

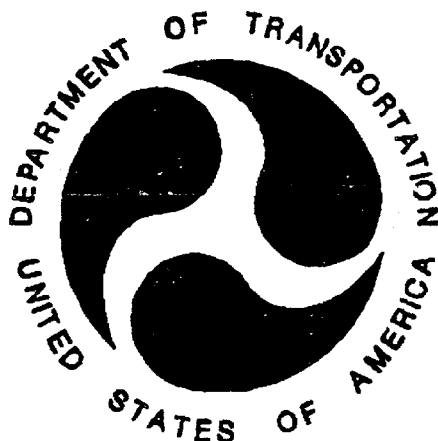
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REPORT NUMBER KAR-99-18

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

**GENERAL MOTORS CORPORATION
2000 CHEVROLET IMPALA
4 DOOR SEDAN
NHTSA NUMBER: GM0001**

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



JUNE 4, 1999

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
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SAFETY PERFORMANCE STANDARDS
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Date of Acceptance

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2000 Chevrolet Impala at KARCO Engineering on May 20, 1999. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 56.4 km/h. The ambient temperature at the barrier face at the time of impact is 25.0 degrees Celcius. The vehicle's maximum post test static crush is 630 mm located at the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and second generation supplemental airbags in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:					
Measurement Description		Units	Threshold	Driver ATD	Passenger ATD
Head Injury Criteria (HIC)		N/A	1000	322.0	468.5
Max. Thorax Accel. (3 msec Clip)		G's	60	36.9	43.3
Left Femur force		Newtons	10009	-6971.4	-4658.5
Right Femur Force		Newtons	10009	-8038.6	-4123.7
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SECTION 1

PURPOSE, TEST PROCEDURE AND SUMMARY OF TEST GM0001

1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the FY' 99 New Car Assessment Program (NCAP) frontal barrier crash worthiness evaluation program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract Number DTNH22-97-D-02007. The purpose of this 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 May 20, 1999 at a speed of 56.4 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 eighteen (18) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A rigid load cell barrier was impacted by a model year 2000 Chevrolet Impala 4 Door Sedan at a velocity of 56.4 km/h. The test vehicle weight is 1791 kilograms with two (2) part 572E 50th percentile adult male ATDs. Twenty-four (24) load cell barrier data channels were obtained in conducting the May 20, 1999 NCAP test. The test vehicle is equipped with a transverse mounted 3.4-liter, 6-cylinder engine and a 4-speed automatic transmission.

The driver Head Injury Criteria (HIC) is 322.0. The maximum resultant chest deceleration over three (3) milliseconds is 36.9 g's. The left and right femur loads are -6971.4 and -8038.6 Newtons, respectively. Chest deflection for the driver ATD peaked at -24.9 mm. The driver ATD head contacted the airbag and headrest, its chest and abdomen contacted the airbag, and both knees contacted the knee bolster.

The right front passenger's HIC is 468.5. The maximum resultant chest deceleration over three (3) milliseconds is 43.3 g's. The left and right femur loads are -4658.5 and -4123.7 Newtons respectively. Chest deflection for the passenger ATD peaked at -27.5 mm. The passenger ATD head contacted the airbag and headrest, the chest and abdomen contacted the airbag and both knees contacted the glove box.

Maximum seat belt spool out as measured by on-board pullout potentiometers is 195.6 mm for the driver ATD and 296.3 mm for the passenger ATD. The shoulder belt stretch for the driver was .035 mm/cm. The shoulder belt stretch for the passenger was .053 mm/cm.

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

1.4 GENERAL COMMENTS

The 2000 Chevrolet Impala 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: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 NHTSA 35 MPH NCAP

Test Date: 5/20/99

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Old 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	lb/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: 2000 Chevrolet Impala 4 Door Sedan
Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
Test Date: 5/20/99

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	56.41
Test Weight	kg	1791
Impact Angle	degrees	0
Average Rebound	mm	608
Maximum Static Crush	mm	630

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Opened	Opened
Rear Door Opening	Opened	Opened
Seat Track Shift (mm)	11	6
Seat Back Failure	None	None

TEST DUMMY INFORMATION

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

16mm MOVIE COVERAGE

High Speed	18
Real Time	1
Total	19

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

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99

TEST VEHICLE INFORMATION

Manufacturer	General Motors
Model	Impala
Body Style	4 Door
NHTSA No.	GM0001
VIN	2G1WF55E1Y9101780
Color	Silver
Delivery Date	5/7/99
Odometer Reading (mile)	19
Dealer	Massey Chevrolet
Transmission	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	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
AM/FM/Cassette	Yes
Anti-Theft System	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors Of Canada	GVWR (kg)	2067
Date of Manufacture	April-99	GAWR Front (kg)	1118
		GAWR Rear (kg)	949

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	210
Cold Pressure (kPa)	210	210
Recommend Tire Size	P225/60/R16	P225/60/R16
Tire Size on Vehicle	P225/60/R16	P225/60/R16
Tire Manufacturer	Uniroyal	Uniroyal

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bench	Bench	None	
Number of Occupants	3	3	0	6
Capacity Wt. (VCW) (kg)				488
Cargo Weight (RCLW) (kg)				80

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

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	484	294		521	383	
Right	kg	496	292		507	380	
Ratio	%	62.6	37.4		57.4	42.6	
Totals	kg	980	586	1566	1028	763	1791

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1566
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Weight (RCLW)	kg	80
Calculated Vehicle Target Weight (TVTW)	kg	1798

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	747	755	759	760	1049
As Tested	mm	728	728	705	705	1194

Vehicle Wheel base (mm): 2802
 Weight of Ballast secured in cargo area (kg): 58 *
 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): 64.3
 Usable Capacity Figure Furnished by COTR (L): 65.1
 Actual Test Volume with entire fuel System Filled (L): 60.2
 Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.764
 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 seat centerline,
fuel lines travel inside left frame rail.

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

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
Test Date: 5/20/99

SPEED TRAP DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.51 to 57.12	56.41
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	56.46
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	4725	4333	-392
Center	mm	5080	4450	-630
Right Side	mm	4725	4425	-300

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	650
Center	mm	531
Right Side	mm	643
Average	mm	608

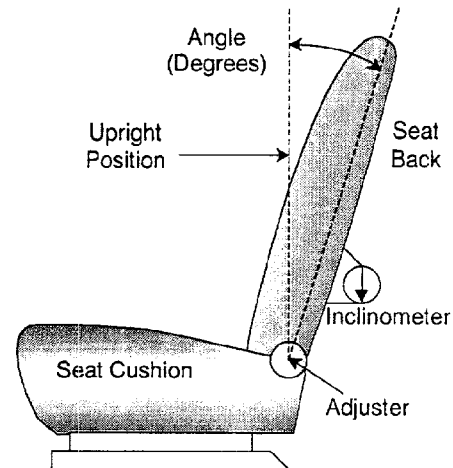
DATA SHEET NO. 4
TEST VEHICLE INFORMATION

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
Test Program: 1999 NHTSA 35 MPH NCAP

NHTSA No.: GM0001
Test Date: 5/20/99

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturers designated angle. The procedure is as follows: For both driver and passenger seats, a slit is cut into the outboard edge of the seat fabric approximately 10-13 inches above the pivot point to expose the seat frame. An inclinometer is firmly placed against the flat portion of the frame surface and the seat back is adjusted to the manufacturers designated angle.



Driver seat back angle: 26.5° with a seated dummy
Passenger seat back angle: 26.5° with a seated dummy

SEAT FORE/AFT POSITIONS

Driver seat is power operated and passenger seat is manually operated. The fore/aft is set to the middle position for both driver and passenger seats. The first detent is numbered "1". The driver seat is equipped with lumbar comfort features, which are set to the lowermost position.

Driver seat fore/aft total travel: 240mm total distance of travel
Passenger seat fore/aft total travel: 25 detents (240mm)
Driver seat fore/aft position: Set at 120 mm aft of forwardmost
Passenger seat fore/aft position: Set at detent 13 (120mm aft of forwardmost)

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with adjustable "D" ring anchorages for both driver and passenger seat positions. There are 4 positions or detents, with the uppermost position numbered "1". Both Driver and passenger "D" ring anchorages are placed in position 2.

DATA SHEET NO. 4...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

Test Date: 5/20/99

FUEL TANK CAPACITY DATA

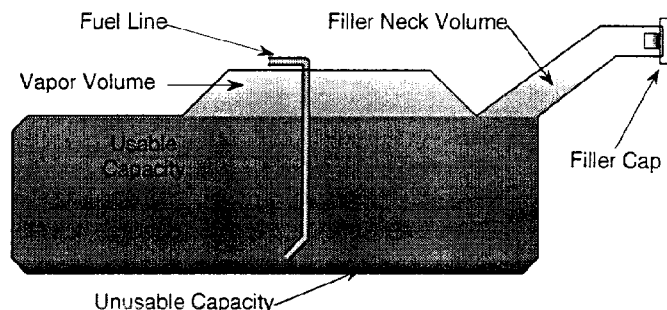
The "Usable Capacity" of the standard equipment fuel tank is: 65.1 liters

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

92-94% of "Usable Capacity" for certification to FMVSS 301 requirement: 59.9 to 61.2 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 60.2 liters

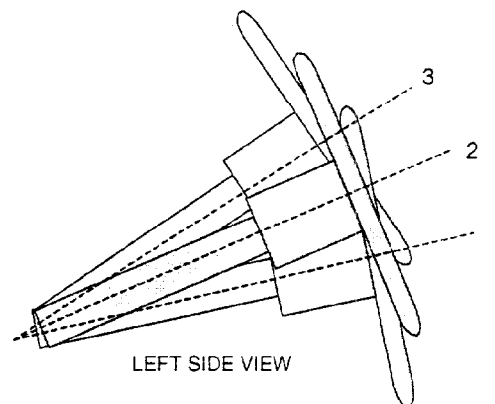
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately three (3) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat. Fuel lines run along the left in-board side of the uni-body frame rail to the engine compartment.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when 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 lower than the geometric center, or position 2 as indicated in the drawing at right and the angle below. A true geometric center does not exist. There are 6 detents, with the uppermost detent numbered "1". The manufacturers' setting is position 4.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 13°

Geometric center, position 2: 21°

Uppermost, position 3: 33°

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

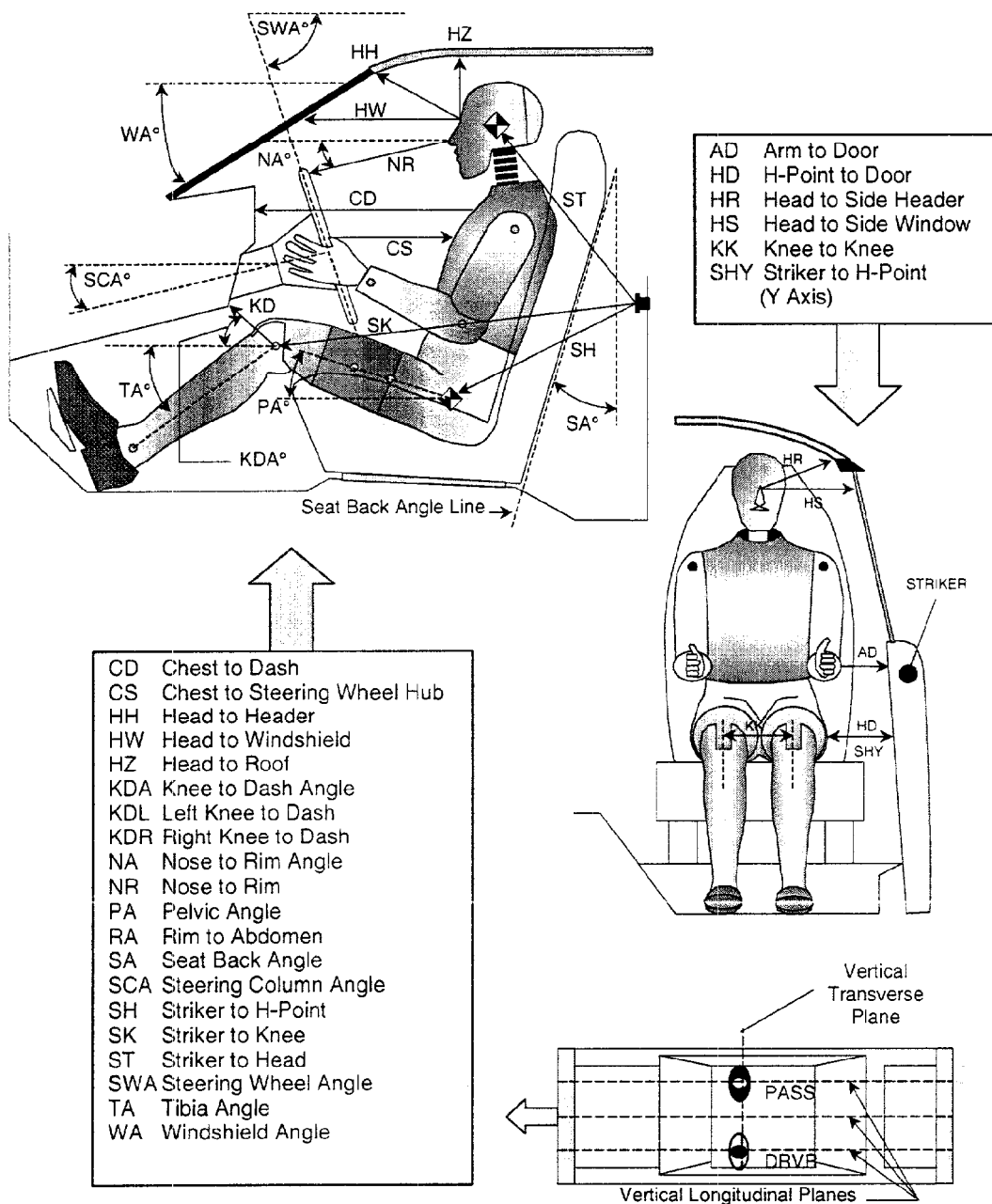
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

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Test Date: 5/20/99

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



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

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99

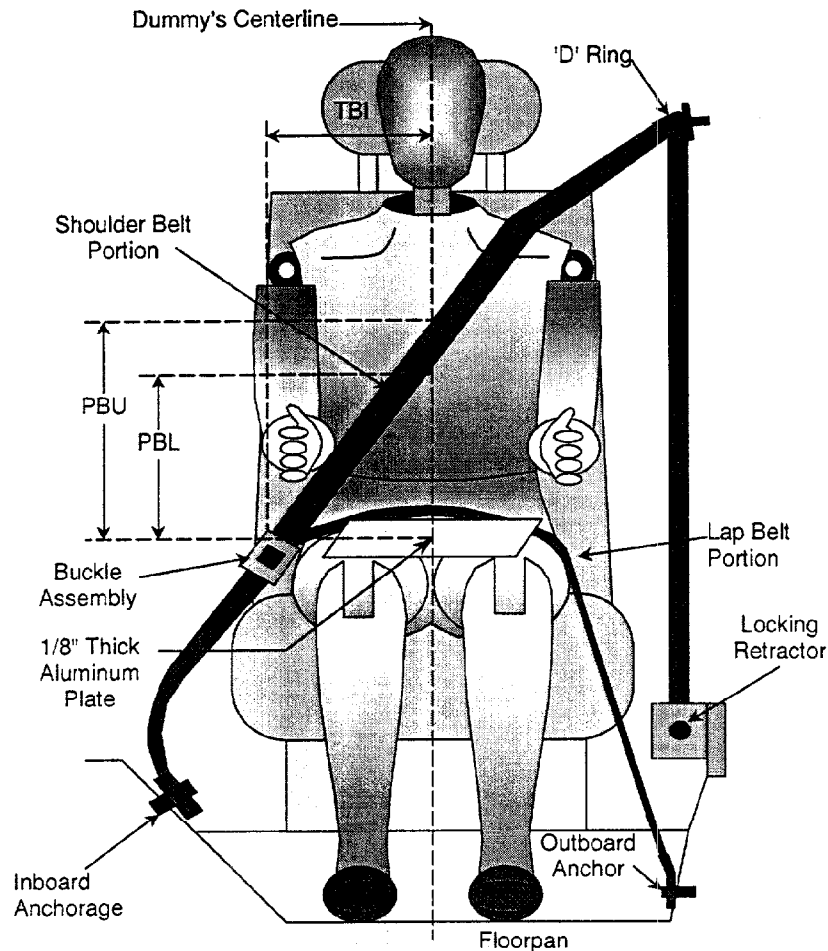
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		29		
SWA	Steering Wheel Angle		69		
SCA	Steering Column Angle		21		
SA	Seat Back Angle		27		27
HZ	Head to Roof (Z)	210	90	190	90
HH	Head to Header	326	0	345	0
HW	Head to Windshield	665	0	650	0
HR	Head to Side Header (Y)	250		225	
NR	Nose to Rim	380	9		
CD	Chest to Dash	515		530	
CS	Chest to Steering Hub	295	0		
RA	Rim to Abdomen	185	0		
KDL	Left Knee to Dash	165	34	185	
KDR	Right Knee to Dash	170		180	36
PA	Pelvic Angle		23		23
TA	Tibia Angle		43		40
KK	Knee to Knee (Y)	280		191	
SK	Striker to Knee	590	1	588	1
ST	Striker to Head	565	7	568	8
SH	Striker to H-Point	221	29	218	30
SHY	Striker to H-Point (Y)	225		215	
HS	Head to Side Window	330		280	
HD	H-Point to Door (Y)	182		180	
AD	Arm to Door (Y)	120		50	

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to lap/shoulder belt intersection	mm	175	175
PBU - Top surface of reference to belt upper edge	mm	306	340
PBL - Top surface of reference to belt lower edge	mm	231	255
Lap Belt tension	Newtons	10	10
Shoulder Belt tension	N/A	Retractor	Retractor

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

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 NHTSA 35 MPH NCAP

Test Date: 5/20/99

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.)	1975	-685	359	G's	1.8	154.3	-36.4	55.3
2	Right Rear X-Member (Pri.)	1925	659	361	G's	2.5	165.2	-38.6	58.9
3	Engine Top	4170	-6	871	G's	58.2	51.8	-104.5	38.0
4	Engine Bottom	4240	-4	149	G's	26.7	57.0	-100.6	41.8
5	Left Brake Caliper	4085	-732	320	G's	41.7	74.5	-87.6	56.2
6	Right Brake Caliper	4085	732	316	G's	57.8	69.7	-91.4	57.4
7	Instrument Panel	0	0	0	G's	0.0	0.0	0.0	0.0
8	Left Rear X-Member (Rednt.)	1930	-686	359	G's	1.6	154.0	-35.7	54.9

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

* Instrument Panel Accelerometer Not Installed, Manufacturer Request

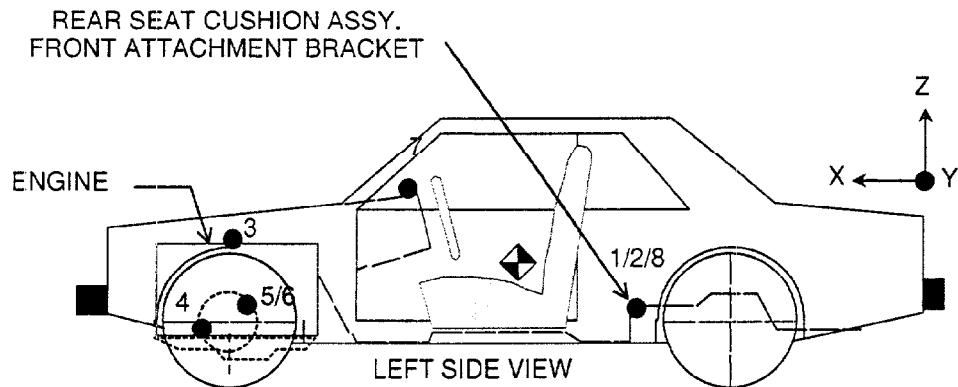
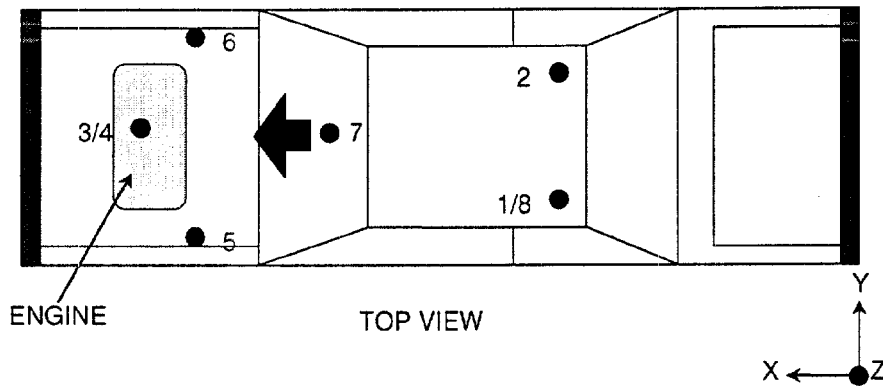
DATA SHEET NO. 7...(continued)
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 NHTSA 35 MPH NCAP

Test Date: 5/20/99



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

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 NHTSA 35 MPH NCAP

Test Date: 5/20/99

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	15.3	240.4	-42.6	66.2	18.1	251.9	-57.1	85.2
Head CG	Y	G's	6.1	85.4	-5.0	50.5	9.6	67.3	-4.9	140.5
Head CG	Z	G's	11.3	68.9	-11.9	97.9	26.5	83.0	-8.8	98.8
Head CG Resultant	N/A	G's	42.7	66.2			61.9	85.2		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	4.5	267.8	-38.9	66.3	3.9	281.3	-43.1	83.4
Chest CG	Y	G's	2.3	61.6	-2.3	66.5	2.4	194.4	-6.7	101.5
Chest CG	Z	G's	8.7	71.0	-4.9	113.7	15.7	81.7	-8.2	97.6
Chest CG Resultant	N/A	G's	39.2	66.4			45.8	83.4		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	341.0	49.4	-6971.4	65.4	582.0	96.6	-4658.5	69.4
Right Femur	Z	Newtons	583.8	58.2	-8038.6	65.3	501.4	57.3	-4123.7	72.7

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	3076.1	62.6	-11.5	299.9	4938.9	71.3	-84.3	121.1
Shoulder Belt Force	N/A	Newtons	4454.4	93.7	-11.0	170.5	5213.3	89.5	-19.0	280.4
Shoulder Belt Spoolout	N/A	MM	195.6	96.2	0.0	10.9	296.3	102.7	-0.1	7.8
Shoulder Belt Stretch	N/A	MM/CM	0.035	296.4	0.000	24.9	0.053	109.3	-0.008	31.1

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Primary	322.0	38.1	56.2	92.1	468.5	46.0	71.1	103.7

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	36.9	65.5	68.5	43.3	82.2	85.2

DATA SHEET NO. 8...(continued)

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 NHTSA 35 MPH NCAP

Test Date: 5/20/99

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	3.6	251.5	-96.9	65.4	3.1	145.1	-61.0	73.0
Pelvis	Y	G's	8.7	58.2	-19.8	65.2	7.4	65.4	-5.4	93.7
Pelvis	Z	G's	4.9	180.3	-17.4	74.3	2.8	195.9	-20.4	69.9

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	538.6	71.0	-351.6	159.4	496.6	97.9	-380.4	169.7
Neck Force	Y	Newtons	244.7	102.5	-222.3	65.4	92.7	227.1	-441.1	86.9
Neck Force	Z	Newtons	1609.7	69.5	-264.6	101.7	665.0	72.2	-434.3	98.6
Neck Moment	X	N·m	10.8	62.6	-5.6	166.5	22.4	87.2	-10.2	137.3
Neck Moment	Y	N·m	38.9	67.8	-26.4	105.0	37.6	75.1	-34.4	109.7
Neck Moment	Z	N·m	7.8	123.2	-9.1	67.0	11.2	120.0	-9.4	79.1

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	13.7	31.7	-95.7	66.4	29.4	75.5	-112.9	64.0
Left Foot Aft	Z	G's	6.9	237.5	-89.4	65.5	27.2	72.0	-45.7	63.2
Left Foot Fore	Z	G's	29.0	28.9	-81.5	26.6	39.4	27.0	-75.3	64.0
Right Foot Aft	X	G's	17.0	26.6	-70.3	58.1	15.2	83.0	-91.5	73.8
Right Foot Aft	Z	G's	19.5	95.5	-66.1	61.4	17.1	81.0	-59.5	73.8
Right Foot Fore	Z	G's	52.9	70.1	-154.3	43.6	42.7	80.1	-104.5	37.7

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	72.8	68.4	-7.1	102.5	69.5	74.3	-24.1	65.3
Left Lower Moment	Y	N·m	28.8	33.7	-41.1	69.5	22.6	74.6	-69.1	66.0
Left Lower Force	Z	Newtons	871.9	60.0	-1895.0	36.8	93.2	226.1	-3601.7	40.0
Left Upper Moment	X	N·m	21.6	58.0	-28.0	102.2	17.3	94.3	-51.9	65.0
Left Upper Moment	Y	N·m	13.6	176.4	-94.5	69.8	14.3	188.6	-140.3	76.1
Right Lower Moment	X	N·m	40.6	75.4	-15.7	61.6	6.5	42.7	-12.6	48.1
Right Lower Moment	Y	N·m	18.9	37.5	-42.4	64.8	17.1	69.2	-28.1	74.7
Right Lower Force	Z	Newtons	94.5	170.5	-2426.5	76.5	254.1	63.8	-3005.1	40.1
Right Upper Moment	X	N·m	15.7	264.9	-38.3	65.1	23.3	96.4	-21.6	70.0
Right Upper Moment	Y	N·m	23.0	136.5	-112.3	74.8	92.4	64.3	-95.5	39.5

DATA SHEET NO. 8...(continued)

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 NHTSA 35 MPH NCAP

Test Date: 5/20/99

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	MM	0.2	10.5	-24.9	70.3	0.3	3.1	-27.5	96.1

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	14.4	238.9	-41.1	66.2	17.2	251.7	-55.5	86.7
Head CG	Y	G's	7.9	86.0	-4.5	50.1	7.6	67.3	-4.7	117.9
Head CG	Z	G's	16.9	69.1	-16.8	96.0	33.7	83.5	-10.3	113.5
Head CG Resultant	N/A	G's	43.3	68.9			63.3	83.6		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	4.7	267.8	-37.7	66.3	4.2	281.0	-43.1	83.3
Chest CG	Y	G's	1.9	61.6	-2.6	96.6	4.4	90.0	-6.0	101.8
Chest CG	Z	G's	7.9	71.0	-4.5	114.2	16.0	81.7	-5.4	97.4
Chest CG Resultant	N/A	G's	37.8	66.4			45.8	83.3		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Redundant	301.0	37.1	56.7	92.6	481.3	49.6	71.7	99.4

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	36.0	65.5	68.5	43.2	82.1	85.1

DATA SHEET NO. 9
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TCI - Dummy centerline to shoulder bolt	mm	175	175
PBU - Top surface of reference to belt upper edge	mm	306	340
PBL - Top surface of reference to belt lower edge	mm	231	255
Lap Belt tension	Newtons	10	10
Shoulder Belt tension	N/A	Retractor	Retractor

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to 'D' ring	mm	610	610
Shoulder belt length as measured on ATD	mm	775	790
Lap belt length as measured on ATD	mm	640	620
Remainder of belt on reel	mm	880	870
Total belt length for continuous webbing systems	mm	2905	2890

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined electronically	mm	195.6	296.3
As determined mechanically	mm	170.0	240.0

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
Electronically from shoulder belt load cell and "D" ring	mm/cm	0.035	0.053
As determined mechanically	mm/cm	0.05	0.10

DATA SHEET NO. 10
SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99

WINDSHIELD MOUNTING DETAILS

Windshield glass is secured to the vehicle frame with a rubber type adhesive. Molding covers the windshield periphery at the top and sides. No moulding covers the lower windshield periphery.

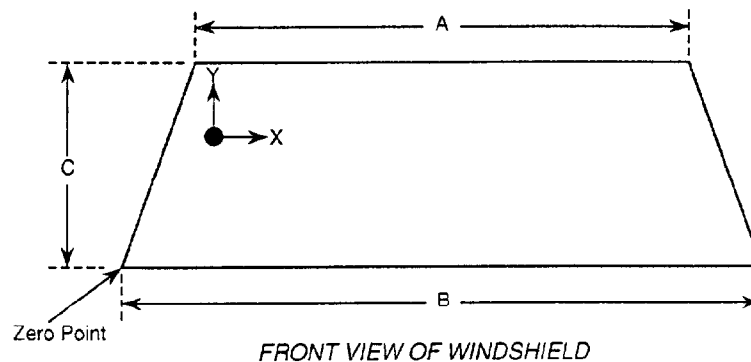
FMVSS 212 REQUIREMENTS

The windshield post-test retention will be at least 75 percent of it's pre-test 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: 21.7 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2159.5	2159.5	100
Right Side	2159.5	2159.5	100
Total	4319.0	4319.0	100



WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1235	20
B	mm	1634	0
C	mm	725	20

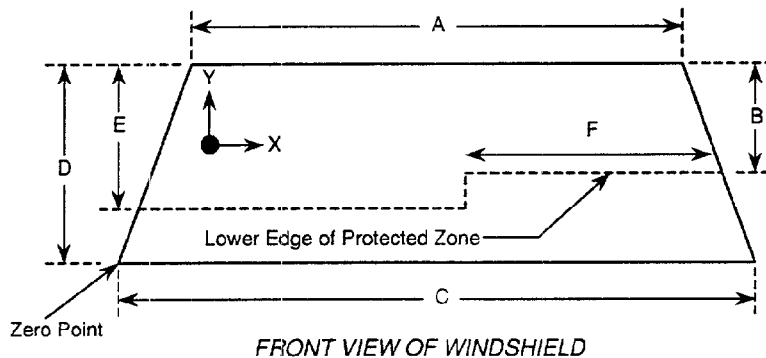
DATA SHEET NO. 11
WINDSHIELD ZONE INTRUSION FMVSS 219 (PARTIAL) DATA

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

Test Date: 5/20/99



**WINDSHIELD AND
PROTECTED ZONE**

Item	Units	Value
A	mm	1235
B	mm	452
C	mm	1634
D	mm	725
E	mm	524
F	mm	588

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. No penetration occurred.

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. No penetration occurred.

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: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

Test Date: 5/20/99

Test Time: 12:38 PM

Temperature at Time of Impact: 25.0 °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

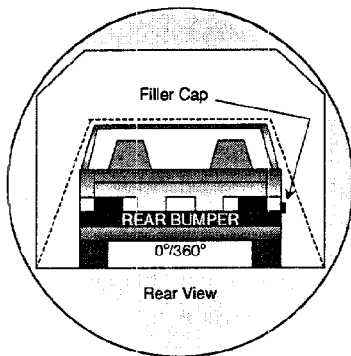
DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

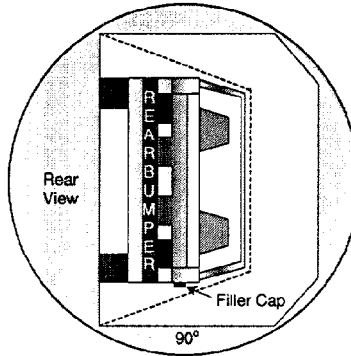
NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

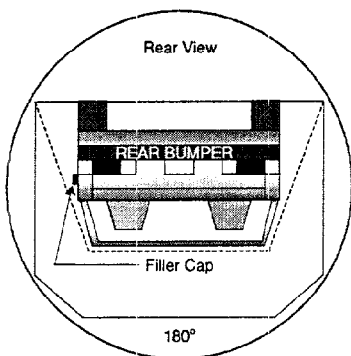
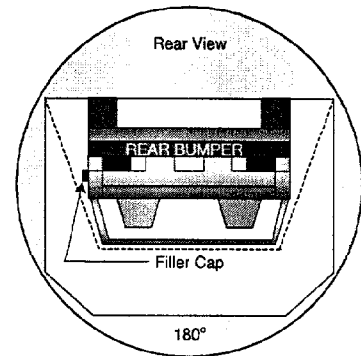
Test Date: 5/20/99



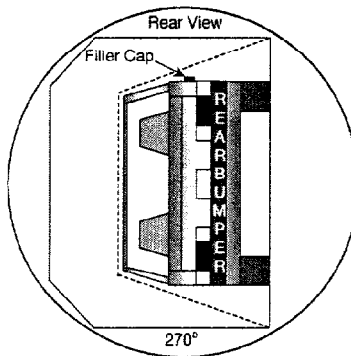
0° TO 90°



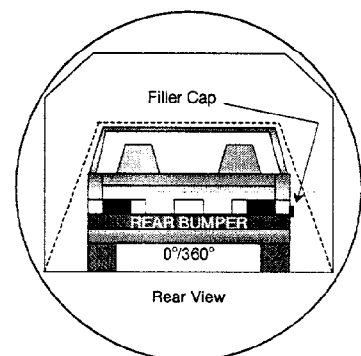
90° TO 180°



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. Details of Stoddard Solvent spillage locations:
 No solvent leakage occurred during static rollover testing.

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

DATA SHEET NO. 14
VEHICLE MEASUREMENTS

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

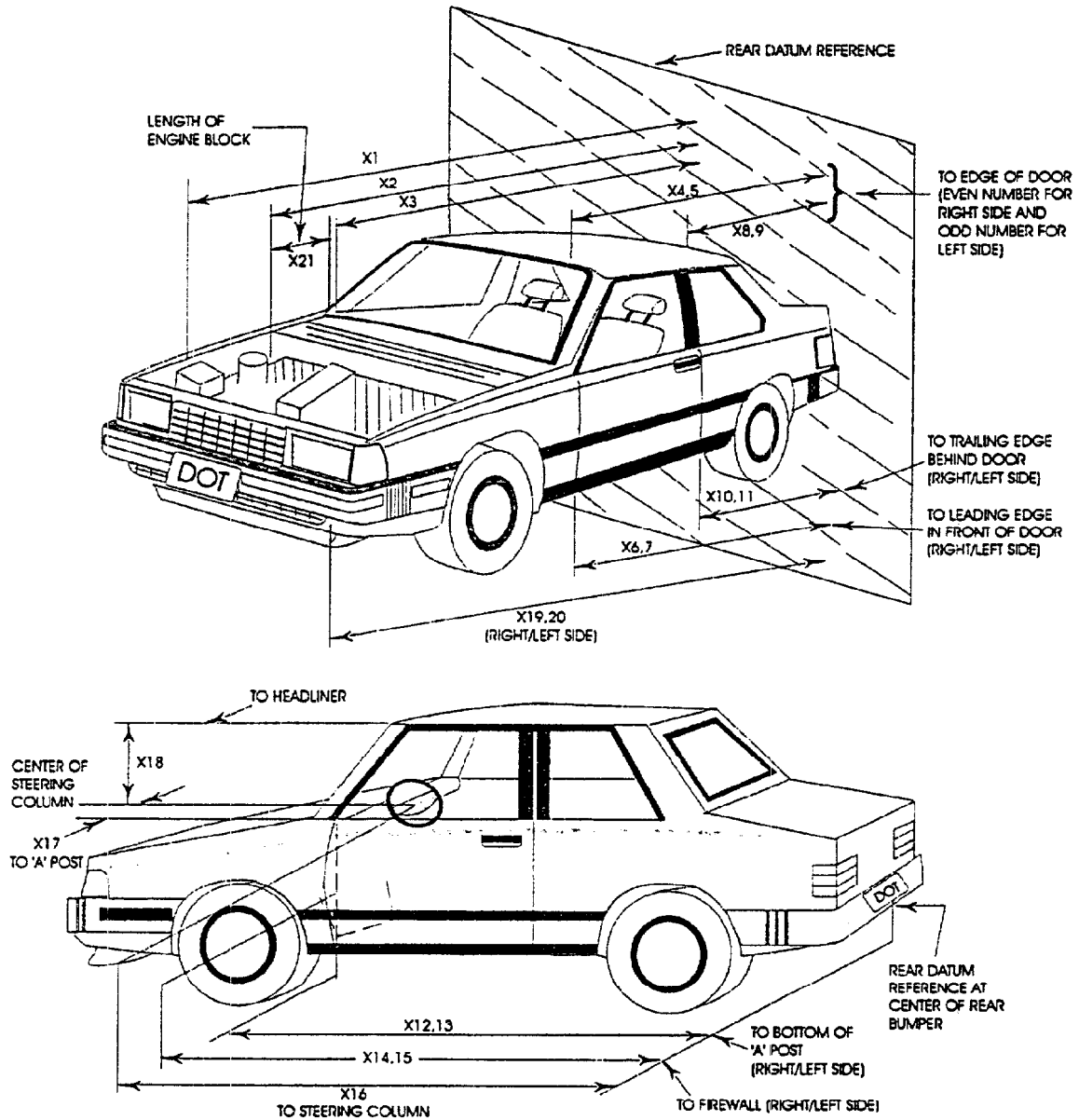
NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

Test Date: 5/20/99

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	5080	4450	-630
2	RSOV to front of engine	mm	4440	4145	-295
3	RSOV to firewall centerline	mm	3900	3832	-68
4	RSOV to leading edge of right door	mm	3497	3480	-17
5	RSOV to leading edge of left door	mm	3499	3483	-16
6	RSOV to lower leading edge of right door	mm	3460	3462	2
7	RSOV to lower leading edge of left door	mm	3464	3468	4
8	RSOV to upper trailing edge of right door	mm	3414	3380	-34
9	RSOV to upper trailing edge of left door	mm	3417	3400	-17
10	RSOV to lower trailing edge of right door	mm	2390	2386	-4
11	RSOV to lower trailing edge of left door	mm	2394	2396	2
12	RSOV to bottom of right 'A' pillar	mm	3474	3452	-22
13	RSOV to bottom of left 'A' pillar	mm	3475	3454	-21
14	RSOV to firewall on right side	mm	3860	3760	-100
15	RSOV to firewall of left side	mm	3858	3815	-43
16	RSOV to steering column	mm	3028	3025	-3
17	Center of steering column to left 'A' pillar	mm	420	405	-15
18	Center of steering column to headlining	mm	400	420	20
19	RSOV to right side of front bumper	mm	4725	4425	-300
20	RSOV to left side of front bumper	mm	4725	4333	-392
21	Length of engine block	mm	450	450	0
RD	RSOV to right side of dash panel	mm	3175	3170	-5
CD	RSOV to center of dash panel	mm	3155	3180	25
LD	RSOV to left side of dash panel	mm	3178	3143	-35

VEHICLE MEASUREMENTS



DATA SHEET NO. 15
CAMERA LOCATIONS

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

Test Date: 5/20/99

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	2100	8250	1355	3	7910	13	930
3	Left Side, No. 2	1000	6600	1480	9	6390	25	920
4	Left Side, No. 3	5040	5260	2140	15	5700	35	880
5	Left Side, No. 4	2210	8330	3088	10	8220	24	910
6	Left Side, No. 5	2200	8300	2625	0	8100	28	950
7	Right Side, No. 1	2020	8300	885	4	8090	19	900
8	Right Side, No. 2	1500	8300	1605	10	8050	40	850
9	Right Side, No. 3	5000	8300	1225	1	5450	35	900
10	Right Side, No. 4	2800	4900	1244	9	5870	24	880
11	Overhead Overall	700	6100	5486	45	N/A	13	900
12	Front View, Driver	200	340	2029	49	N/A	13	920
13	Front View, Passenger	200	340	1500	45	N/A	13	920
14	Pit Camera, Engine	800	0	1895	90	N/A	10	950
15	Pit Camera, Fuel Tank	4250	0	1105	62	N/A	10	970
16	Onboard, Driver	3740	464	1100	3	1468	13	410
17	Onboard, Passenger	3750	464	1100	3	1535	13	360
18	Left Side No. 6	1950	8200	1700	2	8000	50	980
19	Right Side No. 5	5000	9220	1755	10	5600	50	930

X - Barrier Face Y - Monorail Centerline Z - Ground

DATA SHEET NO. 16
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

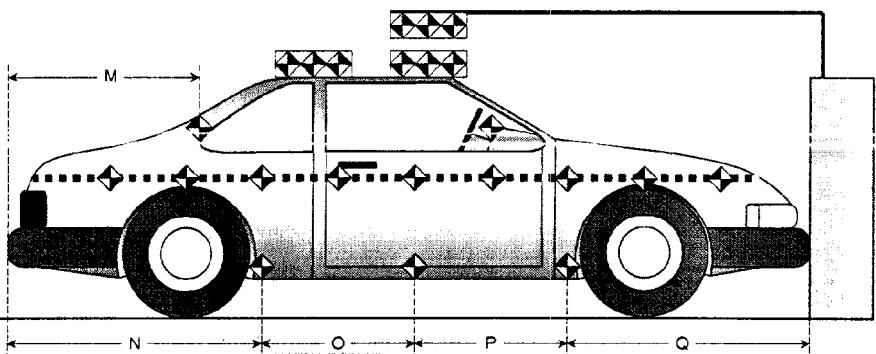
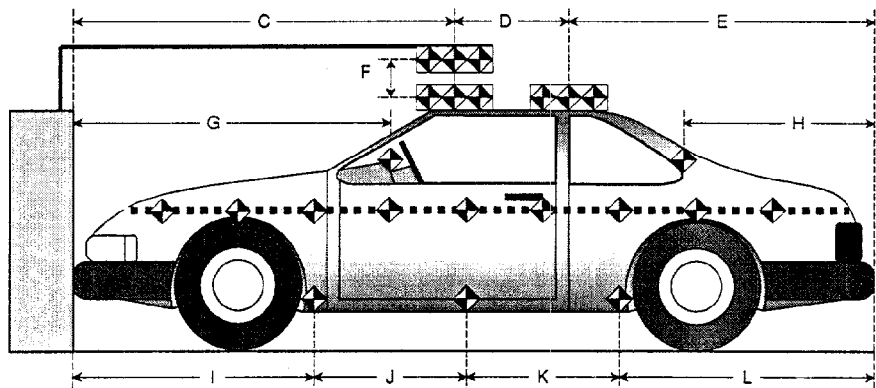
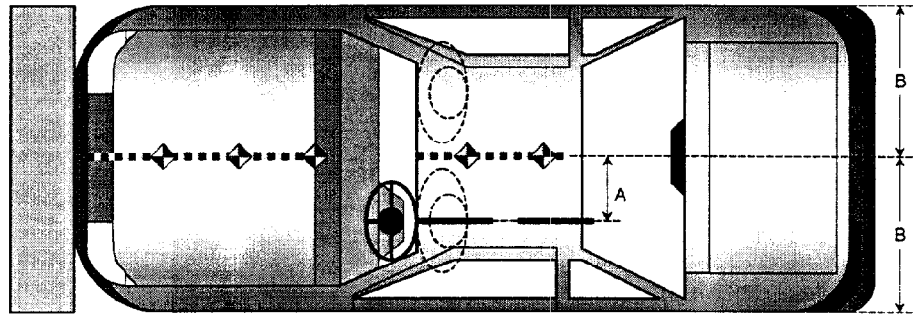
NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

Test Date: 5/20/99

All Dimensions
in mm

Item	Value
A	407
B	928
C	2369
D	610
E	2095
F	153.6
G	1870
H	1222
I	1510
J	962
K	962
L	1641
M	1220
N	1644
O	962
P	962
Q	1508



DATA SHEET NO. 17
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

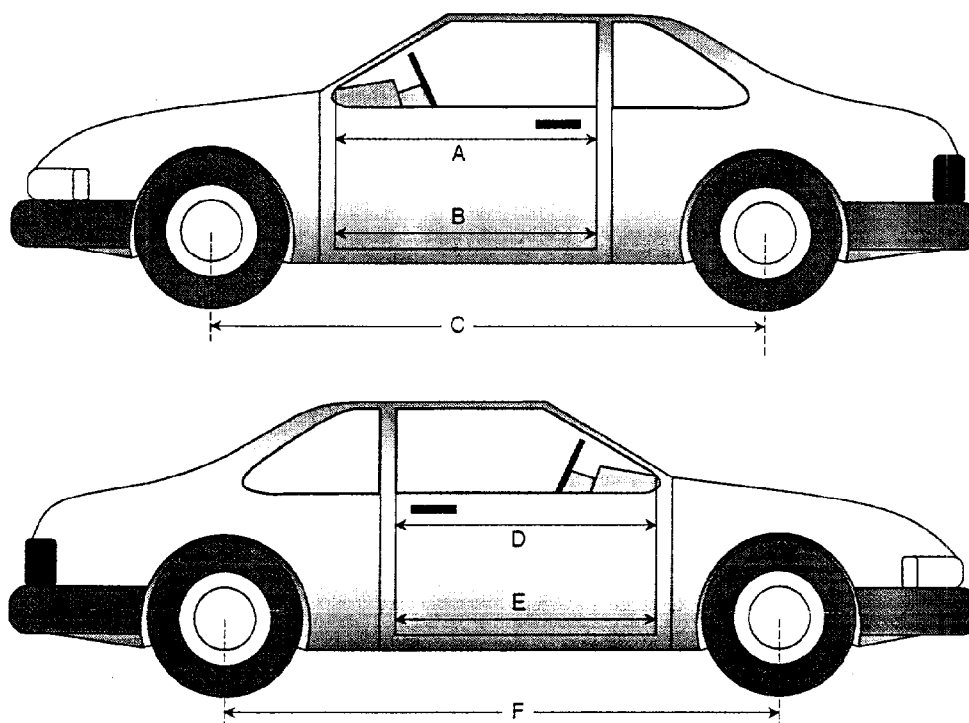
Test Date: 5/20/99

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	981	978	-3
B	Left Side Lower	mm	964	962	-2
D	Right Side Upper	mm	981	980	-1
E	Right Side Lower	mm	966	972	6

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheel base	mm	2802	2702	-100
F	Right Side Wheel base	mm	2802	2702	-100



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

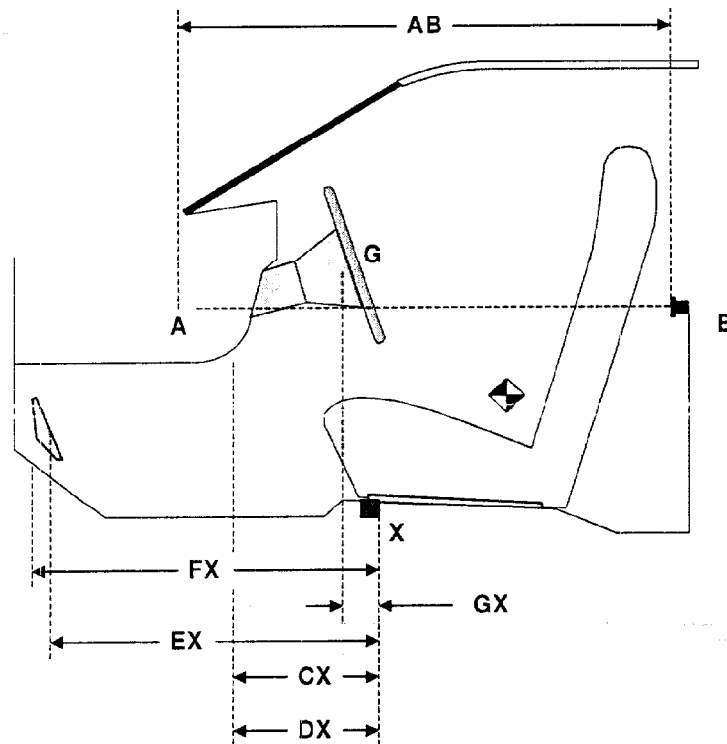
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	981	978	-3
CX	Left Knee Bolster to X	mm	275	256	-19
DX	Right Knee Bolster to X	mm	250	255	5
EX	Brake Pedal to X	mm	550	480	-70
FX	Foot Rest to X	mm	610	570	-40
GX	Center of Steering Wheel Hub to X	mm	50	35	-15

X = Left Front Seat Outboard Anchor Bolt Head

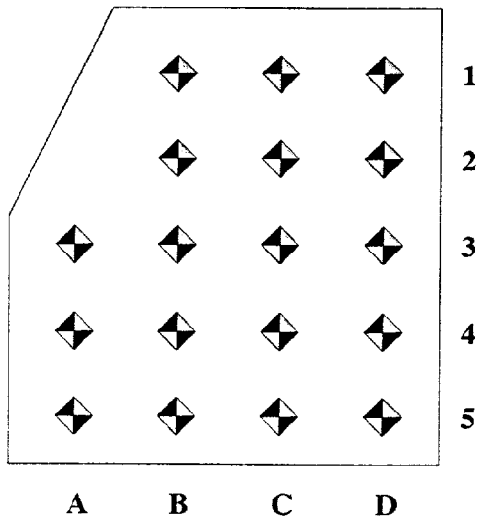


DRIVER COMPARTMENT

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

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
 Test Date: 5/20/99



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

Columns A through D are evenly spaced.

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

Row 2 is 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	720	722	724	724	682	691	674	642	-38	-31	-50	-82
2	620	620	619	619	586	582	567	553	-34	-38	-52	-66
3	521	520	520	520	499	484	464	458	-22	-36	-56	-62
4	421	421	420	421	406	396	408	408	-15	-25	-12	-13
5	320	321	321	321	320	316	322	320	0	-5	1	-1

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	21	20	20	15	67	58	54	62	46	38	34	47
2	-60	-60	-60	-65	-21	-9	-10	-22	39	51	50	43
3	-76	-75	-75	-70	-59	-19	-21	-40	17	56	54	30
4	-85	-80	-100	-100	-91	-69	-96	-98	-6	11	4	2
5	-90	-85	-105	-95	-111	-124	-141	-130	-21	-39	-36	-35

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

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

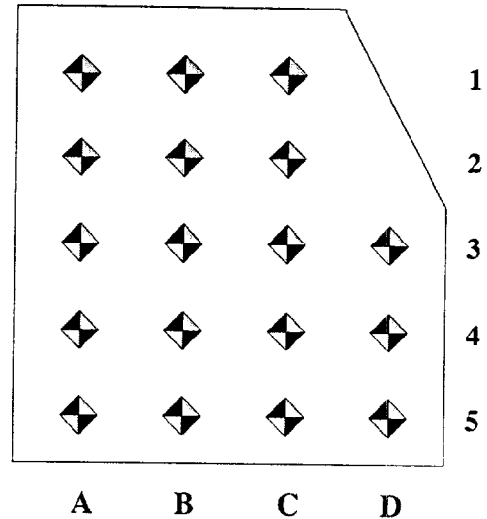
Test Date: 5/20/99

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

Columns A through D are evenly spaced.

