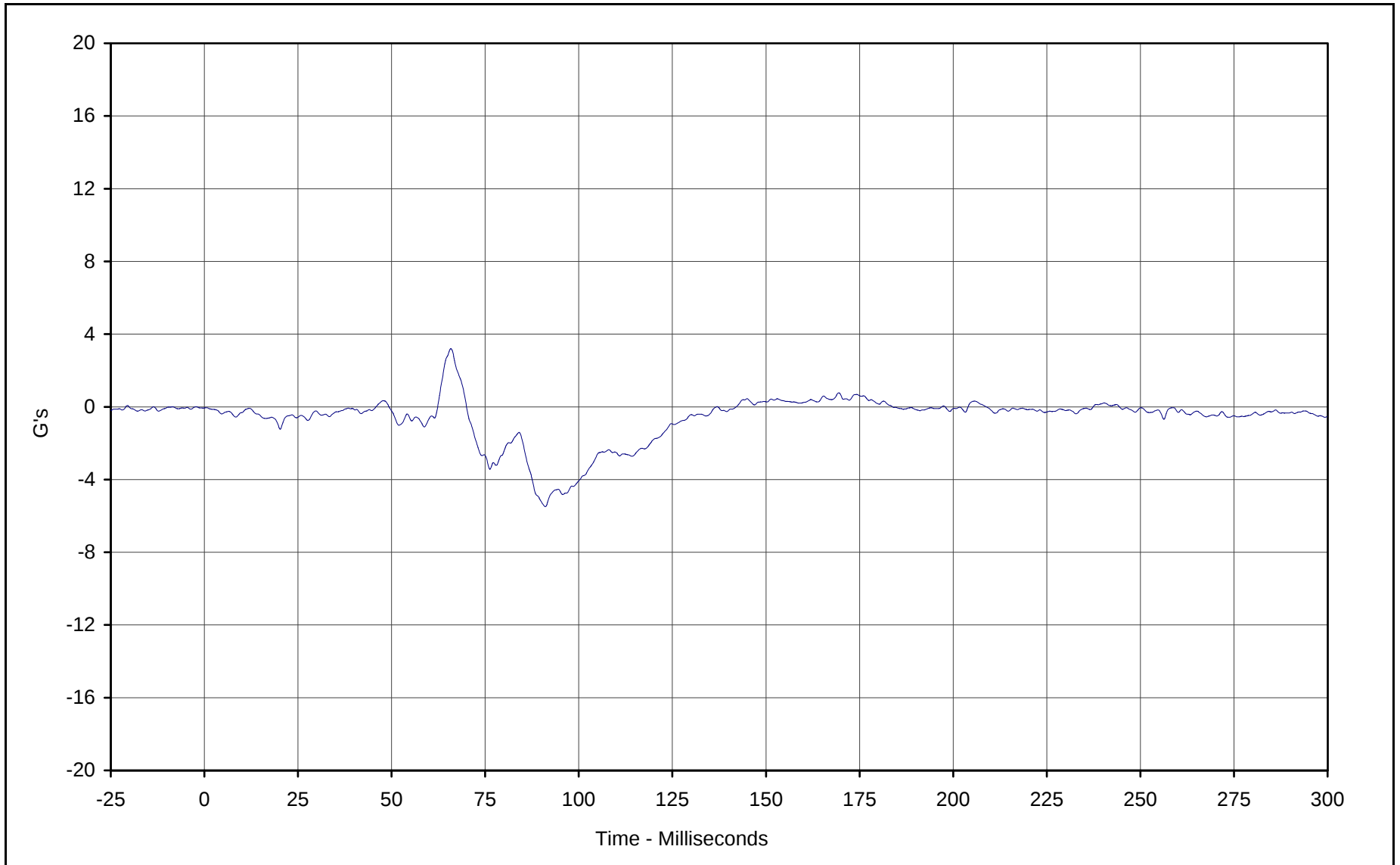


Curve Description: Passenger Chest Primary X Displ.  
Maximum Value: 105.5 at 88.8 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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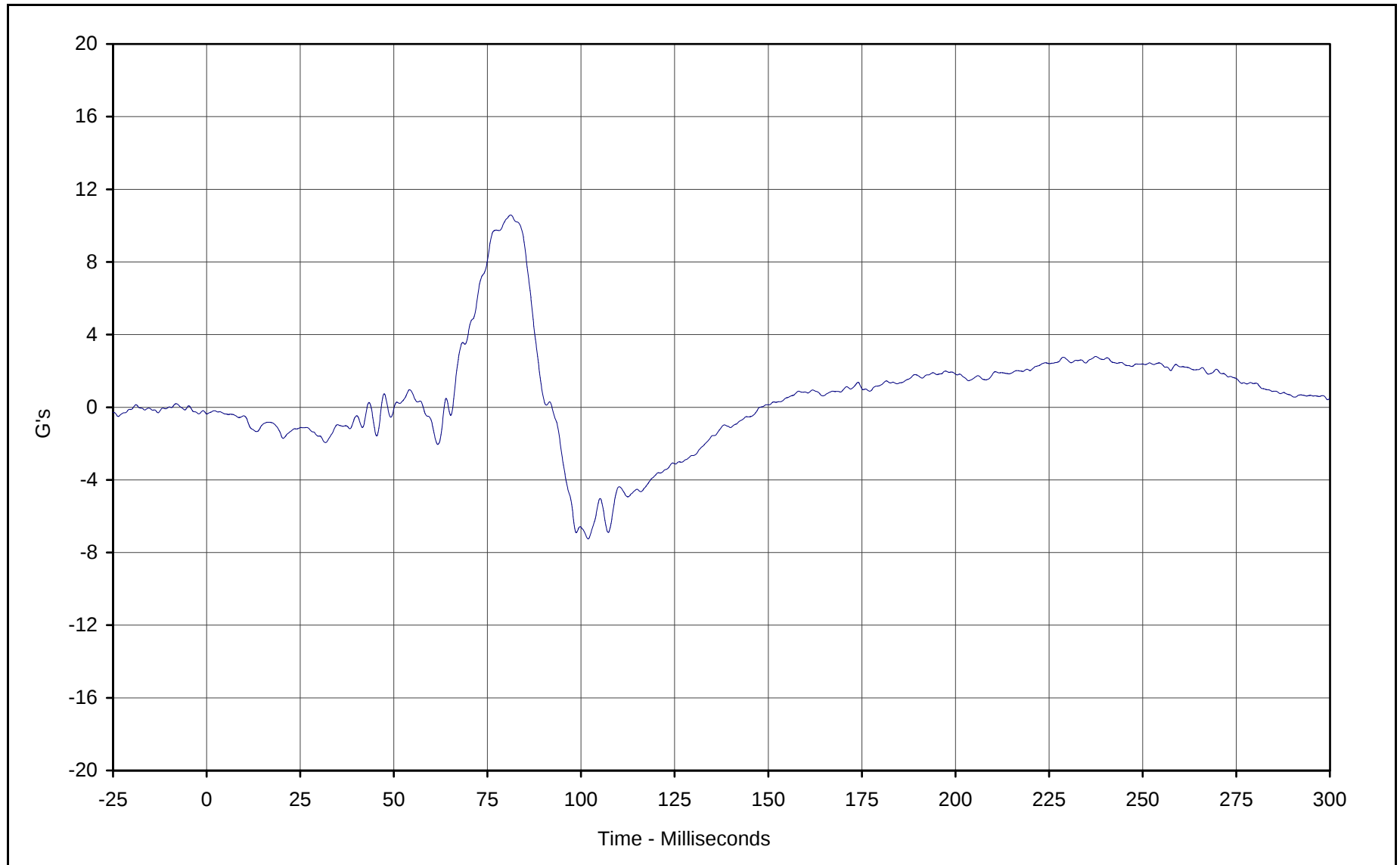


Curve Description: Passenger Chest Primary Y  
Maximum Value: 3.2 at 65.8 Milliseconds  
Minimum Value: -5.5 at 91.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-058

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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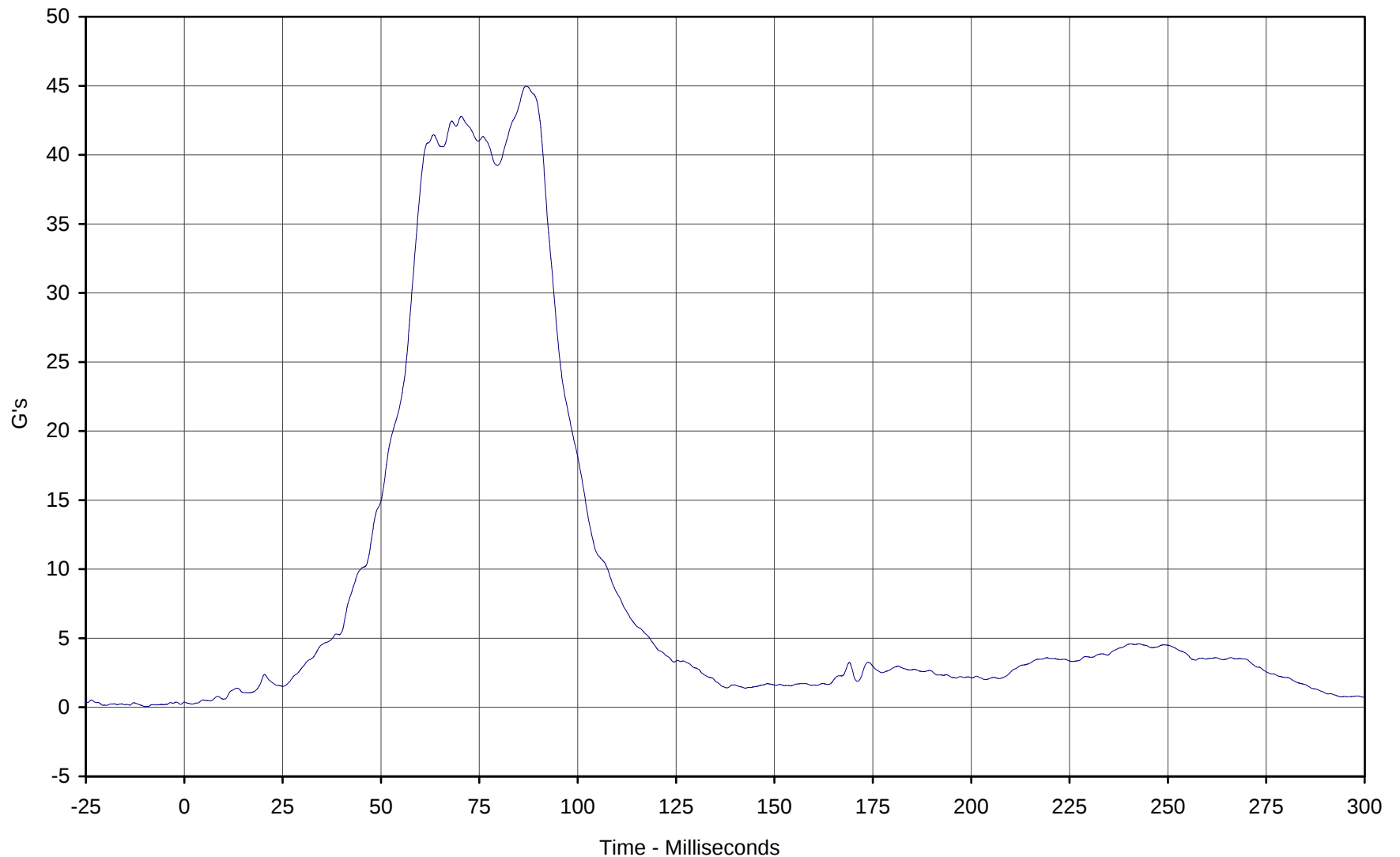


Curve Description: Passenger Chest Primary Z  
Maximum Value: 10.6 at 81.2 Milliseconds  
Minimum Value: -7.3 at 101.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-059

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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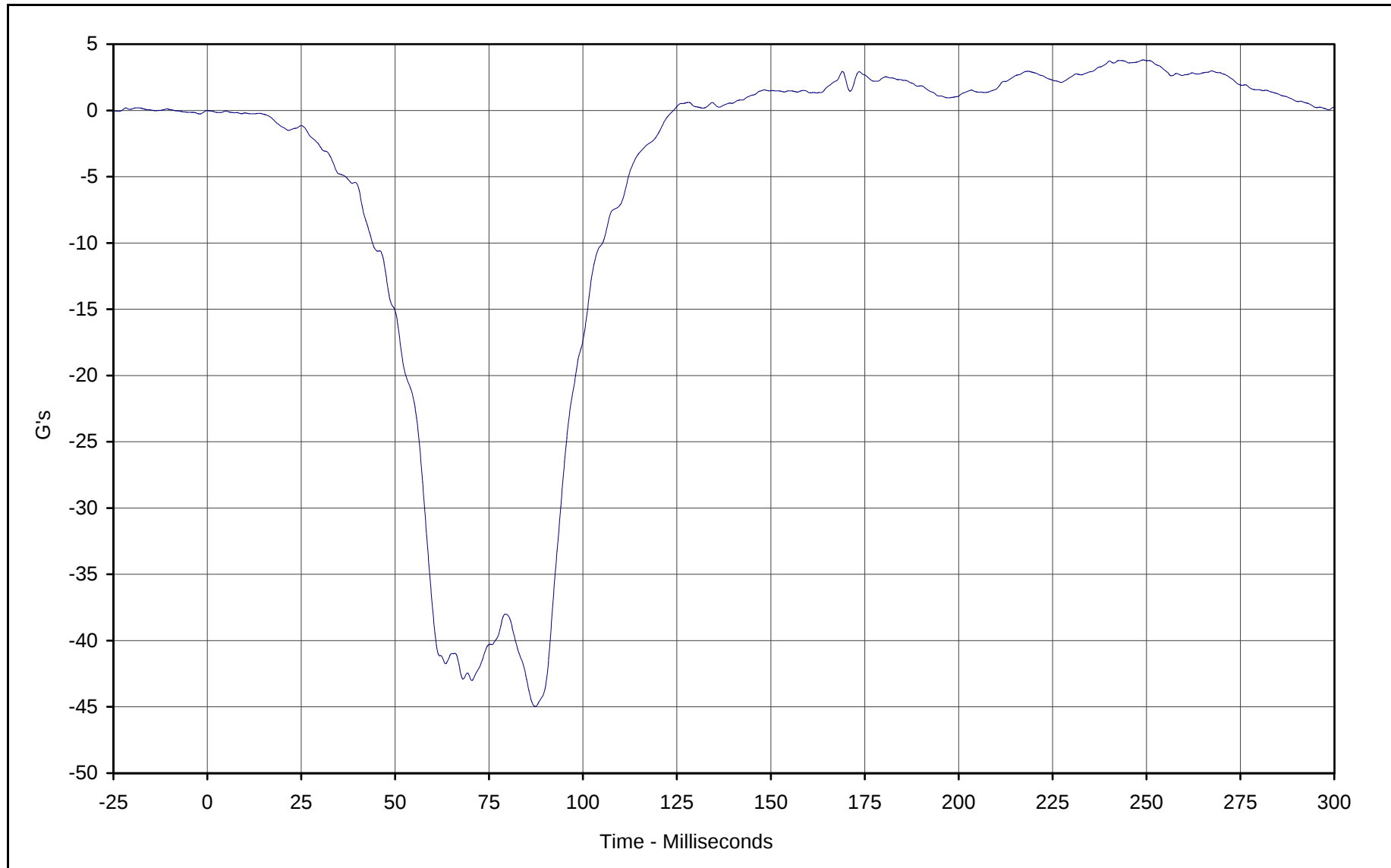
Curve Description: Passenger Chest Resultant Primary  
Maximum Value: 45.0 at 86.9 Milliseconds  
Minimum Value: 0.2 at 1.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: RES-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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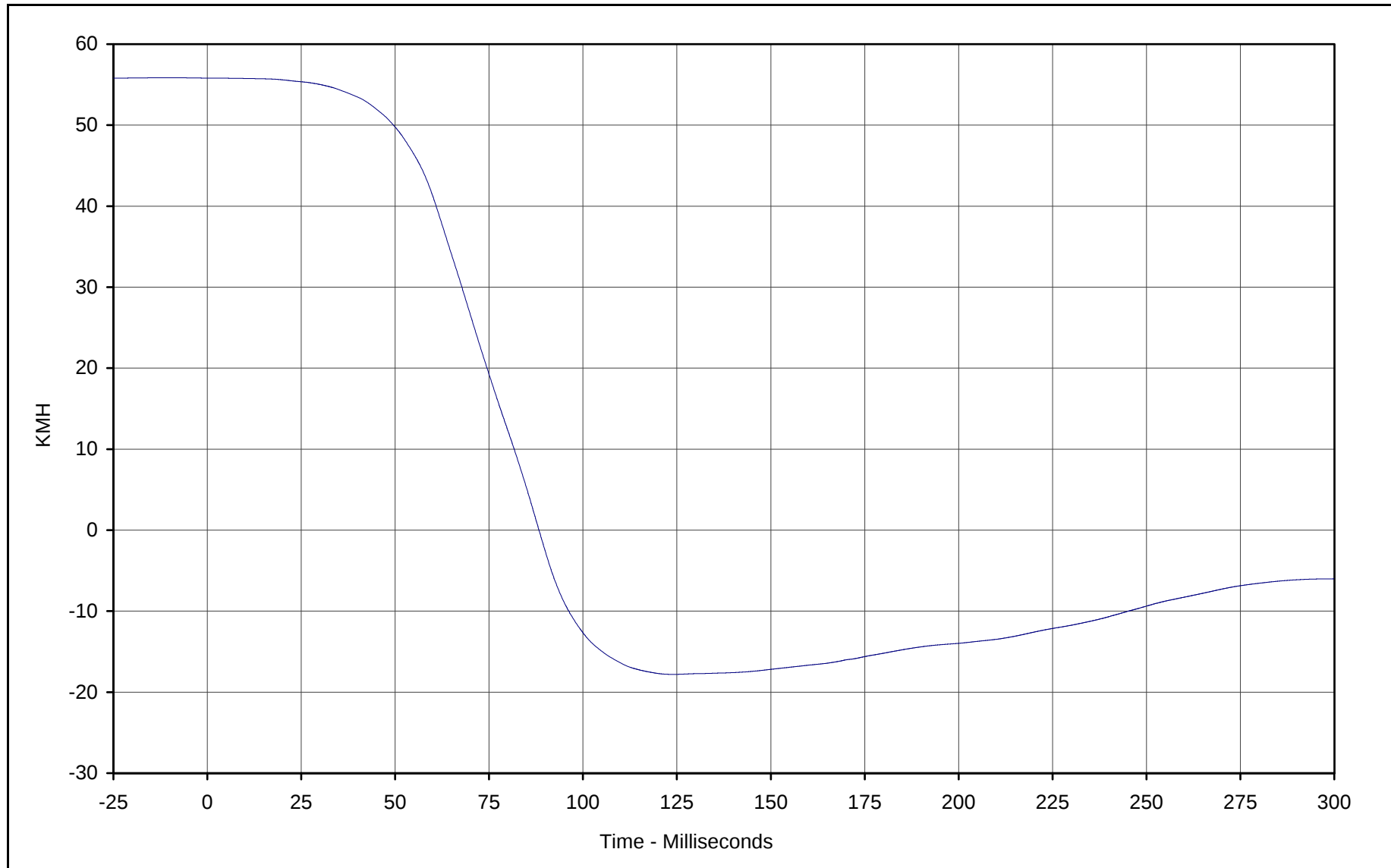


Curve Description: Passenger Chest Redundant X  
Maximum Value: 3.8 at 249.1 Milliseconds  
Minimum Value: -45.0 at 87.3 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Chest Redundant X Velocity

Maximum Value: 55.8 at 0.0 Milliseconds

Minimum Value: -17.8 at 124.1 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

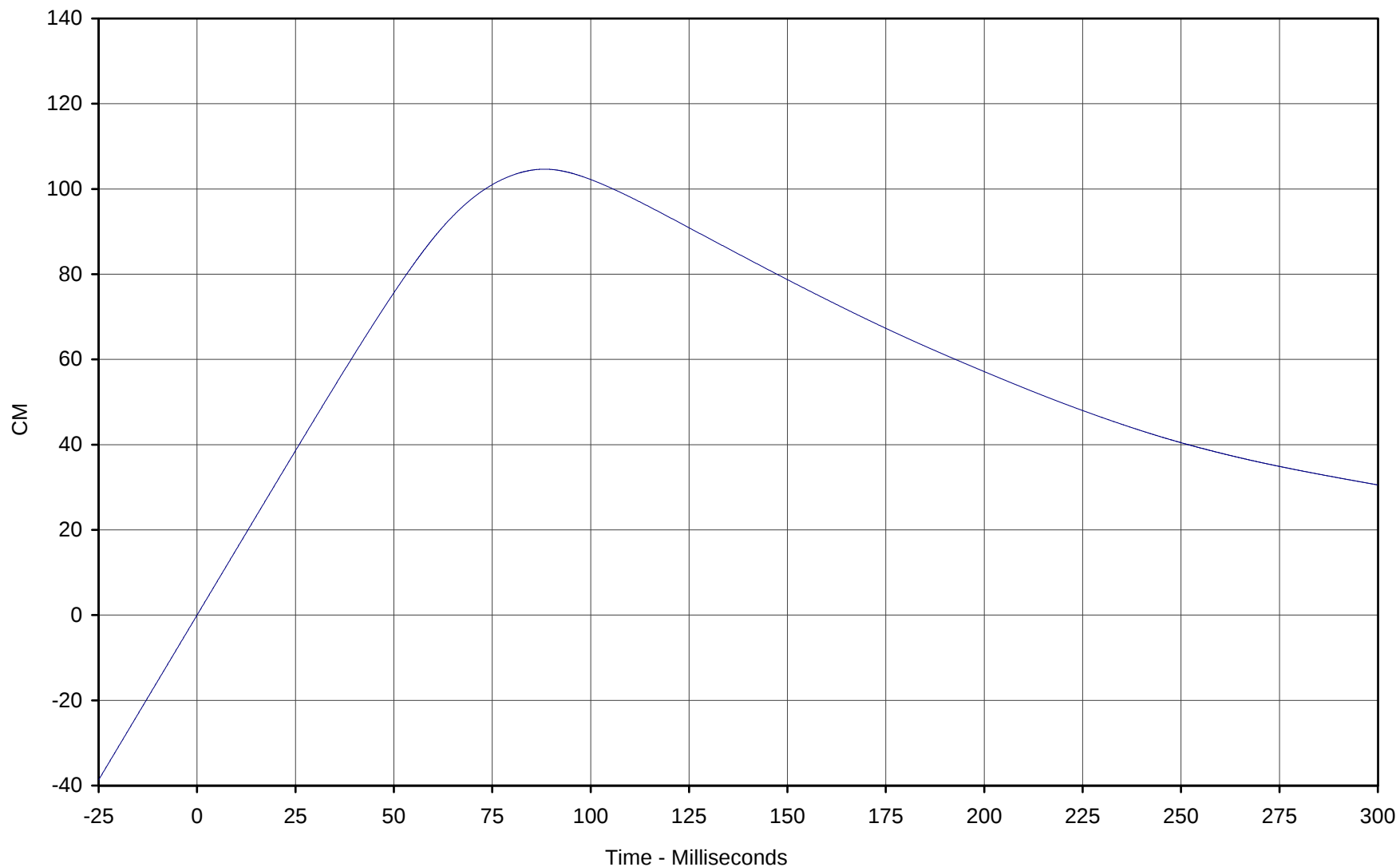
Curve Number: IN1-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Chest Redundant X Displ.

Maximum Value: 104.6 at 88.3 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

Curve Number: IN2-060

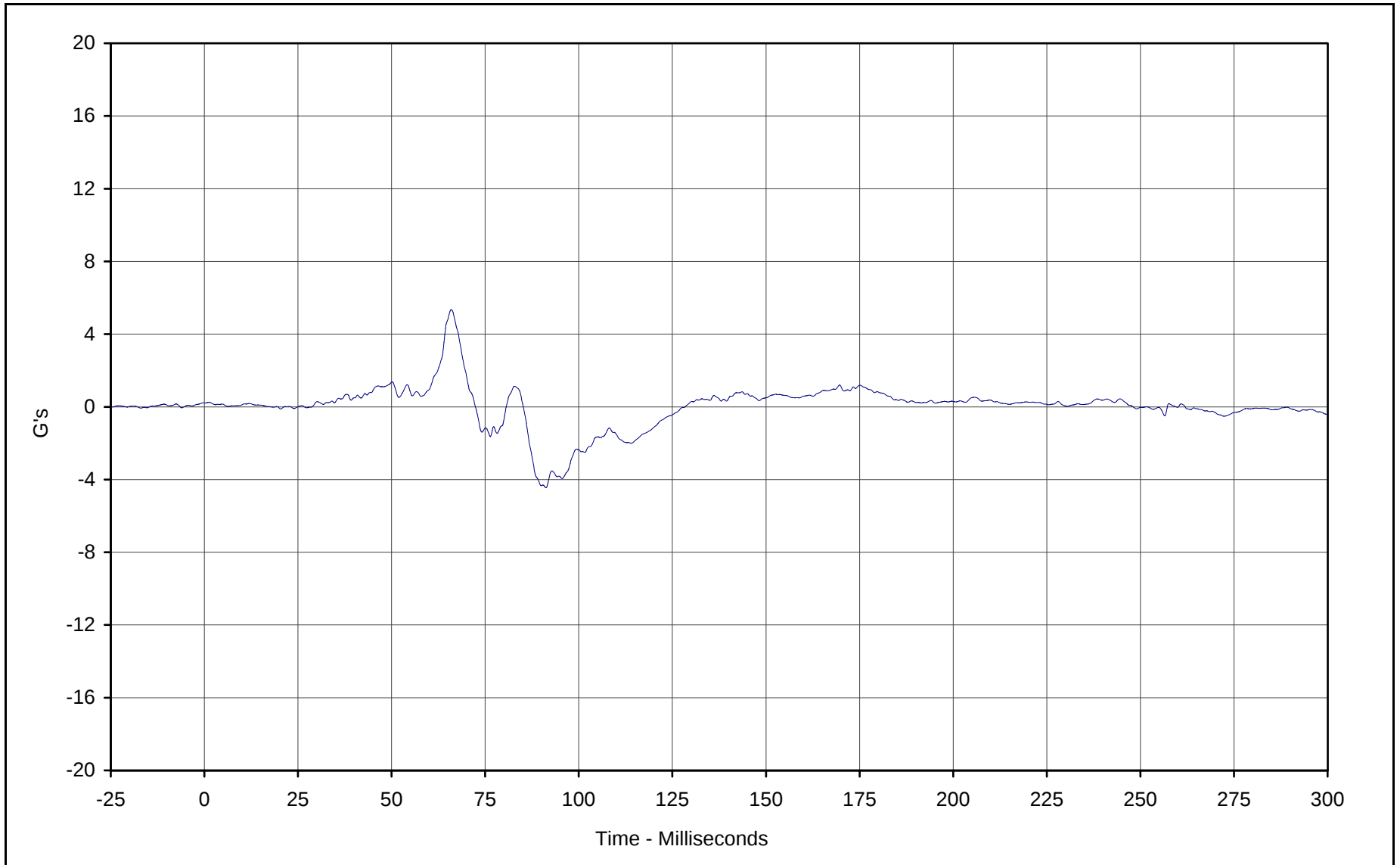
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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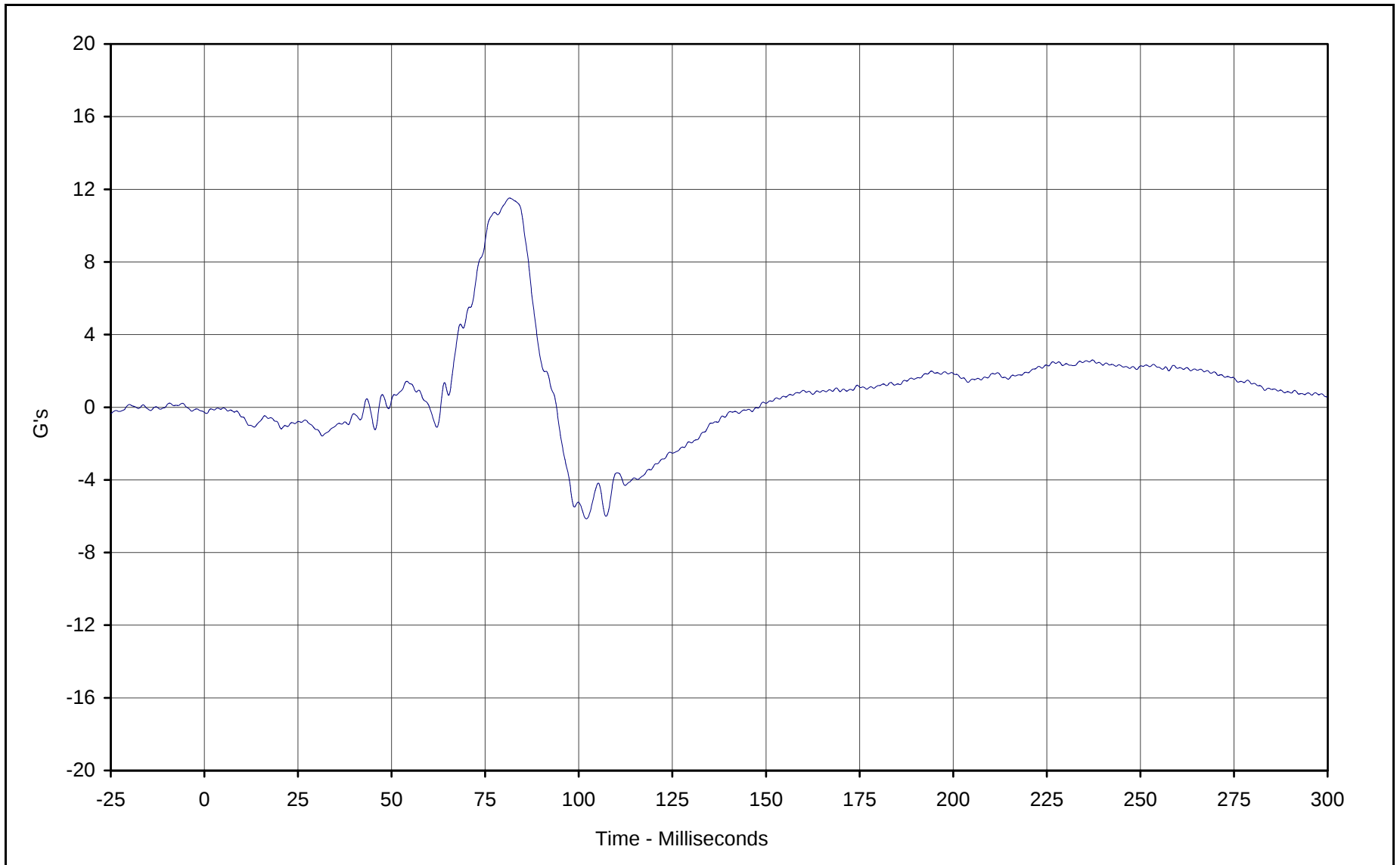
Curve Description: Passenger Chest Redundant Y  
Maximum Value: 5.3 at 65.9 Milliseconds  
Minimum Value: -4.4 at 91.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-061

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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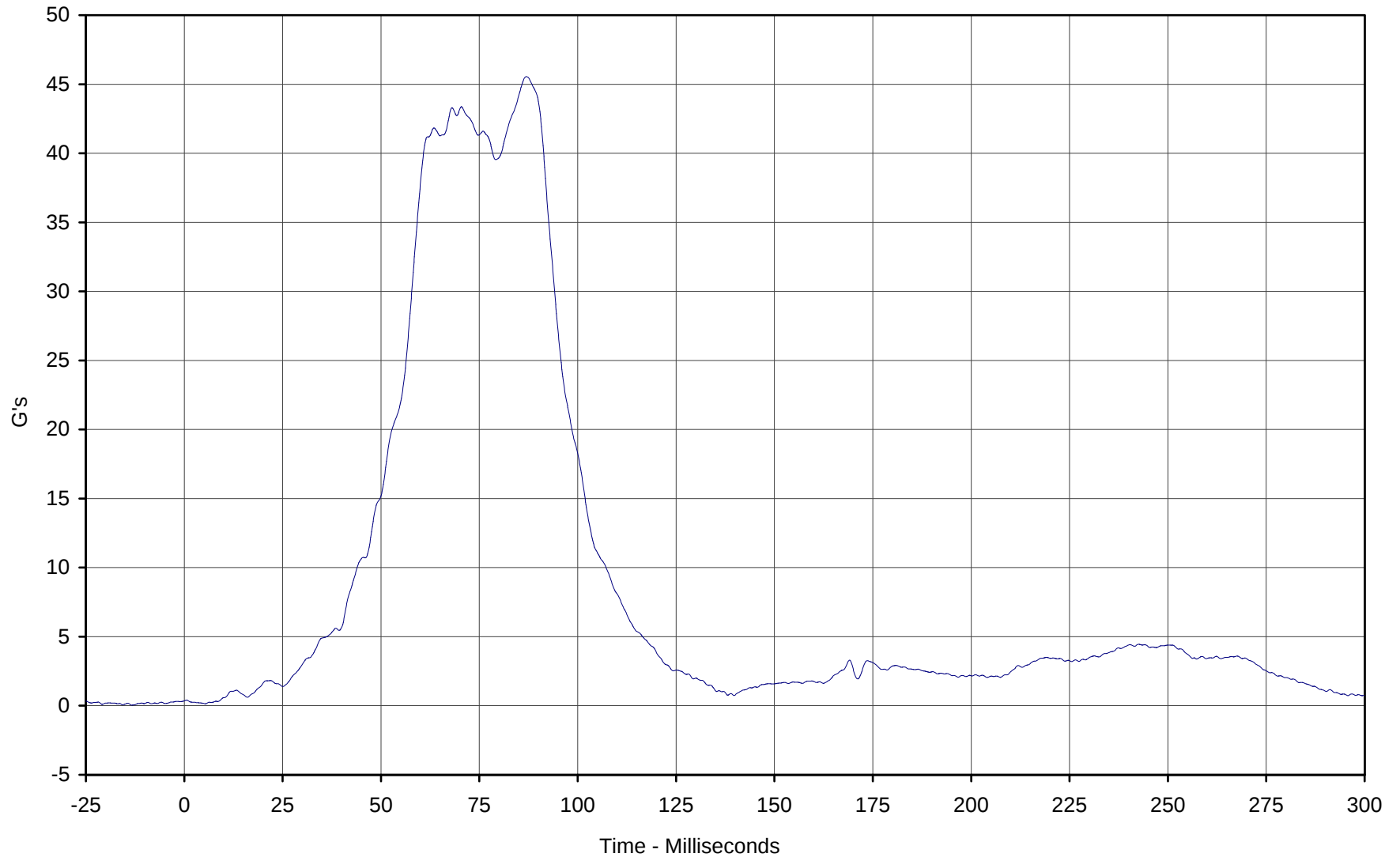
Curve Description: Passenger Chest Redundant Z  
Maximum Value: 11.5 at 81.5 Milliseconds  
Minimum Value: -6.1 at 102.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-062

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Chest Resultant Redundant

Maximum Value: 45.6 at 86.9 Milliseconds

Minimum Value: 0.1 at 5.4 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

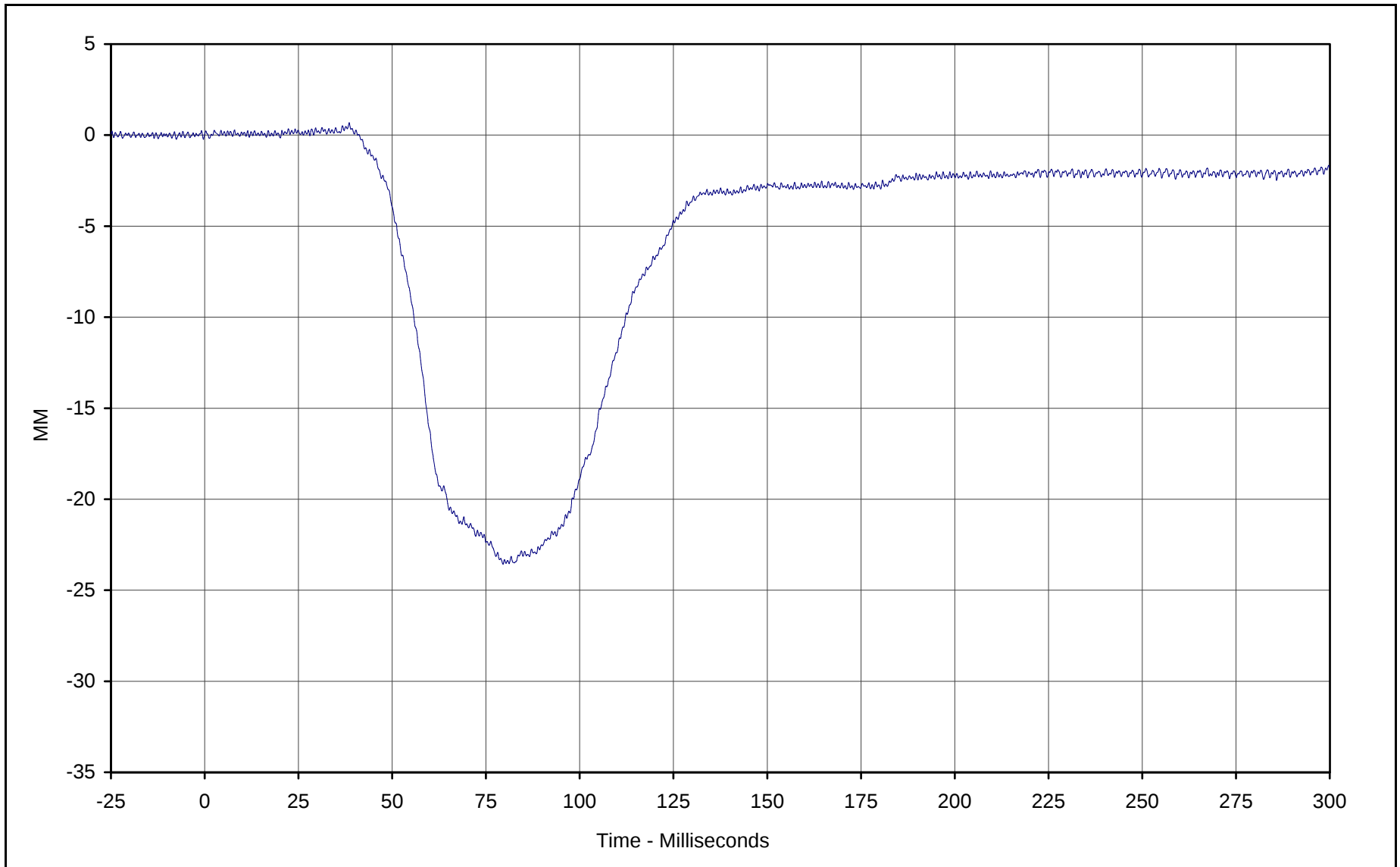
Curve Number: RES-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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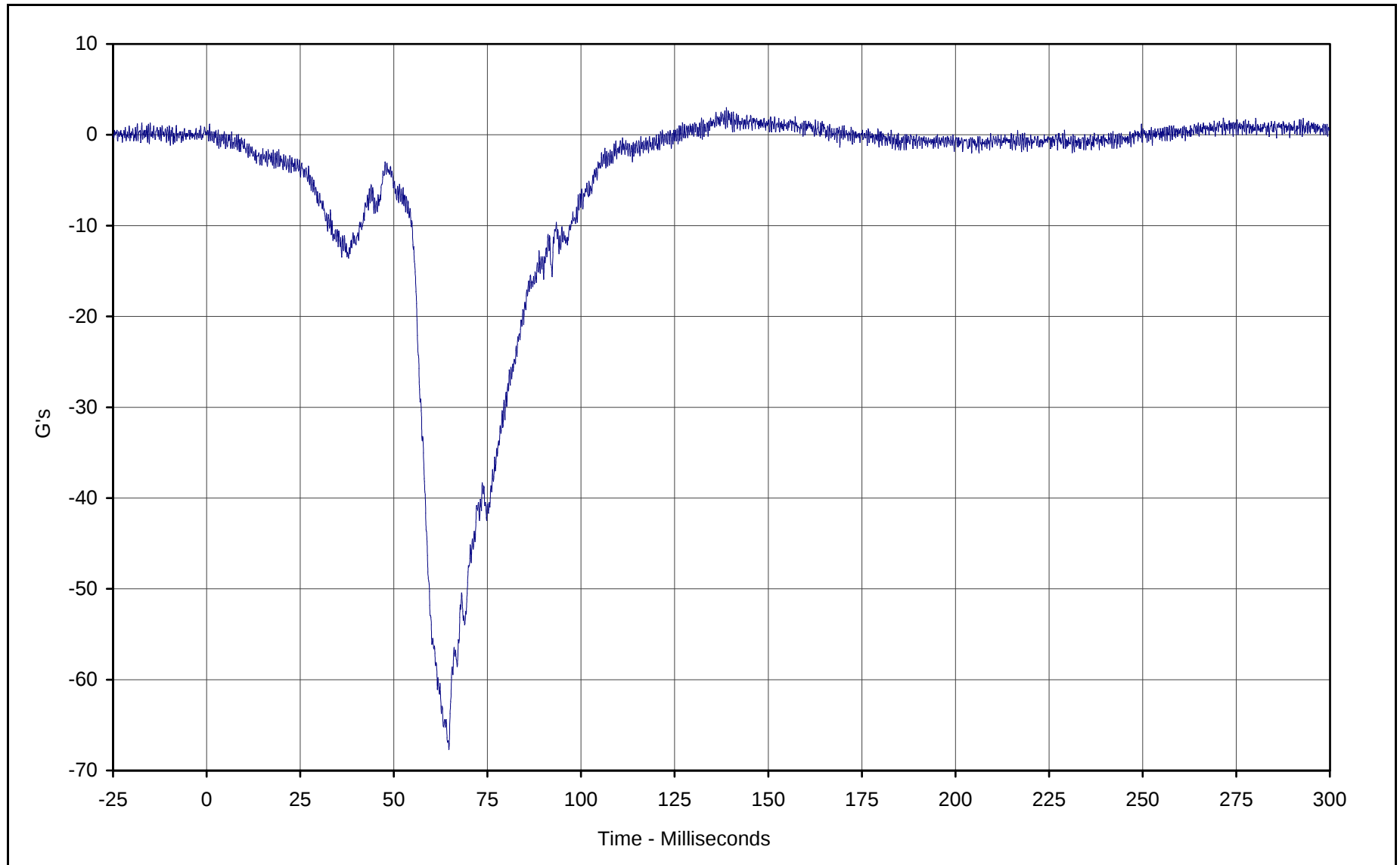


Curve Description: Passenger Chest Displacement X  
Maximum Value: 0.7 at 38.5 Milliseconds  
Minimum Value: -23.6 at 79.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-063

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Pelvis X

Maximum Value: 3.0 at 138.8 Milliseconds

Minimum Value: -67.7 at 64.7 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/30/01

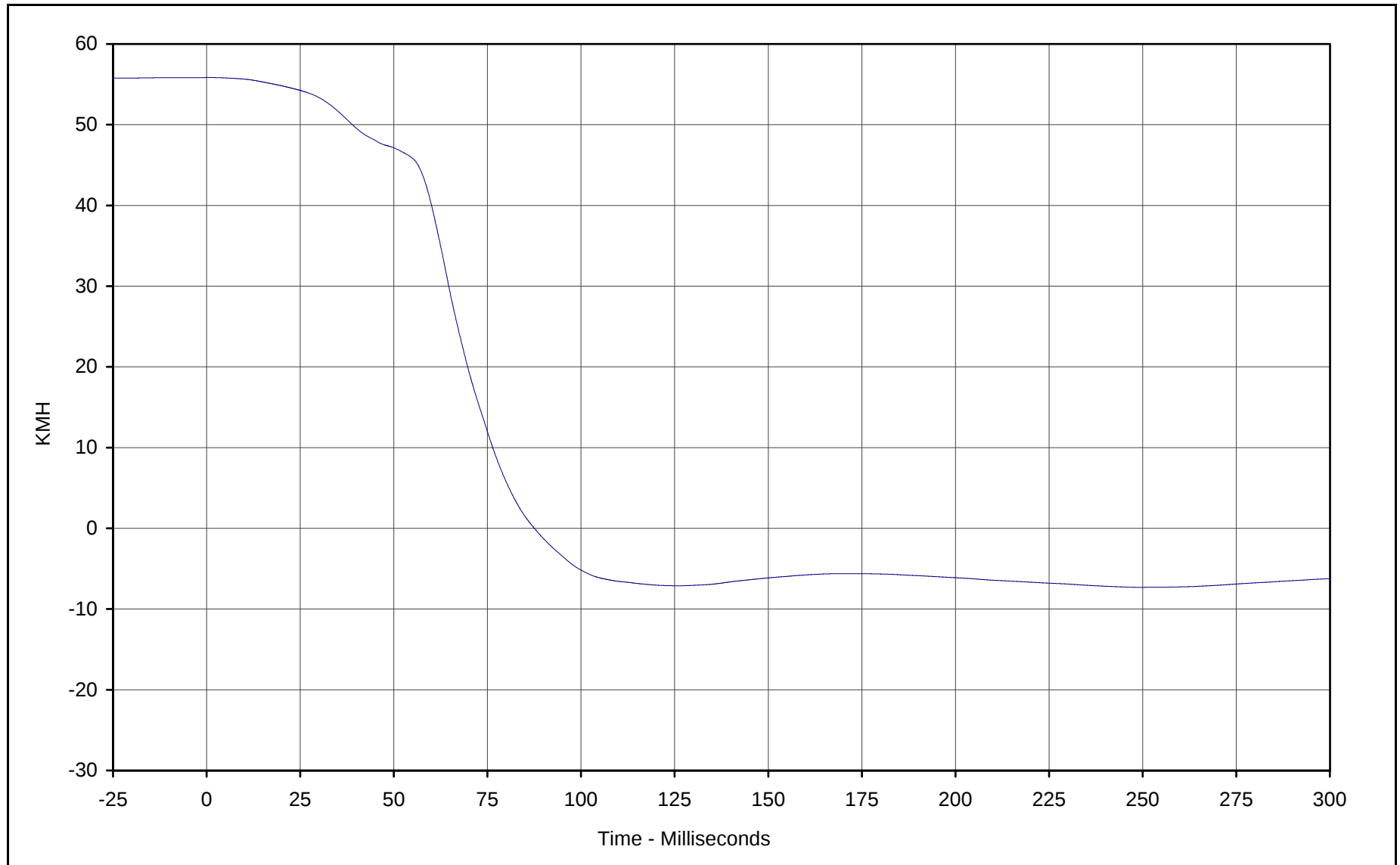
Curve Number: FIL-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

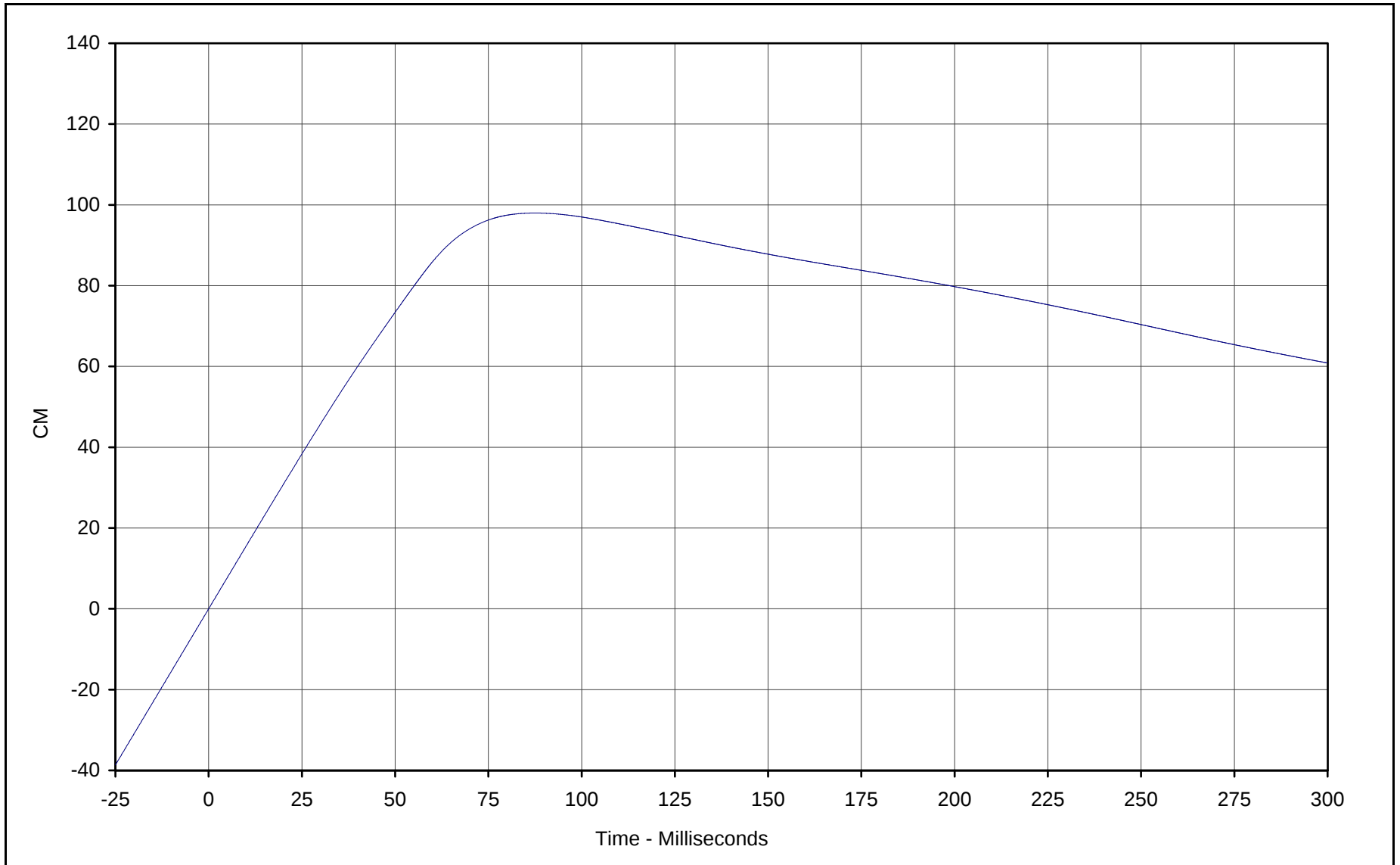


Curve Description: Passenger Pelvis X Velocity  
Maximum Value: 55.8 at 0.9 Milliseconds  
Minimum Value: -7.3 at 249.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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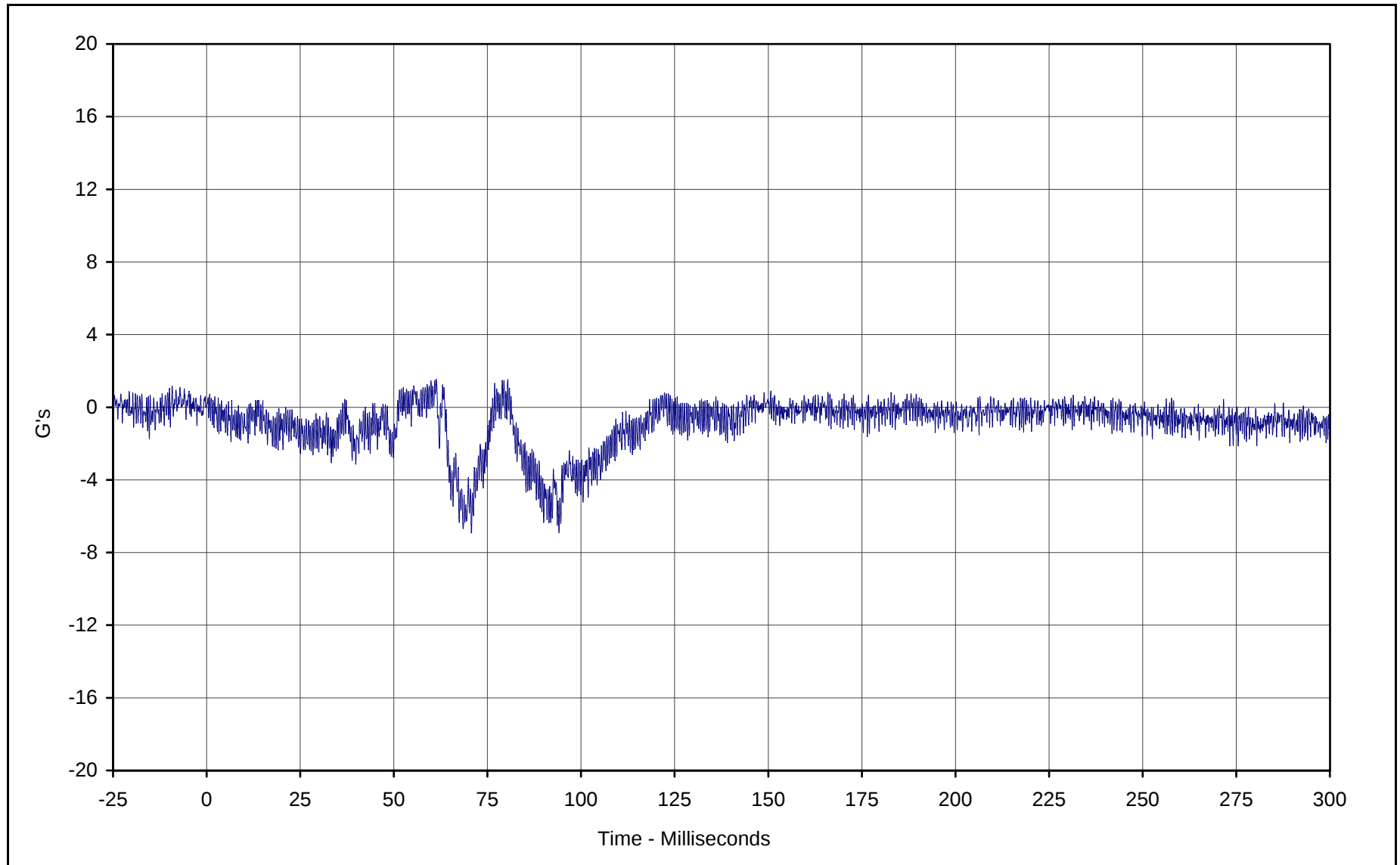
Curve Description: Passenger Pelvis X Displ.  
Maximum Value: 98.0 at 87.5 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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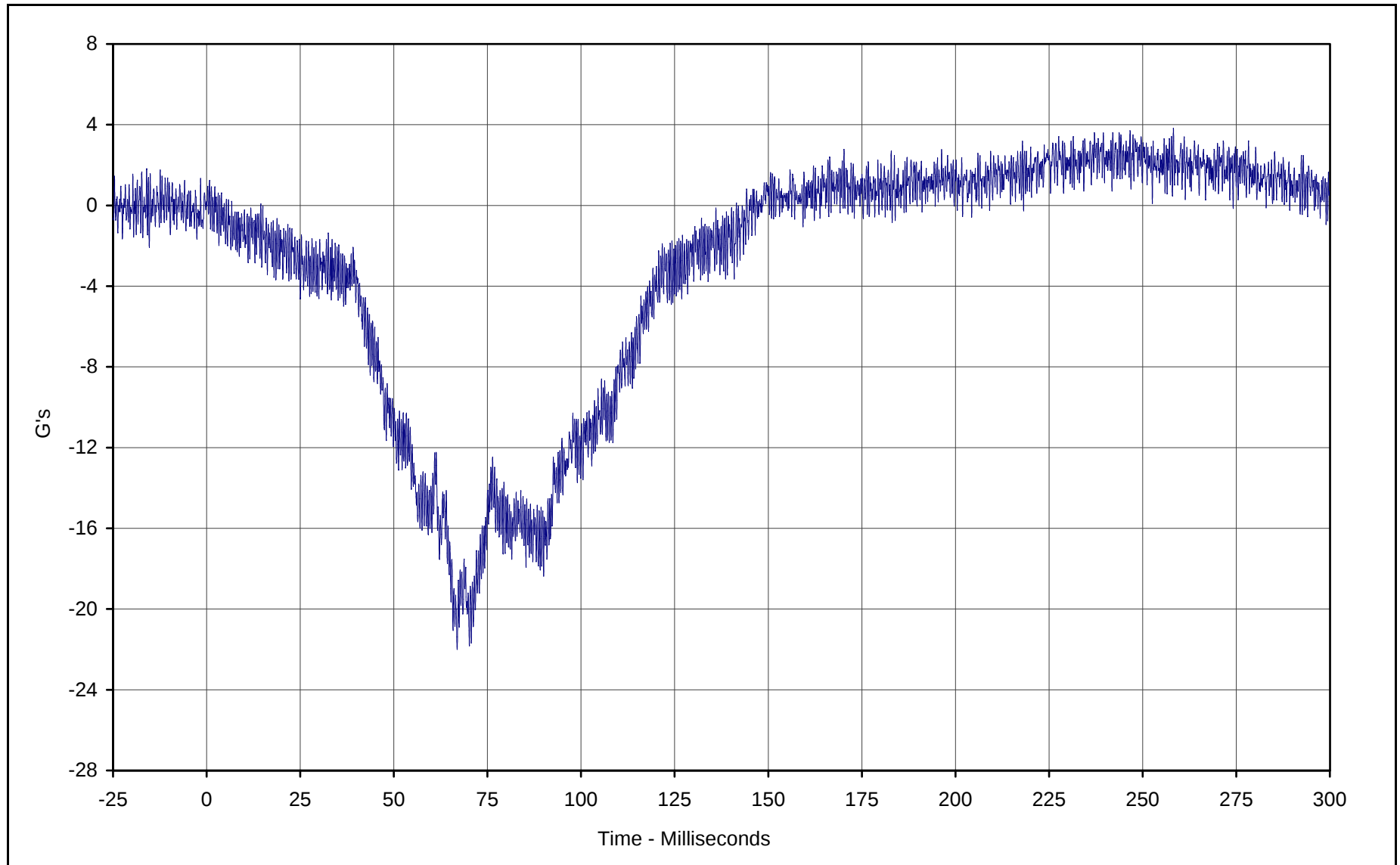
Curve Description: Passenger Pelvis Y  
Maximum Value: 1.5 at 61.3 Milliseconds  
Minimum Value: -6.9 at 70.7 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: FIL-065

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-99



Curve Description: Passenger Pelvis Z

Maximum Value: 3.8 at 258.2 Milliseconds

Minimum Value: -22.0 at 66.9 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/30/01

Curve Number: FIL-066

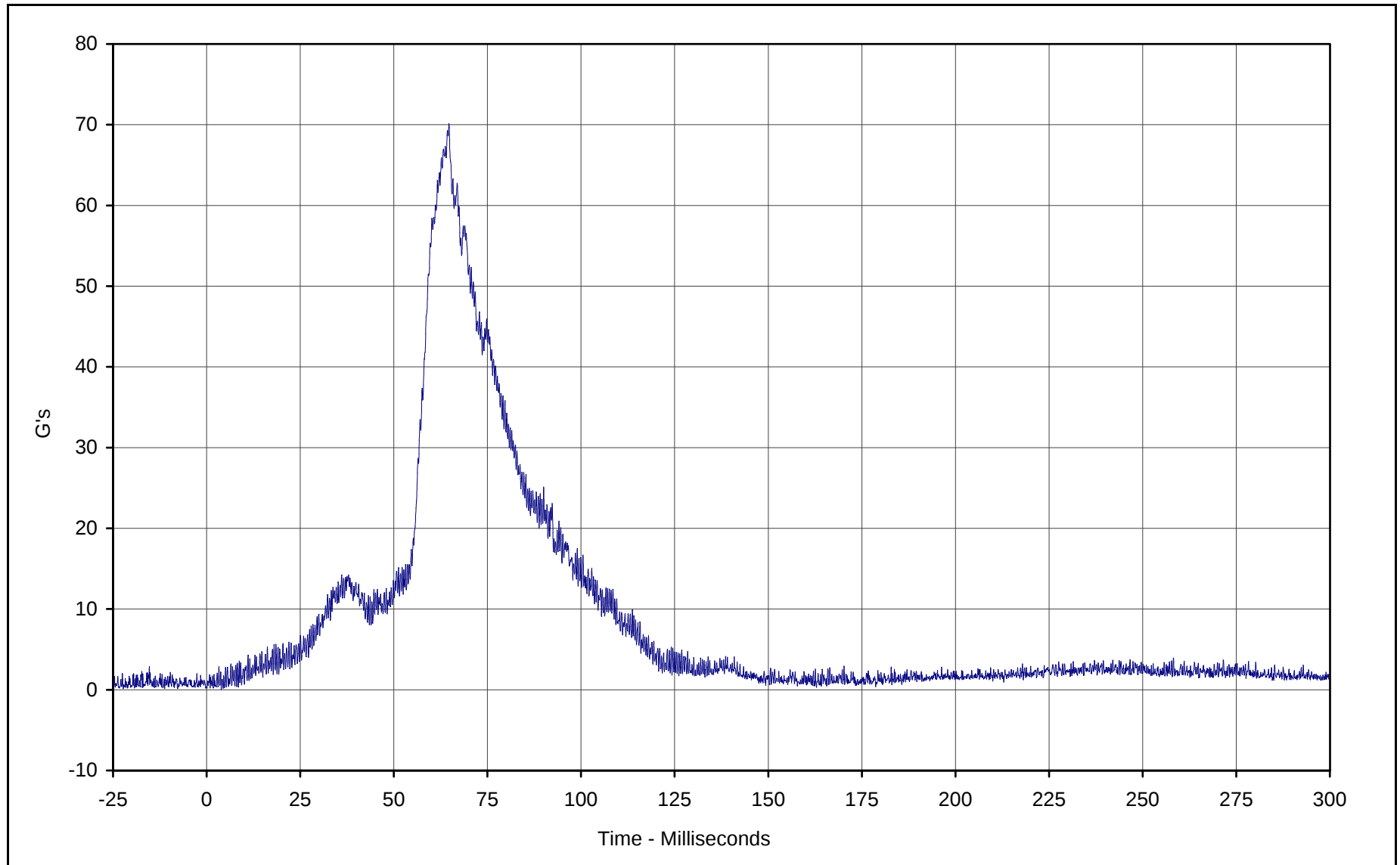
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-100



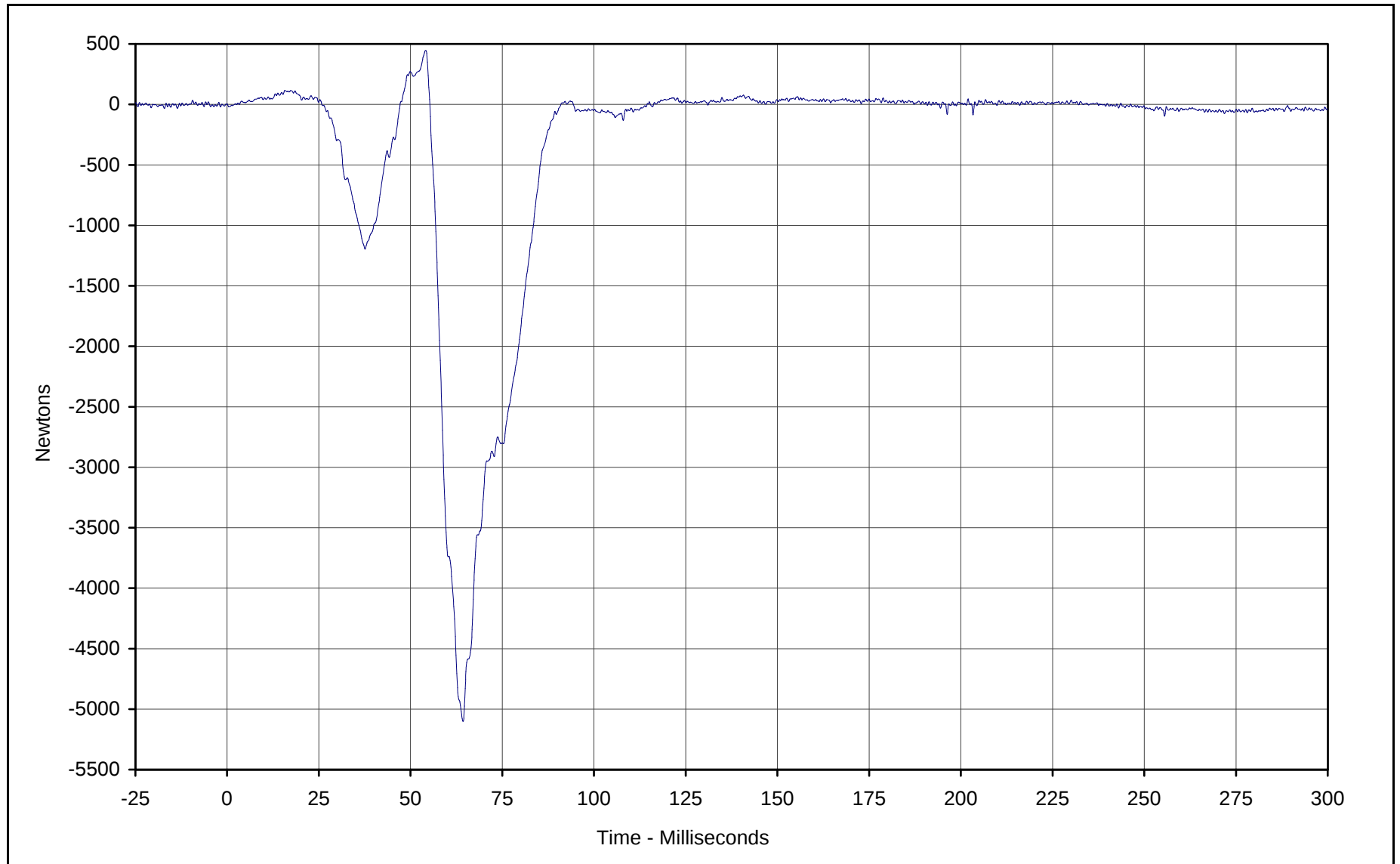
Curve Description: Passenger Pelvis Resultant  
Maximum Value: 70.2 at 64.7 Milliseconds  
Minimum Value: 0.1 at 3.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/30/01  
Curve Number: RES-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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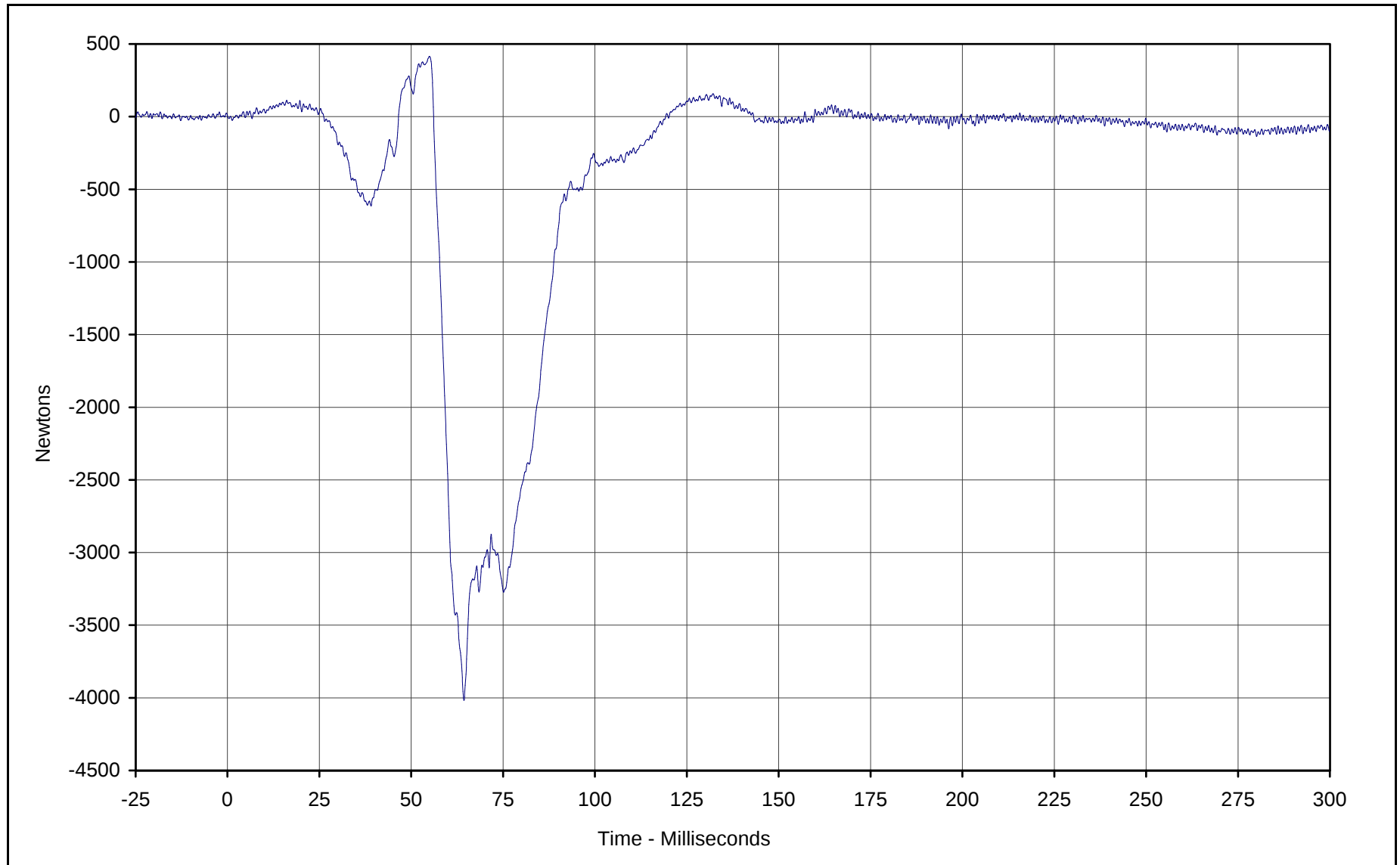


