

**REPORT NUMBER KAR21001-02**

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

**TOYOTA MOTOR CORPORATION  
2001 TOYOTA  
RAV4 4WD SUV  
NHTSA NUMBER: M15103**

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



**JANUARY 23, 2001**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
SAFETY PERFORMANCE STANDARDS  
OFFICE OF CRASHWORTHINESS STANDARDS  
MAIL CODE: NPS-10  
400 SEVENTH STREET, SW, ROOM 5313  
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-97-D-02007.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: \_\_\_\_\_ Date: January 23, 2001  
Mr. James E. Gorth, Project Engineer  
KARCO Engineering

Reviewed by: \_\_\_\_\_ Date: January 23, 2001  
Mr. Jerry L. Kratzke, Director of Operations  
KARCO Engineering

Approved by: \_\_\_\_\_ Date: January 23, 2001  
Mr. Frank D. Richardson, Program Manager  
KARCO Engineering

FINAL REPORT ACCEPTED BY:

\_\_\_\_\_  
Manager, New Car Assessment Program

\_\_\_\_\_  
Date of Acceptance

\_\_\_\_\_  
COTR, NCAP Frontal Impact Program

\_\_\_\_\_  
Date of Acceptance

## Technical Report Documentation Page

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                           |           |                                                                                                                                                                                                                       |               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1. Report No.<br>KAR21001-02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | 2. Government Accession No.                               |           | 3. Recipients Catalog No.                                                                                                                                                                                             |               |
| 4. Title and Subtitle<br><br>Final Report of New Car Assessment Program Testing<br>of a 2001 Toyota RAV4 4WD SUV<br>NHTSA No. M15103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                           |           | 5. Report Date<br>January 23, 2001                                                                                                                                                                                    |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                           |           | 6. Performing Organization Code<br>KAR                                                                                                                                                                                |               |
| 7. Author(s)<br><br>Mr. James E Gorth, Project Engineer, Karco<br>Mr. Frank Richardson, Project Manager, Karco                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                           |           | 8. Performing Organization Report No.<br>KAR21001-02                                                                                                                                                                  |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                           |           | 10. Work Unit No.                                                                                                                                                                                                     |               |
| 9. Performing Organization Name and Address<br><br>KARCO Engineering<br>9270 Holly Road<br>Adelanto, CA 92301                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                           |           | 11. Contract or Grant No.<br>DTNH22-97-D-02007                                                                                                                                                                        |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                           |           | 13. Type of Report and Period Covered<br>Final Test Report<br>Option Year 4                                                                                                                                           |               |
| 12. Sponsoring Agency Name and Address<br><br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Safety Performance Standards<br>Office of Crashworthiness Standards<br>Mail Code: NPS-10<br>400 Seventh Street, SW, Room 5313<br>Washington, D.C. 20590                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                           |           | 14. Sponsoring Agency Code<br>DOT/NHTSA/NRM/OCS                                                                                                                                                                       |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                           |           | 15. Supplementary Notes                                                                                                                                                                                               |               |
| 16. Abstract<br><br>A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2001 Toyota RAV4 4WD SUV at KARCO Engineering on 1/09/01. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 55.83 km/h. The ambient temperature at the barrier face at the time of impact is 12.2 degrees Celcius. The vehicle's maximum post test static crush is 481 mm at the centerline of the vehicle. 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                                                                                                                                                                                                            | Passenger ATD |
| Head Injury Criteria (HIC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  | N/A                                                       | 1000      | 527.6                                                                                                                                                                                                                 | 398.9         |
| Max. Thorax Accel. (3 msec Clip)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | G's                                                       | 60        | 51.5                                                                                                                                                                                                                  | 56.1          |
| Left Femur force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Newtons                                                   | 10009     | -965.2                                                                                                                                                                                                                | -1786.0       |
| Right Femur Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | Newtons                                                   | 10009     | -3935.0                                                                                                                                                                                                               | -1863.2       |
| 17. Key Words<br><br>56.3 km/h NCAP Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)<br>2001 Toyota RAV4 4WD SUV<br>NHTSA No. M15103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                           |           | 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 |               |
| 19. Security Classification(of this report)<br>UNCLASSIFIED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | 20. Security Classification(of this page)<br>UNCLASSIFIED |           | 21. No. of Pages<br>341                                                                                                                                                                                               | 22. Price     |

Form DOT F1700.7 (8-72)

# TABLE OF CONTENTS

| Section |                                                     | Page |
|---------|-----------------------------------------------------|------|
| 1       | Purpose, Test Procedures and Summary of Test M15103 | 1    |
| 2       | Occupant and Vehicle Information Data Sheets        | 3    |

## Appendix

|   |                                              |   |
|---|----------------------------------------------|---|
| A | Photographs                                  | A |
| B | Dummy and Vehicle Response Data Traces       | B |
| C | Load Cell Barrier Data Traces                | C |
| D | Instrumentation and Data Channel Assignments | D |
| E | Dummy Calibration Data Traces and Tables     | E |

## Data Sheet No.

|    |                                                    |    |
|----|----------------------------------------------------|----|
| 1  | Crash Test Summary                                 | 4  |
| 2  | General Test and Vehicle Parameter Data            | 5  |
| 3  | Post Impact Data                                   | 7  |
| 4  | Test Vehicle Information                           | 8  |
| 5  | Dummy Positioning in Vehicle                       | 10 |
| 6  | Seat Belt Positioning Data                         | 12 |
| 7  | Vehicle Accelerometer Location and Data Summary    | 13 |
| 8  | Hybrid III ATD Injury Criteria and Sensor Data     | 14 |
| 9  | Seat Belt Assessment Test Data                     | 17 |
| 10 | Summary of FMVSS 212 Data                          | 18 |
| 11 | Windshield Zone Intrusion FMVSS 219 Data (Partial) | 19 |
| 12 | FMVSS 301 Fuel System Integrity Post Impact Data   | 20 |
| 13 | FMVSS 301 Static Rollover Data                     | 21 |
| 14 | Vehicle Measurements                               | 22 |
| 15 | Camera Locations                                   | 24 |
| 16 | Photographic Reference Target Locations            | 25 |
| 17 | Vehicle Intrusion Measurements                     | 26 |
| 18 | Load Cell Locations on Fixed Barrier               | 30 |
| 19 | Accident Investigation Division Data               | 31 |
| 20 | Dummy/Vehicle Temperature Stabilization            | 32 |



## **SECTION 1**

### **PURPOSE, TEST PROCEDURE AND SUMMARY OF TEST M15103**

#### **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 9, 2001 at a speed of 55.8 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. 35) and the right-front passenger ATD (Serial No. 34) were calibrated one test 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 Toyota RAV4 4WD SUV at a velocity of 55.83 km/h. The test vehicle weight is 1621 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 9, 2001 NCAP test. The test vehicle is a gasoline vehicle, equipped with a longitudinally mounted, 4-cylinder engine and a 5-speed manual transmission.

The driver Head Injury Criteria (HIC) is 527.6. The maximum resultant chest deceleration over three (3) milliseconds is 51.5 g's. The left and right femur loads are -965.2 and -3935.0 Newton's, respectively. Chest deflection for the driver ATD peaked at -27.5 mm. The driver ATD head contacted the airbag, B-pillar and headrest, its chest and abdomen contacted the airbag and seat belt, and both knees contacted the knee bolster and the steering column.

The right front passenger's HIC is 398.9. The maximum resultant chest deceleration over three (3) milliseconds is 56.1 g's. The left and right femur loads are -1786.0 and -1863.2 Newton's respectively. Chest deflection for the passenger ATD peaked at -34.3 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 215.5 mm for the driver ATD and 198.7 mm for the passenger ATD. Shoulder belt stretch data was not recorded.

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 481 mm located at the centerline of the vehicle. Both the driver and passenger side doors opened without the aid of tools.

### **1.4 GENERAL COMMENTS**

The 2001 Toyota RAV4 4WD SUV 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 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01

**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 Toyota RAV4 4WD SUV  
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
Test Date: 01/09/01

**PRIMARY IMPACT DATA**

| Measured Parameter   | Units   | Value |
|----------------------|---------|-------|
| Velocity at Impact   | km/h    | 55.83 |
| Test Weight          | kg      | 1621  |
| Impact Angle         | degrees | 0     |
| Average Rebound      | mm      | 1297  |
| Maximum Static Crush | mm      | 481   |

**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. 35 | 50% Male Hybrid III / No. 34 |
| Head Contact            | Airbag/Headrest/B-Pillar     | Airbag/Headrest              |
| Chest Contact           | Airbag/Belt                  | Airbag/Belt                  |
| Abdomen Contact         | Belt                         | Airbag/Belt                  |
| Left Knee Contact       | Dash/Steering Column         | Glove Box                    |
| Right Knee Contact      | Dash/Steering Column         | 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 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
 Test Date: 01/09/01

**TEST VEHICLE INFORMATION**

|                         |                   |
|-------------------------|-------------------|
| Make                    | Toyota            |
| Model                   | RAV4 4WD          |
| Body Style              | SUV               |
| NHTSA No.               | M15103            |
| VIN                     | JTEHH20V910049732 |
| Color                   | White             |
| Delivery Date           | 12/22/00          |
| Odometer Reading (mile) | 221               |
| Dealer                  | Valley Hi Toyota  |
| Transmission            | 5-Speed Manual    |
| Final Drive             | Full Time 4WD     |
| Number of Cylinders     | 4                 |
| Engine Displacement (L) | 2.0               |
| Engine Placement        | Longitudinal      |

**TEST VEHICLE OPTIONS**

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

**DATA FROM CERTIFICATION LABEL**

|                     |                          |                 |      |
|---------------------|--------------------------|-----------------|------|
| Manufactured By     | Toyota Motor Corporation | GVWR (kg)       | 1810 |
| Date of Manufacture | October-00               | GAWR Front (kg) | 920  |
|                     |                          | GAWR Rear (kg)  | 1010 |

**DATA FROM TIRE PLACARD**

| Measured Parameter          | Front       | Rear        |
|-----------------------------|-------------|-------------|
| Maximum Tire Pressure (kPa) | 200         | 200         |
| Cold Pressure (kPa)         | 200         | 200         |
| Recommend Tire Size         | 235/60/R16  | 235/60/R16  |
| Tire Size on Vehicle        | 235/60/R16  | 235/60/R16  |
| Tire Manufacturer           | Bridgestone | Bridgestone |

**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)  |        |       |       | 417   |
| Cargo Weight (RCLW) (kg) |        |       |       | 75    |

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

Test Vehicle: 2001 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
 Test Date: 01/09/01

**TEST VEHICLE WEIGHTS**

|        | Units | As Delivered ( <i>UVW</i> ) |           |       | As Tested ( <i>ATW</i> ) |           |       |
|--------|-------|-----------------------------|-----------|-------|--------------------------|-----------|-------|
|        |       | Front Axle                  | Rear Axle | Total | Front Axle               | Rear Axle | Total |
| Left   | kg    | 388                         | 318       |       | 422                      | 389       |       |
| Right  | kg    | 390                         | 302       |       | 433                      | 377       |       |
| Ratio  | %     | 55.7                        | 44.3      |       | 52.7                     | 47.3      |       |
| Totals | kg    | 778                         | 620       | 1398  | 855                      | 766       | 1621  |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                               | Units | Value |
|--------------------------------------------------|-------|-------|
| Total Delivered Weight ( <i>UVW</i> )            | kg    | 1398  |
| Weight of 2 P572 ATD's                           | kg    | 152   |
| Rated Cargo/Luggage Weight ( <i>RCLW</i> )       | kg    | 75    |
| Calculated Vehicle Target Weight ( <i>TVTW</i> ) | kg    | 1625  |

**TEST VEHICLE ATTITUDE AND CG**

|              | Units | LF  | RF  | LR  | RR  | CG (aft of front axle) |
|--------------|-------|-----|-----|-----|-----|------------------------|
| As Delivered | mm    | 781 | 782 | 795 | 792 | 1100                   |
| As Tested    | mm    | 760 | 758 | 760 | 756 | 1175                   |

Vehicle Wheel base (mm): 2484  
 Weight of Ballast secured in cargo area (kg): 4  
 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): 56.0  
 Usable Capacity Figure Furnished by COTR (L): N/A  
 Actual Test Volume with entire fuel System Filled (L): 52.0  
 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 Toyota RAV4 4WD SUV  
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
Test Date: 01/09/01

**SPEED TRAP DATA**

| Measured Parameter              | Units | Requirement    | Value |
|---------------------------------|-------|----------------|-------|
| Trap No. 1 Velocity (Primary)   | km/h  | 55.51 to 57.12 | 55.83 |
| 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 | 55.96 |
| 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    | 3735     | 3618      | -117       |
| Center             | mm    | 4077     | 3596      | -481       |
| Right Side         | mm    | 3735     | 3595      | -140       |

**VEHICLE REBOUND FROM BARRIER**

| Measured Parameter | Units | Value |
|--------------------|-------|-------|
| Left Side          | mm    | 1285  |
| Center             | mm    | 1325  |
| Right Side         | mm    | 1280  |
| Average            | mm    | 1297  |

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

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

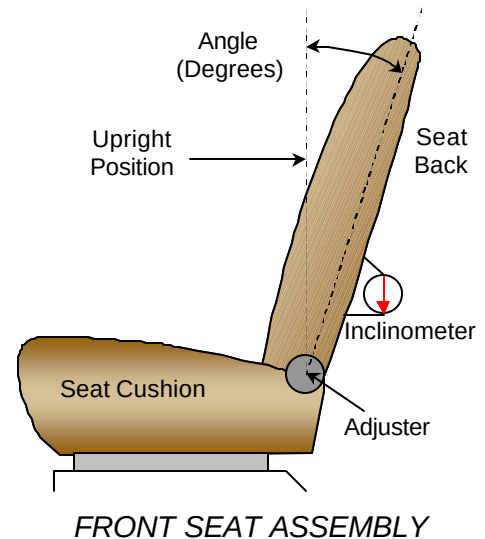
Test Date: 01/09/01

**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: 23° with a seated dummy

Passenger seat back angle: 23° with a seated dummy



**SEAT FORE/AFT POSITIONS**

Both driver and passenger seats have 17 positions or 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: 17 seating positions or detents

Passenger seat fore/aft total travel: 17 seating positions or detents

Driver seat fore/aft position: 9th detent from forward most

Passenger seat fore/aft position: 9th detent from forward most

**SEAT BELT UPPER ANCHORAGE**

The test vehicle is equipped with adjustable anchorages for both driver and passenger seat positions. There are 5 positions or detents. Both the driver and the passenger are placed in the 3rd position from the uppermost.



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

### TEST VEHICLE INFORMATION

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01

### FUEL TANK CAPACITY DATA

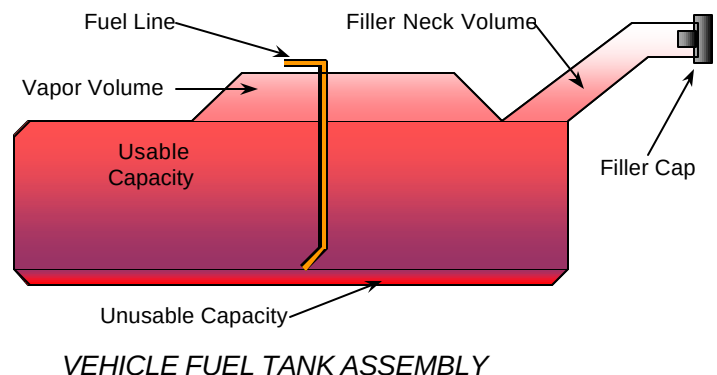
The "Usable Capacity" of the standard equipment fuel tank is: 56.0 liters

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

"Usable Capacity" used for certification tests FMVSS 301 requirements: 51.4 to 52.6 liters

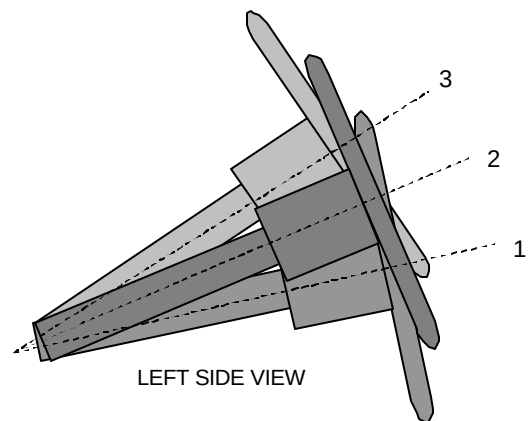
Actual amount of Stoddard solvent added to vehicle for certification test: 52.0 liters

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.



### 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 as indicated in the diagram at right and the angle below.



Lowermost, position 1: 25°

Geometric center, position 2: 27°

Uppermost, position 3: 29°

# DATA SHEET NO. 5

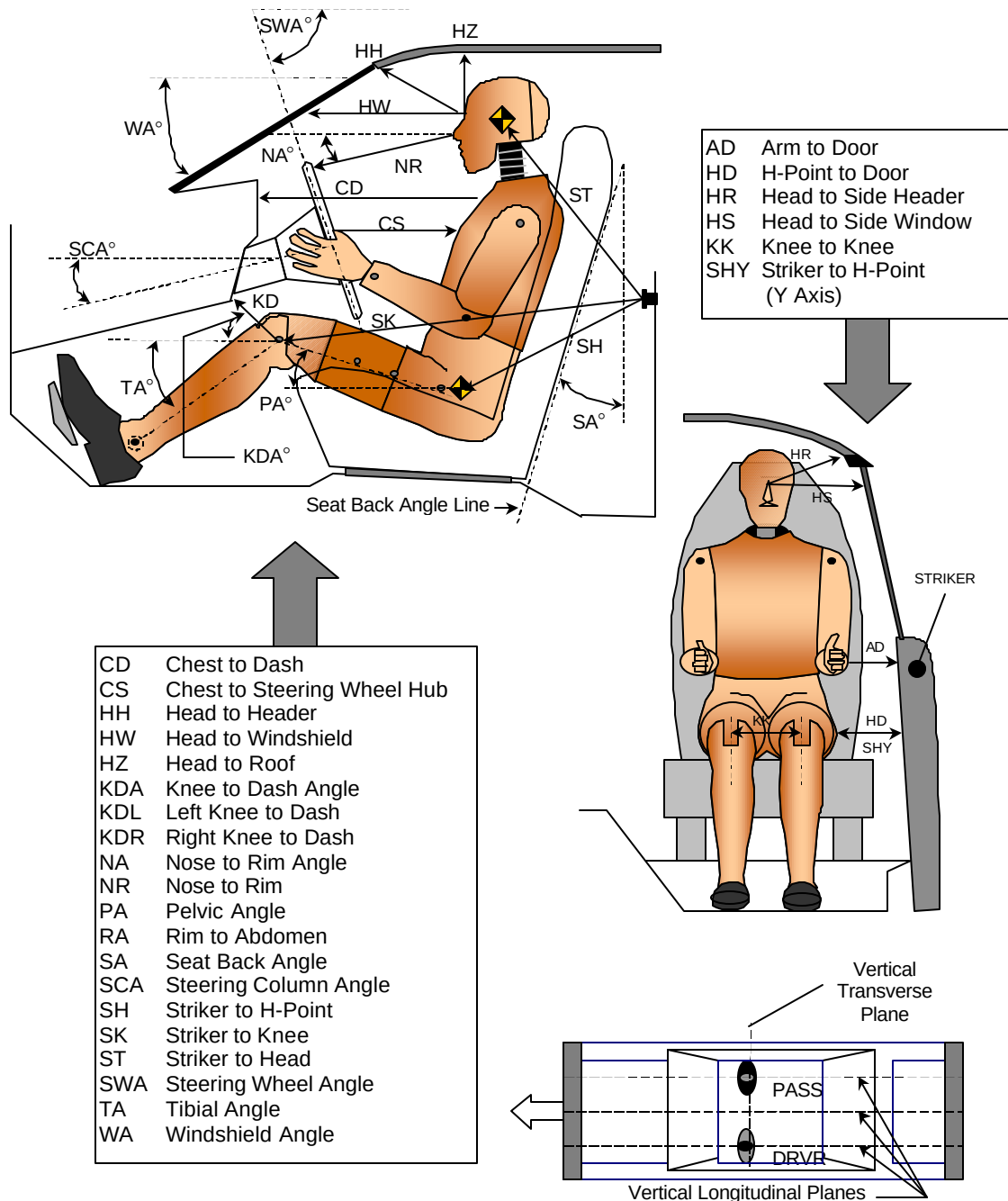
## DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01



DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

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

Test Vehicle: 2001 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
 Test Date: 01/09/01

**TEST DUMMY POSITION MEASUREMENTS**

| Code | Measurement Description | Driver      |           | Passenger   |           |
|------|-------------------------|-------------|-----------|-------------|-----------|
|      |                         | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| WA   | Windshield Angle        |             | 35        |             |           |
| SWA  | Steering Wheel Angle    |             | 63        |             |           |
| SCA  | Steering Column Angle   |             | 27        |             |           |
| SA   | Seat Back Angle         |             | 23        |             | 23        |
| HZ   | Head to Roof (Z)        | 260         | 90        | 240         | 90        |
| HH   | Head to Header          | 400         | 0         | 380         | 0         |
| HW   | Head to Windshield      | 600         | 0         | 600         | 0         |
| HR   | Head to Side Header (Y) | 261         |           | 246         |           |
| NR   | Nose to Rim             | 460         | 12        |             |           |
| CD   | Chest to Dash           | 550         |           | 556         |           |
| CS   | Chest to Steering Hub   | 350         | 0         |             |           |
| RA   | Rim to Abdomen          | 218         | 0         |             |           |
| KDL  | Left Knee to Dash       | 173         | 19        | 144         |           |
| KDR  | Right Knee to Dash      | 162         |           | 170         | 27        |
| PA   | Pelvic Angle            |             | 23        |             | 23        |
| TA   | Tibia Angle             |             | 44        |             | 44        |
| KK   | Knee to Knee (Y)        | 270         |           | 200         |           |
| SK   | Striker to Head         | 558         | 7         | 565         | 5         |
| ST   | Striker to Knee         | 549         | 6         | 560         | 8         |
| SH   | Striker to H-Point      | 186         | 43        | 180         | 35        |
| SHY  | Striker to H-Point (Y)  | 234         |           | 240         |           |
| HS   | Head to Side Window     | 305         |           | 298         |           |
| HD   | H-Point to Door (Y)     | 198         |           | 182         |           |
| AD   | Arm to Door (Y)         | 85          |           | 50          |           |

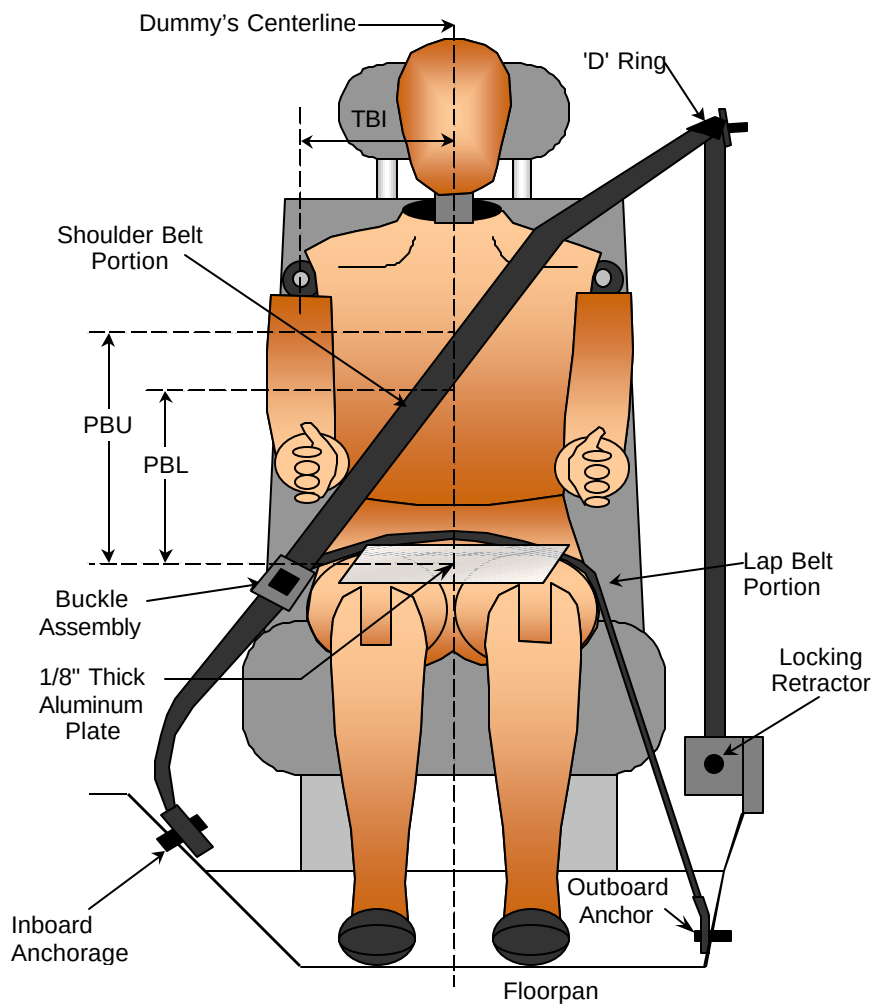
**DATA SHEET NO. 6**  
**SEAT BELT POSITIONING DATA**

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01



**SEAT BELT POSITIONING MEASUREMENTS**

| Measurement Description                           | Units    | Driver    | Passenger |
|---------------------------------------------------|----------|-----------|-----------|
| TBI - Dummy C/L to Lap/Shoulder Belt Intersect    | mm       | 200       | 200       |
| PBU -Top surface of reference to belt upper edge  | mm       | 340       | 340       |
| PBL - Top surface of reference to belt lower edge | mm       | 270       | 270       |
| 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 Toyota RAV4 4WD SUV

NHTSA No.: M15103

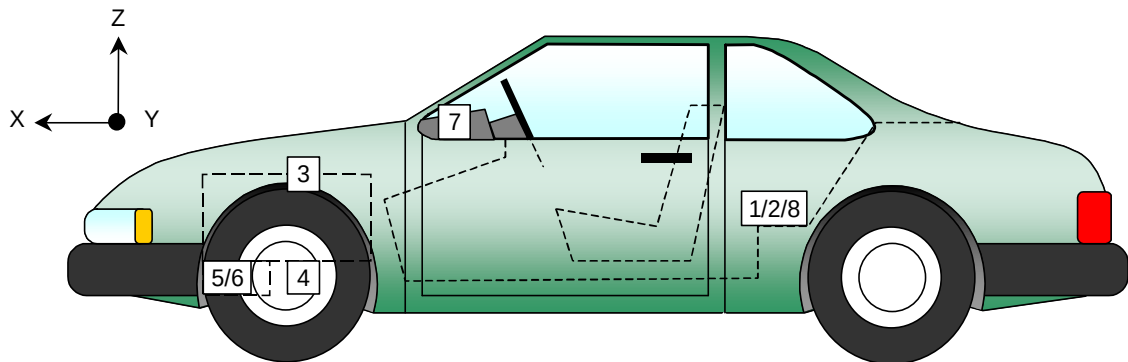
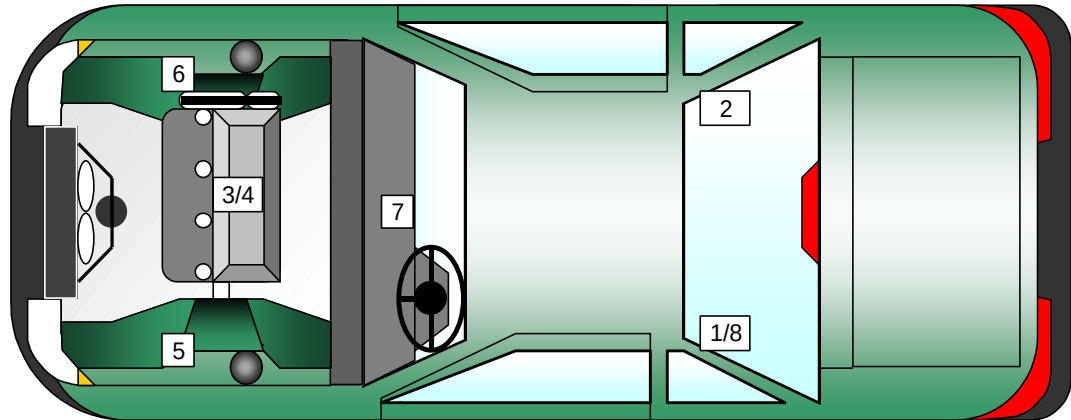
Test Program: 2001 NHTSA 35mph NCAP

Test Date: 01/09/01

## 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.)   | 1555              | -650 | 390 | G's         | 3.2  | 94.0 | -53.5  | 40.2 |
| 2   | Right Rear X-Member (Pri.)  | 1560              | 650  | 390 | G's         | 2.4  | 93.3 | -38.9  | 44.3 |
| 3   | Engine Top                  | 4100              | 20   | 855 | G's         | 65.1 | 30.7 | -192.4 | 19.9 |
| 4   | Engine Bottom               | 4090              | -10  | 180 | G's         | 79.9 | 31.2 | -188.4 | 23.0 |
| 5   | Left Brake Caliper          | 3325              | -560 | 320 | G's         | 55.6 | 55.6 | -100.8 | 36.3 |
| 6   | Right Brake Caliper         | 3325              | 560  | 320 | G's         | 48.3 | 52.0 | -97.7  | 32.7 |
| 7   | Instrument Panel            | 2540              | 25   | 940 | G's         | 13.0 | 90.1 | -64.9  | 49.6 |
| 8   | Left Rear X-Member (Rednt.) | 1530              | -640 | 395 | G's         | 3.1  | 94.0 | -40.8  | 41.0 |

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 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35mph NCAP

Test Date: 01/09/01

## HEAD PRIMARY PEAK ACCELERATIONS

| Location          | Axis | Units | Driver |       |       |      | Passenger |       |       |       |
|-------------------|------|-------|--------|-------|-------|------|-----------|-------|-------|-------|
|                   |      |       | Max    | Time  | Min   | Time | Max       | Time  | Min   | Time  |
| Head CG           | X    | G's   | 11.0   | 232.1 | -61.4 | 77.5 | 20.8      | 215.1 | -55.7 | 75.9  |
| Head CG           | Y    | G's   | 5.4    | 63.0  | -3.0  | 27.1 | 6.2       | 58.3  | -6.4  | 228.1 |
| Head CG           | Z    | G's   | 27.2   | 61.3  | -14.3 | 93.4 | 23.4      | 62.5  | -13.3 | 72.6  |
| Head CG Resultant | N/A  | G's   | 61.5   | 77.5  |       |      | 56.1      | 75.9  |       |       |

## CHEST PRIMARY PEAK ACCELERATIONS

| Location           | Axis | Units | Driver |       |       |      | Passenger |       |       |       |
|--------------------|------|-------|--------|-------|-------|------|-----------|-------|-------|-------|
|                    |      |       | Max    | Time  | Min   | Time | Max       | Time  | Min   | Time  |
| Chest CG           | X    | G's   | 3.0    | 117.6 | -53.6 | 77.9 | 4.1       | 150.5 | -58.7 | 73.0  |
| Chest CG           | Y    | G's   | 4.1    | 98.7  | -7.1  | 52.1 | 7.2       | 51.6  | -7.9  | 69.1  |
| Chest CG           | Z    | G's   | 10.0   | 42.0  | -15.5 | 96.1 | 13.0      | 61.7  | -17.1 | 103.8 |
| Chest CG Resultant | N/A  | G's   | 53.7   | 77.9  |       |      | 59.9      | 72.9  |       |       |

## FEMUR PEAK FORCES

| Location    | Axis | Units   | Driver |      |         |      | Passenger |       |         |      |
|-------------|------|---------|--------|------|---------|------|-----------|-------|---------|------|
|             |      |         | Max    | Time | Min     | Time | Max       | Time  | Min     | Time |
| Left Femur  | Z    | Newtons | 951.2  | 45.4 | -965.2  | 63.5 | 326.9     | 264.6 | -1786.0 | 49.3 |
| Right Femur | Z    | Newtons | 1961.8 | 39.2 | -3935.0 | 51.5 | 655.8     | 42.1  | -1863.2 | 59.3 |

## SEAT BELT SENSOR PEAK VALUES

| Location              | Axis | Units   | Driver |      |       |      | Passenger |      |       |      |
|-----------------------|------|---------|--------|------|-------|------|-----------|------|-------|------|
|                       |      |         | Max    | Time | Min   | Time | Max       | Time | Min   | Time |
| Lap Belt Force        | N/A  | Newtons | 9401.0 | 58.7 | 1.4   | 1.2  | 8949.6    | 58.3 | -2.2  | 0.0  |
| Shoulder Belt Force   | N/A  | Newtons | 5094.9 | 67.5 | -10.7 | 9.3  | 5539.7    | 50.0 | -11.7 | 9.5  |
| Shoulder Belt Pullout | N/A  | MM      | 215.5  | 88.4 | -0.9  | 21.9 | 198.7     | 85.6 | -7.2  | 29.3 |
| Shoulder Belt Stretch | N/A  | MM/CM   | 0.000  | 0.0  | 0.000 | 0.0  | 0.000     | 0.0  | 0.000 | 0.0* |

\* Not installed

## 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 | 527.6  | 46.8  | 60.2           | 95.4           | 398.9     | 41.5  | 56.5           | 92.4           |

## 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 | 51.5   | 77.3           | 80.3           | 56.1      | 71.5           | 74.5           |

**DATA SHEET NO. 8...(continued)**Test Vehicle: 2001 Toyota RAV4 4WD SUVNHTSA No.: M15103Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/09/01**PELVIC PEAK ACCELERATIONS**

| Location | Axis | Units | Driver |       |       |      | Passenger |       |       |      |
|----------|------|-------|--------|-------|-------|------|-----------|-------|-------|------|
|          |      |       | Max    | Time  | Min   | Time | Max       | Time  | Min   | Time |
| Pelvis   | X    | G's   | 6.4    | 101.2 | -64.3 | 63.0 | 9.1       | 111.1 | -64.1 | 58.8 |
| Pelvis   | Y    | G's   | 5.9    | 93.7  | -17.3 | 59.6 | 10.9      | 63.6  | -6.5  | 77.1 |
| Pelvis   | Z    | G's   | 3.1    | 273.3 | -30.9 | 72.2 | 8.0       | 39.4  | -26.0 | 72.7 |

**UPPER NECK PEAK FORCES AND MOMENTS**

| Location    | Axis | Units   | Driver |       |        |       | Passenger |       |        |       |
|-------------|------|---------|--------|-------|--------|-------|-----------|-------|--------|-------|
|             |      |         | Max    | Time  | Min    | Time  | Max       | Time  | Min    | Time  |
| Neck Force  | X    | Newtons | 466.5  | 76.7  | -590.9 | 131.9 | 227.3     | 218.6 | -702.7 | 134.4 |
| Neck Force  | Y    | Newtons | 202.0  | 249.6 | -116.9 | 79.1  | 83.9      | 198.6 | -199.2 | 125.3 |
| Neck Force  | Z    | Newtons | 2025.5 | 69.1  | -242.2 | 271.8 | 1444.2    | 63.0  | -962.8 | 250.3 |
| Neck Moment | X    | N•m     | 10.0   | 65.7  | -6.4   | 93.4  | 11.2      | 100.1 | -10.5  | 77.5  |
| Neck Moment | Y    | N•m     | 51.7   | 135.8 | -24.8  | 94.8  | 54.4      | 141.4 | -55.5  | 77.0  |
| Neck Moment | Z    | N•m     | 5.3    | 236.0 | -7.9   | 96.9  | 7.5       | 104.5 | -7.8   | 72.6  |

**FOOT PEAK ACCELERATIONS**

| Location        | Axis | Units | Driver |       |        |      | Passenger |      |        |      |
|-----------------|------|-------|--------|-------|--------|------|-----------|------|--------|------|
|                 |      |       | Max    | Time  | Min    | Time | Max       | Time | Min    | Time |
| Left Foot Aft   | X    | G's   | 12.9   | 73.0  | -34.1  | 36.1 | 69.4      | 48.7 | -160.7 | 37.4 |
| Left Foot Aft   | Z    | G's   | 2.1    | 299.2 | -53.2  | 38.8 | 53.0      | 46.4 | -52.2  | 31.2 |
| Left Foot Fore  | Z    | G's   | 6.3    | 24.7  | -39.9  | 38.9 | 89.3      | 39.8 | -179.6 | 30.9 |
| Right Foot Aft  | X    | G's   | 42.4   | 59.7  | -138.4 | 39.4 | 26.9      | 50.0 | -142.6 | 44.6 |
| Right Foot Aft  | Z    | G's   | 4.9    | 125.0 | -226.7 | 38.4 | 19.6      | 65.1 | -66.1  | 47.3 |
| Right Foot Fore | Z    | G's   | 123.0  | 44.0  | -370.2 | 38.1 | 55.6      | 68.6 | -84.1  | 29.2 |

**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     | 50.8   | 69.3  | -2.5    | 34.7  | 27.3      | 51.0  | -42.6   | 36.2  |
| Left Lower Moment  | Y    | N•m     | 49.9   | 71.3  | -26.1   | 51.0  | 96.2      | 49.9  | -128.8  | 35.6  |
| Left Lower Force   | Z    | Newtons | 160.1  | 163.5 | -2499.7 | 73.6  | 537.8     | 63.3  | -2573.9 | 84.5  |
| Left Upper Moment  | X    | N•m     | 24.1   | 59.1  | -12.8   | 86.6  | 27.8      | 62.8  | -63.4   | 41.4  |
| Left Upper Moment  | Y    | N•m     | 15.2   | 263.1 | -103.5  | 66.9  | 92.8      | 50.5  | -151.1  | 35.3  |
| Right Lower Moment | X    | N•m     | 28.8   | 38.8  | -53.1   | 61.5  | 63.9      | 62.6  | -11.6   | 43.2  |
| Right Lower Moment | Y    | N•m     | 300.8  | 46.8  | -185.4  | 38.9  | 192.7     | 68.4  | -48.7   | 42.9  |
| Right Lower Force  | Z    | Newtons | 780.0  | 38.7  | -2081.6 | 44.8  | 191.5     | 267.7 | -1984.8 | 80.2  |
| Right Upper Moment | X    | N•m     | 48.4   | 41.3  | -10.7   | 120.7 | 67.2      | 76.1  | -16.9   | 184.0 |
| Right Upper Moment | Y    | N•m     | 37.0   | 45.7  | -183.1  | 39.2  | 128.0     | 67.8  | -82.6   | 42.7  |

**DATA SHEET NO. 8...(continued)**Test Vehicle: 2001 Toyota RAV4 4WD SUVNHTSA No.: M15103Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/09/01**CHEST PEAK DISPLACEMENTS**

| Location | Axis | Units | Driver |      |       |      | Passenger |      |       |      |
|----------|------|-------|--------|------|-------|------|-----------|------|-------|------|
|          |      |       | Max    | Time | Min   | Time | Max       | Time | Min   | Time |
| Chest CG | X    | MM    | 0.1    | 9.9  | -27.5 | 79.5 | 0.3       | 7.8  | -34.3 | 71.4 |

**HEAD REDUNDANT PEAK ACCELERATIONS**

| Location          | Axis | Units | Driver |       |       |      | Passenger |       |       |       |
|-------------------|------|-------|--------|-------|-------|------|-----------|-------|-------|-------|
|                   |      |       | Max    | Time  | Min   | Time | Max       | Time  | Min   | Time  |
| Head CG           | X    | G's   | 10.4   | 229.2 | -62.0 | 77.3 | 20.5      | 216.7 | -54.6 | 76.2  |
| Head CG           | Y    | G's   | 5.8    | 87.6  | -3.8  | 38.9 | 7.5       | 77.3  | -6.0  | 227.7 |
| Head CG           | Z    | G's   | 24.5   | 61.7  | -16.6 | 92.4 | 24.0      | 62.1  | -16.7 | 72.5  |
| Head CG Resultant | N/A  | G's   | 62.1   | 77.3  |       |      | 55.1      | 76.2  |       |       |

**CHEST REDUNDANT PEAK ACCELERATIONS**

| Location           | Axis | Units | Driver |       |       |      | Passenger |       |       |       |
|--------------------|------|-------|--------|-------|-------|------|-----------|-------|-------|-------|
|                    |      |       | Max    | Time  | Min   | Time | Max       | Time  | Min   | Time  |
| Chest CG           | X    | G's   | 3.4    | 117.6 | -53.3 | 78.0 | 3.6       | 150.3 | -59.6 | 73.0  |
| Chest CG           | Y    | G's   | 4.4    | 91.9  | -7.6  | 52.7 | 9.9       | 52.2  | -8.3  | 70.0  |
| Chest CG           | Z    | G's   | 9.8    | 42.0  | -13.9 | 96.4 | 11.8      | 61.8  | -14.3 | 103.8 |
| Chest CG Resultant | N/A  | G's   | 53.5   | 78.0  |       |      | 60.0      | 72.9  |       |       |

**REDUNDANT 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 Redundant | 543.3  | 47.7  | 61.0           | 95.4           | 377.7     | 40.6  | 56.2           | 92.1           |

**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 | 51.3   | 77.4           | 80.4           | 56.1      | 71.6           | 74.6           |



**DATA SHEET NO. 9**  
**SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**

Test Vehicle: 2001 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
 Test Date: 01/09/01

**SEAT BELT PLACEMENT MEASUREMENTS**

| Measurement Description                           | Units    | Driver    | Passenger |
|---------------------------------------------------|----------|-----------|-----------|
| TCI - Dummy C/L to Lap/Shoulder Belt Intersect    | mm       | 200       | 200       |
| PBU -Top surface of reference to belt upper edge  | mm       | 340       | 340       |
| PBL - Top surface of reference to belt lower edge | mm       | 270       | 270       |
| 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    | 710    | 710       |
| Shoulder belt length as measured on ATD          | mm    | 800    | 830       |
| Lap belt length as measured on ATD               | mm    | 750    | 760       |
| Remainder of belt on reel                        | mm    | 700    | 675       |
| Total belt length for continuous webbing systems | mm    | 2960   | 2975      |

**SHOULDER BELT SPOOL-OFF DATA**

| Measurement Description      | Units | Driver | Passenger |
|------------------------------|-------|--------|-----------|
| As determined mechanically   | mm    | 90.0   | 35.0      |
| As determined electronically | mm    | 215.5  | 198.7     |

**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 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01

## **Windshield Mounting Details:**

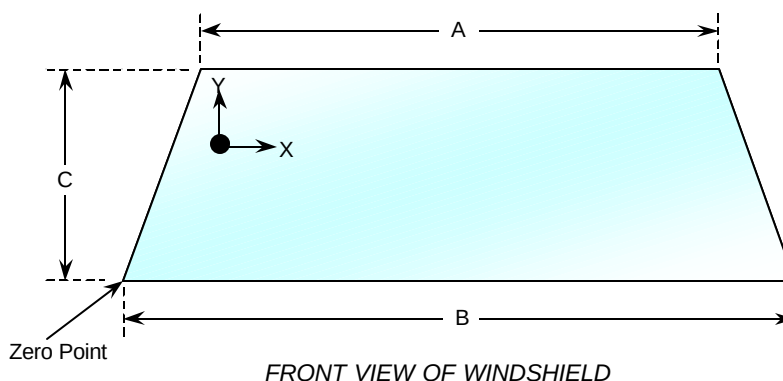
Windshield glass is secured to the vehicle frame with a rubber type adhesive. There is no molding that covers the windshield periphery at any point.

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   | 2026.5        | 2026.5         | 100            |
| Right Side  | 2026.5        | 2026.5         | 100            |
| Total       | 4053.0        | 4053.0         | 100            |



## **WINDSHIELD DIMENSIONS**

| Item | Units | Segment Length | Molding Width |
|------|-------|----------------|---------------|
| A    | mm    | 1150           | 10            |
| B    | mm    | 1485           | 5             |
| C    | mm    | 709            | 22            |

# DATA SHEET NO. 11

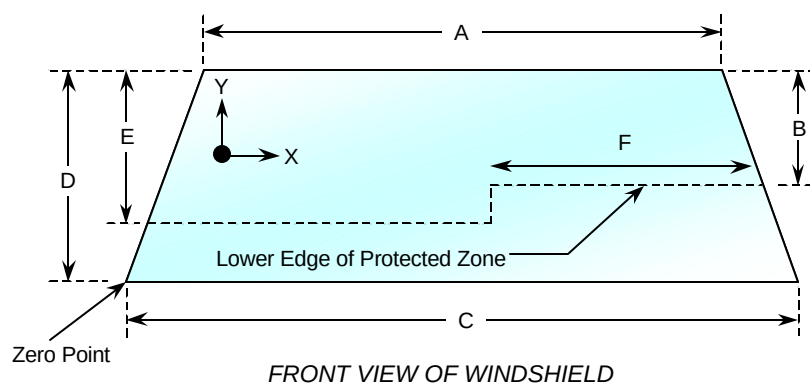
## WINDSHIELD ZONE INTRUSION FMVSS 219 (PARTIAL) DATA

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01



### WINDSHIELD AND PROTECTED ZONE

| Item | Units | Value |
|------|-------|-------|
| A    | mm    | 1150  |
| B    | mm    | 515   |
| C    | mm    | 1485  |
| D    | mm    | 709   |
| E    | mm    | 502   |
| F    | mm    | 487   |

### 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 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01

Test Time: 1:27 PM

Temperature at Time of Impact: 12.2 °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

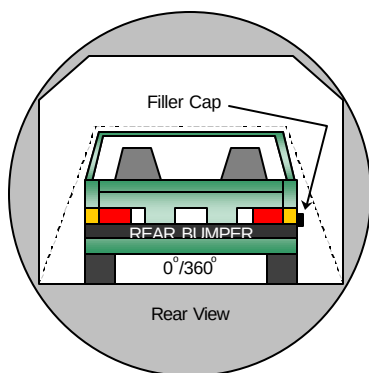
**DATA SHEET NO. 13**  
**FMVSS 301 STATIC ROLLOVER DATA SHEET**

Test Vehicle: 2001 Toyota RAV4 4WD SUV

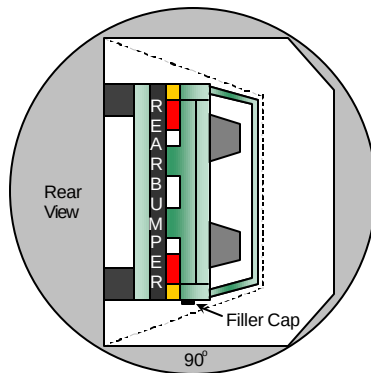
NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

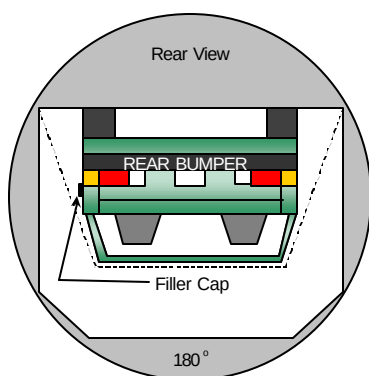
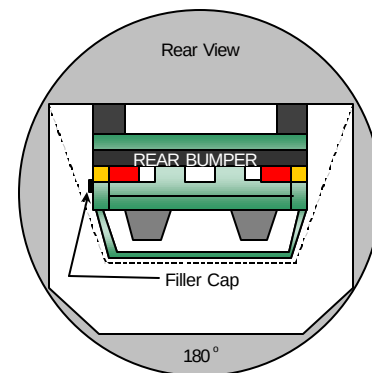
Test Date: 01/09/01



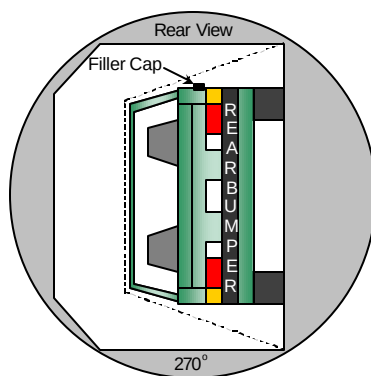
**0° TO 90°**



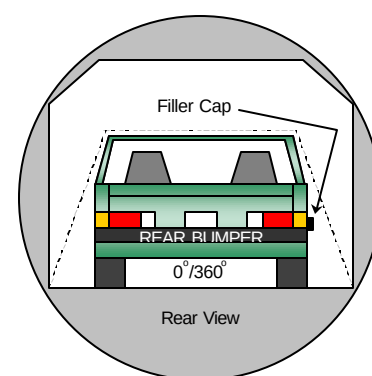
**90° TO 180°**



**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°    | 85                   | 300              | 0.0            |
| 90° TO 180°  | 81                   | 300              | 0.0            |
| 180° TO 270° | 79                   | 300              | 0.0            |
| 270° TO 360° | 80                   | 300              | 0.0            |

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

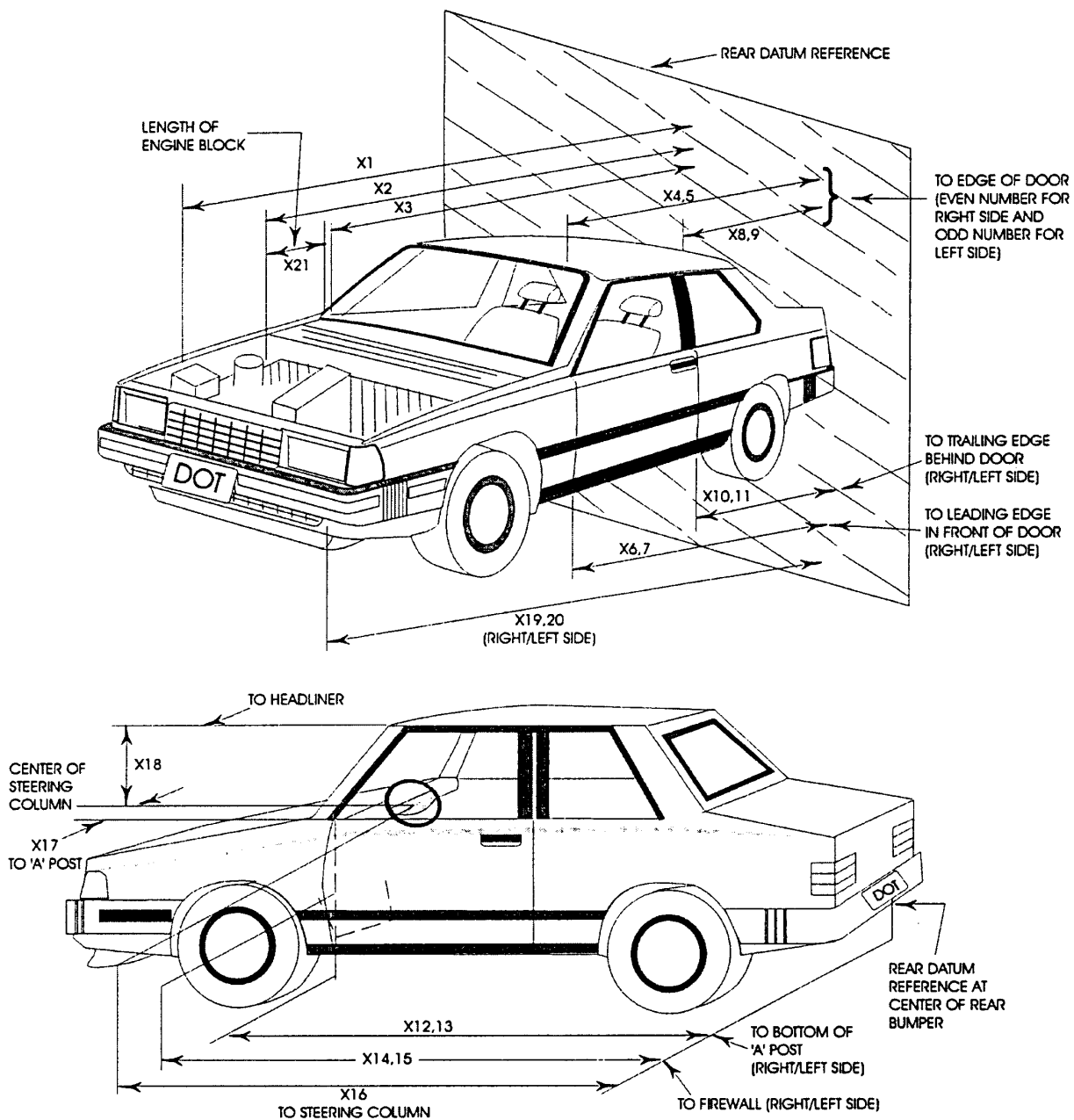
Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01

| No. | Measurement Description                      | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------------------------|-------|----------|-----------|------------|
| 1   | Total length of vehicle at centerline        | mm    | 4077     | 3596      | -481       |
| 2   | RSOV to front of engine                      | mm    | 3497     | 3207      | -290       |
| 3   | RSOV to firewall centerline                  | mm    | 3238     | 3075      | -163       |
| 4   | RSOV to leading edge of right door           | mm    | 2800     | 2823      | 23         |
| 5   | RSOV to leading edge of left door            | mm    | 2808     | 2816      | 8          |
| 6   | RSOV to lower leading edge of right door     | mm    | 2777     | 2782      | 5          |
| 7   | RSOV to lower leading edge of left door      | mm    | 2791     | 2786      | -5         |
| 8   | RSOV to upper trailing edge of right door    | mm    | 1812     | 1835      | 23         |
| 9   | RSOV to upper trailing edge of left door     | mm    | 1818     | 1836      | 18         |
| 10  | RSOV to lower trailing edge of right door    | mm    | 1786     | 1796      | 10         |
| 11  | RSOV to lower trailing edge of left door     | mm    | 1786     | 1794      | 8          |
| 12  | RSOV to bottom of right 'A' pillar           | mm    | 2807     | 2778      | -29        |
| 13  | RSOV to bottom of left 'A' pillar            | mm    | 2797     | 2799      | 2          |
| 14  | RSOV to firewall on right side               | mm    | 3296     | 3057      | -239       |
| 15  | RSOV to firewall of left side                | mm    | 3270     | 3152      | -118       |
| 16  | RSOV to steering column                      | mm    | 2381     | 2404      | 23         |
| 17  | Center of steering column to left 'A' pillar | mm    | 420      | 425       | 5          |
| 18  | Center of steering column to headlining      | mm    | 460      | 430       | -30        |
| 19  | RSOV to right side of front bumper           | mm    | 3735     | 3618      | -117       |
| 20  | RSOV to left side of front bumper            | mm    | 3735     | 3595      | -140       |
| 21  | Length of engine block                       | mm    | 200      | 200       | 0          |
| RD  | RSOV to right side of dash panel             | mm    | 2581     | 2605      | 24         |
| CD  | RSOV to center of dash panel                 | mm    | 2541     | 2604      | 63         |
| LD  | RSOV to left side of dash panel              | mm    | 2586     | 2604      | 18         |



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

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01

| 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              | 7930                     | 13           | 1020           |
| 3   | Left Side, No. 2      | 1455          | -8250  | 1460 | -4              | 7960                     | 35           | 1020           |
| 4   | Left Side, No. 3      | 6495          | -10580 | 4640 | -16             | 11502                    | 70           | 1006           |
| 5   | Left Side, No. 4      | 1455          | -8250  | 3100 | -16             | 8142                     | 19           | 1000           |
| 6   | Left Side, No. 5      | Did Not Run   |        |      |                 |                          |              |                |
| 7   | Right Side, No. 1     | 1955          | 8150   | 730  | -1              | 8542                     | 19           | 1020           |
| 8   | Right Side, No. 2     | 1655          | 8150   | 1450 | -4              | 8536                     | 35           | 1020           |
| 9   | Right Side, No. 3     | 7855          | 8900   | 2800 | -9              | N/A                      | 80           | 920            |
| 10  | Right Side, No. 4     | Did Not Run   |        |      |                 |                          |              |                |
| 11  | Overhead Overall      | 251           | 0      | 4460 | -86             | N/A                      | 13           | 1010           |
| 12  | Front View, Driver    | -525          | -380   | 2590 | -43             | N/A                      | 12           | 810            |
| 13  | Front View, Passenger | -525          | 380    | 2590 | -44             | N/A                      | 13           | 1000           |
| 14  | Pit Camera, Engine    | 638           | 0      | 1640 | 86              | N/A                      | 13           | 950            |
| 15  | Pit Camera, Fuel Tank | Did Not Run   |        |      |                 |                          |              |                |
| 16  | Driver Belt           | 2836          | -374   | 1360 | -4              | 730                      | 13           | 590            |
| 17  | Passenger Belt        | 2924          | 388    | 1380 | -4              | 1050                     | 13           | 590            |
| 18  | Left Side Extra       | 800           | -6681  | 1450 | -2              | 6535                     | 24           | 1100           |

X - Barrier Face   Y - Monorail Centerline   Z - Ground



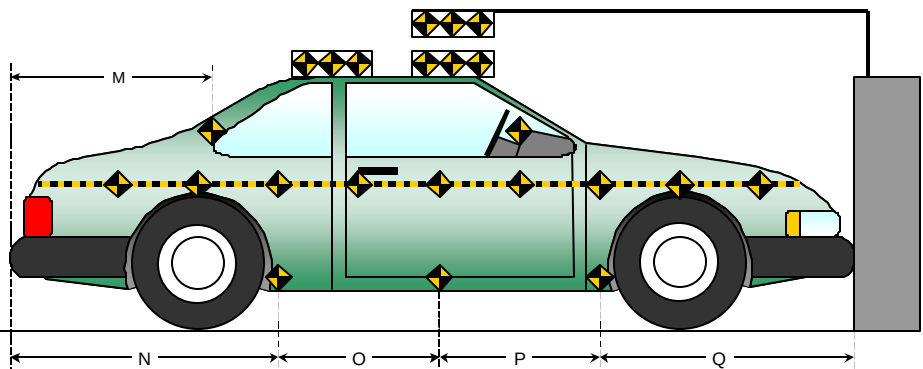
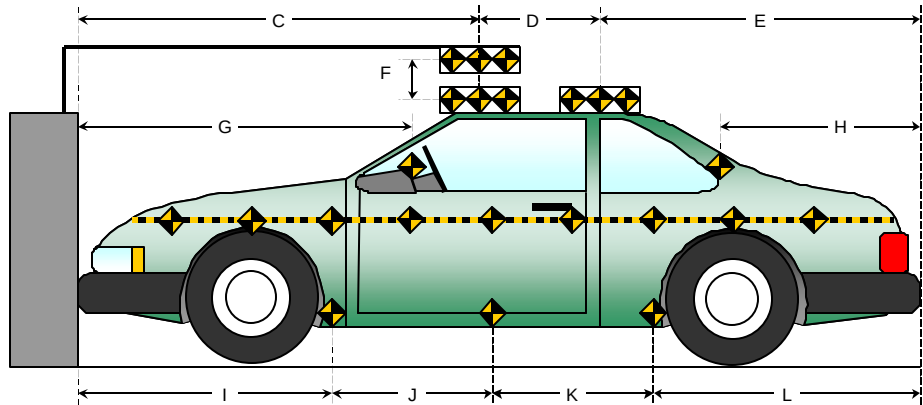
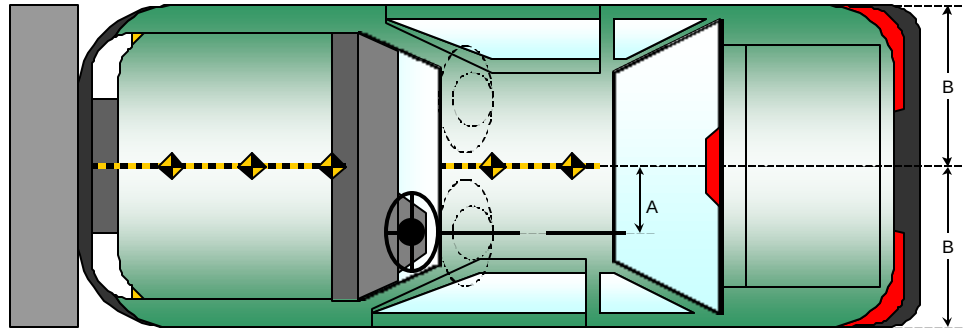
**DATA SHEET NO. 16**  
**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2001 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
 Test Date: 01/09/01

All Dimensions  
in mm

| Item | Value |
|------|-------|
| A    | 356   |
| B    | 886   |
| C    | 1904  |
| D    | 605   |
| E    | 1587  |
| F    | 155   |
| G    | 1577  |
| H    | 982   |
| I    | 1241  |
| J    | 784   |
| K    | 778   |
| L    | 1302  |
| M    | 977   |
| N    | 1302  |
| O    | 763   |
| P    | 762   |
| Q    | 1249  |



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

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

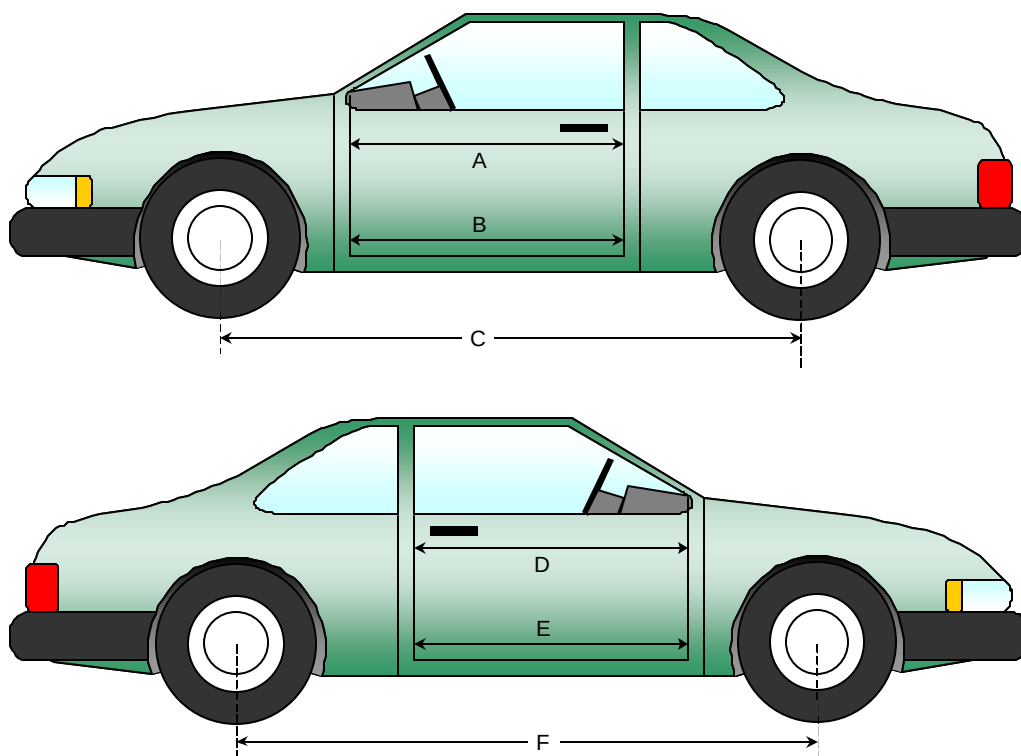
Test Date: 01/09/01

**DOOR OPENING WIDTH**

| Item | Description      | Units | Pre-Test | Post-Test | Difference |
|------|------------------|-------|----------|-----------|------------|
| A    | Left Side Upper  | mm    | 933      | 933       | 0          |
| B    | Left Side Lower  | mm    | 855      | 859       | 4          |
| D    | Right Side Upper | mm    | 928      | 932       | 4          |
| E    | Right Side Lower | mm    | 852      | 859       | 7          |

**WHEELBASE MEASUREMENTS**

| Item | Description           | Units | Pre-Test | Post-Test | Difference |
|------|-----------------------|-------|----------|-----------|------------|
| C    | Left Side Wheel base  | mm    | 2484     | 2415      | -69        |
| F    | Right Side Wheel base | mm    | 2484     | 2370      | -114       |



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

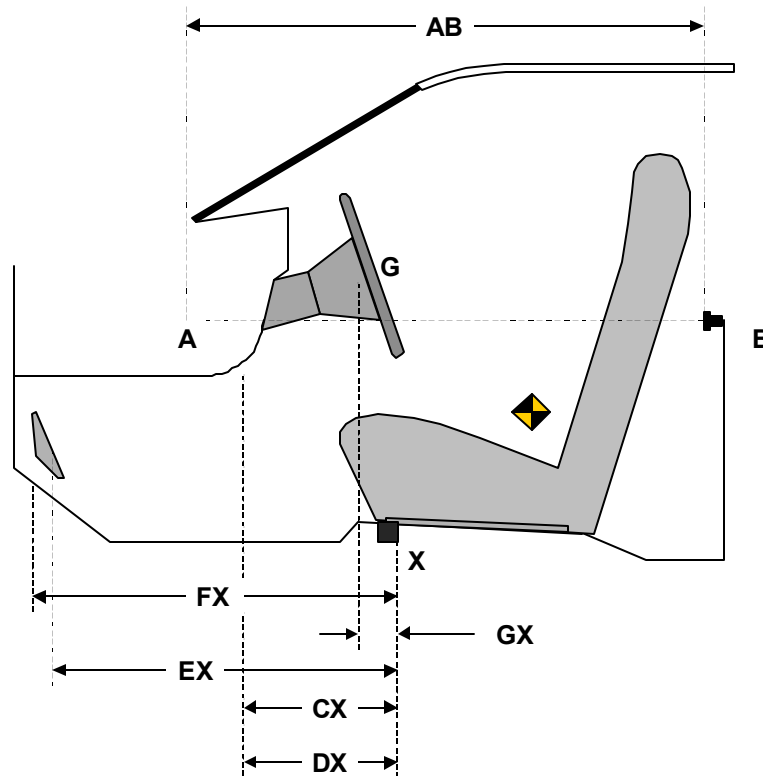
Test Vehicle: 2001 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
 Test Date: 01/09/01

**DRIVER COMPARTMENT INTRUSION**

| Item | Description                       | Units | Pre-Test | Post-Test | Difference |
|------|-----------------------------------|-------|----------|-----------|------------|
| AB   | Door Opening (Inside window jam)  | mm    | 933      | 933       | 0          |
| CX   | Left Knee Bolster to X            | mm    | 196      | 291       | 95         |
| DX   | Right Knee Bolster to X           | mm    | 230      | 302       | 72         |
| EX   | Brake Pedal to X                  | mm    | 487      | 349       | -138       |
| FX   | Foot Rest to X                    | mm    | 535      | 557       | 22         |
| GX   | Center of Steering Wheel Hub to X | mm    | 53       | 45        | -8         |

X = Left Front Seat Outboard Anchor Bolt Head



**DRIVER COMPARTMENT**

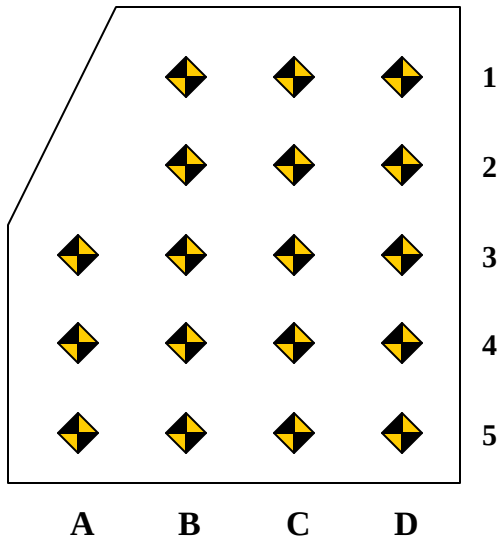
**DATA SHEET NO. 17...(CONTINUED)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2001 Toyota RAV4 4WD SUV

NHTSA No.: M15103

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/09/01



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 |          | 649 | 665 | 645 |           | 615 | 680 | 590 |            | -34 | 15  | -55 |
| 2 |          | 562 | 566 | 566 |           | 551 | 532 | 534 |            | -11 | -34 | -32 |
| 3 | 462      | 465 | 470 | 465 | 433       | 458 | 458 | 452 | -29        | -7  | -12 | -13 |
| 4 | 360      | 362 | 367 | 367 | 352       | 353 | 353 | 355 | -8         | -9  | -14 | -12 |
| 5 | 265      | 262 | 261 | 269 | 252       | 253 | 249 | 254 | -13        | -9  | -12 | -15 |

**DRIVER FLOOR PAN Z-AXIS**

|   | Pre-Test |     |     |     | Post-Test |      |      |      | Difference |     |     |     |
|---|----------|-----|-----|-----|-----------|------|------|------|------------|-----|-----|-----|
|   | A        | B   | C   | D   | A         | B    | C    | D    | A          | B   | C   | D   |
| 1 |          | -6  | -3  | 1   |           | -43  | -43  | -47  |            | -37 | -40 | -48 |
| 2 |          | -50 | -53 | -52 |           | -91  | -101 | -115 |            | -41 | -48 | -63 |
| 3 | -78      | -80 | -78 | -79 | -105      | -123 | -143 | -151 | -27        | -43 | -65 | -72 |
| 4 | -75      | -82 | -92 | -82 | -109      | -130 | -148 | -146 | -34        | -48 | -56 | -64 |
| 5 | -75      | -80 | -88 | -85 | -102      | -124 | -144 | -157 | -27        | -44 | -56 | -72 |

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

Test Vehicle: 2001 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

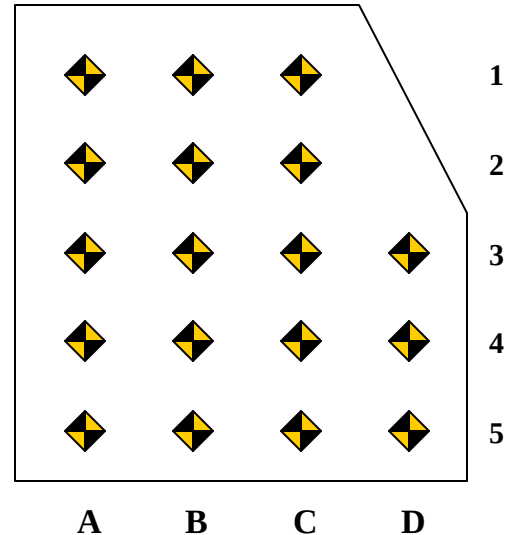
NHTSA No.: M15103  
 Test Date: 01/09/01

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 | 598      | 600 | 607 |     | 559       | 565 | 576 |     | -39        | -35 | -31 |    |
| 2 | 505      | 510 | 513 |     | 489       | 491 | 498 |     | -16        | -19 | -15 |    |
| 3 | 405      | 410 | 413 | 415 | 395       | 399 | 404 | 408 | -10        | -11 | -9  | -7 |
| 4 | 310      | 310 | 310 | 315 | 298       | 301 | 302 | 309 | -12        | -9  | -8  | -6 |
| 5 | 215      | 215 | 215 | 217 | 204       | 202 | 207 | 213 | -11        | -13 | -8  | -4 |

**PASSENGER FLOOR PAN Z-AXIS**

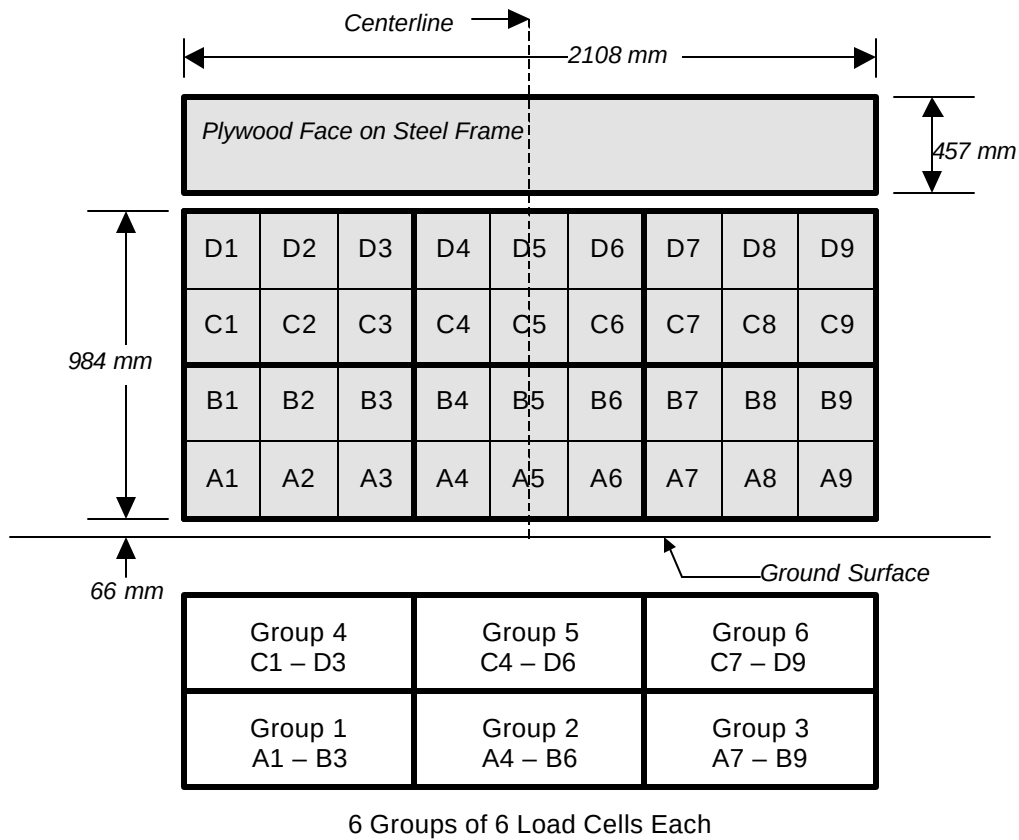
|   | Pre-Test |      |     |     | Post-Test |      |      |      | Difference |     |      |     |
|---|----------|------|-----|-----|-----------|------|------|------|------------|-----|------|-----|
|   | A        | B    | C   | D   | A         | B    | C    | D    | A          | B   | C    | D   |
| 1 | -37      | -34  | -32 |     | -68       | -64  | -67  |      | -31        | -30 | -35  |     |
| 2 | -77      | -71  | -70 |     | -164      | -143 | -129 |      | -87        | -72 | -59  |     |
| 3 | -80      | -90  | -80 | -85 | -145      | -146 | -116 | -116 | -65        | -56 | -36  | -31 |
| 4 | -80      | -105 | -80 | -83 | -137      | -161 | -222 | -114 | -57        | -56 | -142 | -31 |
| 5 | -51      | -100 | -74 | -88 | -110      | -155 | -118 | -112 | -59        | -55 | -44  | -24 |

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

Test Vehicle: 2001 Toyota RAV4 4WD SUV  
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
 Test Date: 01/09/01

**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 Toyota RAV4 4WD SUV  
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
Test Date: 01/09/01

**VEHICLE INFORMATION**

VIN: JTEHH20V910049732  
Vehicle Size Category: SUV

Wheel base (mm): 2484  
Test Weight (kg): 1621

**ACCELEROMETER DATA**

Accelerometer Location: Left rear floor pan  
Cal. Procedure/Interval: 6 months / drop test  
Integration Algorithm: NHTSA Standard  
Impact Velocity (km/h): 55.83  
Velocity Change (km/h): 62.73

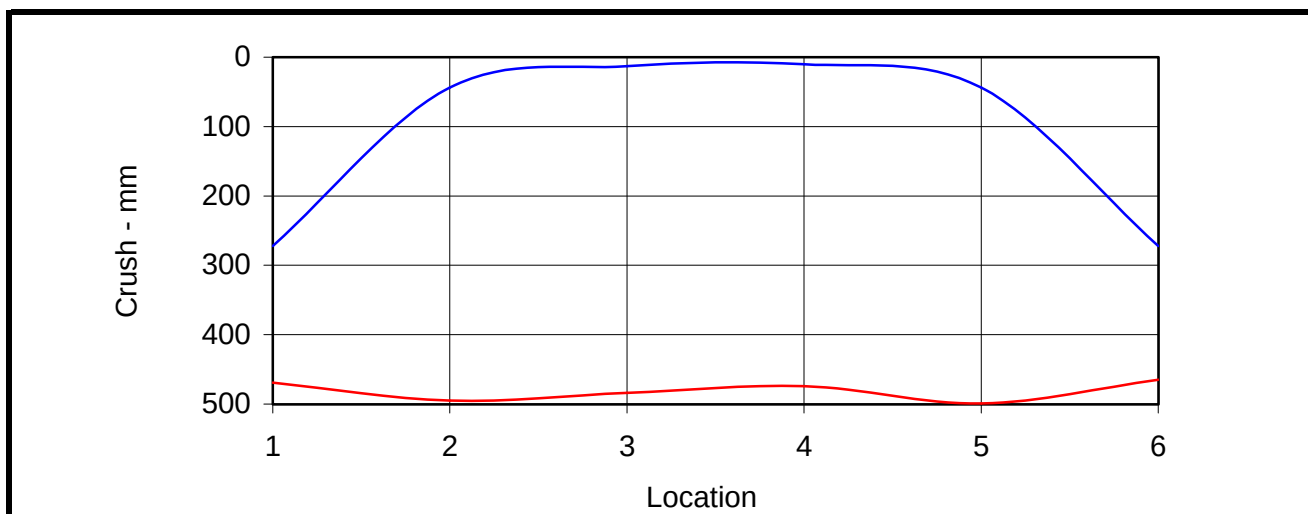
Linearity: Good

Time of Separation (msec): 65.7

**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW6 ; Midpoint of Damage: Vehicle Centerline  
Damage Region Length (mm): 1617 ; Impact Mode: Full Frontal

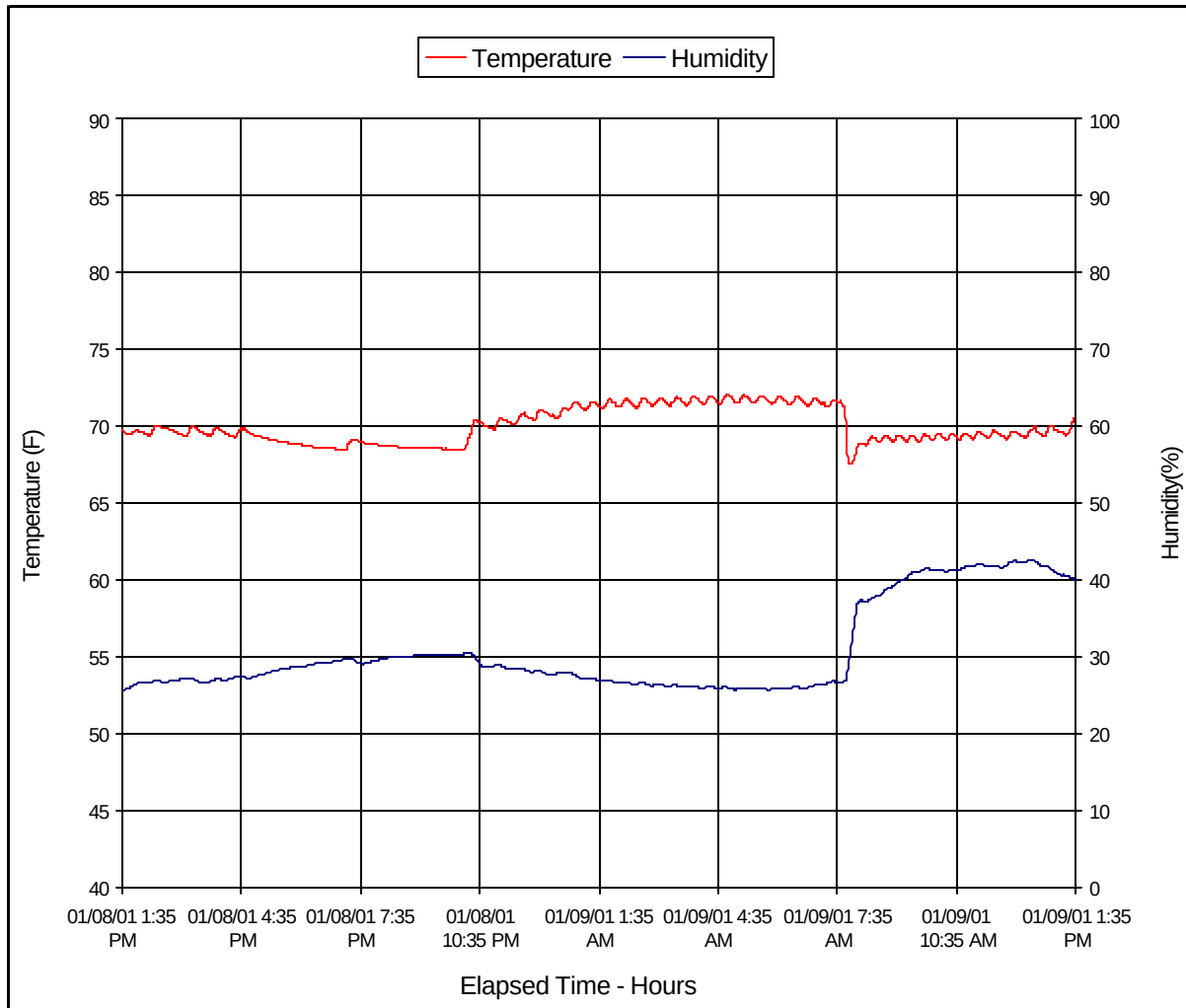
| No. | Measurement Description    | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------|-------|----------|-----------|------------|
| C1  | Crush zone 1 at left side  | mm    | 272      | 469       | -197       |
| C2  | Crush zone 2 on left side  | mm    | 44       | 495       | -451       |
| C3  | Crush zone 3 on left side  | mm    | 13       | 484       | -471       |
| C4  | Crush zone 4 on right side | mm    | 10       | 474       | -464       |
| C5  | Crush zone 5 on right side | mm    | 44       | 499       | -455       |
| C6  | Crush zone 6 at right side | mm    | 272      | 465       | -193       |



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

Test Vehicle: 2001 Toyota RAV4 4WD SUV  
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M15103  
Test Date: 01/09/01





**APPENDIX A**  
**PHOTOGRAPHS**

# LIST OF PHOTOGRAPHS

| Figure |                                         | Page |
|--------|-----------------------------------------|------|
| A-1    | Right Front as Received                 | A-1  |
| A-2    | Left Rear as Received                   | A-2  |
| A-3    | Vehicle Certification Label             | A-3  |
| A-4    | Vehicle Tire Placard                    | A-4  |
| A-5    | Pre-test Front View                     | A-5  |
| A-6    | Post-test Front View                    | A-6  |
| A-7    | Pre-test Left Side View                 | A-7  |
| A-8    | Post-test Left Side View                | A-8  |
| A-9    | Pre-test Right Side View                | A-9  |
| A-10   | Post-test Right Side View               | A-10 |
| A-11   | Pre-test Right Front View               | A-11 |
| A-12   | Post-test Right Front View              | A-12 |
| A-13   | Pre-test Left Rear View                 | A-13 |
| A-14   | Post-test Left Rear View                | A-14 |
| A-15   | Pre-test Windshield                     | A-15 |
| A-16   | Post-test Windshield                    | A-16 |
| A-17   | Pre-test Engine Compartment             | A-17 |
| A-18   | Post-test Engine Compartment            | A-18 |
| A-19   | Pre-test Fuel Cap                       | A-19 |
| A-20   | Post-test Fuel Cap                      | A-20 |
| A-21   | Pre-test Front Underside                | A-21 |
| A-22   | Post-test Front Underside               | A-22 |
| A-23   | Pre-test Rear Underside                 | A-23 |
| A-24   | Post-test Rear Underside                | A-24 |
| A-25   | Pre-test Driver Dummy (Front View)      | A-25 |
| A-26   | Post-test Driver Dummy (Front View)     | A-26 |
| A-27   | Pre-test Driver Dummy (Through Window)  | A-27 |
| A-28   | Post-test Driver Dummy (Through Window) | A-28 |
| A-29   | Pre-test Driver Dummy (Door Open)       | A-29 |
| A-30   | Post-test Driver Dummy (Door Open)      | A-30 |
| A-31   | Pre-test Driver Dummy (90° To Vehicle)  | A-31 |
| A-32   | Post-test Driver Dummy (90° to Vehicle) | A-32 |

# LIST OF PHOTOGRAPHS...(Continued)

| Figure |                                                         | Page |
|--------|---------------------------------------------------------|------|
| A-33   | Pre-test Driver Dummy Feet                              | A-33 |
| A-34   | Post-test Driver Dummy Feet and Knee Contact            | A-34 |
| A-35   | Pre-test Driver Side Knee Bolster                       | A-35 |
| A-36   | Post-test Driver Side Knee Bolster                      | A-36 |
| A-37   | Pre-test Driver Side Floor pan                          | A-37 |
| A-38   | Post-test Driver Side Floor pan                         | A-38 |
| A-39   | Post-test Driver Head                                   | A-39 |
| A-40   | Post-test Driver Dummy Contact                          | A-40 |
| A-41   | Pre-test Passenger Dummy (Front View)                   | A-41 |
| A-42   | Post-test Passenger Dummy (Front View)                  | A-42 |
| A-43   | Pre-test Passenger Dummy (Through Window)               | A-43 |
| A-44   | Post-test Passenger Dummy (Through Window)              | A-44 |
| A-45   | Pre-test Passenger Dummy (Door Open)                    | A-45 |
| A-46   | Post-test Passenger Dummy (Door Open)                   | A-46 |
| A-47   | Pre-test Passenger Dummy (90° to Vehicle)               | A-47 |
| A-48   | Post-test Passenger Dummy (90° to Vehicle)              | A-48 |
| A-49   | Pre-test Passenger Dummy Feet                           | A-49 |
| A-50   | Post-test Driver Passenger Feet and Contact Point       | A-50 |
| A-51   | Pre-test Passenger Side Floor Pan                       | A-51 |
| A-52   | Post-test Passenger Side Floor Pan                      | A-52 |
| A-53   | Pre-test Passenger Side Knee Bolster                    | A-53 |
| A-54   | Post-test Passenger Side Knee Bolster and Dummy Contact | A-54 |
| A-55   | Post-test Passenger Head                                | A-55 |
| A-56   | Post-test Passenger Dummy Contact                       | A-56 |
| A-57   | Vehicle on Rollover Device                              | A-57 |
| A-58   | Vehicle During Impact                                   | A-58 |



Figure A-1: Right Front, as Received



Figure A-2: Left Rear, as Received

\*

MFD. BY: TOYOTA MOTOR CORPORATION DATE 10/00

GVWR (LBS): 3988

GAWR (LBS): FRT. 2028 WITH 215/70R16 TIRES.  
16X6 1/2J RIMS. AT 29 PSI COLD.  
RR. 2227 WITH 215/70R16 TIRES.  
16X6 1/2J RIMS. AT 29 PSI COLD.

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE. JTEHH20V910049732 MPV



C/ TR 056/FG40-A/TM -01A/E352F ACA21L-AWMNKA  
NO 437 MADE IN JAPAN

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

**Photograph Not  
Available**

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



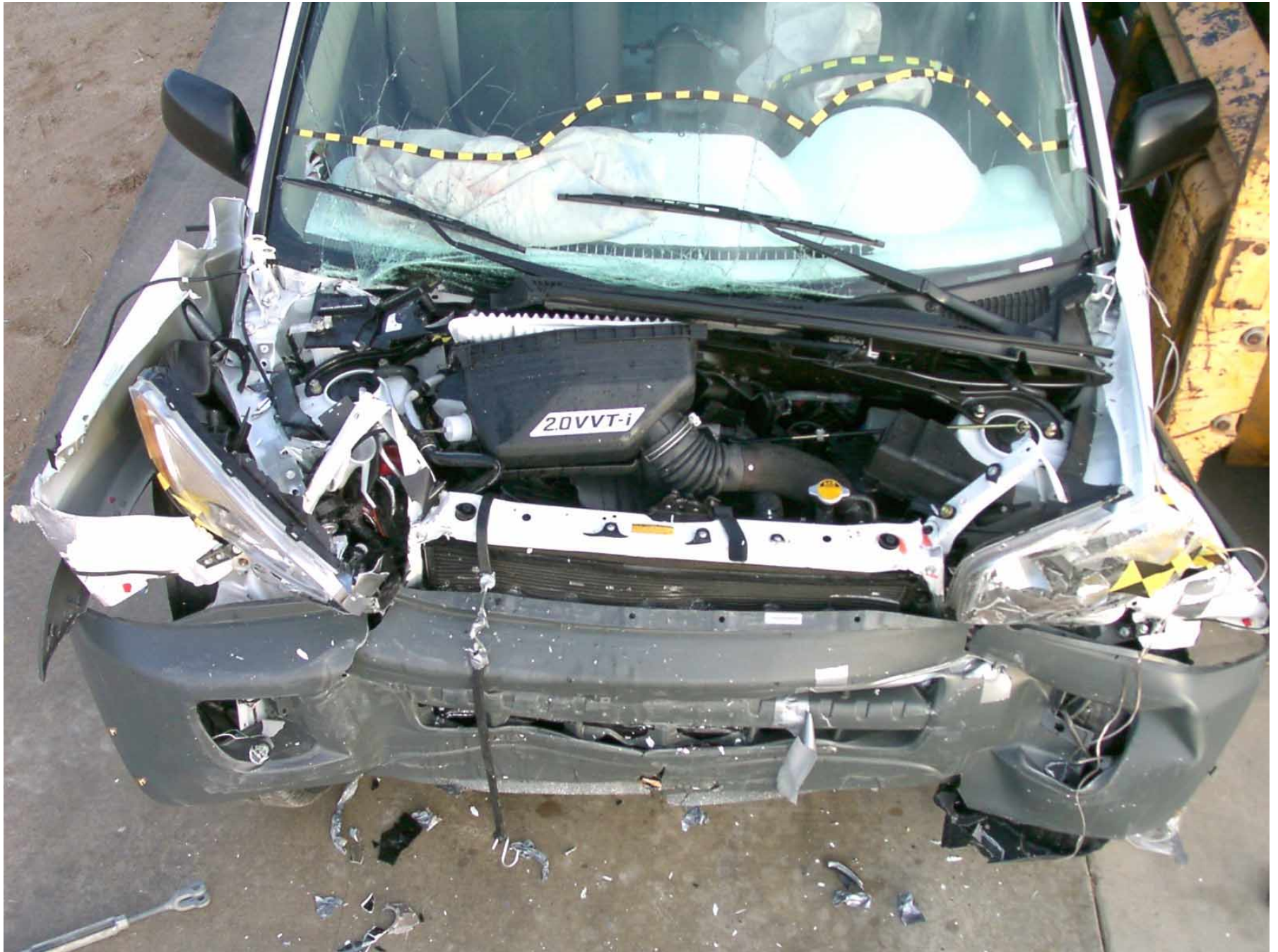


Figure A-18: Engine Compartment, Post-Test



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



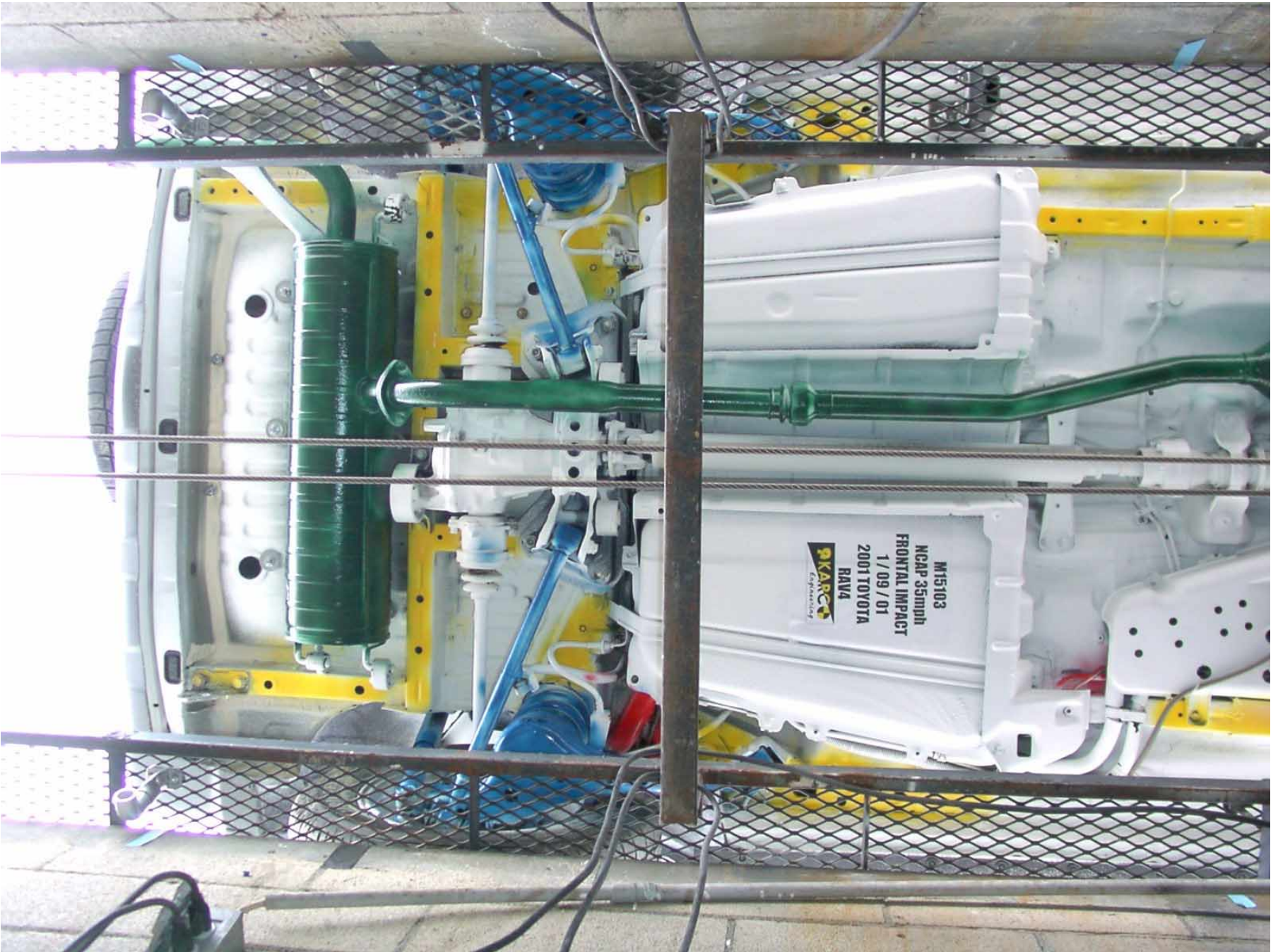


Figure A-23: Rear Underside, Pre-Test



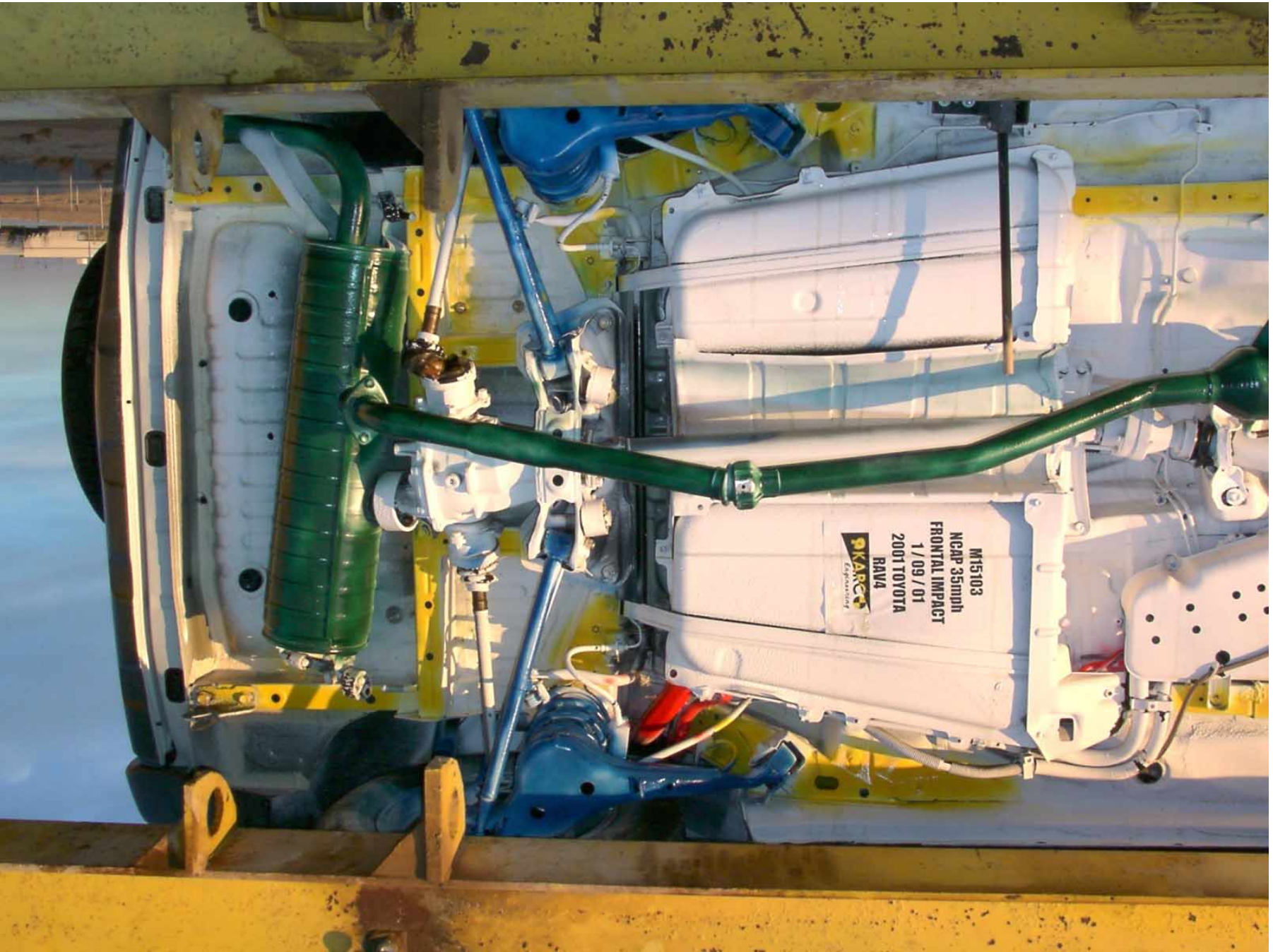


Figure A-24: Rear Underside, Post-Test



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



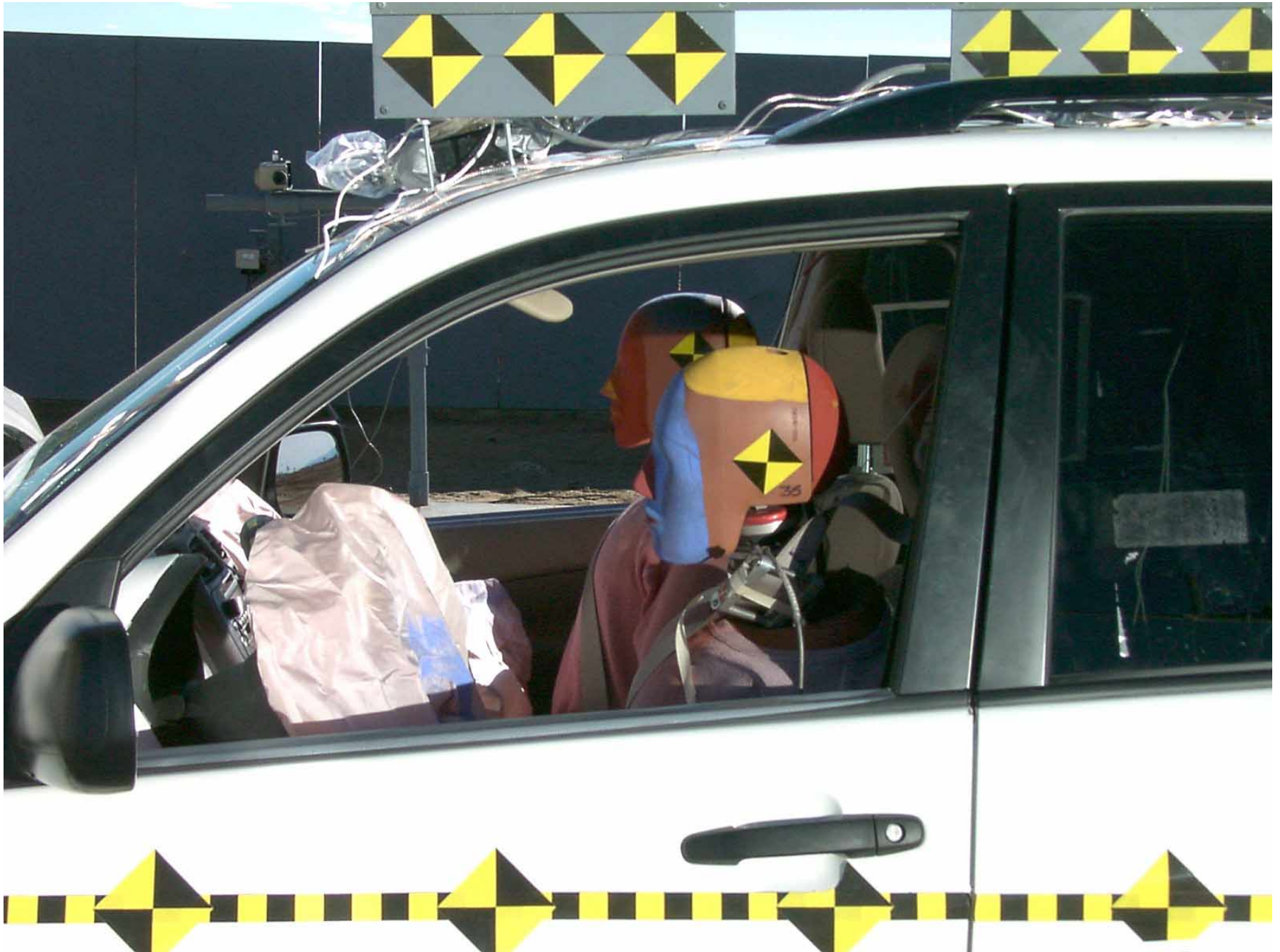


Figure A-28: Driver Dummy Through Window, Post-Test



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



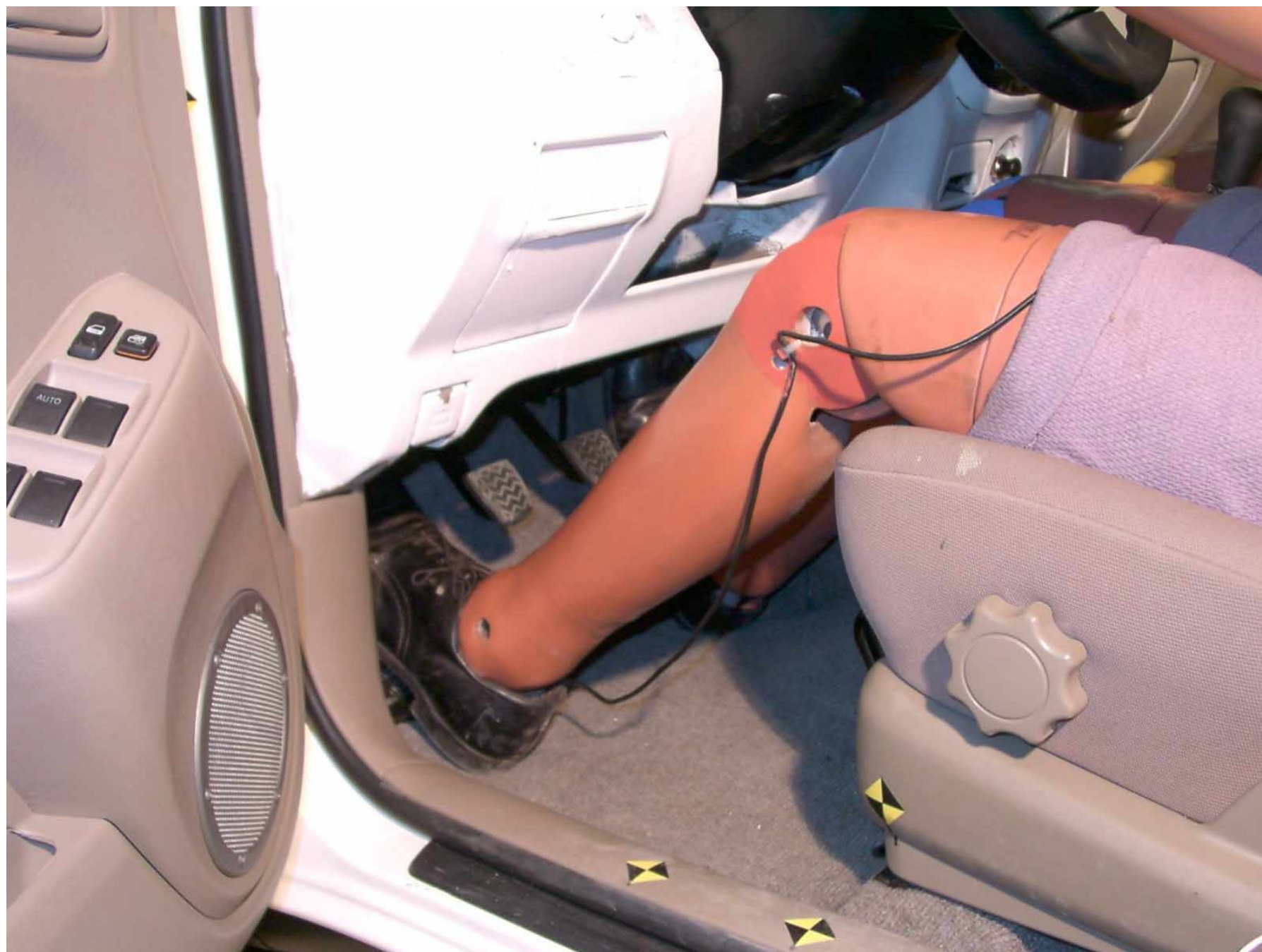


Figure A-33: Driver Dummy Feet, Pre-Test



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



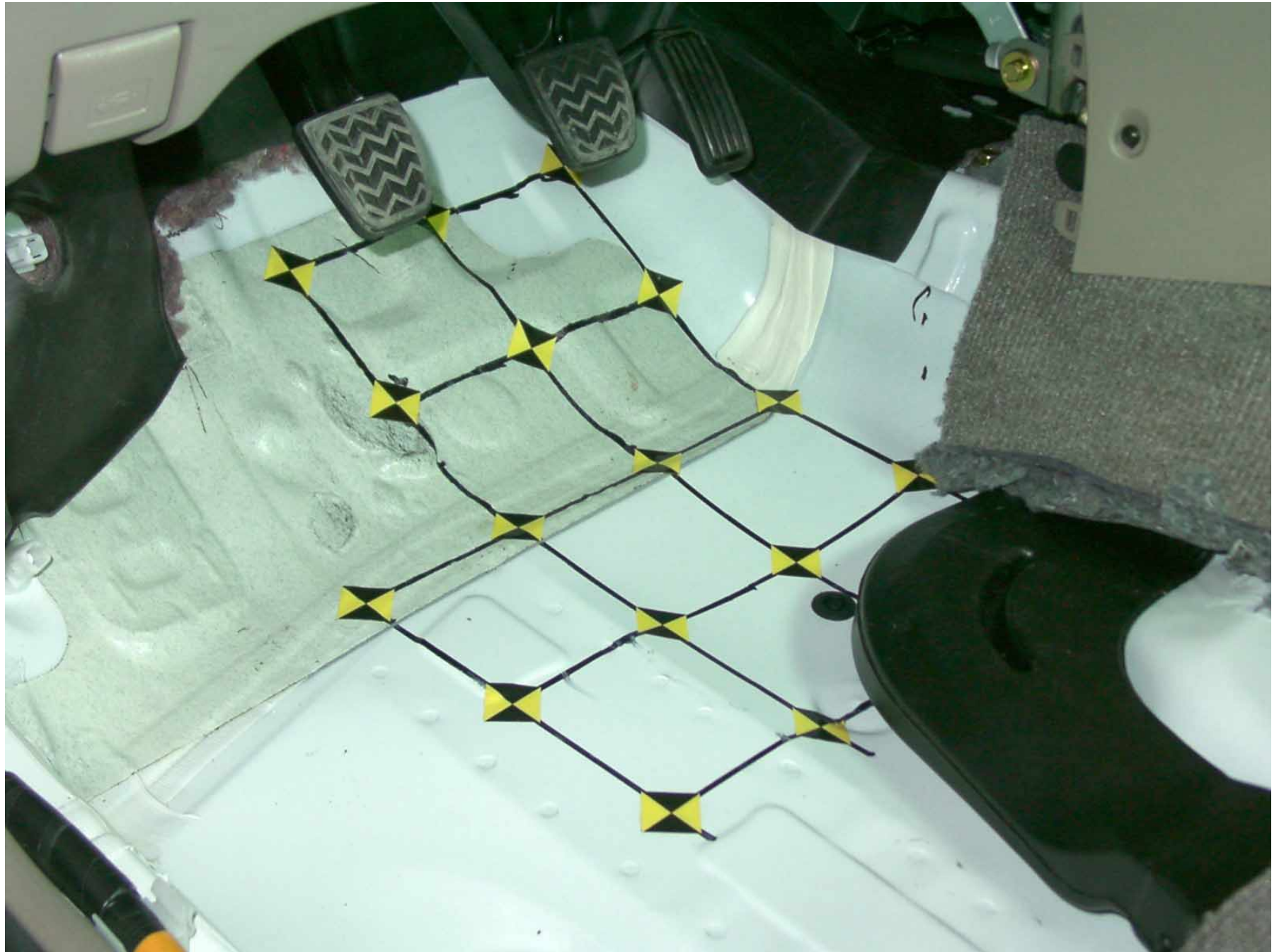


Figure A-37: Driver Side Floor Pan, Pre-Test



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



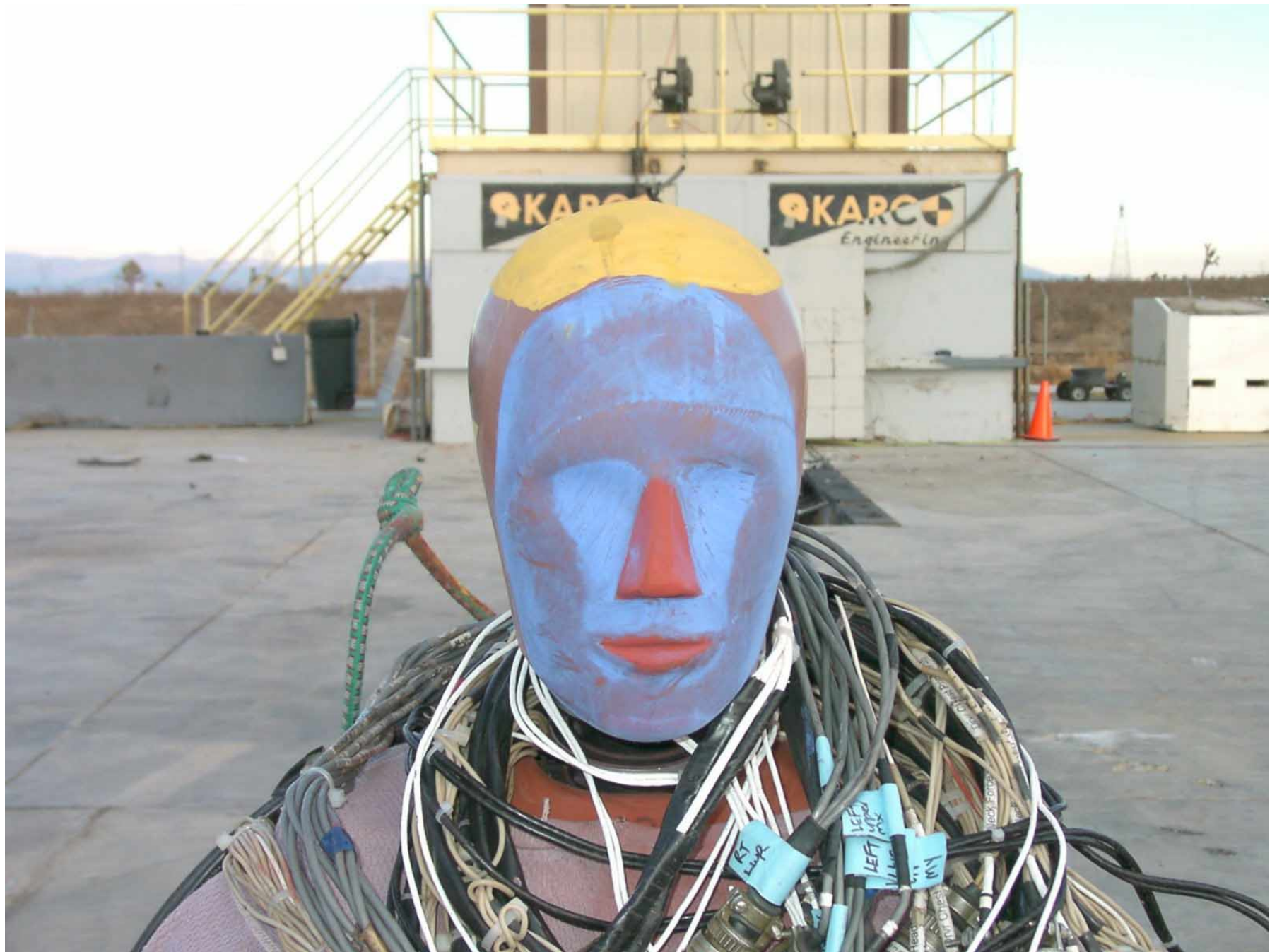


Figure A-39: Driver Dummy Head, Post-Test



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

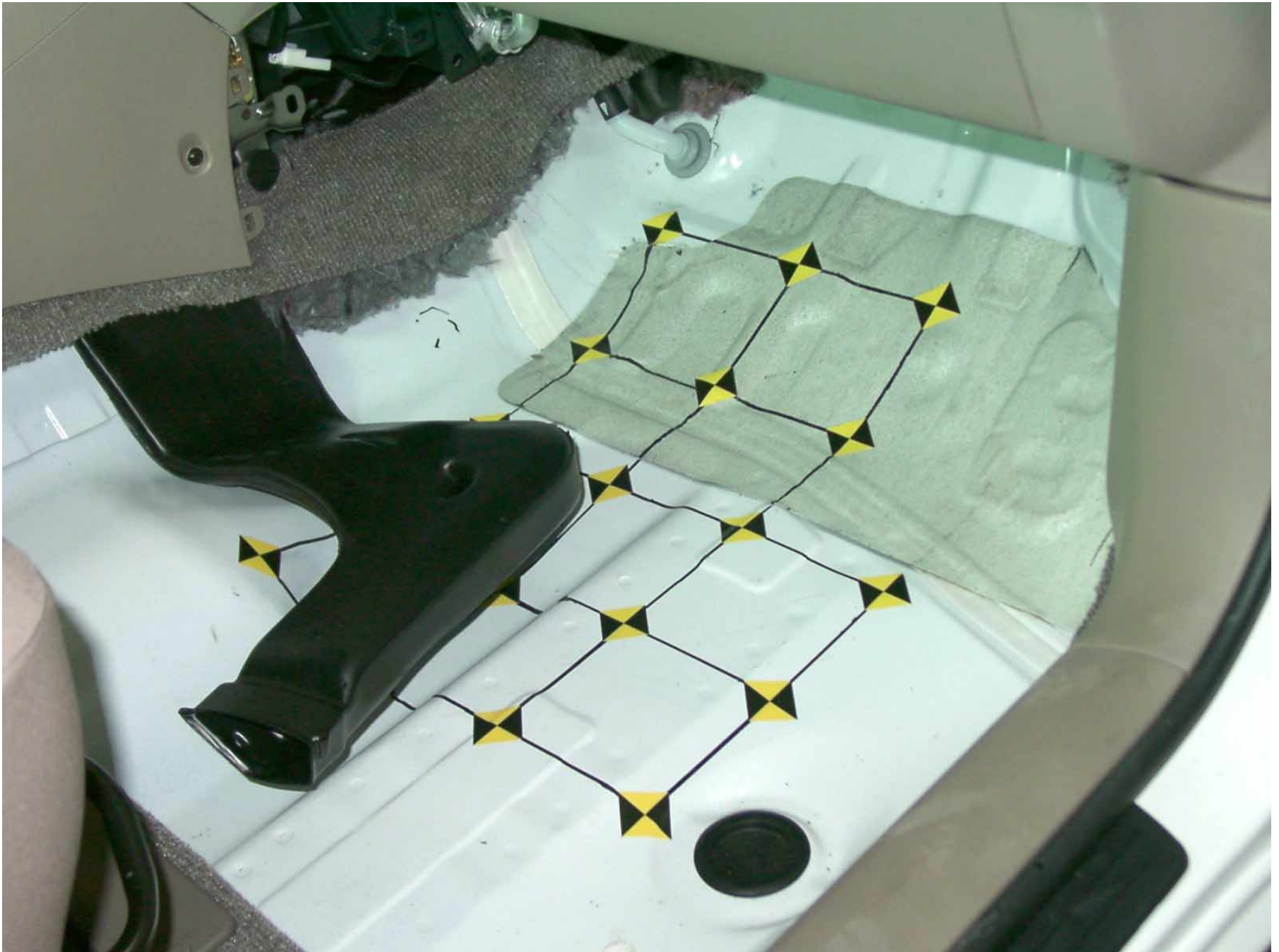


Figure A-51: Passenger Side Floor Pan, Pre-Test





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**

# LIST OF DATA PLOTS

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

# LIST OF DATA PLOTS...(Continued)

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



# LIST OF DATA PLOTS...(Continued)

| Data Plot                                     | Page |
|-----------------------------------------------|------|
| B-62 Passenger Head Primary X                 | B-62 |
| B-63 Passenger Head Primary X Velocity        | B-63 |
| B-64 Passenger Head Primary X Displacement    | B-64 |
| B-65 Passenger Head Primary Y                 | B-65 |
| B-66 Passenger Head Primary Z                 | B-66 |
| B-67 Passenger Head Resultant Primary         | B-67 |
| B-68 Passenger Head Redundant X               | B-68 |
| B-69 Passenger Head Redundant X Velocity      | B-69 |
| B-70 Passenger Head Redundant X Displacement  | B-70 |
| B-71 Passenger Head Redundant Y               | B-71 |
| B-72 Passenger Head Redundant Z               | B-72 |
| B-73 Passenger Head Resultant Redundant       | B-73 |
| B-74 Passenger Neck Force X                   | B-74 |
| B-75 Passenger Neck Force Y                   | B-75 |
| B-76 Passenger Neck Force Z                   | B-76 |
| B-77 Passenger Neck Force Resultant           | B-77 |
| B-78 Passenger Neck Moment X                  | B-78 |
| B-79 Passenger Neck Moment Y                  | B-79 |
| B-80 Passenger Neck Moment Z                  | B-80 |
| B-81 Passenger Neck Moment Resultant          | B-81 |
| B-82 Passenger Chest Primary X                | B-82 |
| B-83 Passenger Chest Primary X Velocity       | B-83 |
| B-84 Passenger Chest Primary X Displacement   | B-84 |
| B-85 Passenger Chest Primary Y                | B-85 |
| B-86 Passenger Chest Primary Z                | B-86 |
| B-87 Passenger Chest Primary Resultant        | B-87 |
| B-88 Passenger Chest Redundant X              | B-88 |
| B-89 Passenger Chest Redundant X Velocity     | B-89 |
| B-90 Passenger Chest Redundant X Displacement | B-90 |
| B-91 Passenger Chest Redundant Y              | B-91 |
| B-92 Passenger Chest Redundant Z              | B-92 |
| B-93 Passenger Chest Redundant Resultant      | B-93 |
| B-94 Passenger Chest Displacement X           | B-94 |