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

Row 2 is 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	686	685	691	688	585	609	618	615	-101	-76	-73	-73
2	589	585	590	587	506	512	525	532	-83	-73	-65	-55
3	485	486	489	486	409	412	439	445	-76	-74	-50	-41
4	386	384	388	387	357	346	343	352	-29	-38	-45	-35
5	285	285	290	287	260	260	255	258	-25	-25	-35	-29

PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	52	35	40	43	106	93	100	99	54	58	60	56
2	-75	-70	-73	-70	-24	-14	-12	-26	51	56	61	44
3	-80	-75	-83	-85	-30	-20	-52	-65	50	55	31	20
4	-108	-114	-95	-92	-109	-97	-100	-95	-1	17	-5	-3
5	-110	-110	-105	-98	-110	-116	-120	-116	0	-6	-15	-18

DATA SHEET NO. 18

FIXED BARRIER TYPE

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

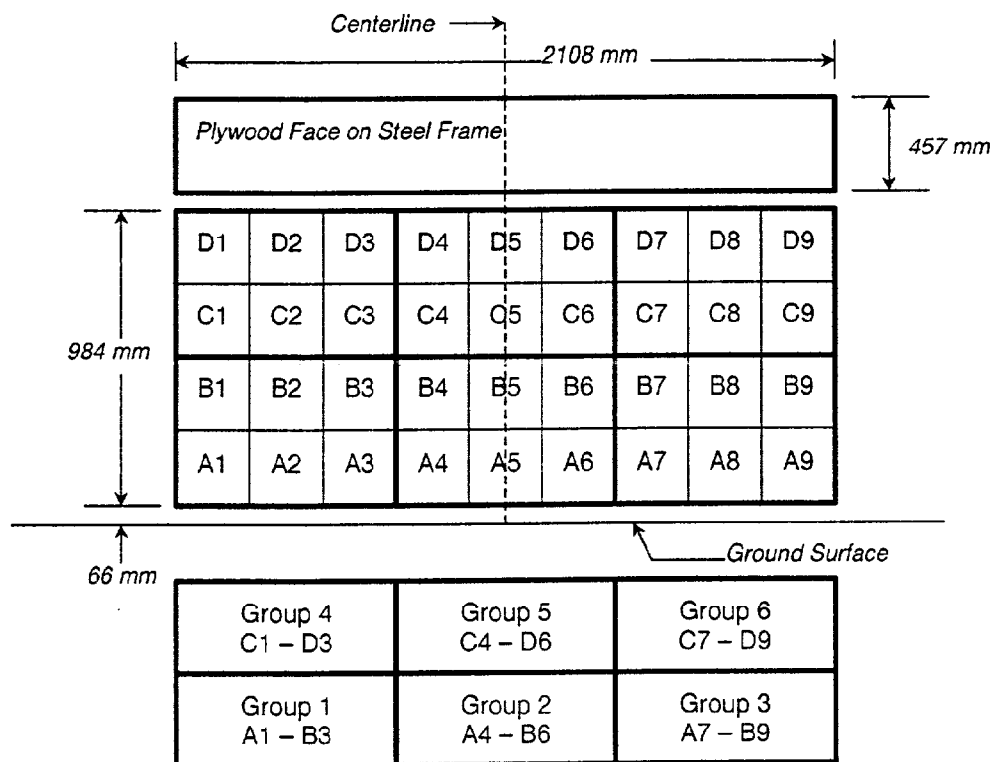
NHTSA No.: GM0001

Test Program: 1999 35 MPH NCAP

Test Date: 5/20/99

36 Load Cell Rigid Barrier (NHTSA Standard)

Load Cell Locations on Fixed Barrier



6 Groups of 6 Load Cells Each

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

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

**DATA SHEET NO. 19
ACCIDENT INVESTIGATION DATA**

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
Test Date: 5/20/99

VEHICLE INFORMATION

VIN: 2G1WF55E1Y9101780
Vehicle Size Category: 4-Door Sedan

Wheel base (mm): 2802
Test Weight (kg): 1791

ACCELEROMETER DATA

Accelerometer Location: Left rear floor pan
Cal. Procedure/Interval: 6 months / drop test
Integration Algorithm: NHTSA Standard
Impact Velocity (km/h): 56.41
Velocity Change (km/h): 65.02

Linearity: Good

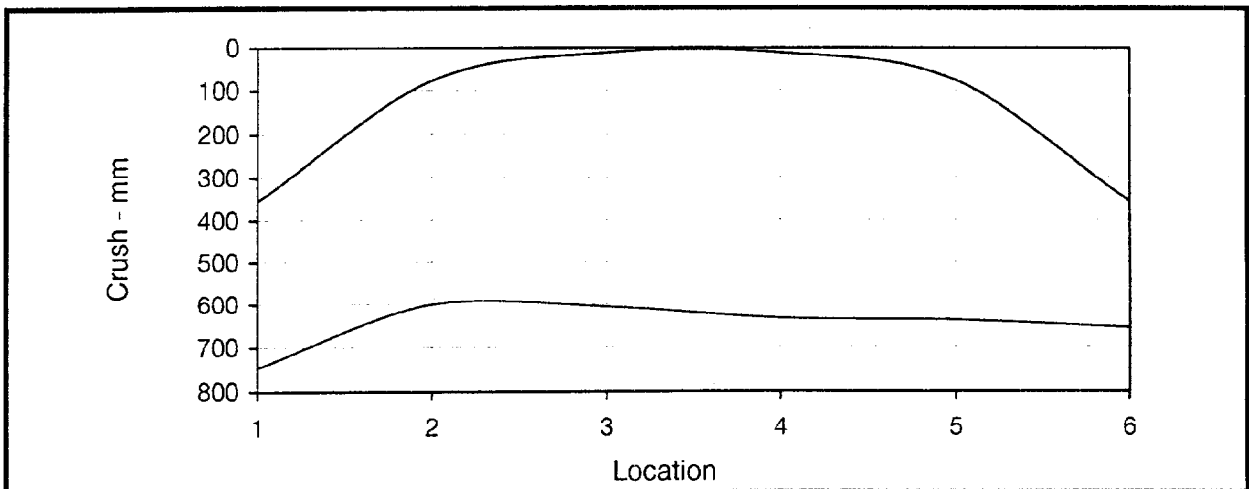
Time of Separation (msec): 87.0

CRUSH PROFILE

Collision Deformation Classification: 12FDEW6
Damage Region Length (mm): 1634

Midpoint of Damage: Vehicle Centerline
Impact Mode: Full Frontal

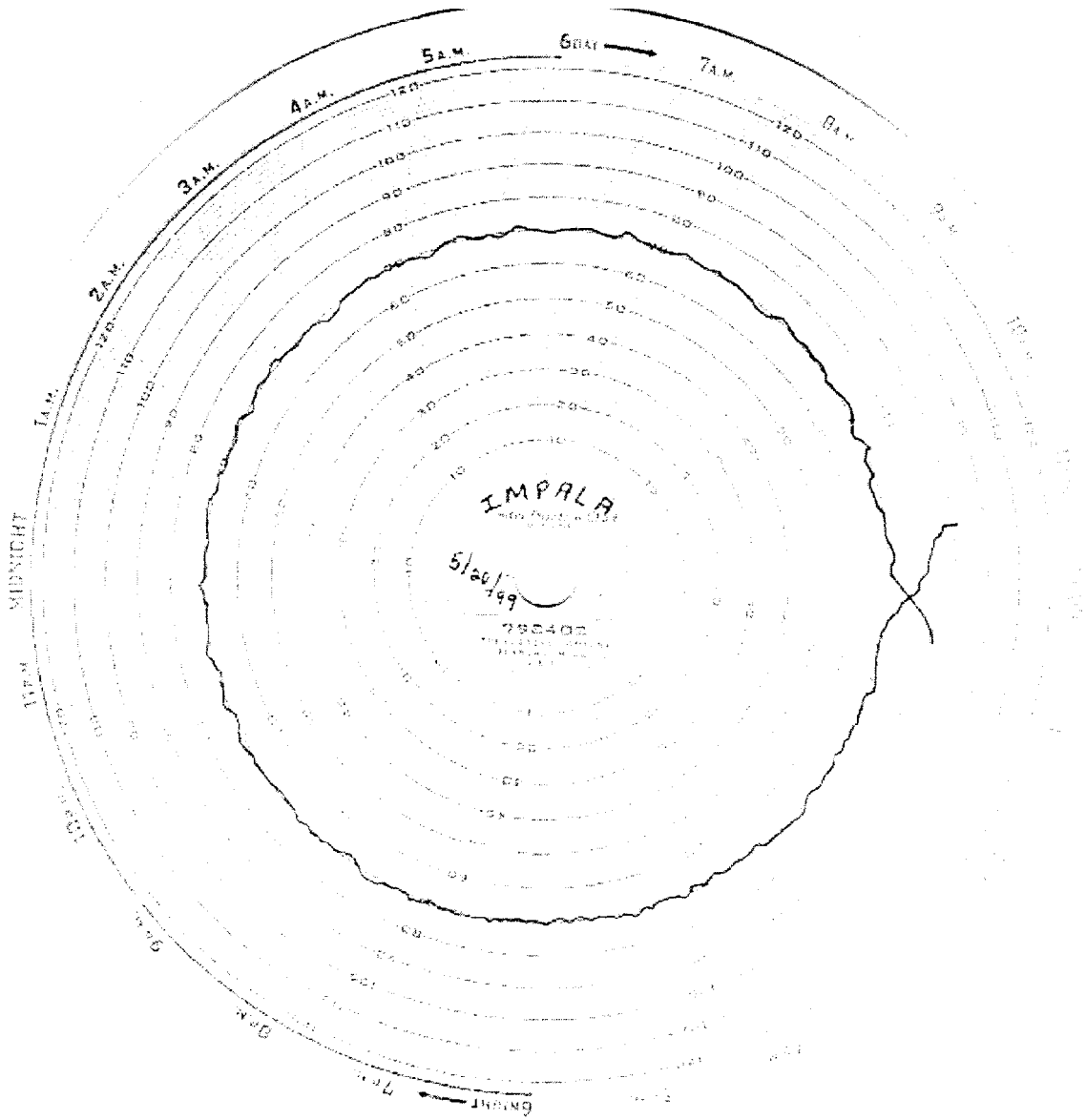
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	355	747	-392
C2	Crush zone 2 on left side	mm	76	600	-524
C3	Crush zone 3 on left side	mm	11	605	-594
C4	Crush zone 4 on right side	mm	11	633	-622
C5	Crush zone 5 on right side	mm	76	637	-561
C6	Crush zone 6 at right side	mm	355	655	-300



DATA SHEET NO. 20
DUMMY/ VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
Test Program: 1999 35 MPH NCAP

NHTSA No.: GM0001
Test Date: 5/20/99



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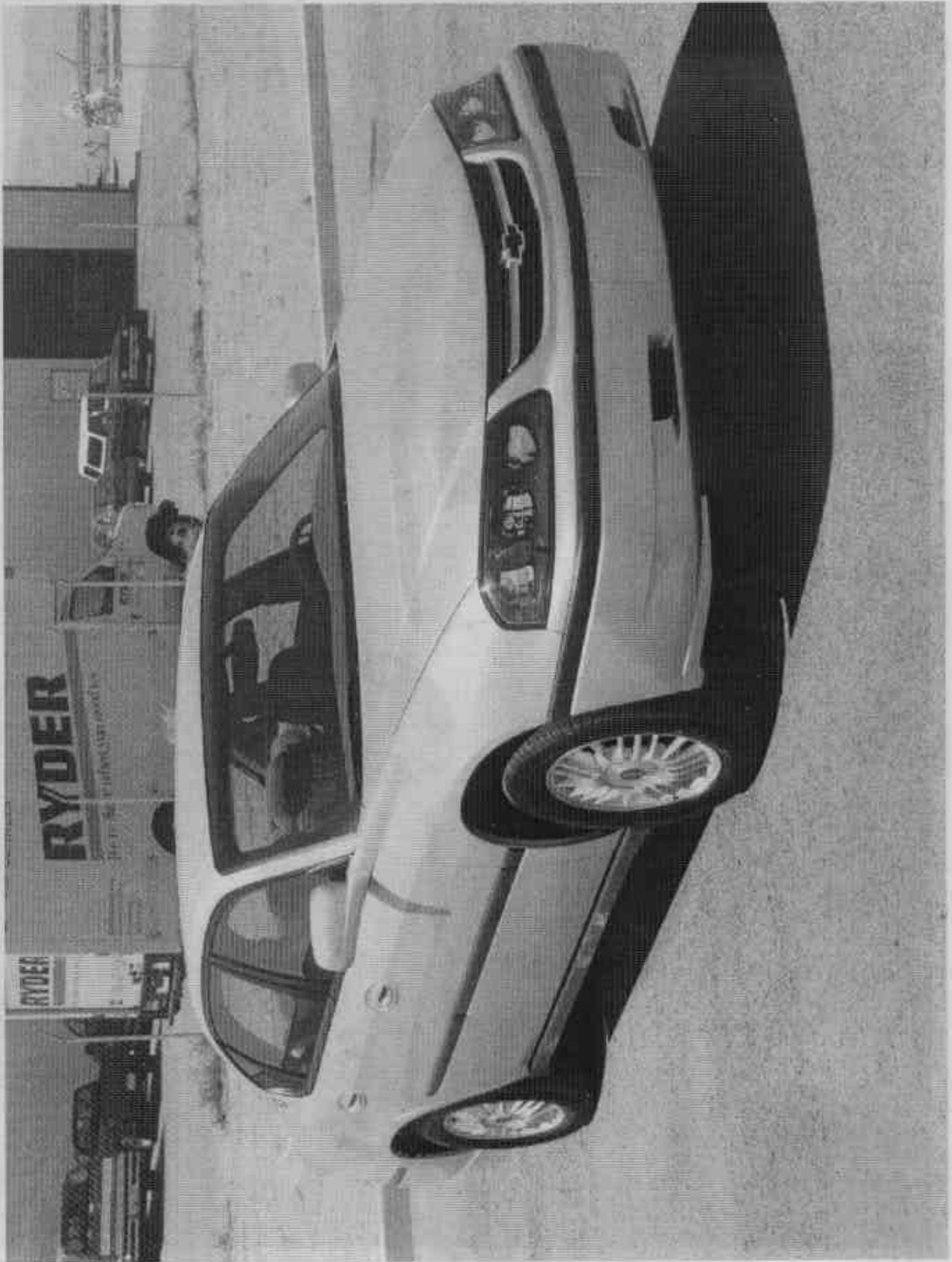


FIGURE A-1. RIGHT FRONT AS RECEIVED

A-1

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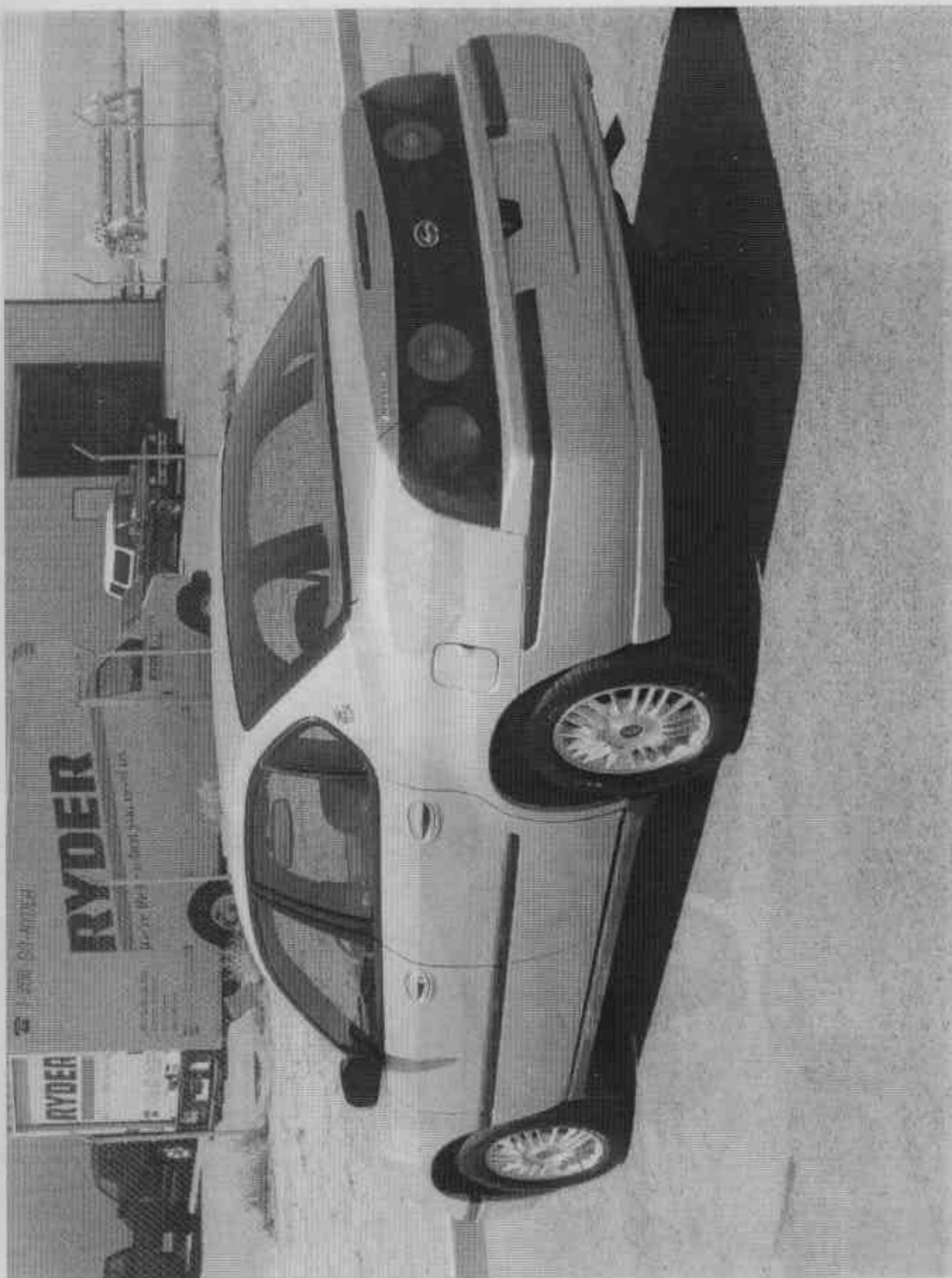


FIGURE A-2. LEFT REAR AS RECEIVED

A-2

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TIRE - LOADING INFORMATION

OCCUPANTS			VEHICLE CAP. WT.	
FRT.	CTR.	RR.	TOTAL	
				KG LBS
3	0	3	6	488 1076

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT.
2G1WF55E1Y9101780
MODEL: WF19 WAP

TIRE SIZE	SPEED RTG	COLD TIRE PRESSURE
FRT P225/60R16	S	210KPA(30PSI)
RR P225/60R16	S	210KPA(30PSI)
SPA T125/70D16	M	420KPA(60PSI)

IF TIRES ARE HOT, ADD 28KPA(4PSI)
SEE OWNER'S MANUAL FOR MORE INFORMATION

FIGURE A-3. VEHICLE CERTIFICATION LABEL



MFD BY GENERAL MOTORS OF CANADA LTD.

DATE	GVWR	GAWR FRT	GAWR RR
04/99	2067 KG	1118 KG	949 KG
	4558 LB	2465 LB	2093 LB

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

2G1WF55E1Y9101780

TYPE: PASS CAR

FIGURE A-4. VEHICLE TIRE PLACARD



FIGURE A-5. PRETEST FRONT VIEW

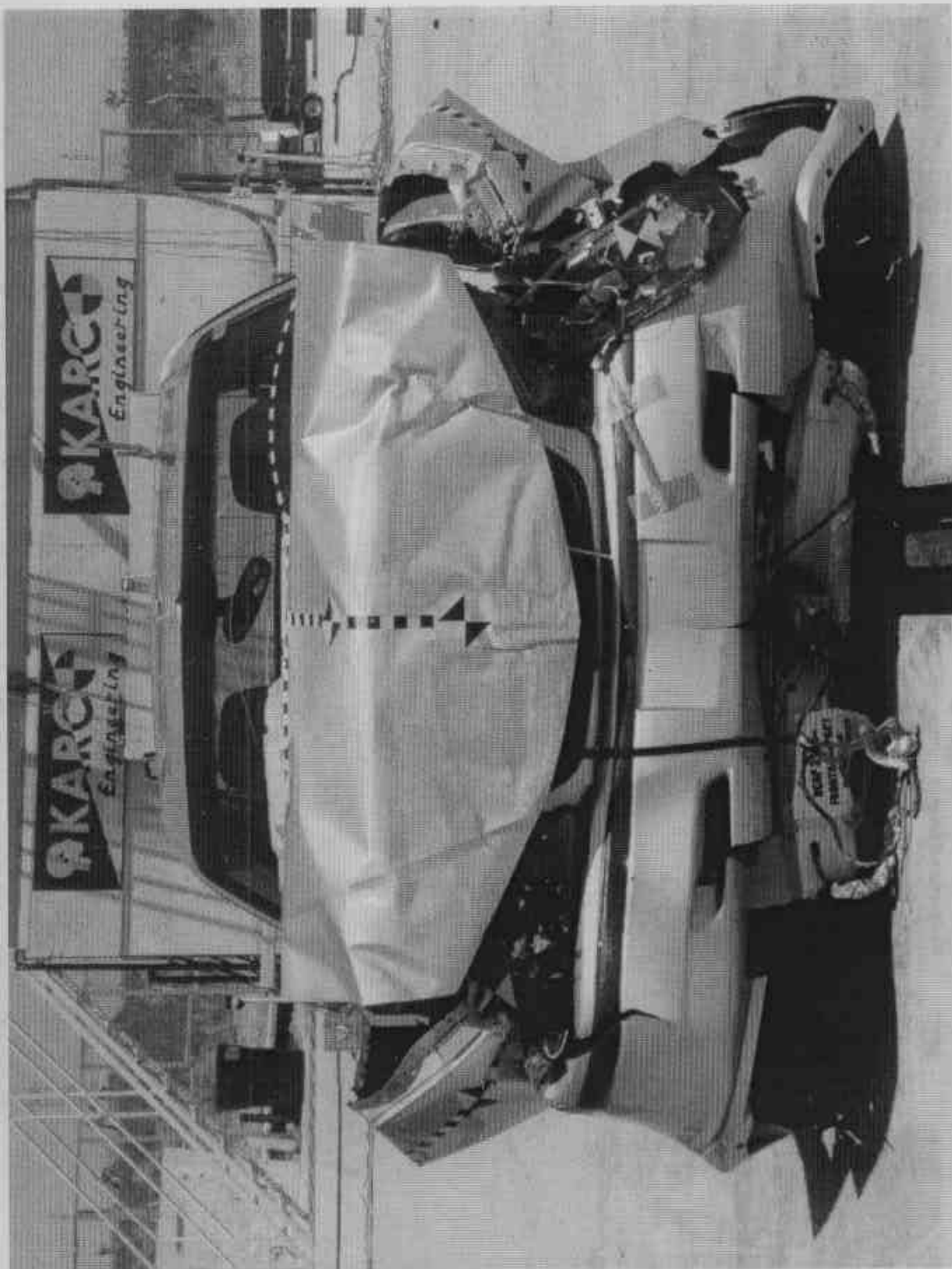


FIGURE A-6. POST TEST FRONT VIEW

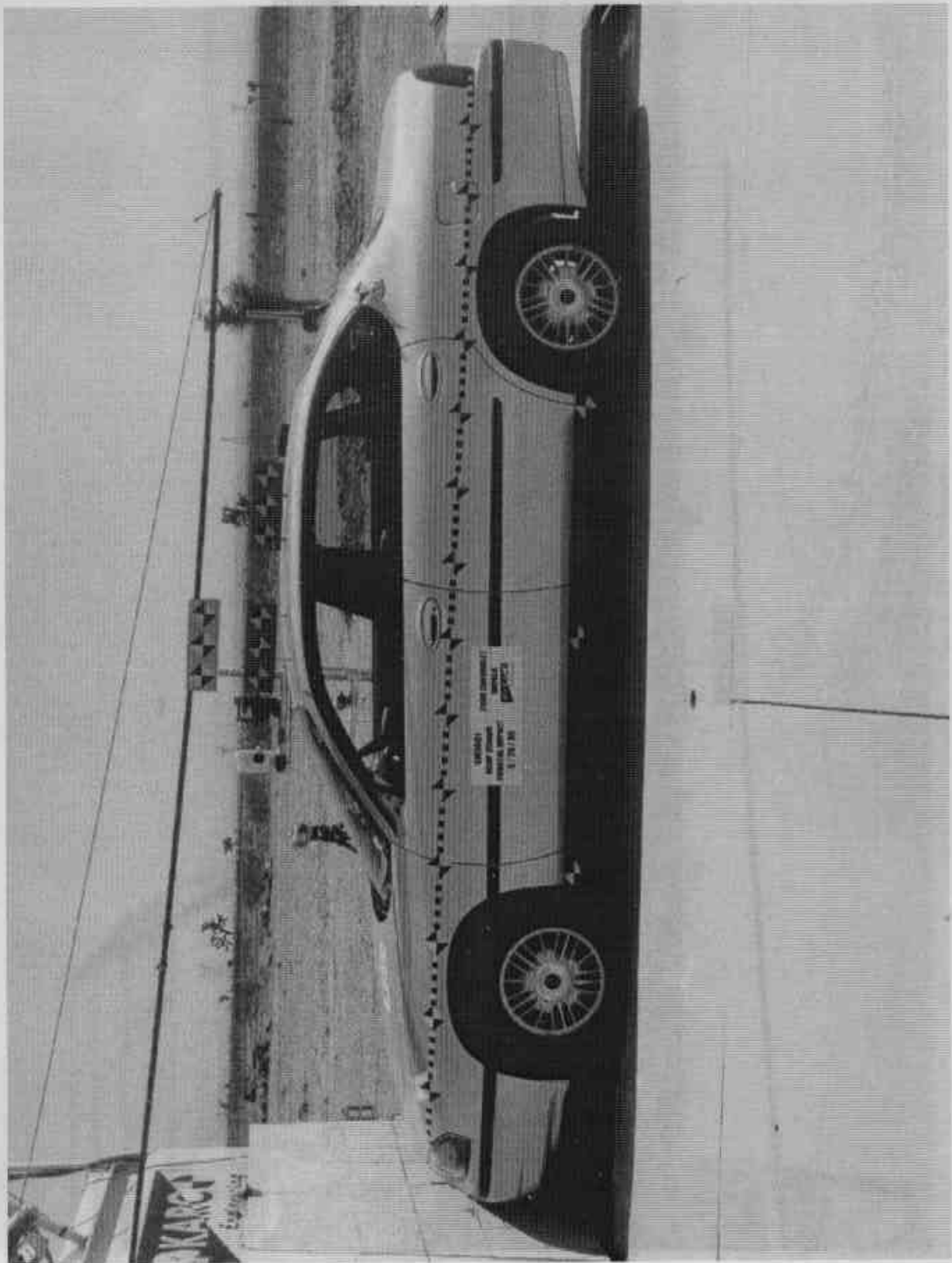


FIGURE A-7. PRETEST LEFT SIDE VIEW

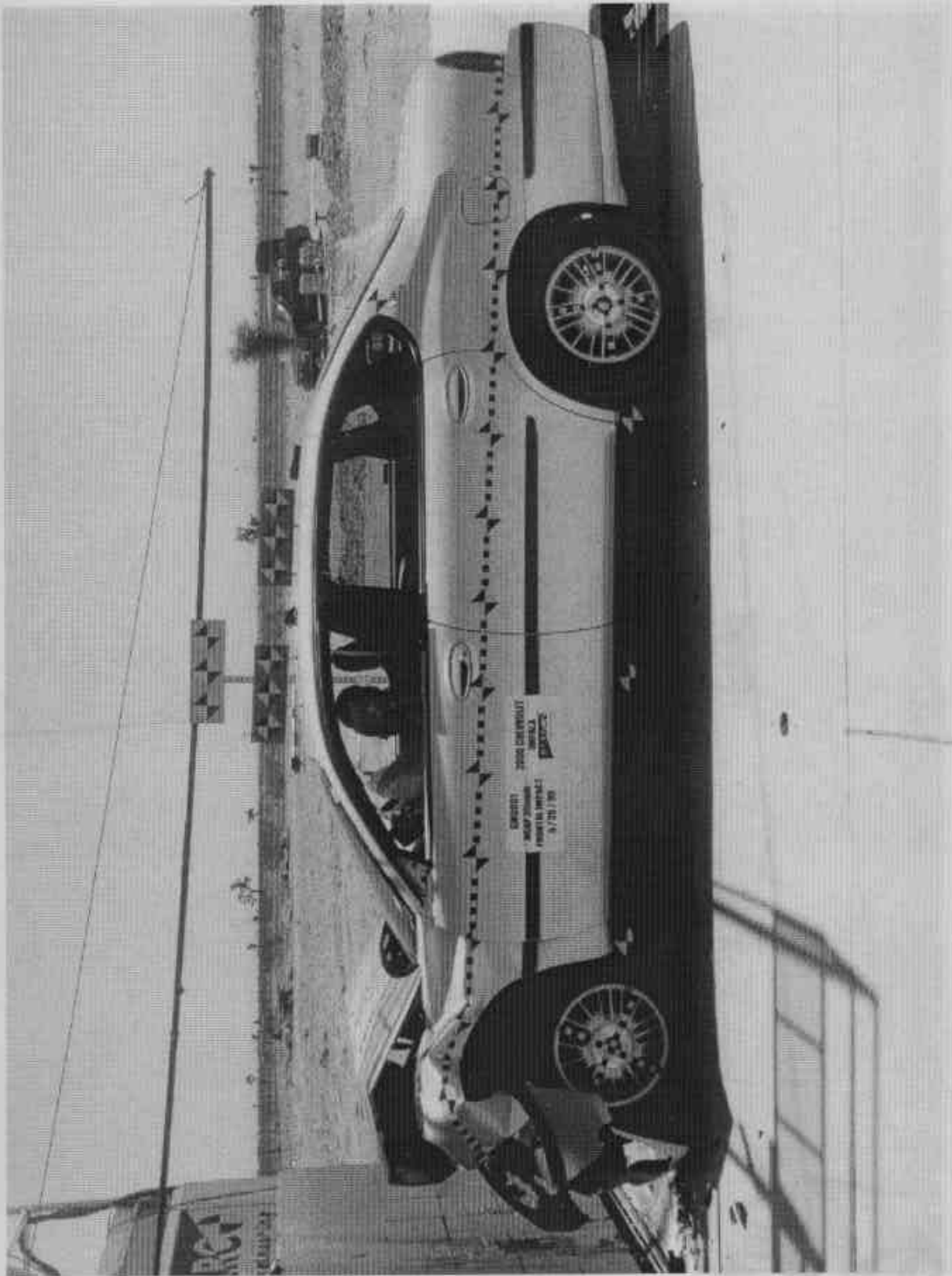


FIGURE A-8. POST TEST LEFT SIDE VIEW



FIGURE A-9. PRETEST RIGHT SIDE VIEW

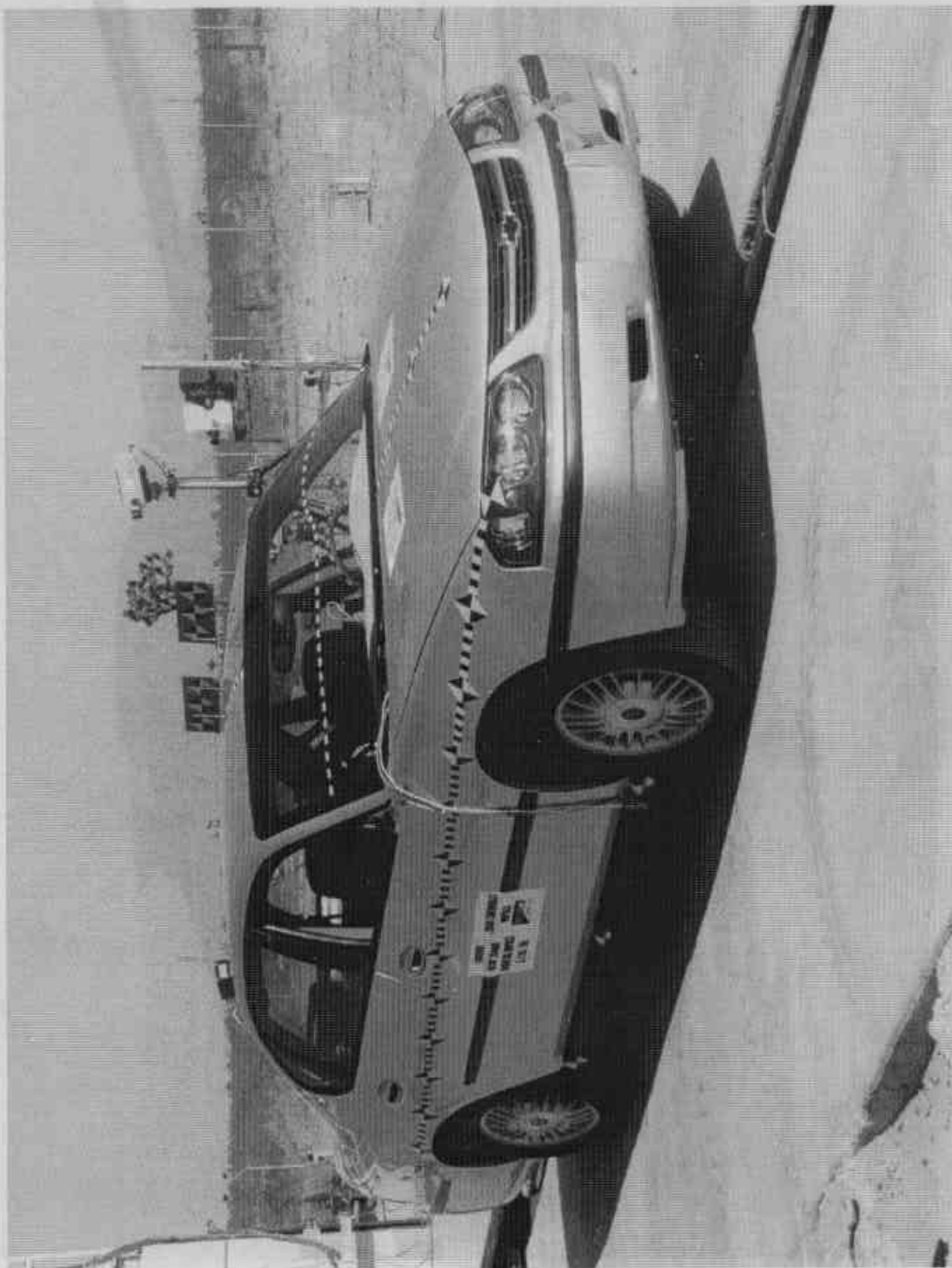


FIGURE A-11. PRETEST RIGHT FRONT VIEW

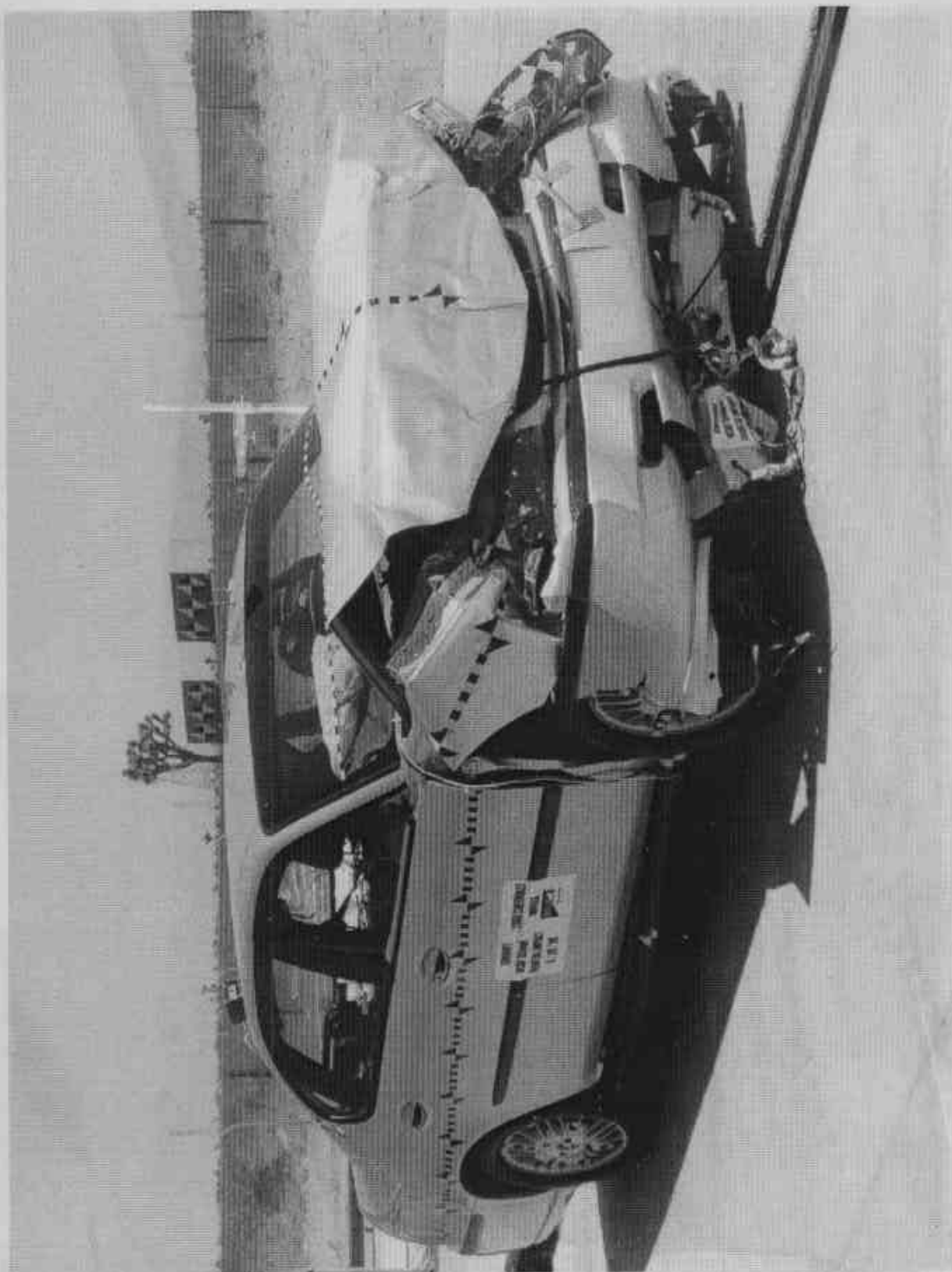


FIGURE A-12. POST TEST RIGHT FRONT VIEW

A-12

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FIGURE A-13. PRETEST LEFT REAR VIEW



FIGURE A-14. POST TEST LEFT REAR VIEW

A-14

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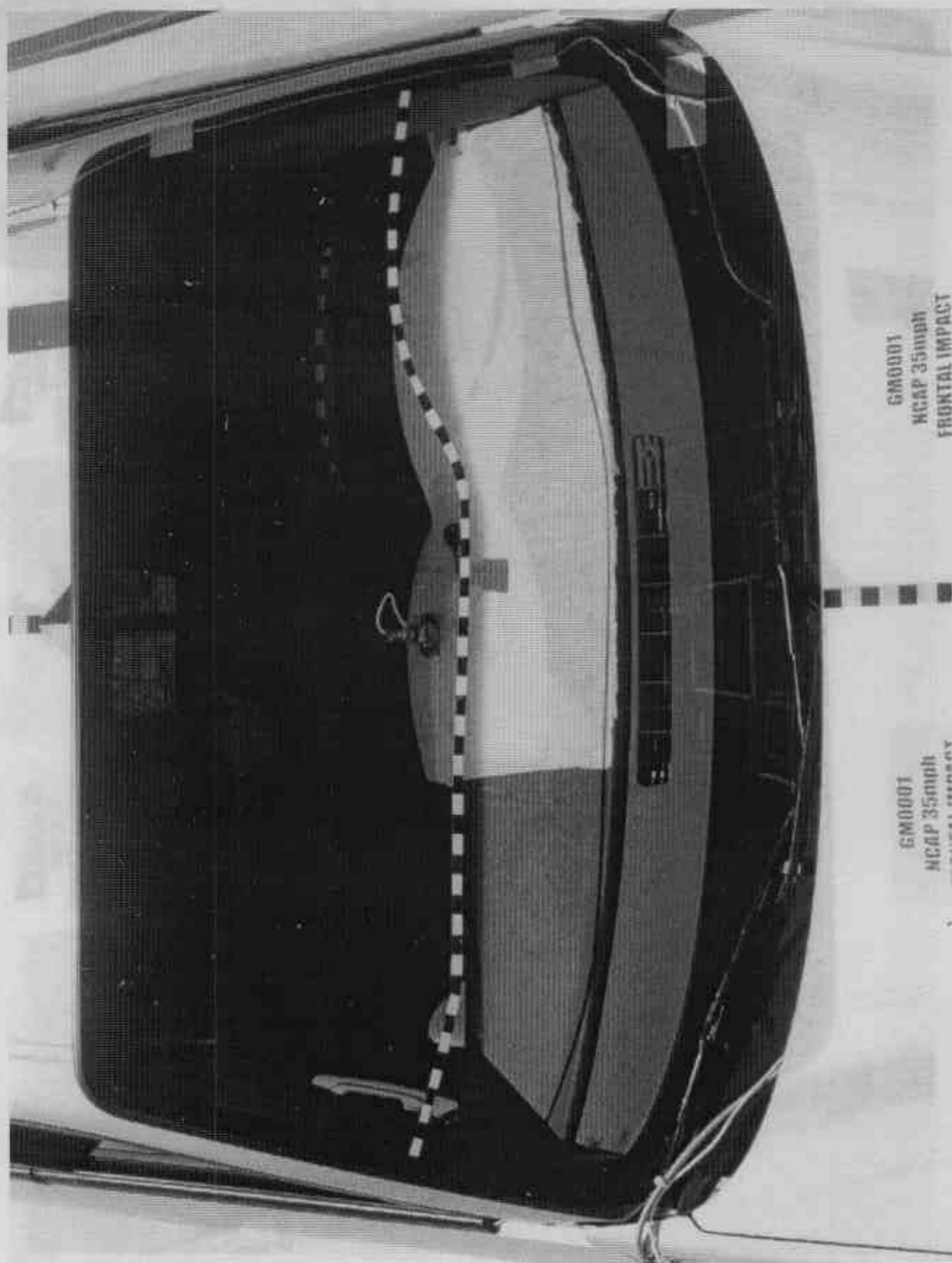