Curve Description: Passenger Left Femur Force  
Maximum Value: 445.9 at 54.1 Milliseconds  
Minimum Value: -5102.1 at 64.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-067

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



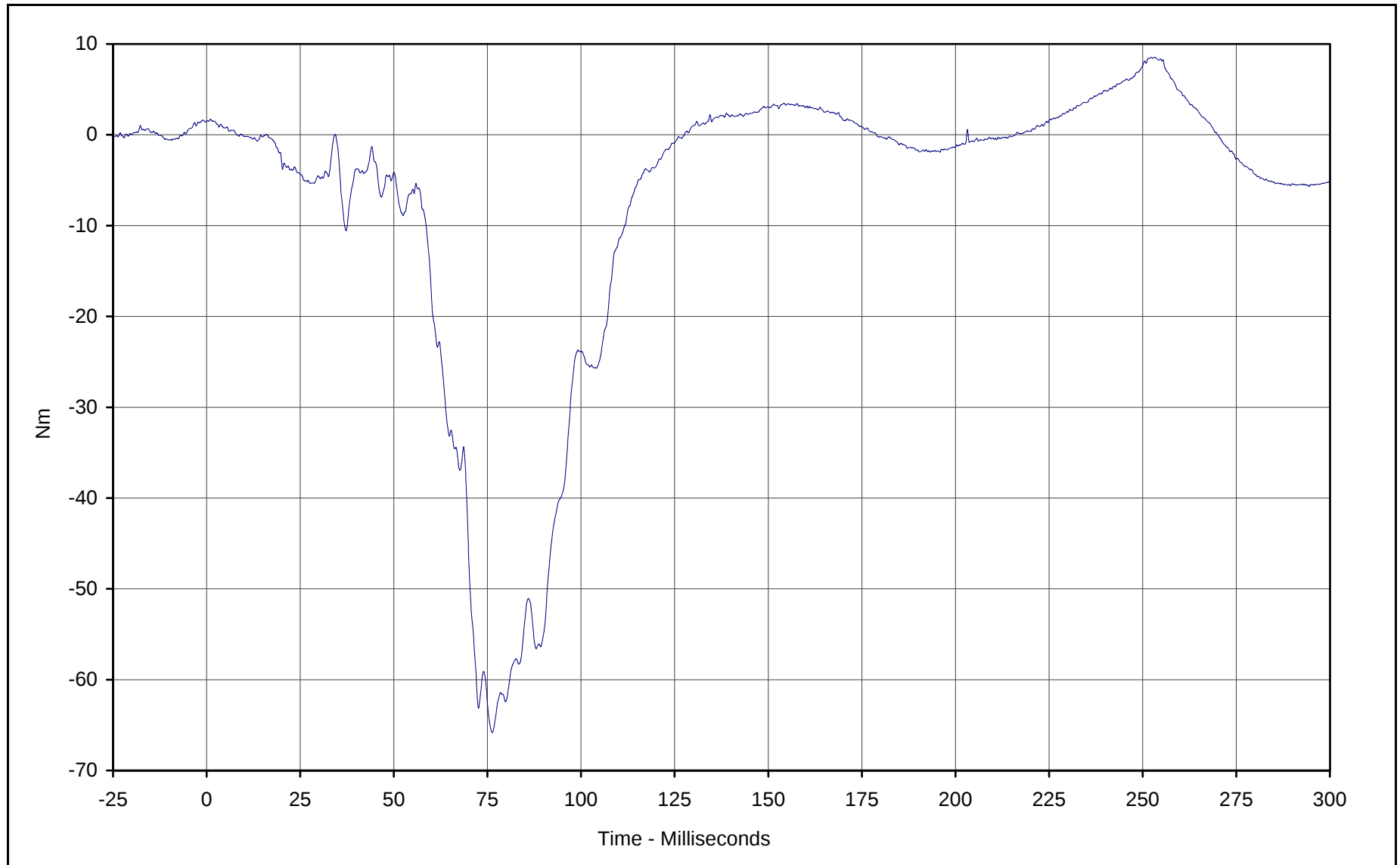
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Curve Description: Passenger Right Femur Force  
Maximum Value: 414.9 at 55.0 Milliseconds  
Minimum Value: -4017.0 at 64.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/30/01  
Curve Number: FIL-068

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan





Curve Description: Passenger Left Upper Tibia Moment X

Maximum Value: 8.5 at 252.3 Milliseconds

Minimum Value: -65.8 at 76.2 Milliseconds

SAE Filter Class: 600

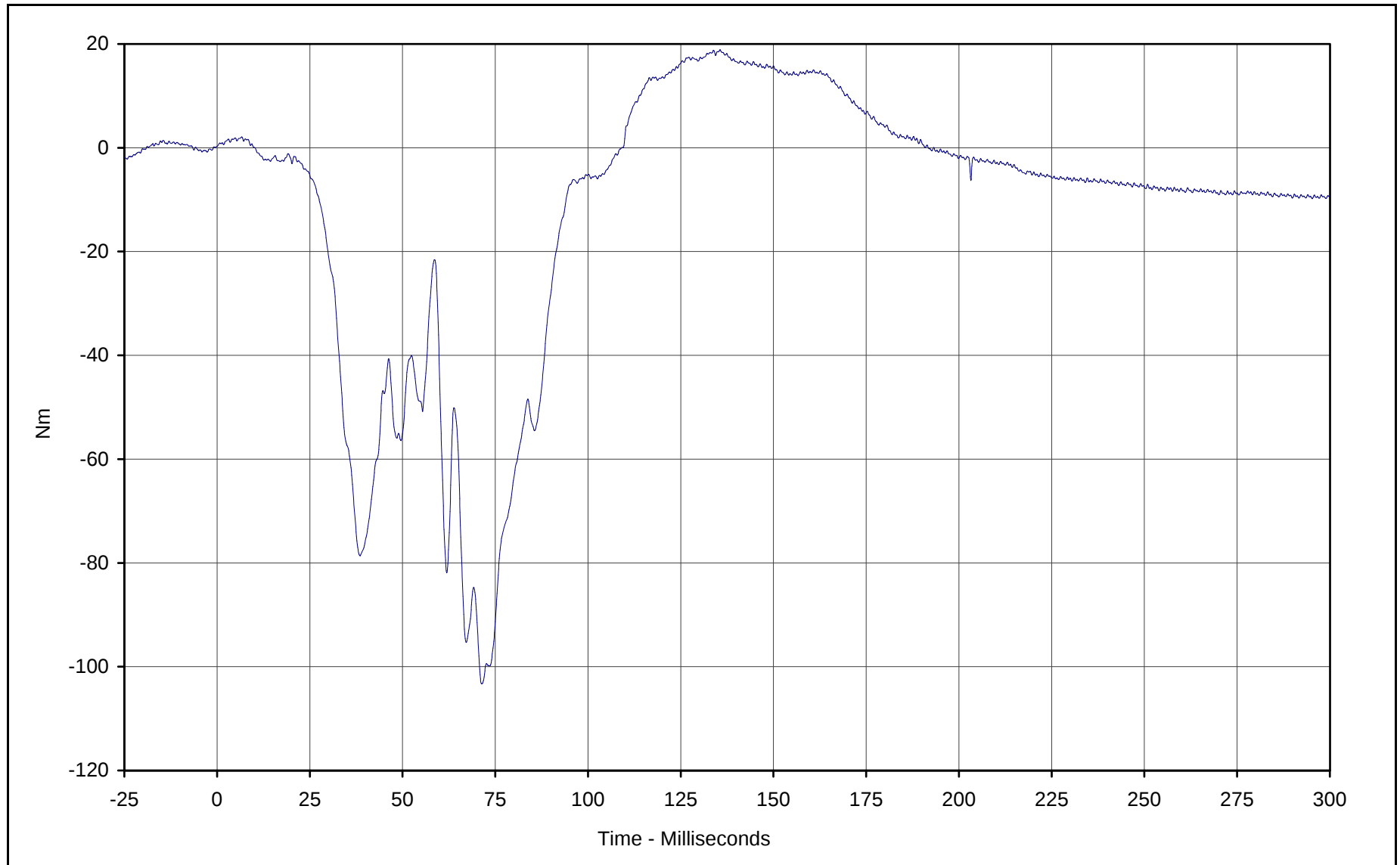
Date of Test: 01/30/01

Curve Number: FIL-069

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan





Curve Description: Passenger Left Upper Tibia Moment Y

Maximum Value: 18.9 at 135.6 Milliseconds

Minimum Value: -103.3 at 71.4 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

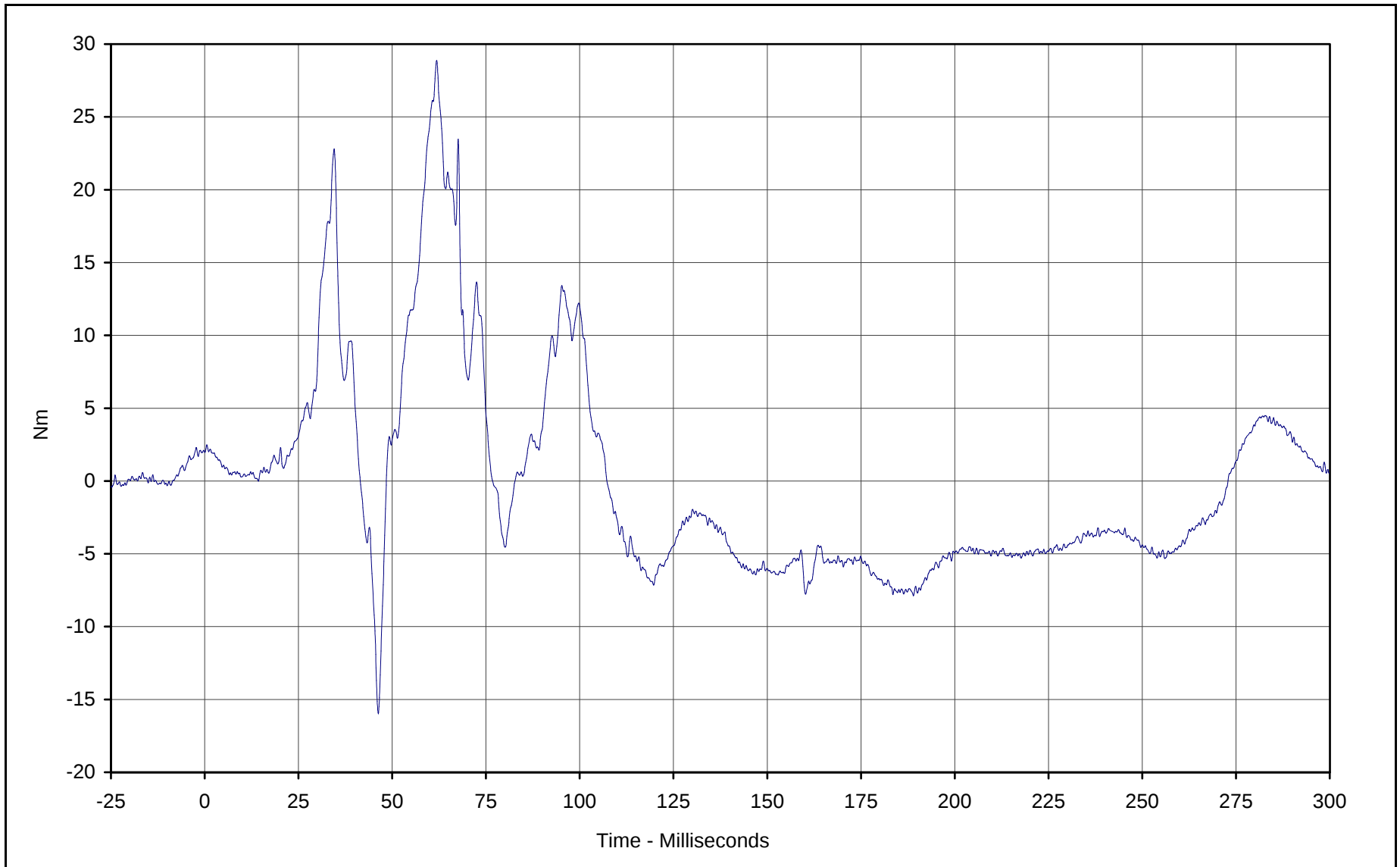
Curve Number: FIL-070

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



B-105



Curve Description: Passenger Right Upper Tibia Moment X

Maximum Value: 28.9 at 61.9 Milliseconds

Minimum Value: -16.0 at 46.3 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

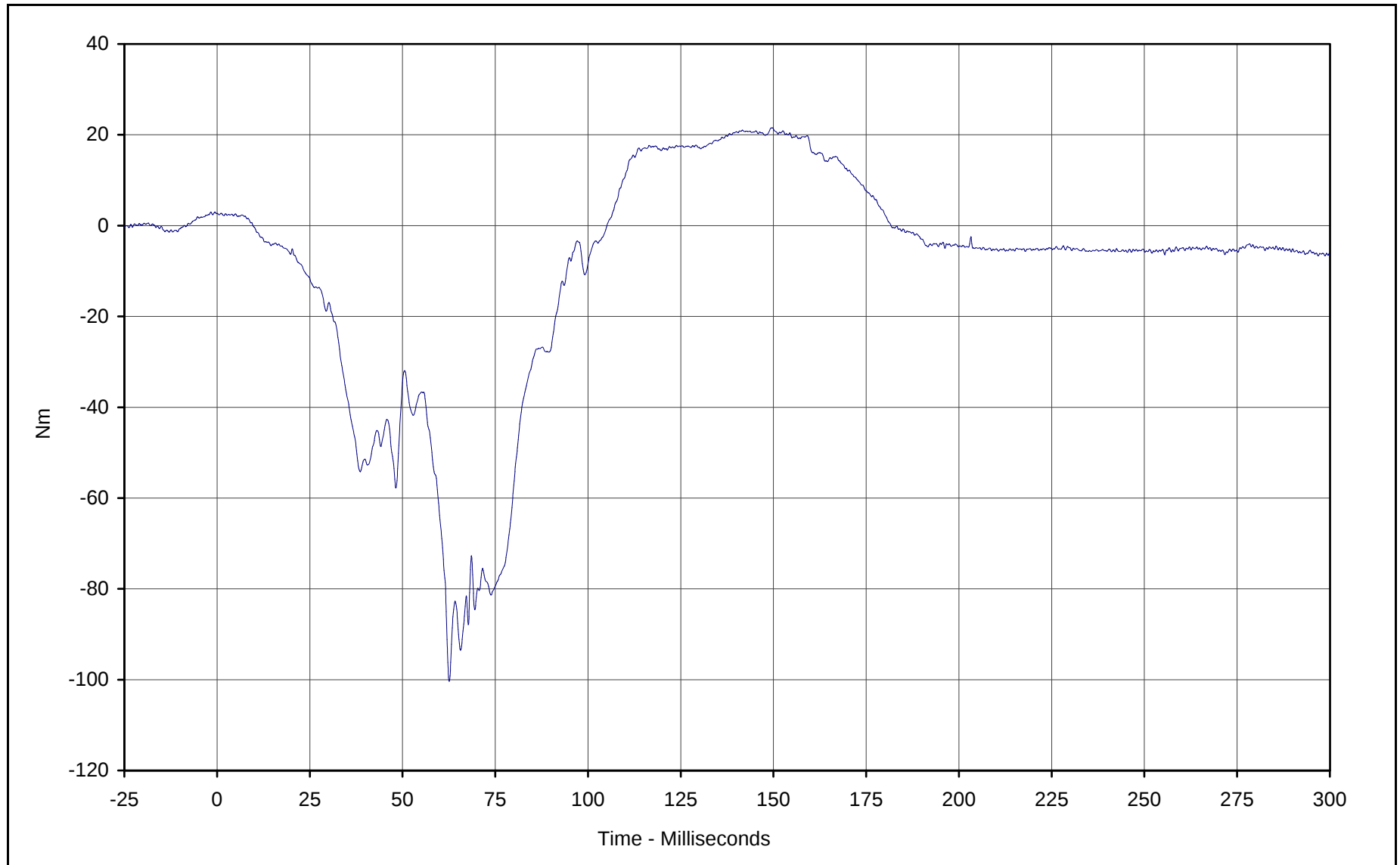
Curve Number: FIL-071

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Right Upper Tibia Moment Y

Maximum Value: 21.5 at 149.8 Milliseconds

Minimum Value: -100.4 at 62.6 Milliseconds

SAE Filter Class: 600

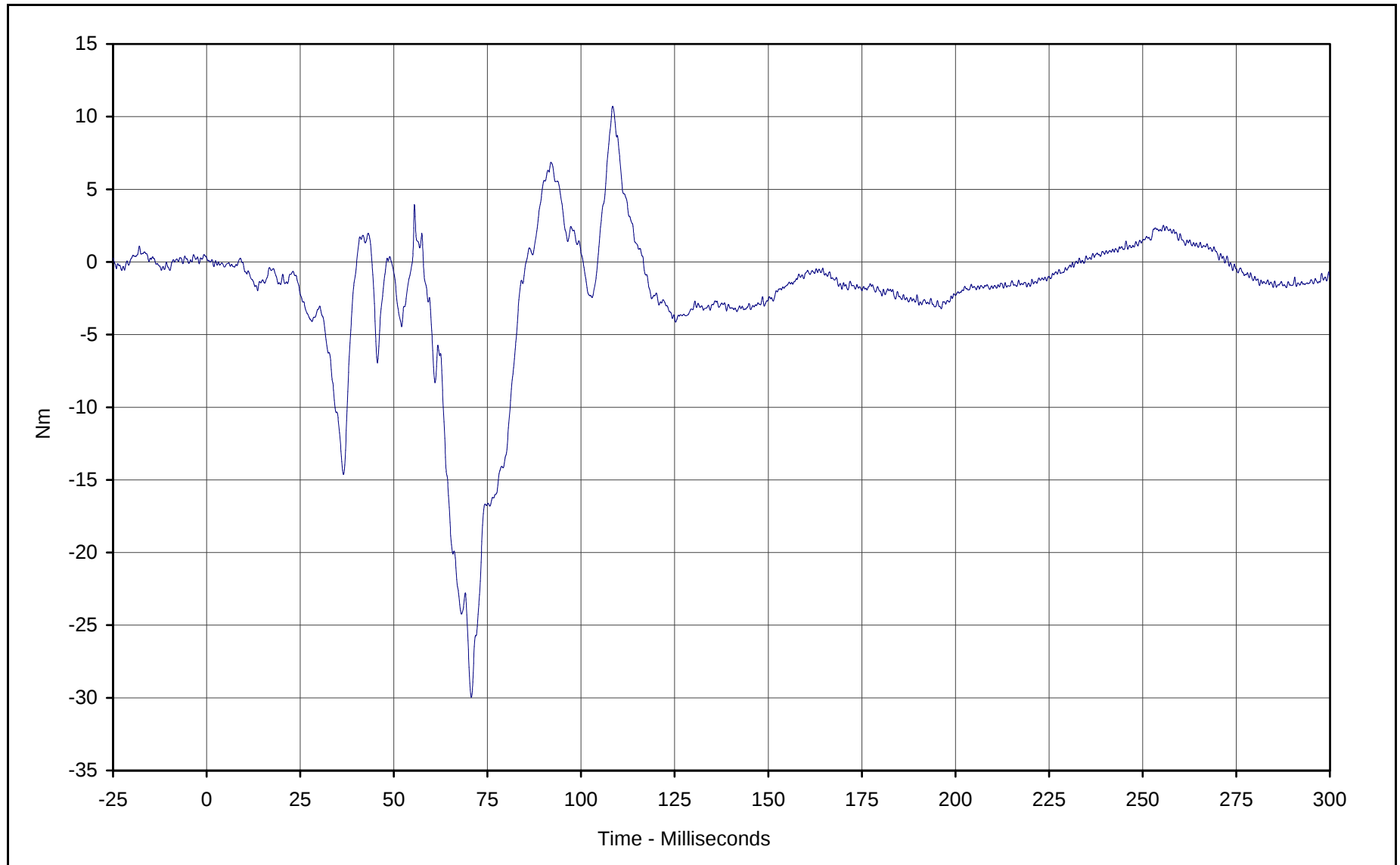
Date of Test: 01/30/01

Curve Number: FIL-072

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan





Curve Description: Passenger Left Lower Tibia Moment X

Maximum Value: 10.7 at 108.5 Milliseconds

Minimum Value: -30.0 at 70.7 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

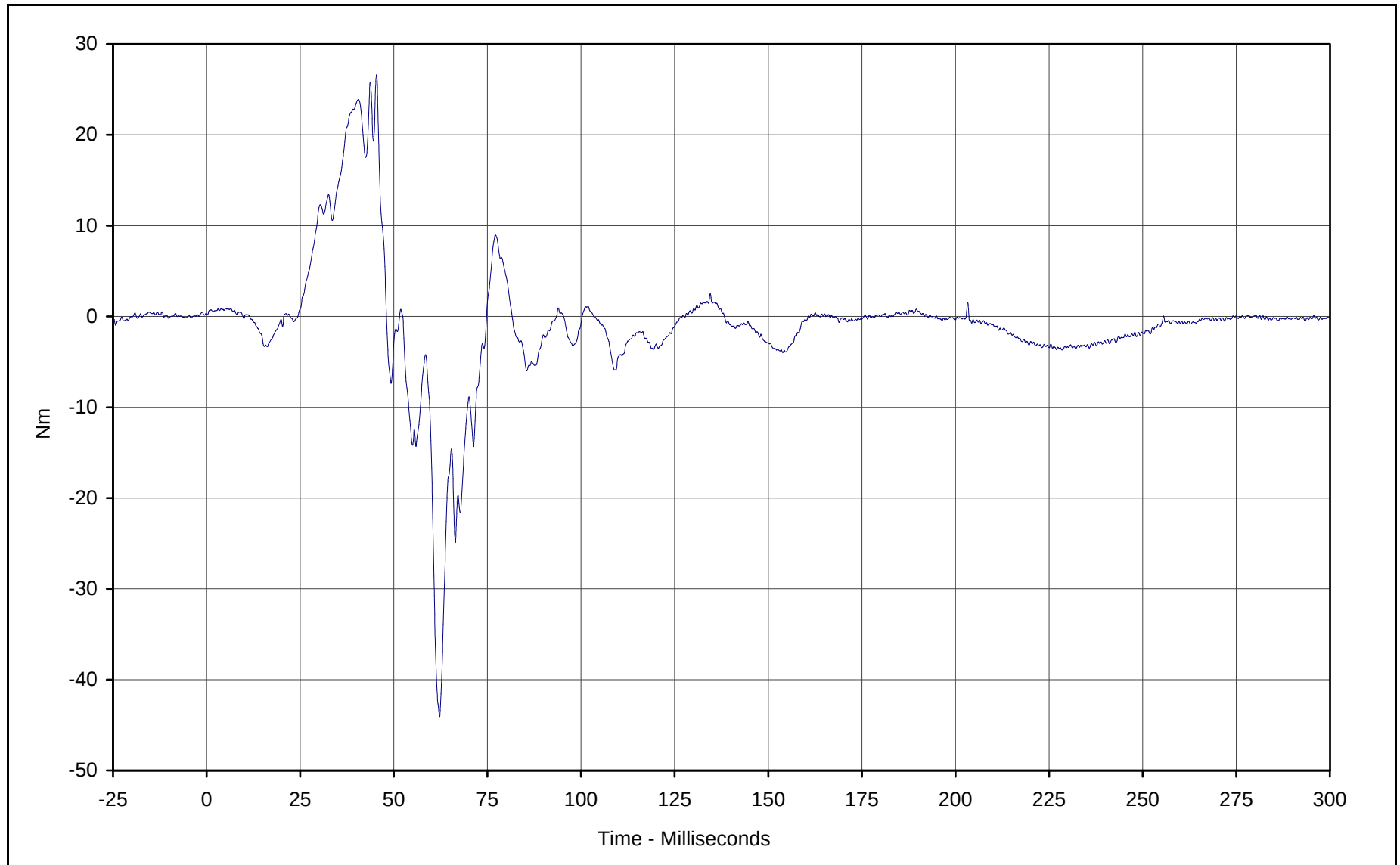
Curve Number: FIL-073

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Left Lower Tibia Moment Y

Maximum Value: 26.6 at 45.4 Milliseconds

Minimum Value: -44.1 at 62.2 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

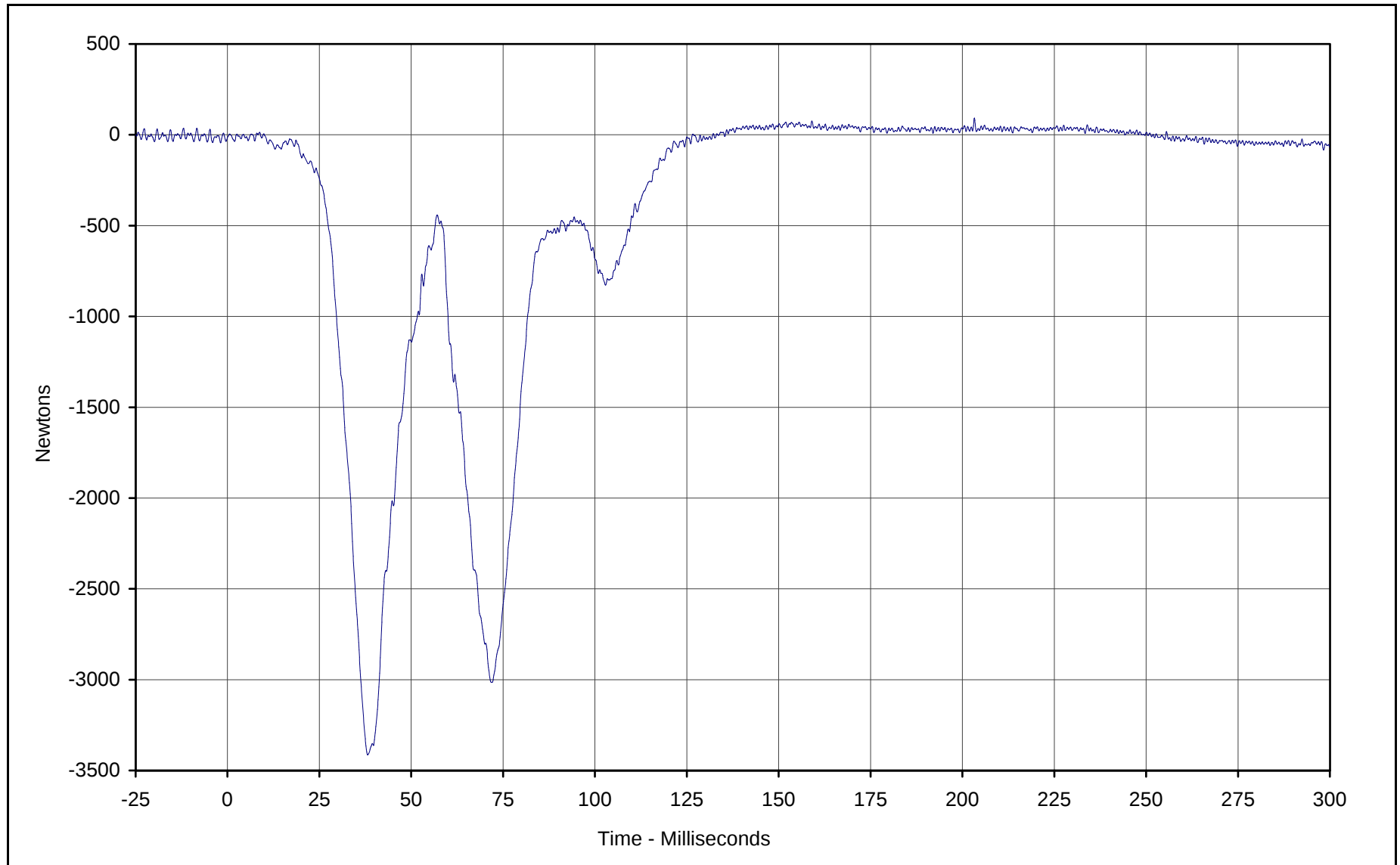
Curve Number: FIL-074

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Left Lower Tibia Force Z

Maximum Value: 92.3 at 203.3 Milliseconds

Minimum Value: -3414.8 at 38.1 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

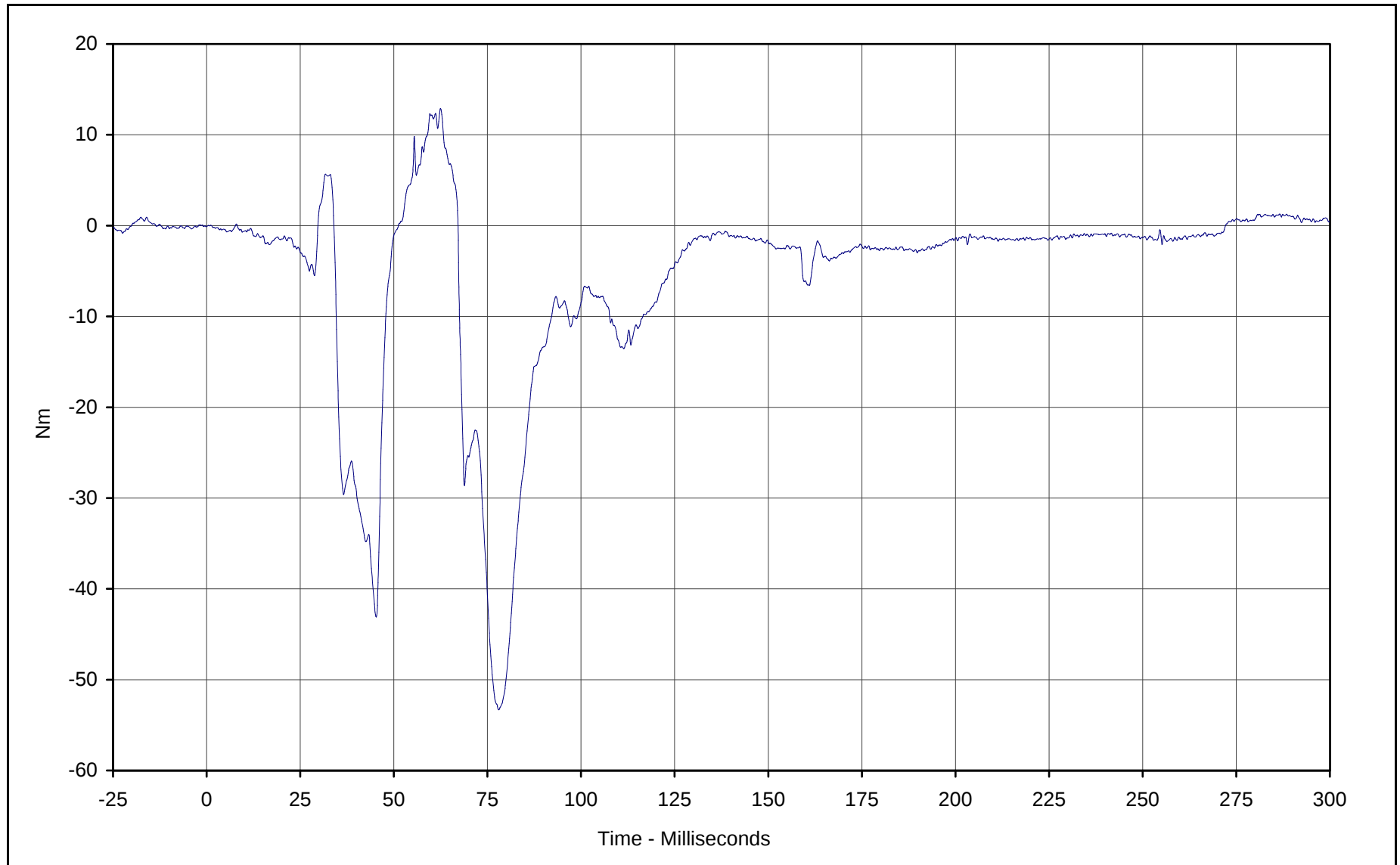
Curve Number: FIL-075

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



B-110



Curve Description: Passenger Right Lower Tibia Moment X

Maximum Value: 12.9 at 62.5 Milliseconds

Minimum Value: -53.3 at 78.0 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

Curve Number: FIL-076

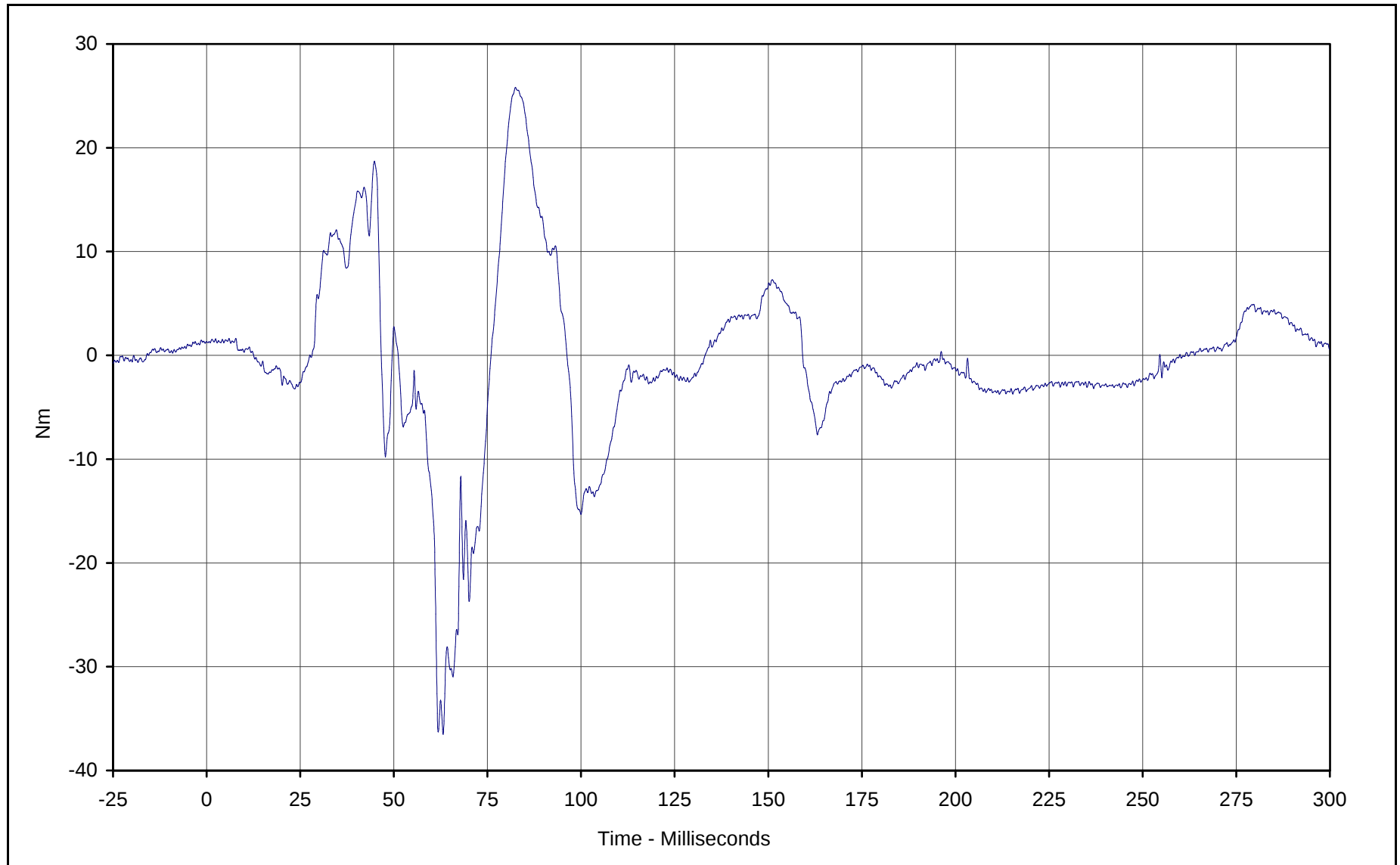
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-111



Curve Description: Passenger Right Lower Tibia Moment Y

Maximum Value: 25.8 at 82.5 Milliseconds

Minimum Value: -36.5 at 63.2 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

Curve Number: FIL-077

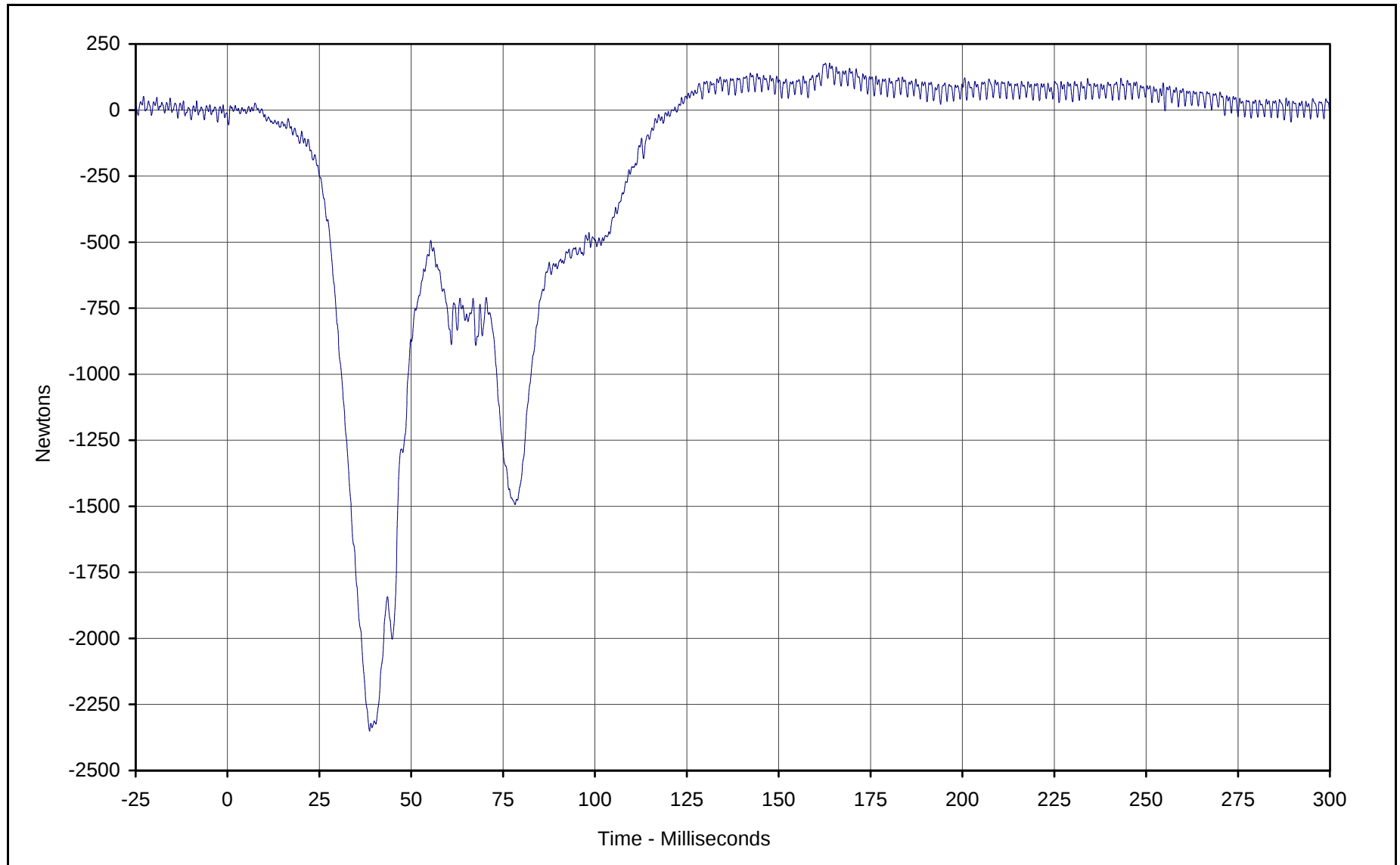
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-112



Curve Description: Passenger Right lower Tibia Force Z

Maximum Value: 177.8 at 163.8 Milliseconds

Minimum Value: -2350.1 at 38.7 Milliseconds

SAE Filter Class: 600

Date of Test: 01/30/01

Curve Number: FIL-078

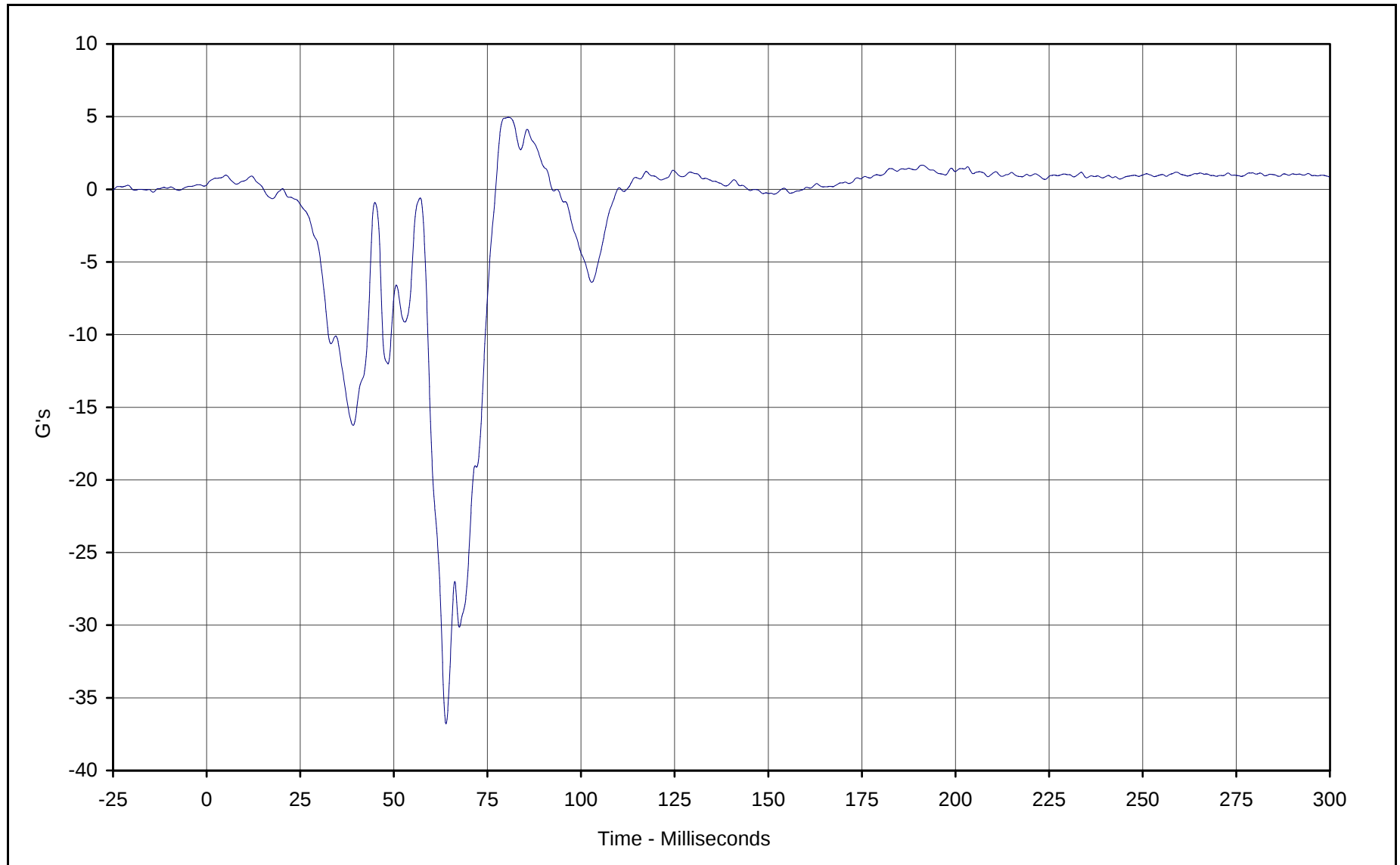
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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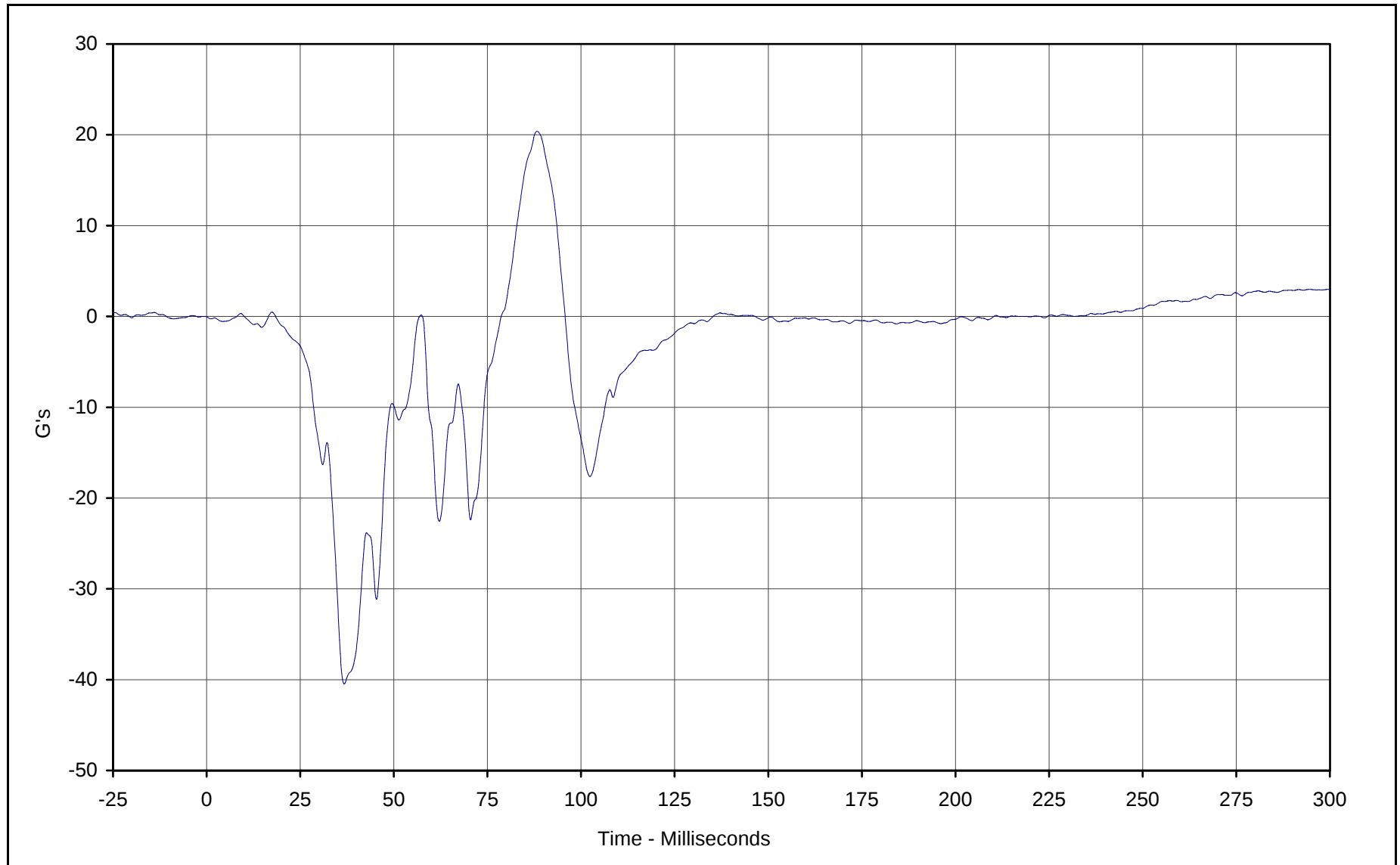
Curve Description: Passenger Left Foot Aft X  
Maximum Value: 5.0 at 80.6 Milliseconds  
Minimum Value: -36.8 at 63.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-079

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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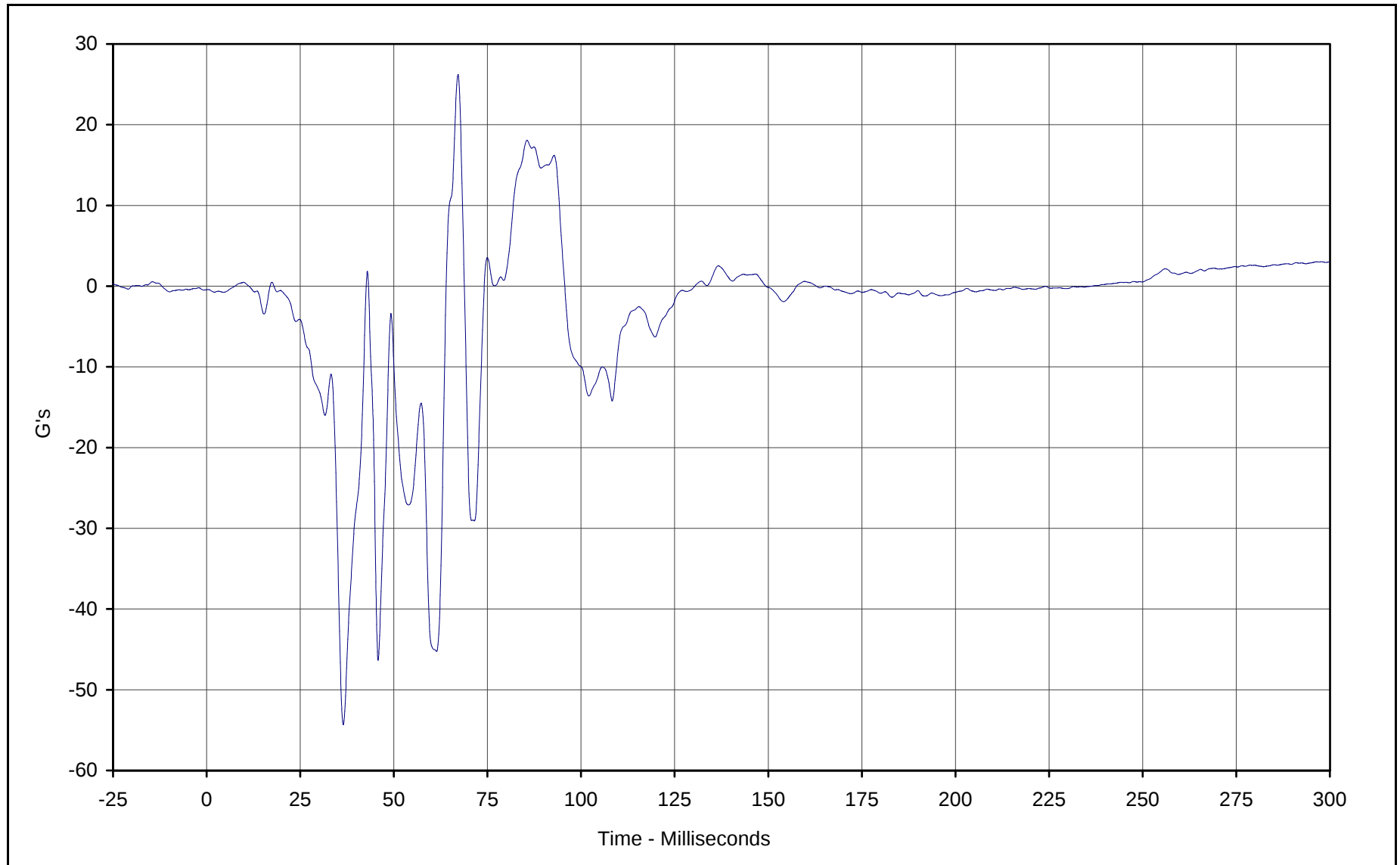
Curve Description: Passenger Left Foot Aft Z  
Maximum Value: 20.4 at 88.3 Milliseconds  
Minimum Value: -40.5 at 36.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-080

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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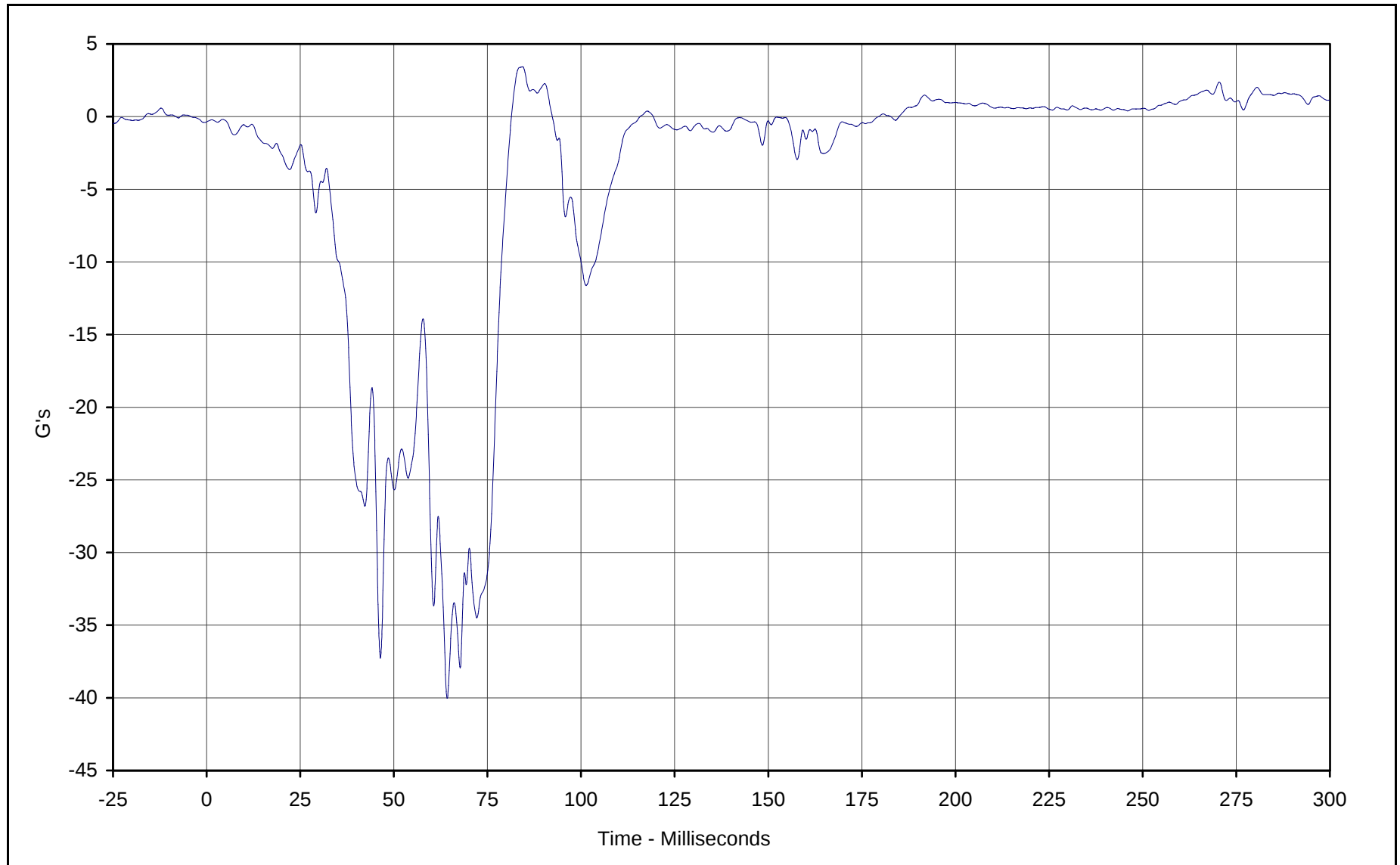
Curve Description: Passenger Left Foot Fore Z  
Maximum Value: 26.2 at 67.1 Milliseconds  
Minimum Value: -54.4 at 36.5 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-081

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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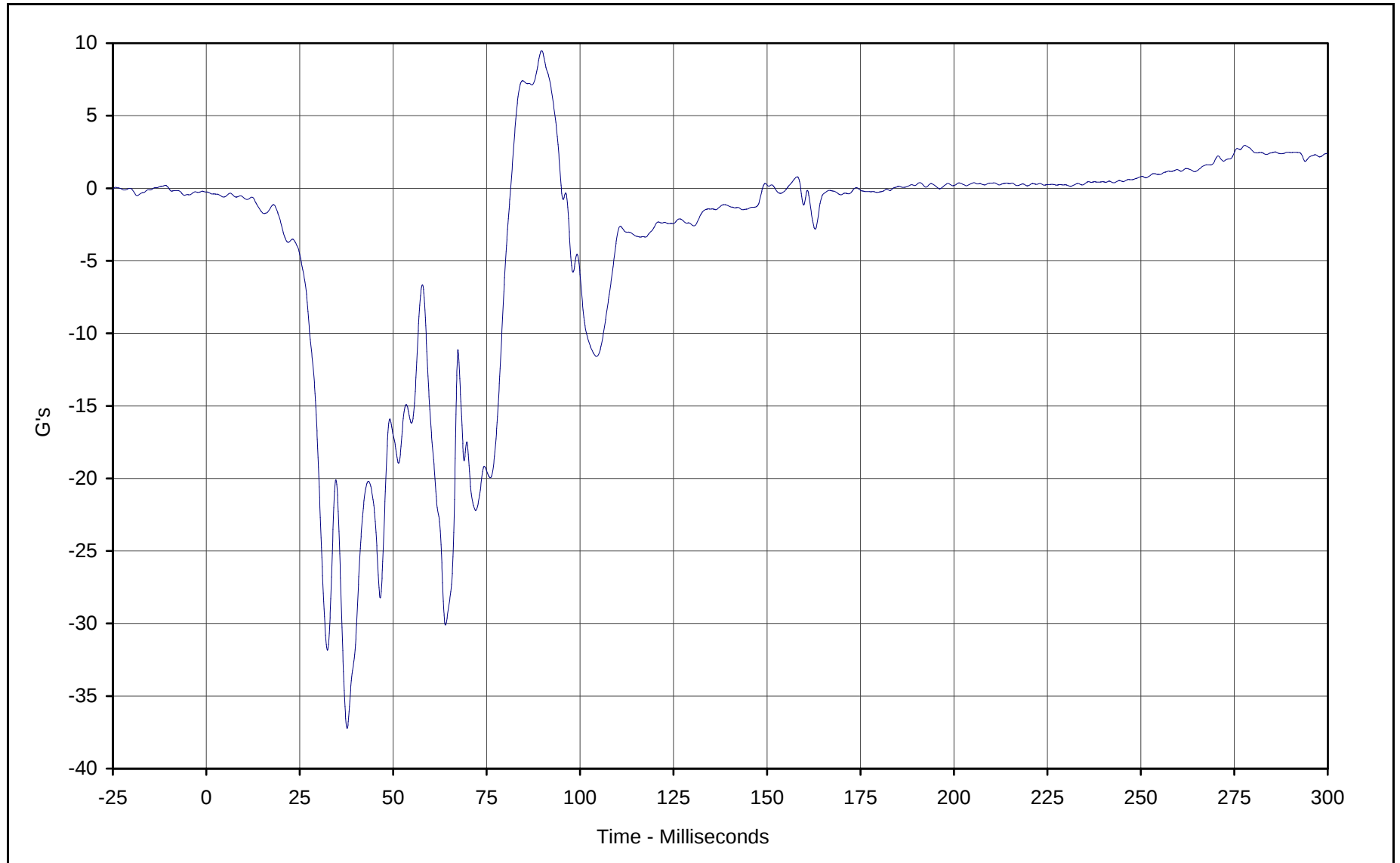
Curve Description: Passenger Right Foot Aft X  
Maximum Value: 3.4 at 84.4 Milliseconds  
Minimum Value: -40.0 at 64.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-082

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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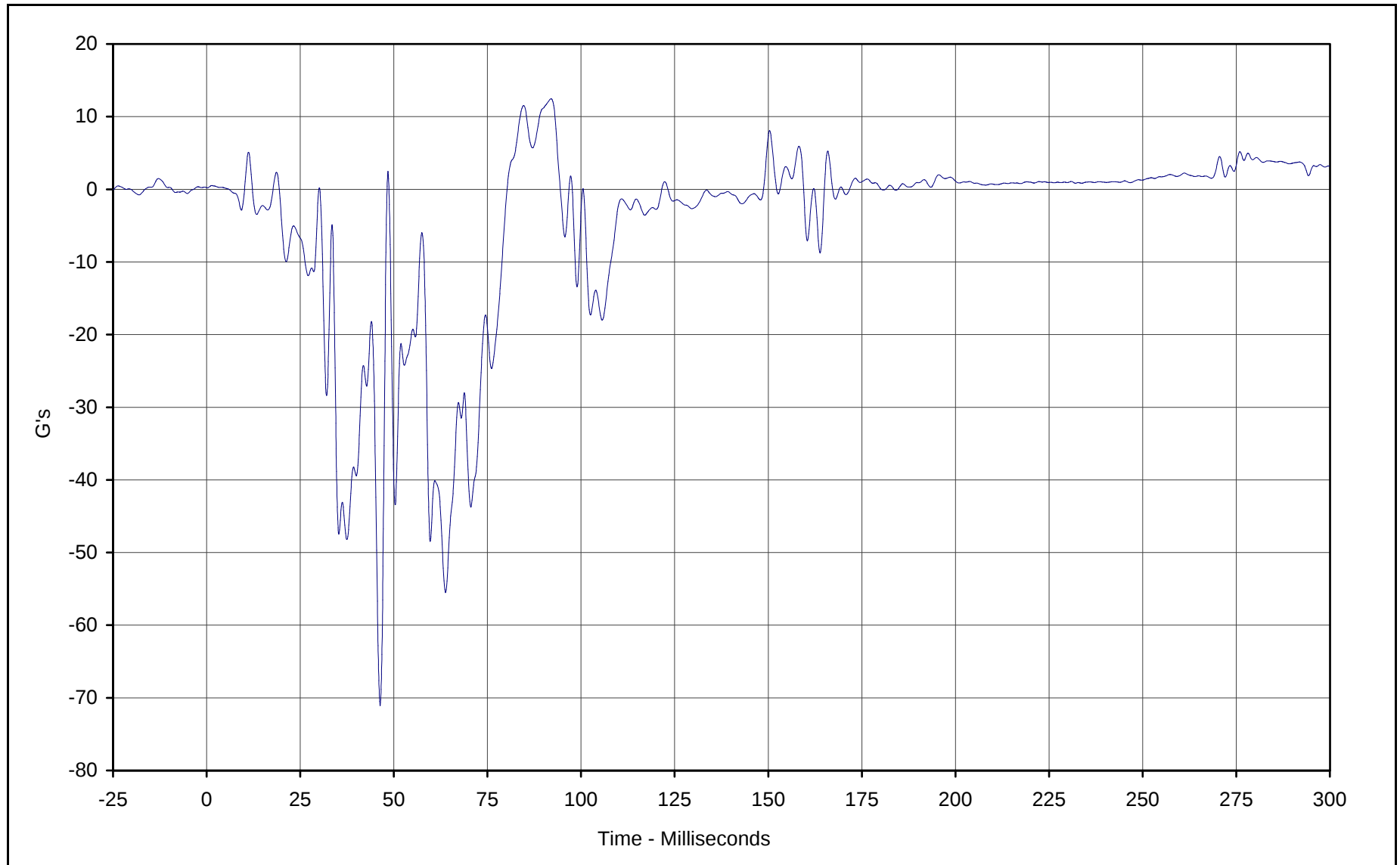
Curve Description: Passenger Right Foot Aft Z  
Maximum Value: 9.5 at 89.7 Milliseconds  
Minimum Value: -37.2 at 37.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-083

