

REPORT NUMBER KAR21001-04

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

**GENERAL MOTORS CORPORATION
2001 PONTIAC GRAND AM SE
2 DOOR COUPE
NHTSA NUMBER: M10115**

**PREPARED BY:
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FEBRUARY 5, 2001

FINAL REPORT

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2001 Pontiac Grand Am SE 2 Door Coupe at KARCO Engineering on 1/11/01. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 55.90 km/h. The ambient temperature at the barrier face at the time of impact is 7.7 degrees Celcius. The vehicle's maximum post test static crush is 463 mm to the right side of the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and second generation supplemental airbags in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:				
Measurement Description	Units	Threshold	Driver ATD	Passenger ATD
Head Injury Criteria (HIC)	N/A	1000	575.1	493.2
Max. Thorax Accel. (3 msec Clip)	G's	60	42.4	42.0
Left Femur force	Newtons	10009	-4644.5	-4316.0
Right Femur Force	Newtons	10009	-2872.9	-2219.9
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TABLE OF CONTENTS

Section		Page
1	Purpose, Test Procedures and Summary of Test M10115	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 M10115

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 11, 2001 at a speed of 55.90 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 re-calibrated for this test. FMVSS 208 "Occupant Crash Protection" injury criteria were not exceeded by either ATD during this frontal barrier impact test.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A rigid load cell barrier was impacted by a 2001 Pontiac Grand Am 2 Door Coupe at a velocity of 55.90 km/h. The test vehicle weight is 1582 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 10, 2001 NCAP test. The test vehicle is a gasoline-powered vehicle, equipped with a transverse mounted, 4-cylinder engine and a 4-speed automatic transmission.

The driver Head Injury Criteria (HIC) is 575.1. The maximum resultant chest deceleration over three (3) milliseconds is 42.4 g's. The left and right femur loads are -4644.5 and -2872.9 Newton's, respectively. Chest deflection for the driver ATD peaked at -23.6 mm. The driver ATD head contacted the airbag 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 493.2. The maximum resultant chest deceleration over three (3) milliseconds is 42.0 g's. The left and right femur loads are -4316.0 and -2219.9 Newton's respectively. Chest deflection for the passenger ATD peaked at -29.7 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 137.7 mm for the driver ATD and 146.8 mm for the passenger ATD. Shoulder belt stretch not measured with pretensioners.

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

The test vehicle sustained a maximum static crush of 463 mm located to the right of the vehicle centerline. Both the driver and passenger side doors opened without the aid of tools.

1.4 GENERAL COMMENTS

The 2001 Pontiac Grand Am 2 Door Coupe passed the requirements of FMVSS 208, FMVSS 212, FMVSS 219 and FMVSS 301-75. Data pertaining to these standards are presented in the data sheets.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. Appendix B contains the dummy and vehicle response data traces. Appendix C contains Load Cell Barrier information. Appendix D contains the instrumentation data channel assignments. Appendix E contains the dummy calibration data and Appendix F contains the owner's manual instructions for the occupant seating and restraint systems.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

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 ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	=(tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

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

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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
Test Date: 01/11/01

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	55.90
Test Weight	kg	1582
Impact Angle	degrees	0
Average Rebound	mm	1118
Maximum Static Crush	mm	463

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Opened	Opened
Rear Door Opening	N/A	N/A
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	Airbag/Headrest
Chest Contact	Airbag/Belt	Airbag/Belt
Abdomen Contact	Airbag/Belt	Airbag/Belt
Left Knee Contact	Dash	Glove Box
Right Knee Contact	Dash	Glove Box

16mm MOVIE COVERAGE

High Speed	17
Real Time	1
Total	18

DATA CHANNELS

Driver ATD Sensors	40
Passenger ATD Sensors	40
Belt Assessment Sensors	8
Vehicle Structure Accelerometers	8
Rigid Barrier Load Cells	24
Total	120

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
 Test Date: 01/11/01

TEST VEHICLE INFORMATION

Make	Pontiac
Model	Grand Am
Body Style	2 Door Coupe
NHTSA No.	M10115
VIN	1G2NE12T11M523711
Color	Red
Delivery Date	12/12/00
Odometer Reading (mile)	27
Dealer	MGA Corporation
Transmission	4-Speed Automatic
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.4
Engine Placement	Transverse

TEST VEHICLE OPTIONS

Driver Airbag	Yes
Passenger Airbag	Yes
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
CruiseControl	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors Corporation	GVWR (kg)	1784
Date of Manufacture	August-00	GAWR Front (kg)	1001
		GAWR Rear (kg)	783

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	210
Cold Pressure (kPa)	210	210
Recommend Tire Size	P215/60/r15	P215/60/r15
Tire Size on Vehicle	P215/60/r15	P215/60/r15
Tire Manufacturer	B. F. Goodrich	B. F. Goodrich

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	None	
Number of Occupants	2	3	0	5
Capacity Wt. (VCW) (kg)				408
Cargo Weight (RCLW) (kg)				68

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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
 Test Date: 01/11/01

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	437	244		479	314	
Right	kg	448	239		482	307	
Ratio	%	64.7	35.3		60.7	39.3	
Totals	kg	885	483	1368	961	621	1582

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1368
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Weight (RCLW)	kg	68
Calculated Vehicle Target Weight (TVTW)	kg	1588

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	680	678	704	711	959
As Tested	mm	664	665	675	682	1068

Vehicle Wheel ba(mm): 2718

Weight of Ballast secured in cargo area (kg): 7

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): 54.1

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

Actual Test Volume with entire fuel System Filled (L): 50.3

Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.764

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

Is Vehicle Fuel Pump Electric or Mechanical?: Electric

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

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

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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
Test Date: 01/11/01

SPEED TRAP DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.51 to 57.12	55.90
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	56.10
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	4371	4109	-262
Center	mm	4723	4272	-451
Right Side	mm	4371	4041	-330

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1215
Center	mm	990
Right Side	mm	1150
Average	mm	1118

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

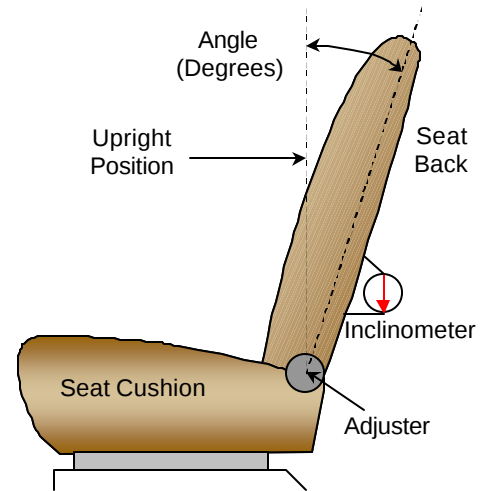
Test Date: 01/11/01

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: 27° with a seated dummy

Passenger seat back angle: 27° with a seated dummy



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

Both driver and passenger seats have 25 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: 25 seating positions or detents

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

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

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

SEAT BELT UPPER ANCHORAGE

The test vehicle was equipped with non-adjustable anchorages for both driver and passenger seat positions.

DATA SHEET NO. 4...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

FUEL TANK CAPACITY DATA

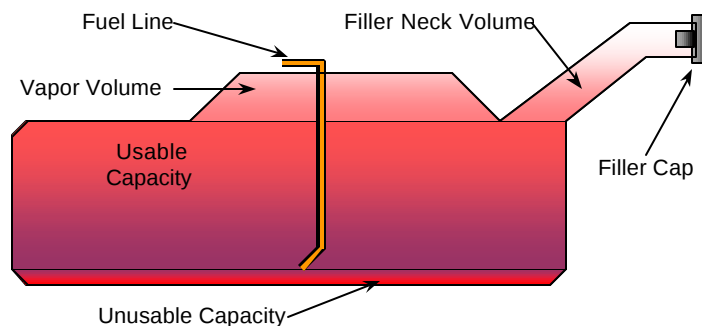
The "Usable Capacity" of the standard equipment fuel tank is: 54.1 liters

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

"Usable Capacity" used for certification tests FMVSS 301 requirements: 49.7 to 50.8 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 50.3 liters

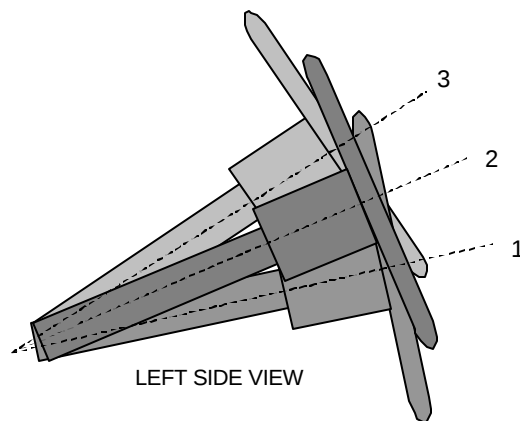
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies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



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed onto the plate and the angle is measured. The tested vehicle has its steering column set to the geometric center, or position 3.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 11.0°

Geometric center, position 2: 21.5°

Uppermost, position 3: 30.0°

DATA SHEET NO. 5

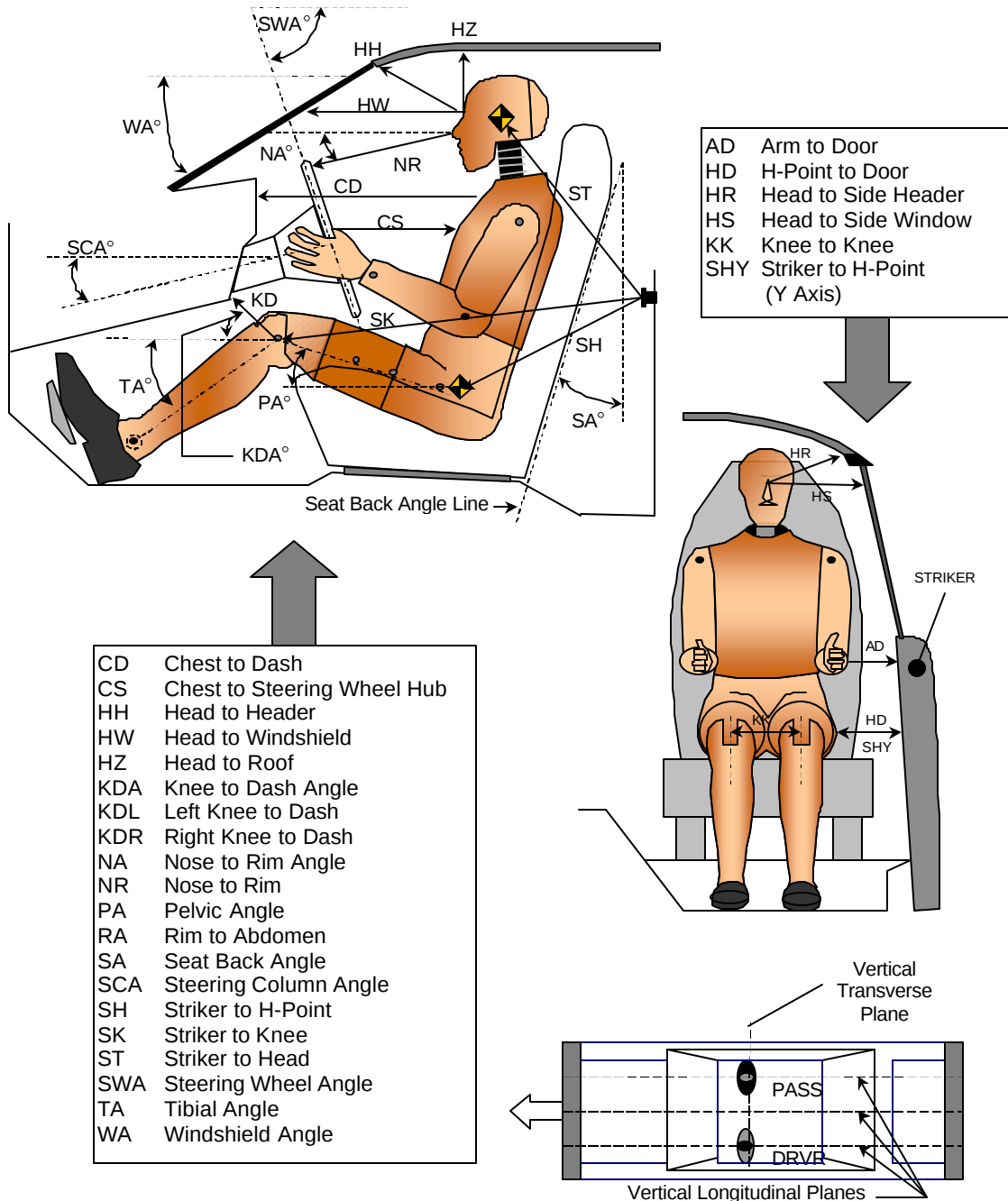
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01



DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
 Test Date: 01/11/01

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		26		
SWA	Steering Wheel Angle		69		
SCA	Steering Column Angle		22		
SA	Seat Back Angle		27		27
HZ	Head to Roof (Z)	156	90	160	90
HH	Head to Header	274	0	275	0
HW	Head to Windshield	530	0	522	0
HR	Head to Side Header (Y)	202		205	
NR	Noto Rim	380	10		
CD	Chest to Dash	515		470	
CS	Chest to Steering Hub	320	0		
RA	Rim to Abdomen	194	0		
KDL	Left Knee to Dash	149	33	128	
KDR	Right Knee to Dash	151		148	29
PA	Pelvic Angle		22.5		23
TA	Tibia Angle		36		40
KK	Knee to Knee (Y)	260		225	
SK	Striker to Head	905	3	917	2
ST	Striker to Knee	665	51	680	50
SH	Striker to H-Point	520	12	536	12
SHY	Striker to H-Point (Y)	235		229	
HS	Head to Side Window	314		309	
HD	H-Point to Door (Y)	132		130	
AD	Arm to Door (Y)	121		38	

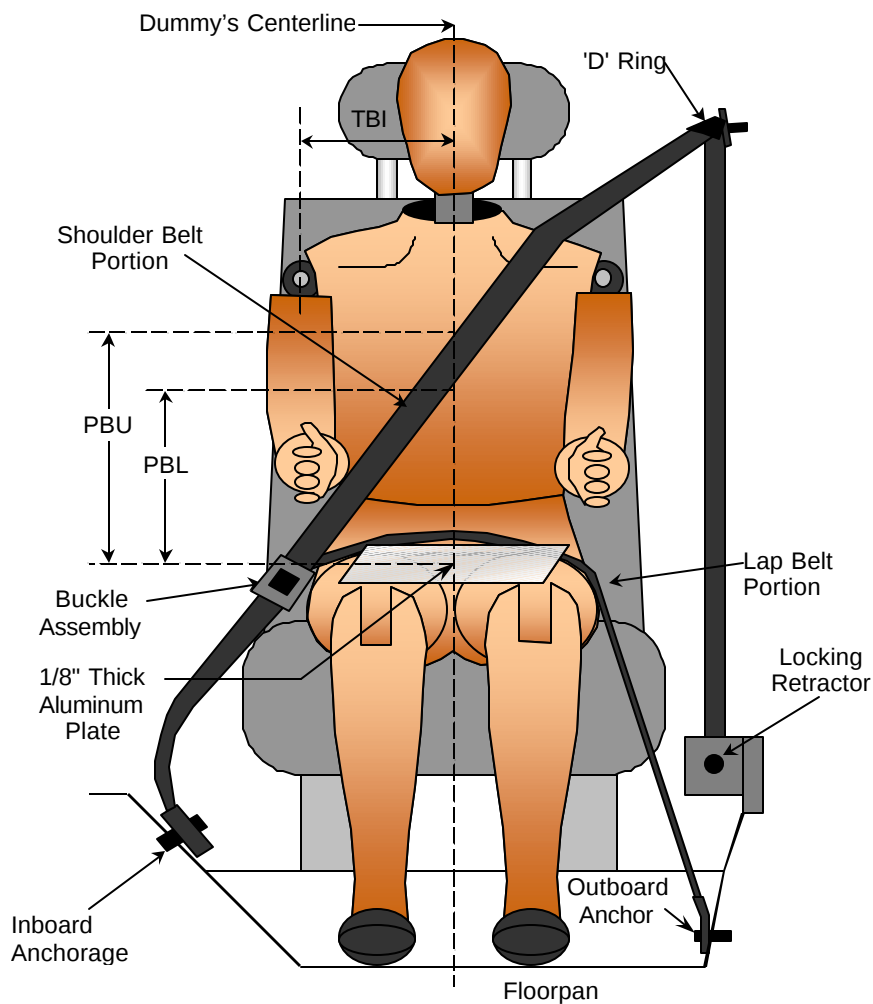
DATA SHEET NO. 6 **SEAT BELT POSITIONING DATA**

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy CL to Lap/Shoulder Belt Intersect	mm	170	170
PBU -Top surface of reference to belt upper edge	mm	292	320
PBL - Top surface of reference to belt lower edge	mm	220	240
Lap Belt tension	Newton's	10	10
Shoulder Belt tension	N/A	Retractor	Retractor

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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35mph NCAP

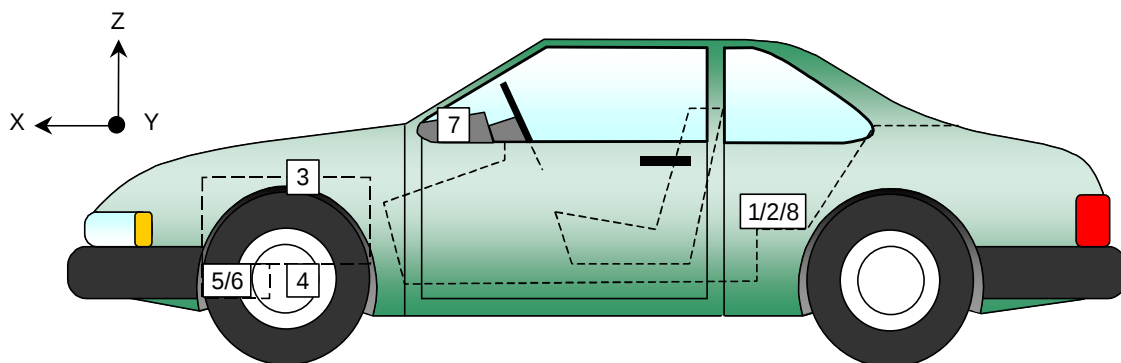
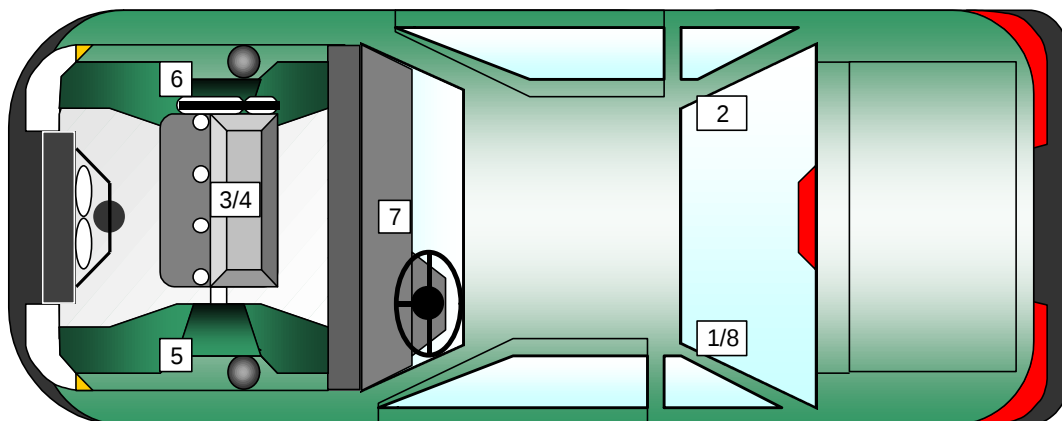
Test Date: 01/11/01

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.)	2235	-600	240	G's	2.1	126.8	-28.4	57.2
2	Right Rear X-Member (Pri.)	2205	600	240	G's	1.5	131.2	-29.7	58.3
3	Engine Top	3845	120	800	G's	65.9	52.9	-129.7	38.0
4	Engine Bottom	3695	80	170	G's	10.6	72.4	-99.9	30.5
5	Left Brake Caliper	3795	-750	325	G's	40.3	50.3	-145.8	43.6
6	Right Brake Caliper	3795	750	325	G's	0.0	0.0	0.0	0.0 *
7	Instrument Panel	2935	0	810	G's	17.3	50.8	-82.9	76.2
8	Left Rear X-Member (Rednt.)	2175	-600	240	G's	2.1	122.2	-29.7	57.6

Reference Points X - From Rear Surface of Vehicle Y - Vehicle Centerline Z - Ground Plane

* Channel failed, no data



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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35mph NCAP

Test Date: 01/11/01

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	8.3	171.8	-57.4	73.9	11.3	221.8	-52.9	78.5
Head CG	Y	G's	5.2	171.4	-7.6	68.9	9.5	56.6	-15.2	32.9
Head CG	Z	G's	17.5	47.4	-21.8	85.0	24.8	70.9	-4.1	34.5
Head CG Resultant	N/A	G's	57.9	73.9			56.8	75.0		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	4.2	207.1	-45.2	64.4	4.0	271.9	-42.1	79.3
Chest CG	Y	G's	3.4	52.3	-6.3	68.5	2.8	71.4	-5.0	82.2
Chest CG	Z	G's	7.8	45.0	-17.3	83.4	10.7	73.0	-11.6	94.6
Chest CG Resultant	N/A	G's	45.7	64.4			42.7	70.5		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	470.4	44.9	-4644.5	53.2	240.1	92.7	-4316.0	50.2
Right Femur	Z	Newtons	587.8	51.5	-2872.9	58.3	214.9	189.6	-2219.9	50.6

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	5378.1	53.4	-13.3	1.6	5469.2	58.7	-9.8	0.0
Shoulder Belt Force	N/A	Newtons	5087.4	53.1	-29.2	178.6	5361.7	68.7	-21.0	166.2
Shoulder Belt Pullout	N/A	MM	137.7	72.0	-26.3	244.5	146.8	74.6	0.4	3.4
Shoulder Belt Stretch	N/A	MM/CM	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.0

* Not used with pre-tensioners.

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G	T ¹	T ²	HIC	Avg G	T ¹	T ²
Head CG Primary	575.1	48.0	52.7	88.6	493.2	45.2	56.2	92.1

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	42.4	63.8	66.8	42.0	77.4	80.4

DATA SHEET NO. 8...(continued)Test Vehicle: 2001 Pontiac Grand Am 2 Door CoupeNHTSA No.: M10115Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/11/01**PELVIC PEAK ACCELERATIONS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	3.4	246.8	-53.4	56.5	2.4	121.5	-56.6	49.3
Pelvis	Y	G's	3.6	89.6	-19.3	61.0	8.8	49.0	-4.9	69.4
Pelvis	Z	G's	3.7	212.3	-31.1	75.3	3.4	134.9	-20.0	87.1

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	445.1	82.8	-476.1	42.1	473.9	66.7	-442.9	113.6
Neck Force	Y	Newtons	244.5	79.1	-106.3	51.6	209.3	63.8	-167.5	137.7
Neck Force	Z	Newtons	1981.5	53.9	-198.1	233.6	1043.1	71.1	-405.7	34.1
Neck Moment	X	N•m	5.5	170.3	-19.9	62.2	20.2	78.6	-7.7	120.8
Neck Moment	Y	N•m	27.4	64.5	-36.9	43.1	52.7	67.5	-15.2	246.9
Neck Moment	Z	N•m	9.0	107.3	-5.7	245.4	17.1	90.7	-6.7	142.4

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	4.7	36.3	-14.7	24.0	20.1	65.5	-99.7	57.3
Left Foot Aft	Z	G's	6.4	82.9	-34.7	44.7	16.9	74.8	-66.6	57.1
Left Foot Fore	Z	G's	12.7	78.1	-49.5	44.7	35.0	74.3	-125.6	56.4
Right Foot Aft	X	G's	16.7	62.2	-74.1	43.1	16.7	82.1	-104.2	58.3
Right Foot Aft	Z	G's	5.5	76.5	-76.4	44.3	2.8	299.0	-53.2	57.2
Right Foot Fore	Z	G's	28.8	66.3	-111.2	50.3	13.6	78.8	-89.2	56.3

UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Lower Moment	X	N•m	67.3	38.9	-12.8	89.8	3.9	155.2	-32.3	71.1
Left Lower Moment	Y	N•m	22.5	36.5	-14.1	22.4	49.4	71.0	-61.5	57.7
Left Lower Force	Z	Newtons	123.7	176.3	-1787.7	36.4	106.7	128.4	-3267.7	41.1
Left Upper Moment	X	N•m	54.1	56.5	-20.2	23.3	14.4	64.1	-32.5	85.2
Left Upper Moment	Y	N•m	12.9	170.5	-72.3	49.9	15.3	204.8	-157.4	58.1
Right Lower Moment	X	N•m	15.9	44.1	-98.2	60.4	6.4	276.6	-52.4	46.2
Right Lower Moment	Y	N•m	72.1	68.4	-20.1	55.1	31.4	77.5	-49.2	57.9
Right Lower Force	Z	Newtons	160.8	176.5	-3357.3	44.7	253.1	261.5	-1724.8	75.7
Right Upper Moment	X	N•m	35.9	51.4	-41.6	60.9	10.9	275.6	-24.3	50.5
Right Upper Moment	Y	N•m	16.6	161.4	-110.3	58.7	21.7	128.3	-133.9	58.6

DATA SHEET NO. 8...(continued)Test Vehicle: 2001 Pontiac Grand Am 2 Door CoupeNHTSA No.: M10115Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/11/01**CHEST PEAK DISPLACEMENTS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	MM	0.1	2.4	-23.6	76.6	0.3	14.9	-29.7	72.9

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	8.6	172.6	-57.4	74.6	11.0	221.5	-53.1	78.6
Head CG	Y	G's	5.6	170.6	-6.3	54.9	8.9	54.1	-14.1	32.9
Head CG	Z	G's	14.8	51.9	-21.5	84.7	28.6	54.0	-5.3	34.6
Head CG Resultant	N/A	G's	58.1	75.4			58.4	75.0		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	4.3	208.3	-45.0	64.3	4.1	256.6	-42.0	79.3
Chest CG	Y	G's	3.1	118.0	-7.0	68.2	4.9	71.6	-3.2	97.0
Chest CG	Z	G's	8.3	44.9	-15.7	83.5	11.5	73.6	-9.9	93.8
Chest CG Resultant	N/A	G's	45.2	64.3			42.9	70.4		

REDUNDANT HEAD INJURY CRITERA (HIC)

Location	Driver				Passenger			
	HIC	Avg G	T ¹	T ²	HIC	Avg G	T ¹	T ²
Head CG Redundant	589.4	48.5	52.5	88.4	499.5	45.4	56.9	92.8

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	42.2	63.7	66.7	42.0	77.2	80.2

DATA SHEET NO. 9
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
 Test Date: 01/11/01

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TCI - Dummy CL o Lap/Shoulder Belt Intersect	mm	170	170
PBU -Top surface of reference to belt upper edge	mm	292	320
PBL - Top surface of reference to belt lower edge	mm	220	240
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	640	640
Shoulder belt length as measured on ATD	mm	1000	1020
Lap belt length as measured on ATD	mm	760	760
Remainder of belt on reel	mm	650	630
Total belt length for continuous webbing systems	mm	3050	3050

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	100.0	Broken
As determined electronically	mm	137.7	146.8

BELT STRETCH DATA

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

*Not used with shoulder belt pre-tensioner systems.

DATA SHEET NO. 10
SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

Windshield Mounting Details:

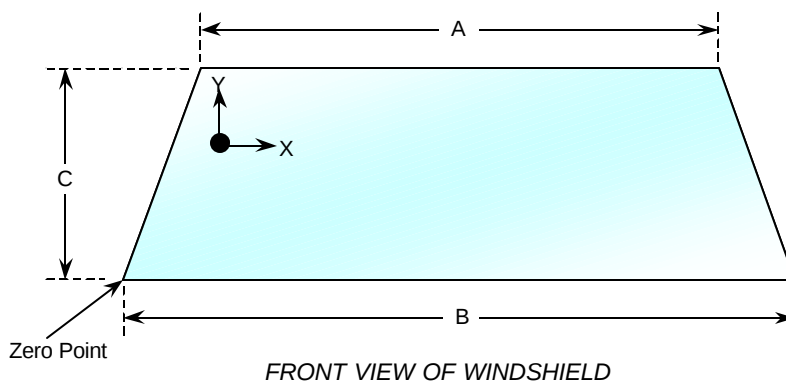
Windshield glass is secured to the vehicle frame with a rubber type adhesive. There is no molding that covers the windshield periphery at any point.

The standard requires that the post test 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 which 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	2118.5	2118.5	100
Right Side	2118.5	2118.5	100
Total	4237.0	4237.0	100



WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1063	20
B	mm	1492	29
C	mm	841	22

DATA SHEET NO. 11

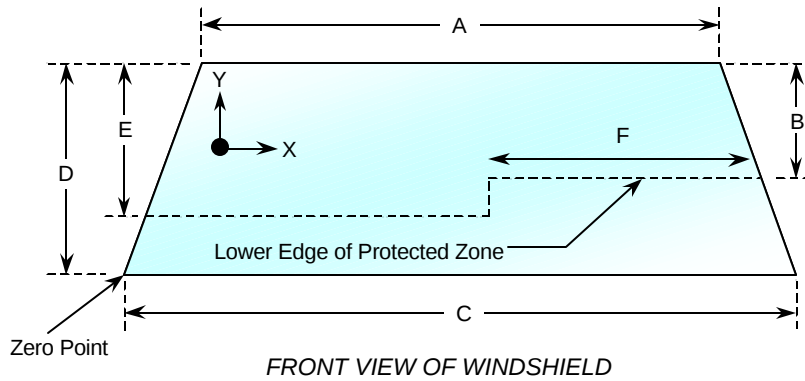
WINDSHIELD ZONE INTRUSION FMVSS 219 (PARTIAL) DATA

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01



WINDSHIELD AND PROTECTED ZONE

Item	Units	Value
A	mm	1063
B	mm	429
C	mm	1492
D	mm	841
E	mm	533
F	mm	776

AREA OF PROTECTED ZONE FAILURES

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

X	Y
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A

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

X	Y
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A

DATA SHEET NO. 12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

Test Time: 2:12 PM

Temperature at Time of Impact: 7.7 °C

STODDARD SOLVENT SPILLAGE MEASUREMENT

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

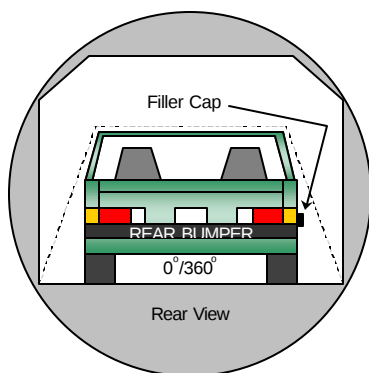
DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

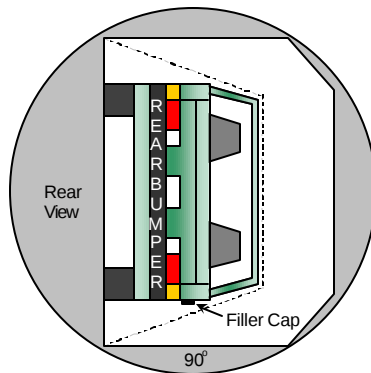
NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

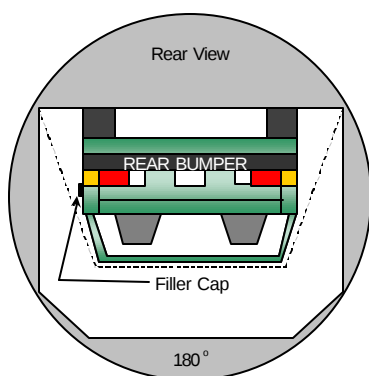
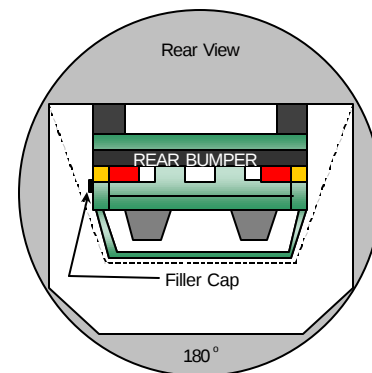
Test Date: 01/11/01



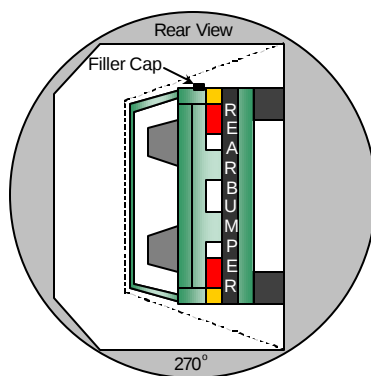
0° TO 90°



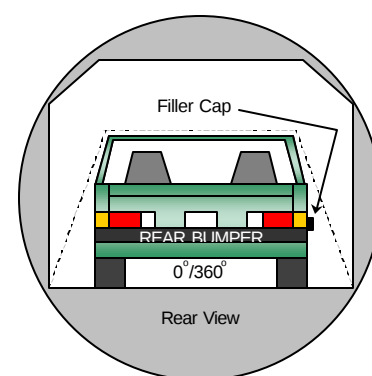
90° TO 180°



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°	82	300	0.0
90° TO 180°	81	300	0.0
180° TO 270°	76	300	0.0
270° TO 360°	82	300	0.0

DATA SHEET NO. 14
VEHICLE MEASUREMENTS

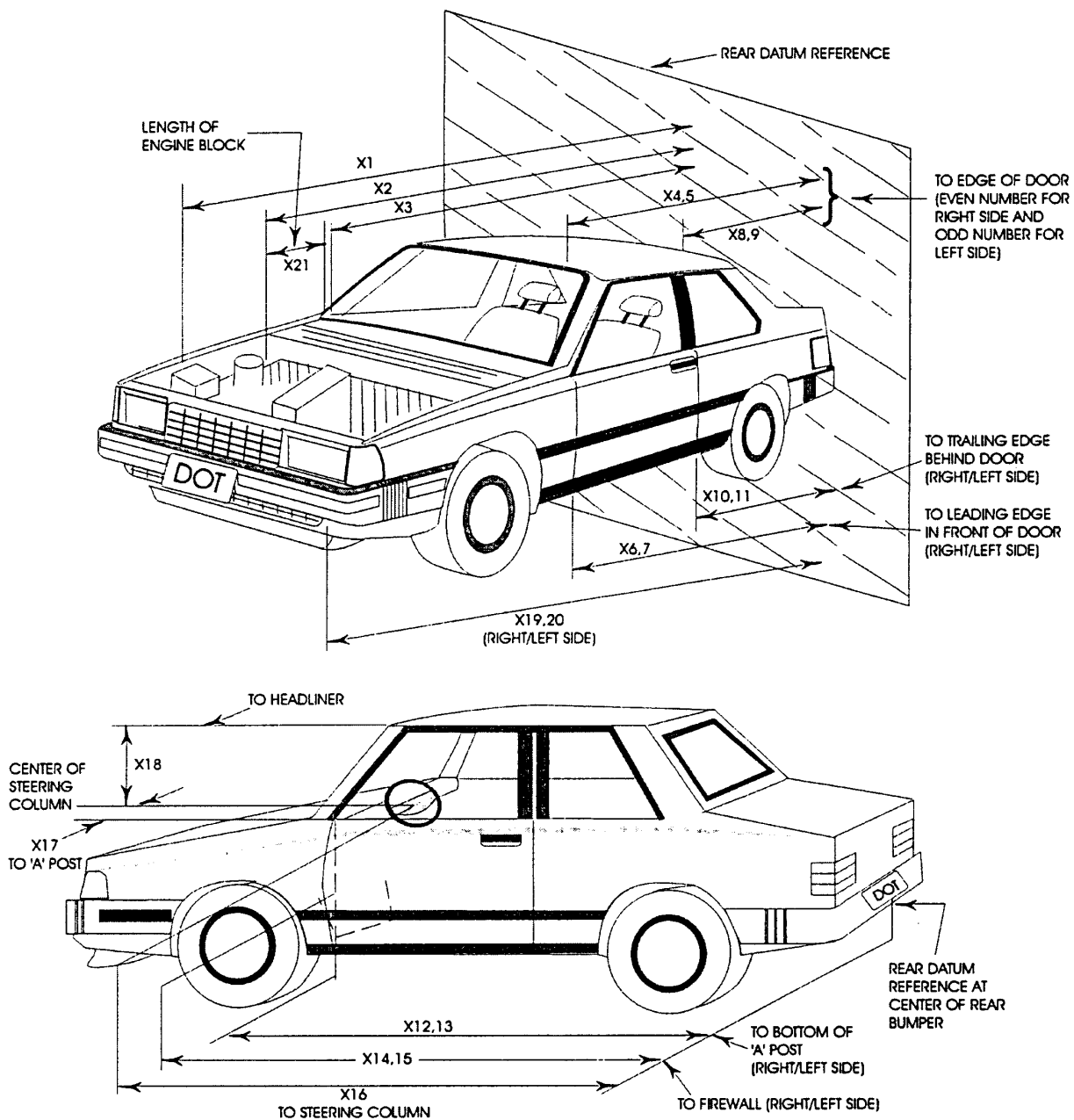
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4723	4272	-451
2	RSOV to front of engine	mm	3873	3832	-41
3	RSOV to firewall centerline	mm	3543	3480	-63
4	RSOV to leading edge of right door	mm	3196	3192	-4
5	RSOV to leading edge of left door	mm	3205	3197	-8
6	RSOV to lower leading edge of right door	mm	3174	3177	3
7	RSOV to lower leading edge of left door	mm	3177	3171	-6
8	RSOV to upper trailing edge of right door	mm	1875	1876	1
9	RSOV to upper trailing edge of left door	mm	1880	1876	-4
10	RSOV to lower trailing edge of right door	mm	1842	1855	13
11	RSOV to lower trailing edge of left door	mm	1849	1845	-4
12	RSOV to bottom of right 'A' pillar	mm	3166	3181	15
13	RSOV to bottom of left 'A' pillar	mm	3170	3162	-8
14	RSOV to firewall on right side	mm	3593	3531	-62
15	RSOV to firewall of left side	mm	3624	3569	-55
16	RSOV to steering column	mm	2883	2815	-68
17	Center of steering column to left 'A' pillar	mm	400	386	-14
18	Center of steering column to headlining	mm	418	395	-23
19	RSOV to right side of front bumper	mm	4371	4041	-330
20	RSOV to left side of front bumper	mm	4371	4109	-262
21	Length of engine block	mm	230	230	0
RD	RSOV to right side of dash panel	mm	2899	2885	-14
CD	RSOV to center of dash panel	mm	2836	2801	-35
LD	RSOV to left side of dash panel	mm	2868	2902	34



DATA SHEET NO. 15
CAMERA LOCATIONS

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

No.	Camera View	Location (mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Speed (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	7886	13	1020
3	Left Side, No. 2	1455	-8250	1460	-4	7921	35	1020
4	Left Side, No. 3	6495	-10580	4640	-16	11485	70	1010
5	Left Side, No. 4	1455	-8250	3100	-16	8130	19	1000
6	Left Side, No. 5	1455	-8250	2700	-13	8051	19	980
7	Right Side, No. 1	1955	8150	730	-1	8576	19	1020
8	Right Side, No. 2	1655	8150	1450	-4	8591	35	1020
9	Right Side, No. 3	7855	8900	2800	-9	N/A	80	900
10	Right Side, No. 4	970	12358	1150	-2	12842	50	970
11	Overhead Overall	251	0	4460	-86	N/A	13	1030
12	Front View, Driver	-525	-380	2590	-43	N/A	12	870
13	Front View, Passenger	-525	380	2590	-44	N/A	13	1020
14	Pit Camera, Engine	638	0	1640	86	N/A	13	960
15	Pit Camera, Fuel Tank	Did Not Run						
16	Driver Belt	2836	-374	1360	-4	807	13	640
17	Passenger Belt	2924	388	1380	-4	1050	13	650
18	Left Side Extra	800	-6681	1450	-2	6535	24	1100

X - Barrier Face Y - Monorail Centerline Z - Ground

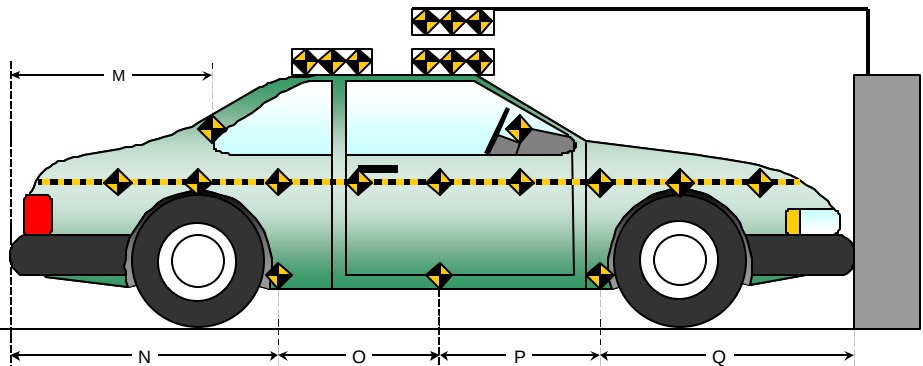
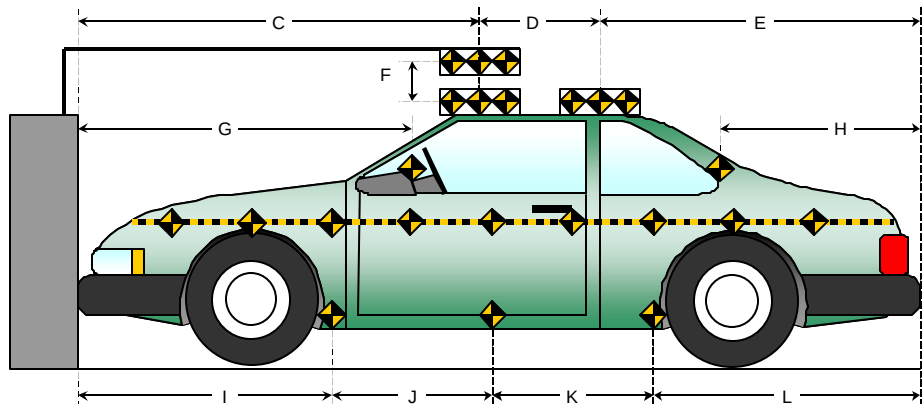
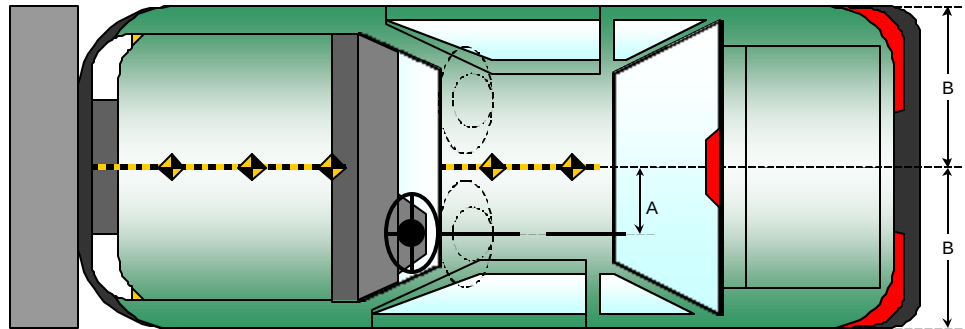
DATA SHEET NO. 16
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
 Test Date: 01/11/01

All Dimensions
in mm

Item	Value
A	323
B	896.5
C	2272
D	609
E	1843
F	155
G	1802
H	1235
I	1440
J	926
K	930
L	1434
M	1231
N	1432
O	925
P	930
Q	1439



DATA SHEET NO. 17
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

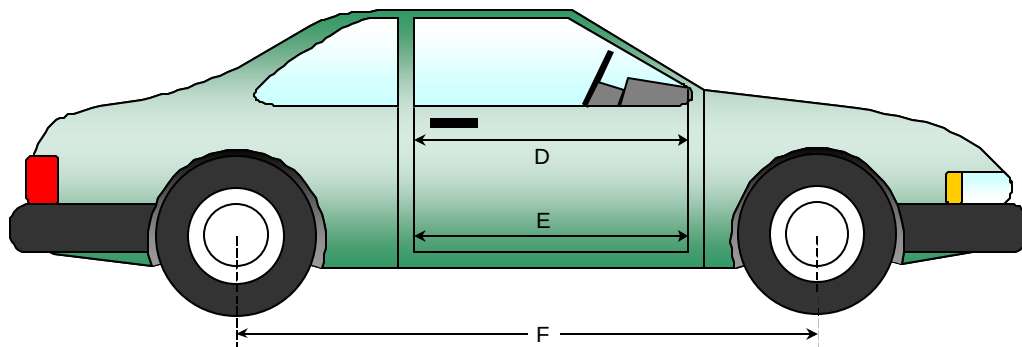
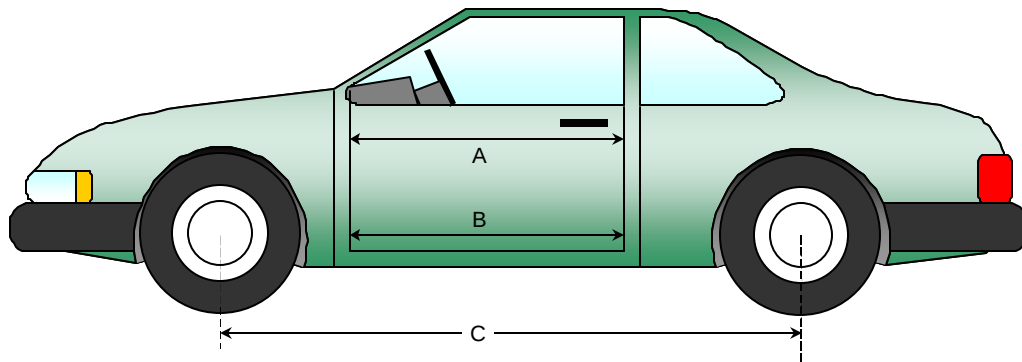
Test Date: 01/11/01

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1278	1265	-13
B	Left Side Lower	mm	1285	1285	0
D	Right Side Upper	mm	1276	1280	4
E	Right Side Lower	mm	1289	1258	-31

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheel base	mm	2718	2626	-92
F	Right Side Wheel base	mm	2718	2617	-101



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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

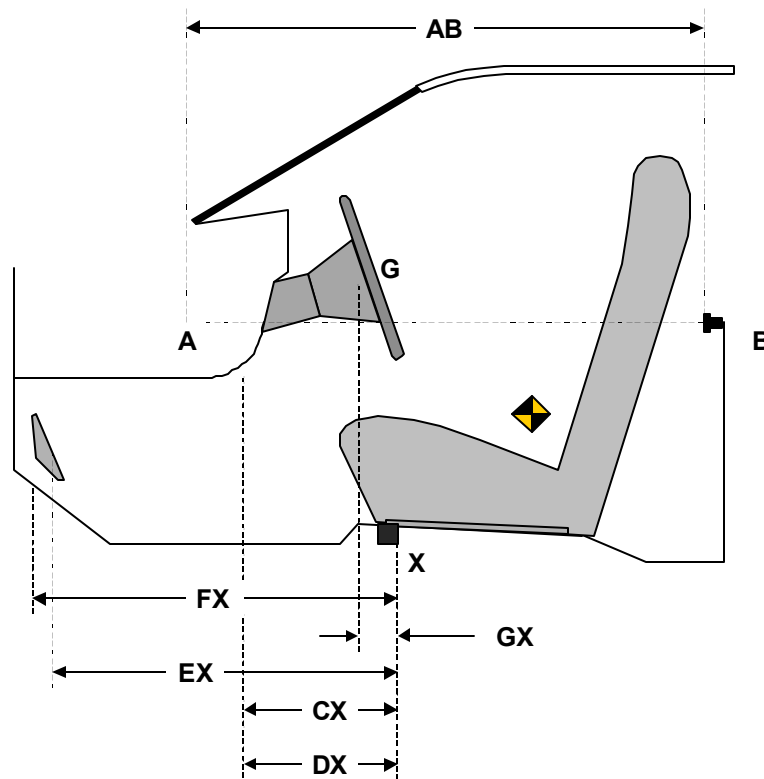
Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	1278	1265	-13
CX	Left Knee Bolster to X	mm	245	219	-26
DX	Right Knee Bolster to X	mm	257	232	-25
EX	Brake Pedal to X	mm	591	488	-103
FX	Foot Rest to X	mm	622	622	0
GX	Center of Steering Wheel Hub to X	mm	67	114	47

X = Left Front Seat Outboard Anchor Bolt Head



DRIVER COMPARTMENT

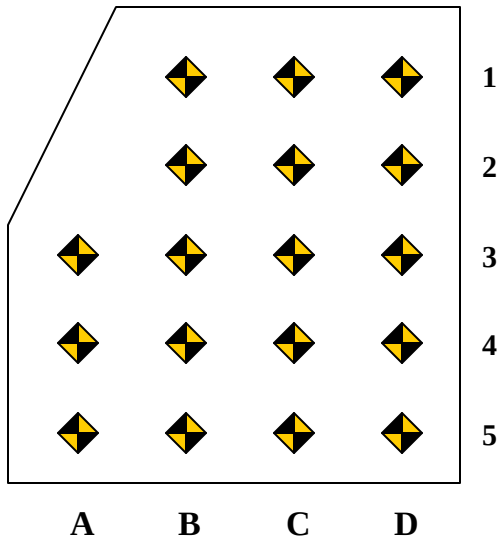
DATA SHEET NO. 17...(CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01



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		688	702	702		610	620	627		-78	-82	-75
2		609	620	618		555	577	577		-54	-43	-41
3	532	525	527	522	529	505	500	483	-3	-20	-27	-39
4	428	424	425	422	421	409	406	398	-7	-15	-19	-24
5	331	325	326	318	336	315	310	305	5	-10	-16	-13

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		-27	-50	-53		9	-1	-13		36	49	40
2		-85	-110	-113		-68	-89	-96		17	21	17
3	-133	-135	-138	-131	-130	-151	-142	-121	3	-16	-4	10
4	-136	-133	-133	-143	-104	-116	-136	-152	32	17	-3	-9
5	-138	-141	-148	-138	-79	-84	-96	-114	59	57	52	24

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

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

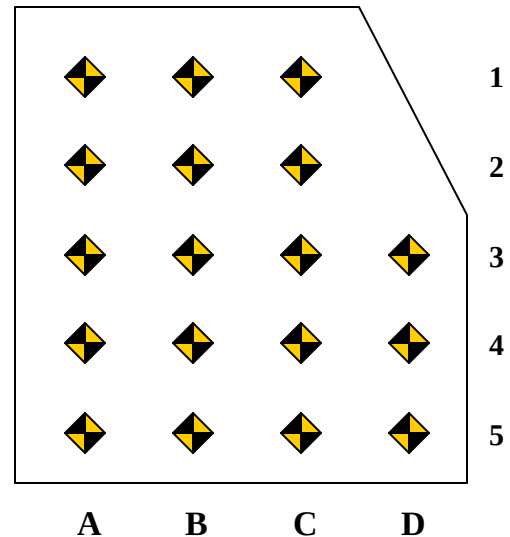
Test Date: 01/11/01

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	694	700	689		651	644	643		-43	-56	-46	
2	615	621	615		580	591	576		-35	-30	-39	
3	524	525	527	529	496	511	523	528	-28	-14	-4	-1
4	425	426	428	433	411	422	426	432	-14	-4	-2	-1
5	322	327	332	334	315	326	329	340	-7	-1	-3	6

PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-54	-55	-38		-8	-21	7		46	34	45	
2	-112	-120	-92		-90	-101	-63		22	19	29	
3	-115	-147	-149	-154	-123	-153	-145	-136	-8	-6	4	18
4	-142	-149	-147	-149	-149	-149	-146	-144	-7	0	1	5
5	-157	-153	-152	-149	-144	-147	-134	-122	13	6	18	27

DATA SHEET NO. 18
FIXED BARRIER TYPE

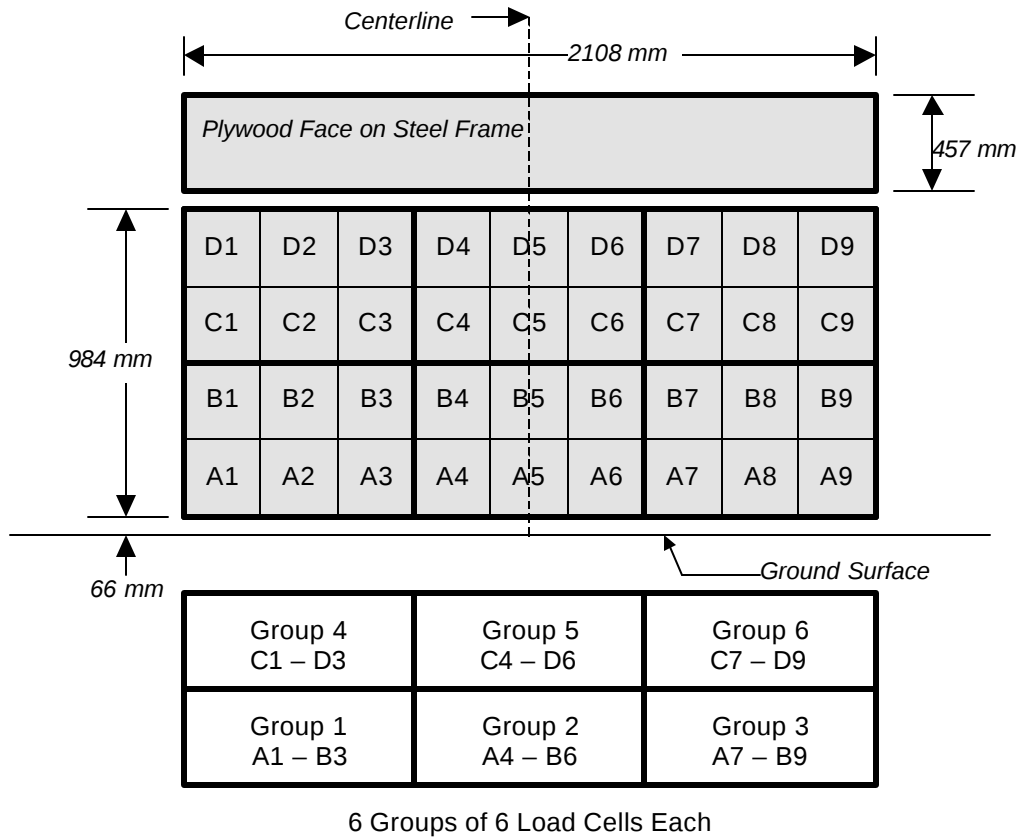
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01

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



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

- 1.) Data from 36 individual load cells
- 2.) Sum data from 6 groupings shown above (6 cells/group)
- 3.) Total or sum of all 36 individual load cells
- 4.) Sum of all 36 individual load cells vs. vehicle dynamic crush

DATA SHEET NO. 19
ACCIDENT INVESTIGATION DATA

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10115
Test Date: 01/11/01

VEHICLE INFORMATION

VIN: 1G2NE12T11M523711
Vehicle Size Category: 2 Door Coupe

Wheel base (mm): 2718
Test Weight (kg): 1582

ACCELEROMETER DATA

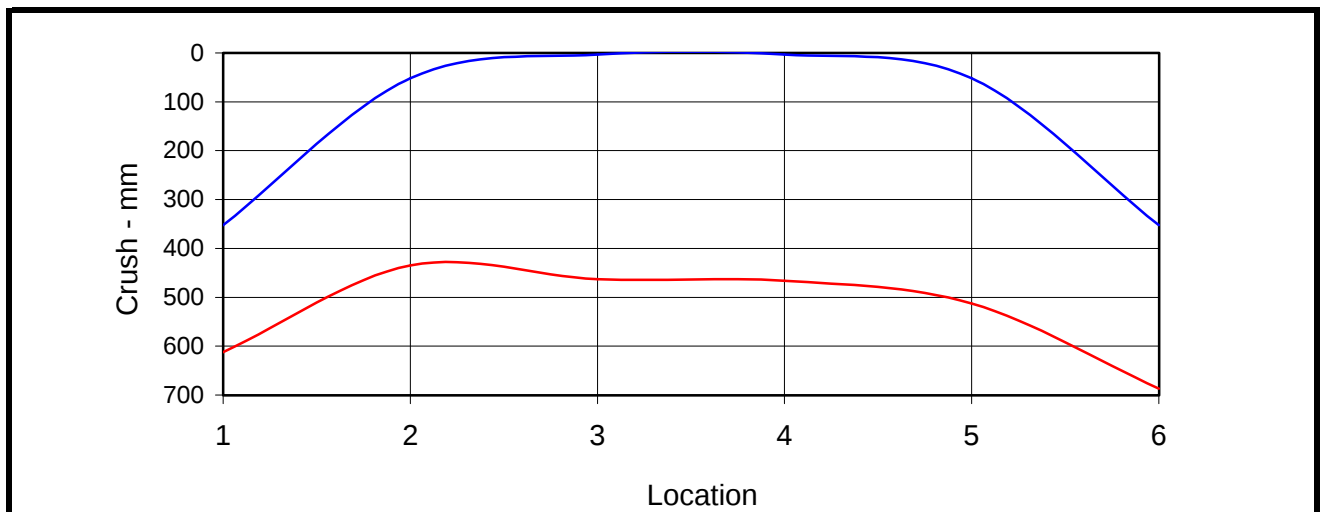
Accelerometer Location: Left rear floor pan
Cal. Procedure/Interval: 6 months / drop test
Integration Algorithm: NHTSA Standard
Impact Velocity (km/h): 55.90
Velocity Change (km/h): 63.5

Linearity: Good
Time of Separation (msec): 81

CRUSH PROFILE

Collision Deformation Classification: 12FDEW6 ; Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1567 ; Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	352	612	-260
C2	Crush zone 2 on left side	mm	52	435	-383
C3	Crush zone 3 on left side	mm	3	463	-460
C4	Crush zone 4 on right side	mm	3	466	-463
C5	Crush zone 5 on right side	mm	52	513	-461
C6	Crush zone 6 at right side	mm	352	687	-335



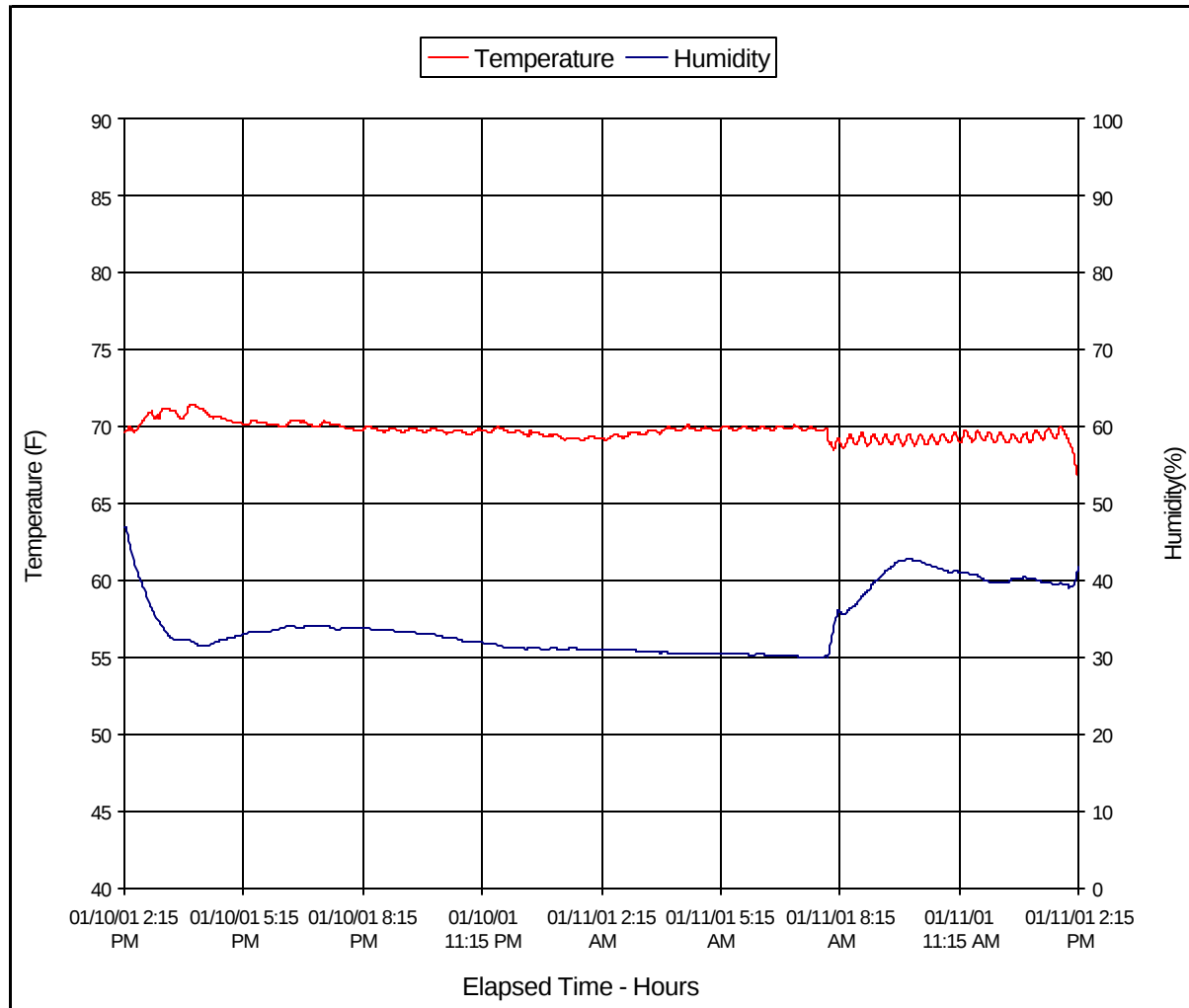
DATA SHEET NO. 20
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

NHTSA No.: M10115

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 01/11/01



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

1G2NE12T1M523711

MODEL: NE37 NBJ

	TIRE SIZE	SPEED RTG	COLD TIRE PRESSURE
FRT	P215/60R15	S	210KPA(30PSI)
RR	P215/60R15	S	210KPA(30PSI)
SPA	T125/70D15	M	420KPA(60PSI)

IF TIRES ARE HOT, ADD 28KPA(4PSI)

SEE OWNER'S MANUAL FOR MORE INFORMATION



MFD BY GENERAL MOTORS CORP

DATE	GVWR	GAWR FRT	GAWR RR
08/00	1785 KG	1002 KG	783 KG
	3934 LB	2208 LB	1726 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

1G2NE12T1M523711

TYPE: PASS CAR

Figure A-3: Vehicle Certification Label

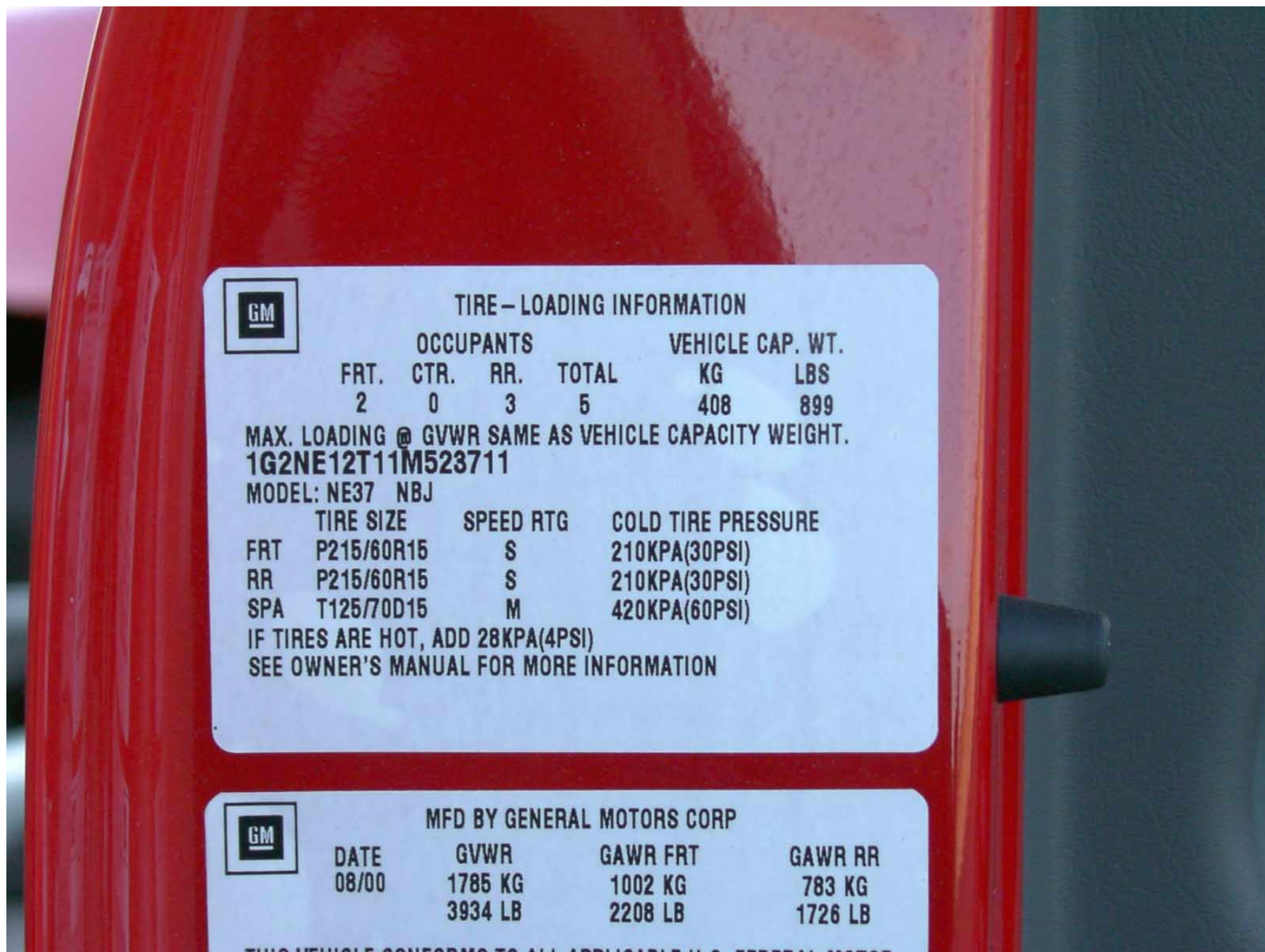


Figure A-4: Vehicle Tire Label



Figure A-5: Front View, Pre-Test



Figure A-6: Front View, Post-Test



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



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



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



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



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

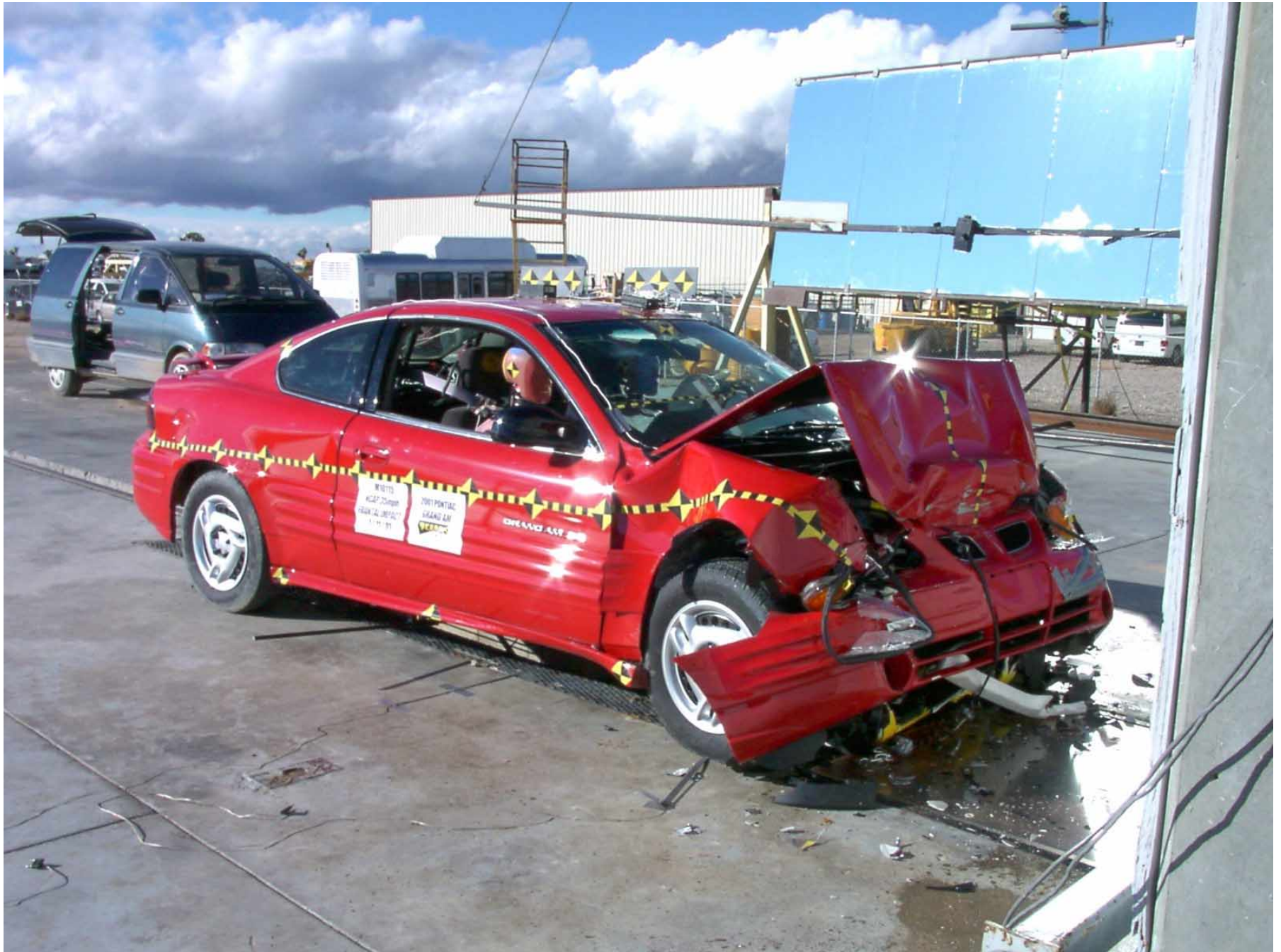


Figure A-12: Right Front View, Post-Test



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



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



Figure A-15: Windshield, Pre-Test

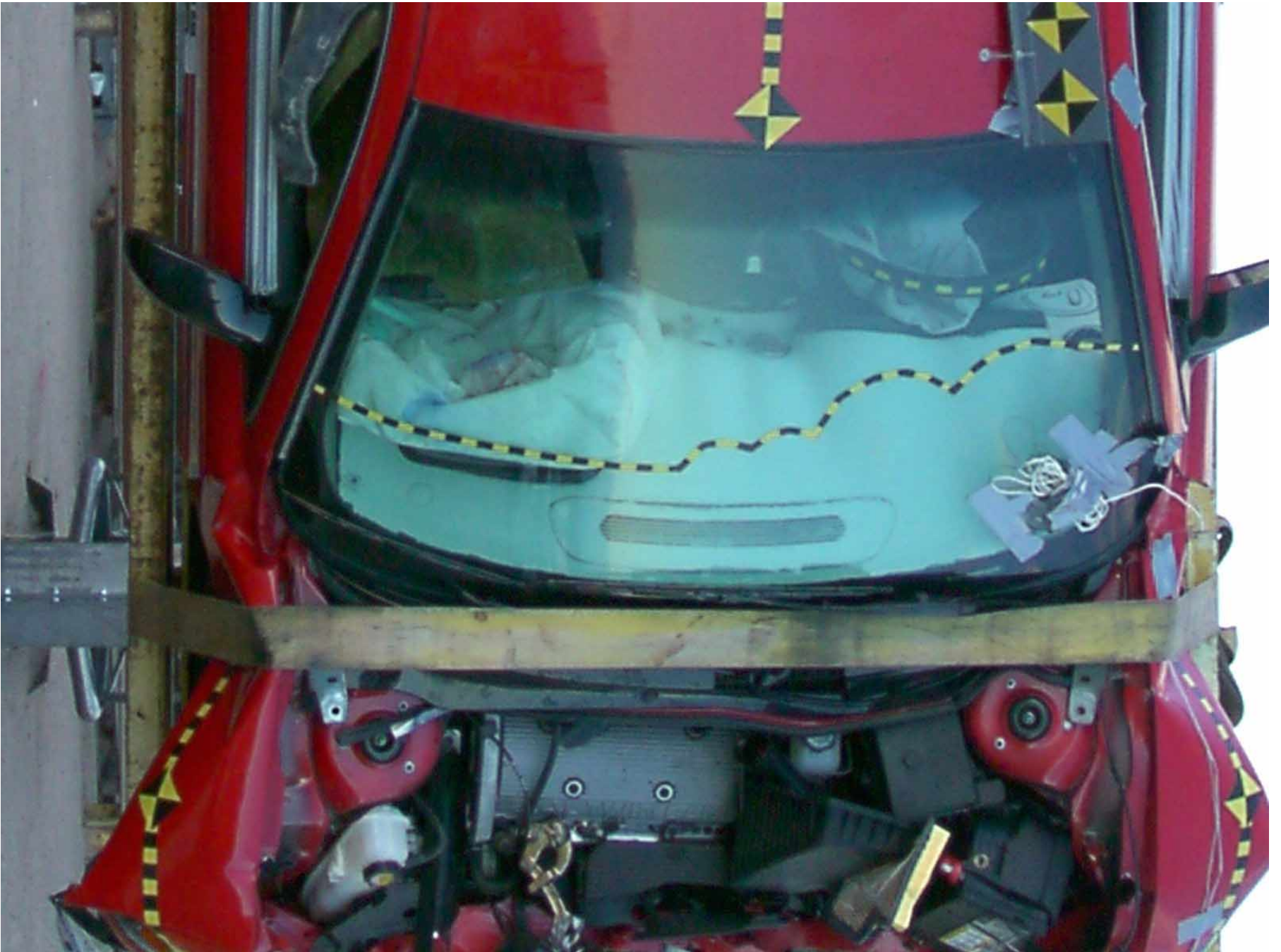


Figure A-16: Windshield, Post-Test



Figure A-17: Engine Compartment, Pre-Test



Figure A-18: Engine Compartment, Post-Test



Figure A-19: Fuel Cap, Pre-test



Figure A-20: Fuel Cap, Post-Test

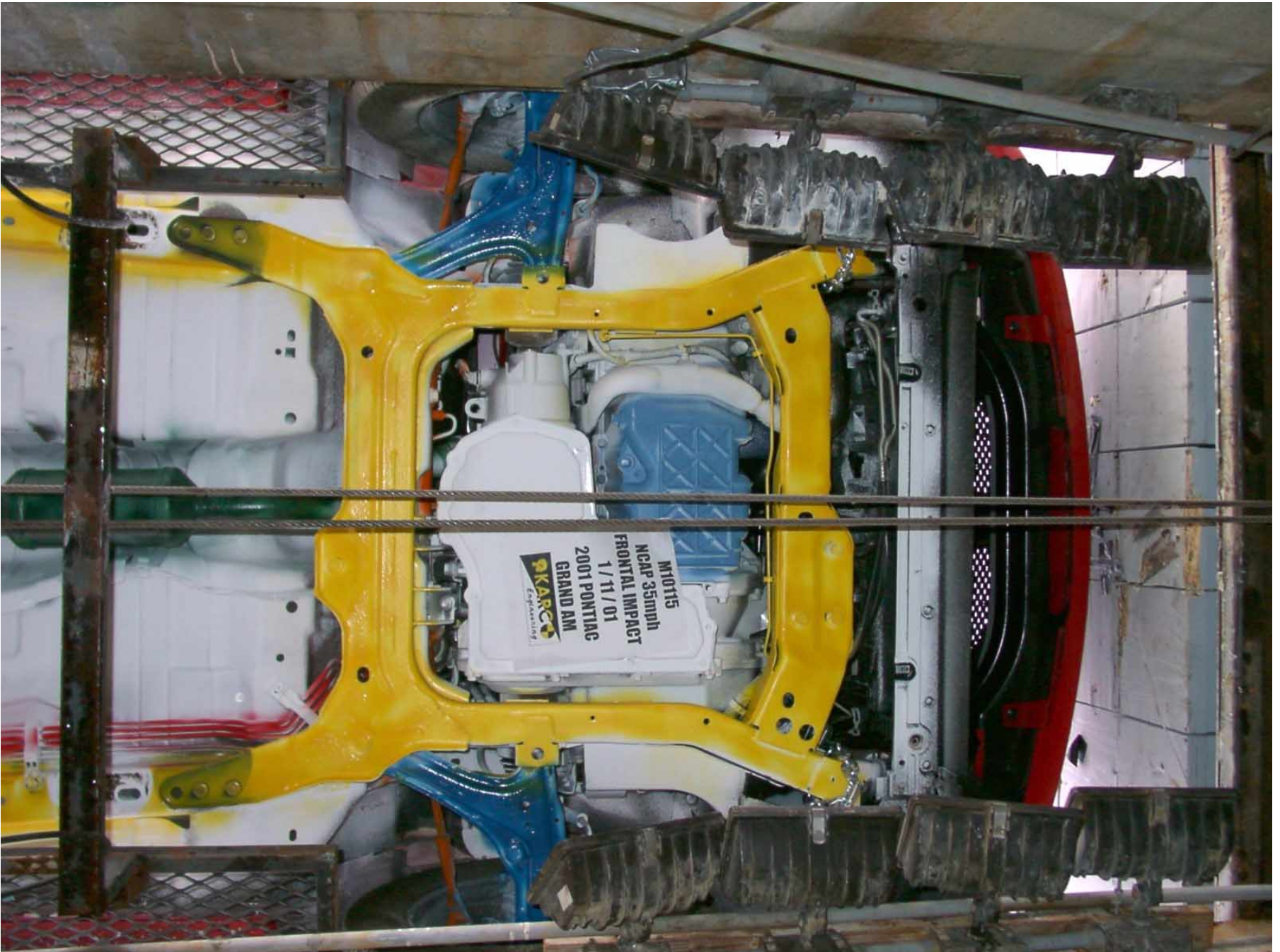


Figure A-21: Front Underside, Pre-Test



Figure A-22: Front Underside, Post-Test

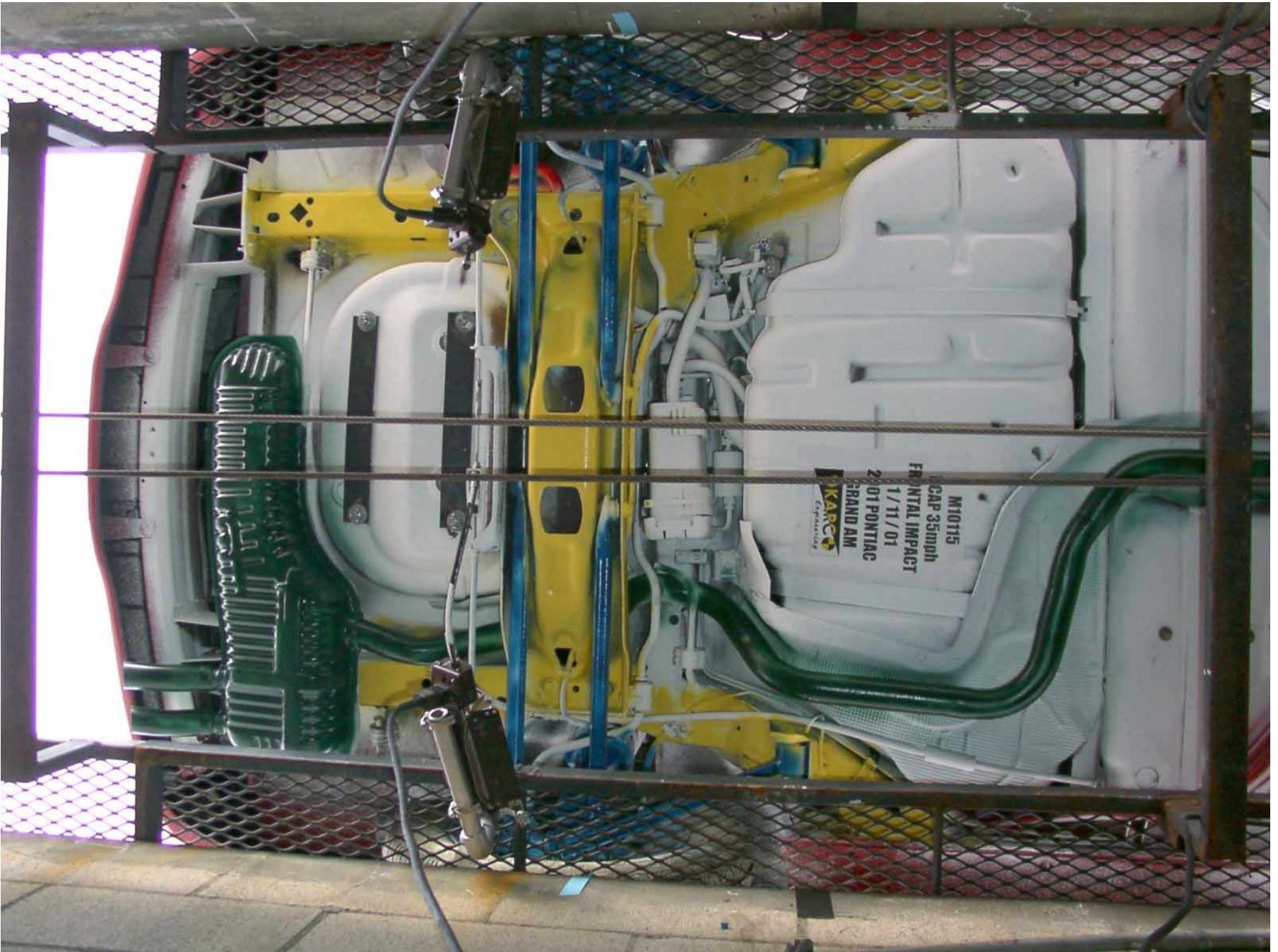


Figure A-23: Rear Underside, Pre-Test

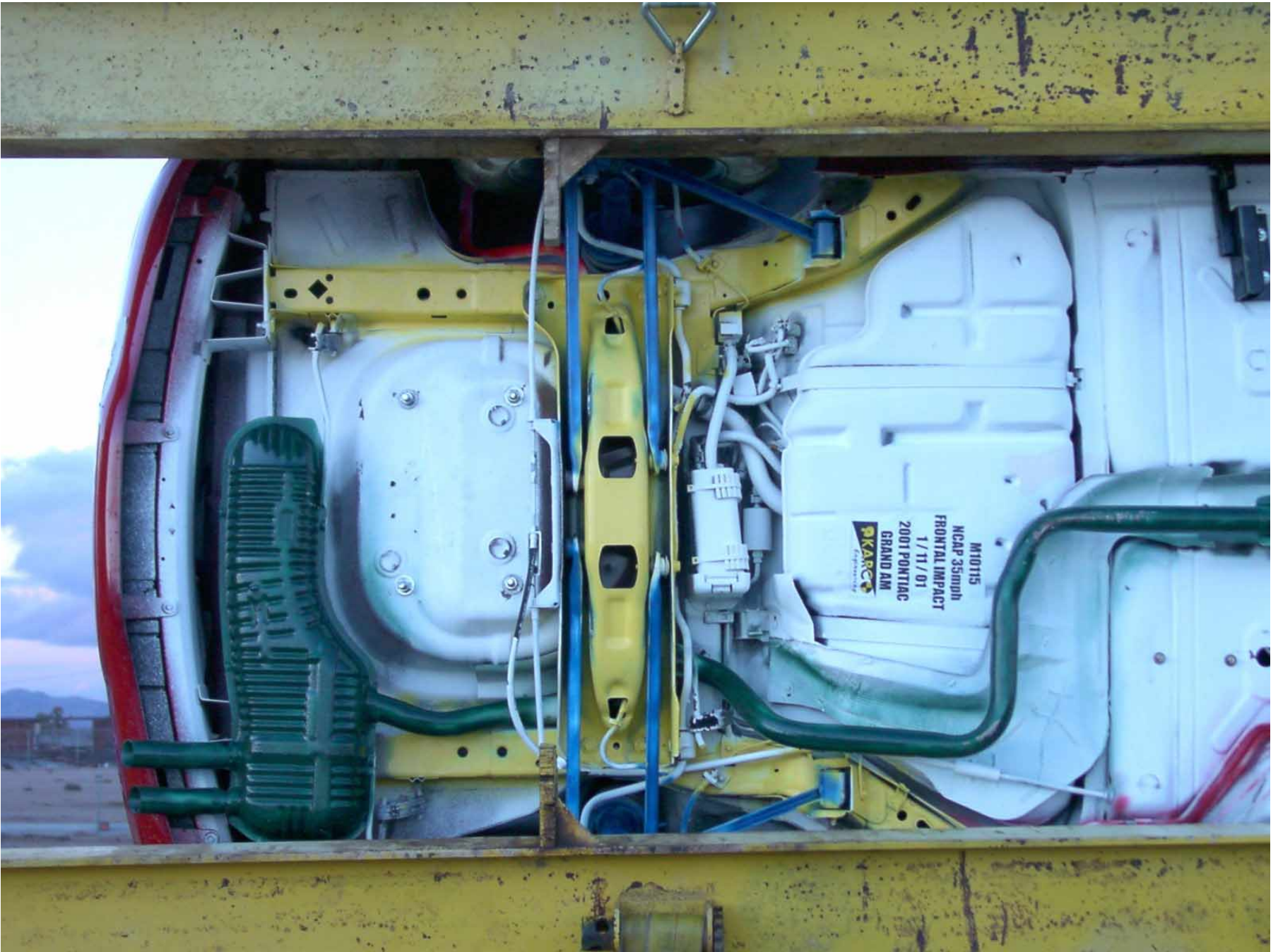


Figure A-24: Rear Underside, Post-Test



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

**Photograph Not
Available**

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

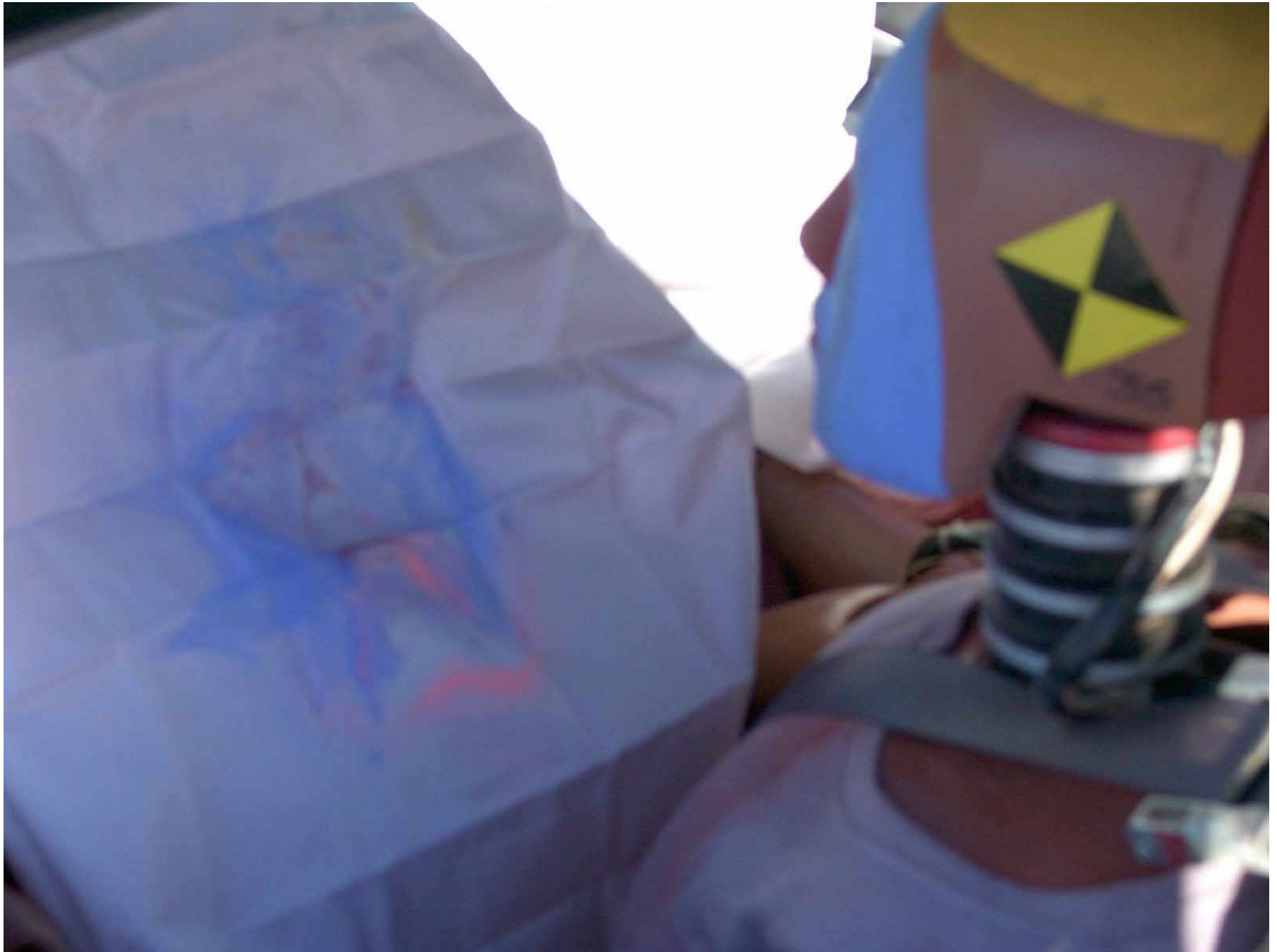


Figure A-40: Driver Dummy Contact, Post-Test

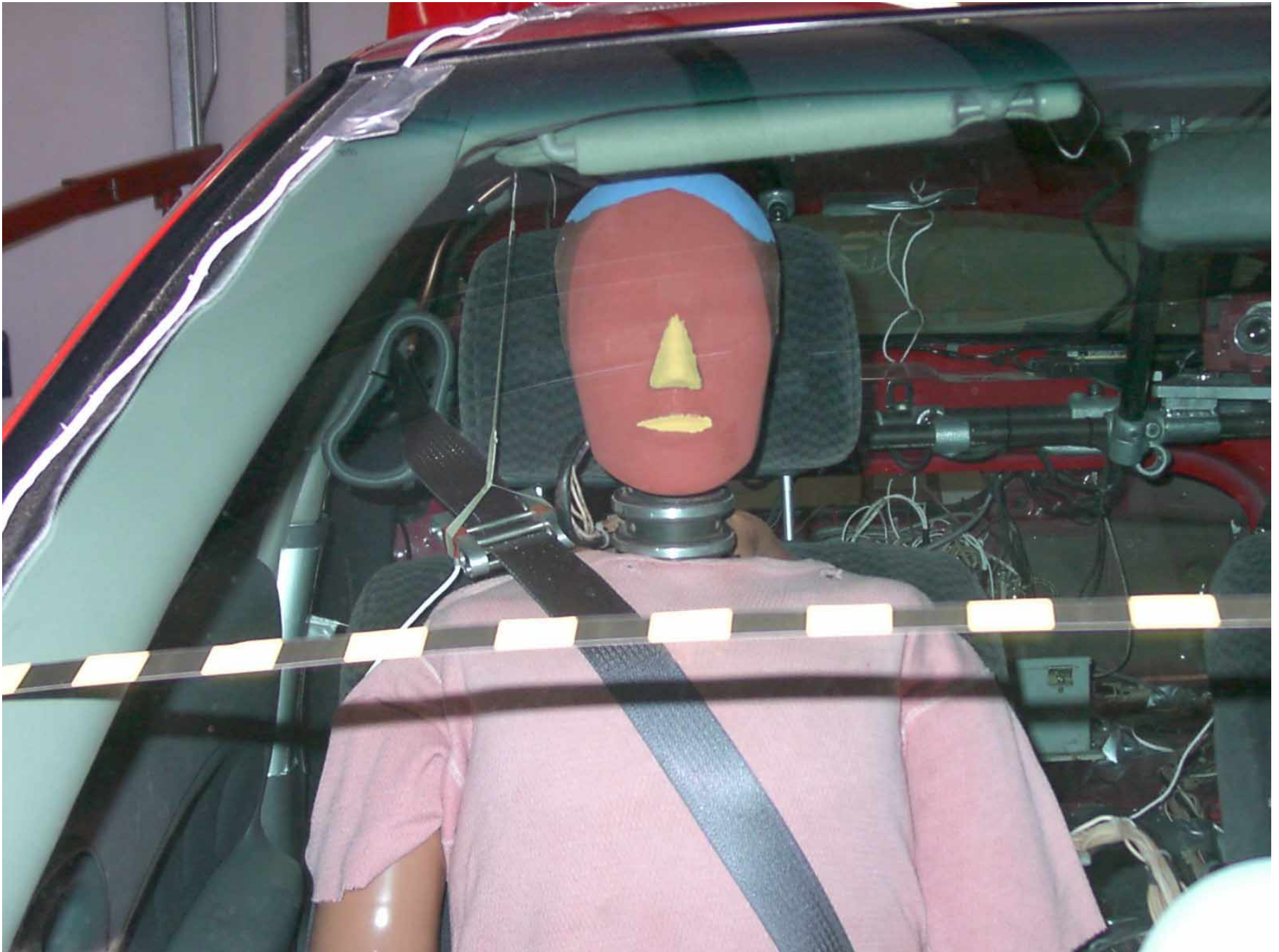


Figure A-41: Passenger Dummy Front View, Pre-Test

**Photograph Not
Available**

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

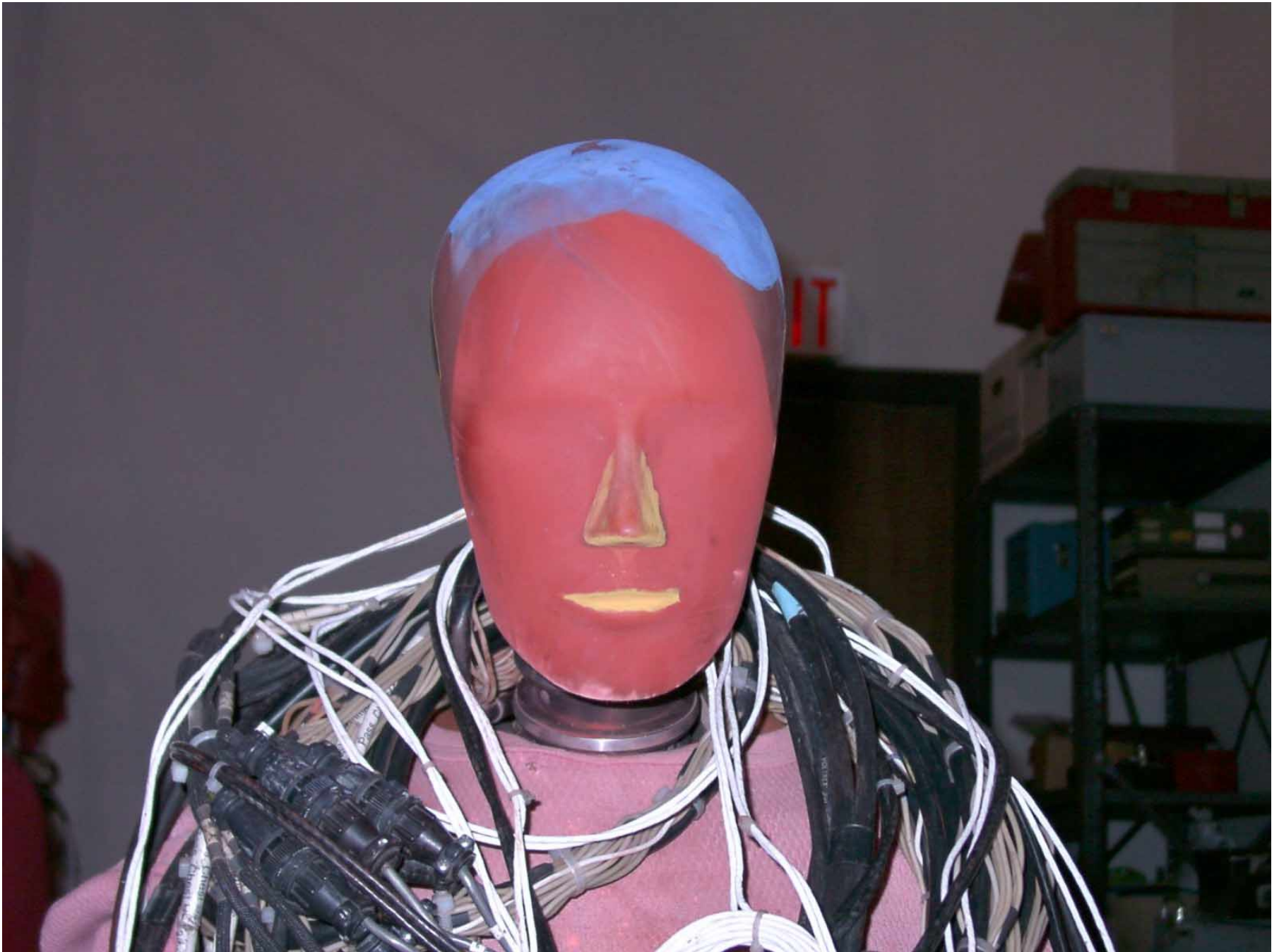


Figure A-55: Passenger Head, Post-Test



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

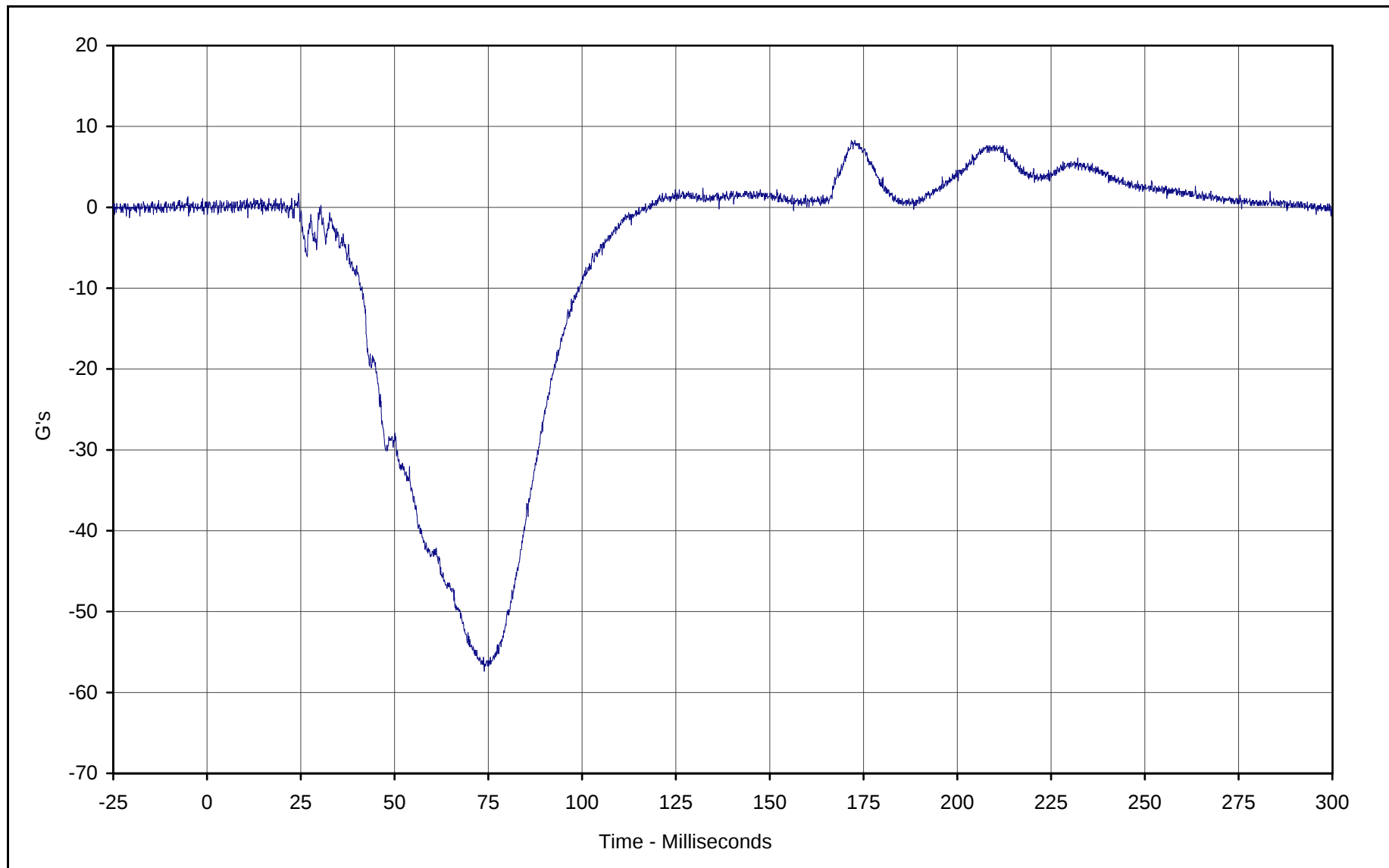
LIST OF DATA PLOTS...(Continued)

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

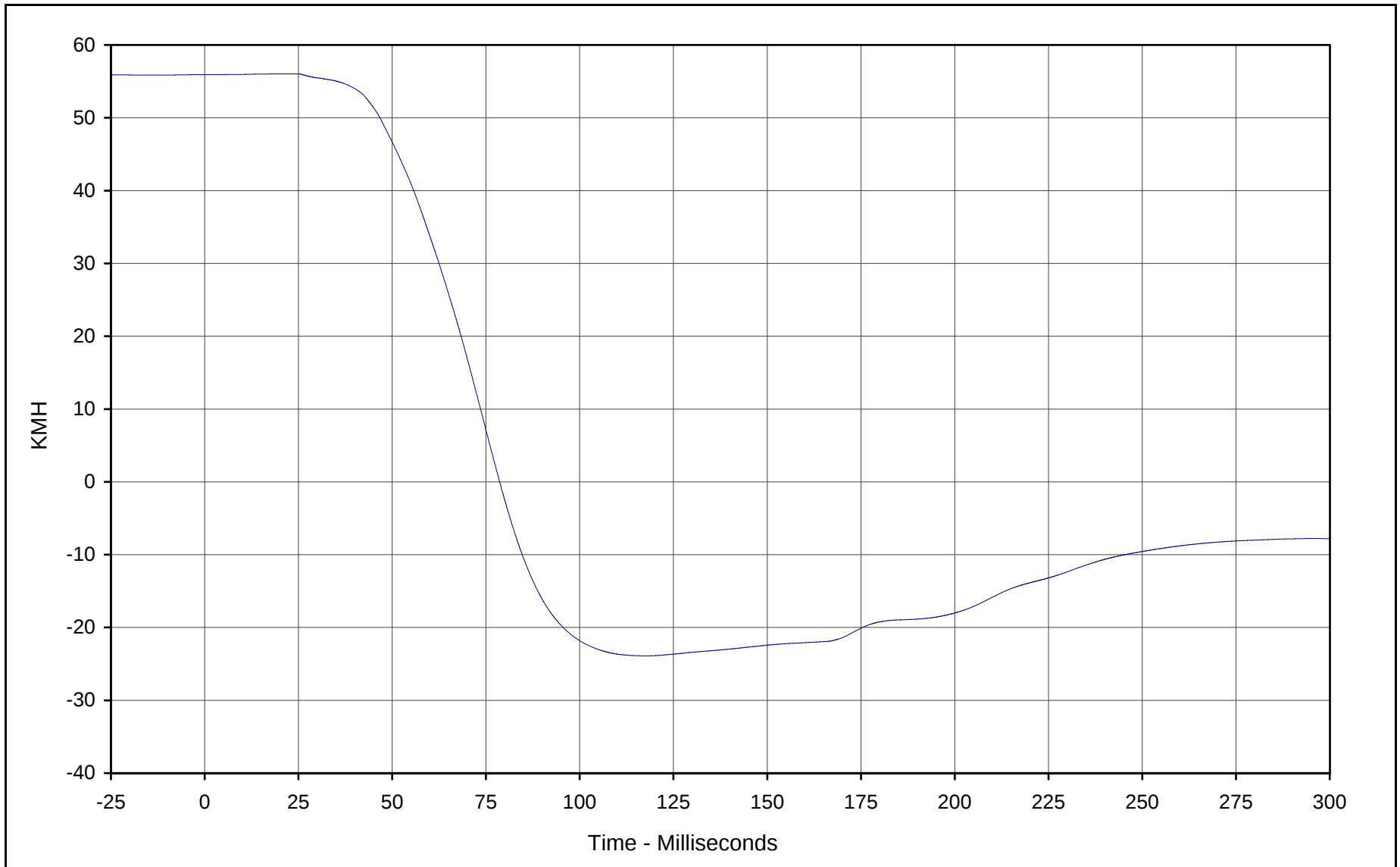


Curve Description: Driver Head Primary X
 Maximum Value: 8.3 at 171.8 Milliseconds
 Minimum Value: -57.4 at 73.9 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 01/11/01
 Curve Number: FIL-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
 Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



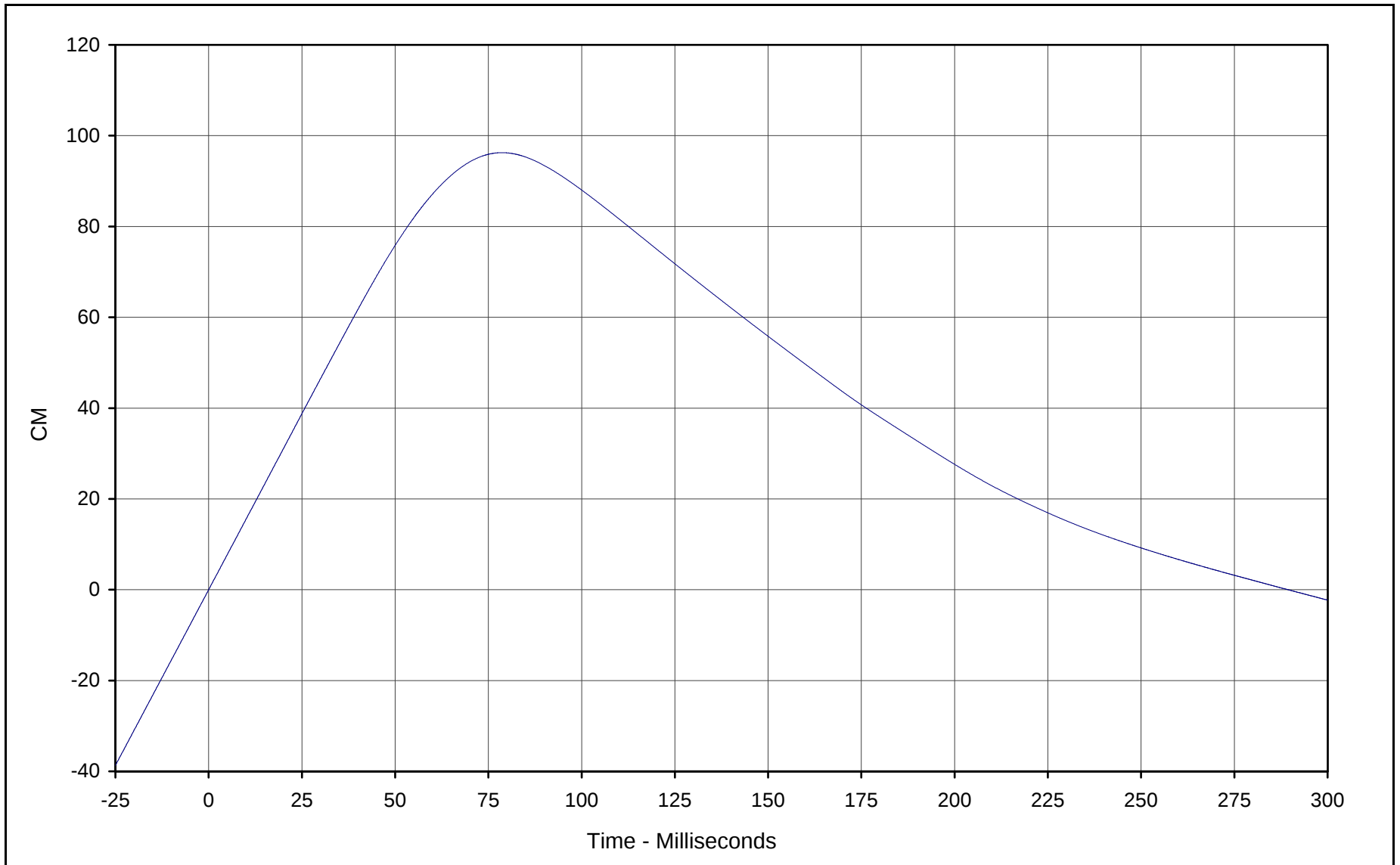
KAR21001-04



Curve Description: Driver Head Primary X Velocity
Maximum Value: 56.0 at 24.5 Milliseconds
Minimum Value: -23.9 at 117.8 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

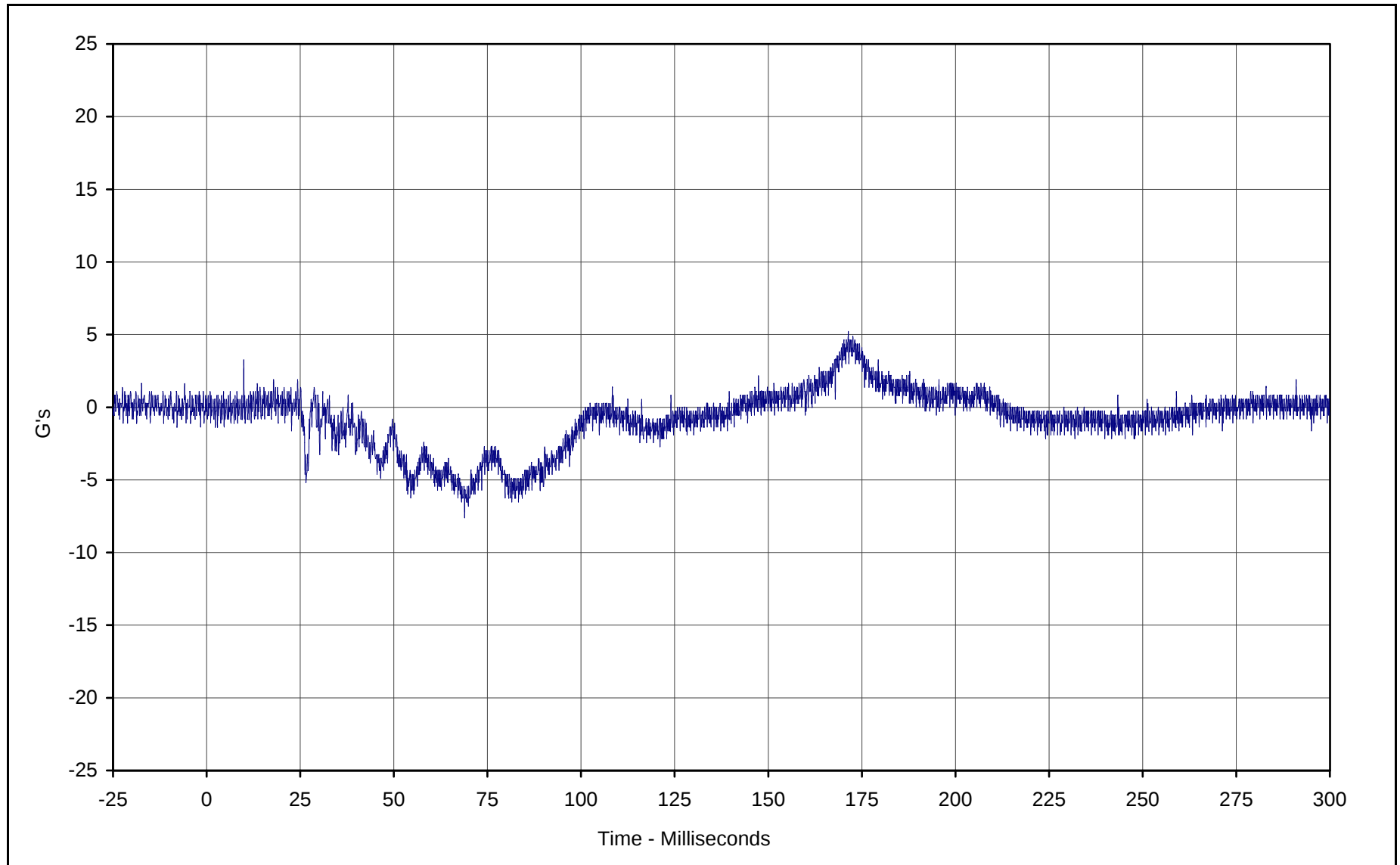




Curve Description: Driver Head Primary X Displ.
Maximum Value: 96.3 at 78.6 Milliseconds
Minimum Value: -2.3 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



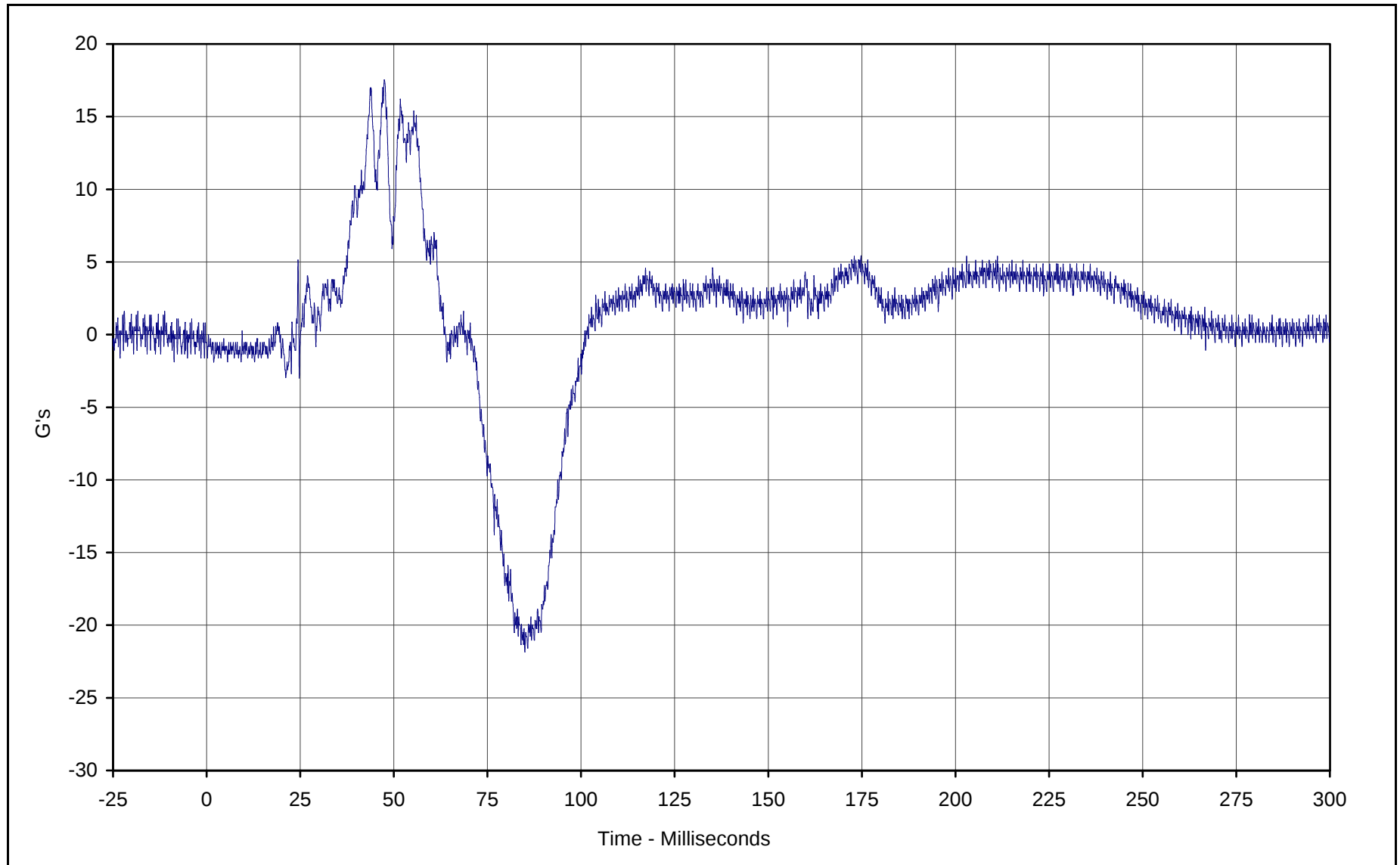


Curve Description: Driver Head Primary Y
Maximum Value: 5.2 at 171.4 Milliseconds
Minimum Value: -7.6 at 68.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-002

