

REPORT NUMBER KAR21001-16

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

**GENERAL MOTORS CORPORATION
2001 CHEVROLET VENTURE
MINIVAN
NHTSA NUMBER: M10109**

**PREPARED BY:
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9270 HOLLY ROAD
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MAY 13, 2001

FINAL REPORT

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2001 Chevrolet Venture Minivan at KARCO Engineering on 3/2/01. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 55.80 km/h. The ambient temperature at the barrier face at the time of impact is 16.1 degrees Celcius. The vehicle's maximum post test static crush is 432 mm located to the left 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	645.5	625.4
Max. Thorax Accel. (3 msec Clip)	G's	60	39.3	42.6
Left Femur force	Newtons	10009	-6245.3	-3231.9
Right Femur Force	Newtons	10009	-8100.3	-4980.9
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SECTION 1

PURPOSE, TEST PROCEDURE AND SUMMARY OF TEST M10109

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 March 2, 2001 at a speed of 55.80 km/h. The test vehicle was instrumented with eight (8) accelerometers to measure longitudinal axis accelerations. The driver and passenger's restraint systems were instrumented with four (4) seat belt load cells to measure lap and shoulder belt tension. The specified impact velocity range was 55.5 to 57.1 km/h. The frontal barrier impact event was documented by one (1) real-time panning motion picture camera and sixteen (16) 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-four (94) channels of data were recorded with a PC based (TDAS) on-board data acquisition system. The data was digitally sampled at 10,000 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

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

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A rigid load cell barrier was impacted by a 2001 Chevrolet Venture Minivan at a velocity of 55.80 km/h. The test vehicle weight is 1969 kilograms with two (2) part 572E 50th percentile adult male ATDs. Twenty-four (24) load cell barrier data channels were obtained in conducting the March 2, 2001 NCAP test. The test vehicle is a gasoline vehicle, equipped with a transverse mounted, 6-cylinder engine and a 4-speed automatic transmission.

The driver Head Injury Criteria (HIC) is 645.5. The maximum resultant chest deceleration over three (3) milliseconds is 39.3 g's. The left and right femur loads are -6245.3 and -8100.3 Newtons, respectively. Chest deflection for the driver ATD peaked at -26.6 mm. The driver ATD head contacted the airbag/headrest, its chest contacted the airbag/belt, the abdomen contacted the belt, with both knees contacting the dash.

The right front passenger's HIC is 625.4. The maximum resultant chest deceleration over three (3) milliseconds is 42.6 g's. The left and right femur loads are -3231.9 and -4980.9 Newtons respectively. Chest deflection for the passenger ATD peaked at -25.2 mm. The passenger ATD head contacted the airbag and headrest, the chest and abdomen contacted the airbag/belt, the left knee and the right knee contacted the glove box.

Maximum shoulder belt spool out as measured by on-board potentiometers is 129.4 mm for the driver ATD and 144.8 mm for the passenger ATD. Shoulder belt stretch is 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 432 mm located to the left of the vehicle centerline. Both the driver and passenger side doors opened without the aid of tools.

1.4 GENERAL COMMENTS

The 2001 Chevrolet Venture Minivan 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 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01

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	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

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

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

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 03/02/01

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	55.80
Test Weight	kg	1971
Impact Angle	degrees	0
Average Rebound	mm	807
Maximum Static Crush	mm	432

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Opened	Opened
Rear Door Opening	Opened	Opened
Seat Track Shift (mm)	None	None
Seat Back Failure	None	None

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type / Serial No.	50% Male Hybrid III / No. 34	50% Male Hybrid III / No. 35
Head Contact	Airbag/Headrest	Airbag/Headrest
Chest Contact	Airbag/Belt	Airbag/Belt
Abdomen Contact	Belt	Airbag/Belt
Left Knee Contact	Dash	Glove Box
Right Knee Contact	Dash	Glove Box

16mm MOVIE COVERAGE

High Speed	16
Real Time	1
Total	17

DATA CHANNELS

Driver ATD Sensors	40
Passenger ATD Sensors	40
Belt Assessment Sensors	6
Vehicle Structure Accelerometers	8
Rigid Barrier Load Cells	24
Total	118

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

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 03/02/01

TEST VEHICLE INFORMATION

Manufacturer	Chevrolet
Model	Venture
Body Style	Van
Project NO.	KAR21001-16
VIN	1GNDU23E81D114838
Color	White
Delivery Date	2/15/01
Odometer Reading (mile)	119
Dealer	Crest Chevrolet
Transmission	4-Speed Automatic
Final Drive	Front
Number of Cylinders	6
Engine Displacement (L)	3.4
Engine Placement	Transverse

TEST VEHICLE OPTIONS

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

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors Corp.	GVWR (kg)	2430
Date of Manufacture	August-00	GAWR Front (kg)	1236
		GAWR Rear (kg)	1215

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	240	240
Cold Pressure (kPa)	240	240
Recommend Tire Size	P215/70R15	P215/70R15
Tire Size on Vehicle	P215/70R15	P215/70R15
Tire Manufacturer	Firestone	Firestone

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	Bench	
Number of Occupants	2	2	3	7
Capacity Wt. (VCW) (kg)				743
Cargo Weight (RCLW) (kg)				136

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

Test Vehicle: 2001 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
 Test Date: 03/02/01

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	507	337		541	424	
Right	kg	505	337		566	438	
Ratio	%	60.0%	40.0%		56.2%	43.8%	
Totals	kg	1012	674	1686	1107	862	1969

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1686
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Weight (RCLW)	kg	136
Calculated Vehicle Target Weight (TVTW)	kg	1974

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	756	762	783	788	1141
As Tested	mm	741	741	749	750	1250

Vehicle Wheel base (mm): 2855

Weight of Ballast secured in cargo area (kg): 68

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): 75.7

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

Actual Test Volume with entire fuel System Filled (L): 70.4

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 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 03/02/01

SPEED TRAP DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.51 to 57.12	55.80
Trap No. 1 Entry Distance	mm	< 1524	1524
Trap No. 1 Exit Distance	mm	< 1524	305
Trap No. 2 Velocity (Redundant)	km/h	55.51 to 57.12	56.11
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	4425	4129	-296
Center	mm	4760	4342	-418
Right Side	mm	4425	4158	-267

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	855
Center	mm	716
Right Side	mm	851
Average	mm	807

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

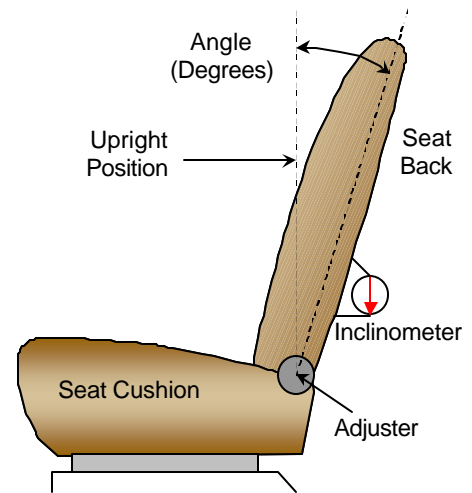
Test Date: 3/2/01

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: 22.0° with a seated dummy

Passenger seat back angle: 22.0° with a seated dummy



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

Driver and the passenger seat each have 17 detents. The first or forward most position is counted as number one (1). The fore/aft position is set aft of the middle position for both driver and passenger.

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

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

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

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

SEAT BELT UPPER ANCHORAGE

Both driver and passenger seat positions are equipped with adjustable anchorages; each have four (4) detents and are placed in the 2nd from the top.

DATA SHEET NO. 4...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01

FUEL TANK CAPACITY DATA

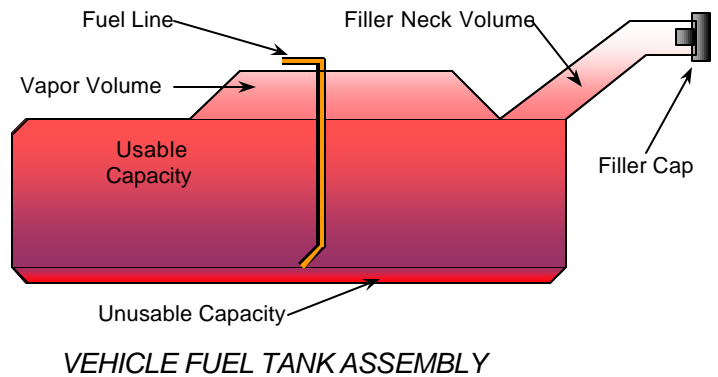
The "Usable Capacity" of the standard equipment fuel tank is: 75.7 liters

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

"Usable Capacity" used for certification tests FMVSS 301 requirements: 69.6 to 71.1 liters

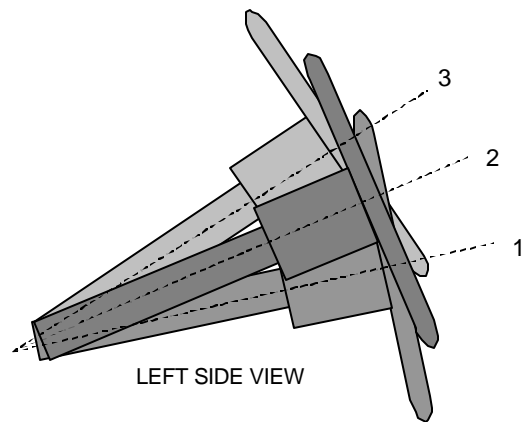
Actual amount of Stoddard solvent added to vehicle for certification test: 70.4 liters

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



STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed onto the plate and the angle is measured. The tested vehicle has its steering column set to the geometric center, or position 2.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 18.0°

Geometric center, position 2: 29.0°

Uppermost, position 3: 40.0°

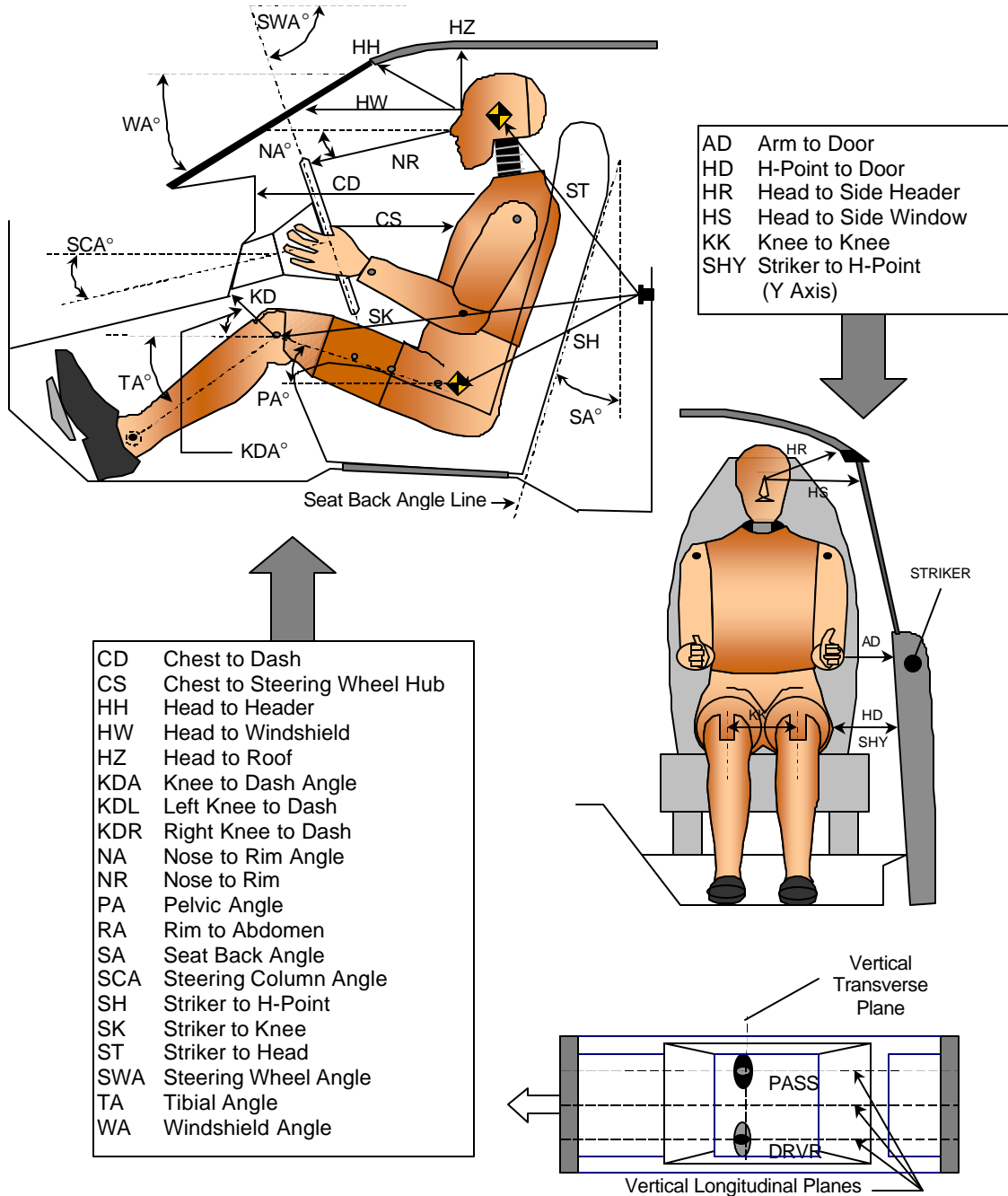
DATA SHEET NO. 5
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01



- CD Chest to Dash
- CS Chest to Steering Wheel Hub
- HH Head to Header
- HW Head to Windshield
- HZ Head to Roof
- KDA Knee to Dash Angle
- KDL Left Knee to Dash
- KDR Right Knee to Dash
- NA Nose to Rim Angle
- NR Nose to Rim
- PA Pelvic Angle
- RA Rim to Abdomen
- SA Seat Back Angle
- SCA Steering Column Angle
- SH Striker to H-Point
- SK Striker to Knee
- ST Striker to Head
- SWA Steering Wheel Angle
- TA Tibial Angle
- WA Windshield Angle

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

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

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 03/02/01

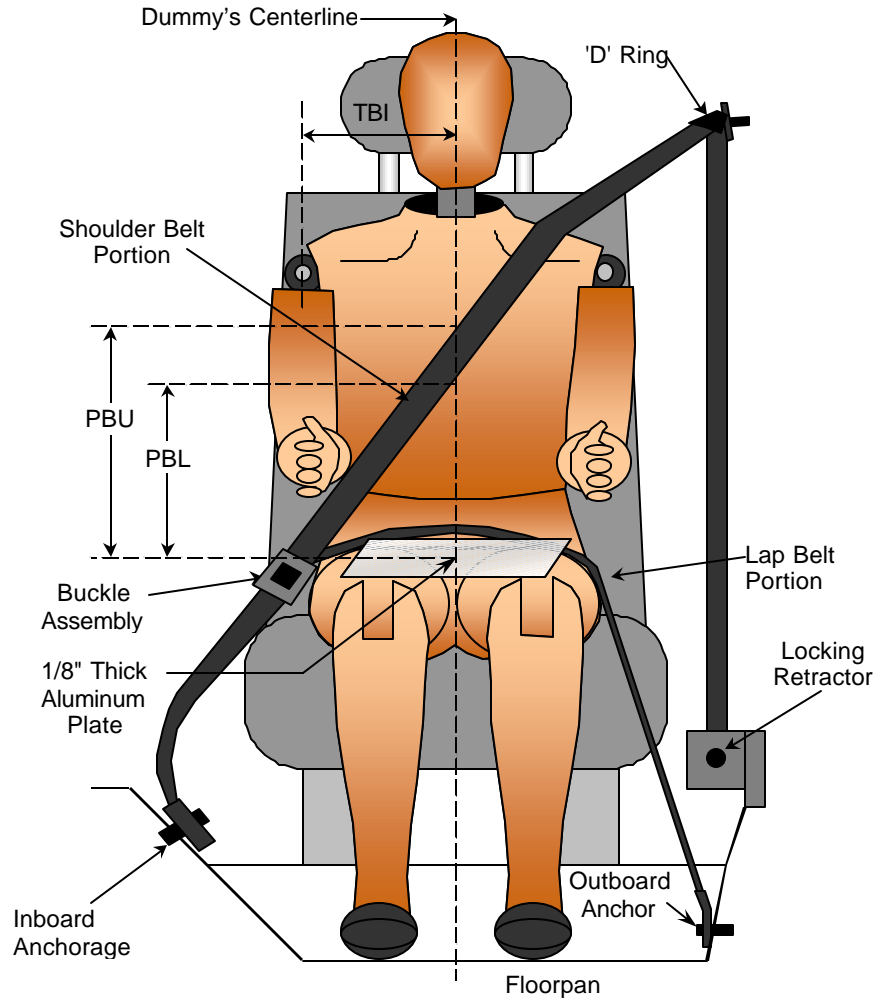
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		31		
SWA	Steering Wheel Angle		61		
SCA	Steering Column Angle		28		
SA	Seat Back Angle		22		22
HZ	Head to Roof (Z)	236	90	215	90
HH	Head to Header	450	0	430	0
HW	Head to Windshield	670	0	715	0
HR	Head to Side Header (Y)	270		265	
NR	Nose to Rim	418	12		
CD	Chest to Dash	555		485	
CS	Chest to Steering Hub	290	0		
RA	Rim to Abdomen	190	0		
KDL	Left Knee to Dash	195	48	170	
KDR	Right Knee to Dash	200		185	30
PA	Pelvic Angle		23.0		24.0
TA	Tibia Angle		50		51
KK	Knee to Knee (Y)	190		190	
SK	Striker to Head	637	8	641	7
ST	Striker to Knee	565	79	574	81
SH	Striker to H-Point	252	46	262	30
SHY	Striker to H-Point (Y)	262		258	
HS	Head to Side Window	336		334	
HD	H-Point to Door (Y)	171		168	
AD	Arm to Door (Y)	106		48	

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

Test Vehicle: 2001 Chevrolet Venture Minivan
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
Test Date: 3/2/01



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy CL to Lap/Shoulder Belt Intersect	mm	215	220
PBU - Top surface of reference to belt upper edge	mm	250	230
PBL - Top surface of reference to belt lower edge	mm	340	320
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 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35mph NCAP

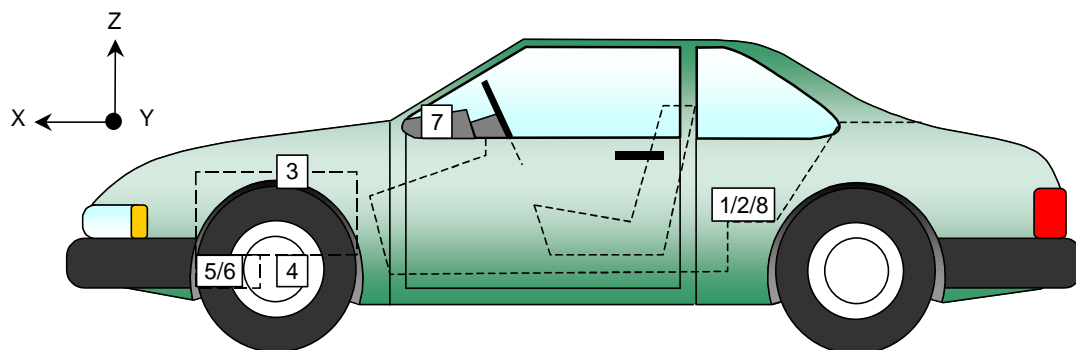
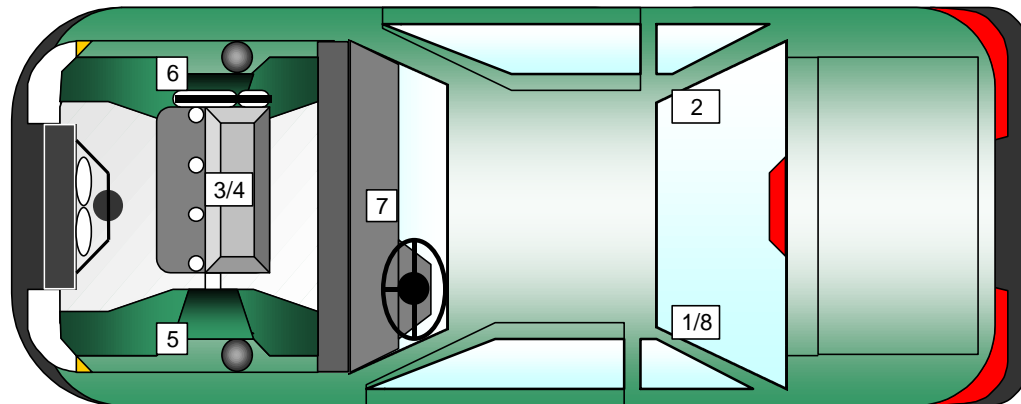
Test Date: 3/2/01

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.)	2020	-630	450	G's	2.8	180.0	-22.6	51.0
2	Right Rear X-Member (Pri.)	2020	620	450	G's	2.7	177.8	-22.7	26.2
3	Engine Top	4165	130	770	G's	42.1	43.0	-194.7	30.5
4	Engine Bottom	4155	70	180	G's	0.0	0.0	0.0	0.0*
5	Left Brake Caliper	4005	-740	255	G's	68.7	58.2	-108.9	38.0
6	Right Brake Caliper	4005	740	255	G's	80.4	61.1	-112.1	44.2
7	Instrument Panel	3220	0	1115	G's	37.1	53.1	-54.9	45.7
8	Left Rear X-Member (Rednt.)	2020	-600	450	G's	3.0	176.5	-22.9	38.2

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 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35mph NCAP

Test Date: 3/2/01

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	11.9	119.5	-62.0	72.4	9.3	219.9	-59.1	79.9
Head CG	Y	G's	7.9	200.5	-26.2	79.1	5.0	144.9	-16.9	79.9
Head CG	Z	G's	23.5	56.0	-12.6	83.8	35.9	68.4	-7.1	144.0
Head CG Resultant	N/A	G's	65.8	74.7			62.8	78.8		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	5.8	173.2	-39.9	75.9	3.5	233.8	-44.3	71.0
Chest CG	Y	G's	6.1	113.7	-6.0	54.1	2.7	52.0	-7.1	74.2
Chest CG	Z	G's	13.0	63.5	-12.6	85.7	12.2	46.9	-16.0	95.9
Chest CG Resultant	N/A	G's	40.6	64.3			45.3	70.9		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	189.1	47.1	-6245.3	52.7	368.2	87.5	-3231.9	60.4
Right Femur	Z	Newtons	688.8	98.7	-8100.3	52.9	204.8	47.4	-4980.9	67.7

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	2932.2	63.4	-9.3	0.0	3356.5	58.7	3.9	0.0
Shoulder Belt Force	N/A	Newtons	5629.2	62.2	-10.7	177.8	5849.0	70.2	-2.1	265.8
Shoulder Belt Pullout	N/A	MM	129.4	103.7	0.0	0.0	144.8	93.7	-0.2	0.0
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	645.5	50.9	53.4	88.2	625.4	51.2	61.6	94.8

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	39.3	63.5	66.5	42.6	63.9	66.9

DATA SHEET NO. 8...(continued)

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35mph NCAP

Test Date: 3/2/01

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	2.7	222.1	-100.7	52.8	3.6	241.7	-38.8	68.1
Pelvis	Y	G's	15.9	55.9	-13.9	50.4	4.1	46.3	-10.6	62.9
Pelvis	Z	G's	6.6	54.2	-20.9	85.2	9.6	46.2	-24.2	99.5

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	413.4	109.1	-467.4	53.3	319.8	60.2	-196.0	105.9
Neck Force	Y	Newtons	367.5	59.0	-173.0	145.3	211.9	41.5	-180.1	236.7
Neck Force	Z	Newtons	1899.1	66.9	-833.3	172.2	1636.4	68.3	-327.6	114.4
Neck Moment	X	N•m	6.8	93.0	-17.3	202.4	5.3	230.6	-28.5	60.9
Neck Moment	Y	N•m	7.1	299.6	-66.6	174.3	46.5	60.9	-15.6	240.6
Neck Moment	Z	N•m	34.7	93.6	-6.8	141.6	18.2	59.1	-4.7	243.8

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	19.1	53.9	-61.6	29.5	10.8	78.6	-53.8	44.0
Left Foot Aft	Z	G's	10.9	96.3	-45.5	33.9	29.7	65.0	-155.3	45.9
Left Foot Fore	Z	G's	23.5	49.5	-55.2	37.4	158.5	58.2	-128.2	52.8
Right Foot Aft	X	G's	16.4	59.8	-116.6	47.3	52.9	54.7	-56.3	40.7
Right Foot Aft	Z	G's	13.1	80.5	-148.2	50.0	17.8	83.9	-116.3	42.8
Right Foot Fore	Z	G's	13.1	85.2	-154.3	52.3	93.3	47.7	-139.1	37.2

UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Lower Moment	X	N•m	26.1	44.8	-3.3	21.6	180.9	46.0	-18.7	42.9
Left Lower Moment	Y	N•m	66.0	62.7	-13.9	33.0	136.9	59.9	-20.6	43.0
Left Lower Force	Z	Newtons	88.5	138.3	-1928.3	30.6	246.6	135.4	-9251.2	46.4
Left Upper Moment	X	N•m	47.7	81.2	-12.2	277.5	72.4	46.7	-40.7	43.6
Left Upper Moment	Y	N•m	16.1	209.4	-75.6	56.5	13.7	229.5	-245.7	46.9
Right Lower Moment	X	N•m	22.9	46.1	-228.2	51.4	71.3	48.8	-53.8	44.5
Right Lower Moment	Y	N•m	68.4	49.8	-17.9	41.7	136.6	56.1	-30.9	32.3
Right Lower Force	Z	Newtons	144.5	184.2	-7064.4	51.2	341.1	68.4	-4464.7	43.8
Right Upper Moment	X	N•m	56.4	47.0	-102.4	52.4	32.9	57.3	-58.2	46.2
Right Upper Moment	Y	N•m	12.3	179.6	-289.4	53.3	19.1	176.4	-139.7	44.3

DATA SHEET NO. 8...(continued)

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35mph NCAP

Test Date: 3/2/01

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	MM	1.4	26.1	-26.6	67.0	0.6	27.7	-25.2	74.0

* Driver channel failed at 166.1 msec.

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	11.5	123.0	-60.9	72.8	10.2	222.8	-59.5	79.1
Head CG	Y	G's	6.8	202.0	-24.9	79.3	5.0	144.8	-21.2	70.1
Head CG	Z	G's	21.4	56.1	-14.5	98.2	32.3	67.7	-6.7	113.9
Head CG Resultant	N/A	G's	64.5	73.7			63.8	78.7		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	6.5	173.6	-39.9	75.7	3.8	233.8	-43.7	70.9
Chest CG	Y	G's	6.0	113.6	-6.1	54.2	4.0	56.2	-7.2	76.4
Chest CG	Z	G's	13.0	63.7	-11.6	85.5	12.2	46.8	-15.8	96.0
Chest CG Resultant	N/A	G's	40.3	64.5			44.9	70.8		

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	633.7	50.8	53.4	87.7	624.3	51.3	61.6	94.6

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	39.7	64.0	67.0	42.4	63.7	66.7

DATA SHEET NO. 9
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2001 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
 Test Date: 3/2/01

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TCI - Dummy CL to Lap/Shoulder Belt Intersect	mm	215	220
PBU -Top surface of reference to belt upper edge	mm	250	230
PBL - Top surface of reference to belt lower edge	mm	340	320
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	865	865
Shoulder belt length as measured on ATD	mm	850	855
Lap belt length as measured on ATD	mm	840	835
Remainder of belt on reel	mm	695	890
Total belt length for continuous webbing systems	mm	3250	3445

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	104.0	113.0
As determined electronically	mm	129.4	144.8

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 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
 Test Date: 3/2/01

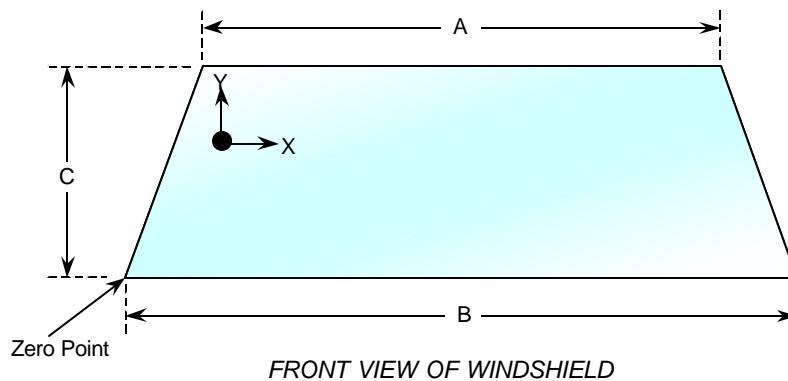
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. There is no molding that covers the windshield periphery at any point.

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	2355.5	2355.5	100
Right Side	2355.5	2355.5	100
Total	4711.0	4711.0	100



WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1318	27
B	mm	1681	N/A
C	mm	856	24

DATA SHEET NO. 11

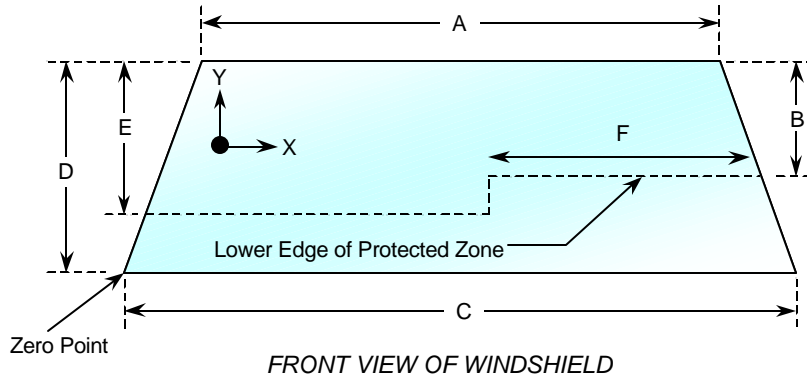
WINDSHIELD ZONE INTRUSION FMVSS 219 (PARTIAL) DATA

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01



WINDSHIELD AND PROTECTED ZONE

Item	Units	Value
A	mm	1318
B	mm	591
C	mm	1681
D	mm	856
E	mm	591
F	mm	423

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 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01

Test Time: 1:03 PM

Temperature at Time of Impact: 16.1 °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

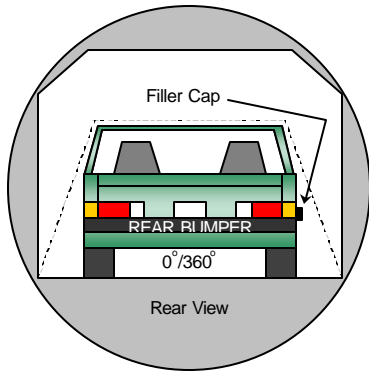
DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2001 Chevrolet Venture Minivan

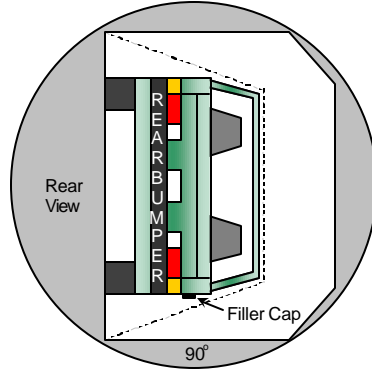
NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

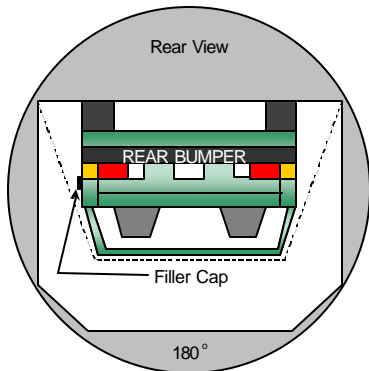
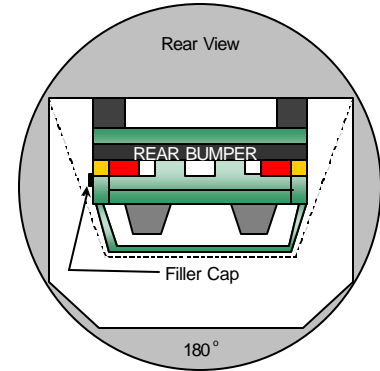
Test Date: 3/2/01



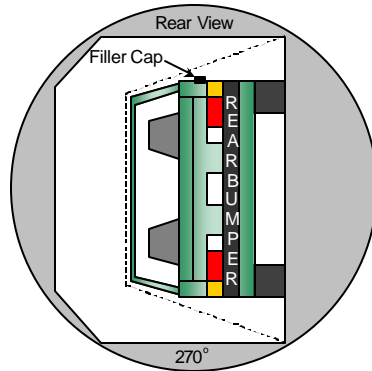
0° TO 90°



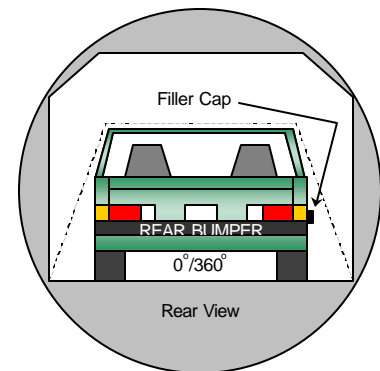
90° TO 180°



180° TO 270°



270° TO 360°



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

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° TO 90°	80	300	0.0
90° TO 180°	82	300	0.0
180° TO 270°	78	300	0.0
270° TO 360°	82	300	0.0

DATA SHEET NO. 14
VEHICLE MEASUREMENTS

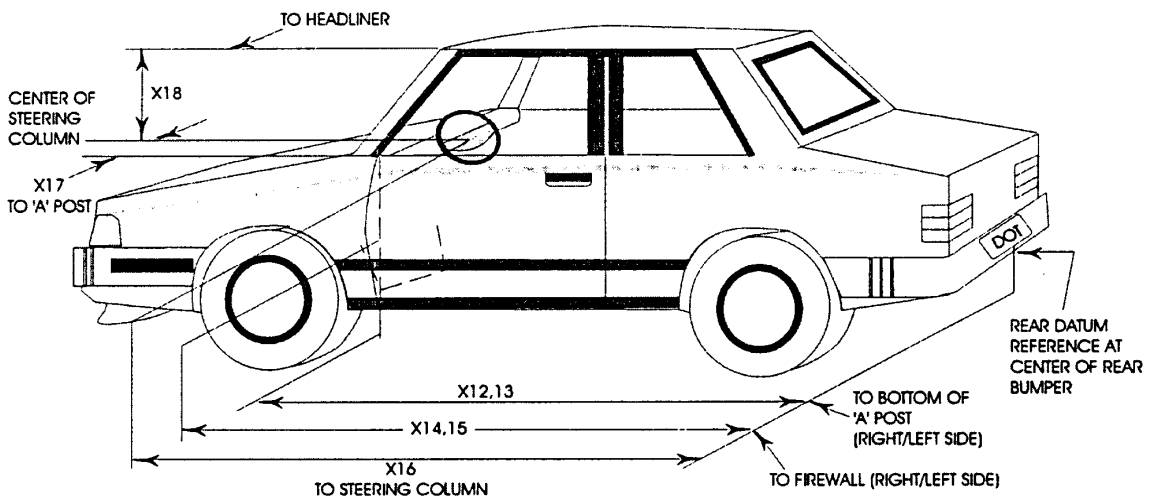
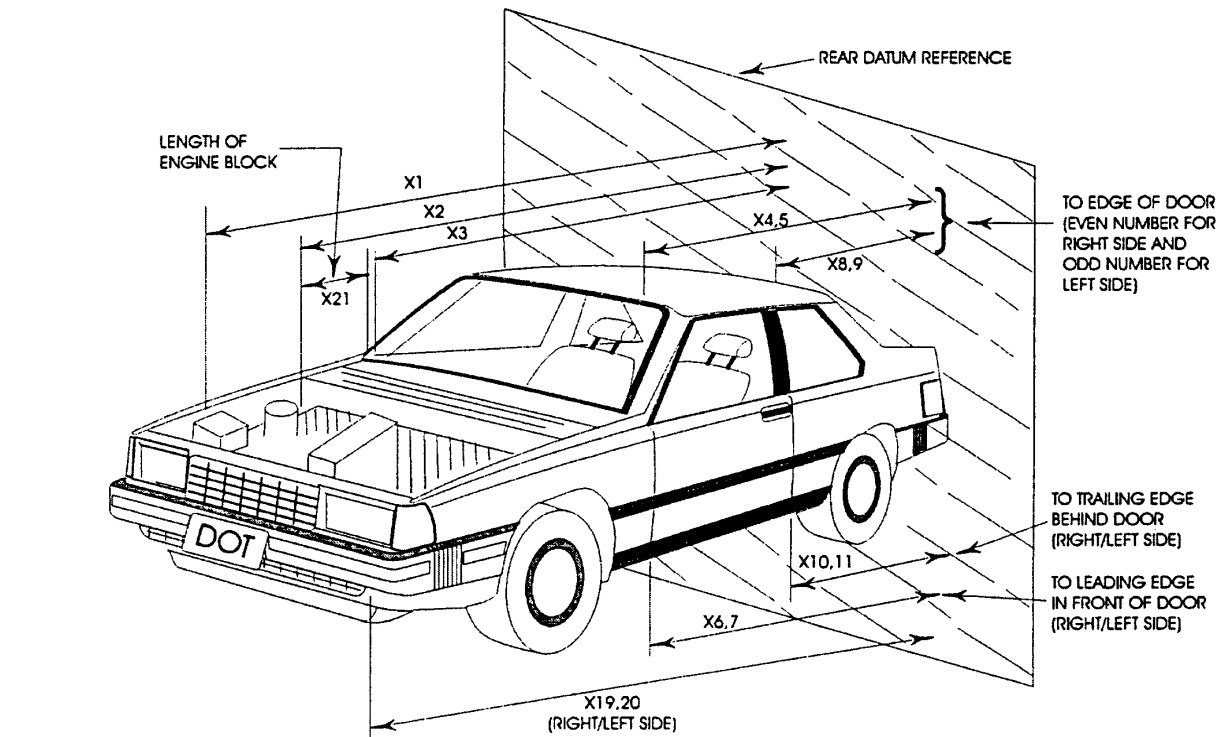
Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4760	4342	-418
2	RSOV to front of engine	mm	4219	3821	-398
3	RSOV to firewall centerline	mm	3658	3515	-143
4	RSOV to leading edge of right door	mm	3431	3424	-7
5	RSOV to leading edge of left door	mm	3427	3417	-10
6	RSOV to lower leading edge of right door	mm	3321	3316	-5
7	RSOV to lower leading edge of left door	mm	3325	3314	-11
8	RSOV to upper trailing edge of right door	mm	2292	2278	-14
9	RSOV to upper trailing edge of left door	mm	2287	2275	-12
10	RSOV to lower trailing edge of right door	mm	2308	2300	-8
11	RSOV to lower trailing edge of left door	mm	2313	2301	-12
12	RSOV to bottom of right 'A' pillar	mm	3379	3371	-8
13	RSOV to bottom of left 'A' pillar	mm	3377	3365	-12
14	RSOV to firewall on right side	mm	3687	3528	-159
15	RSOV to firewall of left side	mm	3633	3554	-79
16	RSOV to steering column	mm	2913	2841	-72
17	Center of steering column to left 'A' pillar	mm	421	393	-28
18	Center of steering column to headlining	mm	379	310	-69
19	RSOV to right side of front bumper	mm	4425	4158	-267
20	RSOV to left side of front bumper	mm	4425	4129	-296
21	Length of engine block	mm	490	490	0
RD	RSOV to right side of dash panel	mm	3111	3078	-33
CD	RSOV to center of dash panel	mm	3066	2952	-114
LD	RSOV to left side of dash panel	mm	3102	3079	-23



DATA SHEET NO. 15
CAMERA LOCATIONS

Test Vehicle: 2001 Chevrolet Venture Minivan
Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
Test Date: 3/2/01

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	1960	-8250	880	-1	7900	13	1030
3	Left Side, No. 2	1460	-8250	1460	-4	7920	35	1010
4	Left Side, No. 3	6500	-10580	4640	-16	11460	70	1010
5	Left Side, No. 4	1460	-8250	3100	-16	8080	19	N/A
6	Left Side, No. 5	1460	-8250	2700	-13	8010	19	980
7	Right Side, No. 1	1960	8150	730	-1	8570	19	1010
8	Right Side, No. 2	1660	8150	1450	-4	8560	50	N/A
9	Right Side, No. 3	7860	8900	2800	-9	N/A	80	930
10	Right Side, No. 4	3460	12650	1410	-2	13080	24	1100
11	Overhead Overall	250	0	4460	-86	N/A	13	1040
12	Front View, Driver	-530	-380	2590	-43	N/A	12	1000
13	Front View, Passenger	-530	380	2590	-44	N/A	13	N/A
14	Pit Camera, Engine	580	0	-1360	90	N/A	13	N/A
15	Pit Camera, Fuel Tank	4700	0	-1680	55	N/A	19	N/A
16	Driver Belt	3050	-250	1440	-15	740	13	520
17	Passenger Belt	3050	250	1440	-15	970	13	490

X - Barrier Face Y - Monorail Centerline Z - Ground

DATA SHEET NO. 16

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2001 Chevrolet Venture Minivan

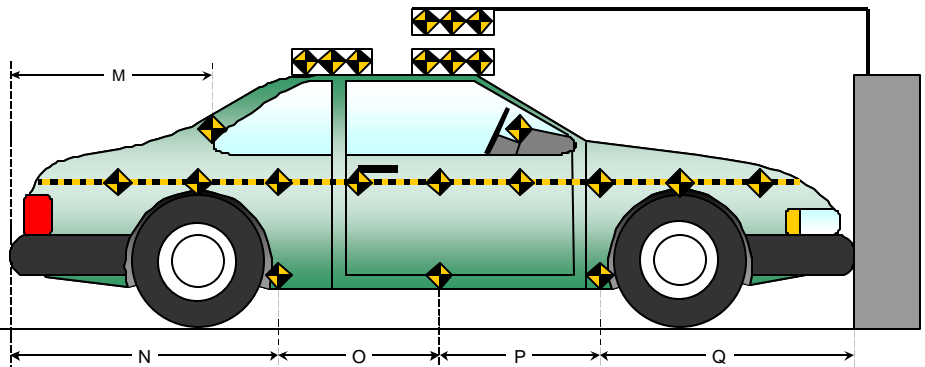
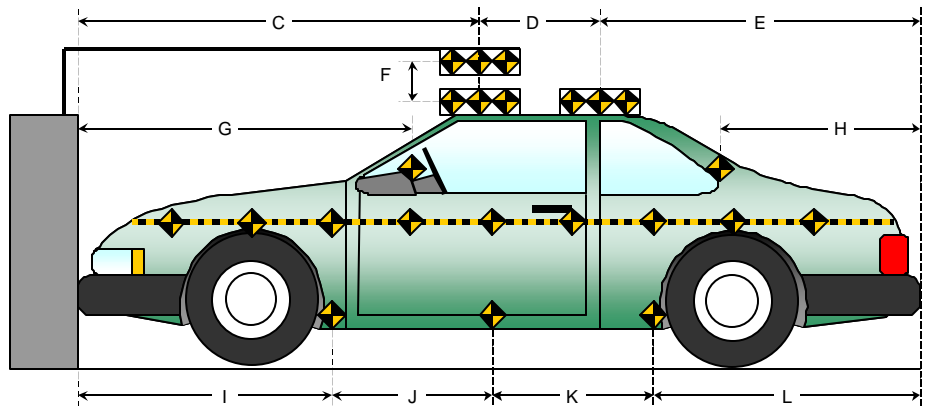
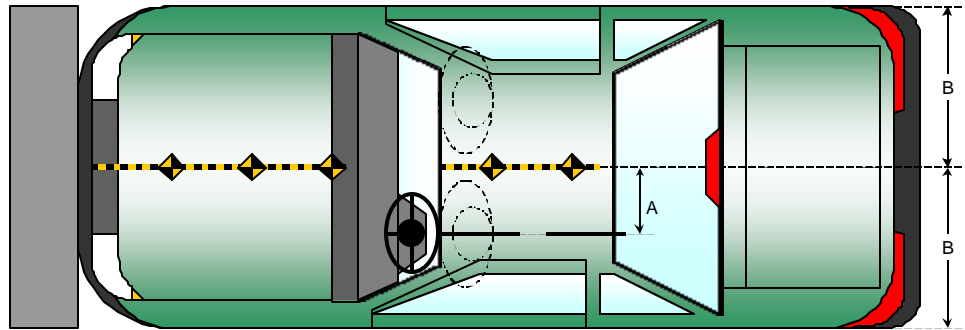
NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01

in mm

Item	Value
A	416
B	919.5
C	2058
D	610
E	2092
F	155
G	1681
H	1198
I	1356
J	990
K	990
L	1400
M	1202
N	1403
O	990
P	990
Q	1387



DATA SHEET NO. 17
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2001 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

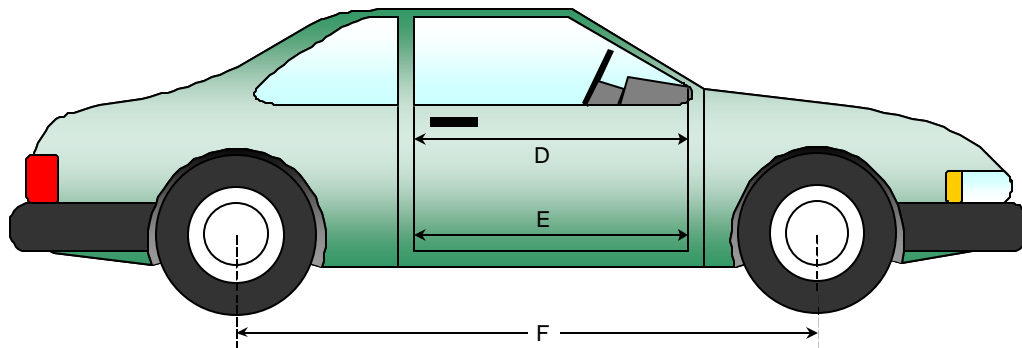
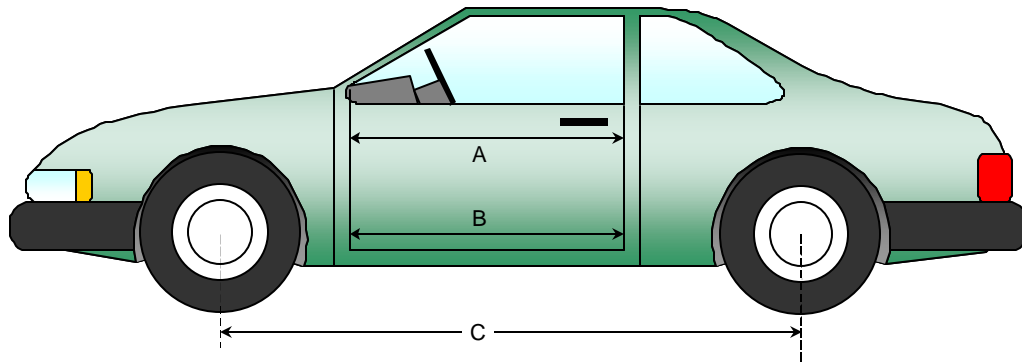
NHTSA No.: M10109
 Test Date: 3/2/01

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1067	1039	-28
B	Left Side Lower	mm	948	923	-25
D	Right Side Upper	mm	1065	1041	-24
E	Right Side Lower	mm	940	916	-24

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheel base	mm	2855	2716	-139
F	Right Side Wheel base	mm	2855	2726	-129



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

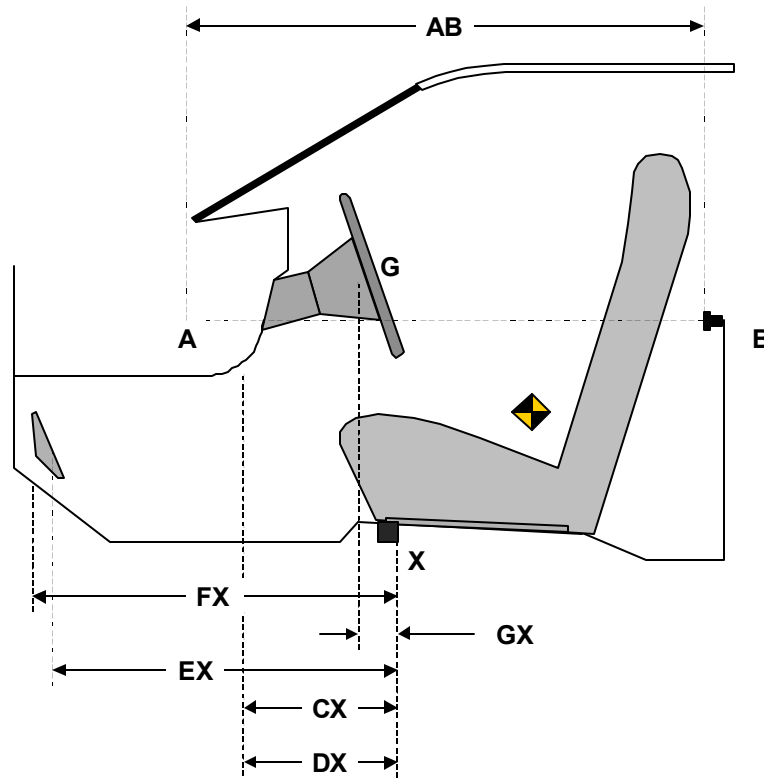
Test Vehicle: 2001 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
 Test Date: 3/2/01

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	1067	1039	-28
CX	Left Knee Bolster to X	mm	382	354	-28
DX	Right Knee Bolster to X	mm	372	264	-108
EX	Brake Pedal to X	mm	649	420	-229
FX	Foot Rest to X	mm	676	501	-175
GX	Center of Steering Wheel Hub to X	mm	107	100	-7

X = Left Front Seat Outboard Anchor Bolt Head

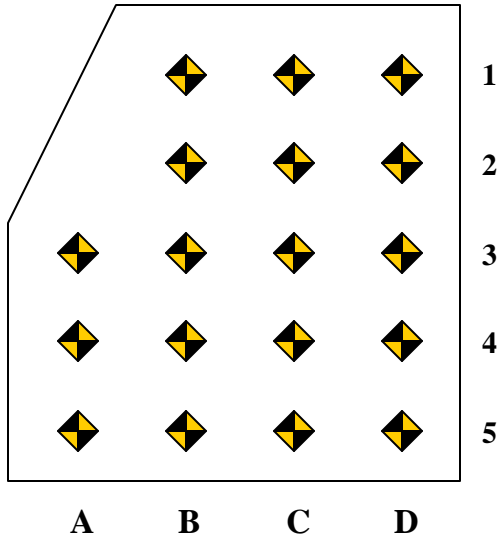


DRIVER COMPARTMENT

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

Test Vehicle: 2001 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
 Test Date: 3/2/01



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		700	712	712		466	497	490		-234	-215	-222
2		623	617	618		435	413	415		-188	-204	-203
3	519	518	517	51	381	365	347	342	-138	-153	-170	291
4	419	418	417	418	345	345	343	333	-74	-73	-74	-85
5	318	318	319	320	245	250	249	249	-73	-68	-70	-71

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		-48	-77	-82		18	58	57		66	135	139
2		-94	-96	-102		20	24	24		114	120	126
3	-100	-100	-101	-107	-38	-27	-12	-15	62	73	89	92
4	-106	-105	-100	-99	-115	-112	-102	-107	-9	-7	-2	-8
5	-100	-98	-94	-95	-117	-119	-128	-122	-17	-21	-34	-27

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

Test Vehicle: 2001 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

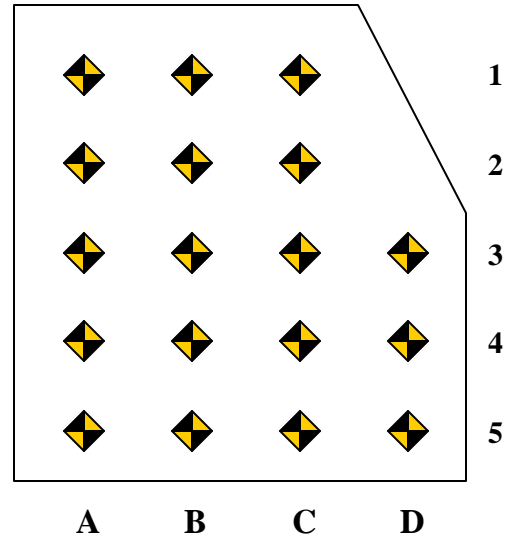
NHTSA No.: M10109
 Test Date: 3/2/01

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	814	815	822		477	502	461		-337	-313	-361	
2	647	643	649		433	451	414		-214	-192	-235	
3	547	544	549	549	327	382	358	374	-220	-162	-191	-175
4	447	444	449	449	335	345	330	345	-112	-99	-119	-104
5	346	342	348	349	261	284	267	266	-85	-58	-81	-83

PASSENGER FLOOR PAN Z-AXIS

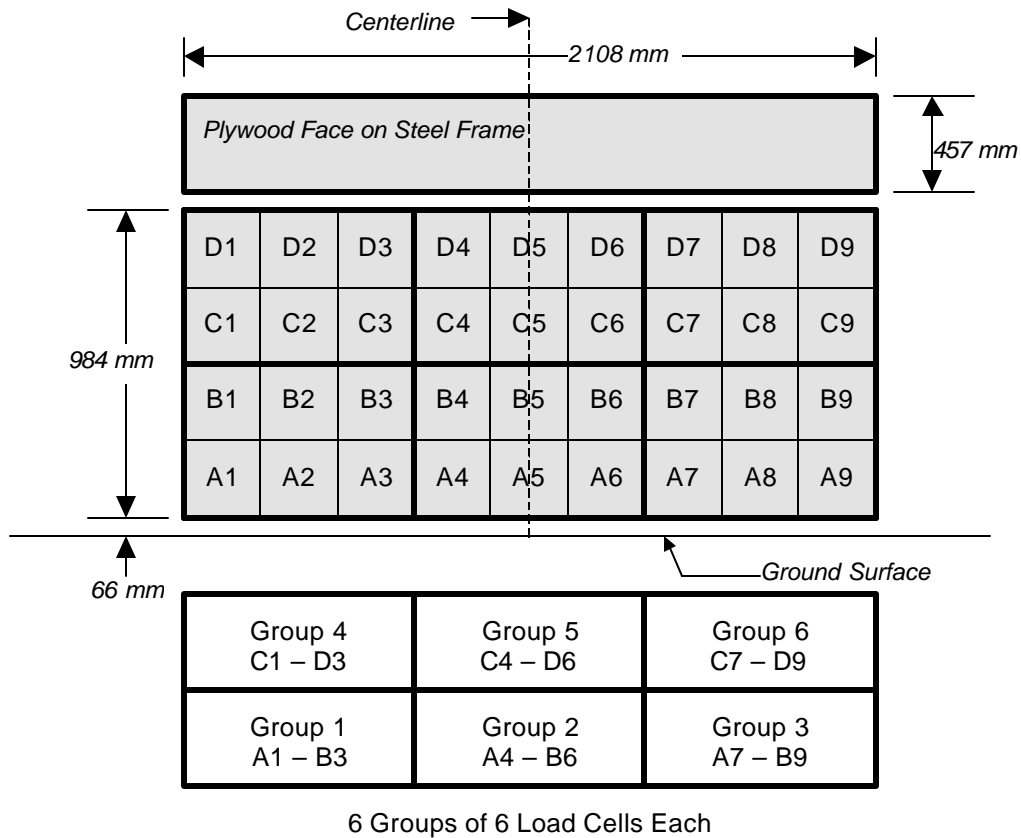
	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-39	-39	-39		91	70	95		130	109	134	
2	-101	-101	-101		4	-19	12		105	82	113	
3	-110	-110	-110	-109	4	-19	8	8	114	91	118	117
4	-112	-105	-110	-110	-58	-67	-81	-85	54	38	29	25
5	-98	-100	-105	-110	-122	-135	-115	-111	-24	-35	-10	-1

DATA SHEET NO. 18
FIXED BARRIER TYPE

Test Vehicle: 2001 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
 Test Date: 3/2/01

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 Chevrolet Venture Minivan
 Test Program: 2001 NHTSA 35 mph NCAP

NHTSA No.: M10109
 Test Date: 03/02/01

VEHICLE INFORMATION

VIN: 1GNDU23E81D114838
 Vehicle Size Category: Van

Wheel base (mm): 2855
 Test Weight (kg): 1971

ACCELEROMETER DATA

Accelerometer Location: Left rear floor pan
 Cal. Procedure/Interval: 6 months / drop test
 Integration Algorithm: NHTSA Standard
 Impact Velocity (km/h): 55.80
 Velocity Change (km/h): 63.52

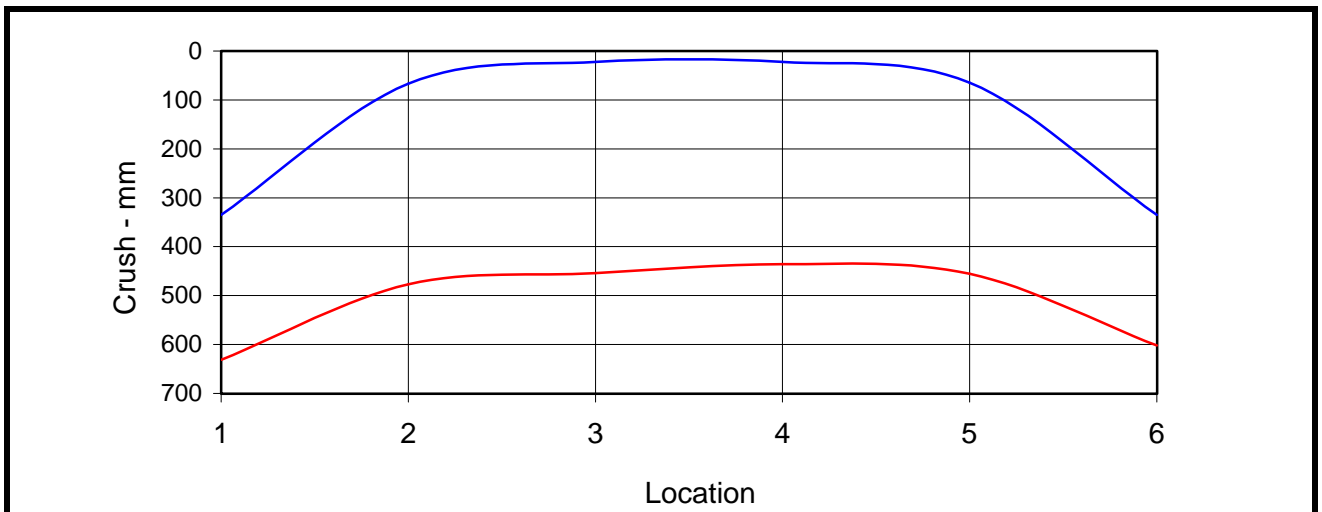
Linearity: Good

Time of Separation (msec): 95.3

CRUSH PROFILE

Collision Deformation Classification: 12FDEW6 ; Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1643 ; Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	335	631	-296
C2	Crush zone 2 on left side	mm	67	477	-410
C3	Crush zone 3 on left side	mm	22	454	-432
C4	Crush zone 4 on right side	mm	22	436	-414
C5	Crush zone 5 on right side	mm	65	455	-390
C6	Crush zone 6 at right side	mm	335	602	-267



DATA SHEET NO. 20

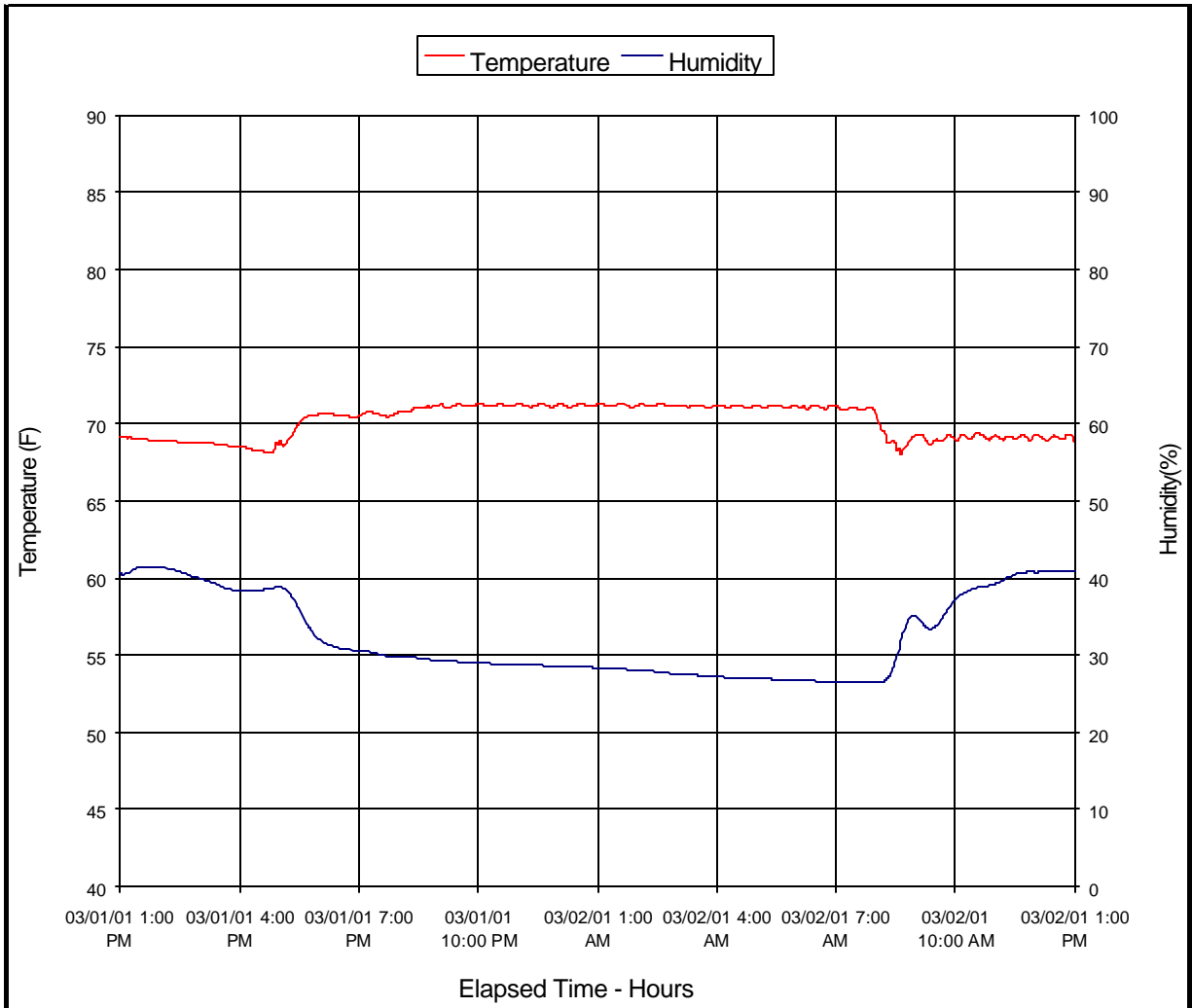
DUMMY/ VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35 mph NCAP

Test Date: 3/2/01



APPENDIX A
PHOTOGRAPHS

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Figure A-1: Right Front, as Received



Figure A-2: Left Rear, as Received



MFD BY GENERAL MOTORS CORP

08/00

GVWR	GAWR FRT	GAWR RR
2430KG(5357LB)	1236KG(2725LB)	1215KG(2678LB)

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

1GNDU23E81D114838 TYPE: M.P.V.

MODEL: UN16

UPBP	TIRE SIZE	SPEED RTG	RIM	COLD TIRE PRESSURE
FRT	P215/70R15	S	15X6J	240KPA(35PSI)
RR	P215/70R15	S	15X6J	240KPA(35PSI)
SPA	T135/70R16	M	16X4T	420KPA(60PSI)

SEE OWNER'S MANUAL FOR MORE INFORMATION.

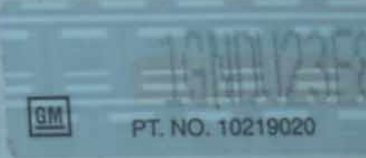


Figure A-3: Vehicle Certification Label



MFD BY GENERAL MOTORS CORP

08/00

GVWR	GAWR FRT	GAWR RR
2430KG(5357LB)	1236KG(2725LB)	1215KG(2678LB)

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

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SPA	T135/70R16	M	16X4T	420KPA(60PSI)

SEE OWNER'S MANUAL FOR MORE INFORMATION.



PT. NO. 10219020

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

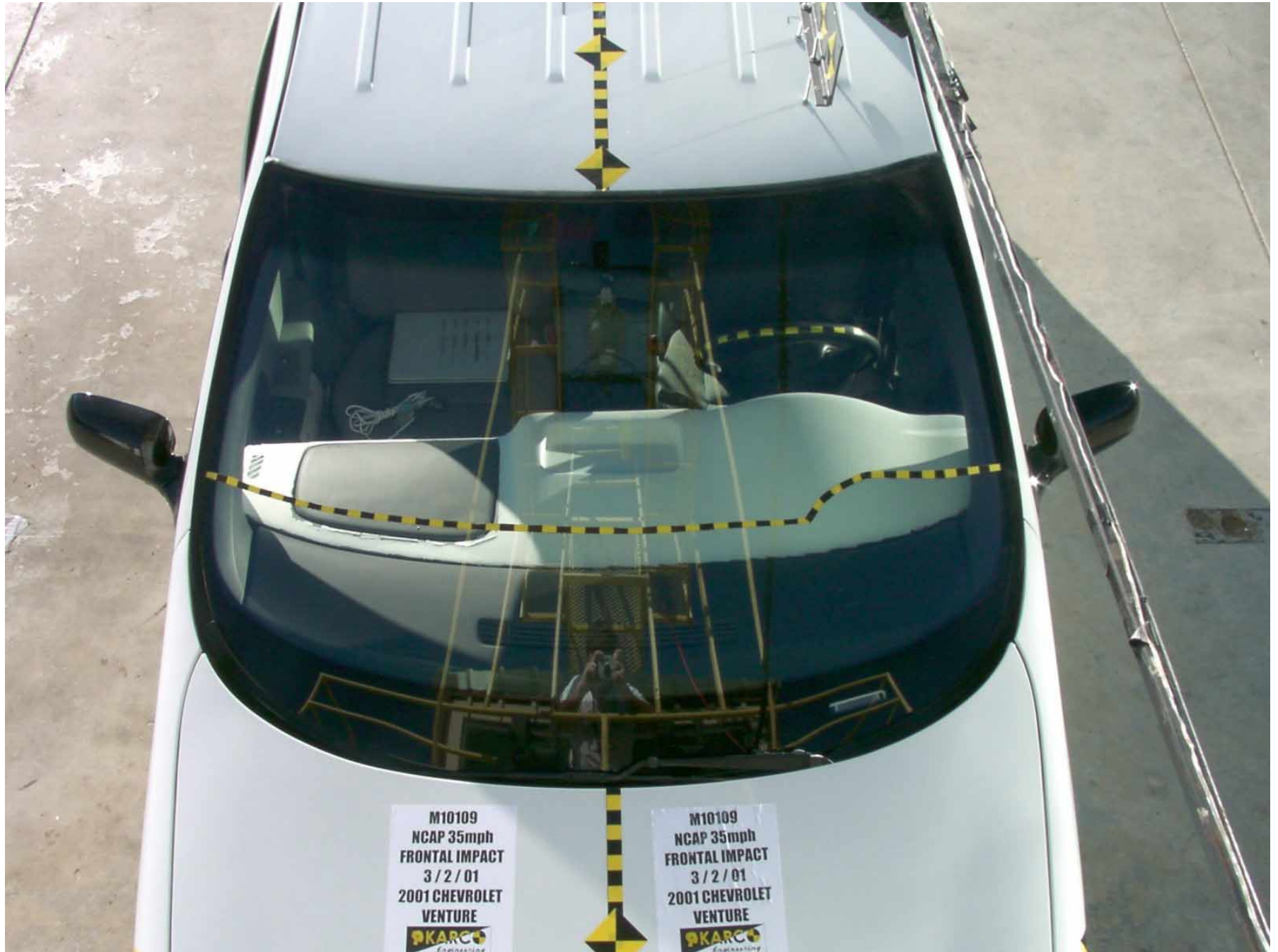


Figure A-15: Windshield, Pre-Test



Figure A-16: Windshield, Post-Test



Figure A-17: Engine Compartment, Pre-Test



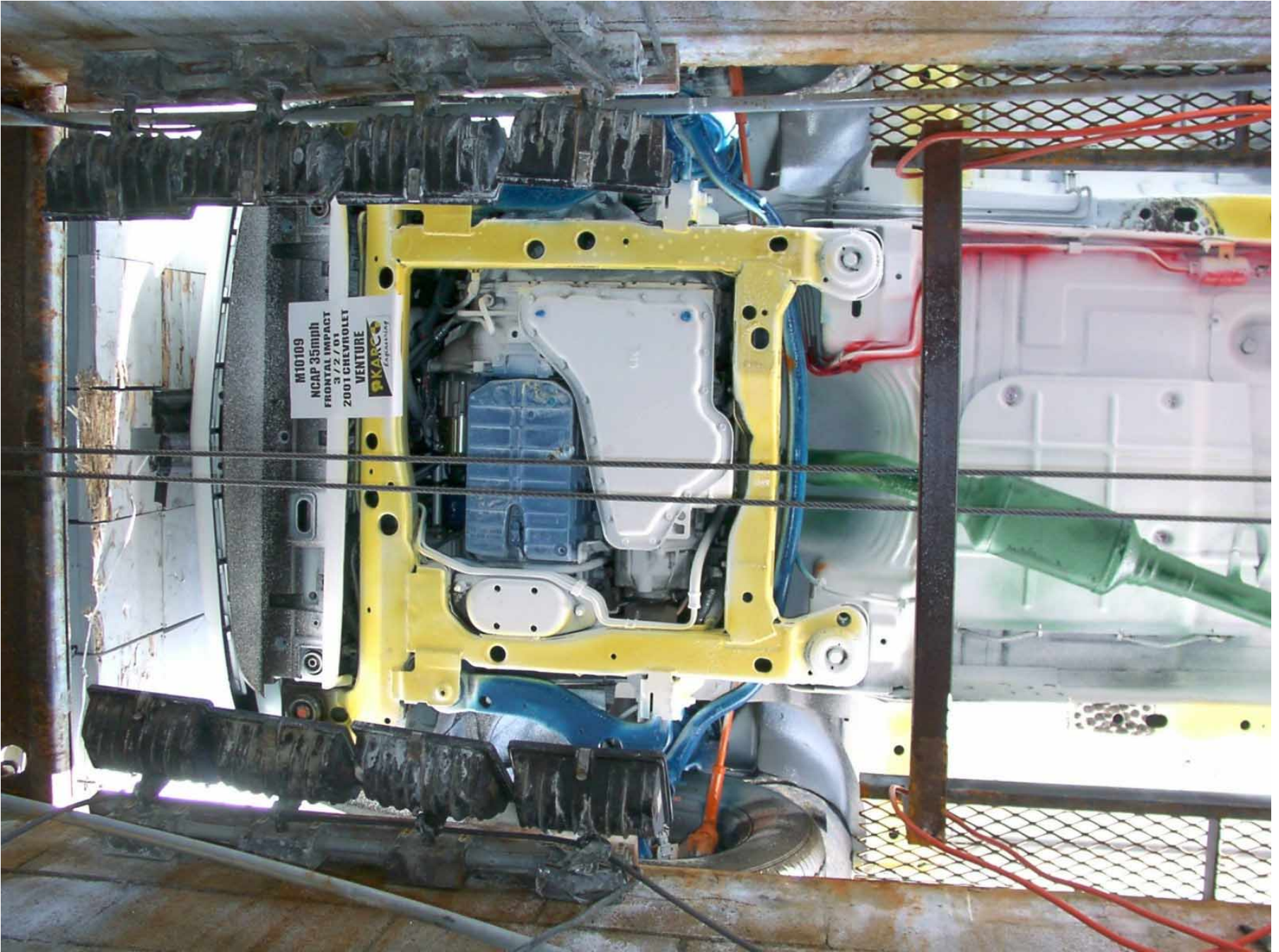
Figure A-18: Engine Compartment, Post-Test



Figure A-19: Fuel Cap, Pre-test



Figure A-20: Fuel Cap, Post-Test



M10109
NCAP 35mph
FRONTAL IMPACT
3 / 2 / 01
2001 CHEVROLET
VENTURE
PKARCO
Engineering

Figure A-21: Front Underside, Pre-Test

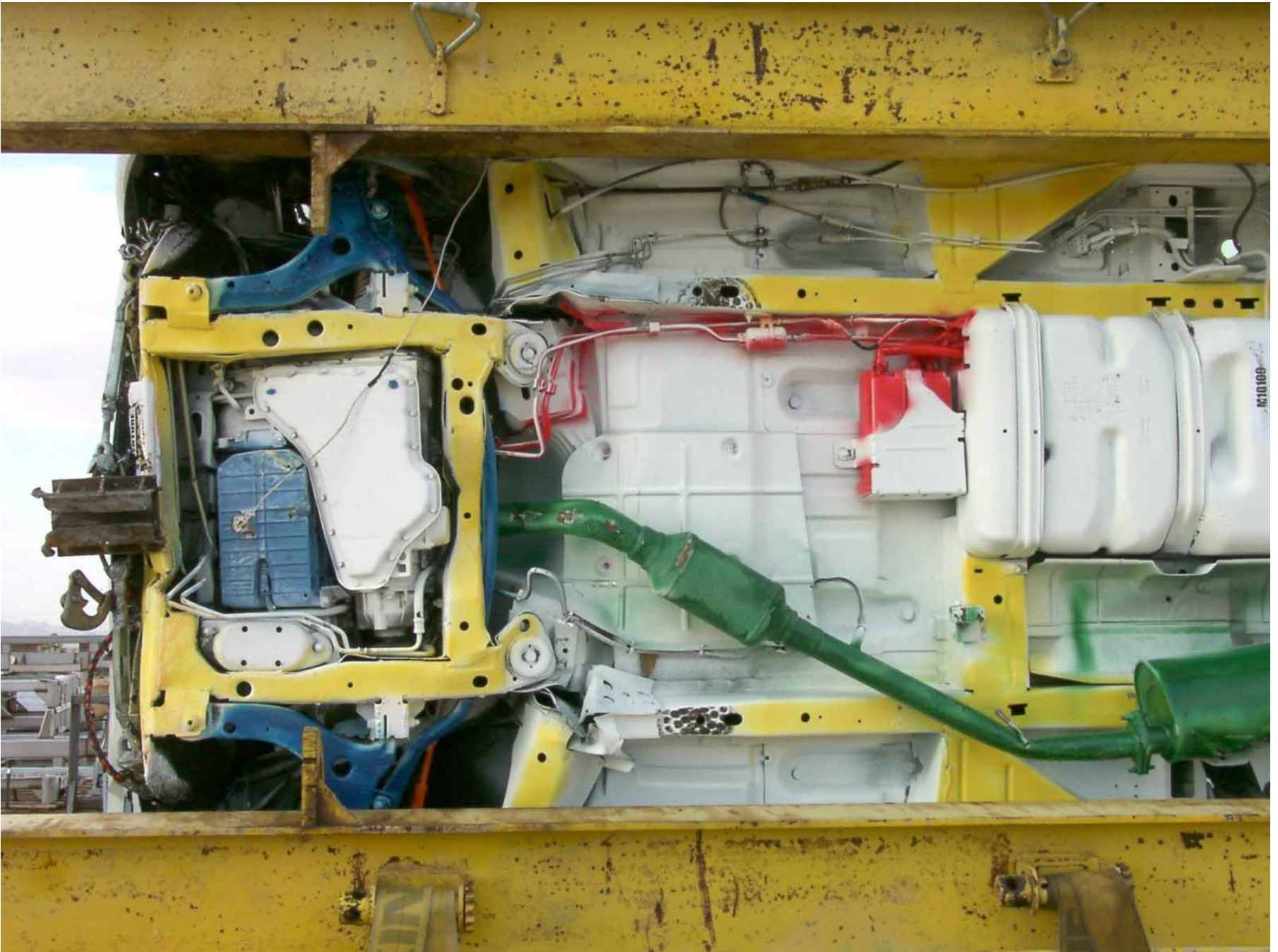


Figure A-22: Front Underside, Post-Test

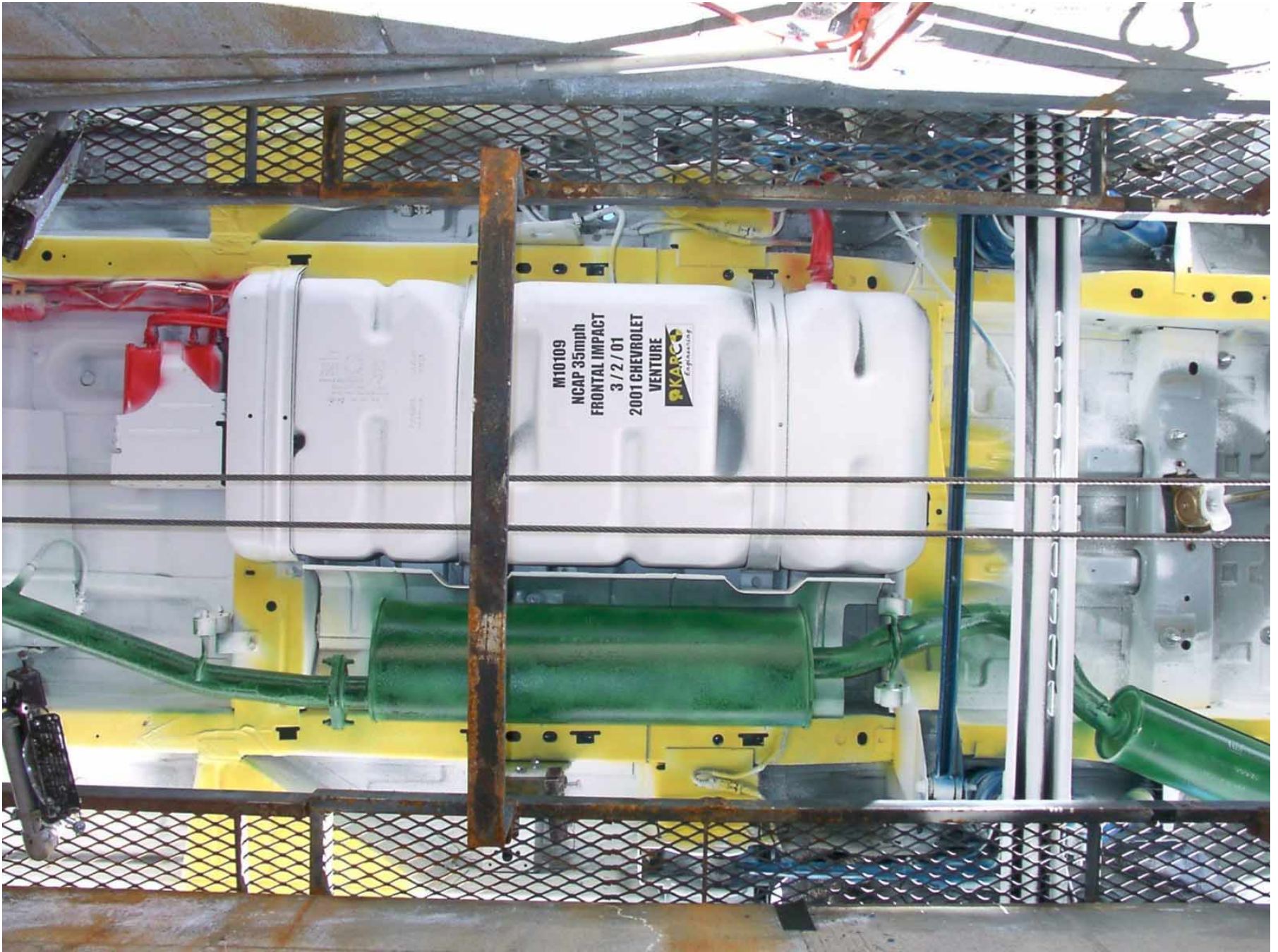


Figure A-23: Rear Underside, Pre-Test

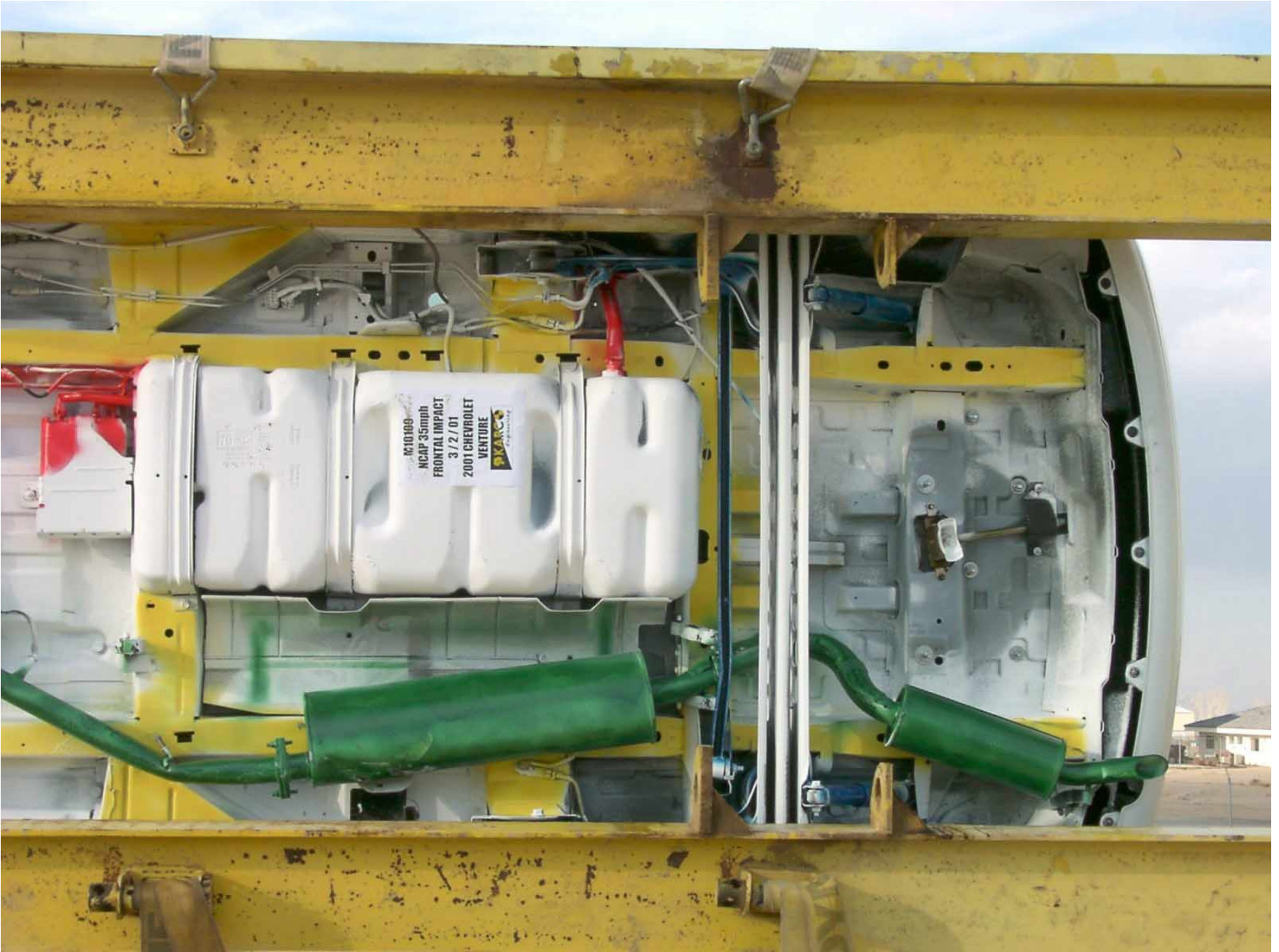


Figure A-24: Rear Underside, Post-Test



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

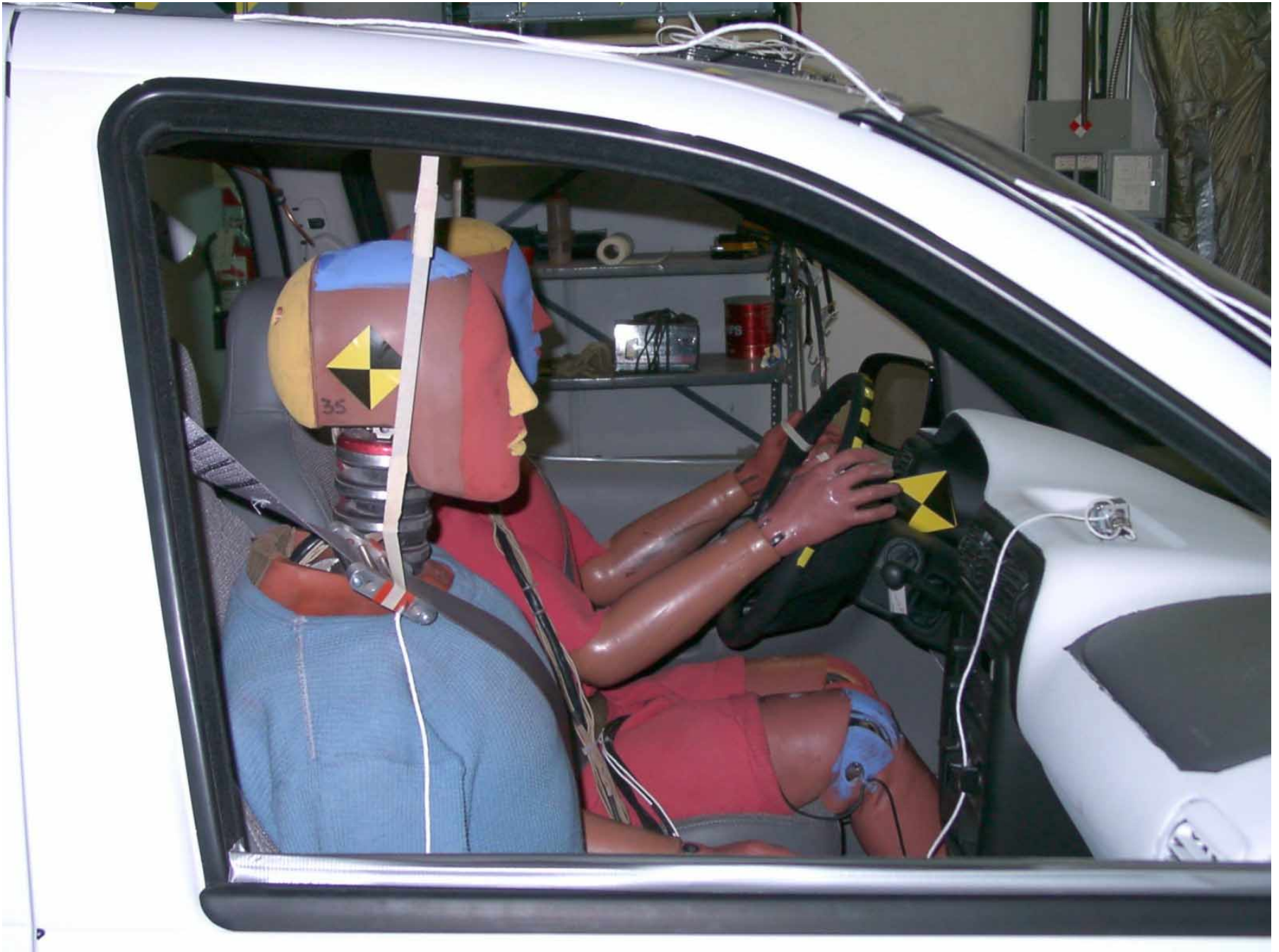


Figure A-43: Passenger Dummy Through Window, Pre-Test



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



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



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



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



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

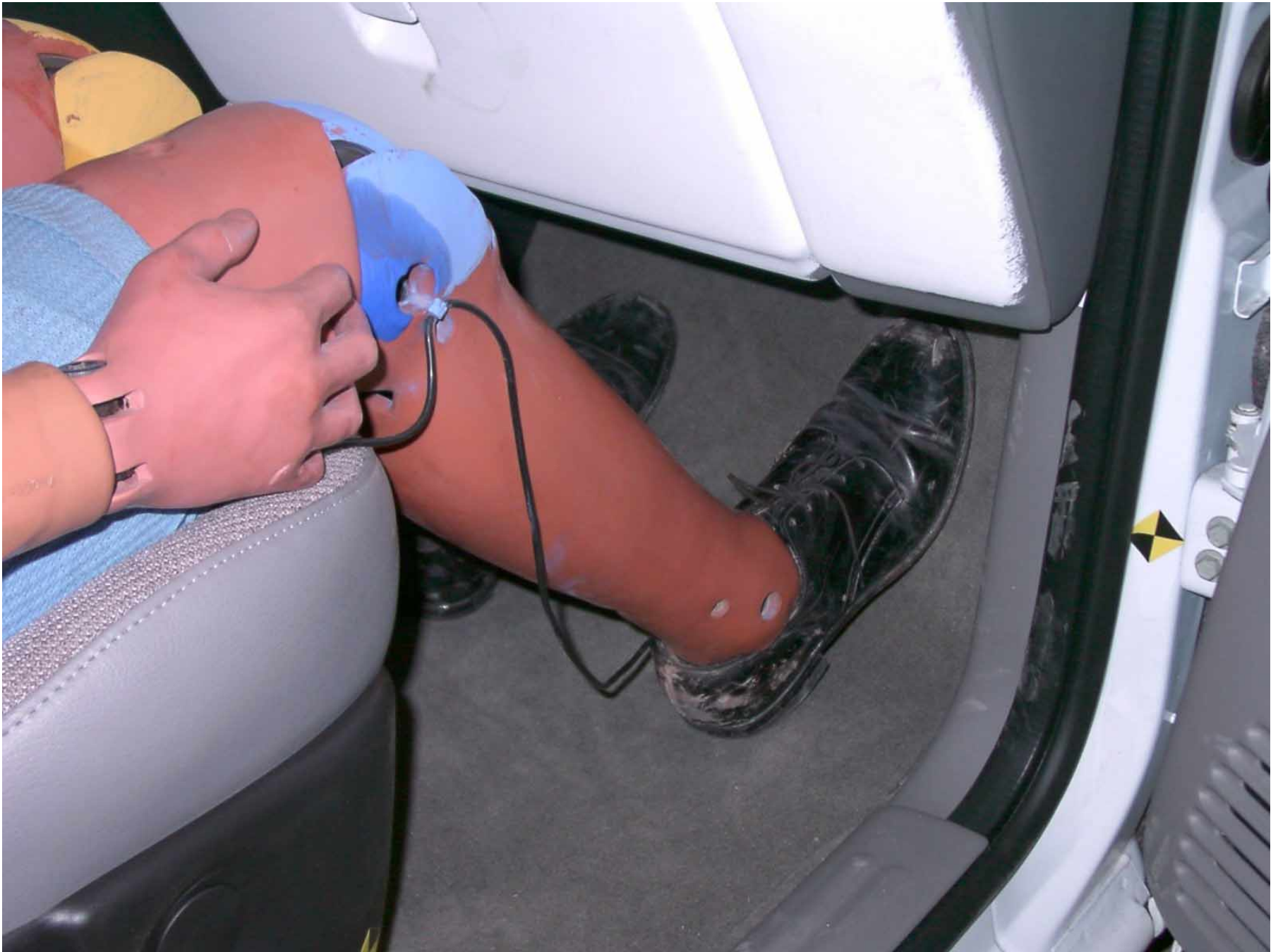


Figure A-49: Passenger Dummy Feet, Pre-Test



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



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



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



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



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



Figure A-55: Passenger Head, Post-Test



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



Figure A-57: Vehicle on Rollover Device



Figure A-58: Vehicle During Impact

APPENDIX B
DUMMY AND VEHICLE RESPONSE DATA TRACES

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B-3 Driver Head Primary X Displacement	B-3
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B-5 Driver Head Primary Z	B-5
B-6 Driver Head Resultant Primary	B-6
B-7 Driver Head Redundant X	B-7
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B-12 Driver Head Resultant Redundant	B-12
B-13 Driver Neck Force X	B-13
B-14 Driver Neck Force Y	B-14
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B-16 Driver Neck Force Resultant	B-16
B-17 Driver Neck Moment X	B-17
B-18 Driver Neck Moment Y	B-18
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B-45	Driver Right Upper Tibia Moment Y	B-45
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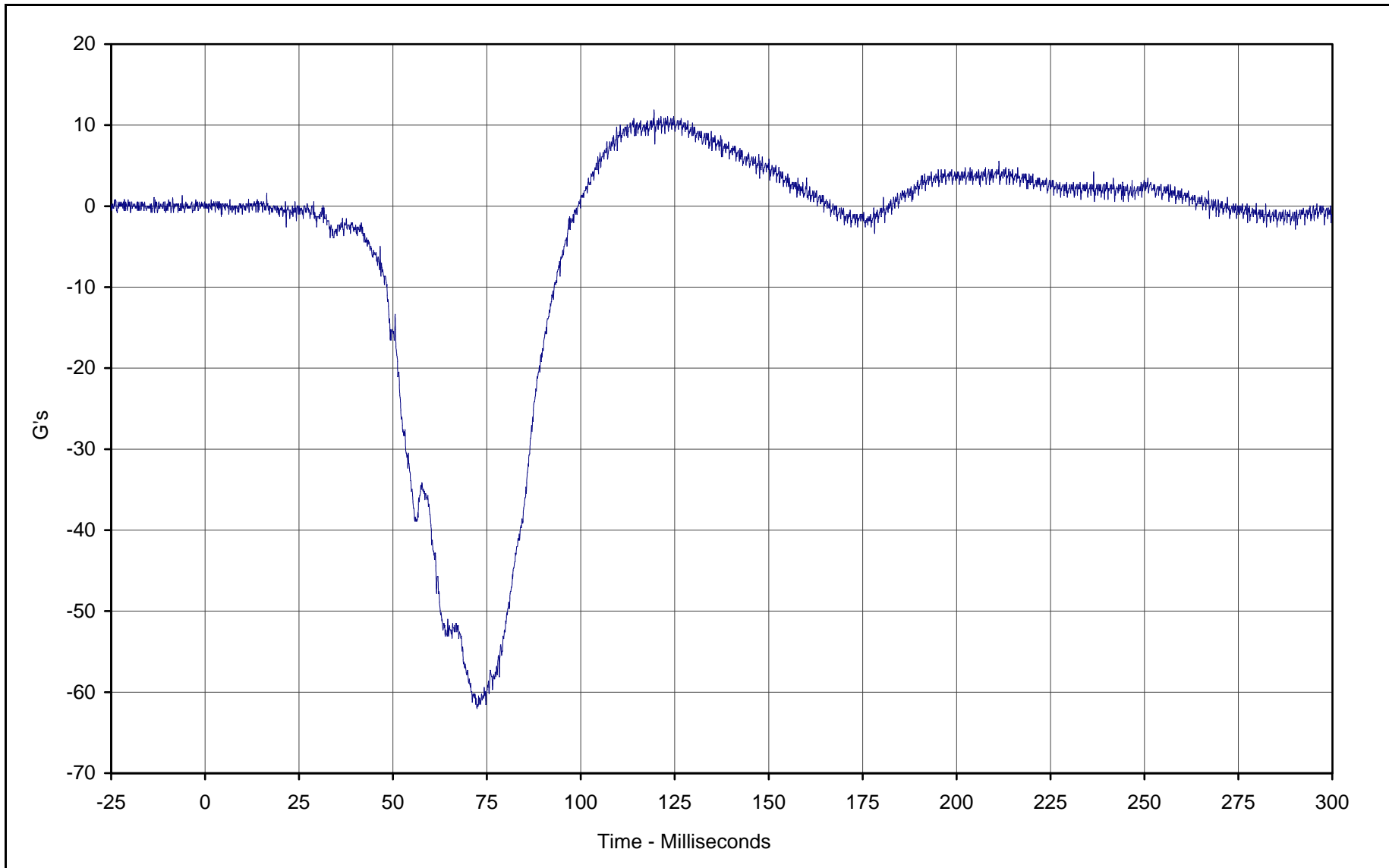
LIST OF DATA PLOTS...(Continued)

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B-97	Passenger Pelvis X Displacement	B-97
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B-138	Vehicle Right Brake Caliper	B-138
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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



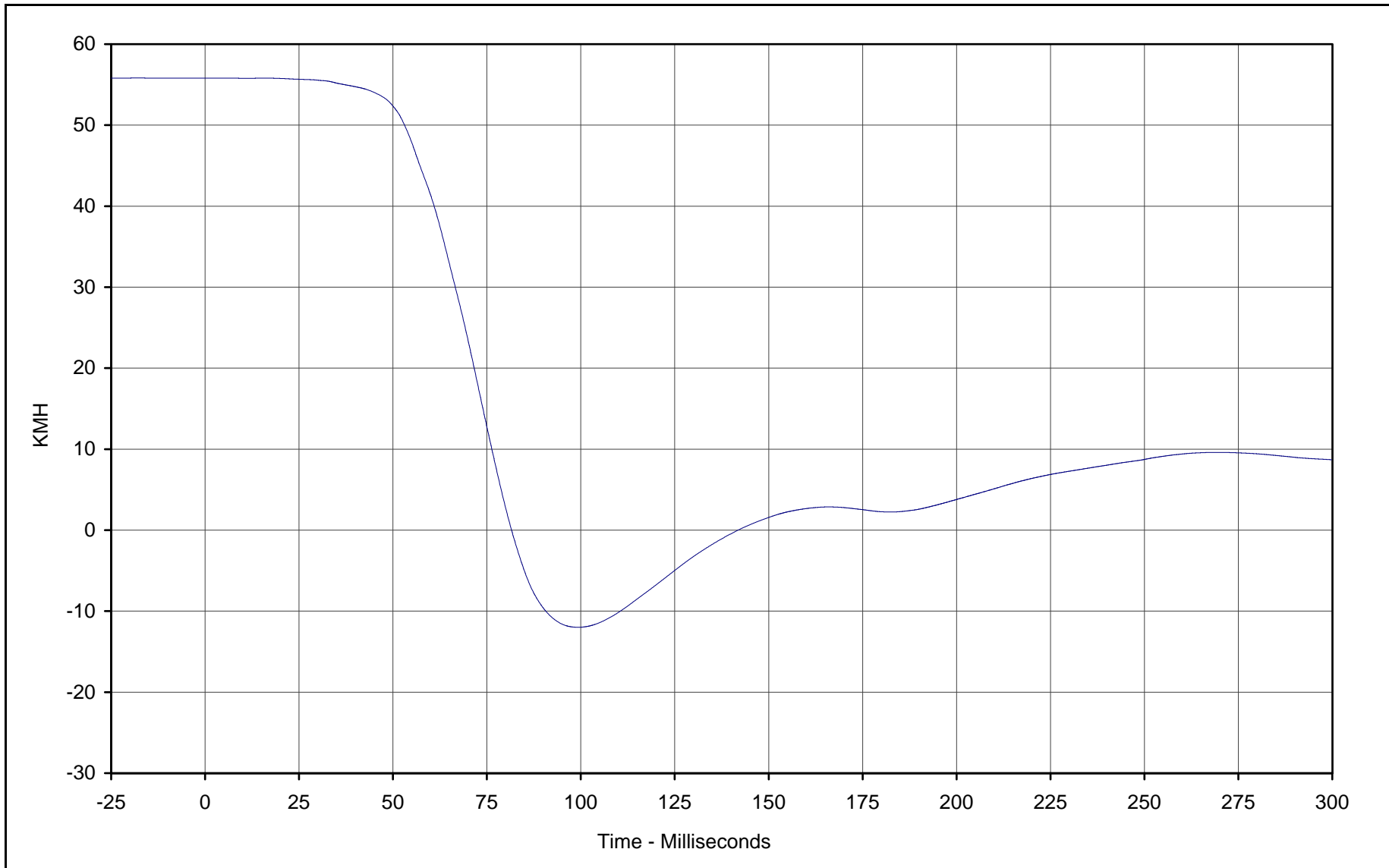
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Maximum Value: 11.9 at 119.5 Milliseconds
Minimum Value: -62.0 at 72.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



KAR21001-16

B-2

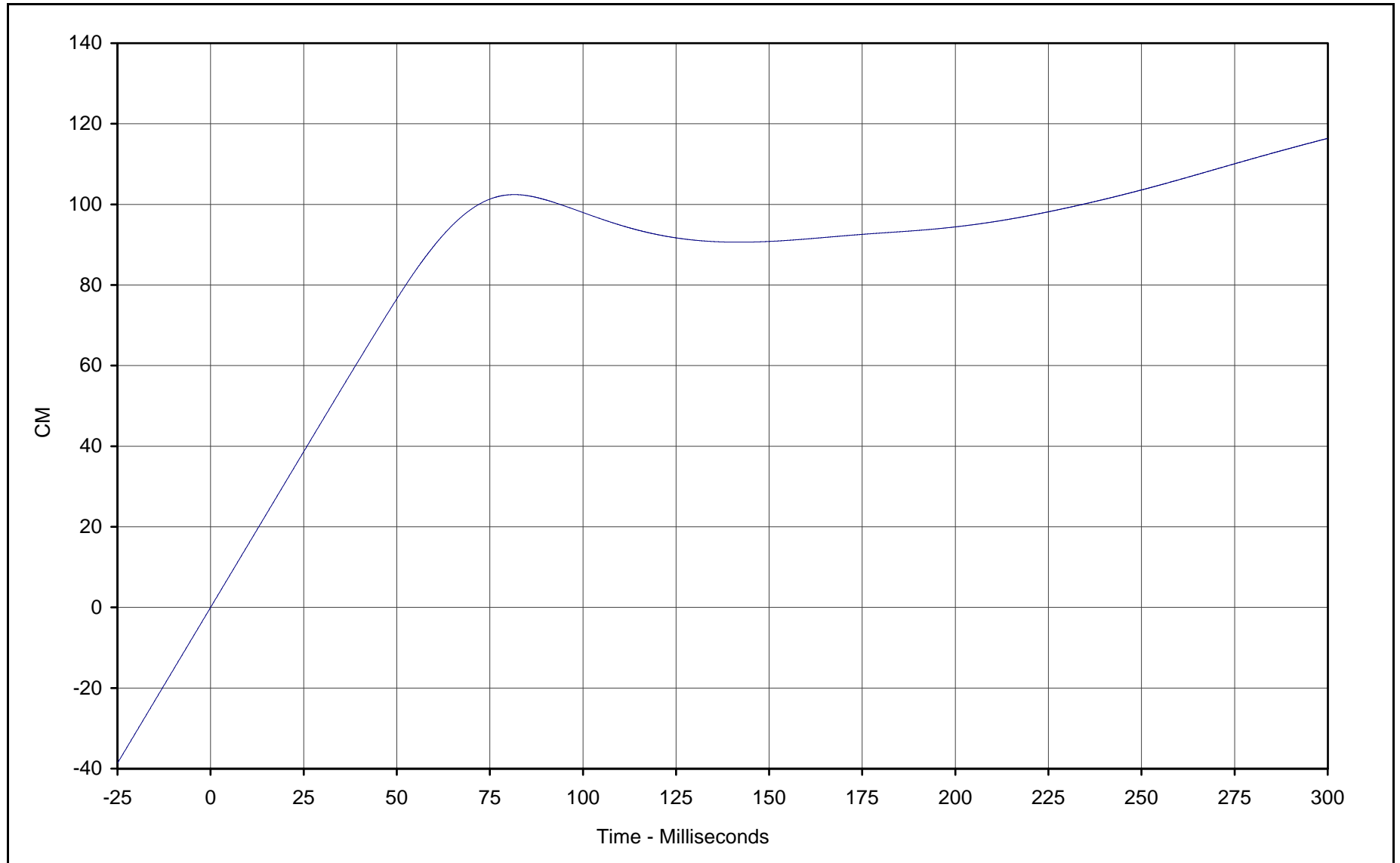


Curve Description: Driver Head Primary X Velocity
Maximum Value: 55.8 at 4.0 Milliseconds
Minimum Value: -12.0 at 99.3 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

KAR21001-16





Curve Description: Driver Head Primary X Displ.