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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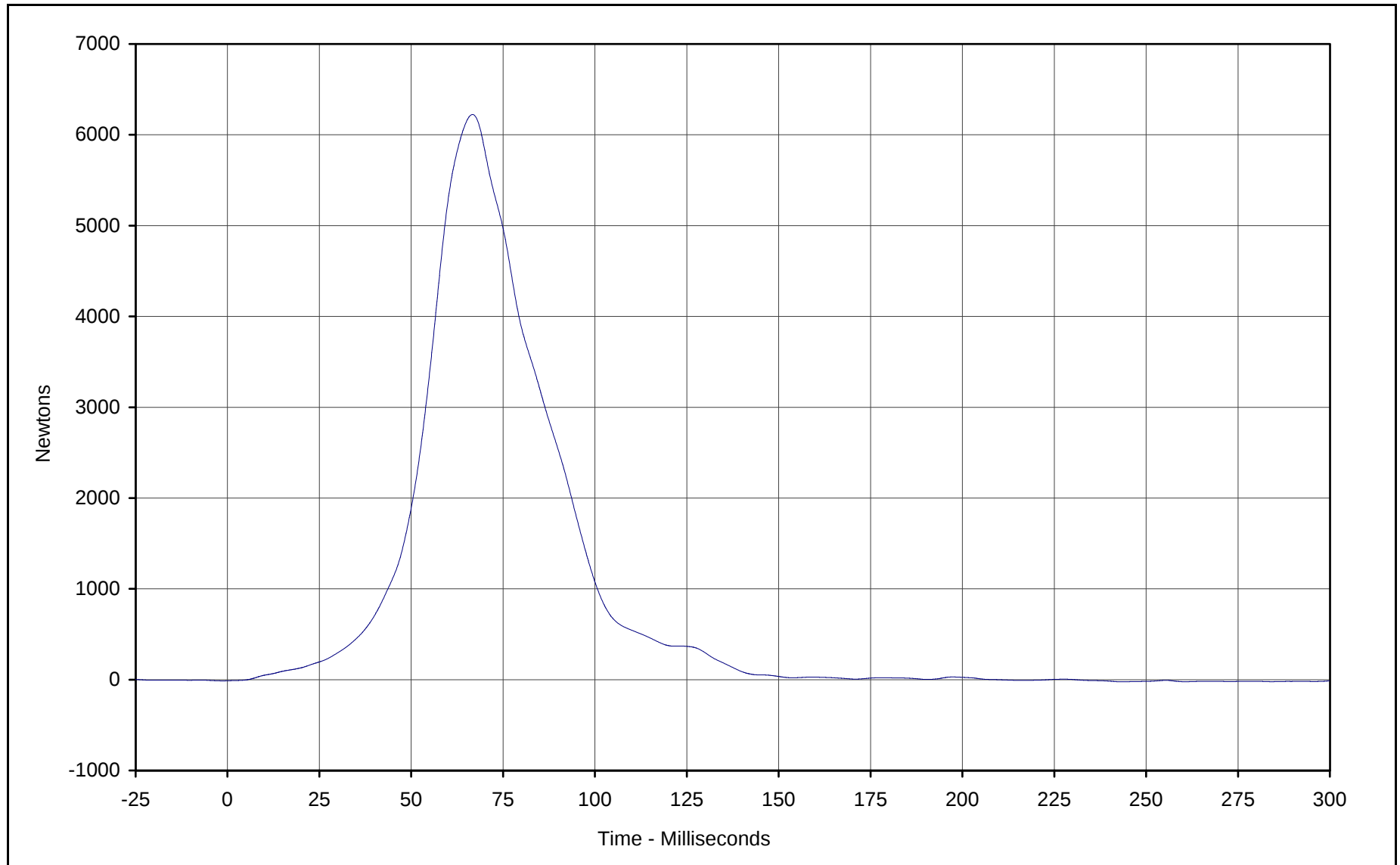
Curve Description: Passenger Right Foot Fore Z  
Maximum Value: 12.5 at 92.0 Milliseconds  
Minimum Value: -71.1 at 46.3 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: FIL-084

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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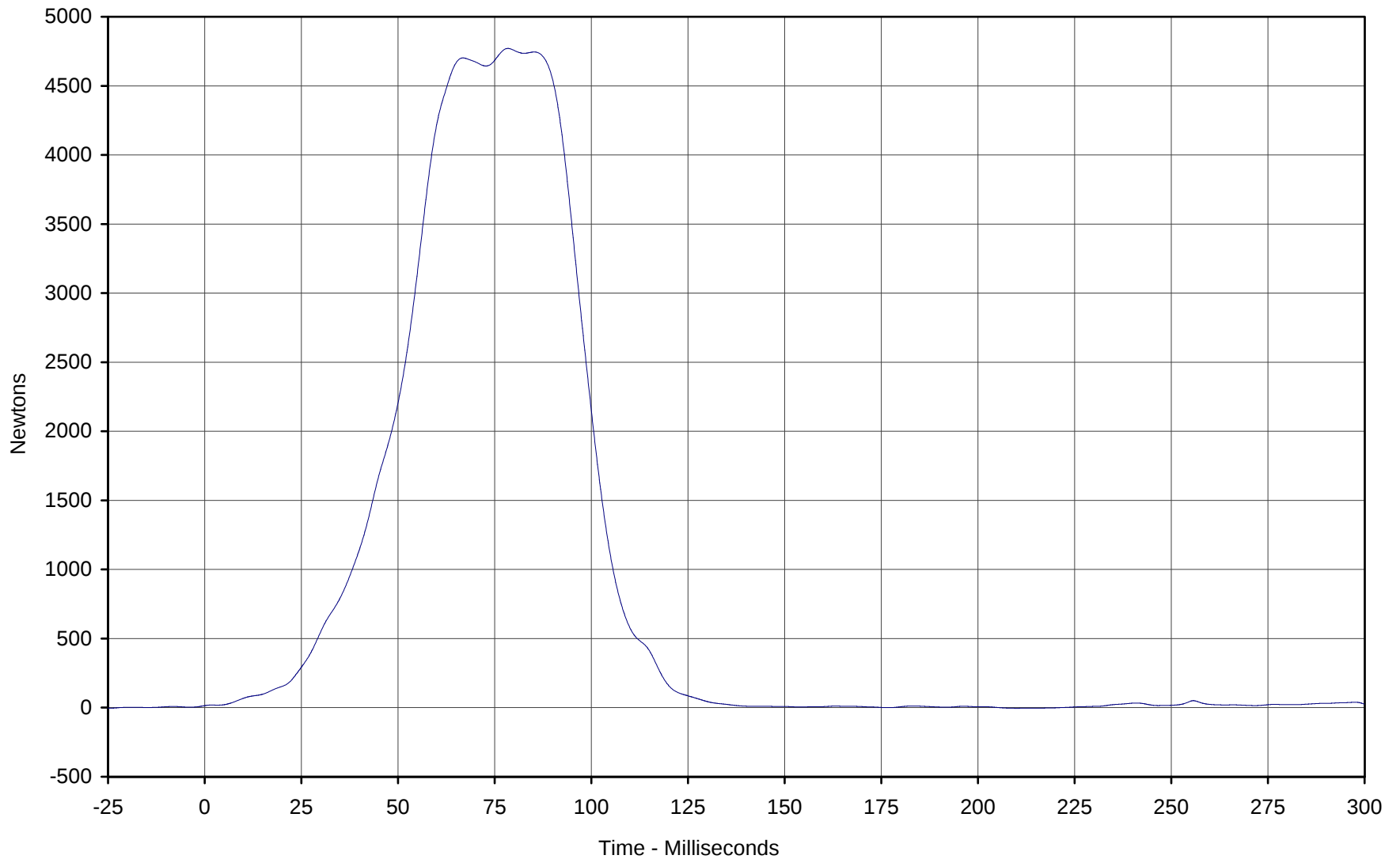
Curve Description: Passenger Lap Belt Force  
Maximum Value: 6223.5 at 66.7 Milliseconds  
Minimum Value: -24.1 at 243.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-085

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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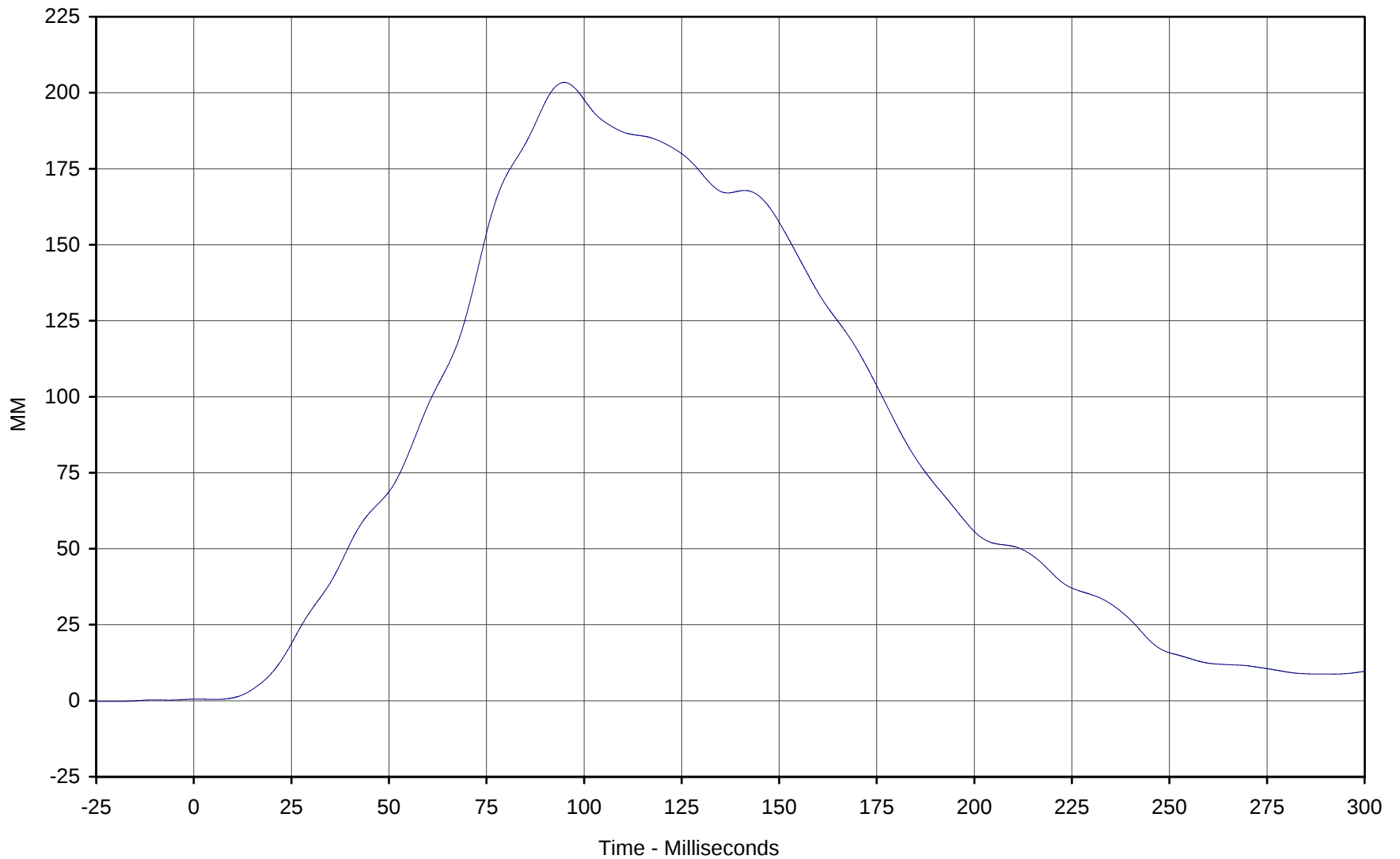
Curve Description: Passenger Shoulder Belt Force  
Maximum Value: 4770.6 at 78.4 Milliseconds  
Minimum Value: -4.8 at 210.1 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-086

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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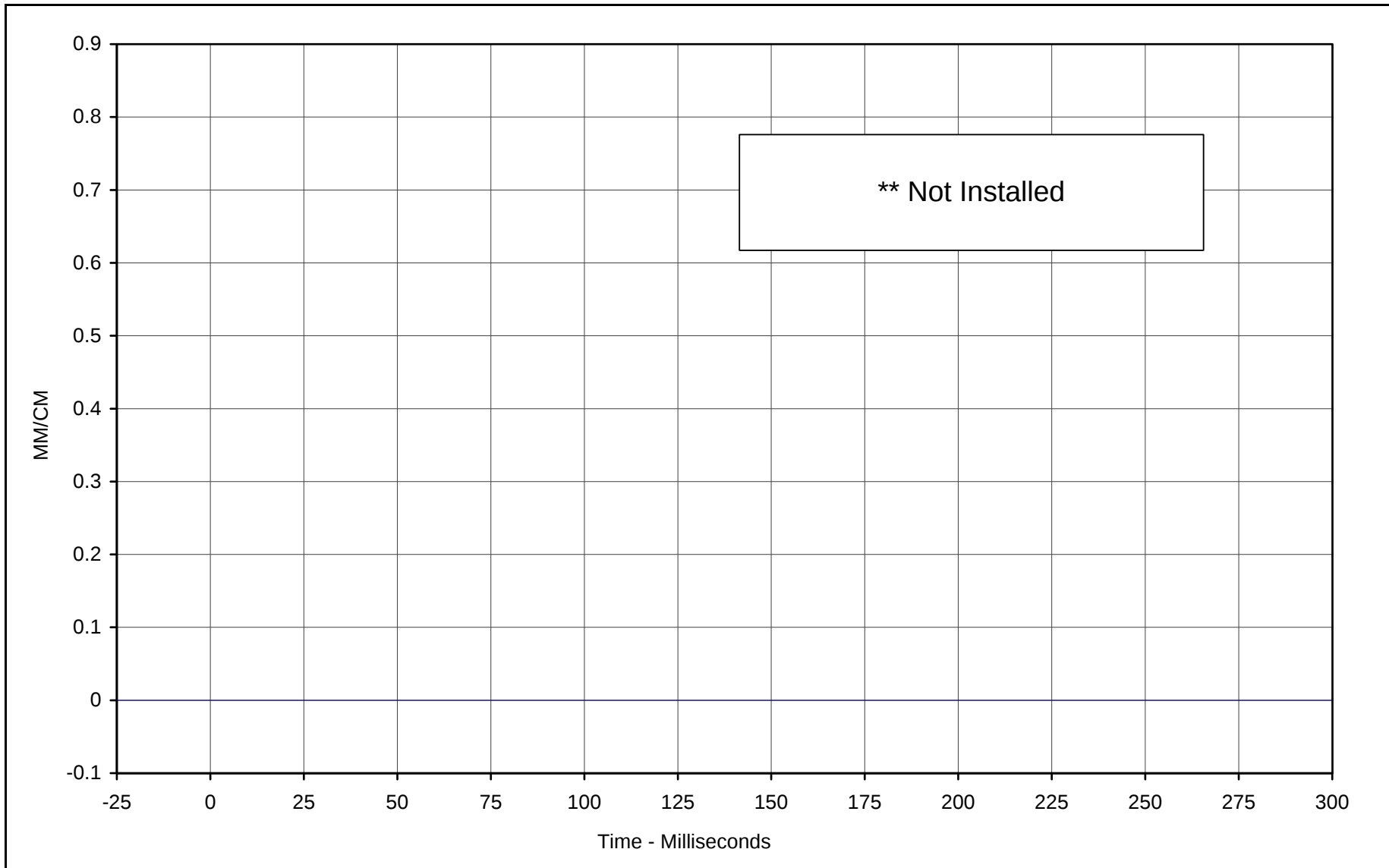
Curve Description: Passenger Shoulder Belt Pullout  
Maximum Value: 203.4 at 94.9 Milliseconds  
Minimum Value: 0.4 at 5.8 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-087

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Passenger Shoulder Belt Elongation \*\*

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Maximum Value: 0.0 at 0.0 Milliseconds

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/30/01

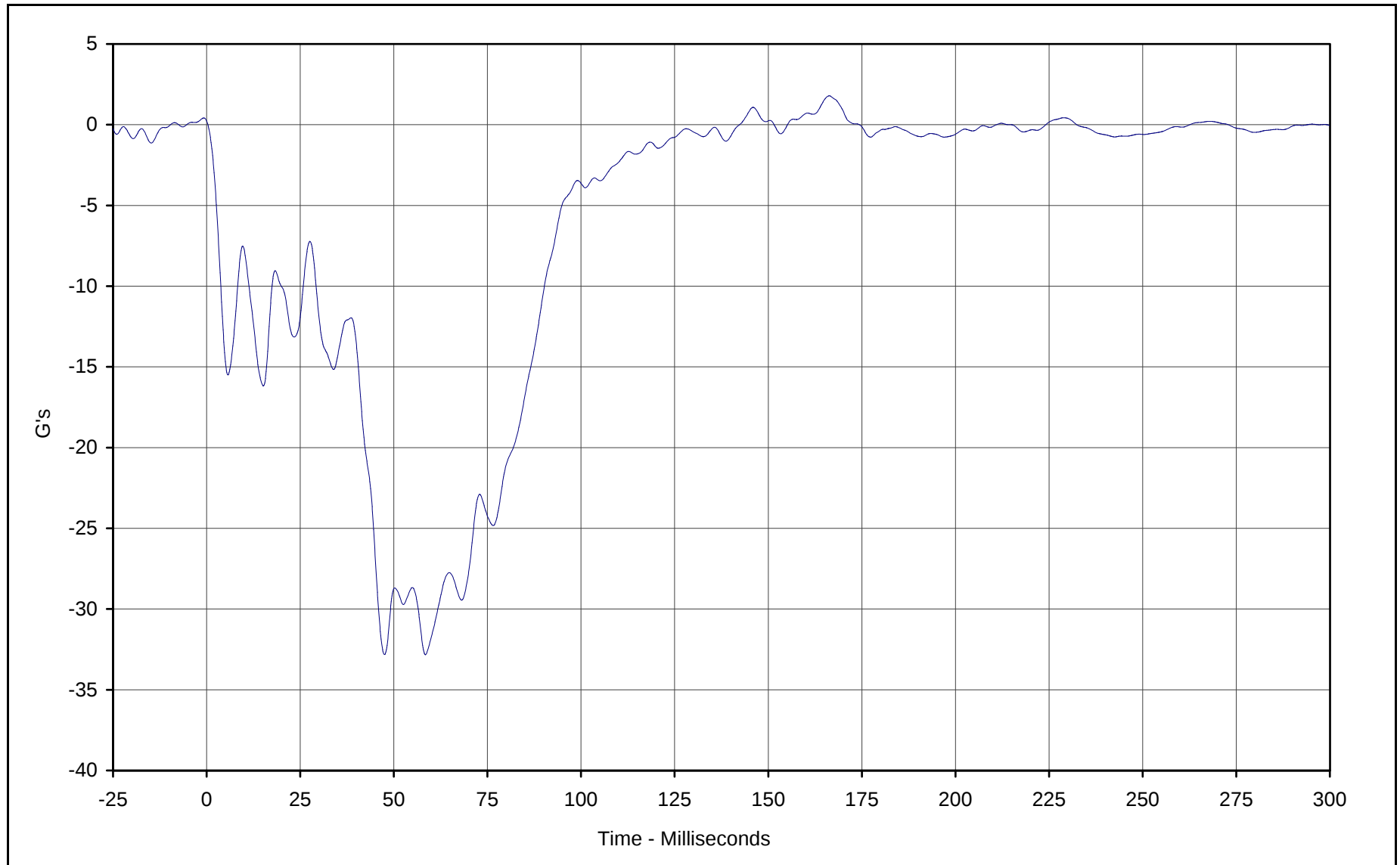
Curve Number: FIL-088

\*\* Not installed



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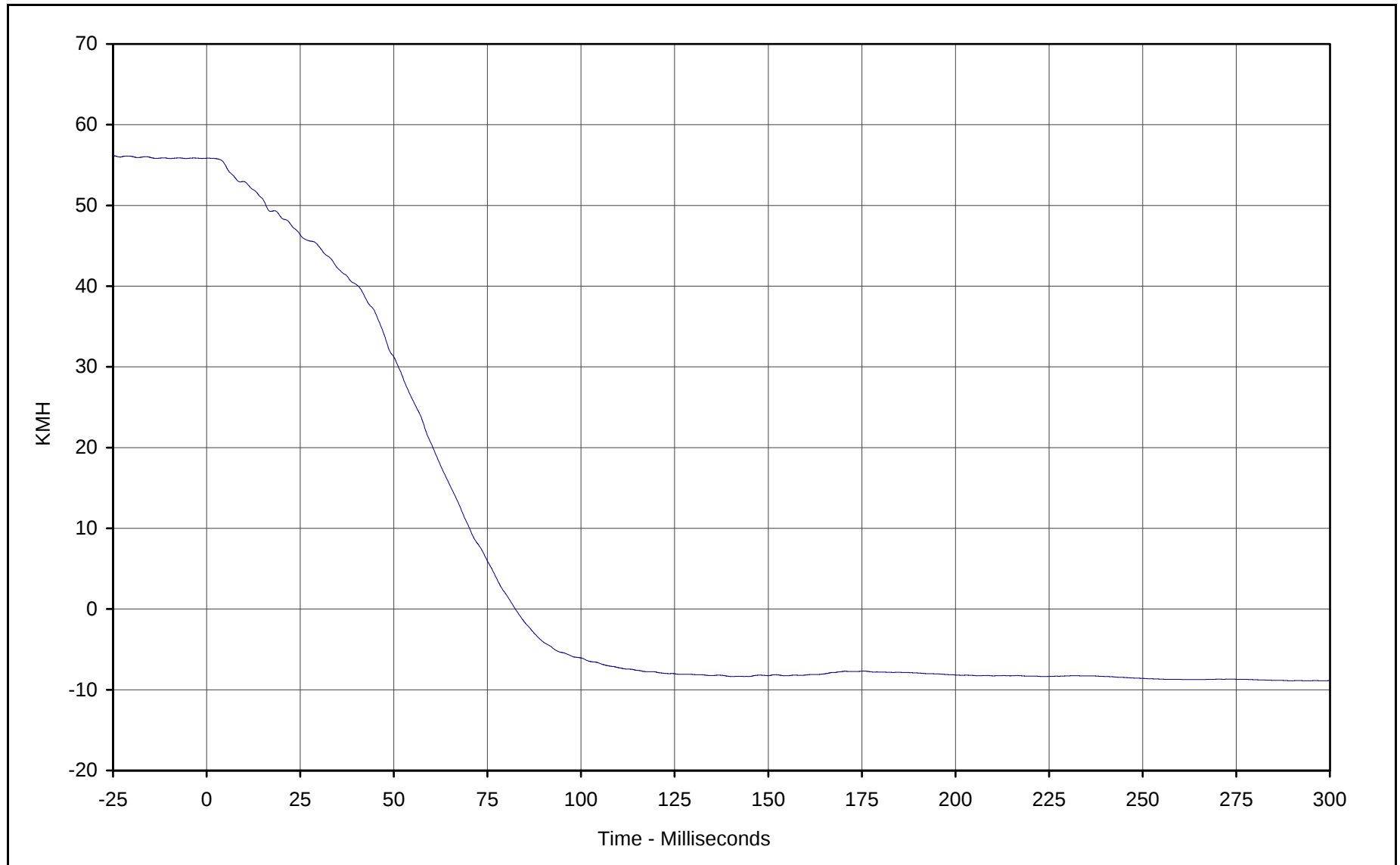
Curve Description: Vehicle Left Rear Primary  
Maximum Value: 1.8 at 166.3 Milliseconds  
Minimum Value: -32.8 at 58.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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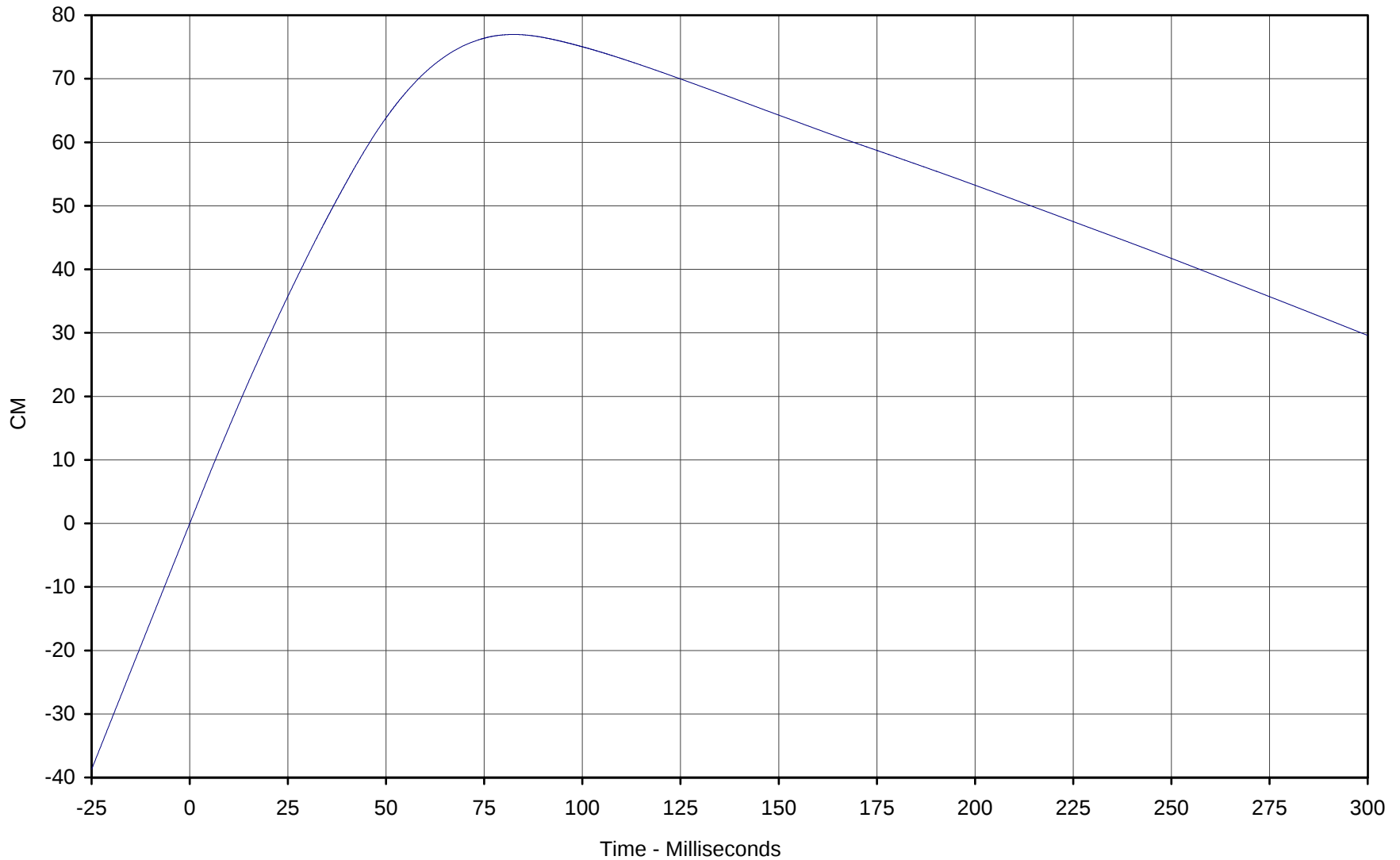
Curve Description: Vehicle Left Rear Primary Velocity  
Maximum Value: 55.9 at 0.4 Milliseconds  
Minimum Value: -8.9 at 294.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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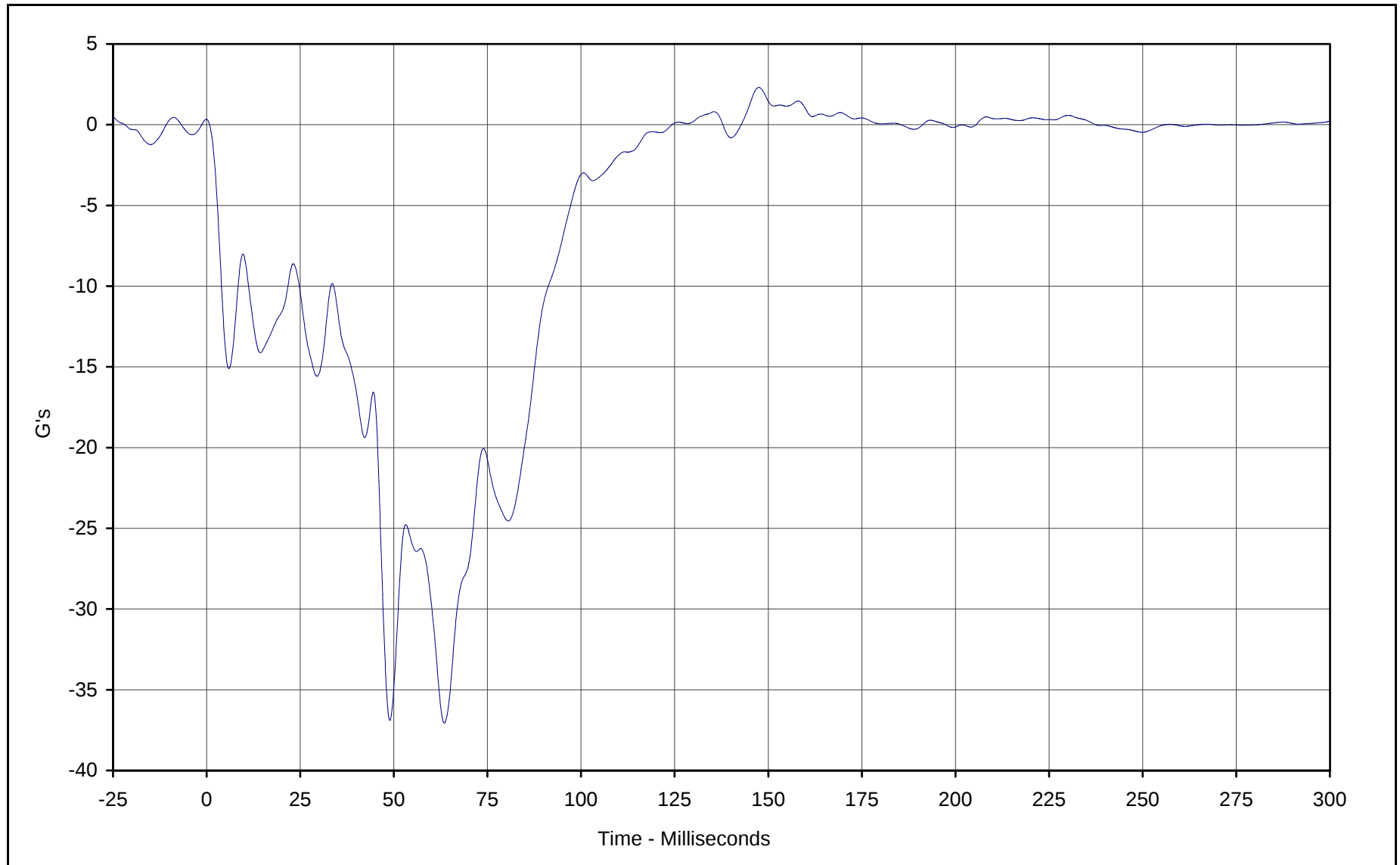


Curve Description: Vehicle Left Rear Primary Displ.  
Maximum Value: 77.0 at 82.5 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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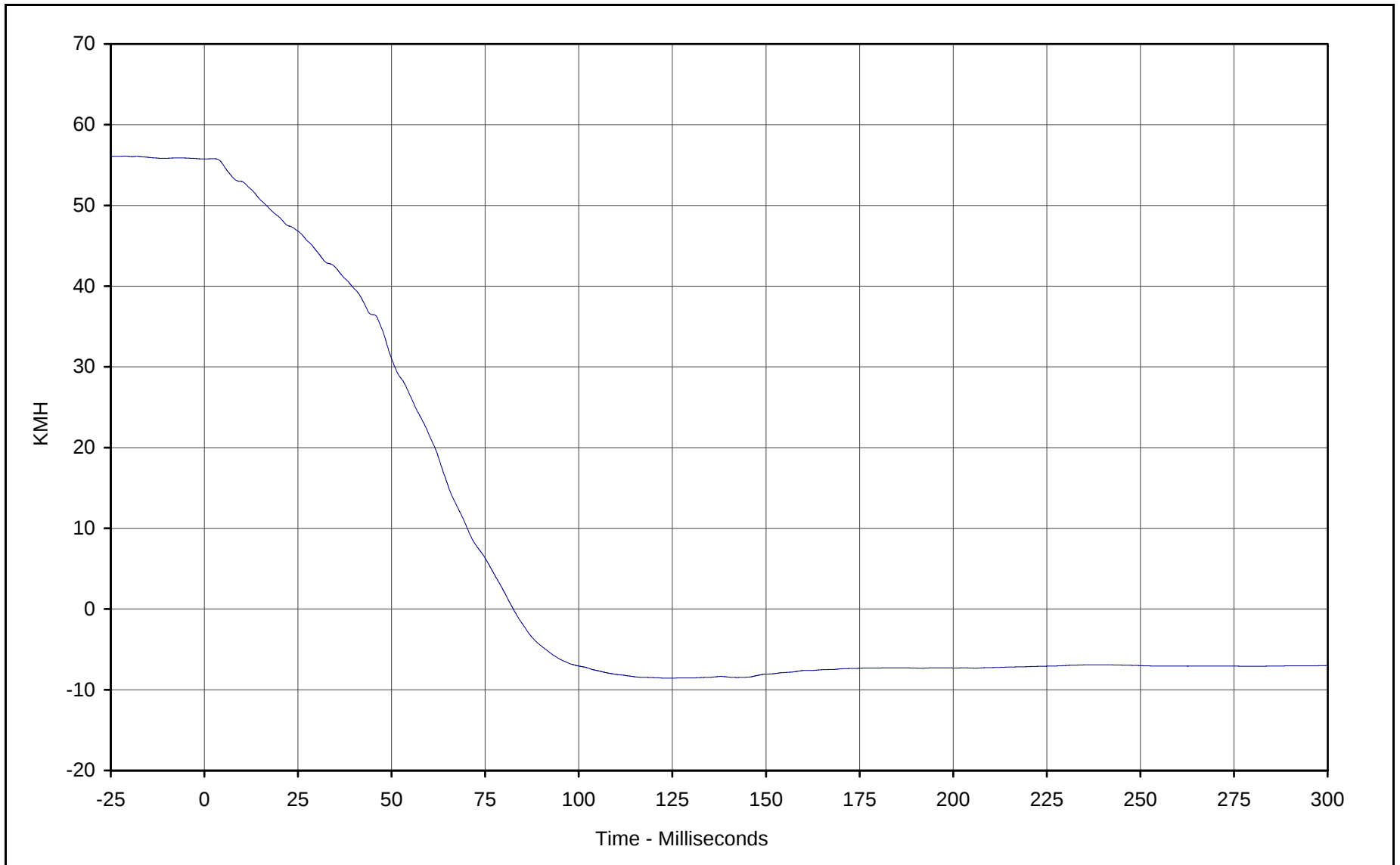


Curve Description: Vehicle Right Rear Primary  
Maximum Value: 2.3 at 147.5 Milliseconds  
Minimum Value: -37.1 at 63.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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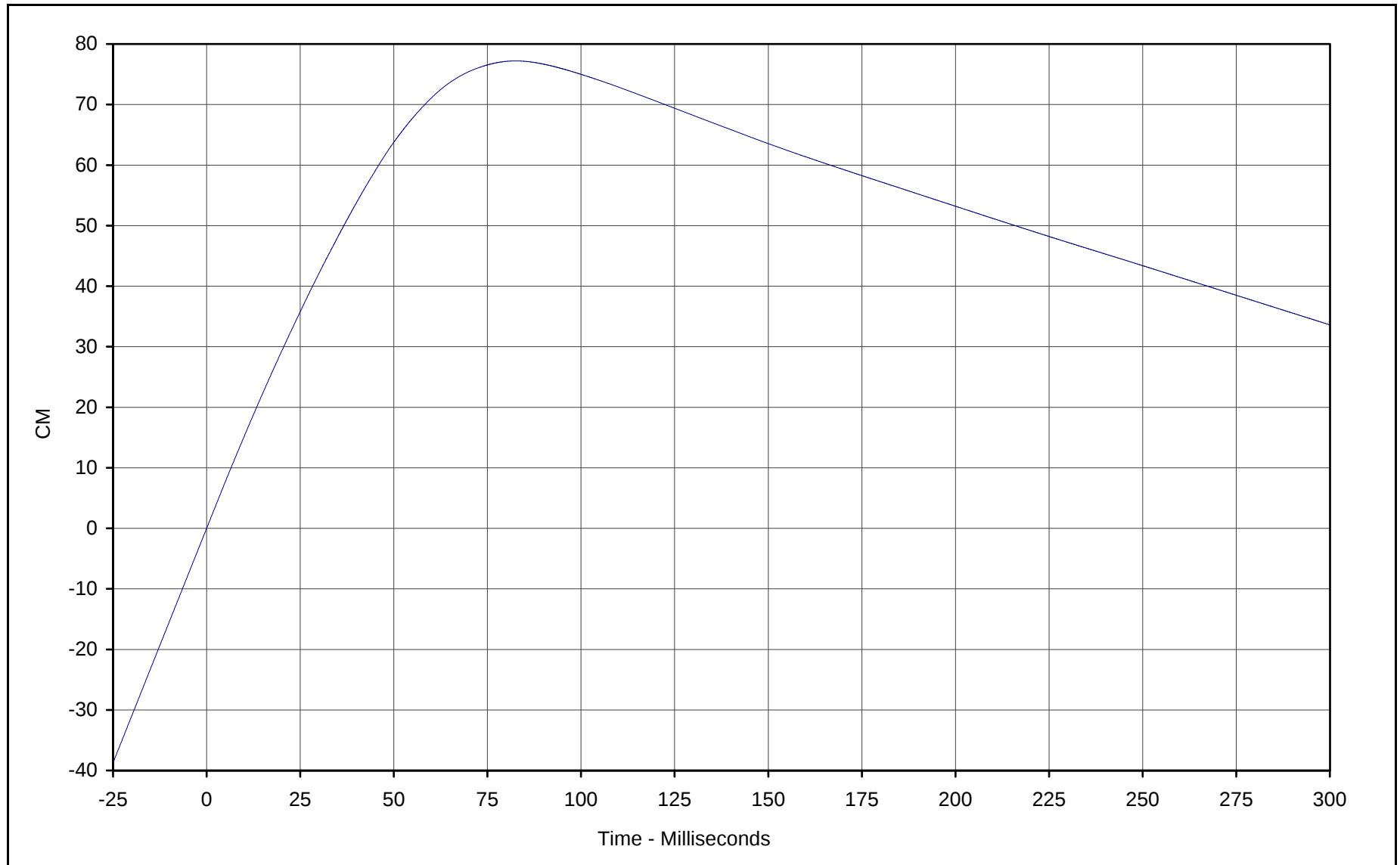
Curve Description: Vehicle Right Rear Primary Velocity  
Maximum Value: 55.8 at 2.5 Milliseconds  
Minimum Value: -8.6 at 123.8 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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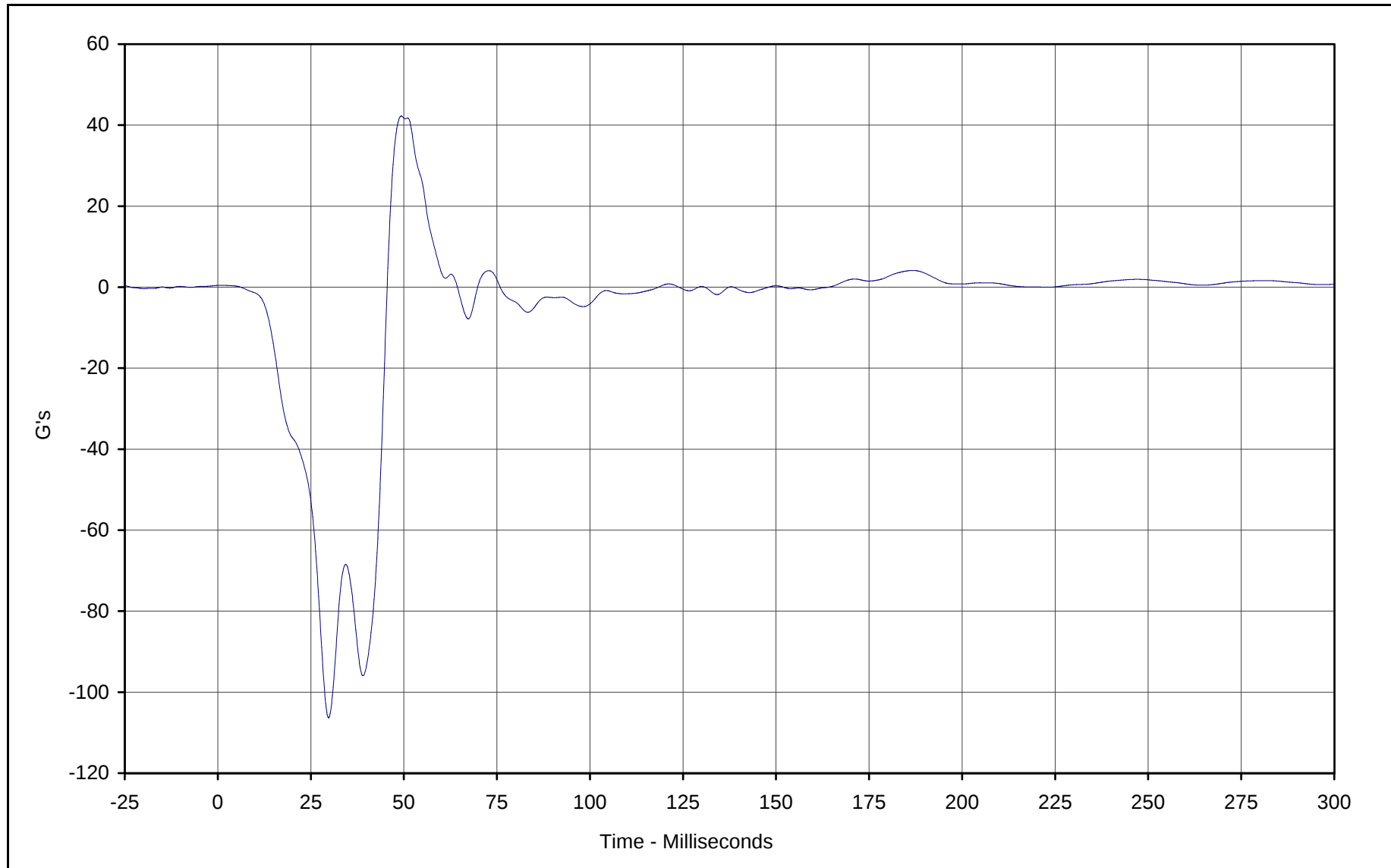
Curve Description: Vehicle Right Rear Primary Displ.  
Maximum Value: 77.2 at 82.5 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Vehicle Engine Top

Maximum Value: 42.3 at 49.3 Milliseconds

Minimum Value: -106.3 at 29.8 Milliseconds

SAE Filter Class: 60

Date of Test: 01/30/01

Curve Number: FIL-091

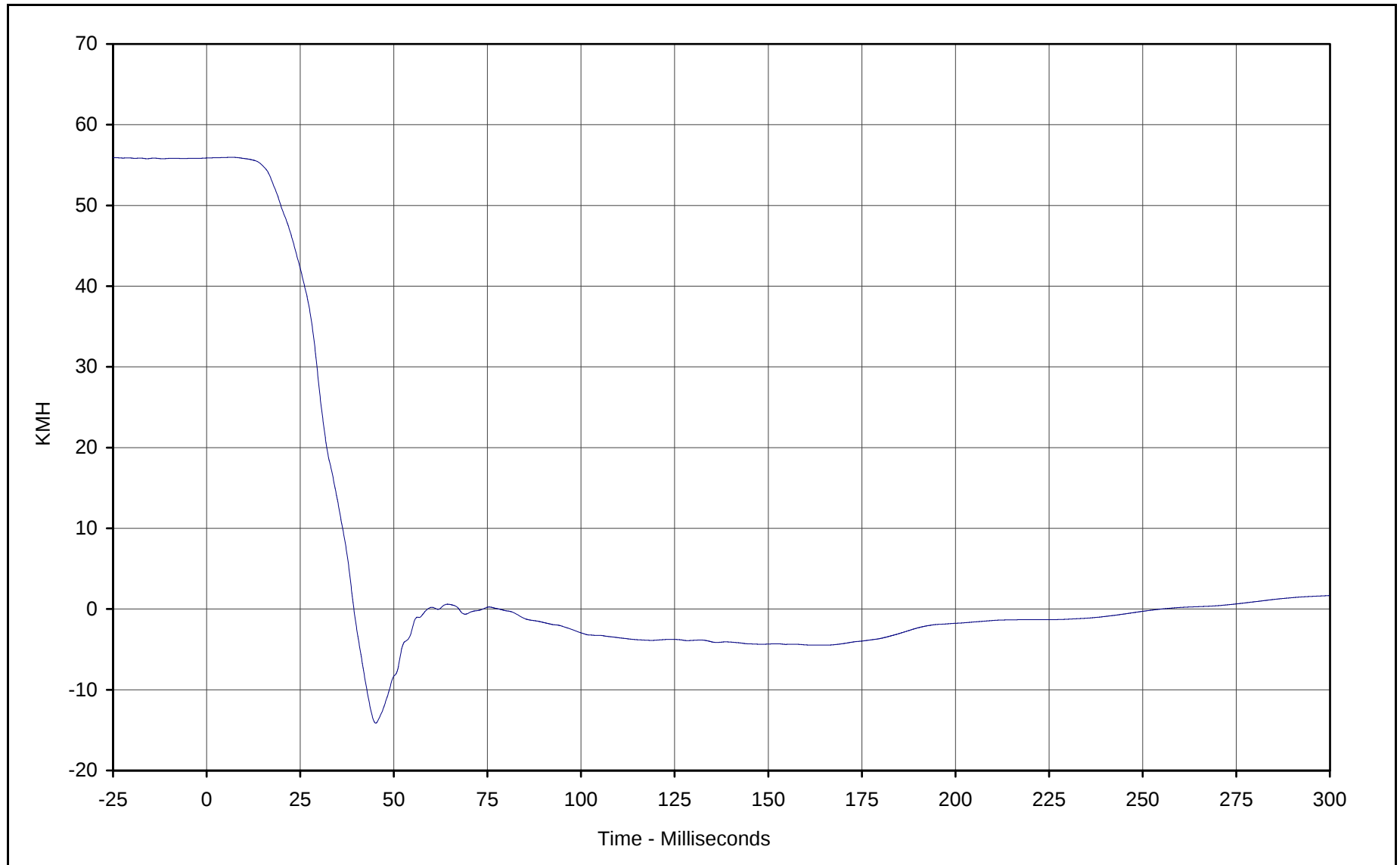
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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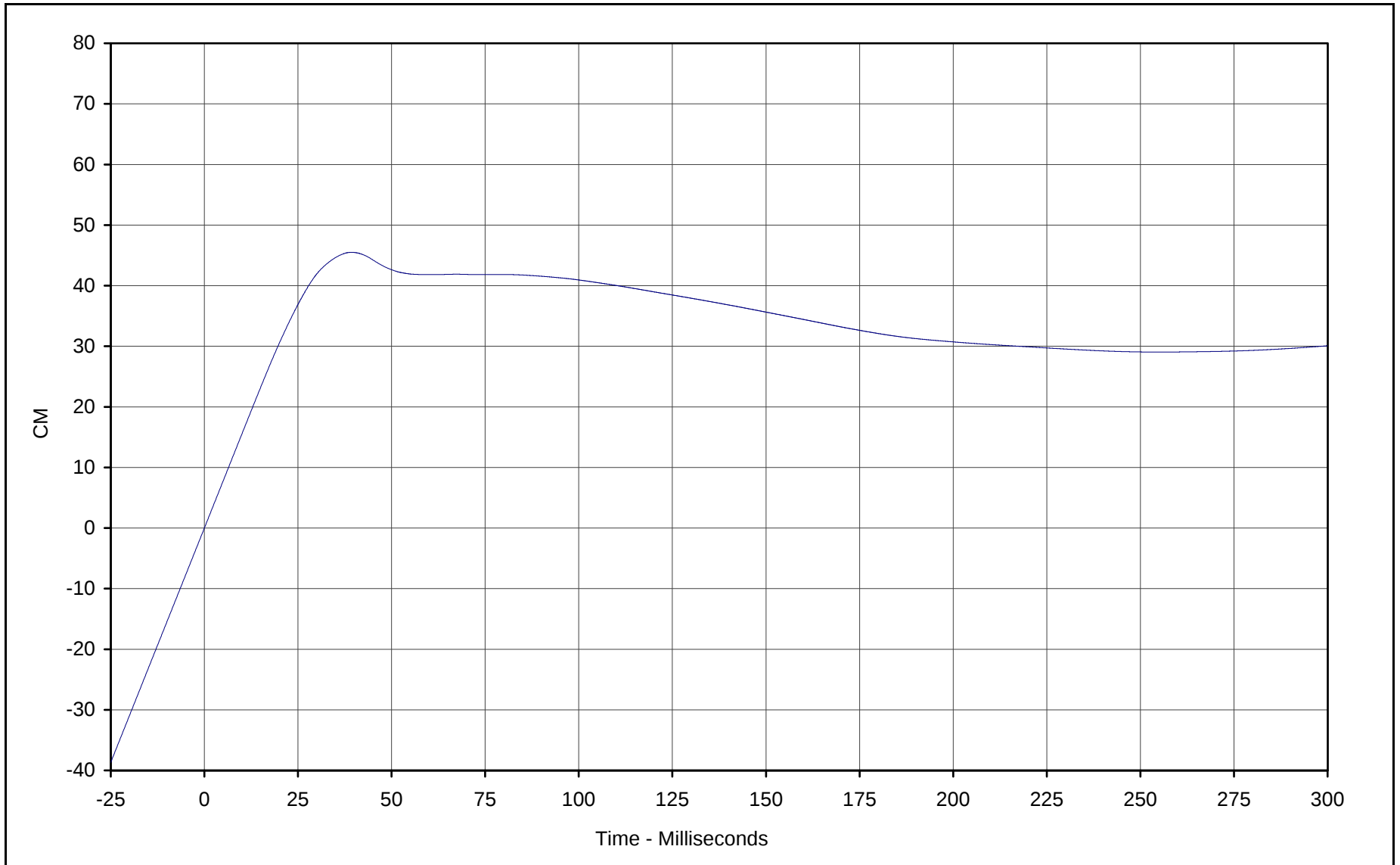
Curve Description: Vehicle Engine Top Velocity  
Maximum Value: 56.0 at 6.9 Milliseconds  
Minimum Value: -14.1 at 45.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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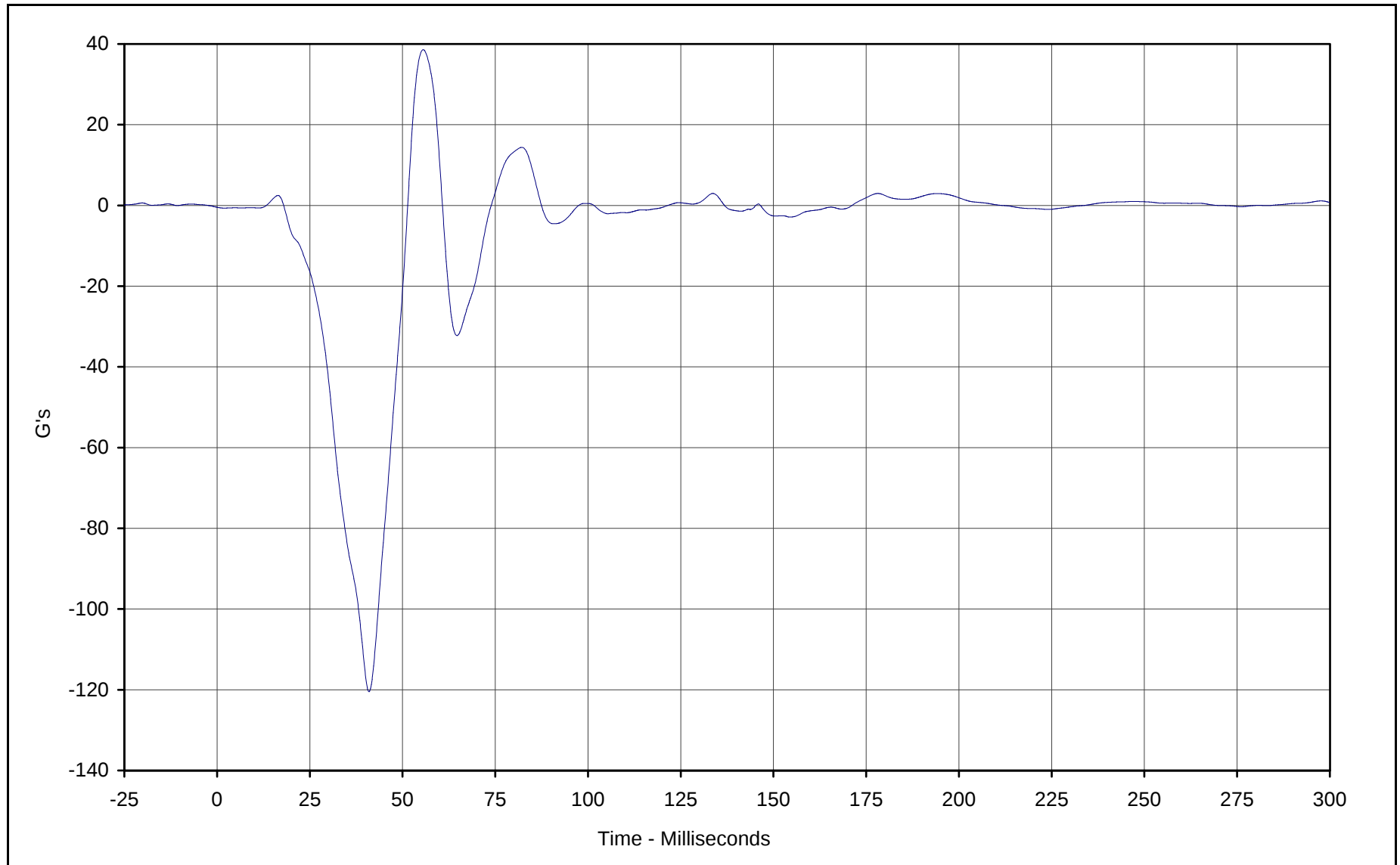
Curve Description: Vehicle Engine Top Displacement  
Maximum Value: 45.5 at 39.3 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Vehicle Engine Bottom

Maximum Value: 38.6 at 55.6 Milliseconds

Minimum Value: -120.5 at 41.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/30/01

Curve Number: FIL-092

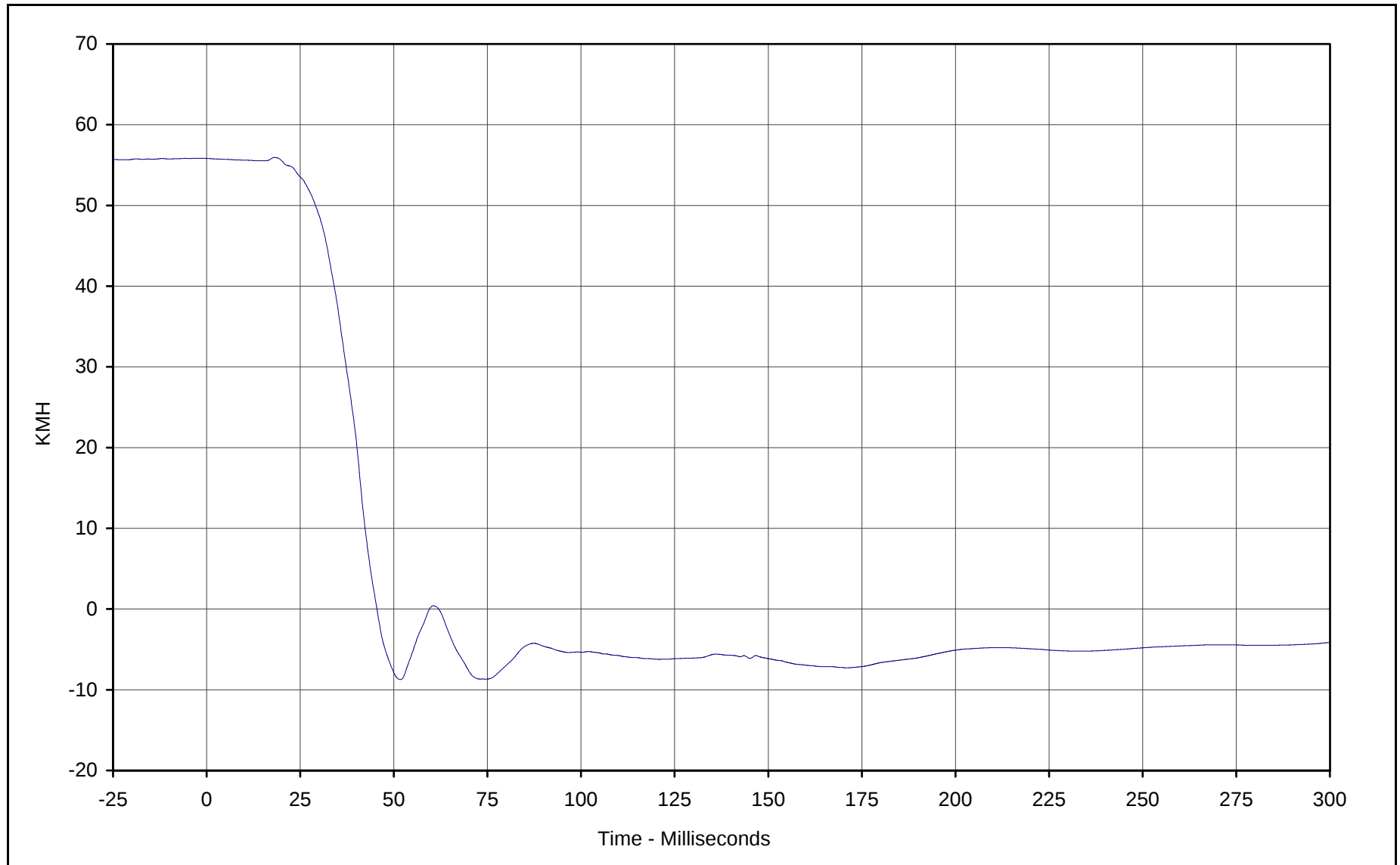
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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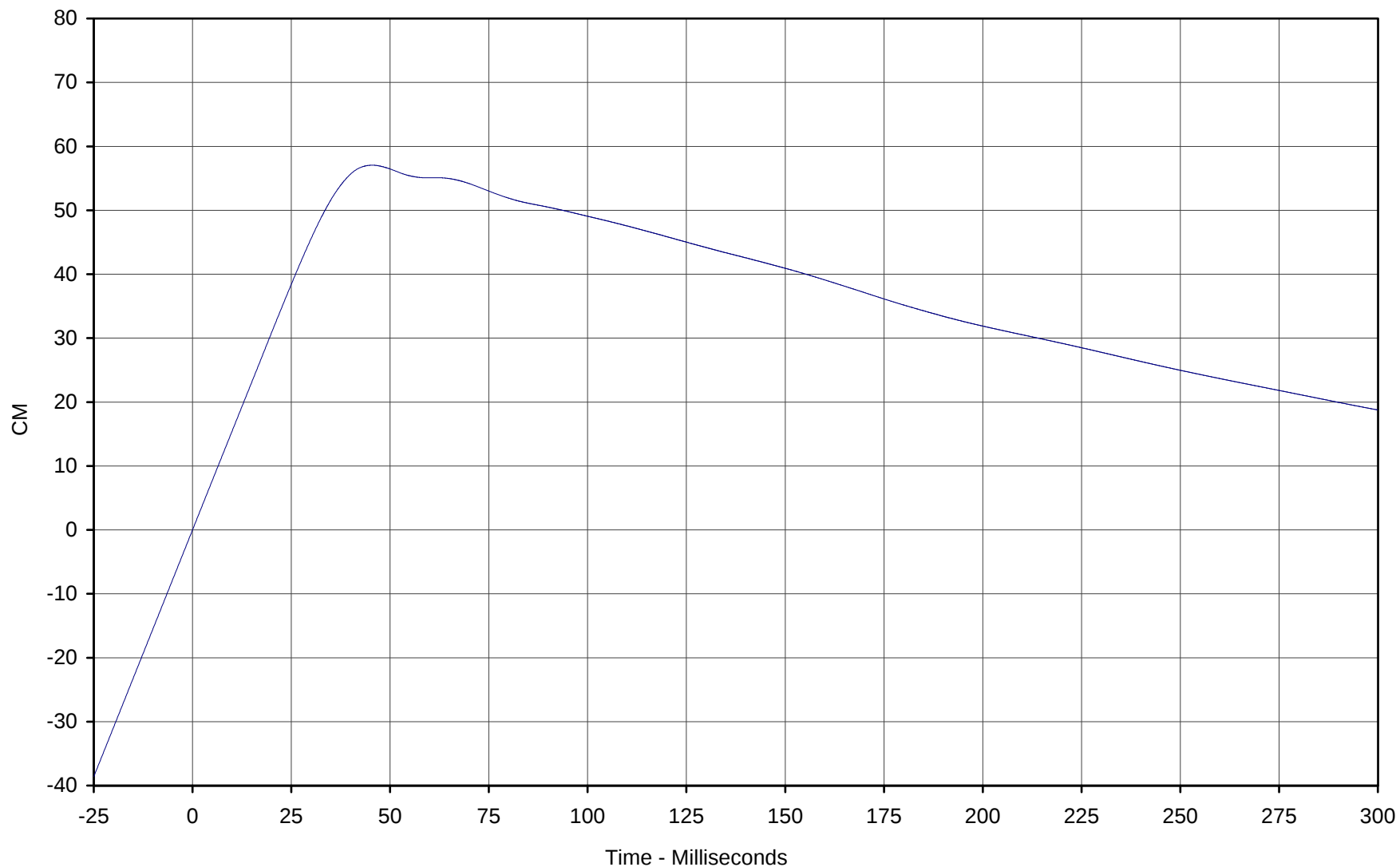
Curve Description: Vehicle Engine Bottom Velocity  
Maximum Value: 55.9 at 18.1 Milliseconds  
Minimum Value: -8.7 at 51.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-092

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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Curve Description: Vehicle Engine Bottom Displacement

Maximum Value: 57.1 at 45.5 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