# LIST OF DATA PLOTS...(Continued)

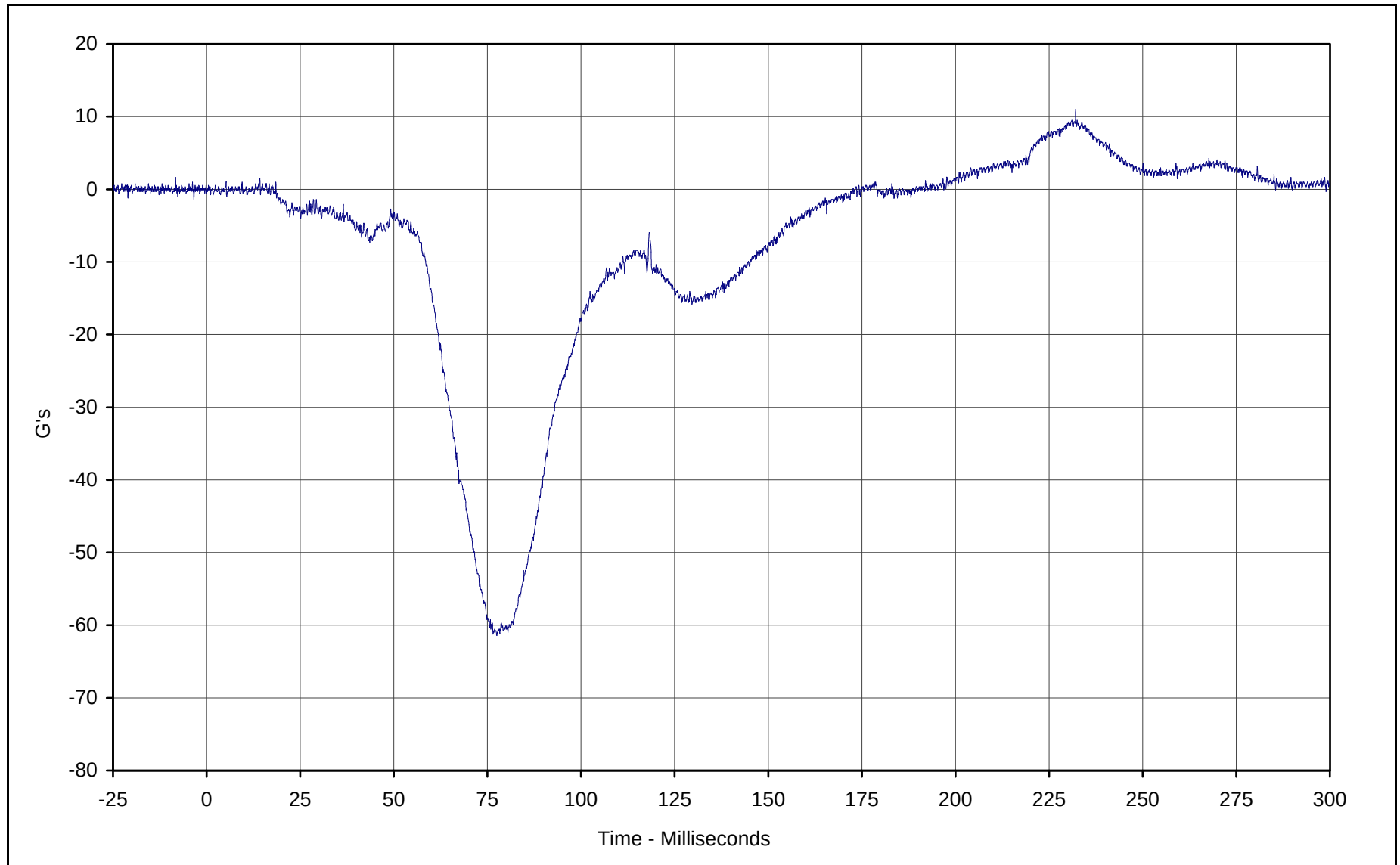
| Data Plot                                  | Page  |
|--------------------------------------------|-------|
| B-95 Passenger Pelvis X                    | B-95  |
| B-96 Passenger Pelvis X Velocity           | B-96  |
| B-97 Passenger Pelvis X Displacement       | B-97  |
| B-98 Passenger Pelvis Y                    | B-98  |
| B-99 Passenger Pelvis Z                    | B-99  |
| B-100 Passenger Pelvis Resultant           | B-100 |
| B-101 Passenger Left Femur Force           | B-101 |
| B-102 Passenger Right Femur Force          | B-102 |
| B-103 Passenger Left Upper Tibia Moment X  | B-103 |
| B-104 Passenger Left Upper Tibia Moment Y  | B-104 |
| B-105 Passenger Right Upper Tibia Moment X | B-105 |
| B-106 Passenger Right Upper Tibia Moment Y | B-106 |
| B-107 Passenger Left Lower Tibia Moment X  | B-107 |
| B-108 Passenger Left Lower Tibia Moment Y  | B-108 |
| B-109 Passenger Left Lower Tibia Force Z   | B-109 |
| B-110 Passenger Right Lower Tibia Moment X | B-110 |
| B-111 Passenger Right Lower Tibia Moment Y | B-111 |
| B-112 Passenger Right Lower Tibia Force Z  | B-112 |
| B-113 Passenger Left Foot Aft X            | B-113 |
| B-114 Passenger Left Foot Aft Z            | B-114 |
| B-115 Passenger Left Foot Fore Z           | B-115 |
| B-116 Passenger Right Foot Aft X           | B-116 |
| B-117 Passenger Right Foot Aft Z           | B-117 |
| B-118 Passenger Right Foot Fore Z          | B-118 |
| B-119 Passenger Lap Belt Force             | B-119 |
| B-120 Passenger Shoulder Belt Force        | B-120 |
| B-121 Passenger Shoulder Belt Pullout      | B-121 |
| B-122 Passenger Shoulder Belt Elongation   | B-122 |

# LIST OF DATA PLOTS...(Continued)

| Data Plot |                                          | Page  |
|-----------|------------------------------------------|-------|
| B-123     | Vehicle Left Rear Primary                | B-123 |
| B-124     | Vehicle Left Rear Primary Velocity       | B-124 |
| B-125     | Vehicle Left Rear Primary Displacement   | B-125 |
| B-126     | Vehicle Right Rear Primary               | B-126 |
| B-127     | Vehicle Right Rear Primary Velocity      | B-127 |
| B-128     | Vehicle Right Rear Primary Displacement  | B-128 |
| B-129     | Vehicle Engine Top                       | B-129 |
| B-130     | Vehicle Engine Top Velocity              | B-130 |
| B-131     | Vehicle Engine Top Displacement          | B-131 |
| B-132     | Vehicle Engine Bottom                    | B-132 |
| B-133     | Vehicle Engine Bottom Velocity           | B-133 |
| B-134     | Vehicle Engine Bottom Displacement       | B-134 |
| B-135     | Vehicle Left Brake Caliper               | B-135 |
| B-136     | Vehicle Left Brake Caliper Velocity      | B-136 |
| B-137     | Vehicle Left Brake Caliper Displacement  | B-137 |
| B-138     | Vehicle Right Brake Caliper              | B-138 |
| B-139     | Vehicle Right Brake Caliper Velocity     | B-139 |
| B-140     | Vehicle Right Brake Caliper Displacement | B-140 |
| B-141     | Vehicle Instrument Panel                 | B-141 |
| B-142     | Vehicle Instrument Panel Velocity        | B-142 |
| B-143     | Vehicle Instrument Panel Displacement    | B-143 |
| B-144     | Vehicle Left Rear Redundant              | B-144 |
| B-145     | Vehicle Left Rear Redundant Velocity     | B-145 |
| B-146     | Vehicle Left Rear Redundant Displacement | B-146 |



B-1

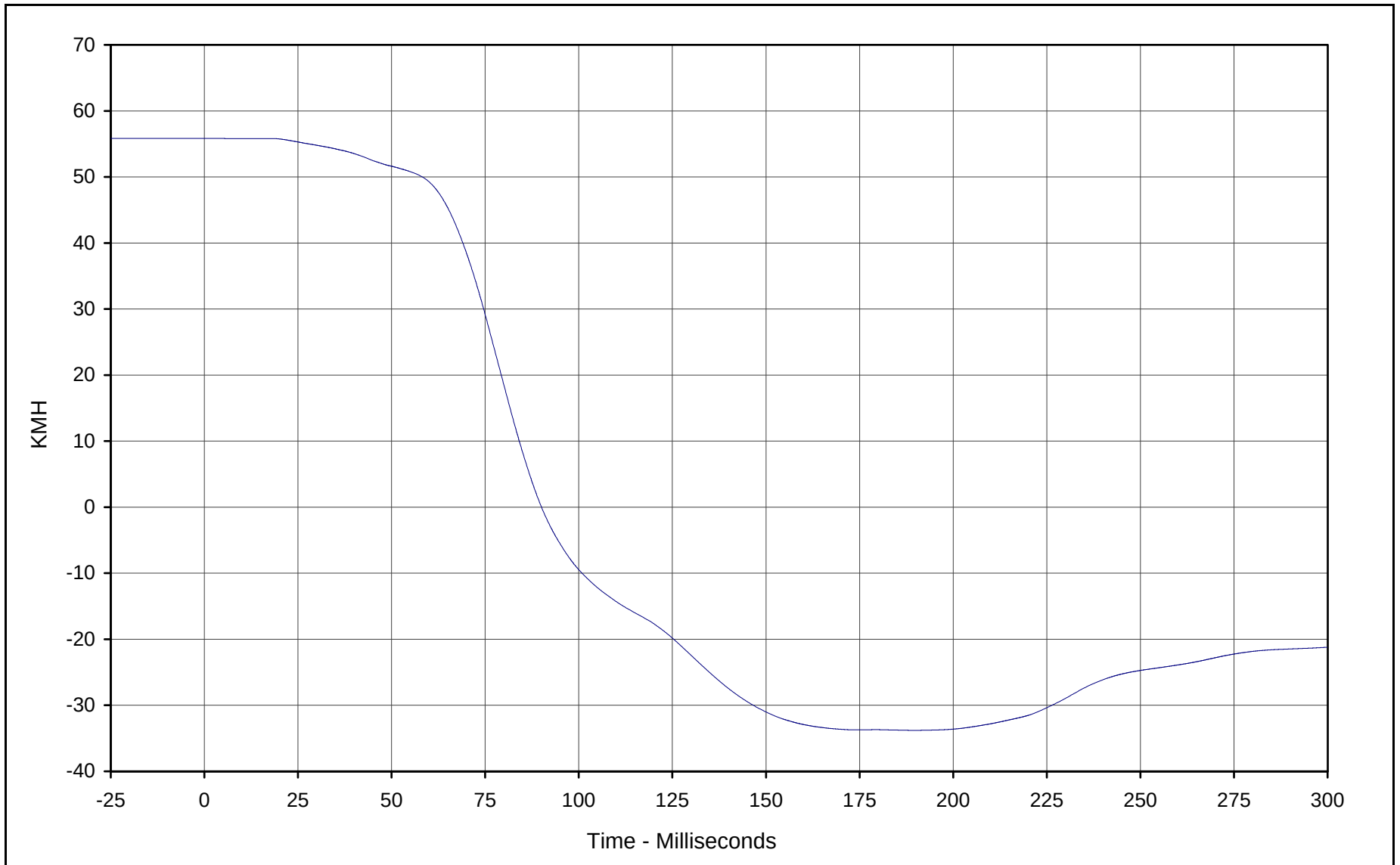


Curve Description: Driver Head Primary X  
Maximum Value: 11.0 at 232.1 Milliseconds  
Minimum Value: -61.4 at 77.5 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-001

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



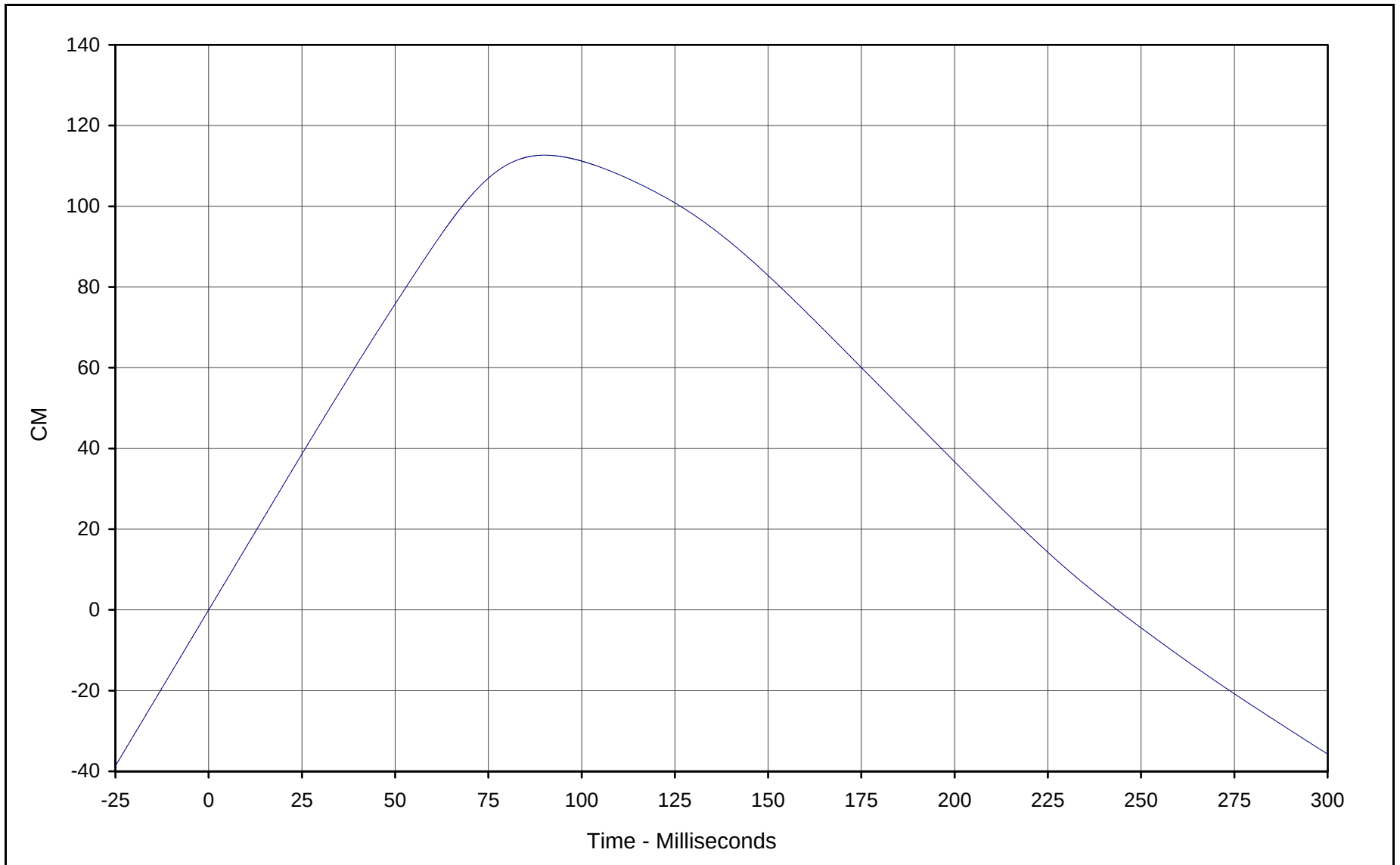
KAR21001-02



Curve Description: Driver Head Primary X Velocity  
Maximum Value: 55.8 at 0.0 Milliseconds  
Minimum Value: -33.8 at 189.4 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-001

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





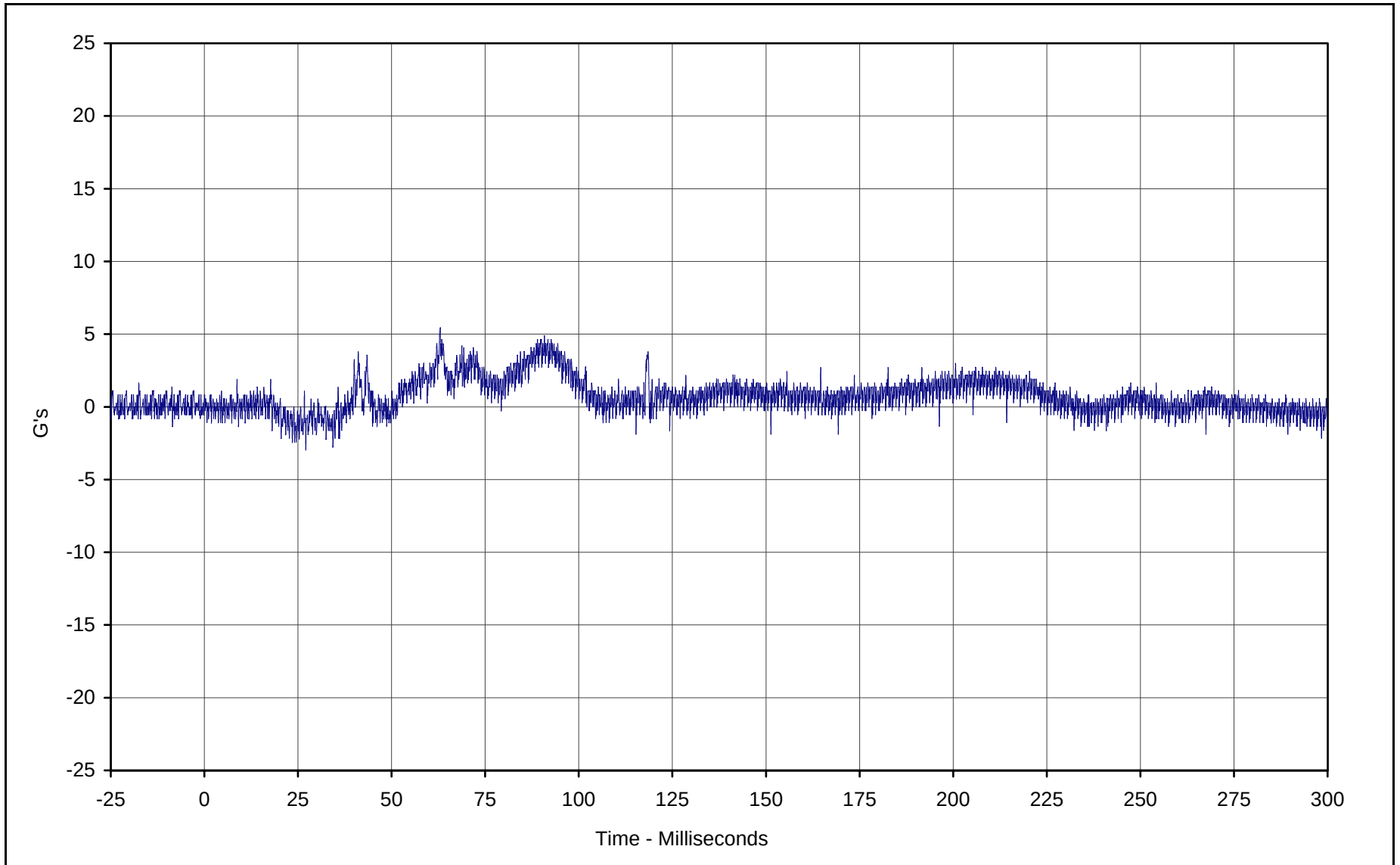
Curve Description: Driver Head Primary X Displ.  
Maximum Value: 112.7 at 90.0 Milliseconds  
Minimum Value: -35.7 at 299.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-001

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





B-4

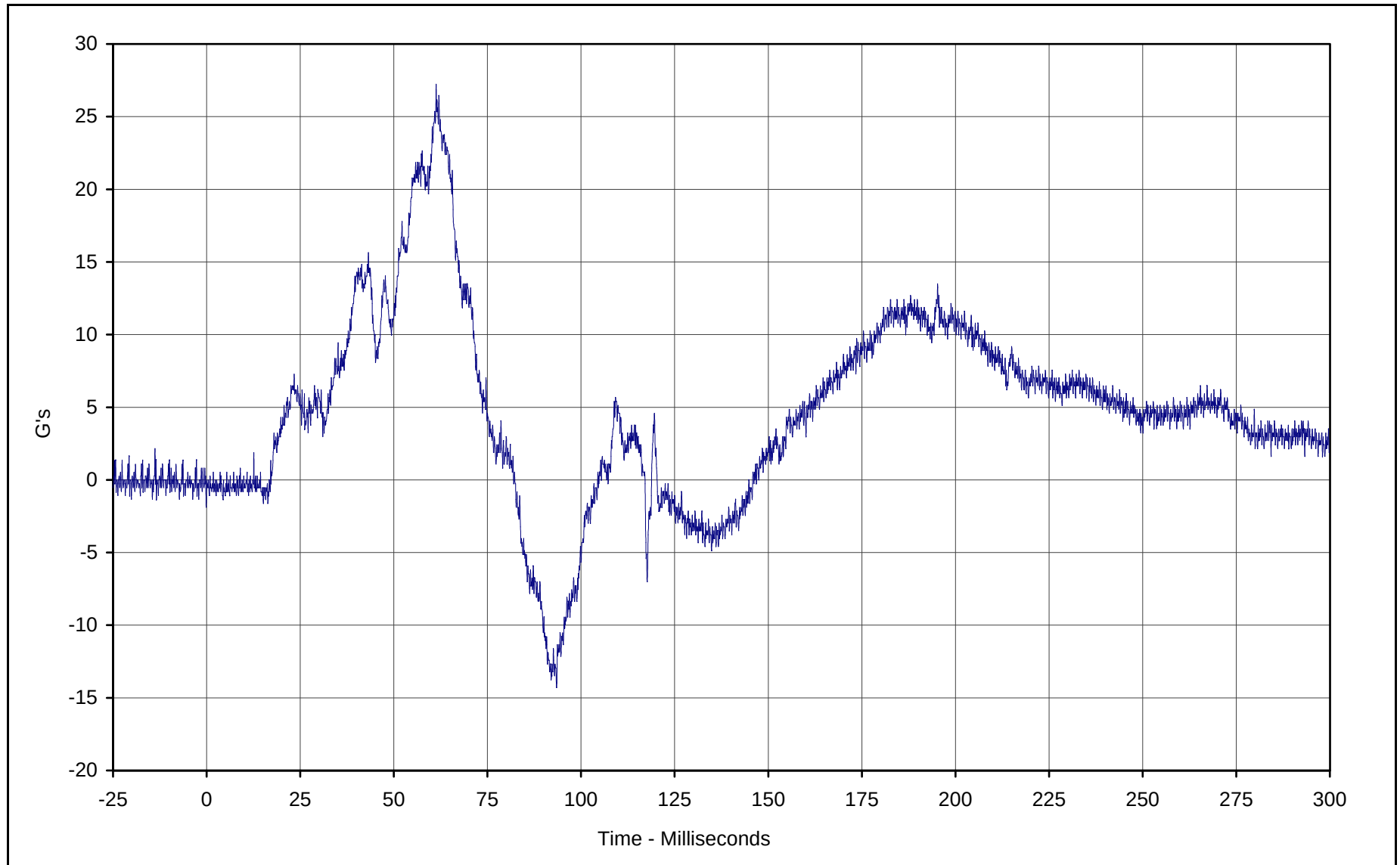


Curve Description: Driver Head Primary Y  
Maximum Value: 5.4 at 63.0 Milliseconds  
Minimum Value: -3.0 at 27.1 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-002

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



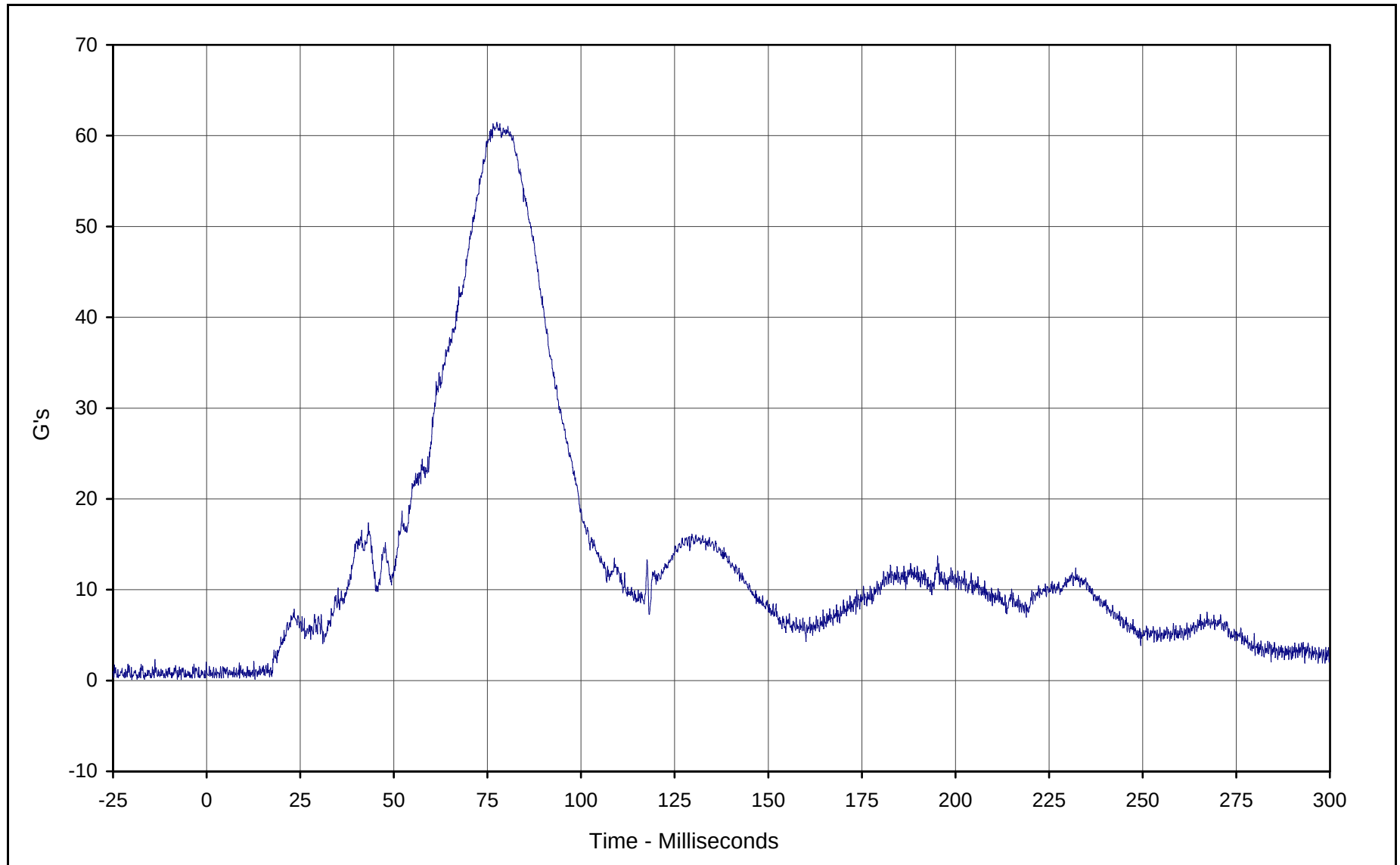
KAR21001-02



Curve Description: Driver Head Primary Z  
Maximum Value: 27.2 at 61.3 Milliseconds  
Minimum Value: -14.3 at 93.4 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-003

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



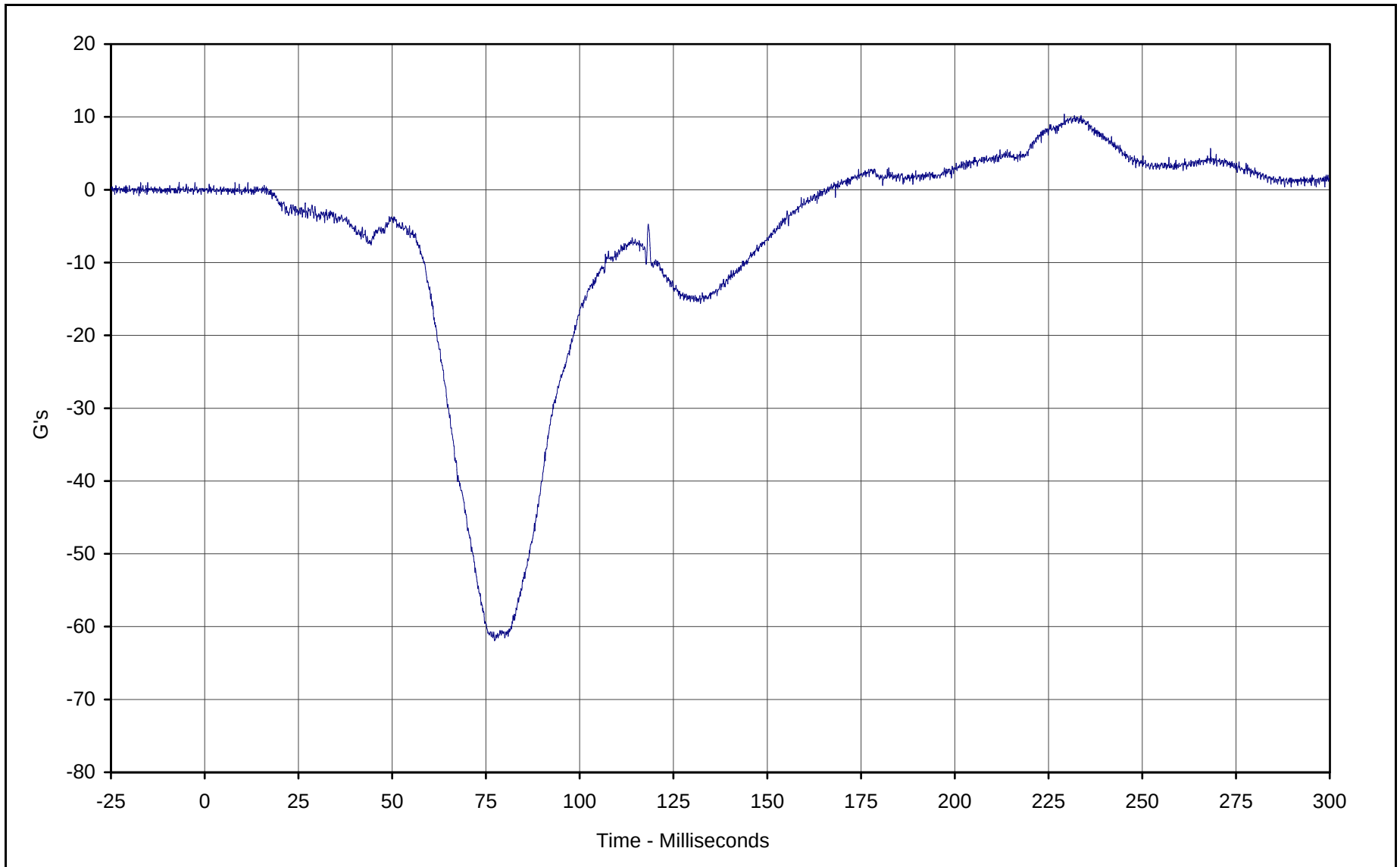


Curve Description: Driver Head Resultant Primary  
Maximum Value: 61.5 at 77.5 Milliseconds  
Minimum Value: 0.1 at 12.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: RES-001

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



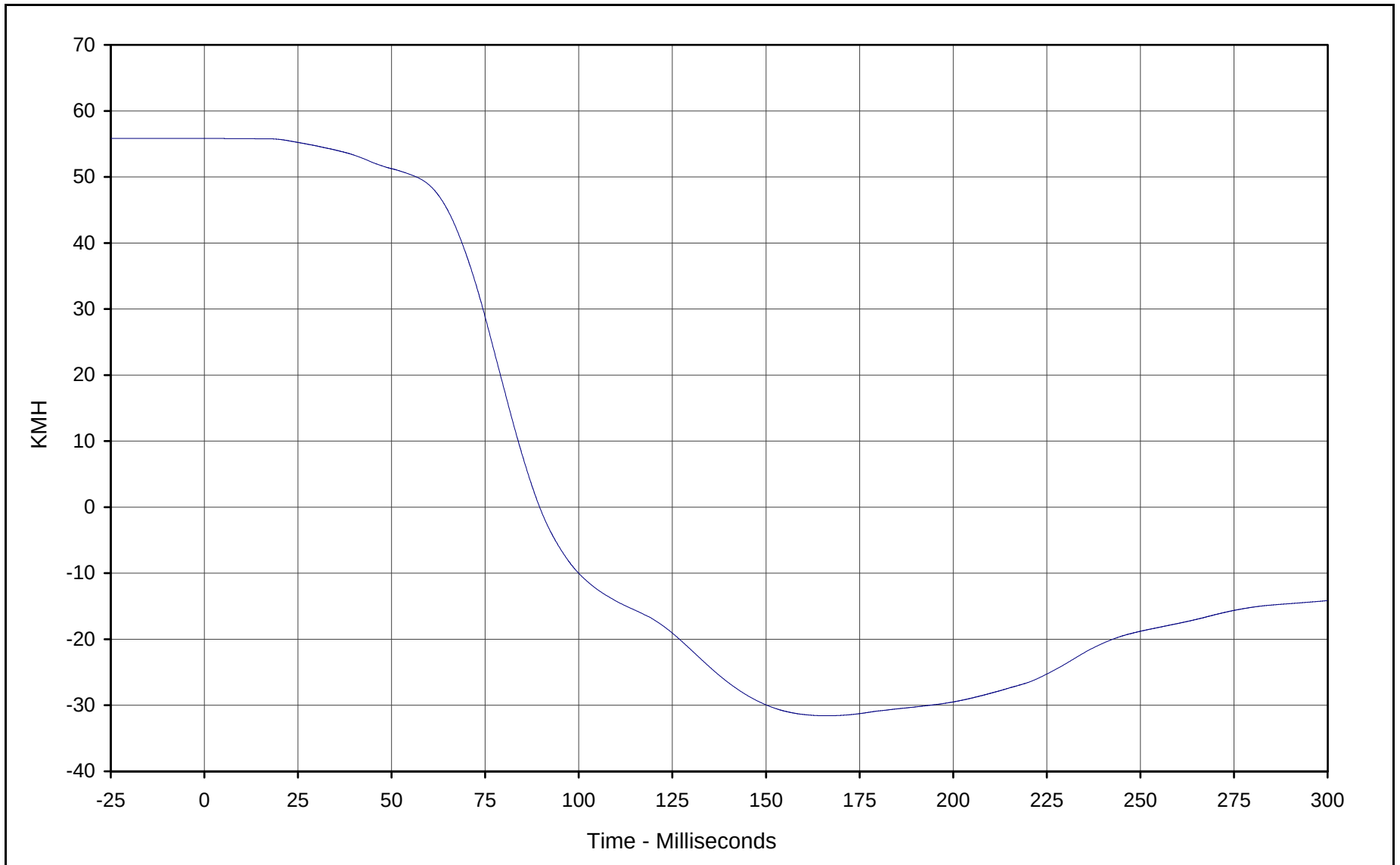




Curve Description: Driver Head Redundant X  
Maximum Value: 10.4 at 229.2 Milliseconds  
Minimum Value: -62.0 at 77.3 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-004

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

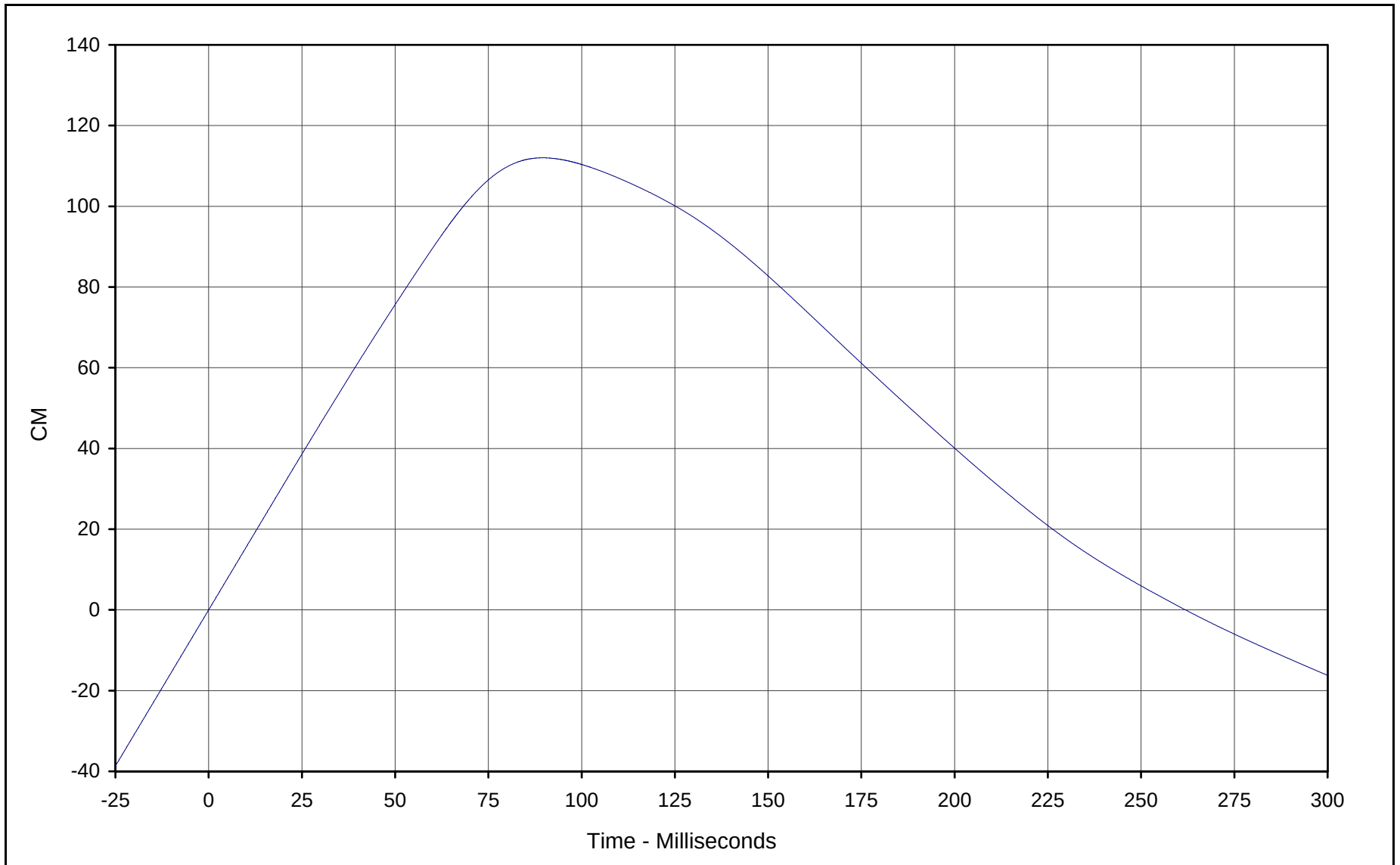




Curve Description: Driver Head Redundant X Velocity  
Maximum Value: 55.8 at 1.7 Milliseconds  
Minimum Value: -31.6 at 166.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-004

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



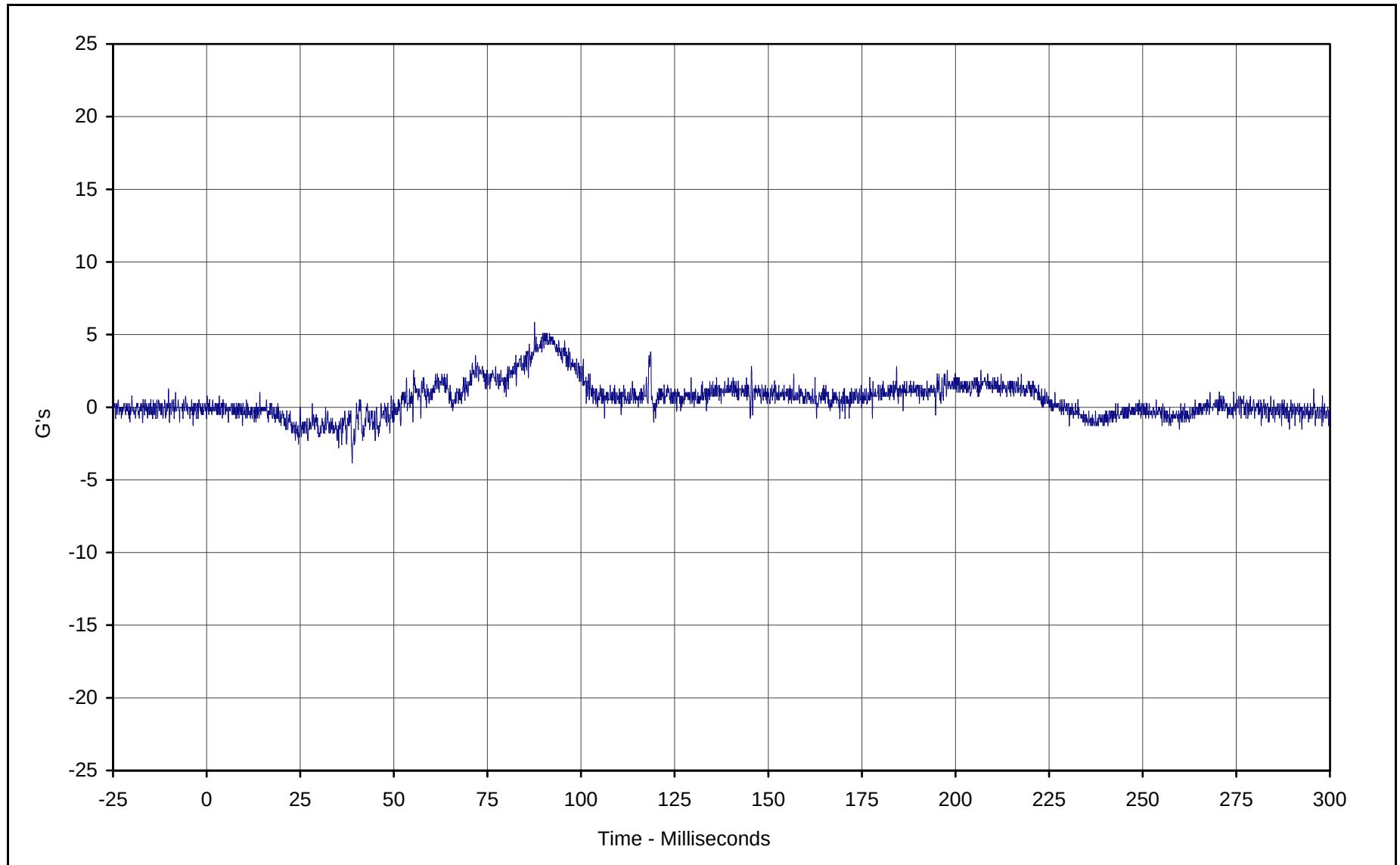


Curve Description: Driver Head Redundant X Displ.  
Maximum Value: 112.0 at 89.6 Milliseconds  
Minimum Value: -16.2 at 299.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-004

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-10



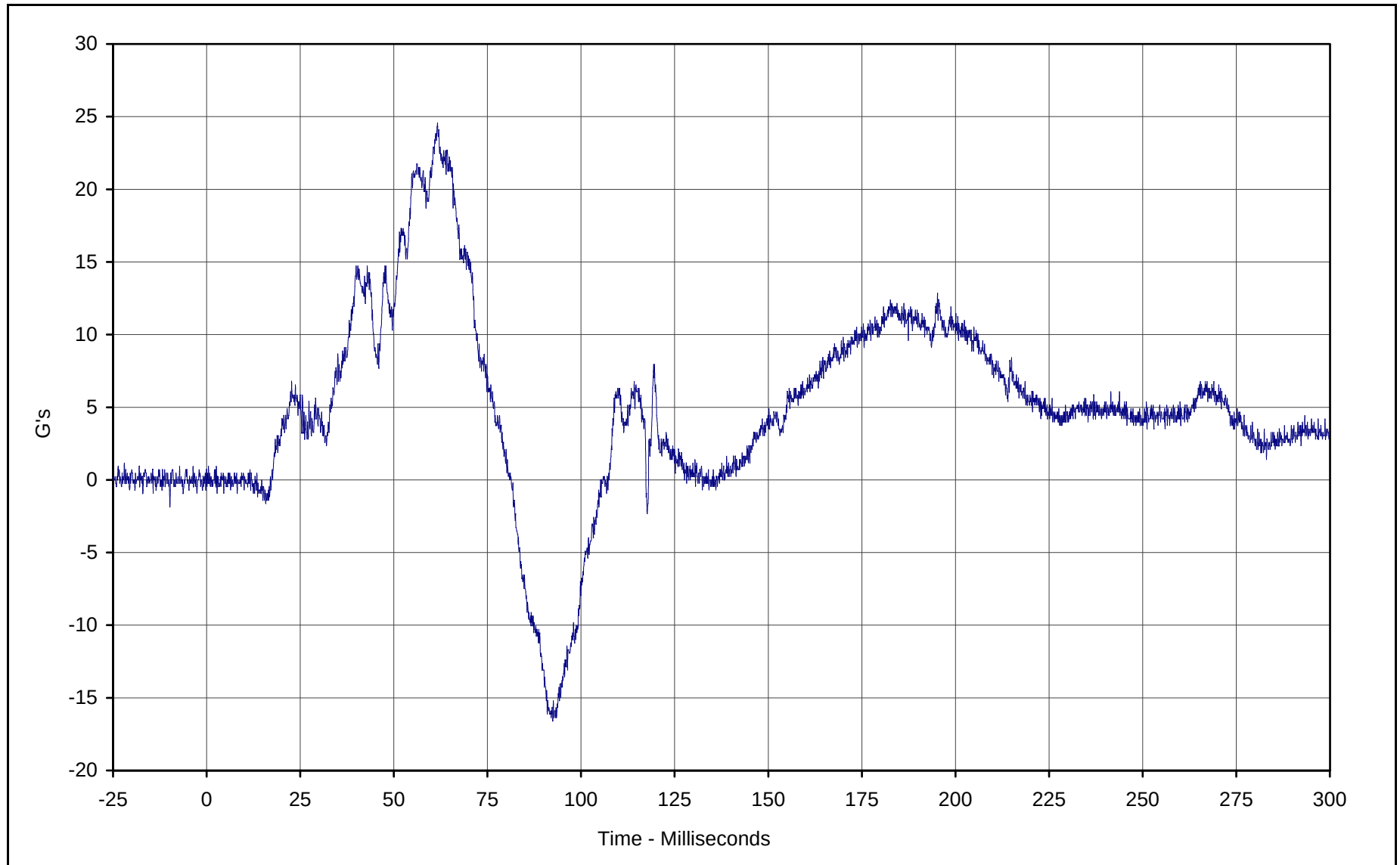
Curve Description: Driver Head Redundant Y  
Maximum Value: 5.8 at 87.6 Milliseconds  
Minimum Value: -3.8 at 38.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-005

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

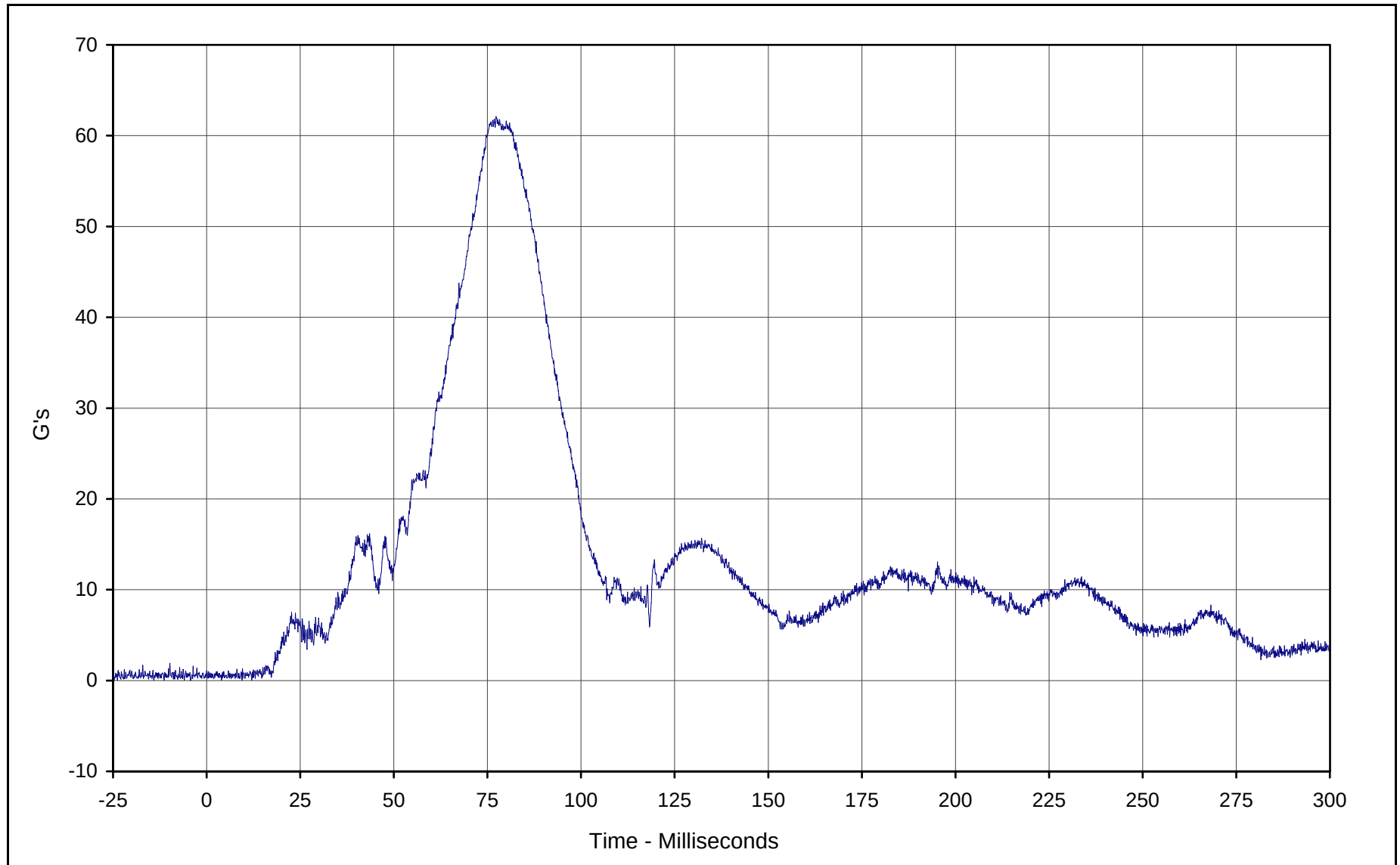




Curve Description: Driver Head Redundant Z  
Maximum Value: 24.5 at 61.7 Milliseconds  
Minimum Value: -16.6 at 92.4 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-006

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

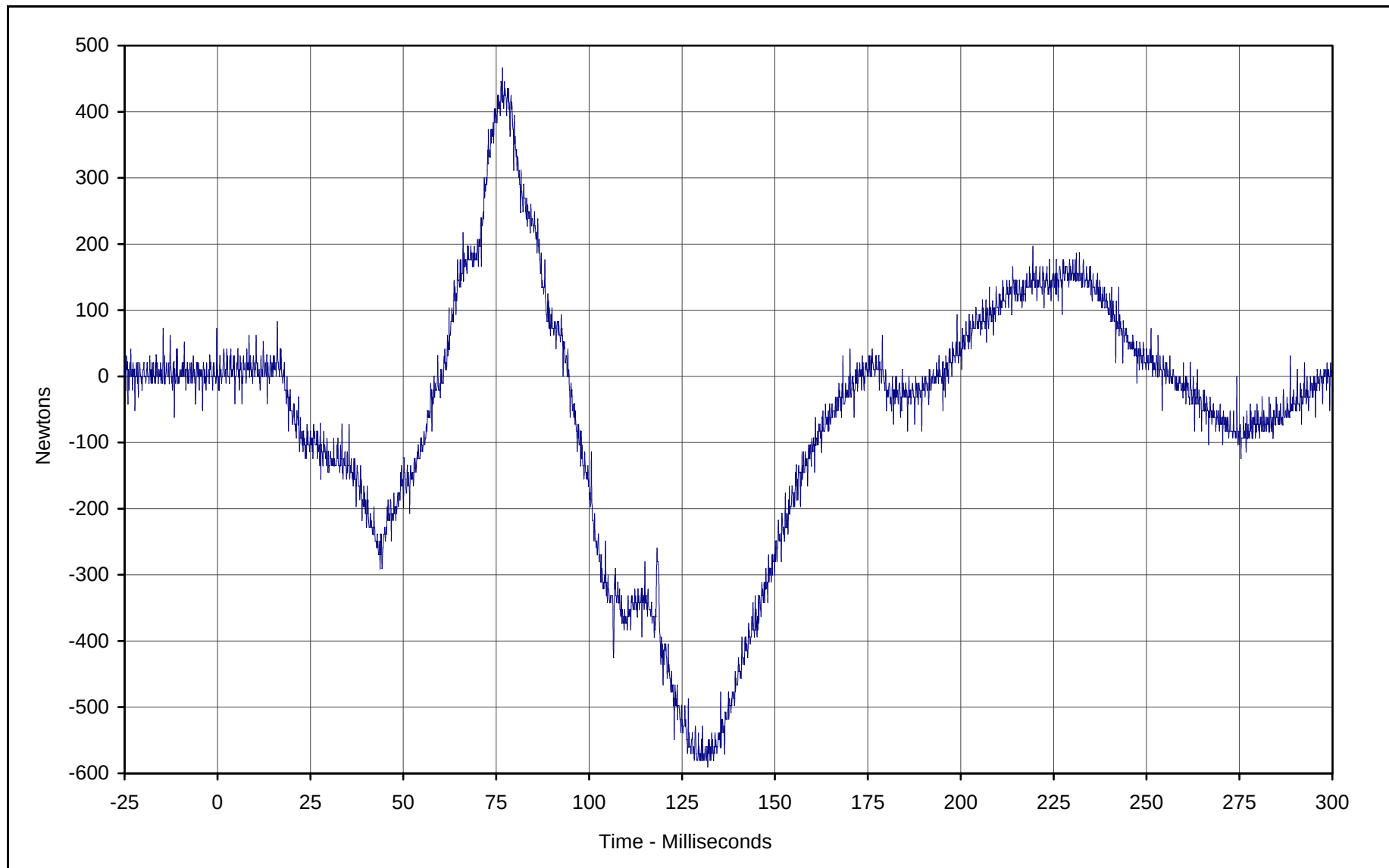




Curve Description: Driver Head Resultant Redundant  
Maximum Value: 62.1 at 77.3 Milliseconds  
Minimum Value: 0.0 at 4.0 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: RES-004

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

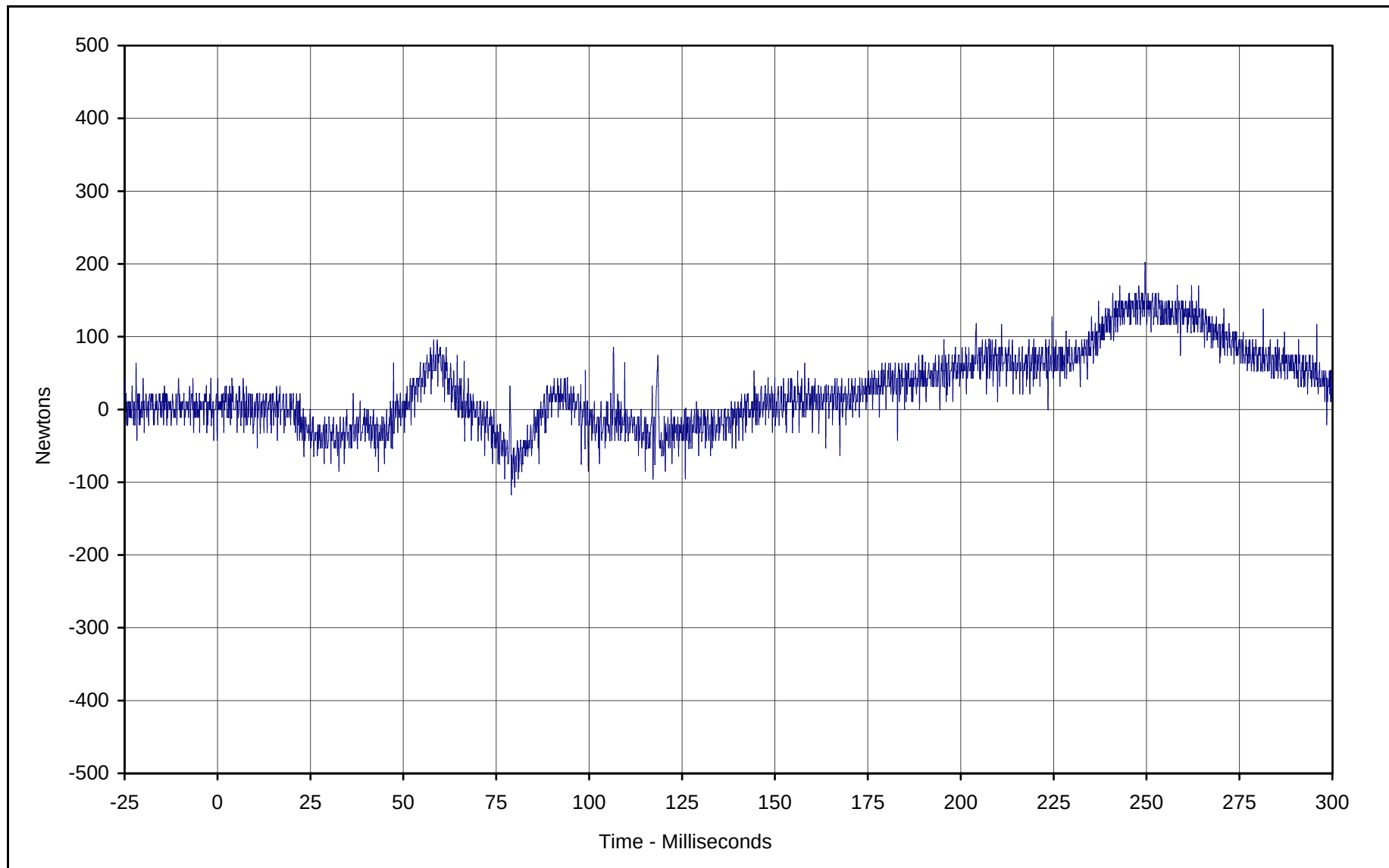




Curve Description: Driver Neck Force X  
Maximum Value: 466.5 at 76.7 Milliseconds  
Minimum Value: -590.9 at 131.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-007

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



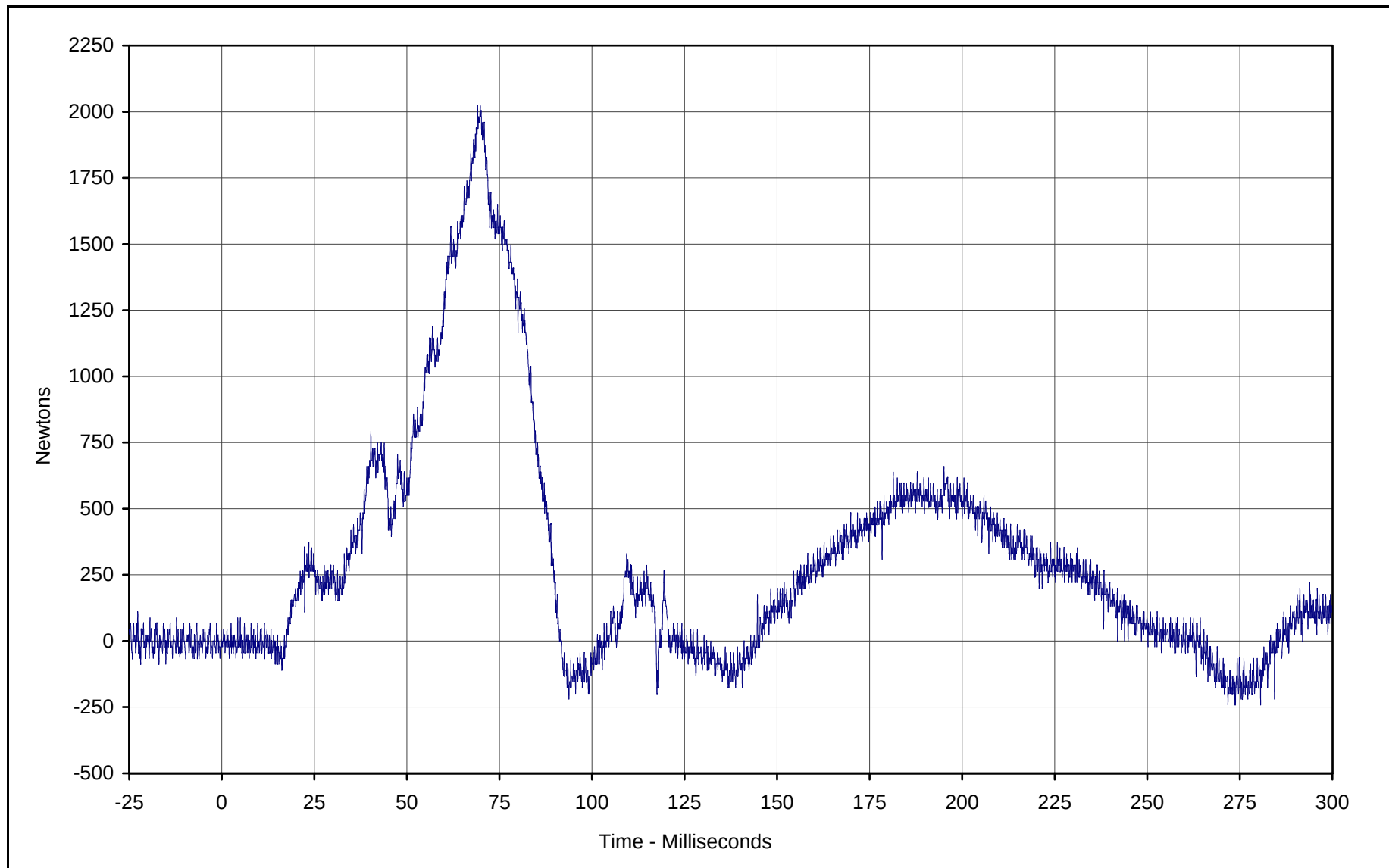


Curve Description: Driver Neck Force Y  
Maximum Value: 202.0 at 249.6 Milliseconds  
Minimum Value: -116.9 at 79.1 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-008

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



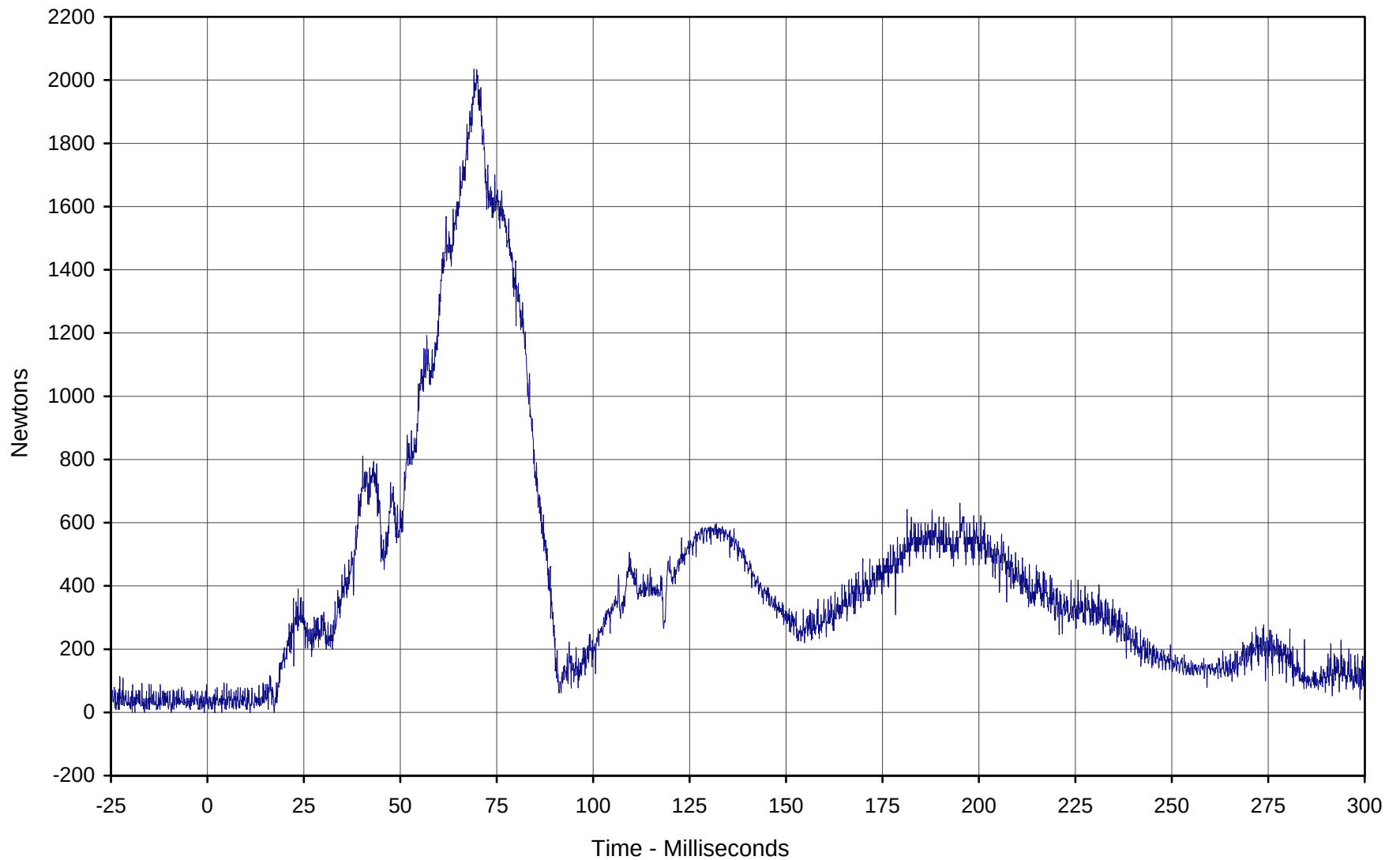




Curve Description: Driver Neck Force Z  
Maximum Value: 2025.5 at 69.1 Milliseconds  
Minimum Value: -242.2 at 271.8 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-009

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

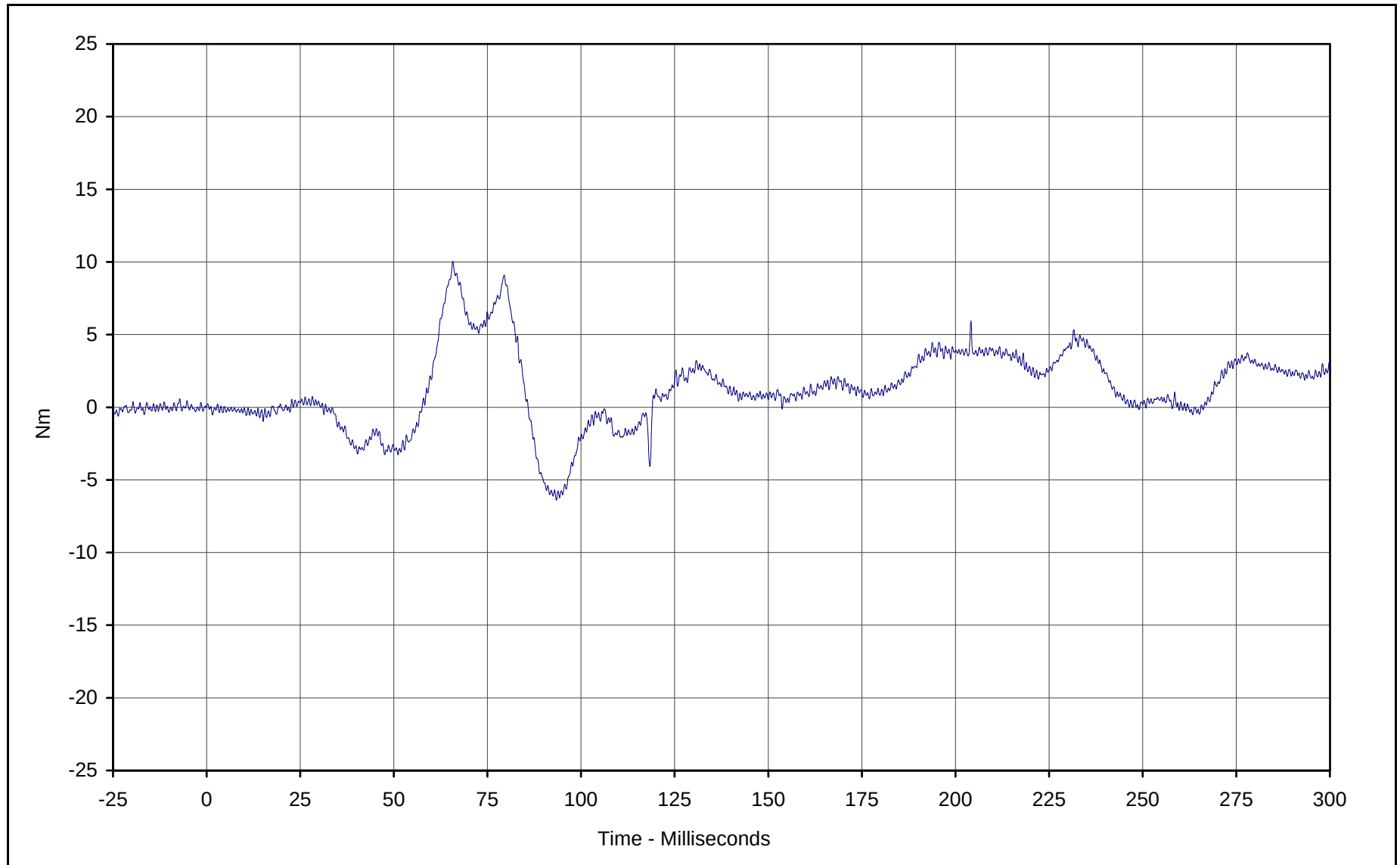




Curve Description: Driver Neck Force Resultant  
Maximum Value: 2035.1 at 69.1 Milliseconds  
Minimum Value: 0.0 at 1.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: RES-007

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

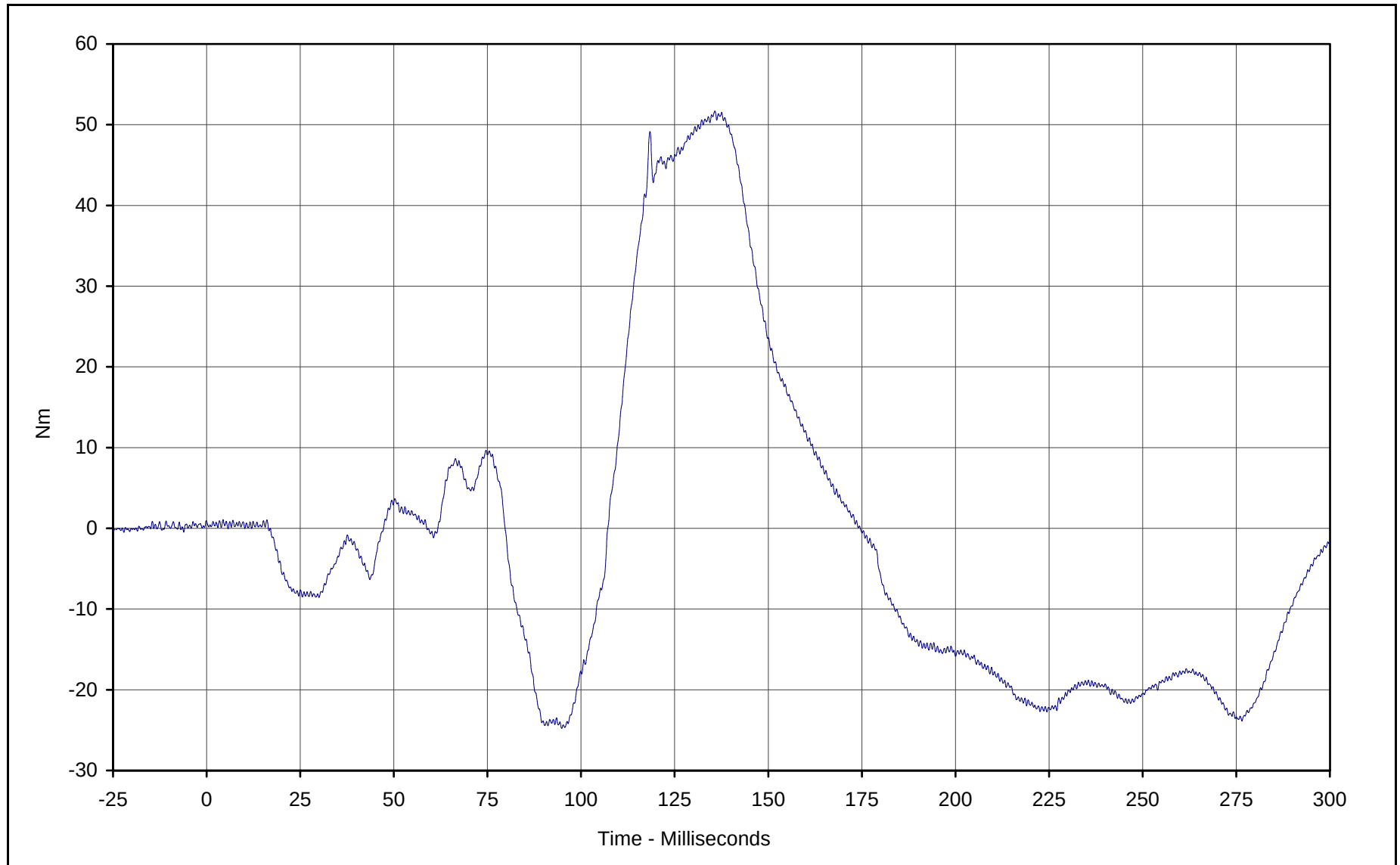




Curve Description: Driver Neck Moment X  
Maximum Value: 10.0 at 65.7 Milliseconds  
Minimum Value: -6.4 at 93.4 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-010

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



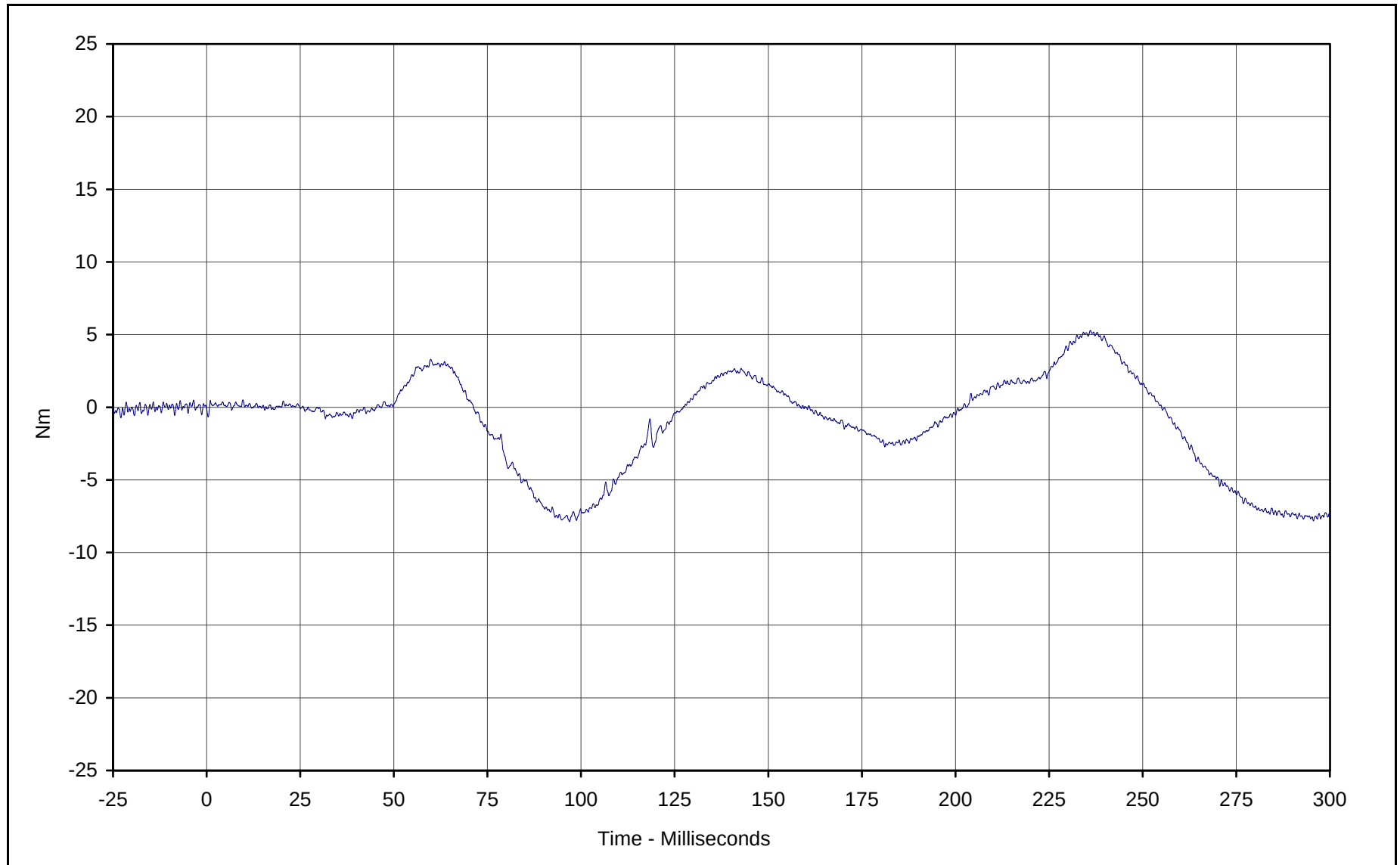


Curve Description: Driver Neck Moment Y  
Maximum Value: 51.7 at 135.8 Milliseconds  
Minimum Value: -24.8 at 94.8 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-011

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



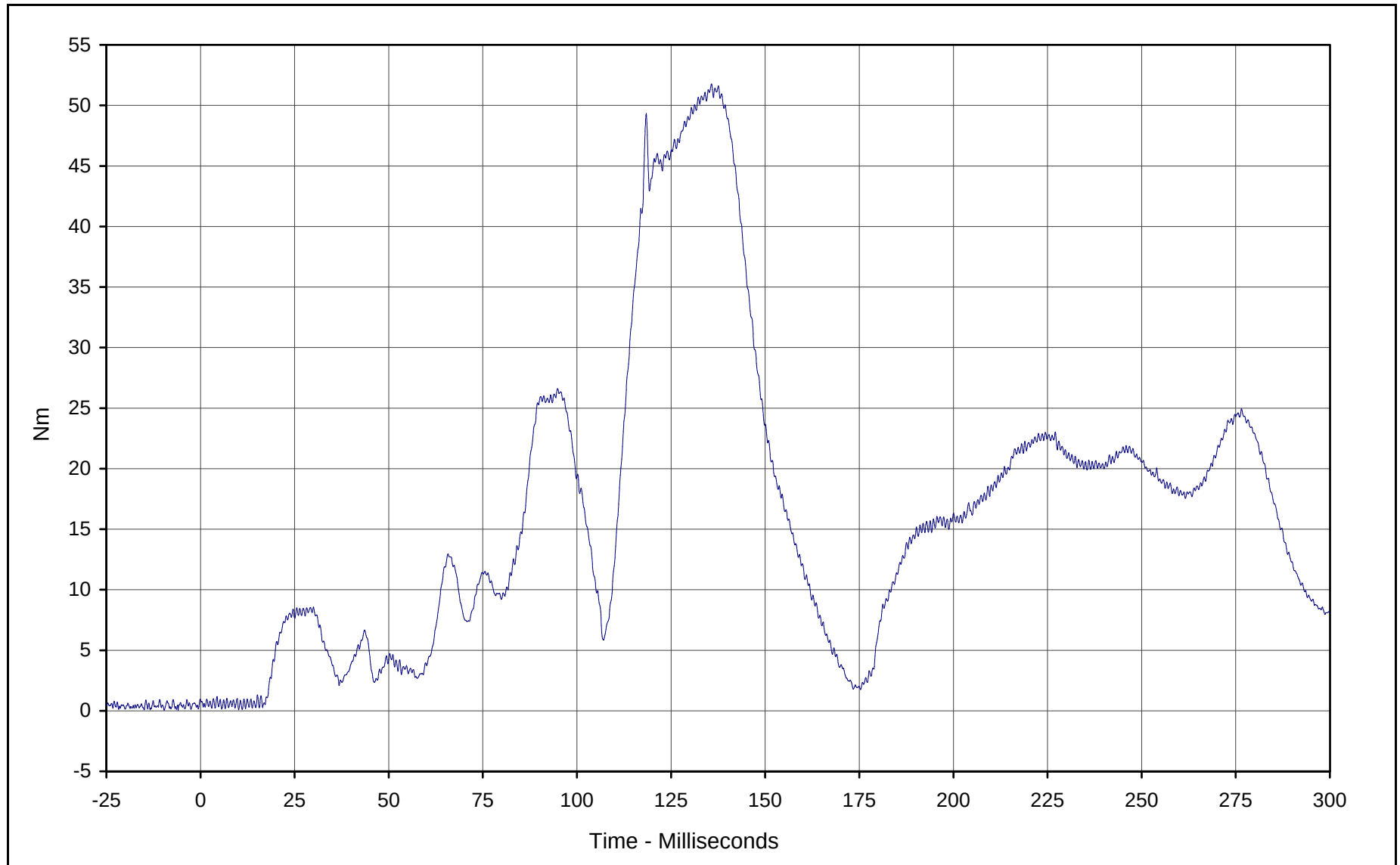




Curve Description: Driver Neck Moment Z  
Maximum Value: 5.3 at 236.0 Milliseconds  
Minimum Value: -7.9 at 96.9 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-012

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



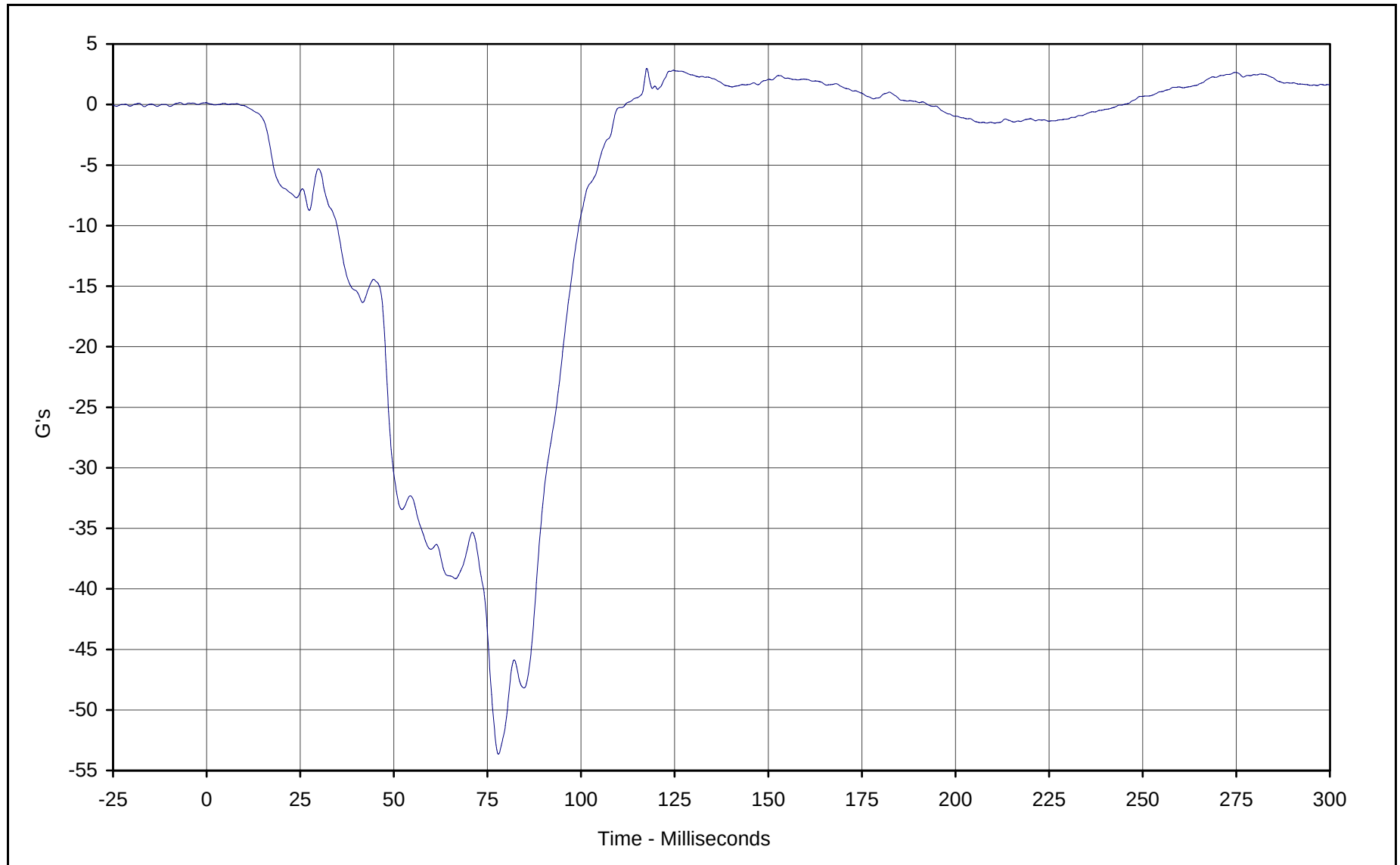


Curve Description: Driver Neck Moment Resultant  
Maximum Value: 51.8 at 135.8 Milliseconds  
Minimum Value: 0.1 at 10.1 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: RES-010

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-21

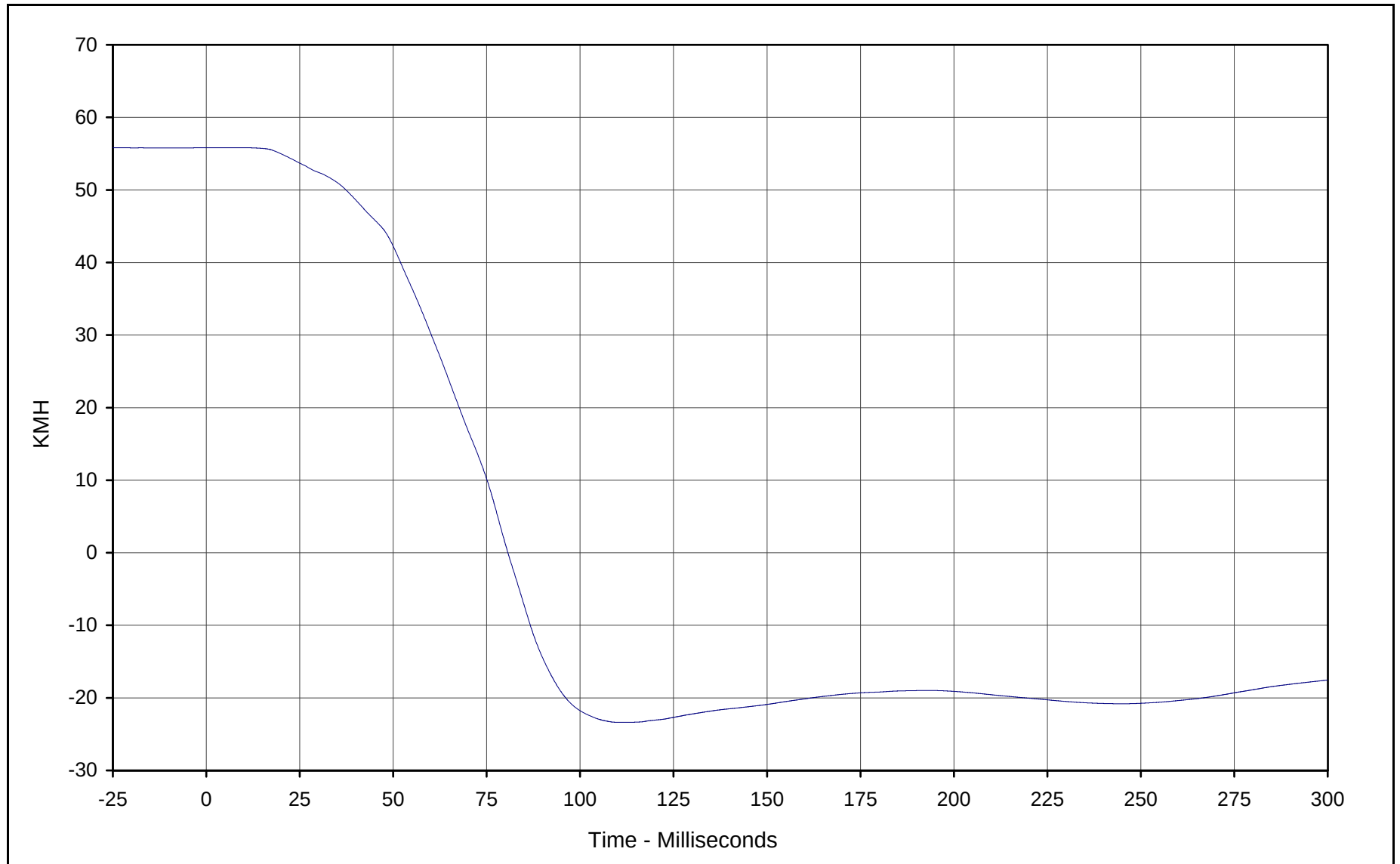


Curve Description: Driver Chest Primary X  
Maximum Value: 3.0 at 117.6 Milliseconds  
Minimum Value: -53.6 at 77.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-013

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

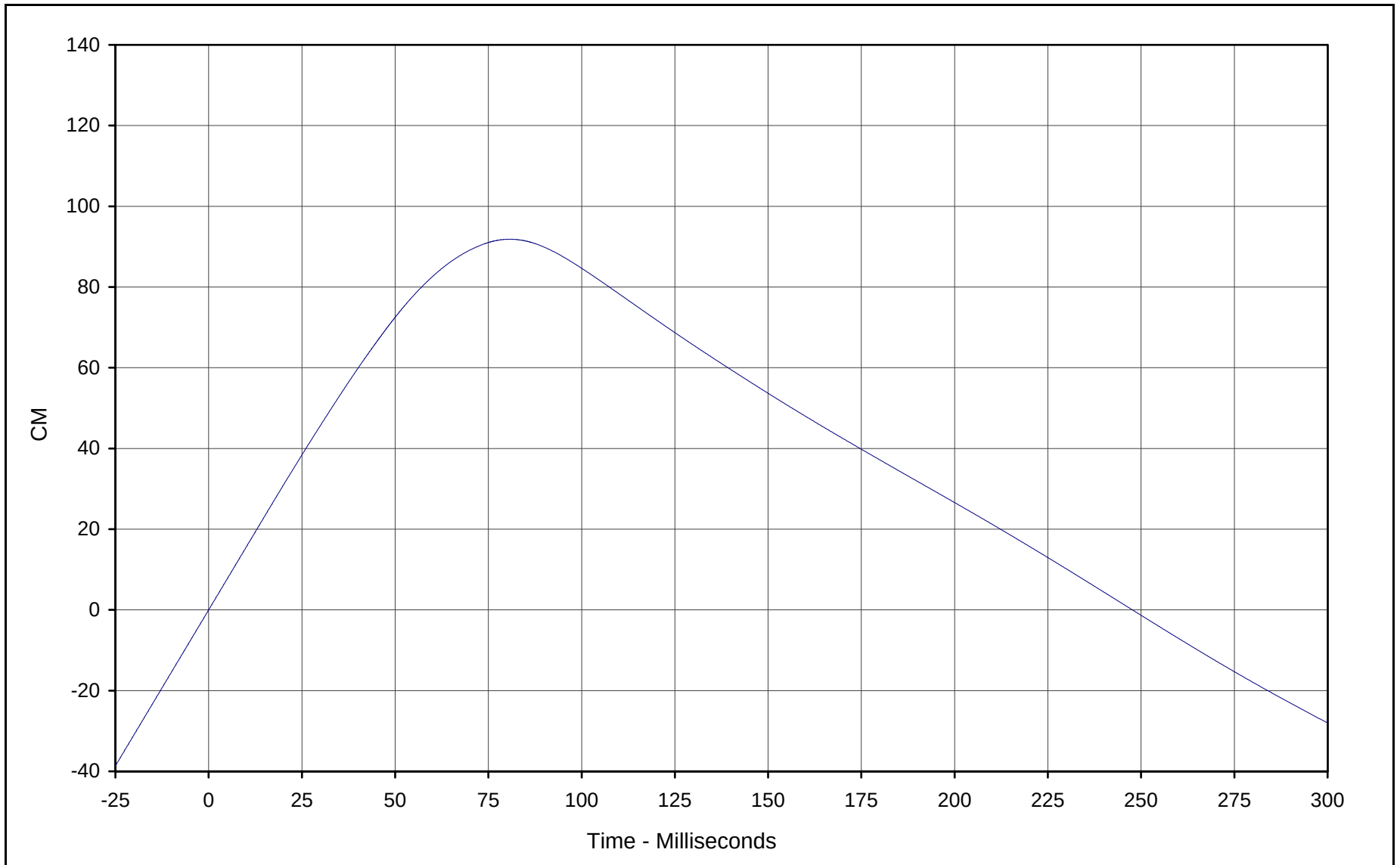


Curve Description: Driver Chest Primary X Velocity  
Maximum Value: 55.8 at 8.7 Milliseconds  
Minimum Value: -23.4 at 111.8 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-013

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



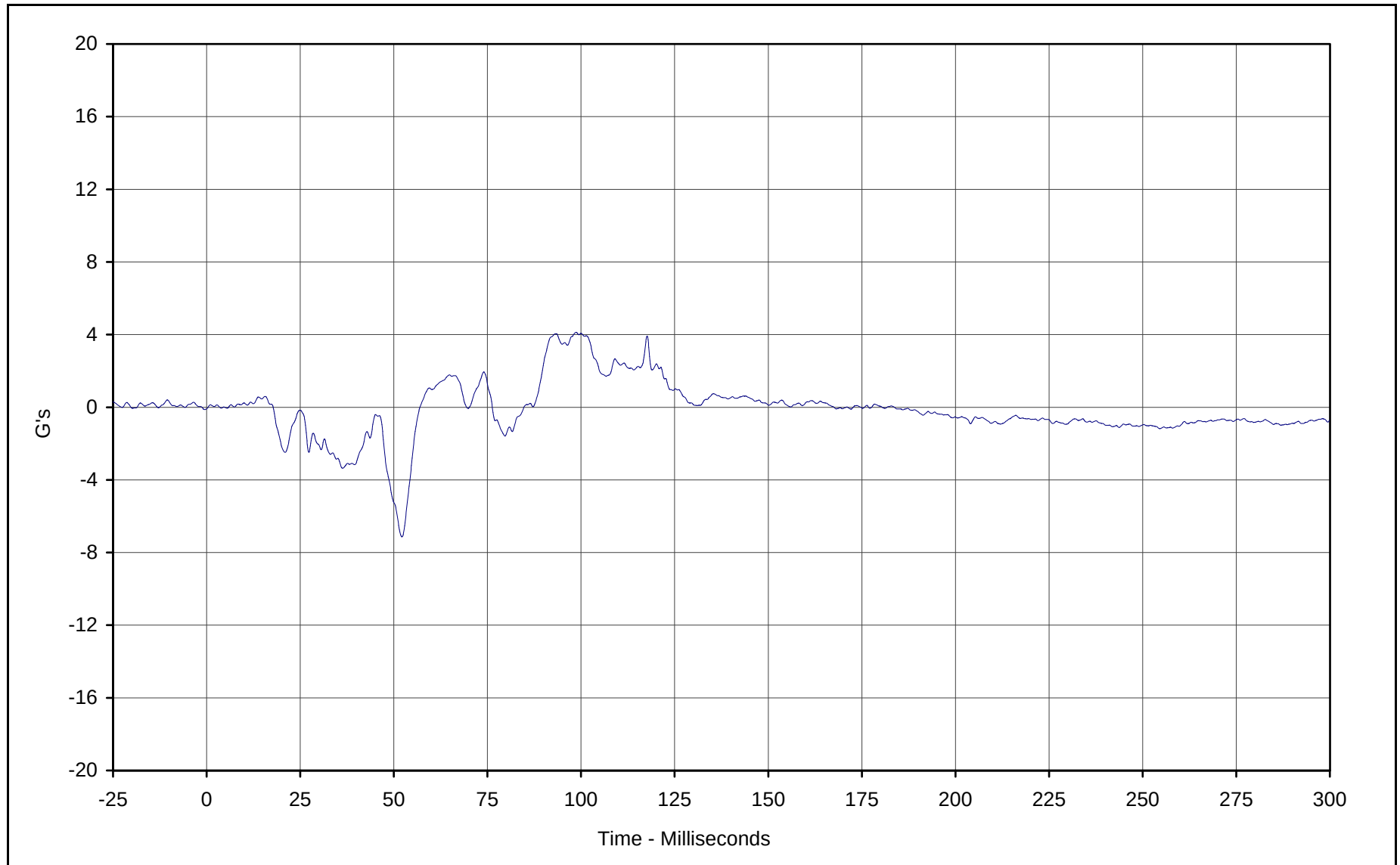




Curve Description: Driver Chest Primary X Displ.  
Maximum Value: 91.8 at 80.7 Milliseconds  
Minimum Value: -28.0 at 299.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-013

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



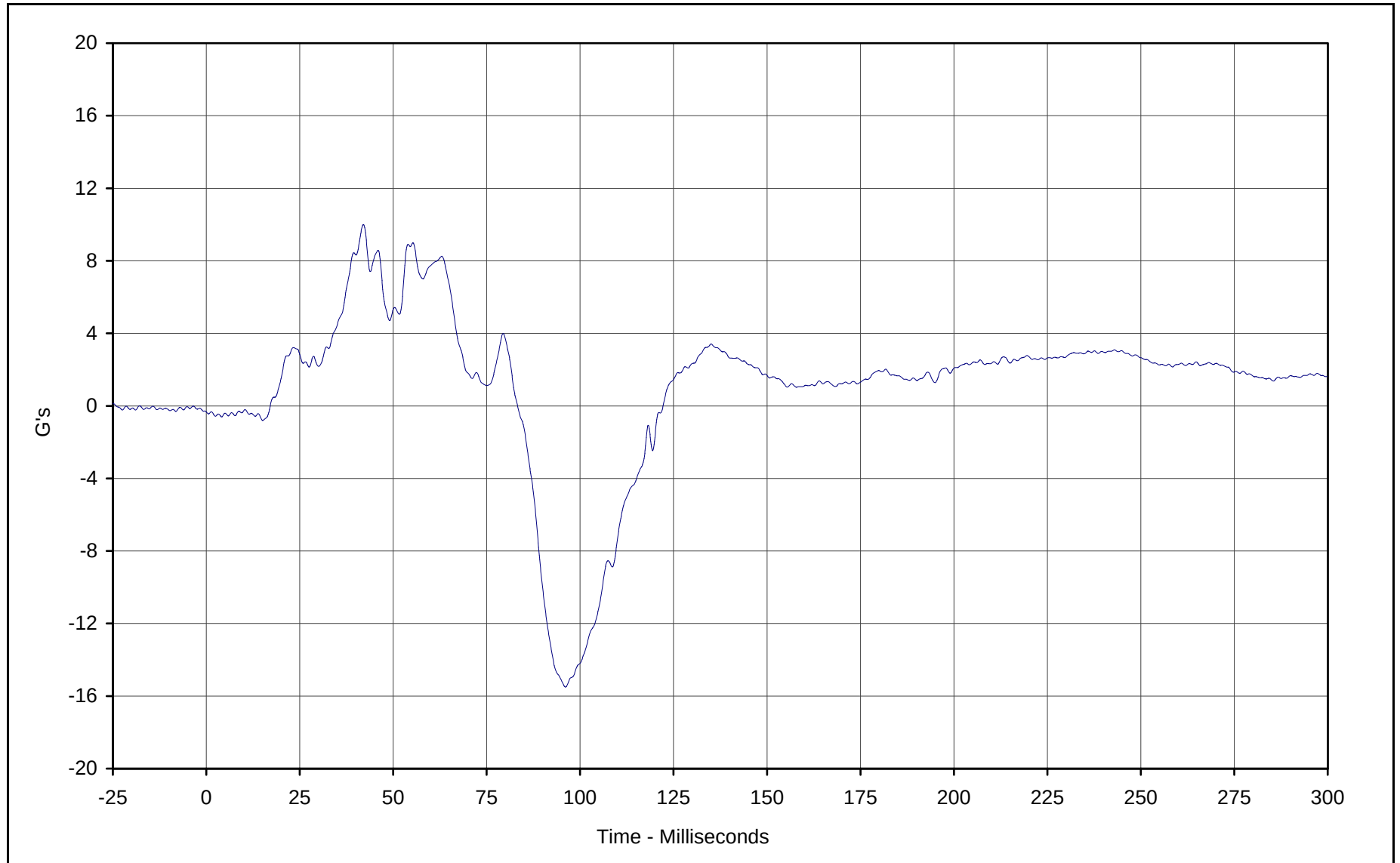


Curve Description: Driver Chest Primary Y  
Maximum Value: 4.1 at 98.7 Milliseconds  
Minimum Value: -7.1 at 52.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-014

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-25

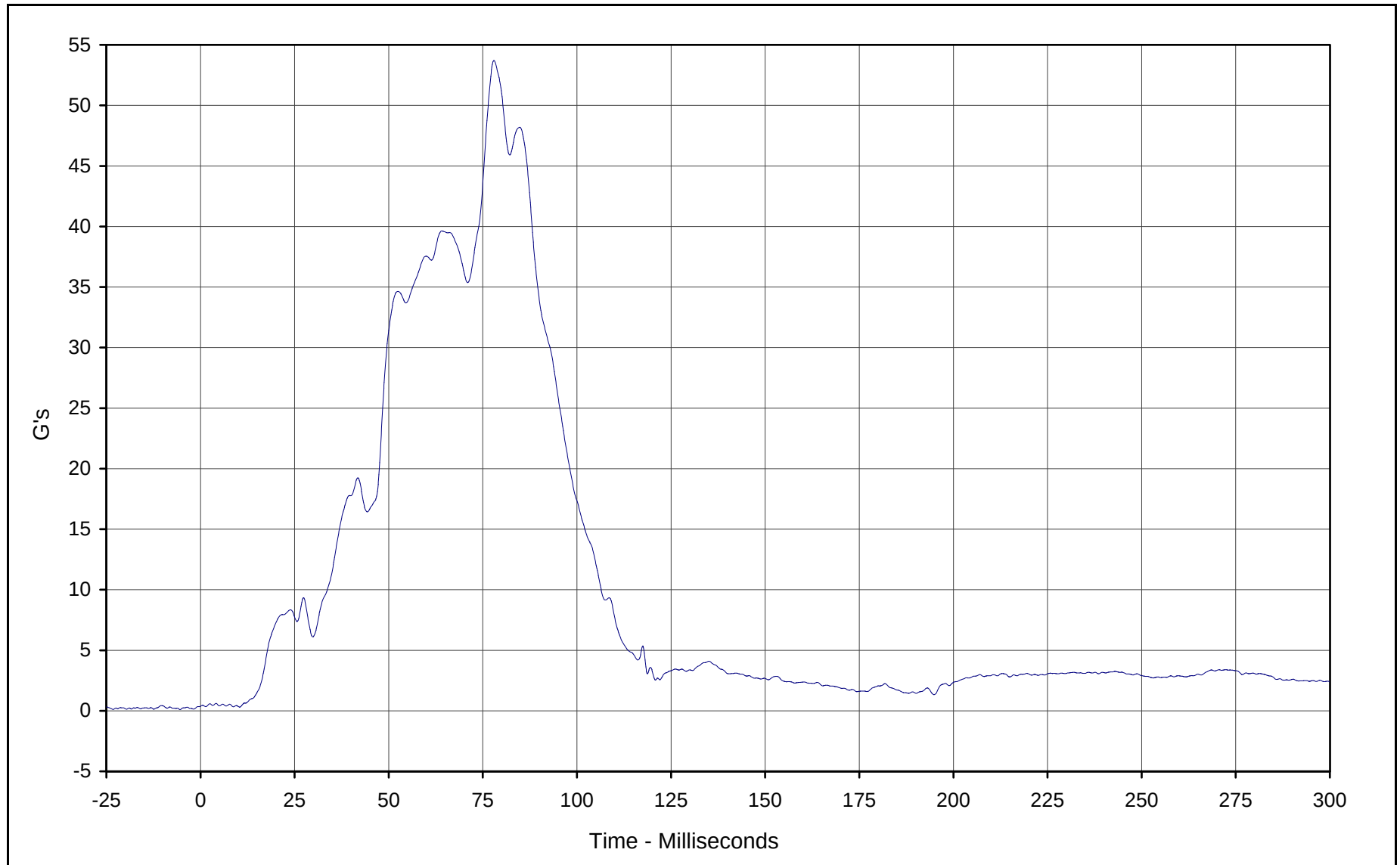


Curve Description: Driver Chest Primary Z  
Maximum Value: 10.0 at 42.0 Milliseconds  
Minimum Value: -15.5 at 96.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-015

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

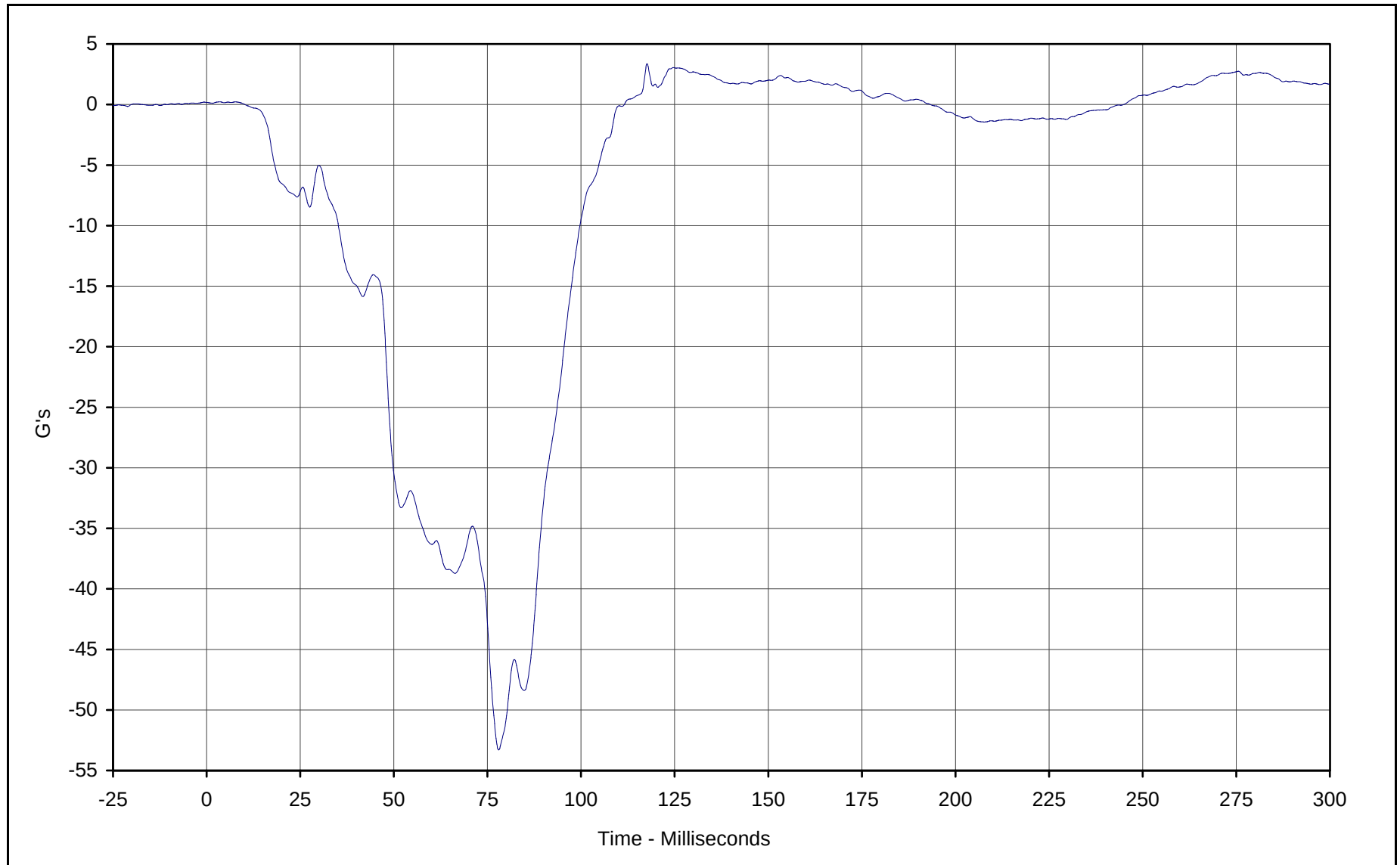


Curve Description: Driver Chest Resultant Primary  
Maximum Value: 53.7 at 77.9 Milliseconds  
Minimum Value: 0.3 at 10.4 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: RES-013

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



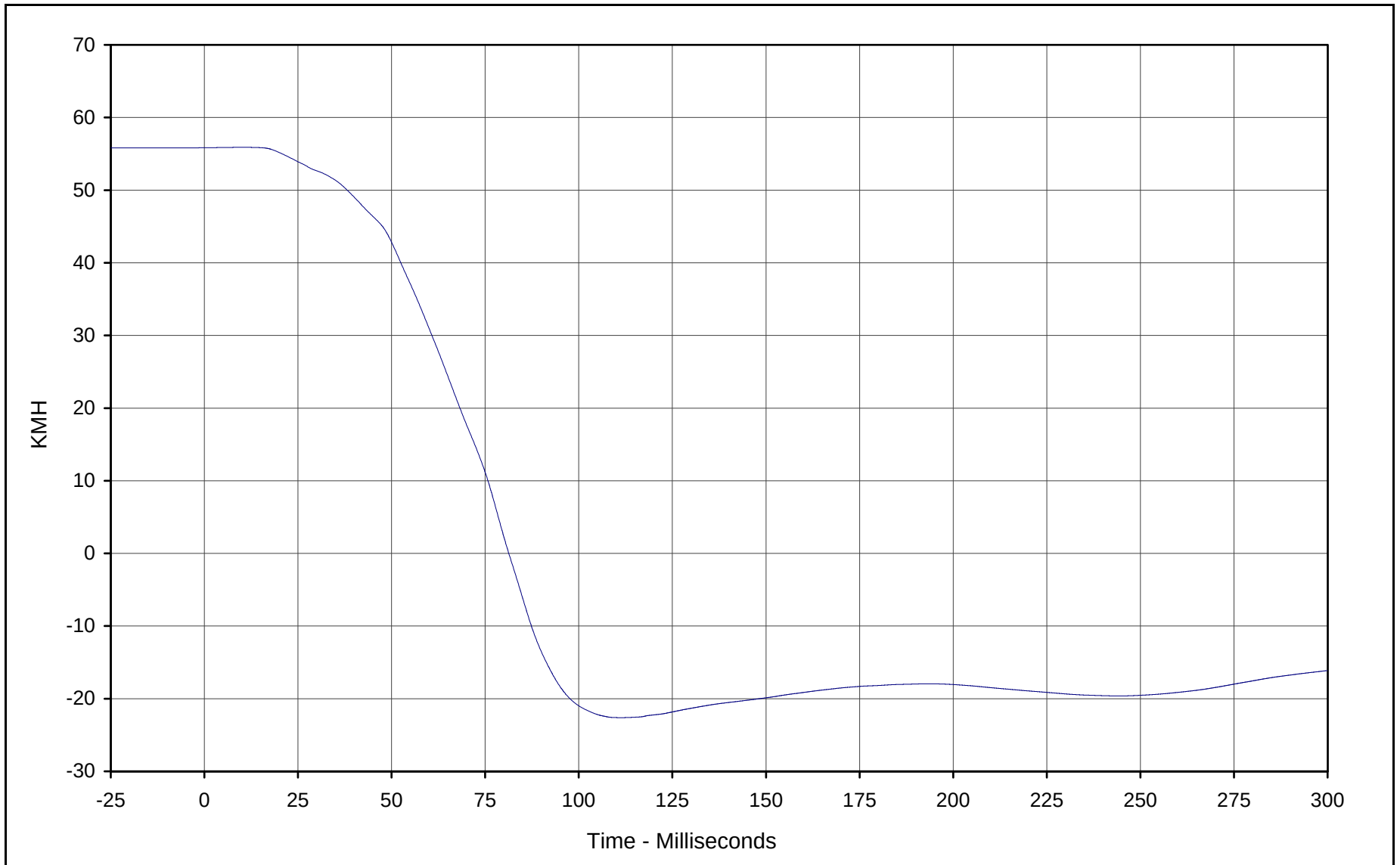




Curve Description: Driver Chest Redundant X  
Maximum Value: 3.4 at 117.6 Milliseconds  
Minimum Value: -53.3 at 78.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-016

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

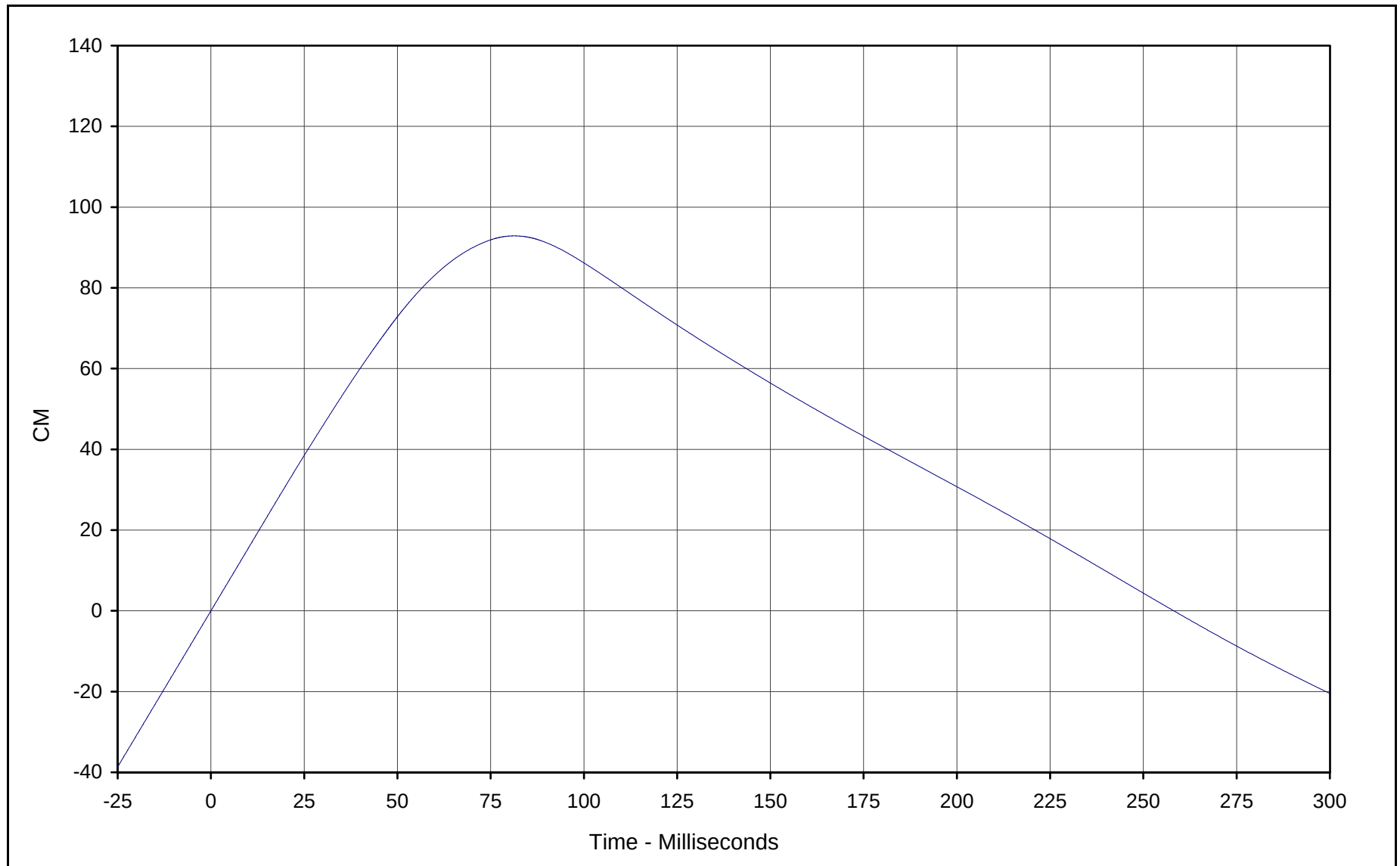




Curve Description: Driver Chest Redundant X Velocity  
Maximum Value: 55.9 at 10.2 Milliseconds  
Minimum Value: -22.6 at 111.5 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-016

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



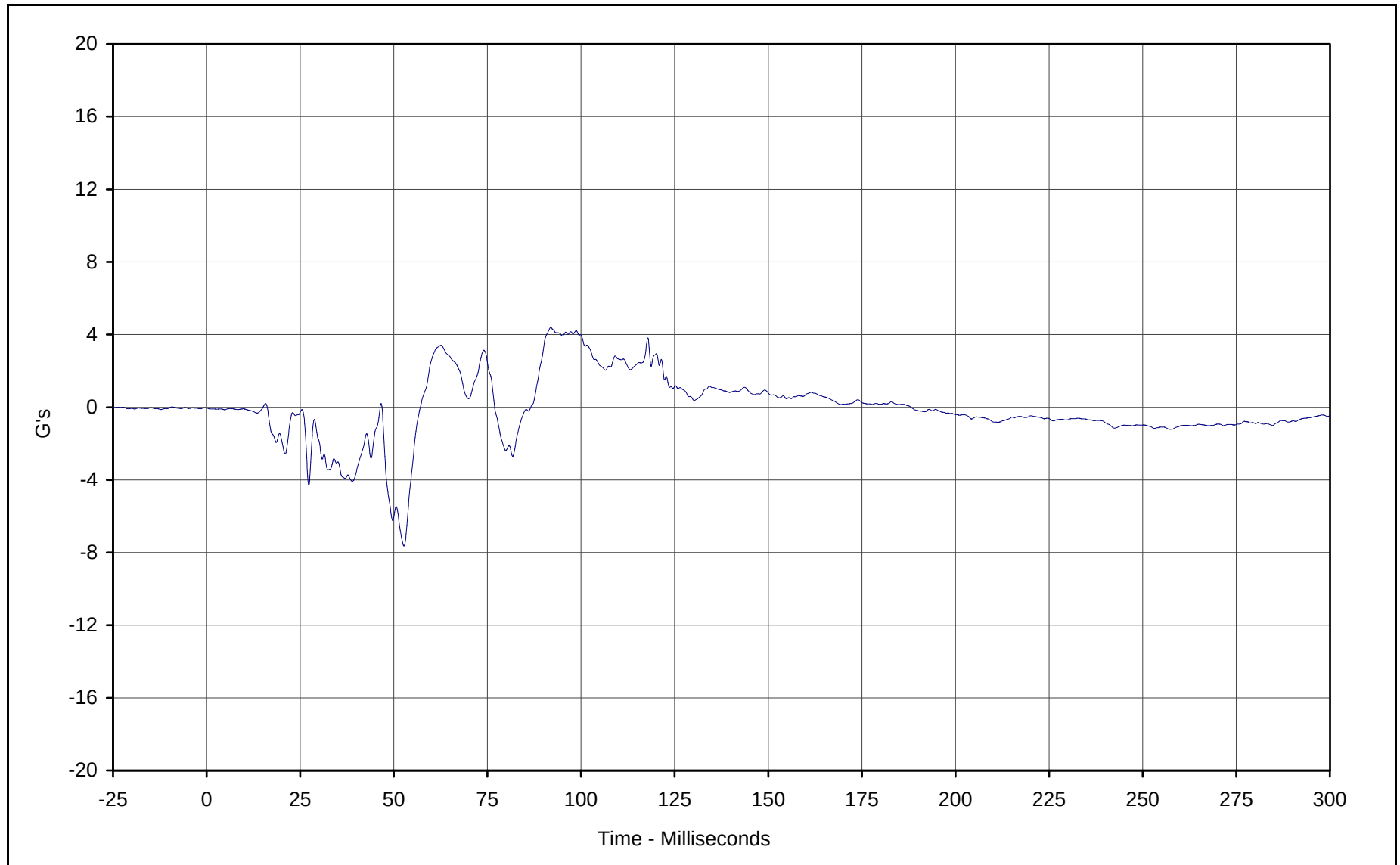


Curve Description: Driver Chest Redundant X Displ.  
Maximum Value: 92.9 at 81.3 Milliseconds  
Minimum Value: -20.4 at 299.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-016

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-30



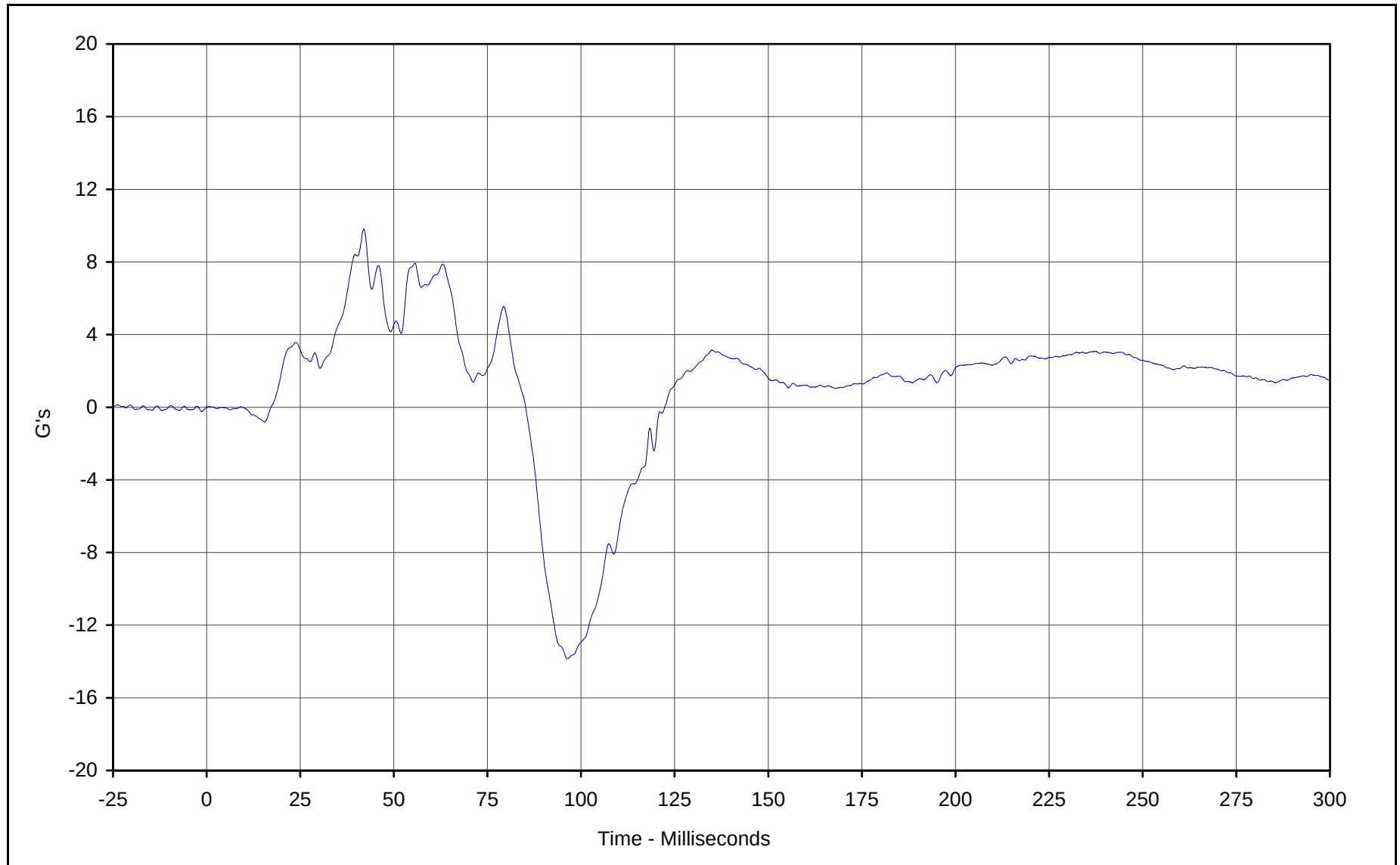
Curve Description: Driver Chest Redundant Y  
Maximum Value: 4.4 at 91.9 Milliseconds  
Minimum Value: -7.6 at 52.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-017