Maximum Value: 116.4 at 299.9 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

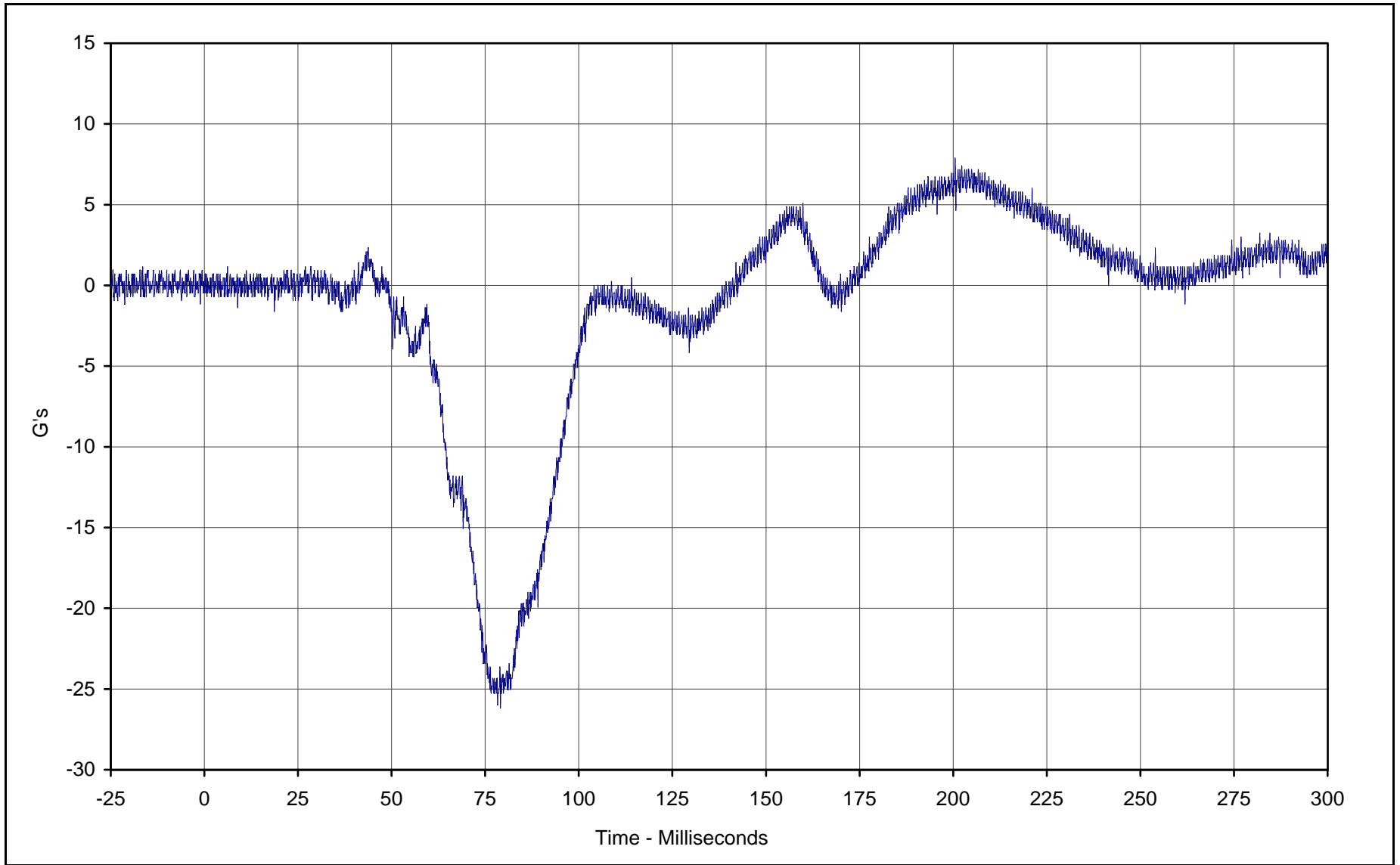
Curve Number: IN2-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan



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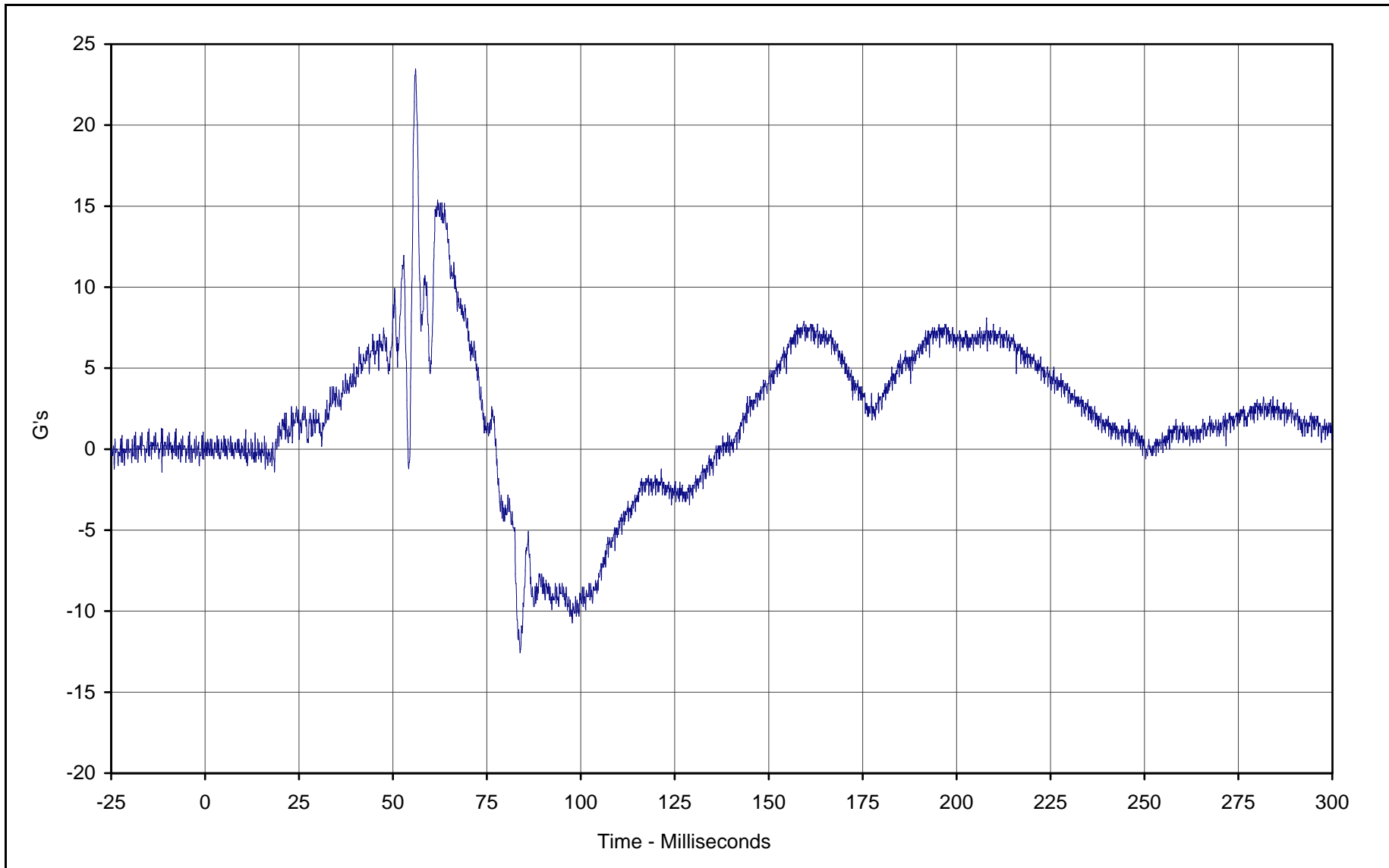
Curve Description: Driver Head Primary Y
Maximum Value: 7.9 at 200.5 Milliseconds
Minimum Value: -26.2 at 79.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-002

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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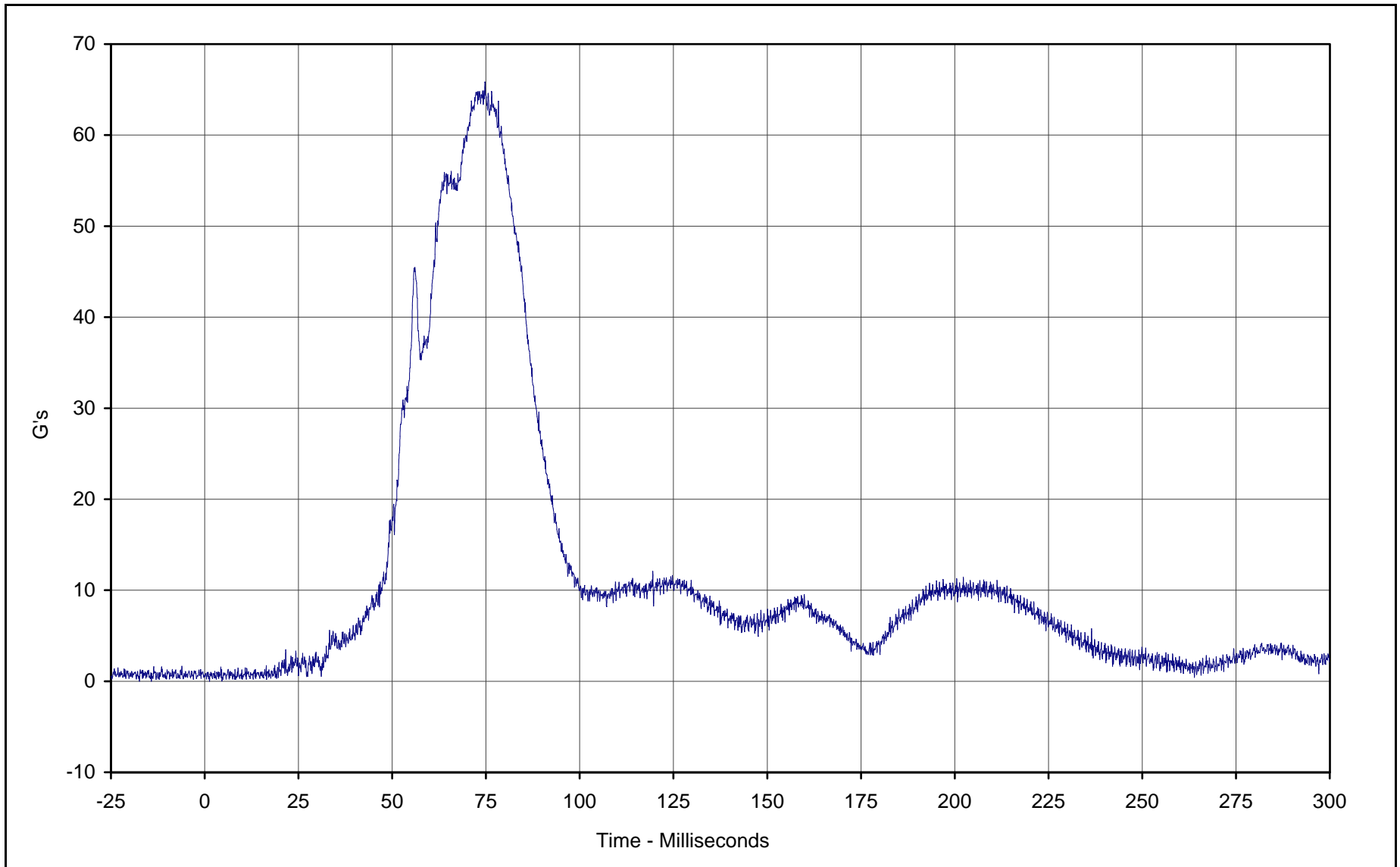
Curve Description: Driver Head Primary Z
Maximum Value: 23.5 at 56.0 Milliseconds
Minimum Value: -12.6 at 83.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-003

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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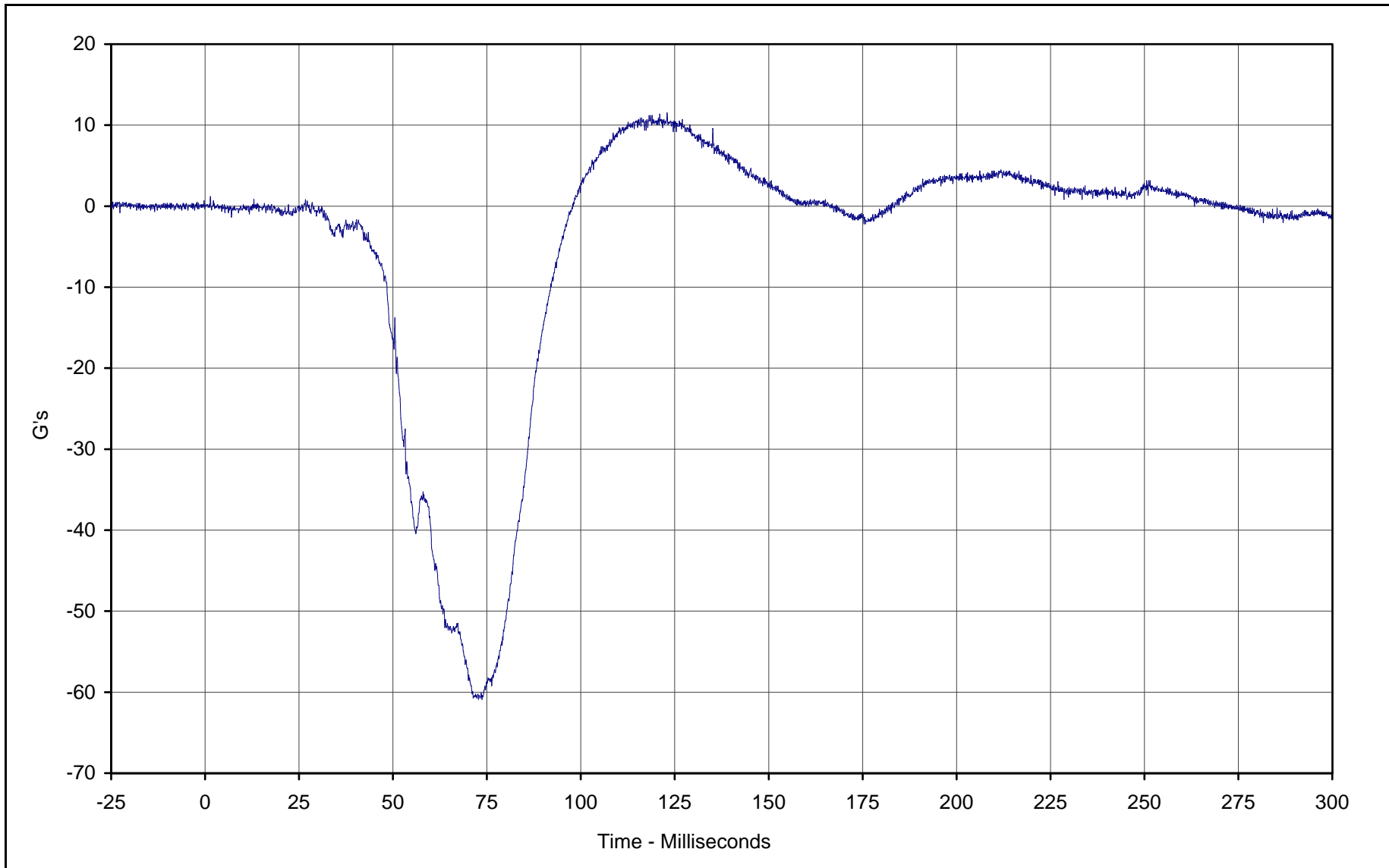
Curve Description: Driver Head Resultant Primary
Maximum Value: 65.8 at 74.7 Milliseconds
Minimum Value: 0.0 at 1.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: RES-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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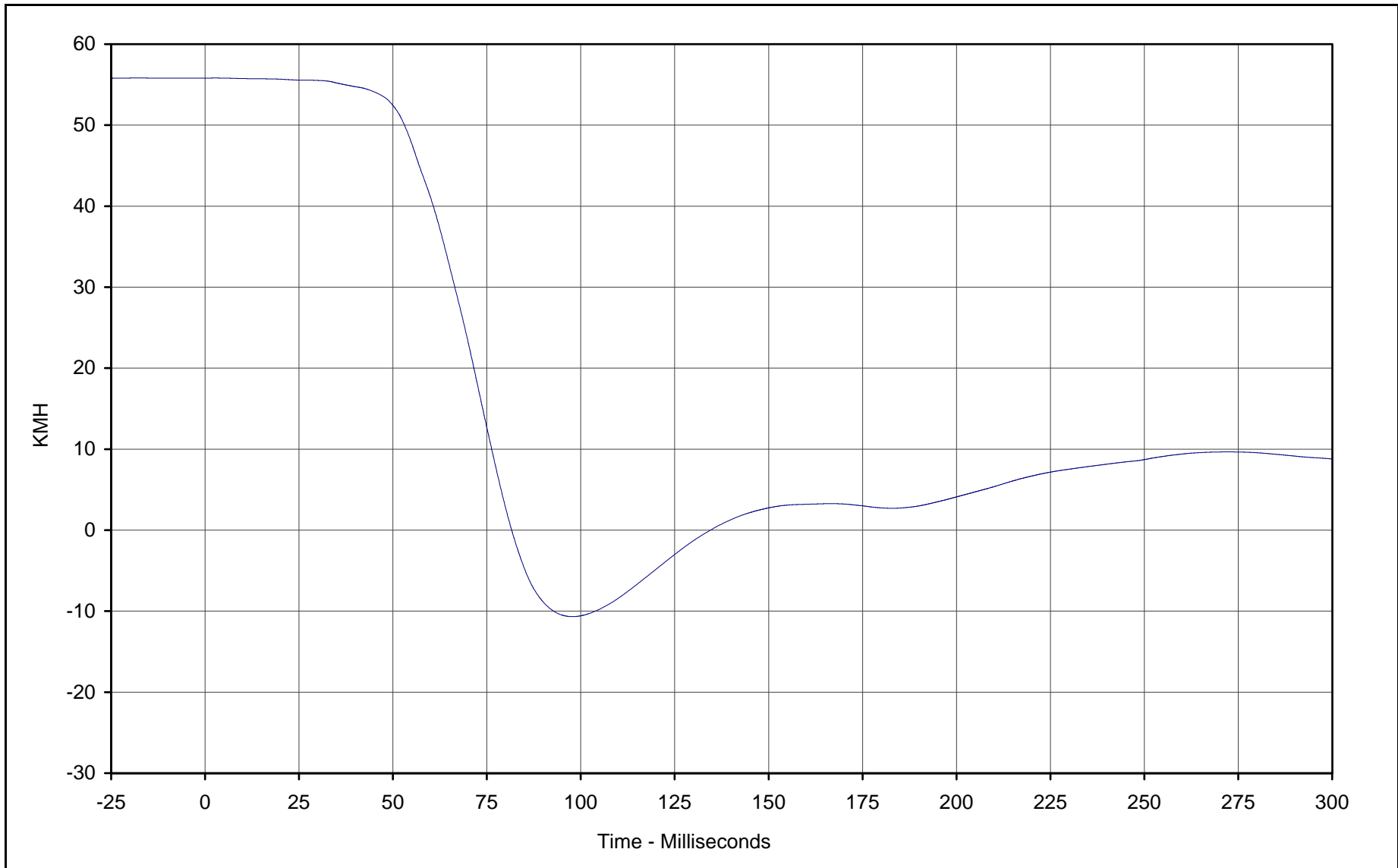
Curve Description: Driver Head Redundant X
Maximum Value: 11.5 at 123.0 Milliseconds
Minimum Value: -60.9 at 72.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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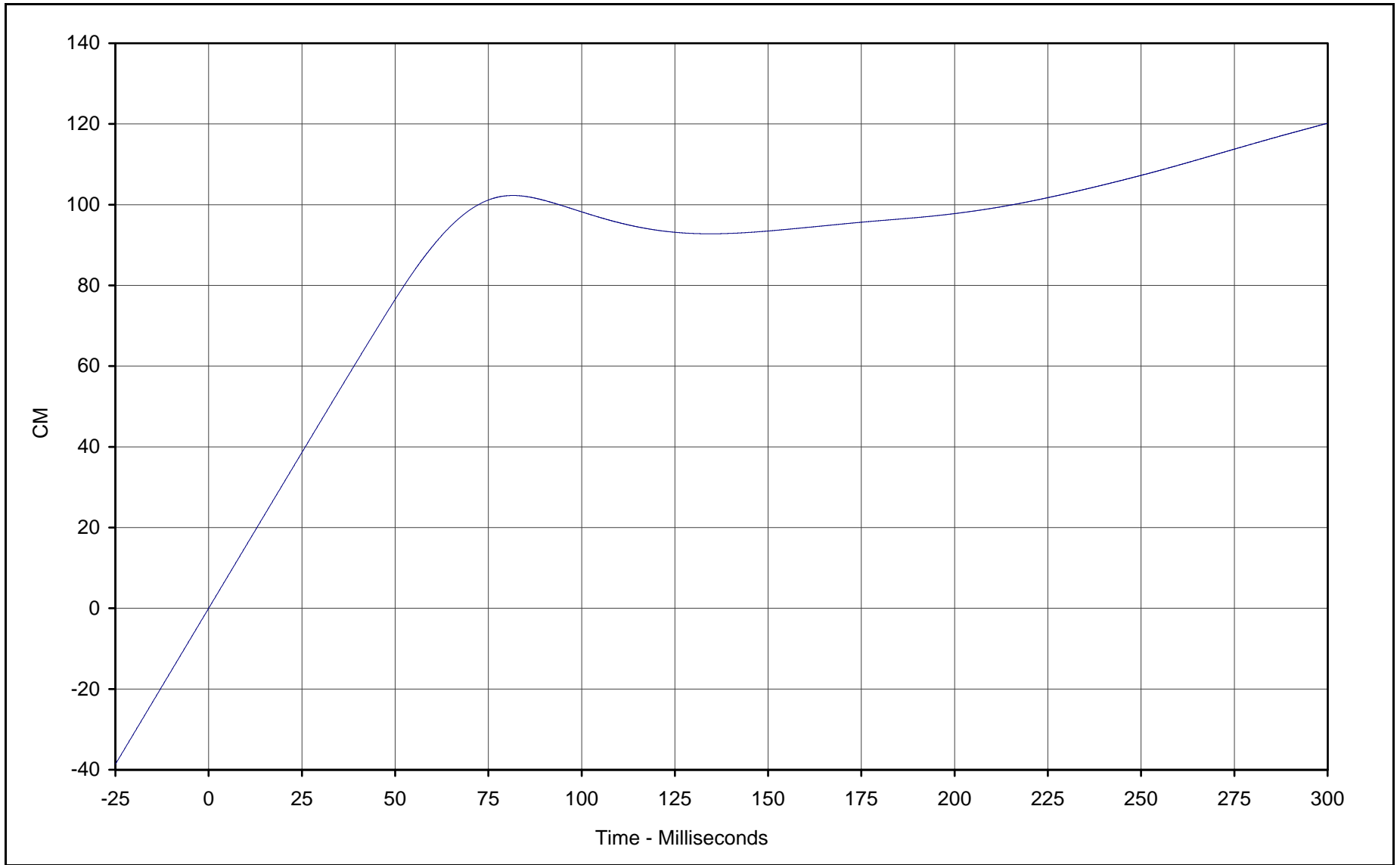
Curve Description: Driver Head Redundant X Velocity
Maximum Value: 55.8 at 2.7 Milliseconds
Minimum Value: -10.7 at 97.8 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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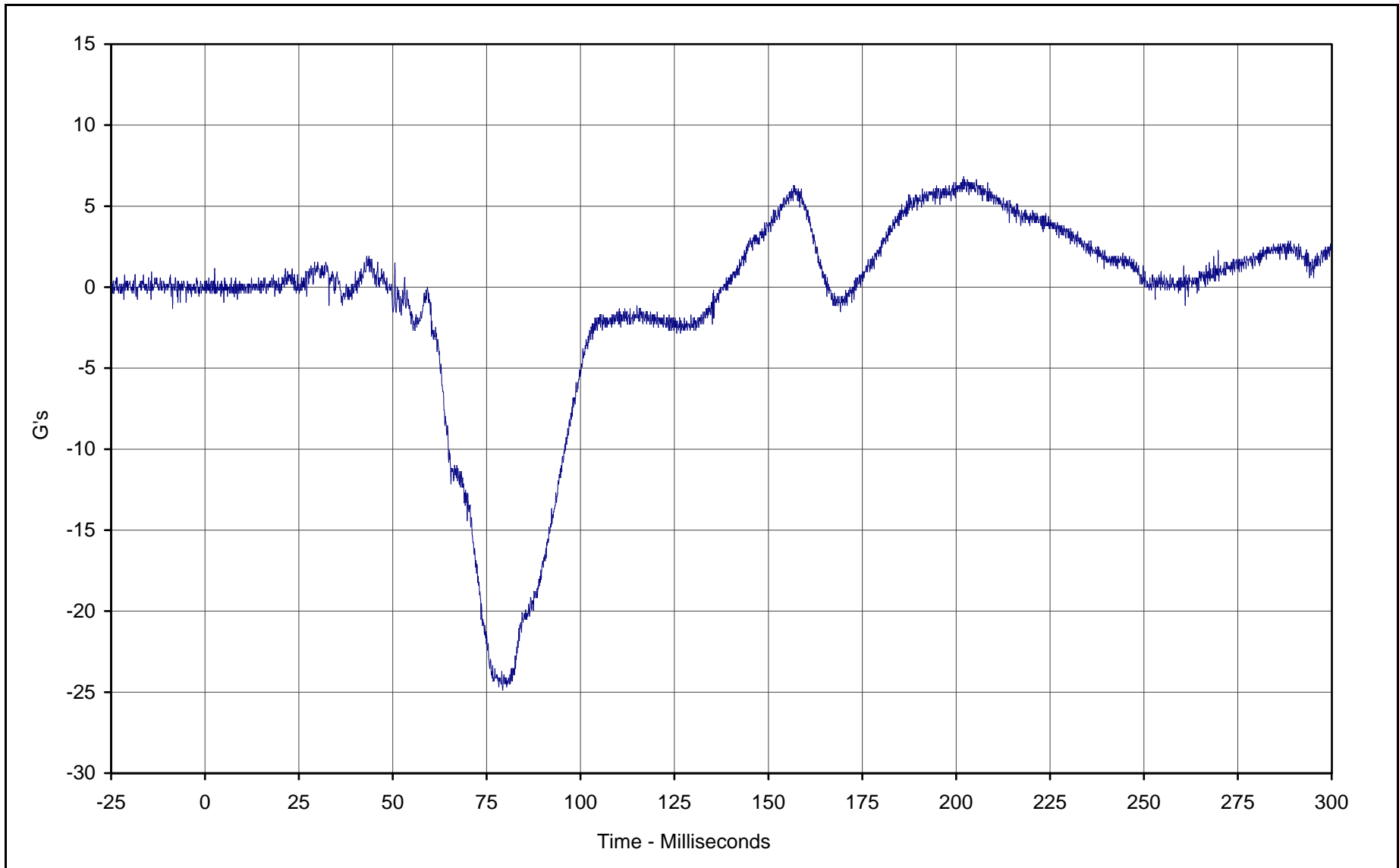
Curve Description: Driver Head Redundant X Displ.
Maximum Value: 120.1 at 299.9 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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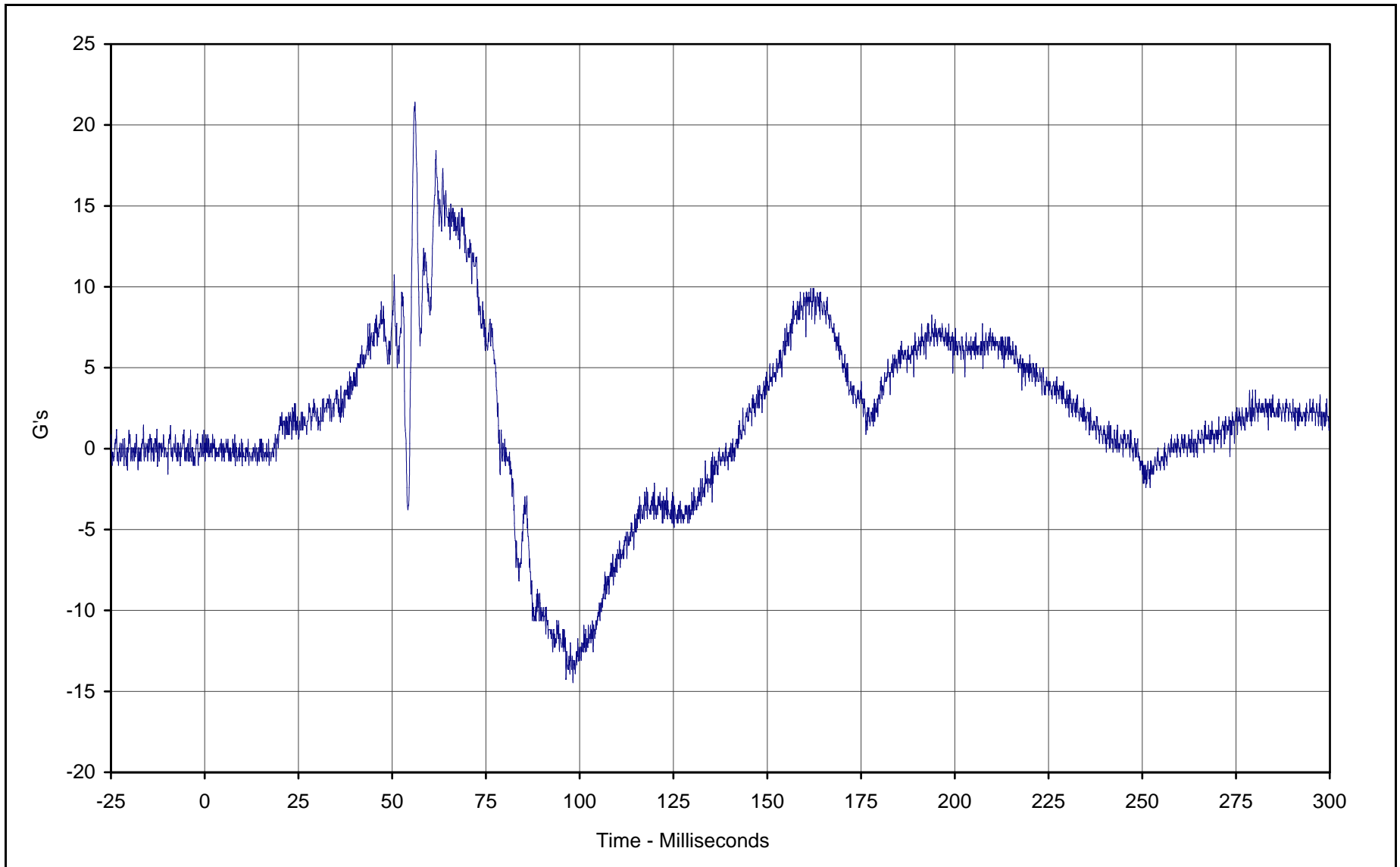
Curve Description: Driver Head Redundant Y
Maximum Value: 6.8 at 202.0 Milliseconds
Minimum Value: -24.9 at 79.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-005

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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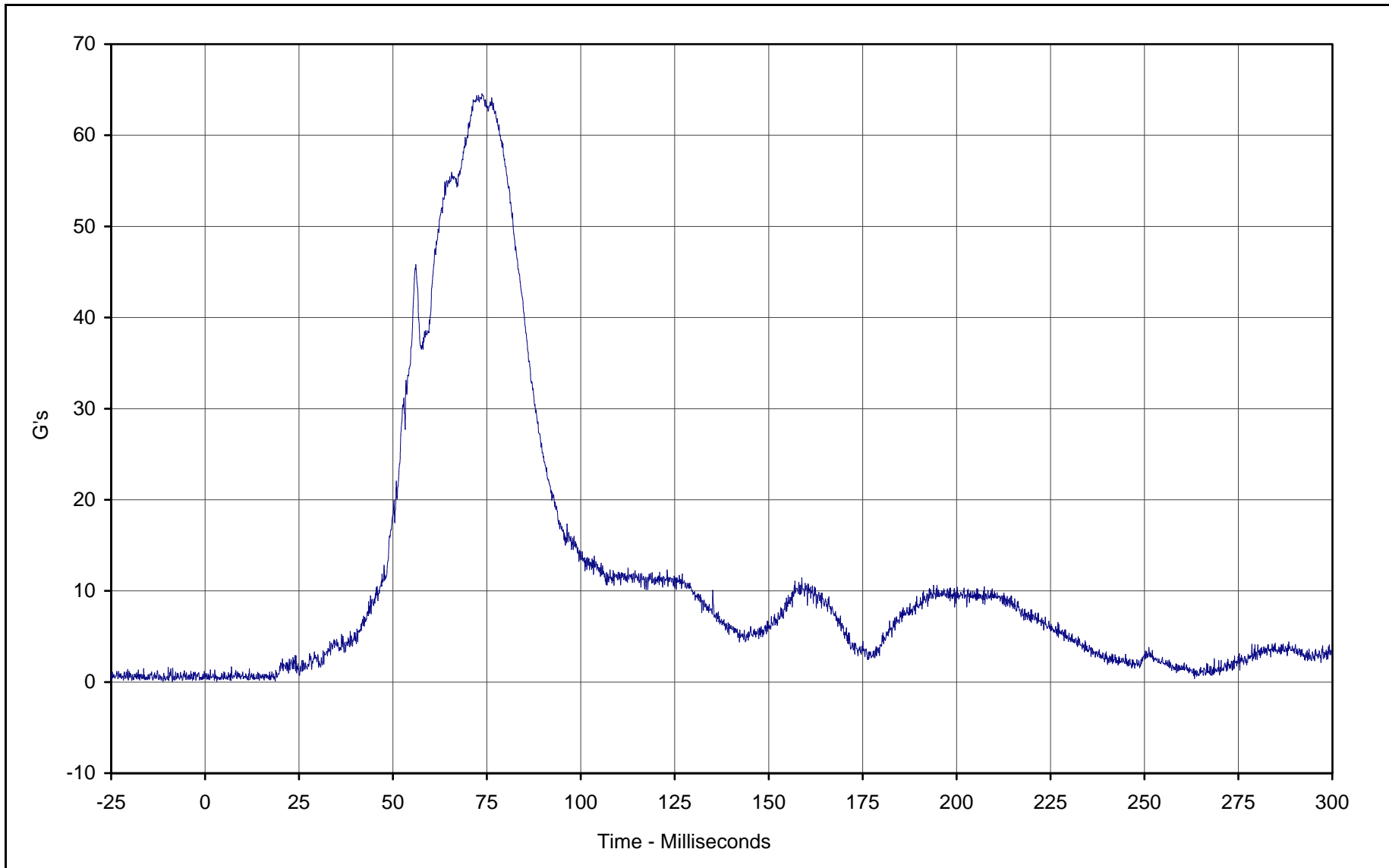
Curve Description: Driver Head Redundant Z
Maximum Value: 21.4 at 56.1 Milliseconds
Minimum Value: -14.5 at 98.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-006

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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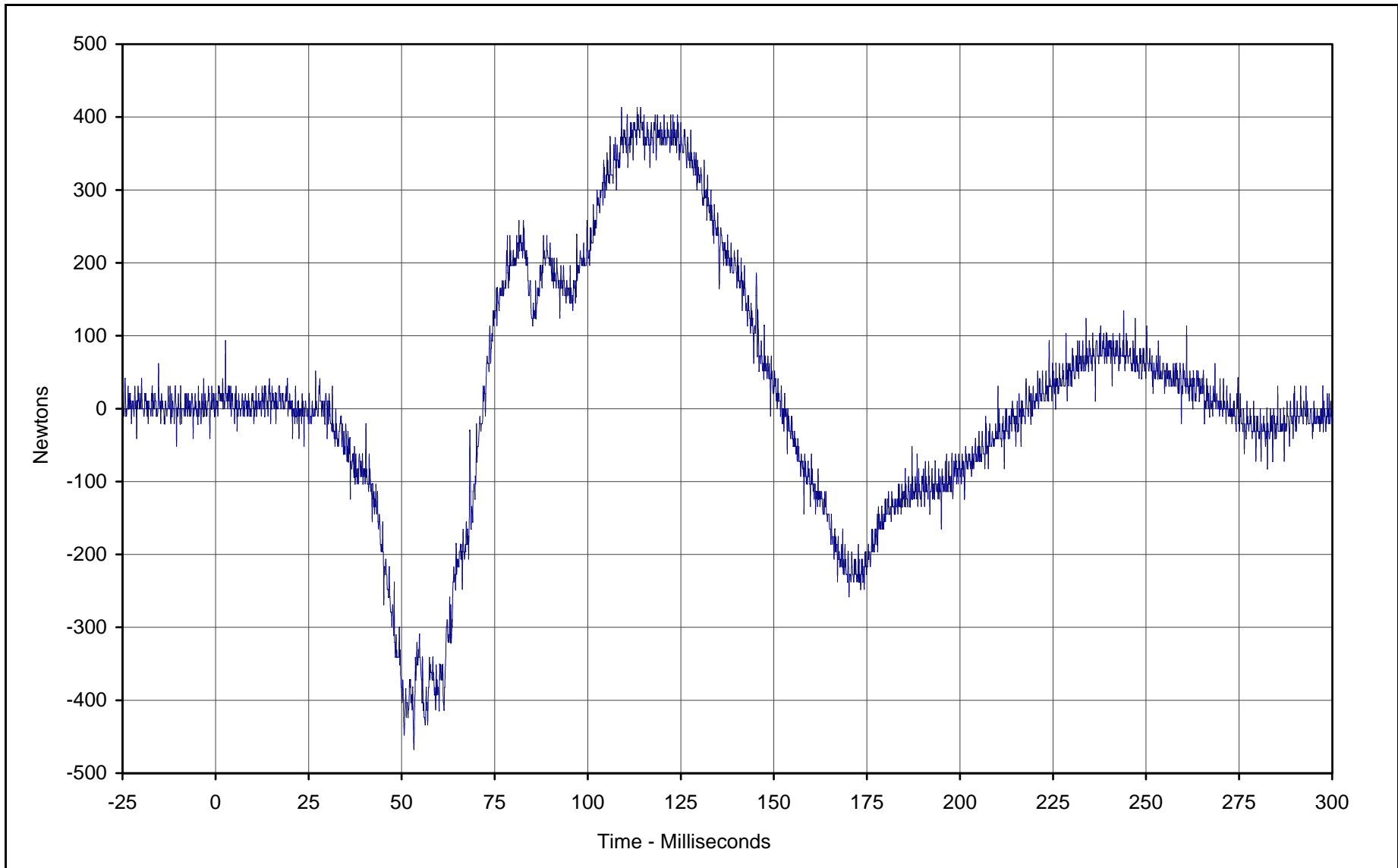
Curve Description: Driver Head Resultant Redundant
Maximum Value: 64.5 at 73.7 Milliseconds
Minimum Value: 0.1 at 3.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: RES-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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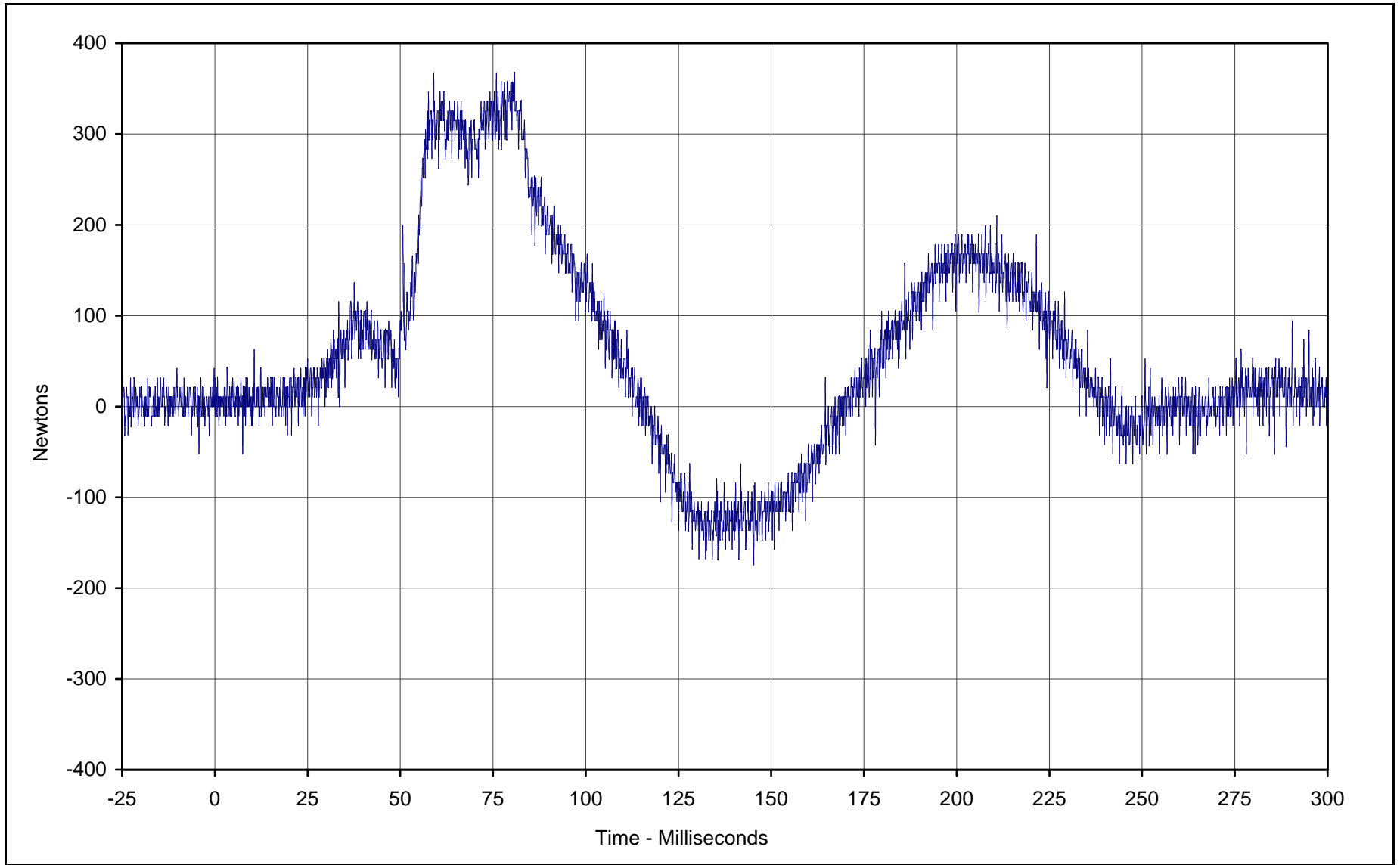
Curve Description: Driver Neck Force X
Maximum Value: 413.4 at 109.1 Milliseconds
Minimum Value: -467.4 at 53.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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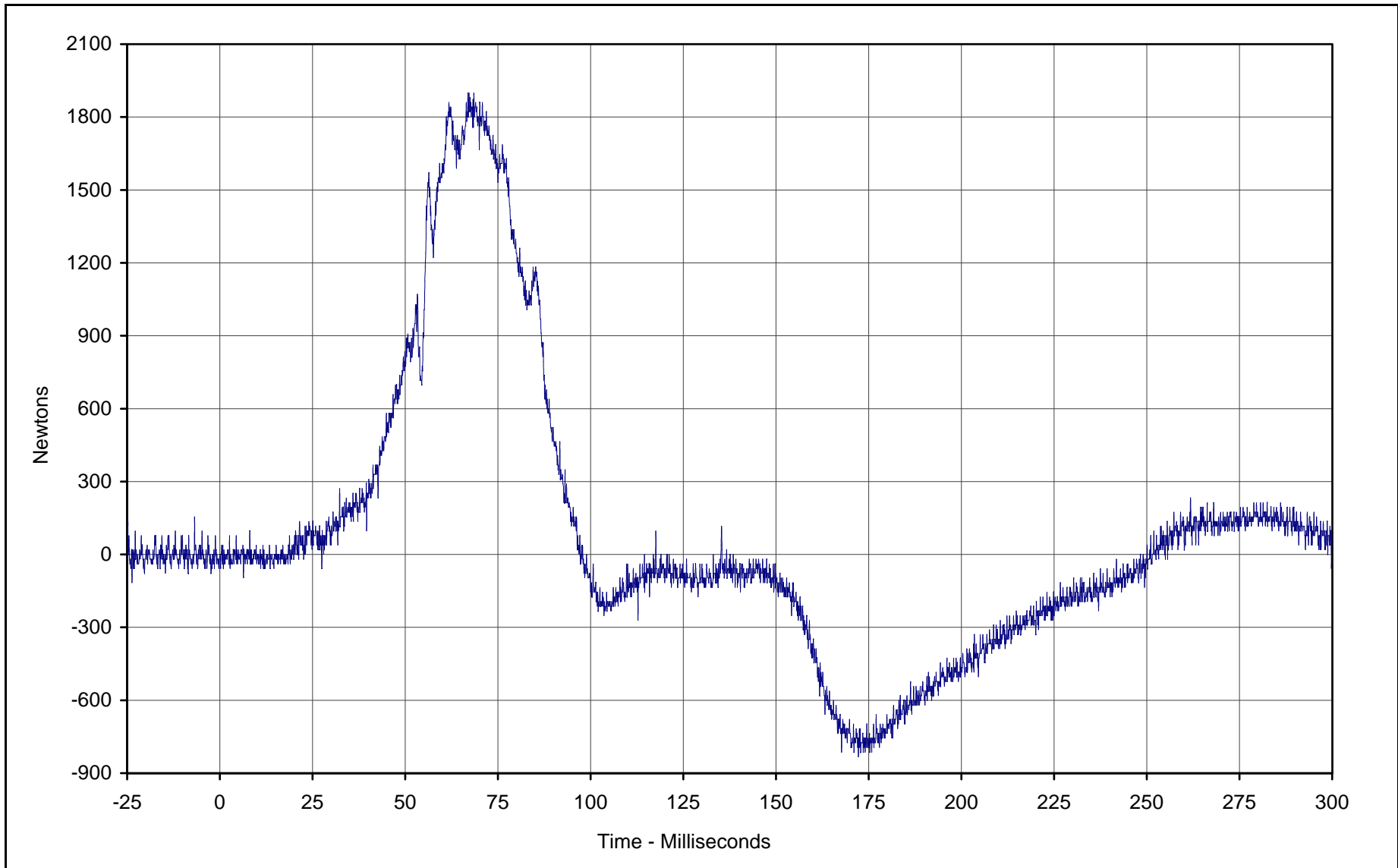
Curve Description: Driver Neck Force Y
Maximum Value: 367.5 at 59.0 Milliseconds
Minimum Value: -173.0 at 145.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-008

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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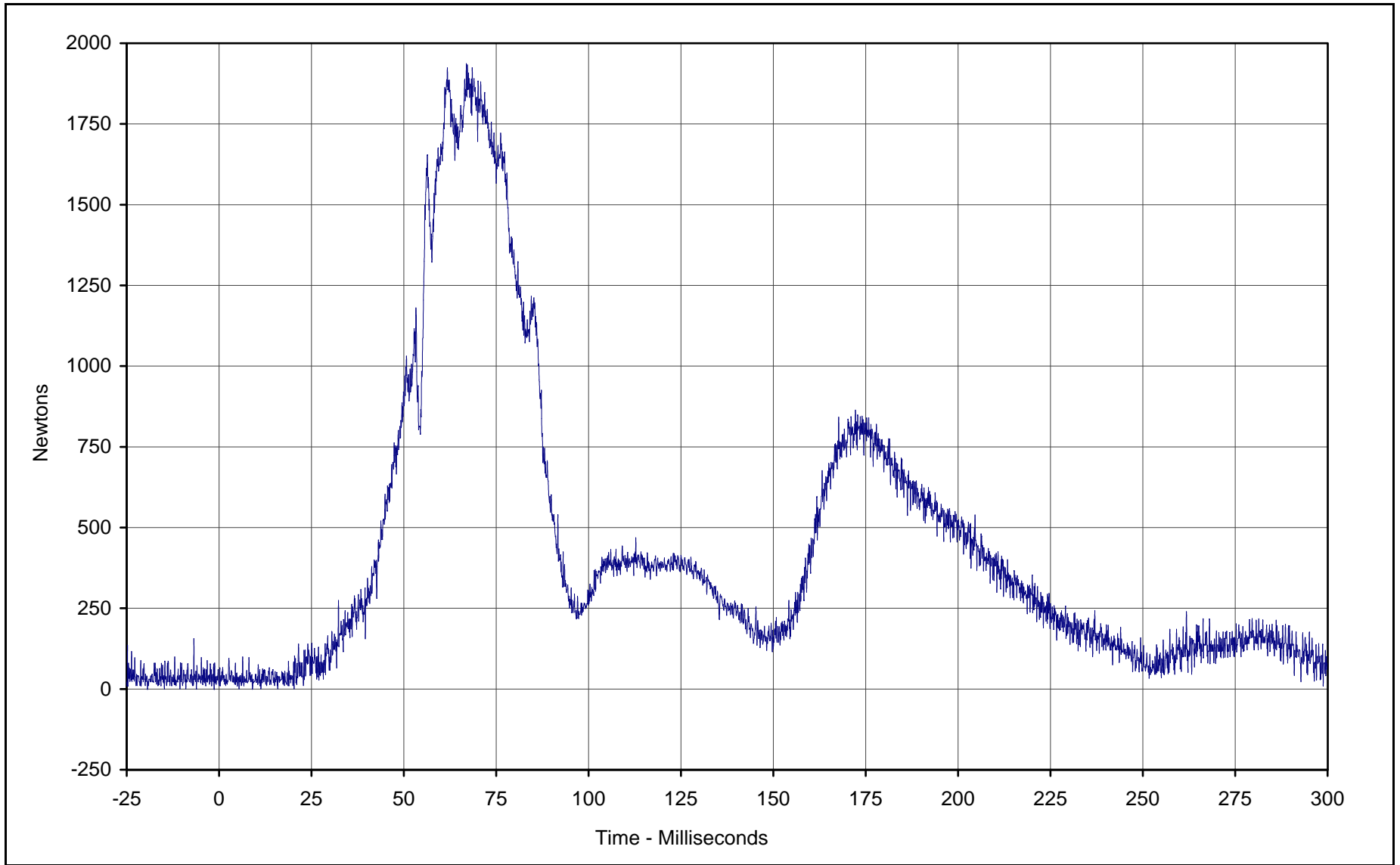


Curve Description: Driver Neck Force Z
Maximum Value: 1899.1 at 66.9 Milliseconds
Minimum Value: -833.3 at 172.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-009

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



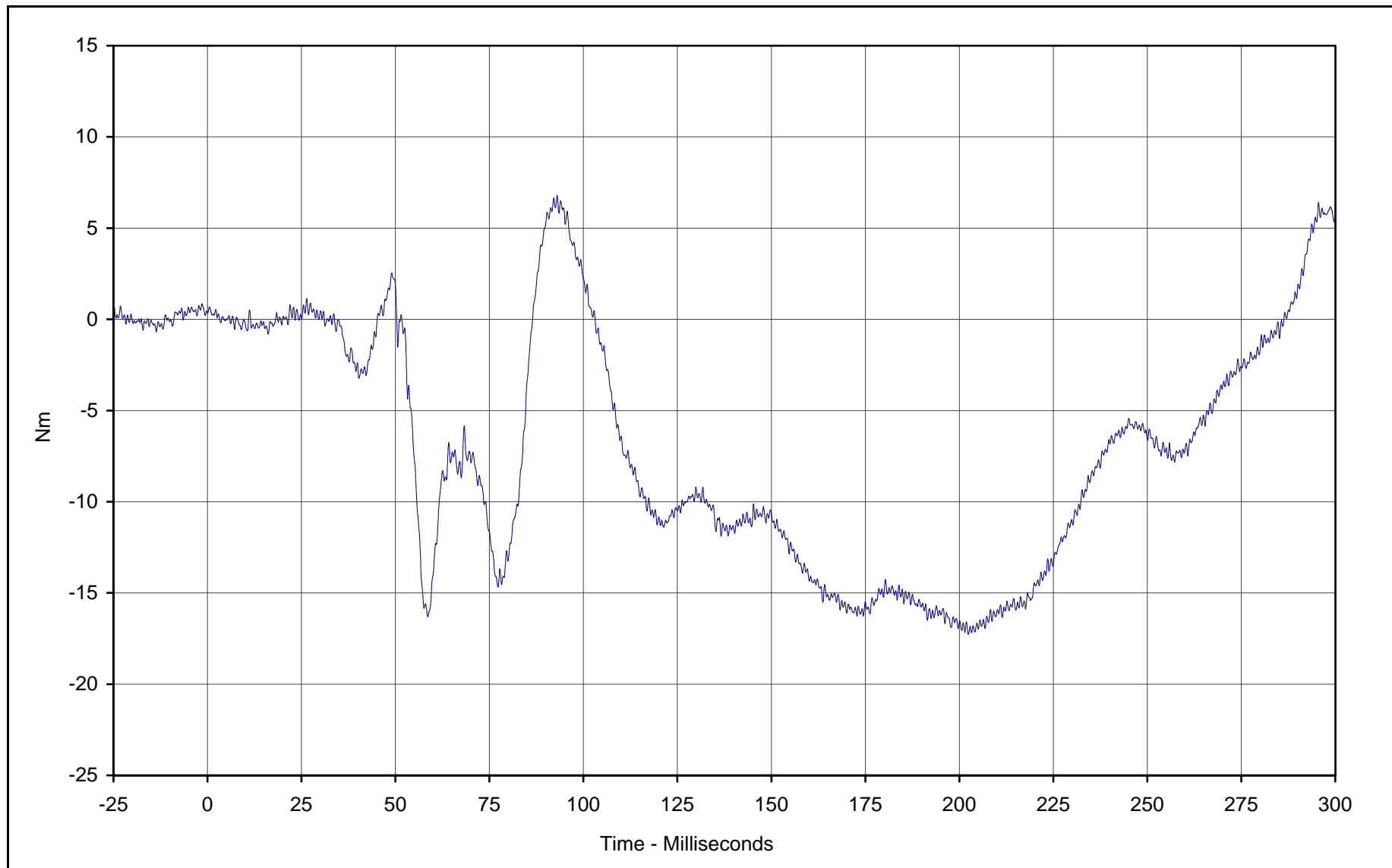
KAR21001-16



Curve Description: Driver Neck Force Resultant
 Maximum Value: 1936.1 at 66.9 Milliseconds
 Minimum Value: 0.0 at 5.4 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 3/2/01
 Curve Number: RES-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
 Test Vehicle: 2001 Chevrolet Venture Minivan



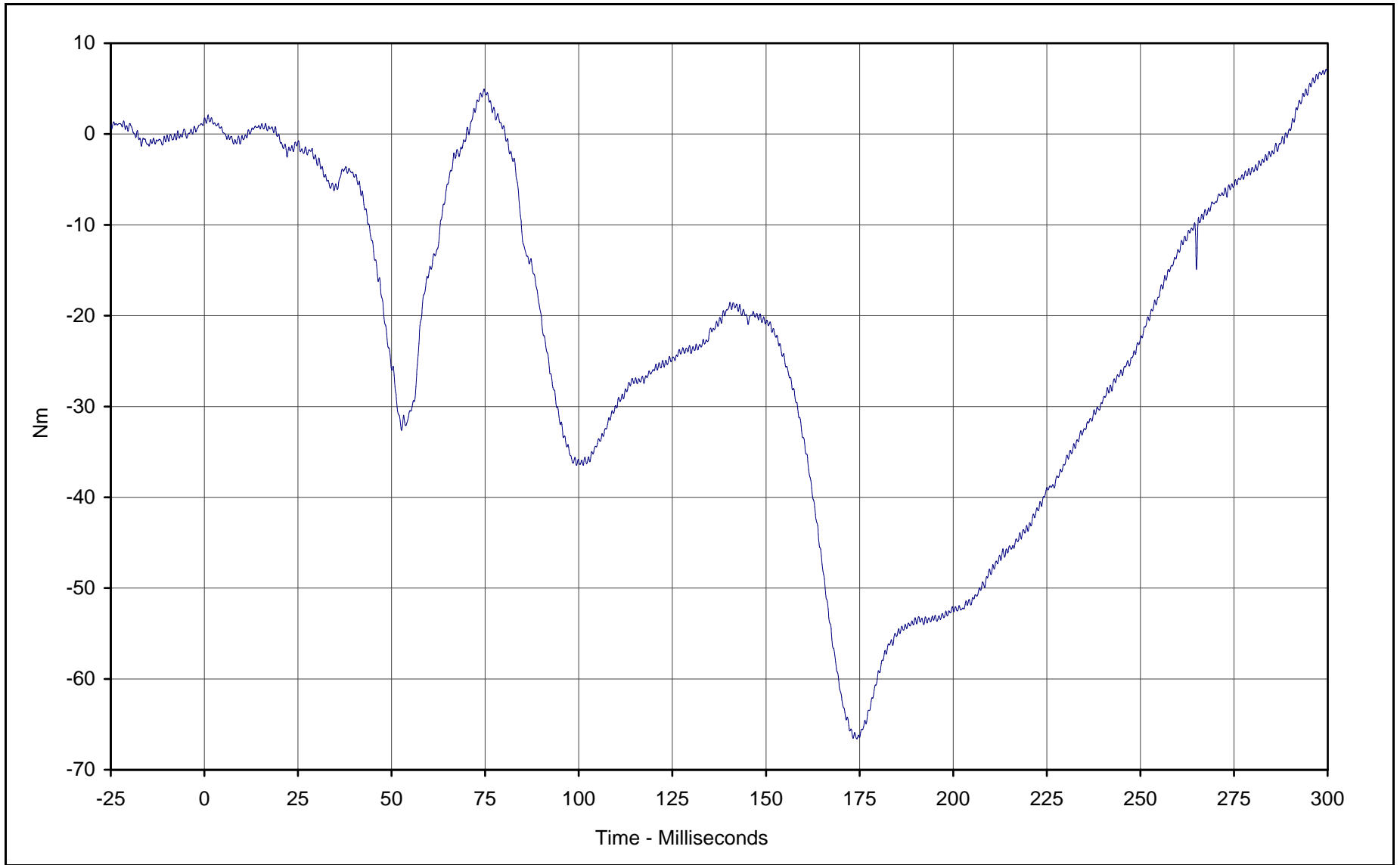


Curve Description: Driver Neck Moment X
 Maximum Value: 6.8 at 93.0 Milliseconds
 Minimum Value: -17.3 at 202.4 Milliseconds
 SAE Filter Class: 600
 Date of Test: 3/2/01
 Curve Number: FIL-010

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
 Test Vehicle: 2001 Chevrolet Venture Minivan



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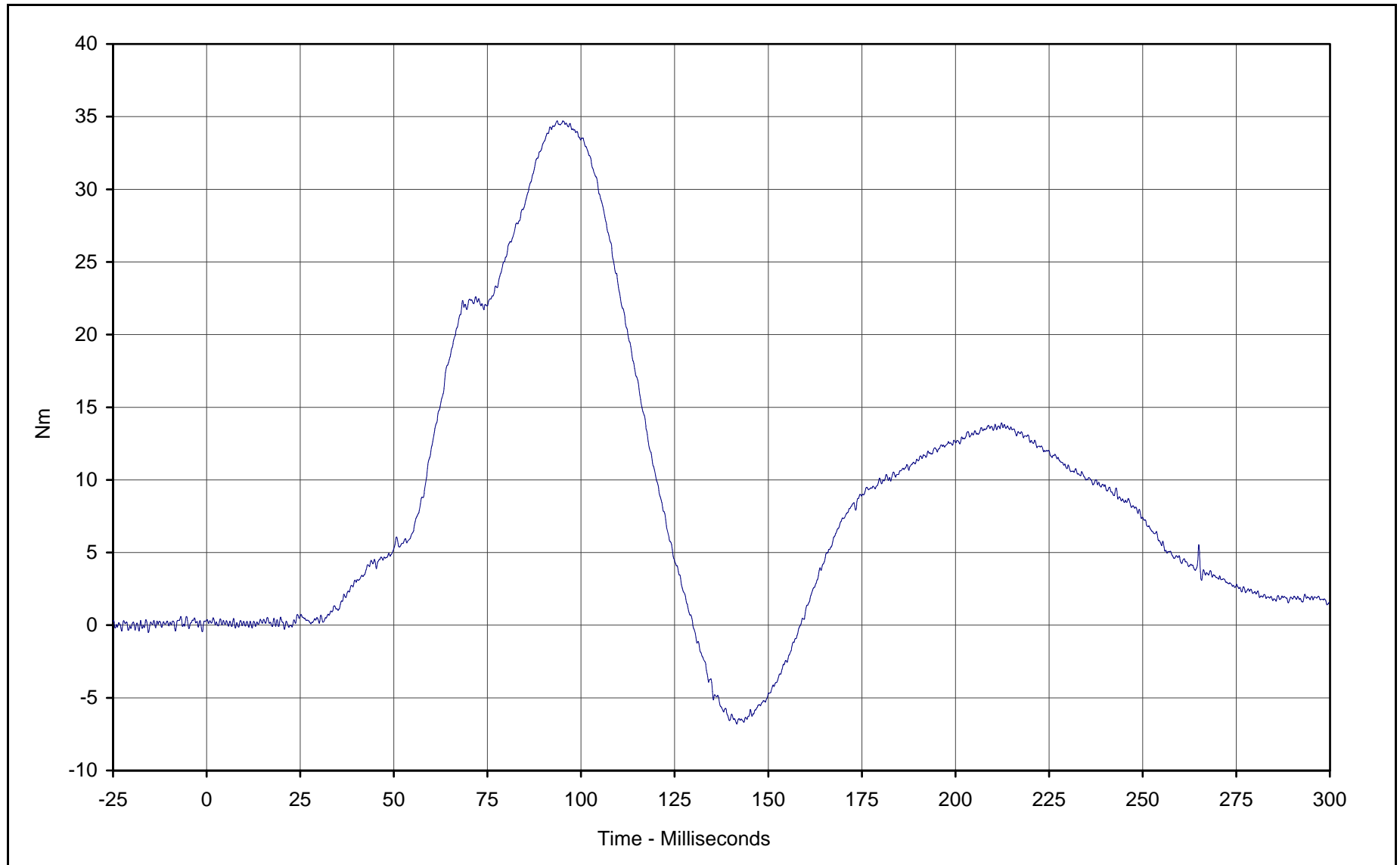


Curve Description: Driver Neck Moment Y
Maximum Value: 7.1 at 299.6 Milliseconds
Minimum Value: -66.6 at 174.3 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-011

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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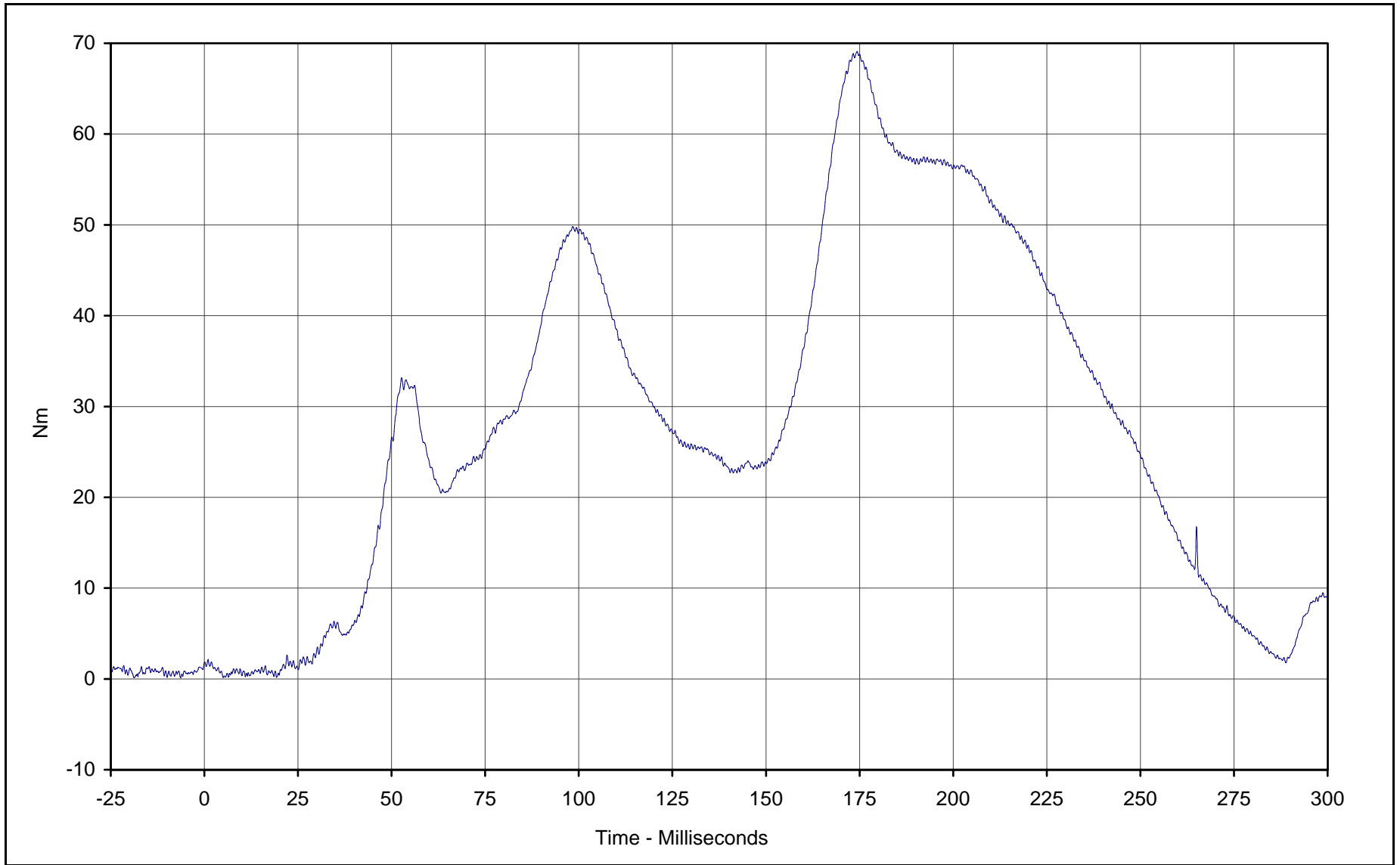


Curve Description: Driver Neck Moment Z
 Maximum Value: 34.7 at 93.6 Milliseconds
 Minimum Value: -6.8 at 141.6 Milliseconds
 SAE Filter Class: 600
 Date of Test: 3/2/01
 Curve Number: FIL-012

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
 Test Vehicle: 2001 Chevrolet Venture Minivan



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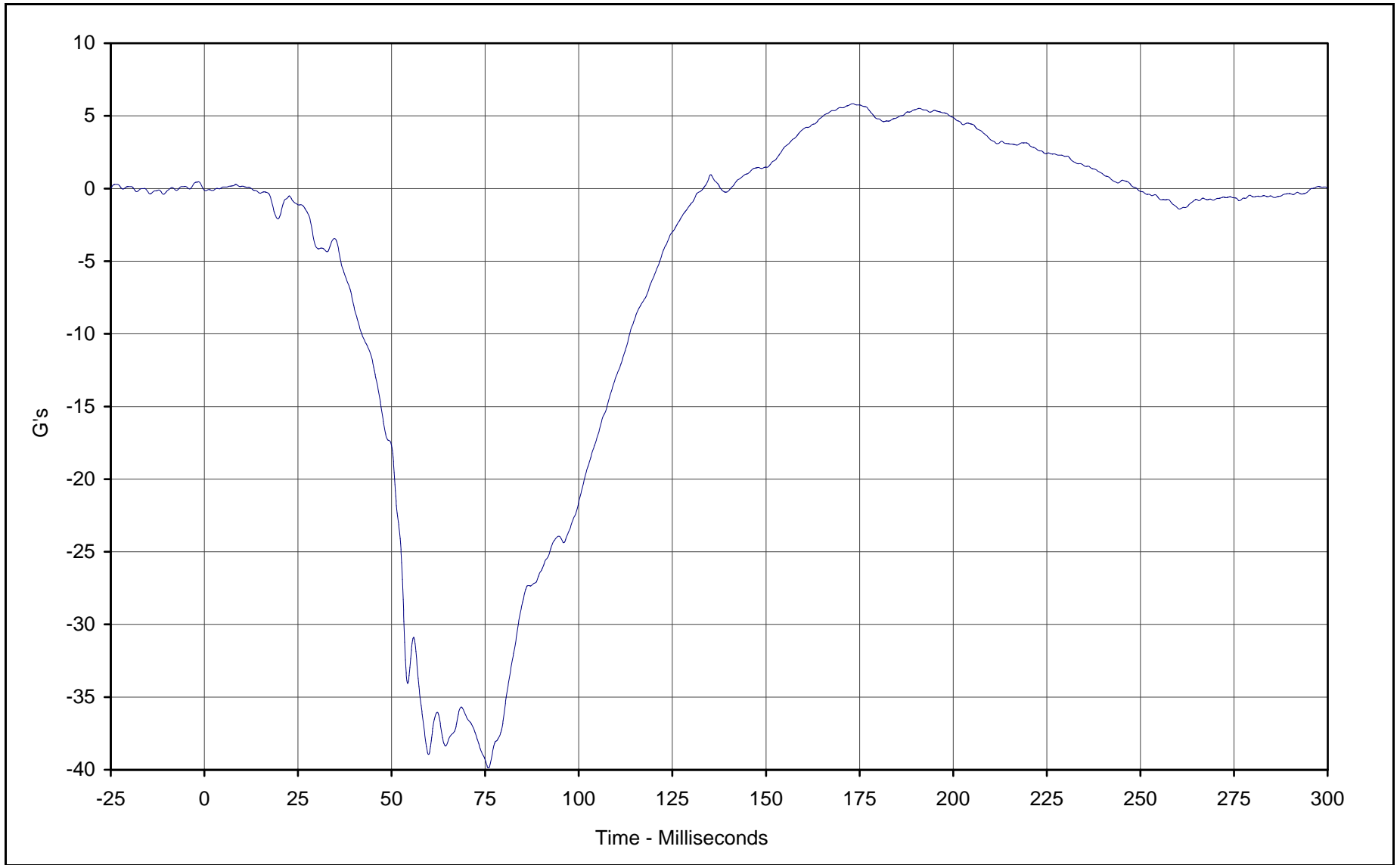
Curve Description: Driver Neck Moment Resultant
Maximum Value: 69.1 at 174.4 Milliseconds
Minimum Value: 0.2 at 5.0 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: RES-010

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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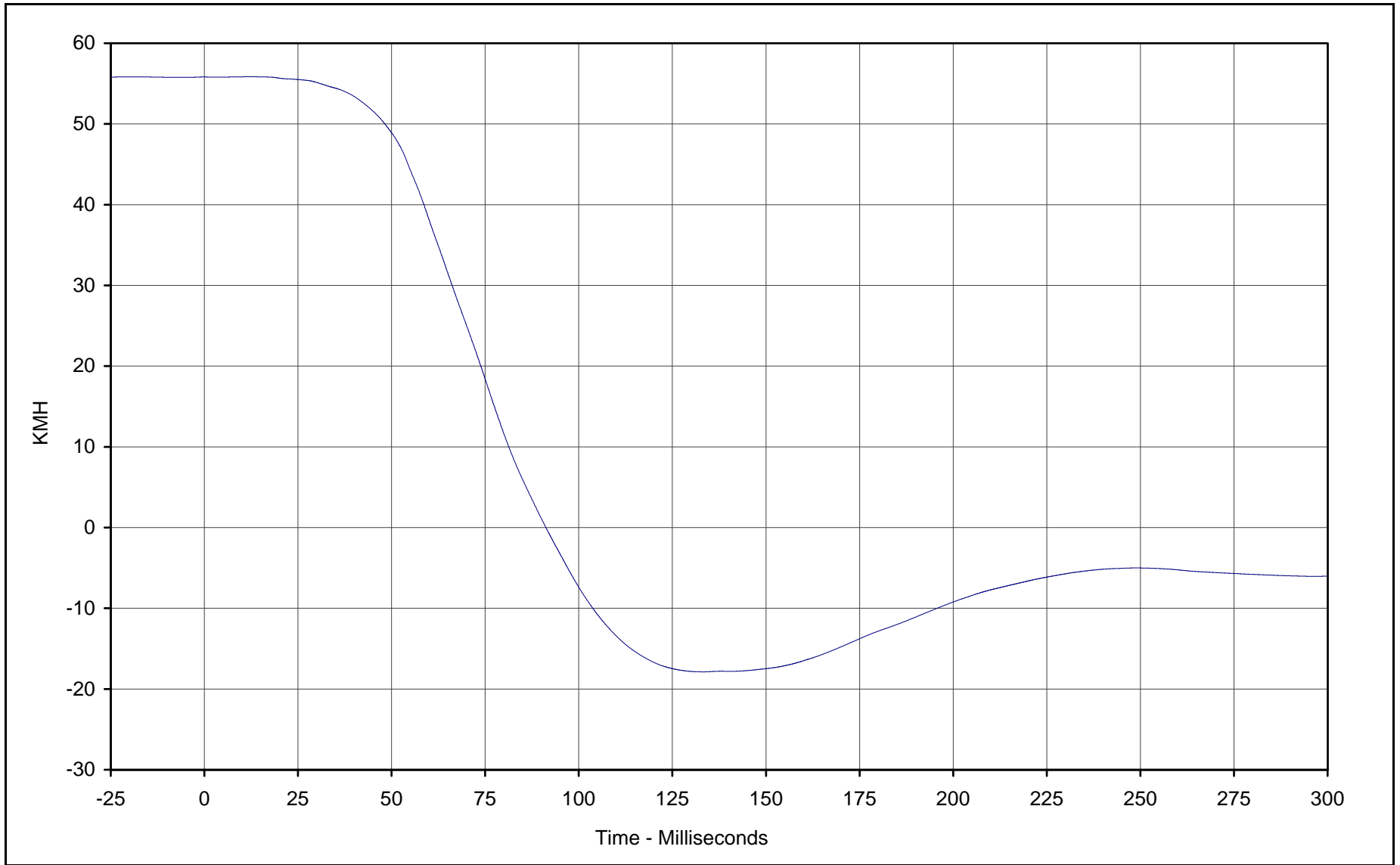
Curve Description: Driver Chest Primary X
Maximum Value: 5.8 at 173.2 Milliseconds
Minimum Value: -39.9 at 75.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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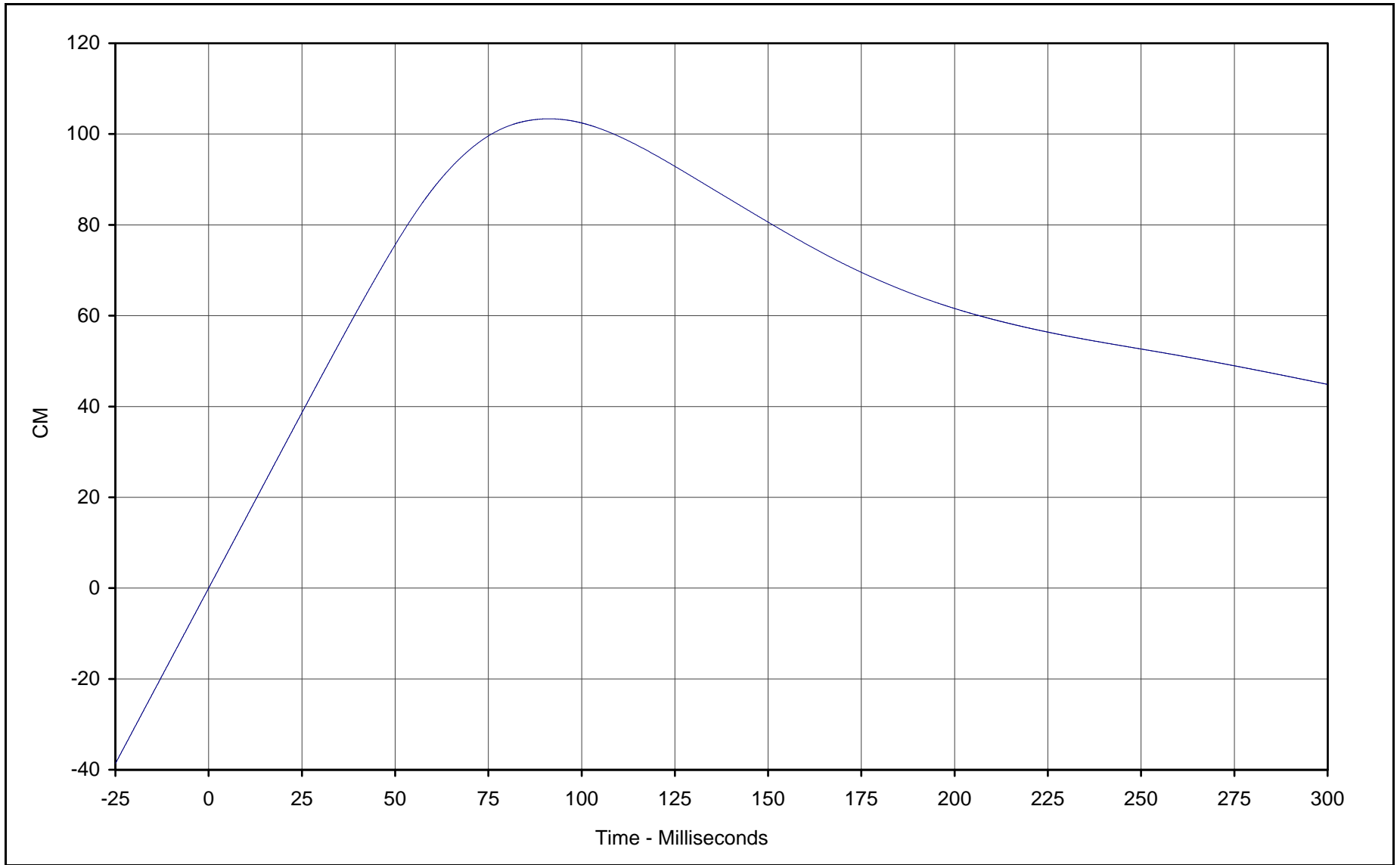
Curve Description: Driver Chest Primary X Velocity
Maximum Value: 55.8 at 12.5 Milliseconds
Minimum Value: -17.9 at 133.2 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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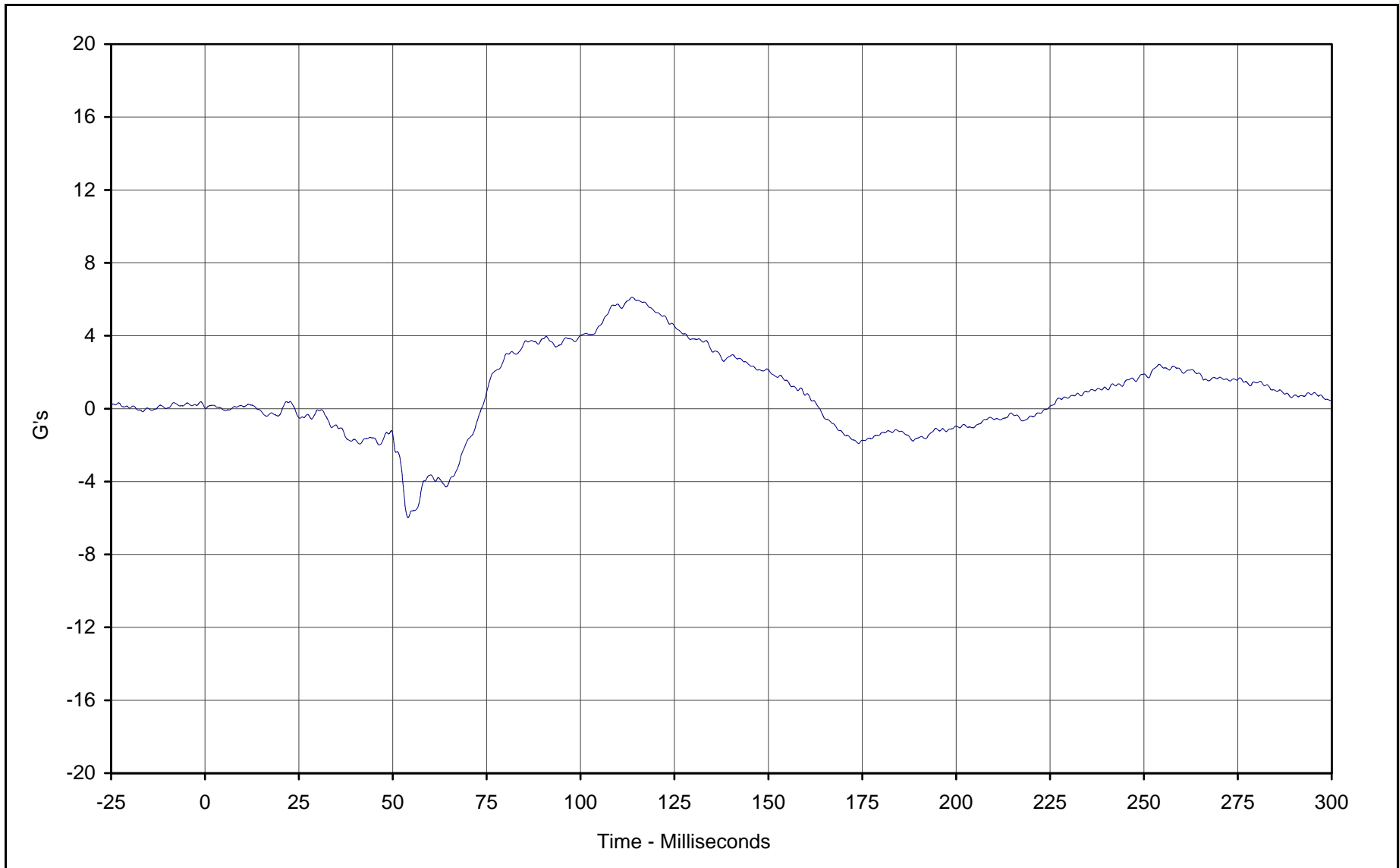
Curve Description: Driver Chest Primary X Displ.
Maximum Value: 103.4 at 91.2 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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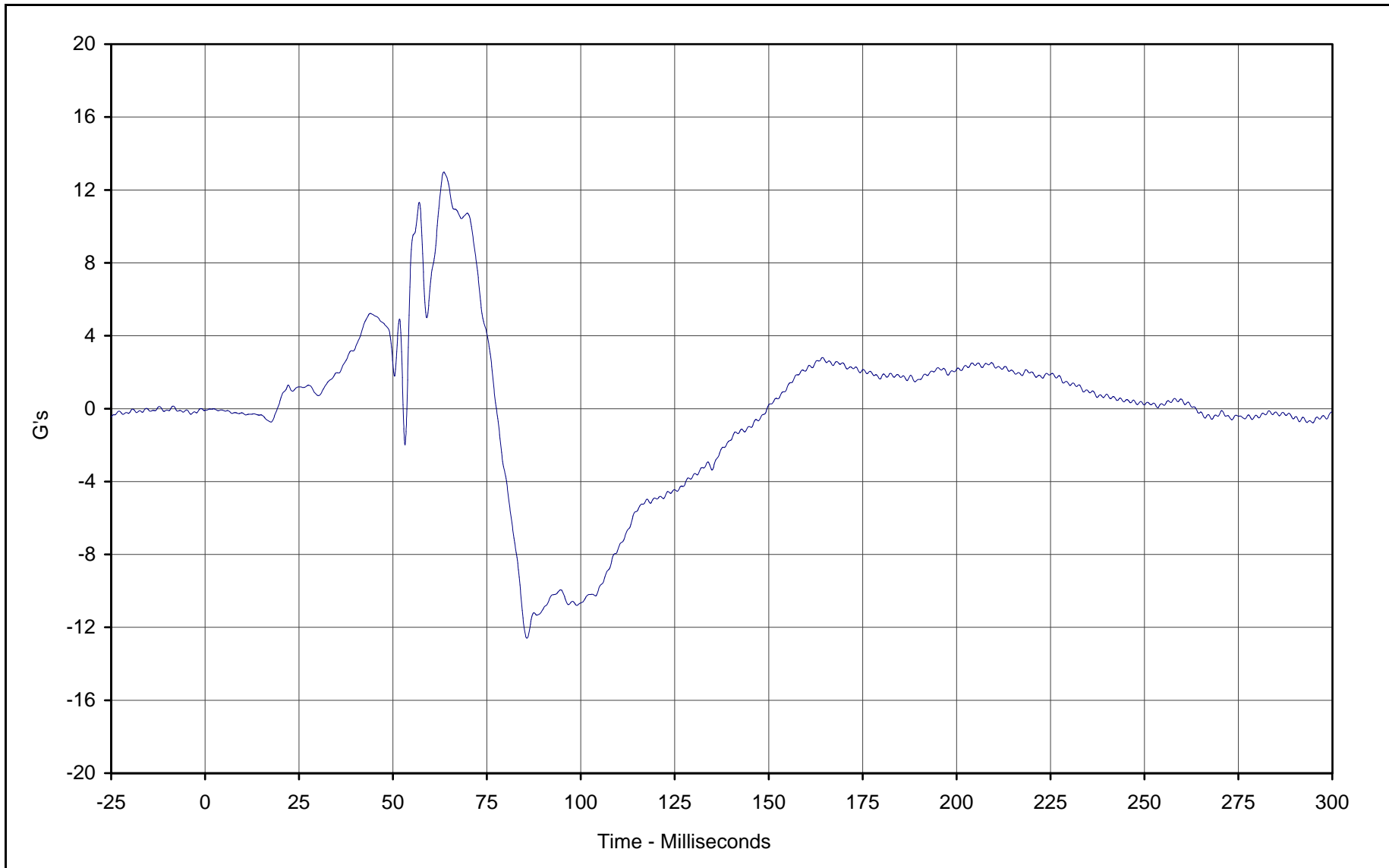
Curve Description: Driver Chest Primary Y
Maximum Value: 6.1 at 113.7 Milliseconds
Minimum Value: -6.0 at 54.1 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-014

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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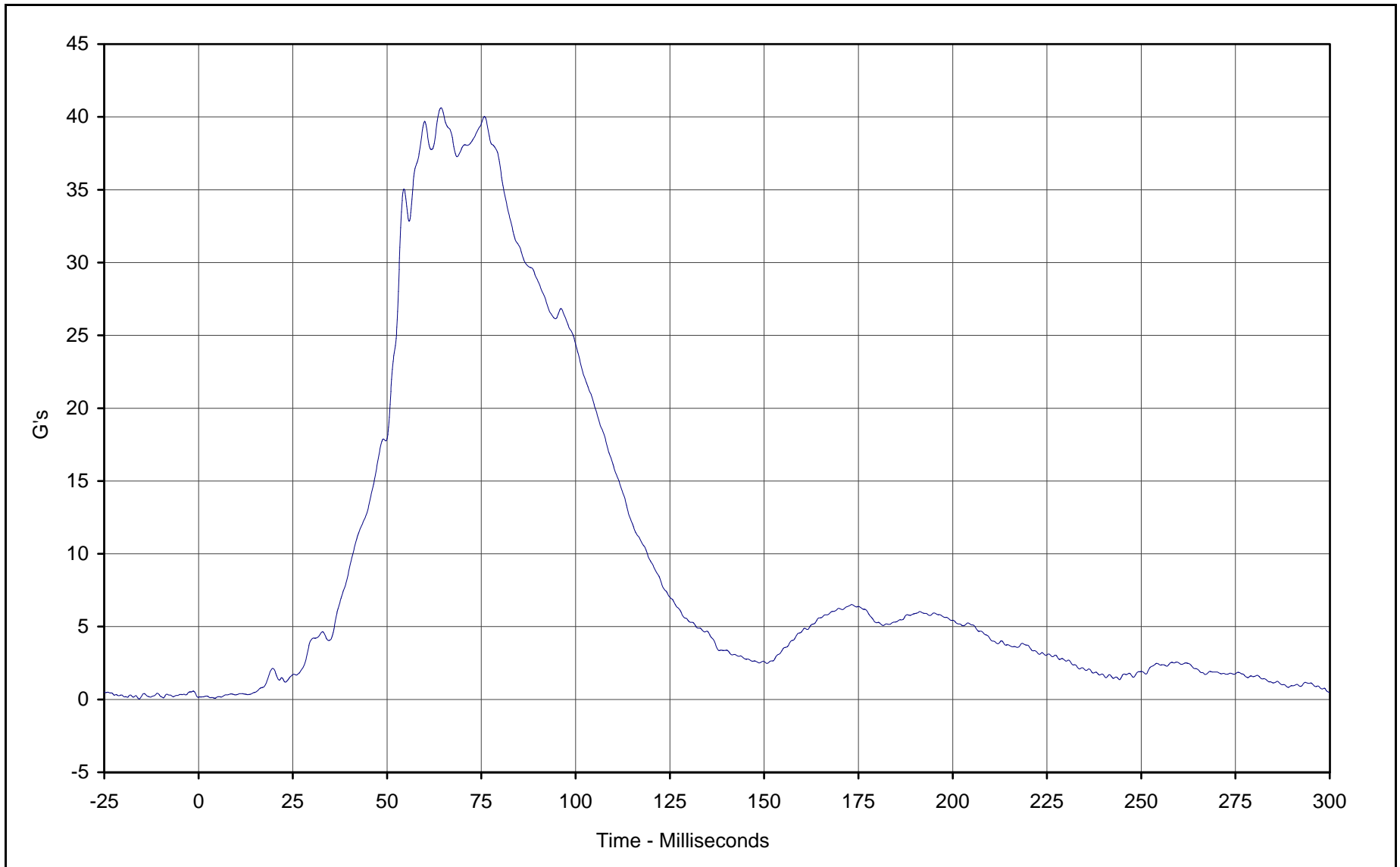
Curve Description: Driver Chest Primary Z
Maximum Value: 13.0 at 63.5 Milliseconds
Minimum Value: -12.6 at 85.7 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-015

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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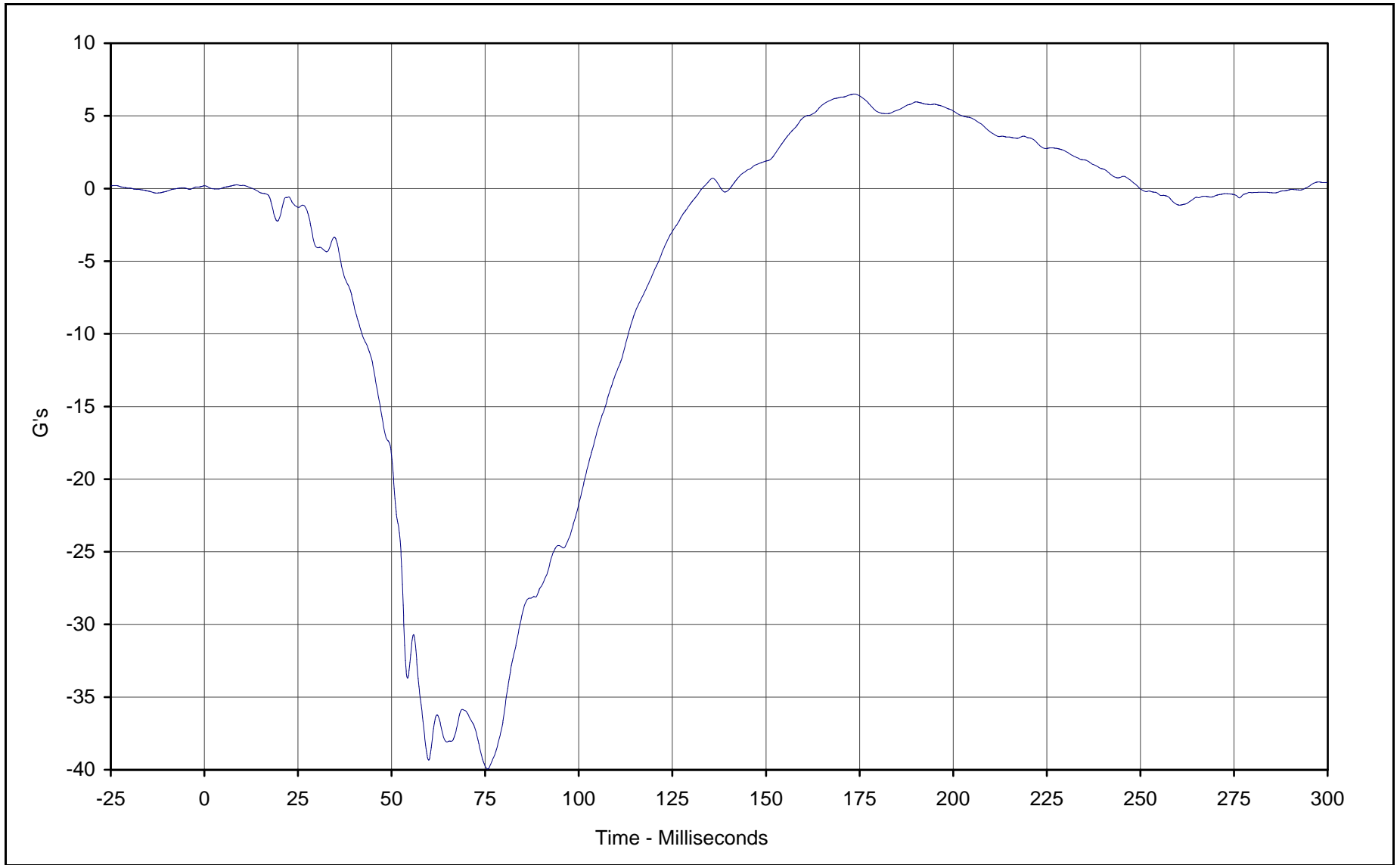
Curve Description: Driver Chest Resultant Primary
Maximum Value: 40.6 at 64.3 Milliseconds
Minimum Value: 0.1 at 4.4 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: RES-013

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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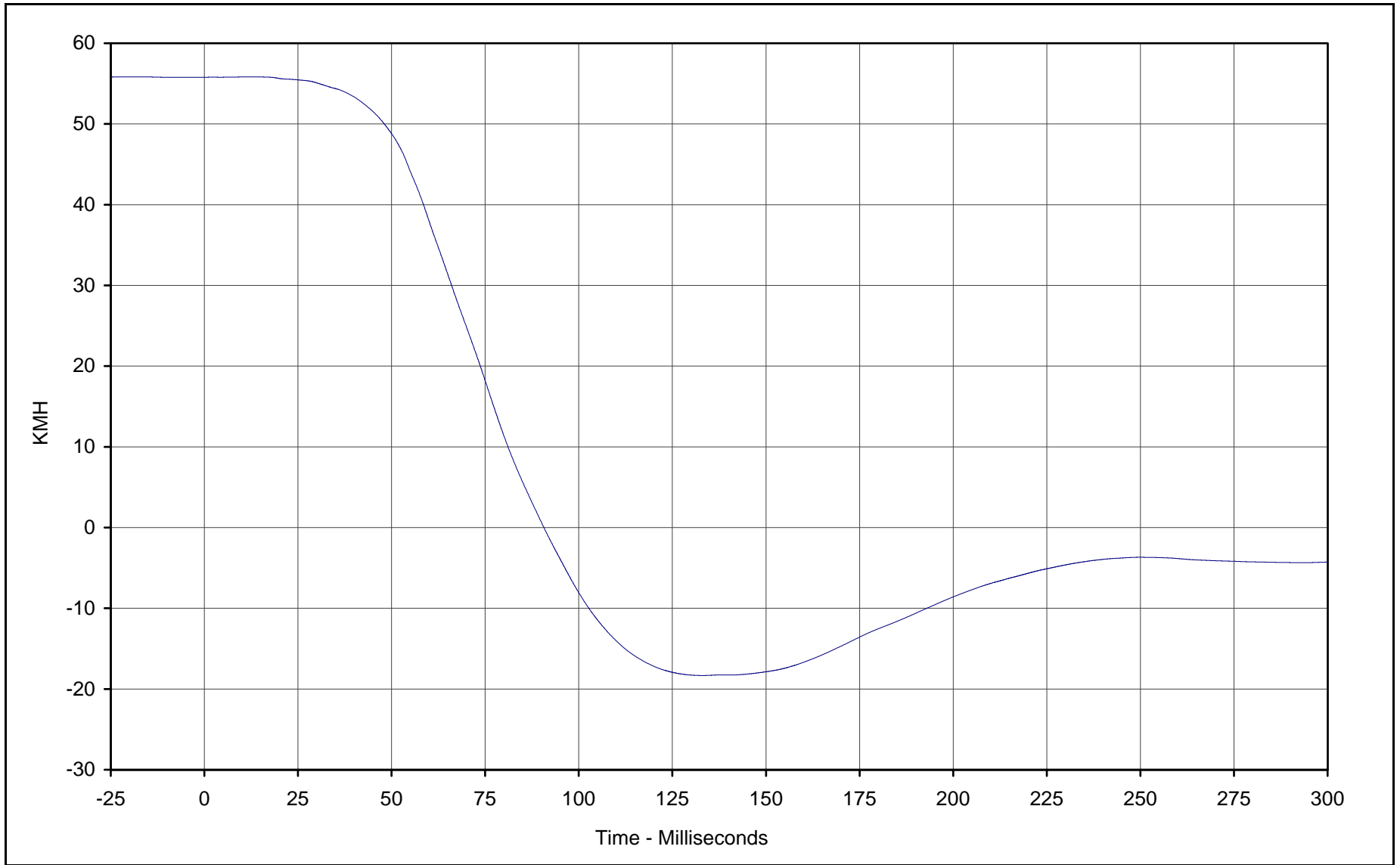
Curve Description: Driver Chest Redundant X
Maximum Value: 6.5 at 173.6 Milliseconds
Minimum Value: -39.9 at 75.7 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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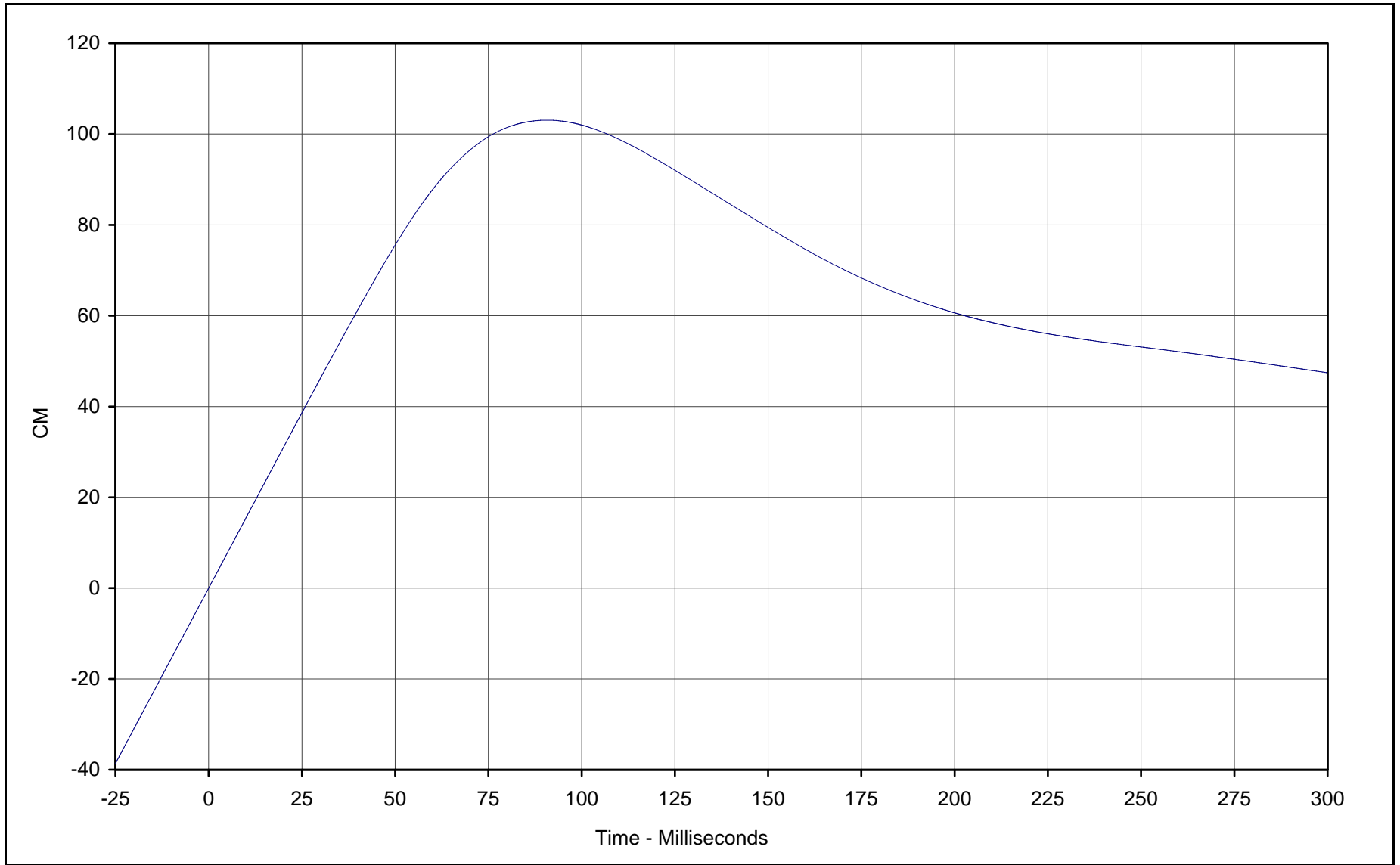
Curve Description: Driver Chest Redundant X Velocity
Maximum Value: 55.8 at 12.9 Milliseconds
Minimum Value: -18.3 at 132.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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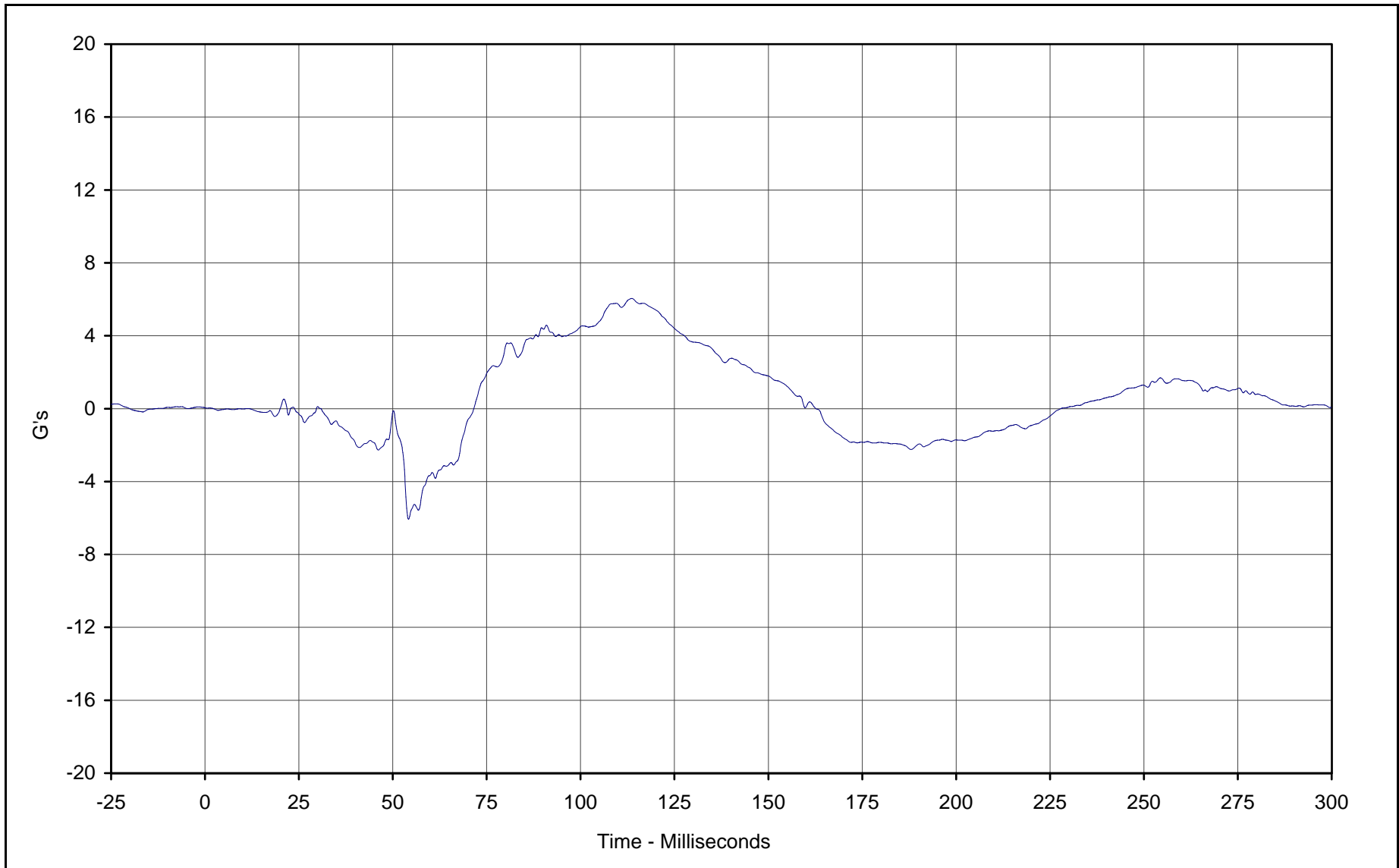
Curve Description: Driver Chest Redundant X Displ.
Maximum Value: 103.1 at 90.7 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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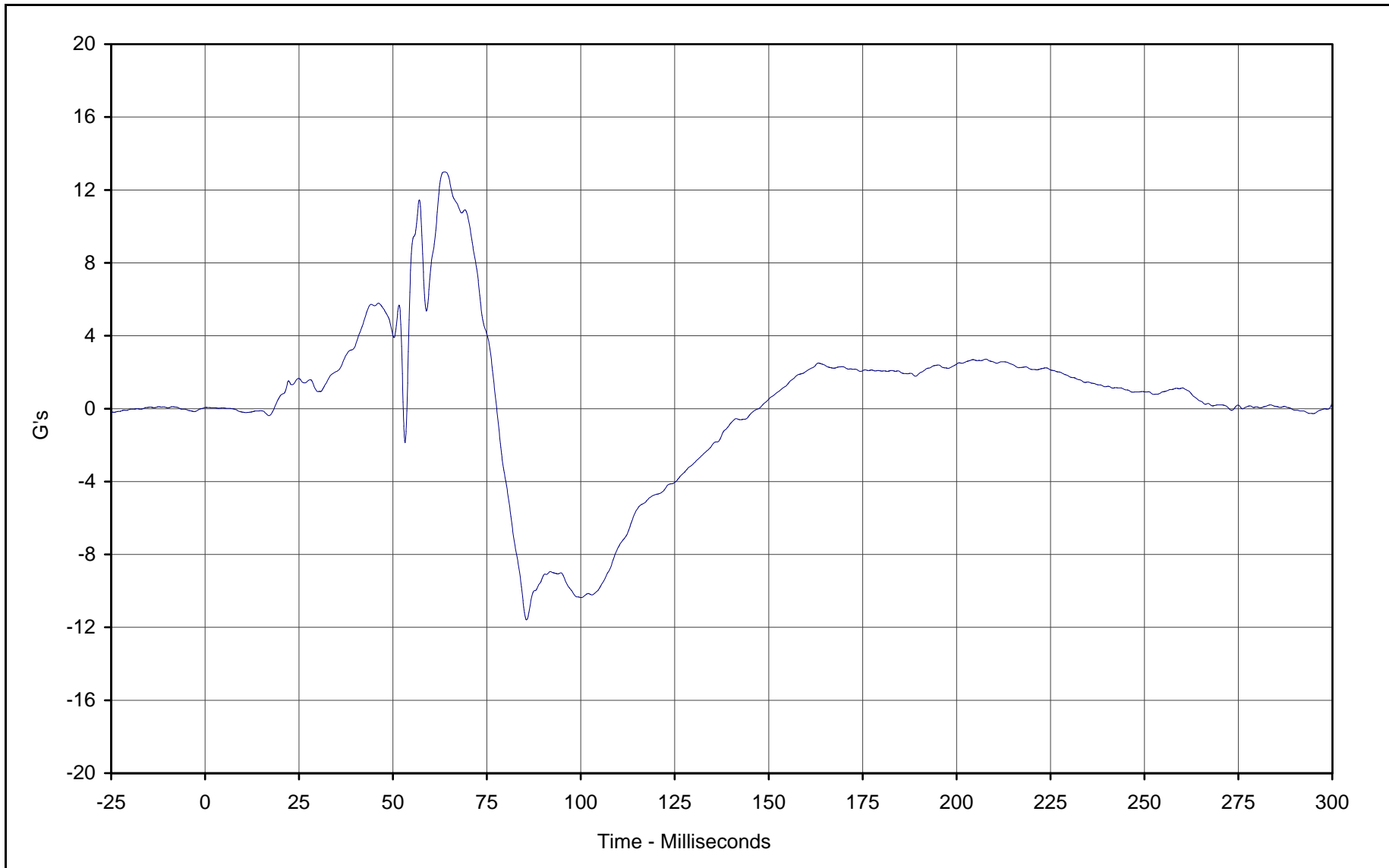
Curve Description: Driver Chest Redundant Y
Maximum Value: 6.0 at 113.6 Milliseconds
Minimum Value: -6.1 at 54.2 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-017

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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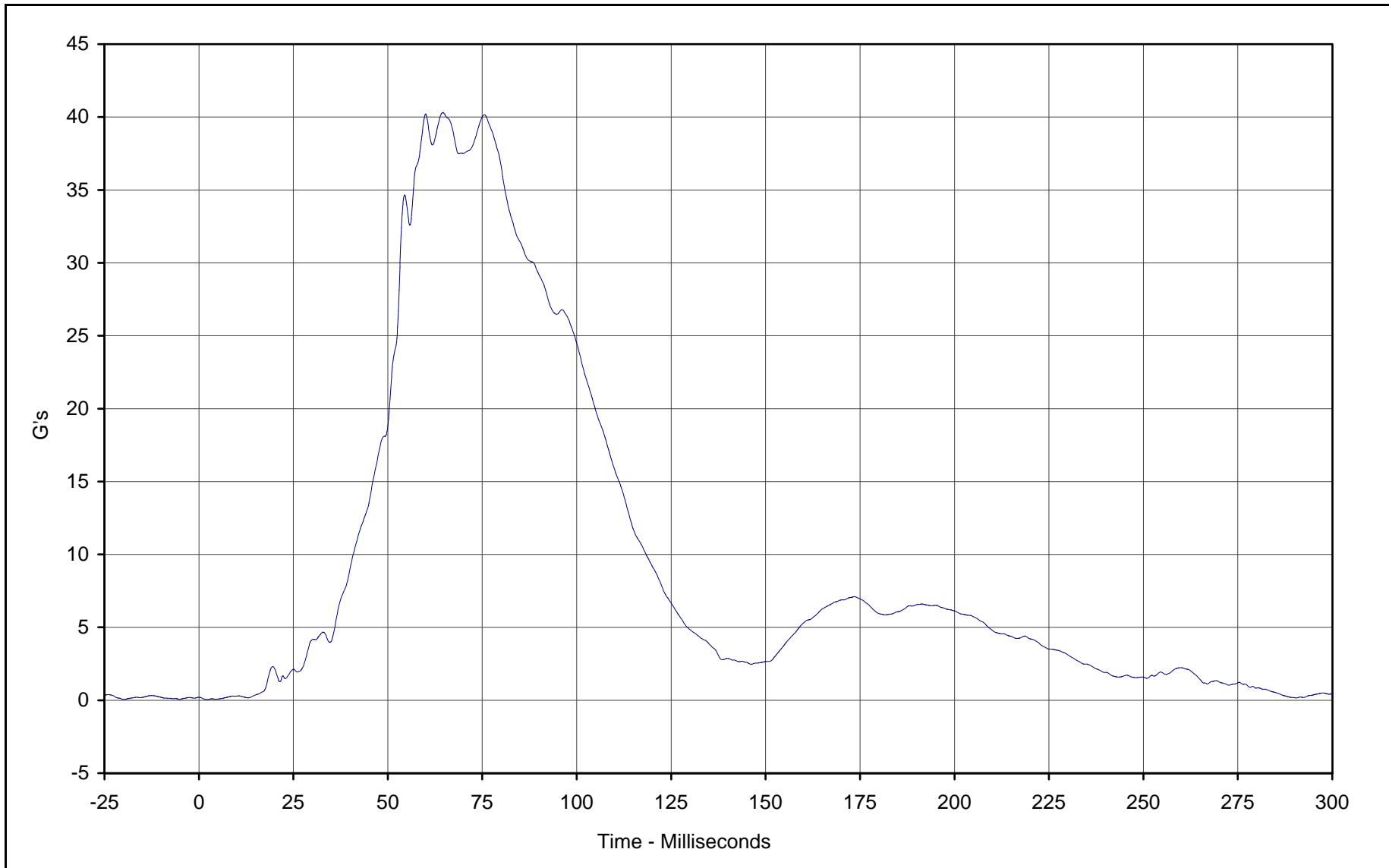
Curve Description: Driver Chest Redundant Z
Maximum Value: 13.0 at 63.7 Milliseconds
Minimum Value: -11.6 at 85.5 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-018

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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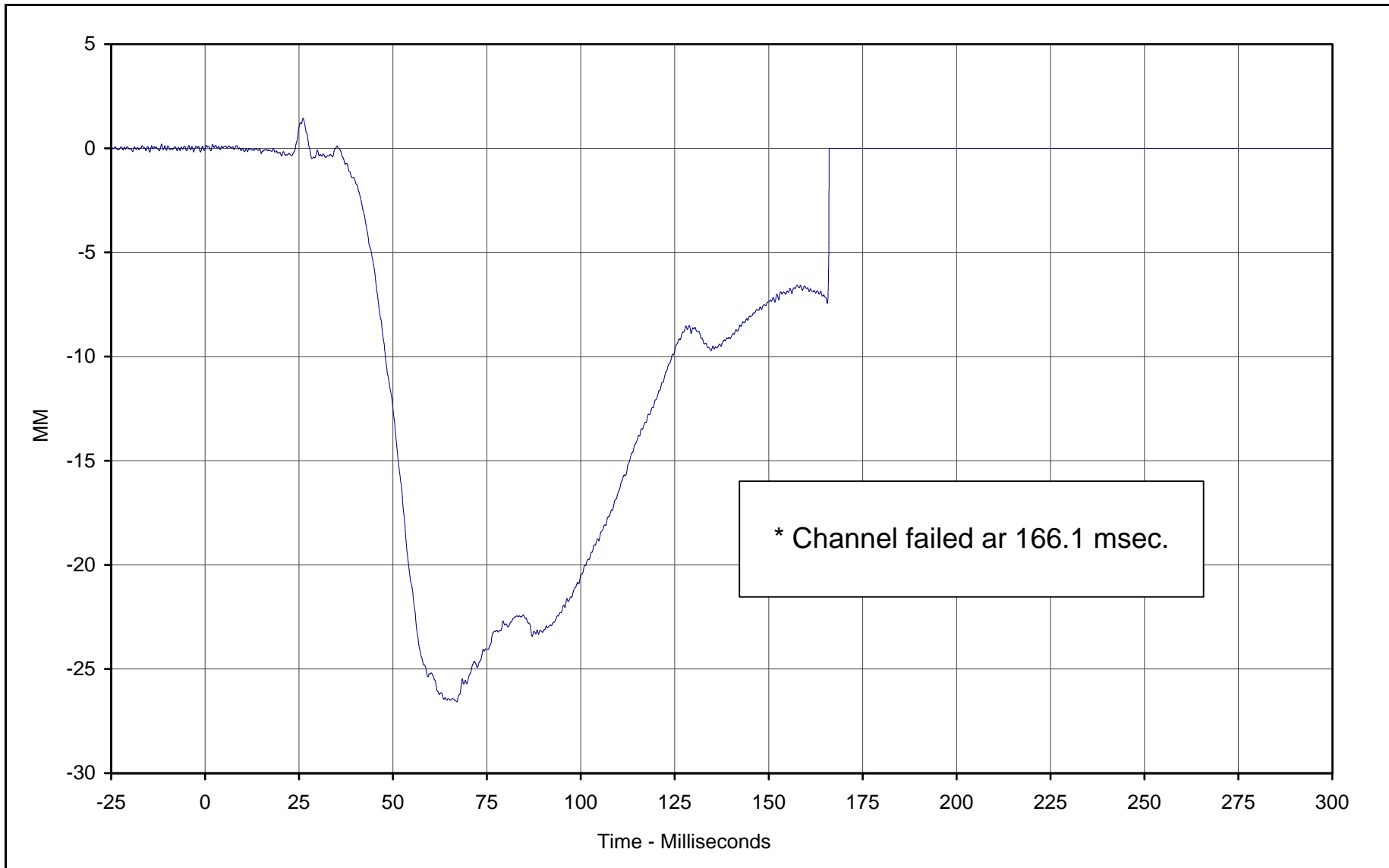
Curve Description: Driver Chest Resultant Redundant
Maximum Value: 40.3 at 64.5 Milliseconds
Minimum Value: 0.1 at 2.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: RES-016

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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* Channel failed ar 166.1 msec.

Curve Description: Driver Chest Displacement X *
Maximum Value: 1.4 at 26.1 Milliseconds
Minimum Value: -26.6 at 67.0 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-019

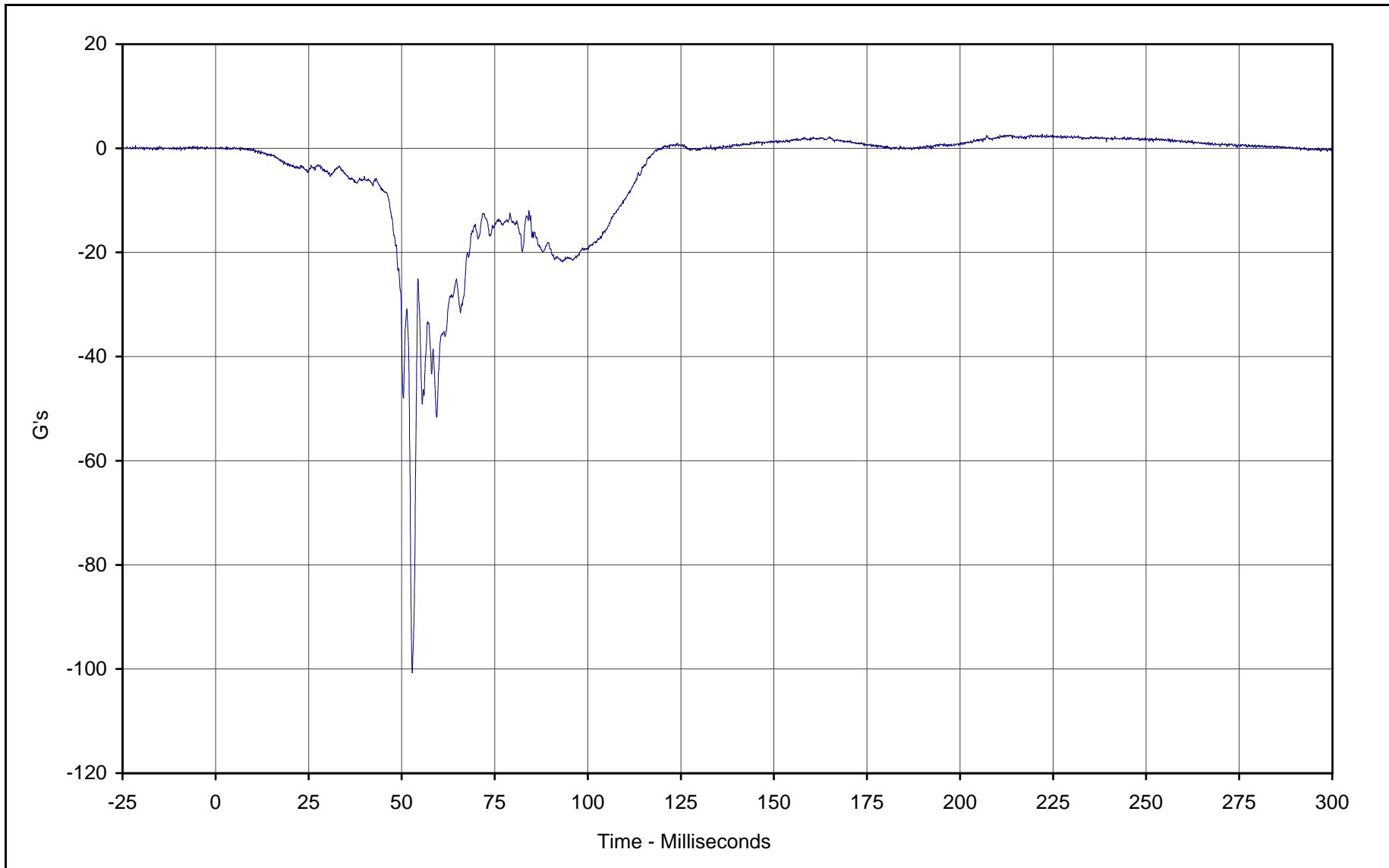
Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

* Channel failed ar 166.1 msec.