Curve Number: IN2-092

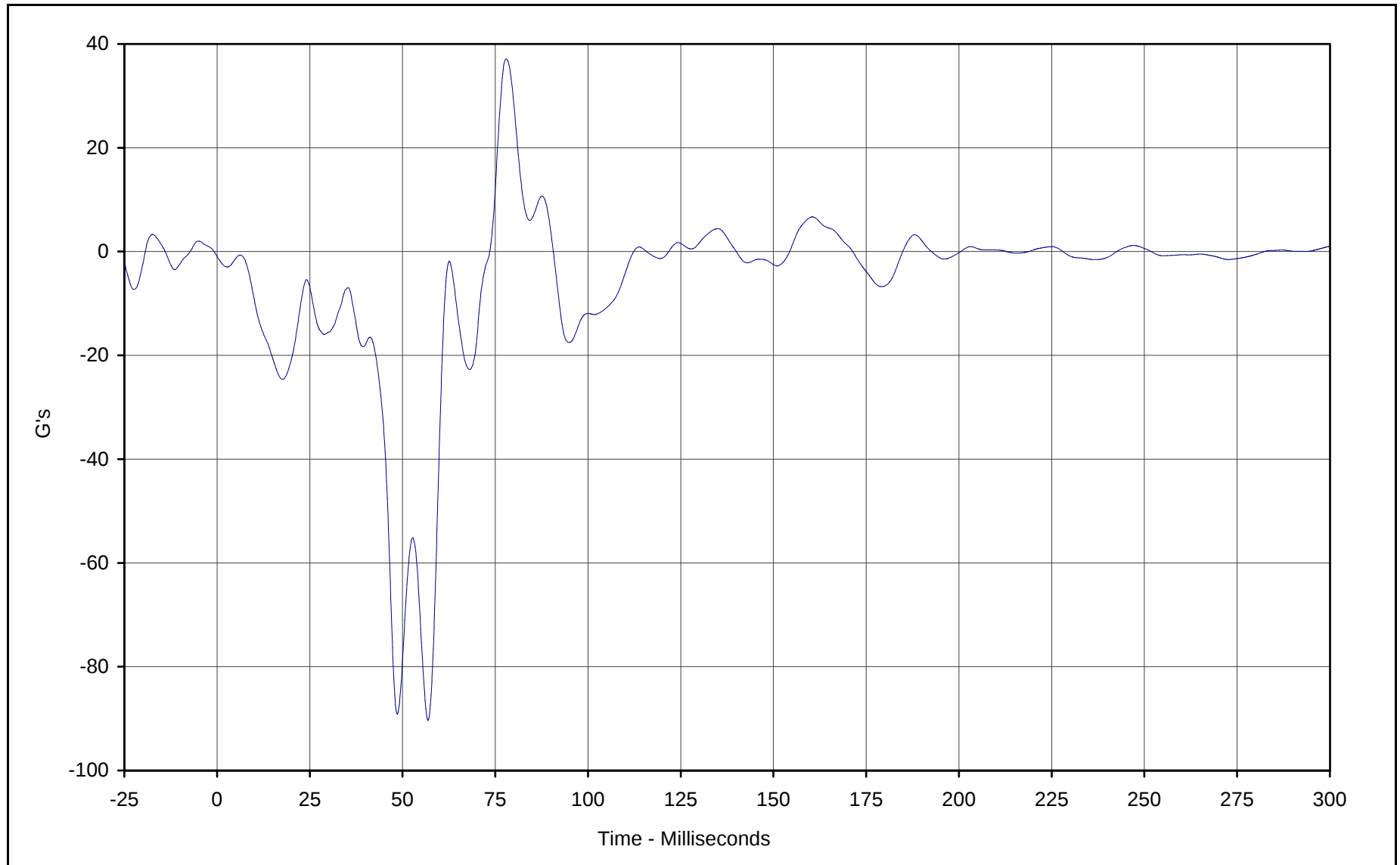
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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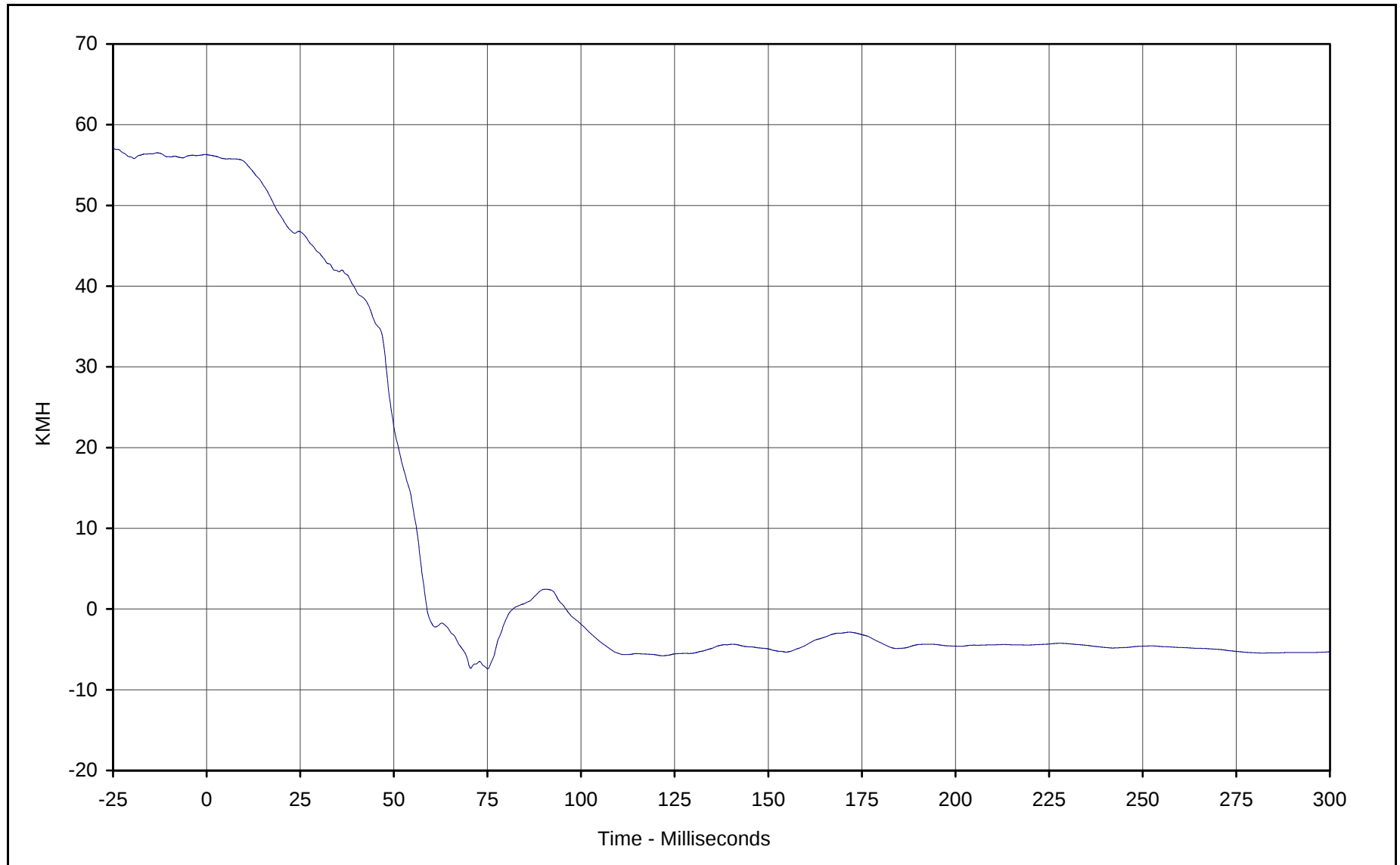


Curve Description: Vehicle Left Brake Caliper  
Maximum Value: 37.1 at 77.9 Milliseconds  
Minimum Value: -90.3 at 56.9 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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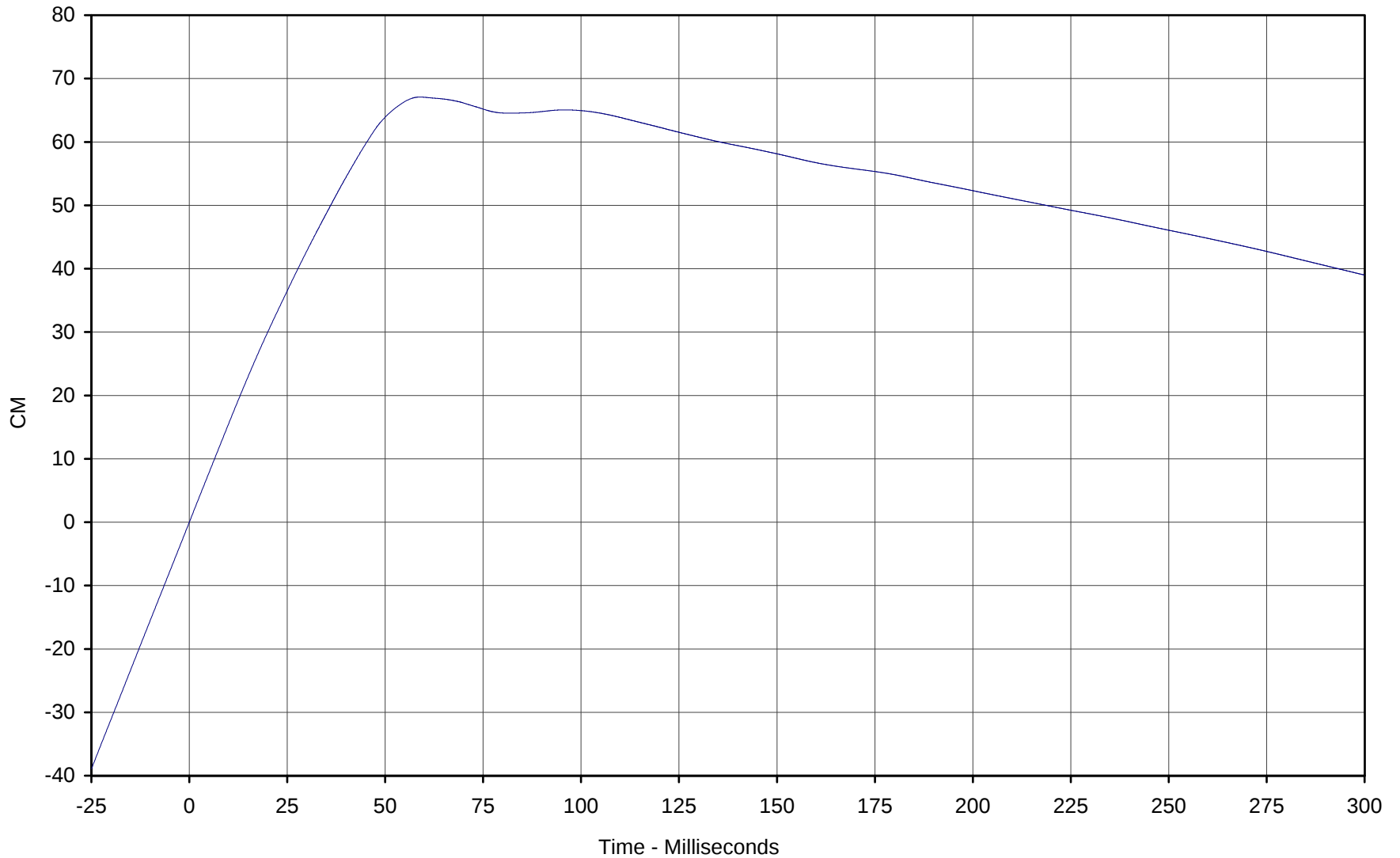


Curve Description: Vehicle Left Brake Caliper Velocity  
Maximum Value: 56.3 at 0.0 Milliseconds  
Minimum Value: -7.4 at 75.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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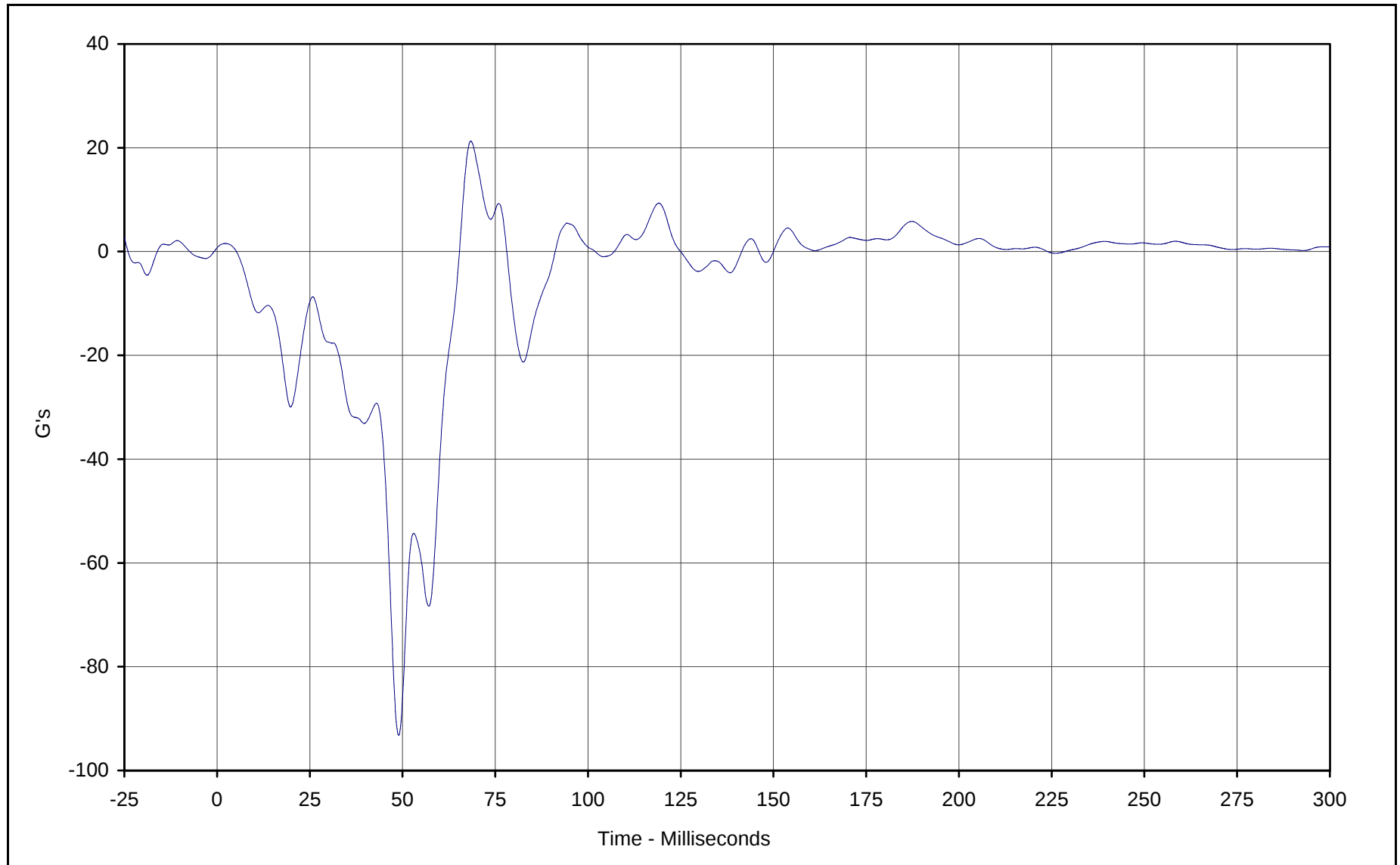
Curve Description: Vehicle Left Brake Caliper Displ.  
Maximum Value: 67.1 at 58.9 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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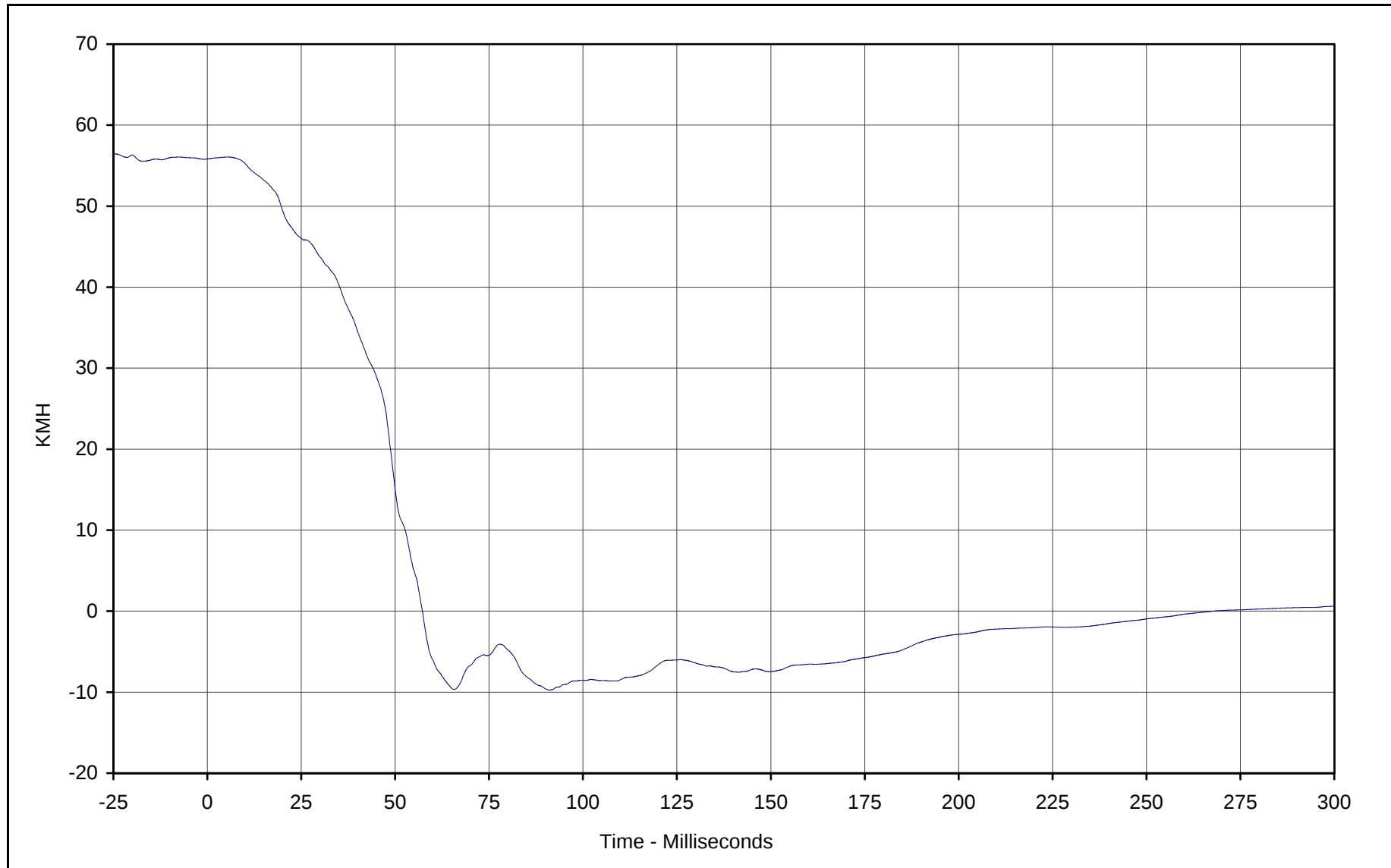
Curve Description: Vehicle Right Brake Caliper  
Maximum Value: 21.3 at 68.4 Milliseconds  
Minimum Value: -93.2 at 49.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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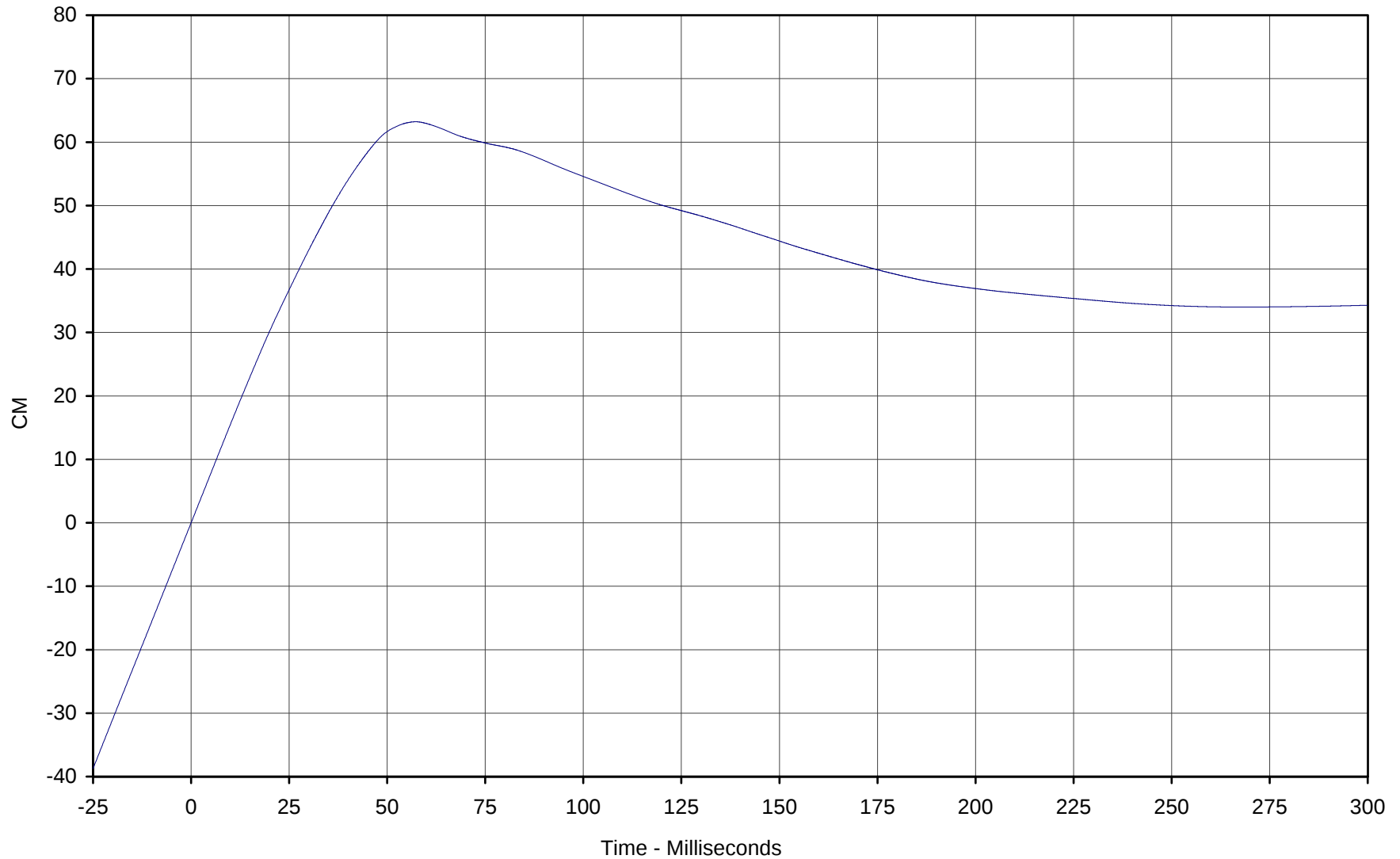
Curve Description: Vehicle Right Brake Caliper Velocity  
Maximum Value: 56.1 at 5.4 Milliseconds  
Minimum Value: -9.7 at 91.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-140



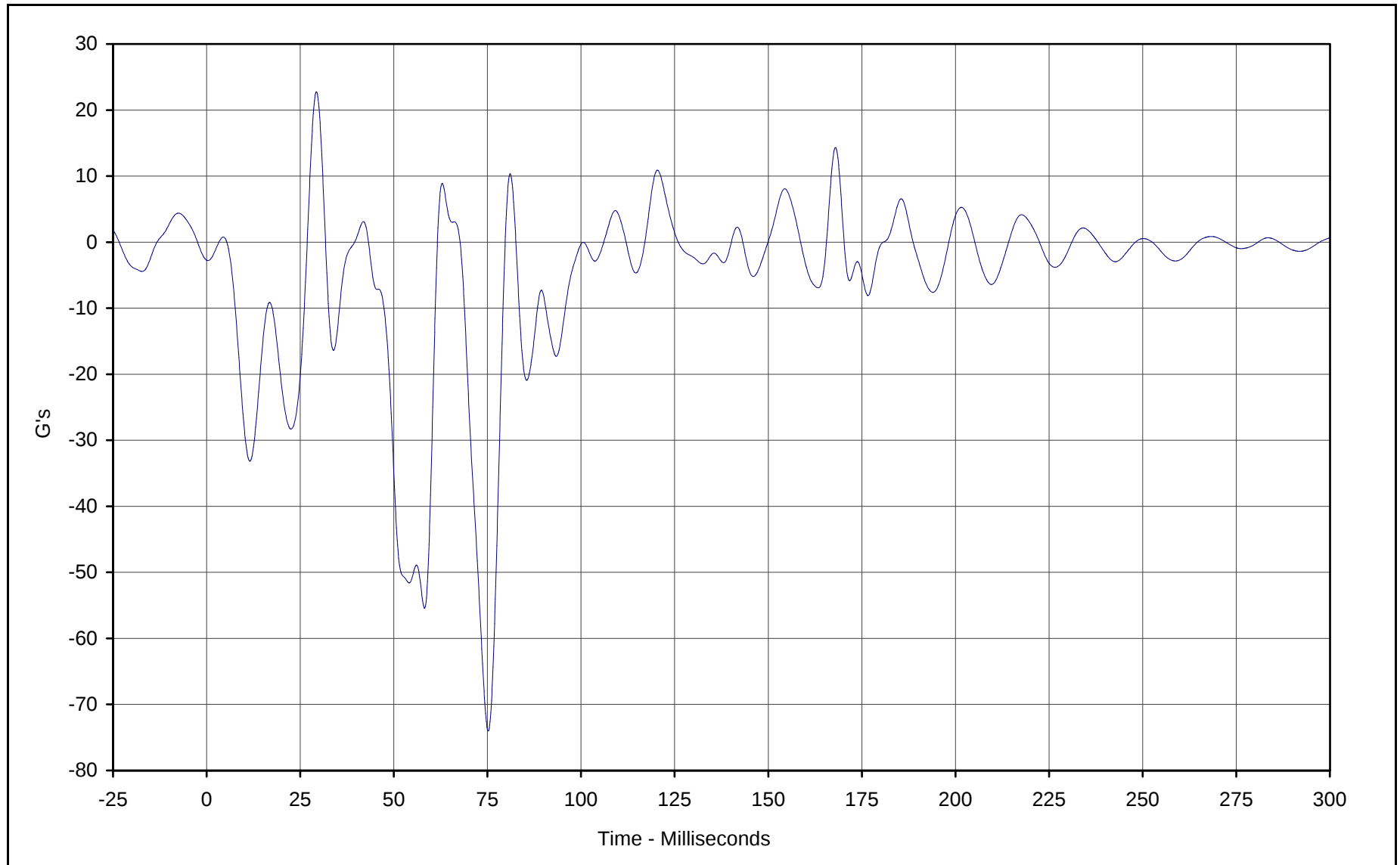
Curve Description: Vehicle Right Brake Caliper Displ.  
Maximum Value: 63.2 at 57.3 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-141



Curve Description: Vehicle Instrument Panel

Maximum Value: 22.8 at 29.3 Milliseconds

Minimum Value: -74.0 at 75.2 Milliseconds

SAE Filter Class: 60

Date of Test: 01/30/01

Curve Number: FIL-095

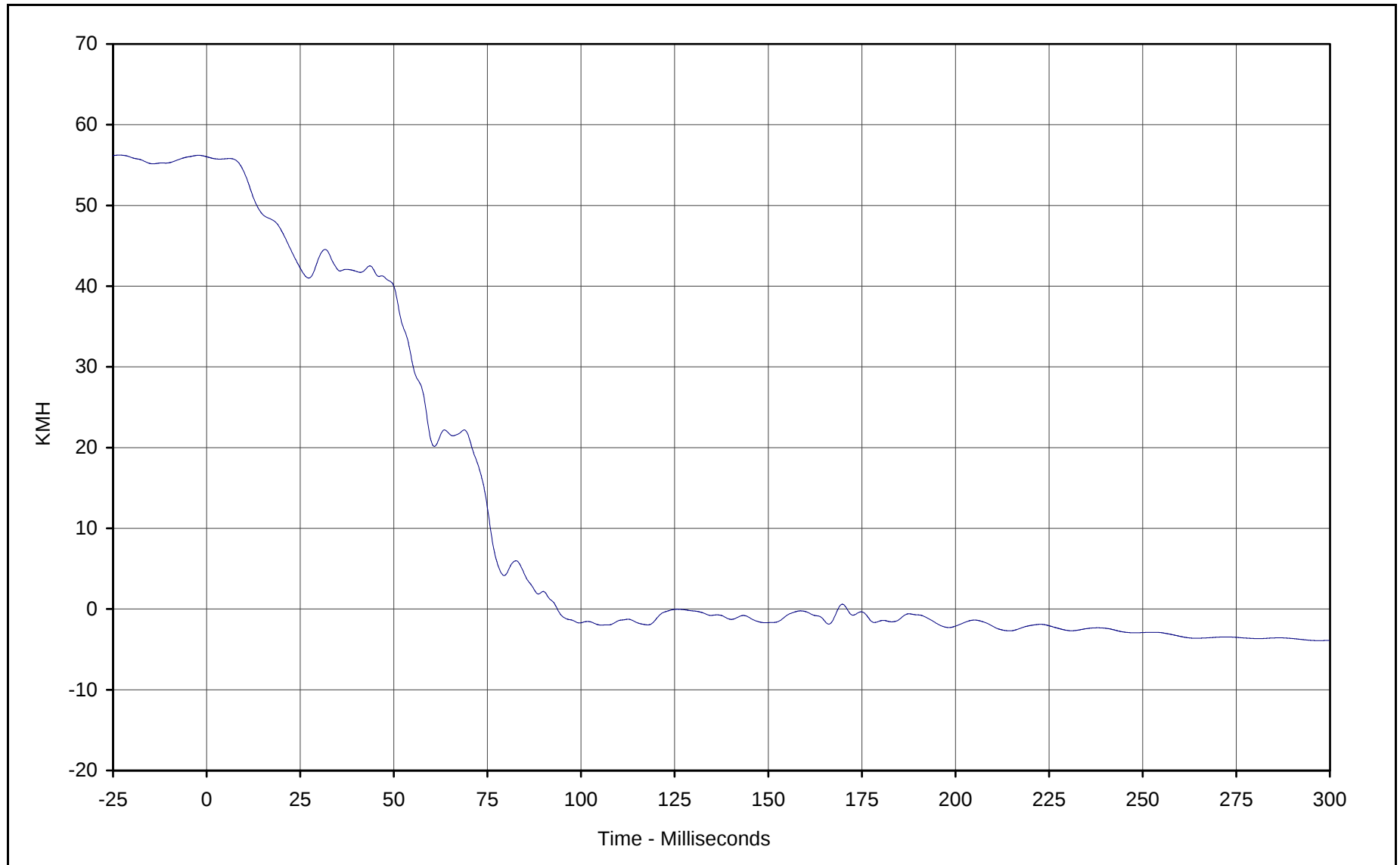
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

B-142



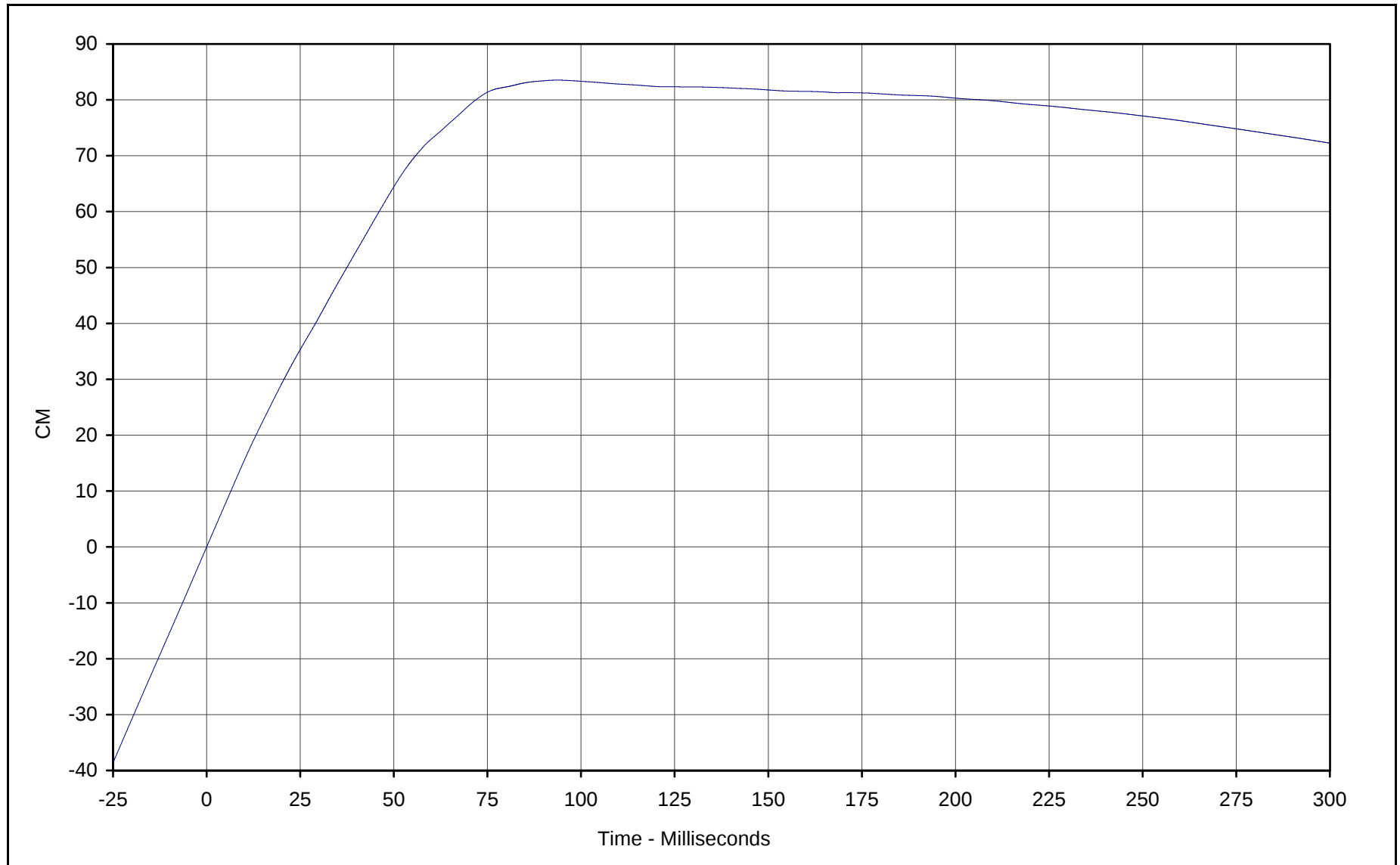
Curve Description: Vehicle Instrument Panel Velocity  
Maximum Value: 56.0 at 0.0 Milliseconds  
Minimum Value: -3.9 at 297.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN1-095

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-143



Curve Description: Vehicle Instrument Panel Displacement

Maximum Value: 83.5 at 93.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

Curve Number: IN2-095

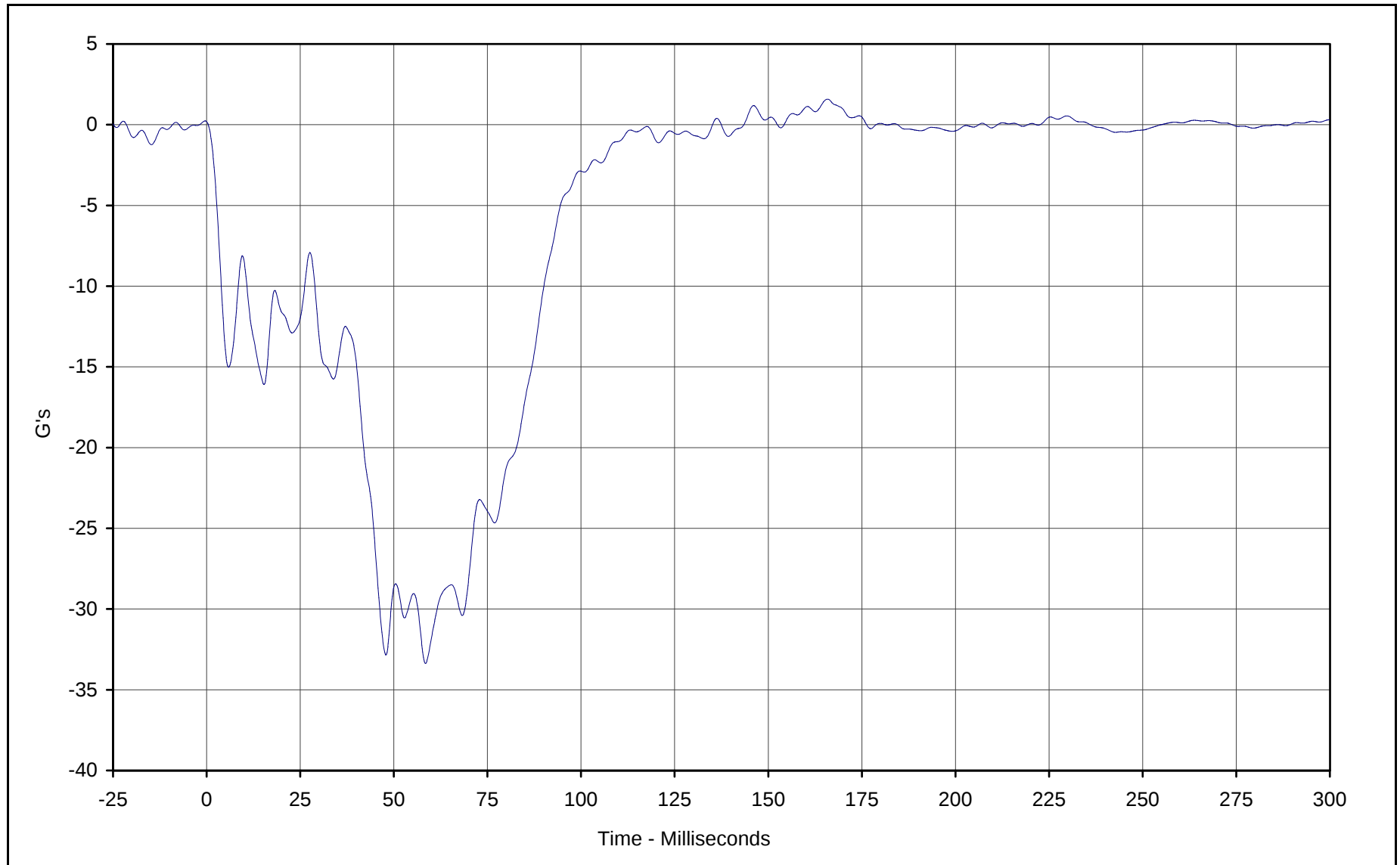
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

B-144



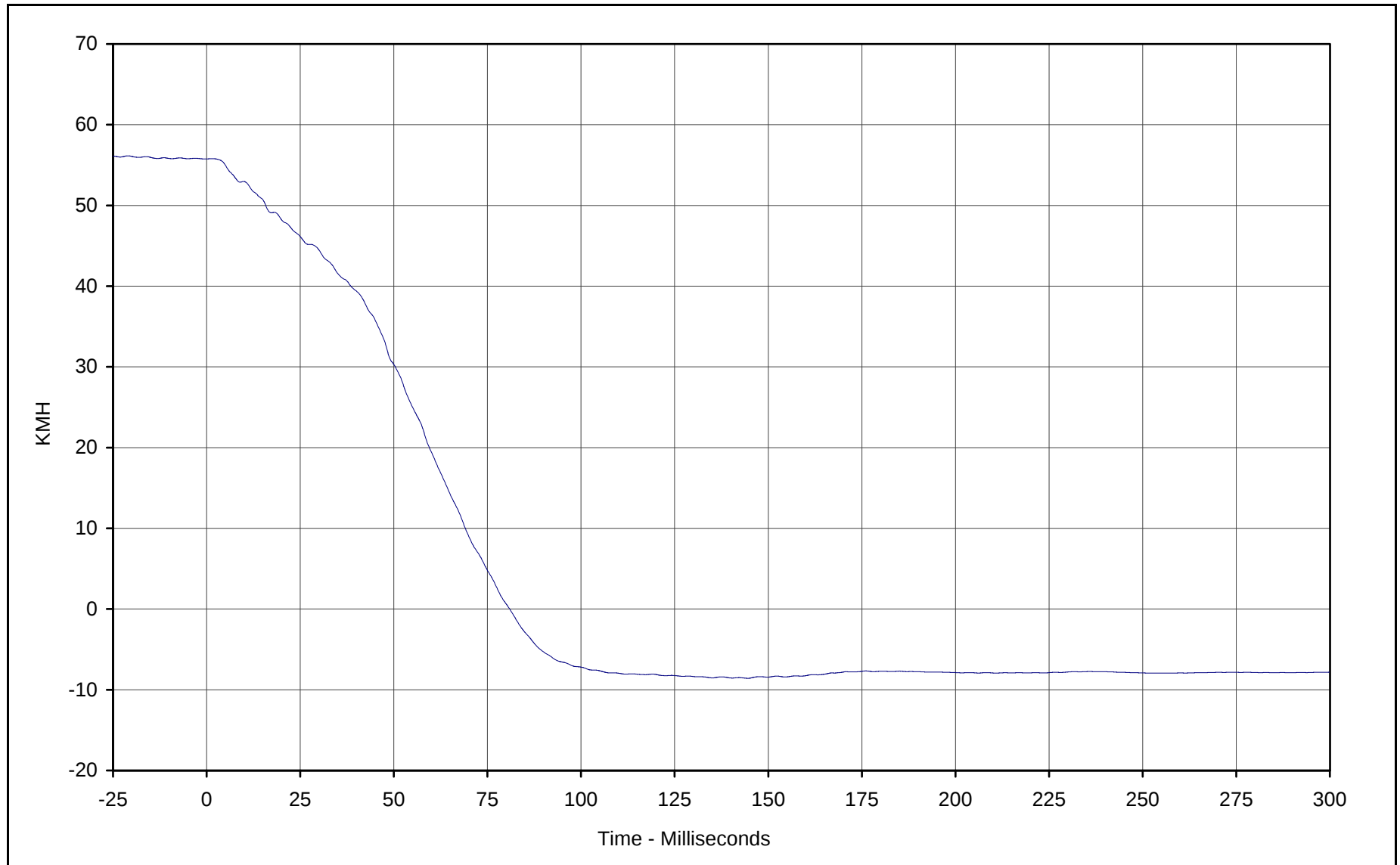
Curve Description: Vehicle Left Rear Redundant  
Maximum Value: 1.6 at 165.8 Milliseconds  
Minimum Value: -33.4 at 58.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-096

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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B-145



Curve Description: Vehicle Left Rear Redundant Velocity

Maximum Value: 55.8 at 1.5 Milliseconds

Minimum Value: -8.6 at 144.6 Milliseconds

SAE Filter Class: 180

Date of Test: 01/30/01

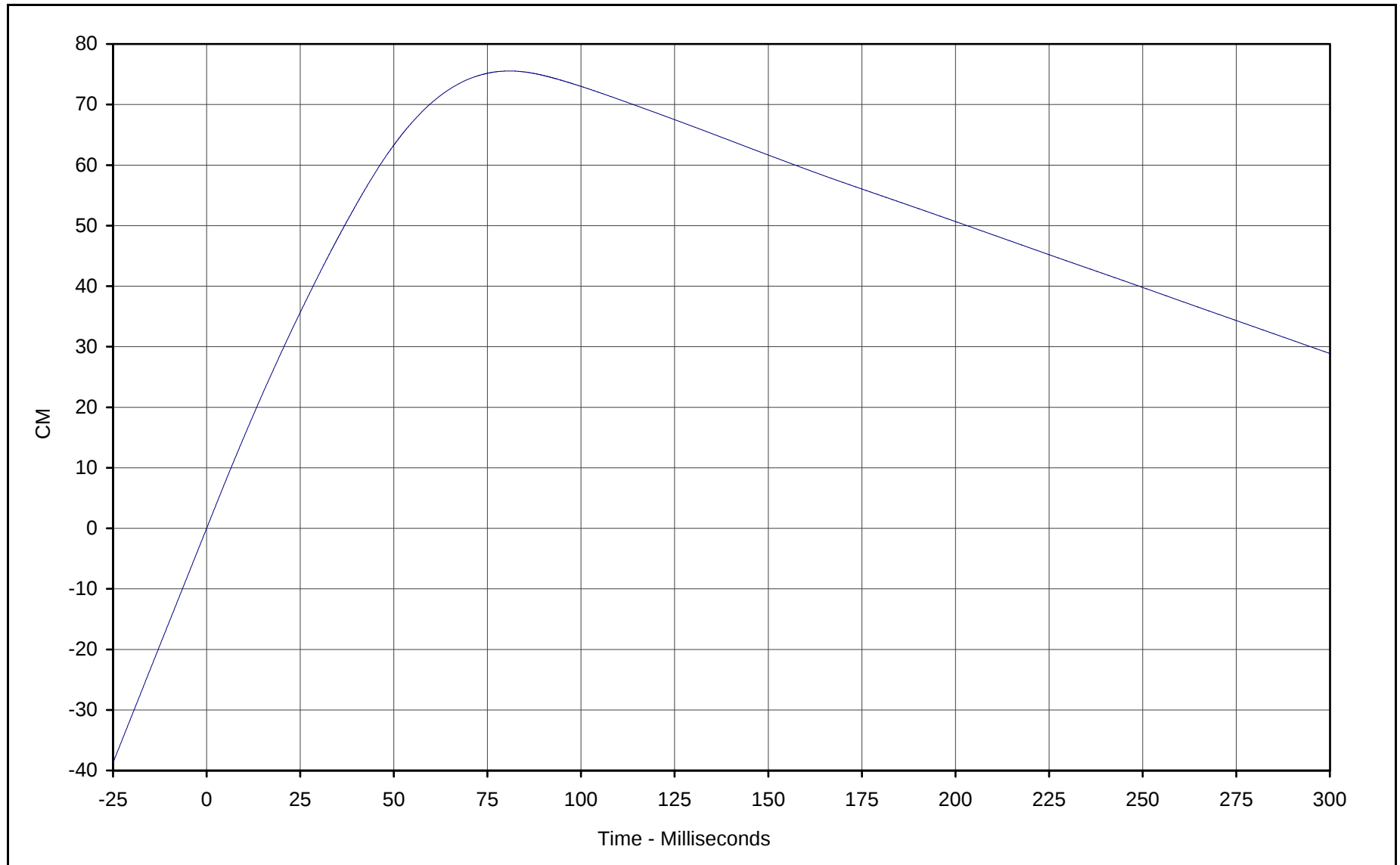
Curve Number: IN1-096

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09



Curve Description: Vehicle Left Rear Redundant Displ.  
Maximum Value: 75.5 at 80.9 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/30/01  
Curve Number: IN2-096

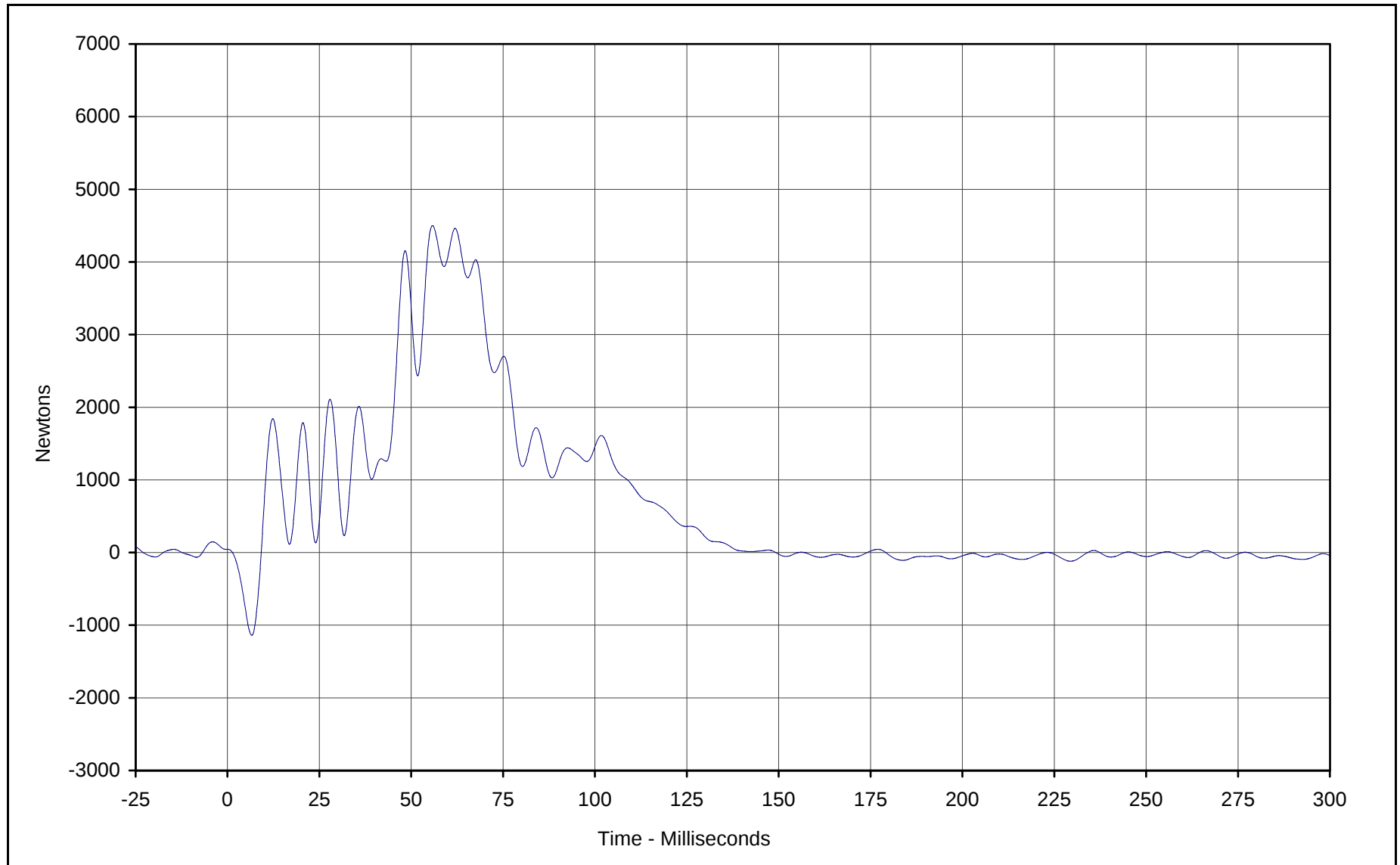
Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



**APPENDIX C**

**LOAD CELL BARRIER INFORMATION**

C-1



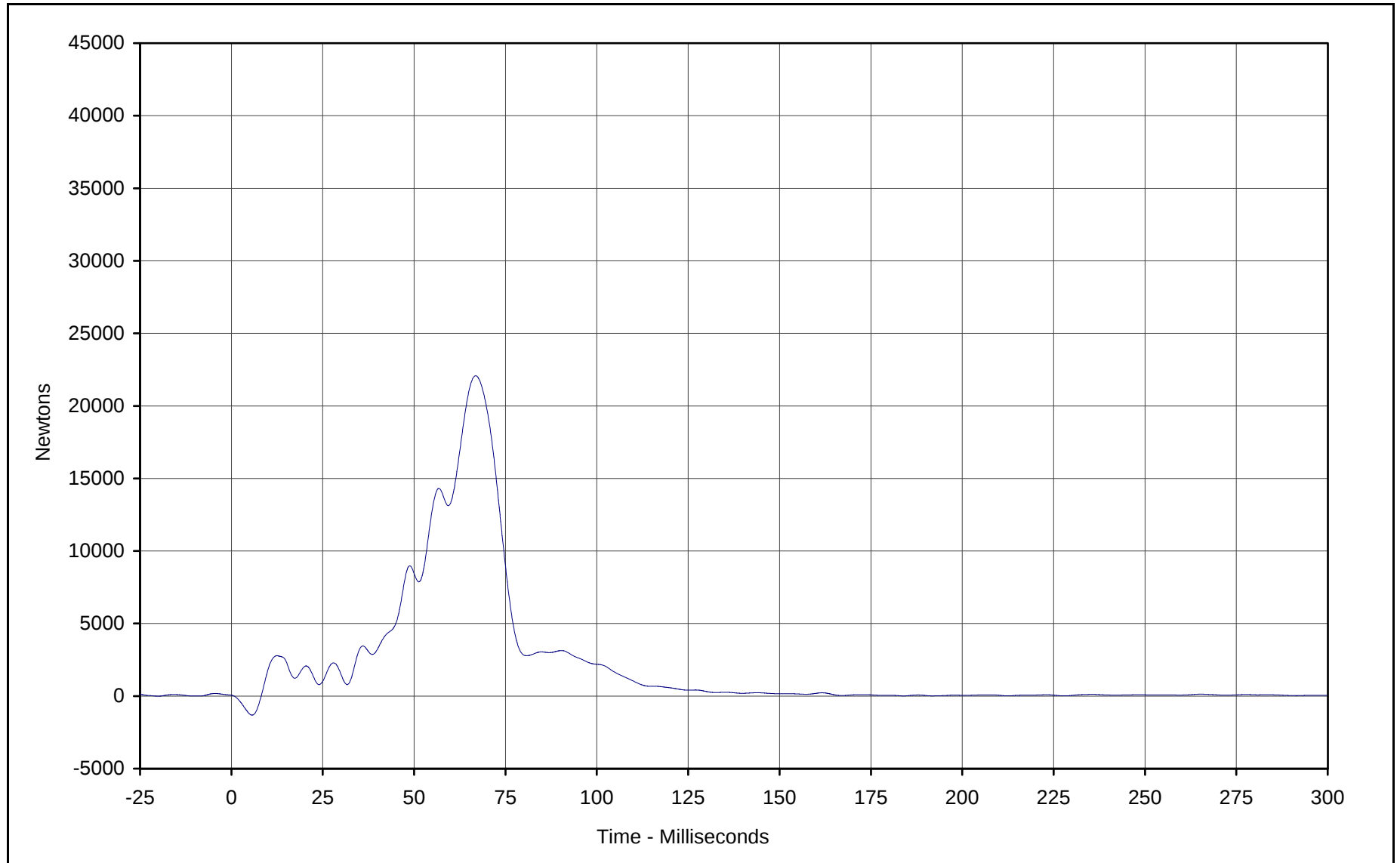
Curve Description: Barrier Force A2  
Maximum Value: 4500.2 at 55.8 Milliseconds  
Minimum Value: -1139.7 at 6.6 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-099

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-2



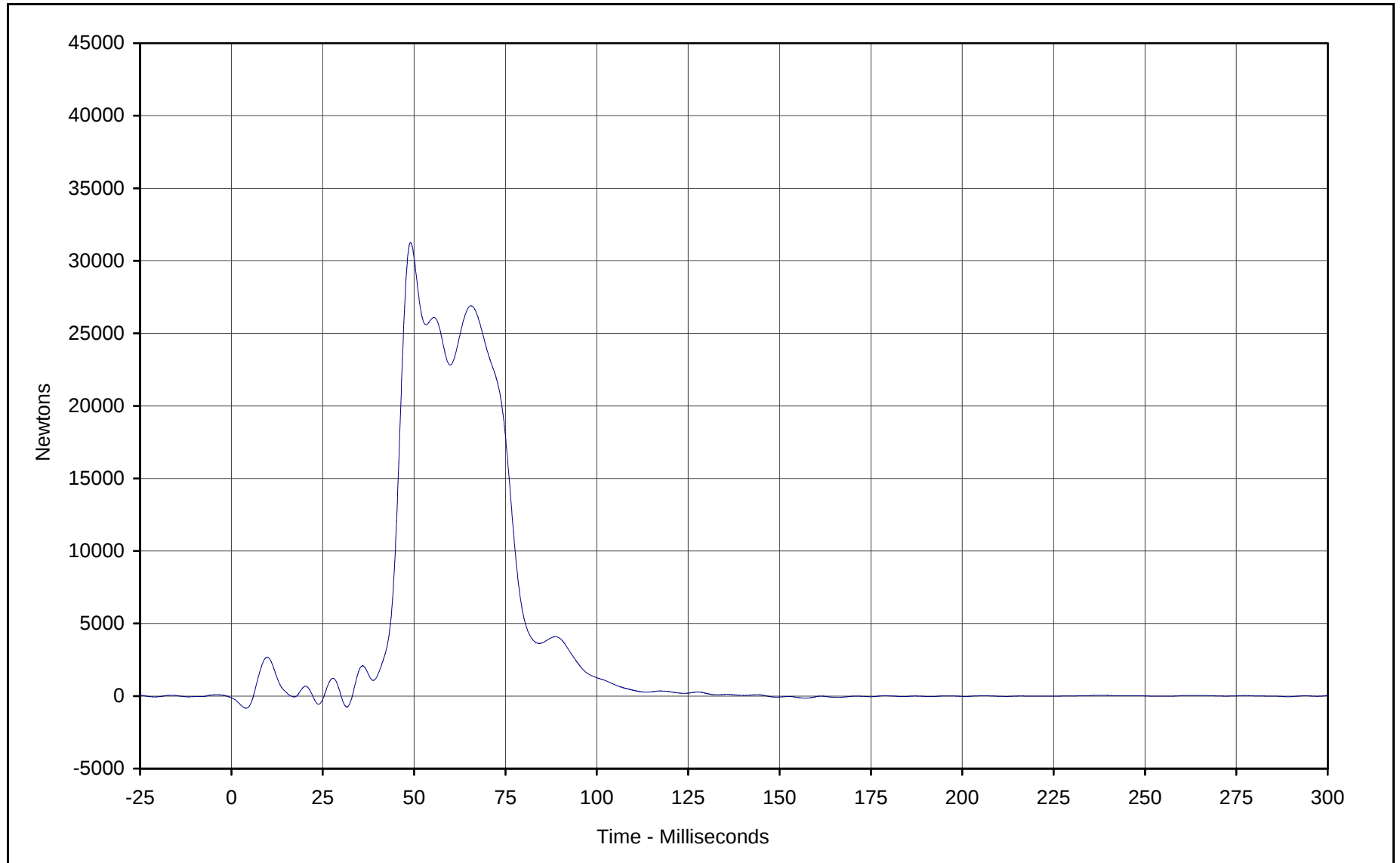
Curve Description: Barrier Force A3  
Maximum Value: 22076.8 at 66.8 Milliseconds  
Minimum Value: -1310.6 at 5.7 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-100

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-3



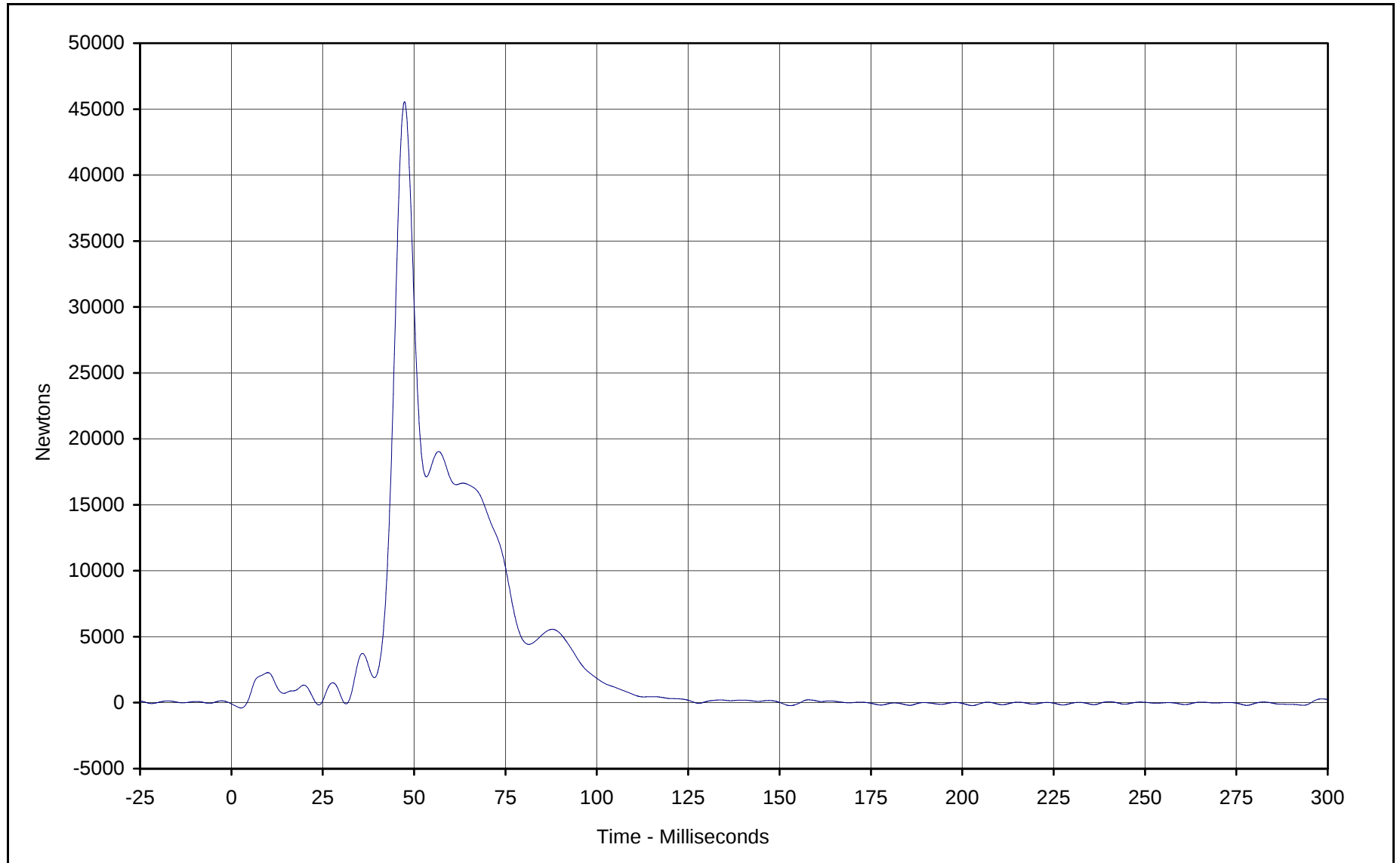
Curve Description: Barrier Force A4  
Maximum Value: 31257.0 at 49.0 Milliseconds  
Minimum Value: -835.6 at 4.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-101

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-4



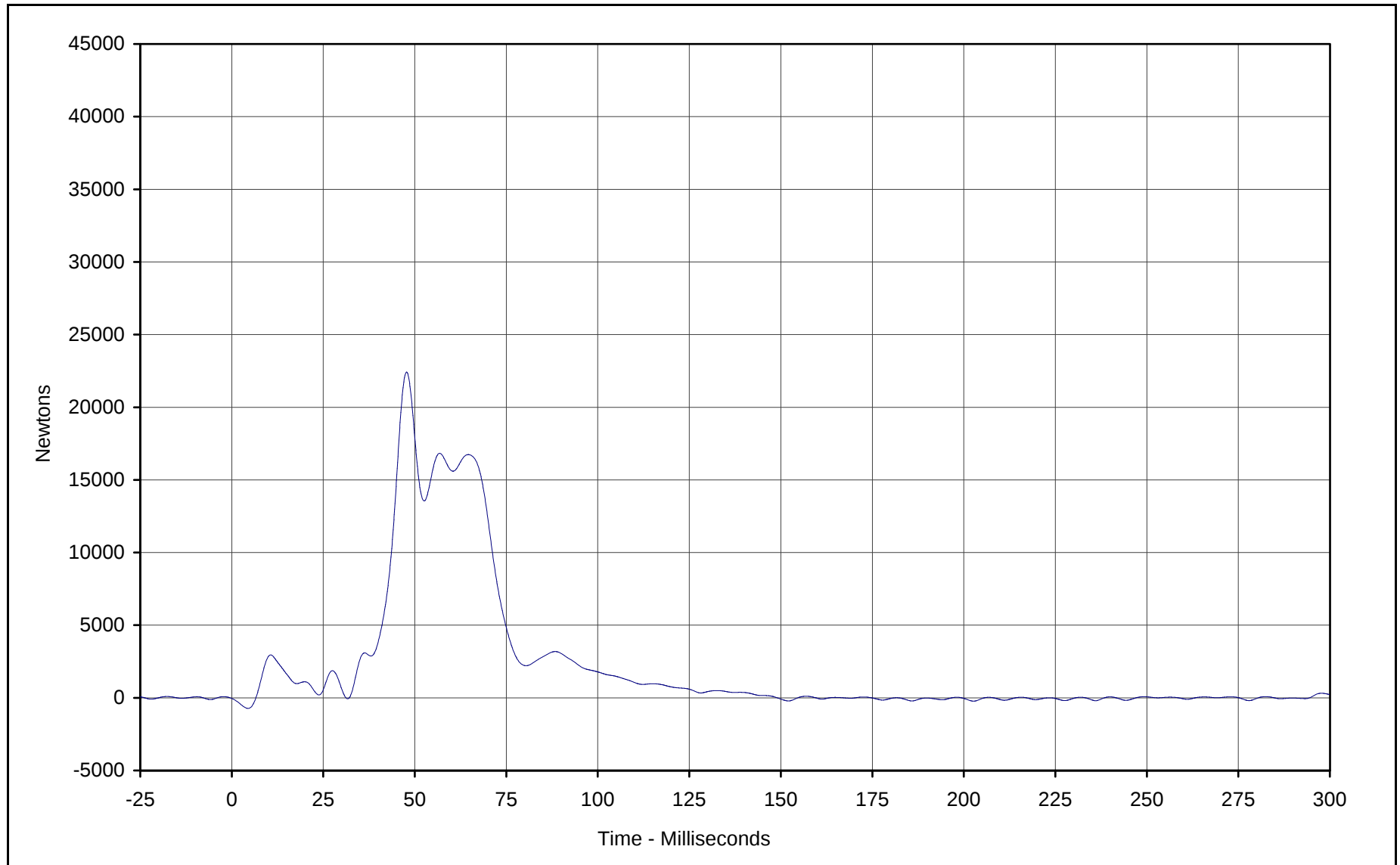
Curve Description: Barrier Force A5  
Maximum Value: 45555.9 at 47.4 Milliseconds  
Minimum Value: -400.9 at 2.7 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-102

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-5



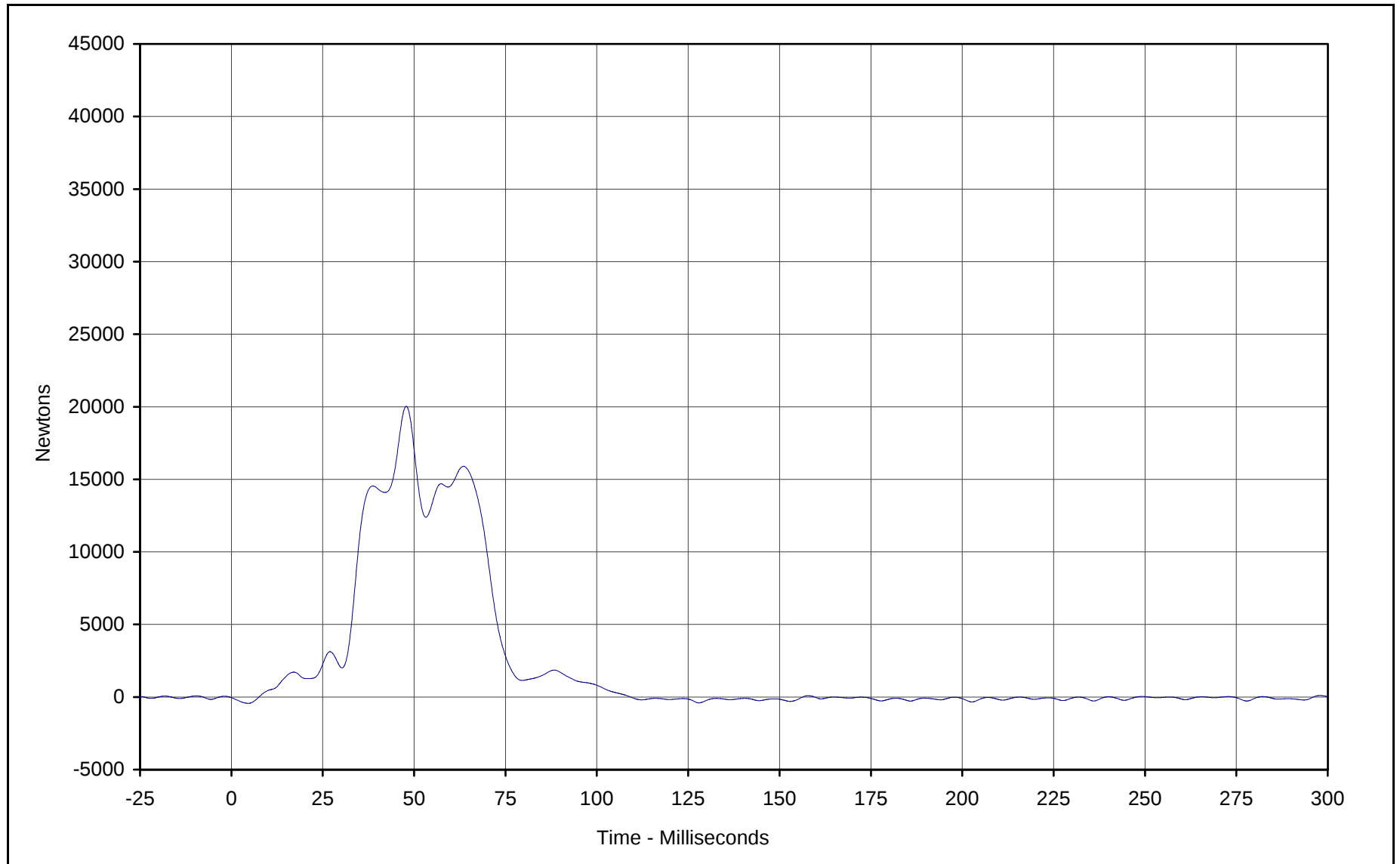
Curve Description: Barrier Force A6  
Maximum Value: 22421.5 at 47.8 Milliseconds  
Minimum Value: -729.9 at 4.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-103