FIGURE A-15. PRETEST WINDSHIELD

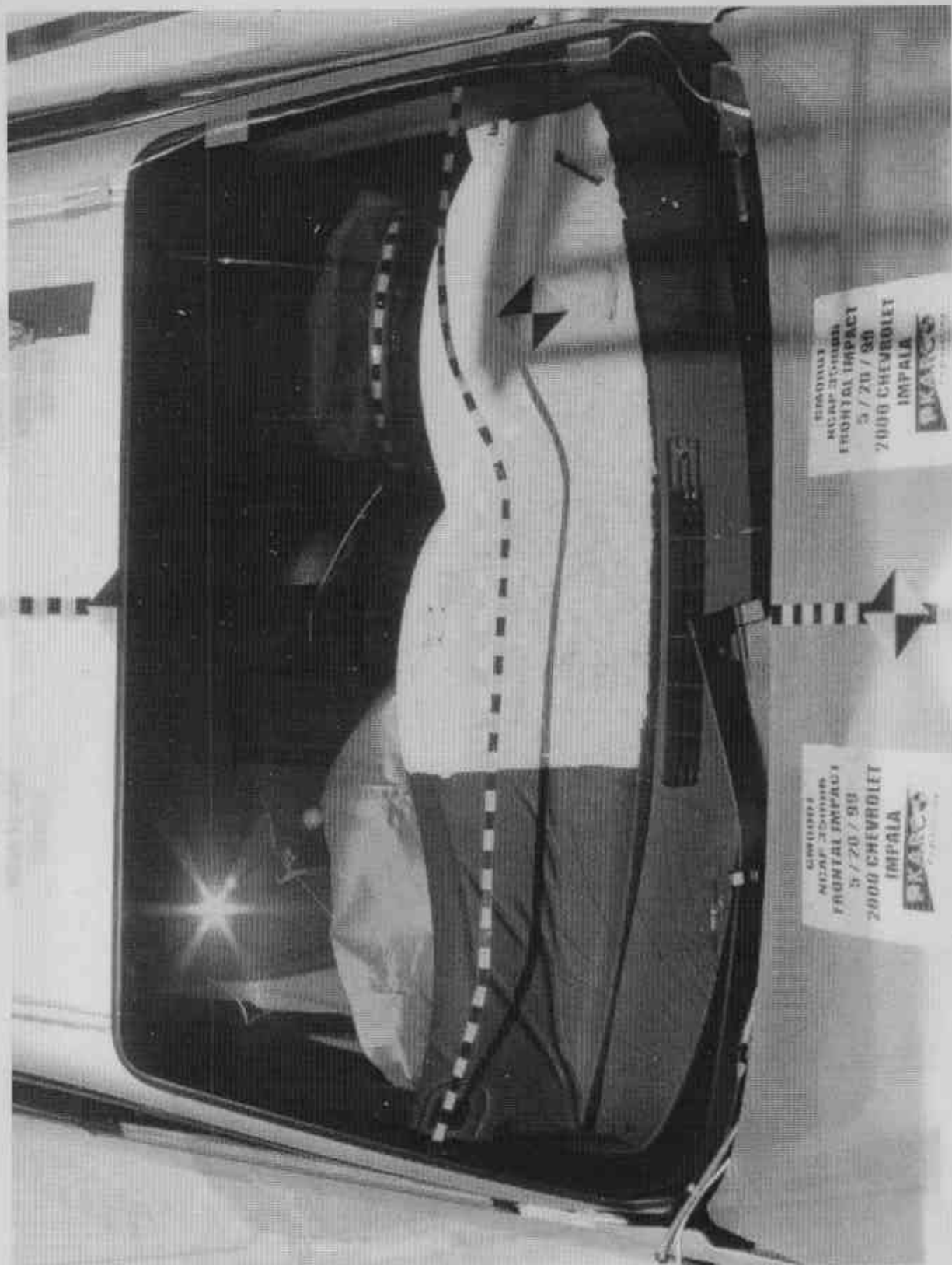


FIGURE A-16. POST TEST WINDSHIELD

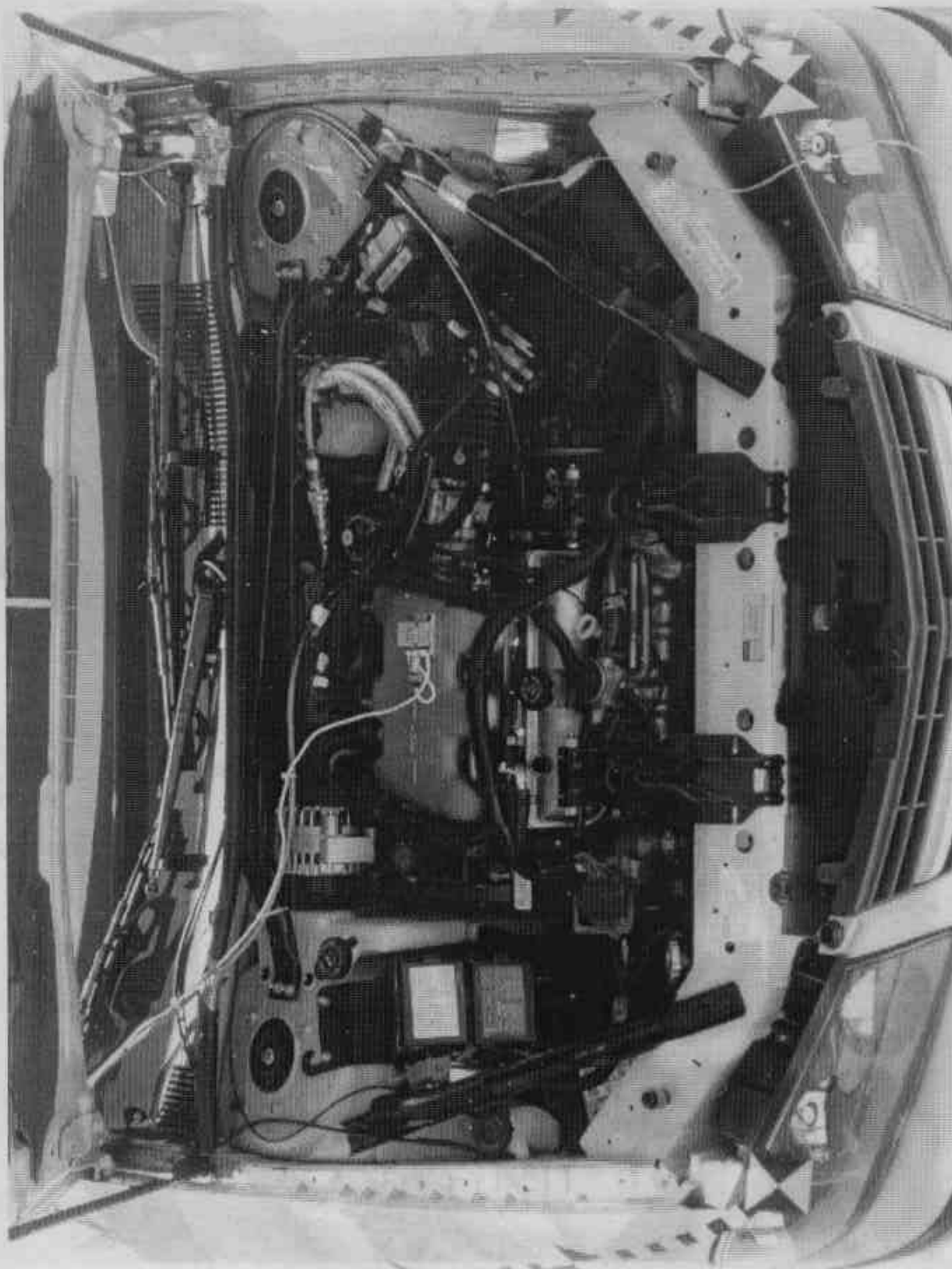


FIGURE A-17. PRETEST ENGINE COMPARTMENT

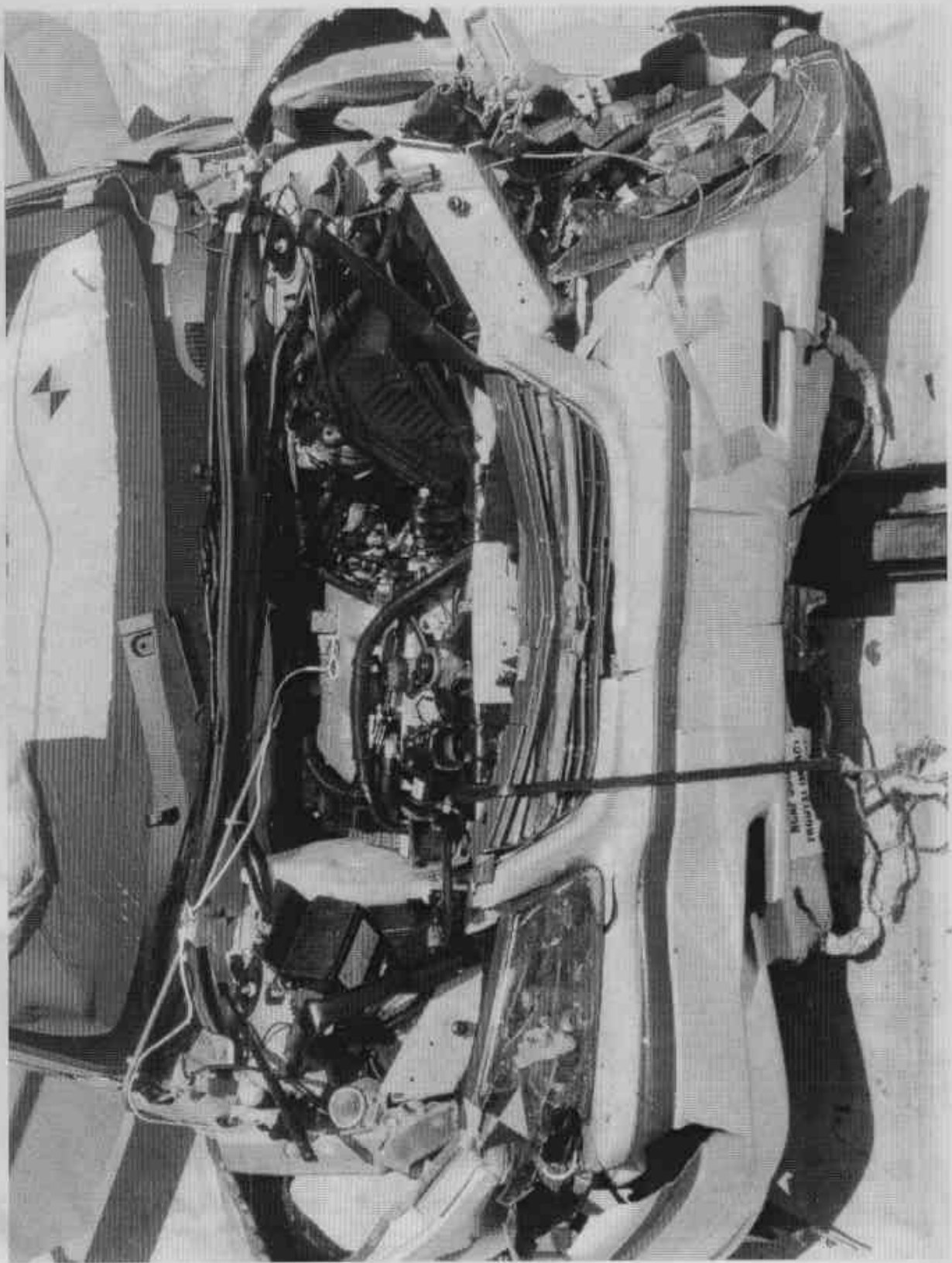


FIGURE A-18. POST TEST ENGINE COMPARTMENT

A-18

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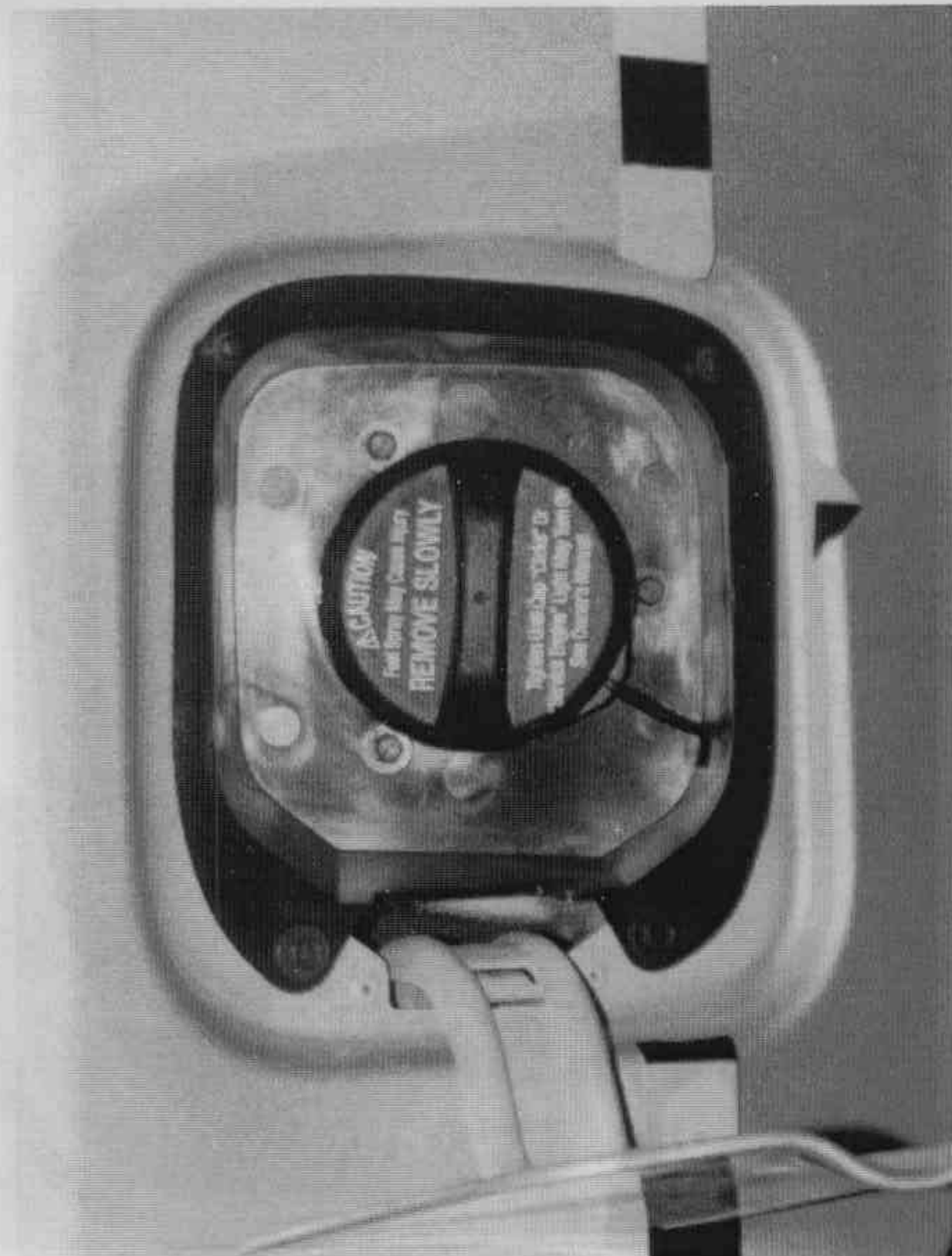


FIGURE A-19. PRETEST FUEL CAP

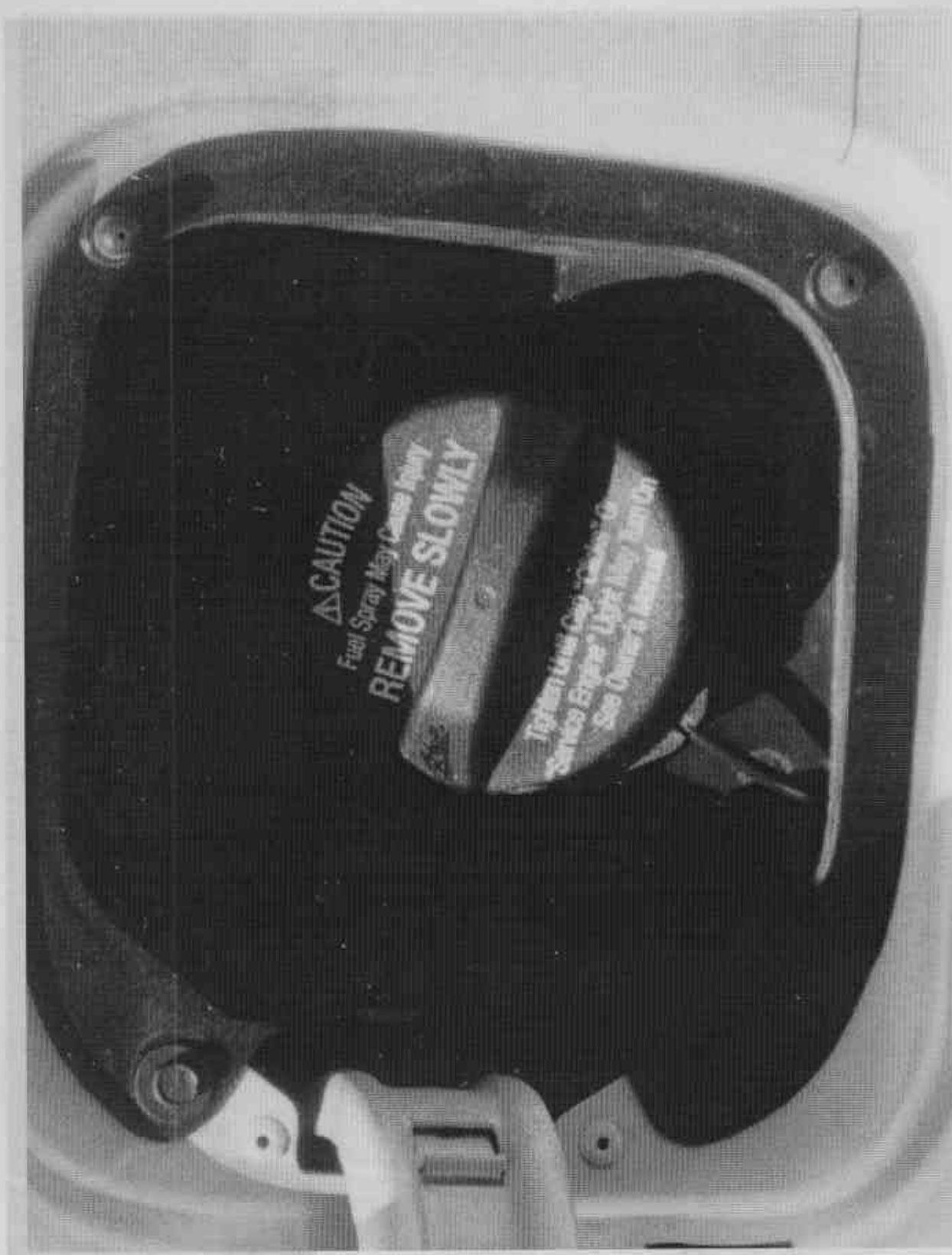


FIGURE A-20. POST TEST FUEL CAP

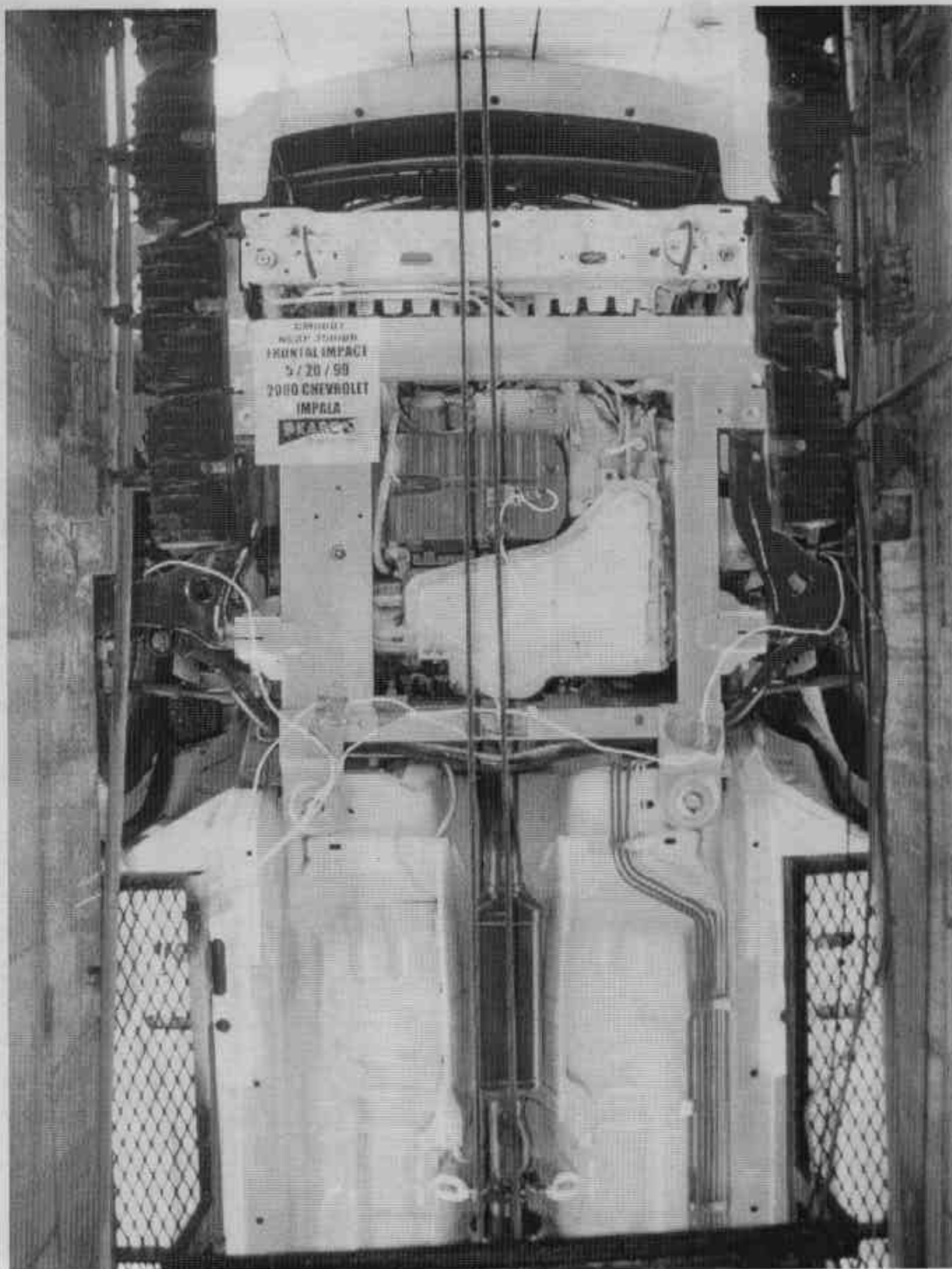


FIGURE A-21. PRETEST FRONT UNDERSIDE

A-21

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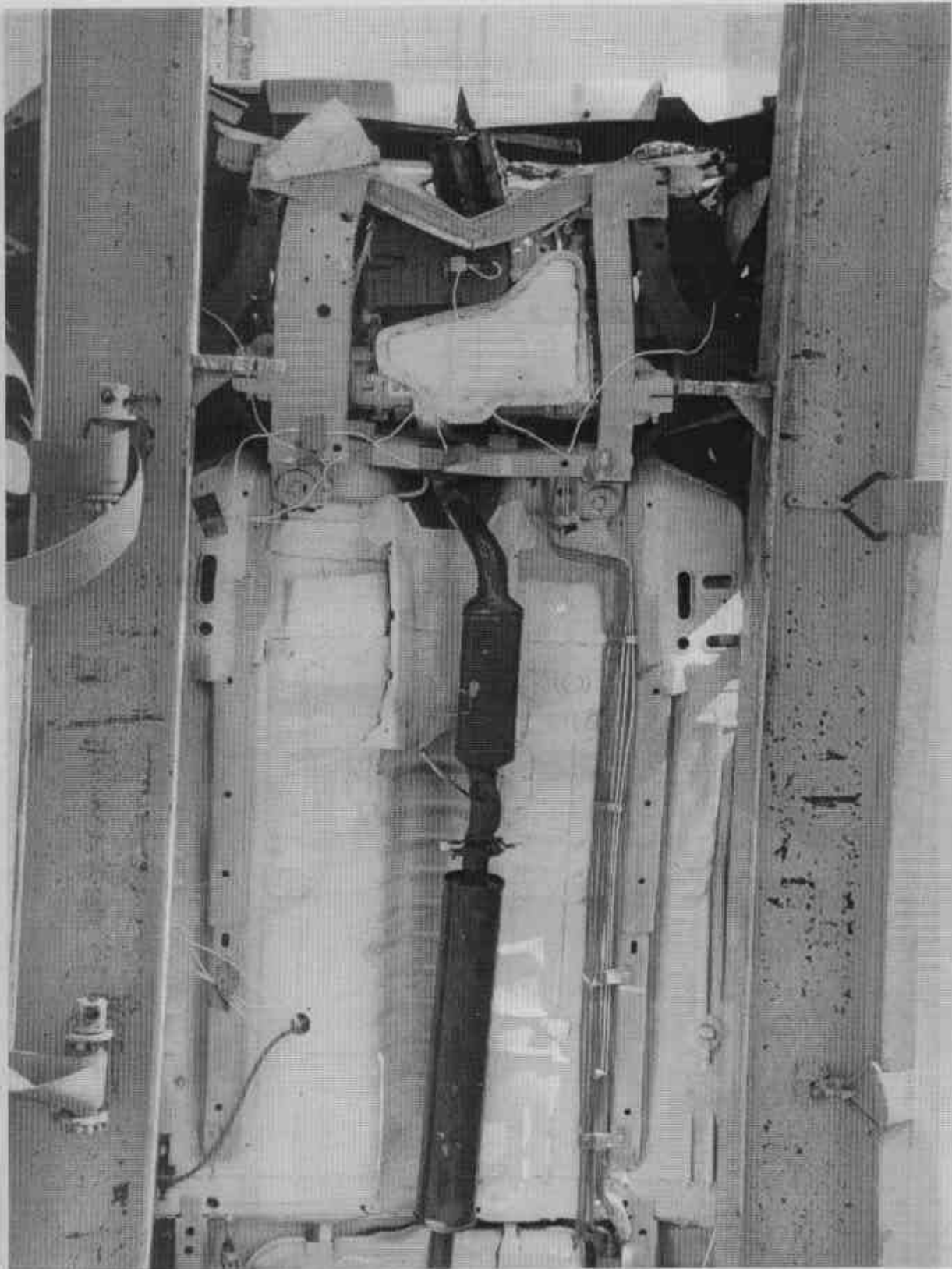


FIGURE A-22. POST TEST FRONT UNDERSIDE

A-22

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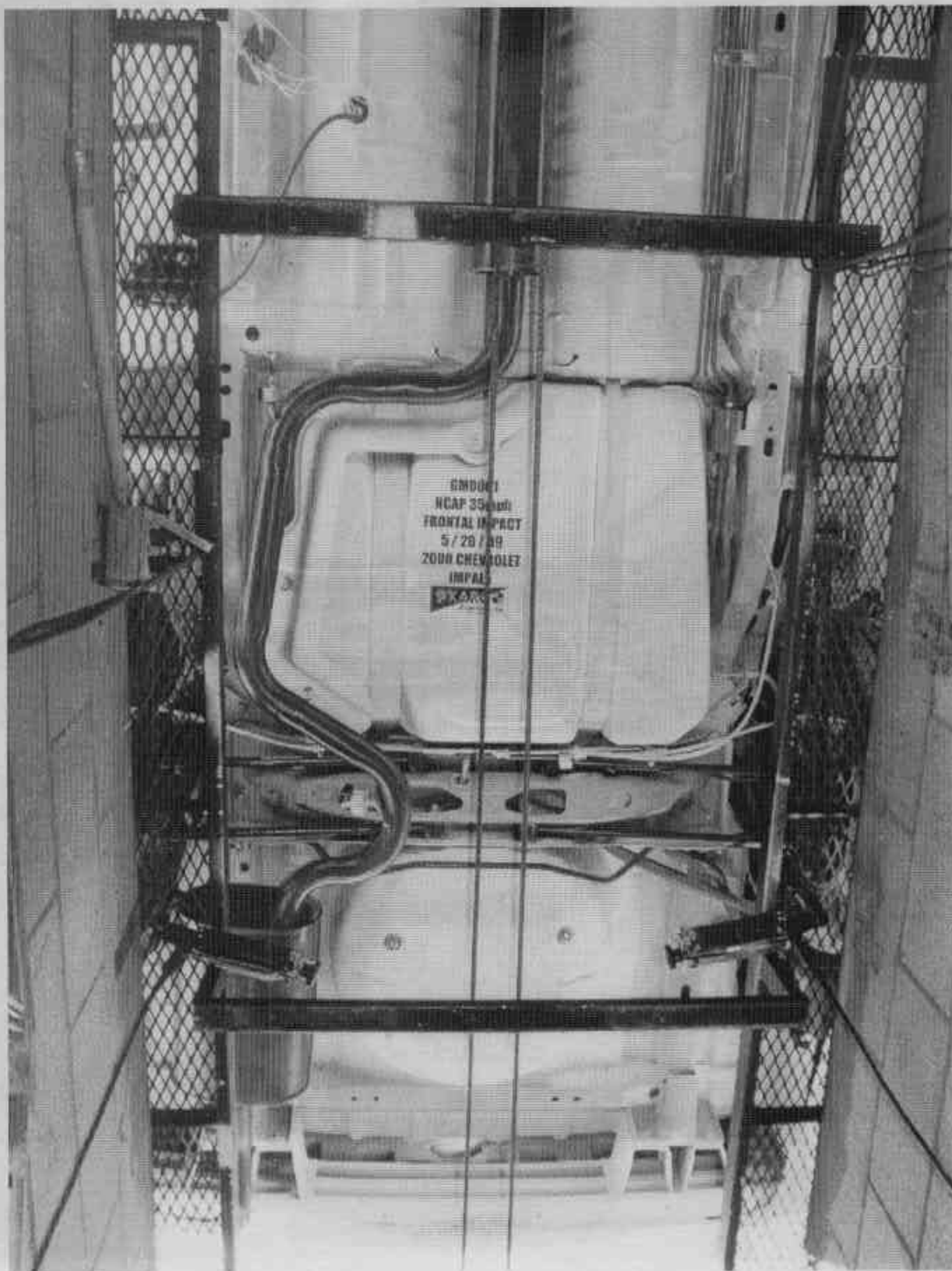


FIGURE A-23. PRETEST REAR UNDERSIDE

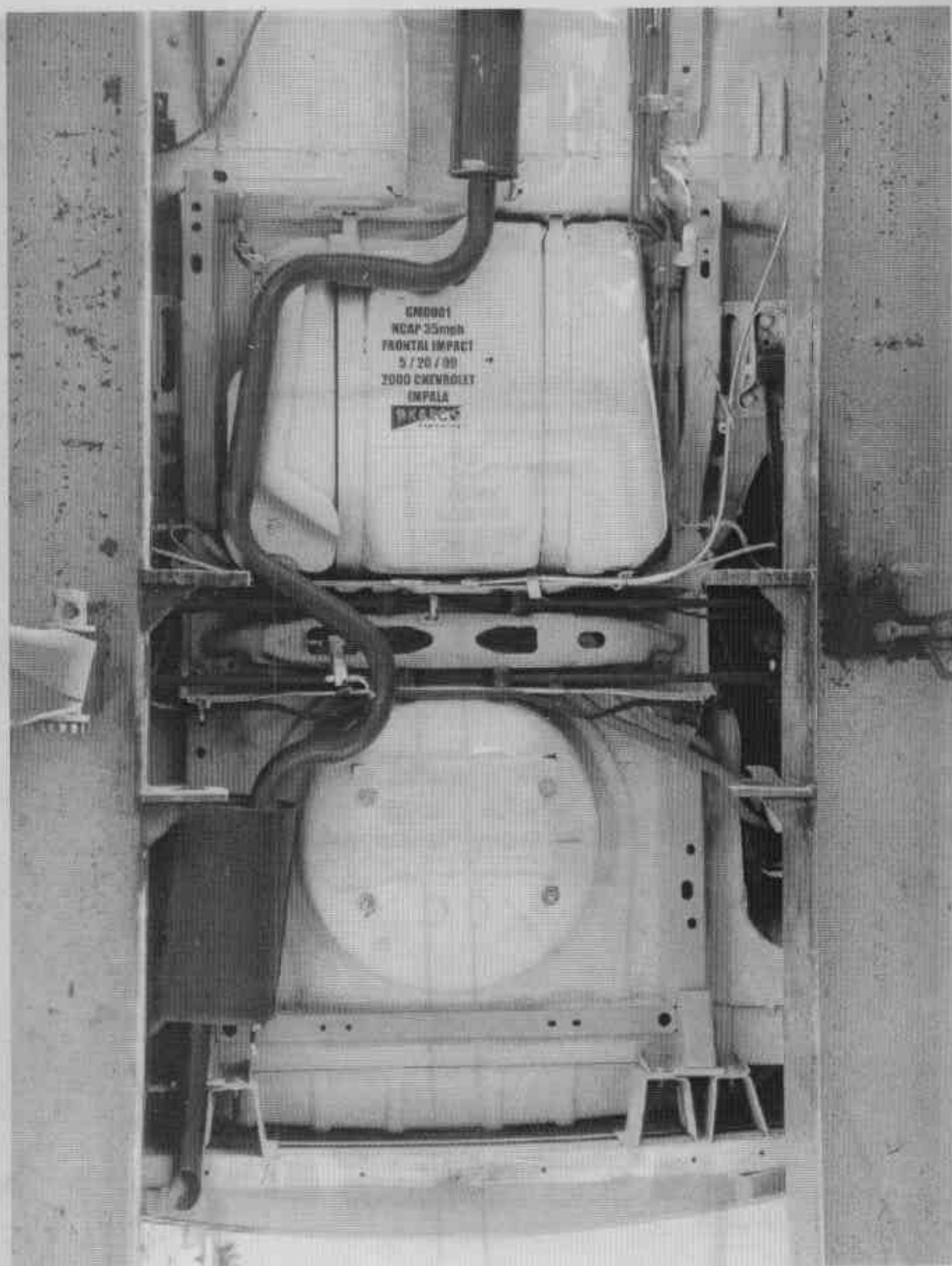


FIGURE A-24. POST TEST REAR UNDERSIDE

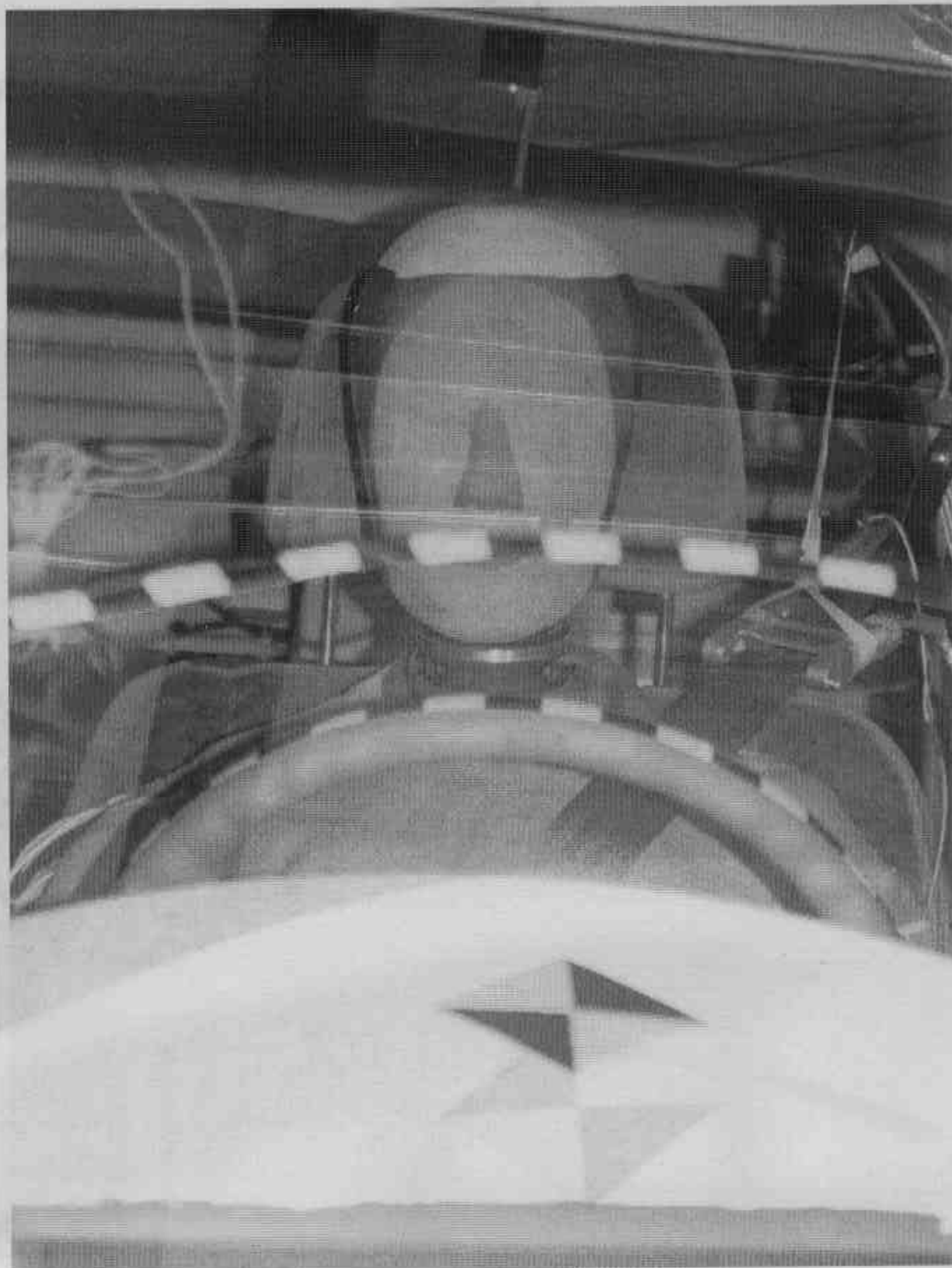


FIGURE A-25. PRETEST DRIVER DUMMY (FRONT VIEW)



FIGURE A-26. POST TEST DRIVER DUMMY (FRONT VIEW)

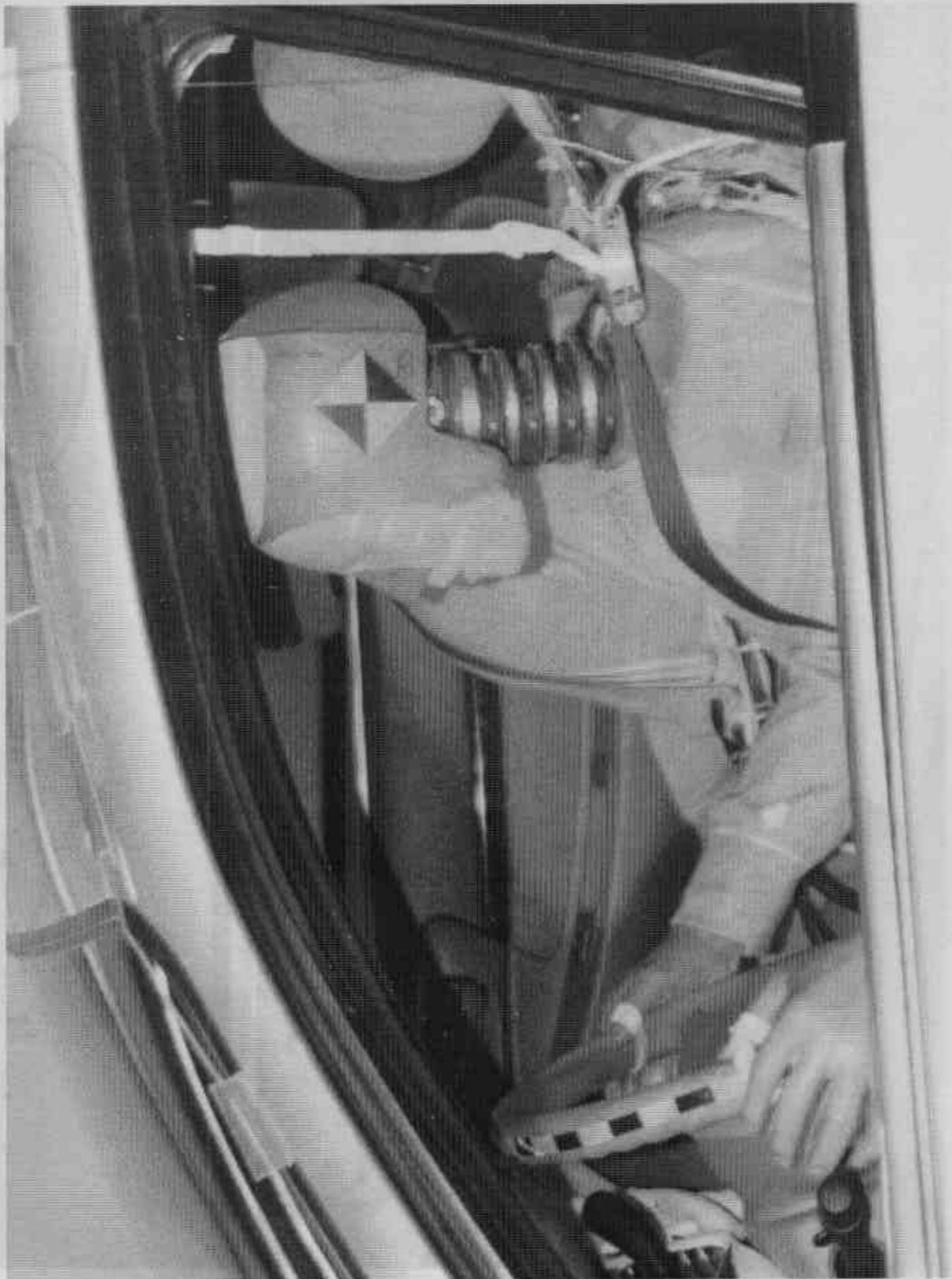


FIGURE A-27. PRETEST DRIVER DUMMY (THUR WINDOW)

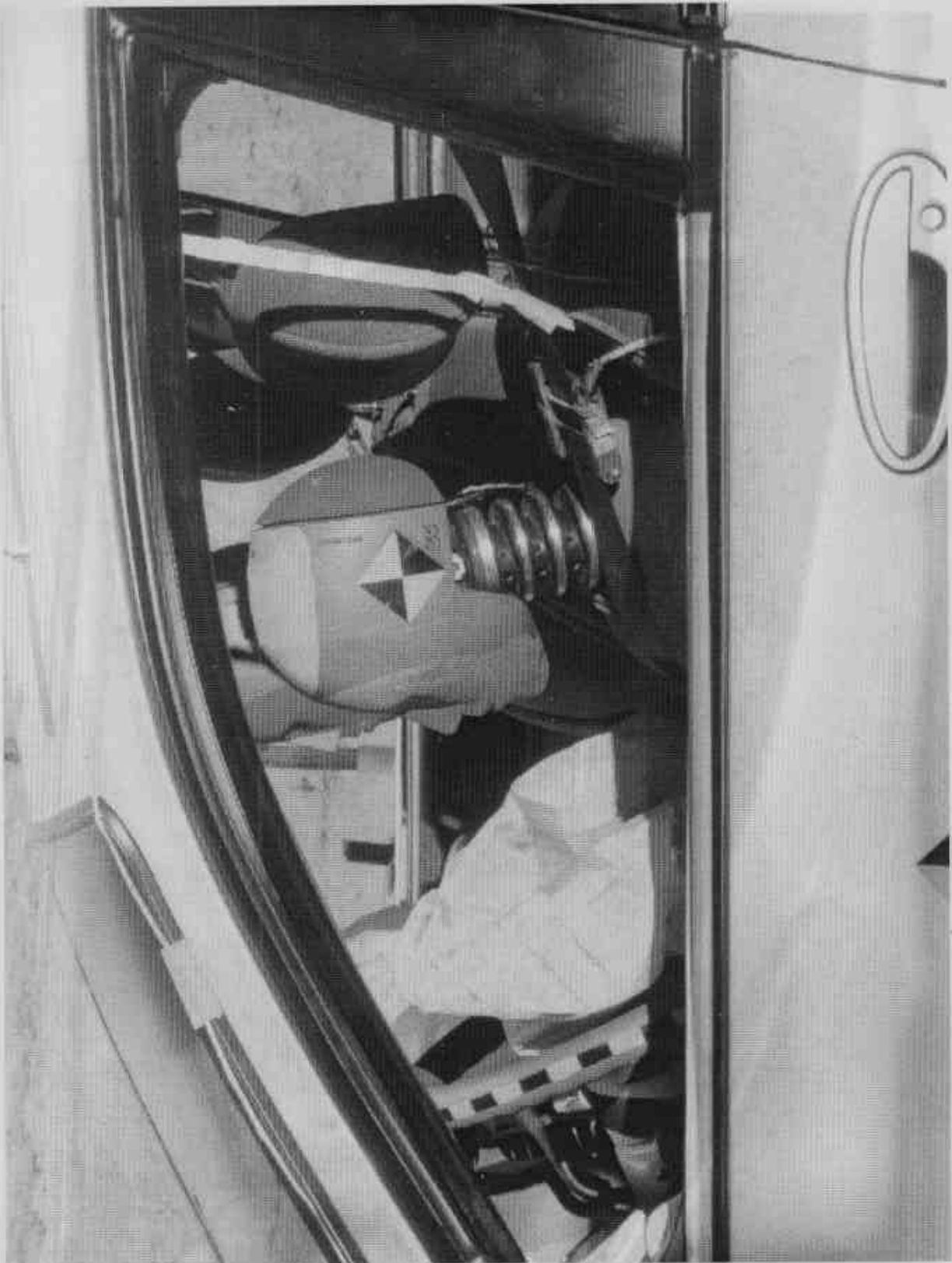


FIGURE A-28. POST TEST DRIVER DUMMY (THUR WINDOW)



FIGURE A-29. PRETEST DRIVER DUMMY (DOOR OPEN)



FIGURE A-30. POST TEST DRIVER DUMMY (DOOR OPEN)



(2) FIGURE A-31. PRETEST DRIVER DUMMY (90° TO VEHICLE)

87-103071A

A-31

KAR99001-18



FIGURE A-32. POST TEST DRIVER DUMMY (90° TO VEHICLE)



FIGURE A-33. PRETEST DRIVER DUMMY FEET

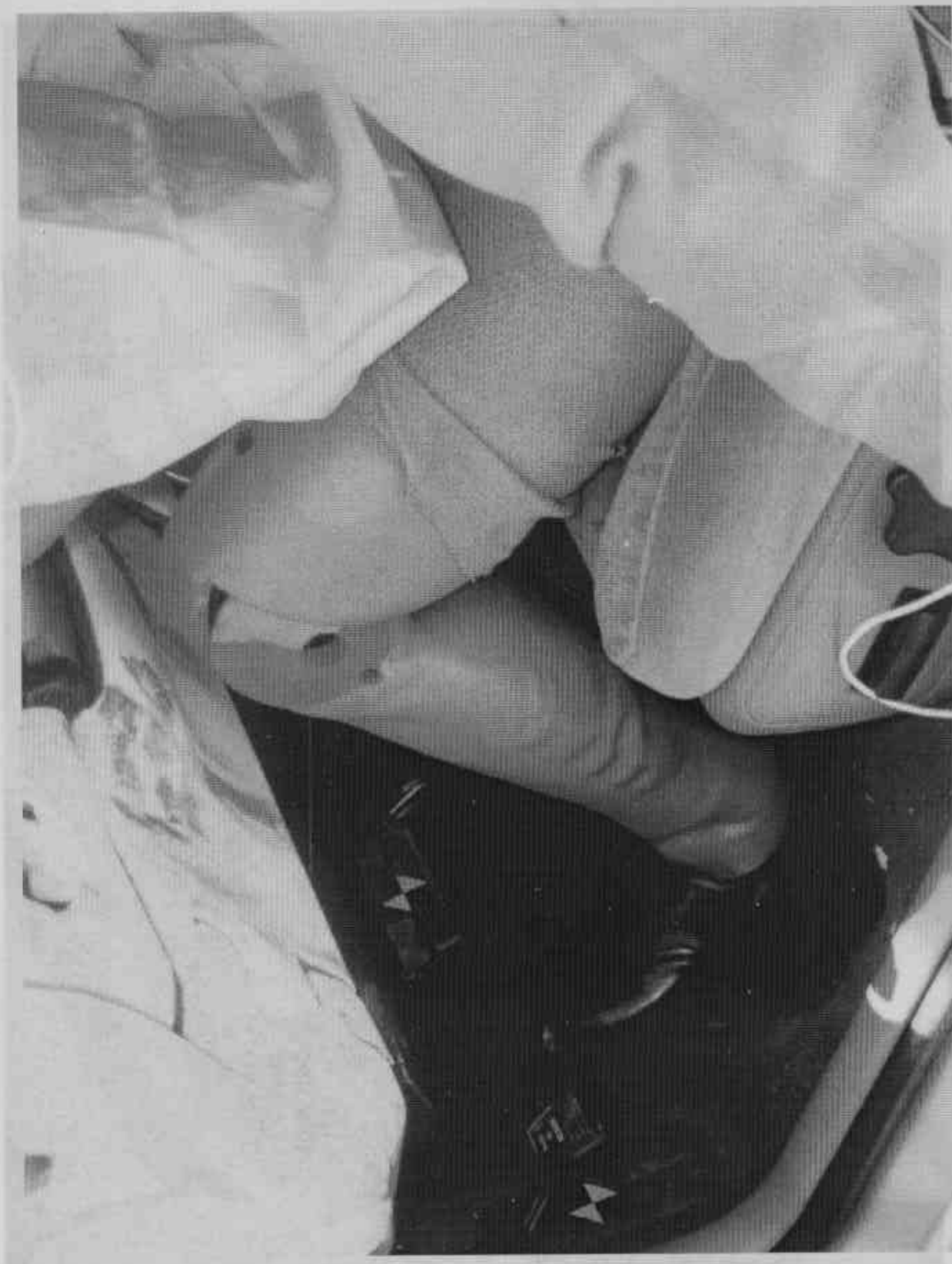


FIGURE A-34. POST TEST DRIVER DUMMY FEET AND KNEE CONTACT

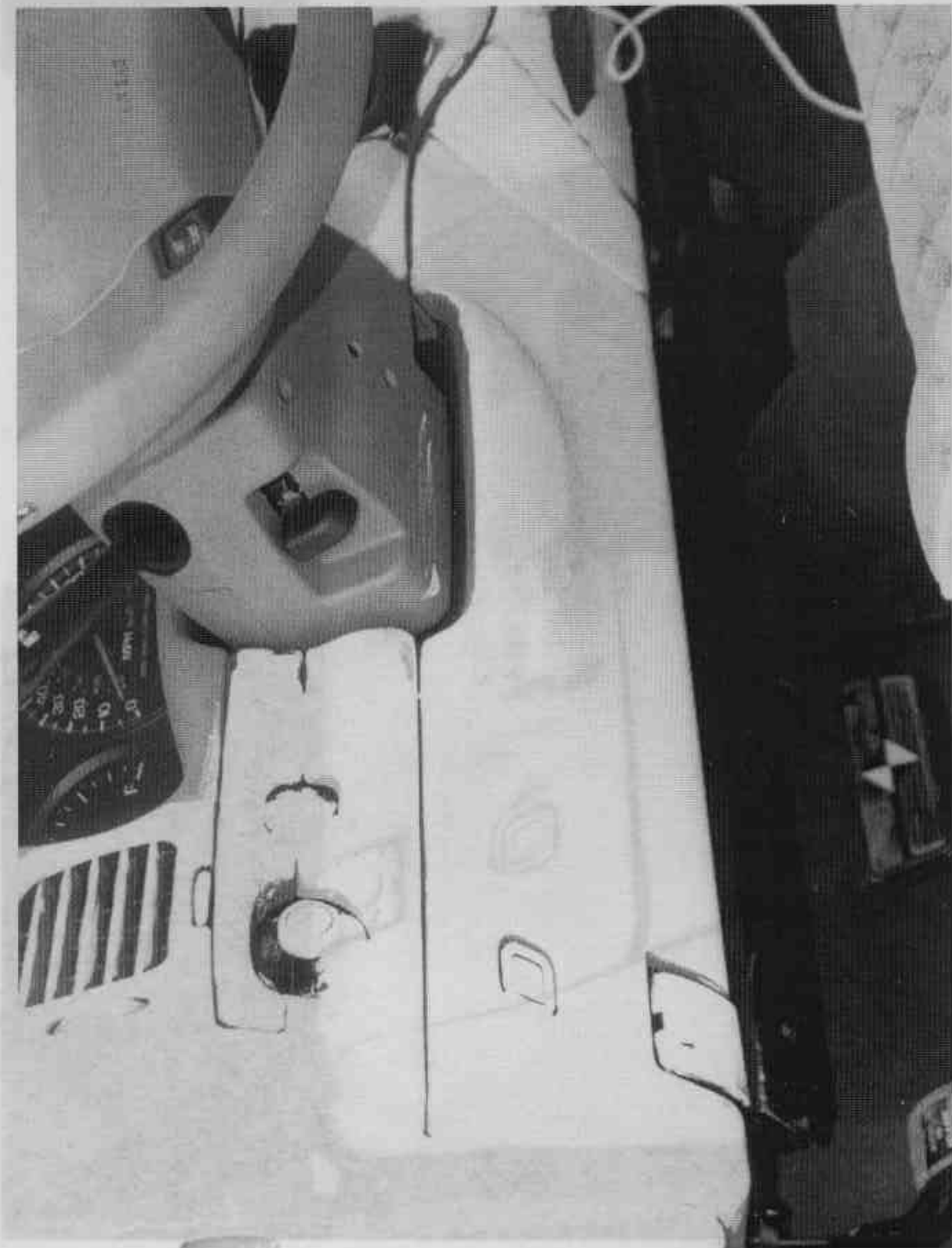


FIGURE A-35. PRETEST DRIVER KNEE BOLSTER



FIGURE A-36. POST TEST DRIVER KNEE BOLSTER

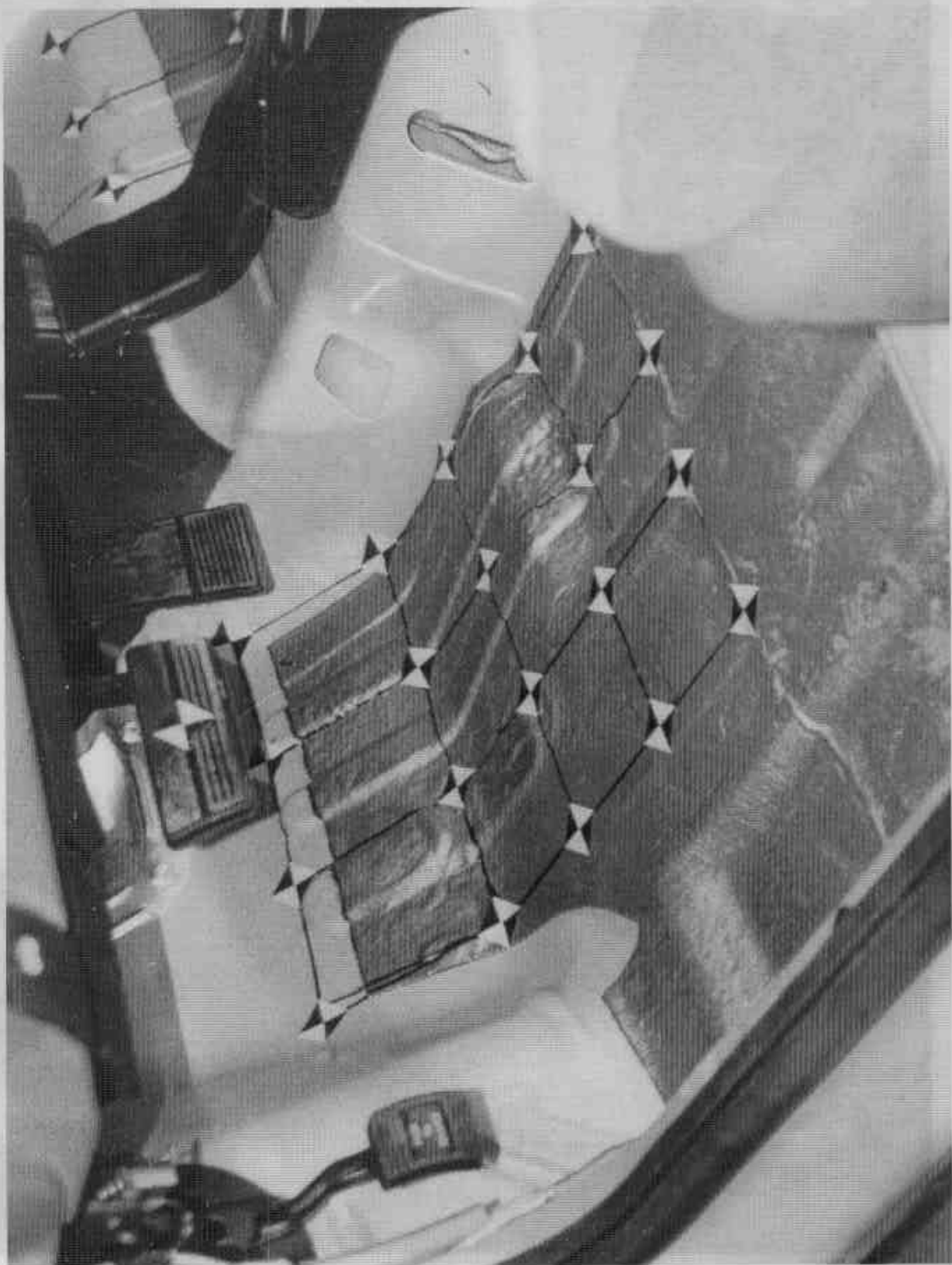


FIGURE A-37. PRETEST DRIVER SIDE FLOOR PAN

A-37

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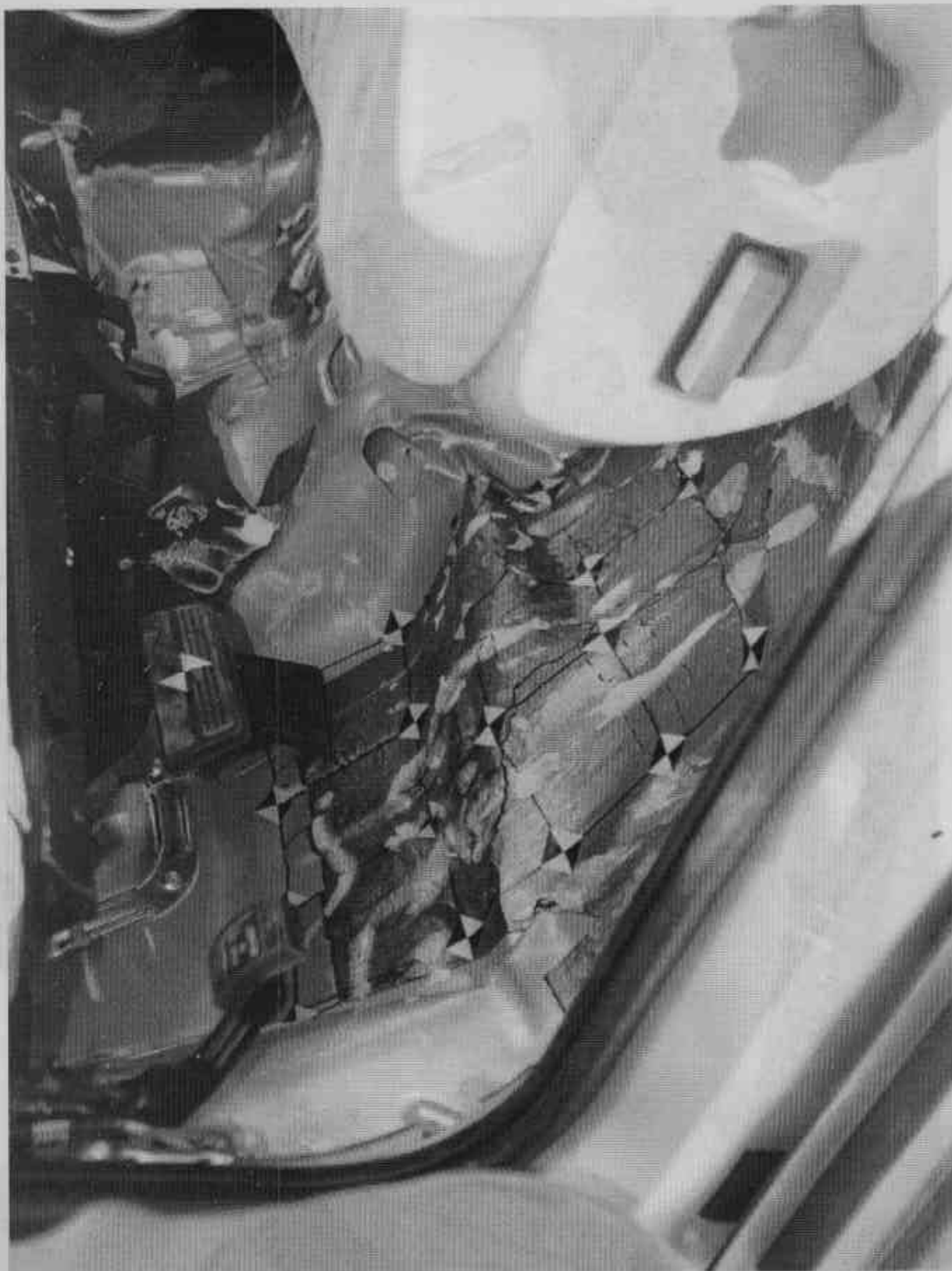