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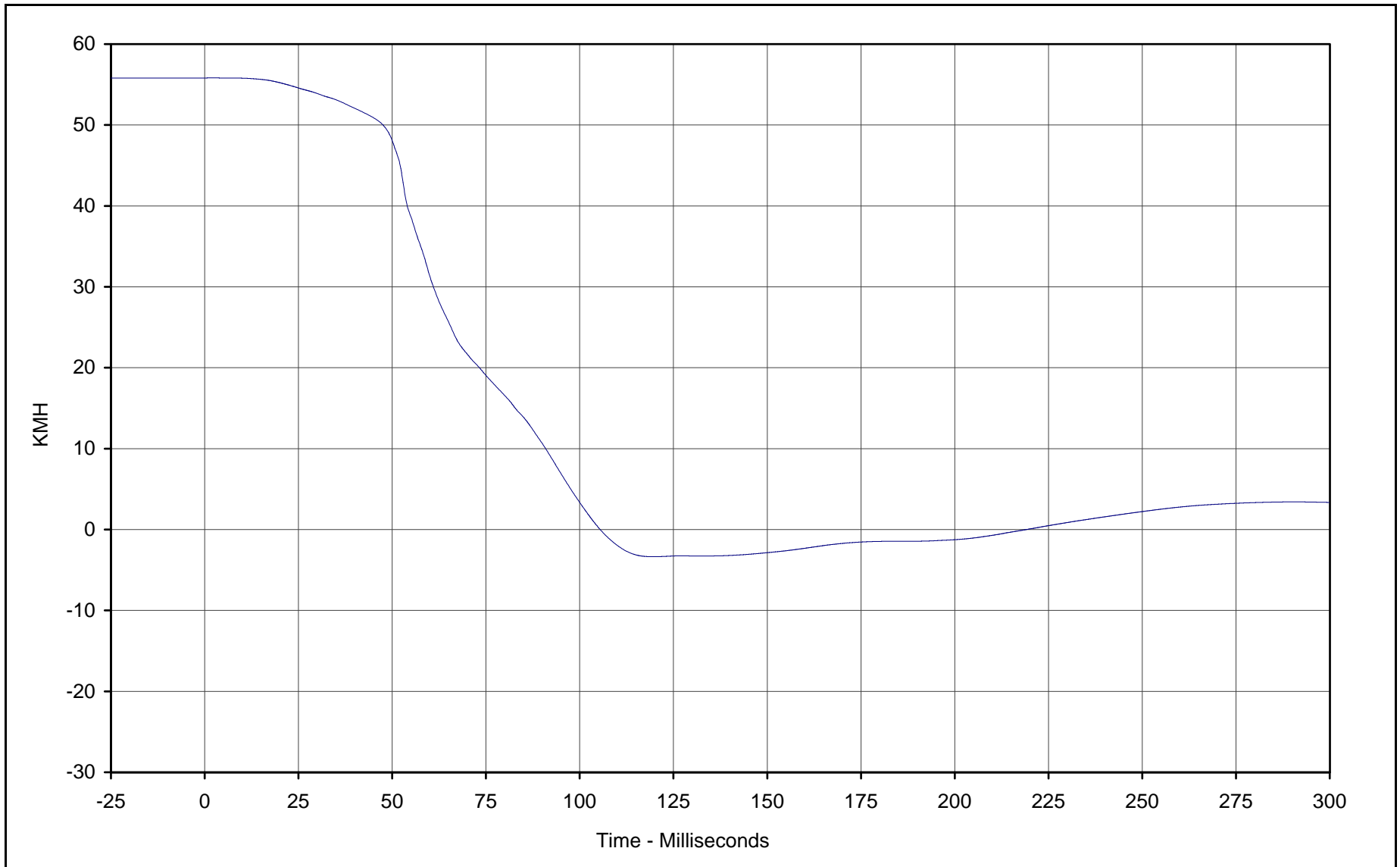
Curve Description: Driver Pelvis X
Maximum Value: 2.7 at 222.1 Milliseconds
Minimum Value: -100.7 at 52.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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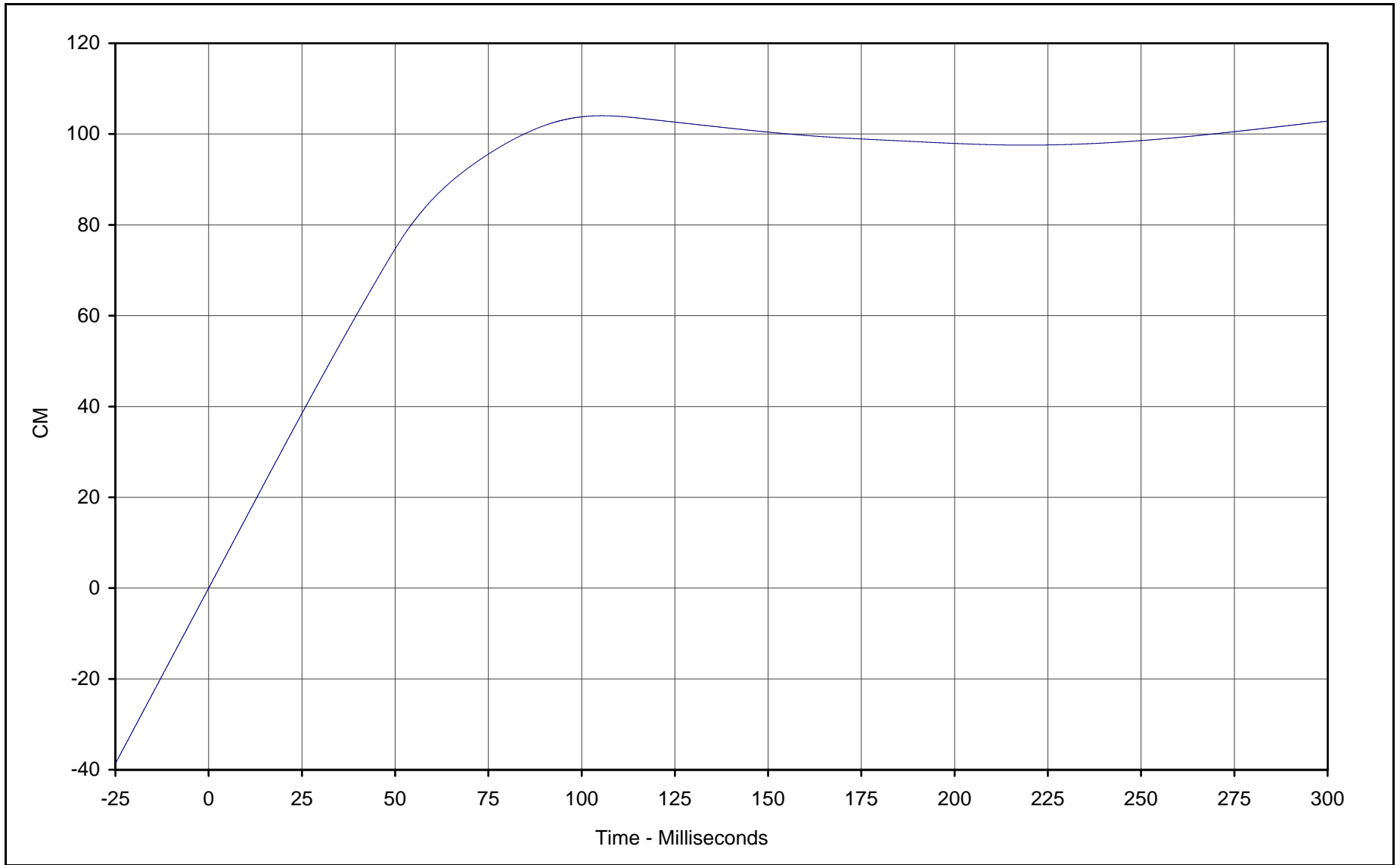
Curve Description: Driver Pelvis X Velocity
Maximum Value: 55.8 at 2.2 Milliseconds
Minimum Value: -3.4 at 119.8 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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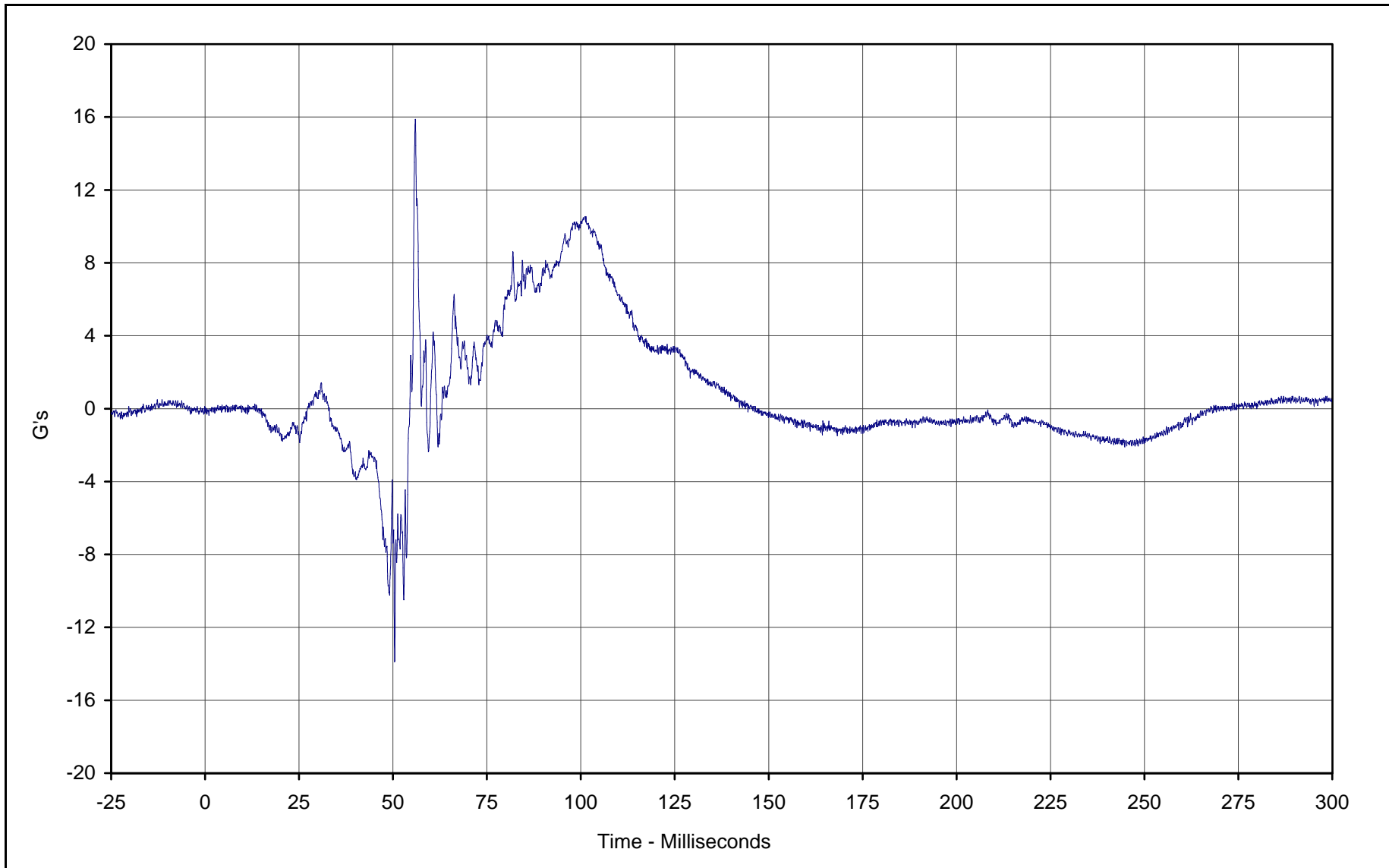
Curve Description: Driver Pelvis X Displ.
Maximum Value: 104.0 at 105.4 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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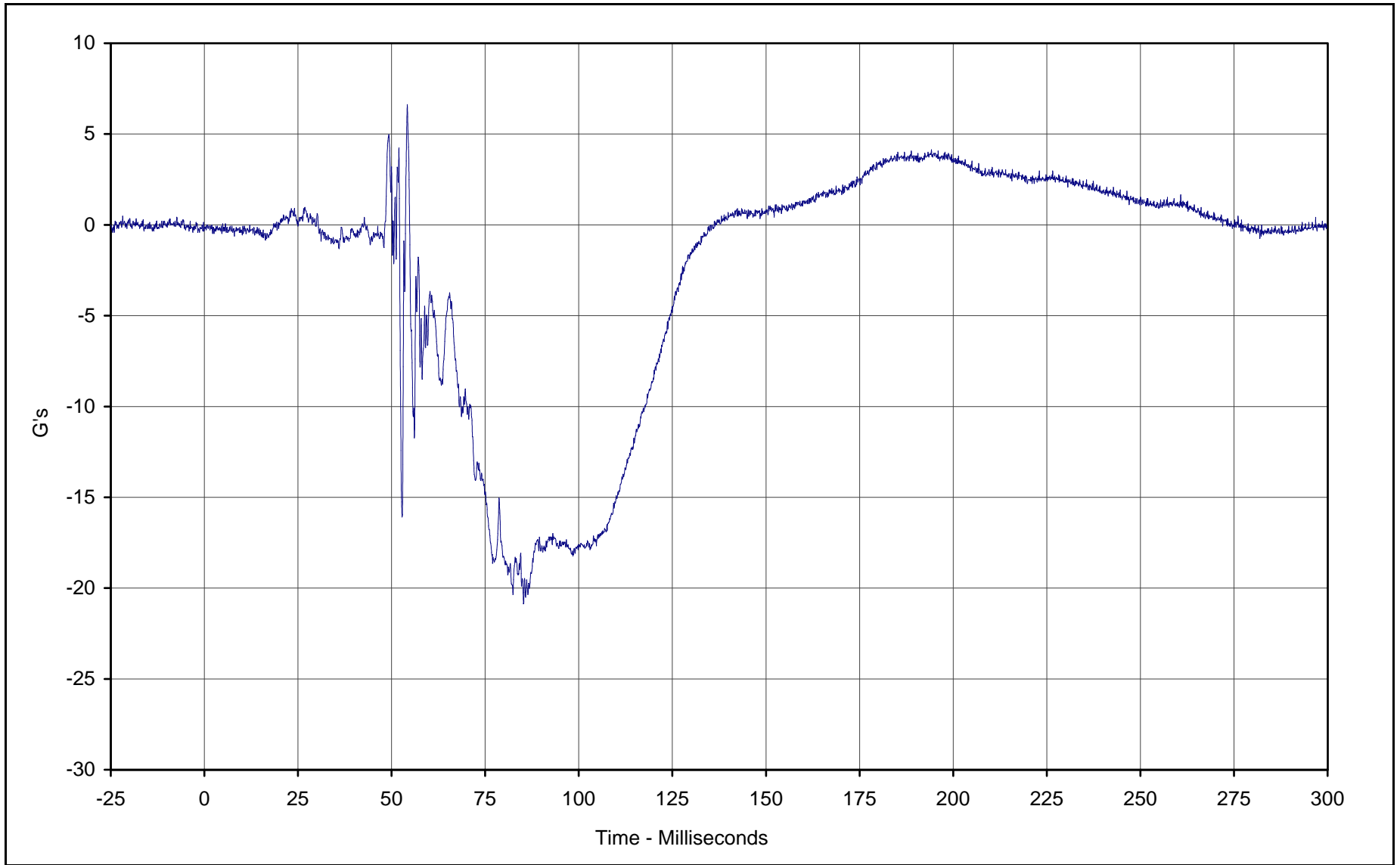
Curve Description: Driver Pelvis Y
Maximum Value: 15.9 at 55.9 Milliseconds
Minimum Value: -13.9 at 50.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-021

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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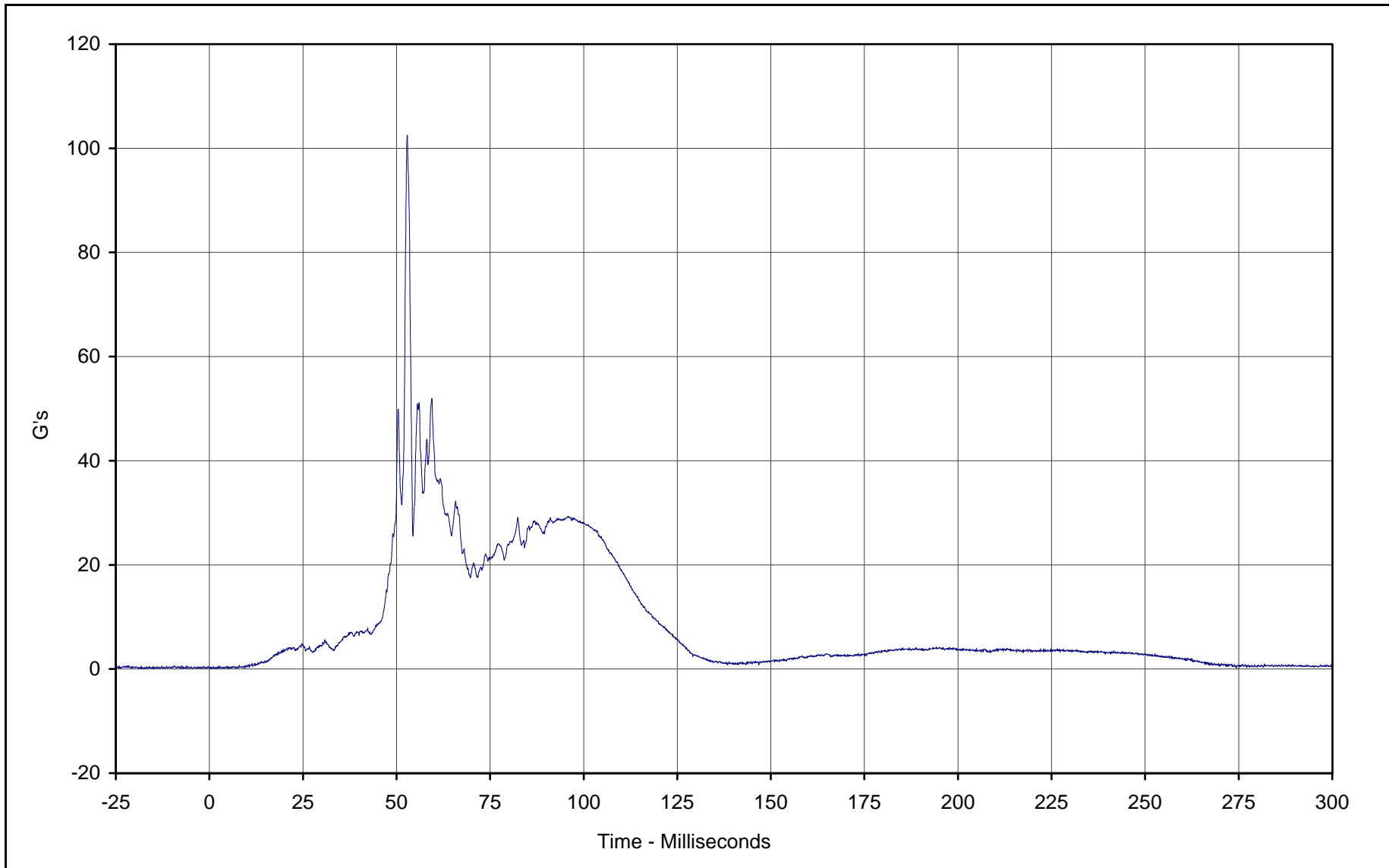
Curve Description: Driver Pelvis Z
Maximum Value: 6.6 at 54.2 Milliseconds
Minimum Value: -20.9 at 85.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-022

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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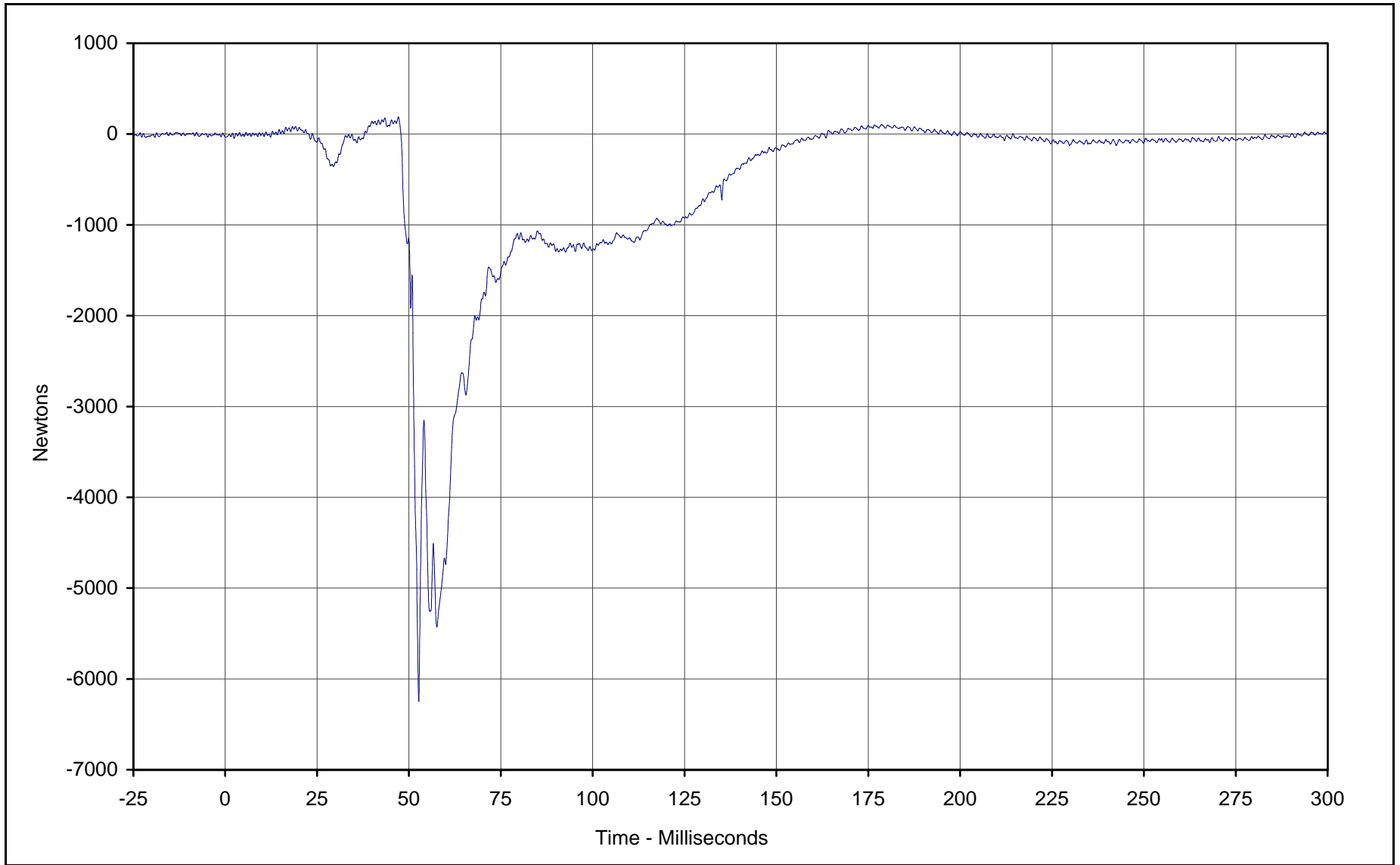
Curve Description: Driver Pelvis Resultant
Maximum Value: 102.5 at 52.8 Milliseconds
Minimum Value: 0.1 at 4.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: RES-020

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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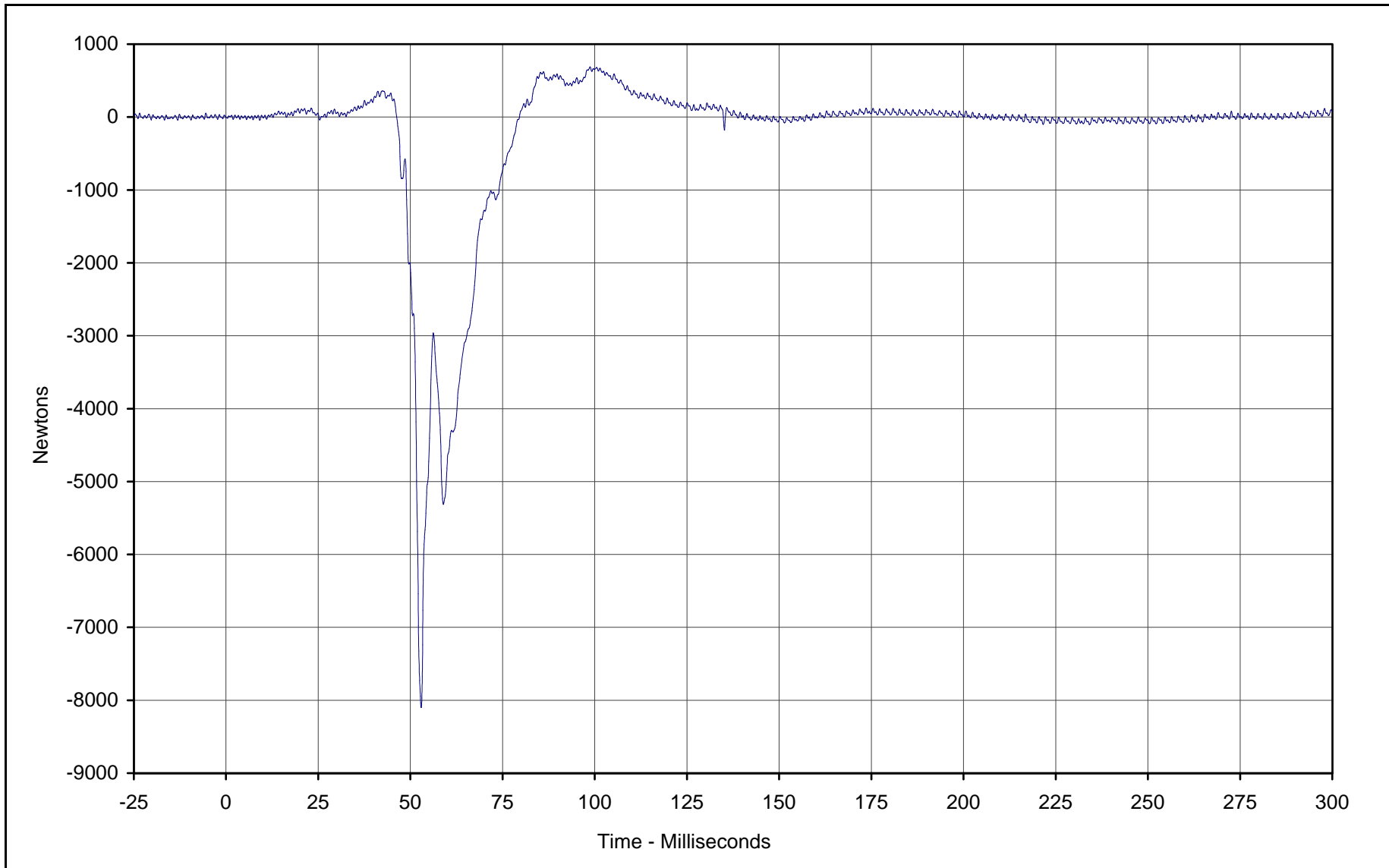
Curve Description: Driver Left Femur Force
Maximum Value: 189.1 at 47.1 Milliseconds
Minimum Value: -6245.3 at 52.7 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-023

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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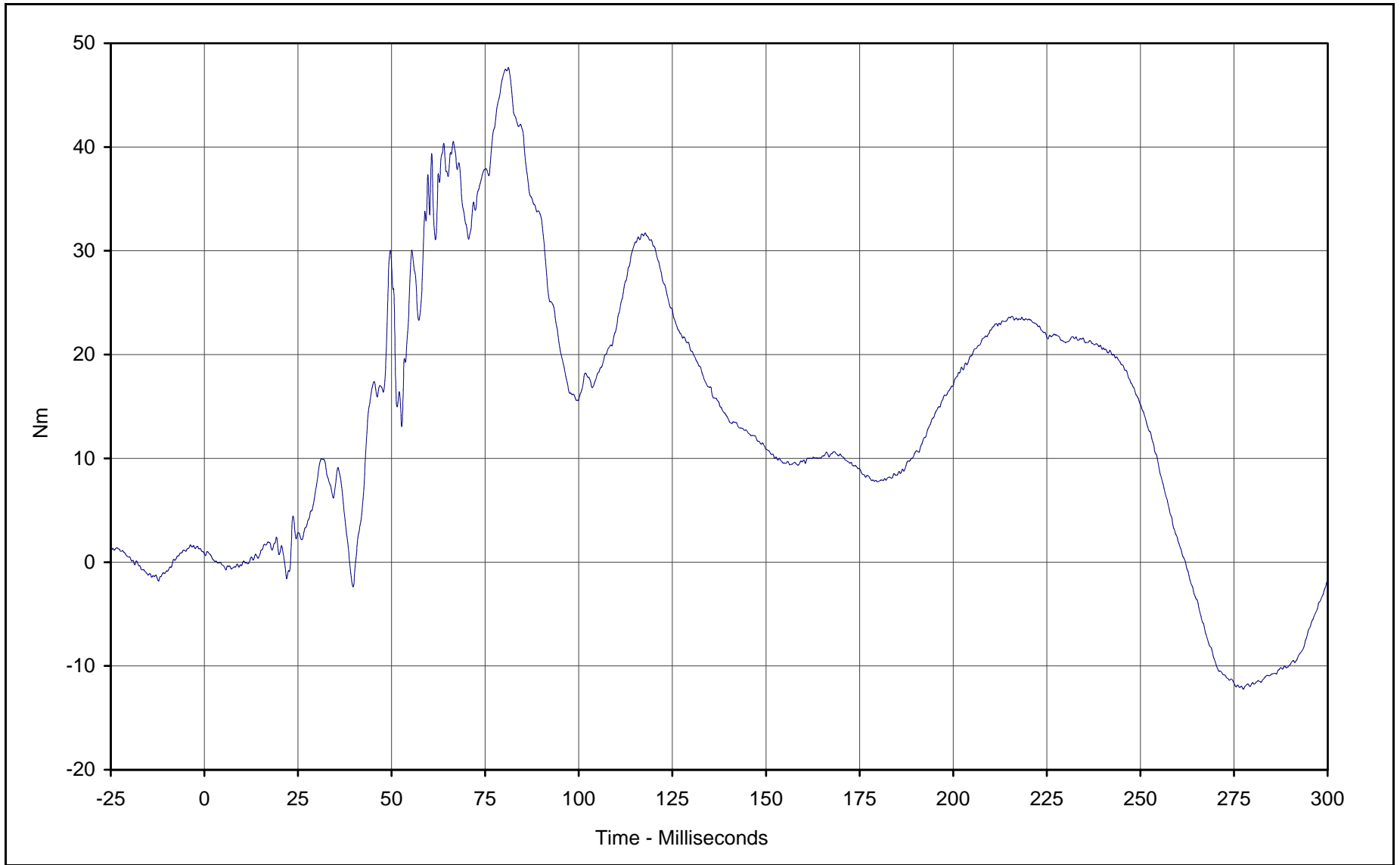
Curve Description: Driver Right Femur Force
Maximum Value: 688.8 at 98.7 Milliseconds
Minimum Value: -8100.3 at 52.9 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-024

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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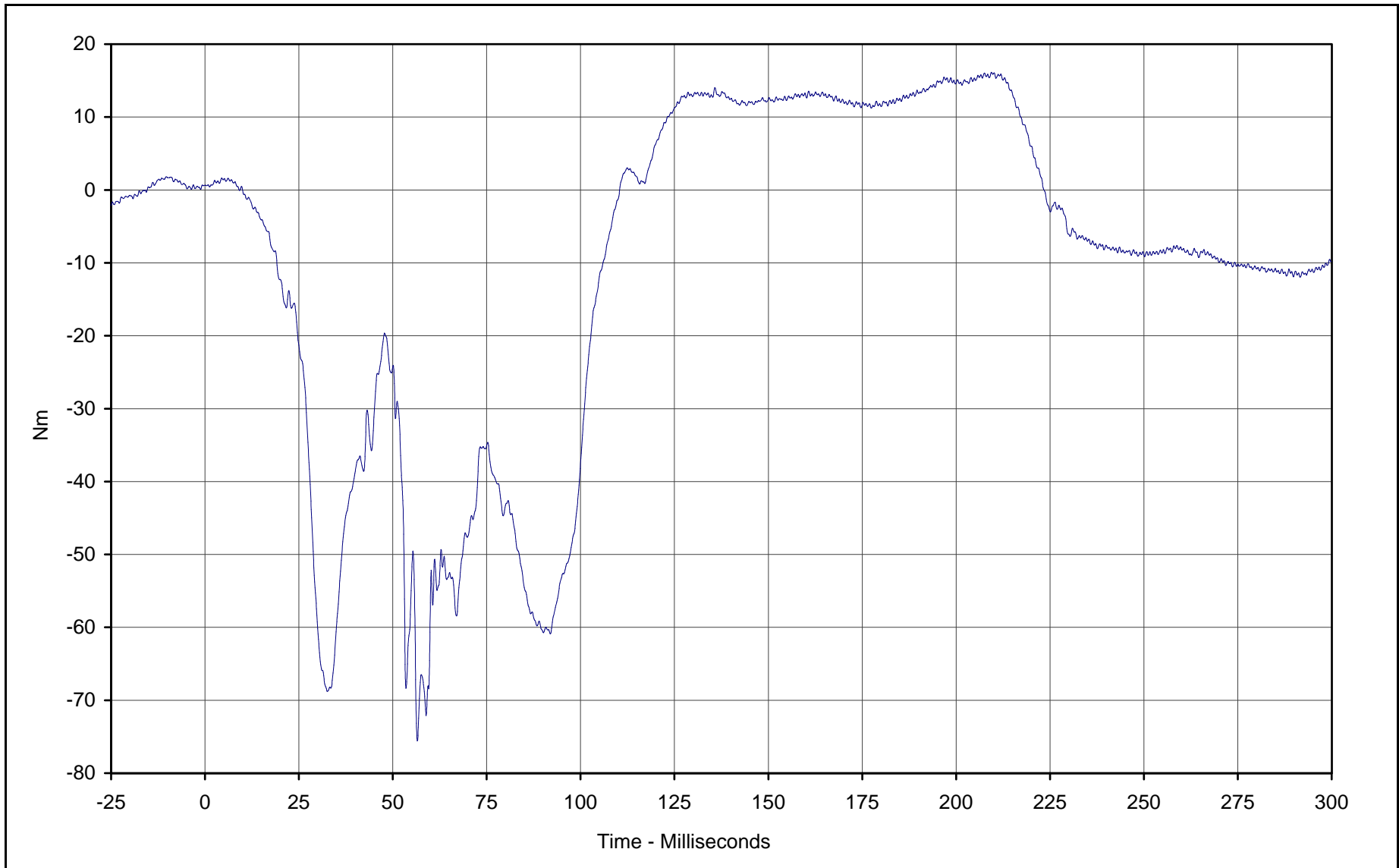
Curve Description: Driver Left Upper Tibia Moment X
Maximum Value: 47.7 at 81.2 Milliseconds
Minimum Value: -12.2 at 277.5 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-025

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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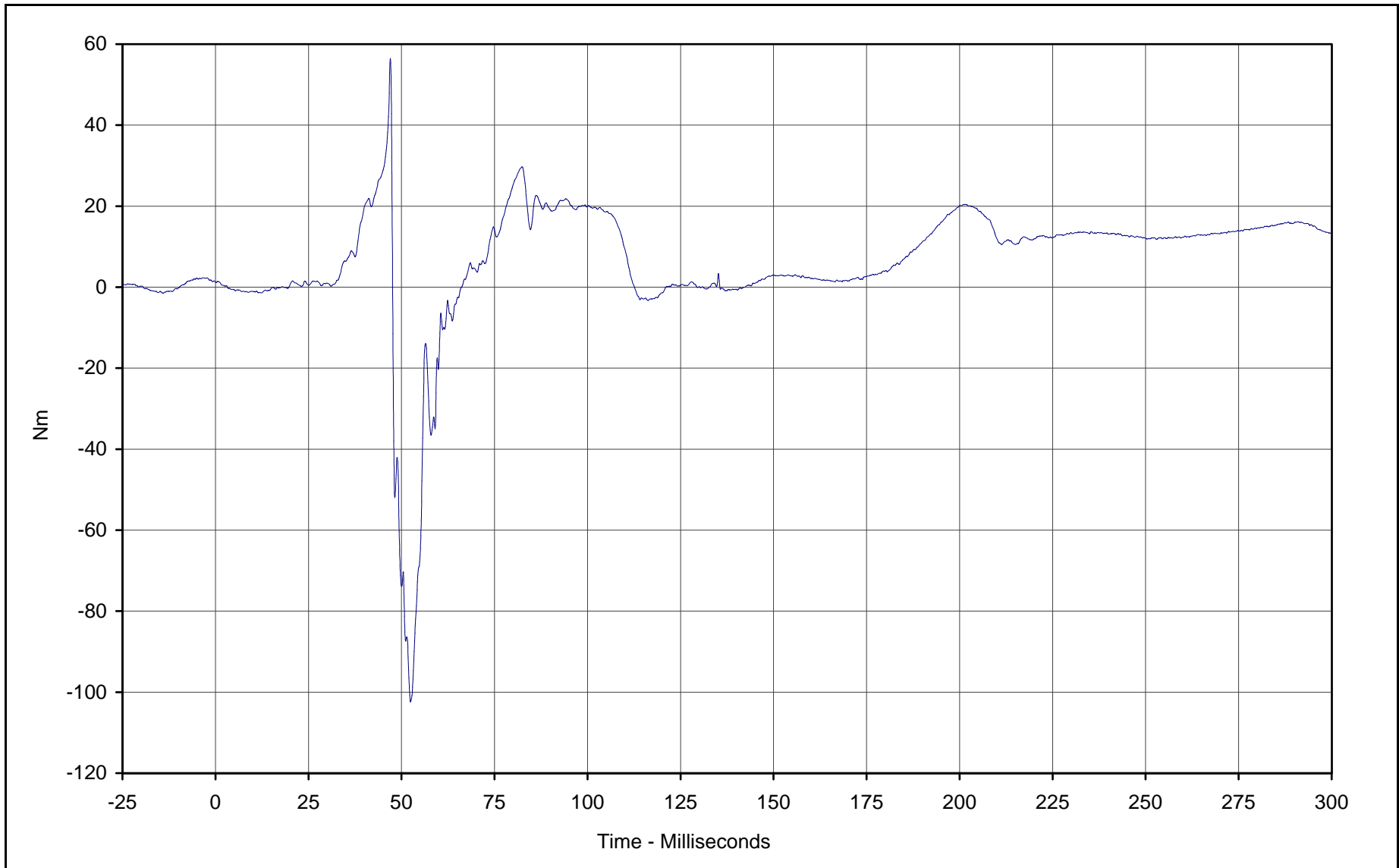
Curve Description: Driver Left Upper Tibia Moment Y
Maximum Value: 16.1 at 209.4 Milliseconds
Minimum Value: -75.6 at 56.5 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-026

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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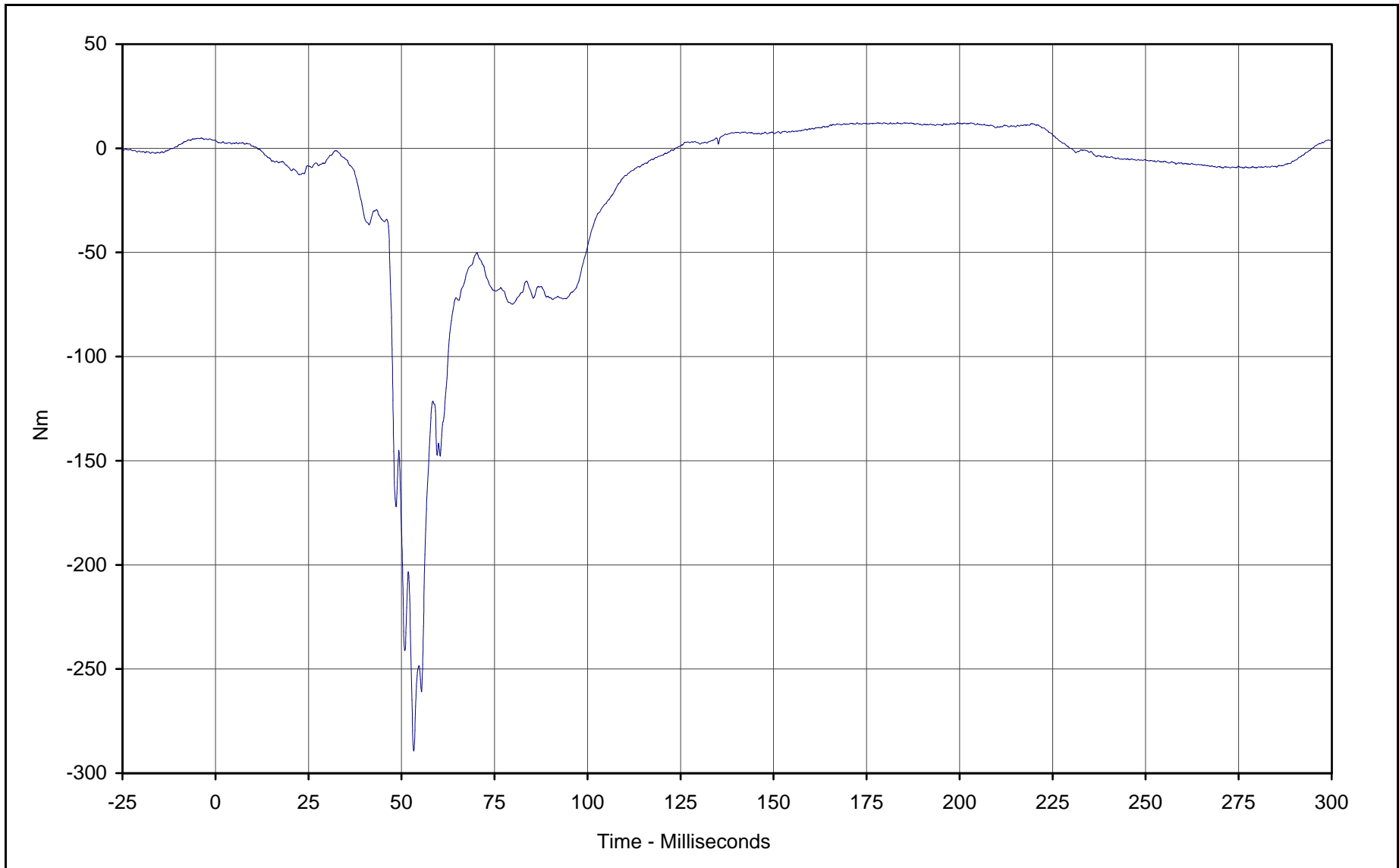
Curve Description: Driver Right Upper Tibia Moment X
Maximum Value: 56.4 at 47.0 Milliseconds
Minimum Value: -102.4 at 52.4 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-027

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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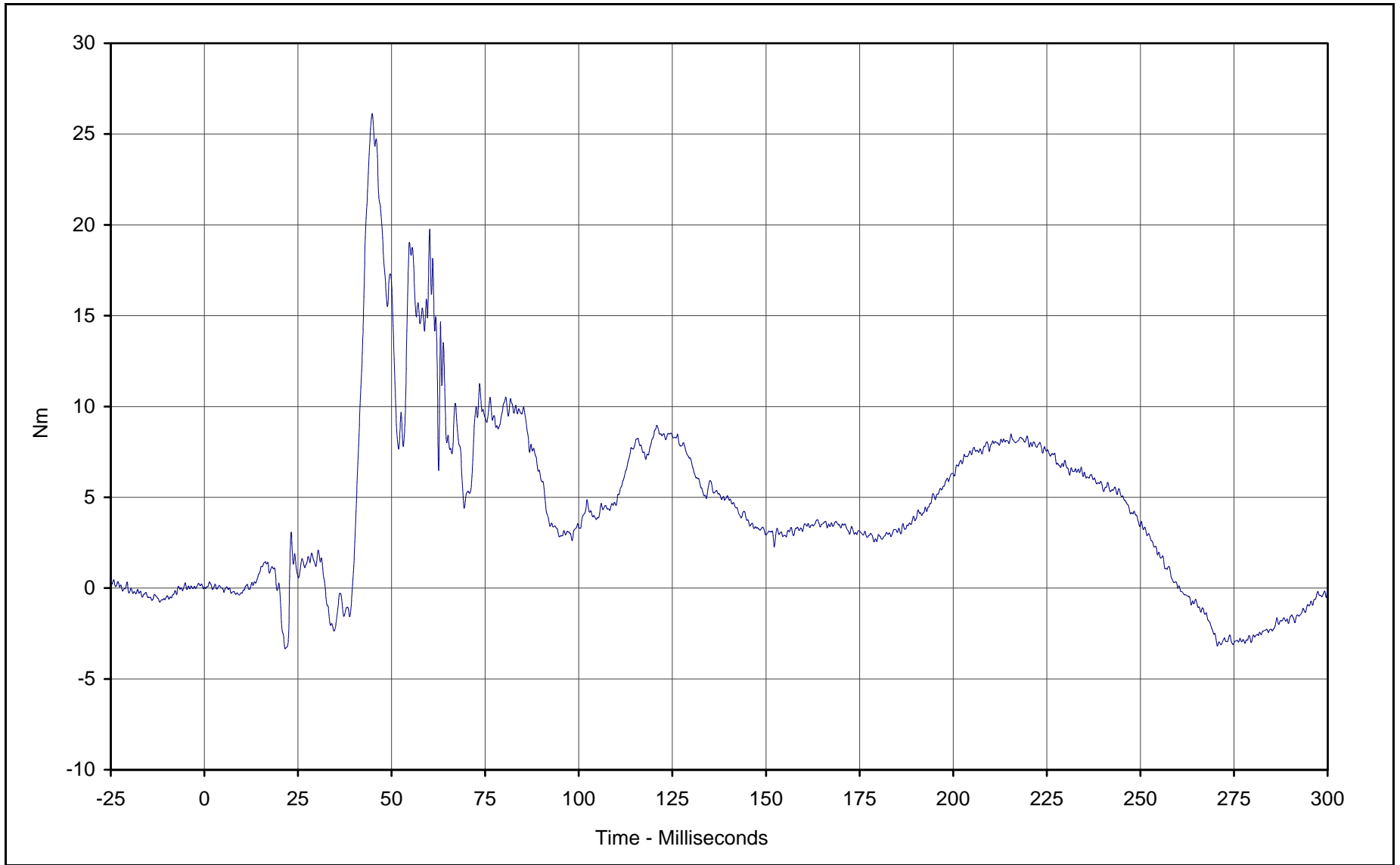
Curve Description: Driver Right Upper Tibia Moment Y
Maximum Value: 12.3 at 179.6 Milliseconds
Minimum Value: -289.4 at 53.3 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-028

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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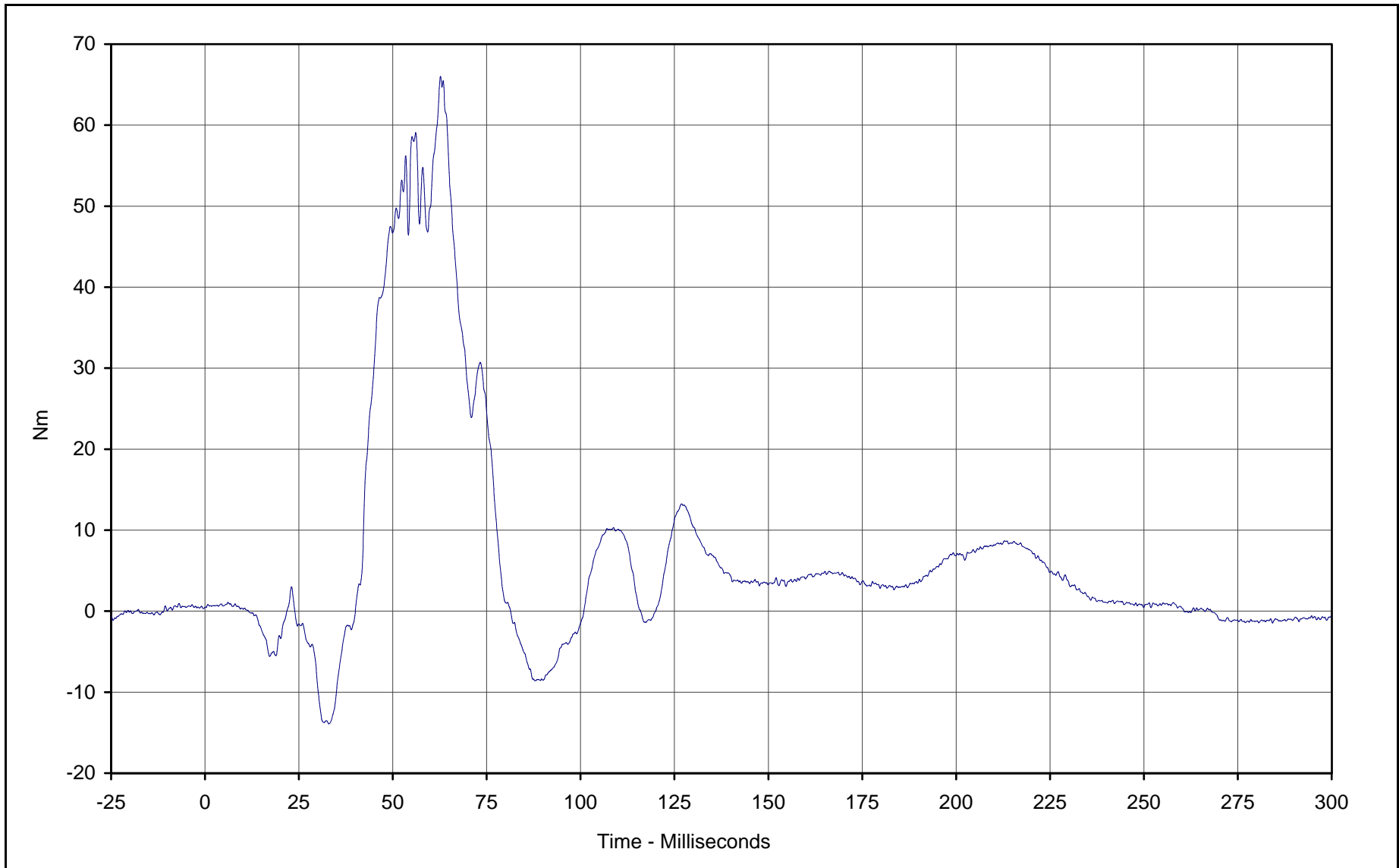
Curve Description: Driver Left Lower Tibia Moment X
Maximum Value: 26.1 at 44.8 Milliseconds
Minimum Value: -3.3 at 21.6 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-029

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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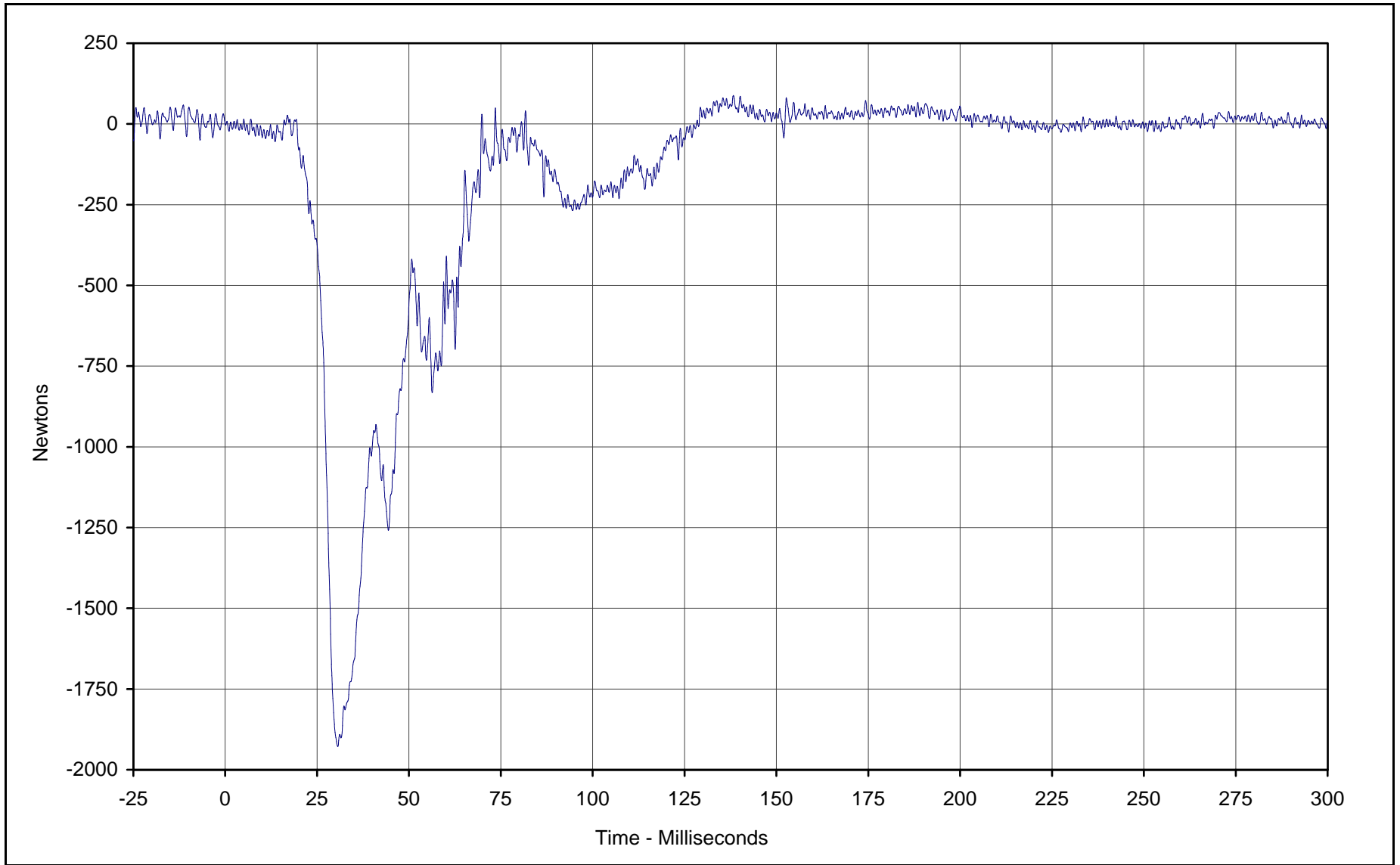
Curve Description: Driver Left Lower Tibia Moment Y
Maximum Value: 66.0 at 62.7 Milliseconds
Minimum Value: -13.9 at 33.0 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-030

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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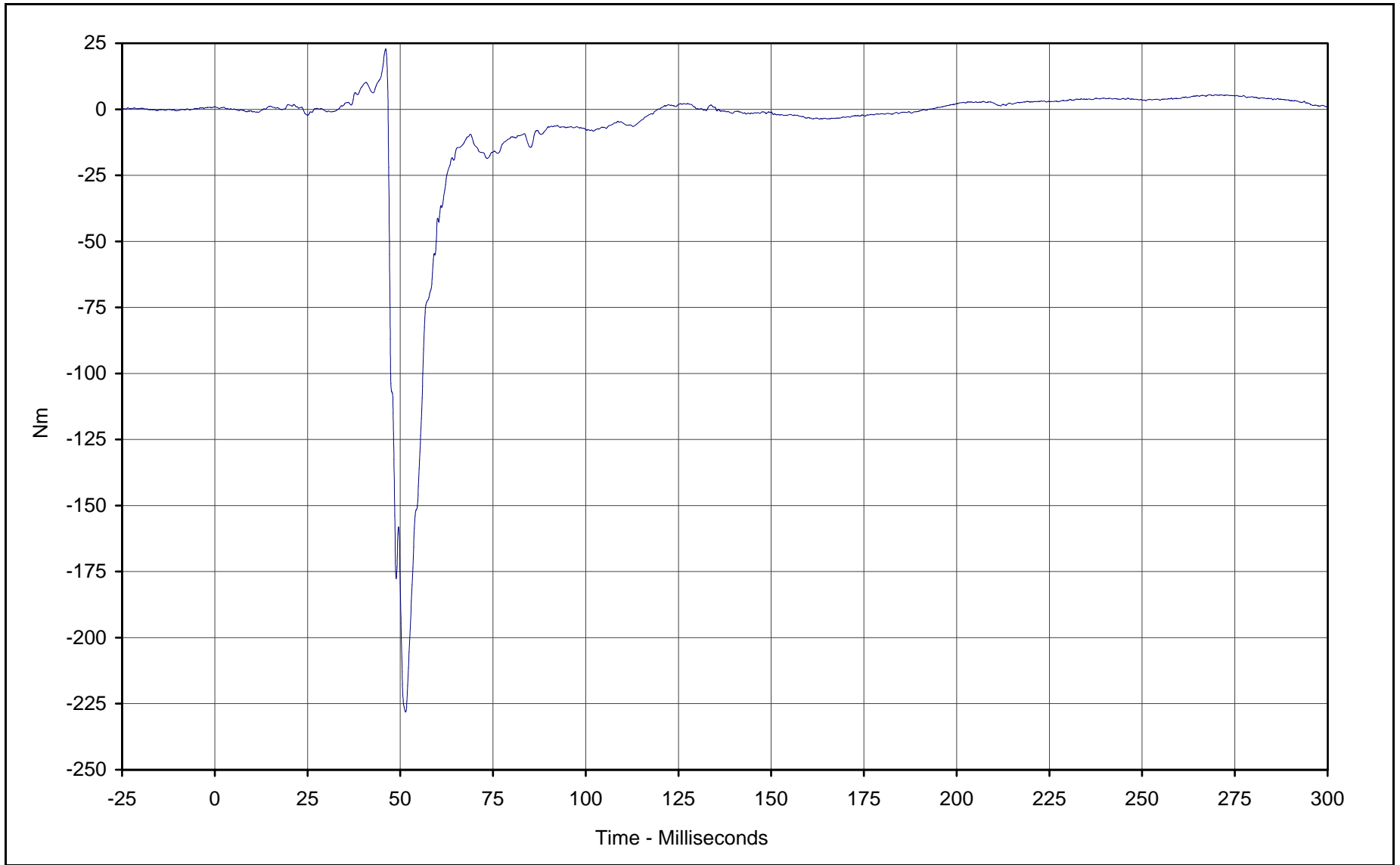
Curve Description: Driver Left Lower Tibia Force Z
Maximum Value: 88.5 at 138.3 Milliseconds
Minimum Value: -1928.3 at 30.6 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-031

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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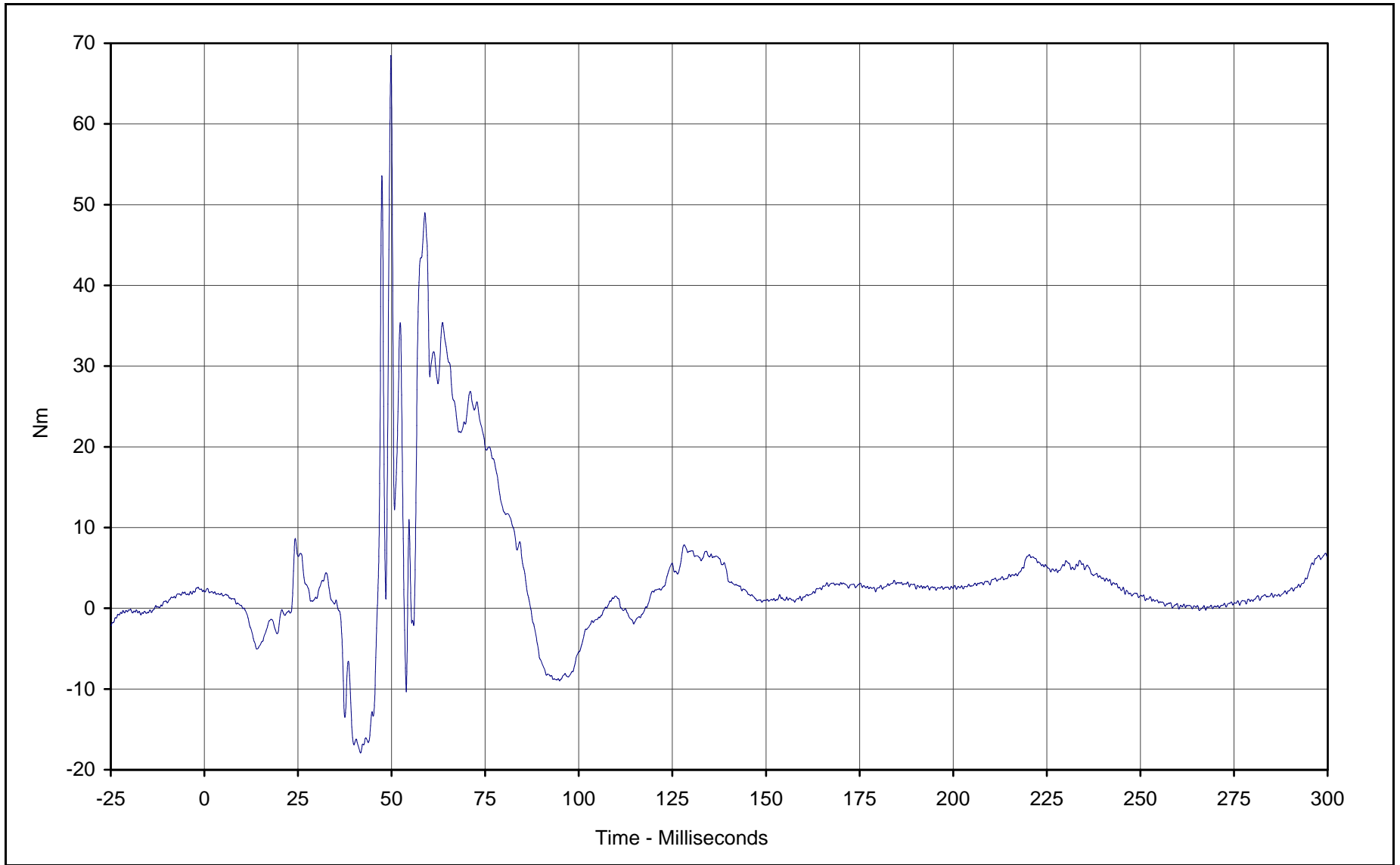
Curve Description: Driver Right Lower Tibia Moment X
Maximum Value: 22.9 at 46.1 Milliseconds
Minimum Value: -228.2 at 51.4 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-032

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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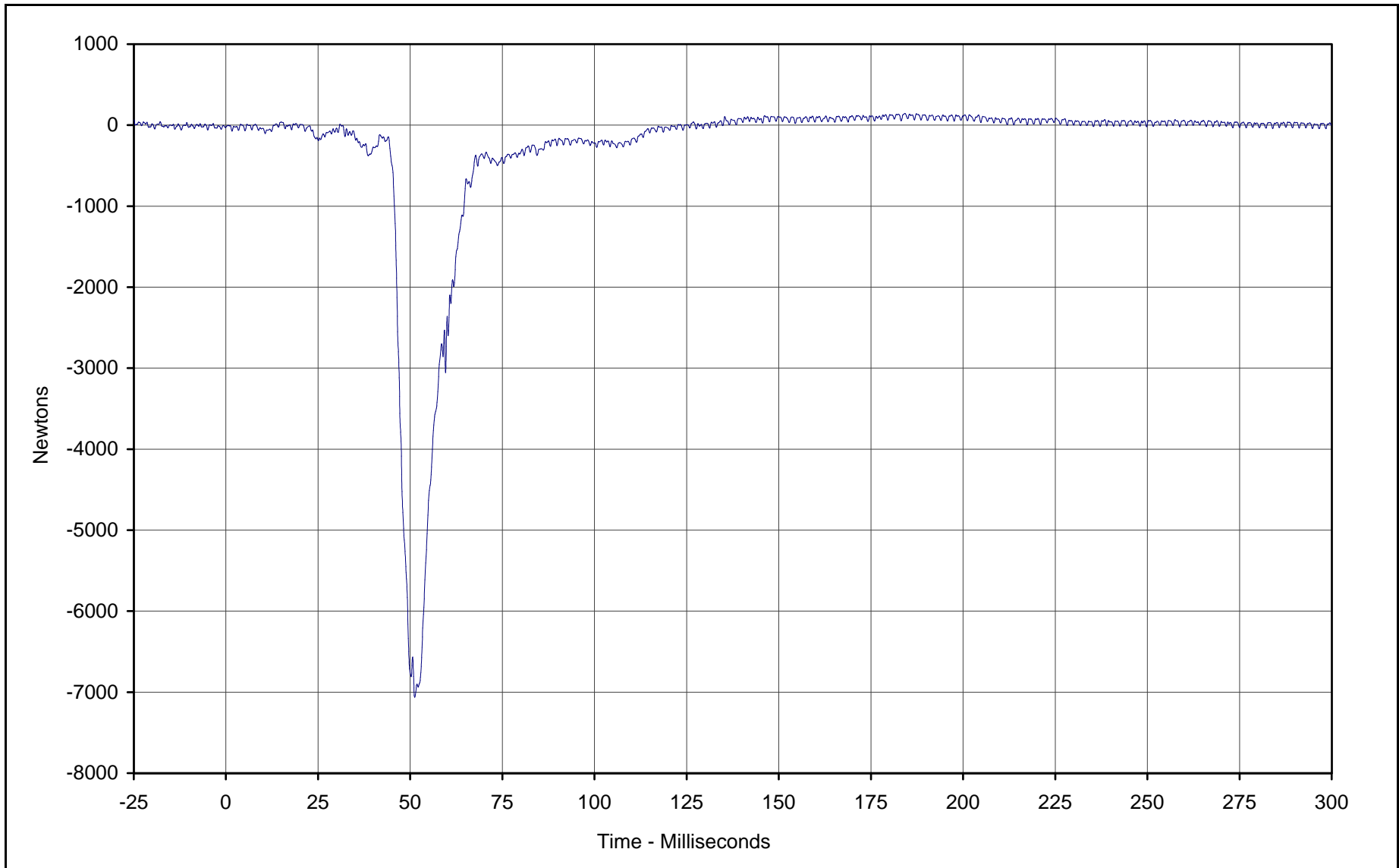
Curve Description: Driver Right Lower Tibia Moment Y
Maximum Value: 68.4 at 49.8 Milliseconds
Minimum Value: -17.9 at 41.7 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-033

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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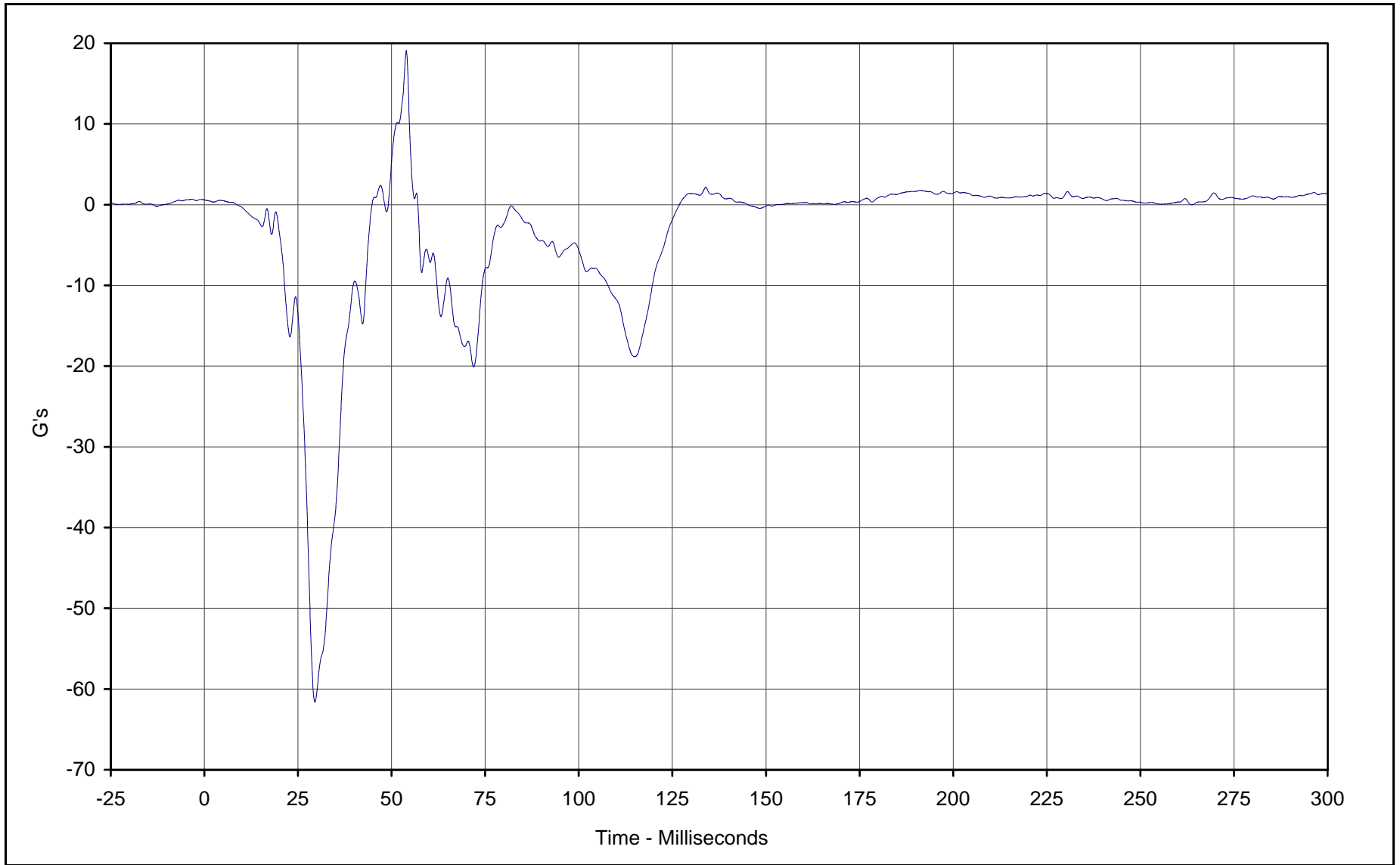
Curve Description: Driver Right Lower Tibia Force Z
Maximum Value: 144.5 at 184.2 Milliseconds
Minimum Value: -7064.4 at 51.2 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-034

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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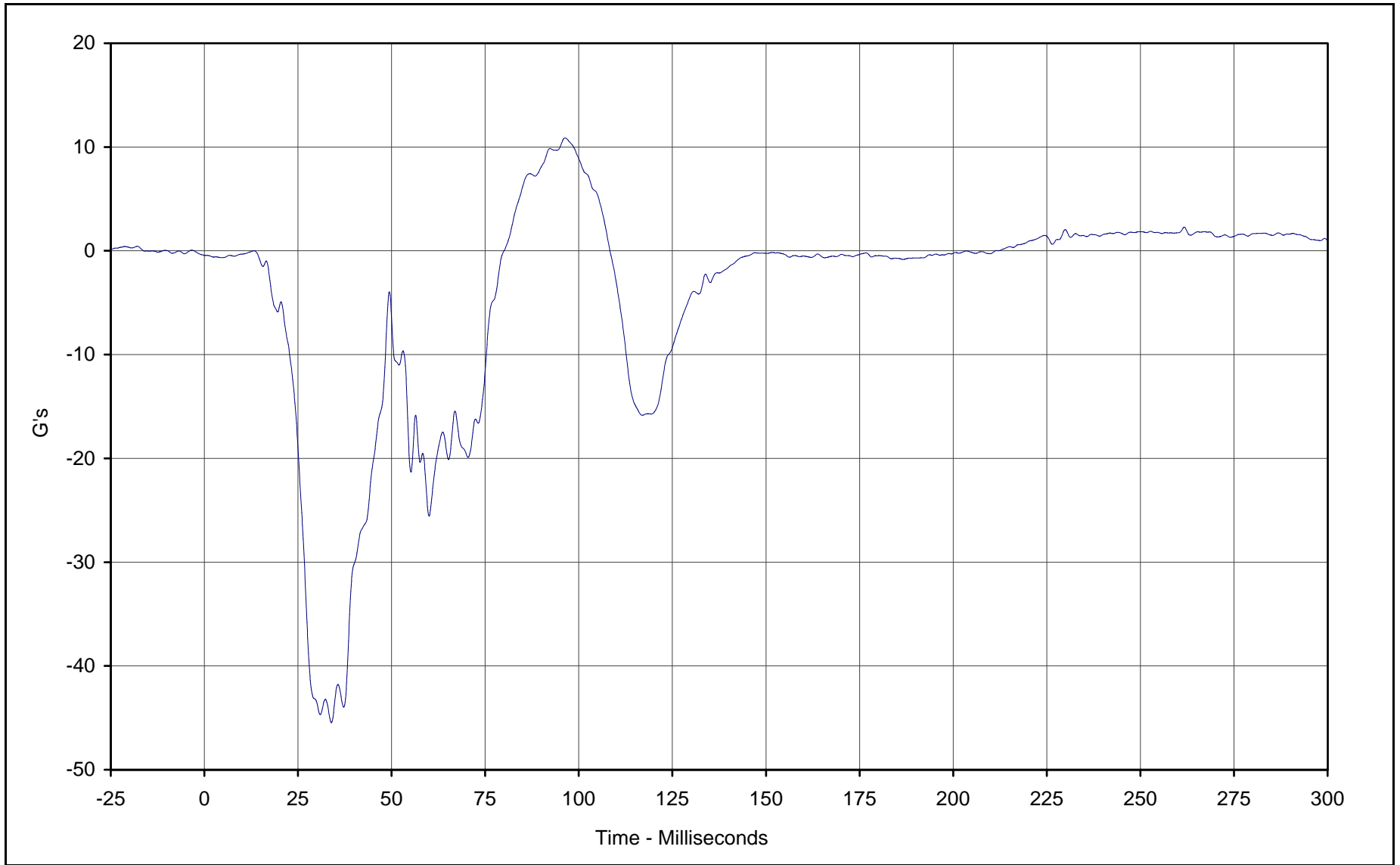
Curve Description: Driver Left Foot Aft X
Maximum Value: 19.1 at 53.9 Milliseconds
Minimum Value: -61.6 at 29.5 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-035

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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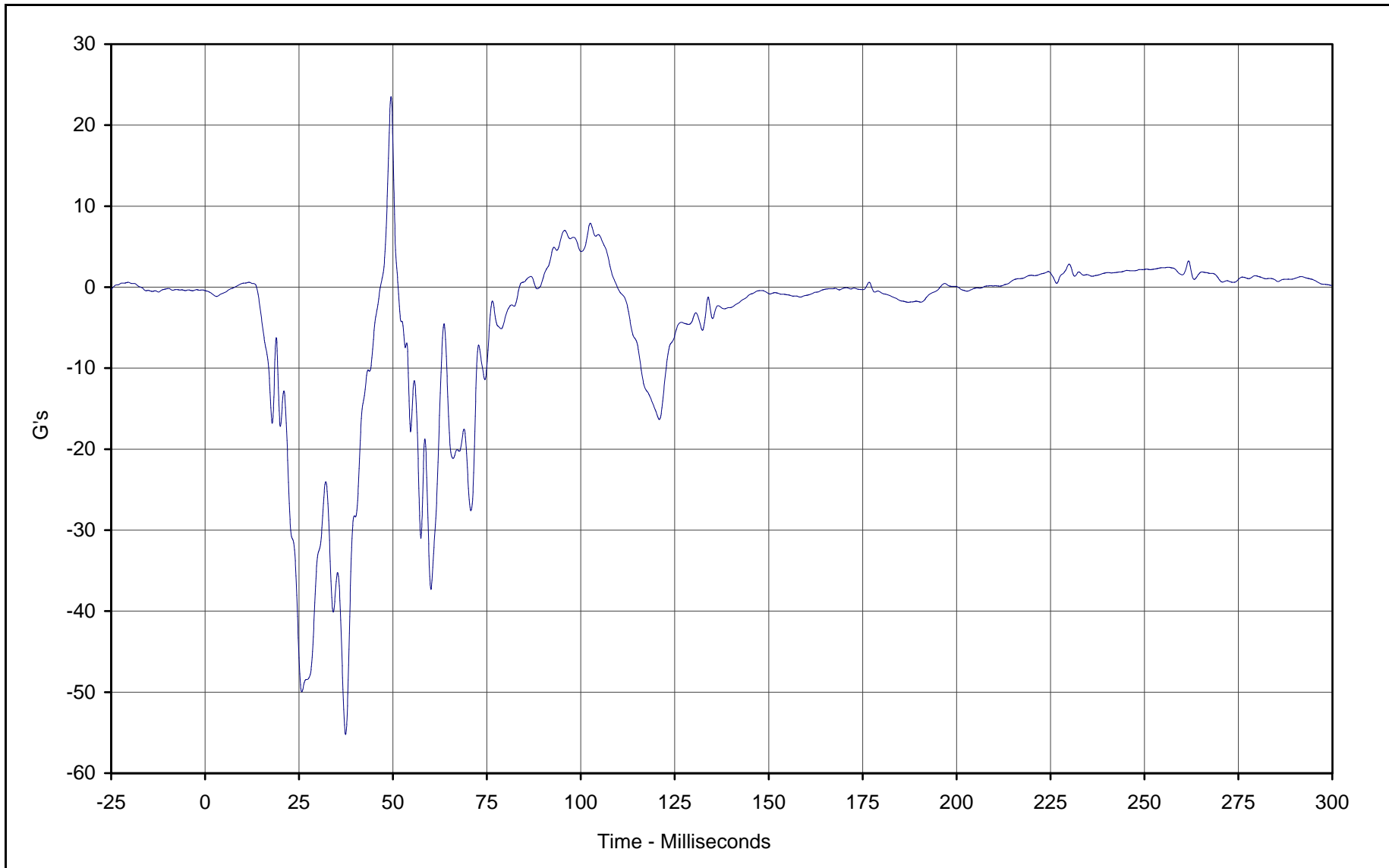
Curve Description: Driver Left Foot Aft Z
Maximum Value: 10.9 at 96.3 Milliseconds
Minimum Value: -45.5 at 33.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-036

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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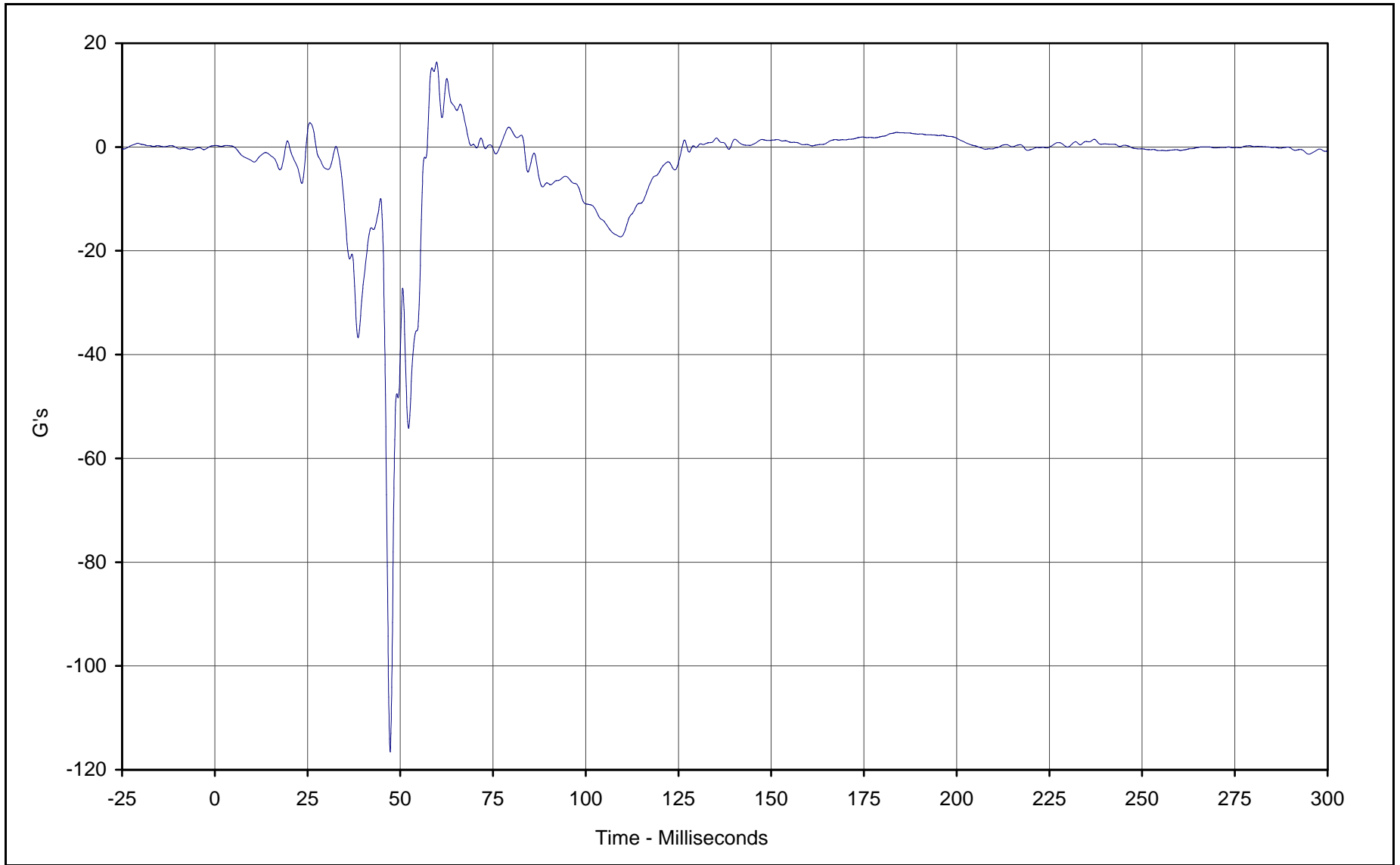
Curve Description: Driver Left Foot Fore Z
Maximum Value: 23.5 at 49.5 Milliseconds
Minimum Value: -55.2 at 37.4 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-037

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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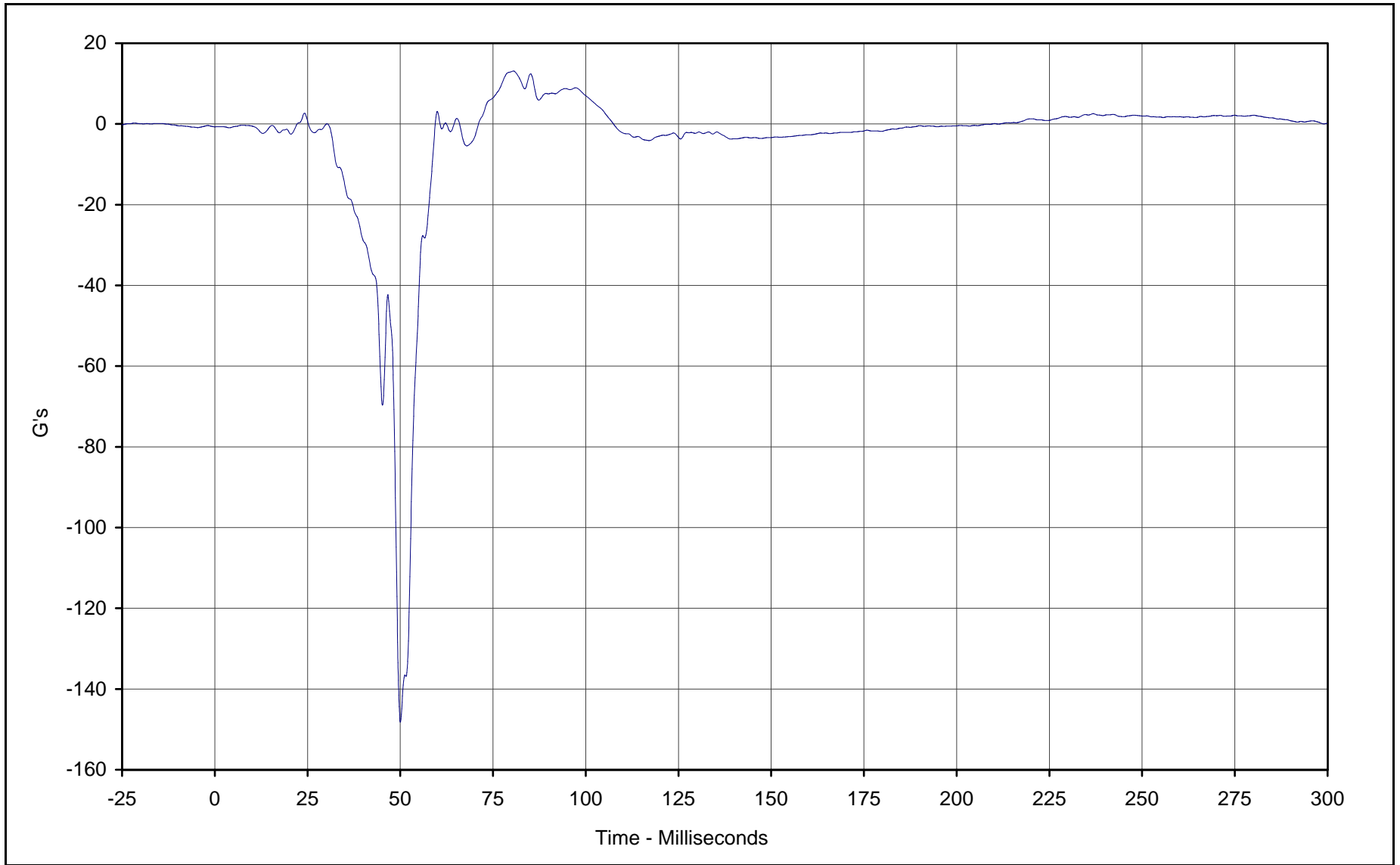
Curve Description: Driver Right Foot Aft X
Maximum Value: 16.4 at 59.8 Milliseconds
Minimum Value: -116.6 at 47.3 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-038

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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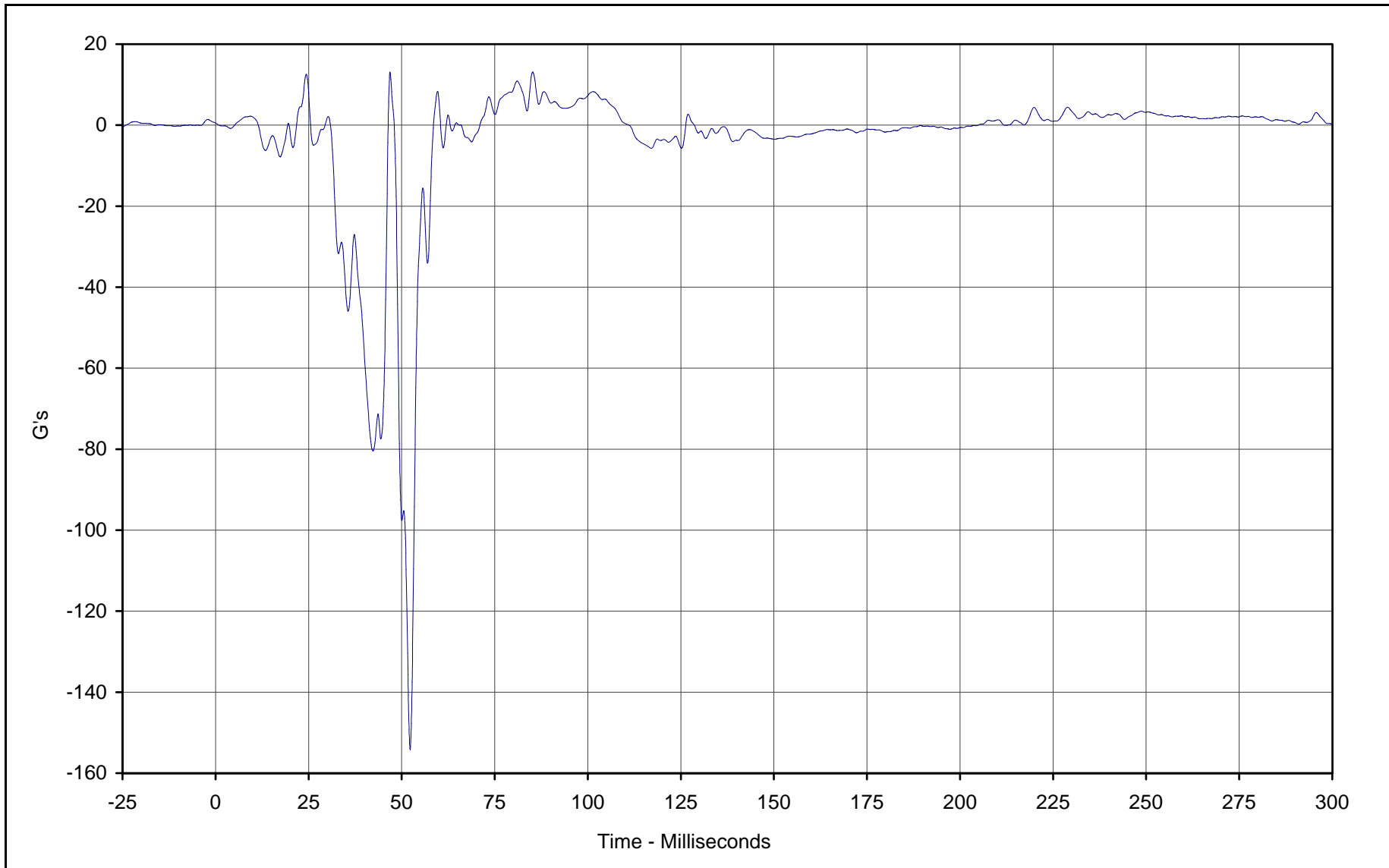
Curve Description: Driver Right Foot Aft Z
Maximum Value: 13.1 at 80.5 Milliseconds
Minimum Value: -148.2 at 50.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-039

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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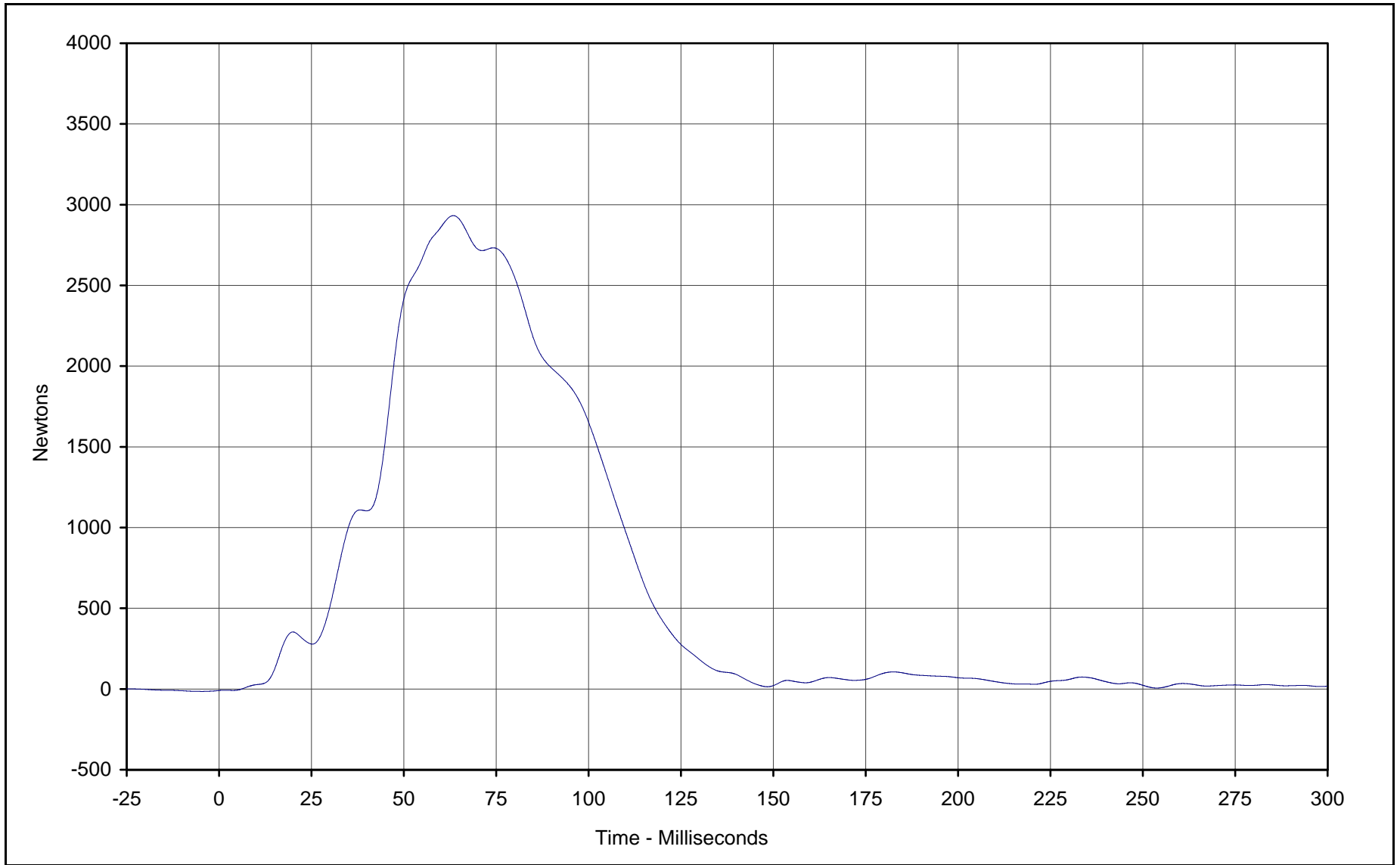
Curve Description: Driver Right Foot Fore Z
Maximum Value: 13.1 at 85.2 Milliseconds
Minimum Value: -154.3 at 52.3 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-040

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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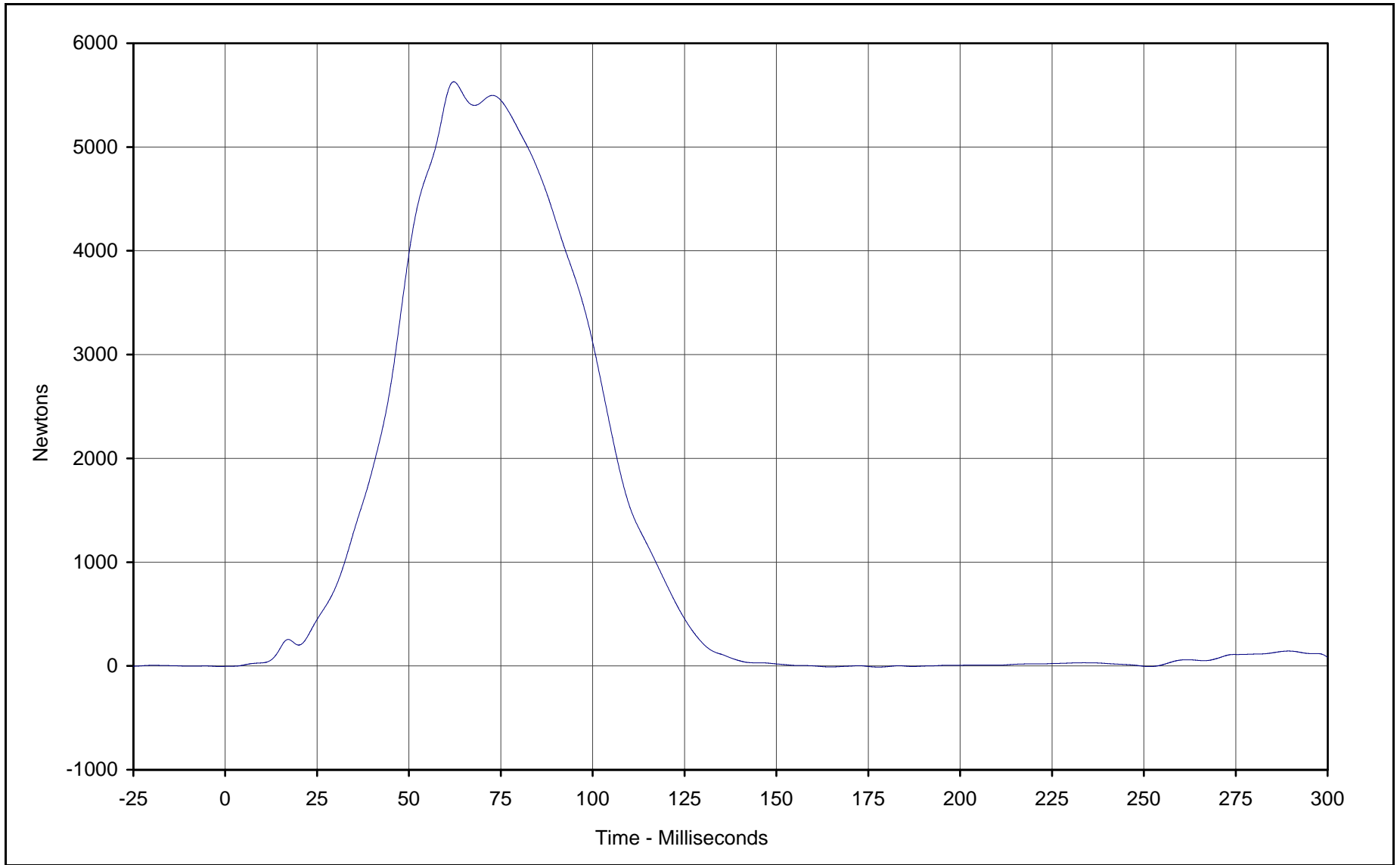
Curve Description: Driver Lap Belt Force
Maximum Value: 2932.2 at 63.4 Milliseconds
Minimum Value: -9.3 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-041

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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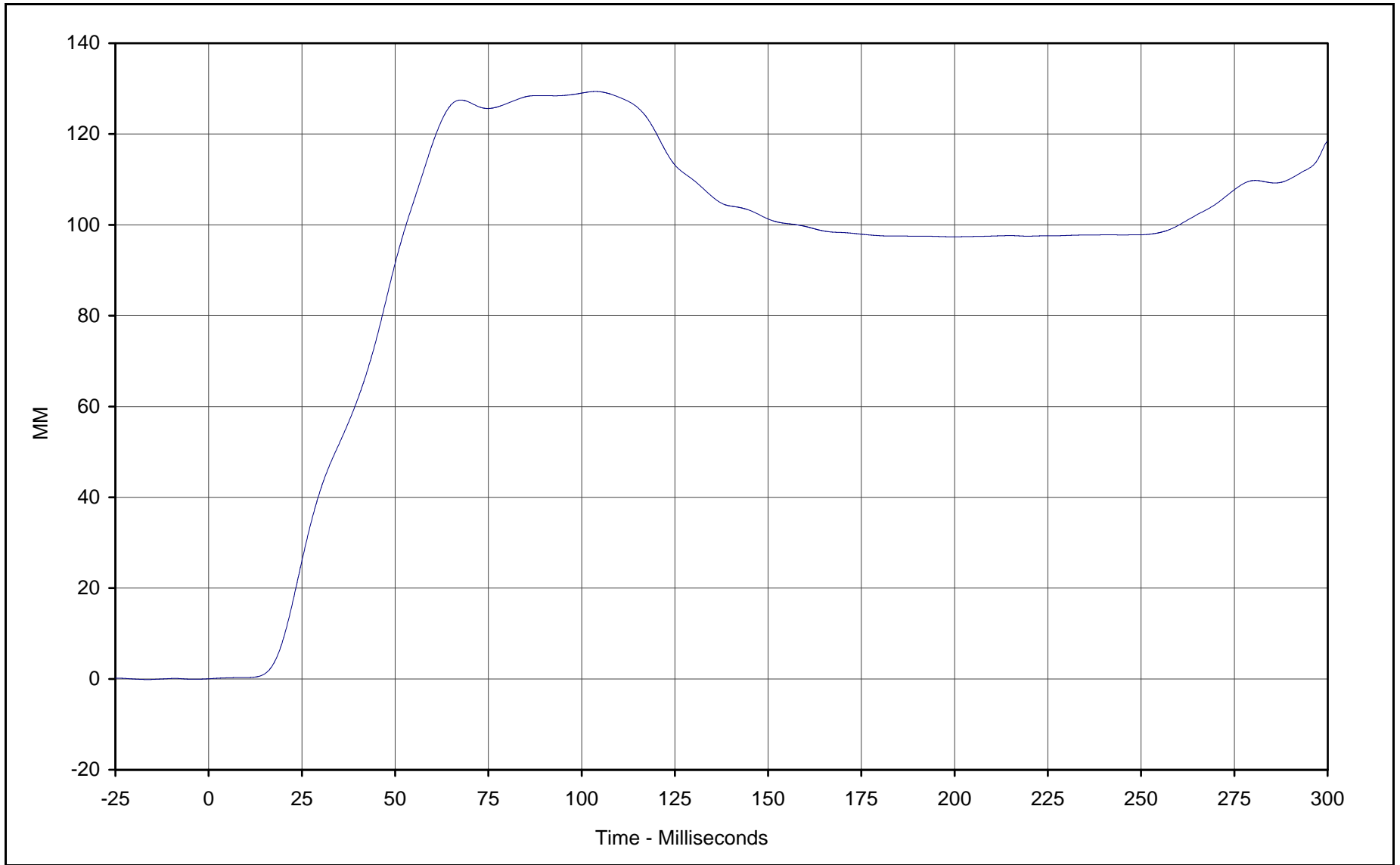
Curve Description: Driver Shoulder Belt Force
Maximum Value: 5629.2 at 62.2 Milliseconds
Minimum Value: -10.7 at 177.8 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-042

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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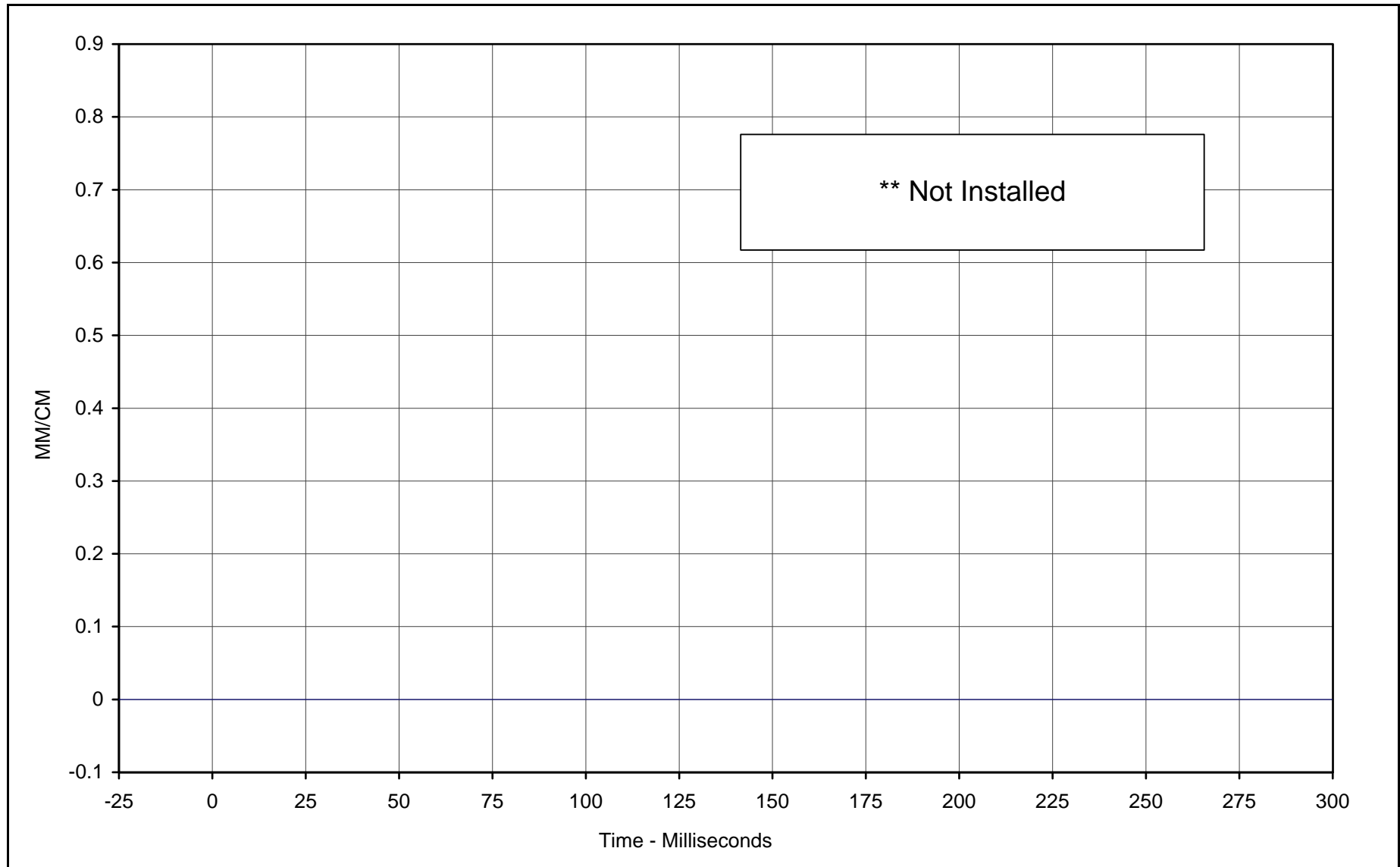
Curve Description: Driver Shoulder Belt Pullout
Maximum Value: 129.4 at 103.7 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-043

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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Curve Description: Driver Shoulder Belt Elongation **

Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Maximum Value: 0.0 at 0.0 Milliseconds

Test Vehicle: 2001 Chevrolet Venture Minivan

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 3/2/01

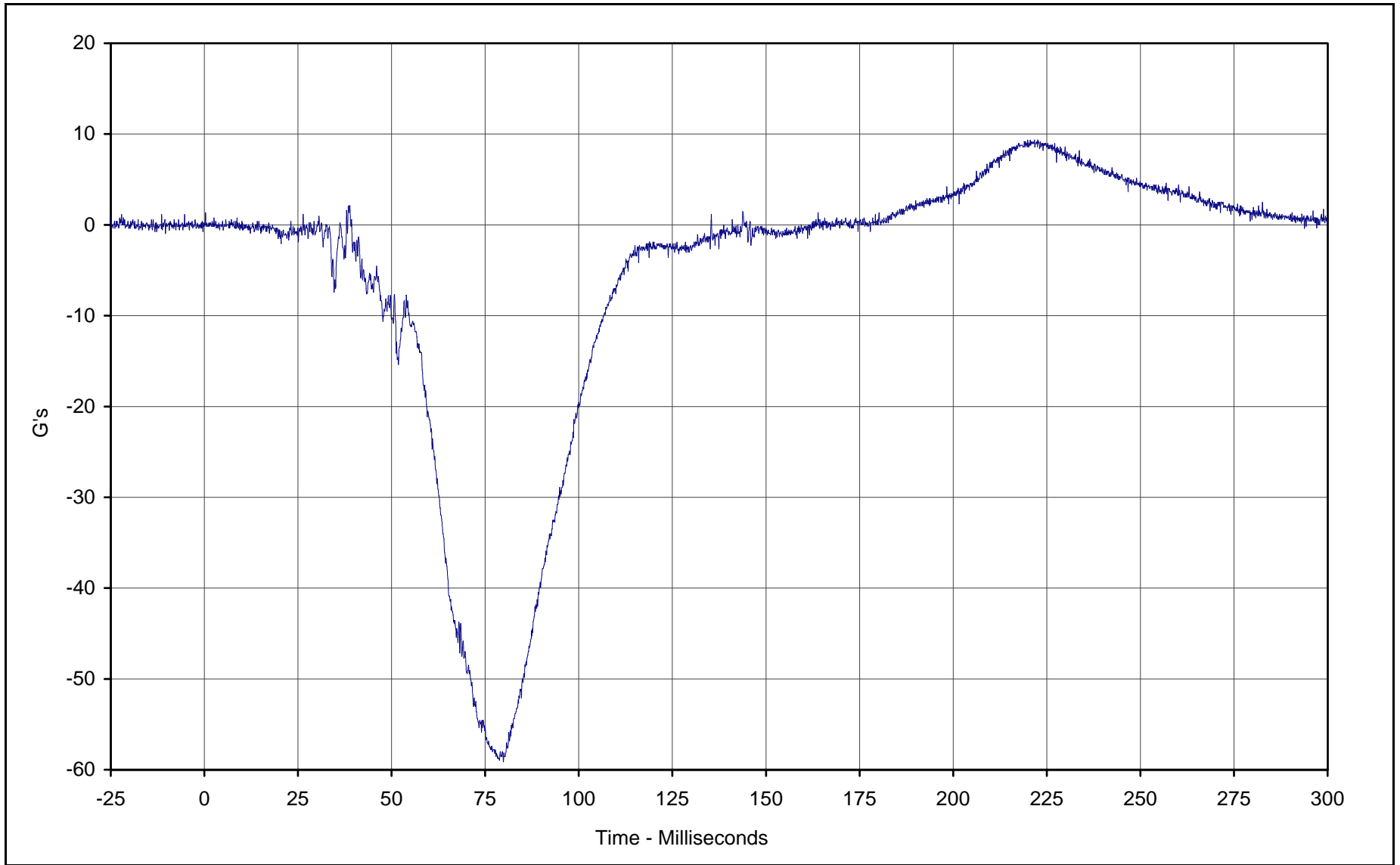
Curve Number: FIL-044

** Not installed



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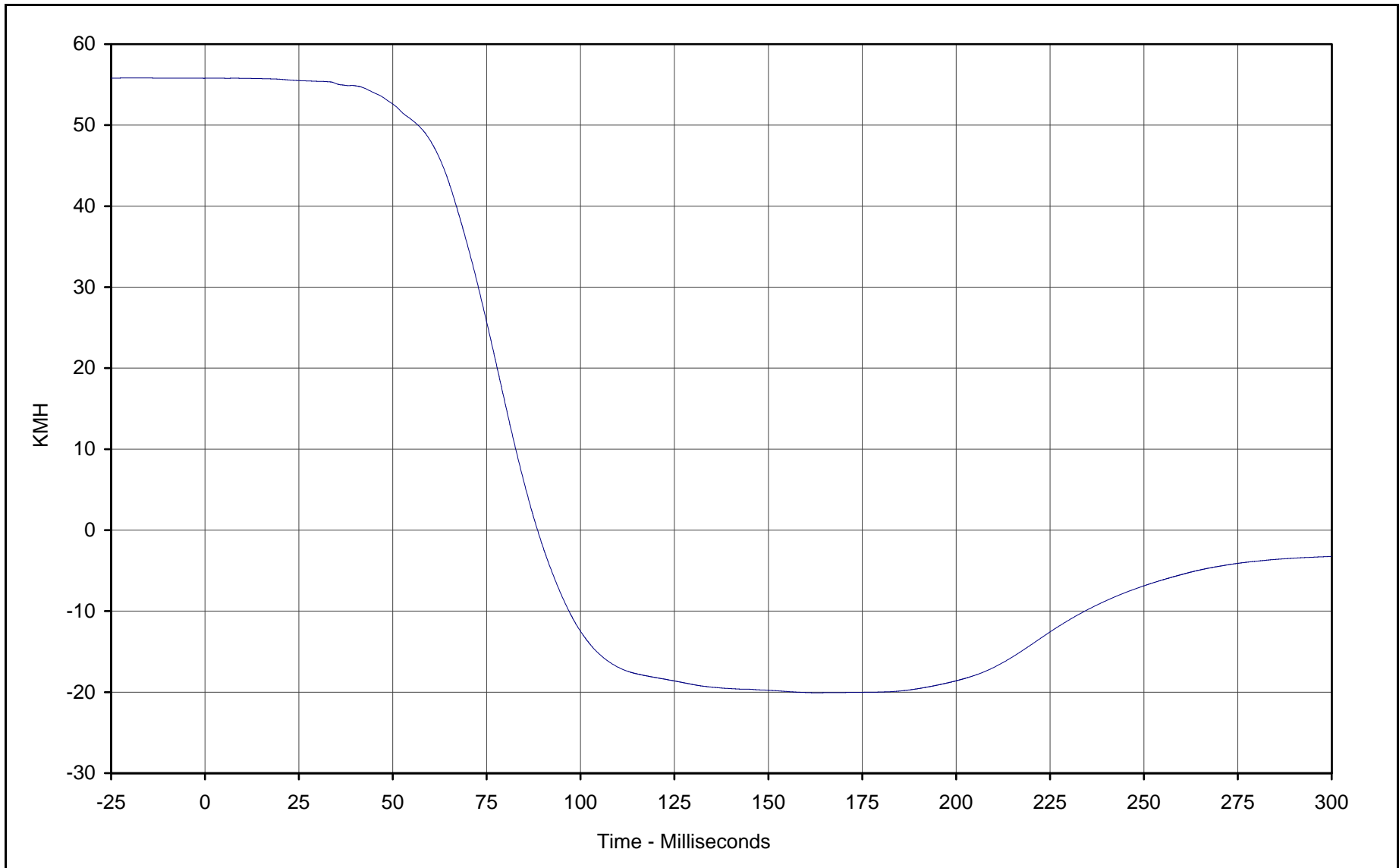
Curve Description: Passenger Head Primary X
Maximum Value: 9.3 at 219.9 Milliseconds
Minimum Value: -59.1 at 79.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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Curve Description: Passenger Head Primary X Velocity

Maximum Value: 55.8 at 3.2 Milliseconds

Minimum Value: -20.1 at 162.8 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN1-045

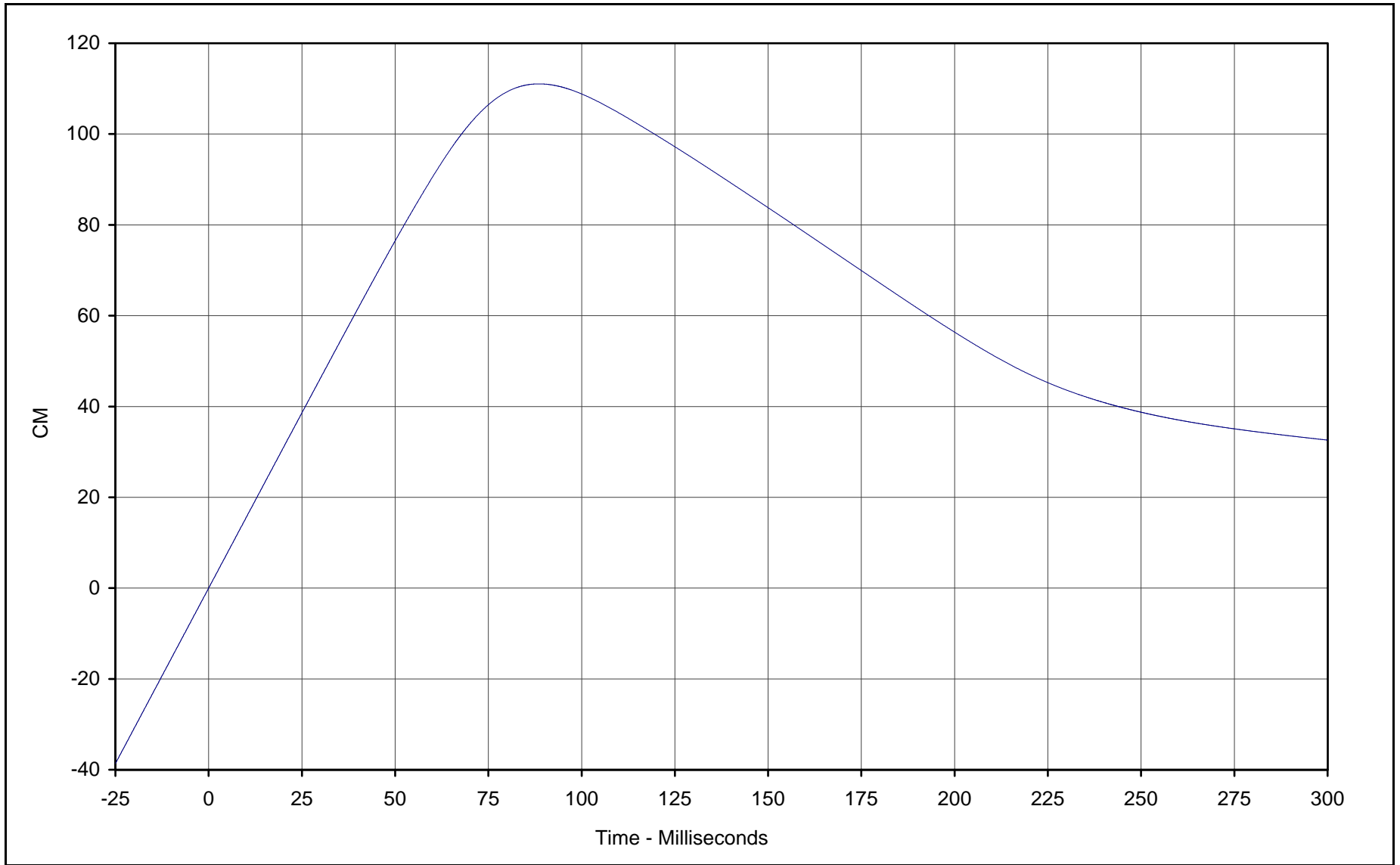
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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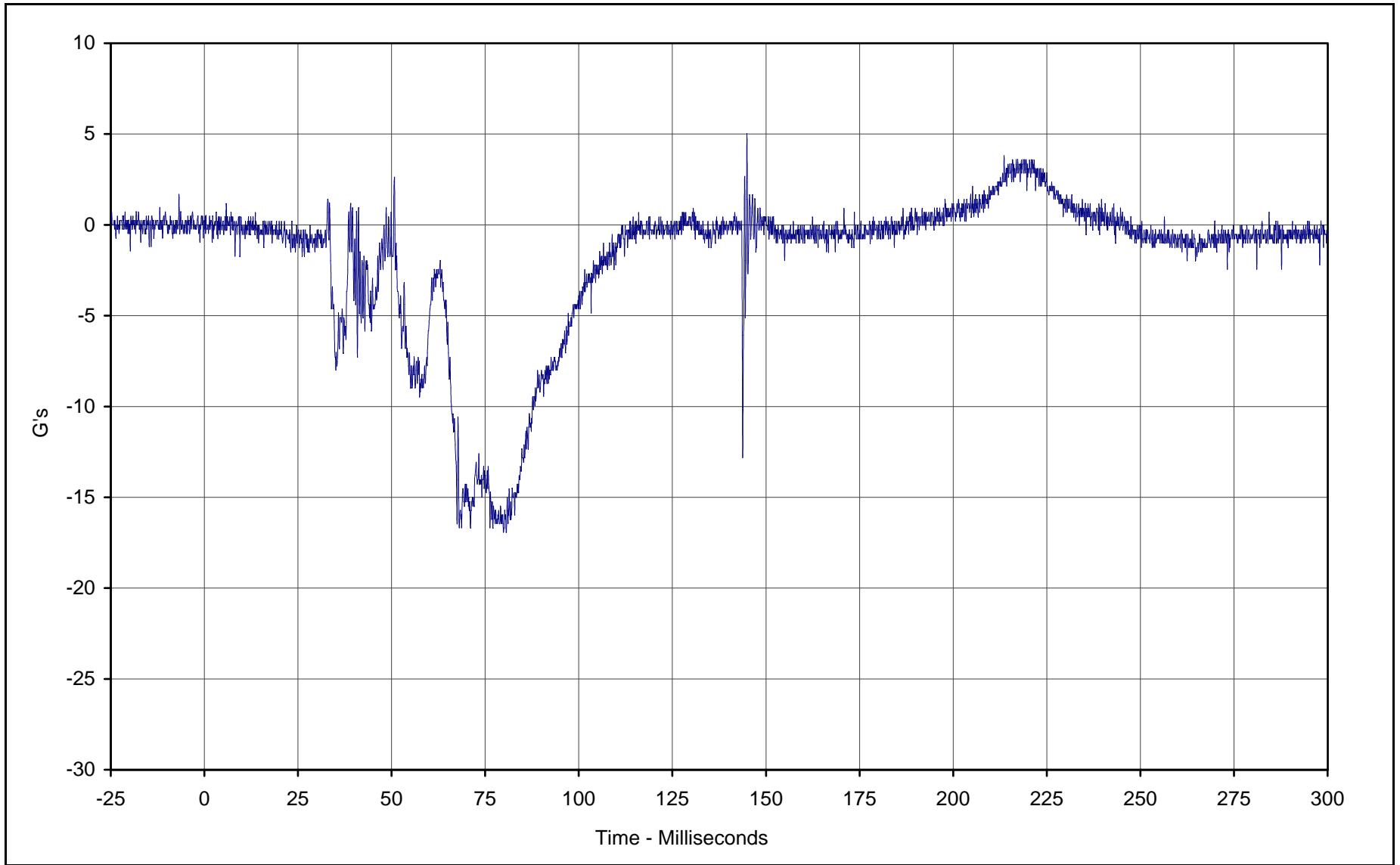
Curve Description: Passenger Head Primary X Displ.
Maximum Value: 111.0 at 88.5 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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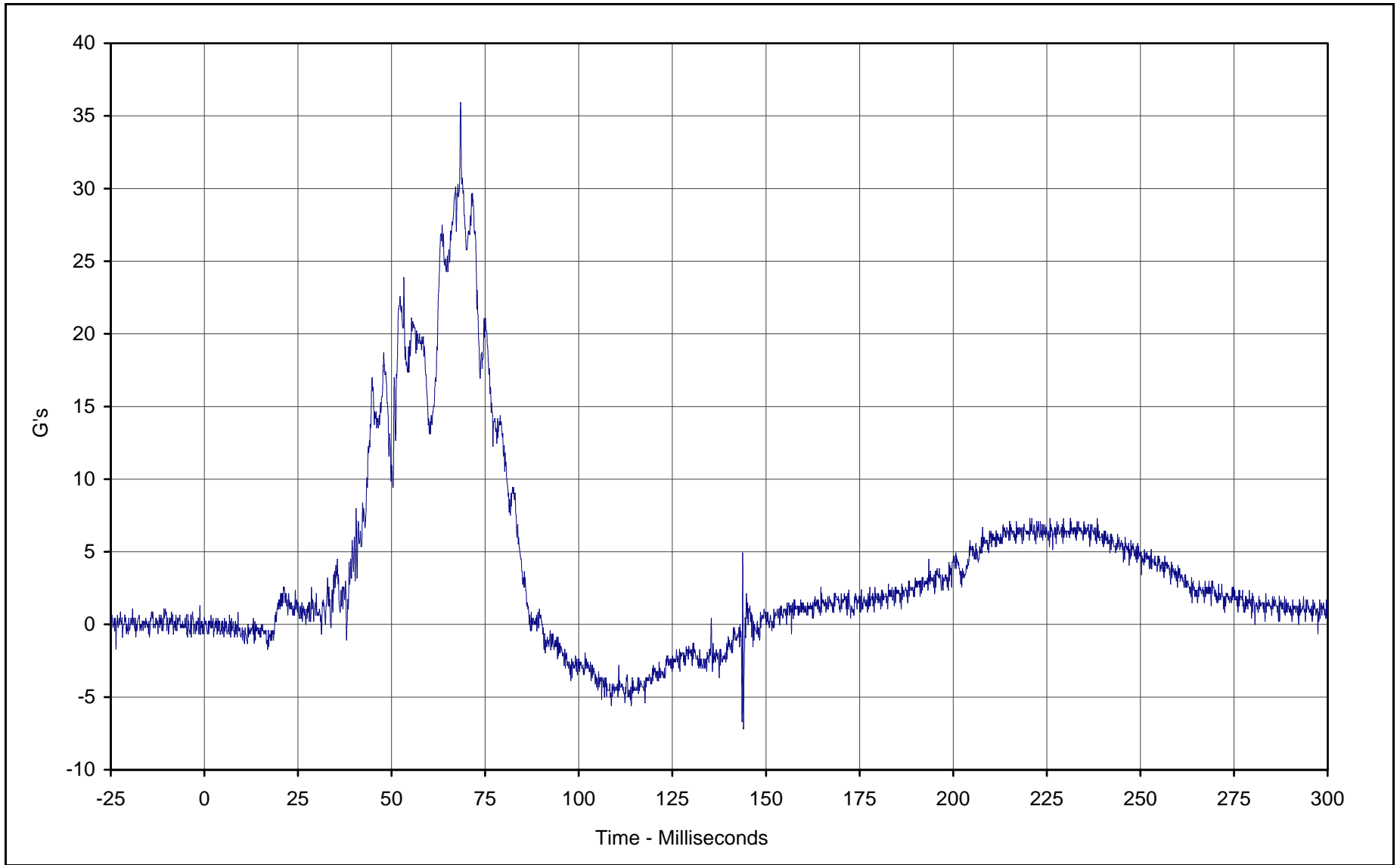
Curve Description: Passenger Head Primary Y
Maximum Value: 5.0 at 144.9 Milliseconds
Minimum Value: -16.9 at 79.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-046