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

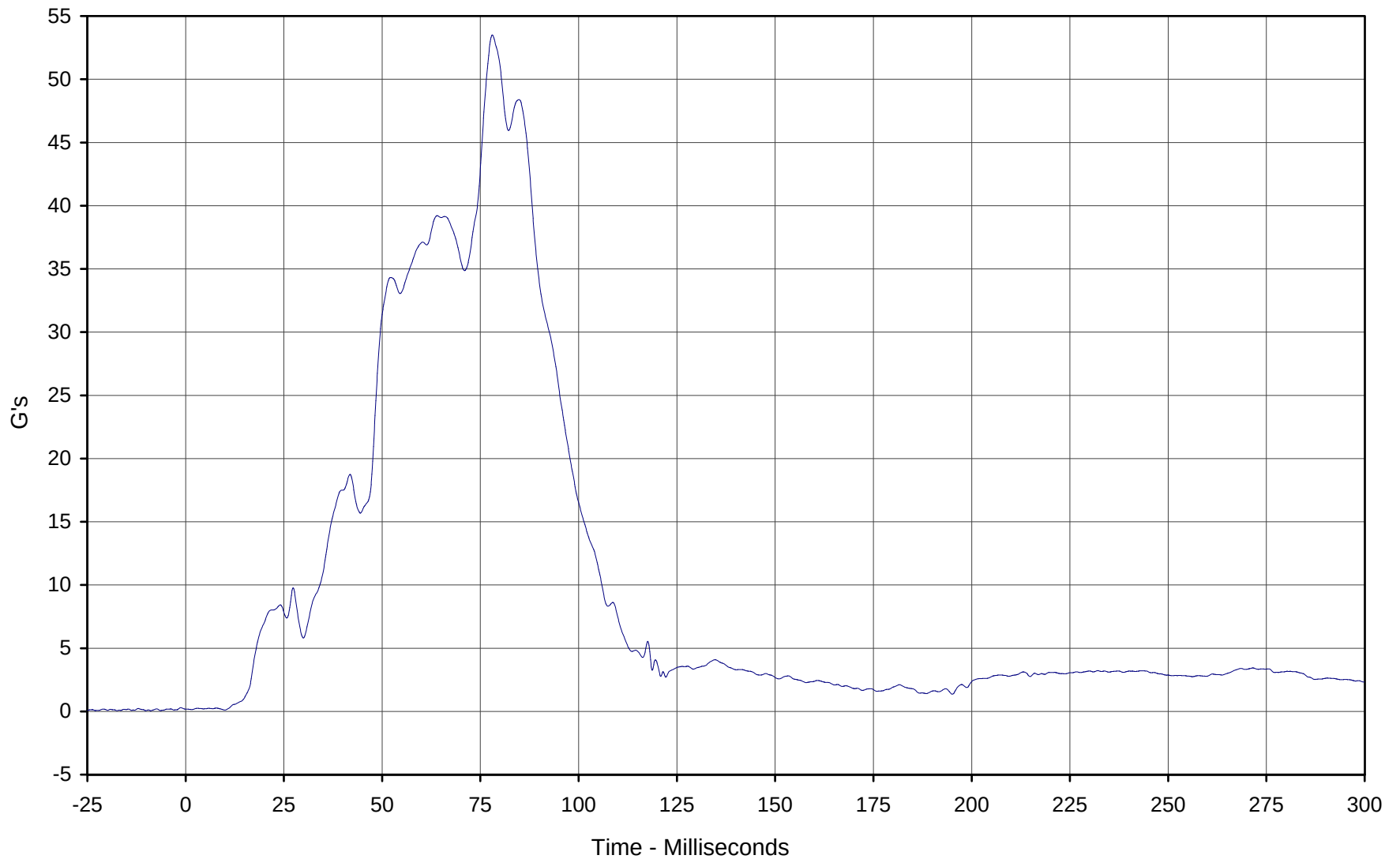




Curve Description: Driver Chest Redundant Z  
Maximum Value: 9.8 at 42.0 Milliseconds  
Minimum Value: -13.9 at 96.4 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-018

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

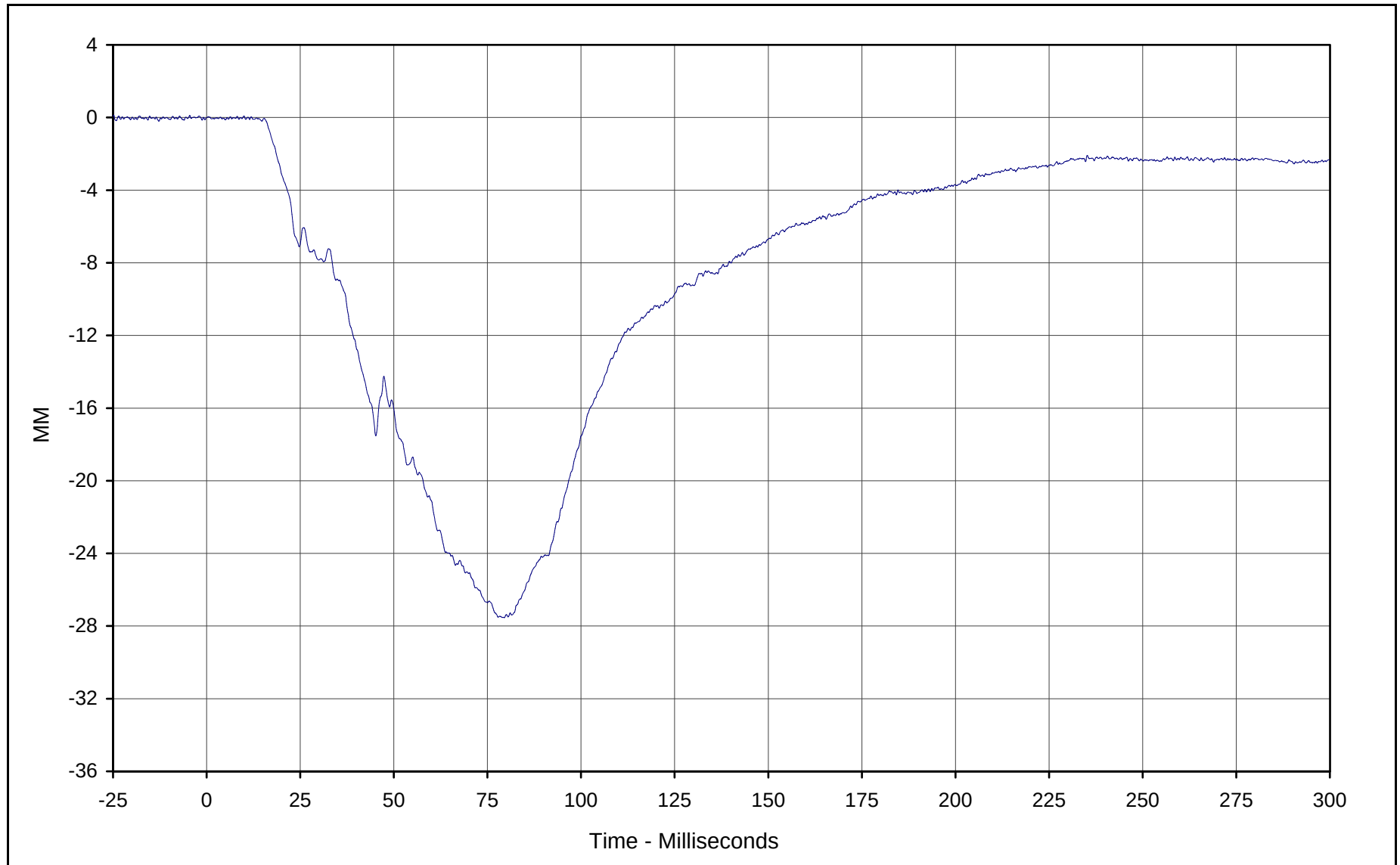




Curve Description: Driver Chest Resultant Redundant  
Maximum Value: 53.5 at 78.0 Milliseconds  
Minimum Value: 0.1 at 9.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: RES-016

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

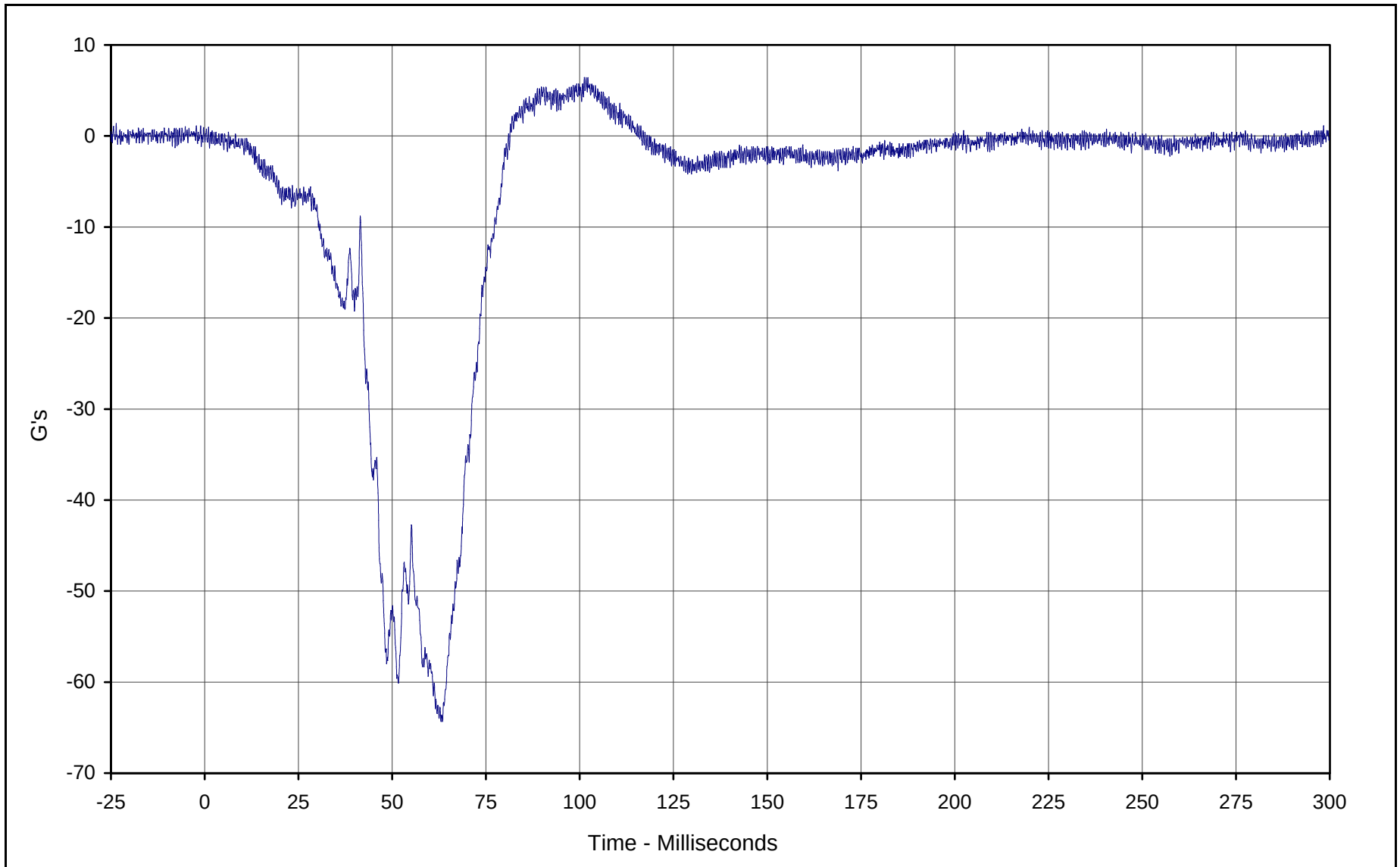




Curve Description: Driver Chest Displacement X  
Maximum Value: 0.1 at 9.9 Milliseconds  
Minimum Value: -27.5 at 79.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-019

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Driver Pelvis X

Maximum Value: 6.4 at 101.2 Milliseconds

Minimum Value: -64.3 at 63.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/09/01

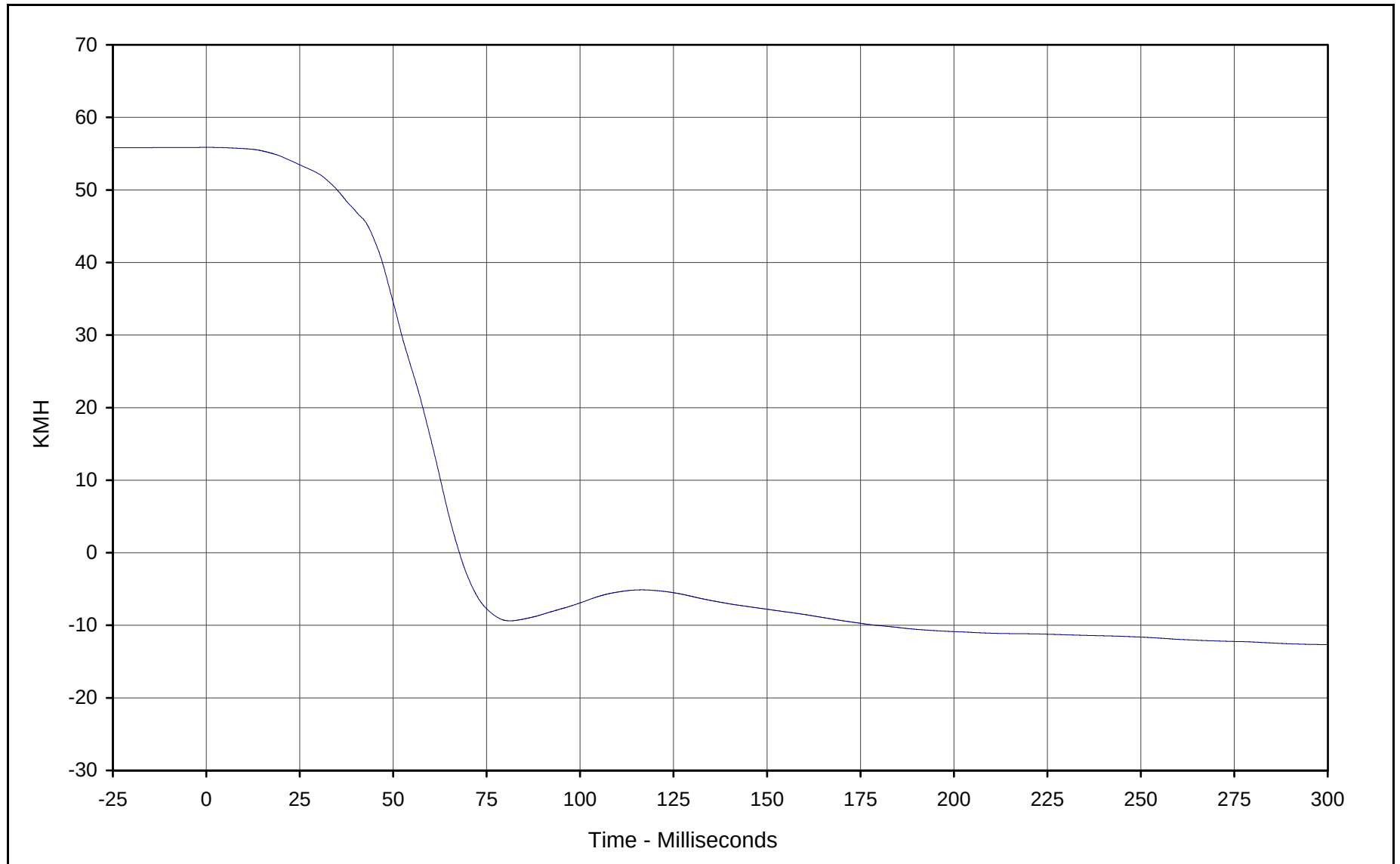
Curve Number: FIL-020

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



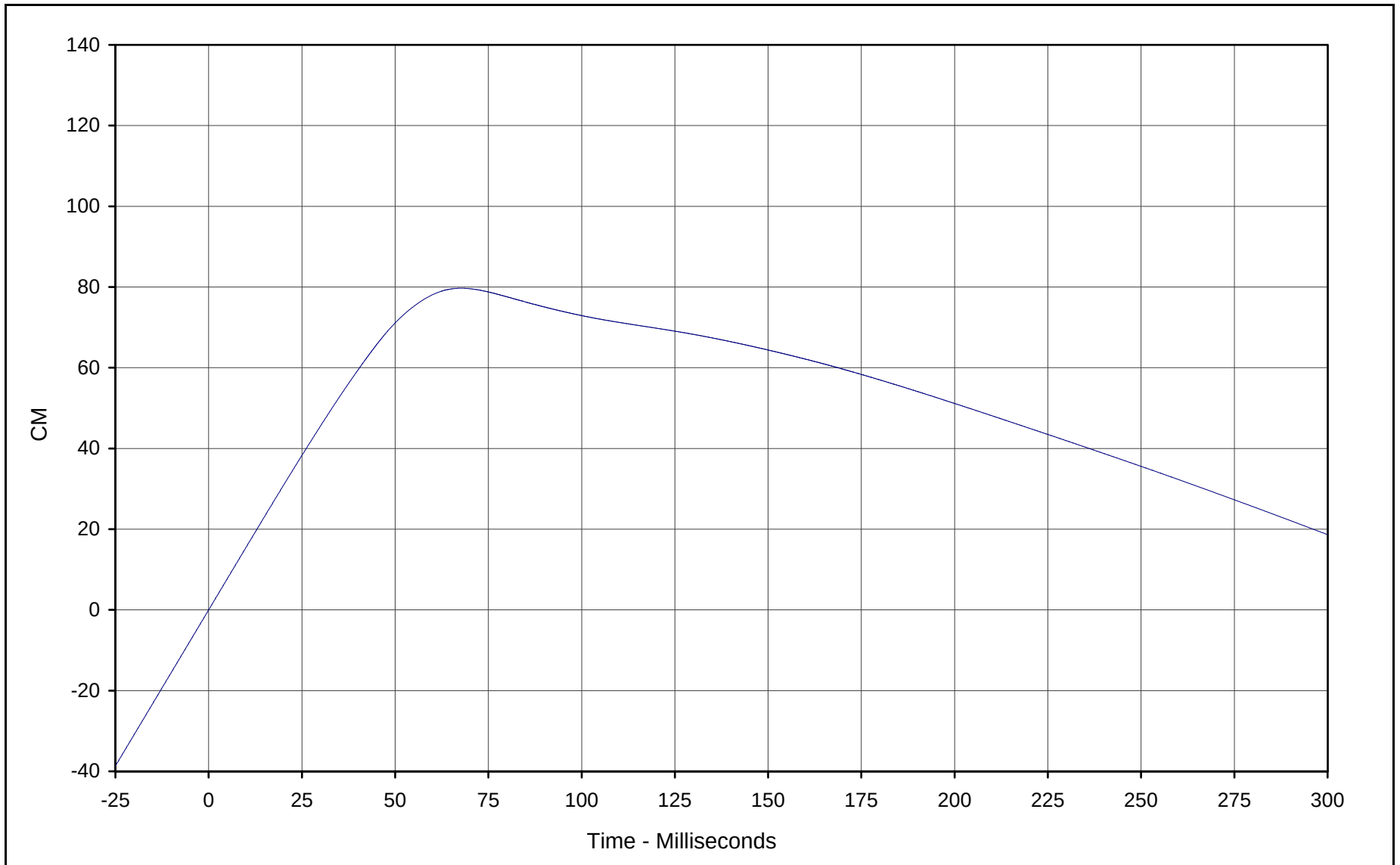




Curve Description: Driver Pelvis X Velocity  
Maximum Value: 55.9 at 0.8 Milliseconds  
Minimum Value: -12.6 at 298.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-020

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

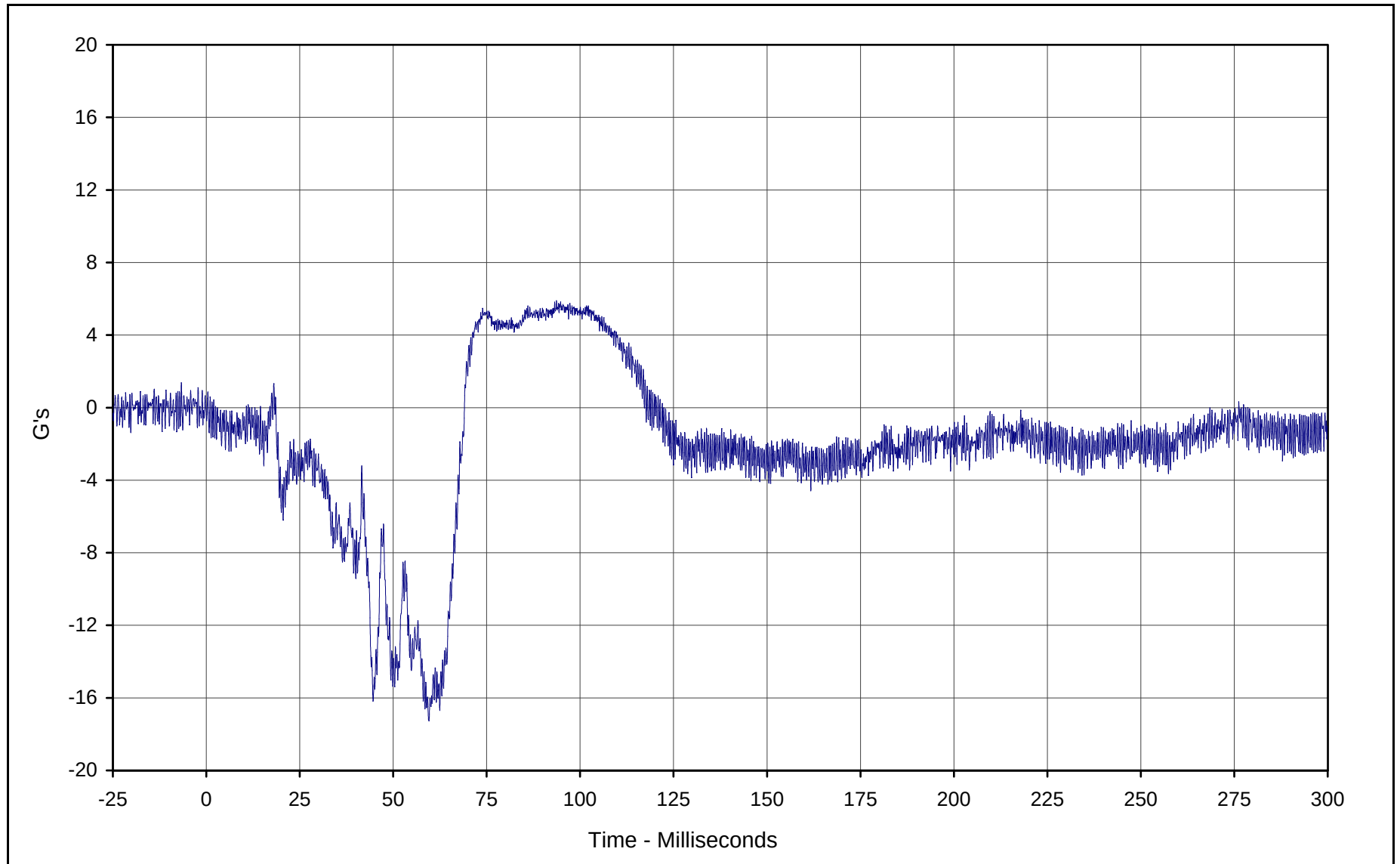




Curve Description: Driver Pelvis X Displ.  
Maximum Value: 79.7 at 67.7 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-020

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Driver Pelvis Y

Maximum Value: 5.9 at 93.7 Milliseconds

Minimum Value: -17.3 at 59.6 Milliseconds

SAE Filter Class: 1000

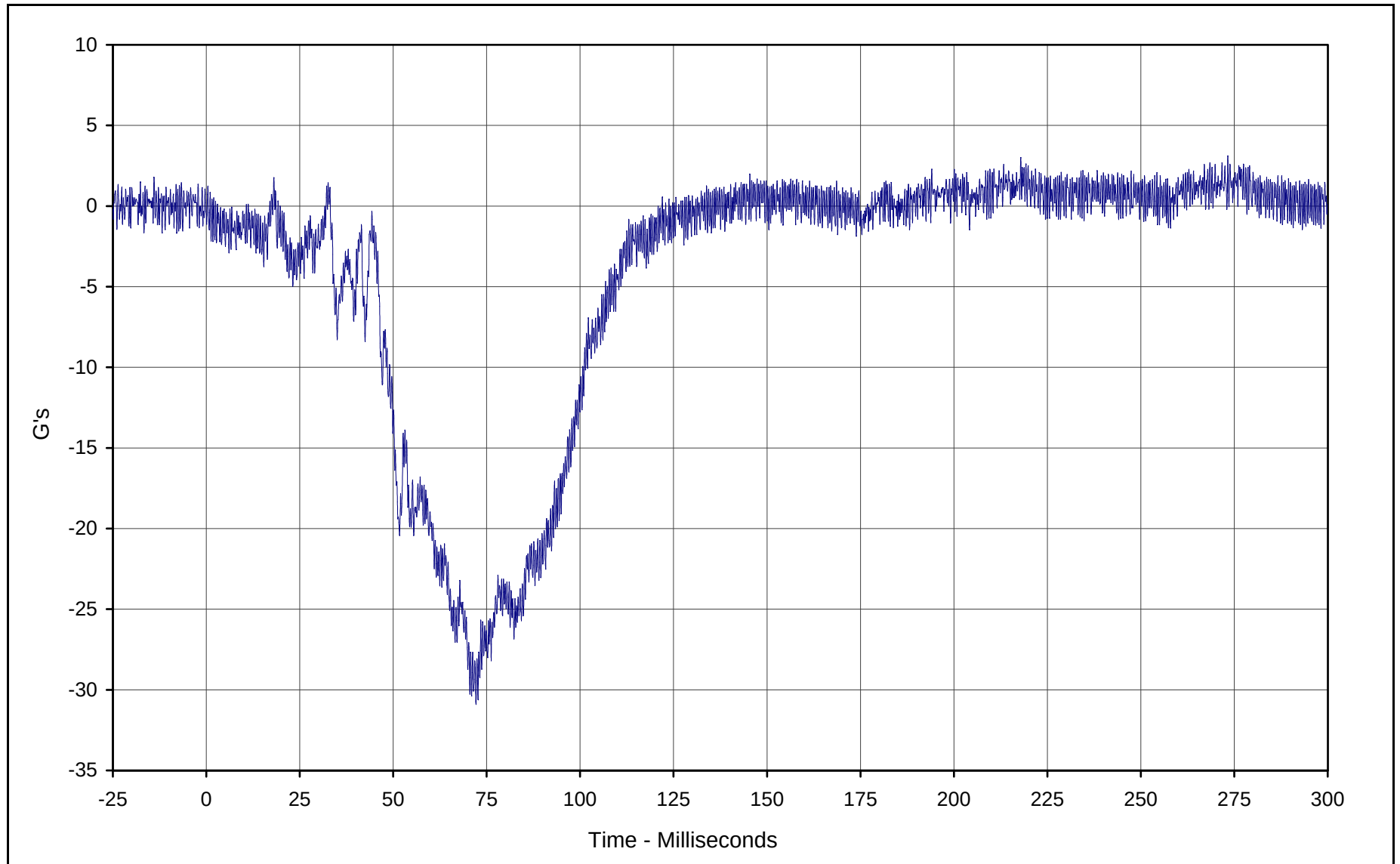
Date of Test: 01/09/01

Curve Number: FIL-021

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Driver Pelvis Z

Maximum Value: 3.1 at 273.3 Milliseconds

Minimum Value: -30.9 at 72.2 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/09/01

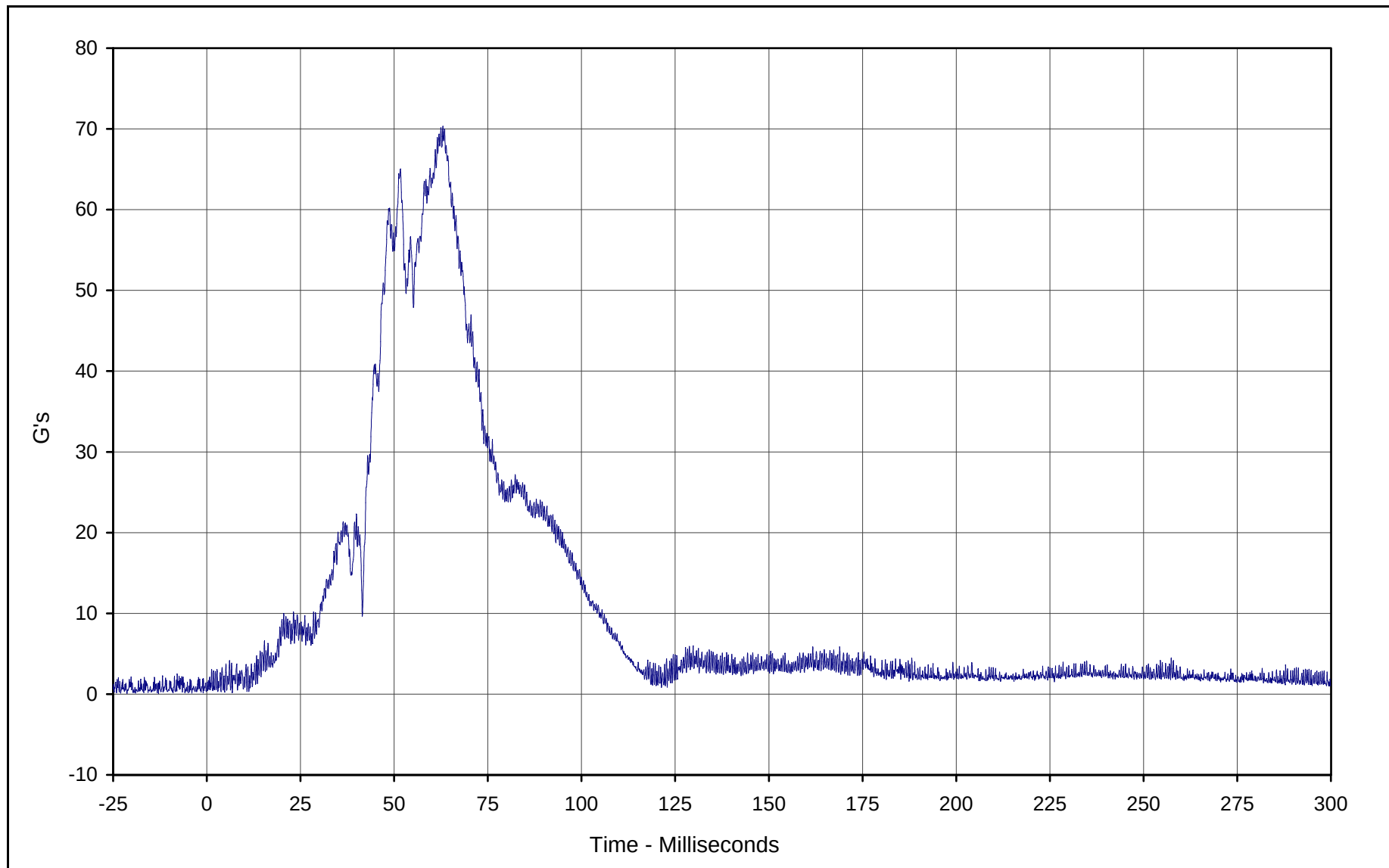
Curve Number: FIL-022

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV







Curve Description: Driver Pelvis Resultant

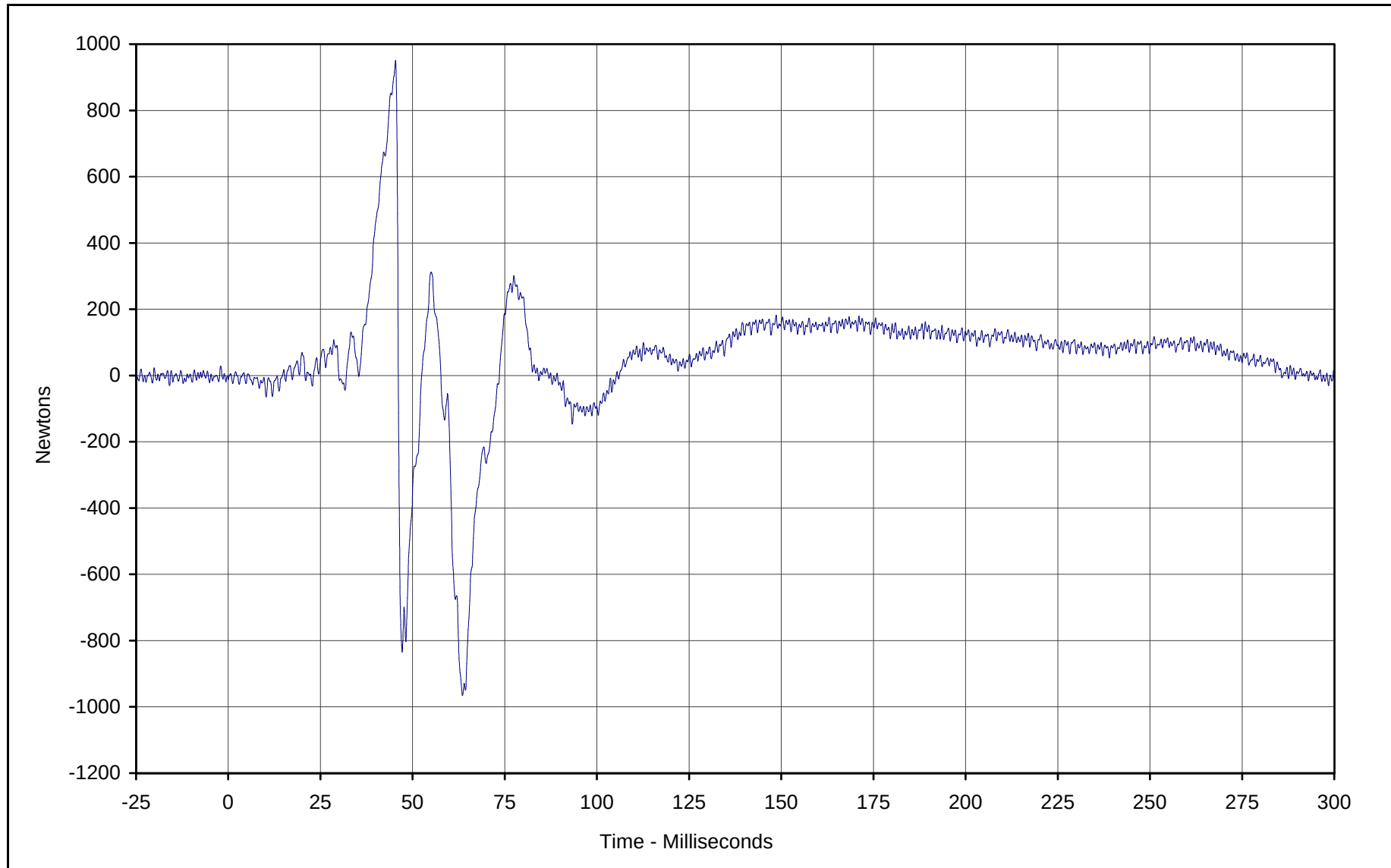
|                   |                 |    |             |              |
|-------------------|-----------------|----|-------------|--------------|
| Maximum Value:    | <u>70.4</u>     | at | <u>63.0</u> | Milliseconds |
| Minimum Value:    | <u>0.3</u>      | at | <u>4.8</u>  | Milliseconds |
| SAE Filter Class: | <u>1000</u>     |    |             |              |
| Date of Test:     | <u>01/09/01</u> |    |             |              |
| Curve Number:     | <u>RES-020</u>  |    |             |              |

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-40

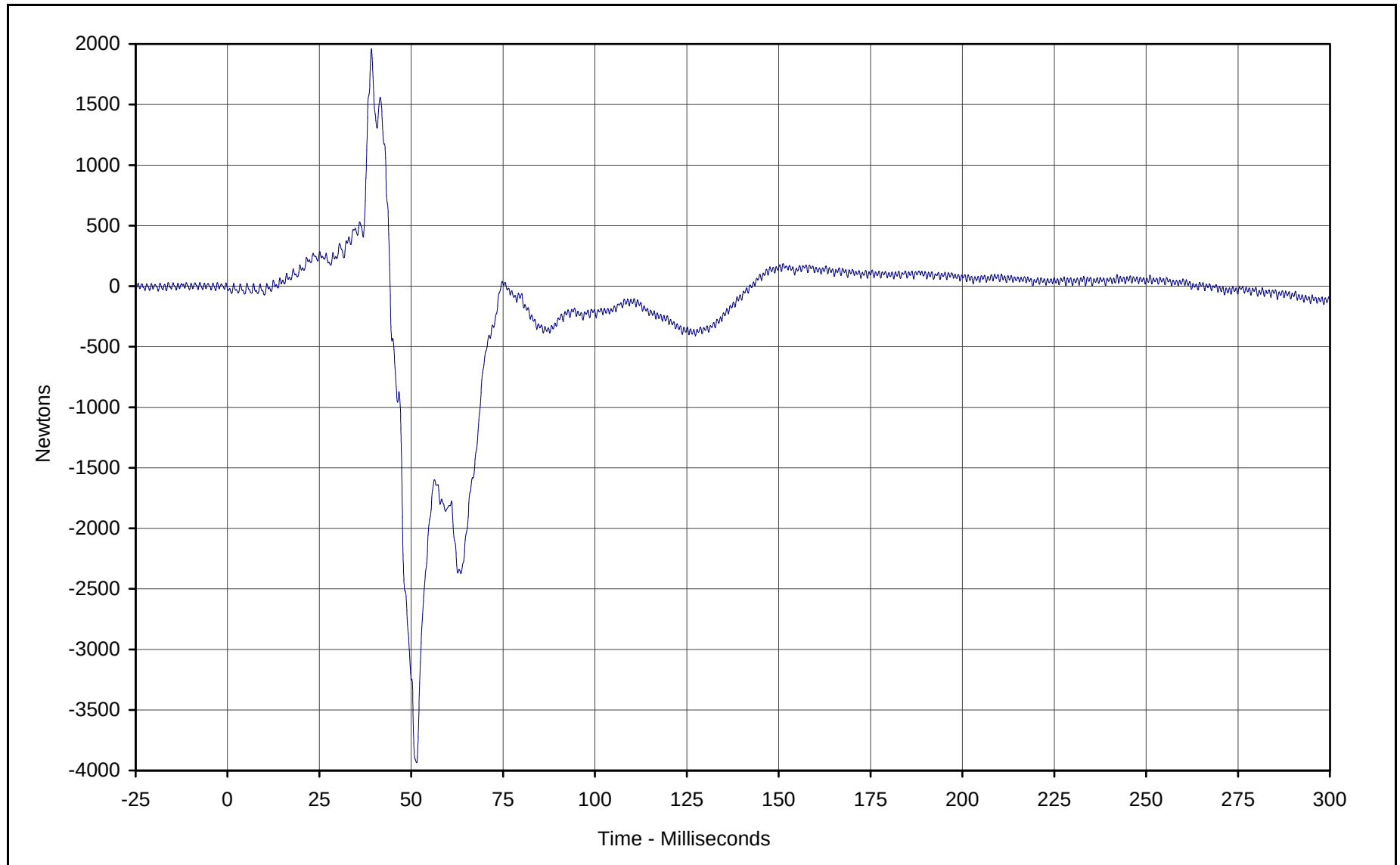


Curve Description: Driver Left Femur Force  
Maximum Value: 951.2 at 45.4 Milliseconds  
Minimum Value: -965.2 at 63.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-023

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



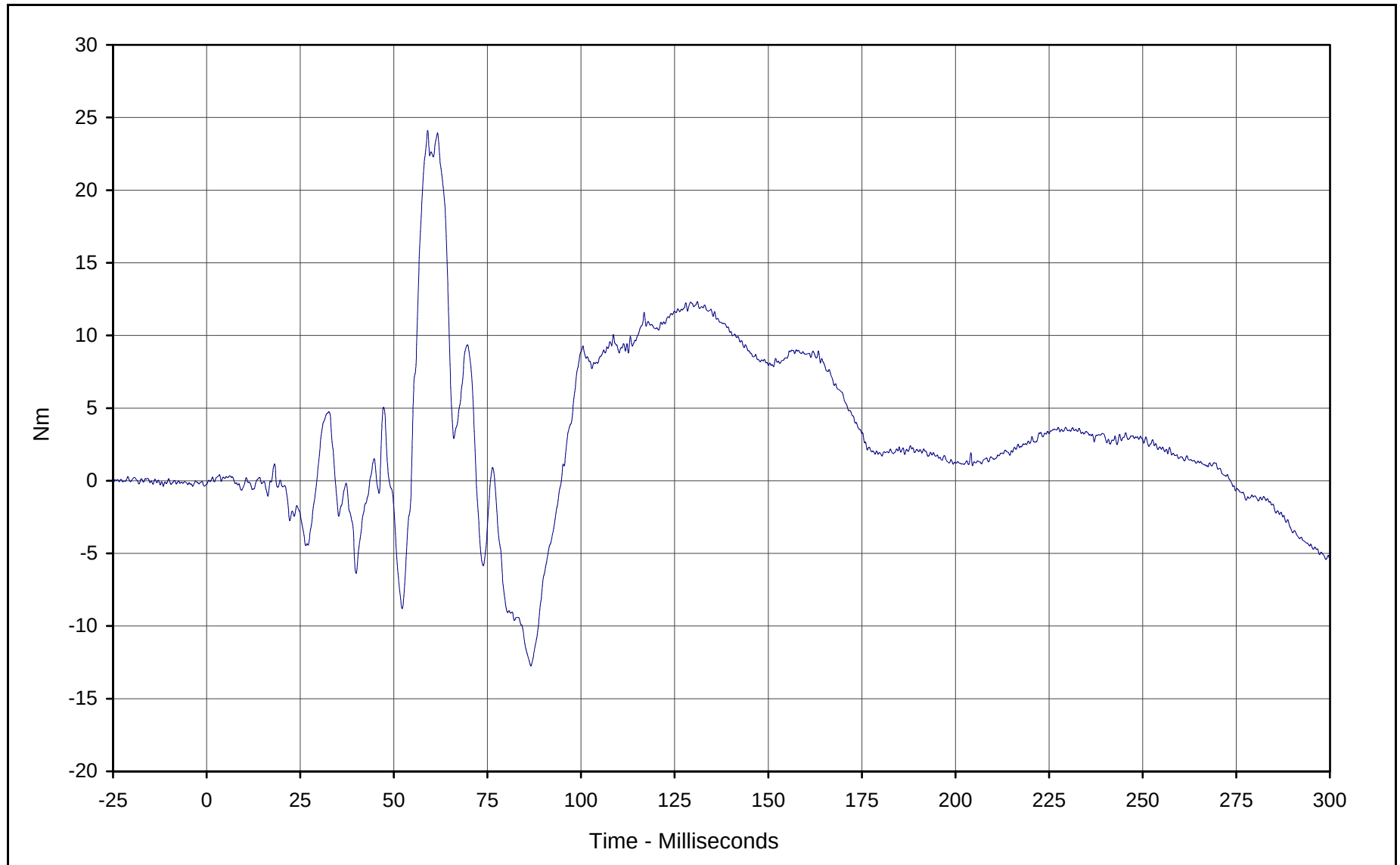
KAR21001-02



Curve Description: Driver Right Femur Force  
Maximum Value: 1961.8 at 39.2 Milliseconds  
Minimum Value: -3935.0 at 51.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-024

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



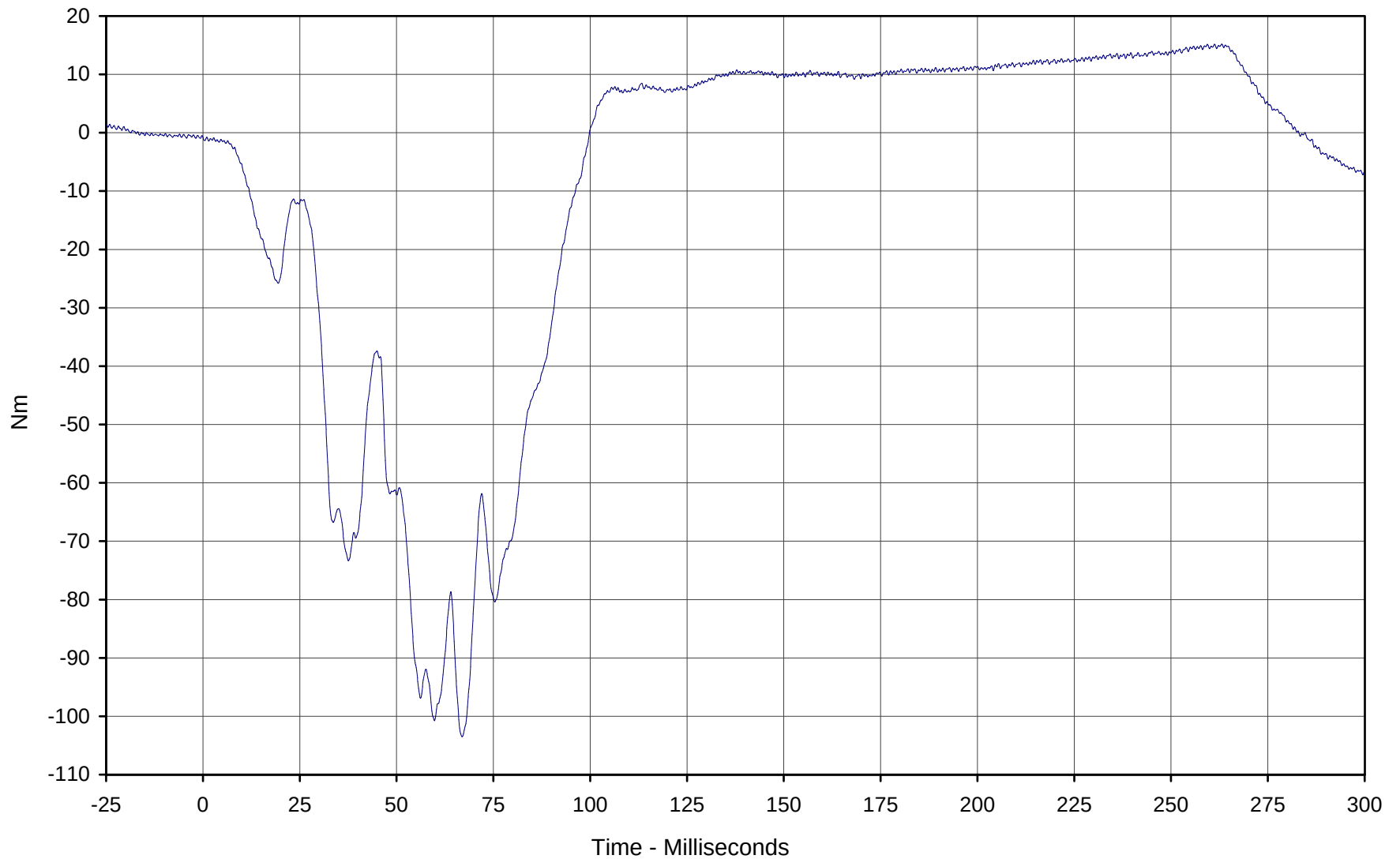


Curve Description: Driver Left Upper Tibia Moment X  
Maximum Value: 24.1 at 59.1 Milliseconds  
Minimum Value: -12.8 at 86.6 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-025

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



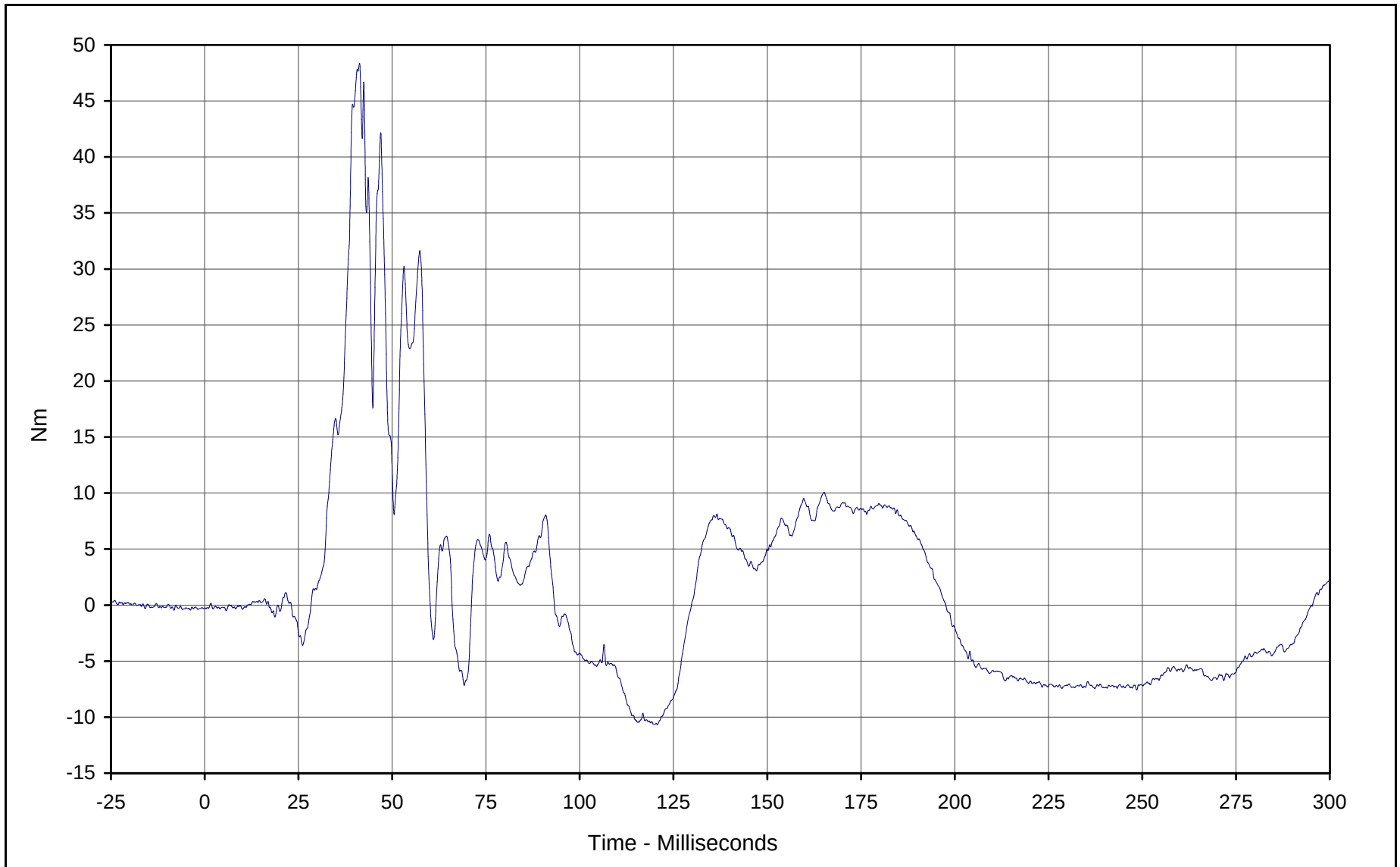




Curve Description: Driver Left Upper Tibia Moment Y  
Maximum Value: 15.2 at 263.1 Milliseconds  
Minimum Value: -103.5 at 66.9 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-026

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





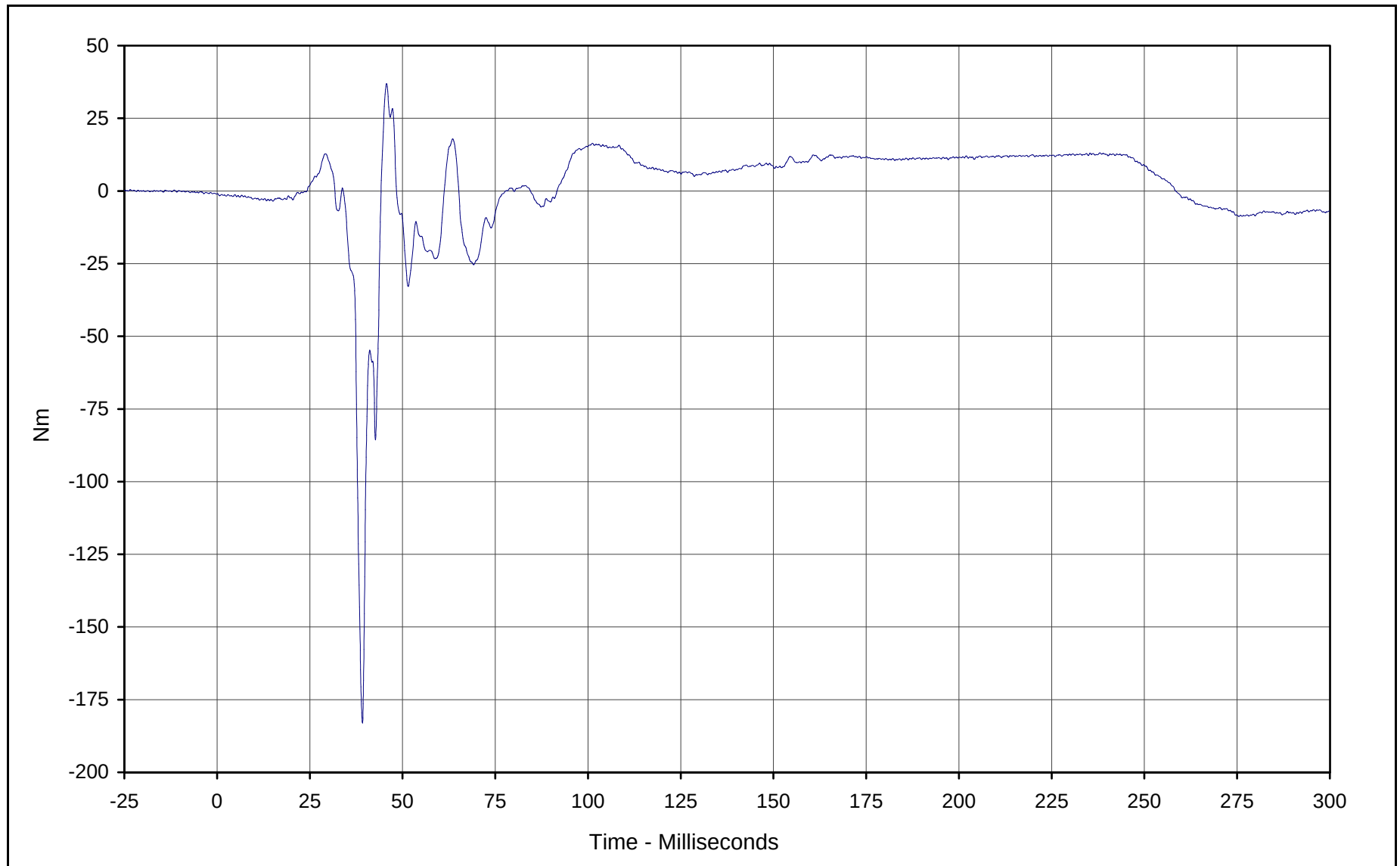
Curve Description: Driver Right Upper Tibia Moment X

|                   |          |    |       |              |
|-------------------|----------|----|-------|--------------|
| Maximum Value:    | 48.4     | at | 41.3  | Milliseconds |
| Minimum Value:    | -10.7    | at | 120.7 | Milliseconds |
| SAE Filter Class: | 600      |    |       |              |
| Date of Test:     | 01/09/01 |    |       |              |
| Curve Number:     | FIL-027  |    |       |              |

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



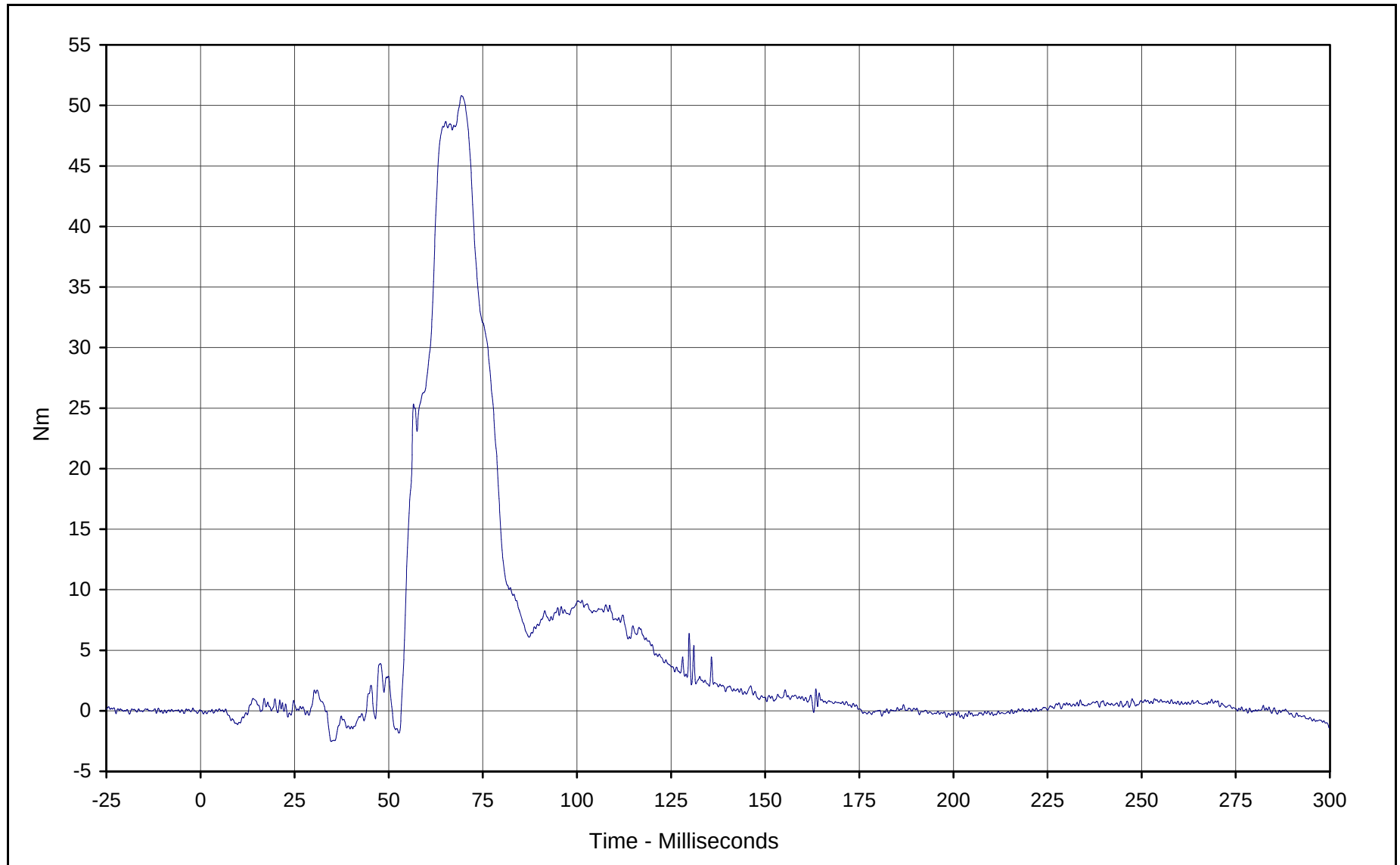


Curve Description: Driver Right Upper Tibia Moment Y  
Maximum Value: 37.0 at 45.7 Milliseconds  
Minimum Value: -183.1 at 39.2 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-028

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV

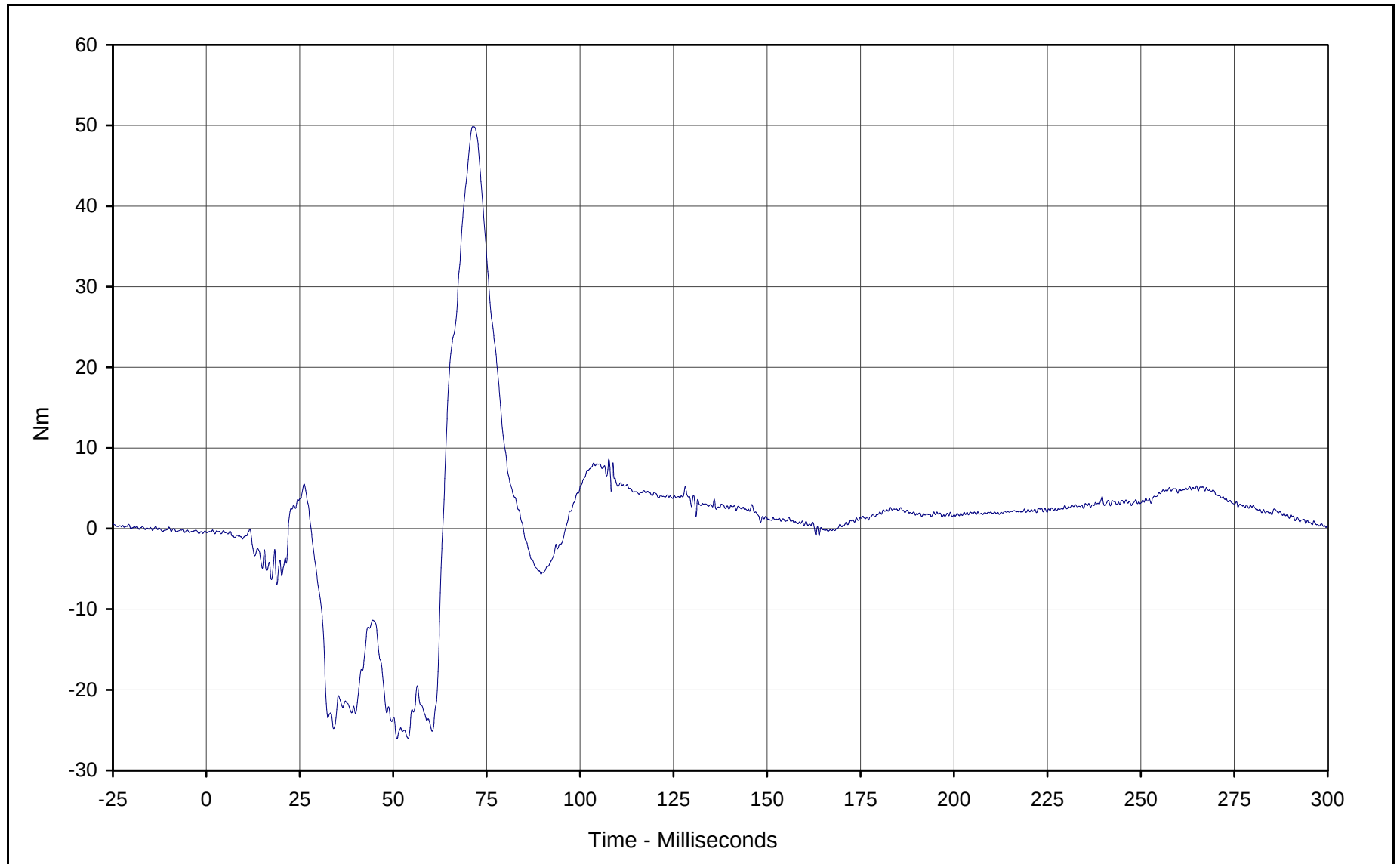




Curve Description: Driver Left Lower Tibia Moment X  
Maximum Value: 50.8 at 69.3 Milliseconds  
Minimum Value: -2.5 at 34.7 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-029

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



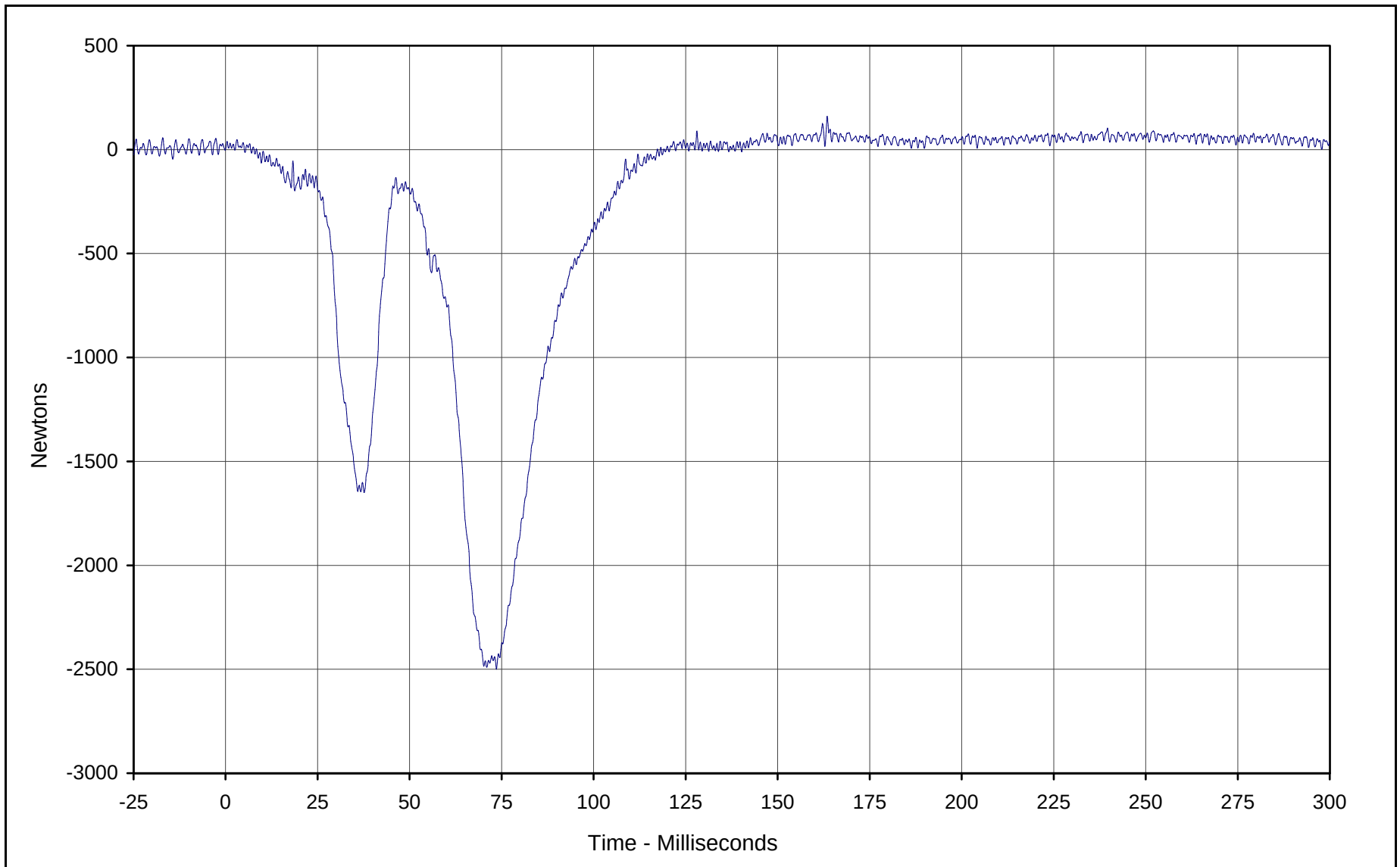


Curve Description: Driver Left Lower Tibia Moment Y  
Maximum Value: 49.9 at 71.3 Milliseconds  
Minimum Value: -26.1 at 51.0 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-030

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



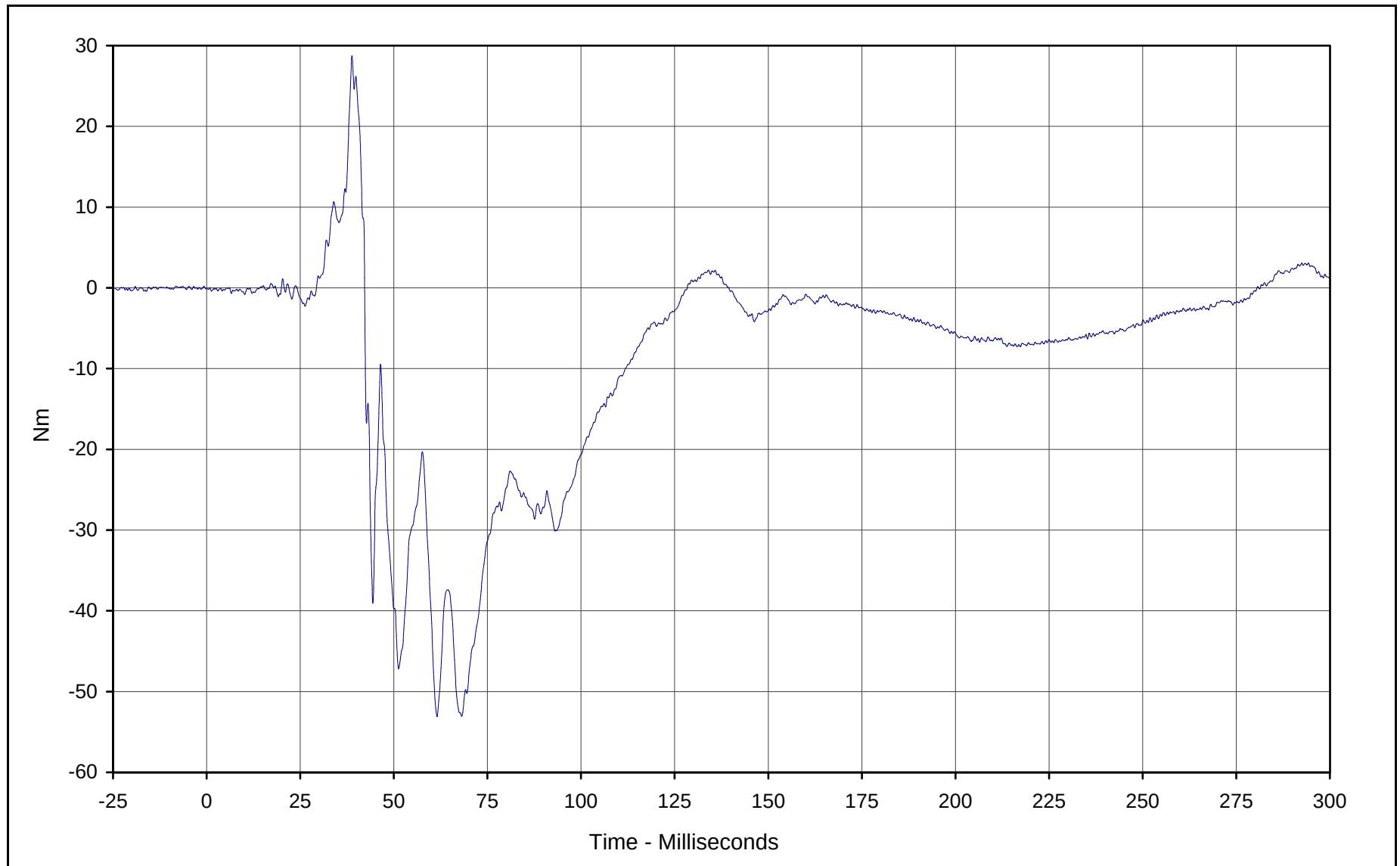




Curve Description: Driver Left Lower Tibia Force Z  
Maximum Value: 160.1 at 163.5 Milliseconds  
Minimum Value: -2499.7 at 73.6 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-031

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

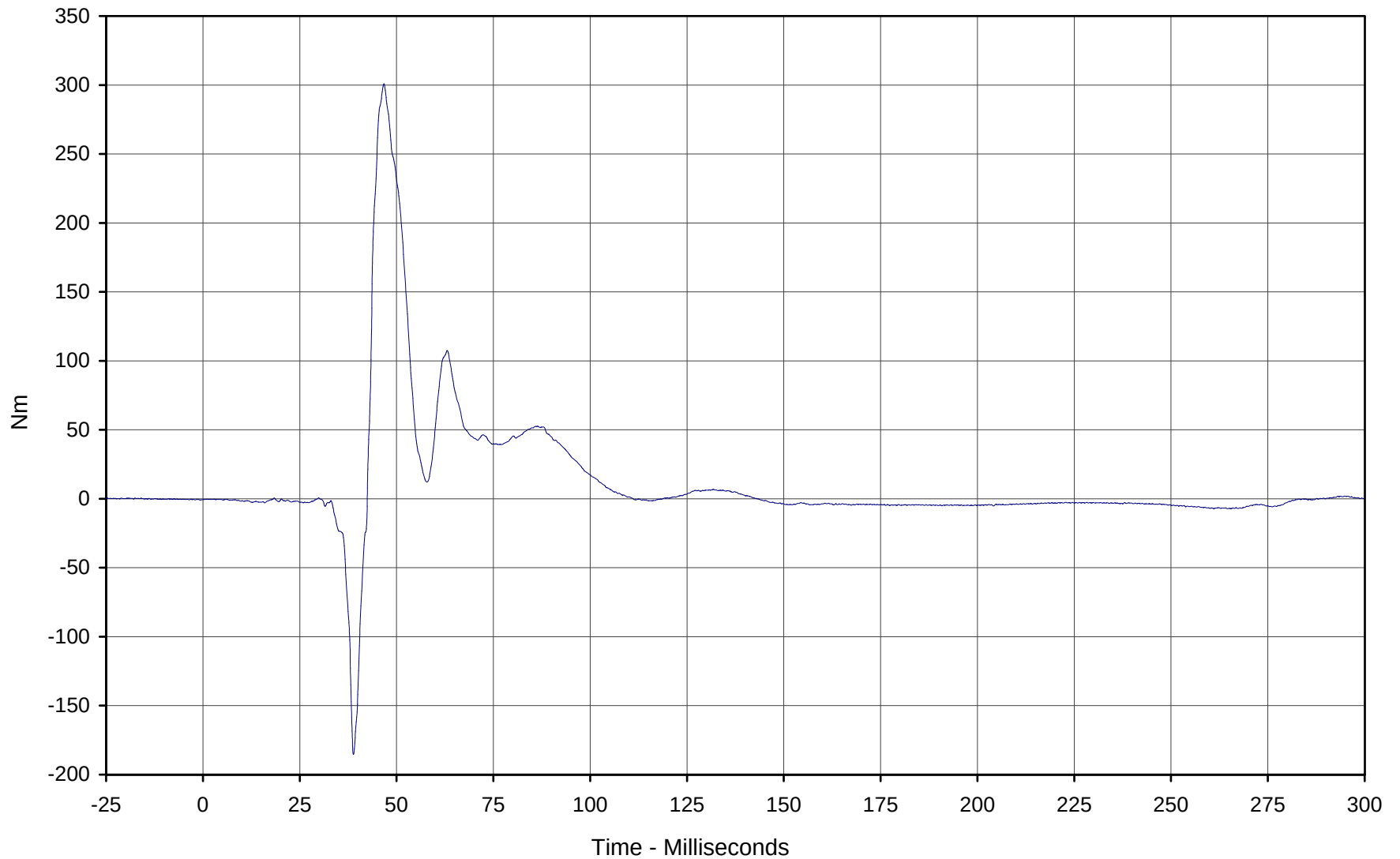




Curve Description: Driver Right Lower Tibia Moment X  
Maximum Value: 28.8 at 38.8 Milliseconds  
Minimum Value: -53.1 at 61.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-032

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

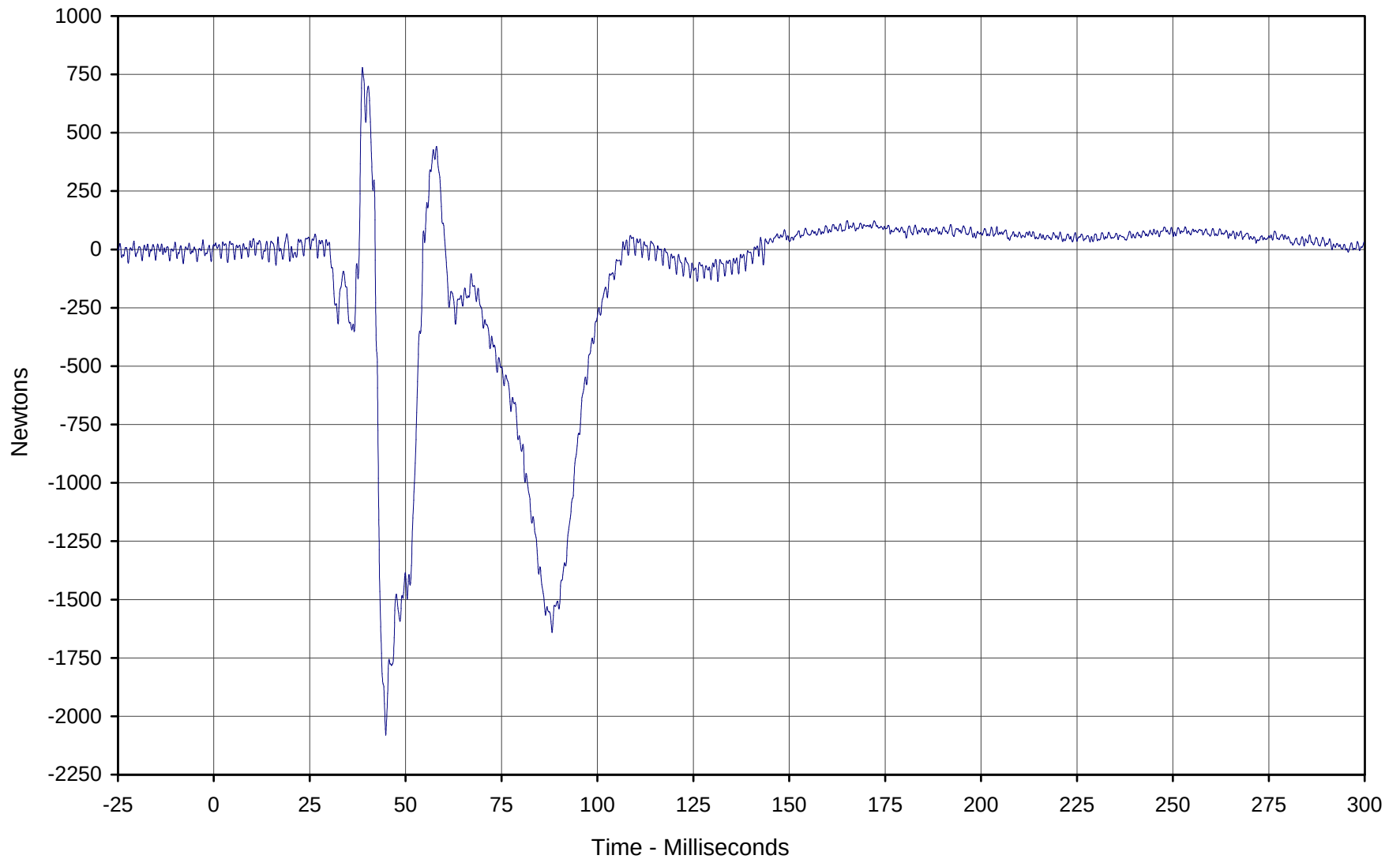




Curve Description: Driver Right Lower Tibia Moment Y  
Maximum Value: 300.8 at 46.8 Milliseconds  
Minimum Value: -185.4 at 38.9 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-033

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

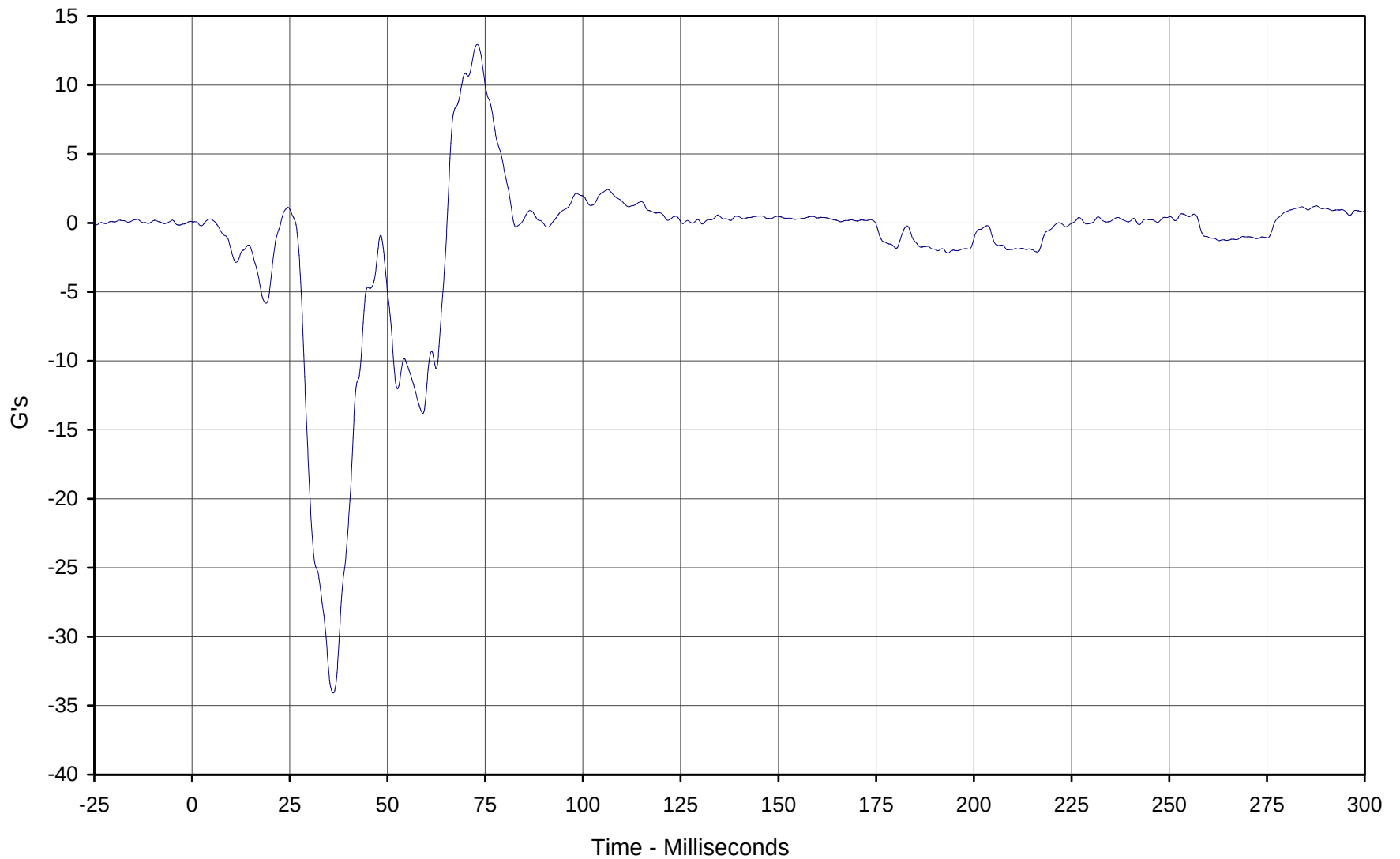




Curve Description: Driver Right Lower Tibia Force Z  
Maximum Value: 780.0 at 38.7 Milliseconds  
Minimum Value: -2081.6 at 44.8 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-034

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Driver Left Foot Aft X

Maximum Value: 12.9 at 73.0 Milliseconds

Minimum Value: -34.1 at 36.1 Milliseconds

SAE Filter Class: 180

Date of Test: 01/09/01

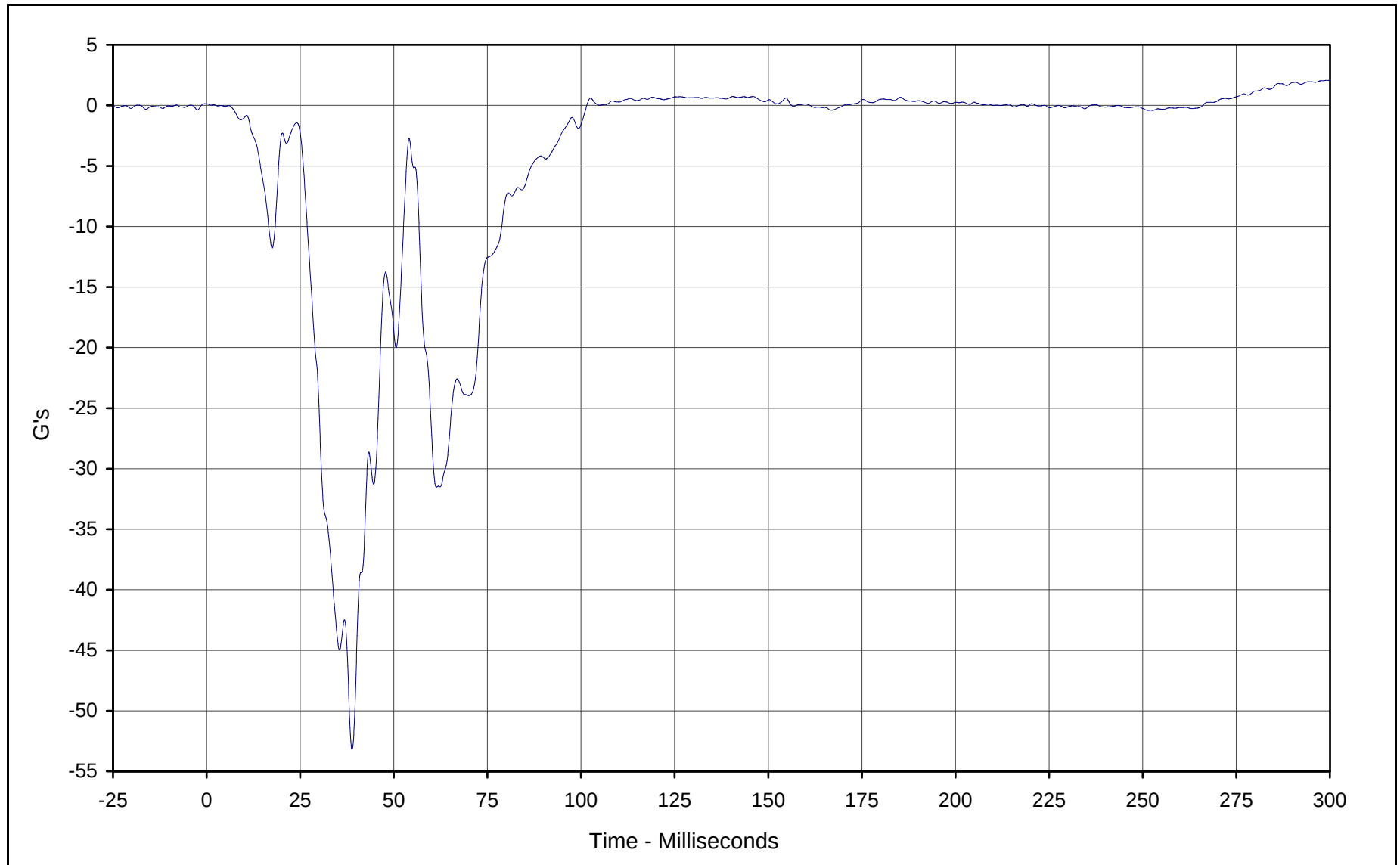
Curve Number: FIL-035

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV







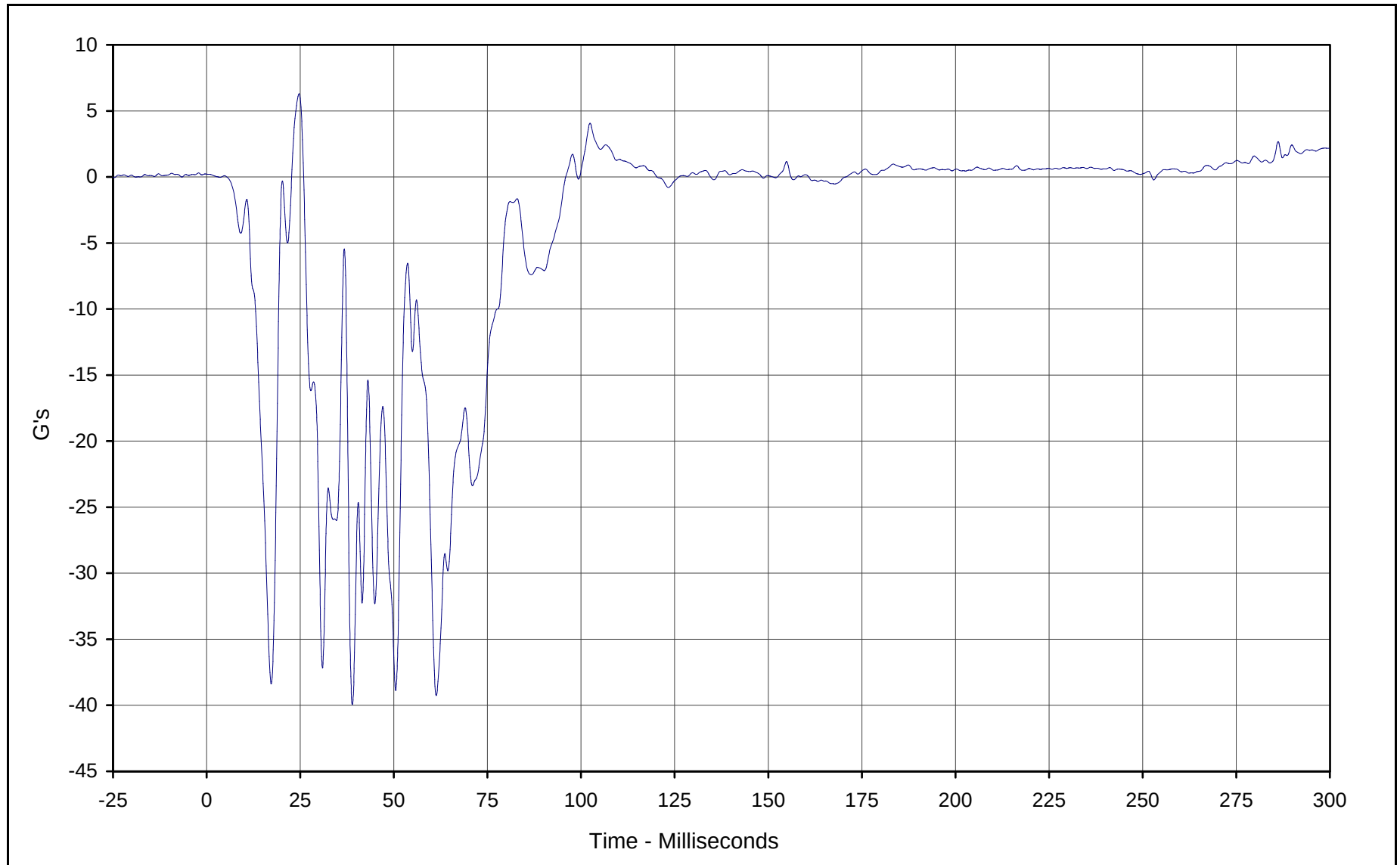
Curve Description: Driver Left Foot Aft Z

|                   |          |    |       |              |
|-------------------|----------|----|-------|--------------|
| Maximum Value:    | 2.1      | at | 299.2 | Milliseconds |
| Minimum Value:    | -53.2    | at | 38.8  | Milliseconds |
| SAE Filter Class: | 180      |    |       |              |
| Date of Test:     | 01/09/01 |    |       |              |
| Curve Number:     | FIL-036  |    |       |              |

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





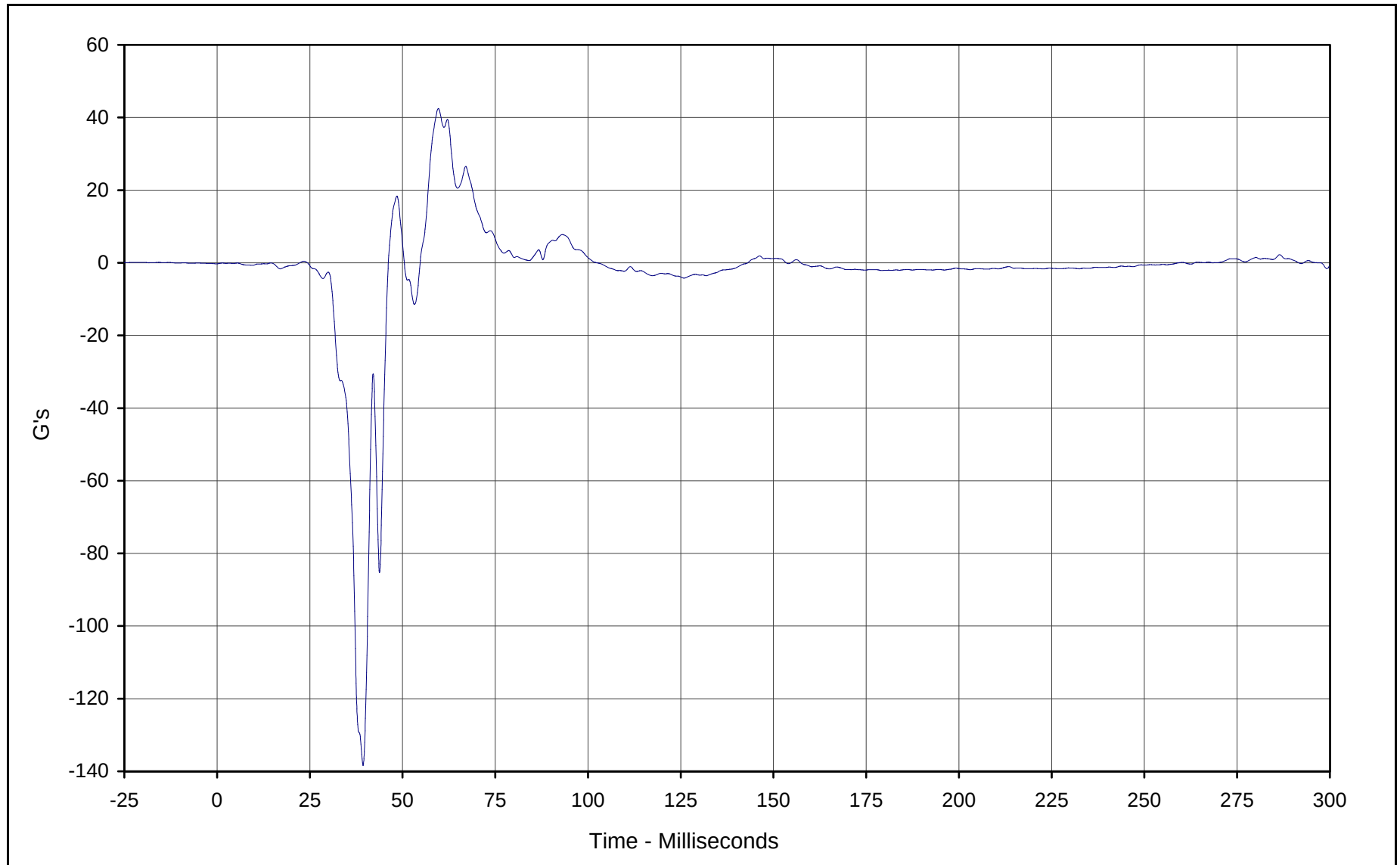
Curve Description: Driver Left Foot Fore Z

|                   |          |    |      |              |
|-------------------|----------|----|------|--------------|
| Maximum Value:    | 6.3      | at | 24.7 | Milliseconds |
| Minimum Value:    | -39.9    | at | 38.9 | Milliseconds |
| SAE Filter Class: | 180      |    |      |              |
| Date of Test:     | 01/09/01 |    |      |              |
| Curve Number:     | FIL-037  |    |      |              |

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





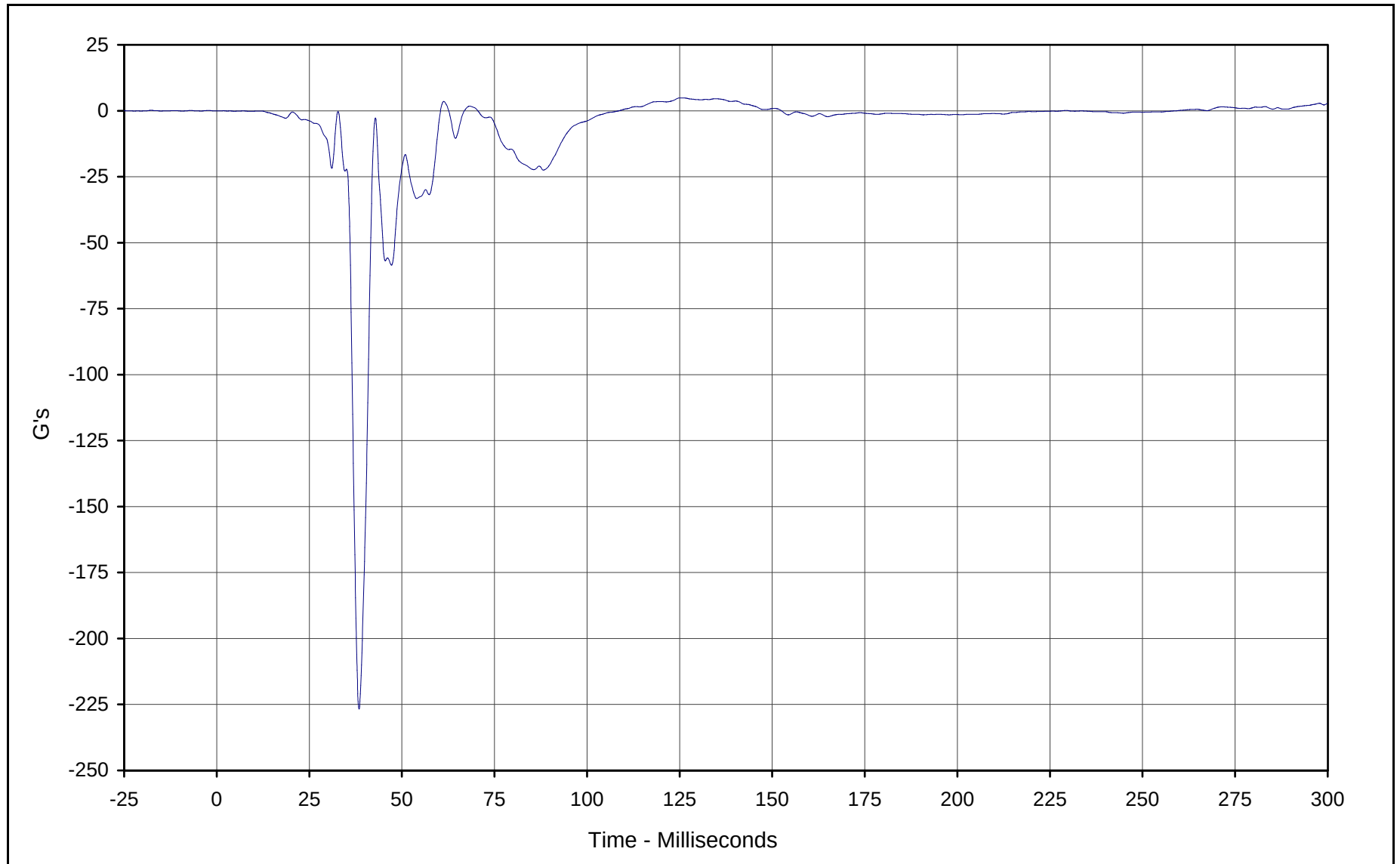
Curve Description: Driver Right Foot Aft X

|                   |          |    |      |              |
|-------------------|----------|----|------|--------------|
| Maximum Value:    | 42.4     | at | 59.7 | Milliseconds |
| Minimum Value:    | -138.4   | at | 39.4 | Milliseconds |
| SAE Filter Class: | 180      |    |      |              |
| Date of Test:     | 01/09/01 |    |      |              |
| Curve Number:     | FIL-038  |    |      |              |

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





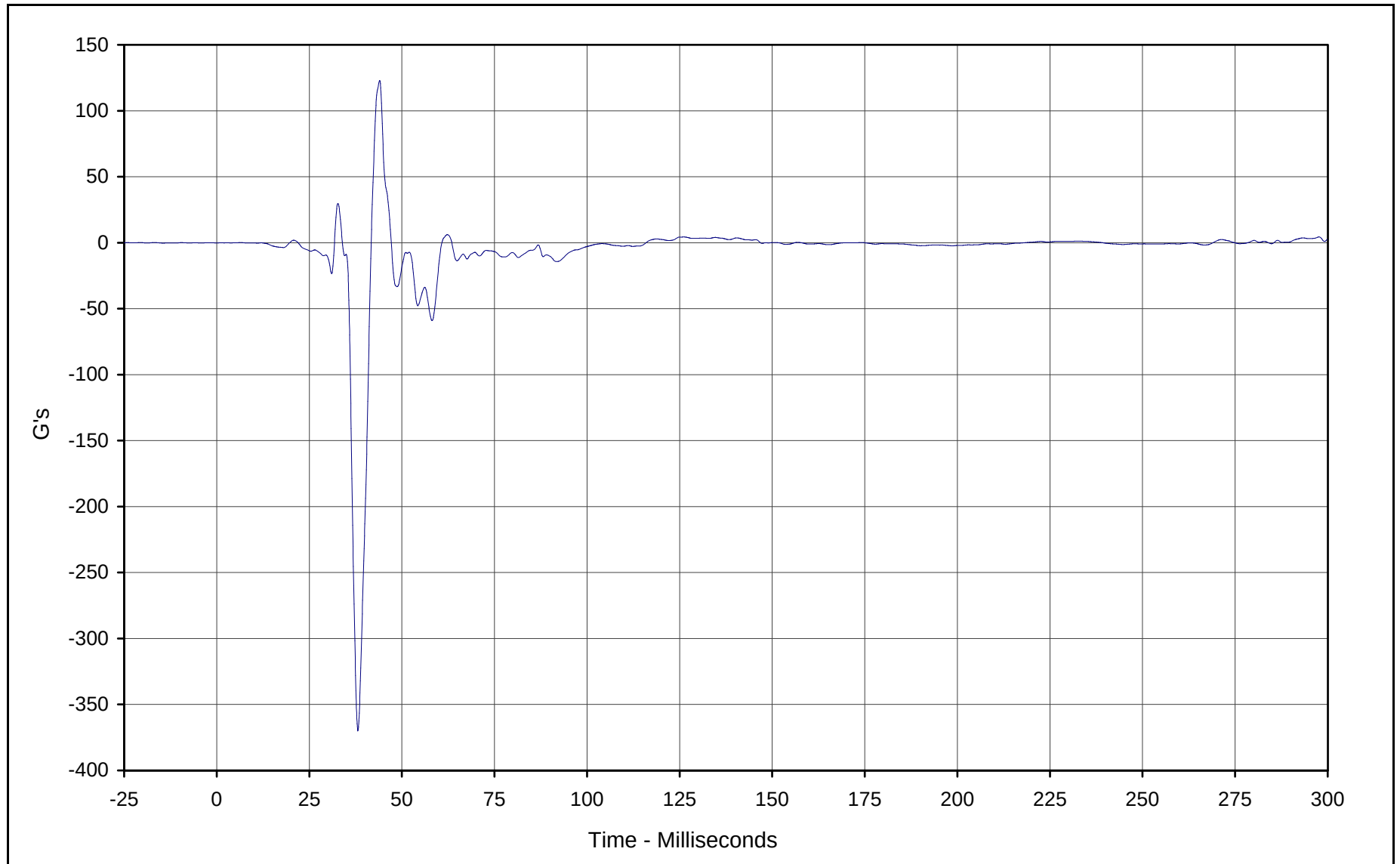
Curve Description: Driver Right Foot Aft Z

|                   |                 |    |              |              |
|-------------------|-----------------|----|--------------|--------------|
| Maximum Value:    | <u>4.9</u>      | at | <u>125.0</u> | Milliseconds |
| Minimum Value:    | <u>-226.7</u>   | at | <u>38.4</u>  | Milliseconds |
| SAE Filter Class: | <u>180</u>      |    |              |              |
| Date of Test:     | <u>01/09/01</u> |    |              |              |
| Curve Number:     | <u>FIL-039</u>  |    |              |              |

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Driver Right Foot Fore Z

|                   |                 |    |             |              |
|-------------------|-----------------|----|-------------|--------------|
| Maximum Value:    | <u>123.0</u>    | at | <u>44.0</u> | Milliseconds |
| Minimum Value:    | <u>-370.2</u>   | at | <u>38.1</u> | Milliseconds |
| SAE Filter Class: | <u>180</u>      |    |             |              |
| Date of Test:     | <u>01/09/01</u> |    |             |              |
| Curve Number:     | <u>FIL-040</u>  |    |             |              |

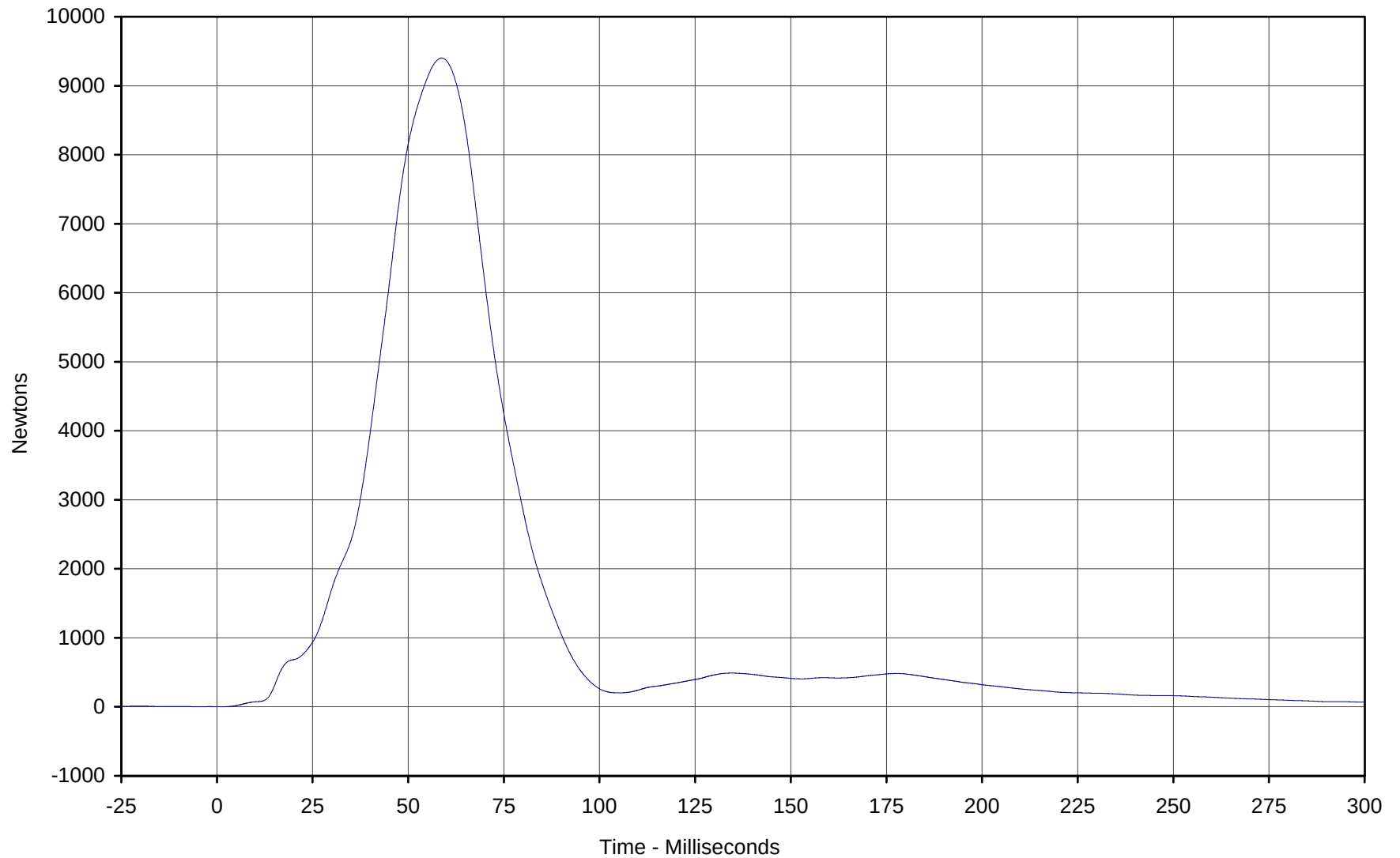
Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





B-58



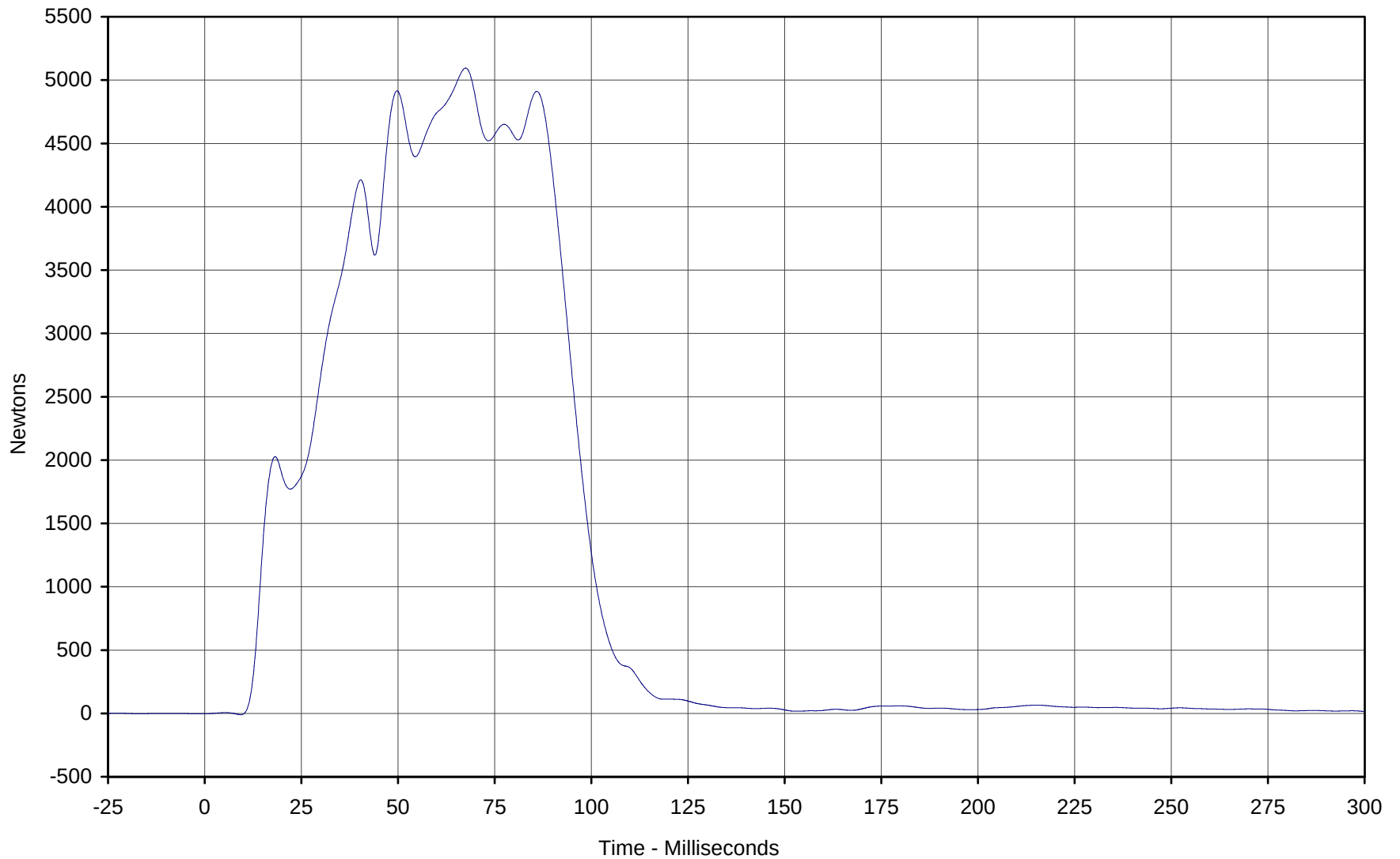
Curve Description: Driver Lap Belt Force  
Maximum Value: 9401.0 at 58.7 Milliseconds  
Minimum Value: 1.4 at 1.2 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-041

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-59



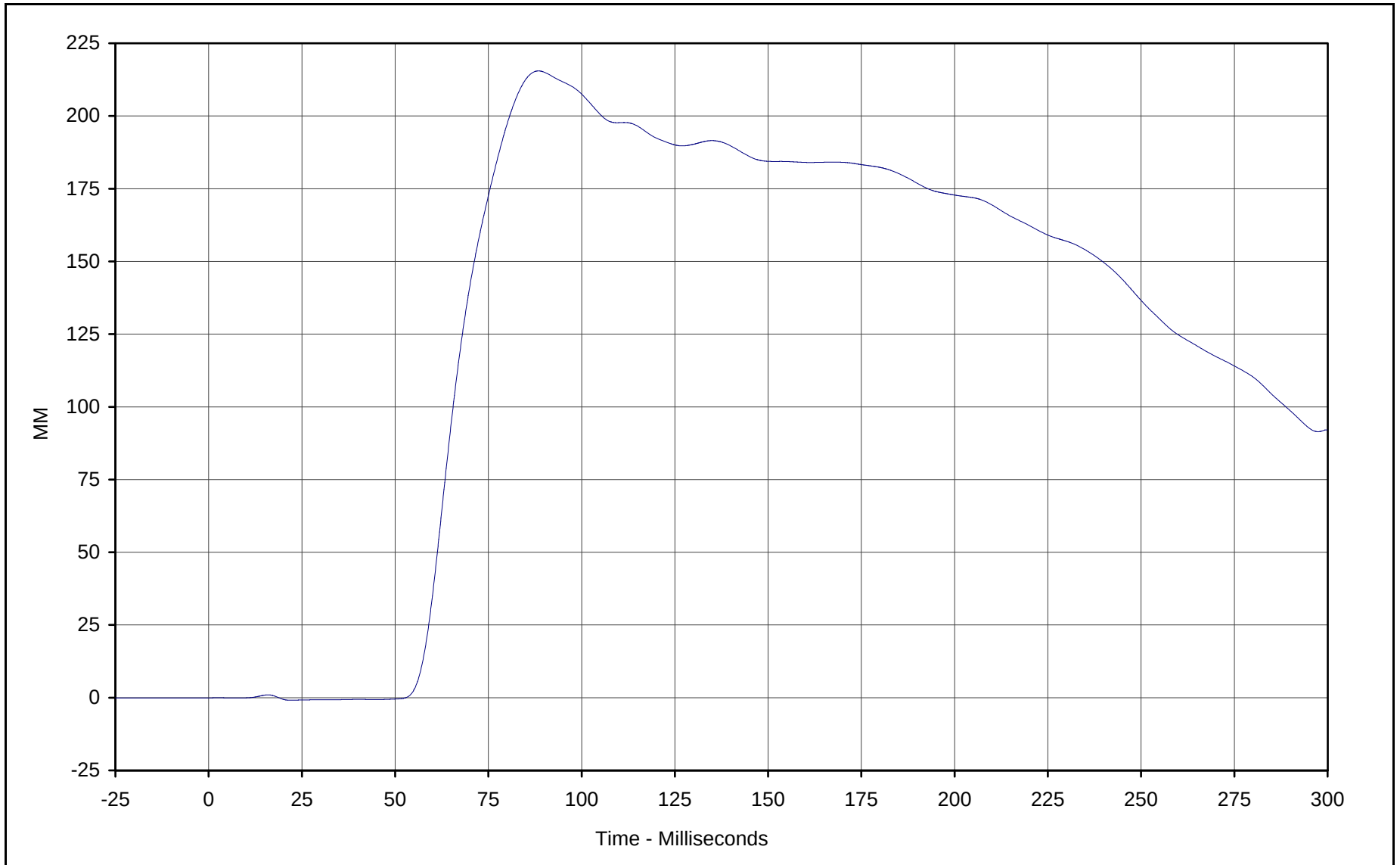
Curve Description: Driver Shoulder Belt Force  
Maximum Value: 5094.9 at 67.5 Milliseconds  
Minimum Value: -10.7 at 9.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-042

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-60

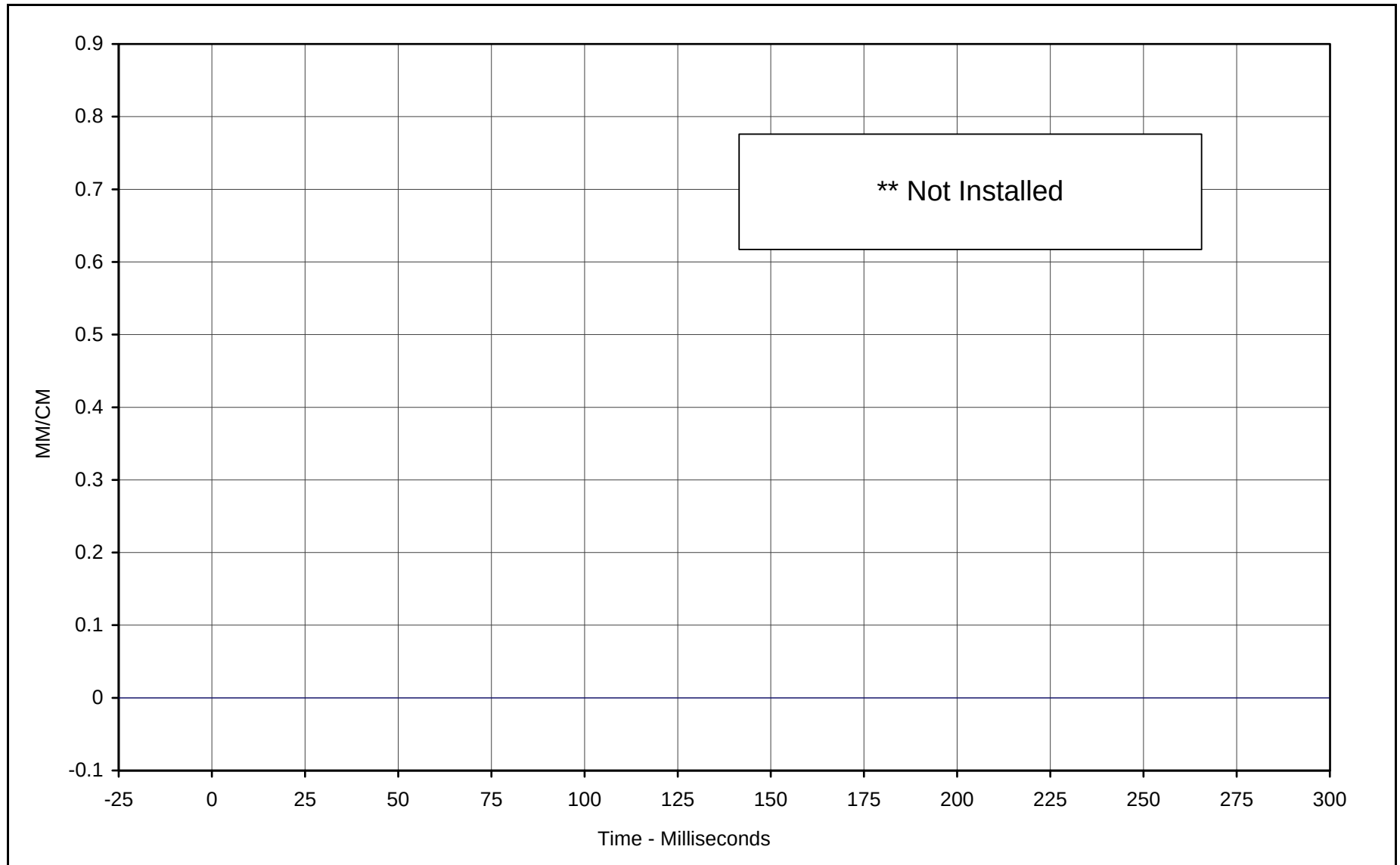


Curve Description: Driver Shoulder Belt Pullout  
Maximum Value: 215.5 at 88.4 Milliseconds  
Minimum Value: -0.9 at 21.9 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-043