FIGURE A-38. POST TEST DRIVER SIDE FLOOR PAN

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FIGURE A-39. POST TEST DRIVER HEAD

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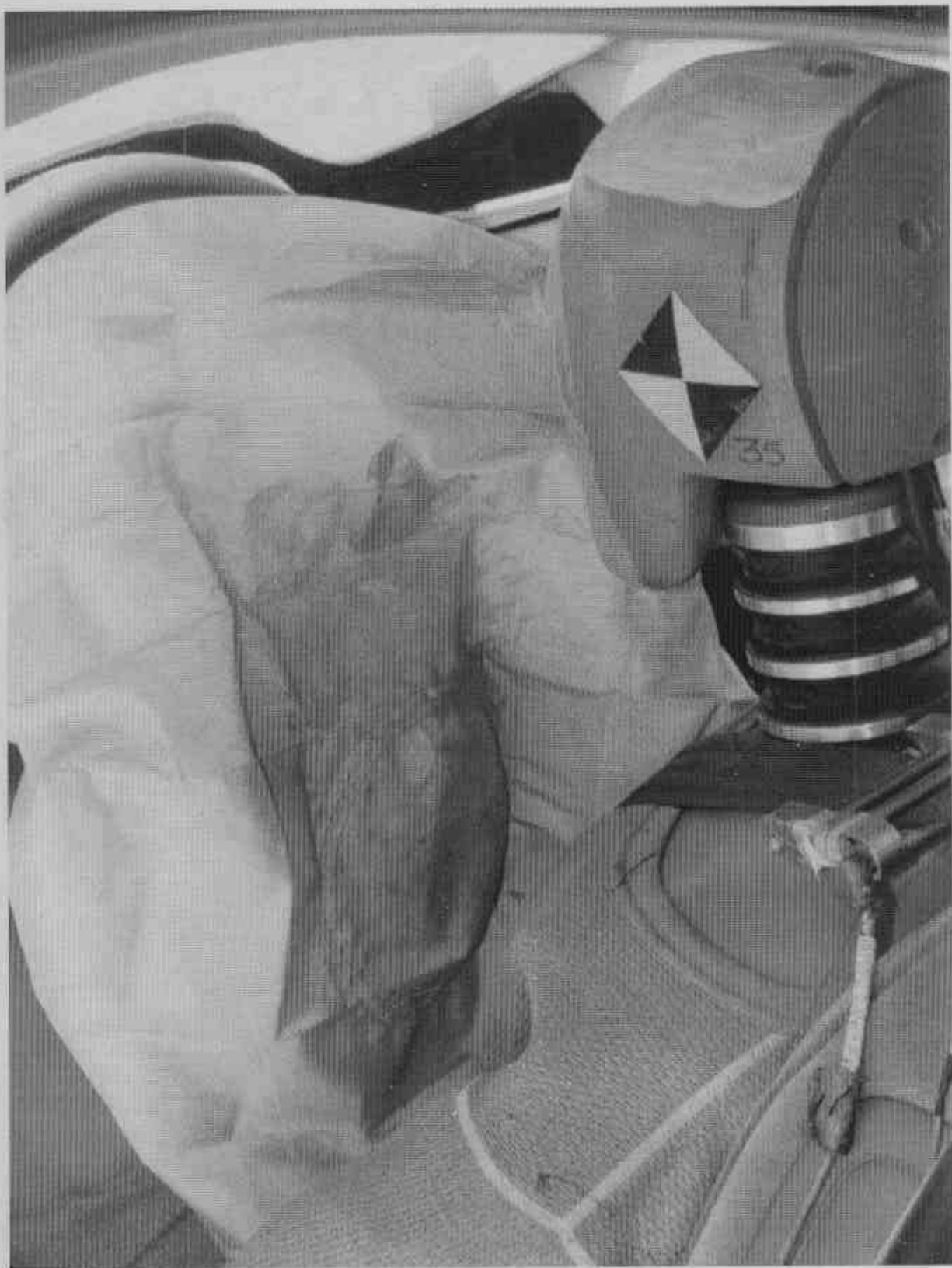


FIGURE A-40. POST TEST DRIVER DUMMY CONTACT



FIGURE A-41. PRETEST PASSENGER DUMMY (FRONT VIEW)



FIGURE A-42. POST TEST PASSENGER DUMMY (FRONT VIEW)



FIGURE A-43. PRETEST PASSENGER DUMMY (THRU WINDOW)



FIGURE A-44. POST TEST PASSENGER DUMMY (THUR WINDOW)



FIGURE A-45. PRETEST PASSENGER DUMMY (DOOR OPEN)



FIGURE A-46. POST TEST PASSENGER DUMMY (DOOR OPEN)



FIGURE A-47. PRETEST PASSENGER DUMMY (90° TO VEHICLE)



FIGURE A-48. POST TEST PASSENGER DUMMY (90° TO VEHICLE)

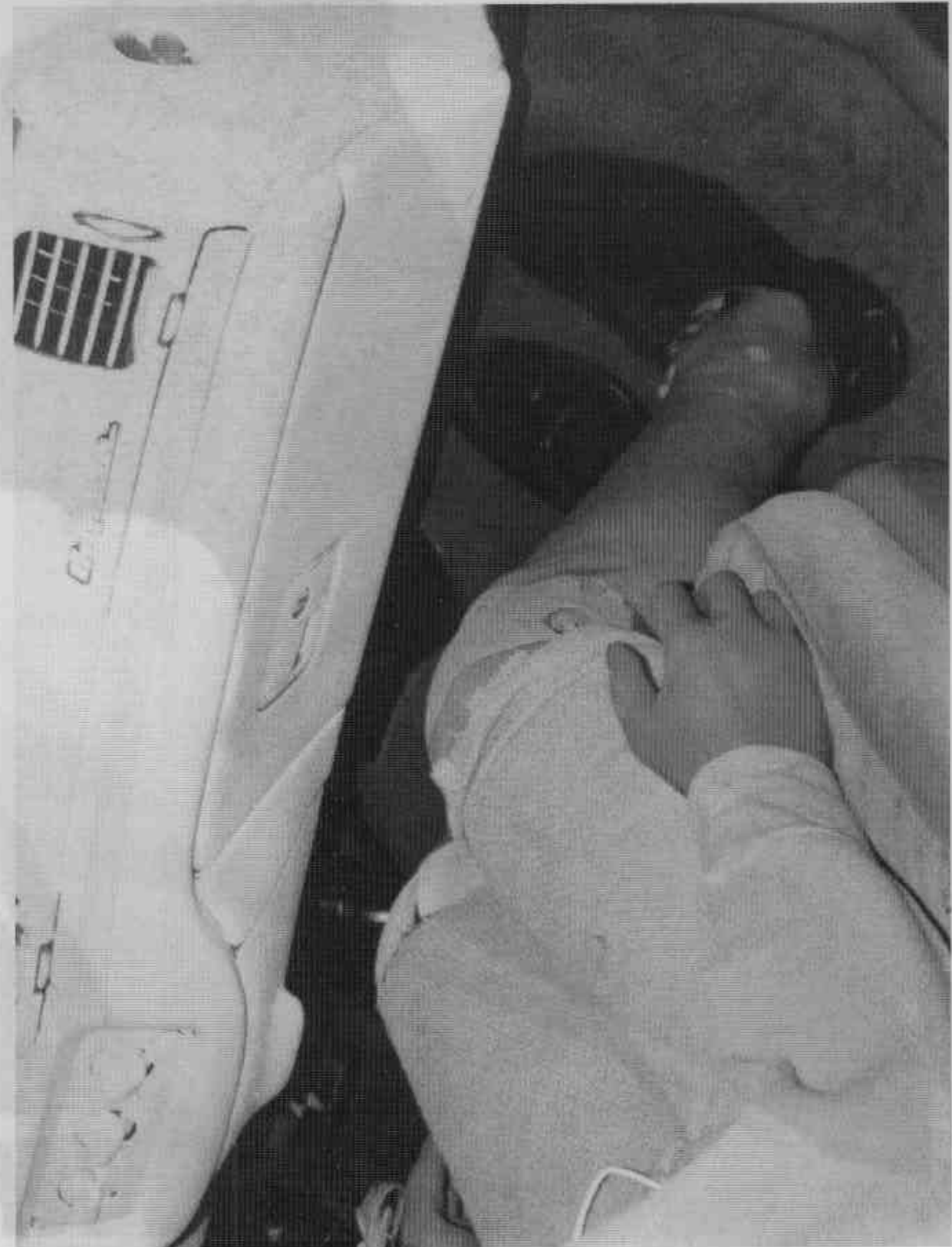


FIGURE A-49. PRETEST PASSENGER DUMMY FEET



FIGURE A-50. POST TEST PASSENGER DUMMY FEET AND CONTACT POINT

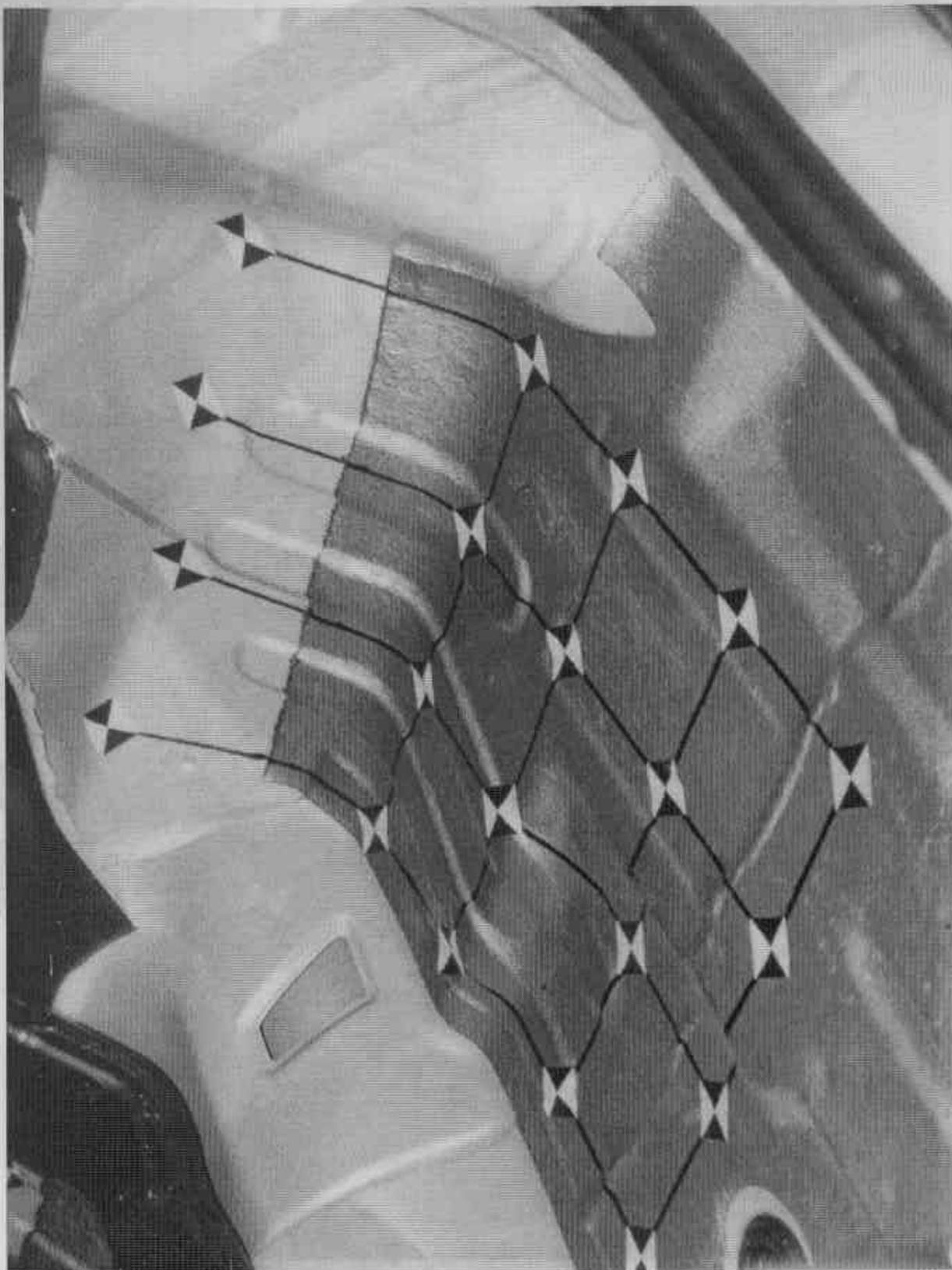


FIGURE A-51. PRETEST PASSENGER SIDE FLOOR PAN

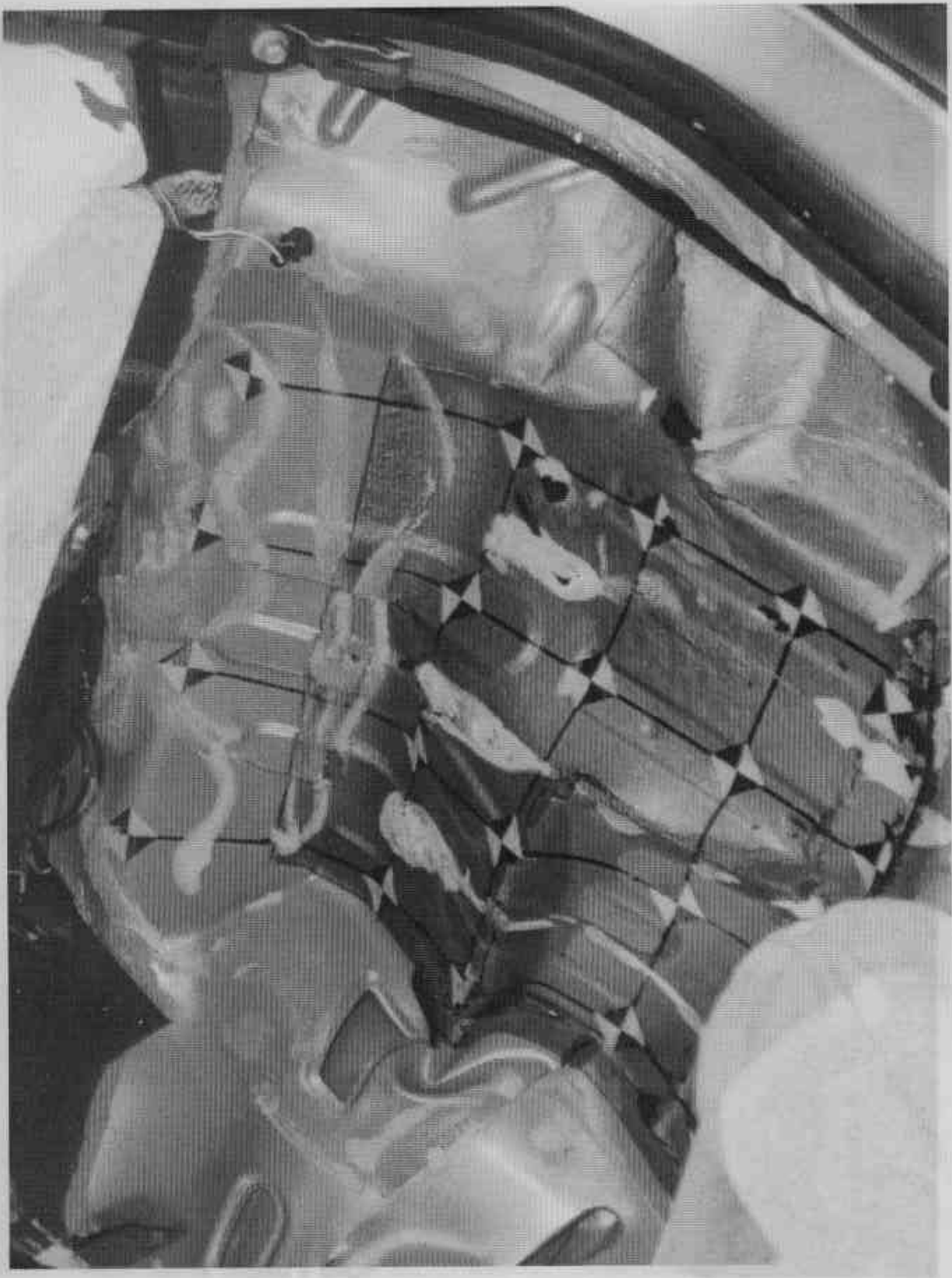


FIGURE A-52. POST TEST PASSENGER SIDE FLOOR PAN

A-52

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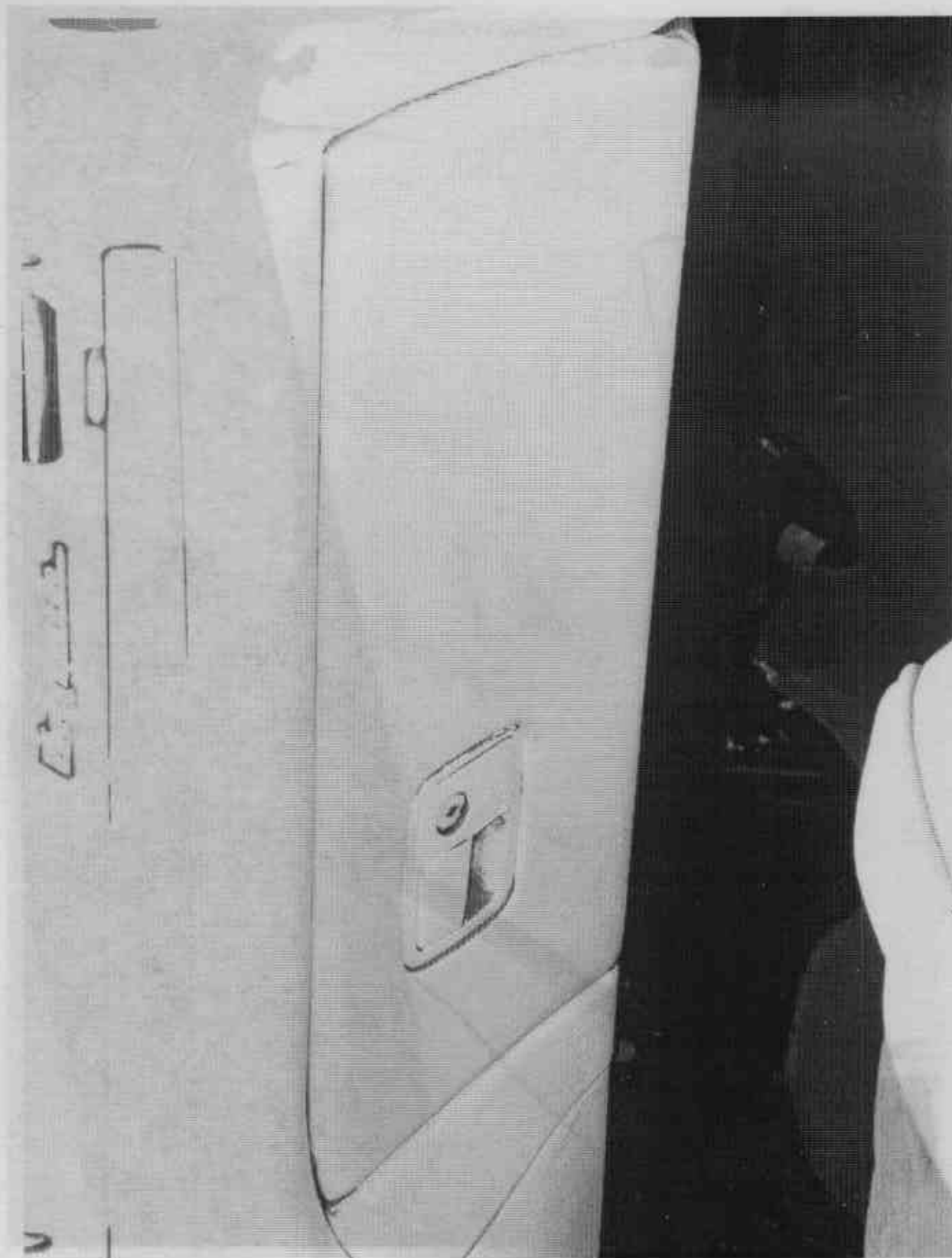


FIGURE A-53. PRETEST PASSENGER SIDE KNEE BOLSTER



FIGURE A-54. POST TEST PASSENGER SIDE KNEE BOLSTER AND DUMMY CONTACT

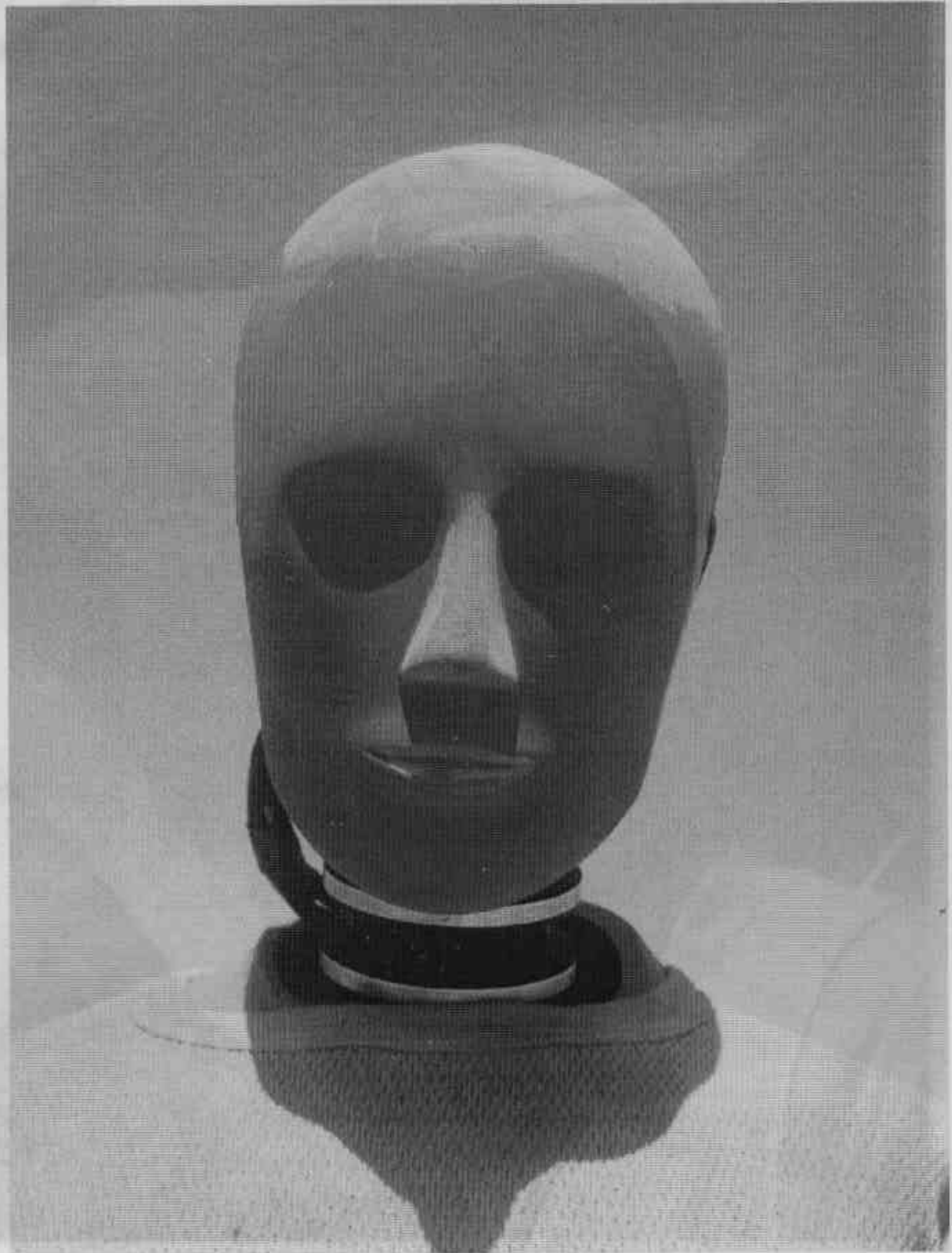


FIGURE A-55. POST TEST PASSENGER HEAD

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FIGURE A-56. POST TEST PASSENGER DUMMY CONTACT

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KAR99001-18

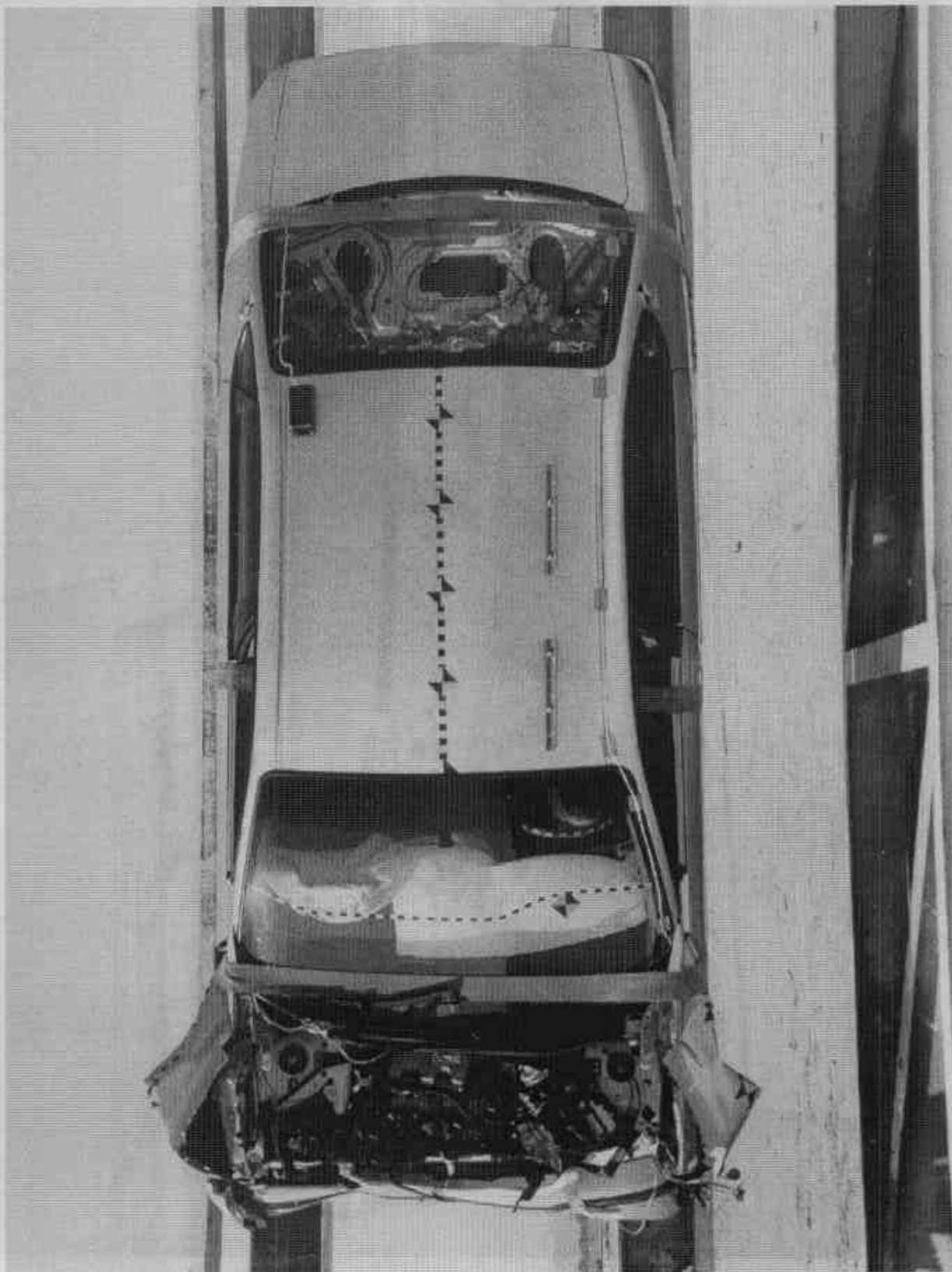


FIGURE A-57. VEHICLE ON ROLLOVER

A-57

KAR99001-18

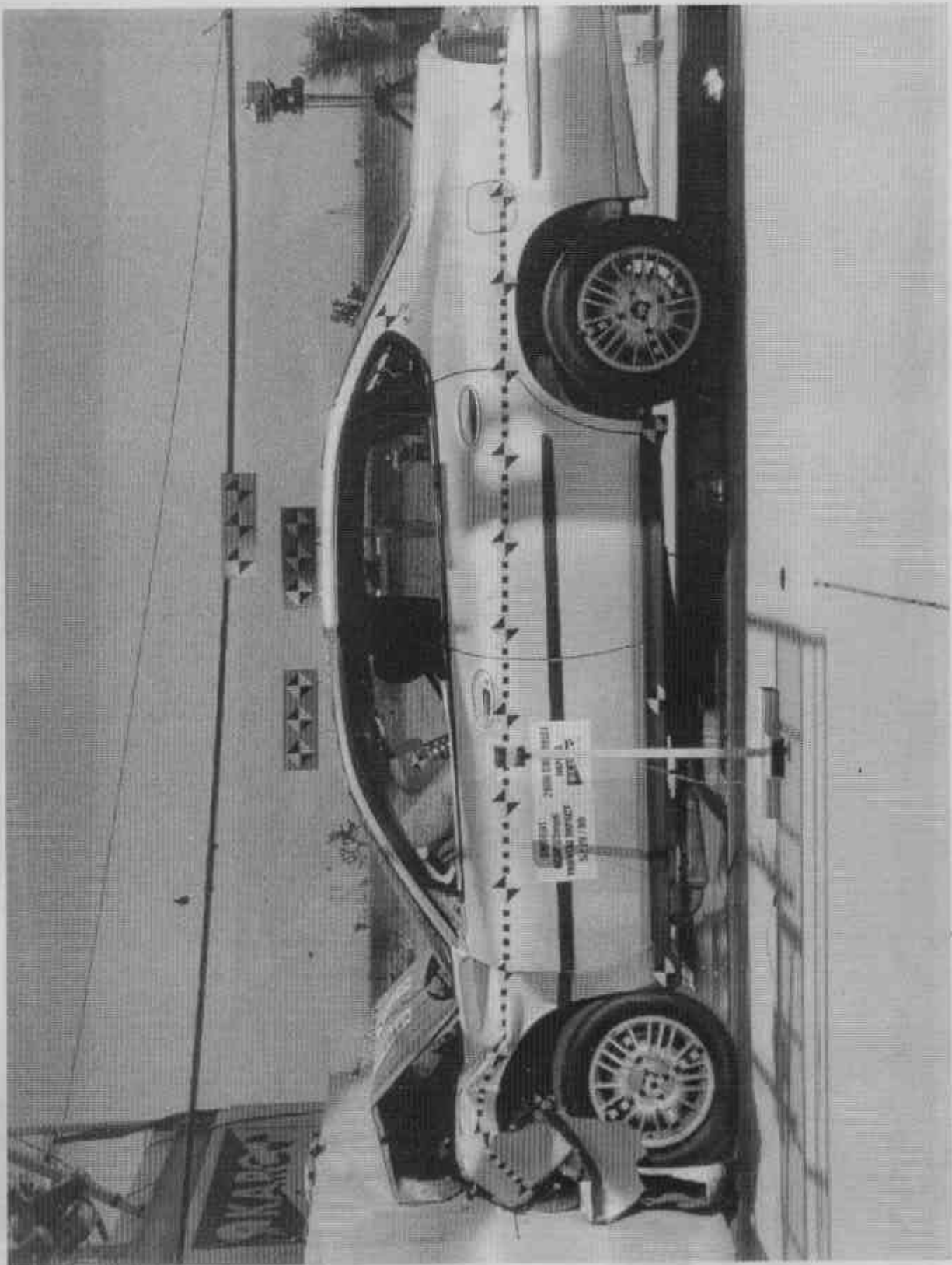


FIGURE A-58. VEHICLE DURING IMPACT

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APPENDIX B
DUMMY AND VEHICLE RESPONSE DATA TRACES

LIST OF DATA PLOTS

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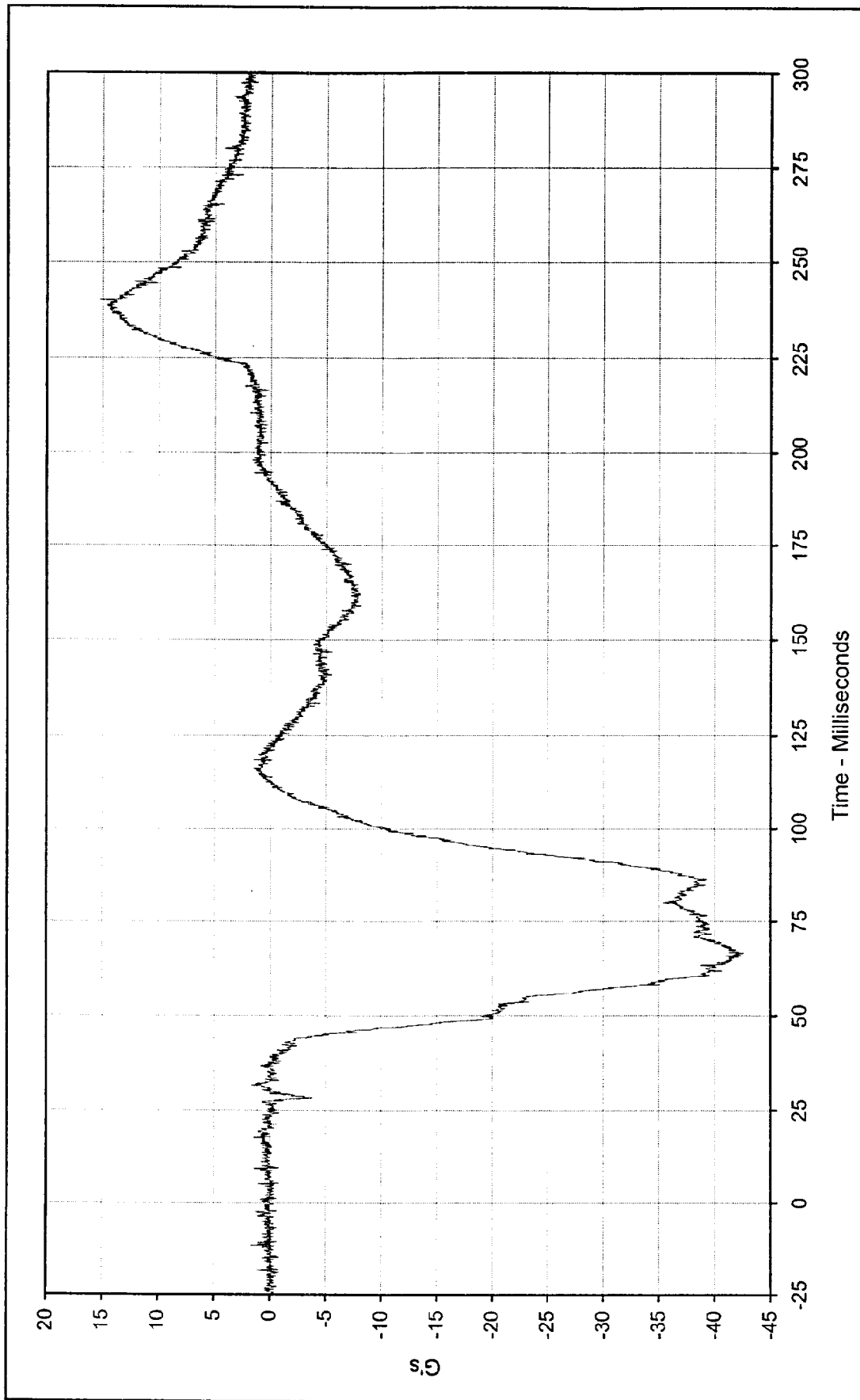
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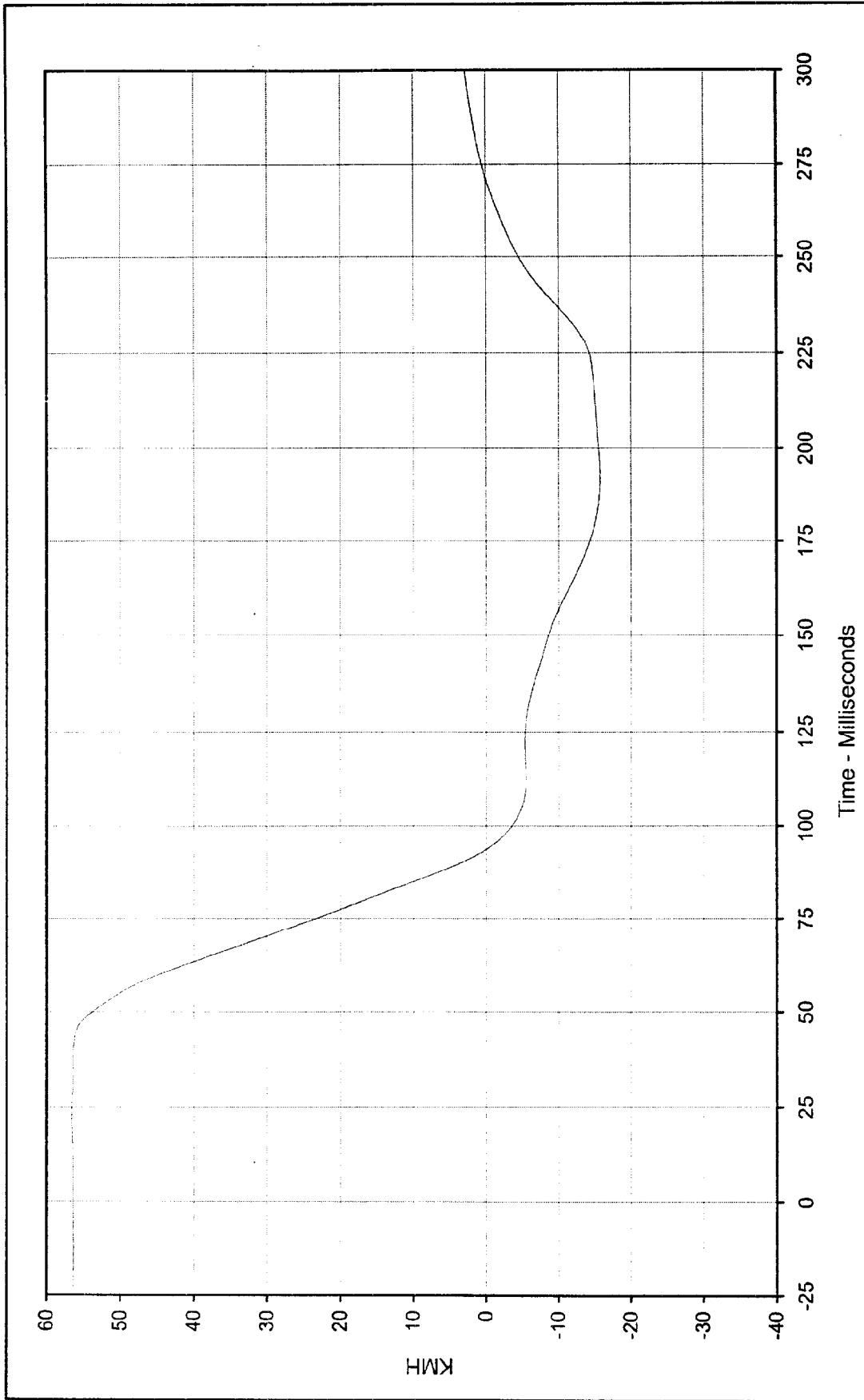


Curve Description:	Driver Head Primary X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	15.3	at 240.4	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-42.6	at 66.2			
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-001				



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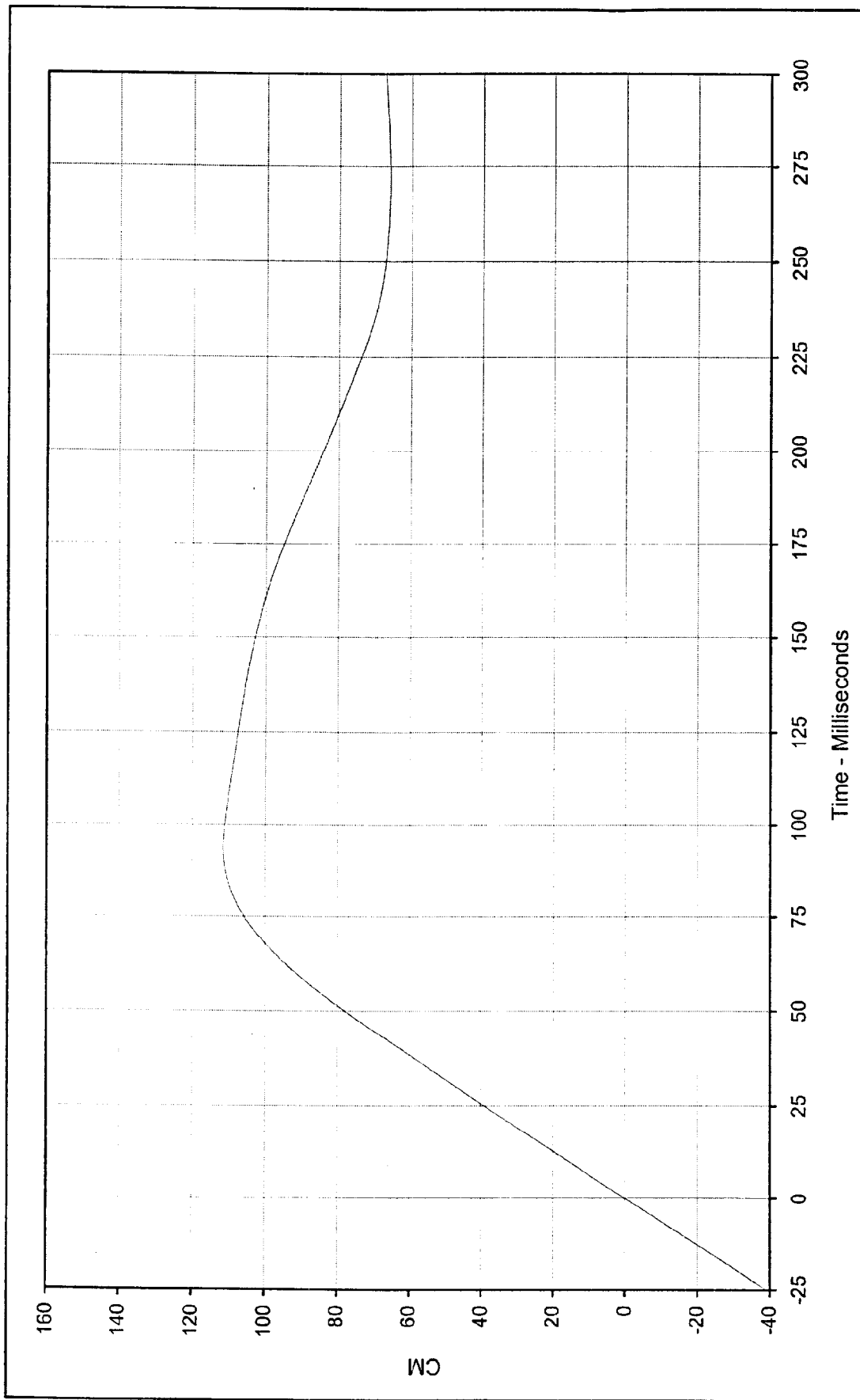




Curve Description:		Driver Head Primary X Velocity		Testing Program	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	56.6	at	23.7	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-15.8	at	192.3			
SAE Filter Class:	180					
Date of Test:	5/20/99					
Curve Number:	IN1-001					

The logo for KARCO Engineering features a stylized lightbulb with a gear-like base, positioned to the left of the word "KARCO" in a large, bold, sans-serif font. Below "KARCO", the word "Engineering" is written in a smaller, italicized, sans-serif font. The entire logo is enclosed within a rectangular border.