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-6



Curve Description: Barrier Force A7

Maximum Value: 20034.4 at 47.8 Milliseconds

Minimum Value: -438.8 at 4.6 Milliseconds

SAE Filter Class: 60

Date of Test: 01/30/01

Curve Number: FIL-104

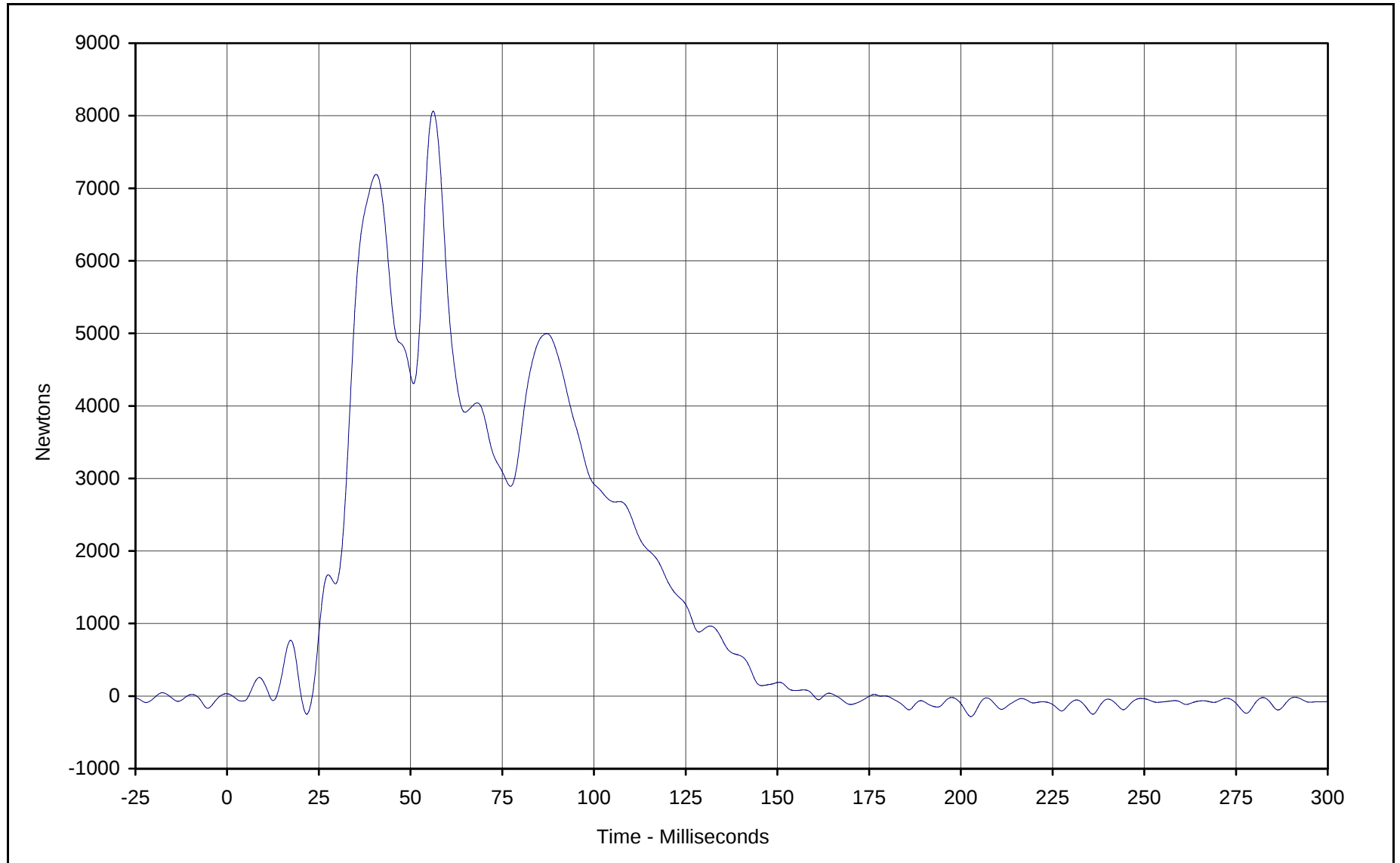
Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-7



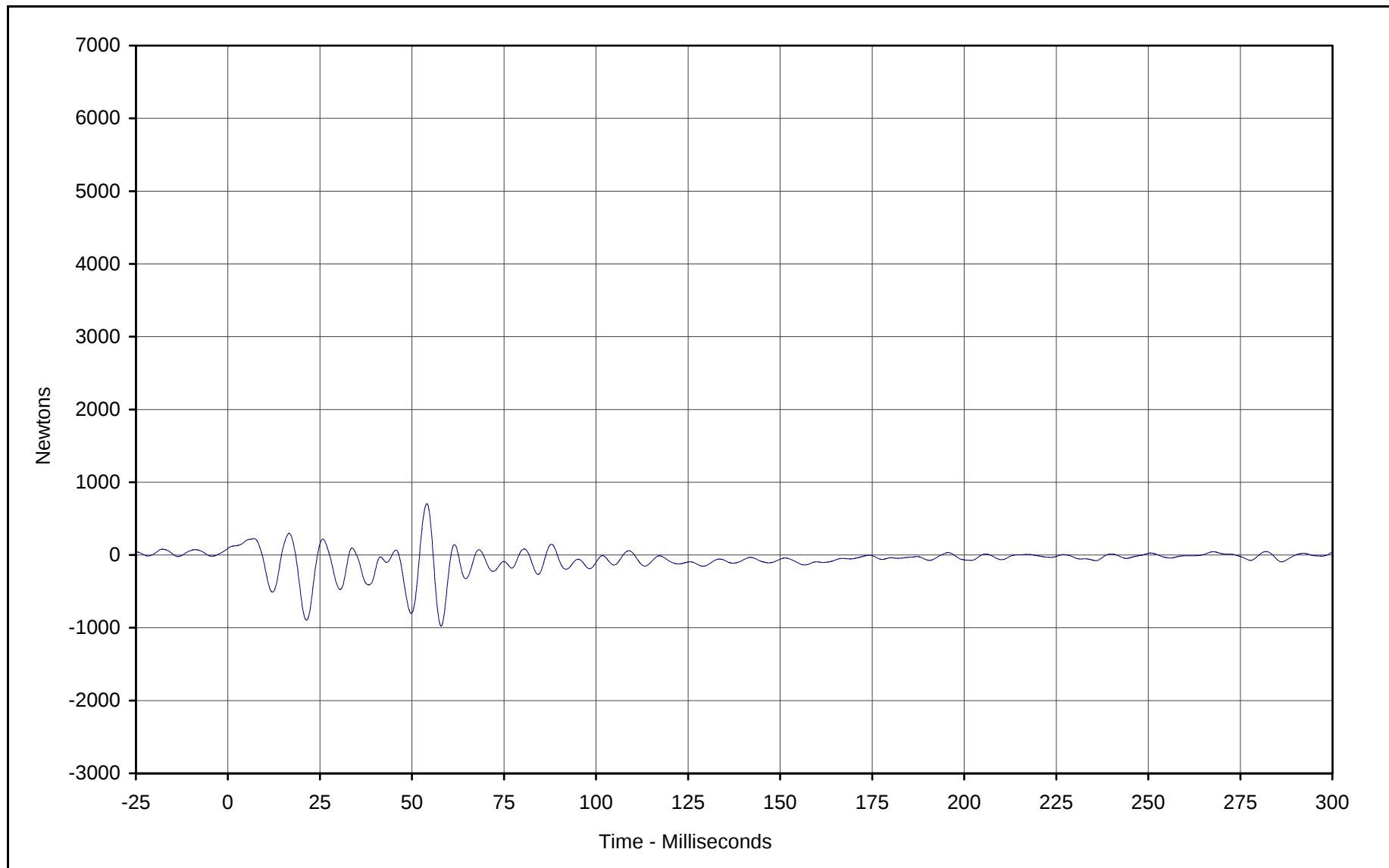
Curve Description: Barrier Force A8  
Maximum Value: 8063.7 at 56.2 Milliseconds  
Minimum Value: -283.0 at 202.7 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-105

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-8



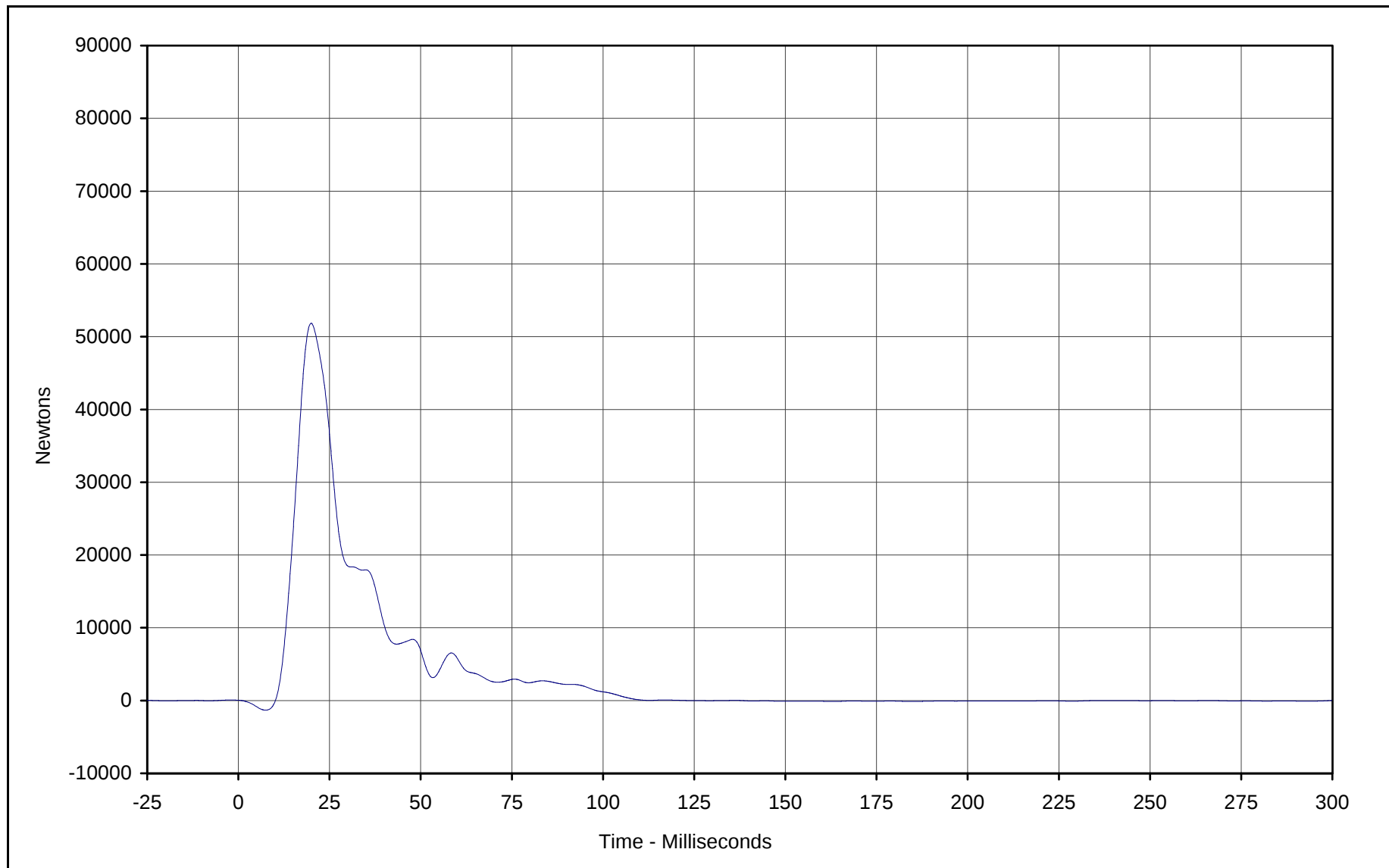
Curve Description: Barrier Force A9  
Maximum Value: 704.0 at 54.0 Milliseconds  
Minimum Value: -977.0 at 57.9 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-106

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-9



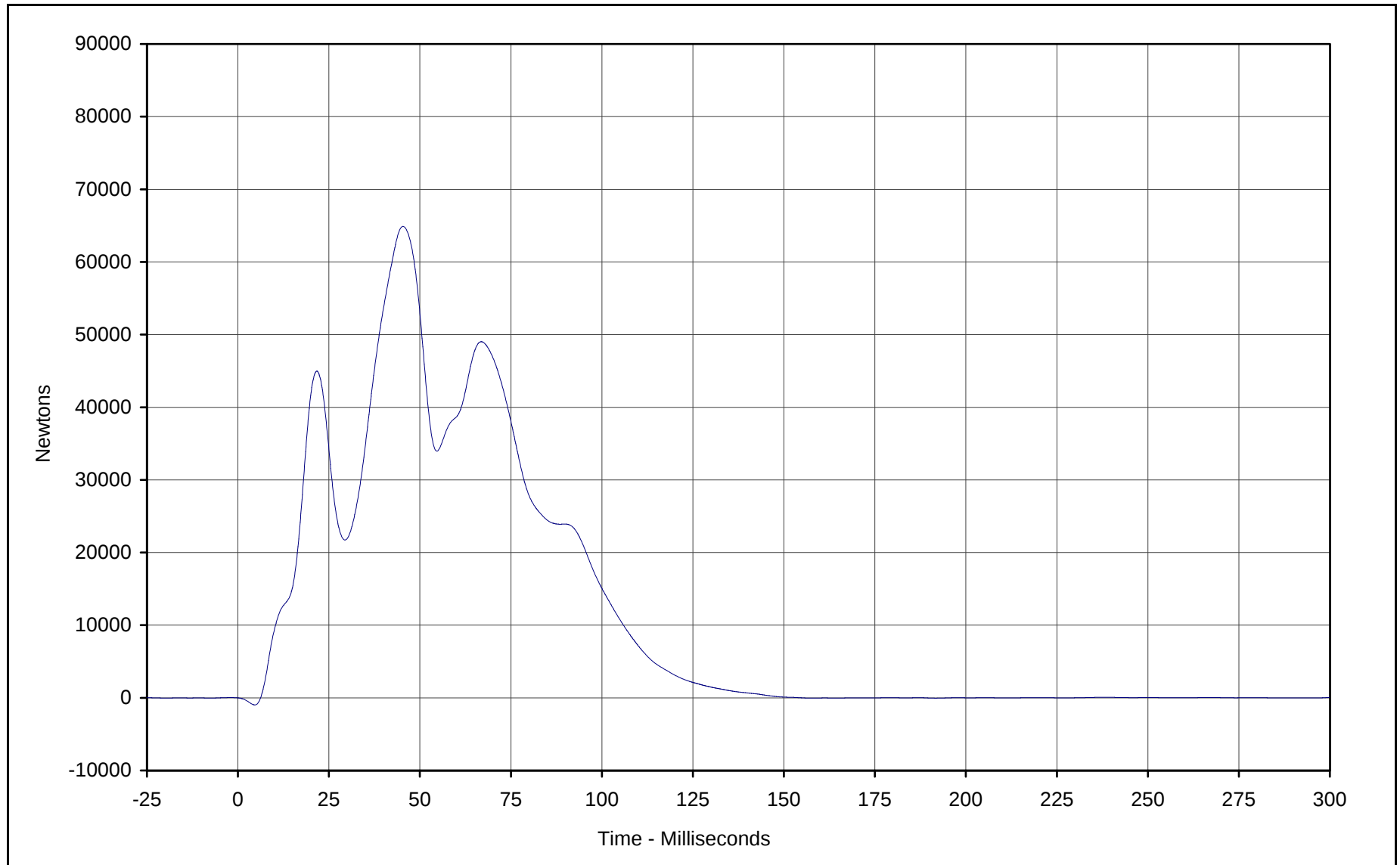
Curve Description: Barrier Force B2  
Maximum Value: 51851.2 at 20.0 Milliseconds  
Minimum Value: -1326.1 at 7.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-108

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-10



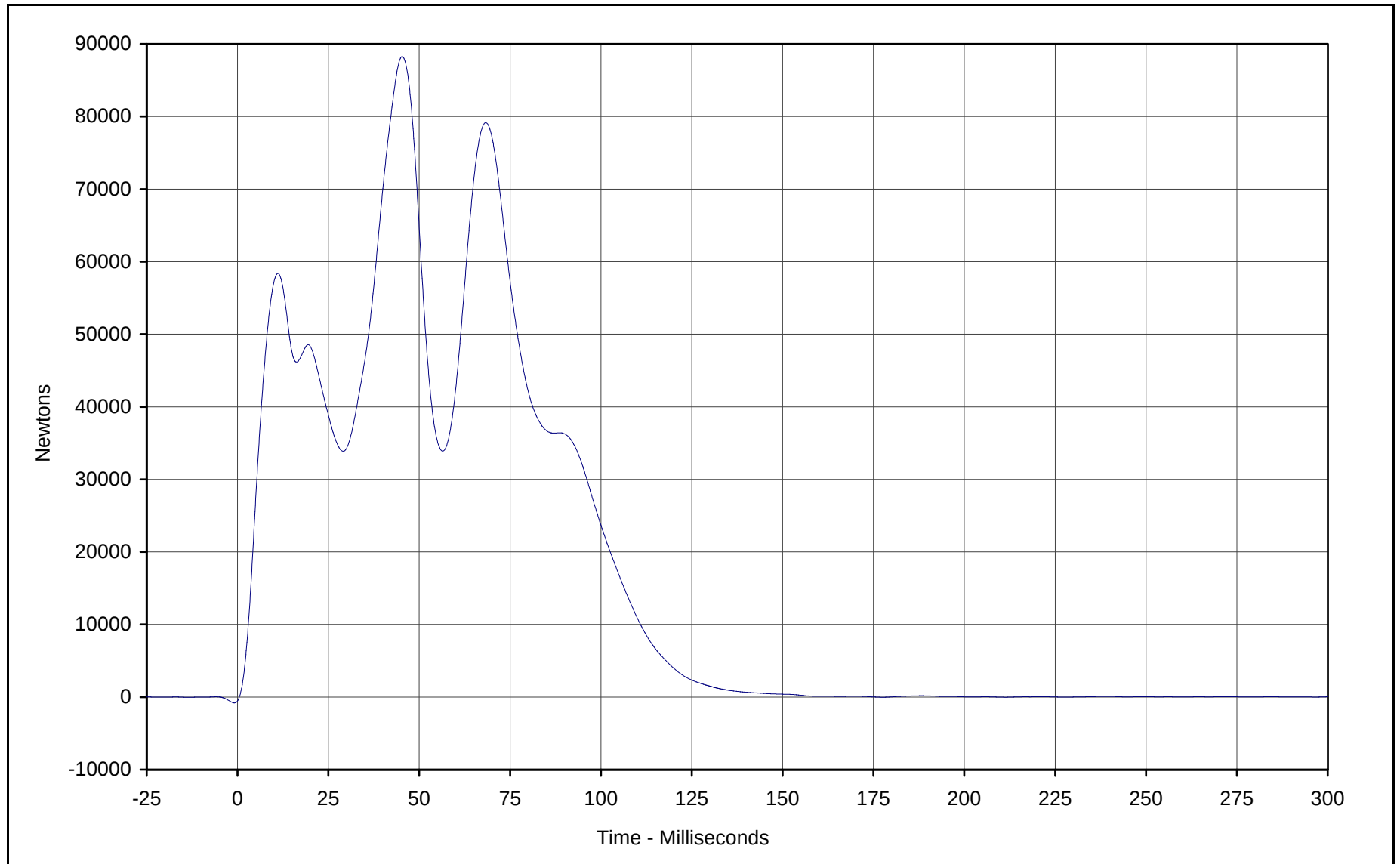
Curve Description: Barrier Force B3  
Maximum Value: 64900.6 at 45.3 Milliseconds  
Minimum Value: -977.0 at 4.6 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-109

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-11



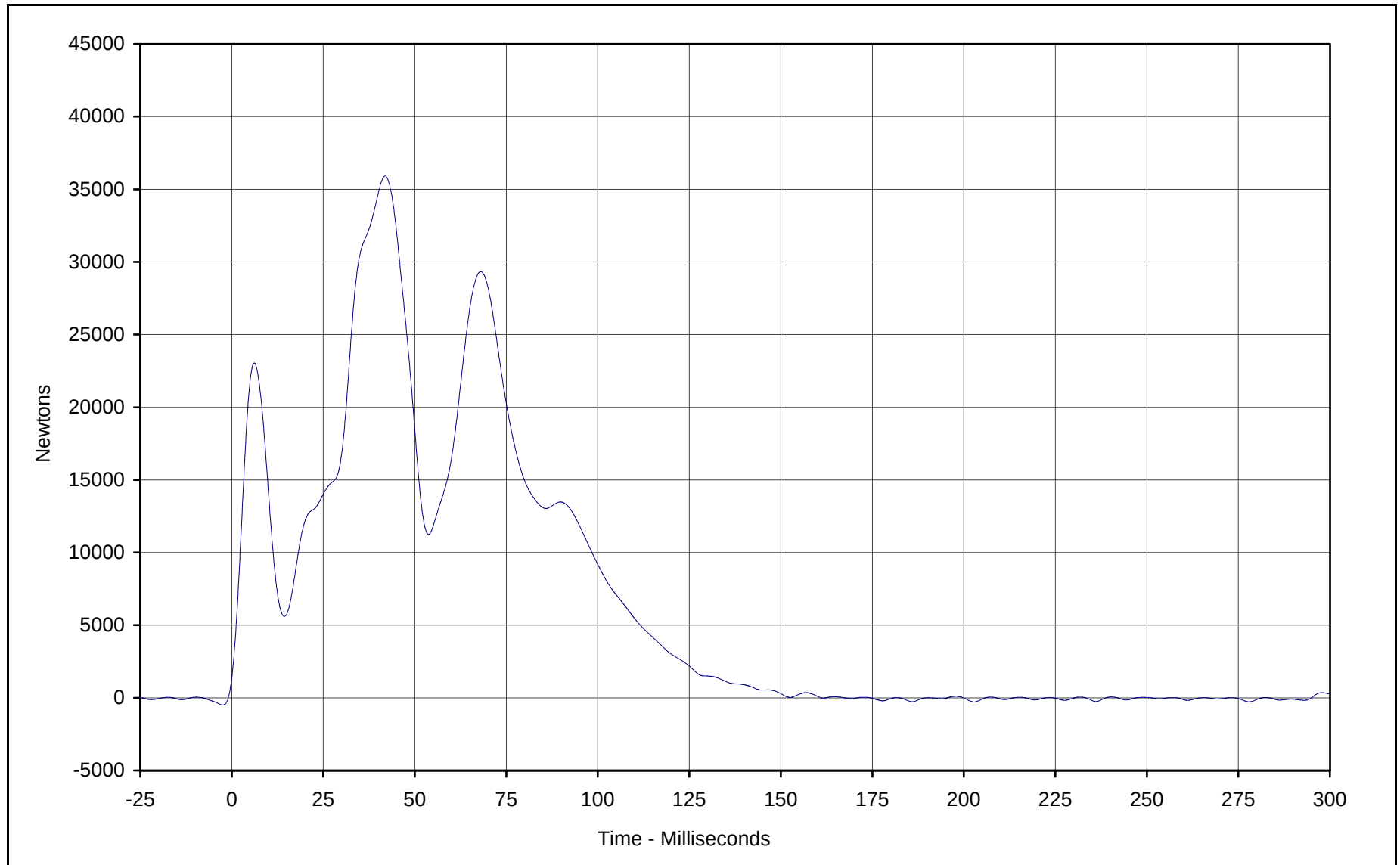
Curve Description: Barrier Force B4  
Maximum Value: 88274.7 at 45.3 Milliseconds  
Minimum Value: -524.5 at 0.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-110

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-12



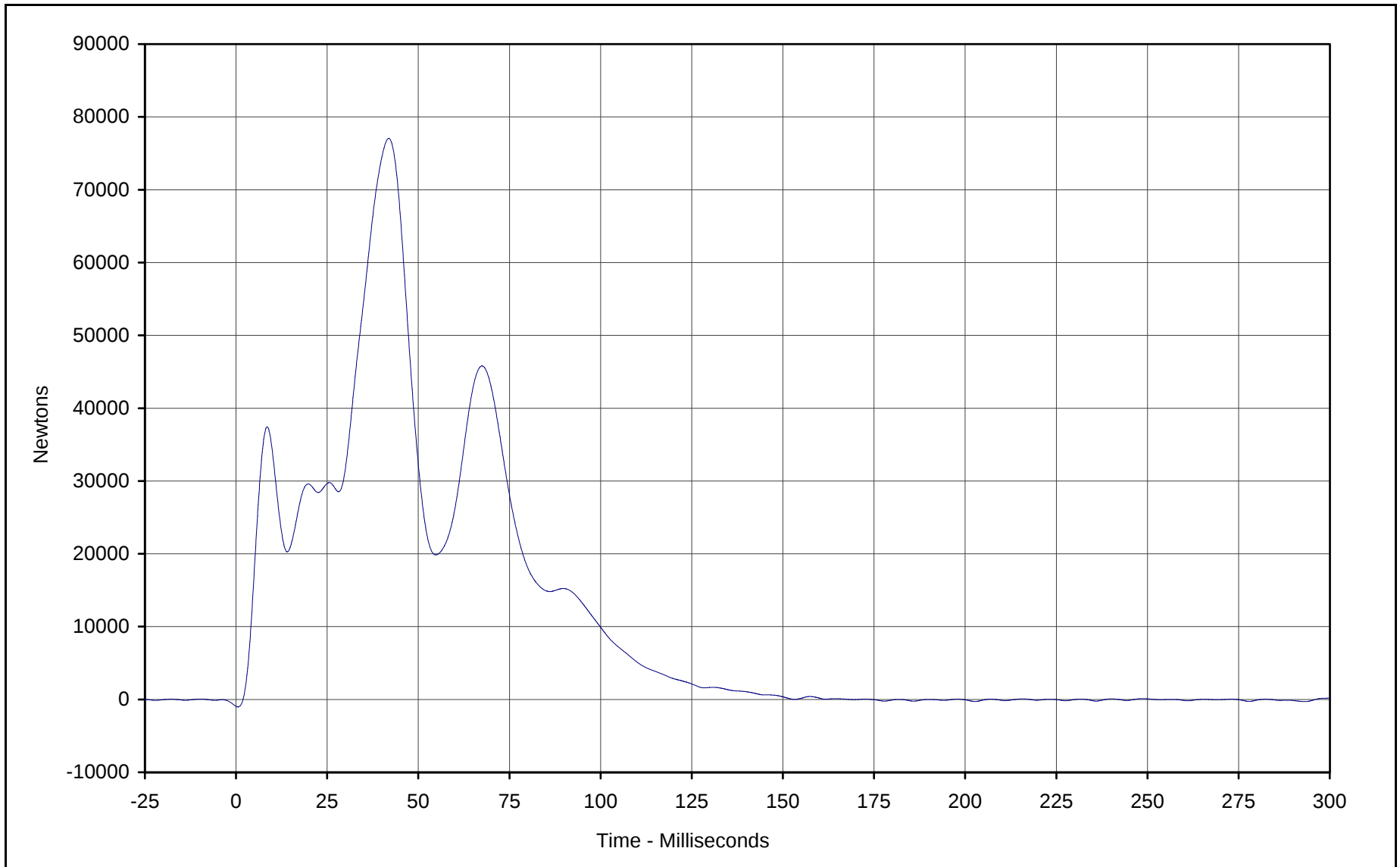
Curve Description: Barrier Force B5  
Maximum Value: 35915.2 at 41.9 Milliseconds  
Minimum Value: -292.0 at 202.8 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-111

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-13



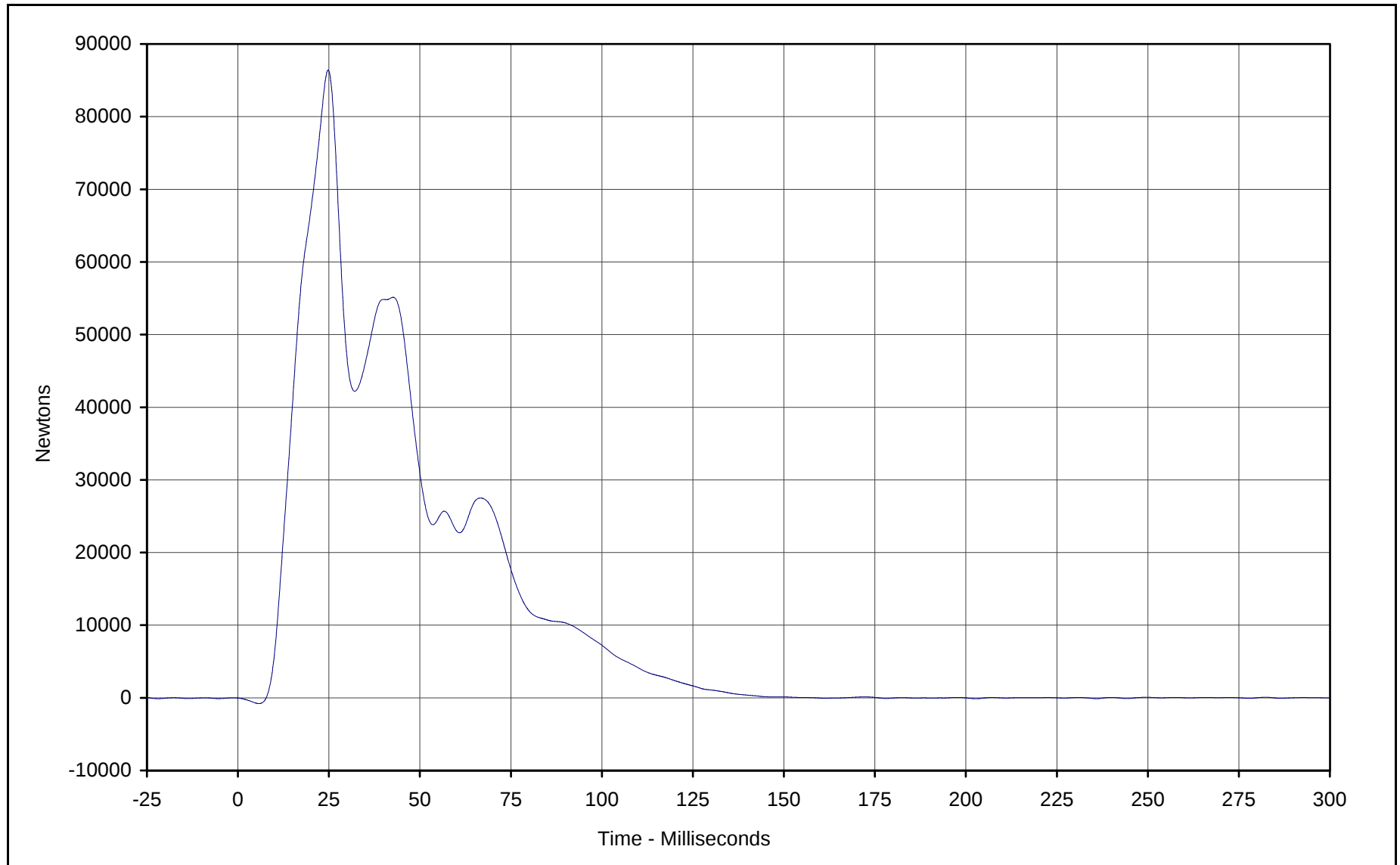
Curve Description: Barrier Force B6  
Maximum Value: 77052.6 at 41.9 Milliseconds  
Minimum Value: -1025.3 at 0.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-112

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-14



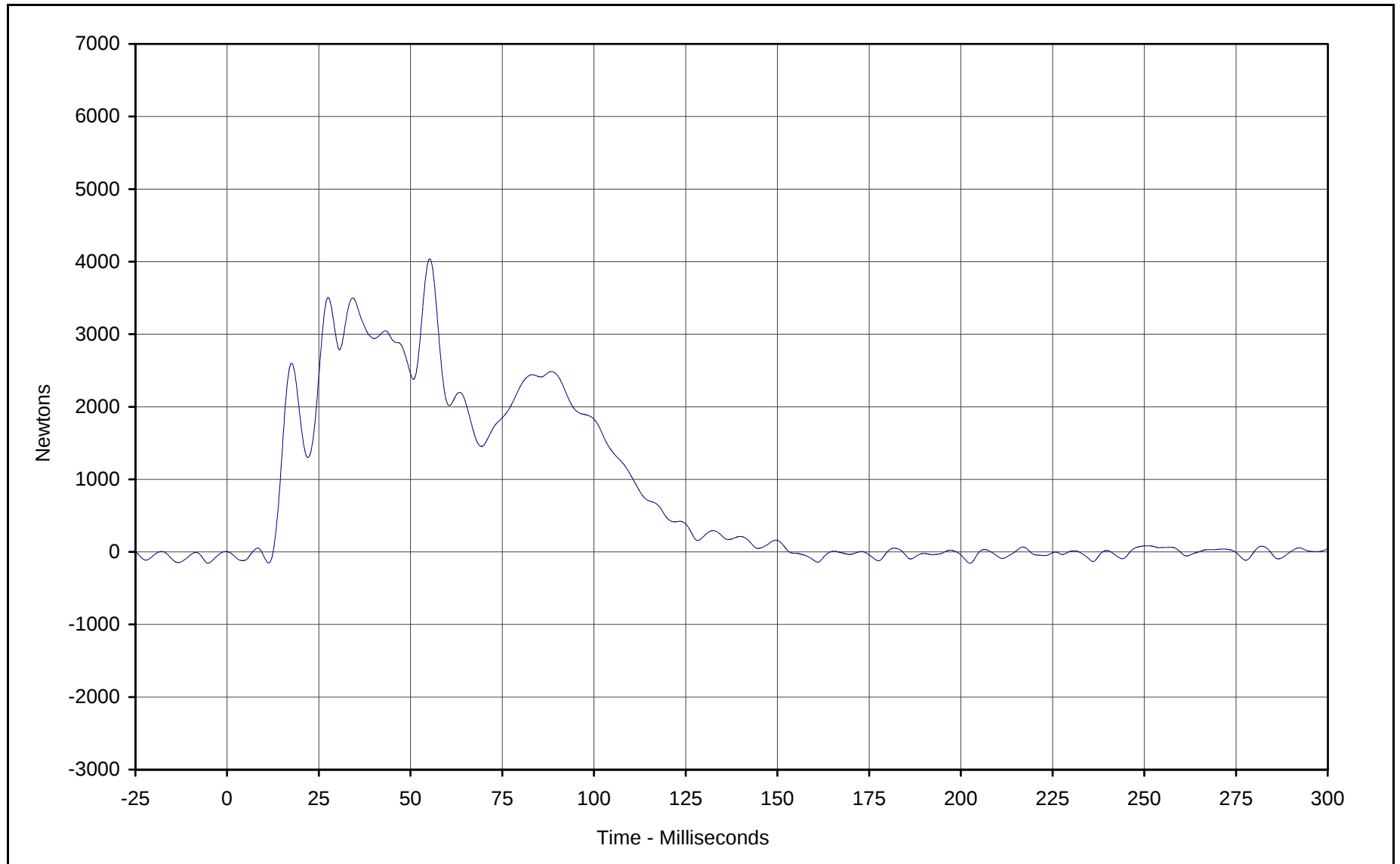
Curve Description: Barrier Force B7  
Maximum Value: 86399.8 at 24.8 Milliseconds  
Minimum Value: -791.3 at 5.8 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-113

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-15



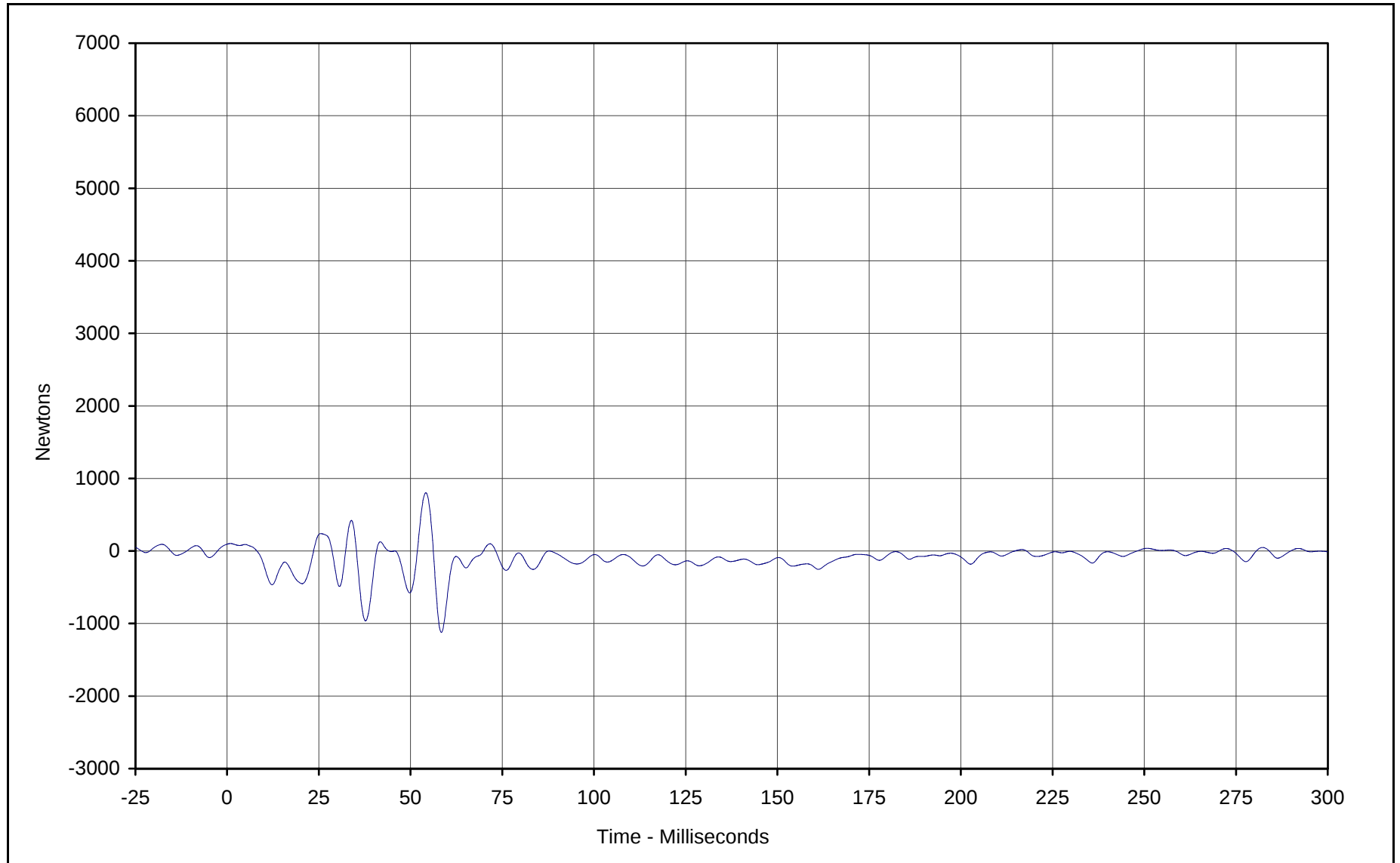
Curve Description: Barrier Force B8  
Maximum Value: 4038.2 at 55.2 Milliseconds  
Minimum Value: -156.4 at 202.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-114

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-16



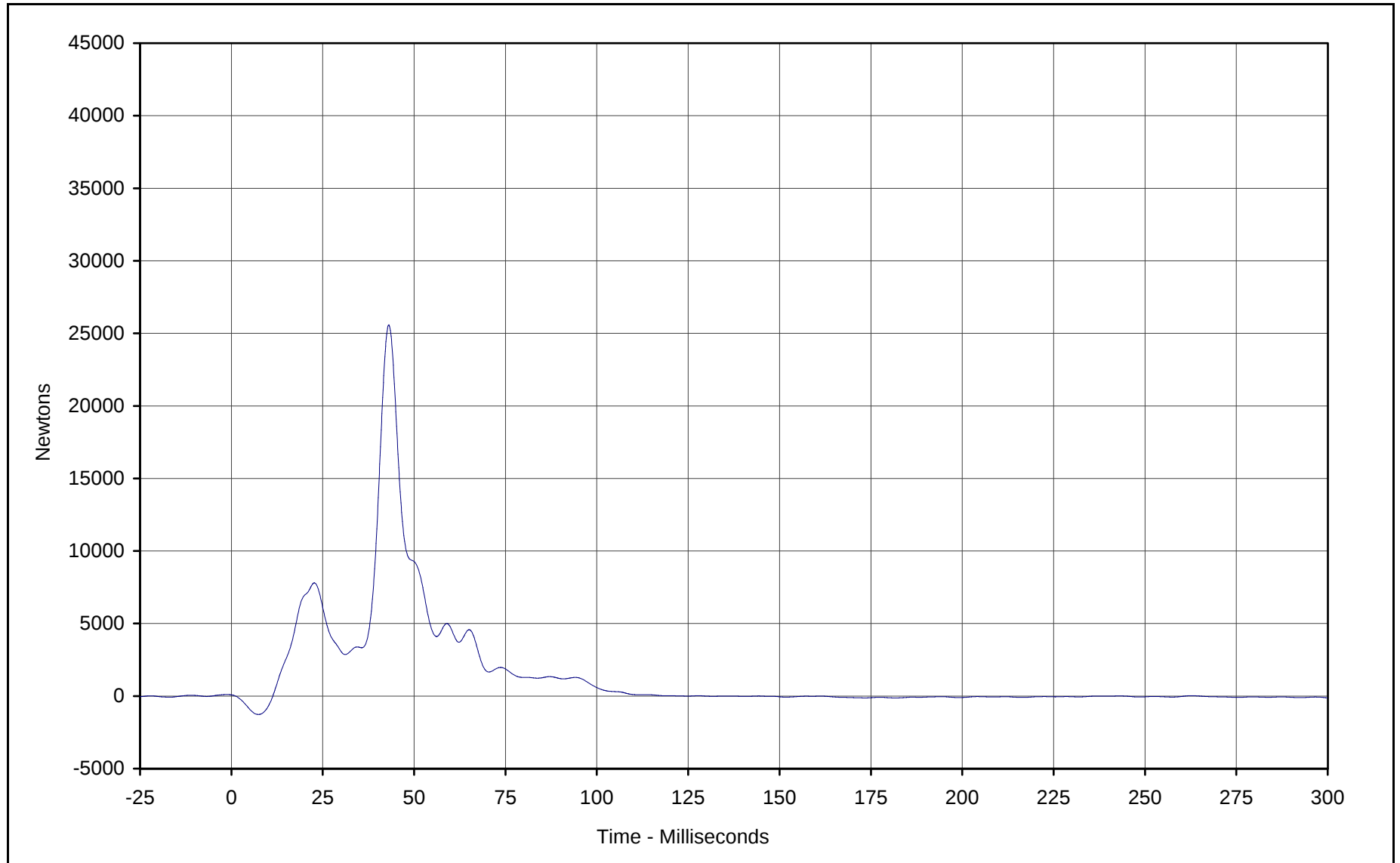
Curve Description: Barrier Force B9  
Maximum Value: 802.9 at 54.2 Milliseconds  
Minimum Value: -1124.7 at 58.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-115

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-17



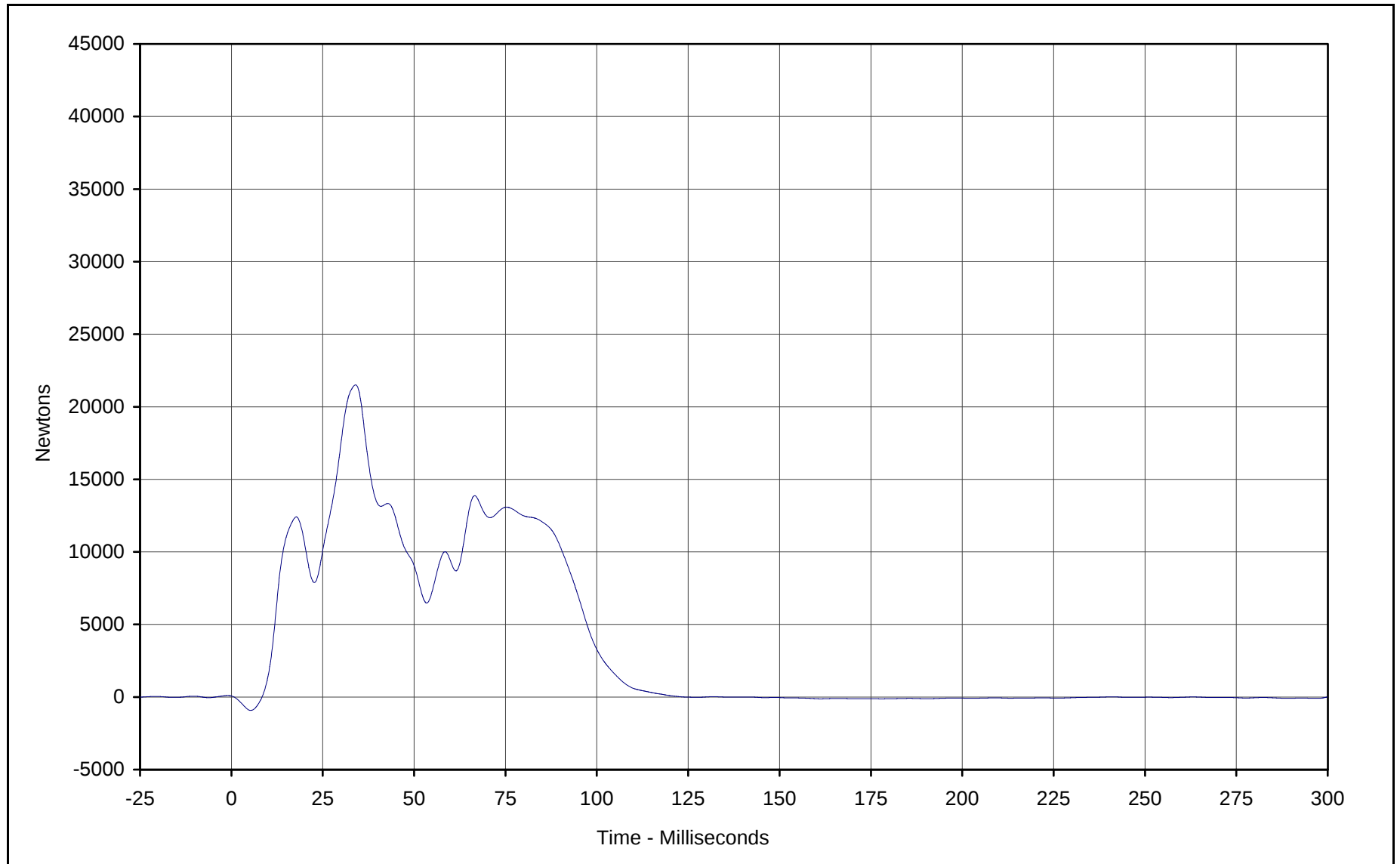
Curve Description: Barrier Force C2  
Maximum Value: 25583.5 at 43.1 Milliseconds  
Minimum Value: -1269.4 at 7.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-117

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-18



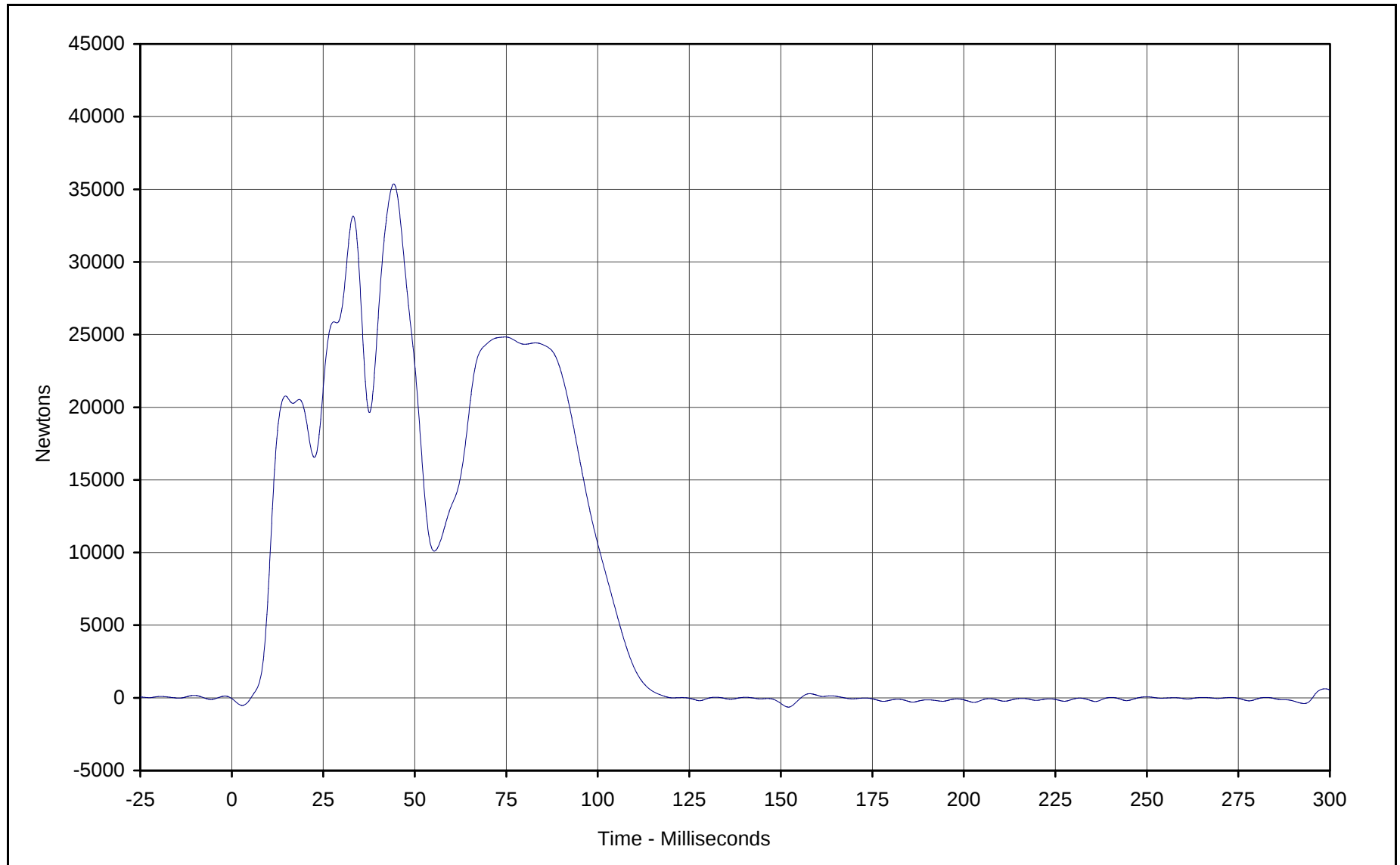
Curve Description: Barrier Force C3  
Maximum Value: 21506.2 at 34.0 Milliseconds  
Minimum Value: -920.3 at 5.2 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-118

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-19



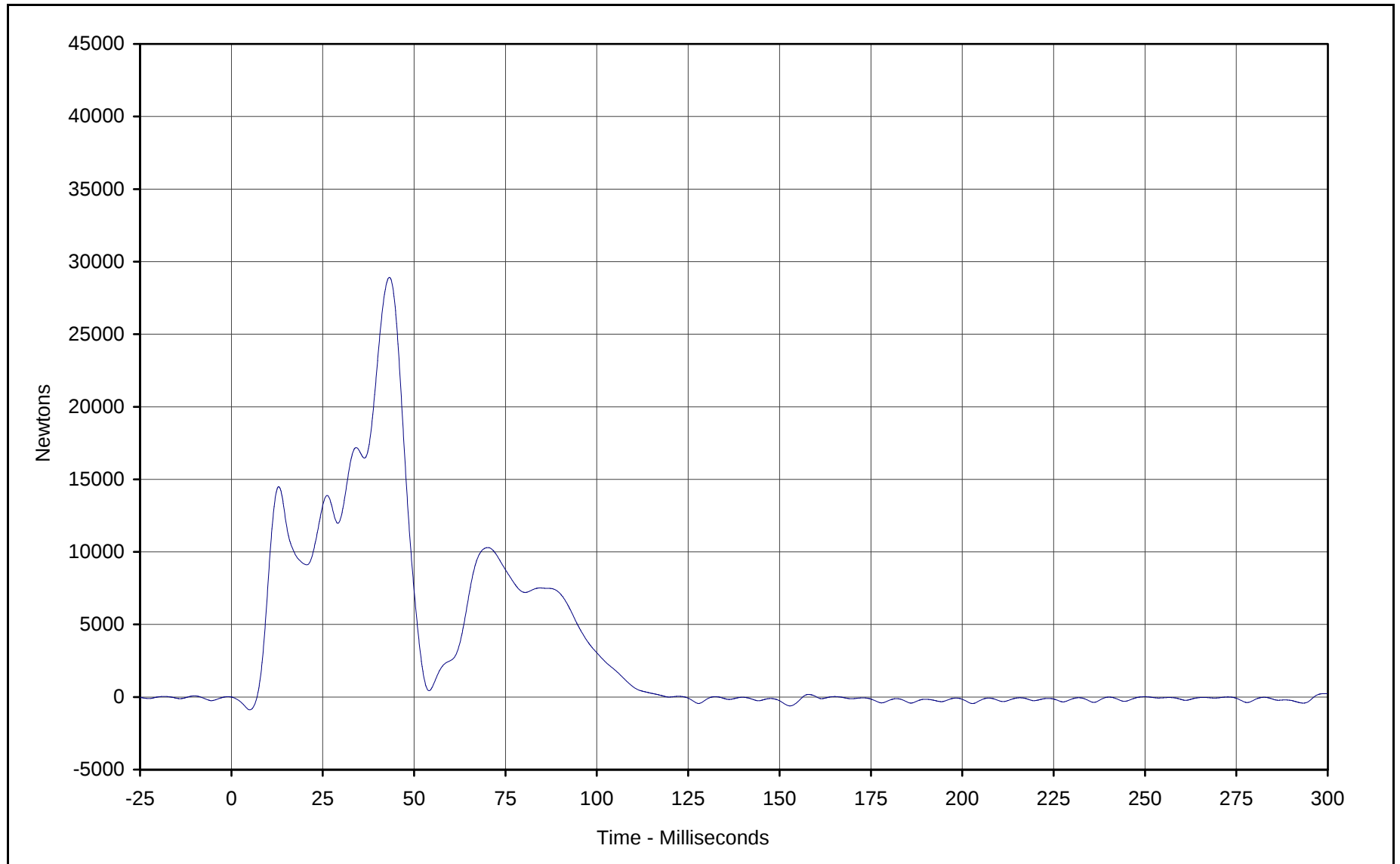
Curve Description: Barrier Force C4  
Maximum Value: 35371.8 at 44.3 Milliseconds  
Minimum Value: -637.8 at 152.1 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-119

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

C-20



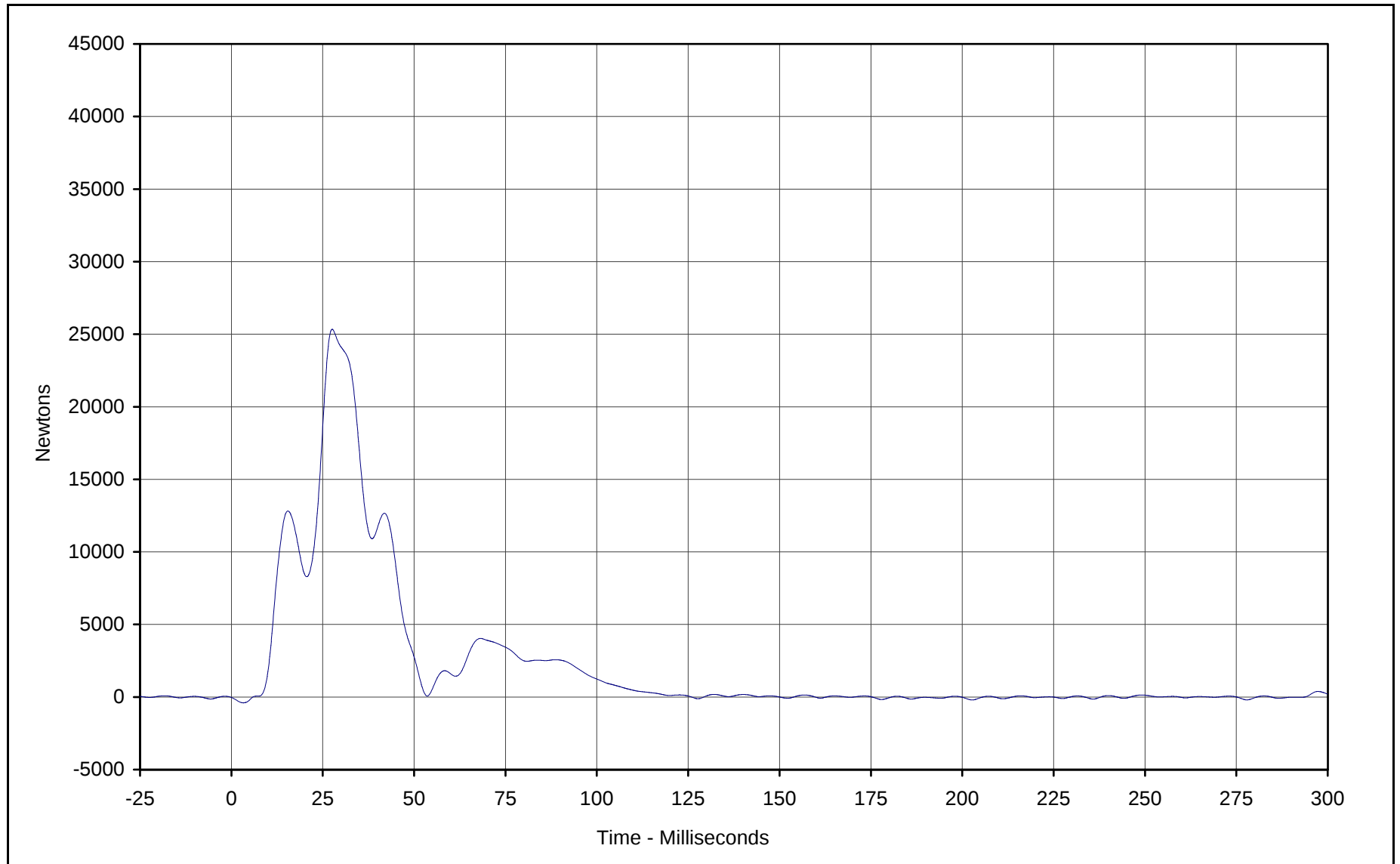
Curve Description: Barrier Force C5  
Maximum Value: 28917.7 at 43.2 Milliseconds  
Minimum Value: -882.9 at 5.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-120

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-21



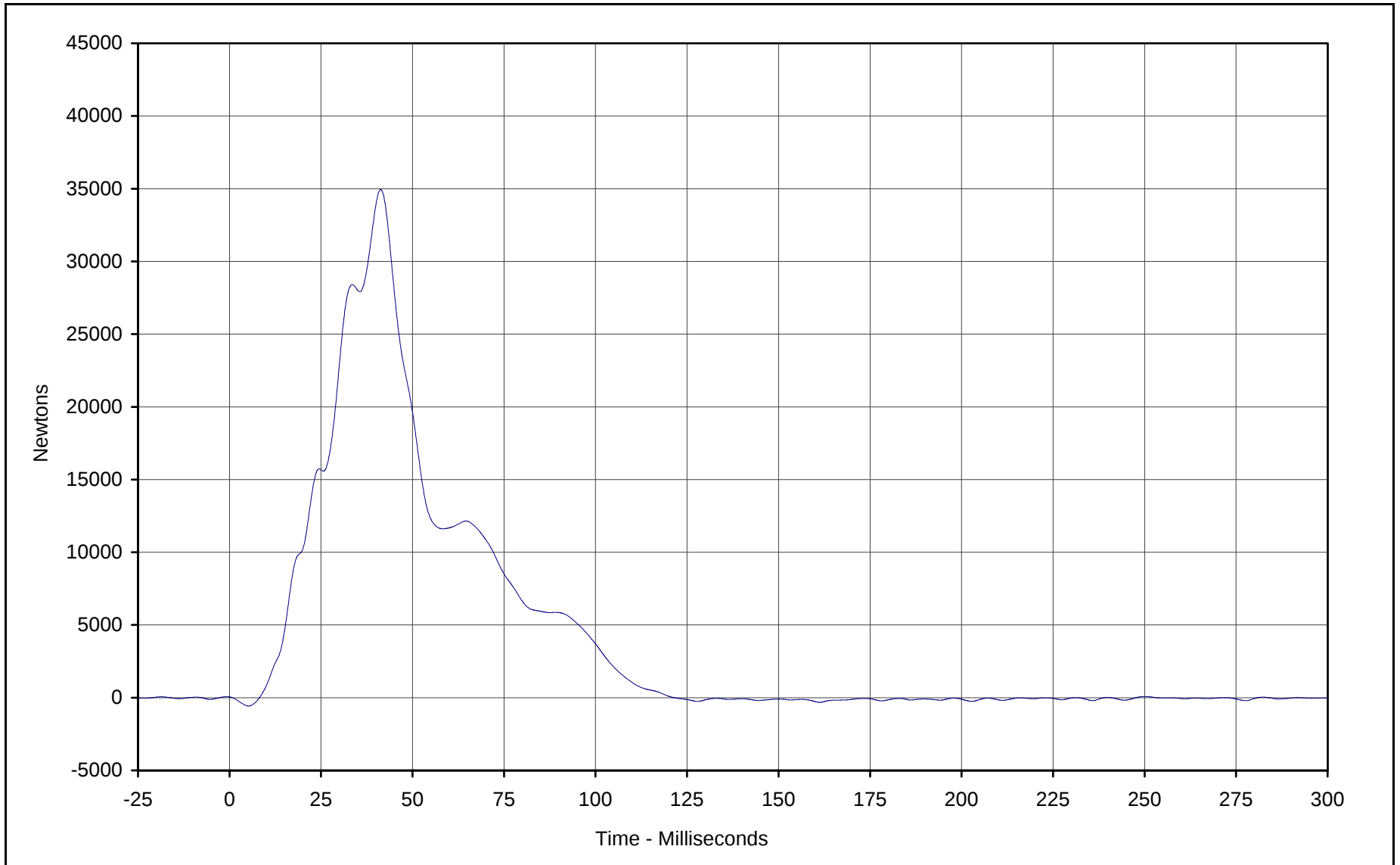
Curve Description: Barrier Force C6  
Maximum Value: 25341.4 at 27.6 Milliseconds  
Minimum Value: -400.3 at 3.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-121

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-22



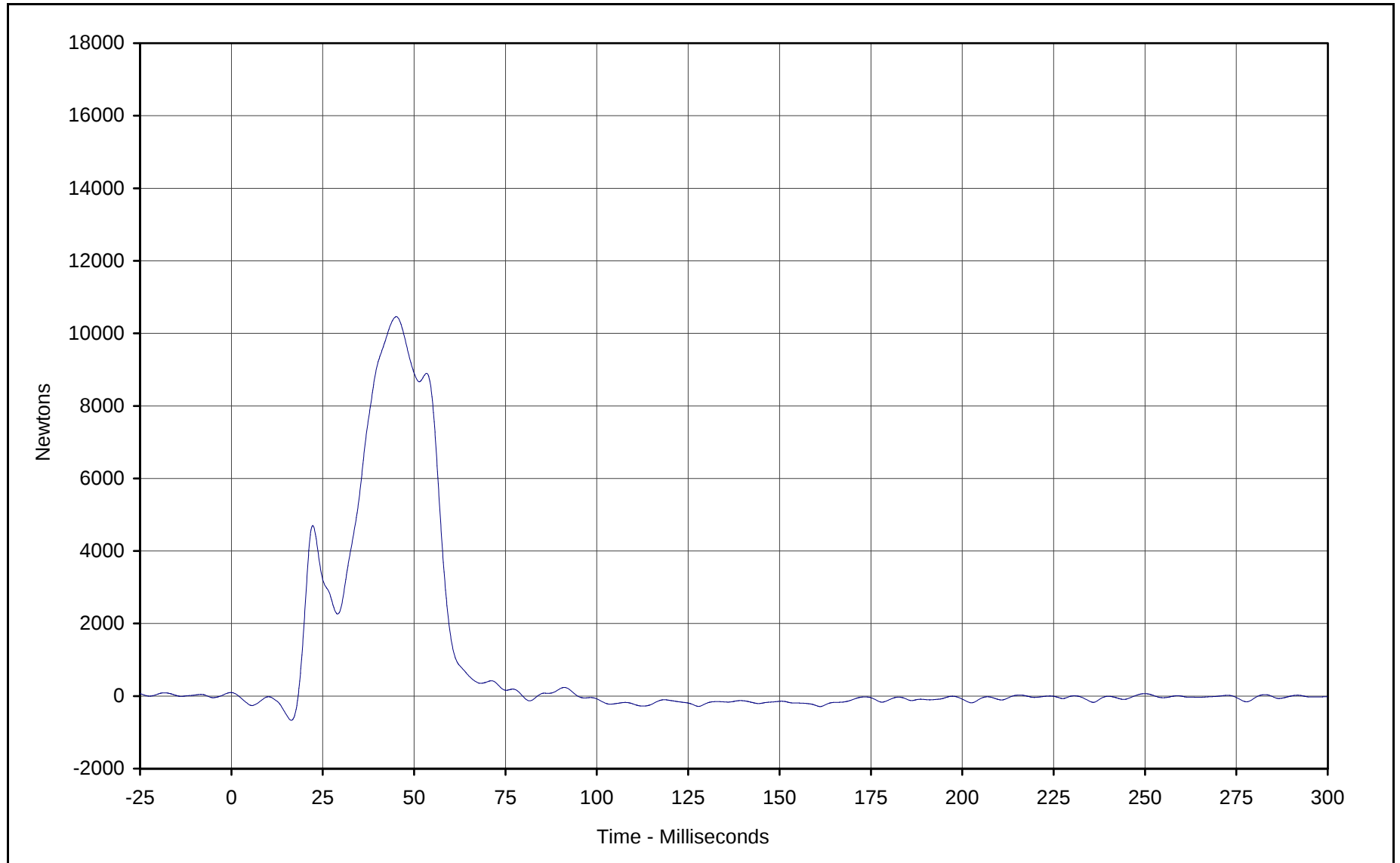
Curve Description: Barrier Force C7  
Maximum Value: 34942.7 at 41.3 Milliseconds  
Minimum Value: -575.8 at 5.2 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-122