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-5

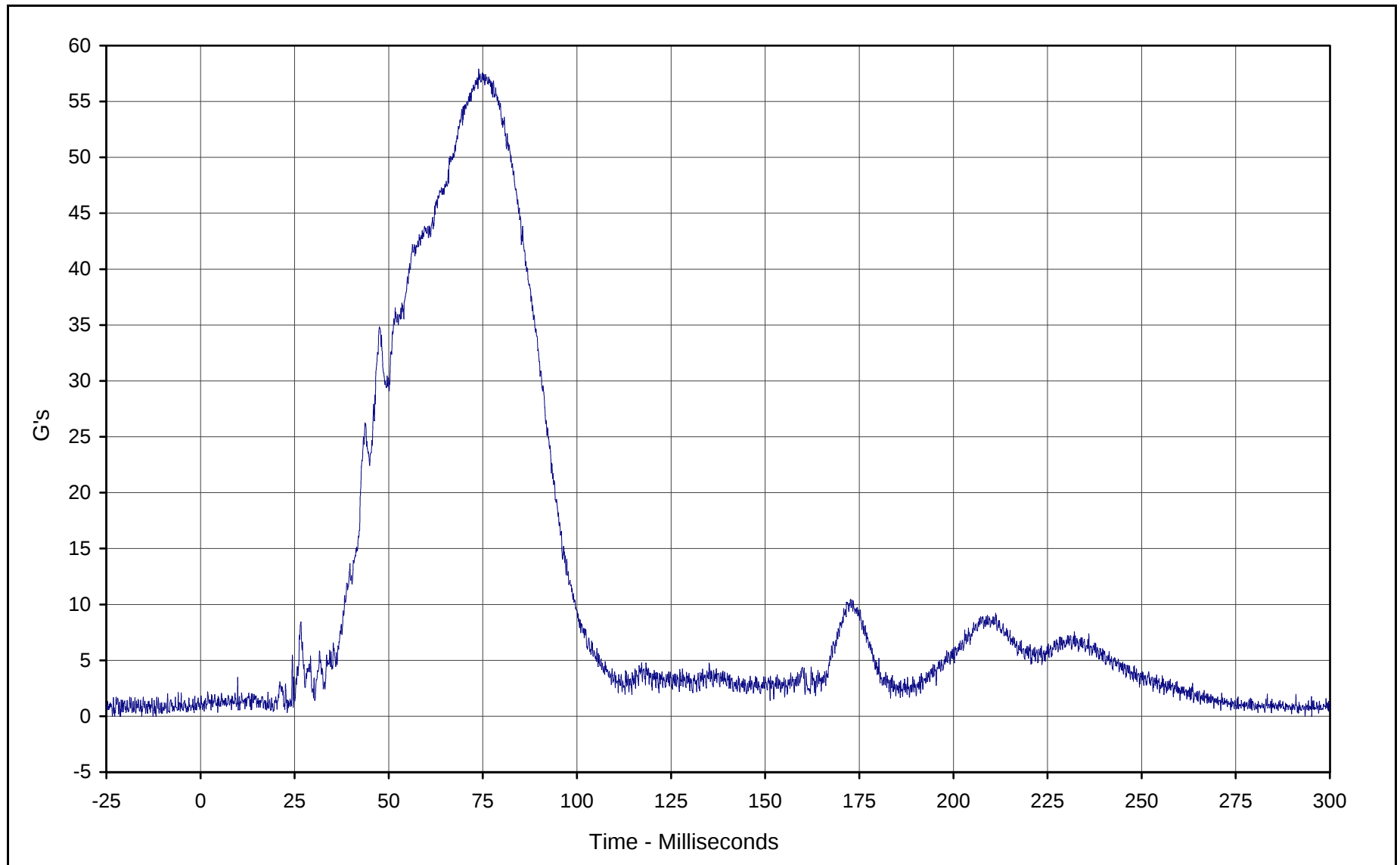


Curve Description: Driver Head Primary Z
Maximum Value: 17.5 at 47.4 Milliseconds
Minimum Value: -21.8 at 85.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-003

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



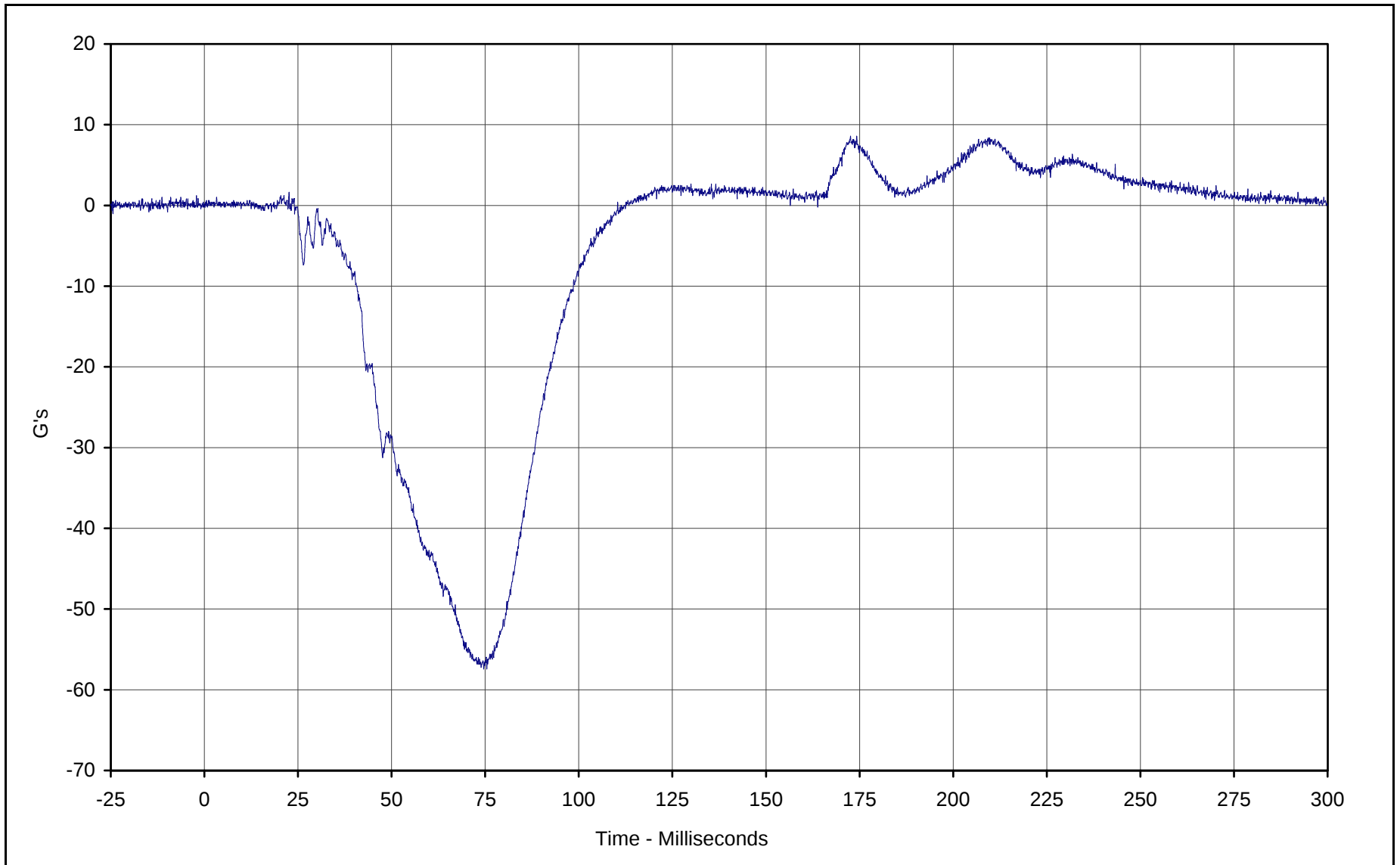
KAR21001-04



Curve Description: Driver Head Resultant Primary
Maximum Value: 57.9 at 73.9 Milliseconds
Minimum Value: 0.0 at 293.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: RES-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

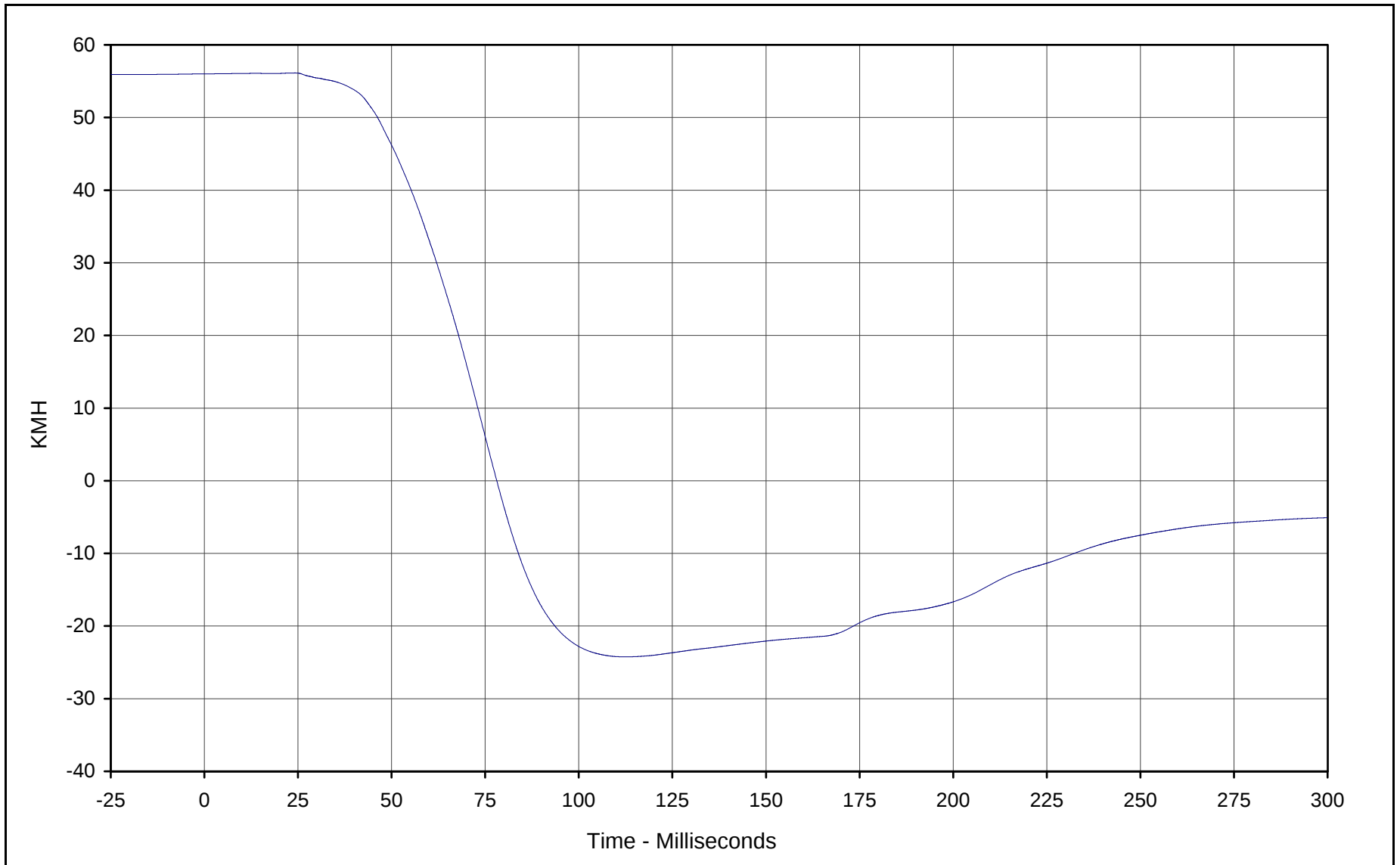




Curve Description: Driver Head Redundant X
Maximum Value: 8.6 at 172.6 Milliseconds
Minimum Value: -57.4 at 74.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

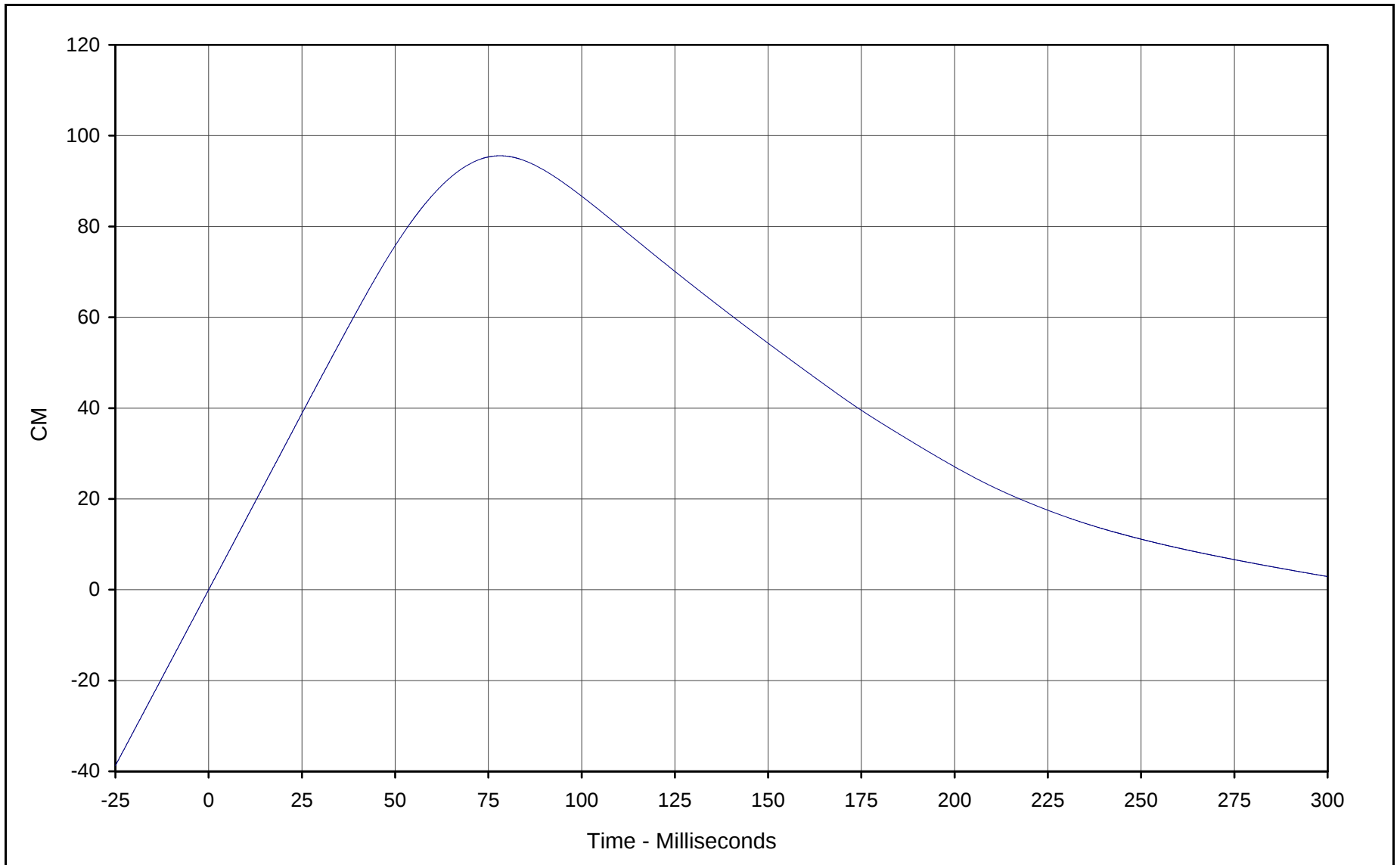




Curve Description: Driver Head Redundant X Velocity
Maximum Value: 56.1 at 24.2 Milliseconds
Minimum Value: -24.2 at 112.4 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



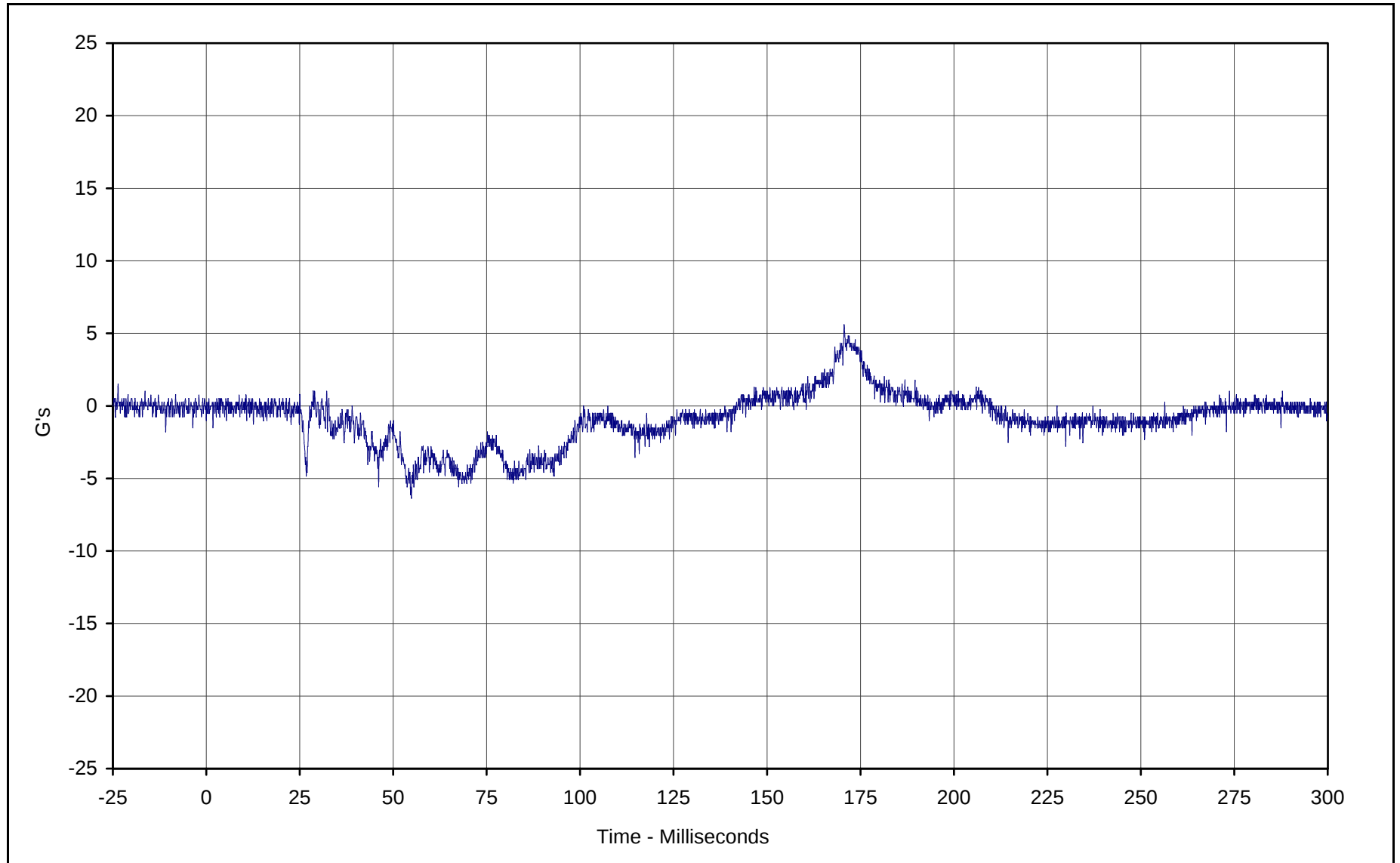


Curve Description: Driver Head Redundant X Displ.
Maximum Value: 95.6 at 78.1 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-10

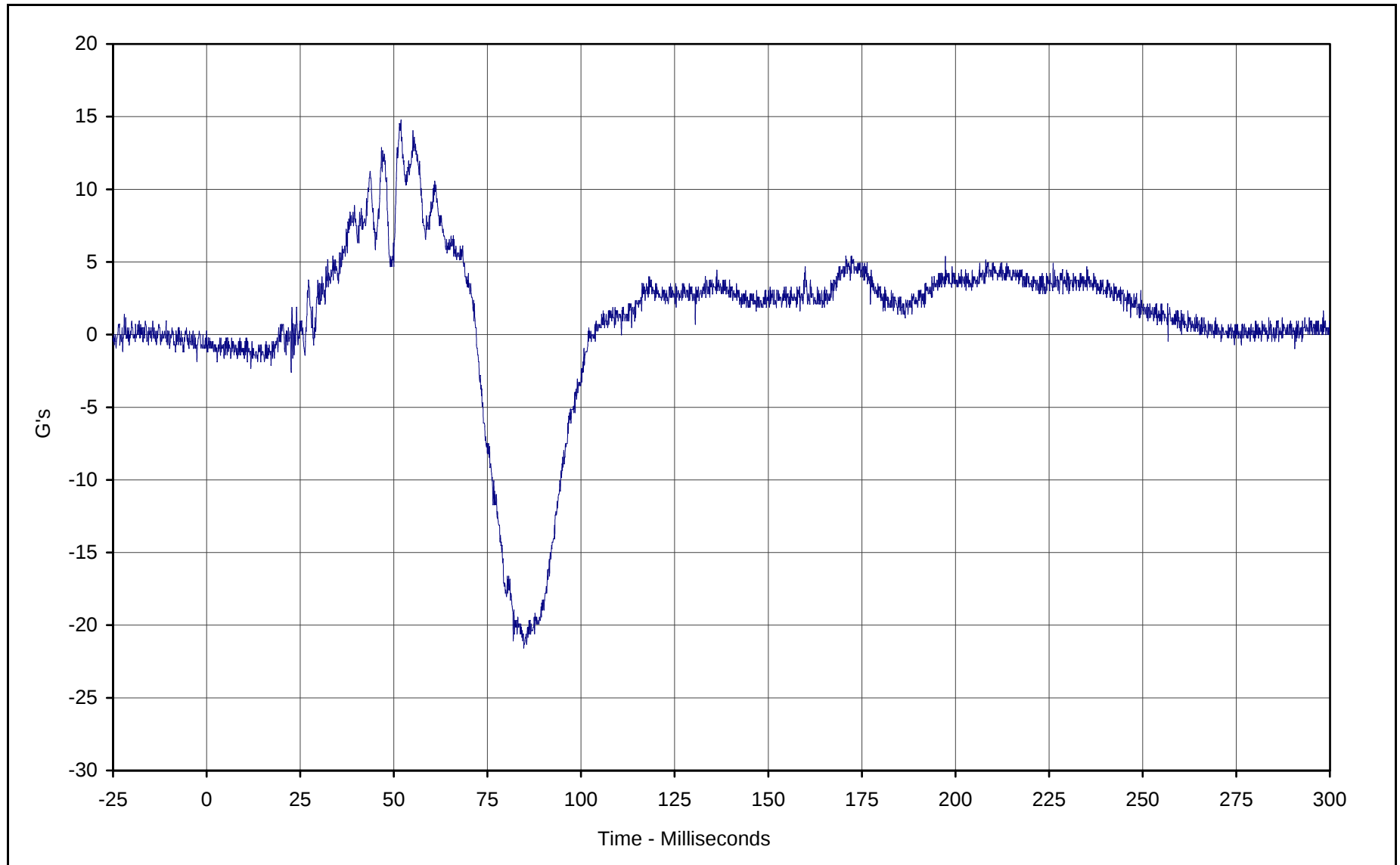


Curve Description: Driver Head Redundant Y
Maximum Value: 5.6 at 170.6 Milliseconds
Minimum Value: -6.3 at 54.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-005

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



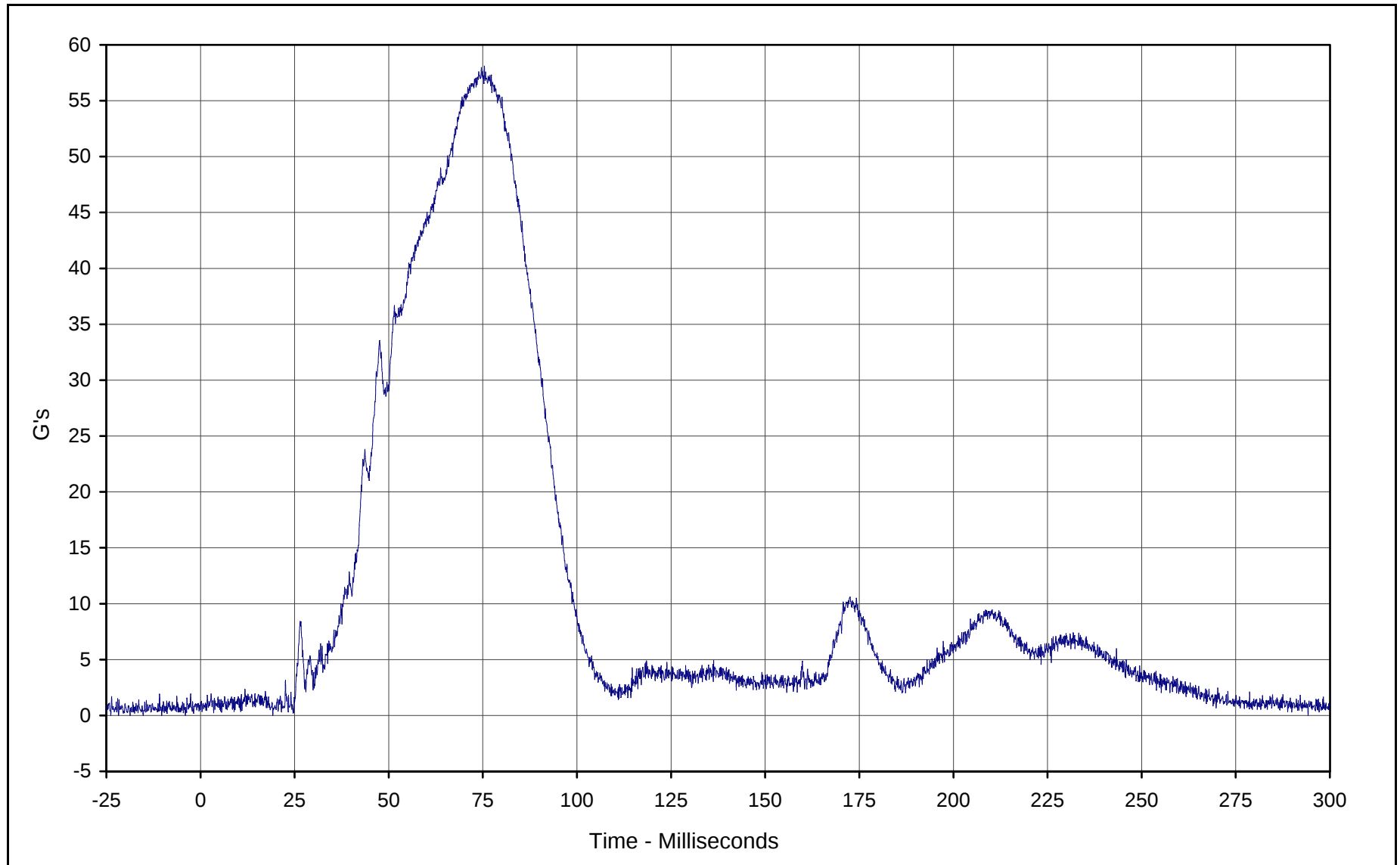
KAR21001-04



Curve Description: Driver Head Redundant Z
Maximum Value: 14.8 at 51.9 Milliseconds
Minimum Value: -21.5 at 84.7 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-006

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

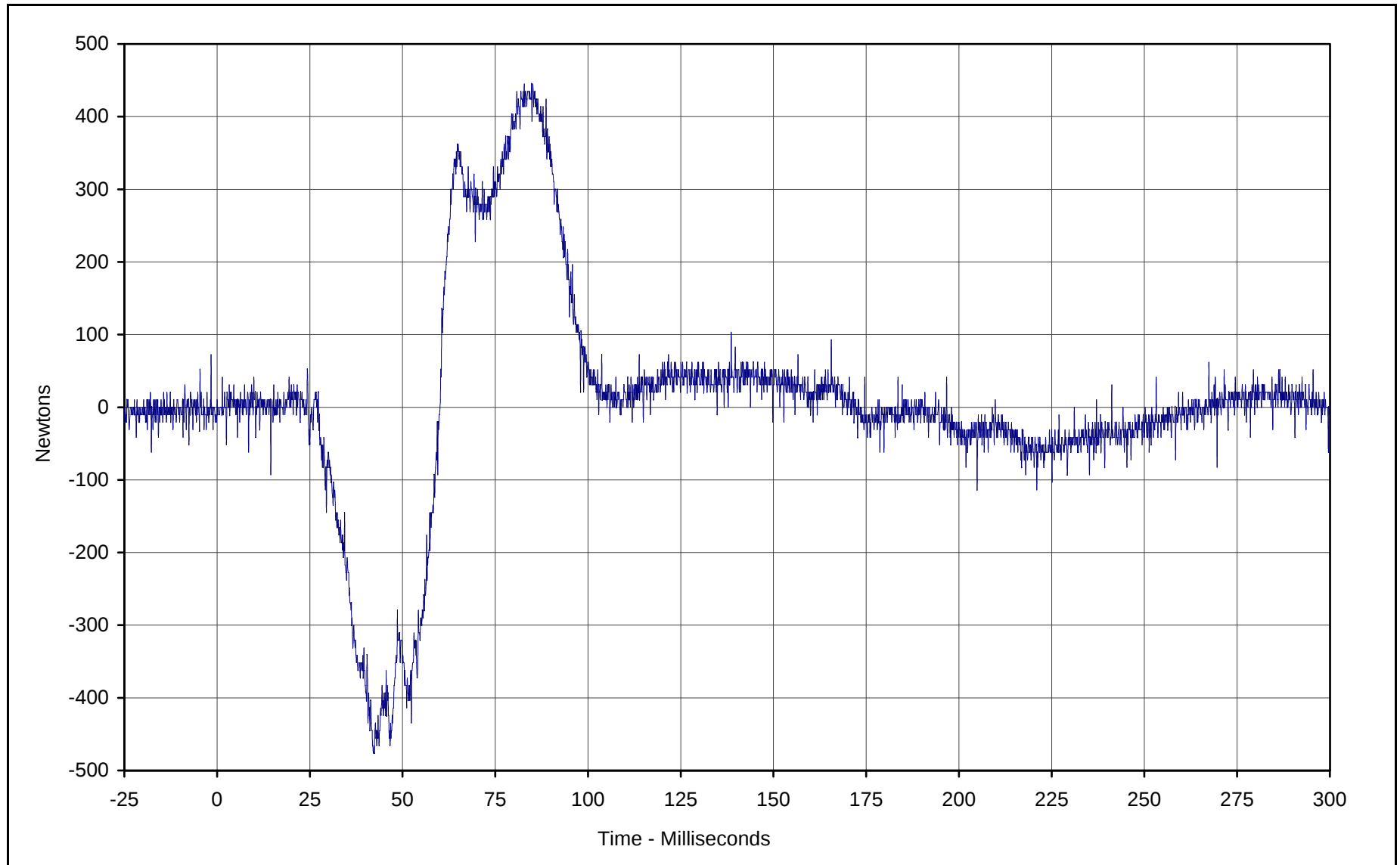




Curve Description: Driver Head Resultant Redundant
Maximum Value: 58.1 at 75.4 Milliseconds
Minimum Value: 0.0 at 19.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: RES-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

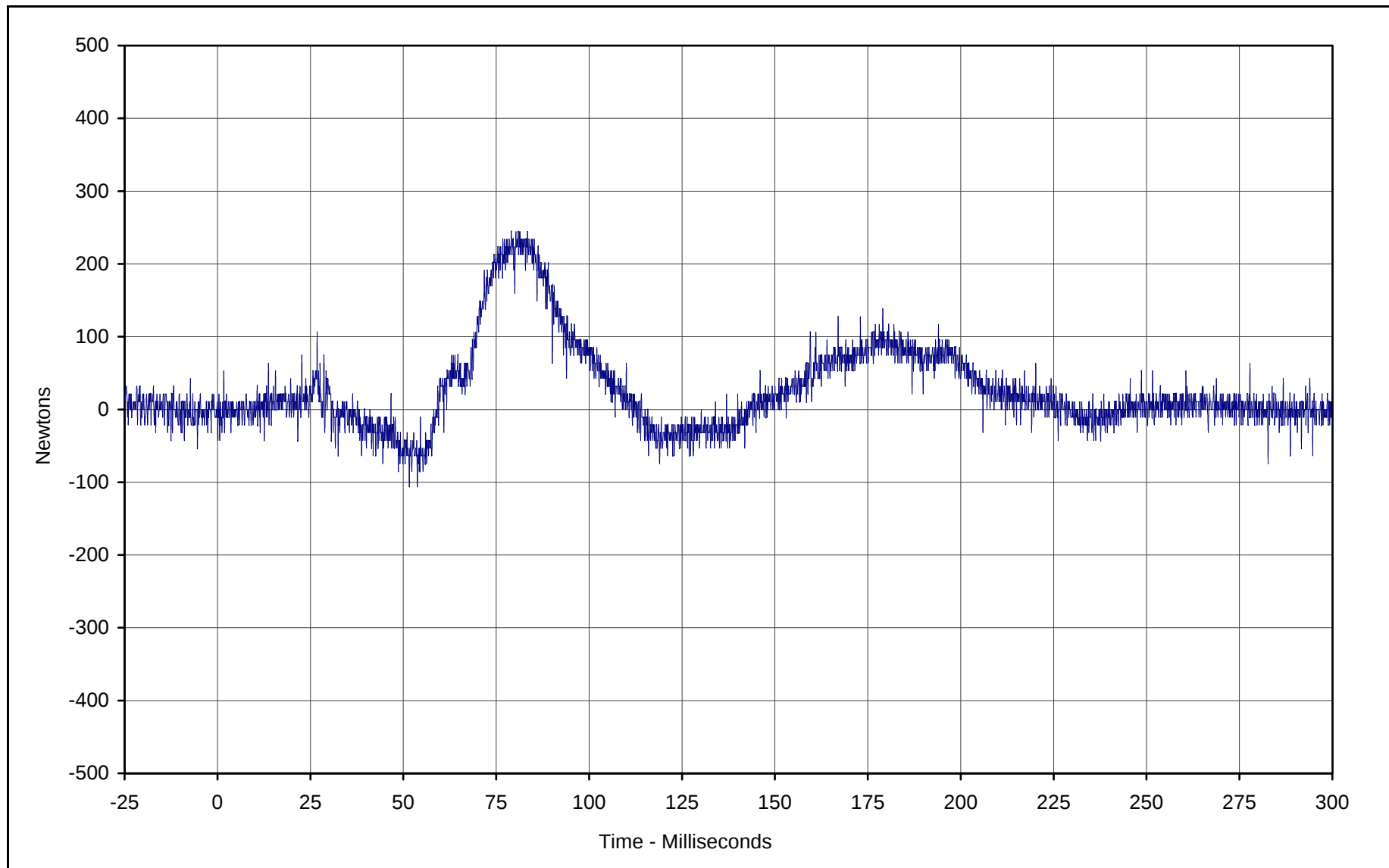




Curve Description: Driver Neck Force X
Maximum Value: 445.1 at 82.8 Milliseconds
Minimum Value: -476.1 at 42.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

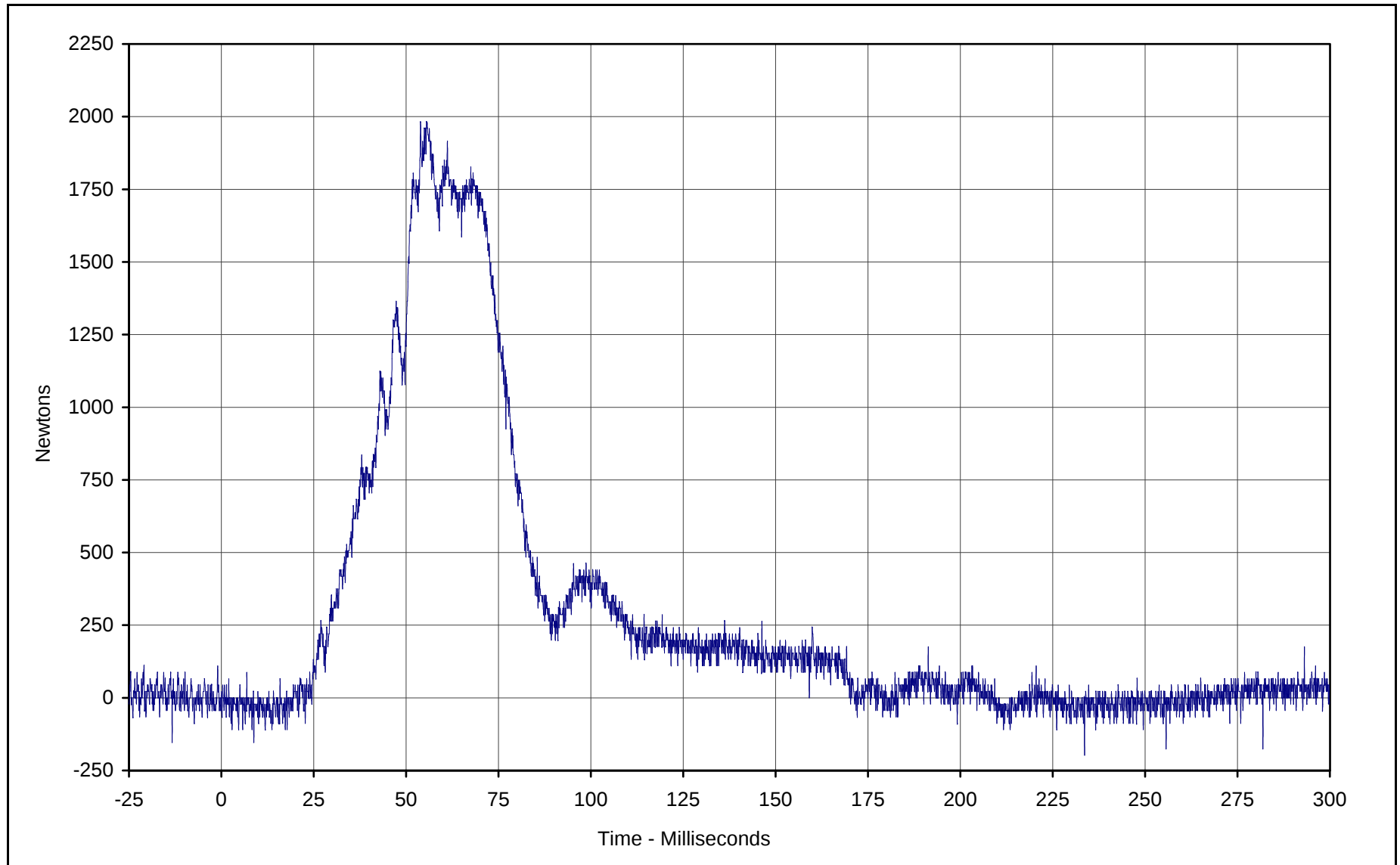




Curve Description: Driver Neck Force Y
Maximum Value: 244.5 at 79.1 Milliseconds
Minimum Value: -106.3 at 51.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-008

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

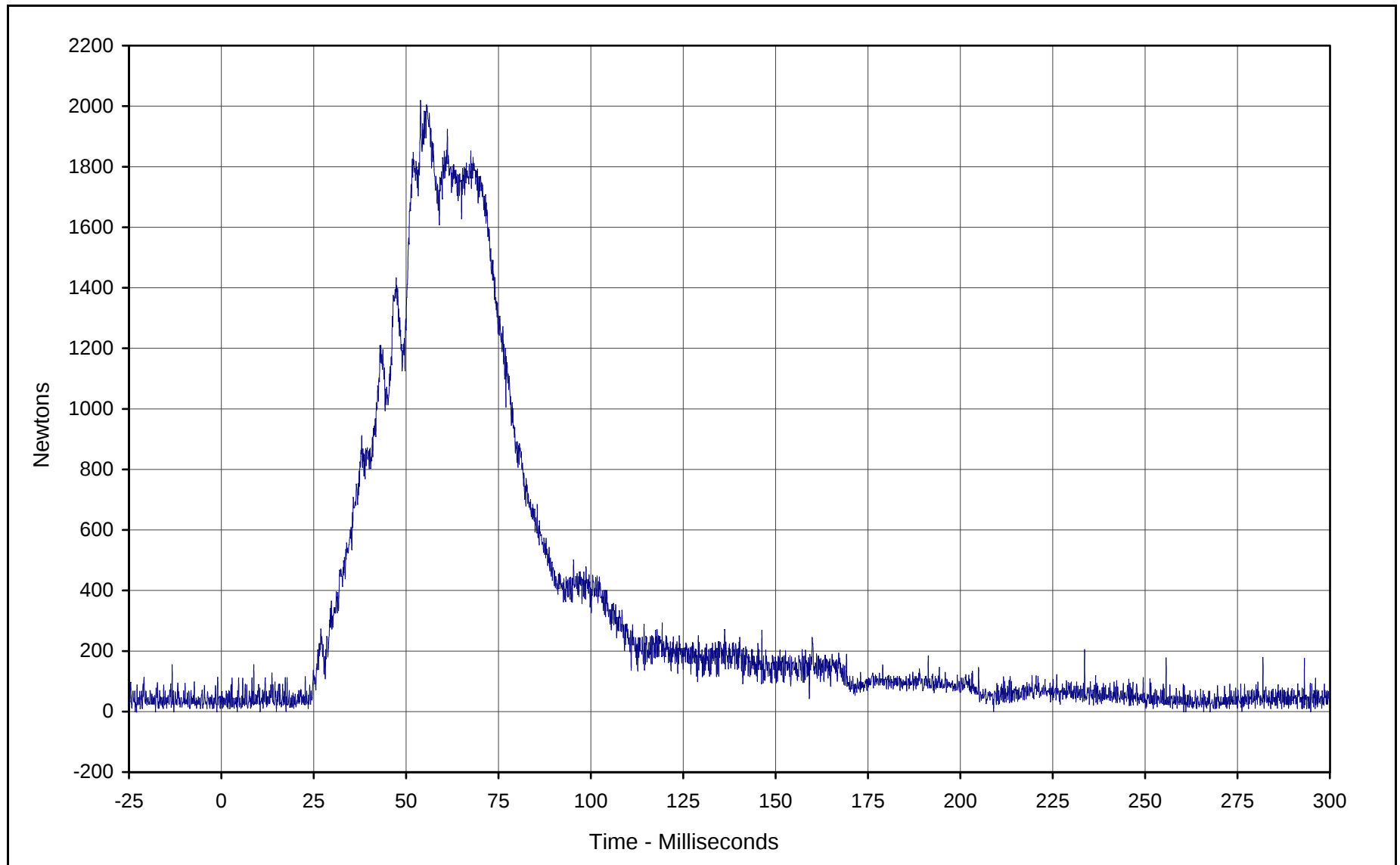




Curve Description: Driver Neck Force Z
Maximum Value: 1981.5 at 53.9 Milliseconds
Minimum Value: -198.1 at 233.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-009

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

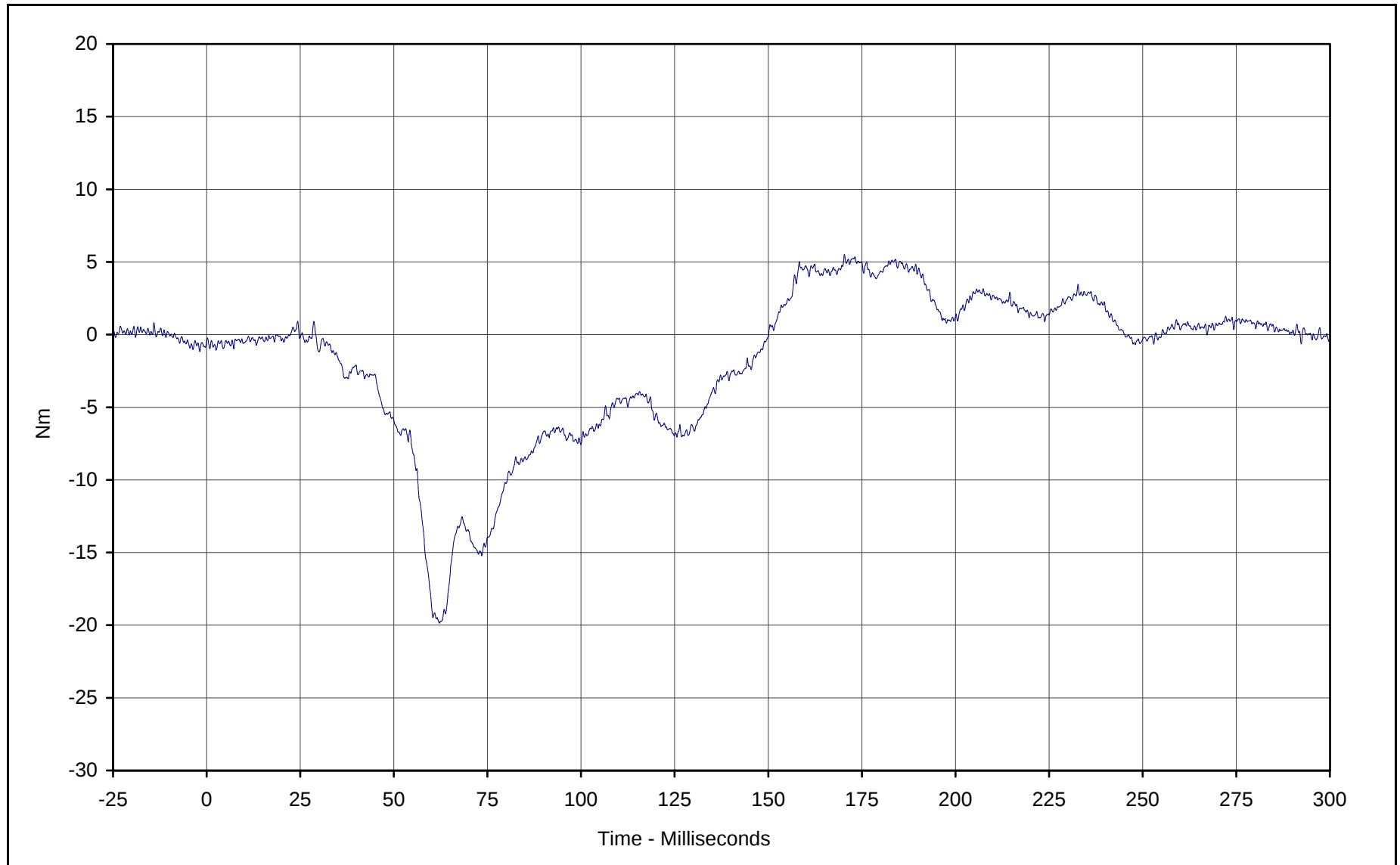




Curve Description: Driver Neck Force Resultant
Maximum Value: 2017.2 at 53.9 Milliseconds
Minimum Value: 0.0 at 4.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: RES-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

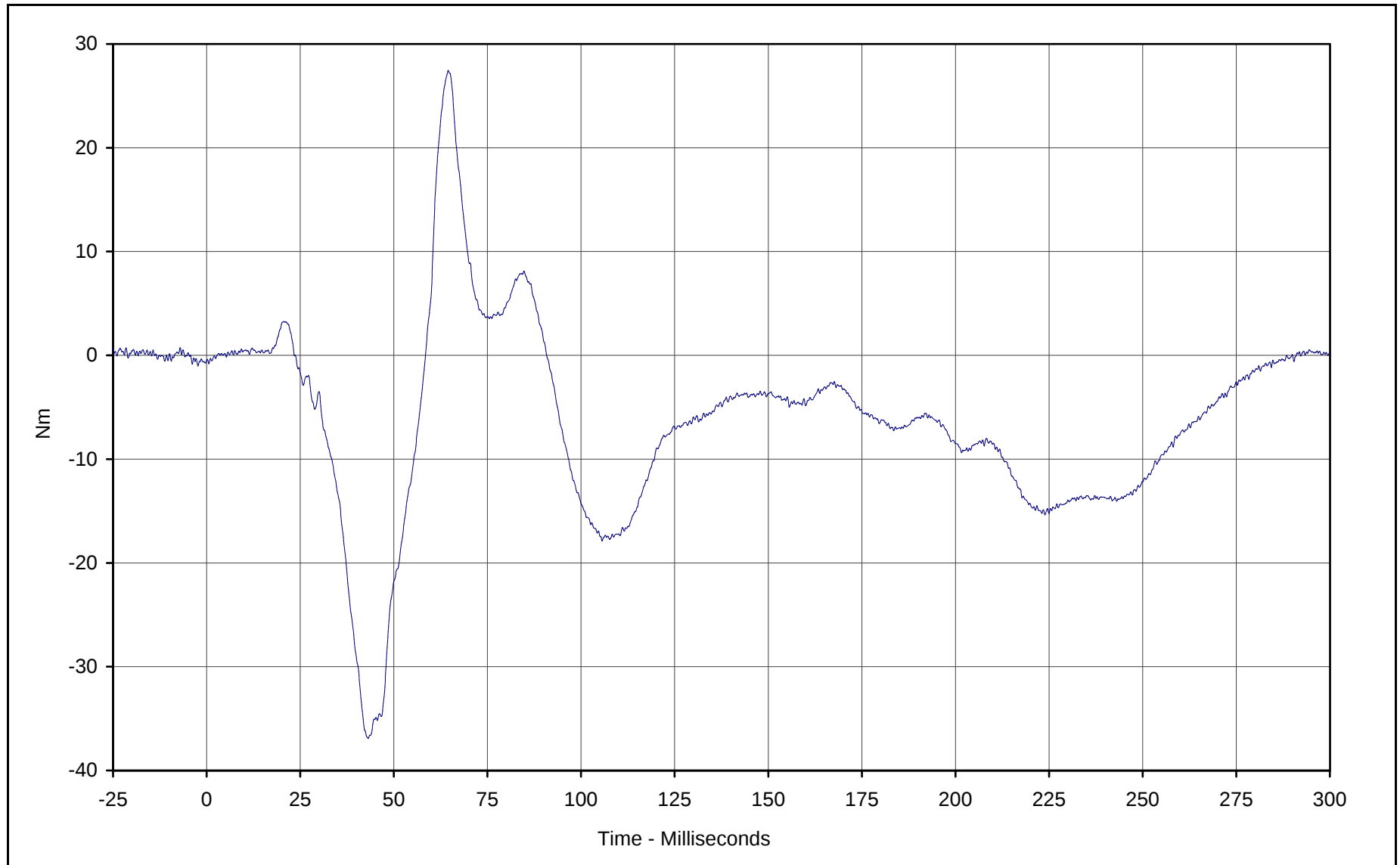




Curve Description: Driver Neck Moment X
Maximum Value: 5.5 at 170.3 Milliseconds
Minimum Value: -19.9 at 62.2 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-010

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

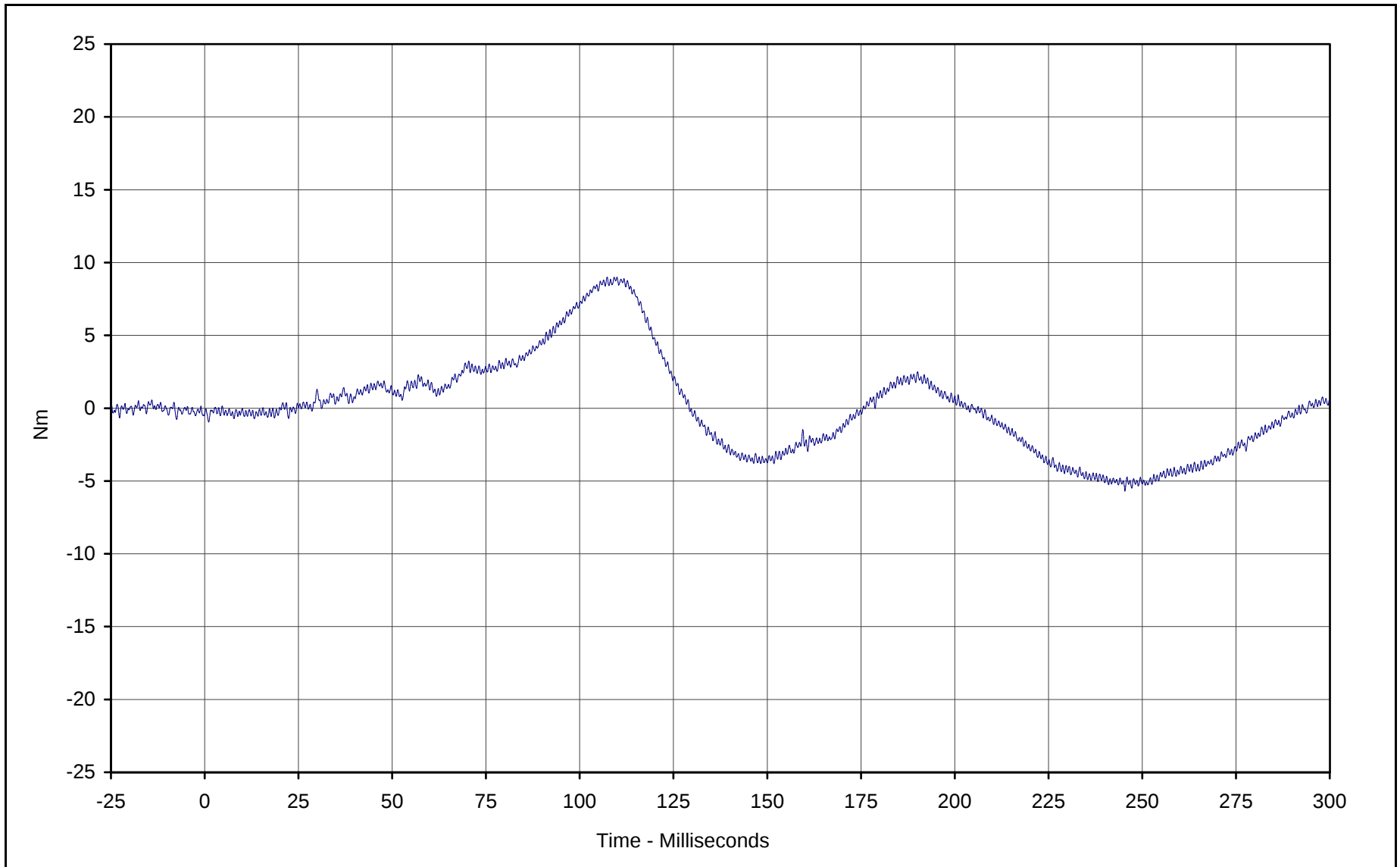




Curve Description: Driver Neck Moment Y
Maximum Value: 27.4 at 64.5 Milliseconds
Minimum Value: -36.9 at 43.1 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-011

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

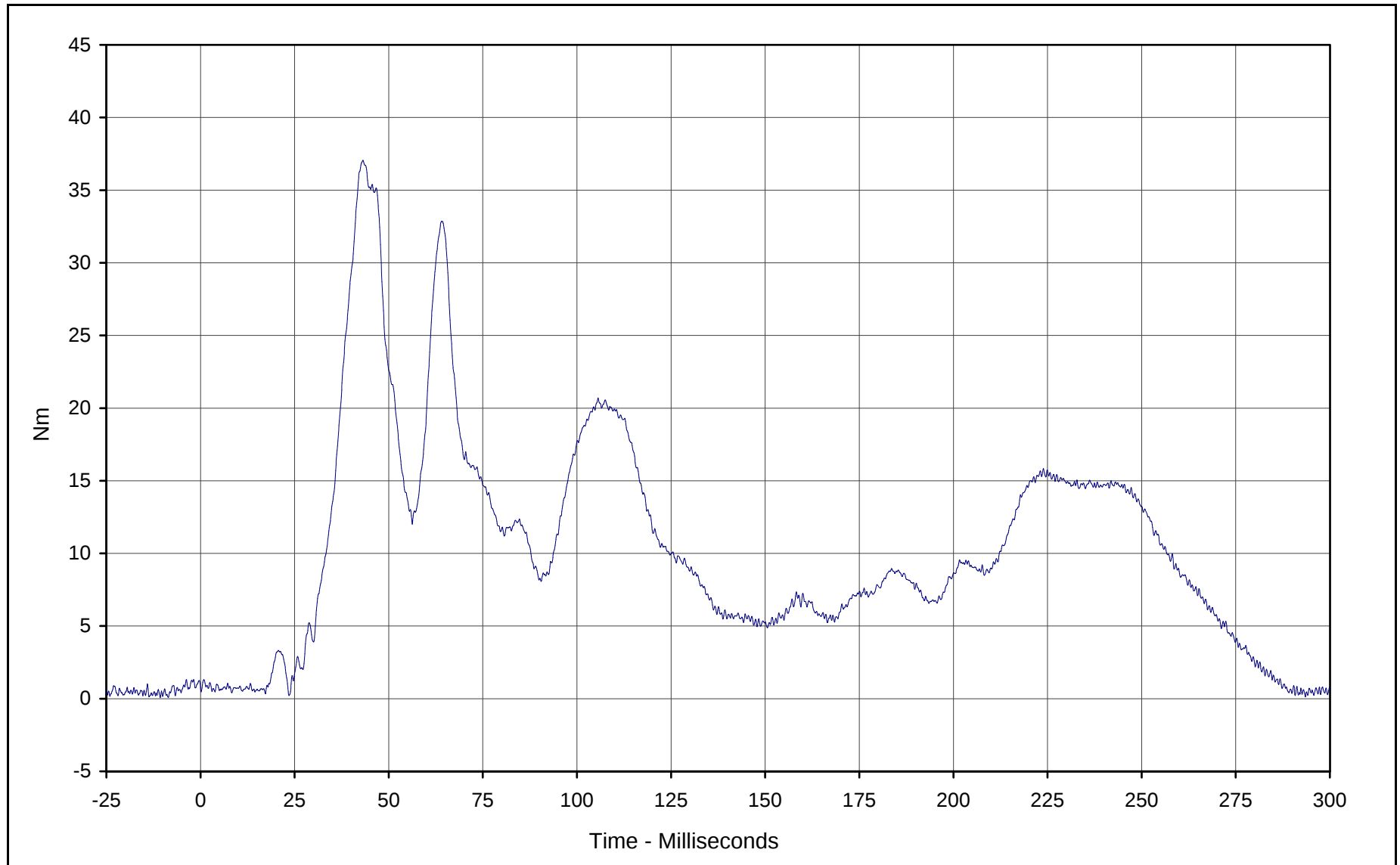




Curve Description: Driver Neck Moment Z
Maximum Value: 9.0 at 107.3 Milliseconds
Minimum Value: -5.7 at 245.4 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-012

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



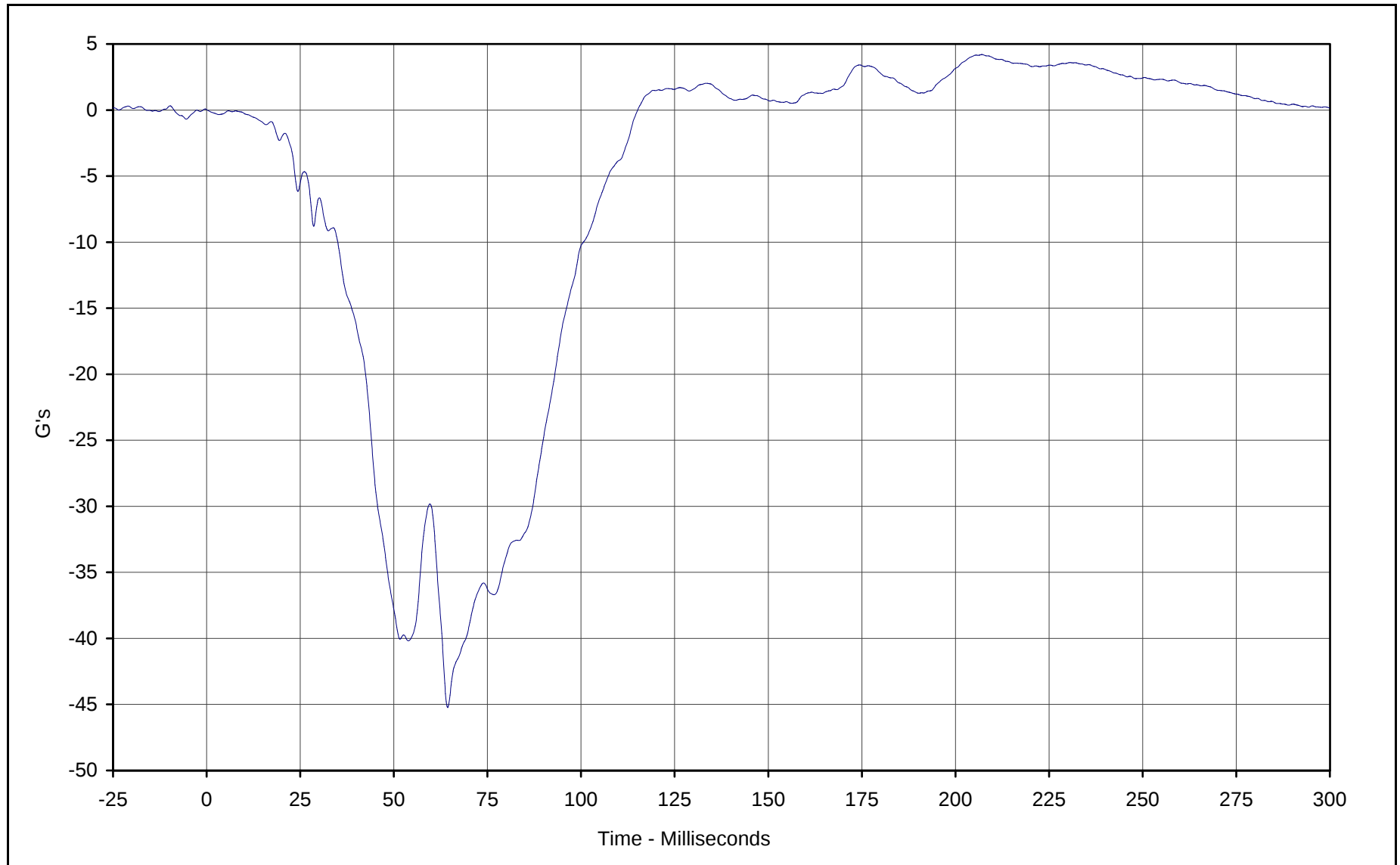


Curve Description: Driver Neck Moment Resultant
Maximum Value: 37.0 at 43.2 Milliseconds
Minimum Value: 0.1 at 293.5 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: RES-010

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-21

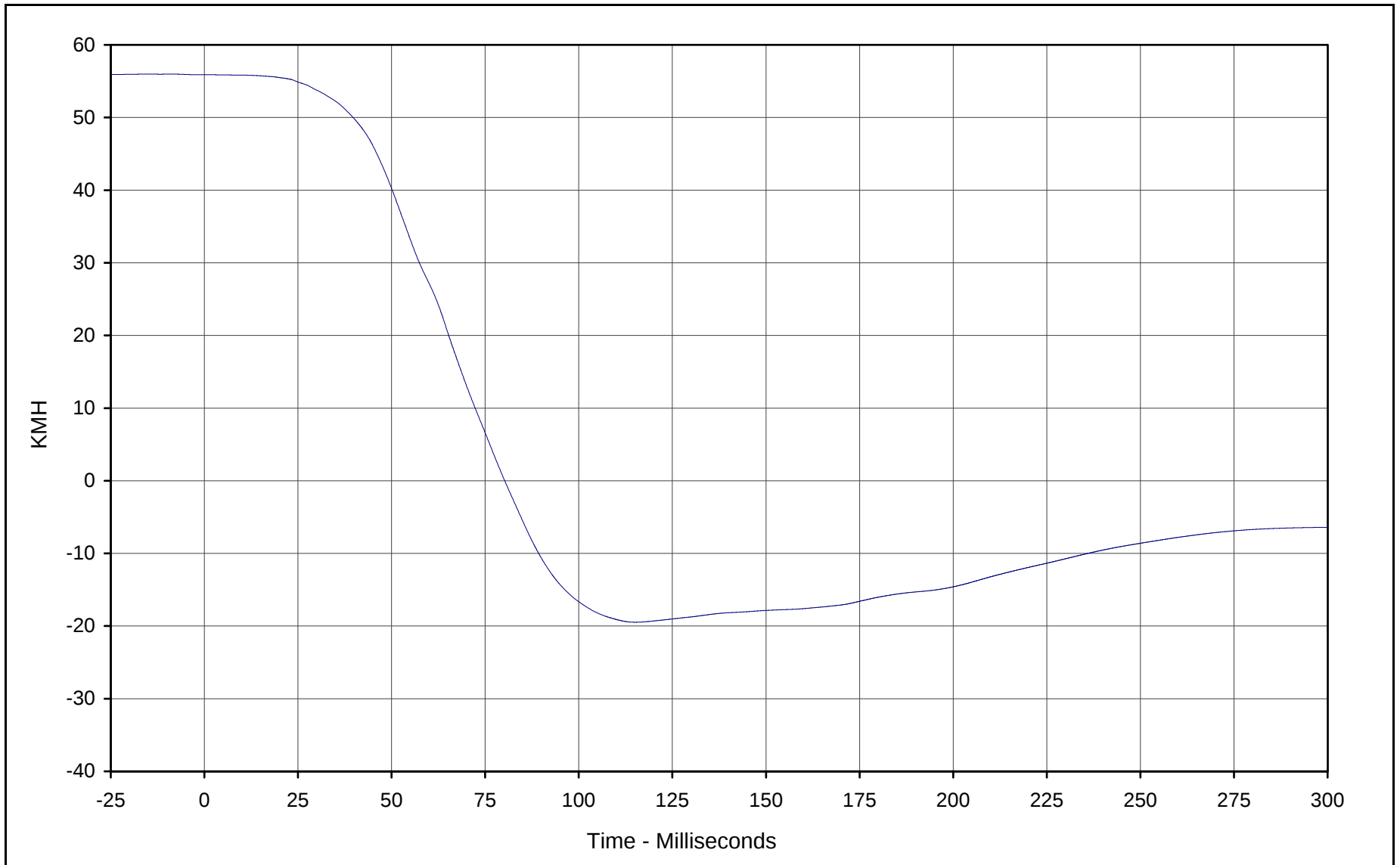


Curve Description: Driver Chest Primary X
Maximum Value: 4.2 at 207.1 Milliseconds
Minimum Value: -45.2 at 64.4 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



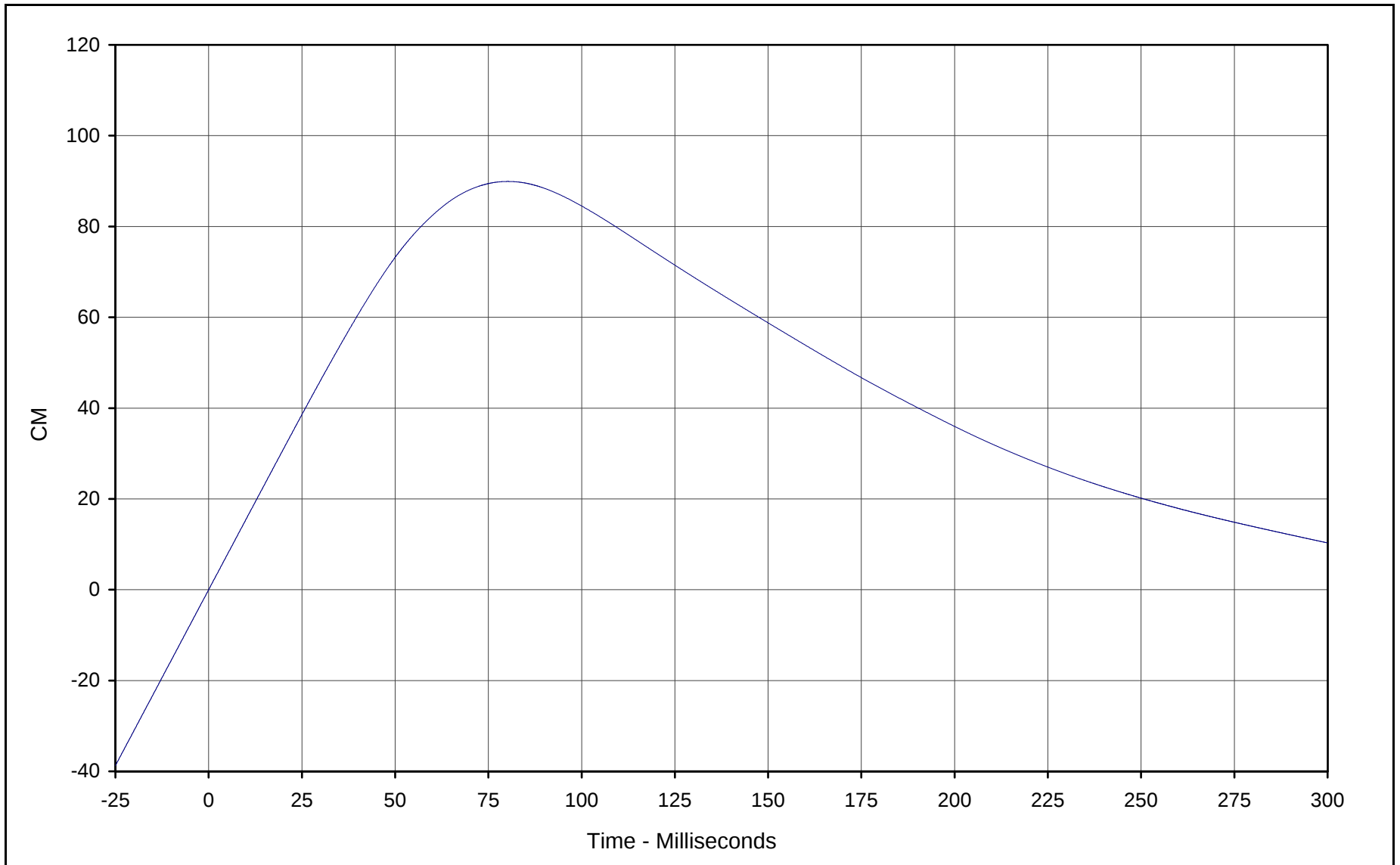
KAR21001-04



Curve Description: Driver Chest Primary X Velocity
Maximum Value: 55.9 at 0.2 Milliseconds
Minimum Value: -19.5 at 115.1 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



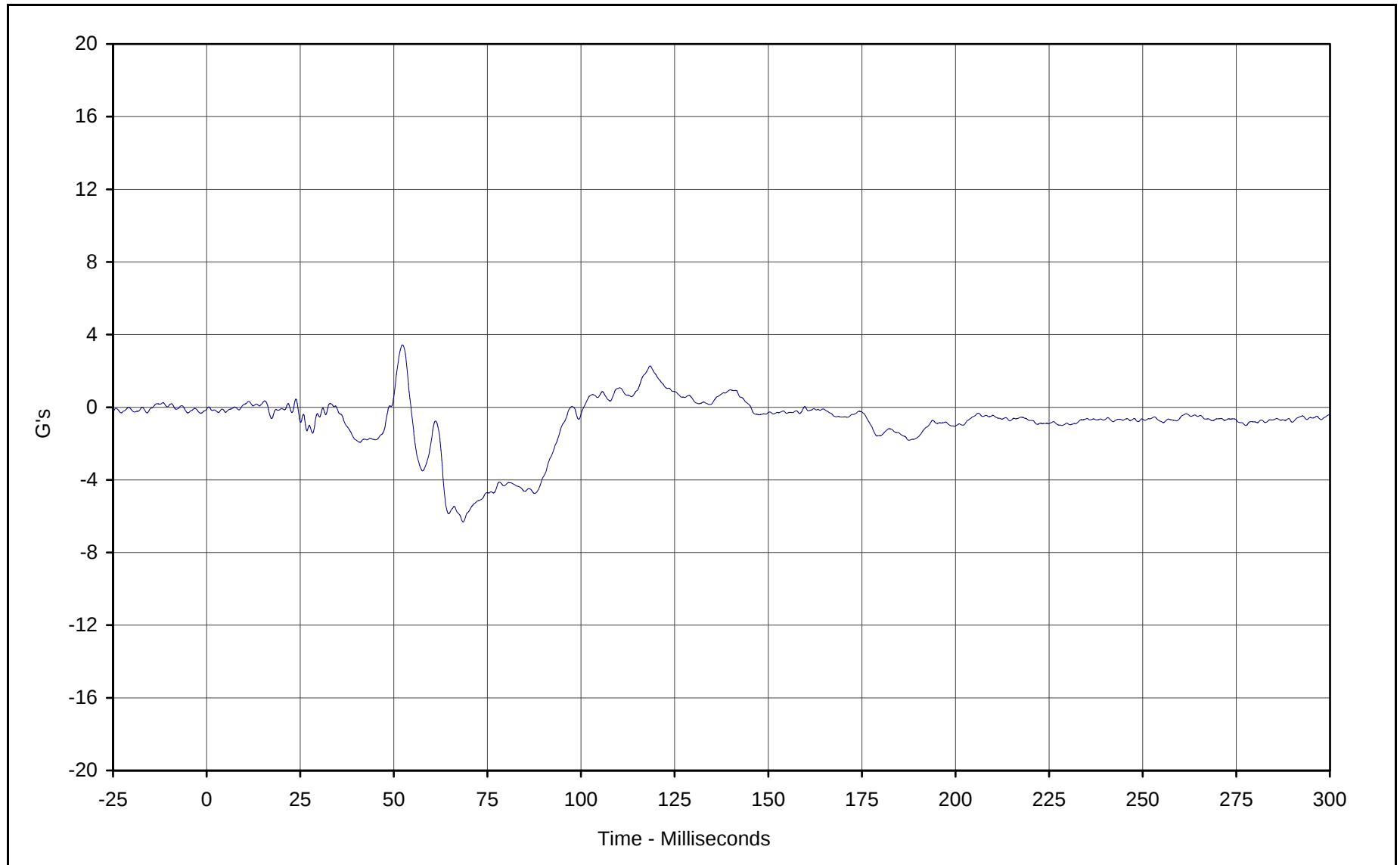


Curve Description: Driver Chest Primary X Displ.
Maximum Value: 89.9 at 80.2 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-24



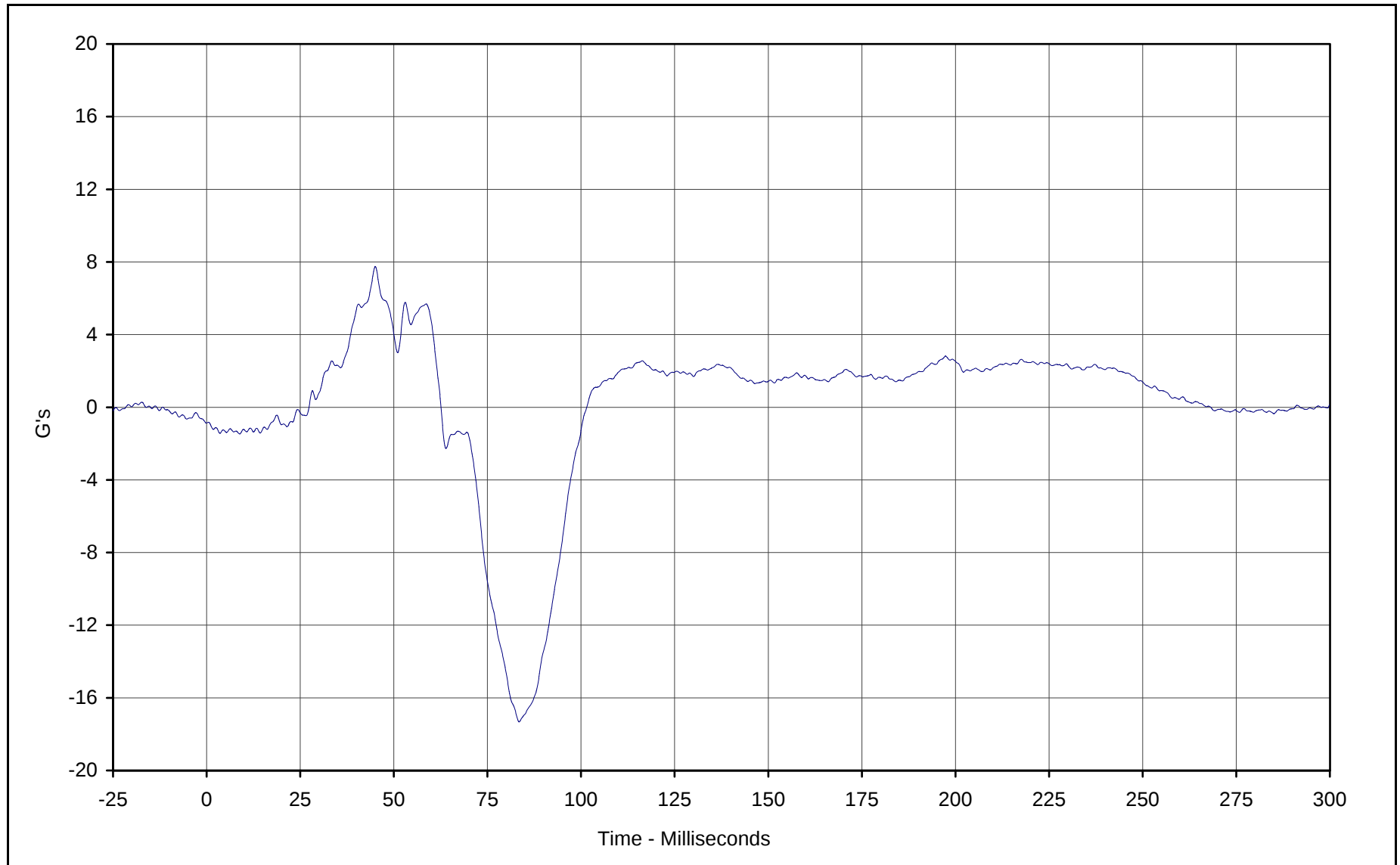
Curve Description: Driver Chest Primary Y
Maximum Value: 3.4 at 52.3 Milliseconds
Minimum Value: -6.3 at 68.5 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-014

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

B-25

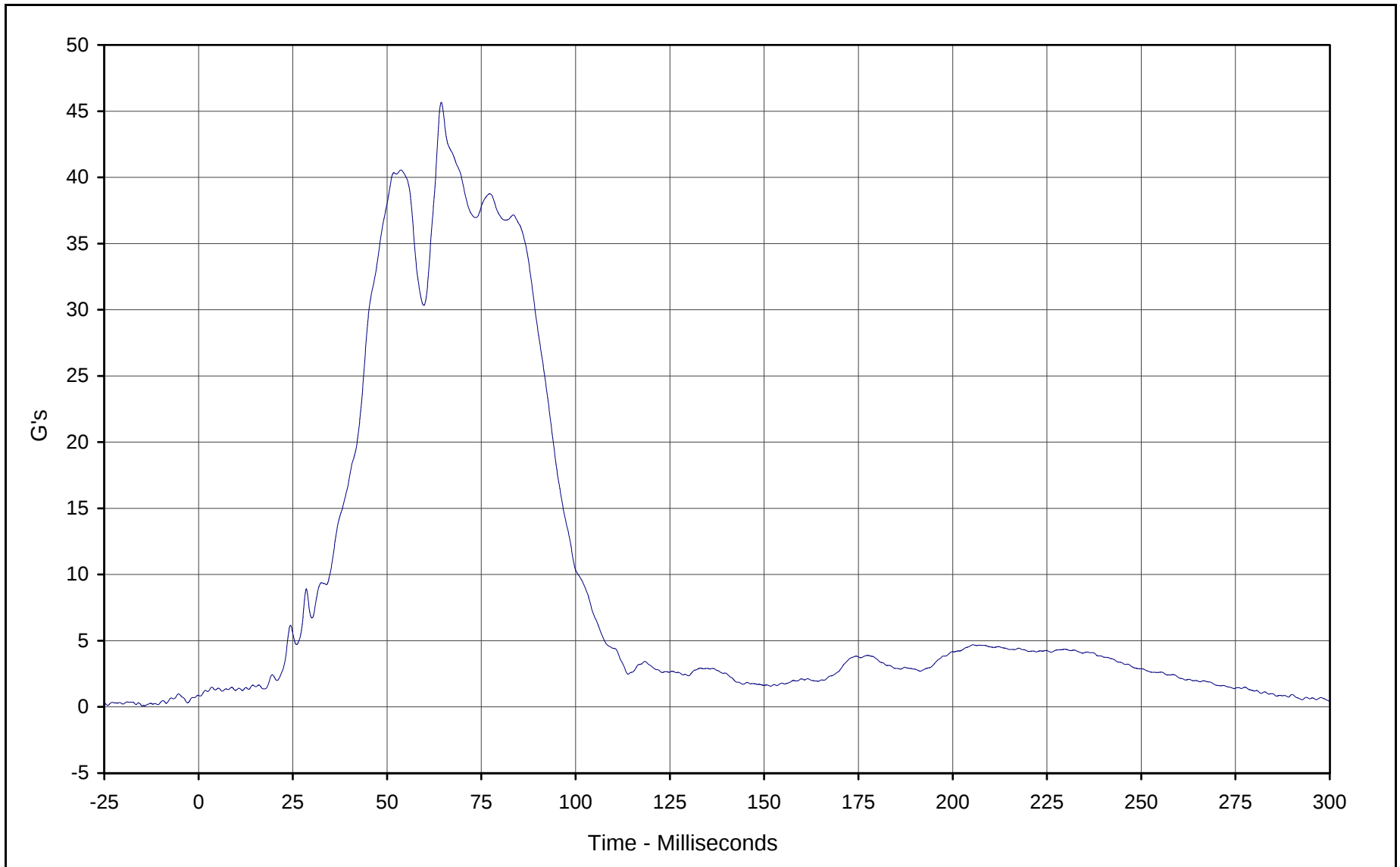


Curve Description: Driver Chest Primary Z
Maximum Value: 7.8 at 45.0 Milliseconds
Minimum Value: -17.3 at 83.4 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-015

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



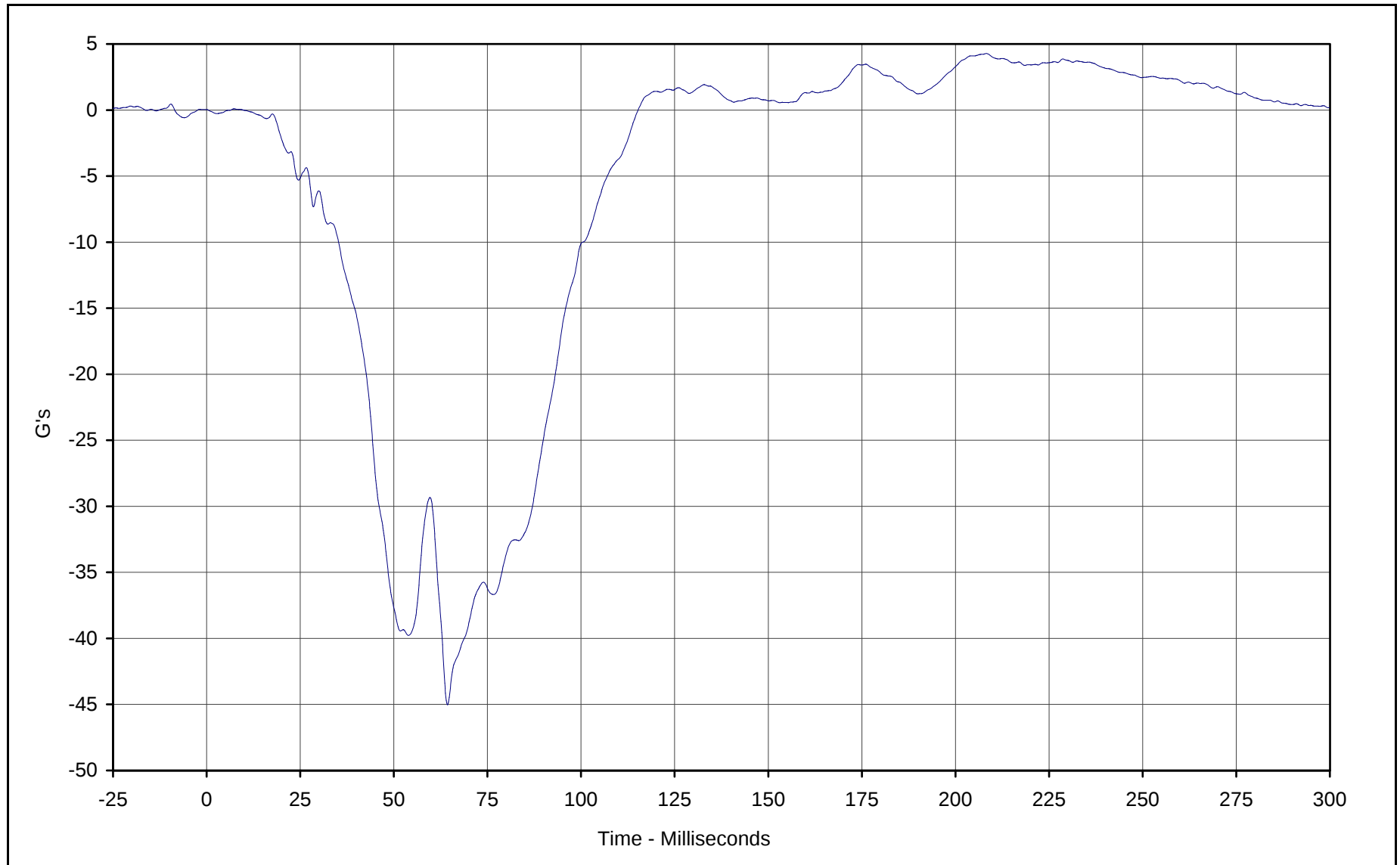
KAR21001-04



Curve Description: Driver Chest Resultant Primary
Maximum Value: 45.7 at 64.4 Milliseconds
Minimum Value: 0.5 at 299.8 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: RES-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

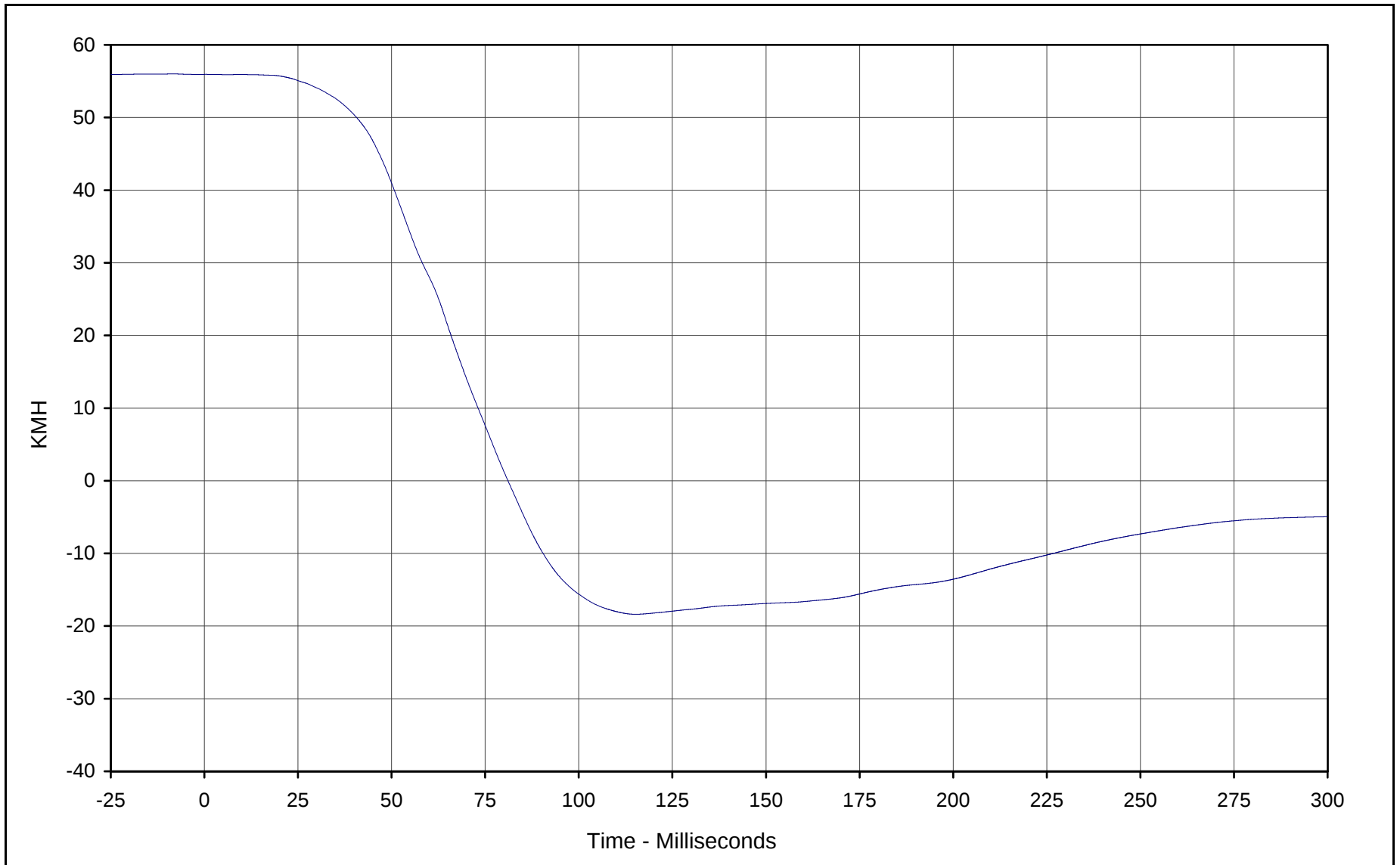




Curve Description: Driver Chest Redundant X
 Maximum Value: 4.3 at 208.3 Milliseconds
 Minimum Value: -45.0 at 64.3 Milliseconds
 SAE Filter Class: 180
 Date of Test: 01/11/01
 Curve Number: FIL-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
 Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

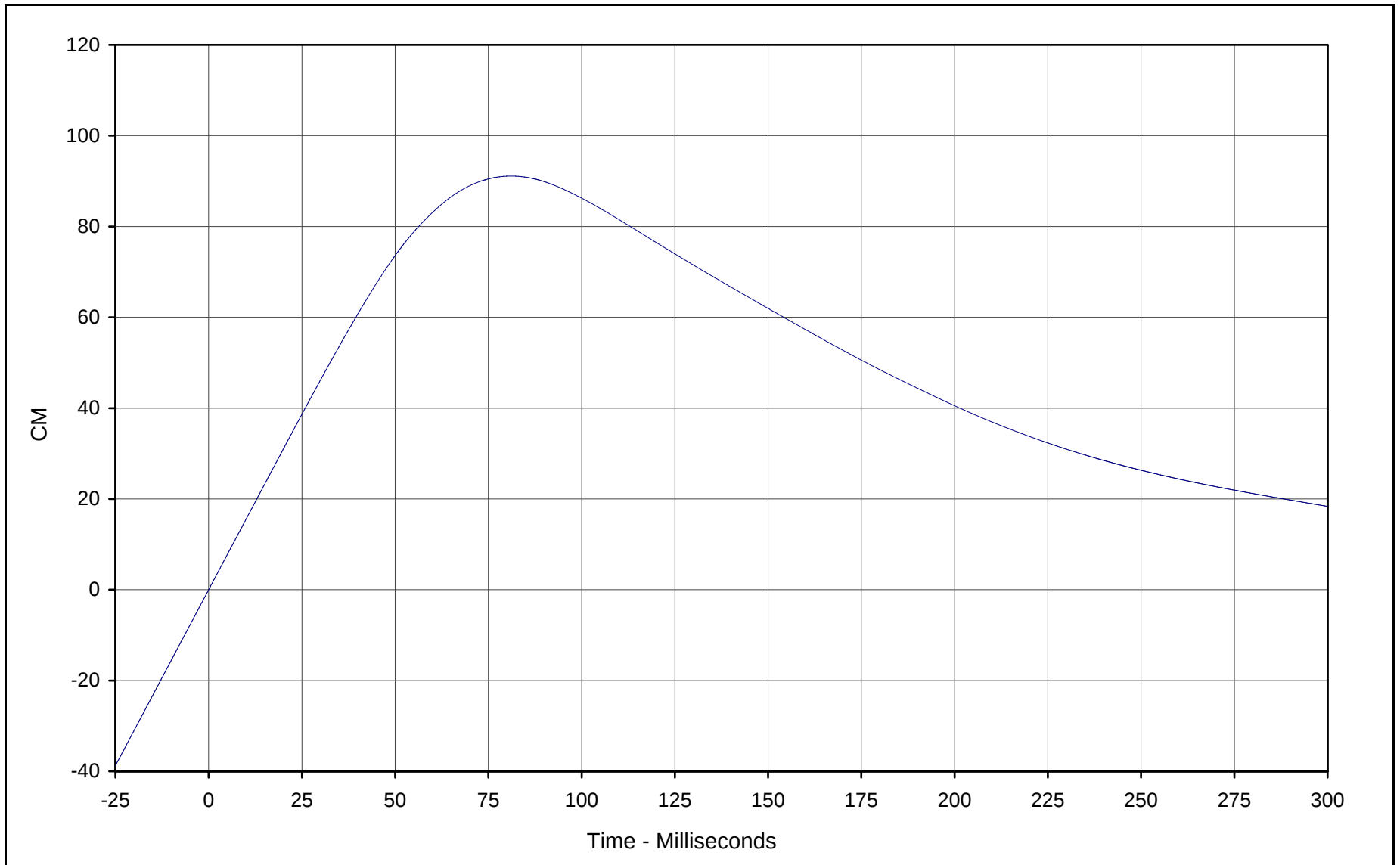




Curve Description: Driver Chest Redundant X Velocity
Maximum Value: 55.9 at 0.4 Milliseconds
Minimum Value: -18.4 at 115.2 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



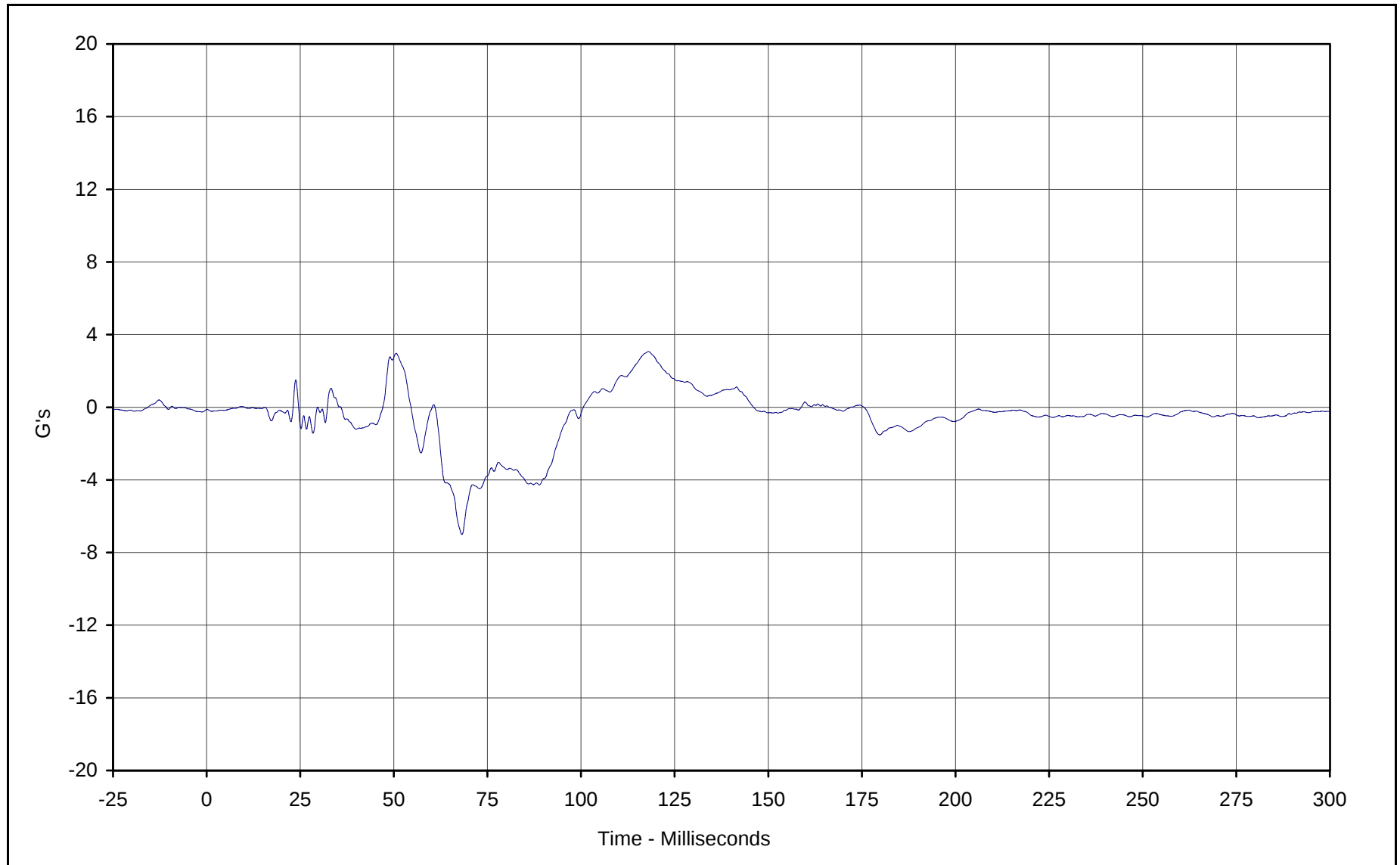


Curve Description: Driver Chest Redundant X Displ.
Maximum Value: 91.1 at 81.1 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-30

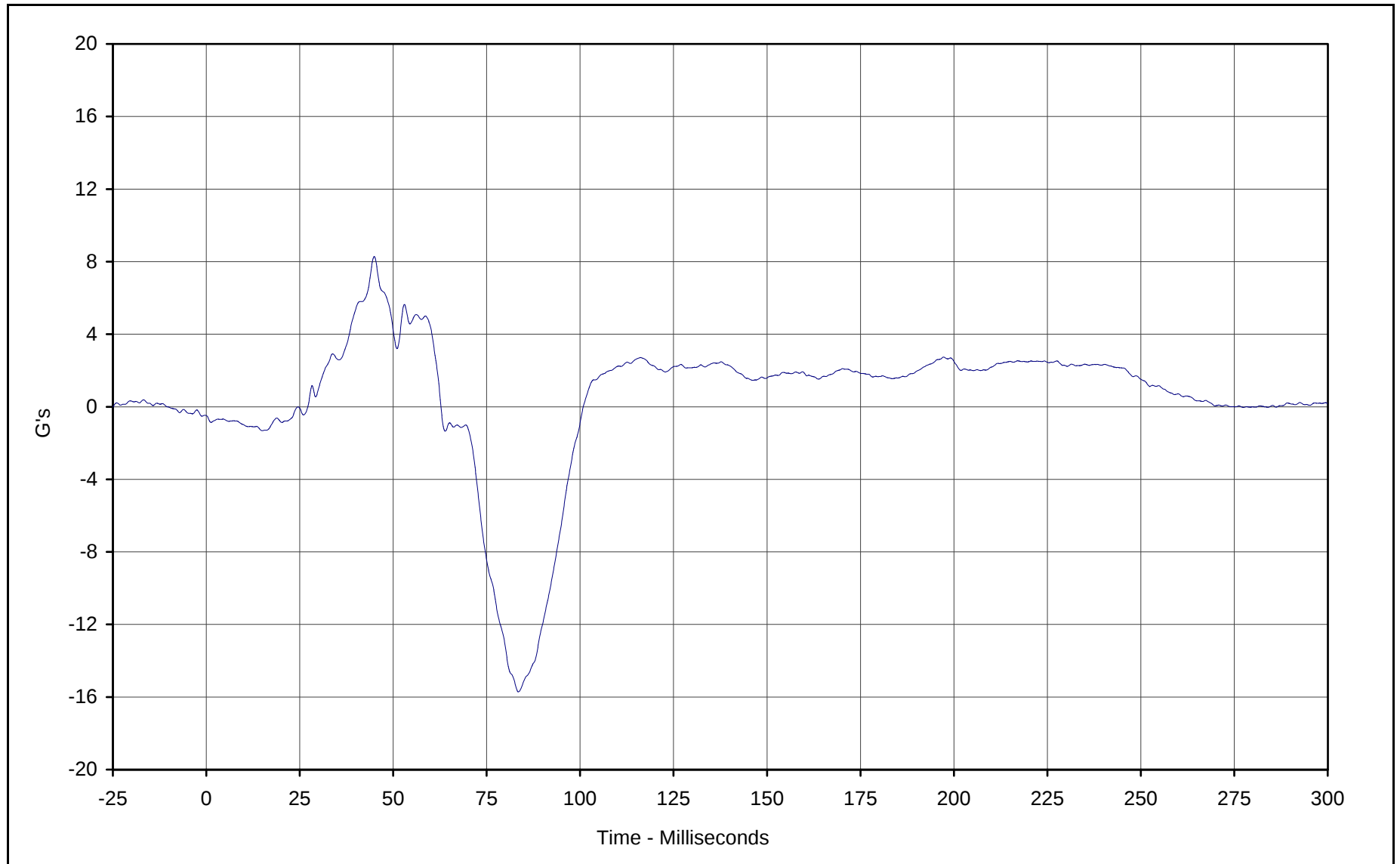


Curve Description: Driver Chest Redundant Y
Maximum Value: 3.1 at 118.0 Milliseconds
Minimum Value: -7.0 at 68.2 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-017

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



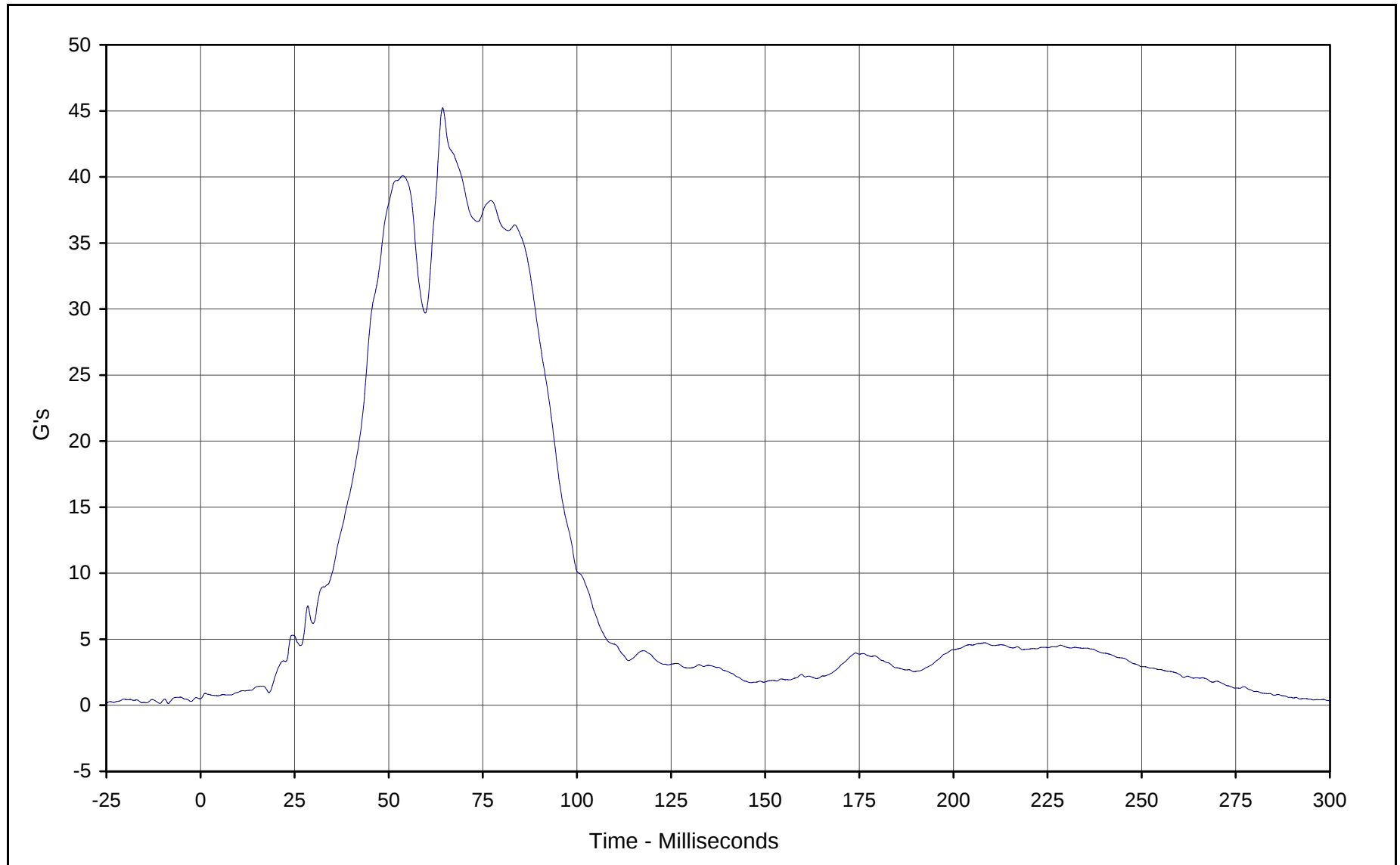
KAR21001-04



Curve Description: Driver Chest Redundant Z
Maximum Value: 8.3 at 44.9 Milliseconds
Minimum Value: -15.7 at 83.5 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-018

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

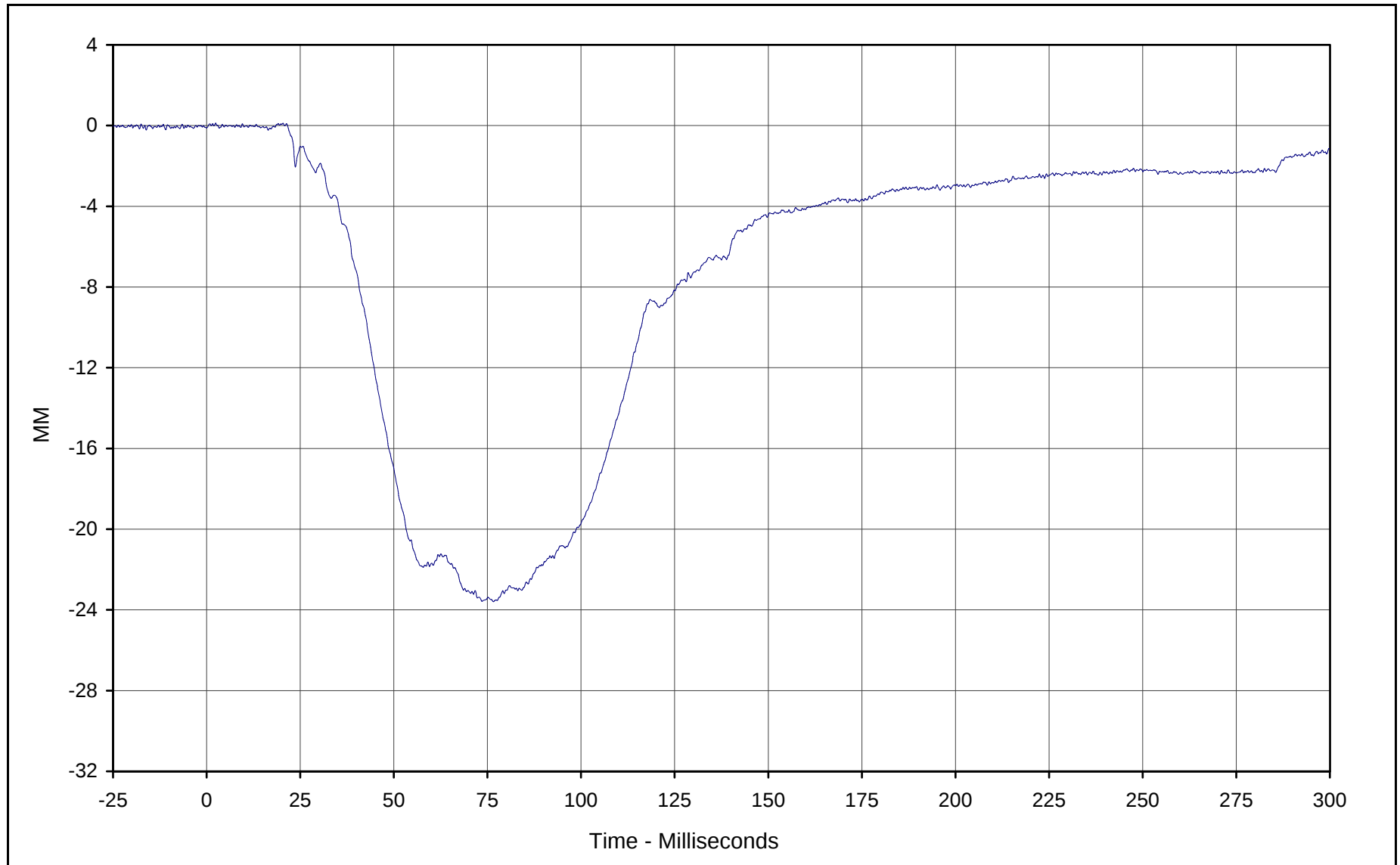




Curve Description: Driver Chest Resultant Redundant
Maximum Value: 45.2 at 64.3 Milliseconds
Minimum Value: 0.4 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: RES-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

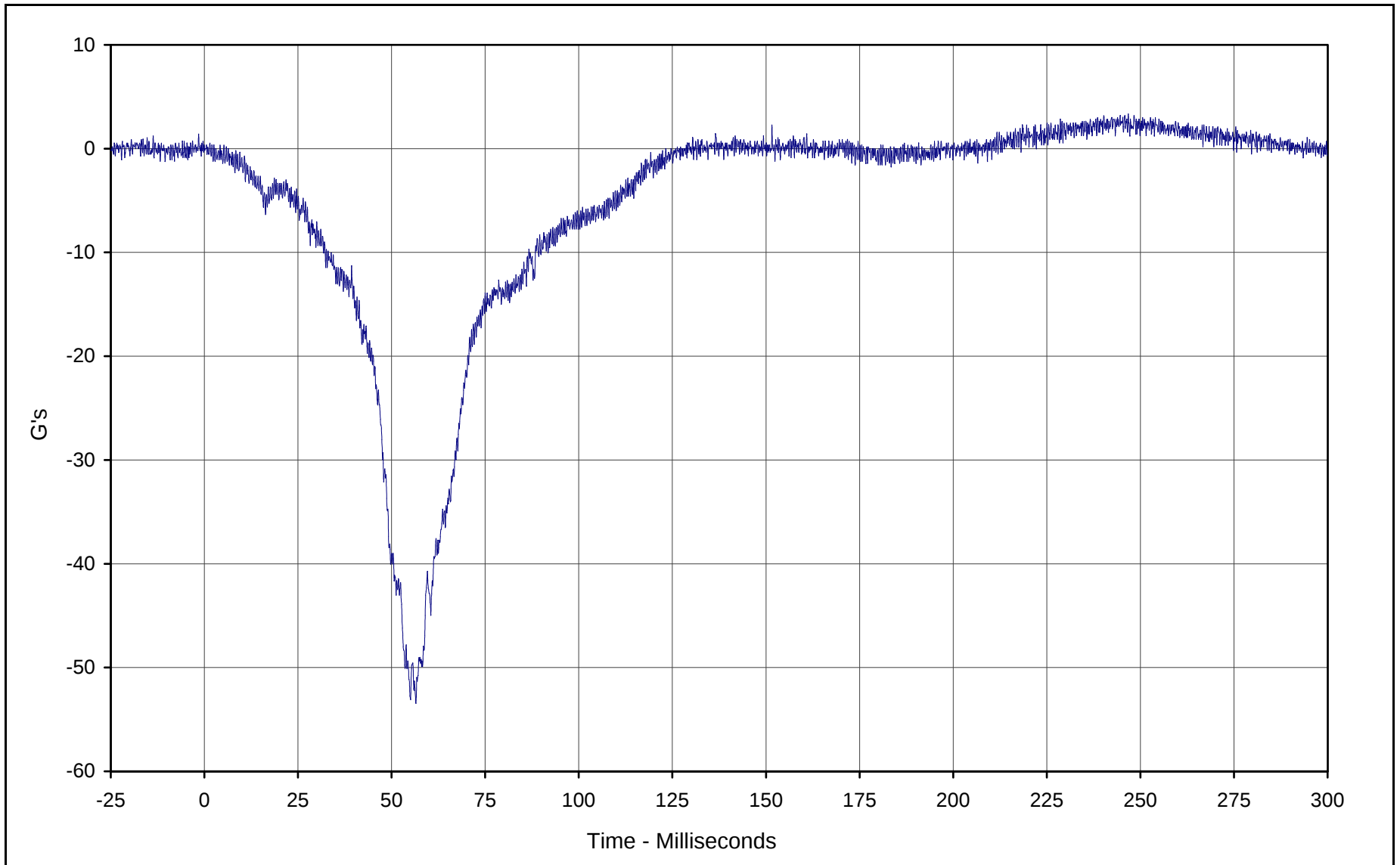




Curve Description: Driver Chest Displacement X
Maximum Value: 0.1 at 2.4 Milliseconds
Minimum Value: -23.6 at 76.6 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-019

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Driver Pelvis X

Maximum Value: 3.4 at 246.8 Milliseconds

Minimum Value: -53.4 at 56.5 Milliseconds

SAE Filter Class: 1000

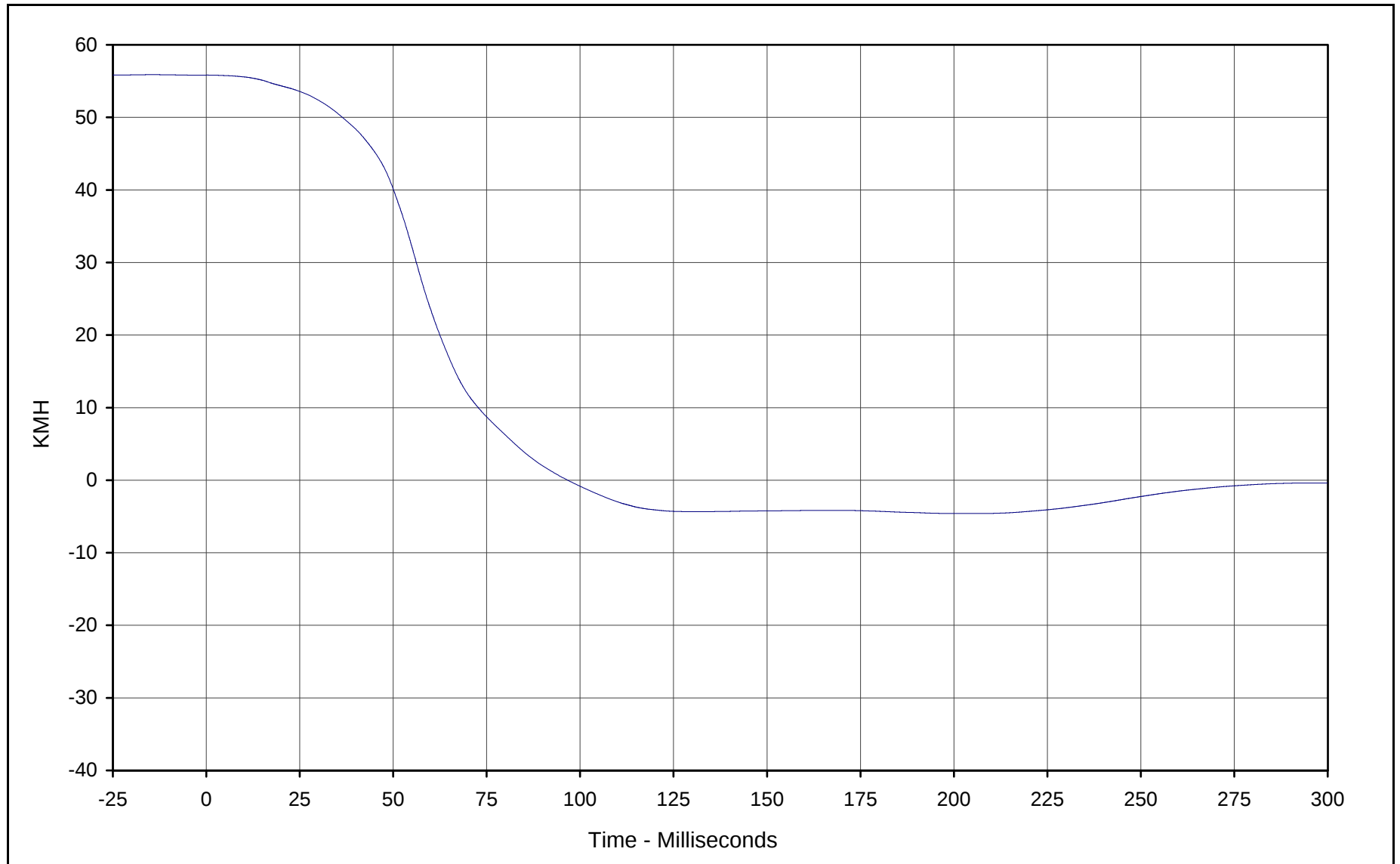
Date of Test: 01/11/01

Curve Number: FIL-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

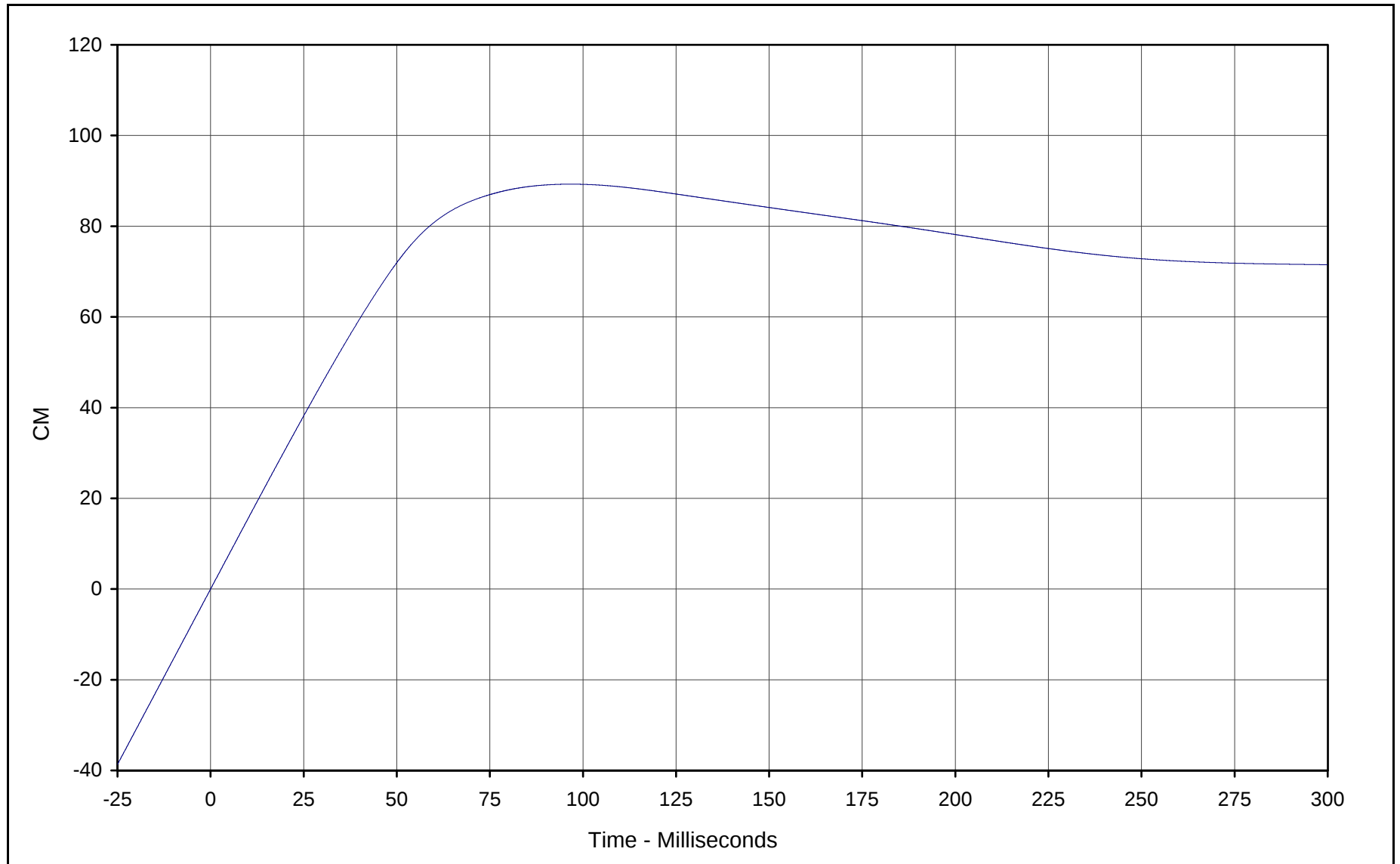




Curve Description: Driver Pelvis X Velocity
Maximum Value: 55.8 at 0.3 Milliseconds
Minimum Value: -4.6 at 203.1 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Driver Pelvis X Displ.