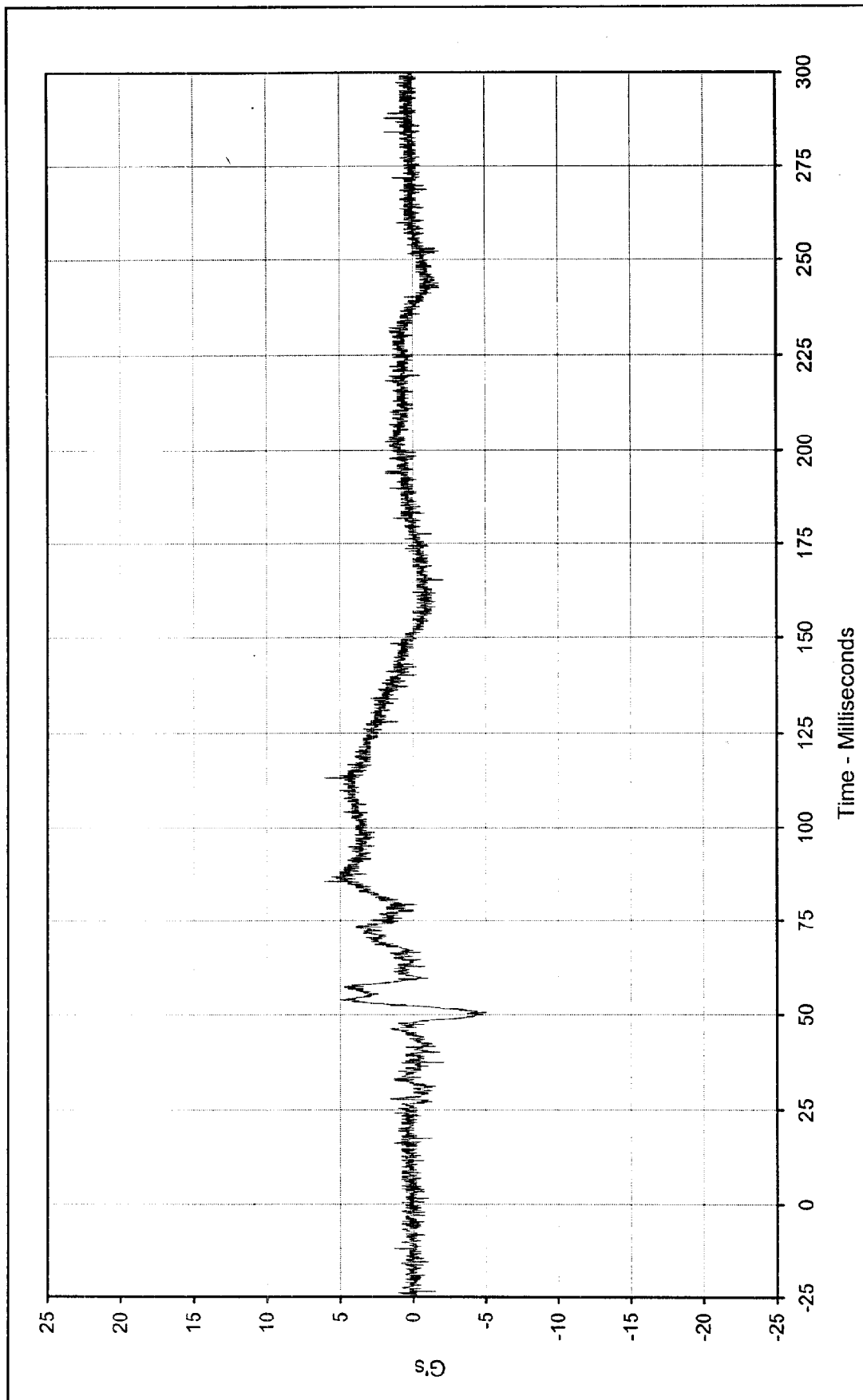




Curve Description: Driver Head Primary X Displ.
Maximum Value: 111.5 at 93.6 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 5/20/99
Curve Number: IN2-001

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

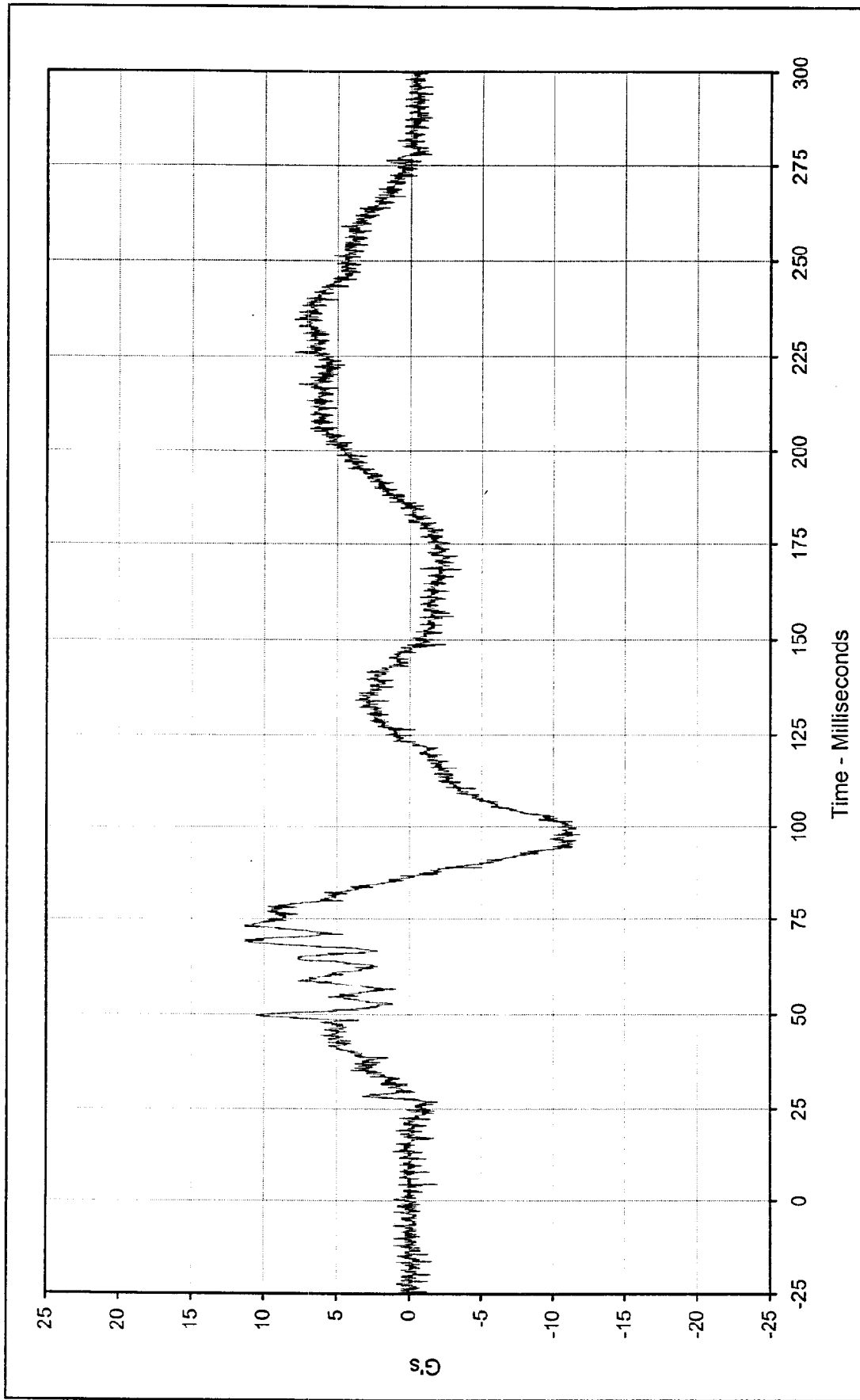




Curve Description: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Program: 2000 Chevrolet Impala 4 Door Sedan
 Test Vehicle:

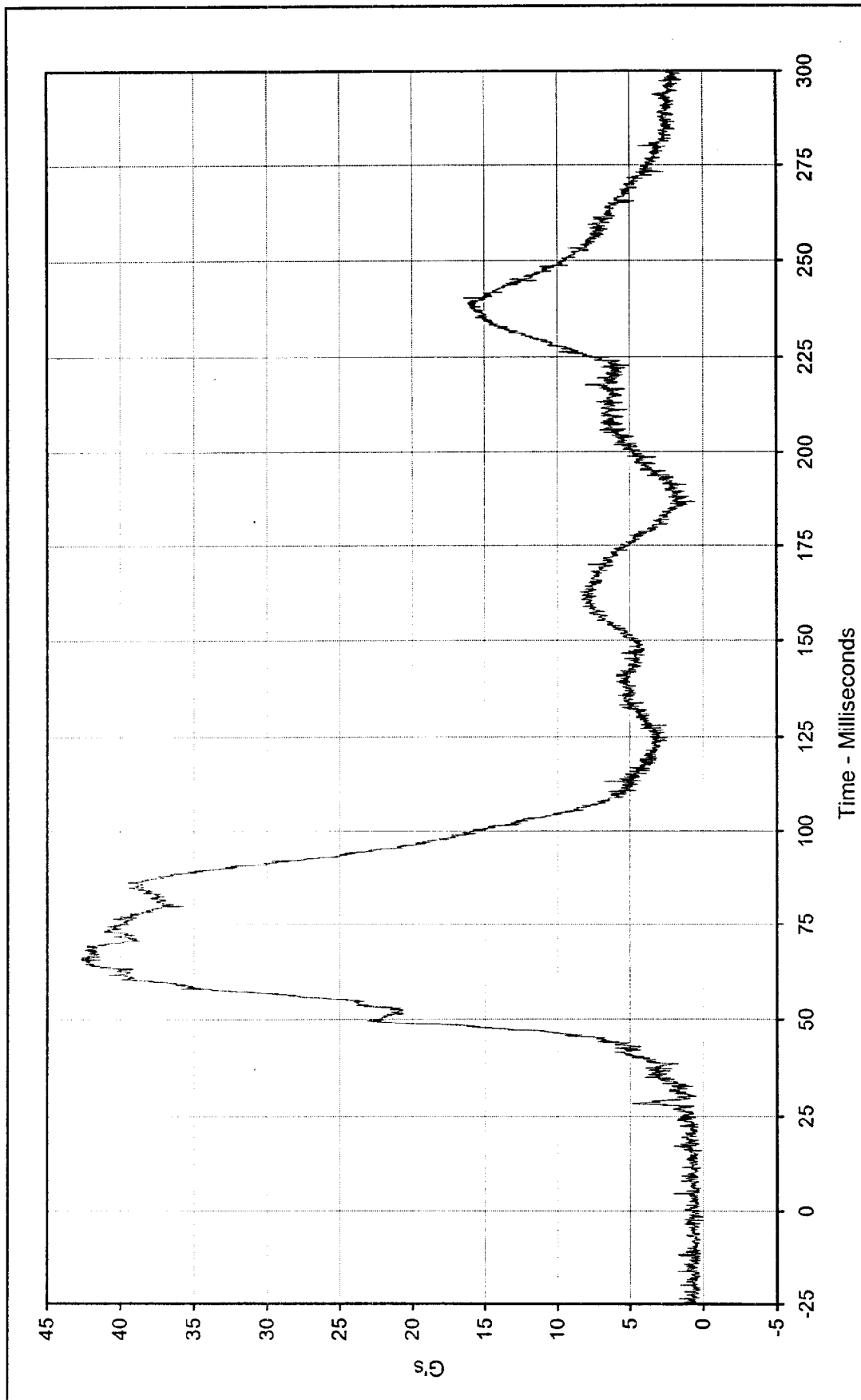
Driver Head Primary Y
 Maximum Value: 6.1 at 85.4 Milliseconds
 Minimum Value: -5.0 at 50.5 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 5/20/99
 Curve Number: FIL-002





Curve Description:		Driver Head Primary Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	11.3	at	68.9	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-11.9	at	97.9	Milliseconds		
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-003					

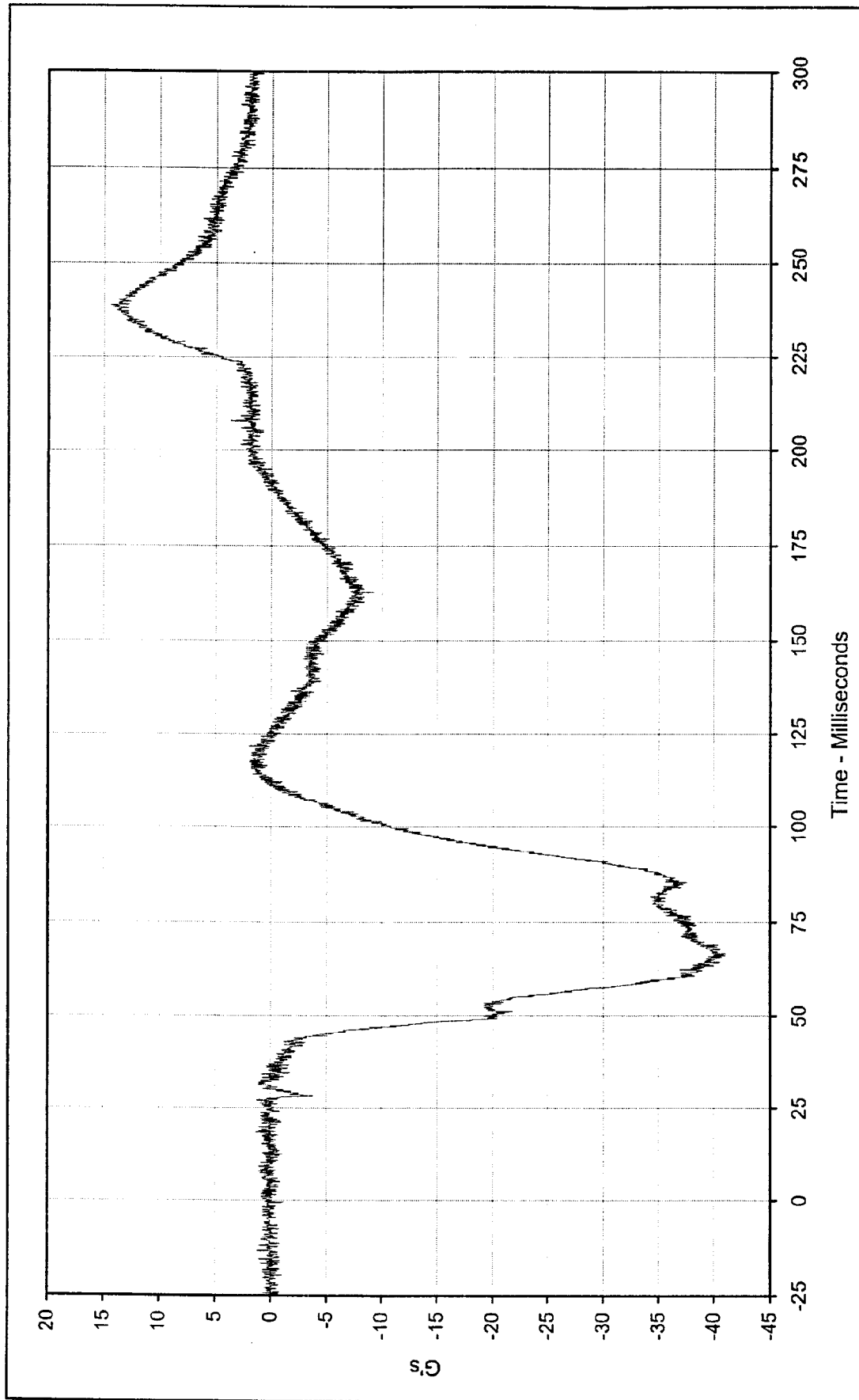




Curve Description: Driver Head Resultant Primary
 Maximum Value: 42.7 at 66.2 Milliseconds
 Minimum Value: 0.1 at 15.8 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 5/20/99
 Curve Number: RES-001

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

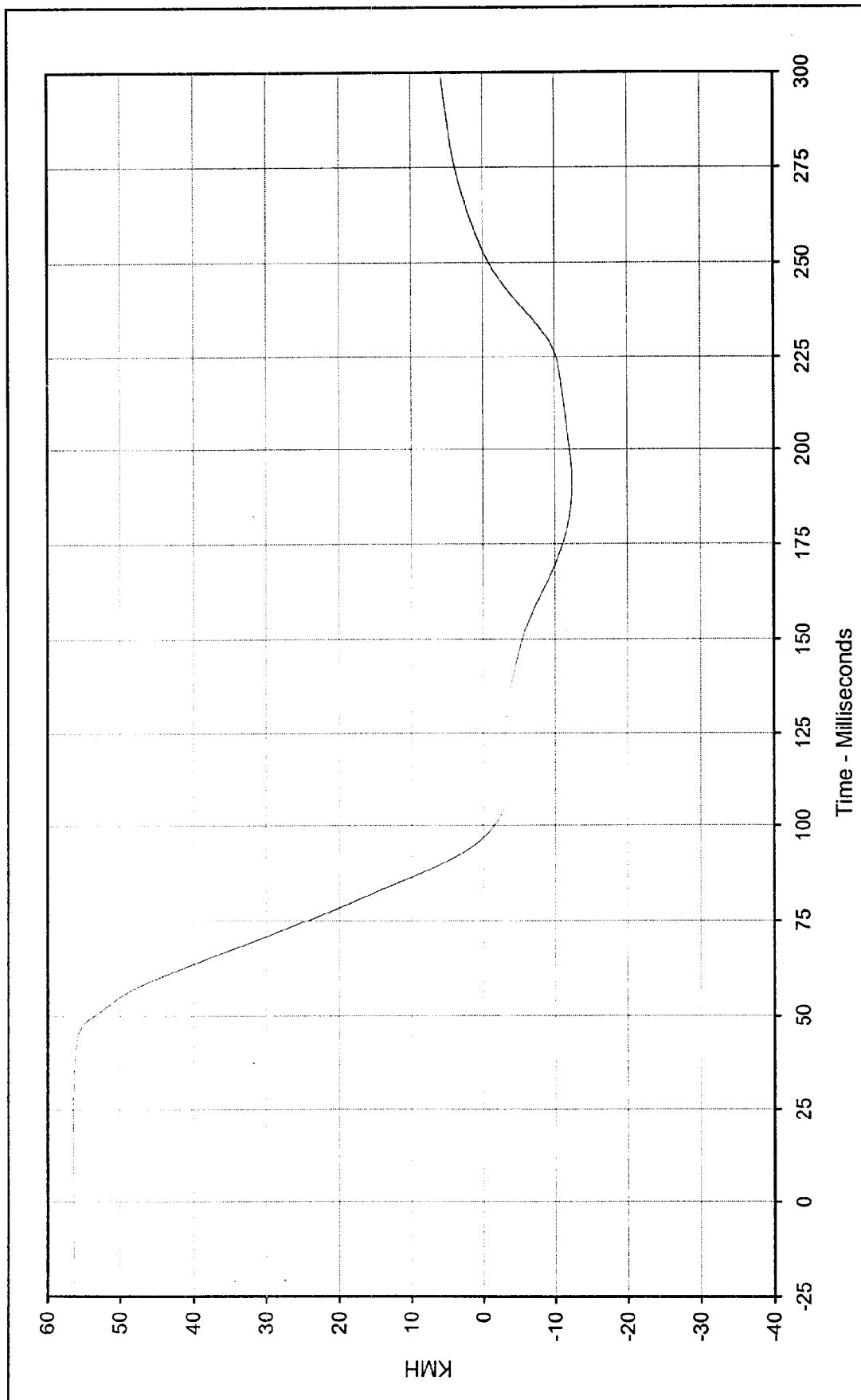




Curve Description:		Driver Head Redundant X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	14.4	at	238.9	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-41.1	at	66.2			
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-004					

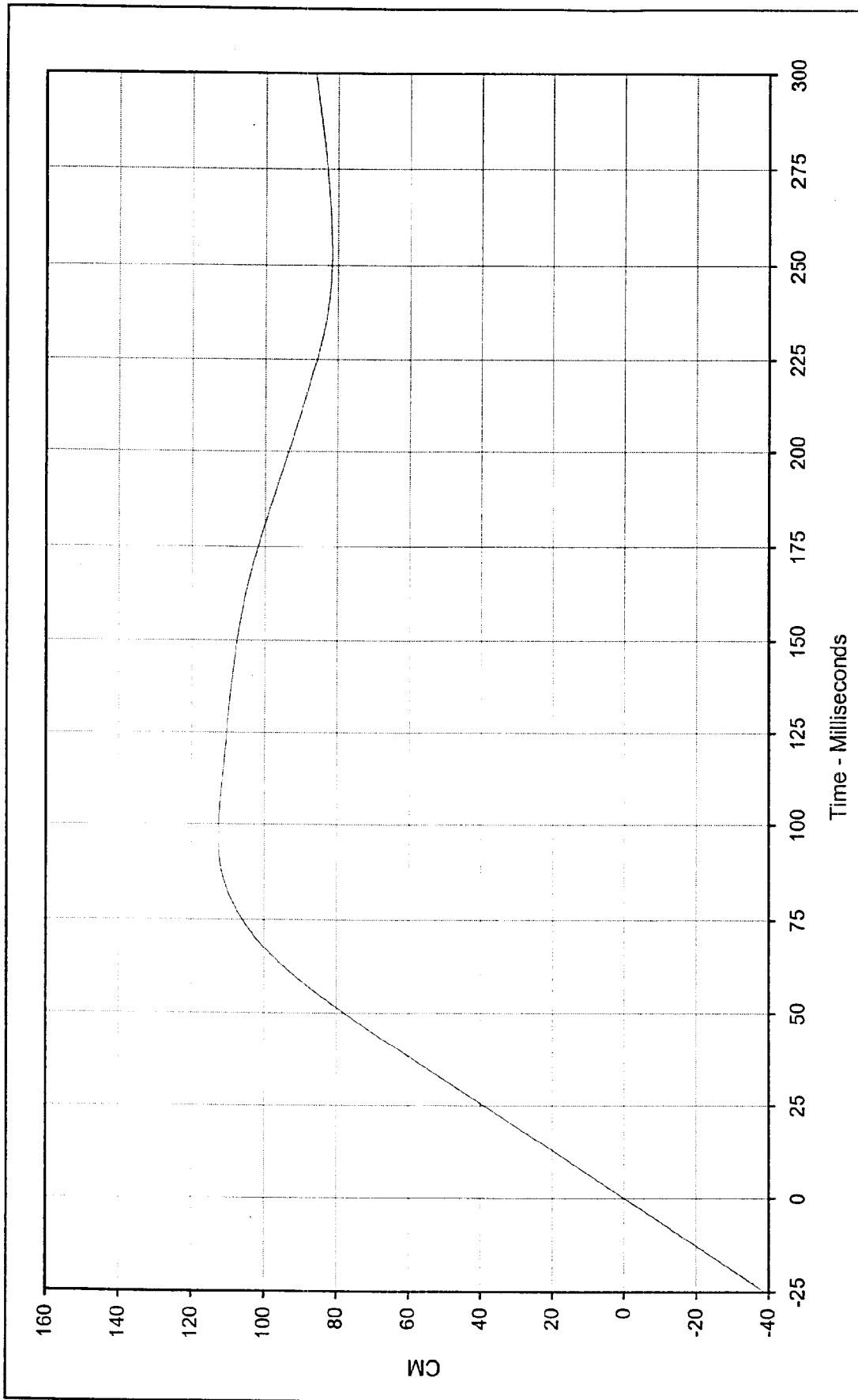






Curve Description:			Driver Head Redundant X Velocity		Testing Program	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	56.5	at	27.2	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-12.4	at	191.2	Milliseconds			
SAE Filter Class:	180						
Date of Test:	5/20/99						
Curve Number:	IN1-004						





Curve Description: Driver Head Redundant X Displ.

Maximum Value: 112.6 at 96.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

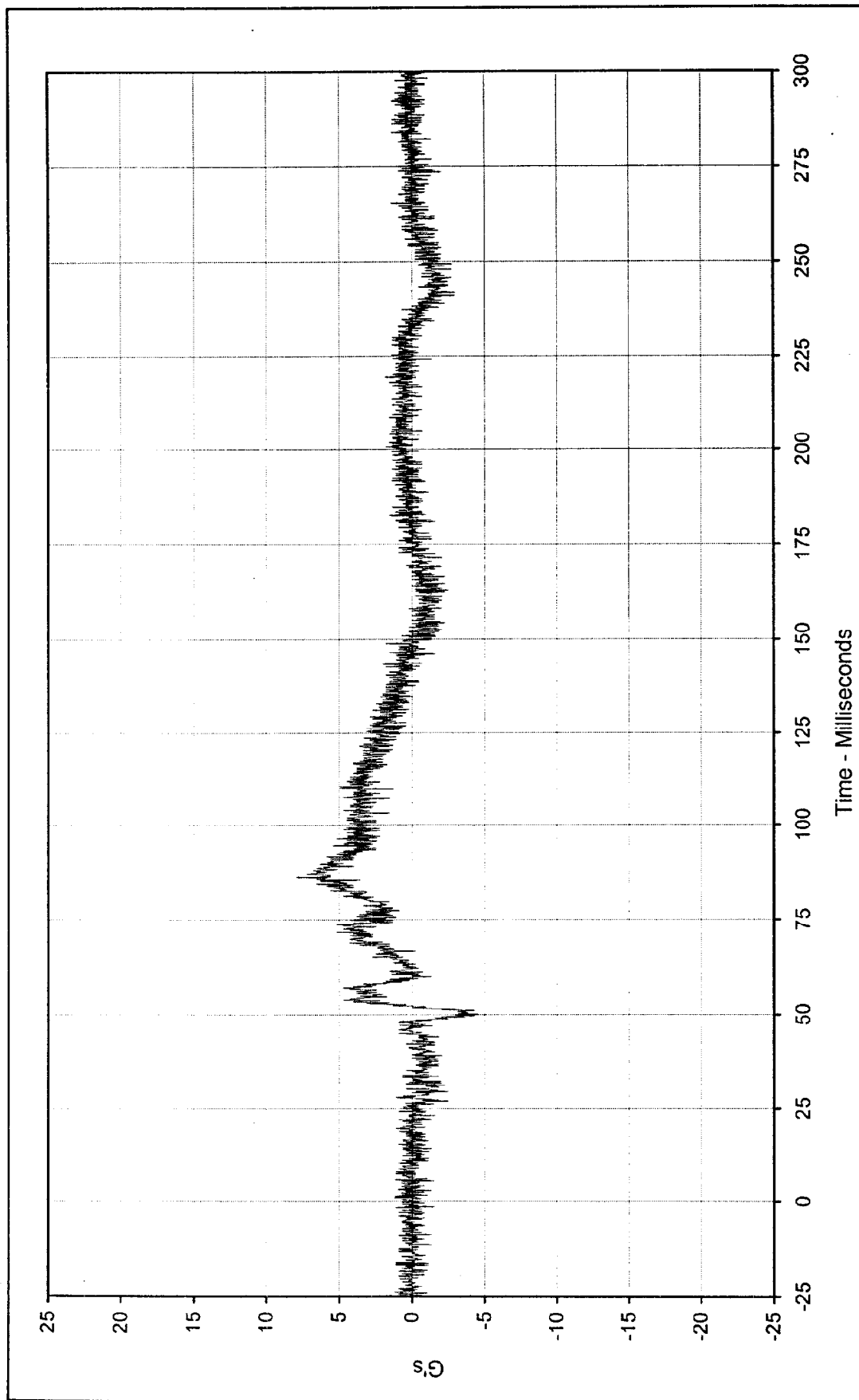
Date of Test: 5/20/99

Curve Number: IN2-004

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan



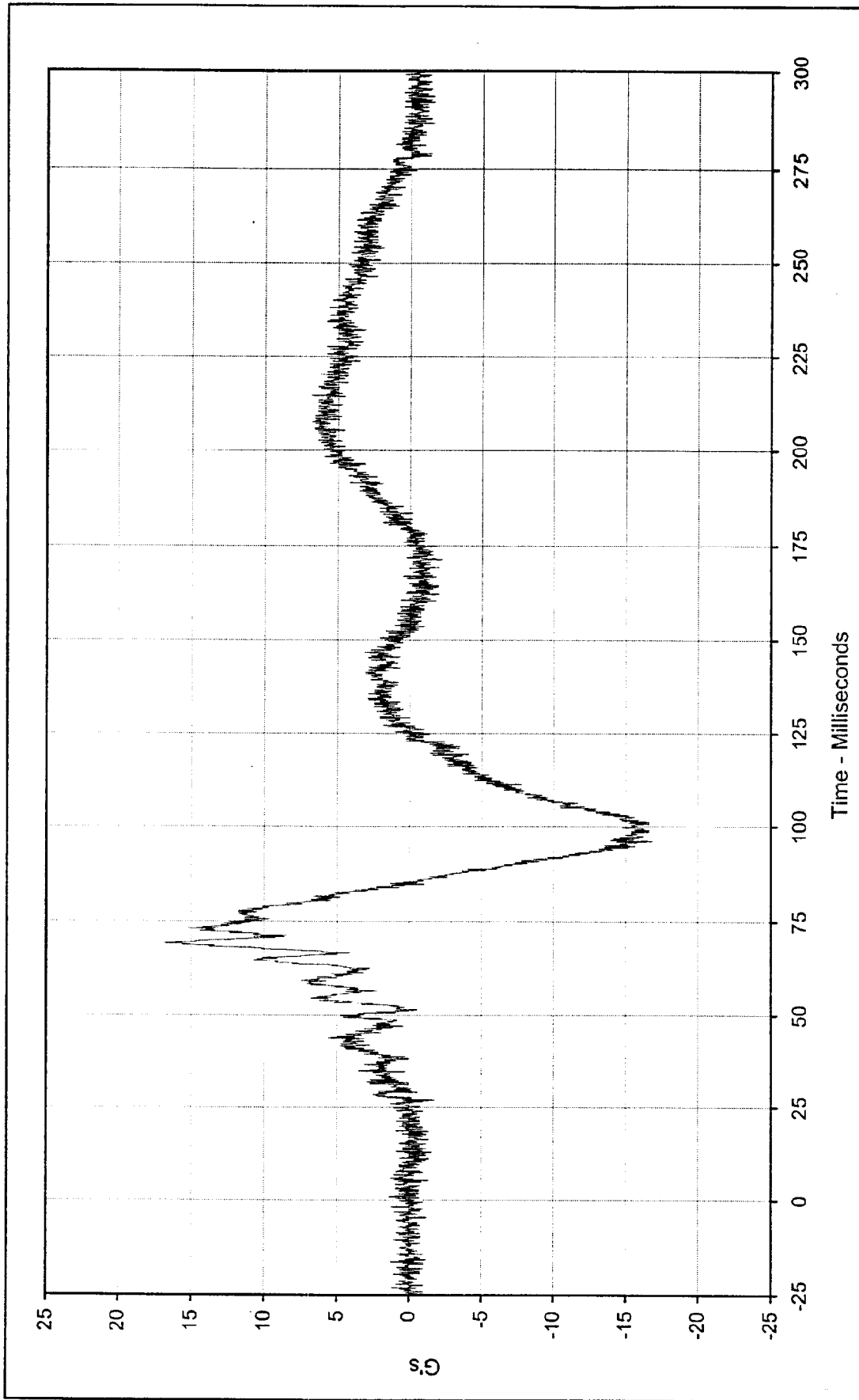


Curve Description:	Driver Head Redundant Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001	
Maximum Value:	7.9	at	86.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-4.5	at	50.1		
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-005				



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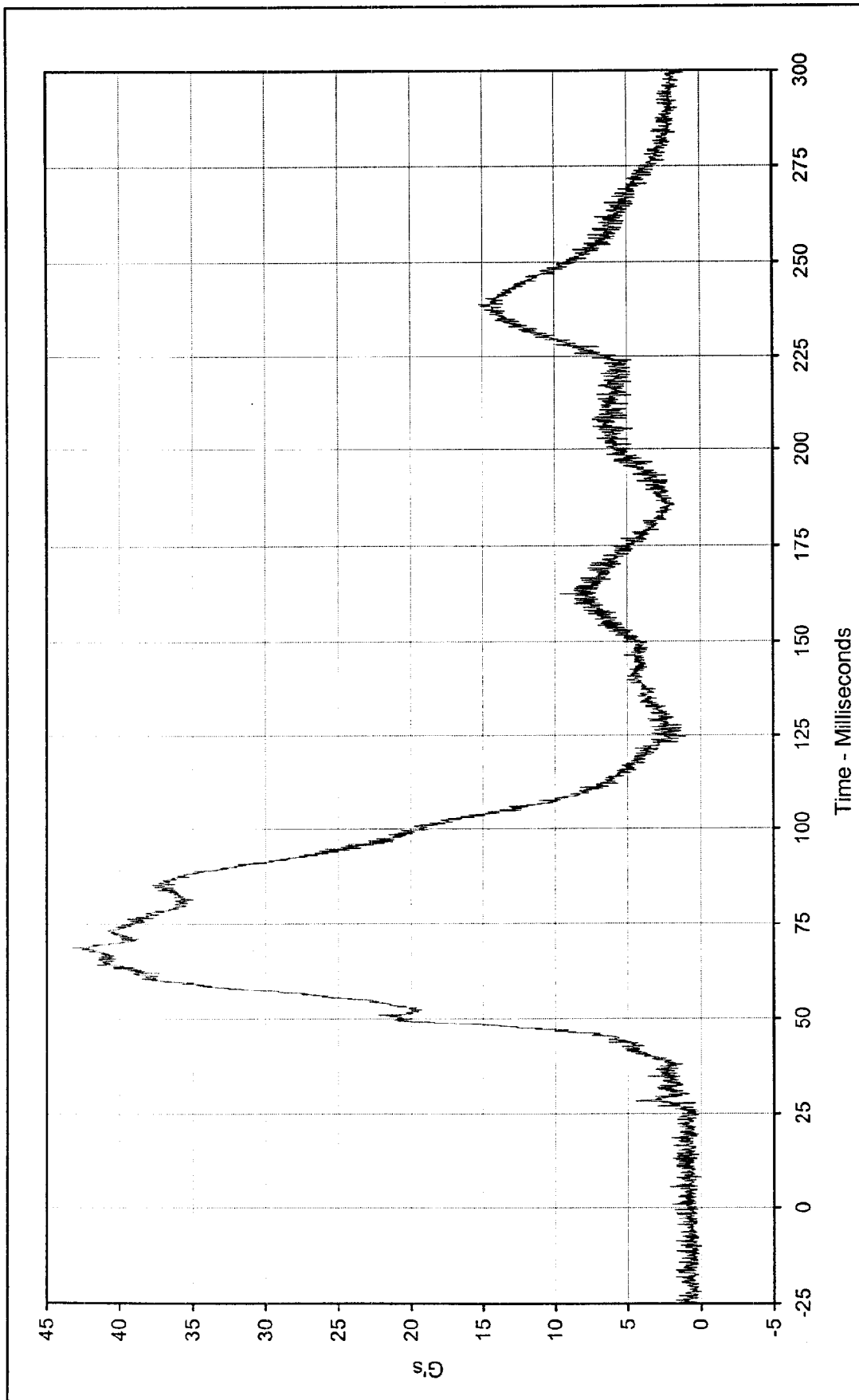




Curve Description:		Driver Head Redundant Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	16.9	at	69.1	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-16.8	at	96.0			
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-006					







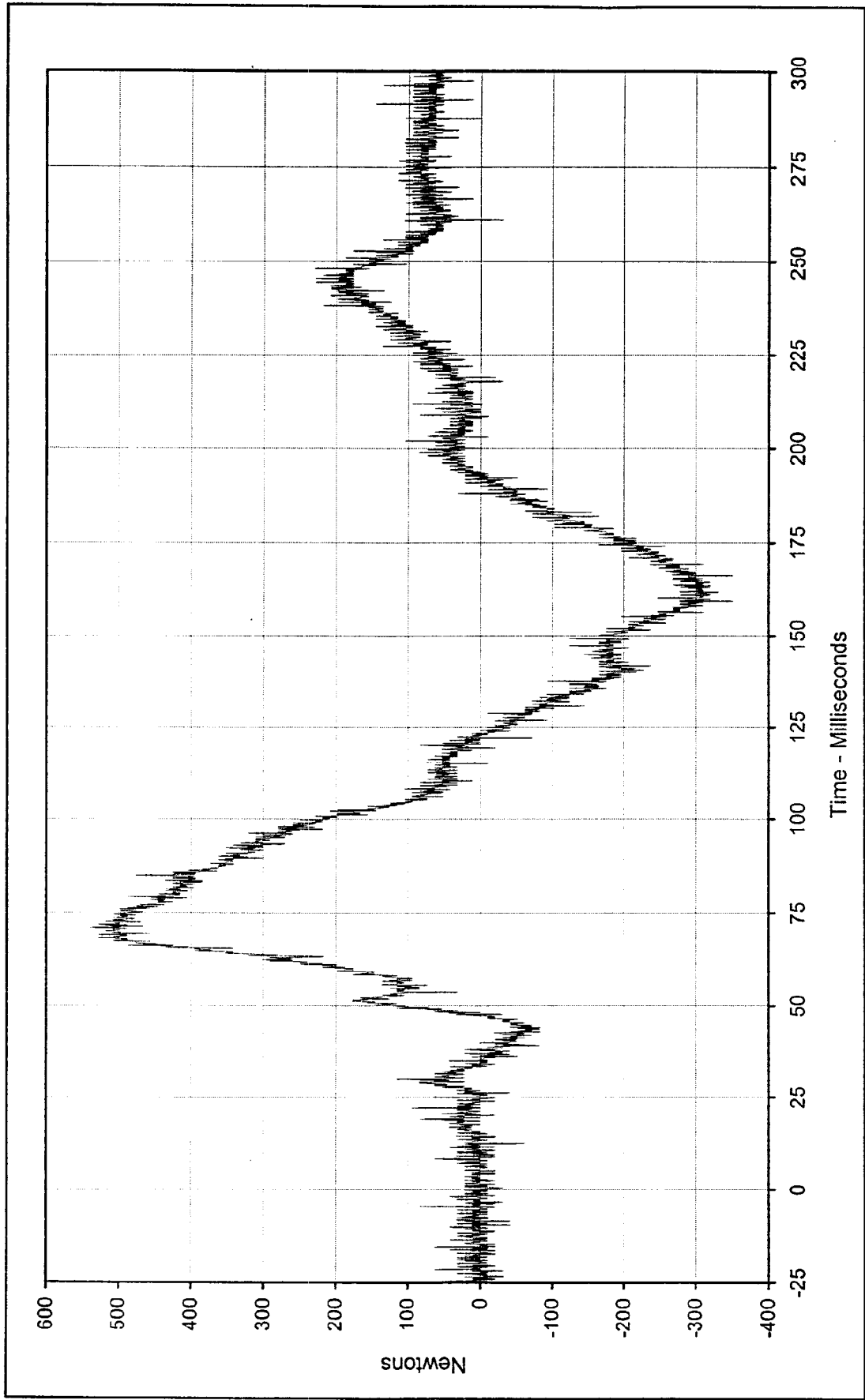
Curve Description: Driver Head Resultant Redundant

Maximum Value:	43.3	at	68.9	Milliseconds
Minimum Value:	0.0	at	7.9	Milliseconds
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	RES-004			

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

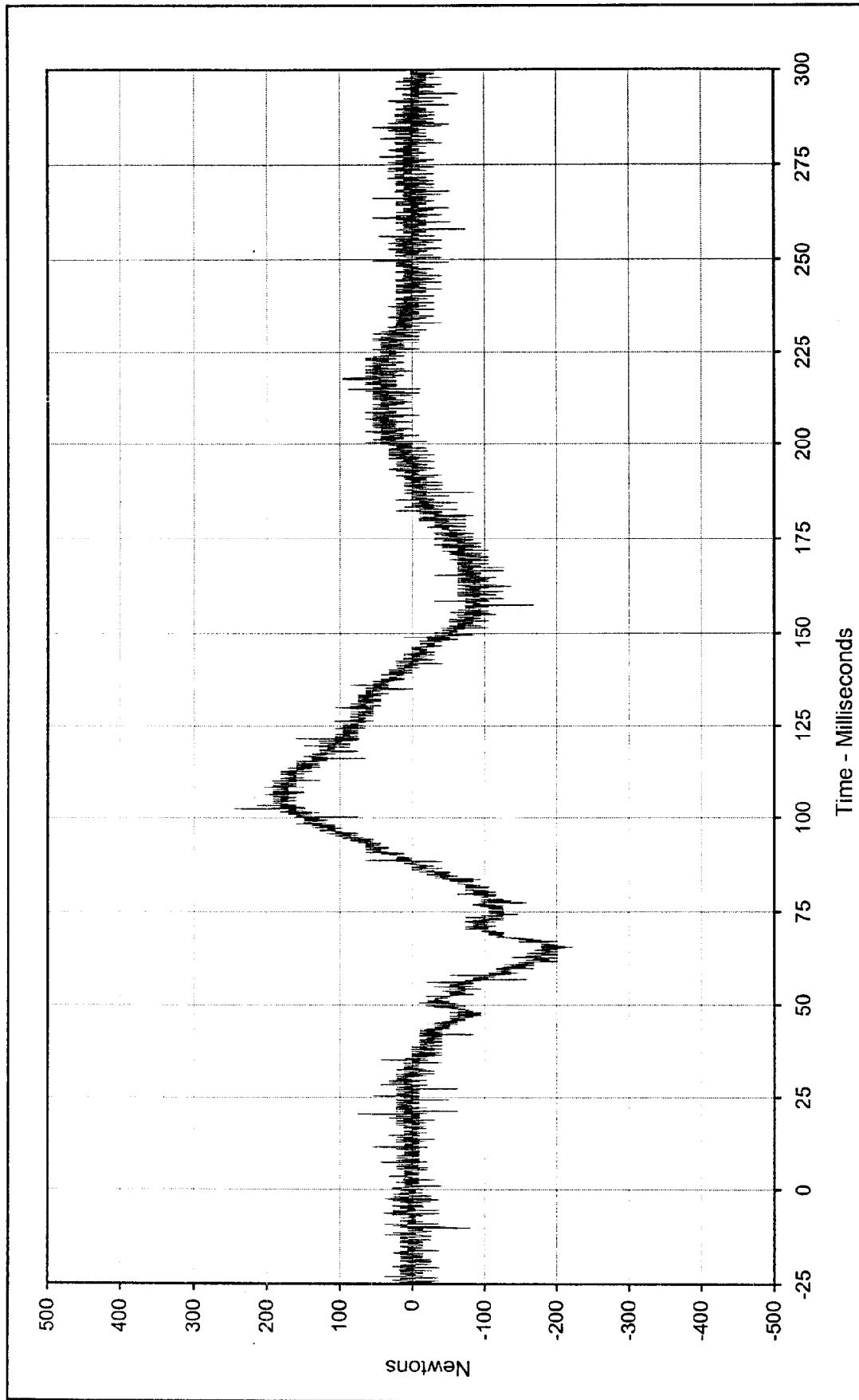




Curve Description:		Driver Neck Force X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	538.6	at	71.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-351.6	at	159.4			
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-007					

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Curve Description: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Program: 2000 Chevrolet Impala 4 Door Sedan

Maximum Value: 244.7 at 102.5 Milliseconds

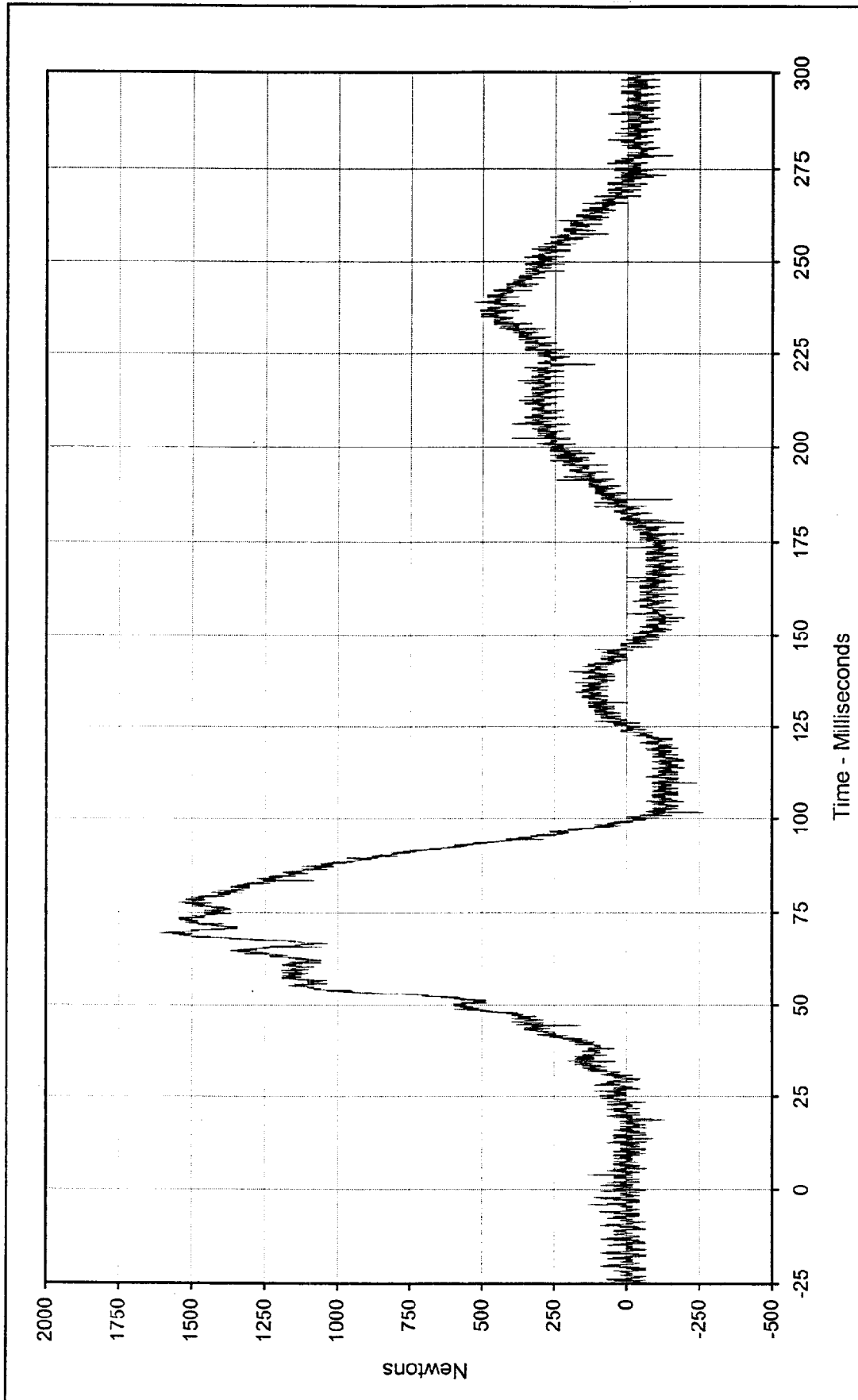
Minimum Value: -222.3 at 65.4 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

Curve Number: FIL-008

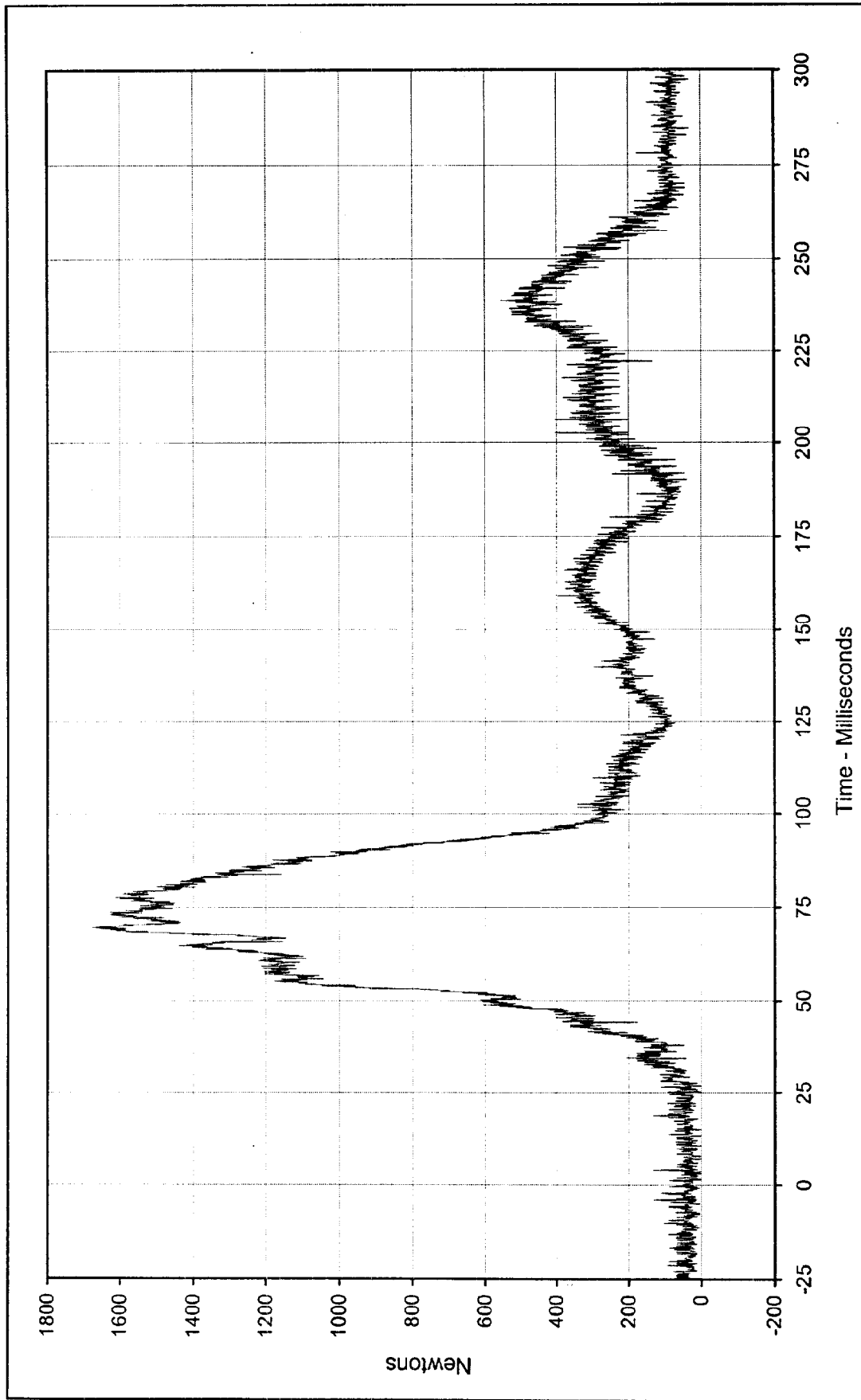




Curve Description:	Driver Neck Force Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	1609.7	at 69.5	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-264.6	at 101.7			
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-009				