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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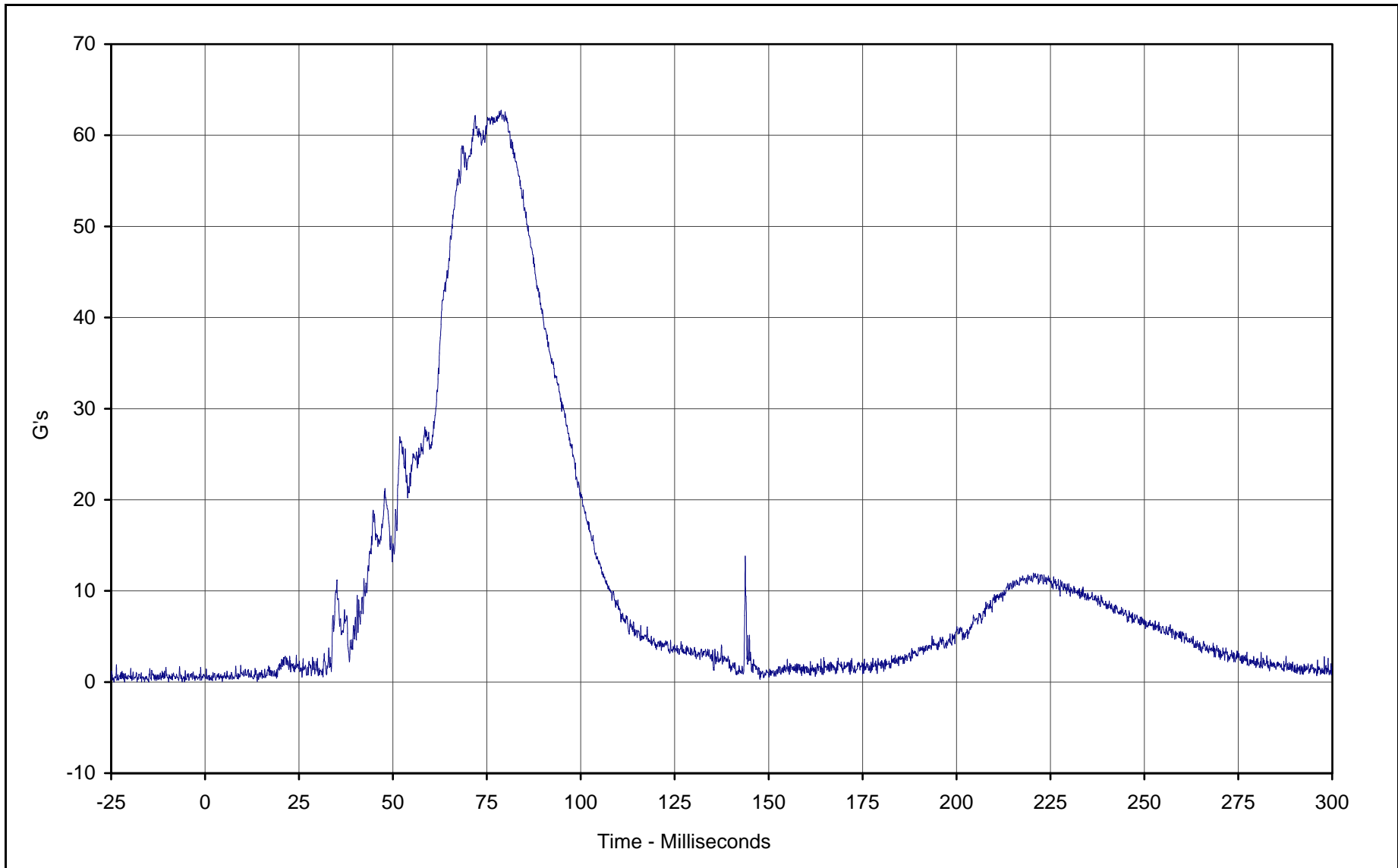
Curve Description: Passenger Head Primary Z
Maximum Value: 35.9 at 68.4 Milliseconds
Minimum Value: -7.1 at 144.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-047

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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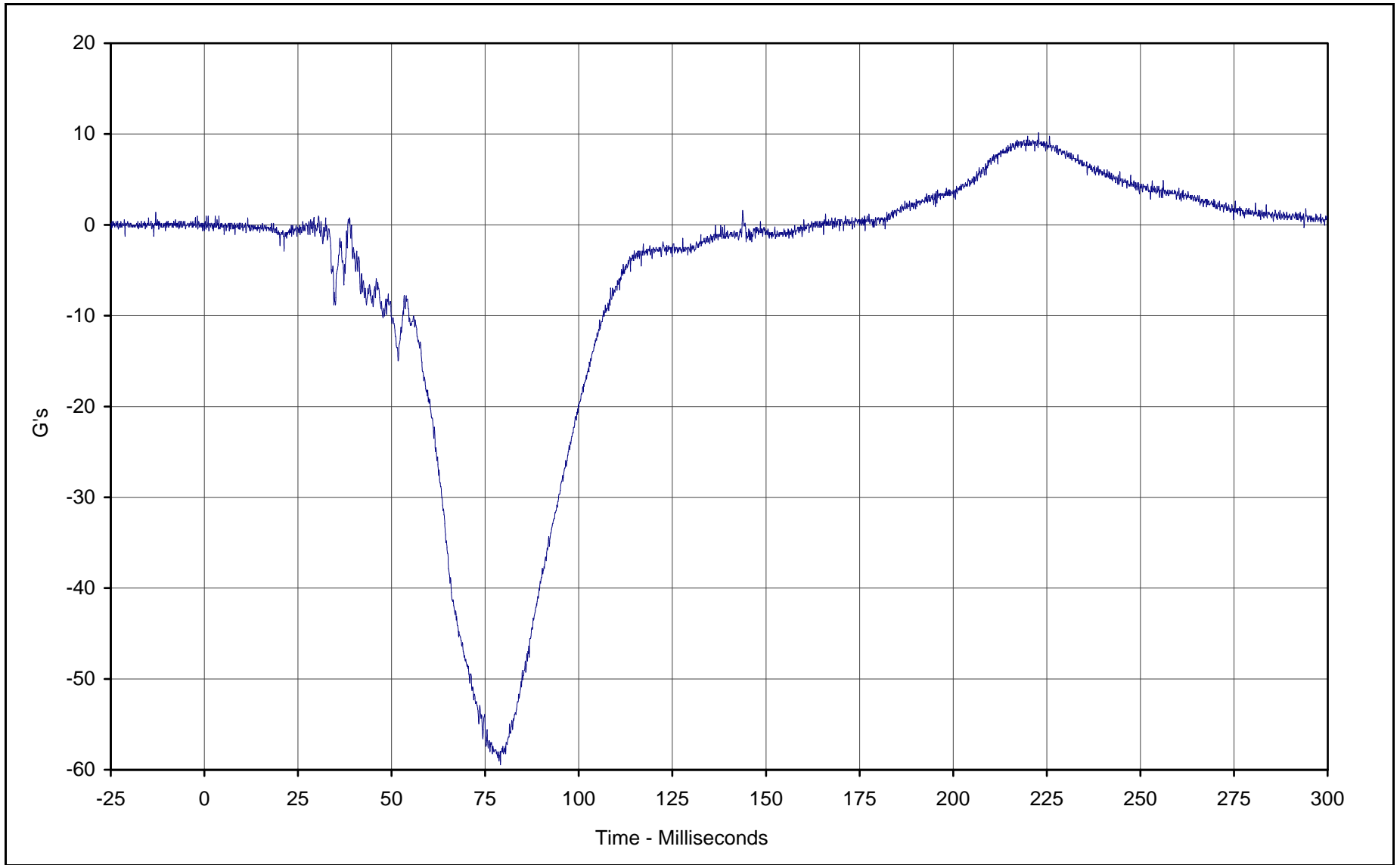
Curve Description: Passenger Head Resultant Primary
Maximum Value: 62.8 at 78.8 Milliseconds
Minimum Value: 0.0 at 4.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: RES-045

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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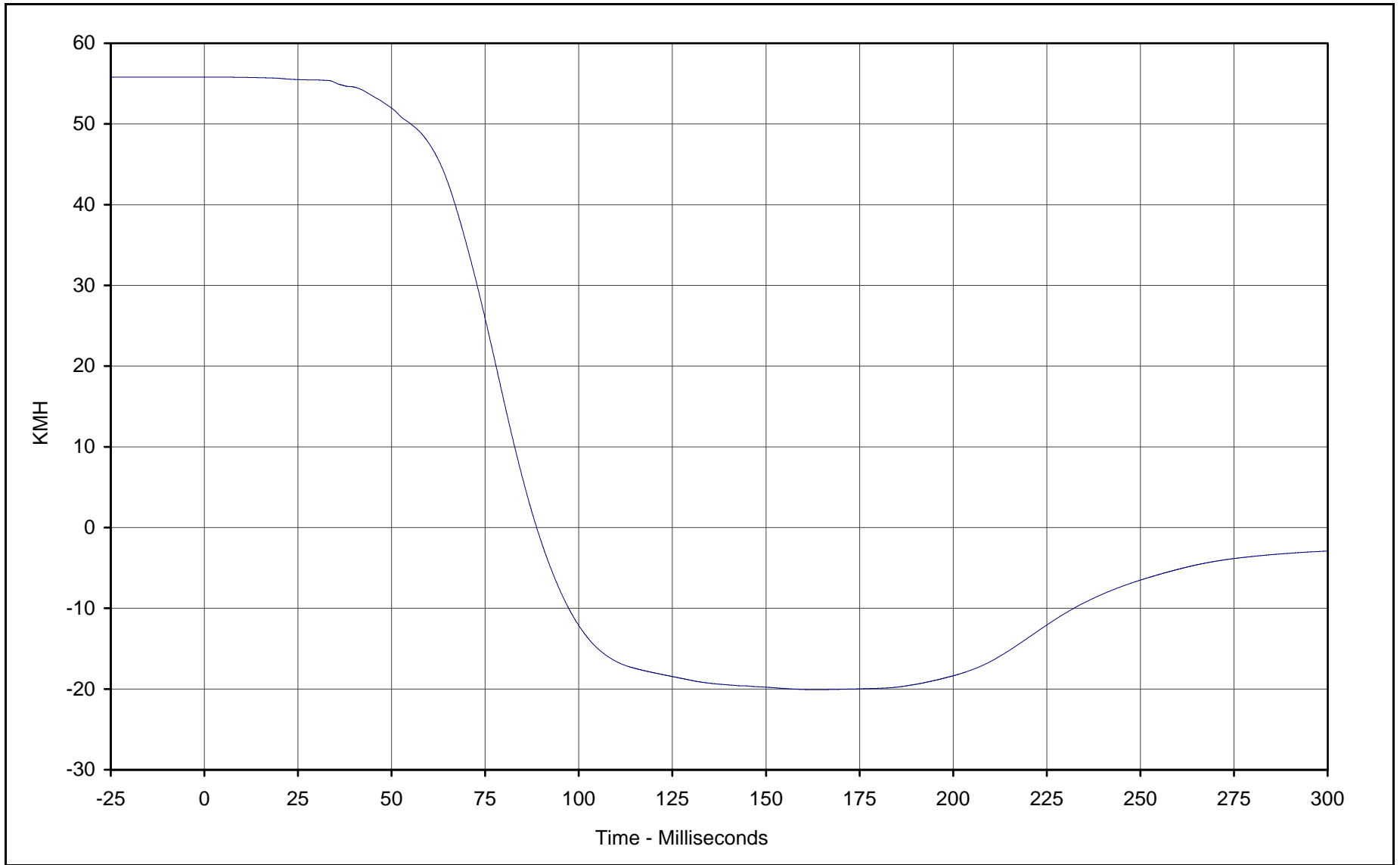
Curve Description: Passenger Head Redundant X
Maximum Value: 10.2 at 222.8 Milliseconds
Minimum Value: -59.5 at 79.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-048

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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Curve Description: Passenger Head Redundant X Velocity

Maximum Value: 55.8 at 1.3 Milliseconds

Minimum Value: -20.1 at 162.8 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN1-048

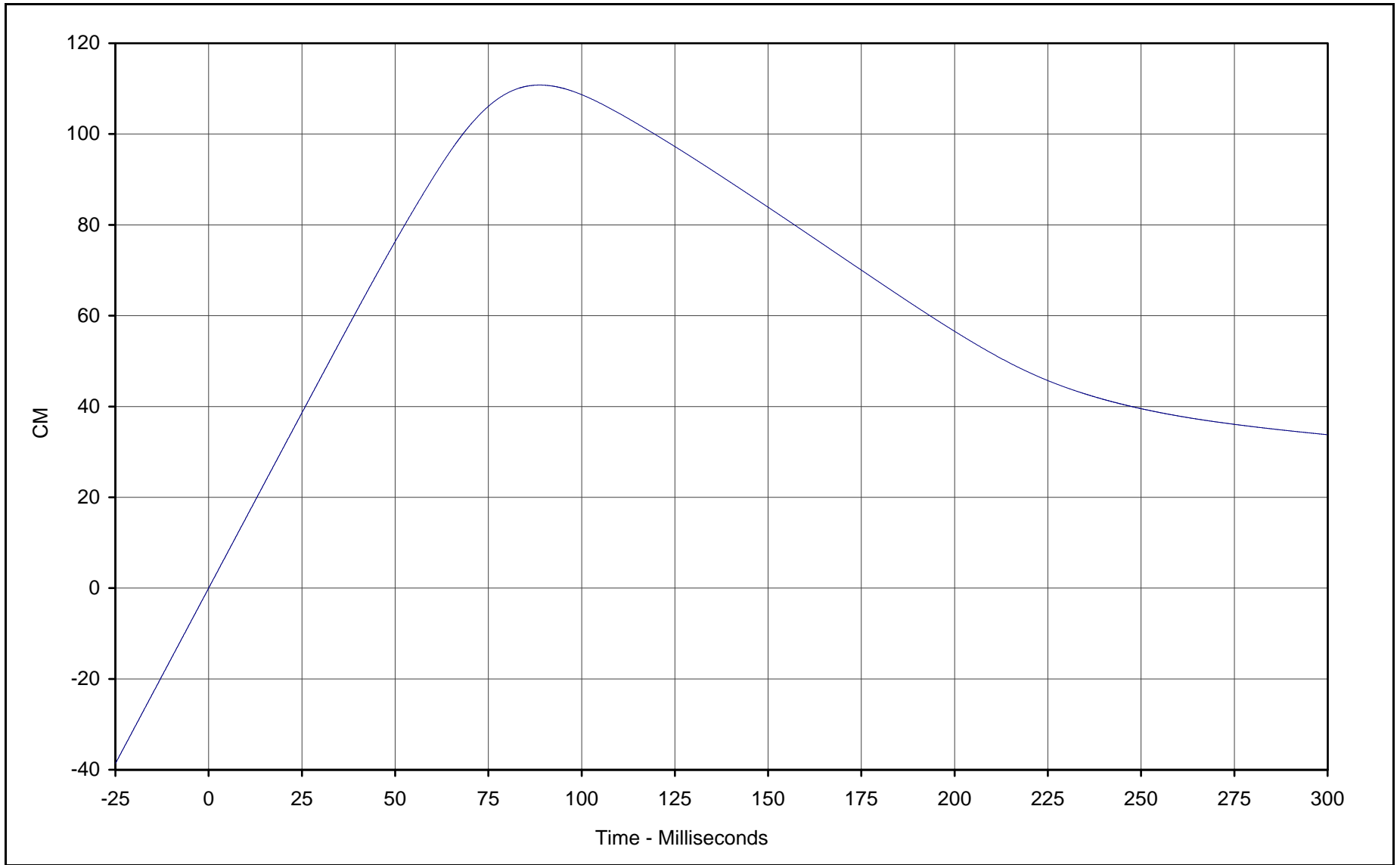
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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Curve Description: Passenger Head Redundant X Displ.

Maximum Value: 110.8 at 88.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN2-048

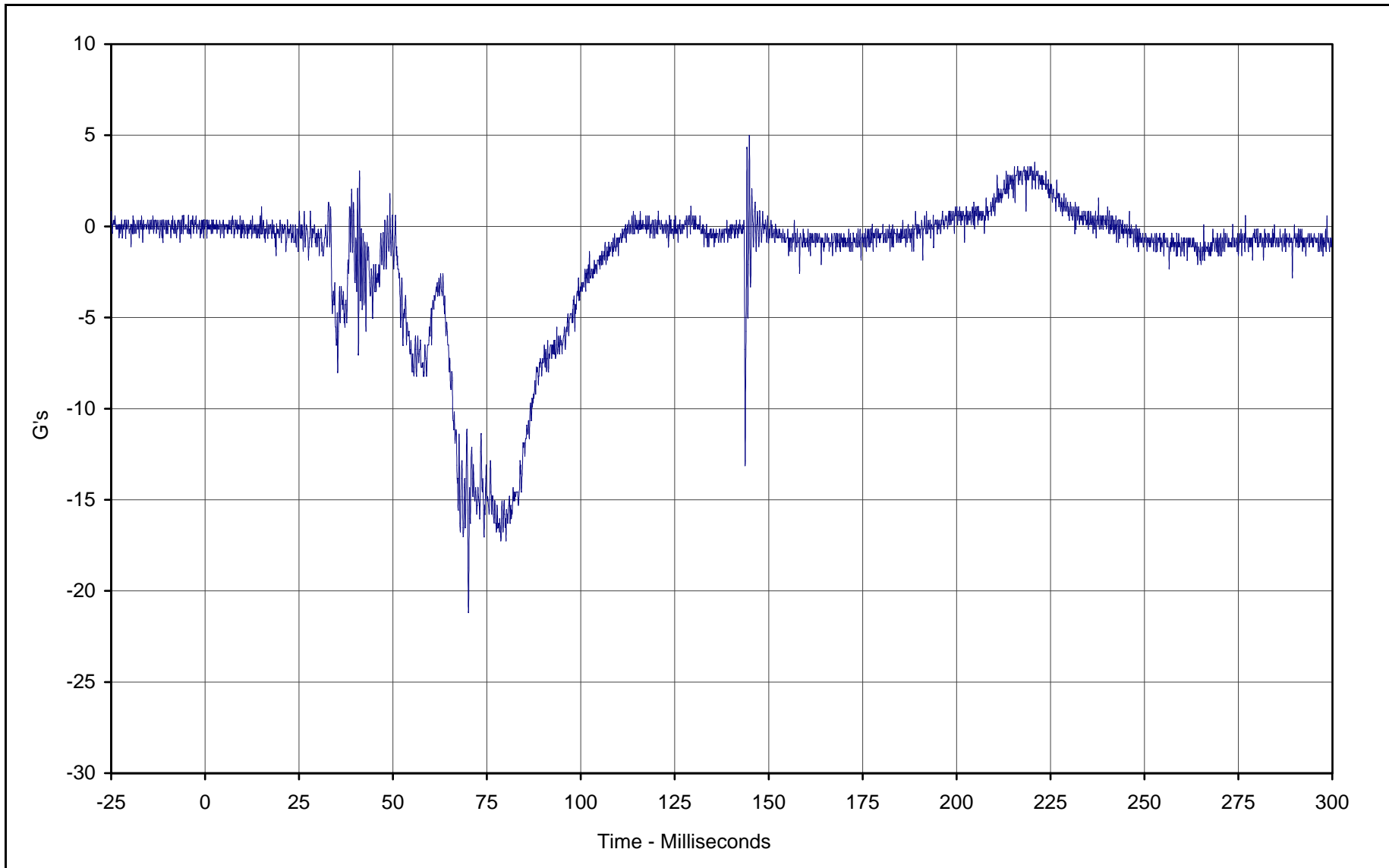
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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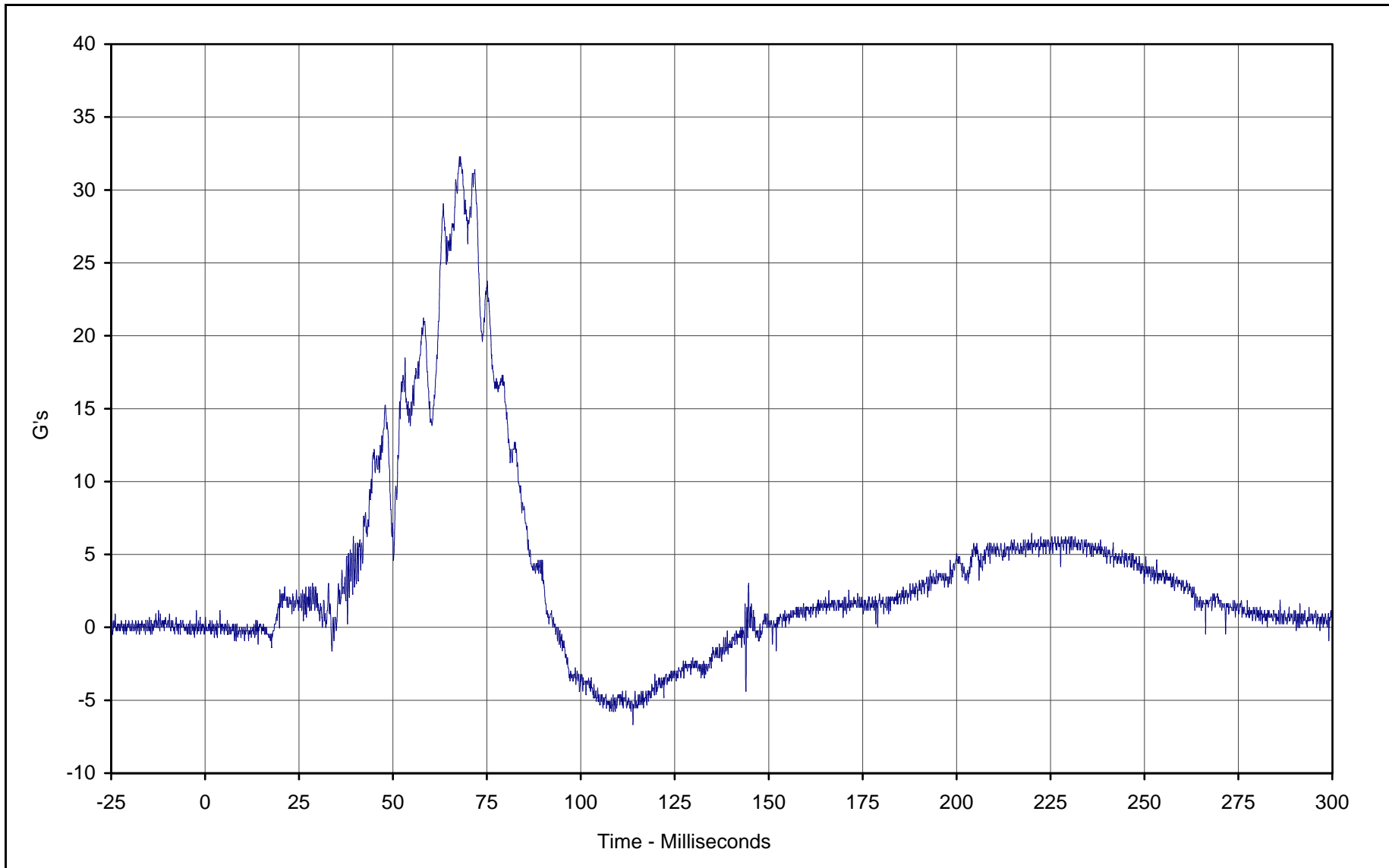
Curve Description: Passenger Head Redundant Y
Maximum Value: 5.0 at 144.8 Milliseconds
Minimum Value: -21.2 at 70.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-049

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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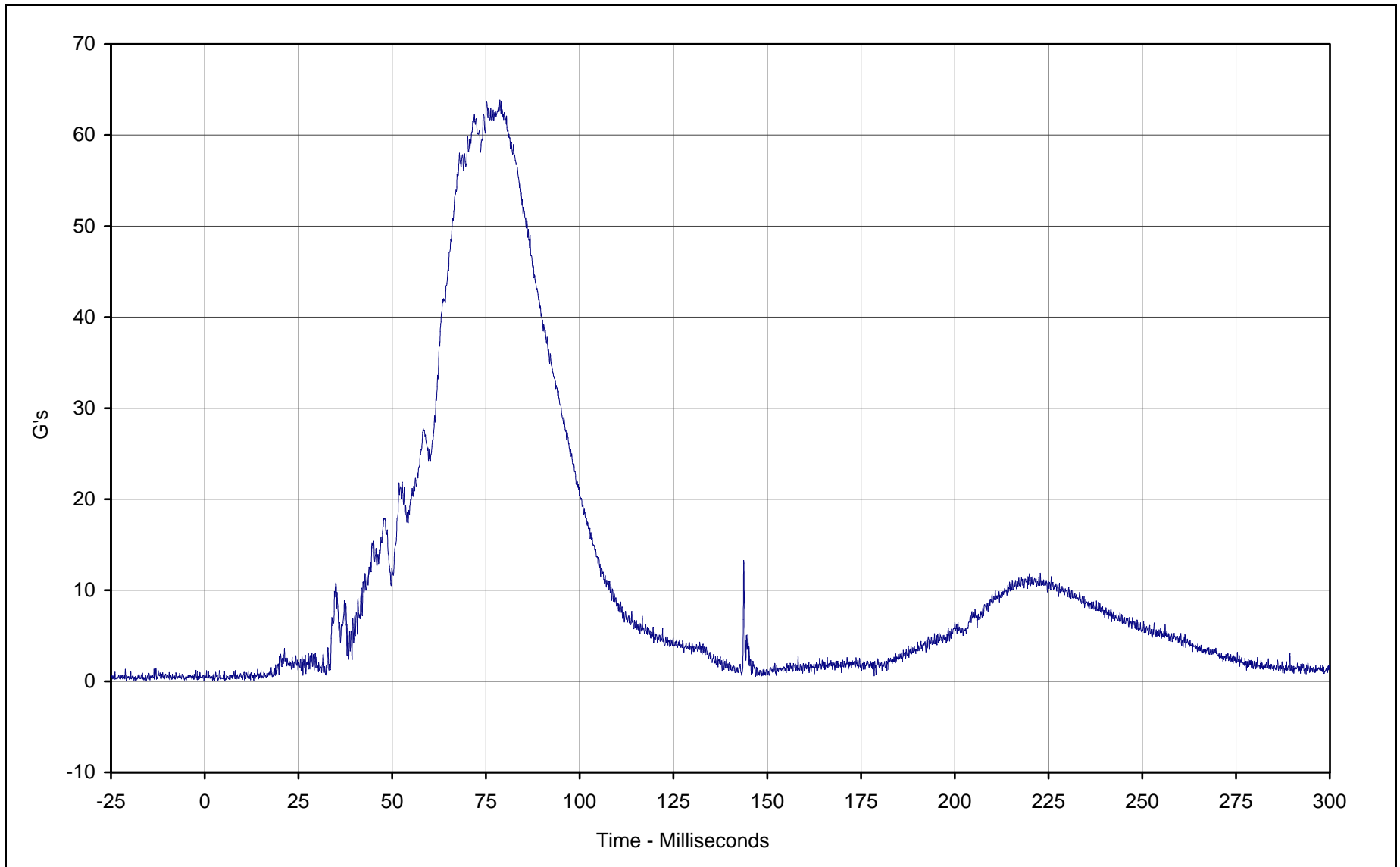
Curve Description: Passenger Head Redundant Z
Maximum Value: 32.3 at 67.7 Milliseconds
Minimum Value: -6.7 at 113.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-050

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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Curve Description: Passenger Head Resultant Redundant

Maximum Value: 63.8 at 78.7 Milliseconds

Minimum Value: 0.1 at 2.1 Milliseconds

SAE Filter Class: 1000

Date of Test: 3/2/01

Curve Number: RES-048

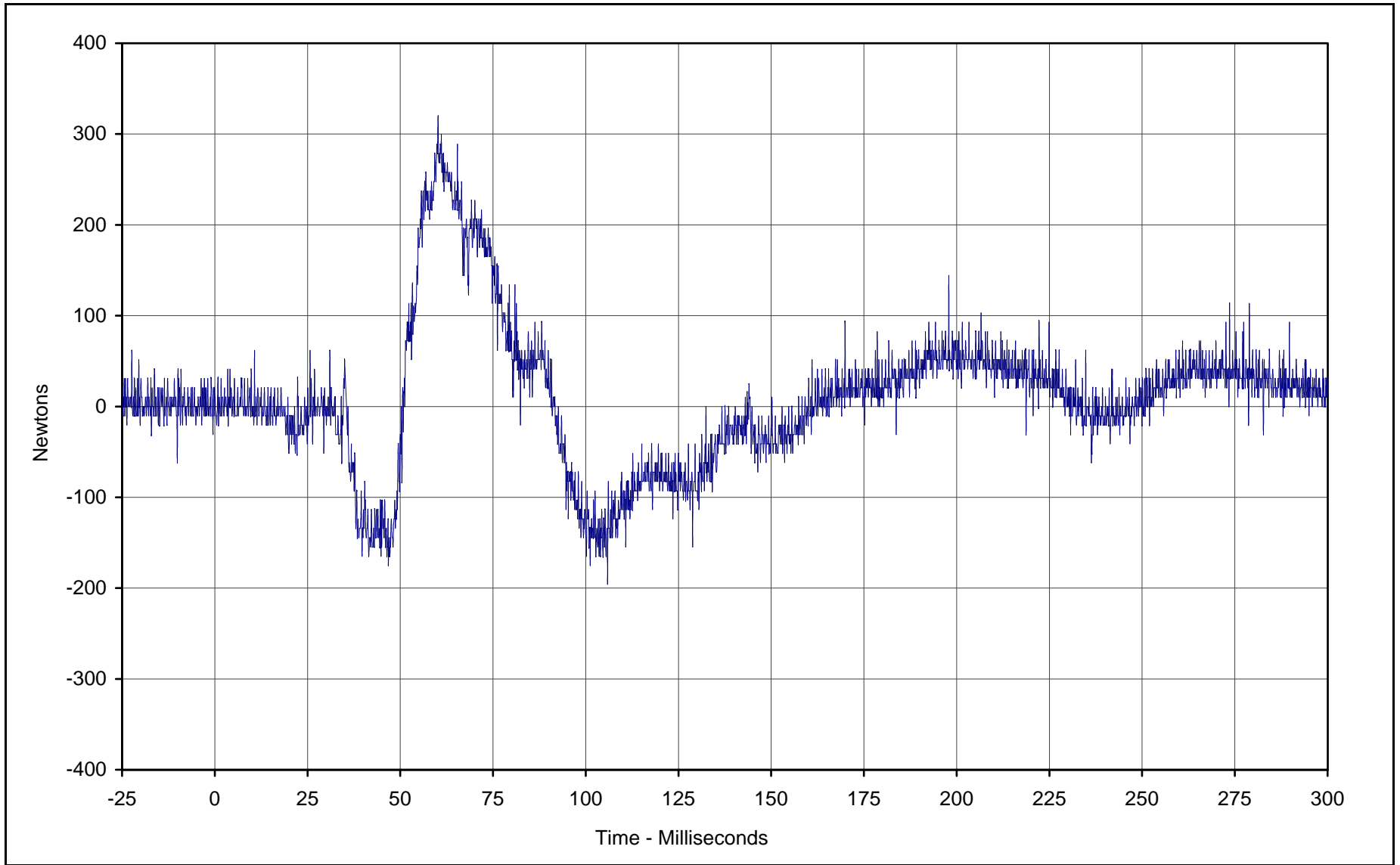
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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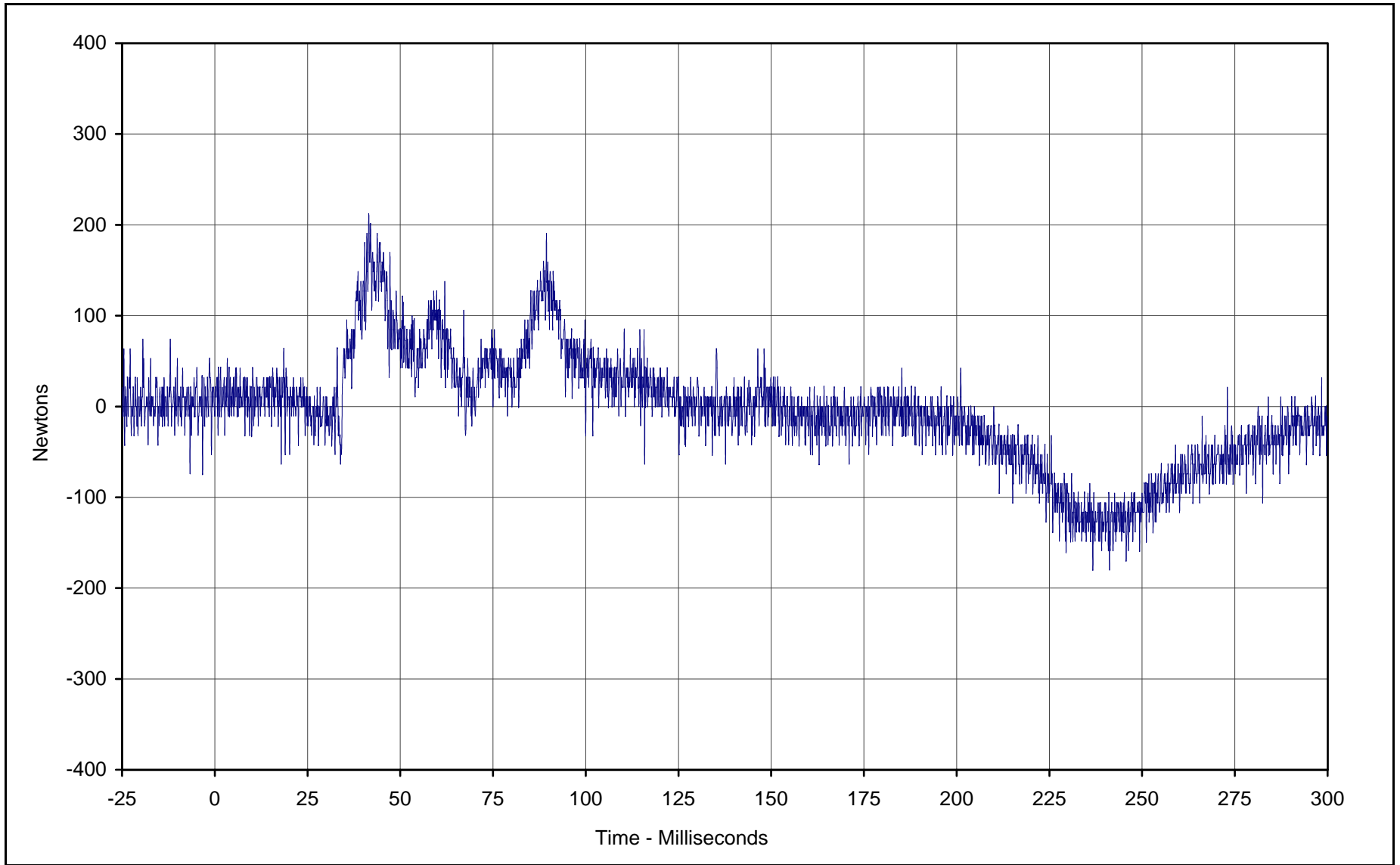
Curve Description: Passenger Neck Force X
Maximum Value: 319.8 at 60.2 Milliseconds
Minimum Value: -196.0 at 105.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-051

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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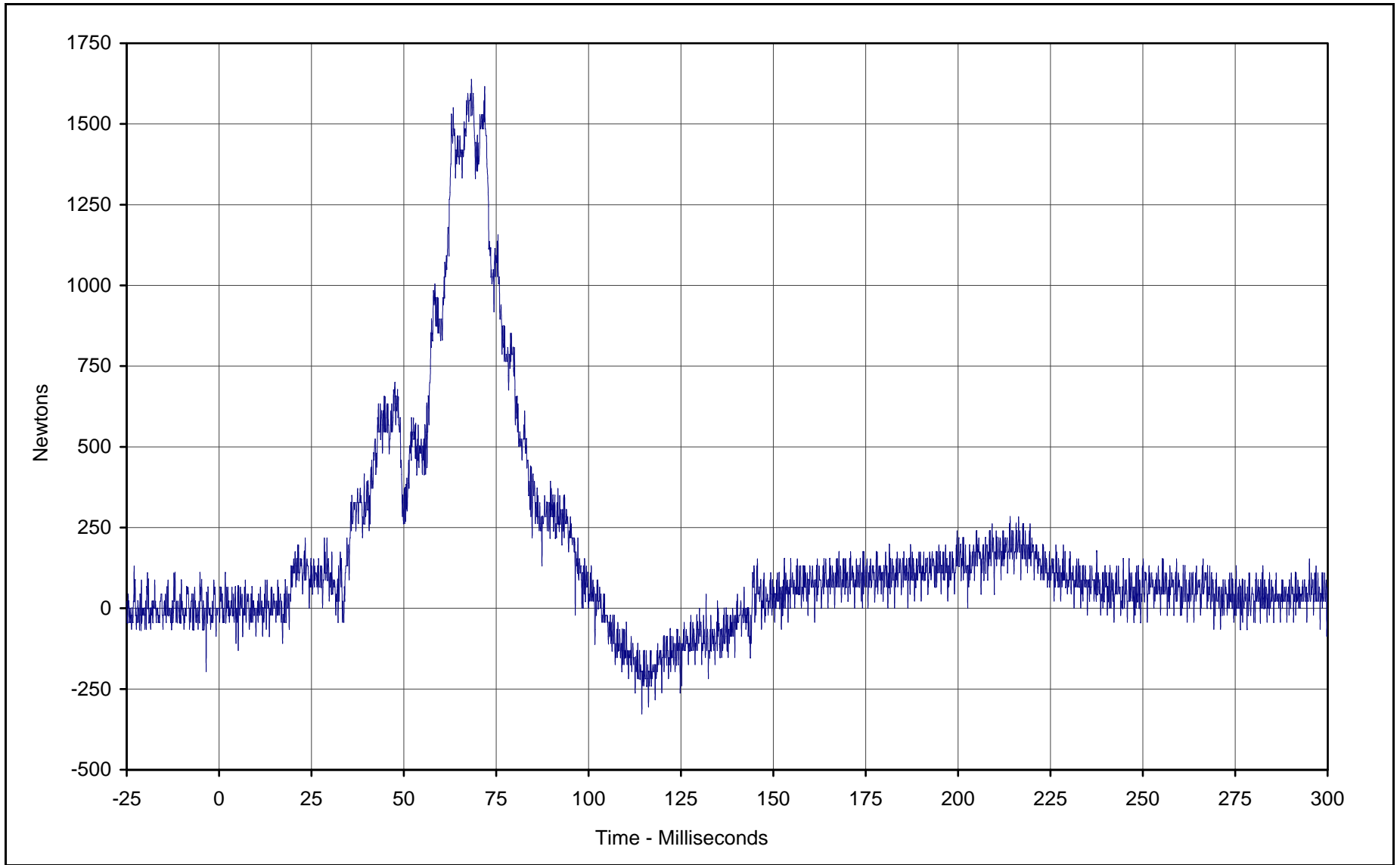
Curve Description: Passenger Neck Force Y
Maximum Value: 211.9 at 41.5 Milliseconds
Minimum Value: -180.1 at 236.7 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-052

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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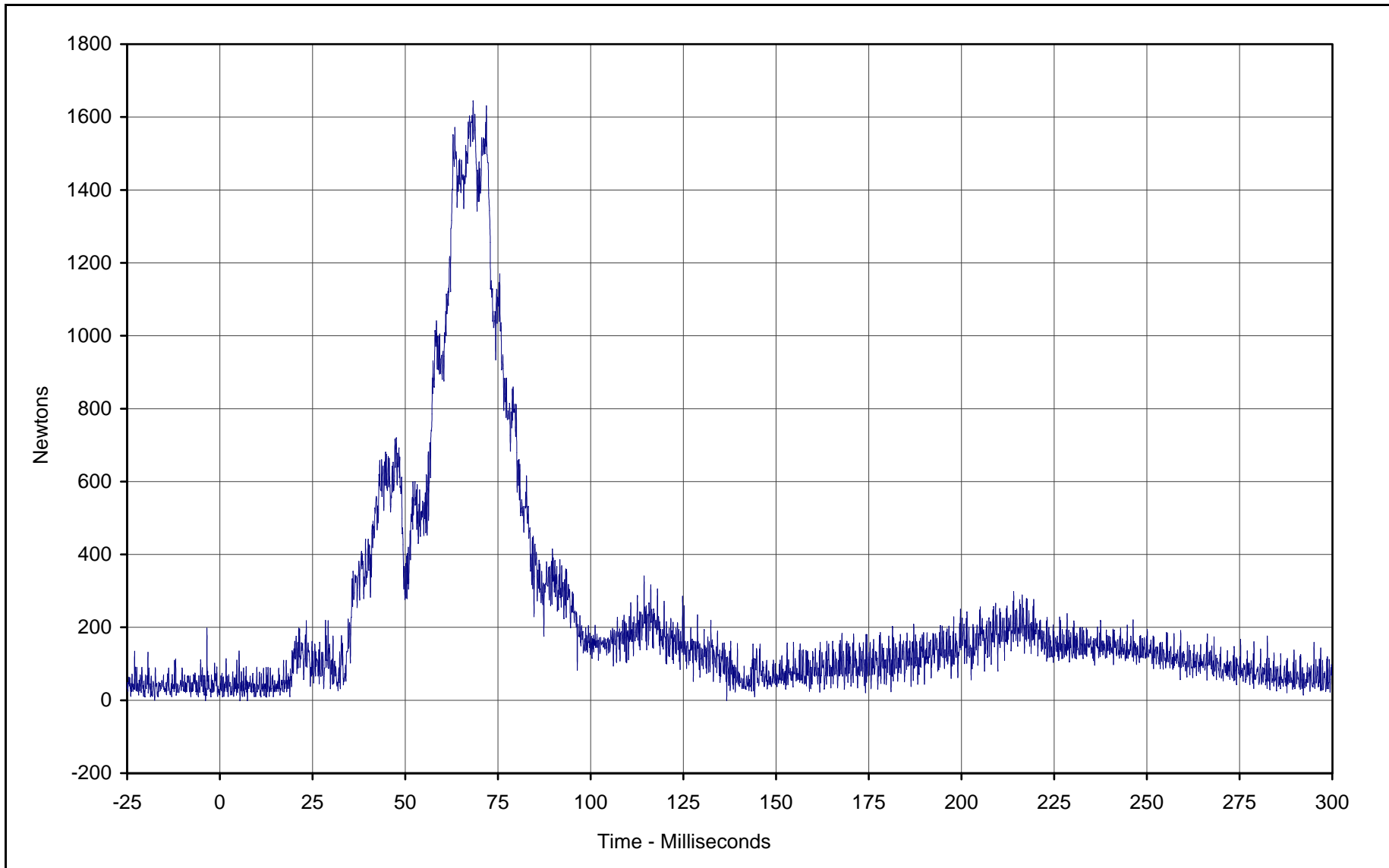
Curve Description: Passenger Neck Force Z
Maximum Value: 1636.4 at 68.3 Milliseconds
Minimum Value: -327.6 at 114.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-053

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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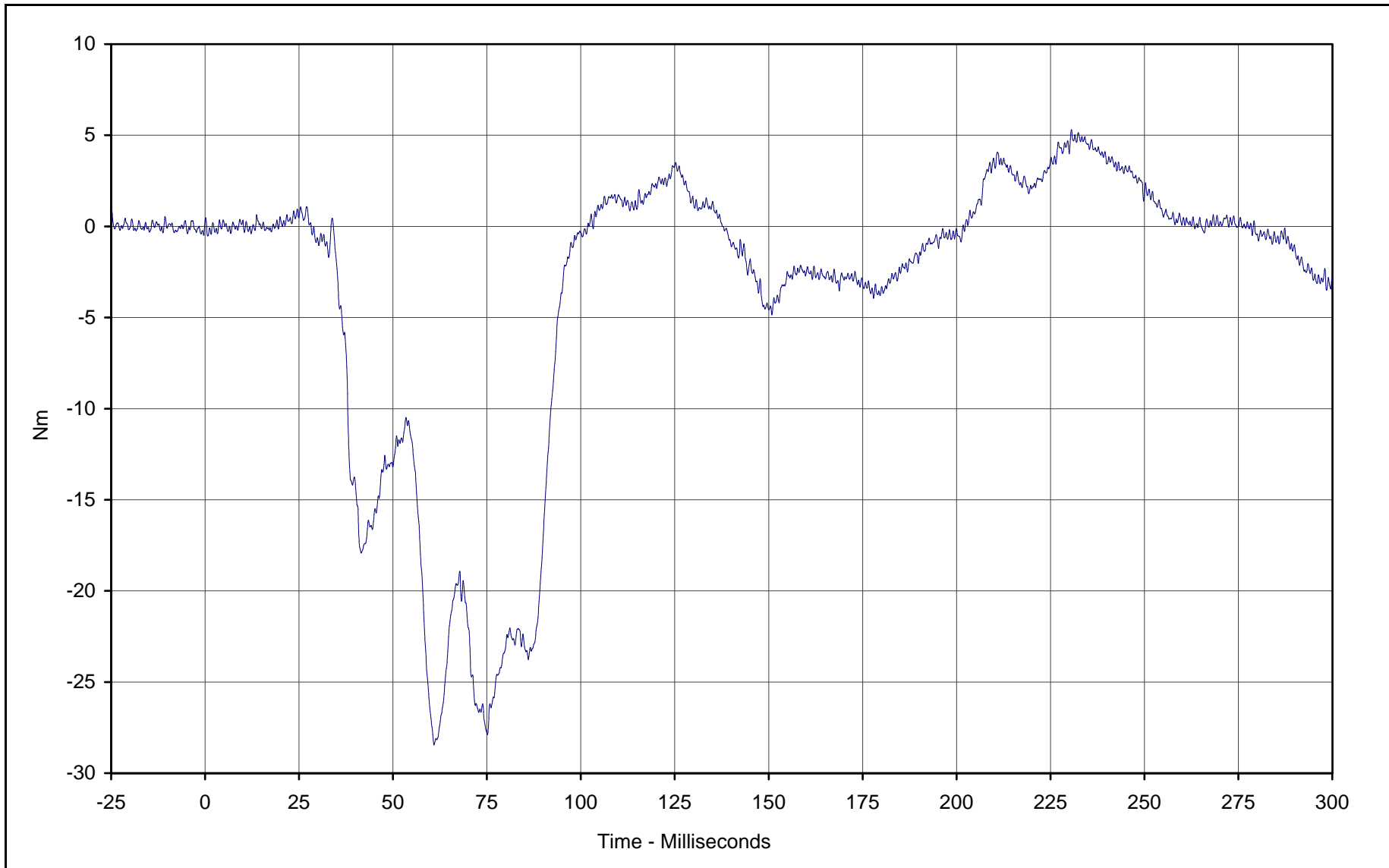
Curve Description: Passenger Neck Force Resultant
Maximum Value: 1642.8 at 68.3 Milliseconds
Minimum Value: 0.0 at 5.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: RES-051

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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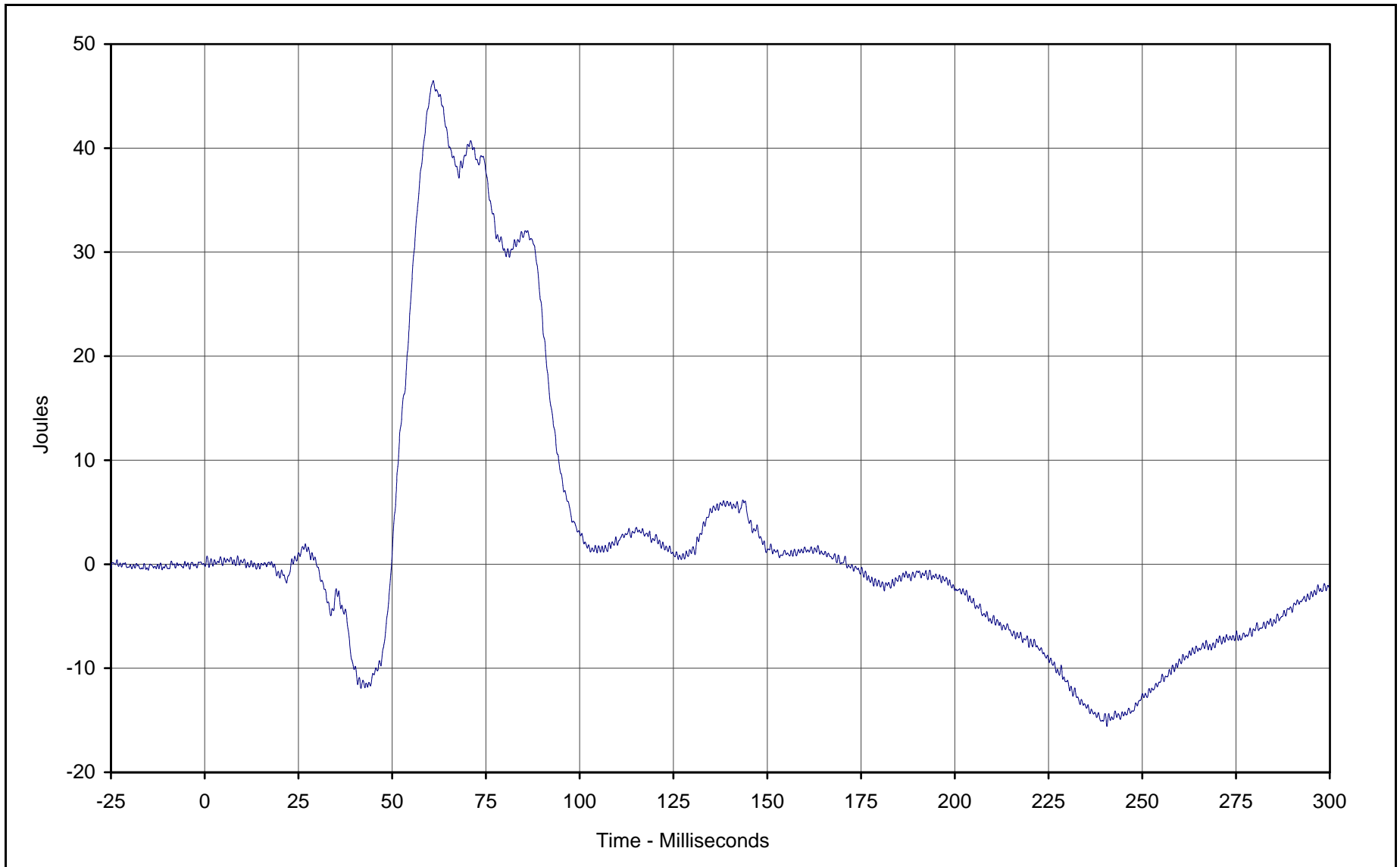
Curve Description: Passenger Neck Moment X
Maximum Value: 5.3 at 230.6 Milliseconds
Minimum Value: -28.5 at 60.9 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-054

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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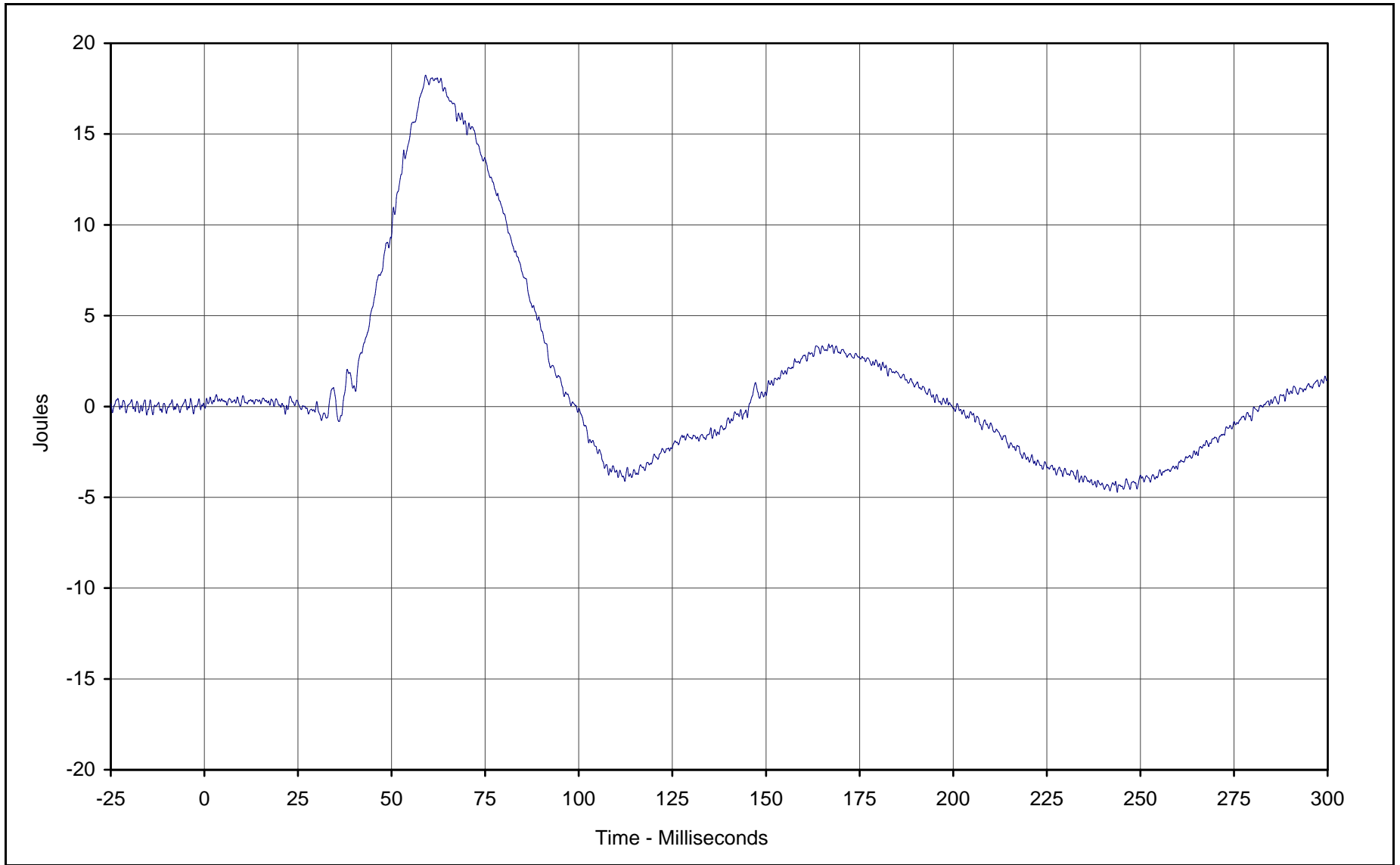
Curve Description: Passenger Neck Moment Y
Maximum Value: 46.5 at 60.9 Milliseconds
Minimum Value: -15.6 at 240.6 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-055

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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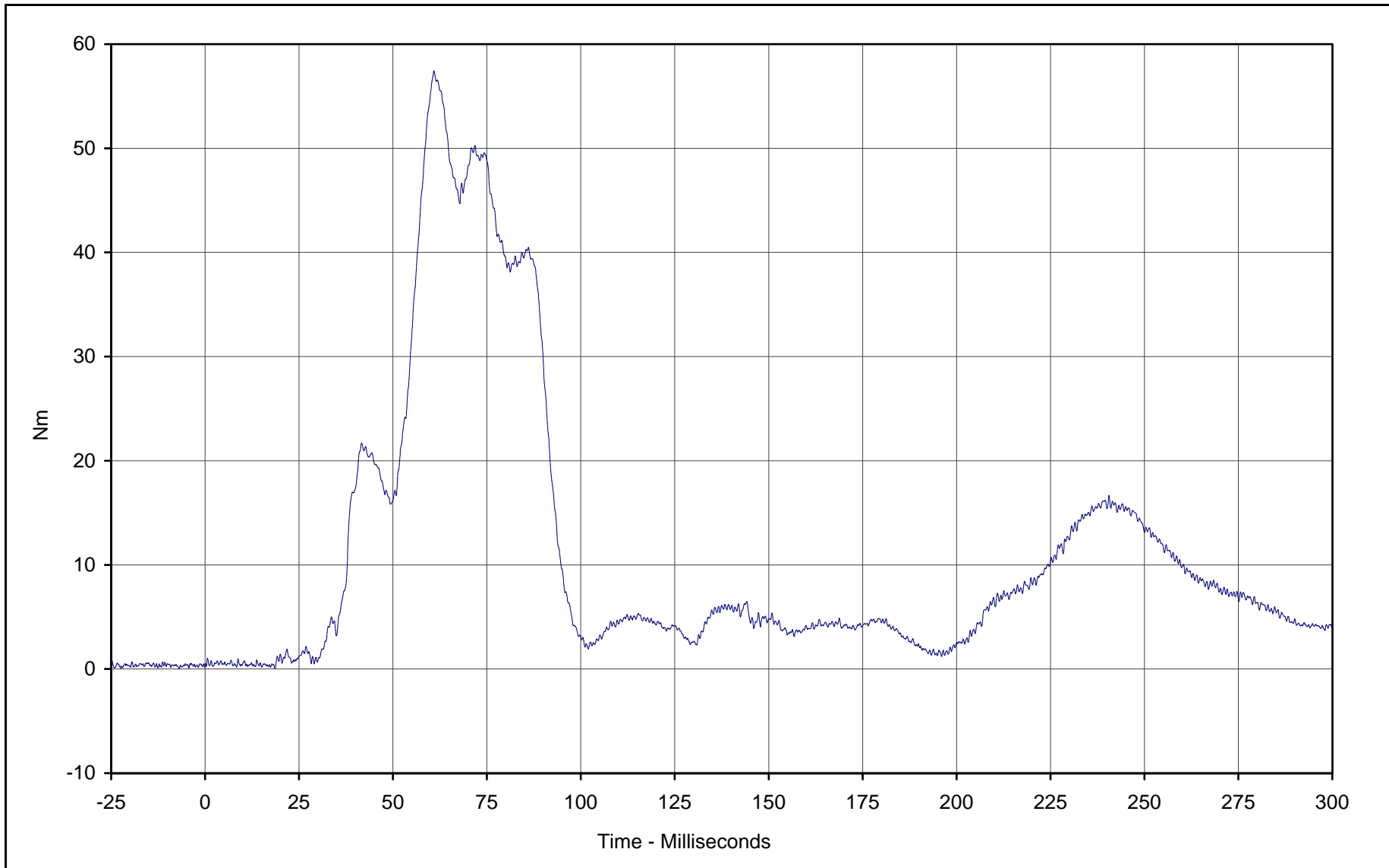
Curve Description: Passenger Neck Moment Z
Maximum Value: 18.2 at 59.1 Milliseconds
Minimum Value: -4.7 at 243.8 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-056

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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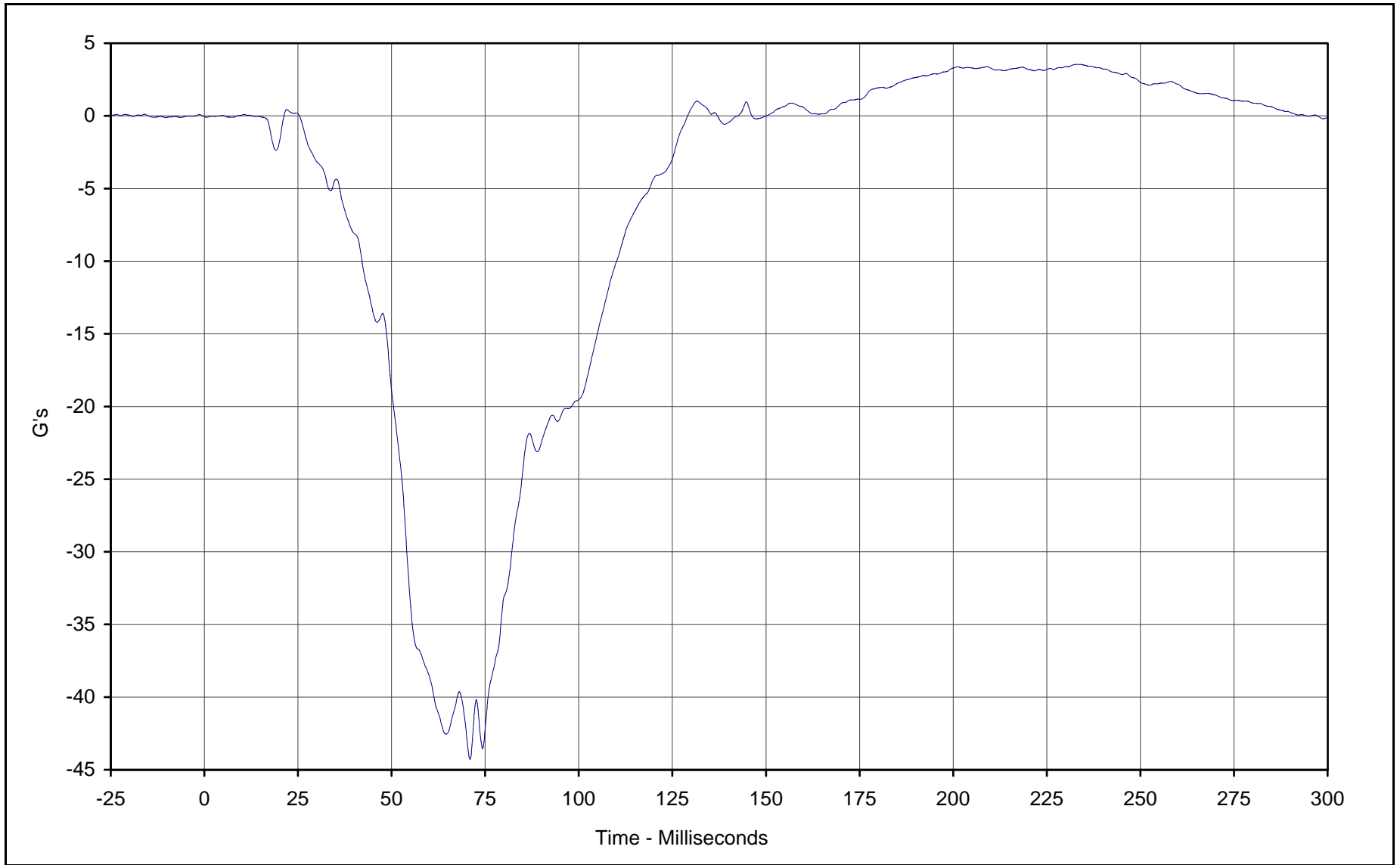
Curve Description: Passenger Neck Moment Resultant
Maximum Value: 57.4 at 60.9 Milliseconds
Minimum Value: 0.1 at 18.6 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: RES-054

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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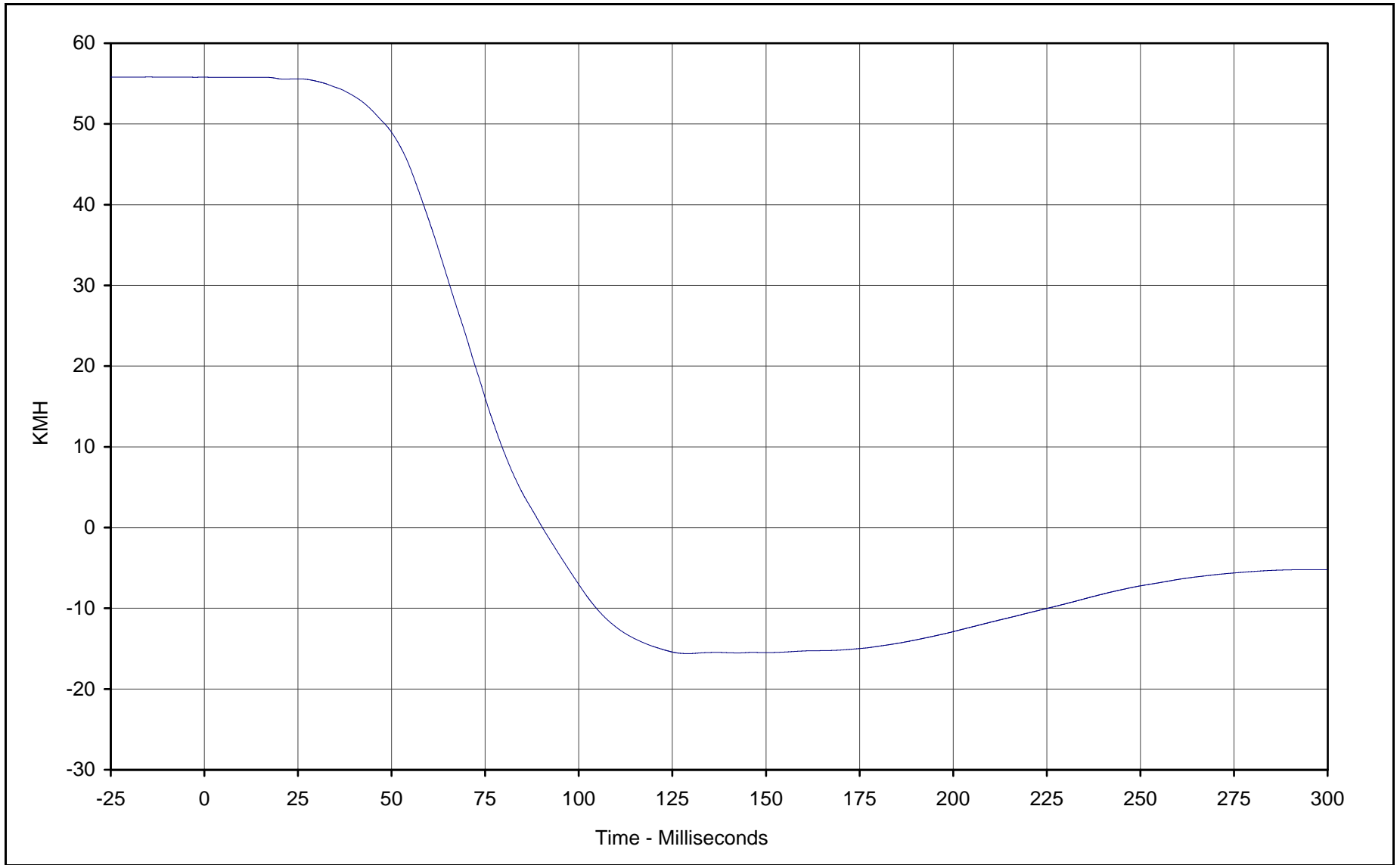
Curve Description: Passenger Chest Primary X
Maximum Value: 3.5 at 233.8 Milliseconds
Minimum Value: -44.3 at 71.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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Curve Description: Passenger Chest Primary X Velocity

Maximum Value: 55.8 at 0.0 Milliseconds

Minimum Value: -15.6 at 129.1 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN1-057

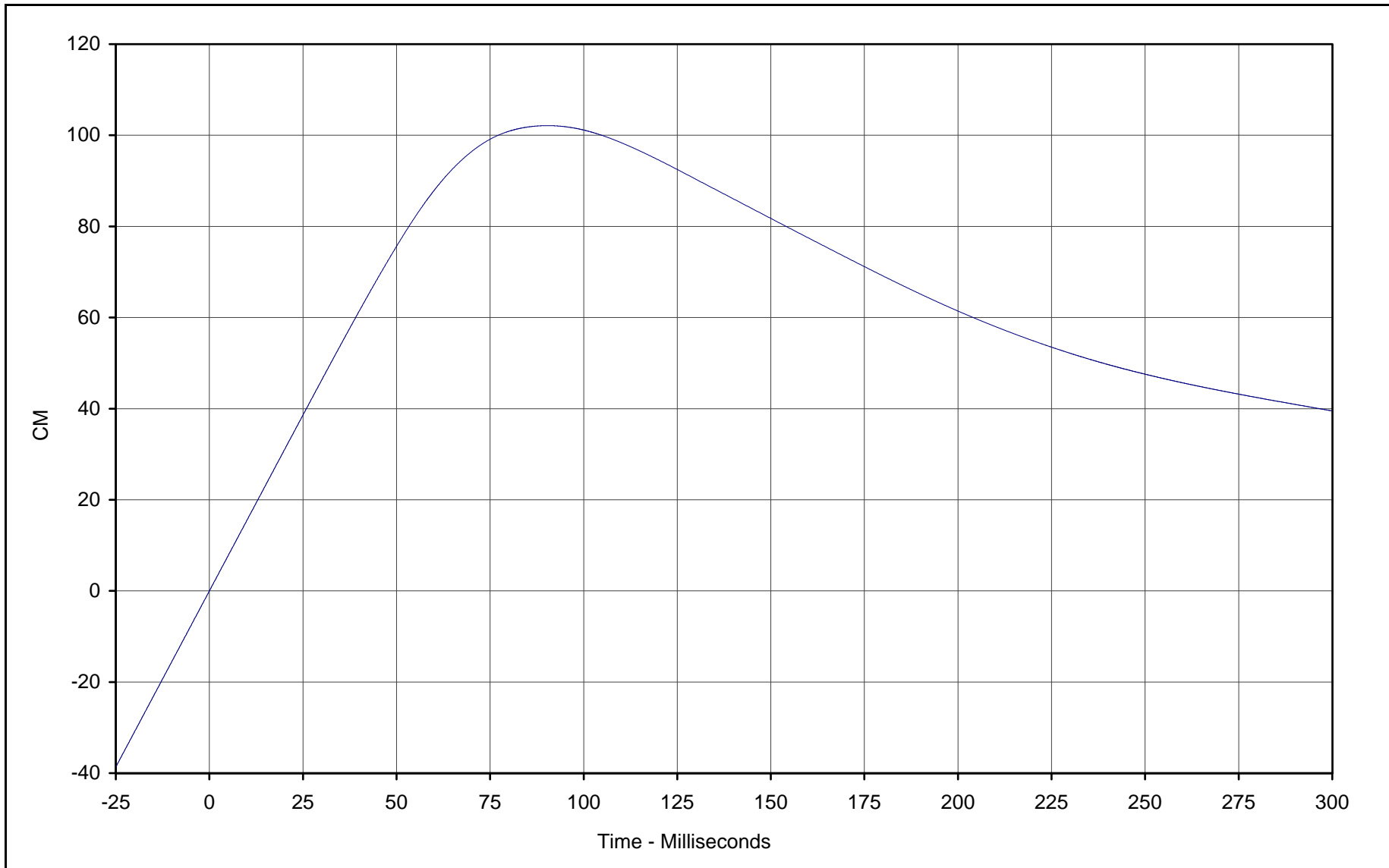
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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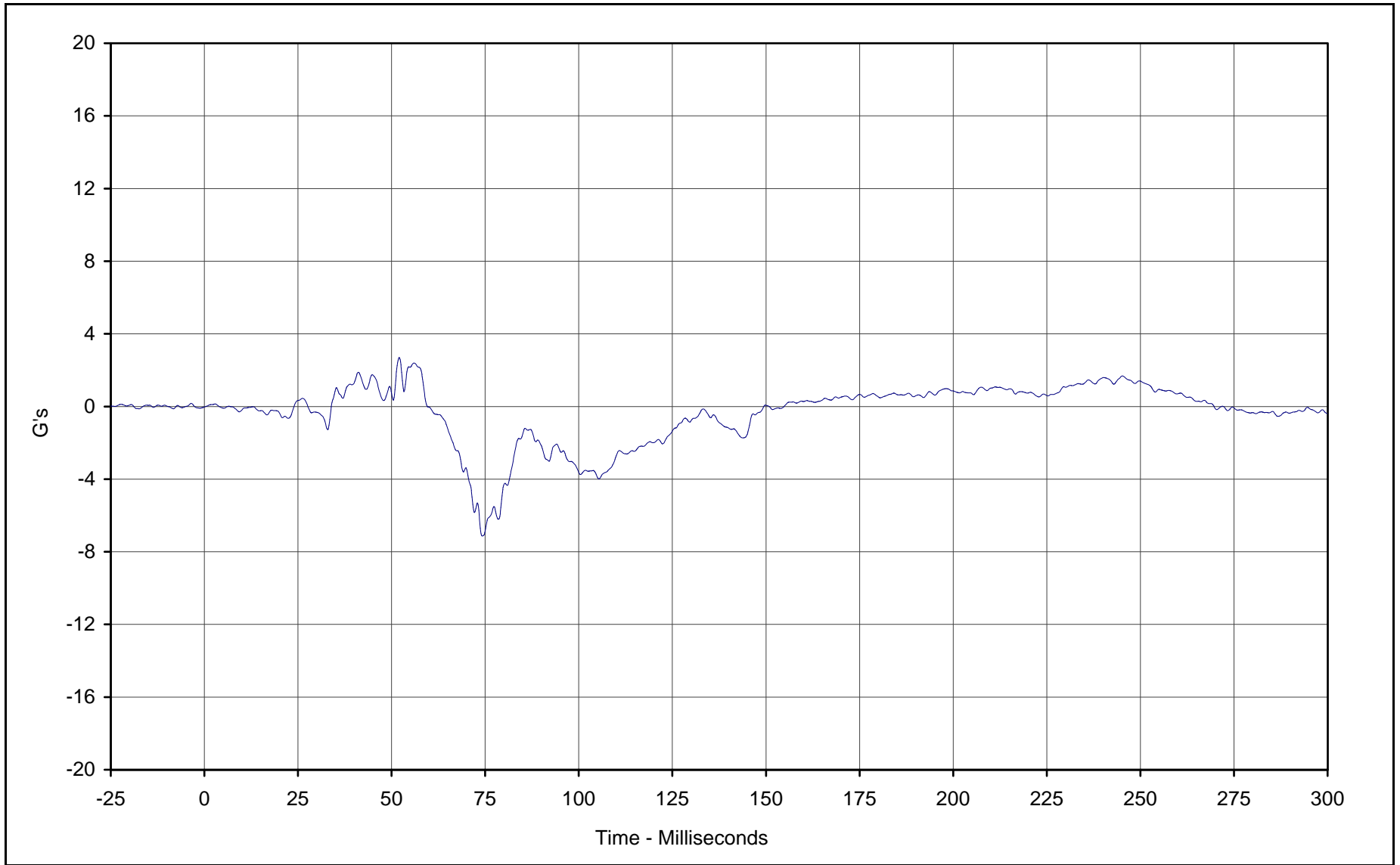
Curve Description: Passenger Chest Primary X Displ.
Maximum Value: 102.1 at 90.3 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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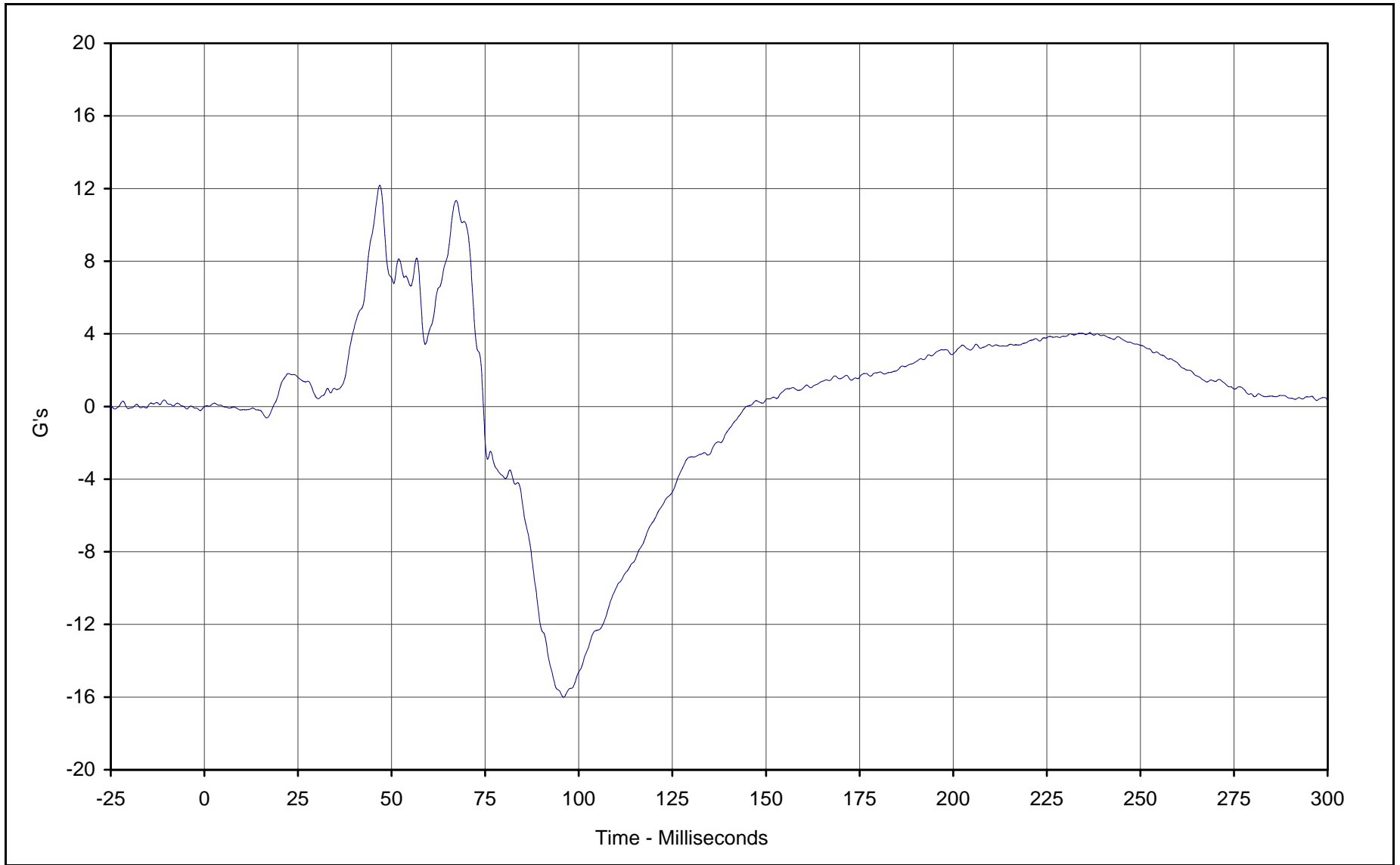
Curve Description: Passenger Chest Primary Y
Maximum Value: 2.7 at 52.0 Milliseconds
Minimum Value: -7.1 at 74.2 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-058

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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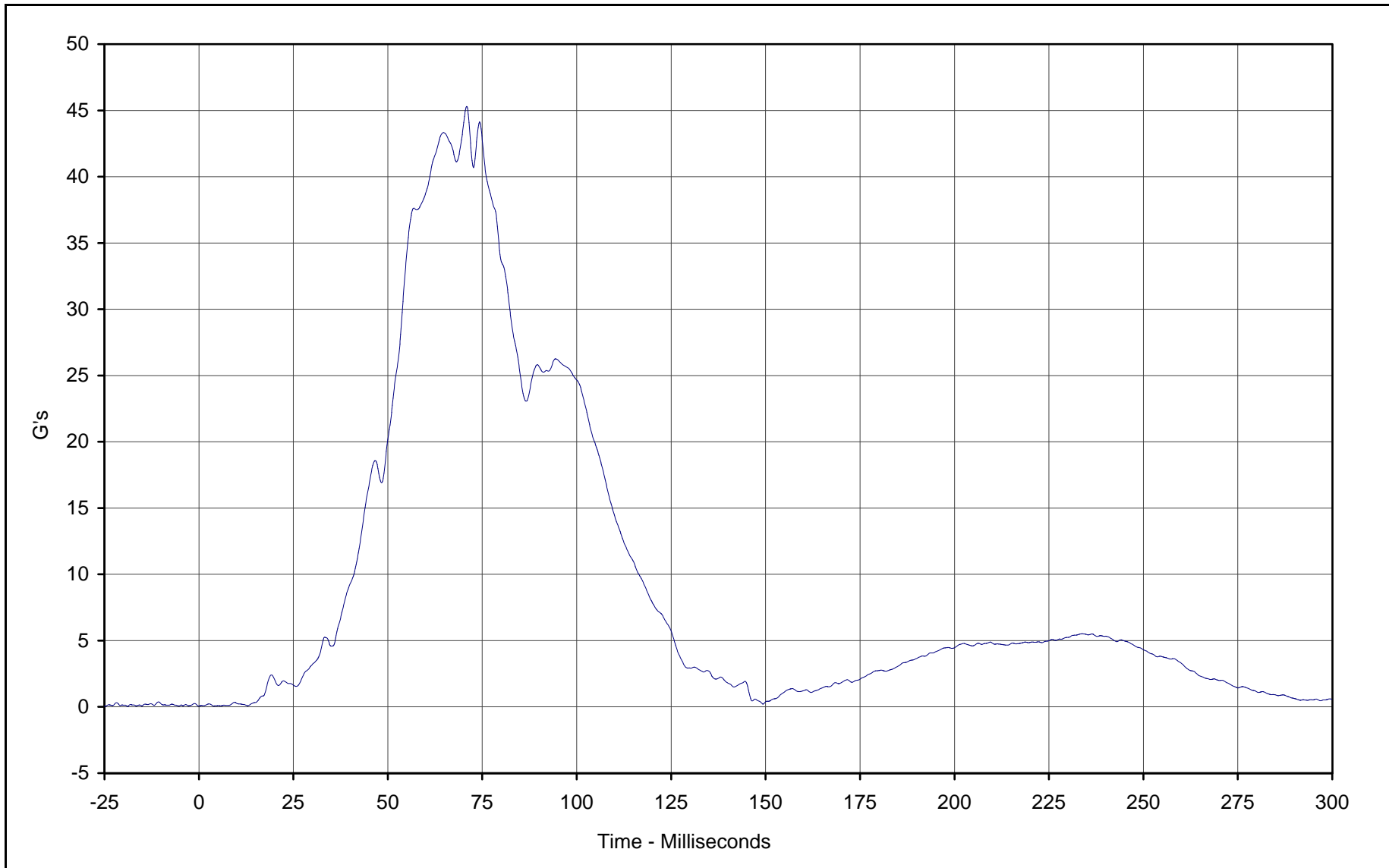
Curve Description: Passenger Chest Primary Z
Maximum Value: 12.2 at 46.9 Milliseconds
Minimum Value: -16.0 at 95.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-059

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-87



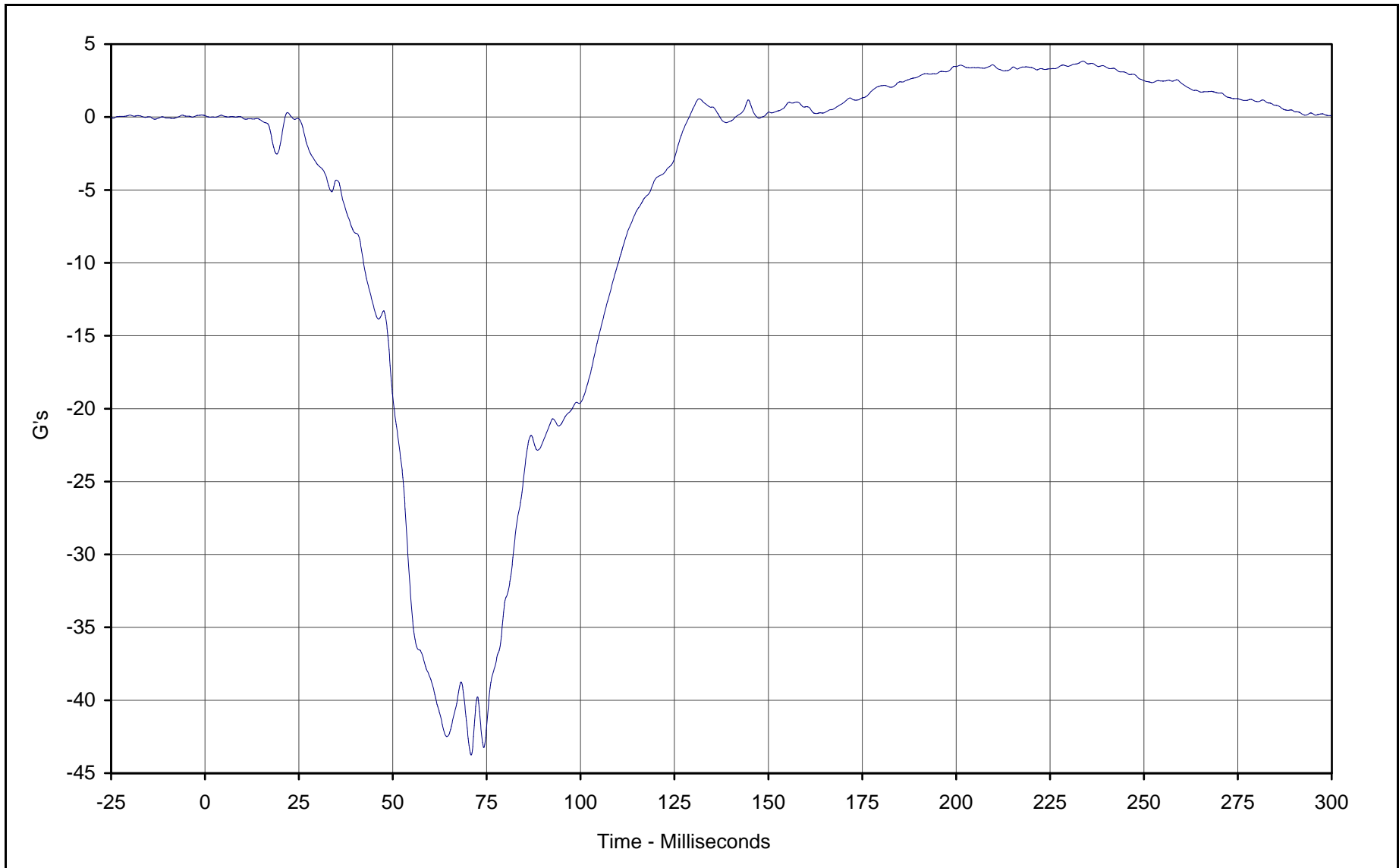
Curve Description: Passenger Chest Resultant Primary
Maximum Value: 45.3 at 70.9 Milliseconds
Minimum Value: 0.1 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: RES-057

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-88



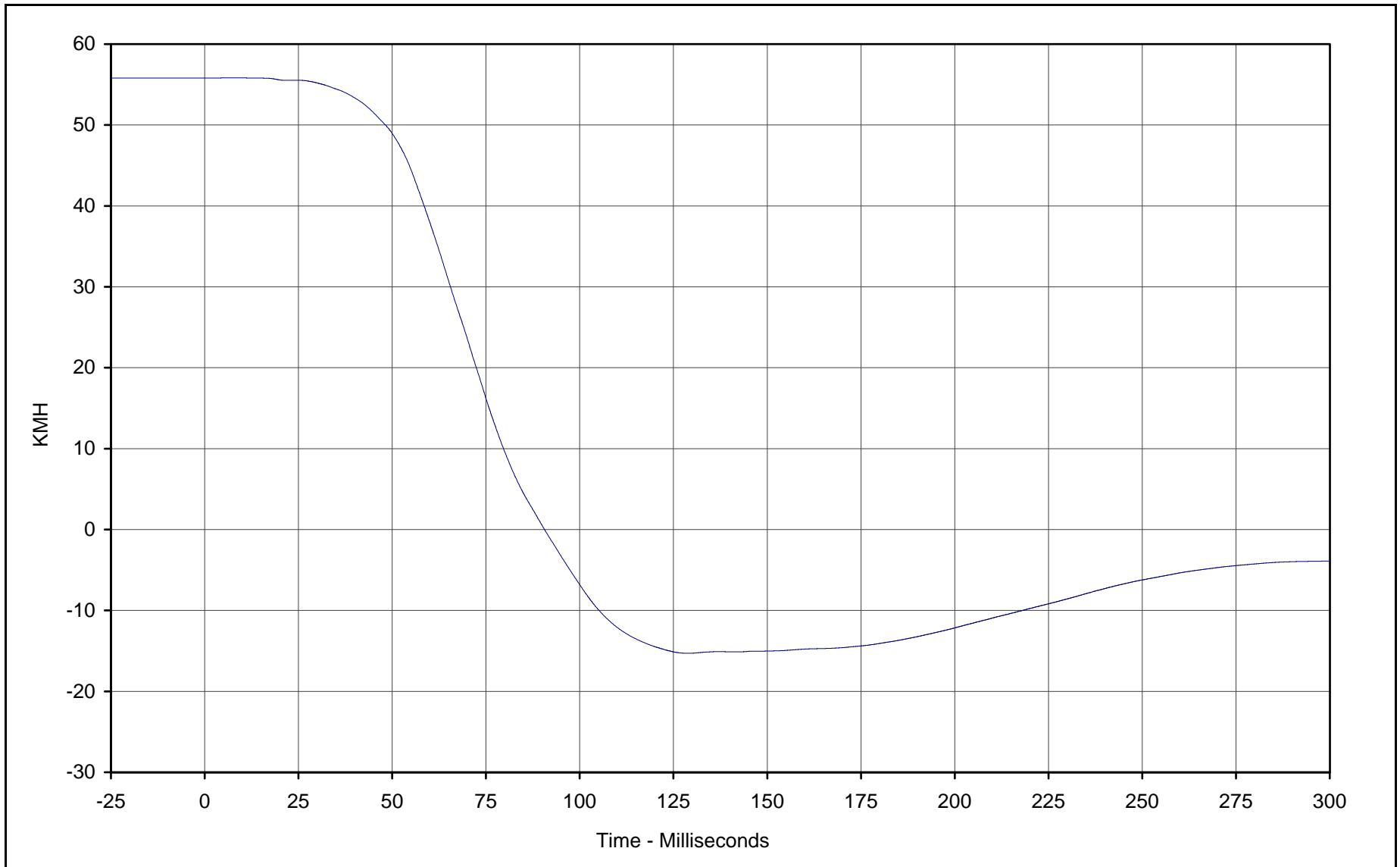
Curve Description: Passenger Chest Redundant X
Maximum Value: 3.8 at 233.8 Milliseconds
Minimum Value: -43.7 at 70.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-060

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-89



Curve Description: Passenger Chest Redundant X Velocity

Maximum Value: 55.8 at 9.7 Milliseconds

Minimum Value: -15.3 at 128.9 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN1-060

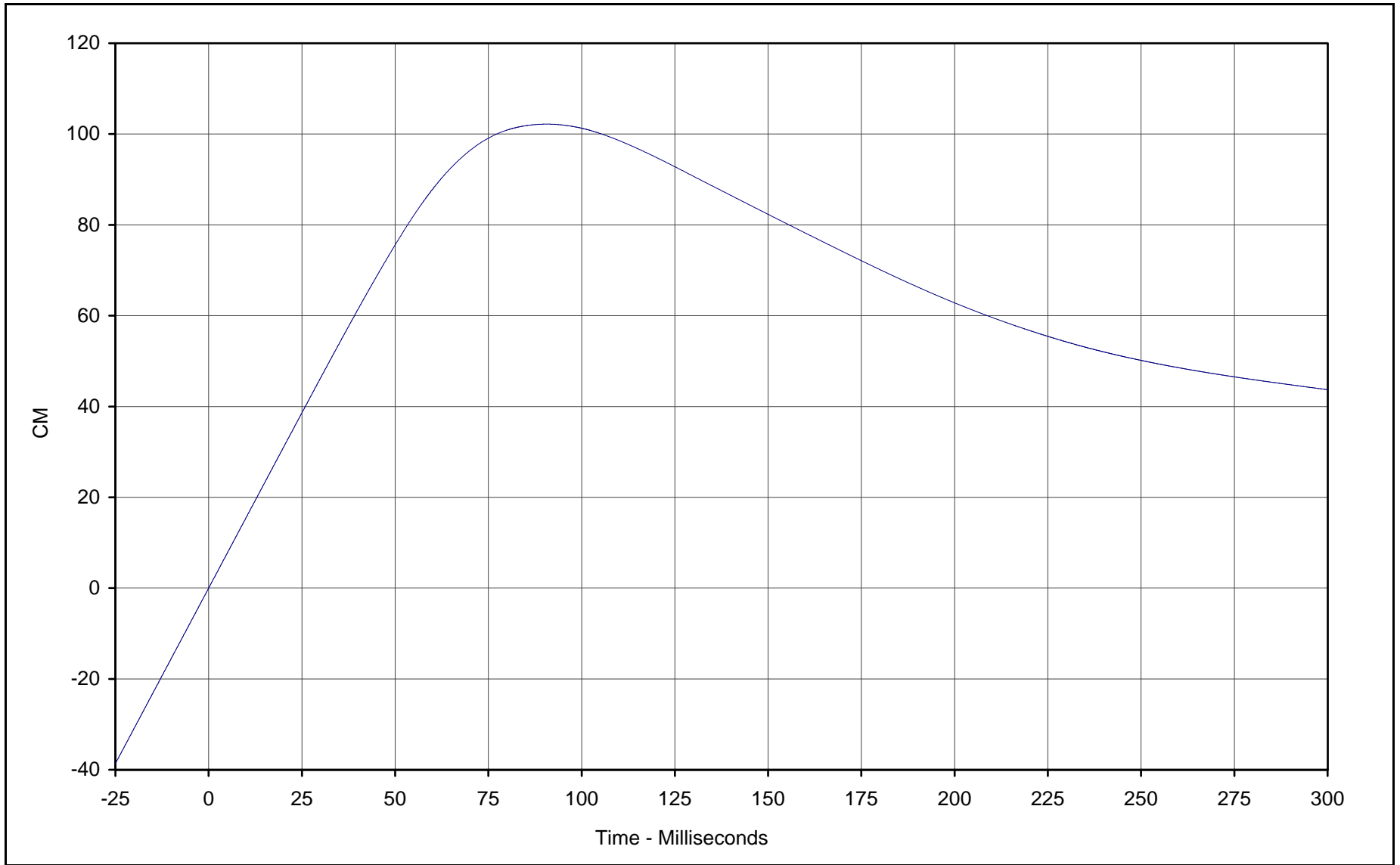
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-90



Curve Description: Passenger Chest Redundant X Displ.

Maximum Value: 102.2 at 90.6 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN2-060

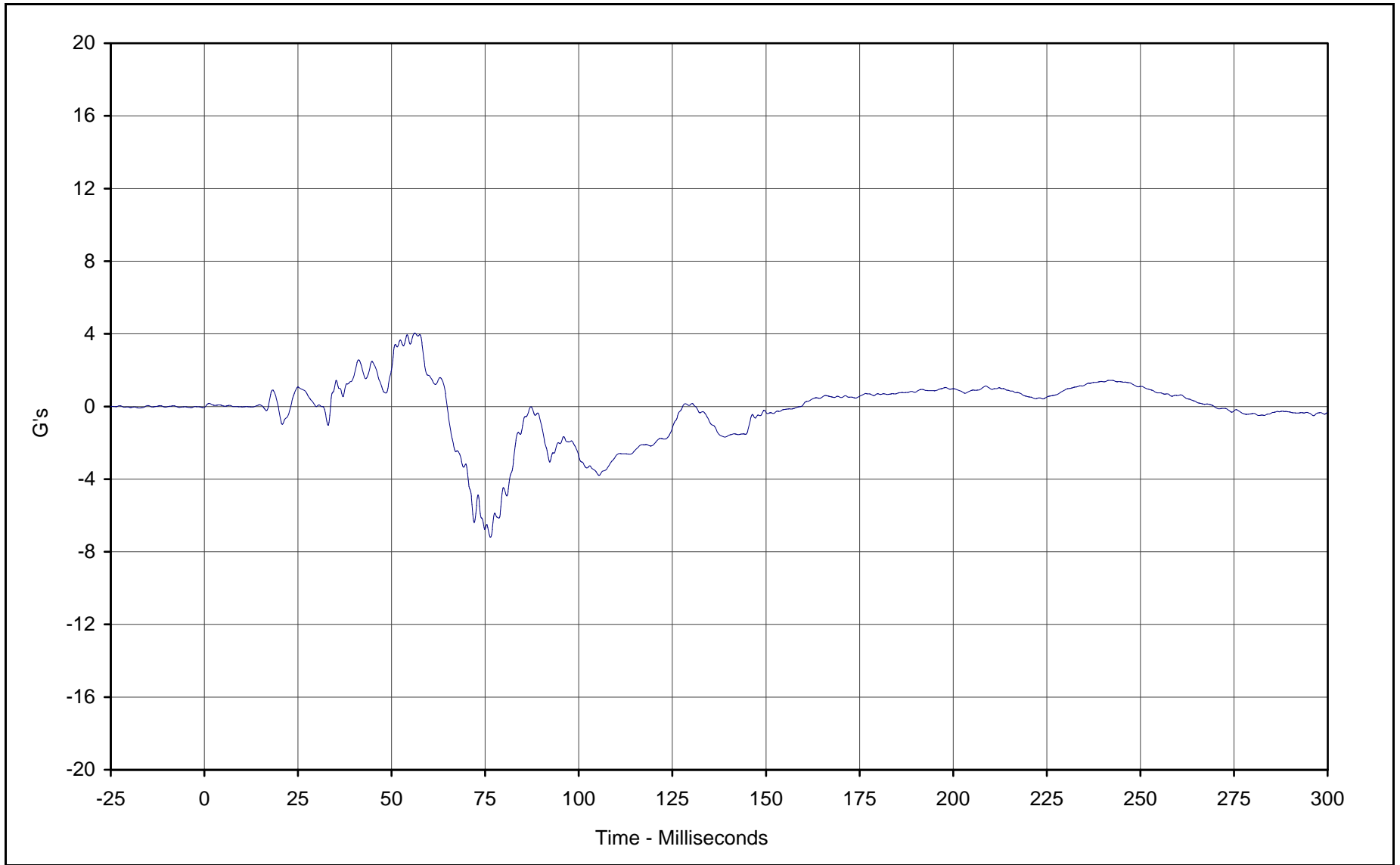
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-91



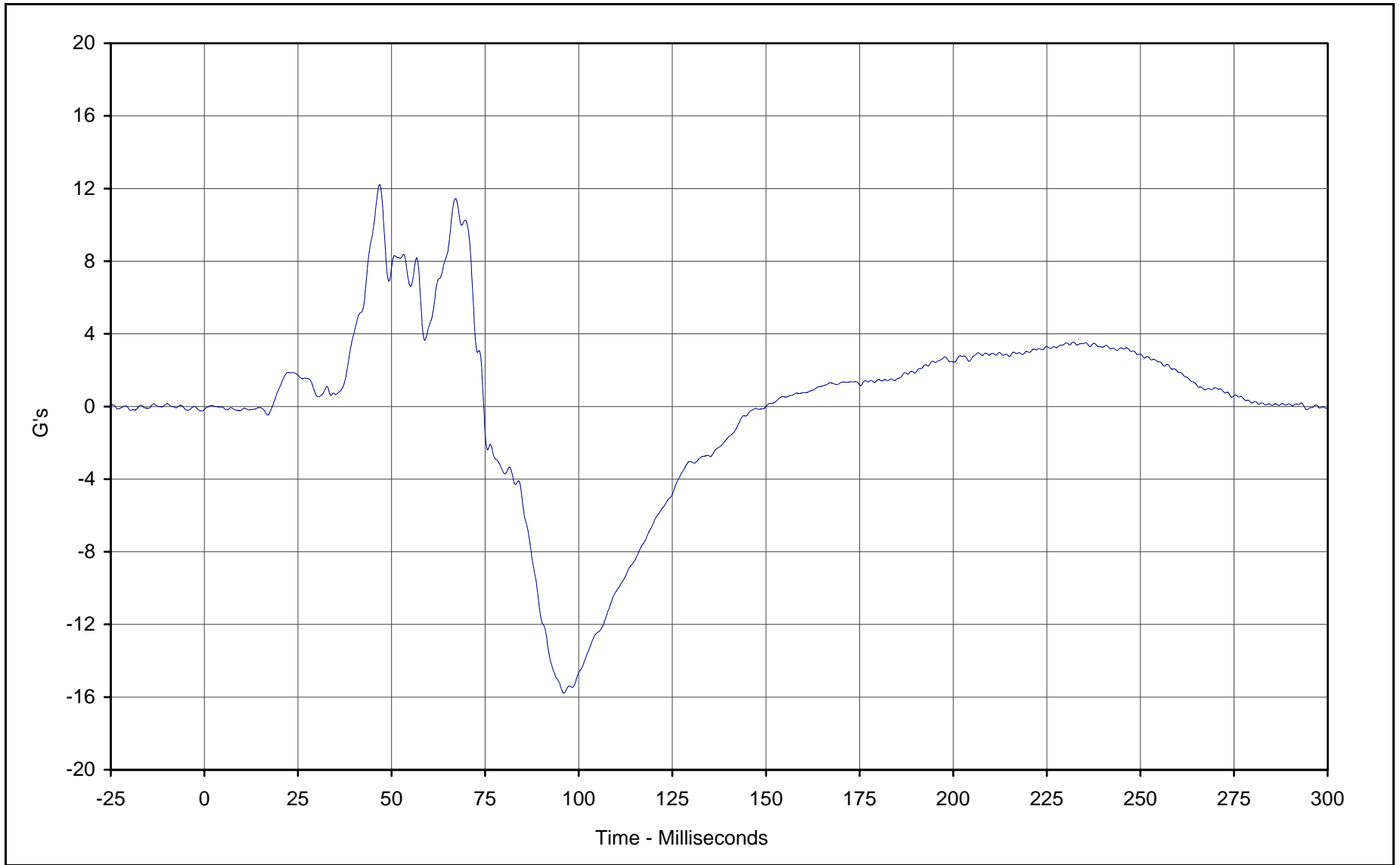
Curve Description: Passenger Chest Redundant Y
Maximum Value: 4.0 at 56.2 Milliseconds
Minimum Value: -7.2 at 76.4 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-061

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-92



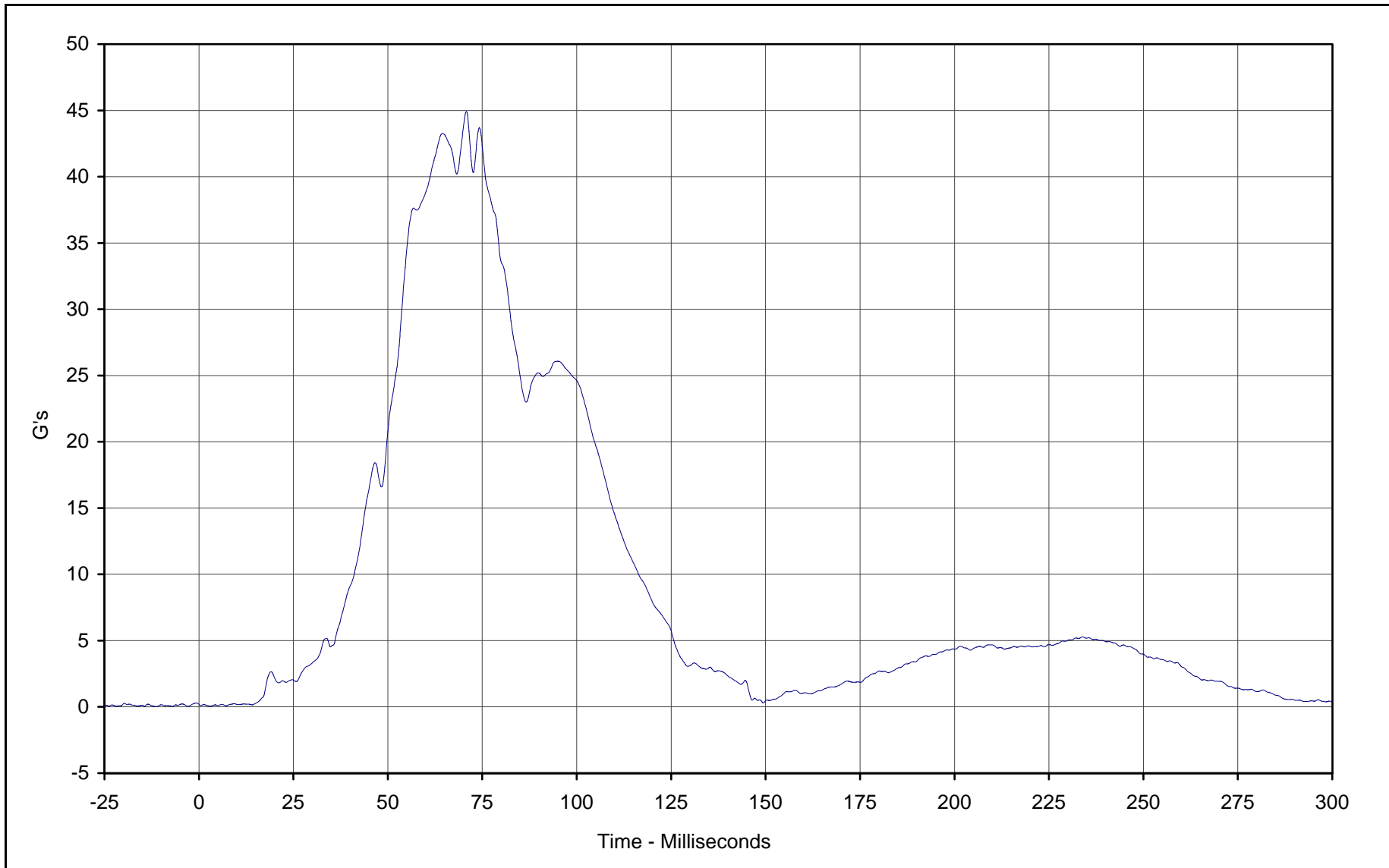
Curve Description: Passenger Chest Redundant Z
Maximum Value: 12.2 at 46.8 Milliseconds
Minimum Value: -15.8 at 96.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-062

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-93



Curve Description: Passenger Chest Resultant Redundant

Maximum Value: 44.9 at 70.8 Milliseconds

Minimum Value: 0.1 at 2.9 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: RES-060

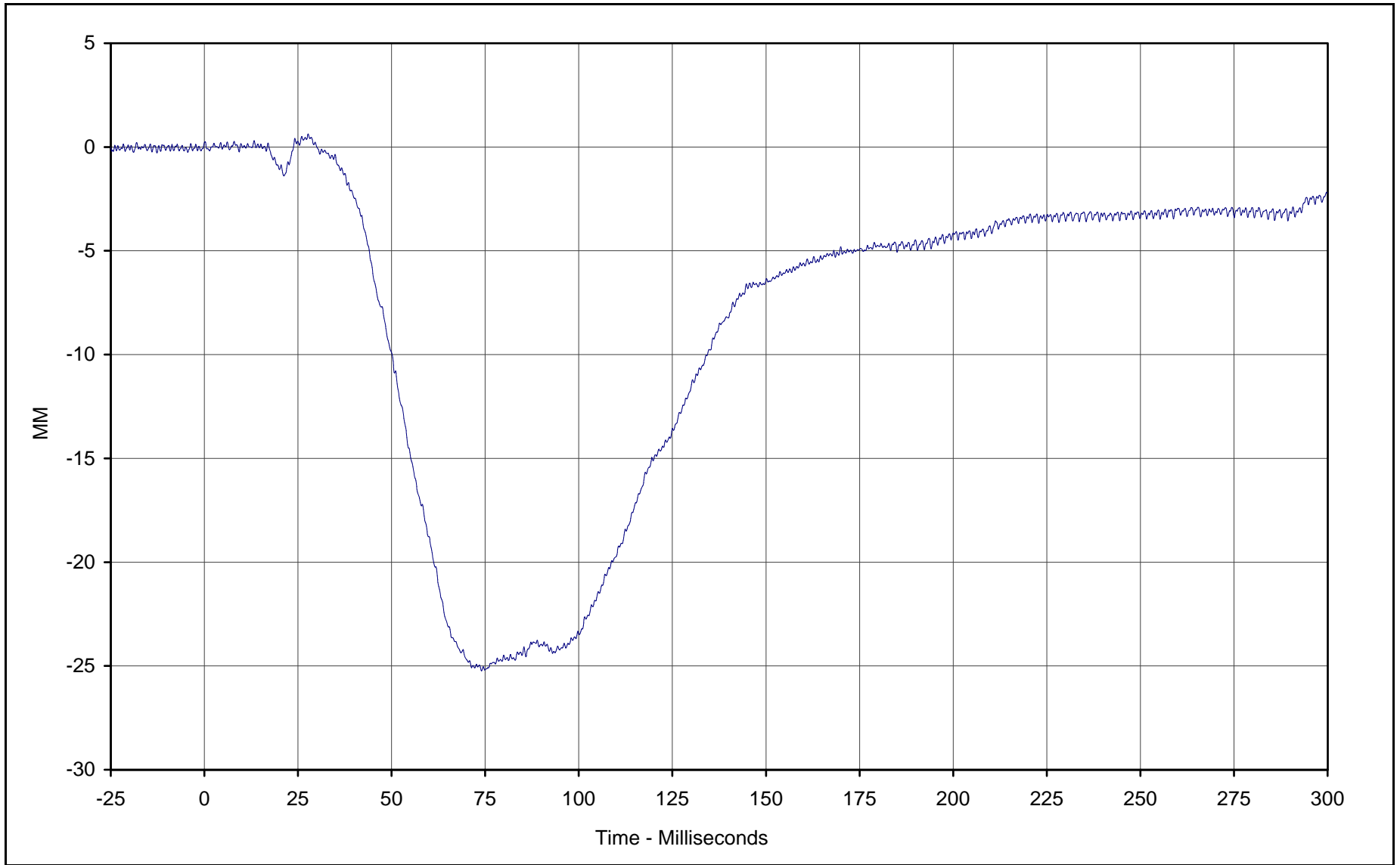
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-94