Maximum Value: 89.3 at 96.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

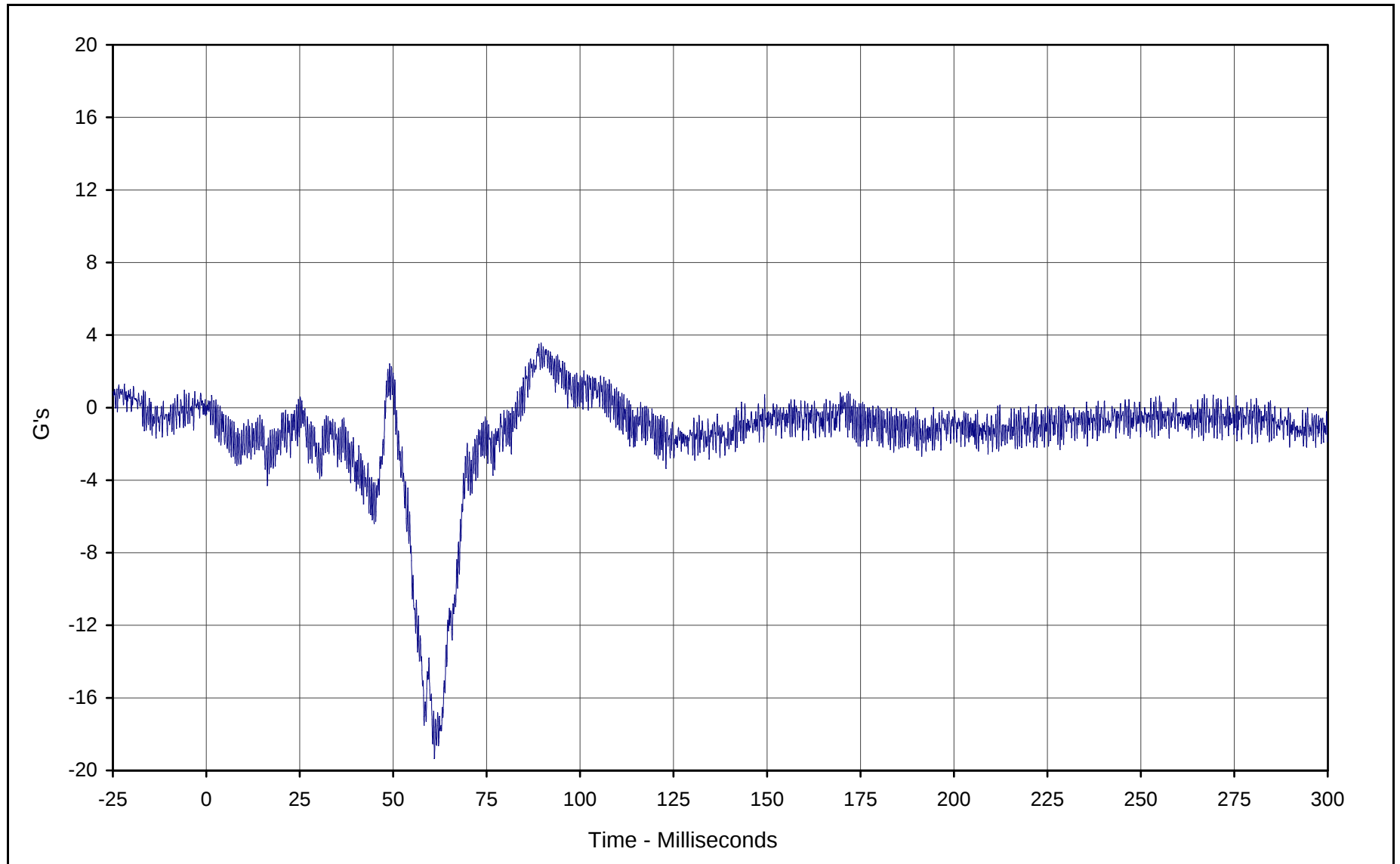
Date of Test: 01/11/01

Curve Number: IN2-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



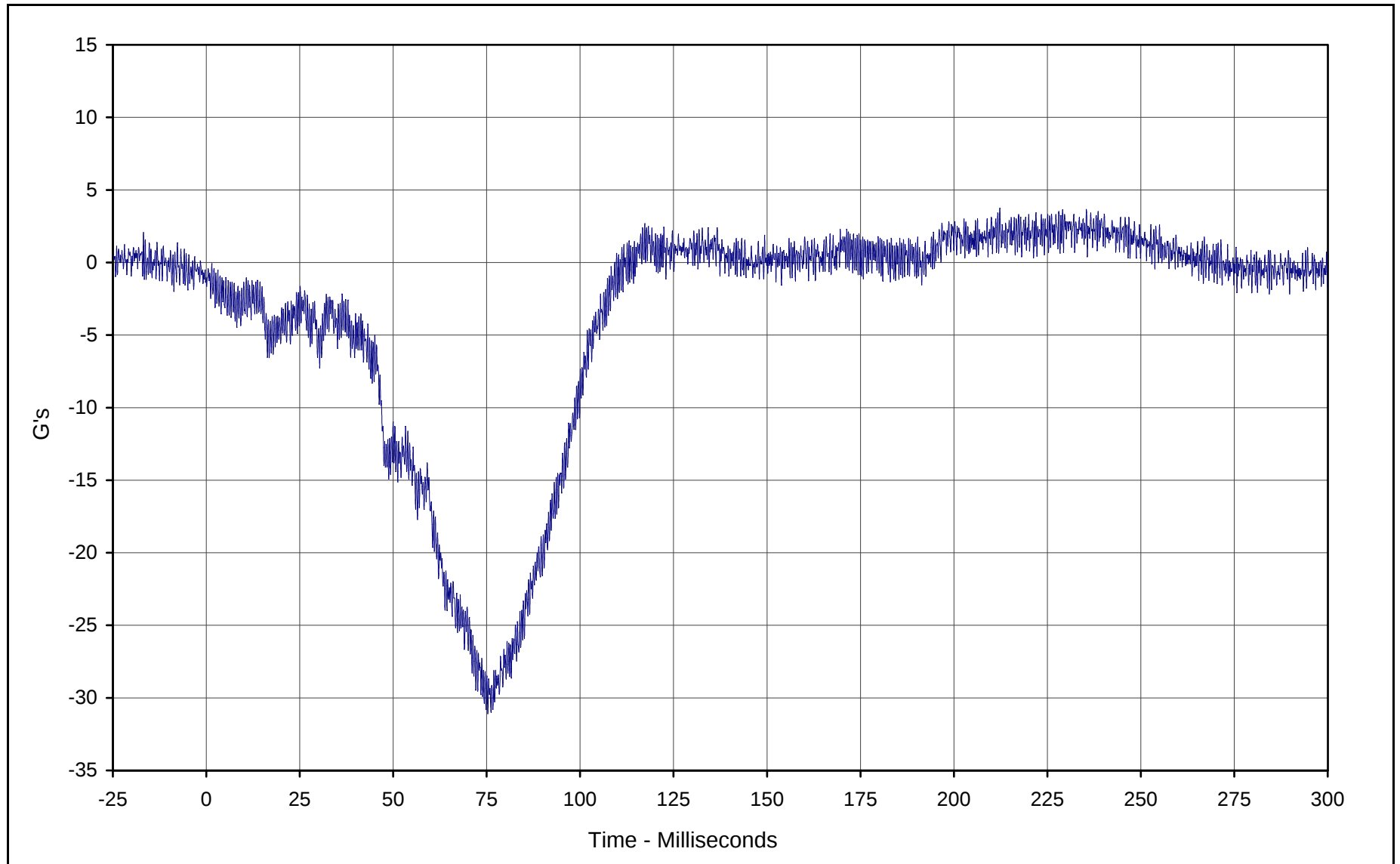


Curve Description: Driver Pelvis Y

Maximum Value:	<u>3.6</u>	at	<u>89.6</u>	Milliseconds
Minimum Value:	<u>-19.3</u>	at	<u>61.0</u>	Milliseconds
SAE Filter Class:	<u>1000</u>			
Date of Test:	<u>01/11/01</u>			
Curve Number:	<u>FIL-021</u>			

Test Program:	<u>2001 NHTSA 35mph NCAP No.: M10115</u>
Test Vehicle:	<u>2001 Pontiac Grand Am 2 Door Coupe</u>





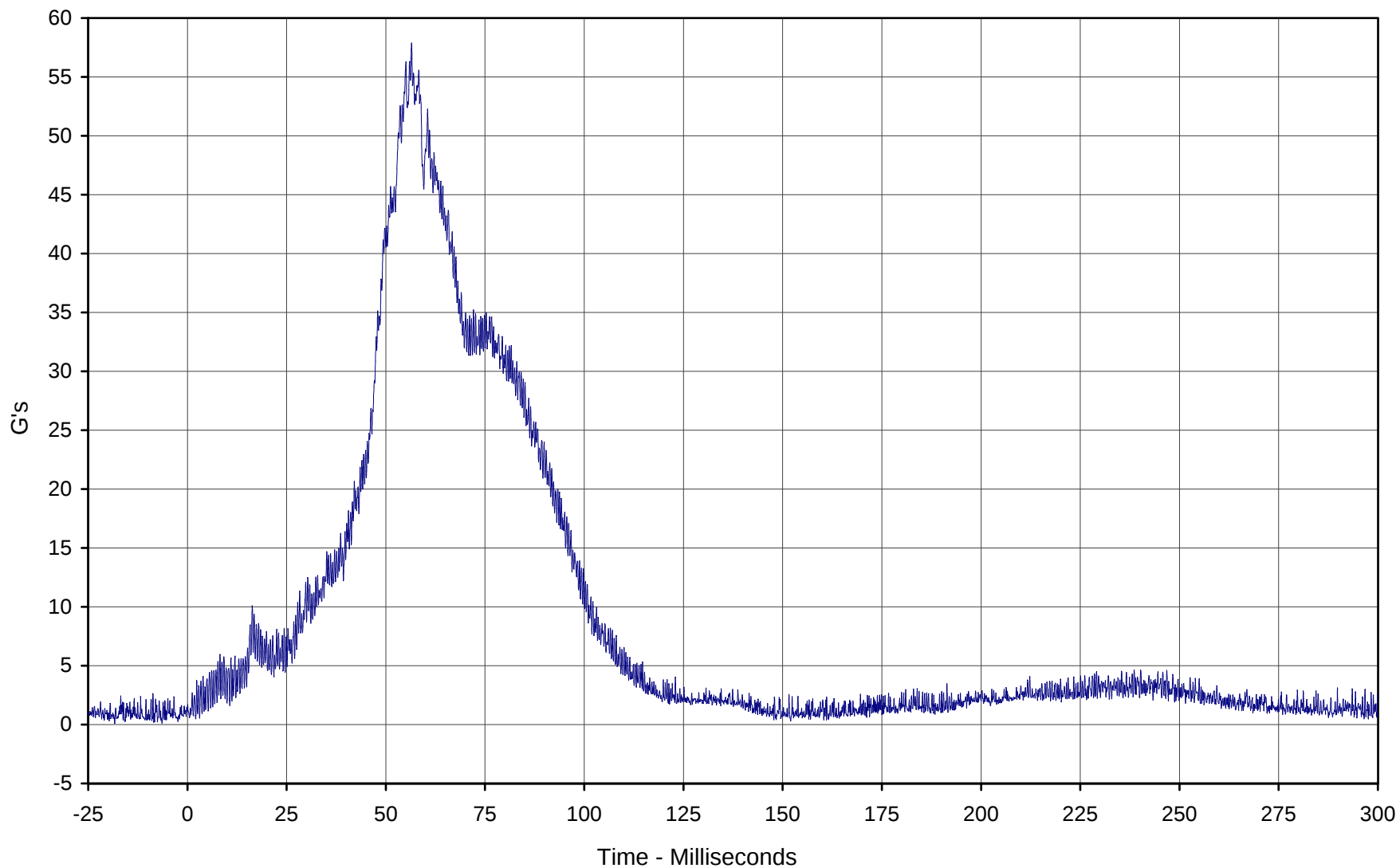
Curve Description: Driver Pelvis Z

Maximum Value:	<u>3.7</u>	at	<u>212.3</u>	Milliseconds
Minimum Value:	<u>-31.1</u>	at	<u>75.3</u>	Milliseconds
SAE Filter Class:	<u>1000</u>			
Date of Test:	<u>01/11/01</u>			
Curve Number:	<u>FIL-022</u>			

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Driver Pelvis Resultant

Maximum Value: 57.9 at 56.5 Milliseconds

Minimum Value: 0.3 at 152.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/11/01

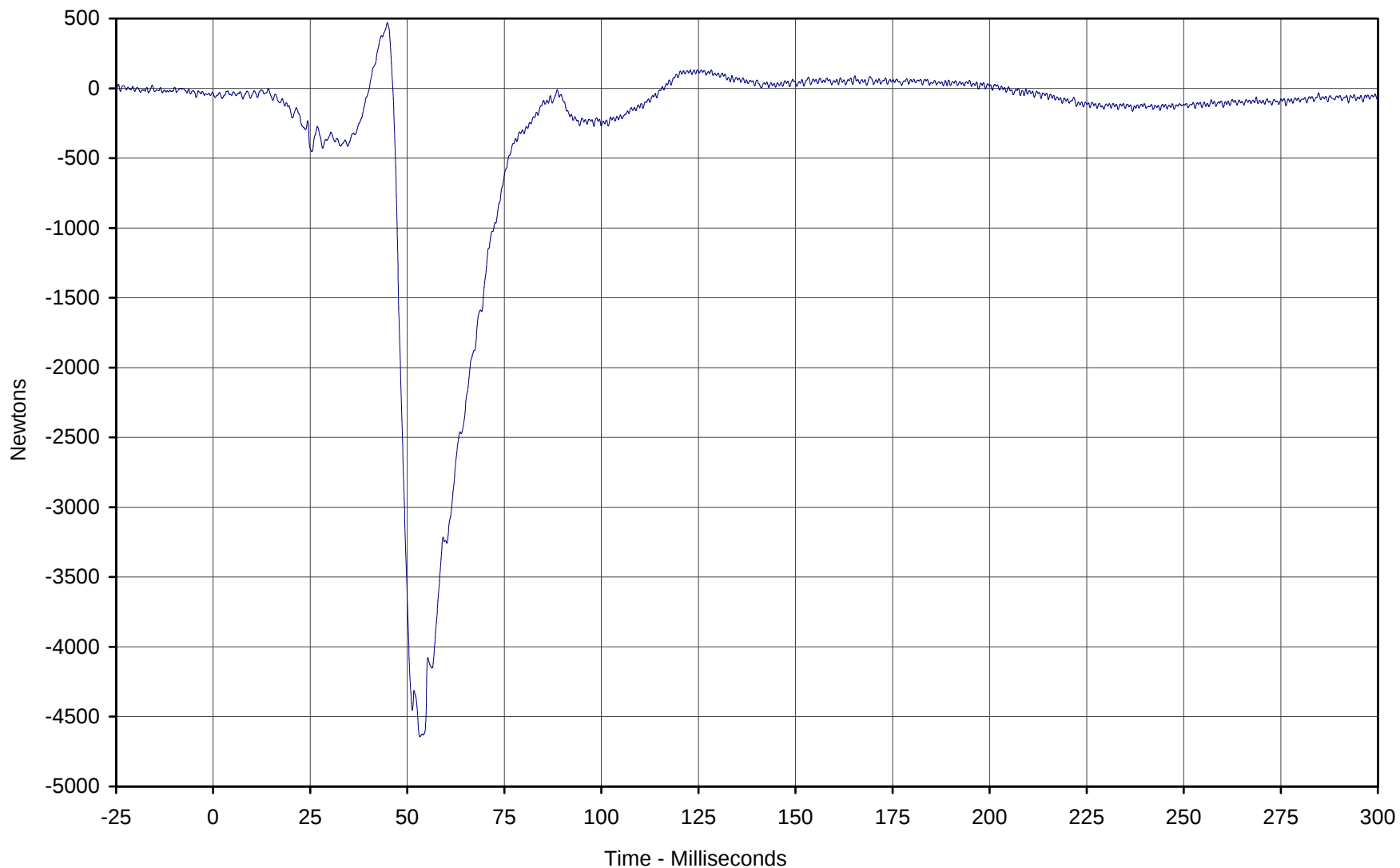
Curve Number: RES-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-40

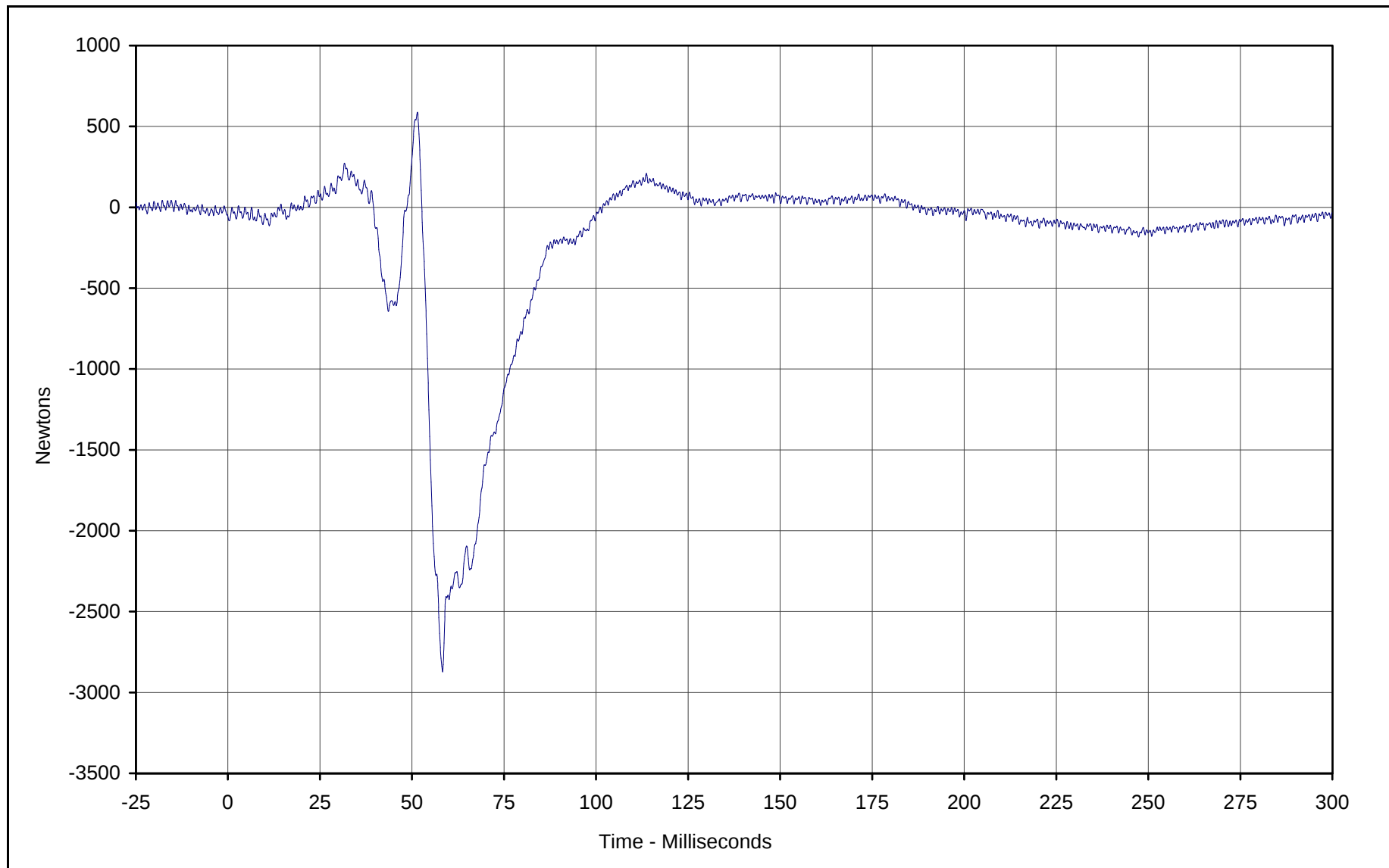


Curve Description: Driver Left Femur Force
Maximum Value: 470.4 at 44.9 Milliseconds
Minimum Value: -4644.5 at 53.2 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-023

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



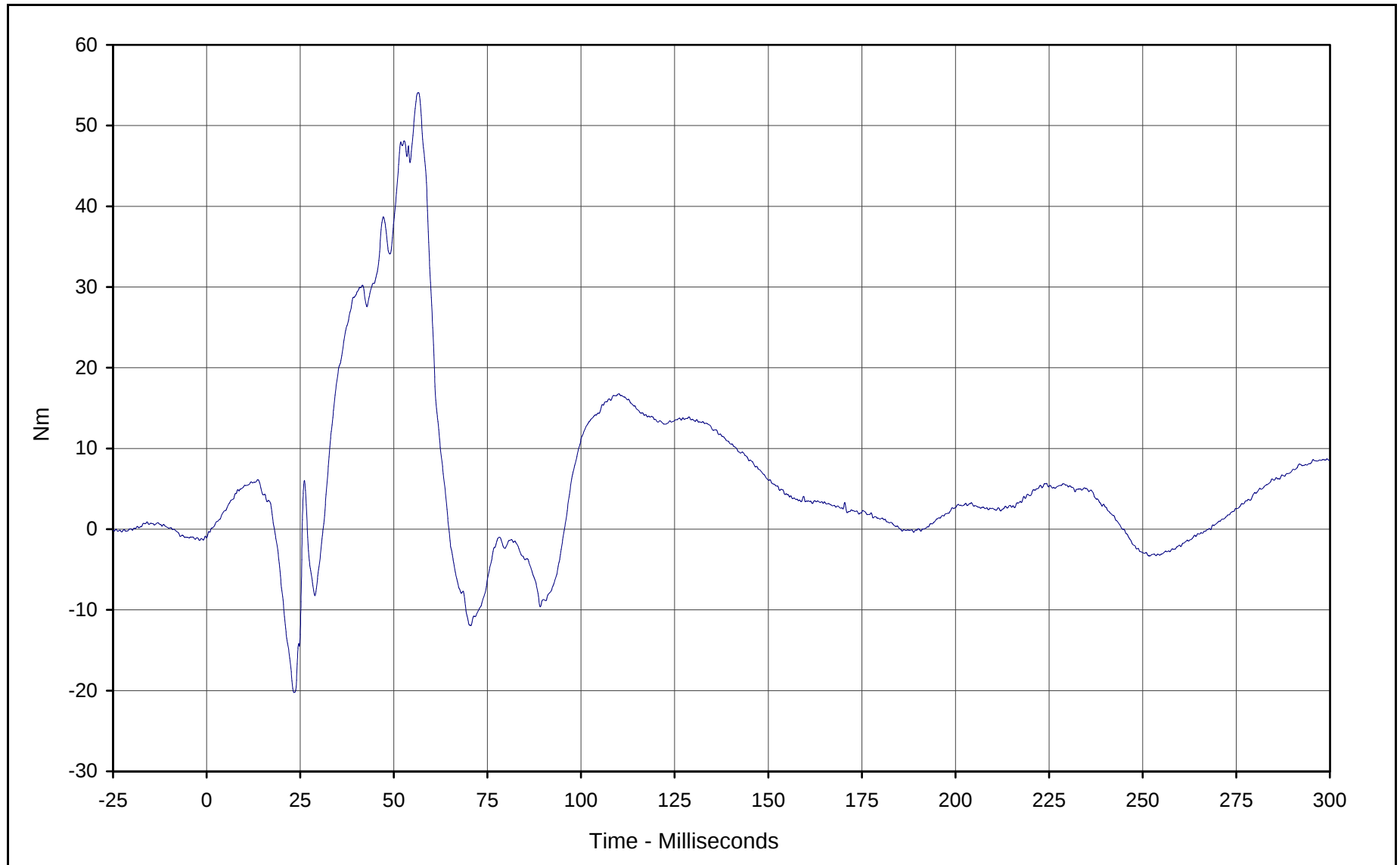
KAR21001-04



Curve Description: Driver Right Femur Force
Maximum Value: 587.8 at 51.5 Milliseconds
Minimum Value: -2872.9 at 58.3 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-024

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

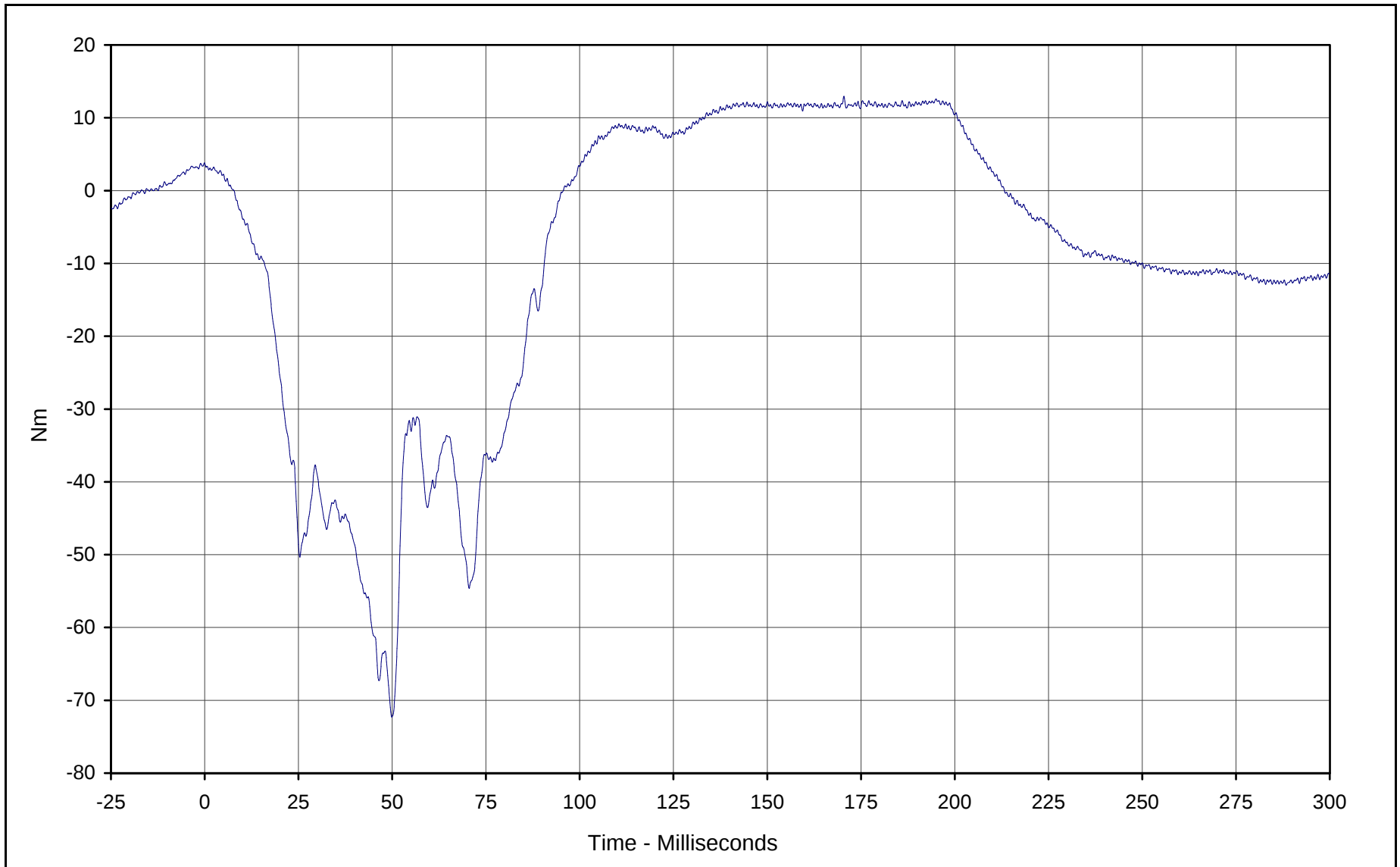




Curve Description: Driver Left Upper Tibia Moment X
Maximum Value: 54.1 at 56.5 Milliseconds
Minimum Value: -20.2 at 23.3 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-025

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

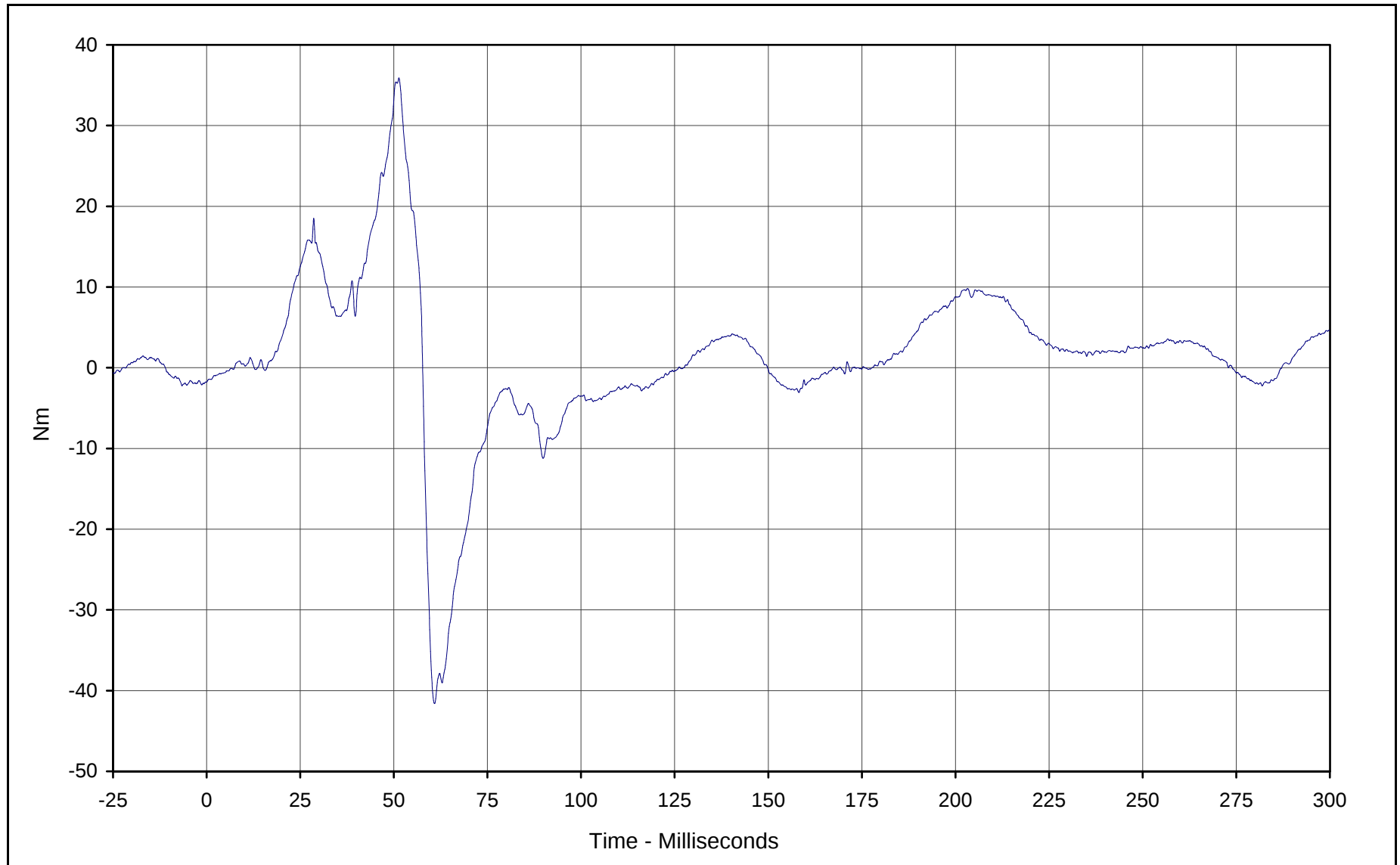




Curve Description: Driver Left Upper Tibia Moment Y
Maximum Value: 12.9 at 170.5 Milliseconds
Minimum Value: -72.3 at 49.9 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-026

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

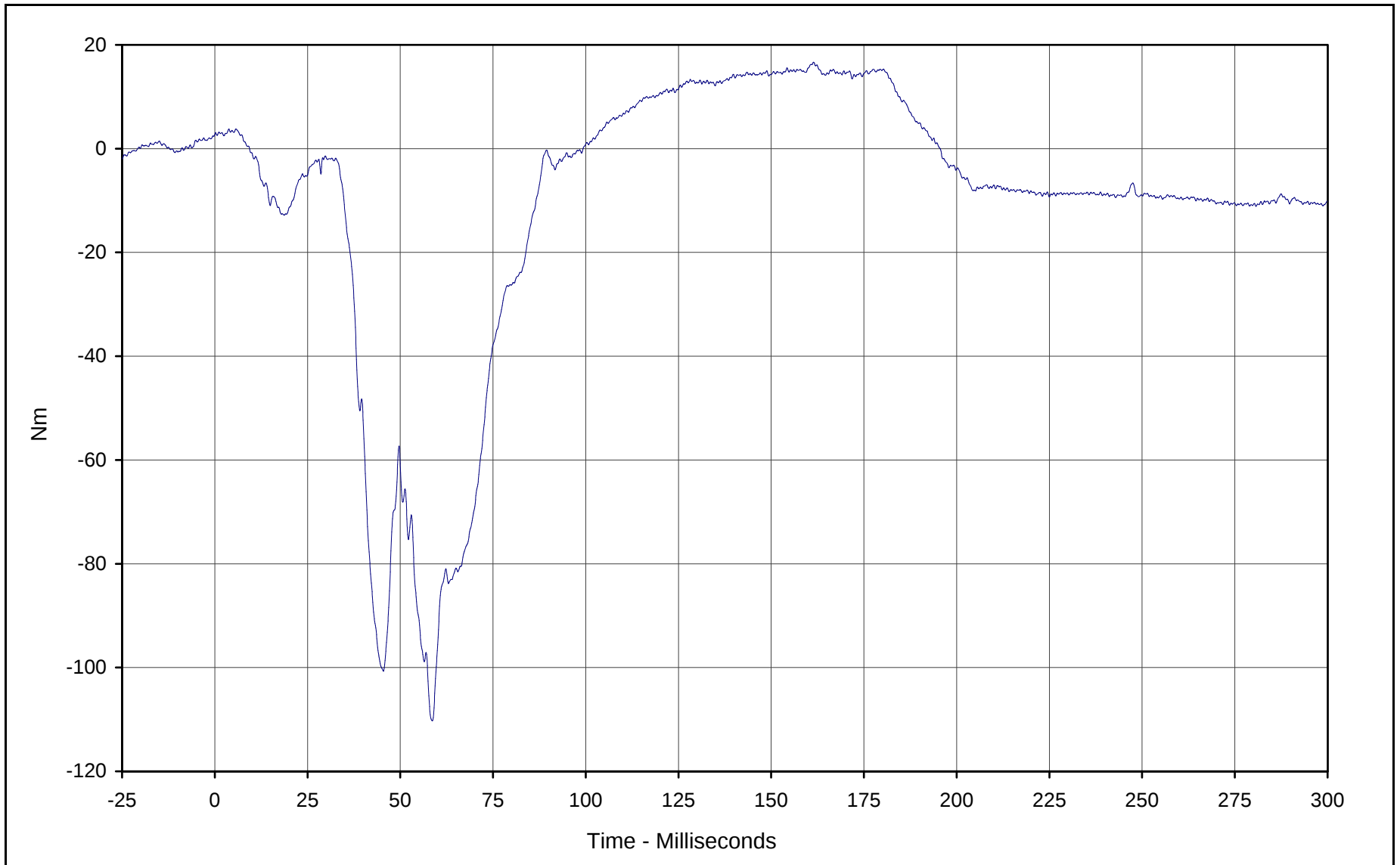




Curve Description: Driver Right Upper Tibia Moment X
Maximum Value: 35.9 at 51.4 Milliseconds
Minimum Value: -41.6 at 60.9 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-027

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

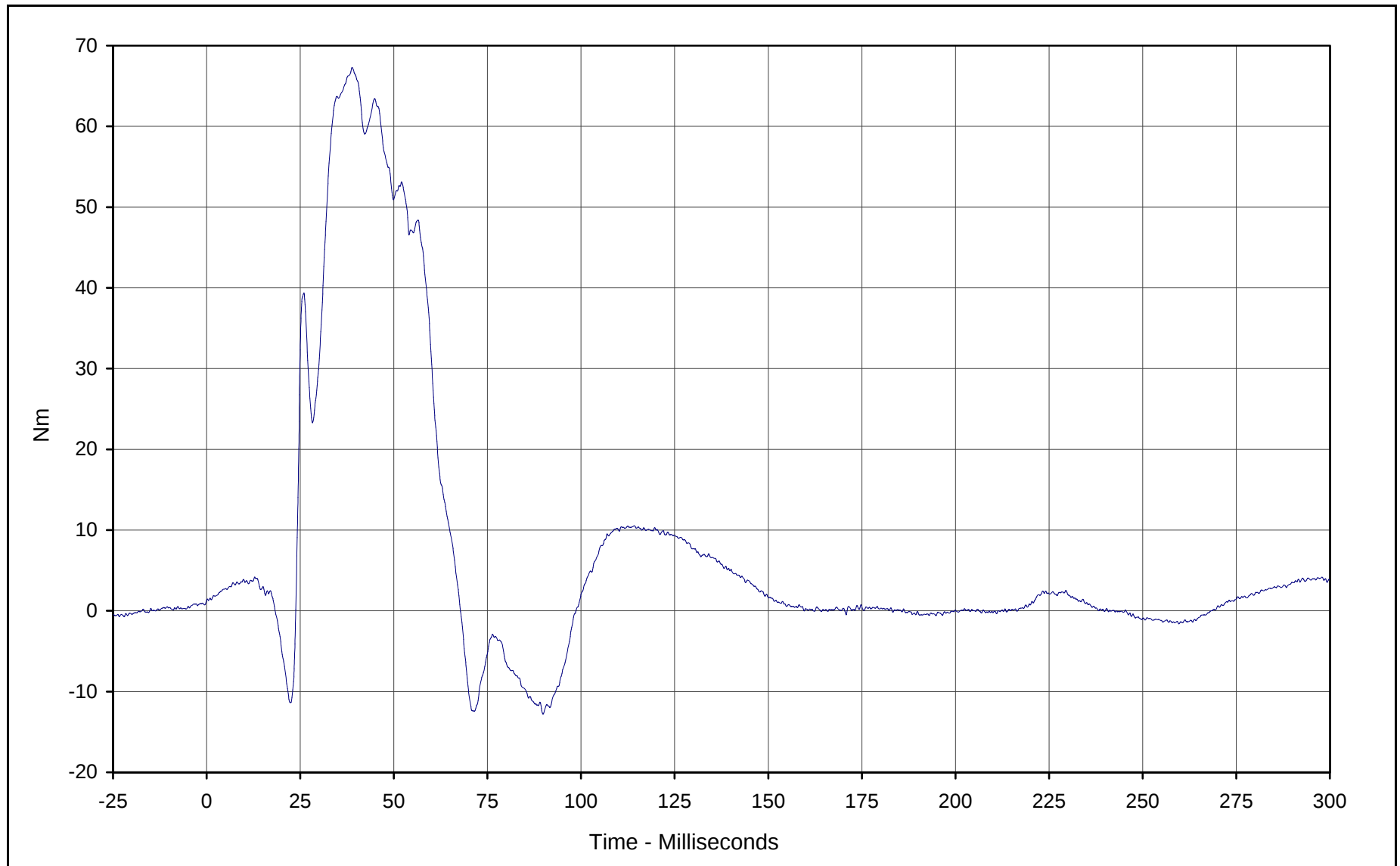




Curve Description: Driver Right Upper Tibia Moment Y
Maximum Value: 16.6 at 161.4 Milliseconds
Minimum Value: -110.3 at 58.7 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-028

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

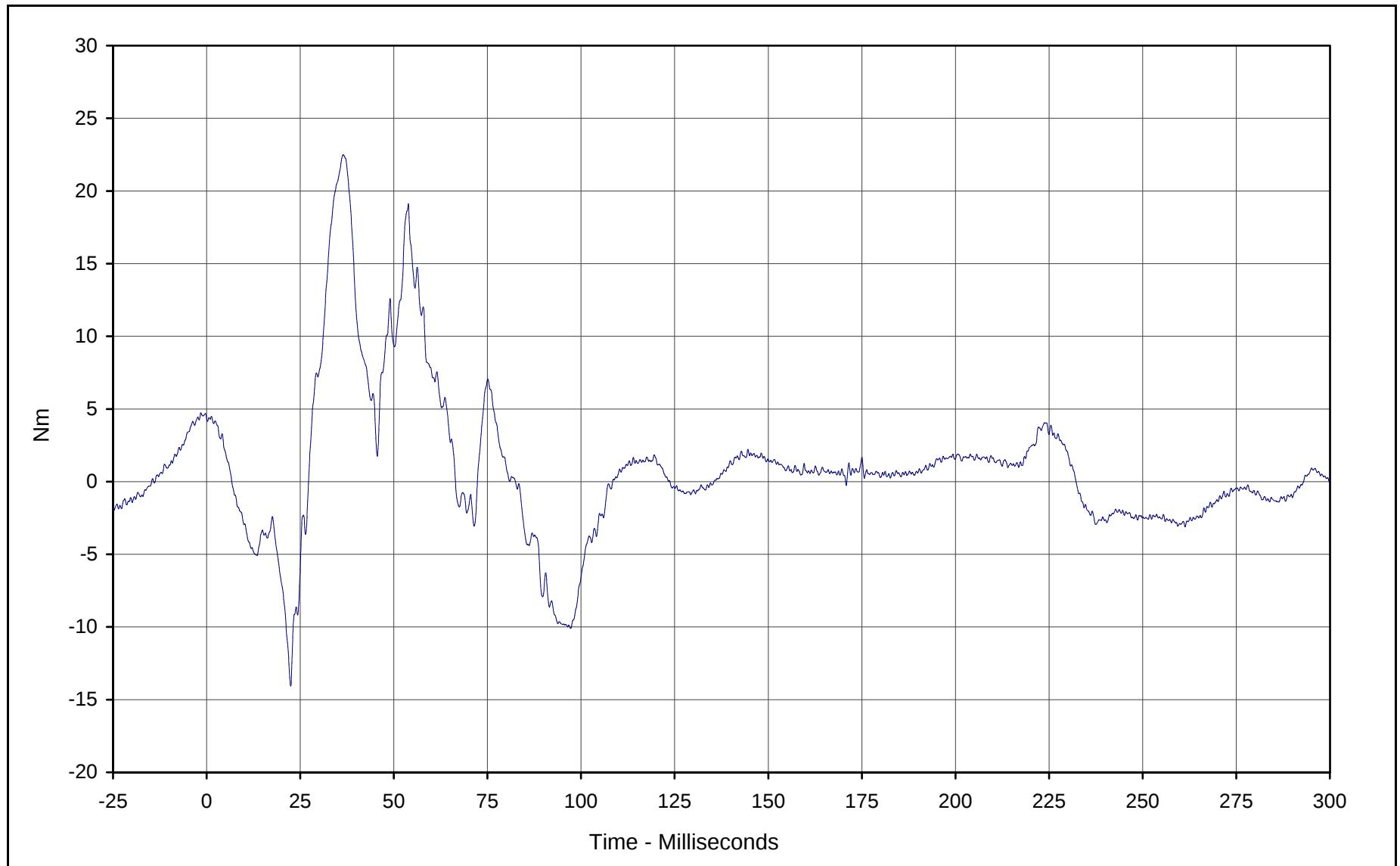




Curve Description: Driver Left Lower Tibia Moment X
Maximum Value: 67.3 at 38.9 Milliseconds
Minimum Value: -12.8 at 89.8 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-029

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

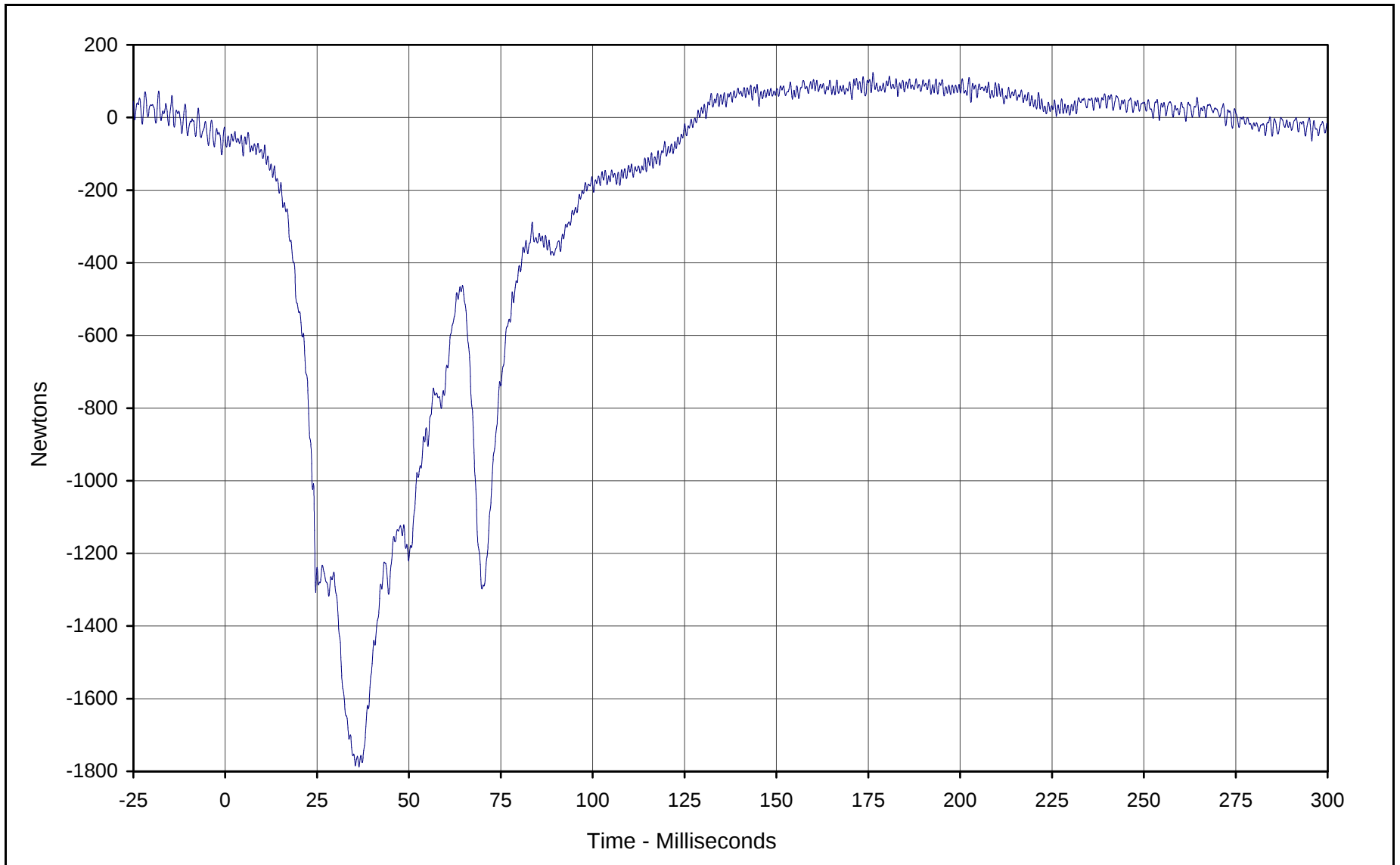




Curve Description: Driver Left Lower Tibia Moment Y
Maximum Value: 22.5 at 36.5 Milliseconds
Minimum Value: -14.1 at 22.4 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-030

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

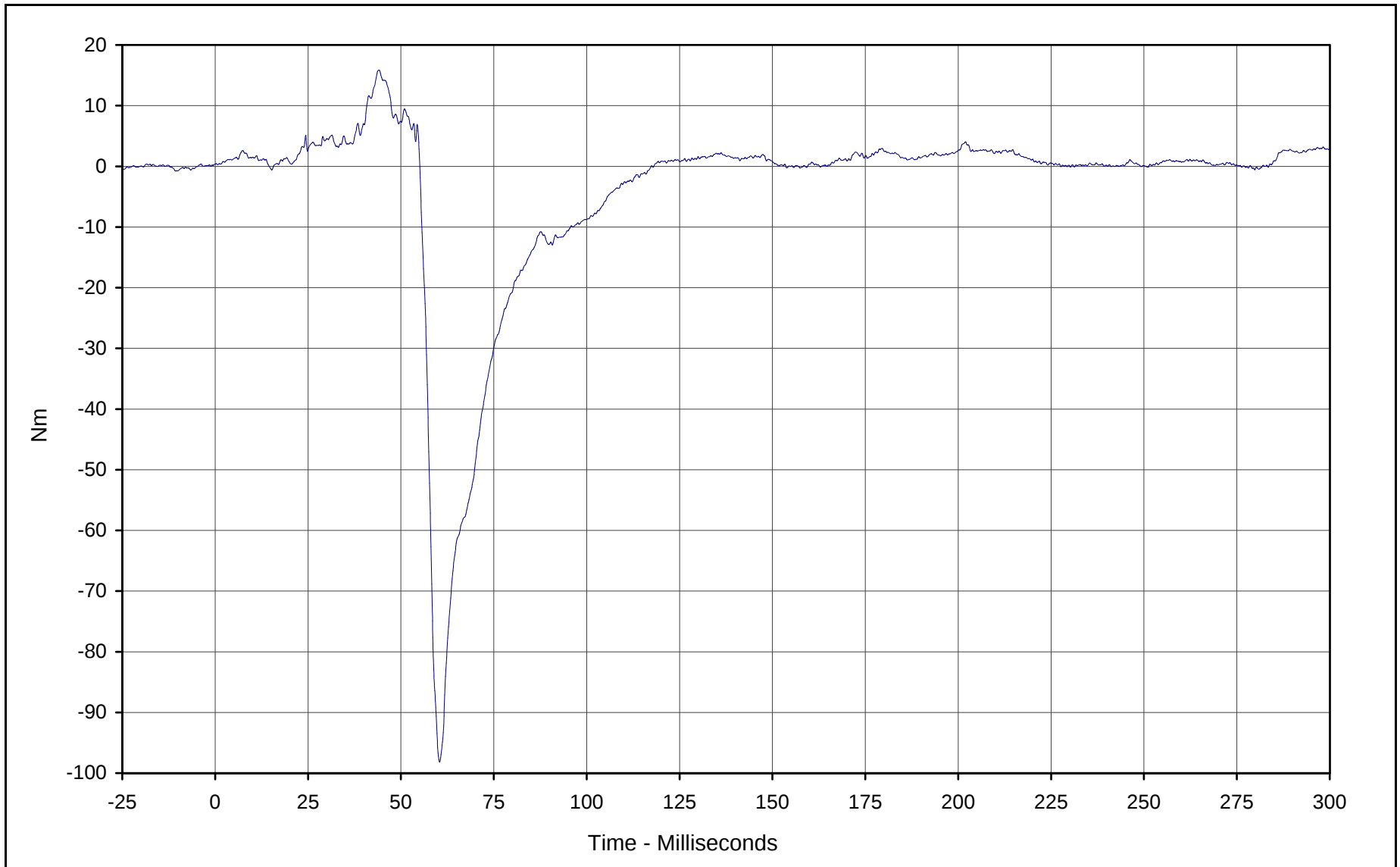




Curve Description: Driver Left Lower Tibia Force Z
Maximum Value: 123.7 at 176.3 Milliseconds
Minimum Value: -1787.7 at 36.4 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-031

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

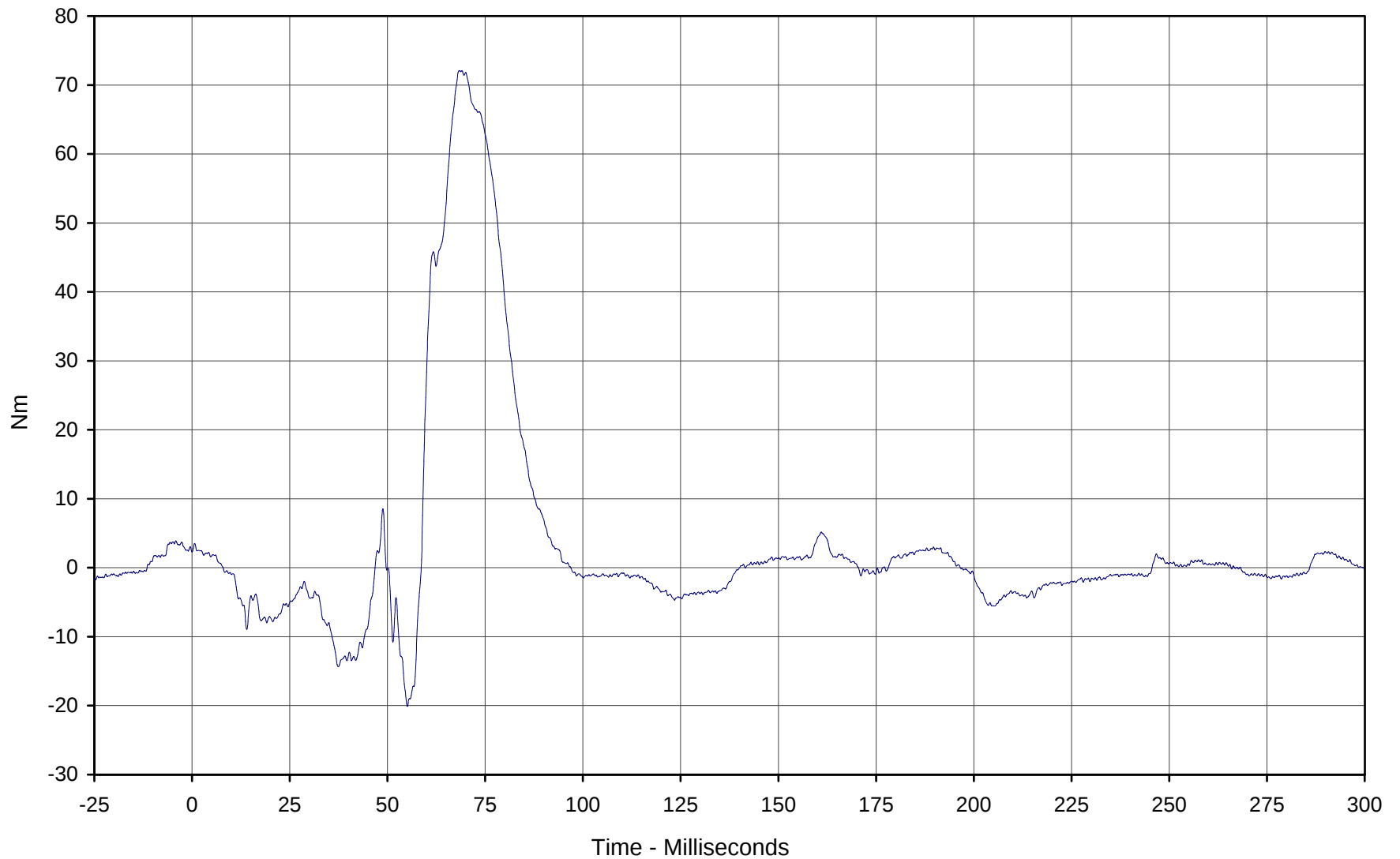




Curve Description: Driver Right Lower Tibia Moment X
Maximum Value: 15.9 at 44.1 Milliseconds
Minimum Value: -98.2 at 60.4 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-032

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

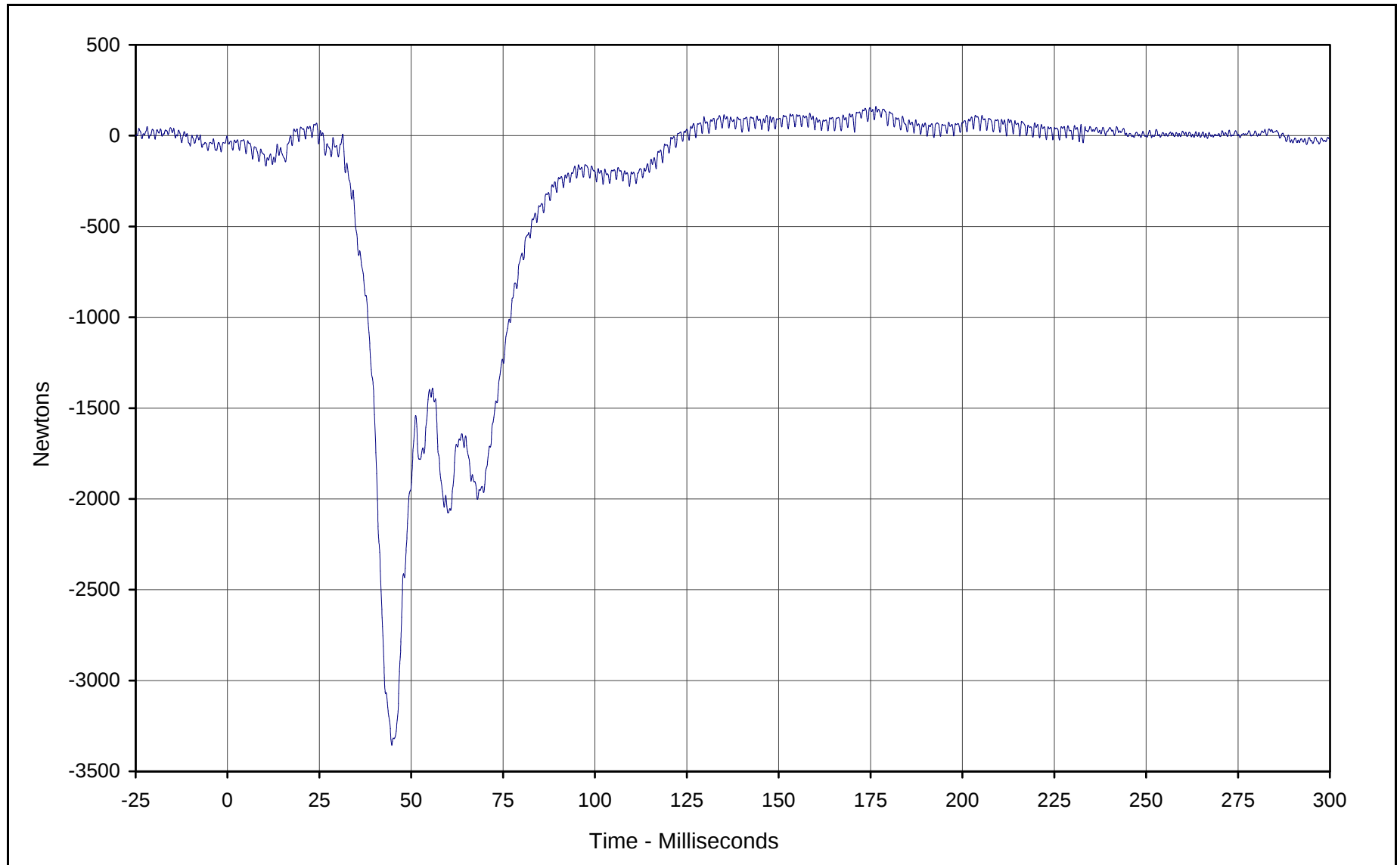




Curve Description: Driver Right Lower Tibia Moment Y
Maximum Value: 72.1 at 68.4 Milliseconds
Minimum Value: -20.1 at 55.1 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-033

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

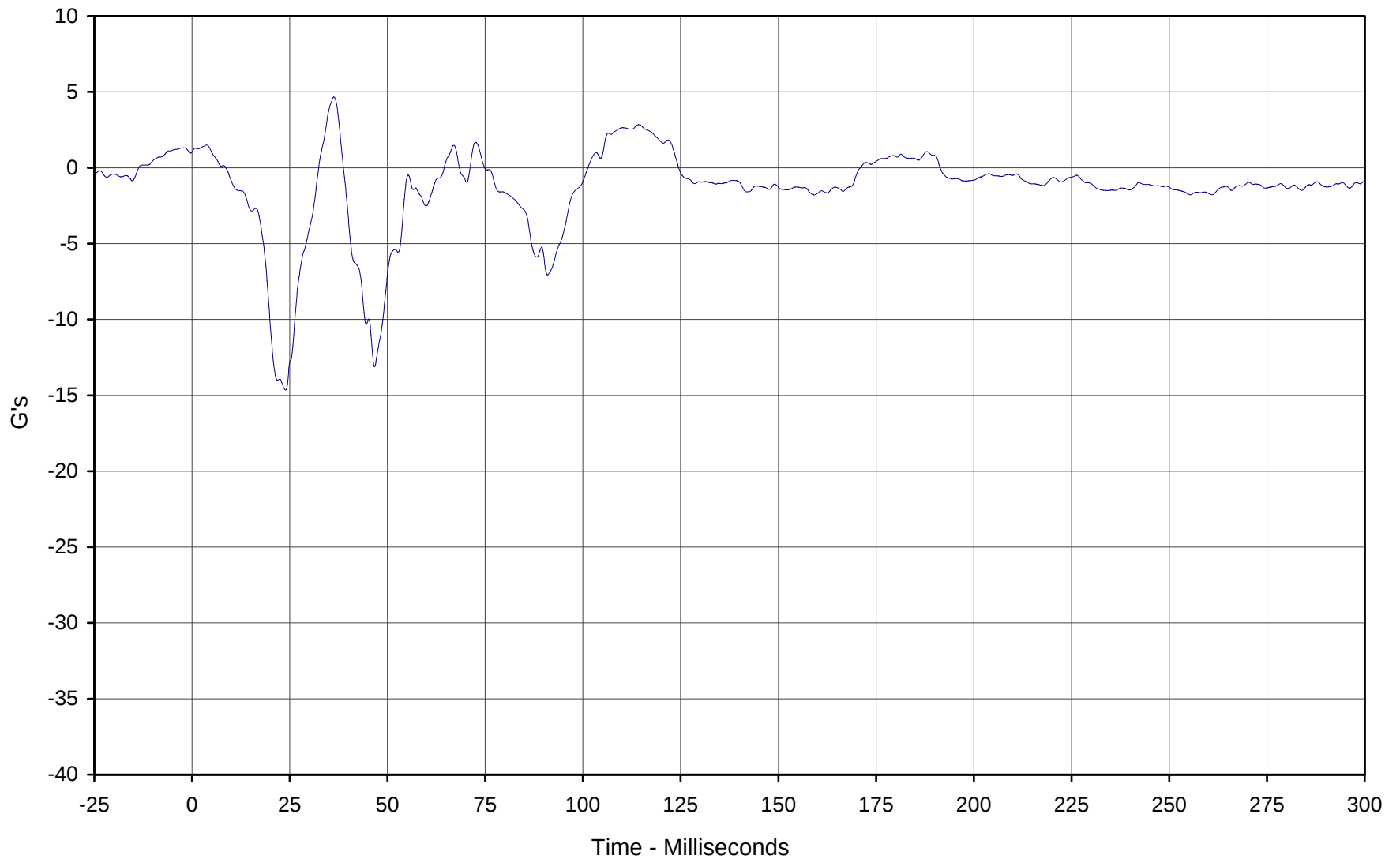




Curve Description: Driver Right Lower Tibia Force Z
Maximum Value: 160.8 at 176.5 Milliseconds
Minimum Value: -3357.3 at 44.7 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-034

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Driver Left Foot Aft X

Maximum Value: 4.7 at 36.3 Milliseconds

Minimum Value: -14.7 at 24.0 Milliseconds

SAE Filter Class: 180

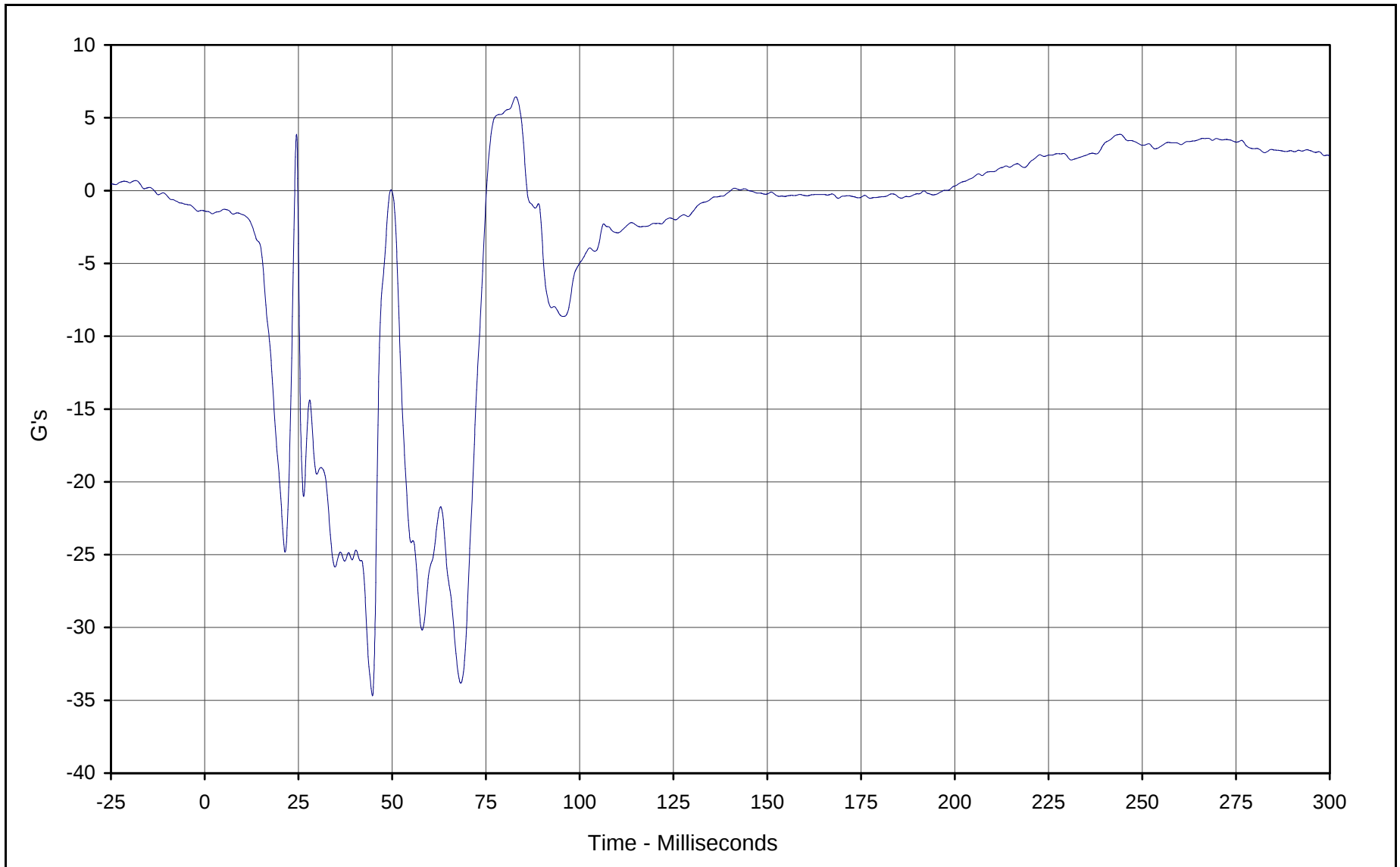
Date of Test: 01/11/01

Curve Number: FIL-035

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





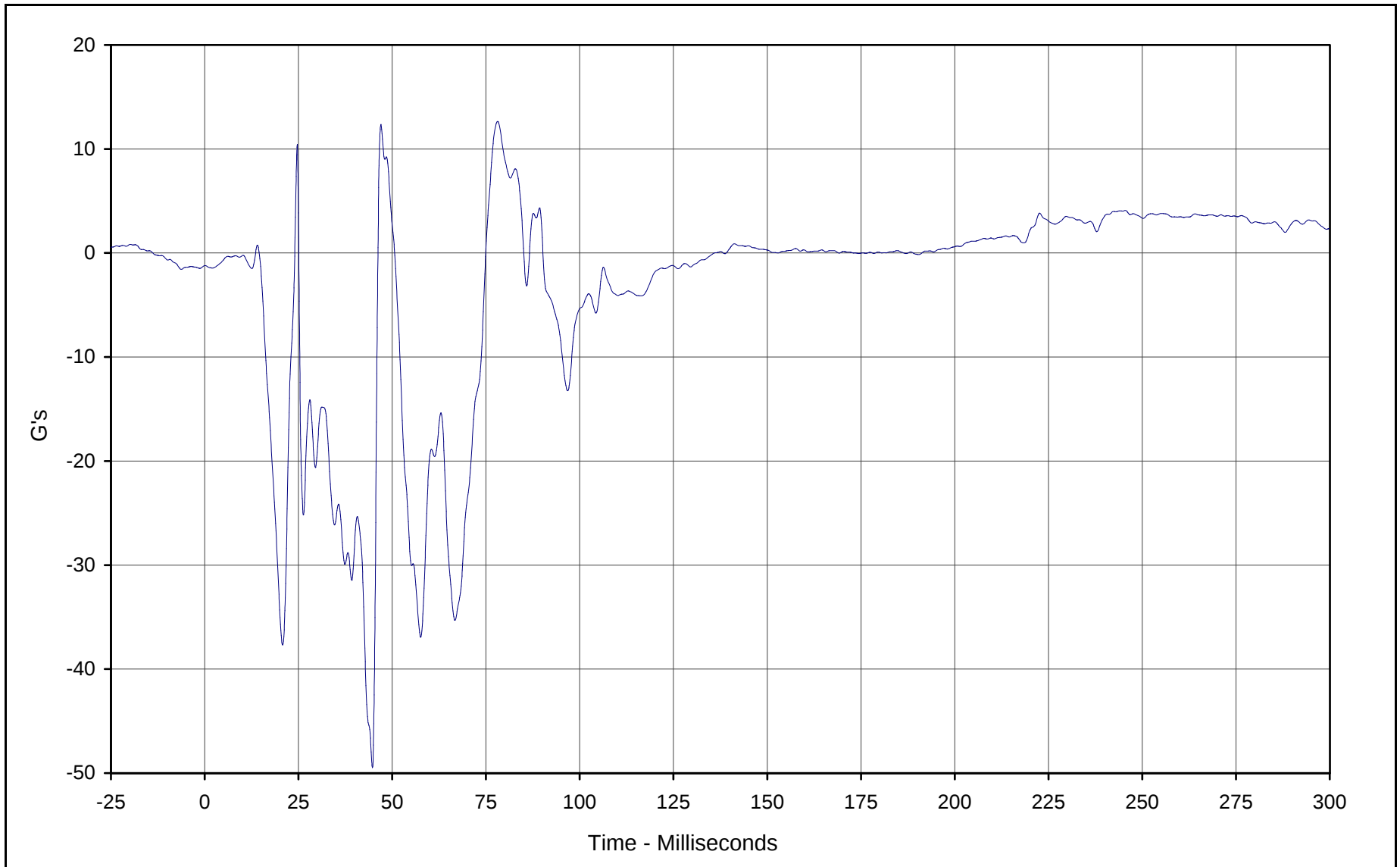
Curve Description: Driver Left Foot Aft Z

Maximum Value:	6.4	at	82.9	Milliseconds
Minimum Value:	-34.7	at	44.7	Milliseconds
SAE Filter Class:	180			
Date of Test:	01/11/01			
Curve Number:	FIL-036			

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





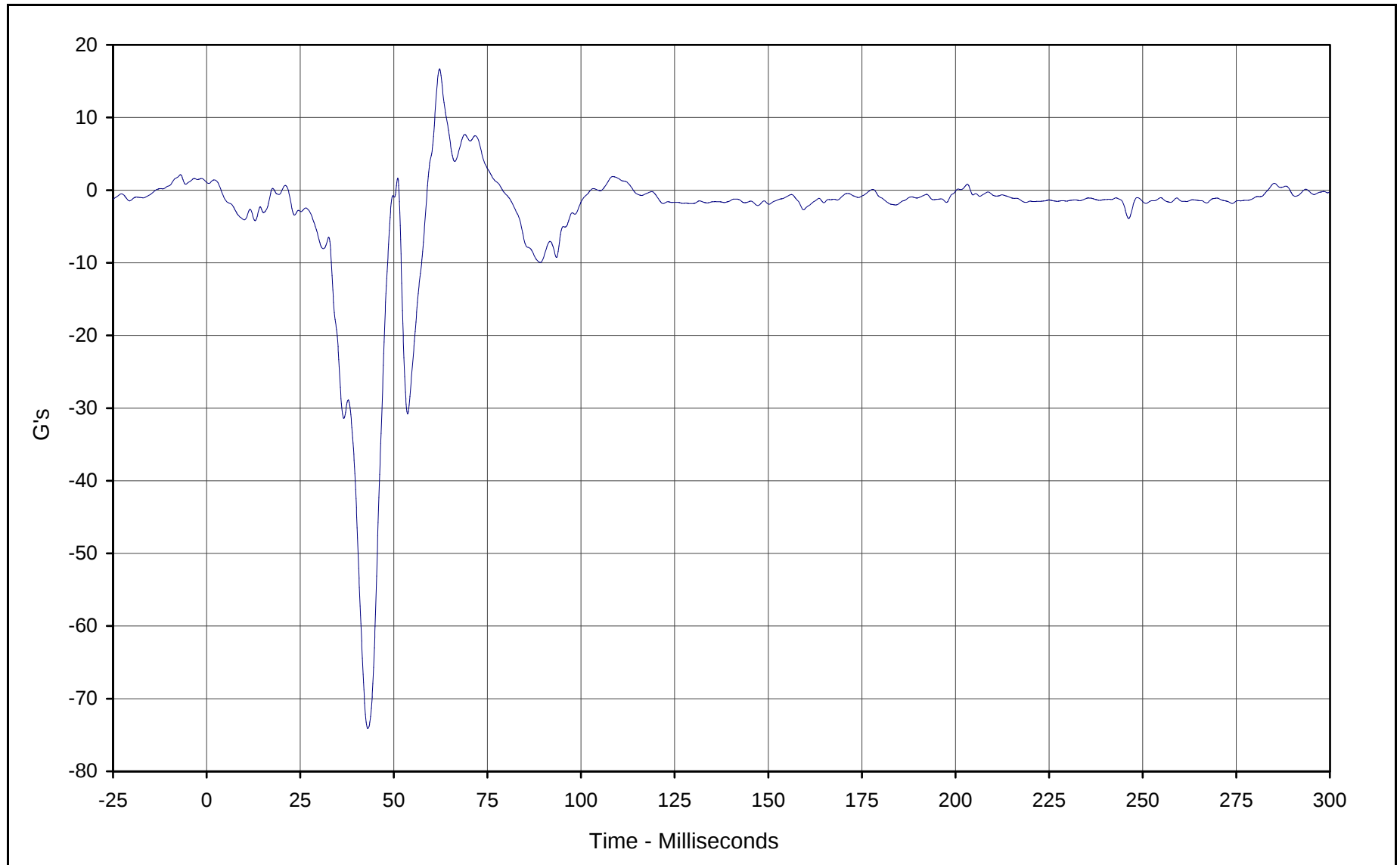
Curve Description: Driver Left Foot Fore Z

Maximum Value:	12.7	at	78.1	Milliseconds
Minimum Value:	-49.5	at	44.7	Milliseconds
SAE Filter Class:	180			
Date of Test:	01/11/01			
Curve Number:	FIL-037			

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





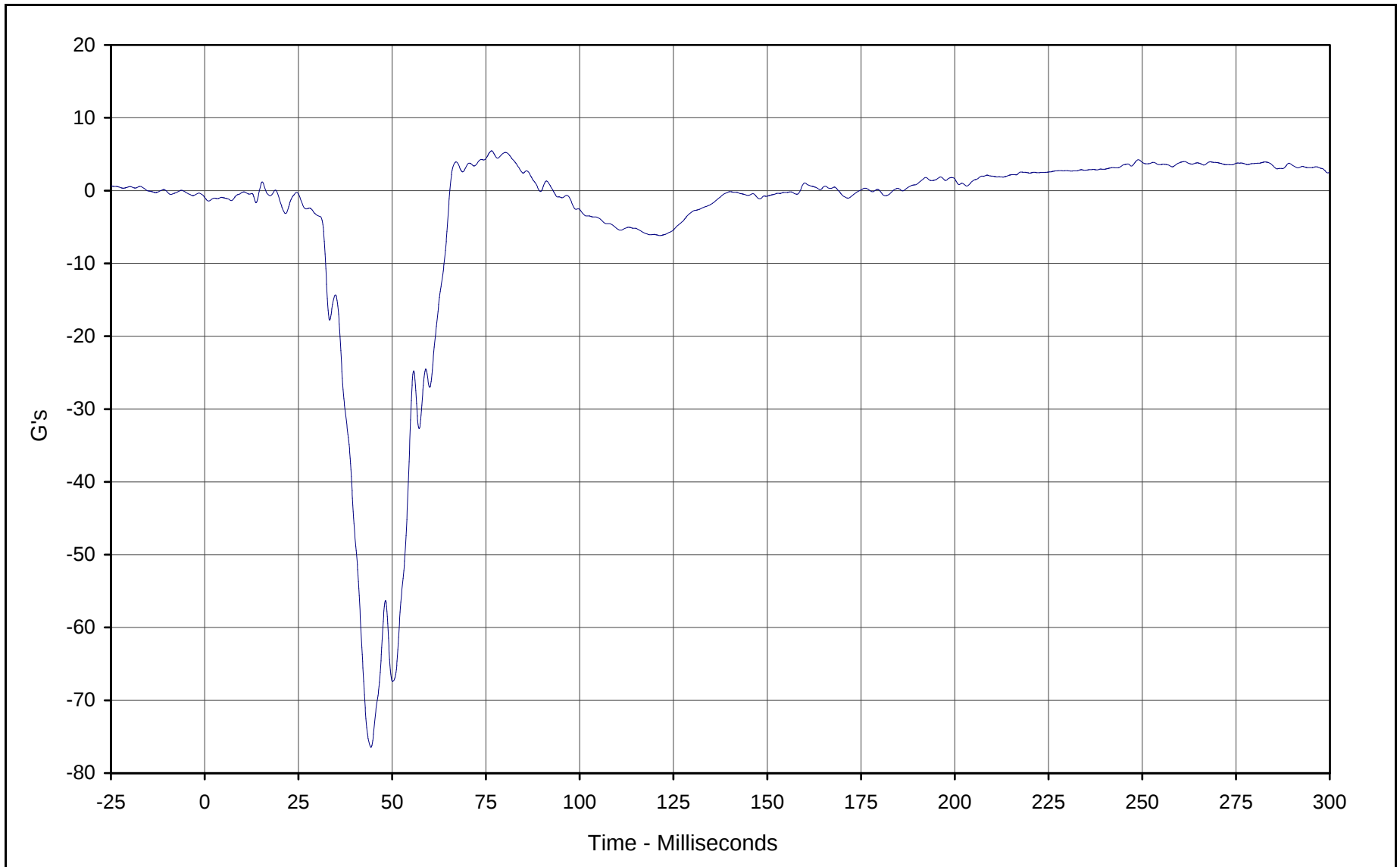
Curve Description: Driver Right Foot Aft X

Maximum Value:	16.7	at	62.2	Milliseconds
Minimum Value:	-74.1	at	43.1	Milliseconds
SAE Filter Class:	180			
Date of Test:	01/11/01			
Curve Number:	FIL-038			

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Driver Right Foot Aft Z

Maximum Value: 5.5 at 76.5 Milliseconds

Minimum Value: -76.4 at 44.3 Milliseconds

SAE Filter Class: 180

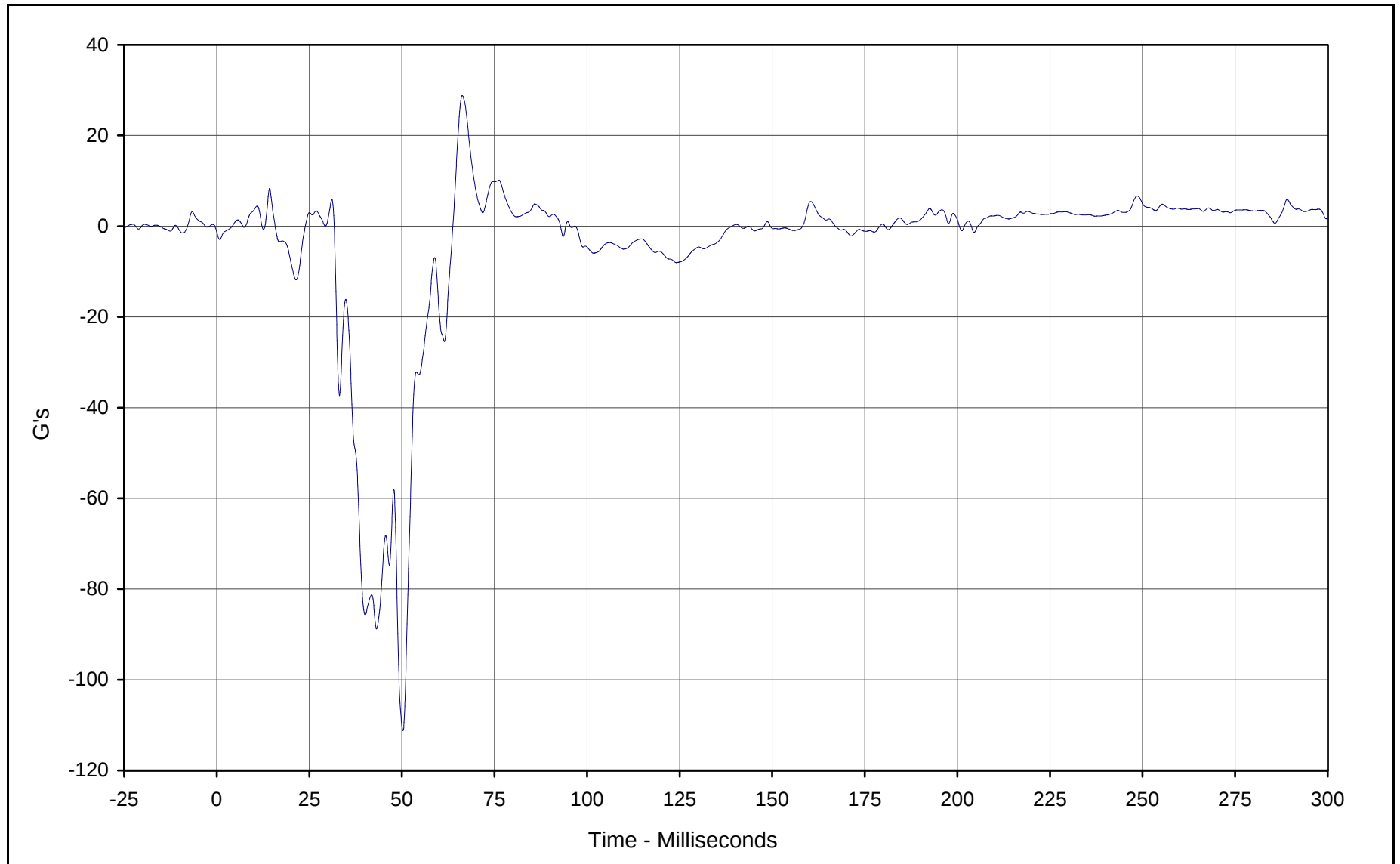
Date of Test: 01/11/01

Curve Number: FIL-039

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Driver Right Foot Fore Z

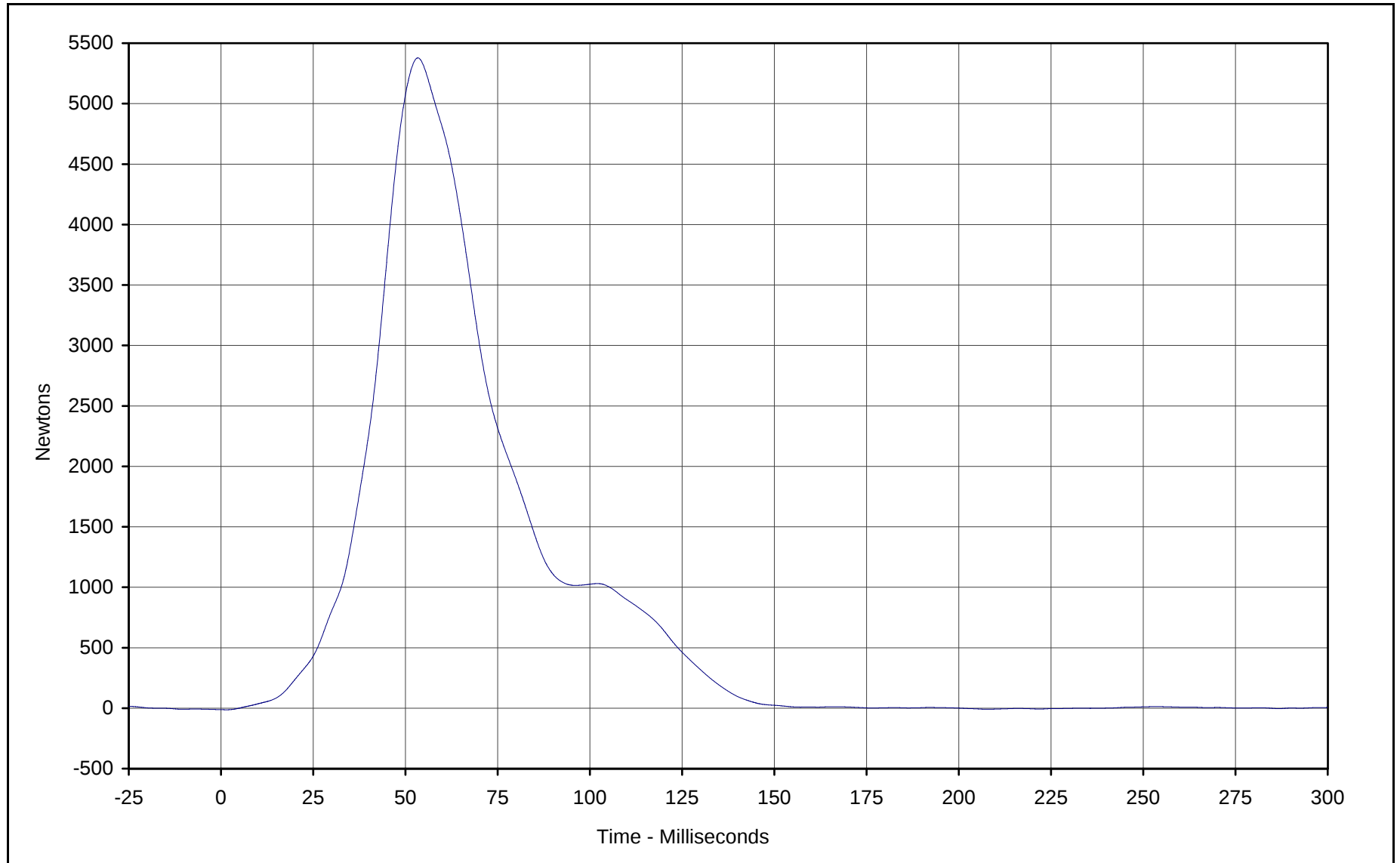
Maximum Value:	28.8	at	66.3	Milliseconds
Minimum Value:	-111.2	at	50.3	Milliseconds
SAE Filter Class:	180			
Date of Test:	01/11/01			
Curve Number:	FIL-040			

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-58



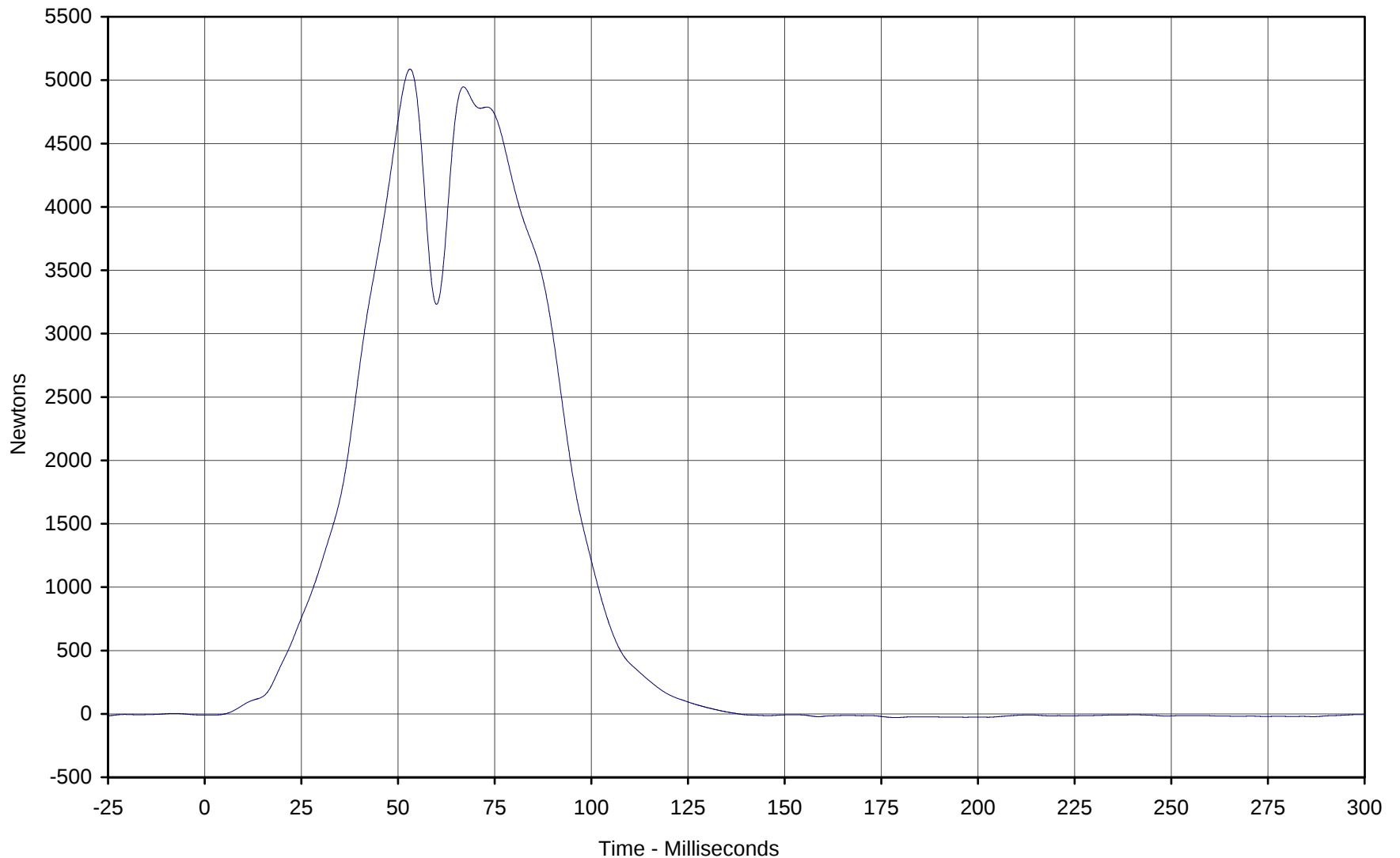
Curve Description: Driver Lap Belt Force
Maximum Value: 5378.1 at 53.4 Milliseconds
Minimum Value: -13.3 at 1.6 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-041

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

B-59



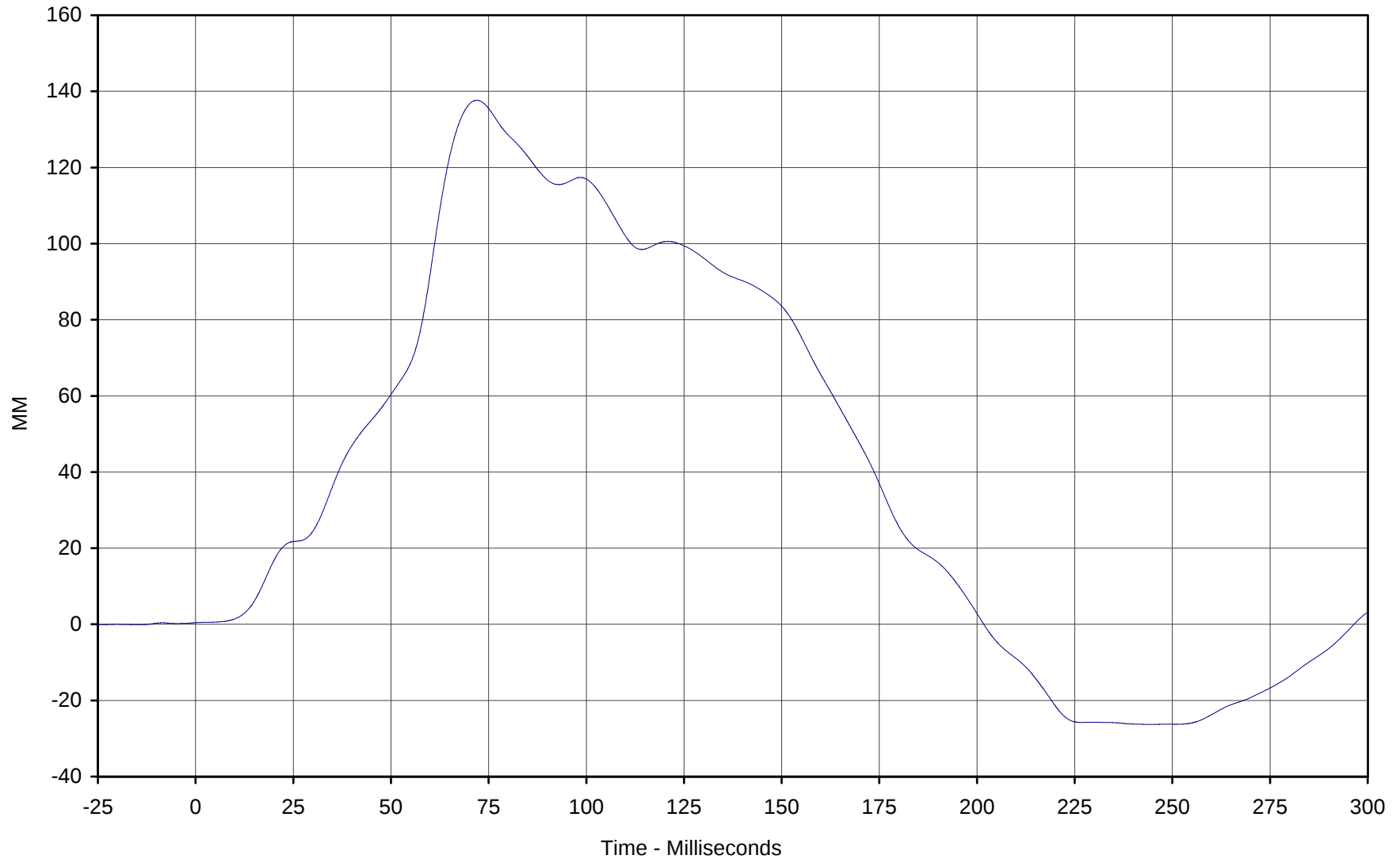
Curve Description: Driver Shoulder Belt Force
Maximum Value: 5087.4 at 53.1 Milliseconds
Minimum Value: -29.2 at 178.6 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-042

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

B-60

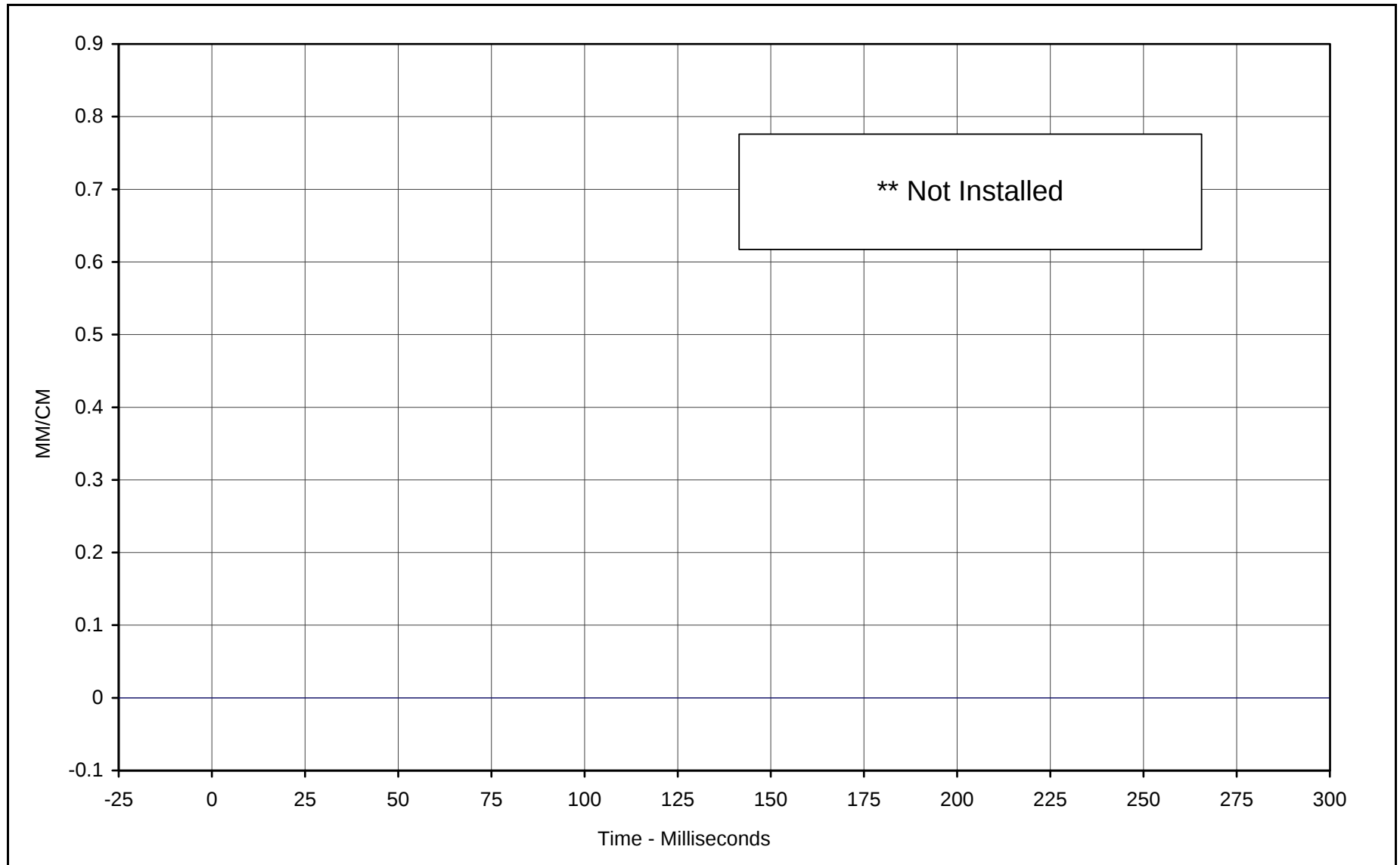


Curve Description: Driver Shoulder Belt Pullout
Maximum Value: 137.7 at 72.0 Milliseconds
Minimum Value: -26.3 at 244.5 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-043

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



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: 01/11/01

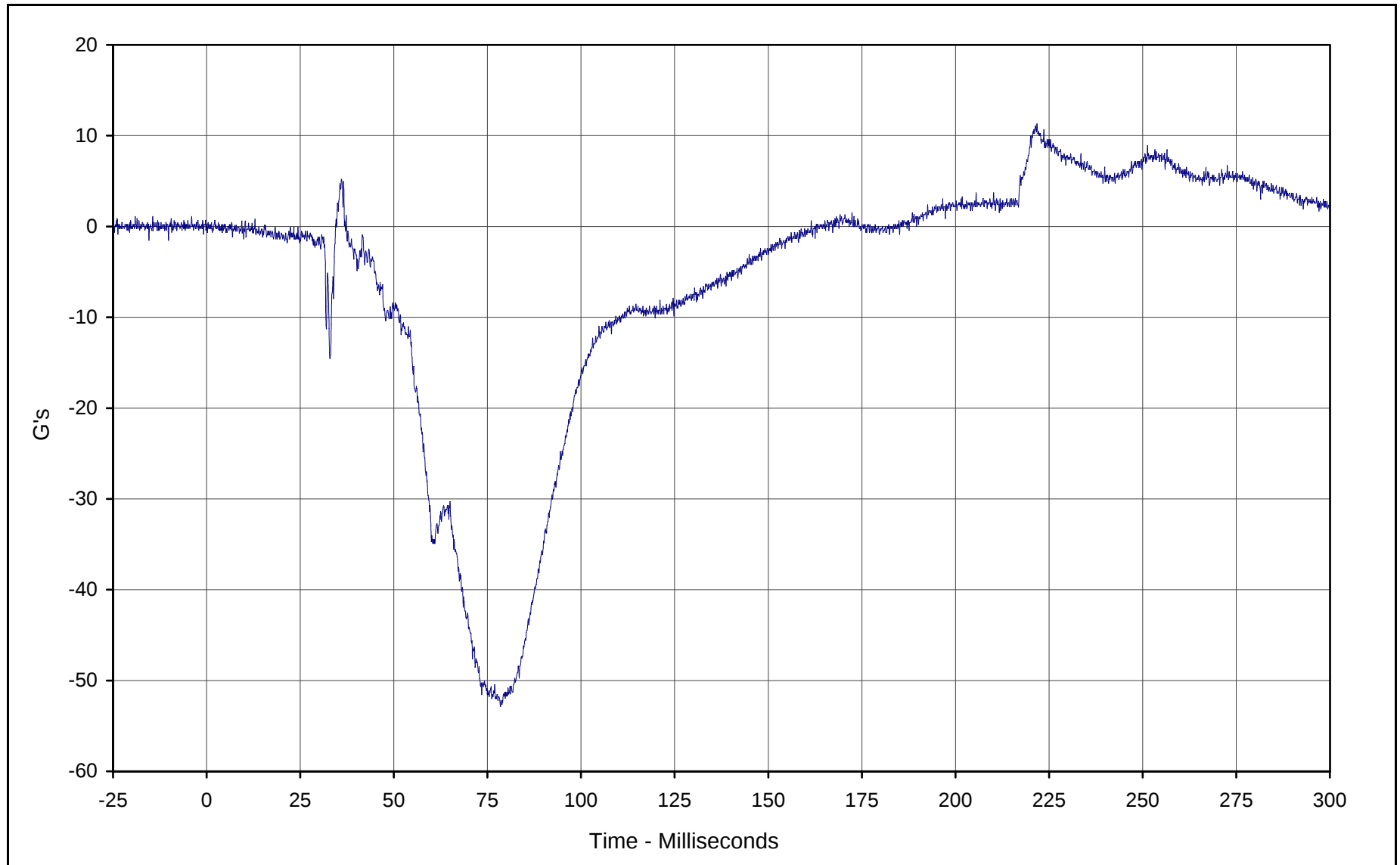
Curve Number: FIL-044

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

** Not installed

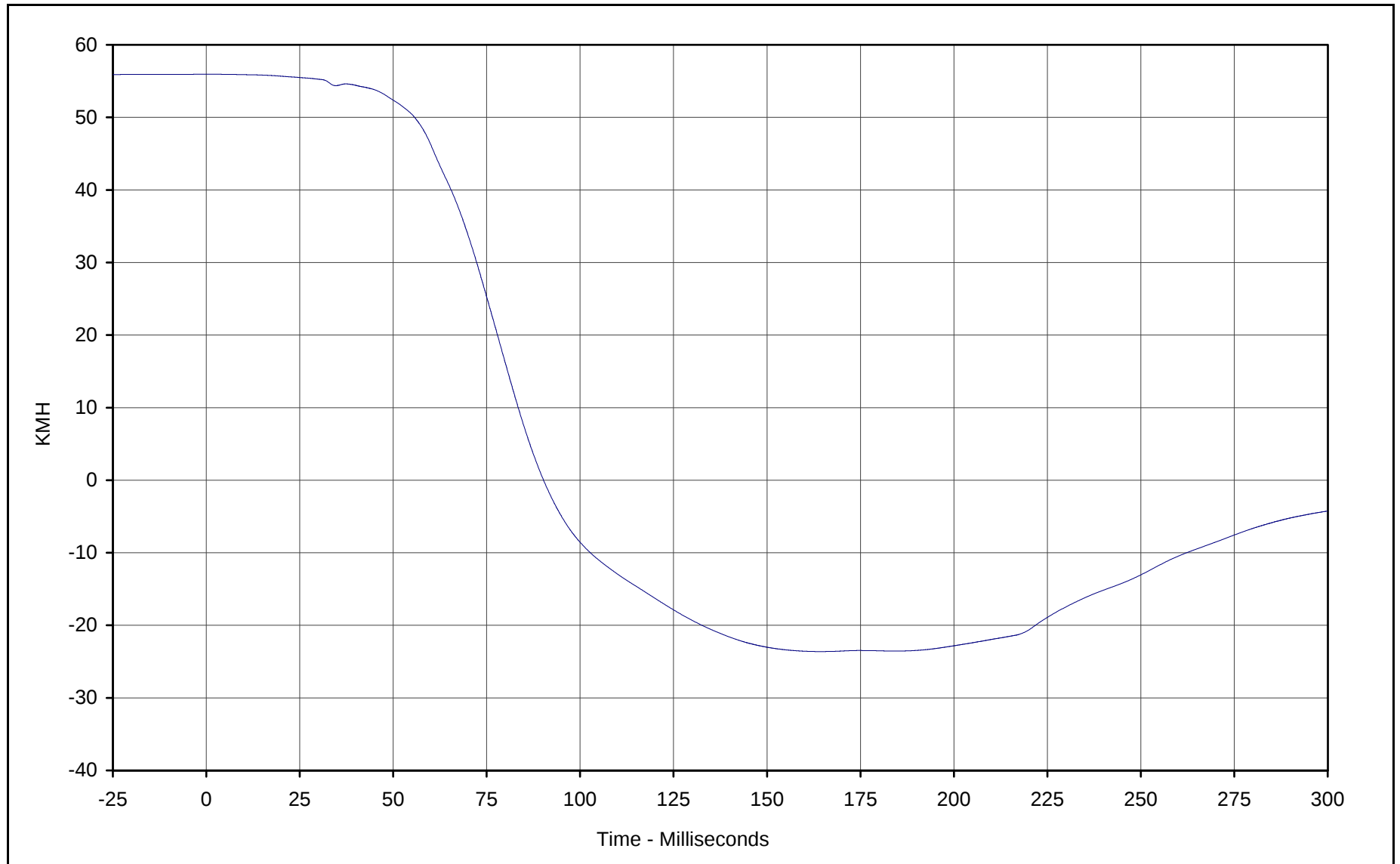




Curve Description: Passenger Head Primary X
Maximum Value: 11.3 at 221.8 Milliseconds
Minimum Value: -52.9 at 78.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

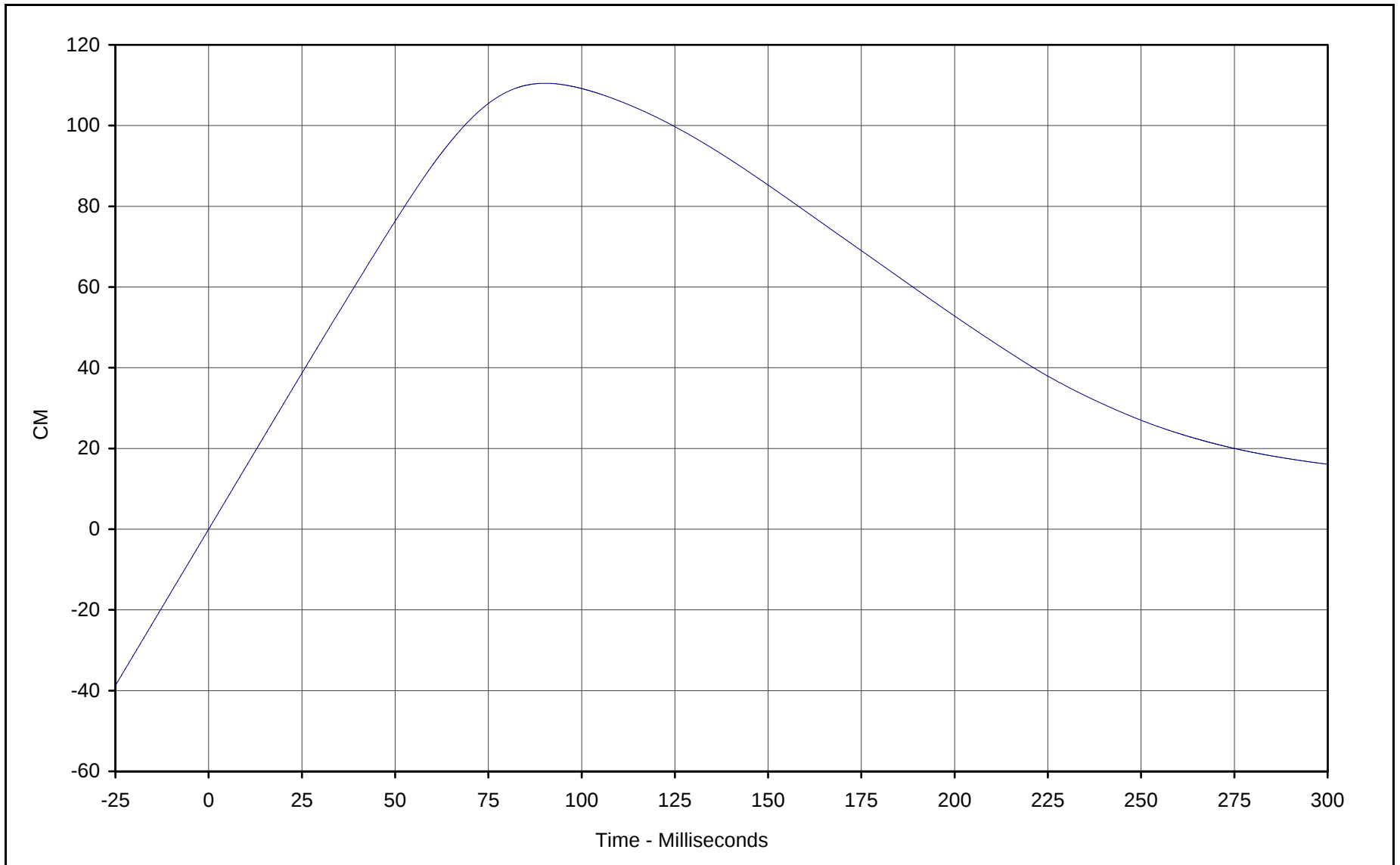




Curve Description: Passenger Head Primary X Velocity
Maximum Value: 55.9 at 0.2 Milliseconds
Minimum Value: -23.6 at 164.2 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