Curve Description: Driver Neck Force Resultant

Maximum Value: 1677.0 at 69.5 Milliseconds

Minimum Value: 0.7 at 1.4 Milliseconds

SAE Filter Class: 1000

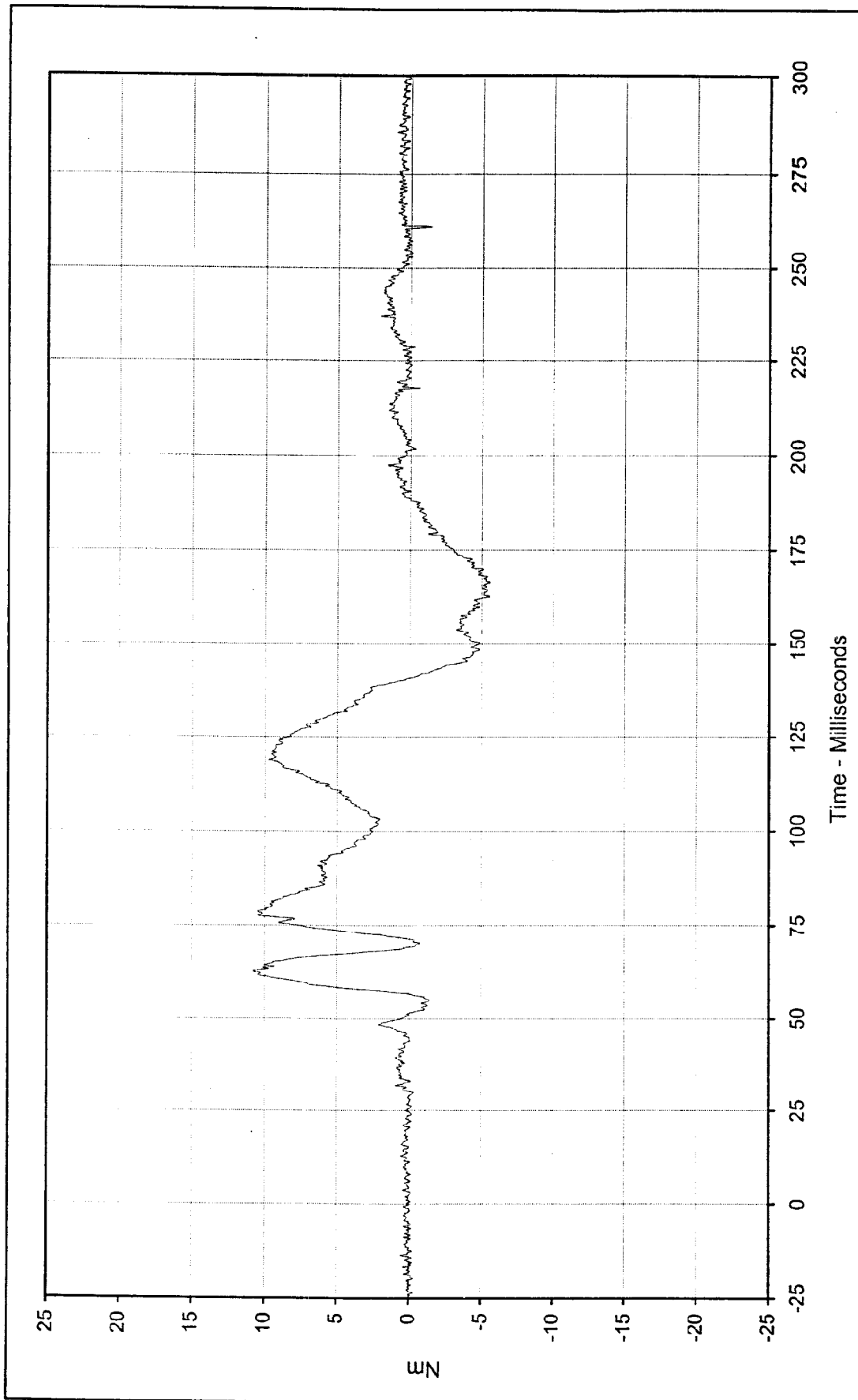
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Curve Number: RES-007

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

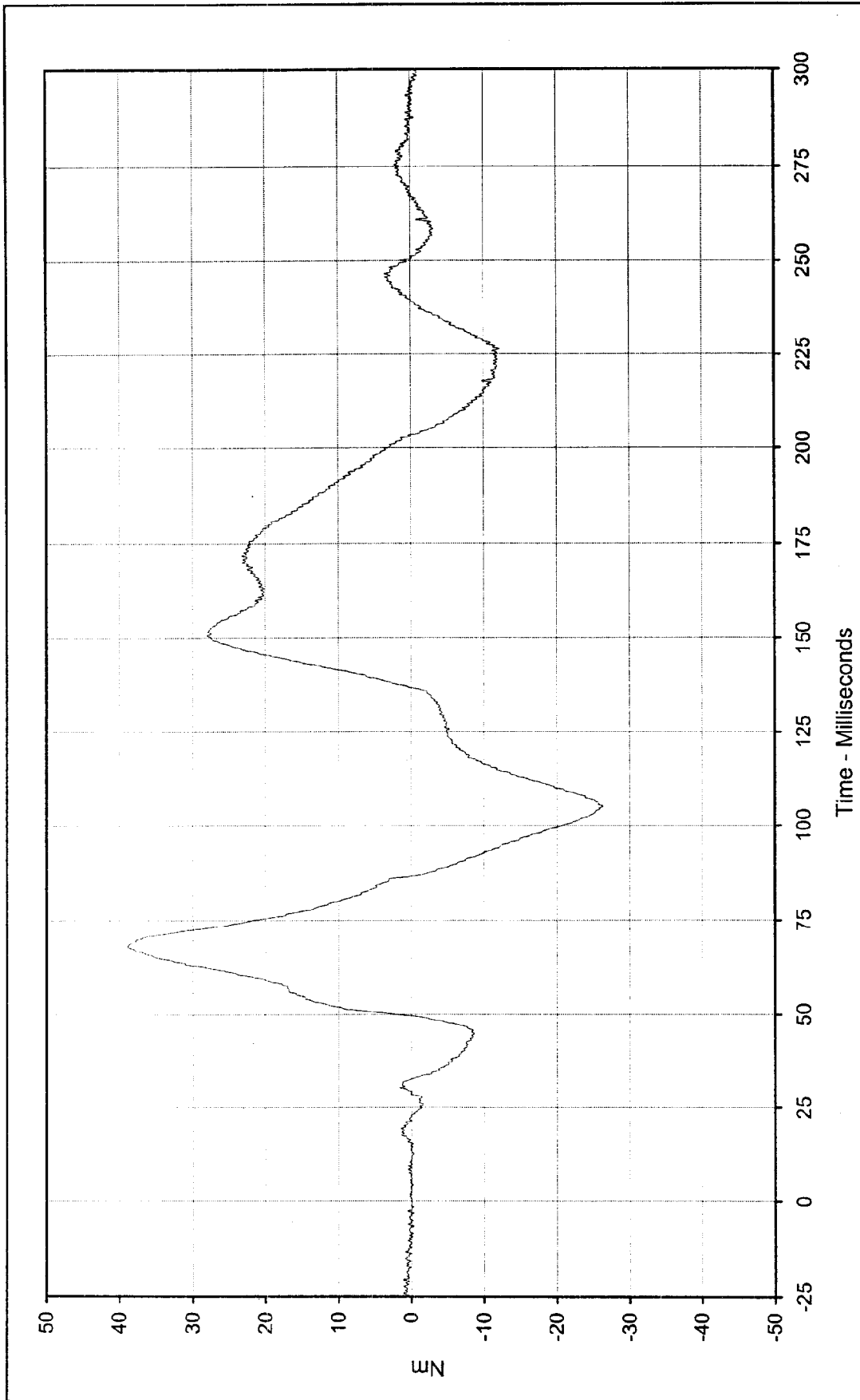
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





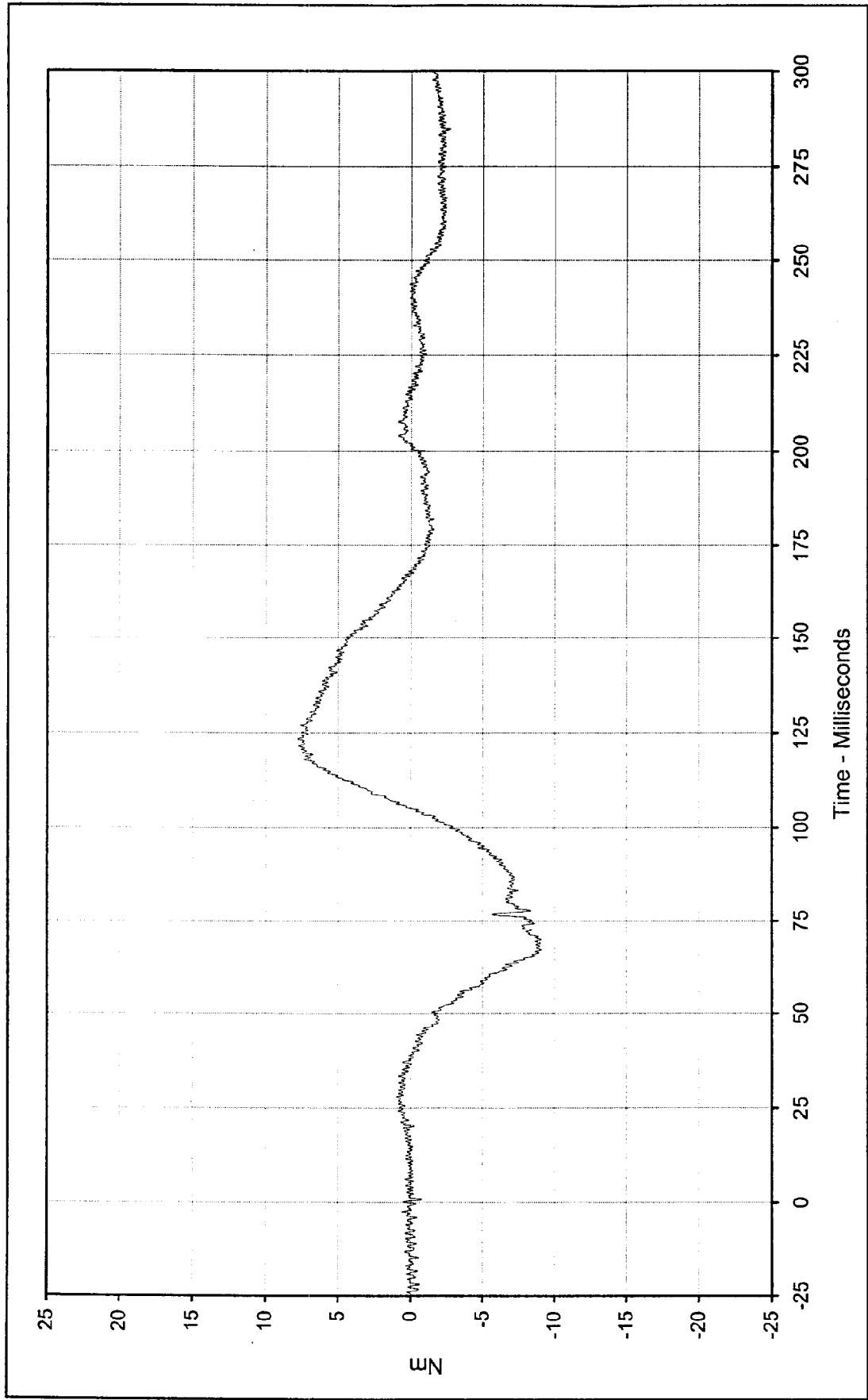
Curve Description:	Driver Neck Moment X	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	10.8	at	62.6	Milliseconds
Minimum Value:	-5.6	at	166.5	Milliseconds
SAE Filter Class:	600	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Date of Test:	5/20/99			
Curve Number:	FIL-010			





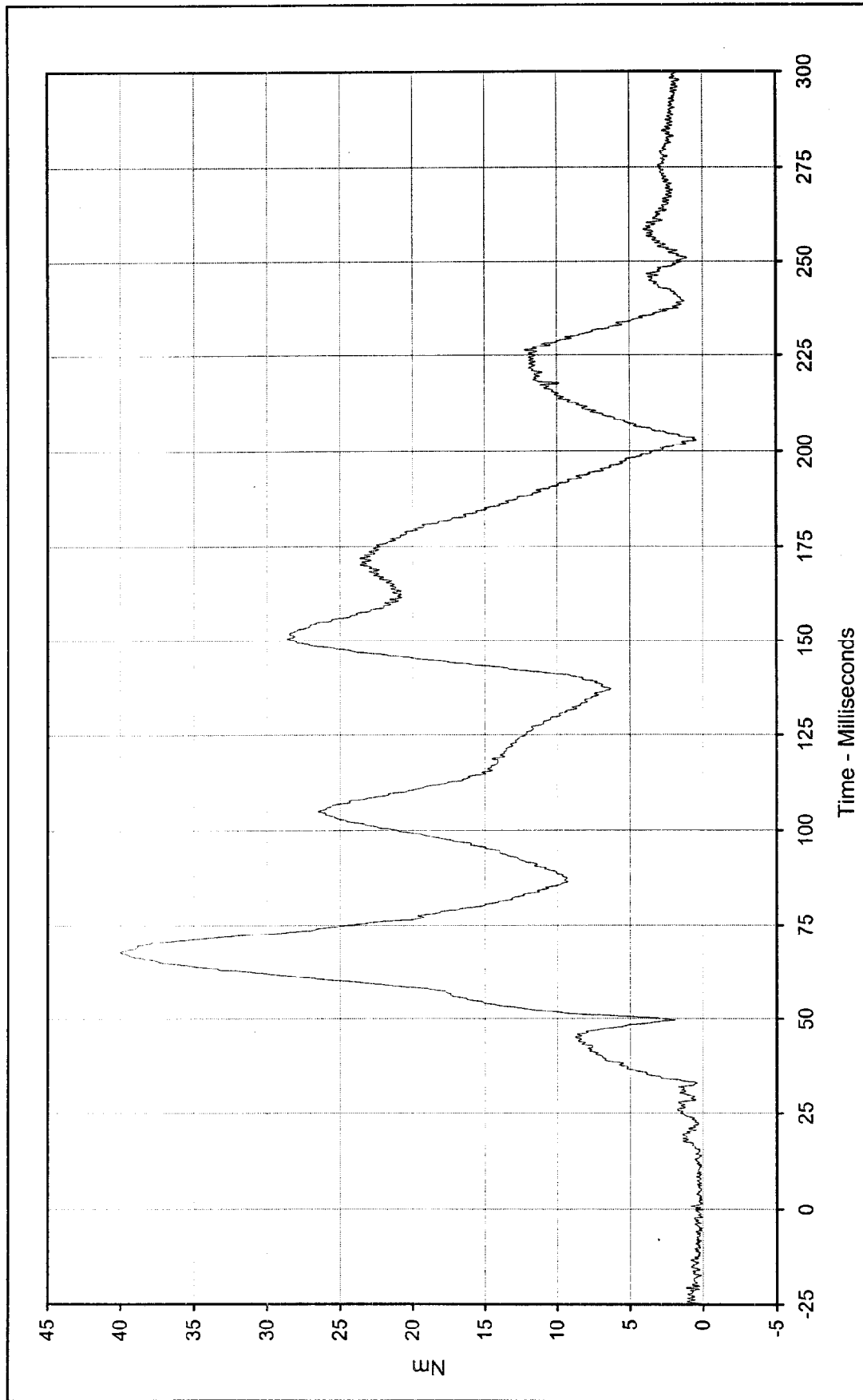
Curve Description:	Driver Neck Moment Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	38.9 at 67.8 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-26.4 at 105.0 Milliseconds			
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-011			





Curve Description:	Driver Neck Moment Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	7.8	at 123.2	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-9.1	at 67.0			
SAE Filter Class:	600				
Date of Test:	5/20/99				
Curve Number:	FIL-012				





Curve Description: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Program: 2000 Chevrolet Impala 4 Door Sedan

Driver Neck Moment Resultant

Maximum Value: 40.0 at 67.8 Milliseconds

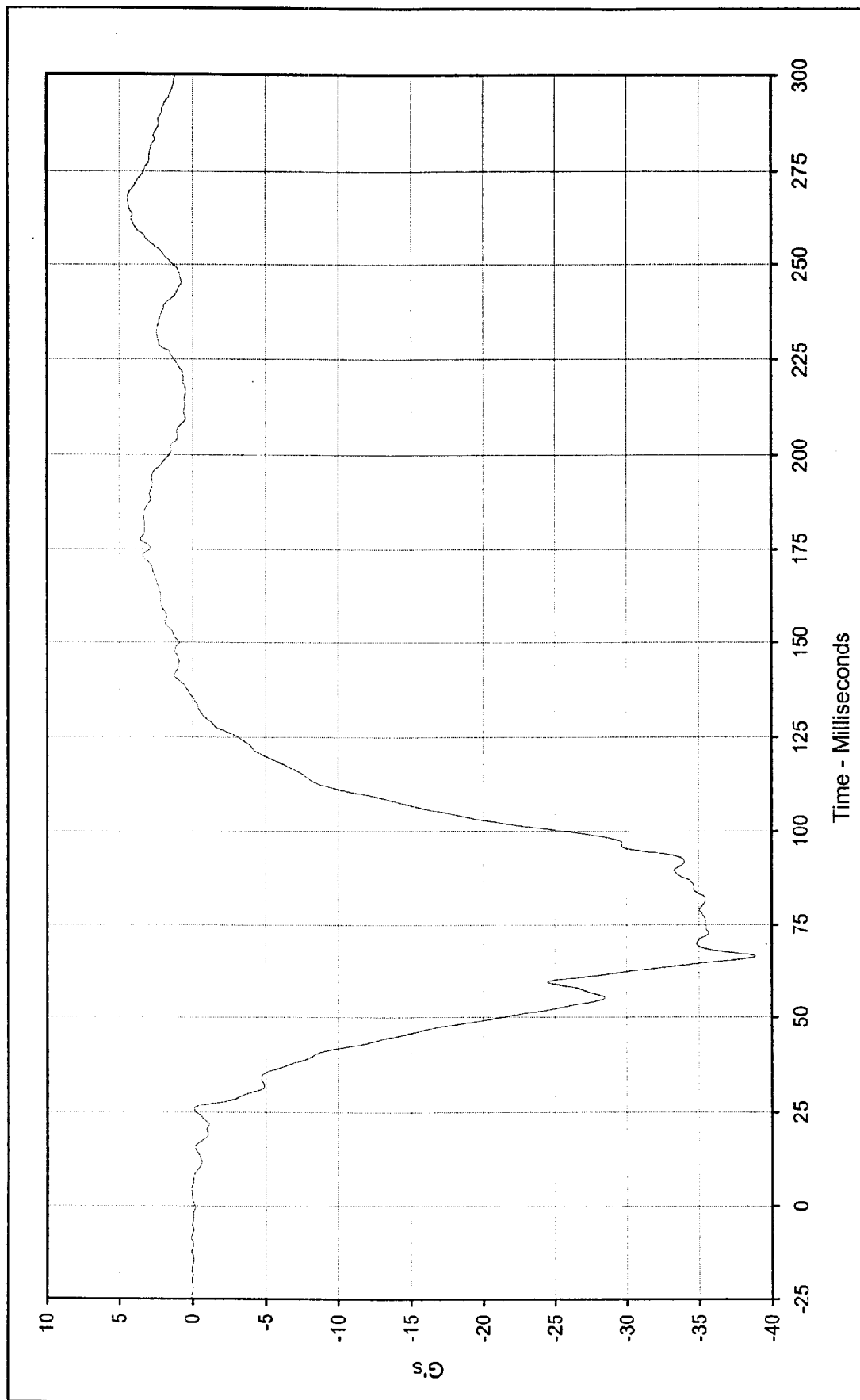
Minimum Value: 0.1 at 1.6 Milliseconds

SAE Filter Class: 600

Date of Test: 5/20/99

Curve Number: RES-010





Curve Description: Driver Chest Primary X

Maximum Value: 4.5 at 267.8 Milliseconds

Minimum Value: -38.9 at 66.3 Milliseconds

SAE Filter Class: 180

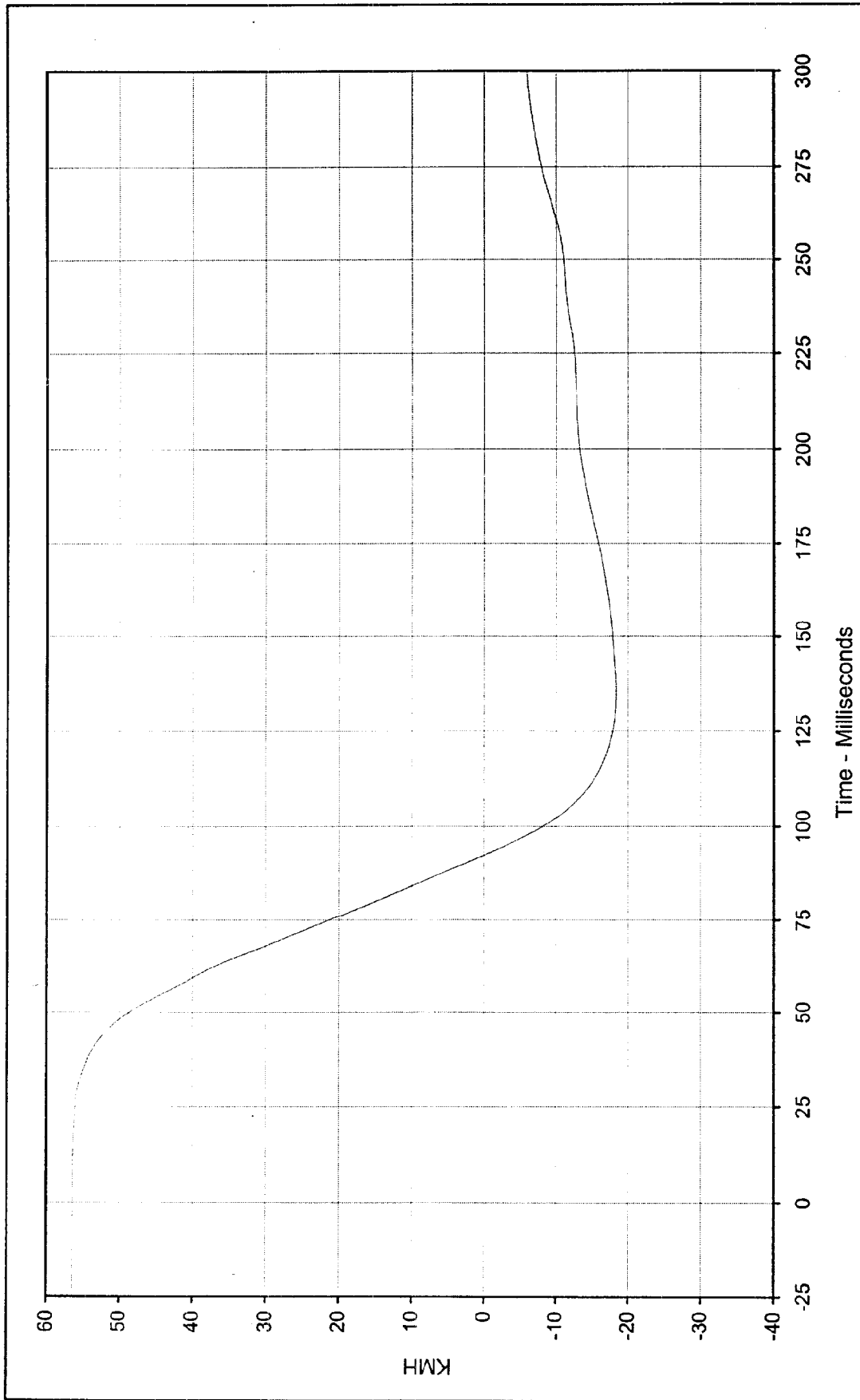
Date of Test: 5/20/99

Curve Number: FIL-013

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

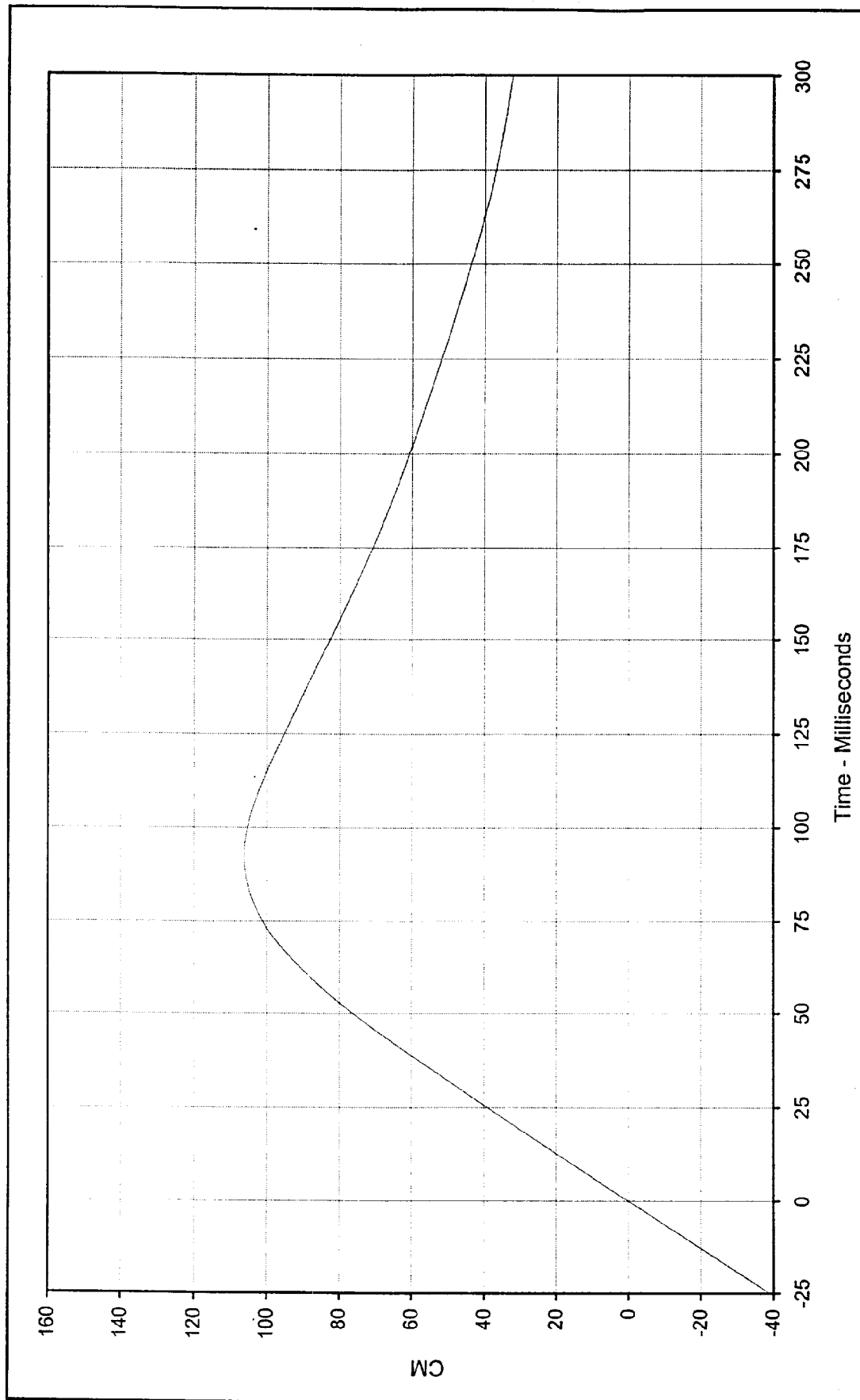
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description:	Driver Chest Primary X Velocity	Testing Program	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	56.4 at 5.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-18.3 at 135.5 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN1-013			





Curve Description: Driver Chest Primary X Displ.

Maximum Value: 106.3 at 92.3 Milliseconds

Minimum Value: 0.1 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 5/20/99

Curve Number: IN2-013

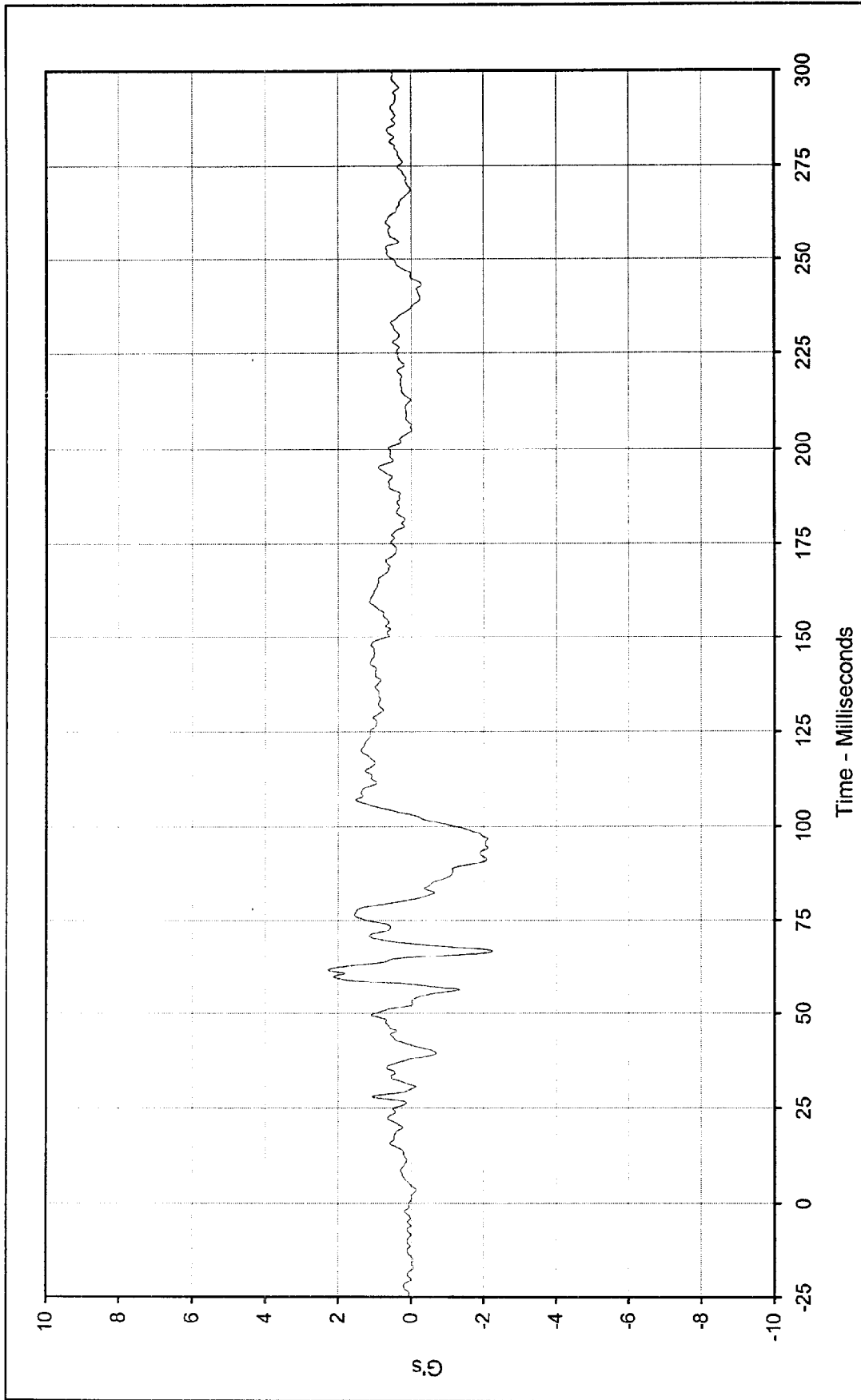
Test Program:

1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle:

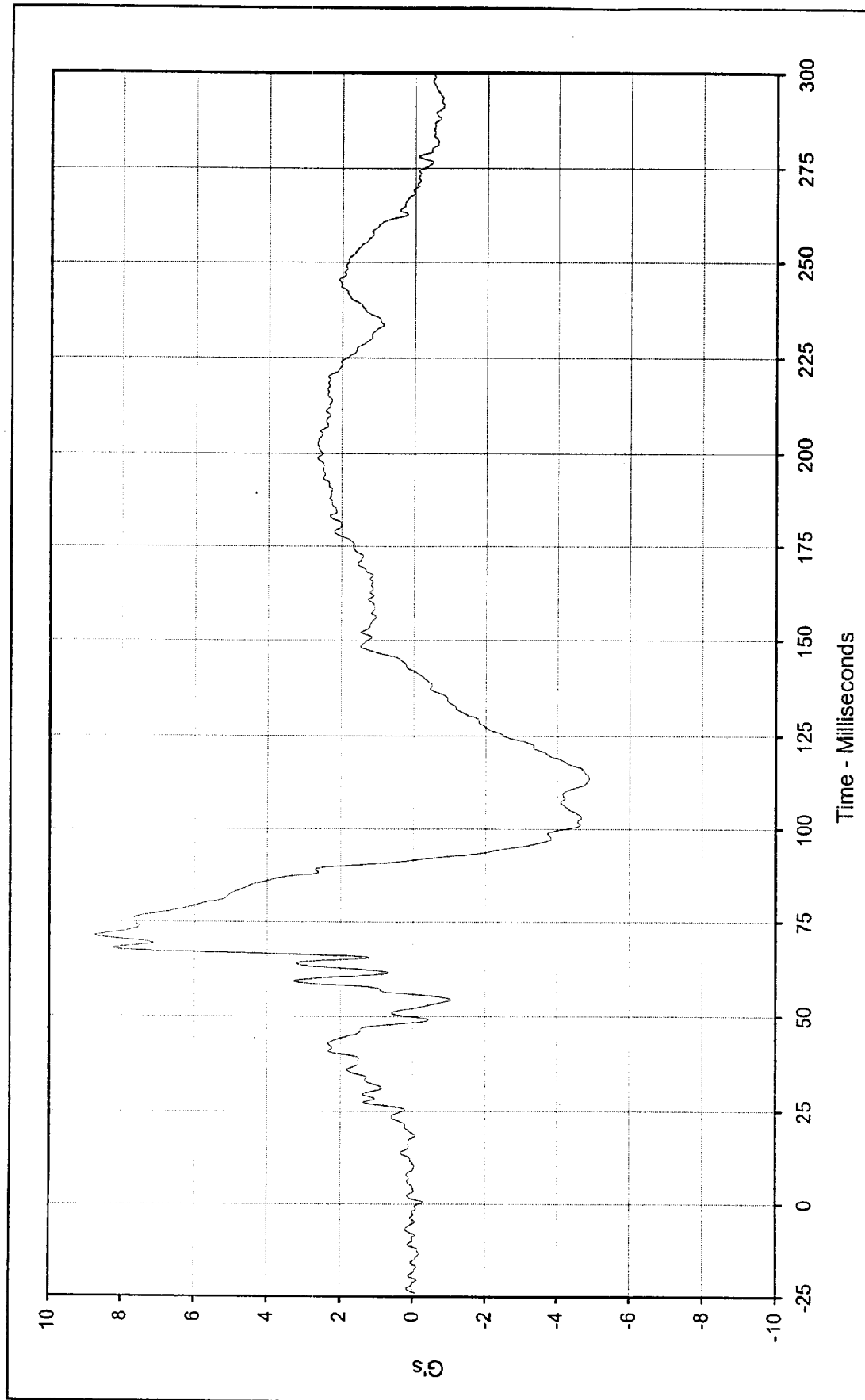
2000 Chevrolet Impala 4 Door Sedan





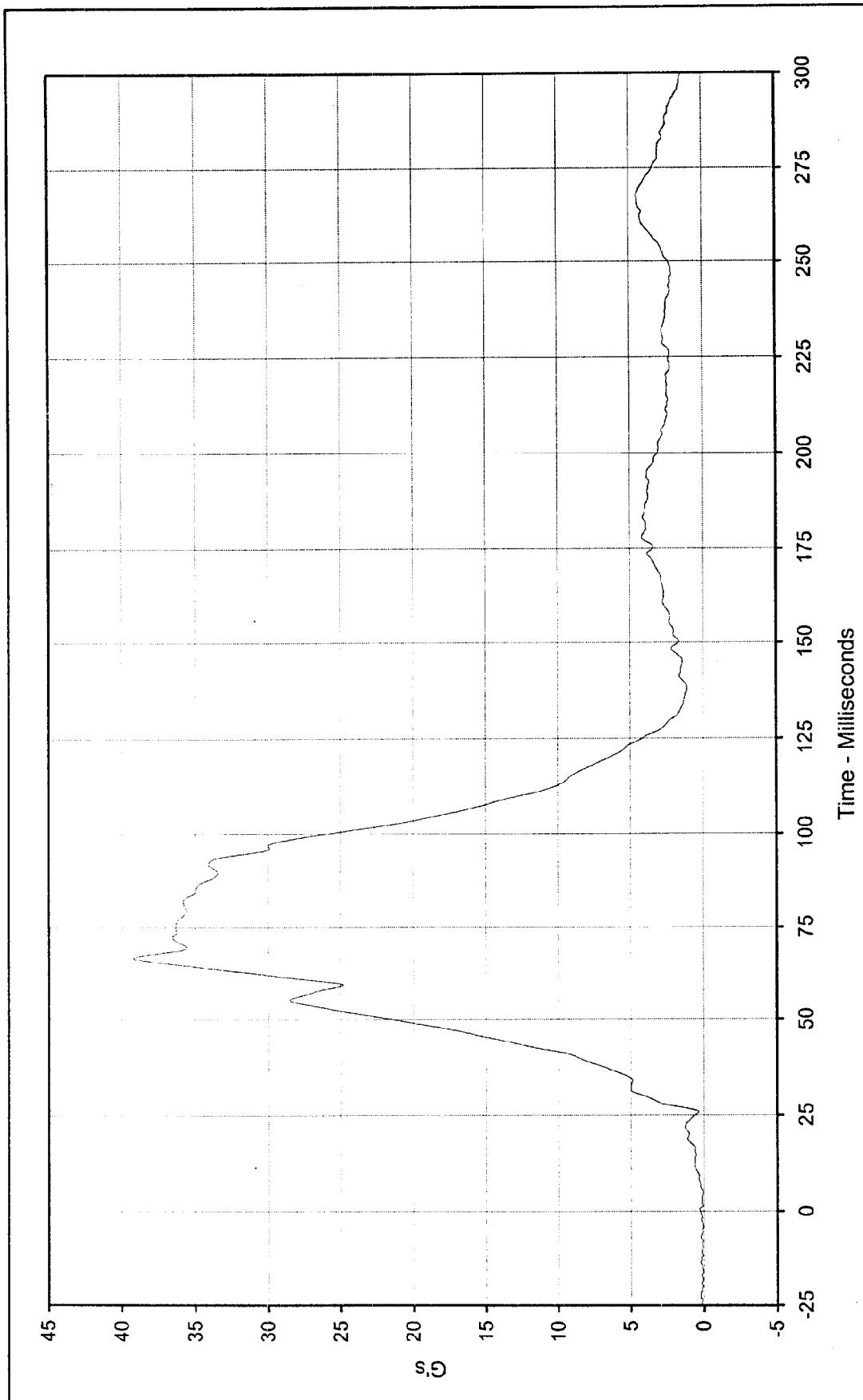
Curve Description:	Driver Chest Primary Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	2.3 at 61.6 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-2.3 at 66.5 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	FIL-014			





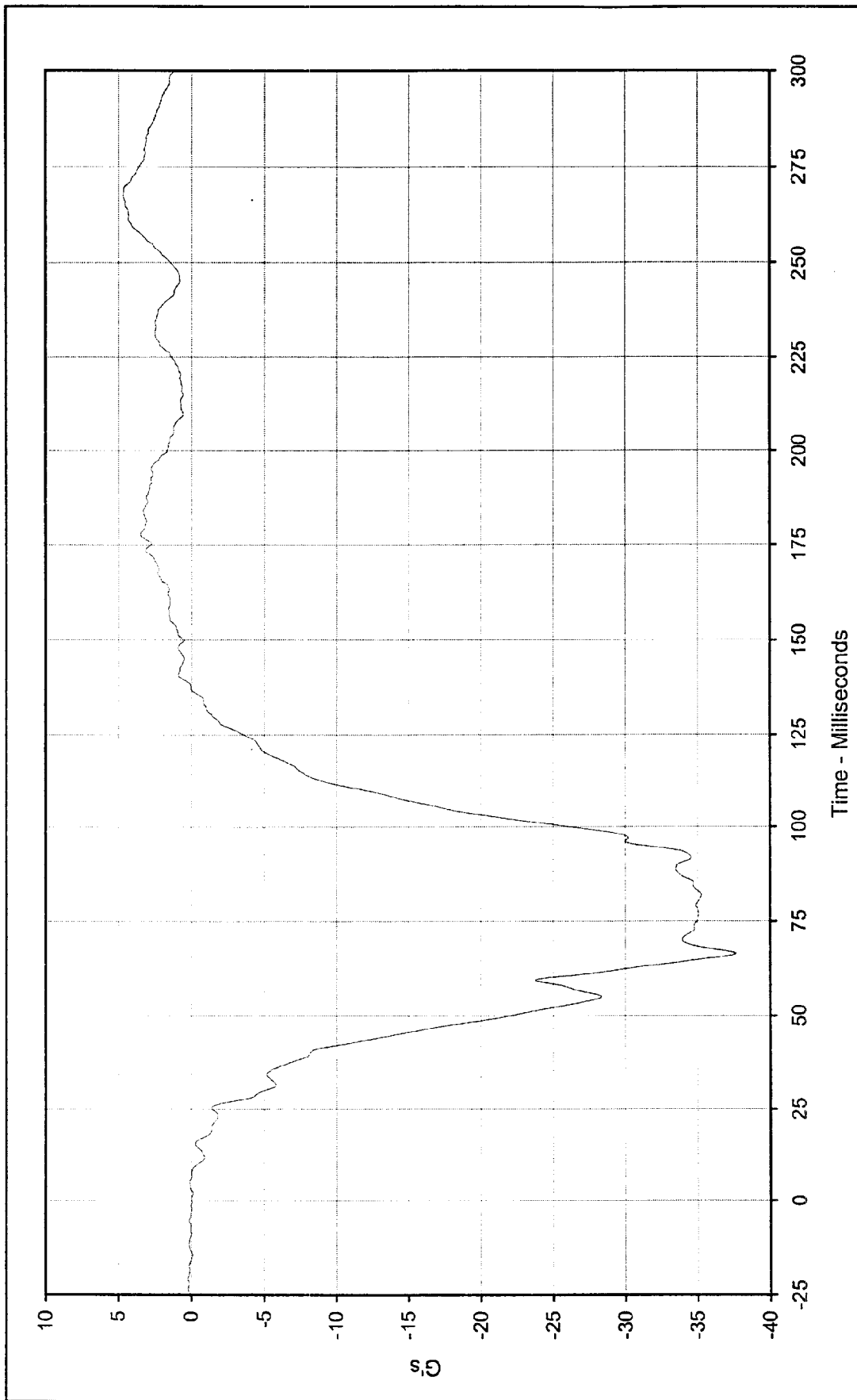
Curve Description:	Driver Chest Primary Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	8.7	at 71.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-4.9	at 113.7 Milliseconds			
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	FIL-015				





Curve Description:	Driver Chest Resultant Primary	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	39.2 at 66.4 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.0 at 1.4 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	RES-013			





Curve Description: Driver Chest Redundant X

Maximum Value: 4.7 at 267.8 Milliseconds

Minimum Value: -37.7 at 66.3 Milliseconds

SAE Filter Class: 180

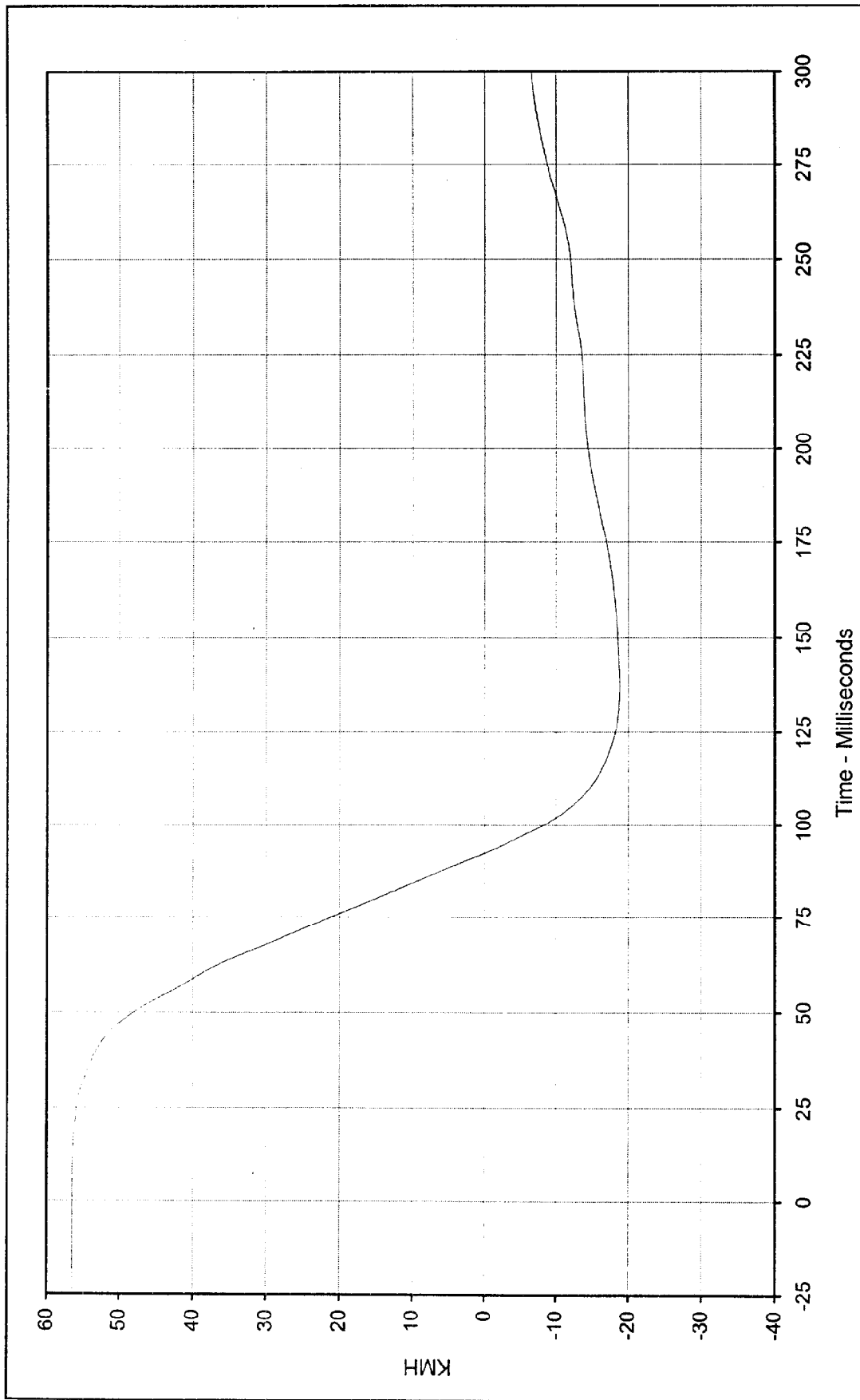
Date of Test: 5/20/99

Curve Number: FIL-016

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Driver Chest Redundant X Velocity

Maximum Value: 56.5 at 6.3 Milliseconds

Minimum Value: -18.8 at 136.8 Milliseconds

SAE Filter Class: 180

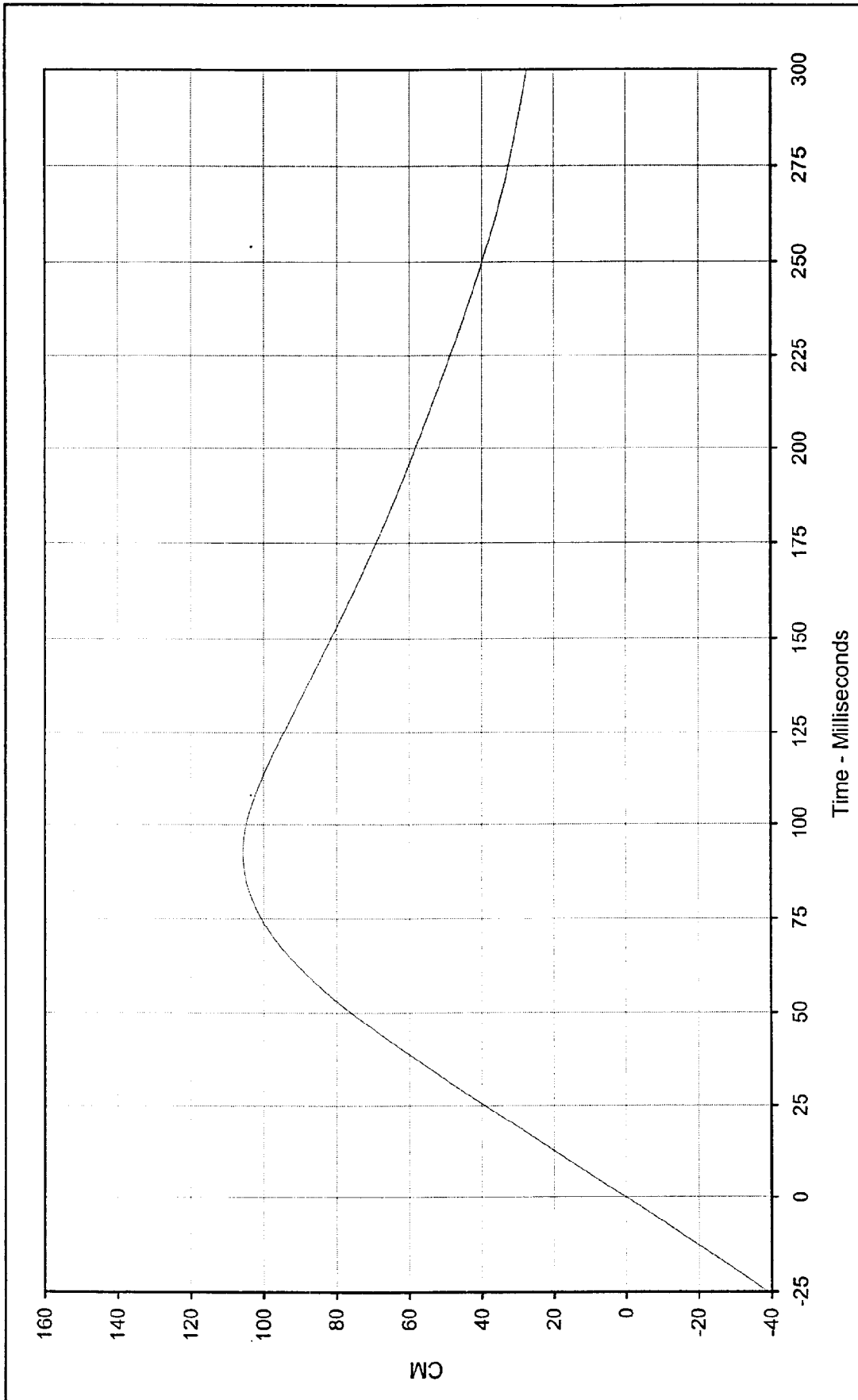
Date of Test: 5/20/99

Curve Number: IN1-016

Testing Program 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Driver Chest Redundant X Displ.