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



Curve Description: Driver Shoulder Belt Elongation \*\*

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

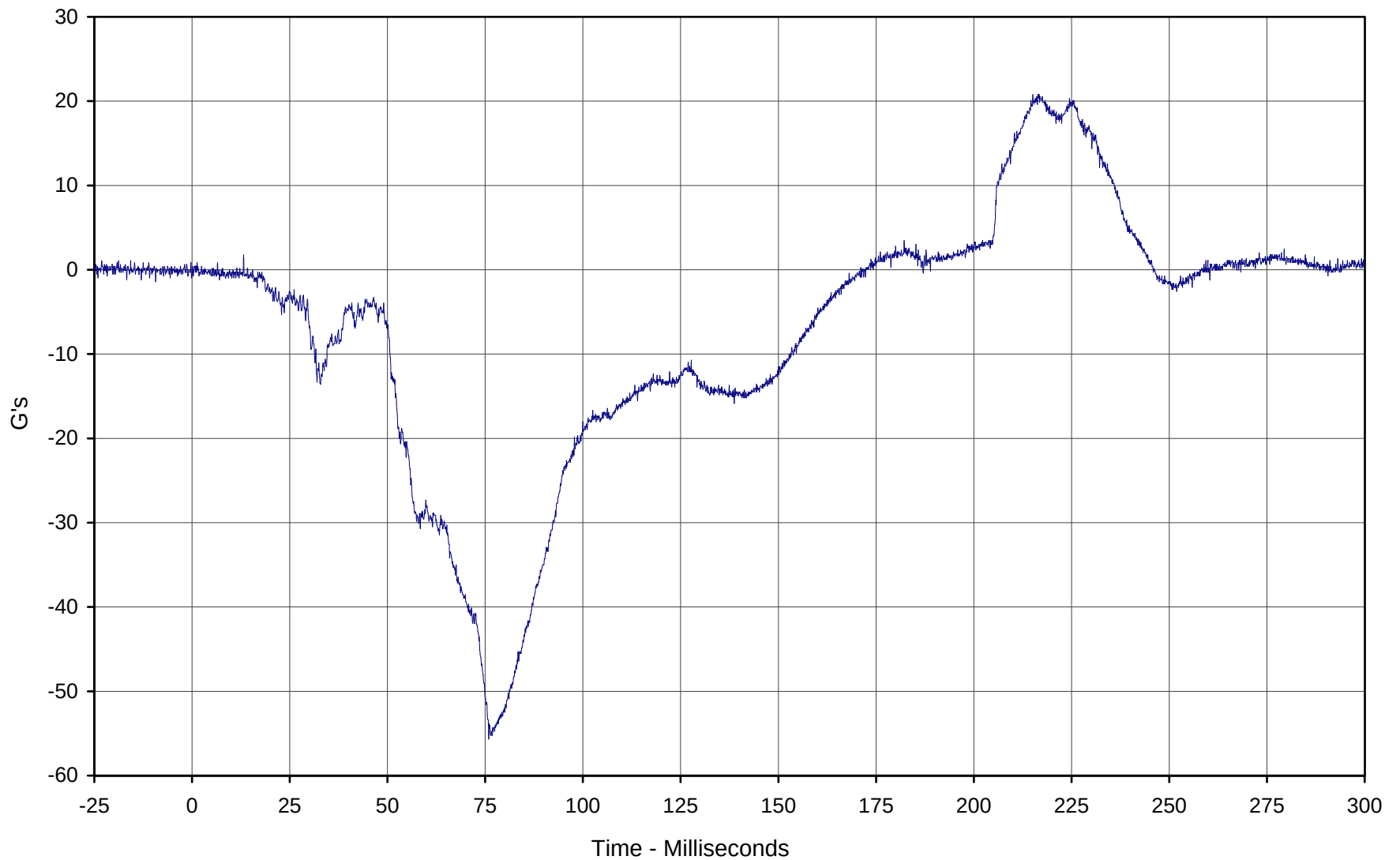
Curve Number: FIL-044

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV

\*\* Not installed





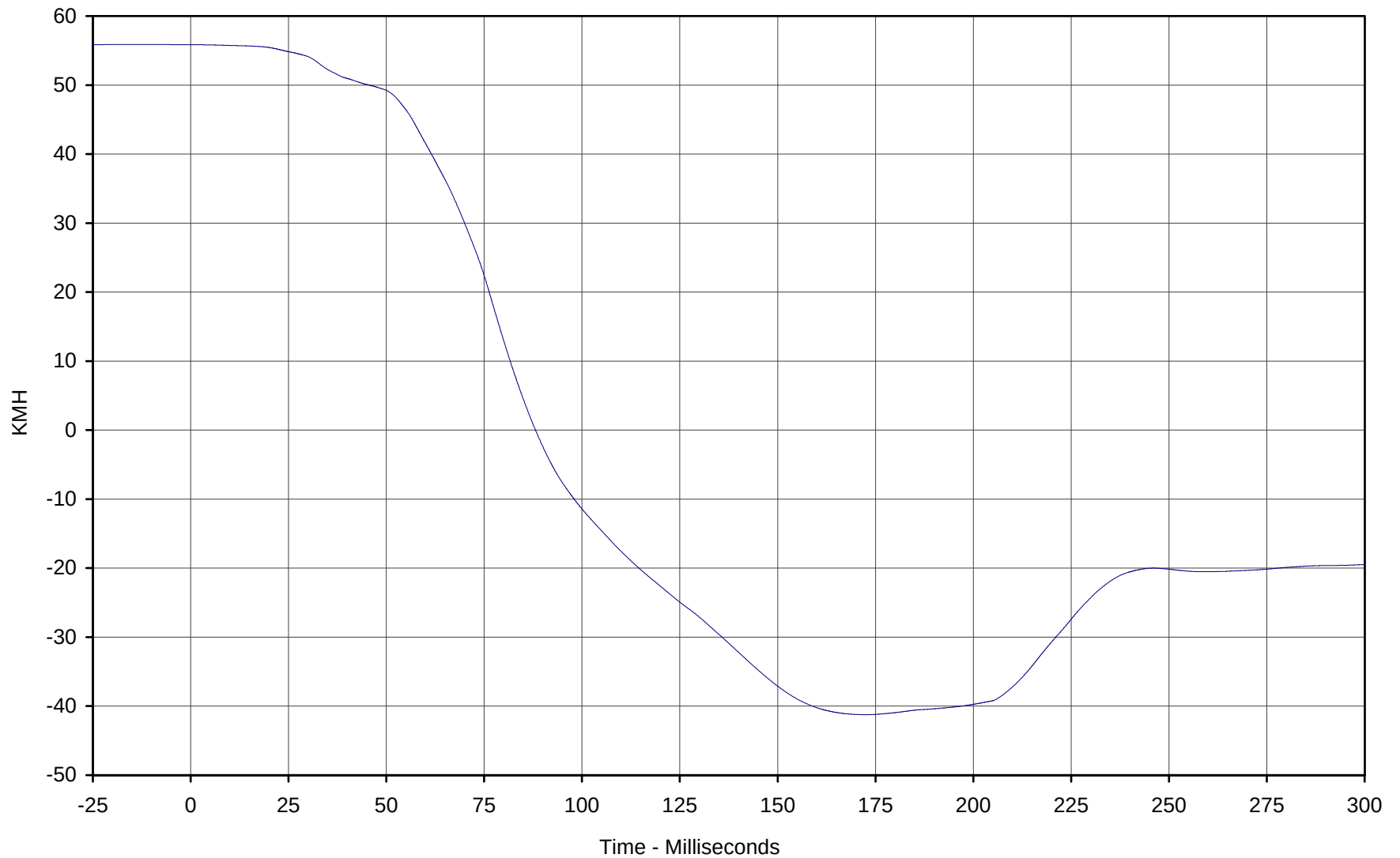
Curve Description: Passenger Head Primary X  
Maximum Value: 20.8 at 215.1 Milliseconds  
Minimum Value: -55.7 at 75.9 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-045

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





B-63

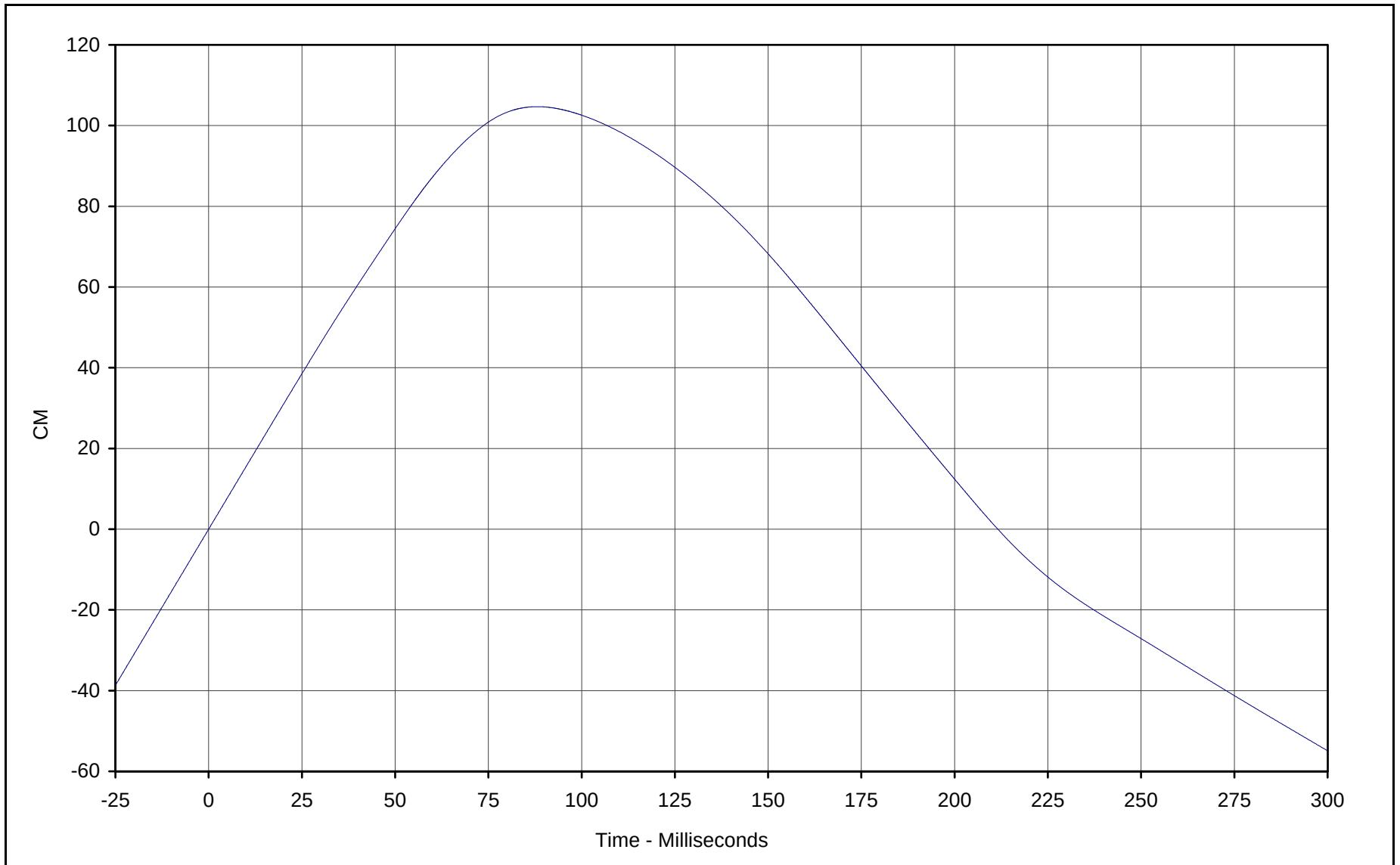


Curve Description: Passenger Head Primary X Velocity  
Maximum Value: 55.8 at 0.0 Milliseconds  
Minimum Value: -41.2 at 172.5 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-045

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



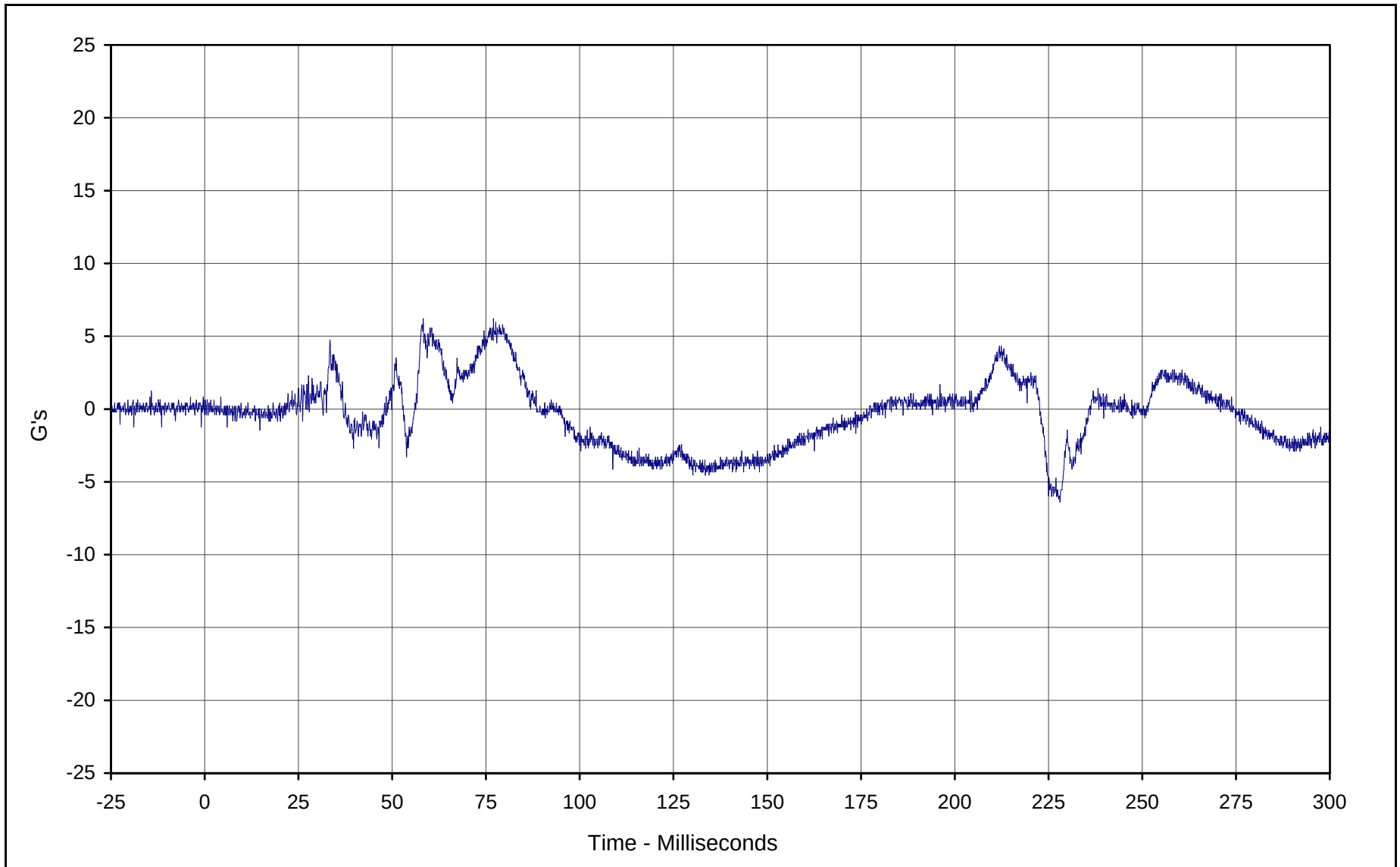
KAR21001-02



Curve Description: Passenger Head Primary X Displ.  
Maximum Value: 104.7 at 88.1 Milliseconds  
Minimum Value: -54.8 at 299.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-045

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

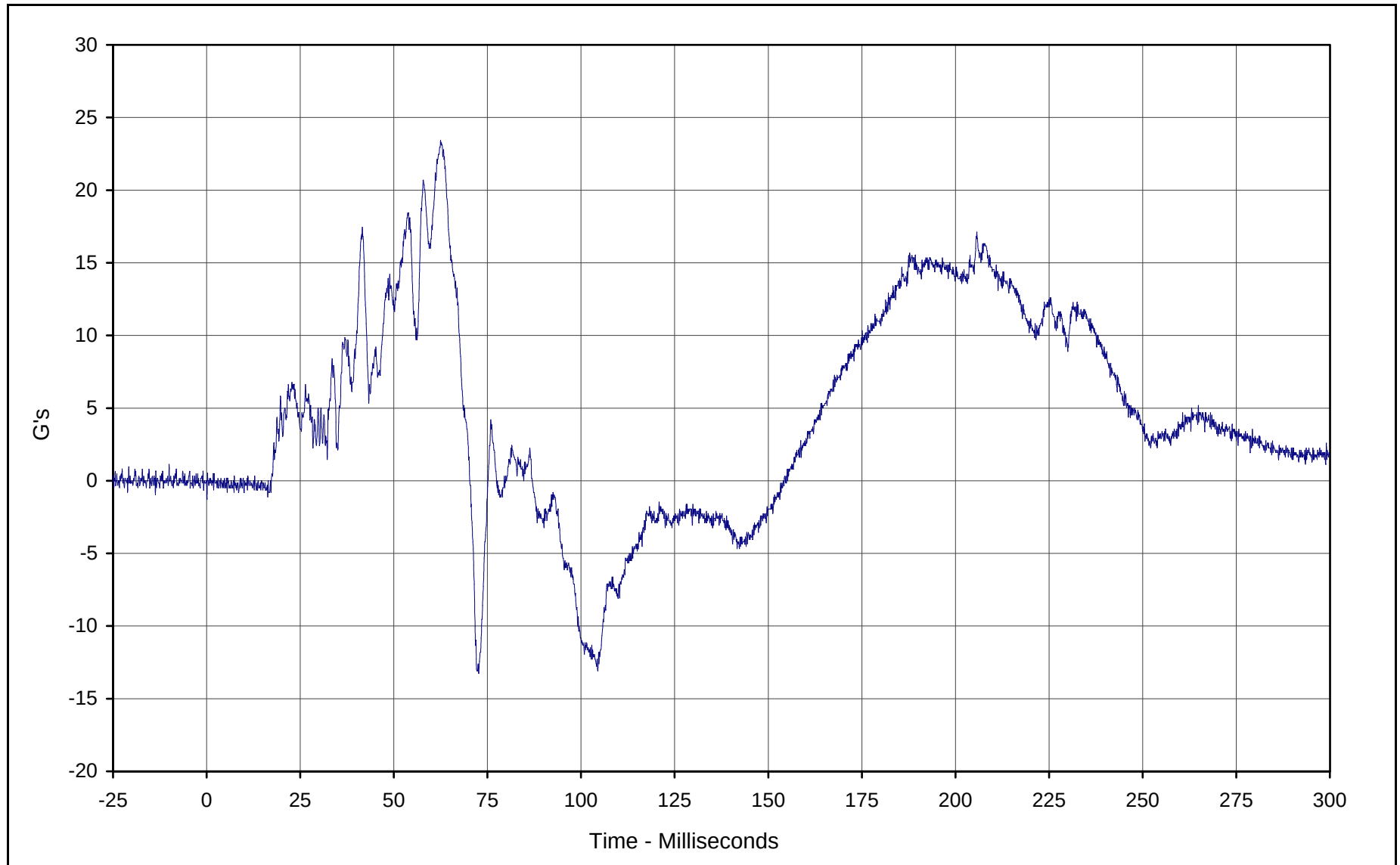




Curve Description: Passenger Head Primary Y  
Maximum Value: 6.2 at 58.3 Milliseconds  
Minimum Value: -6.4 at 228.1 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-046

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

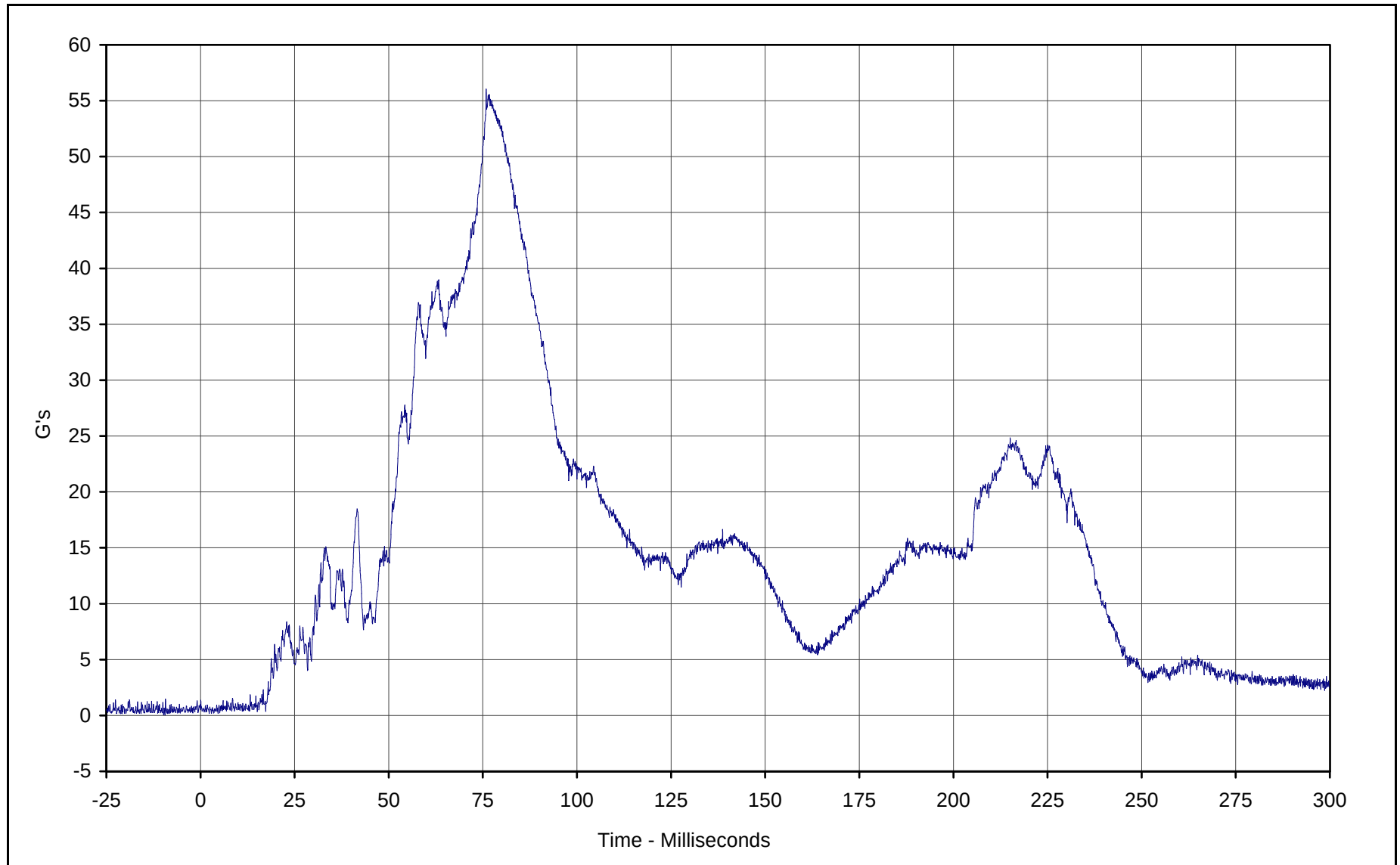




Curve Description: Passenger Head Primary Z  
Maximum Value: 23.4 at 62.5 Milliseconds  
Minimum Value: -13.3 at 72.6 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-047

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





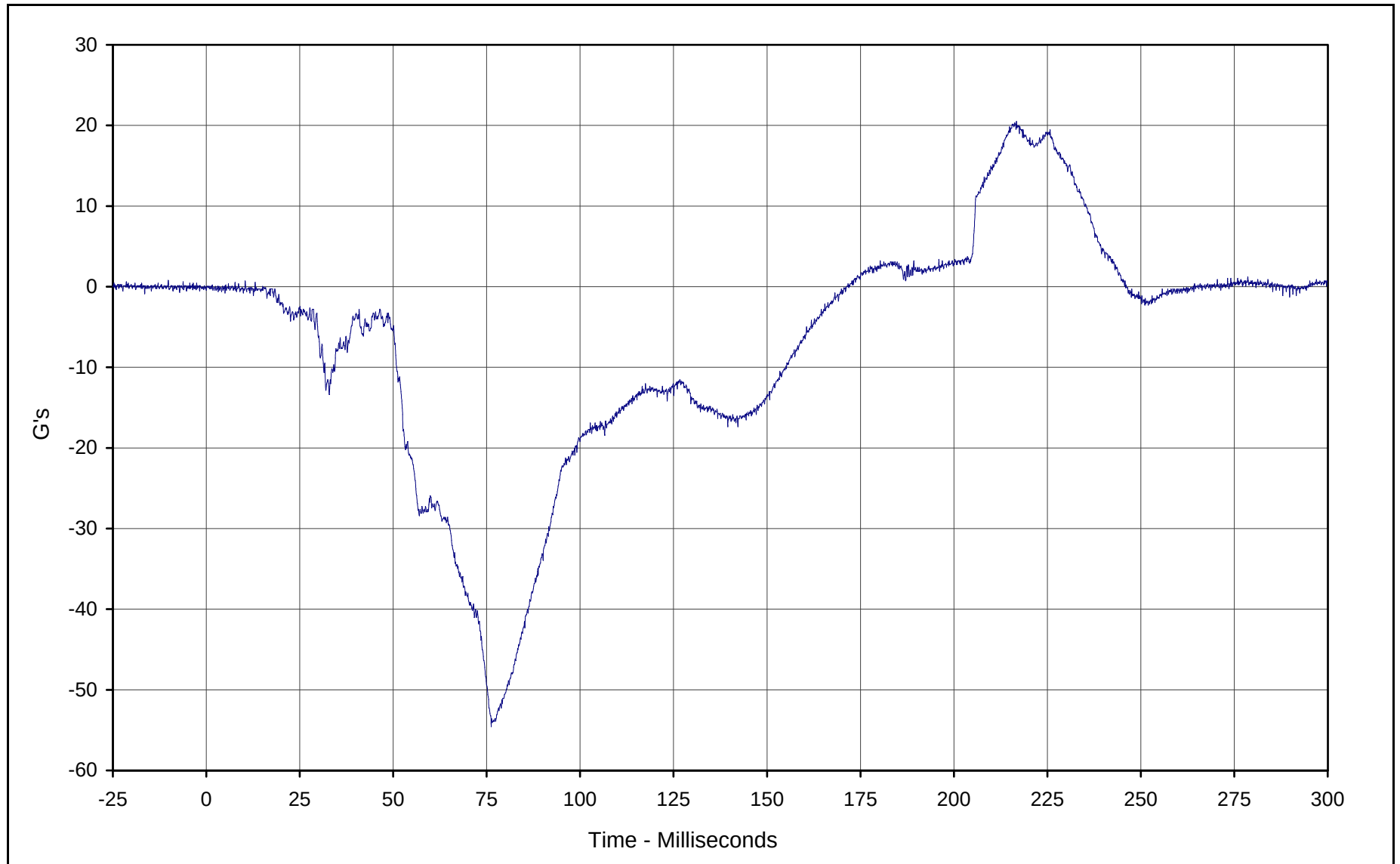
Curve Description: Passenger Head Resultant Primary  
Maximum Value: 56.1 at 75.9 Milliseconds  
Minimum Value: 0.2 at 2.3 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: RES-045

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





B-68

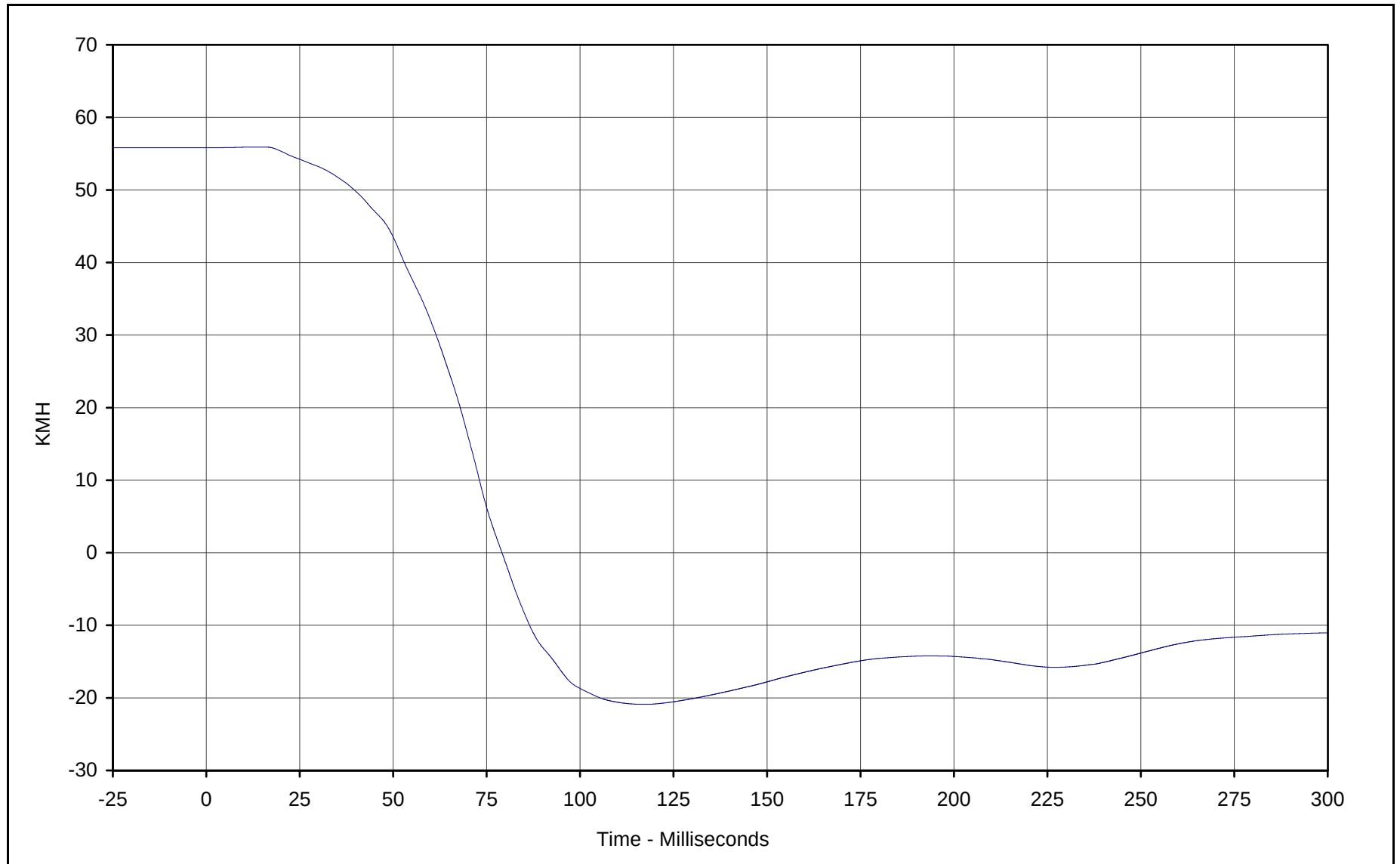


Curve Description: Passenger Head Redundant X  
Maximum Value: 20.5 at 216.7 Milliseconds  
Minimum Value: -54.6 at 76.2 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-048

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



Curve Description: Passenger Chest Primary X Velocity

Maximum Value: 55.9 at 13.7 Milliseconds

Minimum Value: -20.9 at 117.8 Milliseconds

SAE Filter Class: 180

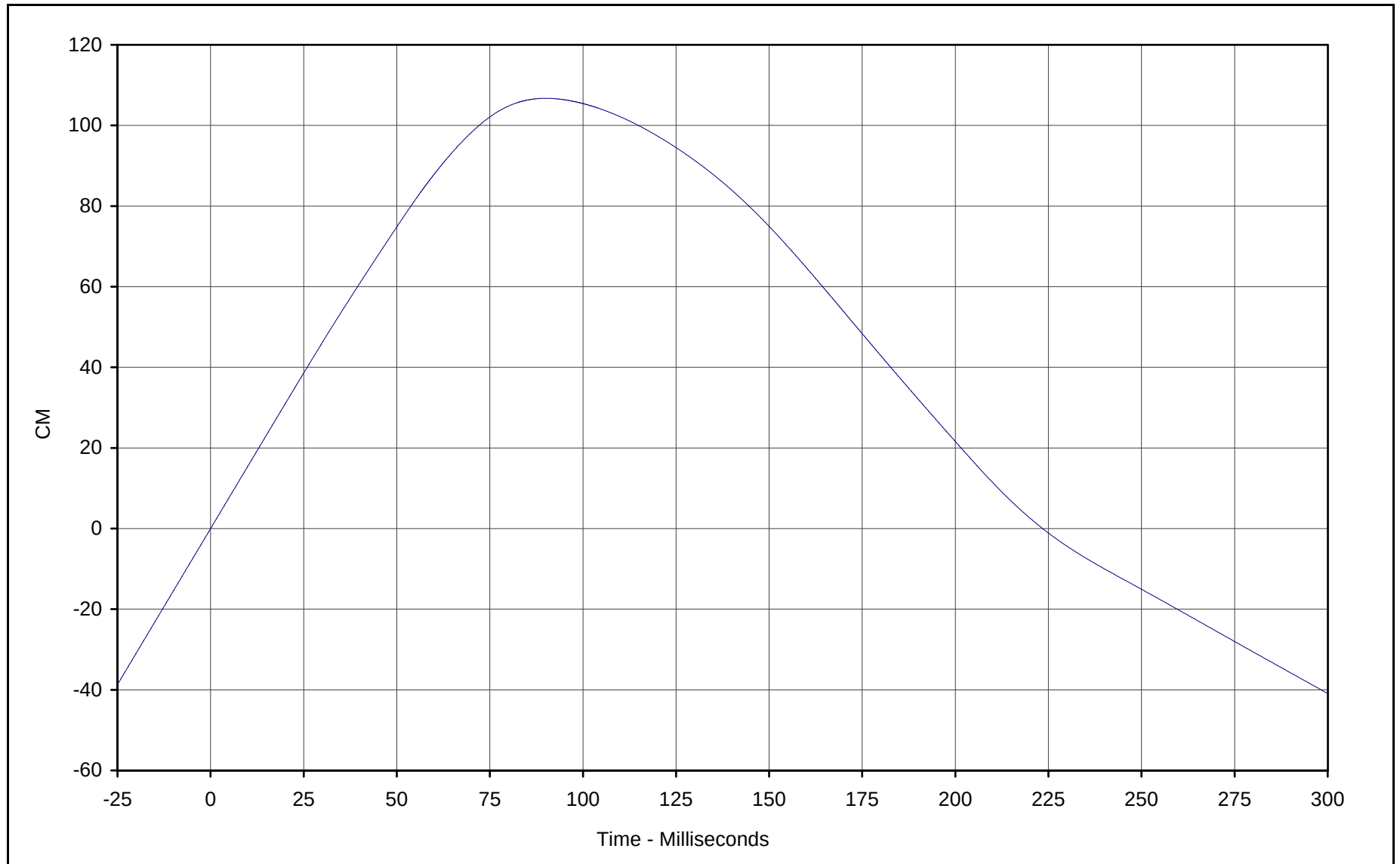
Date of Test: 01/09/01

Curve Number: IN1-057

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Head Redundant X Displ.

Maximum Value: 106.7 at 90.0 Milliseconds

Minimum Value: -40.9 at 299.9 Milliseconds

SAE Filter Class: 180

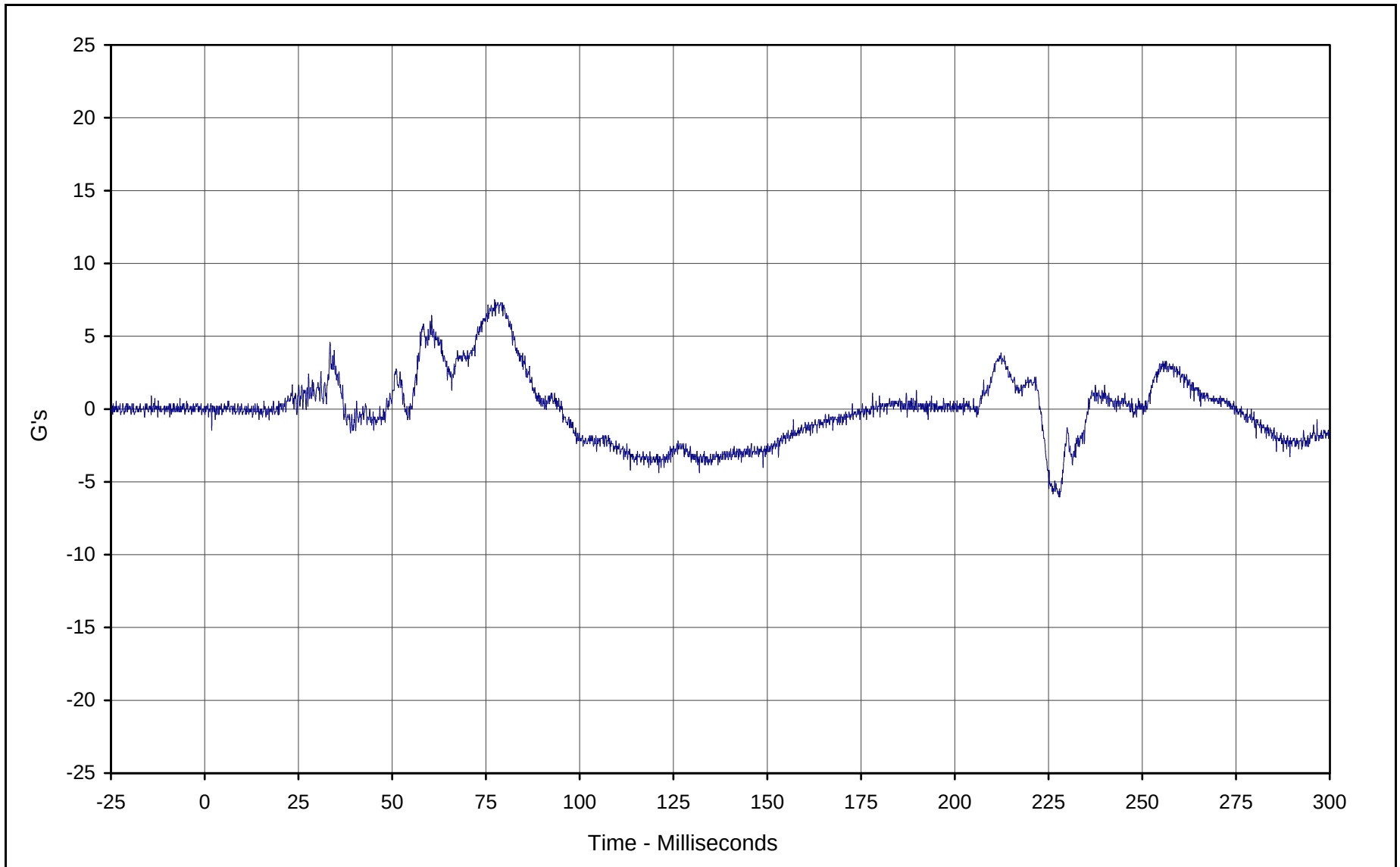
Date of Test: 01/09/01

Curve Number: IN2-048

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV

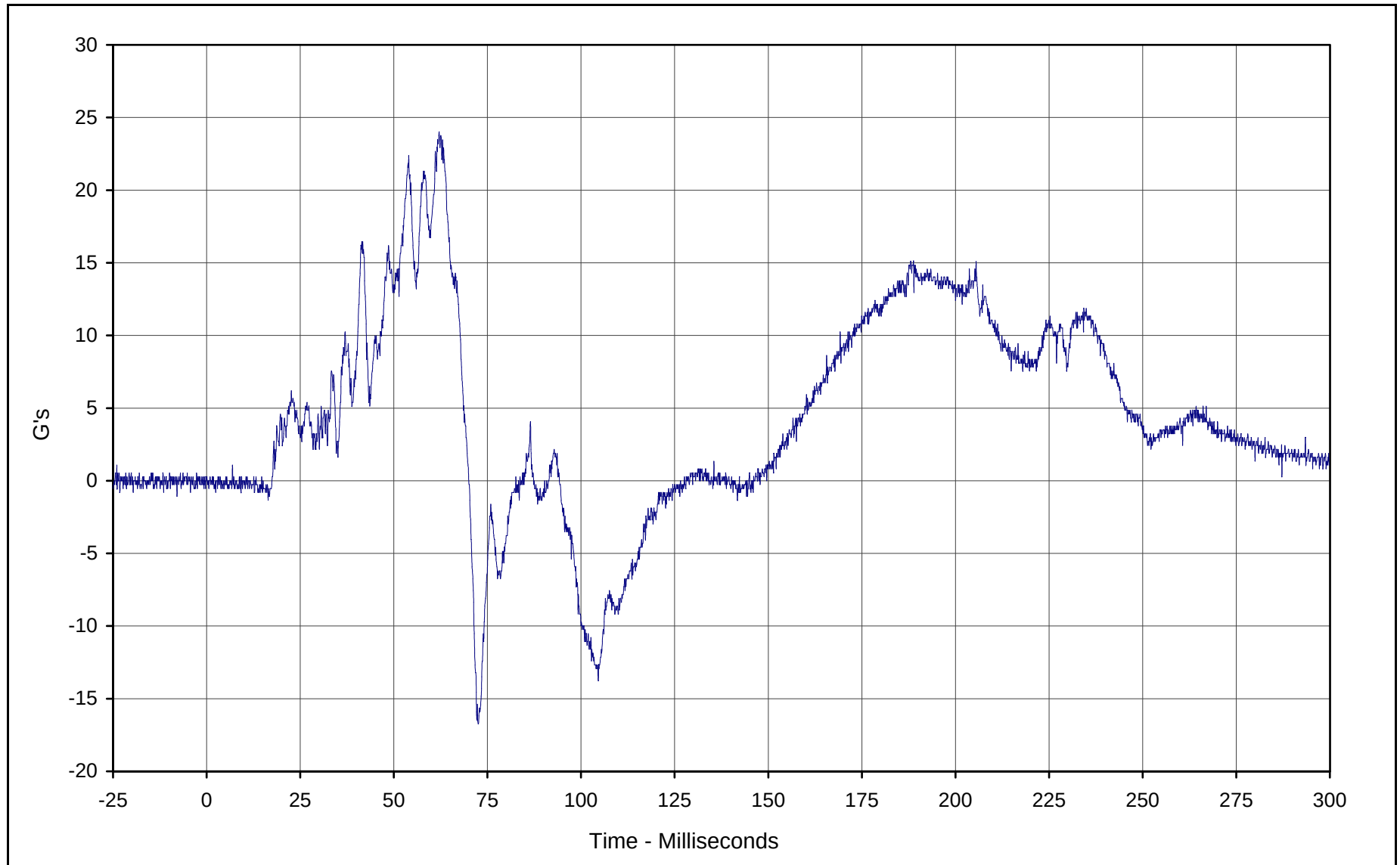




Curve Description: Passenger Head Redundant Y  
Maximum Value: 7.5 at 77.3 Milliseconds  
Minimum Value: -6.0 at 227.7 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-049

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



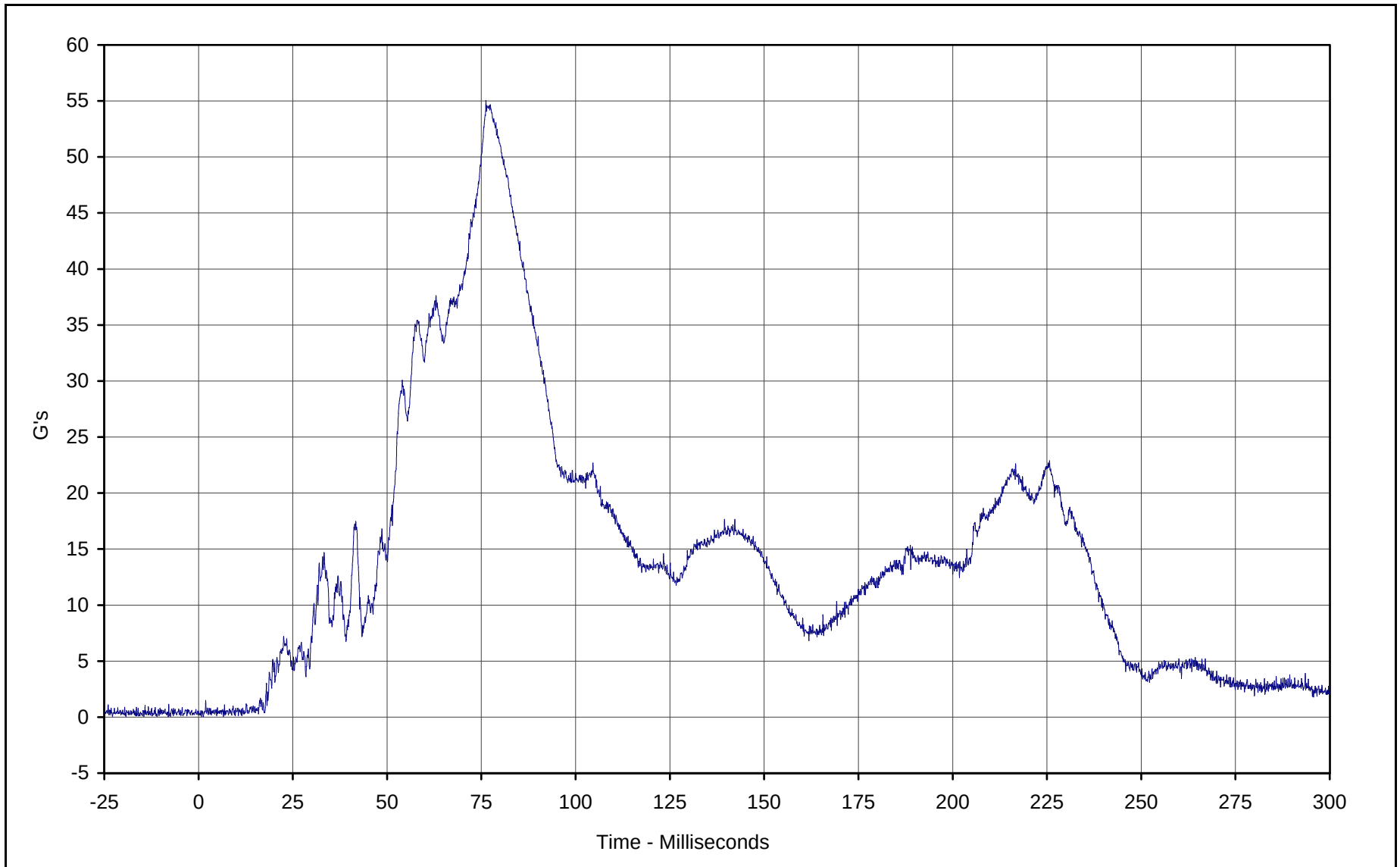


Curve Description: Passenger Head Redundant Z  
Maximum Value: 24.0 at 62.1 Milliseconds  
Minimum Value: -16.7 at 72.5 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-050

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV







Curve Description: Passenger Head Resultant Redundant

Maximum Value: 55.1 at 76.2 Milliseconds

Minimum Value: 0.1 at 0.7 Milliseconds

SAE Filter Class: 1000

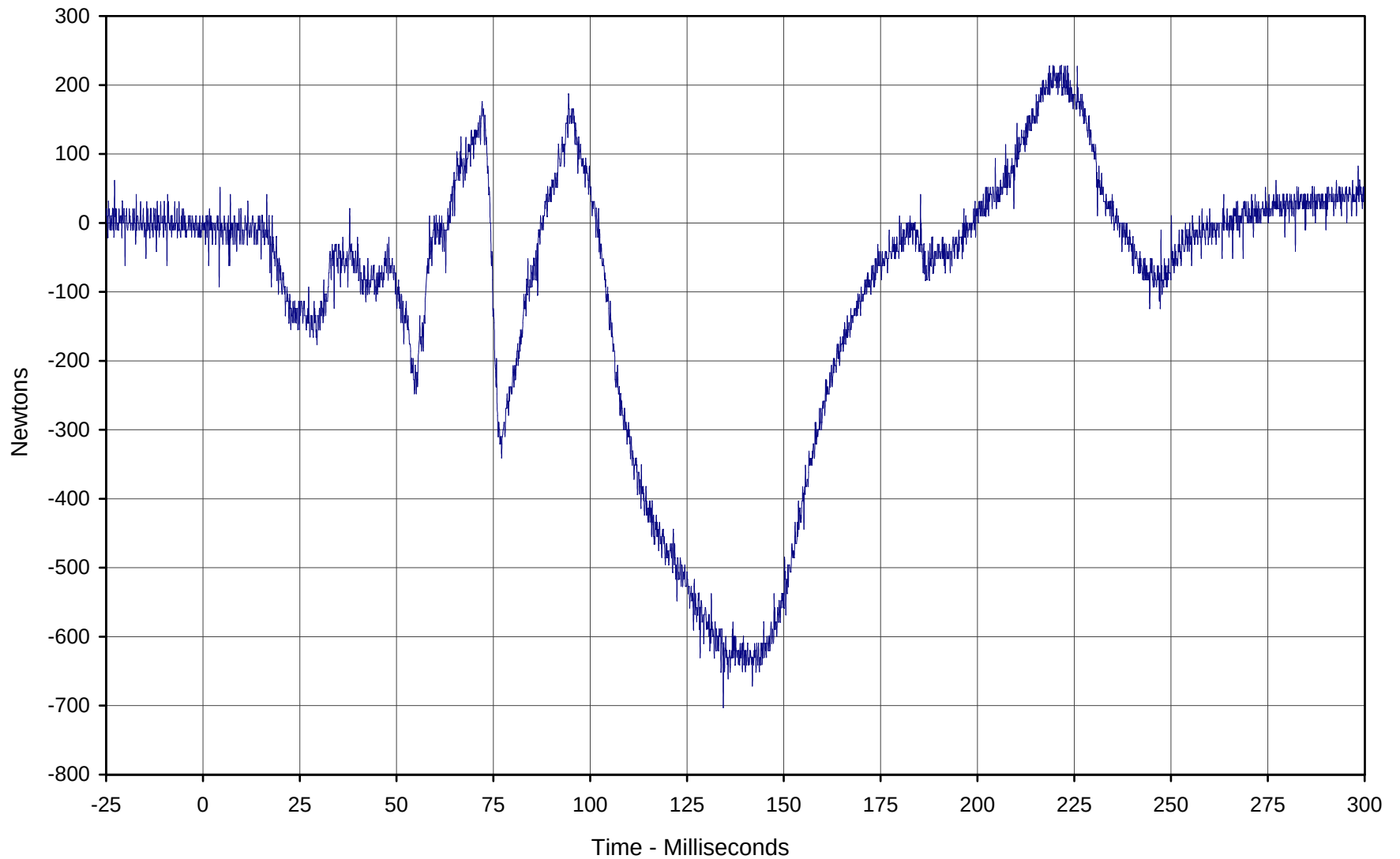
Date of Test: 01/09/01

Curve Number: RES-048

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



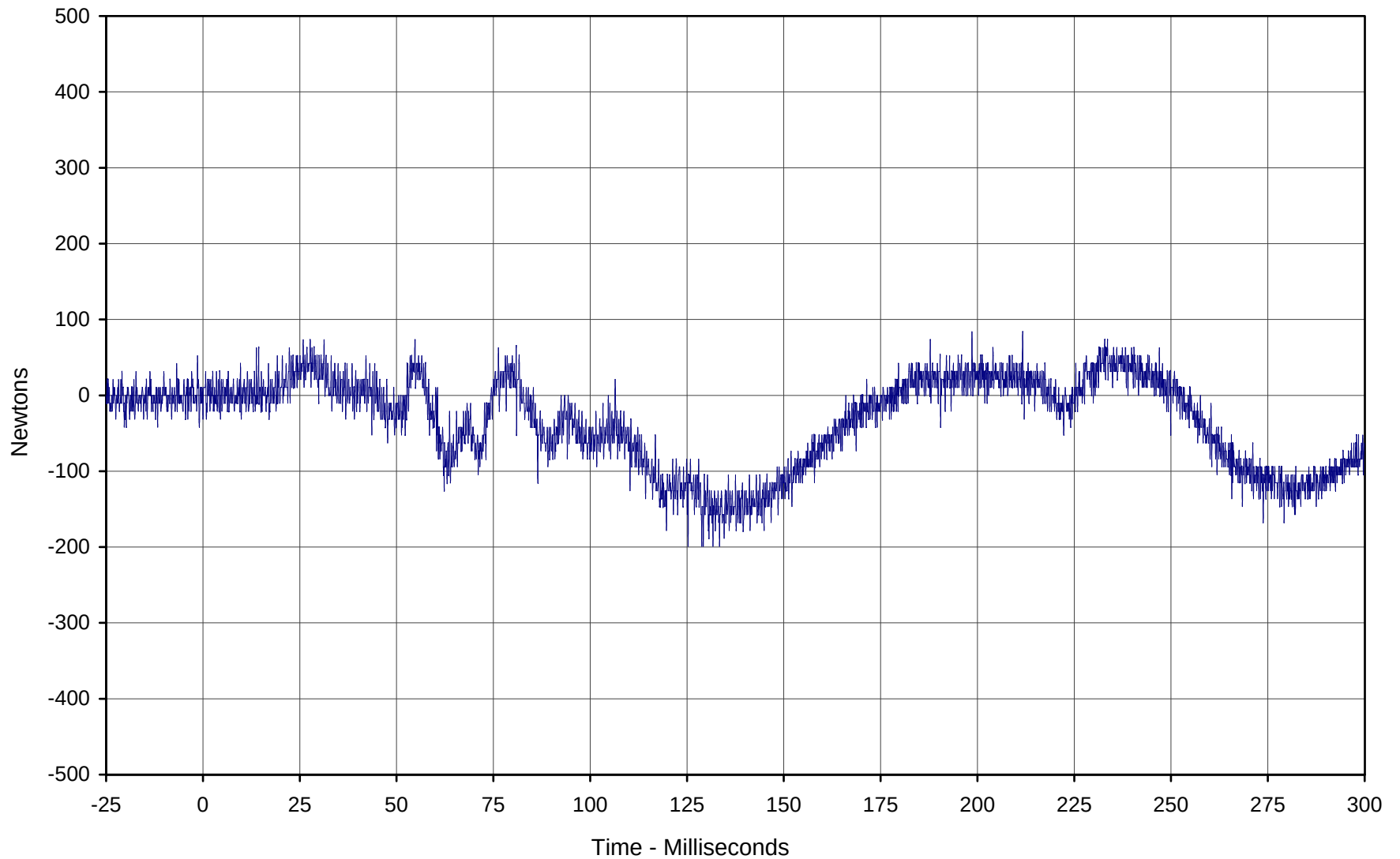


Curve Description: Passenger Neck Force X  
Maximum Value: 227.3 at 218.6 Milliseconds  
Minimum Value: -702.7 at 134.4 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-051

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-75

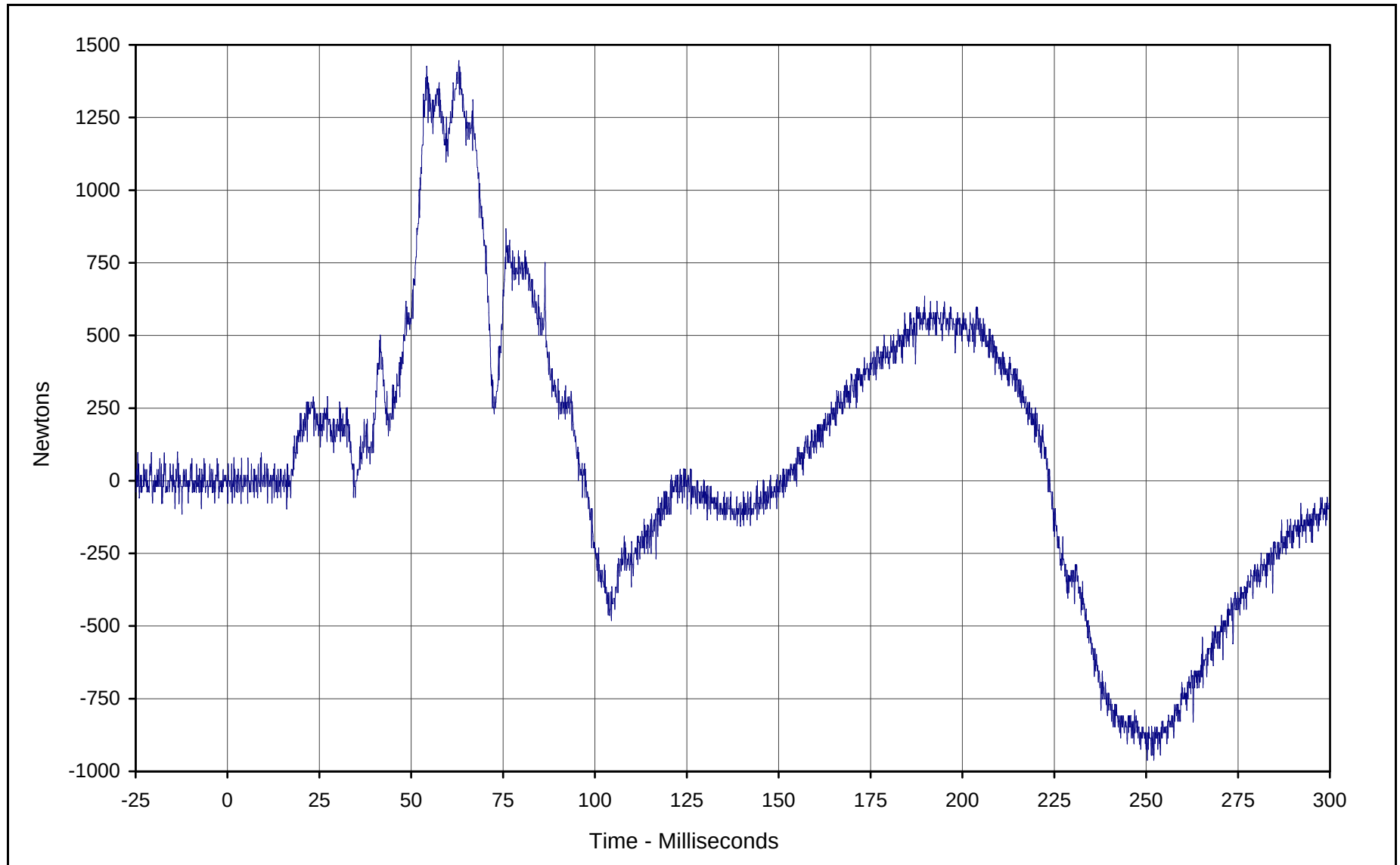


Curve Description: Passenger Neck Force Y  
Maximum Value: 83.9 at 198.6 Milliseconds  
Minimum Value: -199.2 at 125.3 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-052

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



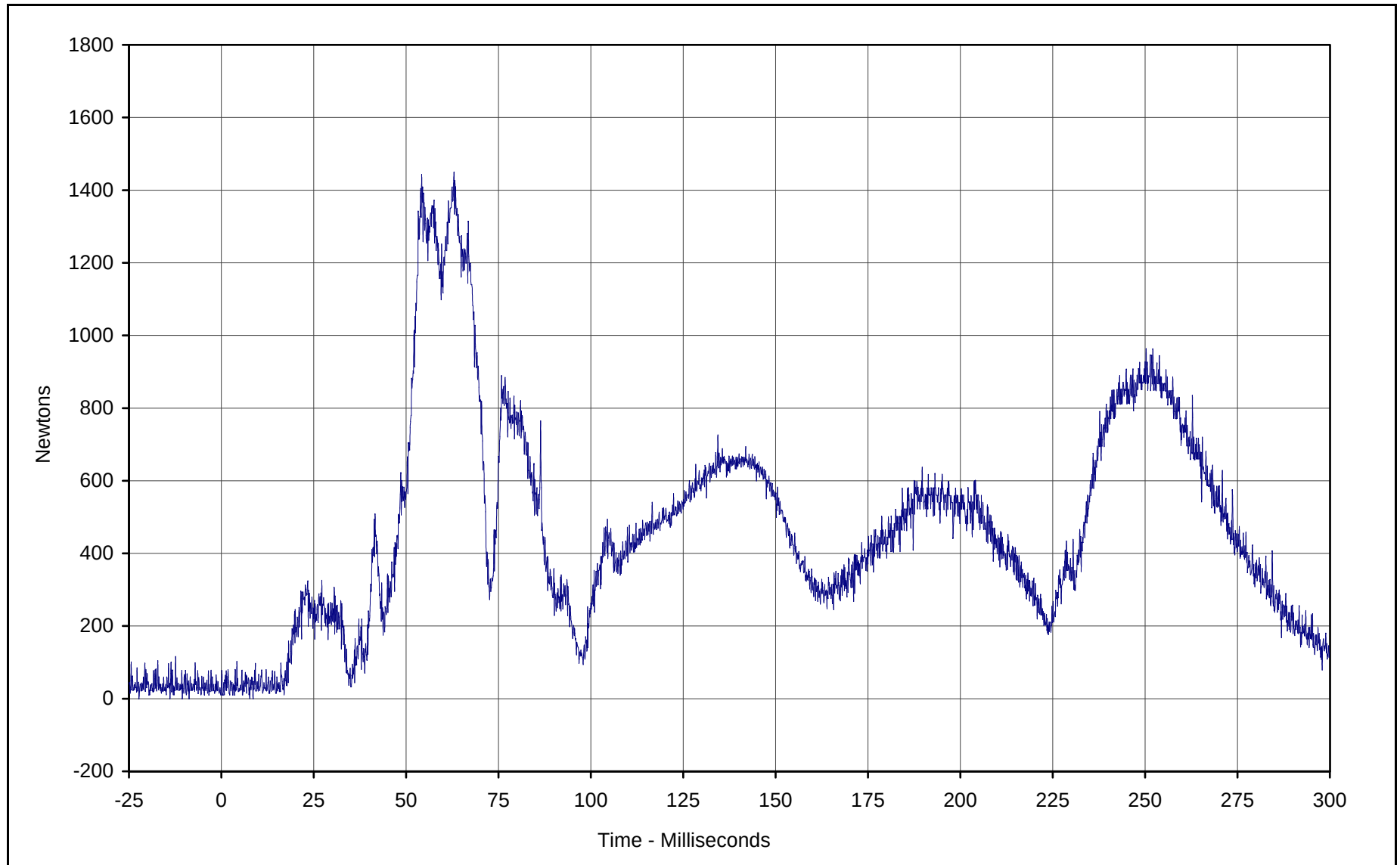
KAR21001-02



Curve Description: Passenger Neck Force Z  
Maximum Value: 1444.2 at 63.0 Milliseconds  
Minimum Value: -962.8 at 250.3 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-053

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



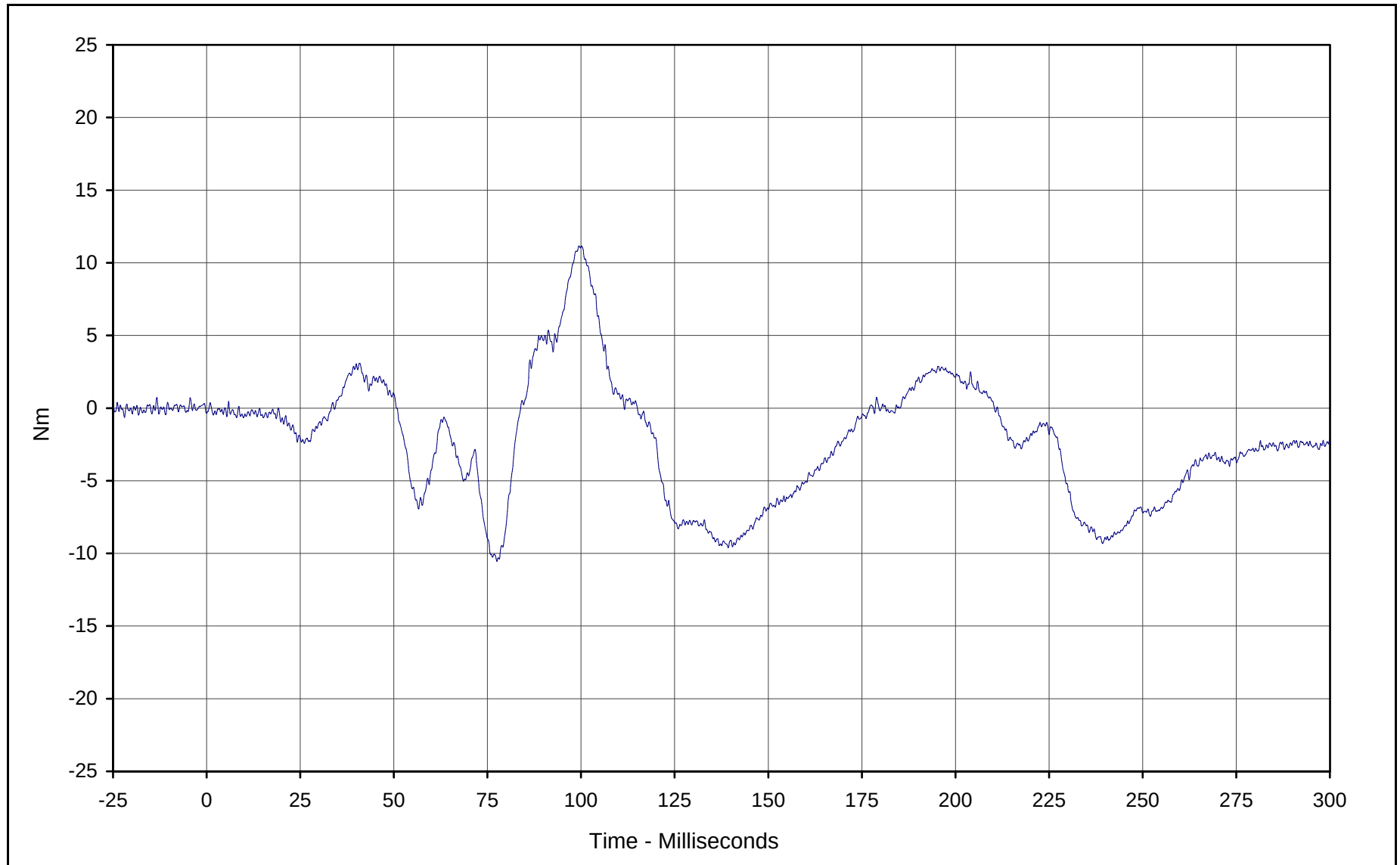


Curve Description: Passenger Neck Force Resultant  
Maximum Value: 1448.1 at 63.0 Milliseconds  
Minimum Value: 0.0 at 7.7 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: RES-051

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



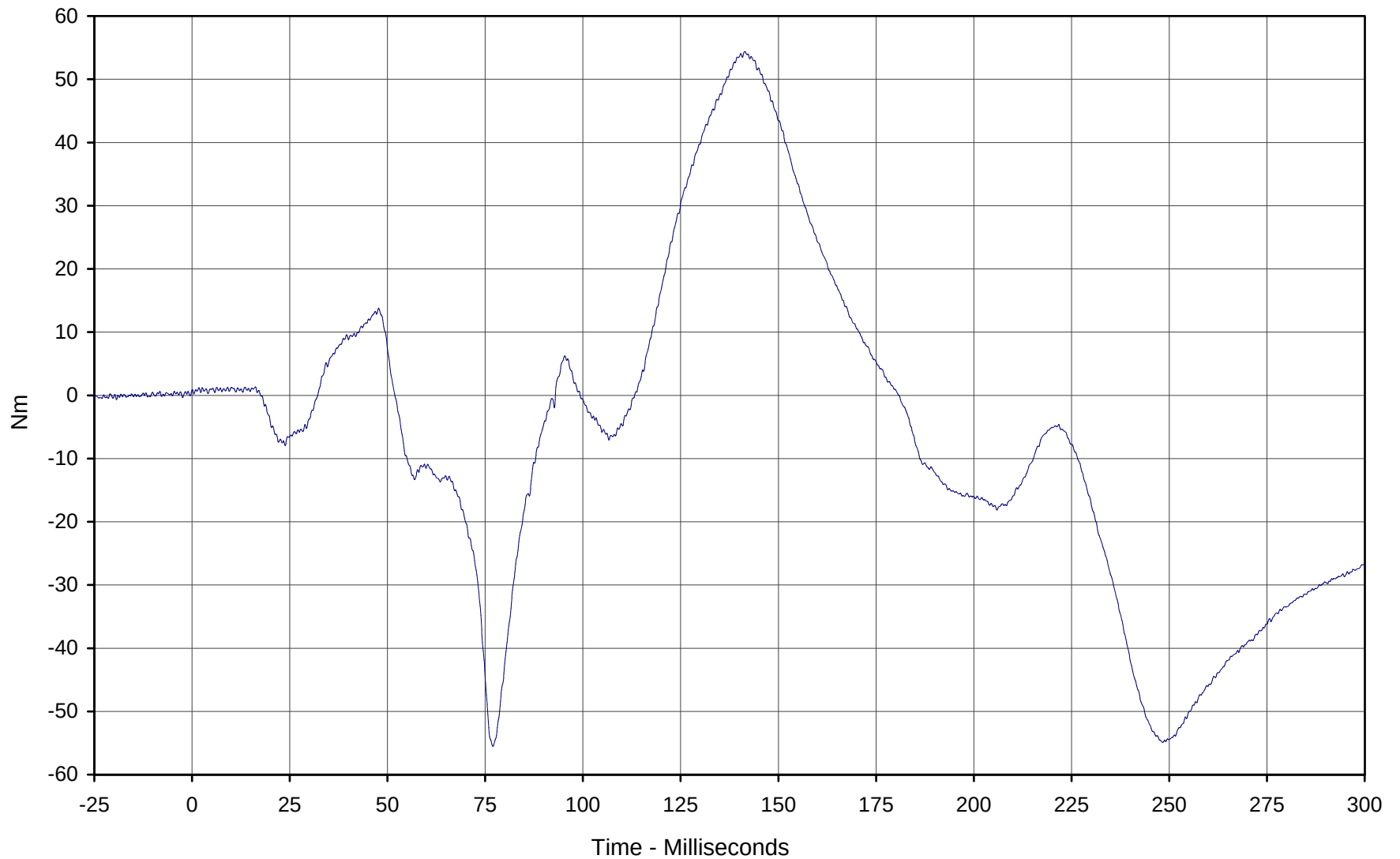




Curve Description: Passenger Neck Moment X  
Maximum Value: 11.2 at 100.1 Milliseconds  
Minimum Value: -10.5 at 77.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-054

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

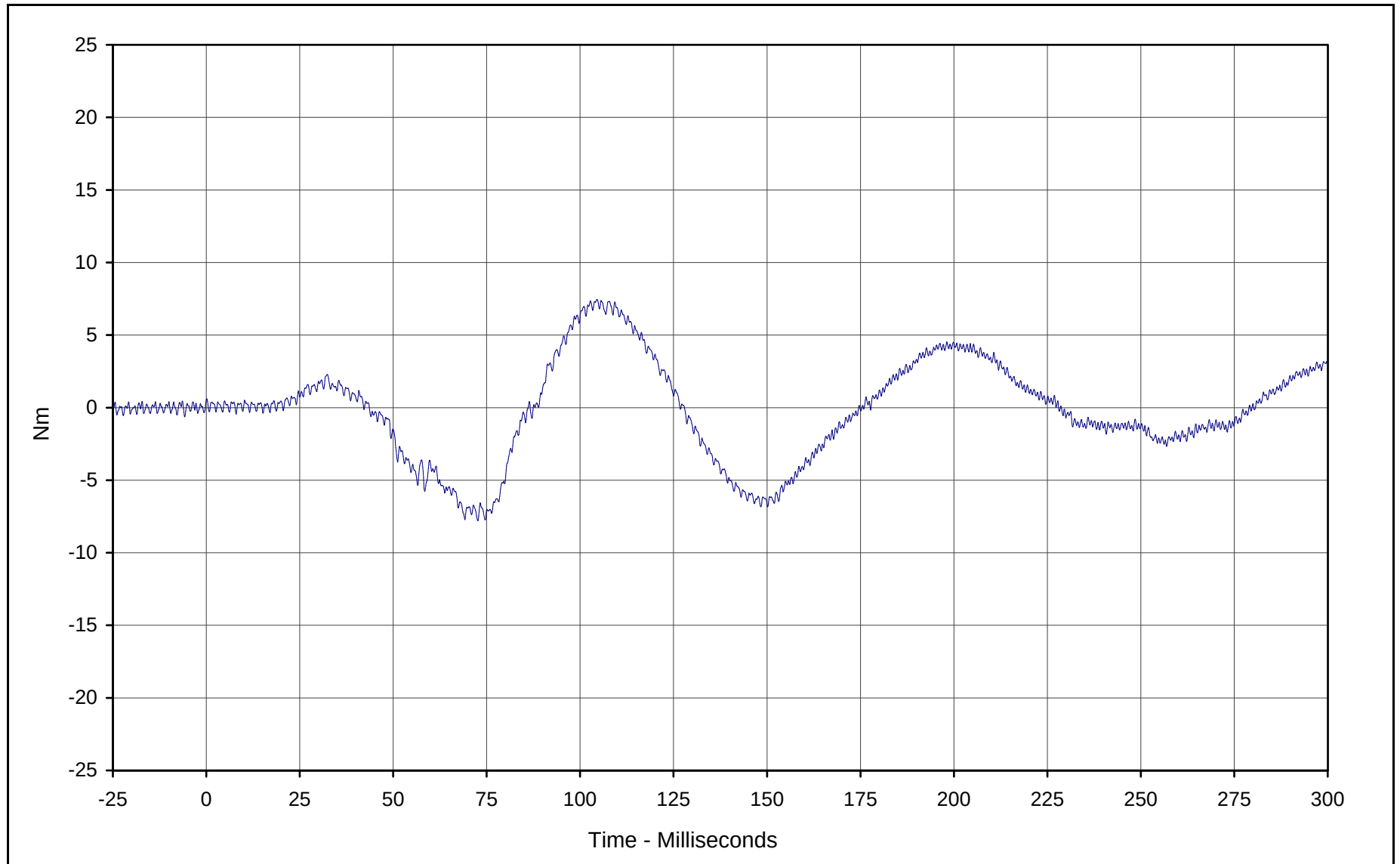




Curve Description: Passenger Neck Moment Y  
Maximum Value: 54.4 at 141.4 Milliseconds  
Minimum Value: -55.5 at 77.0 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-055

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

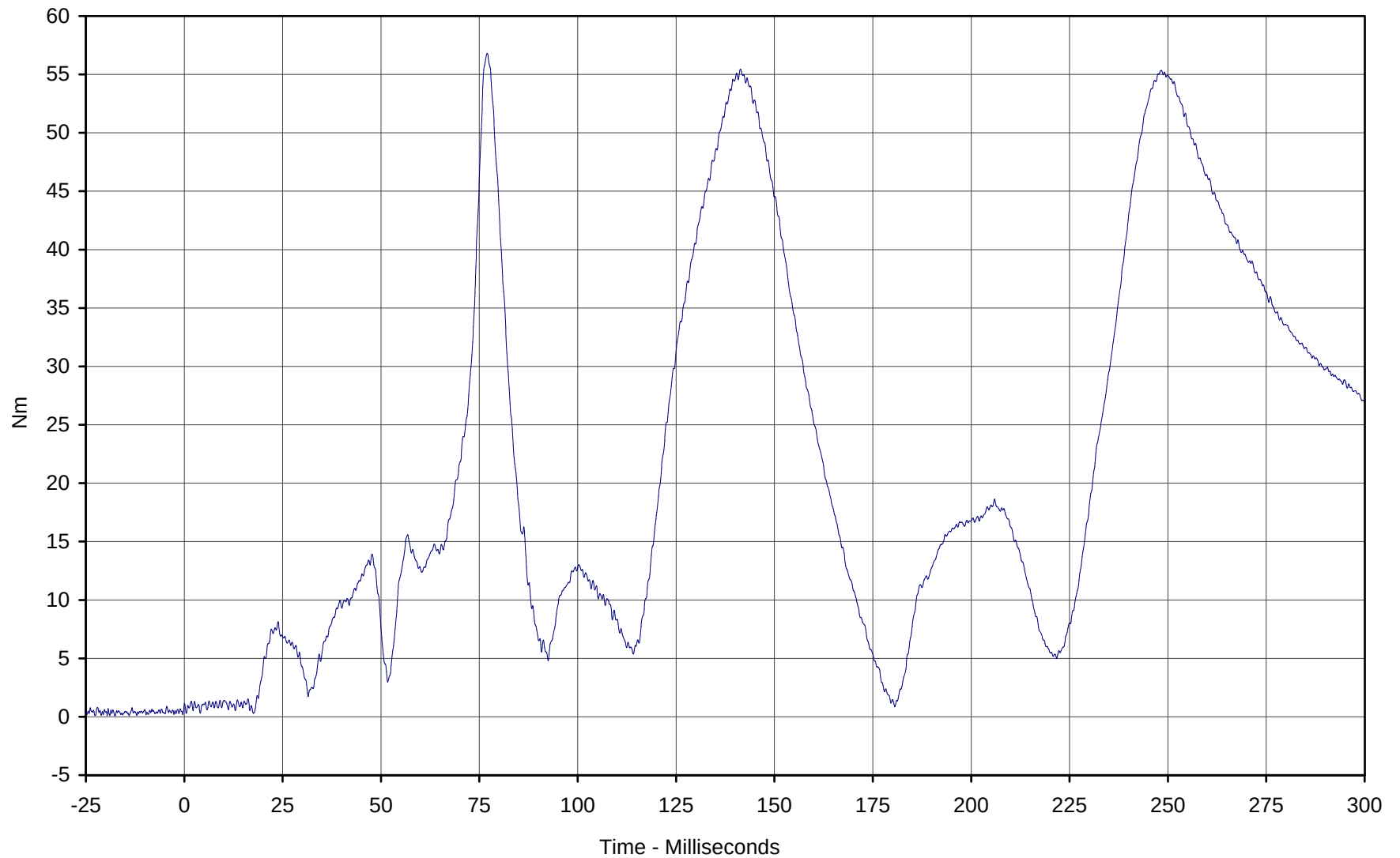




Curve Description: Passenger Neck Moment Z  
Maximum Value: 7.5 at 104.5 Milliseconds  
Minimum Value: -7.8 at 72.6 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-056

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

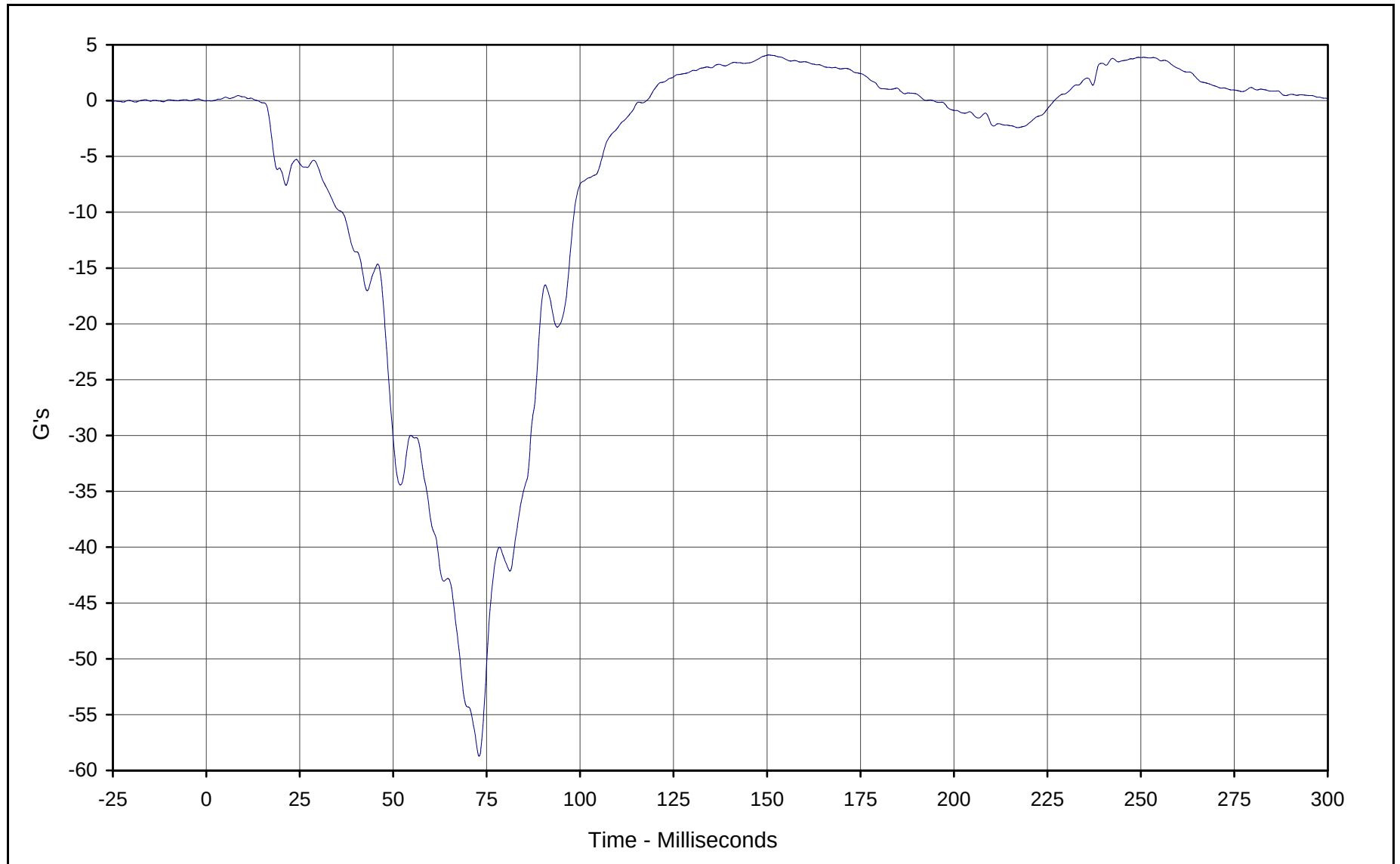




Curve Description: Passenger Neck Moment Resultant  
Maximum Value: 56.8 at 77.0 Milliseconds  
Minimum Value: 0.3 at 0.5 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: RES-054

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



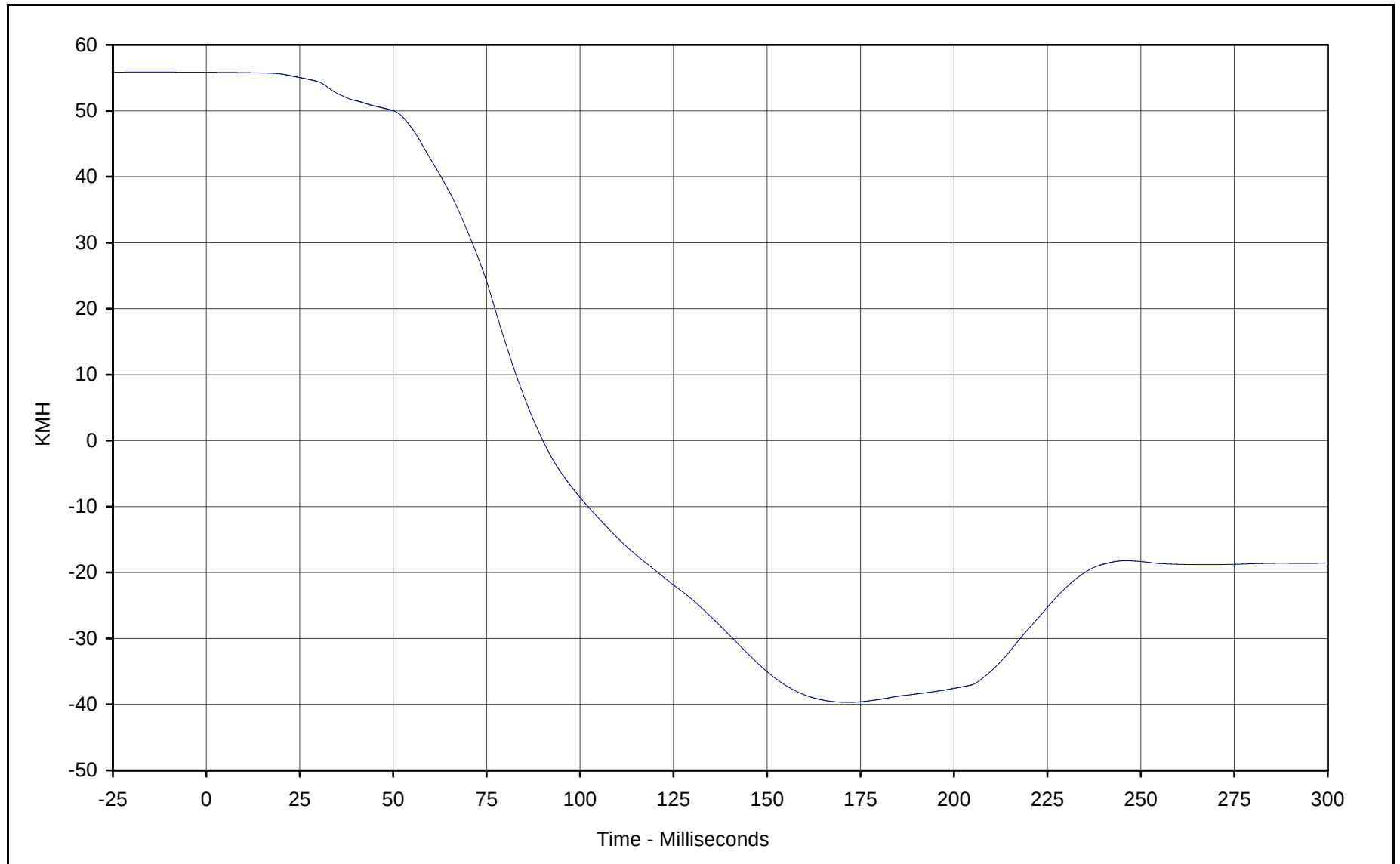


Curve Description: Passenger Chest Primary X  
Maximum Value: 4.1 at 150.5 Milliseconds  
Minimum Value: -58.7 at 73.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-057

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV







Curve Description: Passenger Head Redundant X Velocity

Maximum Value: 55.8 at 0.0 Milliseconds

Minimum Value: -39.7 at 171.5 Milliseconds

SAE Filter Class: 180

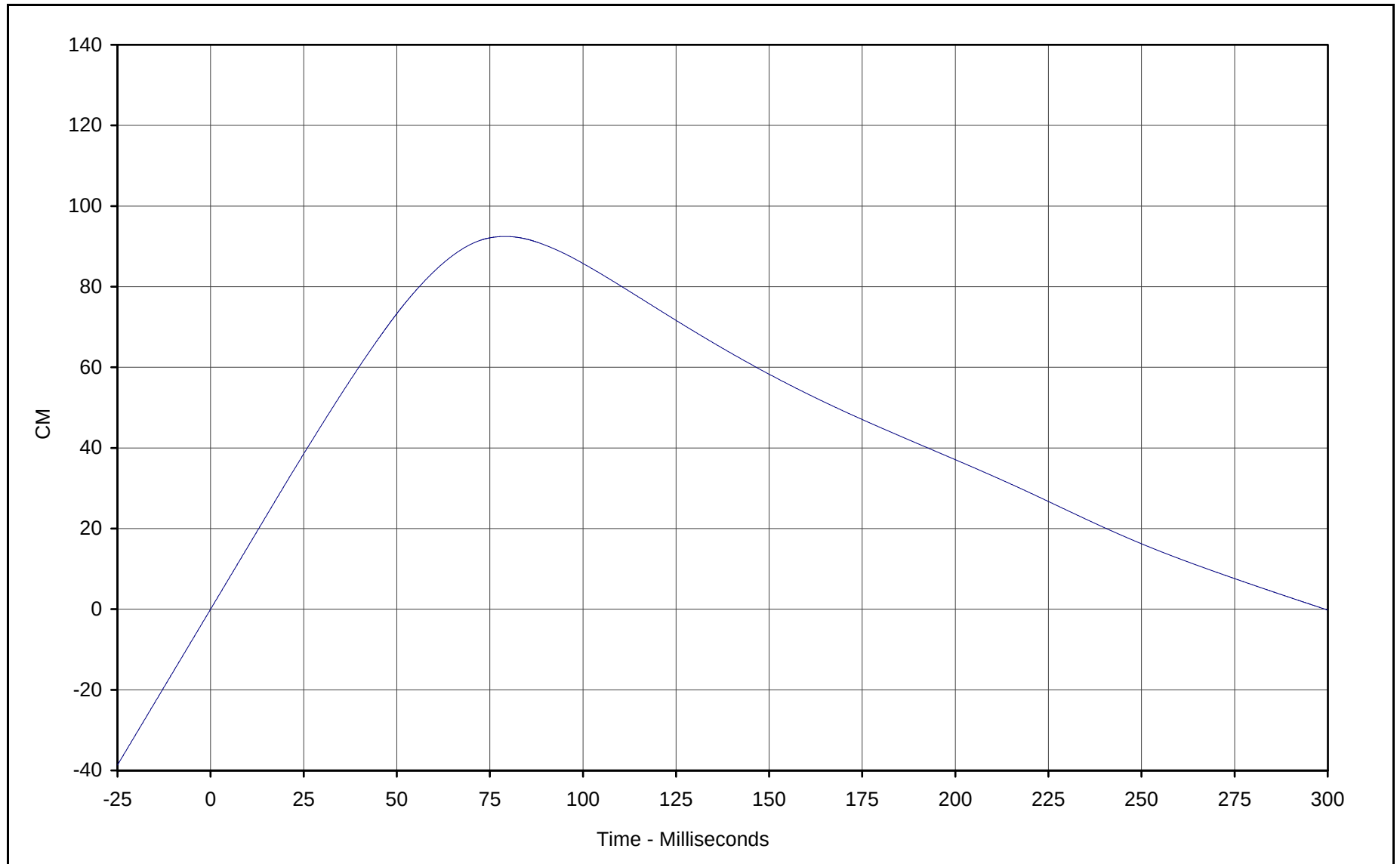
Date of Test: 01/09/01

Curve Number: IN1-048

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV

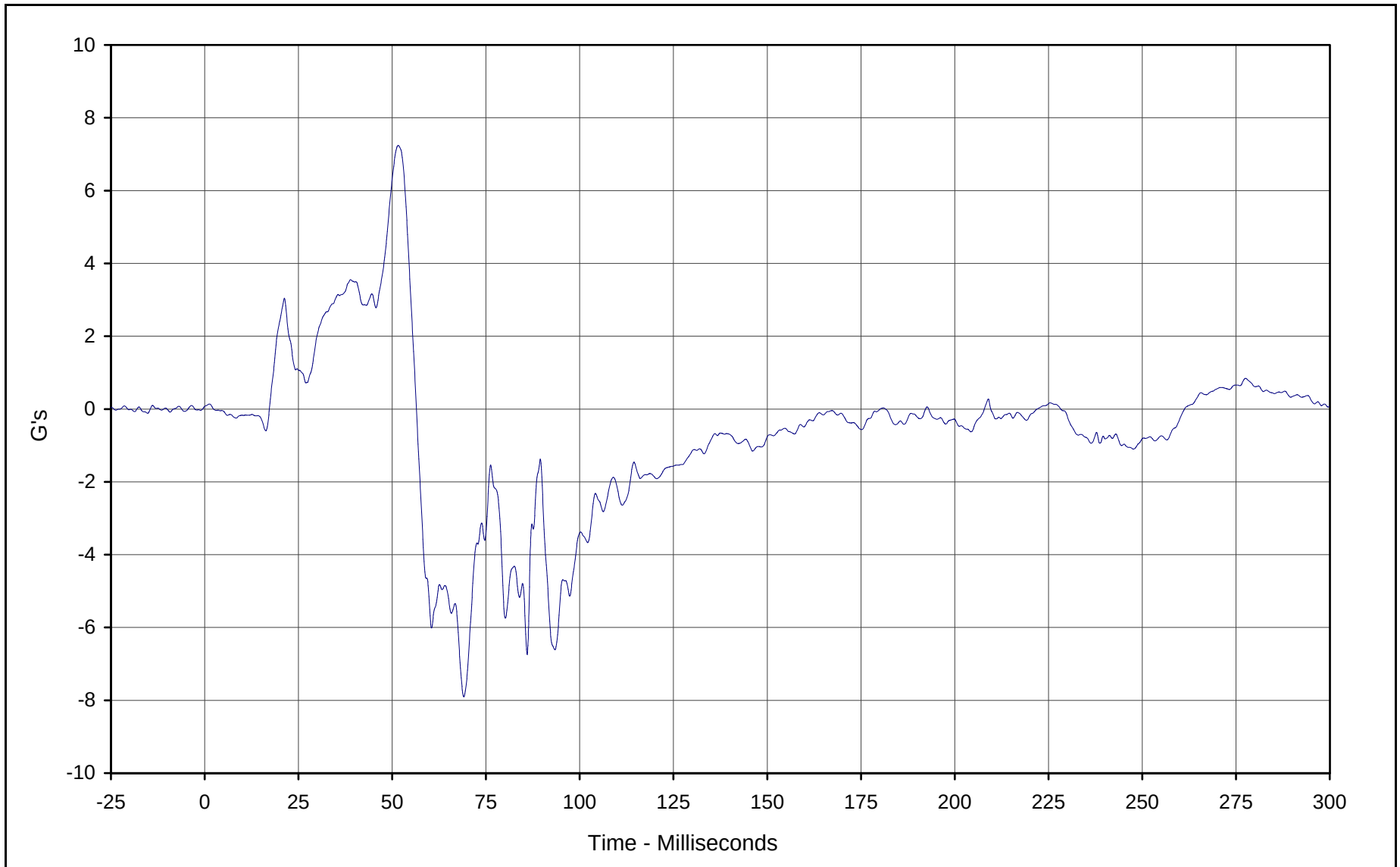




Curve Description: Passenger Chest Primary X Displ.  
Maximum Value: 92.5 at 79.1 Milliseconds  
Minimum Value: -0.2 at 299.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-057

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

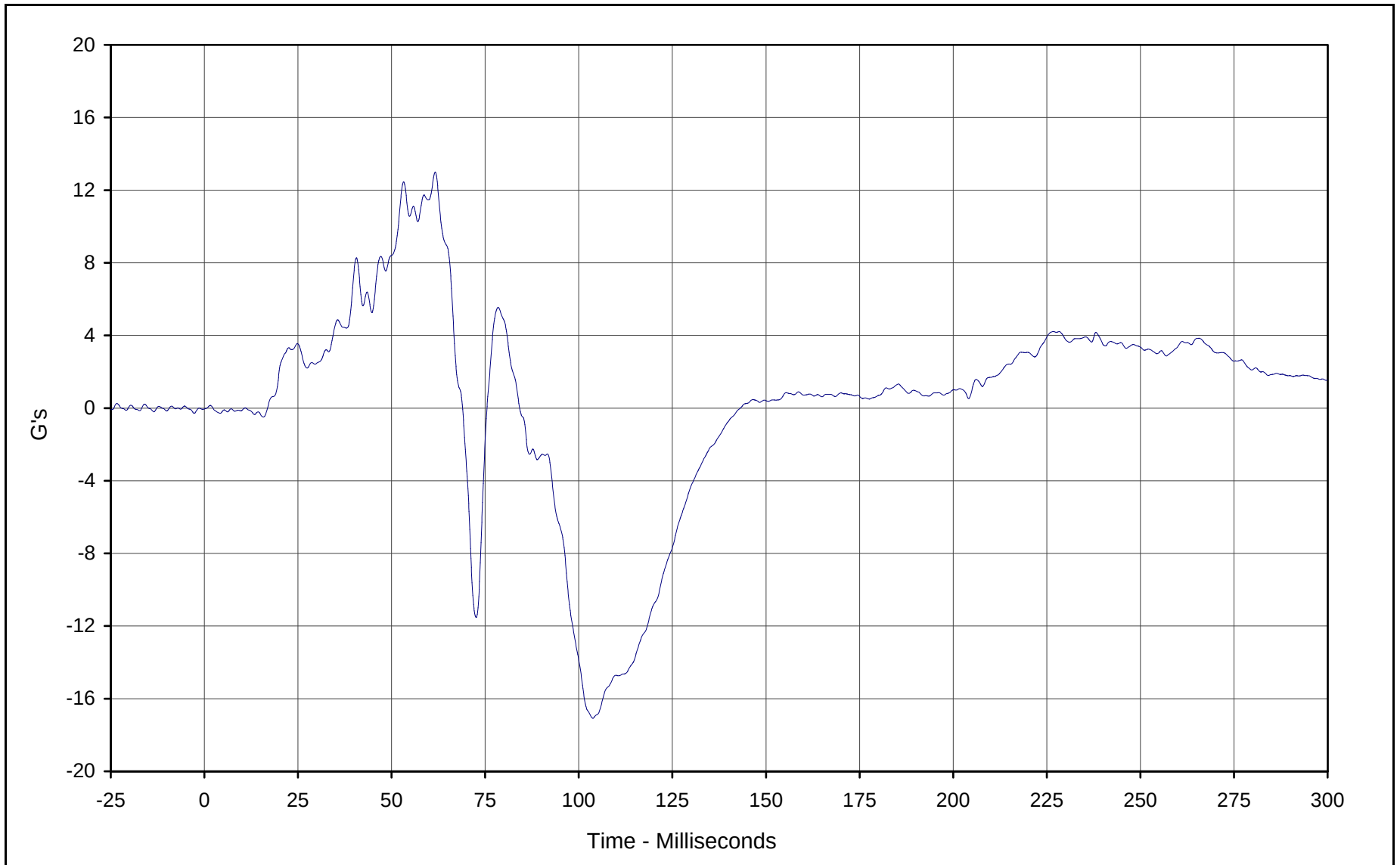




Curve Description: Passenger Chest Primary Y  
Maximum Value: 7.2 at 51.6 Milliseconds  
Minimum Value: -7.9 at 69.1 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-058

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

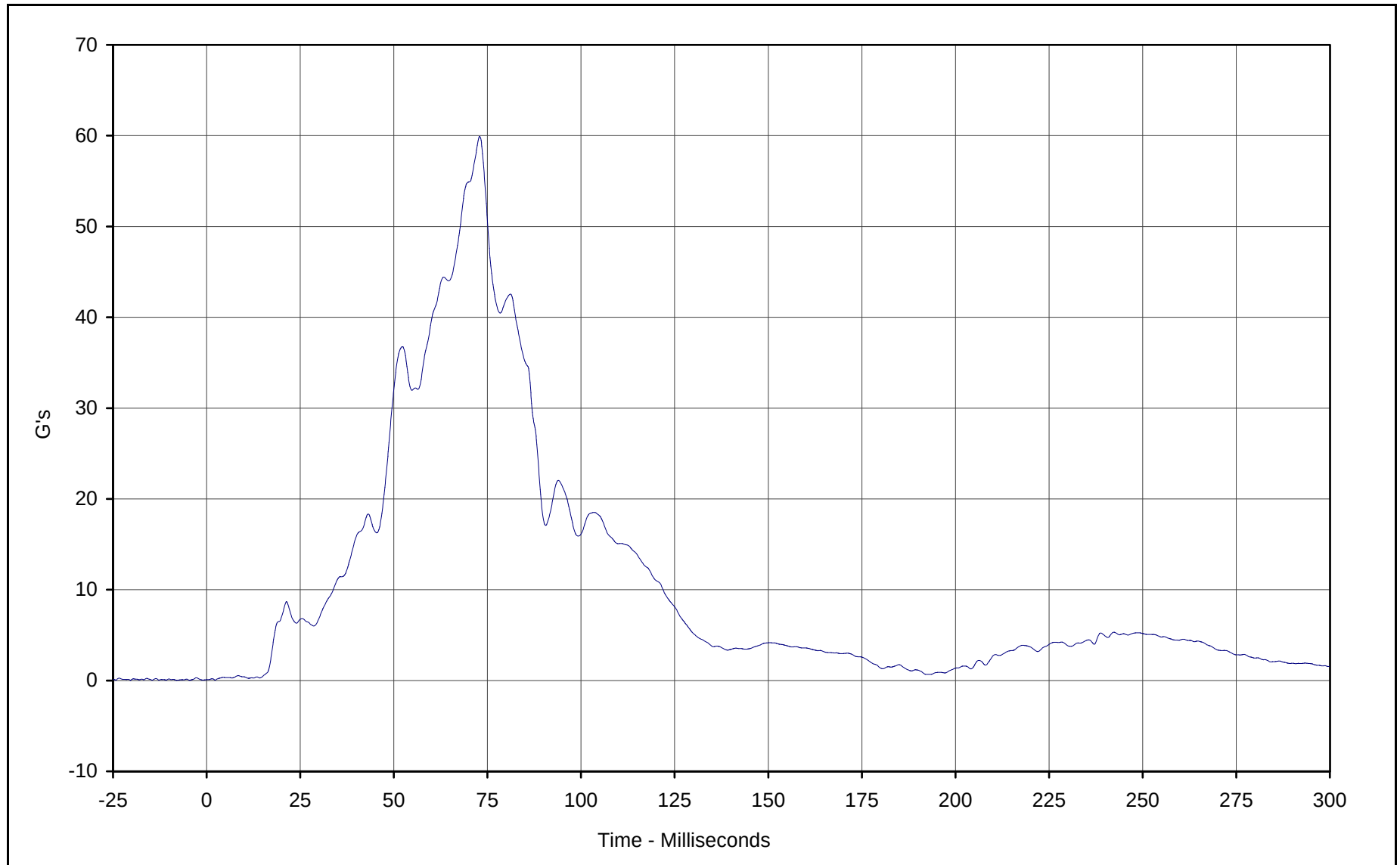




Curve Description: Passenger Chest Primary Z  
Maximum Value: 13.0 at 61.7 Milliseconds  
Minimum Value: -17.1 at 103.8 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-059

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

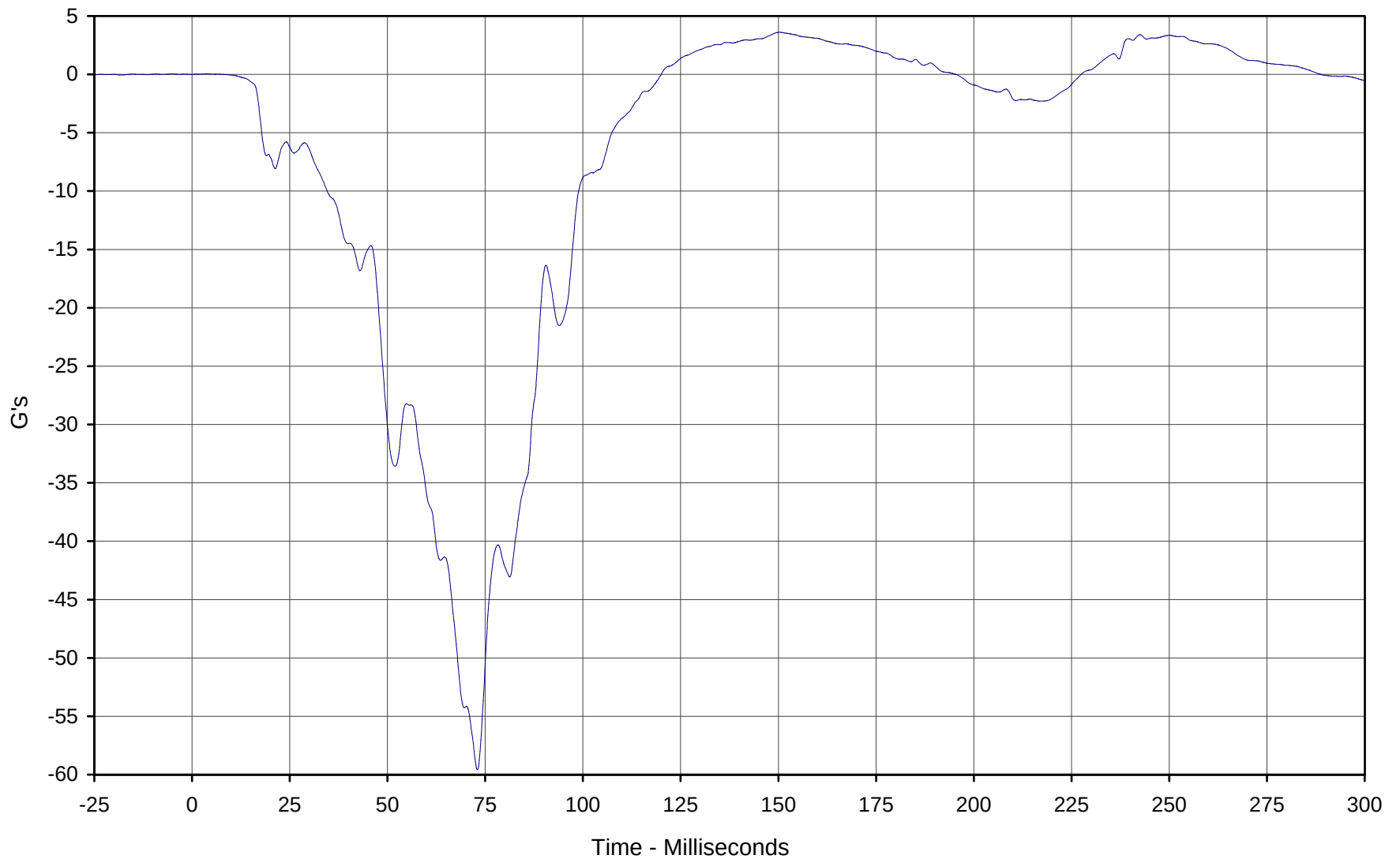




Curve Description: Passenger Chest Resultant Primary  
Maximum Value: 59.9 at 72.9 Milliseconds  
Minimum Value: 0.0 at 2.3 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: RES-057

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



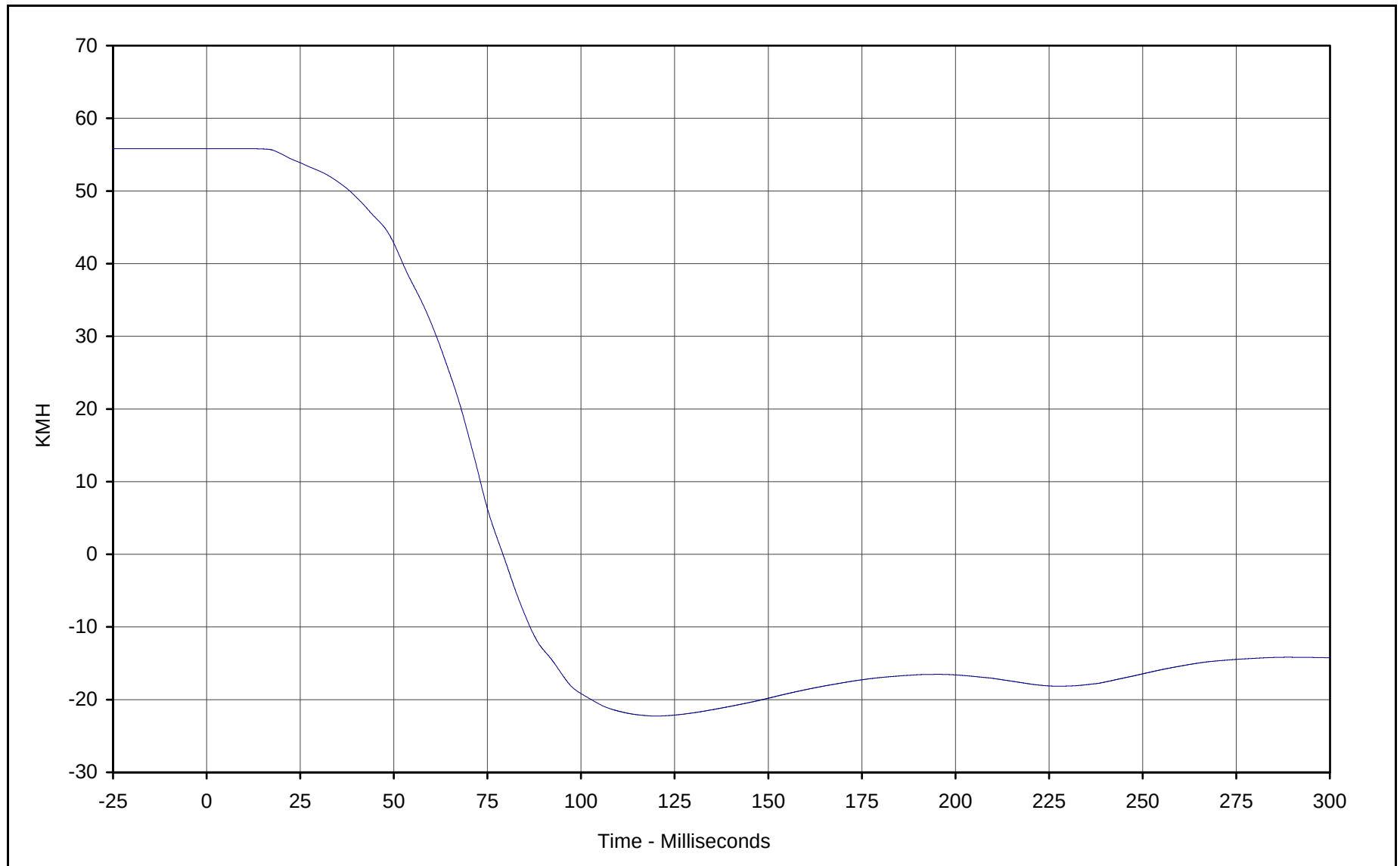


Curve Description: Passenger Chest Redundant X  
Maximum Value: 3.6 at 150.3 Milliseconds  
Minimum Value: -59.6 at 73.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-060

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV







Curve Description: Passenger Chest Redundant X Velocity

Maximum Value: 55.8 at 7.8 Milliseconds

Minimum Value: -22.3 at 120.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/09/01

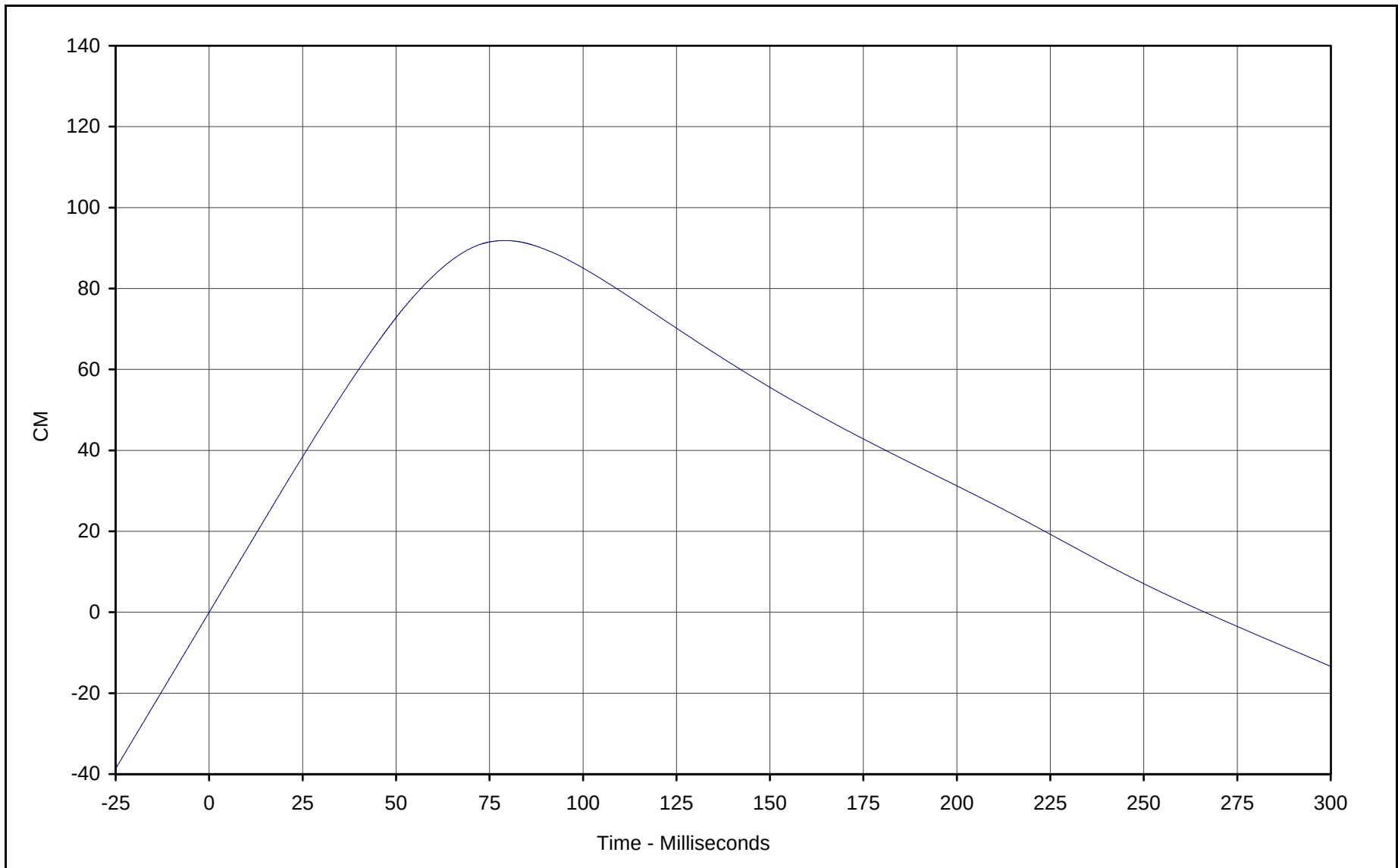
Curve Number: IN1-060

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-90



Curve Description: Passenger Chest Redundant X Displ.