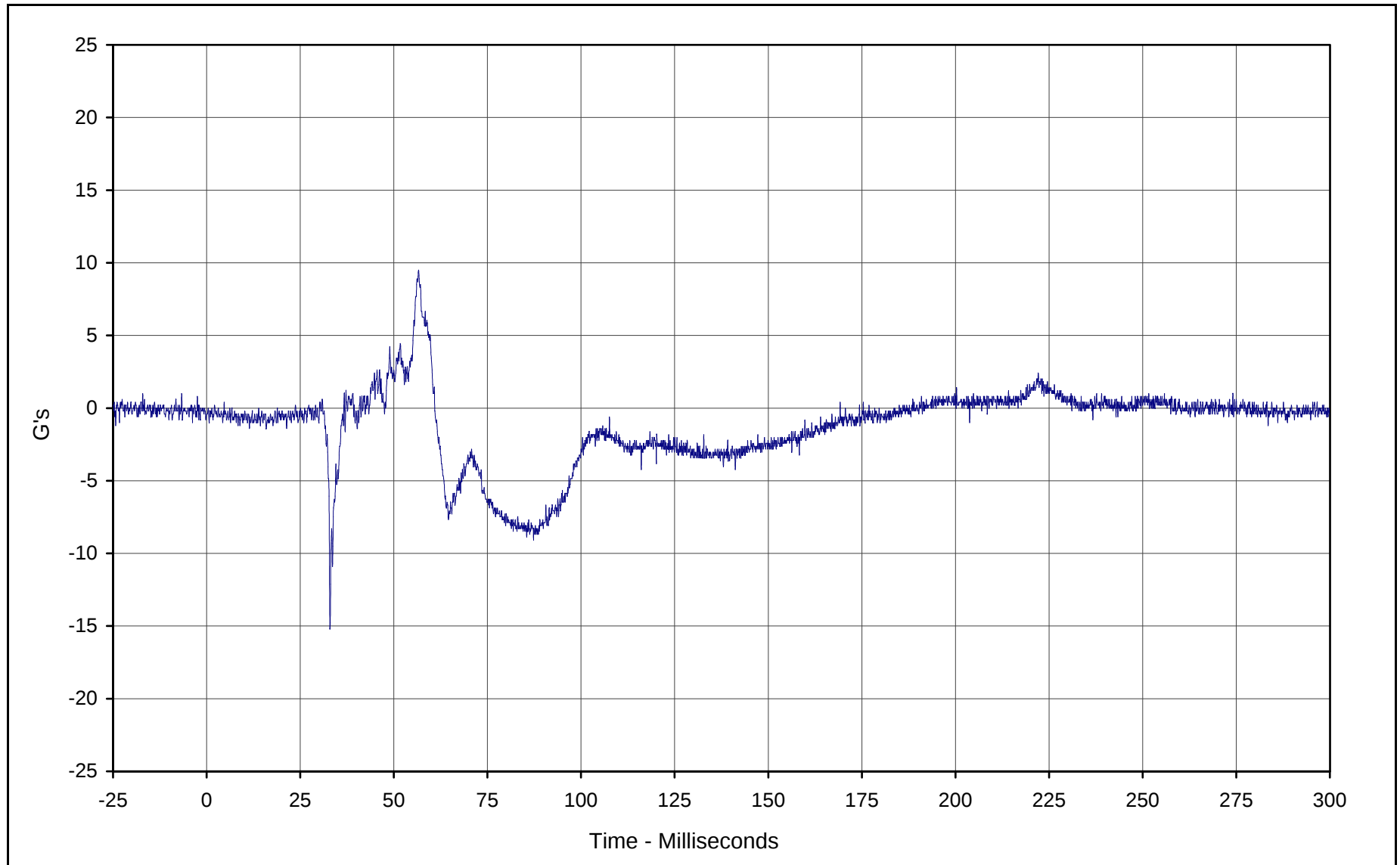




Curve Description: Passenger Head Primary X Displ.
Maximum Value: 110.5 at 90.2 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

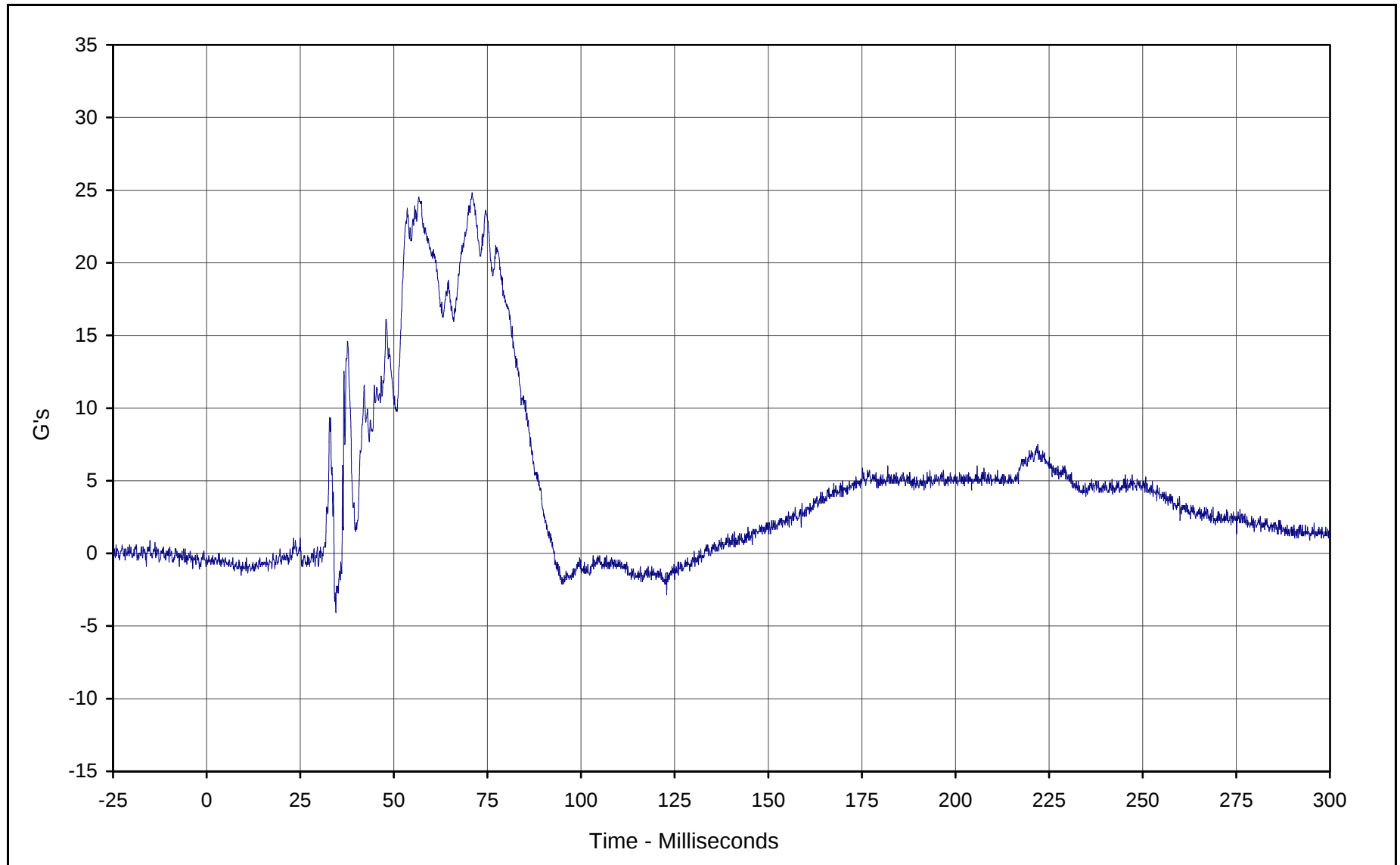




Curve Description: Passenger Head Primary Y
Maximum Value: 9.5 at 56.6 Milliseconds
Minimum Value: -15.2 at 32.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-046

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

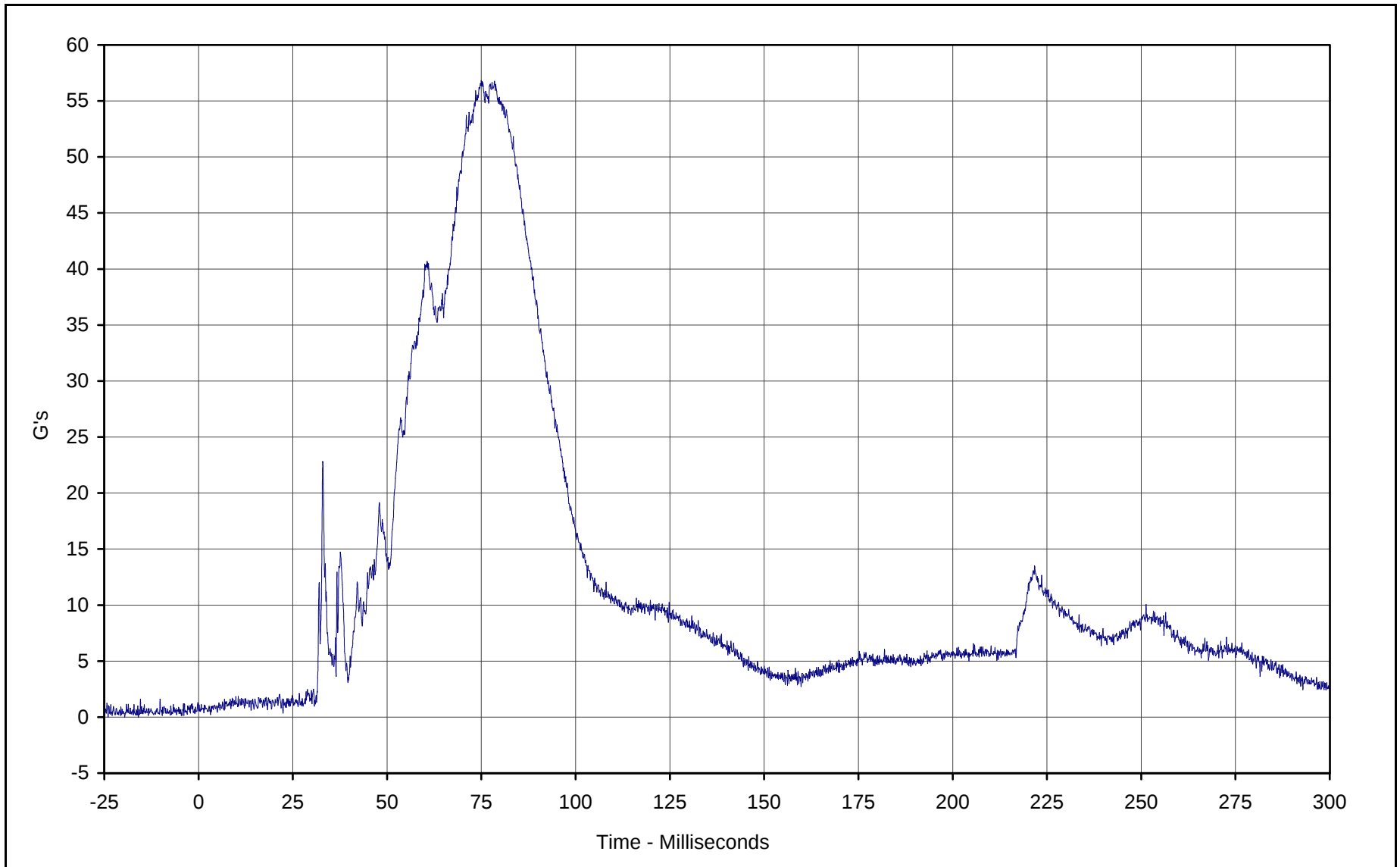




Curve Description: Passenger Head Primary Z
Maximum Value: 24.8 at 70.9 Milliseconds
Minimum Value: -4.1 at 34.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-047

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

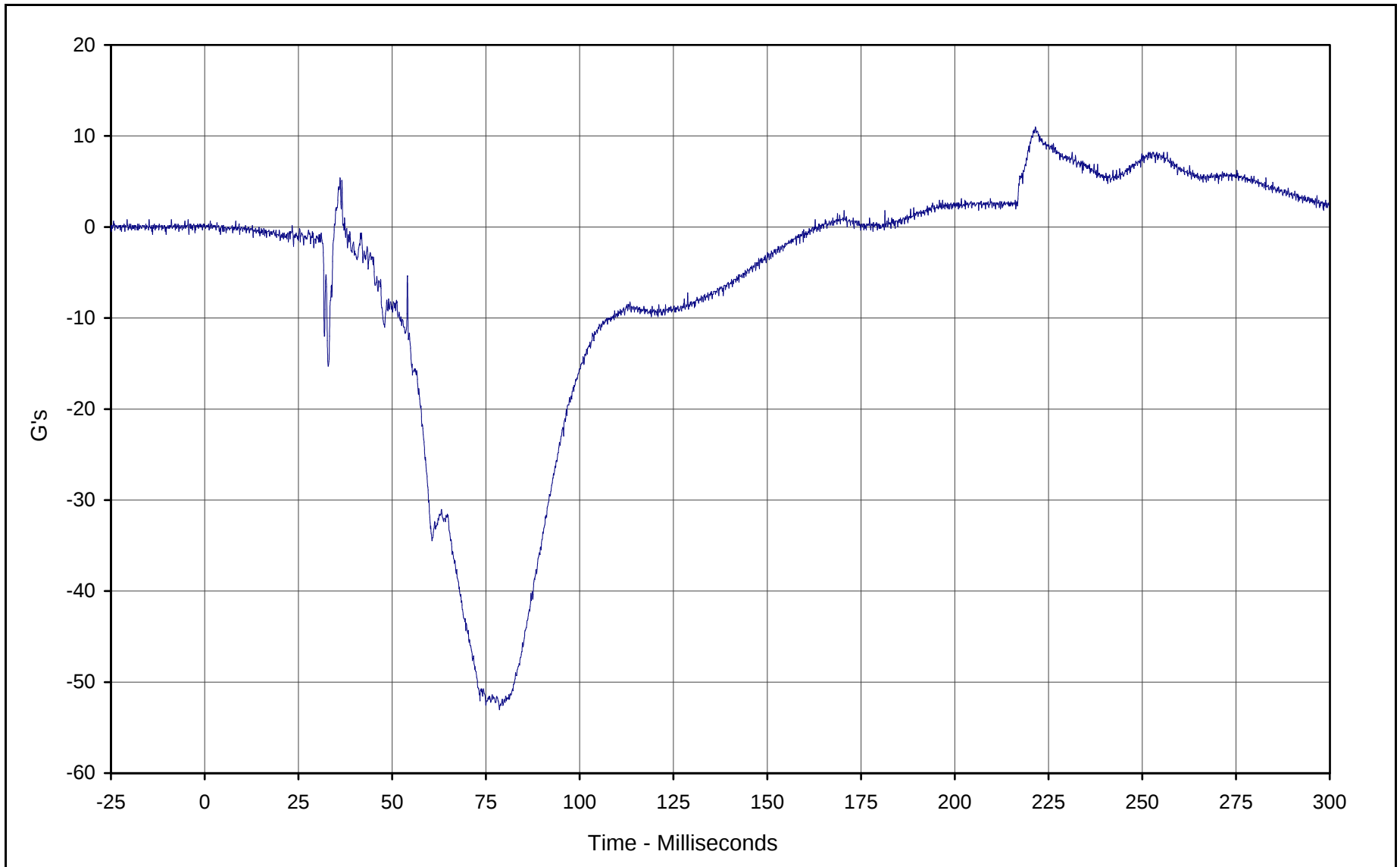




Curve Description: Passenger Head Resultant Primary
Maximum Value: 56.8 at 75.0 Milliseconds
Minimum Value: 0.2 at 3.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: RES-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

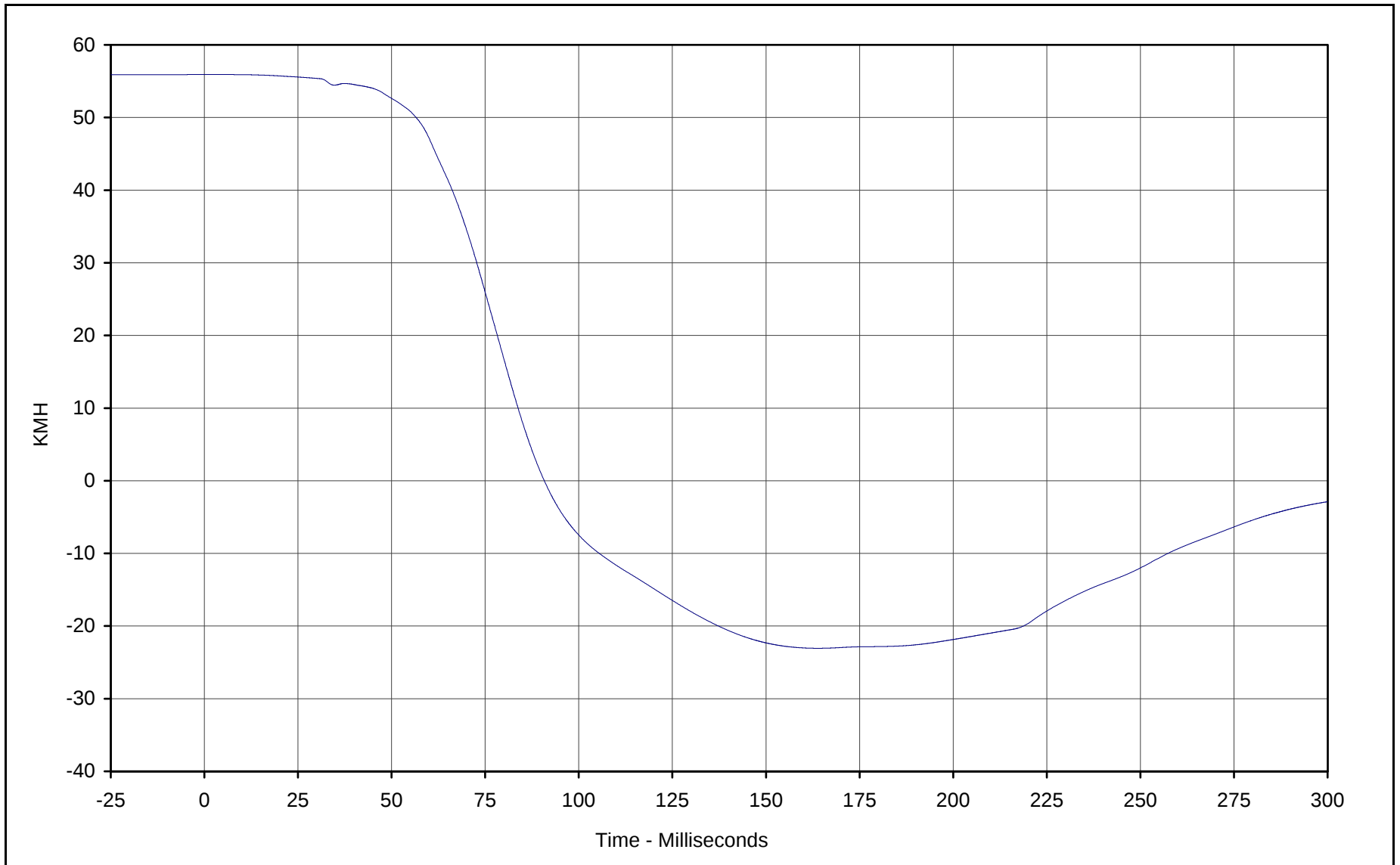




Curve Description: Passenger Head Redundant X
Maximum Value: 11.0 at 221.5 Milliseconds
Minimum Value: -53.1 at 78.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-048

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Head Redundant X Velocity

Maximum Value: 55.9 at 3.2 Milliseconds

Minimum Value: -23.1 at 164.0 Milliseconds

SAE Filter Class: 180

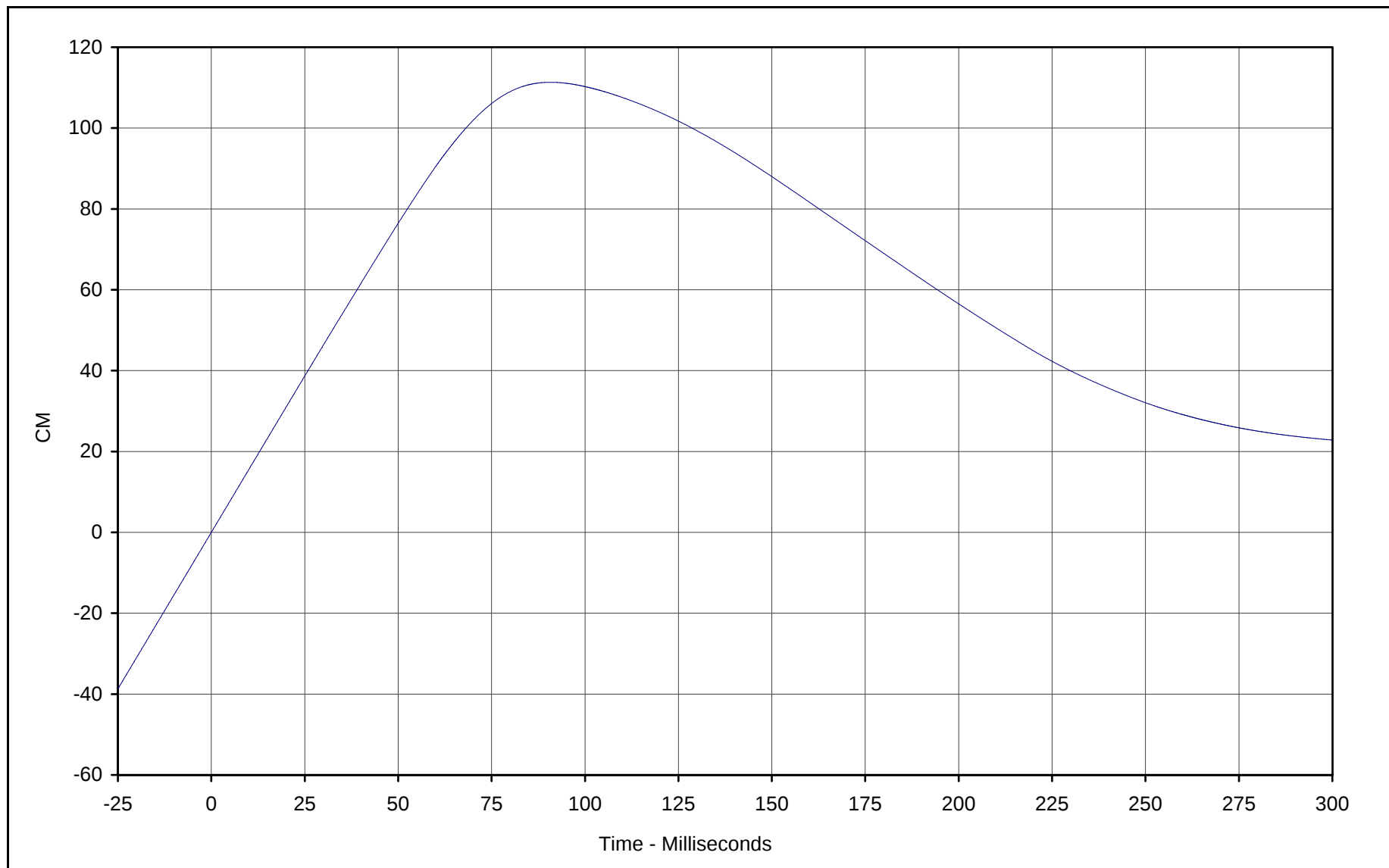
Date of Test: 01/11/01

Curve Number: IN1-048

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Head Redundant X Displ.

Maximum Value: 111.3 at 90.8 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

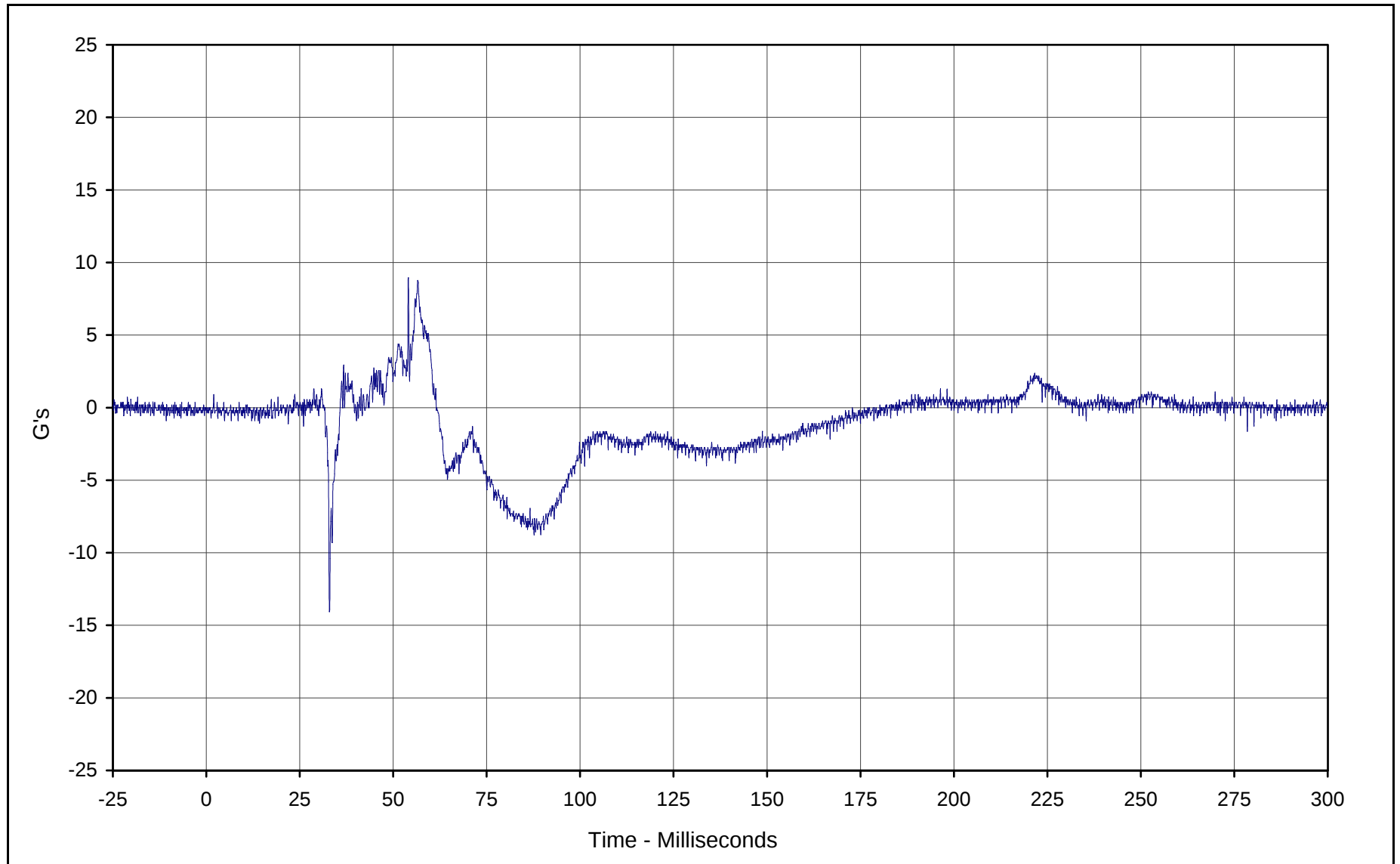
Date of Test: 01/11/01

Curve Number: IN2-048

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

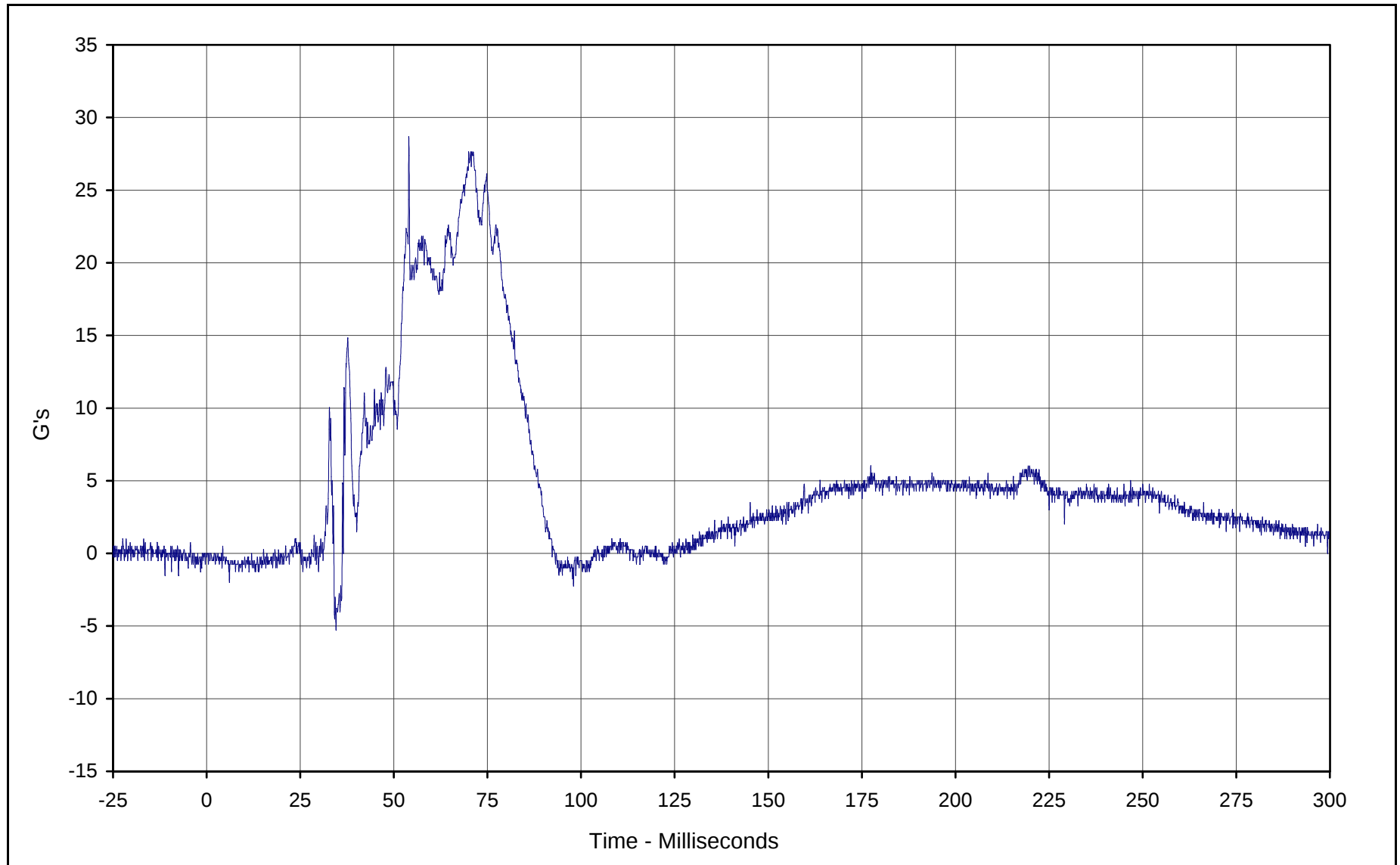




Curve Description: Passenger Head Redundant Y
Maximum Value: 8.9 at 54.1 Milliseconds
Minimum Value: -14.1 at 32.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-049

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

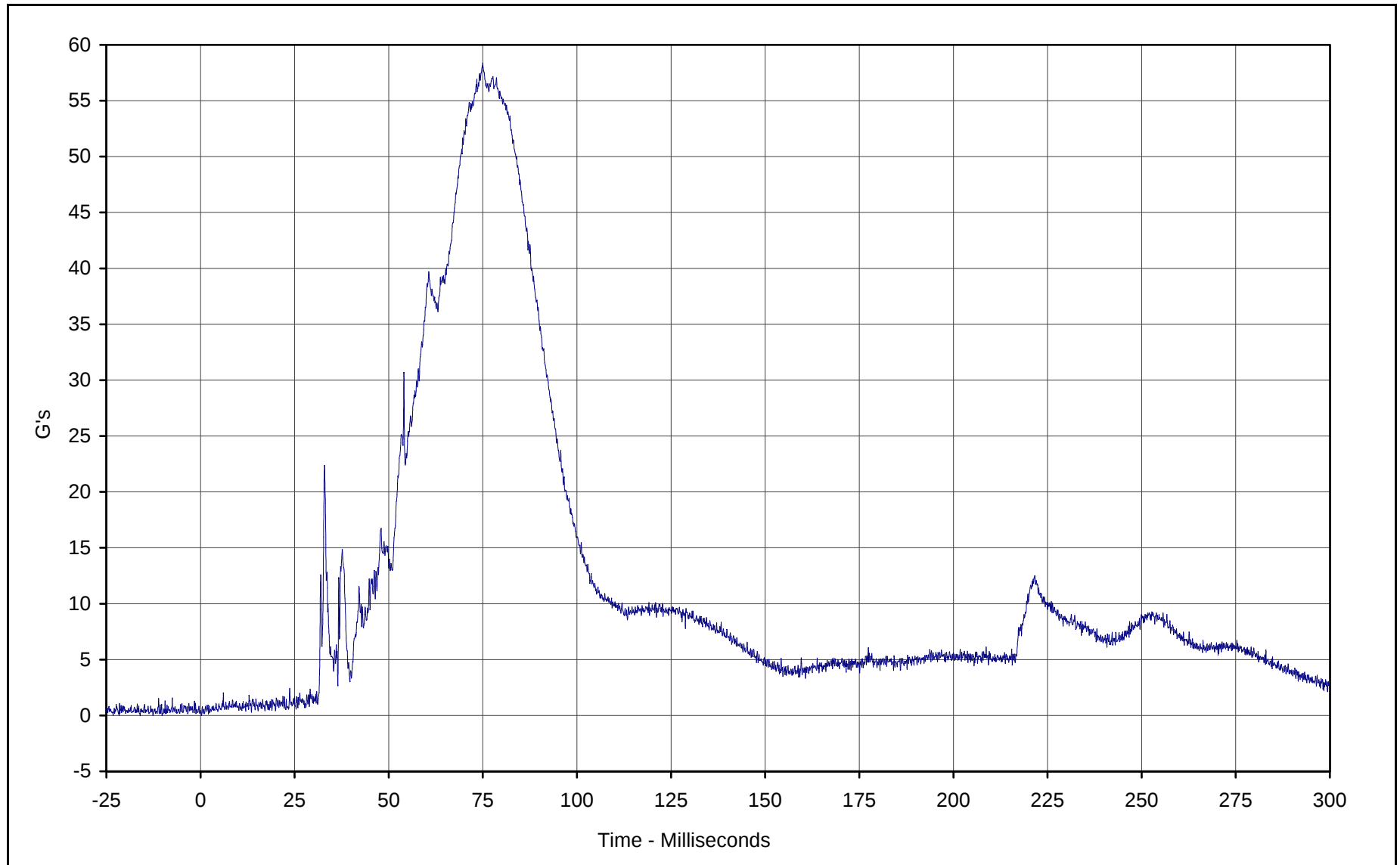




Curve Description: Passenger Head Redundant Z
Maximum Value: 28.6 at 54.0 Milliseconds
Minimum Value: -5.3 at 34.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-050

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Head Resultant Redundant

Maximum Value: 58.4 at 75.0 Milliseconds

Minimum Value: 0.0 at 0.3 Milliseconds

SAE Filter Class: 1000

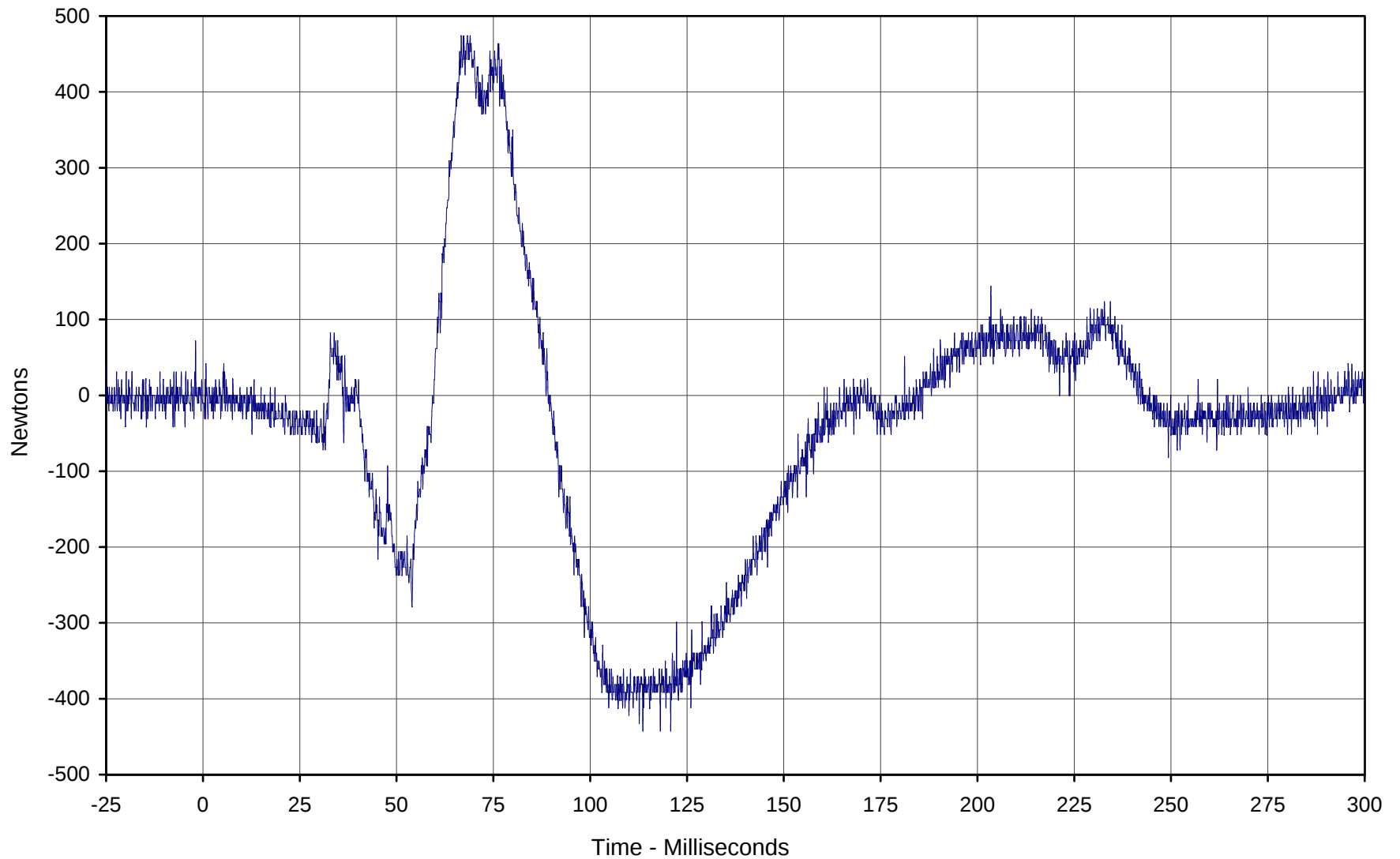
Date of Test: 01/11/01

Curve Number: RES-048

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

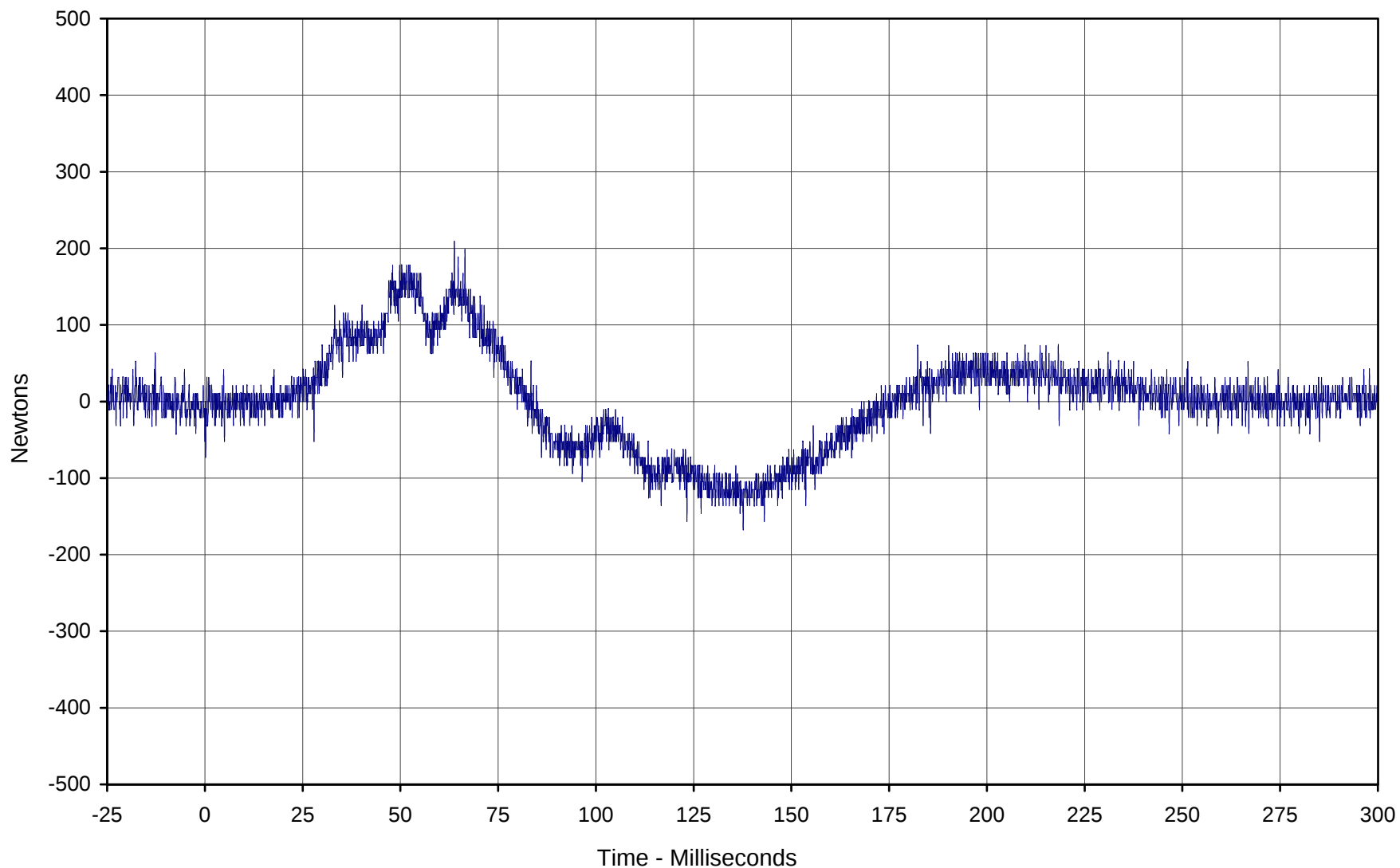




Curve Description: Passenger Neck Force X
Maximum Value: 473.9 at 66.7 Milliseconds
Minimum Value: -442.9 at 113.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-051

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

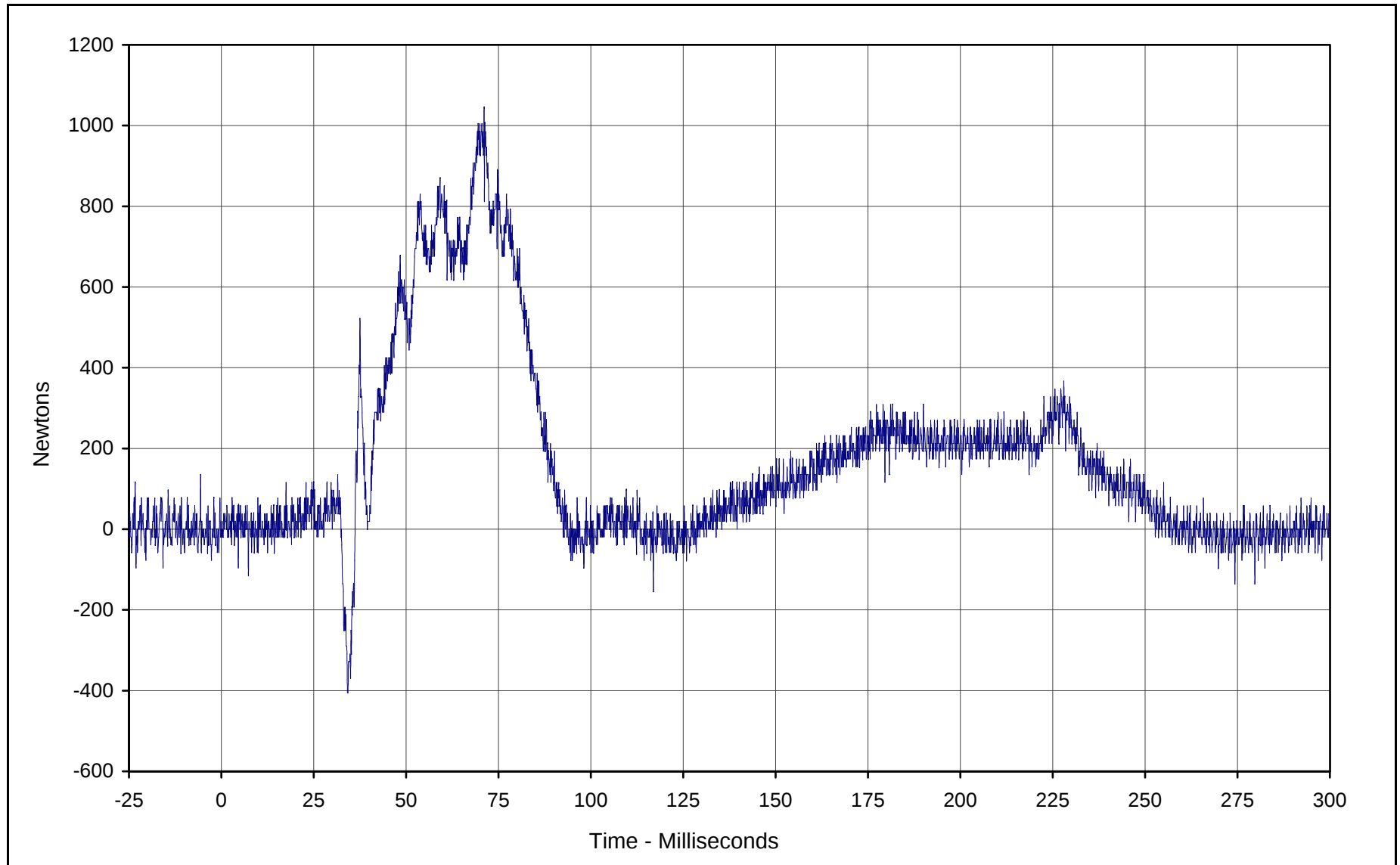




Curve Description: Passenger Neck Force Y
Maximum Value: 209.3 at 63.8 Milliseconds
Minimum Value: -167.5 at 137.7 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-052

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

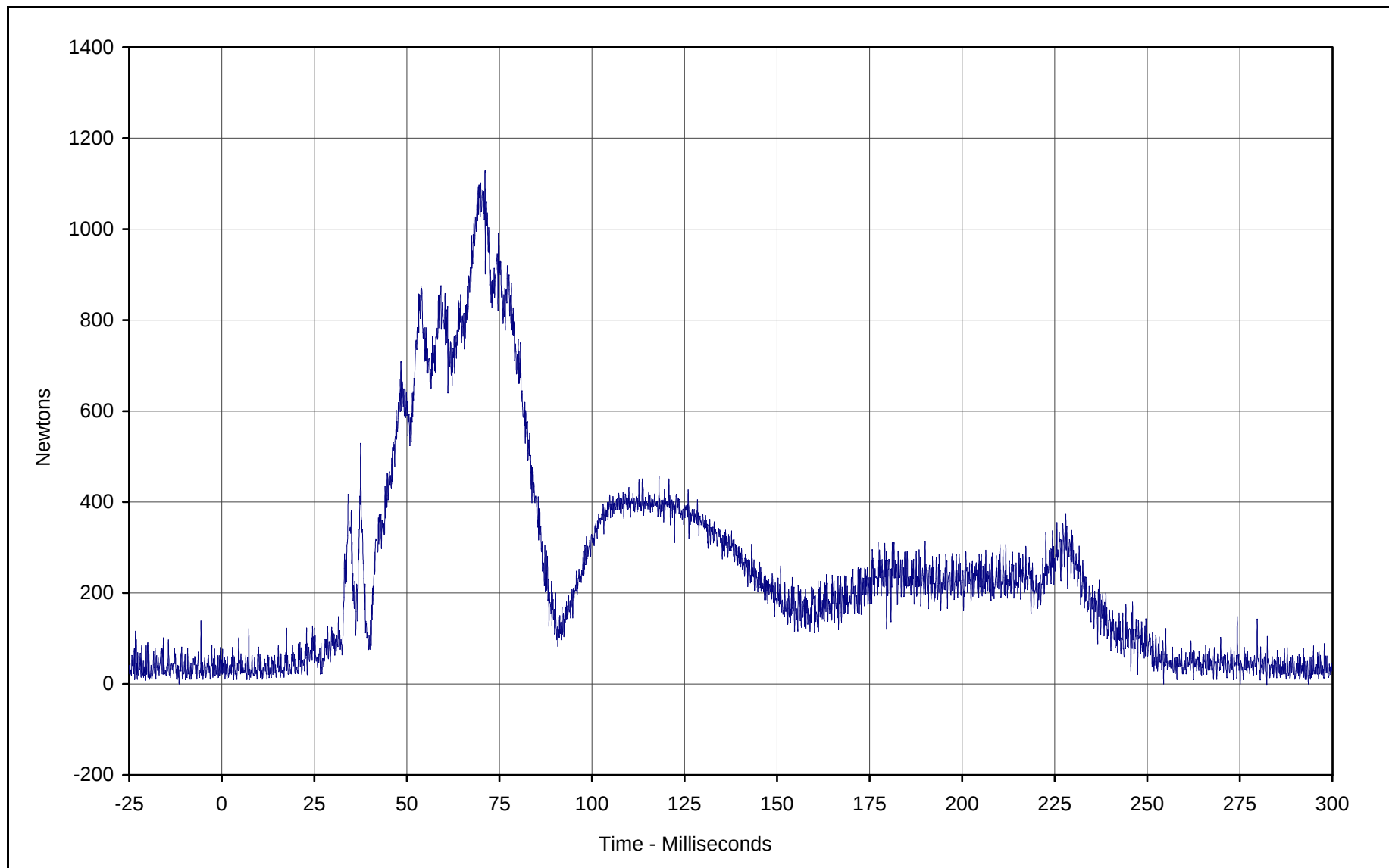




Curve Description: Passenger Neck Force Z
Maximum Value: 1043.1 at 71.1 Milliseconds
Minimum Value: -405.7 at 34.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: FIL-053

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

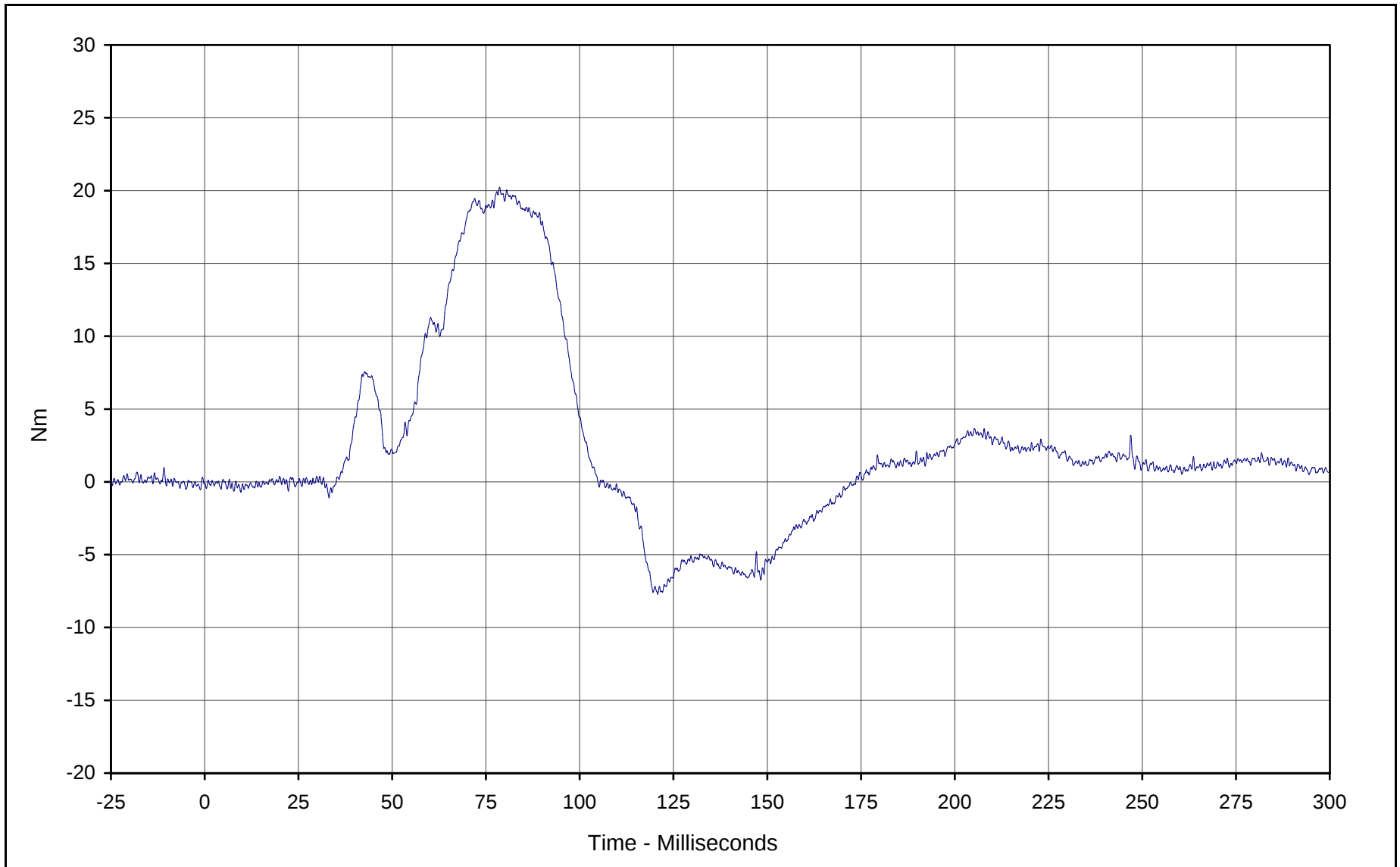




Curve Description: Passenger Neck Force Resultant
Maximum Value: 1123.9 at 71.1 Milliseconds
Minimum Value: 0.0 at 254.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: RES-051

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

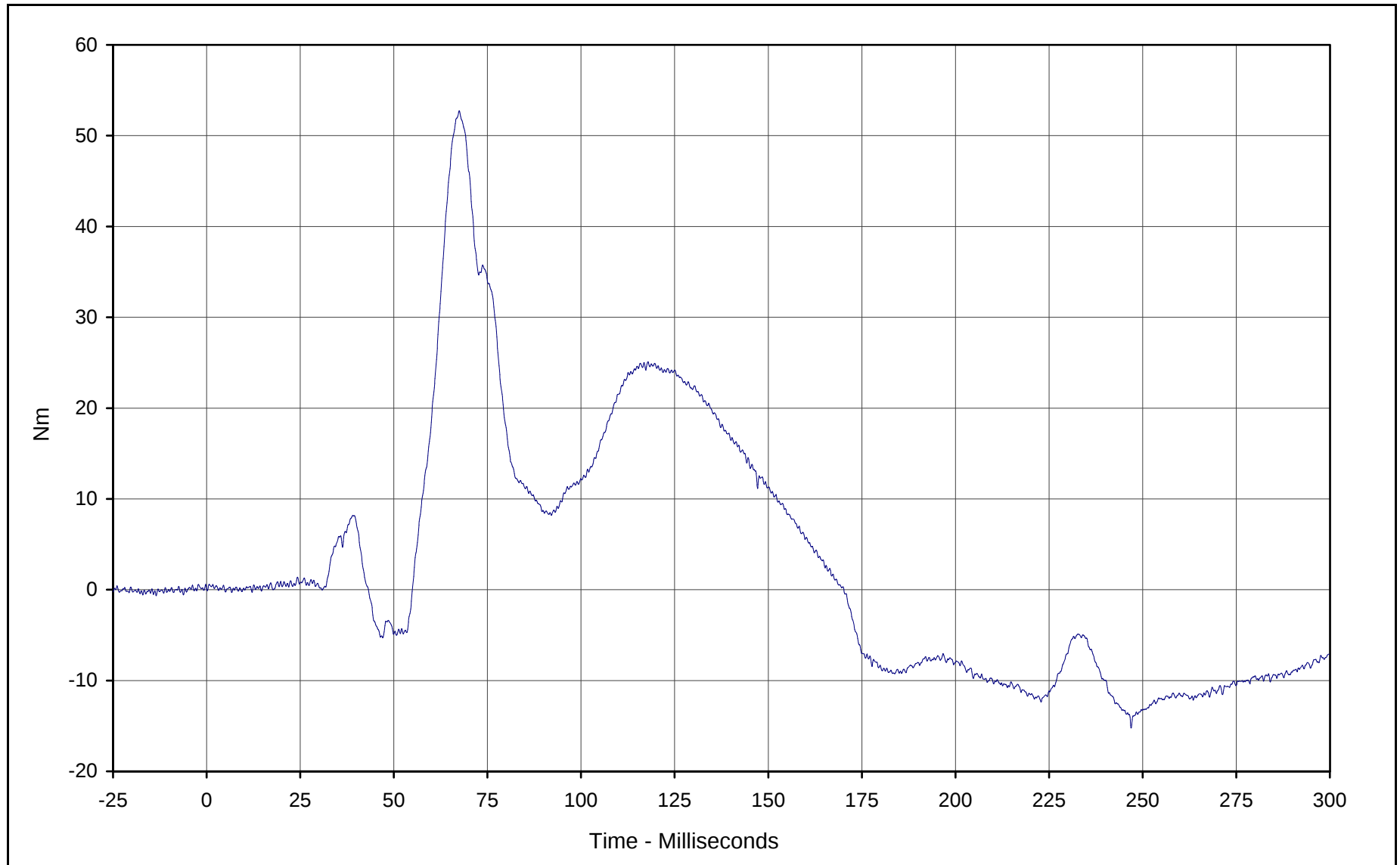




Curve Description: Passenger Neck Moment X
Maximum Value: 20.2 at 78.6 Milliseconds
Minimum Value: -7.7 at 120.8 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-054

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

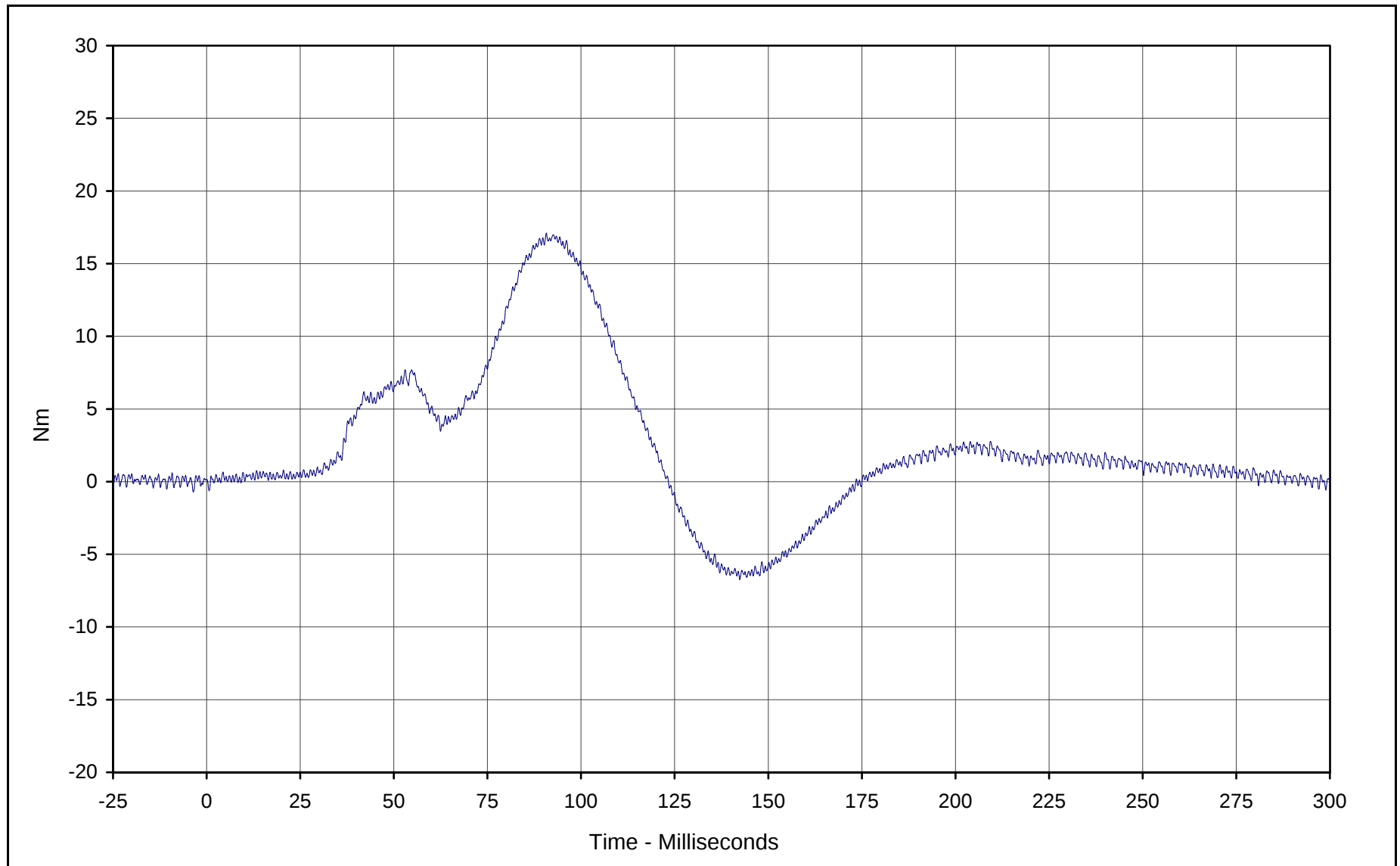




Curve Description: Passenger Neck Moment Y
Maximum Value: 52.7 at 67.5 Milliseconds
Minimum Value: -15.2 at 246.9 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-055

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

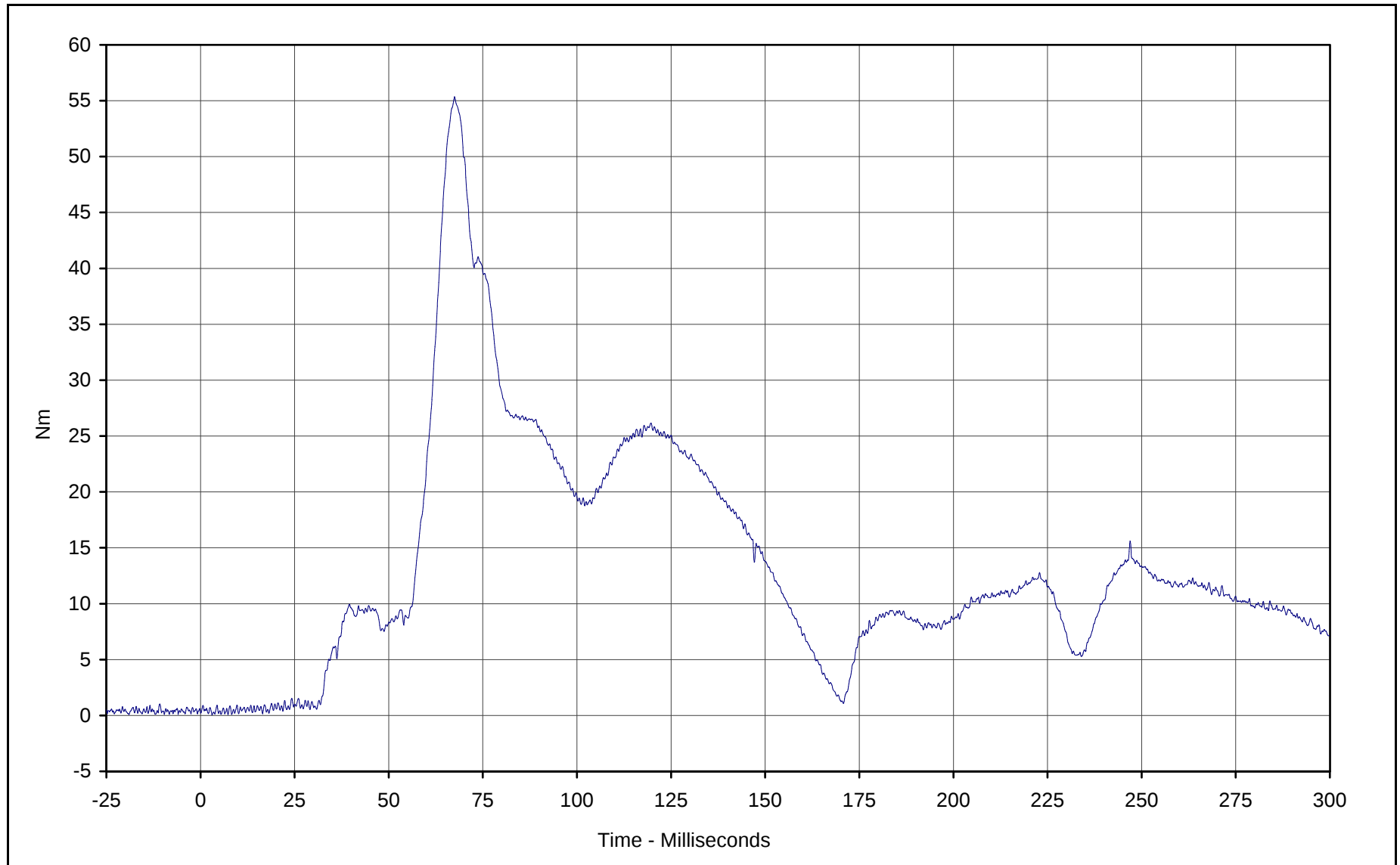




Curve Description: Passenger Neck Moment Z
Maximum Value: 17.1 at 90.7 Milliseconds
Minimum Value: -6.7 at 142.4 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-056

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

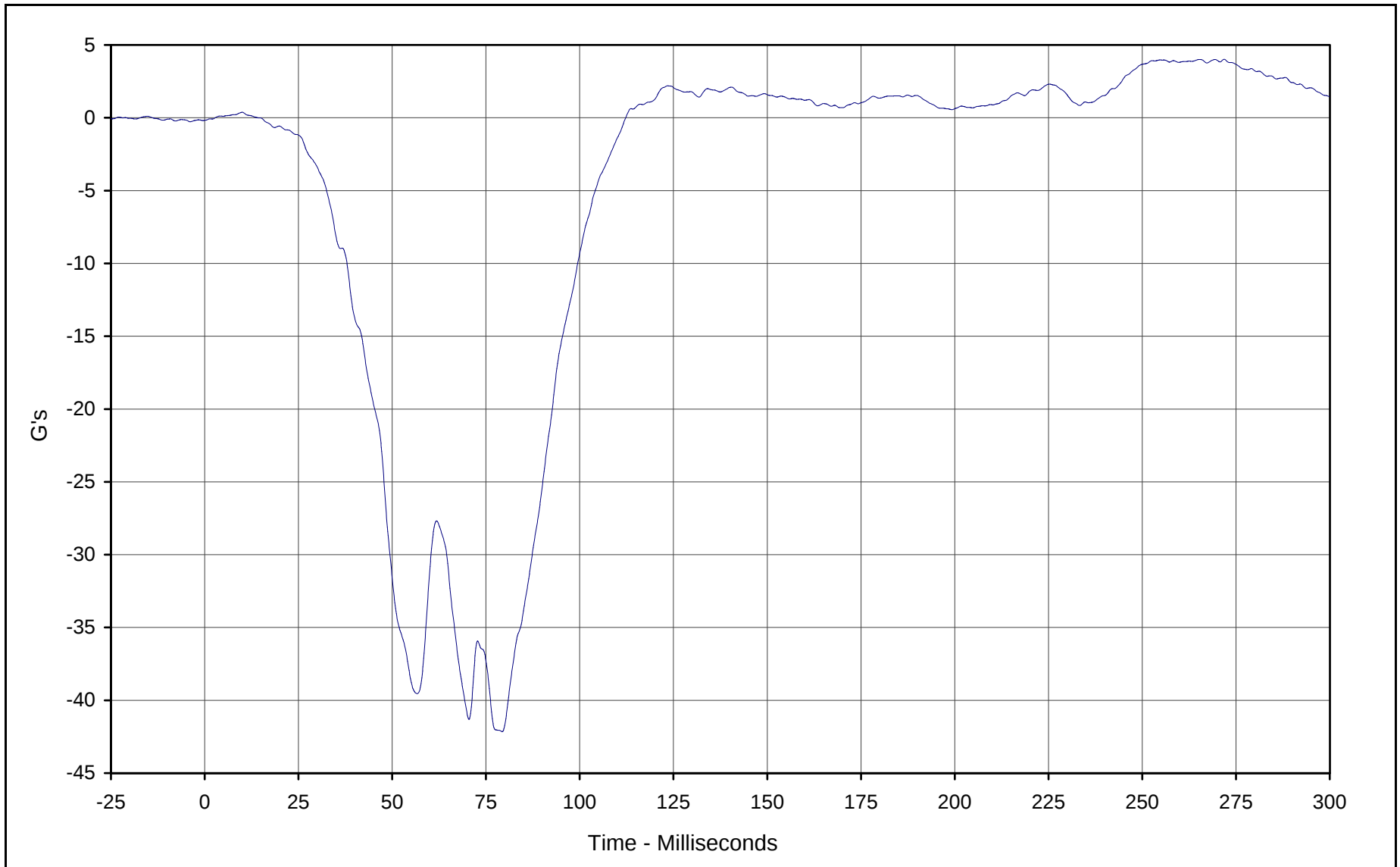




Curve Description: Passenger Neck Moment Resultant
Maximum Value: 55.4 at 67.5 Milliseconds
Minimum Value: 0.1 at 3.1 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: RES-054

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

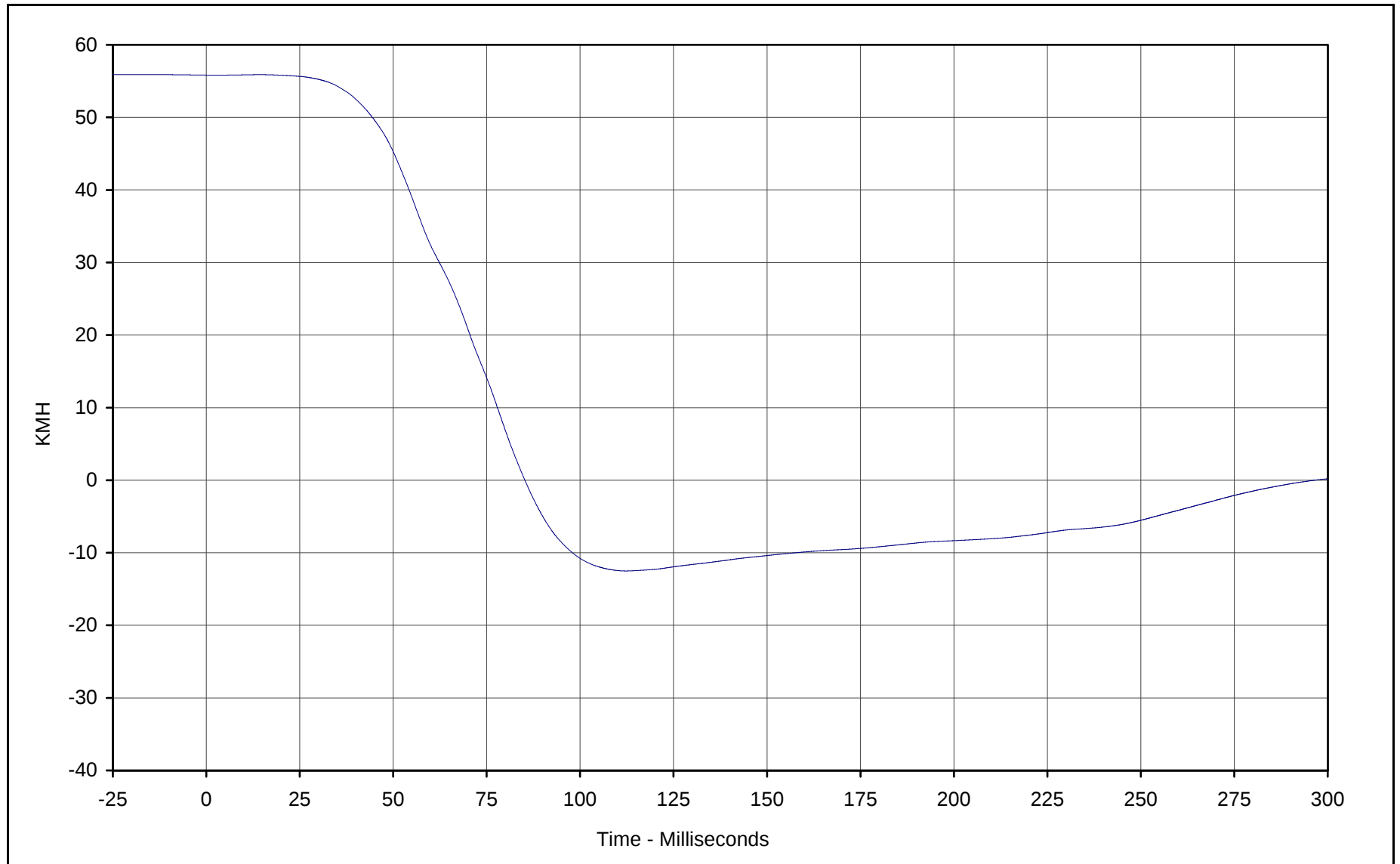




Curve Description: Passenger Chest Primary X
Maximum Value: 4.0 at 271.9 Milliseconds
Minimum Value: -42.1 at 79.3 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Chest Primary X Velocity

Maximum Value: 55.9 at 14.1 Milliseconds

Minimum Value: -12.5 at 112.3 Milliseconds

SAE Filter Class: 180

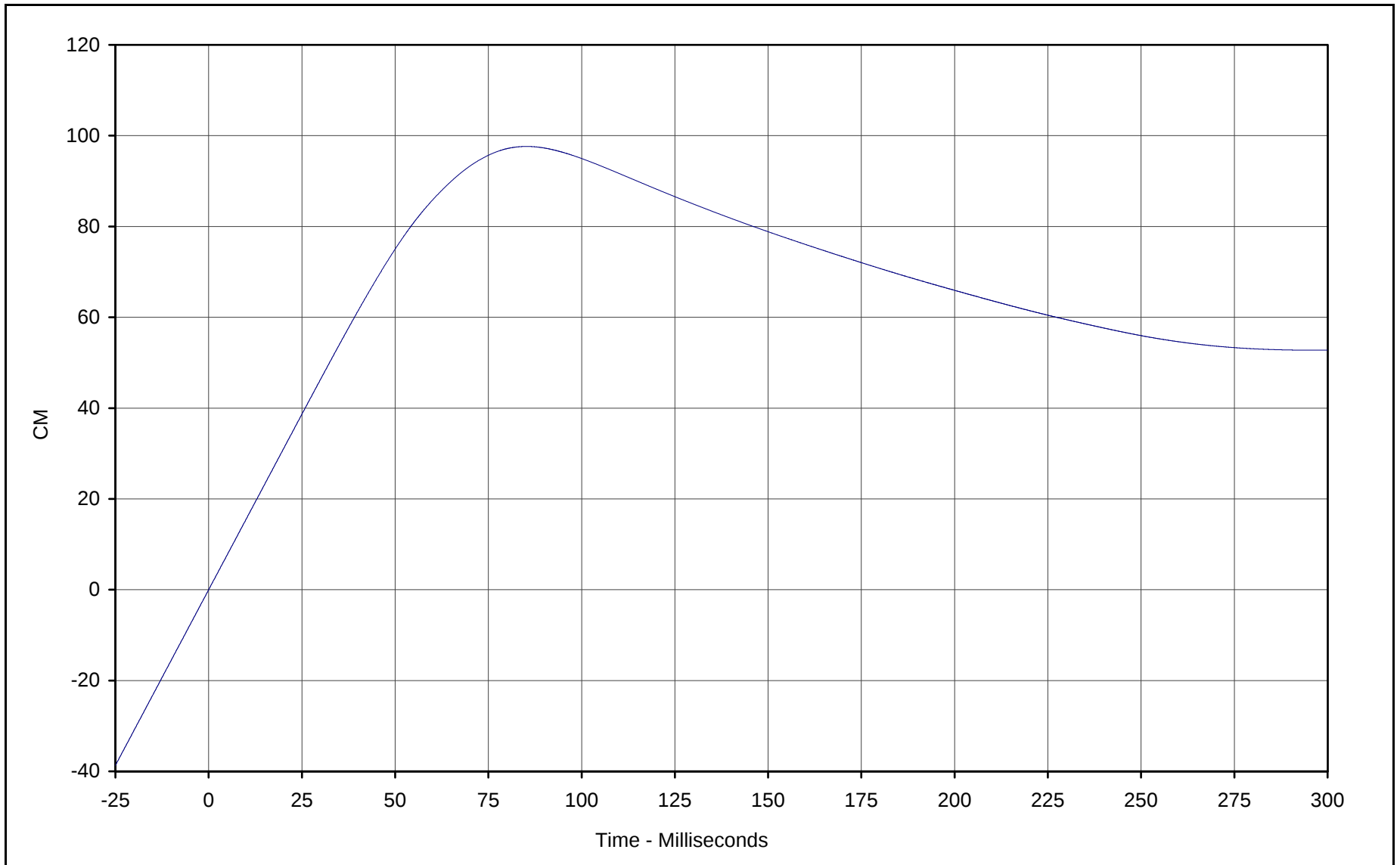
Date of Test: 01/11/01

Curve Number: IN1-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



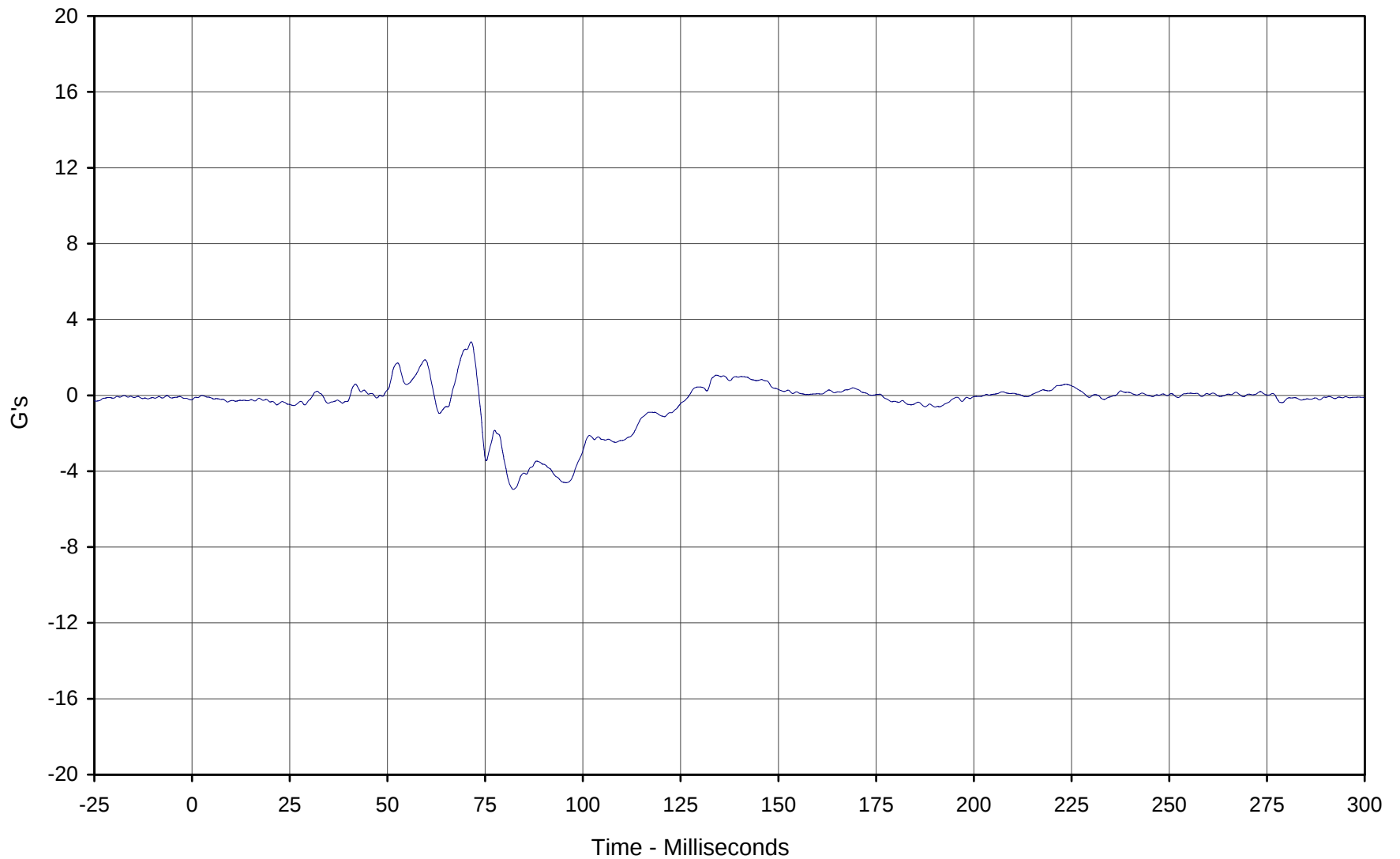


Curve Description: Passenger Chest Primary X Displ.
Maximum Value: 97.6 at 85.2 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-85

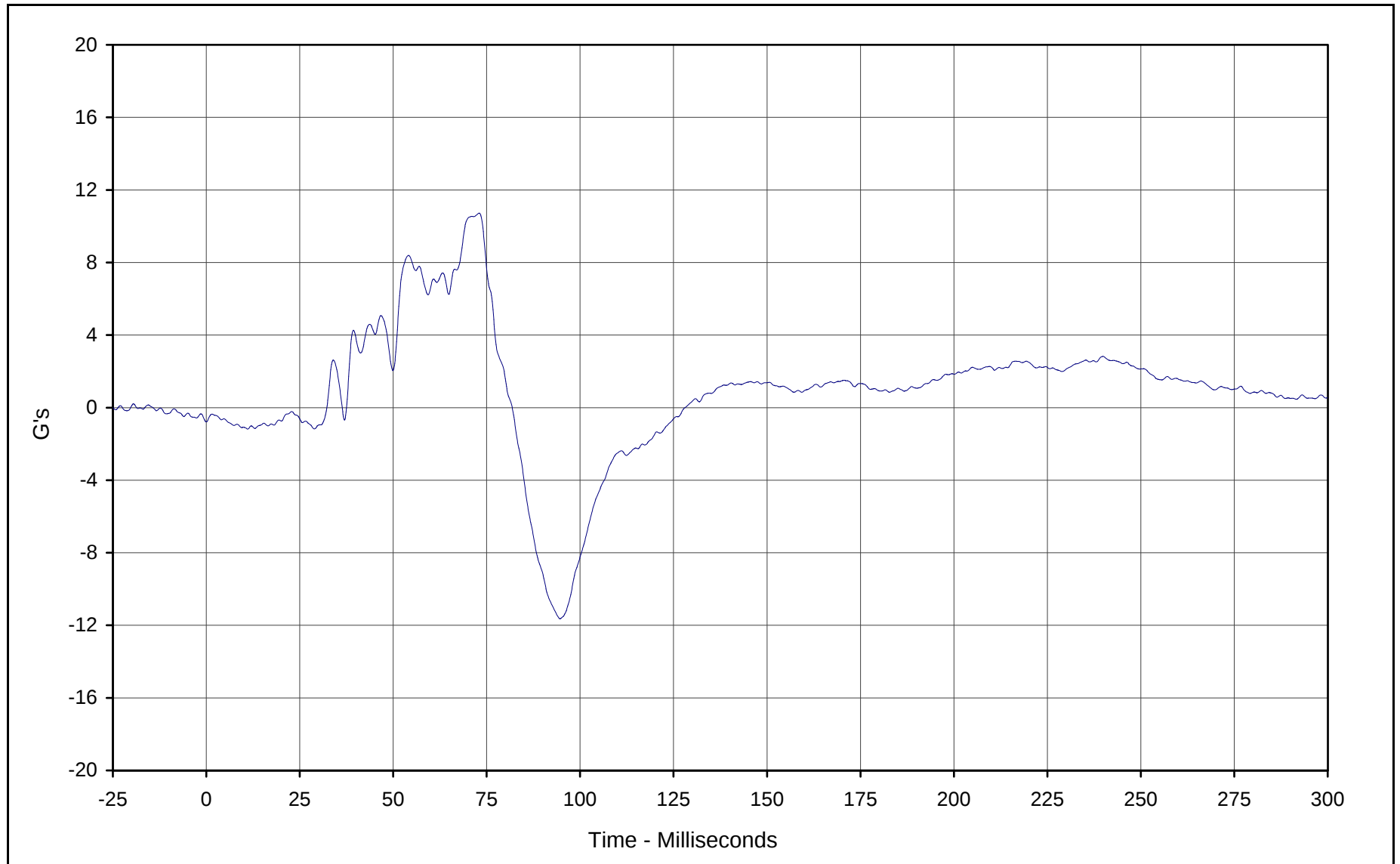


Curve Description: Passenger Chest Primary Y
Maximum Value: 2.8 at 71.4 Milliseconds
Minimum Value: -5.0 at 82.2 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-058

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



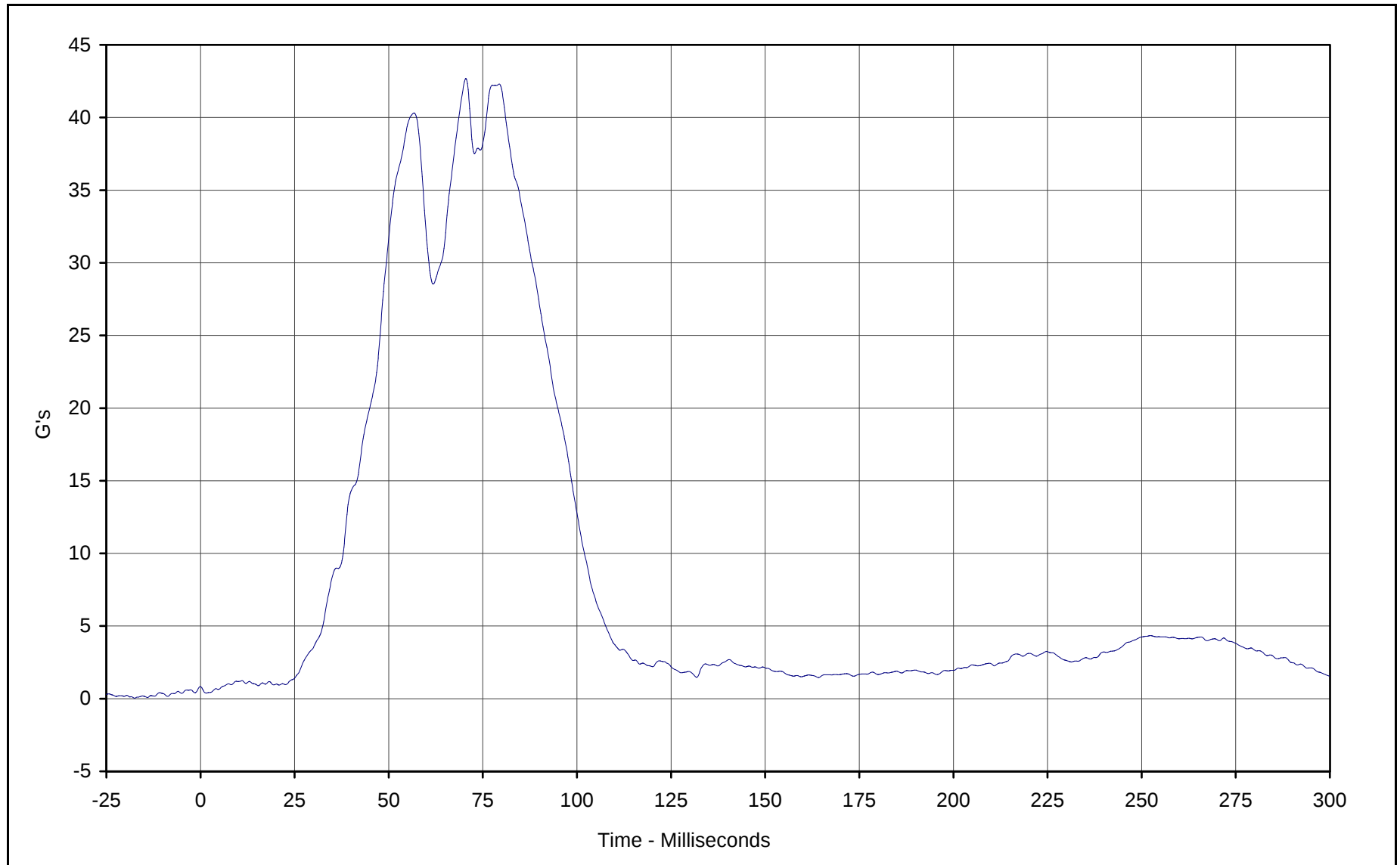
KAR21001-04



Curve Description: Passenger Chest Primary Z
Maximum Value: 10.7 at 73.0 Milliseconds
Minimum Value: -11.6 at 94.6 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-059

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

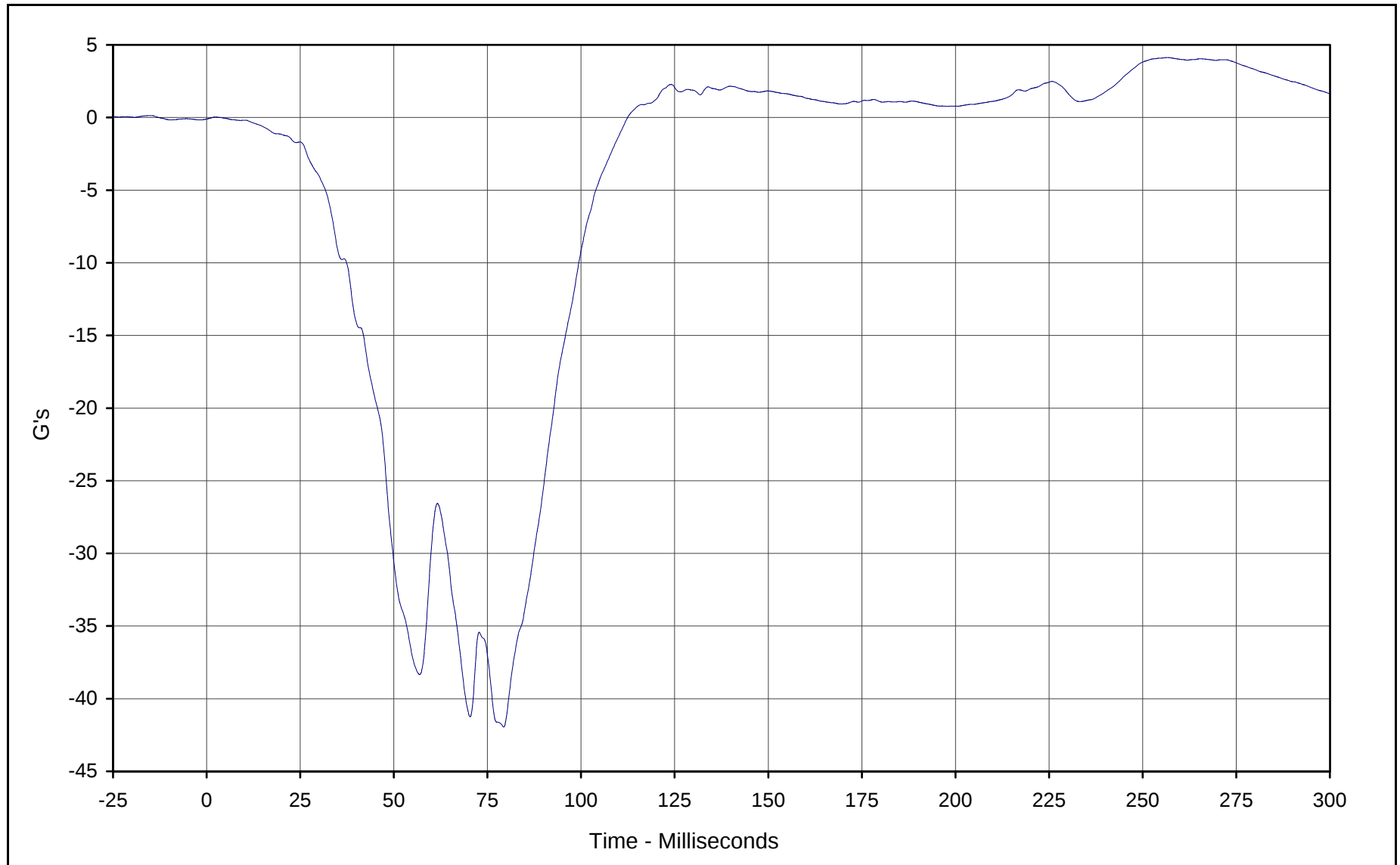




Curve Description: Passenger Chest Resultant Primary
Maximum Value: 42.7 at 70.5 Milliseconds
Minimum Value: 0.4 at 1.6 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: RES-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

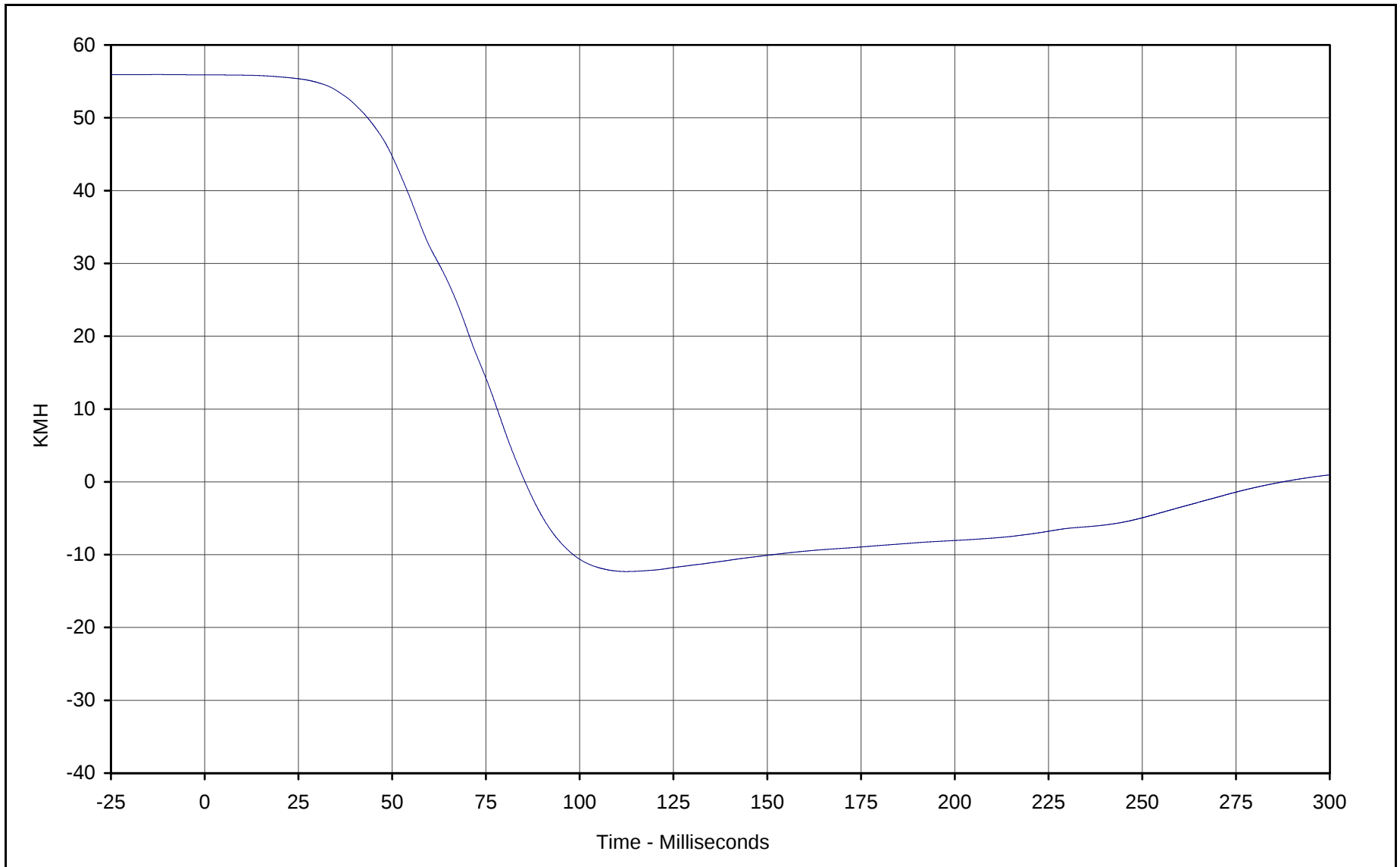




Curve Description: Passenger Chest Redundant X
Maximum Value: 4.1 at 256.6 Milliseconds
Minimum Value: -42.0 at 79.3 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Chest Redundant X Velocity

Maximum Value: 55.9 at 0.0 Milliseconds

Minimum Value: -12.3 at 112.4 Milliseconds

SAE Filter Class: 180

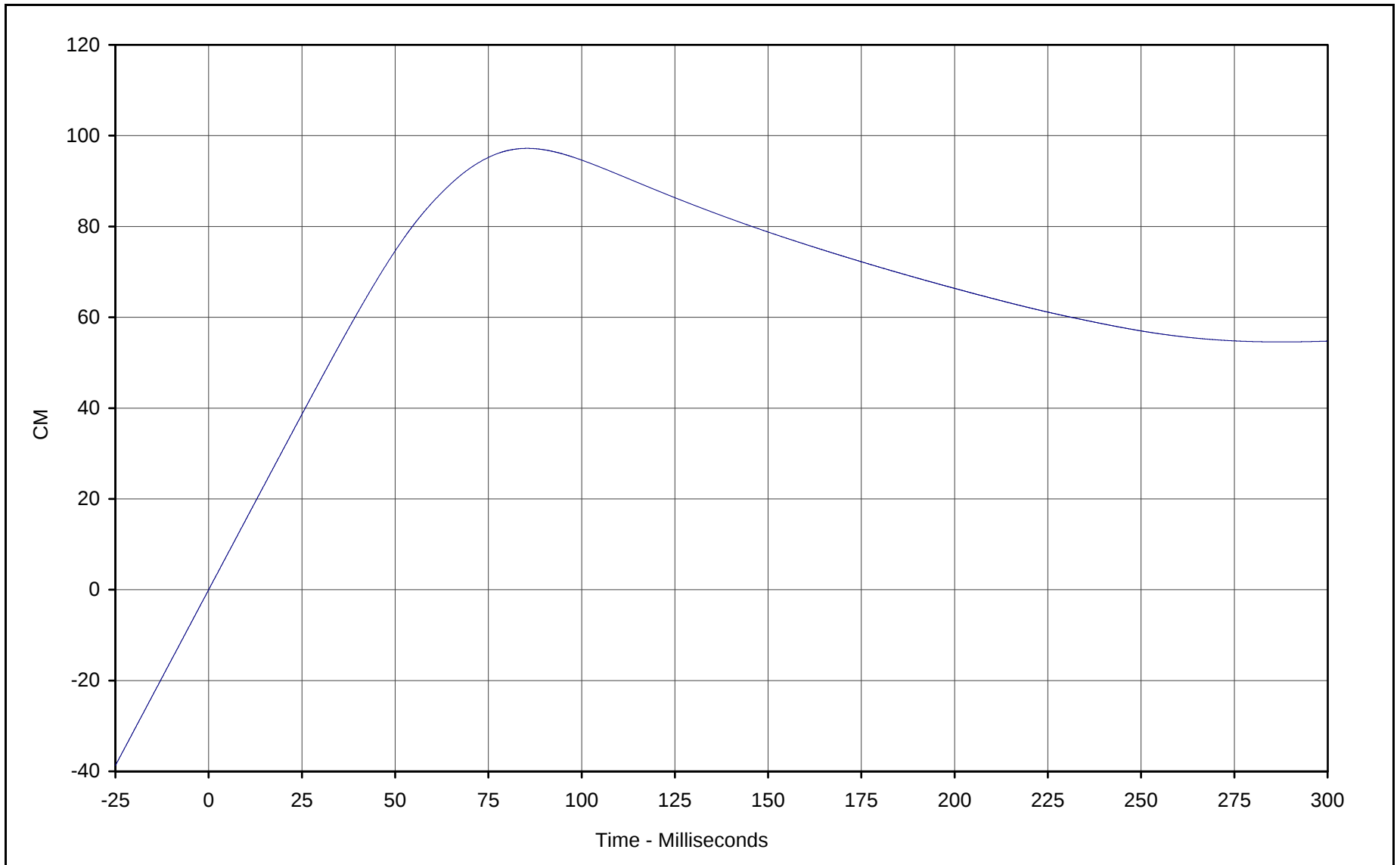
Date of Test: 01/11/01

Curve Number: IN1-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Chest Redundant X Displ.