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-23



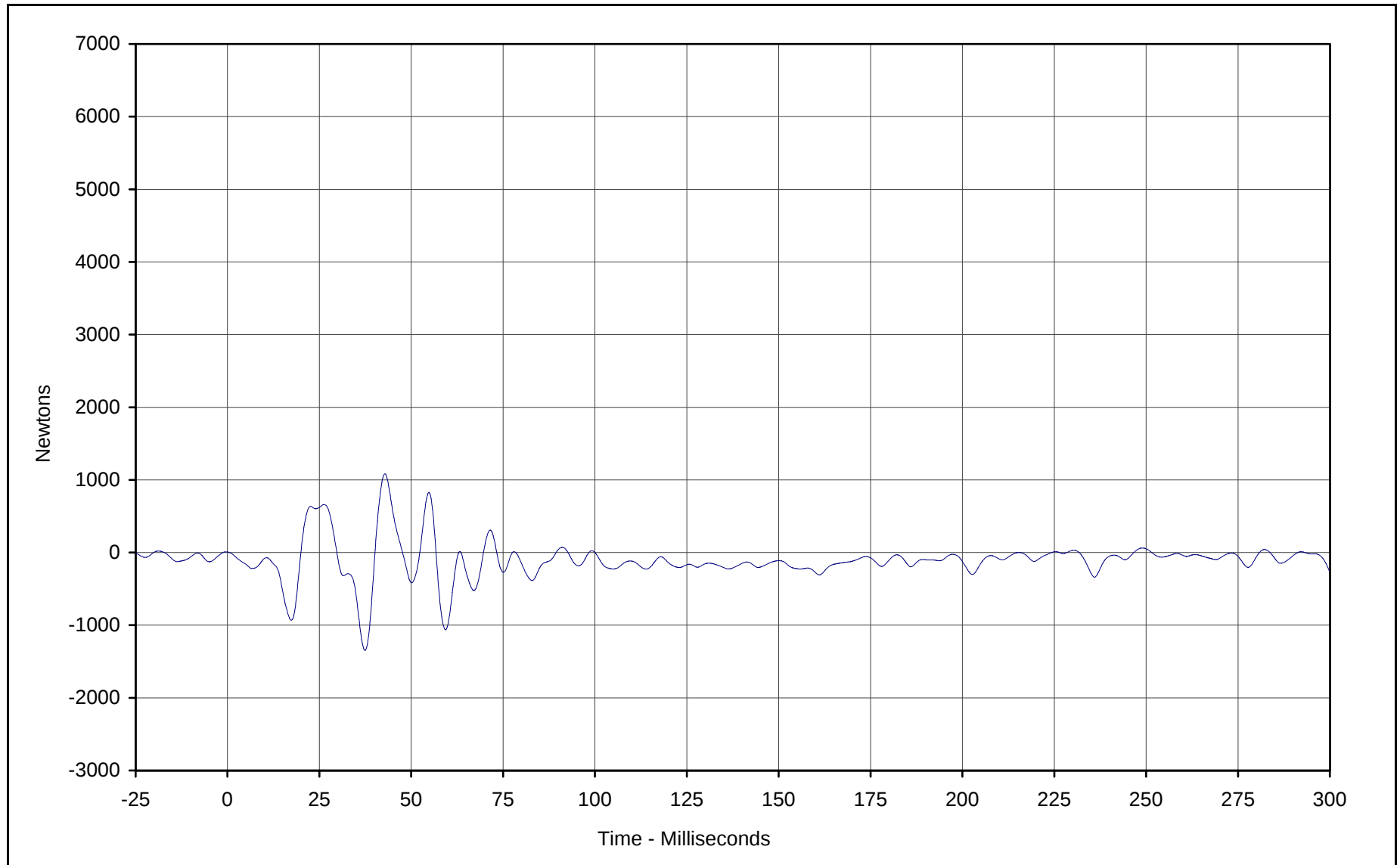
Curve Description: Barrier Force C8  
Maximum Value: 10460.0 at 45.1 Milliseconds  
Minimum Value: -667.5 at 16.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-123

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-24



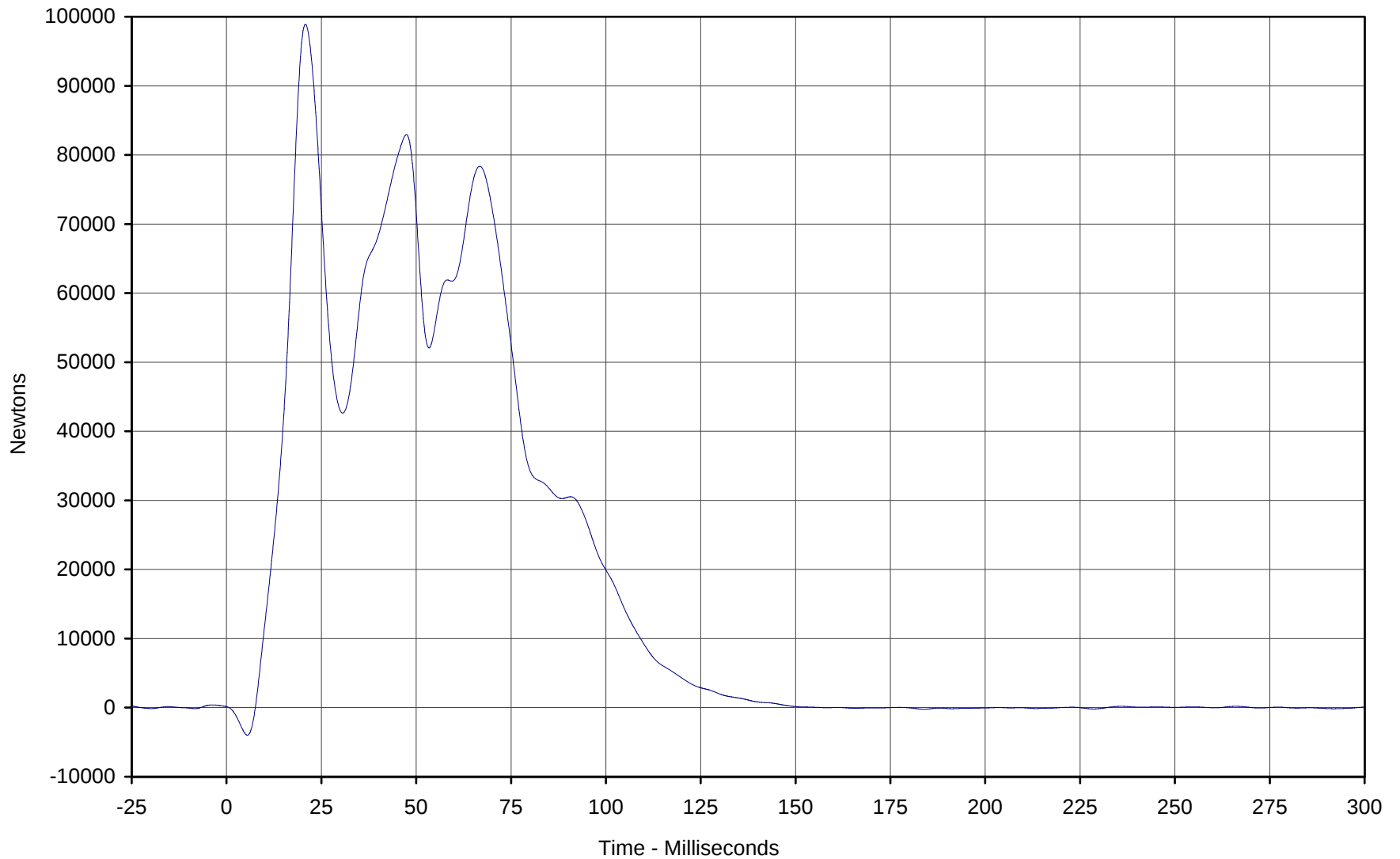
Curve Description: Barrier Force C9  
Maximum Value: 1083.7 at 42.8 Milliseconds  
Minimum Value: -1346.0 at 37.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: FIL-124

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-25

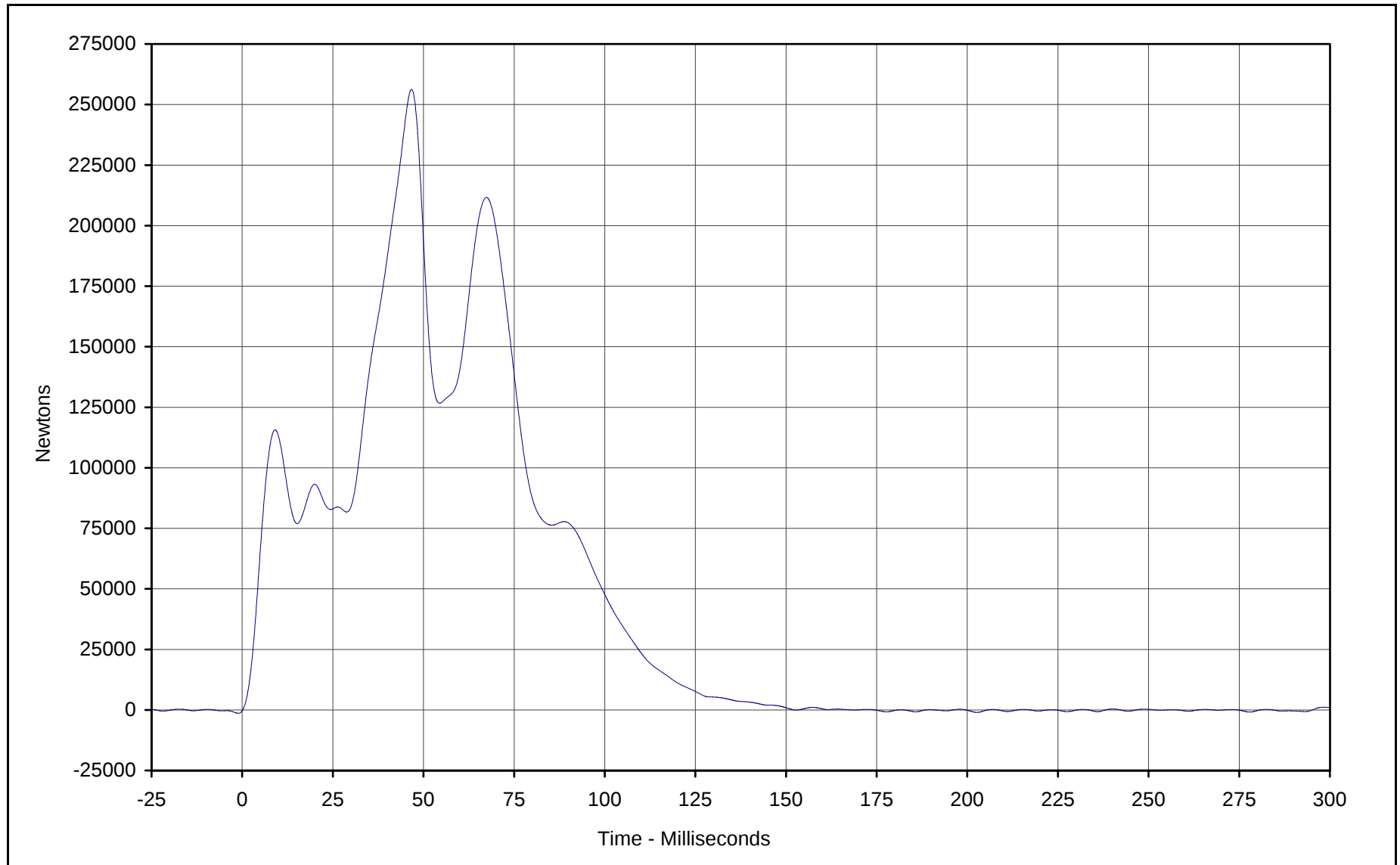


Curve Description: Barrier Force Sum Group 1  
Maximum Value: 98926.6 at 20.8 Milliseconds  
Minimum Value: -3997.8 at 5.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: SUM-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



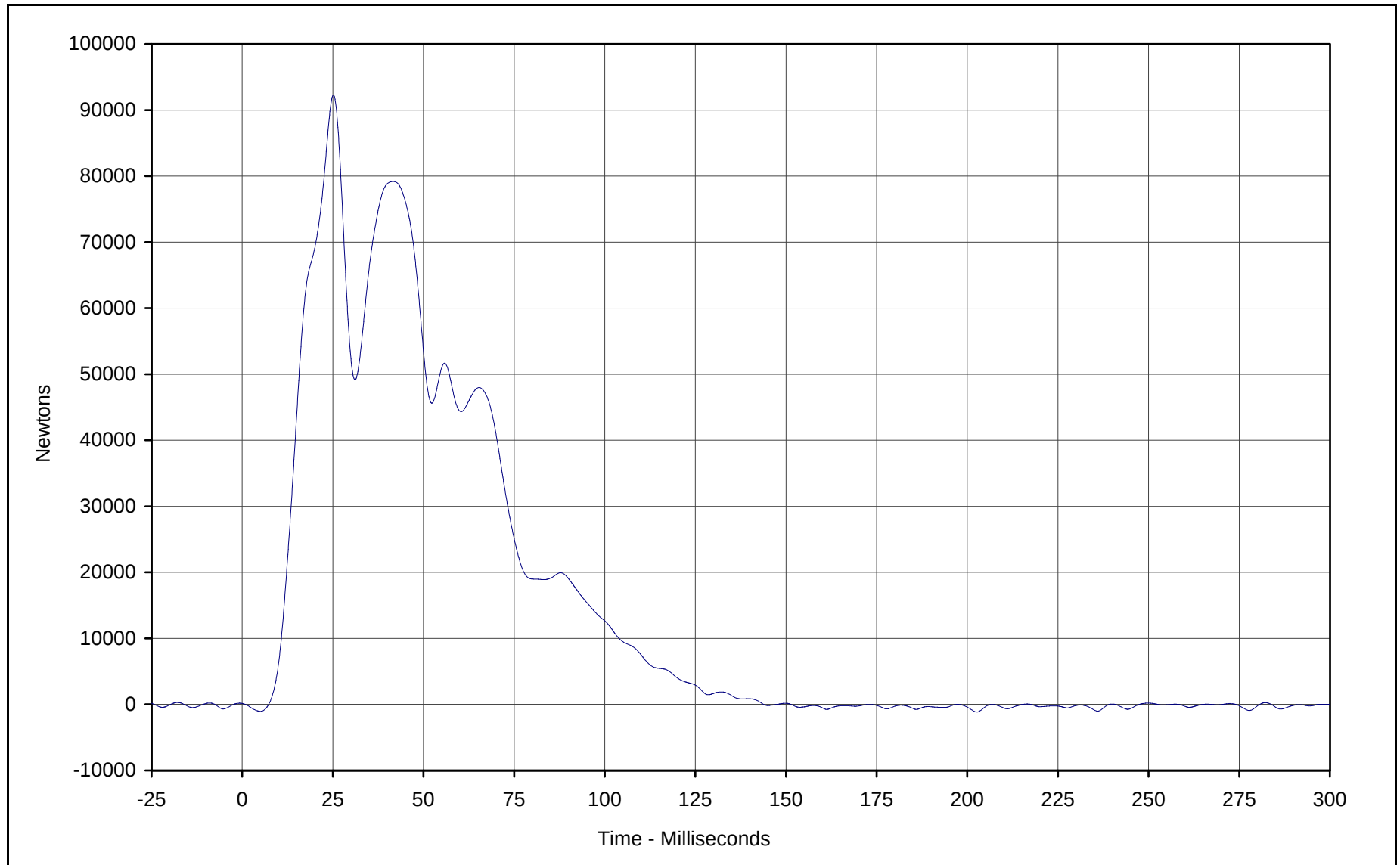
KAR21001-09



Curve Description: Barrier Force Sum Group 2  
Maximum Value: 256282.7 at 46.7 Milliseconds  
Minimum Value: -1022.5 at 202.7 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: SUM-002

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



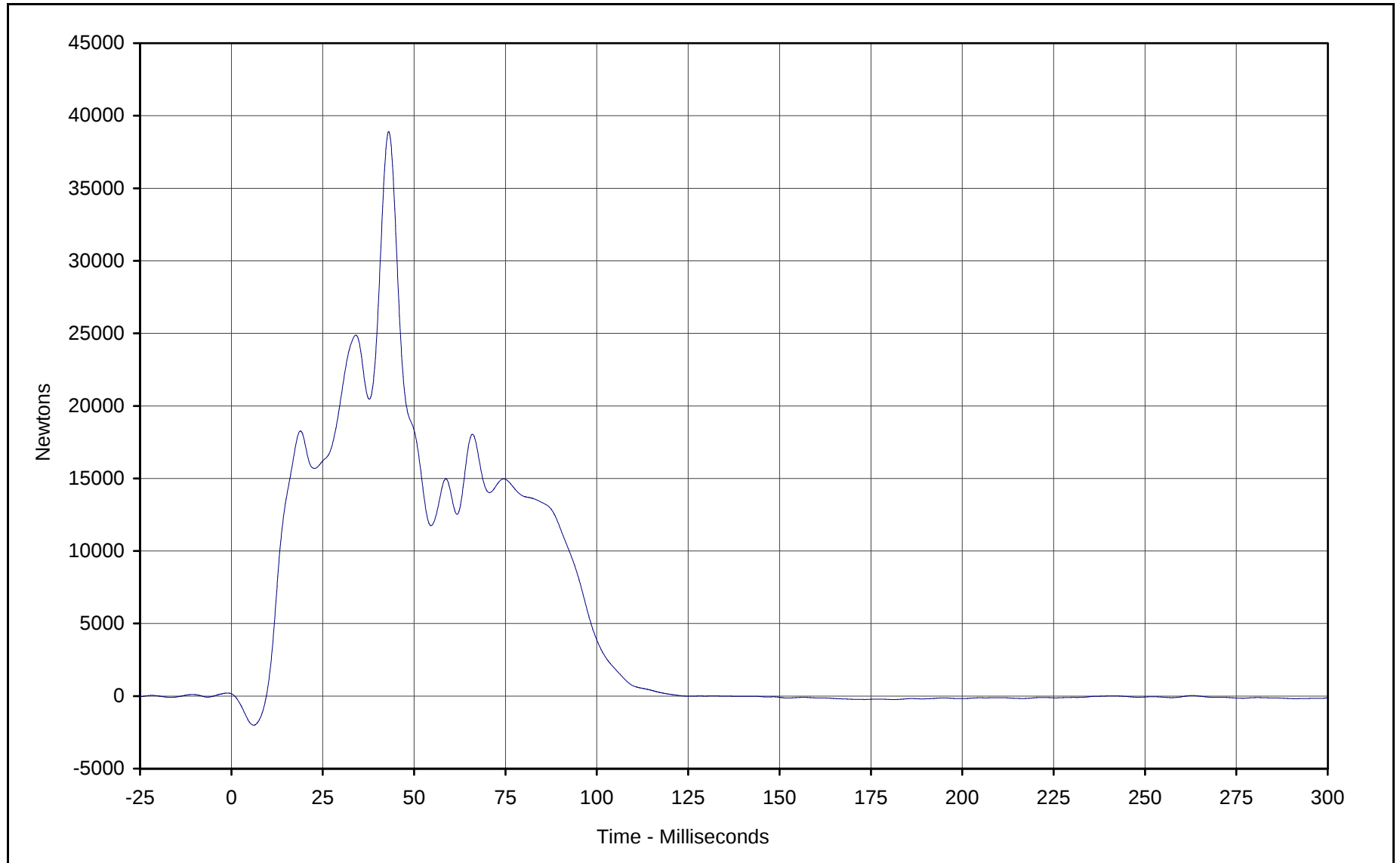


Curve Description: Barrier Force Sum Group 3  
Maximum Value: 92265.7 at 25.2 Milliseconds  
Minimum Value: -1152.7 at 202.6 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: SUM-003

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



C-28

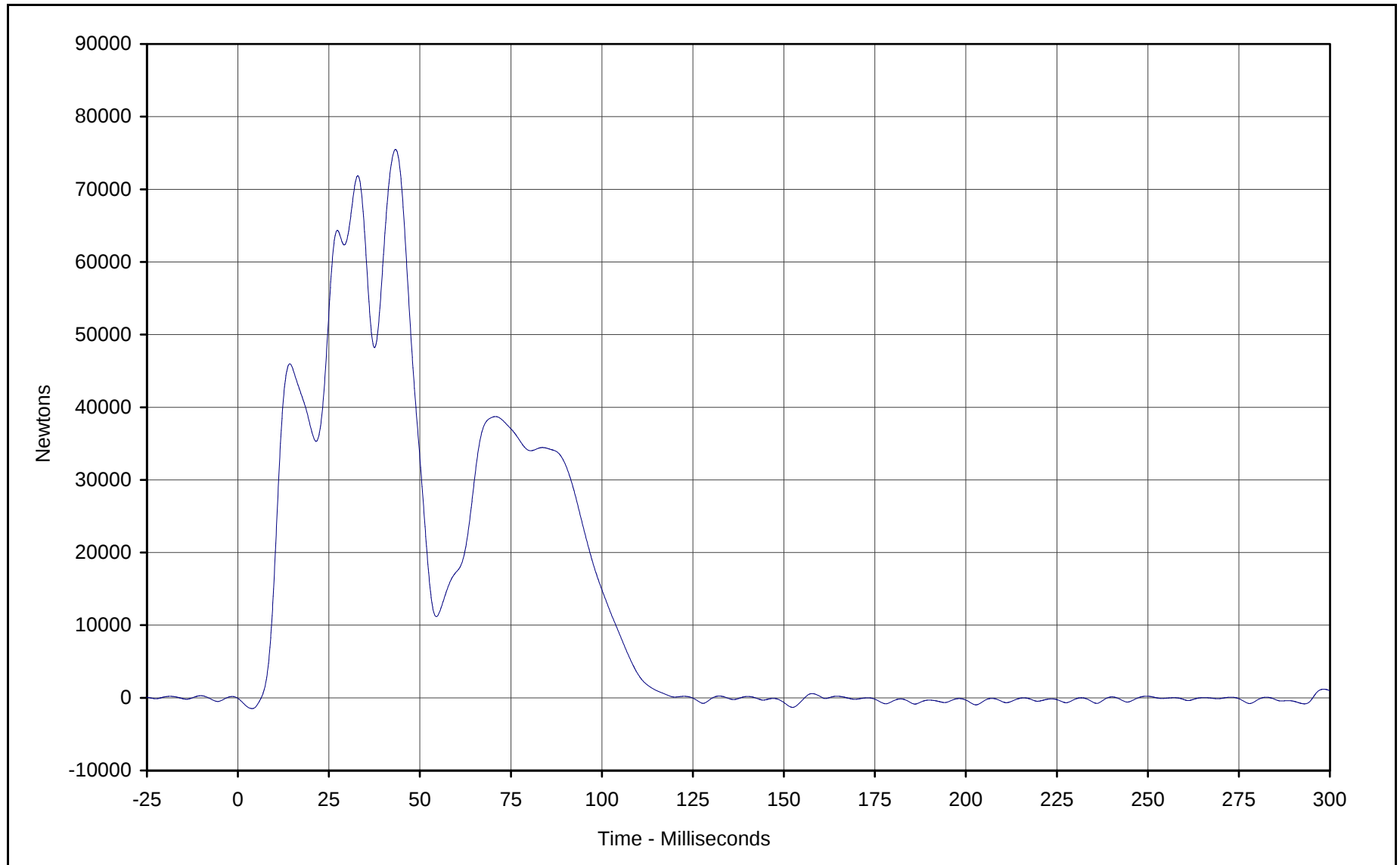


Curve Description: Barrier Force Sum Group 4  
Maximum Value: 38904.6 at 43.0 Milliseconds  
Minimum Value: -2008.3 at 6.1 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: SUM-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09



Curve Description: Barrier Force Sum Group 5

Maximum Value: 75486.8 at 43.3 Milliseconds

Minimum Value: -1475.2 at 3.9 Milliseconds

SAE Filter Class: 60

Date of Test: 01/30/01

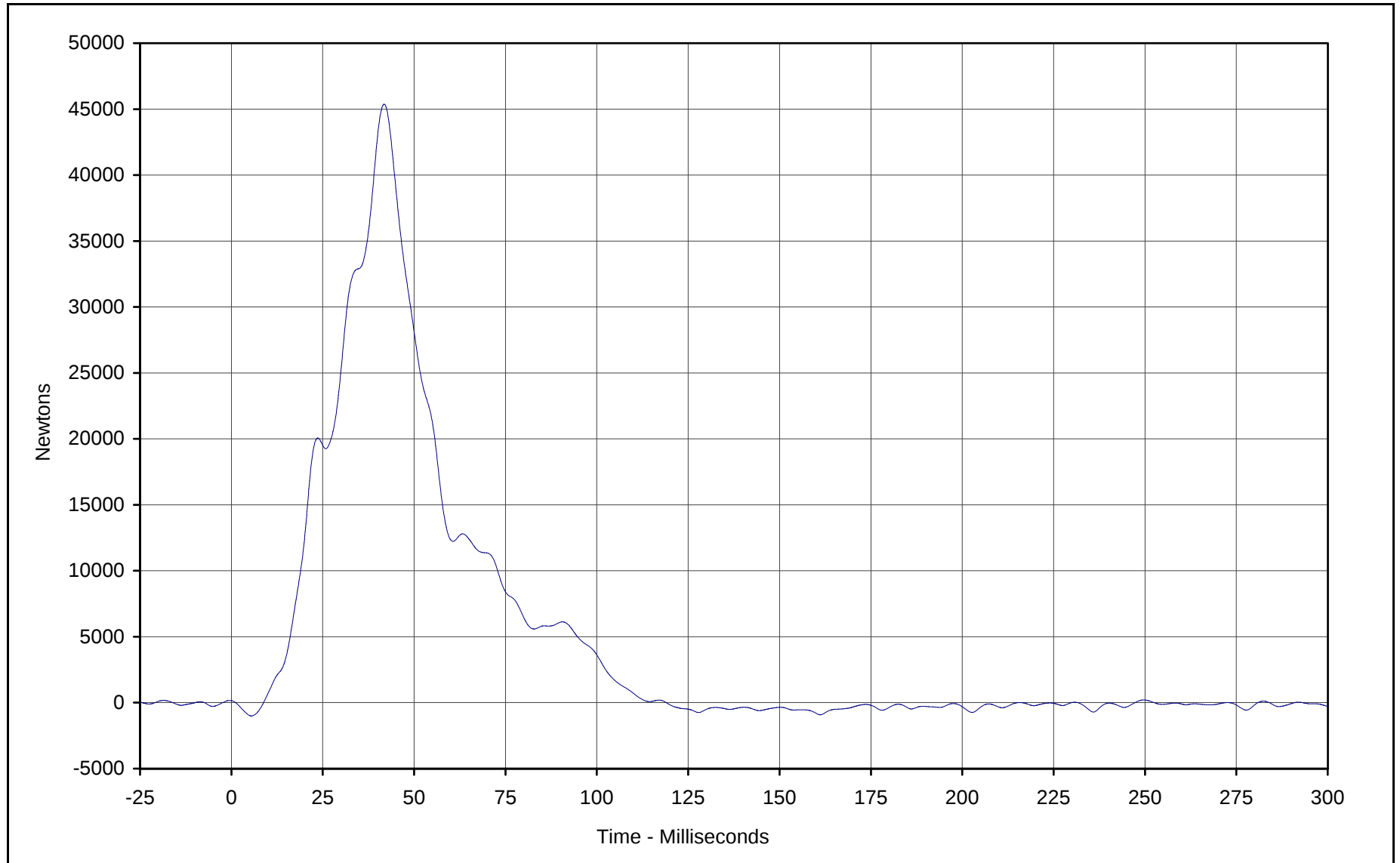
Curve Number: SUM-005

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



C-30



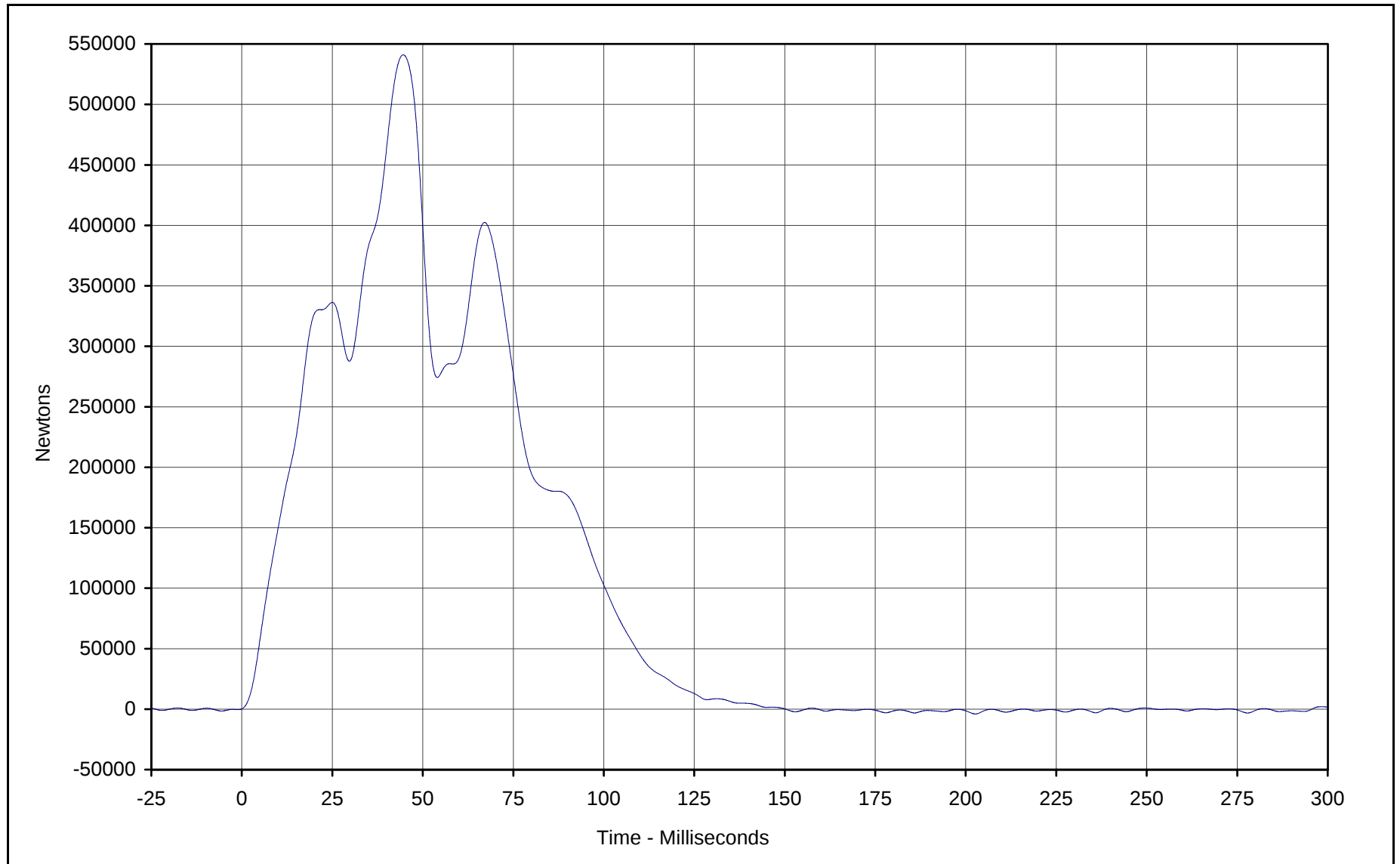
Curve Description: Barrier Force Sum Group 6  
Maximum Value: 45375.4 at 41.8 Milliseconds  
Minimum Value: -1009.9 at 5.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: SUM-006

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-31



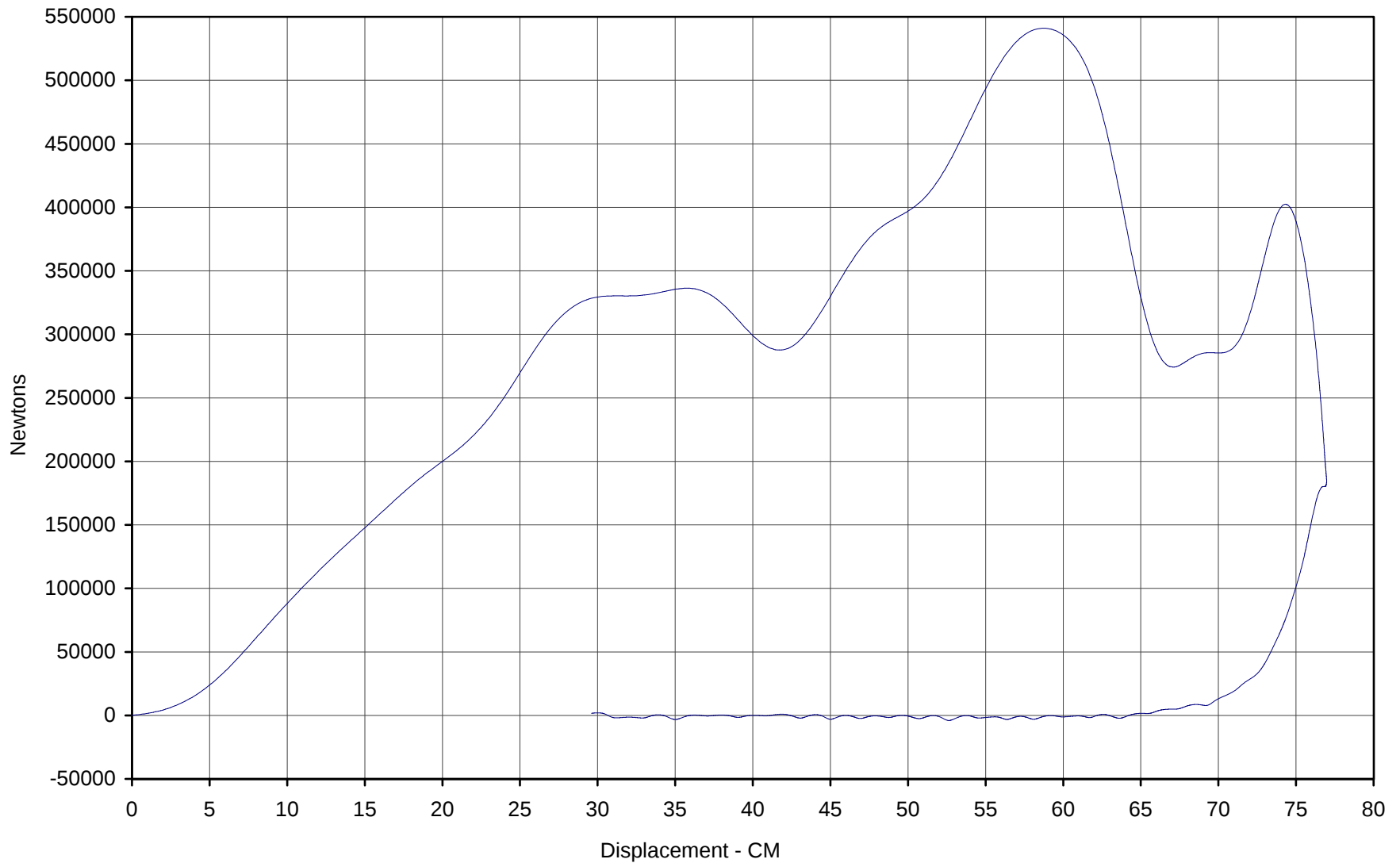
Curve Description: Barrier Force Sum Total  
Maximum Value: 541008.4 at 44.6 Milliseconds  
Minimum Value: -4021.9 at 202.7 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/30/01  
Curve Number: SUM-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10116  
Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



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C-32



Curve Description: Sum Force Total vs. Dynamic Crush

Maximum Displ.: 77.0 at 82.5 Milliseconds

Maximum Force: 541008.4 at 44.6 Milliseconds

Measured Energy: 214619.34 Joules

Date of Test: 01/30/01

Curve Number: XVY-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10116

Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door Sedan



KAR21001-09

**BARRIER LOAD CELL SUMMARY DATA**Test Vehicle: 2001 Pontiac Grand Prix SE 4 Door SedanNHTSA No.: M10116Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/30/01**BARRIER LOAD CELL PEAK FORCES**

| Location                  | Units   | Max      | Time | Min     | Time  |
|---------------------------|---------|----------|------|---------|-------|
| Barrier Force A2          | Newtons | 4500.2   | 55.8 | -1139.7 | 6.6   |
| Barrier Force A3          | Newtons | 22076.8  | 66.8 | -1310.6 | 5.7   |
| Barrier Force A4          | Newtons | 31257.0  | 49.0 | -835.6  | 4.0   |
| Barrier Force A5          | Newtons | 45555.9  | 47.4 | -400.9  | 2.7   |
| Barrier Force A6          | Newtons | 22421.5  | 47.8 | -729.9  | 4.5   |
| Barrier Force A7          | Newtons | 20034.4  | 47.8 | -438.8  | 4.6   |
| Barrier Force A8          | Newtons | 8063.7   | 56.2 | -283.0  | 202.7 |
| Barrier Force A9          | Newtons | 704.0    | 54.0 | -977.0  | 57.9  |
| Barrier Force B2          | Newtons | 51851.2  | 20.0 | -1326.1 | 7.4   |
| Barrier Force B3          | Newtons | 64900.6  | 45.3 | -977.0  | 4.6   |
| Barrier Force B4          | Newtons | 88274.7  | 45.3 | -524.5  | 0.0   |
| Barrier Force B5          | Newtons | 35915.2  | 41.9 | -292.0  | 202.8 |
| Barrier Force B6          | Newtons | 77052.6  | 41.9 | -1025.3 | 0.5   |
| Barrier Force B7          | Newtons | 86399.8  | 24.8 | -791.3  | 5.8   |
| Barrier Force B8          | Newtons | 4038.2   | 55.2 | -156.4  | 202.5 |
| Barrier Force B9          | Newtons | 802.9    | 54.2 | -1124.7 | 58.4  |
| Barrier Force C2          | Newtons | 25583.5  | 43.1 | -1269.4 | 7.4   |
| Barrier Force C3          | Newtons | 21506.2  | 34.0 | -920.3  | 5.2   |
| Barrier Force C4          | Newtons | 35371.8  | 44.3 | -637.8  | 152.1 |
| Barrier Force C5          | Newtons | 28917.7  | 43.2 | -882.9  | 5.0   |
| Barrier Force C6          | Newtons | 25341.4  | 27.6 | -400.3  | 3.3   |
| Barrier Force C7          | Newtons | 34942.7  | 41.3 | -575.8  | 5.2   |
| Barrier Force C8          | Newtons | 10460.0  | 45.1 | -667.5  | 16.4  |
| Barrier Force C9          | Newtons | 1083.7   | 42.8 | -1346.0 | 37.4  |
| Barrier Force Sum Group 1 | Newtons | 98926.6  | 20.8 | -3997.8 | 5.5   |
| Barrier Force Sum Group 2 | Newtons | 256282.7 | 46.7 | -1022.5 | 202.7 |
| Barrier Force Sum Group 3 | Newtons | 92265.7  | 25.2 | -1152.7 | 202.6 |
| Barrier Force Sum Group 4 | Newtons | 38904.6  | 43.0 | -2008.3 | 6.1   |
| Barrier Force Sum Group 5 | Newtons | 75486.8  | 43.3 | -1475.2 | 3.9   |
| Barrier Force Sum Group 6 | Newtons | 45375.4  | 41.8 | -1009.9 | 5.5   |
| Barrier Force Sum Total   | Newtons | 541008.4 | 44.6 | -4021.9 | 202.7 |

Barrier Load cells A1,B1,C1, and D1 through D9 (12 locations) were not recorded.

**APPENDIX D**

**INSTRUMENTATION DATA CHANNEL ASSIGNMENTS**

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Driver A.T.D. Serial Number 34**  
**01/30/01**  
**2001 Pontiac Grand Prix SE 4 Door Sedan**

| CH. | LOCATION           | AXIS | IDENT. NO. | DESCRIPTION              | MFR          | MODEL     | UNITS |
|-----|--------------------|------|------------|--------------------------|--------------|-----------|-------|
| 1   | HEAD, PRIMARY      | X    | GPAC027    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 2   | HEAD, PRIMARY      | Y    | GPAC002    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 3   | HEAD, PRIMARY      | Z    | GPAC003    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 4   | HEAD, REDUNDANT    | X    | GPAC032    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 5   | HEAD, REDUNDANT    | Y    | GPAC021    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 6   | HEAD, REDUNDANT    | Z    | GPAC026    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 7   | NECK FORCE         | X    | GPUN01FX   | Load cell, six axis neck | R. A. Denton | 1716A     | N     |
| 8   | NECK FORCE         | Y    | GPUN01FY   | Load cell, six axis neck | R. A. Denton | 1716A     | N     |
| 9   | NECK FORCE         | Z    | GPUN01FZ   | Load cell, six axis neck | R. A. Denton | 1716A     | N     |
| 10  | NECK MOMENT        | X    | GPUN01MX   | Load cell, six axis neck | R. A. Denton | 1716A     | Nm    |
| 11  | NECK MOMENT        | Y    | GPUN01MY   | Load cell, six axis neck | R. A. Denton | 1716A     | Nm    |
| 12  | NECK MOMENT        | Z    | GPUN01MZ   | Load cell, six axis neck | R. A. Denton | 1716A     | Nm    |
| 13  | CHEST , PRIMARY    | X    | GPAC005    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 14  | CHEST , PRIMARY    | Y    | GPAC011    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 15  | CHEST , PRIMARY    | Z    | GPAC010    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 16  | CHEST , REDUNDANT  | X    | GPAC034    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 17  | CHEST , REDUNDANT  | Y    | GPAC023    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 18  | CHEST , REDUNDANT  | Z    | GPAC020    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 19  | CHEST DISPLACEMENT | X    | GPCP002    | Rotary Pot Chest         | Servo        | 14CBI     | MM    |
| 20  | PELVIS, PRIMARY    | X    | GPAC025    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 21  | PELVIS, PRIMARY    | Y    | GPAC022    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 22  | PELVIS, PRIMARY    | Z    | GPAC019    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 23  | LEFT FEMUR FORCE   | Z    | KEFF003    | Load cell, Femur         | R.A. Denton  | 2121      | N     |
| 24  | RIGHT FEMUR FORCE  | Z    | KEFF004    | Load cell, Femur         | R.A. Denton  | 2121      | N     |

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Driver A.T.D. Serial Number 34**  
**01/30/01**  
**2001 Pontiac Grand Prix SE 4 Door Sedan**

| CH. | LOCATION               | AXIS | IDENT. NO. | DESCRIPTION               | MFR          | MODEL       | UNITS |
|-----|------------------------|------|------------|---------------------------|--------------|-------------|-------|
| 25  | UP. TIBIA LEFT MOM.    | X    | GPOT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 26  | UP. TIBIA LEFT MOM.    | Y    | GPOT09MY   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 27  | UP. TIBIA RIGHT MOM.   | X    | GPOT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 28  | UP. TIBIA RIGHT MOM.   | Y    | GPOT09MY   | 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              | X    | KEIC002X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 36  | FOOT LEFT              | Y    | KEIC002Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 37  | FOOT LEFT              | Z    | KEIC002Z   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 38  | FOOT RIGHT             | X    | KEIC001X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 39  | FOOT RIGHT             | Y    | KEIC001Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 40  | FOOT RIGHT             | Z    | KEIC001Z   | 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 | MM    |
| 44  | SHOULDER BELT ELONG.   | X    | KEEP001    | Linear pot., belt stretch | E.T.I.       | LCP8-10 10K | MM/CM |

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Passenger A.T.D. Serial Number 35**  
**01/30/01**  
**2001 Pontiac Grand Prix SE 4 Door Sedan**

| CH. | LOCATION           | AXIS | IDENT. NO. | DESCRIPTION              | MFR          | MODEL     | UNITS |
|-----|--------------------|------|------------|--------------------------|--------------|-----------|-------|
| 45  | HEAD, PRIMARY      | X    | KEAC039    | Accel.,1/2 bridge        | Endevco      | 7264-2000 | G     |
| 46  | HEAD, PRIMARY      | Y    | KEAC038    | Accel.,1/2 bridge        | Endevco      | 7264-2000 | G     |
| 47  | HEAD, PRIMARY      | Z    | KEAC027    | Accel.,1/2 bridge        | Endevco      | 7264-2000 | G     |
| 48  | HEAD, REDUNDANT    | X    | KEAC031    | Accel.,1/2 bridge        | Endevco      | 7264-2000 | G     |
| 49  | HEAD, REDUNDANT    | Y    | KEAC032    | Accel.,1/2 bridge        | Endevco      | 7264-2000 | G     |
| 50  | HEAD, REDUNDANT    | Z    | KEAC026    | Accel.,1/2 bridge        | Endevco      | 7264-2000 | G     |
| 51  | NECK FORCE         | X    | GPUN02FX   | Load cell, six axis neck | R. A. Denton | 1716A     | N     |
| 52  | NECK FORCE         | Y    | GPUN02FY   | Load cell, six axis neck | R. A. Denton | 1716A     | N     |
| 53  | NECK FORCE         | Z    | GPUN02FZ   | Load cell, six axis neck | R. A. Denton | 1716A     | N     |
| 54  | NECK MOMENT        | X    | GPUN02MX   | Load cell, six axis neck | R. A. Denton | 1716A     | Nm    |
| 55  | NECK MOMENT        | Y    | GPUN02MY   | Load cell, six axis neck | R. A. Denton | 1716A     | Nm    |
| 56  | NECK MOMENT        | Z    | GPUN02MZ   | Load cell, six axis neck | R. A. Denton | 1716A     | Nm    |
| 57  | CHEST , PRIMARY    | X    | GPAC031    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 58  | CHEST , PRIMARY    | Y    | GPAC024    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 59  | CHEST , PRIMARY    | Z    | GPAC029    | Accel., 1/2 bridge       | Endevco      | 7264-2000 | G     |
| 60  | CHEST , REDUNDANT  | X    | KEAC023    | Accel.,1/2 bridge        | Endevco      | 7264-200  | G     |
| 61  | CHEST , REDUNDANT  | Y    | KEAC022    | Accel.,1/2 bridge        | Endevco      | 7264-200  | G     |
| 62  | CHEST , REDUNDANT  | Z    | KEAC024    | Accel.,1/2 bridge        | Endevco      | 7264-200  | G     |
| 63  | CHEST DISPLACEMENT | X    | GPCP001    | Rotary Pot Chest         | Servo        | 14CBI     | MM    |
| 64  | PELVIS, PRIMARY    | X    | KEAC019    | Accel.,1/2 bridge        | Endevco      | 7264-200  | G     |
| 65  | PELVIS, PRIMARY    | Y    | KEAC020    | Accel.,1/2 bridge        | Endevco      | 7264-200  | G     |
| 66  | PELVIS, PRIMARY    | Z    | KEAC021    | Accel.,1/2 bridge        | Endevco      | 7264-200  | G     |
| 67  | LEFT FEMUR FORCE   | Z    | KEFF001    | Load cell, Femur         | R.A. Denton  | 2121      | N     |
| 68  | RIGHT FEMUR FORCE  | Z    | KEFF002    | Load cell, Femur         | R.A. Denton  | 2121      | N     |

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Passenger A.T.D. Serial Number 35**  
**01/30/01**  
**2001 Pontiac Grand Prix SE 4 Door Sedan**

| CH. | LOCATION               | AXIS | IDENT. NO. | DESCRIPTION               | MFR          | MODEL       | UNITS |
|-----|------------------------|------|------------|---------------------------|--------------|-------------|-------|
| 69  | UP. TIBIA LEFT MOM.    | X    | GPOT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 70  | UP. TIBIA LEFT MOM.    | Y    | GPOT09MY   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 71  | UP. TIBIA RIGHT MOM.   | X    | GPOT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 72  | UP. TIBIA RIGHT MOM.   | Y    | GPOT09MY   | 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              | X    | KEIC003X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 80  | FOOT LEFT              | Y    | KEIC003Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 81  | FOOT LEFT              | Z    | KEIC003Z   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 82  | FOOT RIGHT             | X    | KEIC004X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 83  | FOOT RIGHT             | Y    | KEIC004Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 84  | FOOT RIGHT             | Z    | KEIC004Z   | 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 | CM    |
| 88  | SHOULDER BELT ELONG.   | X    | KEEP001    | Linear pot., belt stretch | E.T.I.       | LCP8-10 10K | MM/CM |

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Vehicle Accelerometers and Reference Channel**  
**01/30/01**  
**2001 Pontiac Grand Prix SE 4 Door Sedan**

| CH. | LOCATION            | AXIS | IDENT. NO. | DESCRIPTION           | MFR         | MODEL    | UNITS |
|-----|---------------------|------|------------|-----------------------|-------------|----------|-------|
| 89  | Left Rear Primary   | X    | KEVA010    | Accel., Vehicle block | I.C. Sensor | 3031-200 | G     |
| 90  | Right Rear Primary  | Y    | KEVA006    | Accel., Vehicle block | I.C. Sensor | 3031-200 | G     |
| 91  | Engine Top          | X    | KEVA001    | Accel., Vehicle block | I.C. Sensor | 3031-500 | G     |
| 92  | Engine Bottom       | Y    | KEVA008    | Accel., Vehicle block | I.C. Sensor | 3031-500 | G     |
| 93  | Left Brake Caliper  | X    | KEVA004    | Accel., Vehicle block | I.C. Sensor | 3031-500 | G     |
| 94  | Right Brake Caliper | Y    | KEVA009    | Accel., Vehicle block | I.C. Sensor | 3031-500 | G     |
| 95  | Instrument Panel    | X    | KEVA003    | Accel., Vehicle block | I.C. Sensor | 3031-500 | G     |
| 96  | Left Rear Redundant | Y    | KEVA011    | Accel., Vehicle block | I.C. Sensor | 3031-200 | G     |
| 97  | Zero Reference      | N/A  | N/A        | N/A                   | N/A         | N/A      | N/A   |

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Rigid Load Cell Barrier**  
**01/30/01**  
**2001 Pontiac Grand Prix SE 4 Door Sedan**

| CH. | LOCATION         | AXIS | IDENT. NO. | DESCRIPTION    | MFR   | MODEL   | UNITS |
|-----|------------------|------|------------|----------------|-------|---------|-------|
| 98  | BARRIER FORCE A1 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 99  | BARRIER FORCE A2 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 100 | BARRIER FORCE A3 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 101 | BARRIER FORCE A4 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 102 | BARRIER FORCE A5 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 103 | BARRIER FORCE A6 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 104 | BARRIER FORCE A7 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 105 | BARRIER FORCE A8 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 106 | BARRIER FORCE A9 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 107 | BARRIER FORCE B1 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 108 | BARRIER FORCE B2 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 109 | BARRIER FORCE B3 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 110 | BARRIER FORCE B4 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 111 | BARRIER FORCE B5 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 112 | BARRIER FORCE B6 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 113 | BARRIER FORCE B7 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 114 | BARRIER FORCE B8 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 115 | BARRIER FORCE B9 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Rigid Load Cell Barrier**  
**01/30/01**  
**2001 Pontiac Grand Prix SE 4 Door Sedan**

| CH. | LOCATION         | AXIS | IDENT. NO. | DESCRIPTION    | MFR   | MODEL   | UNITS |
|-----|------------------|------|------------|----------------|-------|---------|-------|
| 116 | BARRIER FORCE C1 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 117 | BARRIER FORCE C2 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 118 | BARRIER FORCE C3 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 119 | BARRIER FORCE C4 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 120 | BARRIER FORCE C5 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 121 | BARRIER FORCE C6 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 122 | BARRIER FORCE C7 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 123 | BARRIER FORCE C8 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 124 | BARRIER FORCE C9 | X    | BARRIER    | Load Cell, LCB | Lebow | 1220-FS | N     |
| 125 | BARRIER FORCE D1 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 126 | BARRIER FORCE D2 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 127 | BARRIER FORCE D3 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 128 | BARRIER FORCE D4 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 129 | BARRIER FORCE D5 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 130 | BARRIER FORCE D6 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 131 | BARRIER FORCE D7 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 132 | BARRIER FORCE D8 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |
| 133 | BARRIER FORCE D9 | X    | BARRIER    | Not Used       | N/A   | N/A     | N/A   |

**APPENDIX E**  
**DUMMY CALIBRATION DATA**



# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Left Knee Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: LK01X

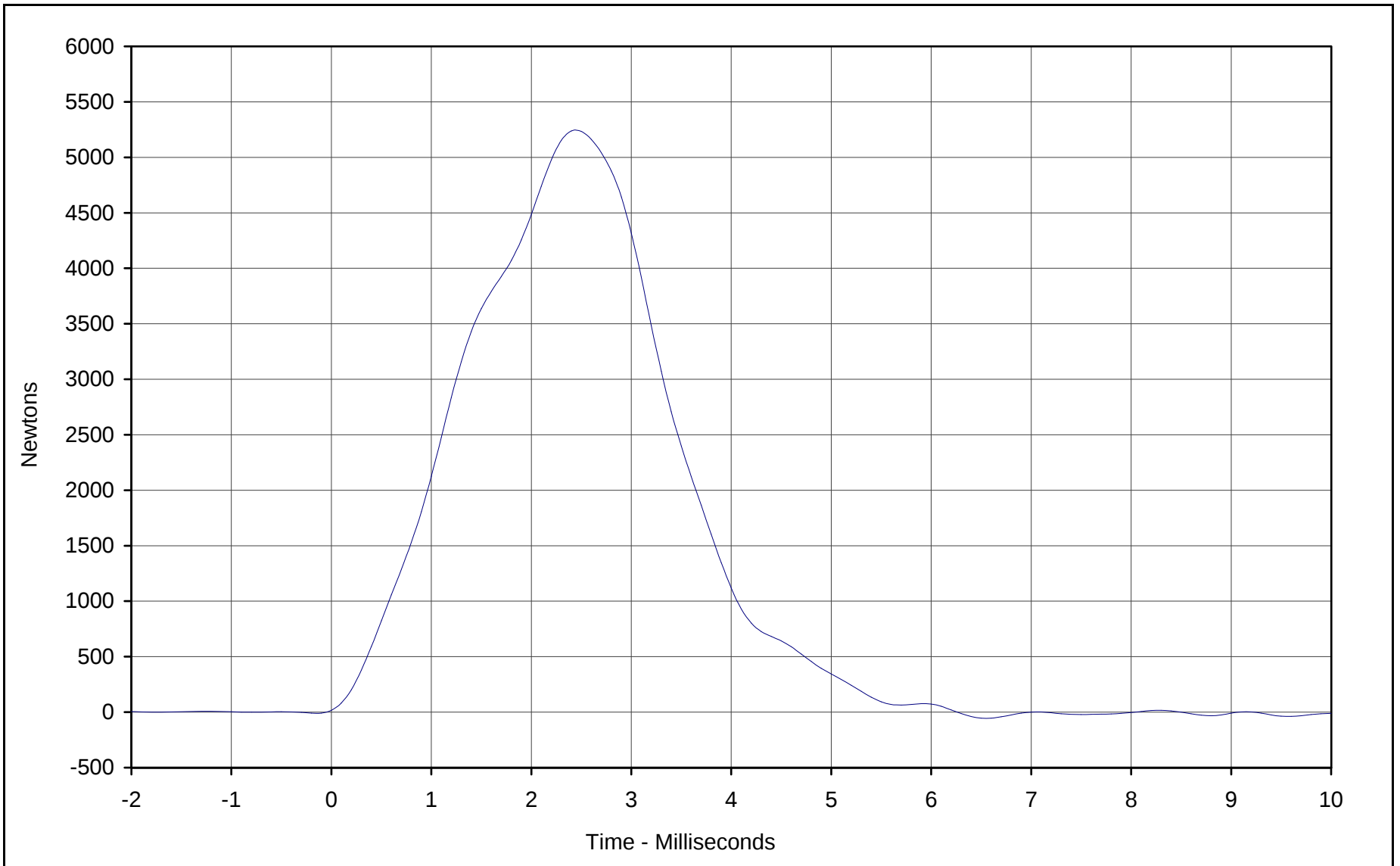
| Tested Parameter             | Units   | Specification  | Result | Pass/Fail |
|------------------------------|---------|----------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70       | 30     | Pass      |
| Probe Velocity               | m/s     | 2.073 to 2.134 | 2.113  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 5238.6 | Pass      |
| Overall Test Results         |         |                | Pass   |           |

\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date



Curve Description: Probe Force

|                   |                |    |            |              |
|-------------------|----------------|----|------------|--------------|
| Maximum Value:    | <u>5238.6</u>  | at | <u>2.4</u> | Milliseconds |
| Minimum Value:    | <u>-53.6</u>   | at | <u>6.6</u> | Milliseconds |
| SAE Filter Class: | <u>600</u>     |    |            |              |
| Date of Test:     | <u>1/21/01</u> |    |            |              |
| ATD Serial No.:   | <u>034</u>     |    |            |              |

Testing Program: Hybrid III Left Knee Impact Test

Test Information: Part S/N: N/A Test I.D.: LK01X





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Right Knee Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: RK01X

| Tested Parameter             | Units   | Specification  | Result | Pass/Fail |
|------------------------------|---------|----------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70       | 30     | Pass      |
| Probe Velocity               | m/s     | 2.073 to 2.134 | 2.103  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 5264.2 | Pass      |
| Overall Test Results         |         |                |        | Pass      |

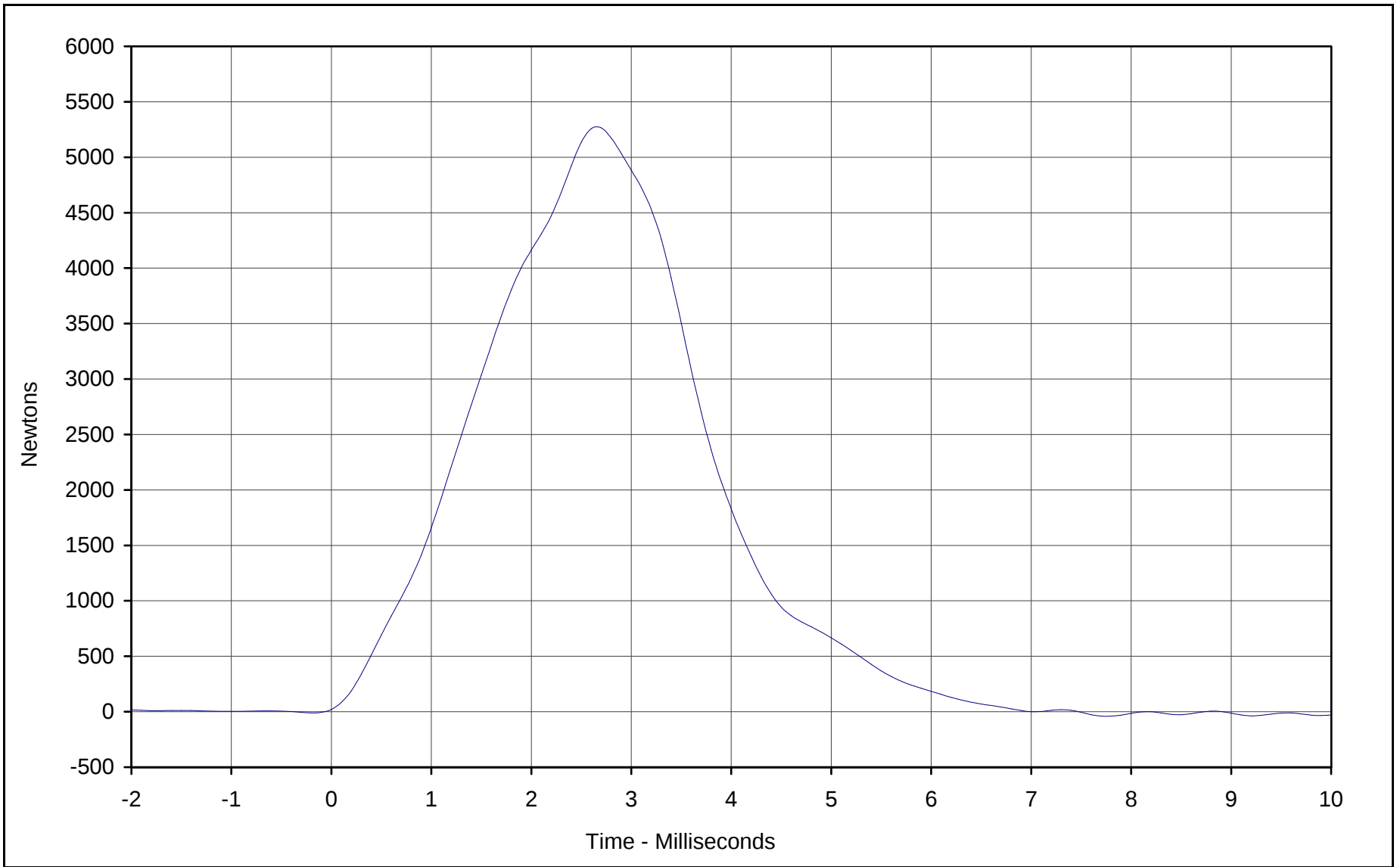
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date

E-4



|                    |                            |
|--------------------|----------------------------|
| Curve Description: | Probe Force                |
| Maximum Value:     | 5264.2 at 2.7 Milliseconds |
| Minimum Value:     | -40.5 at 7.8 Milliseconds  |
| SAE Filter Class:  | 600                        |
| Date of Test:      | 1/21/01                    |
| ATD Serial No.:    | 034                        |

|                   |                                   |
|-------------------|-----------------------------------|
| Testing Program:  | Hybrid III Right Knee Impact Test |
| Test Information: | Part S/N: N/A Test I.D.: RK01X    |



KAR21001-09



# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Head Drop Calibration

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: HD08A

| 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 | 228.8  | Pass      |
| Peak Lateral Acceleration    | G's    | ≤15.0          | 9.1    | Pass      |
| Is Acceleration Unimodal?    | Yes/No | Yes            | Yes    | Pass      |
| Overall Test Results         |        |                |        | Pass      |

\_\_\_\_\_  
Laboratory Technician

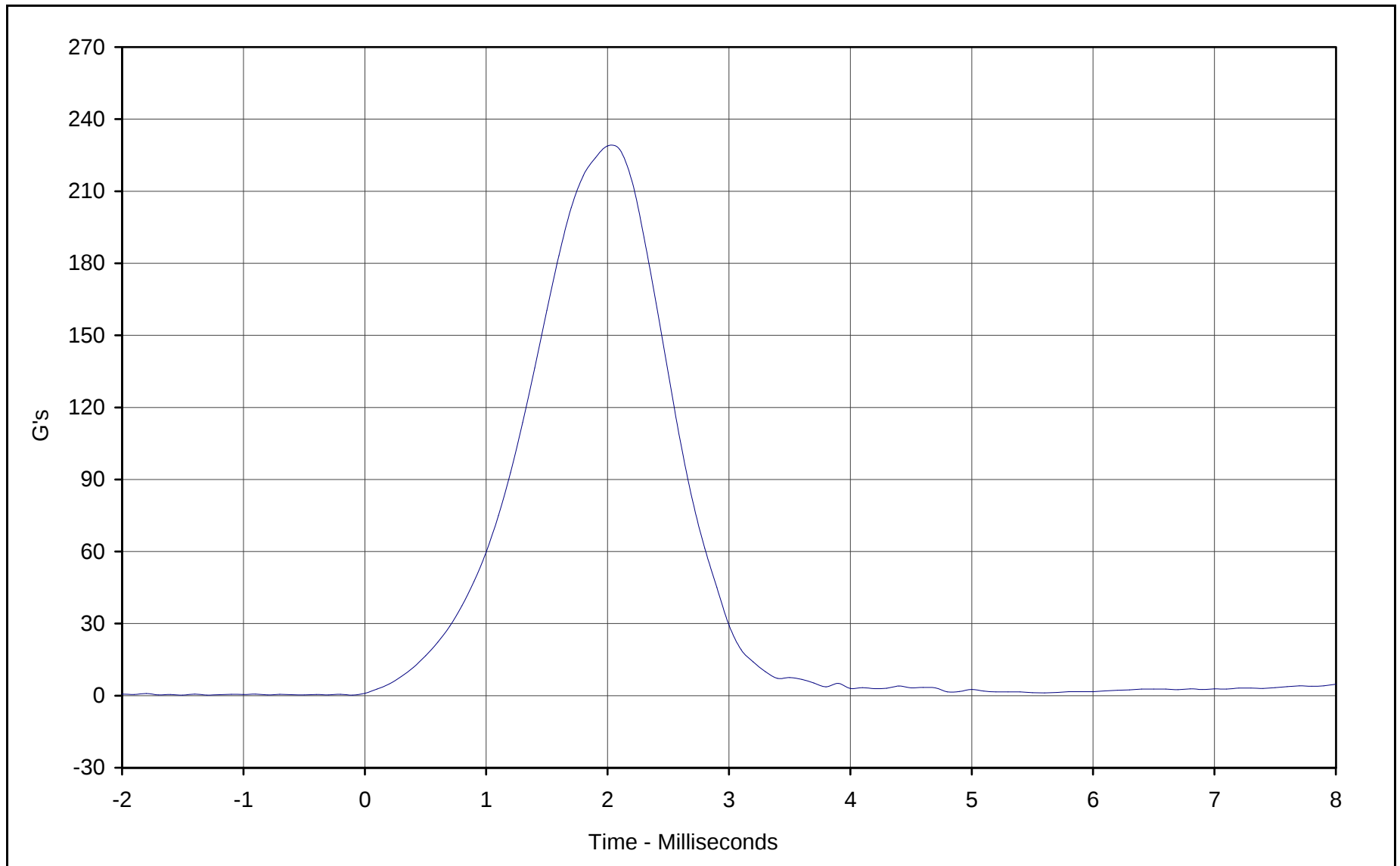
January 20, 2001

\_\_\_\_\_  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date

E-6



Curve Description: Head Resultant Acceleration

|                   |                |    |             |              |
|-------------------|----------------|----|-------------|--------------|
| Maximum Value:    | <u>228.8</u>   | at | <u>2.0</u>  | Milliseconds |
| Minimum Value:    | <u>0.2</u>     | at | <u>-1.3</u> | Milliseconds |
| SAE Filter Class: | <u>1000</u>    |    |             |              |
| Date of Test:     | <u>1/20/01</u> |    |             |              |
| ATD Serial No.:   | <u>034</u>     |    |             |              |