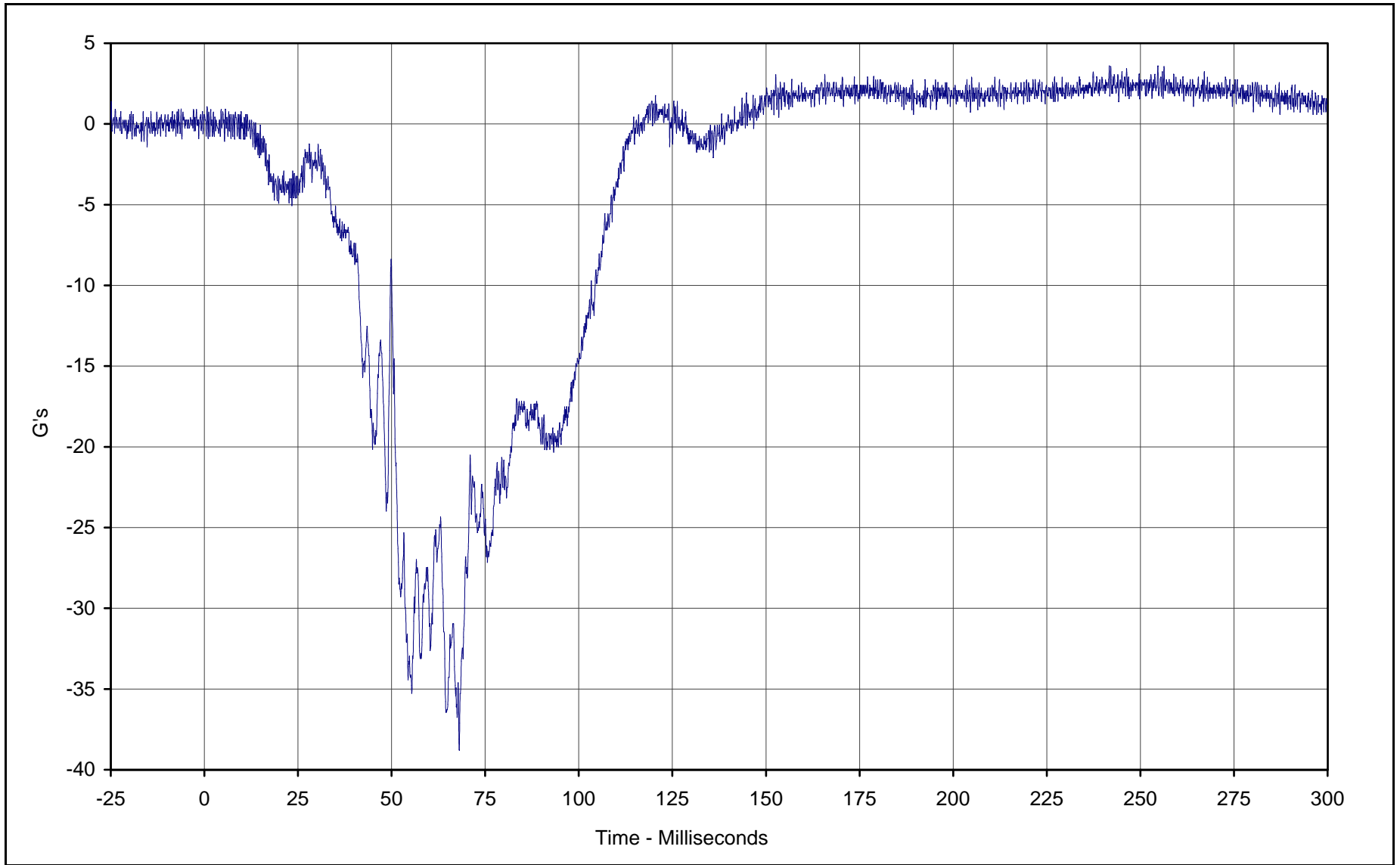
Curve Description: Passenger Chest Displacement X
Maximum Value: 0.6 at 27.7 Milliseconds
Minimum Value: -25.2 at 74.0 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-063

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-95



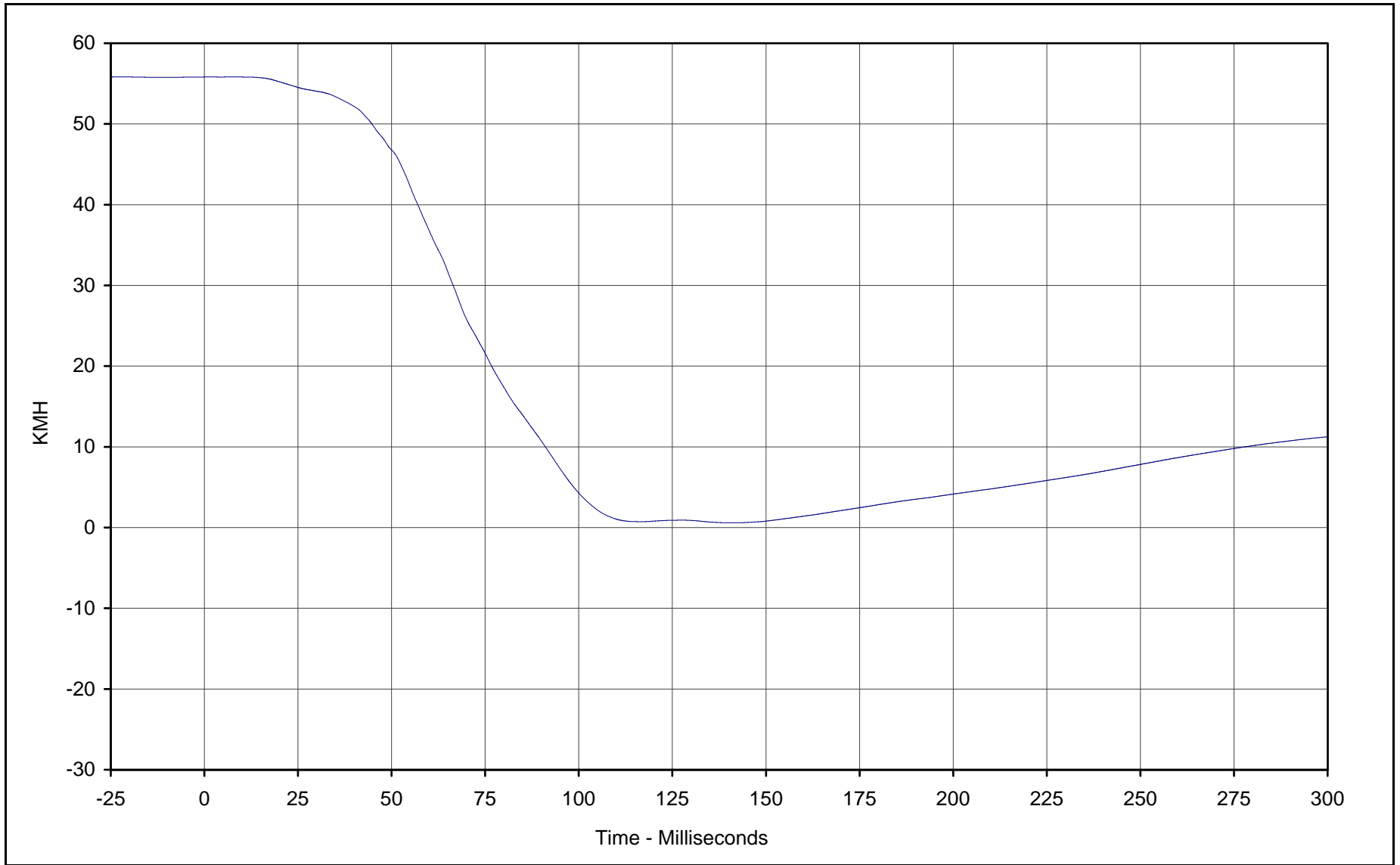
Curve Description: Passenger Pelvis X
Maximum Value: 3.6 at 241.7 Milliseconds
Minimum Value: -38.8 at 68.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-96



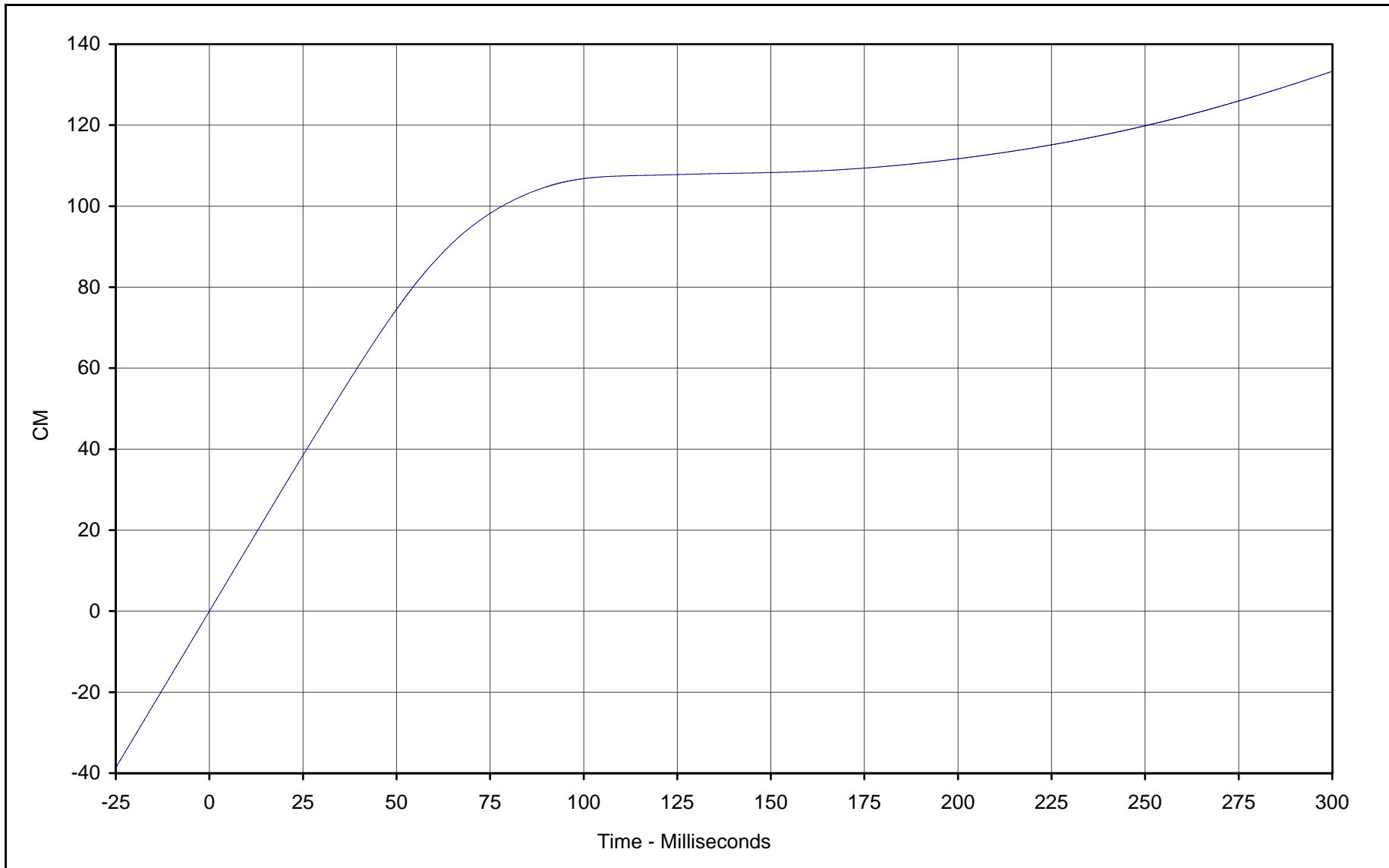
Curve Description: Passenger Pelvis X Velocity
Maximum Value: 55.8 at 1.4 Milliseconds
Minimum Value: 0.6 at 141.3 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-97



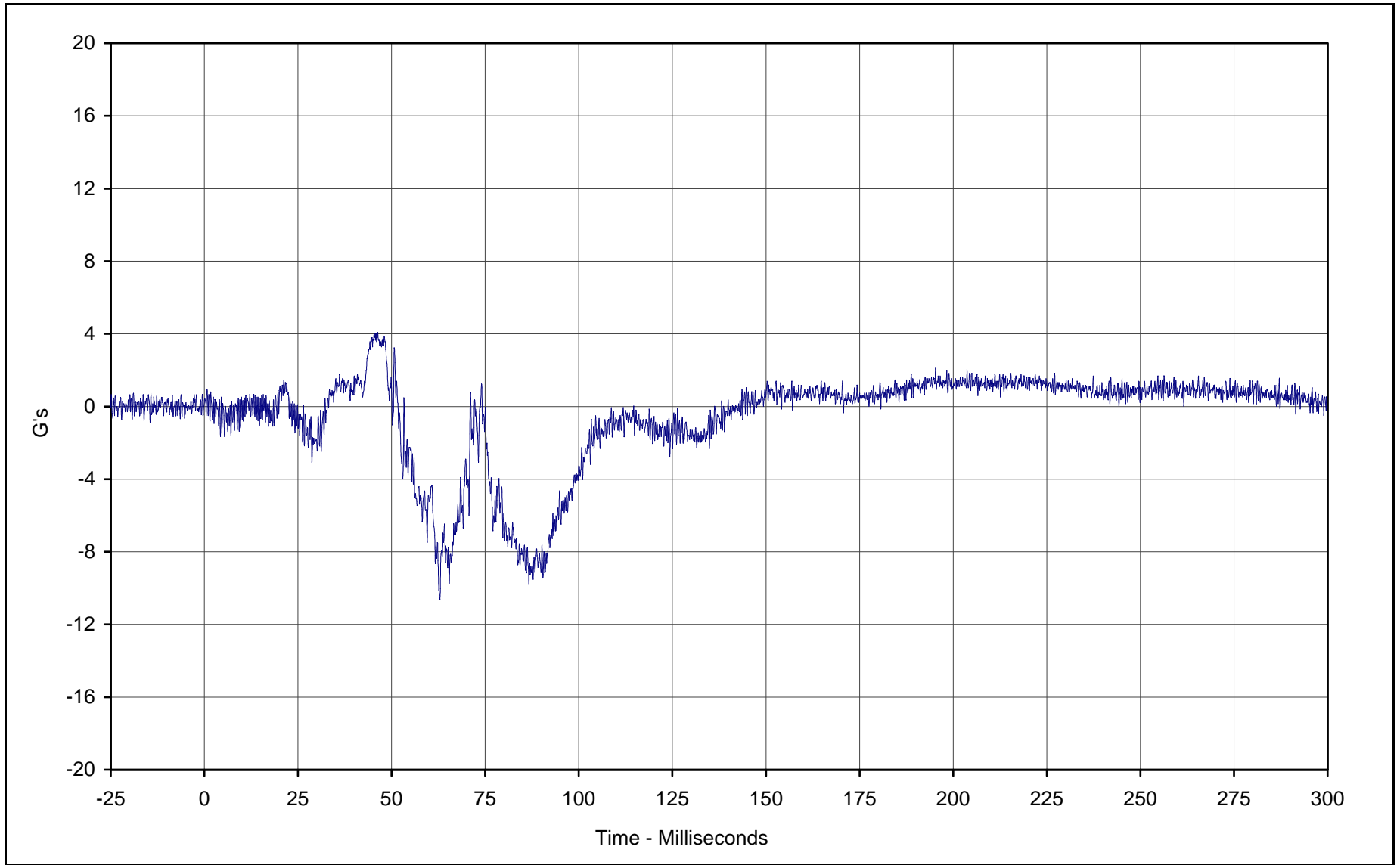
Curve Description: Passenger Pelvis X Displ.
Maximum Value: 133.3 at 299.9 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-98



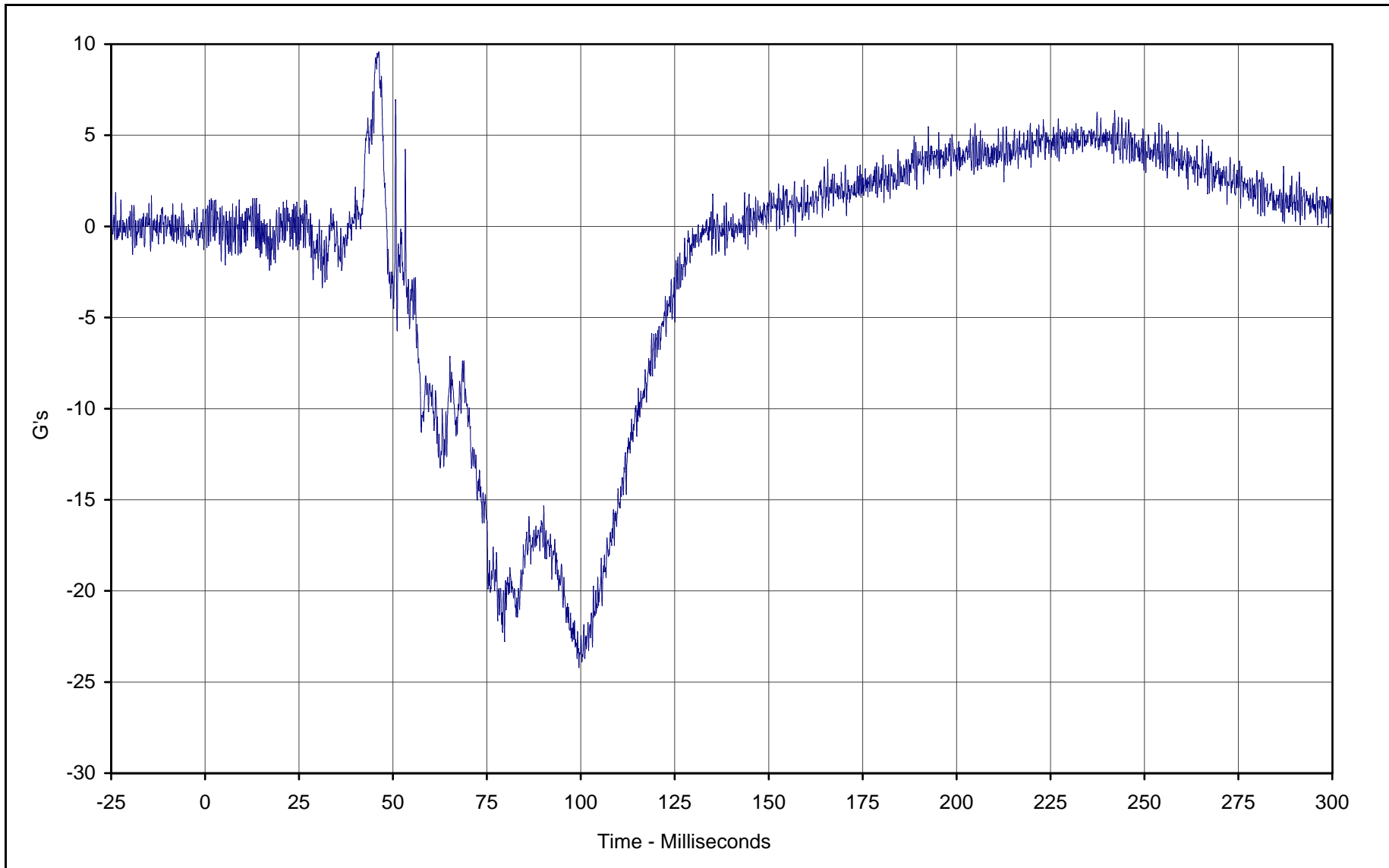
Curve Description: Passenger Pelvis Y
Maximum Value: 4.1 at 46.3 Milliseconds
Minimum Value: -10.6 at 62.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-065

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-99



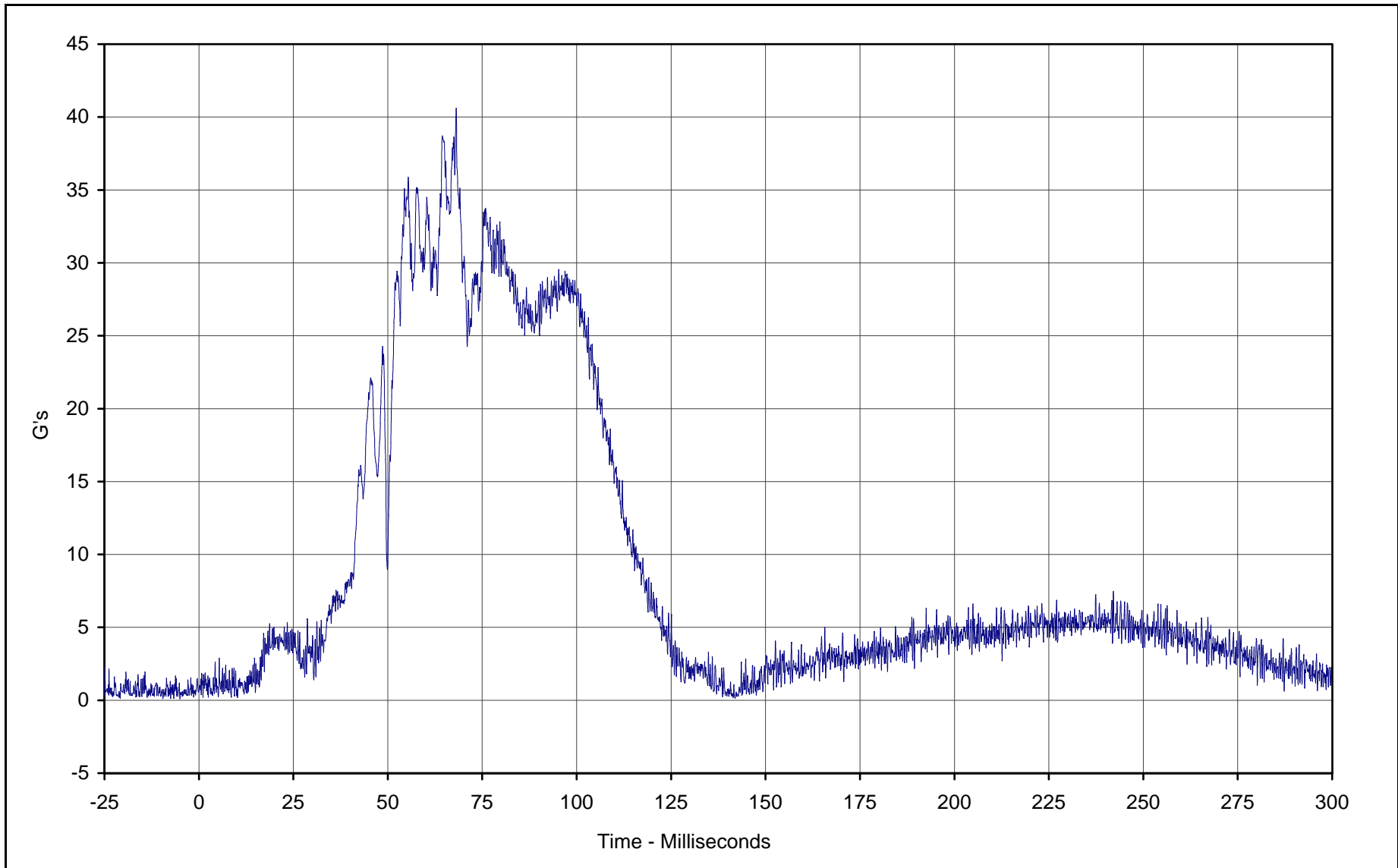
Curve Description: Passenger Pelvis Z
Maximum Value: 9.6 at 46.2 Milliseconds
Minimum Value: -24.2 at 99.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: FIL-066

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-100



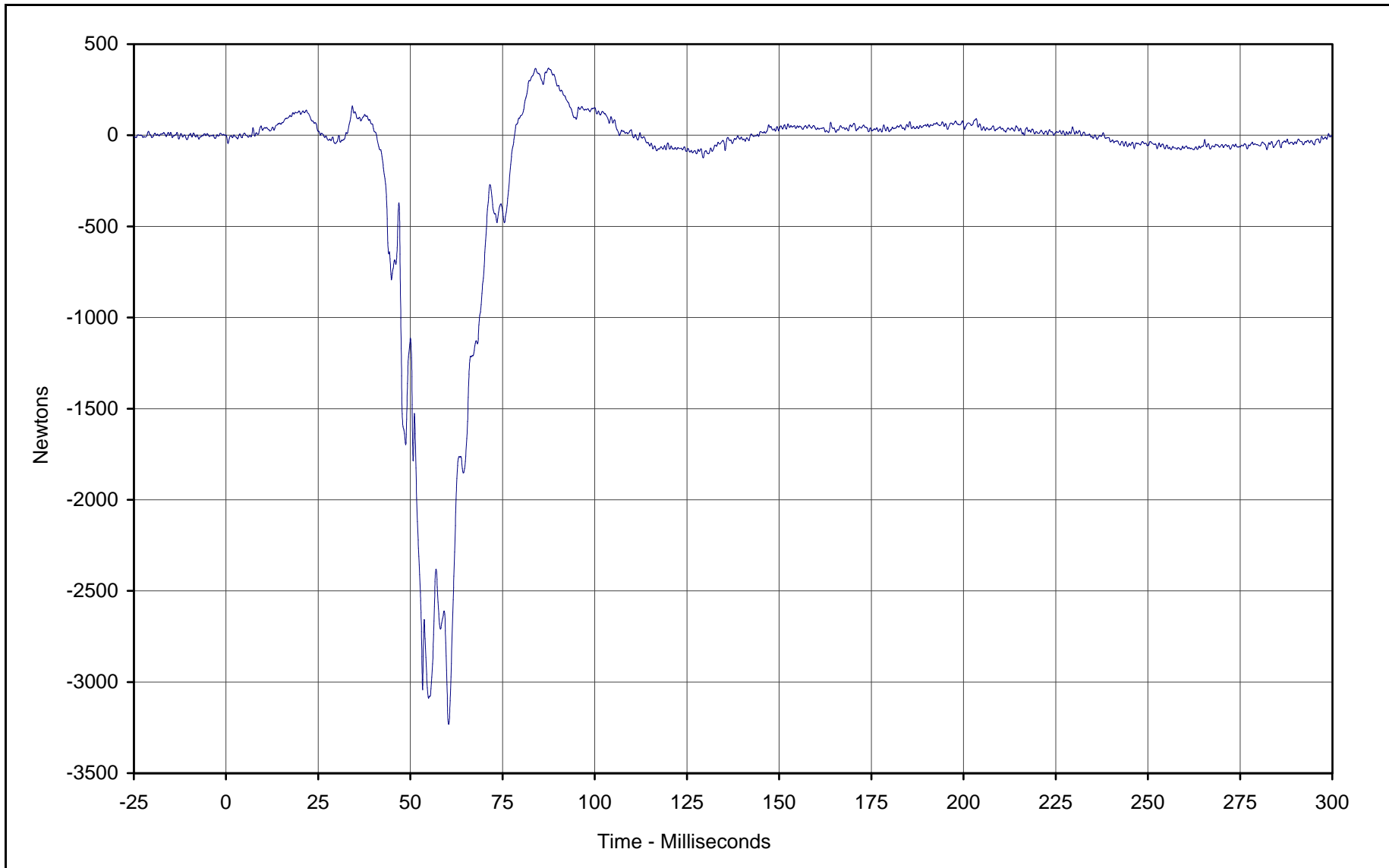
Curve Description: Passenger Pelvis Resultant
Maximum Value: 40.6 at 68.1 Milliseconds
Minimum Value: 0.1 at 141.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/2/01
Curve Number: RES-064

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-101



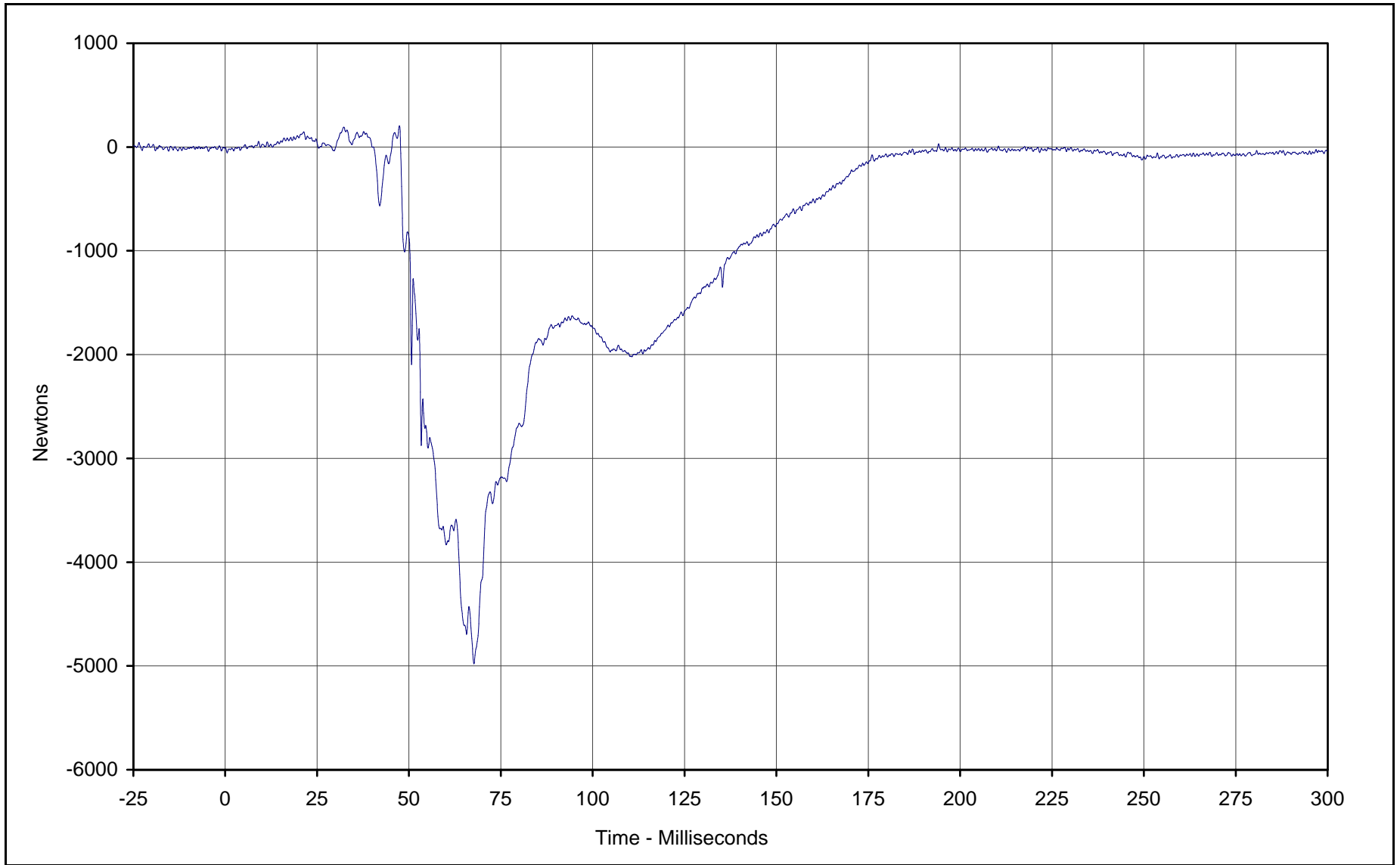
Curve Description: Passenger Left Femur Force
Maximum Value: 368.2 at 87.5 Milliseconds
Minimum Value: -3231.9 at 60.4 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-067

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-102



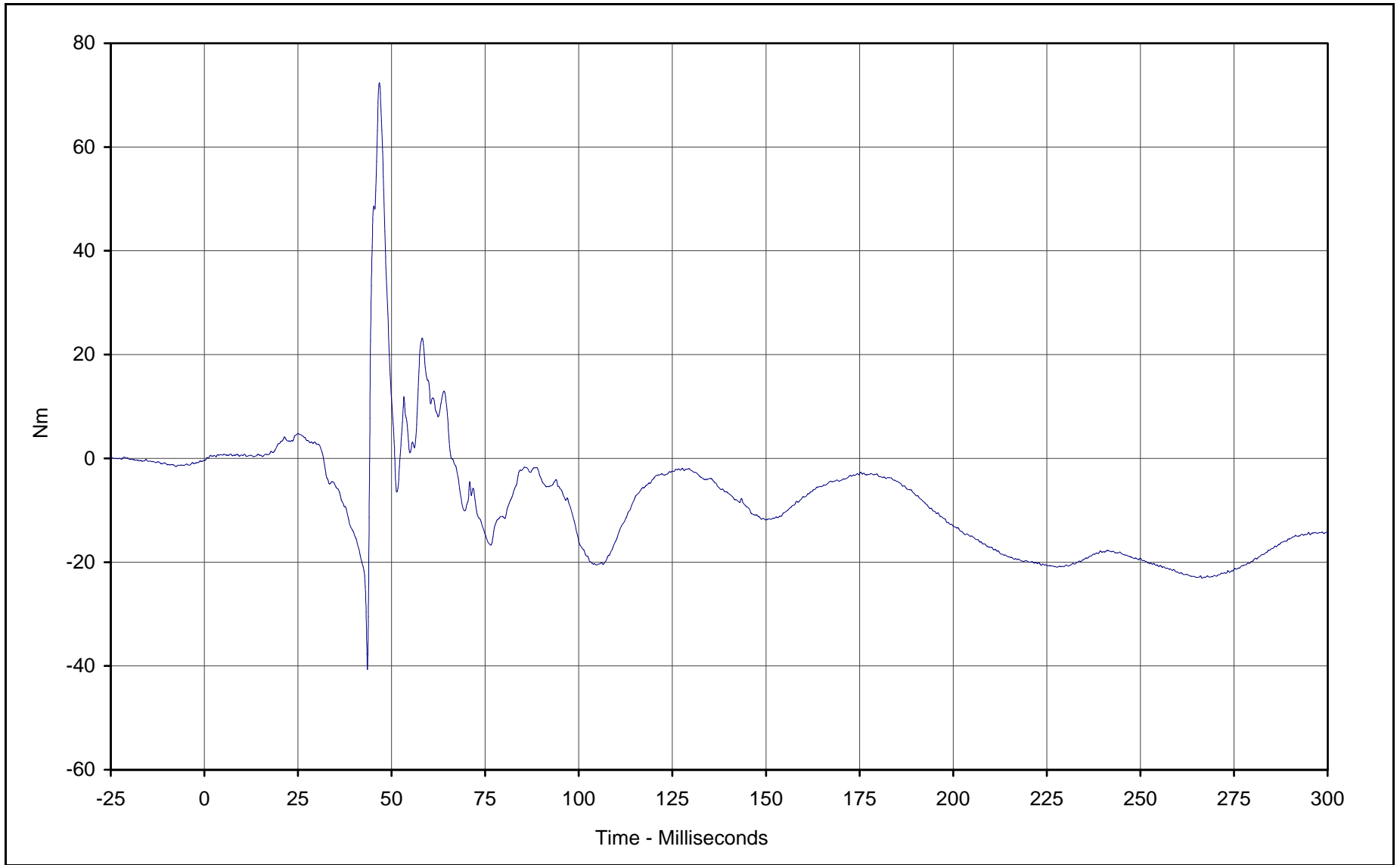
Curve Description: Passenger Right Femur Force
Maximum Value: 204.8 at 47.4 Milliseconds
Minimum Value: -4980.9 at 67.7 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-068

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-103



Curve Description: Passenger Left Upper Tibia Moment X

Maximum Value: 72.4 at 46.7 Milliseconds

Minimum Value: -40.7 at 43.6 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-069

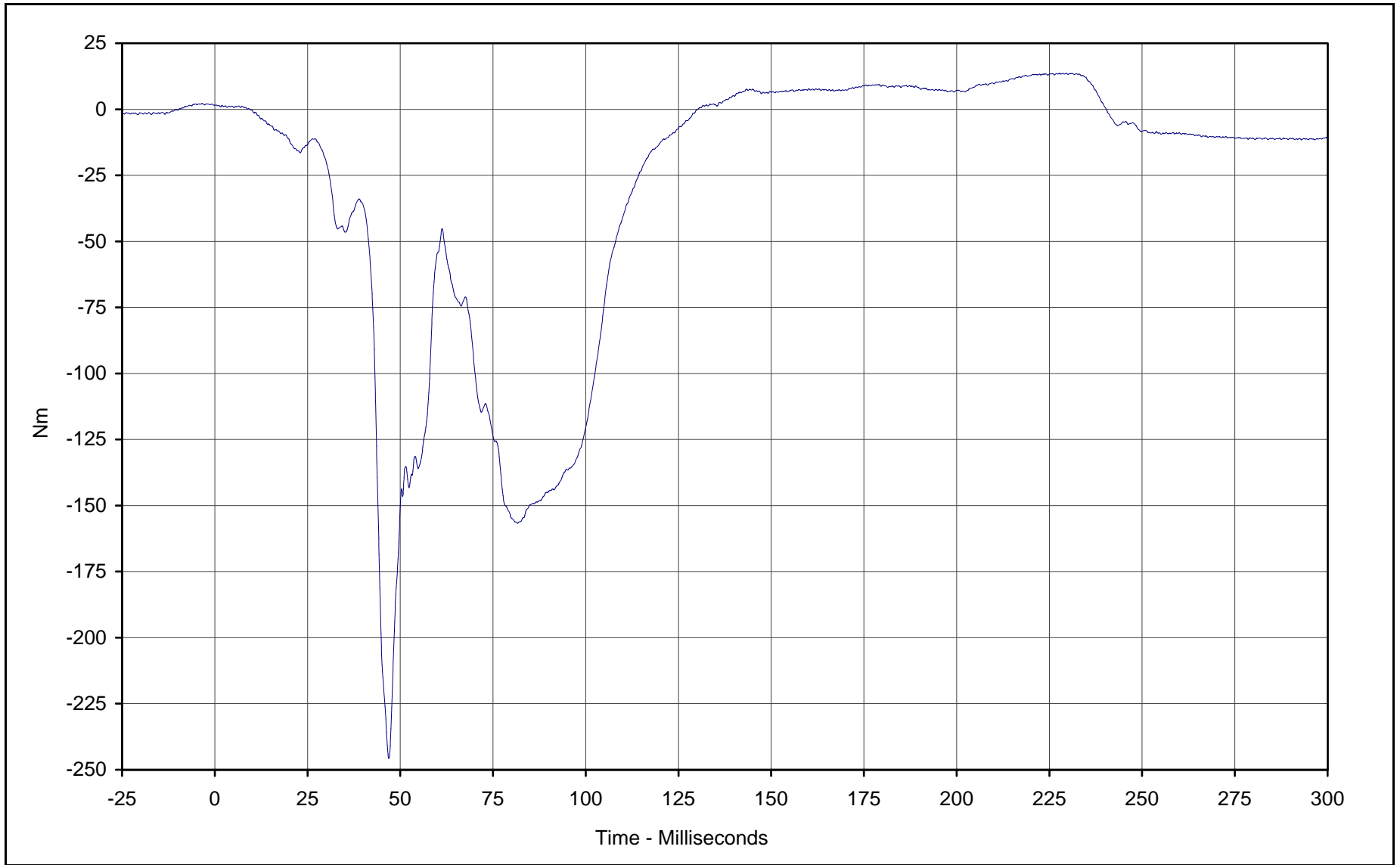
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-104



Curve Description: Passenger Left Upper Tibia Moment Y

Maximum Value: 13.7 at 229.5 Milliseconds

Minimum Value: -245.7 at 46.9 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-070

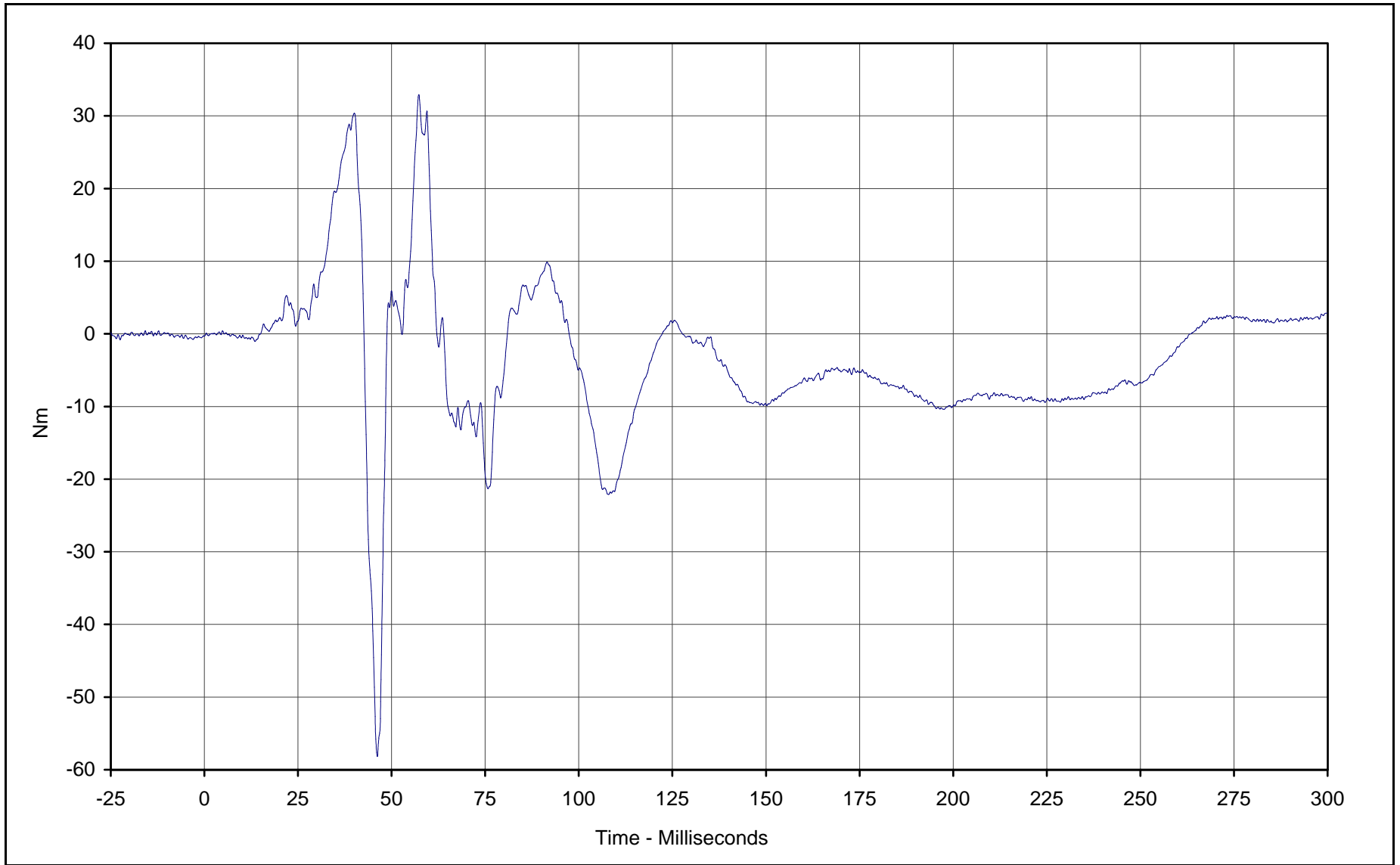
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-105



Curve Description: Passenger Right Upper Tibia Moment X

Maximum Value: 32.9 at 57.3 Milliseconds

Minimum Value: -58.2 at 46.2 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-071

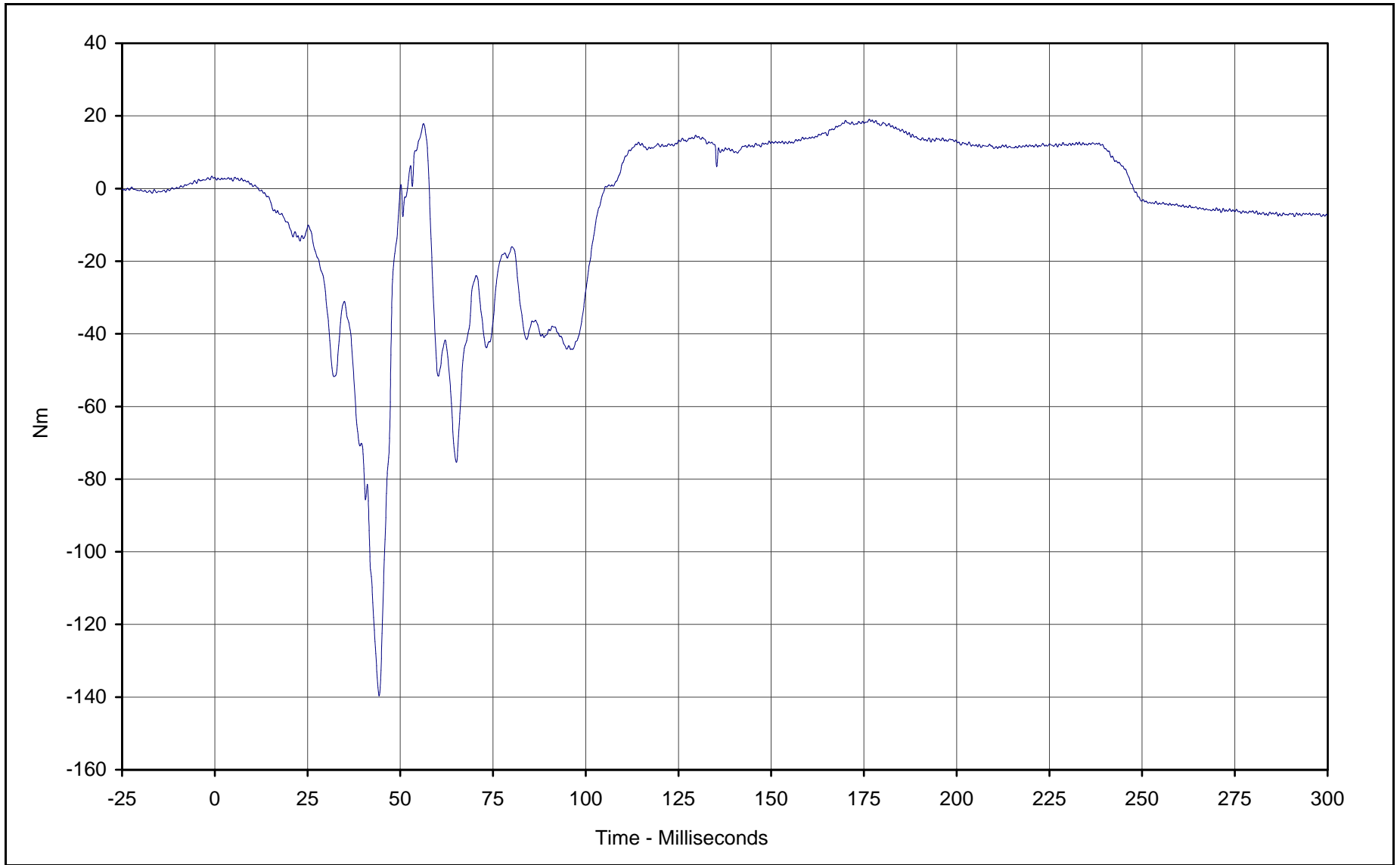
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-106



Curve Description: Passenger Right Upper Tibia Moment Y

Maximum Value: 19.1 at 176.4 Milliseconds

Minimum Value: -139.7 at 44.3 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-072

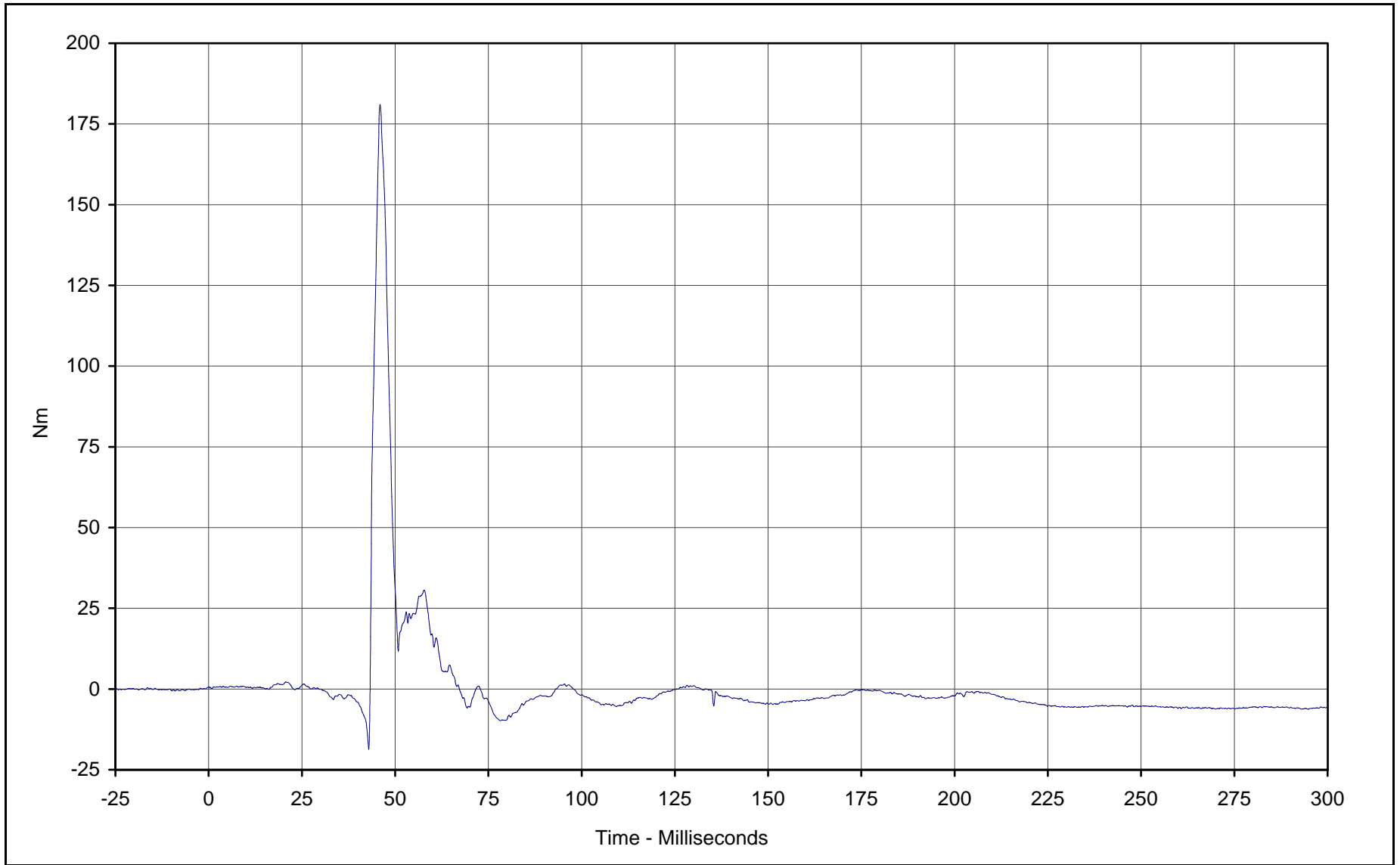
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-107



Curve Description: Passenger Left Lower Tibia Moment X

Maximum Value: 180.9 at 46.0 Milliseconds

Minimum Value: -18.7 at 42.9 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-073

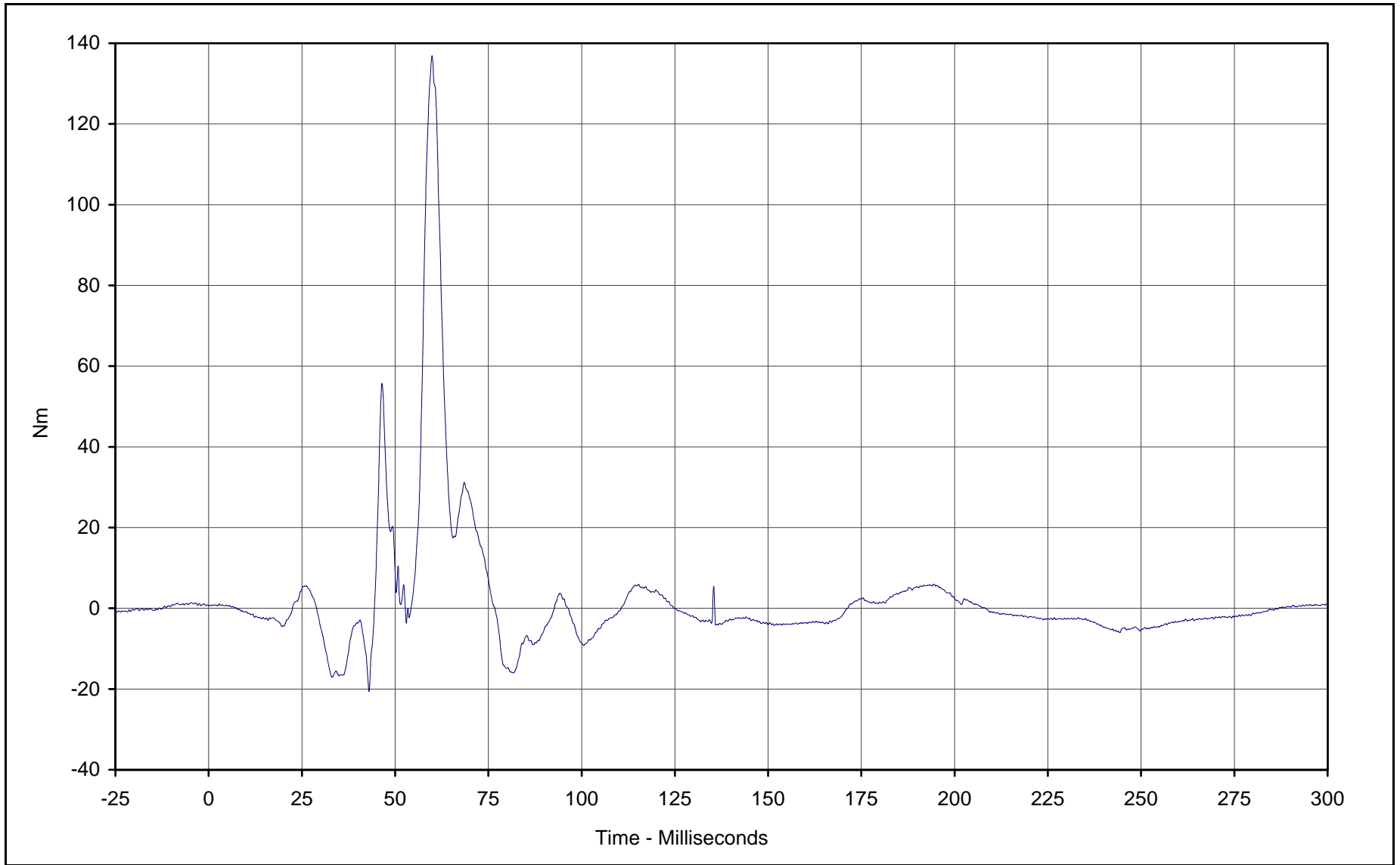
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-108



Curve Description: Passenger Left Lower Tibia Moment Y

Maximum Value: 136.9 at 59.9 Milliseconds

Minimum Value: -20.6 at 43.0 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-074

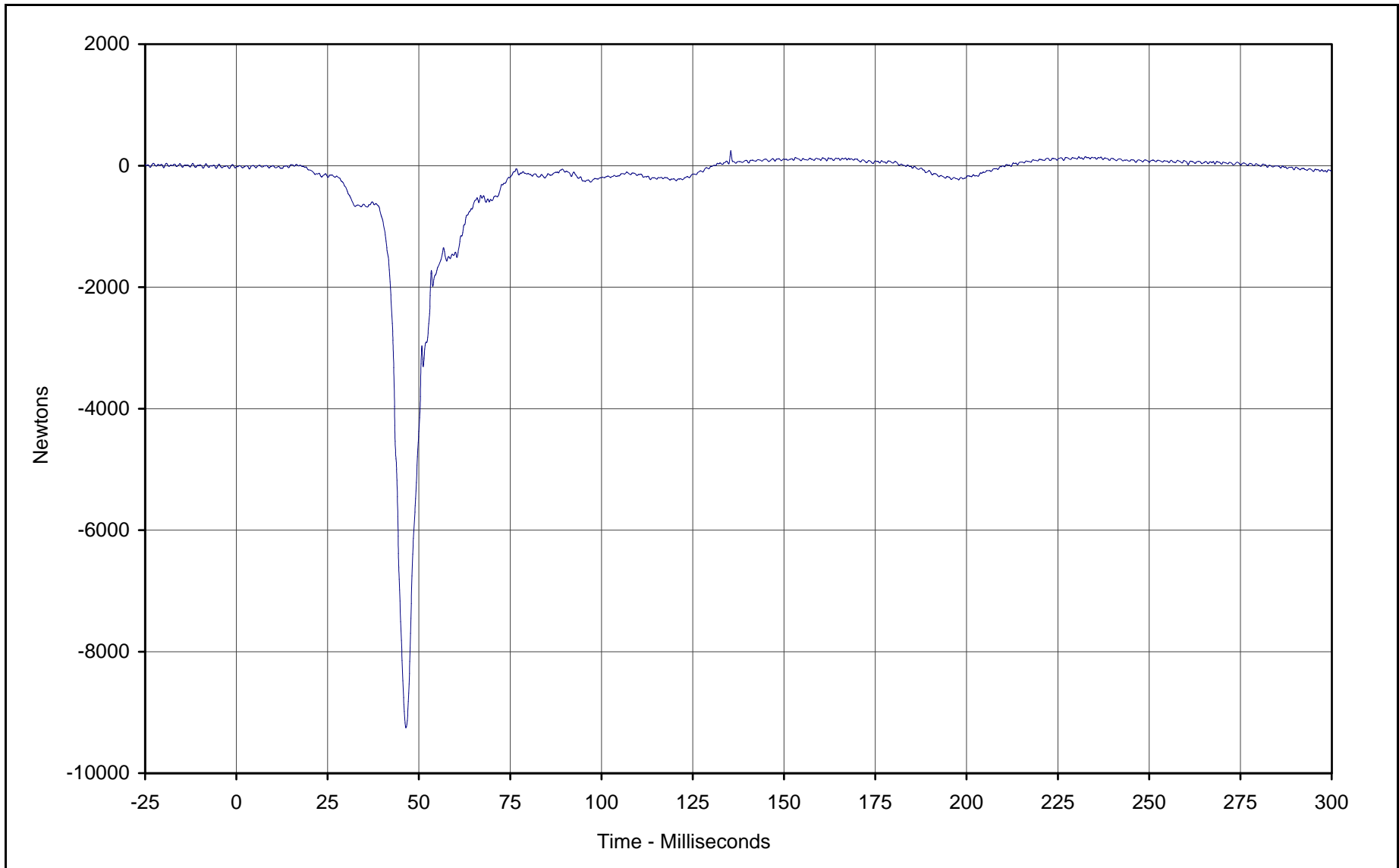
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-109



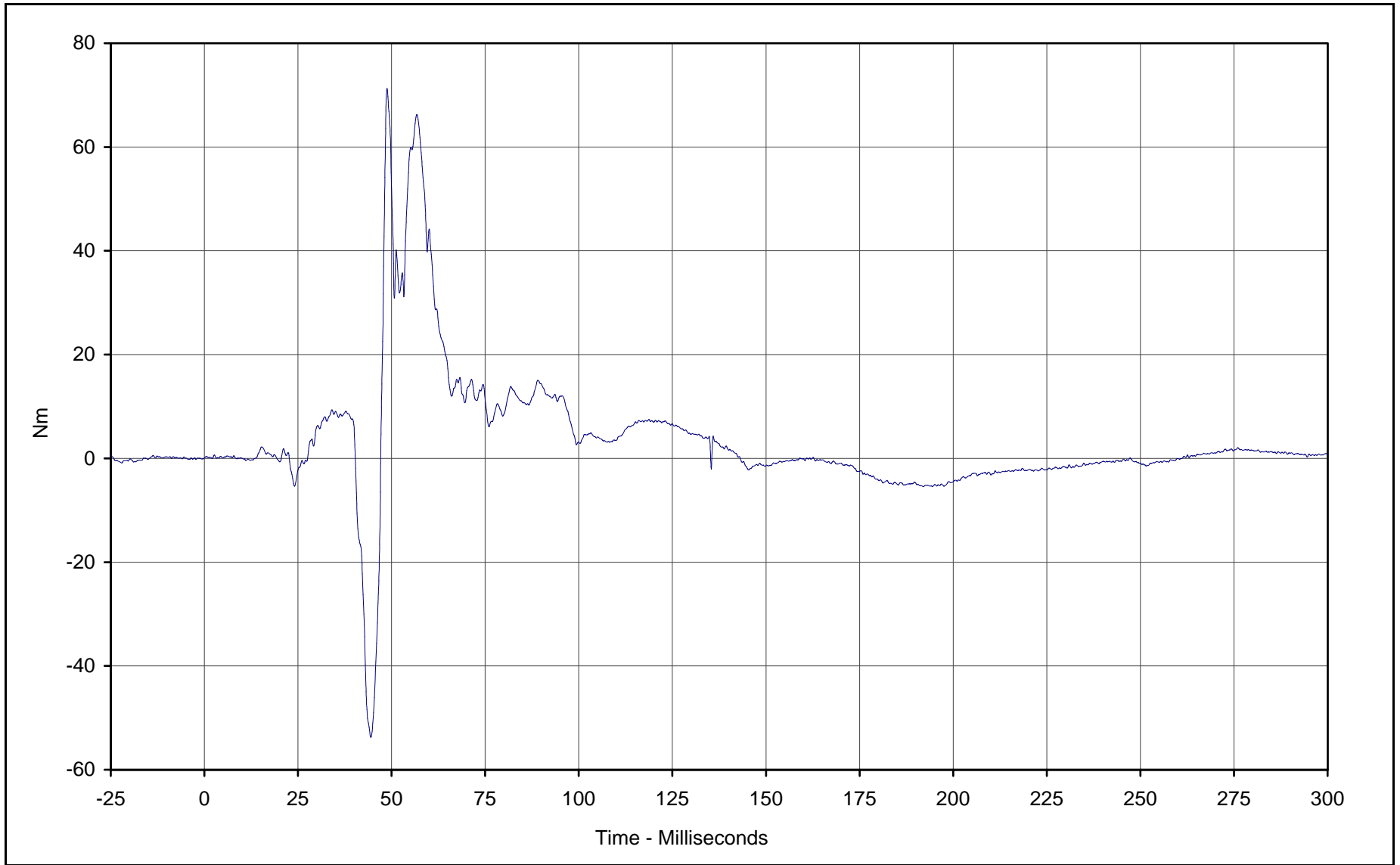
Curve Description: Passenger Left Lower Tibia Force Z
Maximum Value: 246.6 at 135.4 Milliseconds
Minimum Value: -9251.2 at 46.4 Milliseconds
SAE Filter Class: 600
Date of Test: 3/2/01
Curve Number: FIL-075

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-110



Curve Description: Passenger Right Lower Tibia Moment X

Maximum Value: 71.3 at 48.8 Milliseconds

Minimum Value: -53.8 at 44.5 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-076

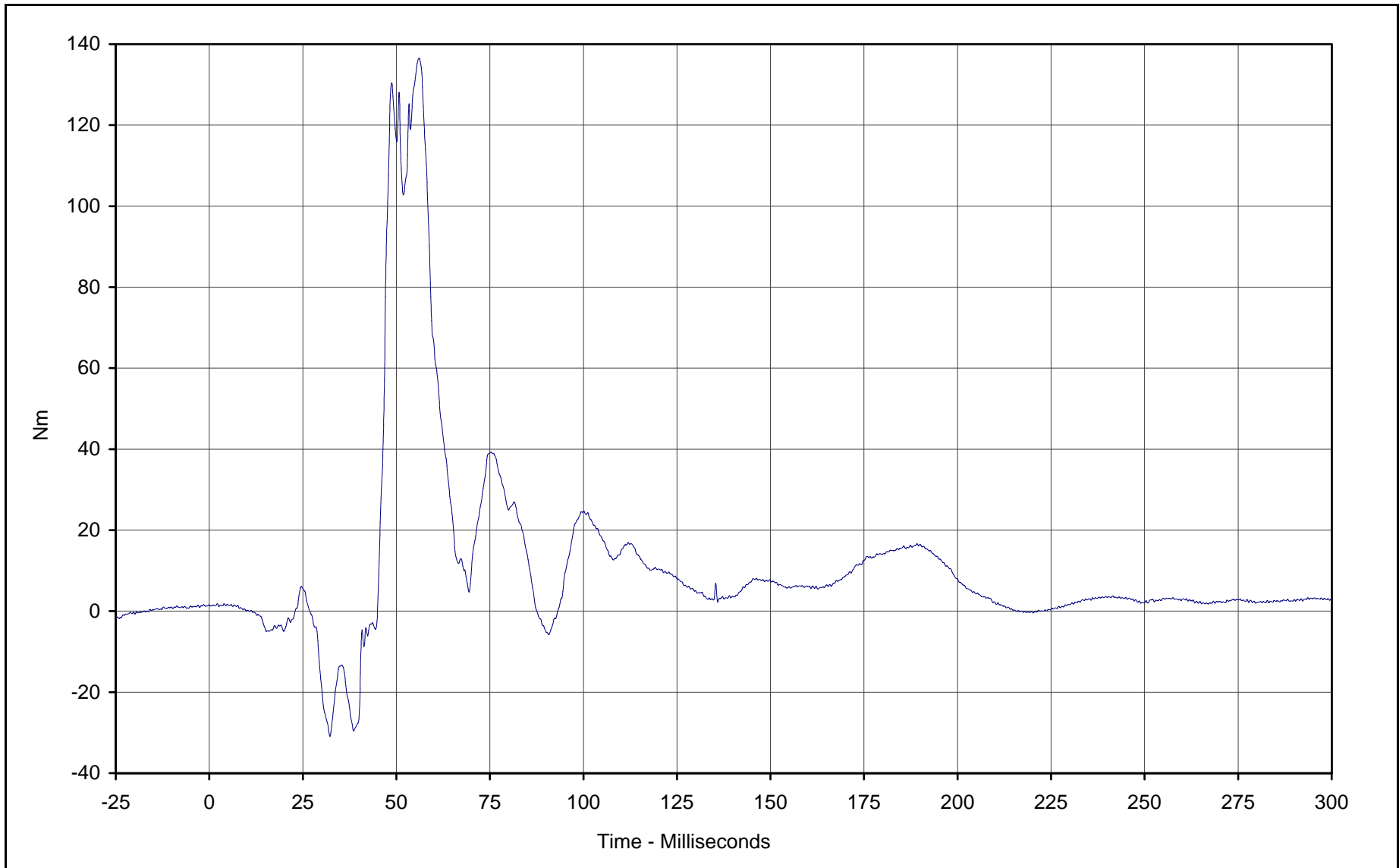
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-111



Curve Description: Passenger Right Lower Tibia Moment Y

Maximum Value: 136.6 at 56.1 Milliseconds

Minimum Value: -30.9 at 32.3 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-077

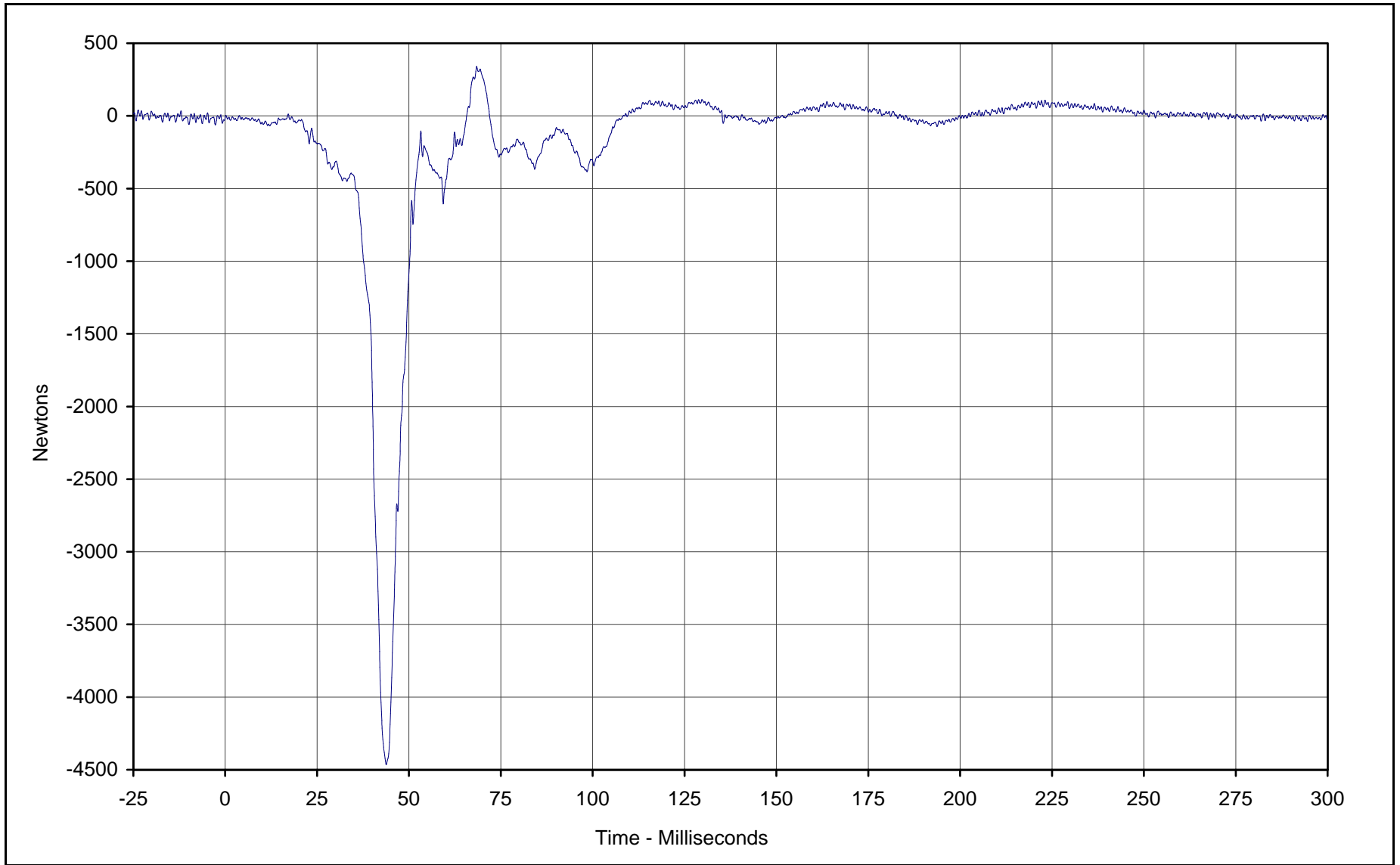
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-112



Curve Description: Passenger Right lower Tibia Force Z

Maximum Value: 341.1 at 68.4 Milliseconds

Minimum Value: -4464.7 at 43.8 Milliseconds

SAE Filter Class: 600

Date of Test: 3/2/01

Curve Number: FIL-078

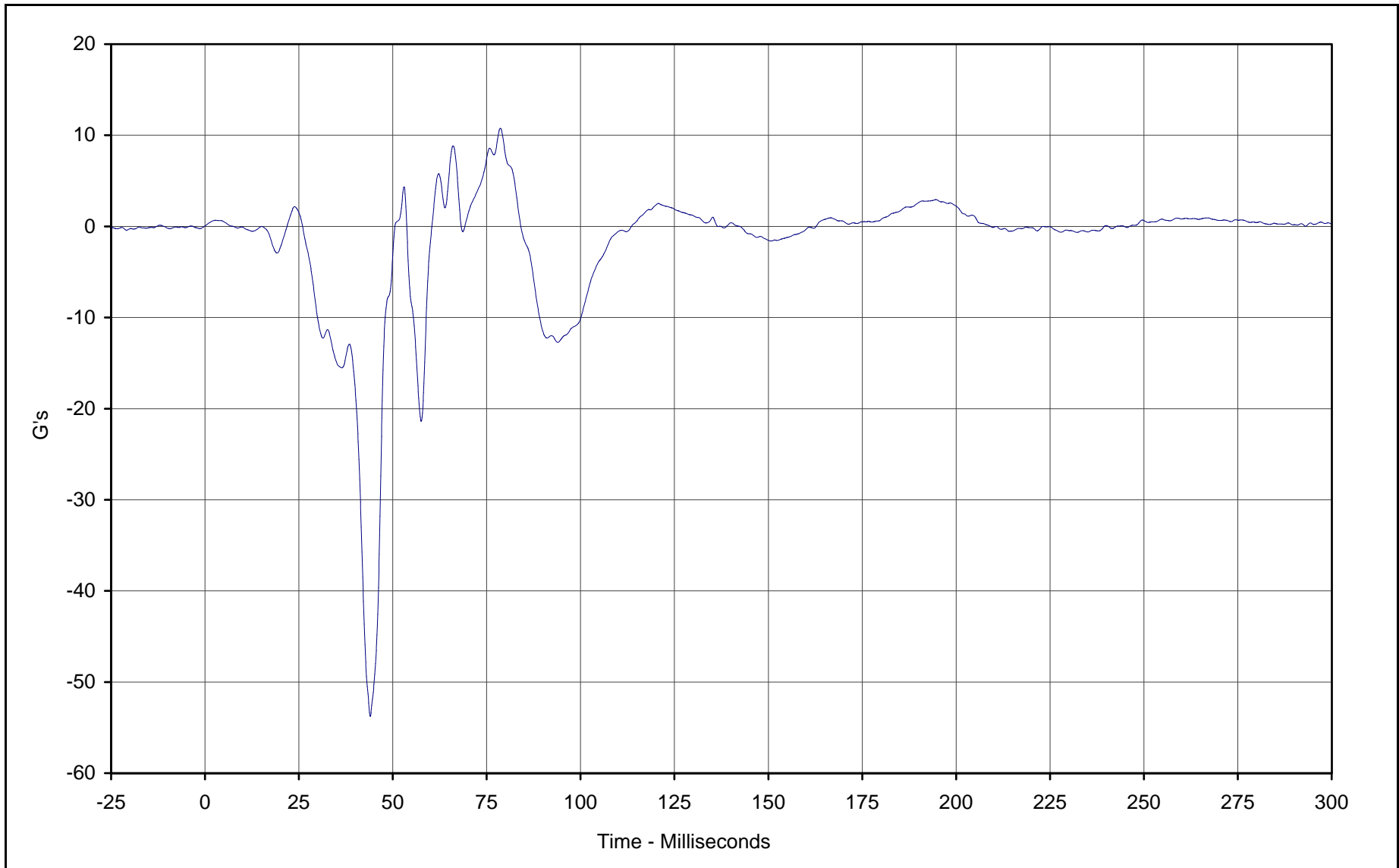
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-113



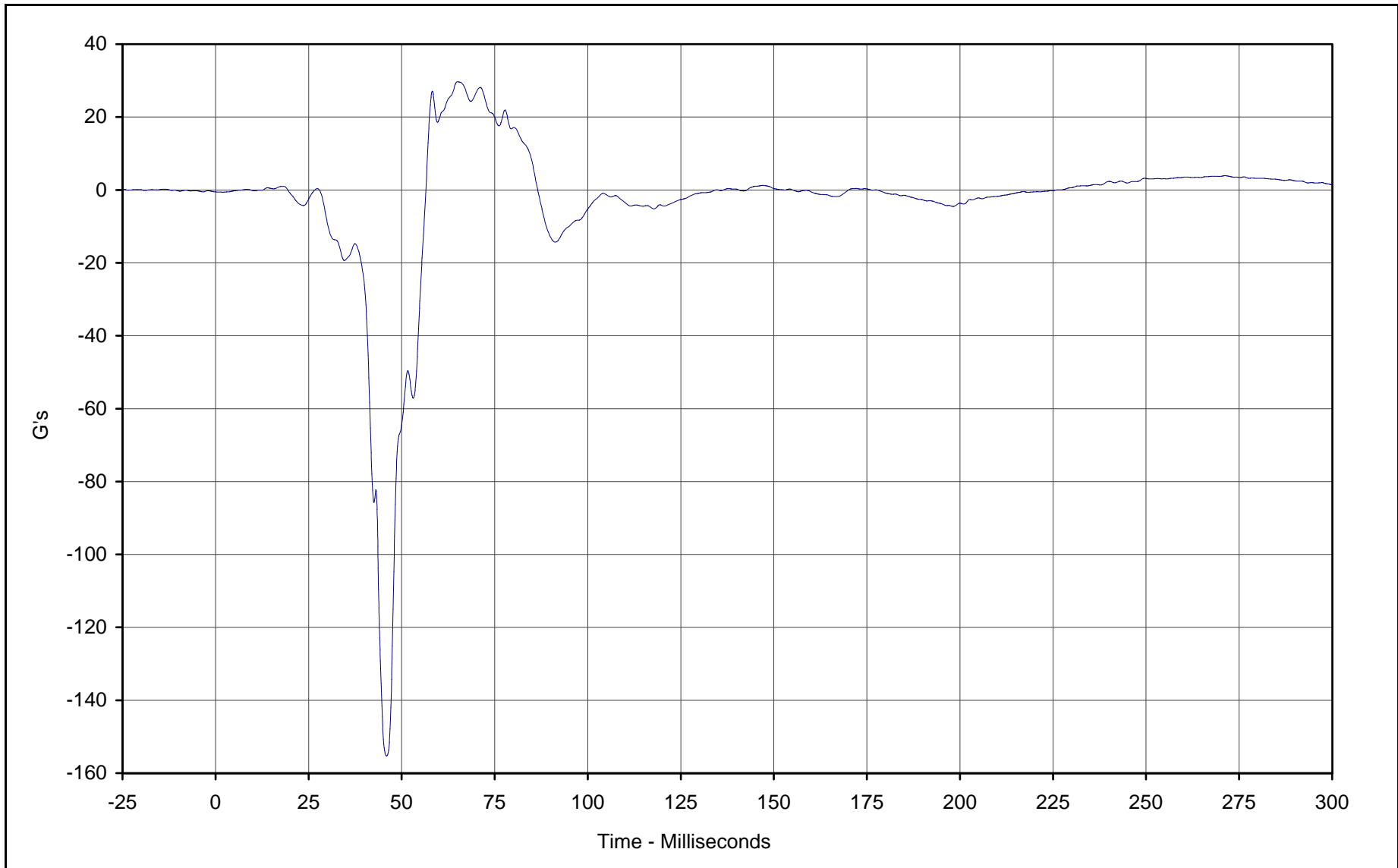
Curve Description: Passenger Left Foot Aft X
Maximum Value: 10.8 at 78.6 Milliseconds
Minimum Value: -53.8 at 44.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-079

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-114



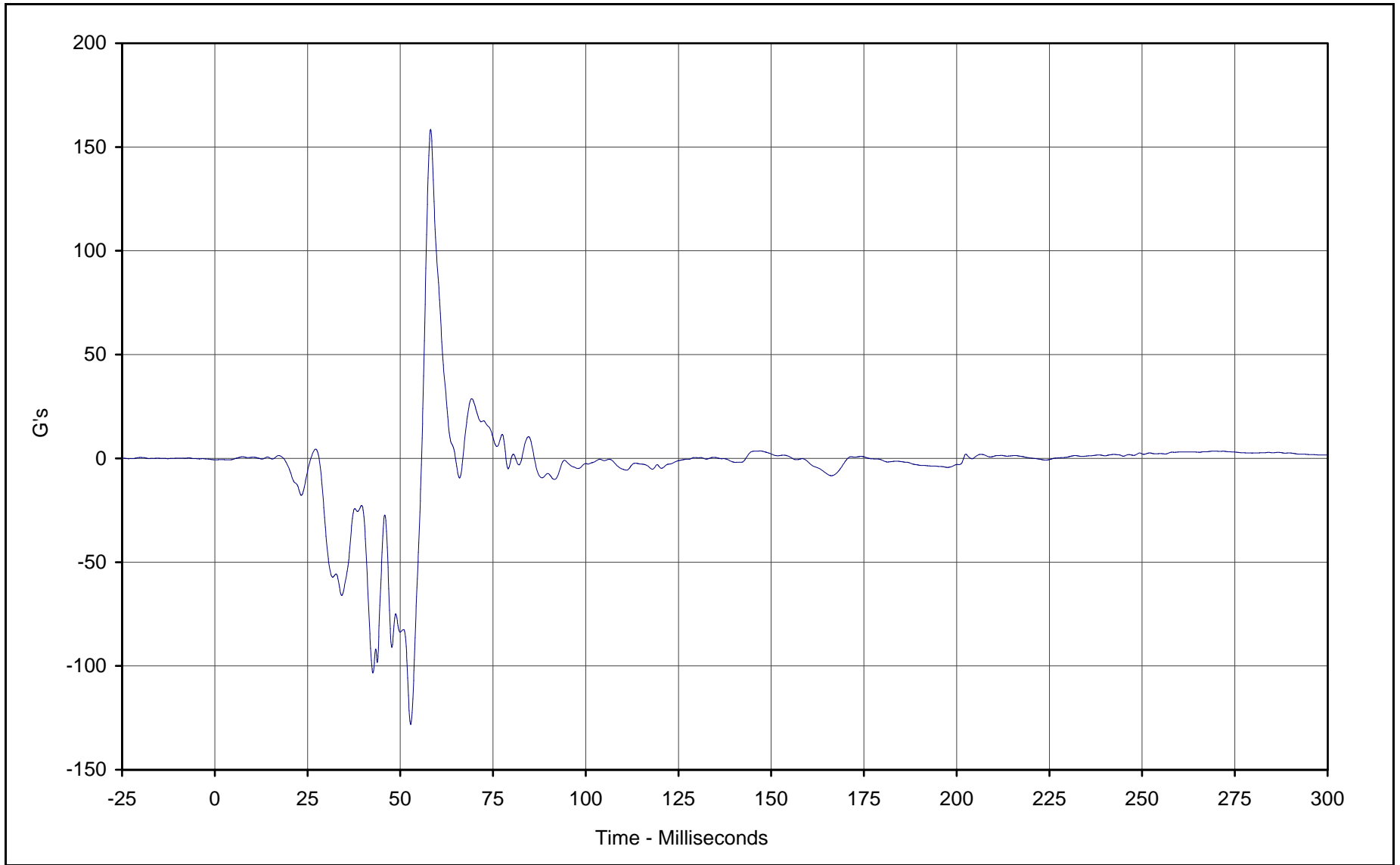
Curve Description: Passenger Left Foot Aft Z
Maximum Value: 29.7 at 65.0 Milliseconds
Minimum Value: -155.3 at 45.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-080

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-115



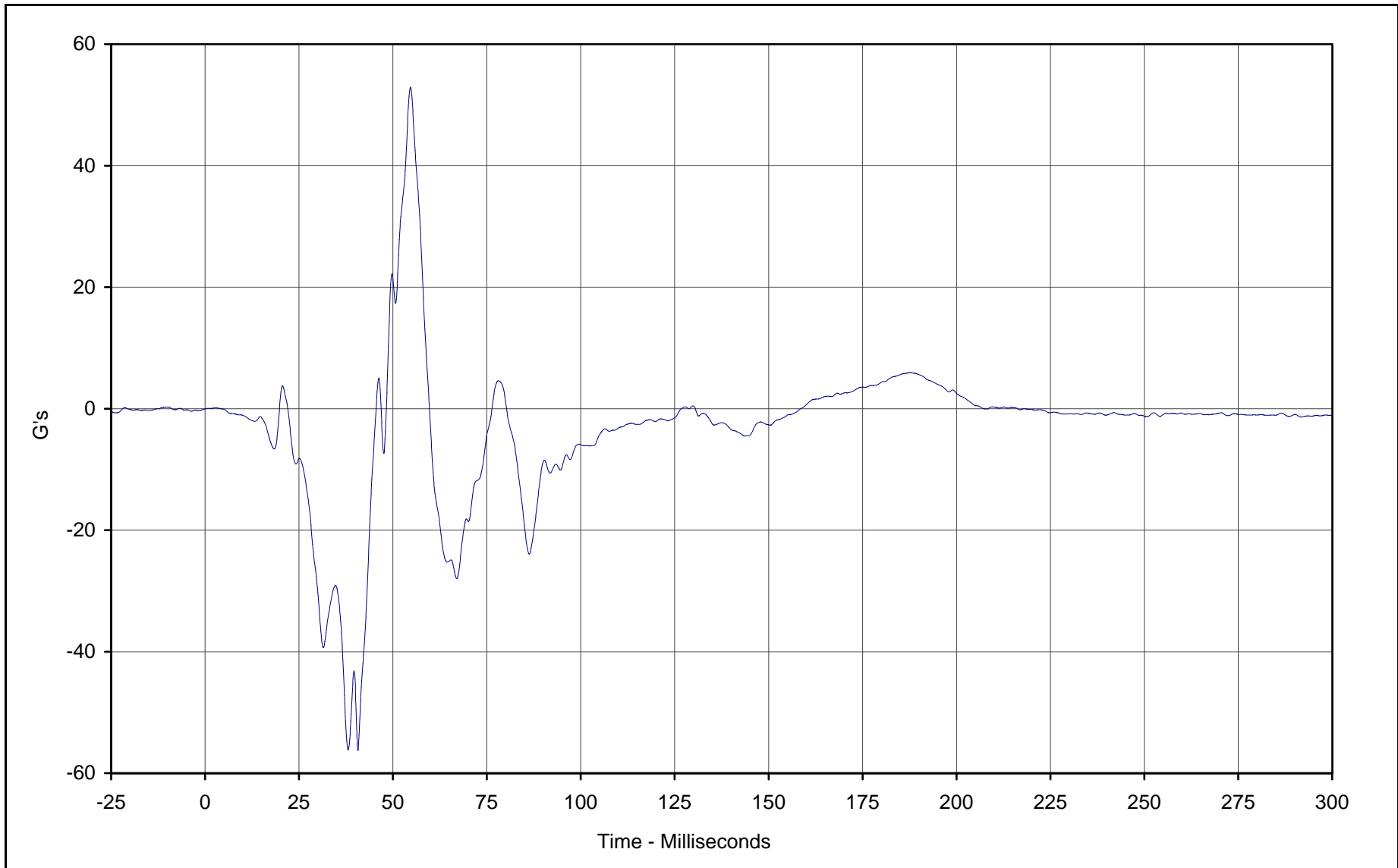
Curve Description: Passenger Left Foot Fore Z
Maximum Value: 158.5 at 58.2 Milliseconds
Minimum Value: -128.2 at 52.8 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-081

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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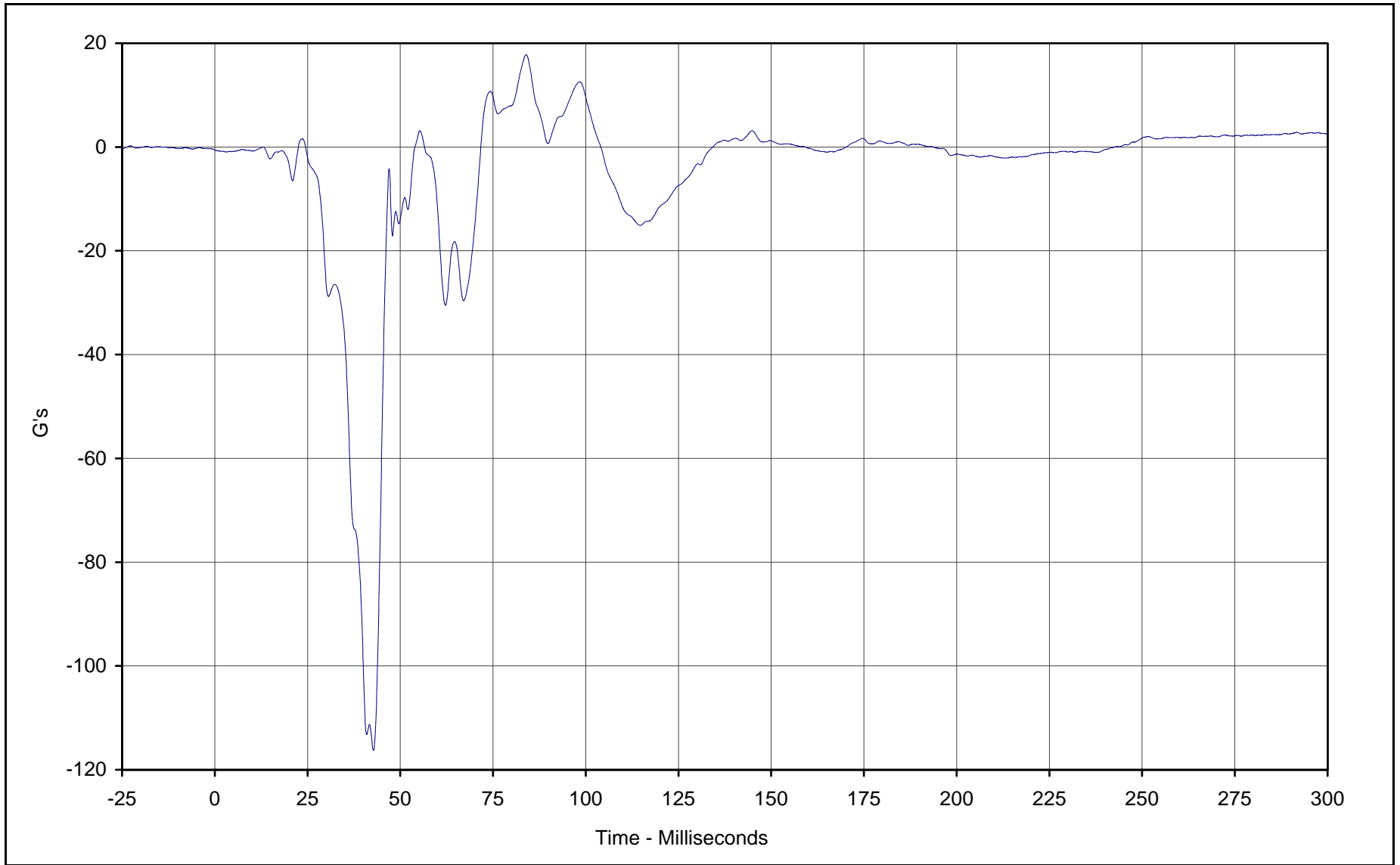
Curve Description: Passenger Right Foot Aft X
Maximum Value: 52.9 at 54.7 Milliseconds
Minimum Value: -56.3 at 40.7 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-082

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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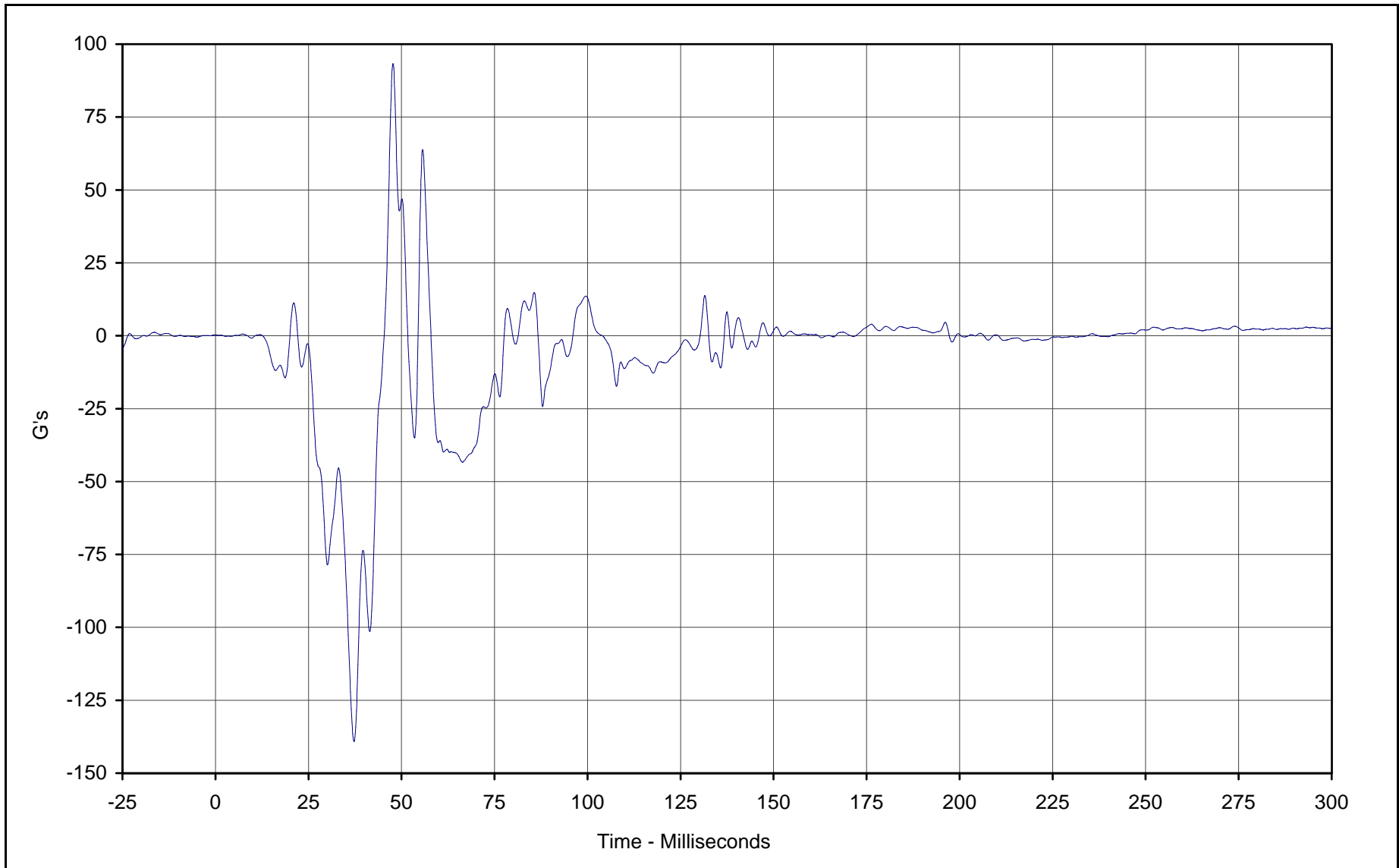
Curve Description: Passenger Right Foot Aft Z
Maximum Value: 17.8 at 83.9 Milliseconds
Minimum Value: -116.3 at 42.8 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-083

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-118



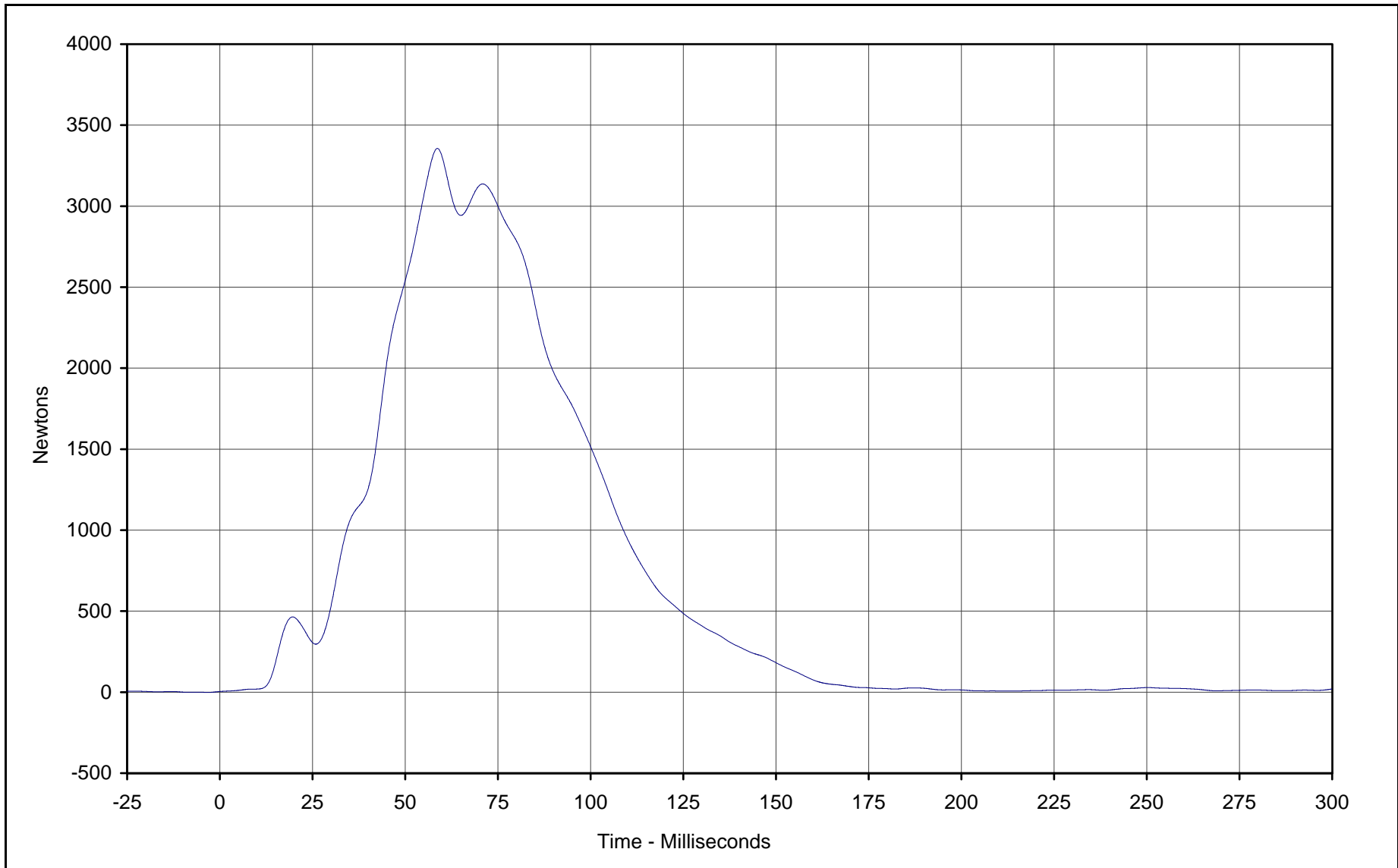
Curve Description: Passenger Right Foot Fore Z
Maximum Value: 93.3 at 47.7 Milliseconds
Minimum Value: -139.1 at 37.2 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: FIL-084

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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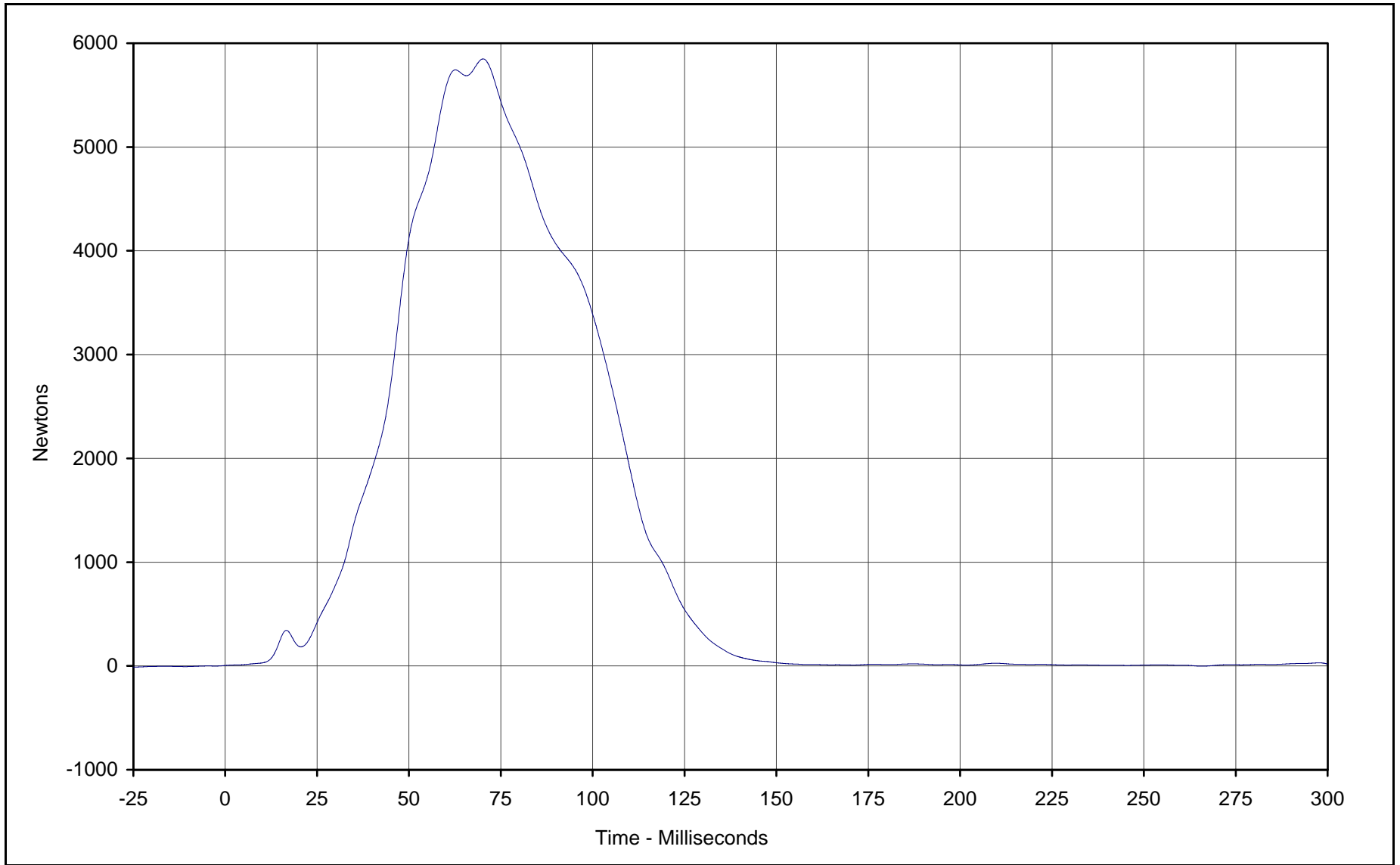
Curve Description: Passenger Lap Belt Force
Maximum Value: 3356.5 at 58.7 Milliseconds
Minimum Value: 3.9 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-085

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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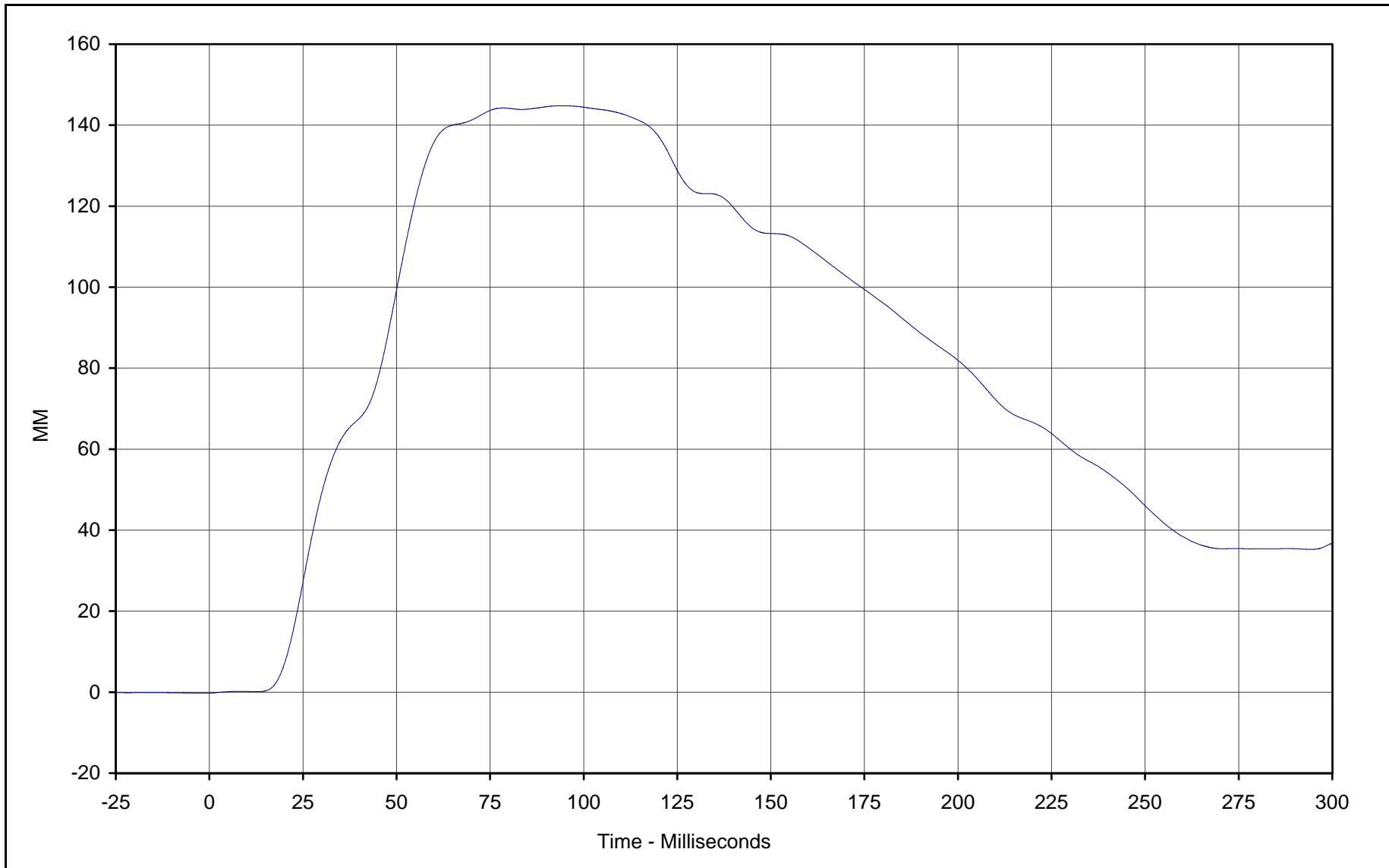
Curve Description: Passenger Shoulder Belt Force
Maximum Value: 5849.0 at 70.2 Milliseconds
Minimum Value: -2.1 at 265.8 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-086

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-121



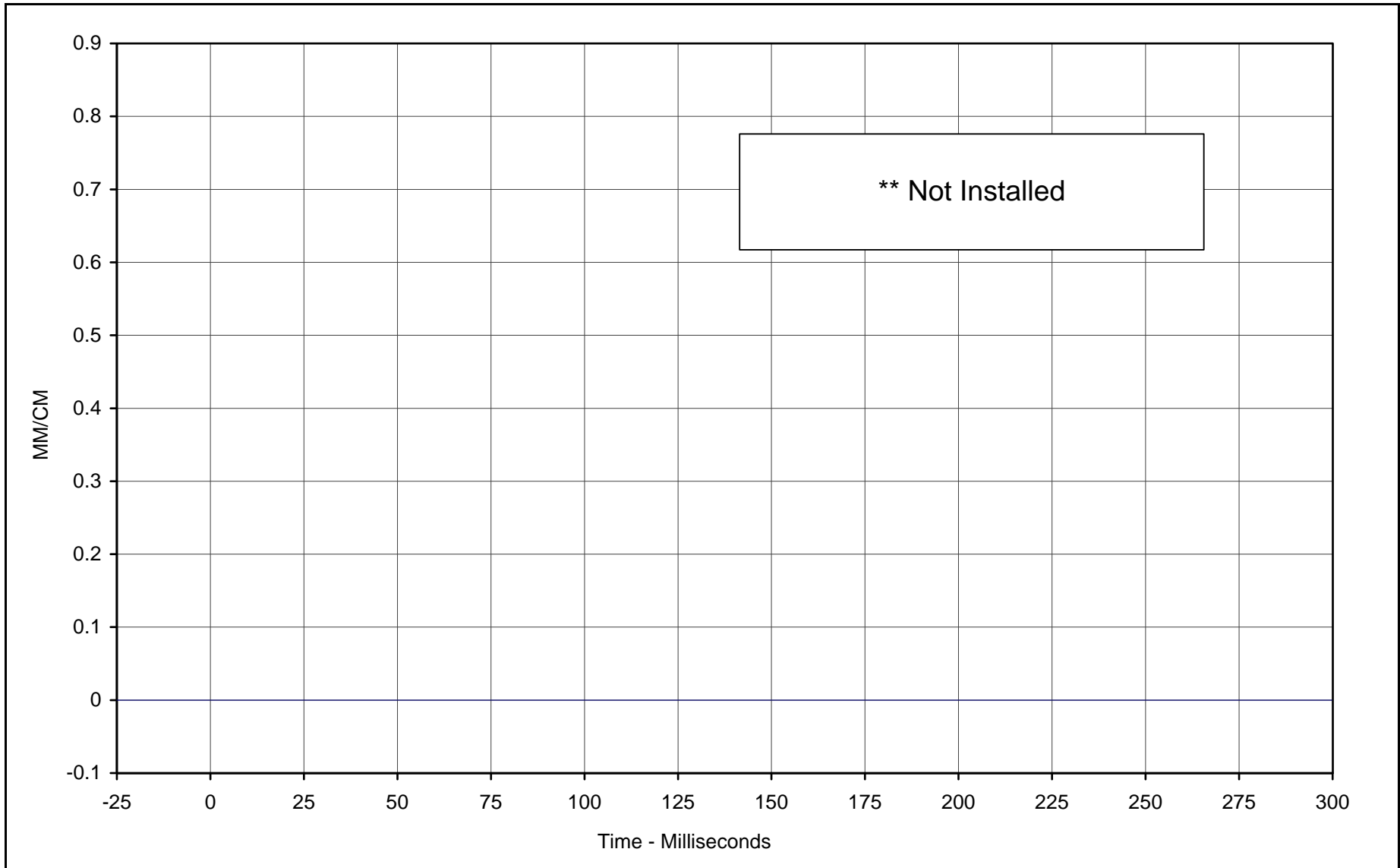
Curve Description: Passenger Shoulder Belt Pullout
Maximum Value: 144.8 at 93.7 Milliseconds
Minimum Value: -0.2 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-087

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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Curve Description: Passenger Shoulder Belt Elongation **

Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Maximum Value: 0.0 at 0.0 Milliseconds

Test Vehicle: 2001 Chevrolet Venture Minivan

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 3/2/01

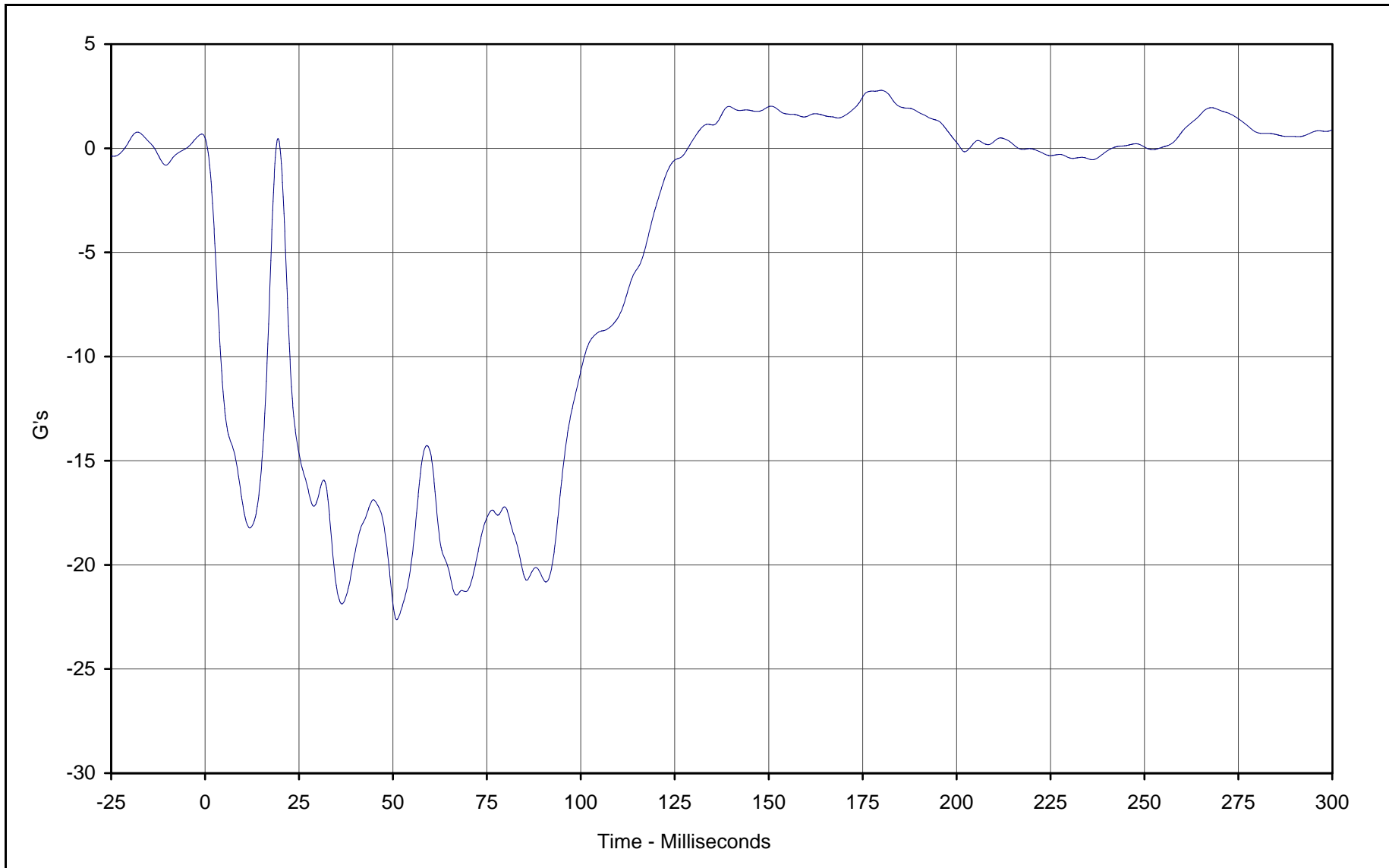
Curve Number: FIL-088

** Not installed



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B-123



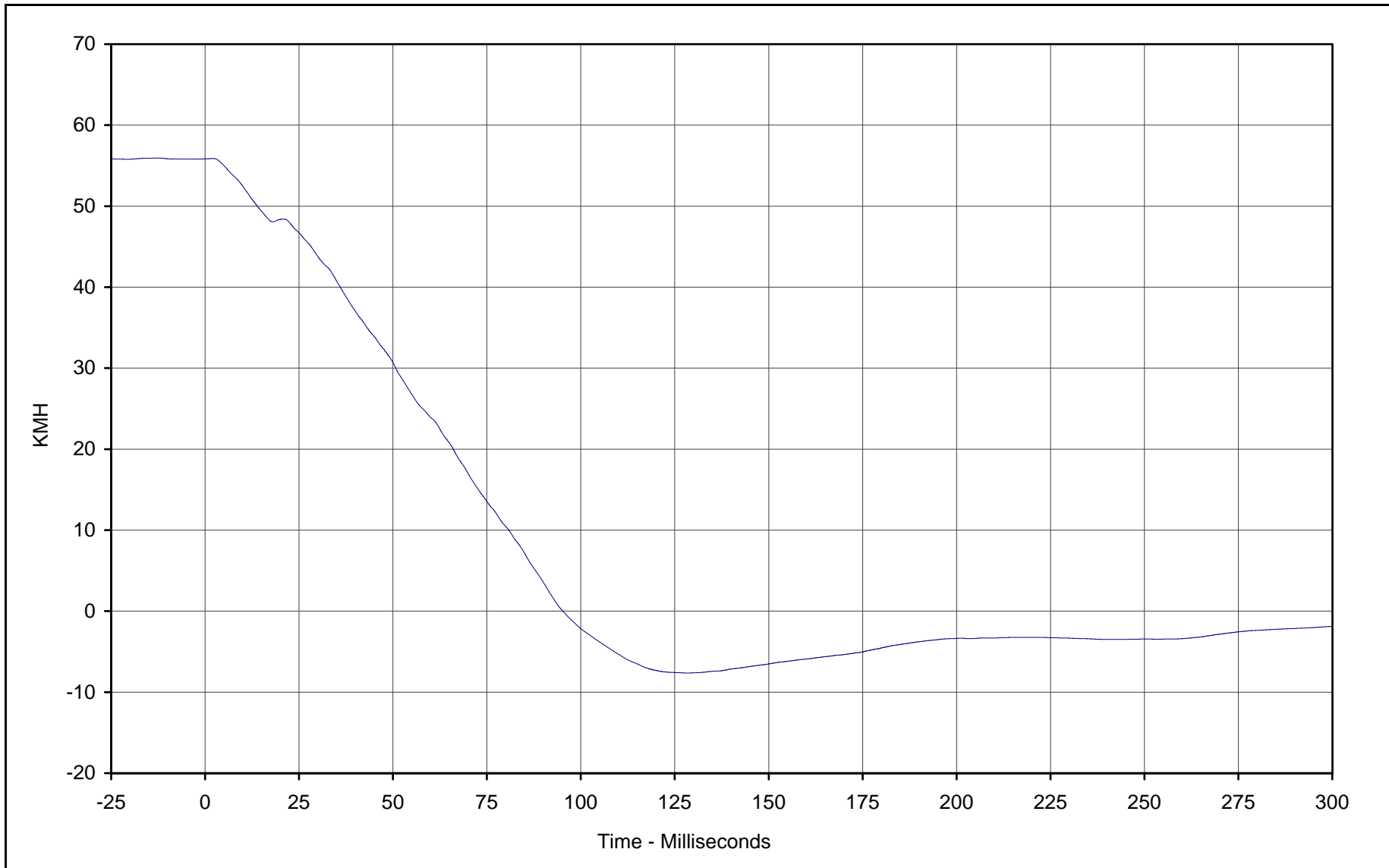
Curve Description: Vehicle Left Rear Primary
Maximum Value: 2.8 at 180.0 Milliseconds
Minimum Value: -22.6 at 51.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-124