Maximum Value: 105.7 at 92.3 Milliseconds

Minimum Value: 0.1 at 0.0 Milliseconds

SAE Filter Class: 180

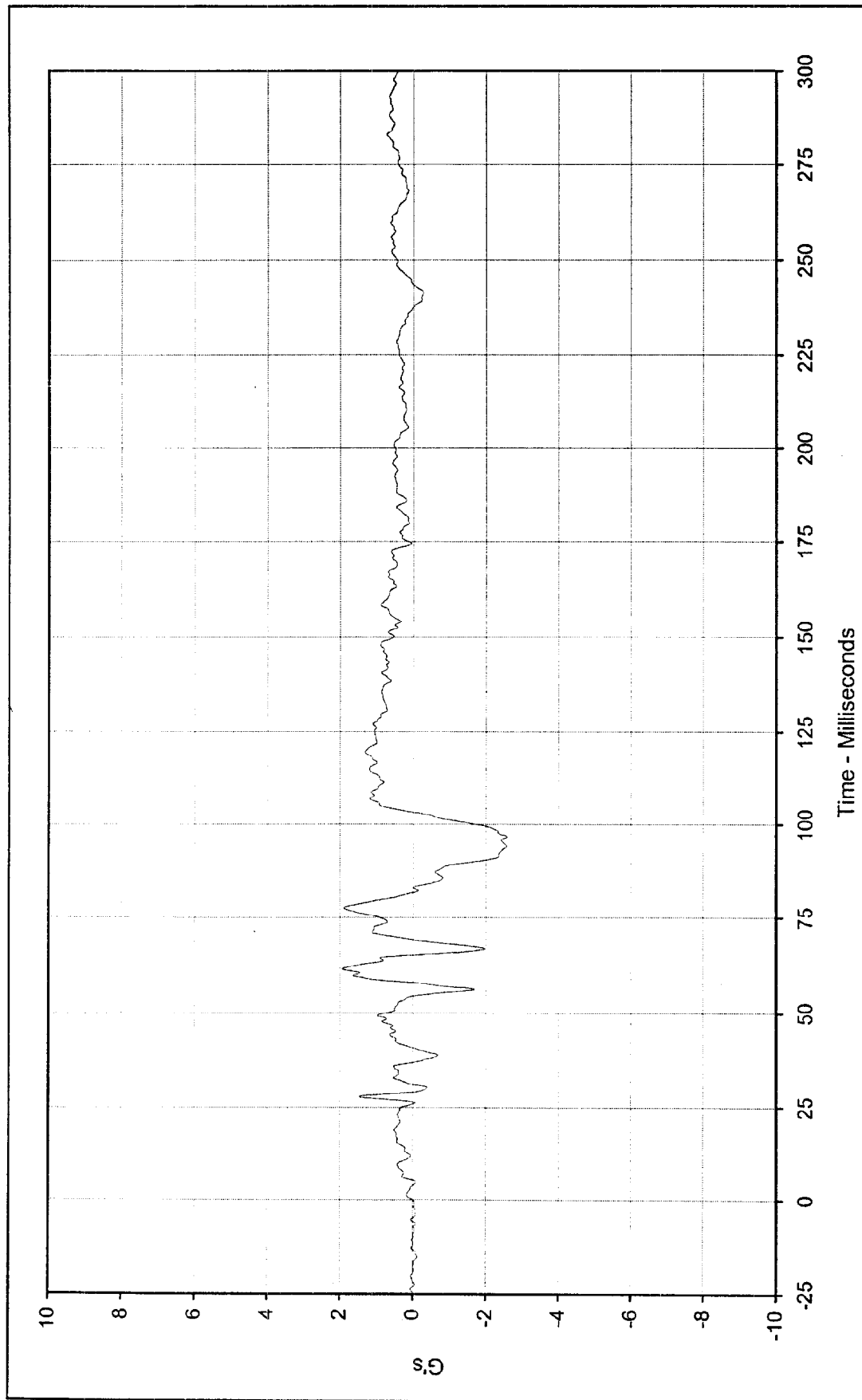
Date of Test: 5/20/99

Curve Number: IN2-016

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Driver Chest Redundant Y

Maximum Value: 1.9 at 61.6 Milliseconds

Minimum Value: -2.6 at 96.6 Milliseconds

SAE Filter Class: 180

Date of Test: 5/20/99

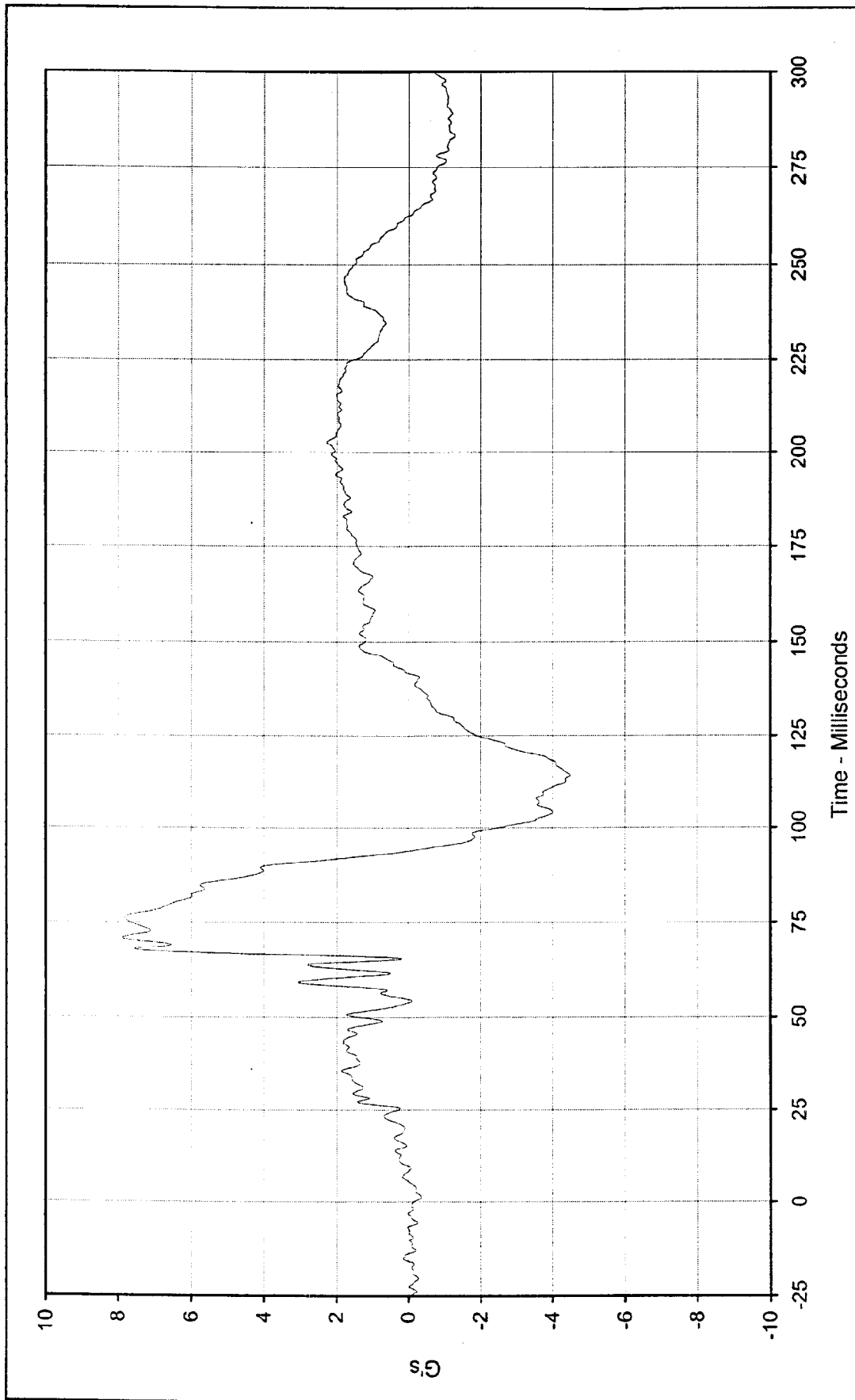
Curve Number: FIL-017

Test Program: 1999 NHTSA 35 mph NCAP

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

No.: GM0001





Curve Description: Driver Chest Redundant Z

Test Program: 1999 NHTSA 35 mph NCAP

No.: GM0001

Maximum Value: 7.9 at 71.0 Milliseconds

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

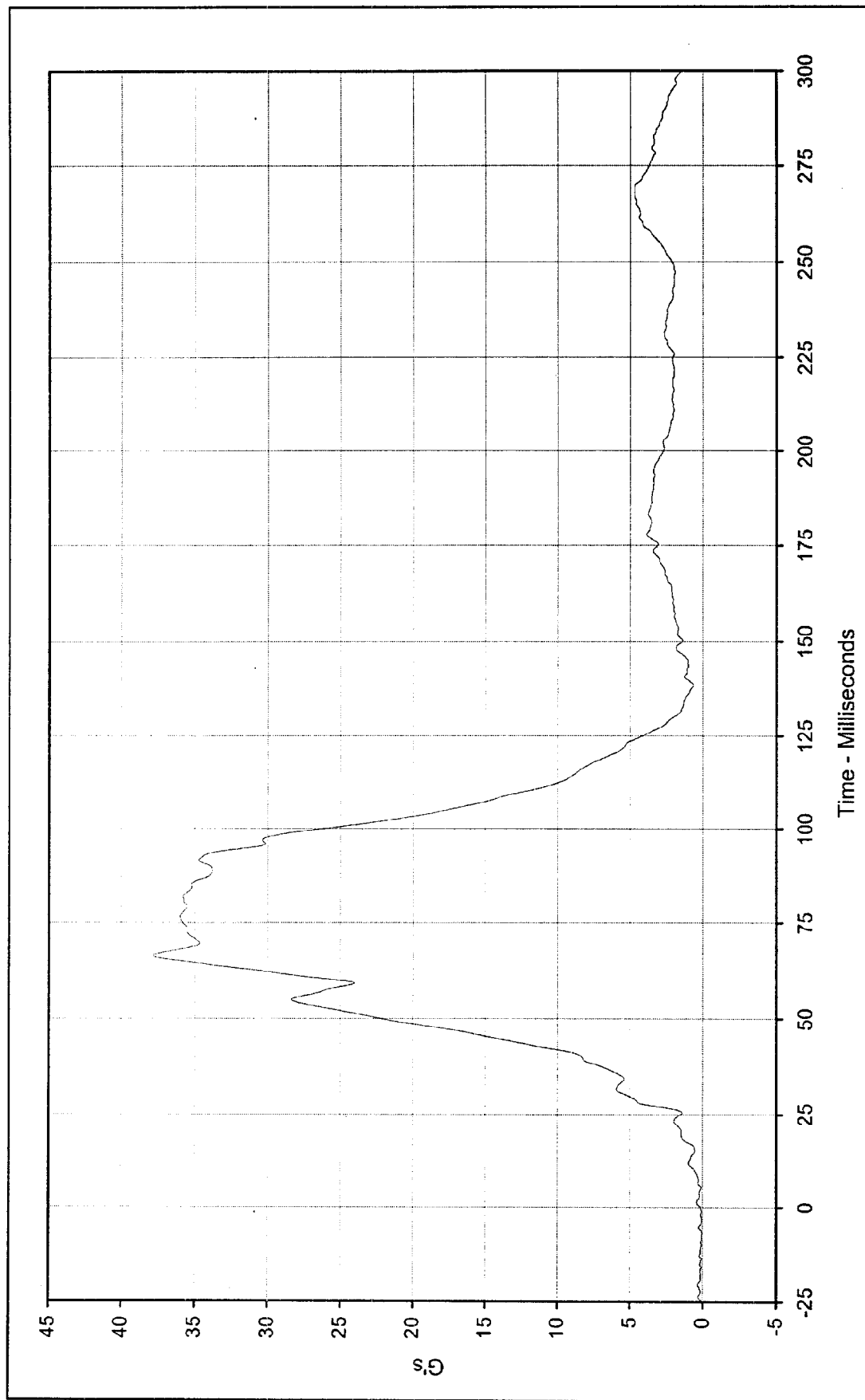
Minimum Value: -4.5 at 114.2 Milliseconds



SAE Filter Class: 180

Date of Test: 5/20/99

Curve Number: FIL-018

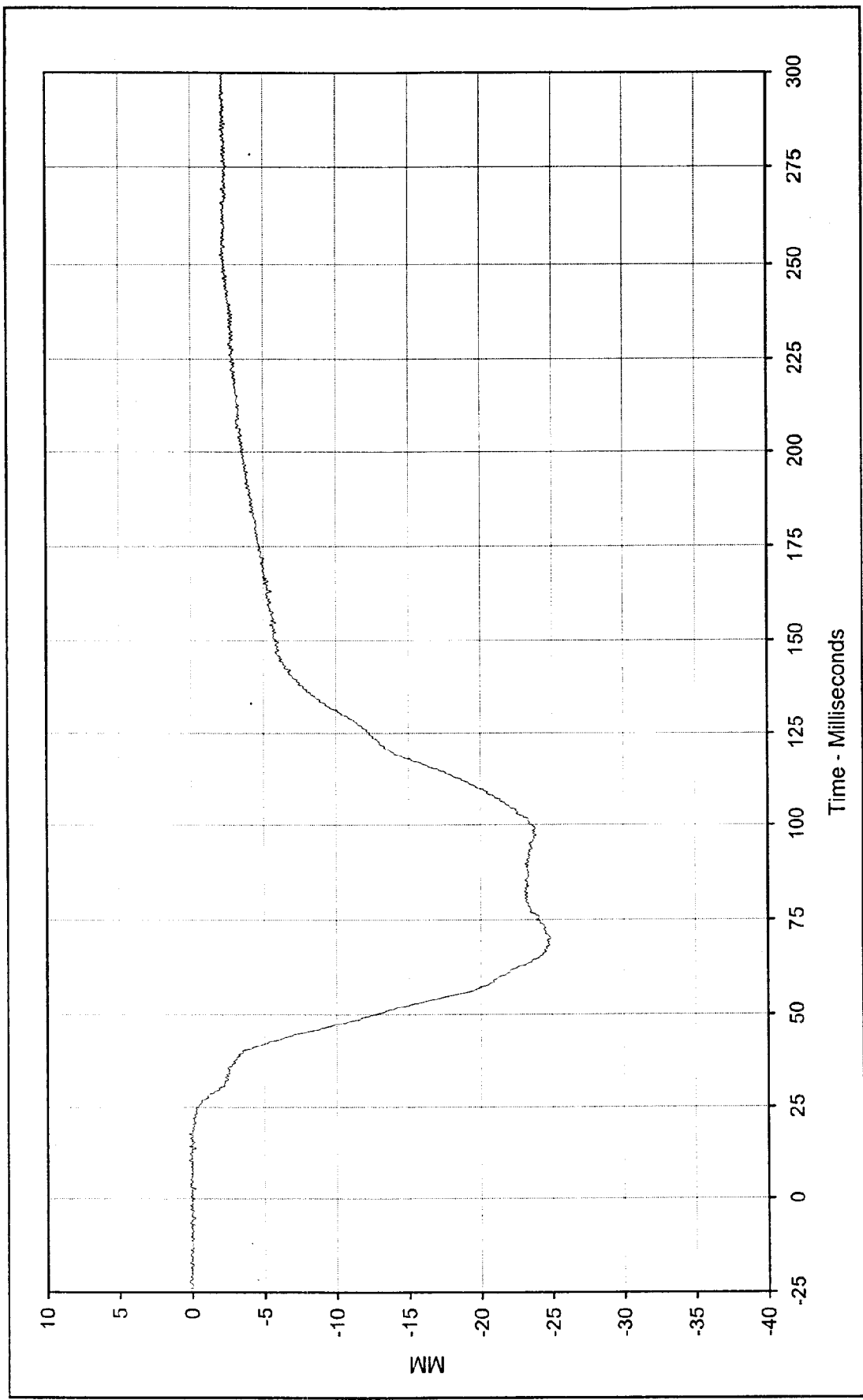


Curve Description: Driver Chest Resultant Redundant
 Maximum Value: 37.8 at 66.4 Milliseconds
 Minimum Value: 0.1 at 5.3 Milliseconds
 SAE Filter Class: 180
 Date of Test: 5/20/99
 Curve Number: RES-016

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

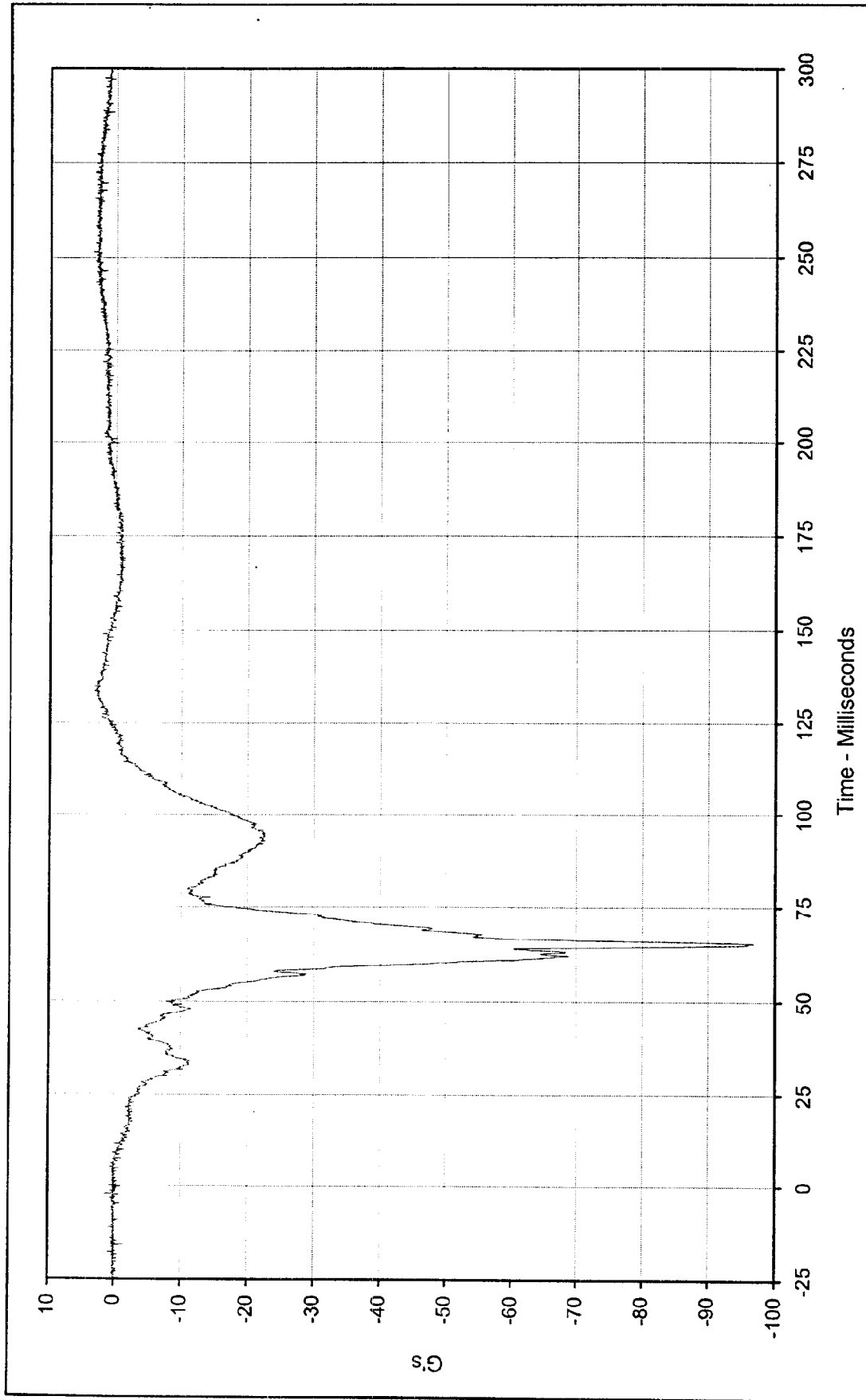
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





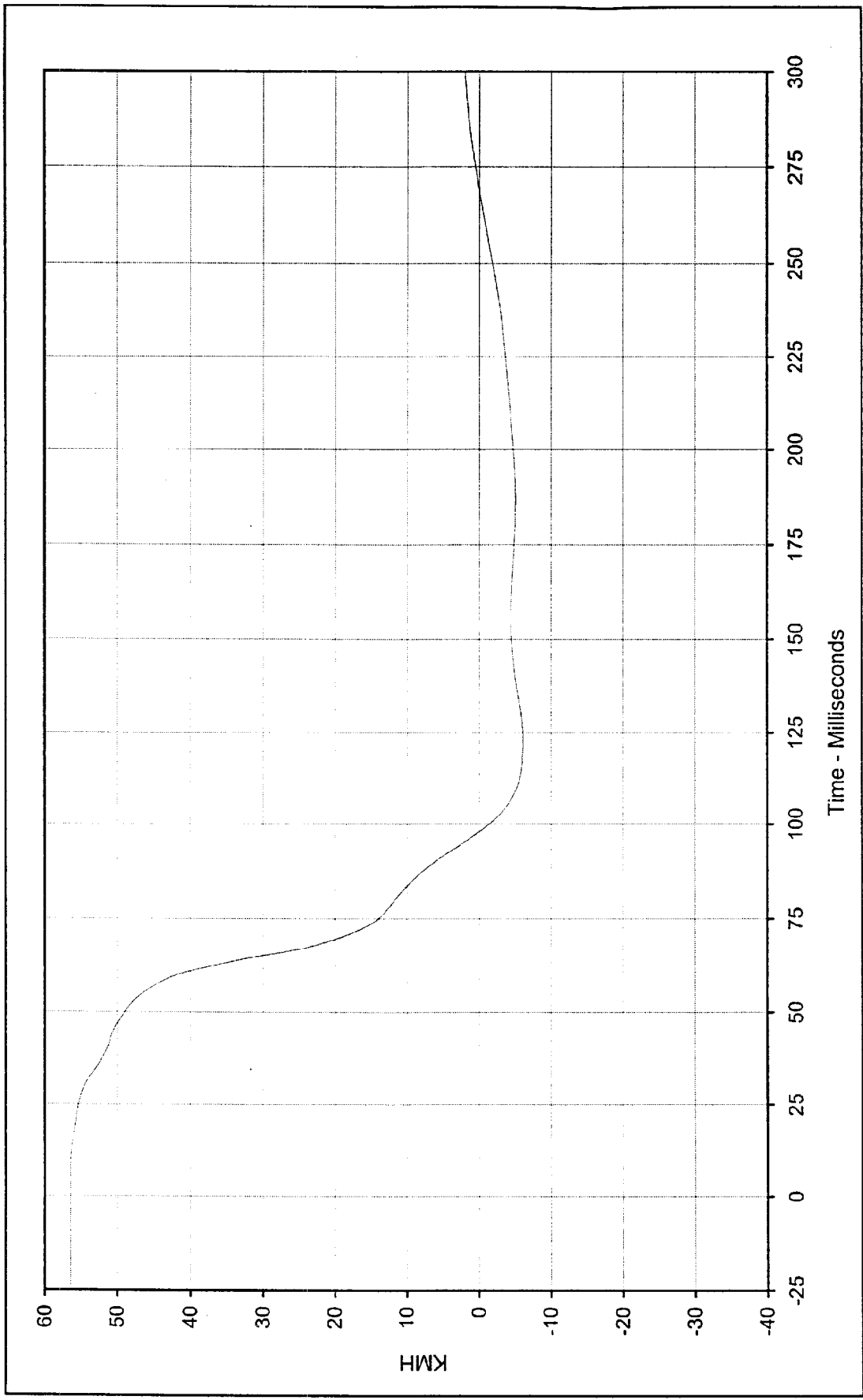
Curve Description:	Driver Chest Displacement X	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001	
Maximum Value:	0.2	at	10.5	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-24.9	at	70.3	Milliseconds		
SAE Filter Class:	600					
Date of Test:	5/20/99					
Curve Number:	FIL-019					





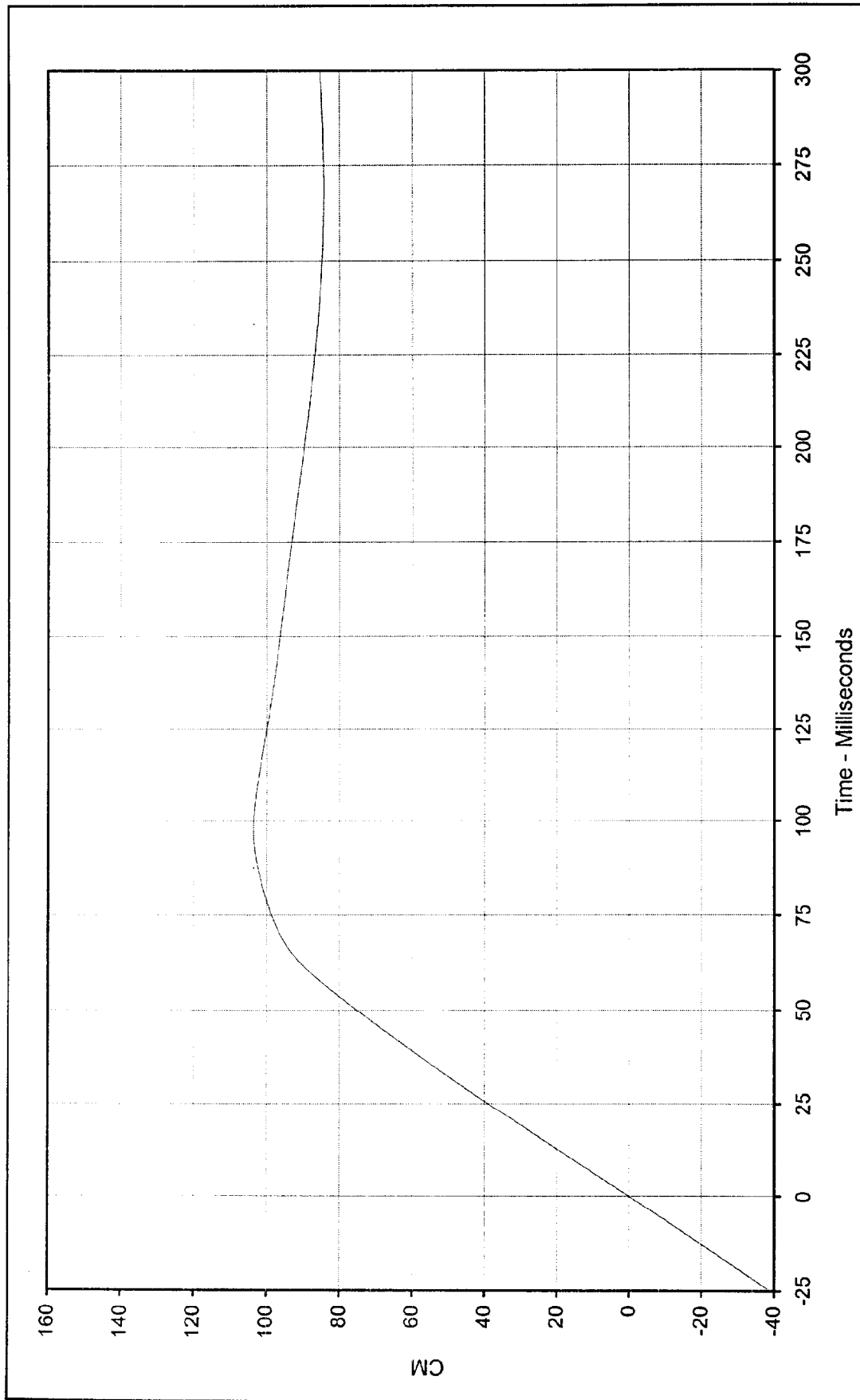
Curve Description:	Driver Pelvis X	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	3.6	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-96.9			
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-020			





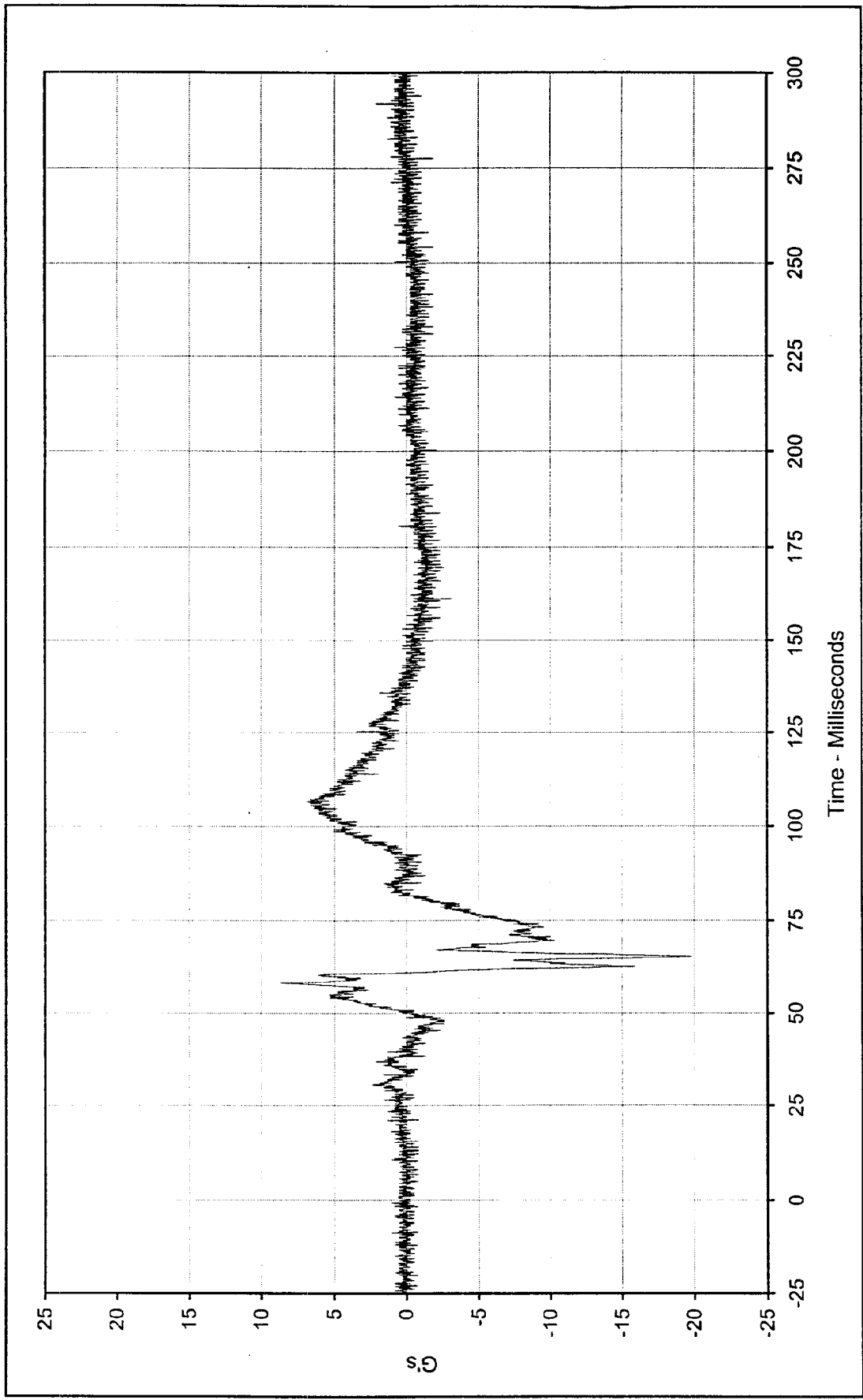
Curve Description:	Driver Pelvis X Velocity	Testing Program	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	56.4	at	0.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-6.1	at	123.2		
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	IN1-020				





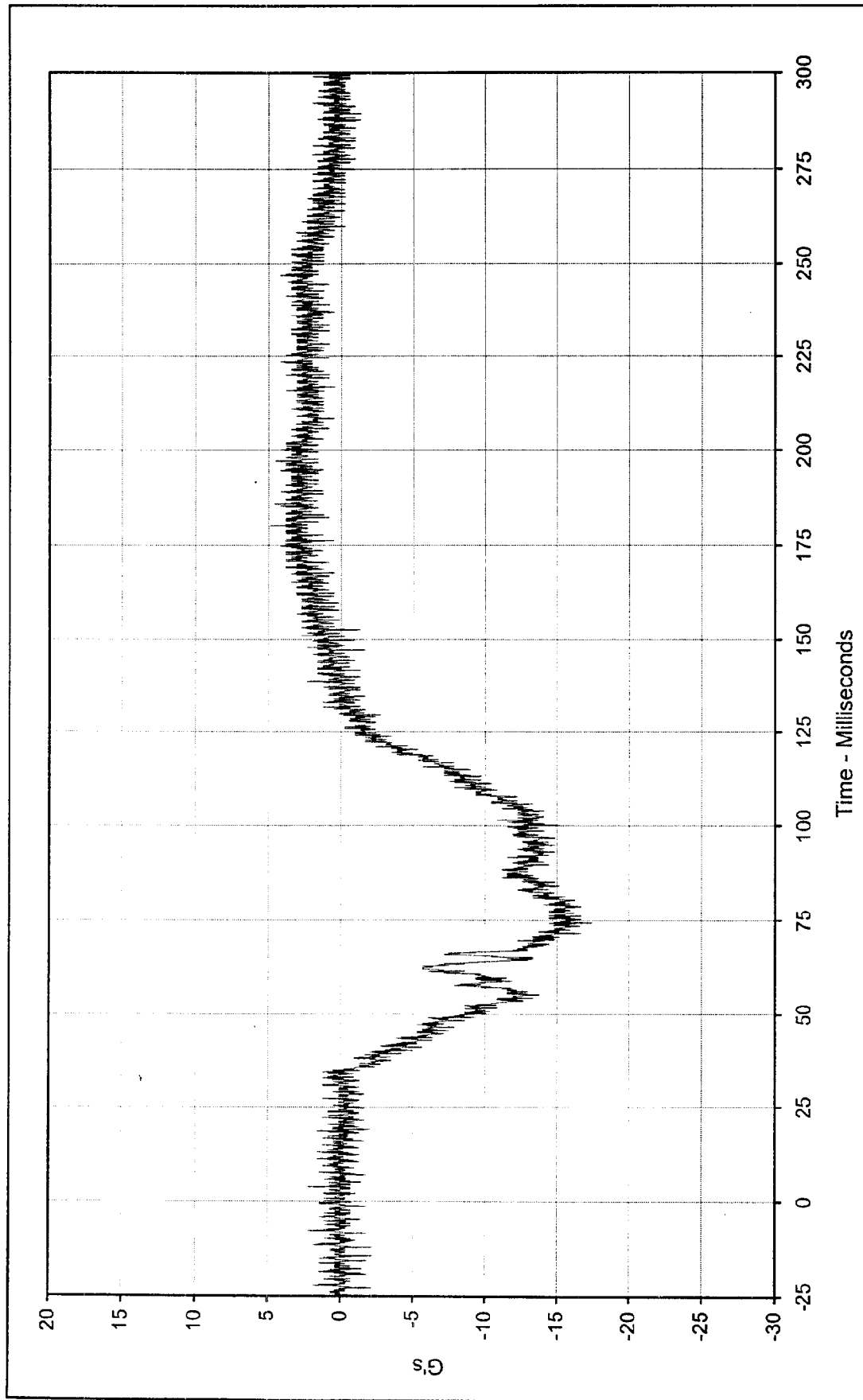
Curve Description:	Driver Pelvis X Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	103.5 at 97.9 milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.1 at 0.0 milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN2-020			





Curve Description:		Driver Pelvis Y		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	8.7	at	58.2	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-19.8	at	65.2	Milliseconds		
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-021					



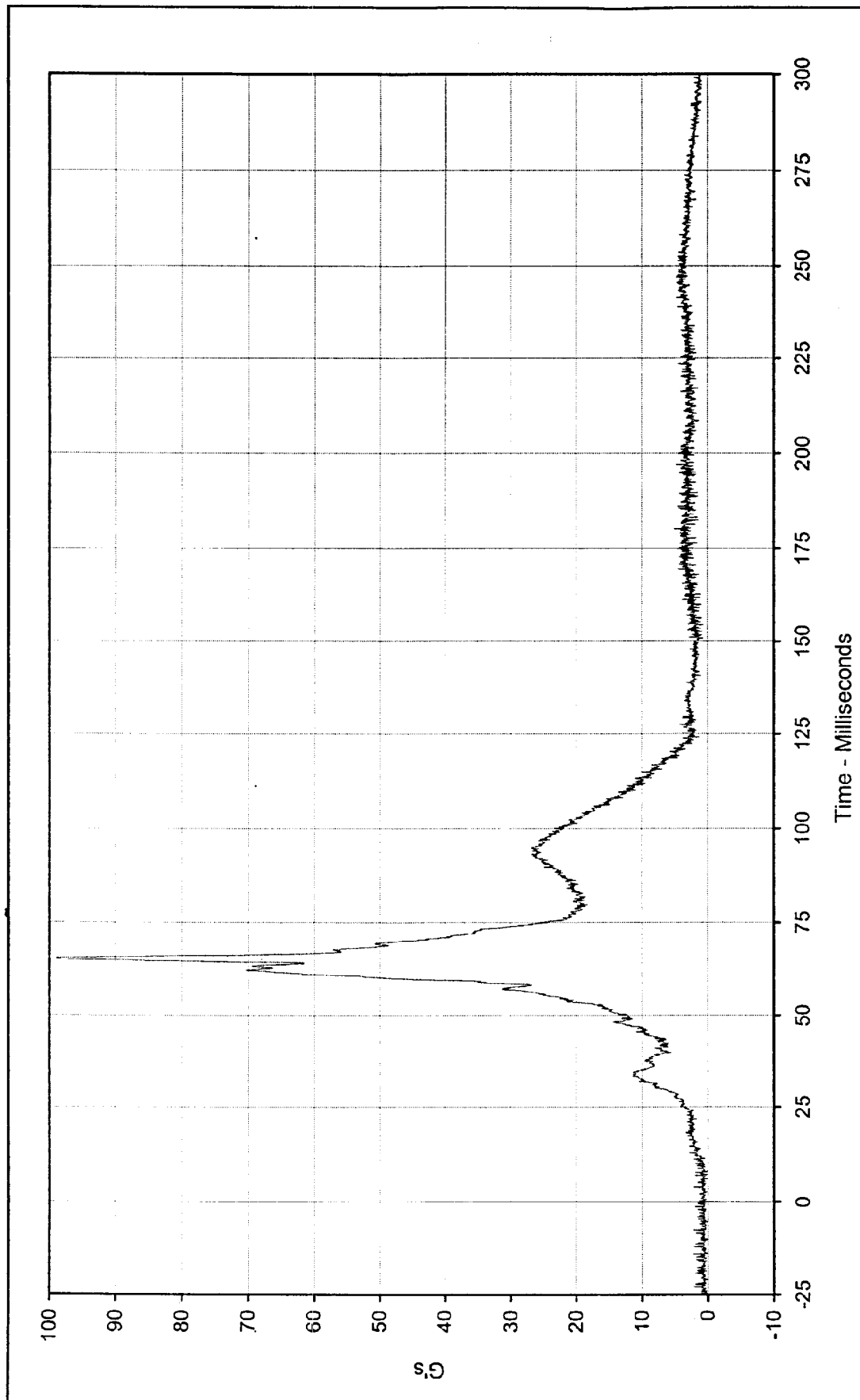


Curve Description:	Driver Pelvis Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	4.9	at 180.3	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-17.4	at 74.3			
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-022				



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Curve Description: Driver Pelvis Resultant

Maximum Value: 98.9 at 65.4 Milliseconds

Minimum Value: 0.1 at 7.0 Milliseconds

SAE Filter Class: 1000

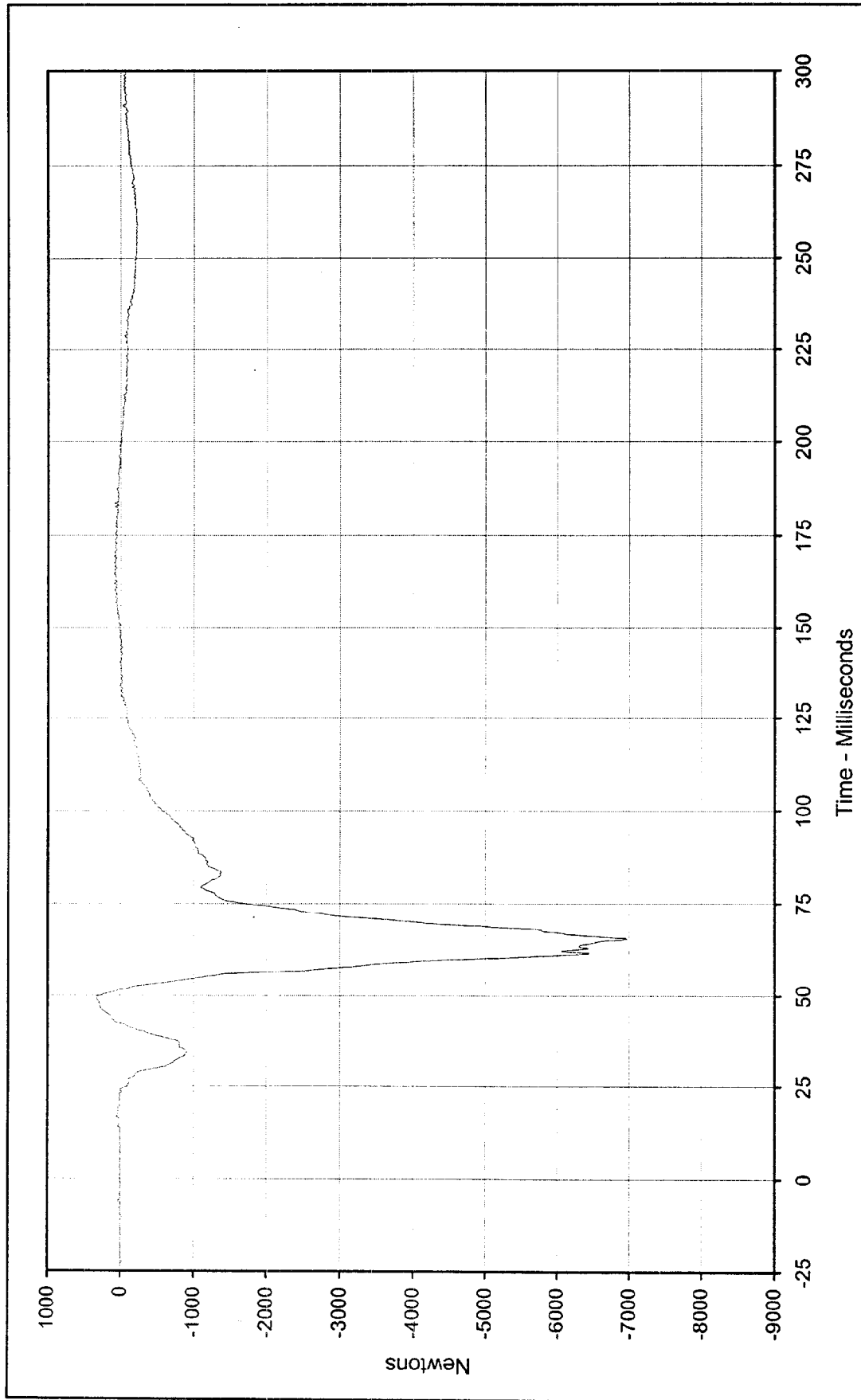
Date of Test: 5/20/99

Curve Number: RES-020

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

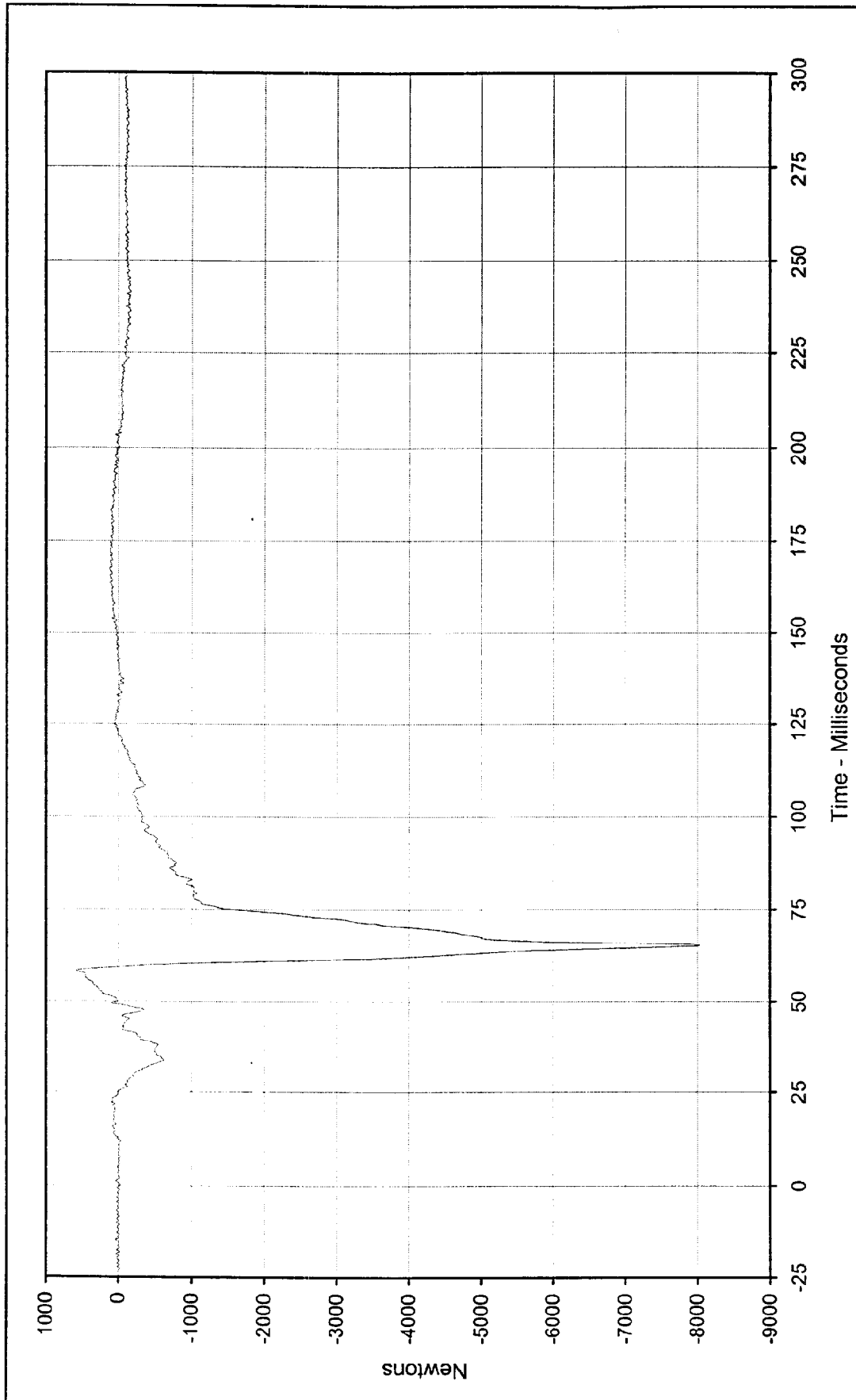




Curve Description:		Driver Left Femur Force		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	341.0	at	49.4	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-6971.4	at	65.4			
SAE Filter Class:	600					
Date of Test:	5/20/99					
Curve Number:	FIL-023					