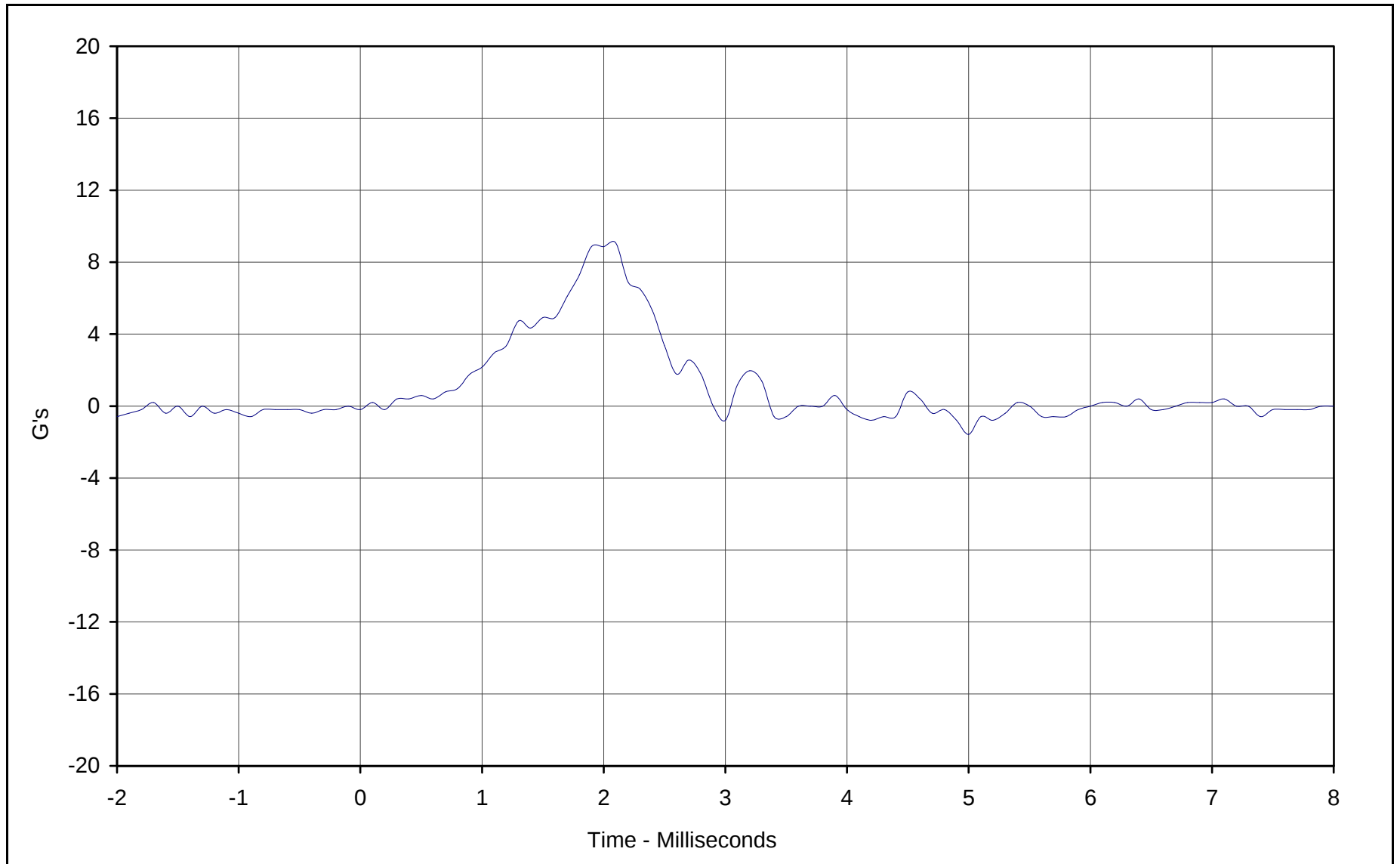
Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD08A



KAR21001-09

E-7



Curve Description: Head Acceleration Y Axis

Maximum Value: 9.1 at 2.1 Milliseconds

Minimum Value: -1.6 at 5.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 1/20/01

ATD Serial No.: 034

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD08A



KAR21001-09



# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Thorax Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: CH01A

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 30     | Pass      |
| Probe Velocity               | m/s     | 6.58 to 6.82  | 6.61   | Pass      |
| Peak Probe Force             | Newtons | 5159 to 5893  | 5773   | Pass      |
| Peak Sternum Displacement    | CM      | 6.35 to 7.26  | 6.51   | Pass      |
| Internal Hysteresis          | %       | 69 to 85      | 76.1   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

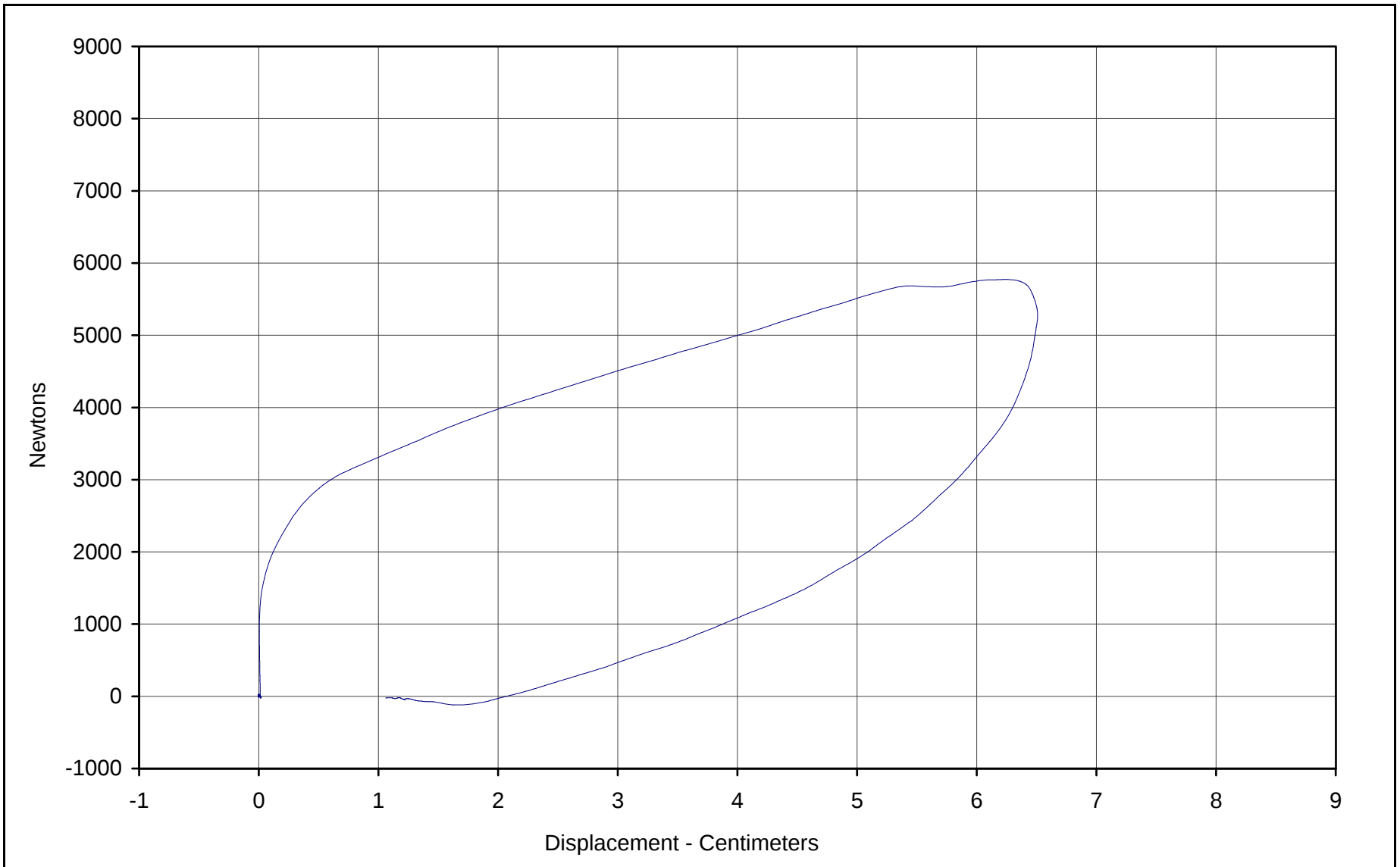
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 20, 2001

\_\_\_\_\_  
Test Date

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Approved By

\_\_\_\_\_  
Date



Curve Description: Probe Force vs. Chest Displacement

Probe Force: 5772.8 Newtons

Chest Displ.: 6.51 Centimeters

SAE Filter Class: 180

Date of Test: 1/20/01

ATD Serial No.: 034

Testing Program: Hybrid III Thorax Impact Test

Test Information: S/N of Part: N/A Test I.D.: CH01A





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Neck Flexion Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NF02A

| 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   | 6.89   | Pass      |
| Pendulum Deceleration                           | 10 Msec. | G's     | 22.5 to 27.5   | 22.6   | Pass      |
|                                                 | 20 Msec. | G's     | 17.6 to 22.6   | 20.2   | Pass      |
|                                                 | 30 Msec. | G's     | 12.5 to 18.5   | 17.8   | Pass      |
| Peak Pendulum Decel. after 30 Msec.             |          | G's     | ≤ 29.0         | 17.8   | Pass      |
| Deceleration Decay, Time to Cross 5 G's         |          | Msec.   | 34.0 to 42.0   | 39.0   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 64.0 to 78.0   | 75.4   | Pass      |
|                                                 | Time     | Msec.   | 57.0 to 64.0   | 62.9   | Pass      |
| "D" Plane Rotation Decay, Time To Zero Crossing |          | Msec.   | 113.0 to 128.0 | 122.8  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N•m     | 84.1 to 108.5  | 86.0   | Pass      |
|                                                 | Time     | Msec.   | 47.0 to 58.0   | 56.8   | Pass      |
| Positive Moment Decay, Time To Zero Crossing    |          | Msec.   | 97.0 to 107.0  | 104.3  | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

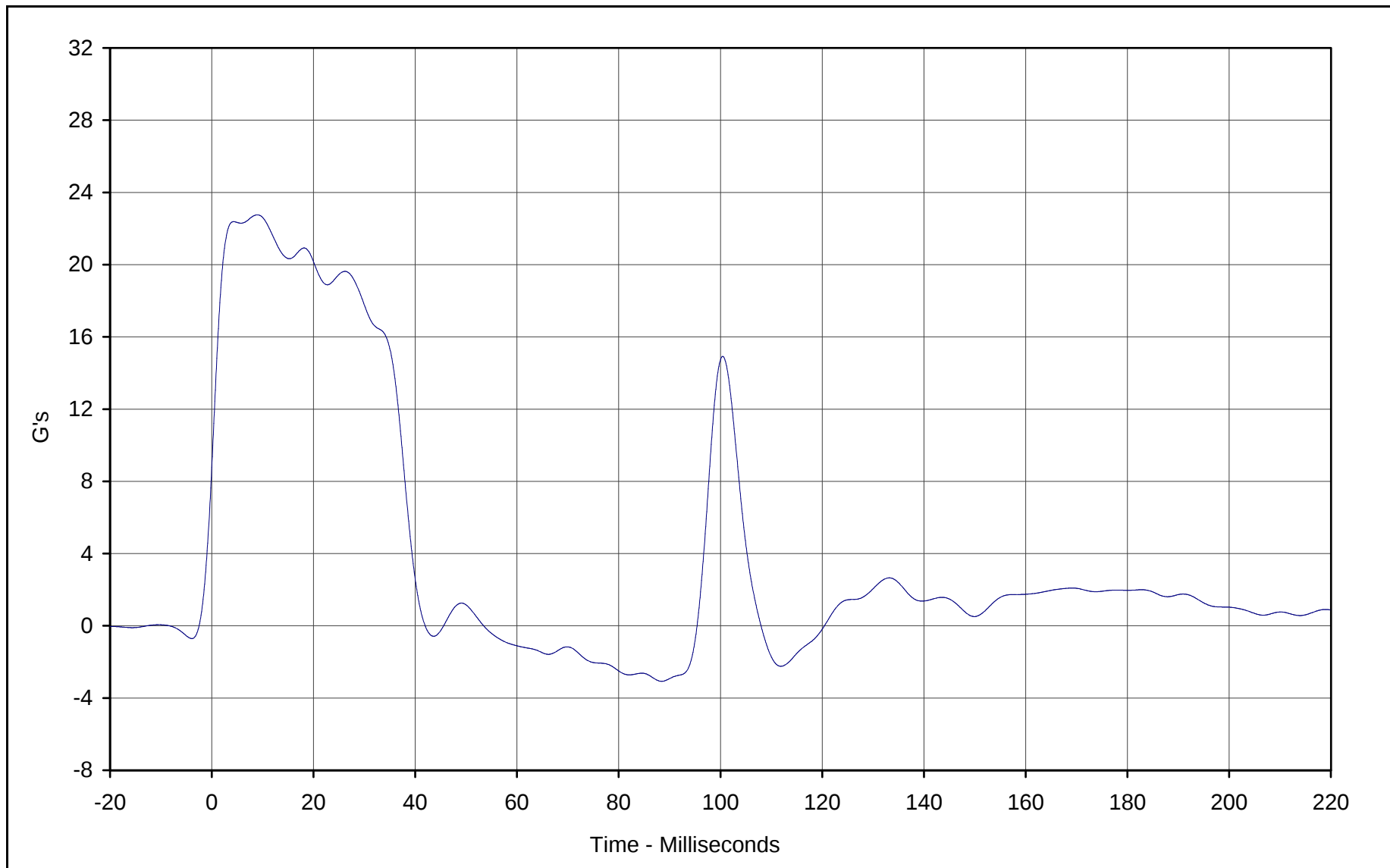
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date

E-11



Curve Description: Pendulum Deceleration

|                   |                |    |             |              |
|-------------------|----------------|----|-------------|--------------|
| Maximum Value:    | <u>22.8</u>    | at | <u>9.0</u>  | Milliseconds |
| Minimum Value:    | <u>-3.1</u>    | at | <u>88.5</u> | Milliseconds |
| SAE Filter Class: | <u>60</u>      |    |             |              |
| Date of Test:     | <u>1/21/01</u> |    |             |              |
| ATD Serial No.:   | <u>034</u>     |    |             |              |

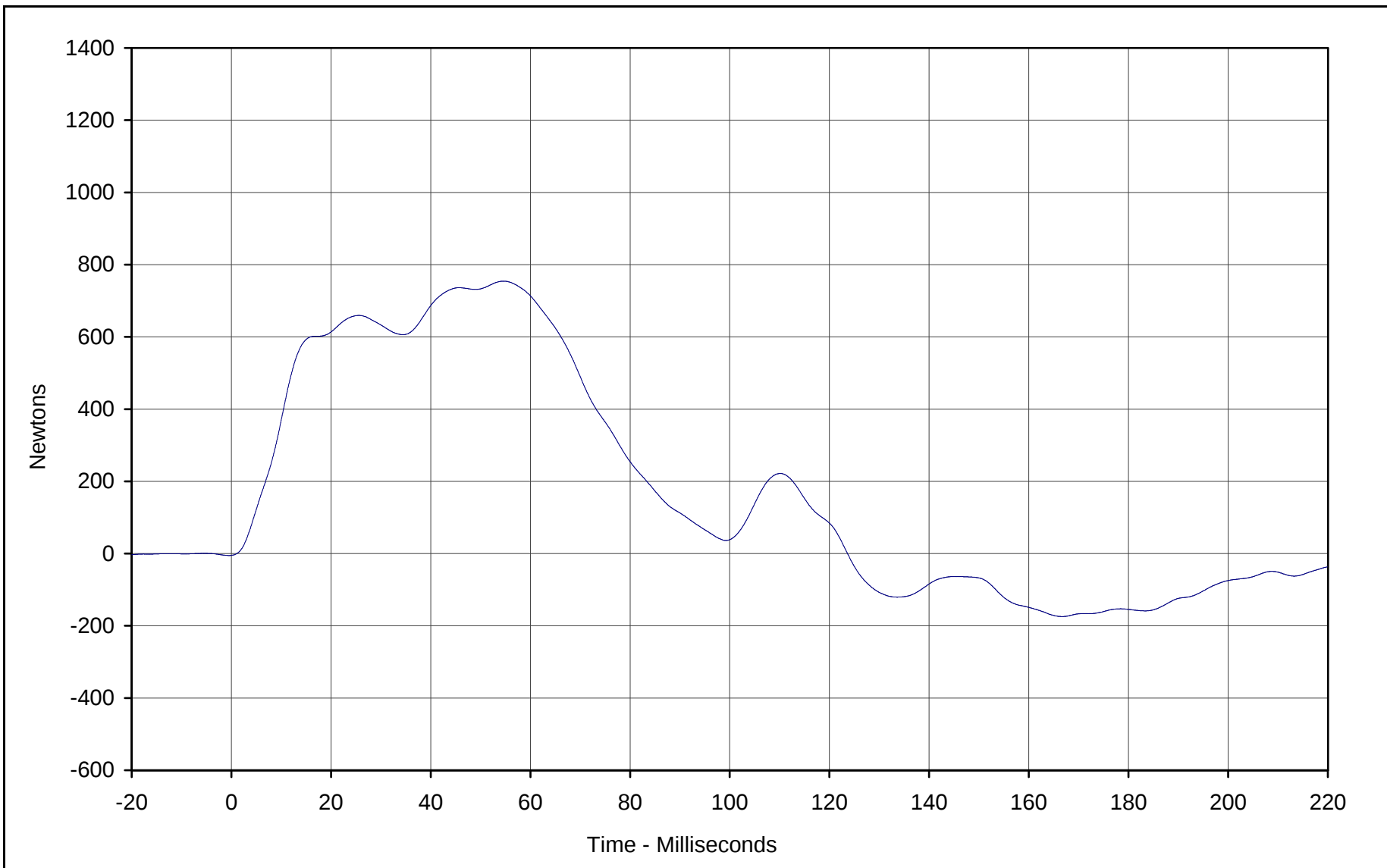
Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02A



KAR21001-09

E-12



Curve Description: Neck Force X

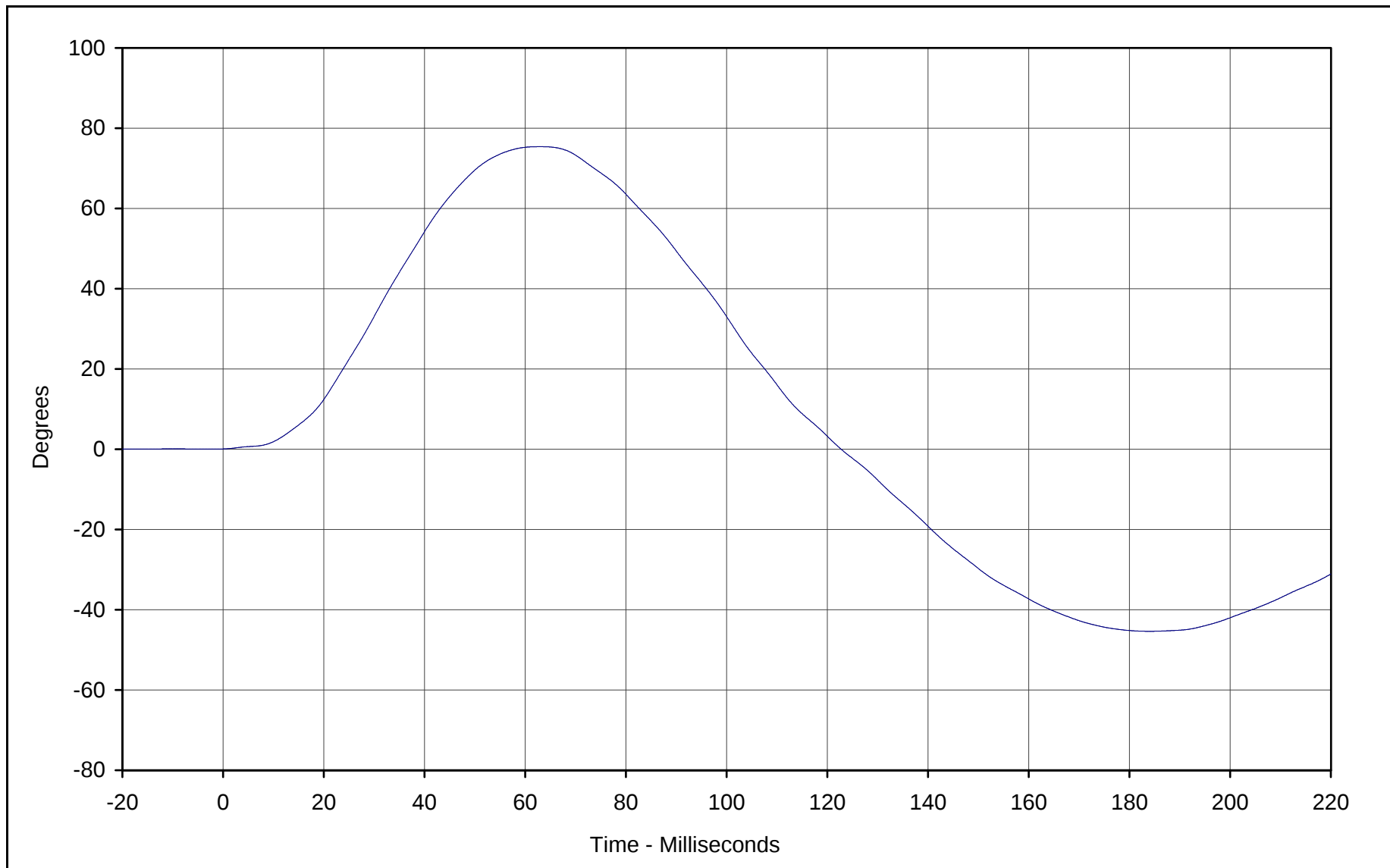
|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 754.3   | at | 54.6  | Milliseconds |
| Minimum Value:    | -174.4  | at | 166.7 | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 034     |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02A



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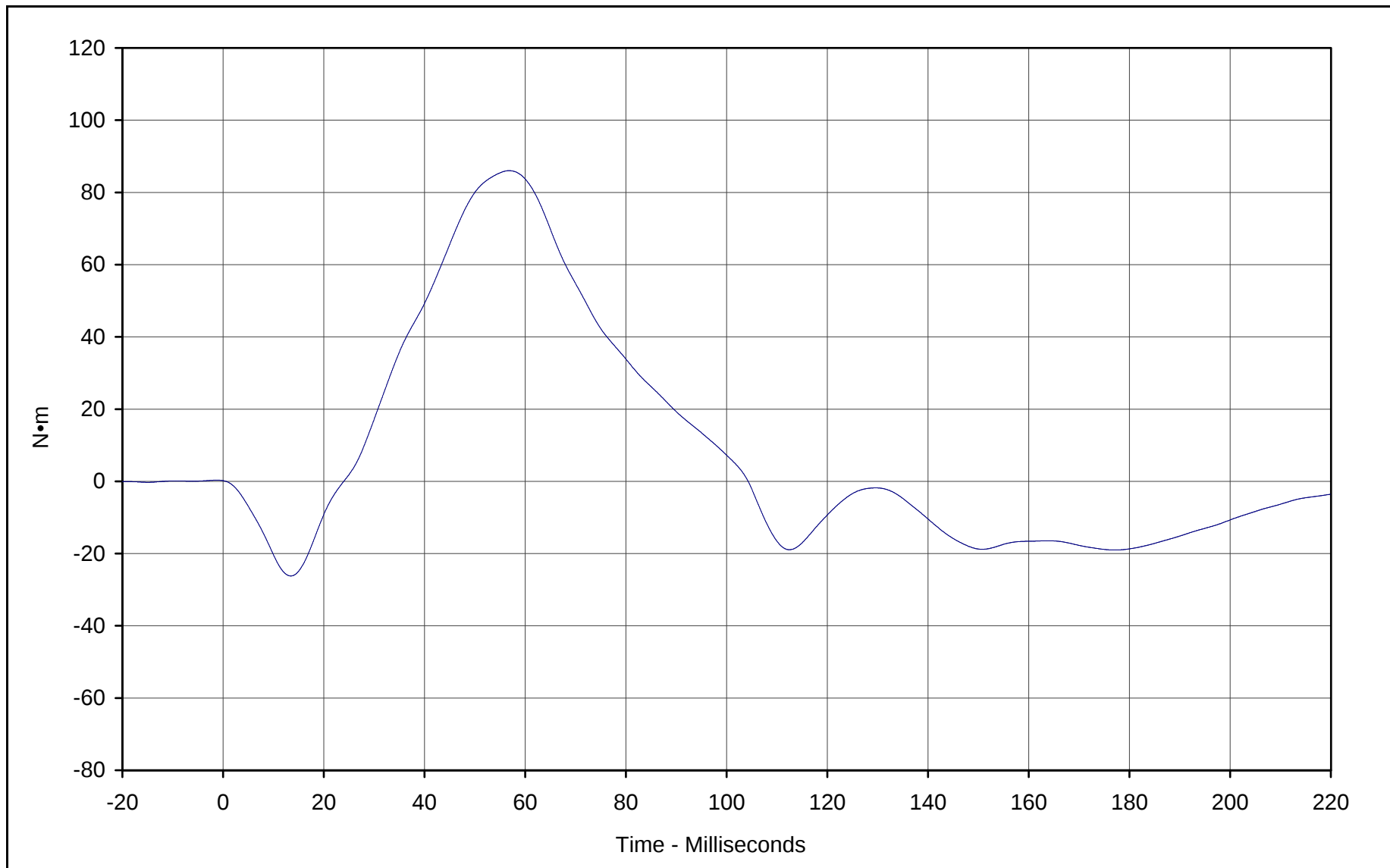
Curve Description: "D" Plane Rotation

|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 75.4    | at | 62.9  | Milliseconds |
| Minimum Value:    | -45.4   | at | 184.0 | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 034     |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02A





Curve Description: Moment About Occipital Condyles

Maximum Value: 86.0 at 56.8 Milliseconds

Minimum Value: -26.2 at 13.4 Milliseconds

SAE Filter Class: 60

Date of Test: 1/21/01

ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02A





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Neck Extension Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NE02A

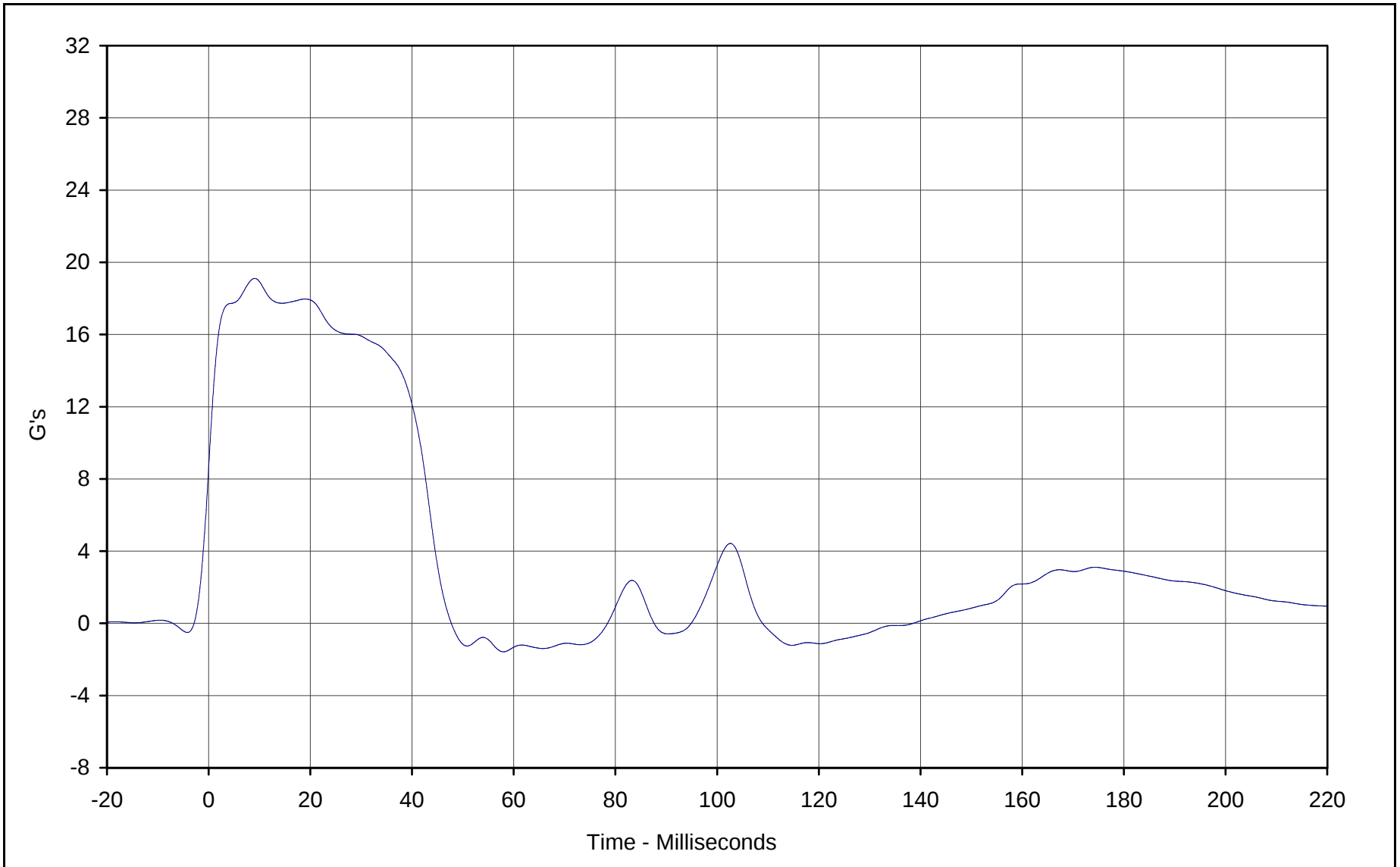
| Tested Parameter                                |          | Units   | Specification  | Result | Pass/Fail |
|-------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                          |          | °C      | 20.6 to 22.2   | 21.1   | Pass      |
| Laboratory Relative Humidity                    |          | %       | 10 to 70       | 30     | Pass      |
| Pendulum Velocity                               |          | m/s     | 5.95 to 6.19   | 6.15   | Pass      |
| Pendulum Deceleration                           | 10 Msec. | G's     | 17.2 to 21.2   | 18.9   | Pass      |
|                                                 | 20 Msec. | G's     | 14.0 to 19.0   | 17.9   | 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   | 44.1   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 81.0 to 106.0  | 94.6   | Pass      |
|                                                 | Time     | Msec.   | 72.0 to 82.0   | 79.5   | Pass      |
| "D" Plane Rotation Decay, Time To Zero Crossing |          | Msec.   | 147.0 to 174.0 | 151.6  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N•m     | -52.9 to- 79.9 | -69.1  | Pass      |
|                                                 | Time     | Msec.   | 65.0 to 79.0   | 67.4   | Pass      |
| Negative Moment Decay, Time To Zero Crossing    |          | Msec.   | 120.0 to 148.0 | 140.5  | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date



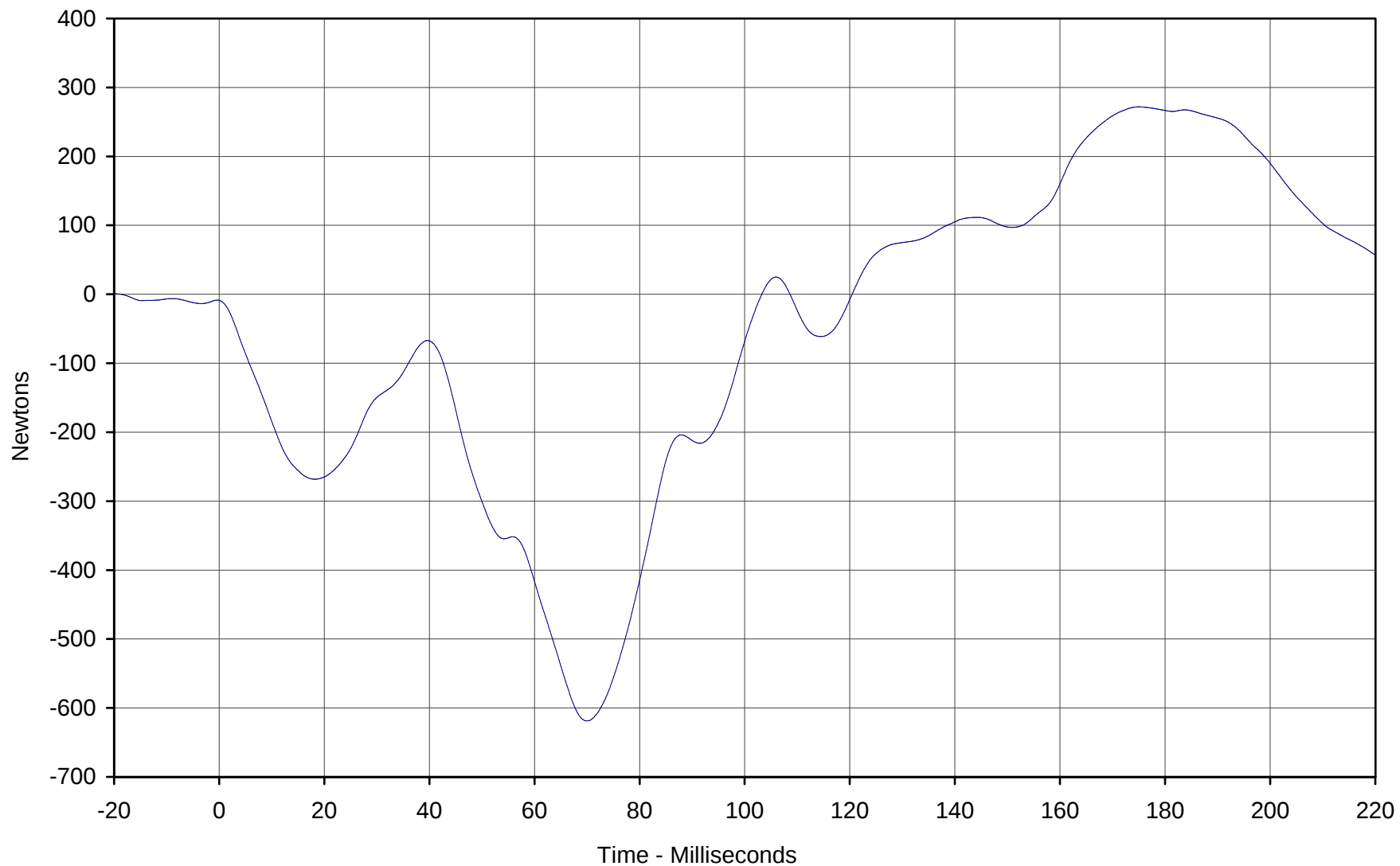
Curve Description: Pendulum Deceleration

|                   |                |    |             |              |
|-------------------|----------------|----|-------------|--------------|
| Maximum Value:    | <u>19.1</u>    | at | <u>9.1</u>  | Milliseconds |
| Minimum Value:    | <u>-1.6</u>    | at | <u>58.0</u> | Milliseconds |
| SAE Filter Class: | <u>60</u>      |    |             |              |
| Date of Test:     | <u>1/21/01</u> |    |             |              |
| ATD Serial No.:   | <u>034</u>     |    |             |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE02A





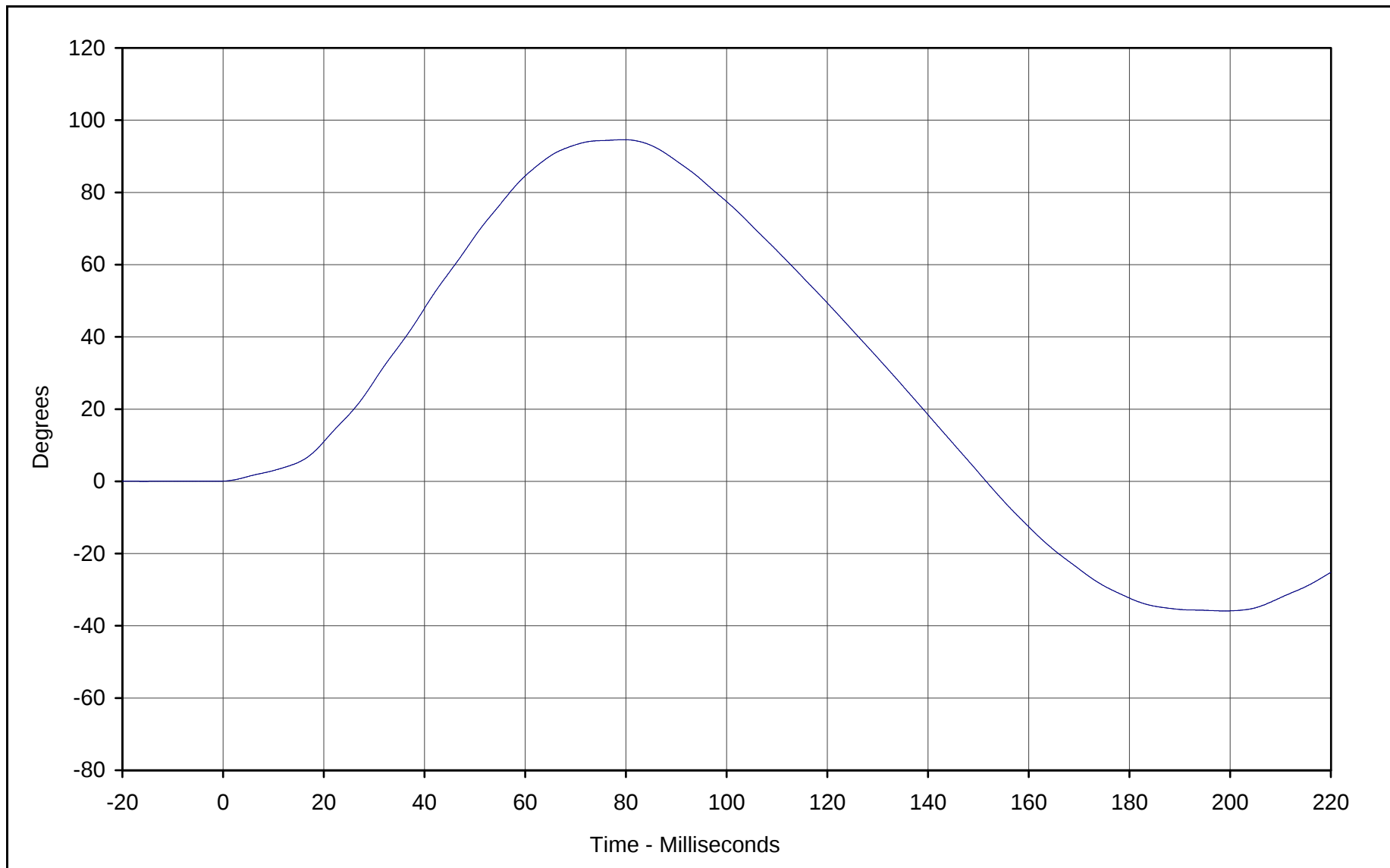
Curve Description: Neck Force X

|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 271.9   | at | 175.0 | Milliseconds |
| Minimum Value:    | -618.8  | at | 70.0  | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 034     |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE02A





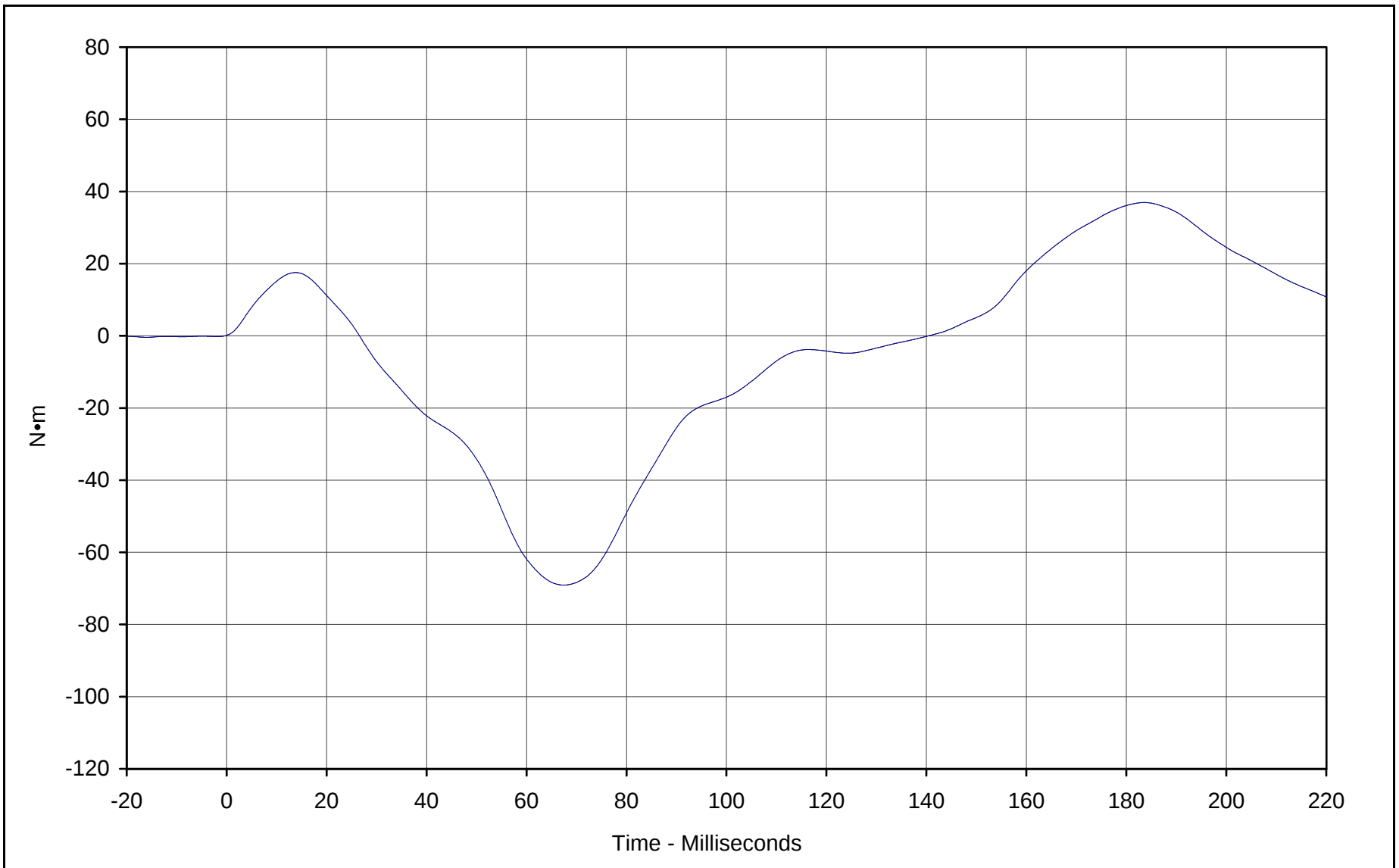
Curve Description: "D" Plane Rotation

|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 94.6    | at | 79.5  | Milliseconds |
| Minimum Value:    | -35.9   | at | 198.9 | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 034     |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE02A





Curve Description: Moment About Occipital Condyles

Maximum Value: 36.9 at 183.6 Milliseconds

Minimum Value: -69.1 at 67.4 Milliseconds

SAE Filter Class: 60

Date of Test: 1/21/01

ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE02A





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### External Measurements

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: N/A

| External Measurement Data             |       |               |        |           |
|---------------------------------------|-------|---------------|--------|-----------|
| Tested Parameter                      | Units | Specification | Result | Pass/Fail |
| Laboratory temperature                | °C    | 20.4 to 22.1  | 20.9   | 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    | 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    | 590    | Pass      |
| L - Popliteal length                  | mm    | 429 to 455    | 445    | Pass      |
| M - Knee pivot height                 | mm    | 485 to 500    | 495    | Pass      |
| N - Buttock popliteal length          | mm    | 452 to 477    | 475    | Pass      |
| O - Chest depth                       | mm    | 213 to 229    | 225    | Pass      |
| P - Foot length                       | mm    | 251 to 267    | 260    | Pass      |
| V - Shoulder breadth                  | mm    | 422 to 437    | 435    | Pass      |
| W - Foot breadth                      | mm    | 91 to 107     | 95     | Pass      |
| Y - Chest circumference               | mm    | 970 to 1001   | 990    | Pass      |
| Z - Waist circumference               | mm    | 836 to 866    | 855    | 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

\_\_\_\_\_  
January 22, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date



# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Left Knee Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: LK01Z

| Tested Parameter             | Units   | Specification  | Result | Pass/Fail |
|------------------------------|---------|----------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70       | 30     | Pass      |
| Probe Velocity               | m/s     | 2.073 to 2.134 | 2.112  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 5505.0 | Pass      |
| Overall Test Results         |         |                |        | Pass      |

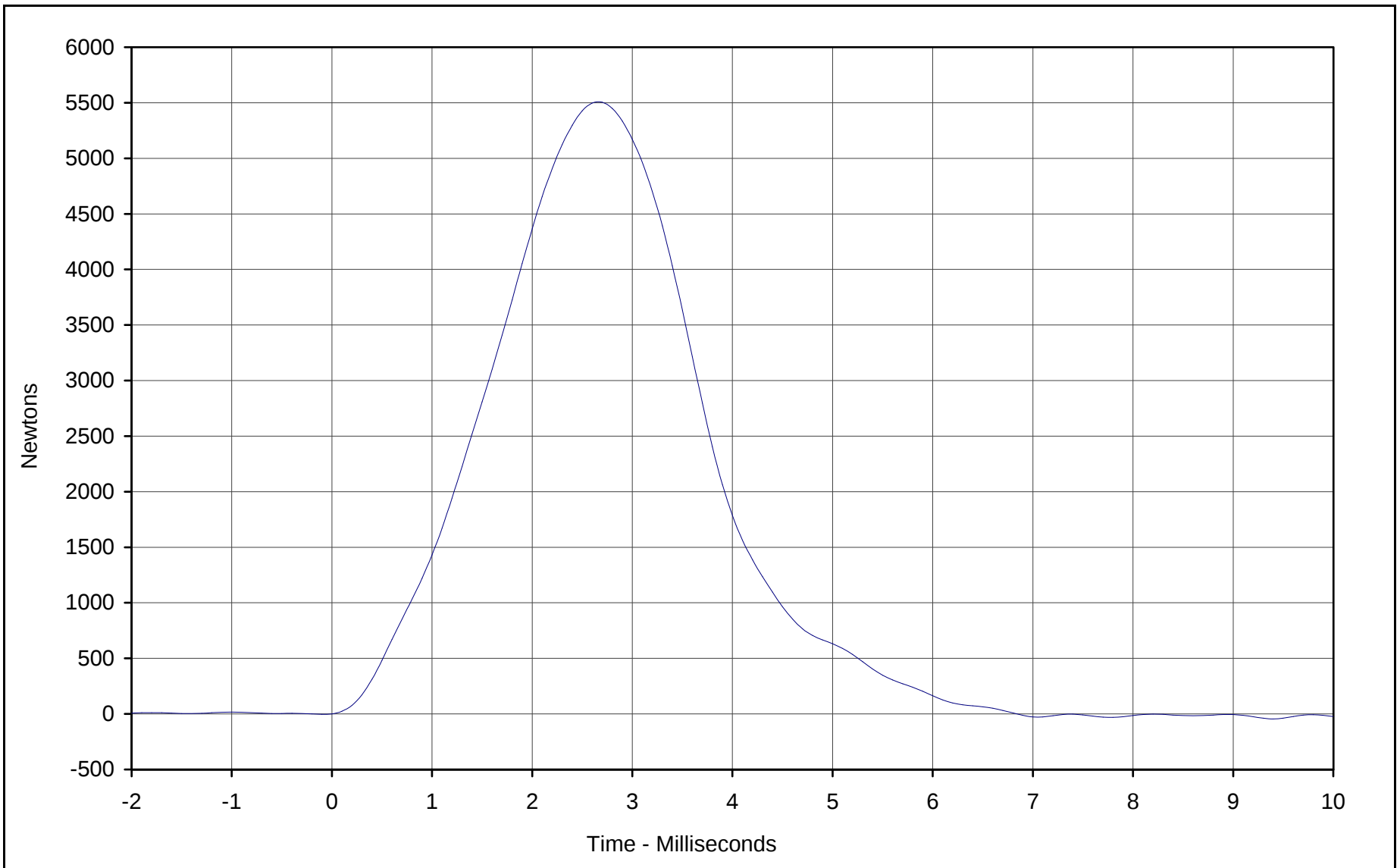
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date

E-22



Curve Description: Probe Force

|                   |                |    |            |              |
|-------------------|----------------|----|------------|--------------|
| Maximum Value:    | <u>5505.0</u>  | at | <u>2.7</u> | Milliseconds |
| Minimum Value:    | <u>-30.1</u>   | at | <u>7.8</u> | Milliseconds |
| SAE Filter Class: | <u>600</u>     |    |            |              |
| Date of Test:     | <u>1/21/01</u> |    |            |              |
| ATD Serial No.:   | <u>035</u>     |    |            |              |

Testing Program: Hybrid III Left Knee Impact Test

Test Information: Part S/N: N/A Test I.D.: LK01Z



KAR21001-09



# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Right Knee Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: RK01Z

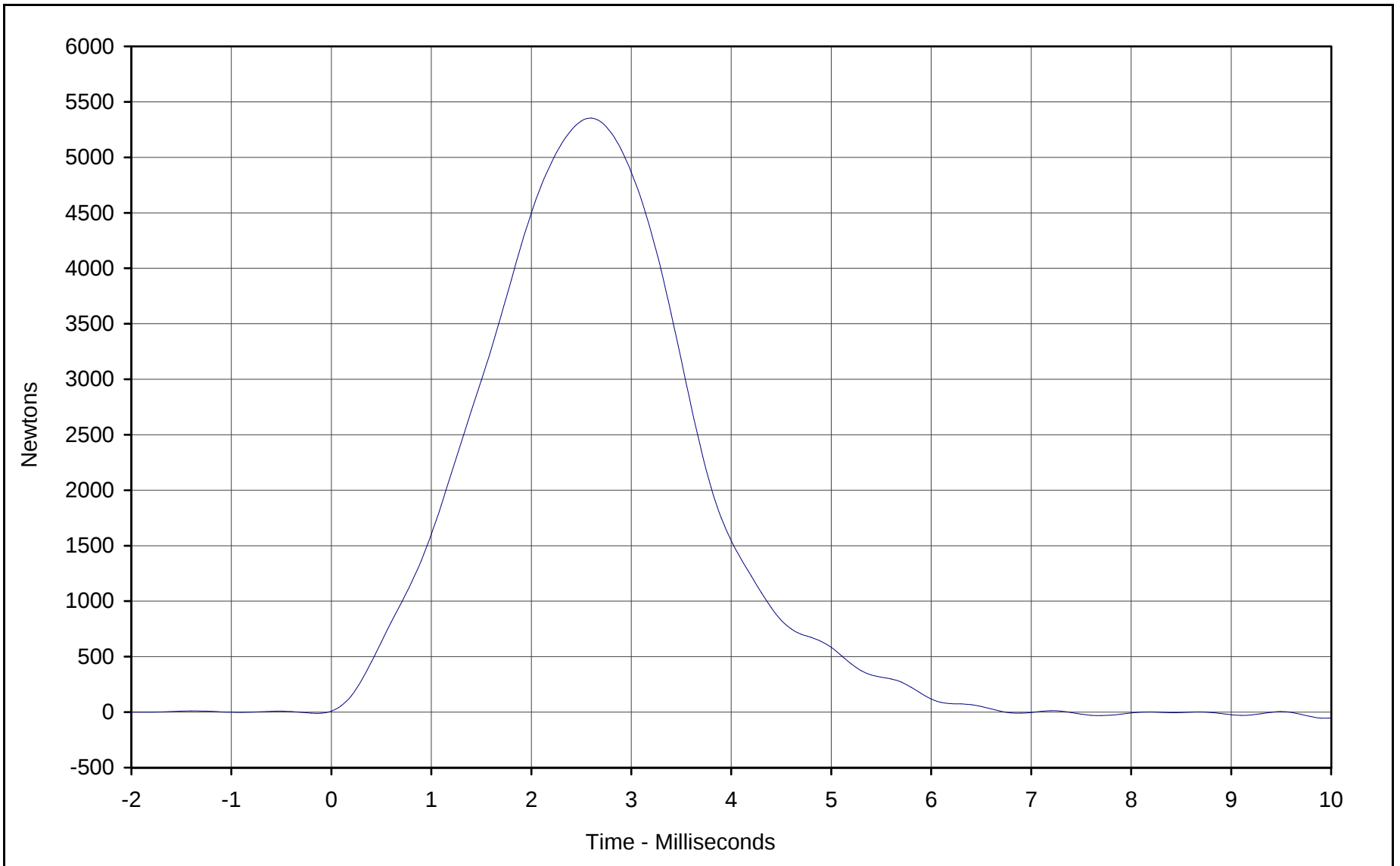
| Tested Parameter             | Units   | Specification  | Result | Pass/Fail |
|------------------------------|---------|----------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70       | 30     | Pass      |
| Probe Velocity               | m/s     | 2.073 to 2.134 | 2.118  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 5353.7 | Pass      |
| Overall Test Results         |         |                |        | Pass      |

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Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date



Curve Description: Probe Force

Maximum Value: 5353.7 at 2.6 Milliseconds

Minimum Value: -31.2 at 7.7 Milliseconds

SAE Filter Class: 600

Date of Test: 1/21/01

ATD Serial No.: 035

Testing Program: Hybrid III Right Knee Impact Test

Test Information: Part S/N: N/A Test I.D.: RK01Z





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Head Drop Calibration

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: HD01C

| 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 | 247.5  | Pass      |
| Peak Lateral Acceleration    | G's    | ≤15.0          | 7.7    | Pass      |
| Is Acceleration Unimodal?    | Yes/No | Yes            | Yes    | Pass      |
| Overall Test Results         |        |                |        | Pass      |

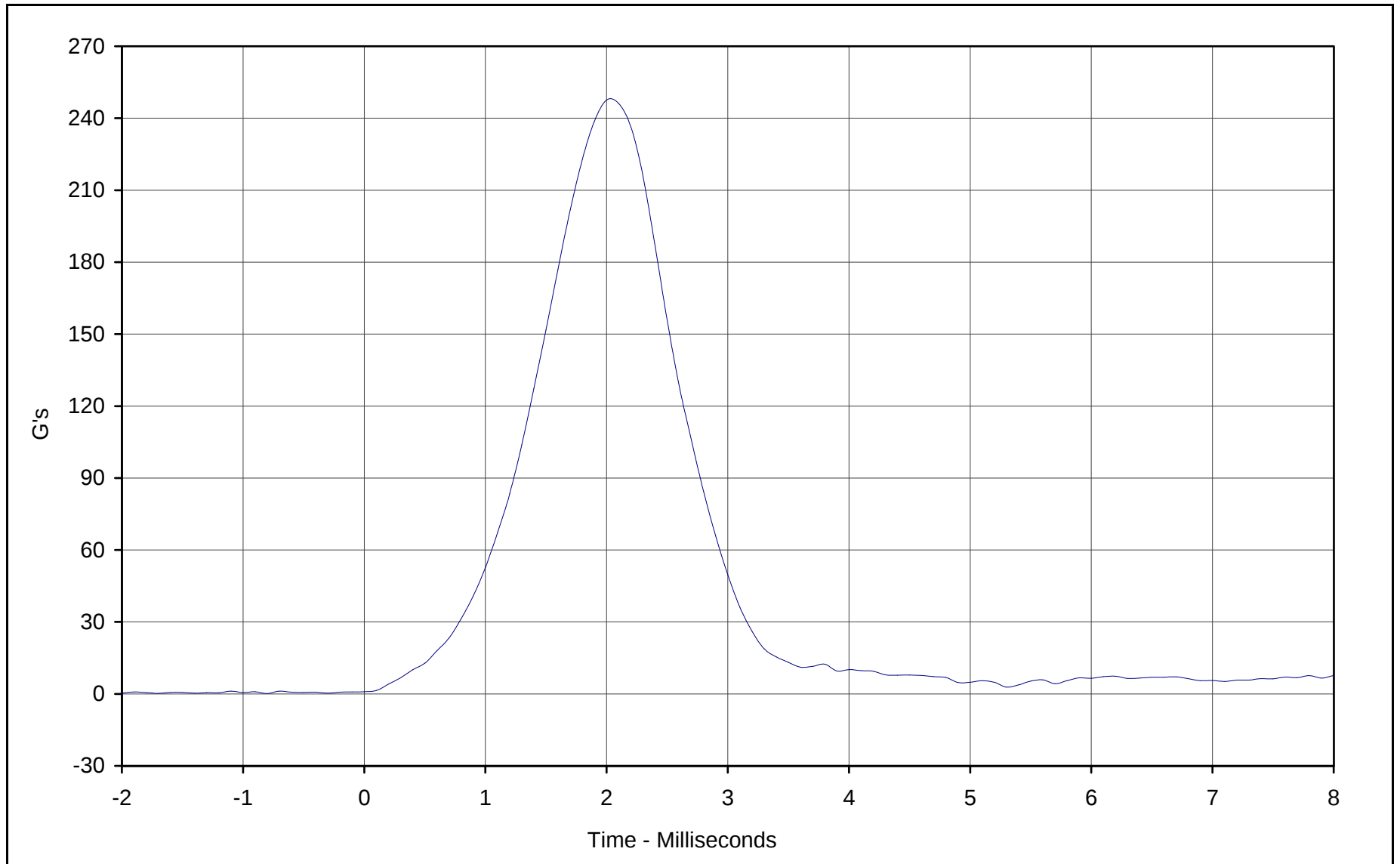
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 20, 2001

\_\_\_\_\_  
Test Date

\_\_\_\_\_  
Approved By

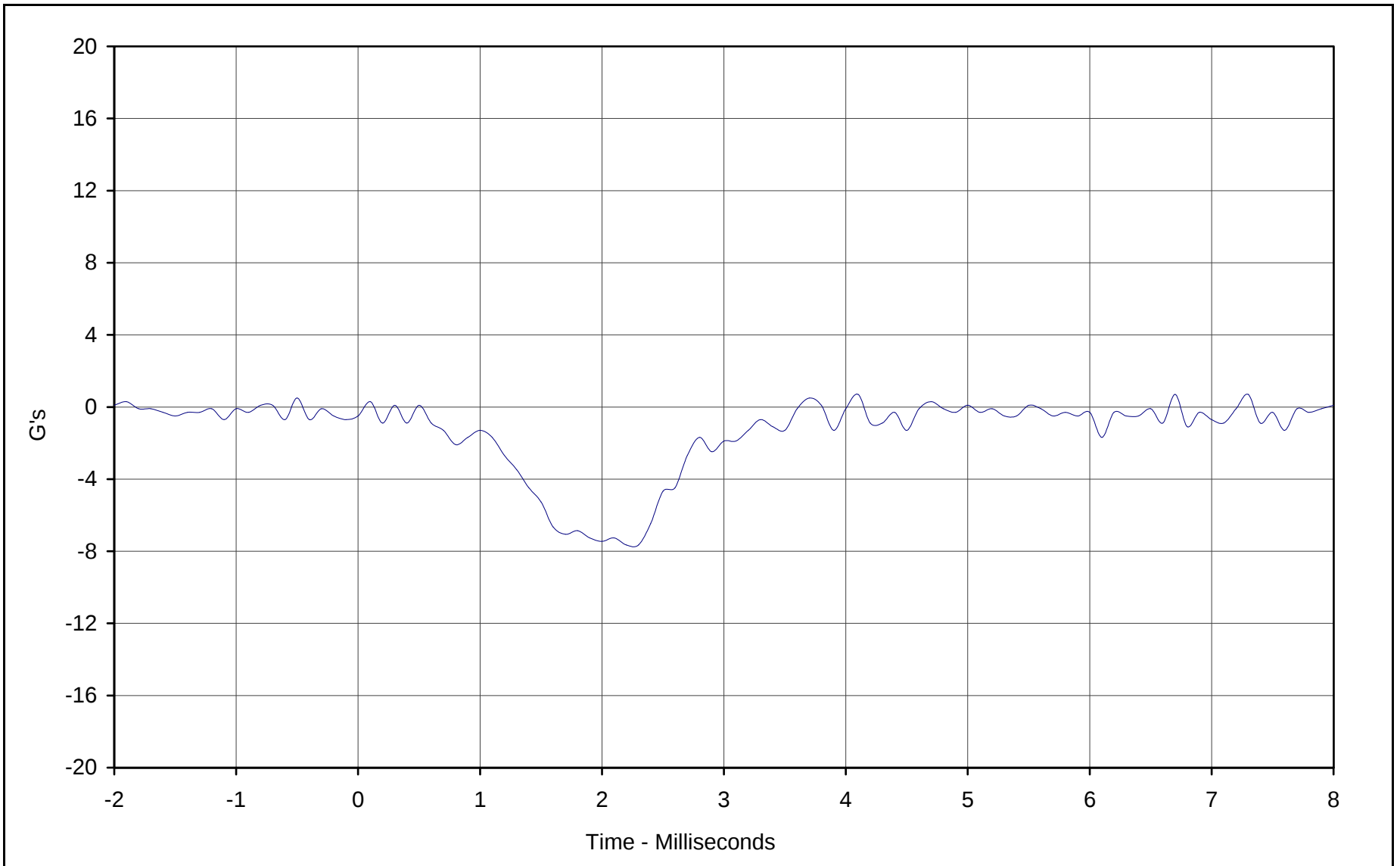
\_\_\_\_\_  
Date



Curve Description: Head Resultant Acceleration  
Maximum Value: 247.5 at 2.0 Milliseconds  
Minimum Value: 0.2 at -0.8 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 1/20/01  
ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)  
Test Information: S/N of Part: N/A Test I.D.: HD01C





Curve Description: Head Acceleration Y Axis

Maximum Value: 0.7 at 4.1 Milliseconds

Minimum Value: -7.7 at 2.2 Milliseconds

SAE Filter Class: 1000

Date of Test: 1/20/01

ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01C





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Thorax Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: CH01B

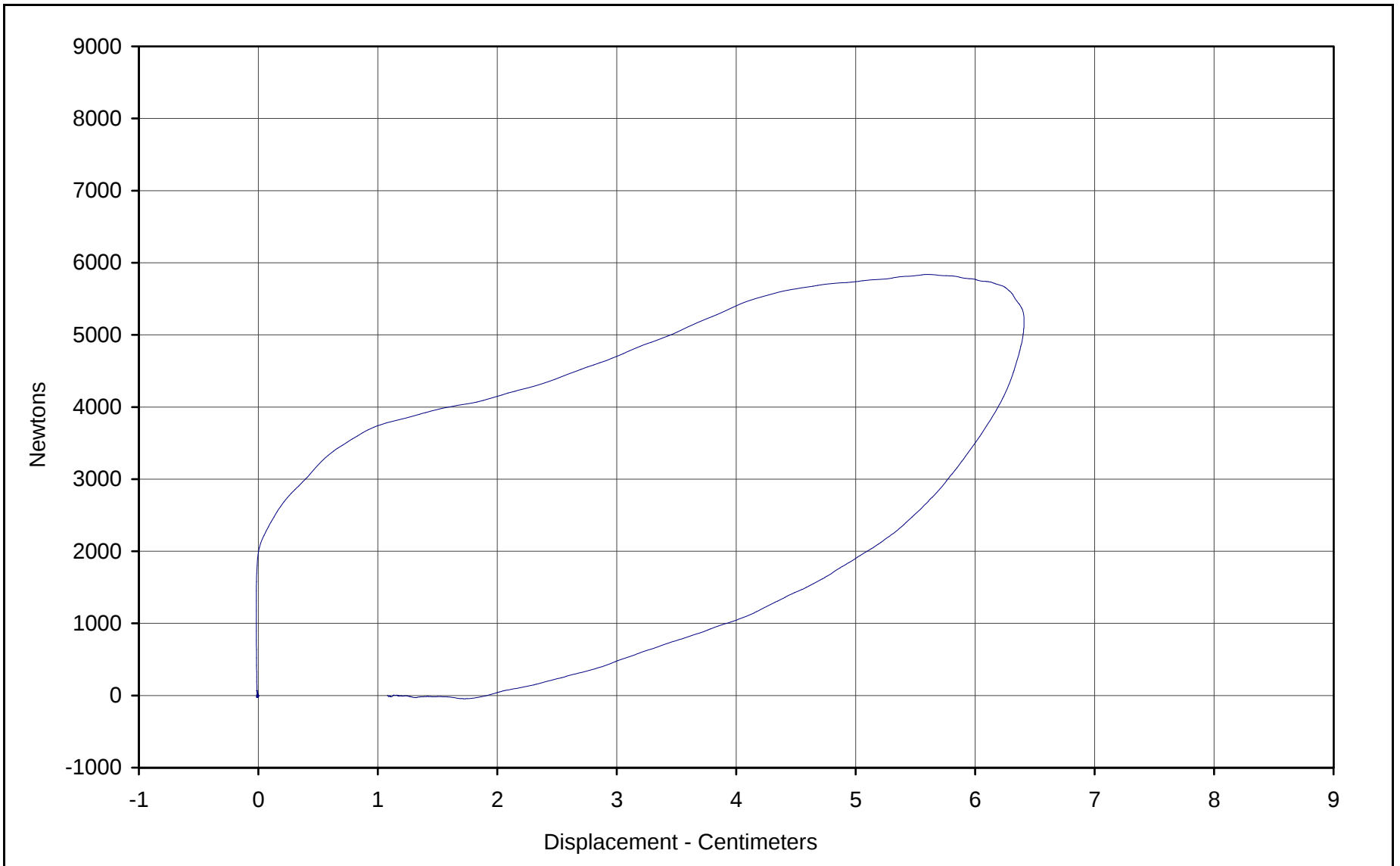
| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 30     | Pass      |
| Probe Velocity               | m/s     | 6.58 to 6.82  | 6.61   | Pass      |
| Peak Probe Force             | Newtons | 5159 to 5893  | 5838   | Pass      |
| Peak Sternum Displacement    | CM      | 6.35 to 7.26  | 6.41   | Pass      |
| Internal Hysteresis          | %       | 69 to 85      | 77.8   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 20, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date