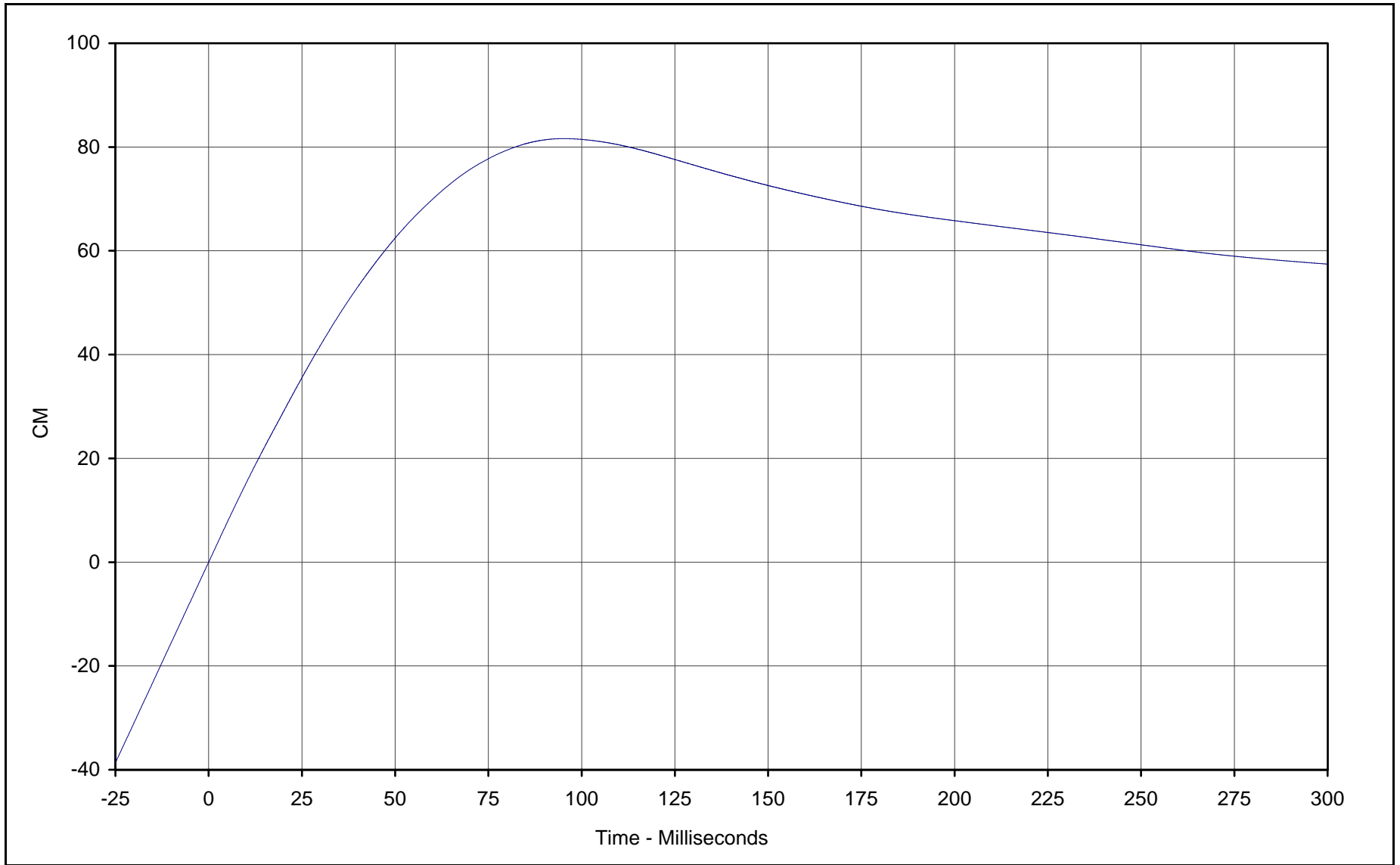
Curve Description: Vehicle Left Rear Primary Velocity
Maximum Value: 55.9 at 2.1 Milliseconds
Minimum Value: -7.6 at 128.1 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-125



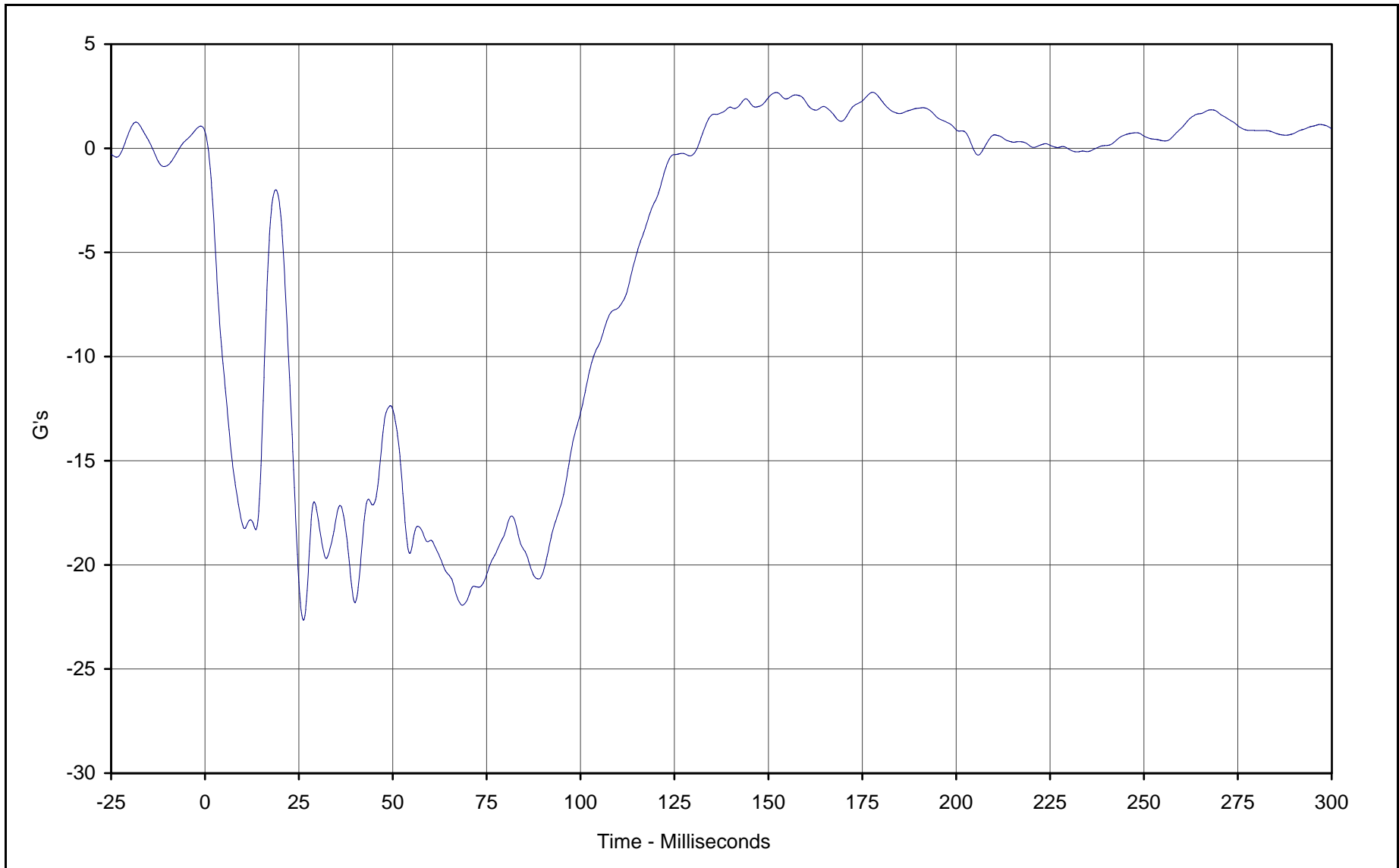
Curve Description: Vehicle Left Rear Primary Displ.
Maximum Value: 81.6 at 95.2 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-089

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-126



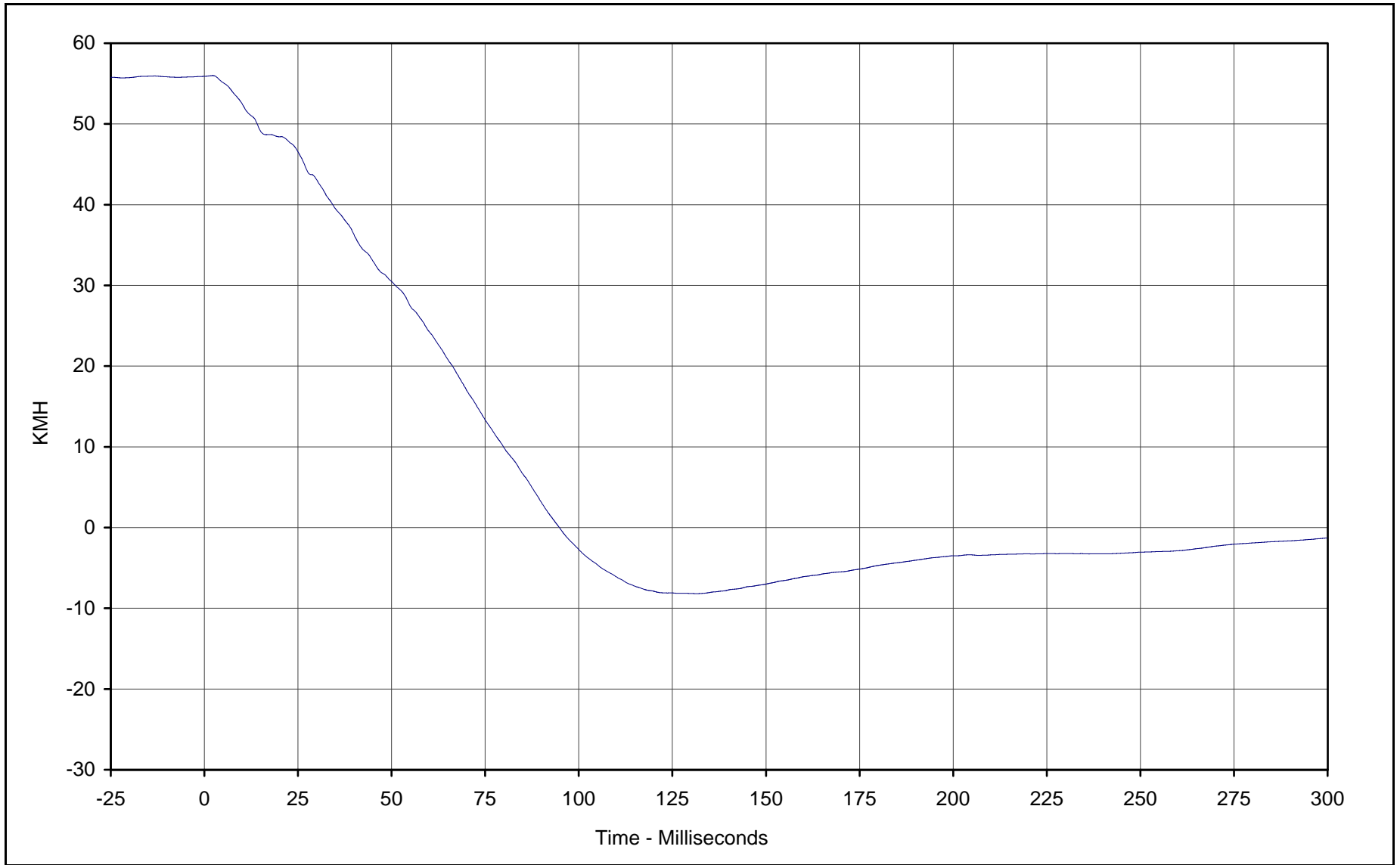
Curve Description: Vehicle Right Rear Primary
Maximum Value: 2.7 at 177.8 Milliseconds
Minimum Value: -22.7 at 26.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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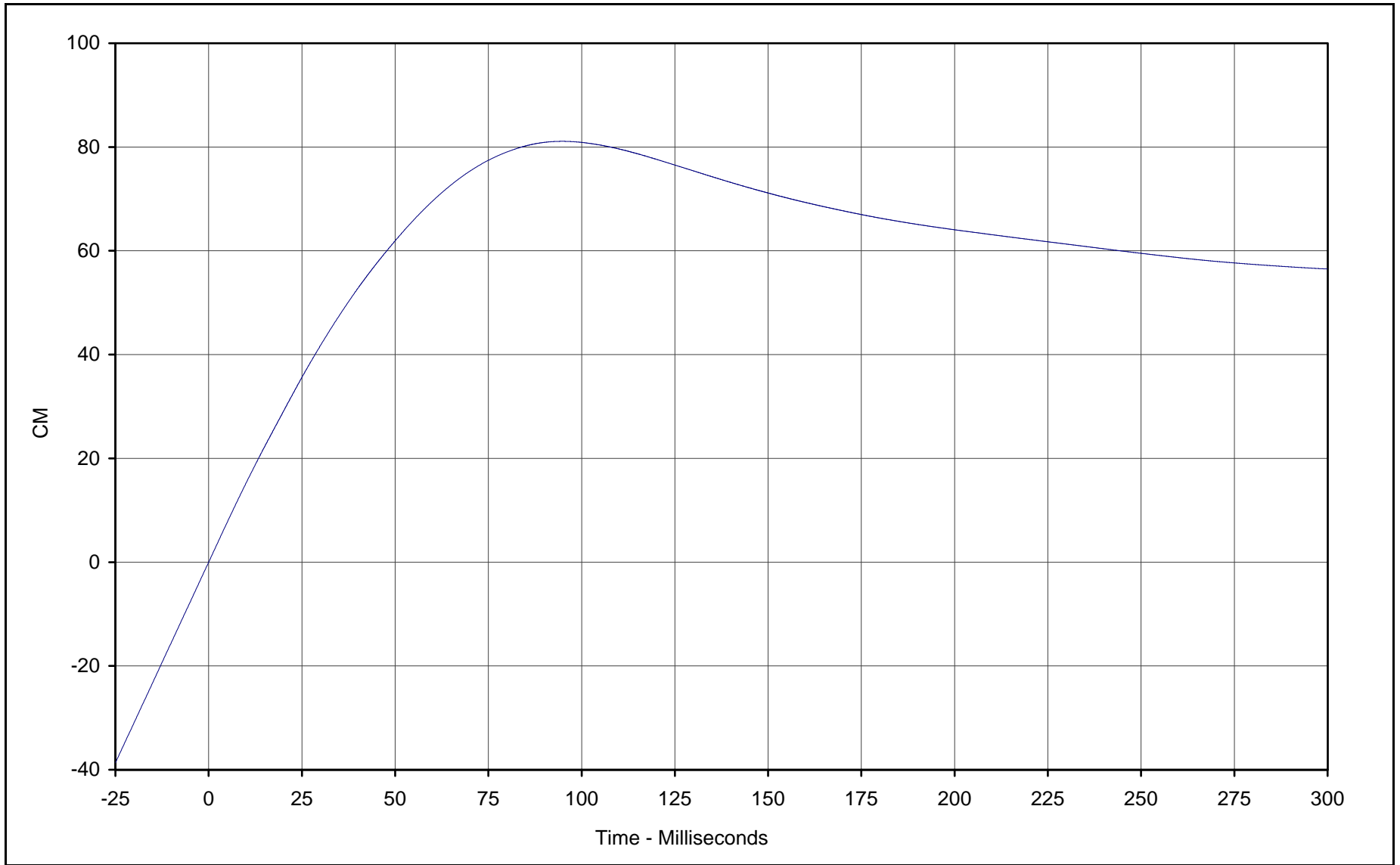
Curve Description: Vehicle Right Rear Primary Velocity
Maximum Value: 56.0 at 2.2 Milliseconds
Minimum Value: -8.2 at 131.5 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-128



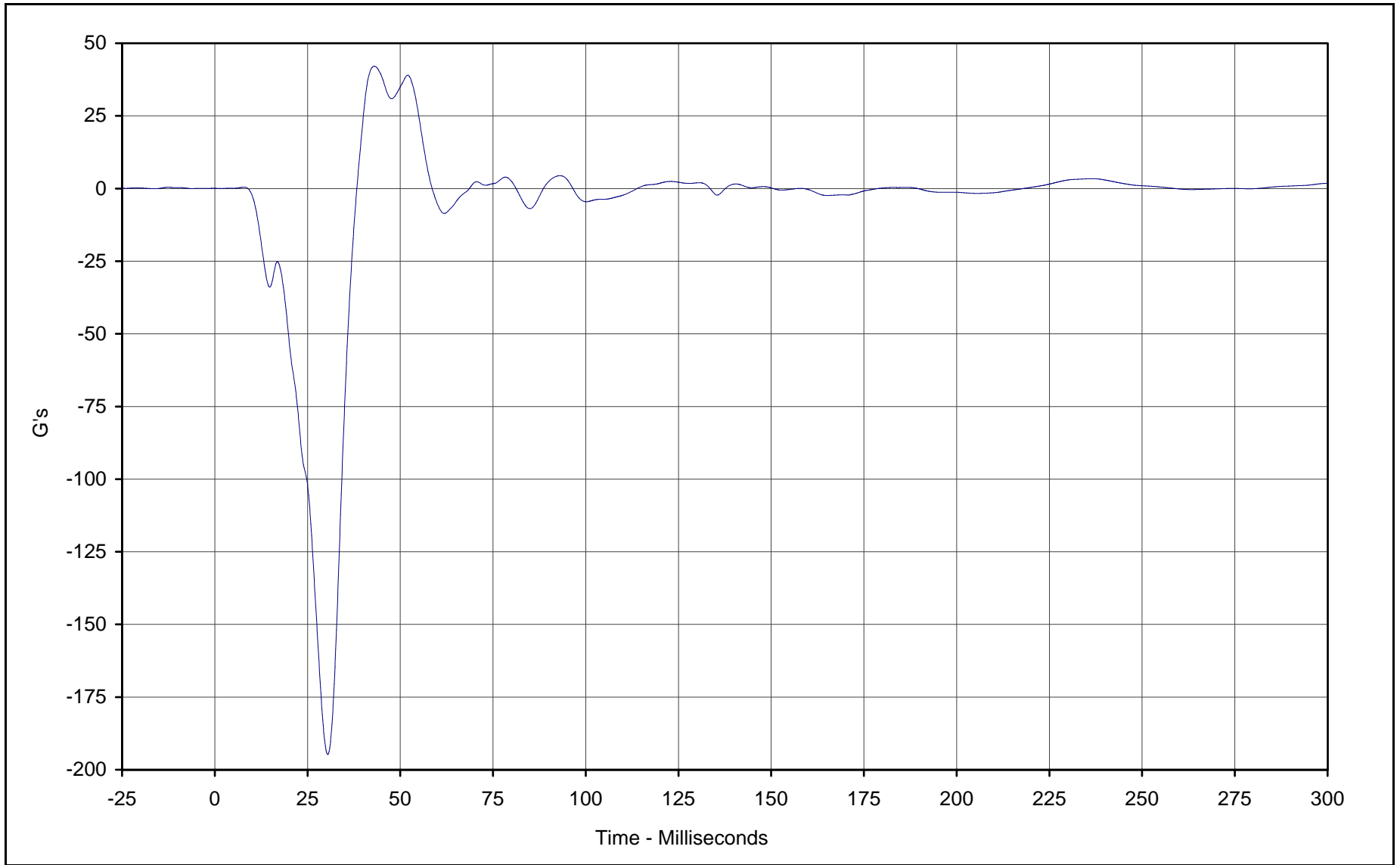
Curve Description: Vehicle Right Rear Primary Displ.
Maximum Value: 81.1 at 94.8 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-090

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-129



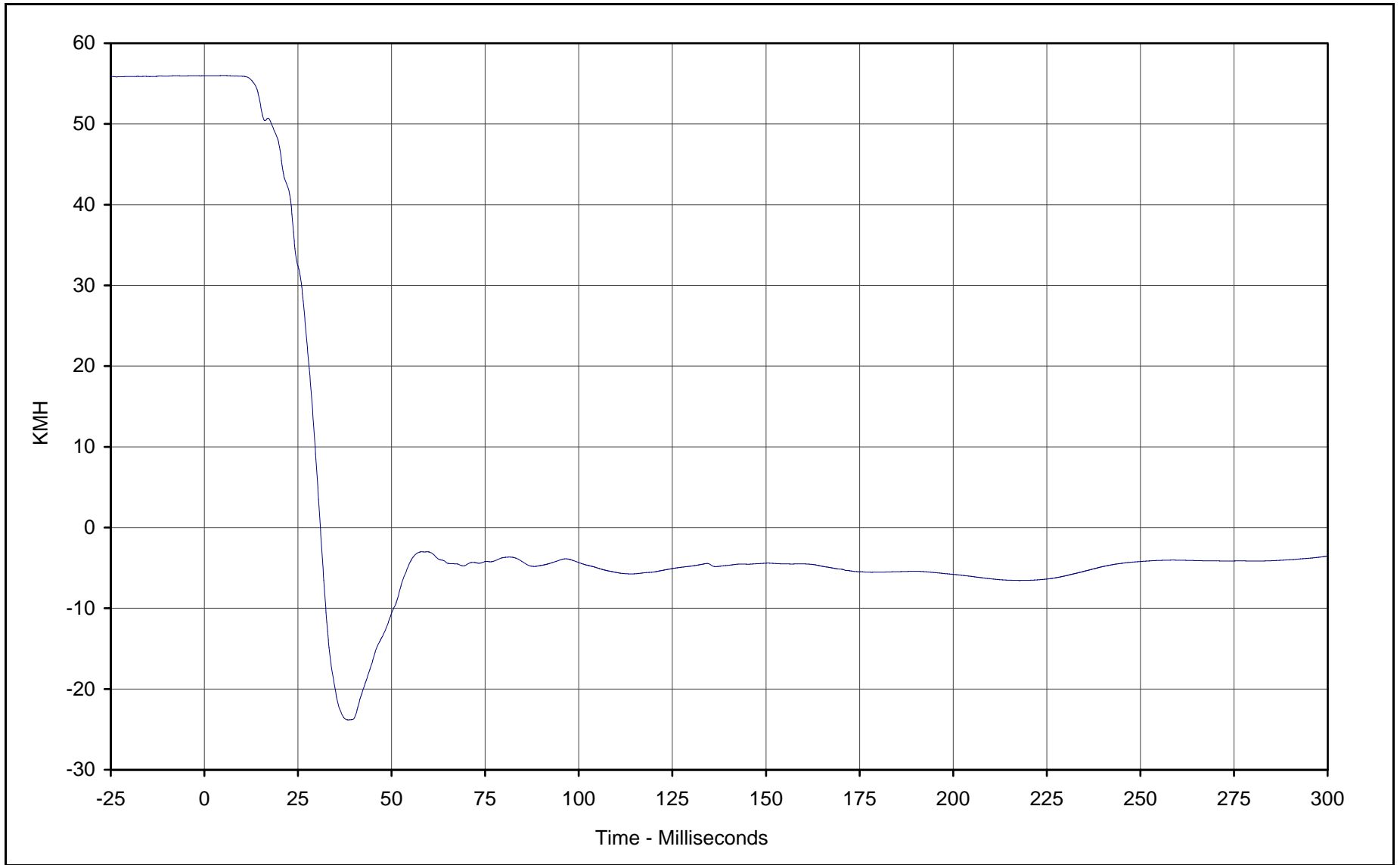
Curve Description: Vehicle Engine Top
Maximum Value: 42.1 at 43.0 Milliseconds
Minimum Value: -194.7 at 30.5 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-130



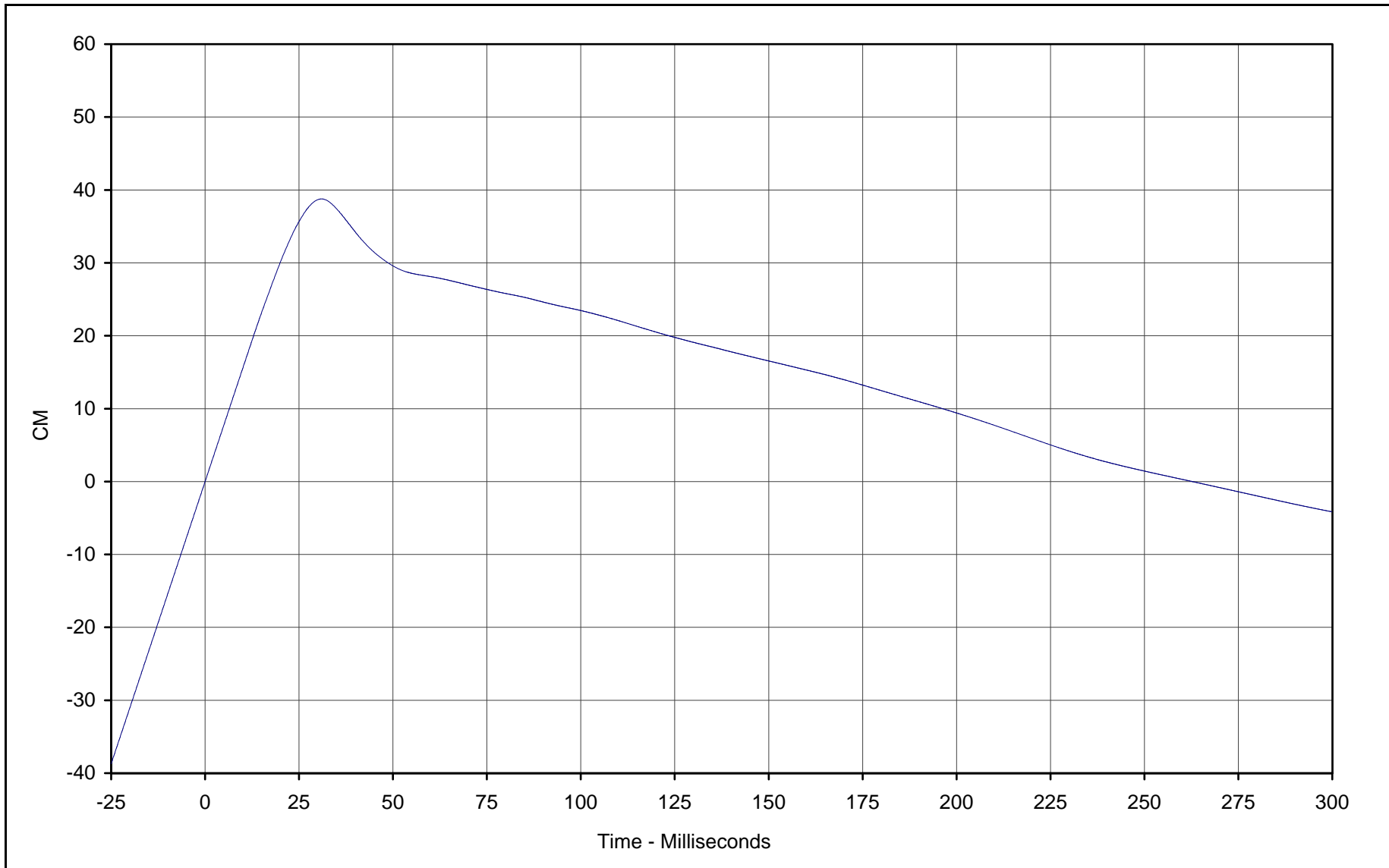
Curve Description: Vehicle Engine Top Velocity
Maximum Value: 56.0 at 5.2 Milliseconds
Minimum Value: -23.8 at 38.4 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-131



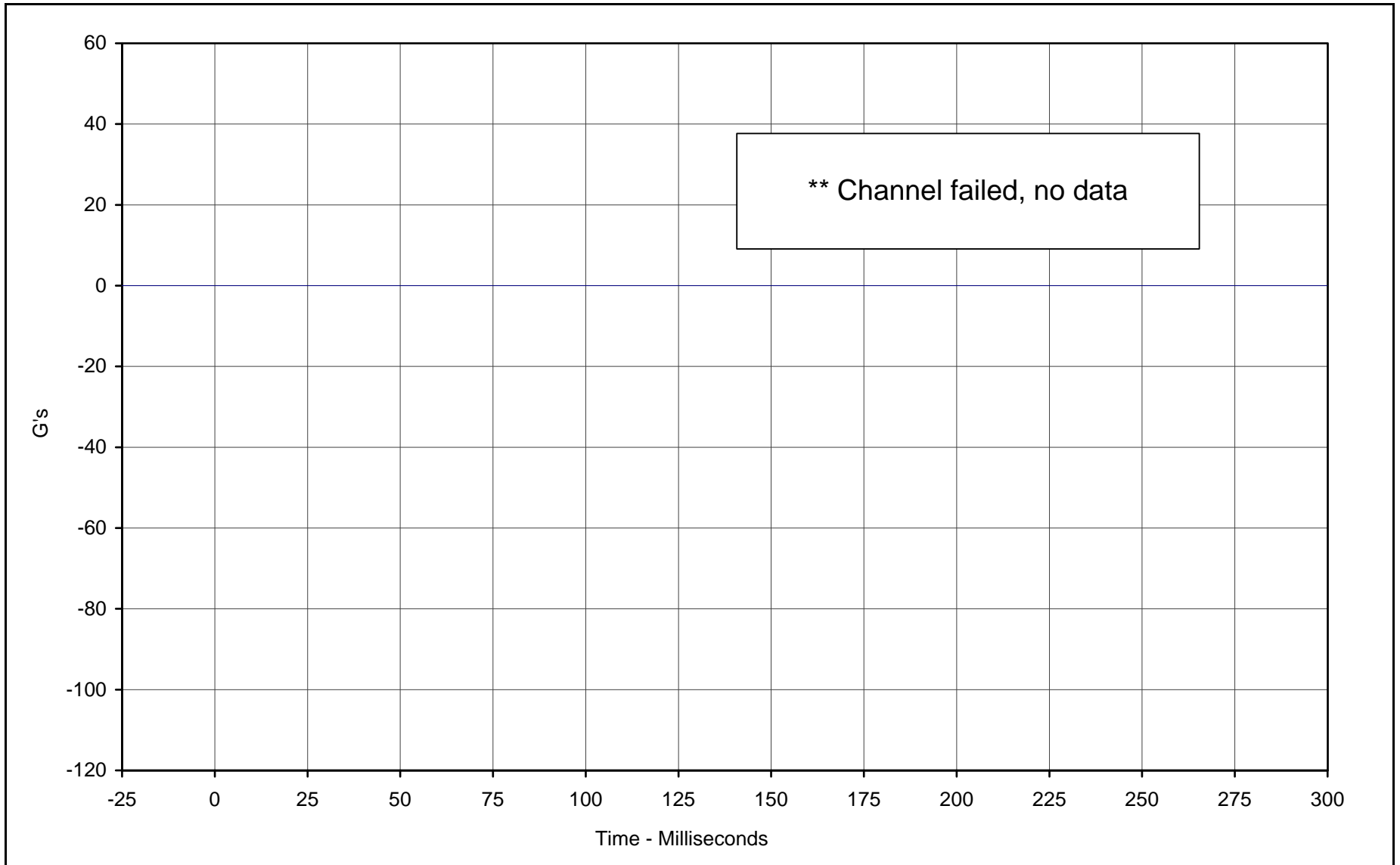
Curve Description: Vehicle Engine Top Displacement
Maximum Value: 38.8 at 31.0 Milliseconds
Minimum Value: -4.1 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-091

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-132



Curve Description: Vehicle Engine Bottom *
Maximum Value: 0.0 at 0.0 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-092

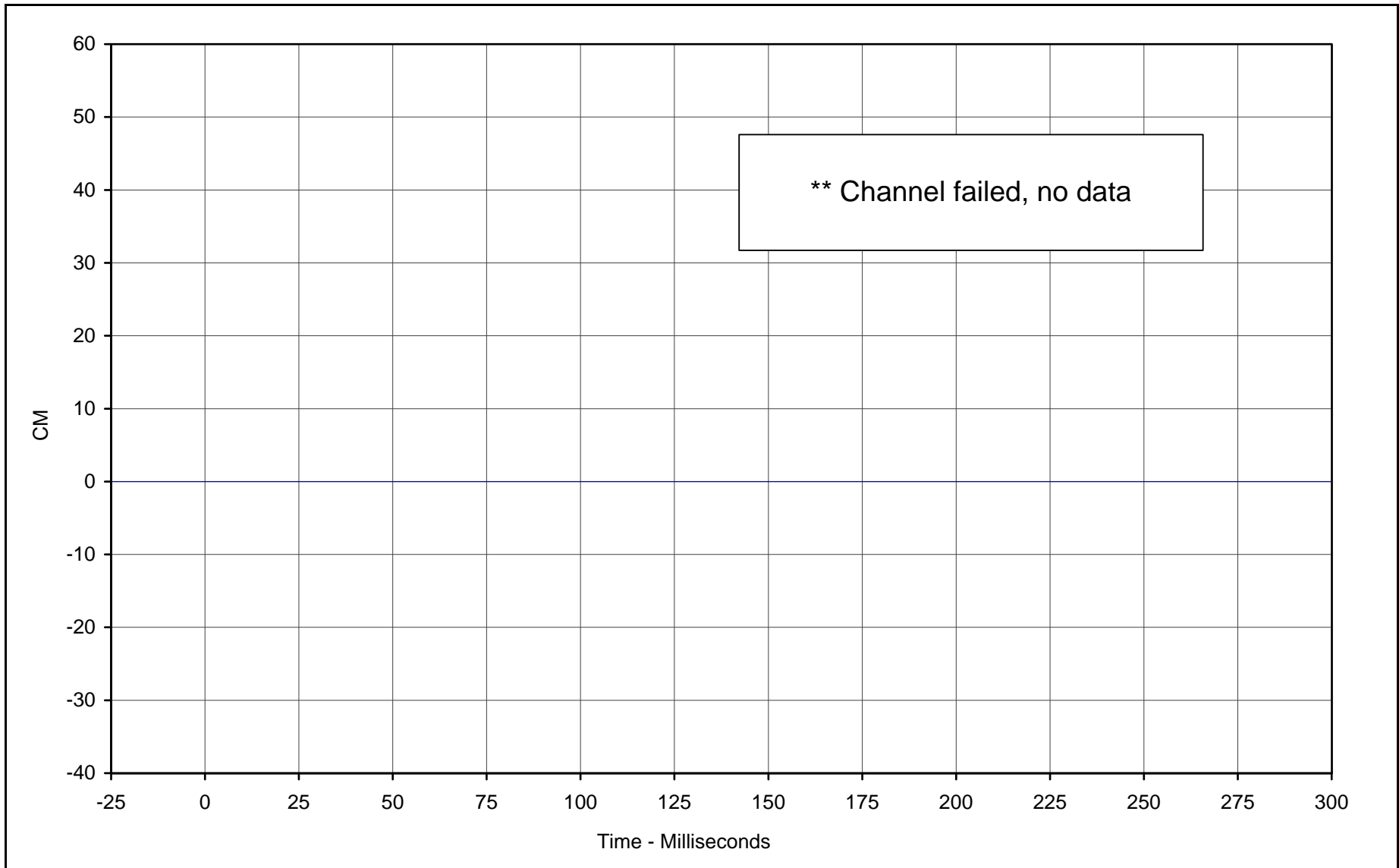
Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

* Channel failed, no data



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B-134



Curve Description: Vehicle Engine Bottom Displacement *

Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Maximum Value: 0.0 at 0.0 Milliseconds

Test Vehicle: 2001 Chevrolet Venture Minivan

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

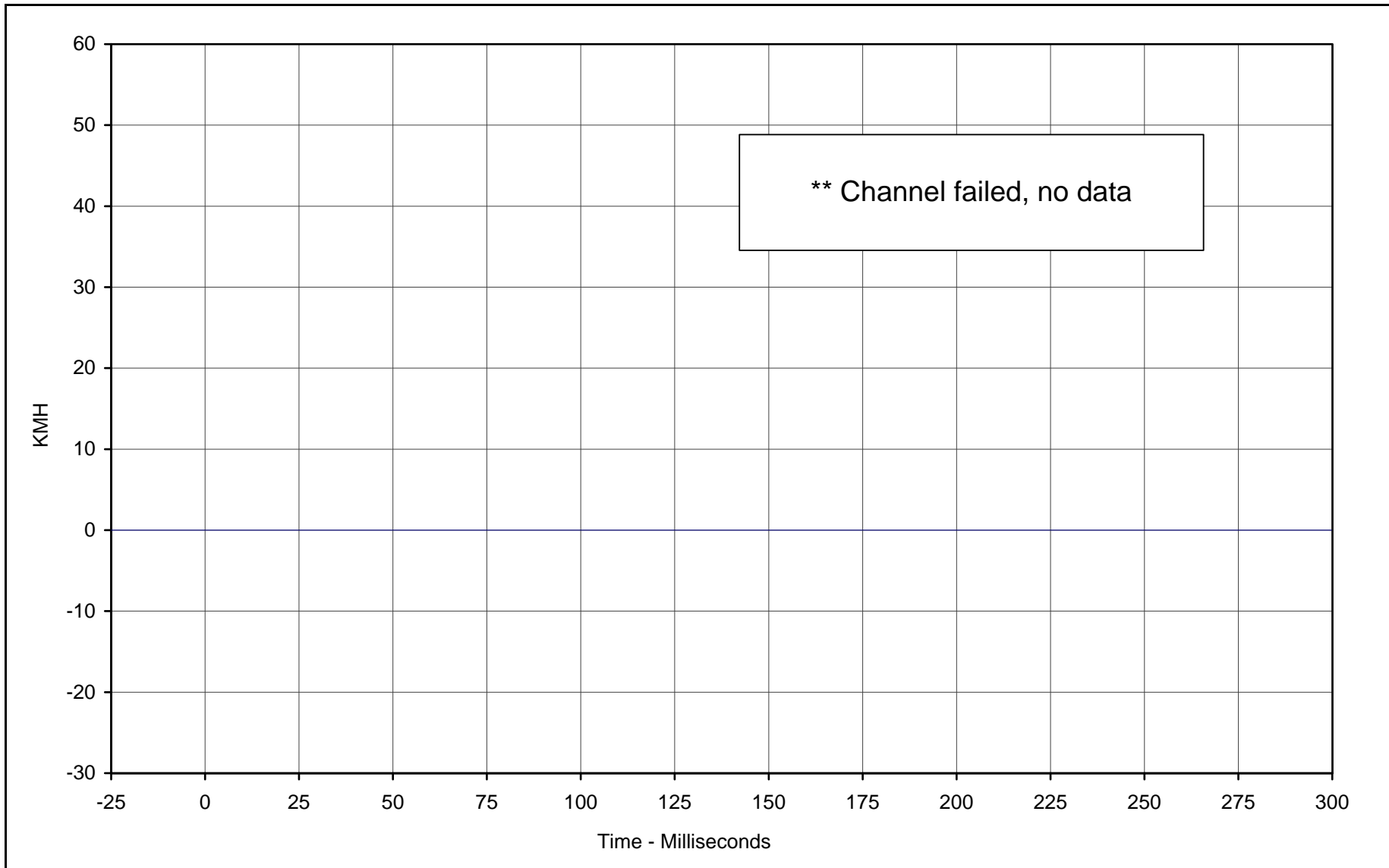
Curve Number: IN2-092

* Channel failed, no data



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B-133



Curve Description: Vehicle Engine Bottom Velocity *
Maximum Value: 0.0 at 0.0 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-092

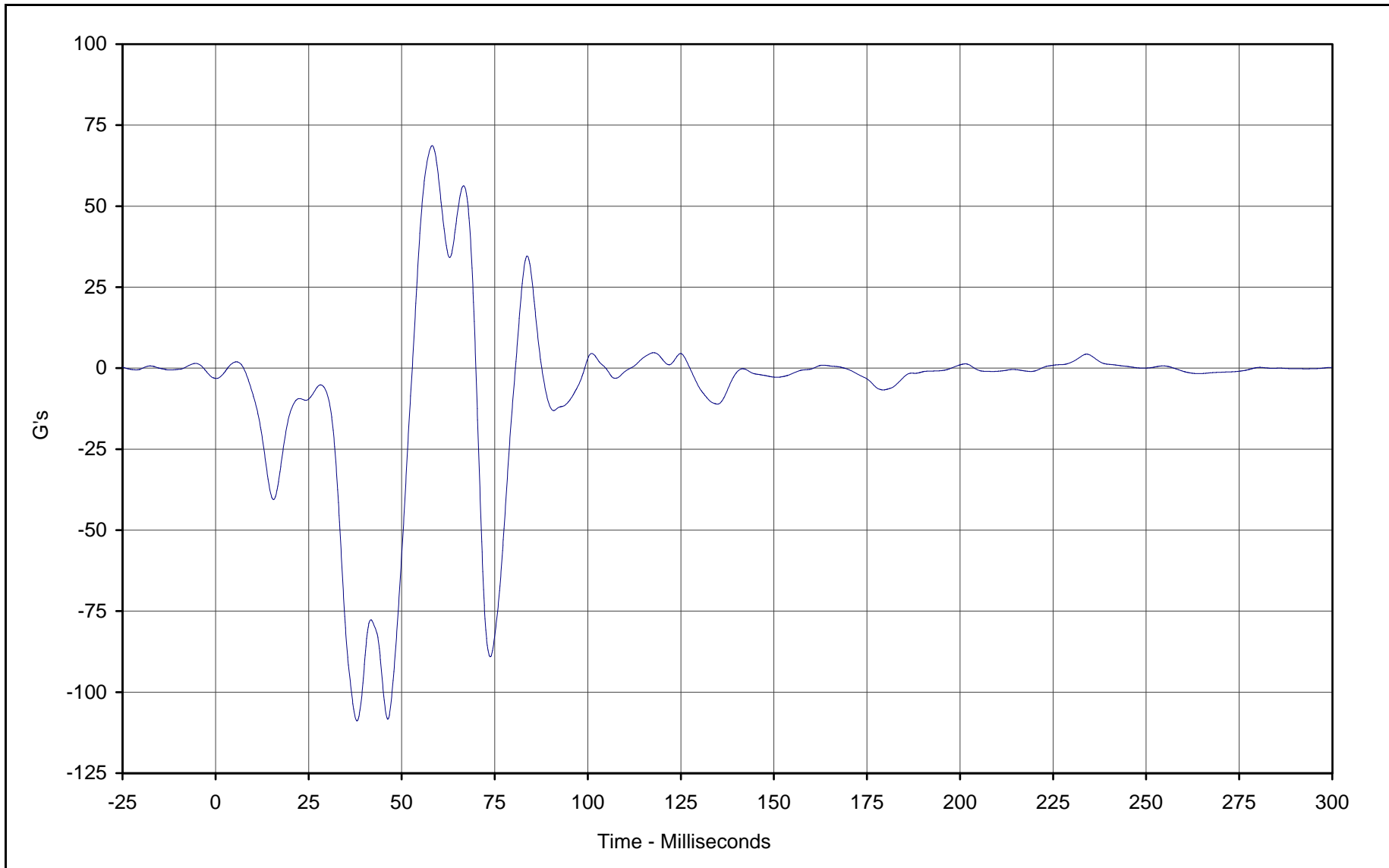
Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

* Channel failed, no data



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B-135



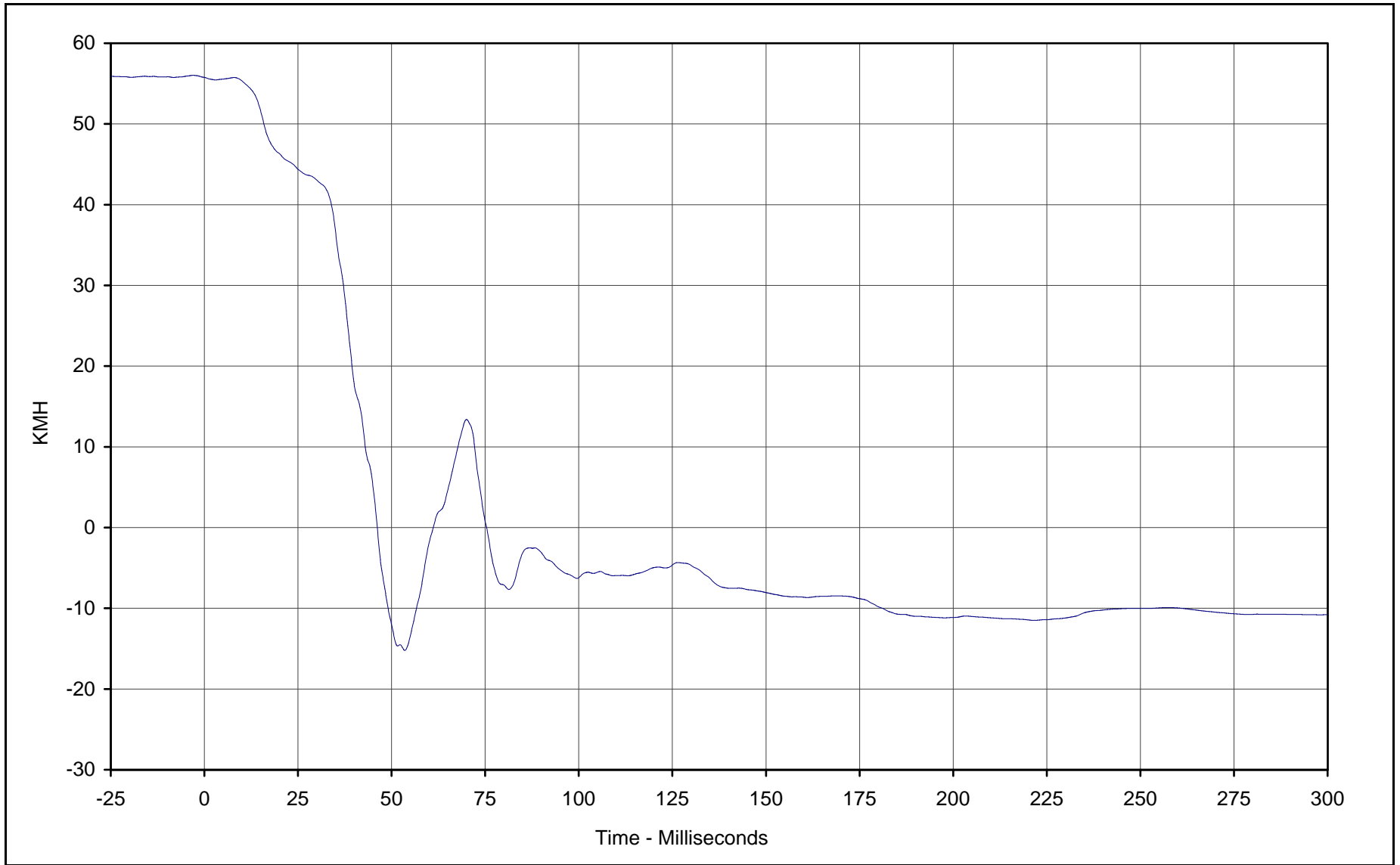
Curve Description: Vehicle Left Brake Caliper
Maximum Value: 68.7 at 58.2 Milliseconds
Minimum Value: -108.9 at 38.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-136



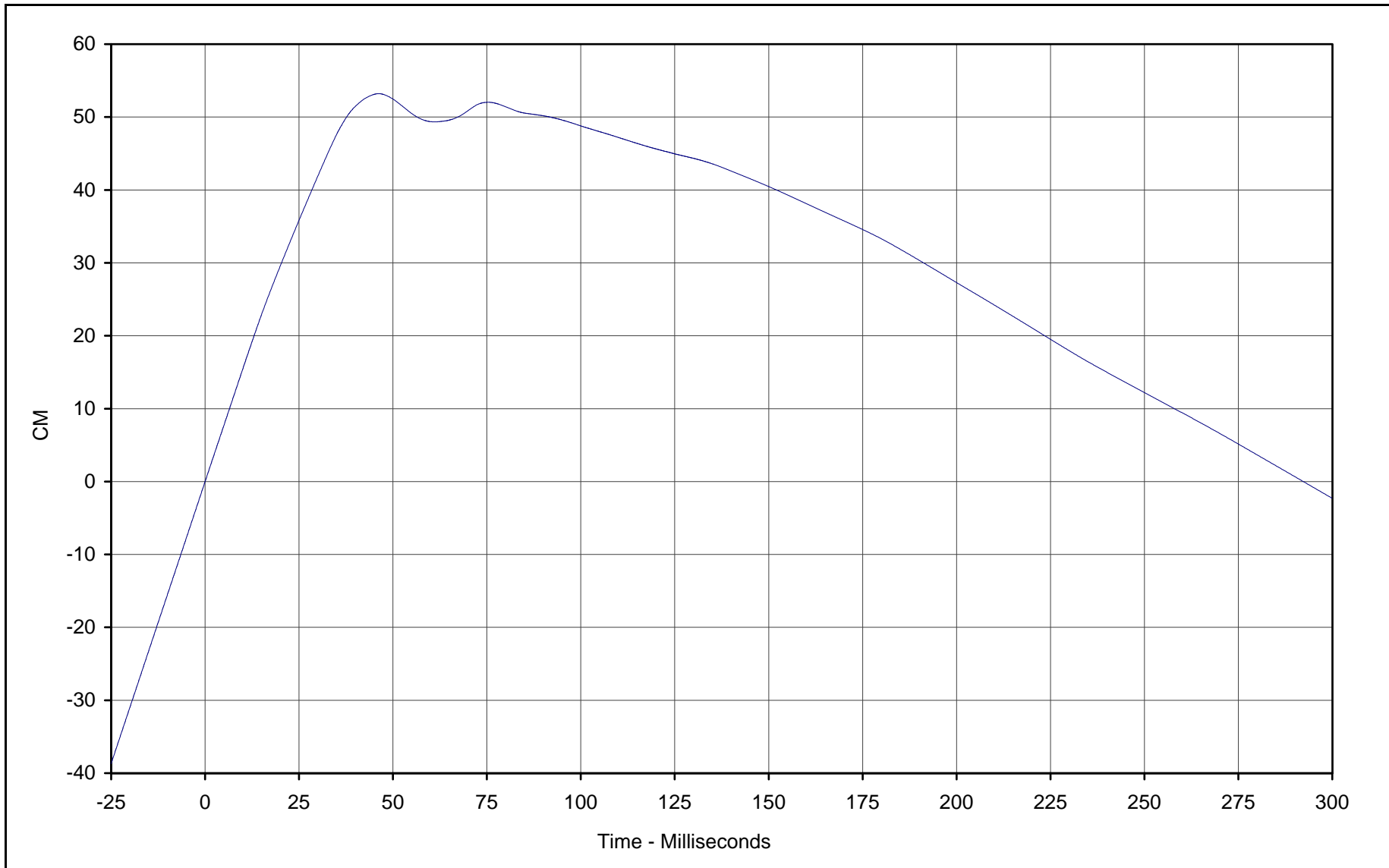
Curve Description: Vehicle Left Brake Caliper Velocity
Maximum Value: 55.8 at 0.0 Milliseconds
Minimum Value: -15.2 at 53.5 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-137



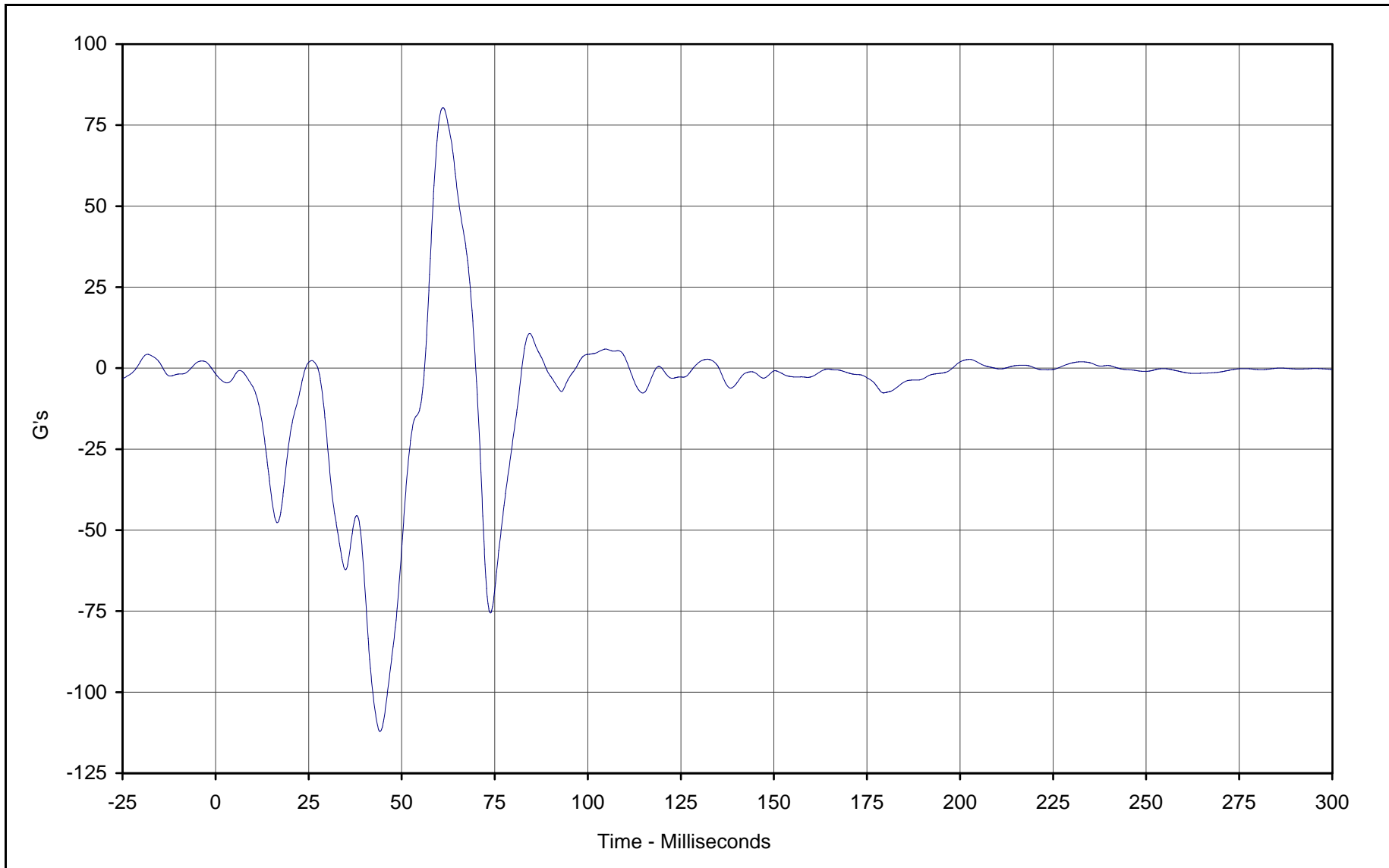
Curve Description: Vehicle Left Brake Caliper Displ.
Maximum Value: 53.2 at 46.2 Milliseconds
Minimum Value: -2.3 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-093

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-138



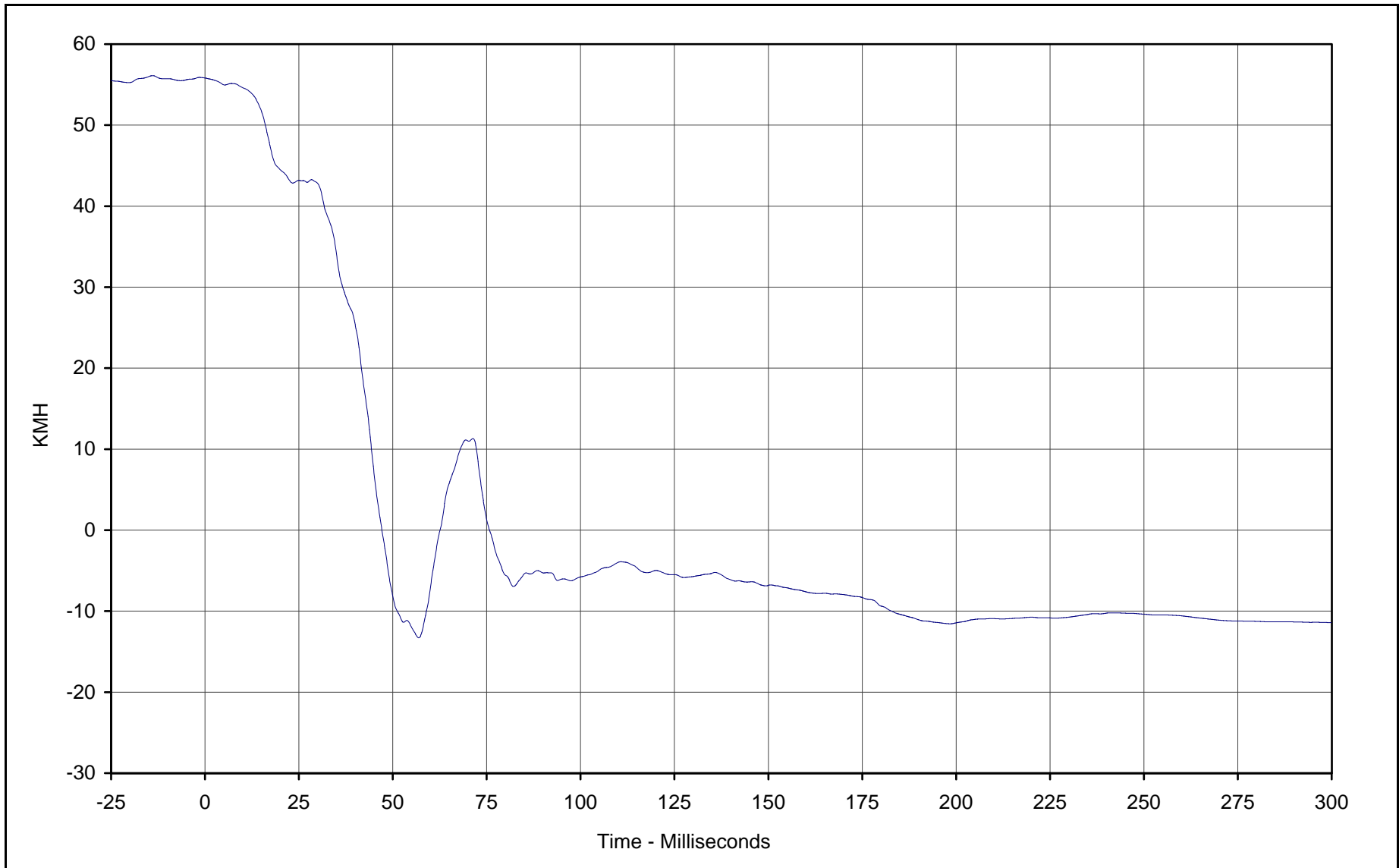
Curve Description: Vehicle Right Brake Caliper
Maximum Value: 80.4 at 61.1 Milliseconds
Minimum Value: -112.1 at 44.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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B-139



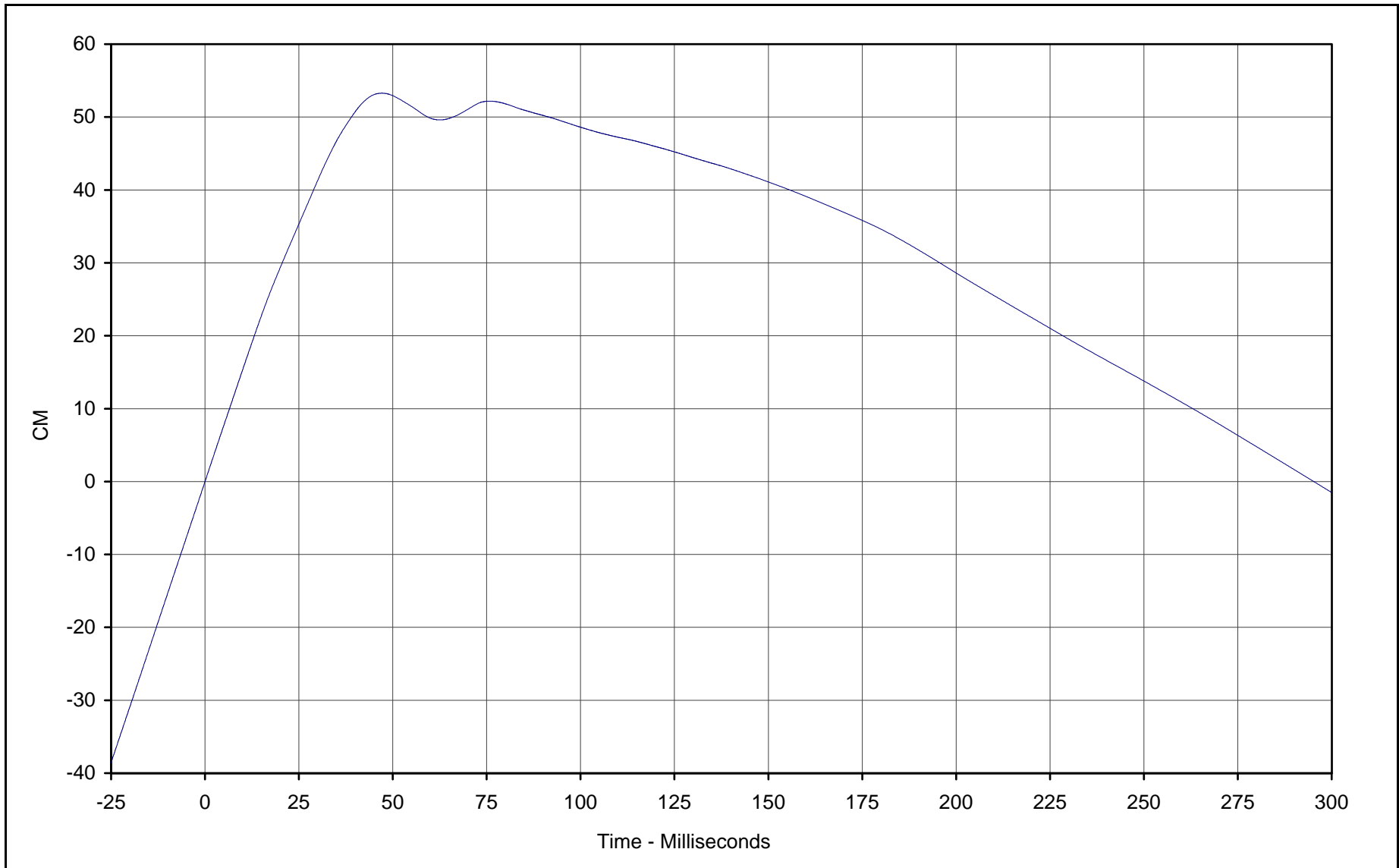
Curve Description: Vehicle Right Brake Caliper Velocity
Maximum Value: 55.8 at 0.0 Milliseconds
Minimum Value: -13.3 at 56.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-140



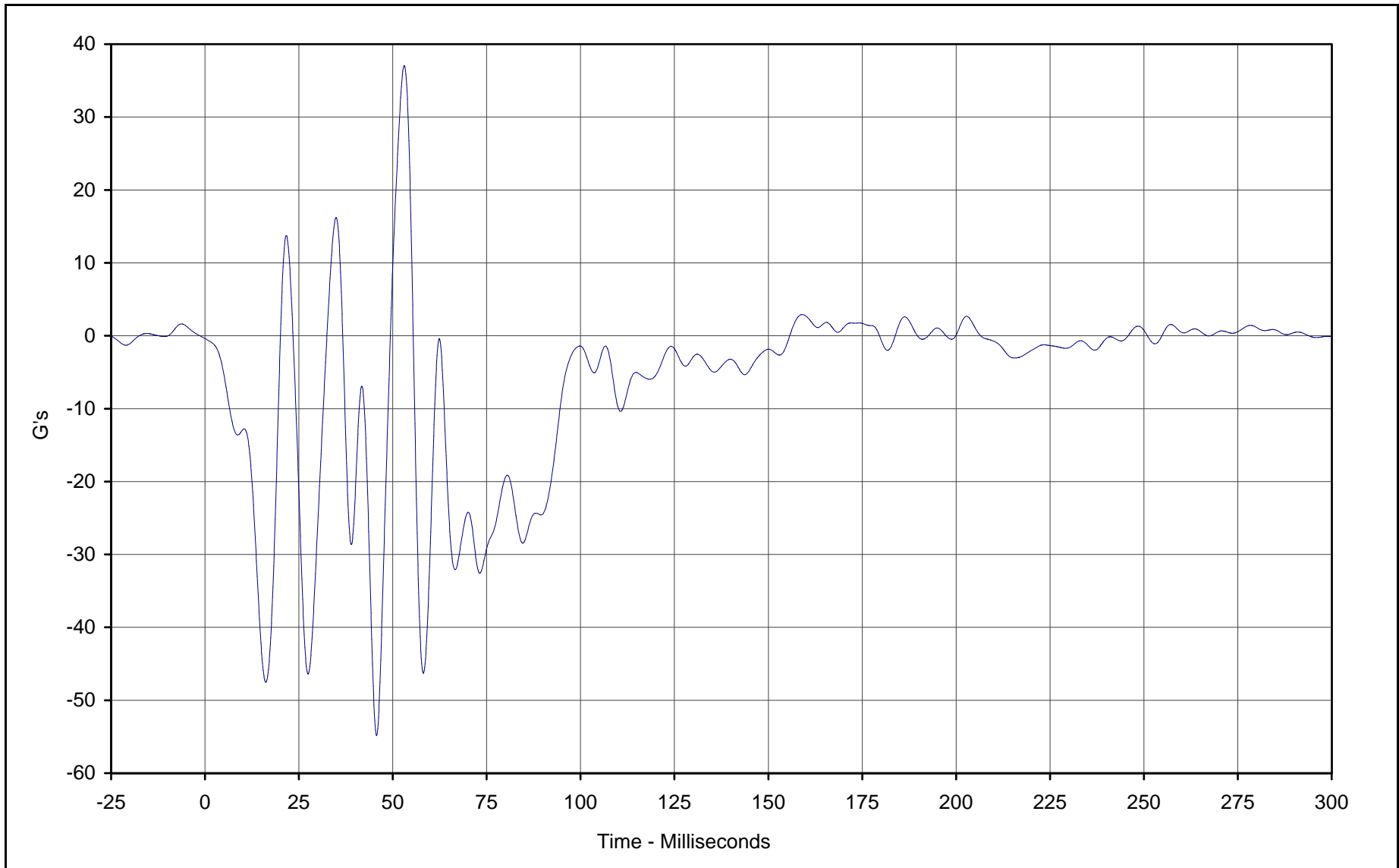
Curve Description: Vehicle Right Brake Caliper Displ.
Maximum Value: 53.3 at 47.1 Milliseconds
Minimum Value: -1.5 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-094

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-141



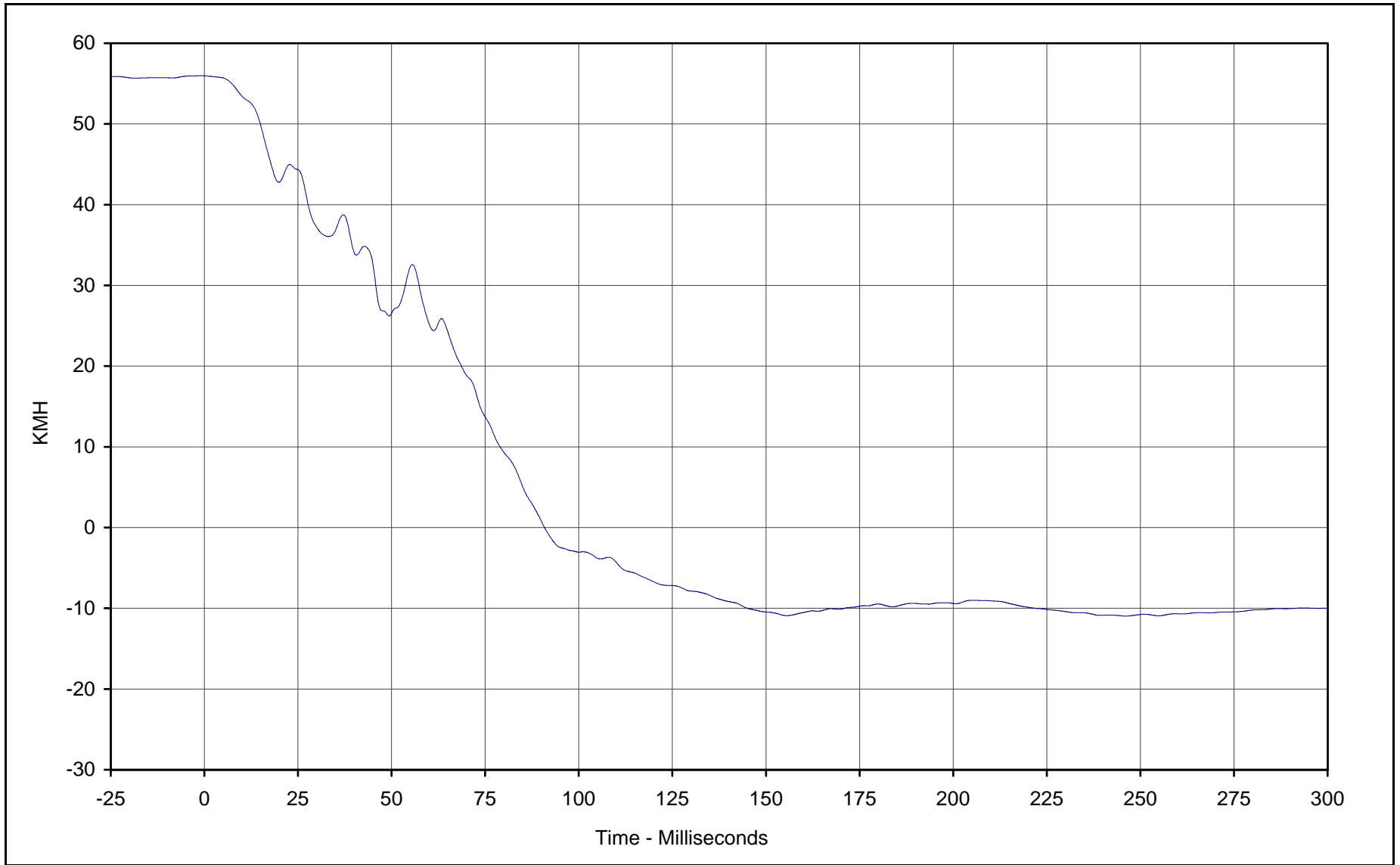
Curve Description: Vehicle Instrument Panel
Maximum Value: 37.1 at 53.1 Milliseconds
Minimum Value: -54.9 at 45.7 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-095

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-142



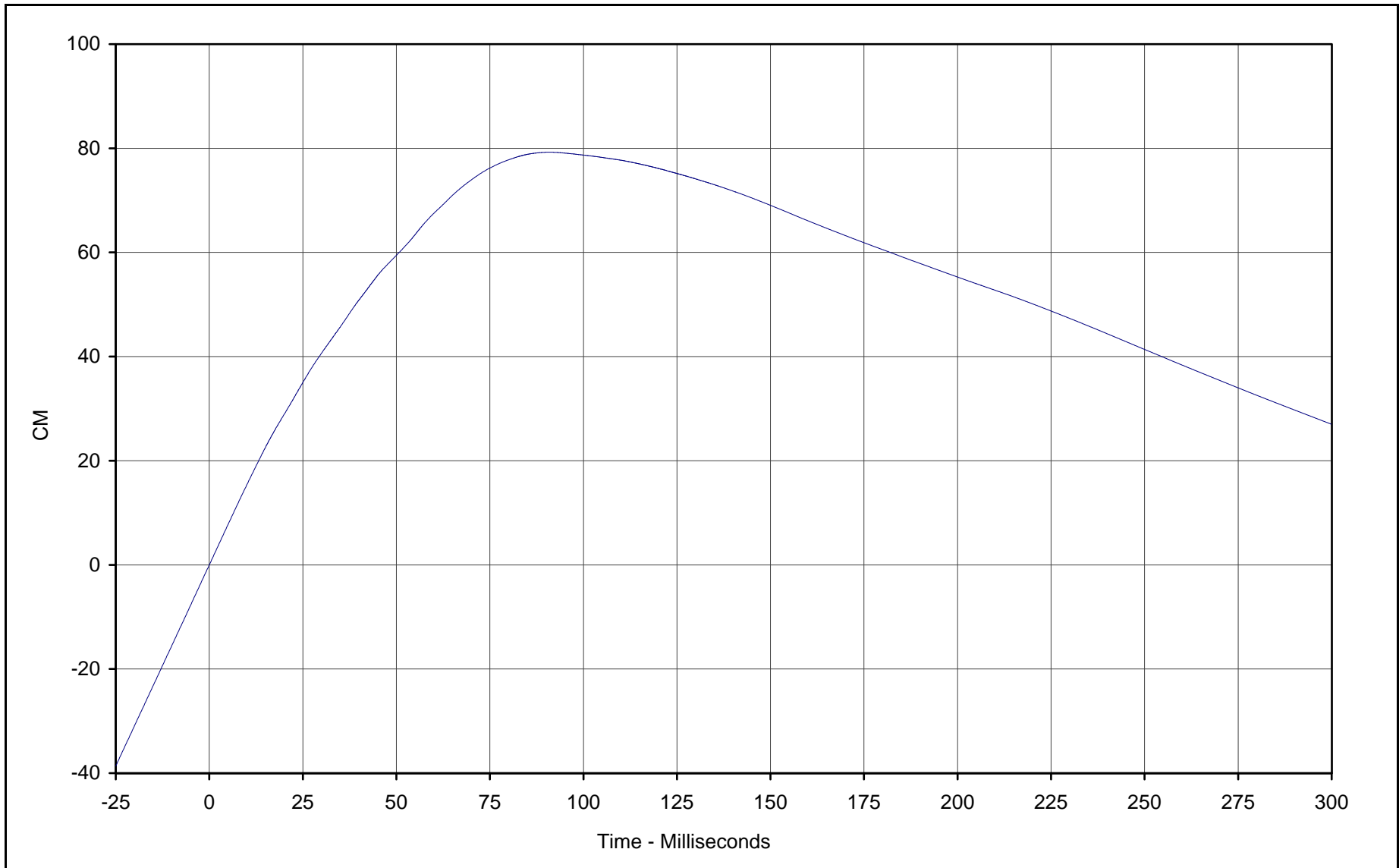
Curve Description: Vehicle Instrument Panel Velocity
Maximum Value: 56.0 at 0.0 Milliseconds
Minimum Value: -11.0 at 246.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN1-095

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-143



Curve Description: Vehicle Instrument Panel Displacement

Maximum Value: 79.2 at 90.9 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN2-095

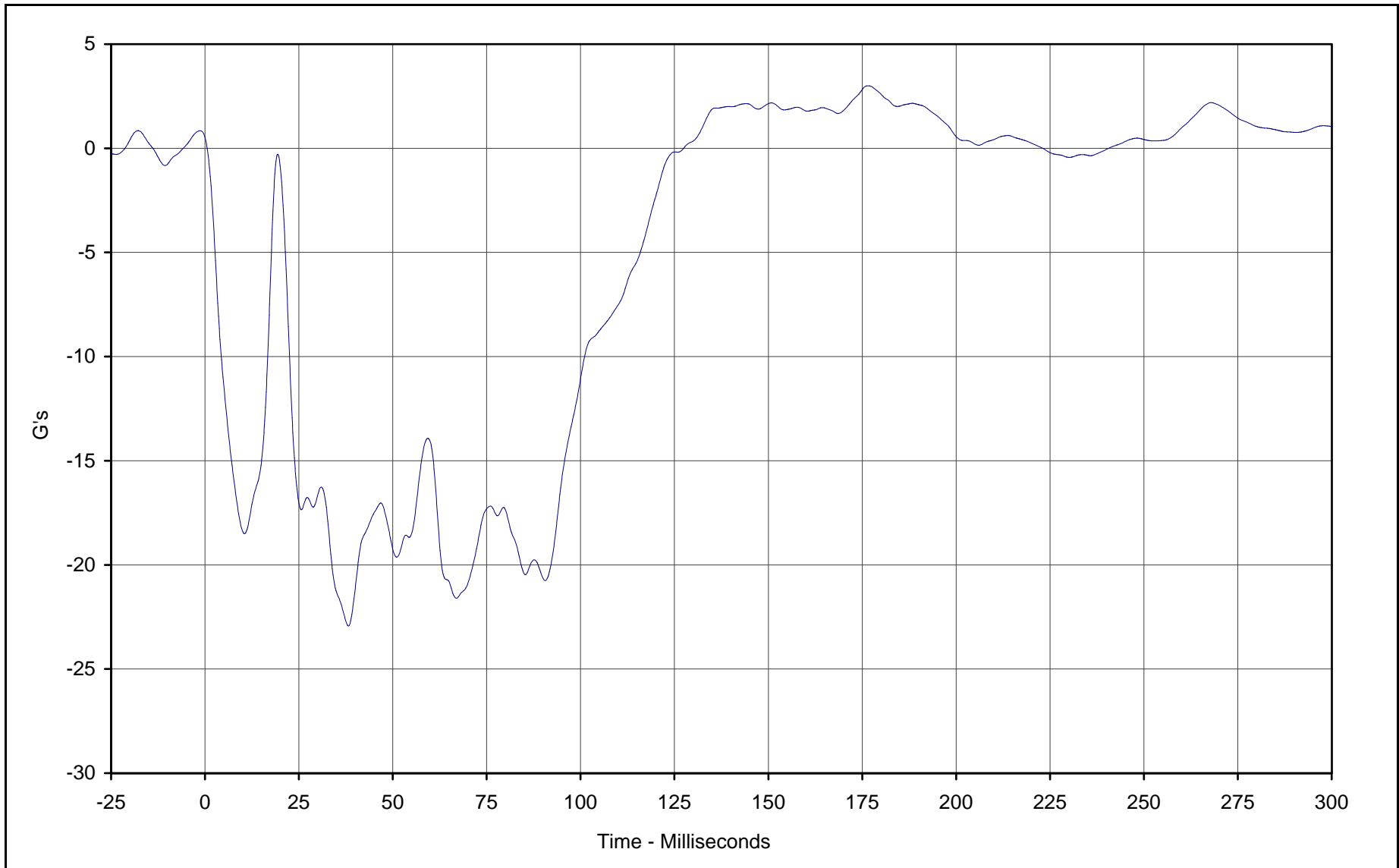
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-144



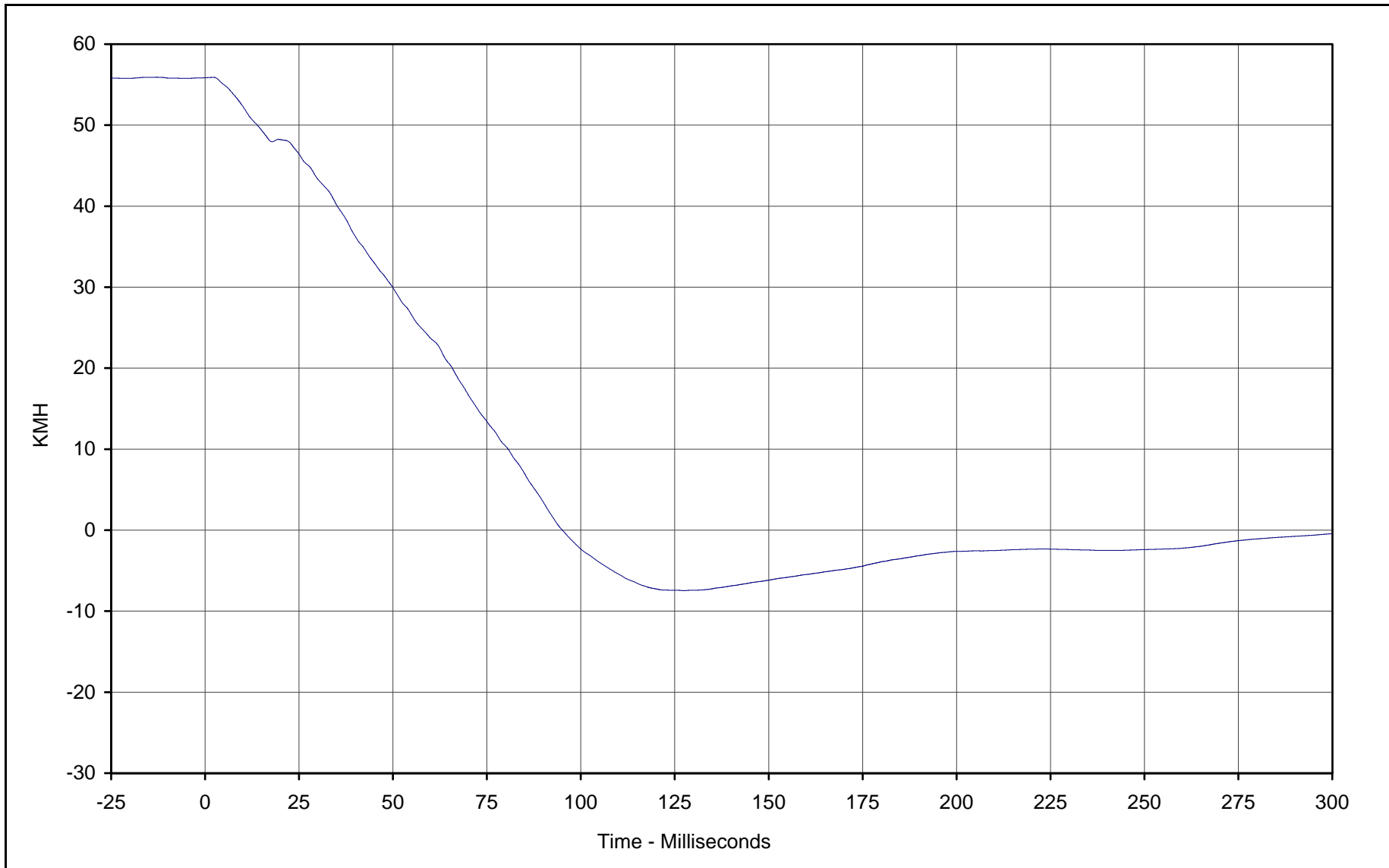
Curve Description: Vehicle Left Rear Redundant
Maximum Value: 3.0 at 176.5 Milliseconds
Minimum Value: -22.9 at 38.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-096

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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B-145



Curve Description: Vehicle Left Rear Redundant Velocity

Maximum Value: 55.9 at 2.1 Milliseconds

Minimum Value: -7.5 at 127.5 Milliseconds

SAE Filter Class: 180

Date of Test: 3/2/01

Curve Number: IN1-096

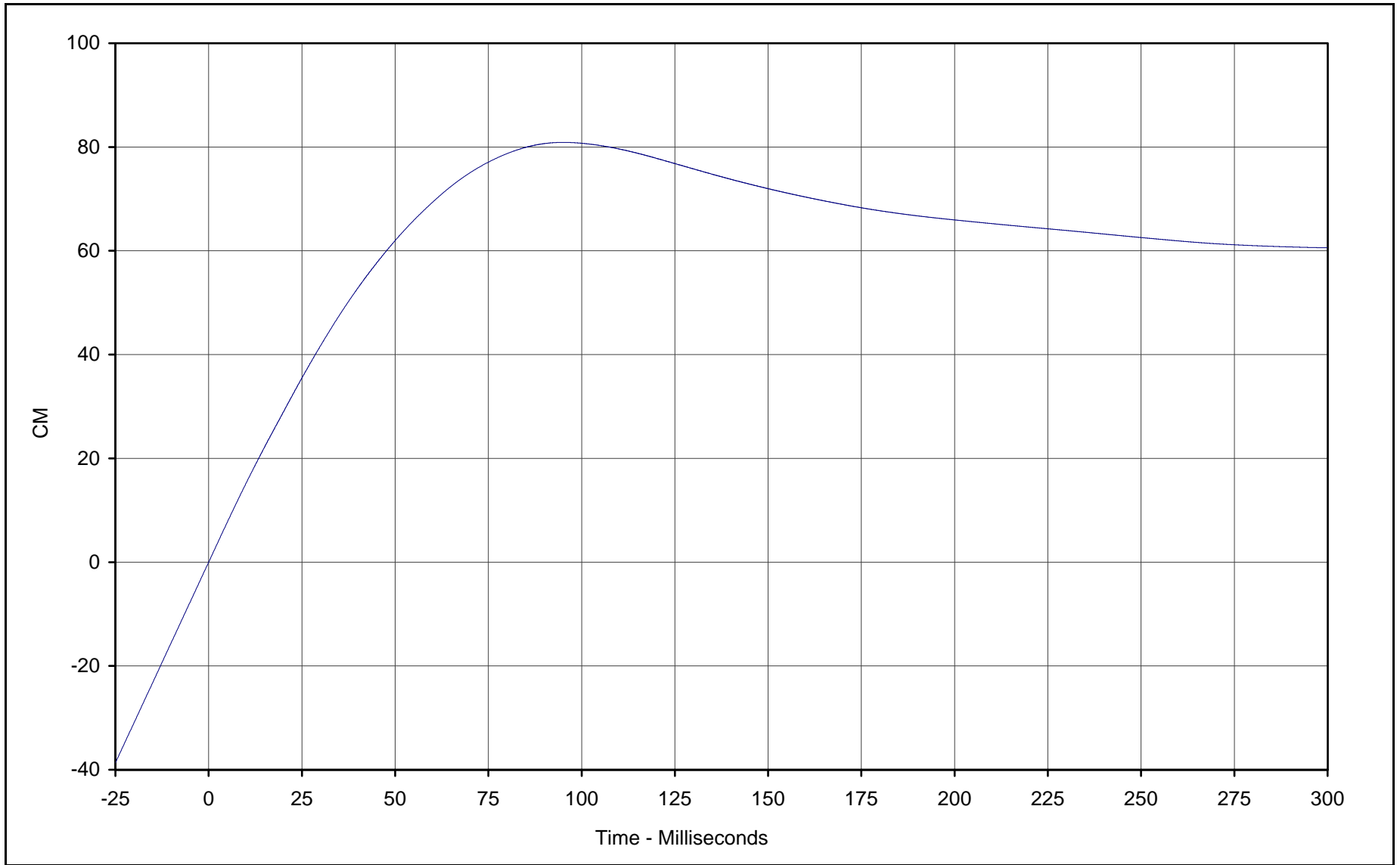
Test Program: 2001 NHTSA 35mph NCAP No.: M10109

Test Vehicle: 2001 Chevrolet Venture Minivan

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B-146



Curve Description: Vehicle Left Rear Redundant Displ.
Maximum Value: 80.9 at 95.1 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 3/2/01
Curve Number: IN2-096

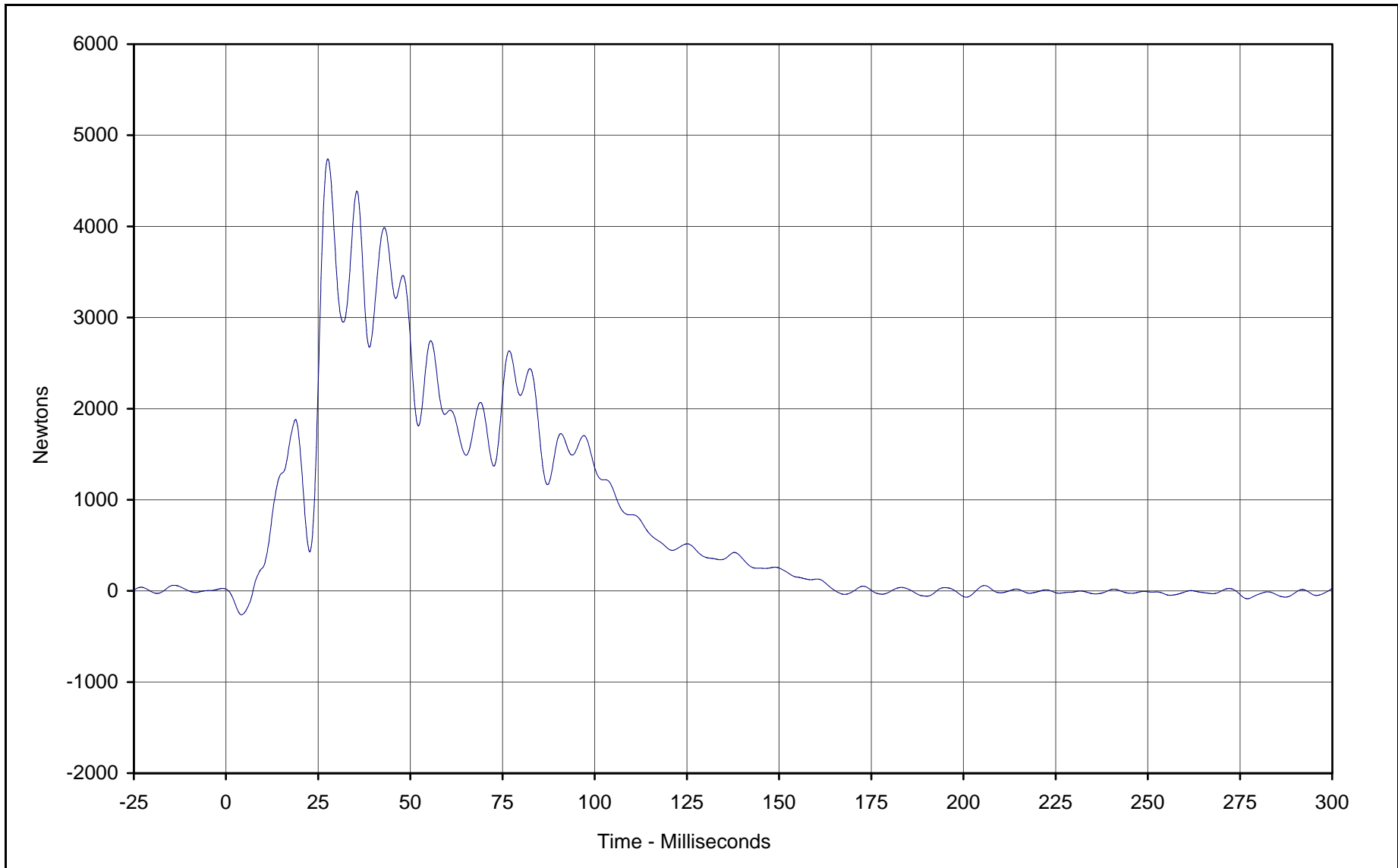
Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

KAR21001-16



APPENDIX C
LOAD CELL BARRIER INFORMATION

C-1



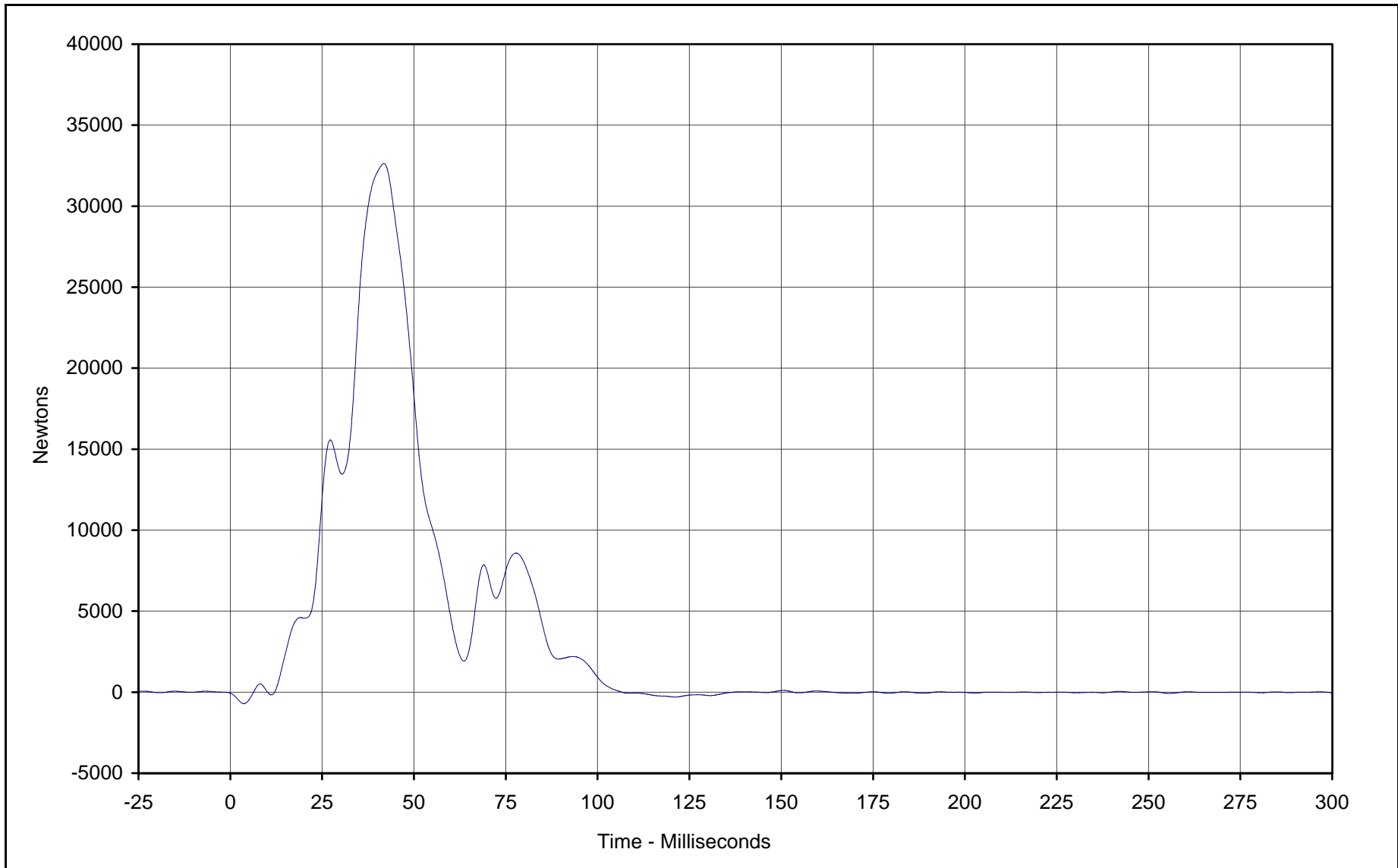
Curve Description: Barrier Force A2
Maximum Value: 4741.3 at 27.6 Milliseconds
Minimum Value: -262.2 at 4.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-099

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-2



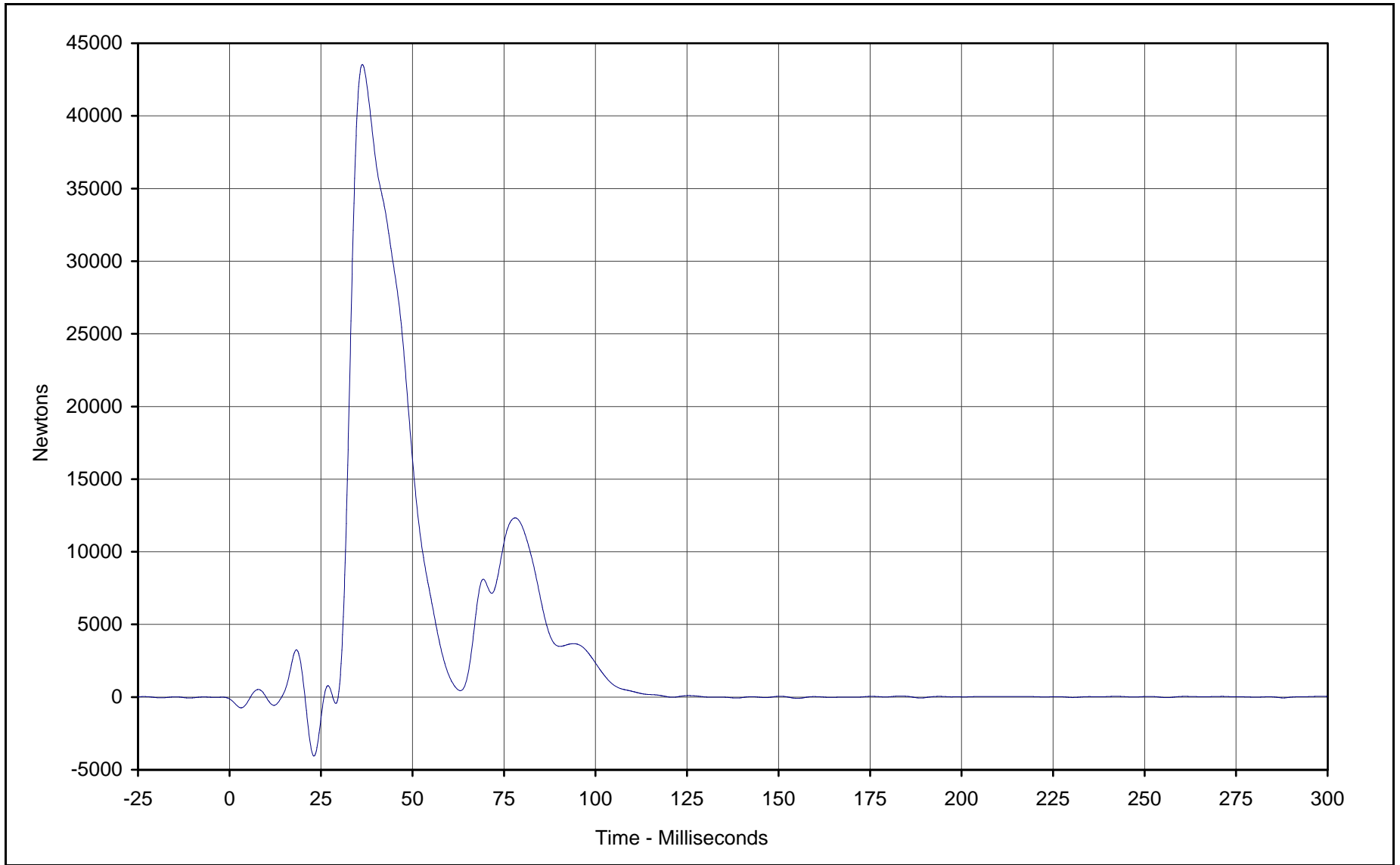
Curve Description: Barrier Force A3
Maximum Value: 32635.1 at 41.8 Milliseconds
Minimum Value: -711.4 at 3.7 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-100

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-3



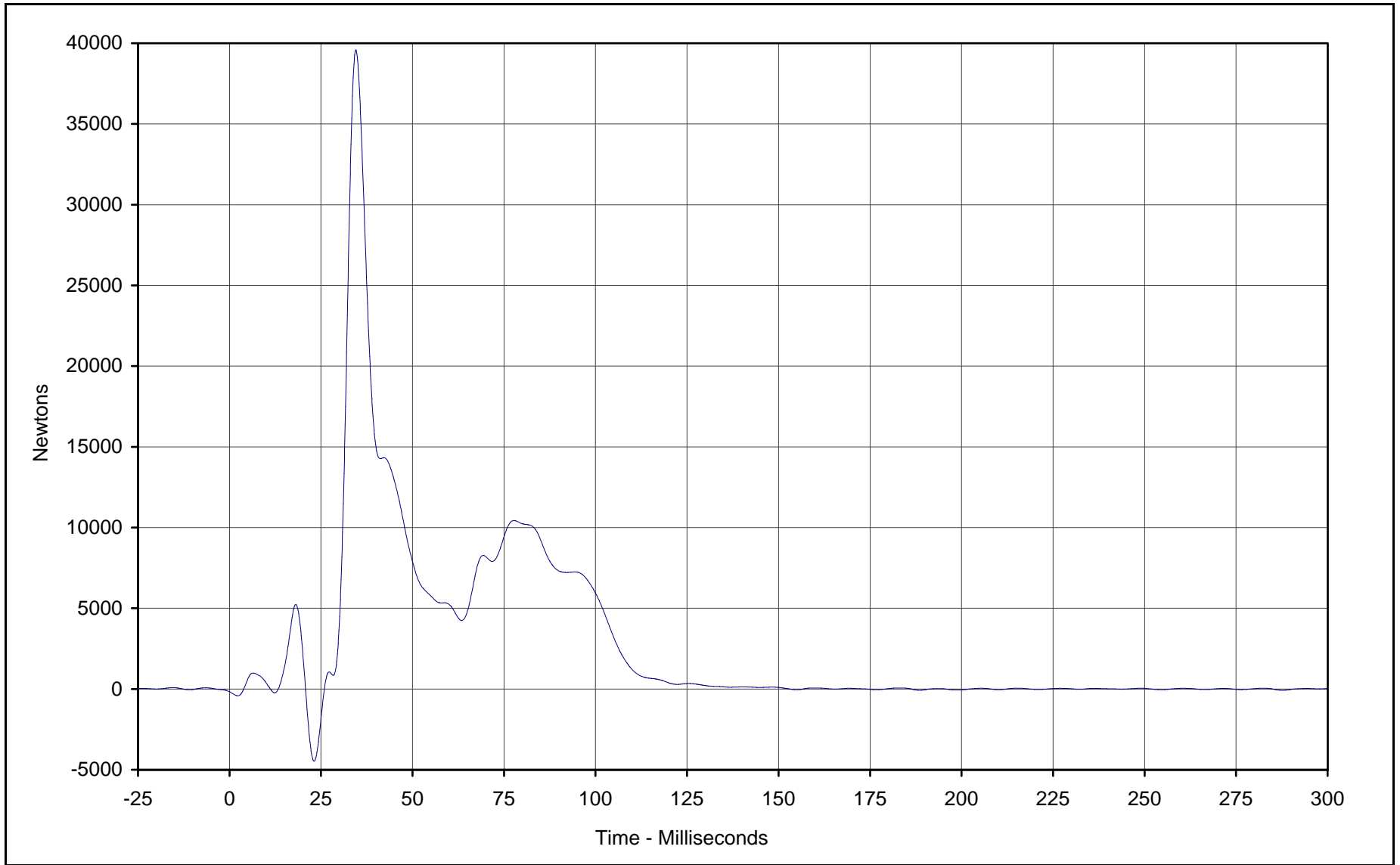
Curve Description: Barrier Force A4
Maximum Value: 43542.0 at 36.3 Milliseconds
Minimum Value: -4059.8 at 23.1 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-101

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-4



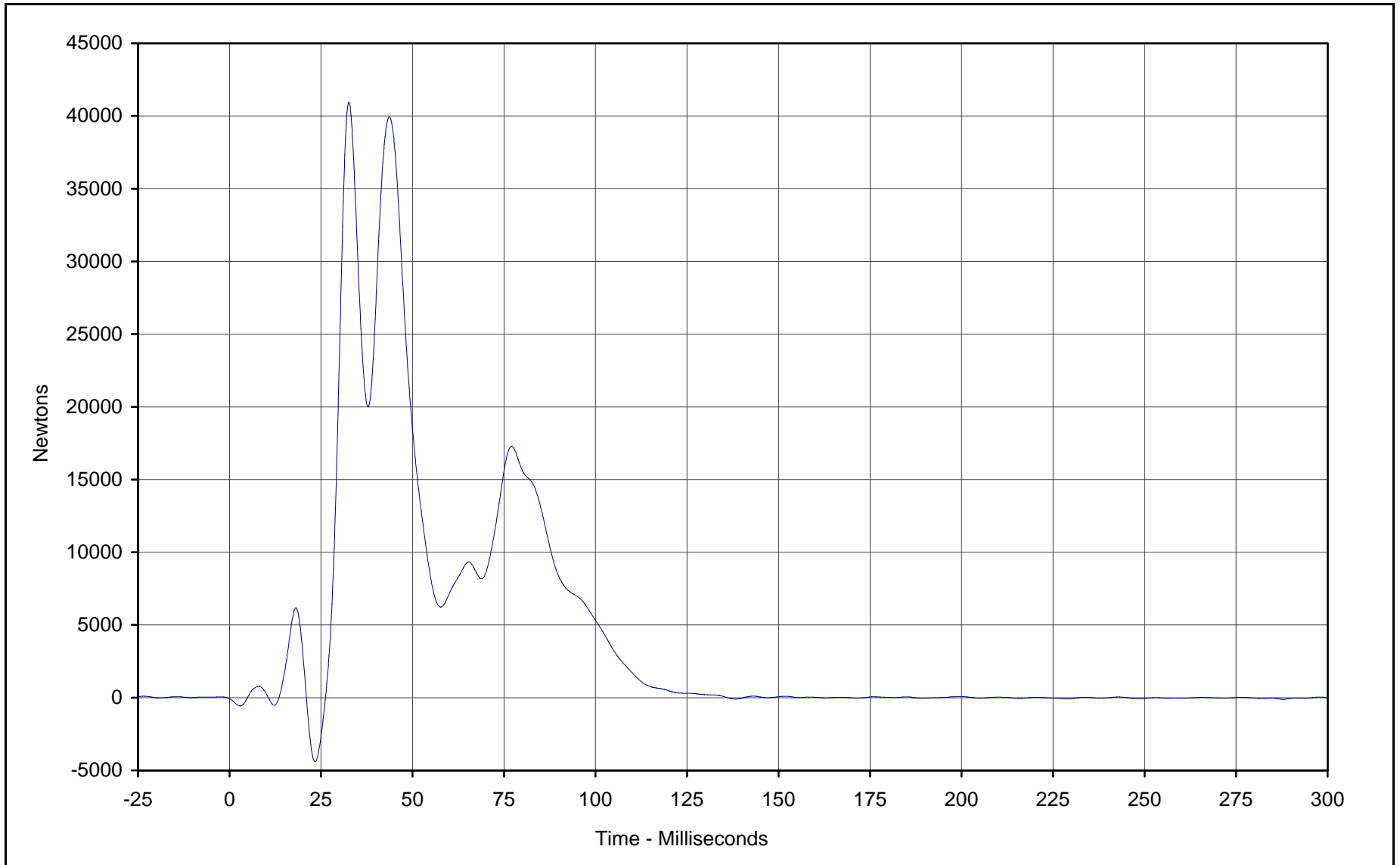
Curve Description: Barrier Force A5
Maximum Value: 39583.6 at 34.5 Milliseconds
Minimum Value: -4469.5 at 23.1 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-102

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-5



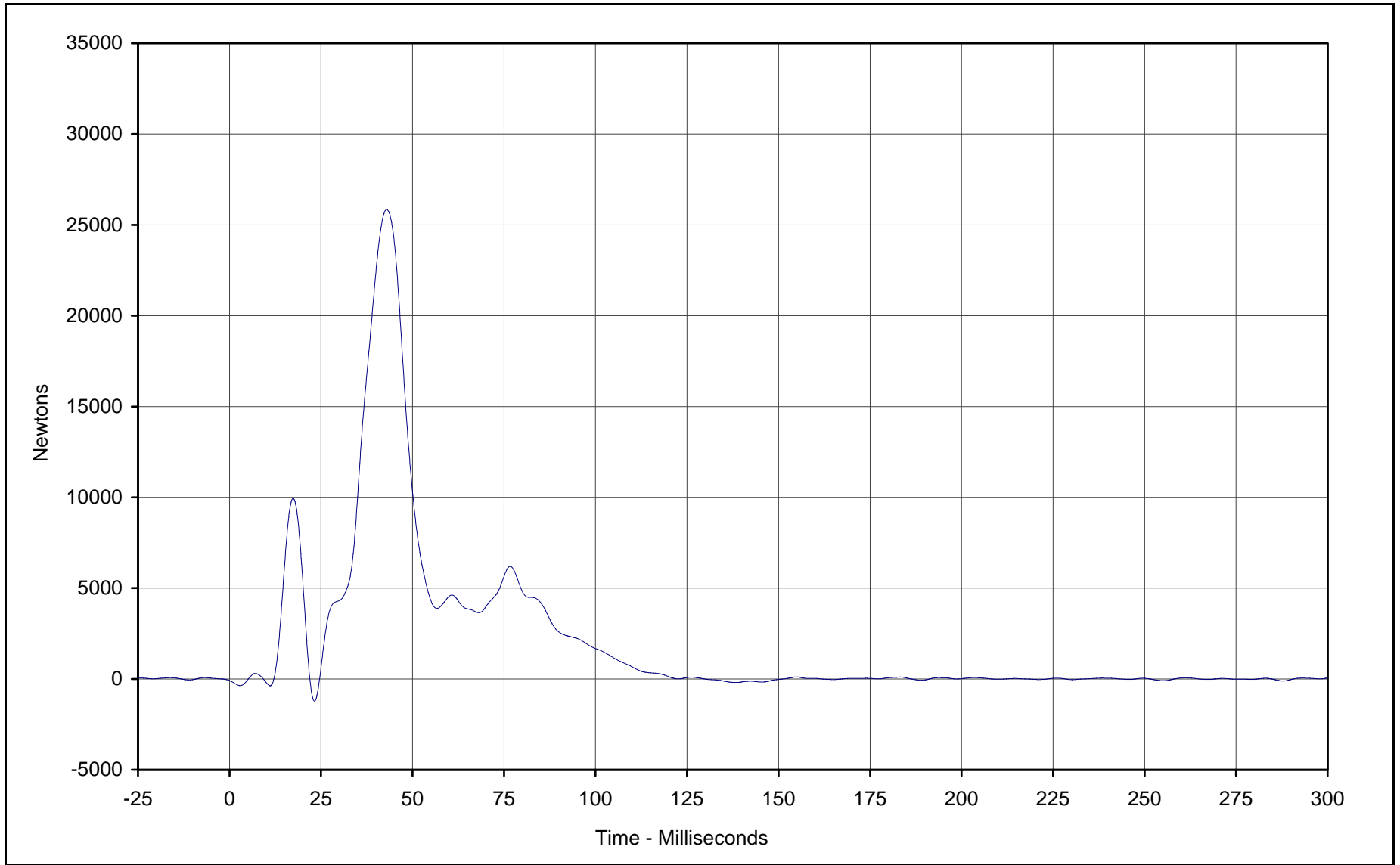
Curve Description: Barrier Force A6
Maximum Value: 40942.6 at 32.6 Milliseconds
Minimum Value: -4402.6 at 23.4 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-103

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-6



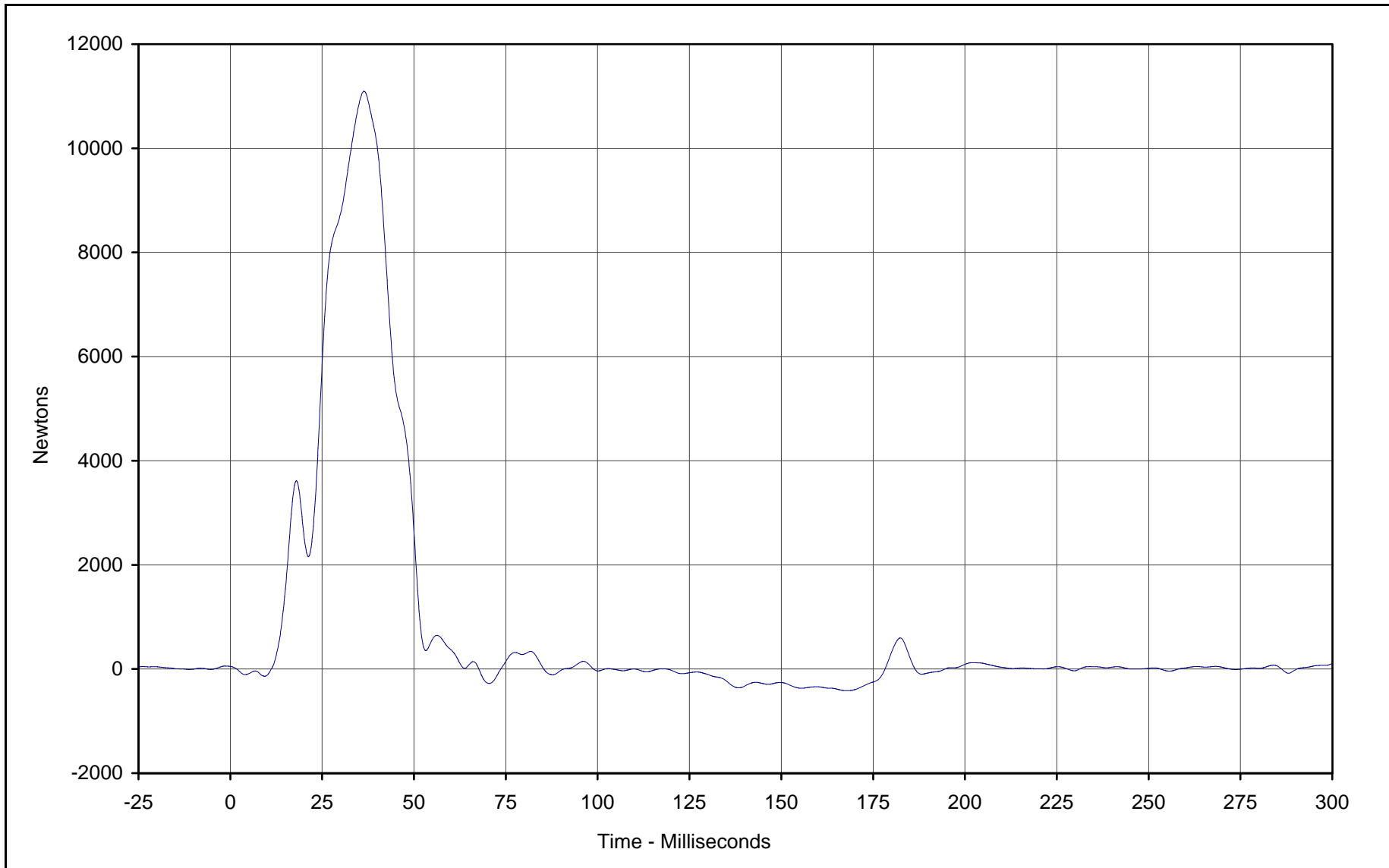
Curve Description: Barrier Force A7
Maximum Value: 25850.8 at 42.9 Milliseconds
Minimum Value: -1228.7 at 23.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-104