Maximum Value: 91.9 at 79.1 Milliseconds

Minimum Value: -13.3 at 299.9 Milliseconds

SAE Filter Class: 180

Date of Test: 01/09/01

Curve Number: IN2-060

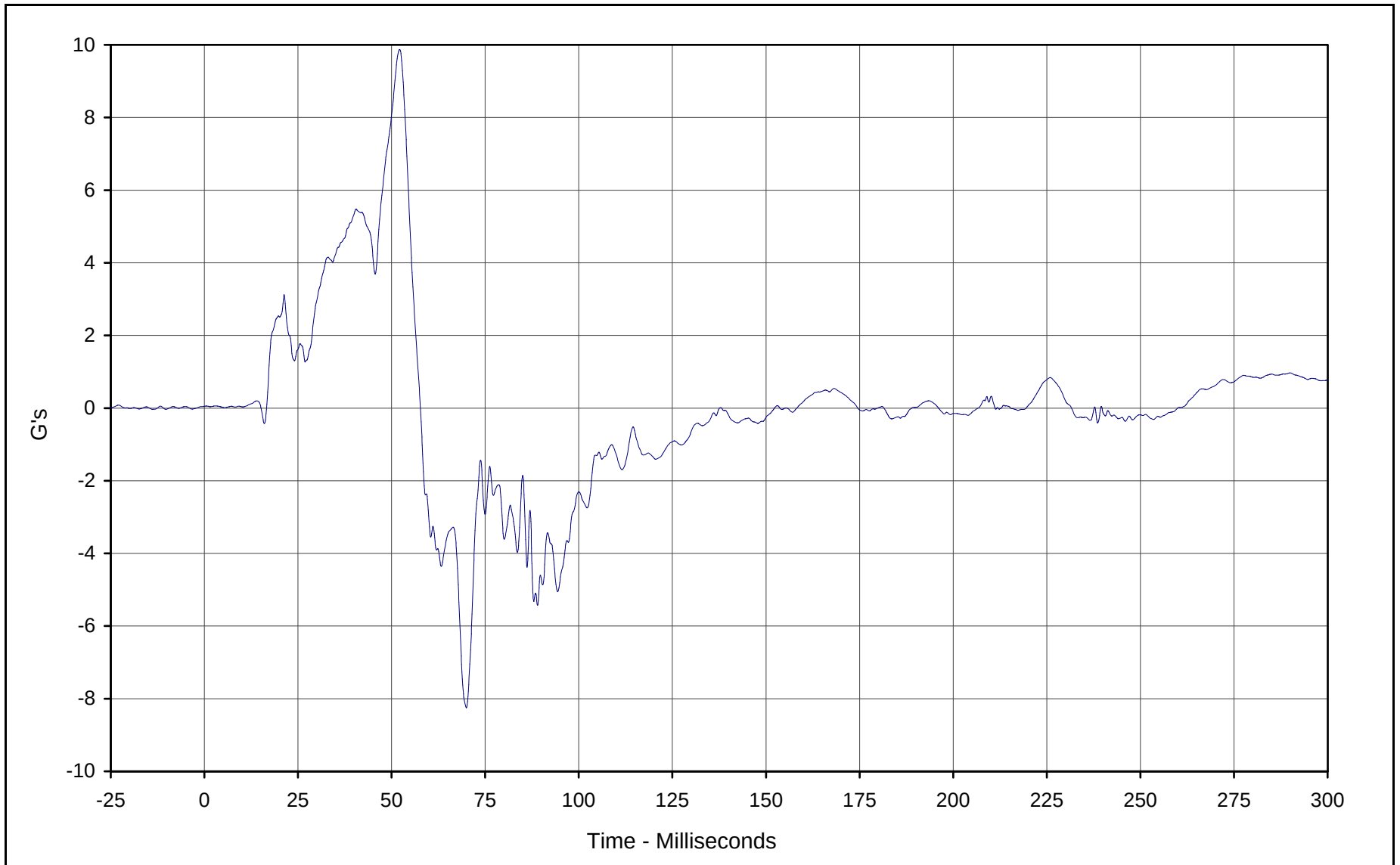
Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-91



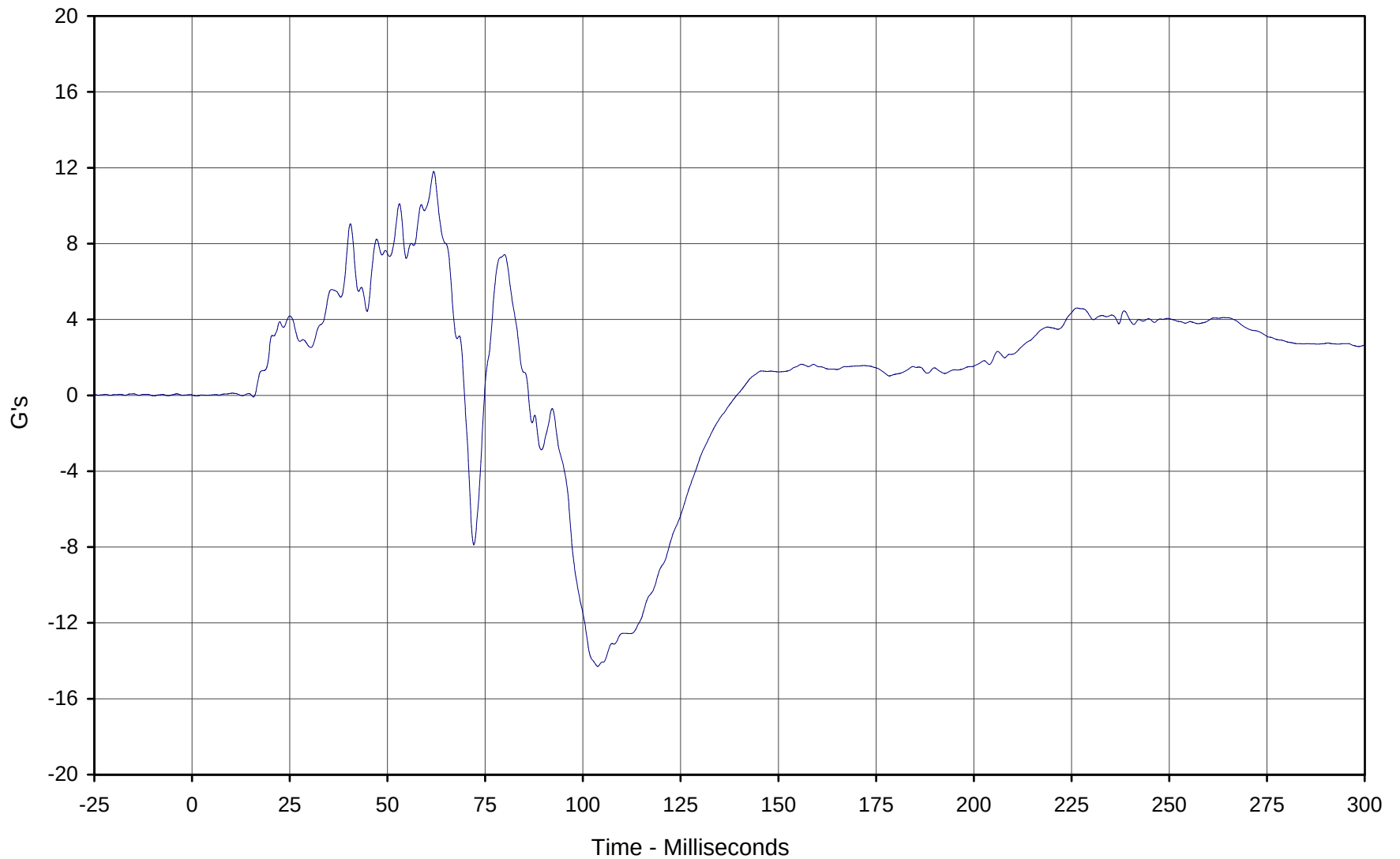
Curve Description: Passenger Chest Redundant Y  
Maximum Value: 9.9 at 52.2 Milliseconds  
Minimum Value: -8.3 at 70.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-061

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-92

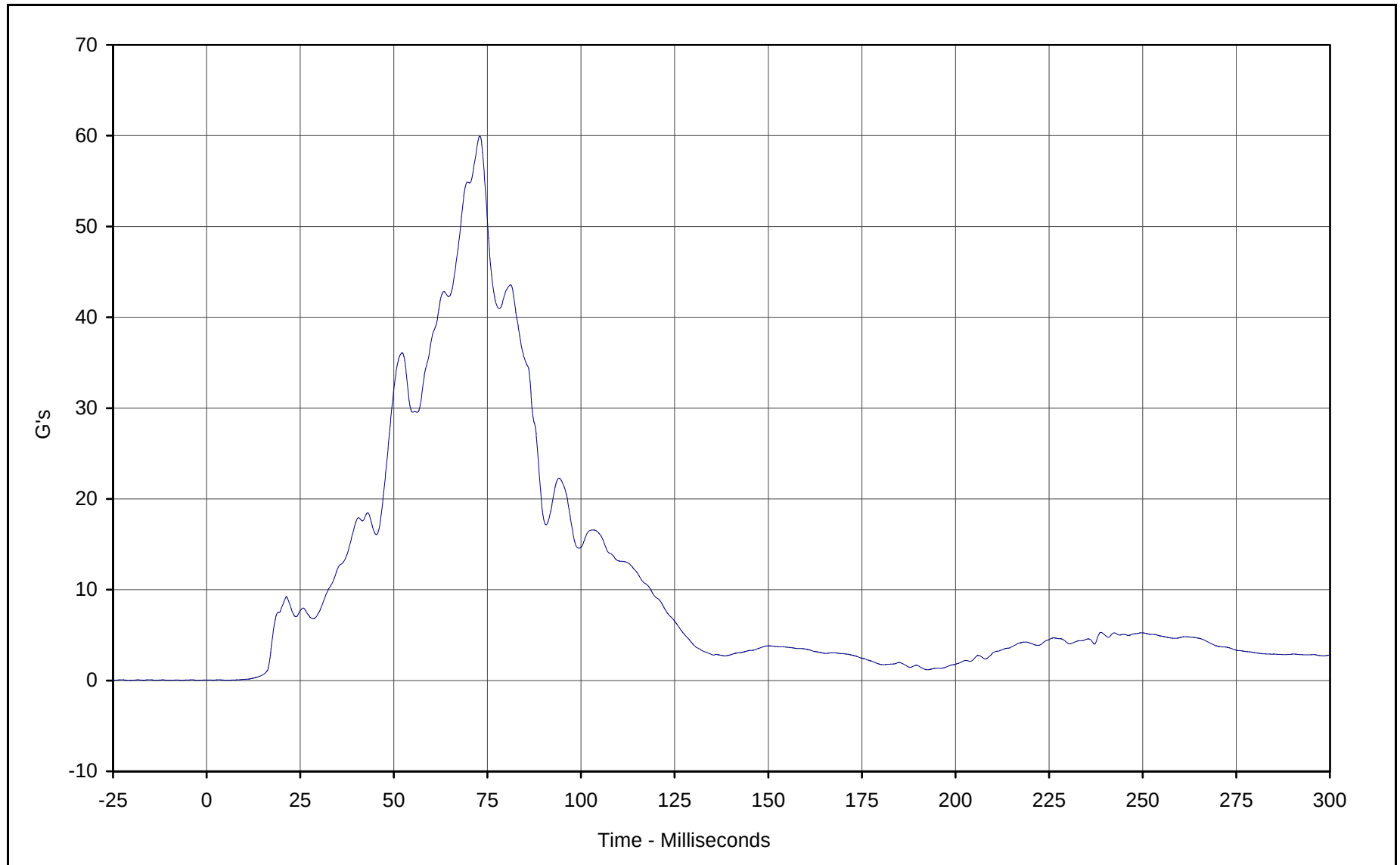


Curve Description: Passenger Chest Redundant Z  
Maximum Value: 11.8 at 61.8 Milliseconds  
Minimum Value: -14.3 at 103.8 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-062

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



Curve Description: Passenger Chest Resultant Redundant

Maximum Value: 60.0 at 72.9 Milliseconds

Minimum Value: 0.0 at 5.3 Milliseconds

SAE Filter Class: 180

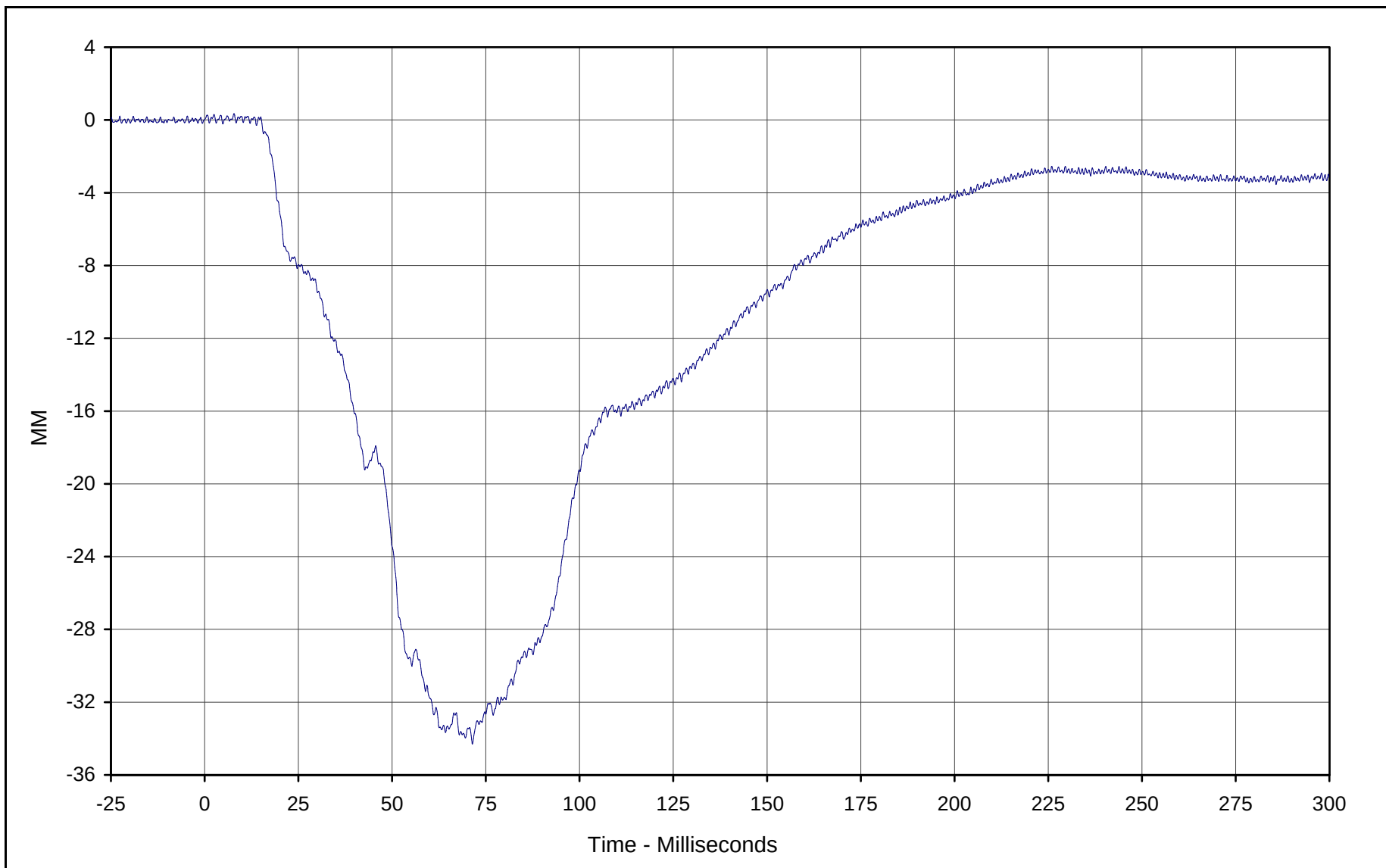
Date of Test: 01/09/01

Curve Number: RES-060

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





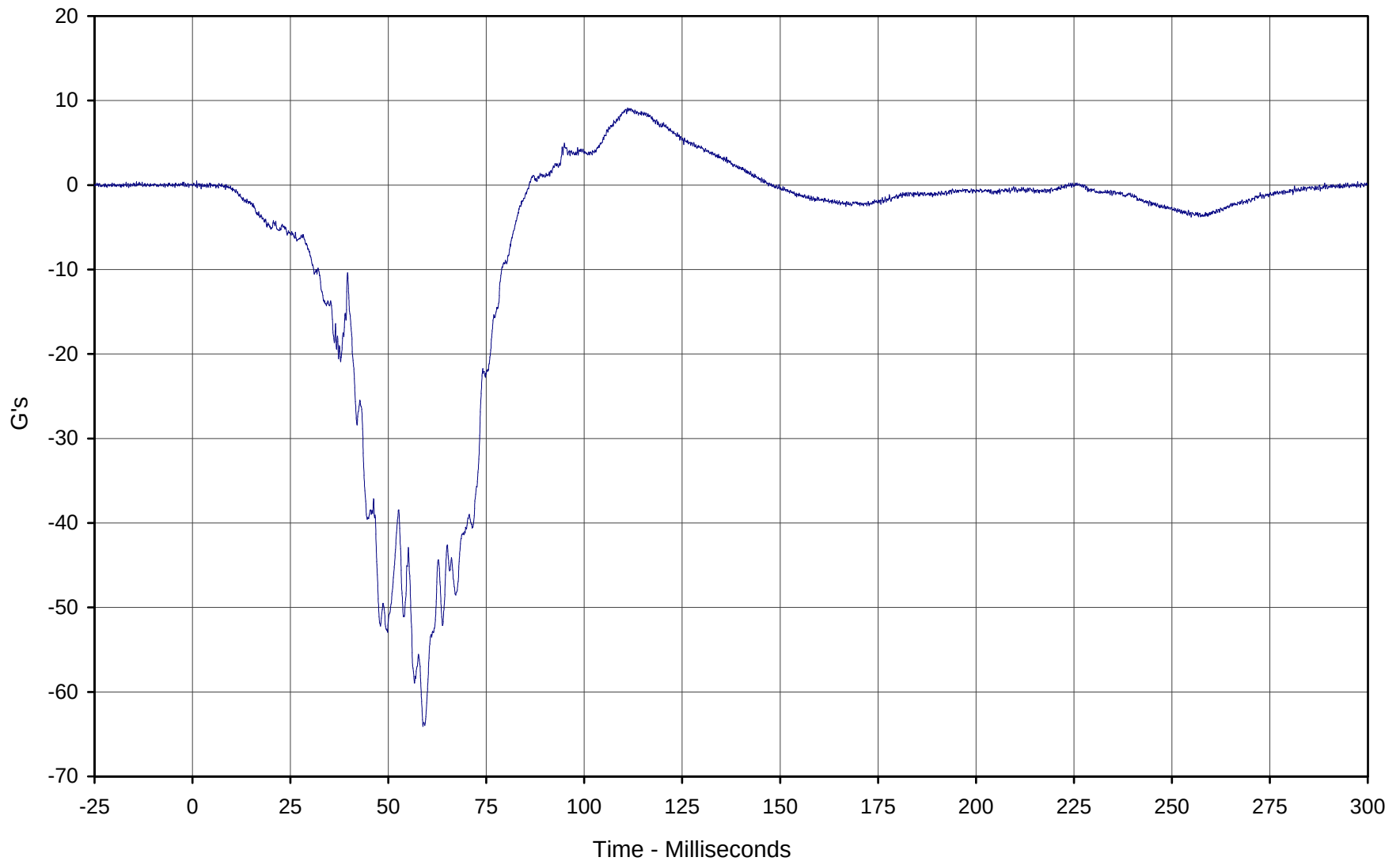
Curve Description: Passenger Chest Displacement X  
Maximum Value: 0.3 at 7.8 Milliseconds  
Minimum Value: -34.3 at 71.4 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-063

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





B-95



Curve Description: Passenger Pelvis X

Maximum Value: 9.1 at 111.1 Milliseconds

Minimum Value: -64.1 at 58.8 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/09/01

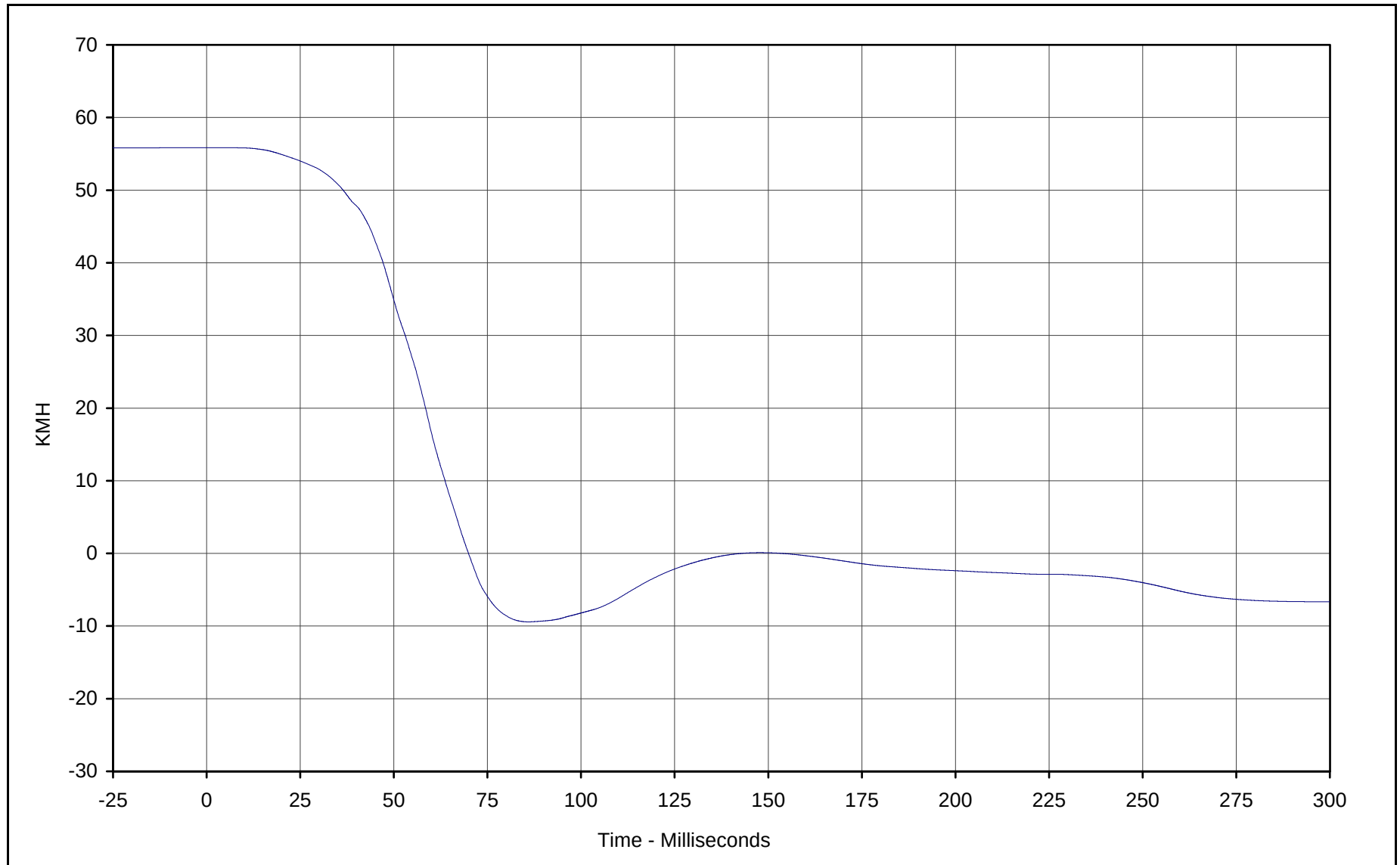
Curve Number: FIL-064

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

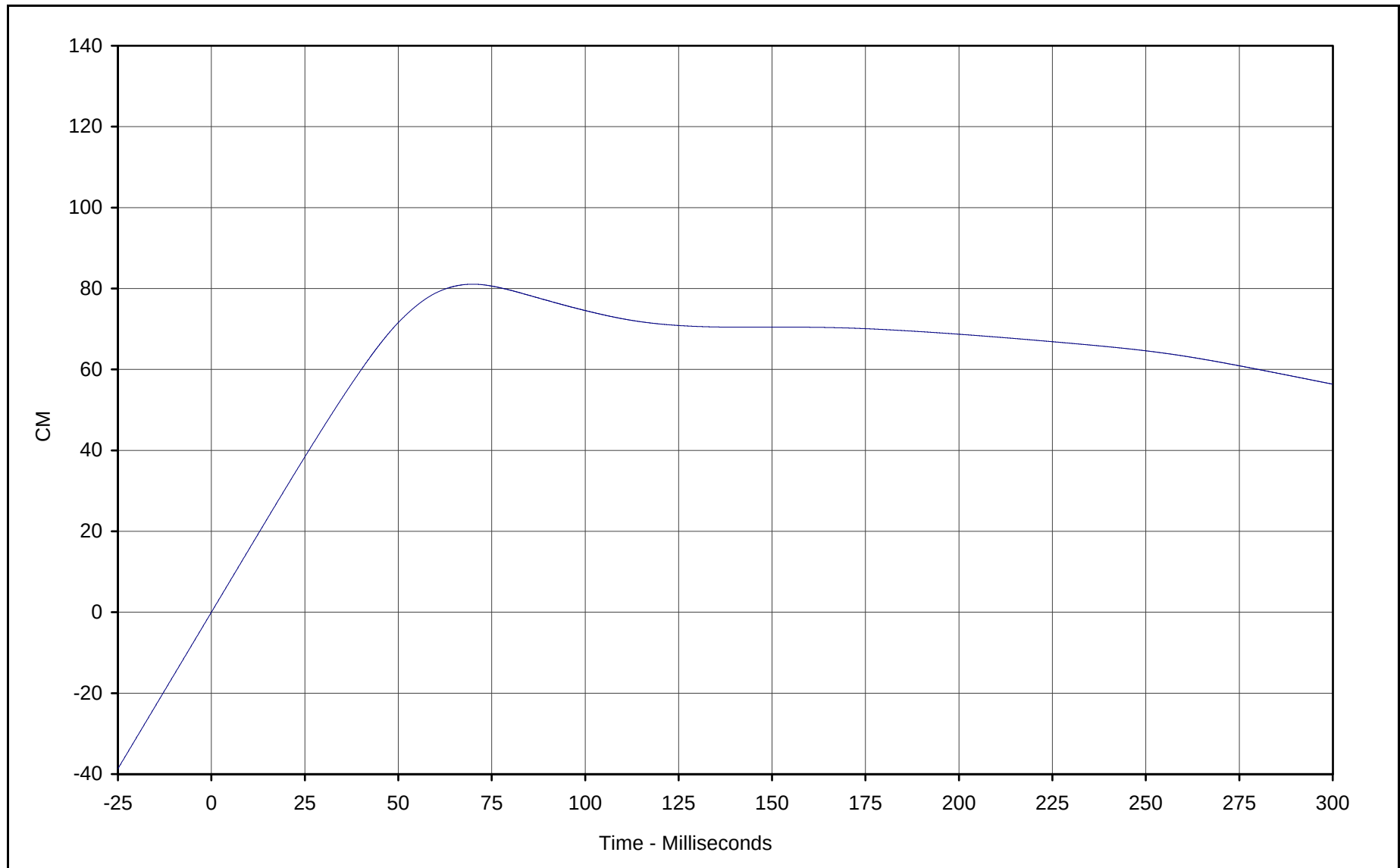


Curve Description: Passenger Pelvis X Velocity  
Maximum Value: 55.8 at 1.9 Milliseconds  
Minimum Value: -9.4 at 85.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-064

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-97



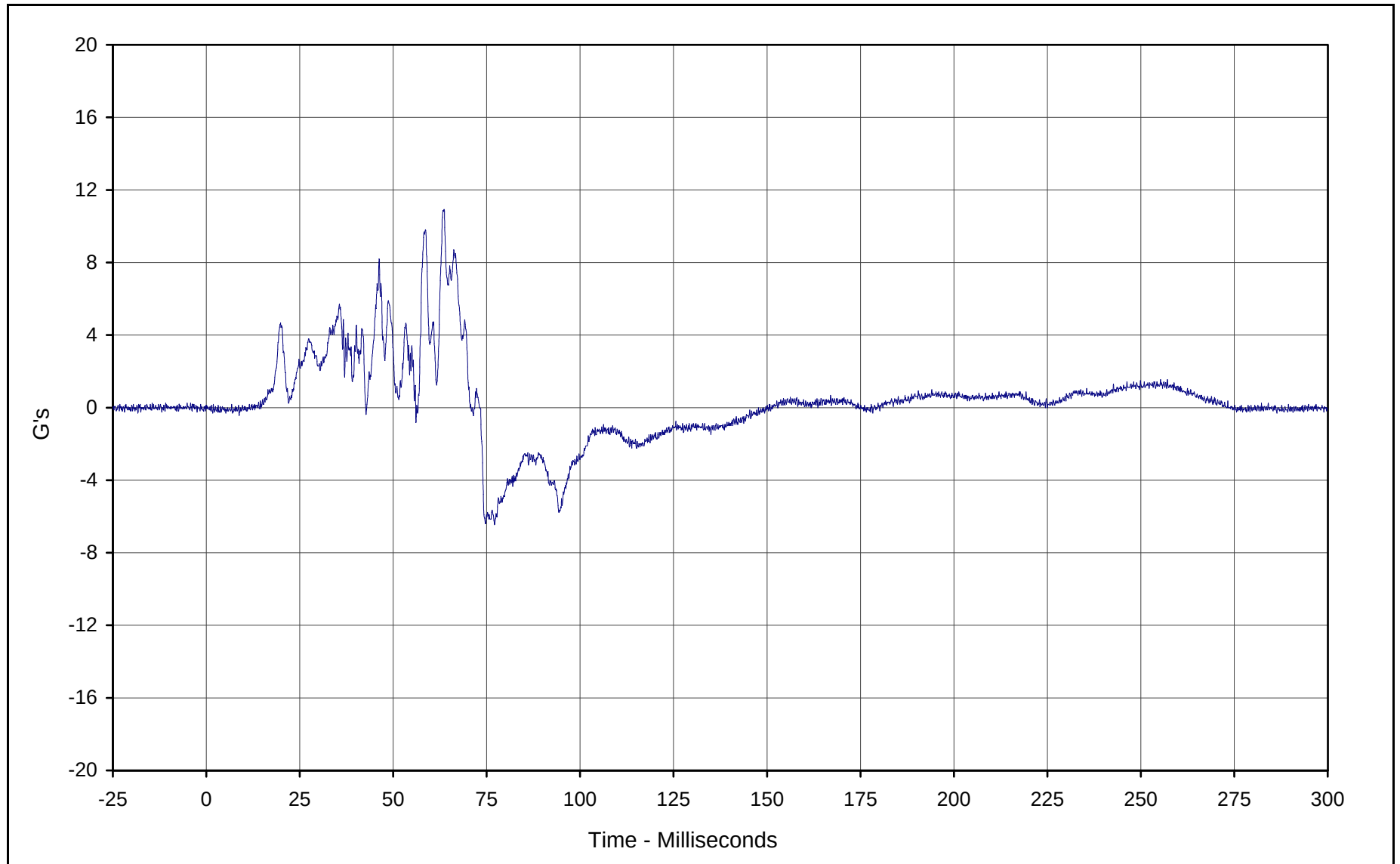
Curve Description: Passenger Pelvis X Displ.  
Maximum Value: 81.1 at 69.9 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-064

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-98



Curve Description: Passenger Pelvis Y

Maximum Value: 10.9 at 63.6 Milliseconds

Minimum Value: -6.5 at 77.1 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/09/01

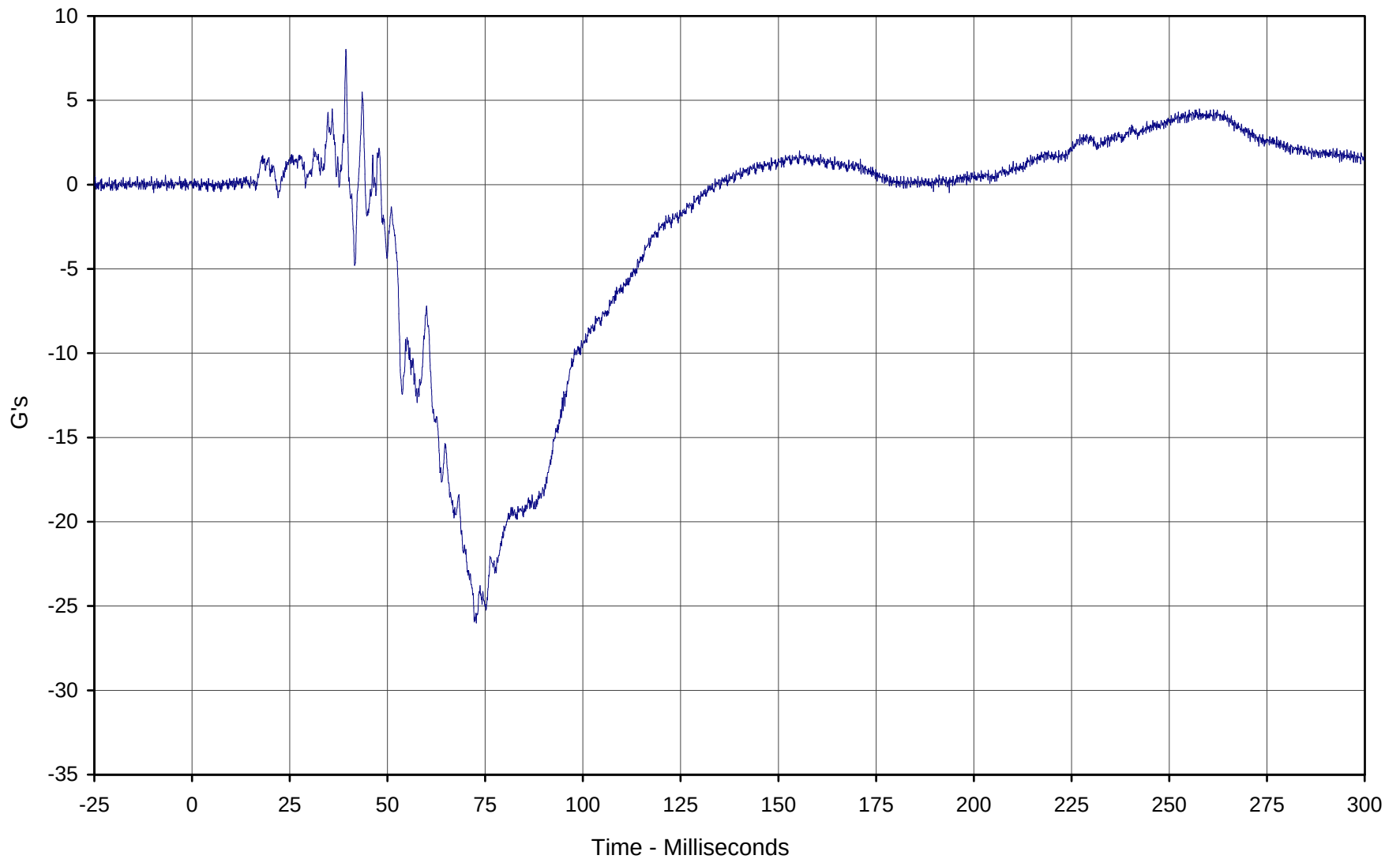
Curve Number: FIL-065

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



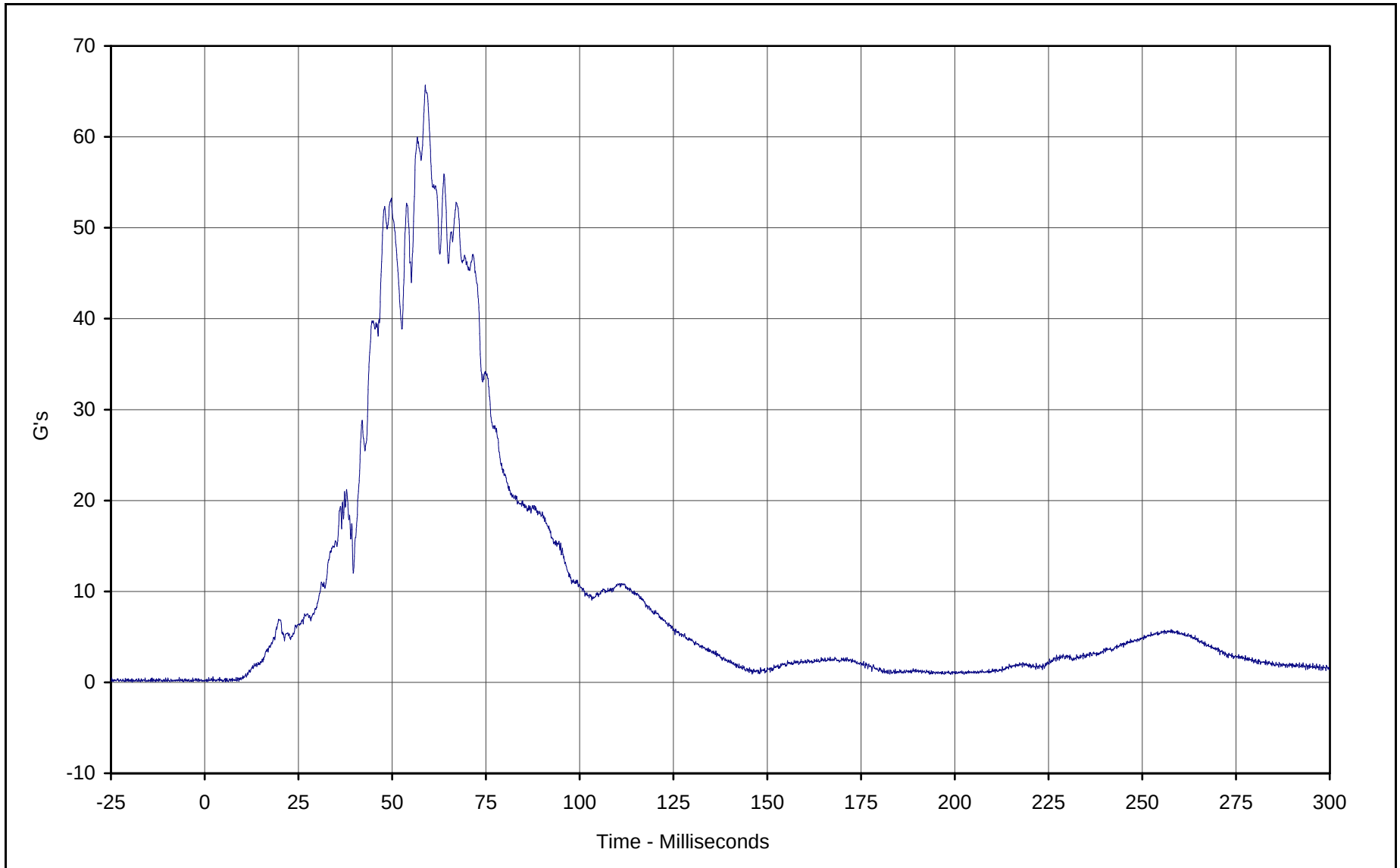
KAR21001-02



Curve Description: Passenger Pelvis Z  
Maximum Value: 8.0 at 39.4 Milliseconds  
Minimum Value: -26.0 at 72.7 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: FIL-066

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



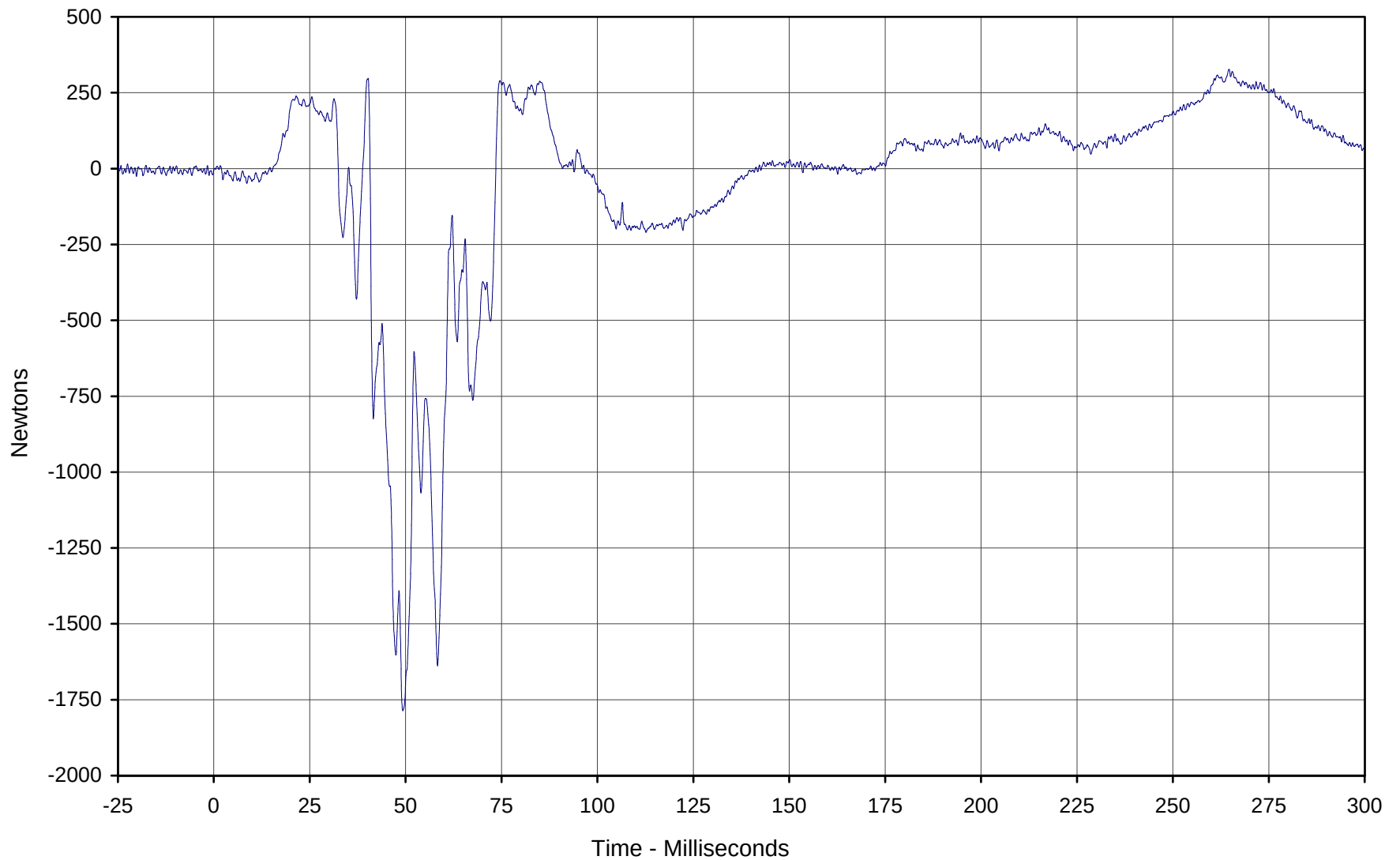


Curve Description: Passenger Pelvis Resultant  
Maximum Value: 65.7 at 58.8 Milliseconds  
Minimum Value: 0.1 at 0.7 Milliseconds  
SAE Filter Class: 1000  
Date of Test: 01/09/01  
Curve Number: RES-064

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



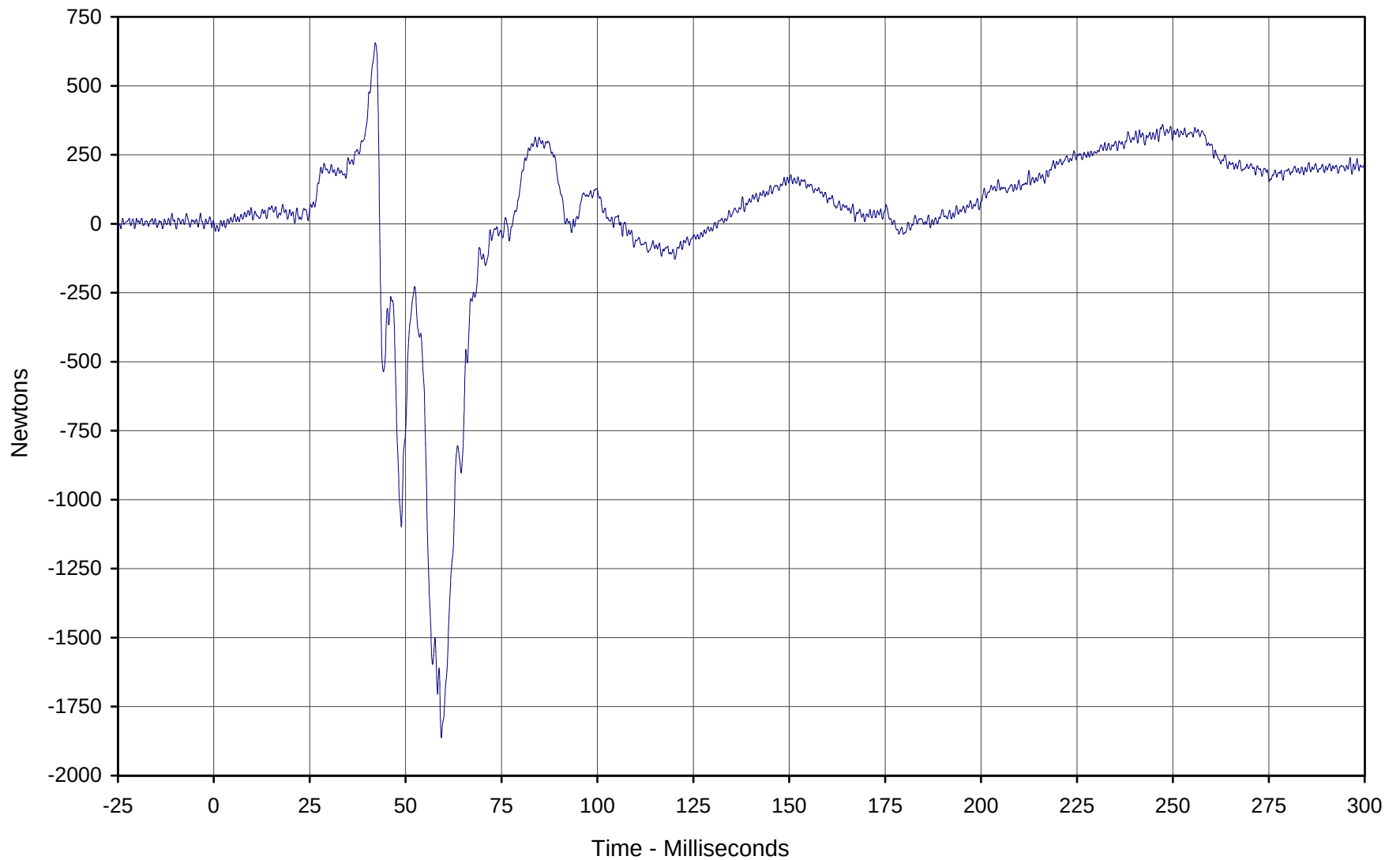




Curve Description: Passenger Left Femur Force  
Maximum Value: 326.9 at 264.6 Milliseconds  
Minimum Value: -1786.0 at 49.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-067

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

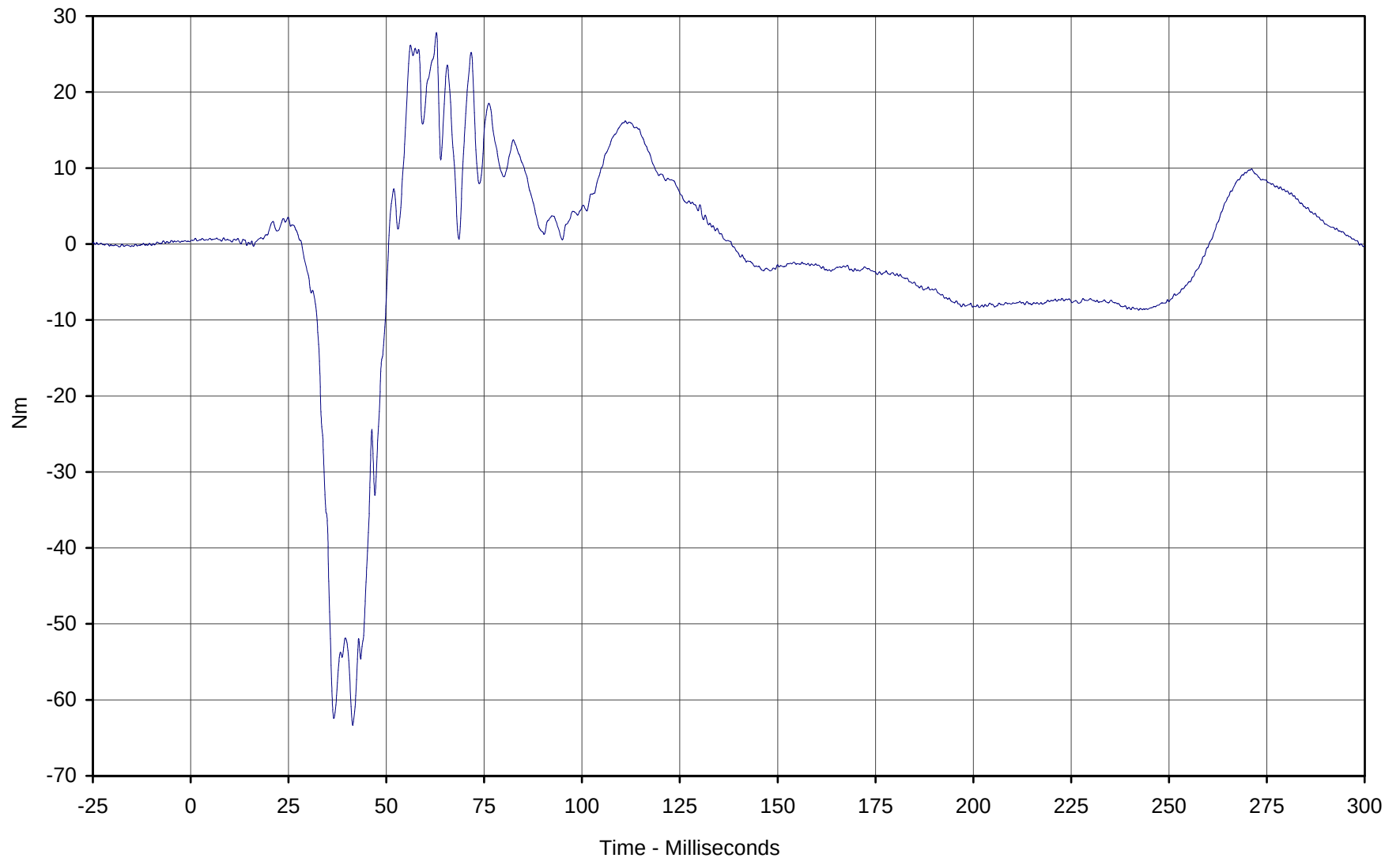




Curve Description: Passenger Right Femur Force  
Maximum Value: 655.8 at 42.1 Milliseconds  
Minimum Value: -1863.2 at 59.3 Milliseconds  
SAE Filter Class: 600  
Date of Test: 01/09/01  
Curve Number: FIL-068

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Left Upper Tibia Moment X

Maximum Value: 27.8 at 62.8 Milliseconds

Minimum Value: -63.4 at 41.4 Milliseconds

SAE Filter Class: 600

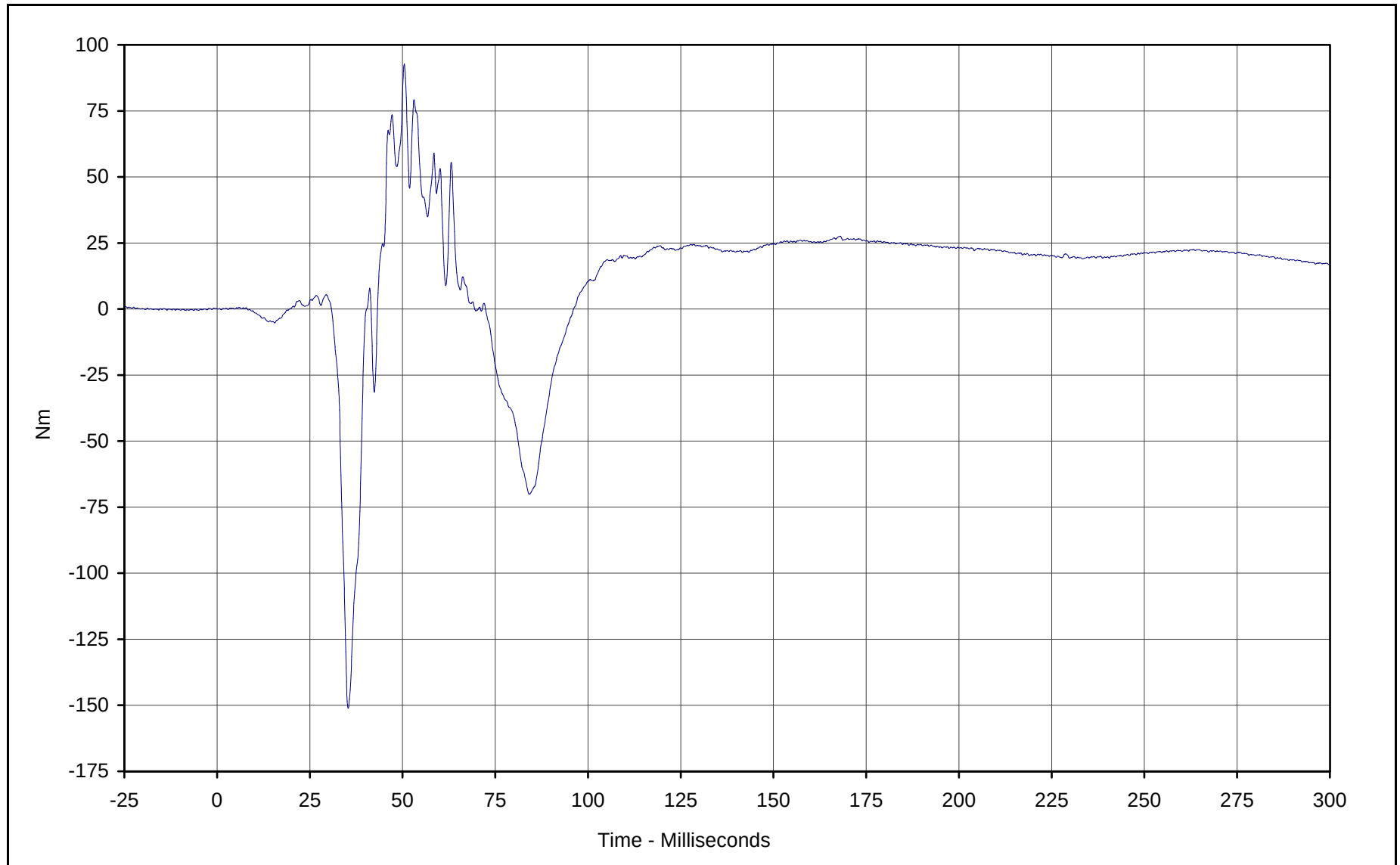
Date of Test: 01/09/01

Curve Number: FIL-069

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Left Upper Tibia Moment Y

Maximum Value: 92.8 at 50.5 Milliseconds

Minimum Value: -151.1 at 35.3 Milliseconds

SAE Filter Class: 600

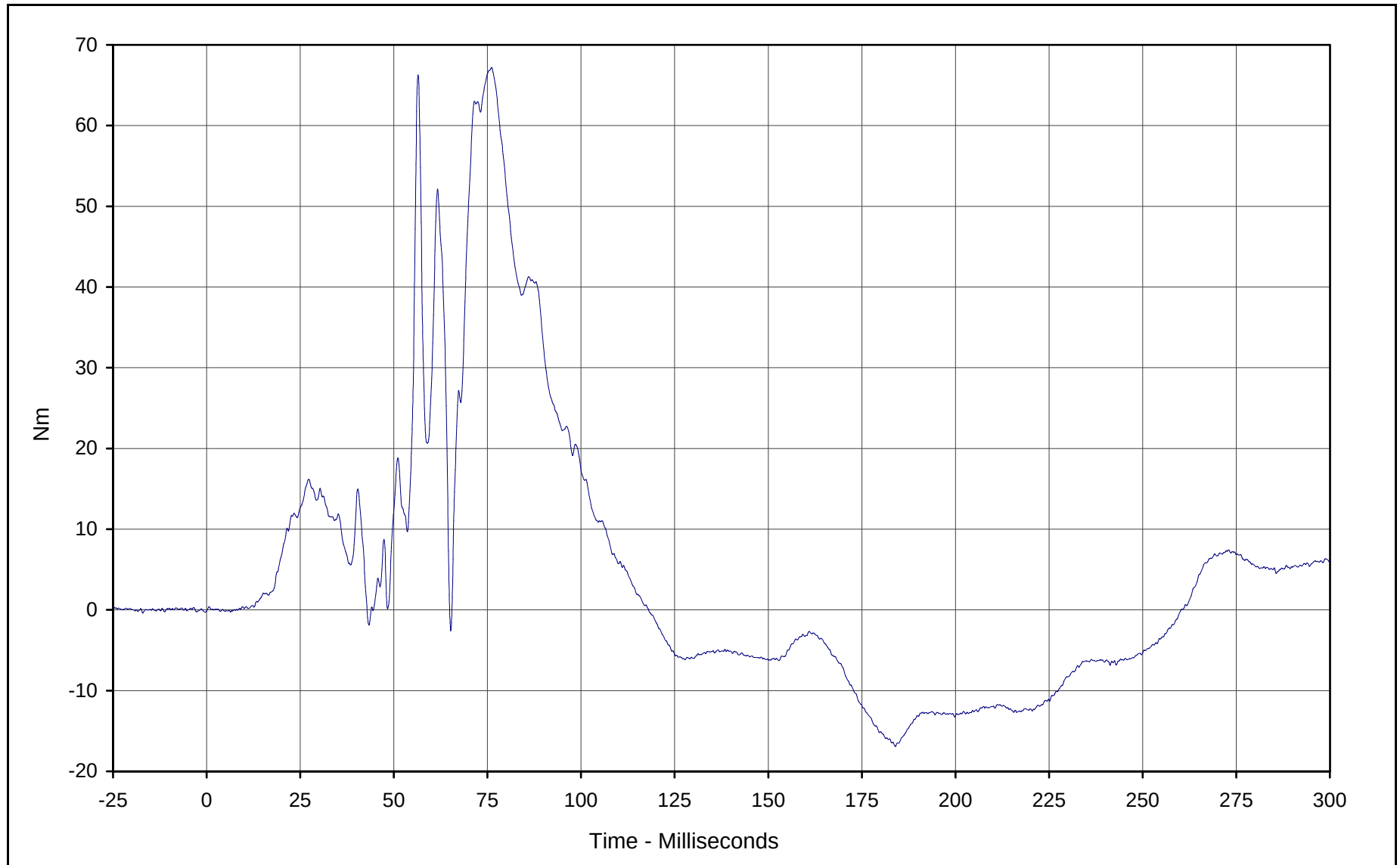
Date of Test: 01/09/01

Curve Number: FIL-070

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Right Upper Tibia Moment X

Maximum Value: 67.2 at 76.1 Milliseconds

Minimum Value: -16.9 at 184.0 Milliseconds

SAE Filter Class: 600

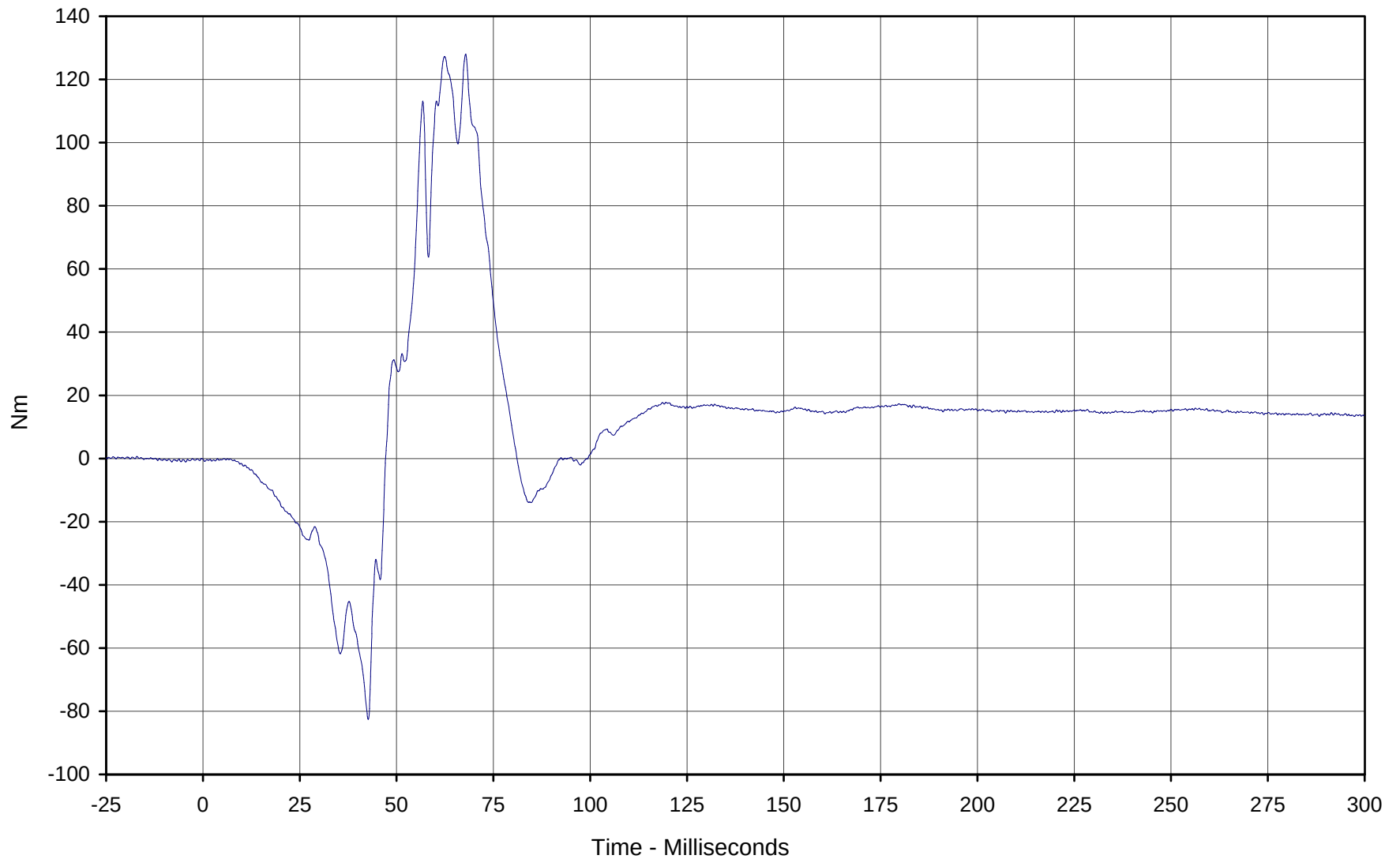
Date of Test: 01/09/01

Curve Number: FIL-071

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Right Upper Tibia Moment Y

Maximum Value: 128.0 at 67.8 Milliseconds

Minimum Value: -82.6 at 42.7 Milliseconds

SAE Filter Class: 600

Date of Test: 01/09/01

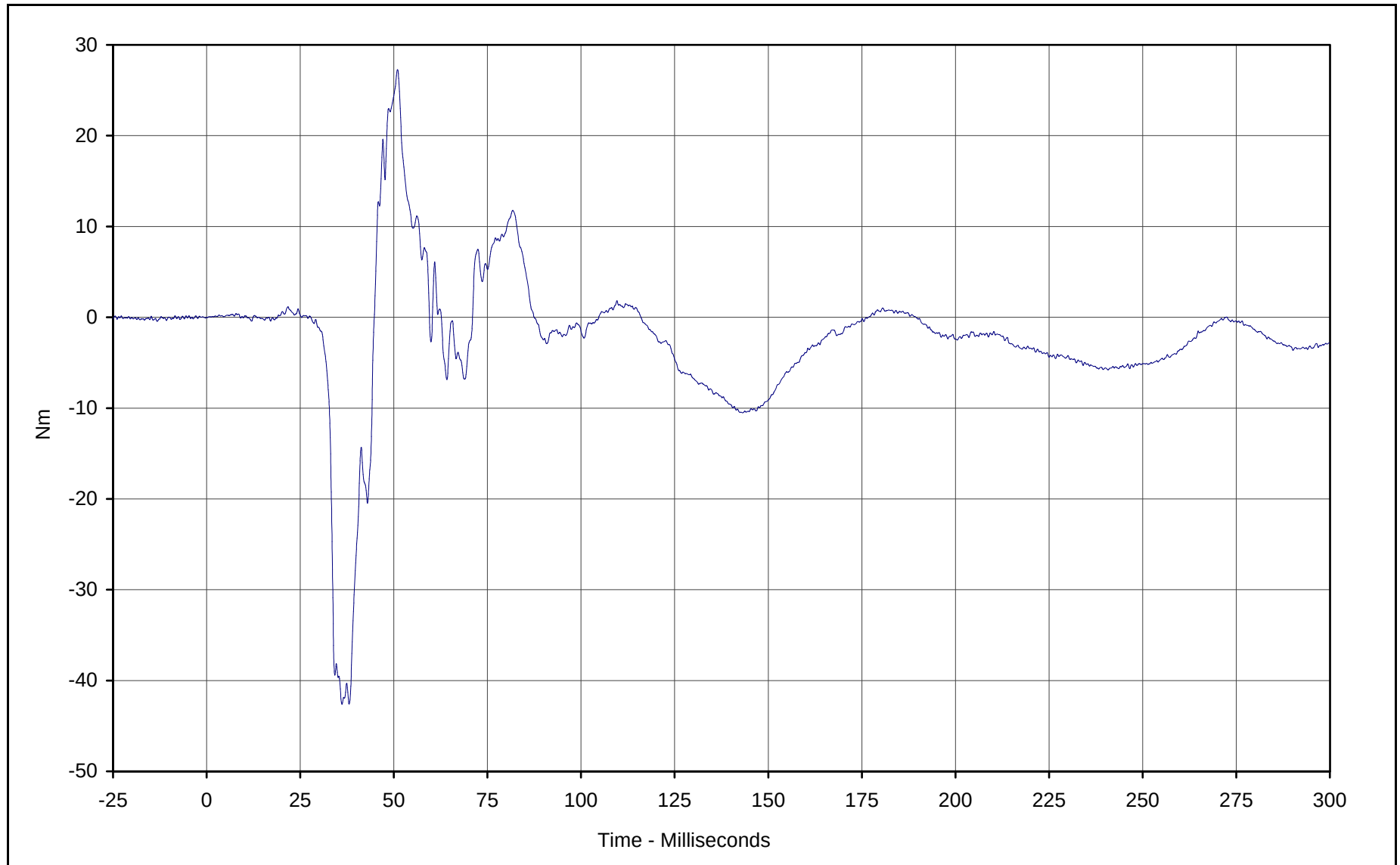
Curve Number: FIL-072

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV







Curve Description: Passenger Left Lower Tibia Moment X

Maximum Value: 27.3 at 51.0 Milliseconds

Minimum Value: -42.6 at 36.2 Milliseconds

SAE Filter Class: 600

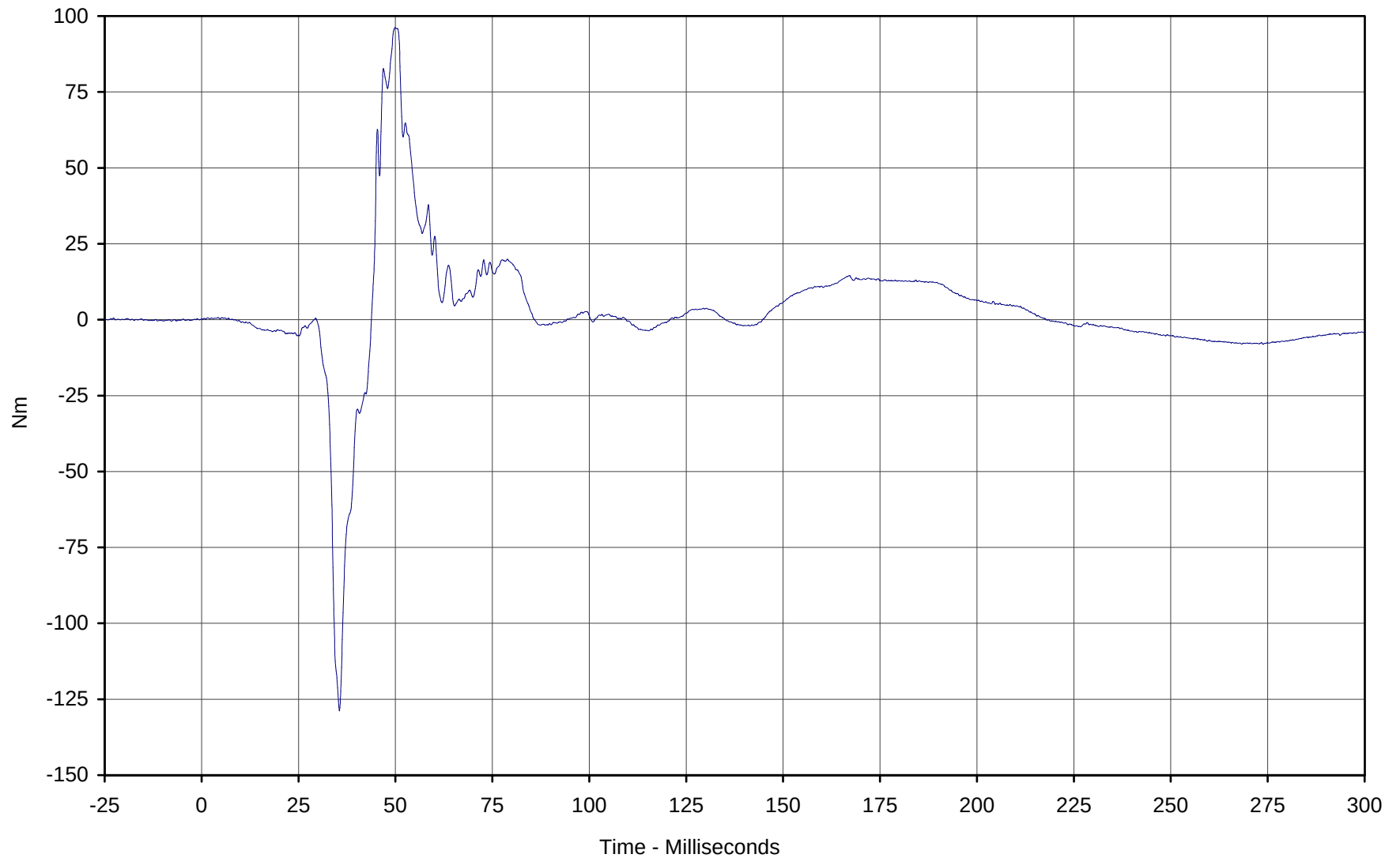
Date of Test: 01/09/01

Curve Number: FIL-073

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Left Lower Tibia Moment Y

Maximum Value: 96.2 at 49.9 Milliseconds

Minimum Value: -128.8 at 35.6 Milliseconds

SAE Filter Class: 600

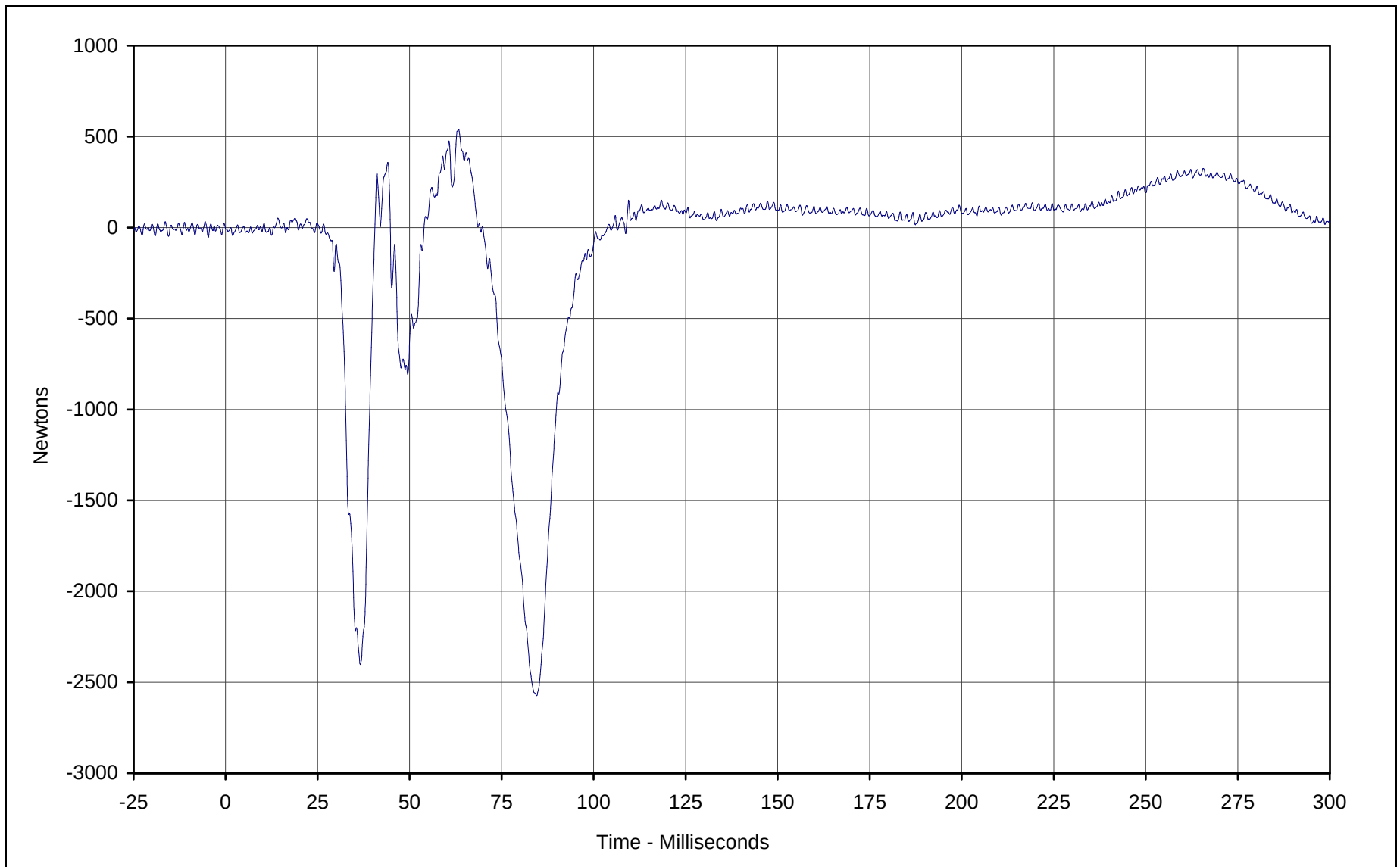
Date of Test: 01/09/01

Curve Number: FIL-074

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Left Lower Tibia Force Z

Maximum Value: 537.8 at 63.3 Milliseconds

Minimum Value: -2573.9 at 84.5 Milliseconds

SAE Filter Class: 600

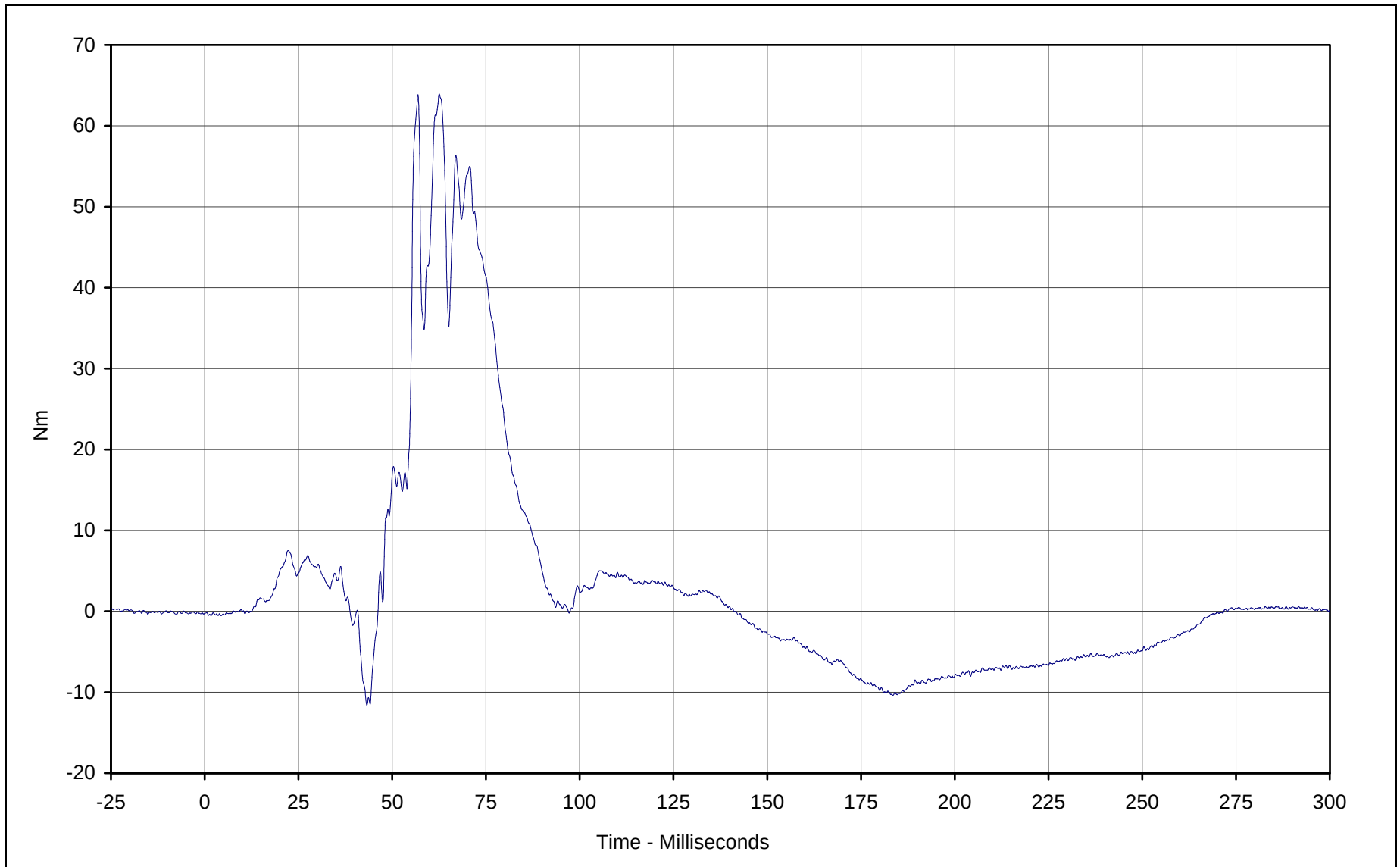
Date of Test: 01/09/01

Curve Number: FIL-075

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Right Lower Tibia Moment X

Maximum Value: 63.9 at 62.6 Milliseconds

Minimum Value: -11.6 at 43.2 Milliseconds

SAE Filter Class: 600

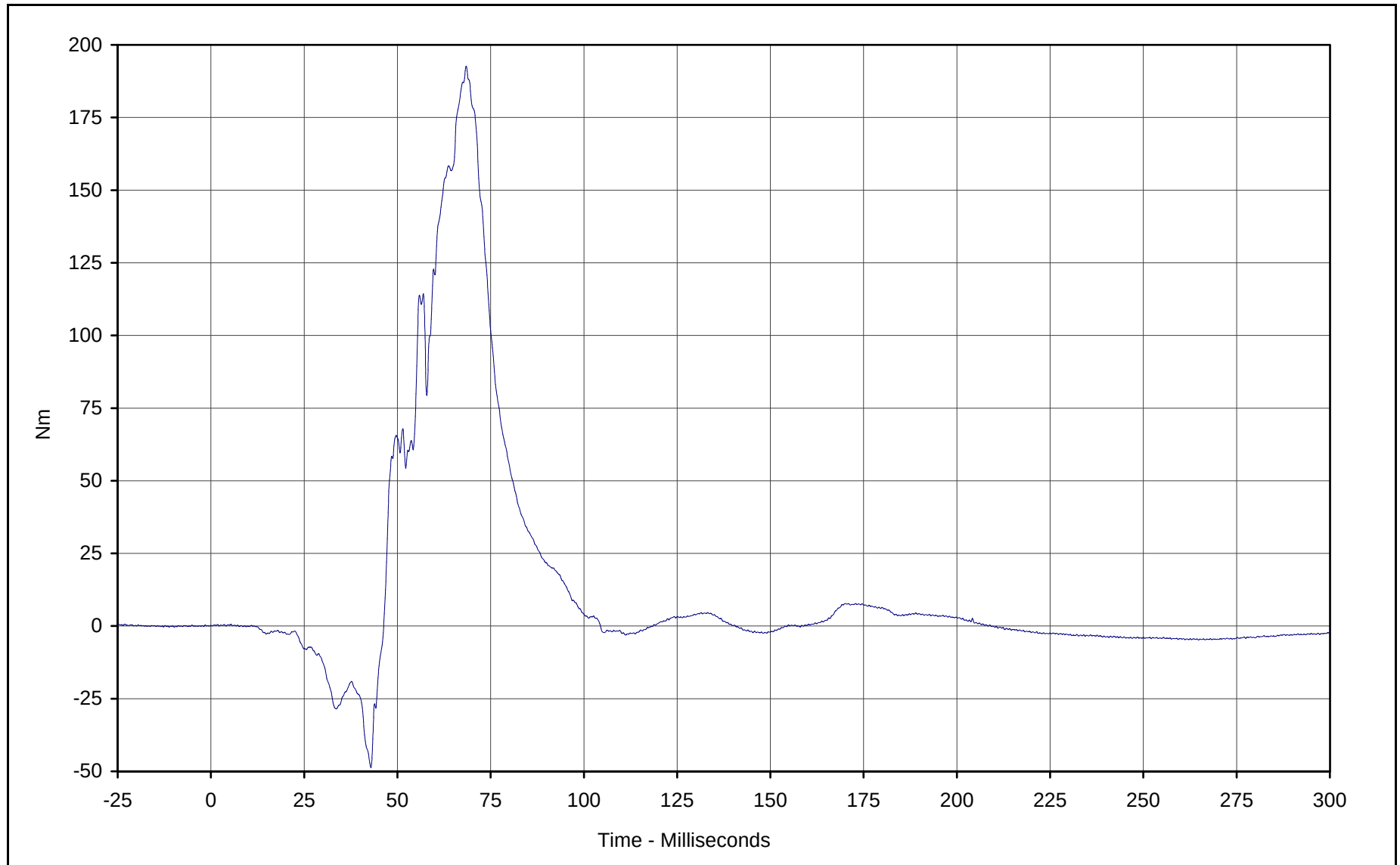
Date of Test: 01/09/01

Curve Number: FIL-076

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Right Lower Tibia Moment Y

Maximum Value: 192.7 at 68.4 Milliseconds

Minimum Value: -48.7 at 42.9 Milliseconds

SAE Filter Class: 600

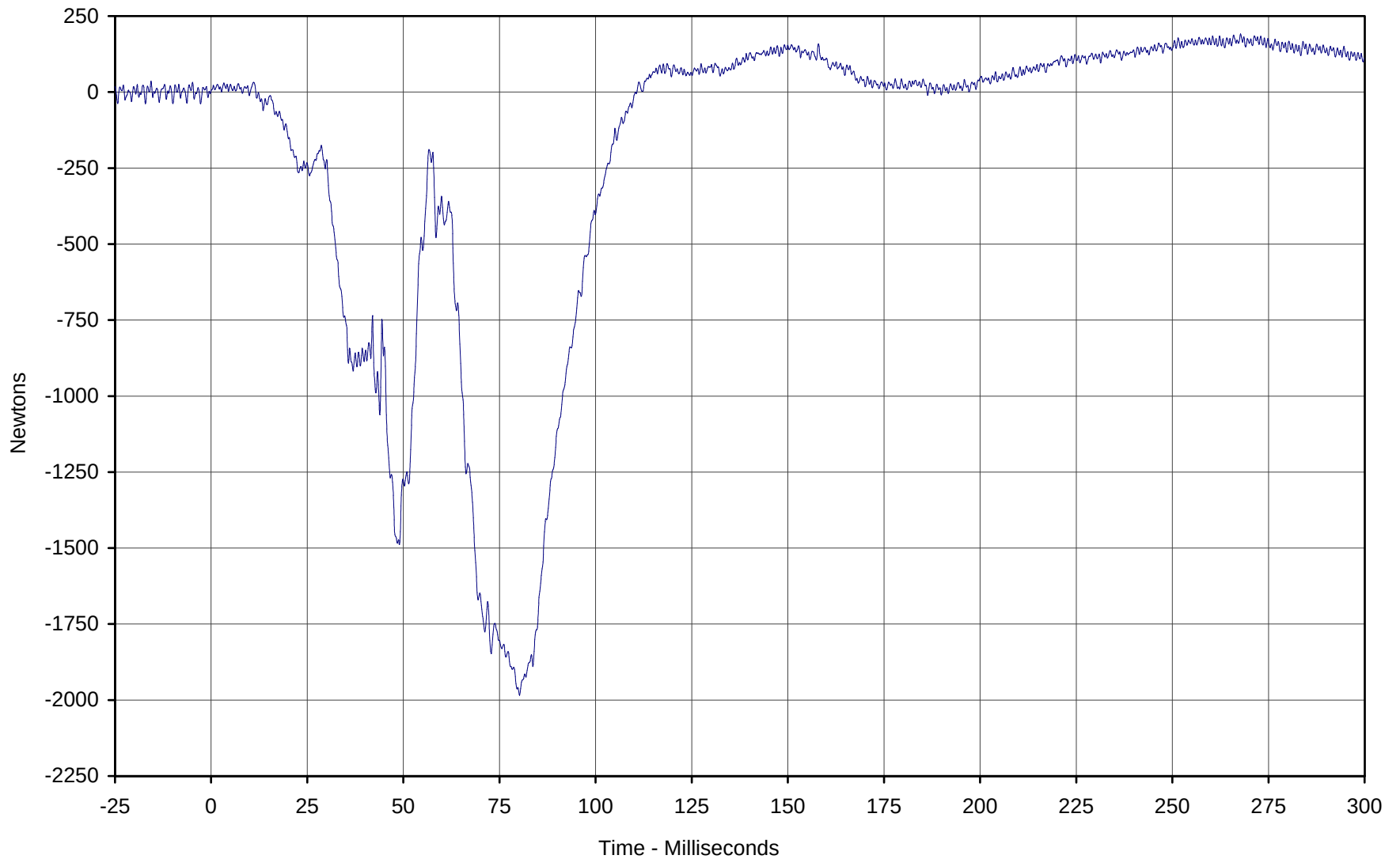
Date of Test: 01/09/01

Curve Number: FIL-077

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Right lower Tibia Force Z

Maximum Value: 191.5 at 267.7 Milliseconds

Minimum Value: -1984.8 at 80.2 Milliseconds

SAE Filter Class: 600

Date of Test: 01/09/01

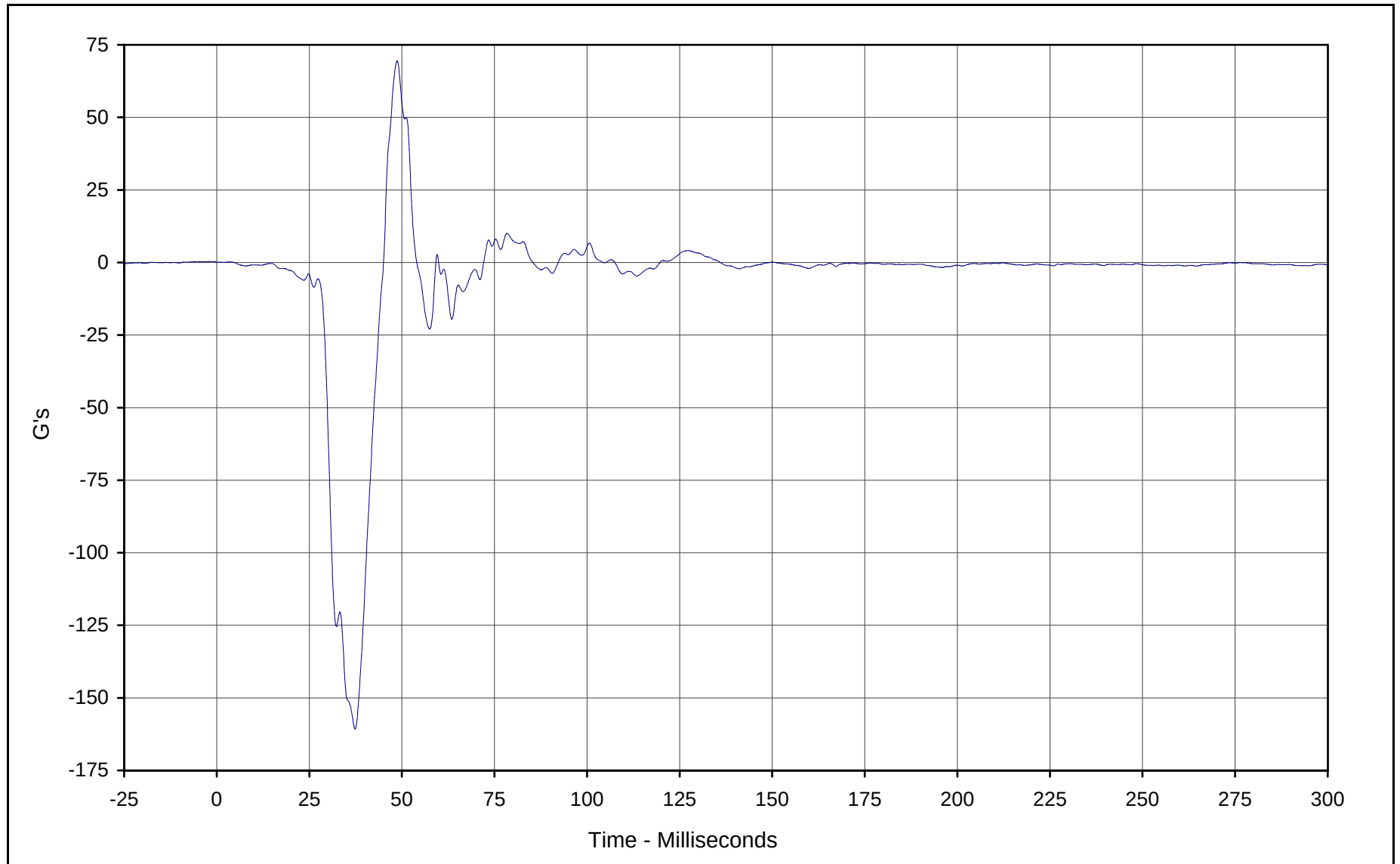
Curve Number: FIL-078

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



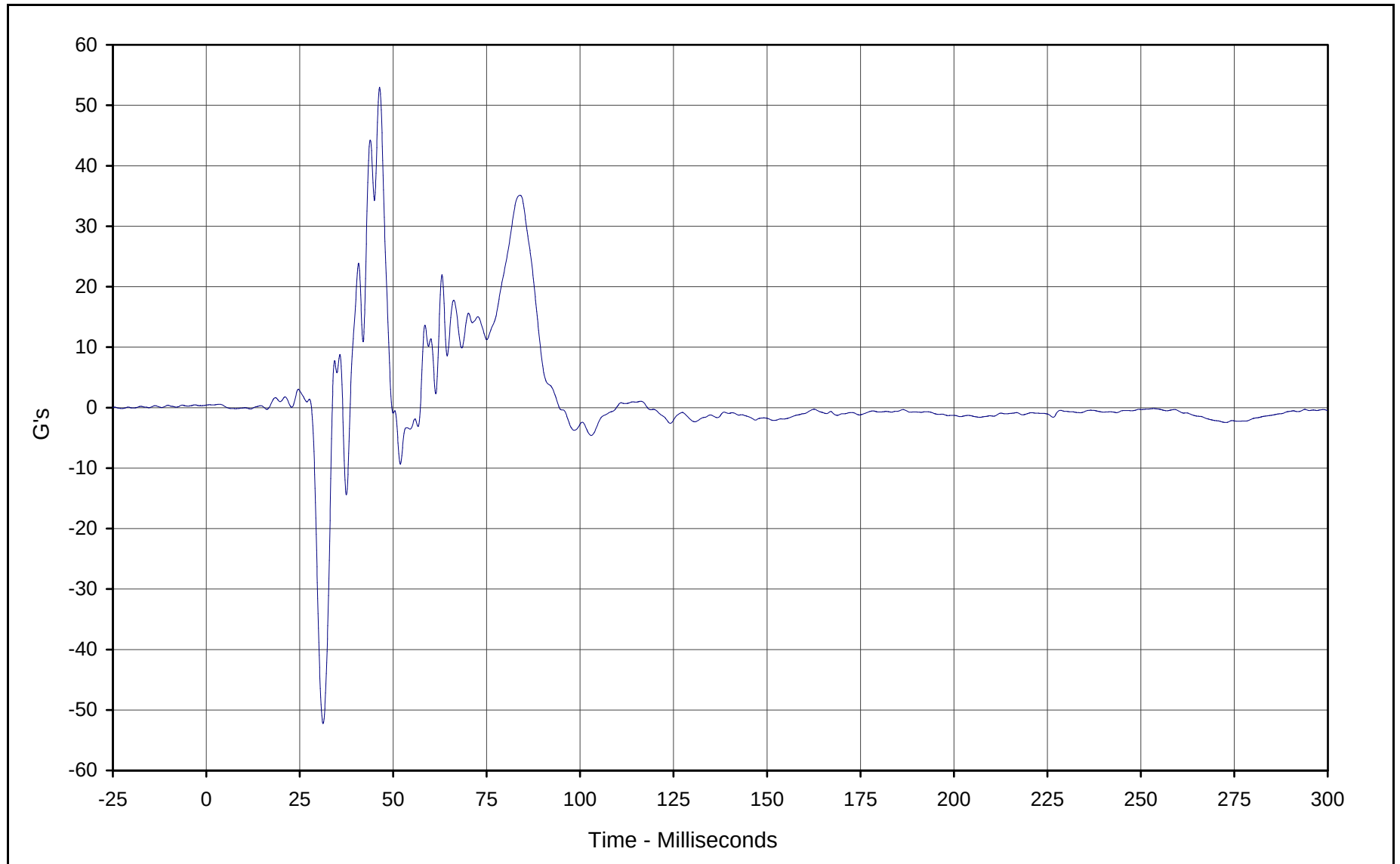




Curve Description: Passenger Left Foot Aft X  
Maximum Value: 69.4 at 48.7 Milliseconds  
Minimum Value: -160.7 at 37.4 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-079

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Left Foot Aft Z

Maximum Value: 53.0 at 46.4 Milliseconds

Minimum Value: -52.2 at 31.2 Milliseconds

SAE Filter Class: 180

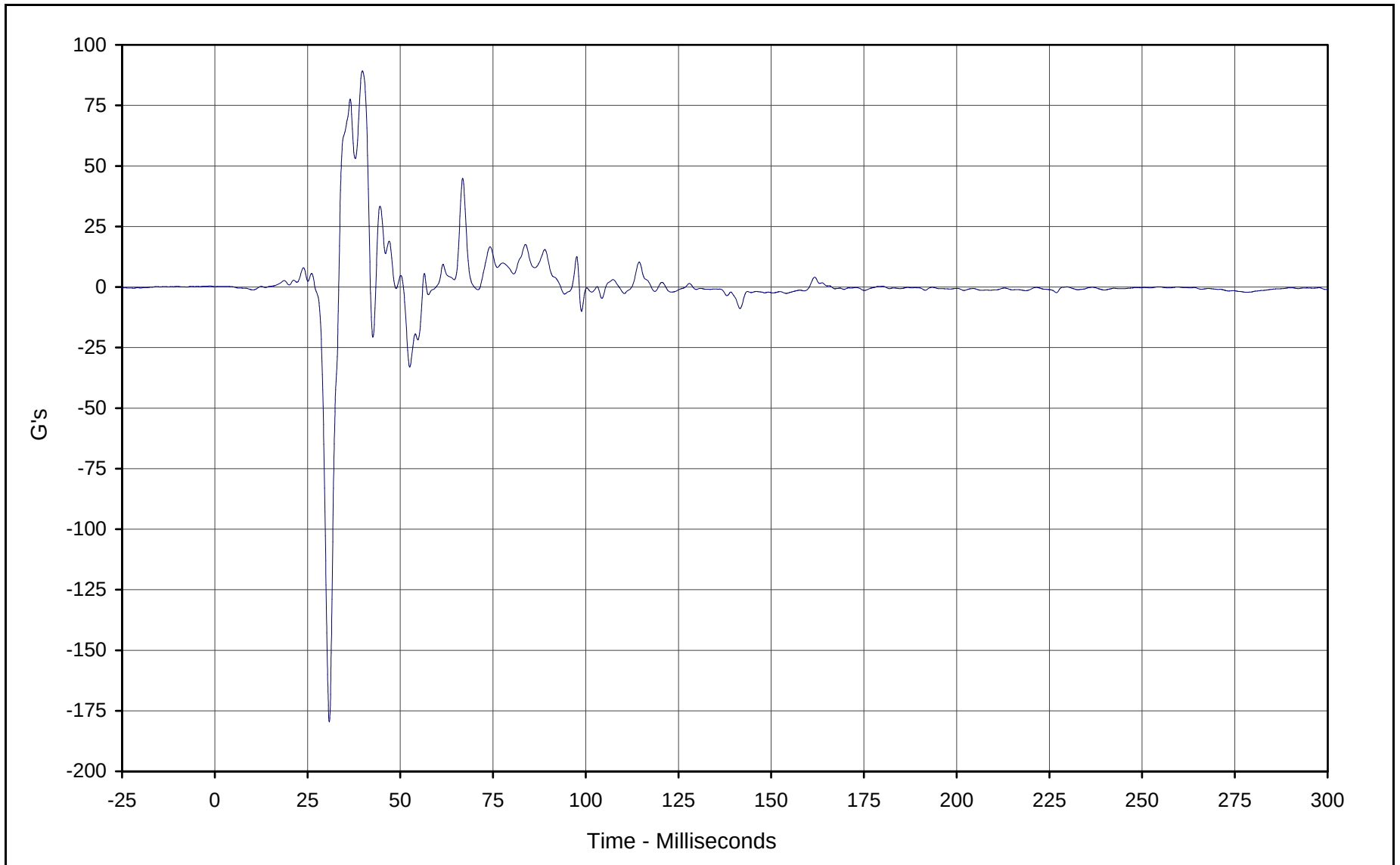
Date of Test: 01/09/01

Curve Number: FIL-080

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV

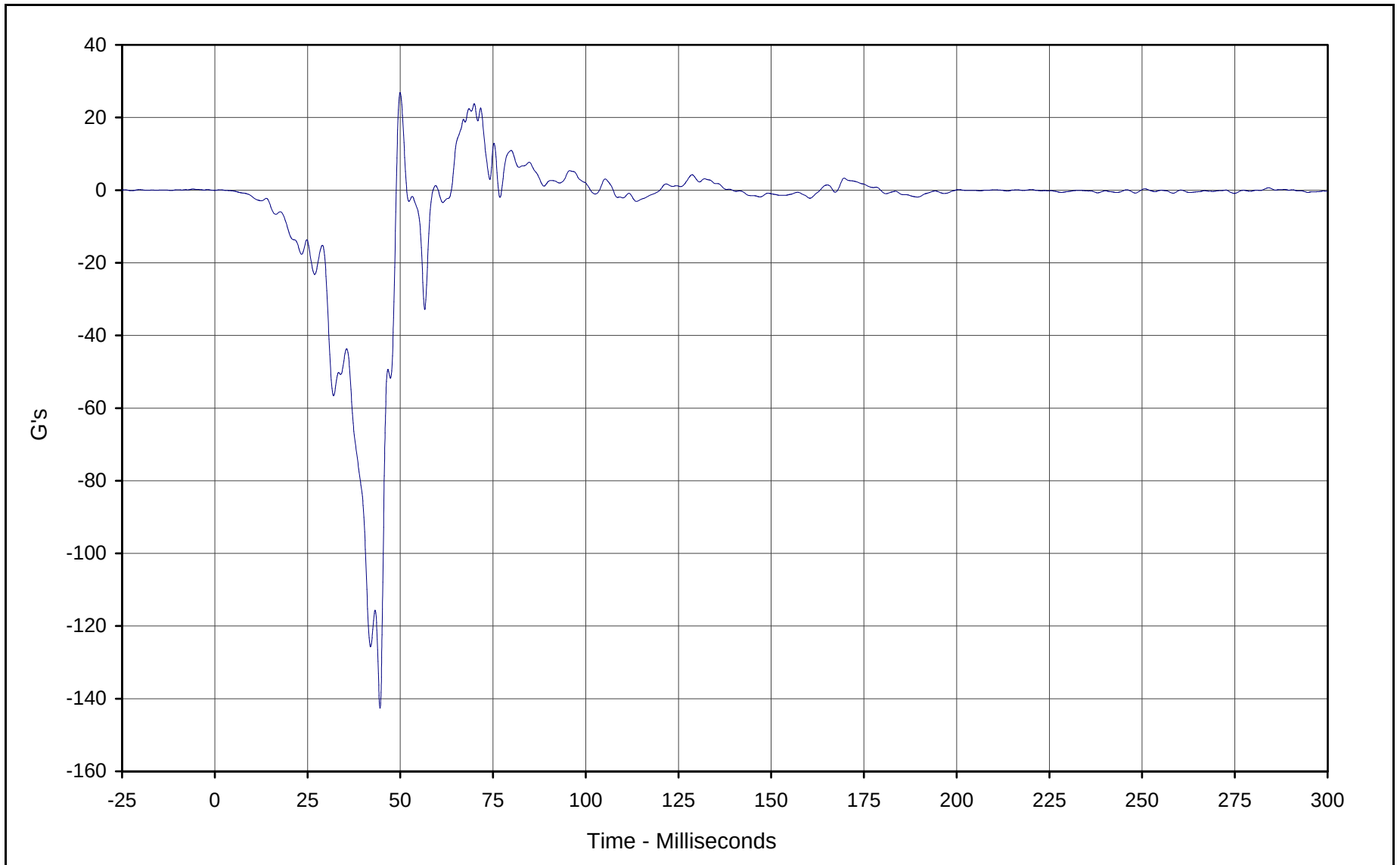




Curve Description: Passenger Left Foot Fore Z  
Maximum Value: 89.3 at 39.8 Milliseconds  
Minimum Value: -179.6 at 30.9 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-081

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

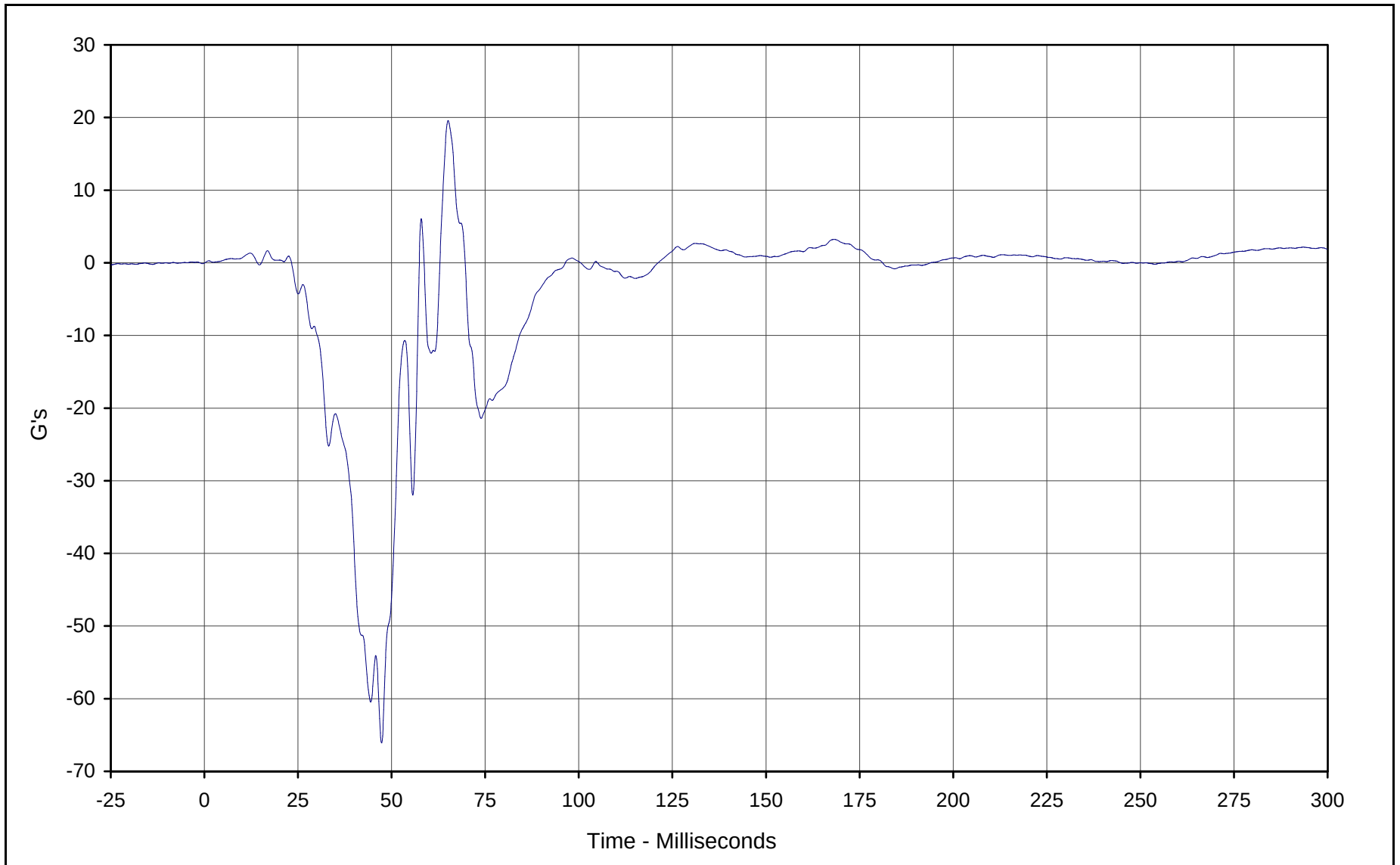




Curve Description: Passenger Right Foot Aft X  
Maximum Value: 26.9 at 50.0 Milliseconds  
Minimum Value: -142.6 at 44.6 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-082

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

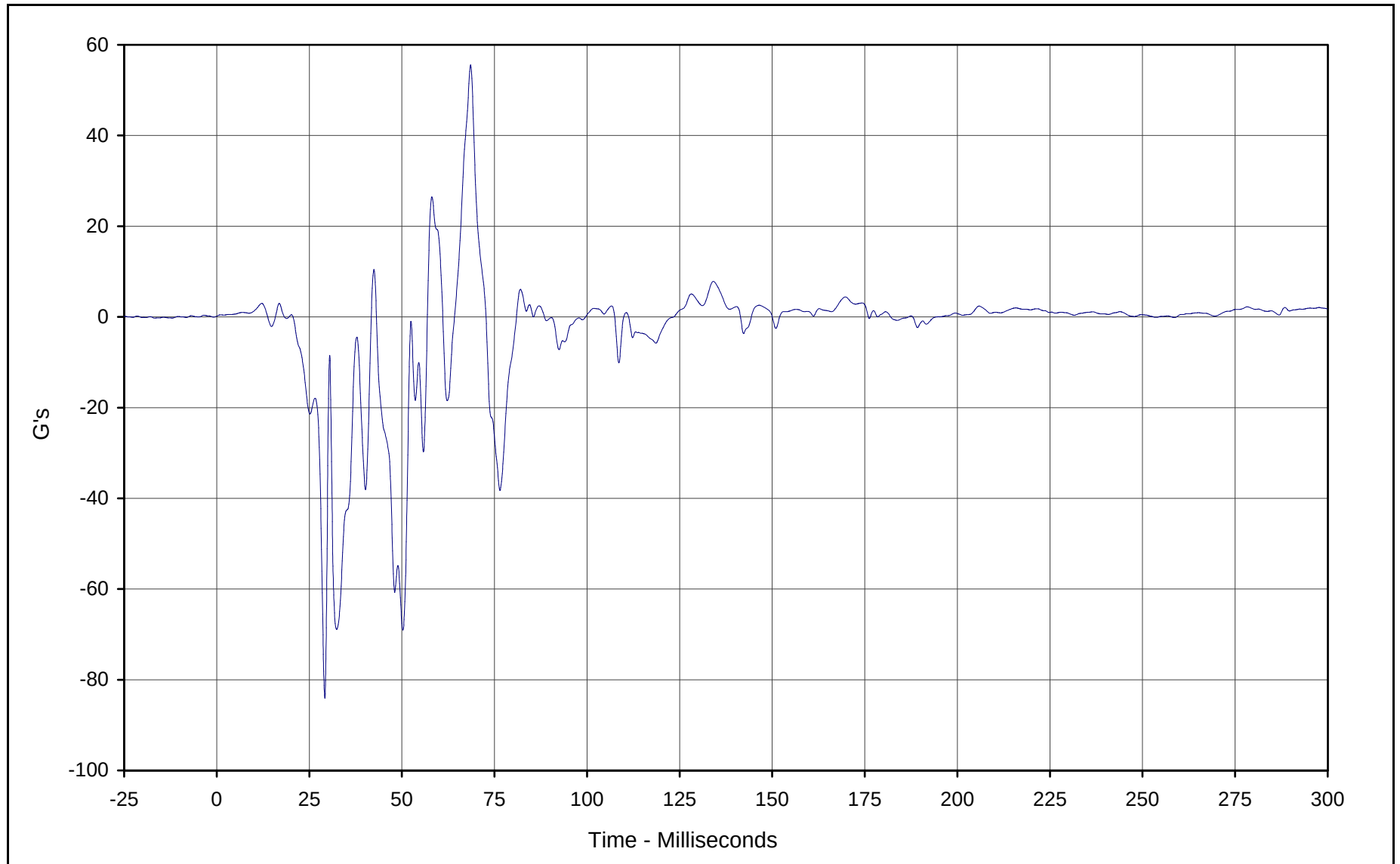




Curve Description: Passenger Right Foot Aft Z  
Maximum Value: 19.6 at 65.1 Milliseconds  
Minimum Value: -66.1 at 47.3 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-083

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



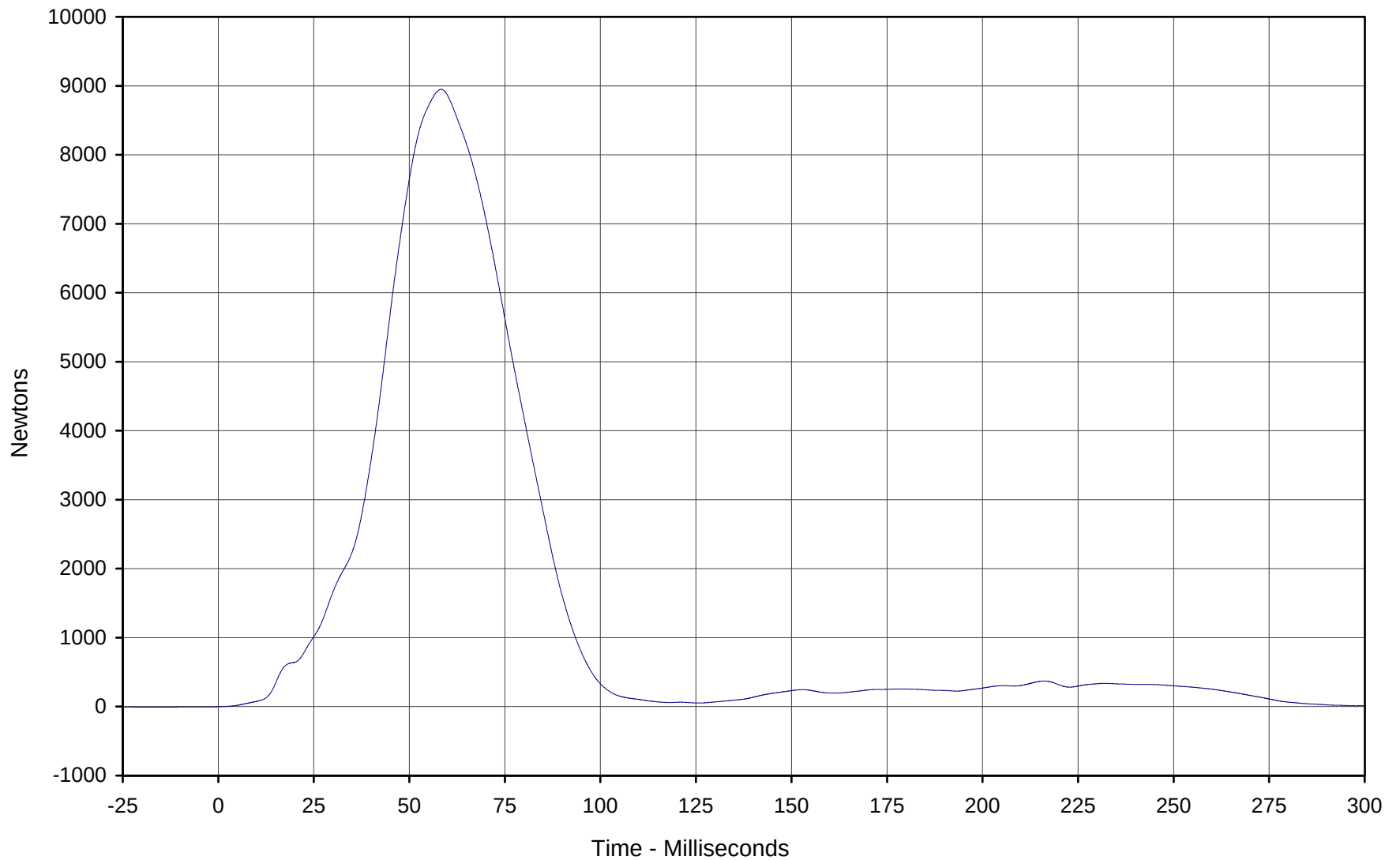


Curve Description: Passenger Right Foot Fore Z  
Maximum Value: 55.6 at 68.6 Milliseconds  
Minimum Value: -84.1 at 29.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: FIL-084

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



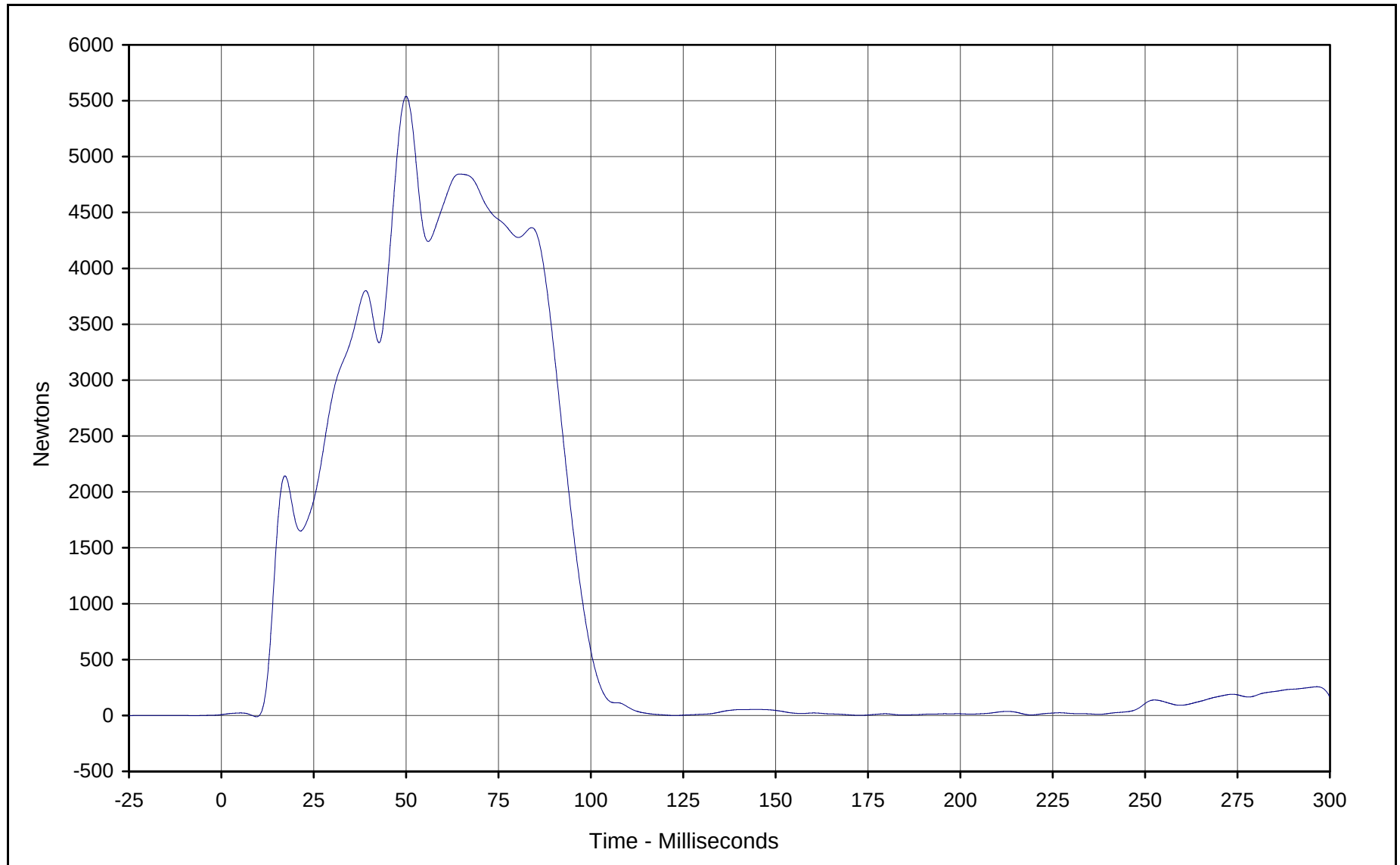




Curve Description: Passenger Lap Belt Force  
Maximum Value: 8949.6 at 58.3 Milliseconds  
Minimum Value: -2.2 at 0.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-085

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





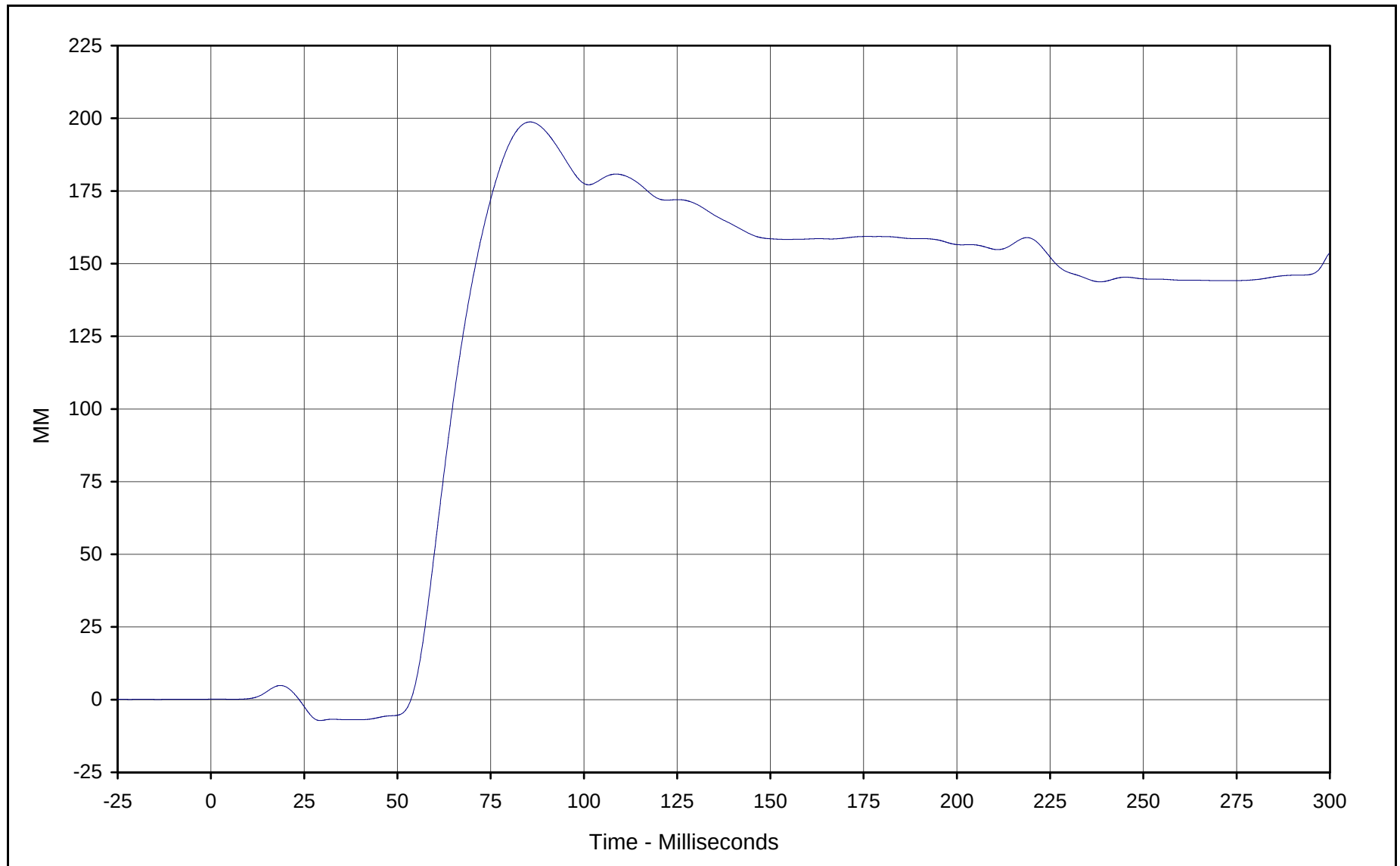
Curve Description: Passenger Shoulder Belt Force  
Maximum Value: 5539.7 at 50.0 Milliseconds  
Minimum Value: -11.7 at 9.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-086

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-121

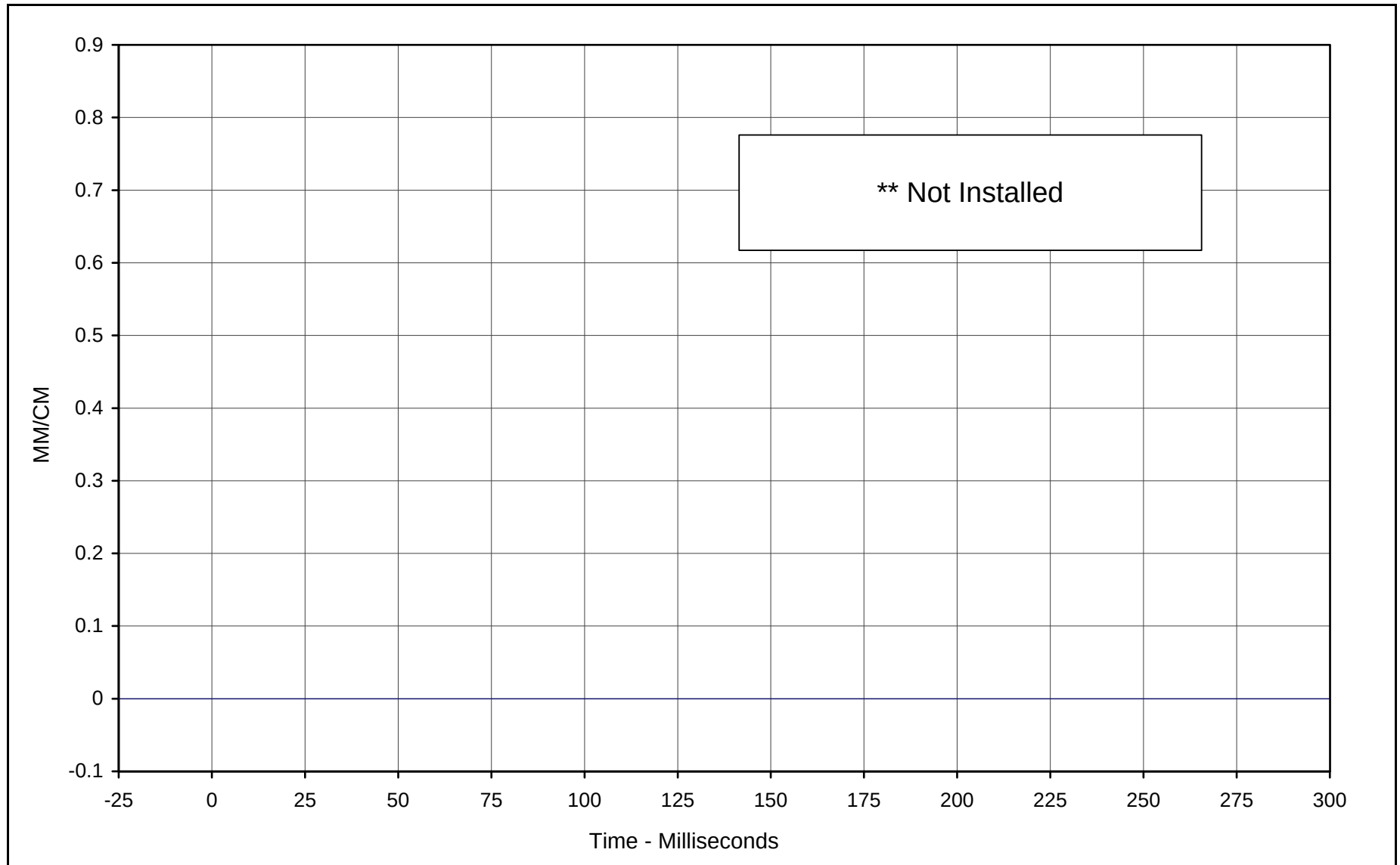
KAR21001-02



Curve Description: Passenger Shoulder Belt Pullout  
Maximum Value: 198.7 at 85.6 Milliseconds  
Minimum Value: -7.2 at 29.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-087

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Passenger Shoulder Belt Elongation \*\*

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Maximum Value: 0.00 at 0.0 Milliseconds

Test Vehicle: 2001 Toyota RAV4 4WD SUV

Minimum Value: 0.00 at 0.0 Milliseconds

SAE Filter Class: 60

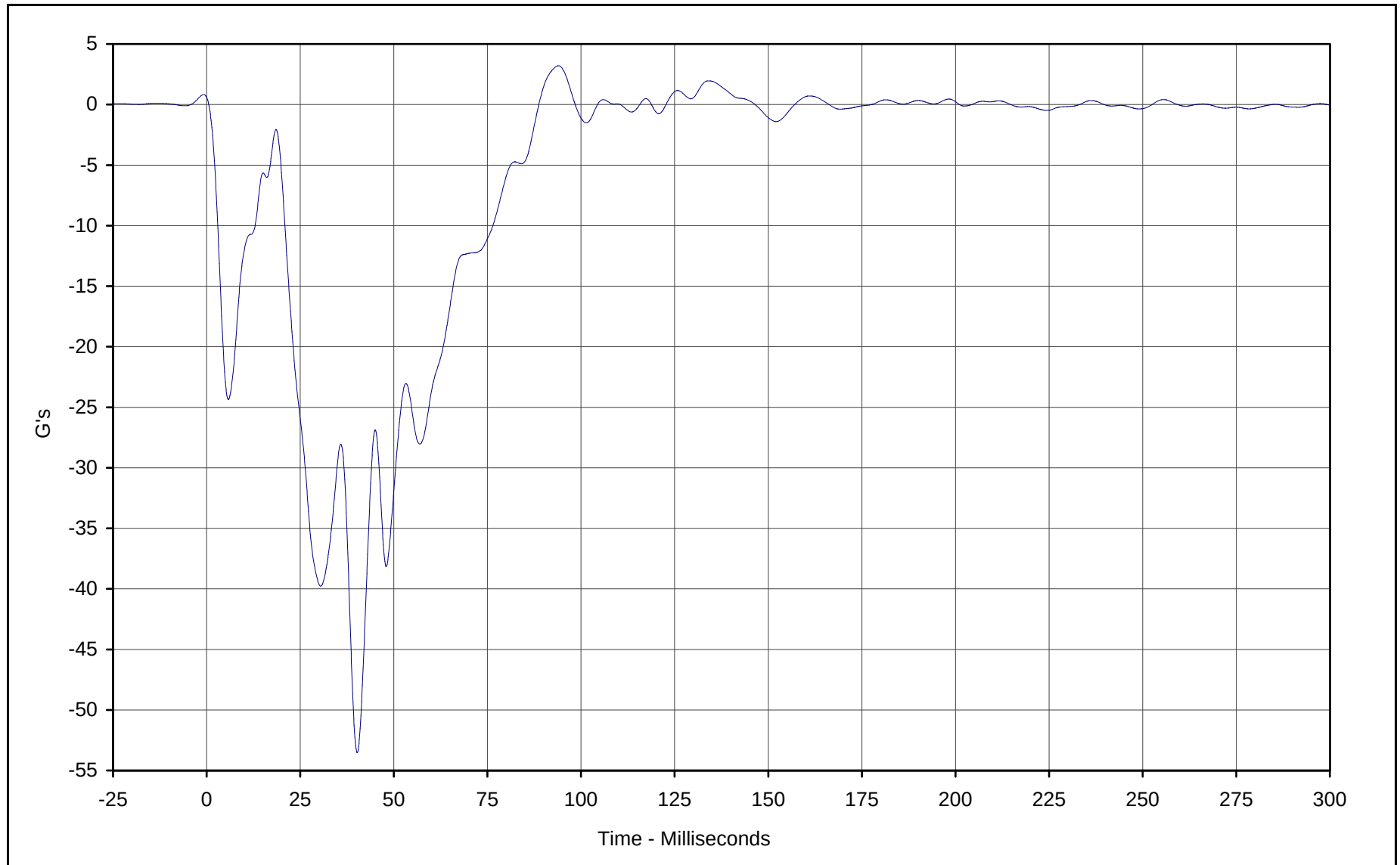
Date of Test: 01/09/01

Curve Number: FIL-088

\*\* Not installed



B-123



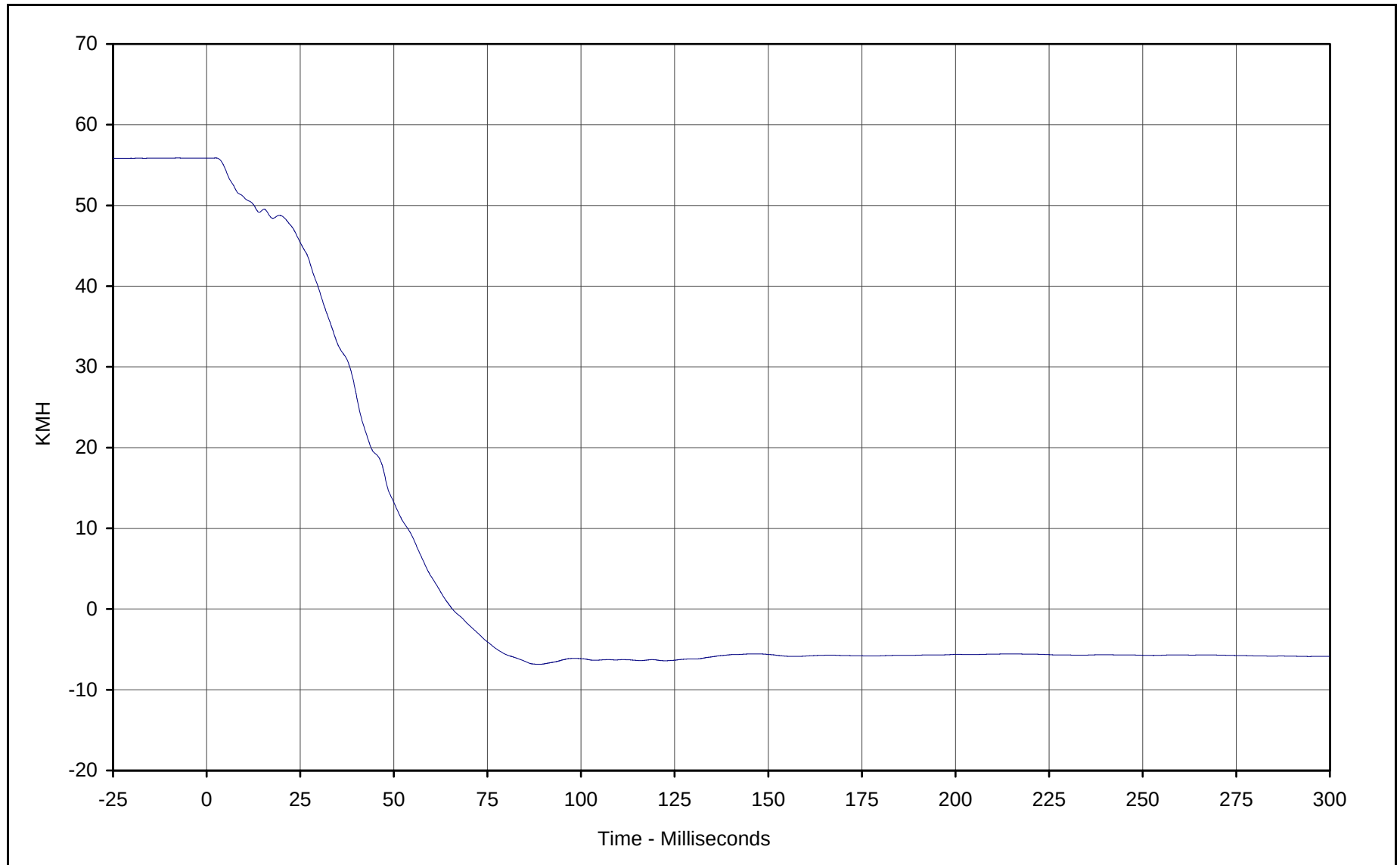
Curve Description: Vehicle Left Rear Primary  
Maximum Value: 3.2 at 94.0 Milliseconds  
Minimum Value: -53.5 at 40.2 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-089