Maximum Value: 97.2 at 85.4 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/11/01

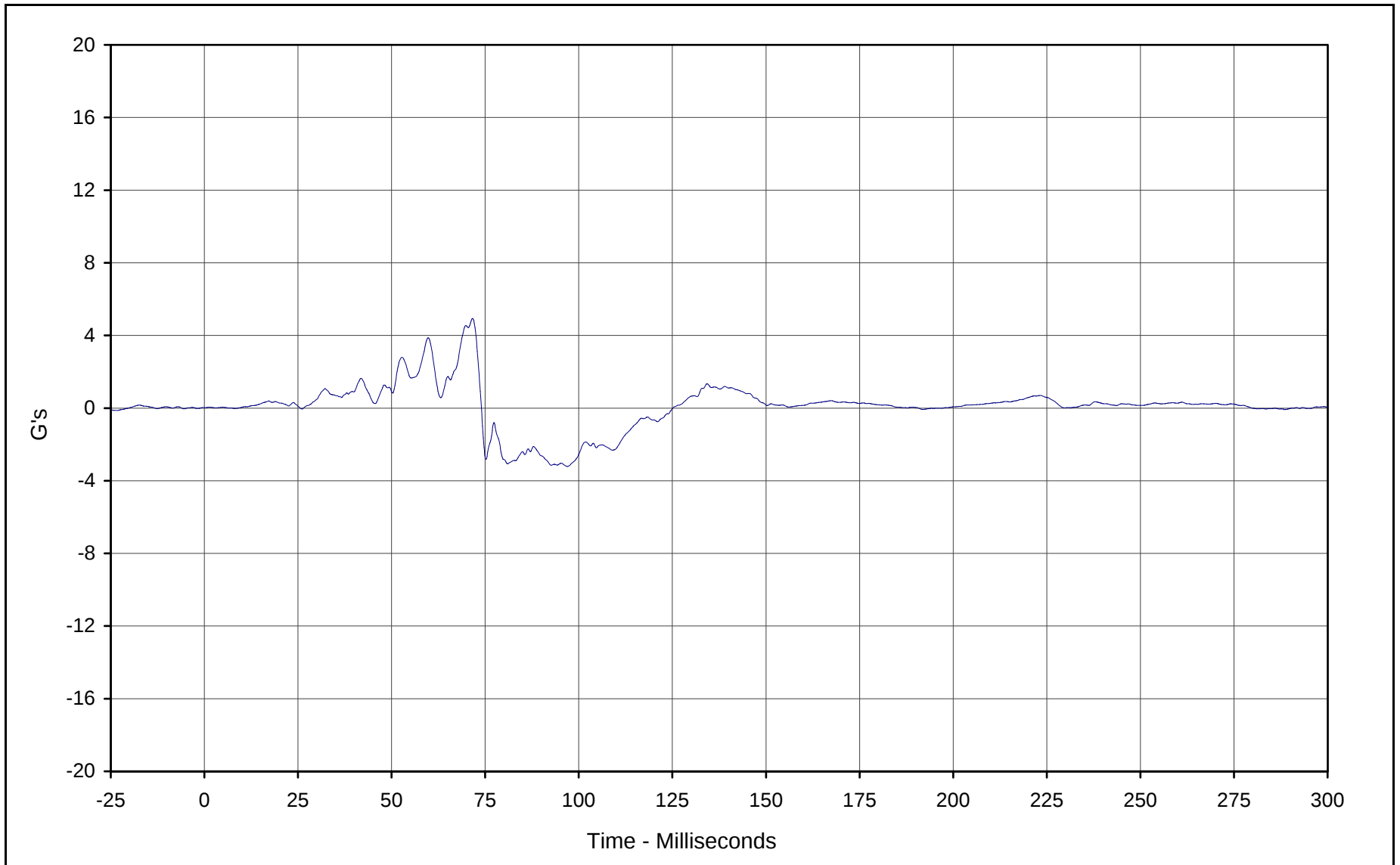
Curve Number: IN2-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-91



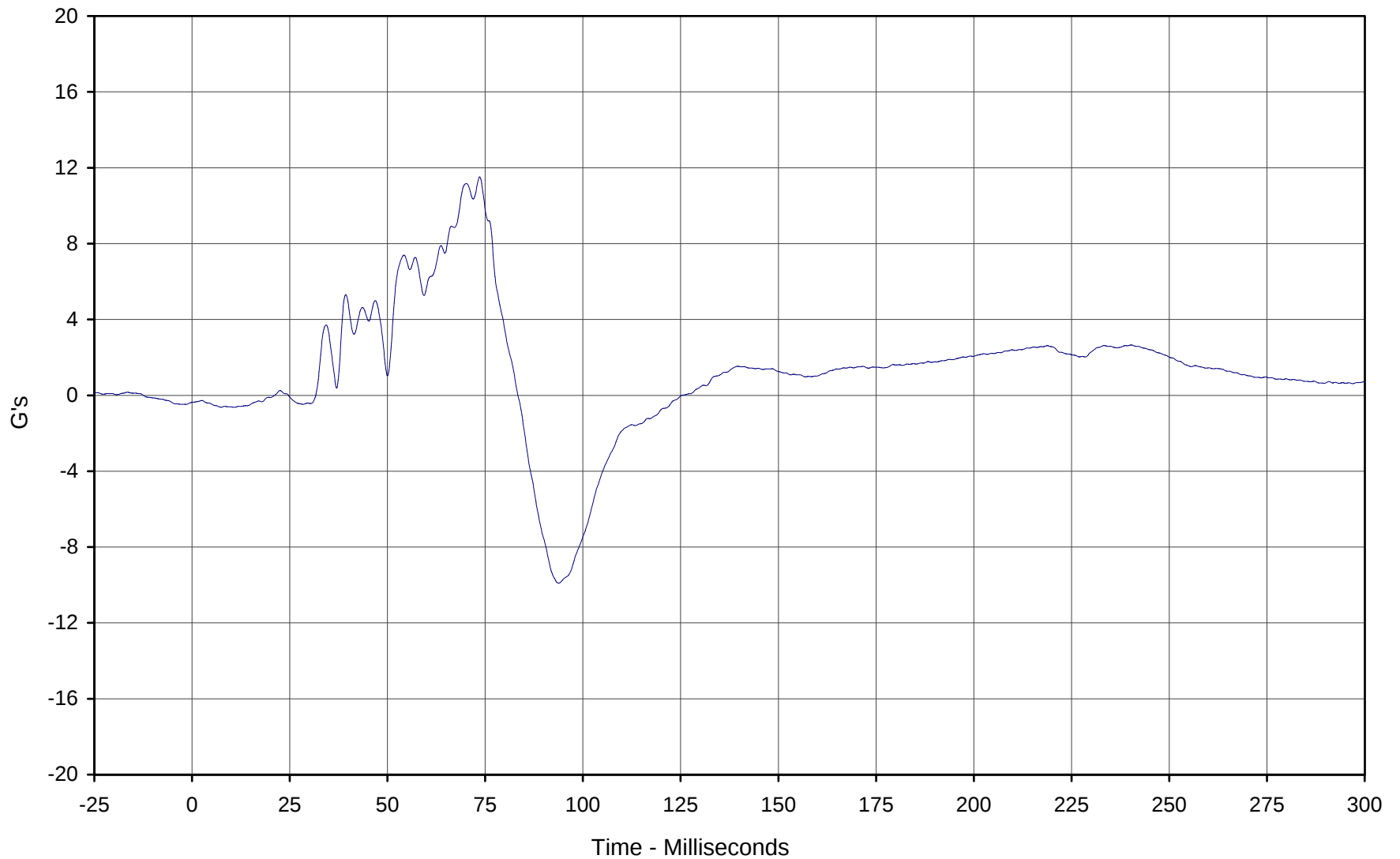
Curve Description: Passenger Chest Redundant Y
Maximum Value: 4.9 at 71.6 Milliseconds
Minimum Value: -3.2 at 97.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-061

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

B-92

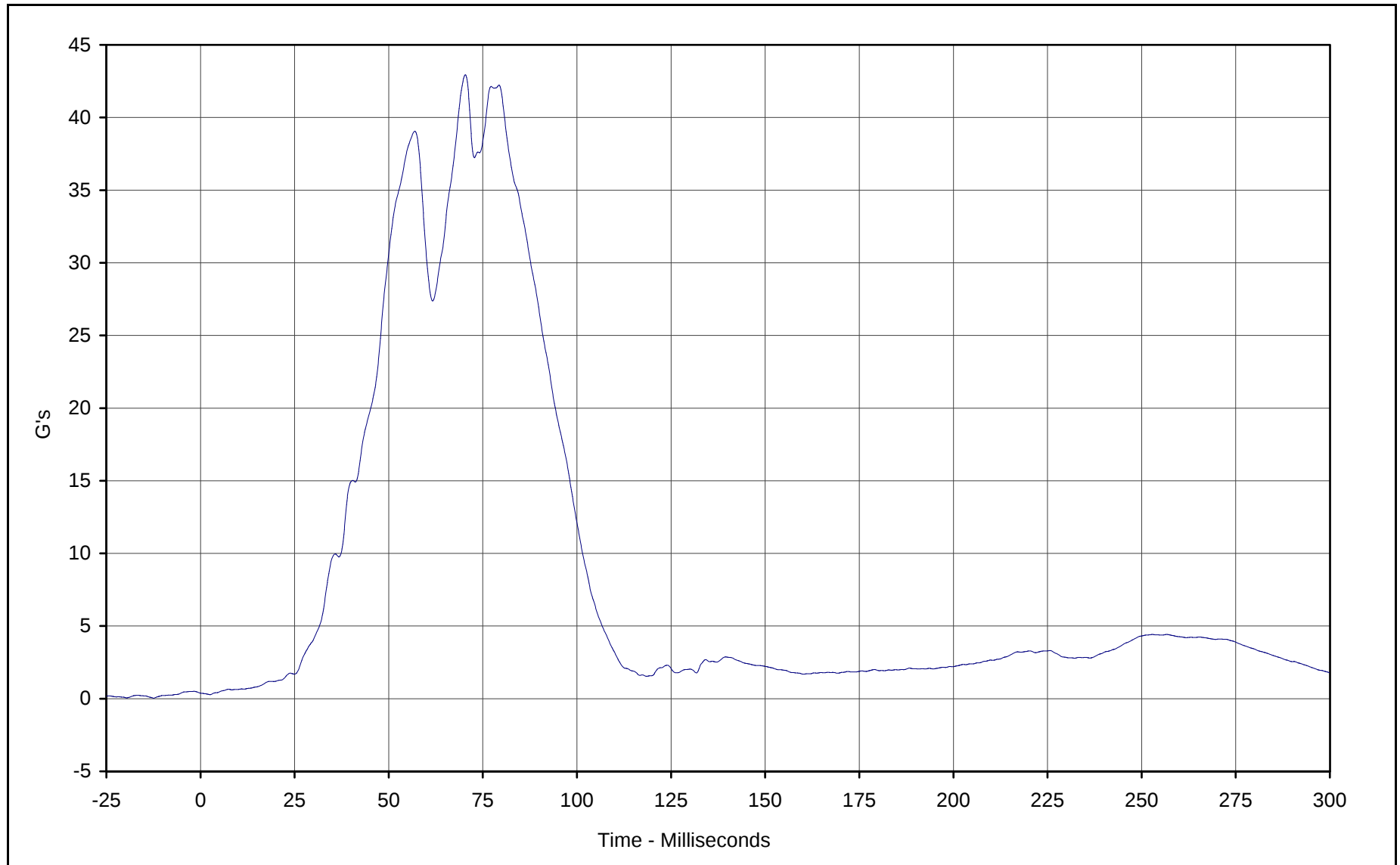


Curve Description: Passenger Chest Redundant Z
Maximum Value: 11.5 at 73.6 Milliseconds
Minimum Value: -9.9 at 93.8 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-062

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Passenger Chest Resultant Redundant

Maximum Value: 42.9 at 70.4 Milliseconds

Minimum Value: 0.3 at 2.6 Milliseconds

SAE Filter Class: 180

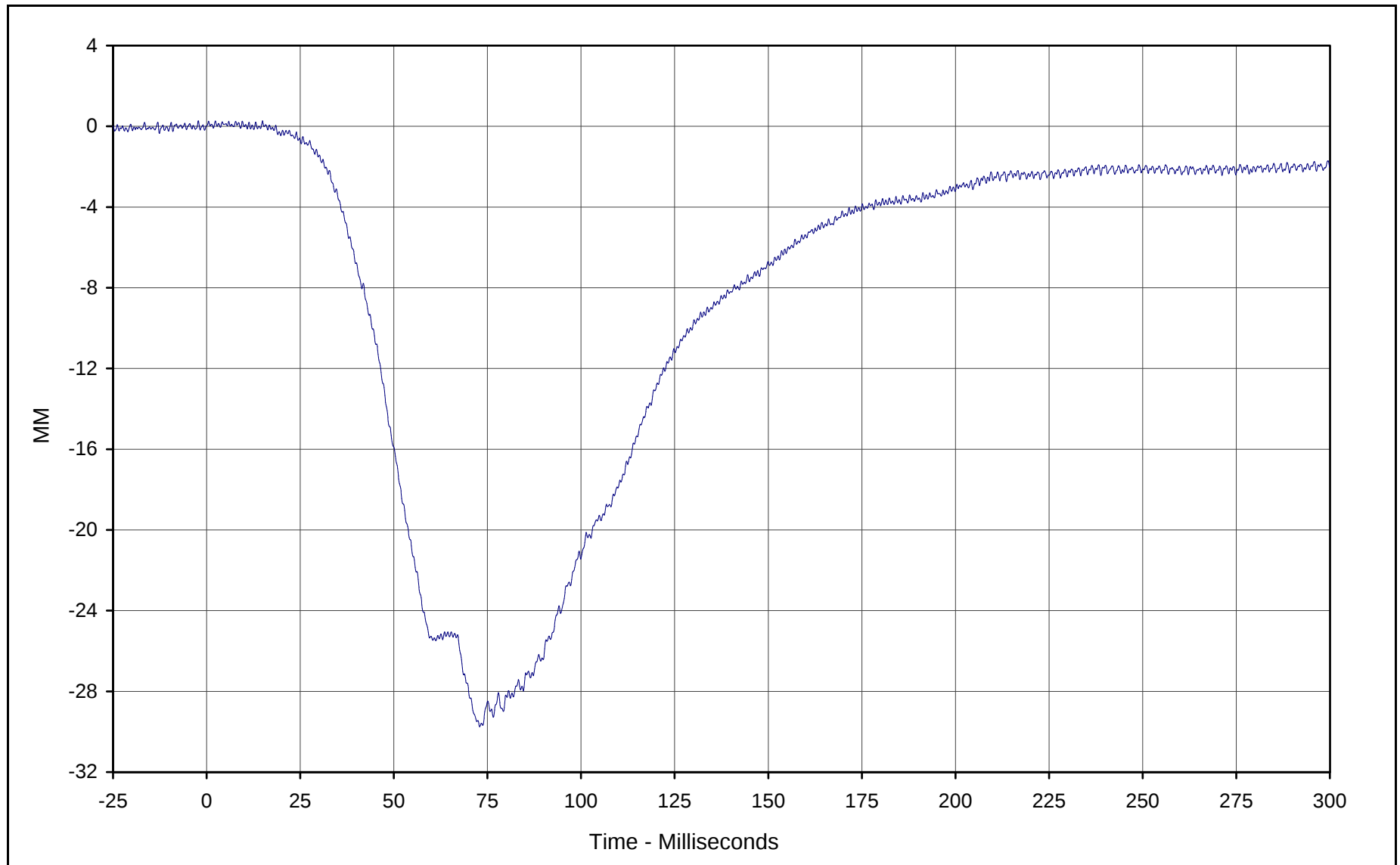
Date of Test: 01/11/01

Curve Number: RES-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

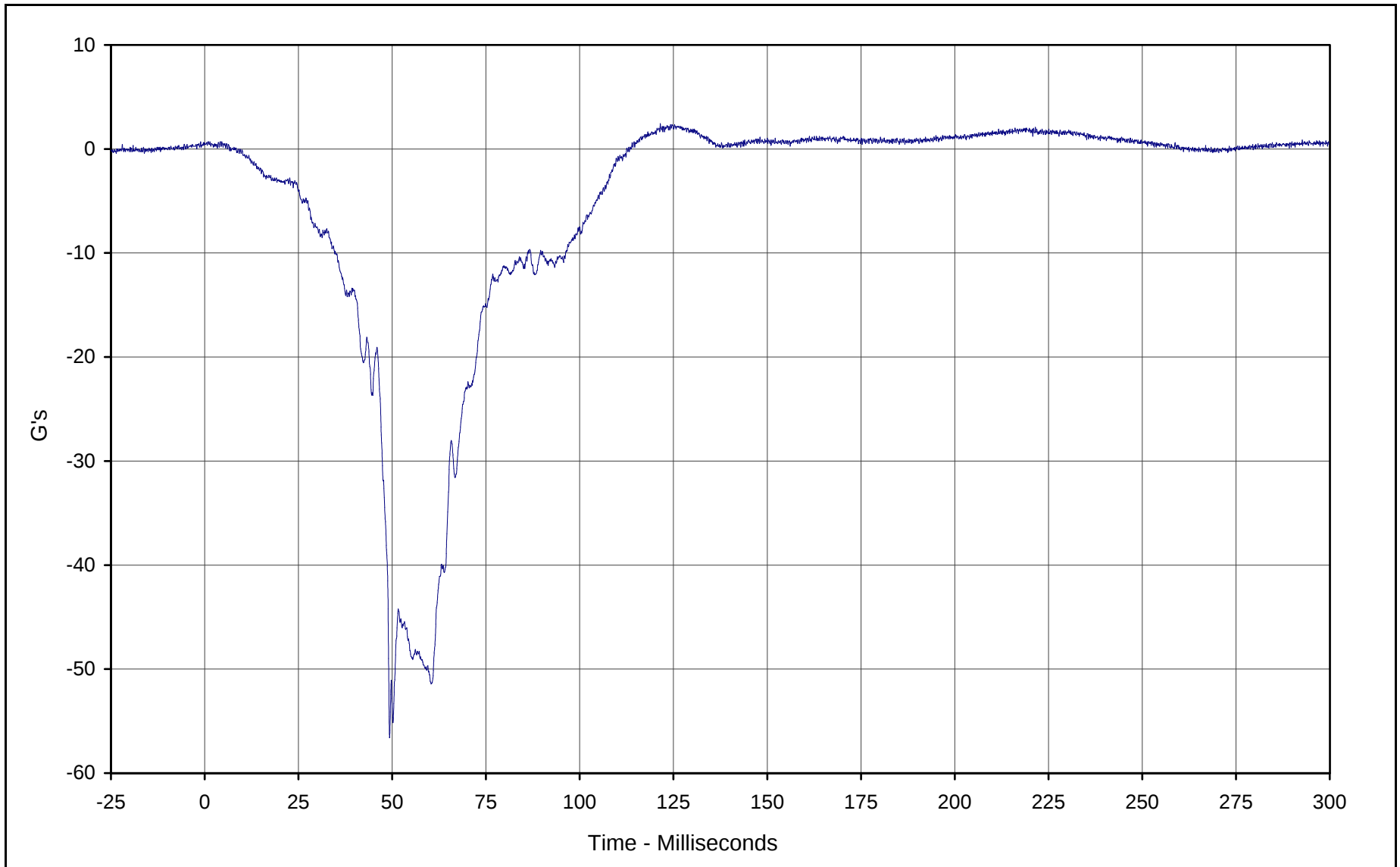




Curve Description: Passenger Chest Displacement X
Maximum Value: 0.3 at 14.9 Milliseconds
Minimum Value: -29.7 at 72.9 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-063

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Pelvis X

Maximum Value: 2.4 at 121.5 Milliseconds

Minimum Value: -56.6 at 49.3 Milliseconds

SAE Filter Class: 1000

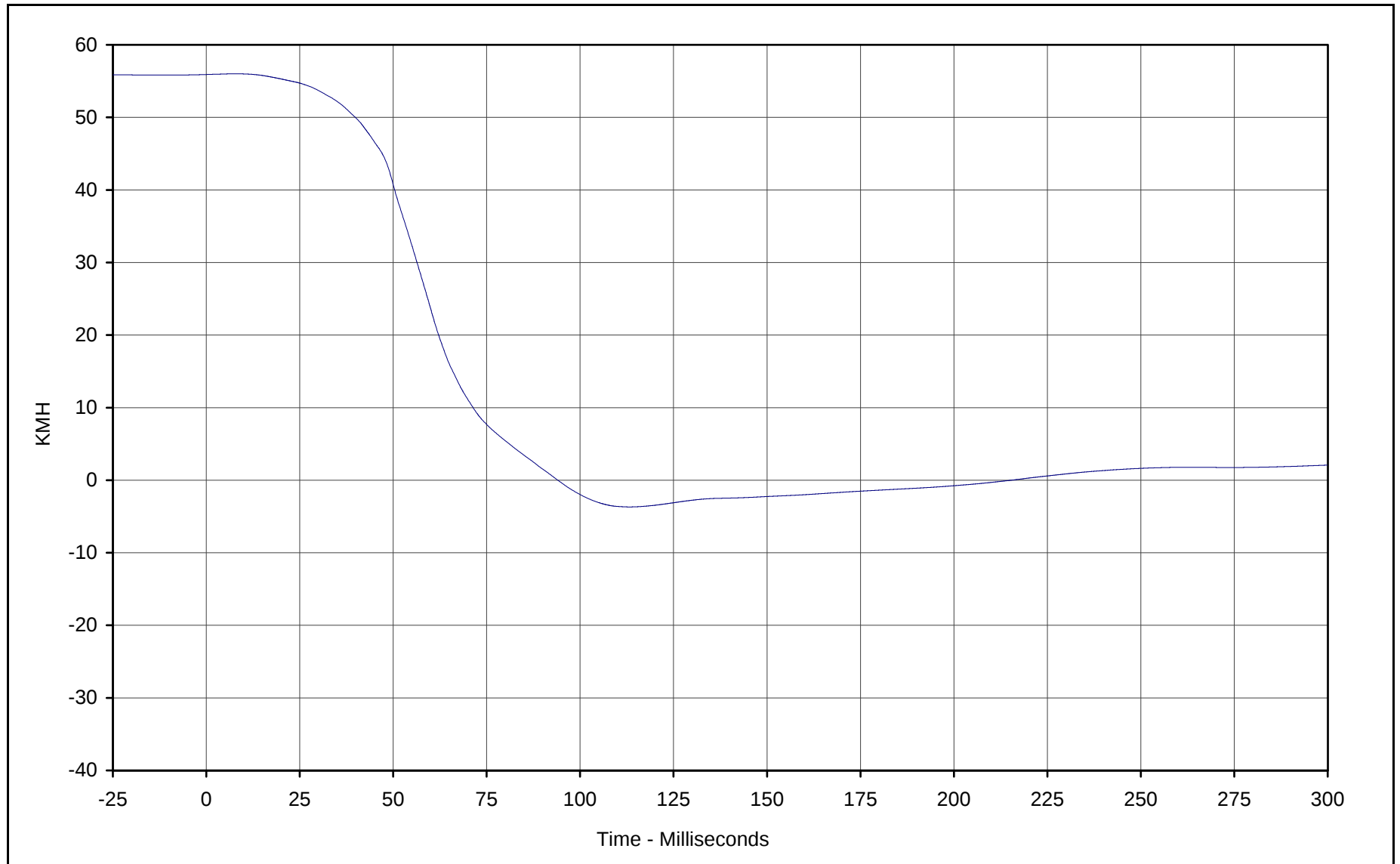
Date of Test: 01/11/01

Curve Number: FIL-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

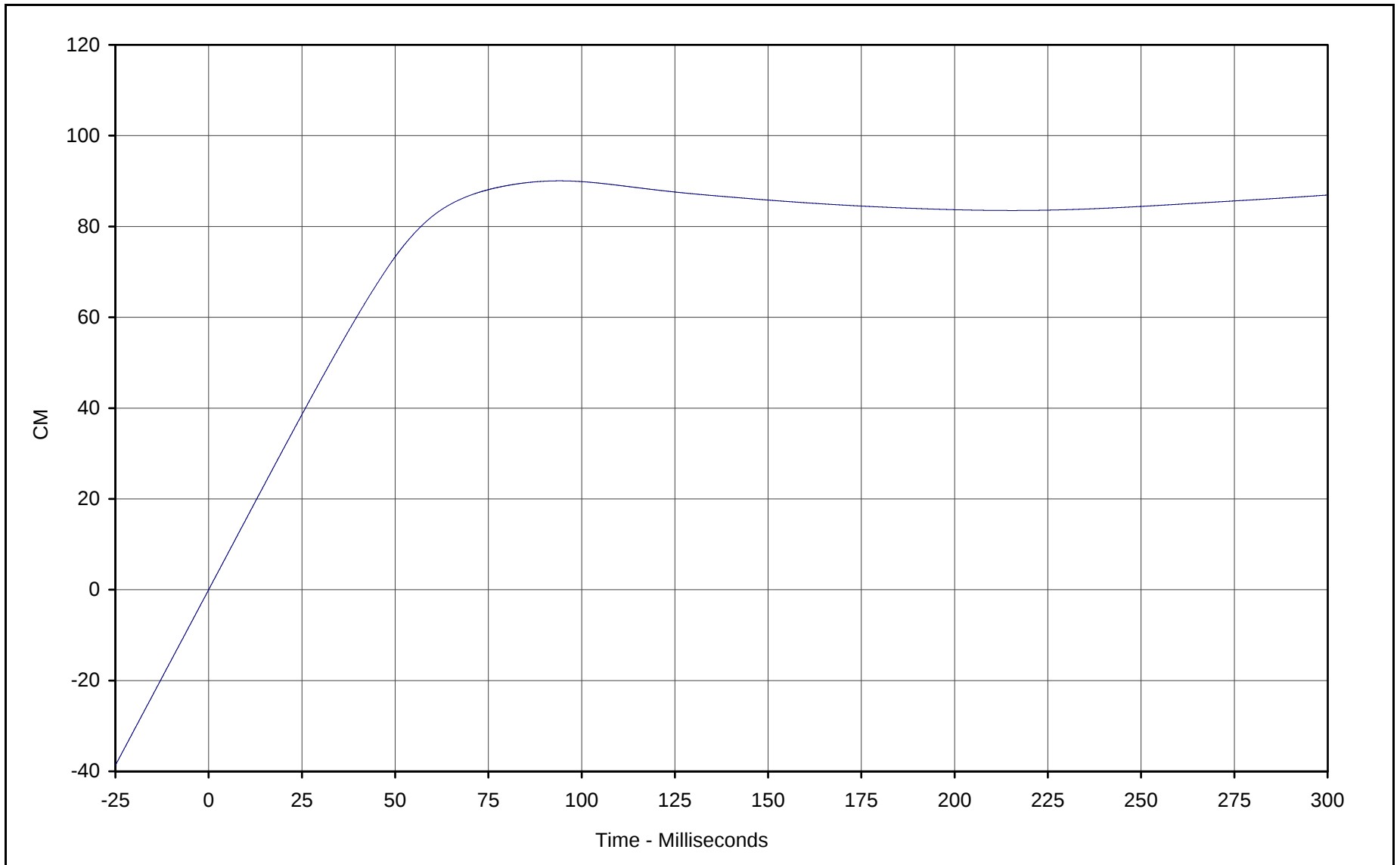




Curve Description: Passenger Pelvis X Velocity
Maximum Value: 56.0 at 7.5 Milliseconds
Minimum Value: -3.7 at 113.2 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



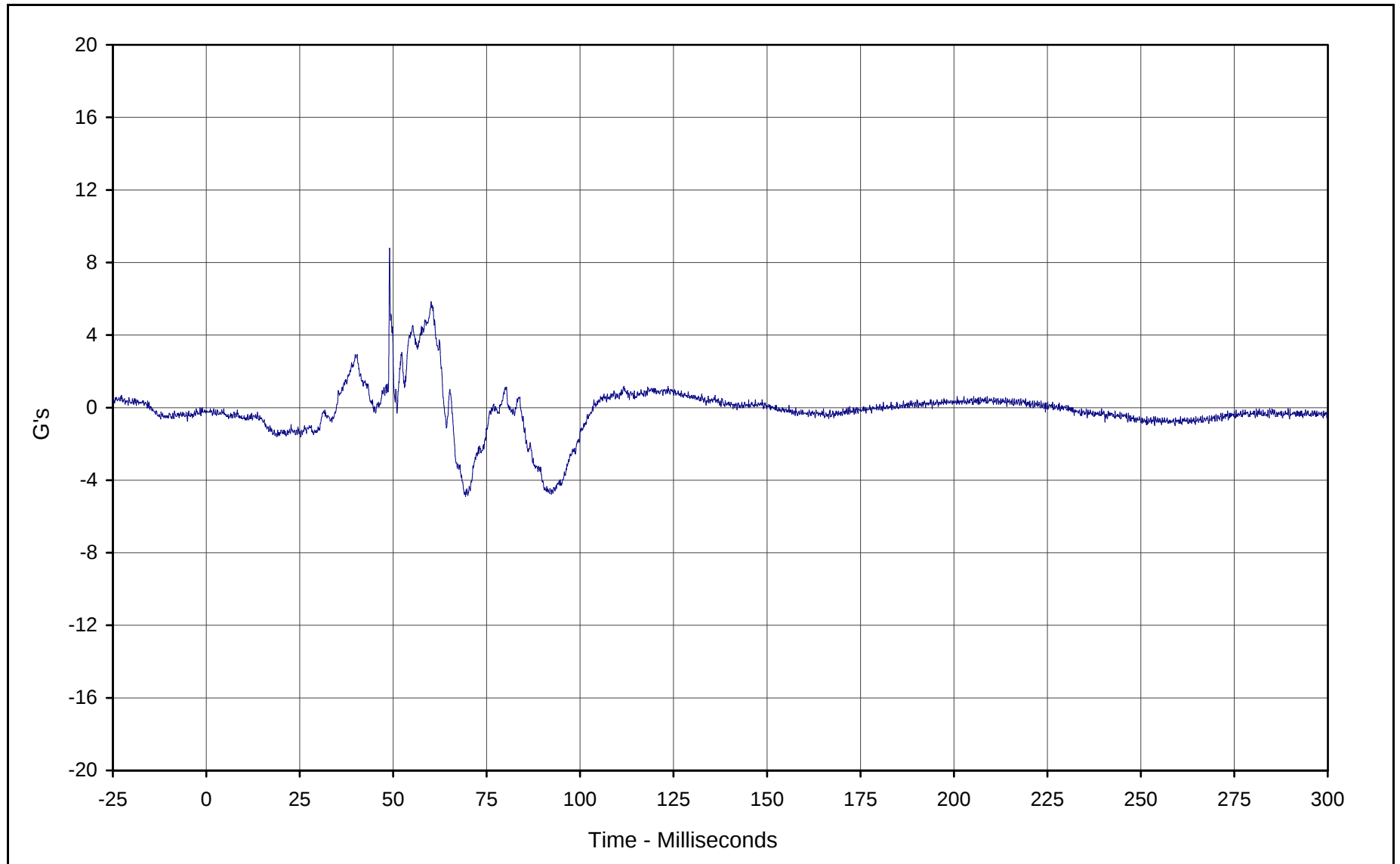


Curve Description: Passenger Pelvis X Displ.
Maximum Value: 90.1 at 94.0 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-98



Curve Description: Passenger Pelvis Y

Maximum Value: 8.8 at 49.0 Milliseconds

Minimum Value: -4.9 at 69.4 Milliseconds

SAE Filter Class: 1000

Date of Test: 01/11/01

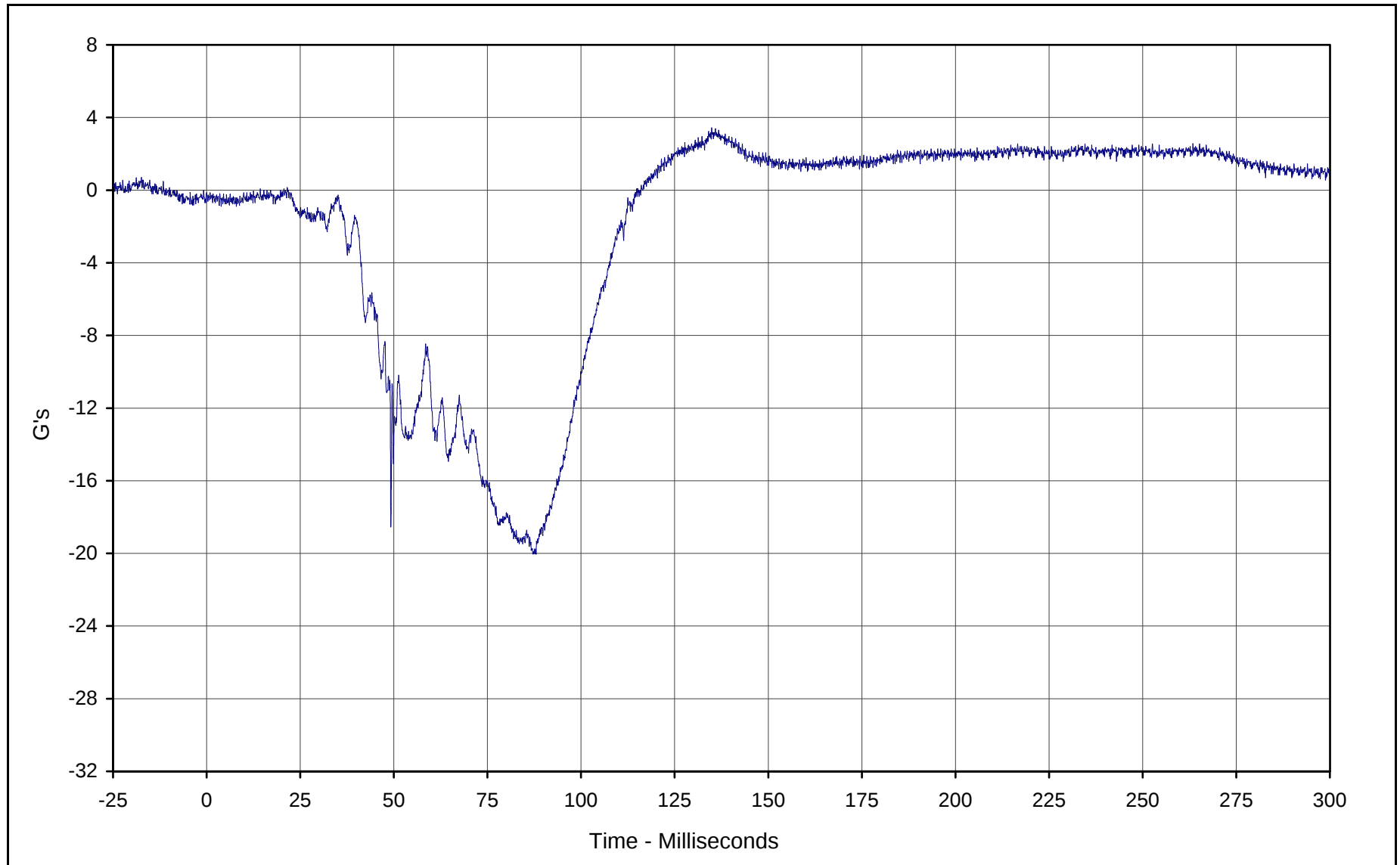
Curve Number: FIL-065

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Passenger Pelvis Z

Maximum Value: 3.4 at 134.9 Milliseconds

Minimum Value: -20.0 at 87.1 Milliseconds

SAE Filter Class: 1000

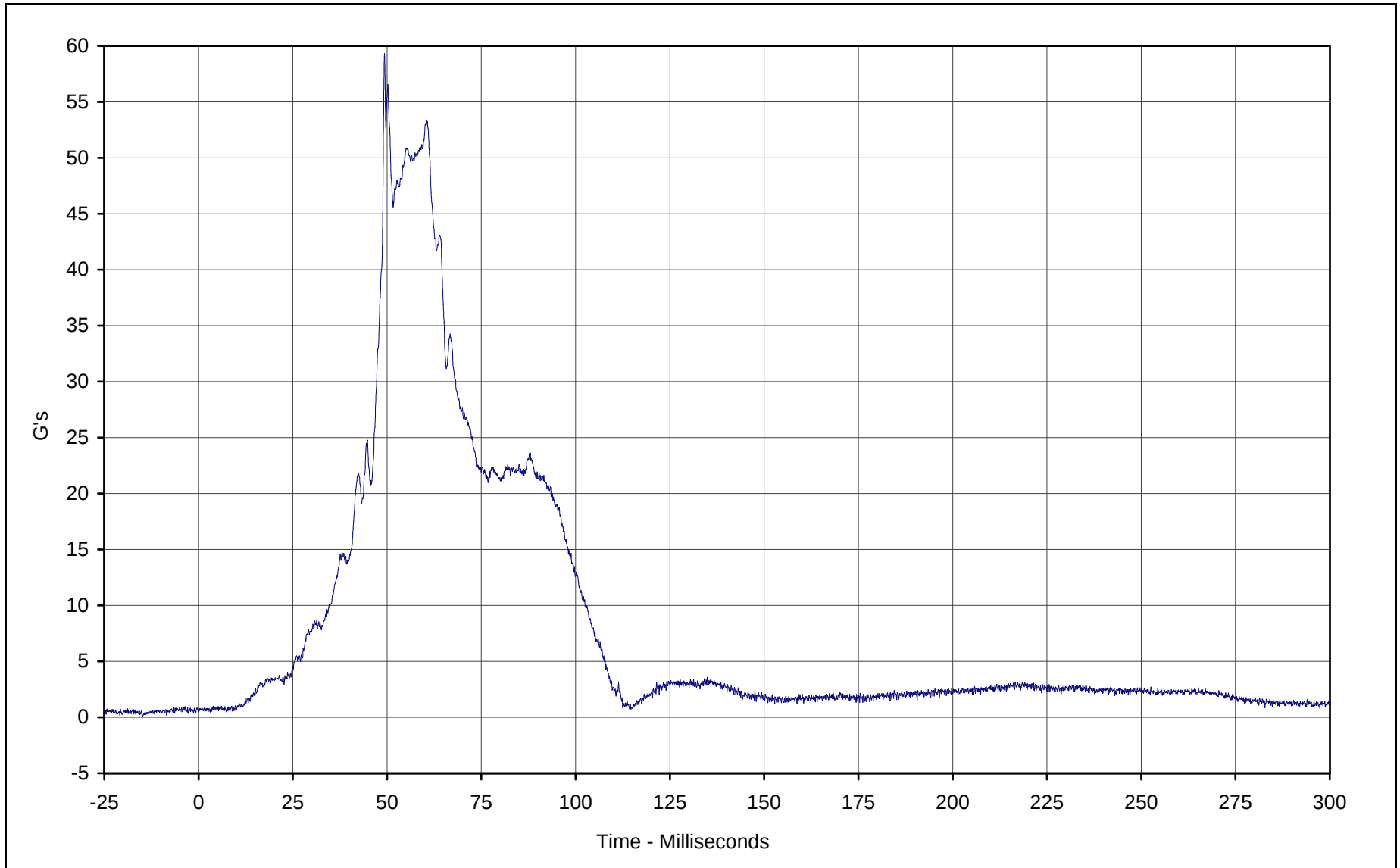
Date of Test: 01/11/01

Curve Number: FIL-066

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



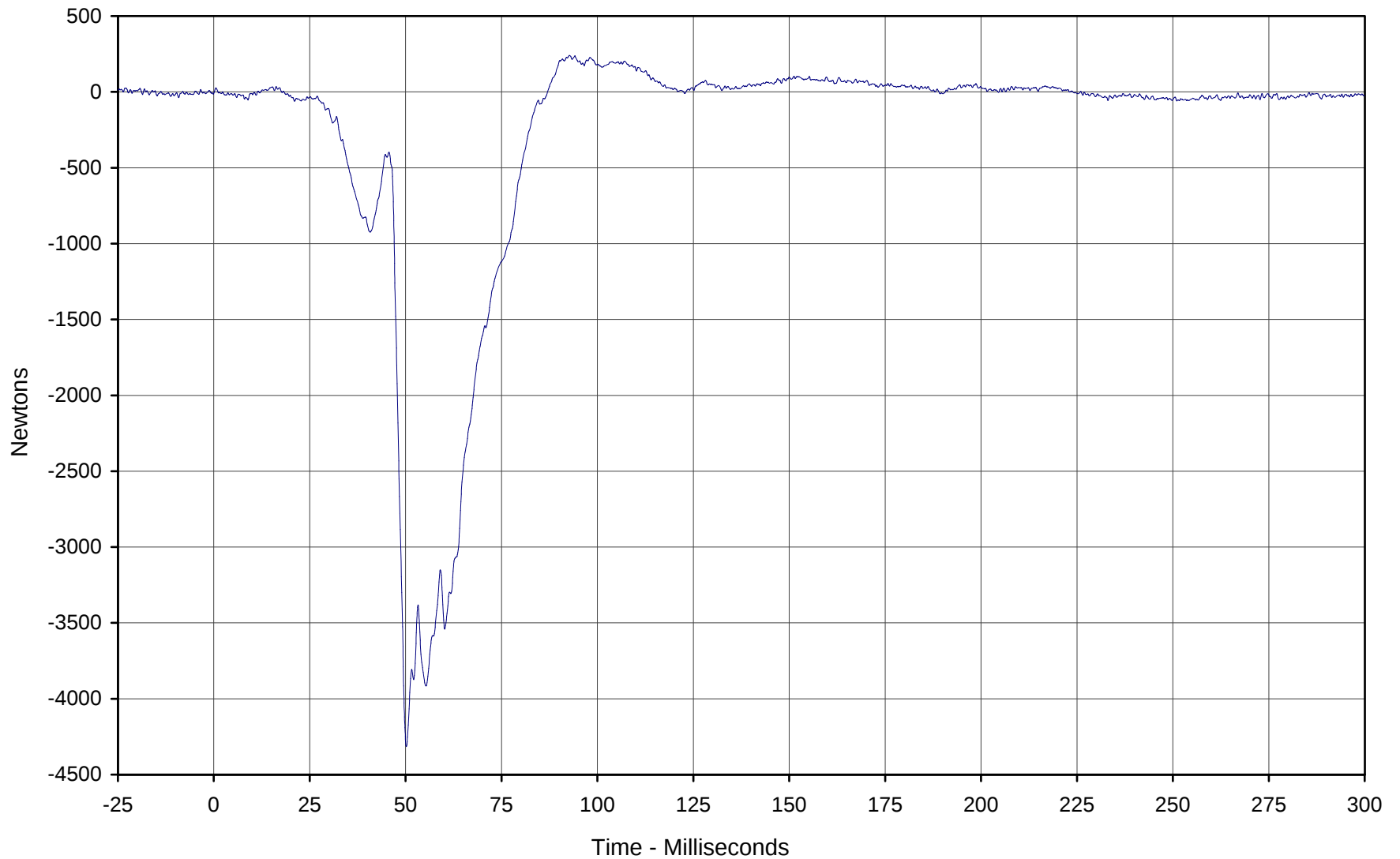


Curve Description: Passenger Pelvis Resultant
Maximum Value: 59.3 at 49.3 Milliseconds
Minimum Value: 0.5 at 3.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 01/11/01
Curve Number: RES-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-101

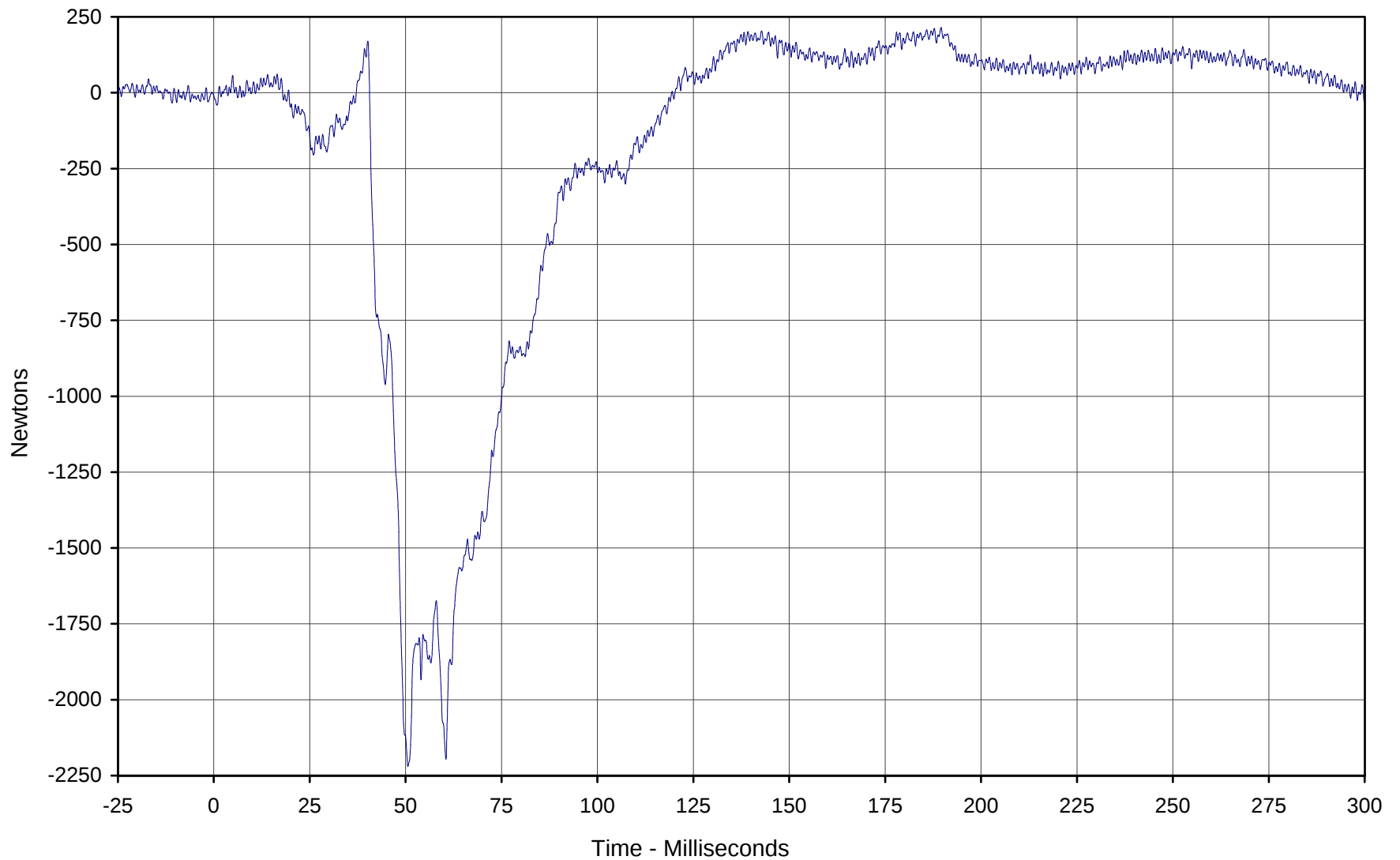


Curve Description: Passenger Left Femur Force
Maximum Value: 240.1 at 92.7 Milliseconds
Minimum Value: -4316.0 at 50.2 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-067

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



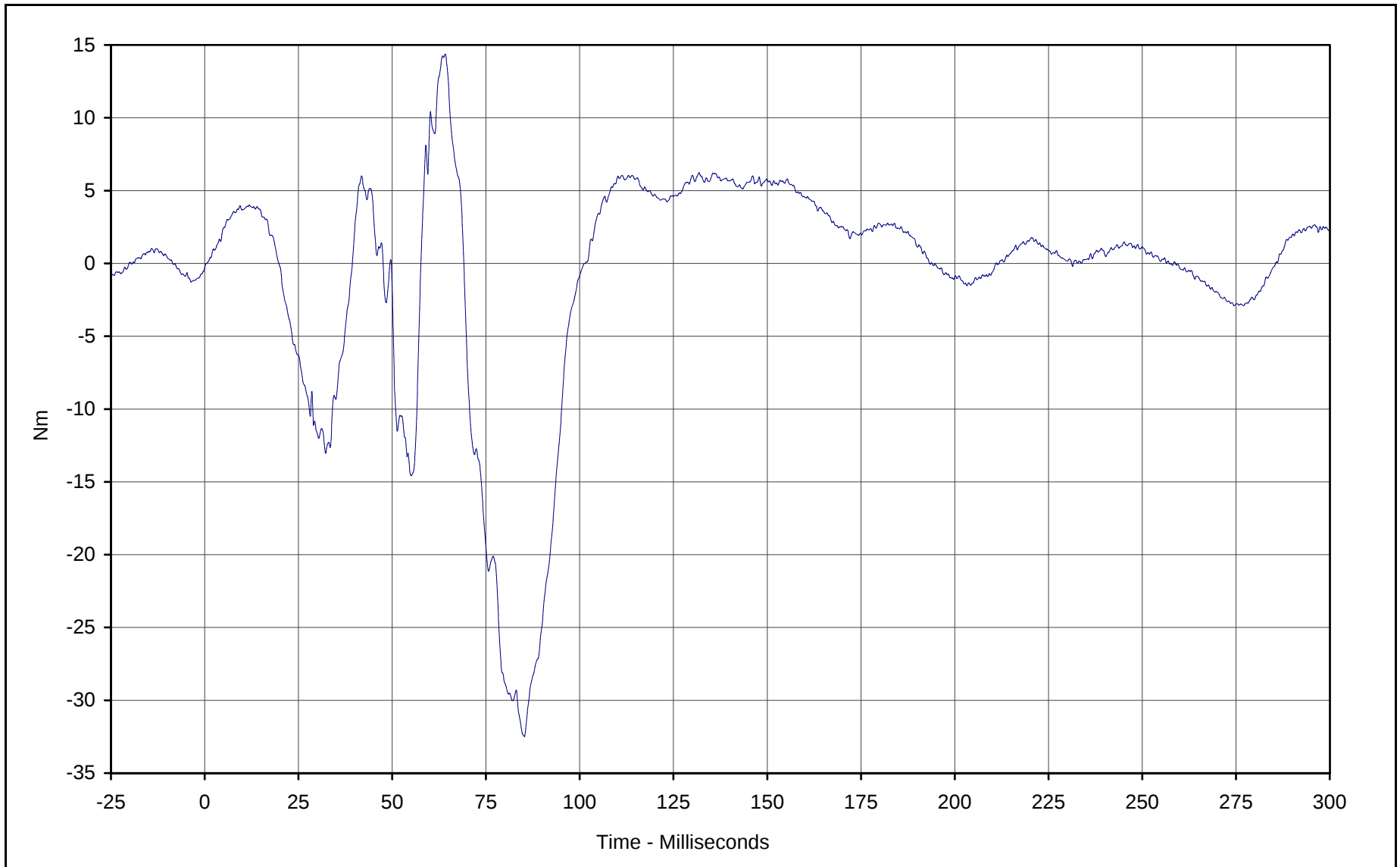
KAR21001-04



Curve Description: Passenger Right Femur Force
Maximum Value: 214.9 at 189.6 Milliseconds
Minimum Value: -2219.9 at 50.6 Milliseconds
SAE Filter Class: 600
Date of Test: 01/11/01
Curve Number: FIL-068

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Left Upper Tibia Moment X

Maximum Value: 14.4 at 64.1 Milliseconds

Minimum Value: -32.5 at 85.2 Milliseconds

SAE Filter Class: 600

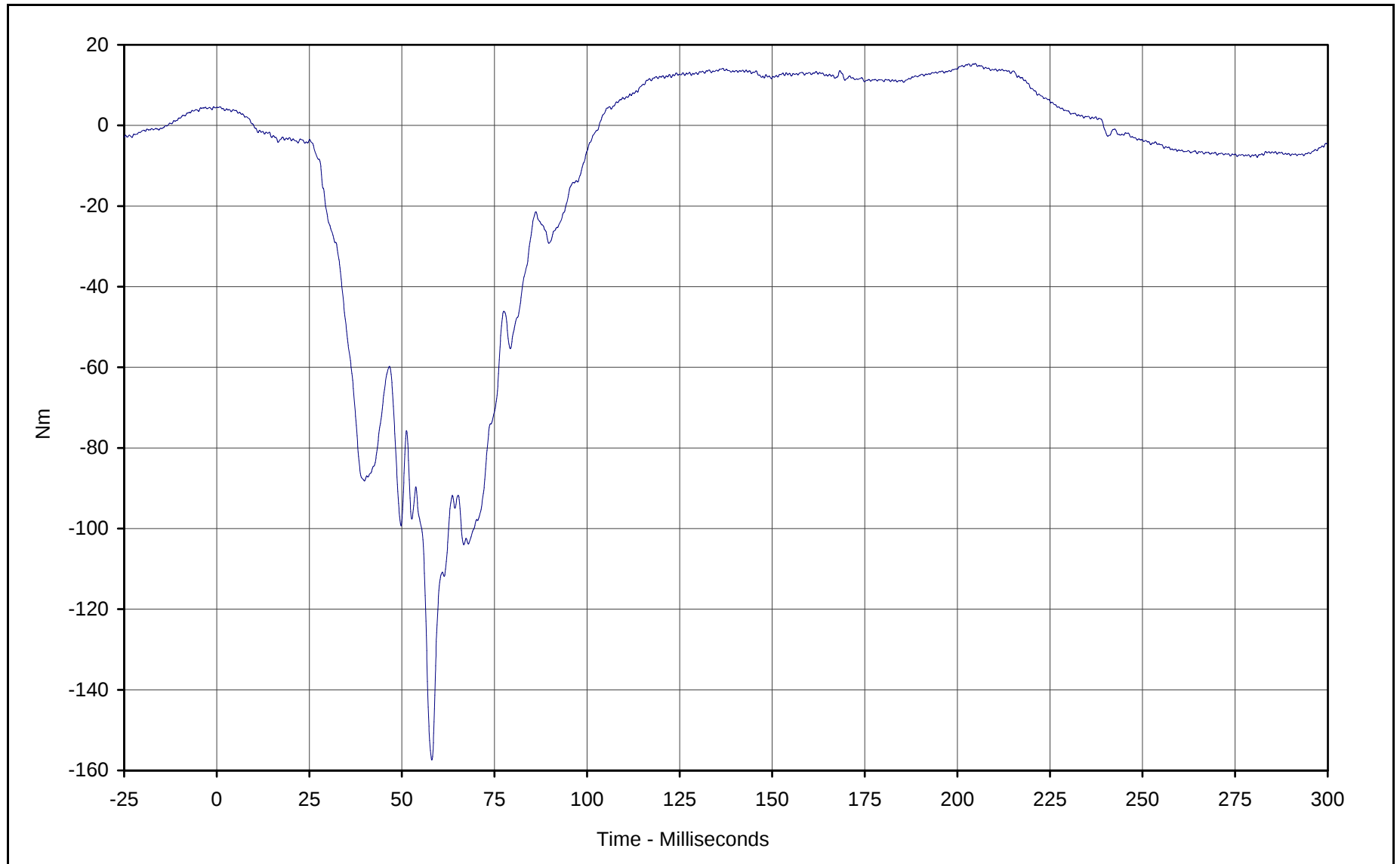
Date of Test: 01/11/01

Curve Number: FIL-069

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Left Upper Tibia Moment Y

Maximum Value: 15.3 at 204.8 Milliseconds

Minimum Value: -157.4 at 58.1 Milliseconds

SAE Filter Class: 600

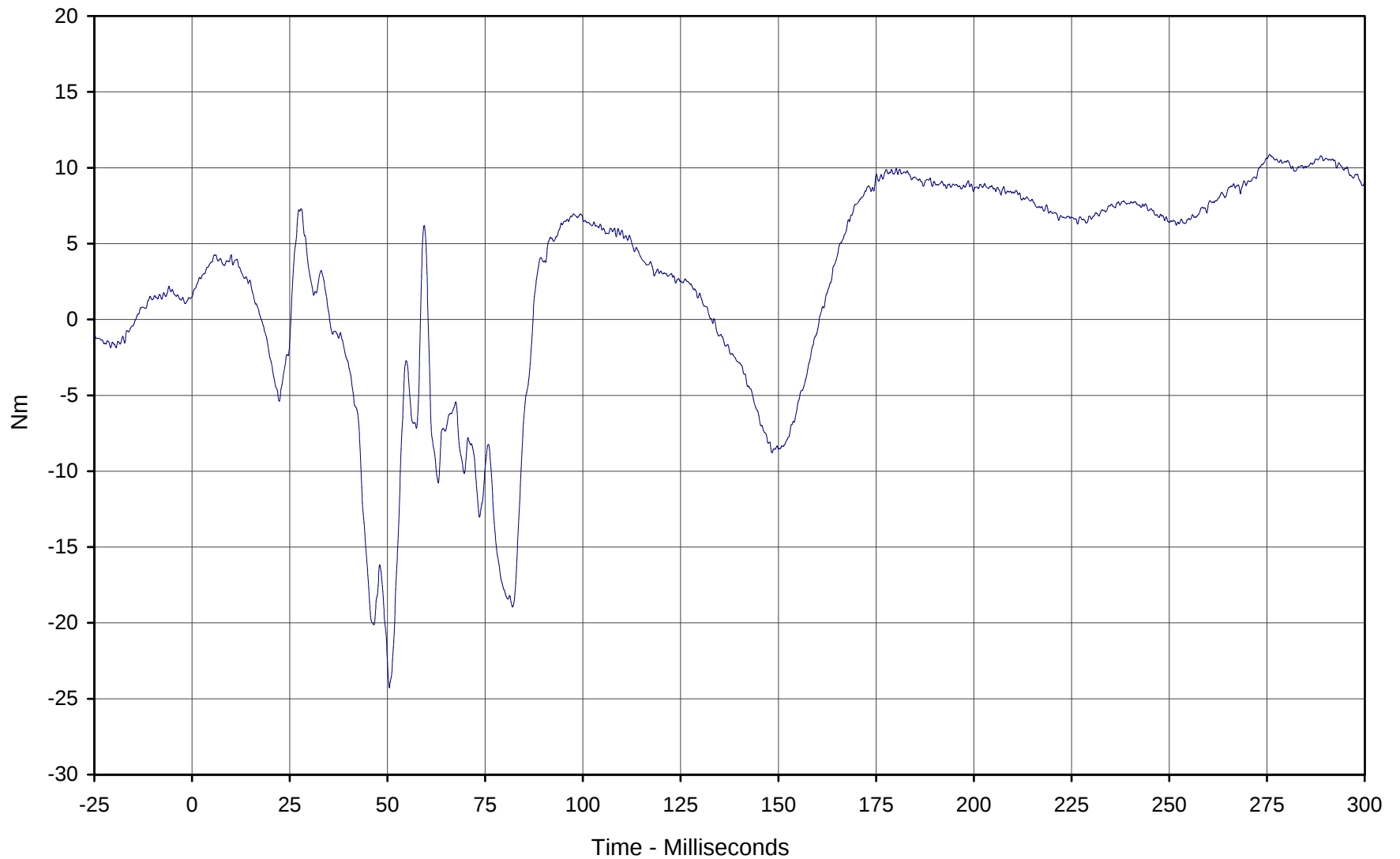
Date of Test: 01/11/01

Curve Number: FIL-070

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Right Upper Tibia Moment X

Maximum Value: 10.9 at 275.6 Milliseconds

Minimum Value: -24.3 at 50.5 Milliseconds

SAE Filter Class: 600

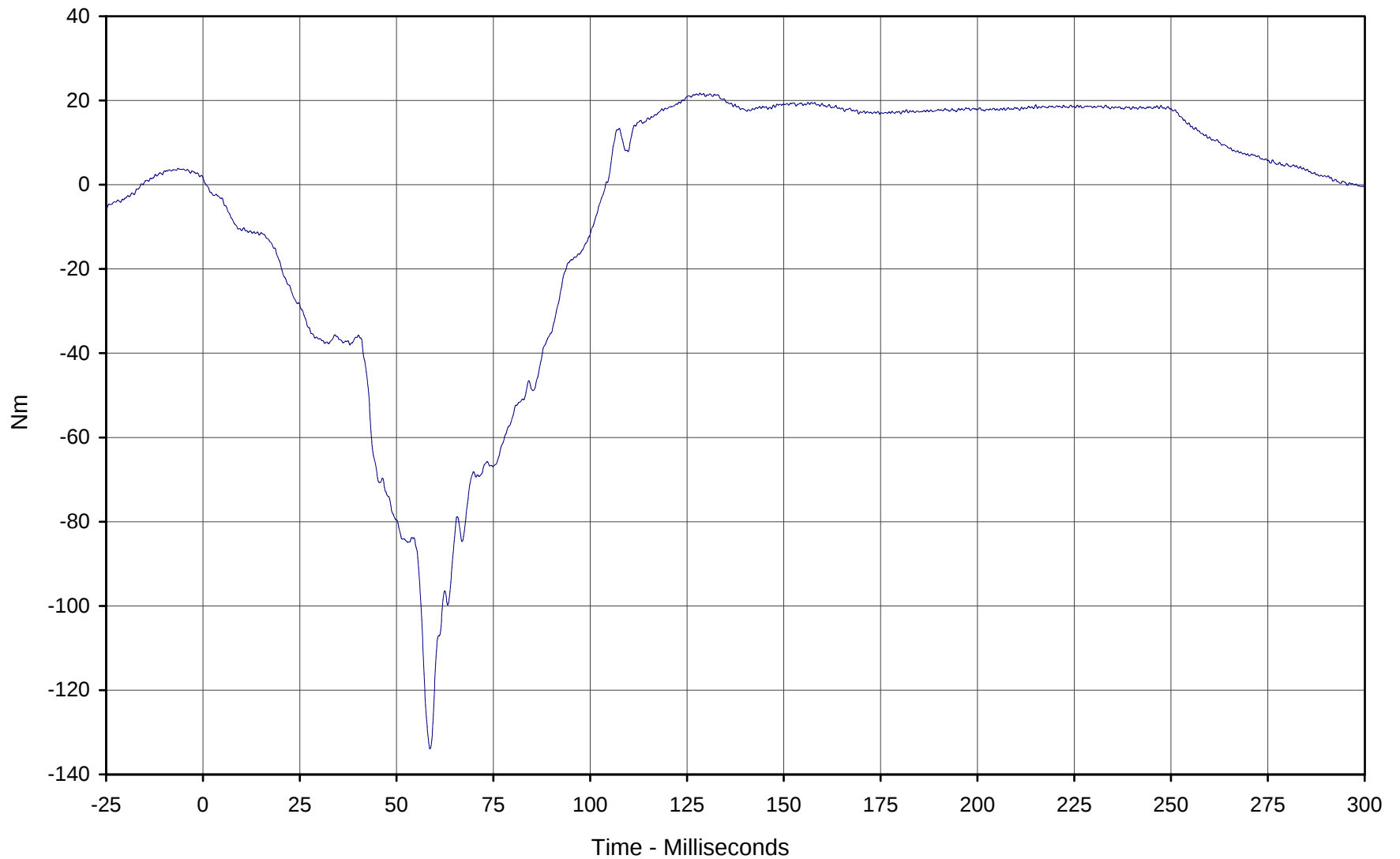
Date of Test: 01/11/01

Curve Number: FIL-071

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Right Upper Tibia Moment Y

Maximum Value: 21.7 at 128.3 Milliseconds

Minimum Value: -133.9 at 58.6 Milliseconds

SAE Filter Class: 600

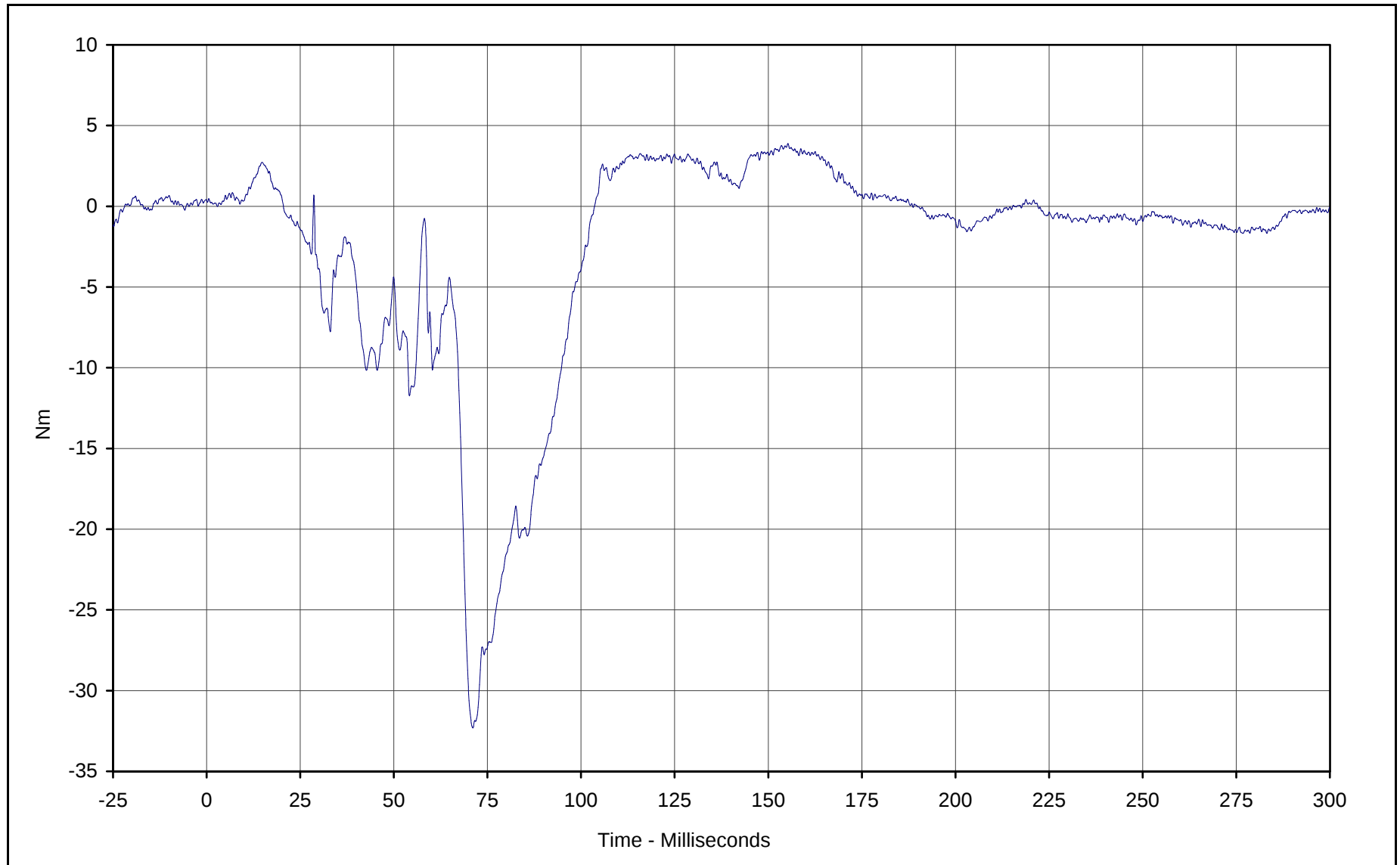
Date of Test: 01/11/01

Curve Number: FIL-072

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Left Lower Tibia Moment X

Maximum Value: 3.9 at 155.2 Milliseconds

Minimum Value: -32.3 at 71.1 Milliseconds

SAE Filter Class: 600

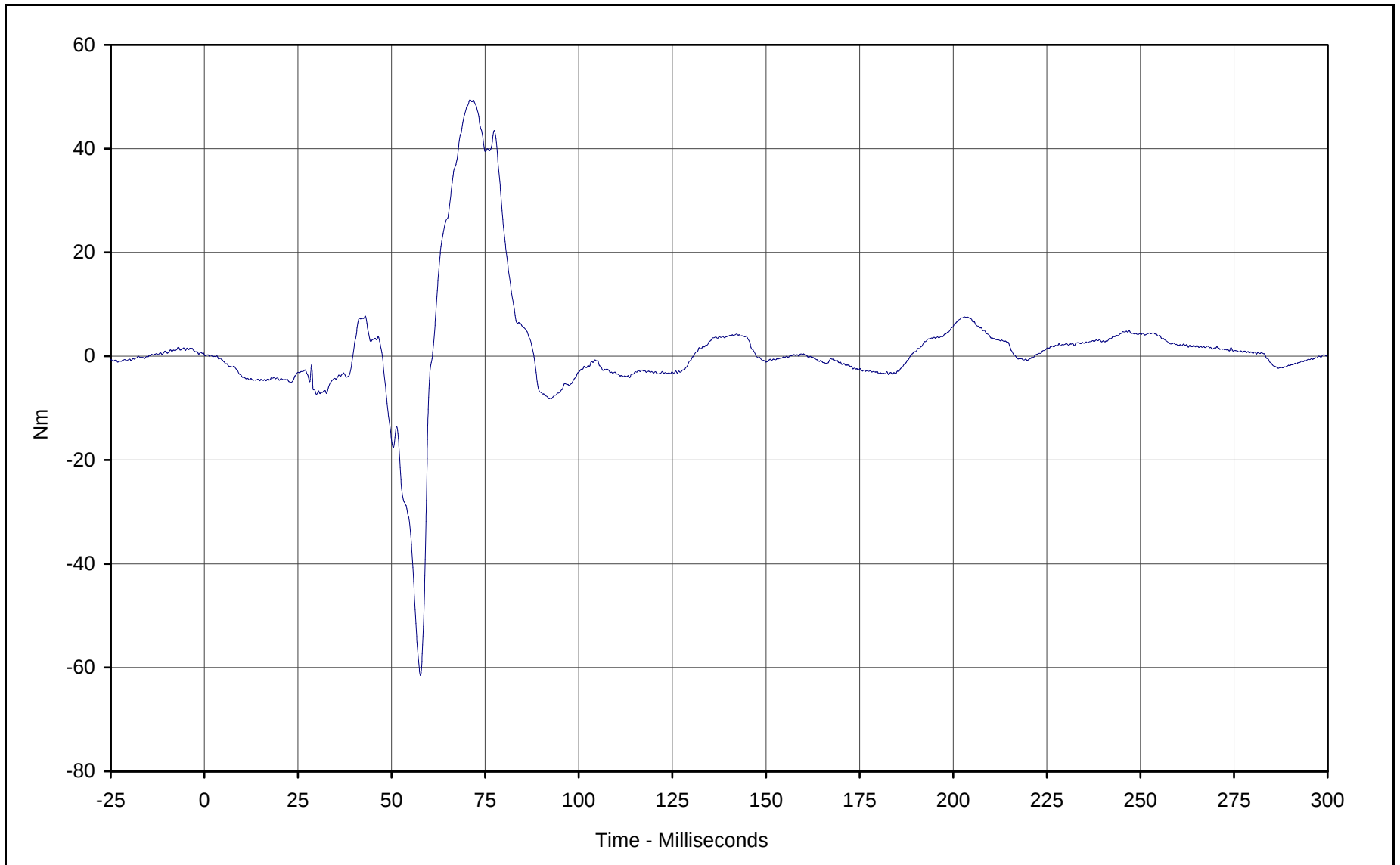
Date of Test: 01/11/01

Curve Number: FIL-073

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Left Lower Tibia Moment Y

Maximum Value: 49.4 at 71.0 Milliseconds

Minimum Value: -61.5 at 57.7 Milliseconds

SAE Filter Class: 600

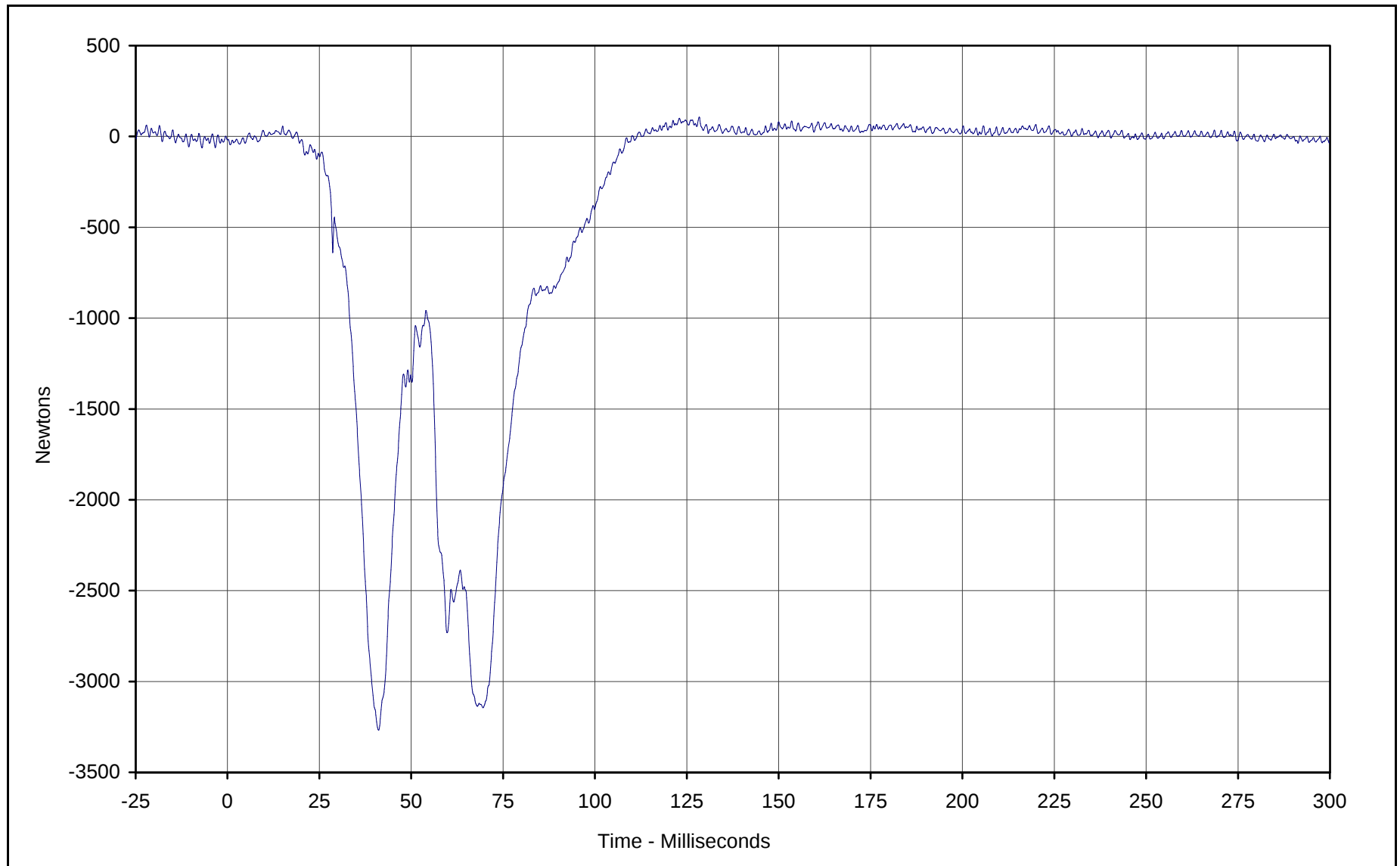
Date of Test: 01/11/01

Curve Number: FIL-074

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Left Lower Tibia Force Z

Maximum Value: 106.7 at 128.4 Milliseconds

Minimum Value: -3267.7 at 41.1 Milliseconds

SAE Filter Class: 600

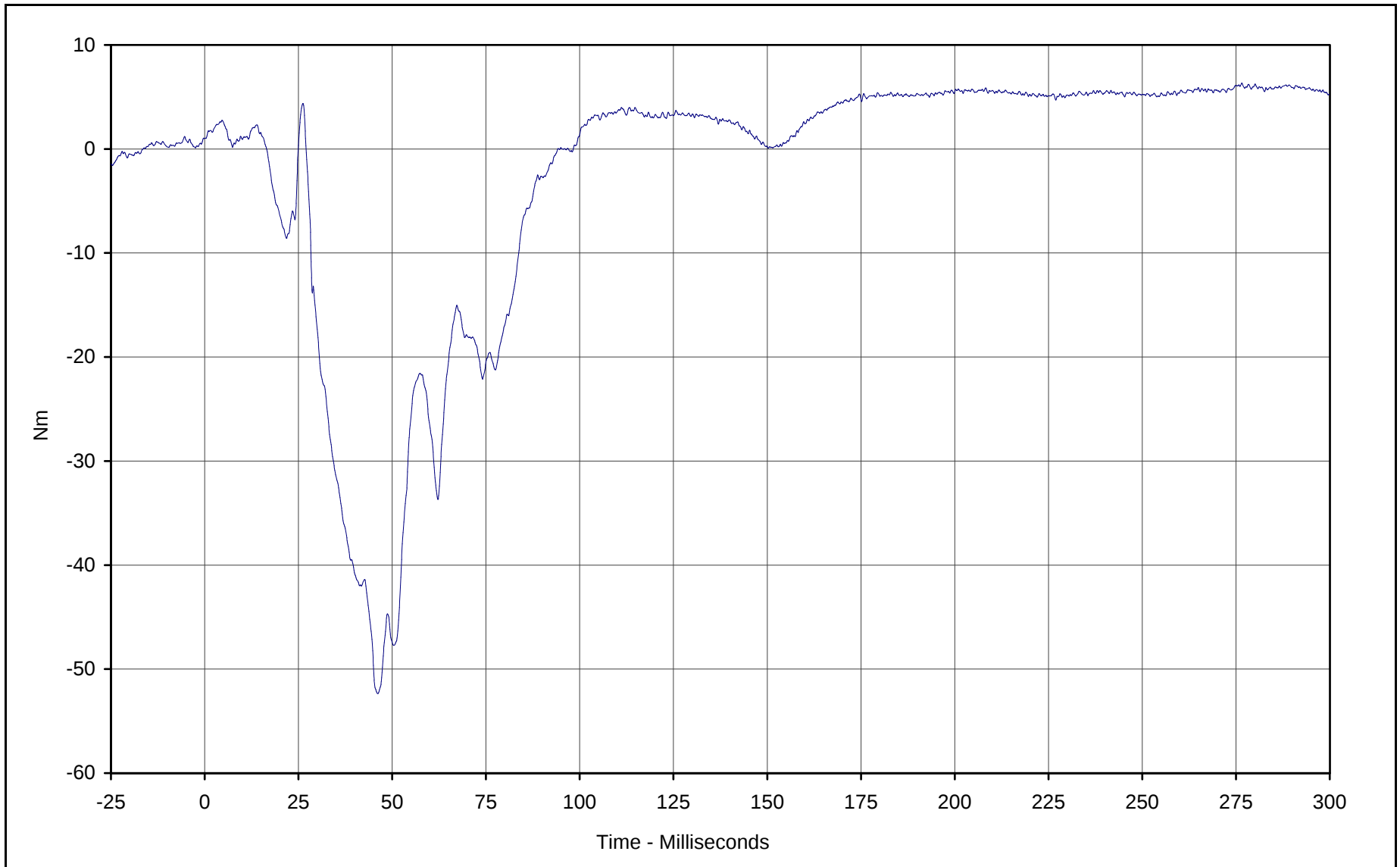
Date of Test: 01/11/01

Curve Number: FIL-075

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Right Lower Tibia Moment X

Maximum Value: 6.4 at 276.6 Milliseconds

Minimum Value: -52.4 at 46.2 Milliseconds

SAE Filter Class: 600

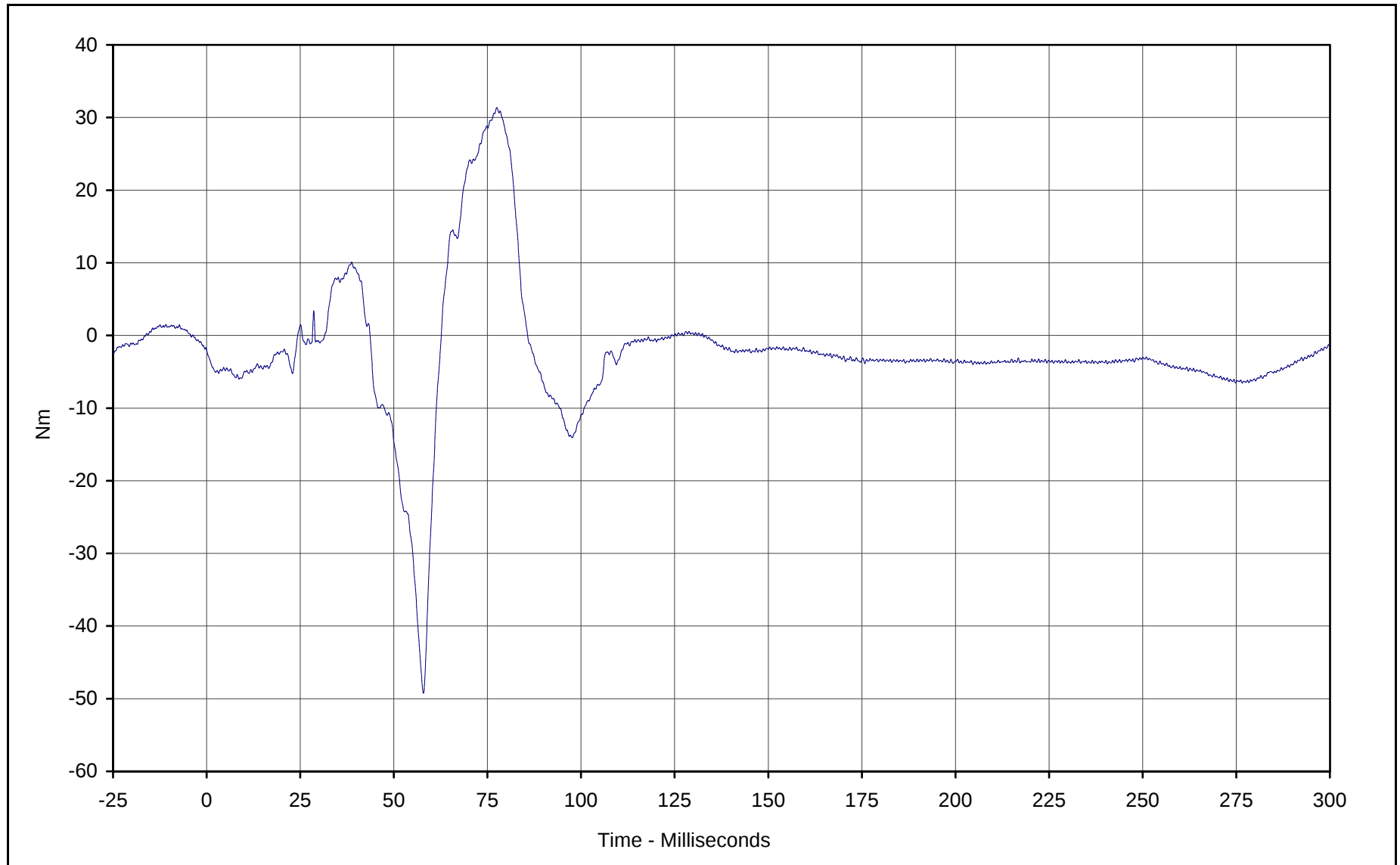
Date of Test: 01/11/01

Curve Number: FIL-076

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Right Lower Tibia Moment Y

Maximum Value: 31.4 at 77.5 Milliseconds

Minimum Value: -49.2 at 57.9 Milliseconds

SAE Filter Class: 600

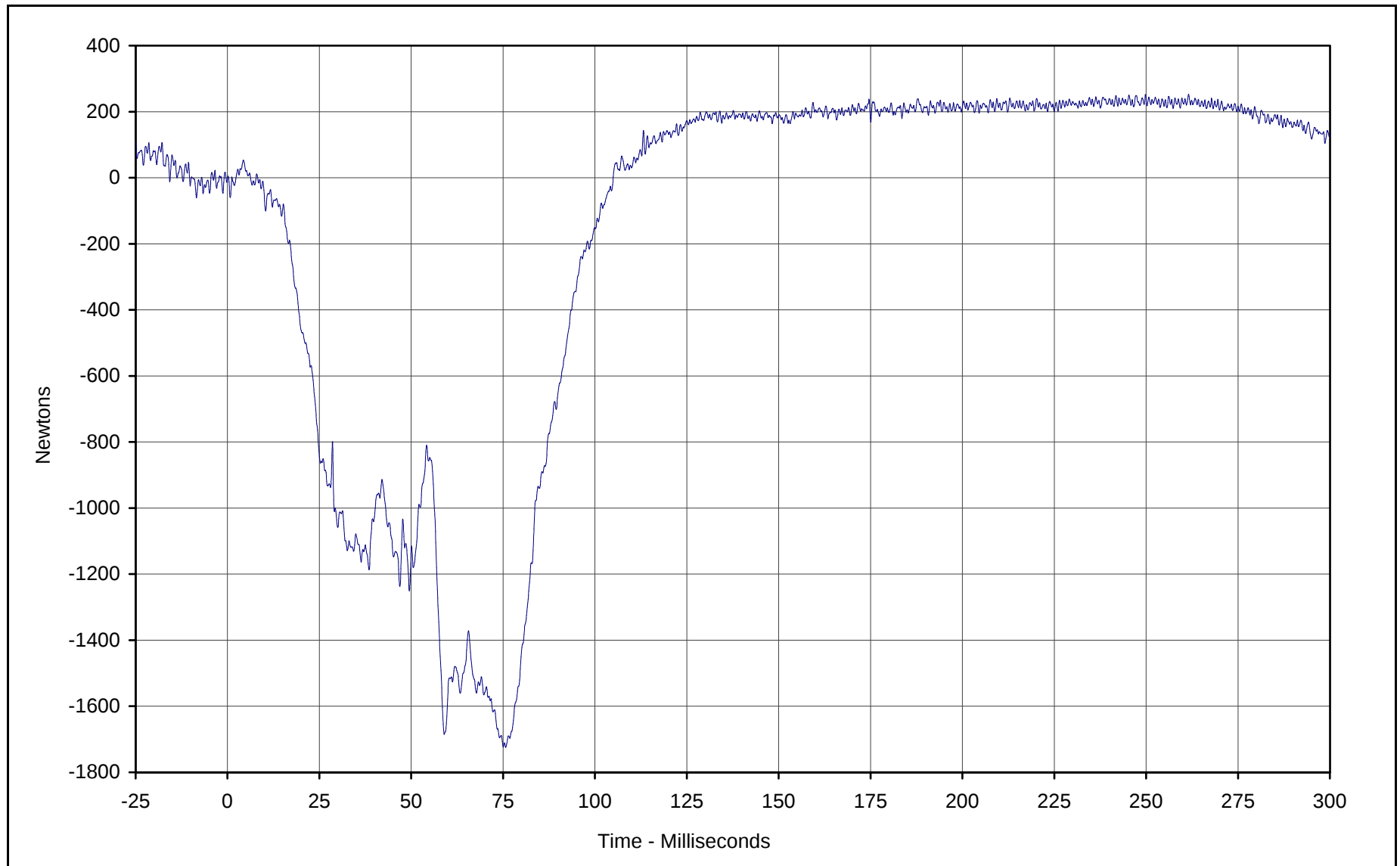
Date of Test: 01/11/01

Curve Number: FIL-077

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Right lower Tibia Force Z

Maximum Value: 253.1 at 261.5 Milliseconds

Minimum Value: -1724.8 at 75.7 Milliseconds

SAE Filter Class: 600

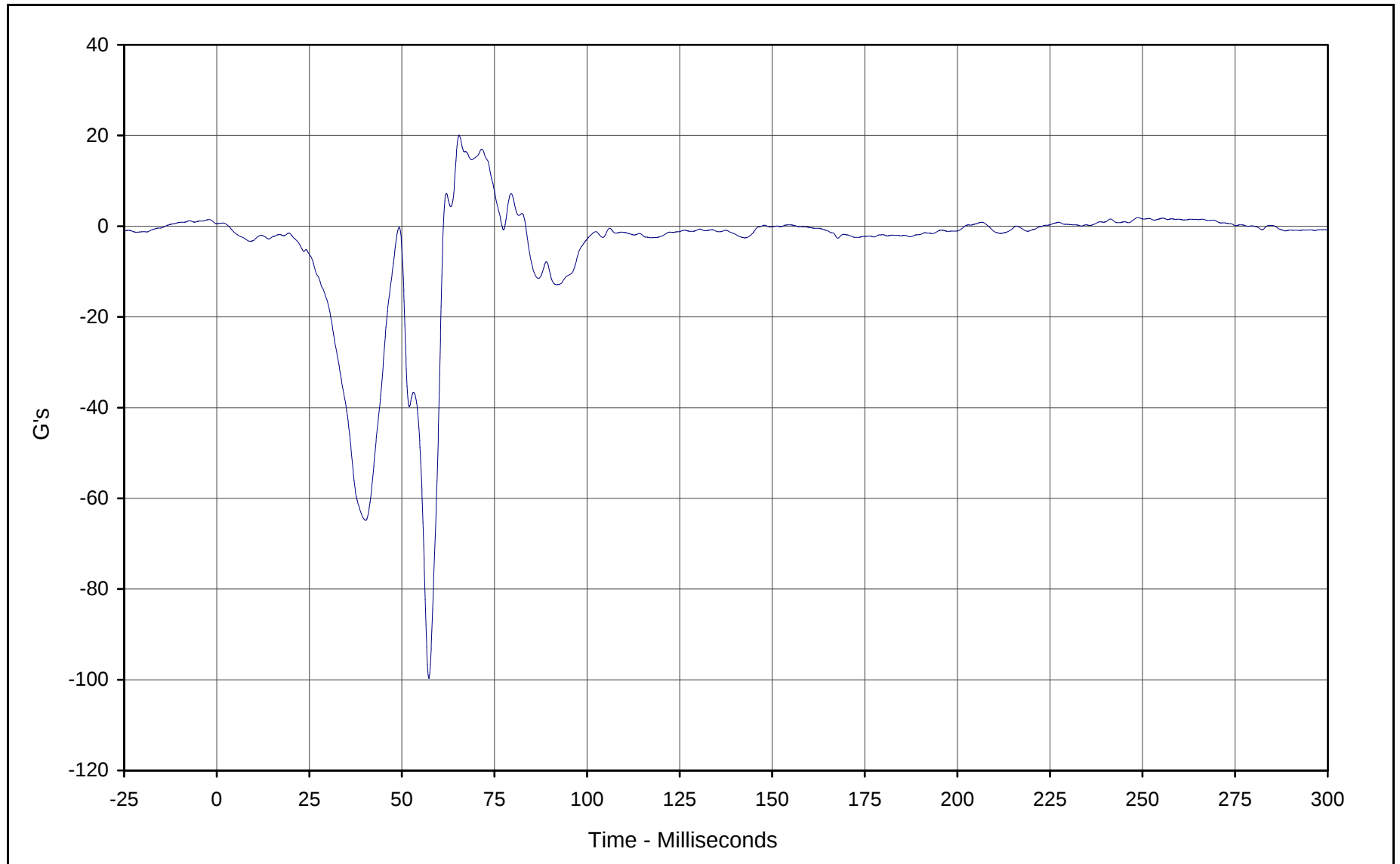
Date of Test: 01/11/01

Curve Number: FIL-078

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

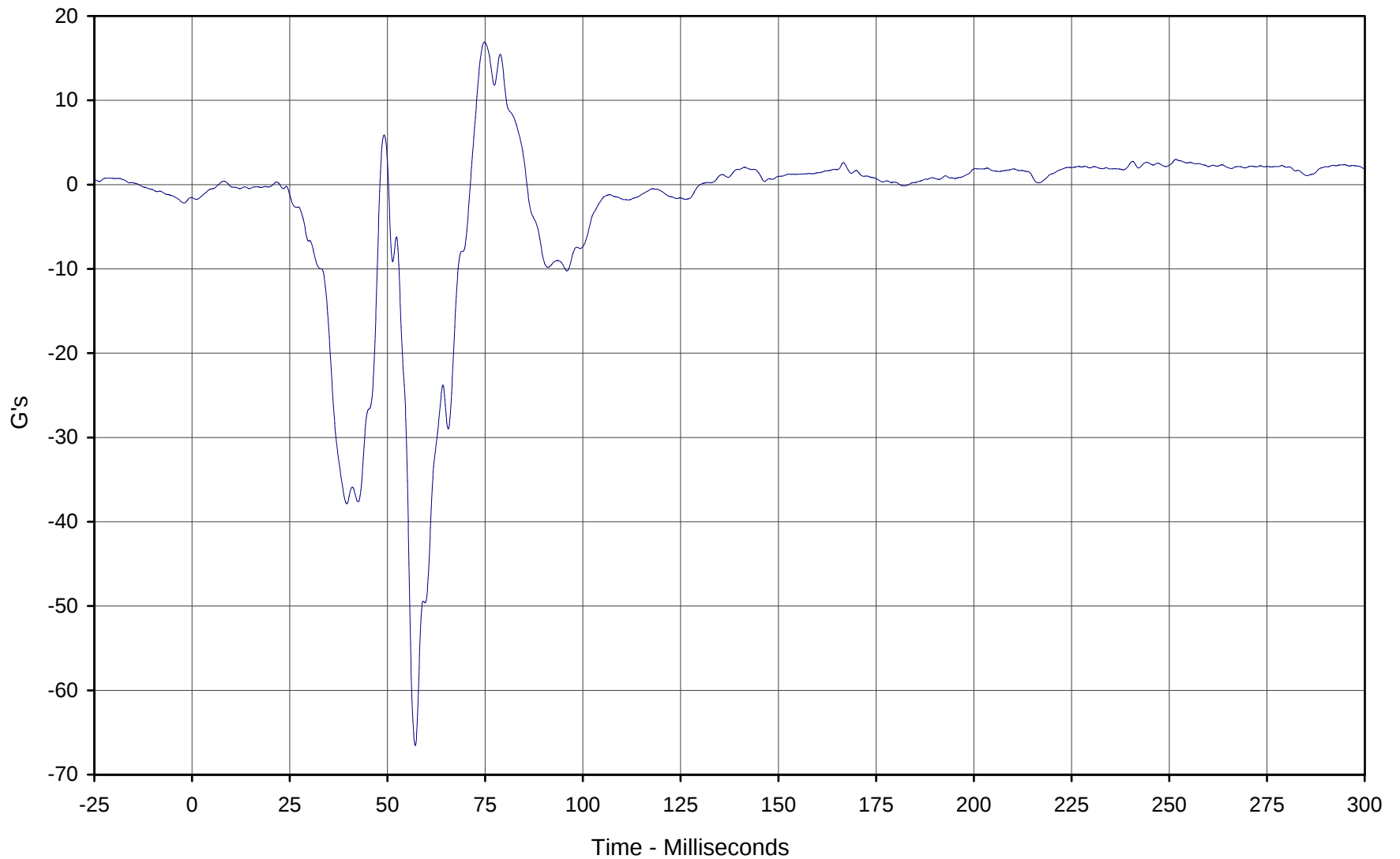




Curve Description: Passenger Left Foot Aft X
Maximum Value: 20.1 at 65.5 Milliseconds
Minimum Value: -99.7 at 57.3 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-079

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

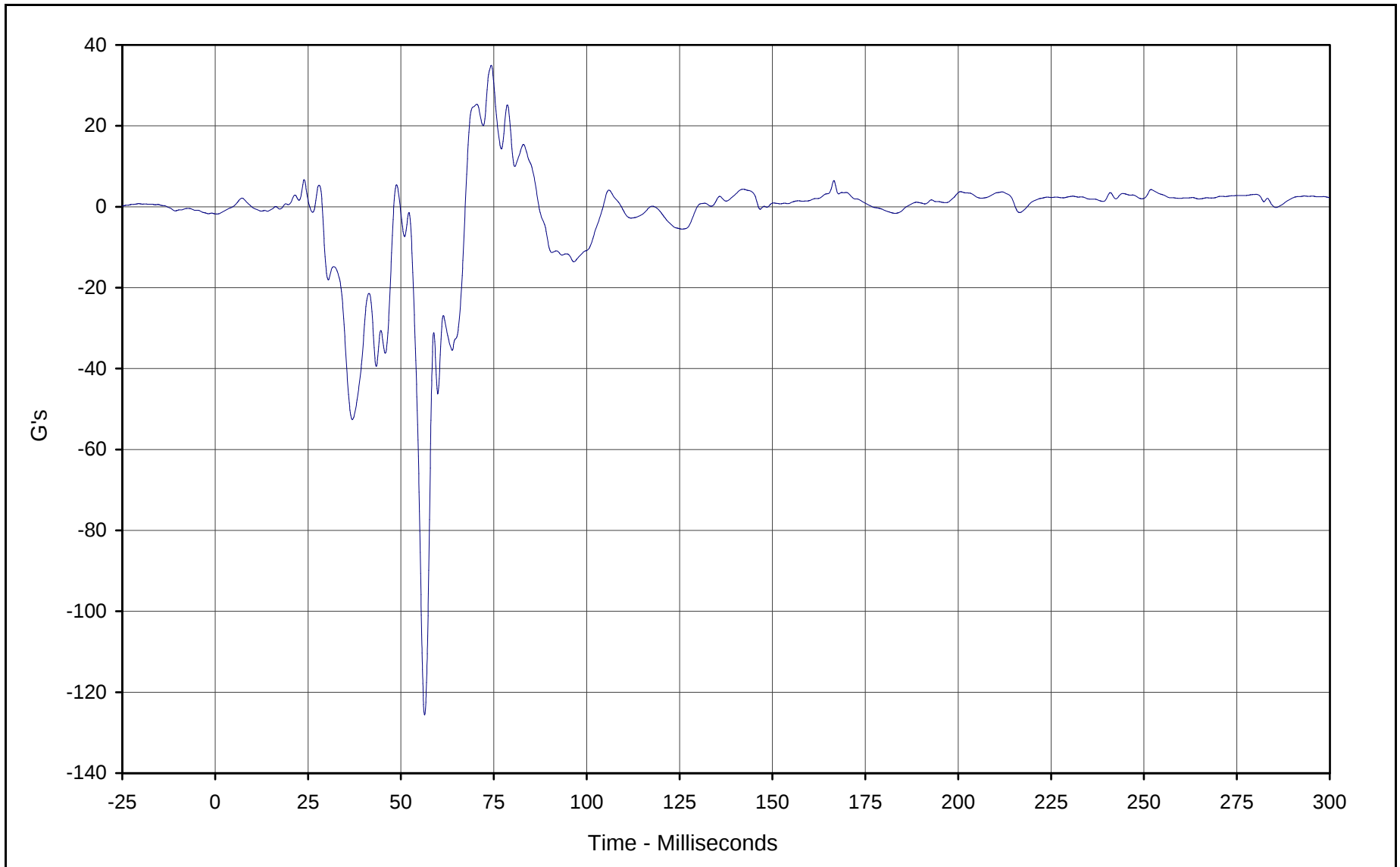




Curve Description: Passenger Left Foot Aft Z
Maximum Value: 16.9 at 74.8 Milliseconds
Minimum Value: -66.6 at 57.1 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-080

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

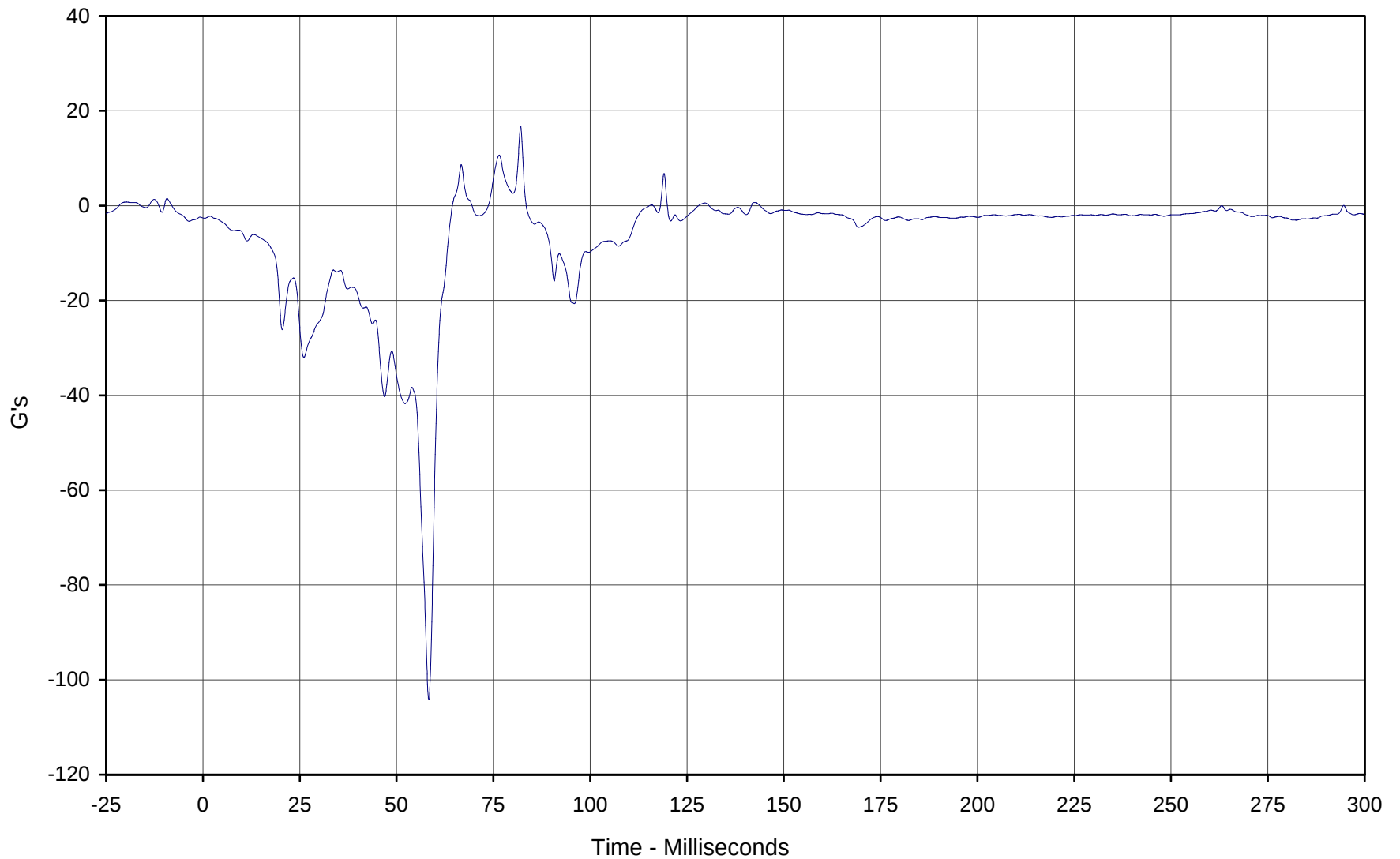




Curve Description: Passenger Left Foot Fore Z
Maximum Value: 35.0 at 74.3 Milliseconds
Minimum Value: -125.6 at 56.4 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-081

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

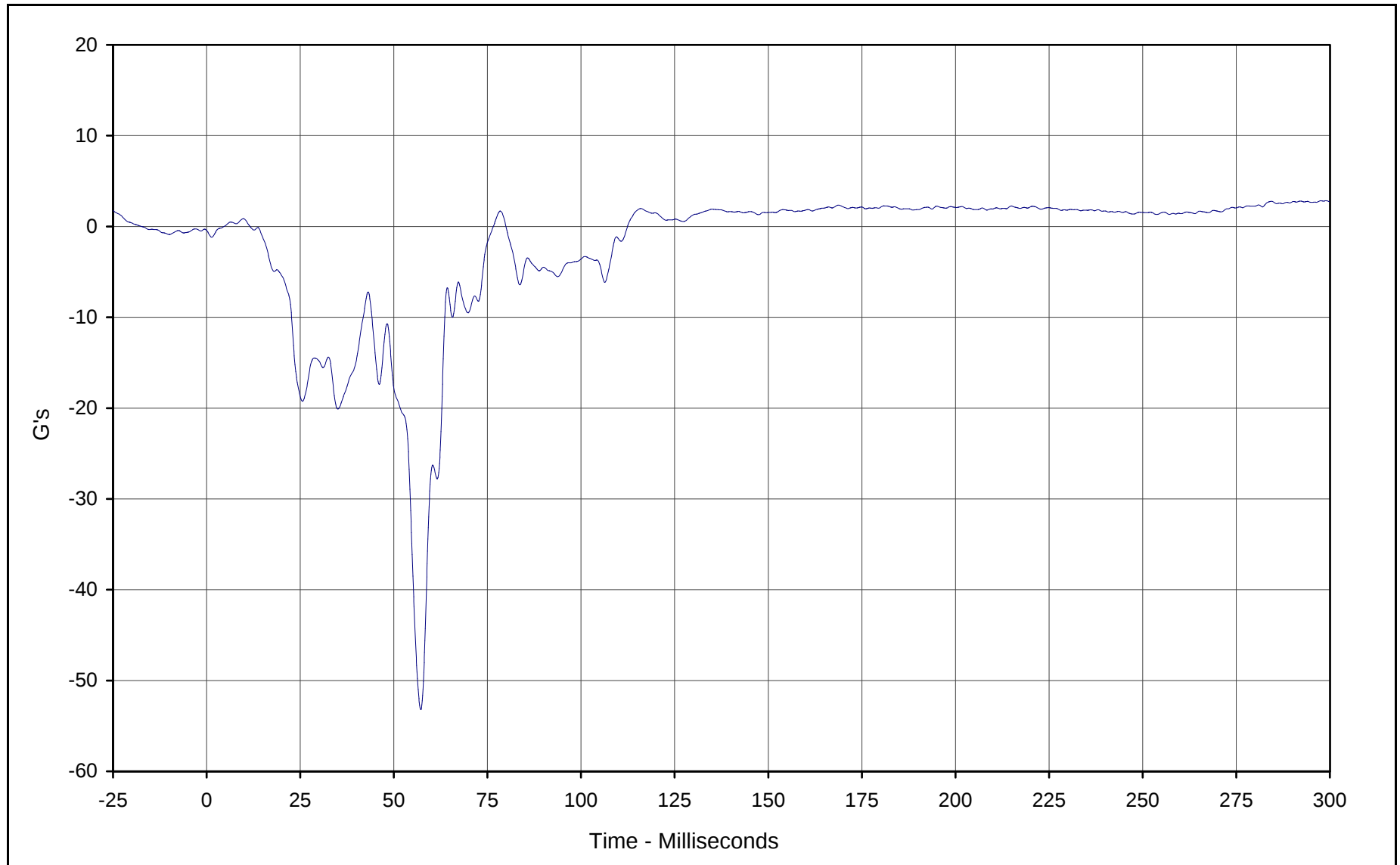




Curve Description: Passenger Right Foot Aft X
Maximum Value: 16.7 at 82.1 Milliseconds
Minimum Value: -104.2 at 58.3 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-082

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Right Foot Aft Z

Maximum Value: 2.8 at 299.0 Milliseconds

Minimum Value: -53.2 at 57.2 Milliseconds

SAE Filter Class: 180

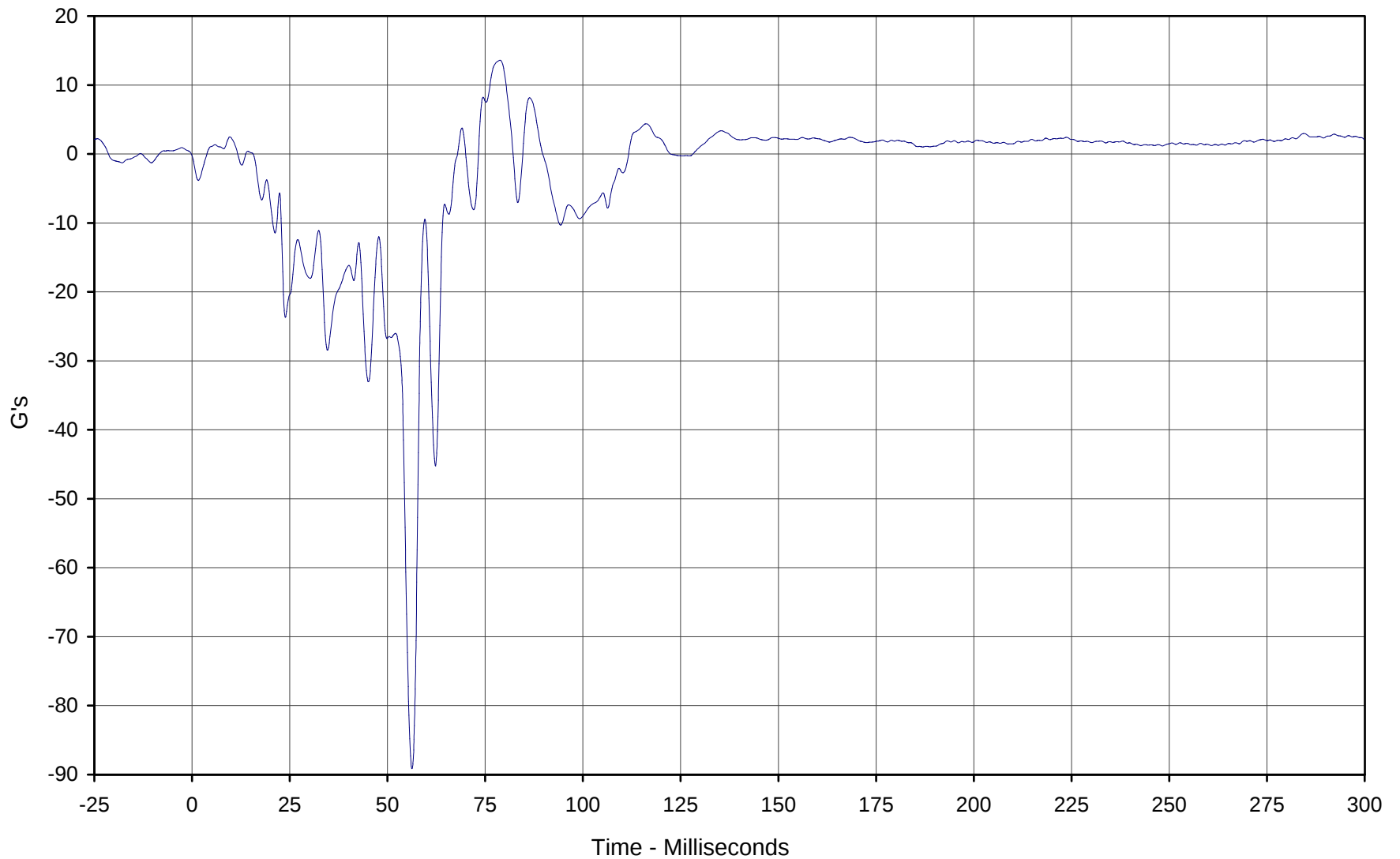
Date of Test: 01/11/01

Curve Number: FIL-083

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

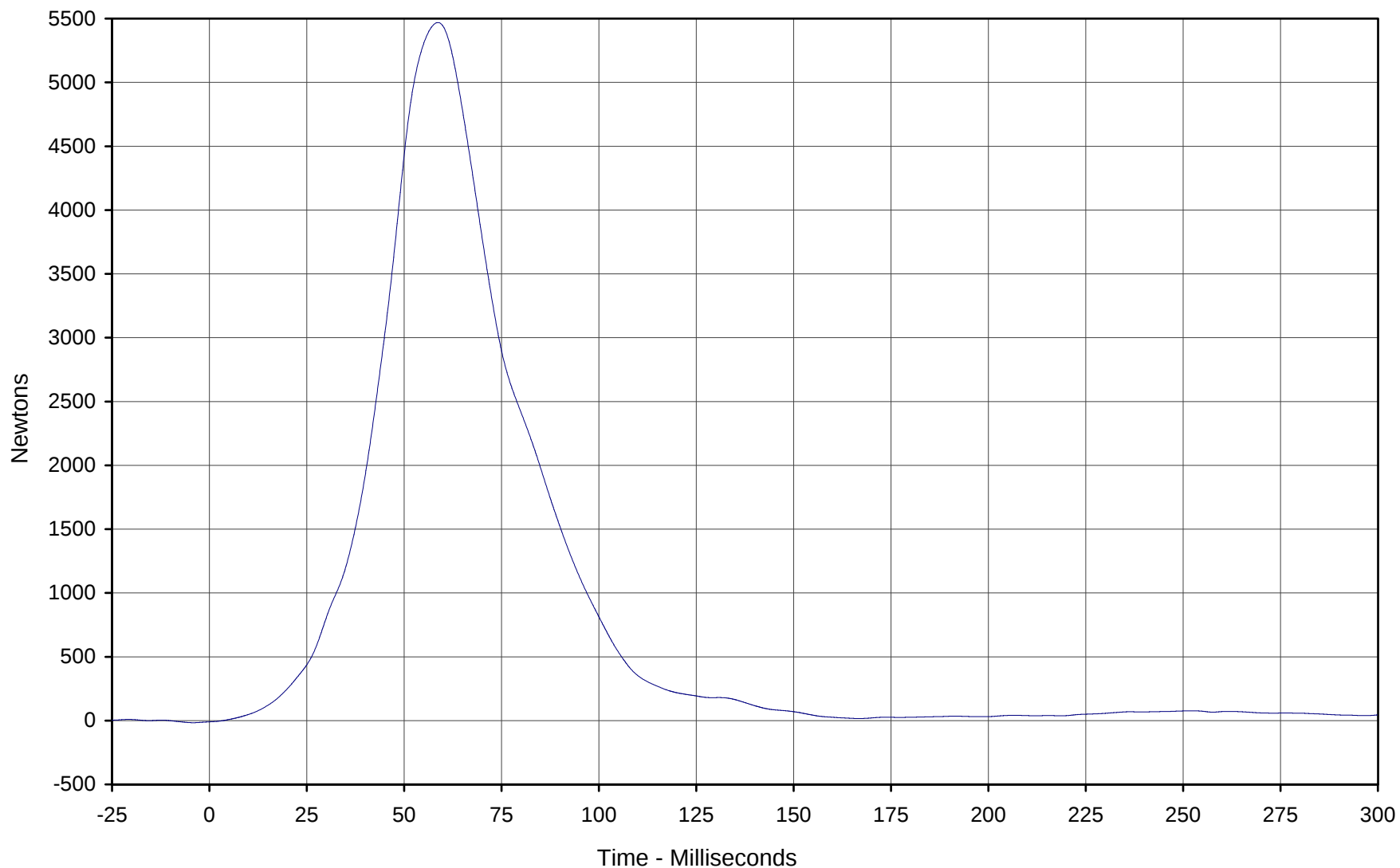




Curve Description: Passenger Right Foot Fore Z
Maximum Value: 13.6 at 78.8 Milliseconds
Minimum Value: -89.2 at 56.3 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: FIL-084

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

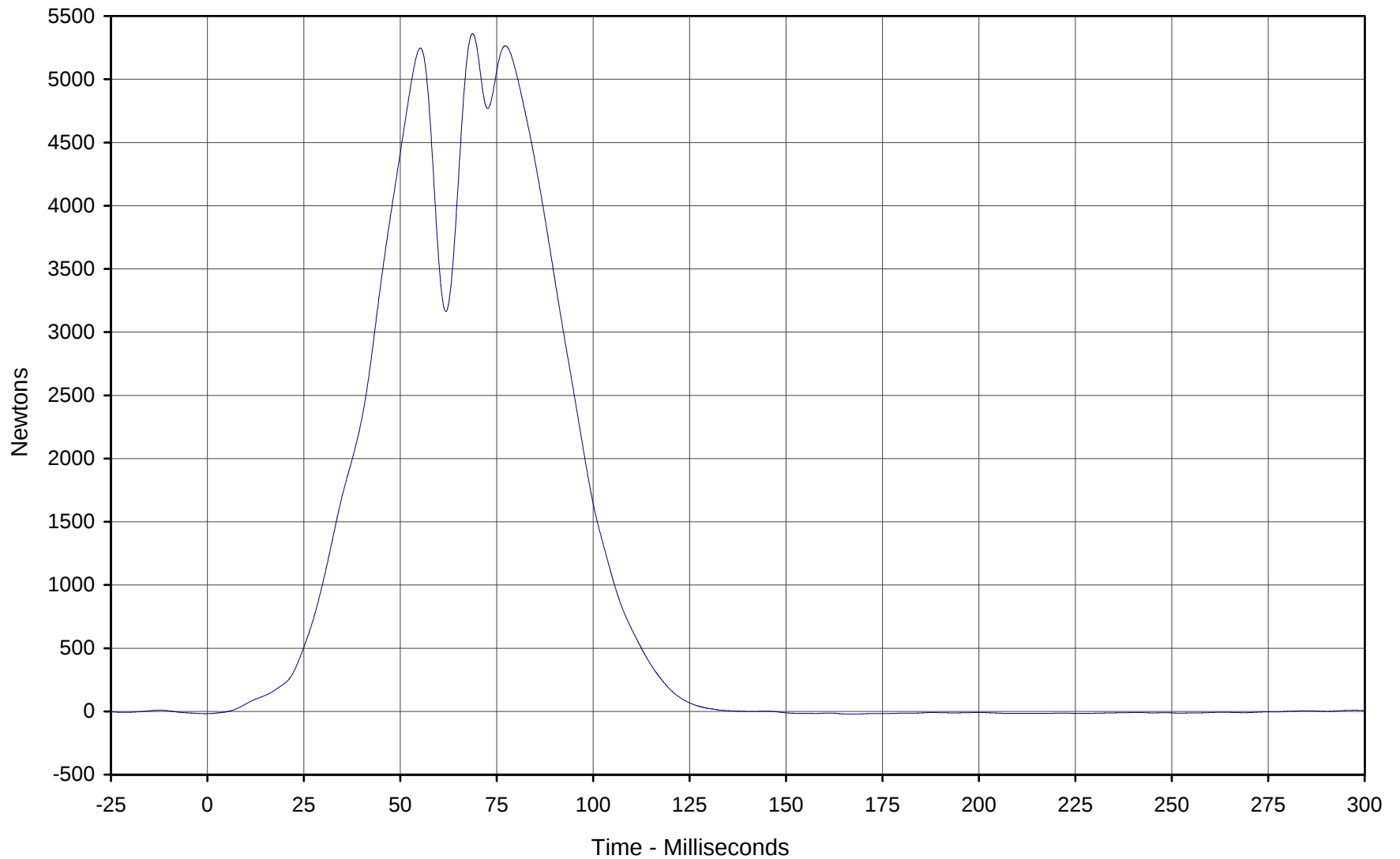




Curve Description: Passenger Lap Belt Force
Maximum Value: 5469.2 at 58.7 Milliseconds
Minimum Value: -9.8 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-085

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

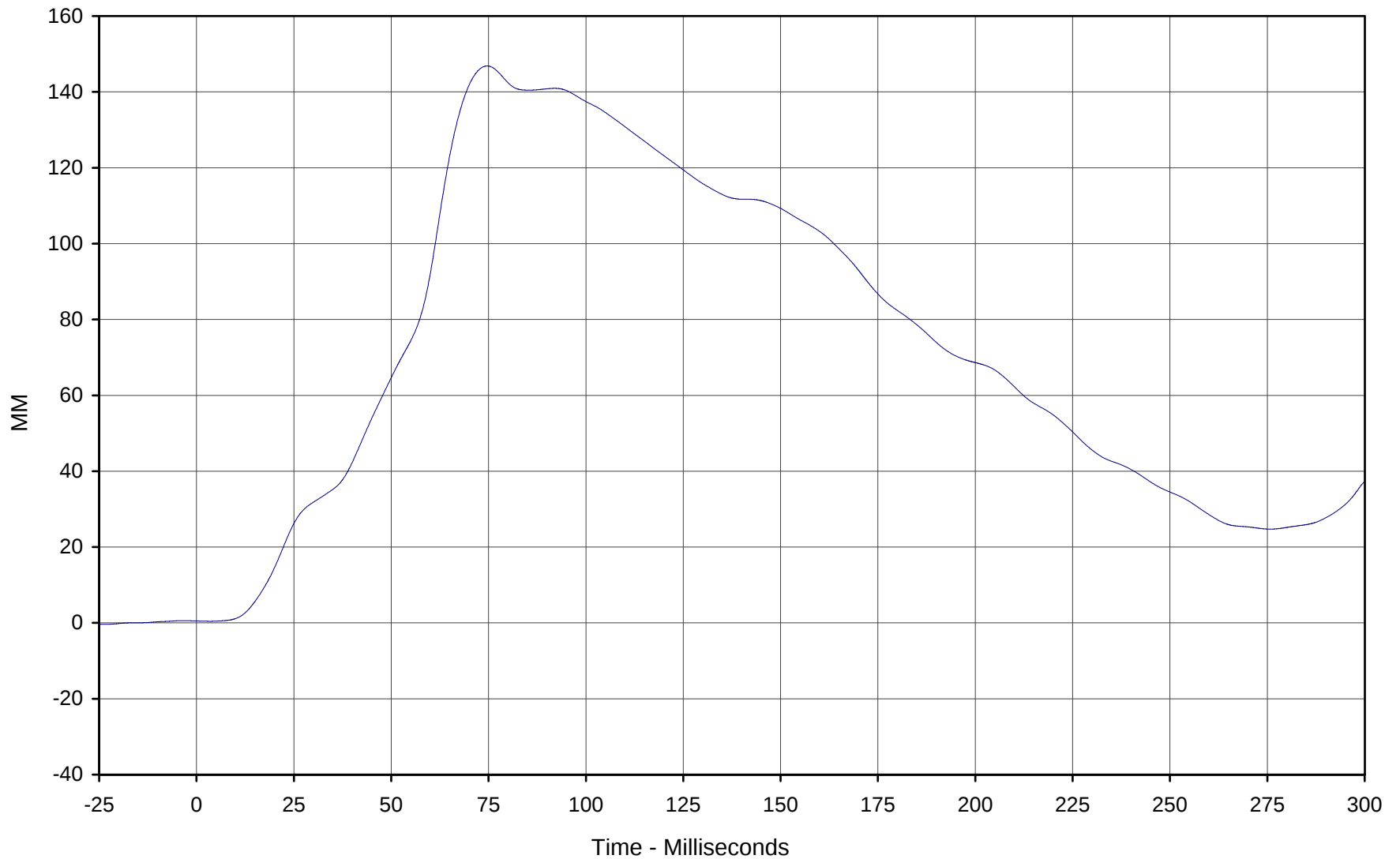




Curve Description: Passenger Shoulder Belt Force
Maximum Value: 5361.7 at 68.7 Milliseconds
Minimum Value: -21.0 at 166.2 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-086

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

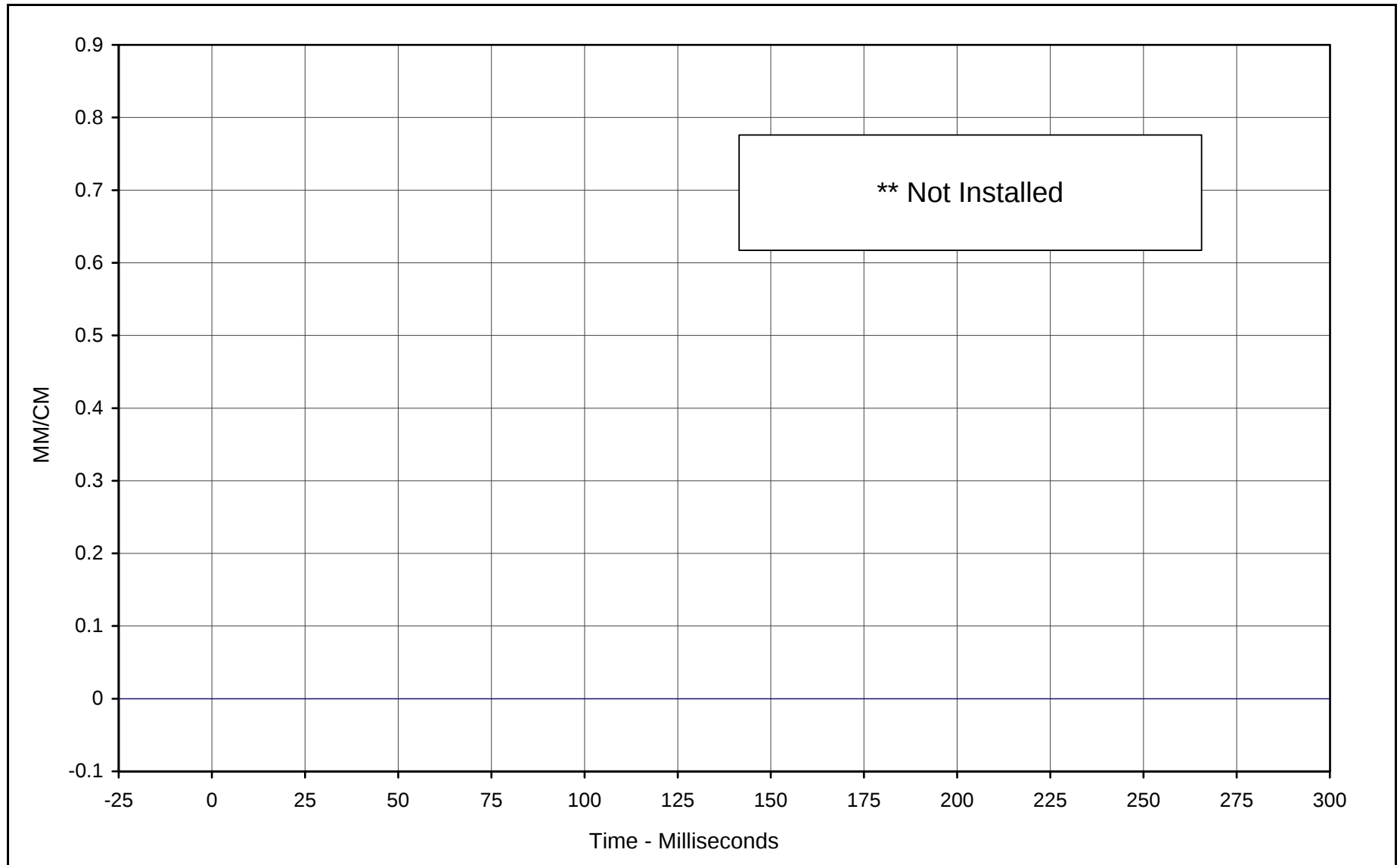




Curve Description: Passenger Shoulder Belt Pullout
Maximum Value: 146.8 at 74.6 Milliseconds
Minimum Value: 0.4 at 3.4 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-087

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Passenger Shoulder Belt Elongation **