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-7



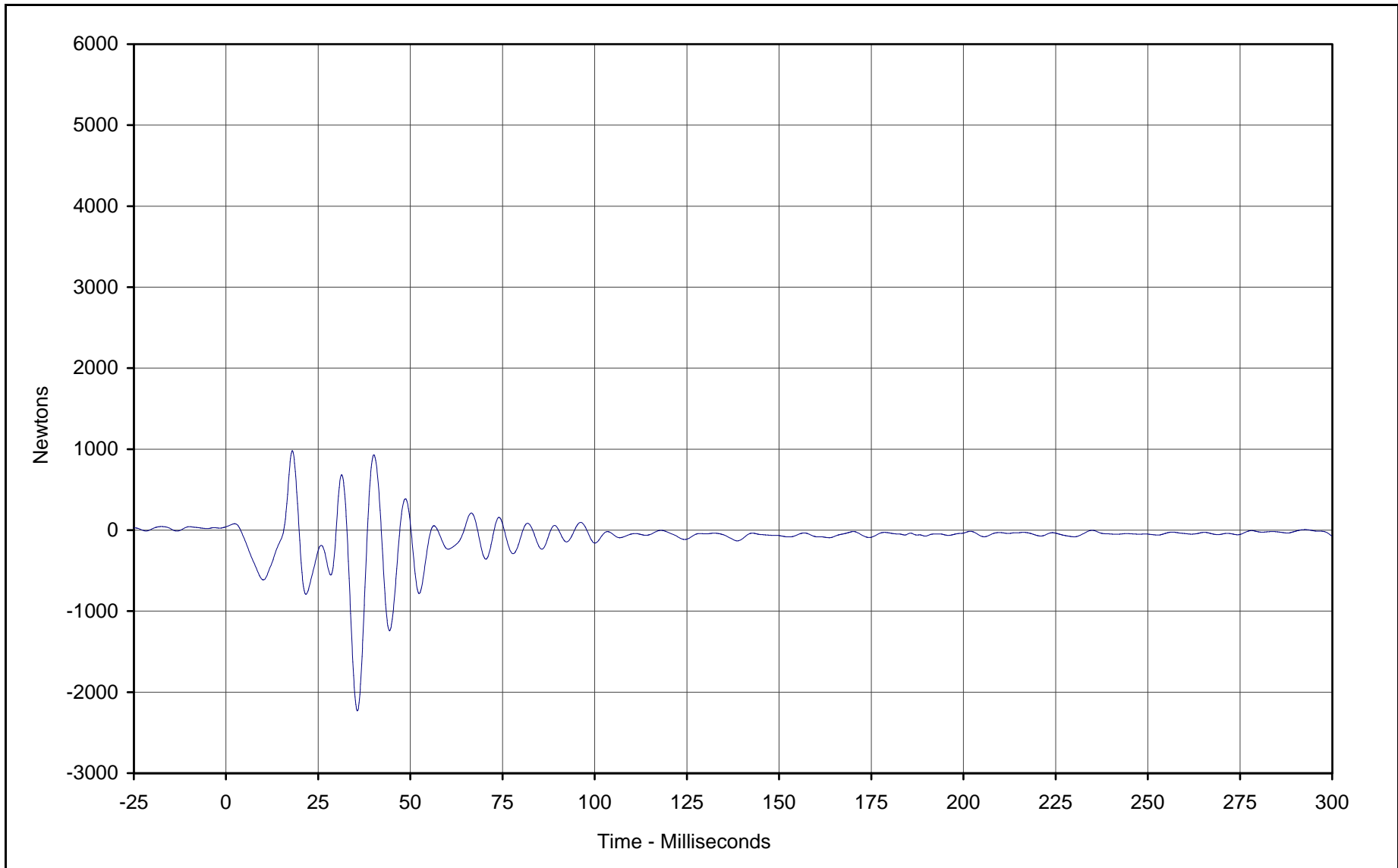
Curve Description: Barrier Force A8
Maximum Value: 11097.7 at 36.4 Milliseconds
Minimum Value: -416.3 at 167.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-105

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-8



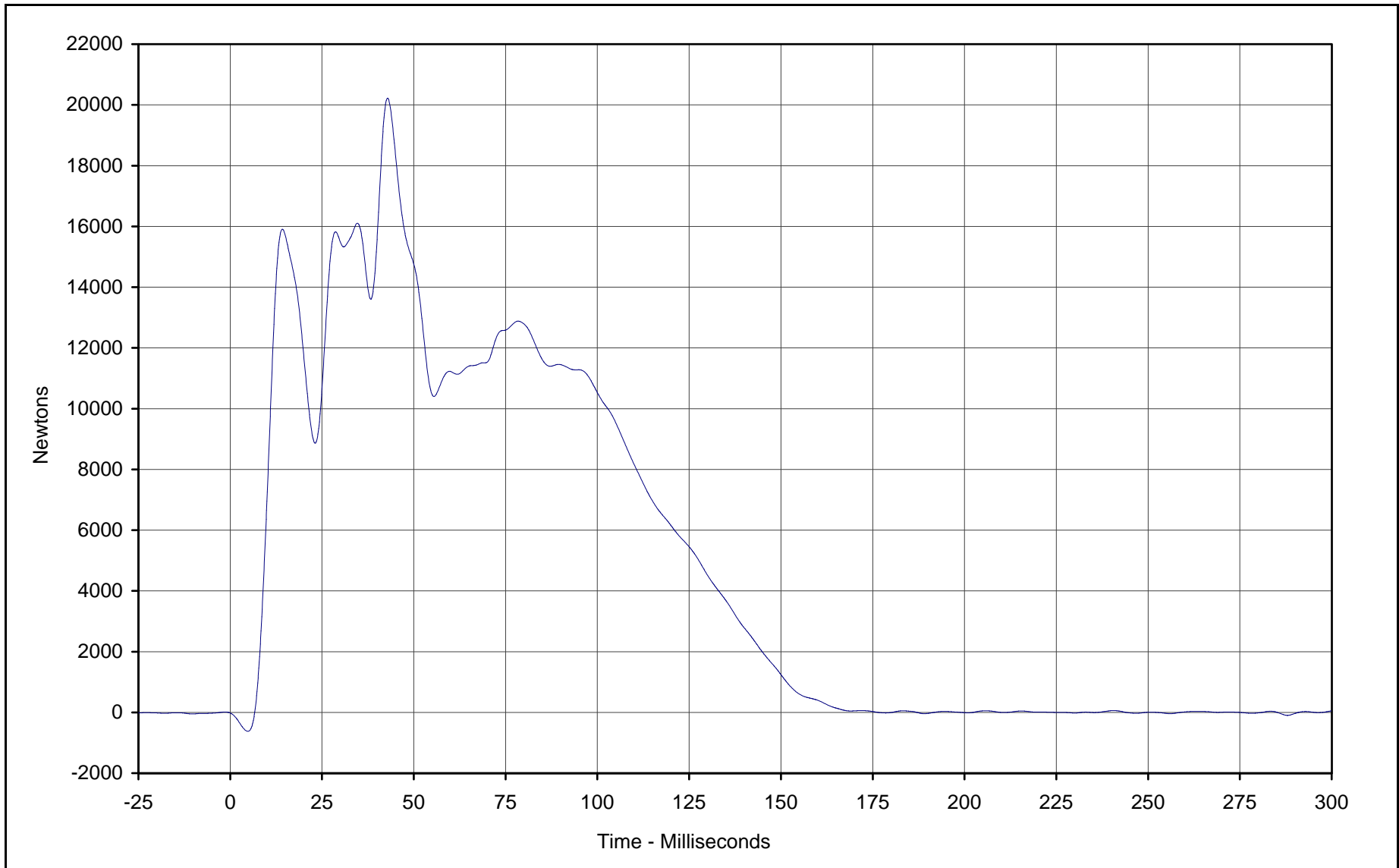
Curve Description: Barrier Force A9
Maximum Value: 981.1 at 18.0 Milliseconds
Minimum Value: -2231.2 at 35.6 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-106

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-9



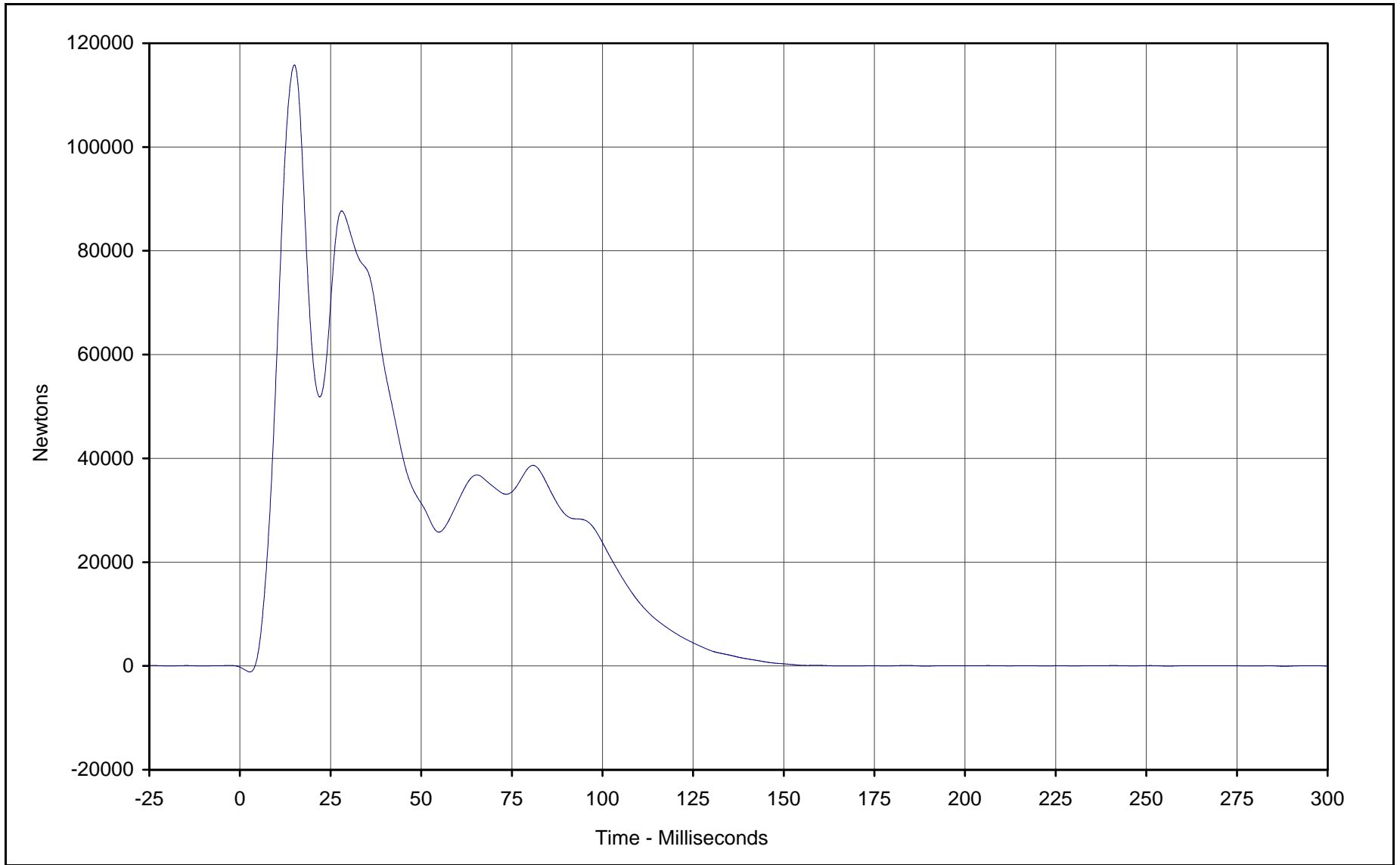
Curve Description: Barrier Force B2
Maximum Value: 20224.7 at 42.9 Milliseconds
Minimum Value: -624.5 at 4.8 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-108

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-10



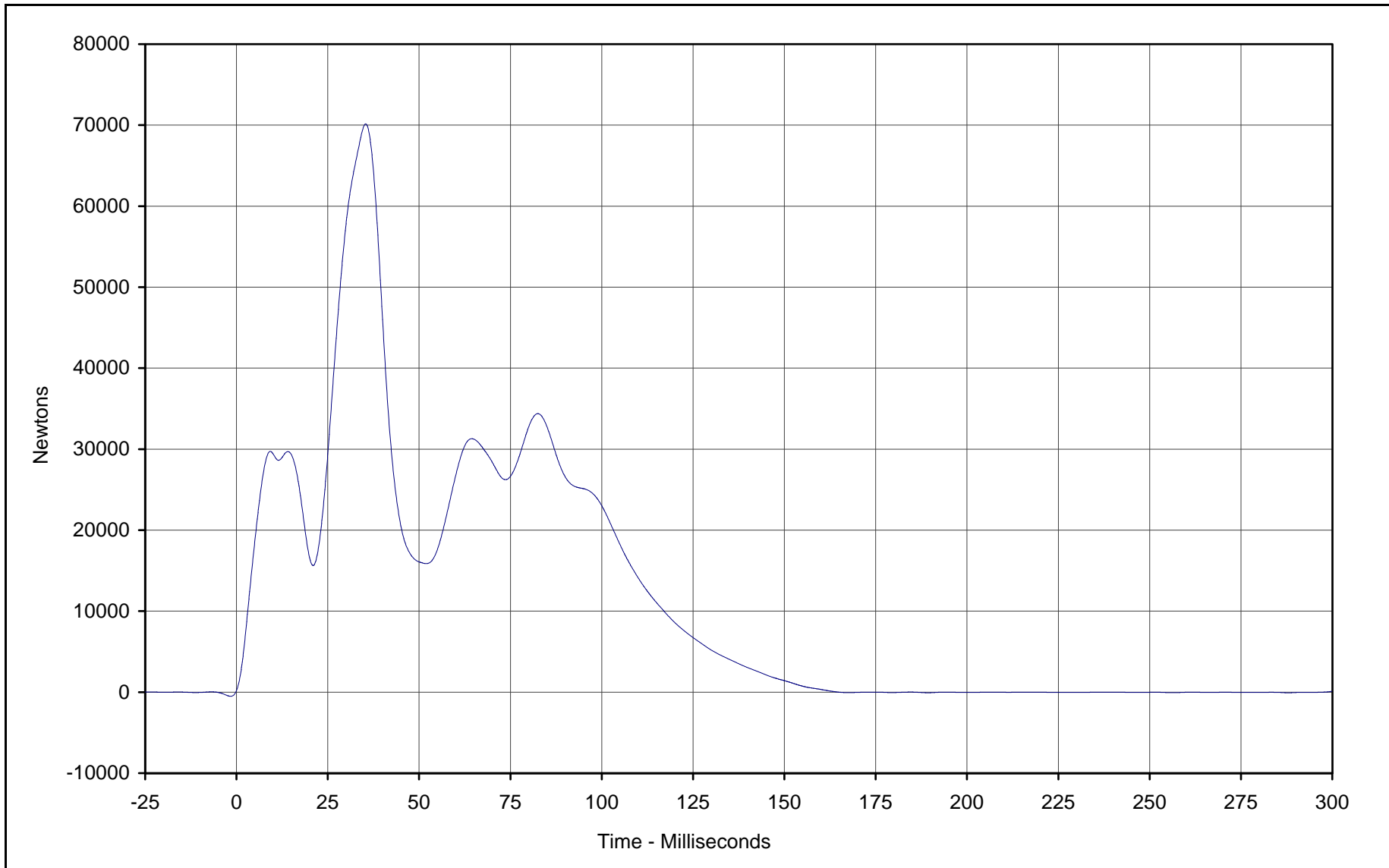
Curve Description: Barrier Force B3
Maximum Value: 115820.5 at 15.0 Milliseconds
Minimum Value: -1161.2 at 2.7 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-109

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-11



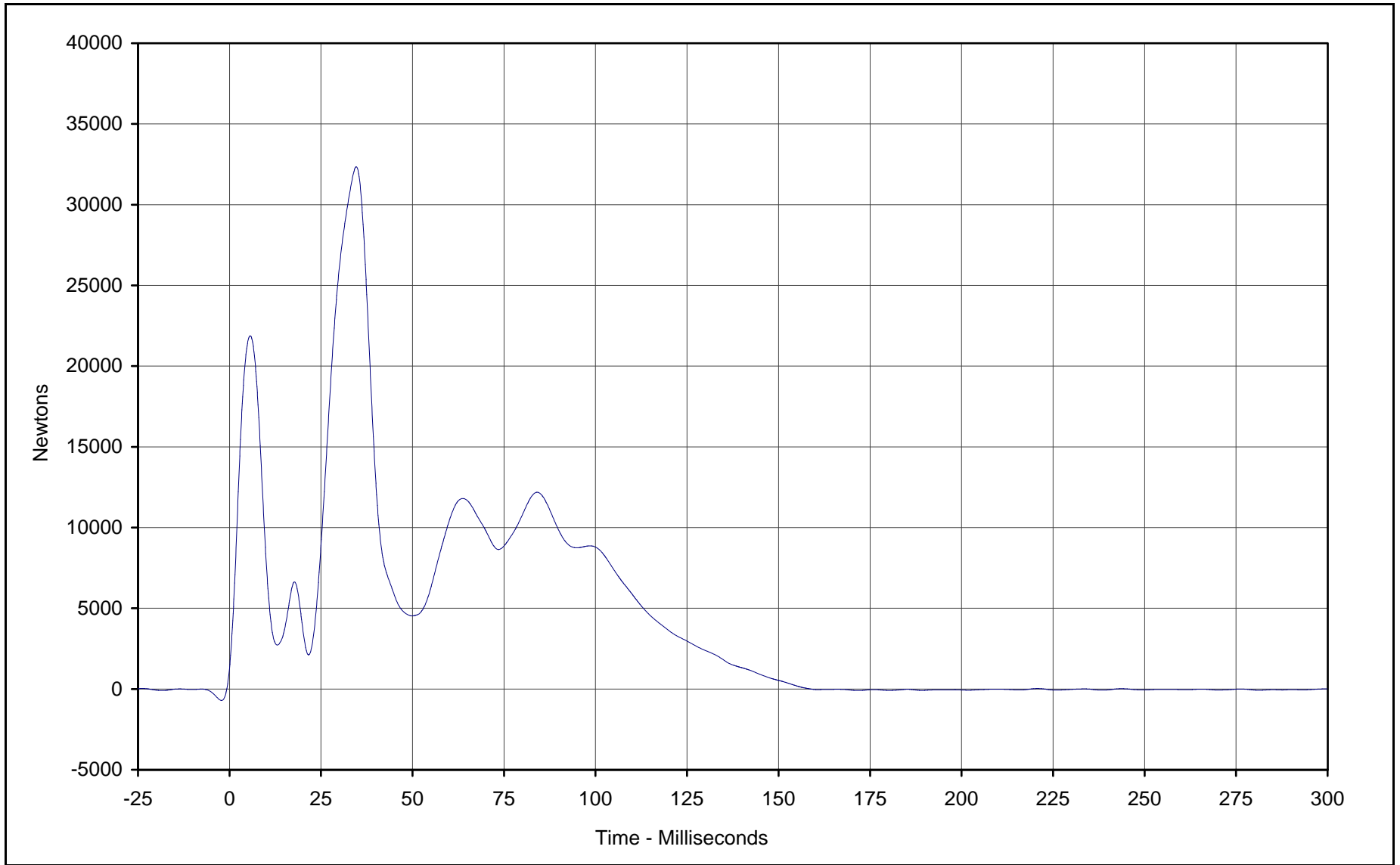
Curve Description: Barrier Force B4
Maximum Value: 70152.8 at 35.4 Milliseconds
Minimum Value: -82.2 at 287.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-110

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan

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C-12



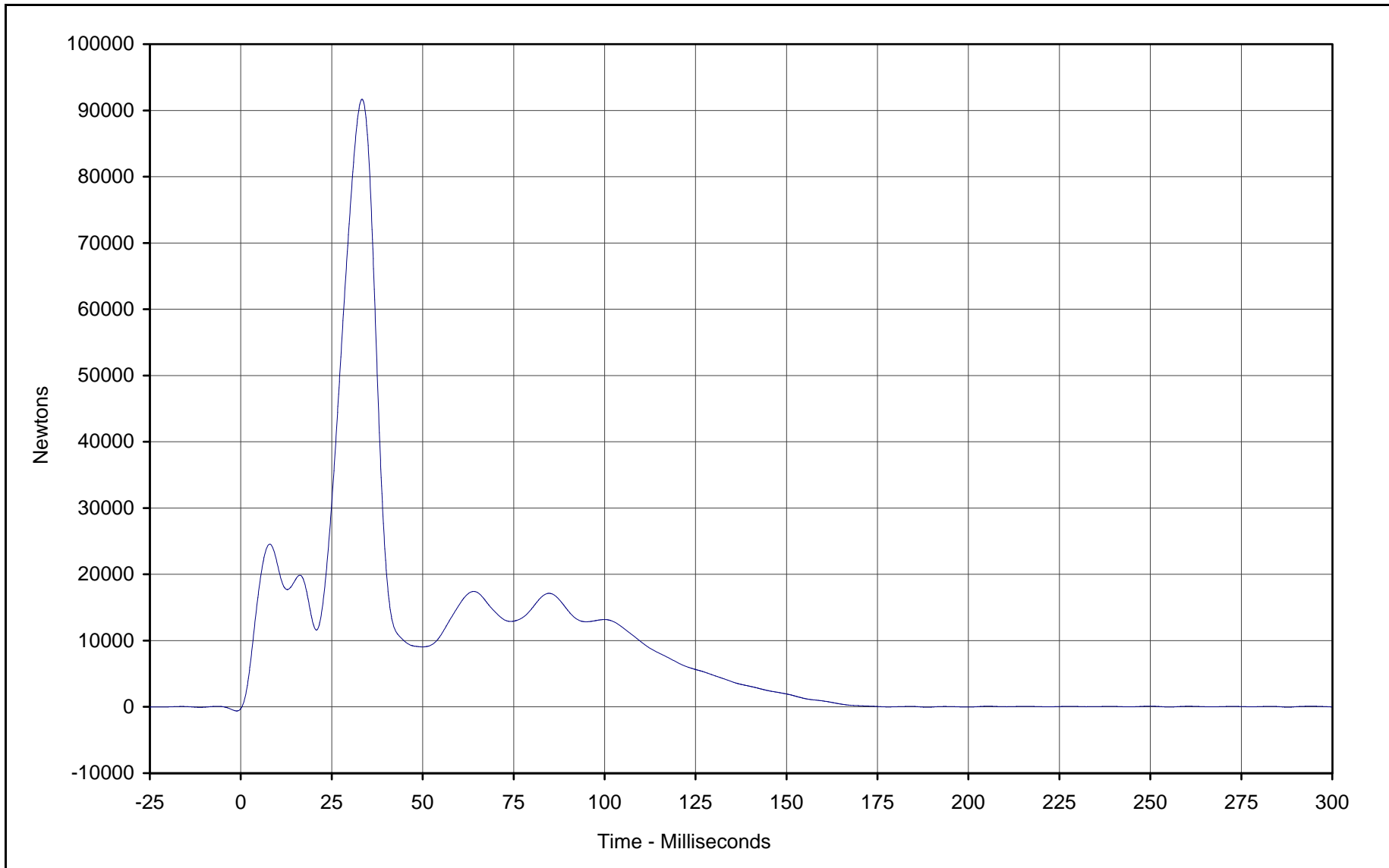
Curve Description: Barrier Force B5
Maximum Value: 32350.5 at 34.6 Milliseconds
Minimum Value: -95.9 at 171.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-111

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-13



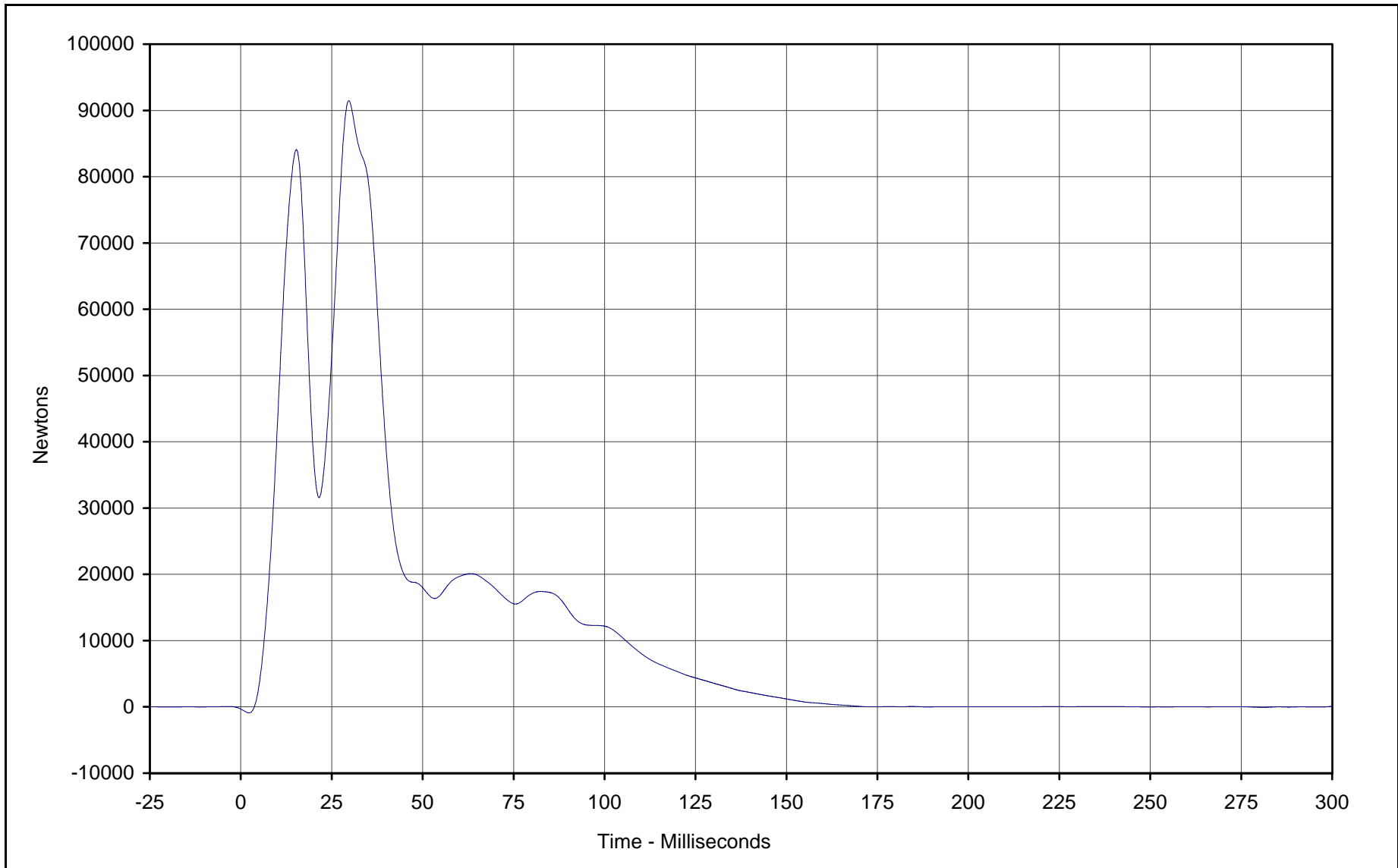
Curve Description: Barrier Force B6
Maximum Value: 91691.9 at 33.3 Milliseconds
Minimum Value: -268.5 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-112

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-14



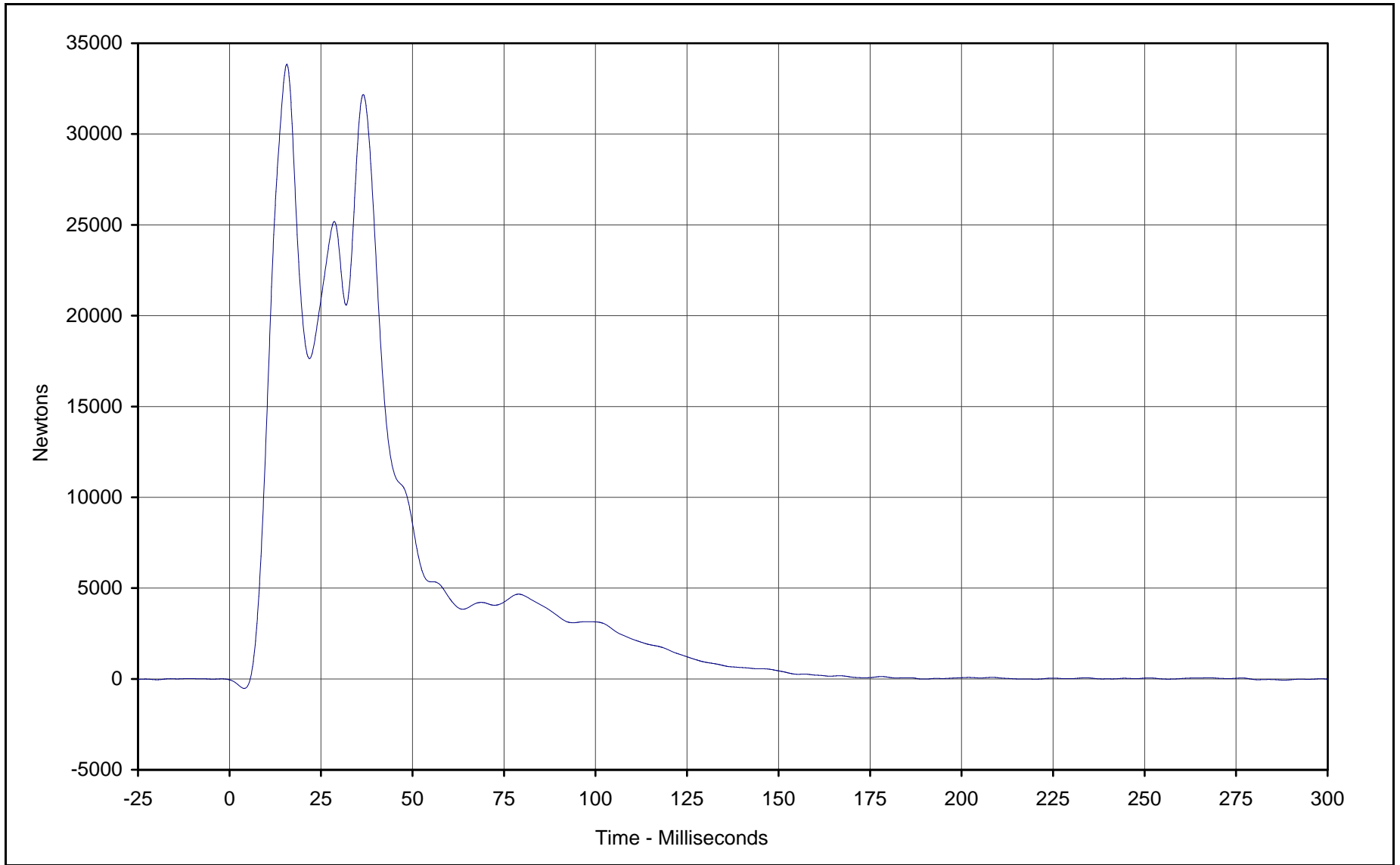
Curve Description: Barrier Force B7
Maximum Value: 91480.9 at 29.7 Milliseconds
Minimum Value: -907.4 at 2.3 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-113

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-15



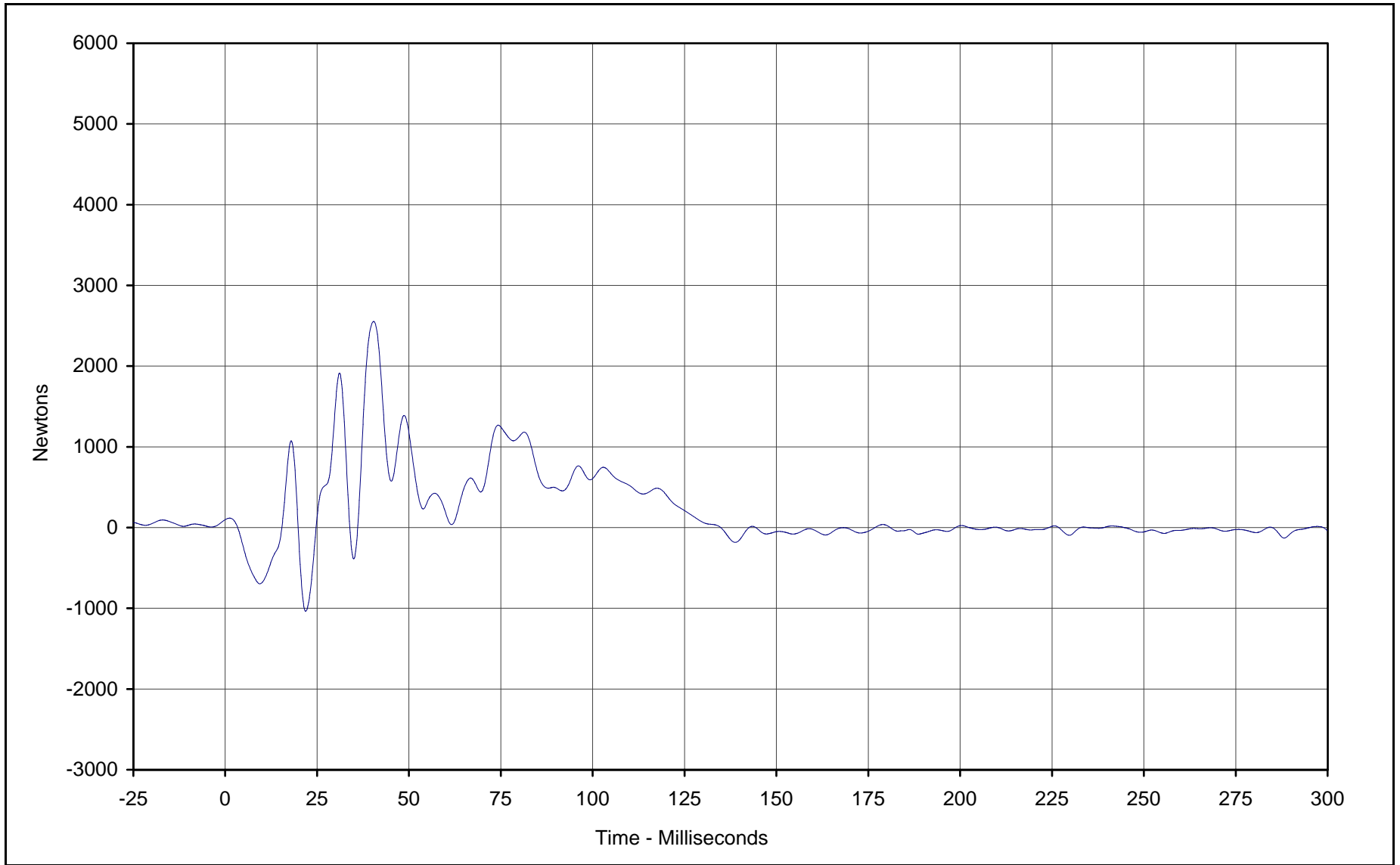
Curve Description: Barrier Force B8
Maximum Value: 33842.3 at 15.7 Milliseconds
Minimum Value: -522.5 at 4.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-114

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-16



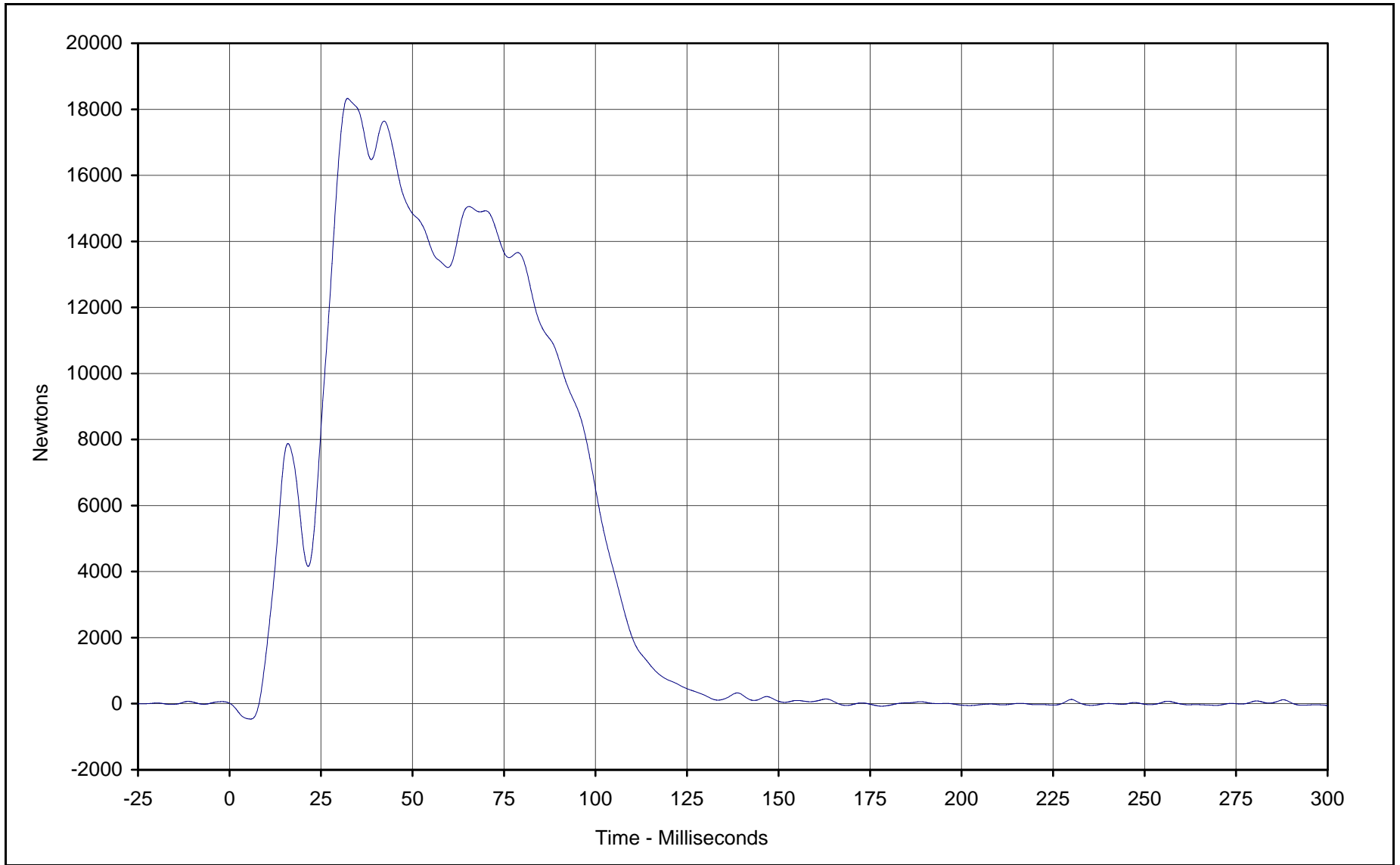
Curve Description: Barrier Force B9
Maximum Value: 2553.3 at 40.4 Milliseconds
Minimum Value: -1037.6 at 21.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-115

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-17



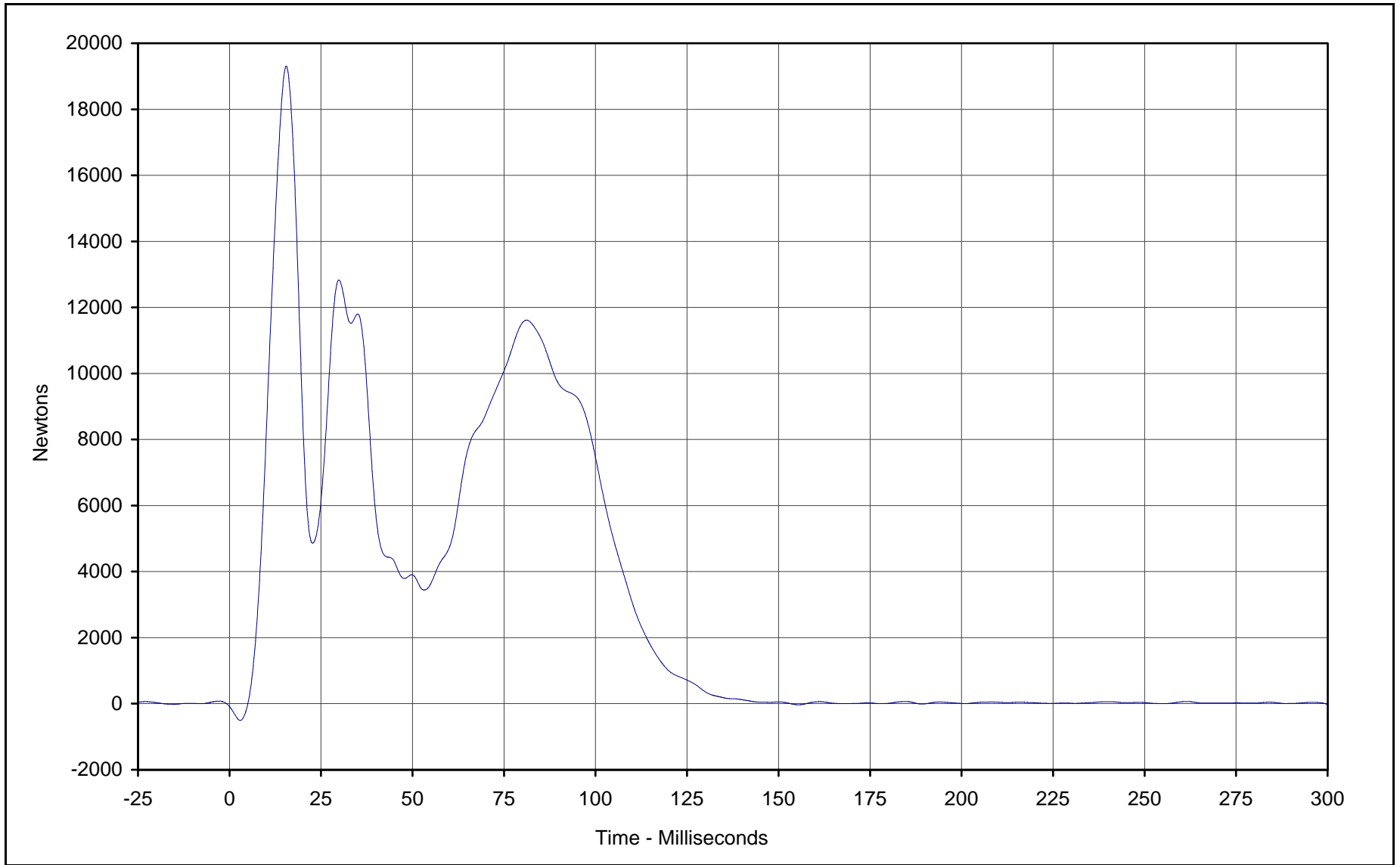
Curve Description: Barrier Force C2
Maximum Value: 18329.3 at 32.2 Milliseconds
Minimum Value: -465.8 at 5.8 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-117

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-18



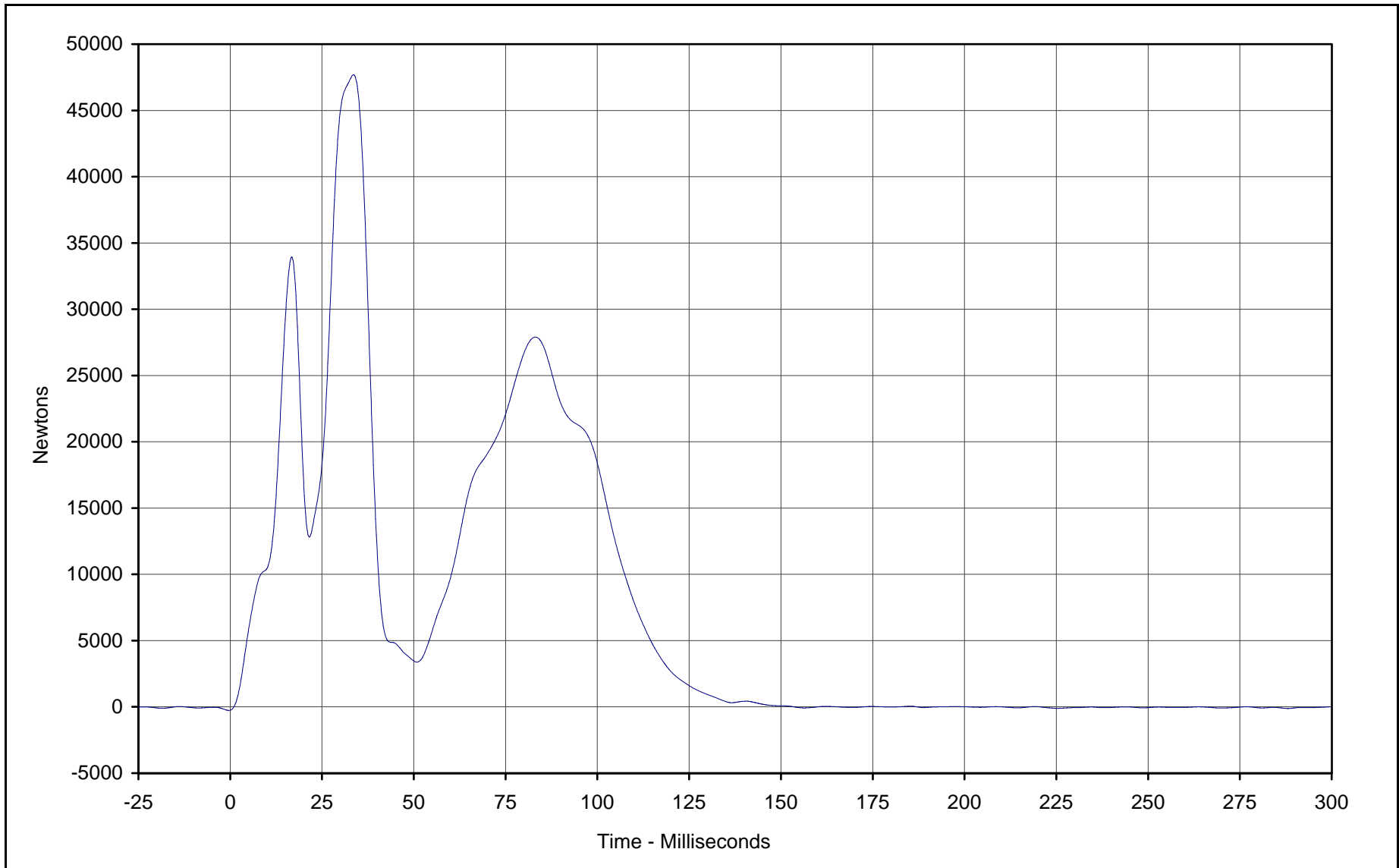
Curve Description: Barrier Force C3
Maximum Value: 19309.2 at 15.5 Milliseconds
Minimum Value: -510.0 at 2.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-118

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-19



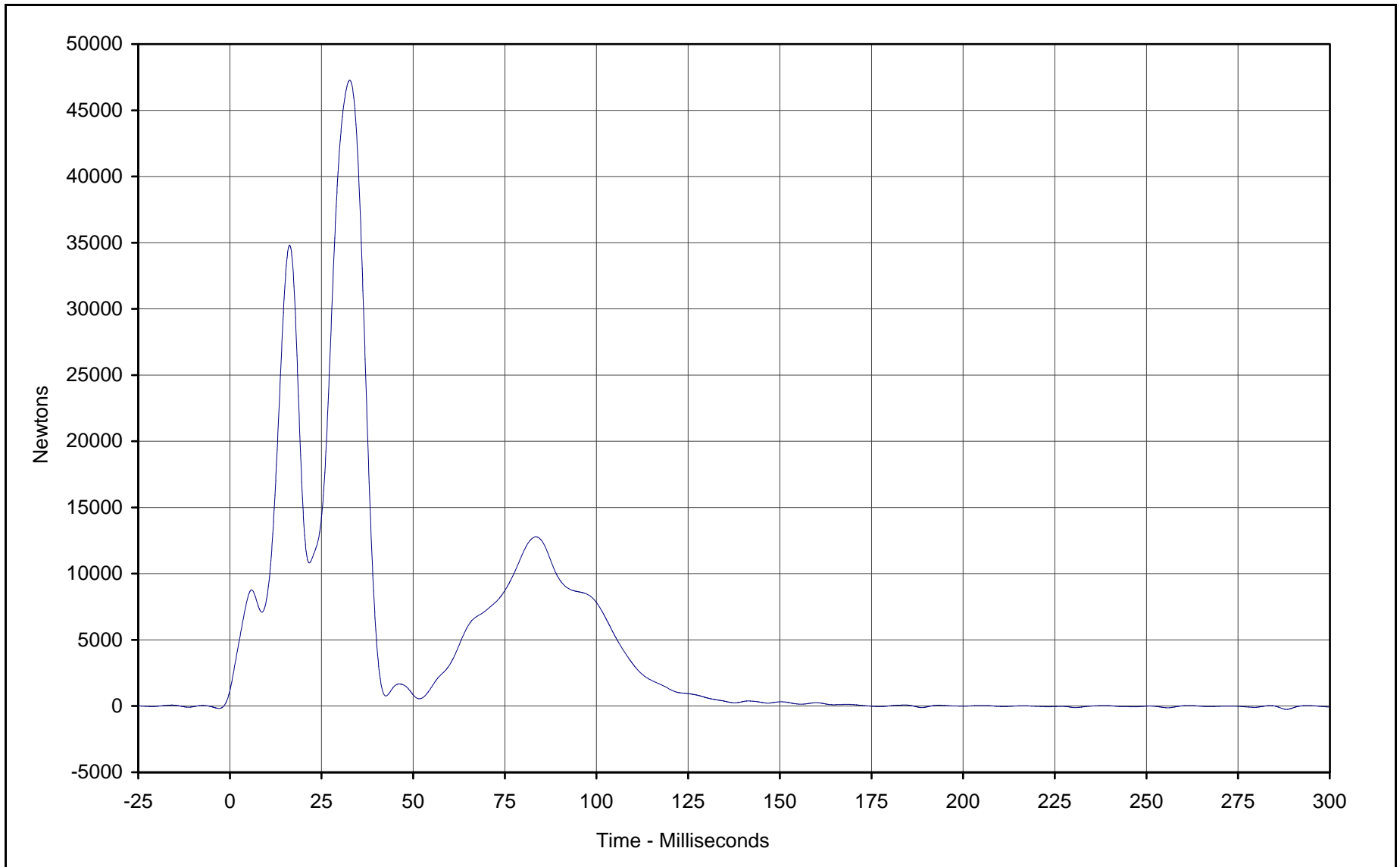
Curve Description: Barrier Force C4
Maximum Value: 47696.8 at 33.6 Milliseconds
Minimum Value: -253.4 at 0.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-119

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-20



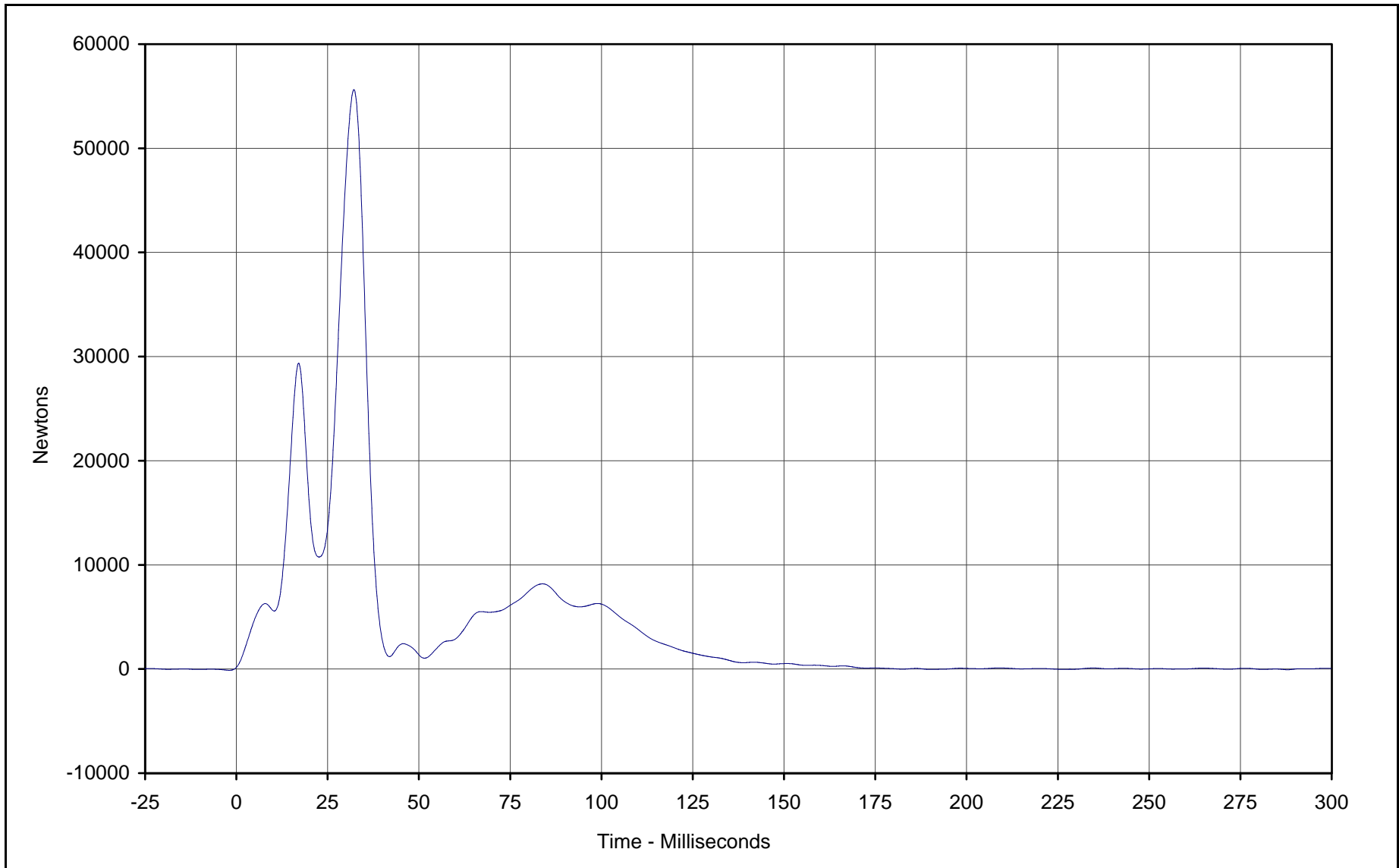
Curve Description: Barrier Force C5
Maximum Value: 47270.1 at 32.7 Milliseconds
Minimum Value: -251.8 at 288.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-120

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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C-21



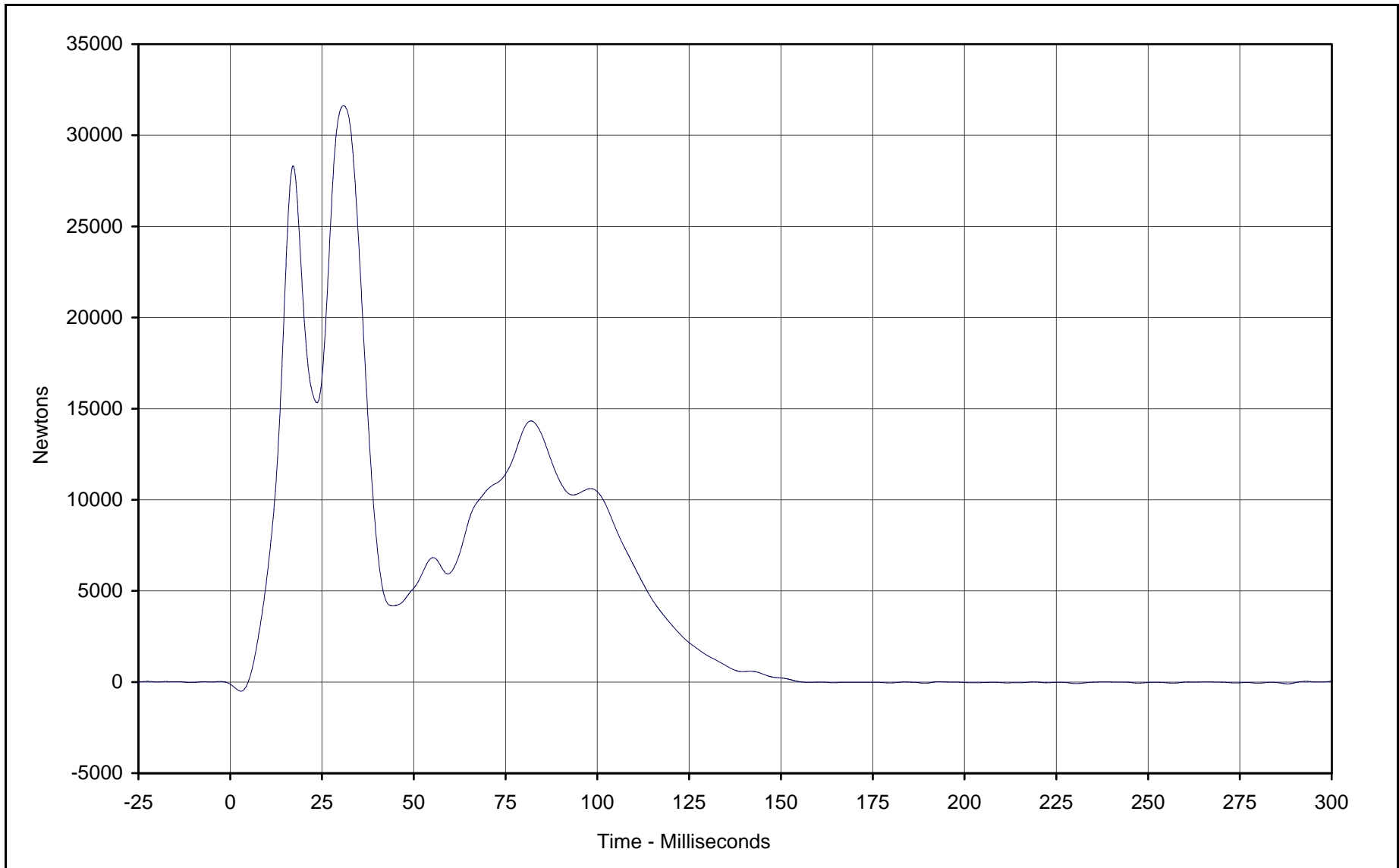
Curve Description: Barrier Force C6
Maximum Value: 55631.2 at 32.2 Milliseconds
Minimum Value: -70.6 at 287.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-121

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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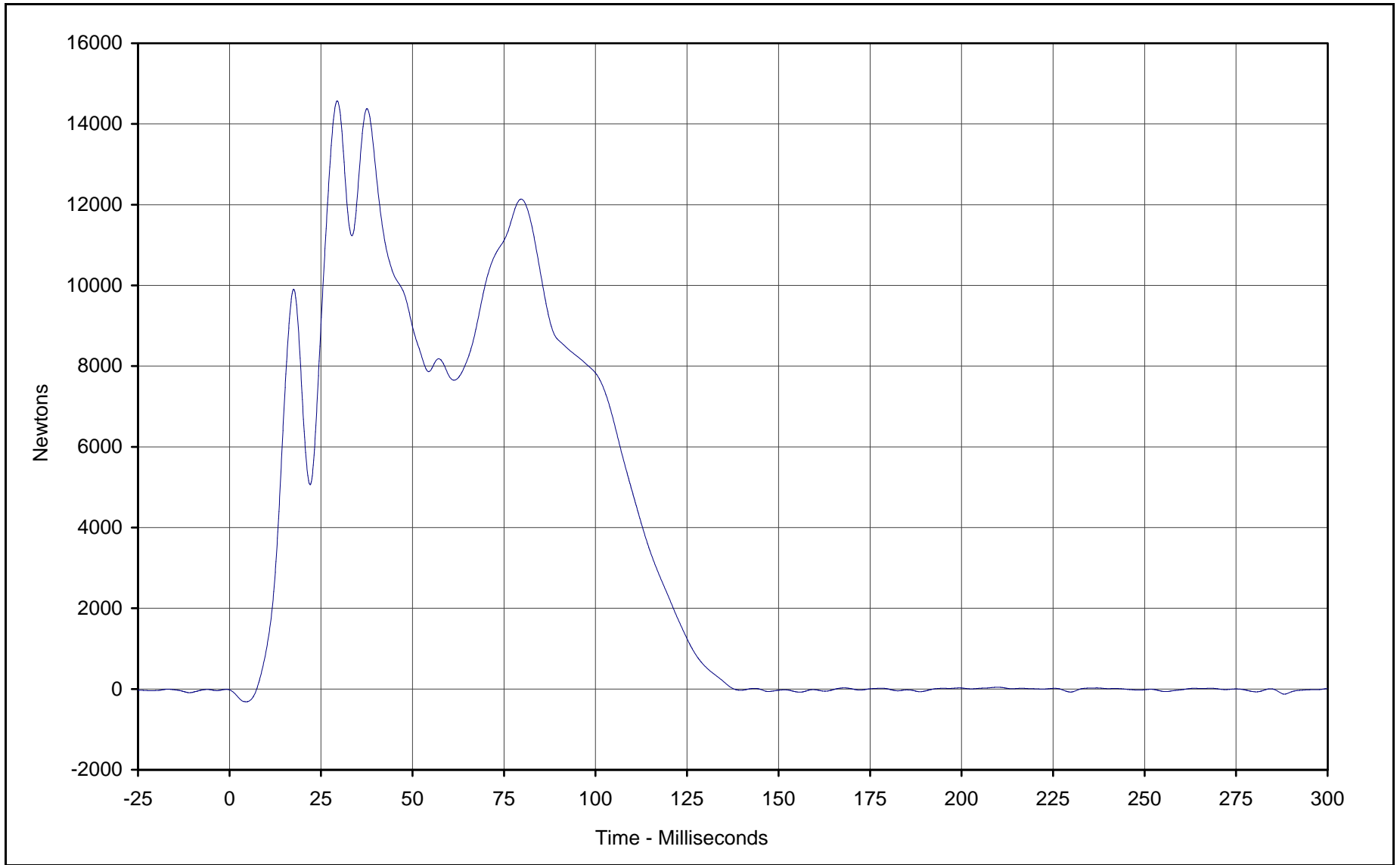
Curve Description: Barrier Force C7
Maximum Value: 31620.2 at 30.9 Milliseconds
Minimum Value: -504.5 at 2.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-122

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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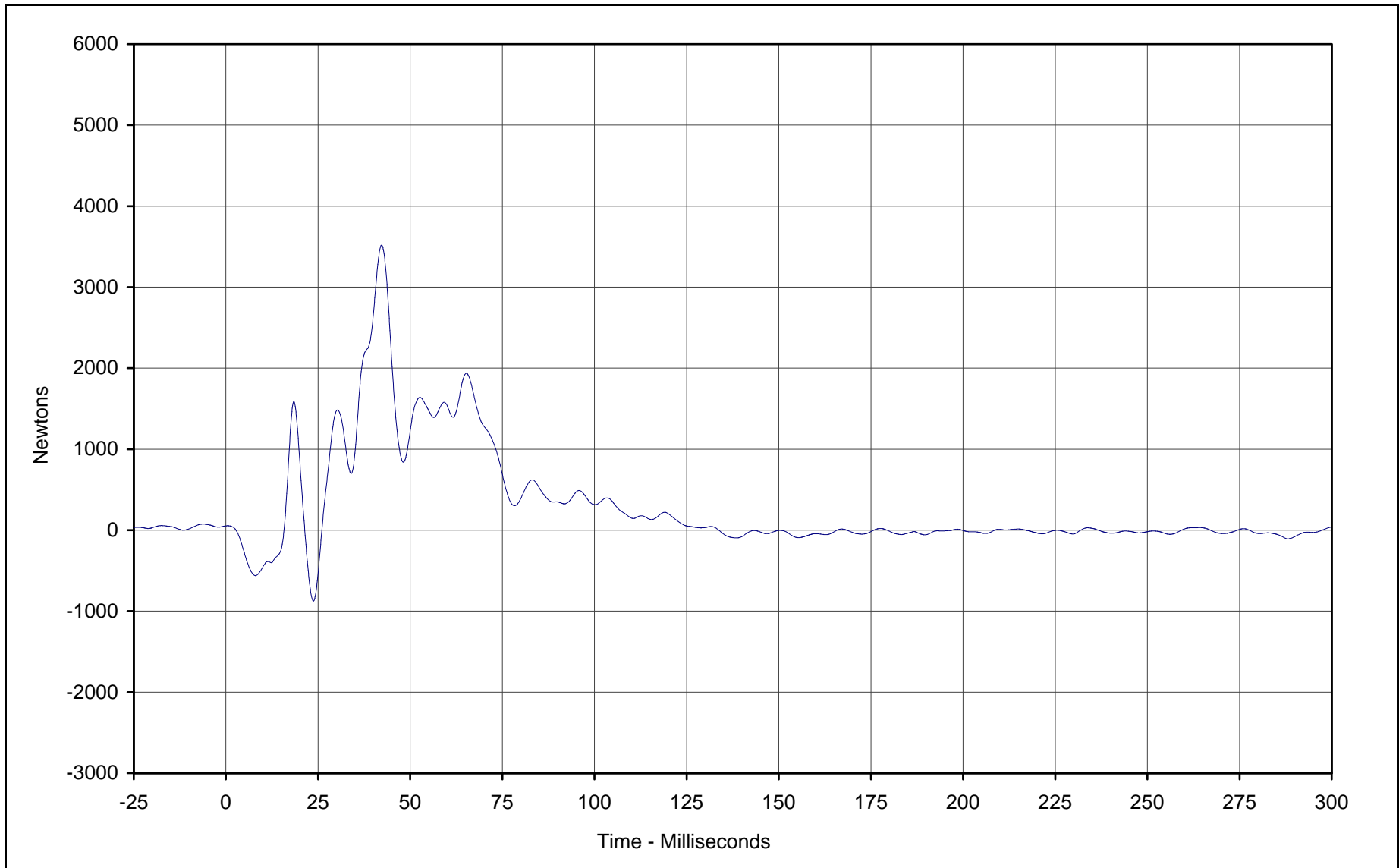
Curve Description: Barrier Force C8
Maximum Value: 14572.5 at 29.4 Milliseconds
Minimum Value: -315.2 at 4.5 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-123

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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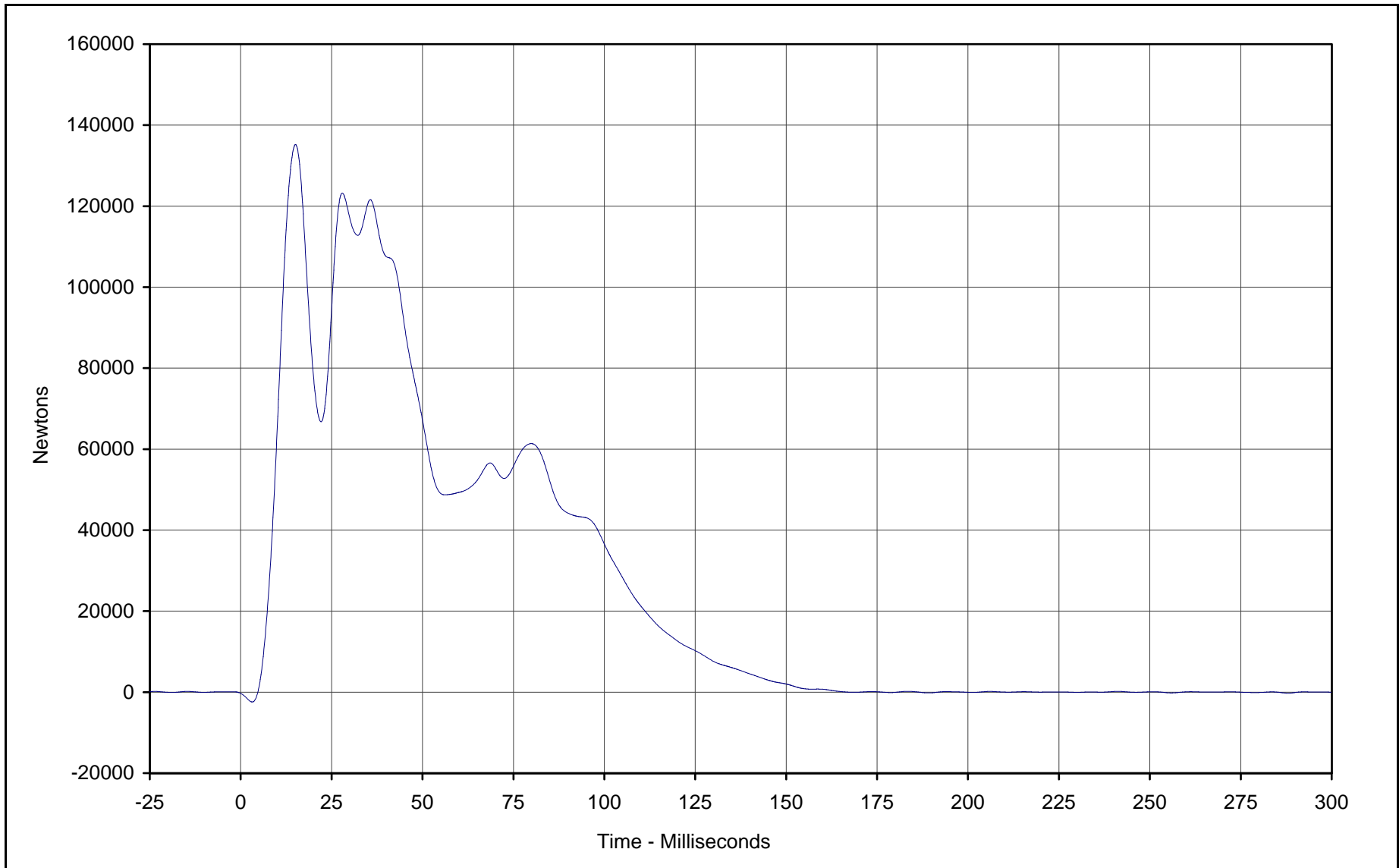
Curve Description: Barrier Force C9
Maximum Value: 3517.9 at 42.2 Milliseconds
Minimum Value: -874.3 at 23.7 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: FIL-124

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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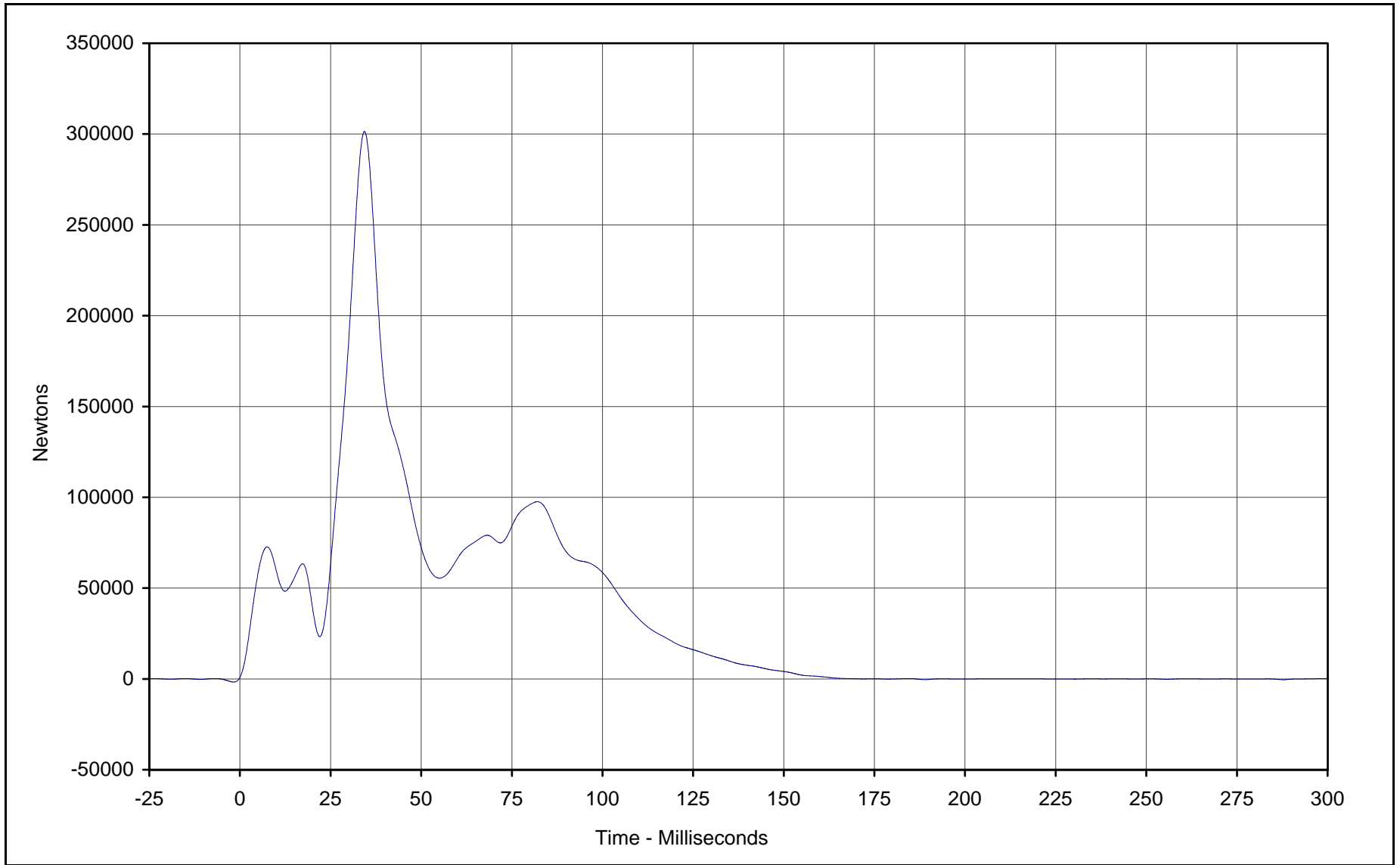
Curve Description: Barrier Force Sum Group 1
Maximum Value: 135208.4 at 15.1 Milliseconds
Minimum Value: -2427.9 at 3.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: SUM-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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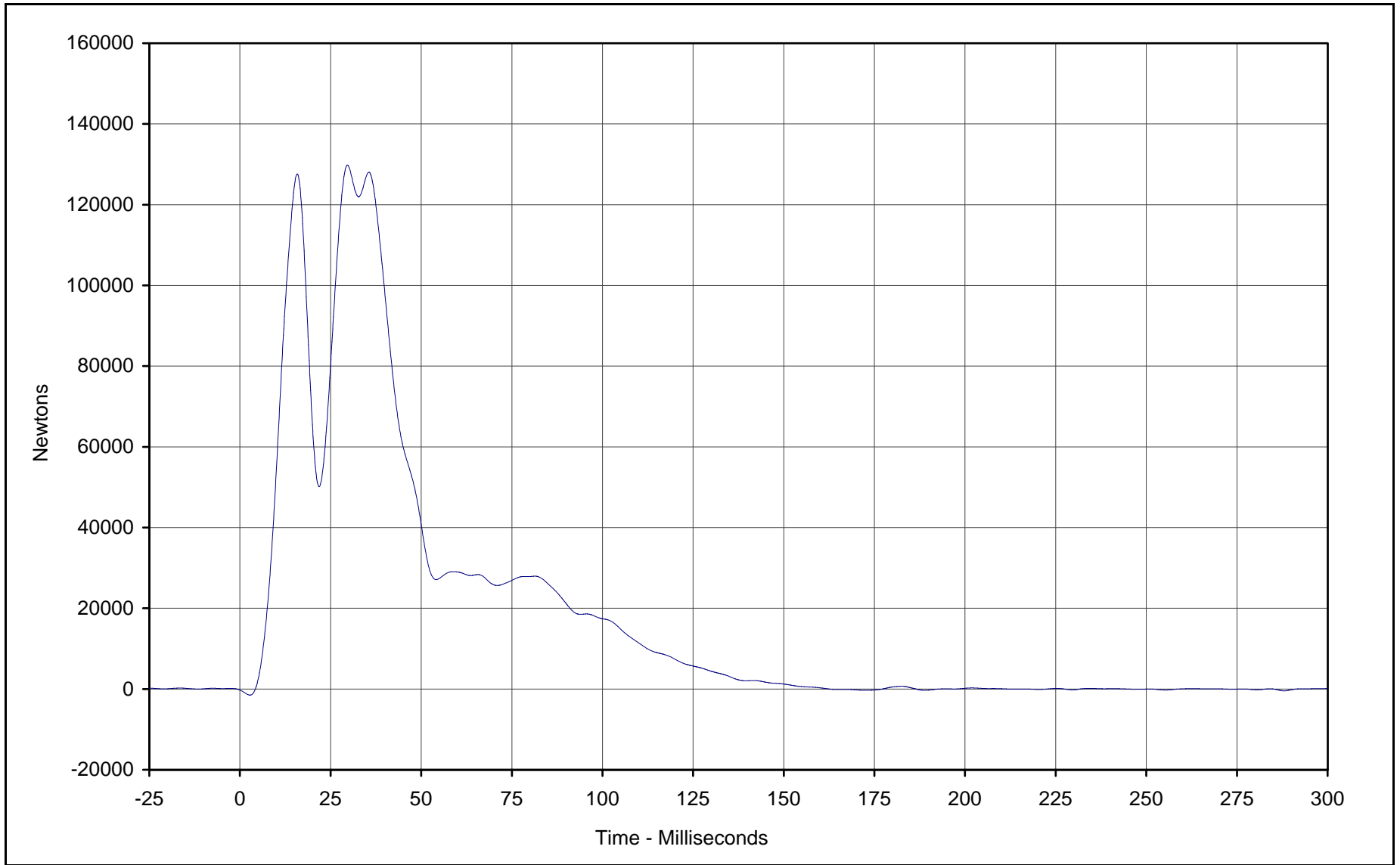
Curve Description: Barrier Force Sum Group 2
Maximum Value: 301485.5 at 34.3 Milliseconds
Minimum Value: -443.8 at 287.9 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: SUM-002

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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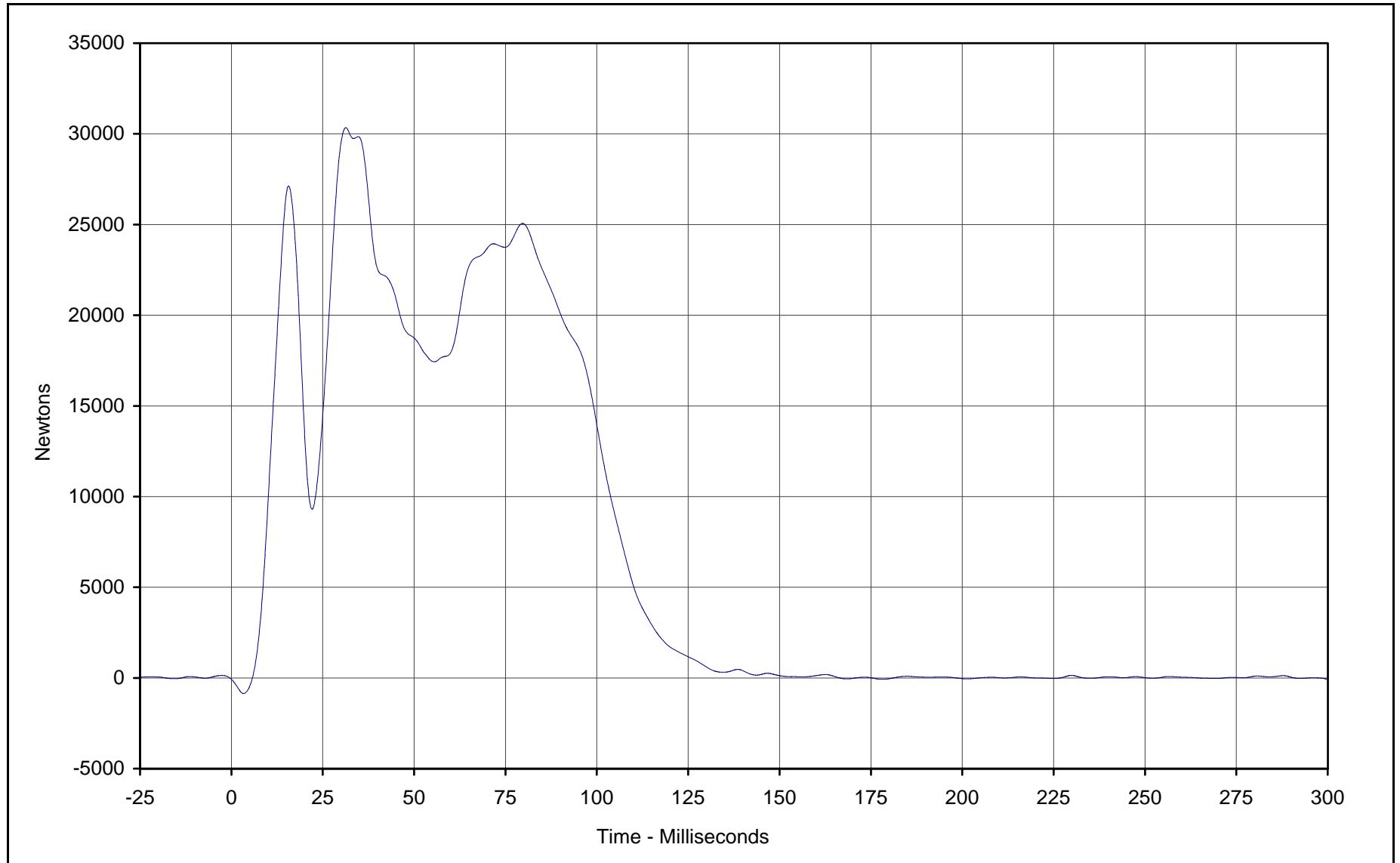


Curve Description: Barrier Force Sum Group 3
Maximum Value: 129812.3 at 29.7 Milliseconds
Minimum Value: -1510.0 at 2.8 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: SUM-003

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



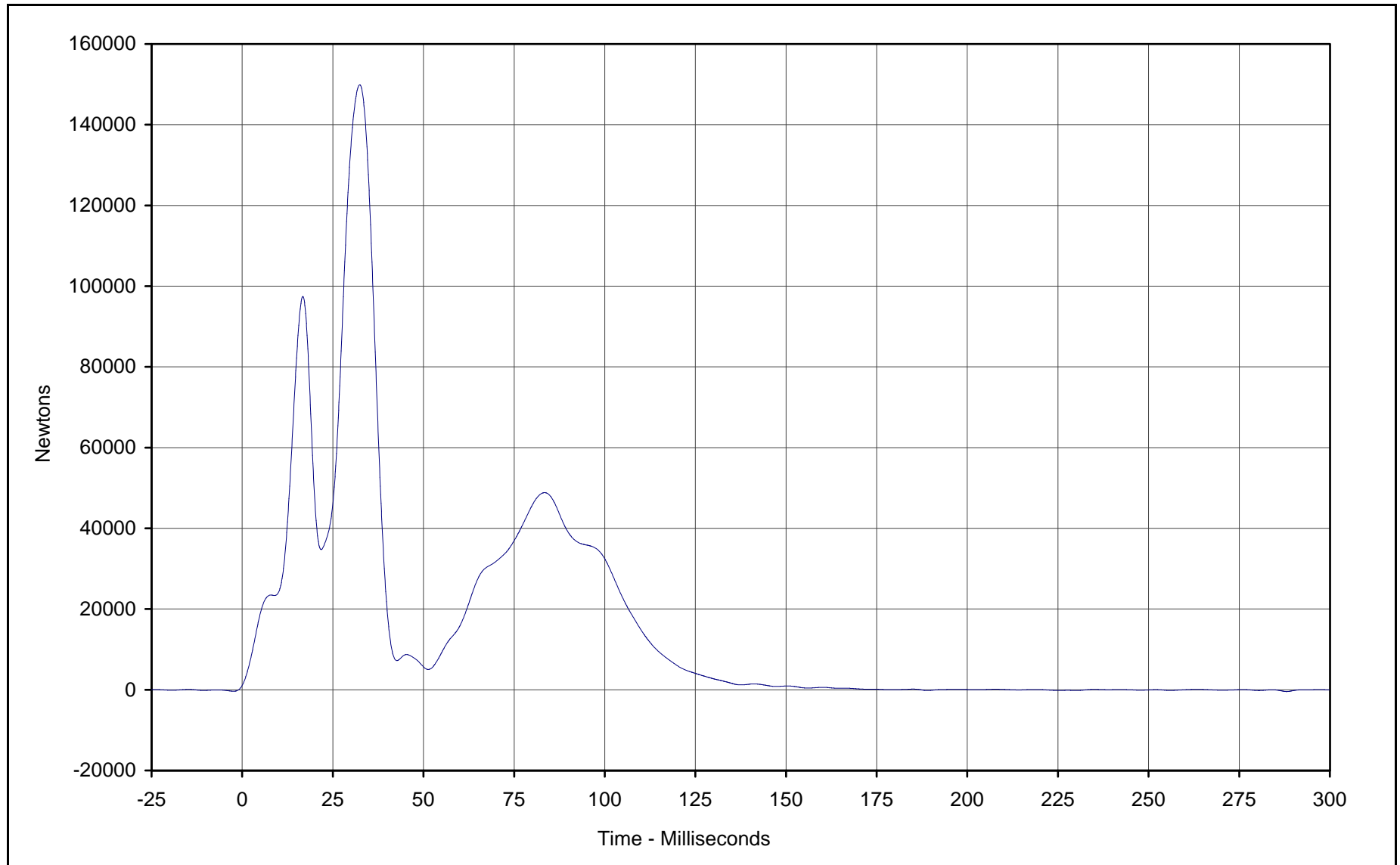
KAR21001-16



Curve Description: Barrier Force Sum Group 4
 Maximum Value: 30339.3 at 31.3 Milliseconds
 Minimum Value: -859.9 at 3.3 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/2/01
 Curve Number: SUM-004

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
 Test Vehicle: 2001 Chevrolet Venture Minivan



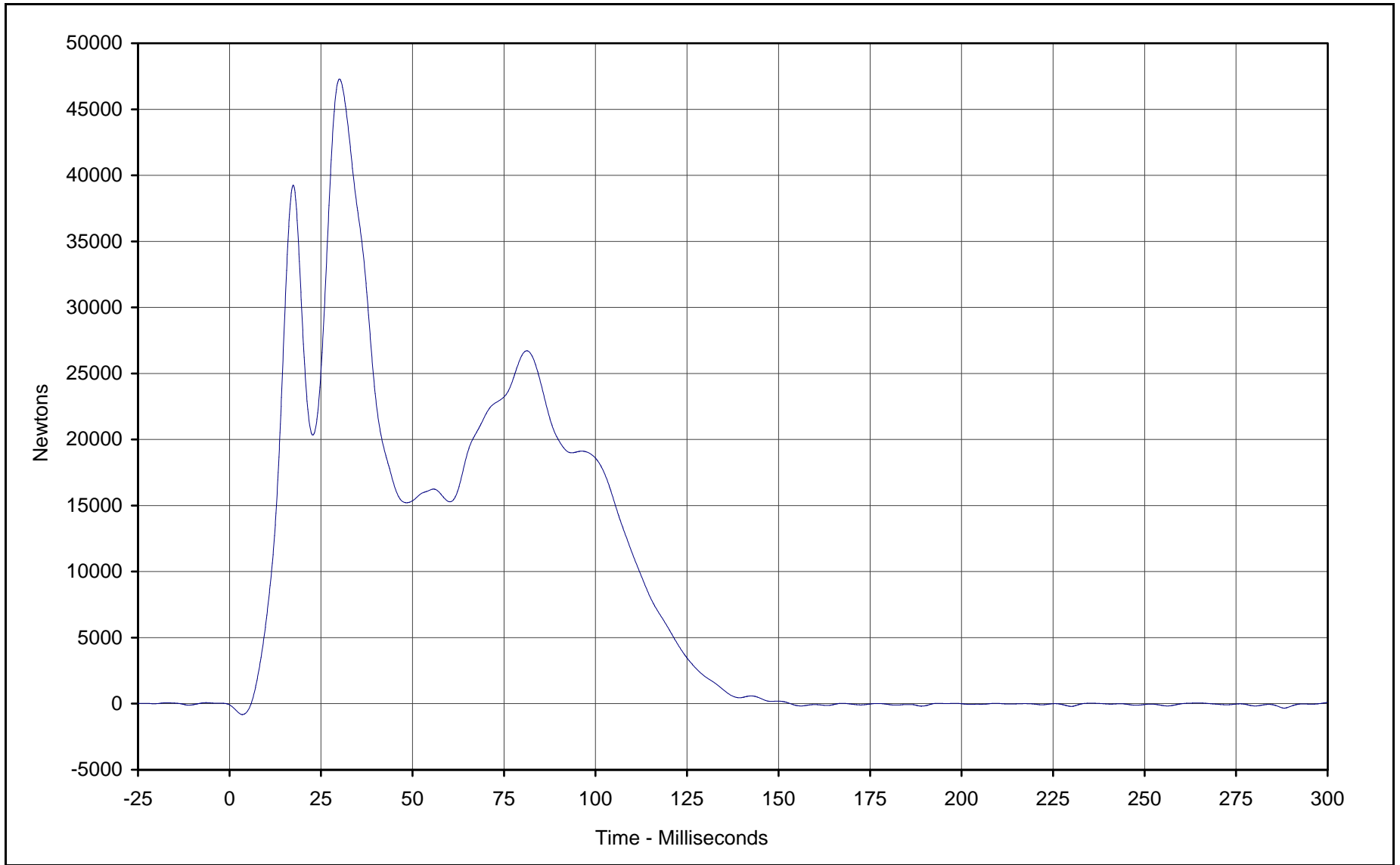


Curve Description: Barrier Force Sum Group 5
 Maximum Value: 149916.6 at 32.4 Milliseconds
 Minimum Value: -444.9 at 288.1 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/2/01
 Curve Number: SUM-005

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
 Test Vehicle: 2001 Chevrolet Venture Minivan



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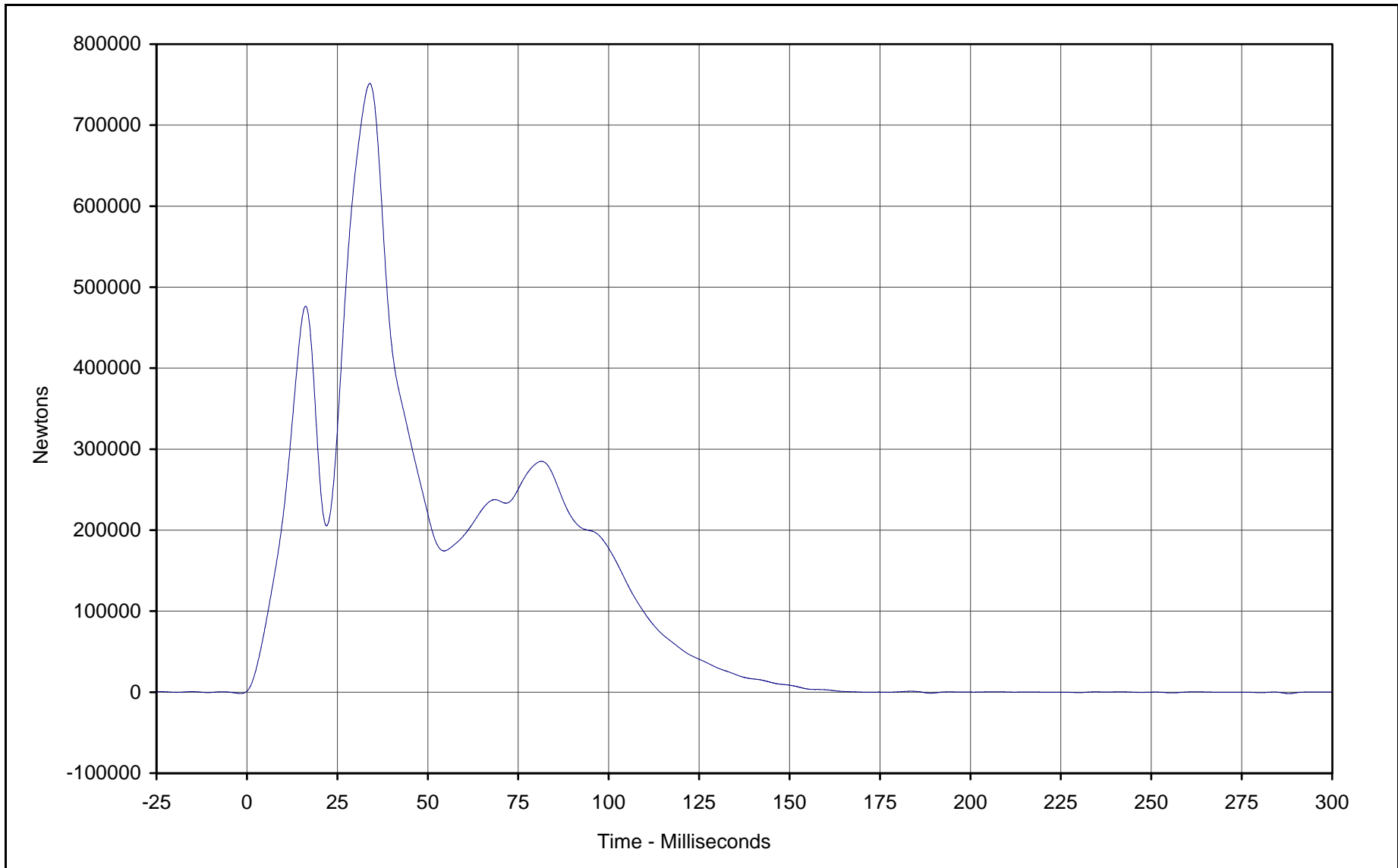
Curve Description: Barrier Force Sum Group 6
Maximum Value: 47280.1 at 30.0 Milliseconds
Minimum Value: -825.0 at 3.5 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: SUM-006

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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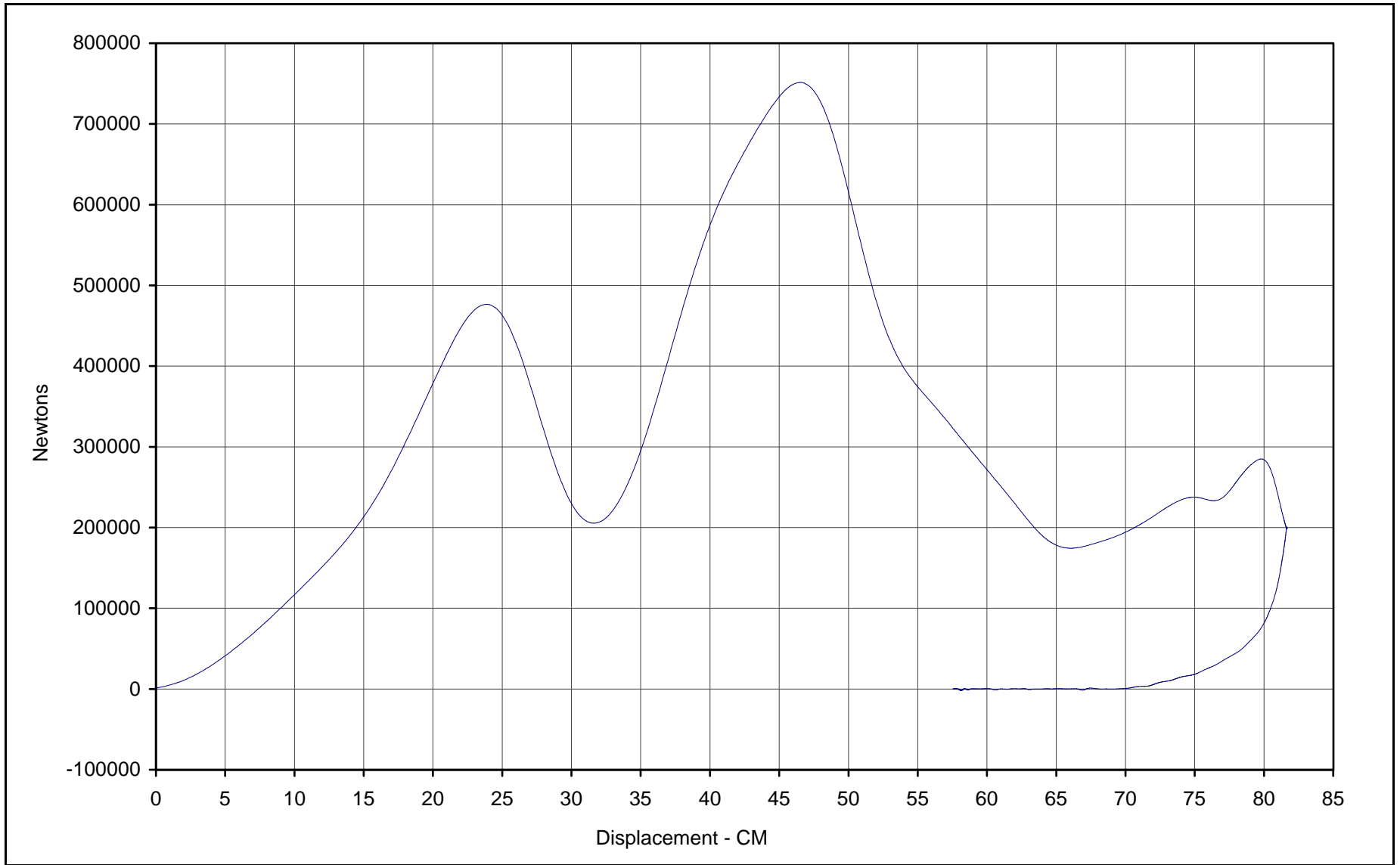
Curve Description: Barrier Force Sum Total
Maximum Value: 751418.5 at 34.0 Milliseconds
Minimum Value: -1835.2 at 288.0 Milliseconds
SAE Filter Class: 60
Date of Test: 3/2/01
Curve Number: SUM-007

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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Curve Description: Sum Force Total vs. Dynamic Crush
Maximum Displ.: 81.6 at 95.2 Milliseconds
Maximum Force: 751,418 at 34.0 Milliseconds
Measured Energy: 253,158 joules
Date of Test: 3/2/01
Curve Number: XVY-001

Test Program: 2001 NHTSA 35mph NCAP No.: M10109
Test Vehicle: 2001 Chevrolet Venture Minivan



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BARRIER LOAD CELL SUMMARY DATA

Test Vehicle: 2001 Chevrolet Venture Minivan

NHTSA No.: M10109

Test Program: 2001 NHTSA 35mph NCAP

Test Date: 3/2/01

BARRIER LOAD CELL PEAK FORCES

Location	Units	Max	Time	Min	Time
Barrier Force A2	Newtons	4741.3	27.6	-262.2	4.2
Barrier Force A3	Newtons	32635.1	41.8	-711.4	3.7
Barrier Force A4	Newtons	43542.0	36.3	-4059.8	23.1
Barrier Force A5	Newtons	39583.6	34.5	-4469.5	23.1
Barrier Force A6	Newtons	40942.6	32.6	-4402.6	23.4
Barrier Force A7	Newtons	25850.8	42.9	-1228.7	23.2
Barrier Force A8	Newtons	11097.7	36.4	-416.3	167.9
Barrier Force A9	Newtons	981.1	18.0	-2231.2	35.6
Barrier Force B2	Newtons	20224.7	42.9	-624.5	4.8
Barrier Force B3	Newtons	115820.5	15.0	-1161.2	2.7
Barrier Force B4	Newtons	70152.8	35.4	-82.2	287.9
Barrier Force B5	Newtons	32350.5	34.6	-95.9	171.9
Barrier Force B6	Newtons	91691.9	33.3	-268.5	0.0
Barrier Force B7	Newtons	91480.9	29.7	-907.4	2.3
Barrier Force B8	Newtons	33842.3	15.7	-522.5	4.0
Barrier Force B9	Newtons	2553.3	40.4	-1037.6	21.9
Barrier Force C2	Newtons	18329.3	32.2	-465.8	5.8
Barrier Force C3	Newtons	19309.2	15.5	-510.0	2.9
Barrier Force C4	Newtons	47696.8	33.6	-253.4	0.0
Barrier Force C5	Newtons	47270.1	32.7	-251.8	288.2
Barrier Force C6	Newtons	55631.2	32.2	-70.6	287.9
Barrier Force C7	Newtons	31620.2	30.9	-504.5	2.9
Barrier Force C8	Newtons	14572.5	29.4	-315.2	4.5
Barrier Force C9	Newtons	3517.9	42.2	-874.3	23.7
Barrier Force Sum Group 1	Newtons	135208.4	15.1	-2427.9	3.2
Barrier Force Sum Group 2	Newtons	301485.5	34.3	-443.8	287.9
Barrier Force Sum Group 3	Newtons	129812.3	29.7	-1510.0	2.8
Barrier Force Sum Group 4	Newtons	30339.3	31.3	-859.9	3.3
Barrier Force Sum Group 5	Newtons	149916.6	32.4	-444.9	288.1
Barrier Force Sum Group 6	Newtons	47280.1	30.0	-825.0	3.5
Barrier Force Sum Total	Newtons	751418.5	34.0	-1835.2	288.0

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

APPENDIX D
INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

**2001 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D. Serial Number 34
3/2/01
2001 Chevrolet Venture Minivan**

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

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**2001 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D. Serial Number 34
3/2/01
2001 Chevrolet Venture Minivan**

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
25	UP. TIBIA LEFT MOM.	X	GPUT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
26	UP. TIBIA LEFT MOM.	Y	GPUT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
27	UP. TIBIA RIGHT MOM.	X	GPUT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
28	UP. TIBIA RIGHT MOM.	Y	GPUT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
29	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
30	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
31	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
32	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
33	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
34	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
35	FOOT LEFT	X	KEIC002X	Accel., Foot Triax	I.C. Sensor	3031-500	G
36	FOOT LEFT	Y	KEIC002Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
37	FOOT LEFT	Z	KEIC002Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
38	FOOT RIGHT	X	KEIC001X	Accel., Foot Triax	I.C. Sensor	3031-500	G
39	FOOT RIGHT	Y	KEIC001Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
40	FOOT RIGHT	Z	KEIC001Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
41	LAP BELT FORCE	X	KELC003	Load cell, Seat belt	Lebow	3371	N
42	SHOULDER BELT FORCE	X	KELC004	Load cell, Seat belt	Lebow	3371	N
43	SHOULDER BELT SPOOL	X	KEPP001	Pullout pot	Celesco	PTX101-0030	MM
44	SHOULDER BELT ELONG.	X	KEEP001	Linear pot., belt stretch	E.T.I.	LCP8-10 10K	MM/CM

**2001 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Passenger A.T.D. Serial Number 35
3/2/01
2001 Chevrolet Venture Minivan**

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

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**2001 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Passenger A.T.D. Serial Number 35
3/2/01
2001 Chevrolet Venture Minivan**

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
69	UP. TIBIA LEFT MOM.	X	GPUT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
70	UP. TIBIA LEFT MOM.	Y	GPUT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
71	UP. TIBIA RIGHT MOM.	X	GPUT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
72	UP. TIBIA RIGHT MOM.	Y	GPUT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
73	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
74	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
75	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
76	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
77	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
78	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
79	FOOT LEFT	X	KEIC003X	Accel., Foot Triax	I.C. Sensor	3031-500	G
80	FOOT LEFT	Y	KEIC003Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
81	FOOT LEFT	Z	KEIC003Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
82	FOOT RIGHT	X	KEIC004X	Accel., Foot Triax	I.C. Sensor	3031-500	G
83	FOOT RIGHT	Y	KEIC004Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
84	FOOT RIGHT	Z	KEIC004Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
85	LAP BELT FORCE	X	KELC001	Load cell, Seat belt	Lebow	3371	N
86	SHOULDER BELT FORCE	X	KELC002	Load cell, Seat belt	Lebow	3371	N
87	SHOULDER BELT SPOOL	X	KEPP001	Pullout pot	Celesco	PTX101-0030	CM
88	SHOULDER BELT ELONG.	X	KEEP001	Linear pot., belt stretch	E.T.I.	LCP8-10 10K	MM/CM

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**2001 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Vehicle Accelerometers and Reference Channel
3/2/01
2001 Chevrolet Venture Minivan**

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
3/2/01
2001 Chevrolet Venture Minivan**

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
3/2/01
2001 Chevrolet Venture Minivan**

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.: RK03C

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	5533.7	Pass
Overall Test Results				Pass

Laboratory Technician

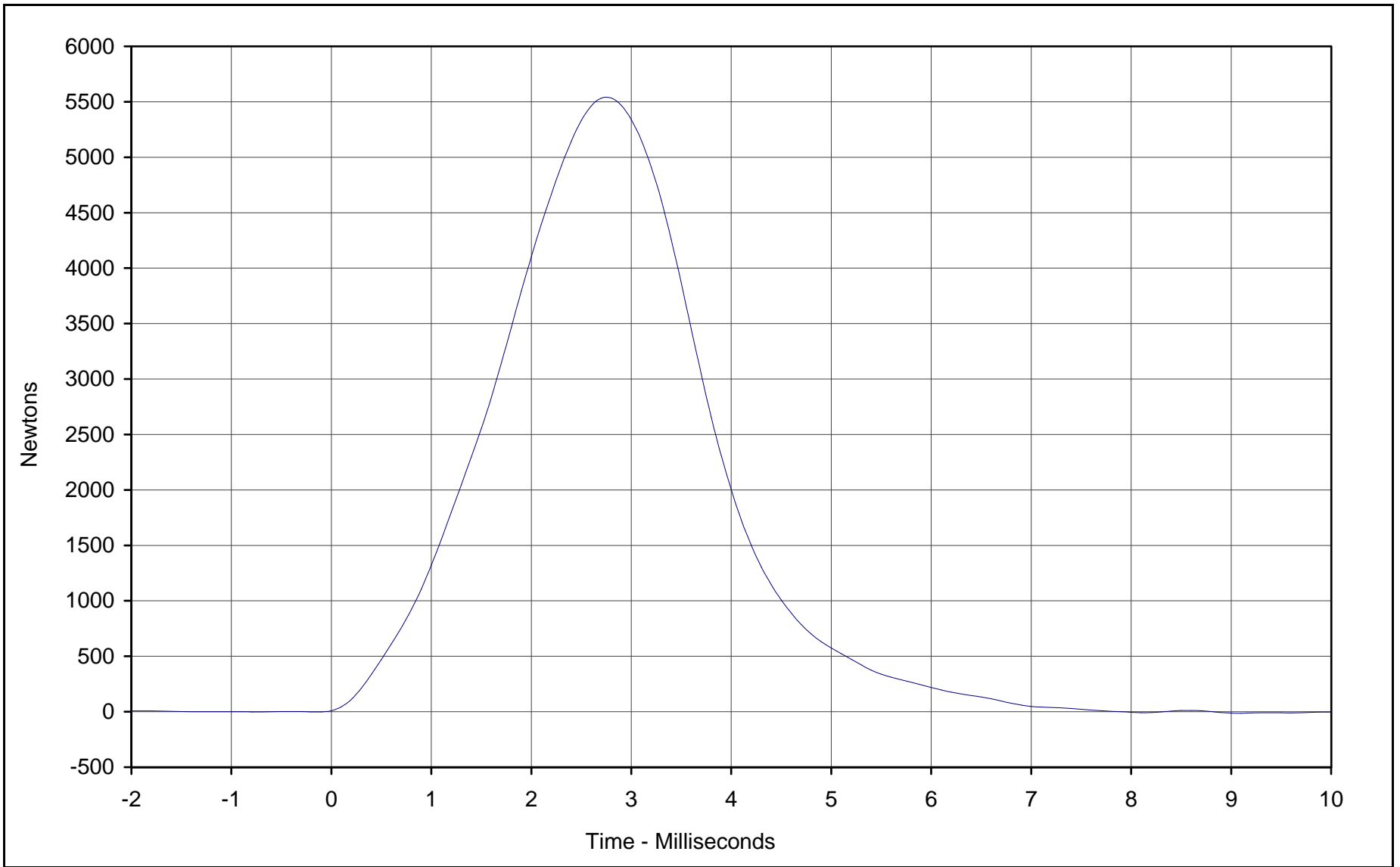
March 1, 2001

Test Date

Approved By

Date

E-2



Curve Description: Probe Force
Maximum Value: 5533.7 at 2.8 Milliseconds
Minimum Value: -4.9 at 8.0 Milliseconds
SAE Filter Class: 600
Date of Test: 3/1/01
ATD Serial No.: 034

Testing Program: Hybrid III Left Knee Impact Test
Test Information: Part S/N: N/A Test I.D.: RK03C



KAR21001-16



Hybrid III Calibration Data Sheet

50TH Percentile Male

Right Knee Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: RK03D

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	5647.5	Pass
Overall Test Results				Pass

Laboratory Technician

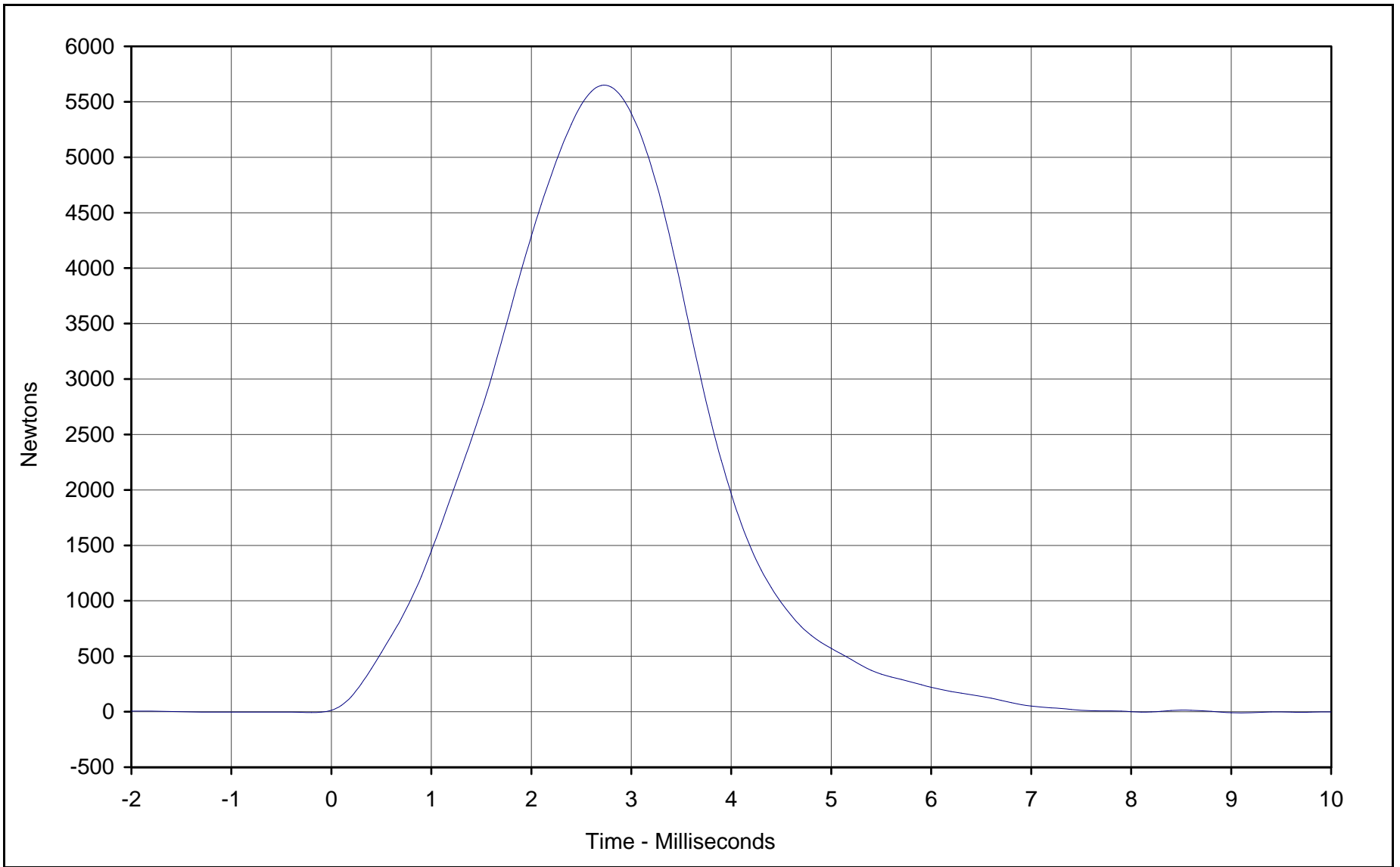
March 1, 2001

Test Date

Approved By

Date

E-4



Curve Description: Probe Force
Maximum Value: 5647.5 at 2.7 Milliseconds
Minimum Value: -6.2 at -0.2 Milliseconds
SAE Filter Class: 600
Date of Test: 3/1/01
ATD Serial No.: 034

Testing Program: Hybrid III Right Knee Impact Test
Test Information: Part S/N: N/A Test I.D.: RK03D



KAR21001-16



Hybrid III Calibration Data Sheet

50TH Percentile Male

Head Drop Calibration

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: HD02D

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	225.7	Pass
Peak Lateral Acceleration	G's	≤15.0	7.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

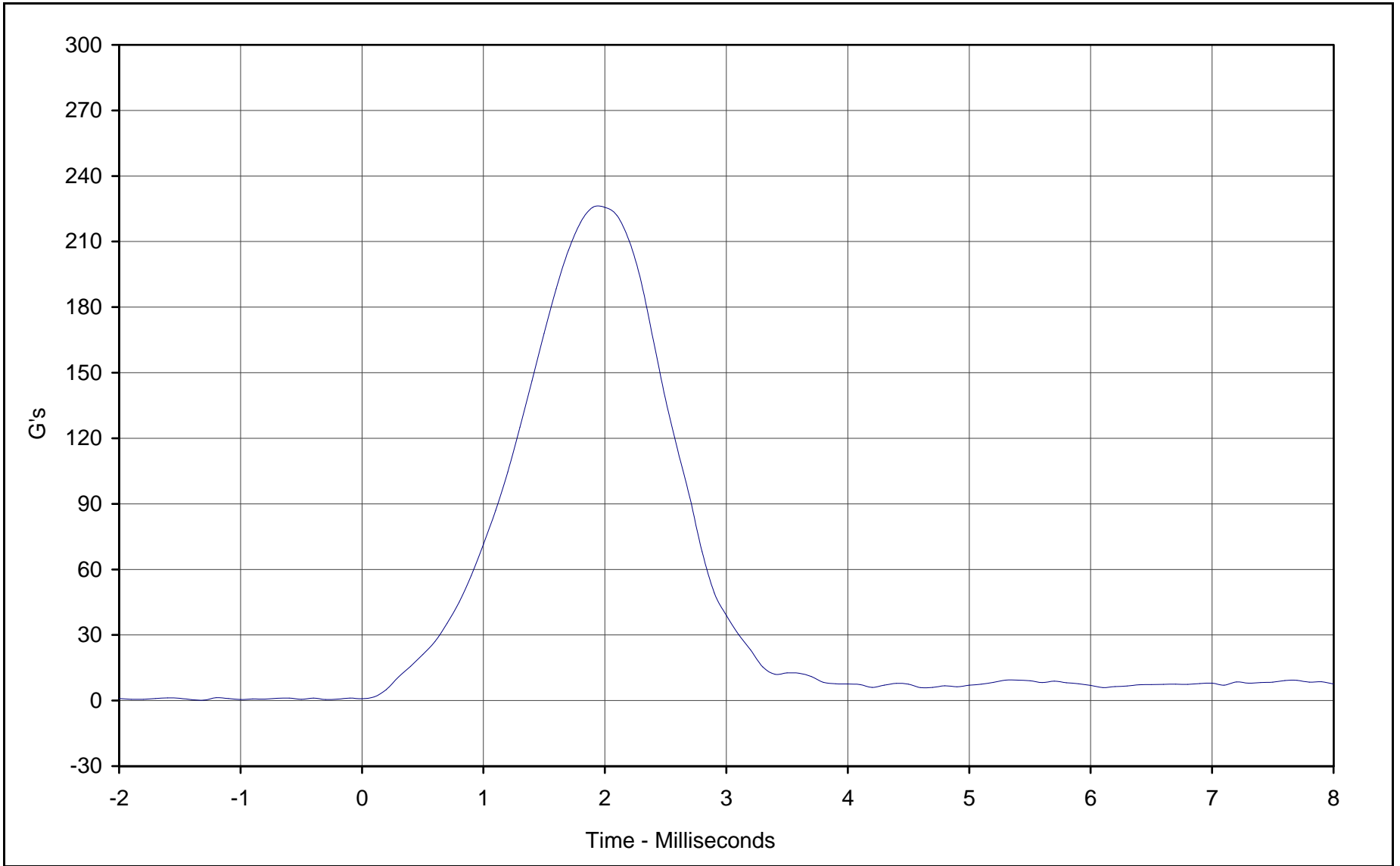
March 1, 2001

Test Date

Approved By

Date

E-6



Curve Description: Head Resultant Acceleration

Maximum Value: 225.7 at 2.0 Milliseconds

Minimum Value: 0.2 at -1.3 Milliseconds

SAE Filter Class: 1000

Date of Test: 3/1/01

ATD Serial No.: 034

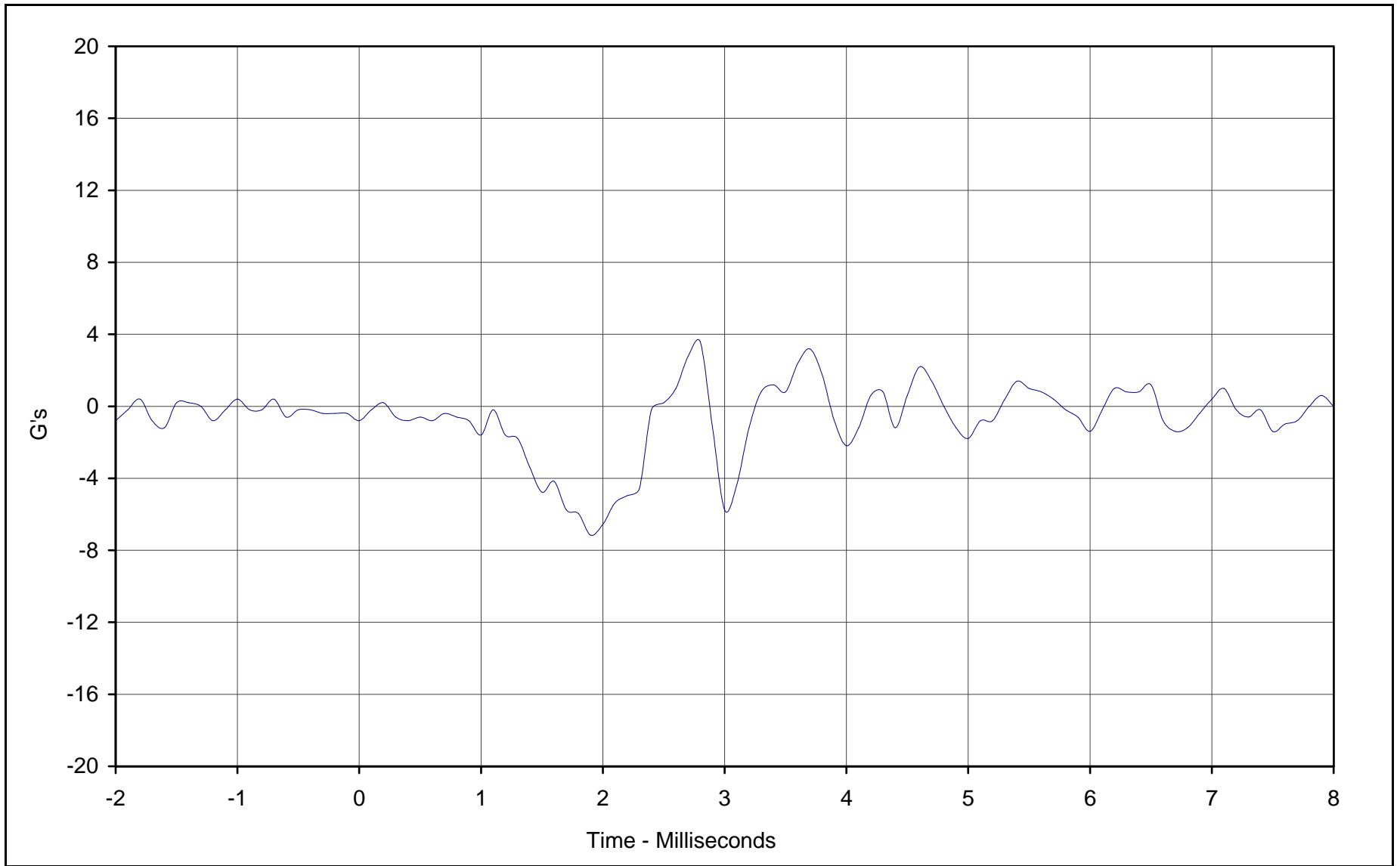
Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD02D