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-124



Curve Description: Vehicle Left Rear Primary Velocity  
Maximum Value: 55.9 at 2.4 Milliseconds  
Minimum Value: -6.8 at 88.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-089

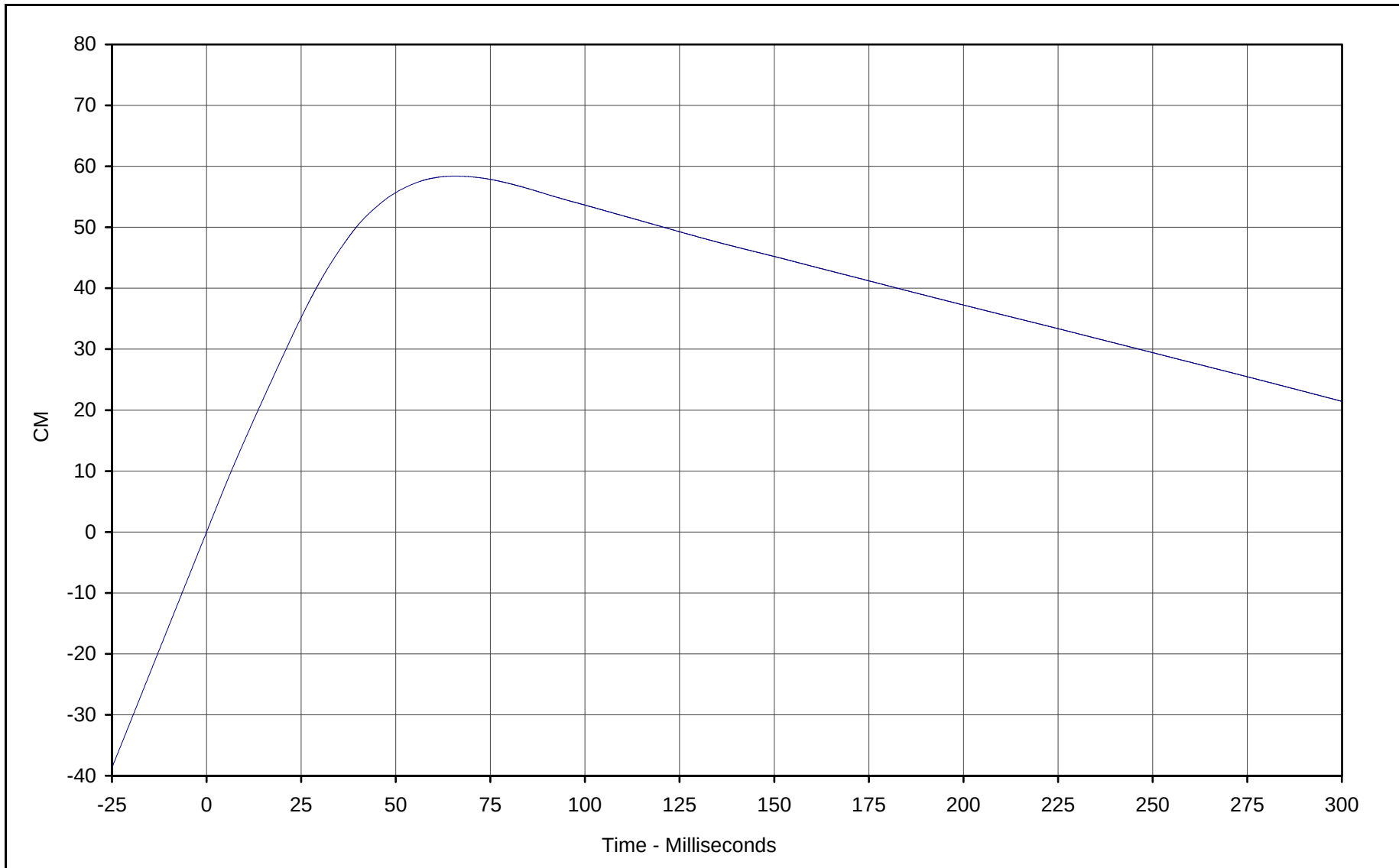
Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



B-125

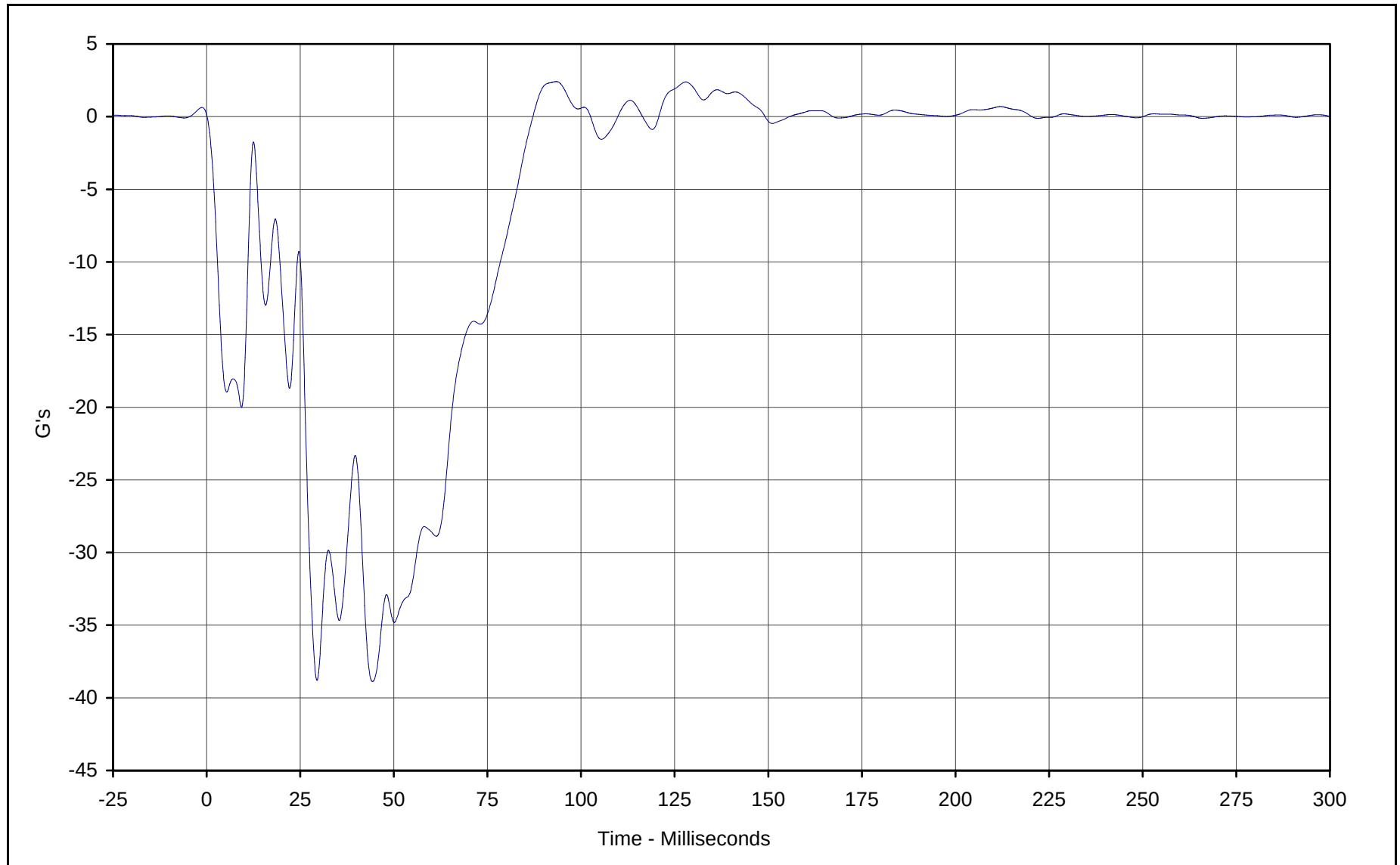


Curve Description: Vehicle Left Rear Primary Displ.  
Maximum Value: 58.4 at 65.6 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-089

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

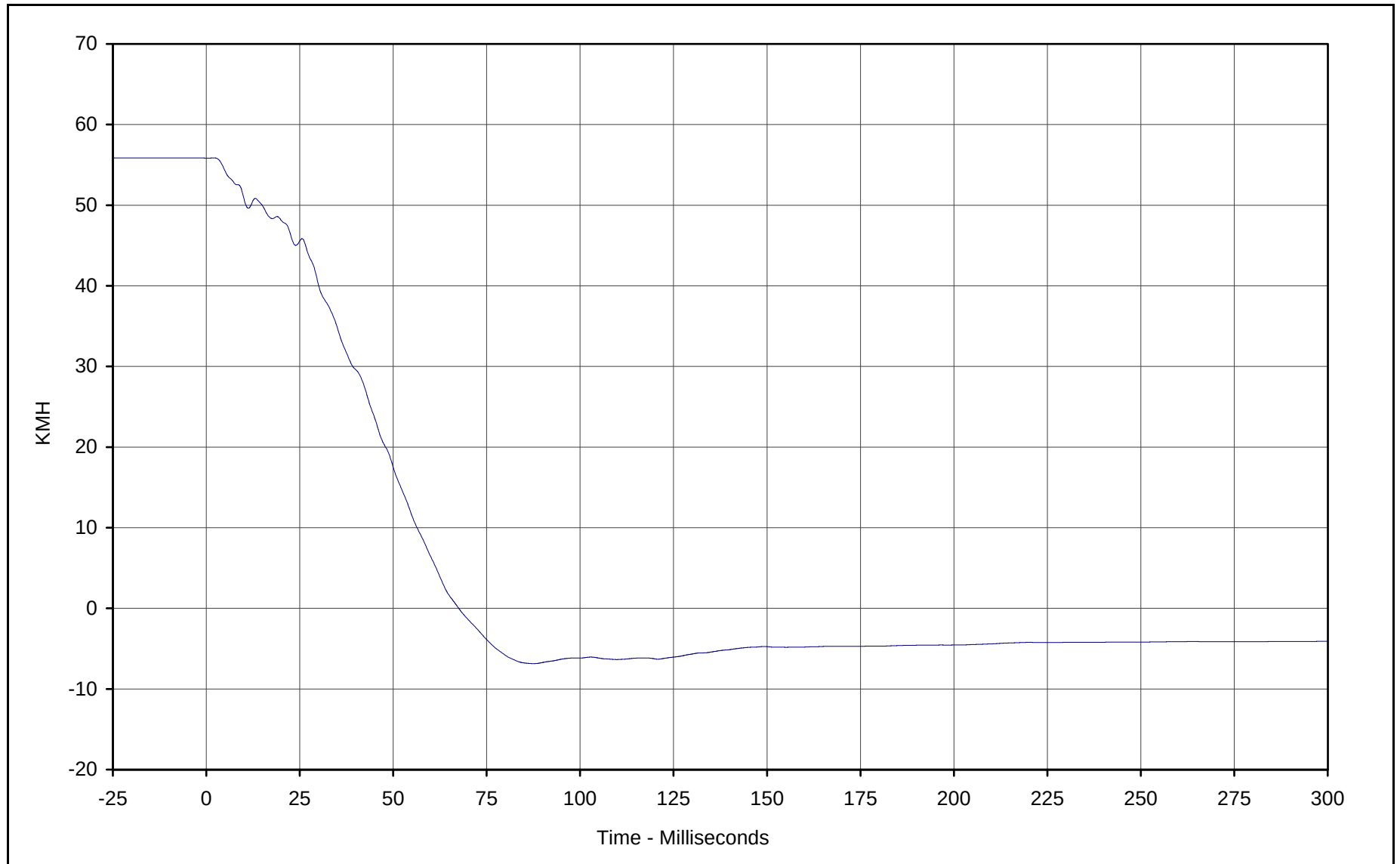


Curve Description: Vehicle Right Rear Primary  
Maximum Value: 2.4 at 93.3 Milliseconds  
Minimum Value: -38.9 at 44.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-090

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-127

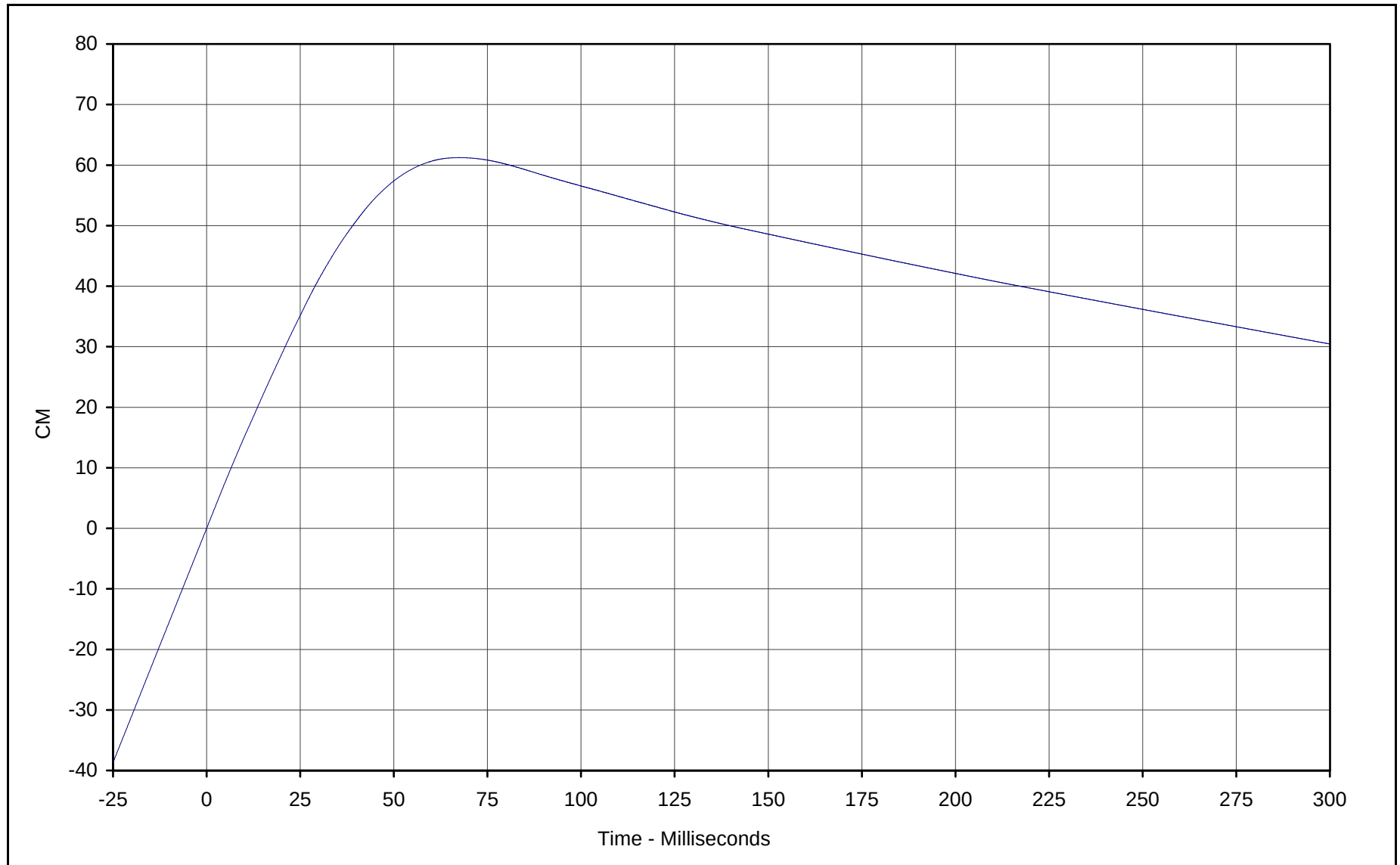


Curve Description: Vehicle Right Rear Primary Velocity  
Maximum Value: 55.9 at 2.1 Milliseconds  
Minimum Value: -6.9 at 87.5 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-090

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

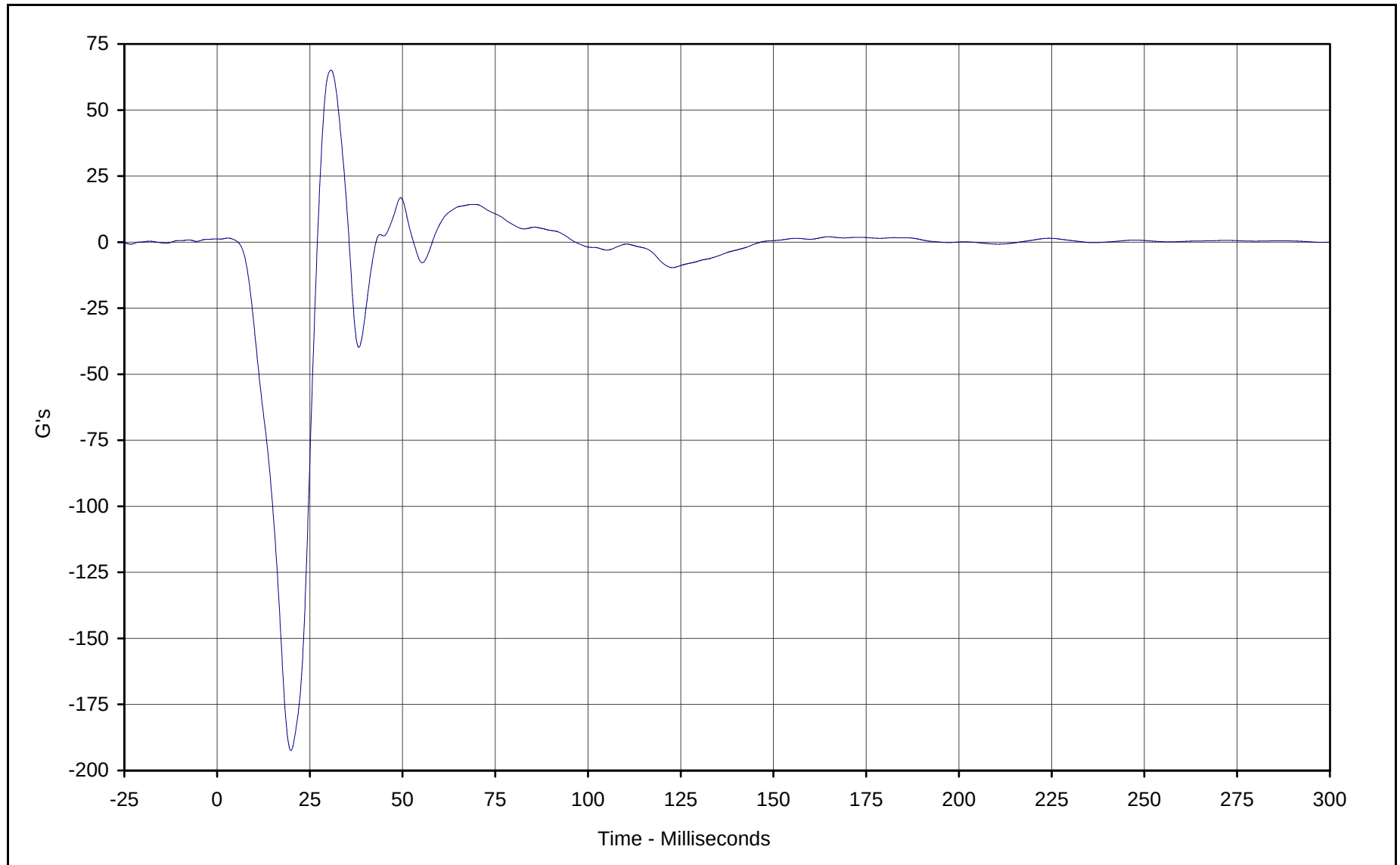


Curve Description: Vehicle Right Rear Primary Displ.  
Maximum Value: 61.2 at 67.5 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-090

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-129



Curve Description: Vehicle Engine Top

Maximum Value: 65.1 at 30.7 Milliseconds

Minimum Value: -192.4 at 19.9 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

Curve Number: FIL-091

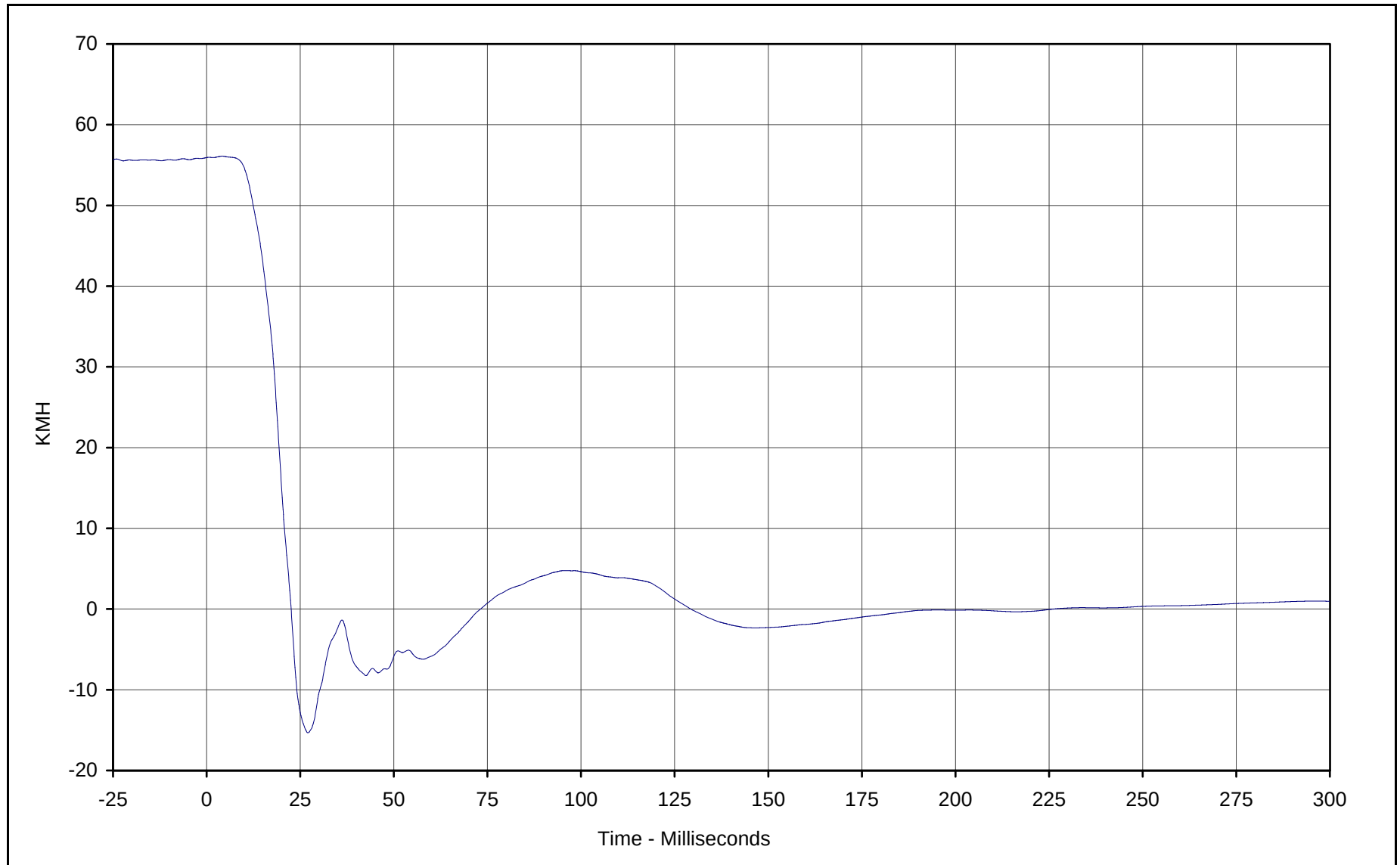
Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-130



Curve Description: Vehicle Engine Top Velocity  
Maximum Value: 56.1 at 4.1 Milliseconds  
Minimum Value: -15.3 at 27.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-091

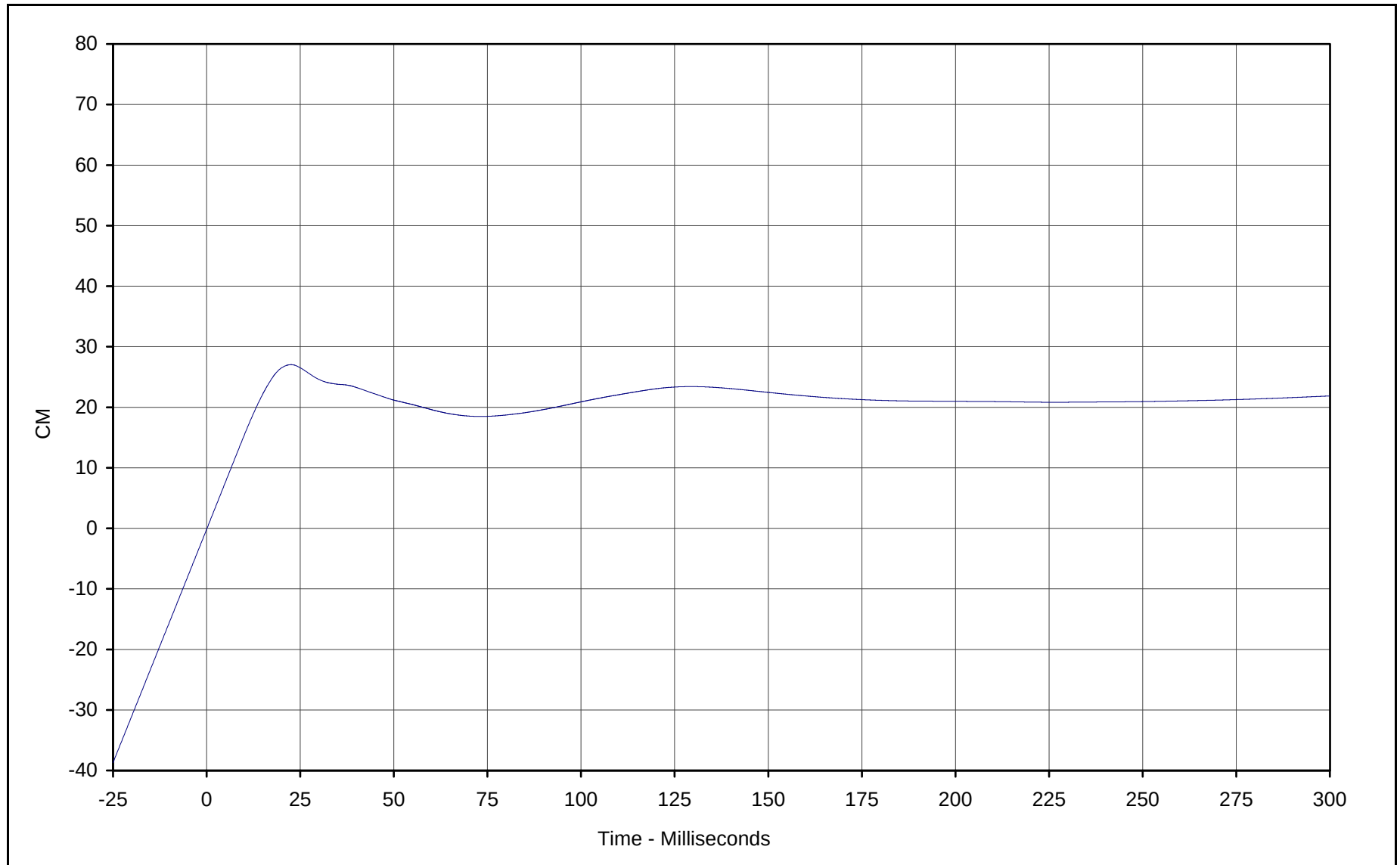
Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



B-131



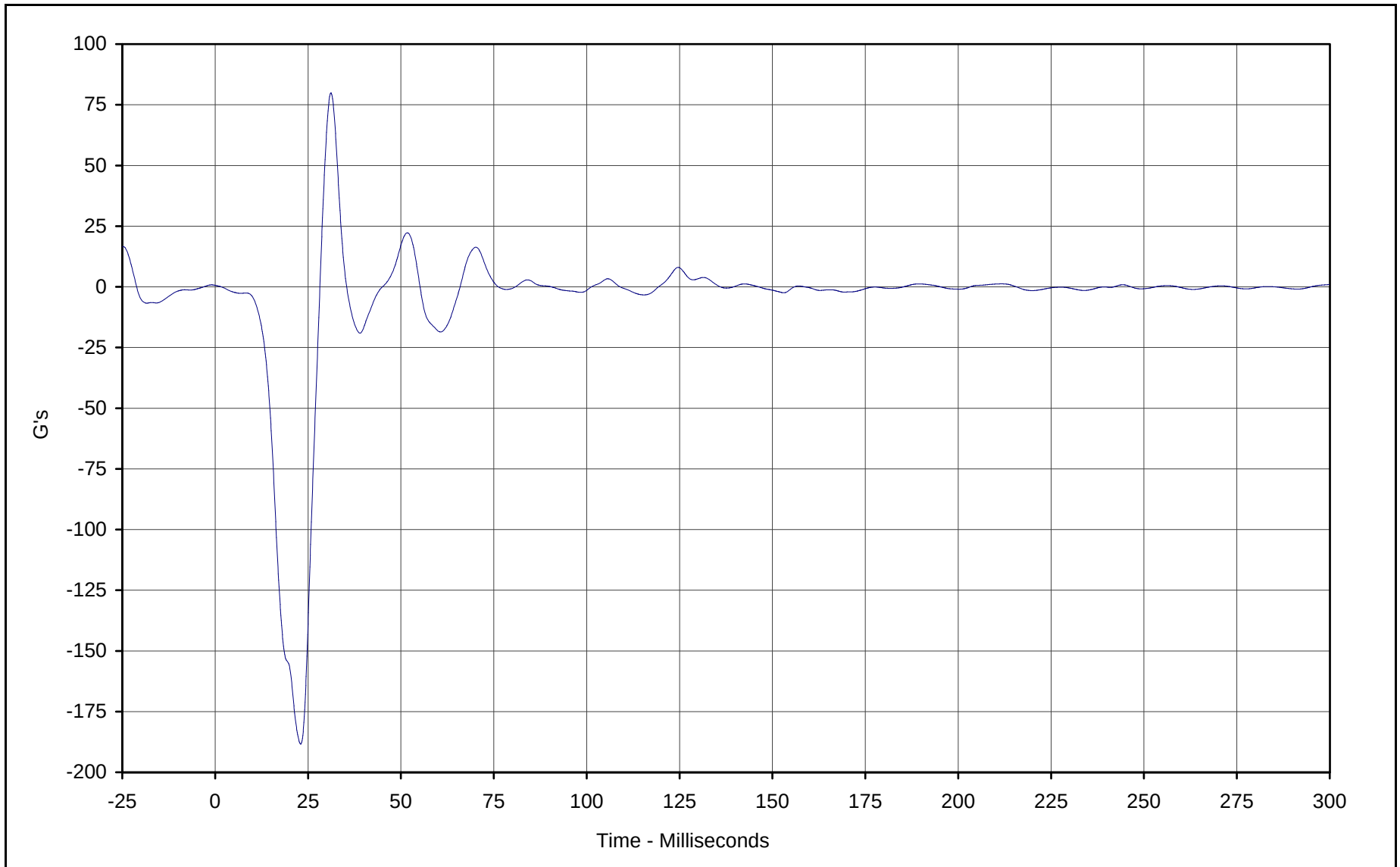
Curve Description: Vehicle Engine Top Displ.  
Maximum Value: 27.0 at 22.6 Milliseconds  
Minimum Value: -0.2 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-091

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-132



Curve Description: Vehicle Engine Bottom

Maximum Value: 79.9 at 31.2 Milliseconds

Minimum Value: -188.4 at 23.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

Curve Number: FIL-092

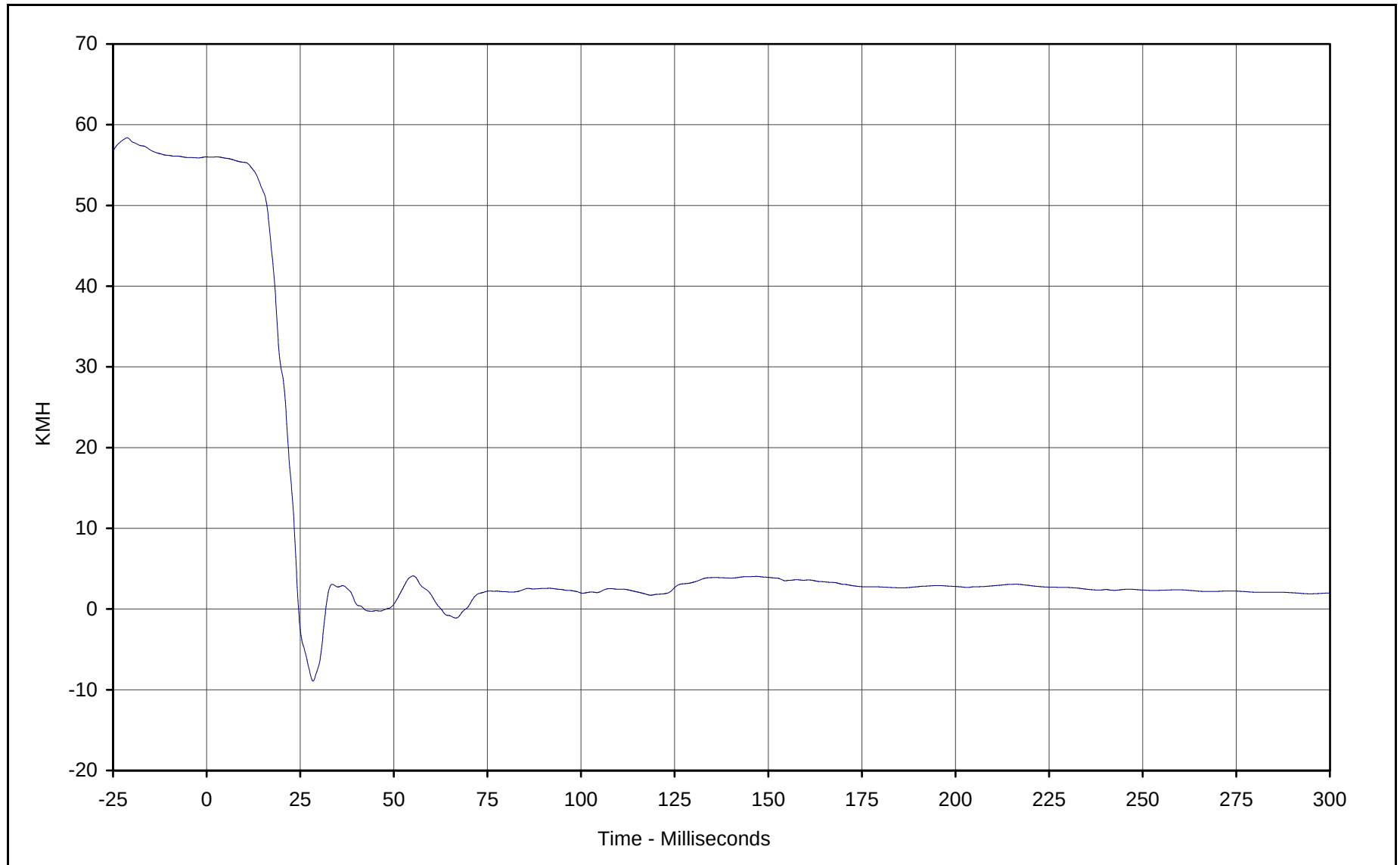
Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-133



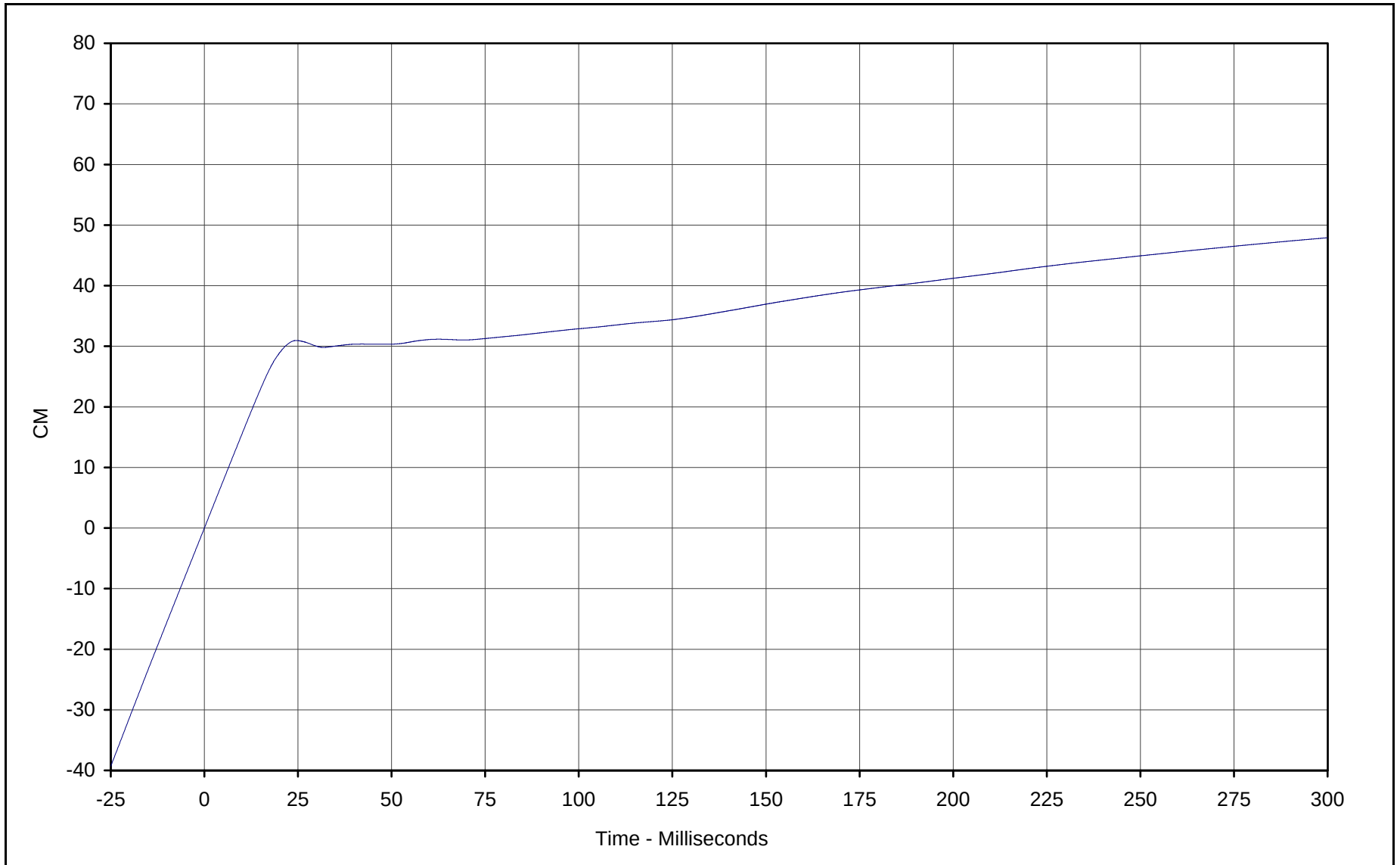
Curve Description: Vehicle Engine Bottom Velocity  
Maximum Value: 56.0 at 2.7 Milliseconds  
Minimum Value: -8.9 at 28.4 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-092

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-134



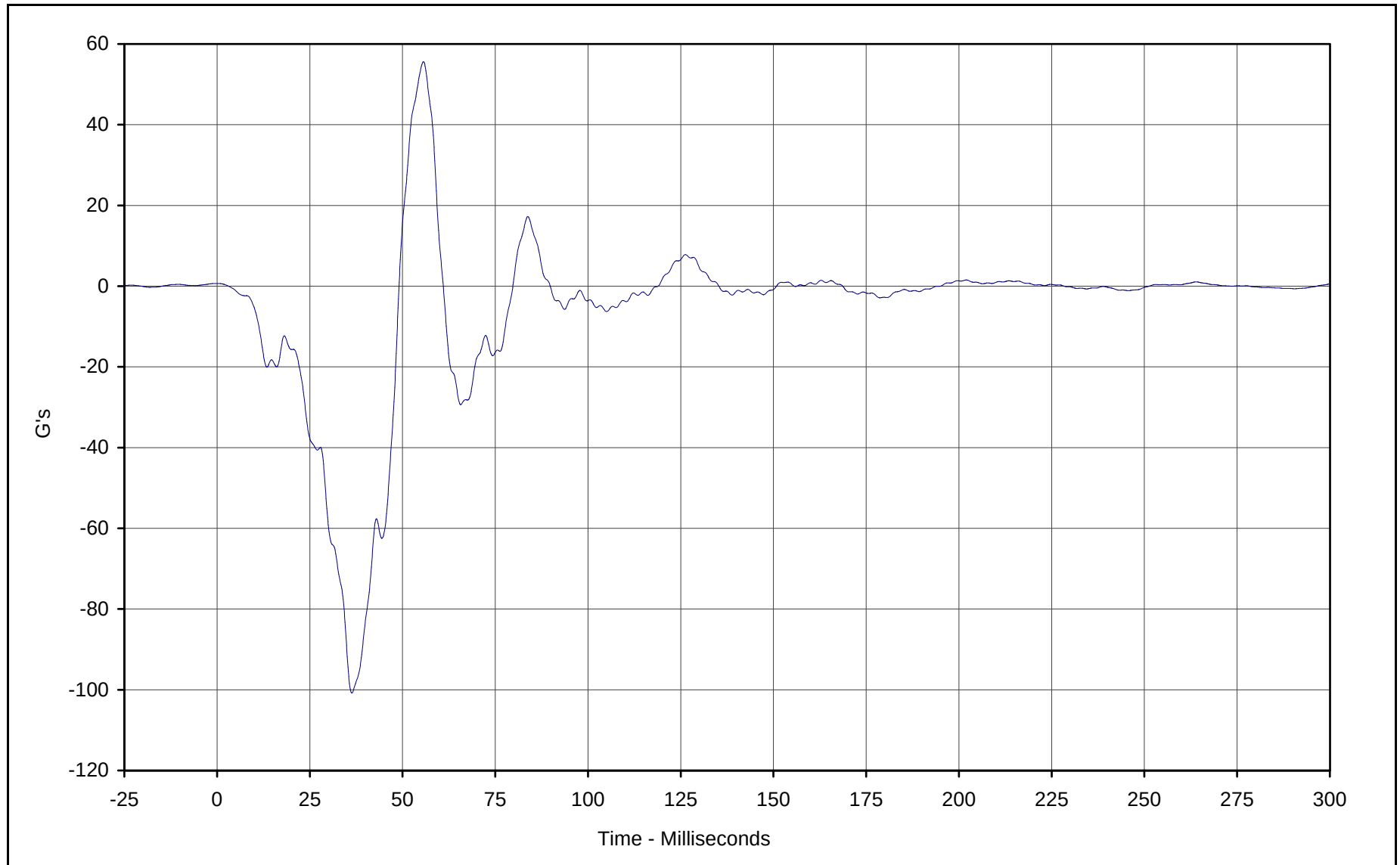
Curve Description: Vehicle Engine Bottom Displ.  
Maximum Value: 47.9 at 299.9 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-092

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-135

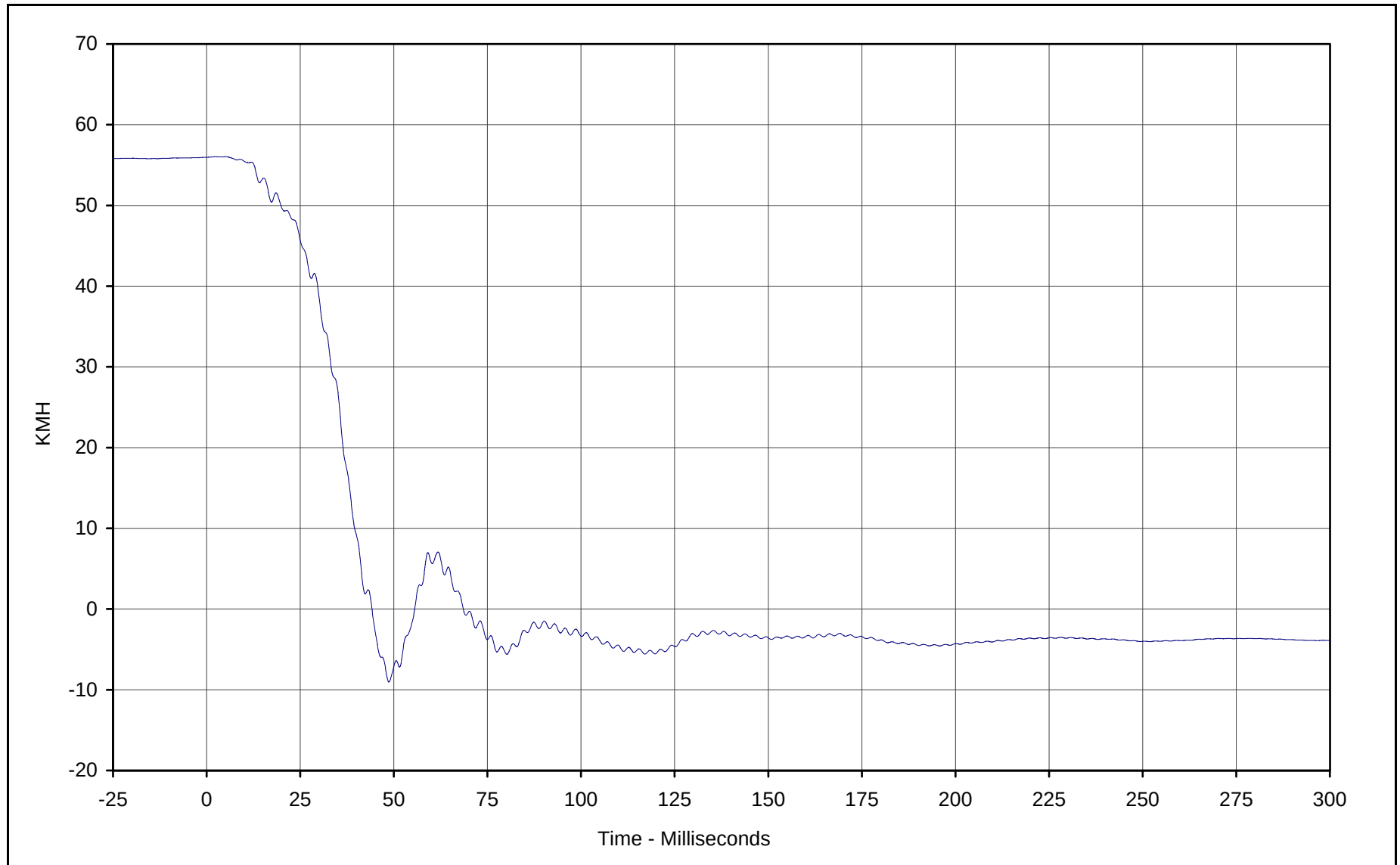


Curve Description: Vehicle Left Brake Caliper  
Maximum Value: 55.6 at 55.6 Milliseconds  
Minimum Value: -100.8 at 36.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-093

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

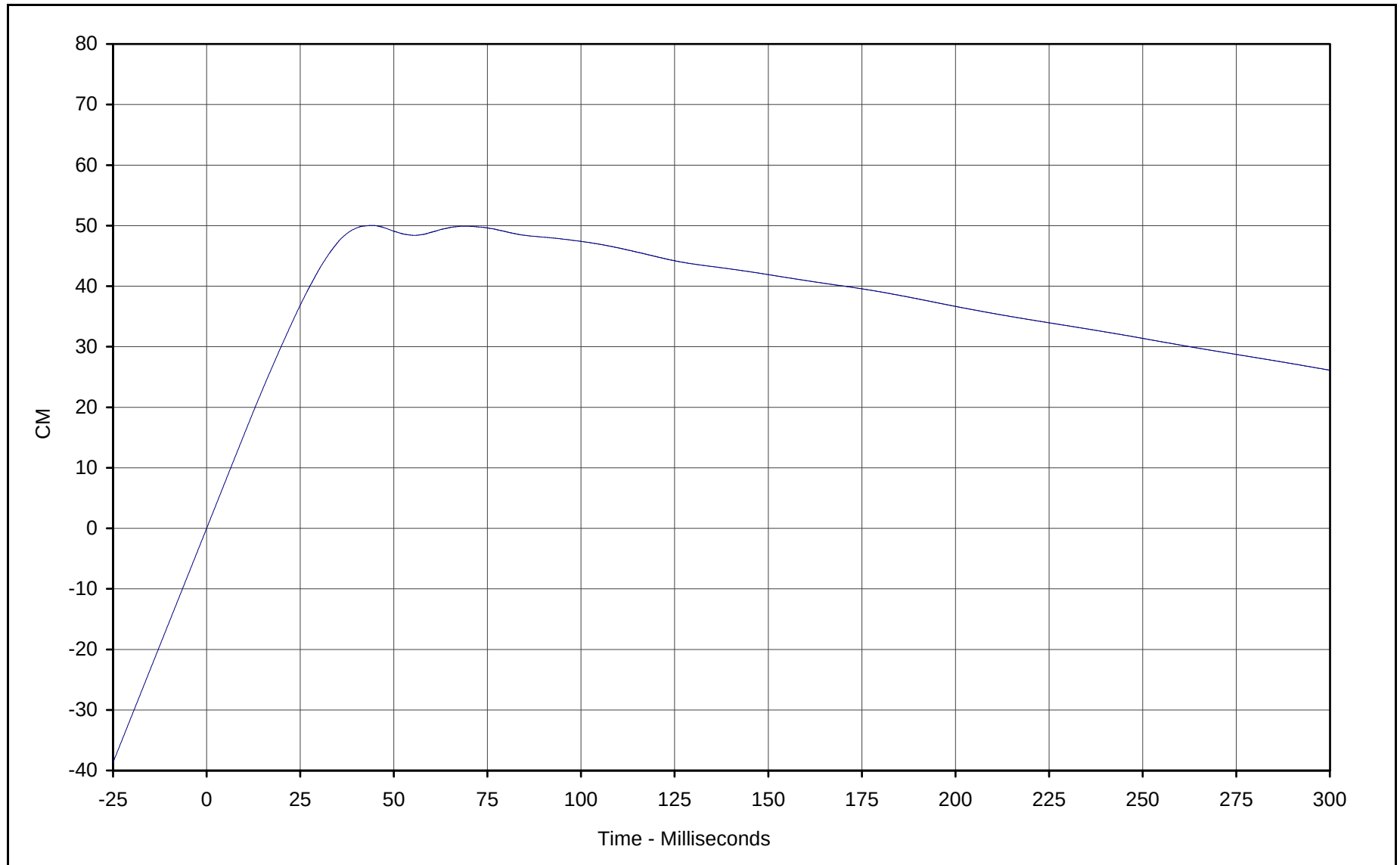


Curve Description: Vehicle Left Brake Caliper Velocity  
Maximum Value: 56.0 at 5.2 Milliseconds  
Minimum Value: -9.0 at 48.7 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-093

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



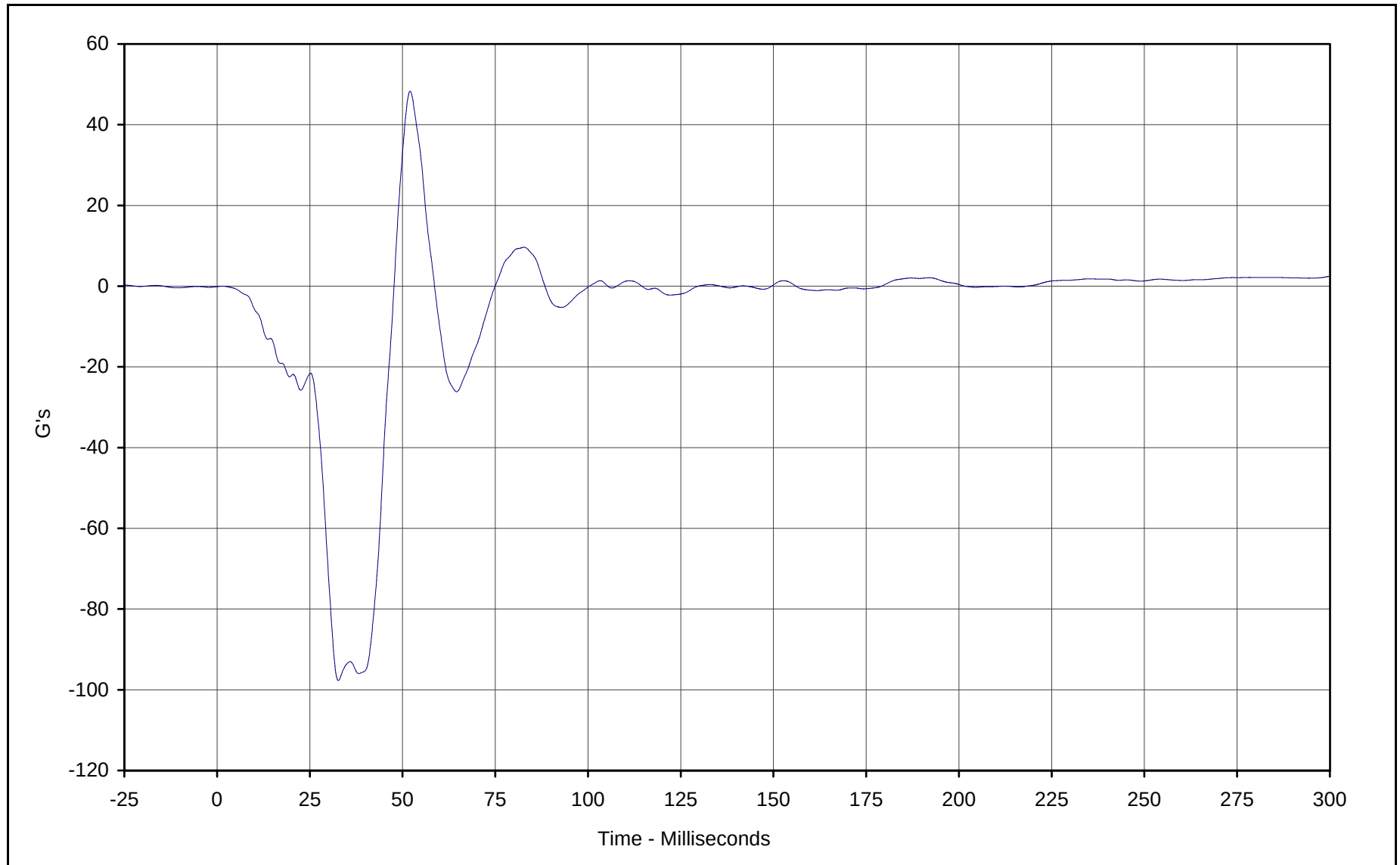


Curve Description: Vehicle Left Brake Caliper Displ.  
Maximum Value: 50.0 at 44.2 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-093

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



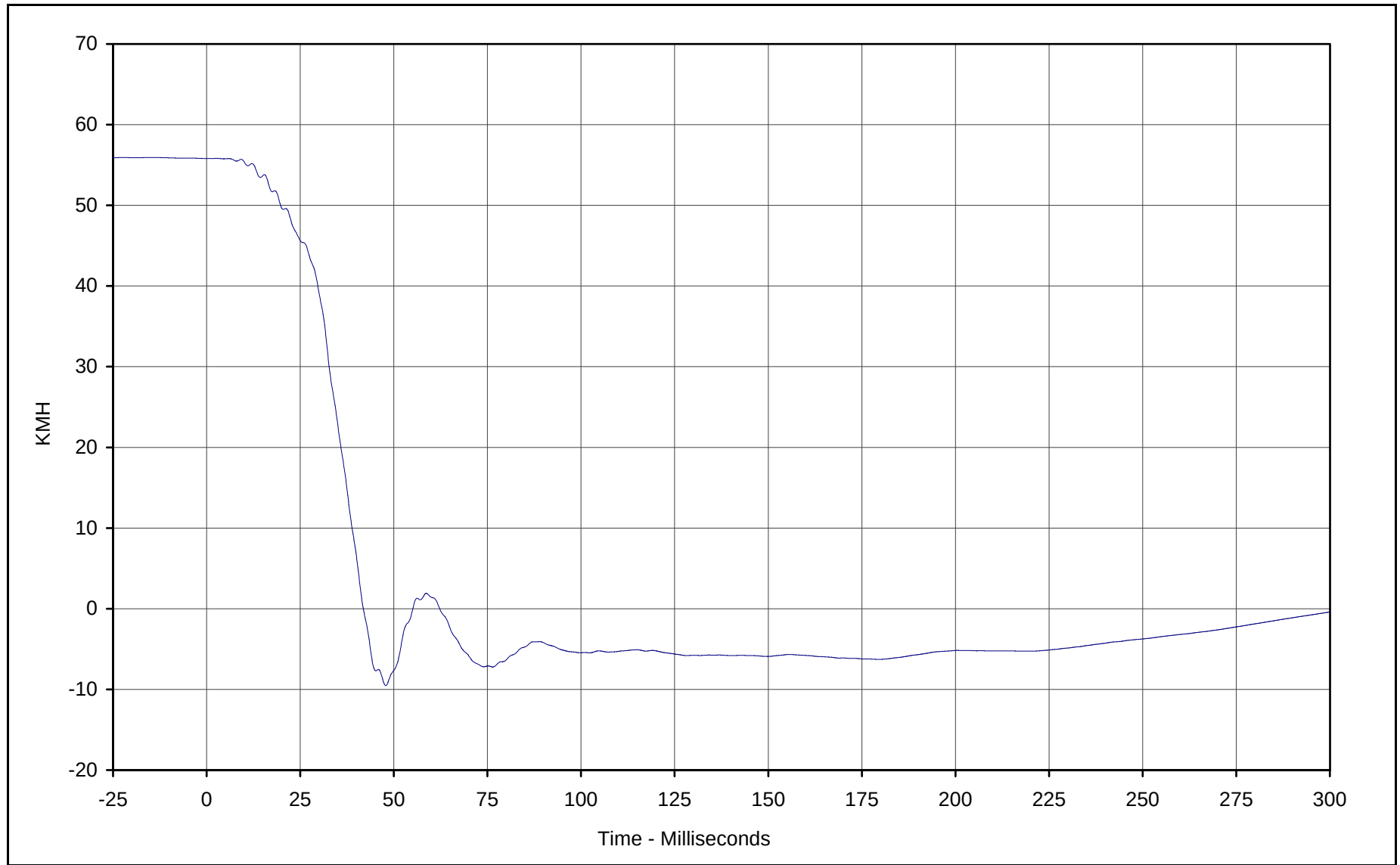




Curve Description: Vehicle Right Brake Caliper  
Maximum Value: 48.3 at 52.0 Milliseconds  
Minimum Value: -97.7 at 32.7 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-094

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV





Curve Description: Vehicle Right Brake Caliper Velocity

Maximum Value: 55.8 at 2.7 Milliseconds

Minimum Value: -9.5 at 47.8 Milliseconds

SAE Filter Class: 180

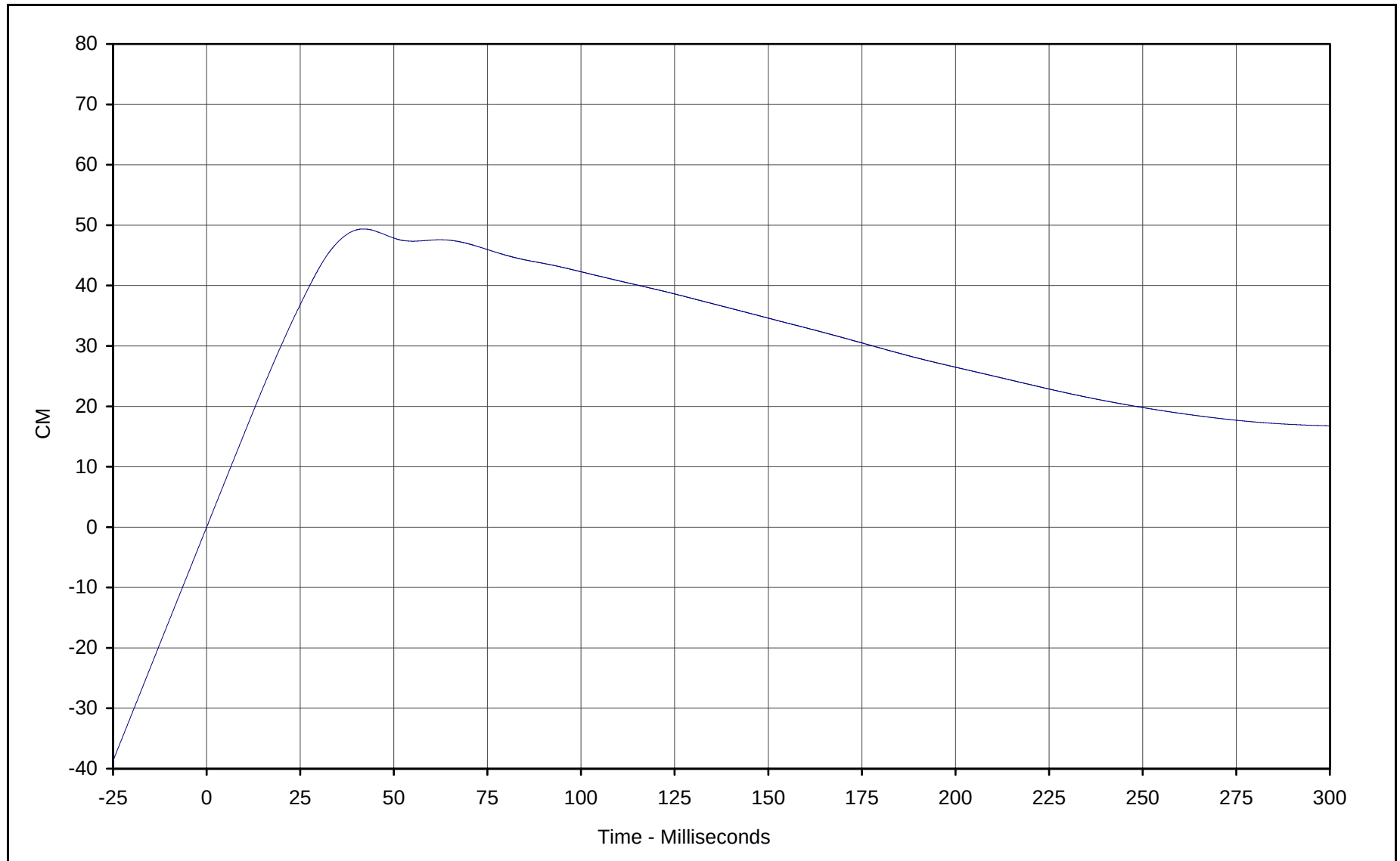
Date of Test: 01/09/01

Curve Number: IN1-094

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



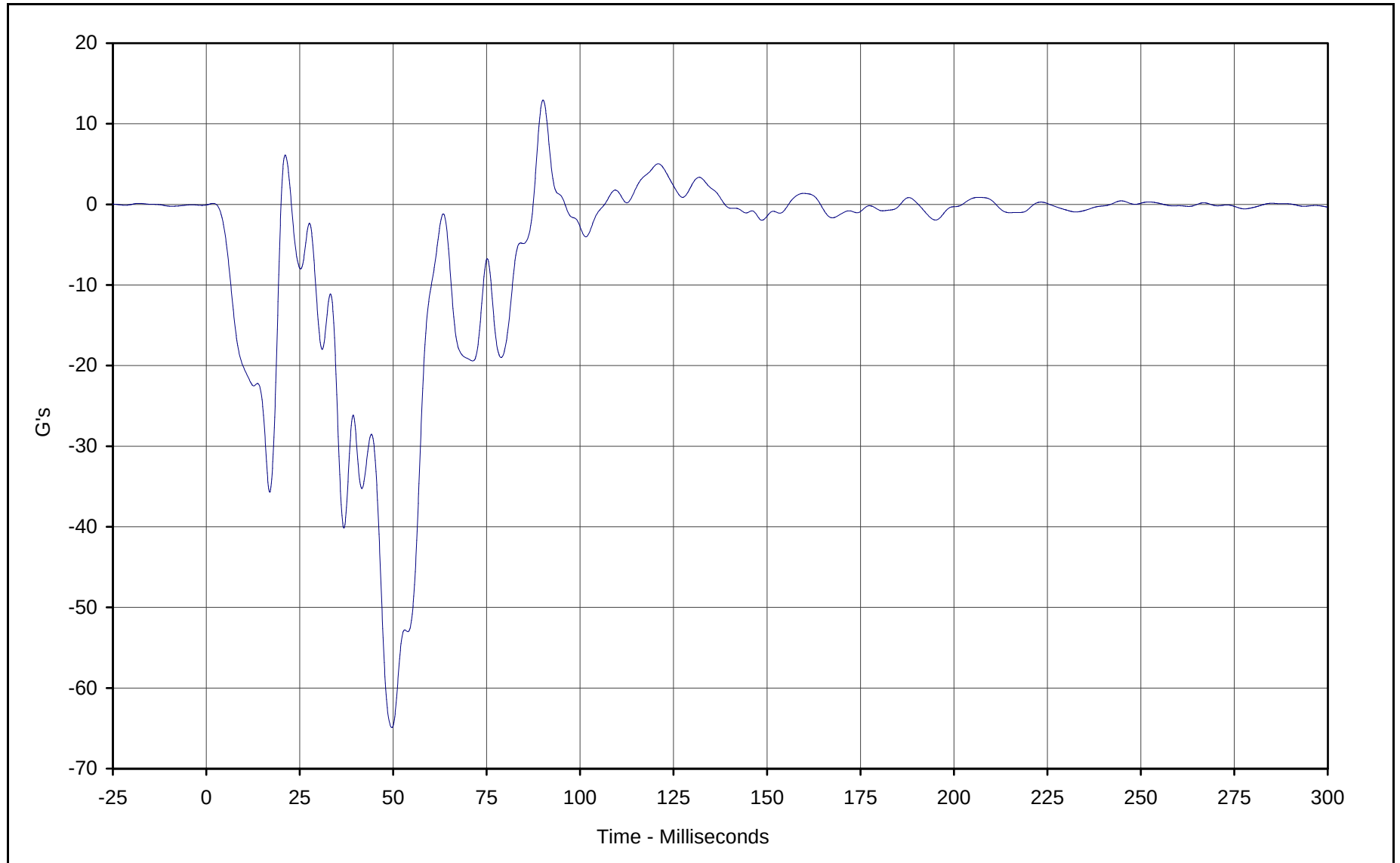


Curve Description: Vehicle Right Brake Caliper Displ.  
Maximum Value: 49.4 at 41.8 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-094

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-141



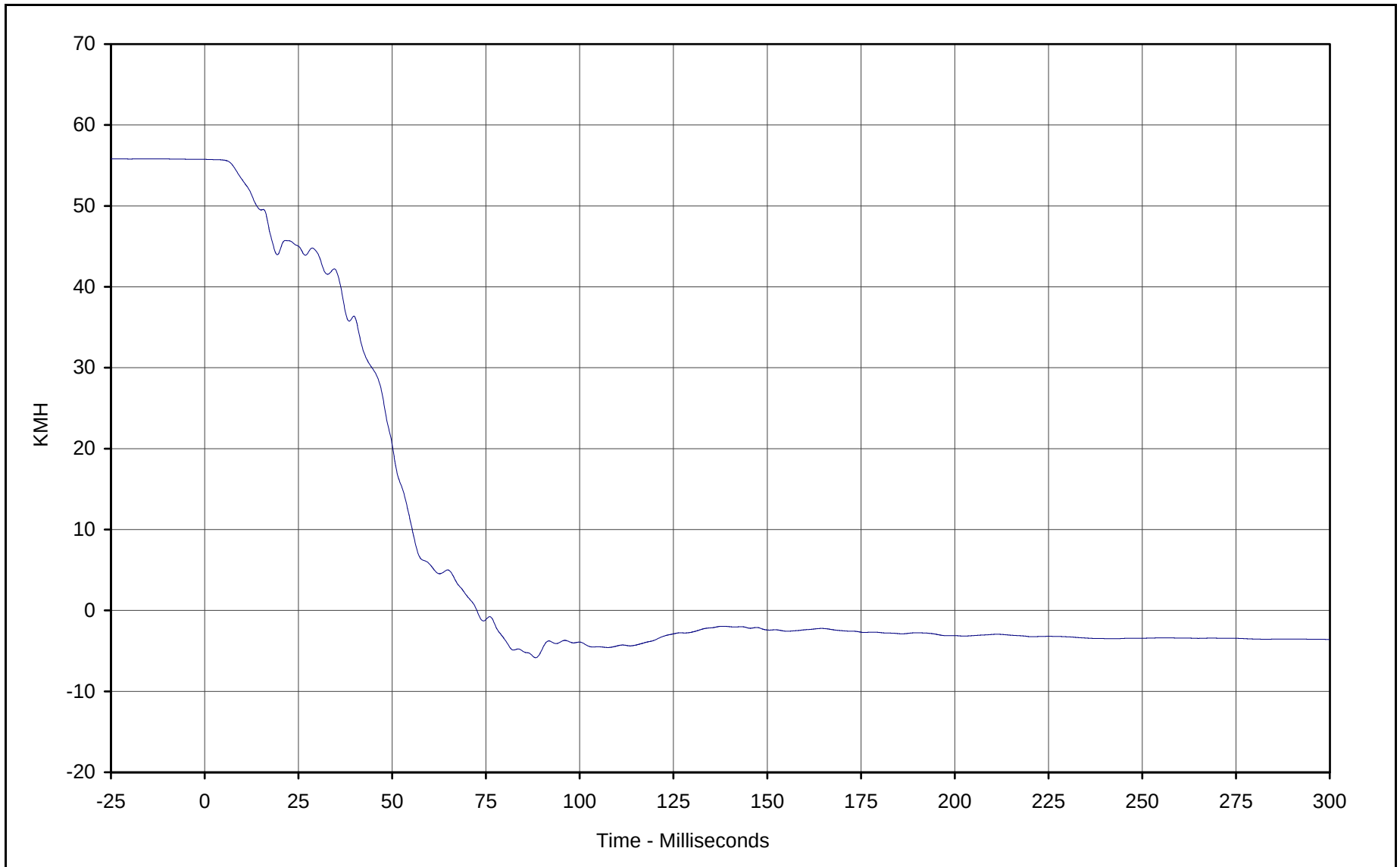
Curve Description: Vehicle Instrument Panel  
Maximum Value: 13.0 at 90.1 Milliseconds  
Minimum Value: -64.9 at 49.6 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-095

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

B-142

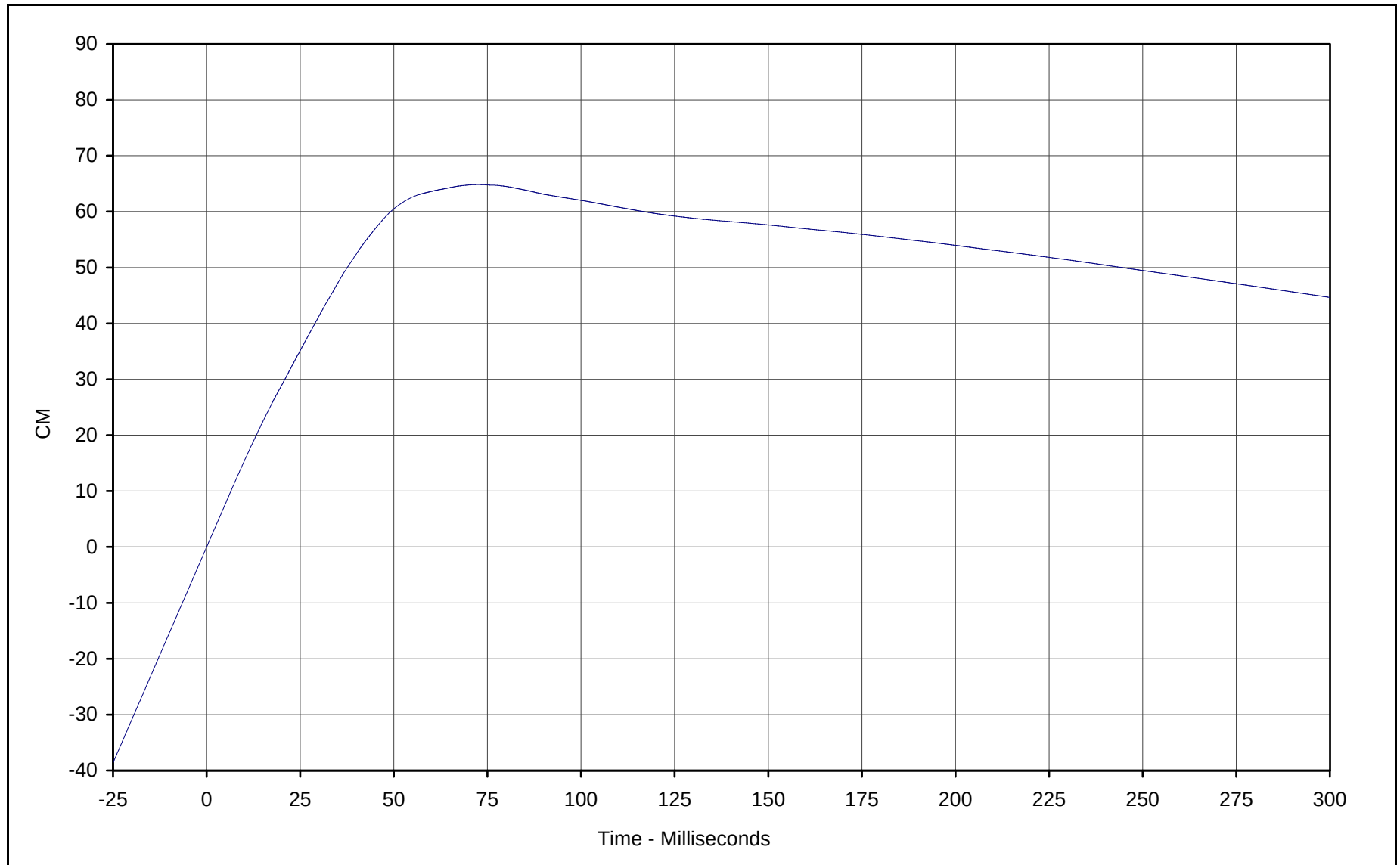


Curve Description: Vehicle Instrument Panel Velocity  
Maximum Value: 55.8 at 0.0 Milliseconds  
Minimum Value: -5.8 at 88.2 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN1-095

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

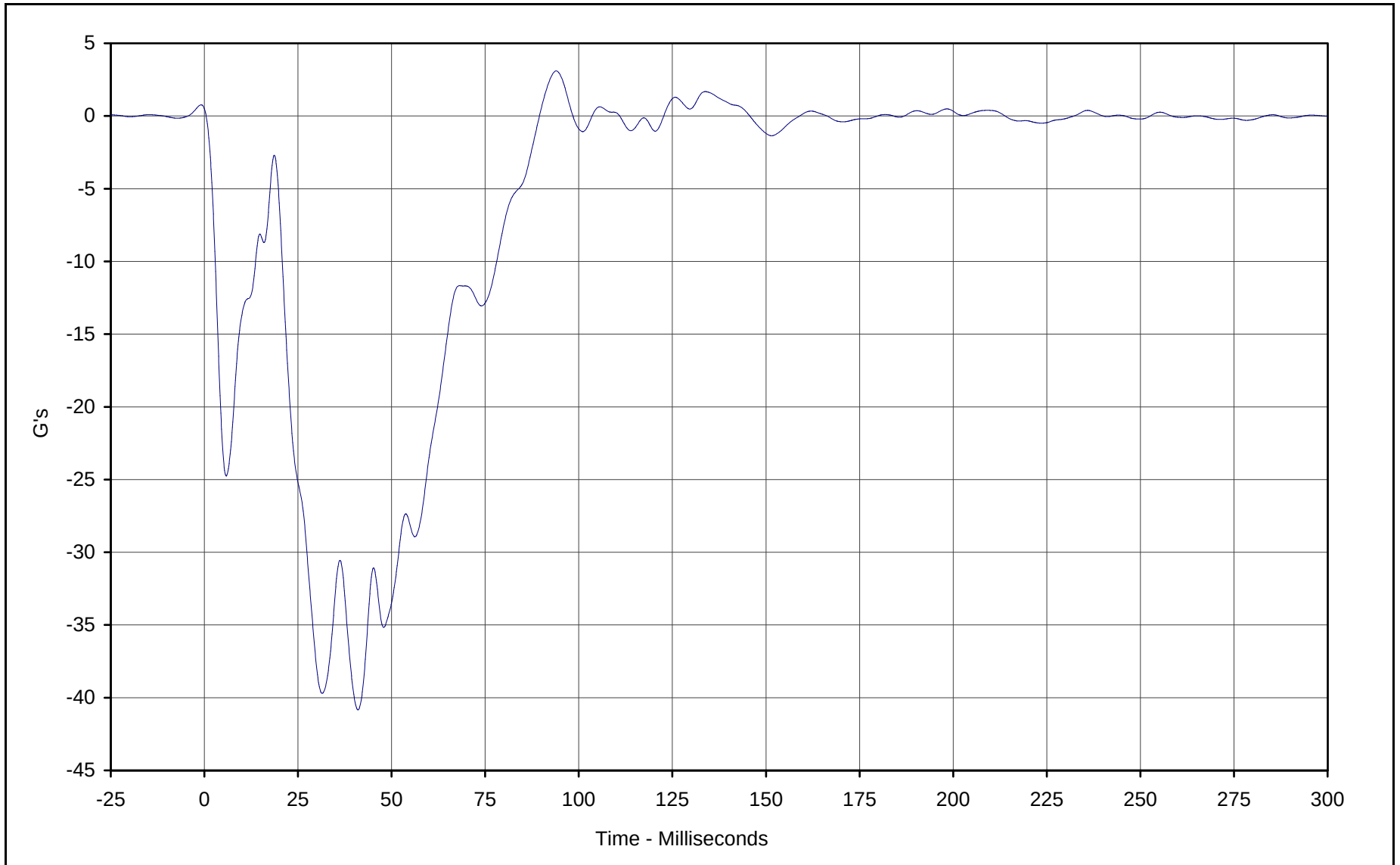


Curve Description: Vehicle Instrument Panel Displ.  
Maximum Value: 64.8 at 72.6 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-095

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



B-144



Curve Description: Vehicle Left Rear Redundant  
Maximum Value: 3.1 at 94.0 Milliseconds  
Minimum Value: -40.8 at 41.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-096

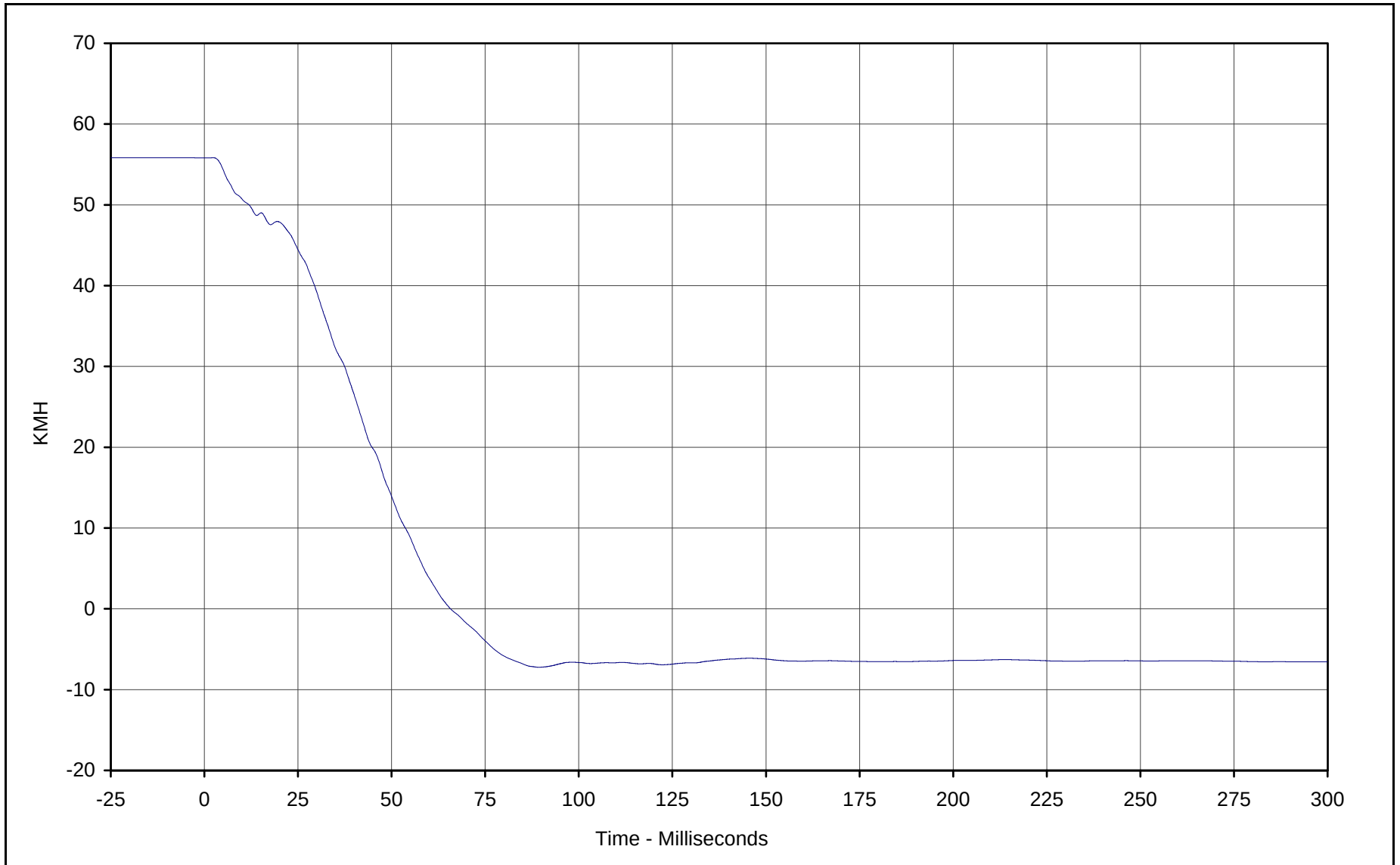
Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



B-145



Curve Description: Vehicle Left Rear Redundant Velocity

Maximum Value: 55.8 at 2.3 Milliseconds

Minimum Value: -7.2 at 89.4 Milliseconds

SAE Filter Class: 180

Date of Test: 01/09/01

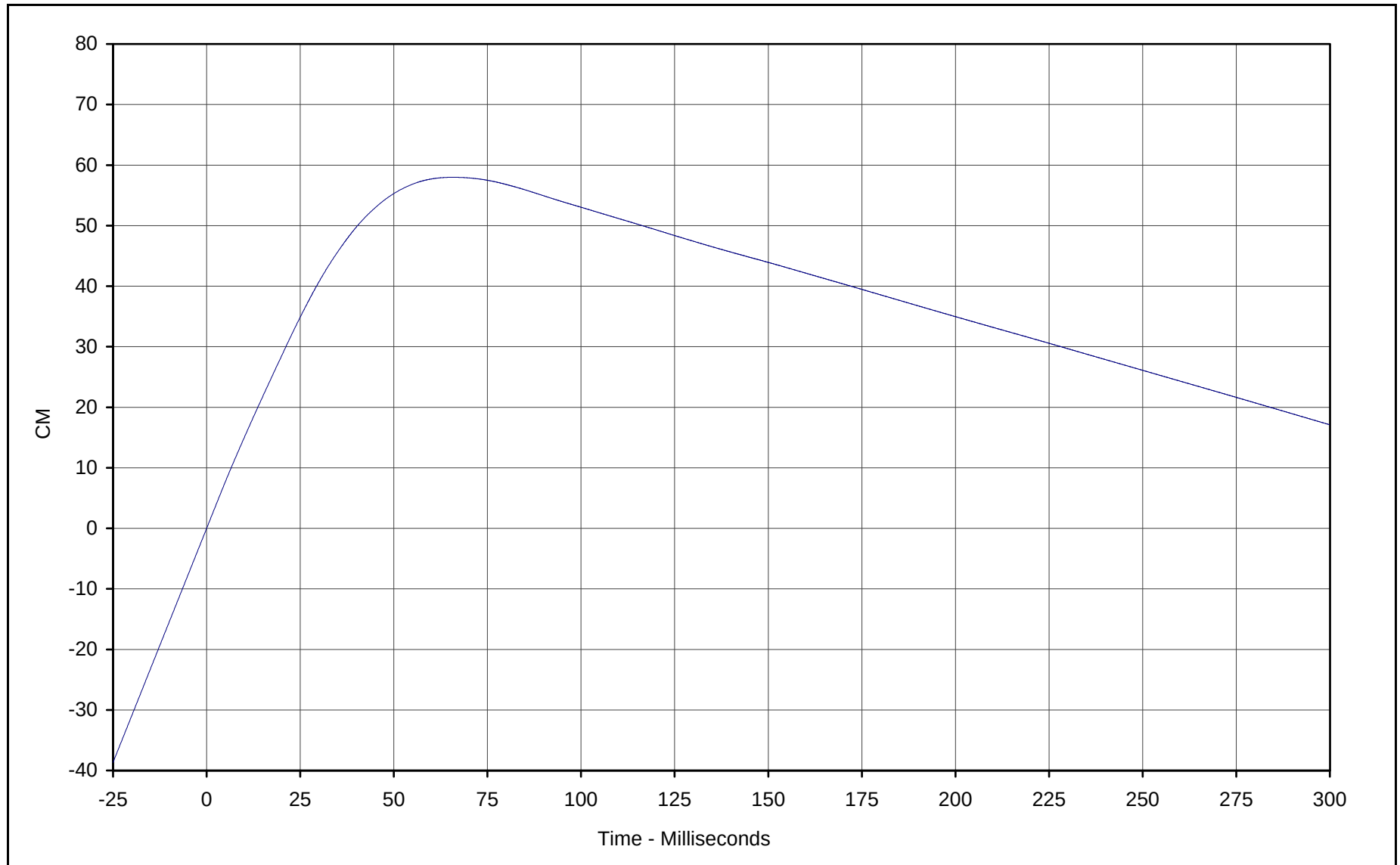
Curve Number: IN1-096

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



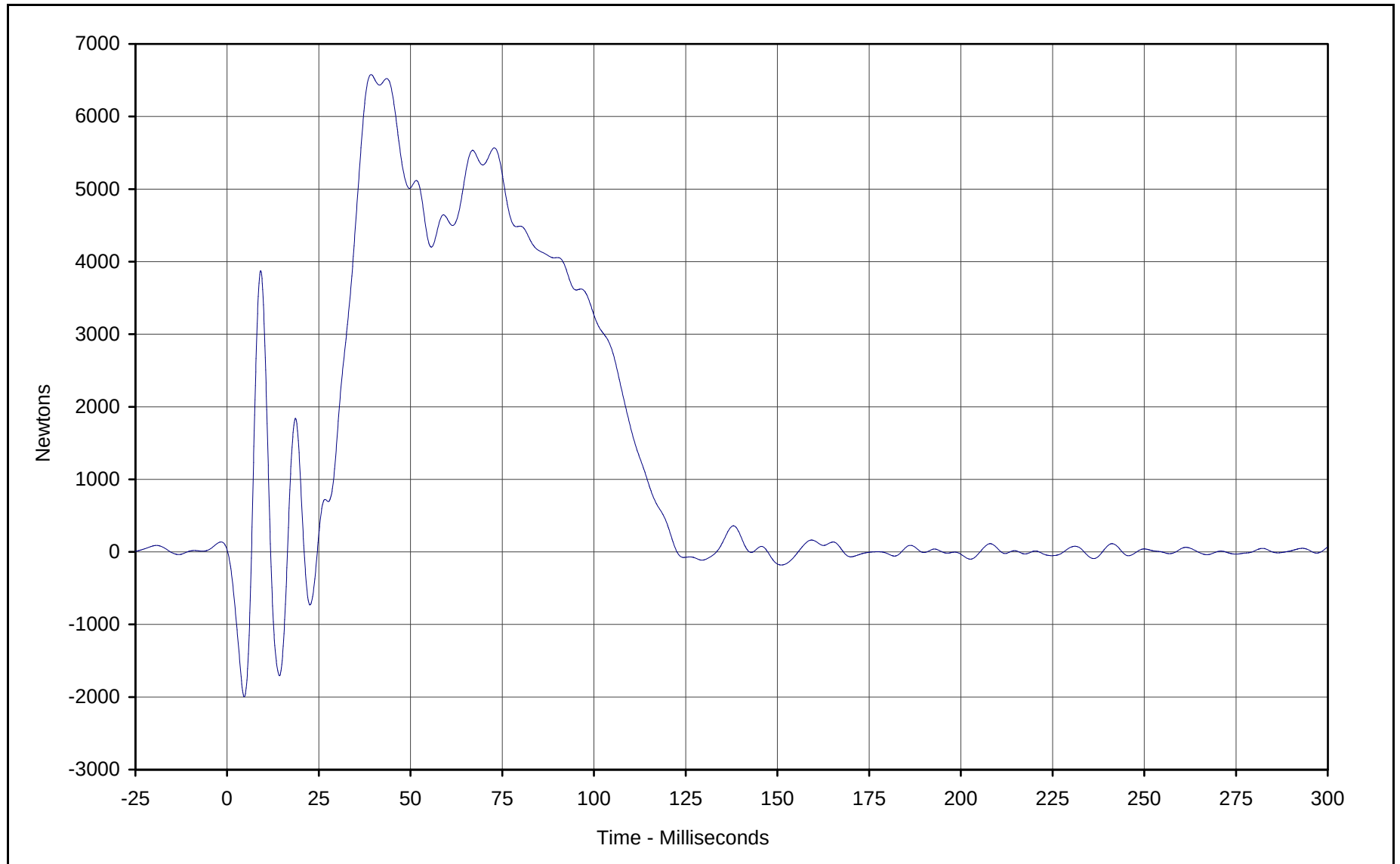
Curve Description: Vehicle Left Rear Redundant Displ.  
Maximum Value: 58.0 at 65.7 Milliseconds  
Minimum Value: 0.0 at 0.0 Milliseconds  
SAE Filter Class: 180  
Date of Test: 01/09/01  
Curve Number: IN2-096

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



**APPENDIX C**  
**LOAD CELL BARRIER INFORMATION**

C-1



Curve Description: Barrier Force A2

Maximum Value: 6578.2 at 39.2 Milliseconds

Minimum Value: -1996.5 at 4.7 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

Curve Number: FIL-099

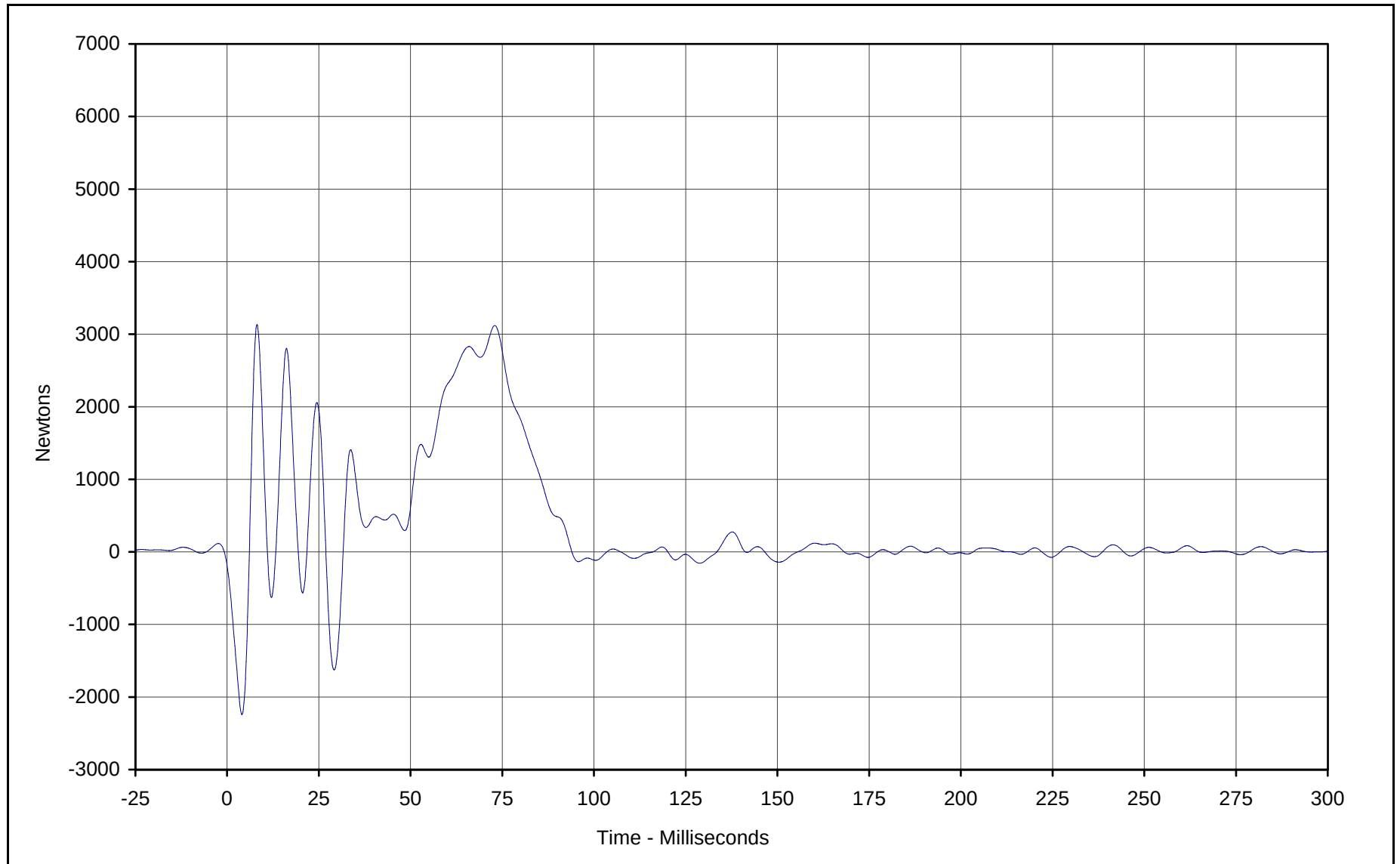
Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-2



Curve Description: Barrier Force A3

Maximum Value: 3131.4 at 8.1 Milliseconds

Minimum Value: -2242.1 at 4.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

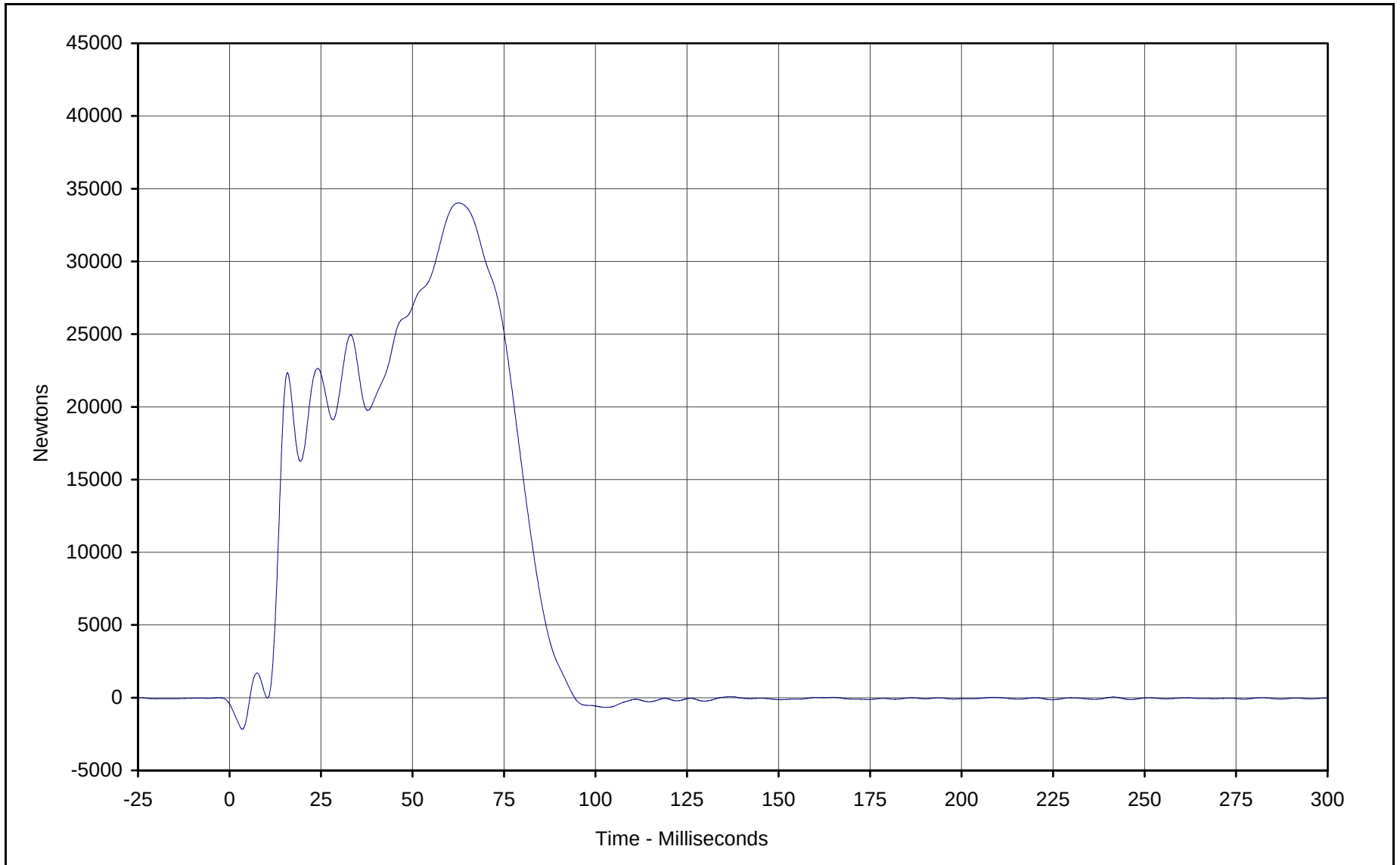
Curve Number: FIL-100

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

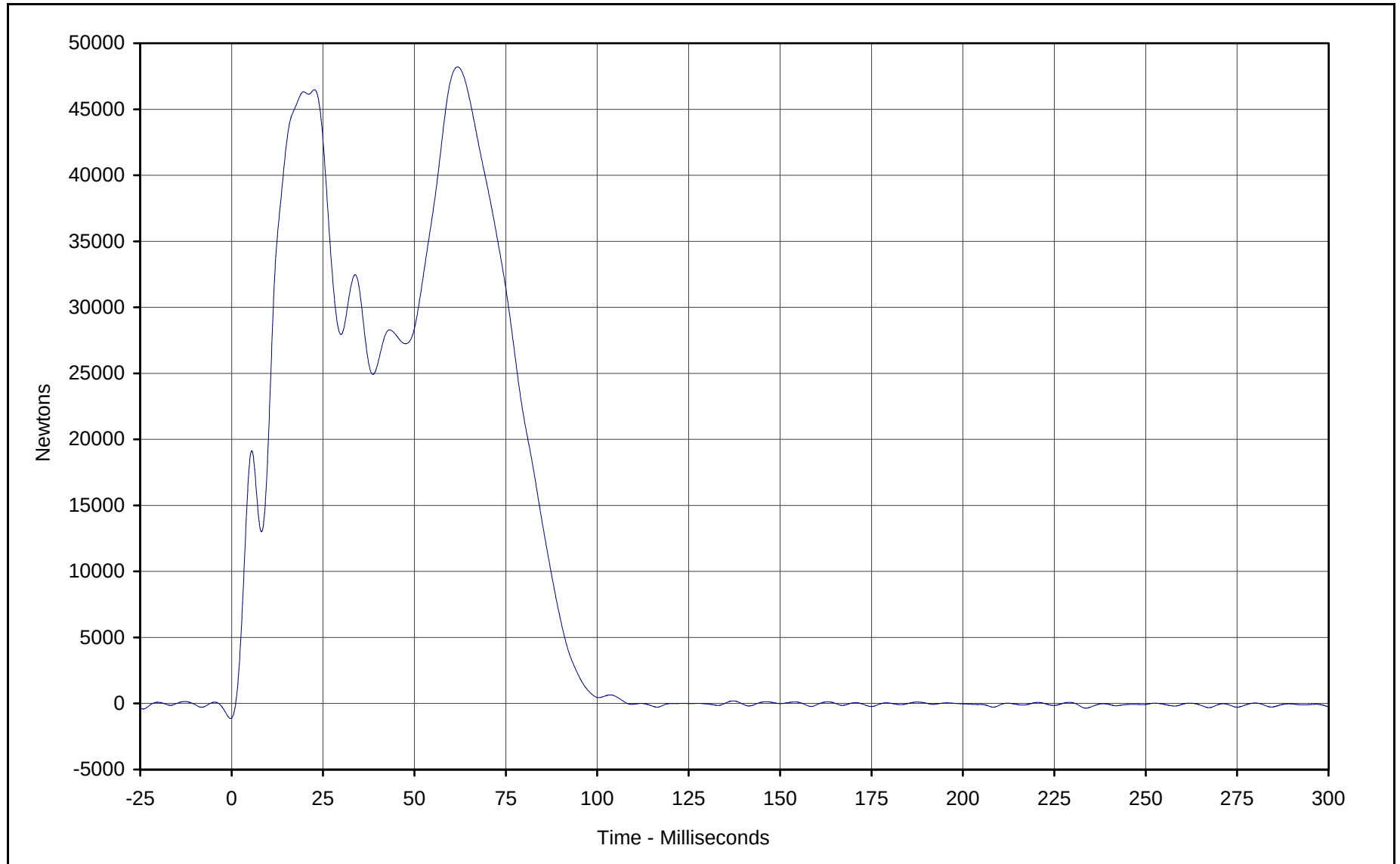


Curve Description: Barrier Force A4  
Maximum Value: 34023.1 at 62.6 Milliseconds  
Minimum Value: -2168.3 at 3.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-101

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



C-4



Curve Description: Barrier Force A5

Maximum Value: 48209.0 at 61.8 Milliseconds

Minimum Value: -1105.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

Curve Number: FIL-102

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

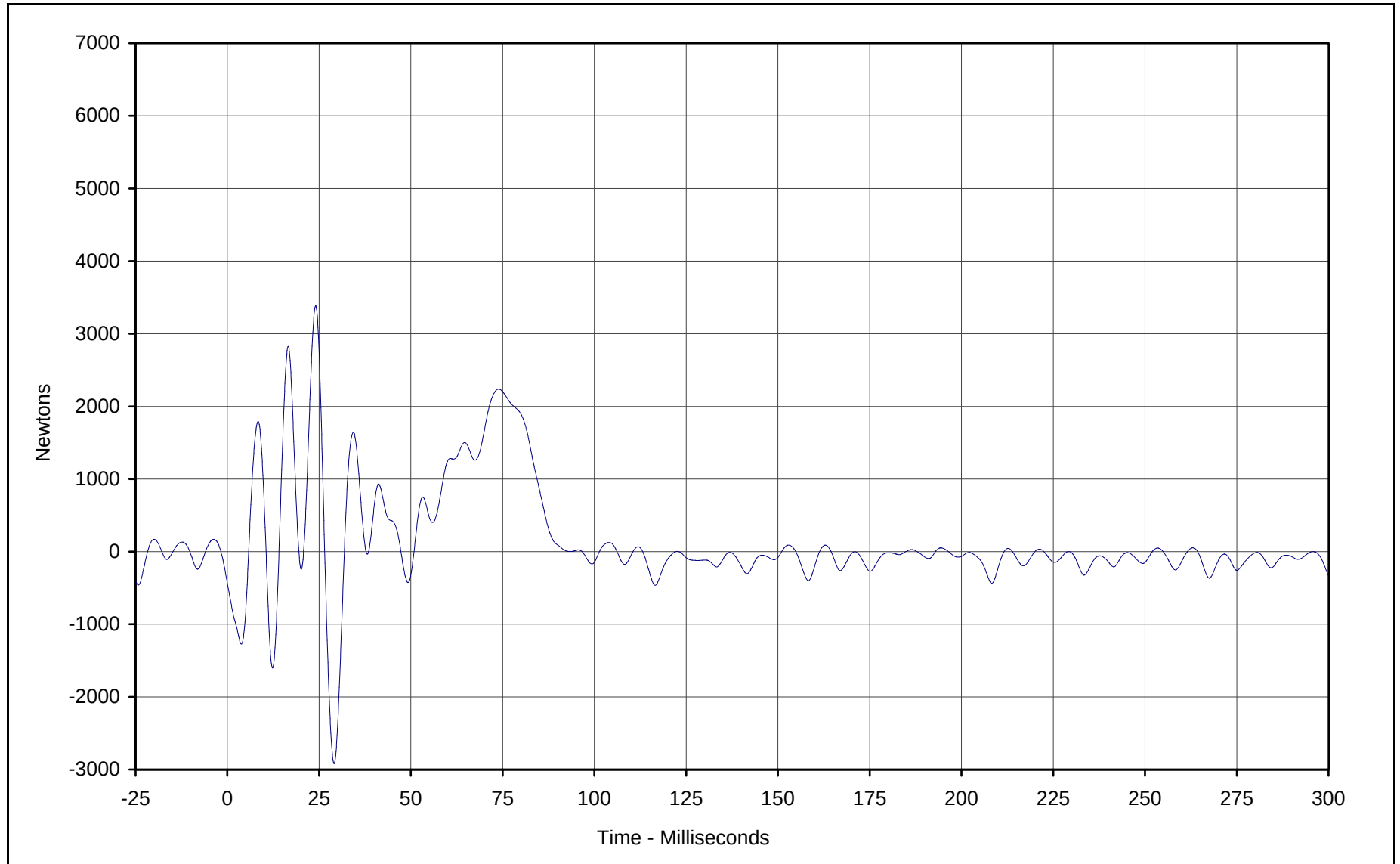
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



C-5



Curve Description: Barrier Force A6

Maximum Value: 3383.4 at 24.1 Milliseconds

Minimum Value: -2918.2 at 29.1 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

Curve Number: FIL-103

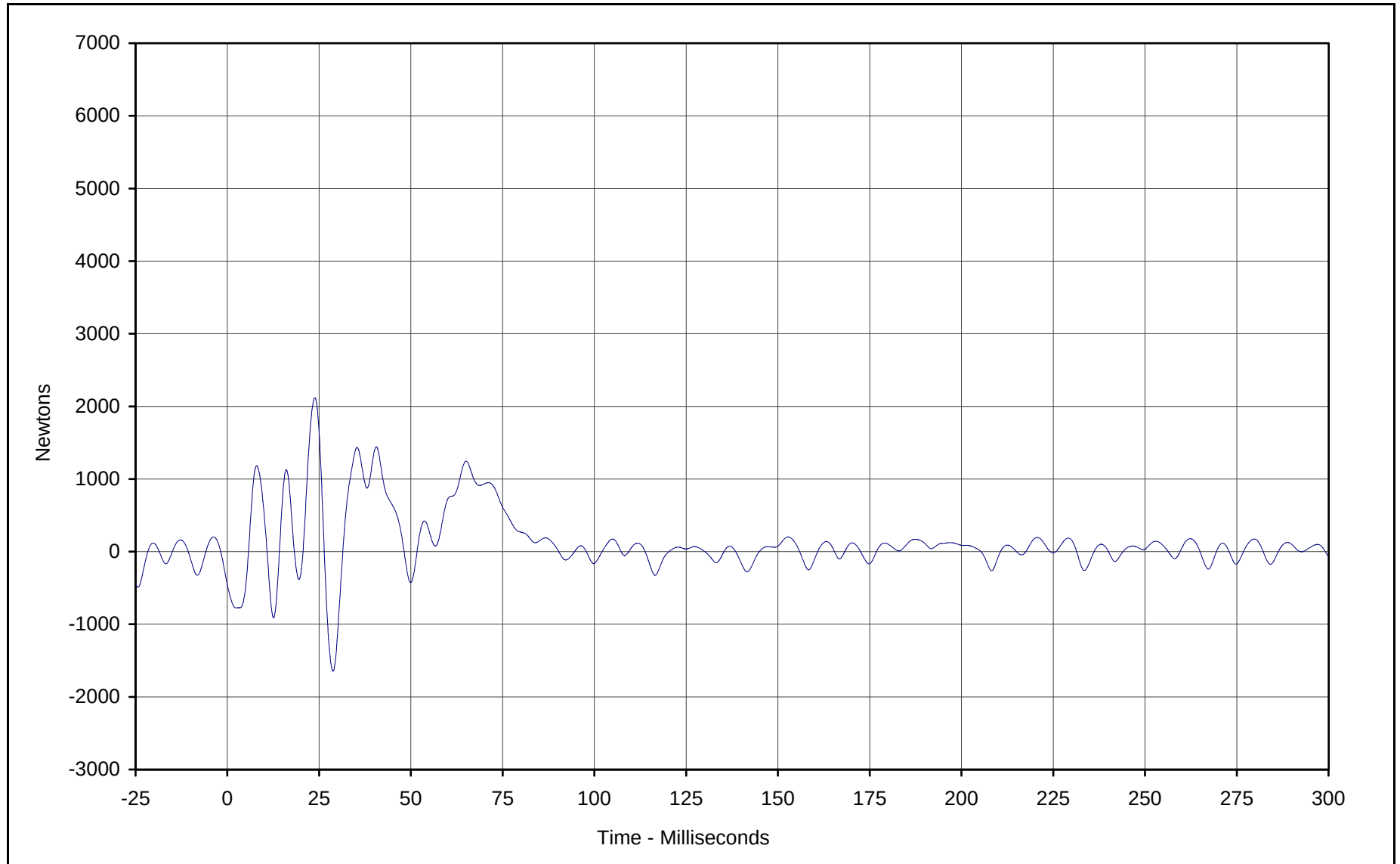
Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-6



Curve Description: Barrier Force A7

Maximum Value: 2118.5 at 23.8 Milliseconds

Minimum Value: -1644.5 at 28.8 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

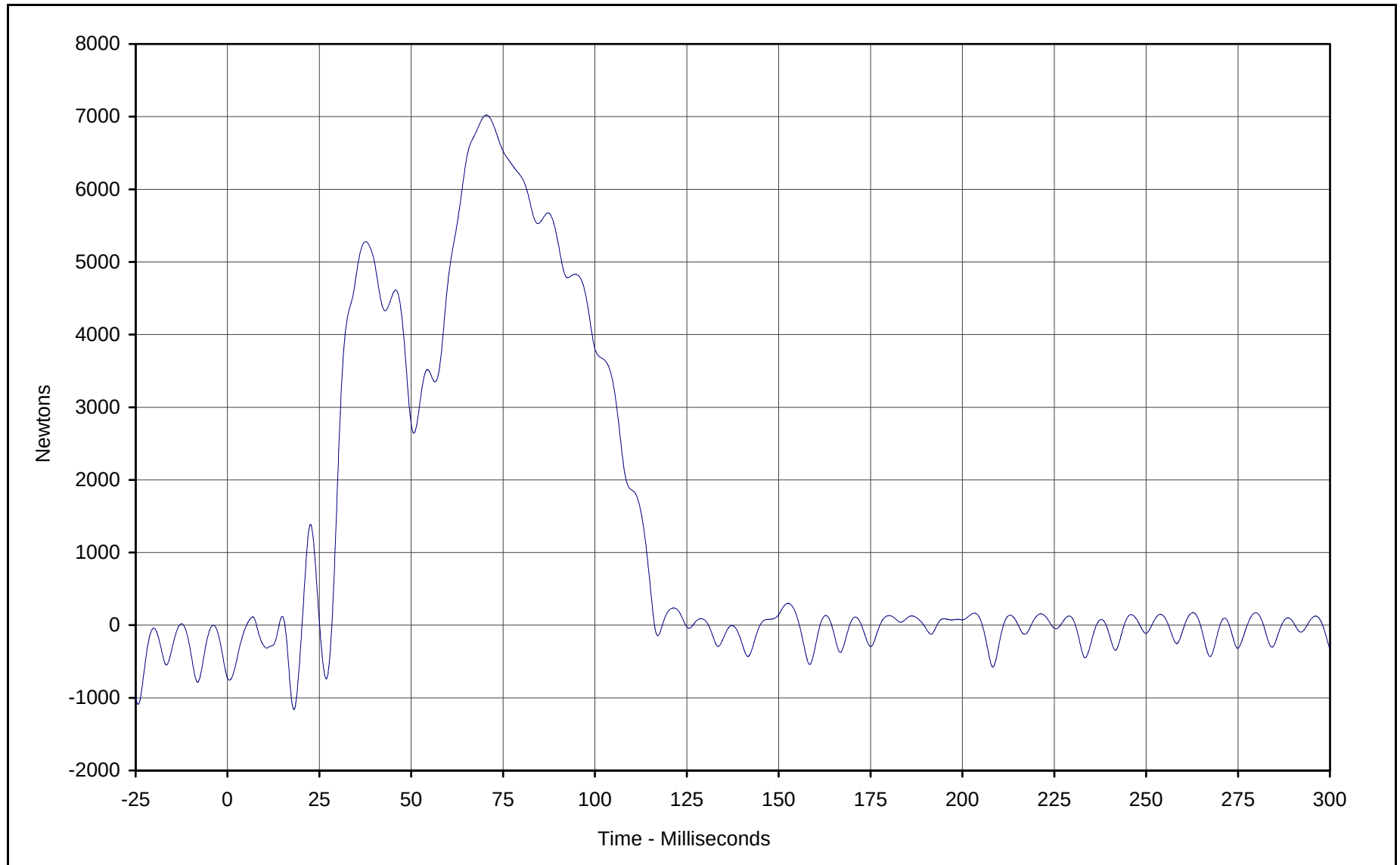
Curve Number: FIL-104

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

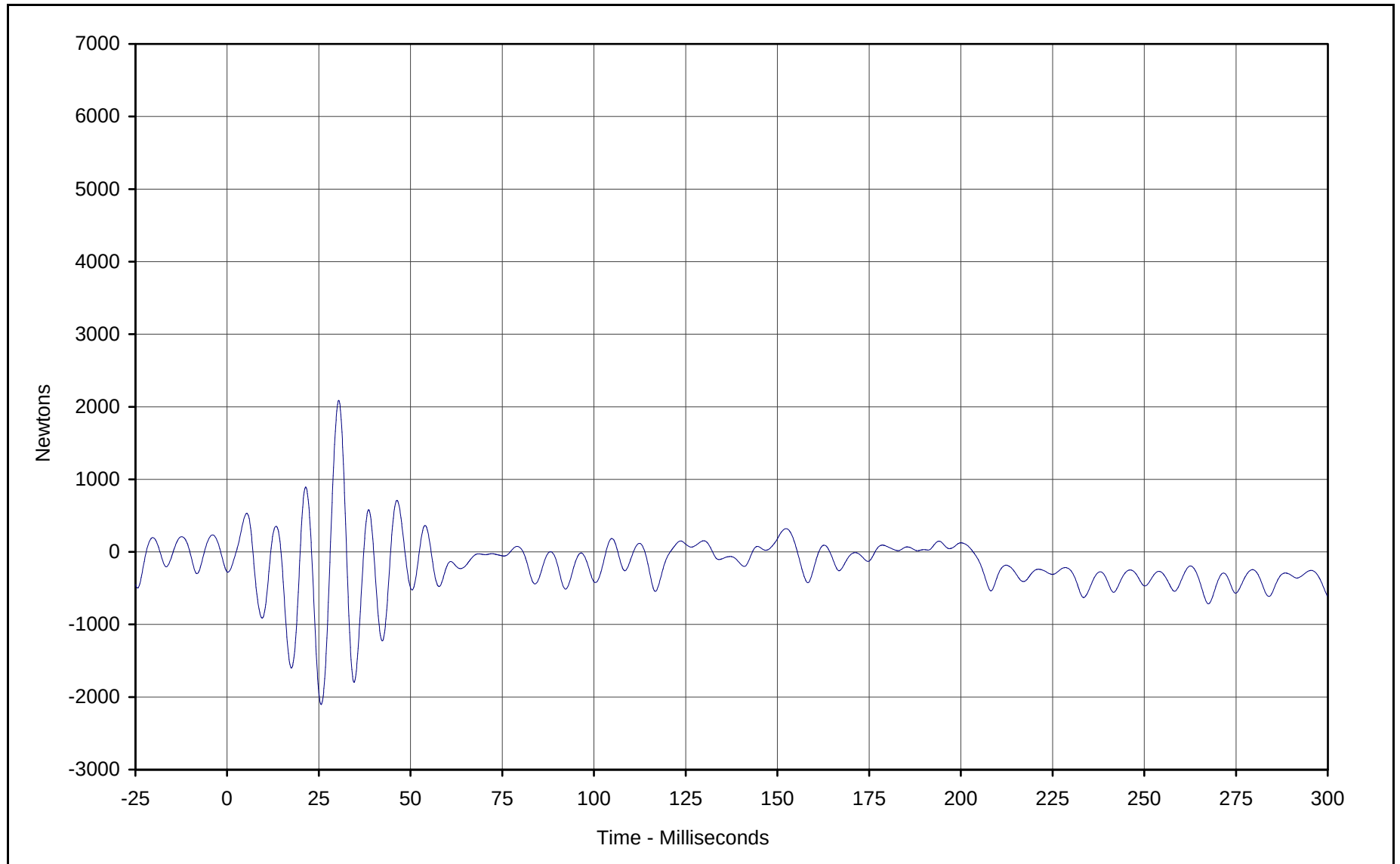


Curve Description: Barrier Force A8  
Maximum Value: 7022.4 at 70.5 Milliseconds  
Minimum Value: -1160.5 at 18.1 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-105

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



C-8

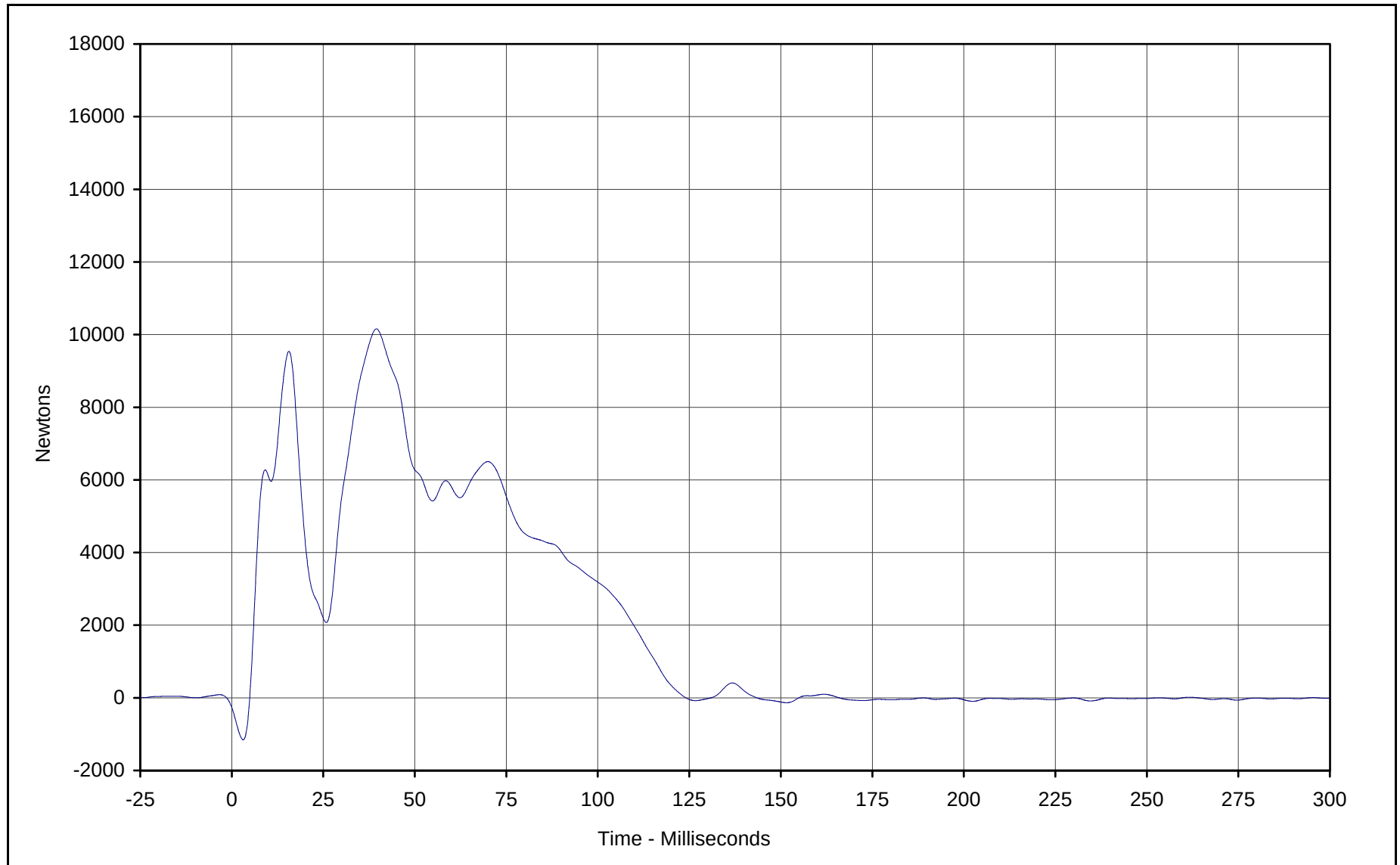


Curve Description: Barrier Force A9  
Maximum Value: 2088.0 at 30.4 Milliseconds  
Minimum Value: -2102.6 at 25.6 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-106