Maximum Value: 0.00 at 0.0 Milliseconds

Minimum Value: 0.00 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

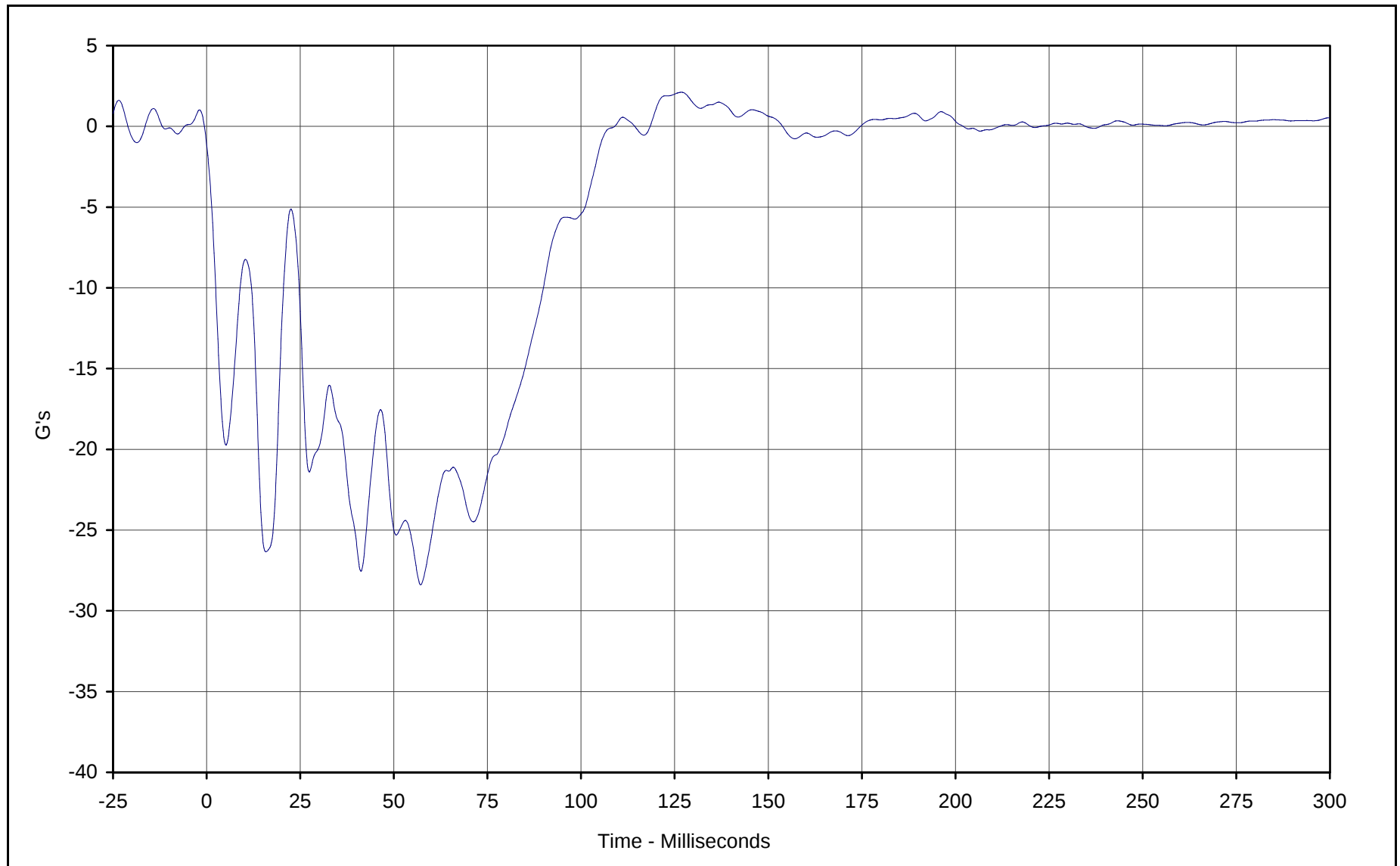
Curve Number: FIL-088

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

** Not installed

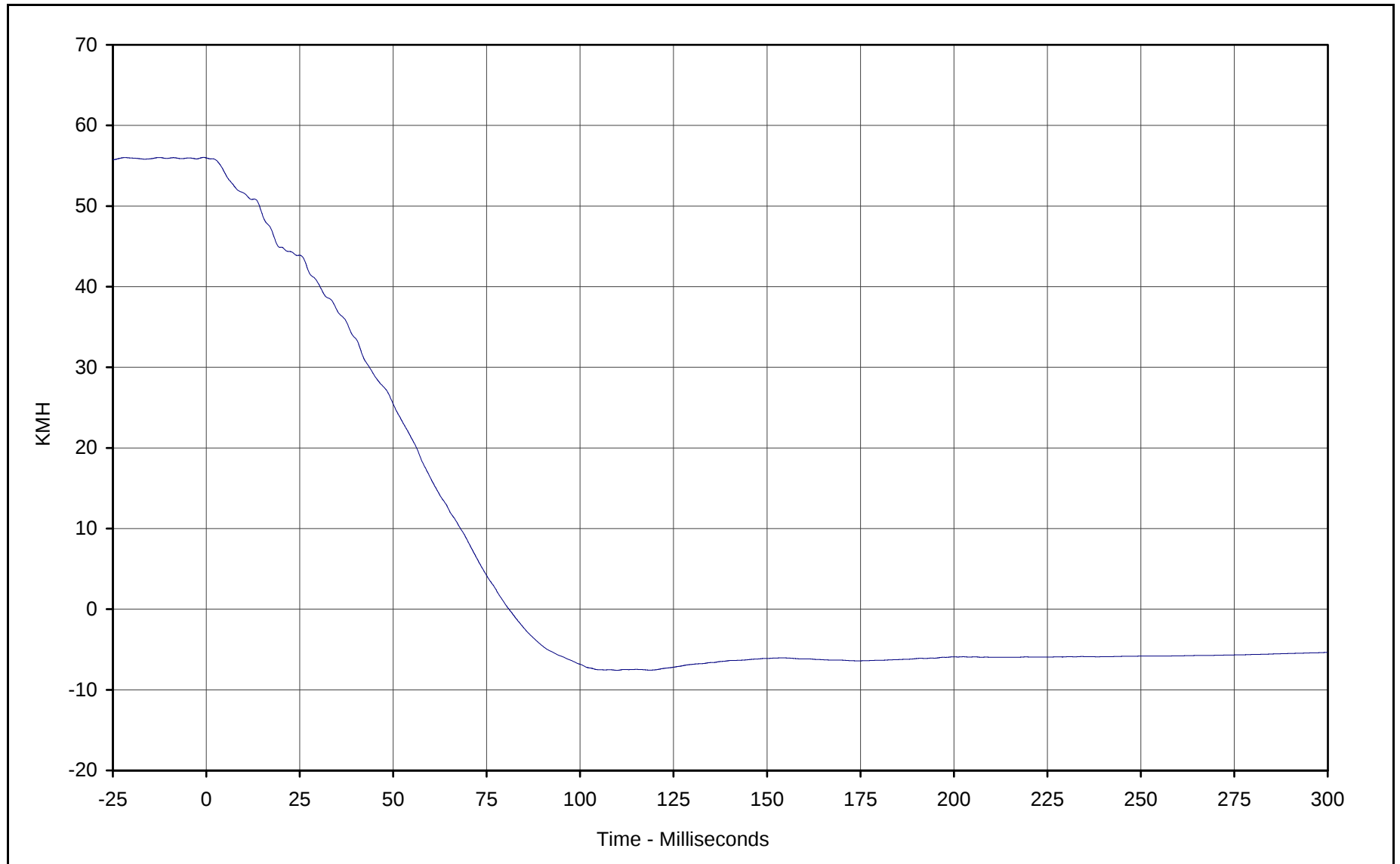




Curve Description: Vehicle Left Rear Primary
Maximum Value: 2.1 at 126.8 Milliseconds
Minimum Value: -28.4 at 57.2 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

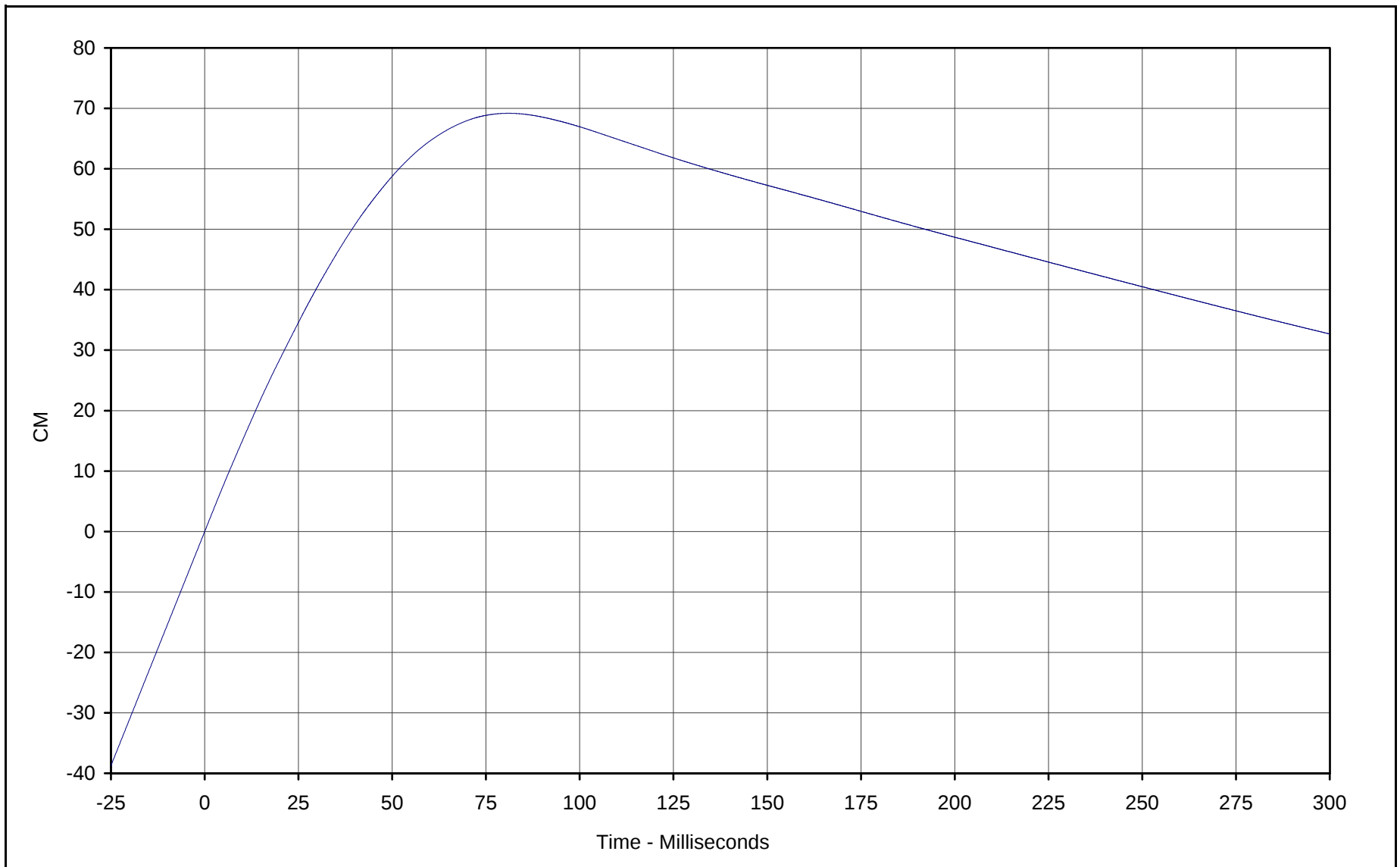




Curve Description: Vehicle Left Rear Primary Velocity
Maximum Value: 56.0 at 0.0 Milliseconds
Minimum Value: -7.6 at 109.9 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

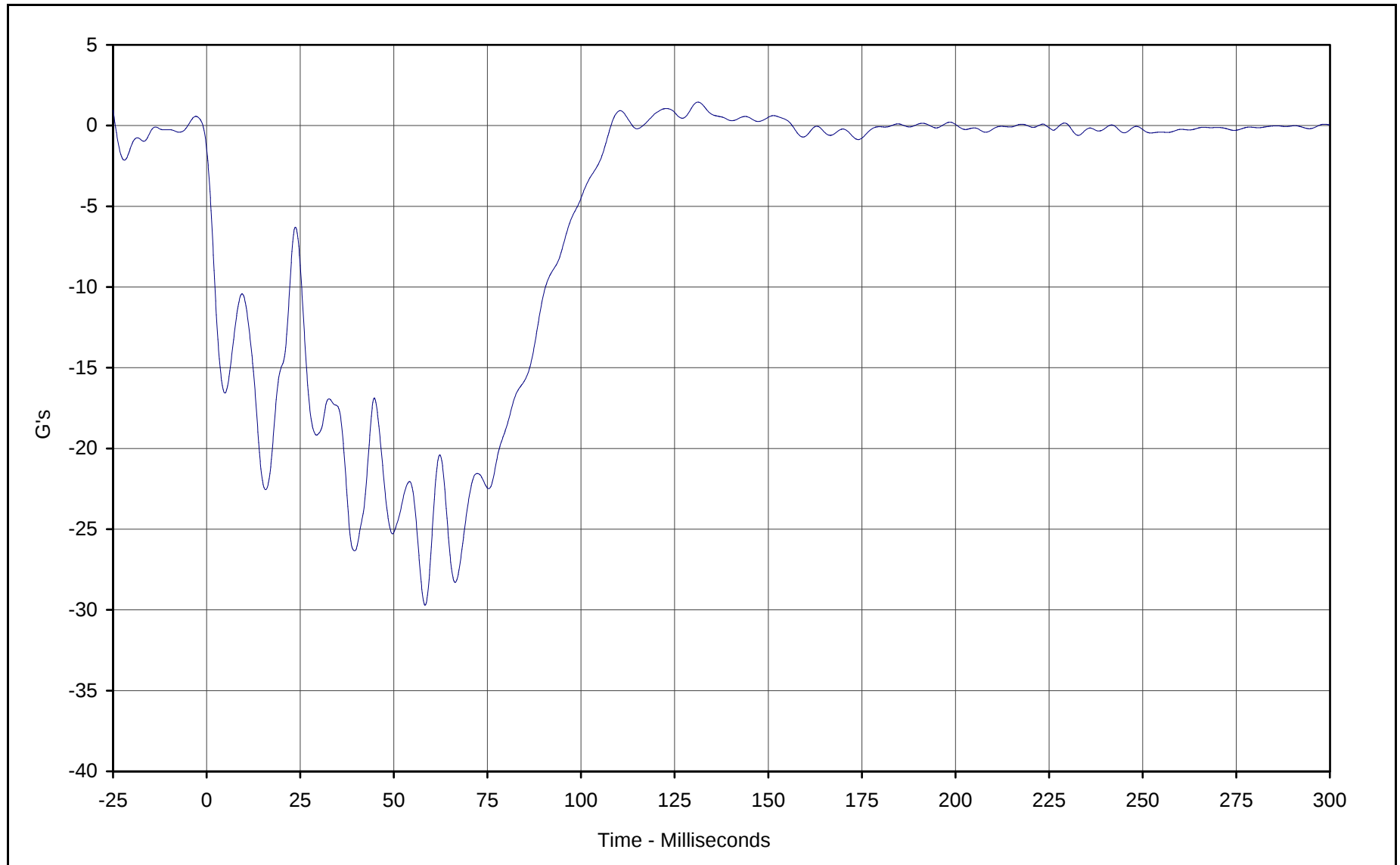




Curve Description: Vehicle Left Rear Primary Displ.
Maximum Value: 69.2 at 81.0 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

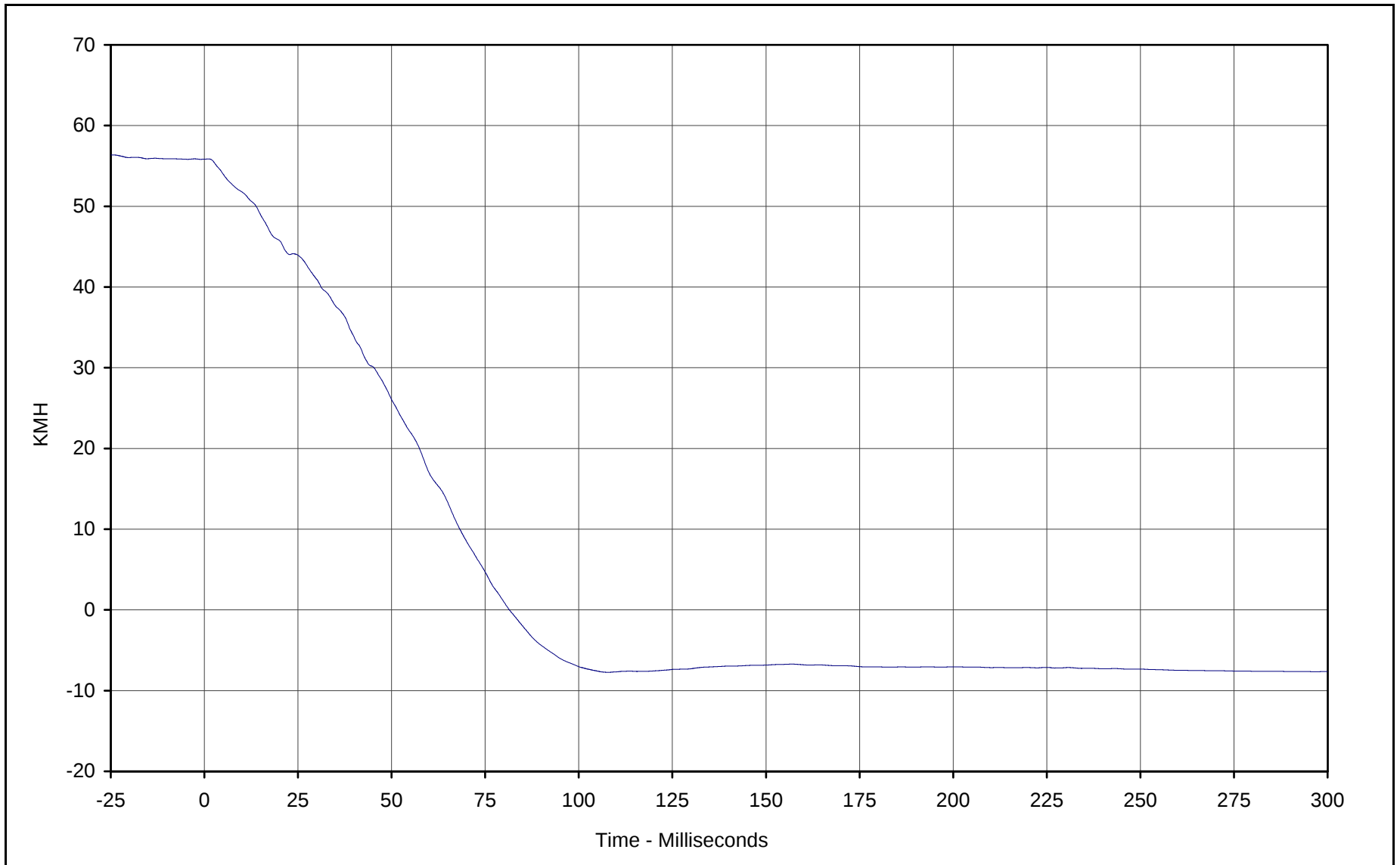




Curve Description: Vehicle Right Rear Primary
Maximum Value: 1.5 at 131.2 Milliseconds
Minimum Value: -29.7 at 58.3 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

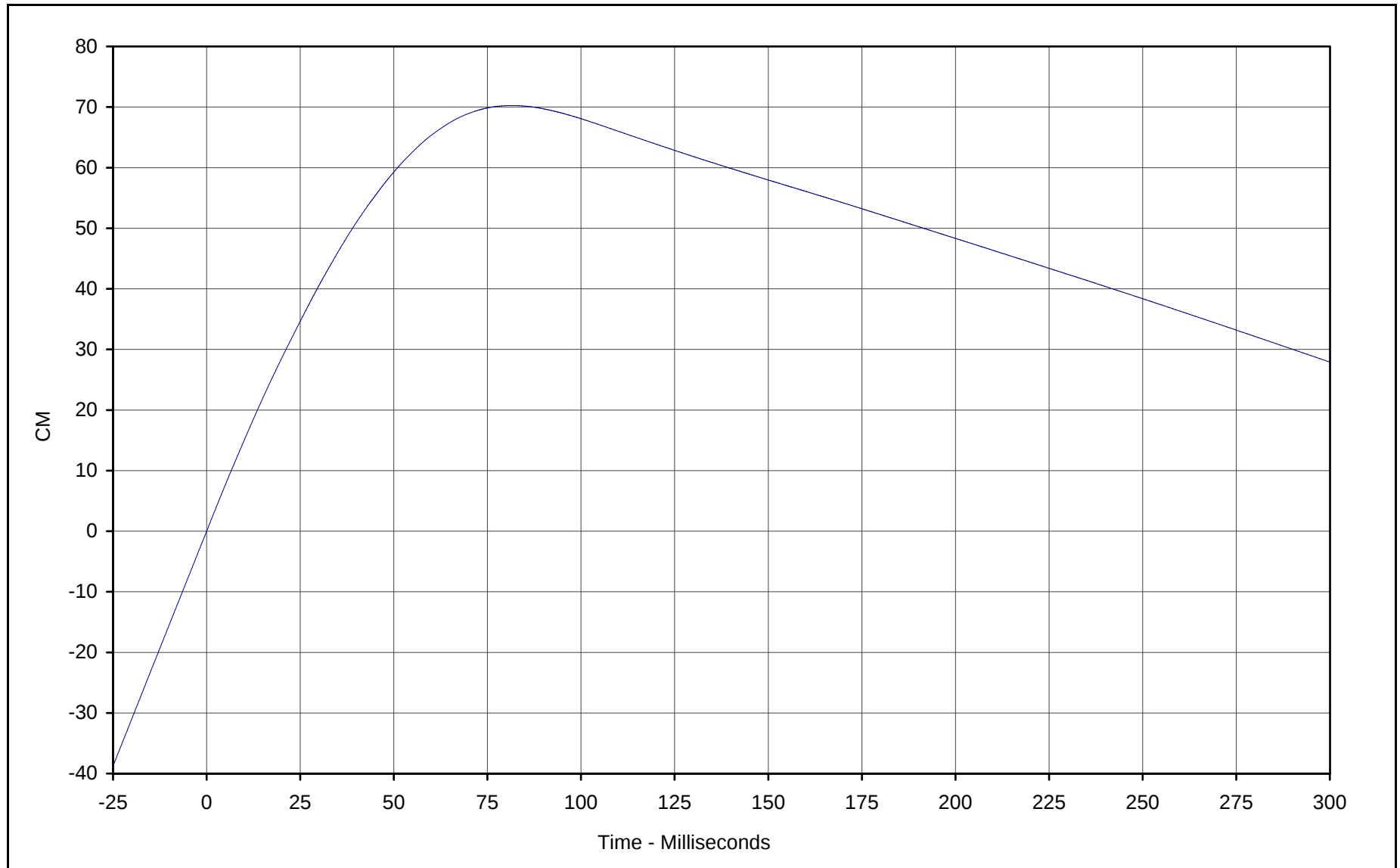




Curve Description: Vehicle Right Rear Primary Velocity
Maximum Value: 55.9 at 1.1 Milliseconds
Minimum Value: -7.7 at 107.9 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





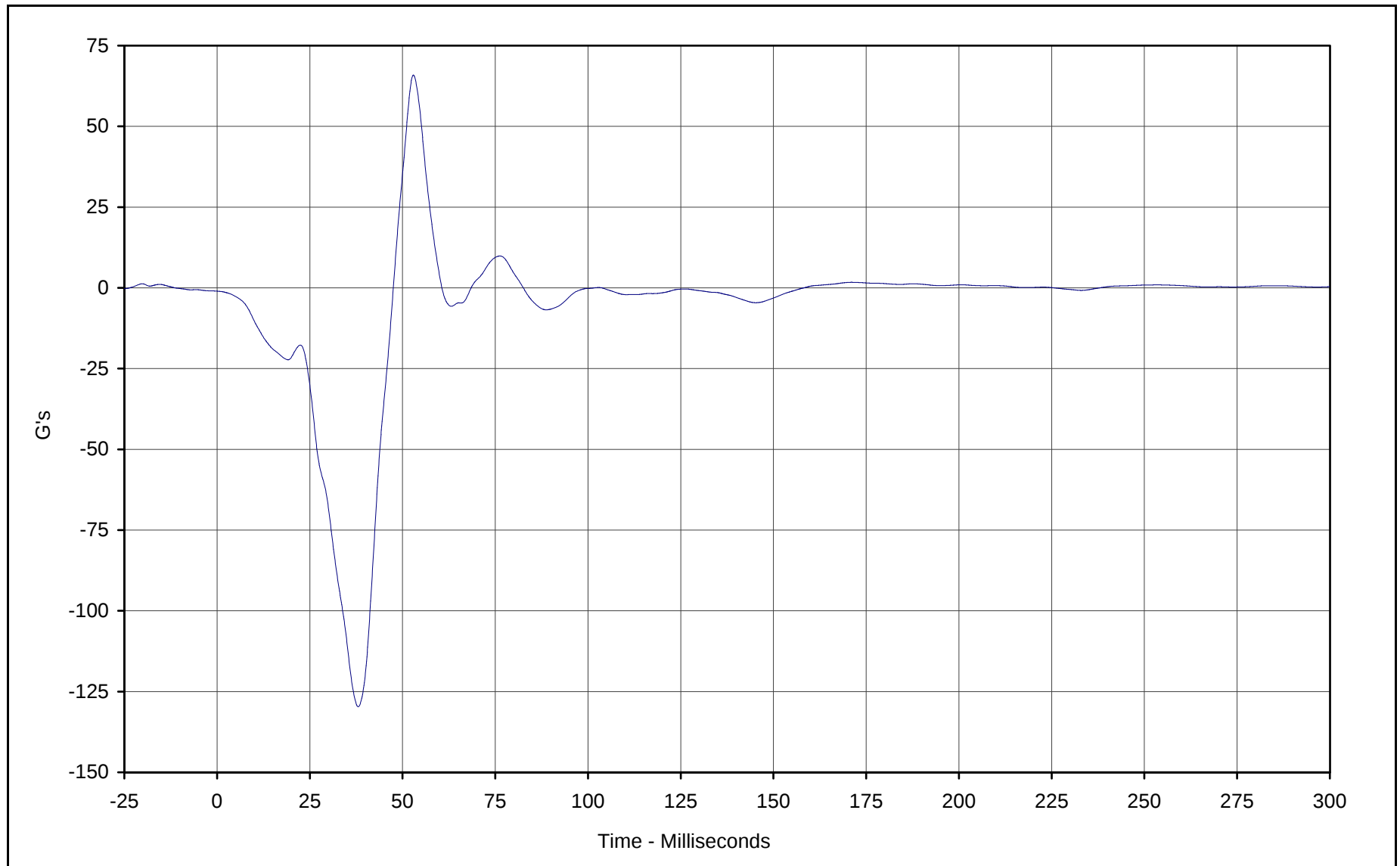
Curve Description: Vehicle Right Rear Primary Displ.
Maximum Value: 70.3 at 81.5 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-129

KAR21001-04



Curve Description: Vehicle Engine Top

Maximum Value: 65.9 at 52.9 Milliseconds

Minimum Value: -129.7 at 38.0 Milliseconds

SAE Filter Class: 60

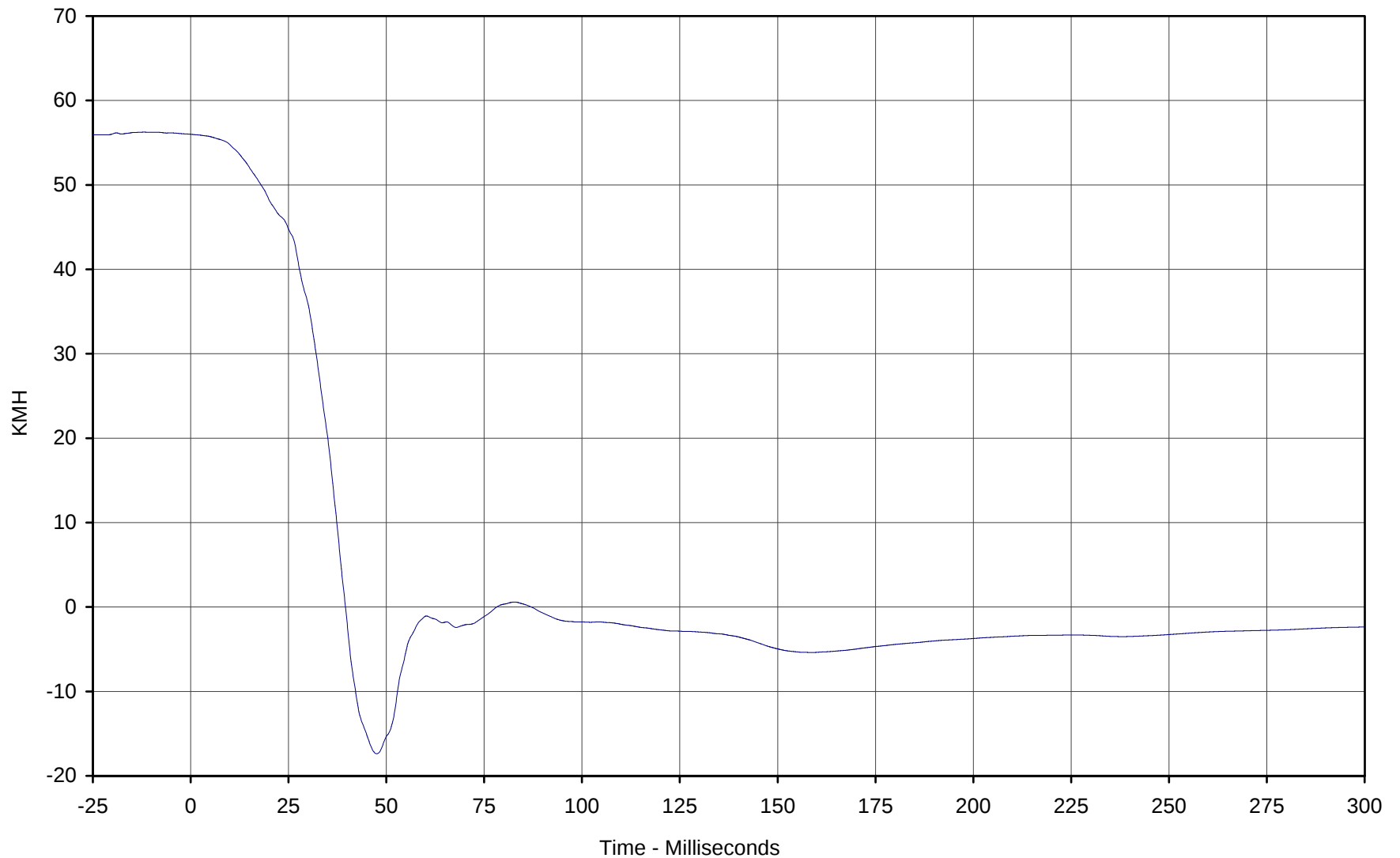
Date of Test: 01/11/01

Curve Number: FIL-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

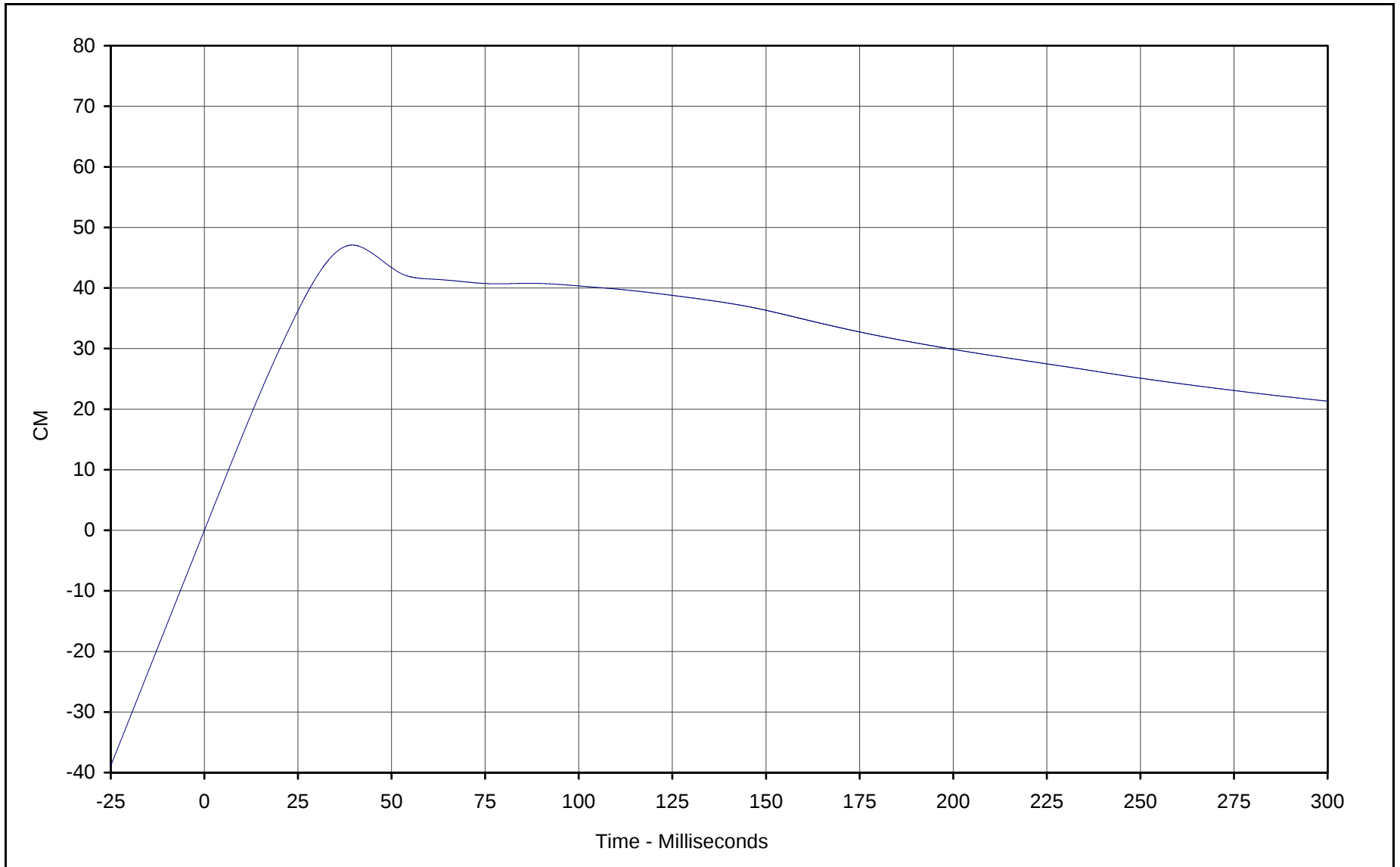




Curve Description: Vehicle Engine Top Velocity
Maximum Value: 56.0 at 0.0 Milliseconds
Minimum Value: -17.4 at 47.5 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

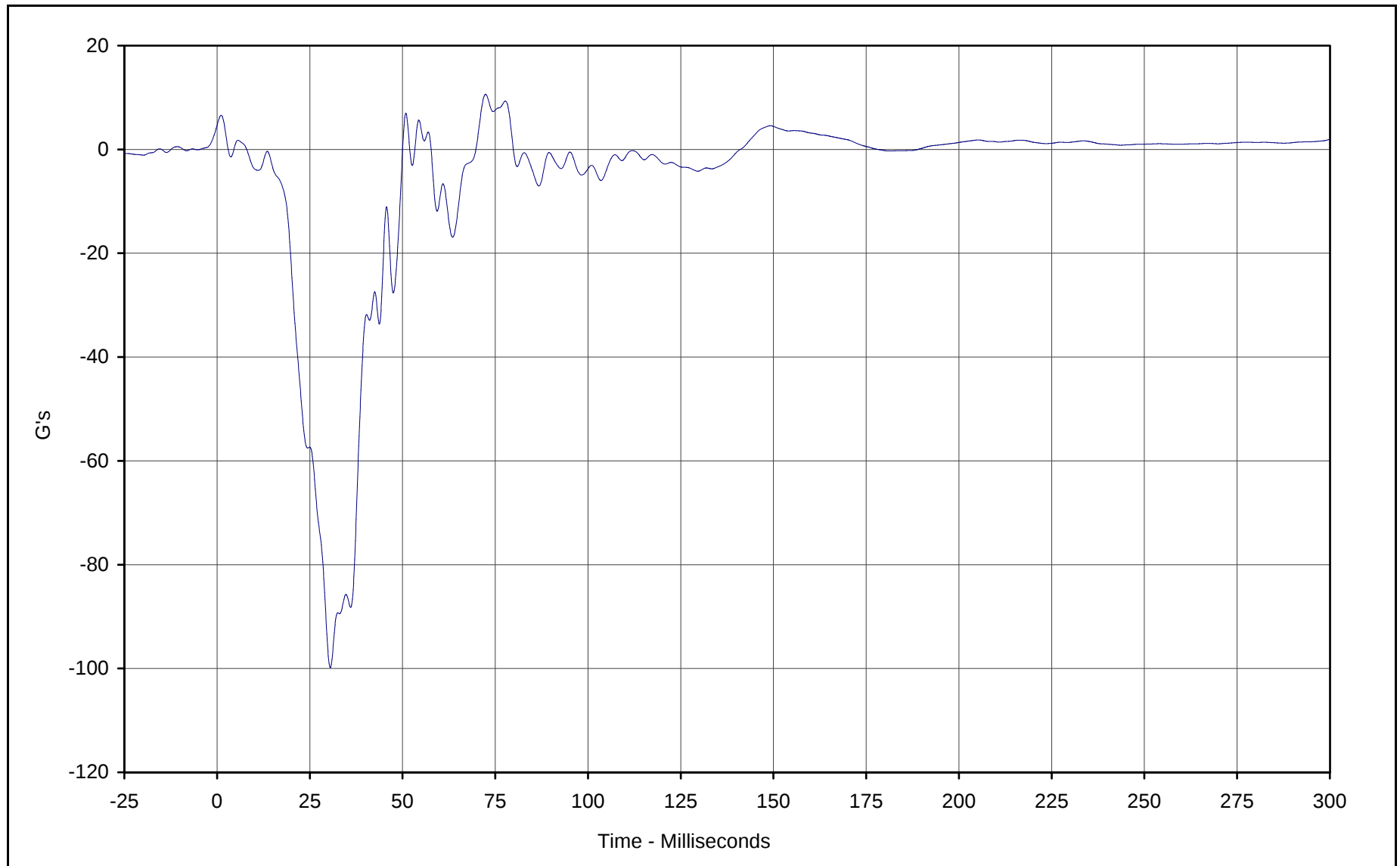




Curve Description: Vehicle Engine Top Displ.
Maximum Value: 47.1 at 39.6 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Vehicle Engine Bottom

Maximum Value: 10.6 at 72.4 Milliseconds

Minimum Value: -99.9 at 30.5 Milliseconds

SAE Filter Class: 60

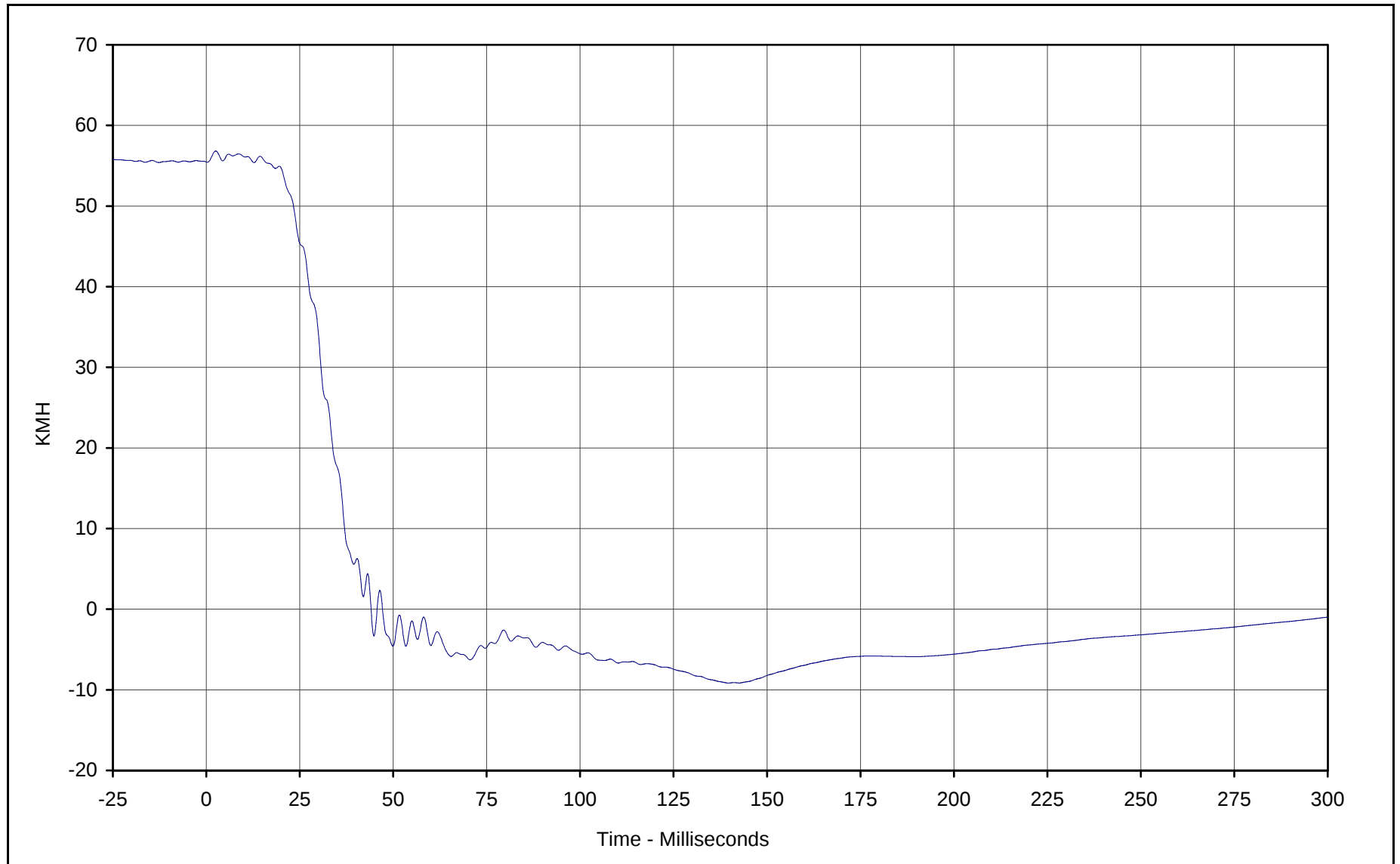
Date of Test: 01/11/01

Curve Number: FIL-092

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

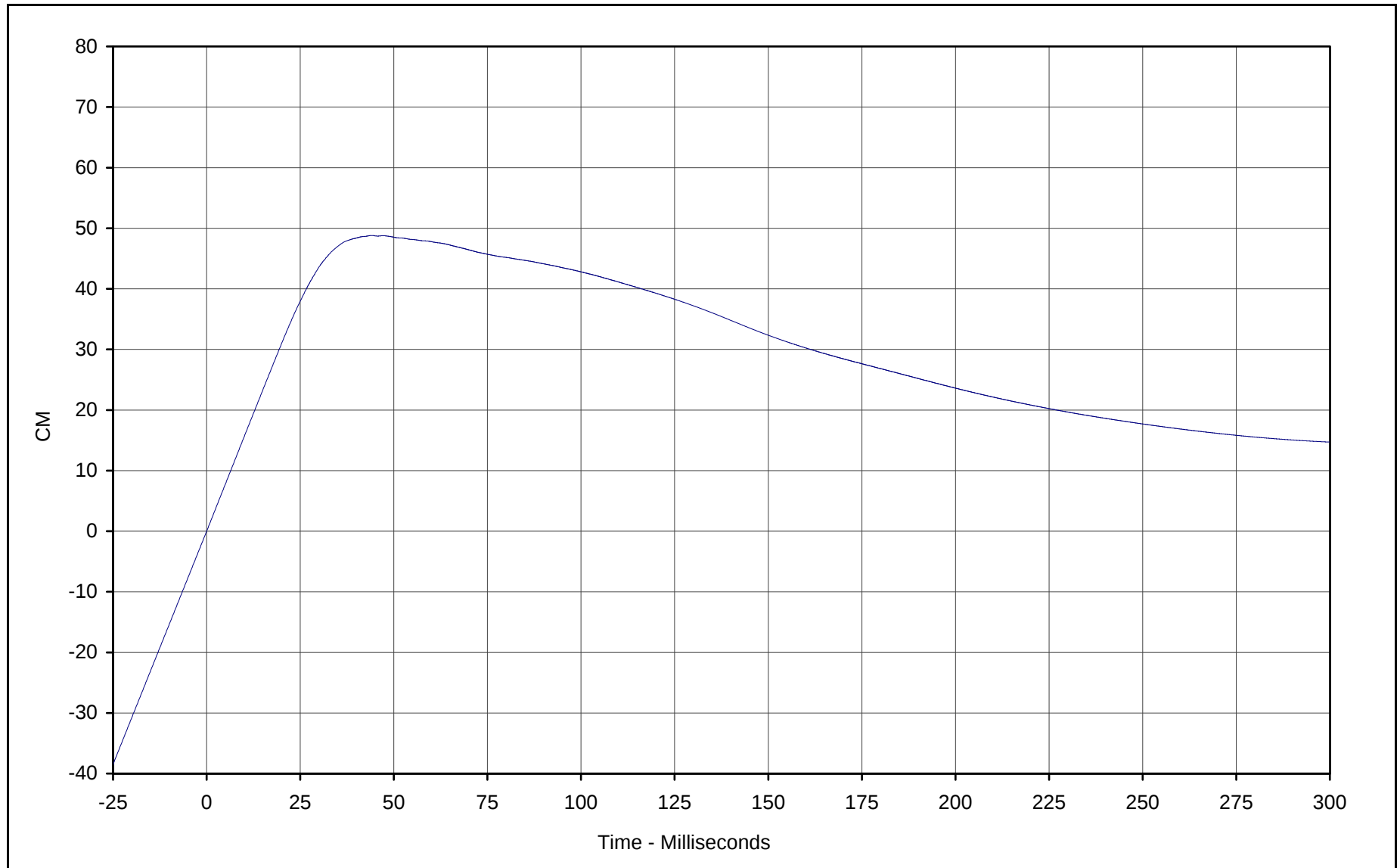




Curve Description: Vehicle Engine Bottom Velocity
Maximum Value: 56.8 at 2.5 Milliseconds
Minimum Value: -9.2 at 139.7 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-092

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

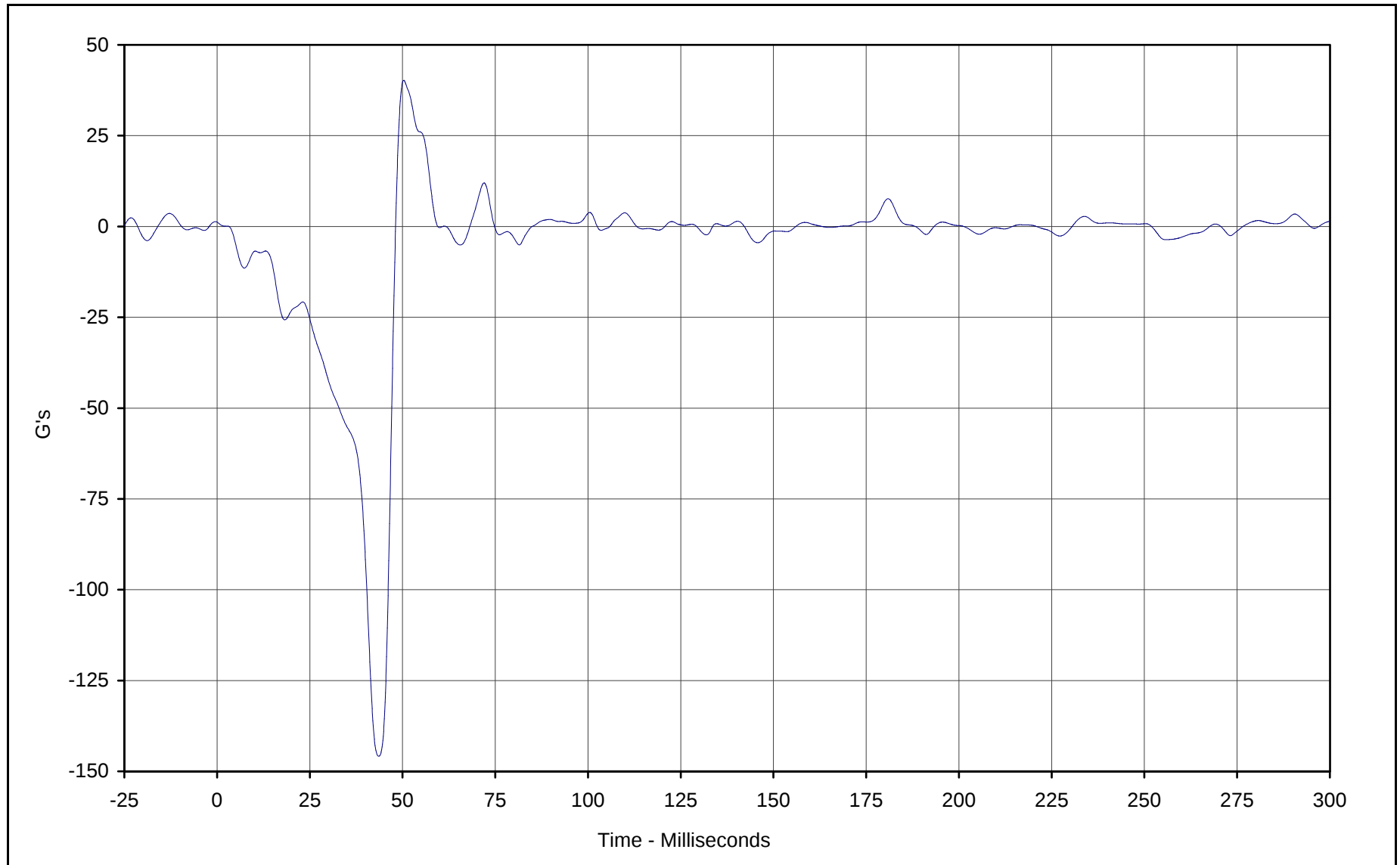




Curve Description: Vehicle Engine Bottom Displ.
Maximum Value: 48.8 at 44.1 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-092

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Vehicle Left Brake Caliper

Maximum Value: 40.3 at 50.3 Milliseconds

Minimum Value: -145.8 at 43.6 Milliseconds

SAE Filter Class: 60

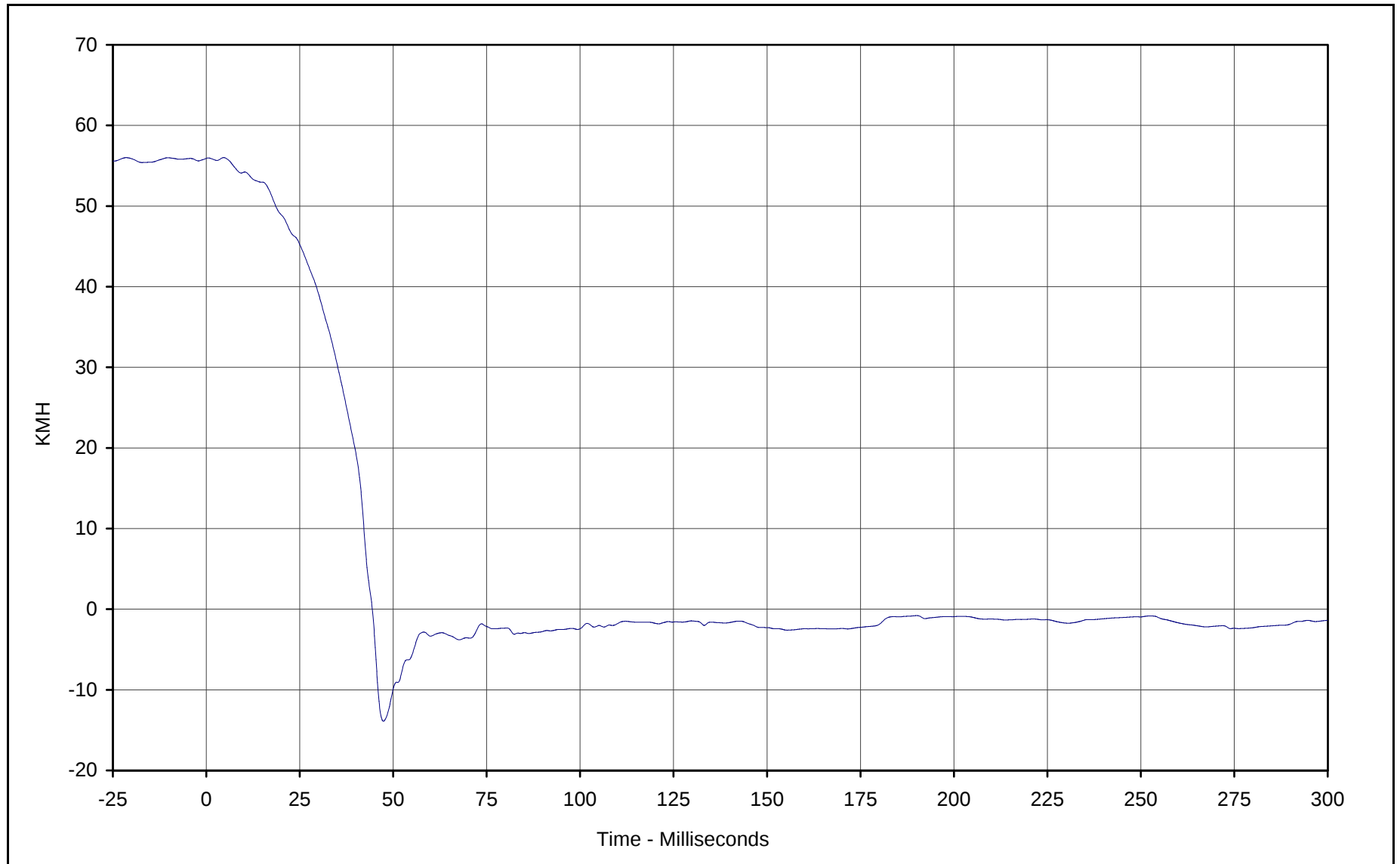
Date of Test: 01/11/01

Curve Number: FIL-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

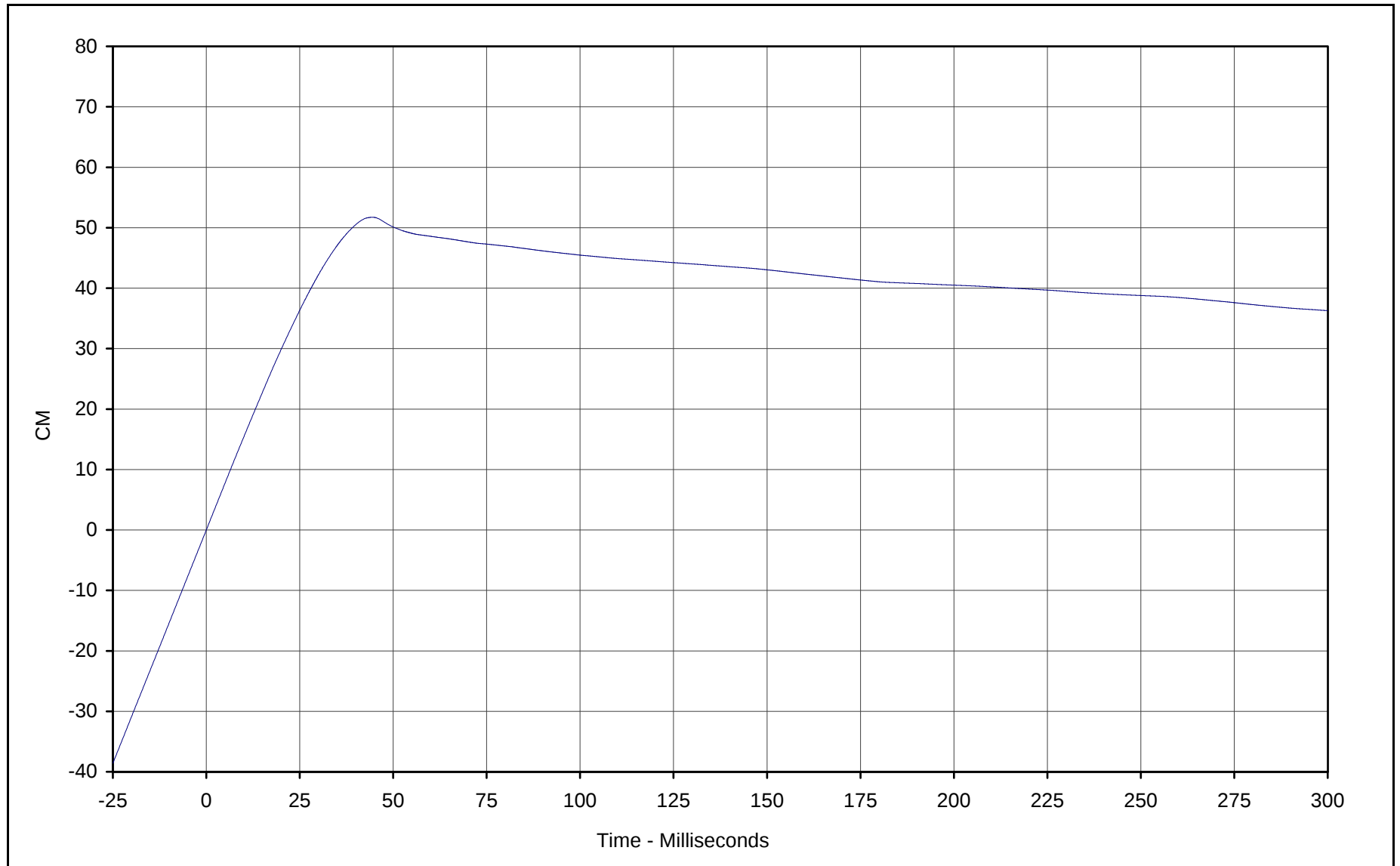




Curve Description: Vehicle Left Brake Caliper Velocity
Maximum Value: 56.0 at 4.7 Milliseconds
Minimum Value: -13.9 at 47.4 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

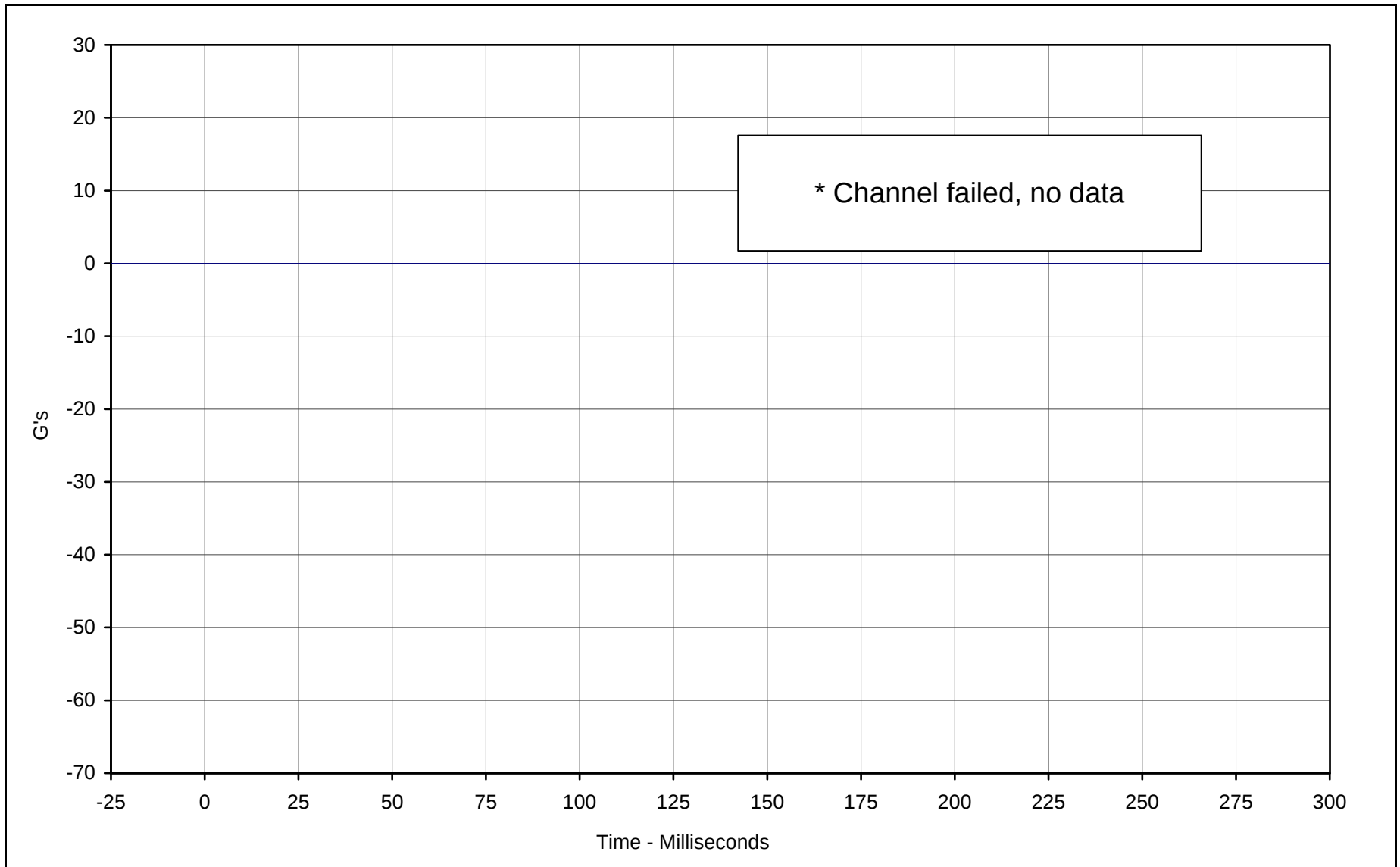




Curve Description: Vehicle Left Brake Caliper Displ.
Maximum Value: 51.7 at 44.4 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Vehicle Right Brake Caliper *

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

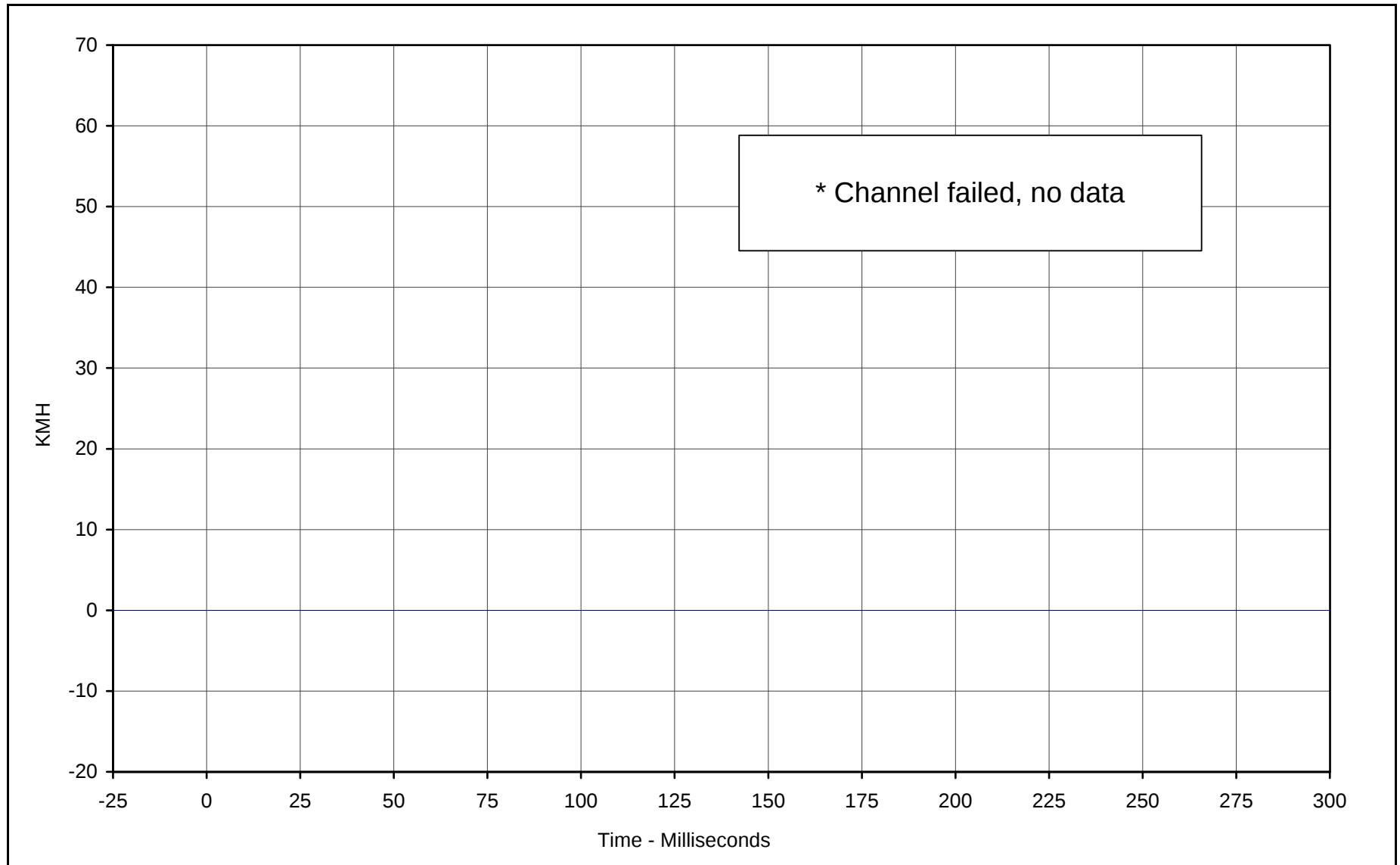
Curve Number: FIL-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

* Channel failed, no data





Curve Description: Vehicle Right Brake Caliper Velocity *

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/11/01

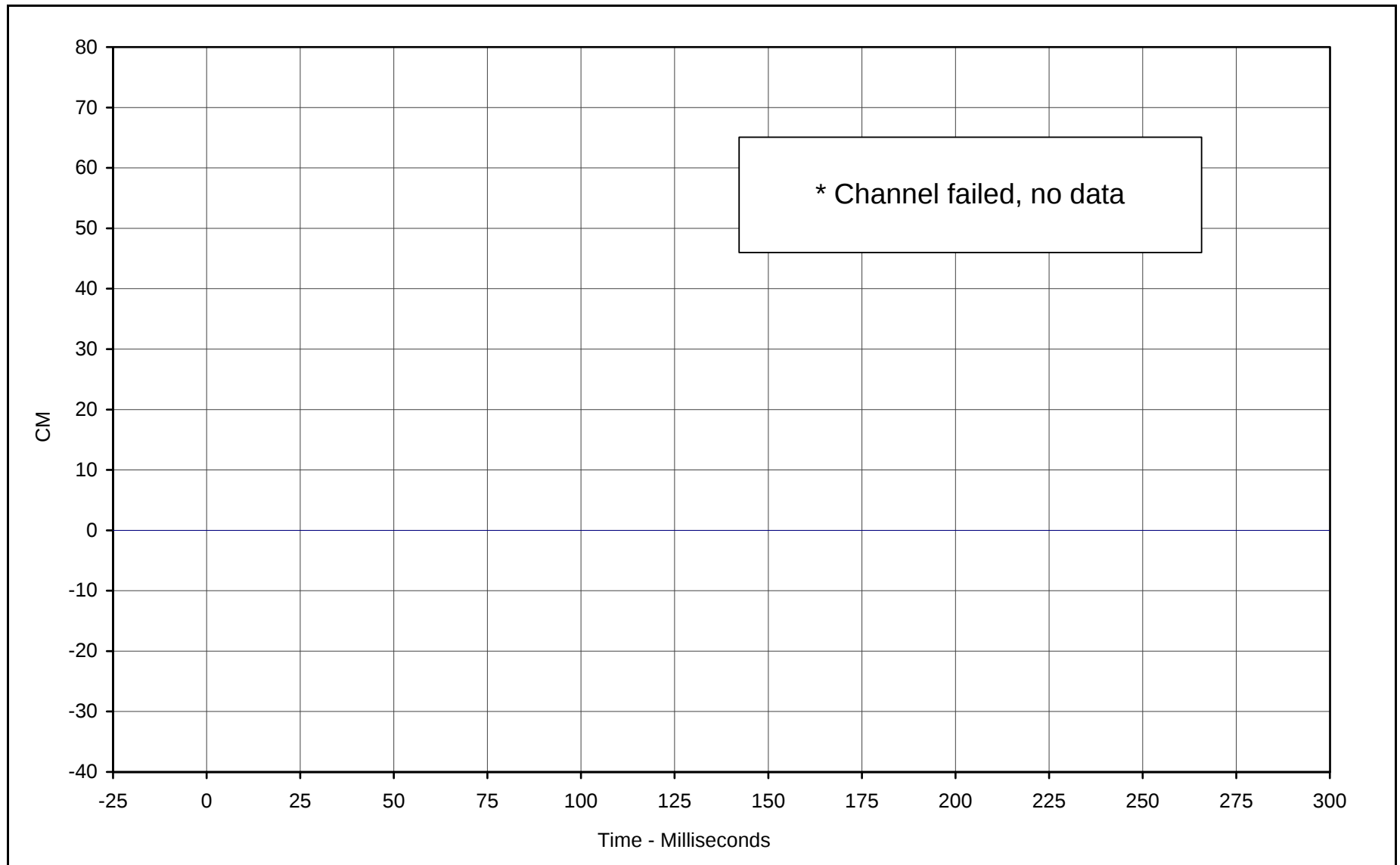
Curve Number: IN1-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

* Channel failed, no data





Curve Description: Vehicle Right Brake Caliper Displ. *

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 01/11/01

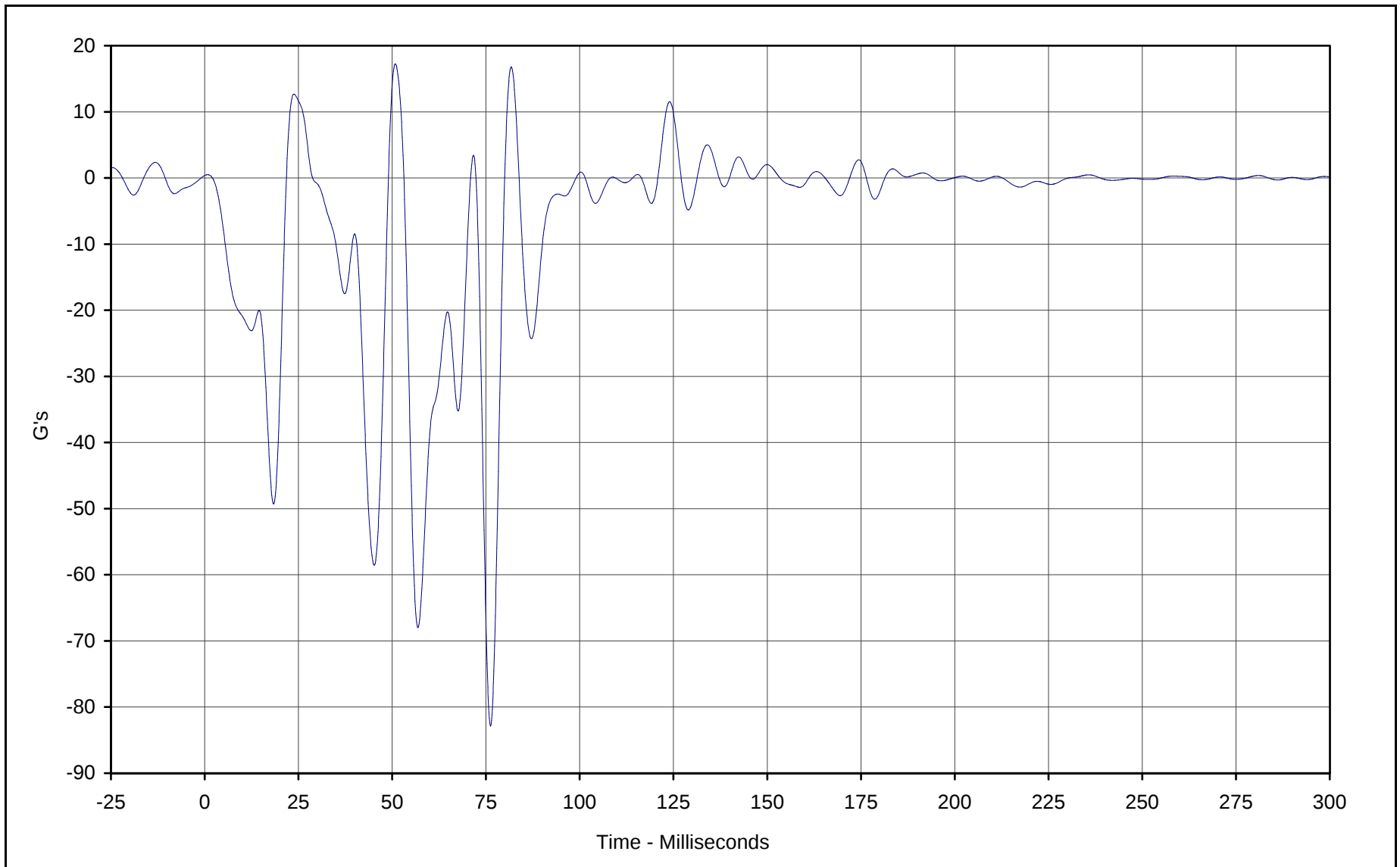
Curve Number: IN2-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

* Channel failed, no data





Curve Description: Vehicle Instrument Panel

Maximum Value: 17.3 at 50.8 Milliseconds

Minimum Value: -82.9 at 76.2 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

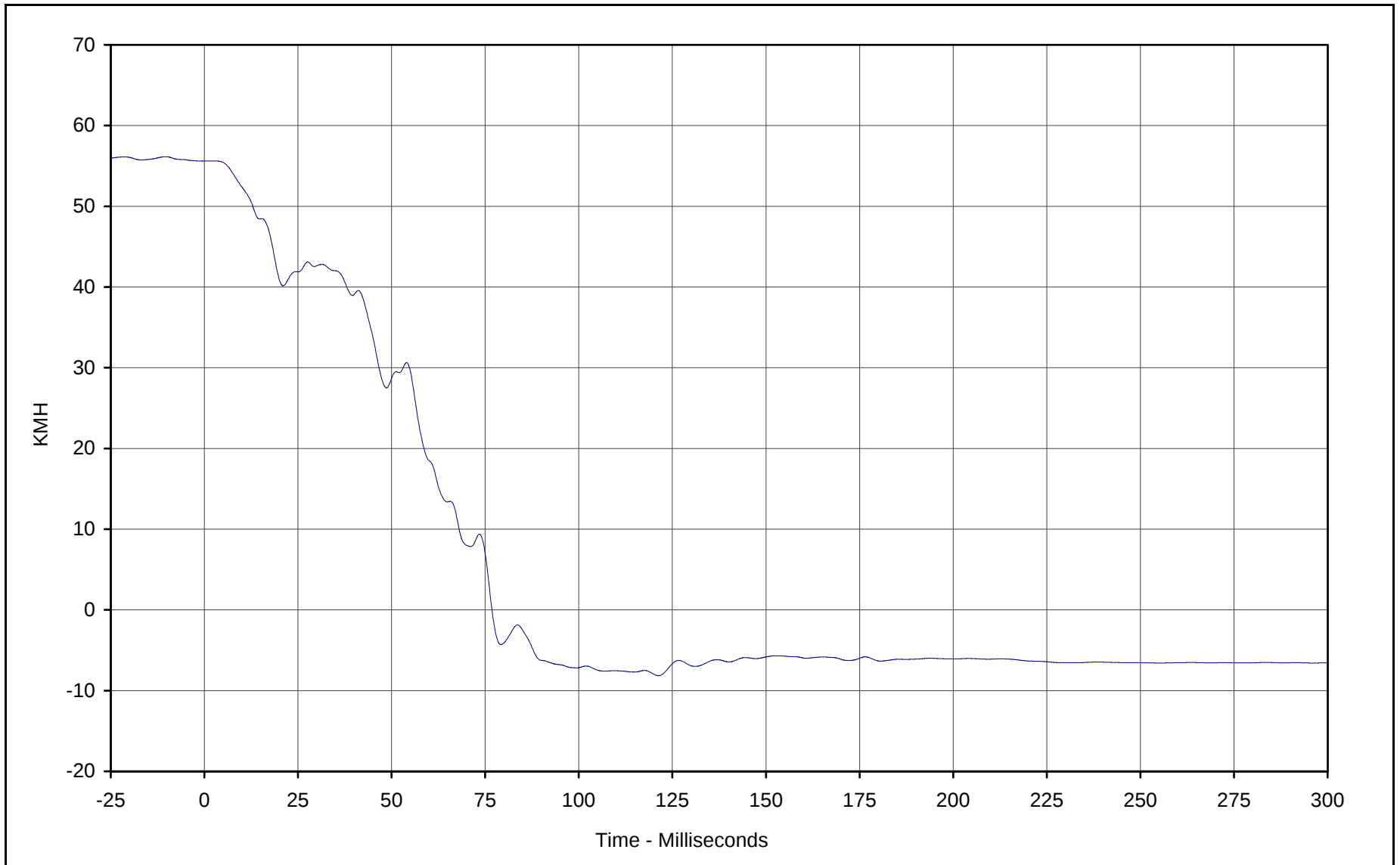
Curve Number: FIL-095

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-142

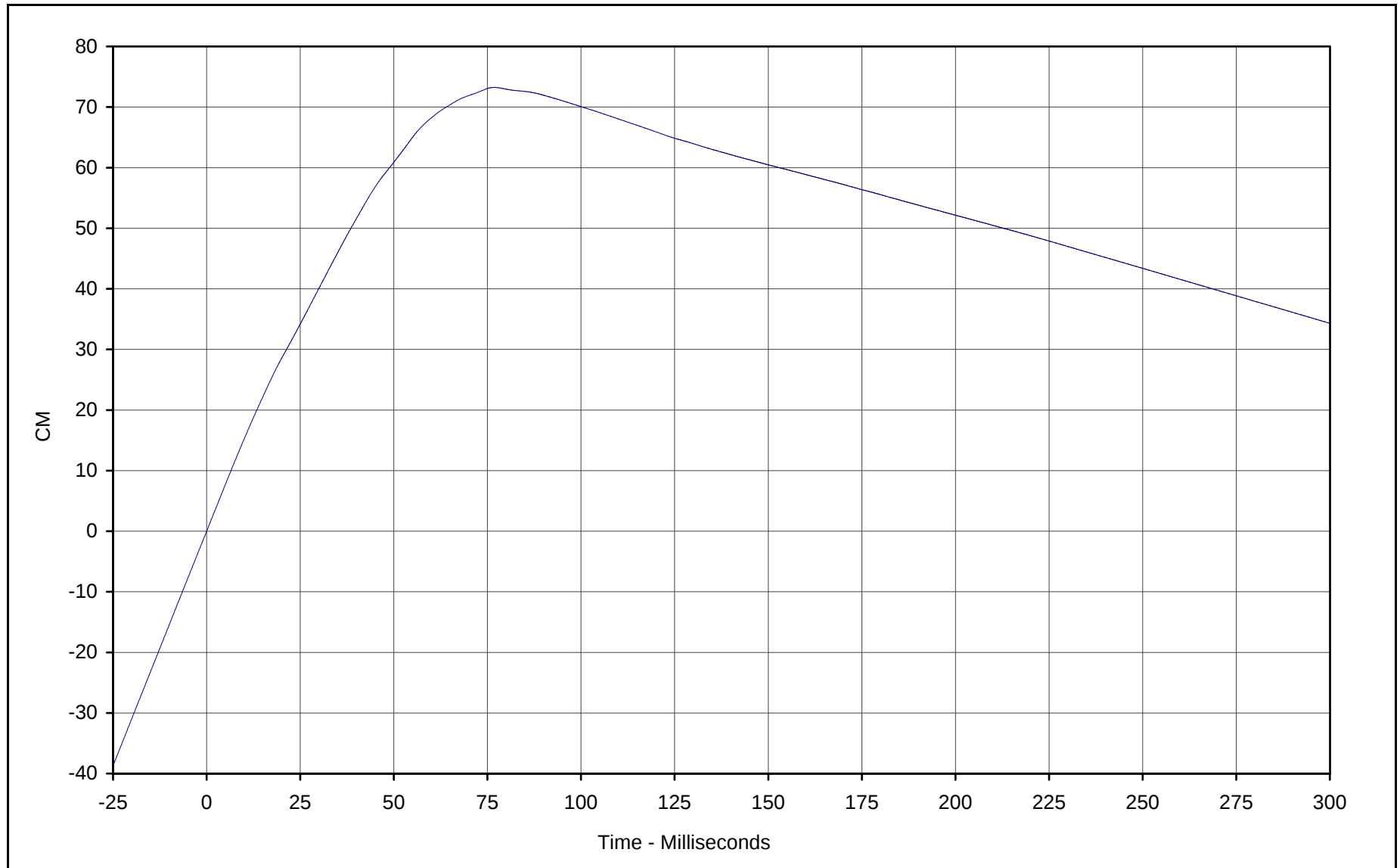


Curve Description: Vehicle Instrument Panel Velocity
Maximum Value: 55.6 at 2.9 Milliseconds
Minimum Value: -8.2 at 121.3 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-095

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



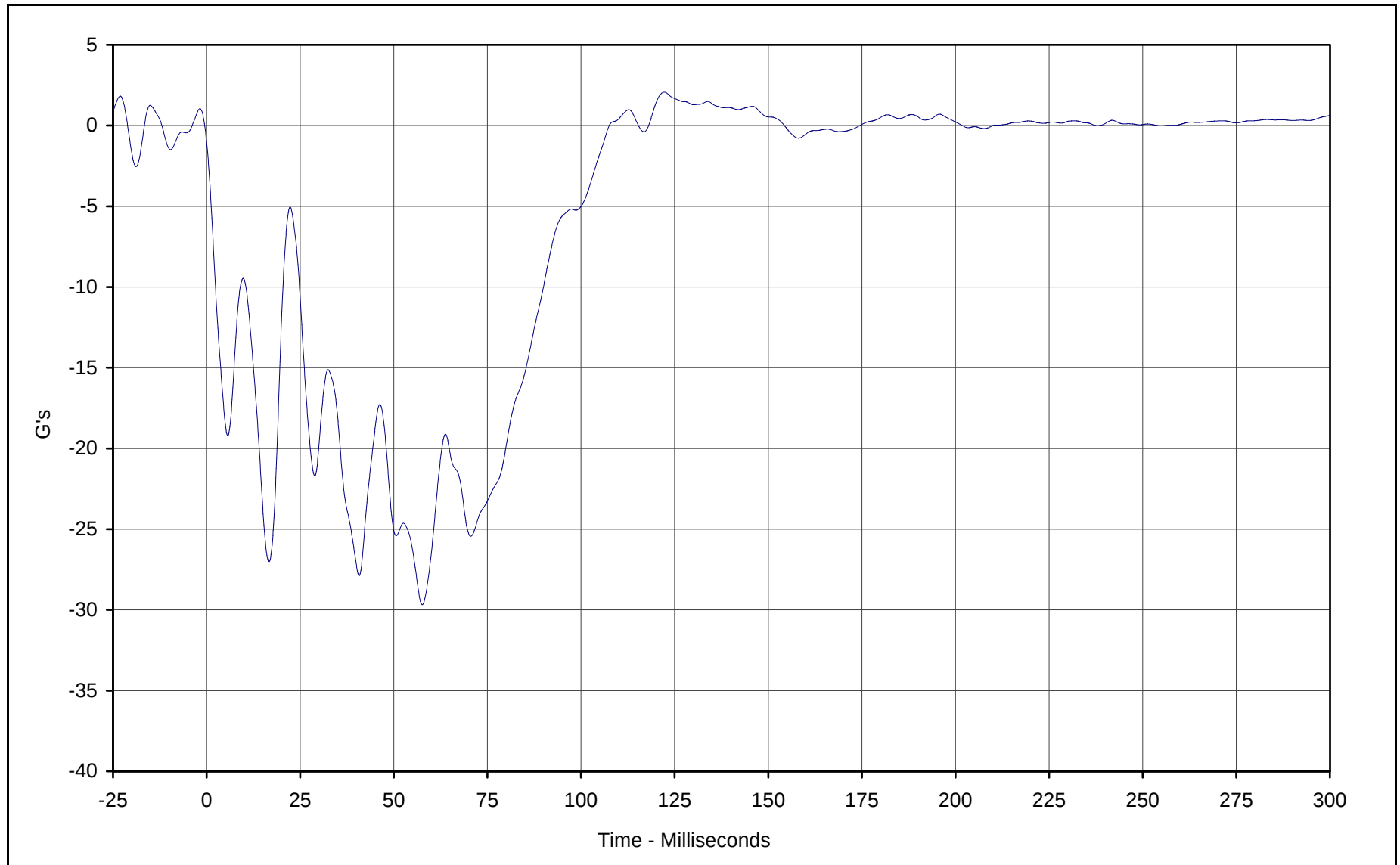
KAR21001-04



Curve Description: Vehicle Instrument Panel Displ.
Maximum Value: 73.2 at 76.8 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-095

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



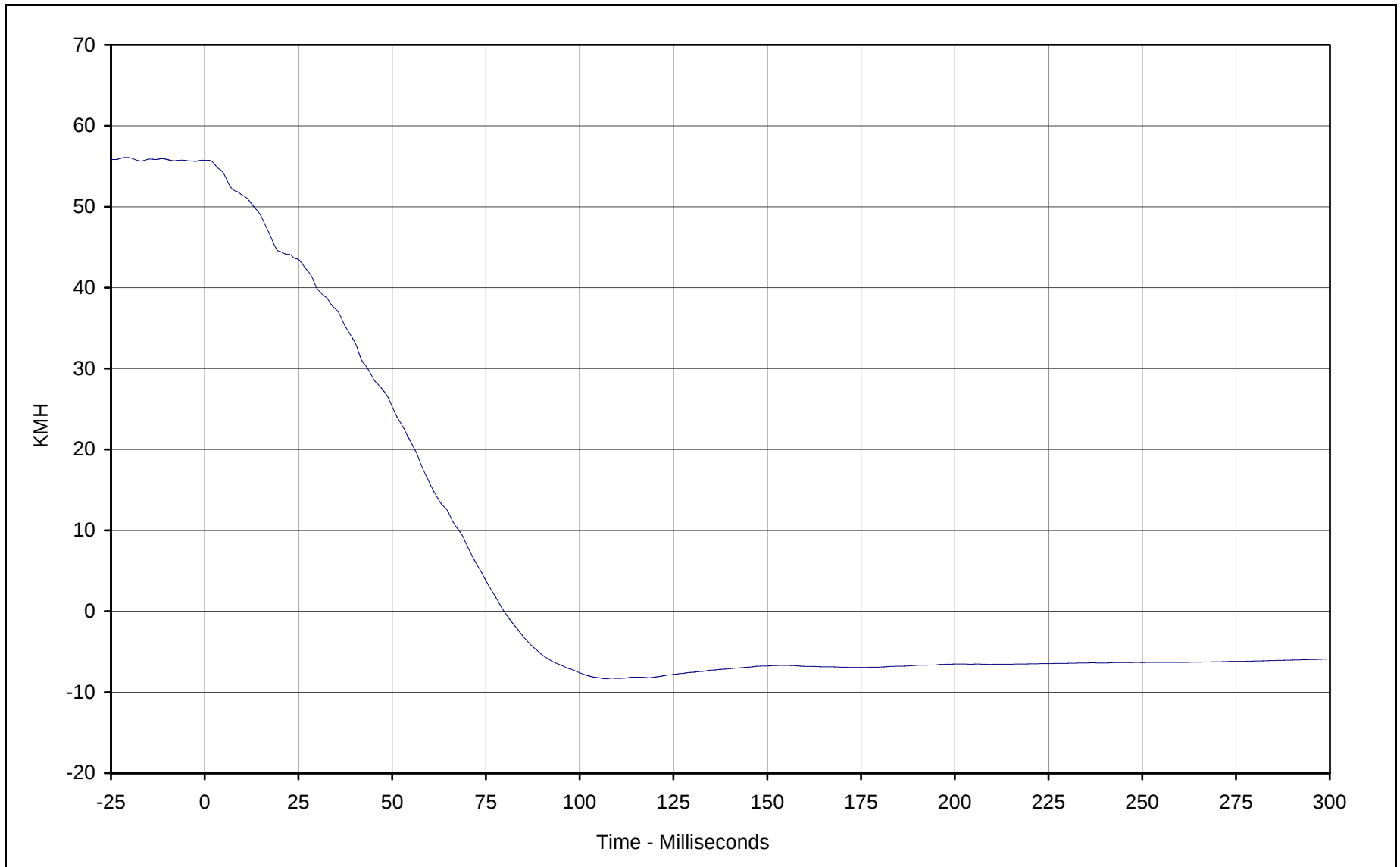


Curve Description: Vehicle Left Rear Redundant
Maximum Value: 2.1 at 122.2 Milliseconds
Minimum Value: -29.7 at 57.6 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: FIL-096

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



B-145

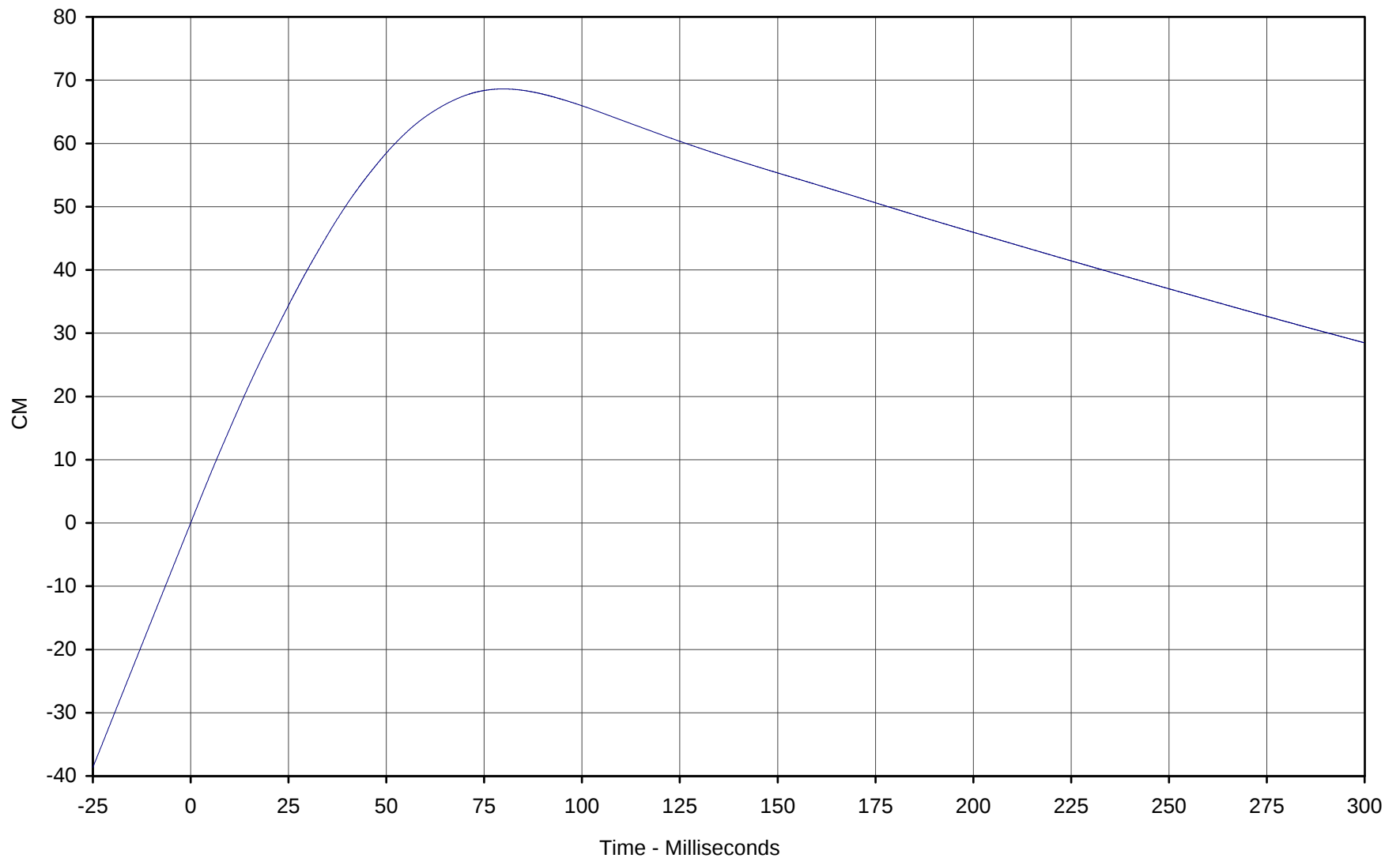


Curve Description: Vehicle Left Rear Redundant Velocity
Maximum Value: 55.7 at 0.8 Milliseconds
Minimum Value: -8.3 at 106.9 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN1-096

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Vehicle Left Rear Redundant Displ.
Maximum Value: 68.6 at 79.8 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 01/11/01
Curve Number: IN2-096

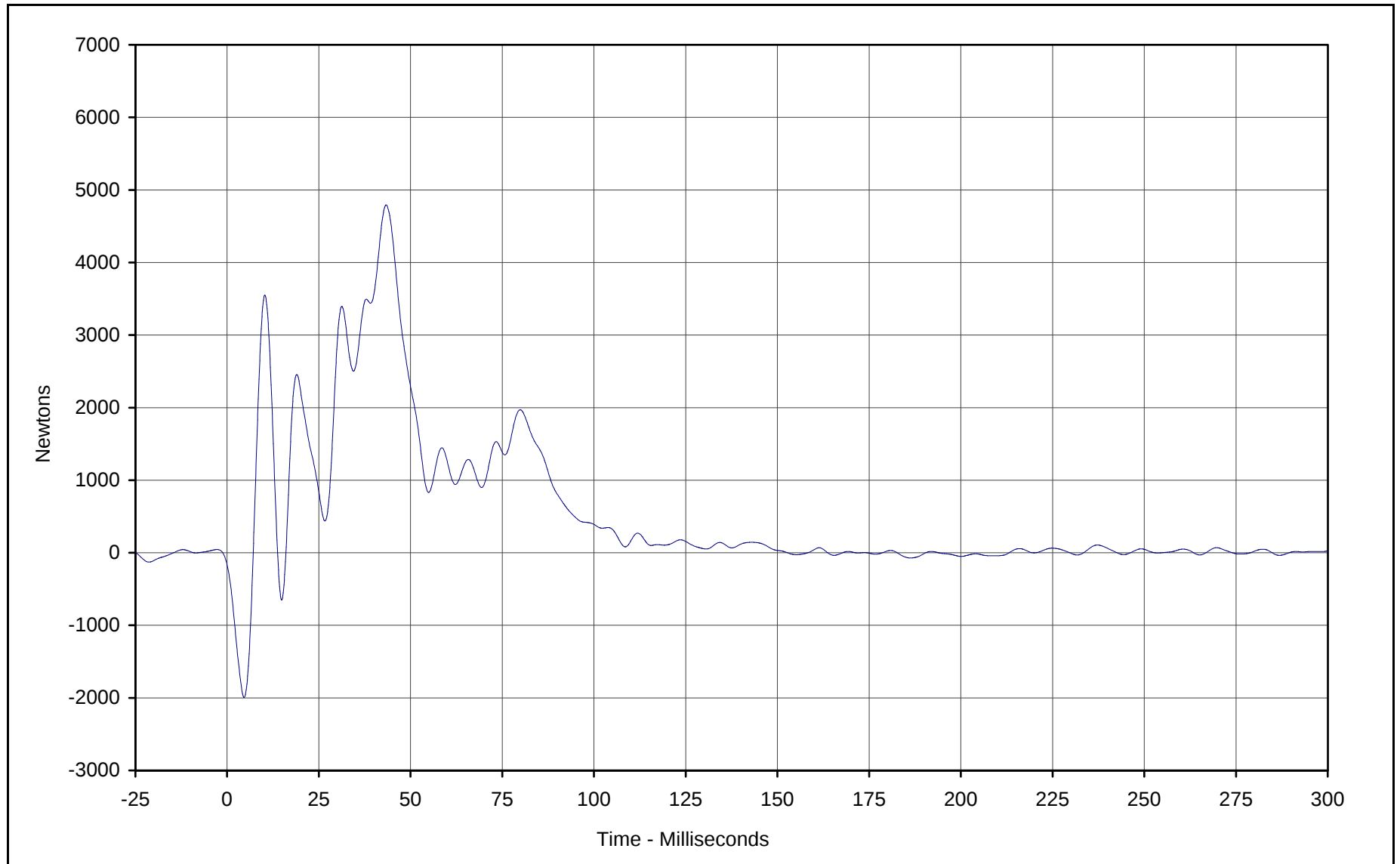
Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



APPENDIX C

LOAD CELL BARRIER INFORMATION

C-1



Curve Description: Barrier Force A2

Maximum Value: 4792.4 at 43.3 Milliseconds

Minimum Value: -1994.0 at 4.6 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

Curve Number: FIL-099

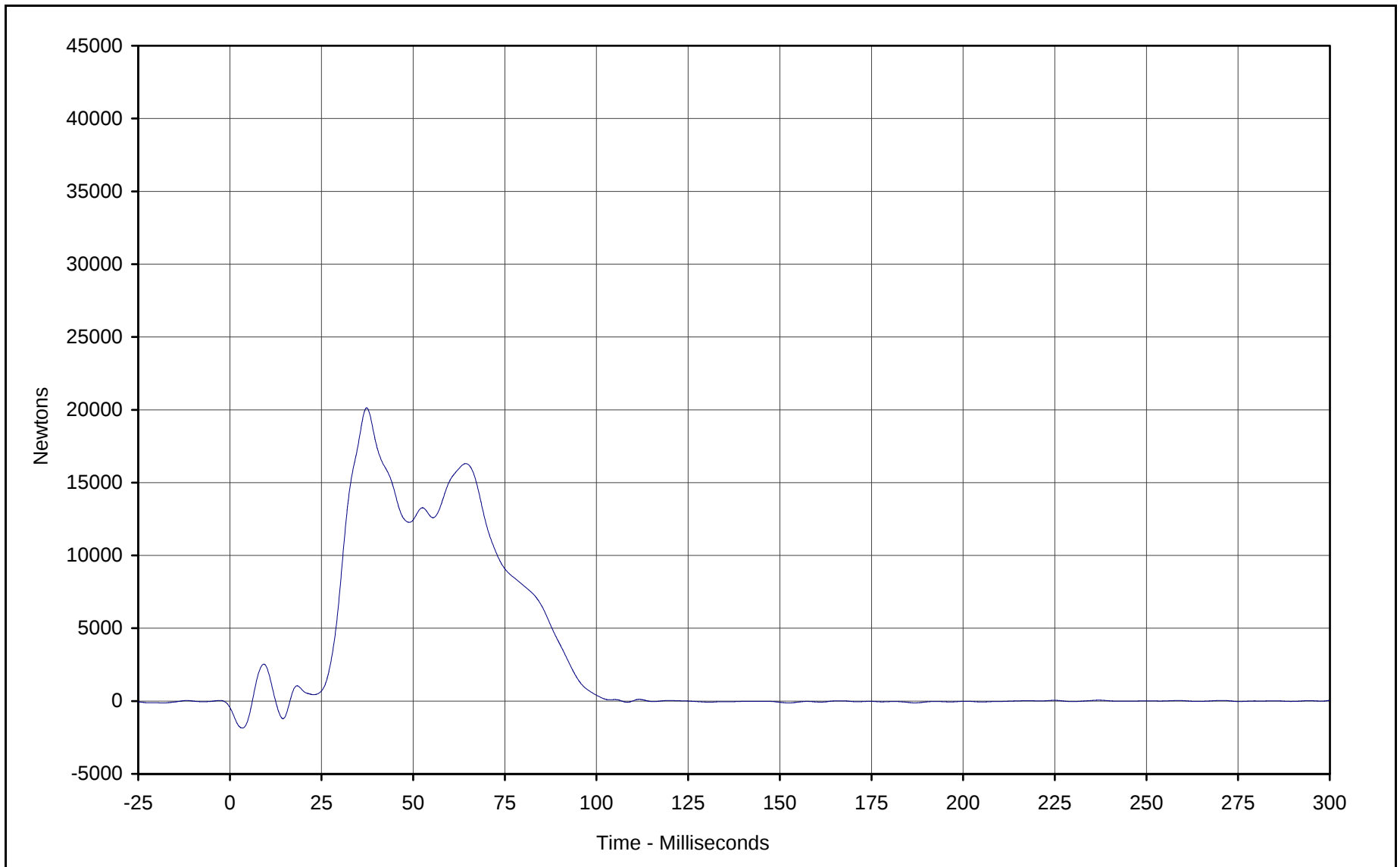
Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

C-2



Curve Description: Barrier Force A3

Maximum Value: 20136.9 at 37.3 Milliseconds

Minimum Value: -1854.9 at 3.4 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

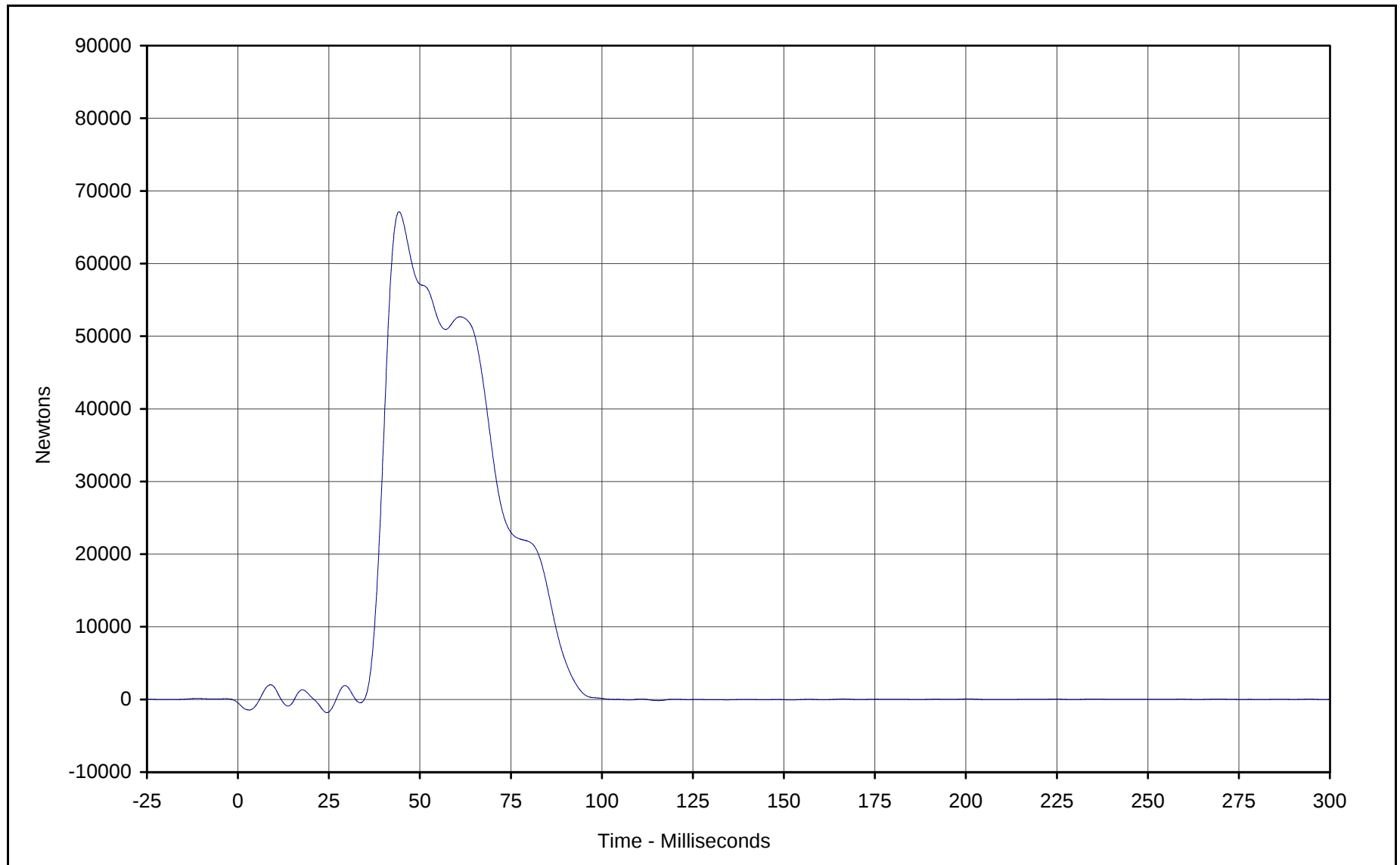
Curve Number: FIL-100

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Barrier Force A4

Maximum Value: 67131.5 at 44.3 Milliseconds

Minimum Value: -1819.5 at 24.4 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

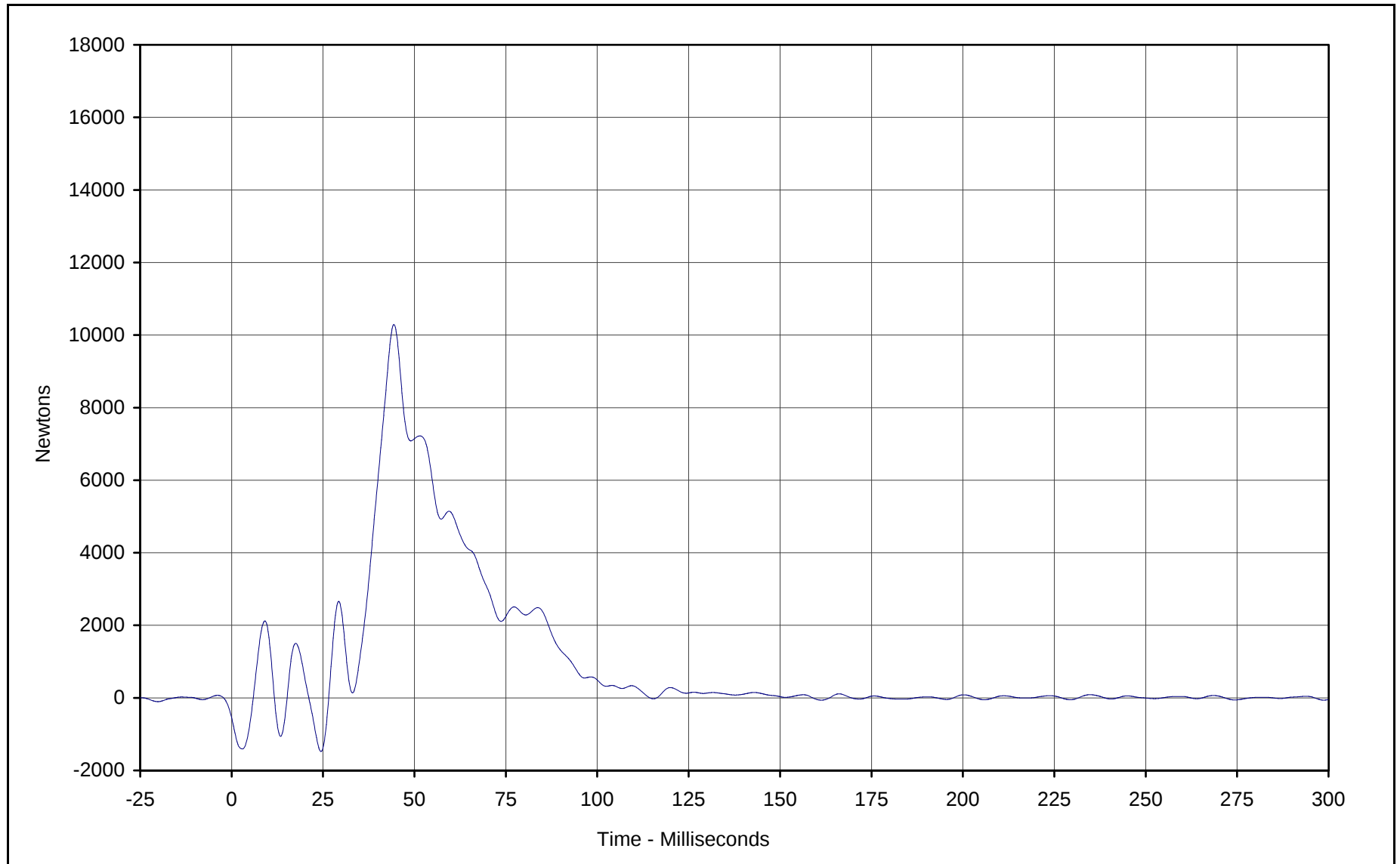
Curve Number: FIL-101

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



C-4



Curve Description: Barrier Force A5

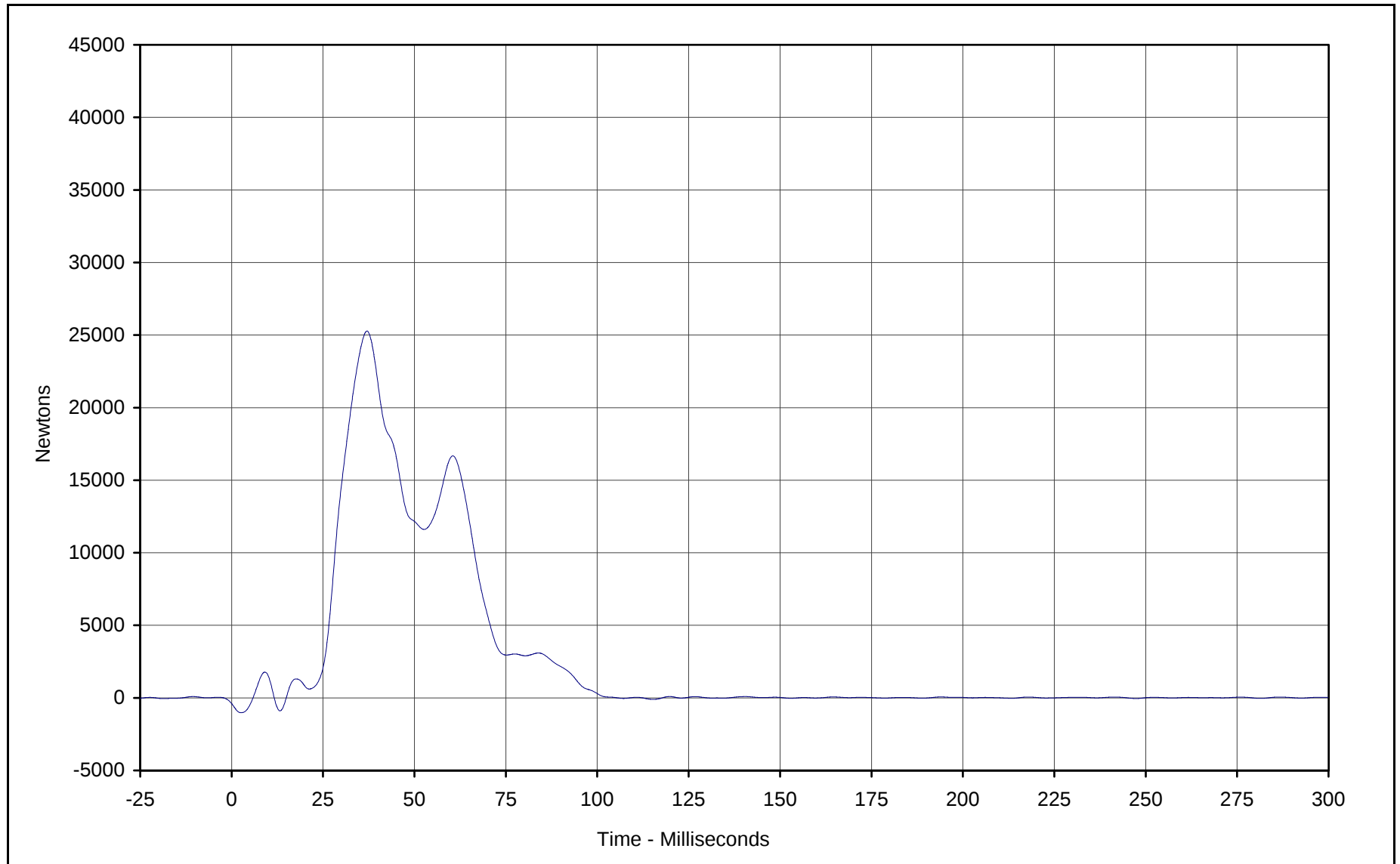
Maximum Value:	<u>10292.1</u>	at	<u>44.4</u>	Milliseconds
Minimum Value:	<u>-1477.0</u>	at	<u>24.4</u>	Milliseconds
SAE Filter Class:	<u>60</u>			
Date of Test:	<u>01/11/01</u>			
Curve Number:	<u>FIL-102</u>			

Test Program:	<u>2001 NHTSA 35mph NCAP No.: M10115</u>
Test Vehicle:	<u>2001 Pontiac Grand Am 2 Door Coupe</u>



KAR21001-04

C-5



Curve Description: Barrier Force A6

Maximum Value: 25277.3 at 37.0 Milliseconds

Minimum Value: -1017.1 at 2.6 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

Curve Number: FIL-103

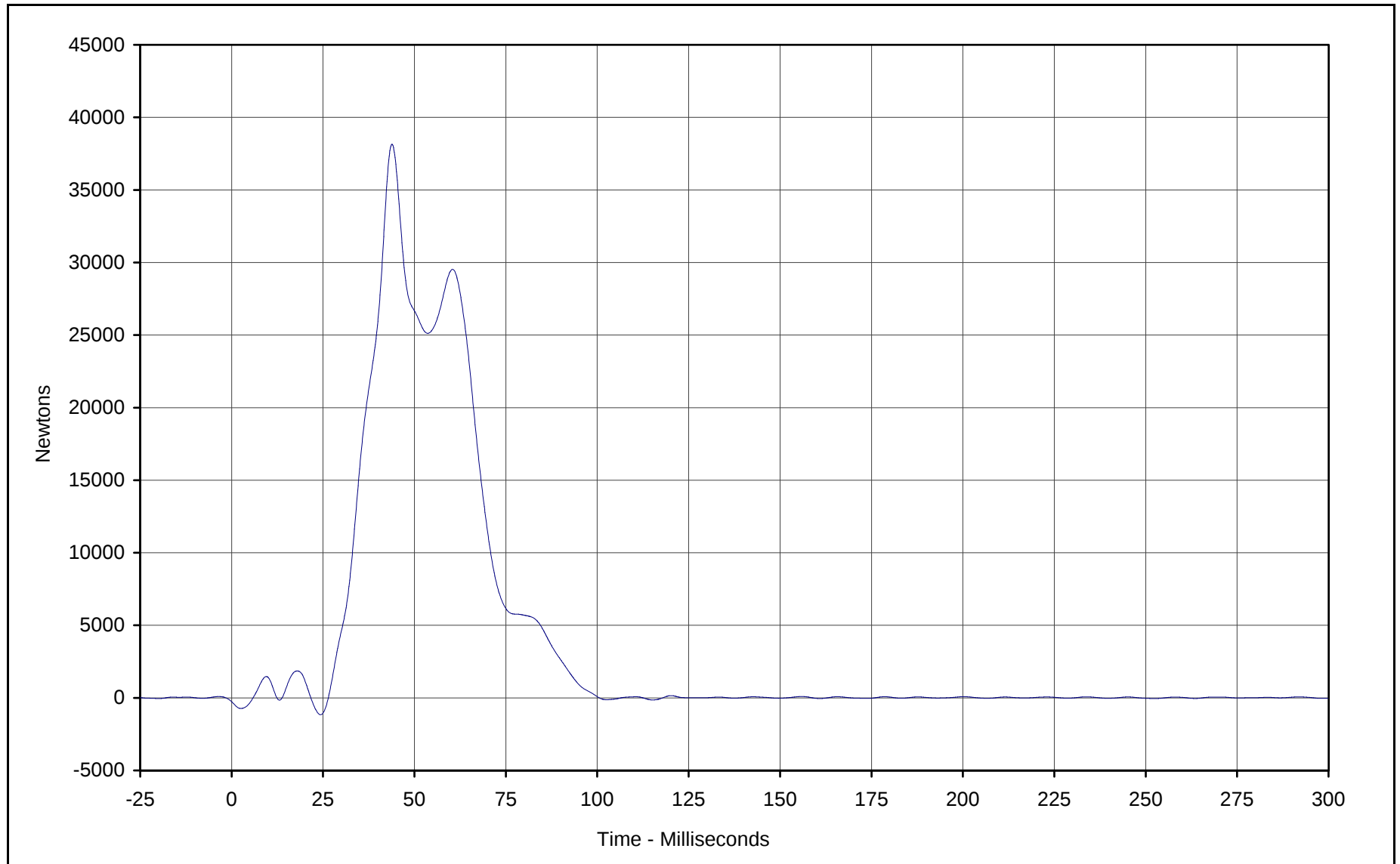
Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