Curve Description: Probe Force vs. Chest Displacement

Probe Force: 5838.0 Newtons

Chest Displ.: 6.41 Centimeters

SAE Filter Class: 180

Date of Test: 1/20/01

ATD Serial No.: 035

Testing Program: Hybrid III Thorax Impact Test

Test Information: S/N of Part: N/A Test I.D.: CH01B





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Neck Flexion Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NF02B

| 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   | 7.05   | Pass      |
| Pendulum Deceleration                           | 10 Msec. | G's     | 22.5 to 27.5   | 22.7   | Pass      |
|                                                 | 20 Msec. | G's     | 17.6 to 22.6   | 20.0   | Pass      |
|                                                 | 30 Msec. | G's     | 12.5 to 18.5   | 17.3   | Pass      |
| Peak Pendulum Decel. after 30 Msec.             |          | G's     | ≤ 29.0         | 17.3   | Pass      |
| Deceleration Decay, Time to Cross 5 G's         |          | Msec.   | 34.0 to 42.0   | 40.5   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 64.0 to 78.0   | 65.8   | 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 | 114.3  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N·m     | 84.1 to 108.5  | 87.6   | Pass      |
|                                                 | Time     | Msec.   | 47.0 to 58.0   | 53.6   | Pass      |
| Positive Moment Decay, Time To Zero Crossing    |          | Msec.   | 97.0 to 107.0  | 99.3   | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

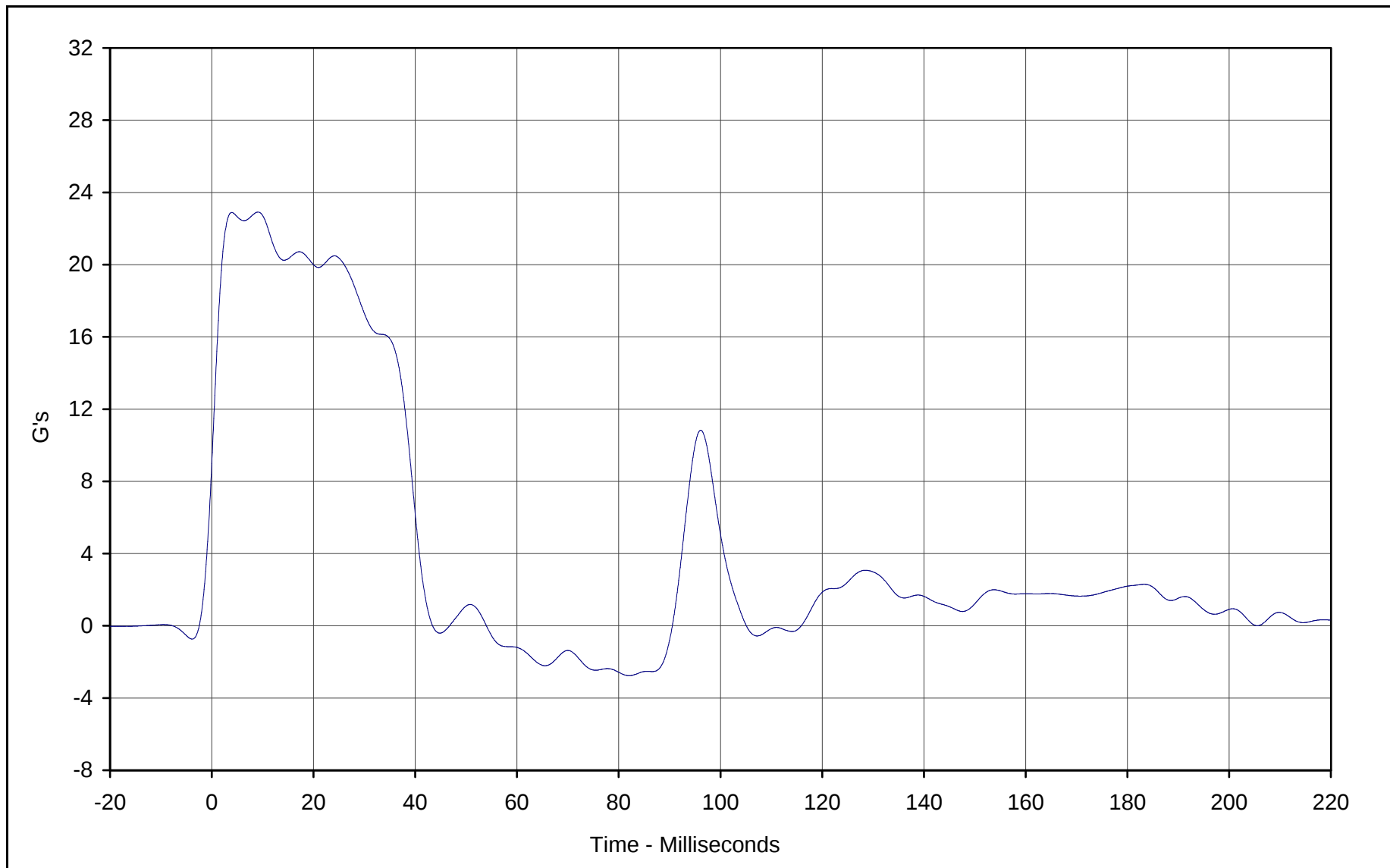
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date

E-31



Curve Description: Pendulum Deceleration

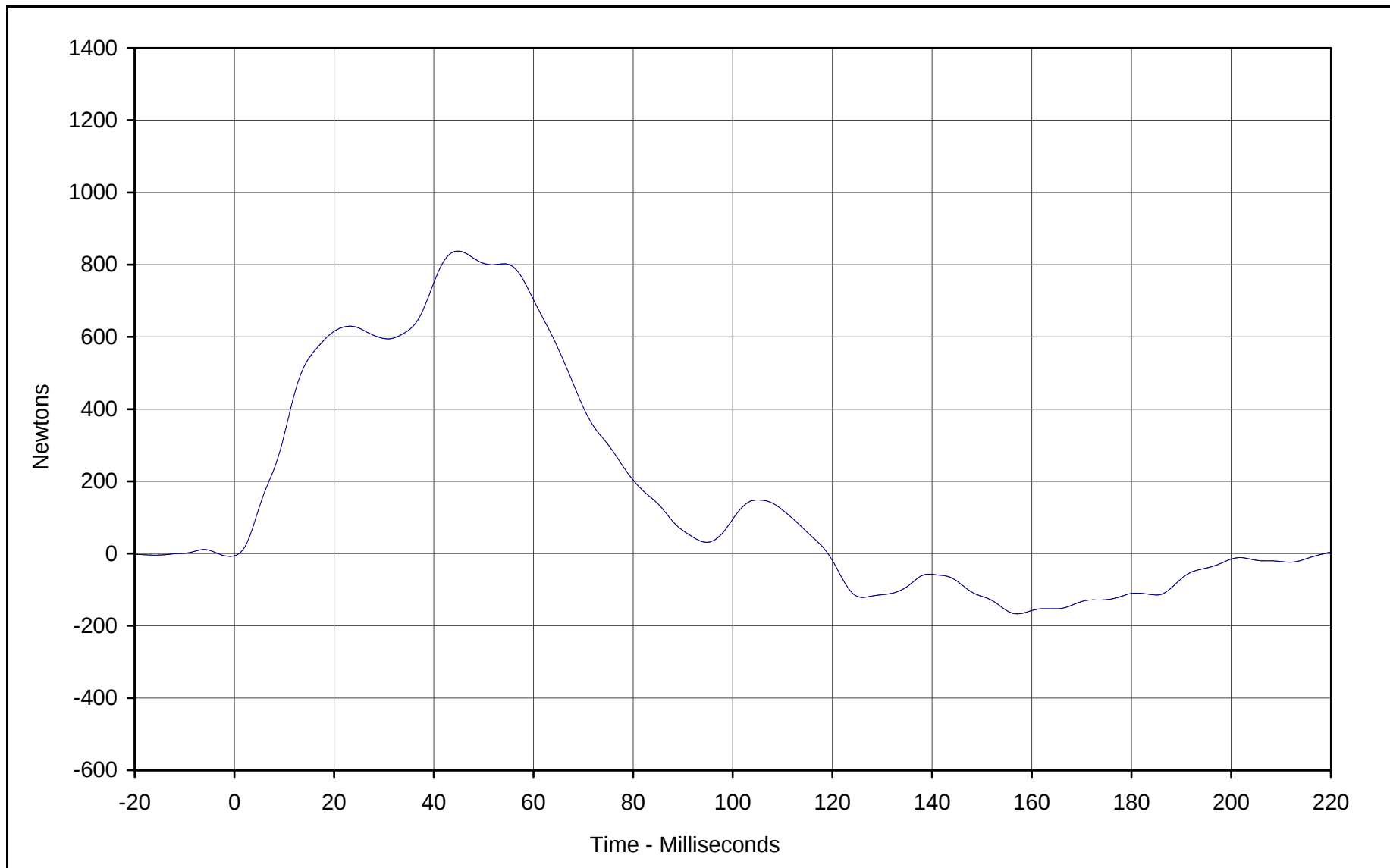
|                   |                |    |             |              |
|-------------------|----------------|----|-------------|--------------|
| Maximum Value:    | <u>22.9</u>    | at | <u>9.1</u>  | Milliseconds |
| Minimum Value:    | <u>-2.8</u>    | at | <u>82.1</u> | Milliseconds |
| SAE Filter Class: | <u>60</u>      |    |             |              |
| Date of Test:     | <u>1/21/01</u> |    |             |              |
| ATD Serial No.:   | <u>035</u>     |    |             |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02B



KAR21001-09



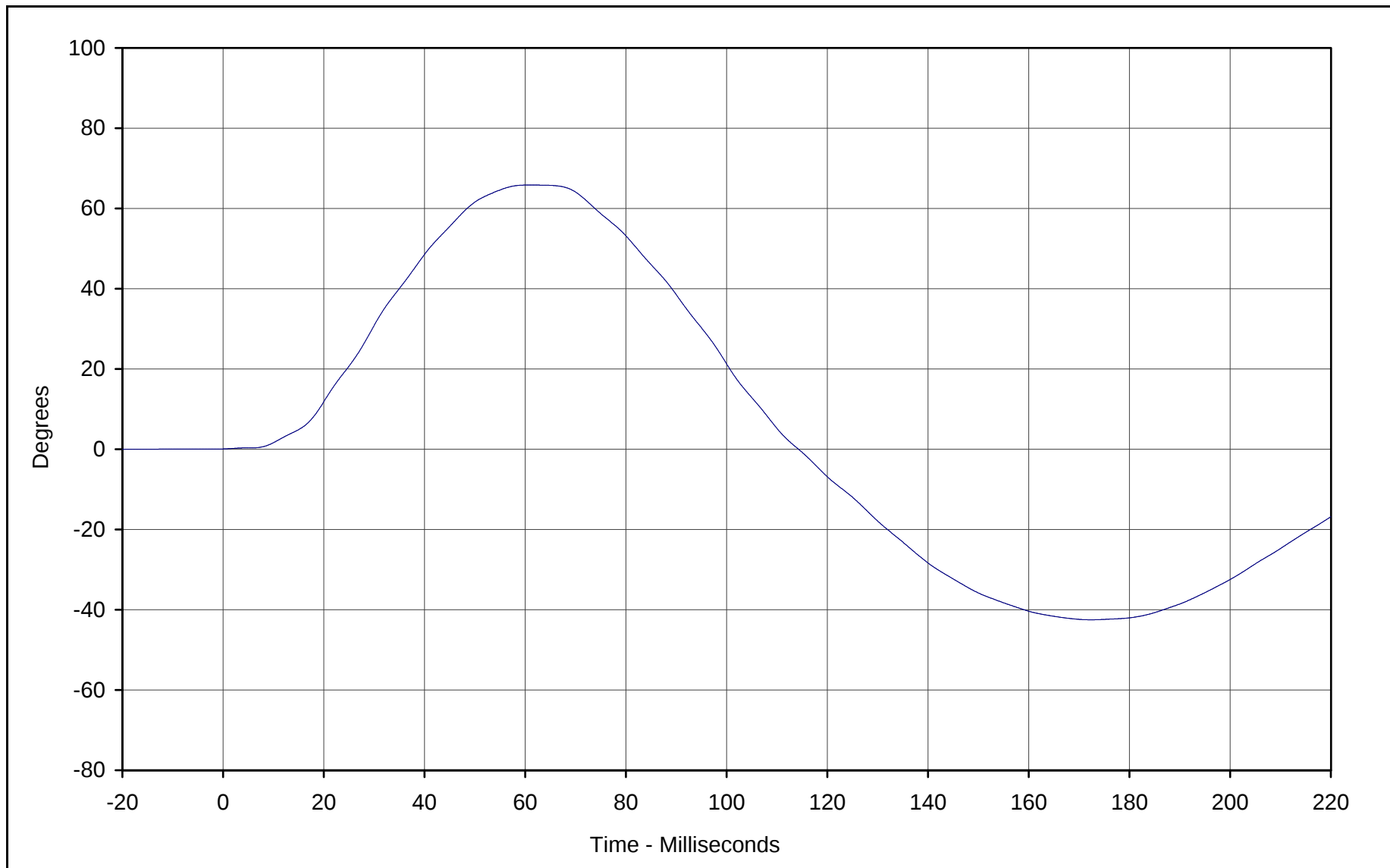
Curve Description: Neck Force X

|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 837.6   | at | 44.8  | Milliseconds |
| Minimum Value:    | -167.0  | at | 157.1 | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 035     |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02B





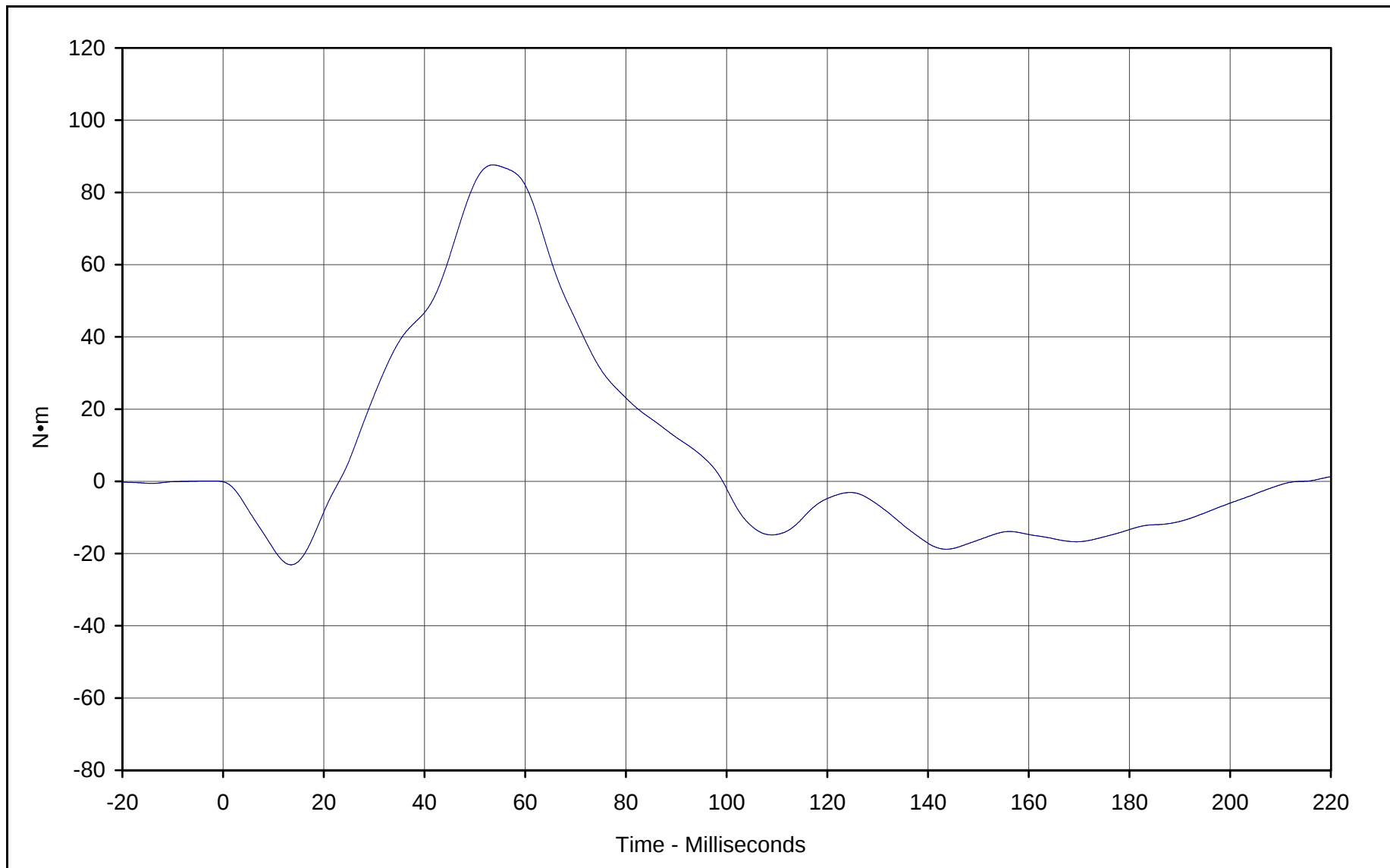
Curve Description: "D" Plane Rotation

|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 65.8    | at | 60.7  | Milliseconds |
| Minimum Value:    | -42.5   | at | 172.4 | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 035     |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02B





Curve Description: Moment About Occipital Condyles

Maximum Value: 87.6 at 53.6 Milliseconds

Minimum Value: -23.1 at 13.5 Milliseconds

SAE Filter Class: 60

Date of Test: 1/21/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF02B





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### Neck Extension Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NE02B

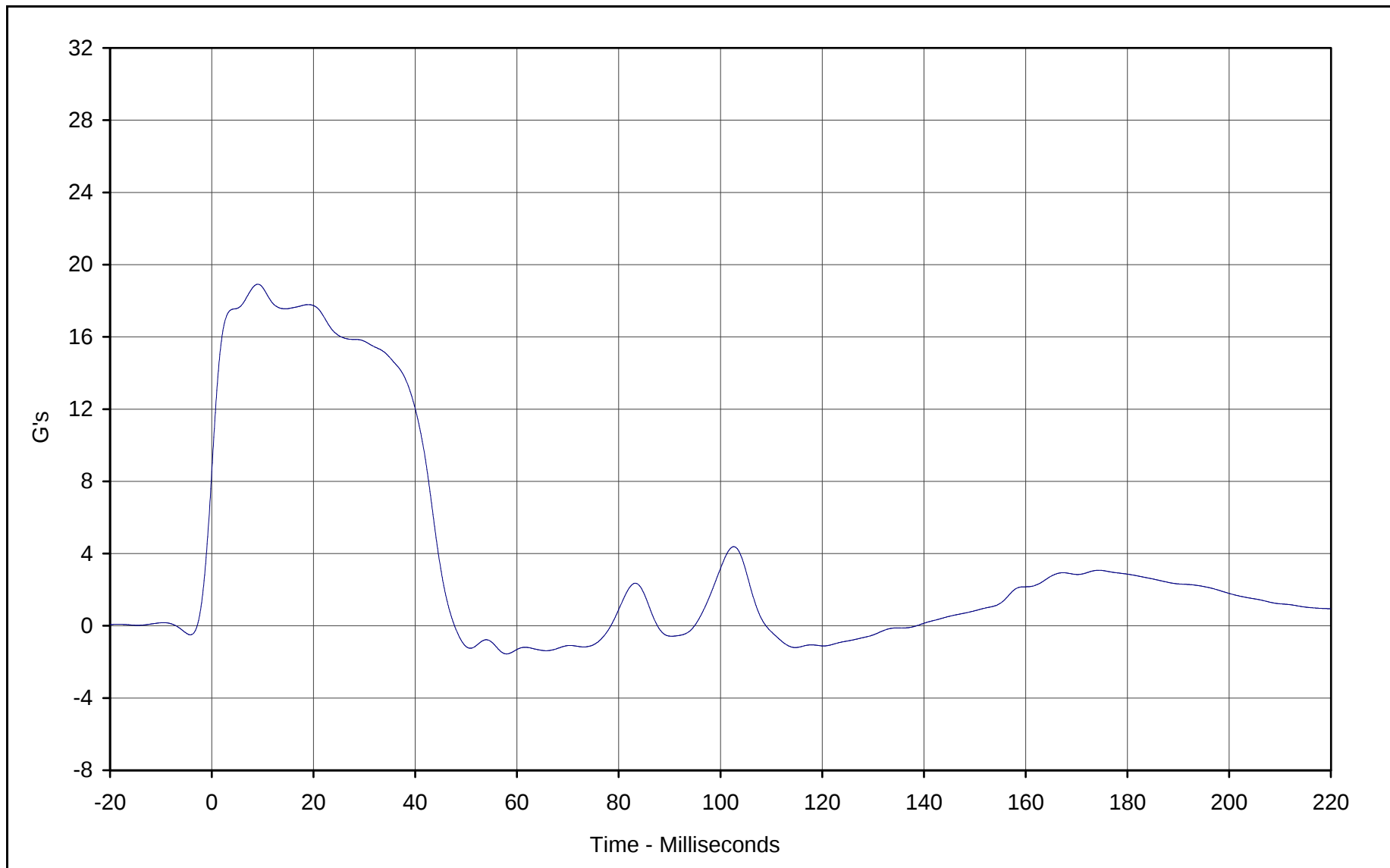
| Tested Parameter                                |          | Units   | Specification  | Result | Pass/Fail |
|-------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                          |          | °C      | 20.6 to 22.2   | 21.1   | Pass      |
| Laboratory Relative Humidity                    |          | %       | 10 to 70       | 30     | Pass      |
| Pendulum Velocity                               |          | m/s     | 5.95 to 6.19   | 6.10   | Pass      |
| Pendulum Deceleration                           | 10 Msec. | G's     | 17.2 to 21.2   | 18.7   | Pass      |
|                                                 | 20 Msec. | G's     | 14.0 to 19.0   | 17.7   | Pass      |
|                                                 | 30 Msec. | G's     | 11.0 to 16.0   | 15.8   | Pass      |
| Peak Pendulum Decel. after 30 Msec.             |          | G's     | ≤ 22.0         | 15.8   | Pass      |
| Deceleration Decay, Time to Cross 5 G's         |          | Msec.   | 38.0 to 46.0   | 44.1   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 81.0 to 106.0  | 99.4   | Pass      |
|                                                 | Time     | Msec.   | 72.0 to 82.0   | 81.9   | Pass      |
| "D" Plane Rotation Decay, Time To Zero Crossing |          | Msec.   | 147.0 to 174.0 | 161.8  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N·m     | -52.9 to- 79.9 | -63.8  | Pass      |
|                                                 | Time     | Msec.   | 65.0 to 79.0   | 74.9   | Pass      |
| Negative Moment Decay, Time To Zero Crossing    |          | Msec.   | 120.0 to 148.0 | 146.1  | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 21, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date

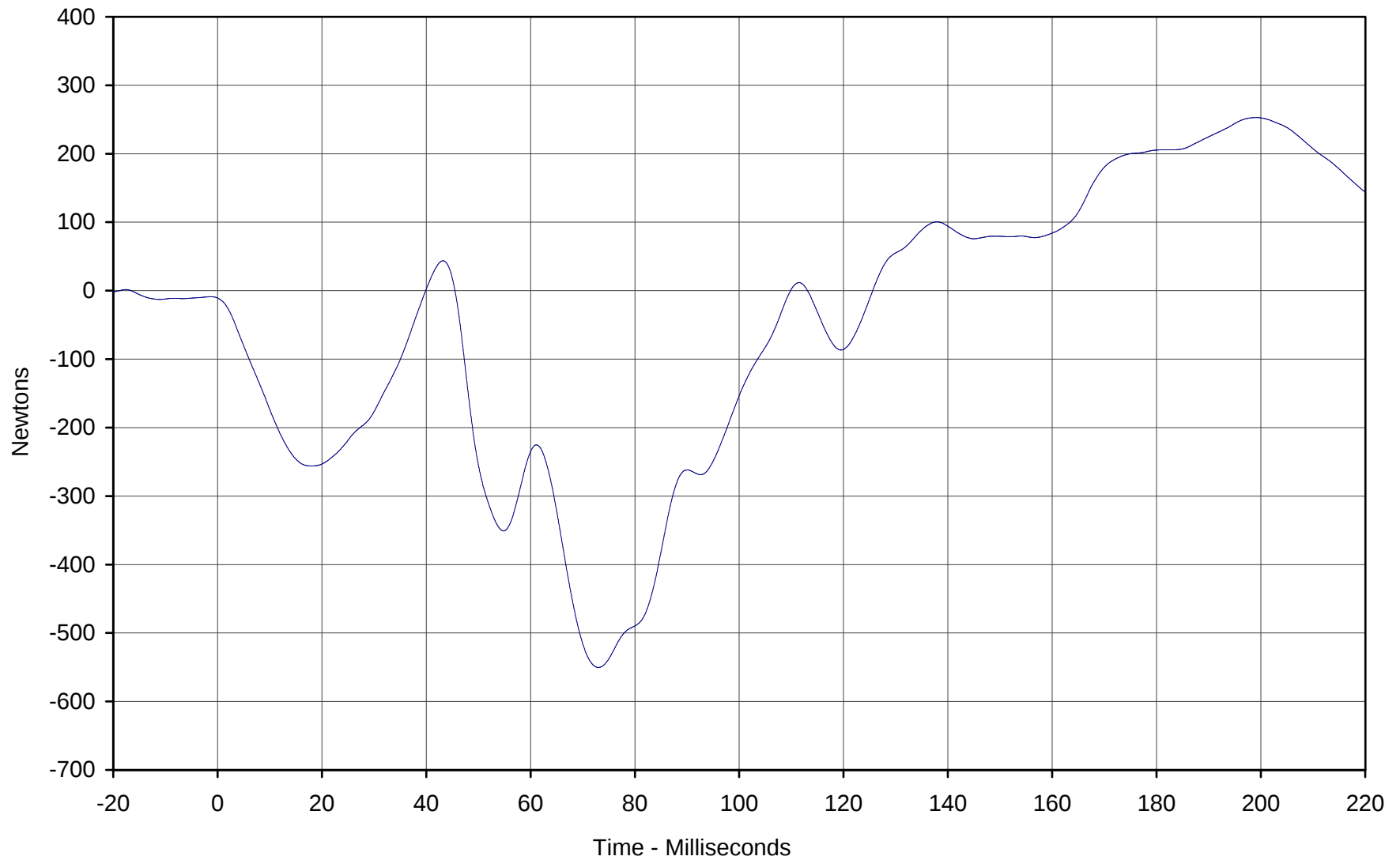


|                    |                       |    |                   |
|--------------------|-----------------------|----|-------------------|
| Curve Description: | Pendulum Deceleration |    |                   |
| Maximum Value:     | 18.9                  | at | 9.1 Milliseconds  |
| Minimum Value:     | -1.6                  | at | 58.0 Milliseconds |
| SAE Filter Class:  | 60                    |    |                   |
| Date of Test:      | 1/21/01               |    |                   |
| ATD Serial No.:    | 035                   |    |                   |

|                  |                                       |
|------------------|---------------------------------------|
| Testing Program: | Hybrid III Neck Extension Test (Male) |
|------------------|---------------------------------------|

|                   |                                   |
|-------------------|-----------------------------------|
| Test Information: | S/N of Part: N/A Test I.D.: NE02B |
|-------------------|-----------------------------------|





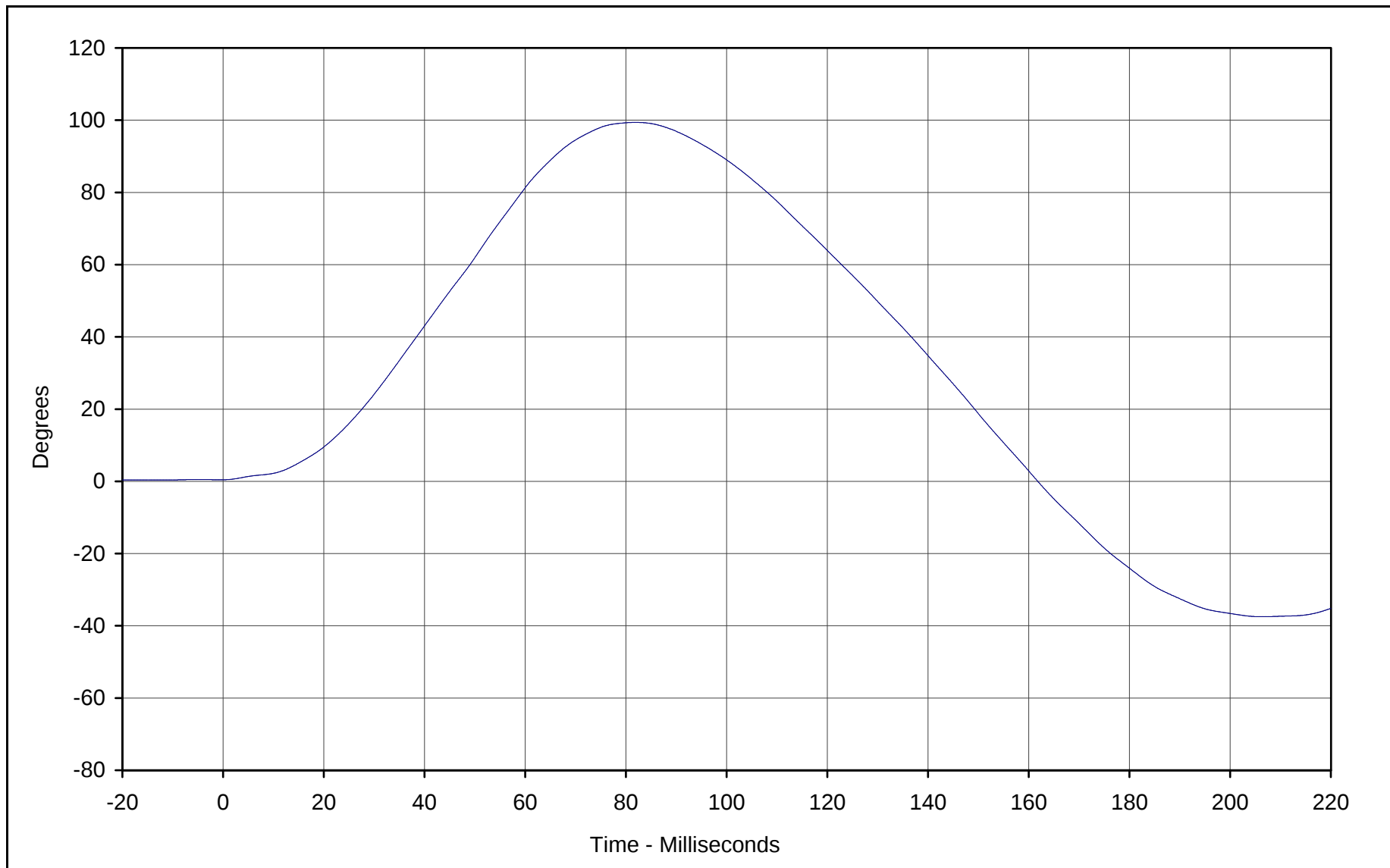
Curve Description: Neck Force X

|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 252.9   | at | 199.0 | Milliseconds |
| Minimum Value:    | -550.3  | at | 73.0  | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 035     |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE02B





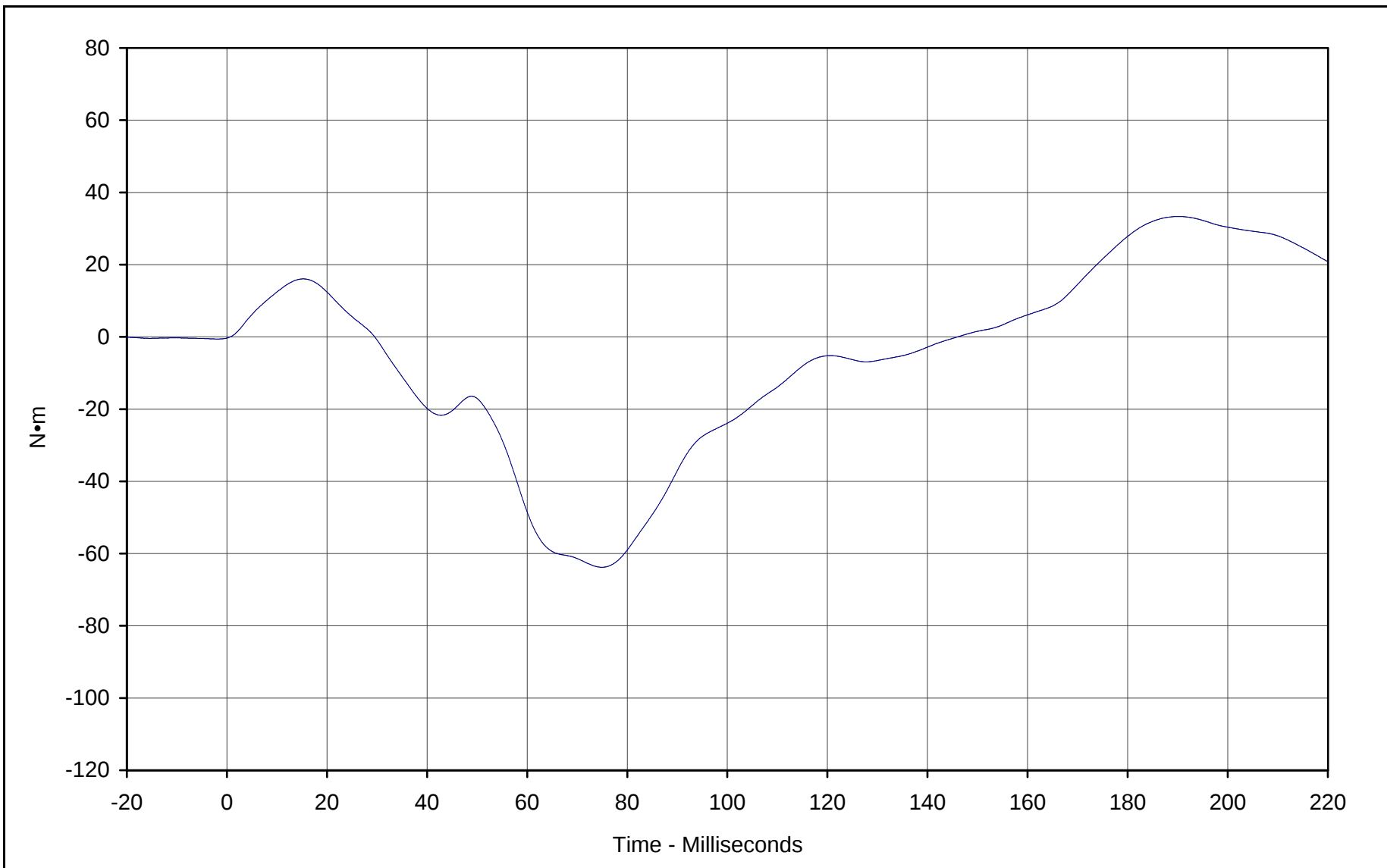
Curve Description: "D" Plane Rotation

|                   |         |    |       |              |
|-------------------|---------|----|-------|--------------|
| Maximum Value:    | 99.4    | at | 81.9  | Milliseconds |
| Minimum Value:    | -37.5   | at | 206.4 | Milliseconds |
| SAE Filter Class: | 60      |    |       |              |
| Date of Test:     | 1/21/01 |    |       |              |
| ATD Serial No.:   | 035     |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE02B





Curve Description: Moment About Occipital Condyles

Maximum Value: 33.3 at 190.2 Milliseconds

Minimum Value: -63.8 at 74.9 Milliseconds

SAE Filter Class: 60

Date of Test: 1/21/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE02B





# Hybrid III Calibration Data Sheet

## 50<sup>TH</sup> Percentile Male

### External Measurements

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: N/A

| External Measurement Data             |       |               |        |           |
|---------------------------------------|-------|---------------|--------|-----------|
| Tested Parameter                      | Units | Specification | Result | Pass/Fail |
| Laboratory temperature                | °C    | 20.4 to 22.1  | 20.9   | 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    | 510    | 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    | 205    | Pass      |
| K - Buttock to knee length            | mm    | 579 to 604    | 595    | Pass      |
| L - Popliteal length                  | mm    | 429 to 455    | 440    | Pass      |
| M - Knee pivot height                 | mm    | 485 to 500    | 495    | Pass      |
| N - Buttock popliteal length          | mm    | 452 to 477    | 475    | Pass      |
| O - Chest depth                       | mm    | 213 to 229    | 215    | Pass      |
| P - Foot length                       | mm    | 251 to 267    | 260    | Pass      |
| V - Shoulder breadth                  | mm    | 422 to 437    | 425    | Pass      |
| W - Foot breadth                      | mm    | 91 to 107     | 95     | Pass      |
| Y - Chest circumference               | mm    | 970 to 1001   | 995    | Pass      |
| Z - Waist circumference               | mm    | 836 to 866    | 855    | 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

\_\_\_\_\_  
January 22, 2001  
Test Date

\_\_\_\_\_  
Approved By

\_\_\_\_\_  
Date

**APPENDIX F**  
**VEHICLE OWNER'S MANUAL**  
**OCCUPANT RESTRAINT INSTRUCTIONS**

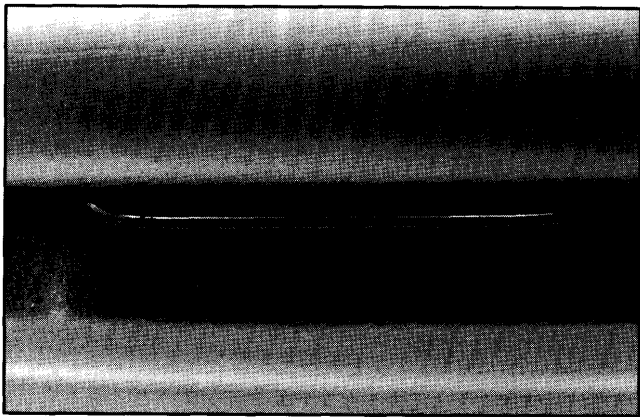
# Seats and Seat Controls

This section tells you about the seats -- how to adjust them -- and also about reclining seatbacks and head restraints.

## Manual Seats

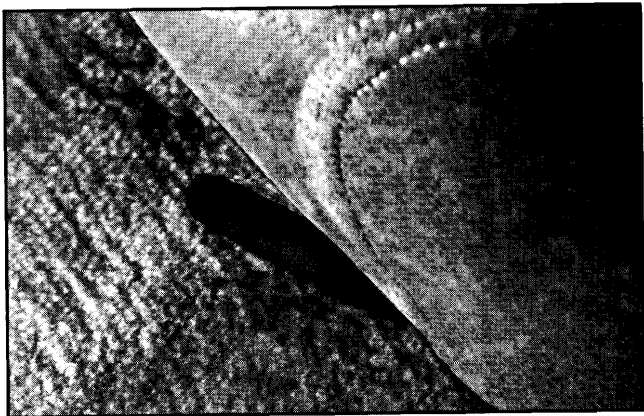
 **CAUTION:**

You can lose control of the vehicle if you try to adjust a manual driver's seat while the vehicle is moving. The sudden movement could startle and confuse you, or make you push a pedal when you don't want to. Adjust the driver's seat only when the vehicle is not moving.

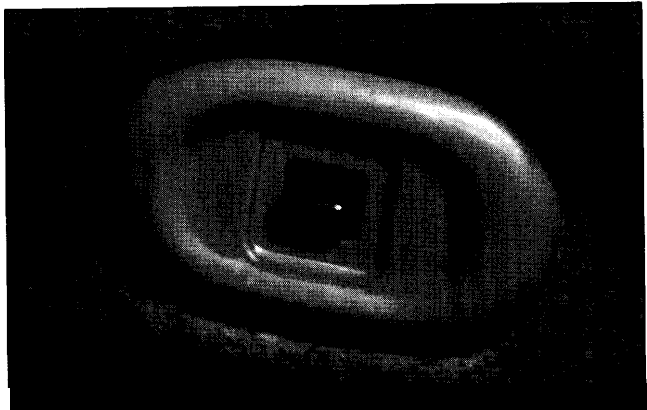


Lift the bar located under the front of the seat to unlock it. Slide the seat to where you want it and release the bar. Try to move the seat with your body to be sure the seat is locked in place.

## Power Lift Seat (If Equipped)

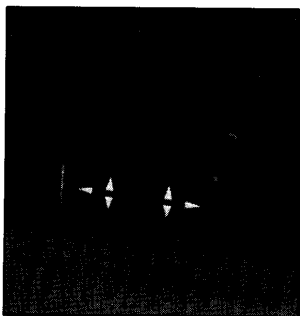


To move the power lift seat forward or rearward, pull up on the lever located under the front of the driver's seat to unlock it. Slide the seat to where you want it. Then release the lever and try to move the seat with your body to make sure the seat is locked into place.



To raise or lower the power lift seat, hold the switch located on the outboard side of the driver's seat up or down.

## 6-Way Power Seat Controls (If Equipped)



The power seat control is located on the outboard side of the driver's seat.

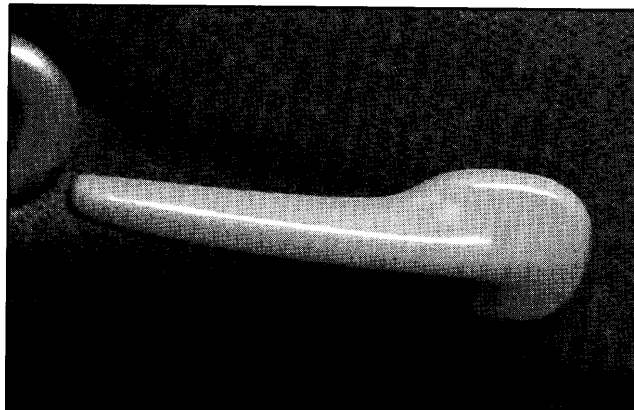
This control allows you to move the seat up, down, forward, or backward. It will also move the front or rear of the seat cushion up or down.

- Move the seat forward or rearward by pushing the control towards the front or rear of the vehicle.
- Raise or lower the entire seat cushion by holding the control up or down.
- Raise or lower the front of the seat cushion by holding the front of the control up or down.
- Raise or lower the rear of the seat cushion by holding the rear of the control up or down.

## Manual Lumbar Support (If Equipped)

Turn the knob located on the inboard side of the driver's seat cushion clockwise or counterclockwise to adjust support of the lower back.

## Reclining Front Seatbacks



To adjust the seatback, lift the lever located on the outboard side of the seat and move the seatback to where you want it. Release the lever to lock the seatback. Pull up on the lever and the seatback will go to an upright position.

1-4



But don't have a seatback reclined if your vehicle is moving.

### CAUTION:

Sitting in a reclined position when your vehicle is in motion can be dangerous. Even if you buckle up, your safety belts can't do their job when you're reclined like this.

The shoulder belt can't do its job because it won't be against your body. Instead, it will be in front of you. In a crash you could go into it, receiving neck or other injuries.

The lap belt can't do its job either. In a crash the belt could go up over your abdomen. The belt forces would be there, not at your pelvic bones. This could cause serious internal injuries.

For proper protection when the vehicle is in motion, have the seatback upright. Then sit well back in the seat and wear your safety belt properly.

## Head Restraints



Slide the head restraint up or down so that the top of the restraint is closest to the top of your ears. This position reduces the chance of a neck injury in a crash.

## Seatback Latches (2-Door Models)

The front seatbacks fold forward to let people get into the back seat. The seatback latch is designed for one-handed operation.

To fold a front seatback forward, lift the seatback latch fully without pushing forward on the seatback to unlock it. Then fold the seatback forward.

Push the seatback to its original position, and the seatback will lock.

### CAUTION:

If the seatback isn't locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always press rearward on the seatback to be sure it is locked.

1-6

## Easy Entry Seat (2-Door Models)

The right front seat of your vehicle makes it easy for people to get in and out of the rear seat.

1. Fold the right front seatback forward by lifting the seatback latch fully.
2. The seat will slide forward to allow someone to get into the rear seat area.
3. Push the seatback upright to lock and slide the seat fully rearward to lock.
4. The front passenger should try to move the seat to make sure the seat is locked into place.

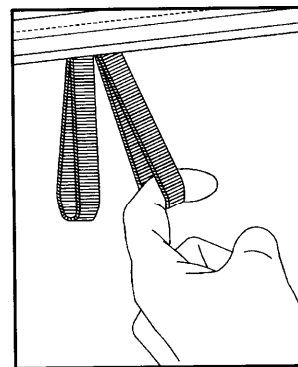
### CAUTION:

If an easy entry right front seat isn't locked, it can move. In a sudden stop or crash, the person sitting there could be injured. After you've used it, be sure to push rearward on an easy entry seat to be sure it is locked.

## Rear Seats

### Folding the Rear Seat (If Equipped)

To fold down the rear seat, do the following:



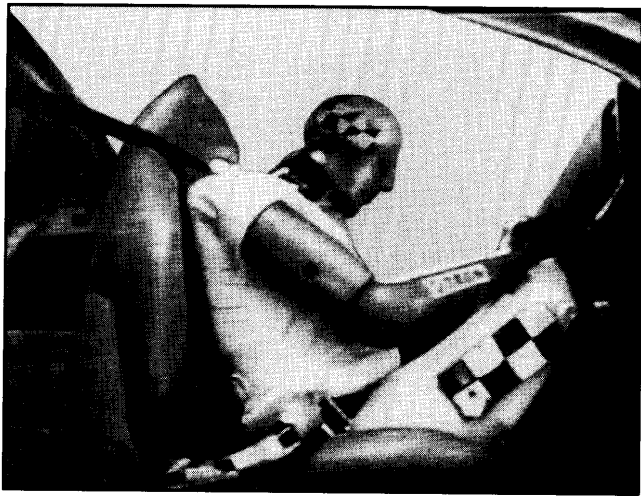
1. Pull the release straps located in the trunk. The right strap operates the passenger's side rear split seat. The left strap operates the driver's side rear split seat.

2. Fold the seatback down from the inside of the vehicle.

To raise the seatback, push the seatback up to return it to its original position.

Push and pull on the seatback to make sure it is latched securely in the fully upright position.

1-7



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

## Here Are Questions Many People Ask About Safety Belts -- and the Answers

**Q:** Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

**A:** **You *could*** be -- whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you **can** unbuckle and get out, is much greater if you are belted.

**Q:** If my vehicle has air bags, why should I have to wear safety belts?

**A:** Air bags are in many vehicles today and will be in most of them in the future. But they are supplemental systems only; so they work with safety belts -- not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, **but** especially in side and other collisions.

I-12

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**Q:** If I'm a good driver, and I never drive far from home, why should I wear safety belts?

**A:** you may be an excellent driver, but if you're in an accident -- even one that isn't your fault -- you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

## How to Wear Safety Belts Properly Adults

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see the part of this manual called "Children." Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

---

I-13

## Driver Position

This part describes the driver's restraint system.

### Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat so you can sit up straight. To see how, see "Seats" in the Index.



3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

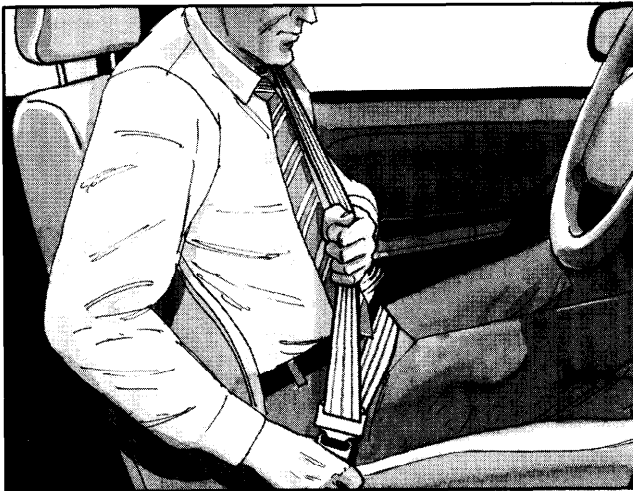
The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

4. Push the latch plate into the buckle until it clicks.

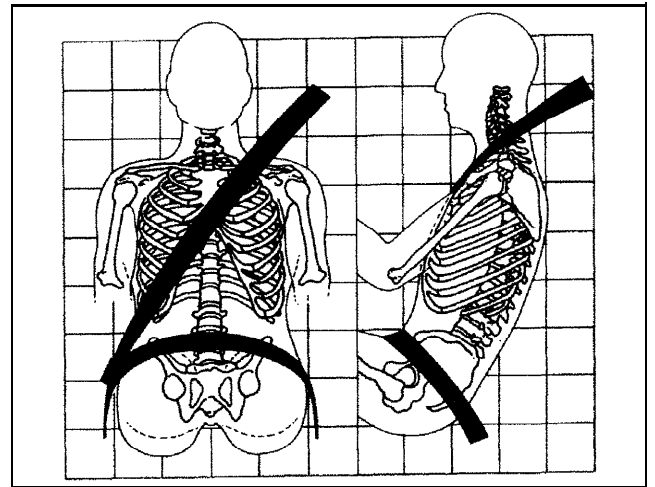
Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

1-14



5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.



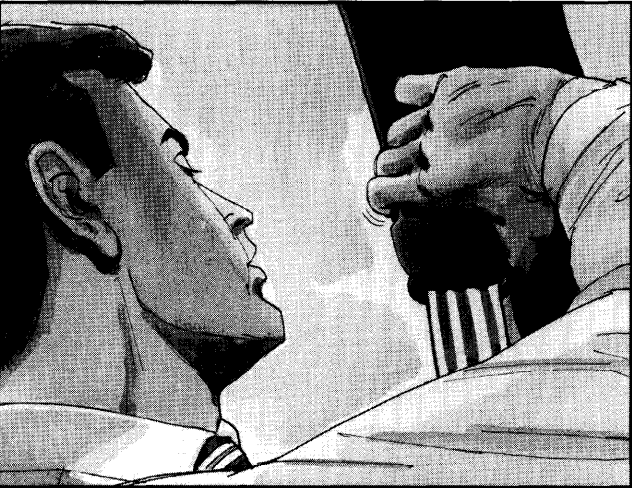
The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

1-15

**Shoulder Belt Height Adjuster (4-Door Models)**

Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.

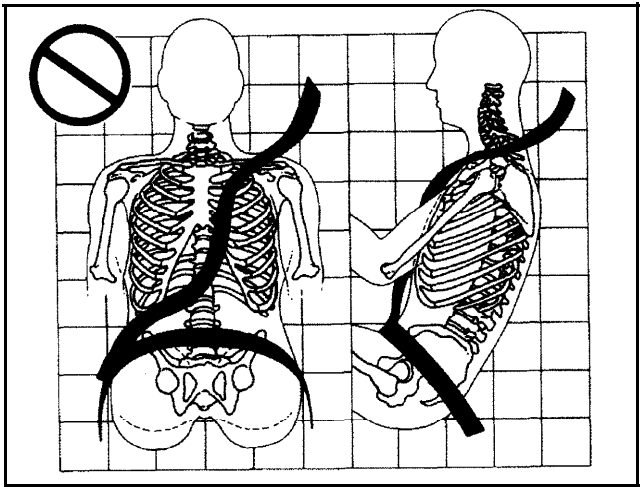


To move it down, squeeze the release button and move the height adjuster to the desired position. You can move the adjuster up just by pushing on the shoulder belt guide. After you move the adjuster to where you want it, try to move it down without squeezing the release button to make sure it has locked into position.

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.

1-16

**Q:** What's wrong with this?

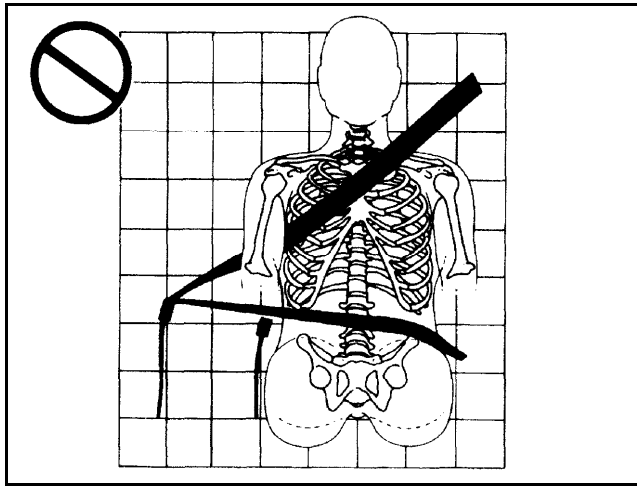


**A:** The shoulder belt is too loose. It won't give nearly as much protection this way.

**⚠CAUTION:**

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

**Q:** What's wrong with this?



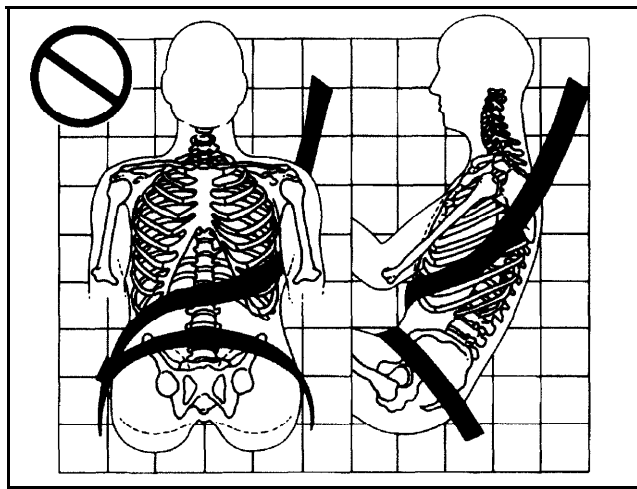
**⚠CAUTION:**

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

**A:** The belt is buckled in the wrong place.

I-18

**Q:** What's wrong with this?

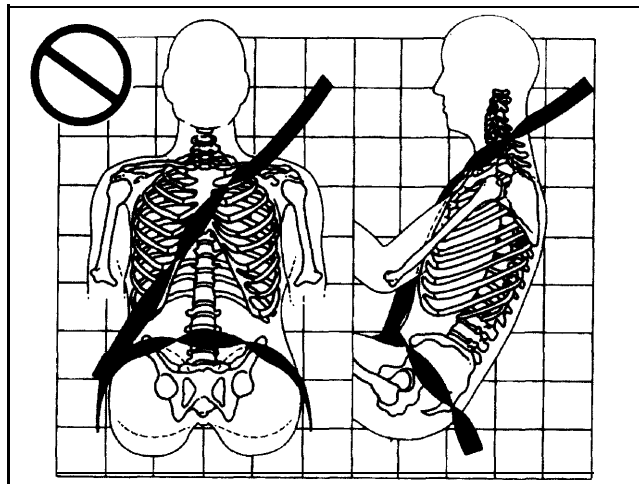


**⚠CAUTION:**

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

**A:** The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

**Q:** What's wrong with this?

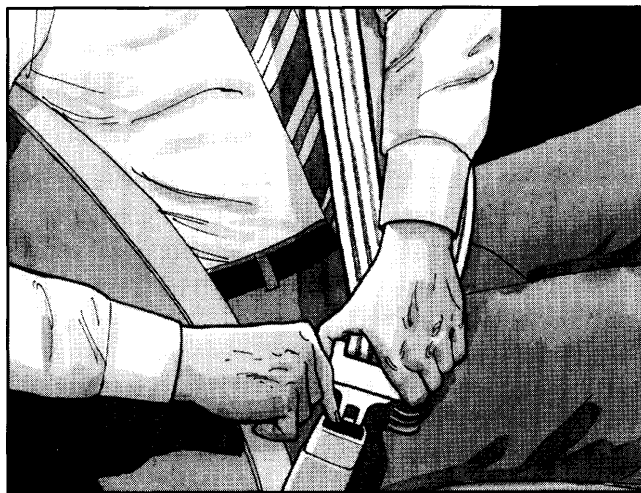


## **⚠CAUTION:**

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.

**At** The belt is twisted across the body.

1-20

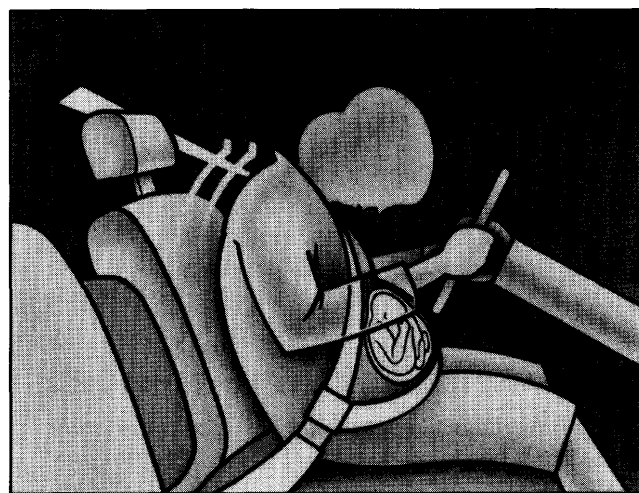


To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

## **Safety Belt Use During Pregnancy**

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.



A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

## Right Front Passenger Position

To learn how to wear the right front passenger's safety belt properly, see "Driver Position" earlier in this section.

The right front passenger's safety belt works the same way as the driver's safety belt -- except for one thing. If you ever pull the shoulder portion of the belt out all the way, you will engage the child restraint locking feature. If this happens, just let the belt go back all the way and start again.

## Supplemental Restraint System (SRS)

This part explains the Supplemental Restraint System (SRS) or air bag system.

Your vehicle has air bags -- one air bag for the driver and another air bag for the right front passenger.

Frontal air bags are designed to help reduce the risk of injury from the force of an inflating air bag. But these air bags must inflate very quickly to do their job and comply with federal regulations.

Here are the most important things to know about the air bag system:

### CAUTION:

You can be severely injured or killed in a crash if you aren't wearing your safety belt -- even if you have air bags. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Air bags are designed to work with safety belts, but don't replace them. Air bags are designed to work only in moderate to severe crashes where the front of your vehicle hits something. They aren't designed to inflate at all in rollover, rear, side or low-speed frontal crashes. And, for some unrestrained occupants, air bags may provide less protection in frontal crashes than more forceful air bags have provided in the past. Everyone in your vehicle should wear a safety belt properly -- whether or not there's an air bag for that person.

I-22

### CAUTION:

Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, as you would be if you were leaning forward, it could seriously injure you. Safety belts help keep you in position before and during a crash. Always wear your safety belt, even with air bags. The driver should sit as far back as possible while still maintaining control of the vehicle.

### CAUTION:

Anyone who is up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer the best protection for adults, but not for young

CAUTION: (Continued)

### CAUTION: (Continued)

children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide. Always secure children properly in your vehicle. To read how, see the part of this manual called "Children."

### AIR BAG

There is an air bag readiness light on the instrument panel, which shows AIR BAG.

The system checks the air bag electrical system for malfunctions. The light tells you if there is an electrical problem. See "Air Bag Readiness Light" in the Index for more information.

I-23

## How the Air Bag System Works



### Where are the air bags?

The driver's air bag is in the middle of the steering wheel.



The right front passenger's air bag is in the instrument panel on the passenger's side.

1-24

### CAUTION:

If something is between an occupant and an air bag, the bag might not inflate properly or it might force the object into that person. The path of an inflating air bag must be kept clear. Don't put anything between an occupant and an air bag, and don't attach or put anything on the steering wheel hub or on or near any other air bag covering.

### When should an air bag inflate?

An air bag is designed to inflate in a moderate to severe frontal or near-frontal crash. The air bag will inflate only if the impact speed is above the system's designed "threshold level." If your vehicle goes straight into a wall that doesn't move or deform, the threshold level is about 9 to 14 mph (14 to 23 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range. If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher. The air bag is not designed to inflate in rollovers, side impacts or rear impacts, because inflation would not help the occupant.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. Inflation is determined by the angle of the impact and how quickly the vehicle slows down in frontal or near-frontal impacts.

1-25

### What makes an air bag inflate?

In an impact of sufficient severity, the air bag sensing system detects that the vehicle is in a crash. The sensing system triggers a release of gas from the inflator, which inflates the air bag. The inflator, air bag and related hardware are all part of the air bag modules inside the steering wheel and in the instrument panel in front of the right front passenger.

### How does an air bag restrain?

In moderate to severe frontal or near-frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. Air bags supplement the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But air bags would not help you in many types of collisions, including rollovers, rear impacts and side impacts, primarily because an occupant's motion is not toward those air bags. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions.

### What will you see after an air bag inflates?

After an air bag inflates, it quickly deflates, so quickly that some people may not even realize the air bag inflated. Some components of the air bag module -- the steering wheel hub for the driver's air bag, or the instrument panel for the right front passenger's bag -- will be hot for a short time. The parts of the bag that come into contact with you may be warm, but not too hot to touch. There will be some smoke and dust coming from vents in the deflated air bags. Air bag inflation doesn't prevent the driver from seeing or from being able to steer the vehicle, nor does it stop people from leaving the vehicle.

1-26

#### CAUTION:

**When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or door.**

In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the right front passenger air bag.

- Air bags are designed to inflate only once. After they inflate, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.

- Your vehicle is equipped with a crash sensing and diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the system commands air bag inflation and driver's safety belt usage at deployment.
- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

#### NOTICE:

**If you damage the covering for the driver's or the right front passenger's air bag, the bag may not work properly. You may have to replace the air bag module in the steering wheel or both the air bag module and the instrument panel for the right front passenger's air bag. Do not open or break the air bag coverings.**

## Servicing Your Air Bag-Equipped Vehicle

Air bags affect how your vehicle should be serviced. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your dealer and the service manual have information about servicing your vehicle and the air bag system. To purchase a service manual, see "Service and Owner Publications" in the Index.

### CAUTION:

For up to 10 minutes after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid wires wrapped with yellow tape or yellow connectors. They are probably part of the air bag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

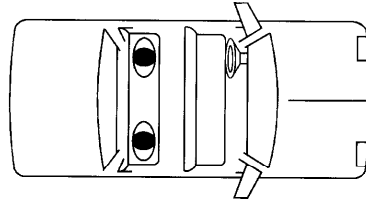
The air bag system does not need regular maintenance.

## Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

### Rear Seat Outside Passenger Positions



#### Lap-Shoulder Belt

The positions next to the windows have lap-shoulder belts. Here's how to wear one properly.

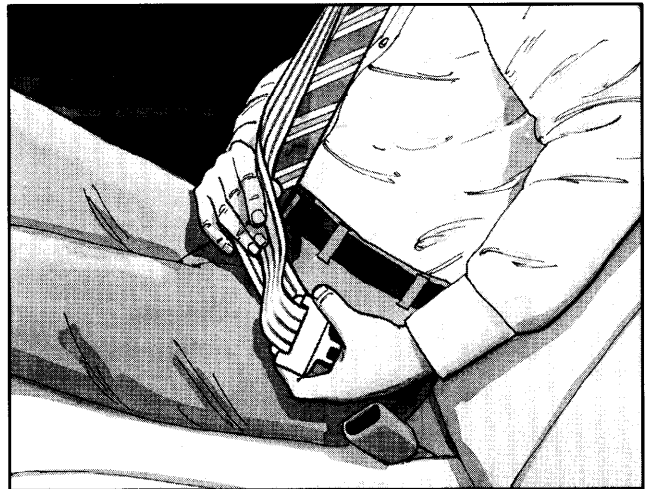
1-28



1. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

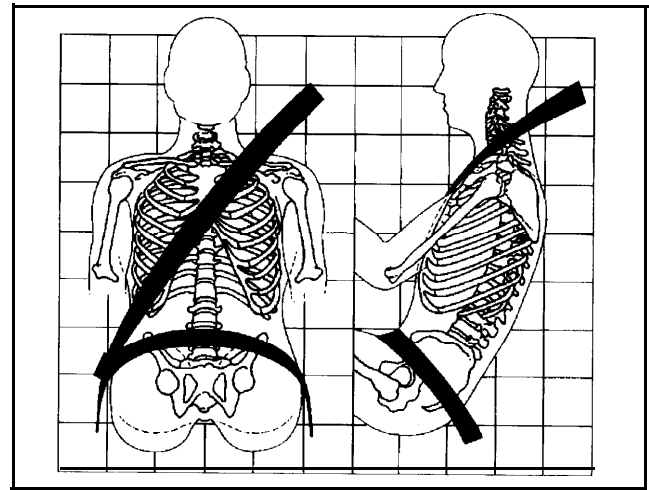
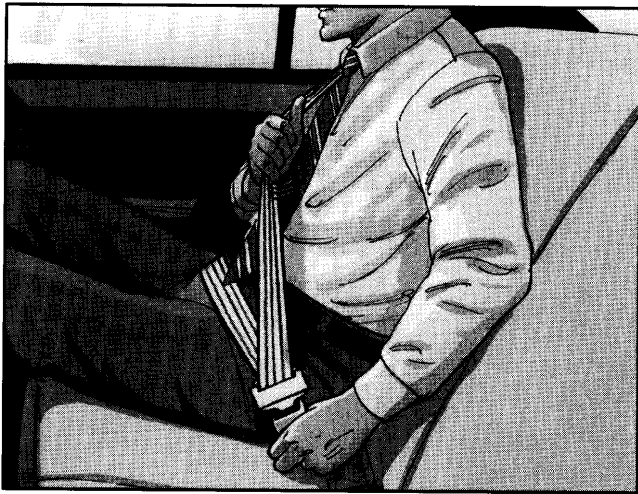
2. Push the latch plate into the buckle until it clicks.



If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle it.

Pull up on the latch plate to make sure it is secure.

If the belt is not long enough, see "Safety Belt Extender" at the end of this section. Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



3. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder part.

The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or a crash, or if you pull the belt very quickly out of the retractor.

1-30

### **⚠CAUTION:**

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.



To unlatch the belt, just push the button on the buckle.

## **Rear Safety Belt Comfort Guides for Children and Small Adults**

Rear shoulder belt comfort guides will provide added safety belt comfort for older children who have outgrown booster seats and for small adults. When installed on a shoulder belt, the comfort guide better positions the belt away from the neck and head.

There is one guide for each outside passenger position in the rear seat. To provide added safety belt comfort for children who have outgrown child restraints and for smaller adults, the comfort guides may be installed on the shoulder belts.

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