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

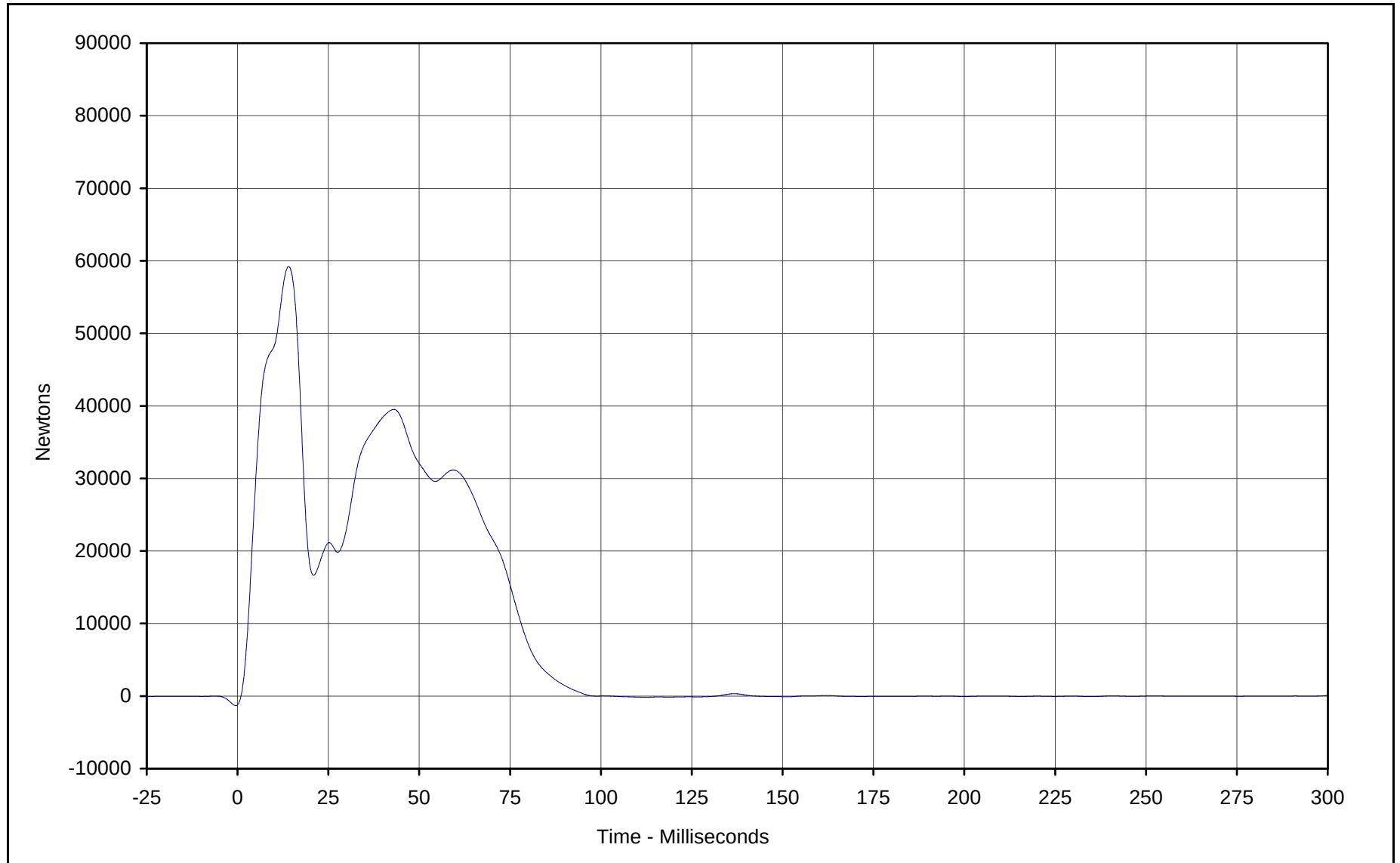


Curve Description: Barrier Force B2  
Maximum Value: 10159.3 at 39.5 Milliseconds  
Minimum Value: -1156.5 at 3.1 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-108

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



C-10



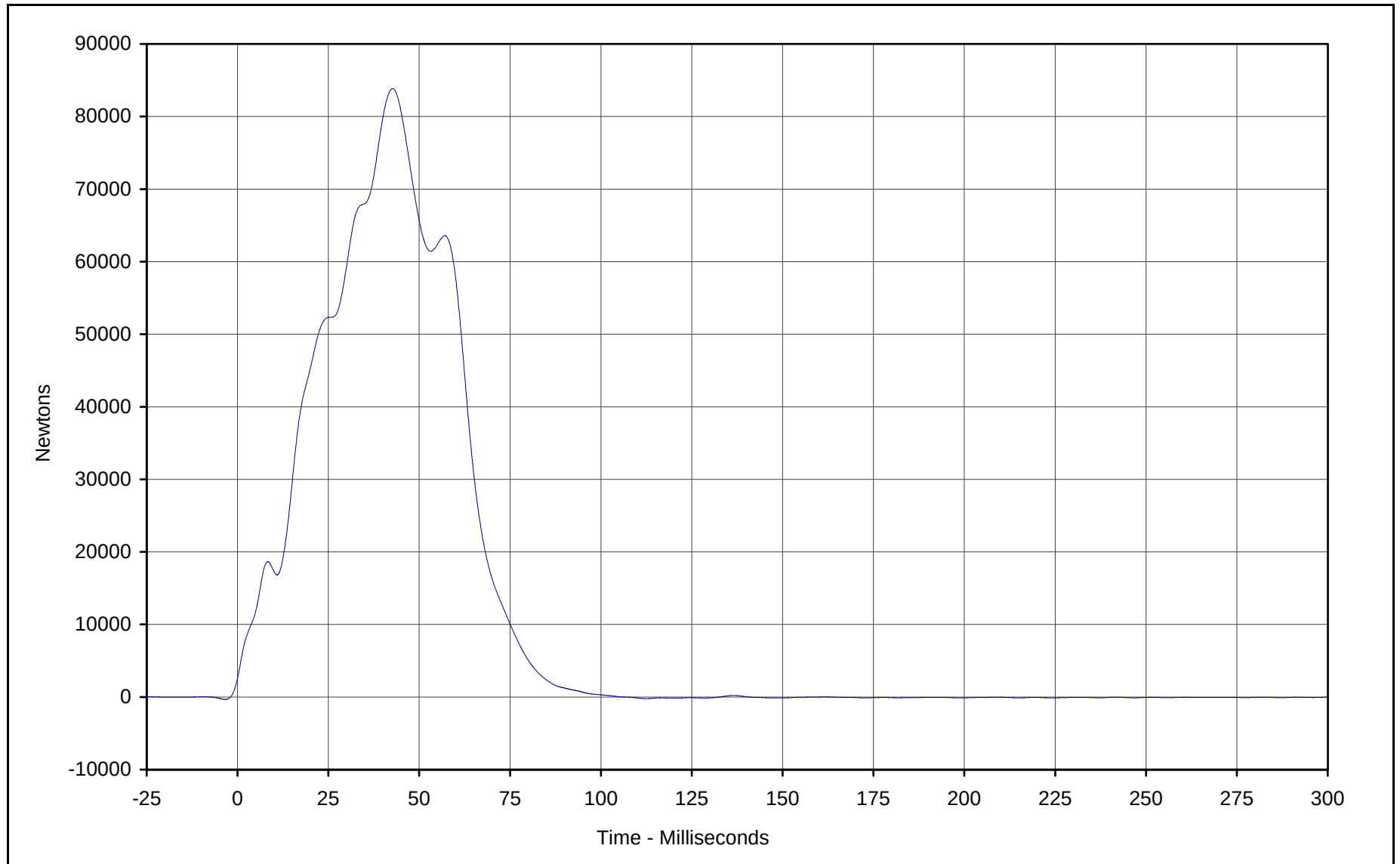
Curve Description: Barrier Force B3  
Maximum Value: 59205.6 at 14.1 Milliseconds  
Minimum Value: -1212.9 at 0.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-109

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-11



Curve Description: Barrier Force B4  
Maximum Value: 83844.8 at 42.7 Milliseconds  
Minimum Value: -222.8 at 112.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-110

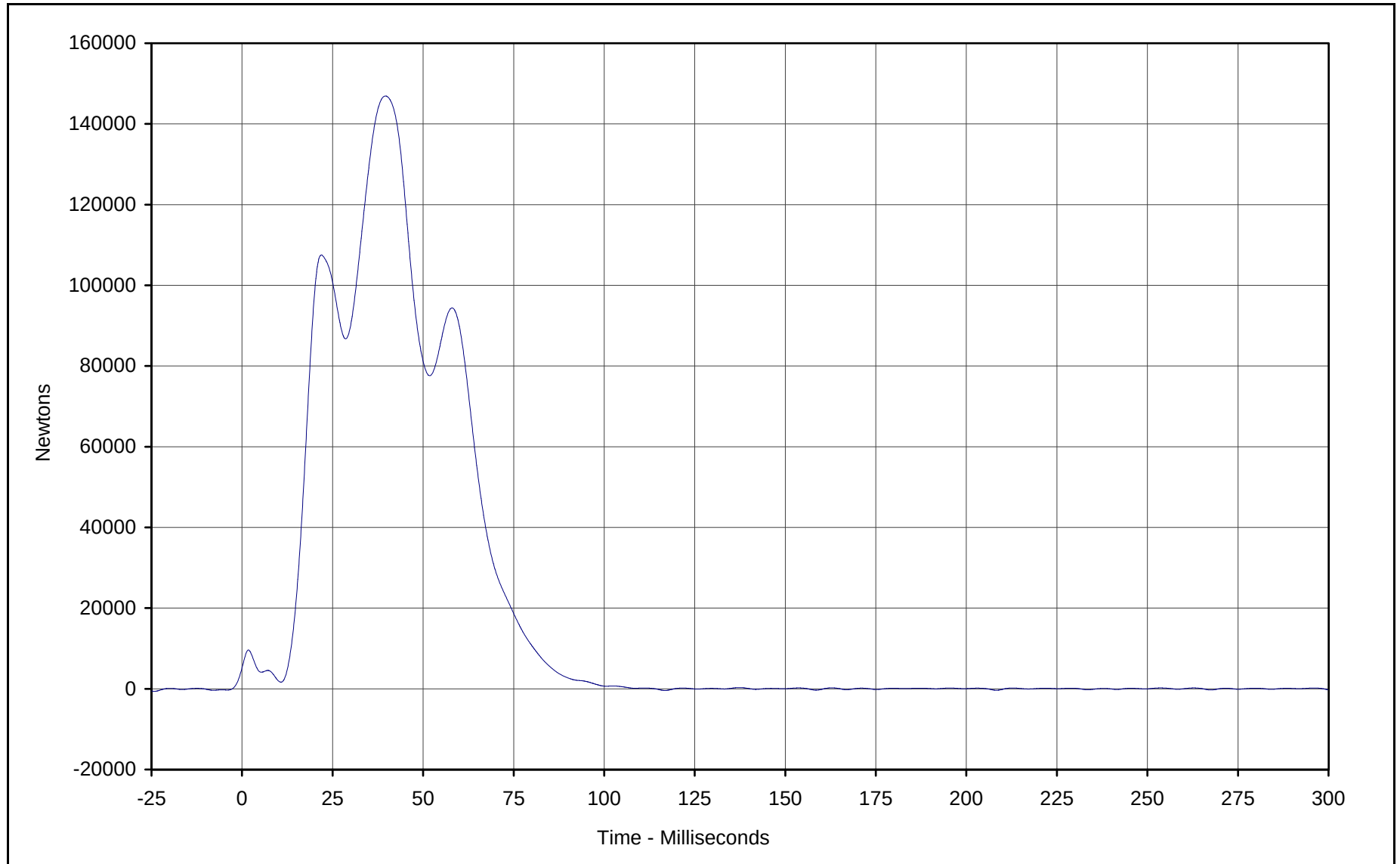
Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



C-12



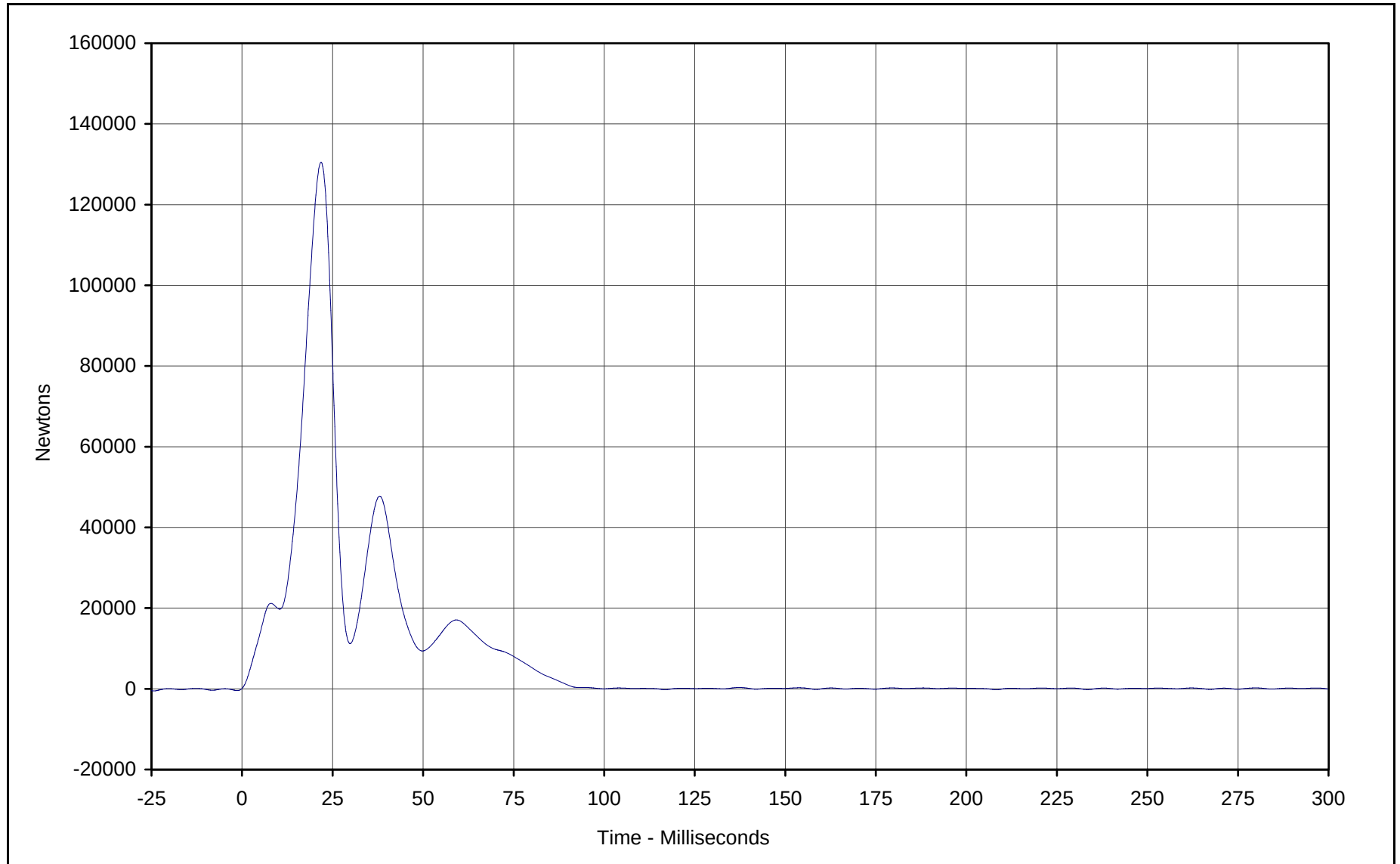
Curve Description: Barrier Force B5  
Maximum Value: 146932.5 at 39.6 Milliseconds  
Minimum Value: -428.2 at 116.7 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-111

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-13



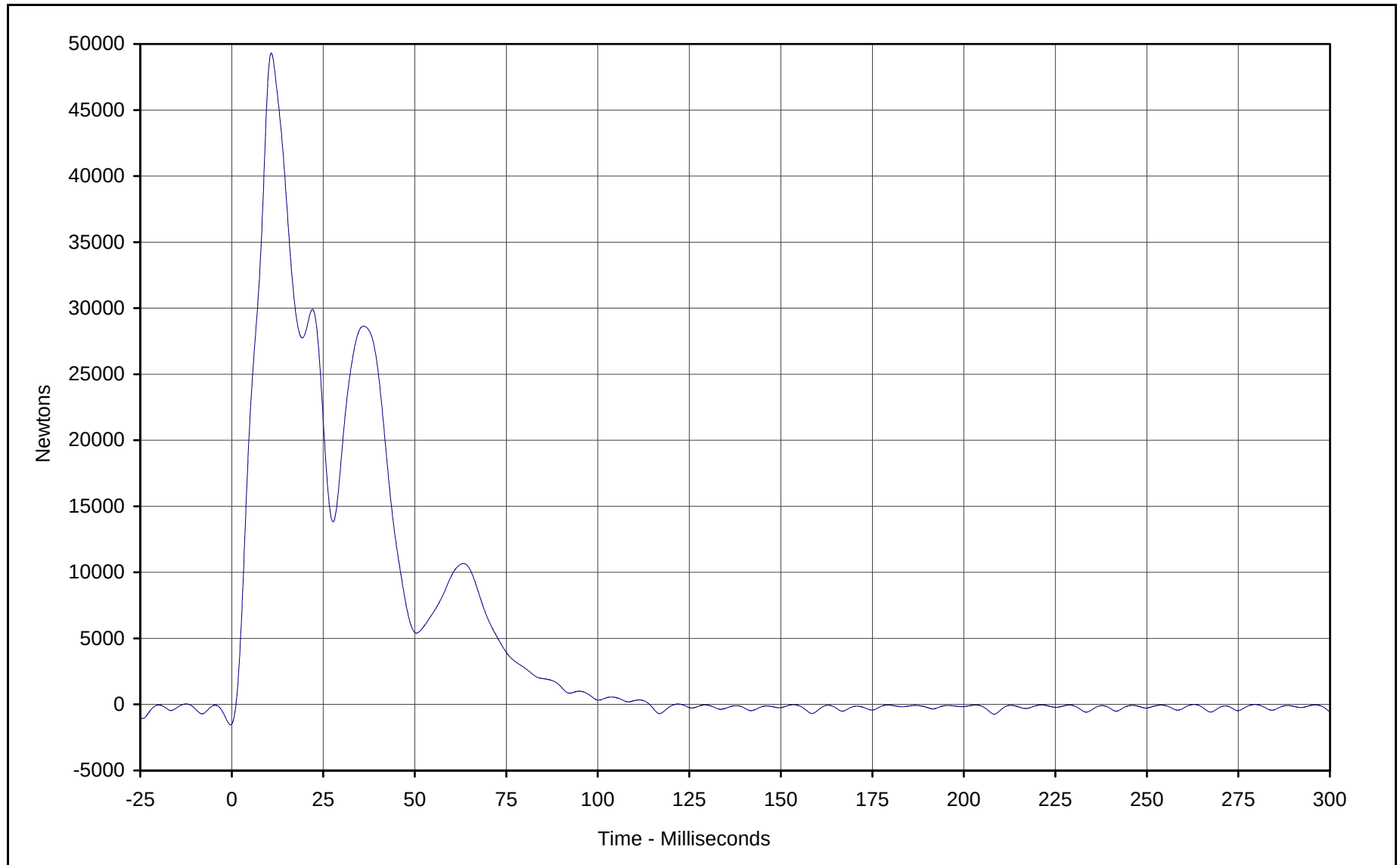
Curve Description: Barrier Force B6  
Maximum Value: 130505.9 at 21.8 Milliseconds  
Minimum Value: -231.1 at 208.2 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-112

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-14



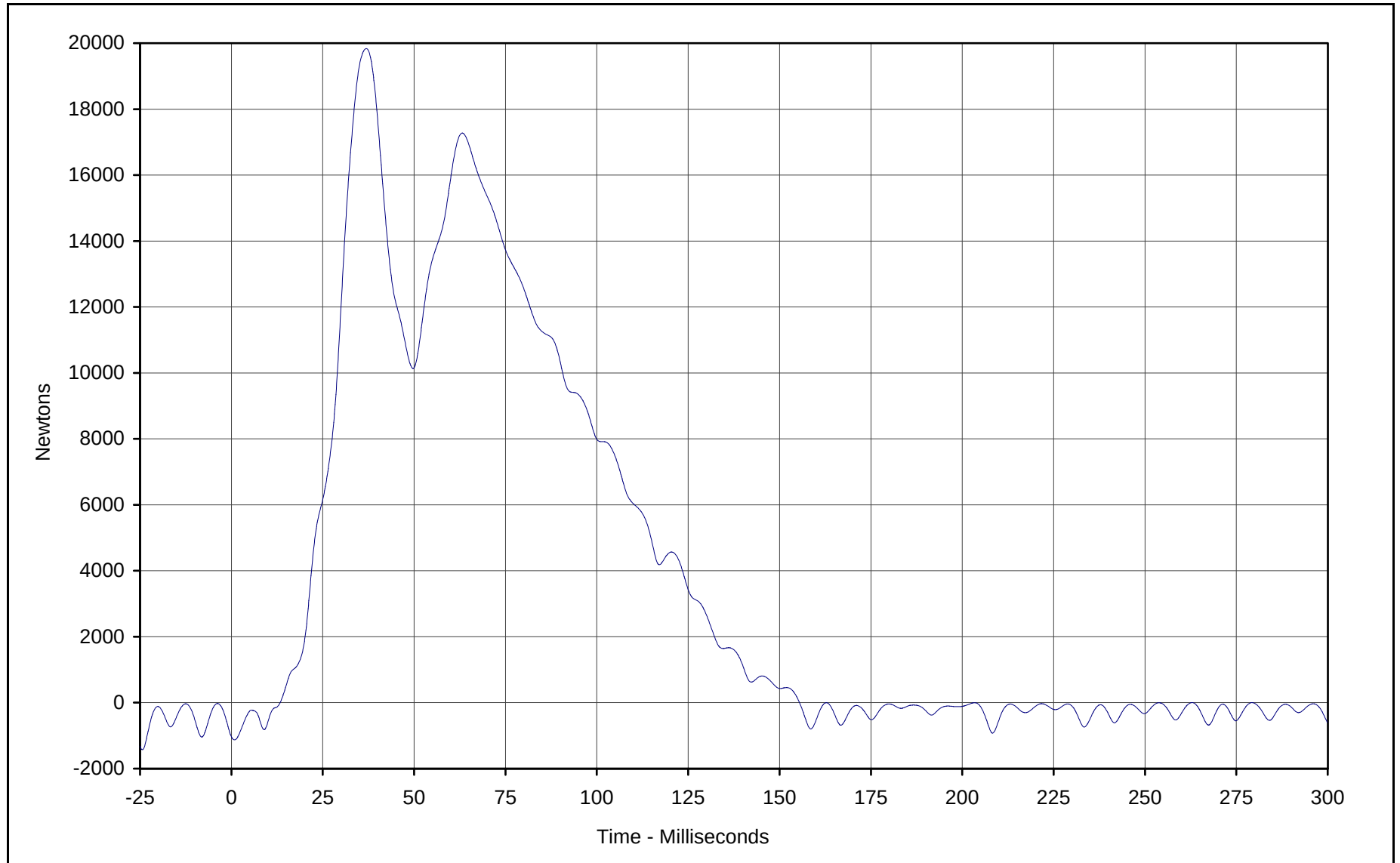
Curve Description: Barrier Force B7  
Maximum Value: 49319.4 at 10.8 Milliseconds  
Minimum Value: -1486.4 at 0.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-113

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-15



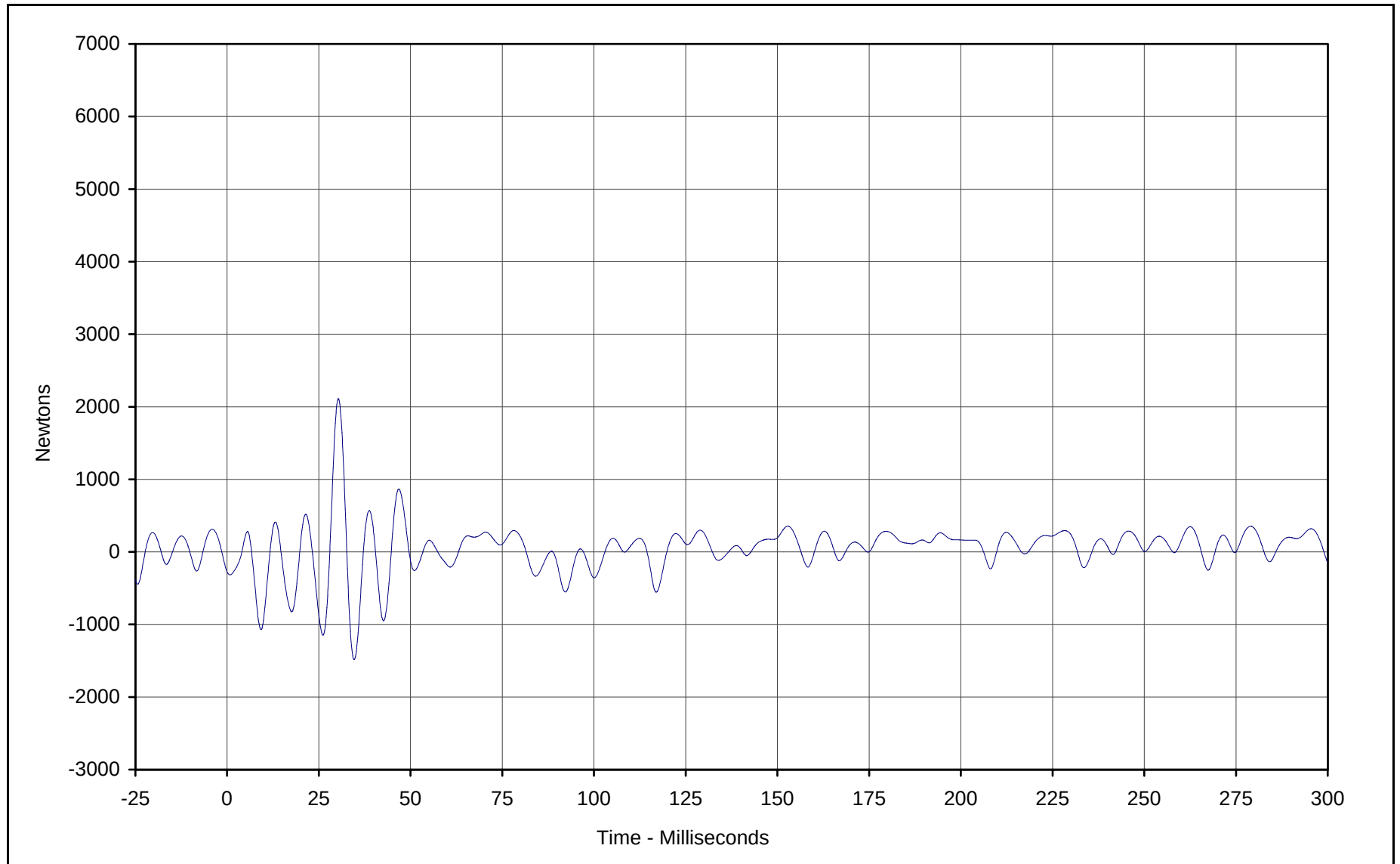
Curve Description: Barrier Force B8  
Maximum Value: 19834.5 at 36.9 Milliseconds  
Minimum Value: -1128.9 at 0.9 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-114

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-16



Curve Description: Barrier Force B9

Maximum Value: 2113.1 at 30.3 Milliseconds

Minimum Value: -1485.2 at 34.6 Milliseconds

SAE Filter Class: 60

Date of Test: 01/09/01

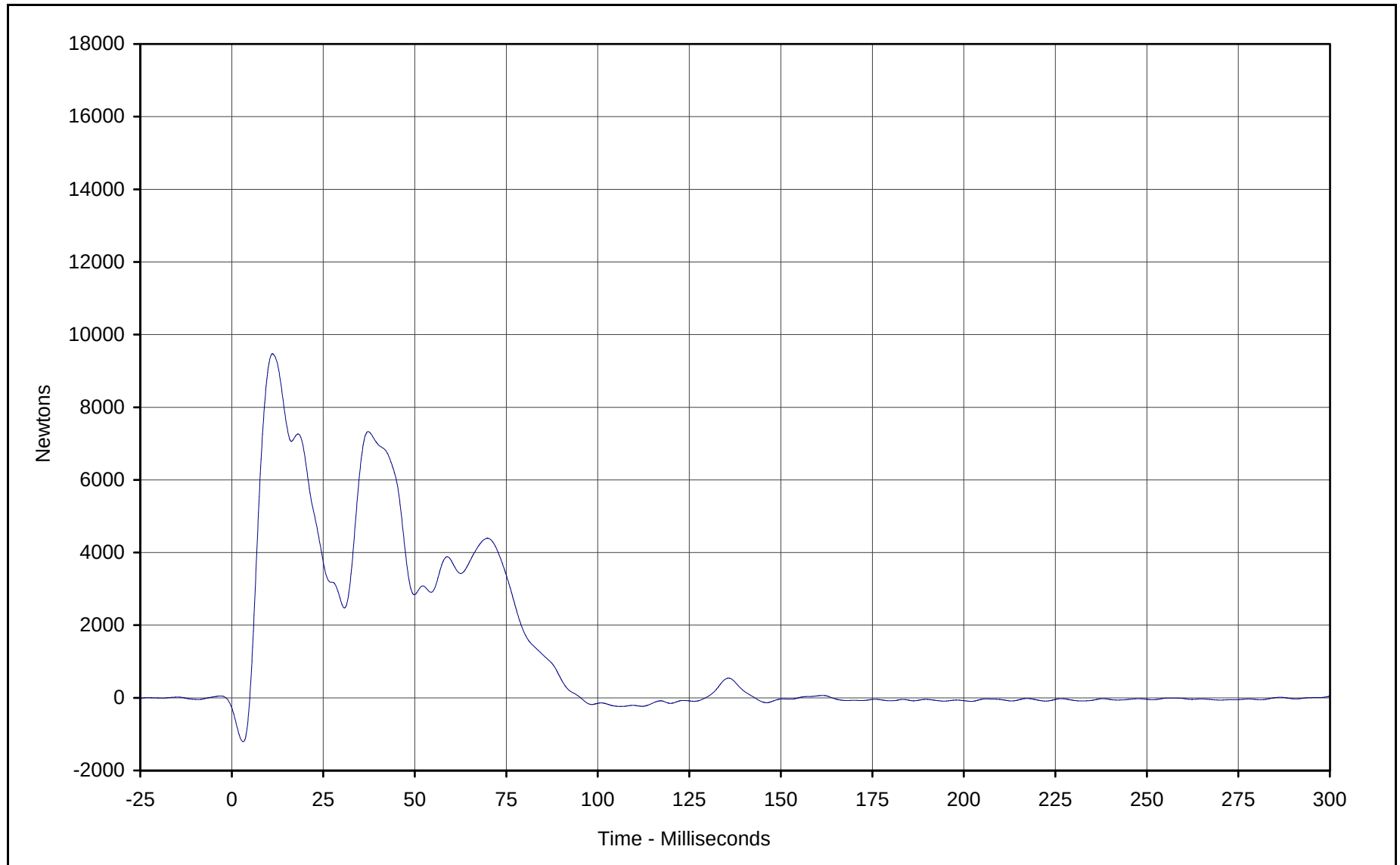
Curve Number: FIL-115

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

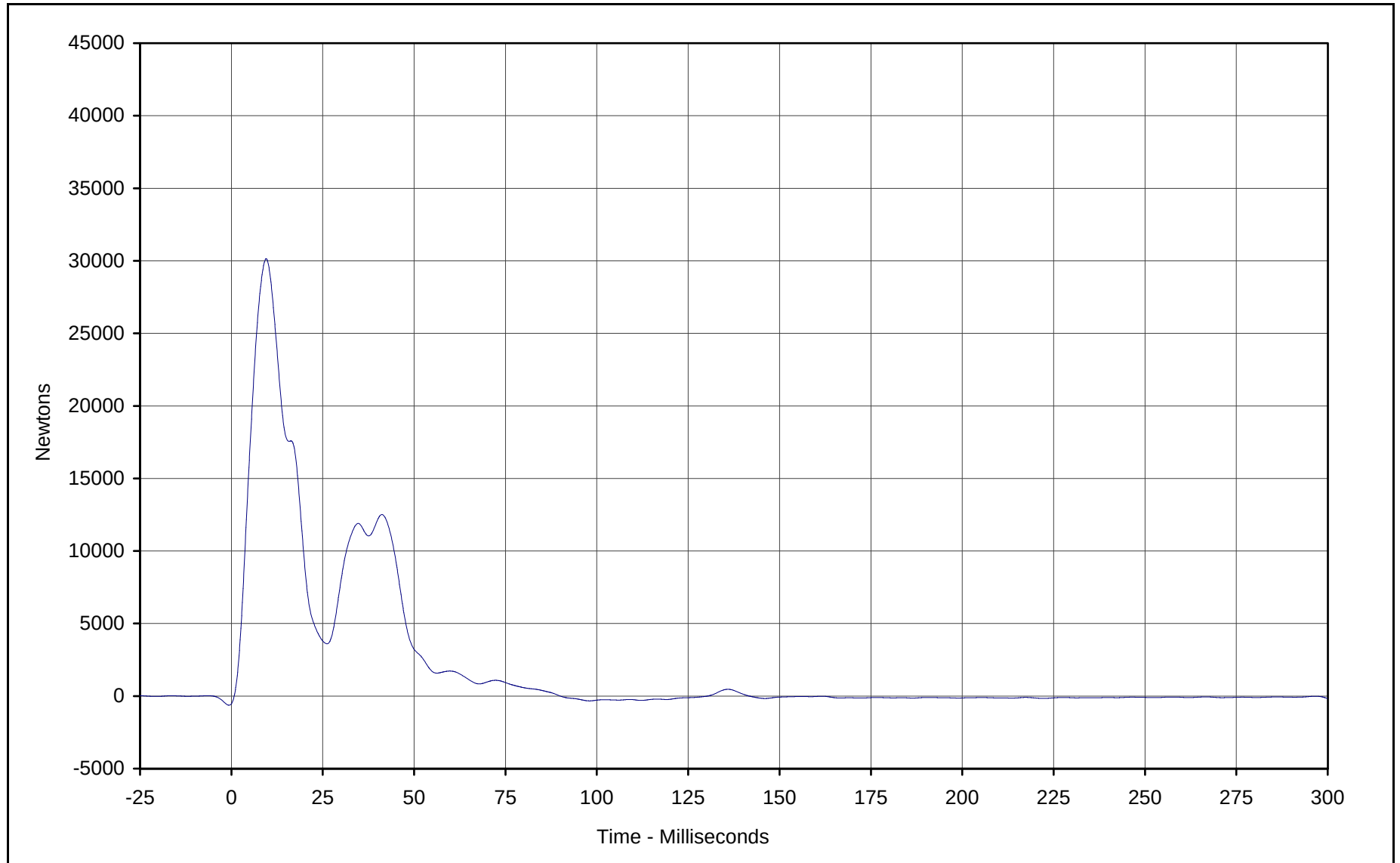


Curve Description: Barrier Force C2  
Maximum Value: 9472.2 at 11.1 Milliseconds  
Minimum Value: -1205.8 at 3.1 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-117

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



C-18



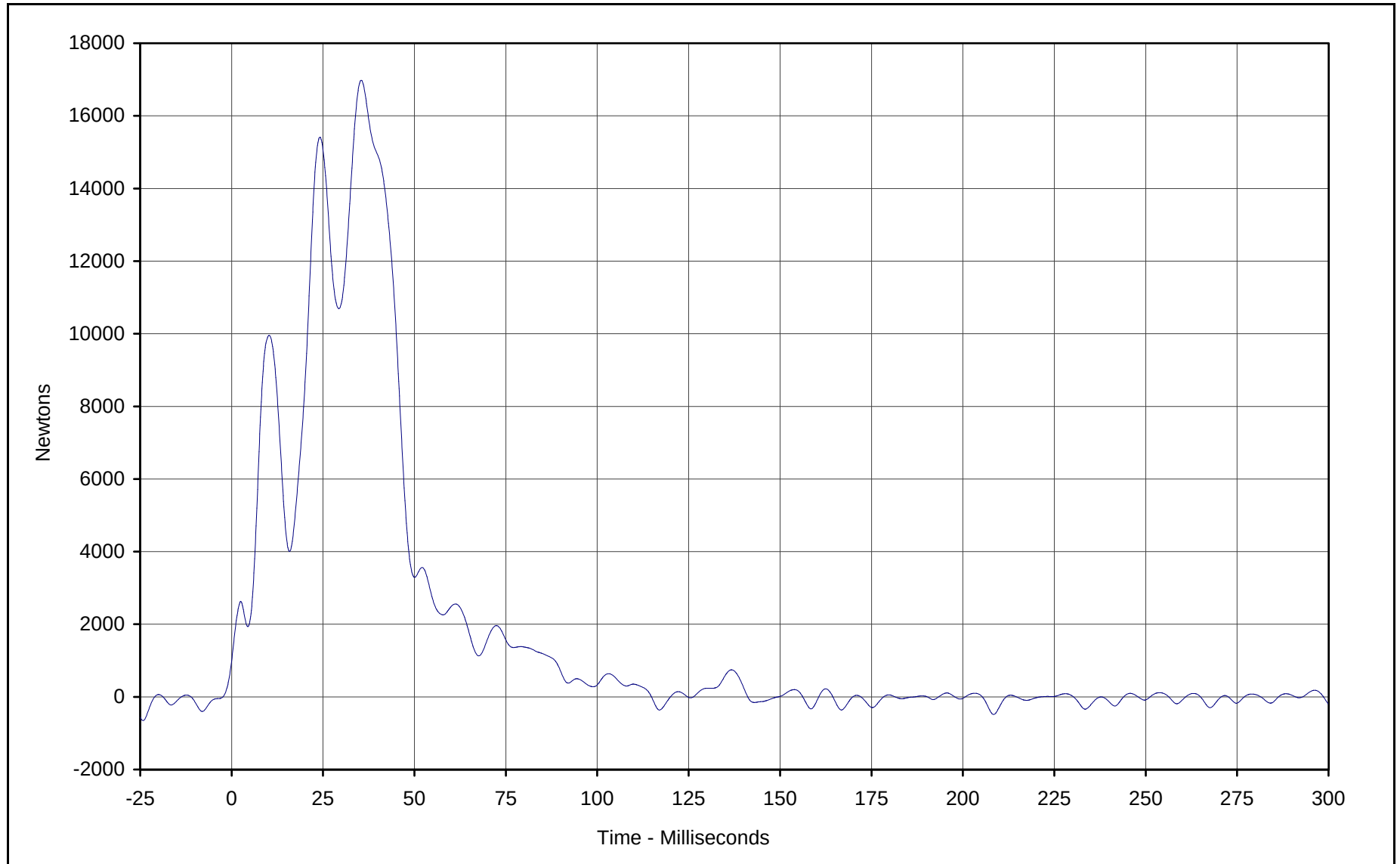
Curve Description: Barrier Force C3  
Maximum Value: 30142.0 at 9.5 Milliseconds  
Minimum Value: -531.6 at 0.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-118

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02





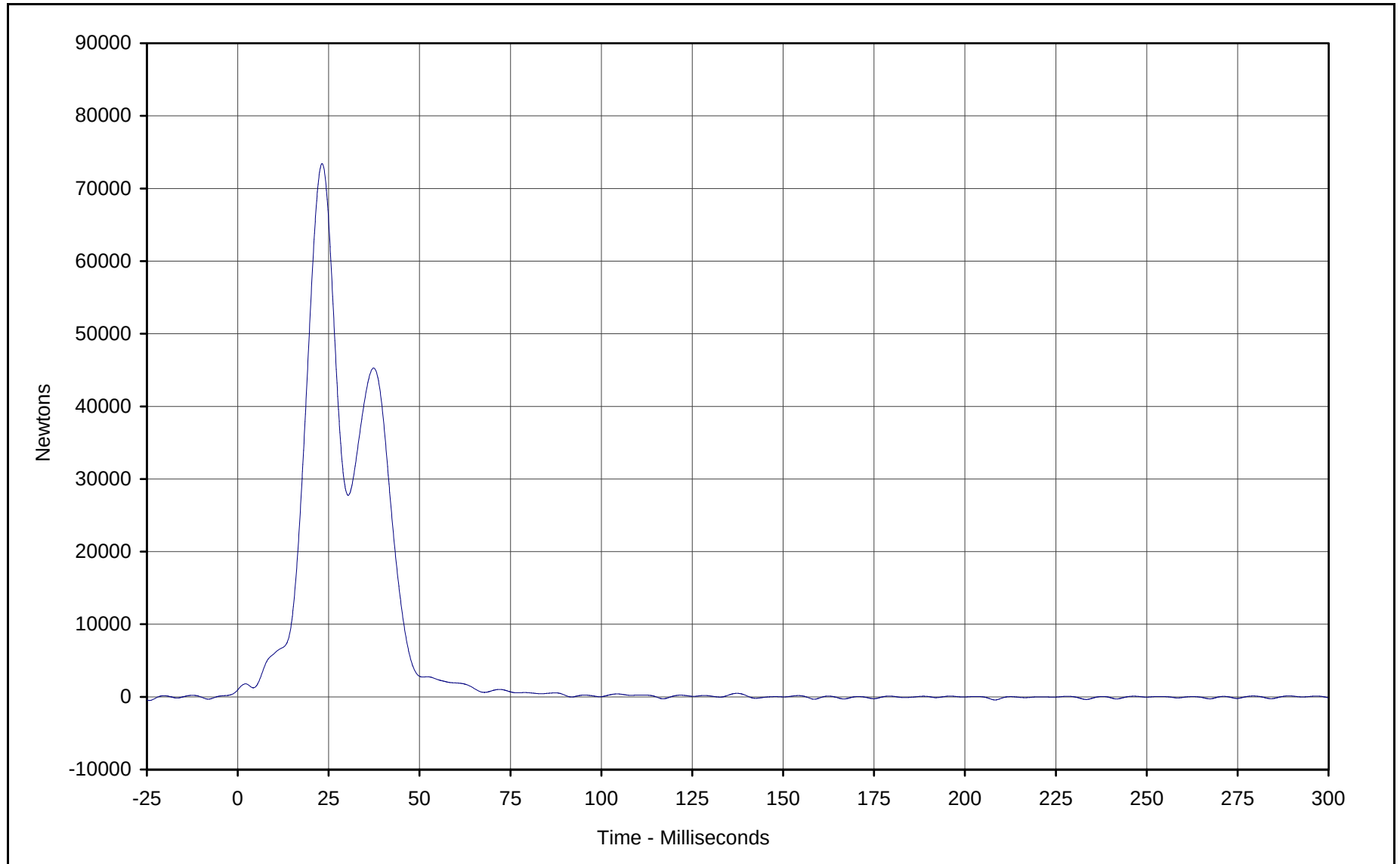
Curve Description: Barrier Force C4  
Maximum Value: 16981.3 at 35.4 Milliseconds  
Minimum Value: -486.1 at 208.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-119

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



C-20



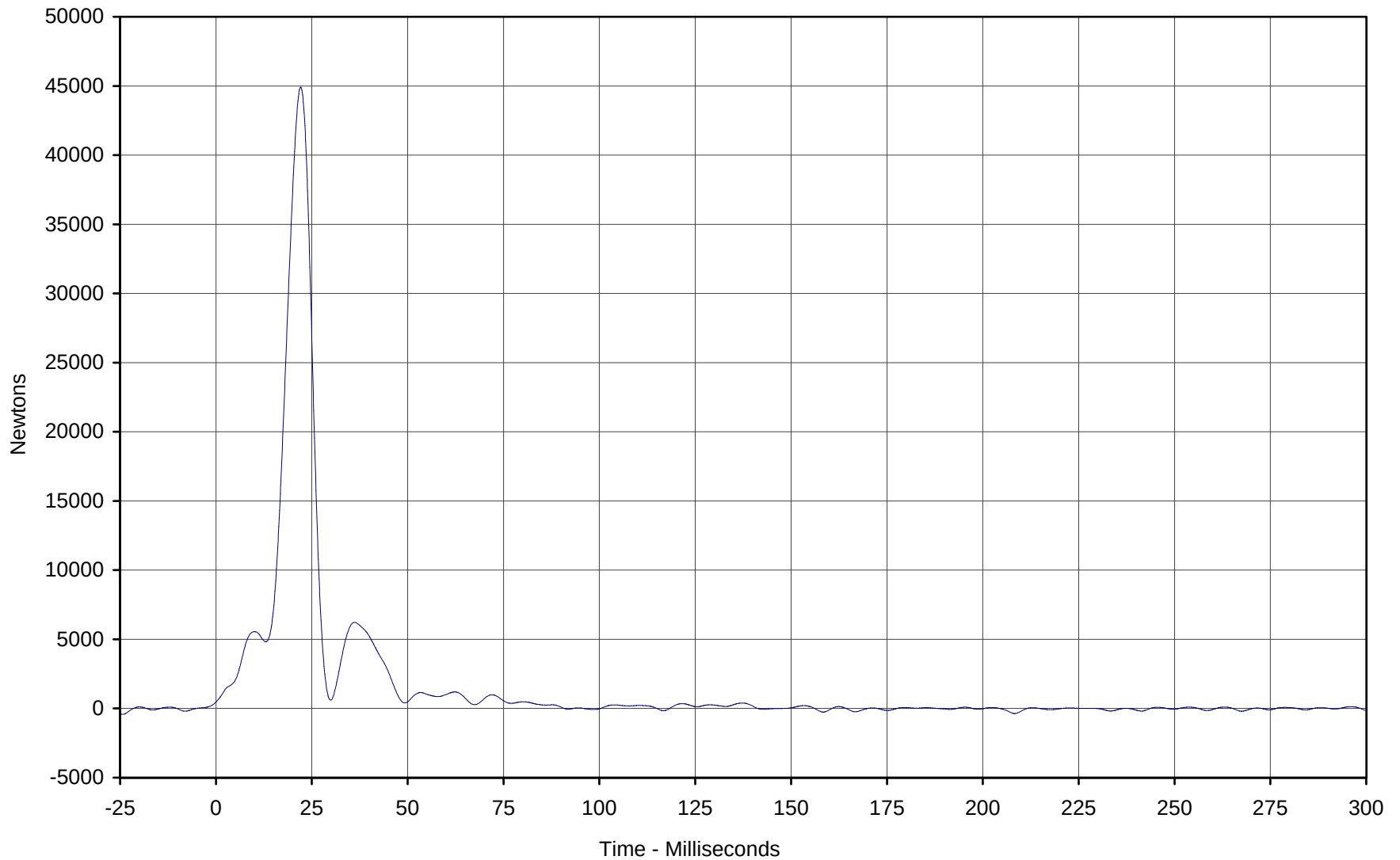
Curve Description: Barrier Force C5  
Maximum Value: 73418.5 at 23.2 Milliseconds  
Minimum Value: -425.3 at 208.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-120

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-21



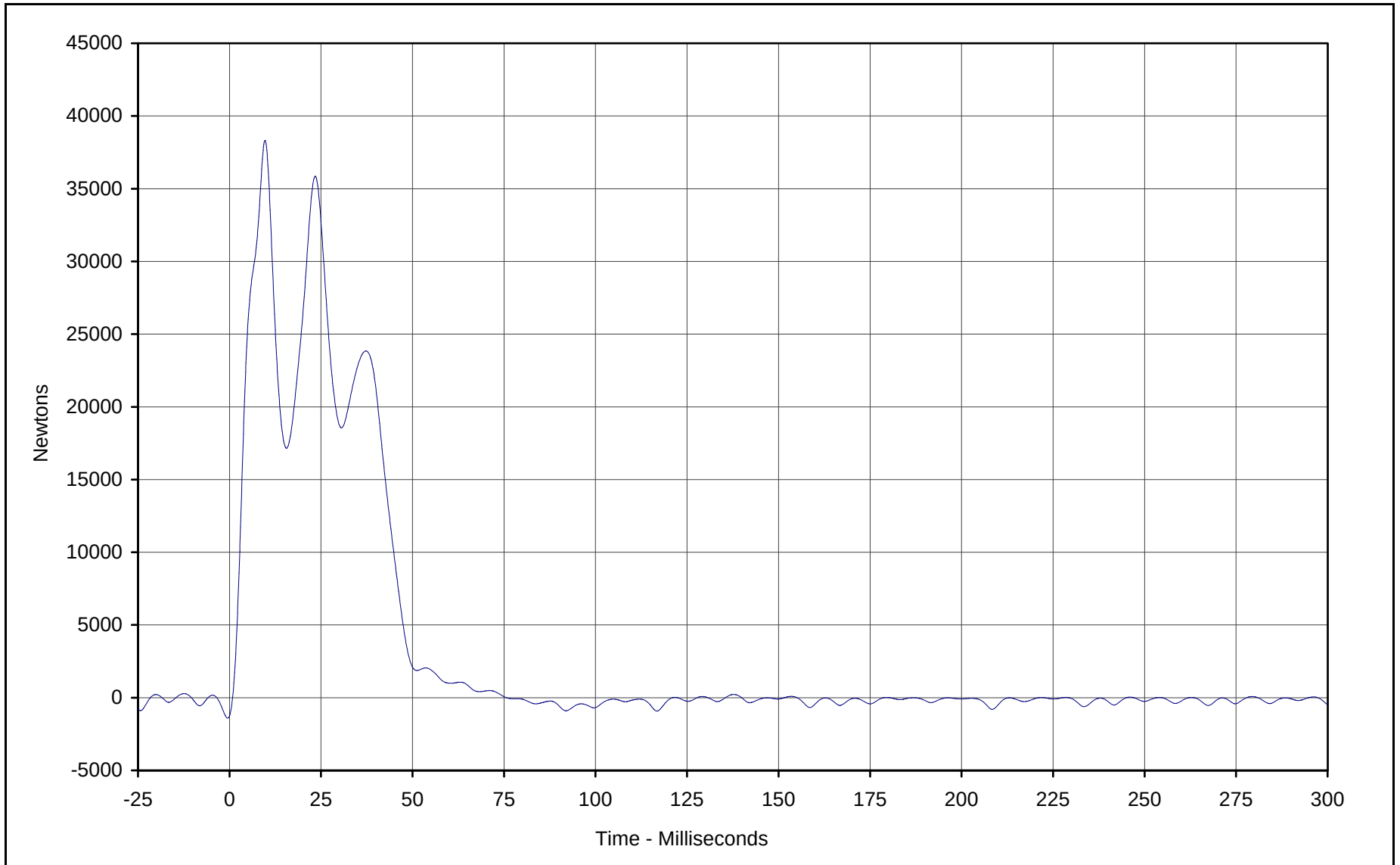
Curve Description: Barrier Force C6  
Maximum Value: 44914.5 at 22.1 Milliseconds  
Minimum Value: -367.8 at 208.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-121

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-22



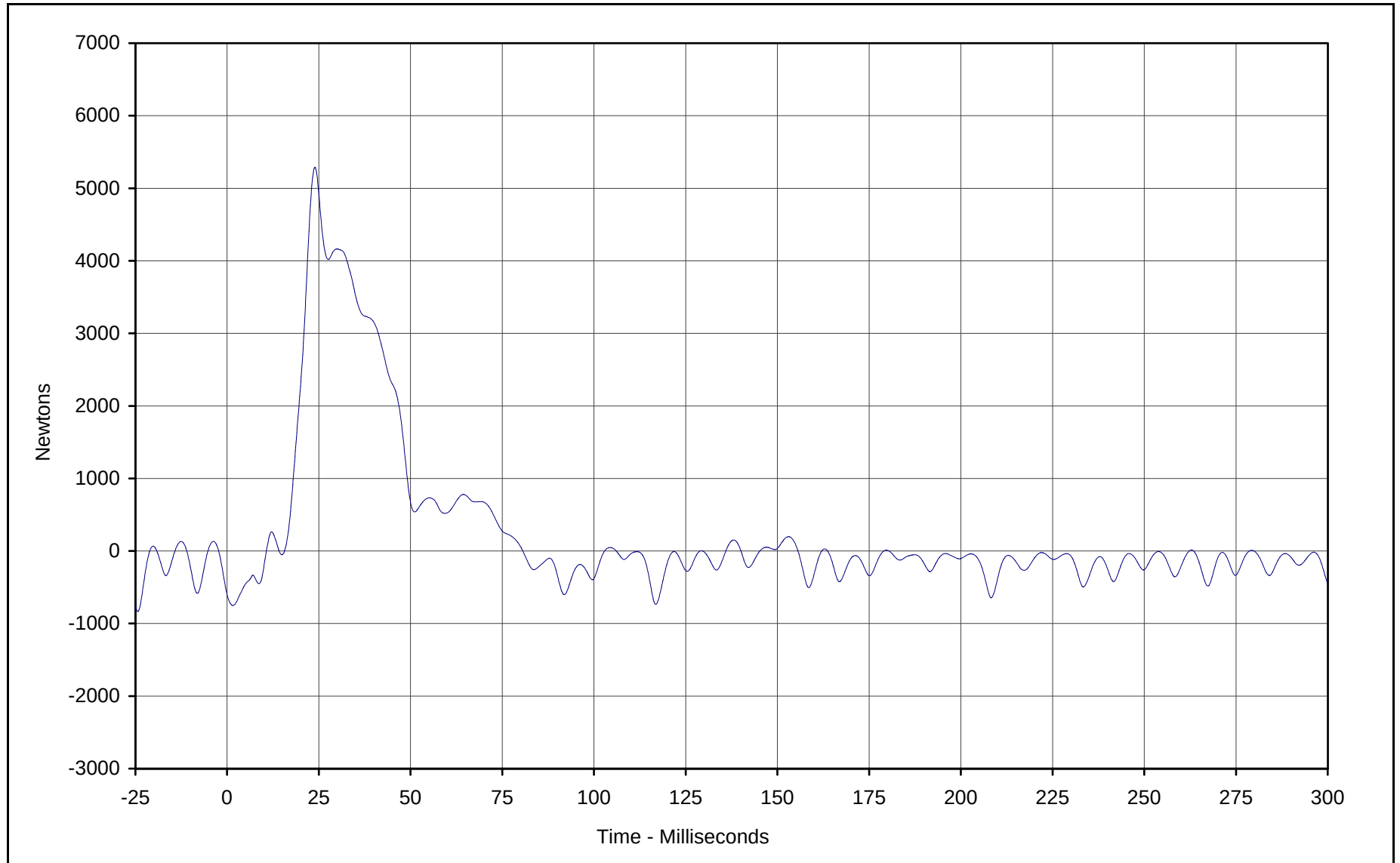
Curve Description: Barrier Force C7  
Maximum Value: 38330.9 at 9.7 Milliseconds  
Minimum Value: -1252.1 at 0.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-122

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-23



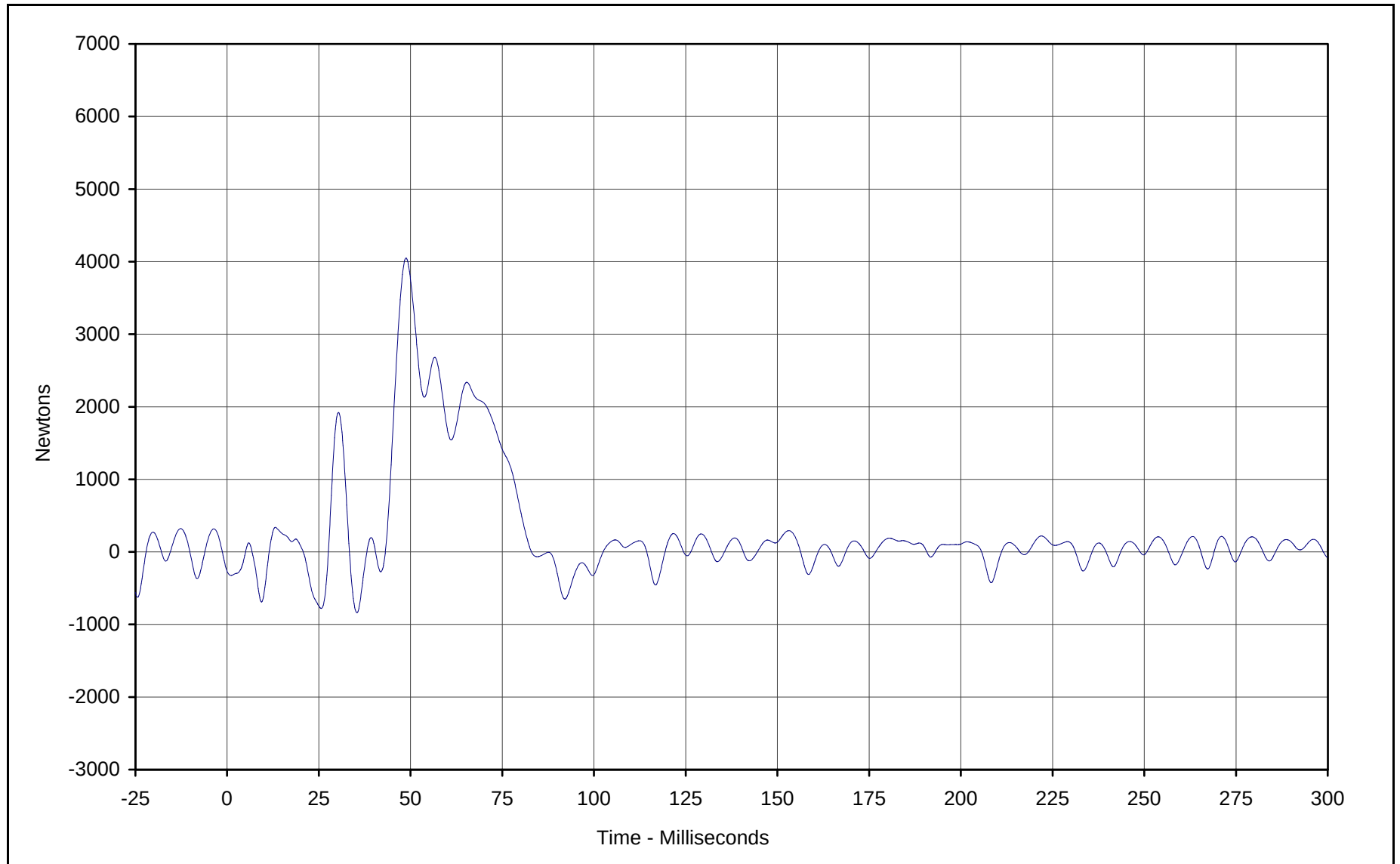
Curve Description: Barrier Force C8  
Maximum Value: 5289.5 at 23.9 Milliseconds  
Minimum Value: -751.4 at 1.5 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-123

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-24



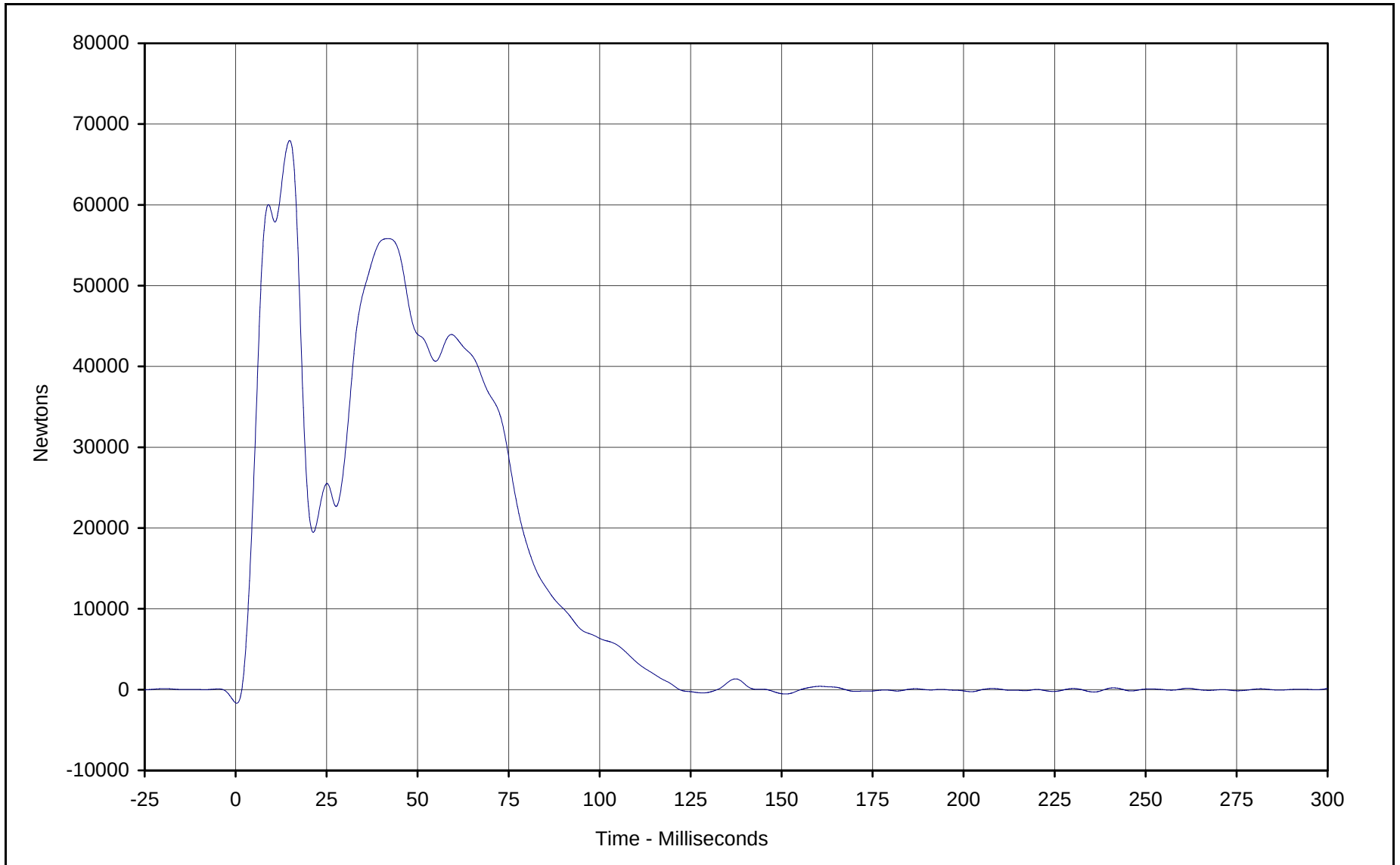
Curve Description: Barrier Force C9  
Maximum Value: 4050.2 at 48.8 Milliseconds  
Minimum Value: -839.2 at 35.4 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: FIL-124

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-25



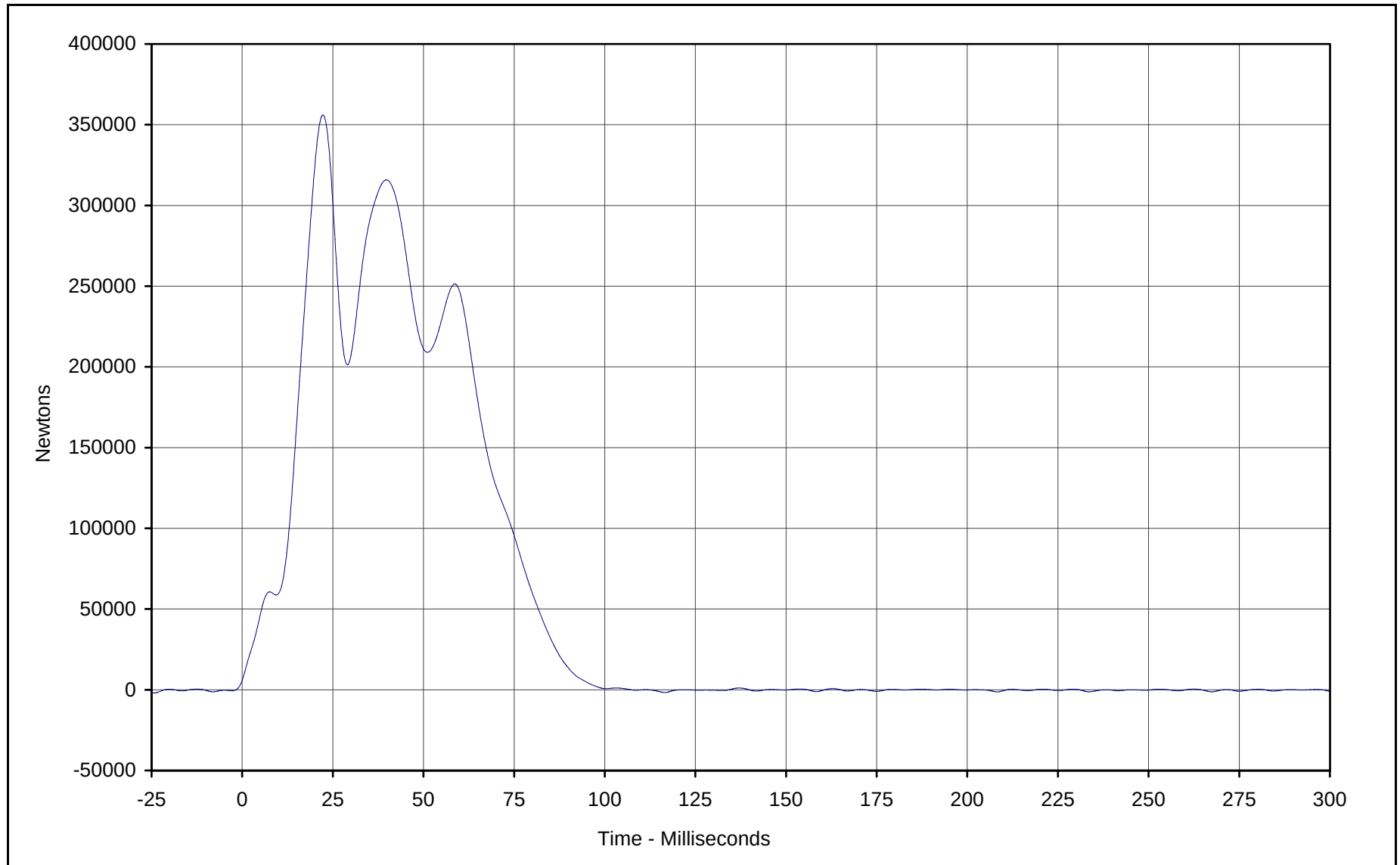
Curve Description: Barrier Force Sum Group 1  
Maximum Value: 67961.6 at 14.9 Milliseconds  
Minimum Value: -1691.1 at 0.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: SUM-001

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

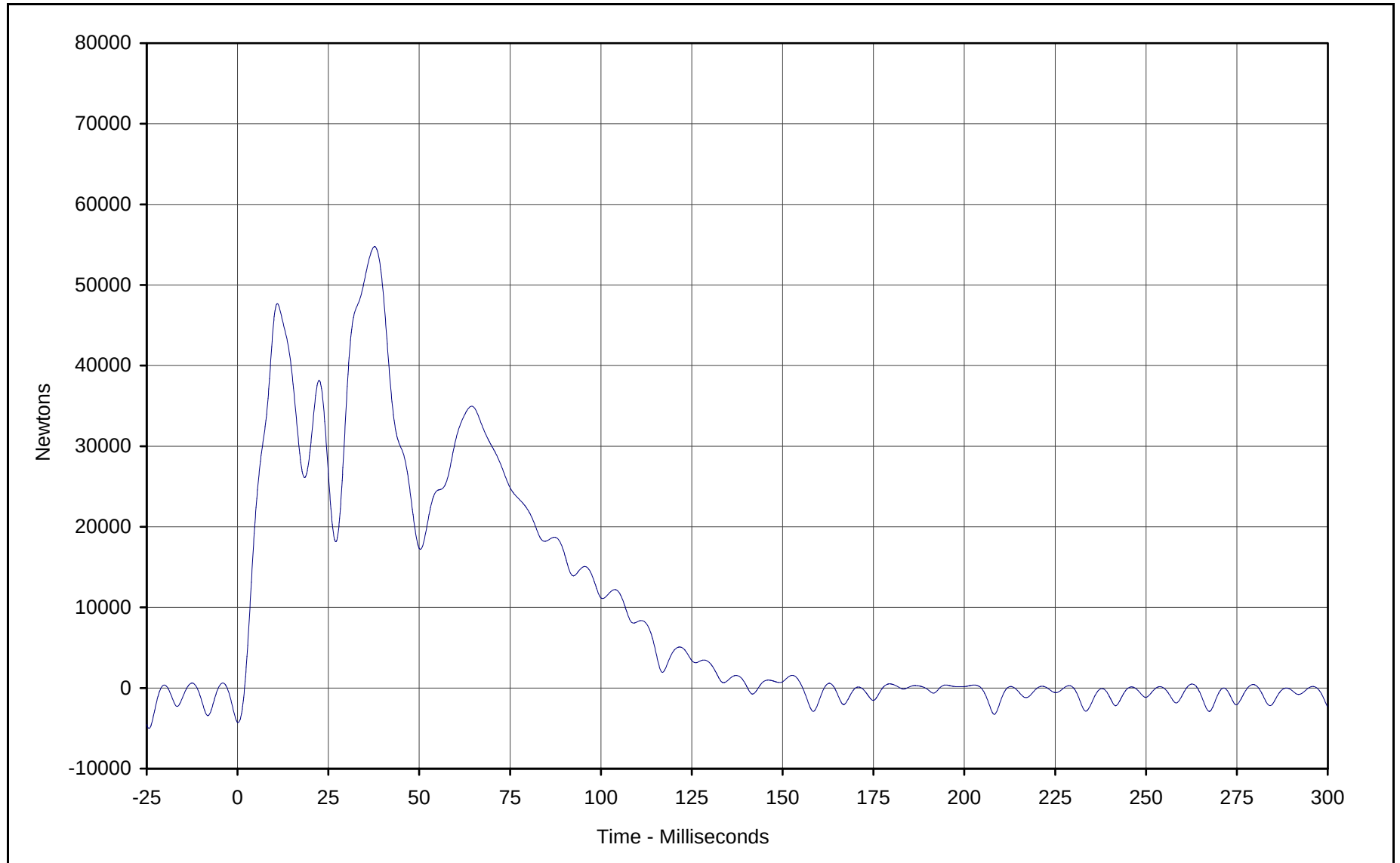




Curve Description: Barrier Force Sum Group 2  
Maximum Value: 356084.6 at 22.3 Milliseconds  
Minimum Value: -1691.3 at 116.6 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: SUM-002

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

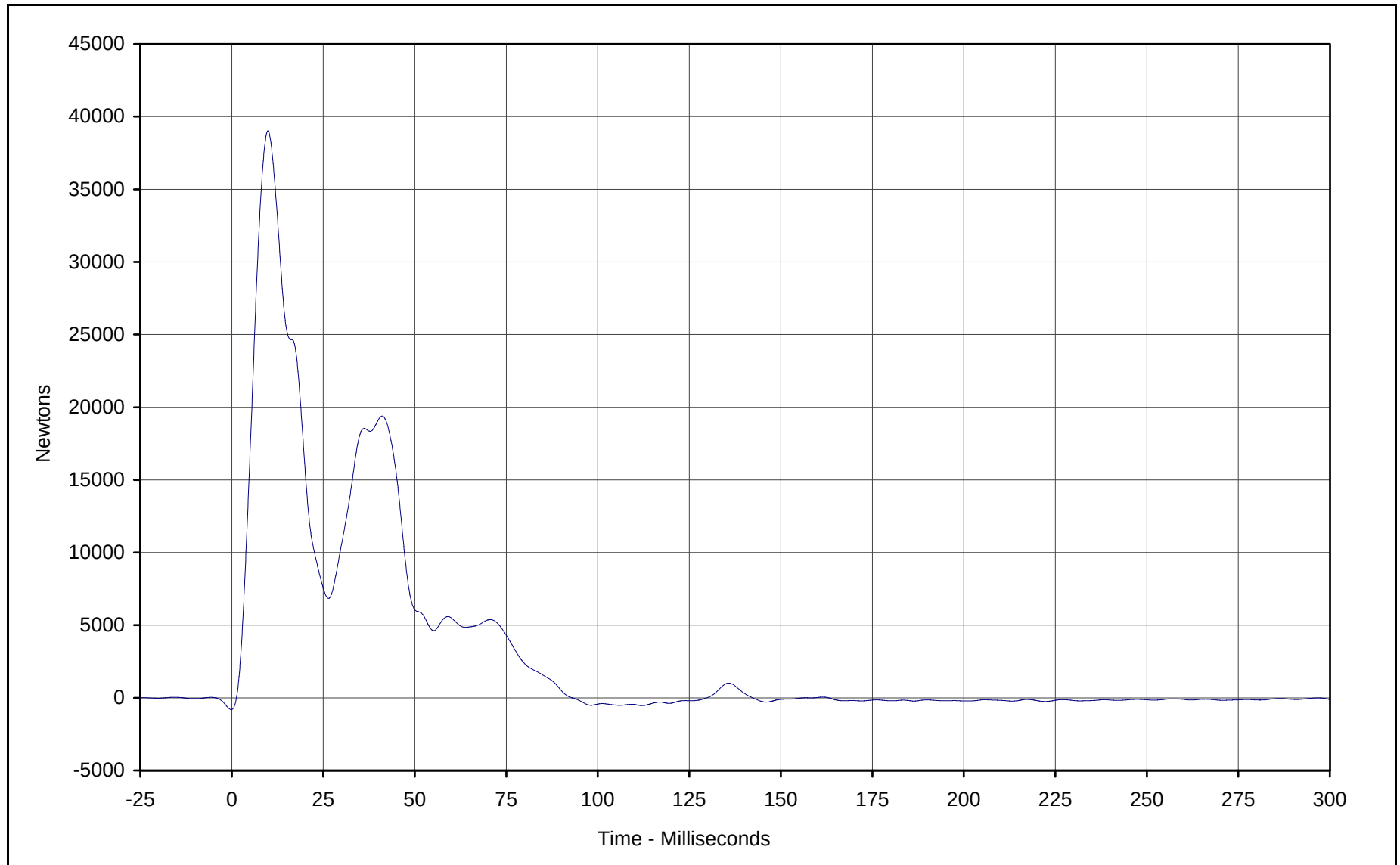




Curve Description: Barrier Force Sum Group 3  
Maximum Value: 54760.7 at 37.7 Milliseconds  
Minimum Value: -4283.9 at 0.1 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: SUM-003

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV

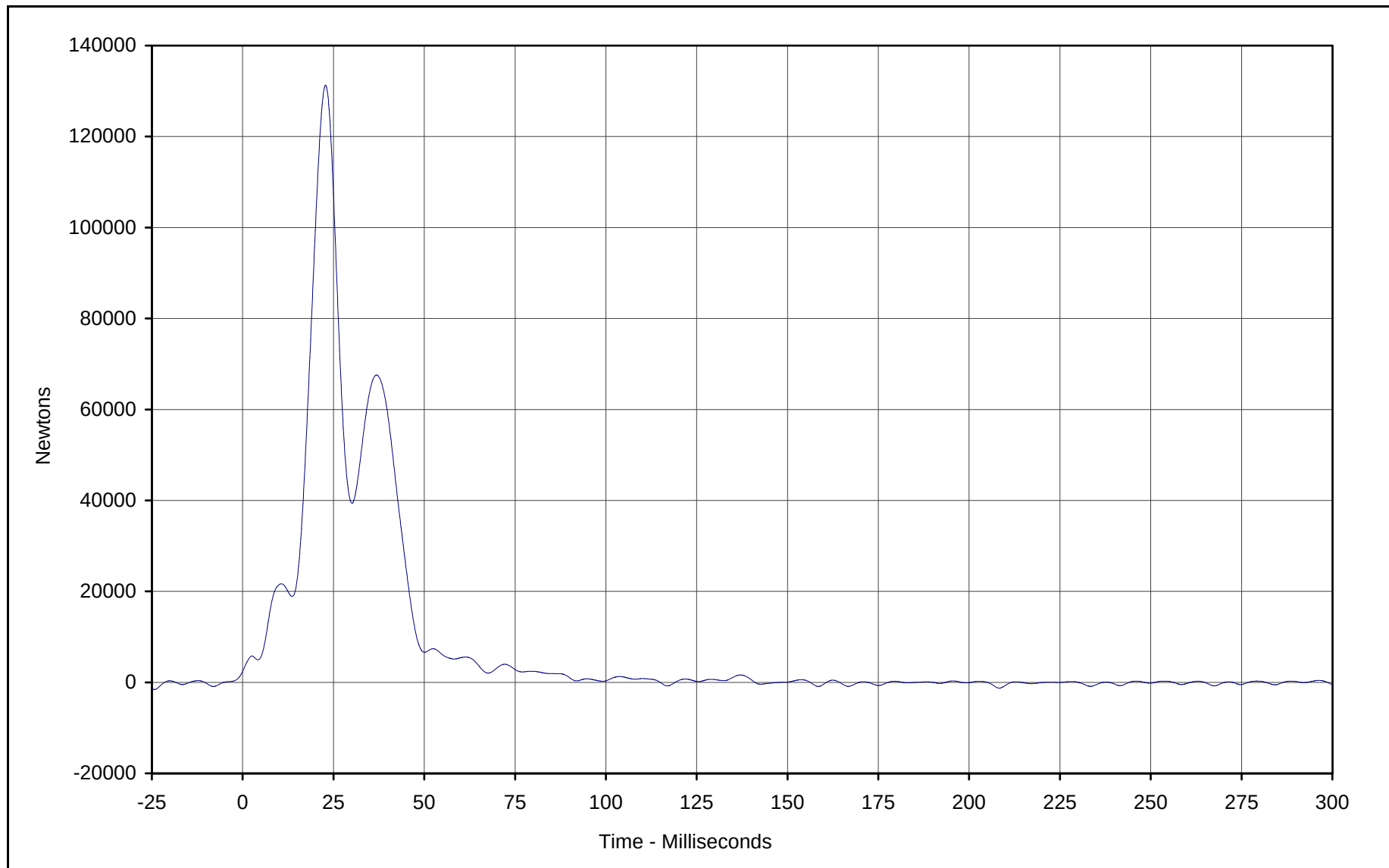




Curve Description: Barrier Force Sum Group 4  
Maximum Value: 39017.8 at 9.9 Milliseconds  
Minimum Value: -810.0 at 0.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: SUM-004

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



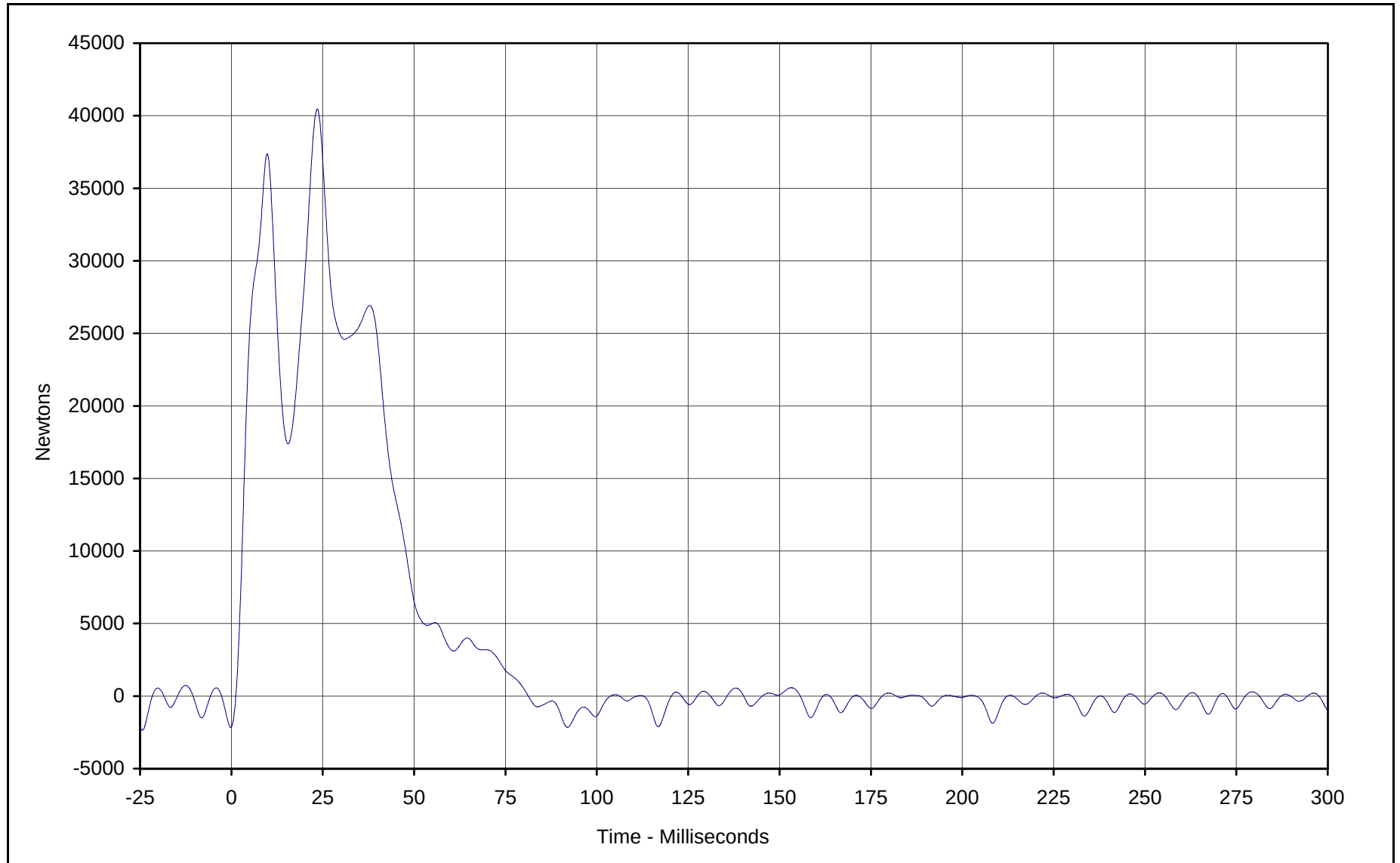


Curve Description: Barrier Force Sum Group 5  
Maximum Value: 131283.6 at 22.8 Milliseconds  
Minimum Value: -1278.3 at 208.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: SUM-005

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



C-30



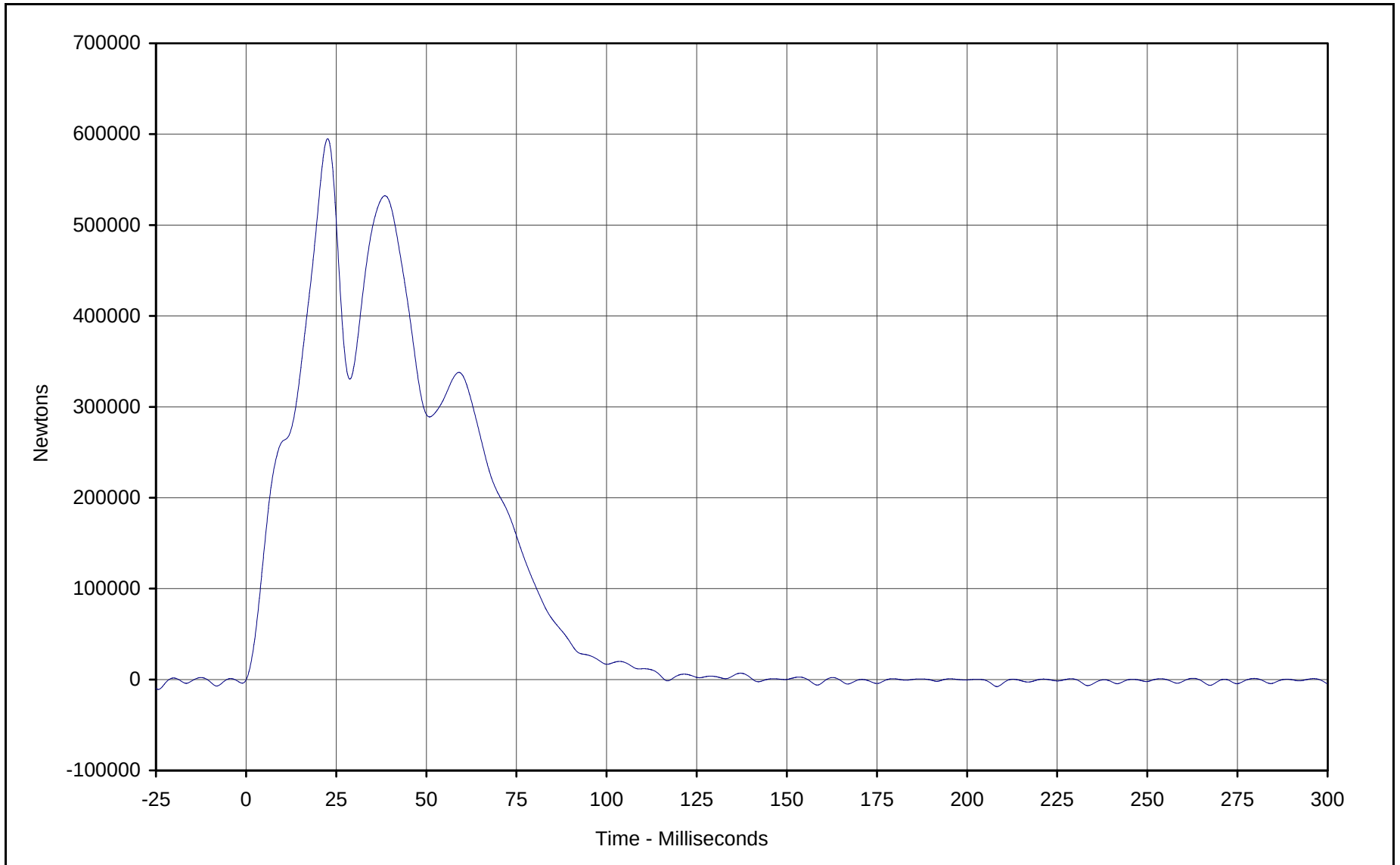
Curve Description: Barrier Force Sum Group 6  
Maximum Value: 40466.4 at 23.5 Milliseconds  
Minimum Value: -2151.6 at 92.0 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: SUM-006

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-31



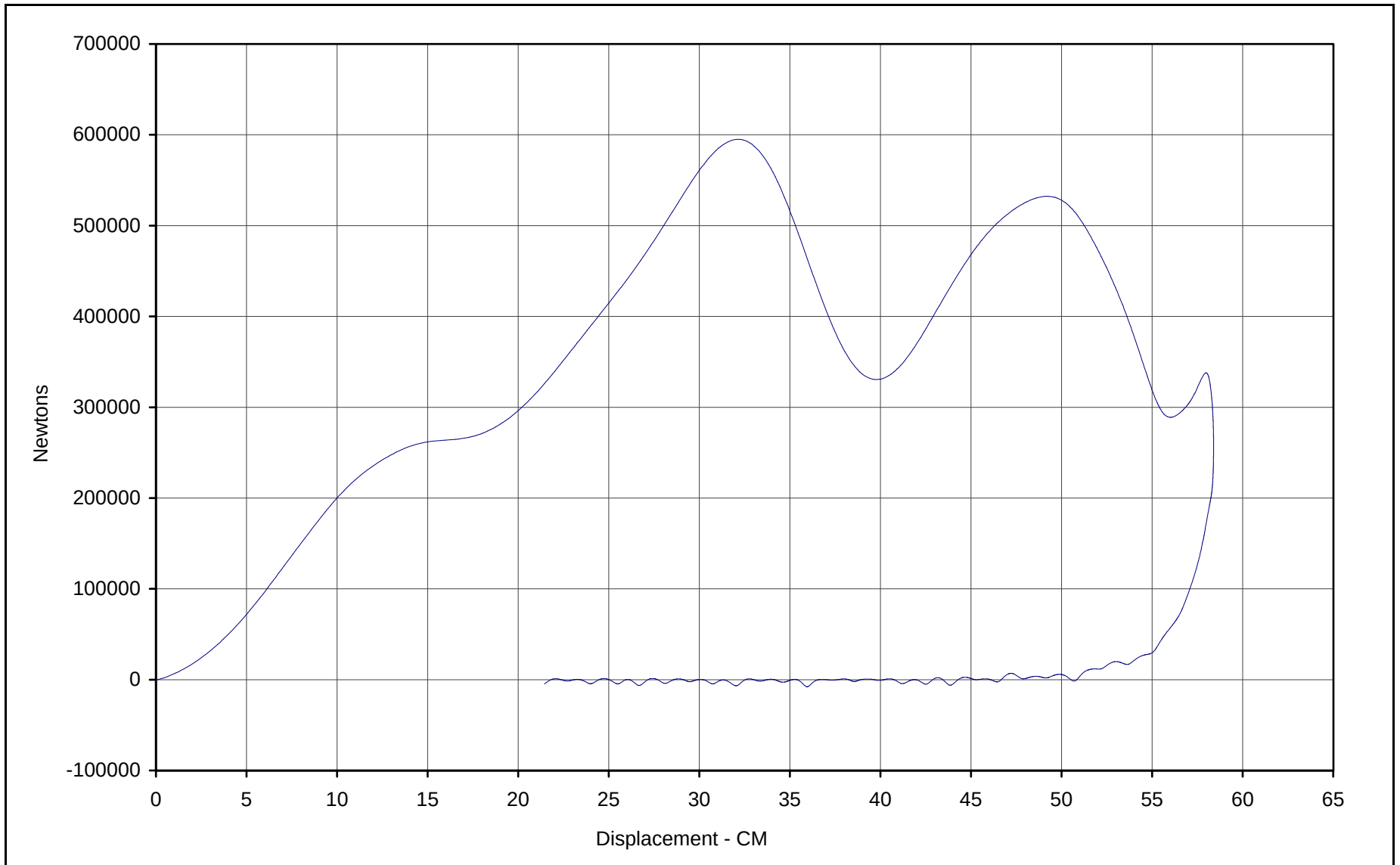
Curve Description: Barrier Force Sum Total  
Maximum Value: 594972.7 at 22.6 Milliseconds  
Minimum Value: -7774.9 at 208.3 Milliseconds  
SAE Filter Class: 60  
Date of Test: 01/09/01  
Curve Number: SUM-007

Test Program: 2001 NHTSA 35mph NCAP No.: M15103  
Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02

C-32



Curve Description: Sum Force Total vs. Dynamic Crush

Maximum Displ.: 58.4 at 65.6 Milliseconds

Maximum Force: 594972.7 at 22.6 Milliseconds

Measured Energy: 198,130 joules

Date of Test: 01/09/01

Curve Number: XVY-001

Test Program: 2001 NHTSA 35mph NCAP No.: M15103

Test Vehicle: 2001 Toyota RAV4 4WD SUV



KAR21001-02



**BARRIER LOAD CELL SUMMARY DATA**Test Vehicle: 2001 Toyota RAV4 4WD SUVNHTSA No.: M15103Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/09/01**BARRIER LOAD CELL PEAK FORCES**

| Location                  | Units   | Max      | Time | Min     | Time  |
|---------------------------|---------|----------|------|---------|-------|
| Barrier Force A2          | Newtons | 6578.2   | 39.2 | -1996.5 | 4.7   |
| Barrier Force A3          | Newtons | 3131.4   | 8.1  | -2242.1 | 4.0   |
| Barrier Force A4          | Newtons | 34023.1  | 62.6 | -2168.3 | 3.5   |
| Barrier Force A5          | Newtons | 48209.0  | 61.8 | -1105.0 | 0.0   |
| Barrier Force A6          | Newtons | 3383.4   | 24.1 | -2918.2 | 29.1  |
| Barrier Force A7          | Newtons | 2118.5   | 23.8 | -1644.5 | 28.8  |
| Barrier Force A8          | Newtons | 7022.4   | 70.5 | -1160.5 | 18.1  |
| Barrier Force A9          | Newtons | 2088.0   | 30.4 | -2102.6 | 25.6  |
| Barrier Force B2          | Newtons | 10159.3  | 39.5 | -1156.5 | 3.1   |
| Barrier Force B3          | Newtons | 59205.6  | 14.1 | -1212.9 | 0.0   |
| Barrier Force B4          | Newtons | 83844.8  | 42.7 | -222.8  | 112.5 |
| Barrier Force B5          | Newtons | 146932.5 | 39.6 | -428.2  | 116.7 |
| Barrier Force B6          | Newtons | 130505.9 | 21.8 | -231.1  | 208.2 |
| Barrier Force B7          | Newtons | 49319.4  | 10.8 | -1486.4 | 0.0   |
| Barrier Force B8          | Newtons | 19834.5  | 36.9 | -1128.9 | 0.9   |
| Barrier Force B9          | Newtons | 2113.1   | 30.3 | -1485.2 | 34.6  |
| Barrier Force C2          | Newtons | 9472.2   | 11.1 | -1205.8 | 3.1   |
| Barrier Force C3          | Newtons | 30142.0  | 9.5  | -531.6  | 0.0   |
| Barrier Force C4          | Newtons | 16981.3  | 35.4 | -486.1  | 208.4 |
| Barrier Force C5          | Newtons | 73418.5  | 23.2 | -425.3  | 208.3 |
| Barrier Force C6          | Newtons | 44914.5  | 22.1 | -367.8  | 208.3 |
| Barrier Force C7          | Newtons | 38330.9  | 9.7  | -1252.1 | 0.0   |
| Barrier Force C8          | Newtons | 5289.5   | 23.9 | -751.4  | 1.5   |
| Barrier Force C9          | Newtons | 4050.2   | 48.8 | -839.2  | 35.4  |
| Barrier Force Sum Group 1 | Newtons | 67961.6  | 14.9 | -1691.1 | 0.3   |
| Barrier Force Sum Group 2 | Newtons | 356084.6 | 22.3 | -1691.3 | 116.6 |
| Barrier Force Sum Group 3 | Newtons | 54760.7  | 37.7 | -4283.9 | 0.1   |
| Barrier Force Sum Group 4 | Newtons | 39017.8  | 9.9  | -810.0  | 0.0   |
| Barrier Force Sum Group 5 | Newtons | 131283.6 | 22.8 | -1278.3 | 208.3 |
| Barrier Force Sum Group 6 | Newtons | 40466.4  | 23.5 | -2151.6 | 92.0  |
| Barrier Force Sum Total   | Newtons | 594972.7 | 22.6 | -7774.9 | 208.3 |

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 35**  
**01/09/01**  
**2001 Toyota RAV4 4WD SUV**

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

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Driver A.T.D. Serial Number 35**  
**01/09/01**  
**2001 Toyota RAV4 4WD SUV**

| CH. | LOCATION               | AXIS | IDENT. NO. | DESCRIPTION               | MFR          | MODEL       | UNITS |
|-----|------------------------|------|------------|---------------------------|--------------|-------------|-------|
| 25  | UP. TIBIA LEFT MOM.    | X    | GPUT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 26  | UP. TIBIA LEFT MOM.    | Y    | GPUT09MY   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 27  | UP. TIBIA RIGHT MOM.   | X    | GPUT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 28  | UP. TIBIA RIGHT MOM.   | Y    | GPUT09MY   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 29  | LWR. TIBIA LEFT MOM.   | X    | GPLT09MX   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 30  | LWR. TIBIA LEFT MOM.   | Y    | GPLT09MY   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 31  | LWR. TIBIA LEFT FORCE  | Z    | GPLT09FZ   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | N     |
| 32  | LWR. TIBIA RIGHT MOM.  | X    | GPLT09MX   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 33  | LWR. TIBIA RIGHT MOM.  | Y    | GPLT09MY   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 34  | LWR. TIBIA RIGHT FORCE | Z    | GPLT09FZ   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | N     |
| 35  | FOOT LEFT              | X    | KEIC003X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 36  | FOOT LEFT              | Y    | KEIC003Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 37  | FOOT LEFT              | Z    | KEIC003Z   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 38  | FOOT RIGHT             | X    | KEIC004X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 39  | FOOT RIGHT             | Y    | KEIC004Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 40  | FOOT RIGHT             | Z    | KEIC004Z   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 41  | LAP BELT FORCE         | X    | KELC001    | Load cell, Seat belt      | Lebow        | 3371        | N     |
| 42  | SHOULDER BELT FORCE    | X    | KELC002    | Load cell, Seat belt      | Lebow        | 3371        | N     |
| 43  | SHOULDER BELT SPOOL    | X    | KEPP001    | Pullout pot               | Celesco      | PTX101-0030 | CM    |
| 44  | SHOULDER BELT ELONG.   | X    | KEEP001    | Linear pot., belt stretch | E.T.I.       | LCP8-10 10K | MM/CM |

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Passenger A.T.D. Serial Number 34**  
**01/09/01**  
**2001 Toyota RAV4 4WD SUV**

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

**2001 NHTSA 35mph NCAP**  
**Instrumentation Data Channel Assignments**  
**Passenger A.T.D. Serial Number 34**  
**01/09/01**  
**2001 Toyota RAV4 4WD SUV**

| CH. | LOCATION               | AXIS | IDENT. NO. | DESCRIPTION               | MFR          | MODEL       | UNITS |
|-----|------------------------|------|------------|---------------------------|--------------|-------------|-------|
| 69  | UP. TIBIA LEFT MOM.    | X    | GPUT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 70  | UP. TIBIA LEFT MOM.    | Y    | GPUT09MY   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 71  | UP. TIBIA RIGHT MOM.   | X    | GPUT09MX   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 72  | UP. TIBIA RIGHT MOM.   | Y    | GPUT09MY   | 2 ch., Upper tibia gage   | R. A. Denton | 1583        | Nm    |
| 73  | LWR. TIBIA LEFT MOM.   | X    | GPLT09MX   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 74  | LWR. TIBIA LEFT MOM.   | Y    | GPLT09MY   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 75  | LWR. TIBIA LEFT FORCE  | Z    | GPLT09FZ   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | N     |
| 76  | LWR. TIBIA RIGHT MOM.  | X    | GPLT09MX   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 77  | LWR. TIBIA RIGHT MOM.  | Y    | GPLT09MY   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | Nm    |
| 78  | LWR. TIBIA RIGHT FORCE | Z    | GPLT09FZ   | 3 ch., lower tibia gage   | R. A. Denton | 3093        | N     |
| 79  | FOOT LEFT              | X    | KEIC002X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 80  | FOOT LEFT              | Y    | KEIC002Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 81  | FOOT LEFT              | Z    | KEIC002Z   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 82  | FOOT RIGHT             | X    | KEIC001X   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 83  | FOOT RIGHT             | Y    | KEIC001Y   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 84  | FOOT RIGHT             | Z    | KEIC001Z   | Accel., Foot Triax        | I.C. Sensor  | 3031-500    | G     |
| 85  | LAP BELT FORCE         | X    | KELC003    | Load cell, Seat belt      | Lebow        | 3371        | N     |
| 86  | SHOULDER BELT FORCE    | X    | KELC004    | Load cell, Seat belt      | Lebow        | 3371        | N     |
| 87  | SHOULDER BELT SPOOL    | X    | KEPP001    | Pullout pot               | Celesco      | PTX101-0030 | MM    |
| 88  | SHOULDER BELT ELONG.   | X    | KEEP001    | Linear pot., belt stretch | E.T.I.       | LCP8-10 10K | MM/CM |

**2001 NHTSA 35mph NCAP  
Instrumentation Data Channel Assignments  
Vehicle Accelerometers and Reference Channel  
01/09/01  
2001 Toyota RAV4 4WD SUV**

| 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**  
**01/09/01**  
**2001 Toyota RAV4 4WD SUV**

| 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  
01/09/01  
2001 Toyota RAV4 4WD SUV**

| 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.: LK01A

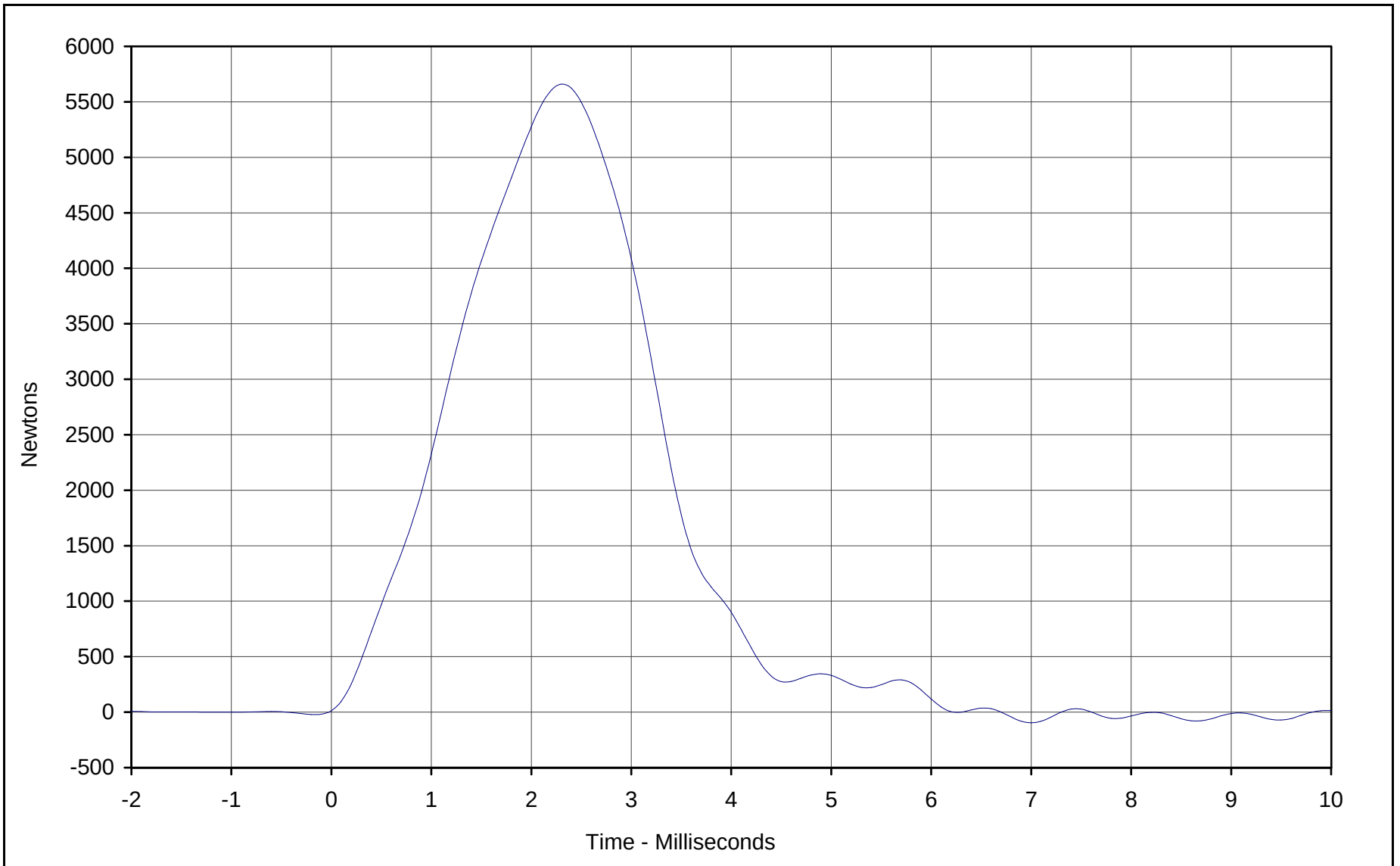
| Tested Parameter             | Units   | Specification  | Result | Pass/Fail |
|------------------------------|---------|----------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70       | 30     | Pass      |
| Probe Velocity               | m/s     | 2.073 to 2.134 | 2.119  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 5659.9 | Pass      |
| Overall Test Results         |         |                |        | Pass      |

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

\_\_\_\_\_  
January 2, 2001  
Test Date

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

\_\_\_\_\_  
Date



Curve Description: Probe Force

|                   |               |    |            |              |
|-------------------|---------------|----|------------|--------------|
| Maximum Value:    | <u>5659.9</u> | at | <u>2.3</u> | Milliseconds |
| Minimum Value:    | <u>-96.7</u>  | at | <u>7.0</u> | Milliseconds |
| SAE Filter Class: | <u>600</u>    |    |            |              |
| Date of Test:     | <u>1/2/01</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.: LK01A





# 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.: LK01B

| 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 | 2.125  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 5758.2 | Pass      |
| Overall Test Results         |         |                |        | Pass      |

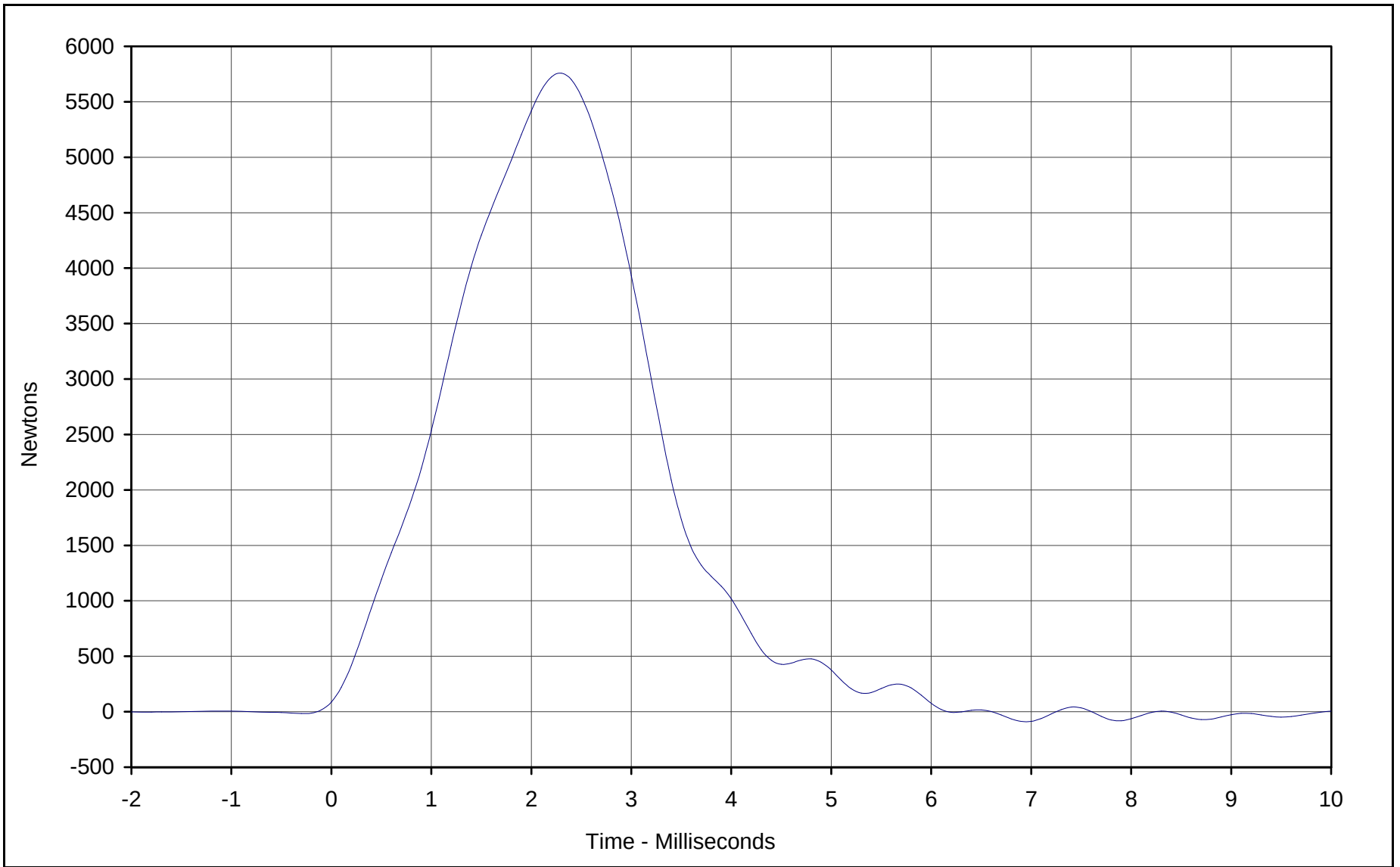
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 2, 2001  
Test Date

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

\_\_\_\_\_  
Date

E-4



Curve Description: Probe Force

|                   |               |    |            |              |
|-------------------|---------------|----|------------|--------------|
| Maximum Value:    | <u>5758.2</u> | at | <u>2.3</u> | Milliseconds |
| Minimum Value:    | <u>-87.5</u>  | at | <u>6.9</u> | Milliseconds |
| SAE Filter Class: | <u>600</u>    |    |            |              |
| Date of Test:     | <u>1/2/01</u> |    |            |              |
| ATD Serial No.:   | <u>034</u>    |    |            |              |

Testing Program: Hybrid III Right Knee Impact Test

Test Information: Part S/N: N/A Test I.D.: LK01B



KAR21001-02



# 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.: HD01A

| 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 | 247.2  | Pass      |
| Peak Lateral Acceleration    | G's    | ≤15.0          | 2.6    | Pass      |
| Is Acceleration Unimodal?    | Yes/No | Yes            | Yes    | Pass      |
| Overall Test Results         |        |                |        | Pass      |

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

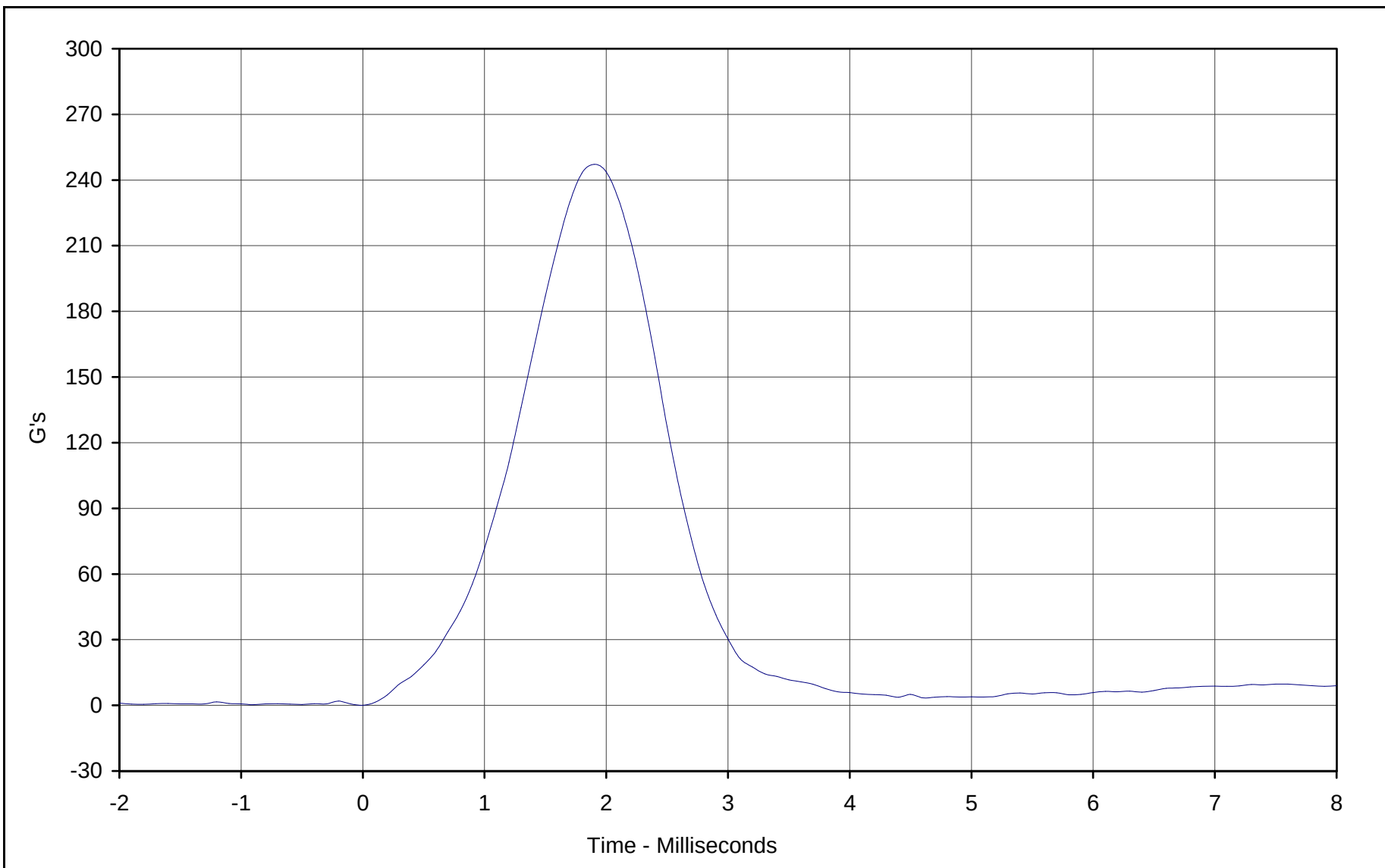
January 2, 2001  
Test Date

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

\_\_\_\_\_  
Date



E-6



Curve Description: Head Resultant Acceleration

Maximum Value: 247.2 at 1.9 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 1/2/01

ATD Serial No.: 034

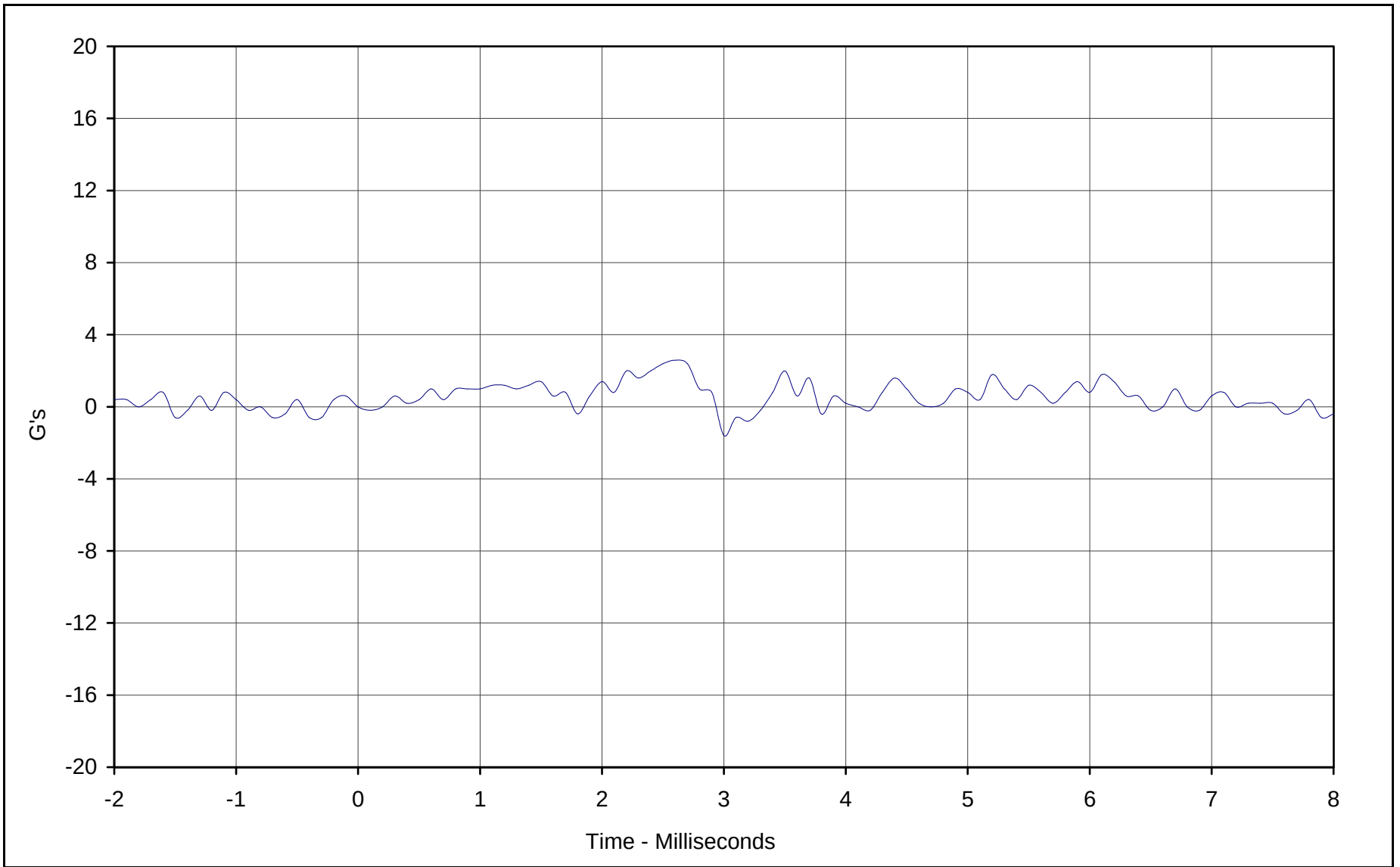
Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01A



KAR21001-02

E-7



Curve Description: Head Acceleration Y Axis

Maximum Value: 2.6 at 2.6 Milliseconds

Minimum Value: -1.6 at 3.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 1/2/01

ATD Serial No.: 034

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01A



KAR21001-02



# 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.: CH07A

| 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  | 5616   | Pass      |
| Peak Sternum Displacement    | CM      | 6.35 to 7.26  | 6.93   | Pass      |
| Internal Hysteresis          | %       | 69 to 85      | 73.1   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

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

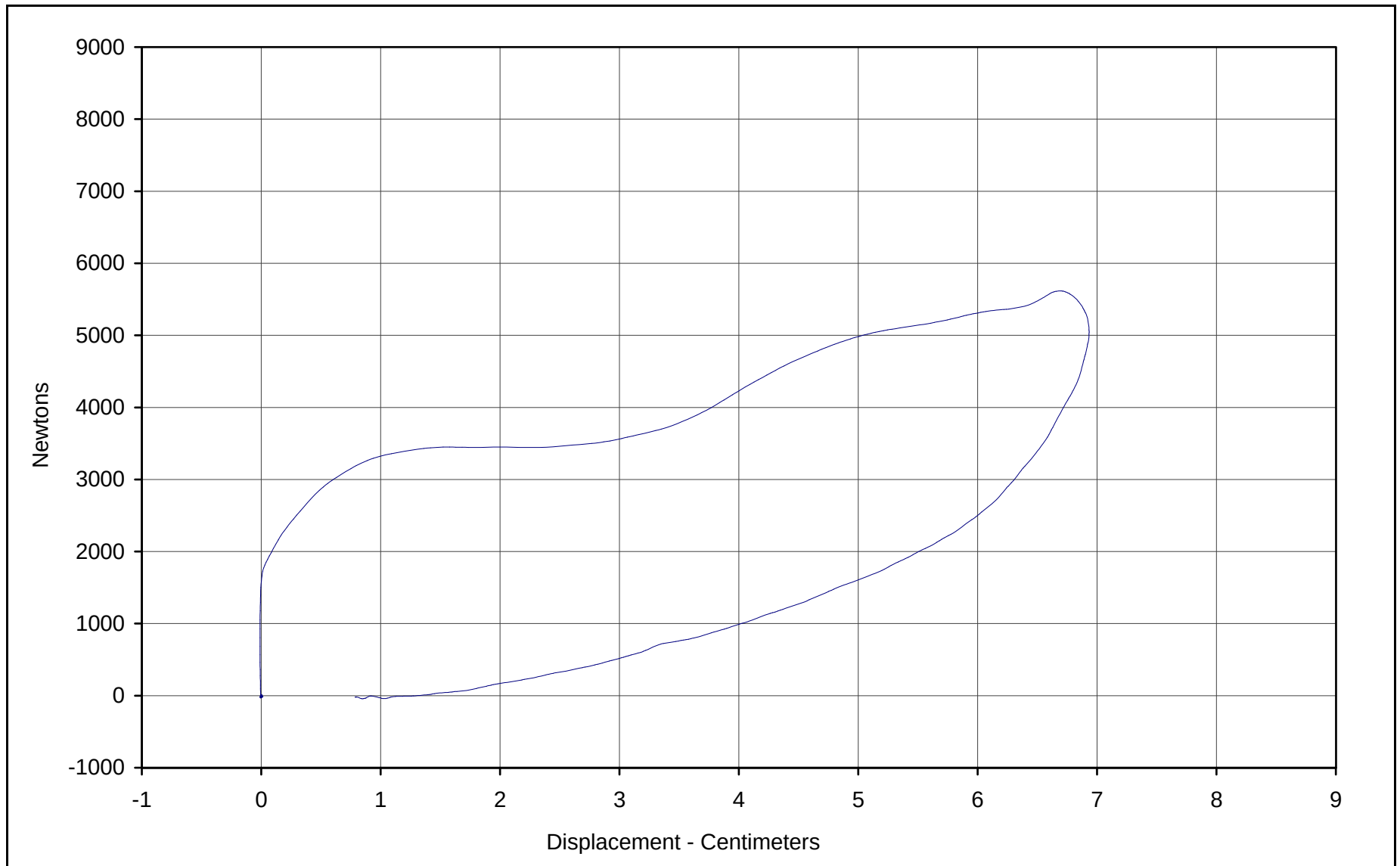
\_\_\_\_\_  
January 3, 2001

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

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

\_\_\_\_\_  
Date

E-9



Curve Description: Probe Force vs. Chest Displacement

Testing Program: Hybrid III Thorax Impact Test

Probe Force: 5616.1 Newtons

Test Information: S/N of Part: N/A Test I.D.: CH07A

Chest Displ.: 6.93 Centimeters

SAE Filter Class: 180

Date of Test: 1/3/01

ATD Serial No.: 034



KAR21001-02



# 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.: NF01A

| 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   | 23.5   | Pass      |
|                                                 | 20 Msec. | G's     | 17.6 to 22.6   | 20.1   | Pass      |
|                                                 | 30 Msec. | G's     | 12.5 to 18.5   | 18.5   | Pass      |
| Peak Pendulum Decel. after 30 Msec.             |          | G's     | ≤ 29.0         | 18.5   | Pass      |
| Deceleration Decay, Time to Cross 5 G's         |          | Msec.   | 34.0 to 42.0   | 38.3   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 64.0 to 78.0   | 68.1   | Pass      |
|                                                 | Time     | Msec.   | 57.0 to 64.0   | 60.5   | Pass      |
| "D" Plane Rotation Decay, Time To Zero Crossing |          | Msec.   | 113.0 to 128.0 | 113.6  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N·m     | 84.1 to 108.5  | 88.0   | Pass      |
|                                                 | Time     | Msec.   | 47.0 to 58.0   | 57.7   | Pass      |
| Positive Moment Decay, Time To Zero Crossing    |          | Msec.   | 97.0 to 107.0  | 102.7  | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