C-6



Curve Description: Barrier Force A7

Maximum Value: 38149.4 at 43.9 Milliseconds

Minimum Value: -1159.8 at 24.3 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

Curve Number: FIL-104

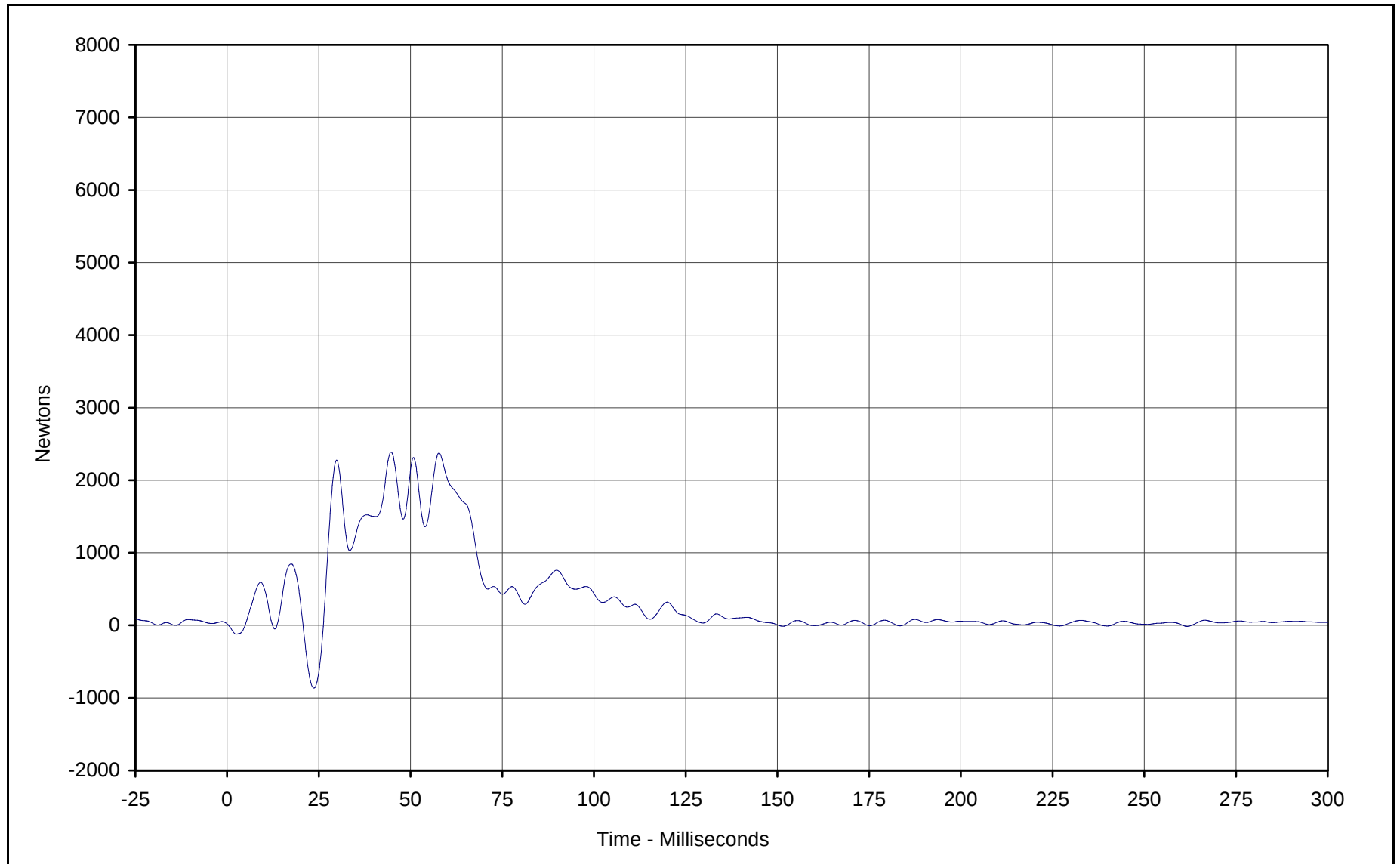
Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

C-7



Curve Description: Barrier Force A8

Maximum Value: 2388.8 at 44.7 Milliseconds

Minimum Value: -864.4 at 23.7 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

Curve Number: FIL-105

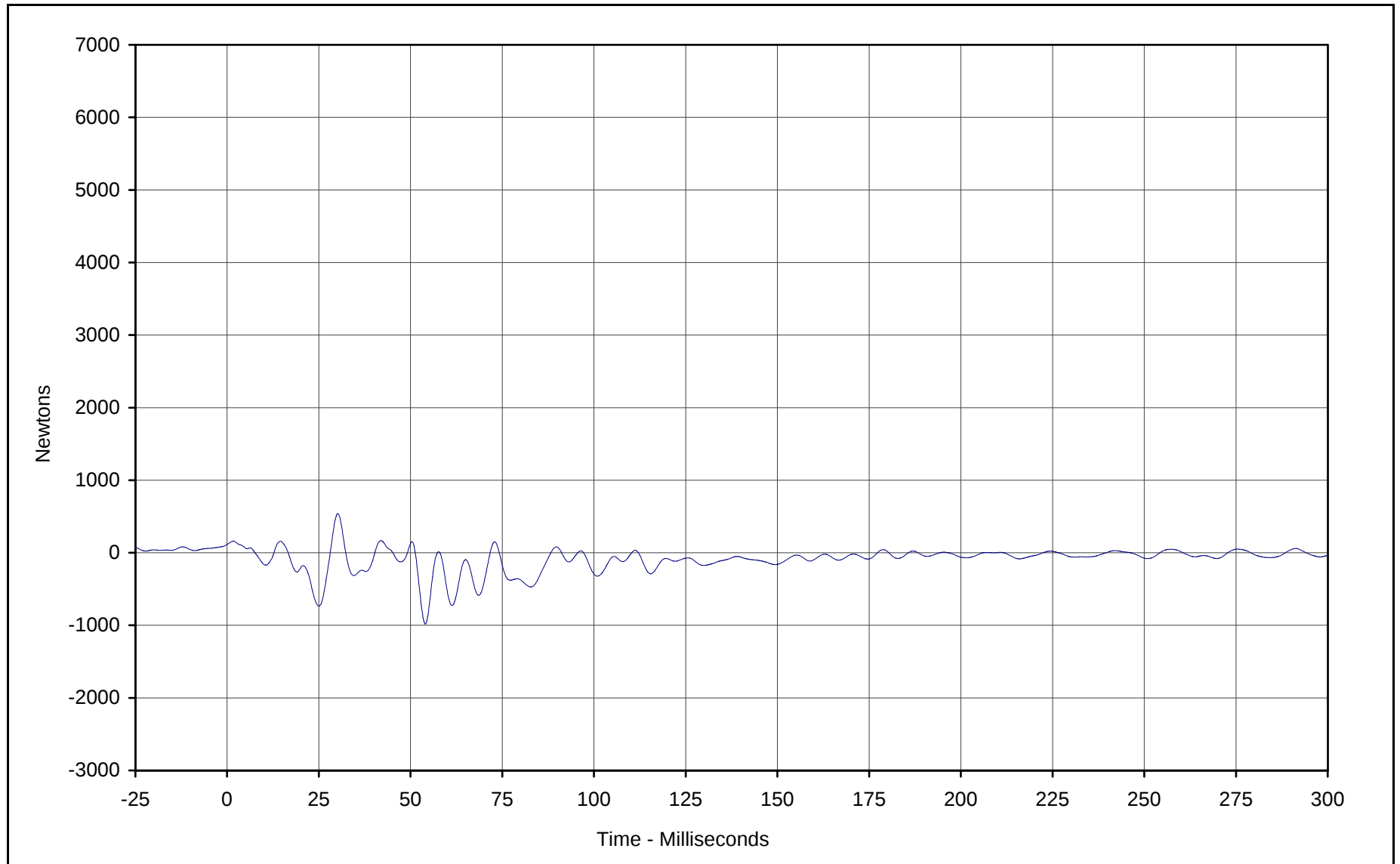
Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04

C-8



Curve Description: Barrier Force A9

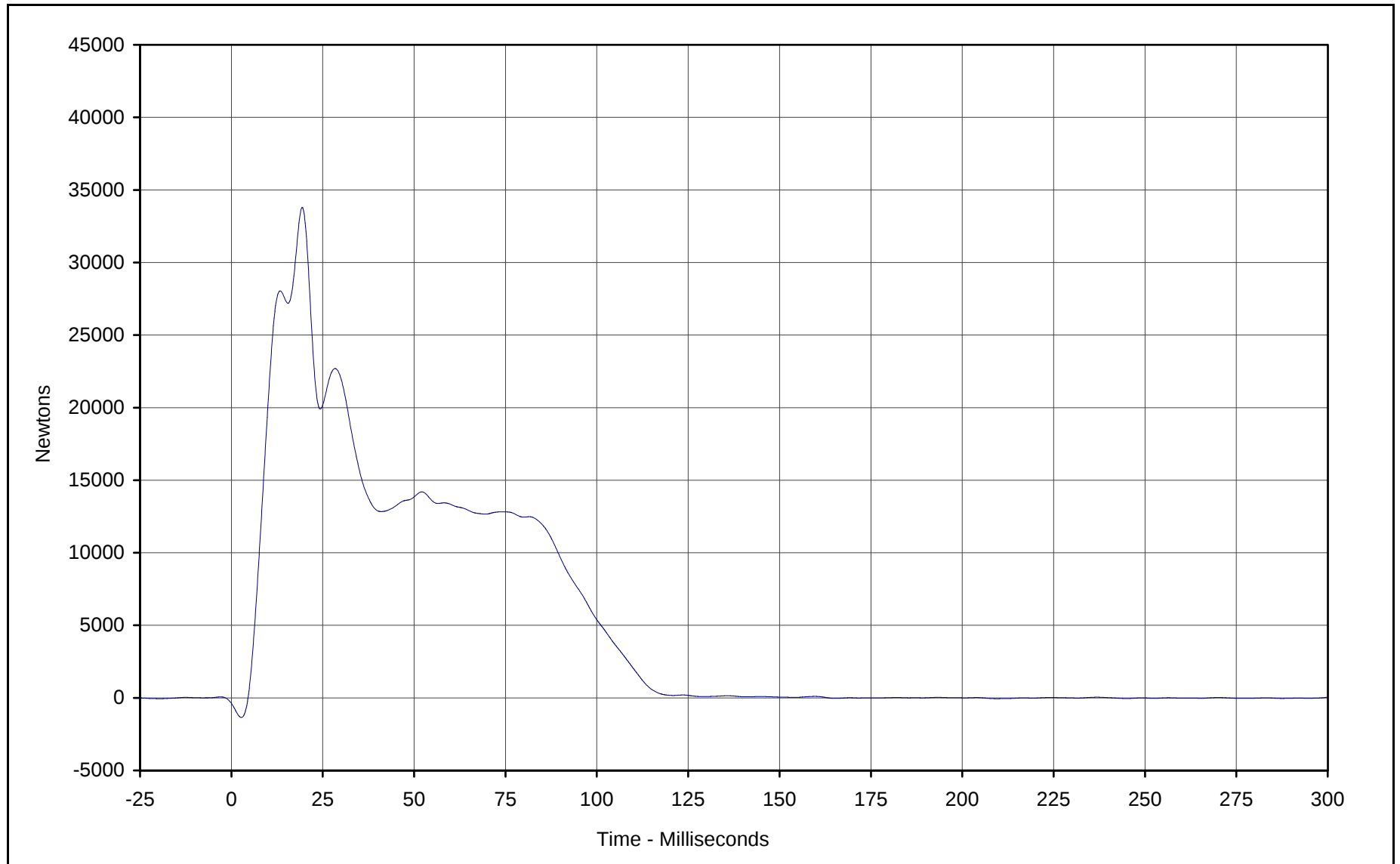
Maximum Value:	<u>539.0</u>	at	<u>30.2</u>	Milliseconds
Minimum Value:	<u>-981.4</u>	at	<u>54.0</u>	Milliseconds
SAE Filter Class:	<u>60</u>			
Date of Test:	<u>01/11/01</u>			
Curve Number:	<u>FIL-106</u>			

Test Program:	<u>2001 NHTSA 35mph NCAP No.: M10115</u>
Test Vehicle:	<u>2001 Pontiac Grand Am 2 Door Coupe</u>



KAR21001-04

C-9



Curve Description: Barrier Force B2

Maximum Value: 33789.6 at 19.4 Milliseconds

Minimum Value: -1350.0 at 2.7 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

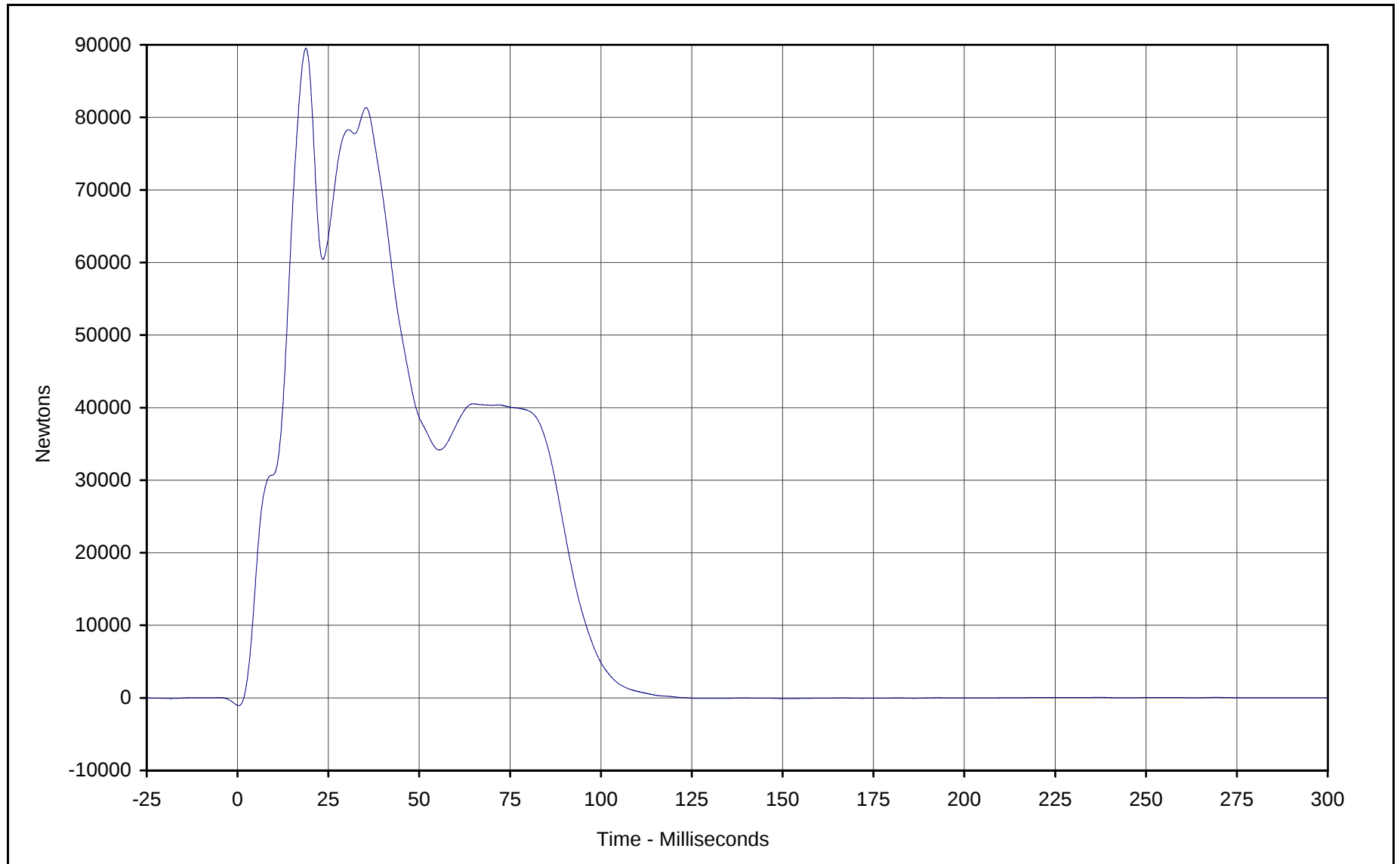
Curve Number: FIL-108

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Barrier Force B3

Maximum Value: 89517.5 at 18.8 Milliseconds

Minimum Value: -1062.6 at 0.3 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

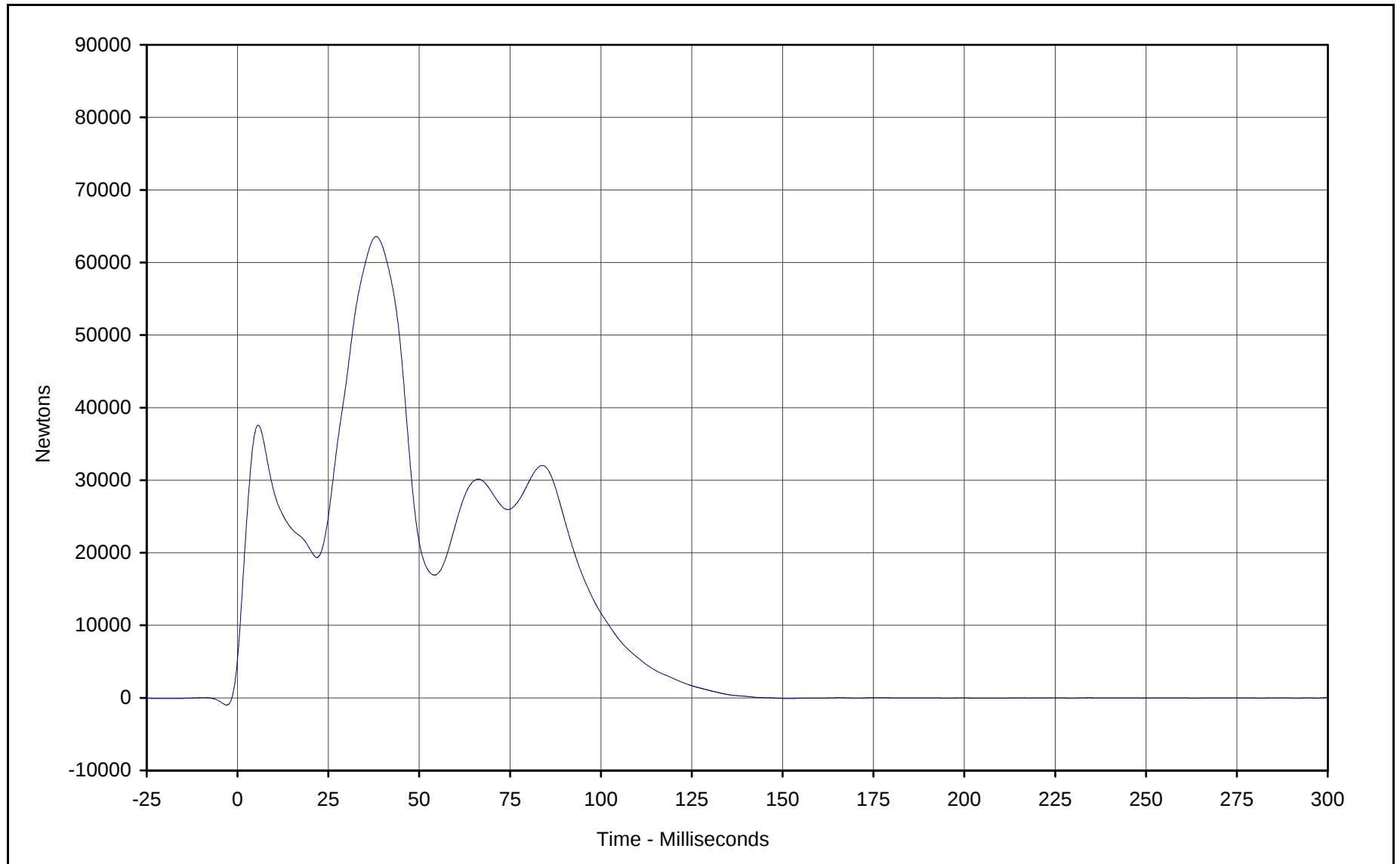
Curve Number: FIL-109

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



C-11



Curve Description: Barrier Force B4

Maximum Value: 63574.4 at 38.1 Milliseconds

Minimum Value: -90.9 at 151.6 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

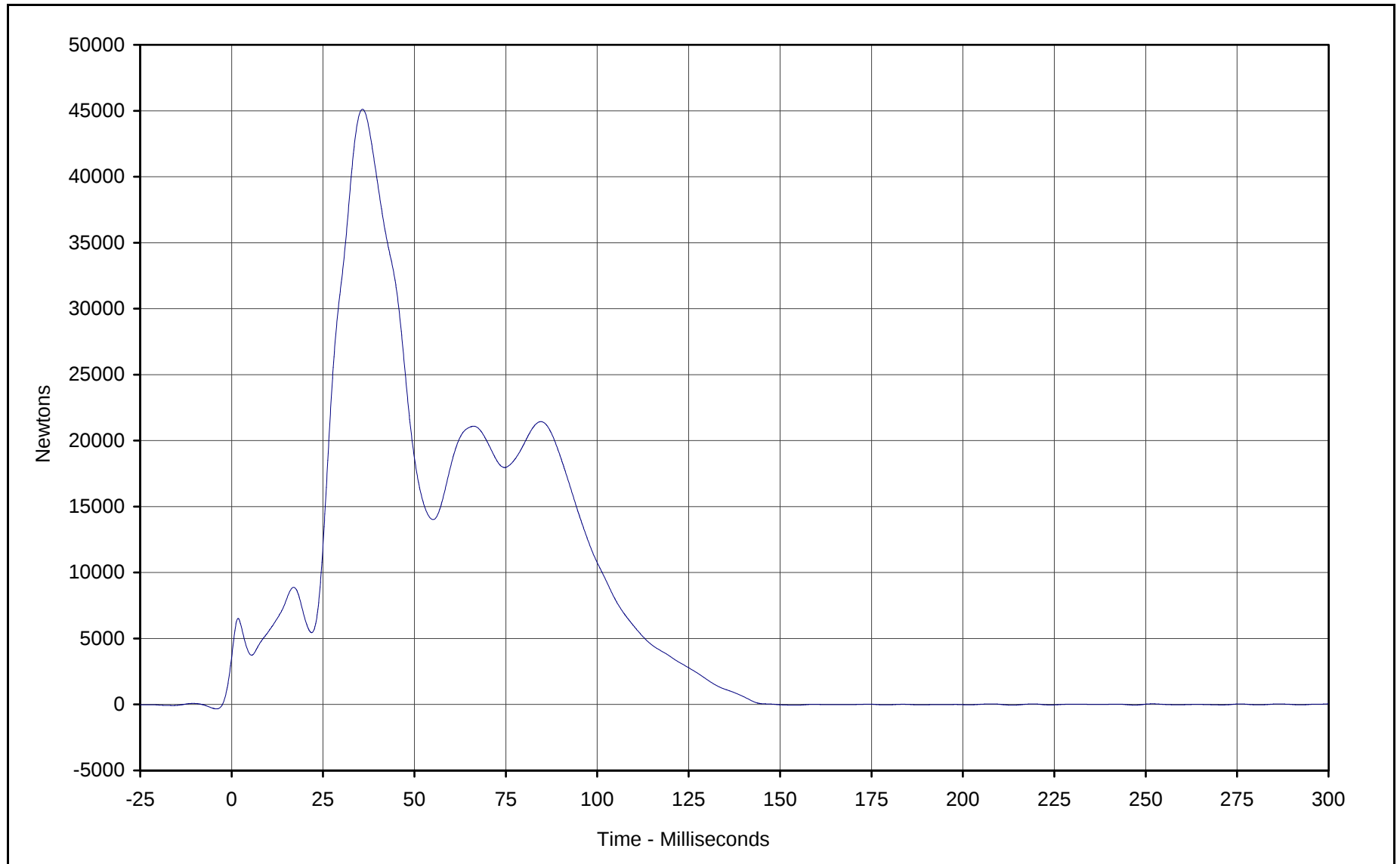
Curve Number: FIL-110

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Barrier Force B5

Maximum Value: 45120.7 at 35.8 Milliseconds

Minimum Value: -60.5 at 213.6 Milliseconds

SAE Filter Class: 60

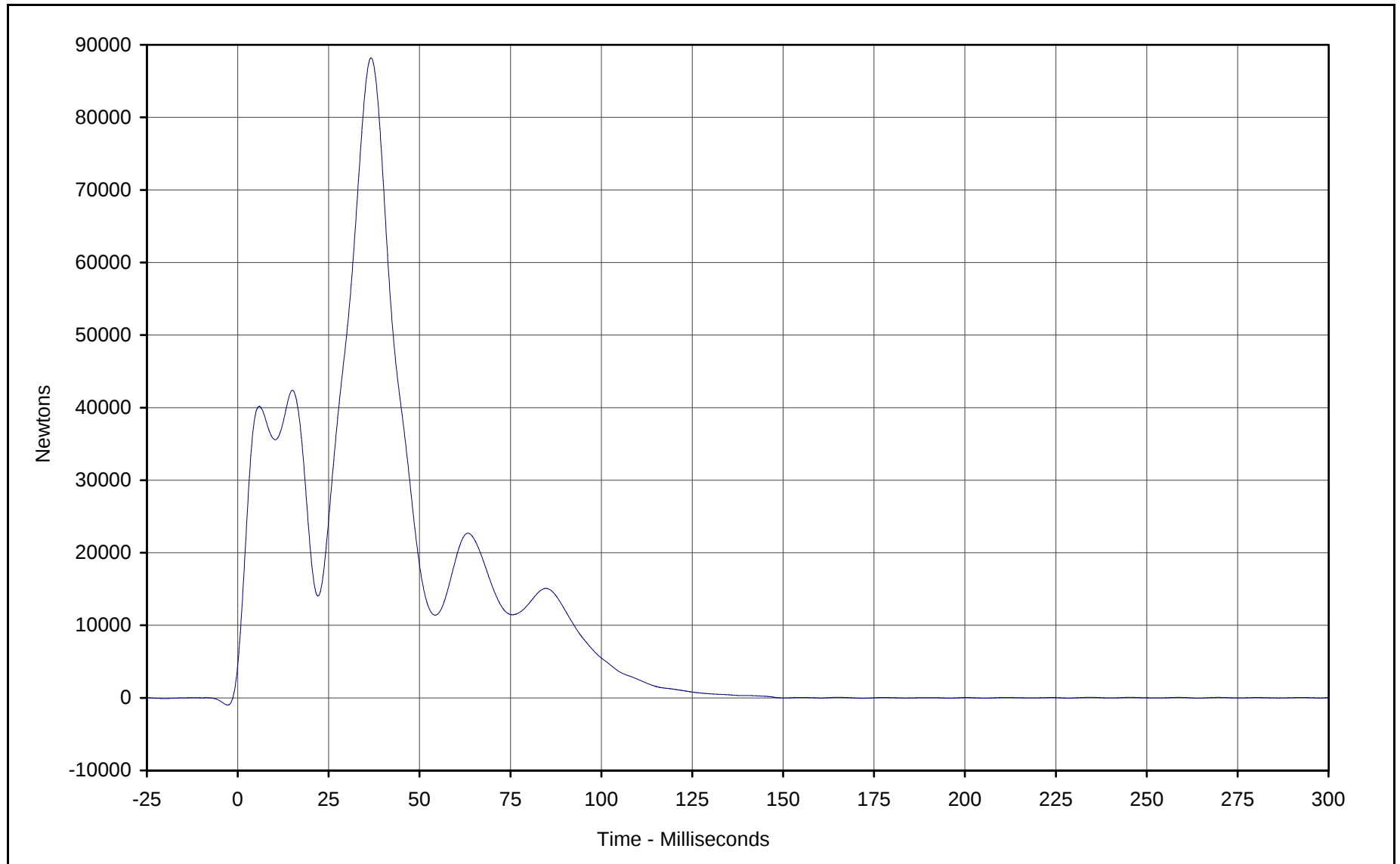
Date of Test: 01/11/01

Curve Number: FIL-111

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Barrier Force B6

Maximum Value: 88203.7 at 36.7 Milliseconds

Minimum Value: -54.2 at 171.9 Milliseconds

SAE Filter Class: 60

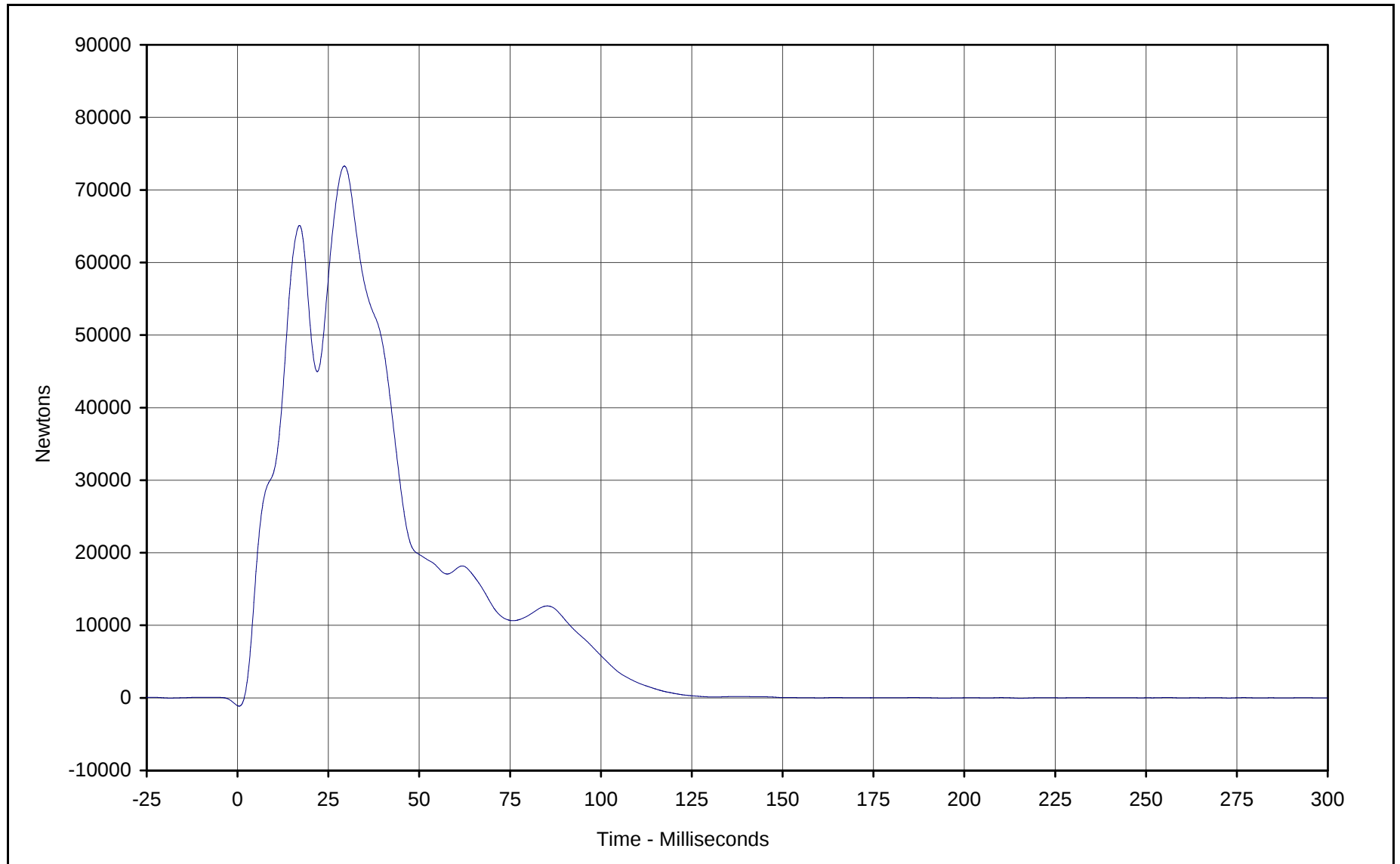
Date of Test: 01/11/01

Curve Number: FIL-112

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Barrier Force B7

Maximum Value: 73290.1 at 29.4 Milliseconds

Minimum Value: -1137.7 at 0.4 Milliseconds

SAE Filter Class: 60

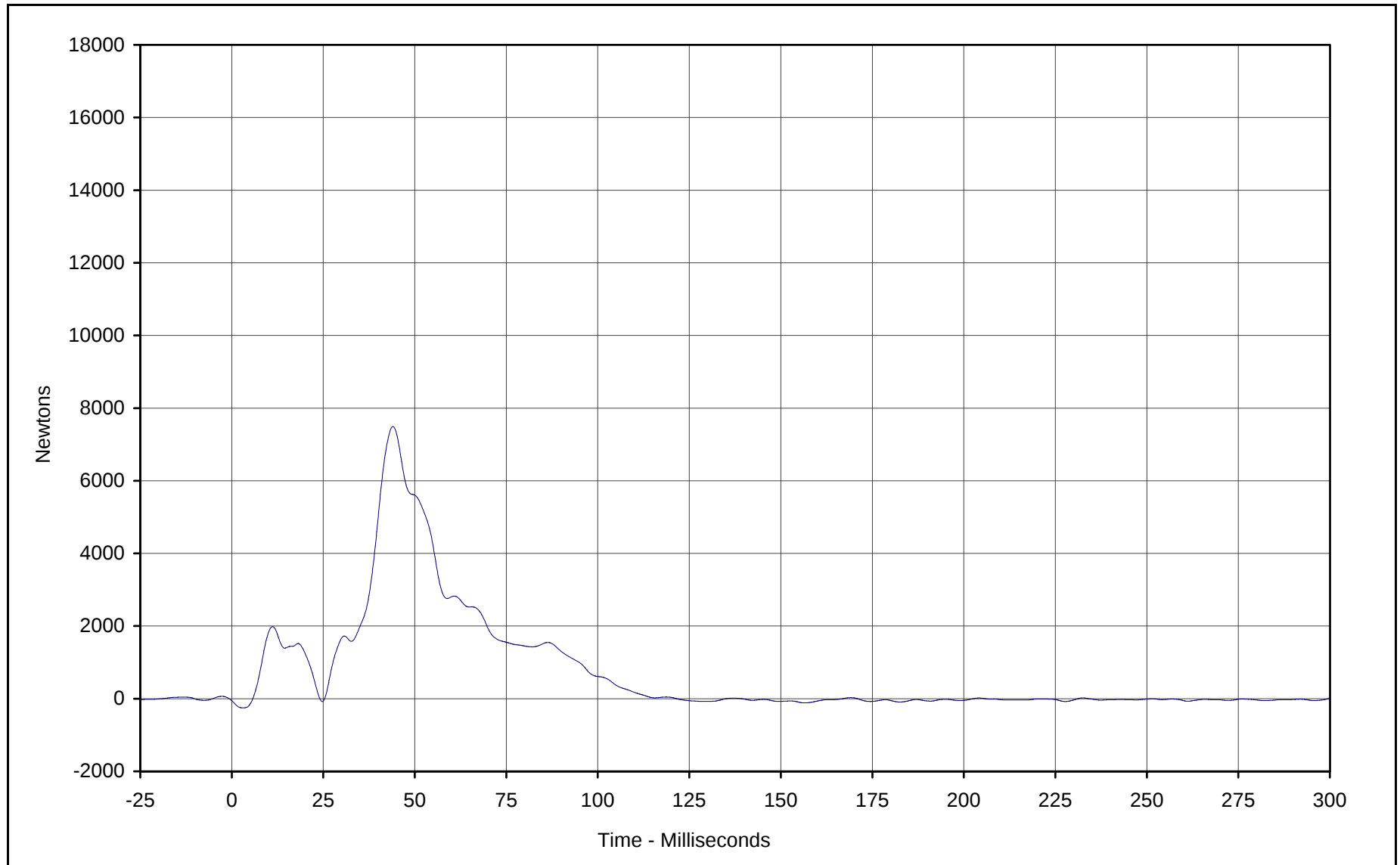
Date of Test: 01/11/01

Curve Number: FIL-113

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Barrier Force B8

Maximum Value: 7494.7 at 44.0 Milliseconds

Minimum Value: -251.9 at 3.1 Milliseconds

SAE Filter Class: 60

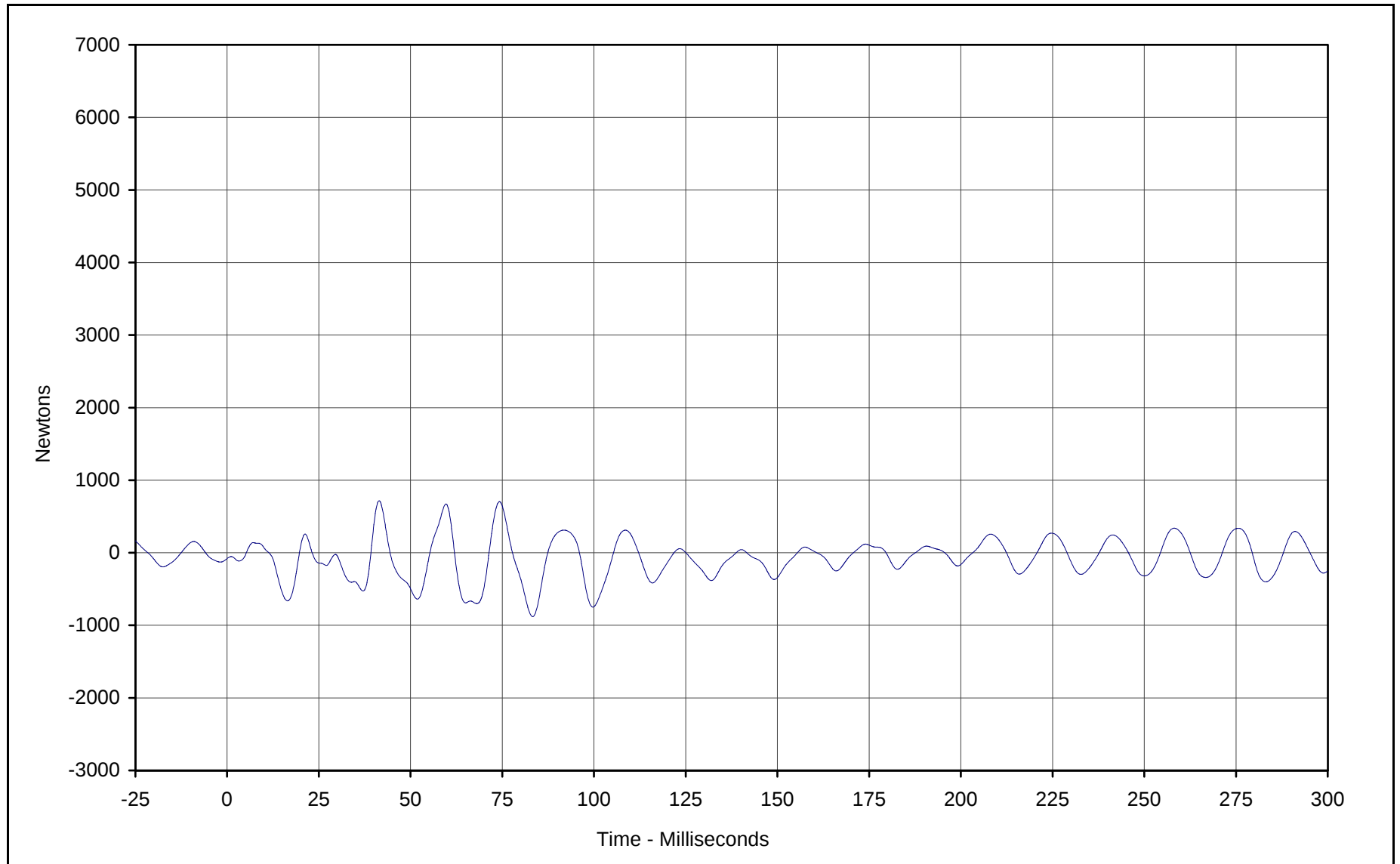
Date of Test: 01/11/01

Curve Number: FIL-114

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Barrier Force B9

Maximum Value: 717.7 at 41.4 Milliseconds

Minimum Value: -880.6 at 83.3 Milliseconds

SAE Filter Class: 60

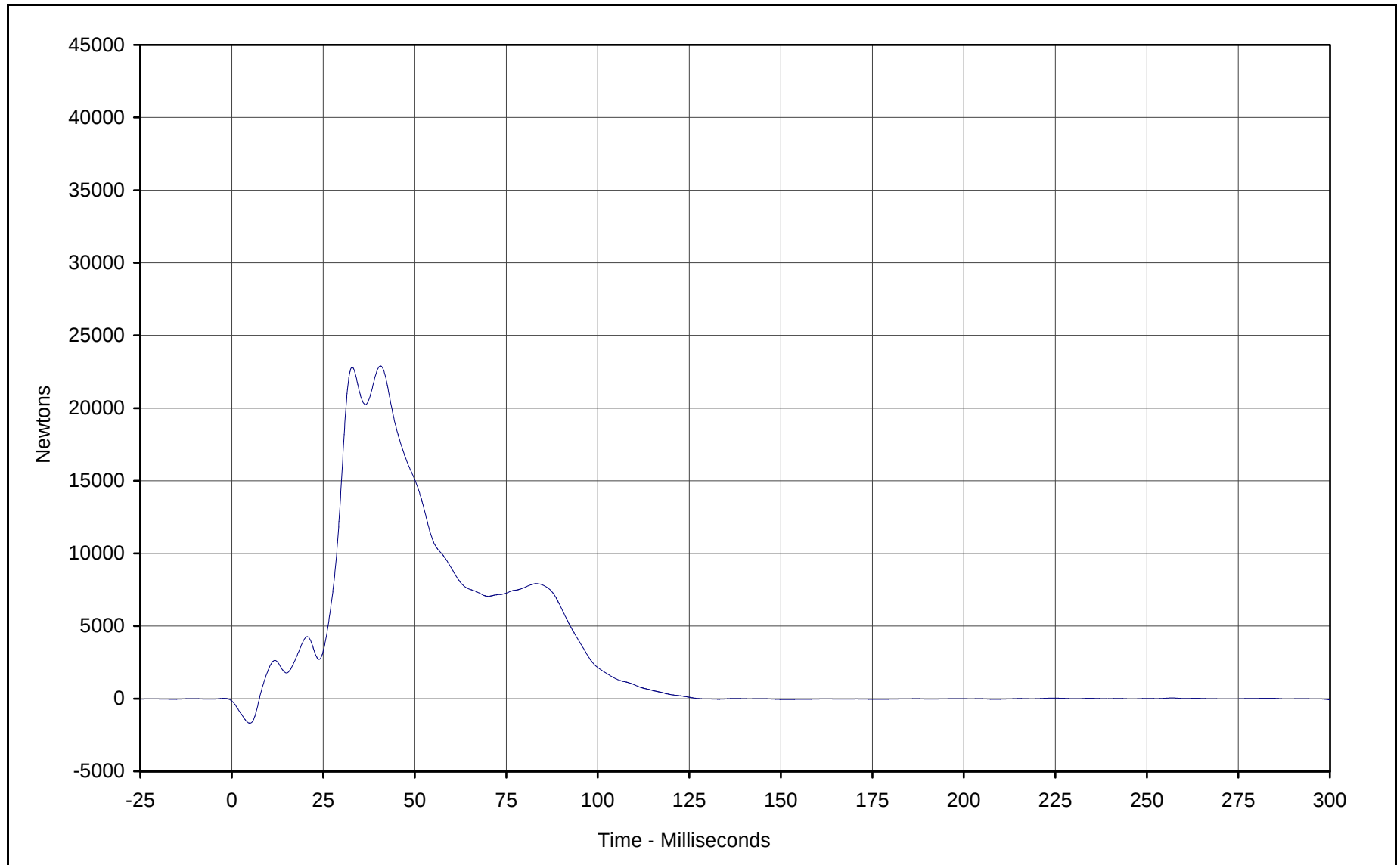
Date of Test: 01/11/01

Curve Number: FIL-115

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Barrier Force C2

Maximum Value: 22899.2 at 40.6 Milliseconds

Minimum Value: -1684.1 at 4.9 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

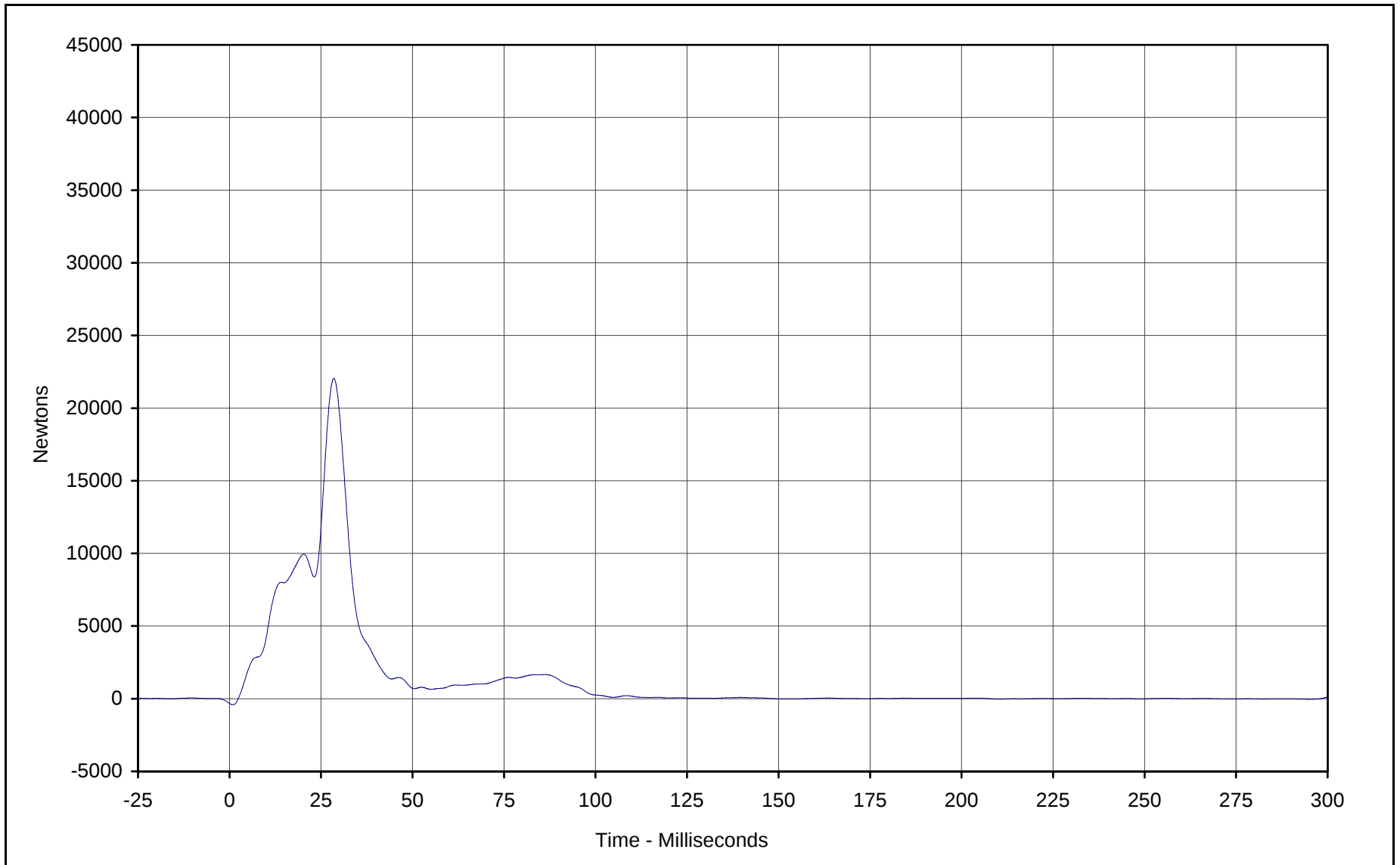
Curve Number: FIL-117

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



C-18



Curve Description: Barrier Force C3

Maximum Value: 22040.8 at 28.5 Milliseconds

Minimum Value: -410.5 at 1.0 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

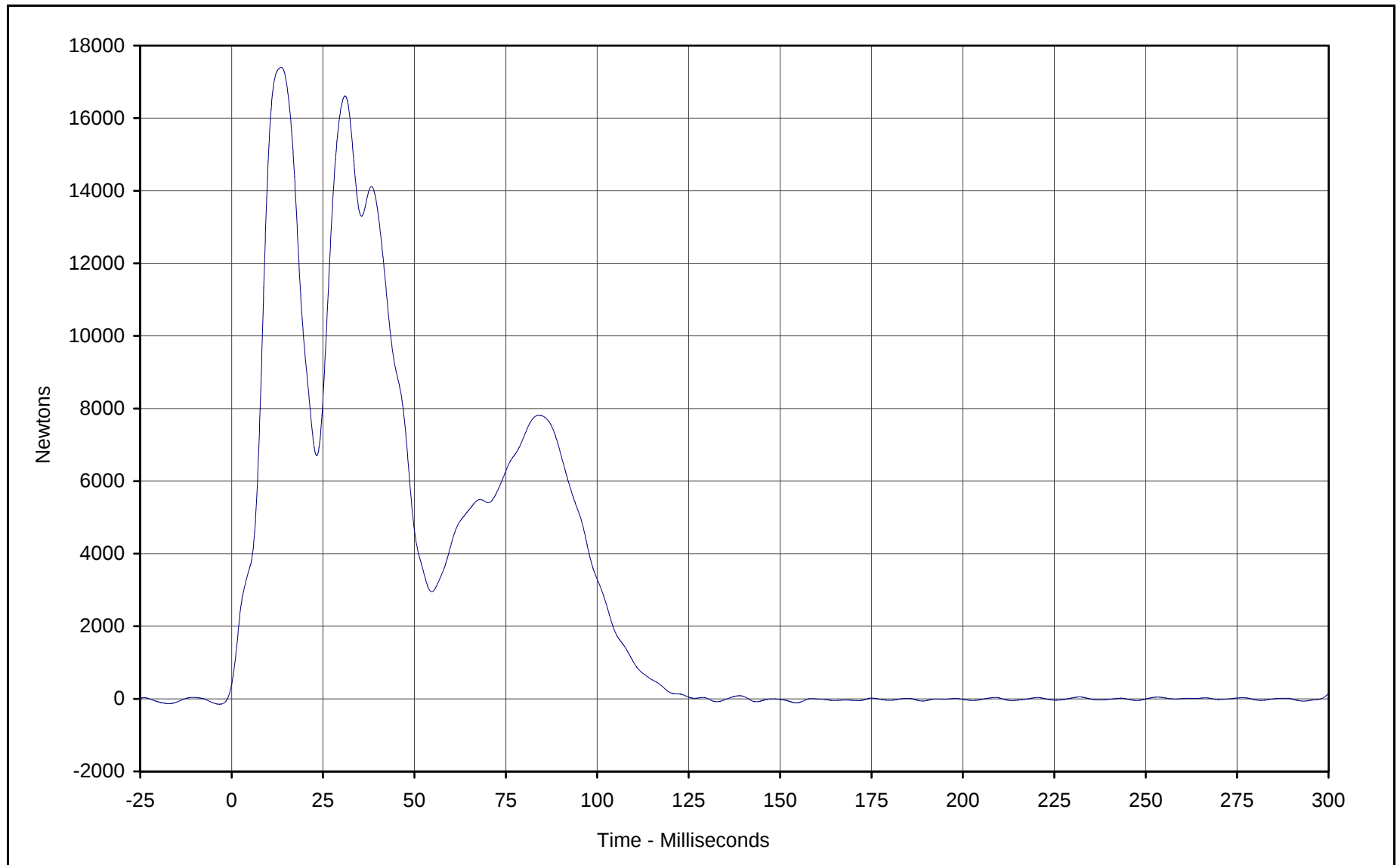
Curve Number: FIL-118

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Barrier Force C4

Maximum Value: 17397.0 at 13.5 Milliseconds

Minimum Value: -110.1 at 154.4 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

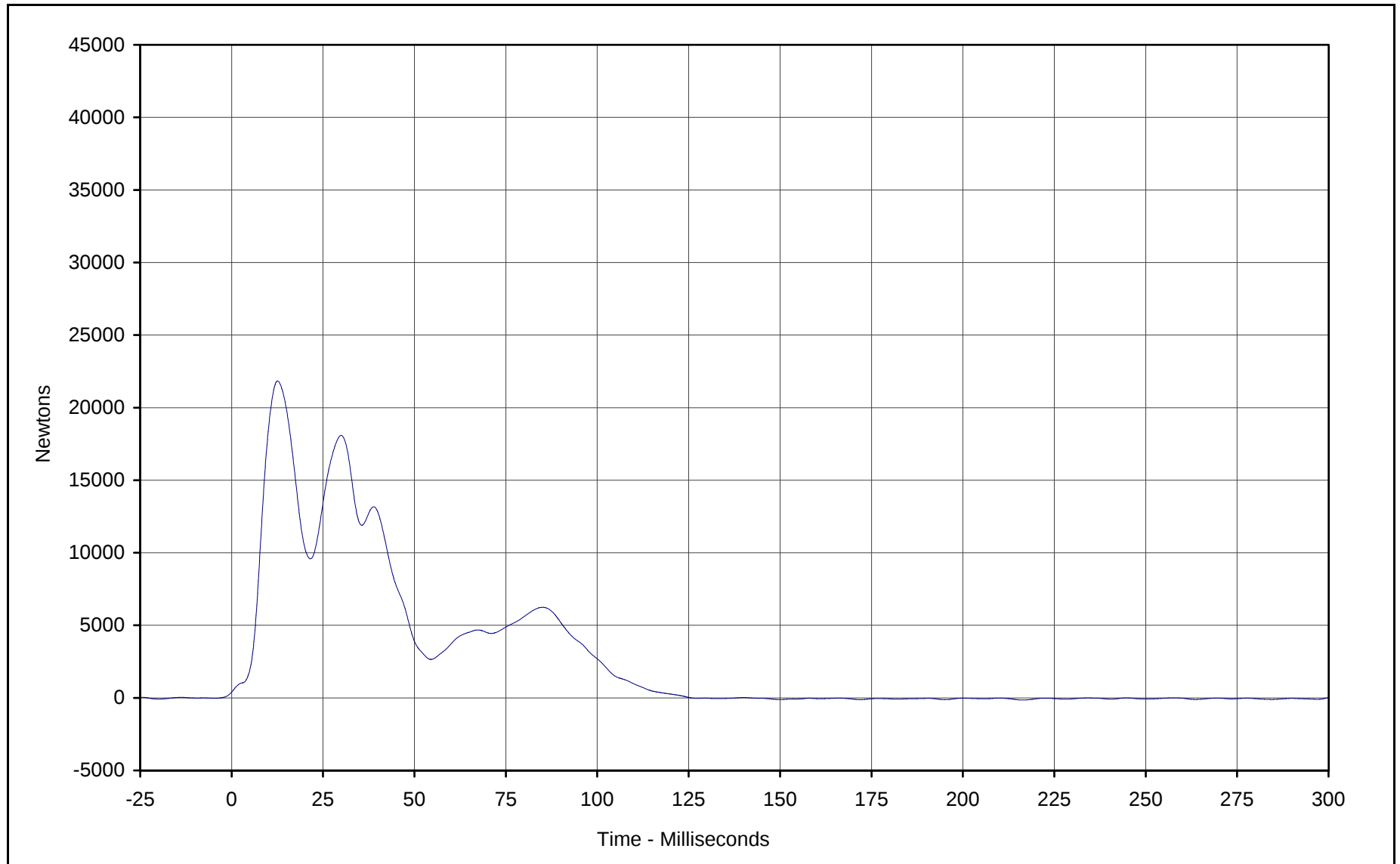
Curve Number: FIL-119

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



C-20



Curve Description: Barrier Force C5

Maximum Value: 21836.4 at 12.6 Milliseconds

Minimum Value: -147.3 at 216.4 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

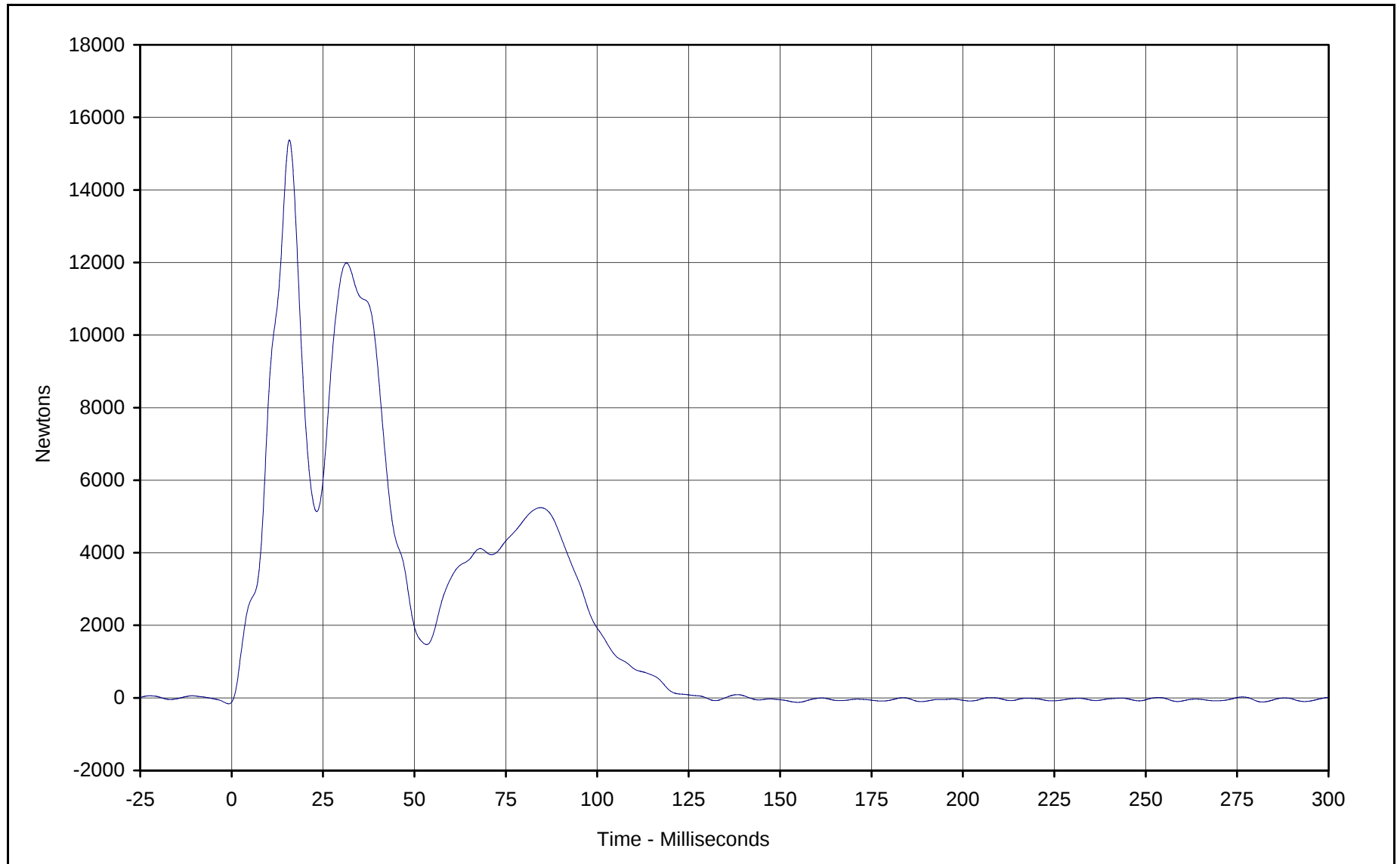
Curve Number: FIL-120

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



KAR21001-04



Curve Description: Barrier Force C6

Maximum Value: 15379.5 at 15.8 Milliseconds

Minimum Value: -122.9 at 154.9 Milliseconds

SAE Filter Class: 60

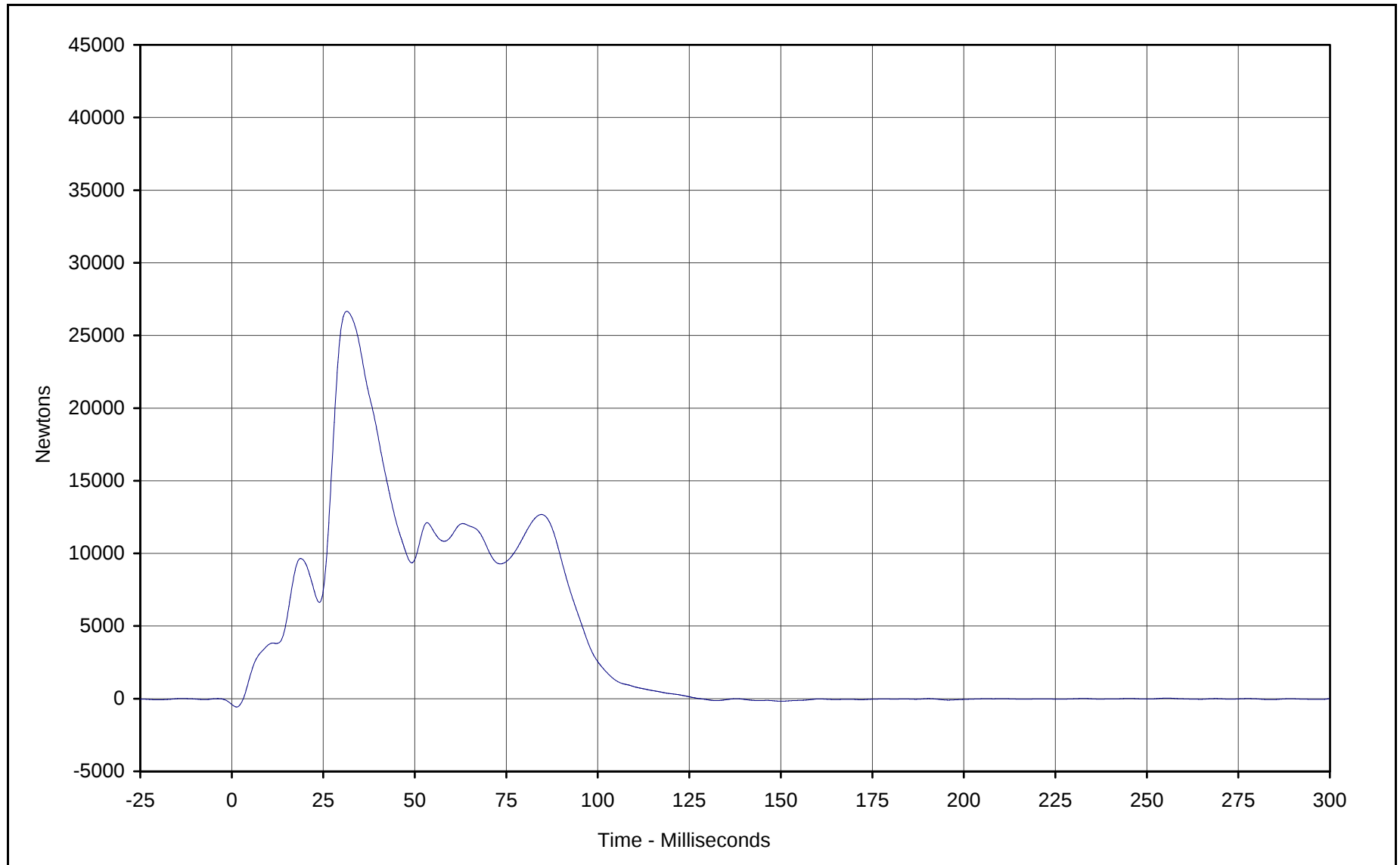
Date of Test: 01/11/01

Curve Number: FIL-121

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Barrier Force C7

Maximum Value: 26664.2 at 31.4 Milliseconds

Minimum Value: -573.4 at 1.3 Milliseconds

SAE Filter Class: 60

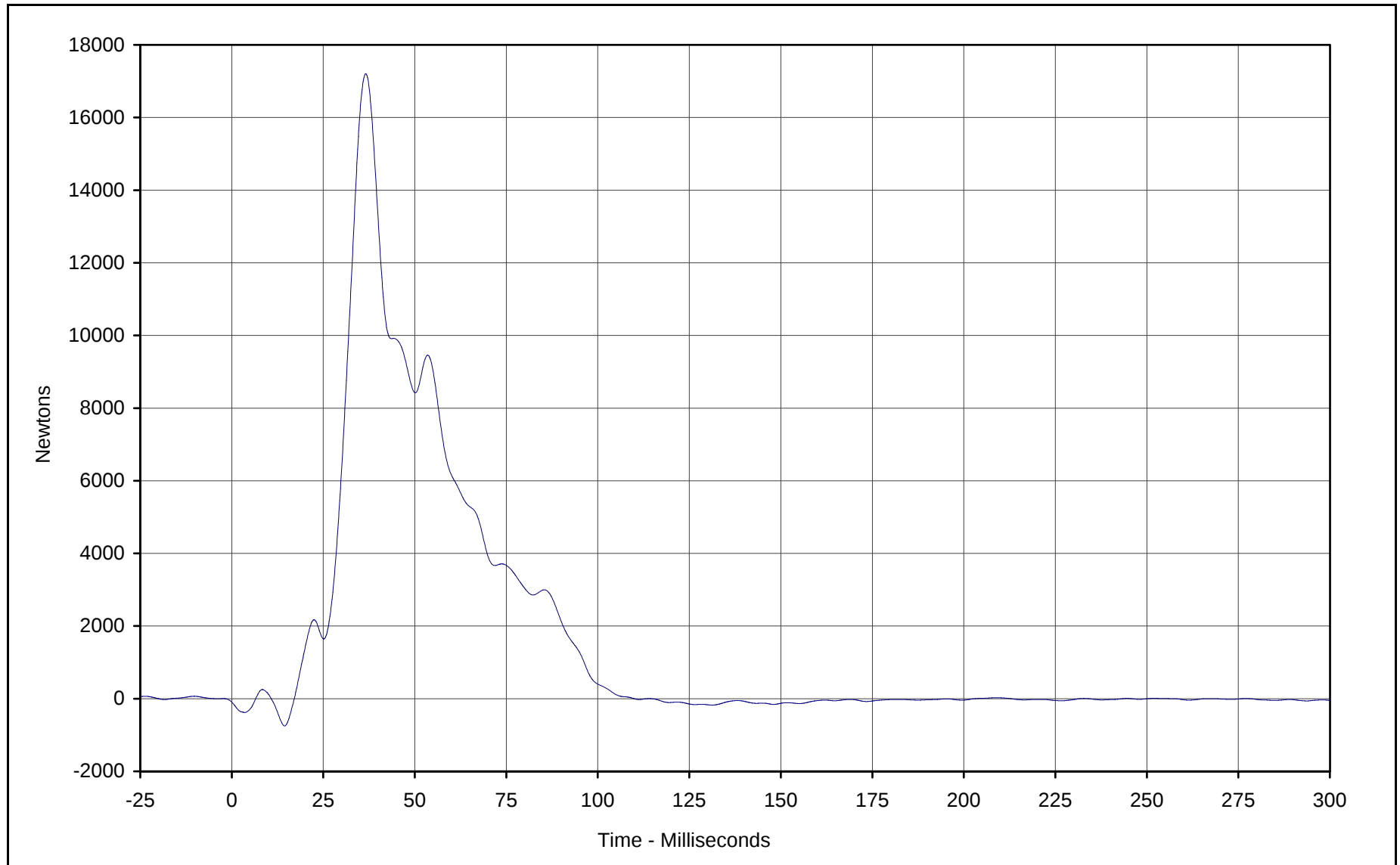
Date of Test: 01/11/01

Curve Number: FIL-122

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Barrier Force C8

Maximum Value: 17204.2 at 36.6 Milliseconds

Minimum Value: -750.5 at 14.4 Milliseconds

SAE Filter Class: 60

Date of Test: 01/11/01

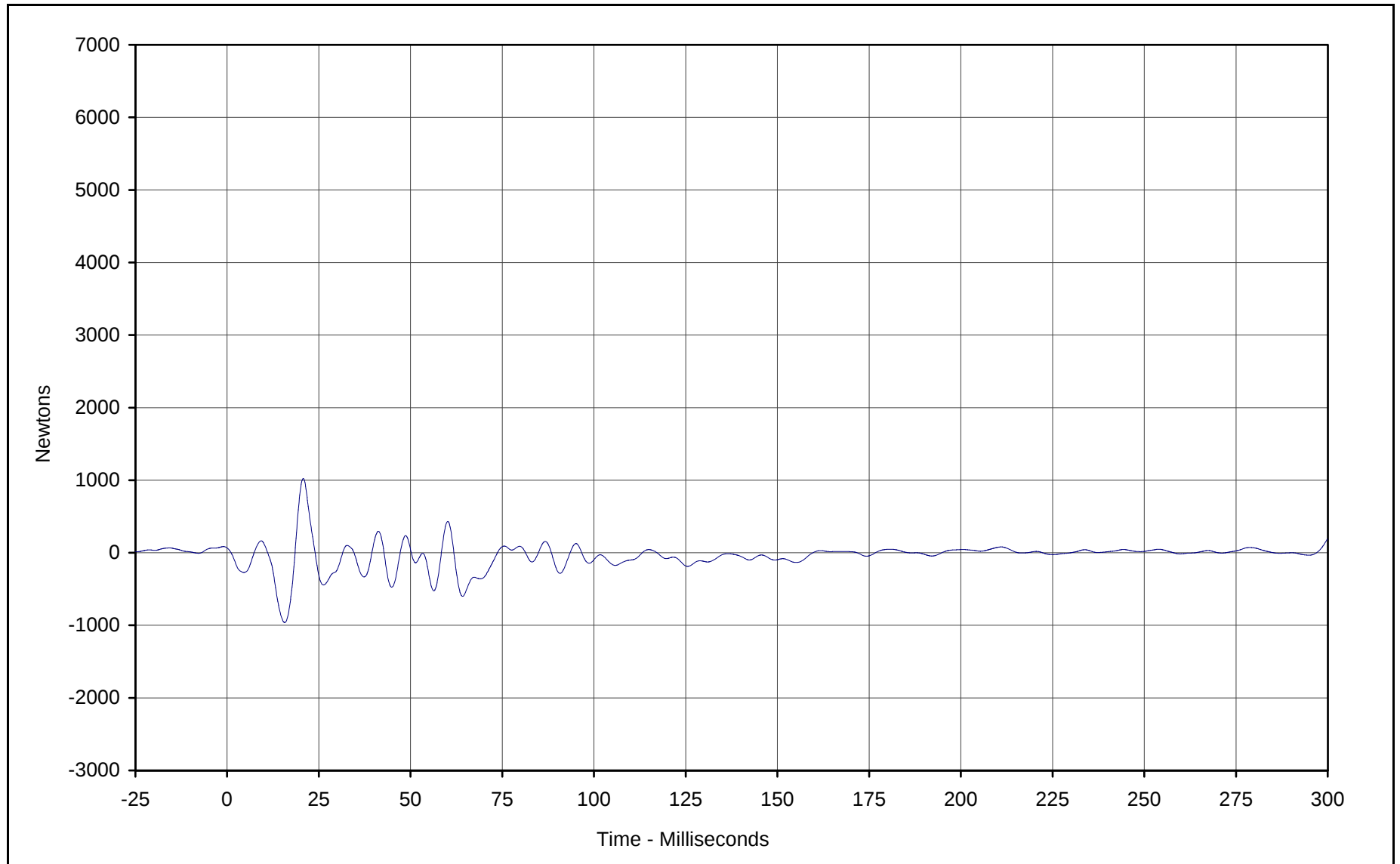
Curve Number: FIL-123

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



C-24



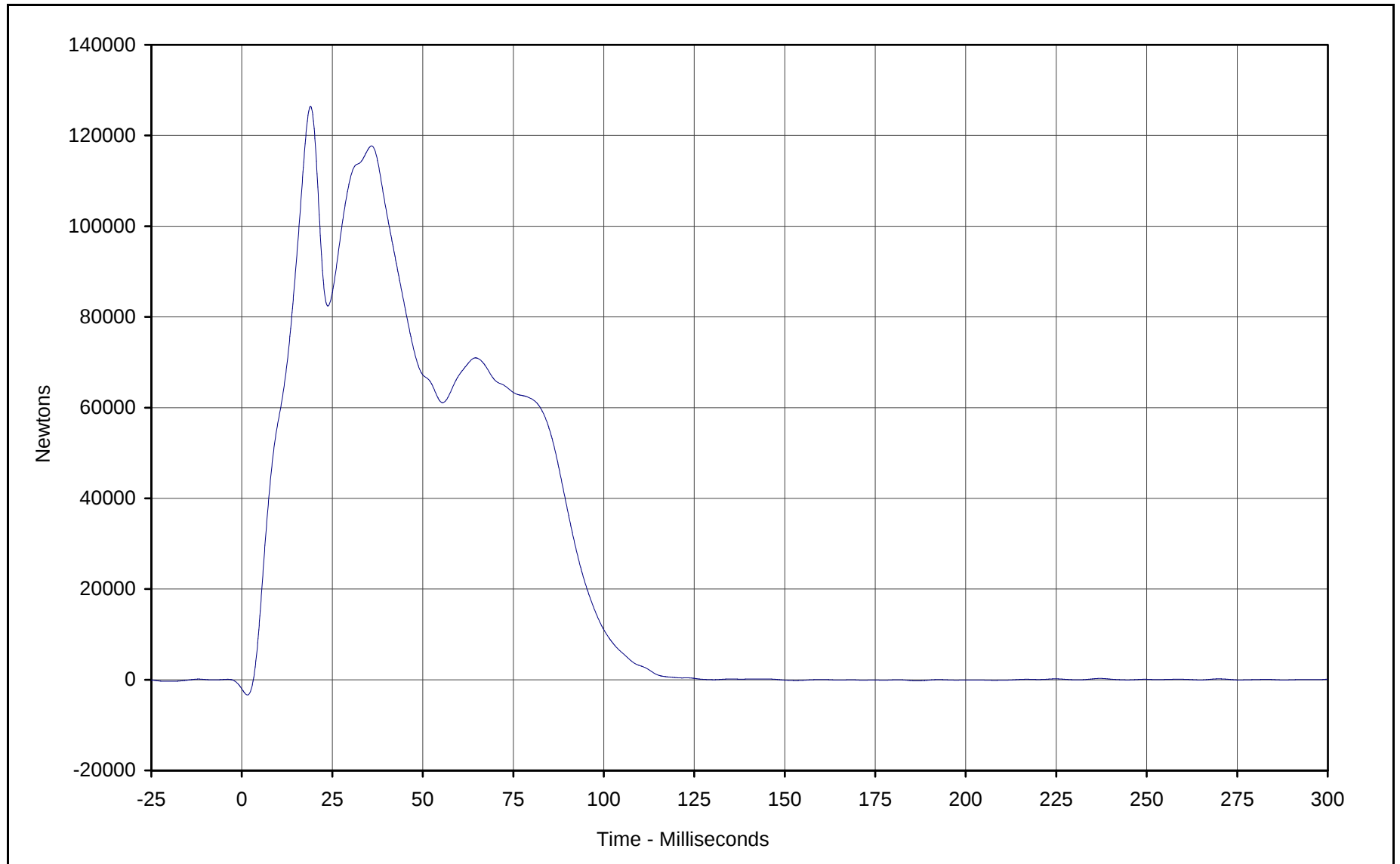
Curve Description: Barrier Force C9

Maximum Value:	<u>1025.4</u>	at	<u>20.7</u>	Milliseconds
Minimum Value:	<u>-962.3</u>	at	<u>15.7</u>	Milliseconds
SAE Filter Class:	<u>60</u>			
Date of Test:	<u>01/11/01</u>			
Curve Number:	<u>FIL-124</u>			

Test Program:	<u>2001 NHTSA 35mph NCAP No.: M10115</u>
Test Vehicle:	<u>2001 Pontiac Grand Am 2 Door Coupe</u>



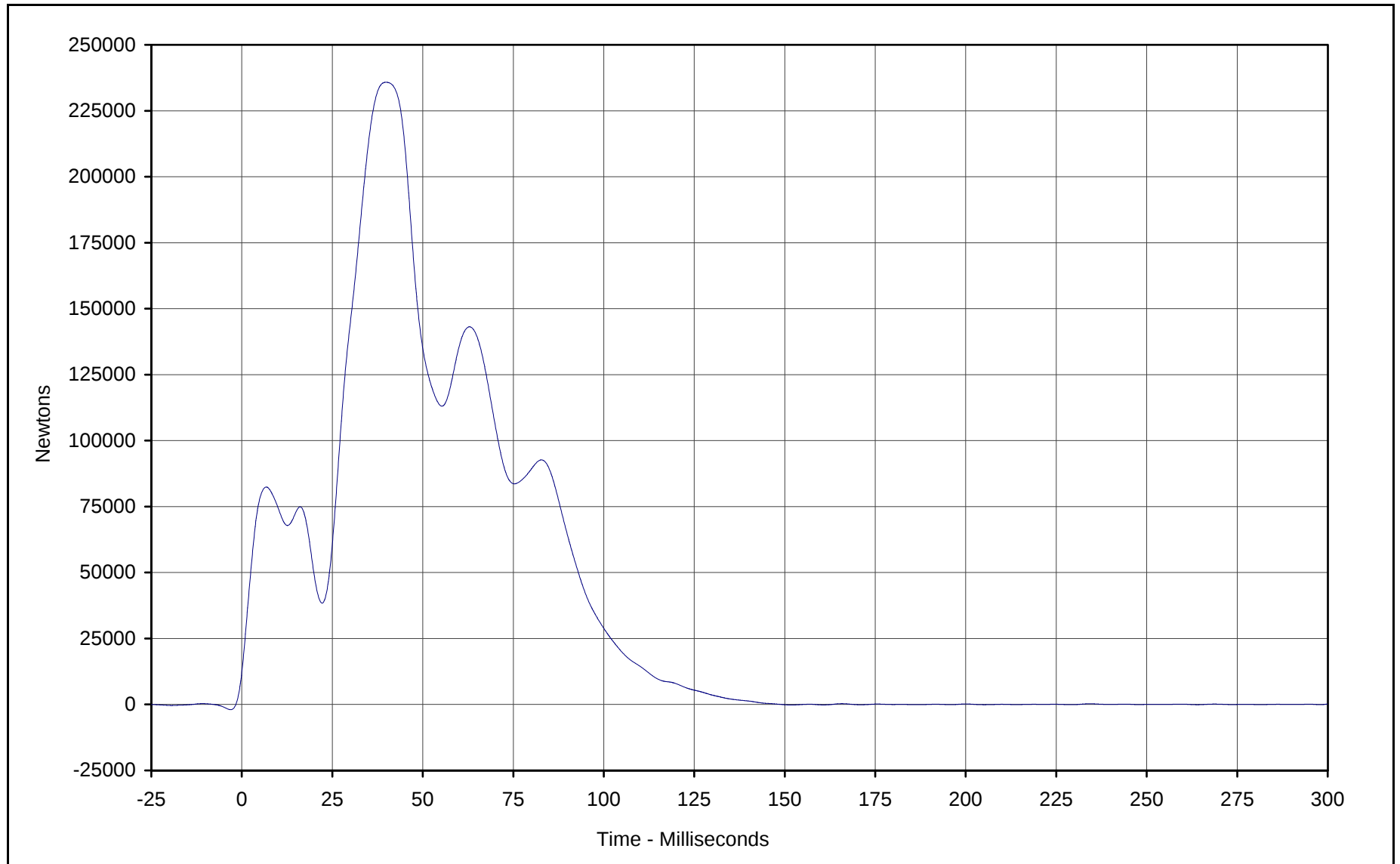
KAR21001-04



Curve Description: Barrier Force Sum Group 1
Maximum Value: 126402.8 at 19.0 Milliseconds
Minimum Value: -3362.1 at 1.6 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: SUM-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

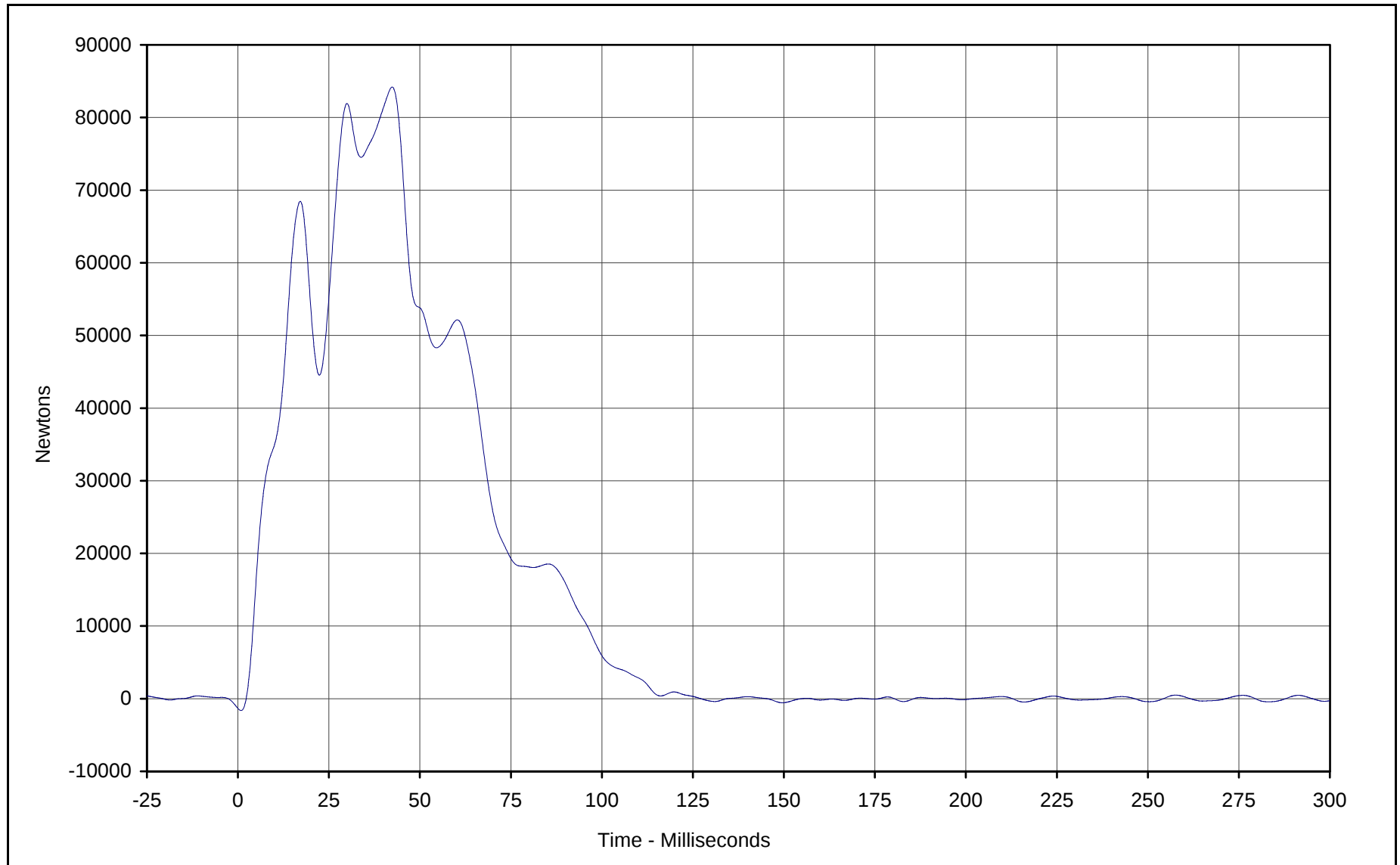




Curve Description: Barrier Force Sum Group 2
Maximum Value: 235814.8 at 39.8 Milliseconds
Minimum Value: -200.4 at 151.8 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: SUM-002

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

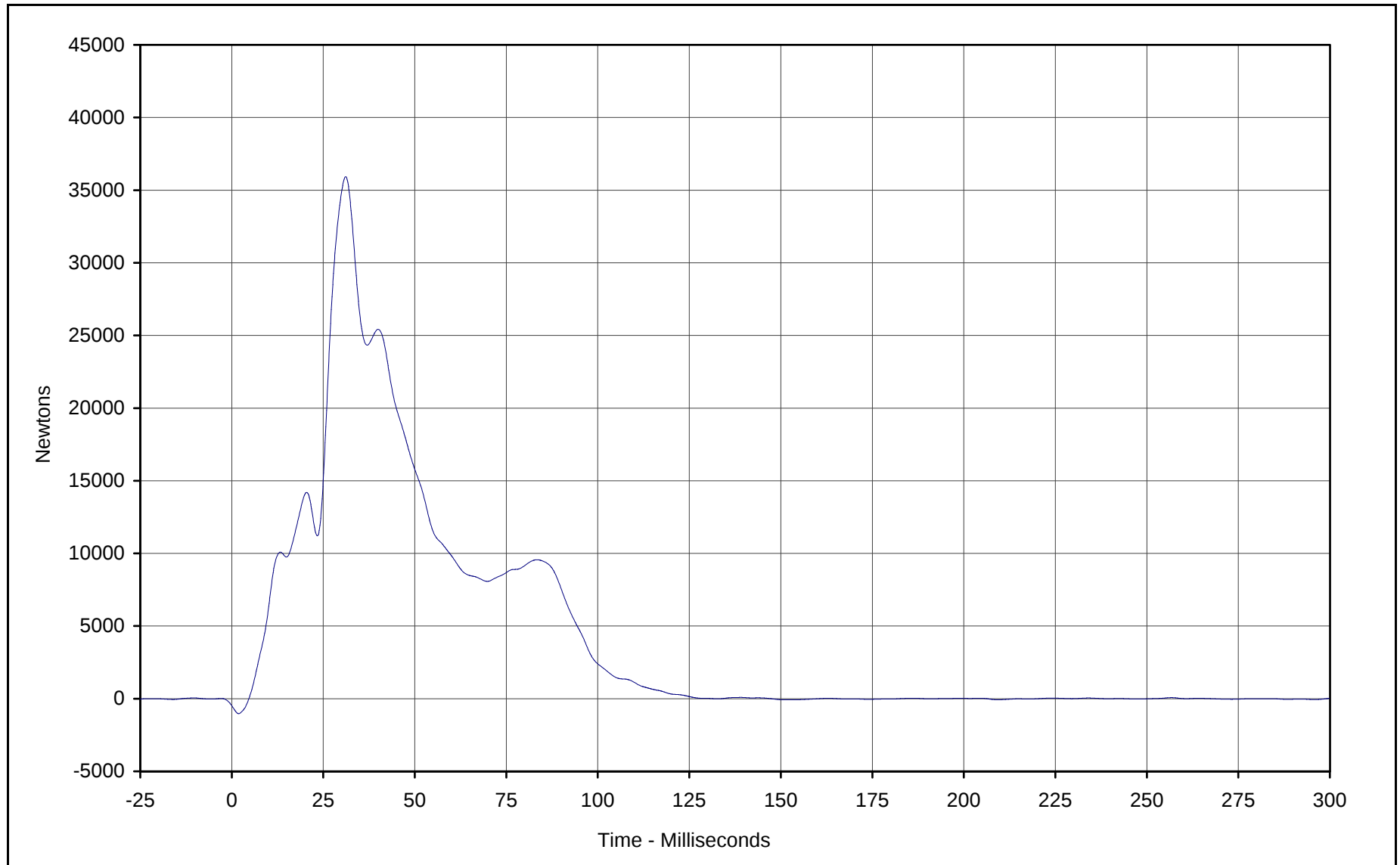




Curve Description: Barrier Force Sum Group 3
Maximum Value: 84195.4 at 42.4 Milliseconds
Minimum Value: -1625.6 at 0.9 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: SUM-003

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe

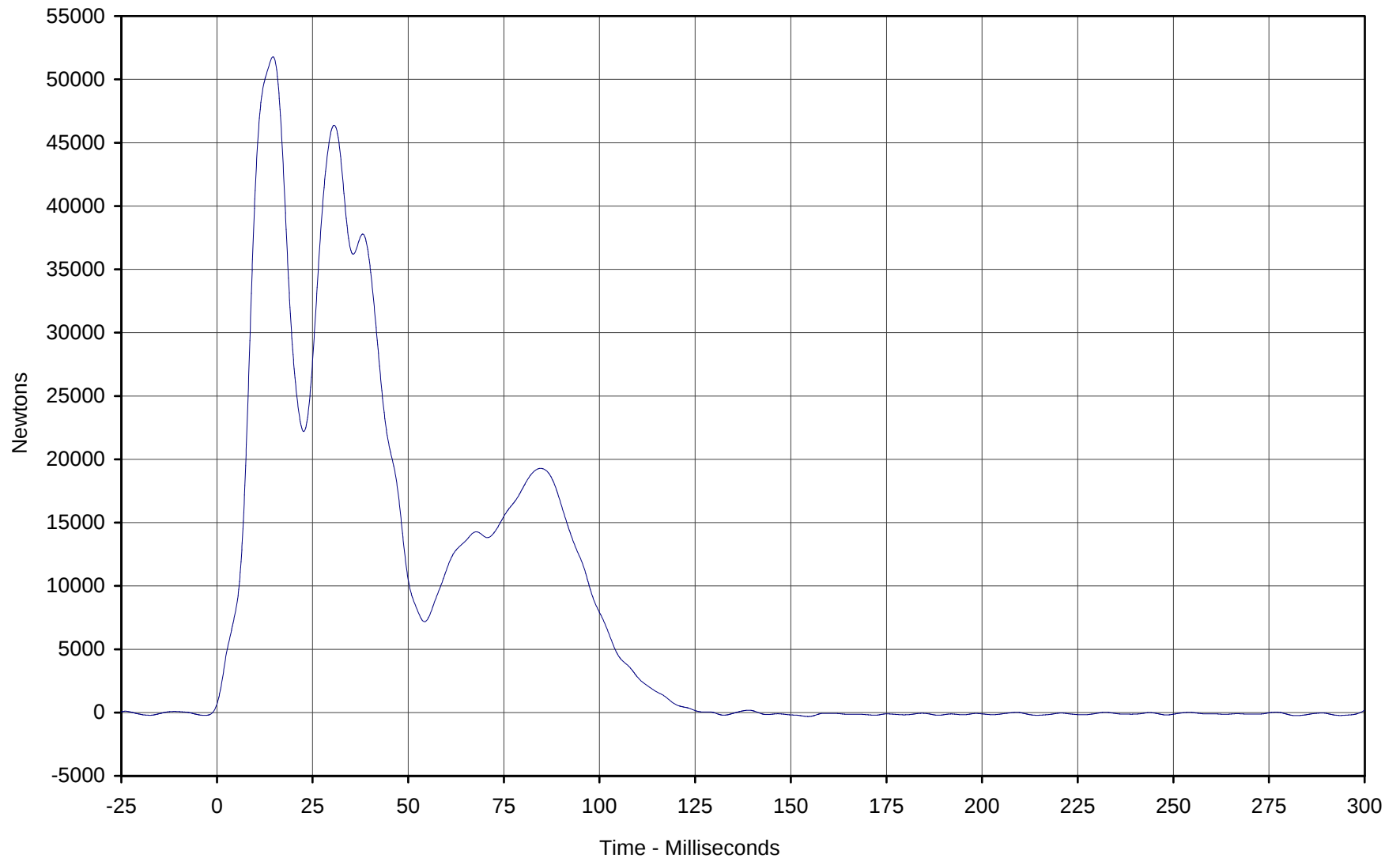




Curve Description: Barrier Force Sum Group 4
Maximum Value: 35929.7 at 31.1 Milliseconds
Minimum Value: -1033.4 at 1.9 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: SUM-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



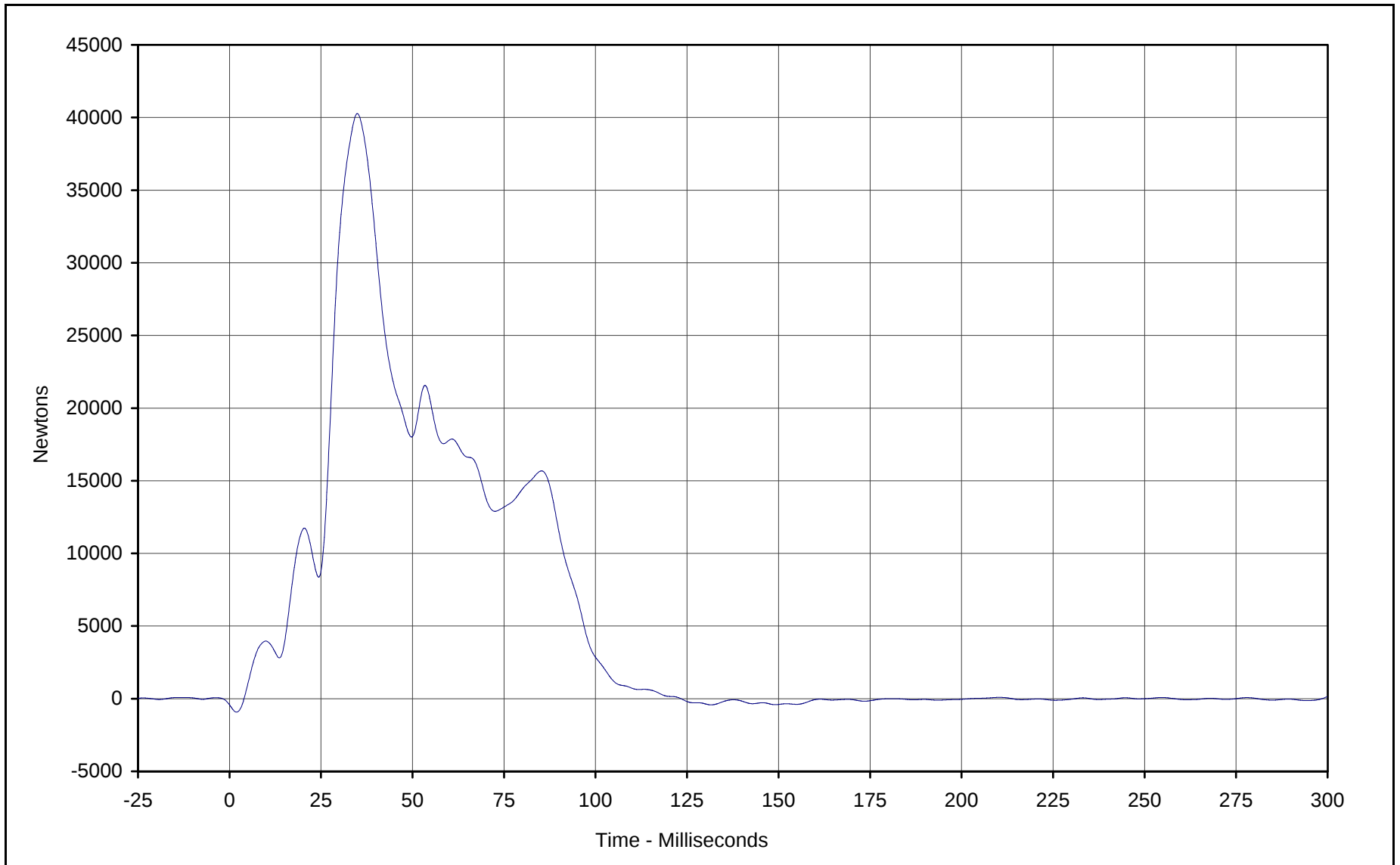


Curve Description: Barrier Force Sum Group 5
Maximum Value: 51786.0 at 14.6 Milliseconds
Minimum Value: -313.0 at 154.5 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: SUM-005

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



C-30

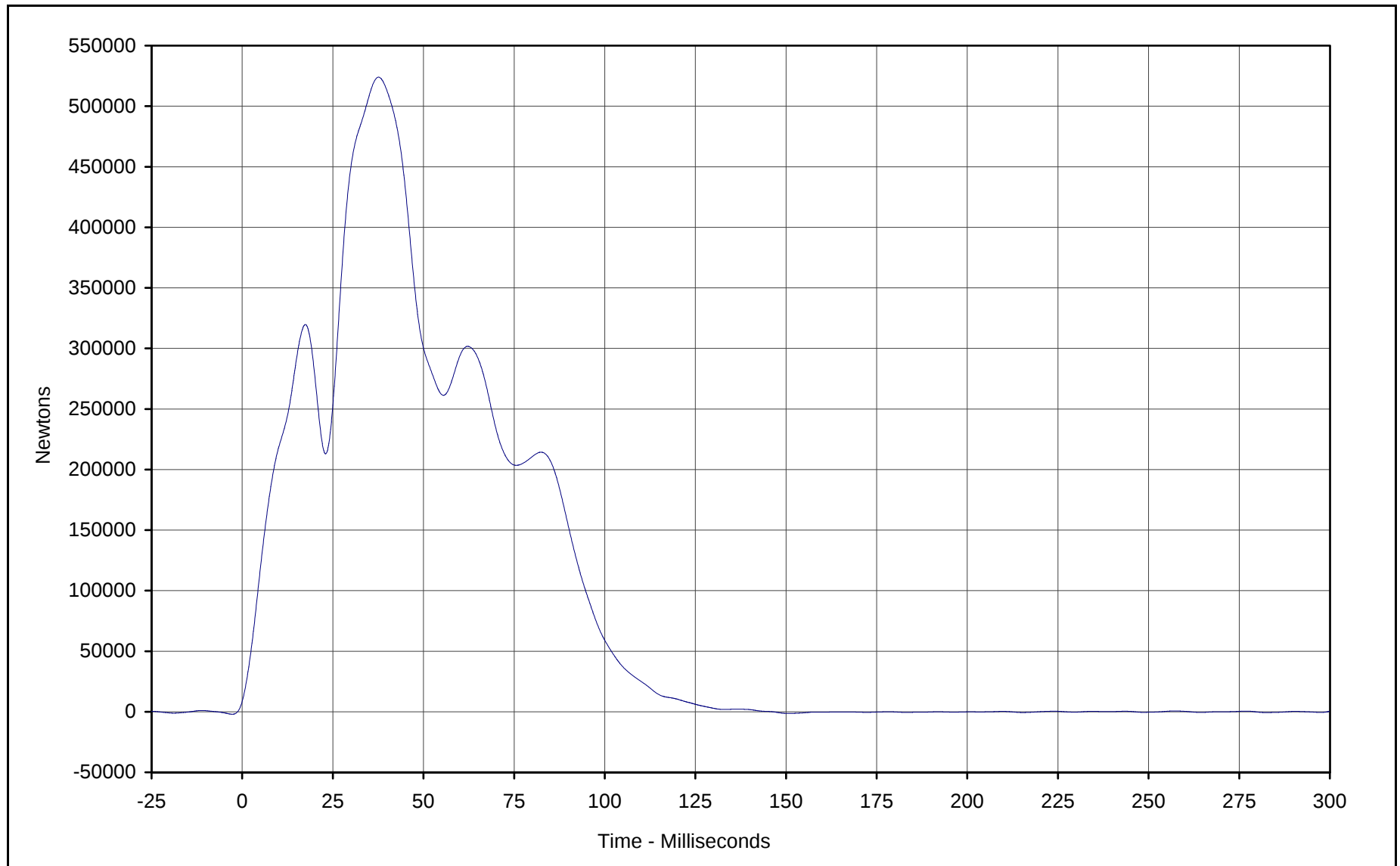


Curve Description: Barrier Force Sum Group 6
Maximum Value: 40272.5 at 34.9 Milliseconds
Minimum Value: -925.6 at 1.9 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: SUM-006

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



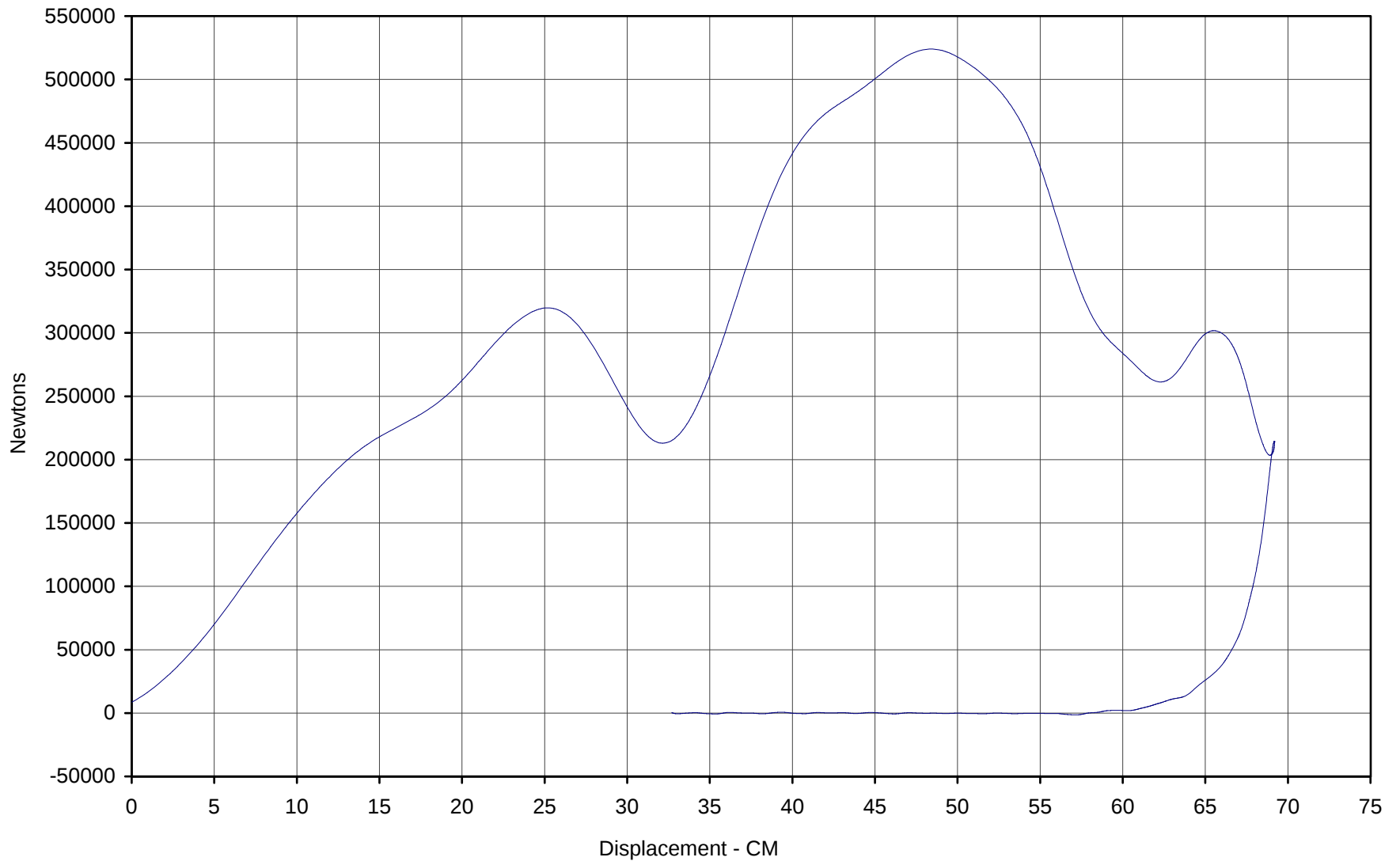
KAR21001-04



Curve Description: Barrier Force Sum Total
Maximum Value: 523971.1 at 37.6 Milliseconds
Minimum Value: -1425.2 at 150.7 Milliseconds
SAE Filter Class: 60
Date of Test: 01/11/01
Curve Number: SUM-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10115
Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe





Curve Description: Sum Force Total vs. Dynamic Crush

Maximum Displ.: 69.2 at 81.0 Milliseconds

Maximum Force: 523971.1 at 37.6 Milliseconds

Measured Energy: 199,539 joules

Date of Test: 01/11/01

Curve Number: XVY-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10115

Test Vehicle: 2001 Pontiac Grand Am 2 Door Coupe



BARRIER LOAD CELL SUMMARY DATATest Vehicle: 2001 Pontiac Grand Am 2 Door CoupeNHTSA No.: M10115Test Program: 2001 NHTSA 35mph NCAPTest Date: 01/11/01**BARRIER LOAD CELL PEAK FORCES**

Location	Units	Max	Time	Min	Time
Barrier Force A2	Newtons	4792.4	43.3	-1994.0	4.6
Barrier Force A3	Newtons	20136.9	37.3	-1854.9	3.4
Barrier Force A4	Newtons	67131.5	44.3	-1819.5	24.4
Barrier Force A5	Newtons	10292.1	44.4	-1477.0	24.4
Barrier Force A6	Newtons	25277.3	37.0	-1017.1	2.6
Barrier Force A7	Newtons	38149.4	43.9	-1159.8	24.3
Barrier Force A8	Newtons	2388.8	44.7	-864.4	23.7
Barrier Force A9	Newtons	539.0	30.2	-981.4	54.0
Barrier Force B2	Newtons	33789.6	19.4	-1350.0	2.7
Barrier Force B3	Newtons	89517.5	18.8	-1062.6	0.3
Barrier Force B4	Newtons	63574.4	38.1	-90.9	151.6
Barrier Force B5	Newtons	45120.7	35.8	-60.5	213.6
Barrier Force B6	Newtons	88203.7	36.7	-54.2	171.9
Barrier Force B7	Newtons	73290.1	29.4	-1137.7	0.4
Barrier Force B8	Newtons	7494.7	44.0	-251.9	3.1
Barrier Force B9	Newtons	717.7	41.4	-880.6	83.3
Barrier Force C2	Newtons	22899.2	40.6	-1684.1	4.9
Barrier Force C3	Newtons	22040.8	28.5	-410.5	1.0
Barrier Force C4	Newtons	17397.0	13.5	-110.1	154.4
Barrier Force C5	Newtons	21836.4	12.6	-147.3	216.4
Barrier Force C6	Newtons	15379.5	15.8	-122.9	154.9
Barrier Force C7	Newtons	26664.2	31.4	-573.4	1.3
Barrier Force C8	Newtons	17204.2	36.6	-750.5	14.4
Barrier Force C9	Newtons	1025.4	20.7	-962.3	15.7
Barrier Force Sum Group 1	Newtons	126402.8	19.0	-3362.1	1.6
Barrier Force Sum Group 2	Newtons	235814.8	39.8	-200.4	151.8
Barrier Force Sum Group 3	Newtons	84195.4	42.4	-1625.6	0.9
Barrier Force Sum Group 4	Newtons	35929.7	31.1	-1033.4	1.9
Barrier Force Sum Group 5	Newtons	51786.0	14.6	-313.0	154.5
Barrier Force Sum Group 6	Newtons	40272.5	34.9	-925.6	1.9
Barrier Force Sum Total	Newtons	523971.1	37.6	-1425.2	150.7

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

APPENDIX D

INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

2001 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D. Serial Number 35
01/11/01
2001 Pontiac Grand Am 2 Door Coupe

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
01/11/01
2001 Pontiac Grand Am 2 Door Coupe

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
25	UP. TIBIA LEFT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
26	UP. TIBIA LEFT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
27	UP. TIBIA RIGHT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
28	UP. TIBIA RIGHT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
29	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
30	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
31	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
32	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
33	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
34	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
35	FOOT LEFT	X	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
01/11/01
2001 Pontiac Grand Am 2 Door Coupe

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
01/11/01
2001 Pontiac Grand Am 2 Door Coupe

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
69	UP. TIBIA LEFT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
70	UP. TIBIA LEFT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
71	UP. TIBIA RIGHT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
72	UP. TIBIA RIGHT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
73	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
74	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
75	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
76	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
77	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
78	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
79	FOOT LEFT	X	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
01/11/01
2001 Pontiac Grand Am 2 Door Coupe

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
01/11/01
2001 Pontiac Grand Am 2 Door Coupe

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
01/11/01
2001 Pontiac Grand Am 2 Door Coupe

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

50TH Percentile Male

Left Knee Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: LK01D

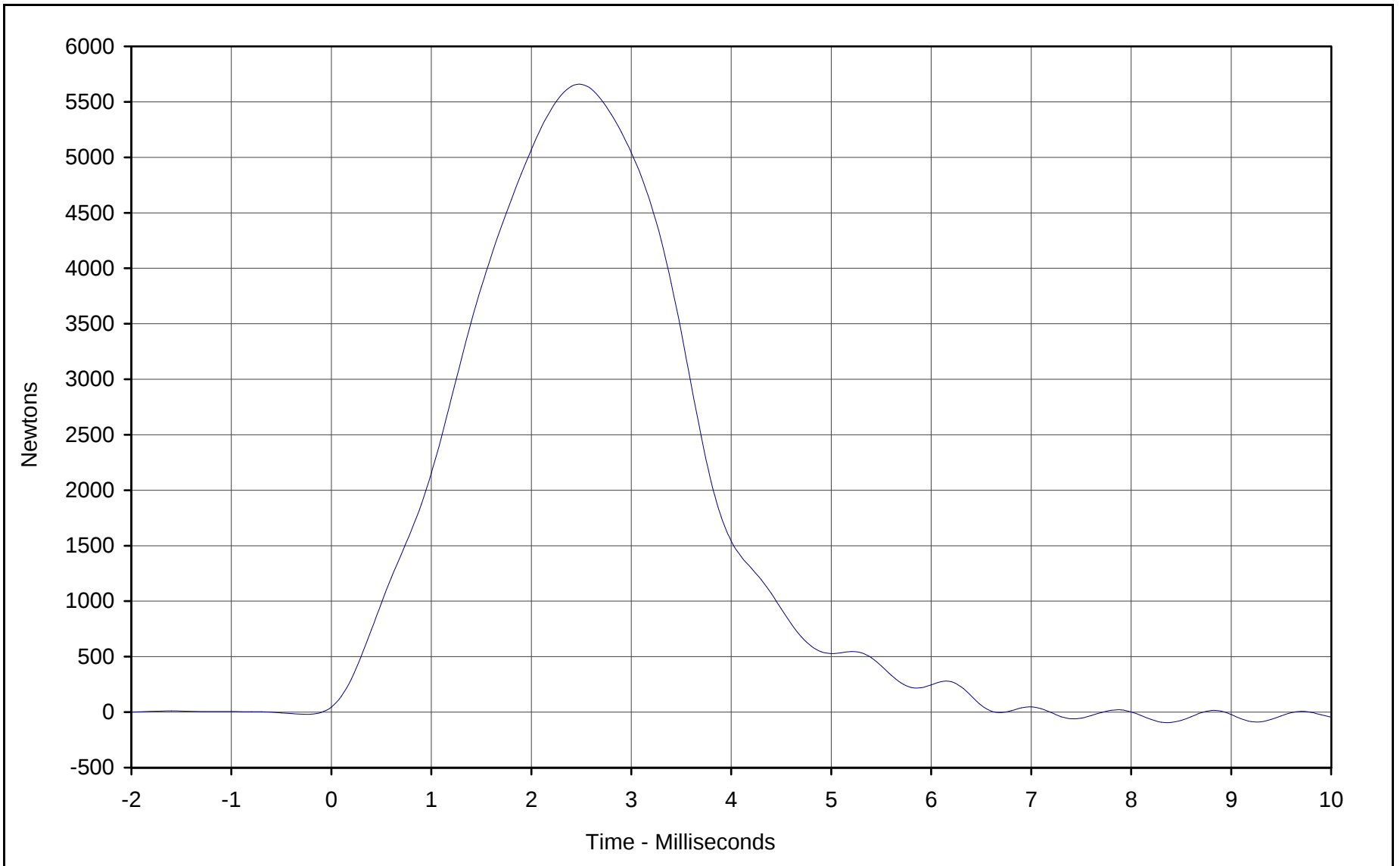
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	2.073 to 2.134	2.100	Pass
Peak Probe Force	Newtons	4715 to 5782	5658.6	Pass
Overall Test Results				Pass

Laboratory Technician

January 10, 2001
Test Date

Approved By

Date



Curve Description: Probe Force

Maximum Value:	<u>5658.6</u>	at	<u>2.5</u>	Milliseconds
Minimum Value:	<u>-60.4</u>	at	<u>7.4</u>	Milliseconds
SAE Filter Class:	<u>600</u>			
Date of Test:	<u>1/10/01</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.: LK01D





Hybrid III Calibration Data Sheet

50TH Percentile Male

Right Knee Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: RK01B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	2.073 to 2.134	2.113	Pass
Peak Probe Force	Newtons	4715 to 5782	5389.1	Pass
Overall Test Results				Pass

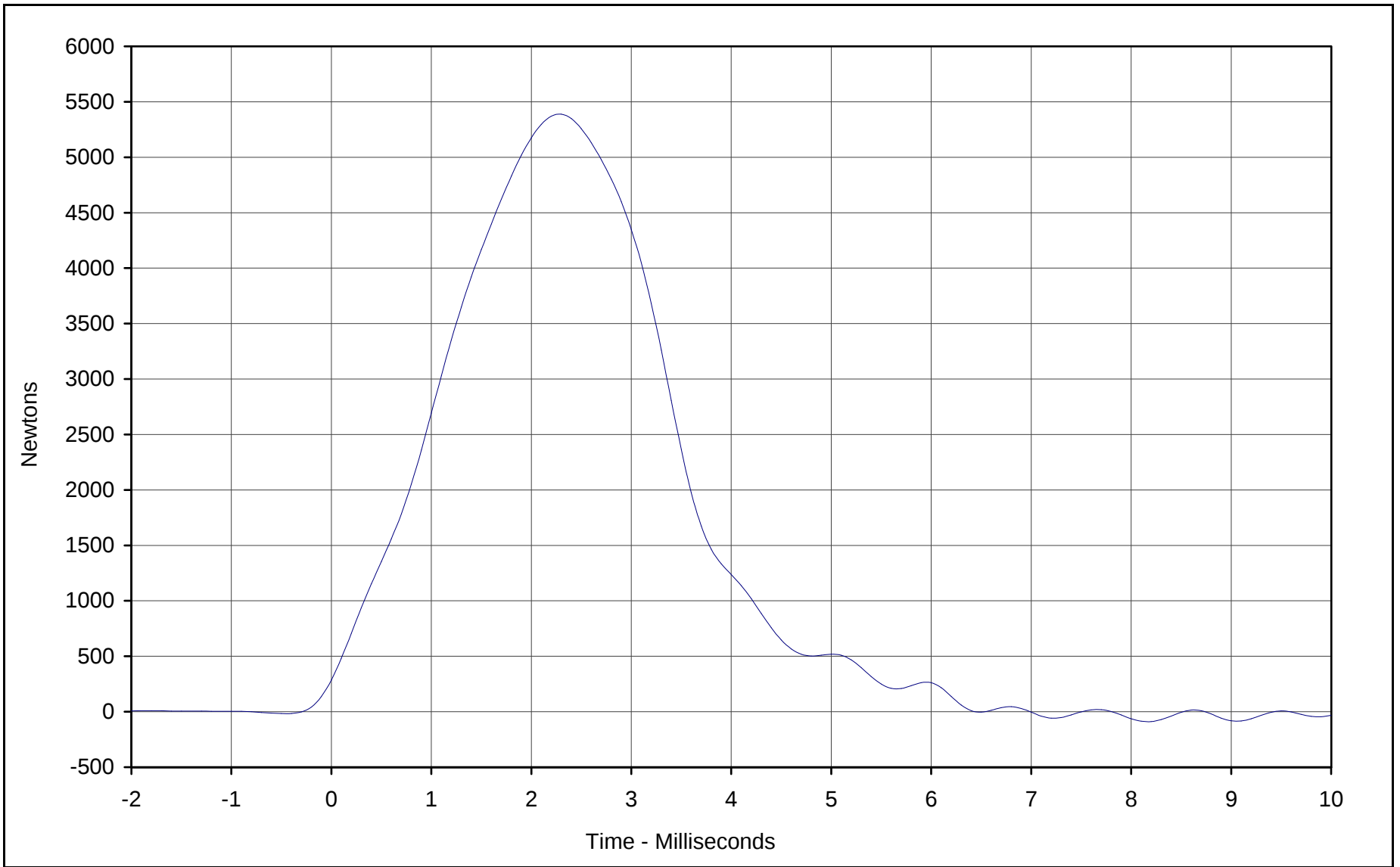
Laboratory Technician

January 10, 2001
Test Date

Approved By

Date

E-4



Curve Description:	Probe Force
Maximum Value:	5389.1 at 2.3 Milliseconds
Minimum Value:	-62.9 at 8.0 Milliseconds
SAE Filter Class:	600
Date of Test:	1/10/01
ATD Serial No.:	034