KAR21001-16

E-7



Curve Description: Head Acceleration Y Axis

Maximum Value: 3.6 at 2.8 Milliseconds

Minimum Value: -7.2 at 1.9 Milliseconds

SAE Filter Class: 1000

Date of Test: 3/1/01

ATD Serial No.: 034

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD02D



KAR21001-16



Hybrid III Calibration Data Sheet

50TH Percentile Male

Thorax Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: CH03F

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	5448	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.58	Pass
Internal Hysteresis	%	69 to 85	74.8	Pass
Overall Test Results				Pass

Laboratory Technician

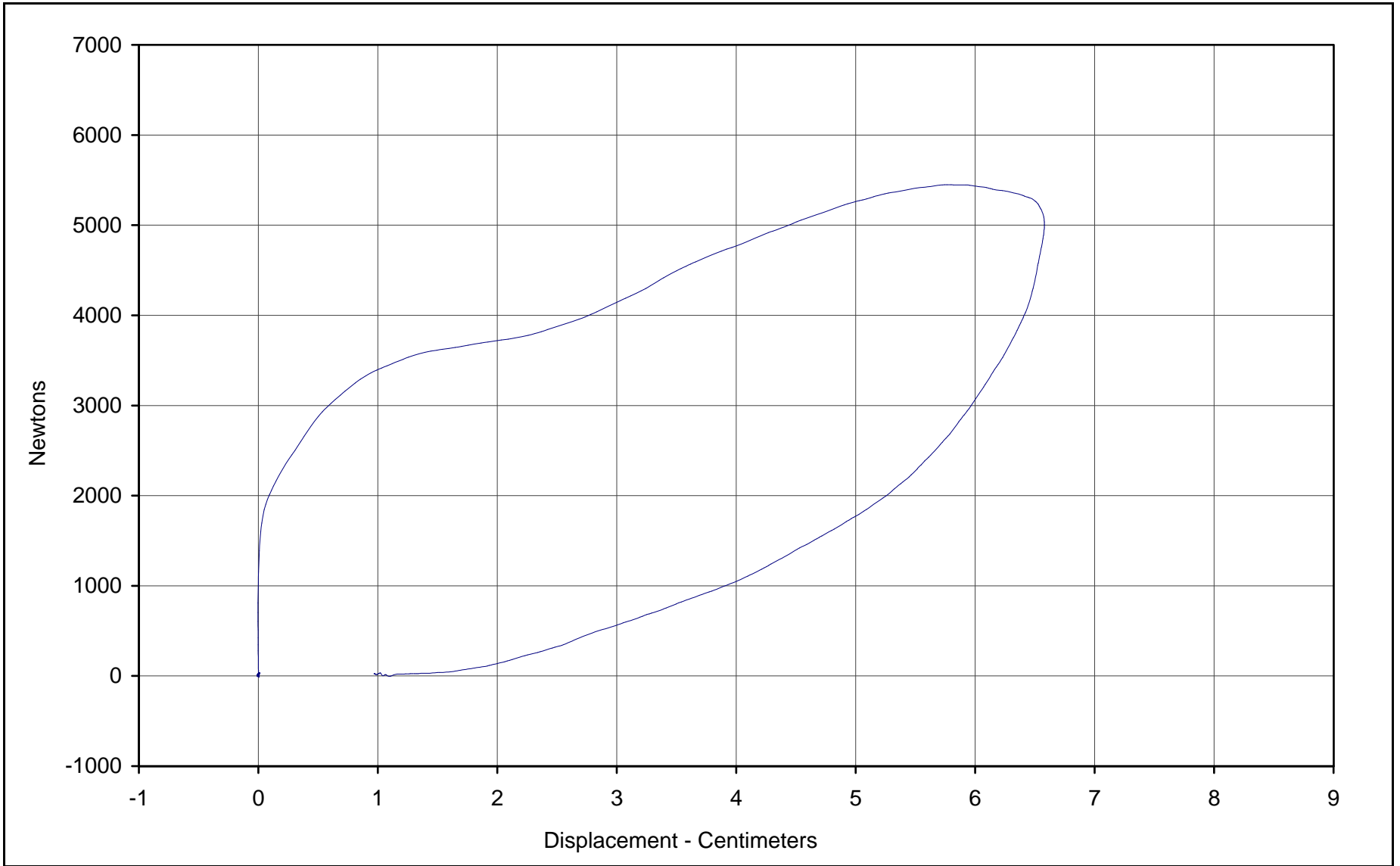
March 1, 2001

Test Date

Approved By

Date

E-9



Curve Description: Probe Force vs. Chest Displacement

Testing Program: Hybrid III Thorax Impact Test

Probe Force: 5448.4 Newtons

Test Information: S/N of Part: N/A Test I.D.: CH03F

Chest Displ.: 6.58 Centimeters

SAE Filter Class: 180

Date of Test: 3/1/01

ATD Serial No.: 034



KAR21001-16



Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NF03C

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	6.91	Pass	
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	25.5	Pass
	20 Msec.	G's	17.6 to 22.6	22.4	Pass
	30 Msec.	G's	12.5 to 18.5	18.4	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 29.0	18.4	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	34.0 to 42.0	34.2	Pass	
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	71.3	Pass
	Time	Msec.	57.0 to 64.0	60.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	113.0 to 128.0	114.5	Pass	
Moment About Occipital Condyle	Maximum	N·m	84.1 to 108.5	96.8	Pass
	Time	Msec.	47.0 to 58.0	51.8	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	97.0 to 107.0	100.7	Pass	
Overall Test Results				Pass	

Laboratory Technician

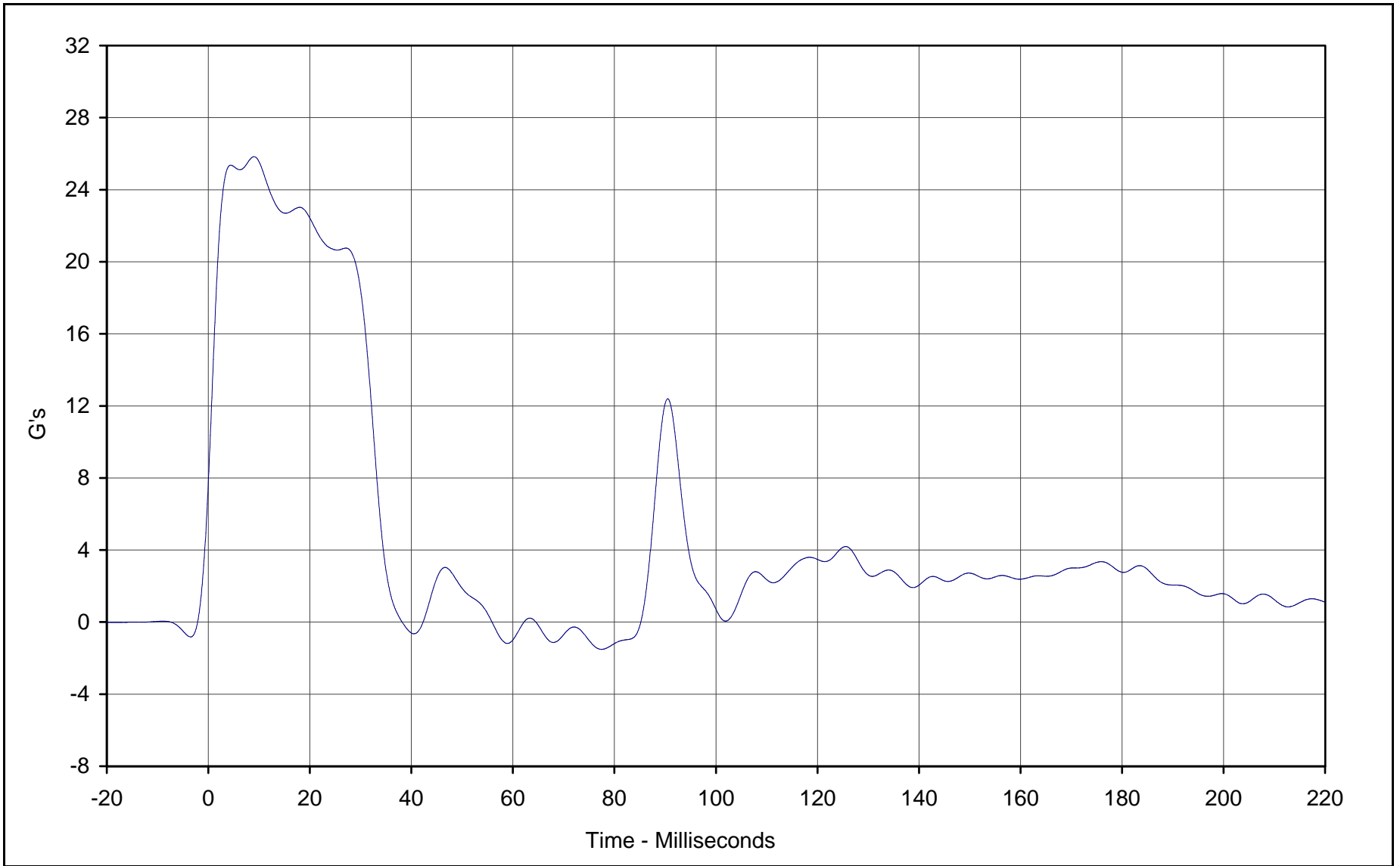
March 1, 2001

Test Date

Approved By

Date

E-11



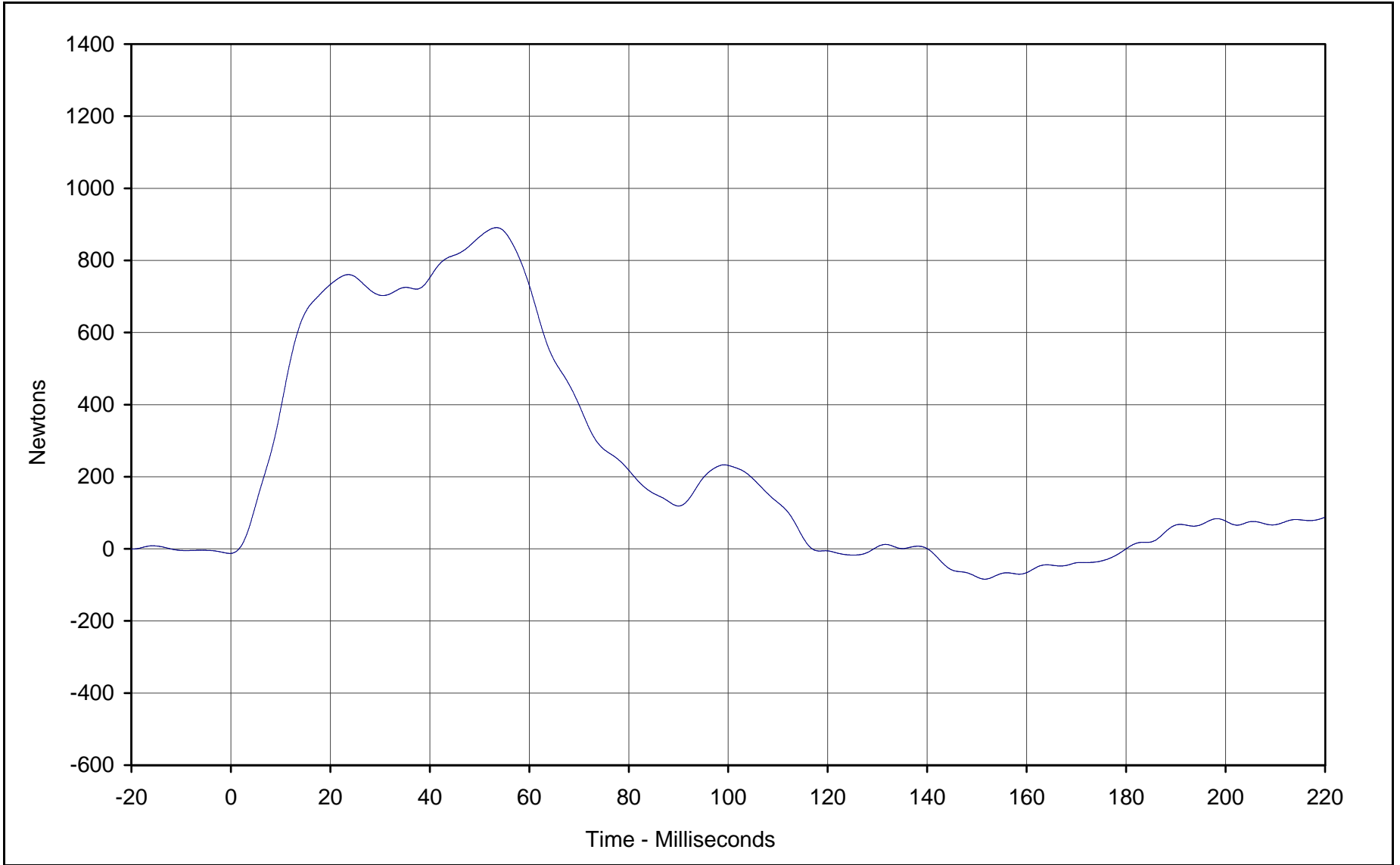
Curve Description: Pendulum Deceleration
Maximum Value: 25.8 at 9.0 Milliseconds
Minimum Value: -1.5 at 77.5 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/01
ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NF03C

KAR21001-16



E-12

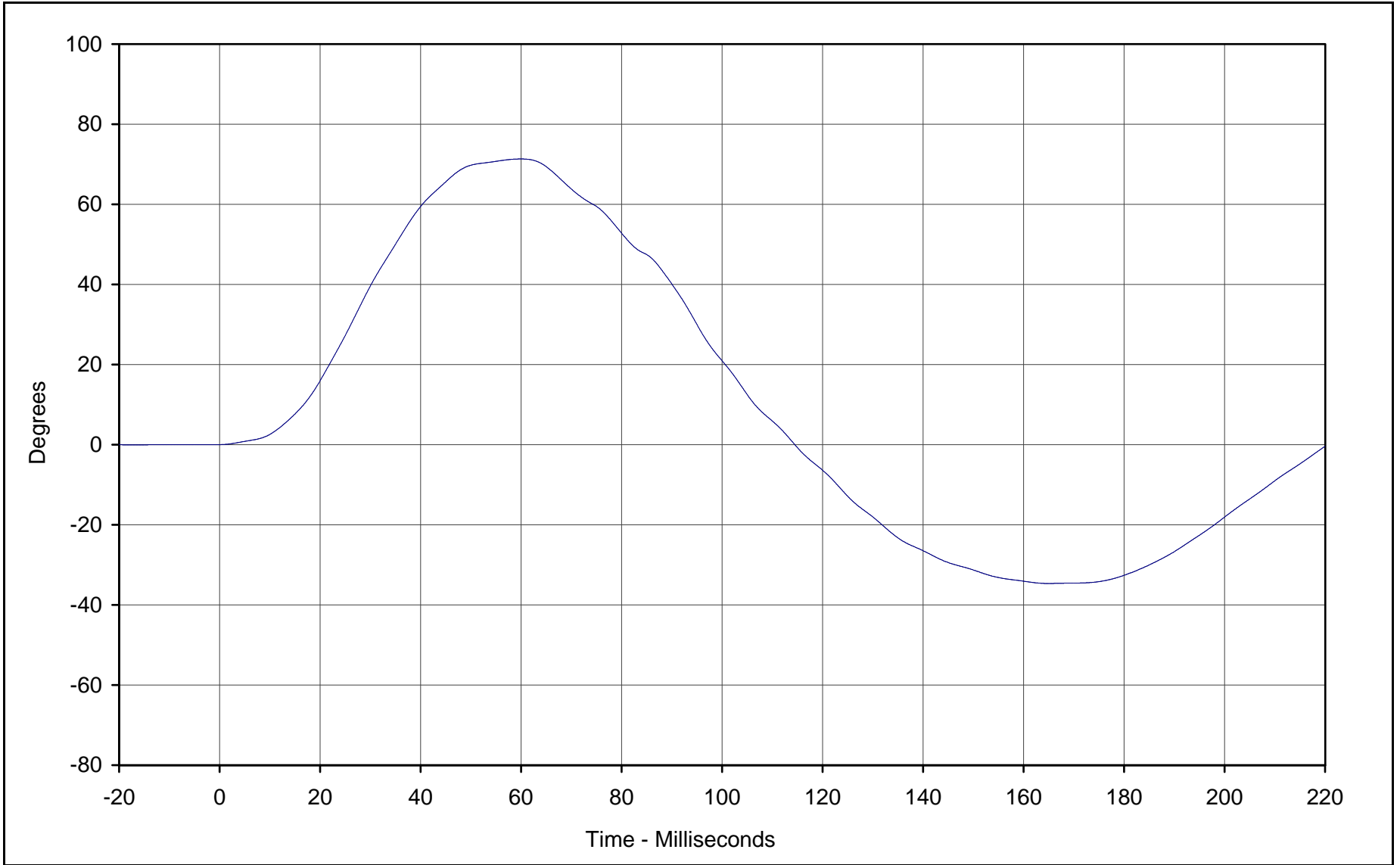


Curve Description: Neck Force X
Maximum Value: 890.9 at 53.4 Milliseconds
Minimum Value: -84.2 at 151.6 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/01
ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NF03C



KAR21001-16

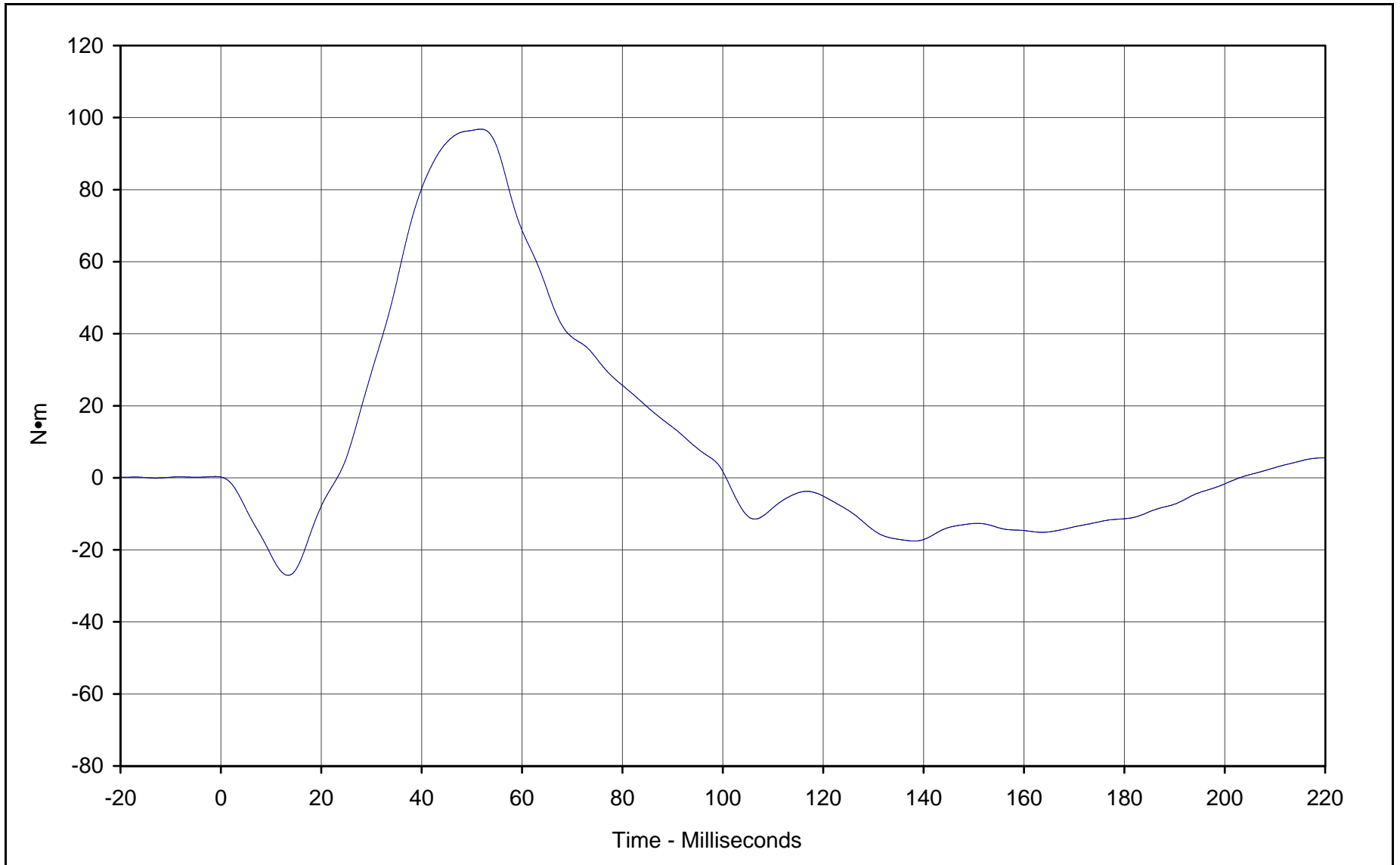


Curve Description: "D" Plane Rotation
 Maximum Value: 71.3 at 60.0 Milliseconds
 Minimum Value: -34.7 at 165.0 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/1/01
 ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NF03C



E-14



Curve Description: Moment About Occipital Condyles
Maximum Value: 96.8 at 51.8 Milliseconds
Minimum Value: -27.1 at 13.4 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/01
ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NF03C



KAR21001-16



Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Extension Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NE03C

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	6.02	Pass	
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.8	Pass
	20 Msec.	G's	14.0 to 19.0	17.1	Pass
	30 Msec.	G's	11.0 to 16.0	16.0	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 22.0	16.0	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	38.0 to 46.0	40.0	Pass	
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	99.9	Pass
	Time	Msec.	72.0 to 82.0	80.9	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	147.0 to 174.0	157.2	Pass	
Moment About Occipital Condyle	Maximum	N·m	-52.9 to- 79.9	-70.4	Pass
	Time	Msec.	65.0 to 79.0	68.2	Pass
Negative Moment Decay, Time To Zero Crossing	Msec.	120.0 to 148.0	143.4	Pass	
Overall Test Results				Pass	

Laboratory Technician

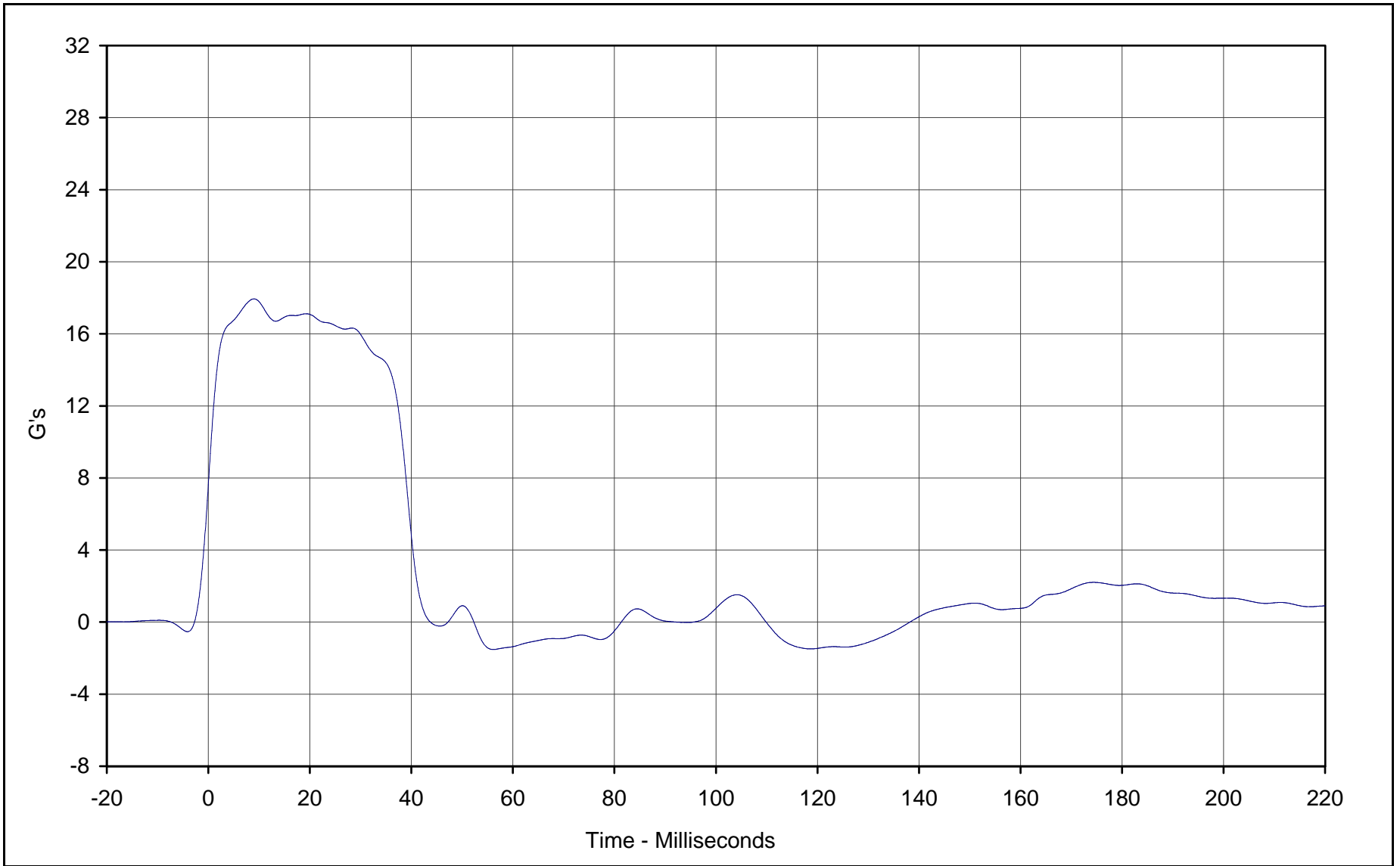
3/1/101

Test Date

Approved By

Date

E-16



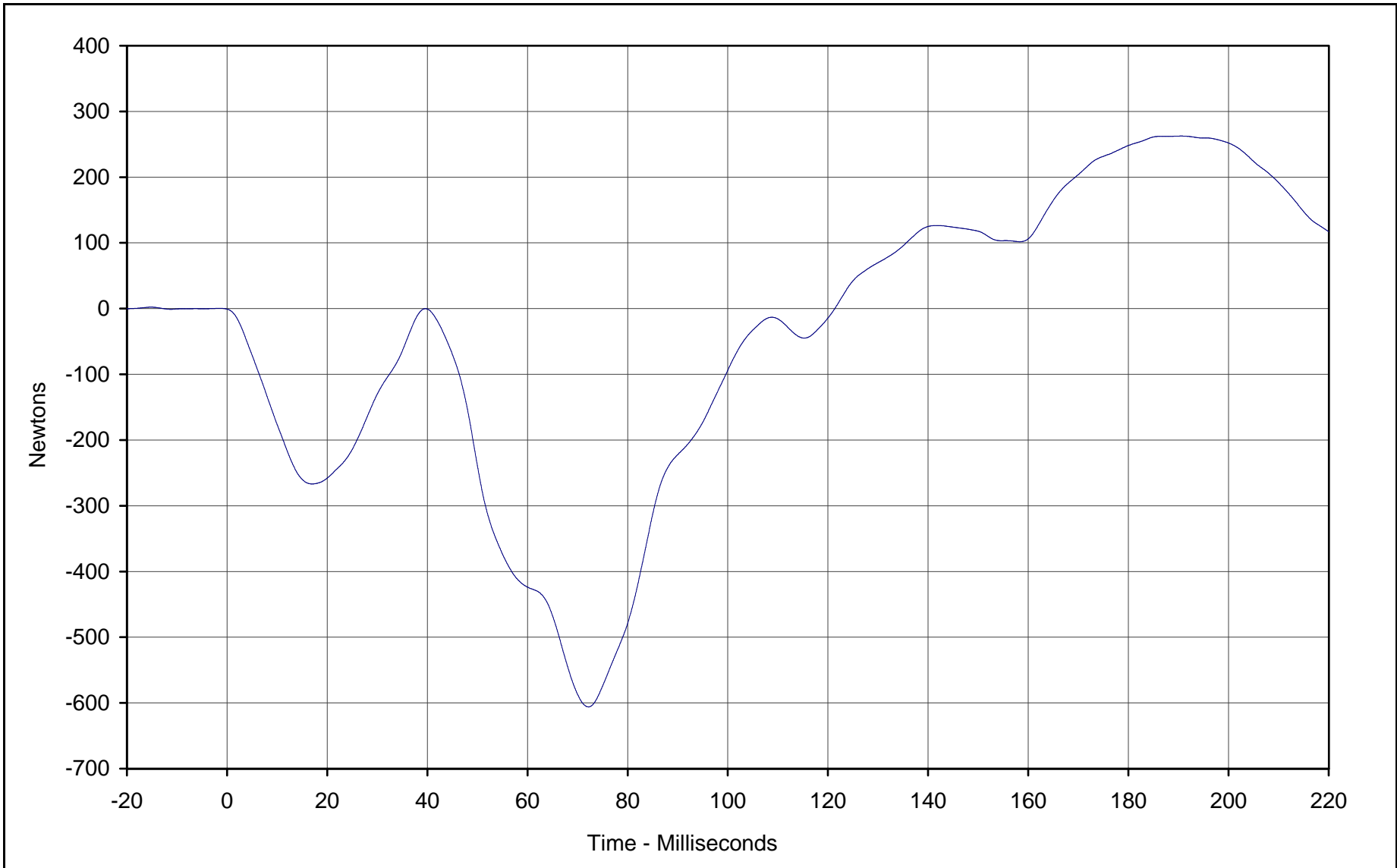
Curve Description: Pendulum Deceleration
Maximum Value: 17.9 at 9.0 Milliseconds
Minimum Value: -1.5 at 56.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/101
ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NE03C

KAR21001-16



E-17

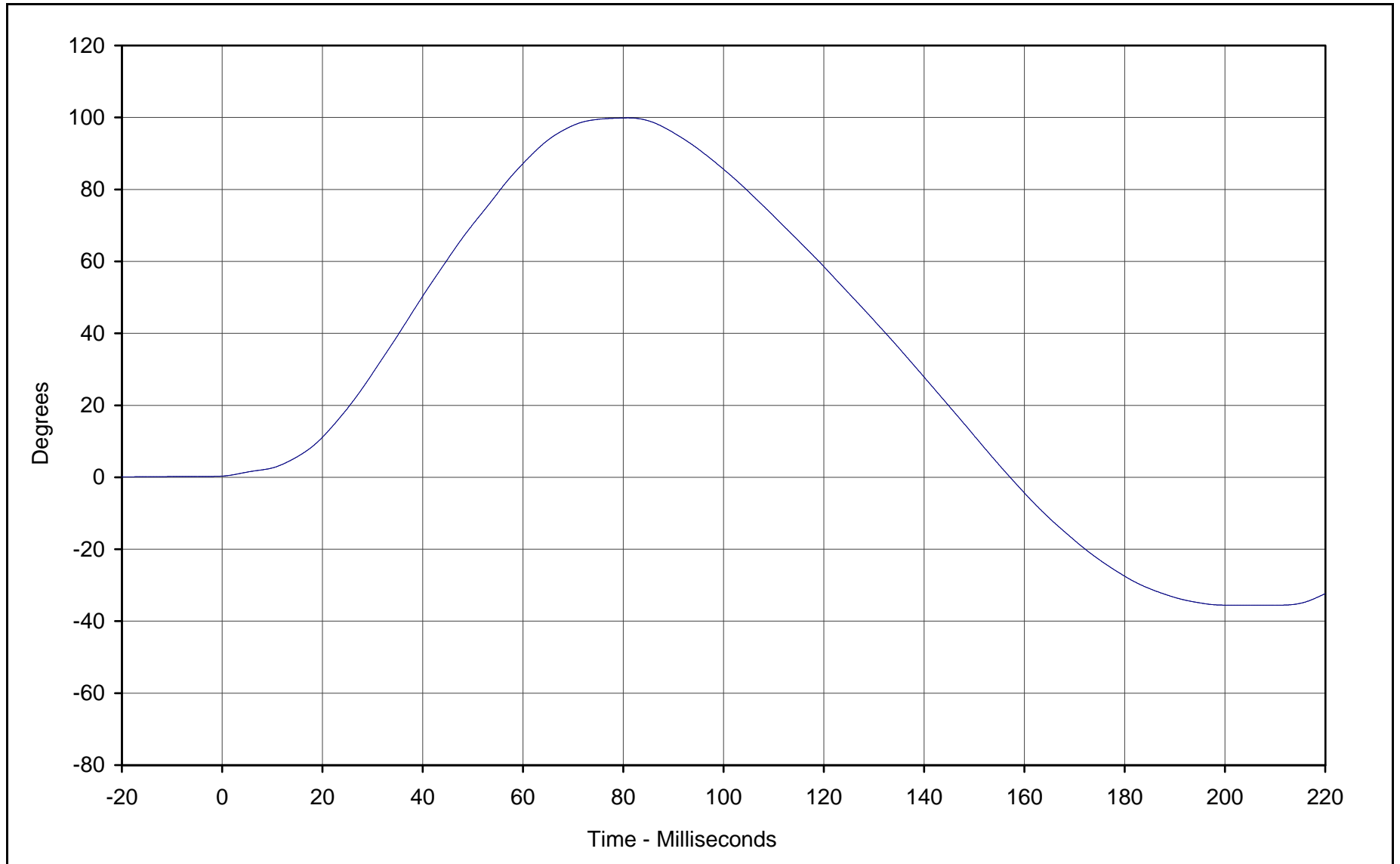


Curve Description: Neck Force X
Maximum Value: 262.6 at 190.5 Milliseconds
Minimum Value: -606.1 at 72.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/101
ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NE03C



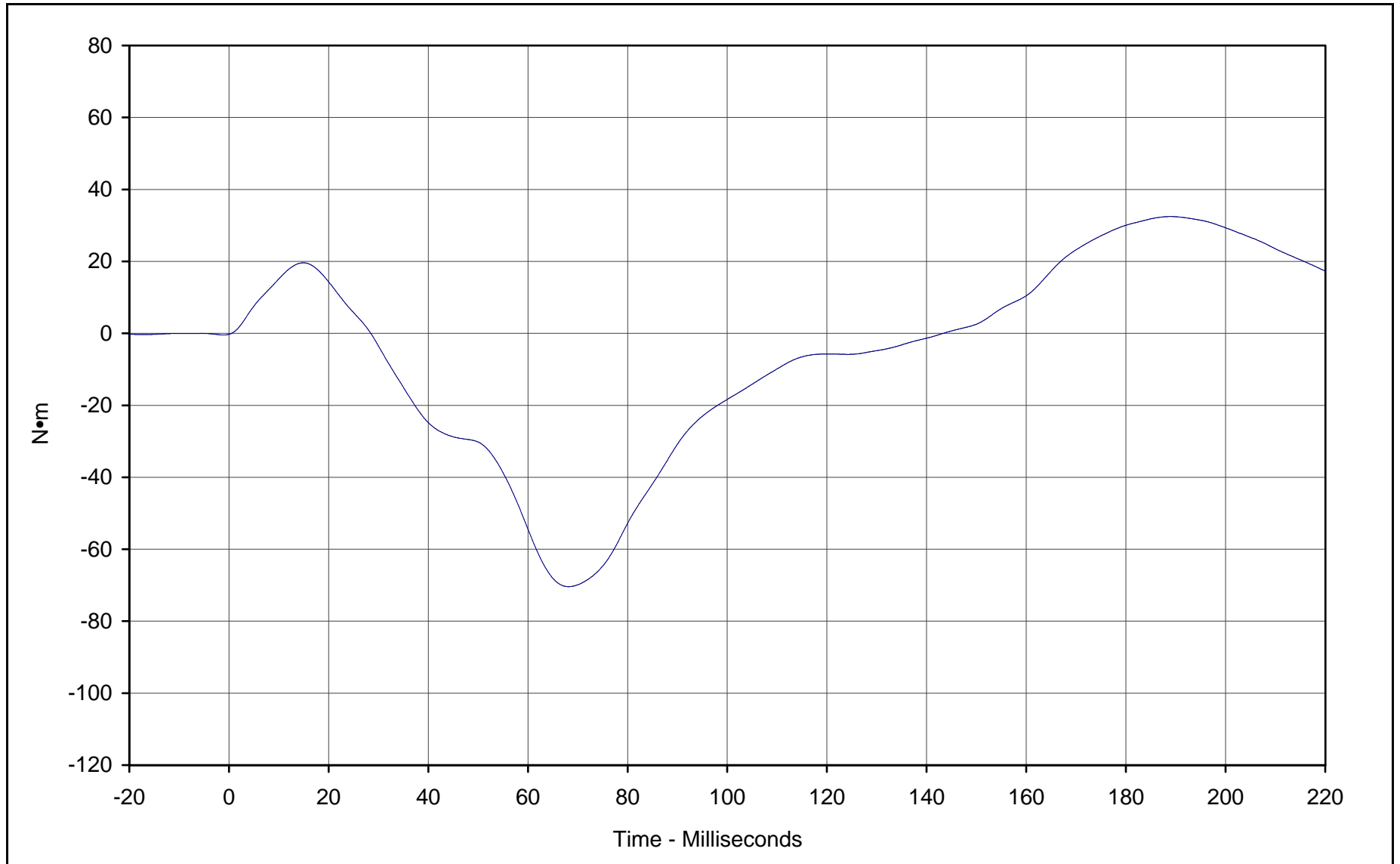
KARR21001-16



Curve Description: "D" Plane Rotation
 Maximum Value: 99.9 at 80.9 Milliseconds
 Minimum Value: -35.6 at 205.4 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/1/101
 ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NE03C





Curve Description: Moment About Occipital Condyles
 Maximum Value: 32.5 at 189.0 Milliseconds
 Minimum Value: -70.4 at 68.2 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/1/101
 ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE03C





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	43	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	510	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	135	Pass
E - Shoulder pivot from back	mm	84 to 94	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	210	Pass
K - Buttock to knee length	mm	579 to 604	585	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	220	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	425	Pass
W - Foot breadth	mm	91 to 107	105	Pass
Y - Chest circumference	mm	970 to 1001	980	Pass
Z - Waist circumference	mm	836 to 866	845	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

March 1, 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.: RK03F

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	4878.3	Pass
Overall Test Results				Pass

Laboratory Technician

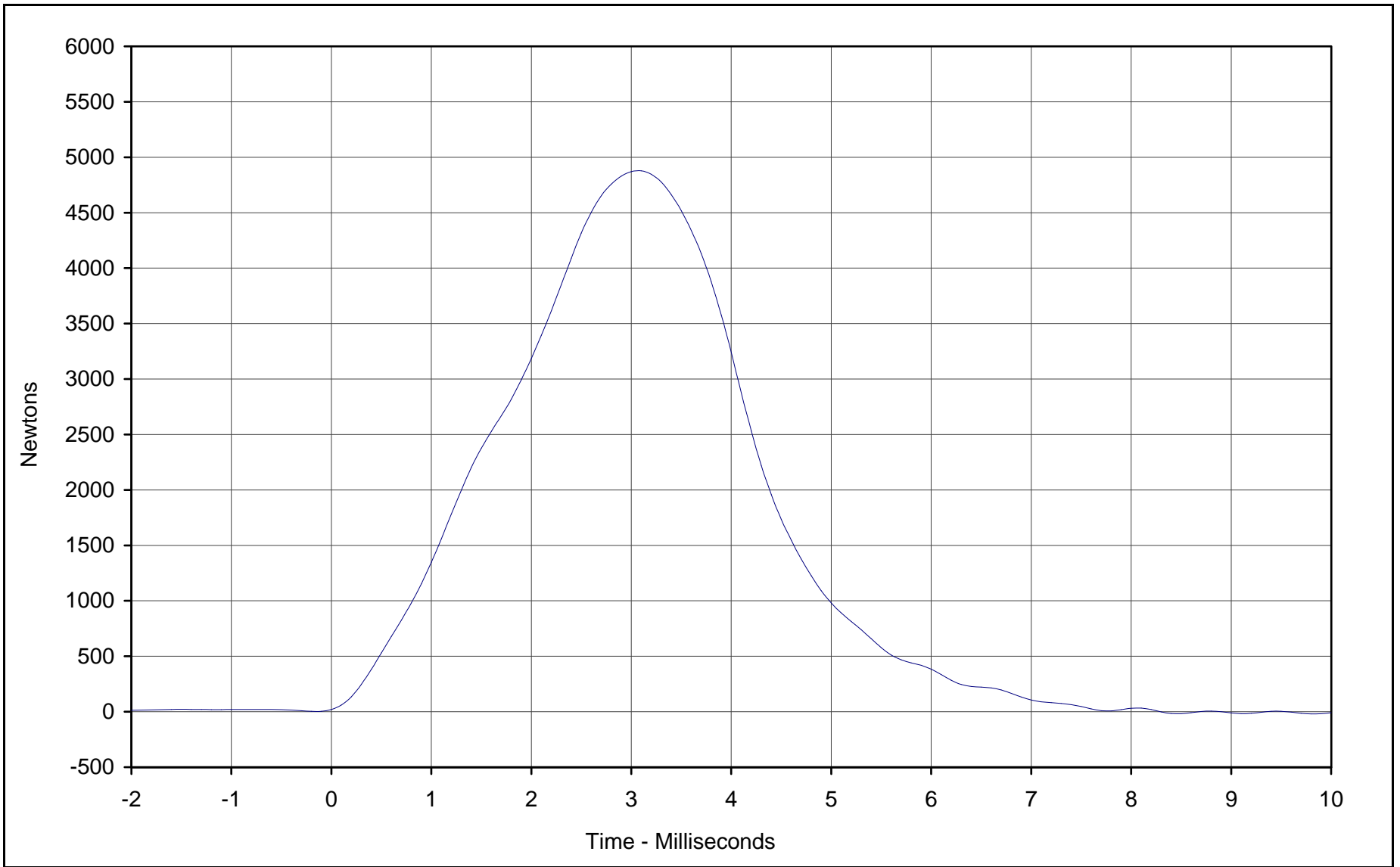
March 1, 2001

Test Date

Approved By

Date

E-22



Curve Description: Probe Force
Maximum Value: 4878.3 at 3.1 Milliseconds
Minimum Value: 3.9 at -0.2 Milliseconds
SAE Filter Class: 600
Date of Test: 3/1/01
ATD Serial No.: 035

Testing Program: Hybrid III Left Knee Impact Test
Test Information: Part S/N: N/A Test I.D.: RK03F



KAR21001-16



Hybrid III Calibration Data Sheet

50TH Percentile Male

Right Knee Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: RK03E

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	5518.0	Pass
Overall Test Results				Pass

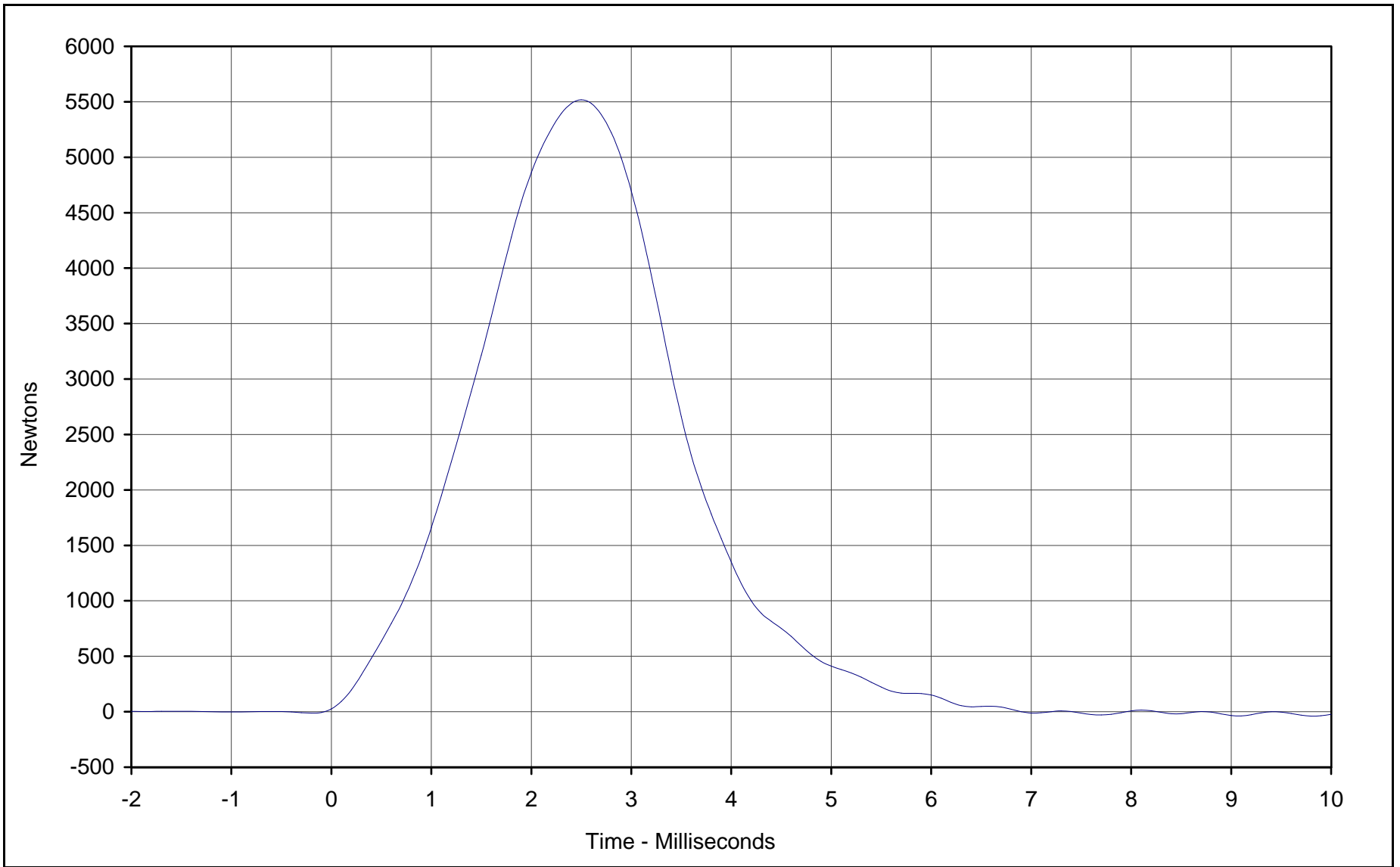
Laboratory Technician

March 1, 2001

Test Date

Approved By

Date



Curve Description: Probe Force
Maximum Value: 5518.0 at 2.5 Milliseconds
Minimum Value: -29.3 at 7.7 Milliseconds
SAE Filter Class: 600
Date of Test: 3/1/01
ATD Serial No.: 035

Testing Program: Hybrid III Right Knee Impact Test
Test Information: Part S/N: N/A Test I.D.: RK03E





Hybrid III Calibration Data Sheet

50TH Percentile Male

Head Drop Calibration

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: HD02C

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	233.9	Pass
Peak Lateral Acceleration	G's	≤15.0	8.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

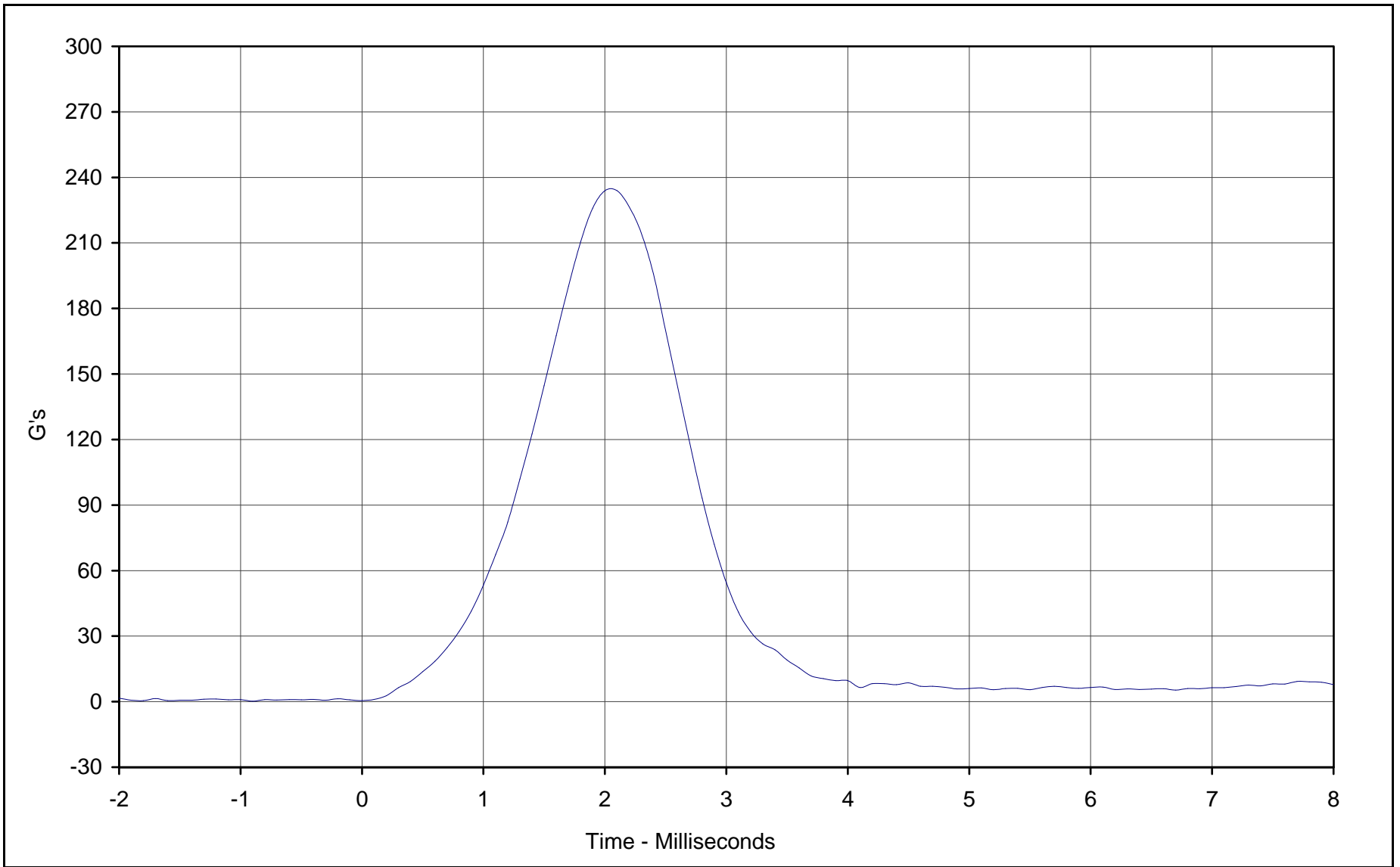
March 1, 2001

Test Date

Approved By

Date

E-26



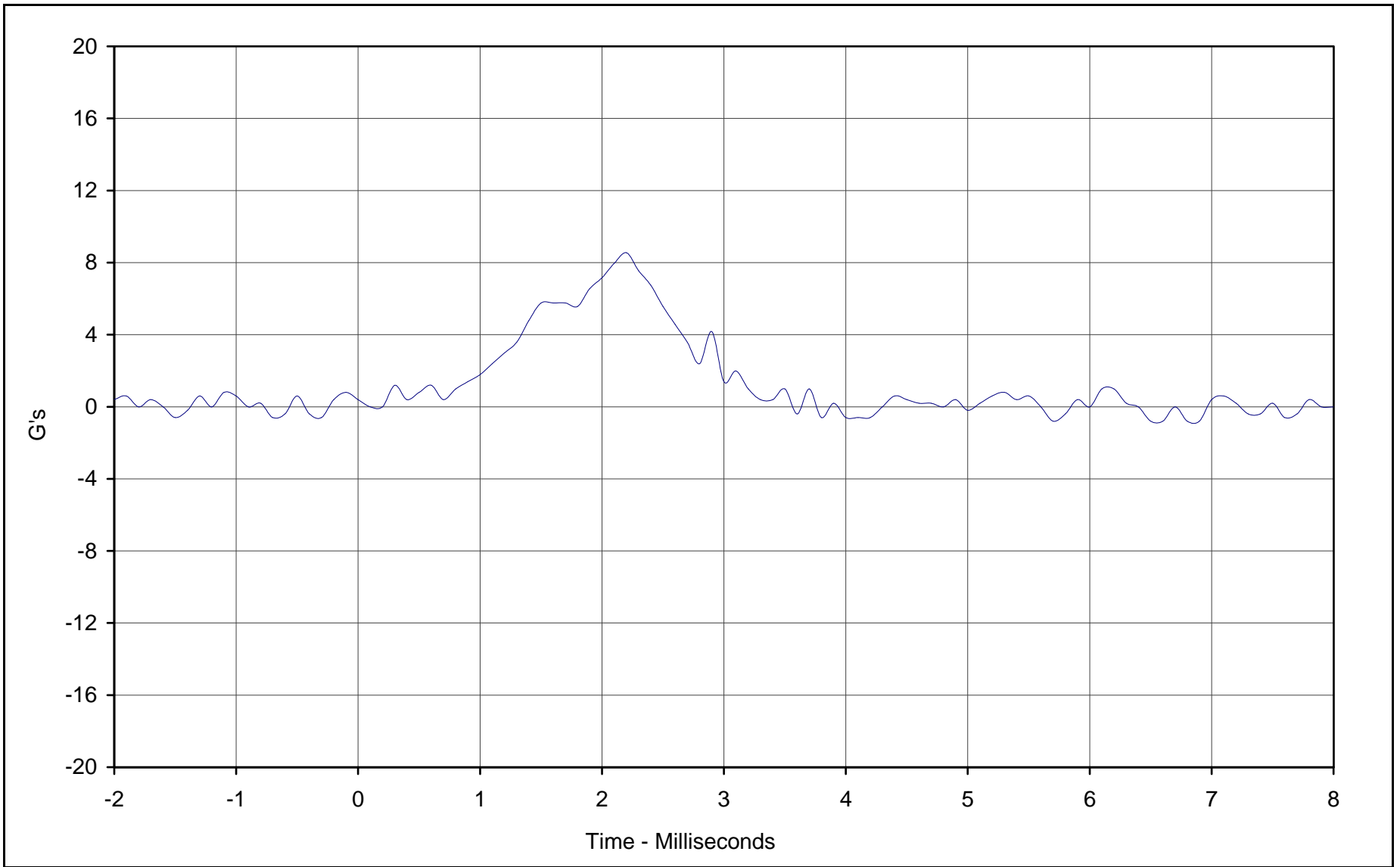
Curve Description: Head Resultant Acceleration
Maximum Value: 233.9 at 2.1 Milliseconds
Minimum Value: 0.2 at -0.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 3/1/01
ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)
Test Information: S/N of Part: N/A Test I.D.: HD02C



KAR21001-16

E-27



Curve Description: Head Acceleration Y Axis

Maximum Value: 8.5 at 2.2 Milliseconds

Minimum Value: -0.8 at 5.7 Milliseconds

SAE Filter Class: 1000

Date of Test: 3/1/01

ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD02C



KAR21001-16



Hybrid III Calibration Data Sheet

50TH Percentile Male

Thorax Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: CH03E

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	5542	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.69	Pass
Internal Hysteresis	%	69 to 85	76.5	Pass
Overall Test Results				Pass

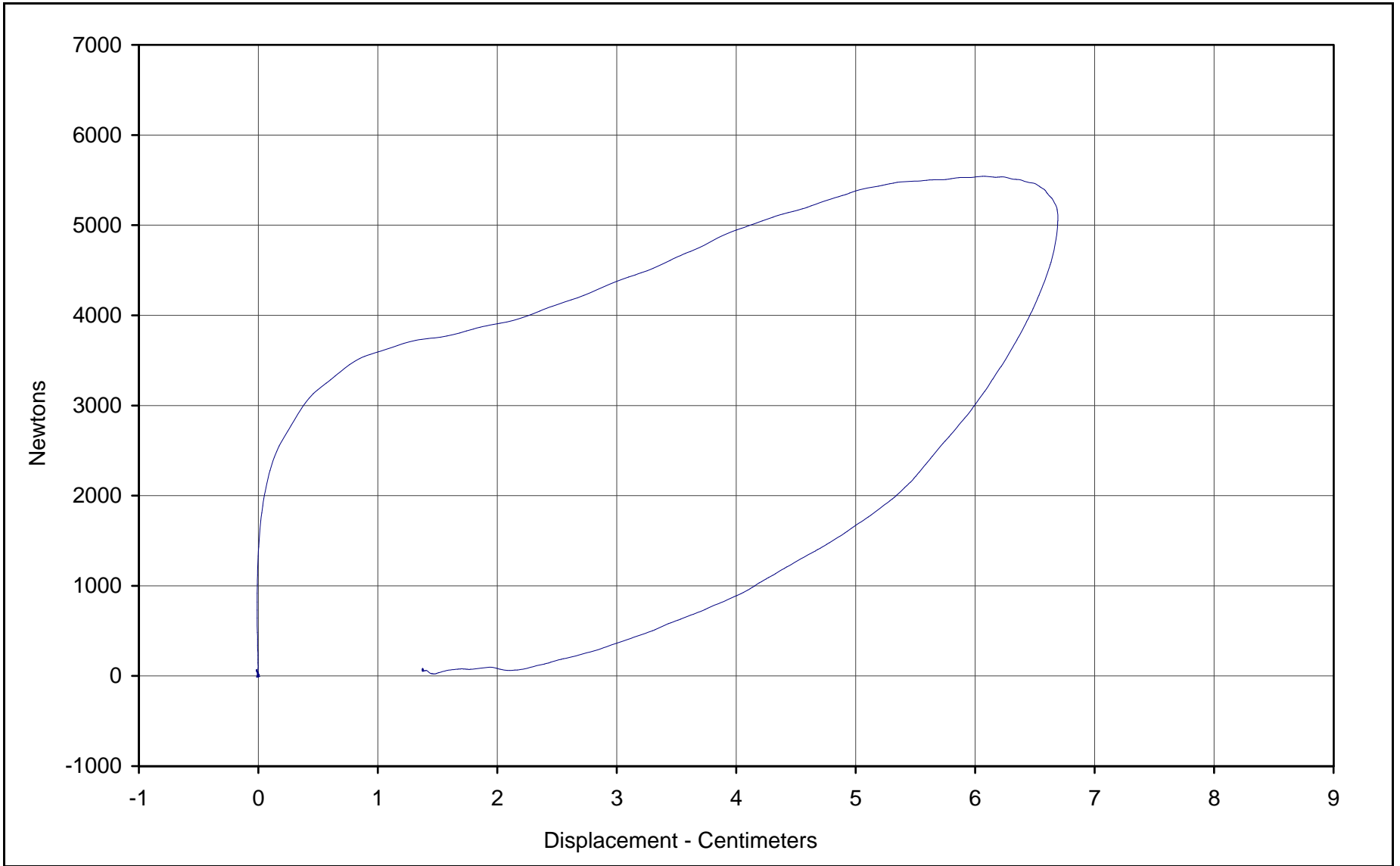
Laboratory Technician

March 1, 2001

Test Date

Approved By

Date



Curve Description: Probe Force vs. Chest Displacement

Testing Program: Hybrid III Thorax Impact Test

Probe Force: 5542.3 Newtons

Test Information: S/N of Part: N/A Test I.D.: CH03E

Chest Displ.: 6.69 Centimeters

SAE Filter Class: 180

Date of Test: 3/1/01

ATD Serial No.: 035





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NF03D

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	6.91	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	26.0	Pass
	20 Msec.	G's	17.6 to 22.6	21.7	Pass
	30 Msec.	G's	12.5 to 18.5	17.8	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.8	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	34.0	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	72.8	Pass
	Time	Msec.	57.0 to 64.0	58.3	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	114.6	Pass
Moment About Occipital Condyle	Maximum	N·m	84.1 to 108.5	93.6	Pass
	Time	Msec.	47.0 to 58.0	52.5	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	99.7	Pass
Overall Test Results					Pass

Laboratory Technician

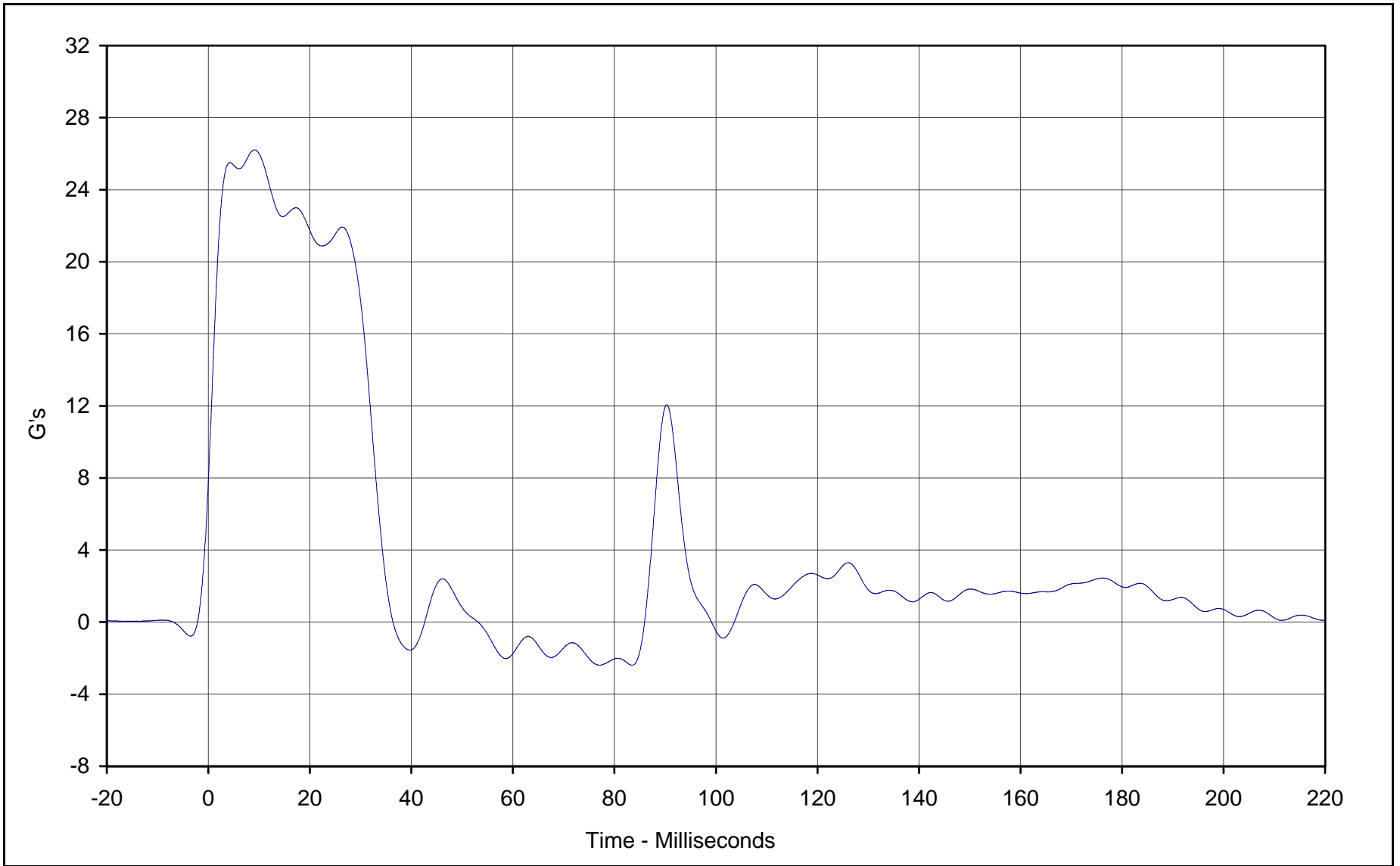
March 1, 2001

Test Date

Approved By

Date

E-31

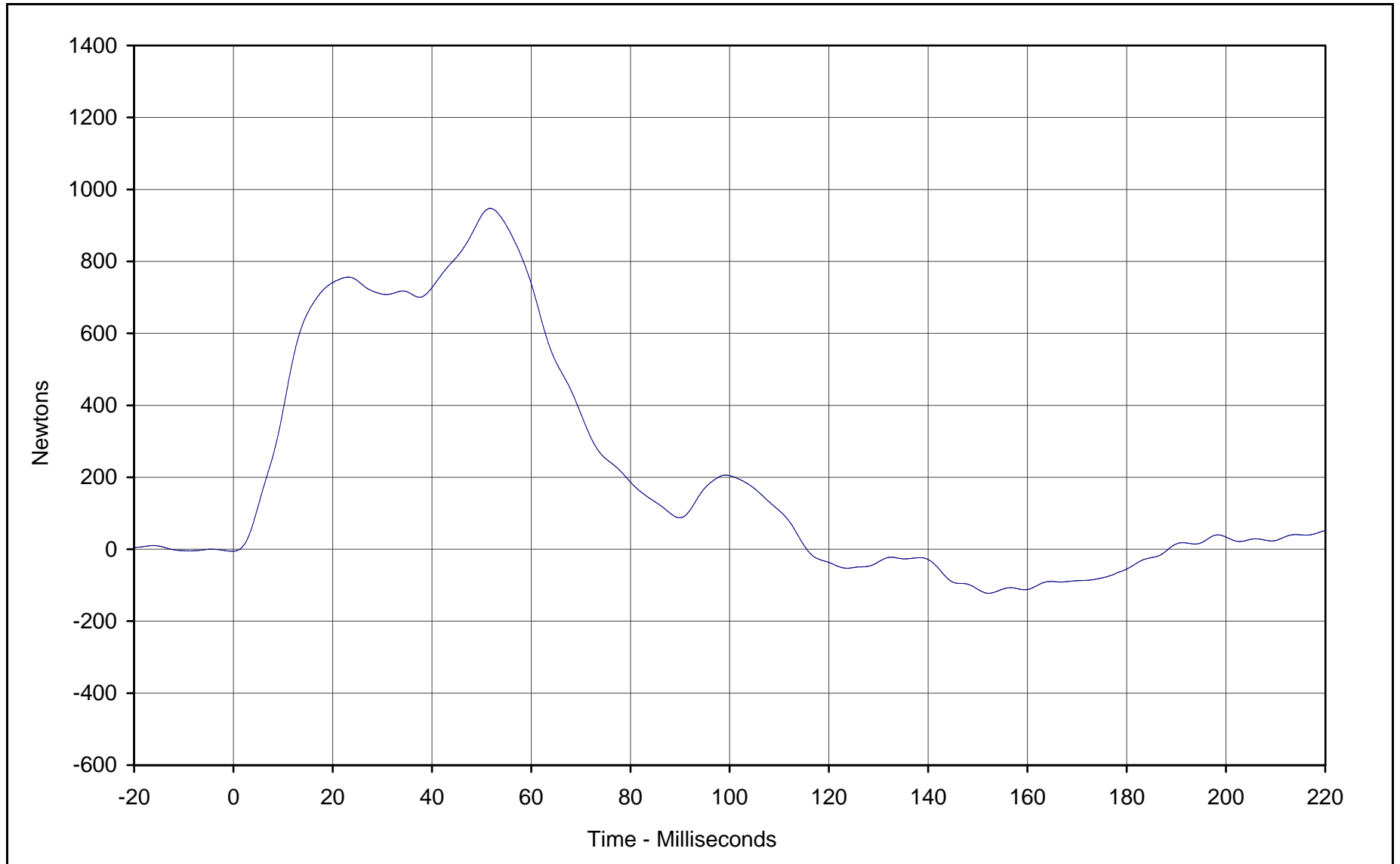


Curve Description: Pendulum Deceleration
Maximum Value: 26.2 at 9.1 Milliseconds
Minimum Value: -2.4 at 83.5 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/01
ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NF03D



KAR21001-16

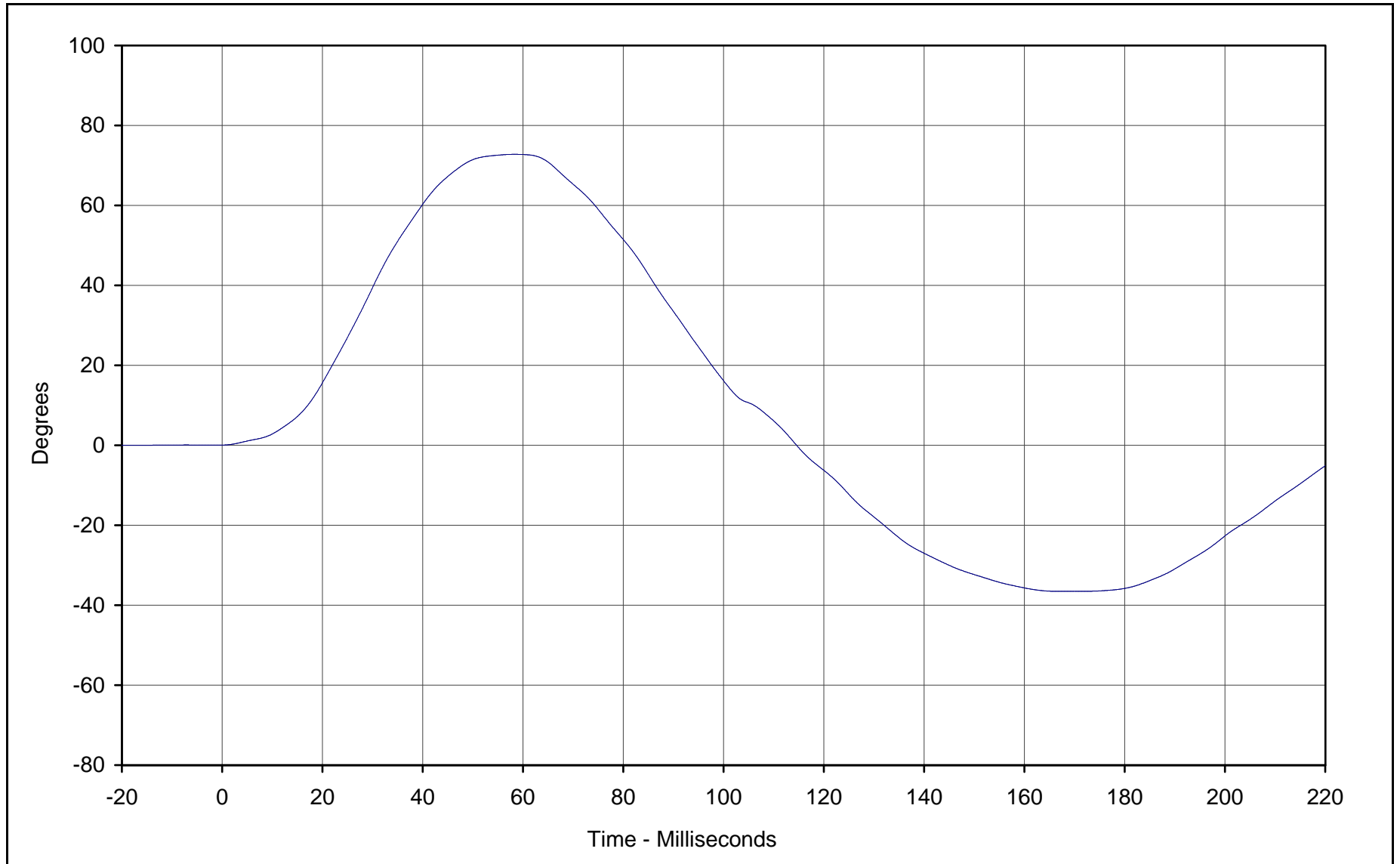


Curve Description: Neck Force X
 Maximum Value: 947.2 at 51.8 Milliseconds
 Minimum Value: -122.4 at 152.2 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/1/01
 ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF03D





Curve Description: "D" Plane Rotation

Maximum Value: 72.8 at 58.3 Milliseconds

Minimum Value: -36.5 at 170.5 Milliseconds

SAE Filter Class: 60

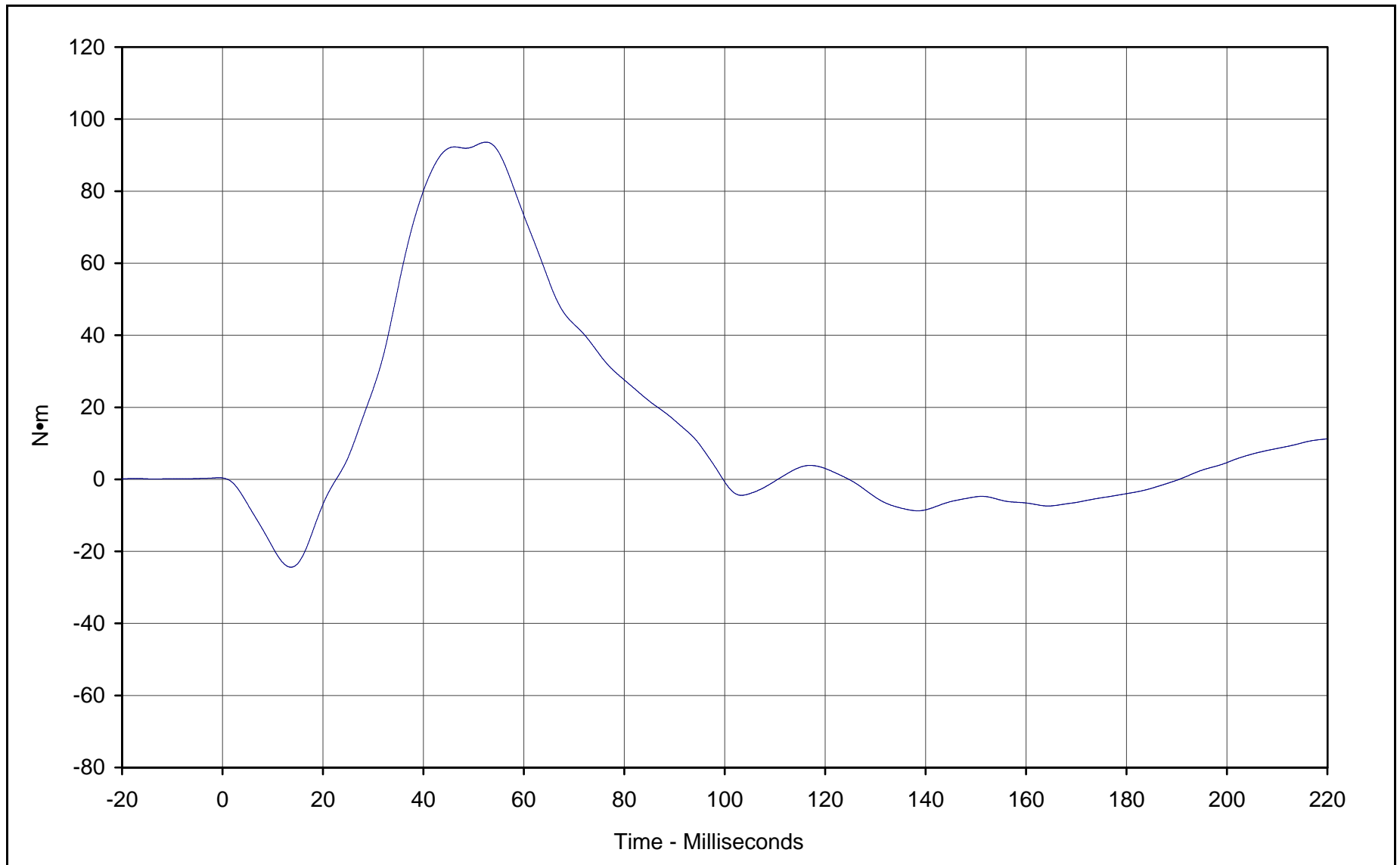
Date of Test: 3/1/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF03D





Curve Description: Moment About Occipital Condyles
 Maximum Value: 93.6 at 52.5 Milliseconds
 Minimum Value: -24.4 at 13.6 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/1/01
 ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF03D





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Extension Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NE03D

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	6.02	Pass	
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.7	Pass
	20 Msec.	G's	14.0 to 19.0	16.9	Pass
	30 Msec.	G's	11.0 to 16.0	15.5	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 22.0	15.5	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	38.0 to 46.0	39.0	Pass	
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	102.4	Pass
	Time	Msec.	72.0 to 82.0	79.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	147.0 to 174.0	153.7	Pass	
Moment About Occipital Condyle	Maximum	N·m	-52.9 to- 79.9	-78.6	Pass
	Time	Msec.	65.0 to 79.0	68.3	Pass
Negative Moment Decay, Time To Zero Crossing	Msec.	120.0 to 148.0	141.5	Pass	
Overall Test Results				Pass	

Laboratory Technician

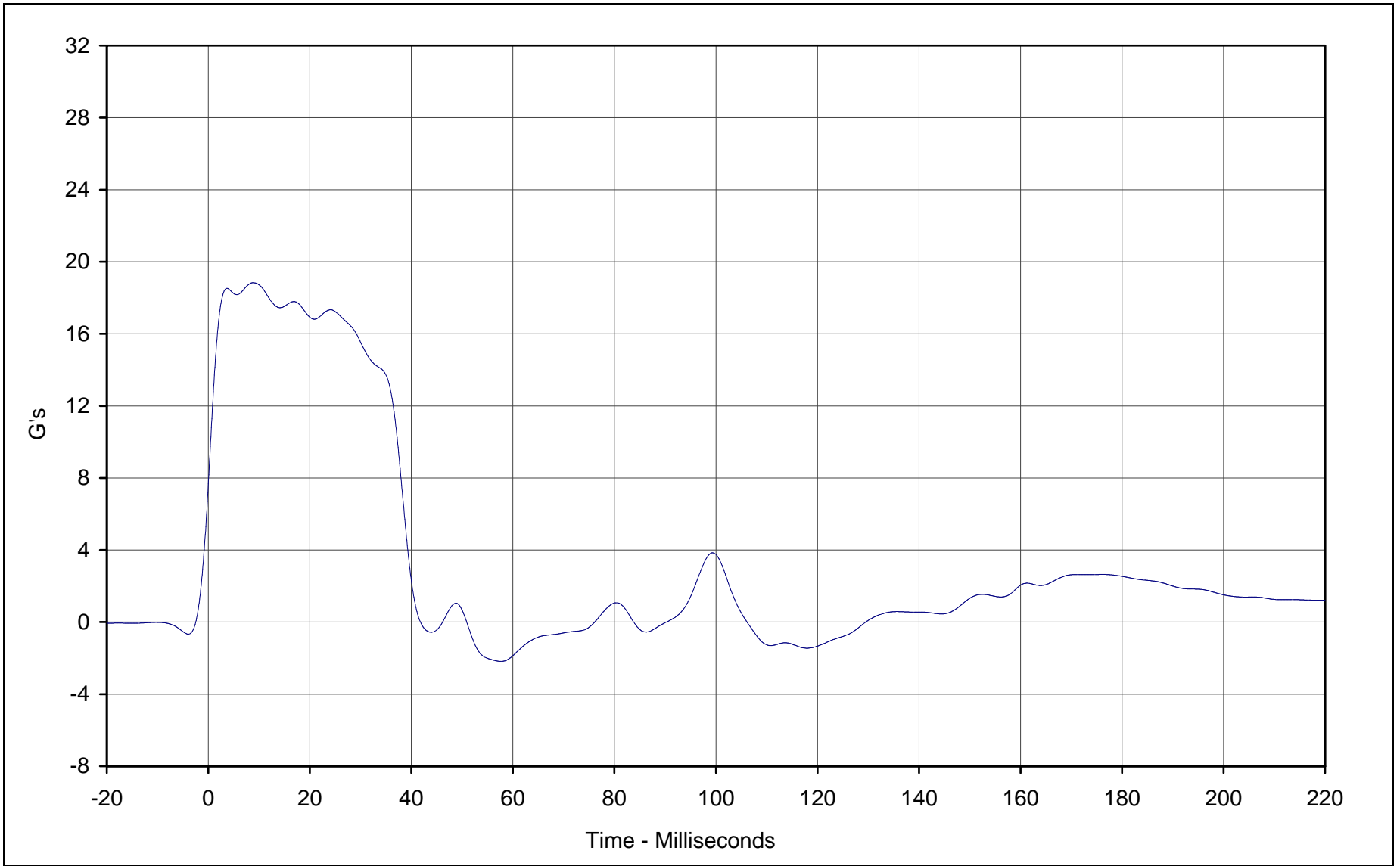
3/1/101

Test Date

Approved By

Date

E-36



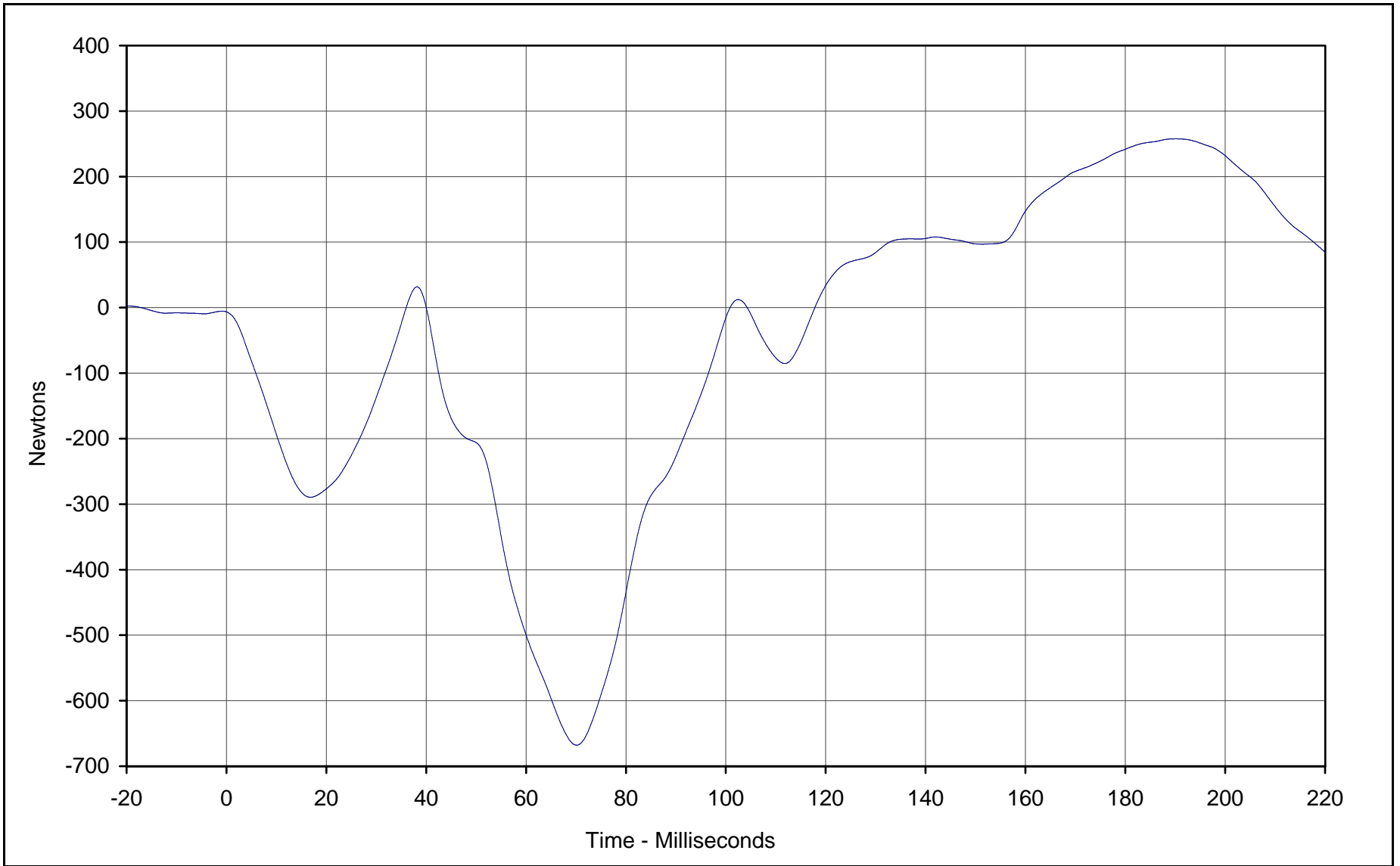
Curve Description: Pendulum Deceleration
Maximum Value: 18.8 at 8.9 Milliseconds
Minimum Value: -2.2 at 57.6 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/101
ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NE03D



KAR21001-16

E-37

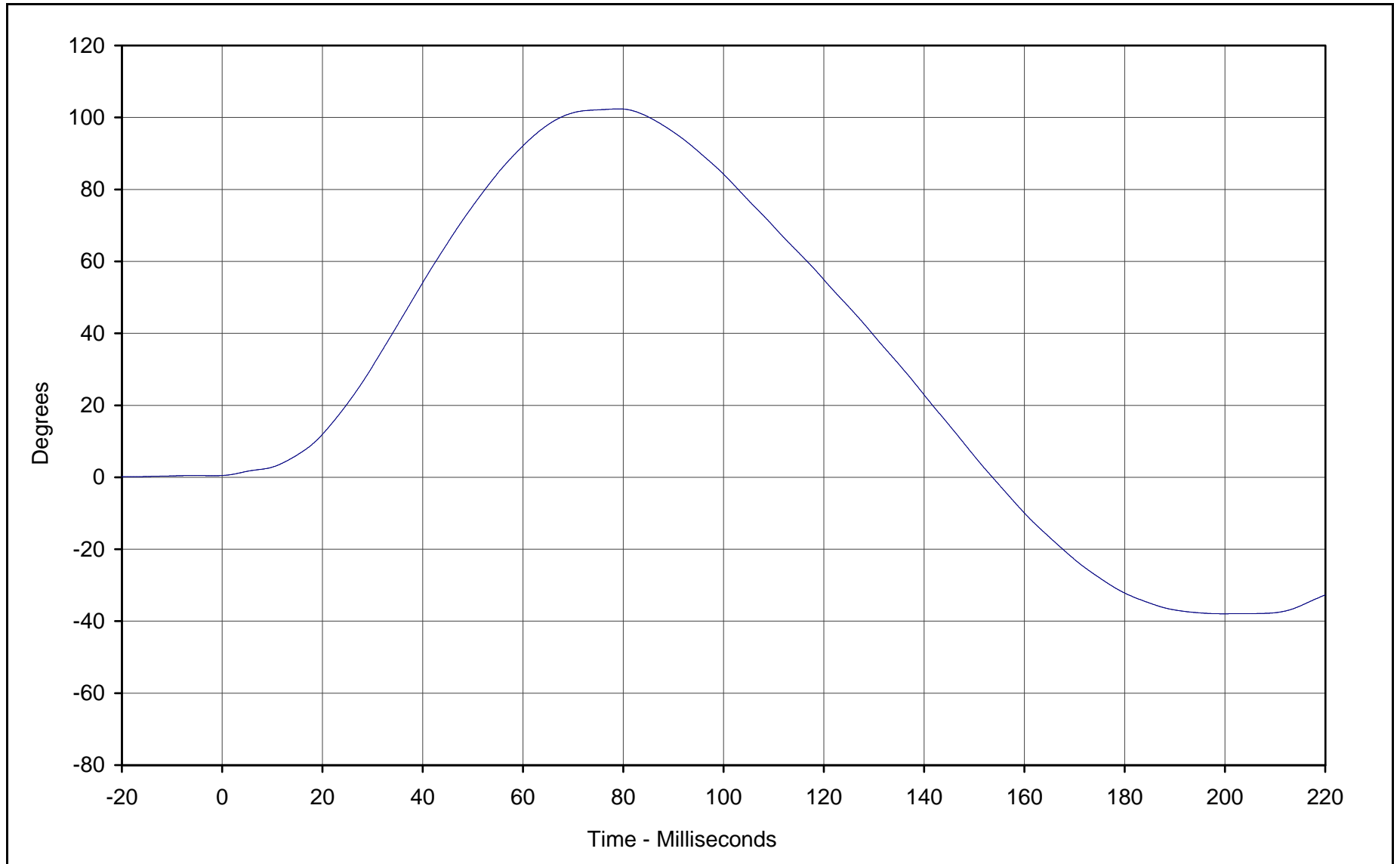


Curve Description: Neck Force X
Maximum Value: 257.6 at 190.1 Milliseconds
Minimum Value: -667.9 at 70.1 Milliseconds
SAE Filter Class: 60
Date of Test: 3/1/101
ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NE03D



KARR21001-16

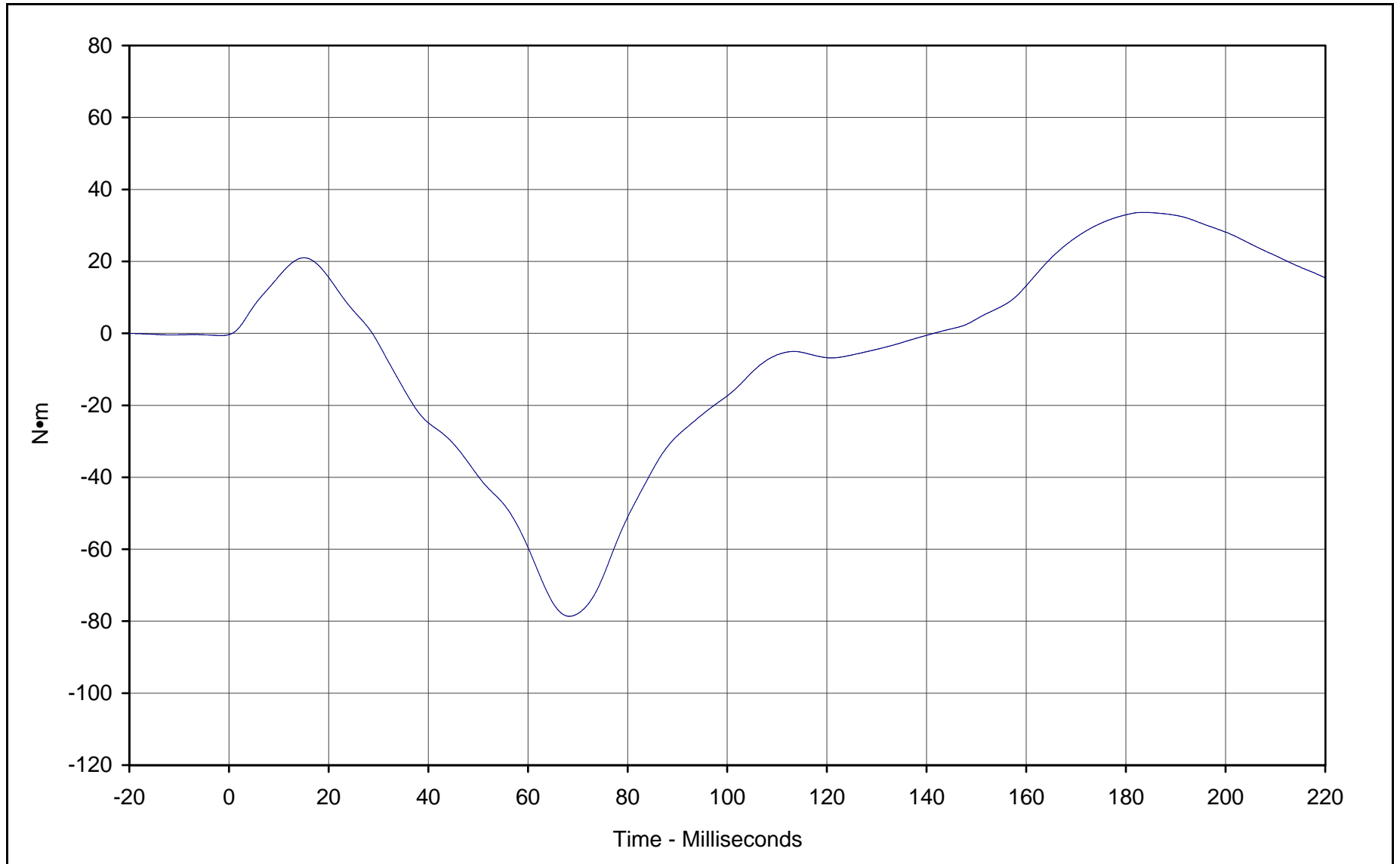


Curve Description: "D" Plane Rotation
 Maximum Value: 102.4 at 79.0 Milliseconds
 Minimum Value: -37.9 at 199.6 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/1/101
 ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE03D





Curve Description: Moment About Occipital Condyles
 Maximum Value: 33.6 at 183.6 Milliseconds
 Minimum Value: -78.6 at 68.3 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/1/101
 ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE03D





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	43	Pass
A - Total sitting height	mm	879 to 889	880	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	85	Pass
F - Thigh clearance	mm	140 to 155	150	Pass
G - Elbow back to wrist pivot	mm	290 to 305	295	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	205	Pass
K - Buttock to knee length	mm	579 to 604	590	Pass
L - Popliteal length	mm	429 to 455	445	Pass
M - Knee pivot height	mm	485 to 500	495	Pass
N - Buttock popliteal length	mm	452 to 477	465	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	255	Pass
V - Shoulder breadth	mm	422 to 437	435	Pass
W - Foot breadth	mm	91 to 107	95	Pass
Y - Chest circumference	mm	970 to 1001	985	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

March 1, 2001

Test Date

Approved By

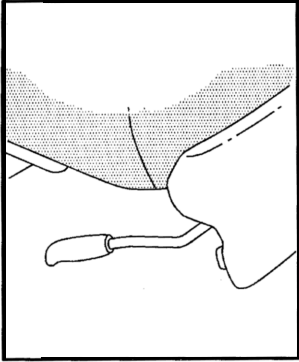
Date

APPENDIX F
VEHICLE OWNER'S MANUAL
OCCUPANT RESTRAINT INSTRUCTIONS

Seats and Seat Controls

This section tells you about the seats -- how to adjust them, take them out, put them back in, fold and unfold them.

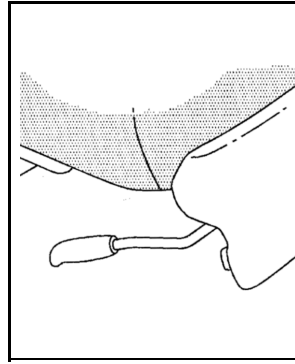
Driver's 2-Way Manual Seat



Use the lever located on the front left side of the seat to adjust the seat forward or rearward. Pull up the lever to unlock the seat. Slide the seat to where you want it and release the lever.

To make sure the seat is locked into place, try to move the seat back and forth with your body.

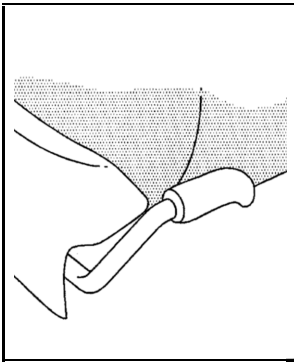
Driver's 4-Way Manual Seat (If Equipped)



Use the lever located on the front left side of the seat to adjust the seat forward or rearward. Pull up the lever to unlock the seat. Slide the seat to where you want it and release the lever.

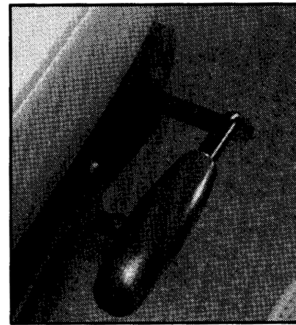
To make sure the seat is locked into place, try to move the seat back and forth with your body.

1-2



To raise the seat, pull up on the lever located on the front right side of the seat. To lower the seat, push the lever down. Adjust the seat and release the lever.

Manual Front Passenger Seats



To move the seat, pull up the lever located on the front of the seat to unlock it.

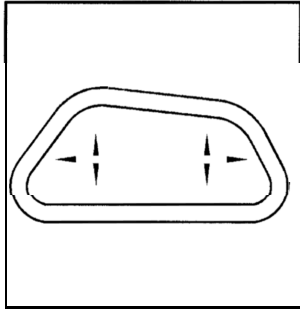
CAUTION:

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.

Slide the seat to where you want it and release the lever. To make sure the seat is locked into place, try to move the seat back and forth with your body.

1-3

6-Way Power Seat (Option)

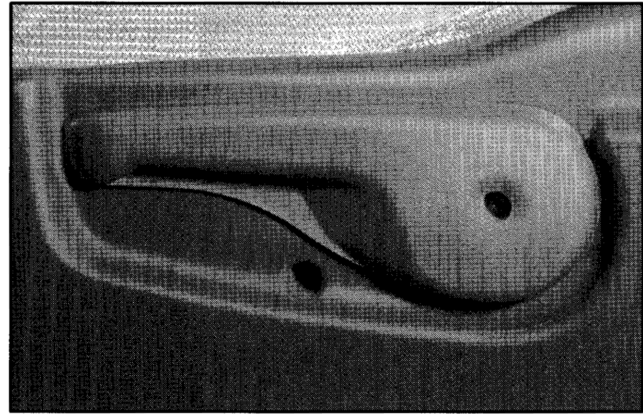


The six-way power seat controls are located on the outboard side of the driver's seat.

- Move the front of the control in the direction of the arrows to adjust the front portion of the cushion up or down.
- Move the rear of the control in the direction of the arrows to adjust the rear portion of the cushion up or down.
- Lift up or push down on both outer arrows at the same time to move the entire seat up or down.
- To move the whole seat forward or rearward, slide the control in the direction of the center arrows.

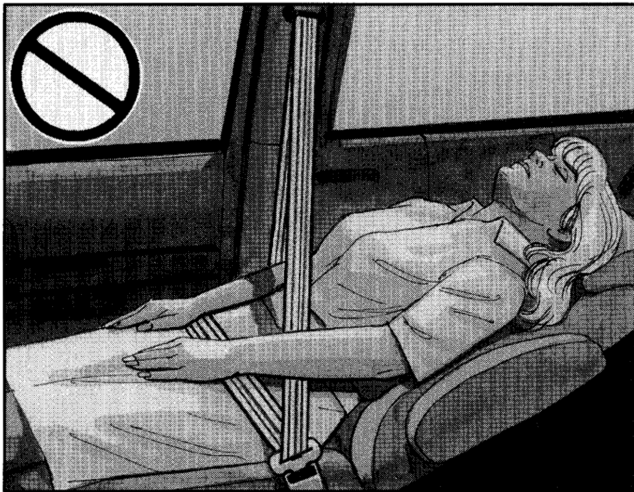
Reclining Front Seatbacks

All front seats recline.



To adjust the seatback, pull up on the lever located on the outboard sides of both the driver's and the front passenger's seats. It is easier to recline the seat if you lean forward, taking your weight off the seatback.

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.

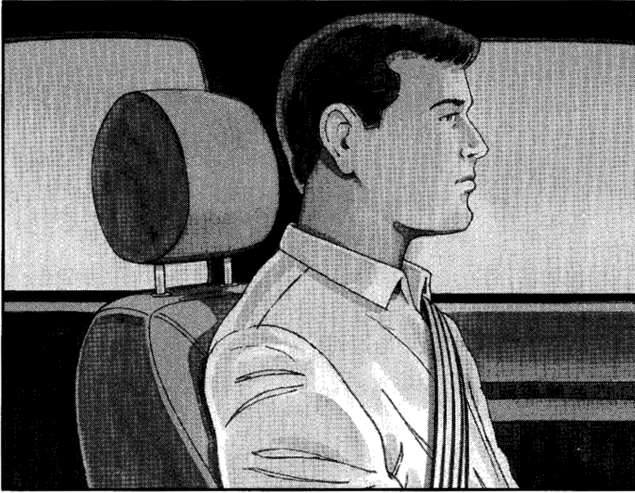
The shoulder belt can't do its job because it won't be against your body. Instead, it will be in front of you. In a crash you could go into it, receiving neck or other injuries.

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.

1-5

Head Restraints

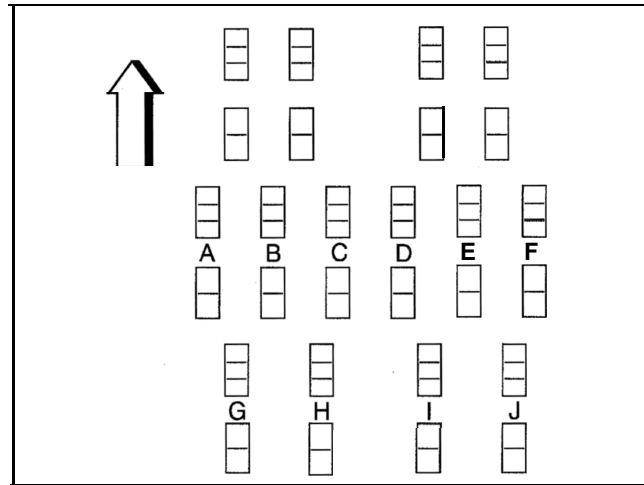


Head restraints are fixed on some models and adjustable on others. Slide an adjustable head restraint up or down so that the top of the restraint is closest to the top of your ears. This position reduces the chance of a neck injury in a crash.

Rear Seats

Seat Controls

The rear seats in your vehicle have levers and straps used to adjust, remove and reinstall the seats. By using the levers and straps, in the correct order, you can easily remove the seats from your vehicle.



Floor Seat Pin Diagram

1-6



- If the front latches are not attaching correctly, check that the seat is in the full rear position.
3. Firmly push the rear hooks onto the rear floor pins by pushing down the rear of the seat.

⚠ CAUTION:

A seat that isn't locked into place properly can move around in a collision or sudden stop. People in the vehicle could be injured. Be sure to lock the seat into place properly when installing it.

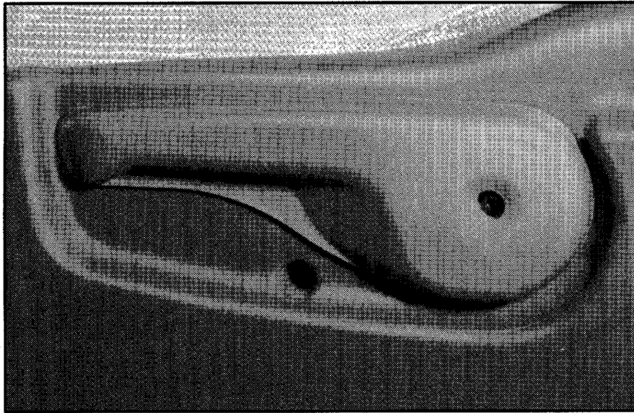
4. Try to raise the seat to check that it is locked down.
5. Lift the seatback recliner lever or pull the nylon strap on the back of the seat and raise the seatback until it locks upright.
6. Push and pull on the seatback to make sure that it is locked in place.

⚠ 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.

Captain's Chairs

If your vehicle has the captain's chairs, the seatbacks can be folded forward or reclined and the seats can be removed.



To recline the seatback, lift up on the recliner lever located on the outboard side of the seat. Use the recliner lever to move the seatback to the desired position.

It is easier to raise or lower the seatback if you lean forward, taking the weight off the seatback.

The armrests can be lowered or raised for entering or exiting the vehicle.

The seatbacks on the captain's chairs also fold forward to put items behind the left and right seats.

Lift up on the recliner lever and fold the seatback forward. The seatback will lock into place when you push it back to the upright position.

⚠ 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.

1-20

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 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.

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

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

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

Safety belts are for everyone.

How to Wear Safety Belts Properly

Adults

This part is only for people of adult size.

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

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

We'll start with the driver position.

Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

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

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

1-32

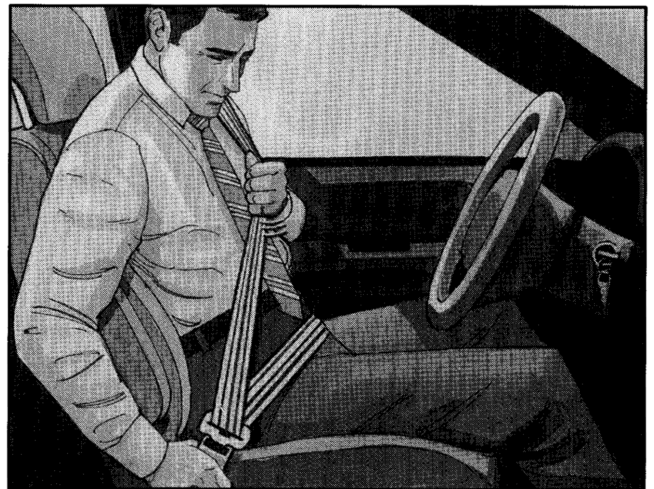


3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

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

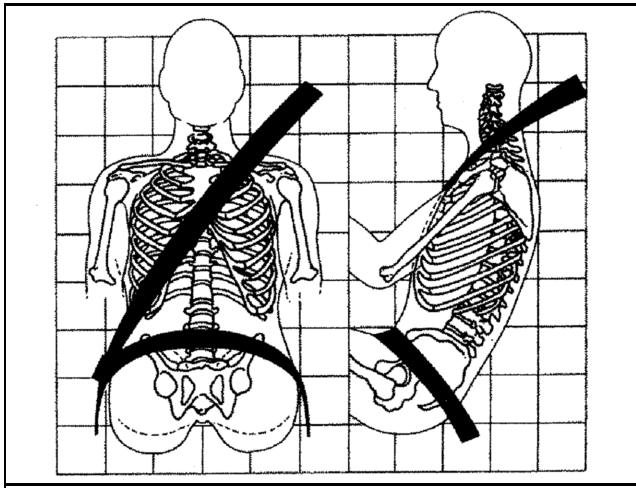
4. Push the latch plate into the buckle until it clicks.
Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

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



1-33

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



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

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

1-34

Shoulder Belt Height Adjuster

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



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

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

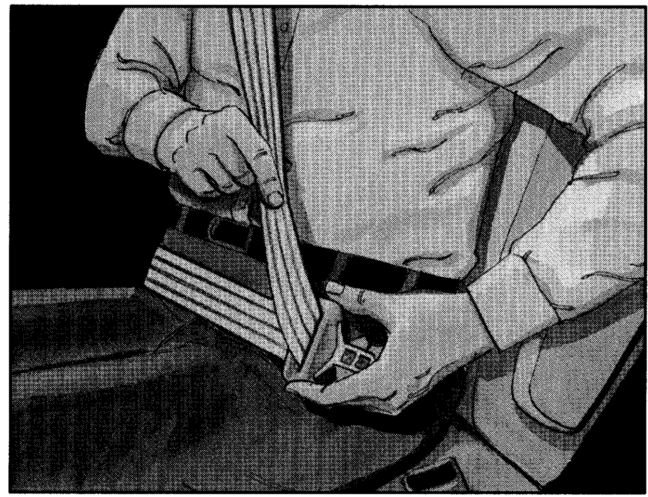
1.35

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 two things.



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

On some vehicles, if you 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.

1-42

Air Bag Systems

This part explains the frontal and side impact air bag systems.

Your vehicle has four air bags -- a frontal air bag for the driver, another frontal air bag for the right front passenger, a side impact air bag for the driver, and another side impact 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 frontal 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 systems:

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.

CAUTION: (Continued)

CAUTION: (Continued)

Air bags are "supplemental restraints" to the safety belts. All air bags are designed to work with safety belts but don't replace them.

Frontal air bags for the driver and right front passenger 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 unrestrained occupants, frontal air bags may provide less protection in frontal crashes than more forceful air bags have provided in the past. The side impact air bags for the driver and right front passenger are designed to inflate only in moderate to severe crashes where something hits the side of your vehicle. They aren't designed to inflate in frontal, in rollover or in rear crashes. Everyone in your vehicle should wear a safety belt properly -- whether or not there's an air bag for that person.

⚠ CAUTION:

Both frontal and side impact 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 for air bag inflation before and during a crash. Always wear your safety belt, even with frontal air bags. The driver should sit as far back as possible while still maintaining control of the vehicle. Front occupants should not lean on or sleep against the door.

⚠ 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 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."



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

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.

1-44

How the Air Bag Systems Work

Where are the air bags?



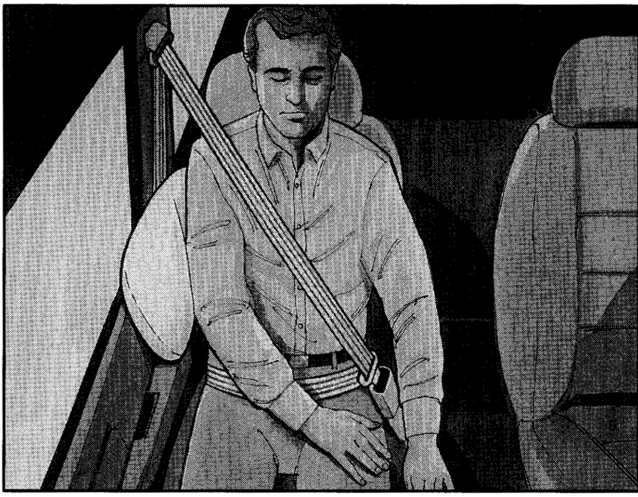
The driver's frontal air bag is in the middle of the steering wheel.



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

The driver's side impact air bag is in the side of the driver's seatback closest to the door.

1-45



⚠ 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 and don't let seat covers block the inflation path of a side impact air bag.

The right front passenger's side impact air bag is in the side of the passenger's seatback closest to the door.

1-46

When should an air bag inflate?

The driver's and right front passenger's frontal air bags are designed to inflate in moderate to severe frontal or near-frontal crashes. But they are designed to 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 12 to 19 mph (19 to 31 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 driver's and right front passenger's frontal air bags are not designed to inflate in rollovers, side impacts, or rear impacts, because inflation would not help the occupant.

The side impact air bags are designed to inflate in moderate to severe side crashes. A side impact air bag will inflate if the crash severity is above the system's designed "threshold level." The threshold level can vary with specific vehicle design. Side impact air bags are not designed to inflate in frontal or near-frontal impacts, rollovers or rear impacts, because inflation would not help the occupant. A side impact air bag will only deploy on the side of the vehicle that is struck.

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. For frontal air bags, inflation is determined by the angle of the impact and how quickly the vehicle slows down in frontal and near-frontal impacts. For side impact air bags, inflation is determined by the location and severity of the impact.

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. For both frontal and side impact air bags, 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, instrument panel and the side of the front seatbacks closest to the door.

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. In moderate to severe side collisions, even belted occupants can contact the inside of the vehicle. The air bag supplements 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 the frontal 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 the air bag. Side impact air bags would not help you in many types of collisions, including frontal or near frontal collisions, rollovers, and rear 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 for the driver's and right front passenger's frontal air bags, and only in moderate to severe side collisions for the driver's and right front passenger's side impact air bags.

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, the instrument panel for the right front passenger's bag, the side of the seatback closest to the door for the driver and right front passenger's side impact air bags -- 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 the vents in the deflated air bags. Air bag inflation doesn't prevent the driver from seeing or 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 a door.

1-48

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 an air bag inflates, 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 frontal 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. The module also records speed, engine rpm, brake and throttle data.
- Let only qualified technicians work on your air bag systems. Improper service can mean that an 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, or the air bag covering on the driver's and right front passenger's seatback, the bag may not work properly. You may have to replace the air bag module in the steering wheel, both the air bag module and the instrument panel for the right front passenger's air bag, or both the air bag module and seatback for the driver's and right front passenger's side impact air bag. Do not open or break the air bag coverings.

1-49

Servicing Your Air Bag-Equipped Vehicle

Air bags affect how your vehicle should be serviced. There are parts of the air bag systems in several places around your vehicle. Your dealer and the service manual have information about servicing your vehicle and the air bag systems. To purchase a service manual, see "Service and Owner Publications" in the Index.

CAUTION:

For up to 10 seconds 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 yellow connectors. They are probably part of the air bag systems. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

The air bag systems do not need regular maintenance.

Safety Belt Pretensioners

Your vehicle has safety belt pretensioners. You'll find them on the buckle end of the safety belts for the driver and right front passenger. They help the safety belts reduce a person's forward movement in a moderate to severe crash in which the front of the vehicle hits something.

Pretensioners work only once. If they activate in a crash, you'll need to get new ones, and probably other new parts for your safety belt system. See "Replacing Restraint System Parts After a Crash" in the Index.

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.