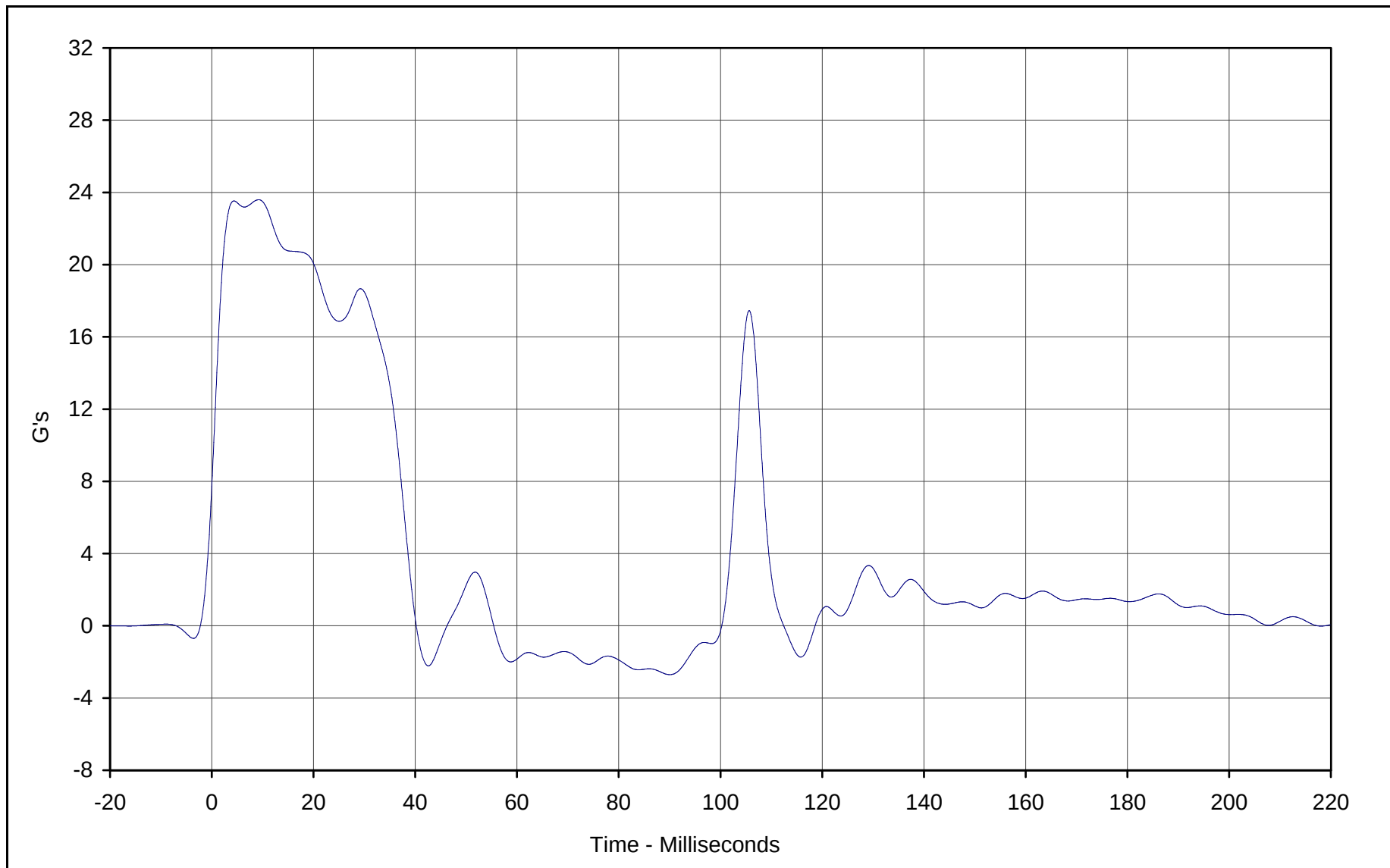
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 3, 2001  
Test Date

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

\_\_\_\_\_  
Date

E-11



|                    |                       |    |                   |
|--------------------|-----------------------|----|-------------------|
| Curve Description: | Pendulum Deceleration |    |                   |
| Maximum Value:     | 23.6                  | at | 9.2 Milliseconds  |
| Minimum Value:     | -2.7                  | at | 90.0 Milliseconds |
| SAE Filter Class:  | 60                    |    |                   |
| Date of Test:      | 1/3/01                |    |                   |
| ATD Serial No.:    | 034                   |    |                   |

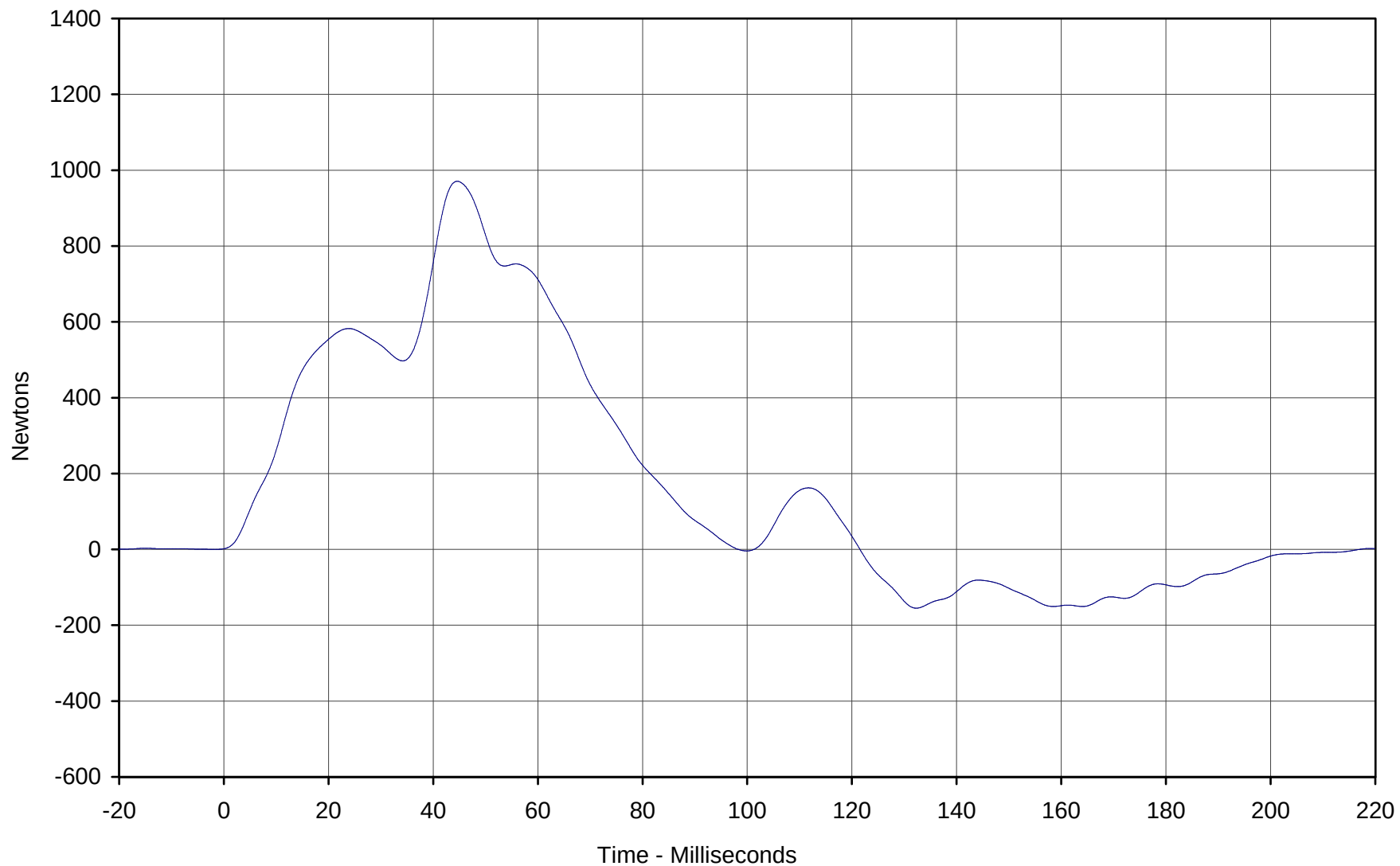
|                  |                                     |
|------------------|-------------------------------------|
| Testing Program: | Hybrid III Neck Flexion Test (Male) |
|------------------|-------------------------------------|

|                   |                                   |
|-------------------|-----------------------------------|
| Test Information: | S/N of Part: N/A Test I.D.: NF01A |
|-------------------|-----------------------------------|



KAR21001-02

E-12



Curve Description: Neck Force X

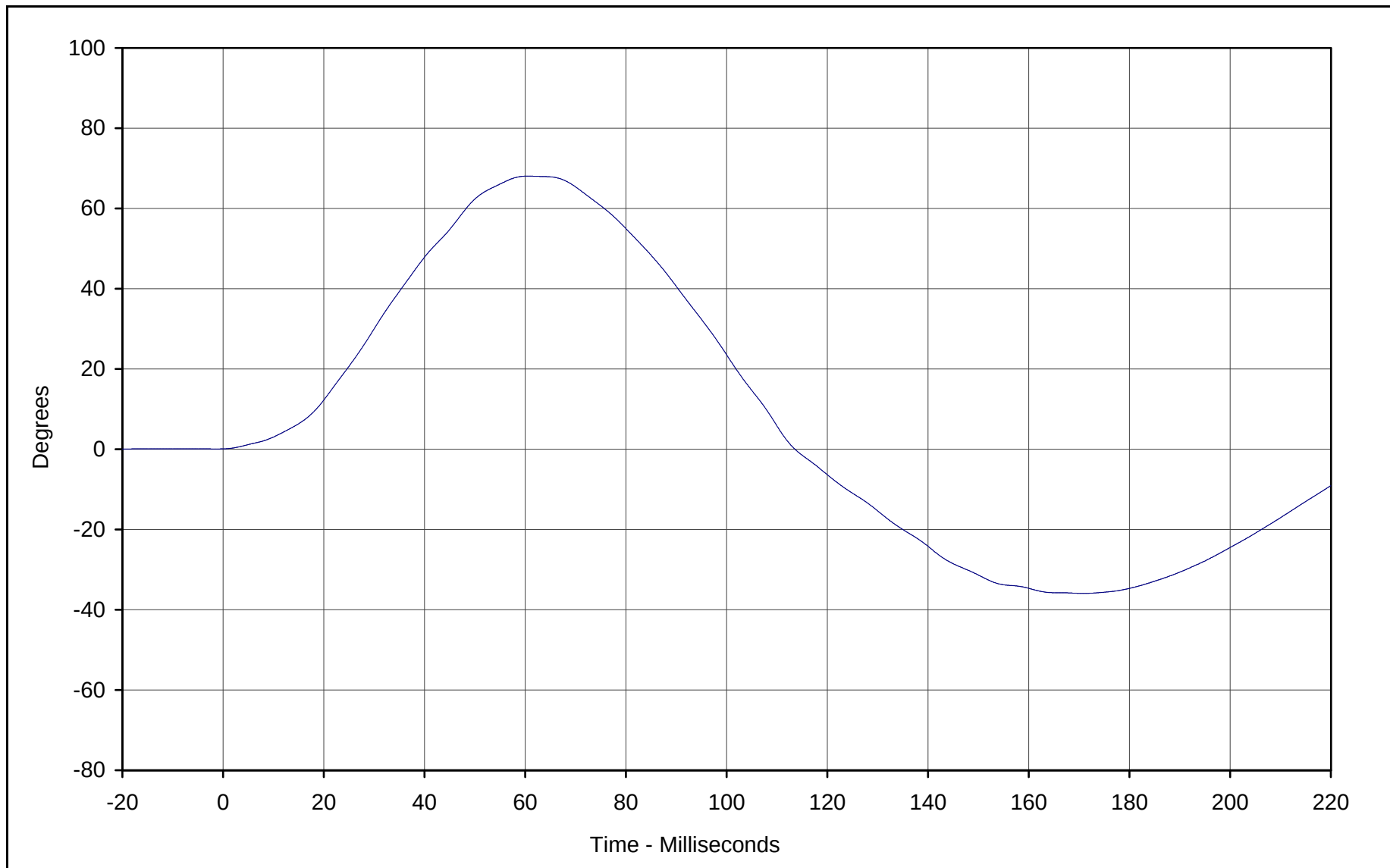
|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 970.7  | at | 44.6  | Milliseconds |
| Minimum Value:    | -155.2 | at | 132.3 | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 034    |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01A



KAR21001-02



Curve Description: "D" Plane Rotation

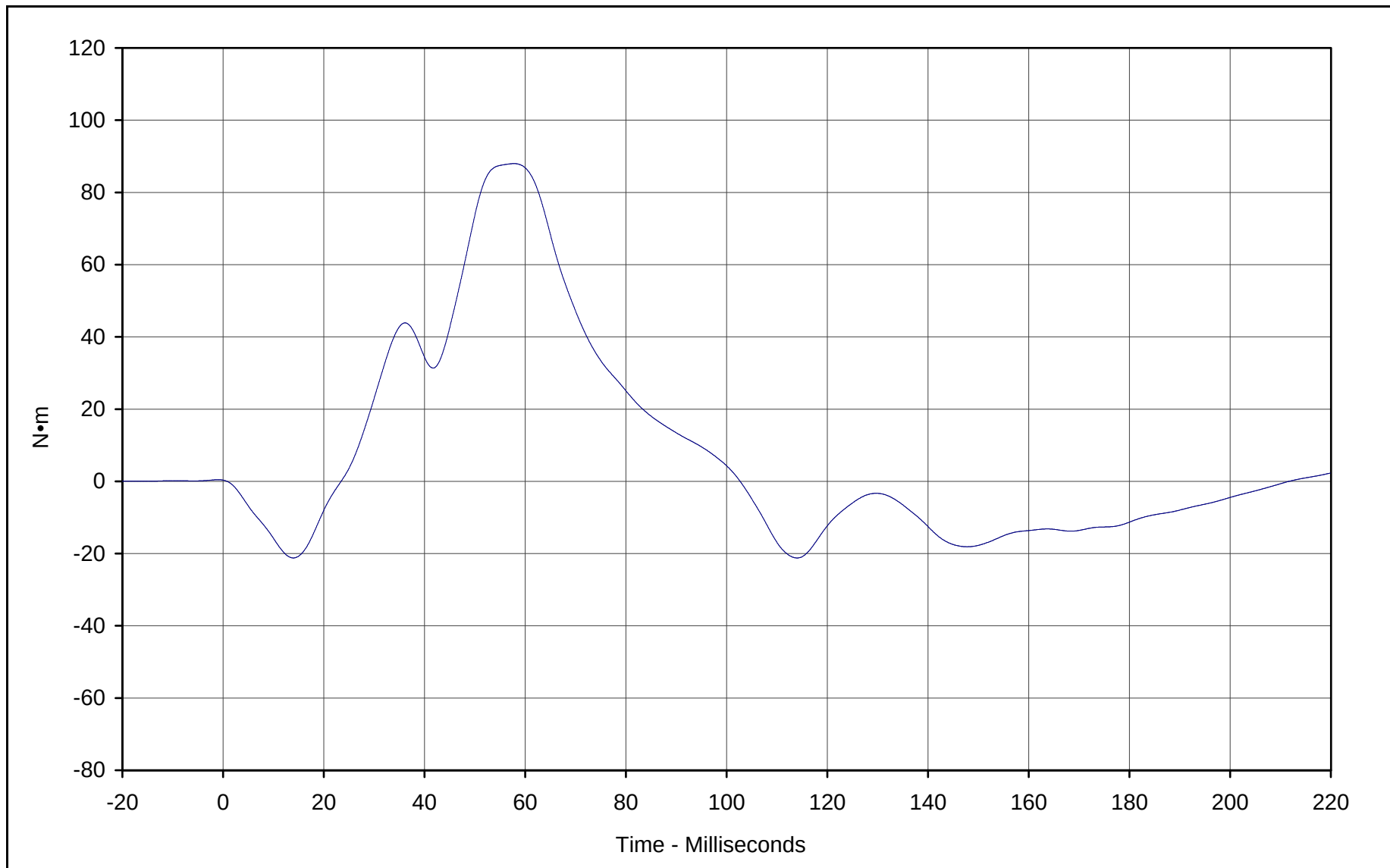
|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 68.1   | at | 60.5  | Milliseconds |
| Minimum Value:    | -35.9  | at | 170.8 | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 034    |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01A







Curve Description: Moment About Occipital Condyles

Maximum Value: 88.0 at 57.7 Milliseconds

Minimum Value: -21.2 at 114.0 Milliseconds

SAE Filter Class: 60

Date of Test: 1/3/01

ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01A





# 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.: NE01A

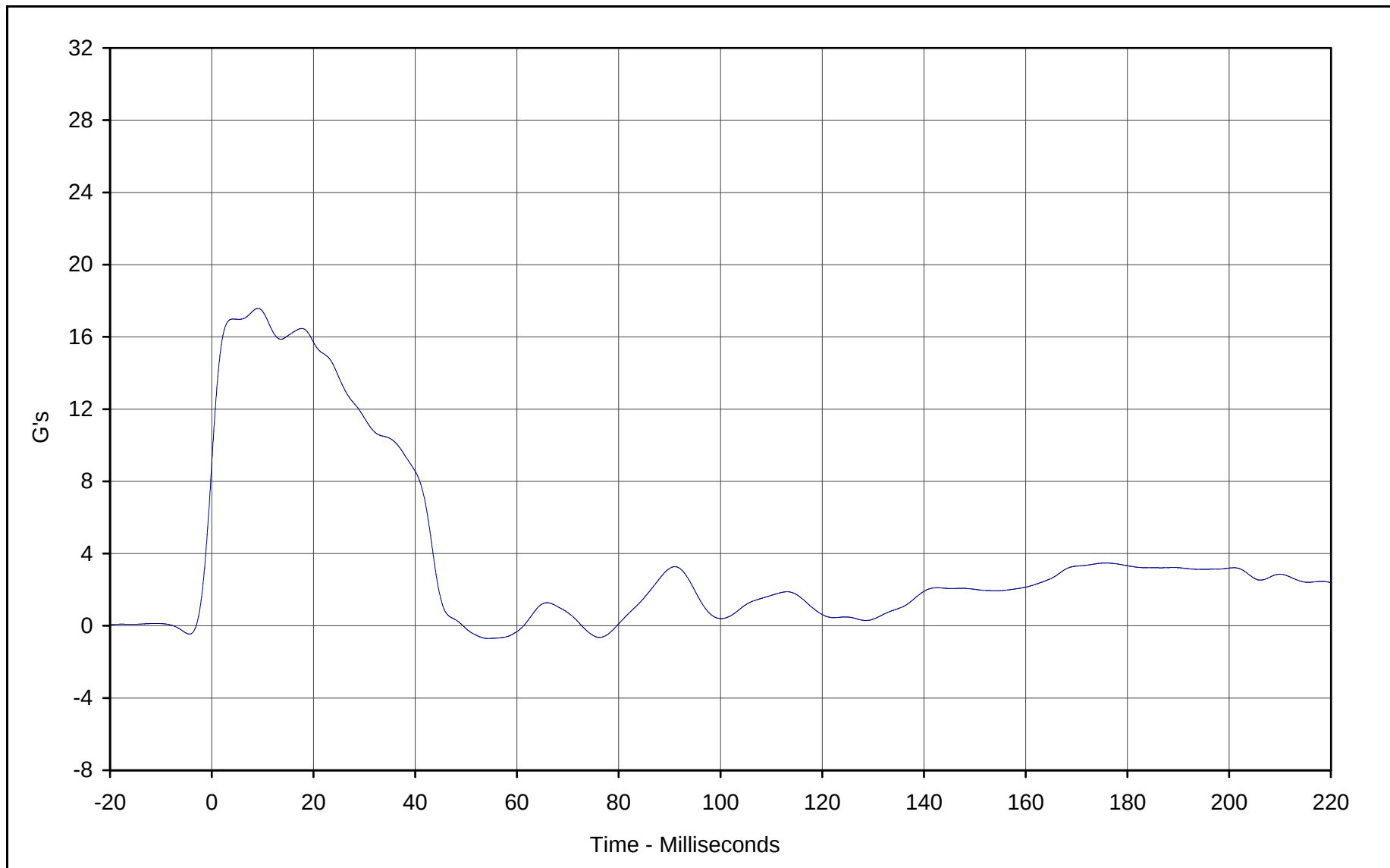
| Tested Parameter                                |          | Units   | Specification  | Result | Pass/Fail |
|-------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                          |          | °C      | 20.6 to 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   | 17.4   | Pass      |
|                                                 | 20 Msec. | G's     | 14.0 to 19.0   | 15.7   | Pass      |
|                                                 | 30 Msec. | G's     | 11.0 to 16.0   | 11.5   | Pass      |
| Peak Pendulum Decel. after 30 Msec.             |          | G's     | ≤ 22.0         | 11.5   | Pass      |
| Deceleration Decay, Time to Cross 5 G's         |          | Msec.   | 38.0 to 46.0   | 43.1   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 81.0 to 106.0  | 91.8   | Pass      |
|                                                 | Time     | Msec.   | 72.0 to 82.0   | 81.3   | Pass      |
| "D" Plane Rotation Decay, Time To Zero Crossing |          | Msec.   | 147.0 to 174.0 | 155.6  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N•m     | -52.9 to- 79.9 | -76.3  | Pass      |
|                                                 | Time     | Msec.   | 65.0 to 79.0   | 68.0   | Pass      |
| Negative Moment Decay, Time To Zero Crossing    |          | Msec.   | 120.0 to 148.0 | 136.8  | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

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

\_\_\_\_\_  
January 3, 2001  
Test Date

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

\_\_\_\_\_  
Date

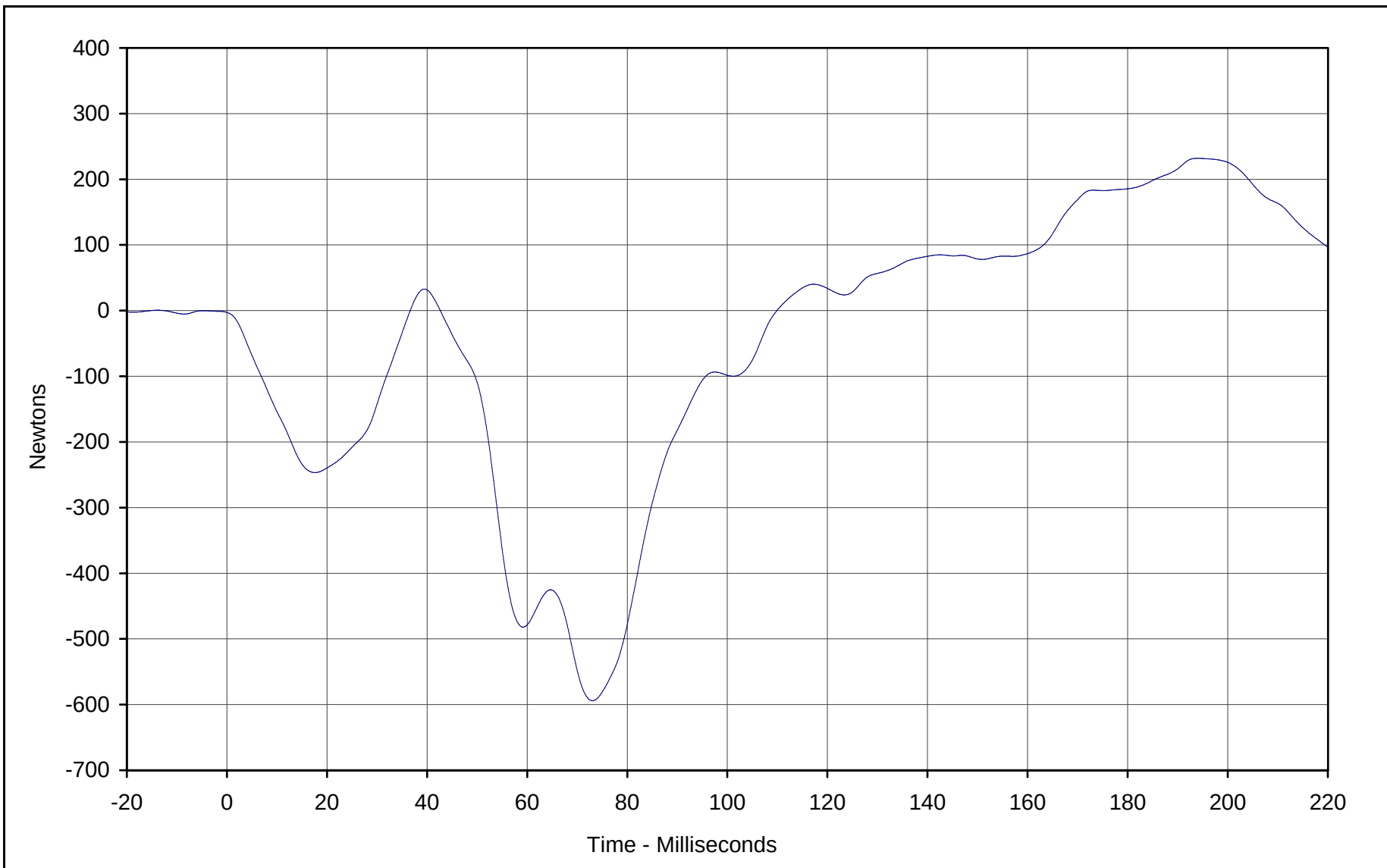


|                    |                       |    |                   |
|--------------------|-----------------------|----|-------------------|
| Curve Description: | Pendulum Deceleration |    |                   |
| Maximum Value:     | 17.6                  | at | 9.1 Milliseconds  |
| Minimum Value:     | -0.7                  | at | 54.4 Milliseconds |
| SAE Filter Class:  | 60                    |    |                   |
| Date of Test:      | 1/3/01                |    |                   |
| ATD Serial No.:    | 034                   |    |                   |

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

|                   |                                   |
|-------------------|-----------------------------------|
| Test Information: | S/N of Part: N/A Test I.D.: NE01A |
|-------------------|-----------------------------------|





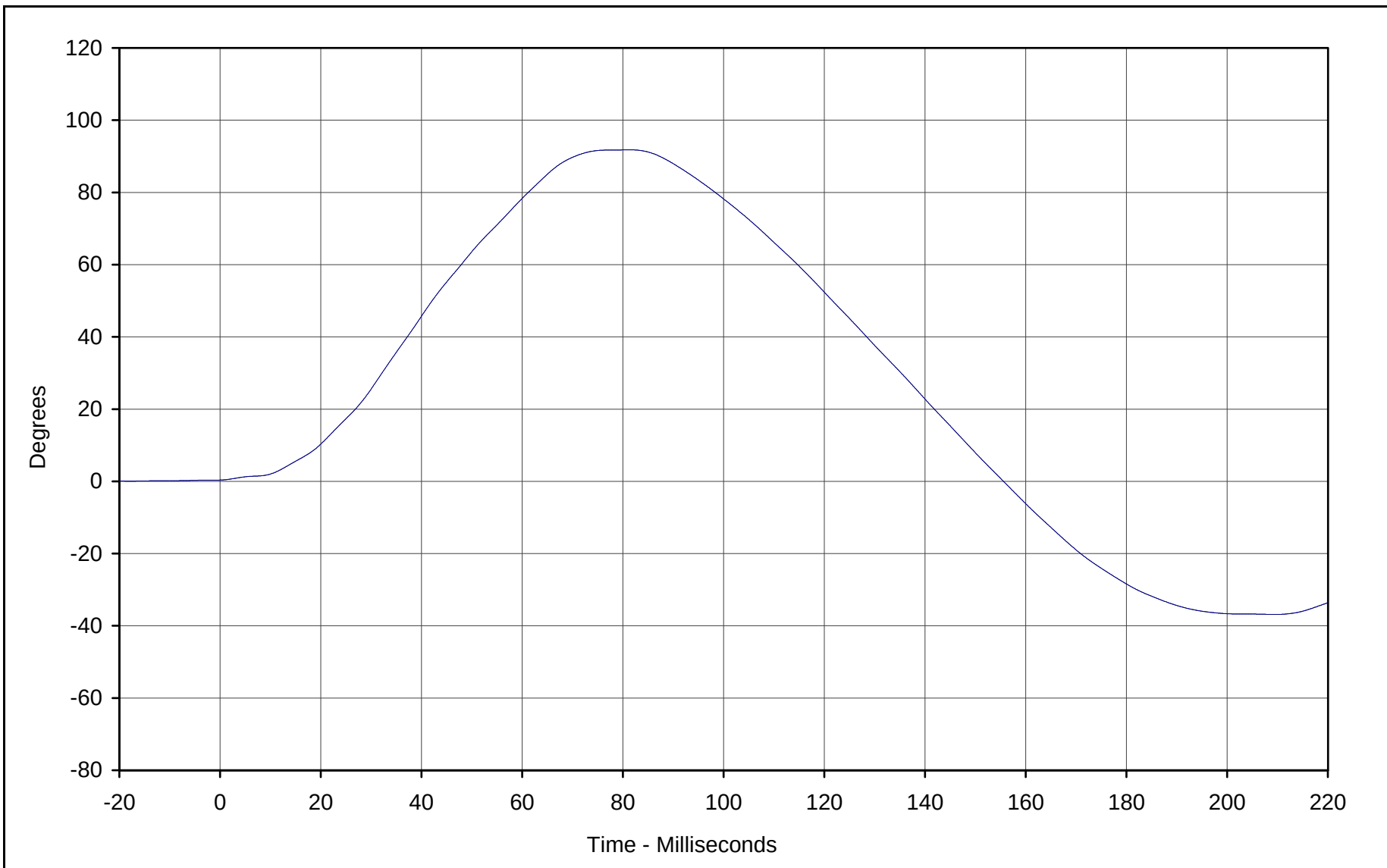
Curve Description: Neck Force X

|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 231.9  | at | 194.0 | Milliseconds |
| Minimum Value:    | -594.1 | at | 73.0  | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 034    |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01A





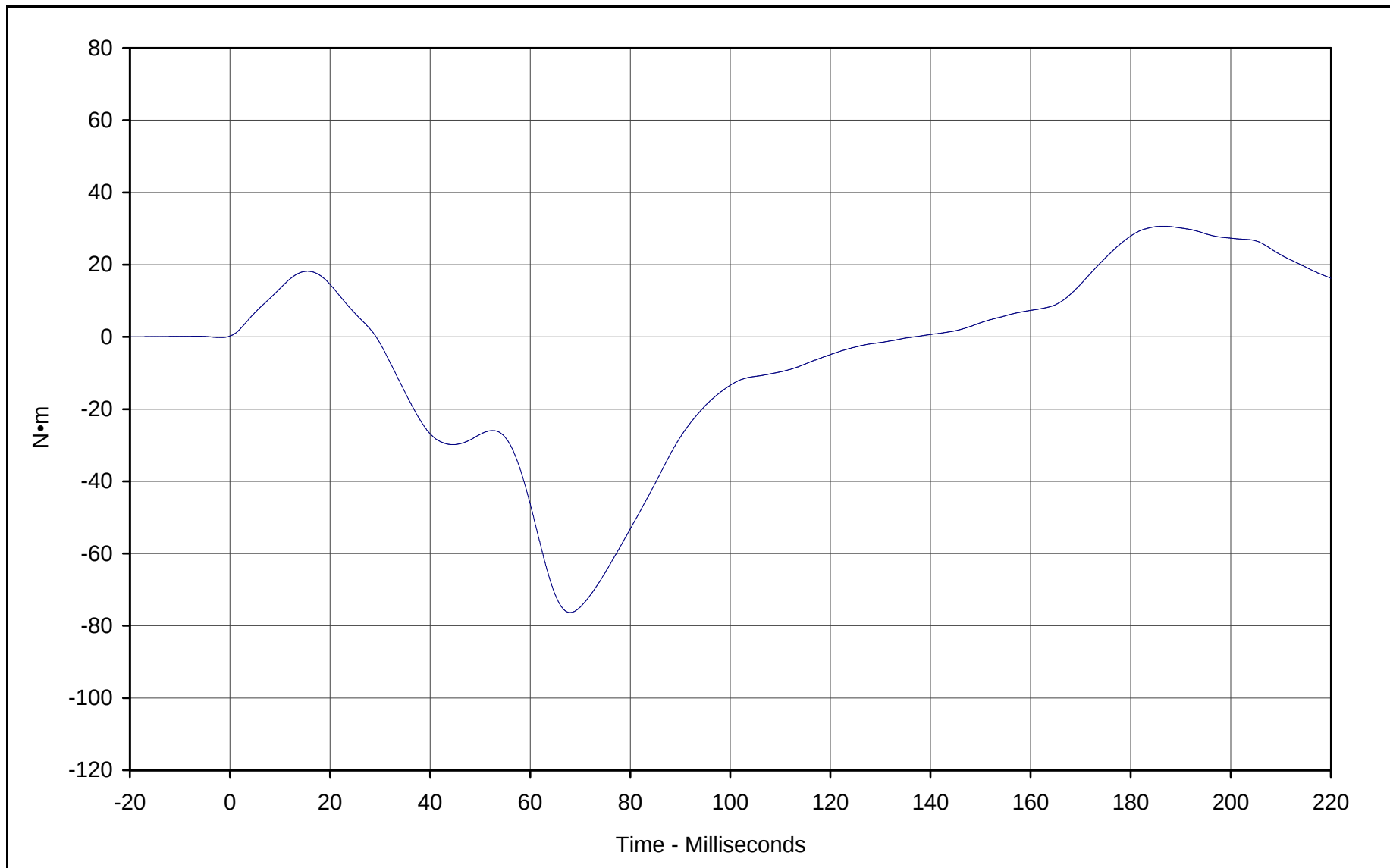
Curve Description: "D" Plane Rotation

|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 91.8   | at | 81.3  | Milliseconds |
| Minimum Value:    | -36.9  | at | 209.5 | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 034    |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01A





Curve Description: Moment About Occipital Condyles

Maximum Value: 30.7 at 186.5 Milliseconds

Minimum Value: -76.3 at 68.0 Milliseconds

SAE Filter Class: 60

Date of Test: 1/3/01

ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01A





# 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      | 43     | 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      | 87     | Pass      |
| D - "H" point from seat back          | mm    | 135 to 140    | 135    | Pass      |
| E - Shoulder pivot from back          | mm    | 84 to 94      | 92     | Pass      |
| F - Thigh clearance                   | mm    | 140 to 155    | 150    | Pass      |
| G - Elbow back to wrist pivot         | mm    | 290 to 305    | 300    | Pass      |
| H - Skull cap to back line            | mm    | 41 to 46      | 43     | Pass      |
| I - Shoulder to elbow length          | mm    | 330 to 345    | 342    | Pass      |
| J - Elbow rest height                 | mm    | 190 to 211    | 204    | Pass      |
| K - Buttock to knee length            | mm    | 579 to 604    | 585    | Pass      |
| L - Popliteal length                  | mm    | 429 to 455    | 434    | Pass      |
| M - Knee pivot height                 | mm    | 485 to 500    | 492    | Pass      |
| N - Buttock popliteal length          | mm    | 452 to 477    | 470    | 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    | 431    | Pass      |
| W - Foot breadth                      | mm    | 91 to 107     | 102    | Pass      |
| Y - Chest circumference               | mm    | 970 to 1001   | 986    | Pass      |
| Z - Waist circumference               | mm    | 836 to 866    | 850    | Pass      |
| AA - Location for chest circumference | mm    | 429 to 434    | 433    | Pass      |
| BB - Location for waist circumference | mm    | 226 to 231    | 229    | Pass      |
| Overall Test Results                  |       |               |        | Pass      |

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

\_\_\_\_\_  
January 3, 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.: LK01C

| 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 | 2.125  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 5182.5 | Pass      |
| Overall Test Results         |         |                |        | Pass      |

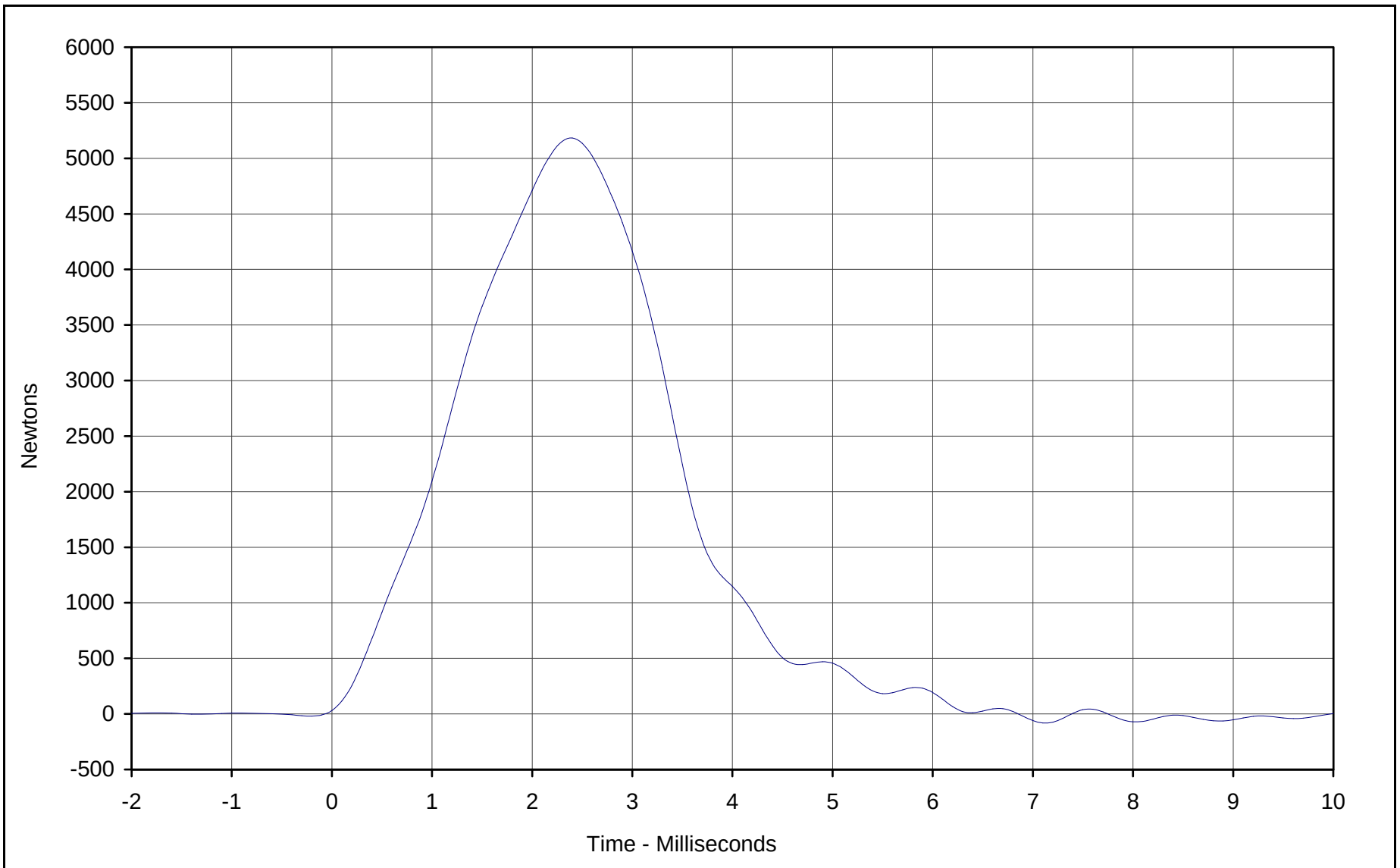
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 2, 2001  
Test Date

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

\_\_\_\_\_  
Date





Curve Description: Probe Force

|                   |               |    |            |              |
|-------------------|---------------|----|------------|--------------|
| Maximum Value:    | <u>5182.5</u> | at | <u>2.4</u> | Milliseconds |
| Minimum Value:    | <u>-81.4</u>  | at | <u>7.1</u> | Milliseconds |
| SAE Filter Class: | <u>600</u>    |    |            |              |
| Date of Test:     | <u>1/2/01</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.: LK01C





# 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.: RK01A

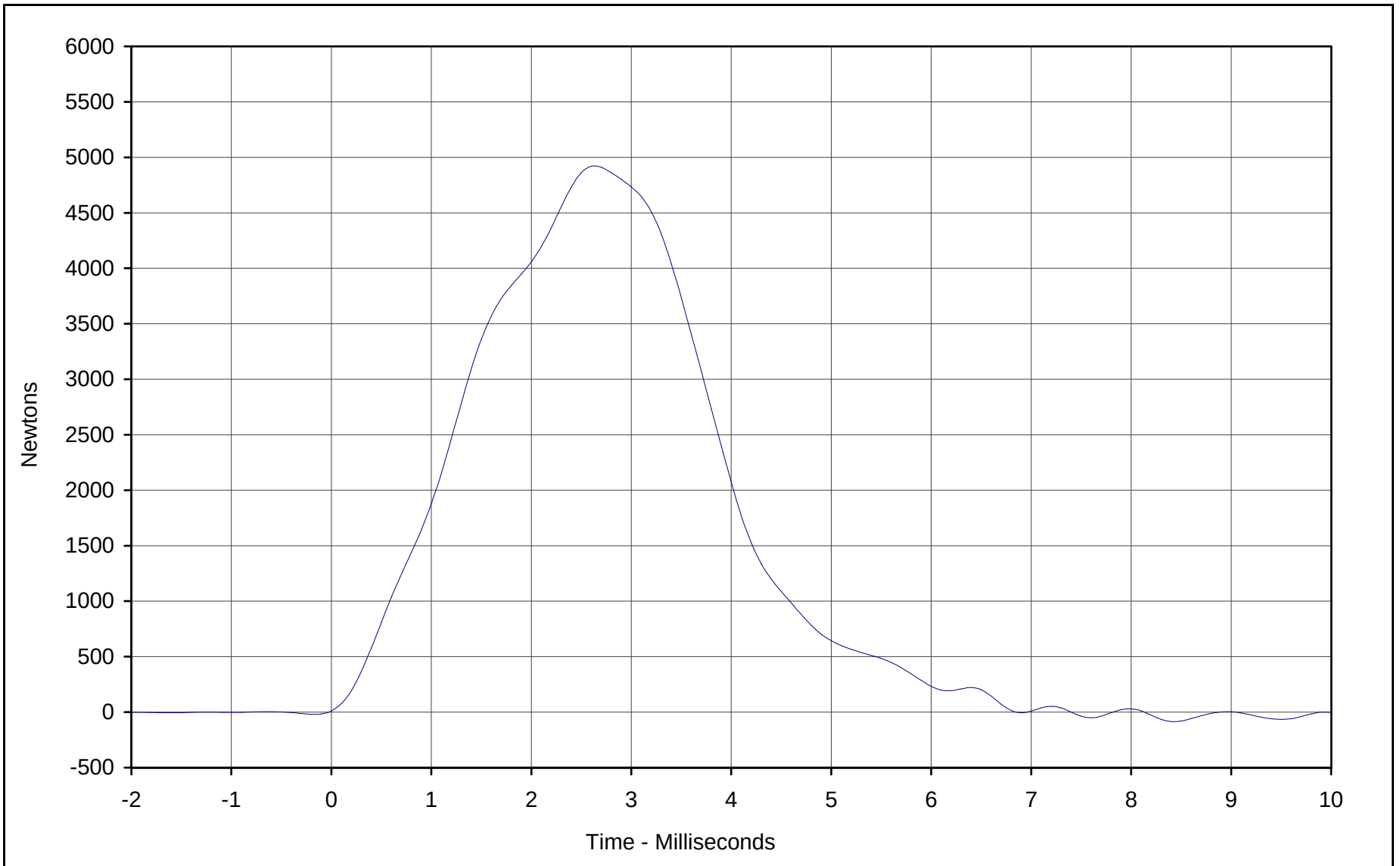
| Tested Parameter             | Units   | Specification  | Result | Pass/Fail |
|------------------------------|---------|----------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70       | 30     | Pass      |
| Probe Velocity               | m/s     | 2.073 to 2.134 | 2.125  | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782   | 4918.6 | Pass      |
| Overall Test Results         |         |                | Pass   |           |

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

\_\_\_\_\_  
January 2, 2001  
Test Date

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

\_\_\_\_\_  
Date



Curve Description: Probe Force

|                   |               |    |            |              |
|-------------------|---------------|----|------------|--------------|
| Maximum Value:    | <u>4918.6</u> | at | <u>2.6</u> | Milliseconds |
| Minimum Value:    | <u>-50.2</u>  | at | <u>7.6</u> | Milliseconds |
| SAE Filter Class: | <u>600</u>    |    |            |              |
| Date of Test:     | <u>1/2/01</u> |    |            |              |
| ATD Serial No.:   | <u>035</u>    |    |            |              |

Testing Program: Hybrid III Right Knee Impact Test

Test Information: Part S/N: N/A Test I.D.: RK01A





# 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.: HD01B

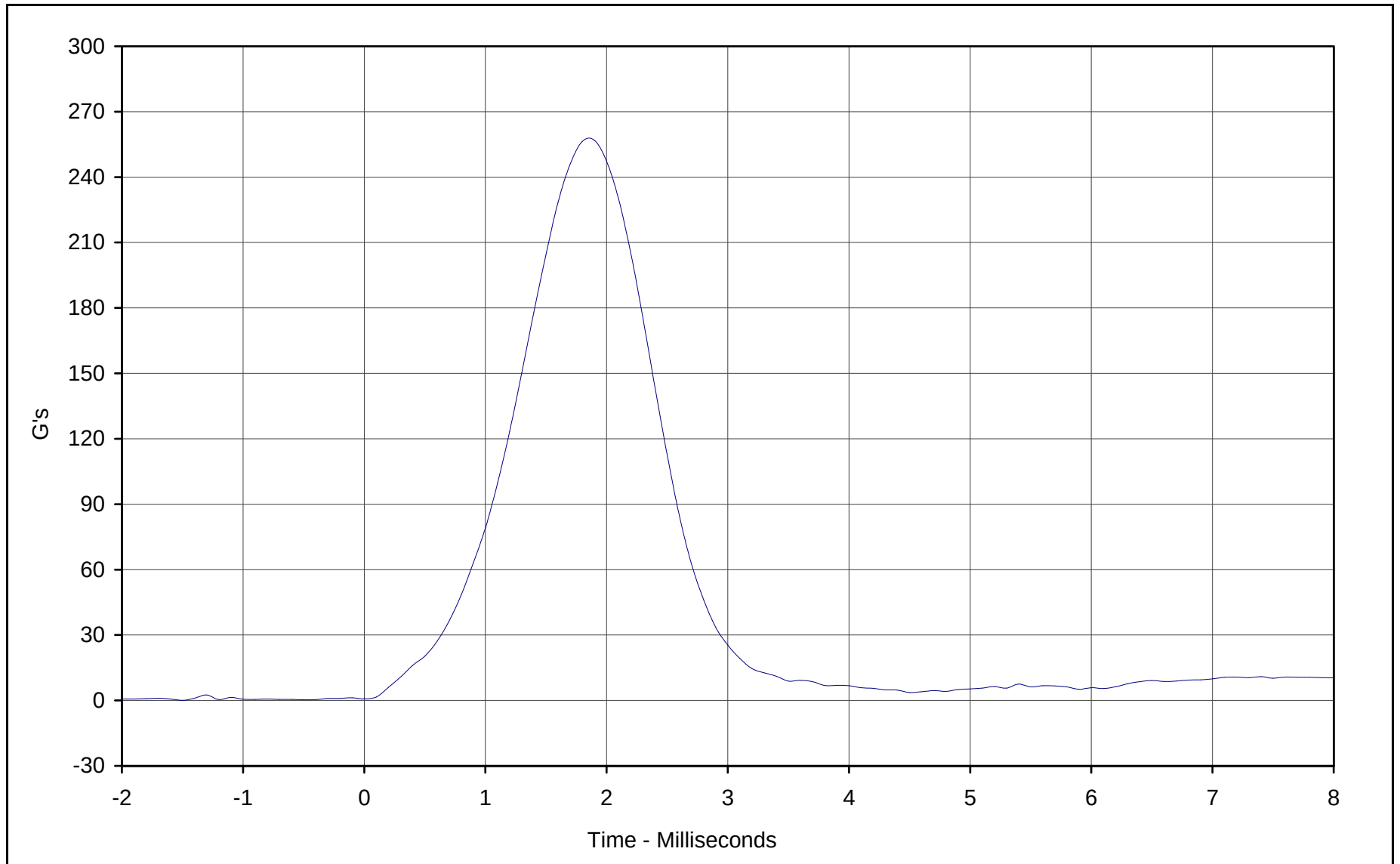
| Tested Parameter             | Units  | Specification  | Result | Pass/Fail |
|------------------------------|--------|----------------|--------|-----------|
| Laboratory Temperature       | °C     | 18.9 to 25.6   | 21.1   | Pass      |
| Laboratory Relative Humidity | %      | 10 to 70       | 30     | Pass      |
| Peak Resultant Acceleration  | G's    | 225.0 to 275.0 | 256.8  | Pass      |
| Peak Lateral Acceleration    | G's    | ≤15.0          | 6.4    | Pass      |
| Is Acceleration Unimodal?    | Yes/No | Yes            | Yes    | Pass      |
| Overall Test Results         |        |                |        | Pass      |

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

January 2, 2001  
Test Date

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

\_\_\_\_\_  
Date



Curve Description: Head Resultant Acceleration

Maximum Value: 256.8 at 1.9 Milliseconds

Minimum Value: 0.0 at -1.5 Milliseconds

SAE Filter Class: 1000

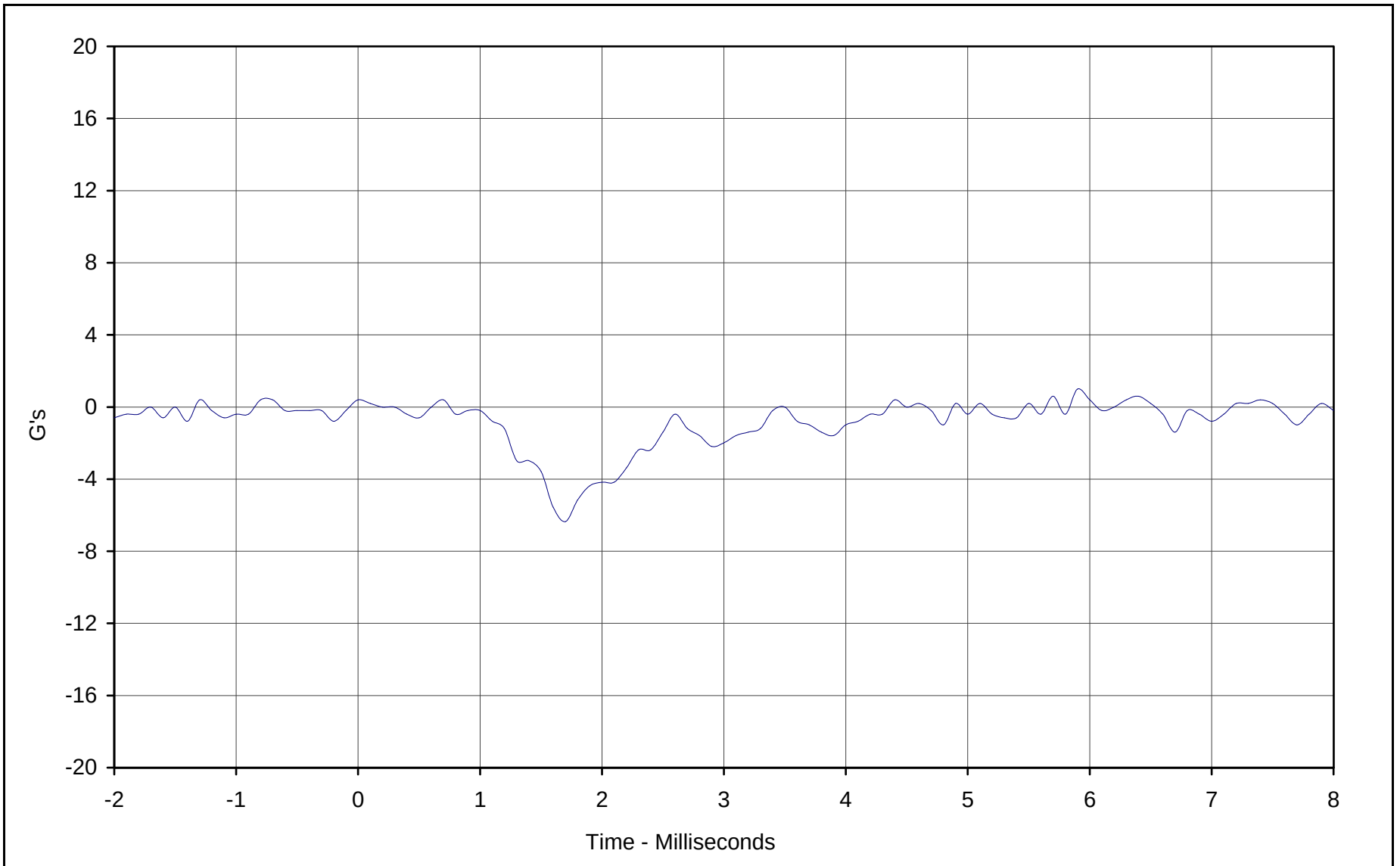
Date of Test: 1/2/01

ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01B





Curve Description: Head Acceleration Y Axis

Maximum Value: 1.0 at 5.9 Milliseconds

Minimum Value: -6.4 at 1.7 Milliseconds

SAE Filter Class: 1000

Date of Test: 1/2/01

ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01B





# 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.: CH07B

| 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  | 5318   | Pass      |
| Peak Sternum Displacement    | CM      | 6.35 to 7.26  | 6.85   | Pass      |
| Internal Hysteresis          | %       | 69 to 85      | 74.8   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

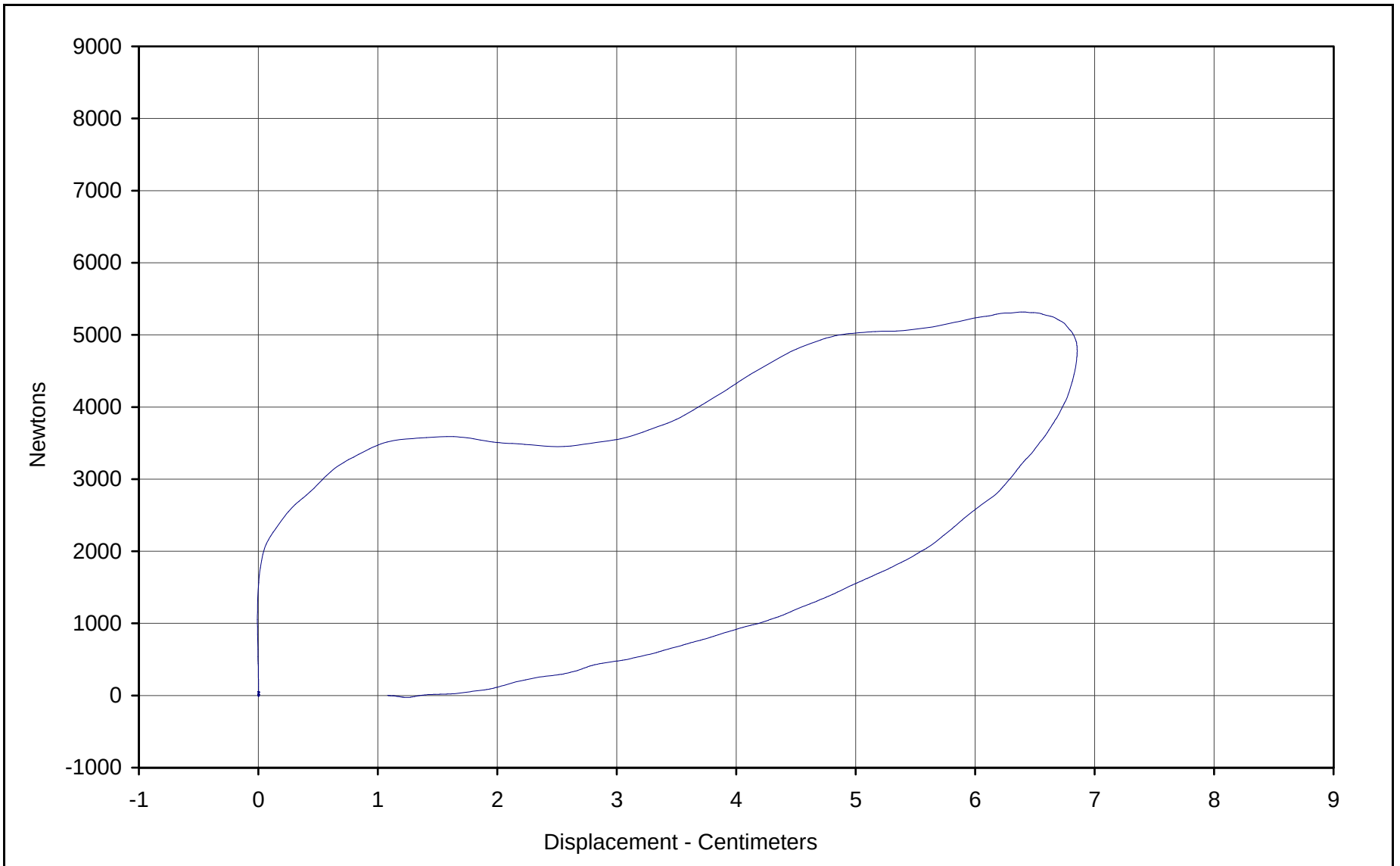
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 3, 2001

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

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

\_\_\_\_\_  
Date



Curve Description: Probe Force vs. Chest Displacement

Probe Force: 5317.8 Newtons

Chest Displ.: 6.85 Centimeters

SAE Filter Class: 180

Date of Test: 1/3/01

ATD Serial No.: 035

Testing Program: Hybrid III Thorax Impact Test

Test Information: S/N of Part: N/A Test I.D.: CH07B







# 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.: NF06B

| 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   | 22.7   | Pass      |
|                                                 | 20 Msec. | G's     | 17.6 to 22.6   | 19.6   | Pass      |
|                                                 | 30 Msec. | G's     | 12.5 to 18.5   | 13.0   | Pass      |
| Peak Pendulum Decel. after 30 Msec.             |          | G's     | ≤ 29.0         | 13.0   | Pass      |
| Deceleration Decay, Time to Cross 5 G's         |          | Msec.   | 34.0 to 42.0   | 38.0   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 64.0 to 78.0   | 69.1   | Pass      |
|                                                 | Time     | Msec.   | 57.0 to 64.0   | 63.3   | Pass      |
| "D" Plane Rotation Decay, Time To Zero Crossing |          | Msec.   | 113.0 to 128.0 | 118.0  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N•m     | 84.1 to 108.5  | 92.9   | Pass      |
|                                                 | Time     | Msec.   | 47.0 to 58.0   | 54.4   | Pass      |
| Positive Moment Decay, Time To Zero Crossing    |          | Msec.   | 97.0 to 107.0  | 97.7   | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

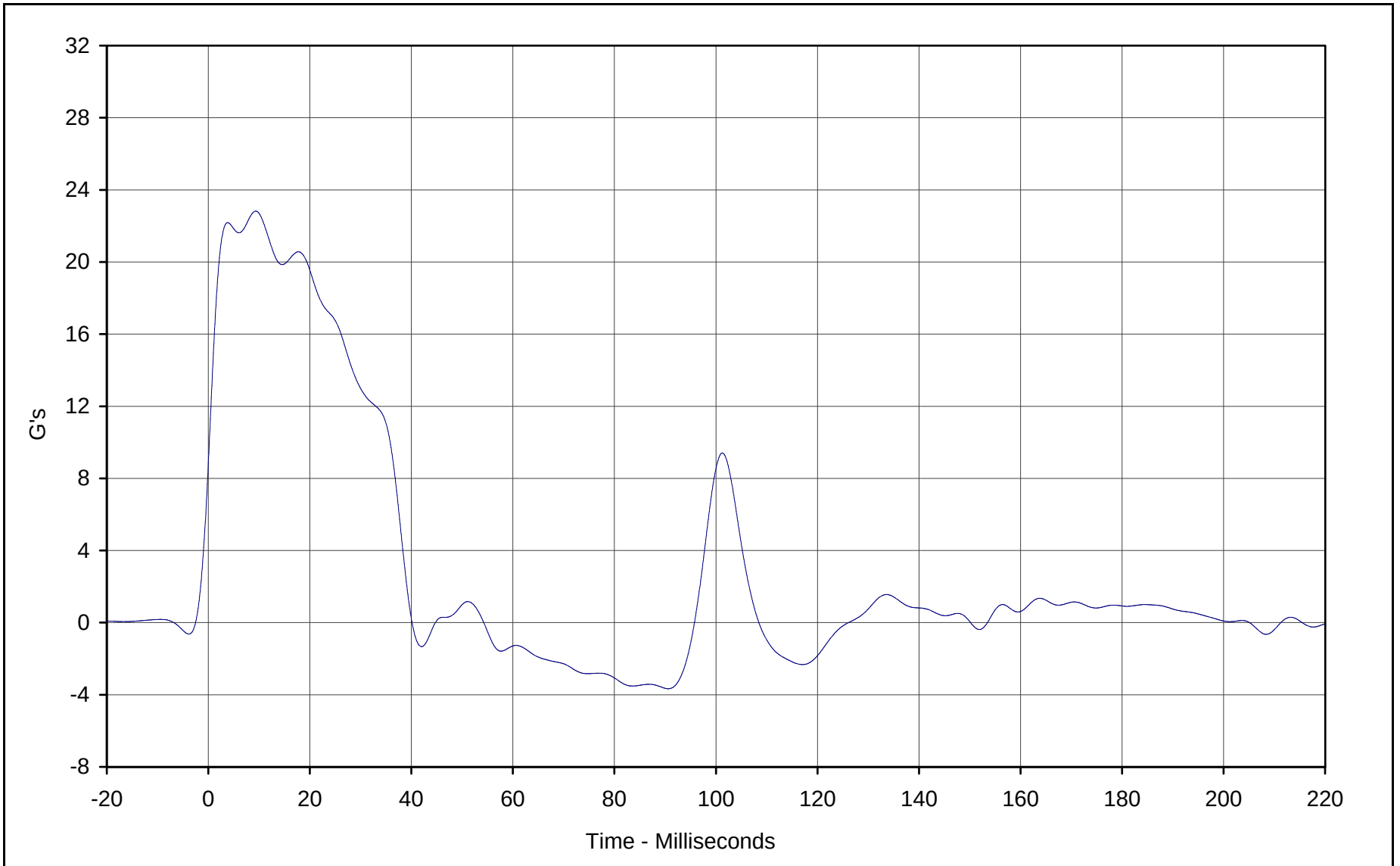
\_\_\_\_\_  
Laboratory Technician

\_\_\_\_\_  
January 3, 2001  
Test Date

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

\_\_\_\_\_  
Date

E-31



Curve Description: Pendulum Deceleration

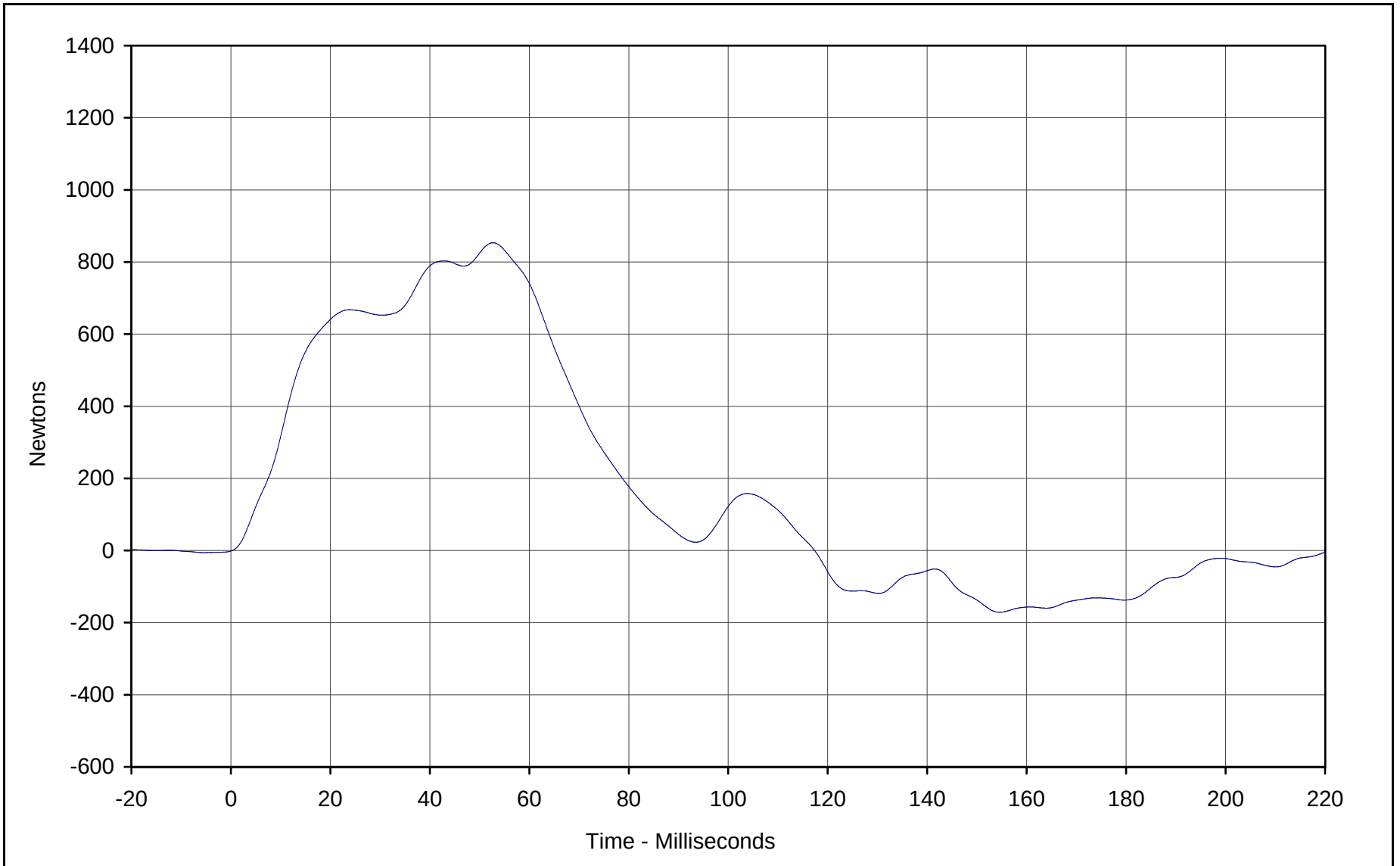
|                   |               |    |             |              |
|-------------------|---------------|----|-------------|--------------|
| Maximum Value:    | <u>22.8</u>   | at | <u>9.3</u>  | Milliseconds |
| Minimum Value:    | <u>-3.7</u>   | at | <u>90.6</u> | Milliseconds |
| SAE Filter Class: | <u>60</u>     |    |             |              |
| Date of Test:     | <u>1/3/01</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.: NF06B



KAR21001-02



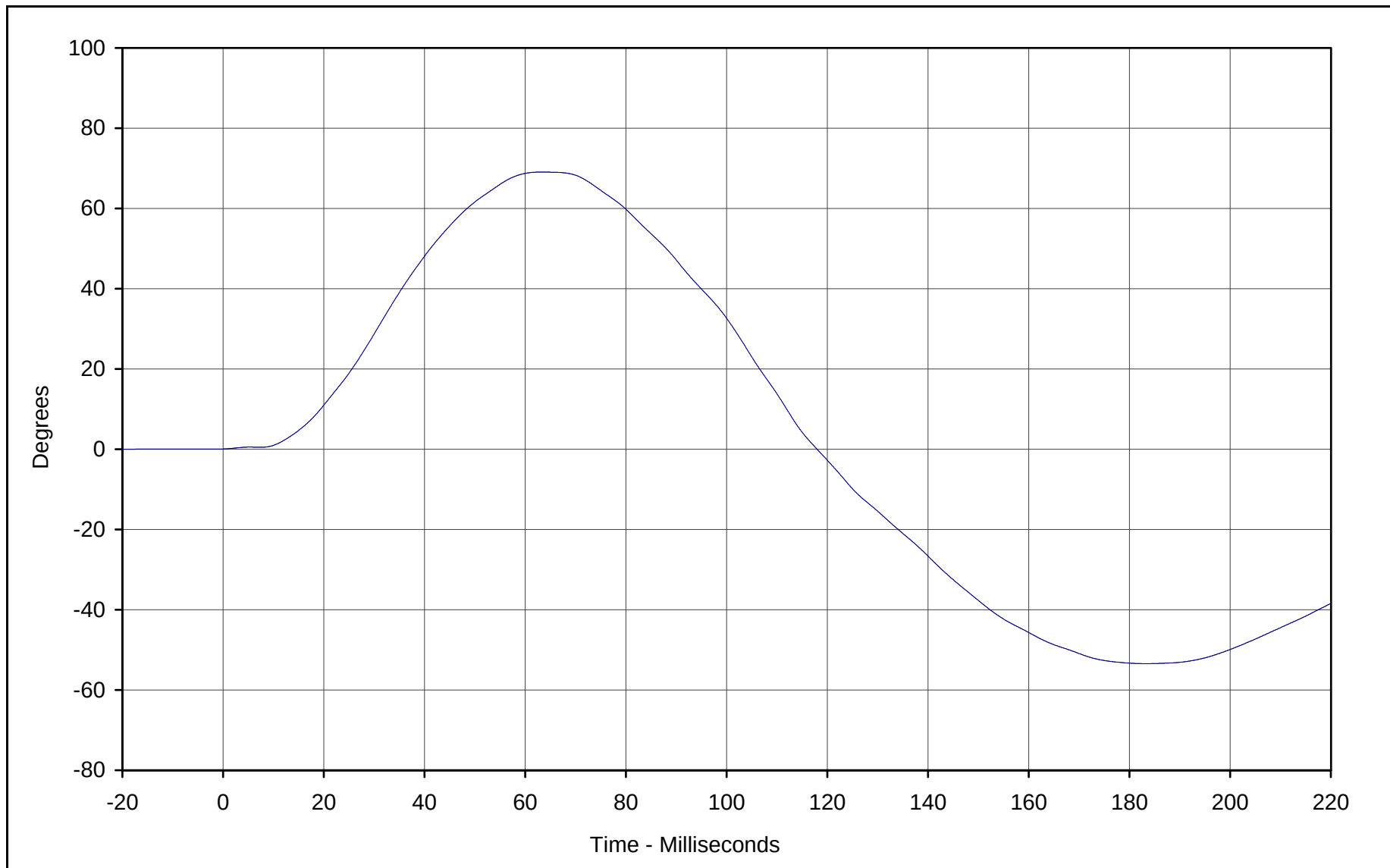
Curve Description: Neck Force X

|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 853.4  | at | 52.7  | Milliseconds |
| Minimum Value:    | -171.4 | at | 154.6 | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 035    |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF06B





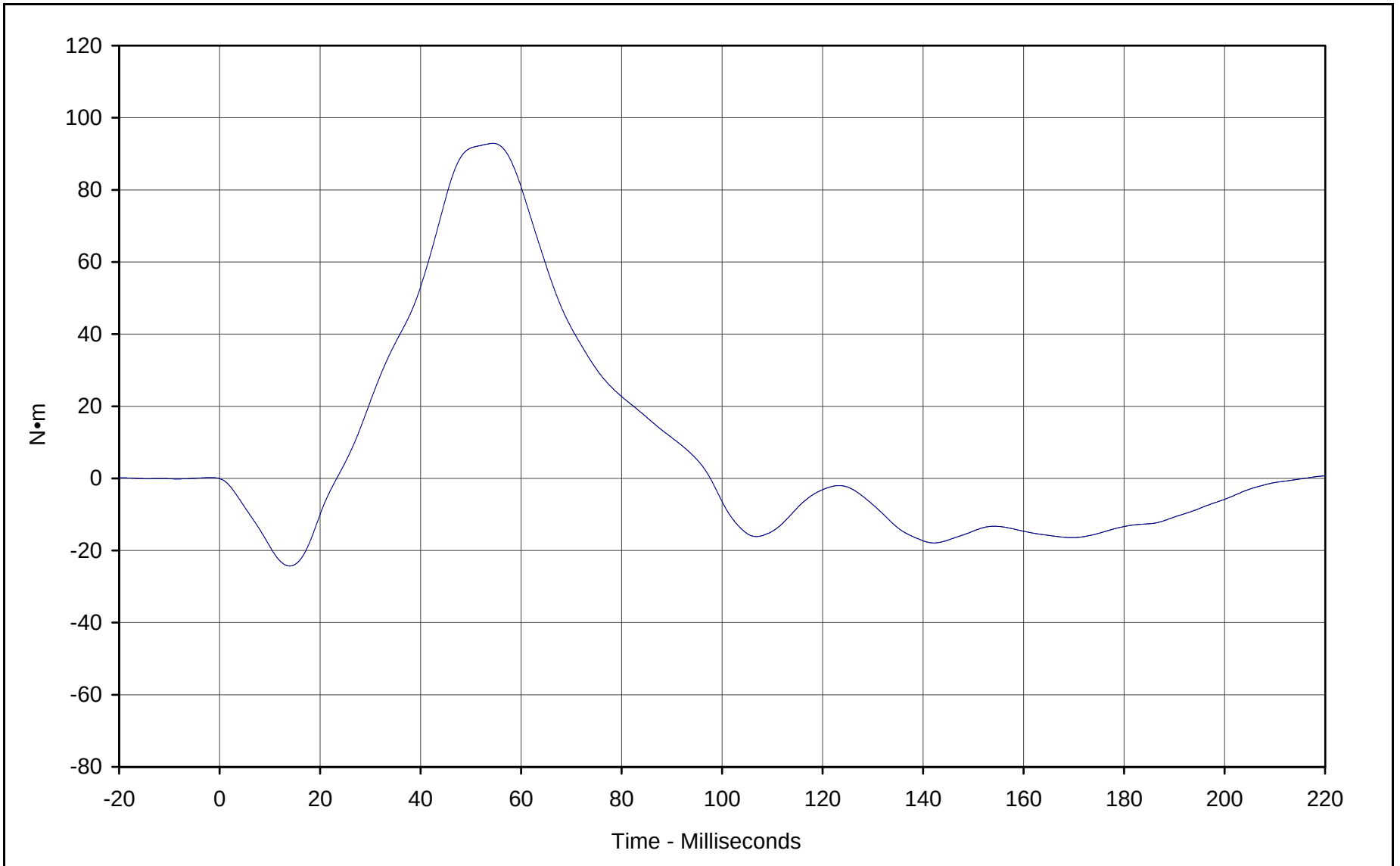
Curve Description: "D" Plane Rotation

|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 69.1   | at | 63.3  | Milliseconds |
| Minimum Value:    | -53.4  | at | 183.3 | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 035    |    |       |              |

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF06B





Curve Description: Moment About Occipital Condyles

Maximum Value: 92.9 at 54.4 Milliseconds

Minimum Value: -24.3 at 14.0 Milliseconds

SAE Filter Class: 60

Date of Test: 1/3/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF06B





# 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.: NE01B

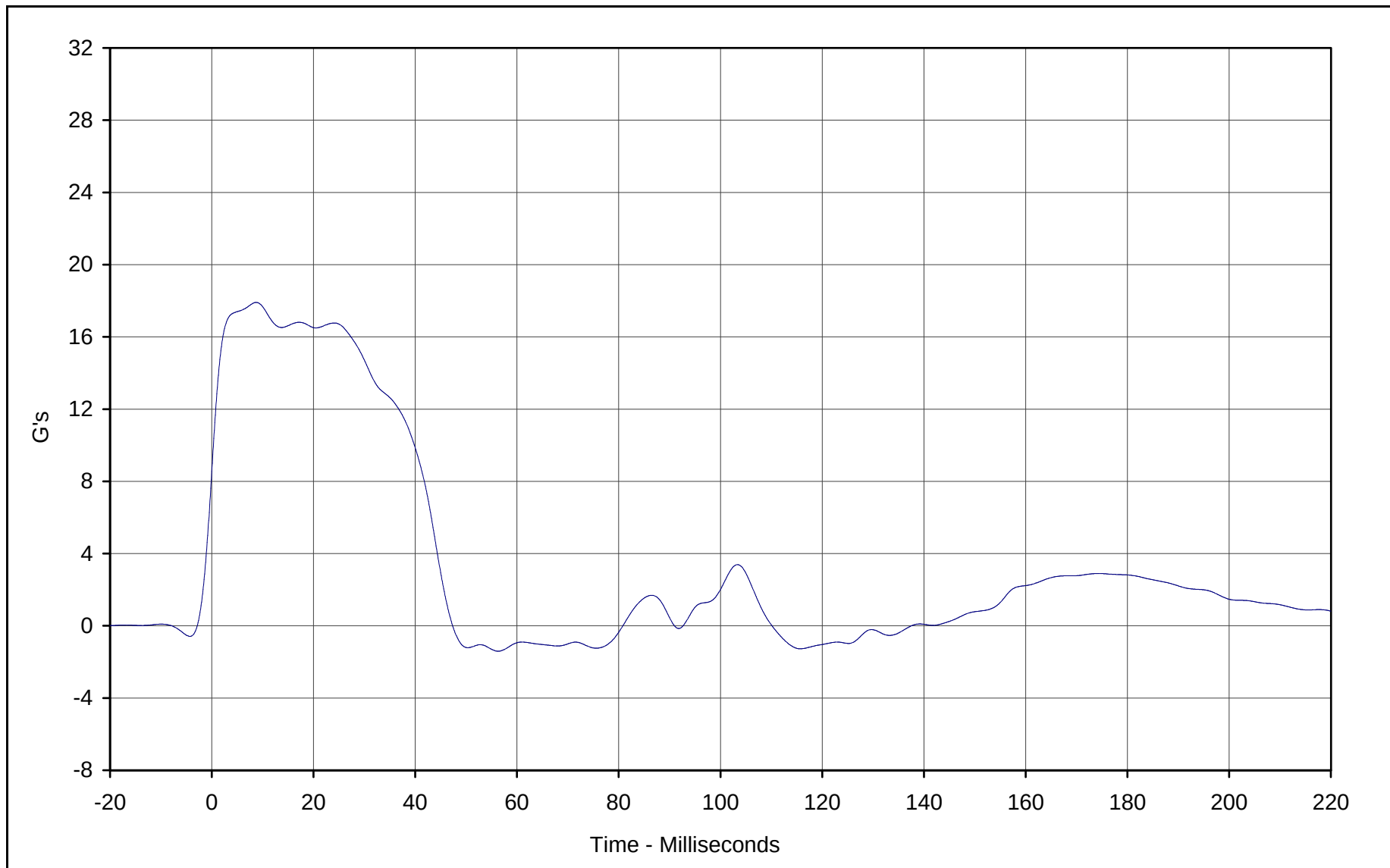
| Tested Parameter                                |          | Units   | Specification  | Result | Pass/Fail |
|-------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                          |          | °C      | 20.6 to 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   | 17.7   | Pass      |
|                                                 | 20 Msec. | G's     | 14.0 to 19.0   | 16.5   | Pass      |
|                                                 | 30 Msec. | G's     | 11.0 to 16.0   | 14.7   | Pass      |
| Peak Pendulum Decel. after 30 Msec.             |          | G's     | ≤ 22.0         | 14.7   | Pass      |
| Deceleration Decay, Time to Cross 5 G's         |          | Msec.   | 38.0 to 46.0   | 43.8   | Pass      |
| Maximum "D" Plane Rotation                      | Maximum  | Degrees | 81.0 to 106.0  | 93.2   | Pass      |
|                                                 | Time     | Msec.   | 72.0 to 82.0   | 78.5   | Pass      |
| "D" Plane Rotation Decay, Time To Zero Crossing |          | Msec.   | 147.0 to 174.0 | 149.9  | Pass      |
| Moment About Occipital Condyle                  | Maximum  | N•m     | -52.9 to- 79.9 | -68.2  | Pass      |
|                                                 | Time     | Msec.   | 65.0 to 79.0   | 66.0   | Pass      |
| Negative Moment Decay, Time To Zero Crossing    |          | Msec.   | 120.0 to 148.0 | 135.7  | Pass      |
| Overall Test Results                            |          |         |                |        | Pass      |

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

\_\_\_\_\_  
January 3, 2001  
Test Date

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

\_\_\_\_\_  
Date



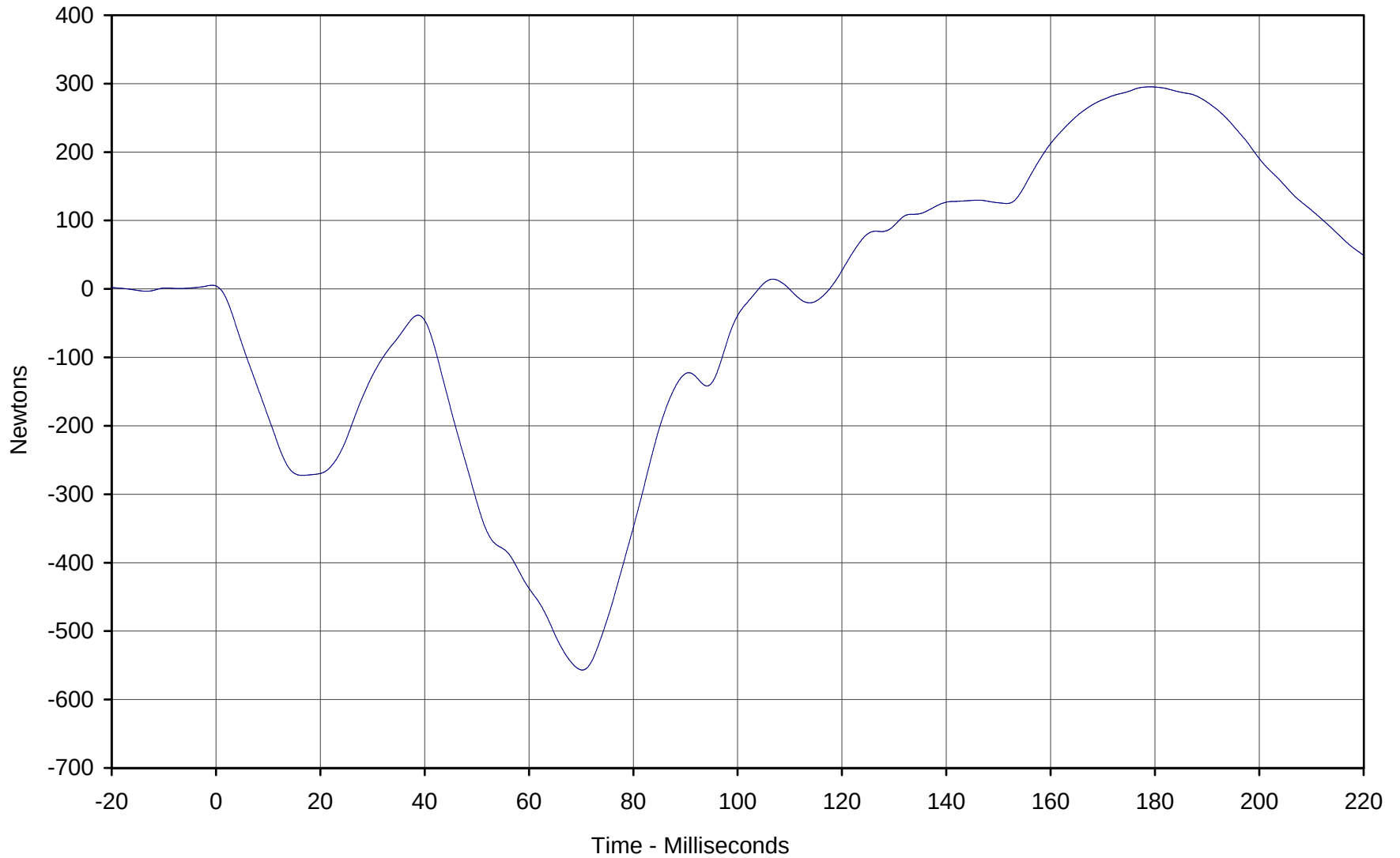
Curve Description: Pendulum Deceleration

|                   |               |    |             |              |
|-------------------|---------------|----|-------------|--------------|
| Maximum Value:    | <u>17.9</u>   | at | <u>8.7</u>  | Milliseconds |
| Minimum Value:    | <u>-1.4</u>   | at | <u>56.3</u> | Milliseconds |
| SAE Filter Class: | <u>60</u>     |    |             |              |
| Date of Test:     | <u>1/3/01</u> |    |             |              |
| ATD Serial No.:   | <u>035</u>    |    |             |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01B





Curve Description: Neck Force X

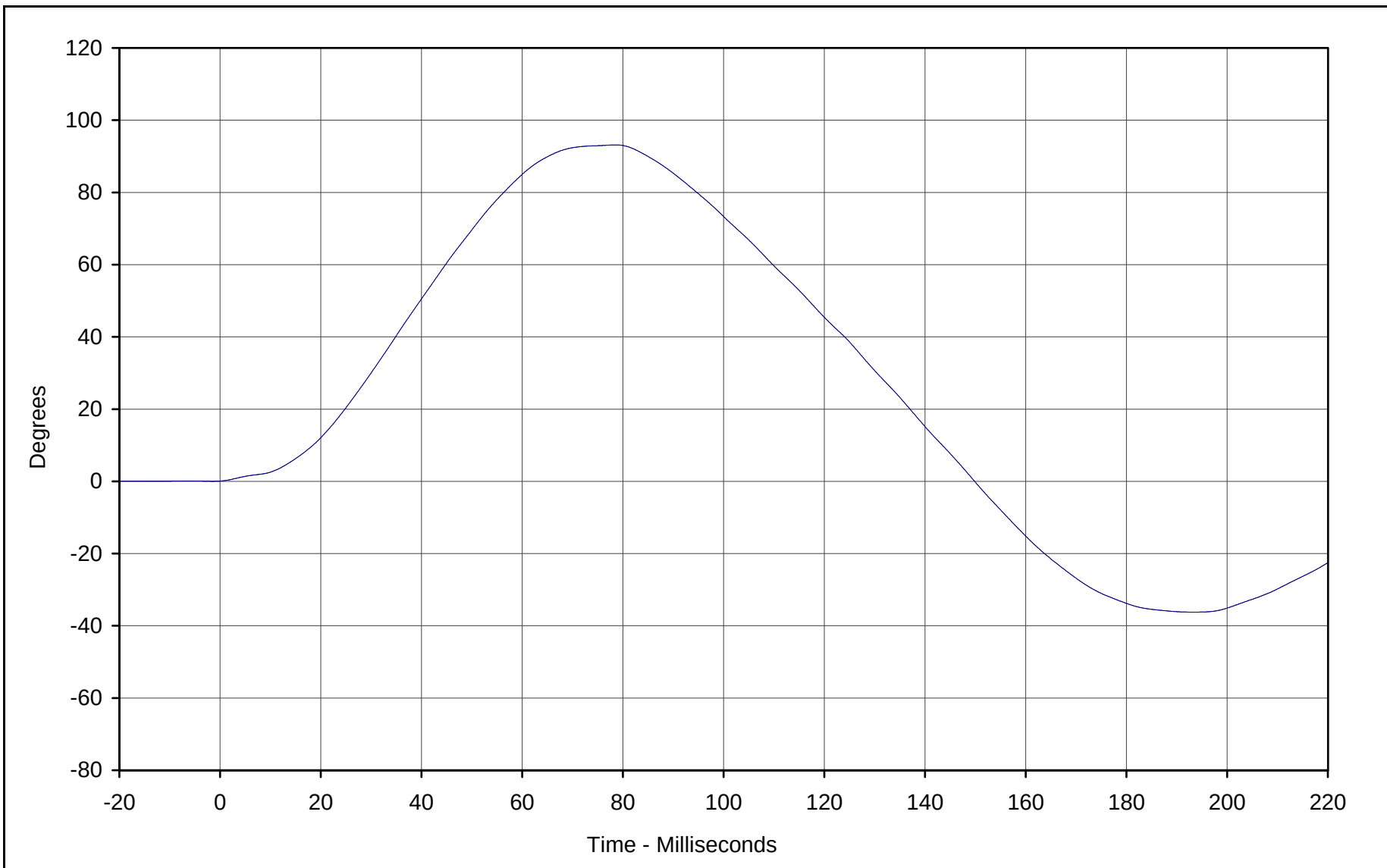
|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 295.3  | at | 179.1 | Milliseconds |
| Minimum Value:    | -556.9 | at | 70.2  | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 035    |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01B







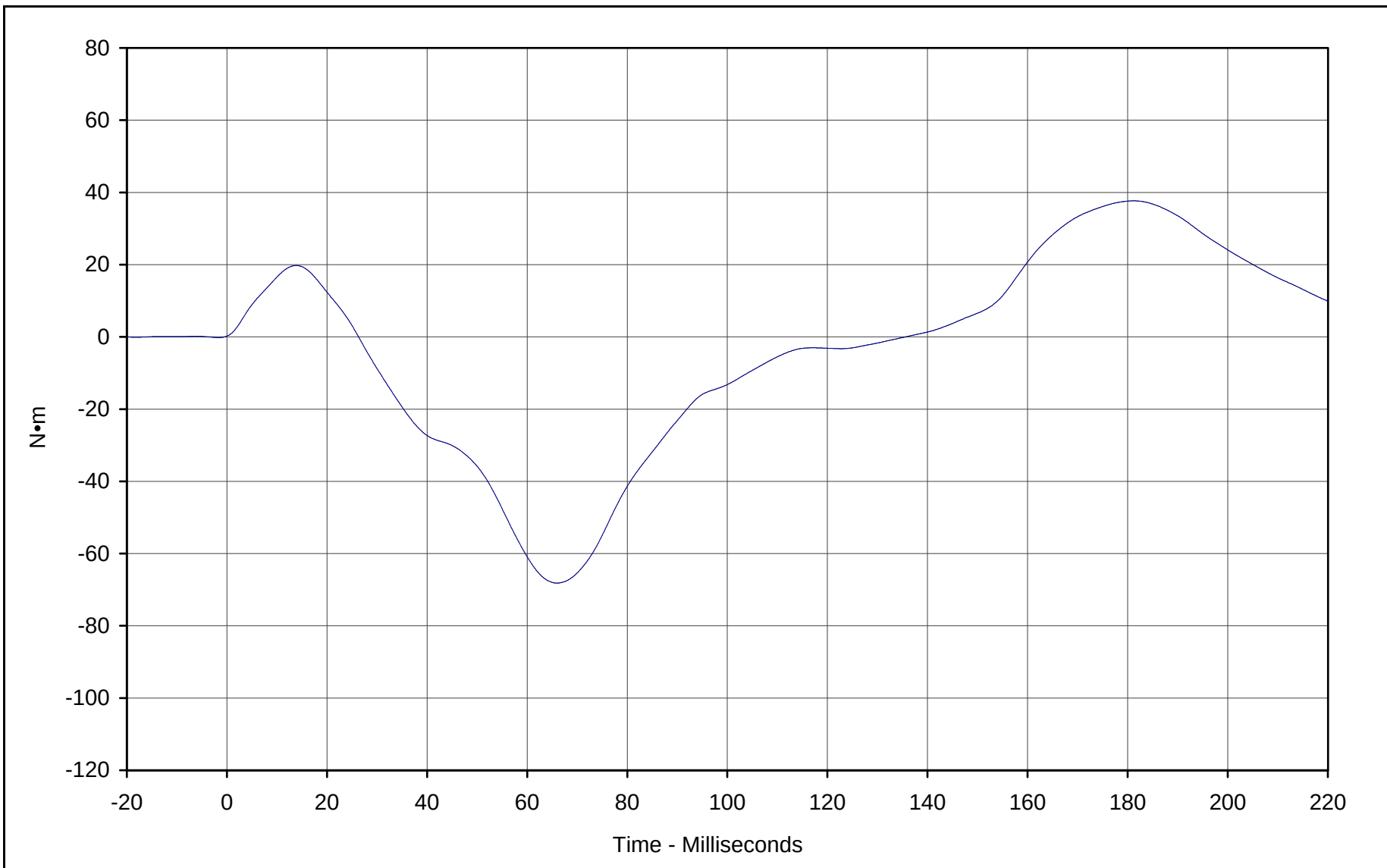
Curve Description: "D" Plane Rotation

|                   |        |    |       |              |
|-------------------|--------|----|-------|--------------|
| Maximum Value:    | 93.2   | at | 78.5  | Milliseconds |
| Minimum Value:    | -36.2  | at | 193.3 | Milliseconds |
| SAE Filter Class: | 60     |    |       |              |
| Date of Test:     | 1/3/01 |    |       |              |
| ATD Serial No.:   | 035    |    |       |              |

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01B





Curve Description: Moment About Occipital Condyles

Maximum Value: 37.7 at 181.2 Milliseconds

Minimum Value: -68.2 at 66.0 Milliseconds

SAE Filter Class: 60

Date of Test: 1/3/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01B





# 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      | 43     | 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      | 92     | Pass      |
| F - Thigh clearance                   | mm    | 140 to 155    | 145    | Pass      |
| G - Elbow back to wrist pivot         | mm    | 290 to 305    | 295    | Pass      |
| H - Skull cap to back line            | mm    | 41 to 46      | 44     | 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    | 585    | Pass      |
| L - Popliteal length                  | mm    | 429 to 455    | 435    | Pass      |
| M - Knee pivot height                 | mm    | 485 to 500    | 490    | Pass      |
| N - Buttock popliteal length          | mm    | 452 to 477    | 465    | Pass      |
| O - Chest depth                       | mm    | 213 to 229    | 220    | Pass      |
| P - Foot length                       | mm    | 251 to 267    | 260    | Pass      |
| V - Shoulder breadth                  | mm    | 422 to 437    | 430    | Pass      |
| W - Foot breadth                      | mm    | 91 to 107     | 100    | Pass      |
| Y - Chest circumference               | mm    | 970 to 1001   | 985    | Pass      |
| Z - Waist circumference               | mm    | 836 to 866    | 850    | Pass      |
| AA - Location for chest circumference | mm    | 429 to 434    | 430    | Pass      |
| BB - Location for waist circumference | mm    | 226 to 231    | 230    | Pass      |
| Overall Test Results                  |       |               |        | Pass      |

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

\_\_\_\_\_  
January 3, 2001  
Test Date

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

\_\_\_\_\_  
Date

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

Seats

While the vehicle is being driven, all vehicle occupants should have the seatback upright, sit well back in the seat and properly wear the seat belts provided.

 CAUTION

- Do not drive the vehicle unless the occupants are properly seated. Do not allow sitting on top of a folded-down seatback, or in the luggage compartment. Persons not properly seated and/or properly restrained by seat belts can be severely injured in the event of emergency braking or a collision.
- During driving, do not allow passengers to stand up or move around between seats. Severe injuries can occur in the event of emergency braking or a collision.

Front seats-  
-Seat adjustment  
precautions

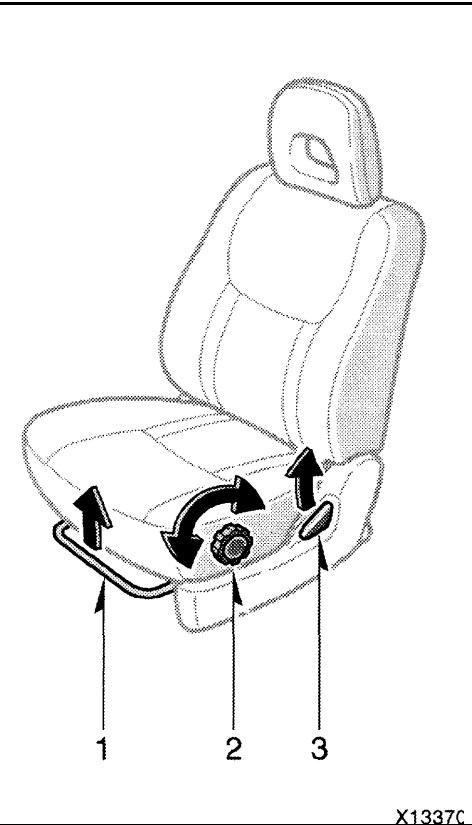
Adjust the driver's seat so that the foot pedals, steering wheel and instrument panel controls are within easy reach of the driver.

 CAUTION

- Adjustments should not be made while the vehicle is moving, as the seat may unexpectedly move and cause the driver to lose control of the vehicle.
- When adjusting the seat, be careful not to hit the seat against a passenger or luggage.
- After adjusting the seat position, try sliding it forward and backward to make sure it is locked in position.
- After adjusting the seatback, exert body pressure to make sure it is locked in position.
- Do not put objects under the seats. The objects may interfere with the seat-lock mechanism or unexpectedly push up the seat position adjusting lever; the seat may suddenly move, causing the driver to lose control of the vehicle.

 While adjusting the seat, do not put your hands under the seat or near the moving parts. You may catch and injure your hands or fingers.

-Adjusting front seats



1. SEAT POSITION ADJUSTING LEVER

Hold the center of the lever and pull it up. Then slide the seat to the desired position with slight body pressure and release the lever.

2. SEAT CUSHION ANGLE ADJUSTING KNOB

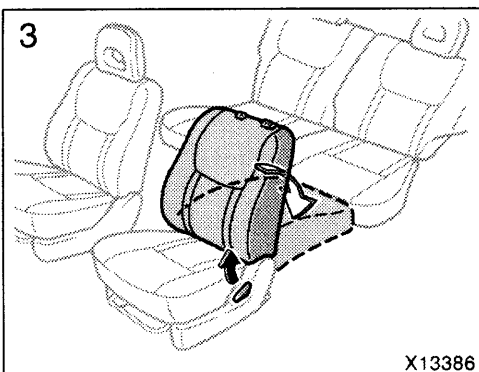
Turn the knob either way.

3. SEATBACK ANGLE ADJUSTING LEVER

Lean forward and pull the lever up. Then lean back to the desired angle and release the lever.

 CAUTION

To reduce the risk of sliding under the lap belt during a collision, avoid reclining the seatback any more than needed. The seat belts provide maximum protection in a frontal or rear collision when the driver and the passenger are sitting up straight and well back in the seats. If you are reclined, the lap belt may slide past your hips and apply restraint forces directly to the abdomen. Therefore, in the event of a frontal collision, the risk of personal injury may increase with increasing recline of the seatback.



3. Pull the seatback angle adjusting lever to unlock and push down the seatback.

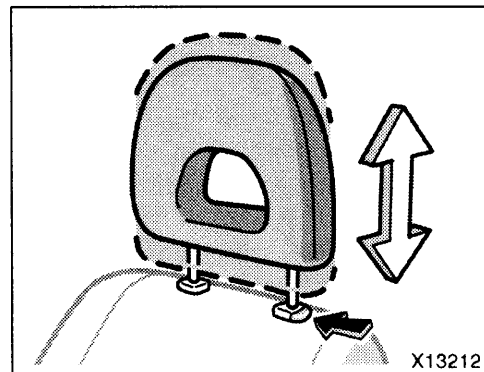
When returning the seatback upright, be careful not to make yourself hit by the seatback which will bound with considerable spring force.

After returning the seat to its original position, be certain to replace the head restraint.

**⚠ CAUTION**

- Do not allow passengers to ride on the flattened seat while driving; use the seat in the normal position.
- After putting back the seat, try pushing the seat and seatback forward and rearward to make sure it is secured in place. Be certain to replace head restraint.

## Head restraints



**For your safety and comfort, adjust the head restraint before driving.**

To raise: Pull it up.

To lower: Push it down while pressing the lock release button.

The head restraint is most effective when it is close to your head. Therefore, using a cushion on the seatback is not recommended.

**⚠ CAUTION**

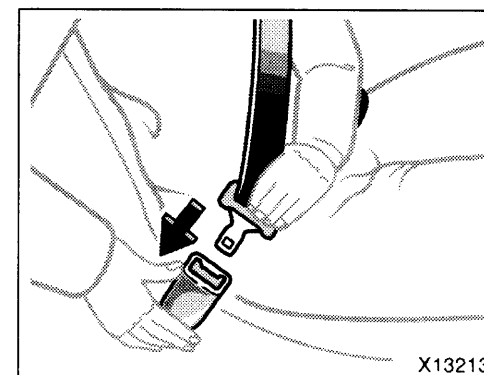
Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury or death in the event of sudden braking or a collision.

When using the seat belts, observe the following:

- Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (Refer to the seat adjustment instructions.)
- Be careful not to damage the belt webbing or hardware. Take care that they do not get caught or pinched in the seat or side doors.

- Inspect the belt system periodically. Check for cuts, fraying, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.
- Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners—they may severely weaken the belts. (See “Cleaning the interior” on page 207 in Section 5.)
- Replace the belt assembly (including bolts) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

## —Front and rear seat belts

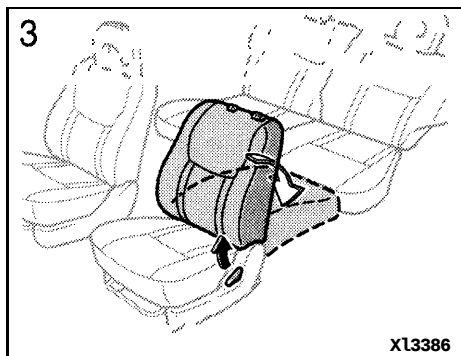


Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.



3. Pull the **seatback angle** adjusting lever to unlock and push down the seatback.

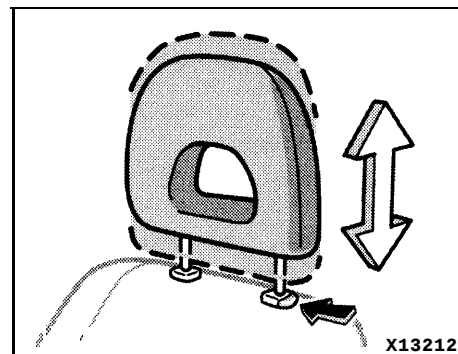
When returning the **seatback** upright, be careful not to make yourself hit by the **seatback** which will bound with considerable spring force.

After returning the seat to its original position, be certain to replace the head restraint.

### CAUTION

- Do not allow passengers to ride on the flattened seat while driving; use the seat in the normal position.
- After putting back the seat, try pushing the seat and **seatback** forward and rearward to make sure it is secured in place. Be certain to replace head restraint.

## Head restraints



For your safety and comfort, adjust the head restraint before driving.

To raise: Pull it up.

To lower: Push it down while pressing the lock release button.

The head restraint is most effective when it is close to your head. Therefore, using a cushion on the **seatback** is not recommended.

39

### CAUTION

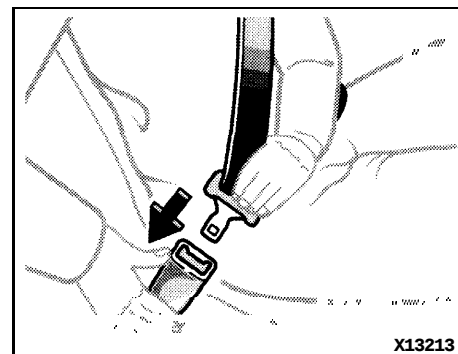
Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury or death in the event of sudden braking or a collision.

When using the seat belts, observe the following:

- Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (Refer to the seat adjustment instructions.)
- Be careful not to damage the belt webbing or hardware. Take care that they do not get caught or pinched in the seat or side doors.

- Inspect the belt system periodically. Check for cuts, fraying, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.
- Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners—they may severely weaken the belts. (See "Cleaning the interior" on page 207 in Section 5.)
- Replace the belt assembly (including bolts) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

## -Front and rear seat belts



Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.

**CAUTION**

- Adjust the center of the head restraint so that it is closest to the top of your ears.
- After adjusting the head restraint, make sure it is locked in position.
- Do not drive with the head restraints removed.

## Seat belts- -Seat belt precautions

Toyota strongly urges that the driver and passengers in the vehicle be properly restrained at all times with the seat belts provided. Failure to do so could increase the chance of injury and/or the severity of injury in accidents.

**Child.** Use a child restraint system appropriate for the child until the child becomes large enough to properly wear the vehicle's seat belts. See "Child restraint" on page 57 for details.

If a child is too large for a child restraint system, the child should sit in the rear seat and must be restrained using the vehicle's seat belt. According to accident statistics, the child is safer when properly restrained in the rear seat than in the front seat.

If a child must sit in the front seat, the seat belts should be worn properly. If an accident occurs and seat belts are not worn properly, the force of the rapid inflation of the **airbag** may cause death or serious injury to the child.

Do not allow the child to stand up or kneel on either rear or front seats. An unrestrained child could suffer serious injury or death during emergency braking or a collision. Also, do not let the child sit on your lap. It does not provide sufficient restraint.

**Pregnant woman.** Toyota recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

**Injured person.** Toyota recommends the use of a seat belt. Depending on the injury, first check with your doctor for specific recommendations.

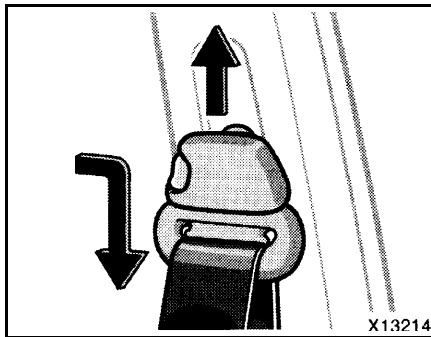
40

If the seat belt cannot be pulled out of the retractor, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.

When a passenger's shoulder belt is completely extended and is then retracted even slightly, the belt is locked in that position and cannot be extended. This feature is used to hold the child restraint system securely. (For details, see "Child restraint" on page 57 in this section.) To free the belt again, fully retract the belt and then pull the belt out once more.

**CAUTION**

- After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.
- Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.
- If the seat belt does not function normally, immediately contact your Toyota dealer. Do not use the seat until the seat belt is fixed. It cannot protect an adult occupant or your child from injury.



### Seat belts with an adjustable shoulder anchor—

**Adjust the shoulder anchor position to your size.**

To raise: Slide the anchor up.

To lower: Push in the lock release button and slide the anchor down.

After adjustment, make sure the anchor is locked in position.

**CAUTION**

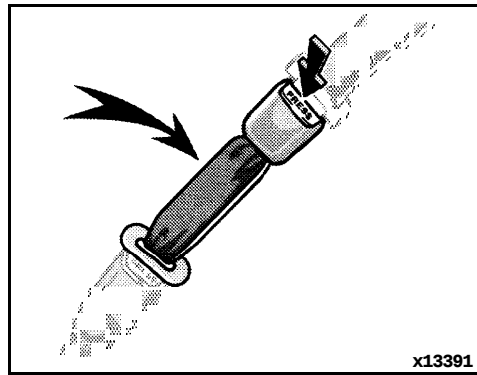
**Always make sure the shoulder belt is positioned across the center of your shoulder. The belt should be kept away from your neck, but not falling off your shoulder. Failure to do so could reduce the amount of protection in an accident and cause serious injuries in a collision.**



## ⚠ CAUTION

When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle-release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle-release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

## ⚠ CAUTION

- After inserting the tab, make sure the tab and buckle are locked and that the seat belt extender is not twisted.
- Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.
- If the seat belt does not function normally, immediately contact your Toyota dealer. Do not use the seat until the seat belt is fixed. It cannot protect an adult occupant or your child from injury.

When the front seat belt pretensioners are activated, an operating noise may be heard and a small amount of smoke-like gas may be released. This gas is harmless and does not indicate that a fire is occurring.

Once the front seat belt pretensioners have been activated, the seat belt retractors remain locked.

## ⚠ CAUTION

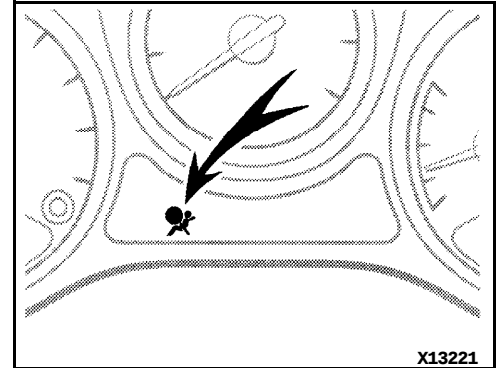
Do not modify, remove, strike or open the front seat belt pretensioner assemblies, airbag sensor or surrounding area or wiring. Doing any of these may cause sudden operation of the front seat belt pretensioners or disable the system, which could result in death or serious injury.

Failure to follow these instructions can result in death or serious injuries.

## NOTICE

**Do not perform any of the following changes without consulting your Toyota dealer. Such changes can interfere with proper operation of the front seat belt pretensioners in some cases.**

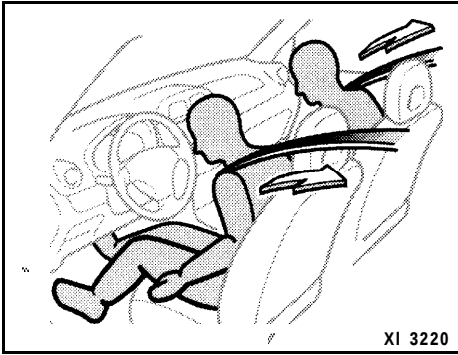
- ◆ Installation of electronic devices such as a mobile two-way radio, cassette tape player or compact disc player
- ◆ Repairs on or near the front seat belt retractor assemblies
- ◆ Modification of the suspension system
- ◆ Modification of the front end structure
- ◆ Attachment of a grille guard (bull bar, kangaroo bar, etc.), snowplow, winches or any other equipment to the front end
- ◆ Repairs made on or near the front fenders, front end structure or console



This front seat belt pretensioner system has a service reminder indicator to inform the driver of operating problems. If any of the following conditions occurs, this indicates a malfunction of the airbags or pretensioners. Contact your Toyota dealer as soon as possible to service the vehicle.

- The light does not come on when the ignition key is turned to the "ON" position, or the light remains on.
- The light comes on or flashes while driving.
- If either front seat belt does not retract or cannot be pulled out due to a malfunction or activation of the relevant front seat belt pretensioner.

## -Front seat belt pretensioners

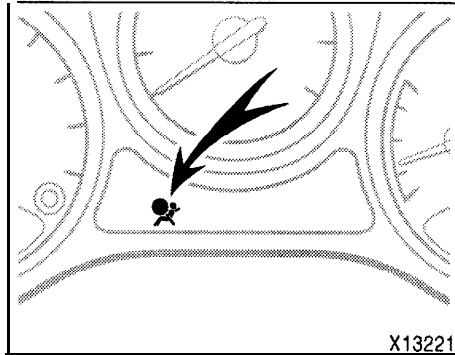


The driver and front passenger's seat belt pretensioners are designed to be activated in response to a severe frontal impact.

When the airbag sensor detects the shock of a severe frontal impact, the front seat belts are quickly drawn back in by the retractors so that the belts snugly restrain the front seat occupants.

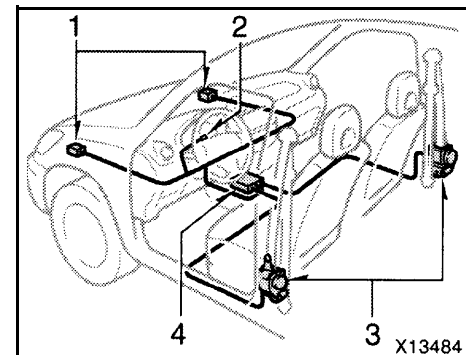
The front seat belt pretensioners are activated even with no passenger in the front seat.

Collisions occurring at certain speeds and angles may cause the seat belt pretensioners and SRS airbags not to operate all together.



This indicator comes on when the ignition key is turned to the "ON" position. It goes off after about 6 seconds. This means the front seat belt pretensioners are operating properly.

This warning light system monitors the airbag sensor assembly, front airbag sensors, front seat belt pretensioner assemblies, inflators, warning light, interconnecting wiring and power sources. (For details, see "Service reminder indicators and warning buzzers" on page 90 in Section I-5.)



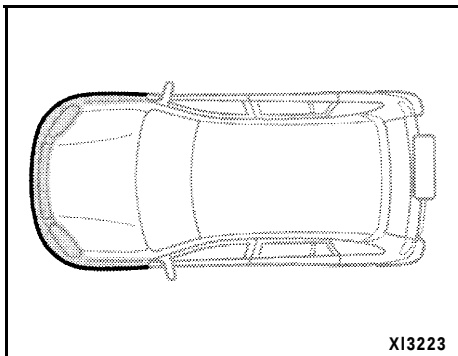
The front seat belt pretensioner system mainly consists of the following components and their locations are shown in the illustration.

1. Front airbag sensors
2. SRS warning light
3. Front seat belt pretensioner assemblies
4. Airbag sensor assembly

The front seat belt pretensioners are controlled by the airbag sensor assembly. The airbag sensor assembly consists of a safing sensor and airbag sensor.

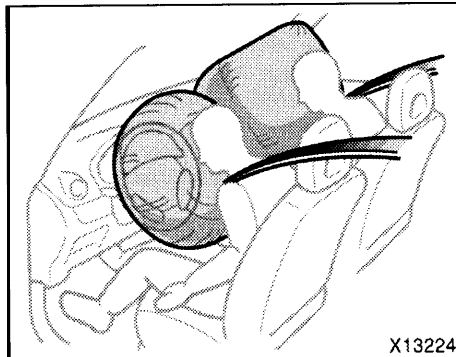
48

## SRS driver and front passenger airbags



In the following cases, contact your Toyota dealer as soon as possible:

- The front part of the vehicle (shaded in the illustration) was involved in an accident that was not severe enough to cause the front seat belt pretensioners to operate.
- Either front seat belt pretensioner assembly or surrounding area is scratched, cracked, or otherwise damaged.



The SRS (Supplemental Restraint System) airbags are designed to provide further protection for the driver and front passenger in addition to the primary safety protection provided by the seat belts.

In response to a severe frontal impact, the SRS airbags work together with the seat belts to help reduce injury by inflating. The SRS airbags help to reduce injuries mainly to the driver's or front passenger's head or chest caused by directly hitting the steering wheel or dashboard. The front passenger airbag is activated even with no passenger in the front seat.

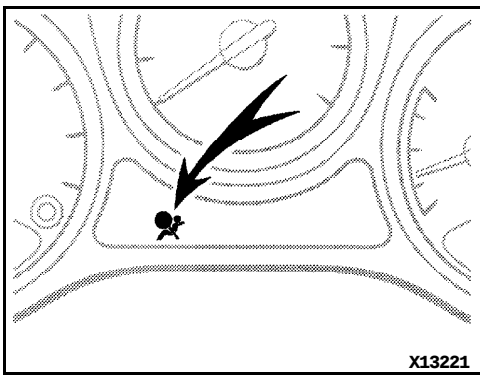
Be sure to wear your seat belt properly.

Your vehicle is equipped with a crash sensing and diagnostic module, which will record the use of the seat belt restraint system by the driver and front passenger when the SRS airbags are inflated.

### CAUTION

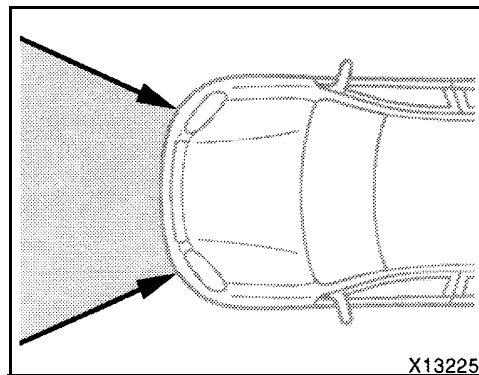
A driver or front passenger too close to the steering wheel or dashboard during airbag deployment can be killed or seriously injured. Toyota strongly recommends that:

- The driver sit as far back as possible from the steering wheel while still maintaining control of the vehicle.
- The front passenger sit as far back as possible from the dashboard.
- All vehicle occupants be properly restrained using the available seat belts.



This indicator comes on when the ignition key is turned to the “ON” position. It goes off after about 6 seconds. This means the SRS airbags are operating properly.

This warning light system monitors the airbag sensor assembly, front airbag sensors, front seat belt pretensioner assemblies, inflators, warning light, interconnecting wiring and power sources. (For details, see “Service reminder indicators and warning buzzers” on page 90 in Section I-5.)



The SRS airbag system is designed to activate in response to a severe frontal impact within the shaded area between the arrows in the illustration.

The SRS airbags will deploy if the severity of the impact is above the designed threshold level, comparable to an approximate 25 km/h (15 mph) collision when impacting straight into a fixed barrier that does not move or deform.

If the severity of the impact is below the above threshold level, the SRS airbags may not deploy.

However, this threshold velocity will be considerably higher if the vehicle strikes an object, such as a parked vehicle or sign pole, which can move or deform on impact, or if it is involved in an underride collision (e.g. a collision in which the nose of the vehicle “underrides”, or goes under, the bed of a truck, etc.).

It is possible that in some collisions at the lower zone of airbag sensor detection and activation the SRS airbags and front seat belt pretensioners will not operate all together.

For the safety of all occupants, always wear your seat belts properly.

51

In a severe frontal impact, the sensors detect deceleration and the system triggers the airbag inflators. Then a chemical reaction in the inflators quickly fills the airbags with non-toxic gas to help restrain the forward motion of the occupants.

When the airbags inflate, they produce a fairly loud noise and release some smoke and residue along with non-toxic gas. This does not indicate a fire. This gas is normally harmless; however, for those who have delicate skin, it may cause a minor skin irritation. Be sure to wash off any residue as soon as possible to prevent any potential skin irritation.

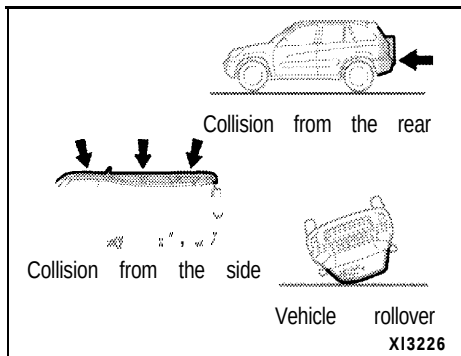
Deployment of the airbags happens in a fraction of a second, so the airbags must inflate with considerable force. While the system is designed to reduce serious injuries, it may also cause minor burns or abrasions and swelling.

Parts of the airbag module (steering wheel hub, dashboard) may be hot for several minutes, but the airbags themselves will not be hot. The airbags are designed to inflate only once.

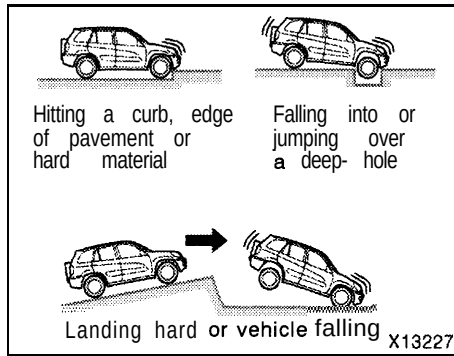
A crash severe enough to inflate the airbags may break the windshield as the vehicle buckles. In vehicles with a passenger airbag the windshield may also be damaged by absorbing some of the force of the inflating airbag.

### ⚠ CAUTION

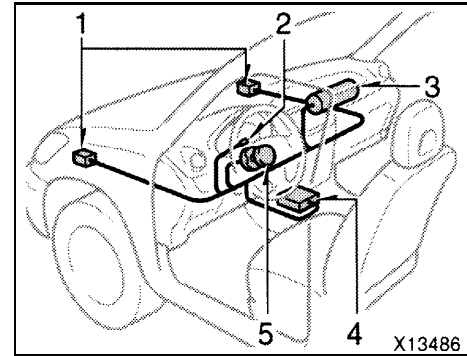
- The SRS airbag system is designed only as a supplement to the primary protection of the driver side and front passenger side seat belt systems. The front seat occupants can be killed or seriously injured by the inflating airbags if they do not wear the available seat belts properly. During sudden braking just before a collision, an unrestrained driver or front passenger can move forward into direct contact with or close proximity to the airbag which may then deploy during the collision. To ensure maximum protection in an accident, the driver and all passengers in the vehicle must wear their seat belts properly. Wearing a seat belt properly during an accident reduces the chances of death or serious injury or being thrown out of the vehicle. For instructions and precautions concerning the seat belt system, see “Seat belts” on page 40 in this section.



The SRS airbags are not designed to inflate if the vehicle is involved in a side or rear collision, if it rolls over, or if it is involved in a low-speed frontal collision.



The SRS airbags may deploy if a serious impact occurs to the underside of your vehicle. Some examples are shown in the illustration.



The SRS airbag system consists mainly of the following components, and their locations are shown in the illustration.

1. Front airbag sensors
2. SRS warning light
3. Airbag module for front passenger (airbag and inflator)
4. Airbag sensor assembly
5. Airbag module for driver (airbag and inflator)

The airbag sensor assembly consists of a safing sensor and airbag sensor,

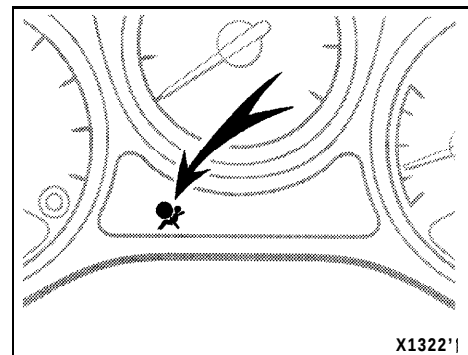
- Do not modify or remove any wiring. Do not modify, remove, strike or open any components, such as the steering wheel pad, steering wheel, column cover, front passenger airbag cover, front passenger airbag or airbag sensor assembly. Doing any of these may cause sudden SRS airbag inflation or disable the system, which could result in death or serious injury.

Failure to follow these instructions can result in death or serious injury.

#### NOTICE

*Do not perform any of the following changes without consulting your Toyota dealer. Such changes can interfere with proper operation of the SRS airbag system in some cases.*

- ◆ Installation of electronic devices such as a mobile two-way radio, cassette tape player or compact disc player
- ◆ Modification of the suspension system
- ◆ Modification of the front end structure
- ◆ Attachment of a grille guard (bull bar, kangaroo bar, etc.), snowplow, winches or any other equipment to the front end
- ◆ Repairs made on or near the front fenders, front end structure, console, steering column, steering wheel or dashboard near the front passenger airbag



This SRS airbag system has a service reminder indicator to inform the driver of operating problems. If either of the following conditions occurs, this indicates a malfunction of the airbags. Contact your Toyota dealer as soon as possible to service the vehicle.

- The light does not come on when the ignition key is turned to the "ON" position, or the light remains on.
- The light comes on while driving.