Testing Program:	Hybrid III Right Knee Impact Test
Test Information:	Part S/N: N/A Test I.D.: RK01B



KAR21001-04



Hybrid III Calibration Data Sheet

50TH Percentile Male

Head Drop Calibration

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: HD01D

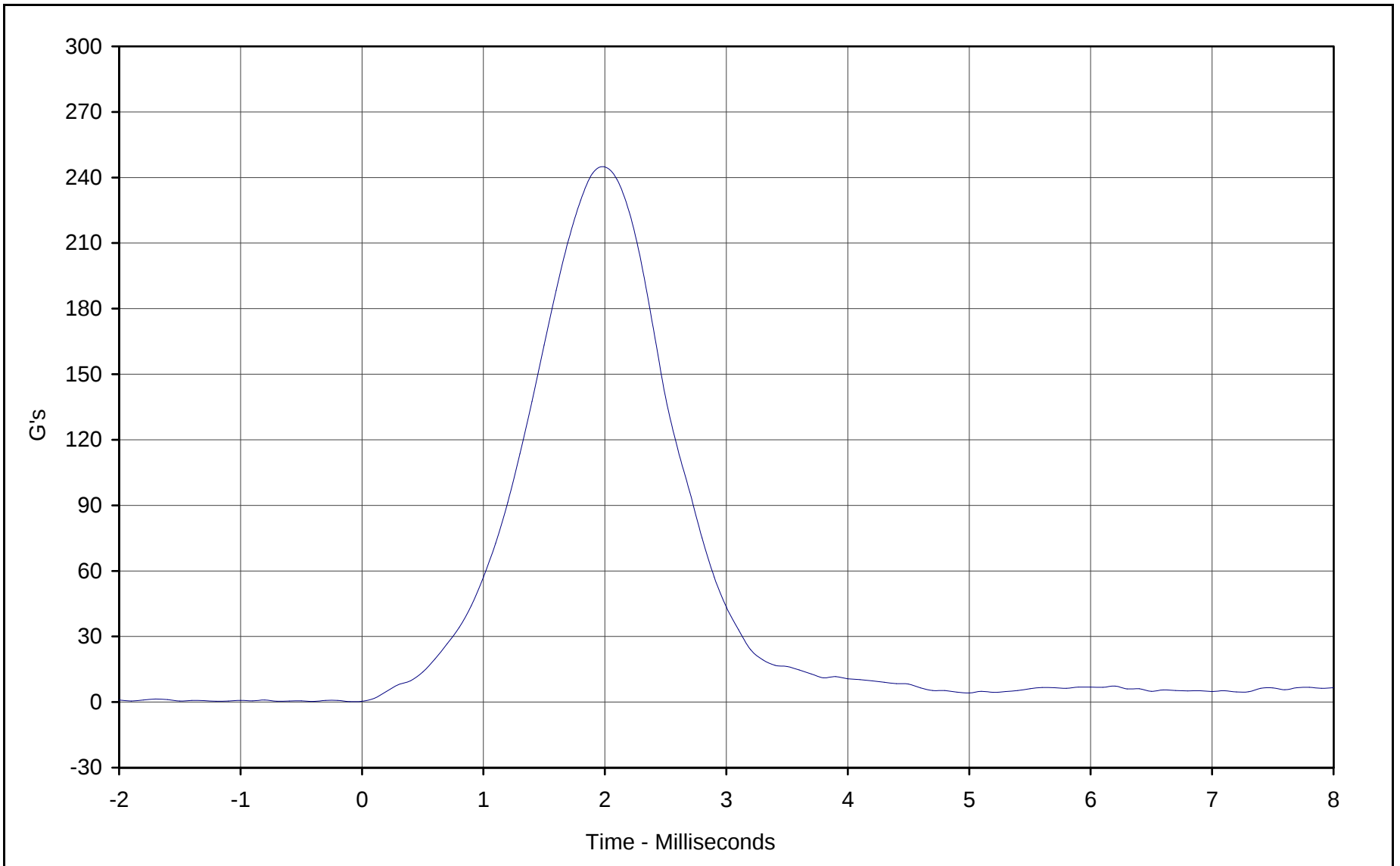
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	244.9	Pass
Peak Lateral Acceleration	G's	≤15.0	2.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

January 10, 2001
Test Date

Approved By

Date



Curve Description: Head Resultant Acceleration

Maximum Value: 244.9 at 2.0 Milliseconds

Minimum Value: 0.2 at -0.1 Milliseconds

SAE Filter Class: 1000

Date of Test: 1/10/01

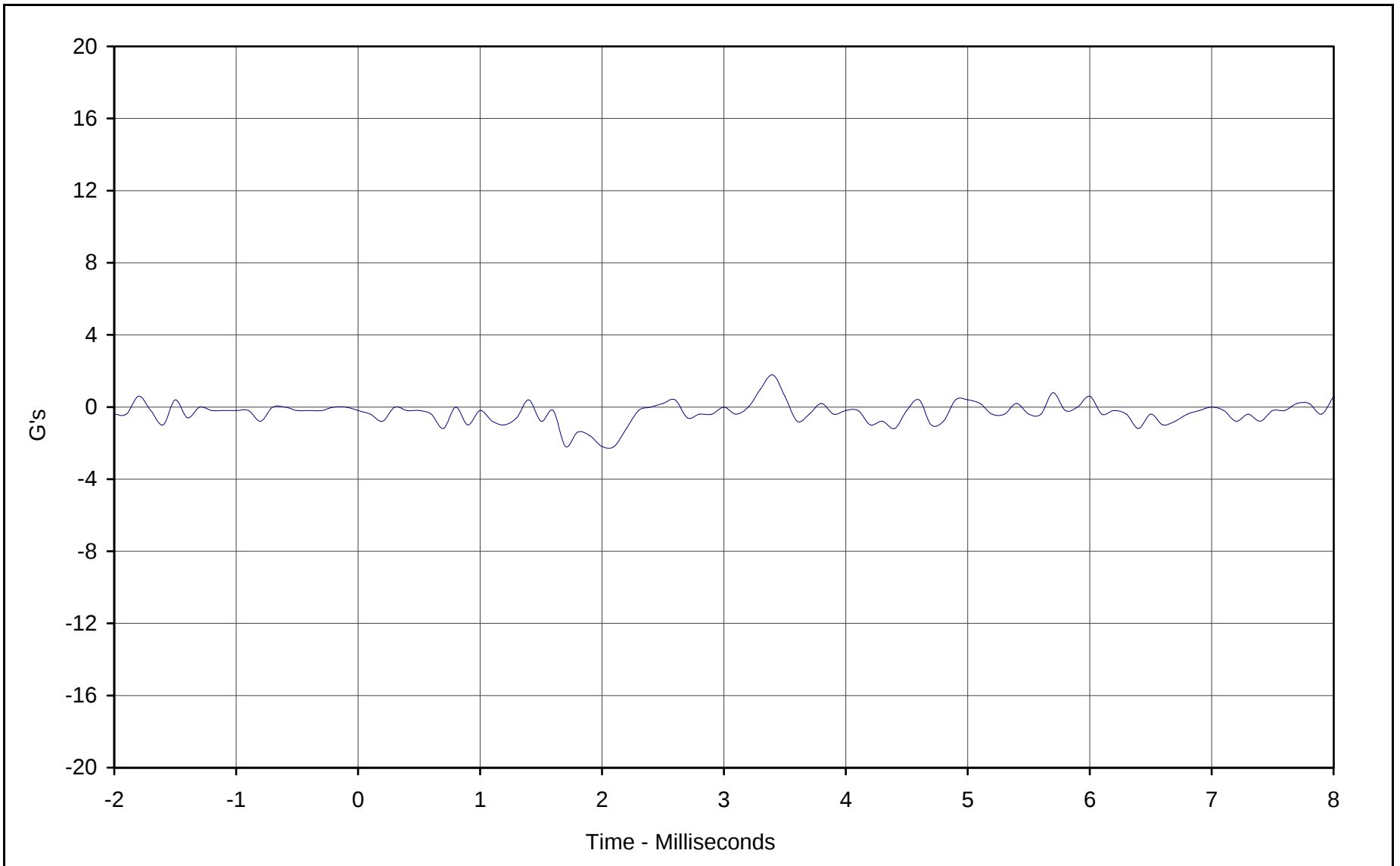
ATD Serial No.: 034

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01D



E-7



Curve Description:	Head Acceleration Y Axis		
Maximum Value:	1.8	at	3.4 Milliseconds
Minimum Value:	-2.2	at	1.7 Milliseconds
SAE Filter Class:	1000		
Date of Test:	1/10/01		
ATD Serial No.:	034		

Testing Program:	Hybrid III Head Drop Calibration (Male)
Test Information:	S/N of Part: N/A Test I.D.: HD01D



KAR21001-04



Hybrid III Calibration Data Sheet

50TH Percentile Male

Thorax Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: CH01E

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	5378	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.86	Pass
Internal Hysteresis	%	69 to 85	74.2	Pass
Overall Test Results				Pass

Laboratory Technician

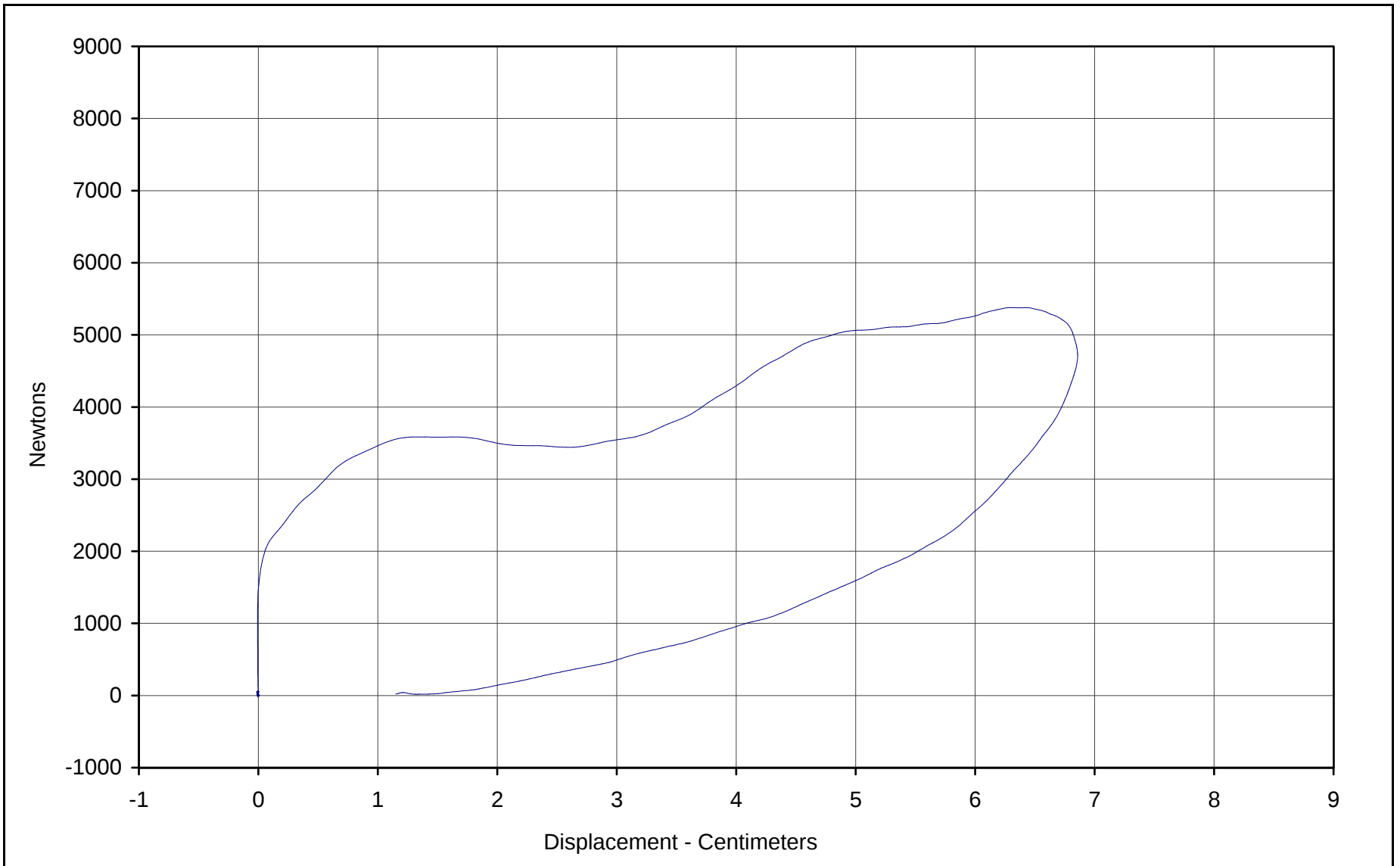
January 10, 2001

Test Date

Approved By

Date

E-9



Curve Description: Probe Force vs. Chest Displacement

Probe Force: 5378.1 Newtons

Chest Displ.: 6.86 Centimeters

SAE Filter Class: 180

Date of Test: 1/10/01

ATD Serial No.: 034

Testing Program: Hybrid III Thorax Impact Test

Test Information: S/N of Part: N/A Test I.D.: CH01E



KAR21001-04



Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NF01C

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	24.2	Pass
	20 Msec.	G's	17.6 to 22.6	20.6	Pass
	30 Msec.	G's	12.5 to 18.5	17.3	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.3	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.8	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	65.4	Pass
	Time	Msec.	57.0 to 64.0	57.7	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	116.1	Pass
Moment About Occipital Condyle	Maximum	N·m	84.1 to 108.5	87.8	Pass
	Time	Msec.	47.0 to 58.0	51.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	97.4	Pass
Overall Test Results					Pass

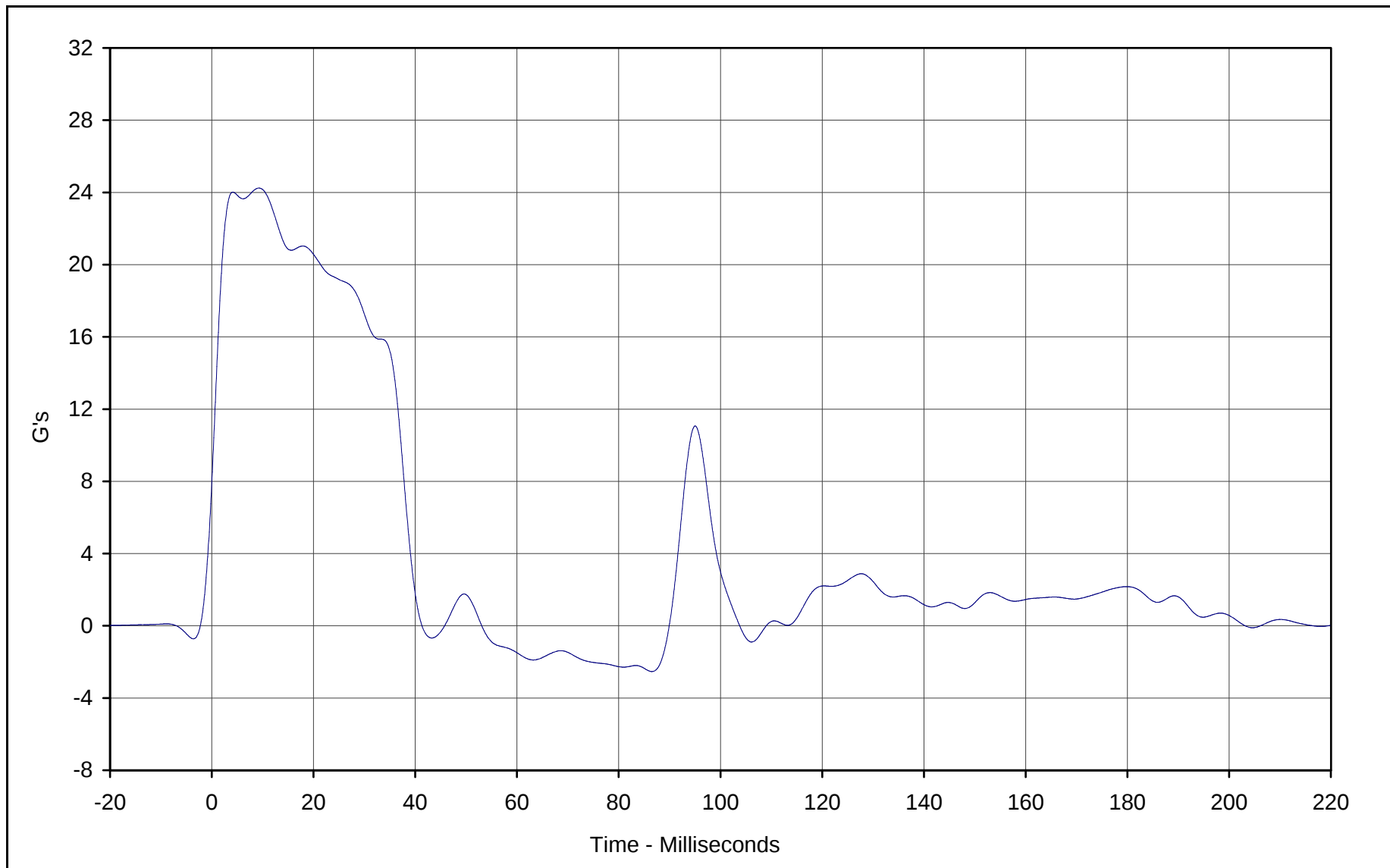
Laboratory Technician

January 10, 2001
Test Date

Approved By

Date

E-11



Curve Description:	Pendulum Deceleration		
Maximum Value:	24.2	at	9.3 Milliseconds
Minimum Value:	-2.5	at	86.5 Milliseconds
SAE Filter Class:	60		
Date of Test:	1/10/01		
ATD Serial No.:	034		

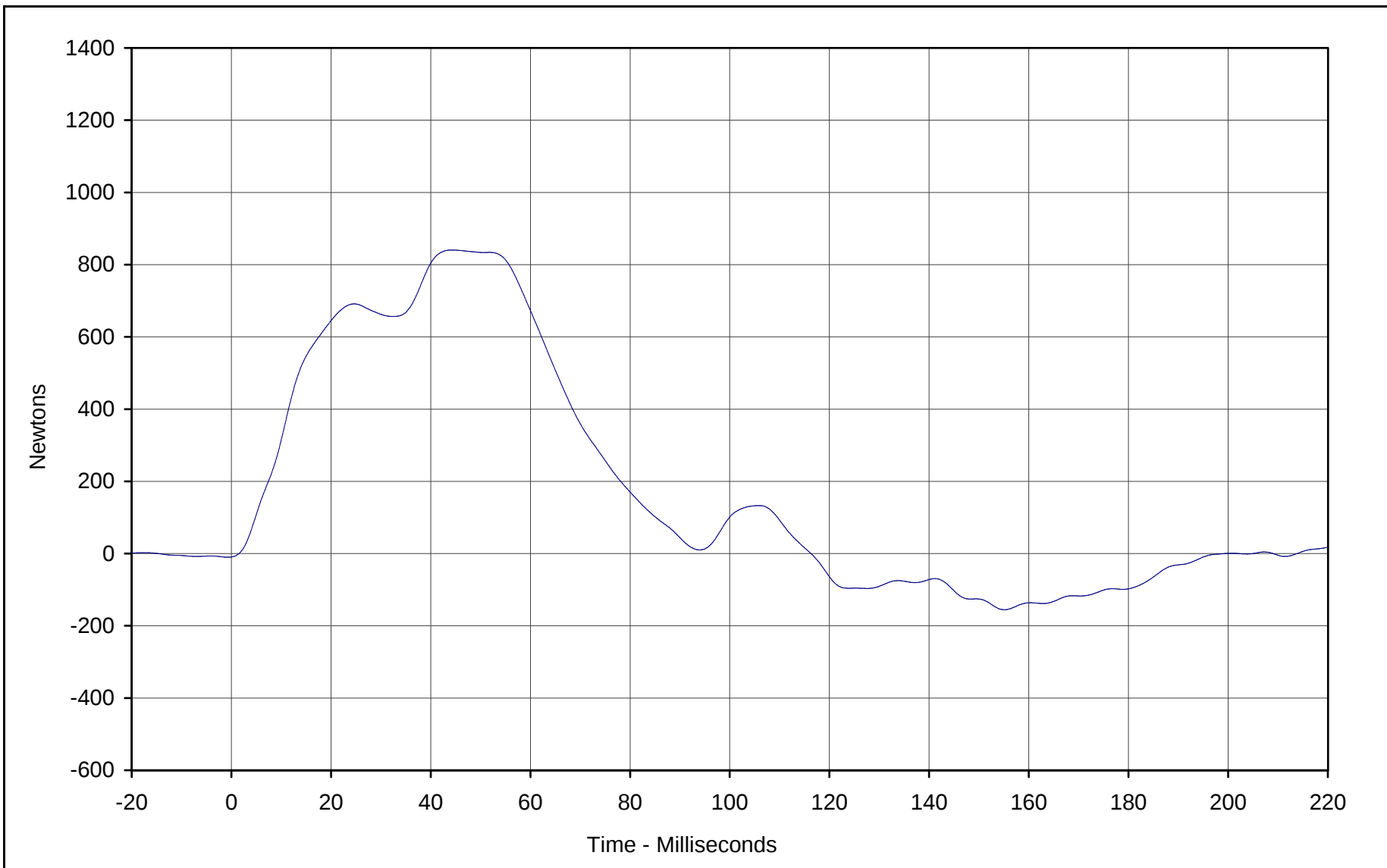
Testing Program:	Hybrid III Neck Flexion Test (Male)
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Test Information:	S/N of Part: N/A Test I.D.: NF01C
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KAR21001-04

E-12



Curve Description: Neck Force X

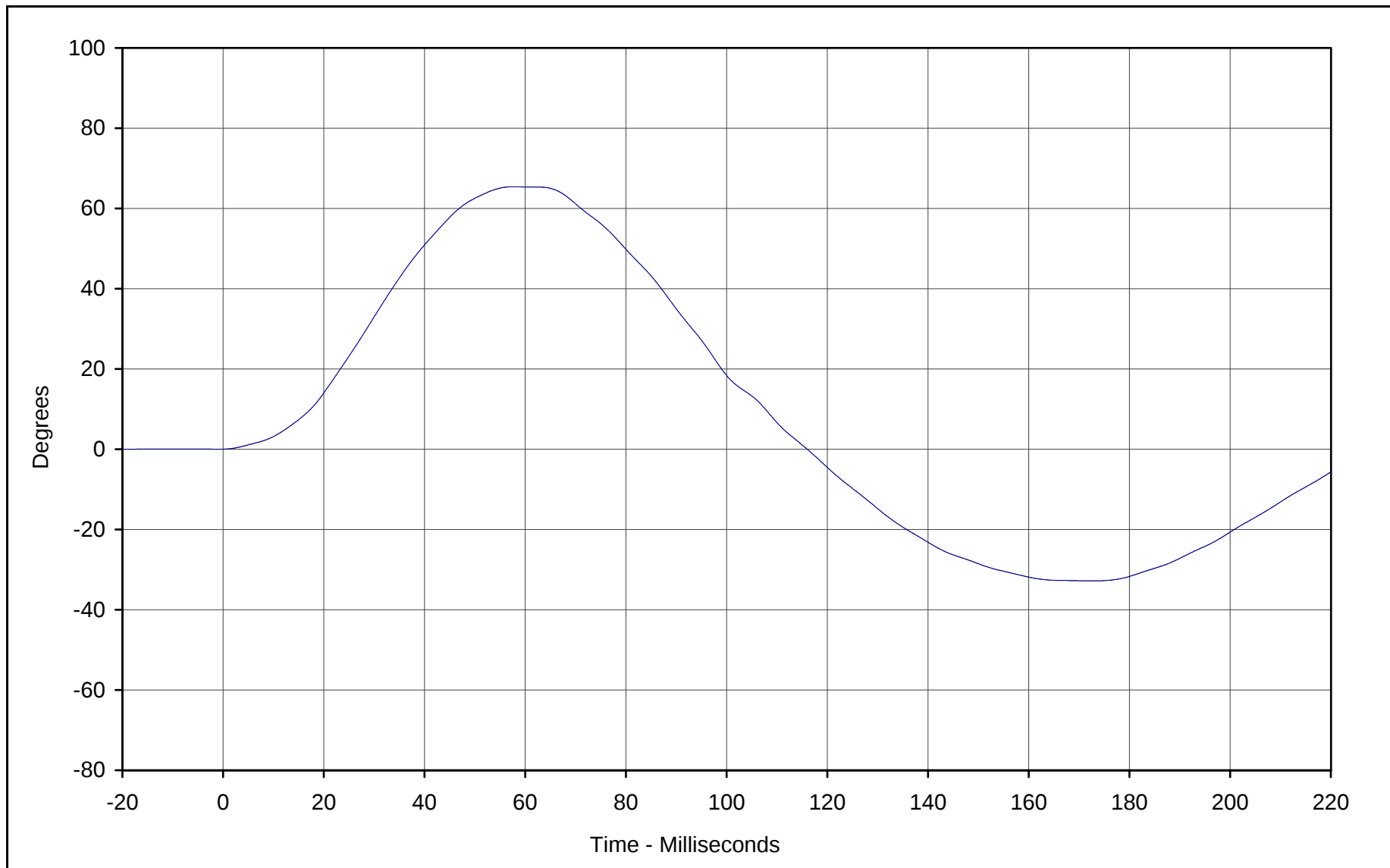
Maximum Value:	840.4	at	44.3	Milliseconds
Minimum Value:	-155.5	at	155.1	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01C



KAR21001-04



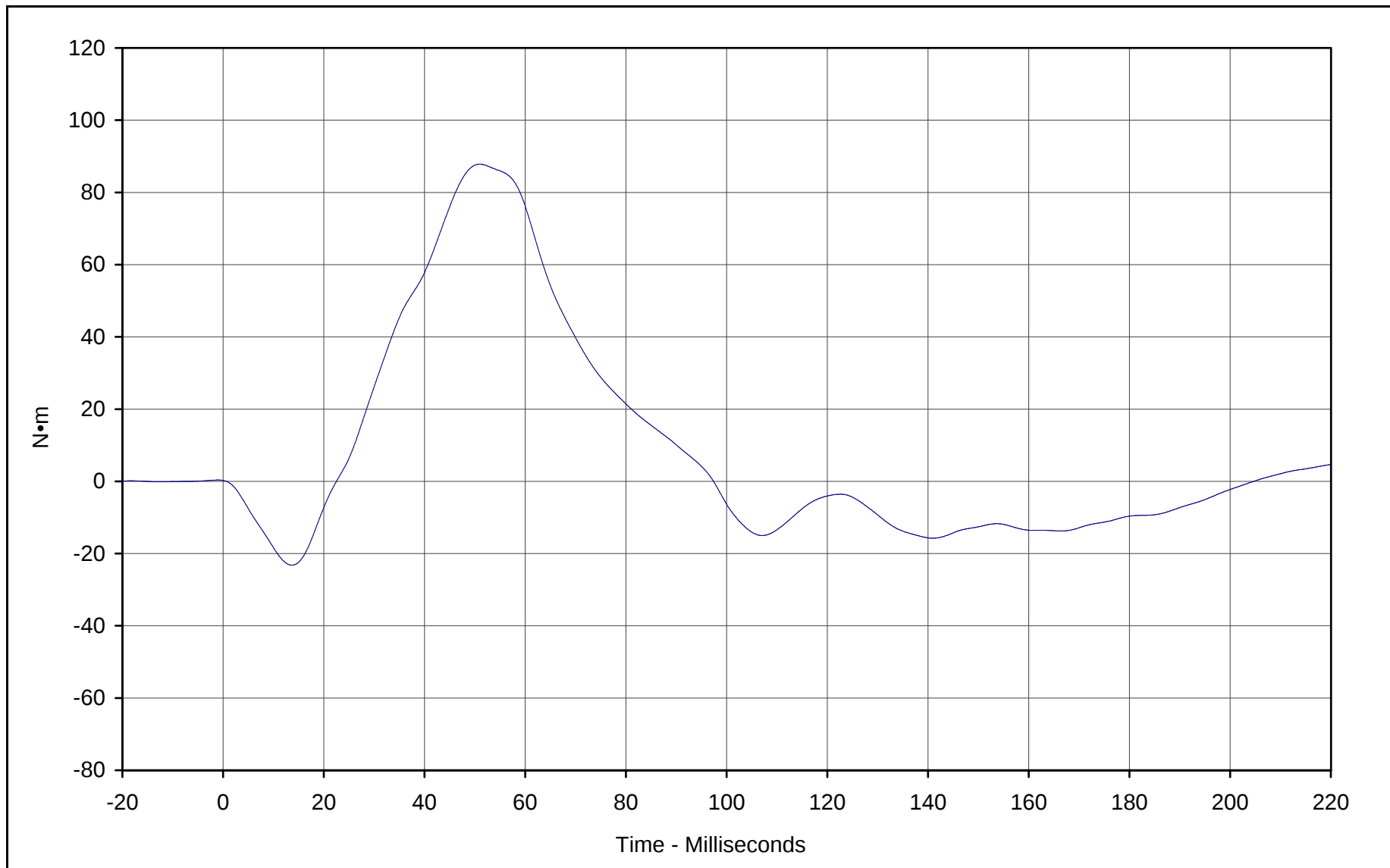
Curve Description: "D" Plane Rotation

Maximum Value:	65.4	at	57.7	Milliseconds
Minimum Value:	-32.8	at	172.4	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01C





Curve Description: Moment About Occipital Condyles

Maximum Value: 87.8 at 51.0 Milliseconds

Minimum Value: -23.2 at 13.7 Milliseconds

SAE Filter Class: 60

Date of Test: 1/10/01

ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01C





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Extension Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NE01C

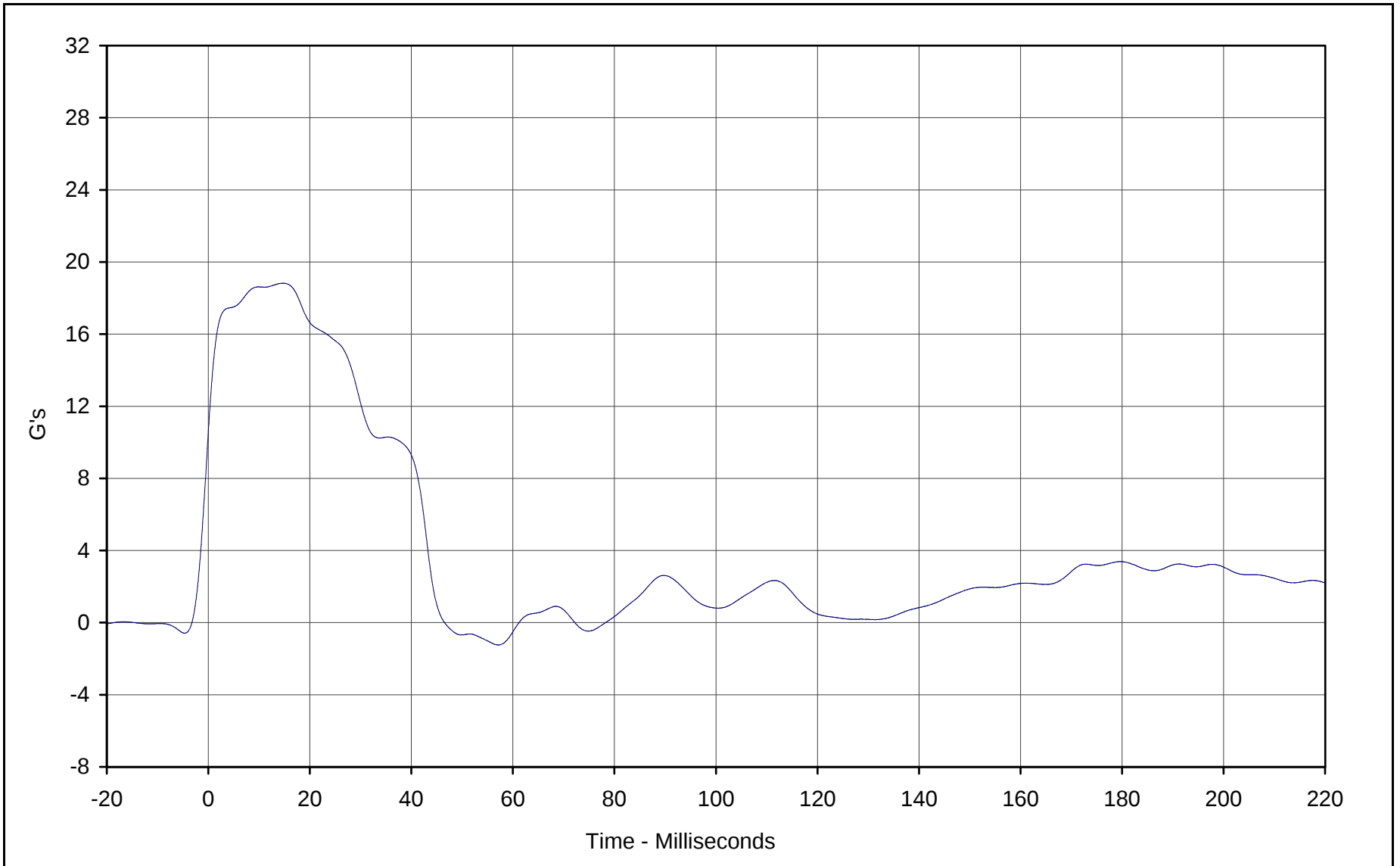
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.10	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.6	Pass
	20 Msec.	G's	14.0 to 19.0	16.6	Pass
	30 Msec.	G's	11.0 to 16.0	12.2	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	12.2	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	42.9	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	94.3	Pass
	Time	Msec.	72.0 to 82.0	81.8	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	156.9	Pass
Moment About Occipital Condyle	Maximum	N•m	-52.9 to- 79.9	-73.0	Pass
	Time	Msec.	65.0 to 79.0	68.5	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	136.5	Pass
Overall Test Results					Pass

Laboratory Technician

January 10, 2001
Test Date

Approved By

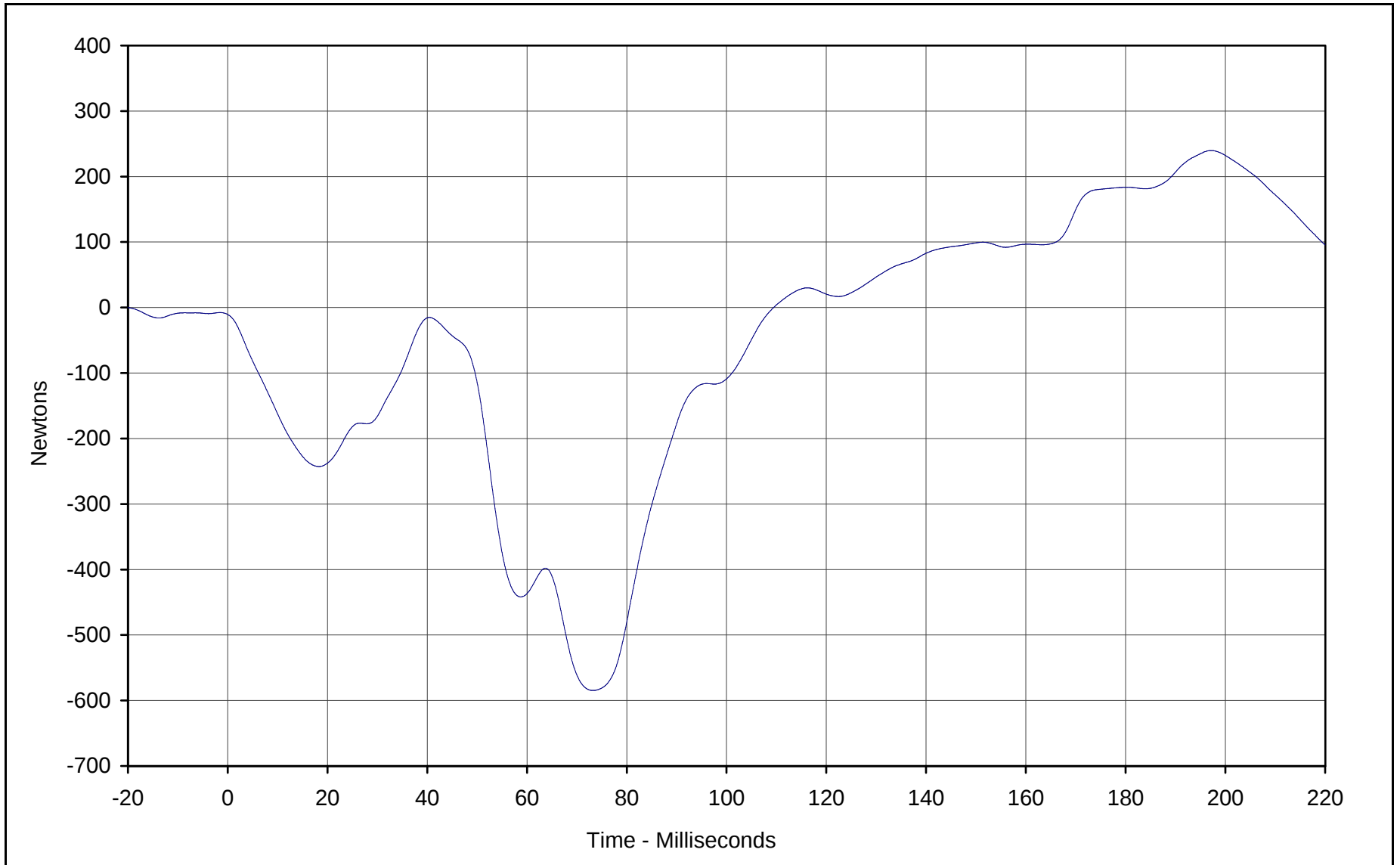
Date



Curve Description:	Pendulum Deceleration		
Maximum Value:	18.8	at	14.7 Milliseconds
Minimum Value:	-1.2	at	57.1 Milliseconds
SAE Filter Class:	60		
Date of Test:	1/10/01		
ATD Serial No.:	034		

Testing Program:	Hybrid III Neck Extension Test (Male)
Test Information:	S/N of Part: N/A Test I.D.: NE01C





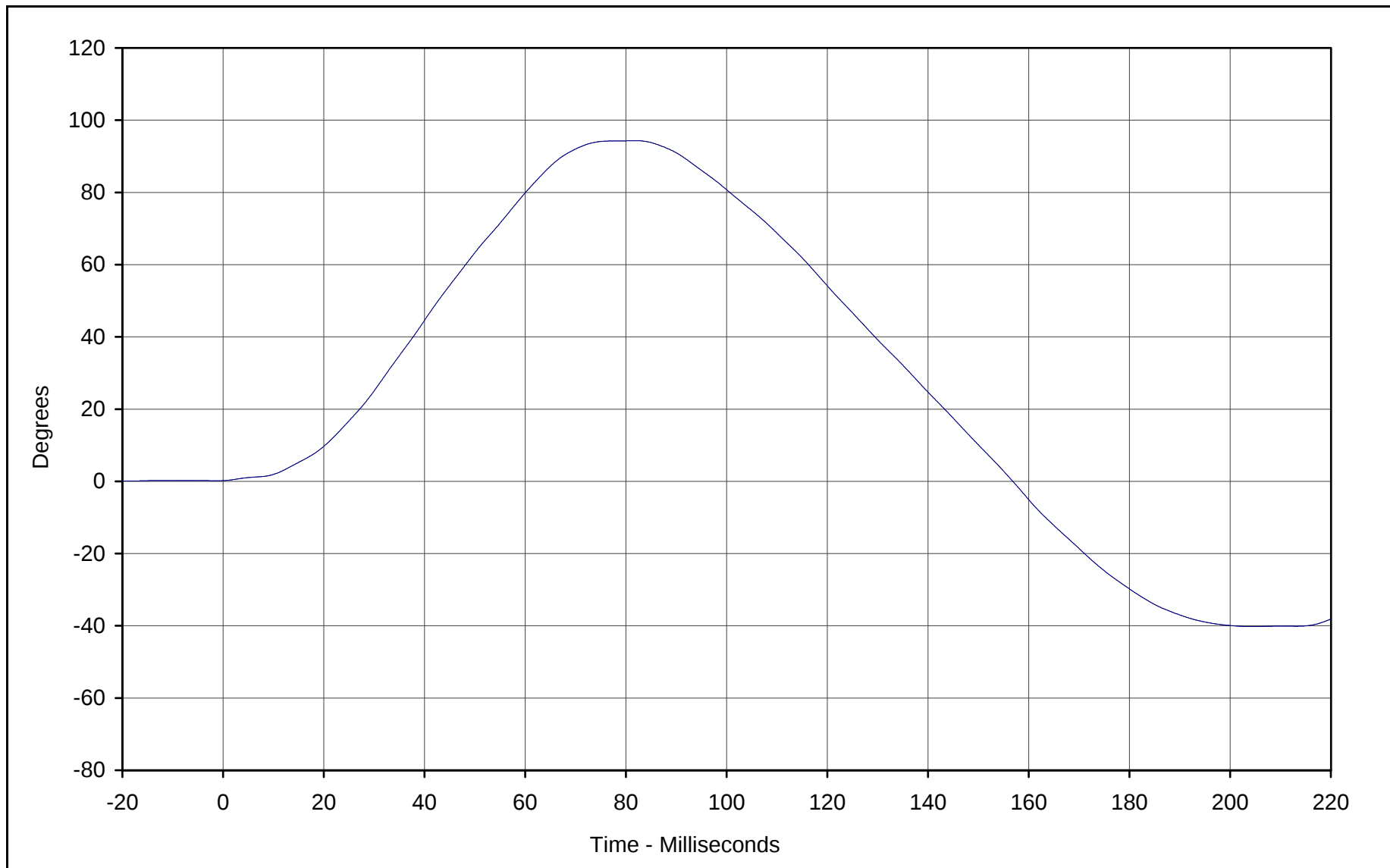
Curve Description: Neck Force X

Maximum Value:	239.7	at	197.1	Milliseconds
Minimum Value:	-584.7	at	73.2	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01C





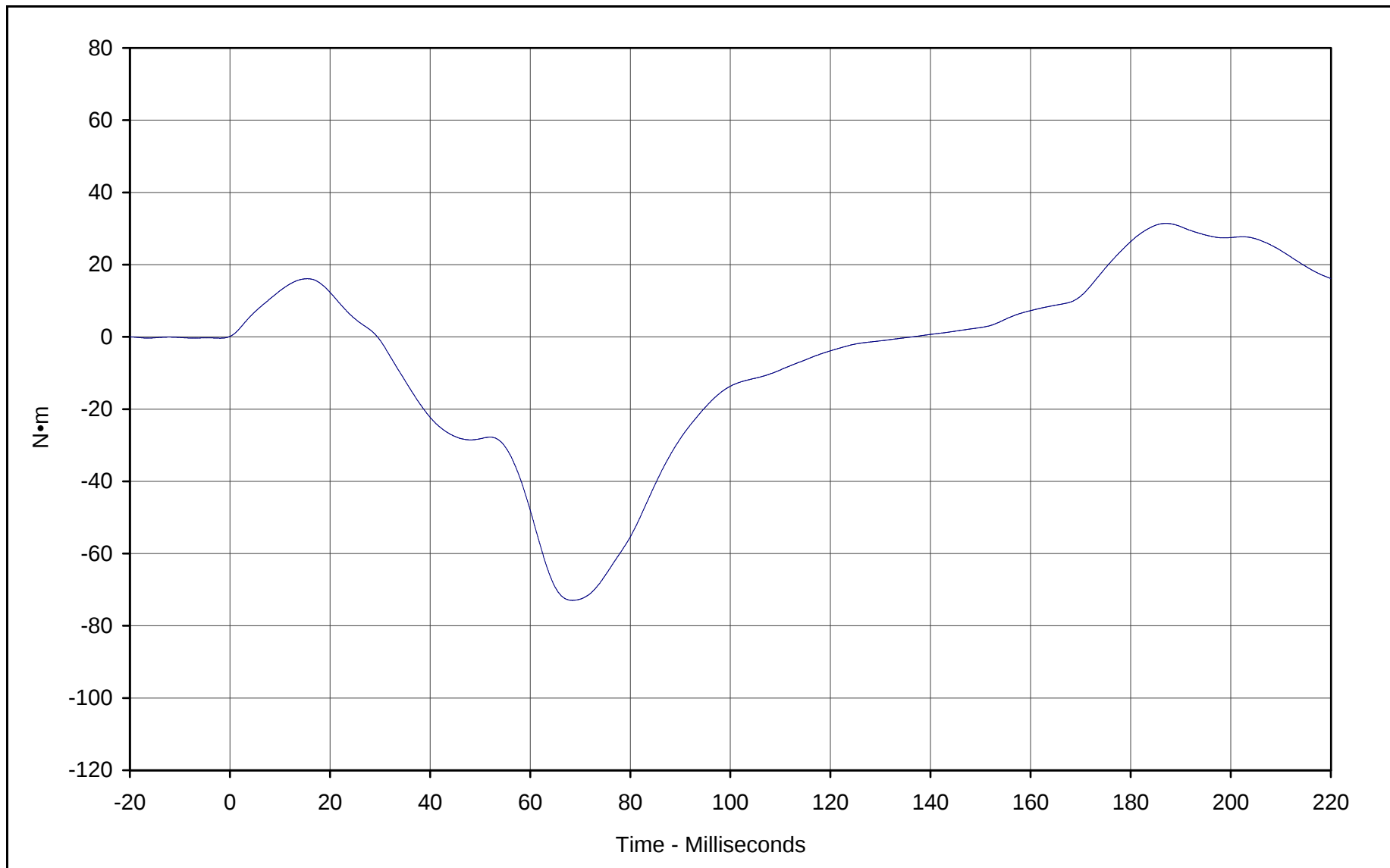
Curve Description: "D" Plane Rotation

Maximum Value:	94.3	at	81.8	Milliseconds
Minimum Value:	-40.2	at	204.5	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01C





Curve Description: Moment About Occipital Condyles

Maximum Value: 31.4 at 187.0 Milliseconds

Minimum Value: -73.0 at 68.5 Milliseconds

SAE Filter Class: 60

Date of Test: 1/10/01

ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01C





Hybrid III Calibration Data Sheet

50TH Percentile Male

External Measurements

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: N/A

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	20.9	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	135	Pass
E - Shoulder pivot from back	mm	84 to 94	90	Pass
F - Thigh clearance	mm	140 to 155	150	Pass
G - Elbow back to wrist pivot	mm	290 to 305	300	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	340	Pass
J - Elbow rest height	mm	190 to 211	195	Pass
K - Buttock to knee length	mm	579 to 604	595	Pass
L - Popliteal length	mm	429 to 455	445	Pass
M - Knee pivot height	mm	485 to 500	495	Pass
N - Buttock popliteal length	mm	452 to 477	475	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	255	Pass
V - Shoulder breadth	mm	422 to 437	430	Pass
W - Foot breadth	mm	91 to 107	100	Pass
Y - Chest circumference	mm	970 to 1001	990	Pass
Z - Waist circumference	mm	836 to 866	860	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 10, 2001

Test Date

Approved By

Date



Hybrid III Calibration Data Sheet

50TH Percentile Male

Left Knee Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: LK01G

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	2.073 to 2.134	2.113	Pass
Peak Probe Force	Newtons	4715 to 5782	5296.7	Pass
Overall Test Results				Pass

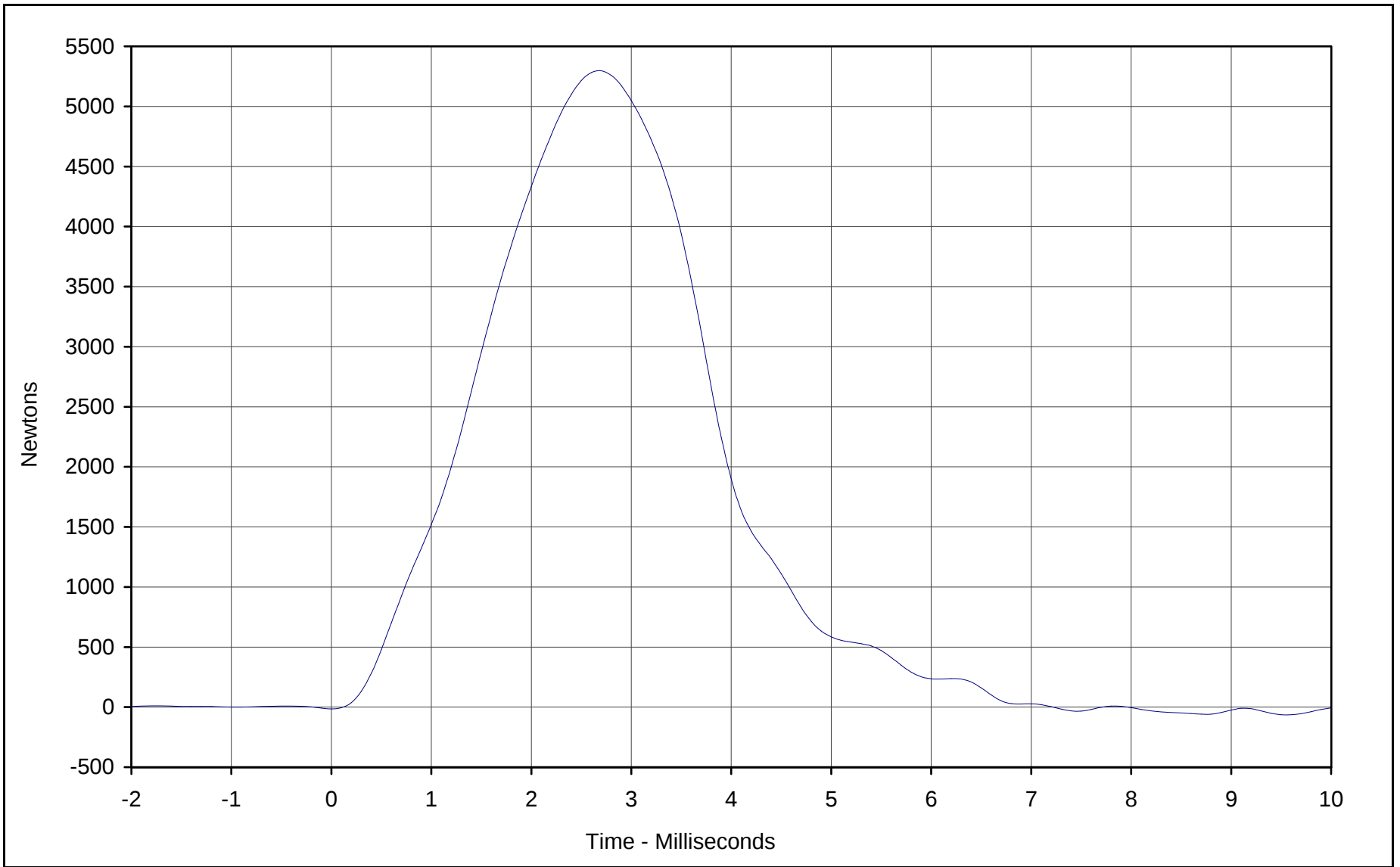
Laboratory Technician

January 10, 2001
Test Date

Approved By

Date

E-22



Curve Description: Probe Force

Maximum Value:	<u>5296.7</u>	at	<u>2.7</u>	Milliseconds
Minimum Value:	<u>-32.5</u>	at	<u>7.5</u>	Milliseconds
SAE Filter Class:	<u>600</u>			
Date of Test:	<u>1/10/01</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.: LK01G



KAR21001-04



Hybrid III Calibration Data Sheet

50TH Percentile Male

Right Knee Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: RK01C

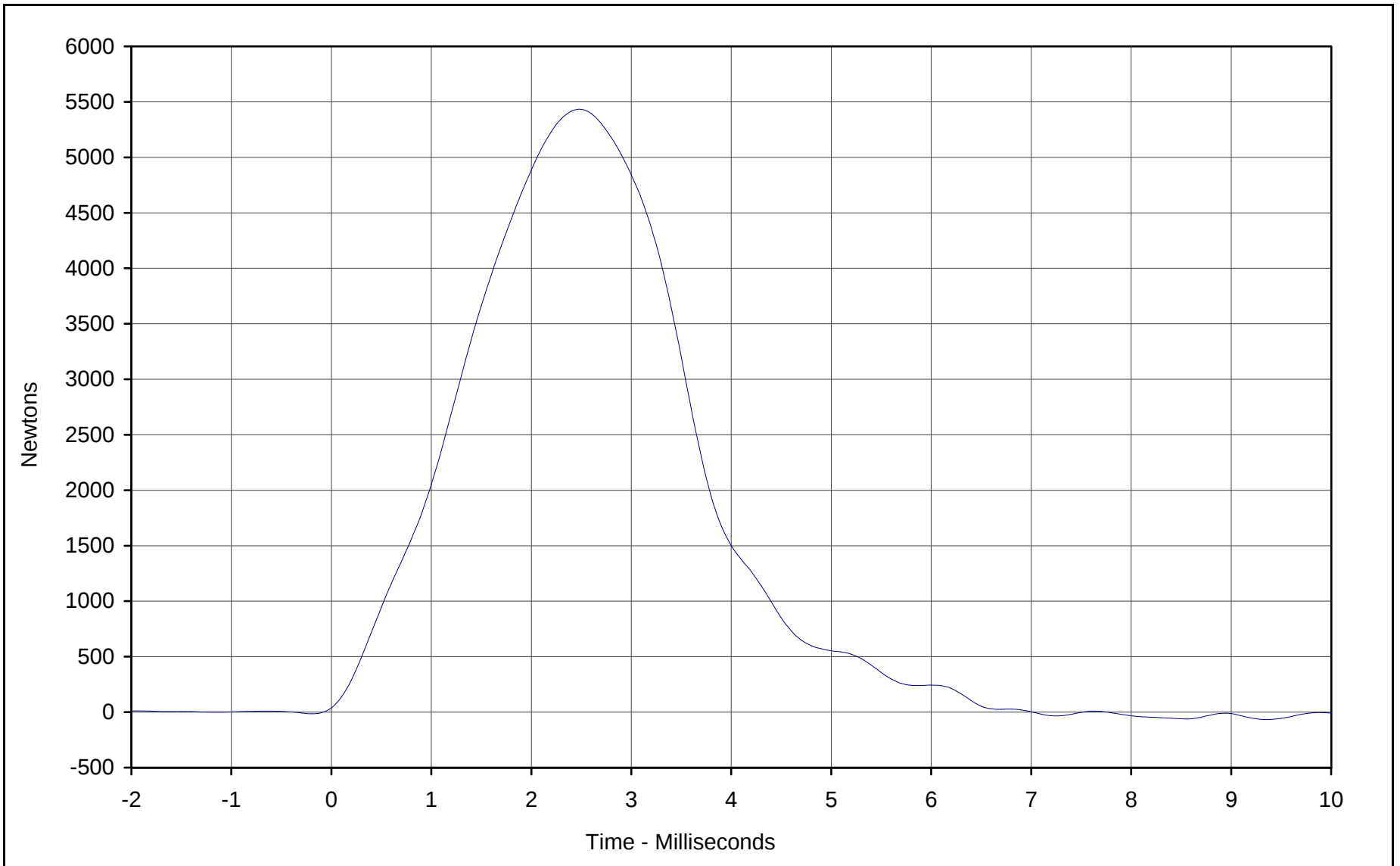
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	2.073 to 2.134	2.113	Pass
Peak Probe Force	Newtons	4715 to 5782	5432.5	Pass
Overall Test Results				Pass

Laboratory Technician

January 10, 2001
Test Date

Approved By

Date



Curve Description: Probe Force

Maximum Value:	<u>5432.5</u>	at	<u>2.5</u>	Milliseconds
Minimum Value:	<u>-33.3</u>	at	<u>7.3</u>	Milliseconds
SAE Filter Class:	<u>600</u>			
Date of Test:	<u>1/10/01</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.: RK01C





Hybrid III Calibration Data Sheet

50TH Percentile Male

Head Drop Calibration

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: HD01E

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	233.5	Pass
Peak Lateral Acceleration	G's	≤15.0	10.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

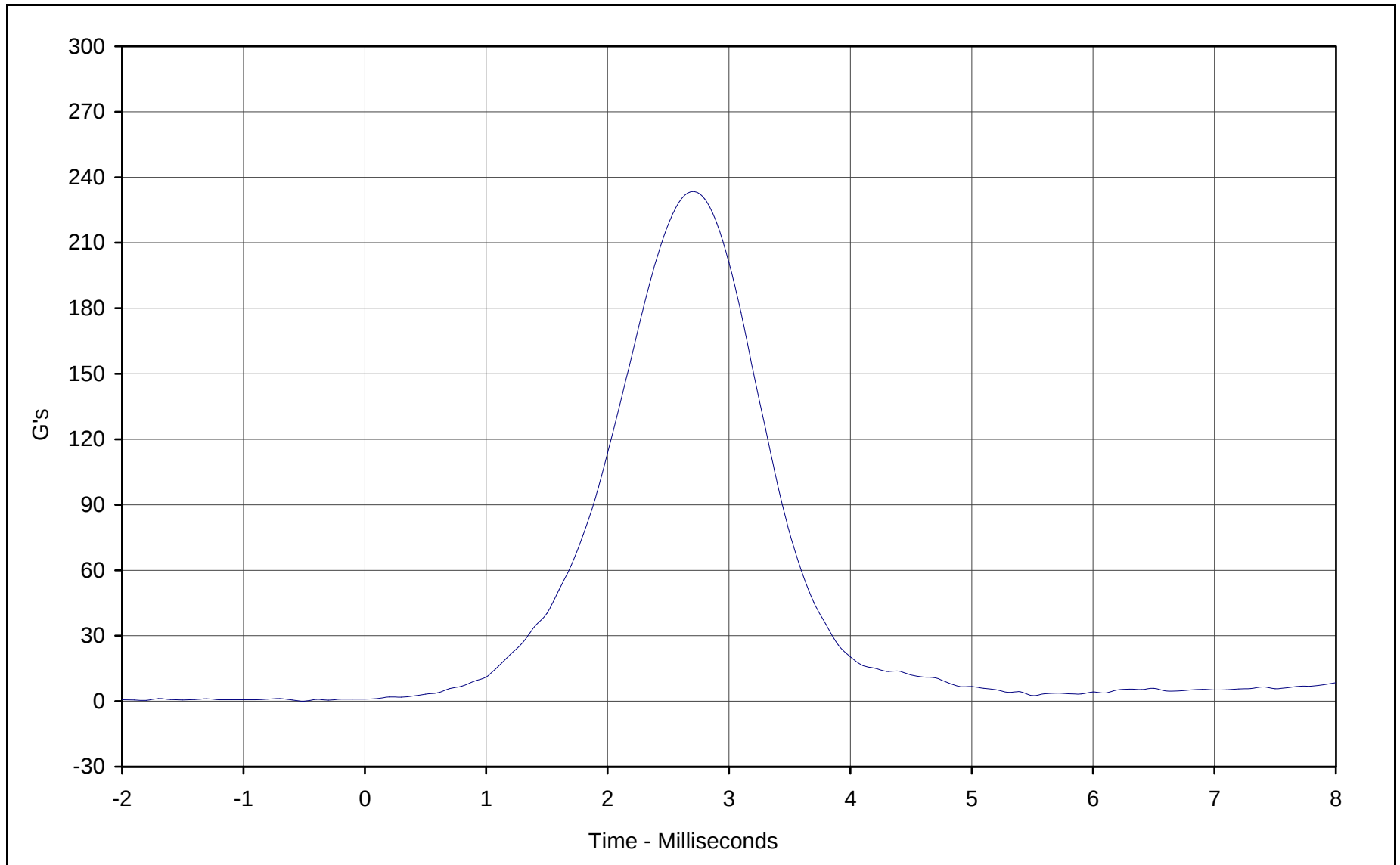
Laboratory Technician

January 10, 2001

Test Date

Approved By

Date



Curve Description: Head Resultant Acceleration

Maximum Value: 233.5 at 2.7 Milliseconds

Minimum Value: 0.0 at -0.5 Milliseconds

SAE Filter Class: 1000

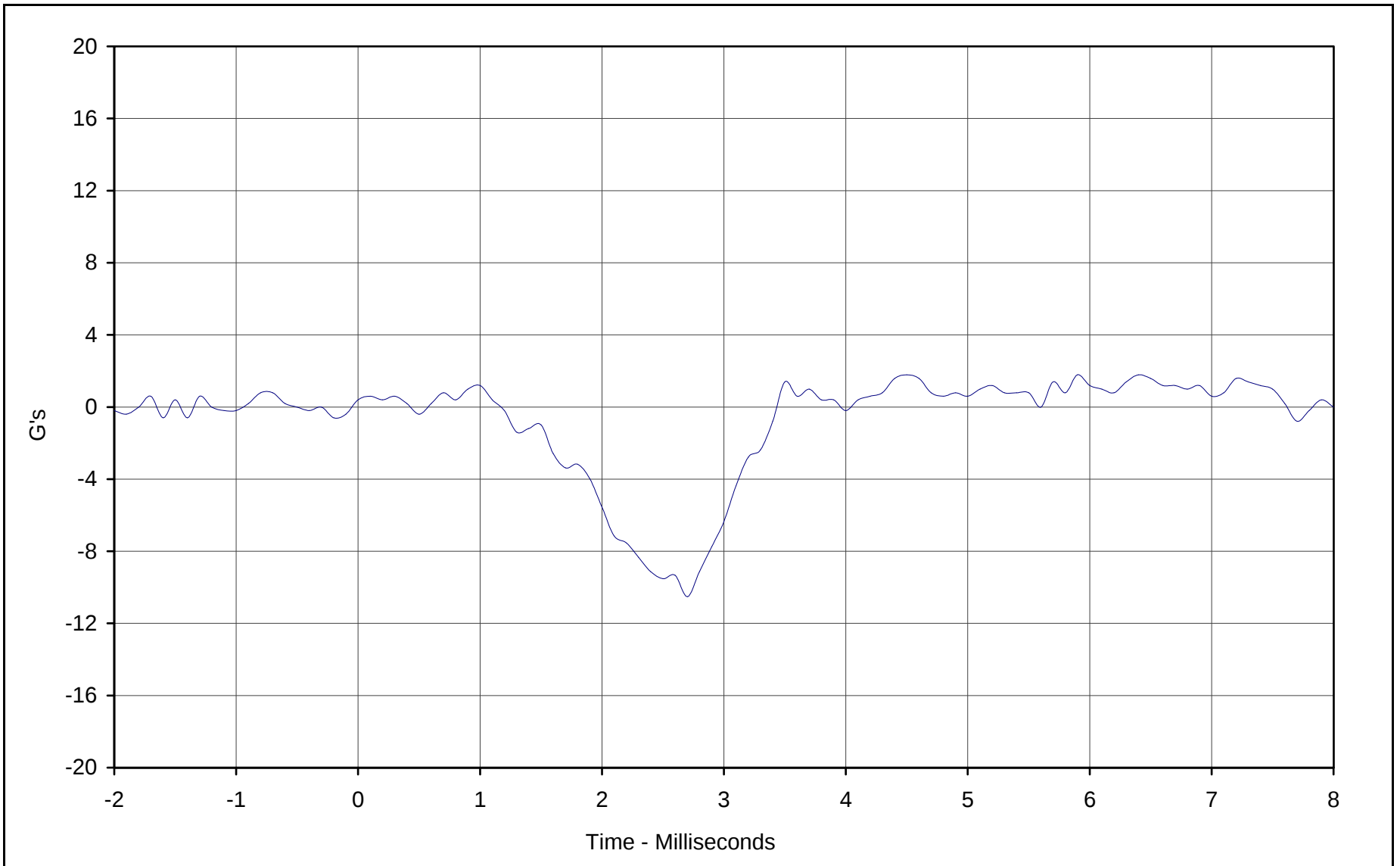
Date of Test: 1/10/01

ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01E





Curve Description: Head Acceleration Y Axis

Maximum Value: 1.8 at 4.5 Milliseconds

Minimum Value: -10.5 at 2.7 Milliseconds

SAE Filter Class: 1000

Date of Test: 1/10/01

ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD01E





Hybrid III Calibration Data Sheet

50TH Percentile Male

Thorax Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: CH01G

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	5352	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	7.12	Pass
Internal Hysteresis	%	69 to 85	73.5	Pass
Overall Test Results				Pass

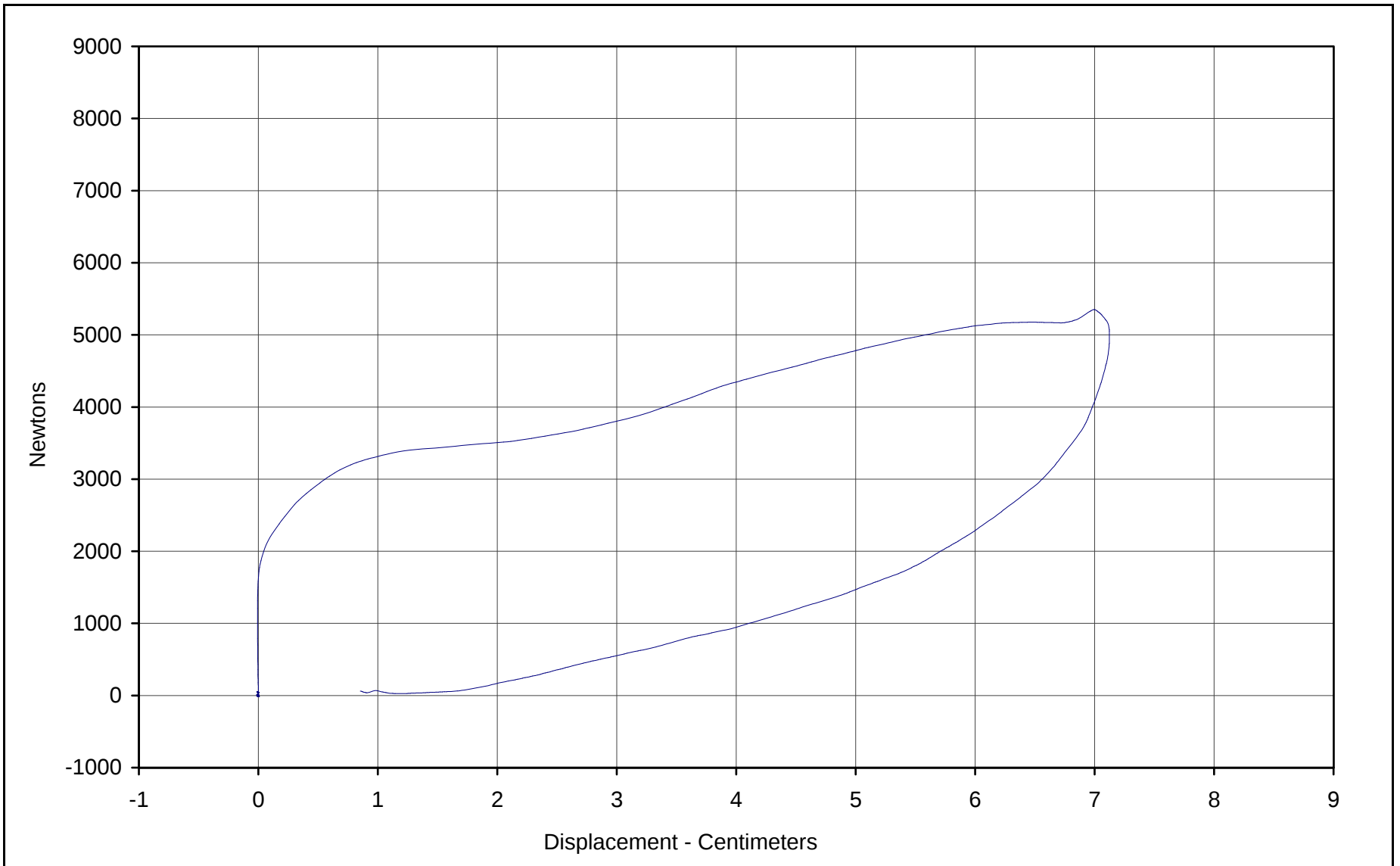
Laboratory Technician

January 10, 2001

Test Date

Approved By

Date



Curve Description: Probe Force vs. Chest Displacement

Probe Force: 5351.7 Newtons

Chest Displ.: 7.12 Centimeters

SAE Filter Class: 180

Date of Test: 1/10/01

ATD Serial No.: 035

Testing Program: Hybrid III Thorax Impact Test

Test Information: S/N of Part: N/A Test I.D.: CH01G





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NF01D

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.89	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.6	Pass
	20 Msec.	G's	17.6 to 22.6	20.3	Pass
	30 Msec.	G's	12.5 to 18.5	16.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	16.9	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	75.7	Pass
	Time	Msec.	57.0 to 64.0	63.1	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	122.7	Pass
Moment About Occipital Condyle	Maximum	N·m	84.1 to 108.5	89.4	Pass
	Time	Msec.	47.0 to 58.0	57.3	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	102.1	Pass
Overall Test Results					Pass

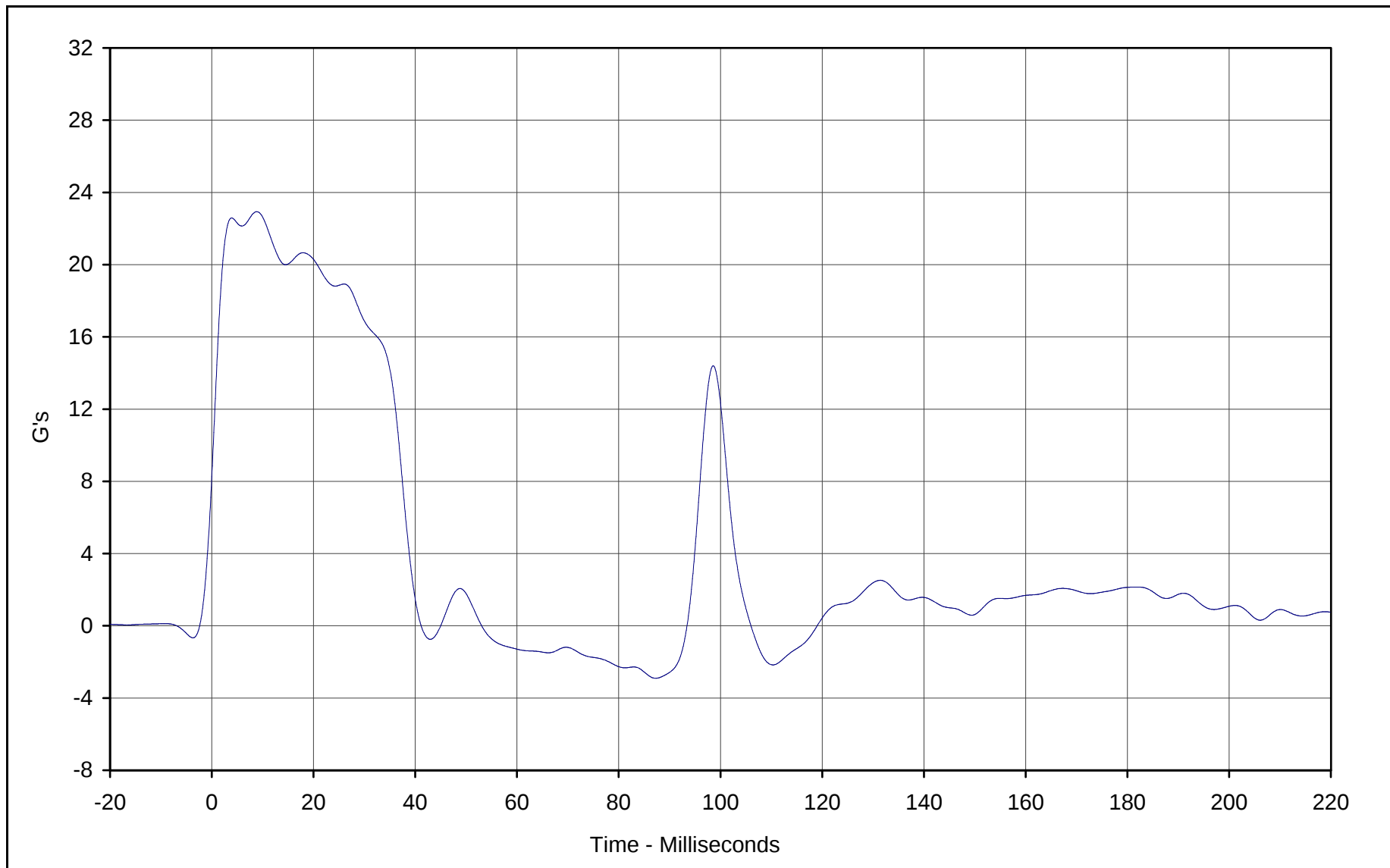
Laboratory Technician

January 10, 2001
Test Date

Approved By

Date

E-31



Curve Description: Pendulum Deceleration

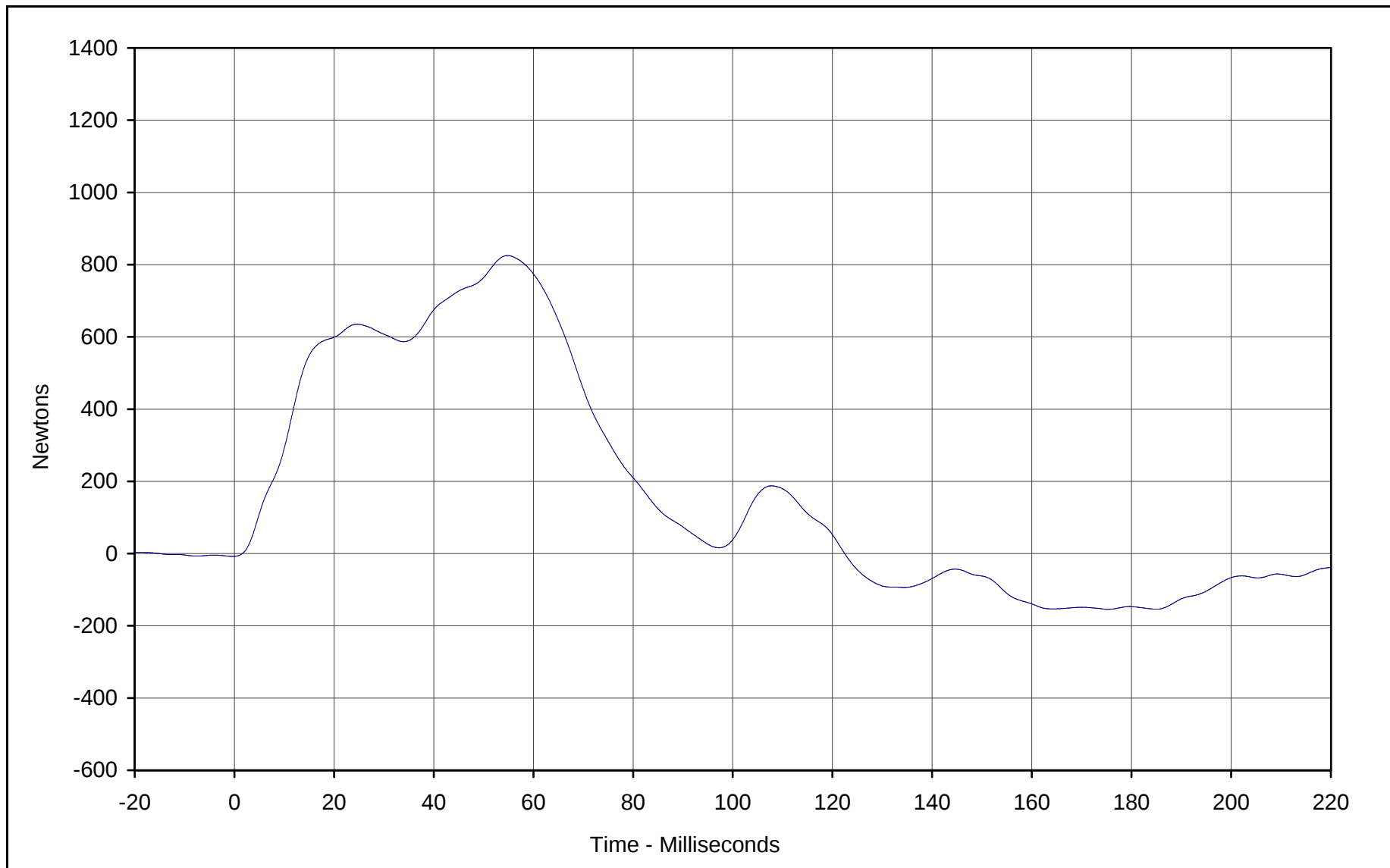
Maximum Value:	<u>22.9</u>	at	<u>8.8</u>	Milliseconds
Minimum Value:	<u>-2.9</u>	at	<u>87.3</u>	Milliseconds
SAE Filter Class:	<u>60</u>			
Date of Test:	<u>1/10/01</u>			
ATD Serial No.:	<u>035</u>			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01D



KAR21001-04



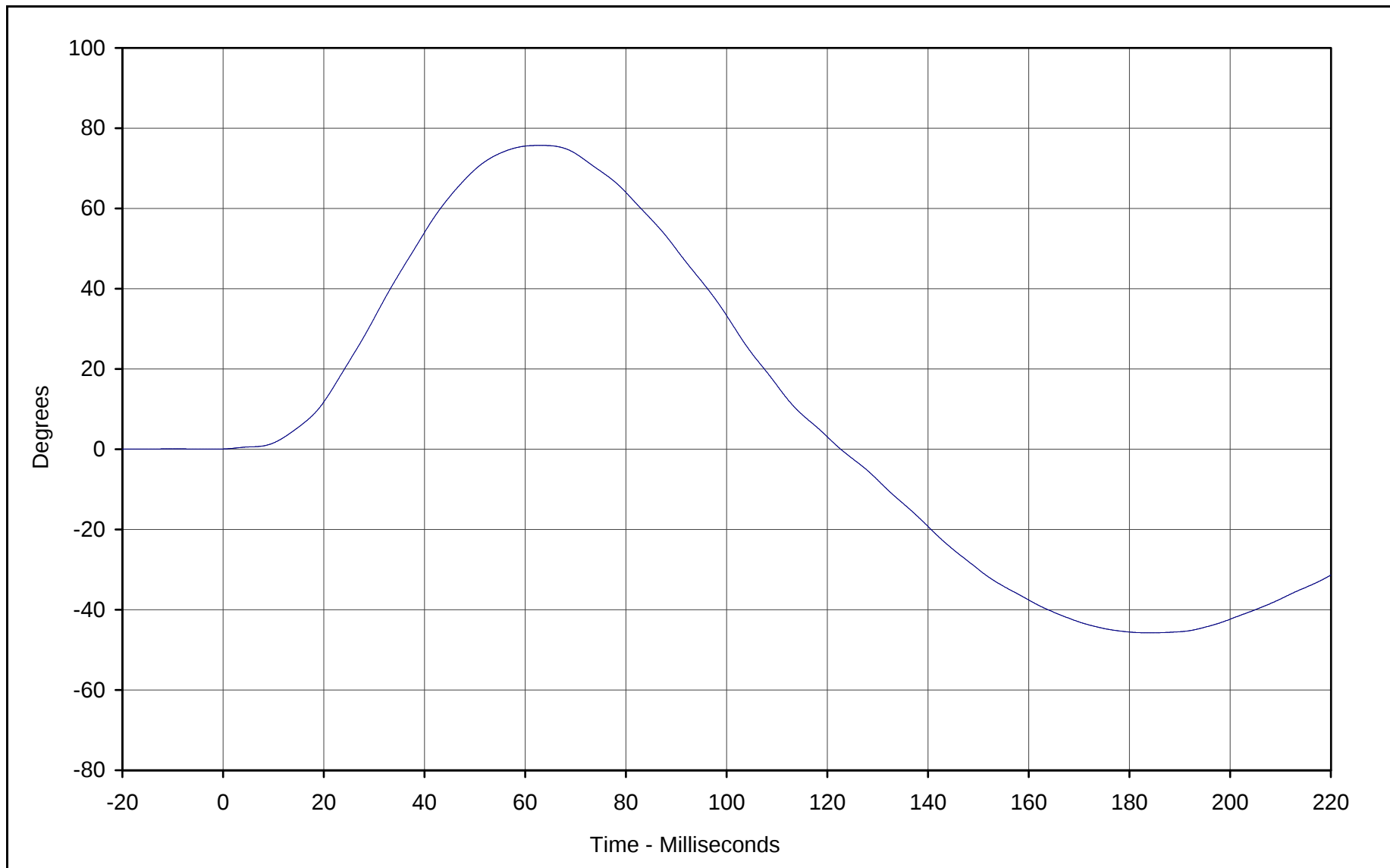
Curve Description: Neck Force X

Maximum Value:	825.3	at	54.8	Milliseconds
Minimum Value:	-154.5	at	175.3	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01D





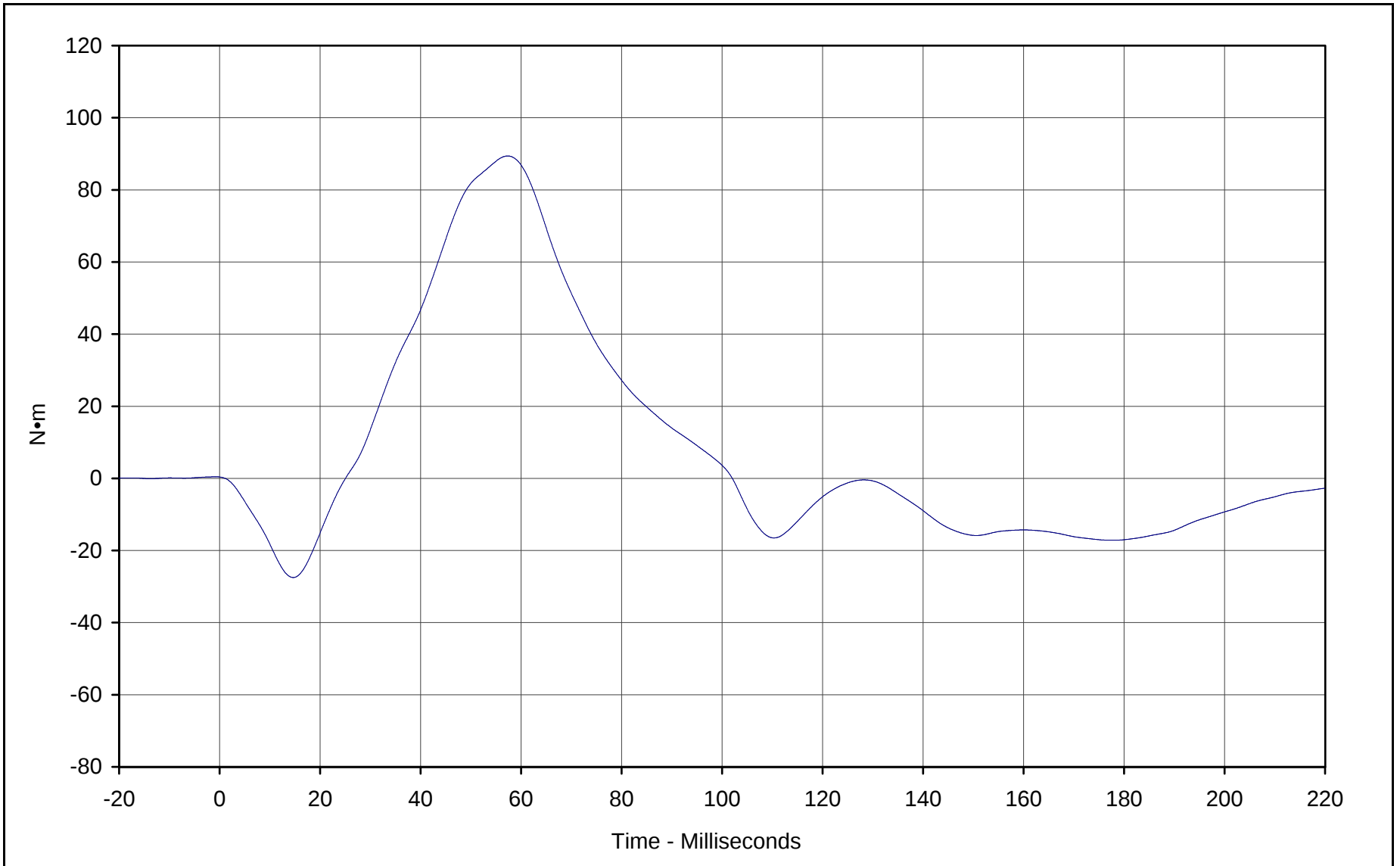
Curve Description: "D" Plane Rotation

Maximum Value:	75.7	at	63.1	Milliseconds
Minimum Value:	-45.8	at	184.1	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01D





Curve Description: Moment About Occipital Condyles

Maximum Value: 89.4 at 57.3 Milliseconds

Minimum Value: -27.5 at 14.6 Milliseconds

SAE Filter Class: 60

Date of Test: 1/10/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF01D





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Extension Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NE01D

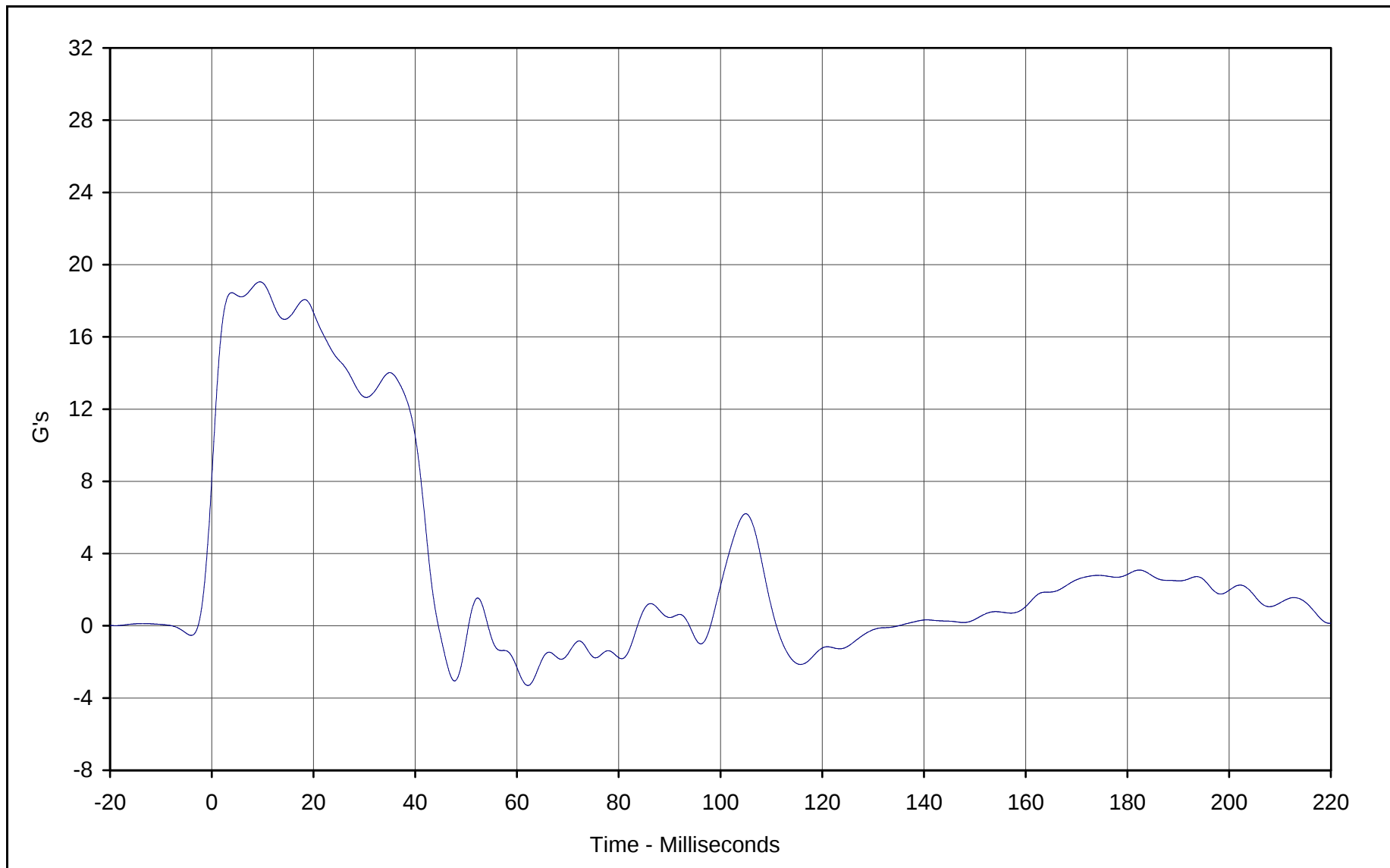
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.10	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.0	Pass
	20 Msec.	G's	14.0 to 19.0	17.3	Pass
	30 Msec.	G's	11.0 to 16.0	12.7	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	14.0	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	42.3	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	90.7	Pass
	Time	Msec.	72.0 to 82.0	81.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	155.3	Pass
Moment About Occipital Condyle	Maximum	N•m	-52.9 to- 79.9	-61.8	Pass
	Time	Msec.	65.0 to 79.0	73.2	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	138.4	Pass
Overall Test Results					Pass

Laboratory Technician

January 10, 2001
Test Date

Approved By

Date



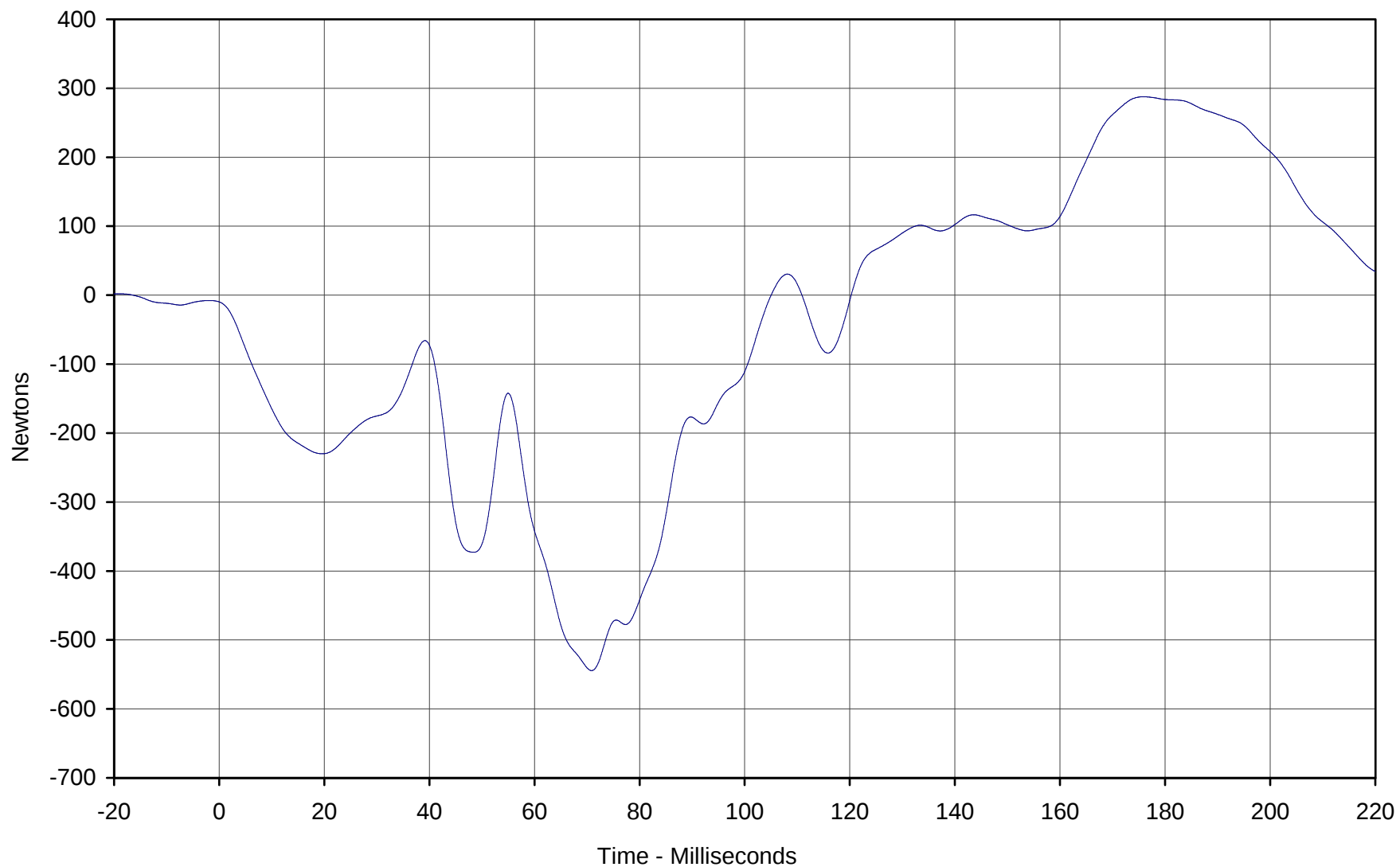
Curve Description: Pendulum Deceleration

Maximum Value:	<u>19.1</u>	at	<u>9.5</u>	Milliseconds
Minimum Value:	<u>-3.3</u>	at	<u>62.1</u>	Milliseconds
SAE Filter Class:	<u>60</u>			
Date of Test:	<u>1/10/01</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.: NE01D





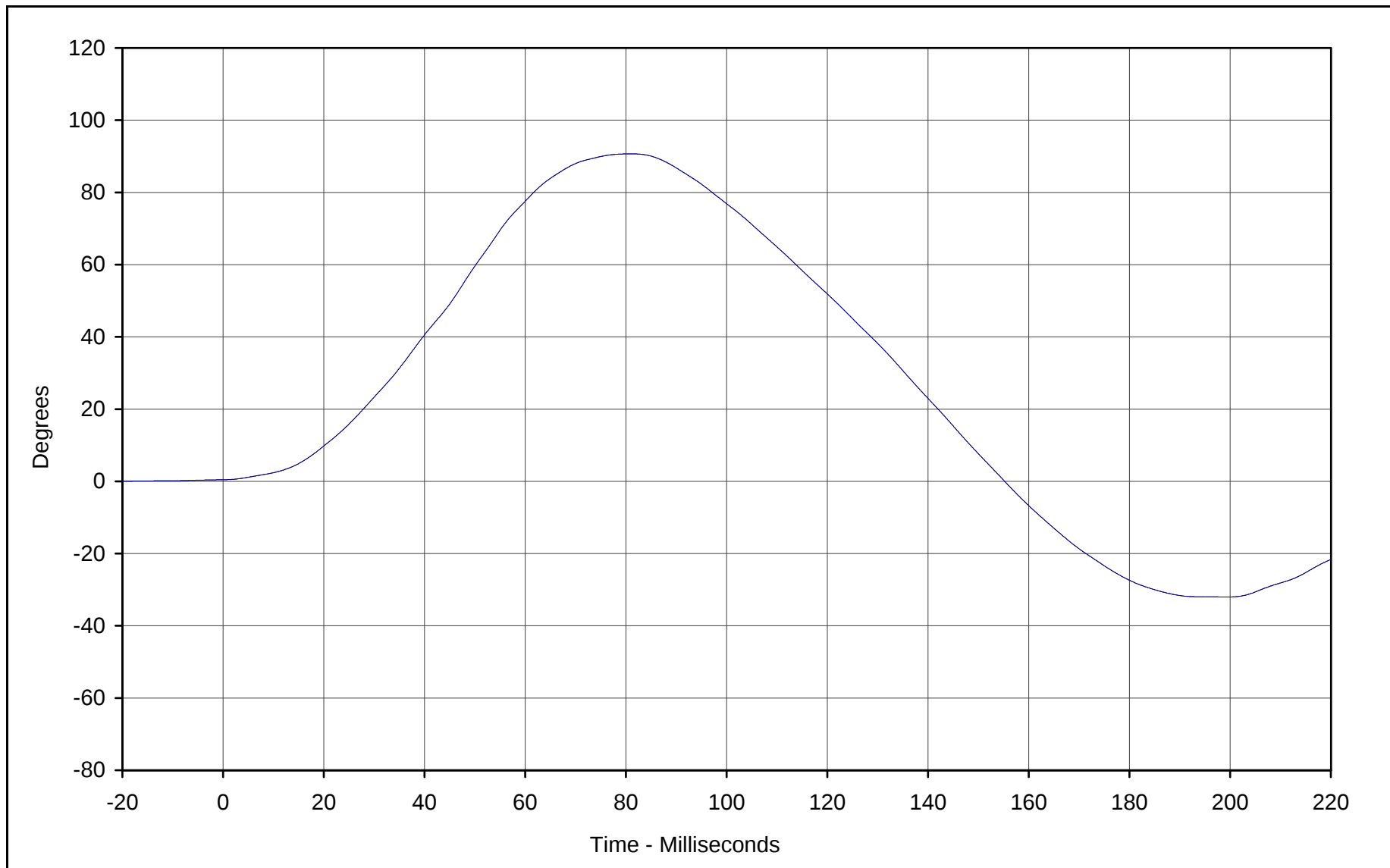
Curve Description: Neck Force X

Maximum Value:	287.7	at	175.9	Milliseconds
Minimum Value:	-544.4	at	70.9	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01D





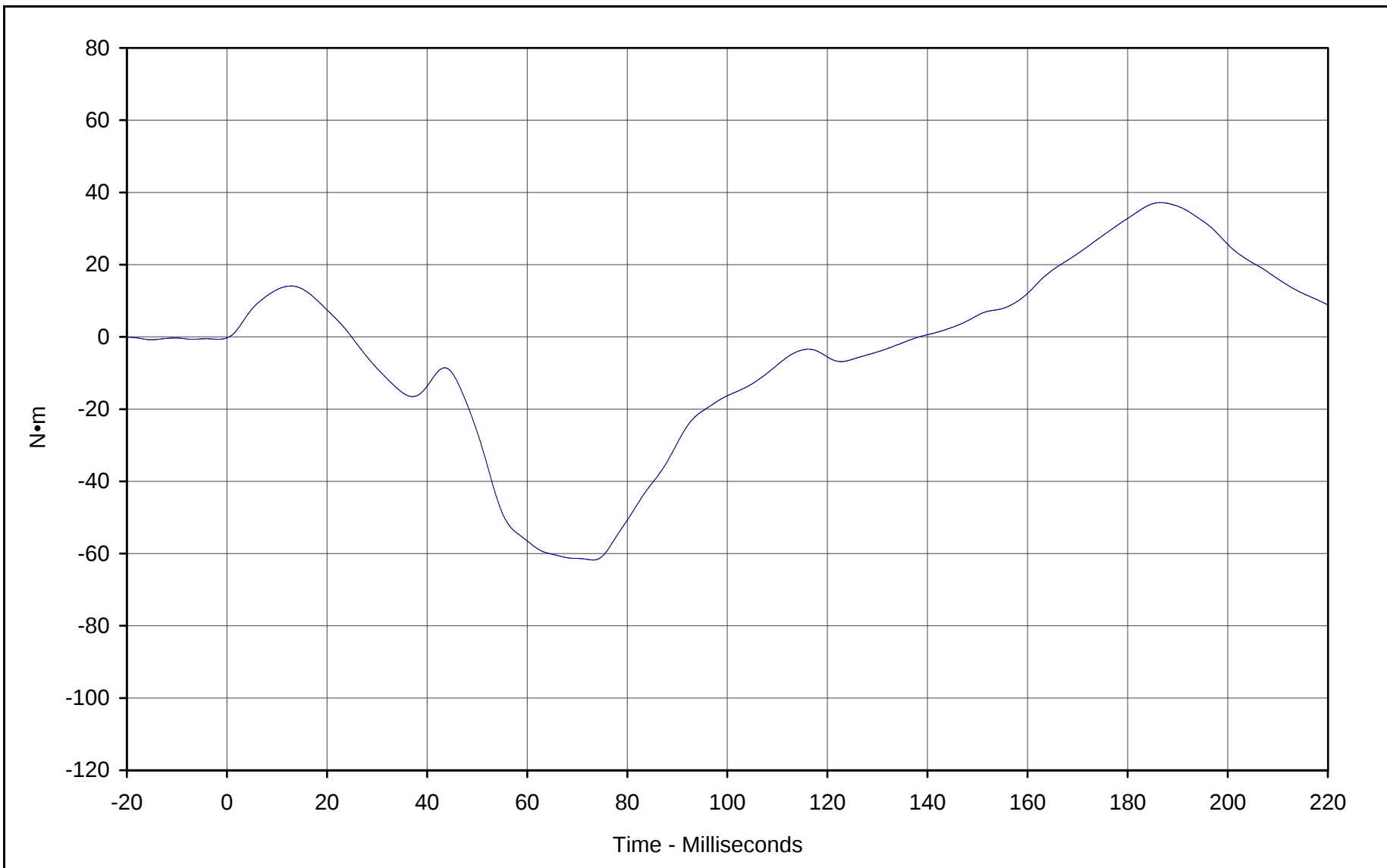
Curve Description: "D" Plane Rotation

Maximum Value:	90.7	at	81.0	Milliseconds
Minimum Value:	-32.0	at	199.4	Milliseconds
SAE Filter Class:	60			
Date of Test:	1/10/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01D





Curve Description: Moment About Occipital Condyles

Maximum Value: 37.2 at 186.5 Milliseconds

Minimum Value: -61.8 at 73.2 Milliseconds

SAE Filter Class: 60

Date of Test: 1/10/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE01D





Hybrid III Calibration Data Sheet

50TH Percentile Male

External Measurements

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: N/A

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	20.9	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	510	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	135	Pass
E - Shoulder pivot from back	mm	84 to 94	90	Pass
F - Thigh clearance	mm	140 to 155	145	Pass
G - Elbow back to wrist pivot	mm	290 to 305	295	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	340	Pass
J - Elbow rest height	mm	190 to 211	210	Pass
K - Buttock to knee length	mm	579 to 604	590	Pass
L - Popliteal length	mm	429 to 455	440	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	470	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	265	Pass
V - Shoulder breadth	mm	422 to 437	435	Pass
W - Foot breadth	mm	91 to 107	105	Pass
Y - Chest circumference	mm	970 to 1001	990	Pass
Z - Waist circumference	mm	836 to 866	855	Pass
AA - Location for chest circumference	mm	429 to 434	430	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Laboratory Technician

January 10, 2001

Test Date

Approved By

Date

APPENDIX F
VEHICLE OWNER'S MANUAL
OCCUPANT RESTRAINT INSTRUCTIONS

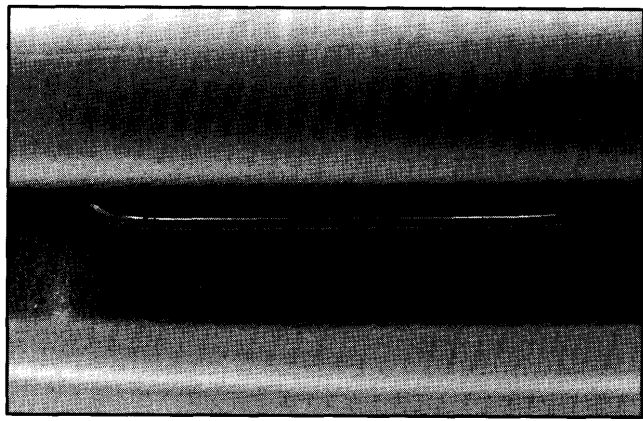
Seats and Seat Controls

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

Manual Seats

CAUTION:

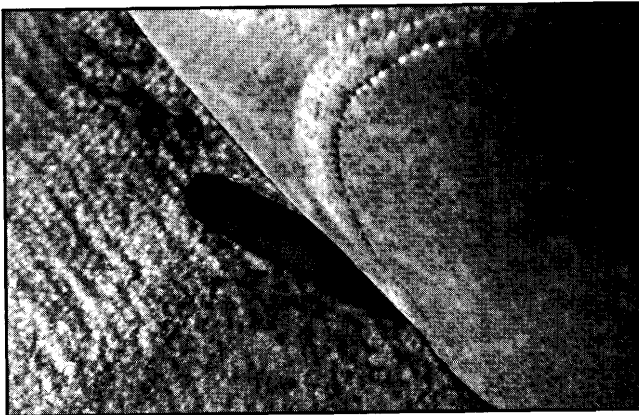
You can lose control of the vehicle if you try to adjust a manual driver's seat while the vehicle is moving. The sudden movement could startle and confuse you, or make you push a pedal when you don't want to. Adjust the driver's seat only when the vehicle is not moving.



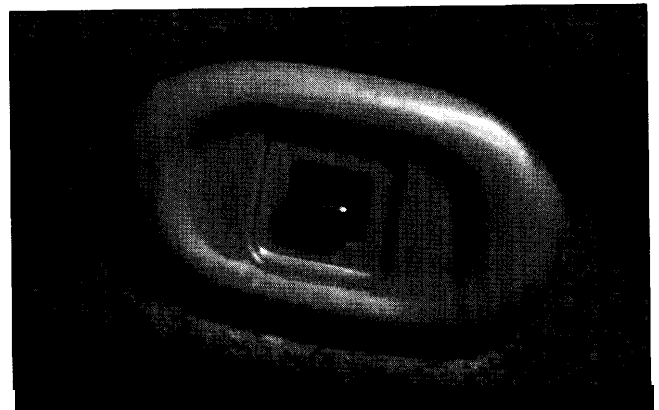
Lift the bar located under the front of the seat to unlock it. Slide the seat to where you want it and release the bar. Try to move the seat with your body to be sure the seat is locked in place.

1-2

Power Lift Seat (If Equipped)



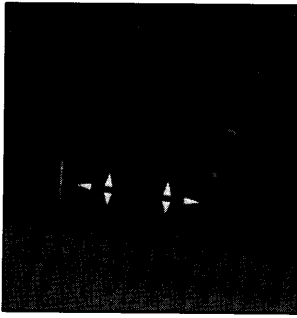
To move the power lift seat forward or rearward, pull up on the lever located under the front of the driver's seat to unlock it. Slide the seat to where you want it. Then release the lever and try to move the seat with your body to make sure the seat is locked into place.



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

1-3

6-Way Power Seat Controls (If Equipped)



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

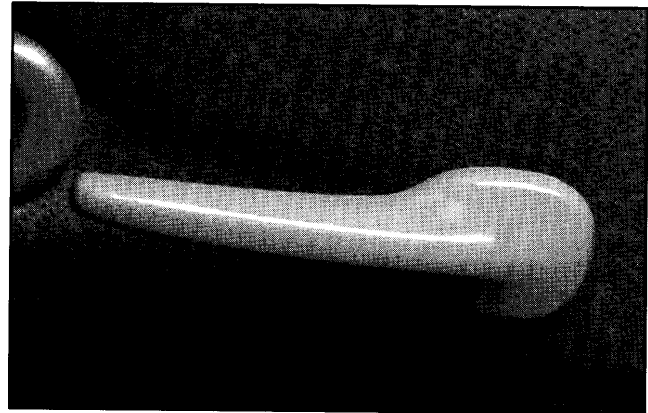
This control allows you to move the seat up, down, forward, or backward. It will also move the front or rear of the seat cushion up or down.

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

Manual Lumbar Support (If Equipped)

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

Reclining Front Seatbacks



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

1-4



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

CAUTION:

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

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

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

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

Head Restraints



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

Seatback Latches (2-Door Models)

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

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

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

CAUTION:

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

1-6

Easy Entry Seat (2-Door Models)

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

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

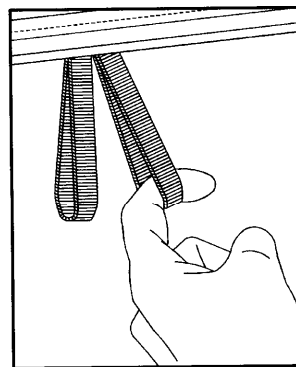
CAUTION:

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

Rear Seats

Folding the Rear Seat (If Equipped)

To fold down the rear seat, do the following:



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

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

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

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

1-7

Safety Belts: They're for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

And it explains the Supplemental Restraint System (SRS), or air bag system.

CAUTION:

Don't let anyone ride where he or she can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.

CAUTION:

It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed. Do not allow people to ride in any area of your vehicle that is not equipped with seats and safety belts. Be sure everyone in your vehicle is in a seat and using a safety belt properly.



Your vehicle has a light that comes on as a reminder to buckle up. See "Safety Belt Reminder Light" in the Index.

In most states and Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

1-8

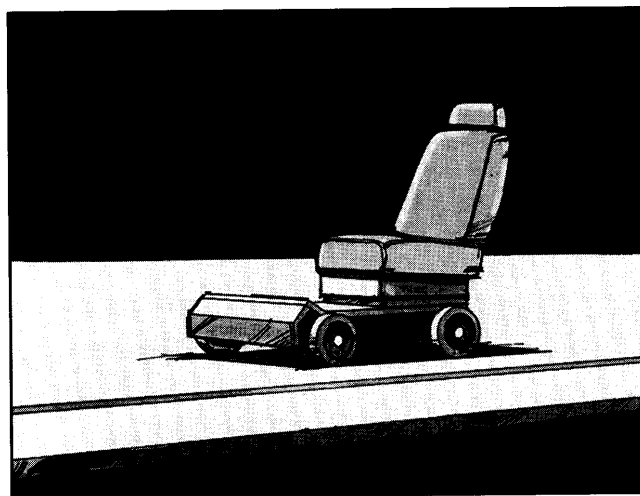
You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are mild, and some crashes can be so serious that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

After more than 30 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter . . . a lot!

Why Safety Belts Work

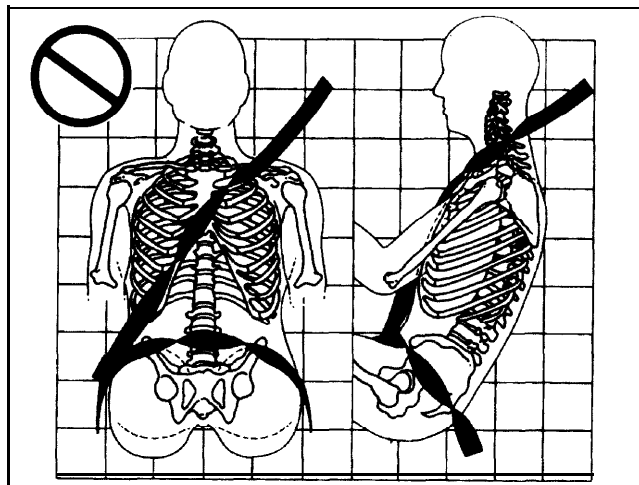
When you ride in or on anything, you go as fast as it goes.



Take the simplest vehicle. Suppose it's just a seat on wheels.

1-9

Q: What's wrong with this?

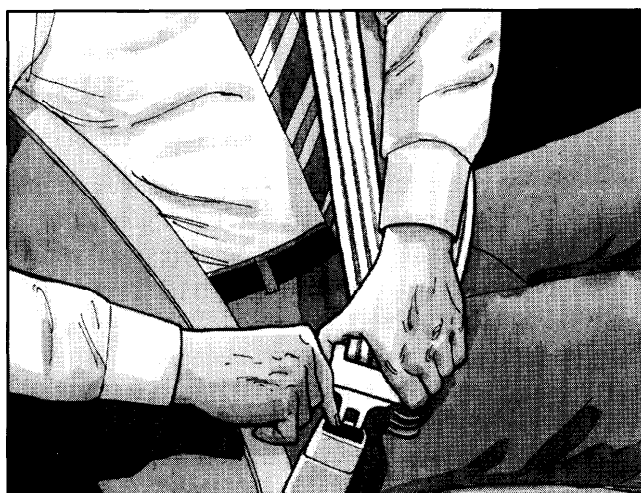


⚠ CAUTION:

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

At The belt is twisted across the body.

1-20

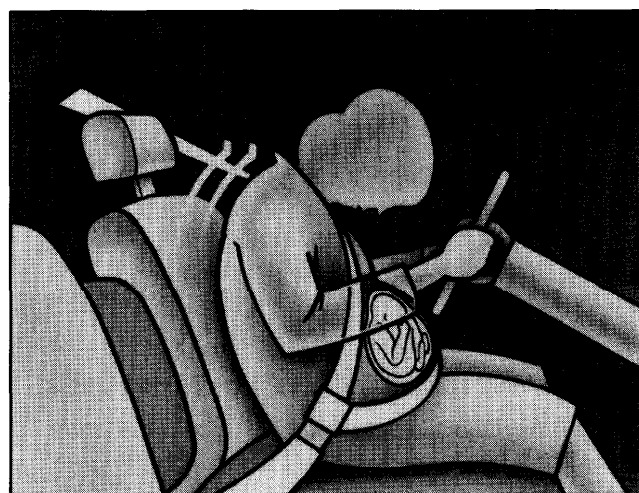


To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

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

Safety Belt Use During Pregnancy

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



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

1-21

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

Right Front Passenger Position

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

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

Supplemental Restraint System (SRS)

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

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

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

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

CAUTION:

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

I-22

CAUTION:

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

CAUTION:

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

CAUTION: (Continued)

CAUTION: (Continued)

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

AIR
BAG

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

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

I-23

How the Air Bag System Works



Where are the air bags?

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



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

1-24

CAUTION:

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

When should an air bag inflate?

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

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

1-25

What makes an air bag inflate?

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

How does an air bag restrain?

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

What will you see after an air bag inflates?

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



CAUTION:

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

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

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

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

NOTICE:

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

Servicing Your Air Bag-Equipped Vehicle

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

CAUTION:

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

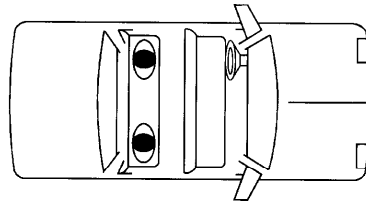
The air bag system does not need regular maintenance.

Rear Seat Passengers

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

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

Rear Seat Outside Passenger Positions



Lap-Shoulder Belt

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

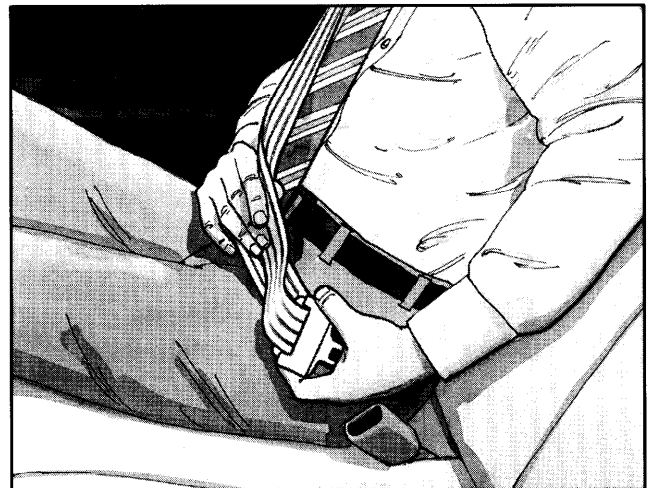
1-28



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

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

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



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

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

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

⚠CAUTION:

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



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

Rear Safety Belt Comfort Guides for Children and Small Adults

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

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