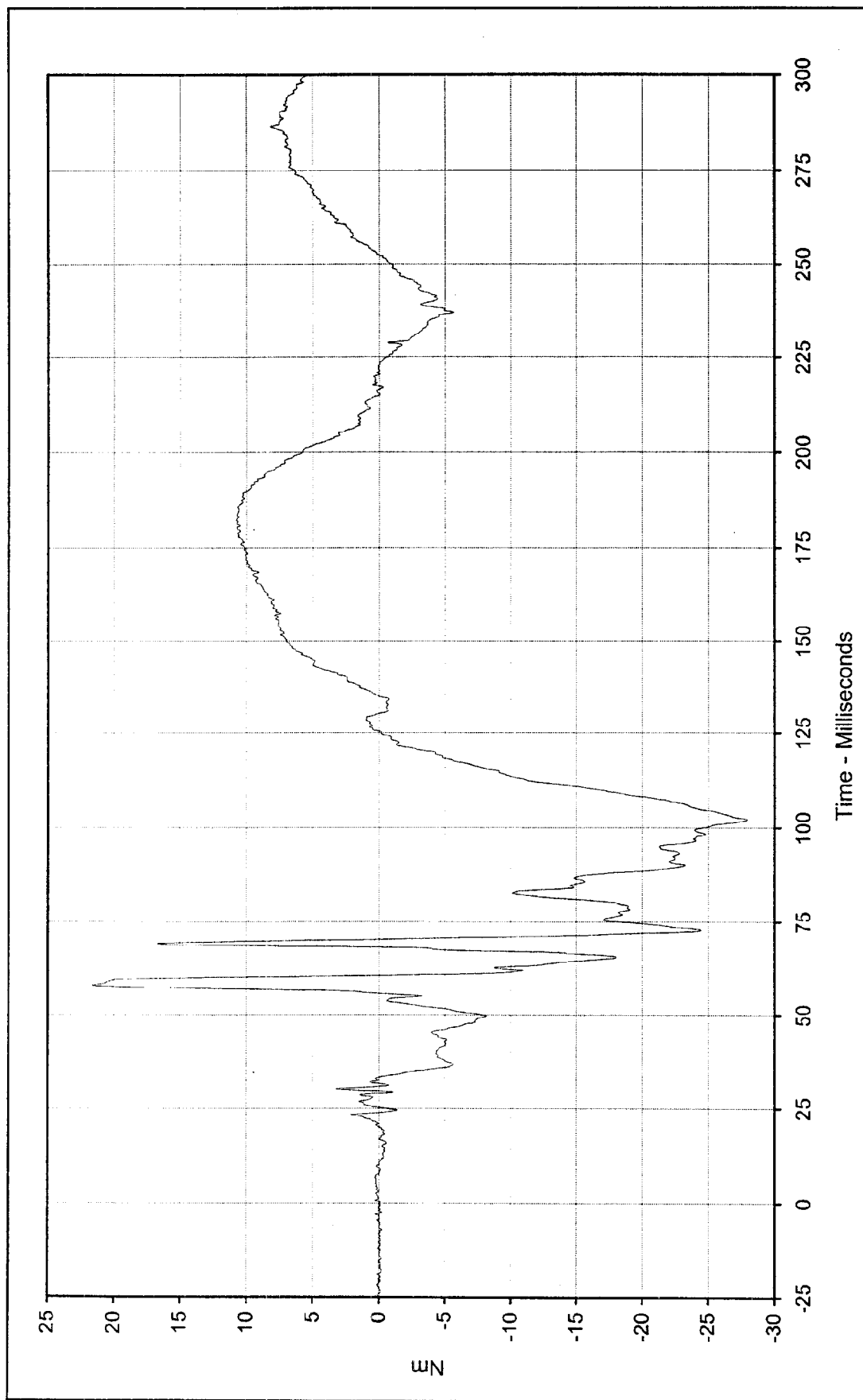






Curve Description:		Driver Right Femur Force		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	583.8	at	58.2	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-8038.6	at	65.3	Milliseconds		
SAE Filter Class:	600					
Date of Test:	5/20/99					
Curve Number:	FIL-024					





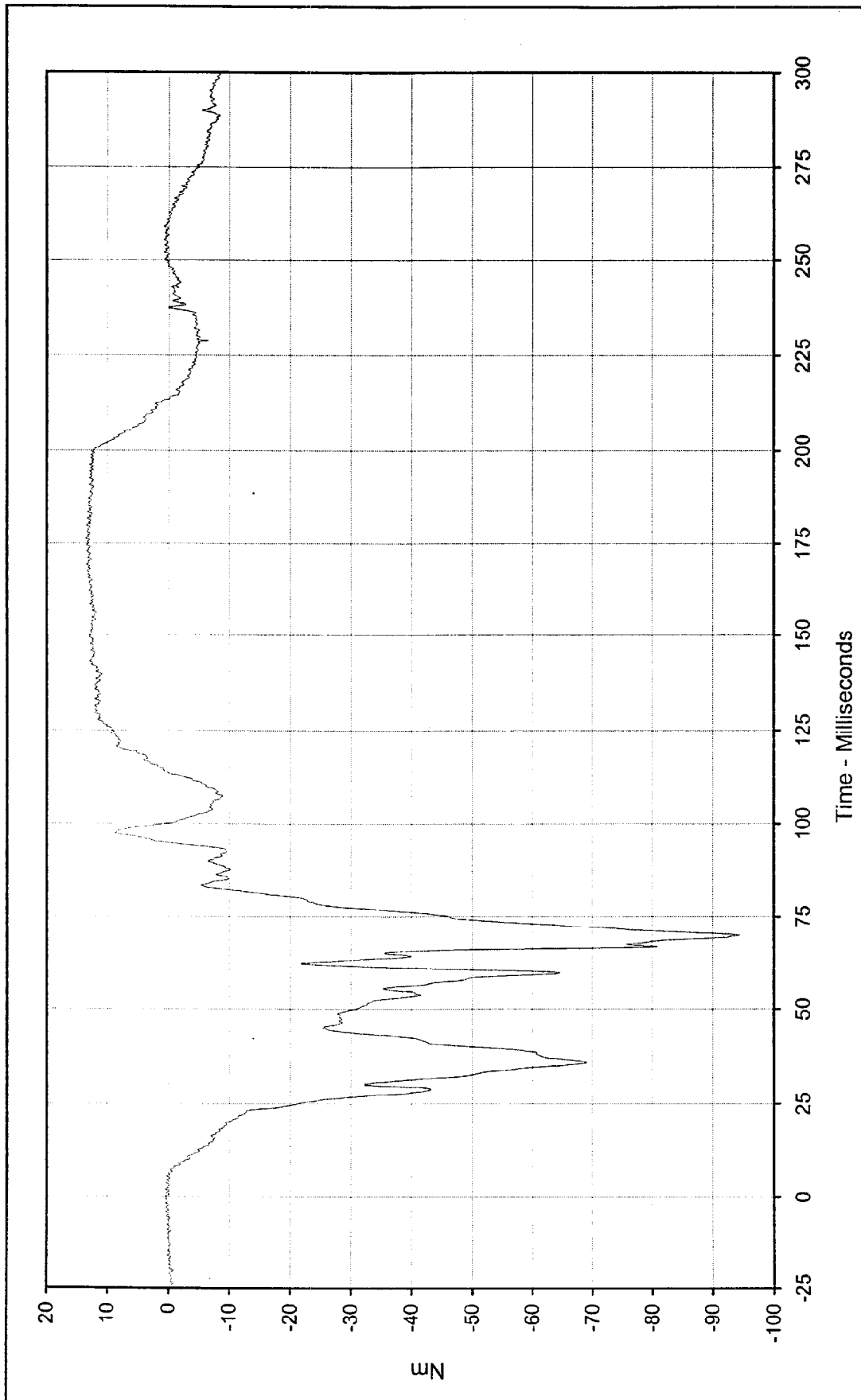
Curve Description: Driver Left Upper Tibia Moment X

Maximum Value:	21.6	at	58.0	Milliseconds
Minimum Value:	-28.0	at	102.2	Milliseconds
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-025			

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Driver Left Upper Tibia Moment Y

Maximum Value: 13.6 at 176.4 Milliseconds

Minimum Value: -94.5 at 69.8 Milliseconds

SAE Filter Class: 600

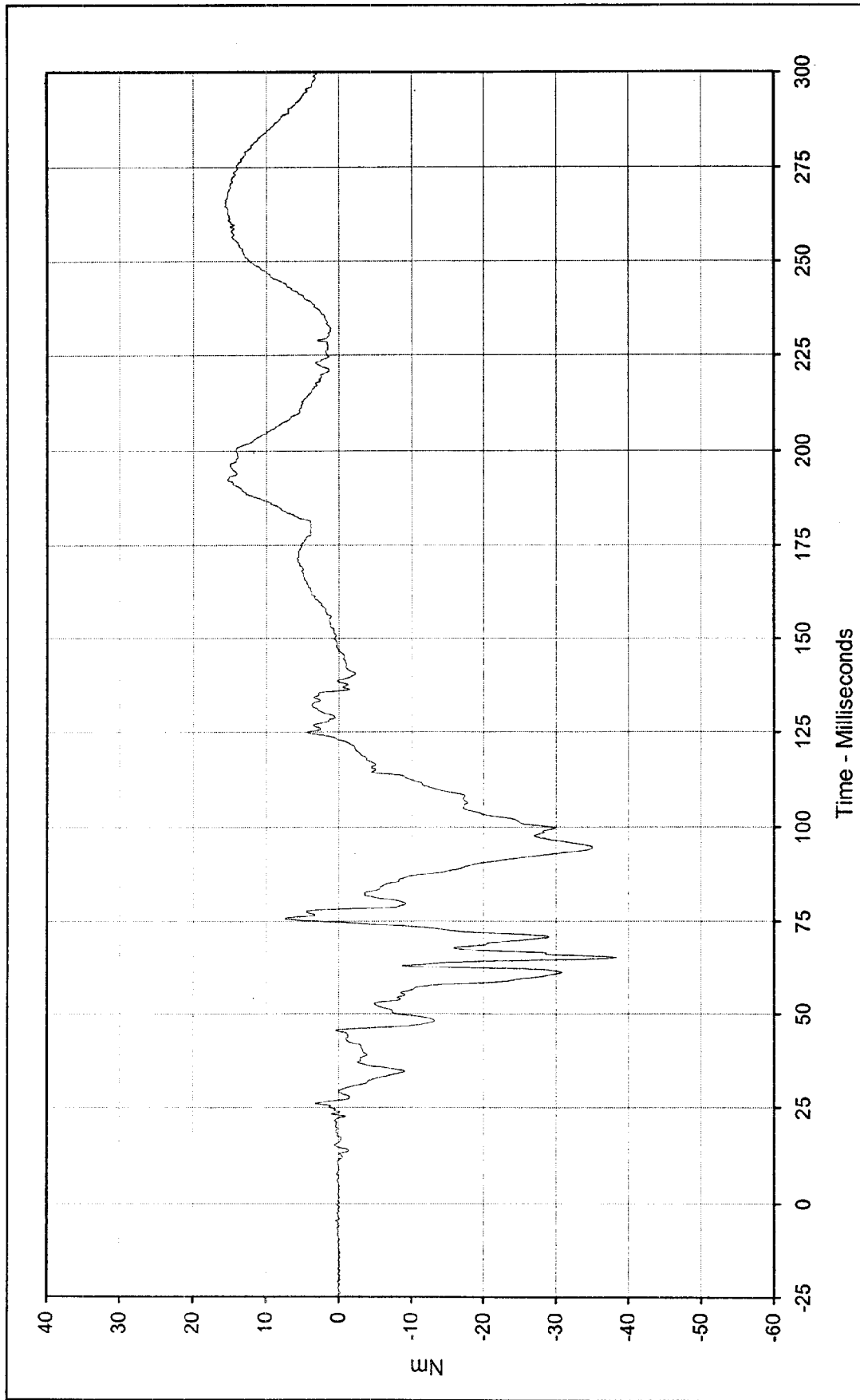
Date of Test: 5/20/99

Curve Number: FIL-026

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





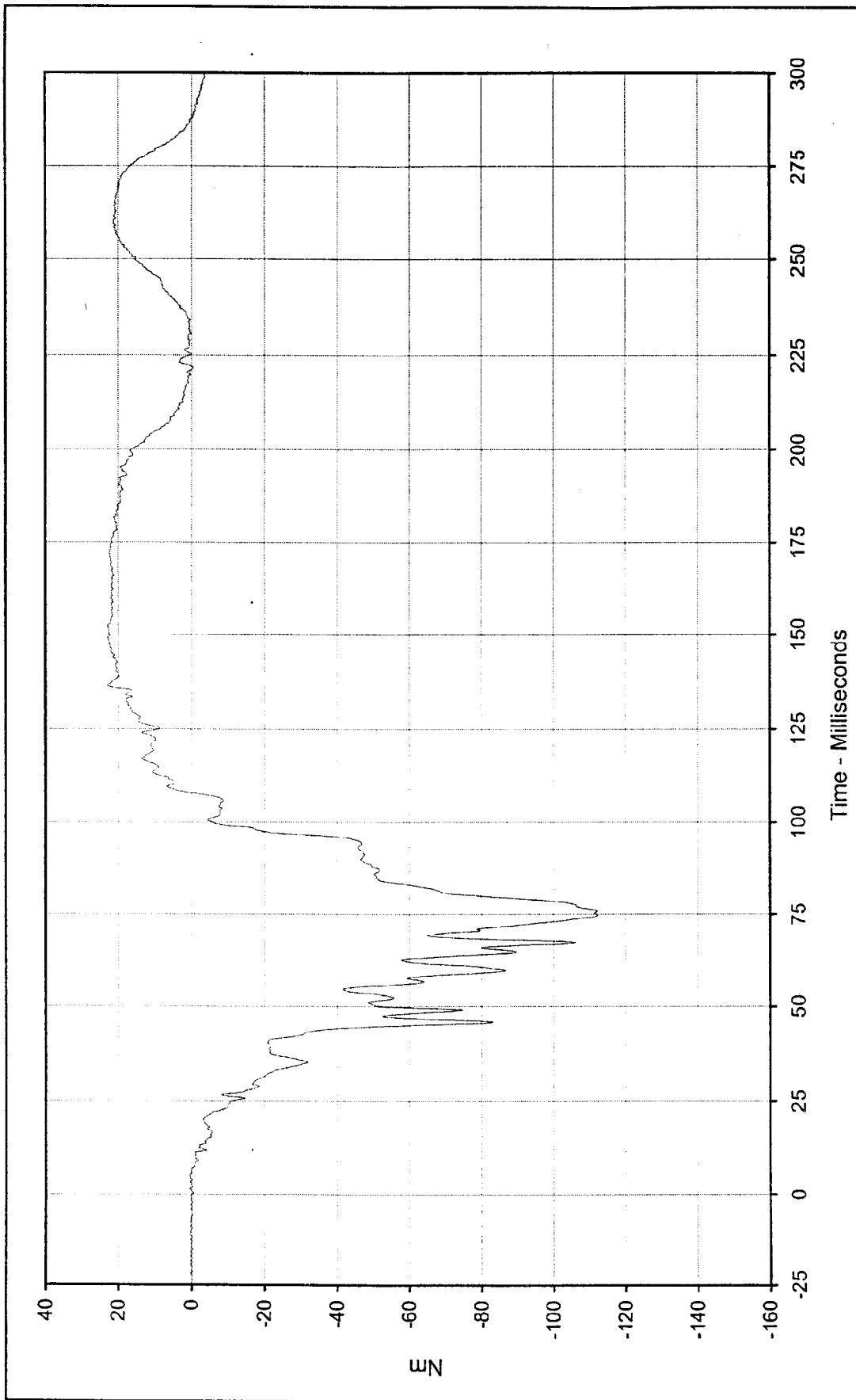
Curve Description: Driver Right Upper Tibia Moment X

Maximum Value:	15.7	at	264.9	Milliseconds
Minimum Value:	-38.3	at	65.1	Milliseconds
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-027			

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

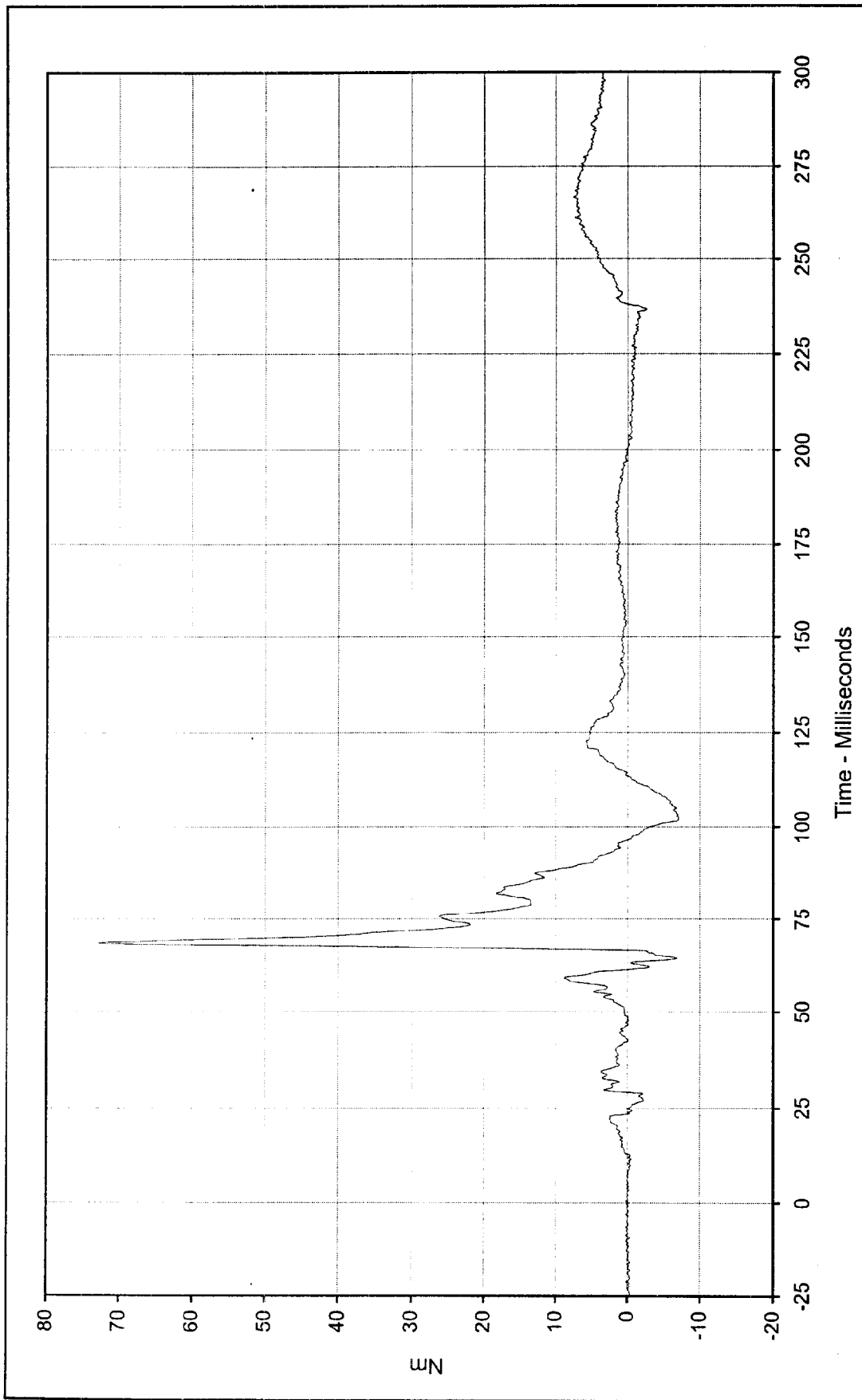




Curve Description: Driver Right Upper Tibia Moment Y
 Maximum Value: 23.0 at 136.5 Milliseconds
 Minimum Value: -112.3 at 74.8 Milliseconds
 SAE Filter Class: 600
 Date of Test: 5/20/99
 Curve Number: FIL-028

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan



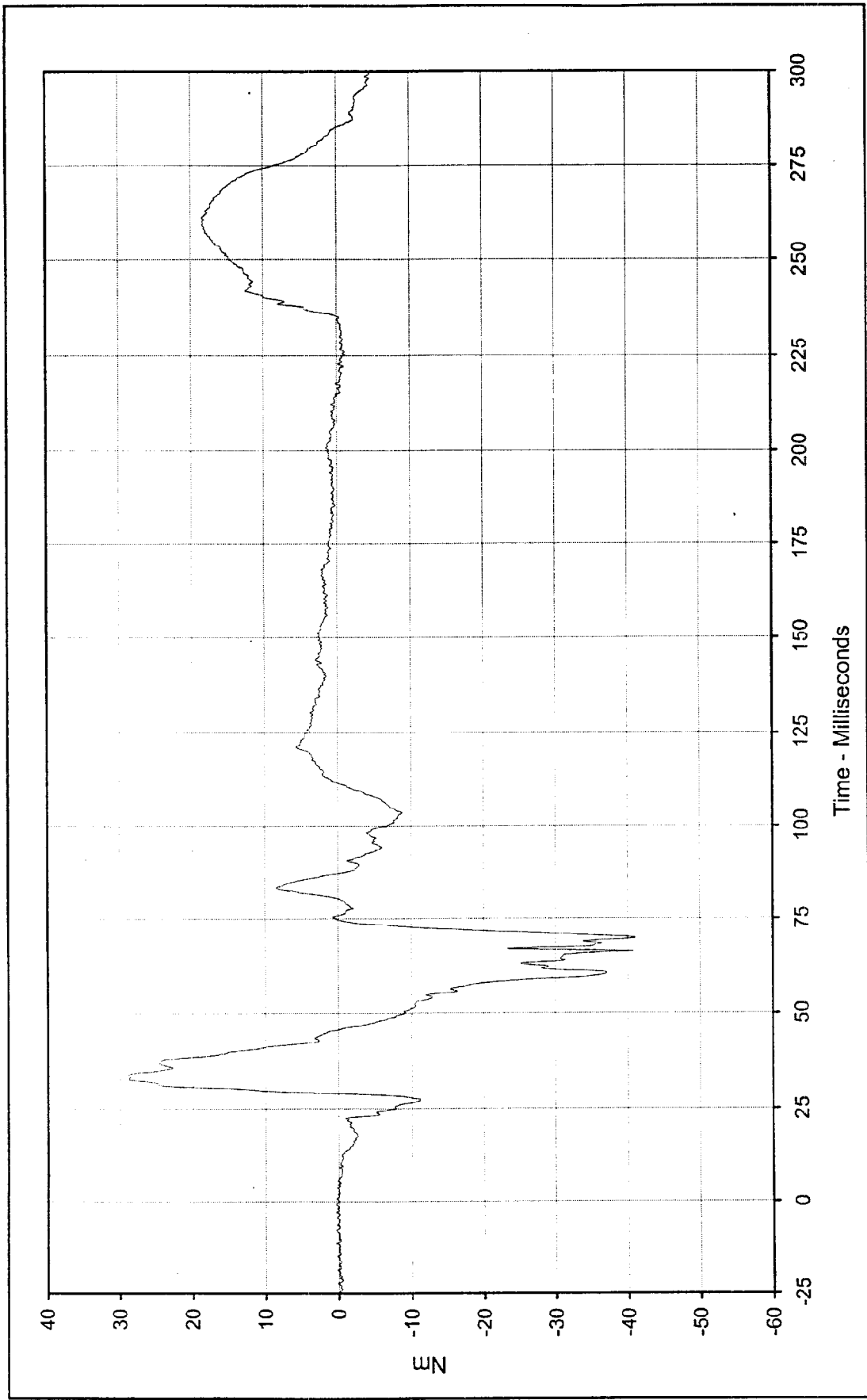


Curve Description:	Driver Left Lower Tibia Moment X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	72.8	at 68.4	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-7.1	at 102.5			
SAE Filter Class:	600				
Date of Test:	5/20/99				
Curve Number:	FIL-029				



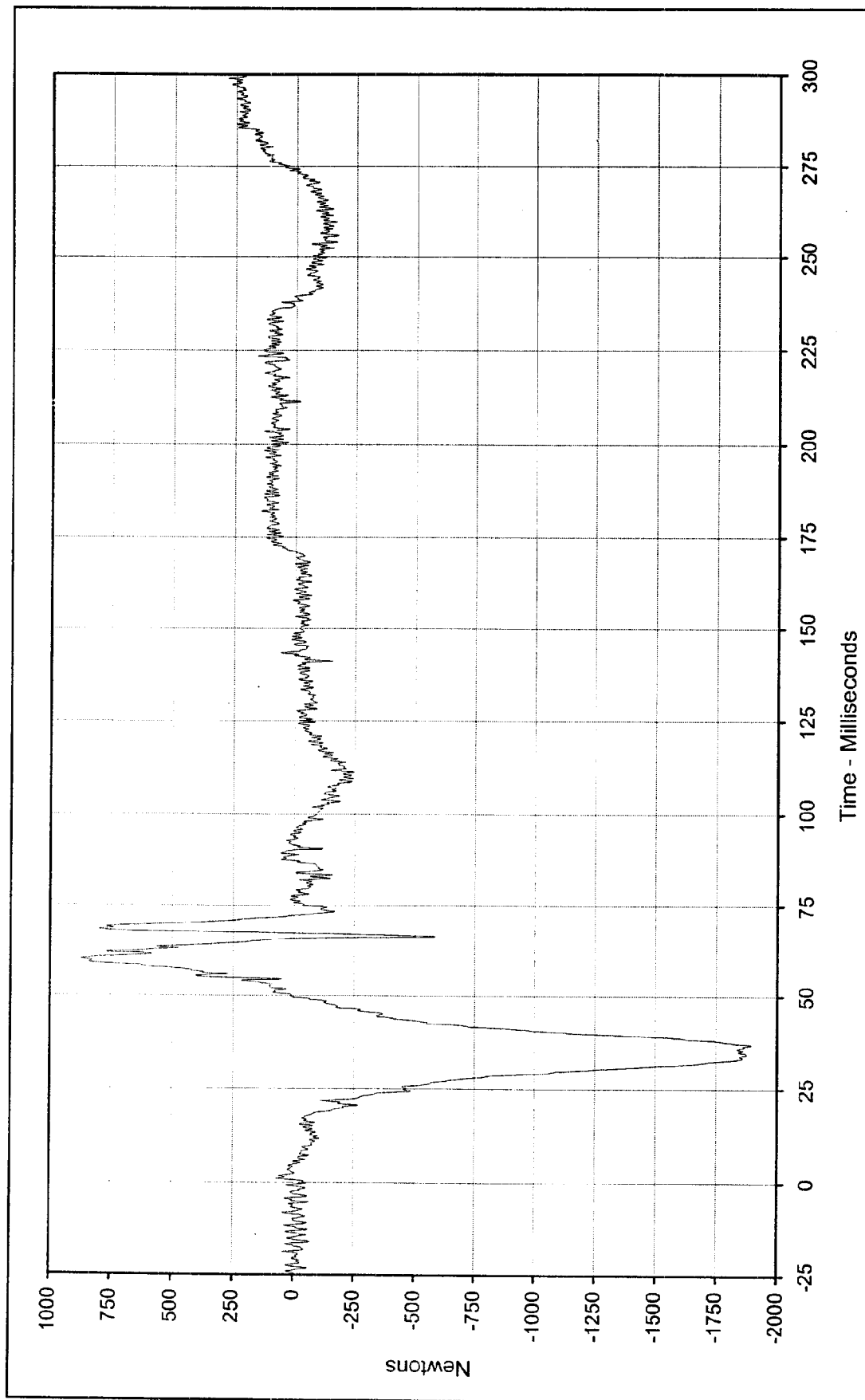
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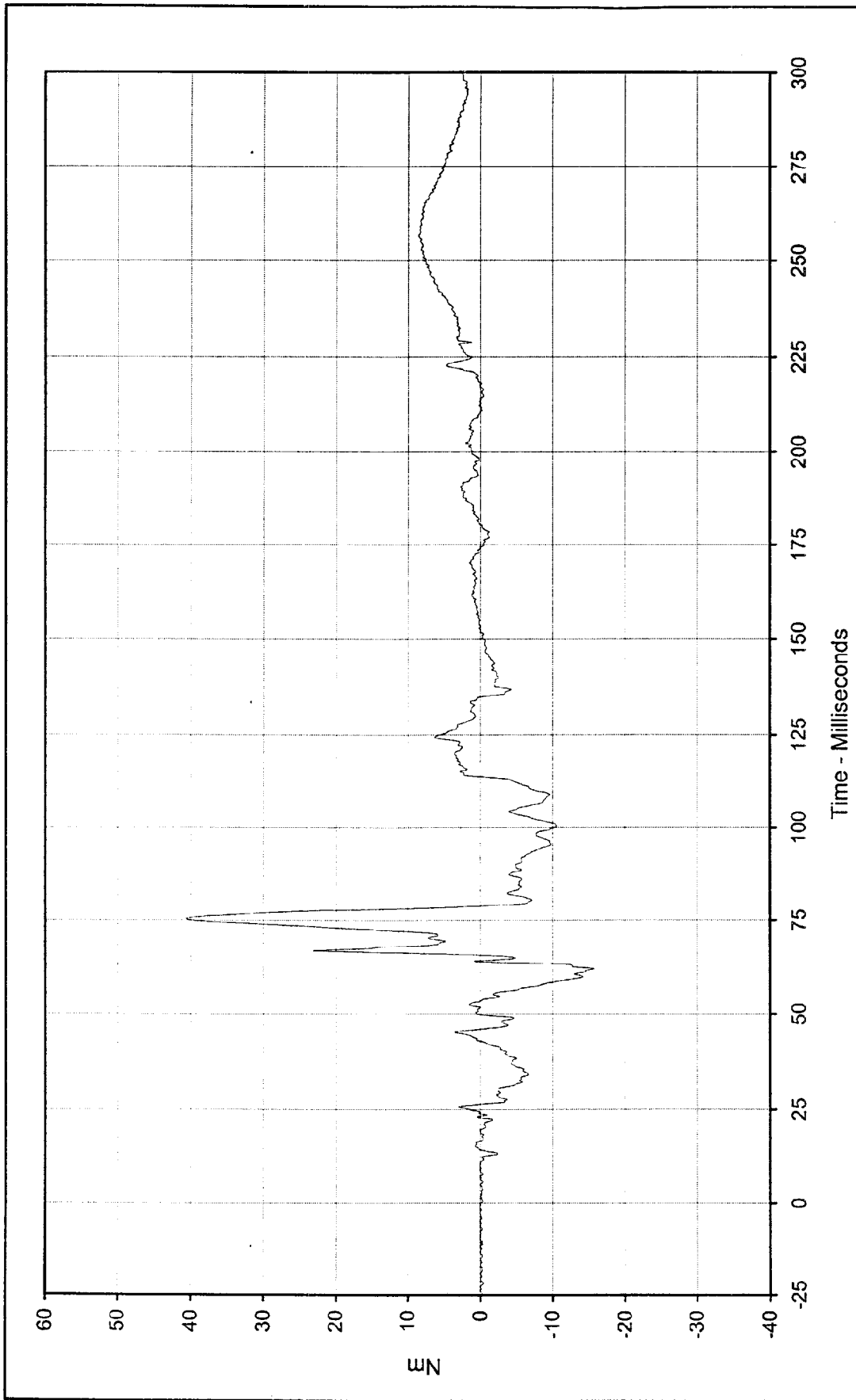
Curve Description:	Driver Left Lower Tibia Moment Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	28.8 at 33.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-41.1 at 69.5 Milliseconds			
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-030			





Curve Description:		Driver Left Lower Tibia Force Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	871.9	at	60.0	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-1895.0	at	36.8	Milliseconds		
SAE Filter Class:	600					
Date of Test:	5/20/99					
Curve Number:	FIL-031					



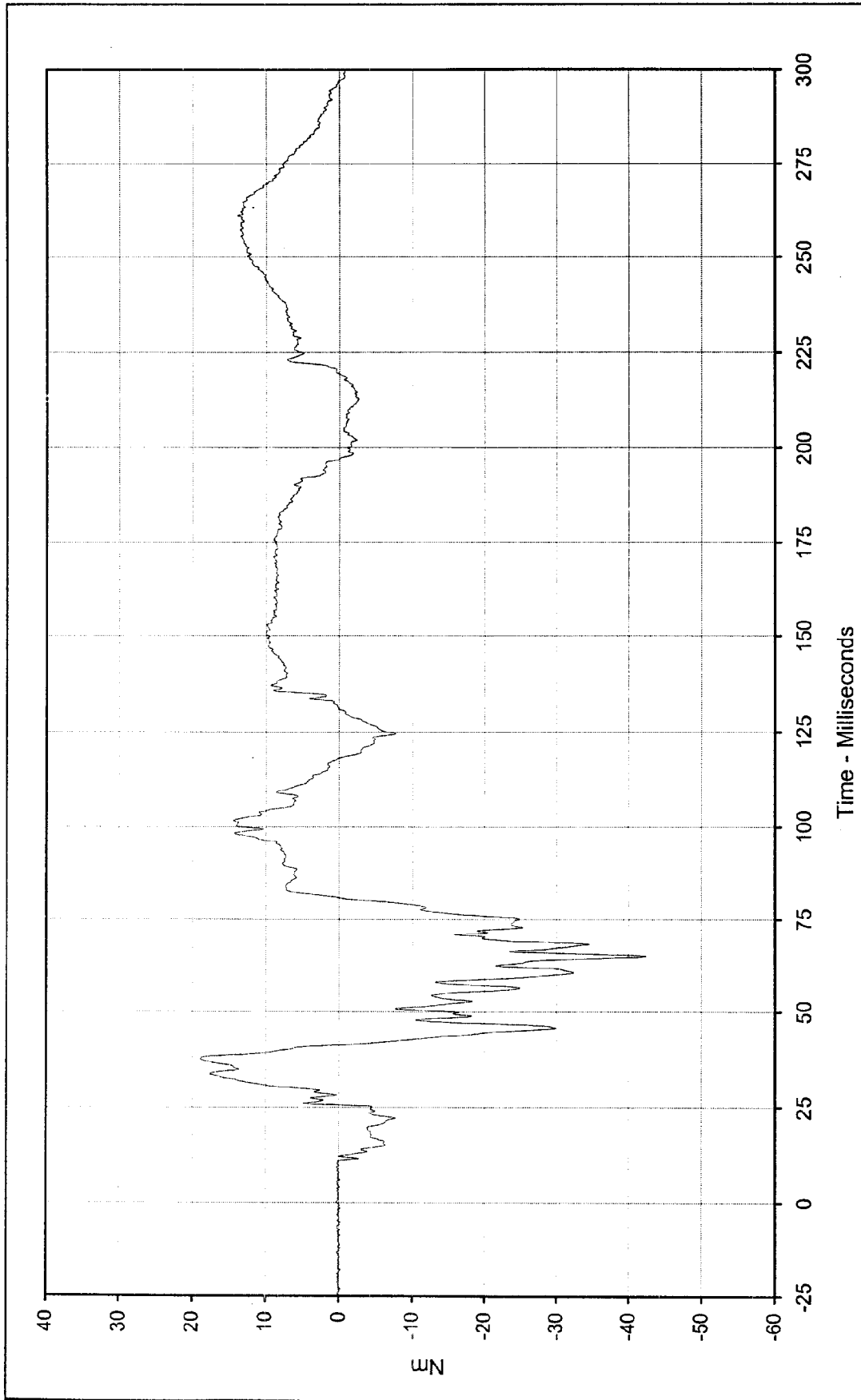


Curve Description:	Driver Right Lower Tibia Moment X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	40.6	at 75.4	Milliseconds		
Minimum Value:	-15.7	at 61.6	Milliseconds		
SAE Filter Class:	600		Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Date of Test:	5/20/99				
Curve Number:	FIL-032				



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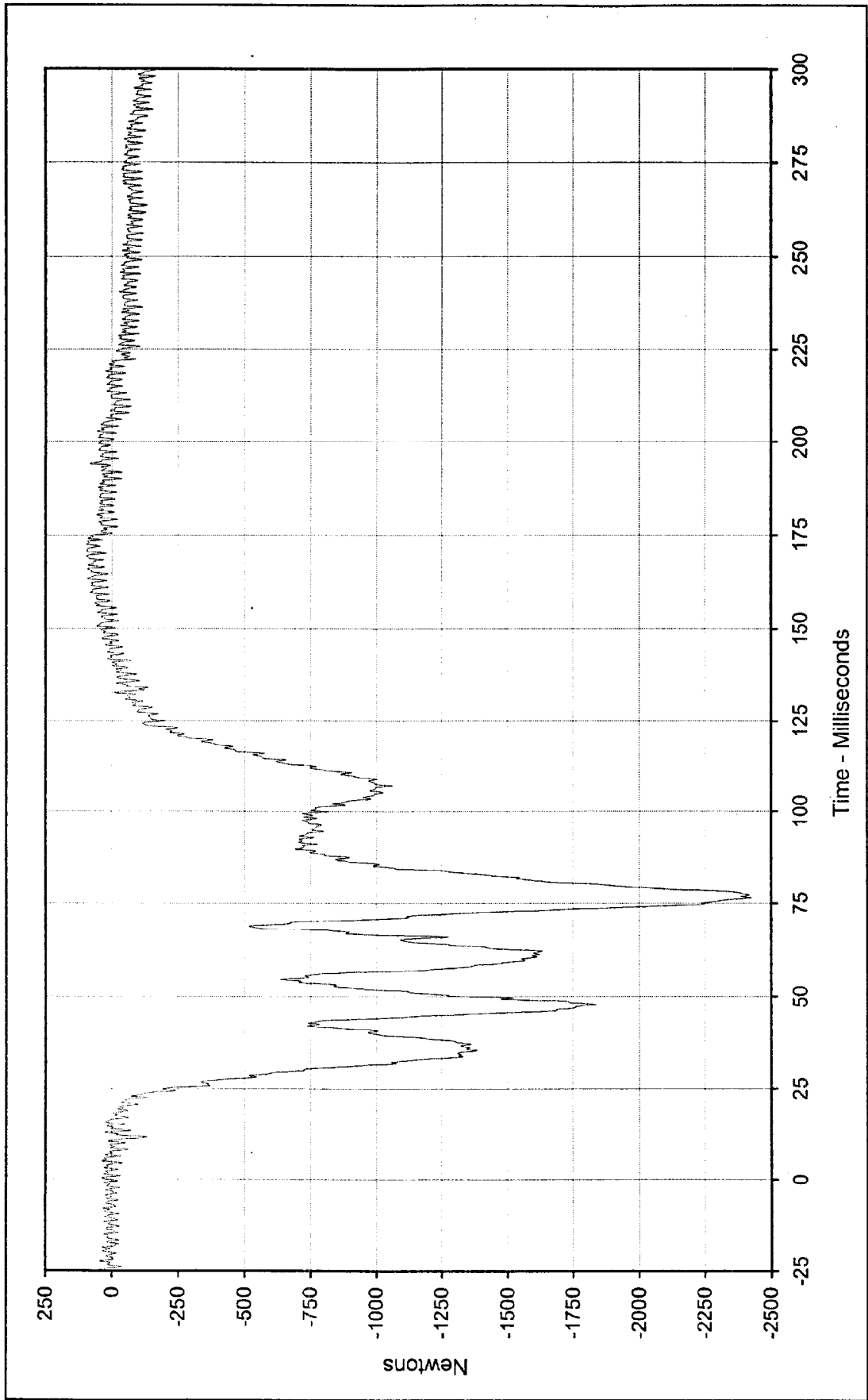




Curve Description: Driver Right Lower Tibia Moment Y
 Maximum Value: 18.9 at 37.5 Milliseconds
 Minimum Value: -42.4 at 64.8 Milliseconds
 SAE Filter Class: 600
 Date of Test: 5/20/99
 Curve Number: FIL-033

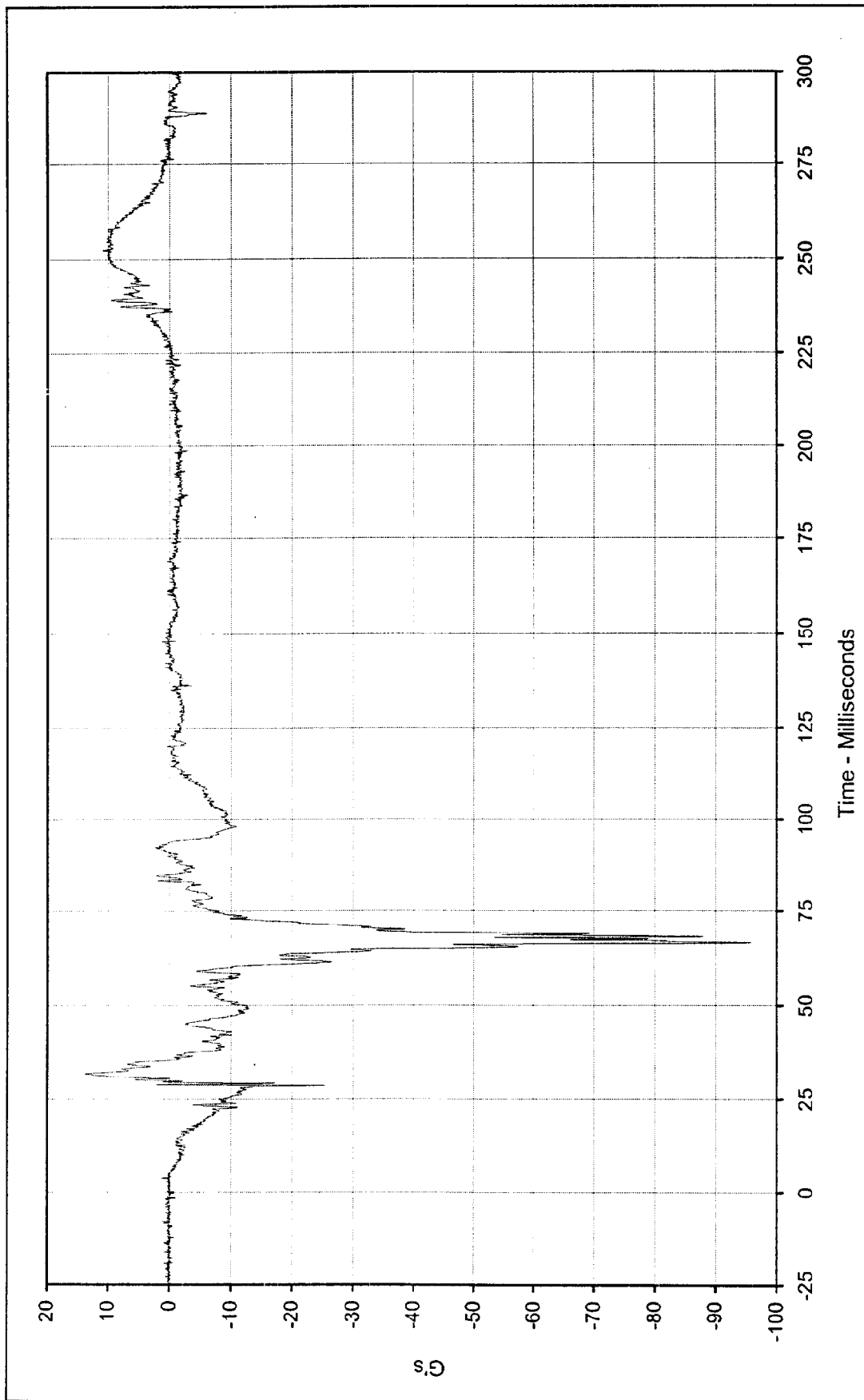
Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





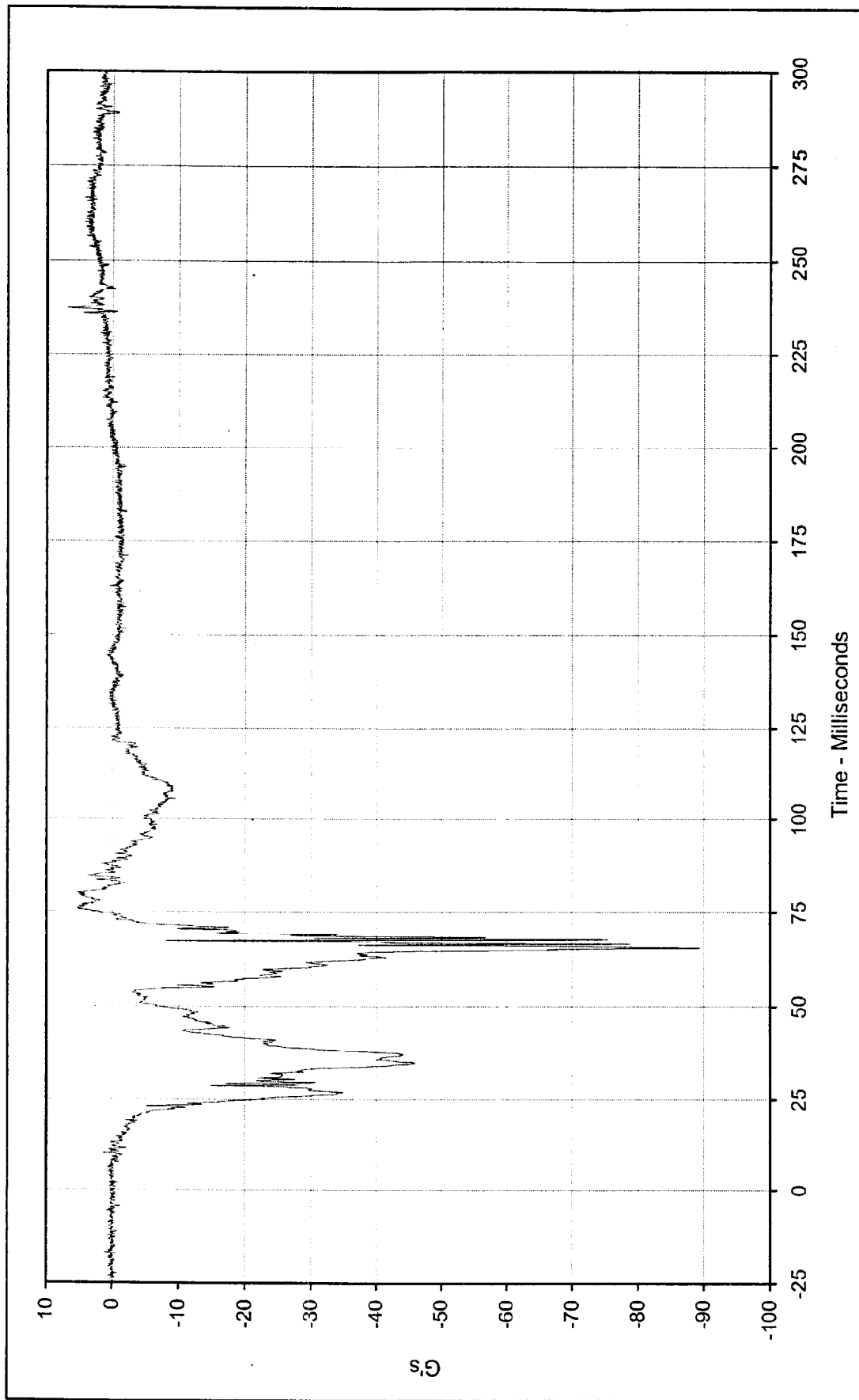
Curve Description:	Driver Right Lower Tibia Force Z	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001	
Maximum Value:	94.5	at	170.5	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-2426.5	at	76.5	Milliseconds		
SAE Filter Class:	600					
Date of Test:	5/20/99					
Curve Number:	FIL-034					





Curve Description:		Driver Left Foot Aft X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	13.7	at	31.7	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-95.7	at	66.4	Milliseconds		
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-035					

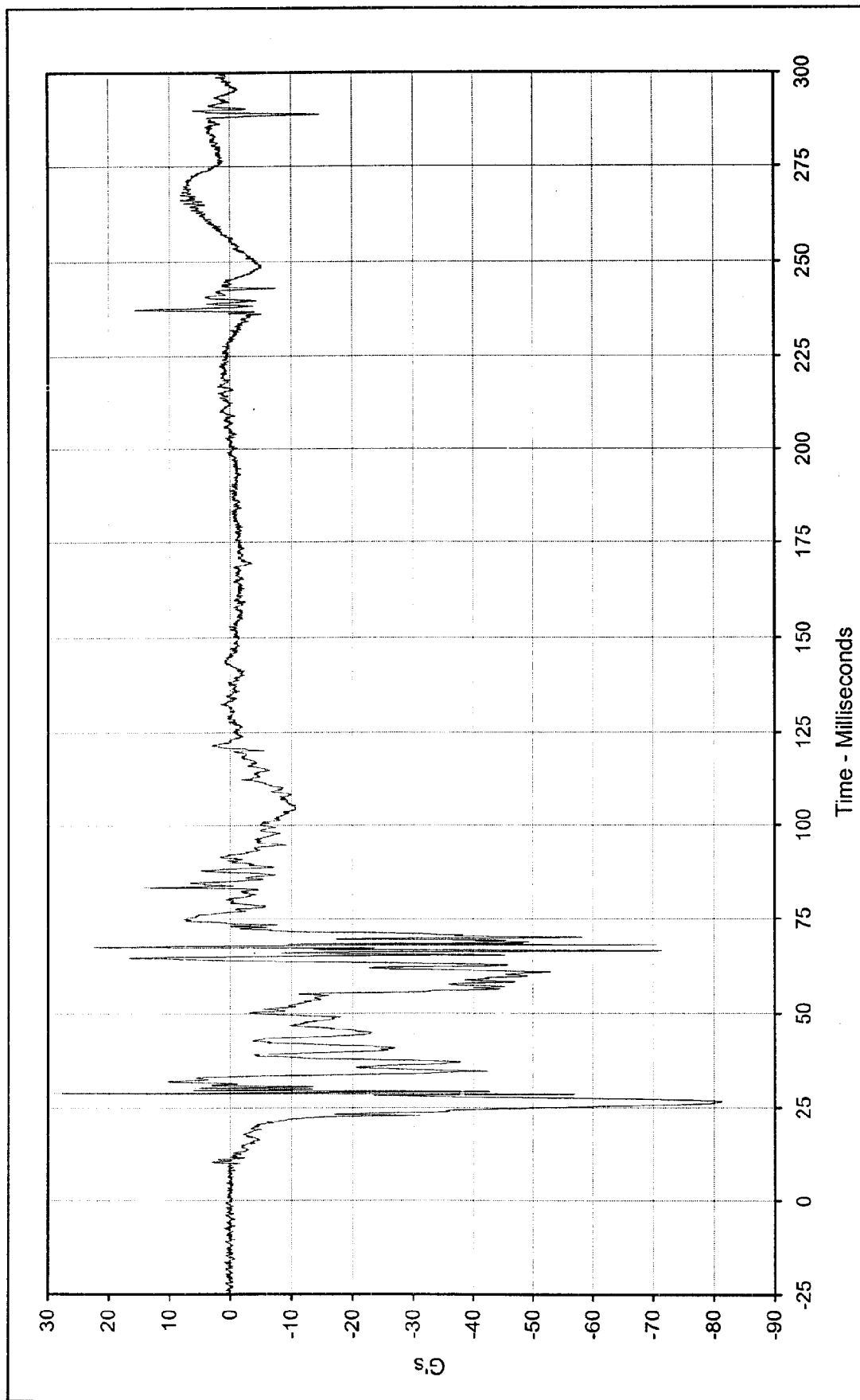




Curve Description:	Driver Left Foot Aft Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	6.9	at 237.5	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-89.4	at 65.5			
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-036				

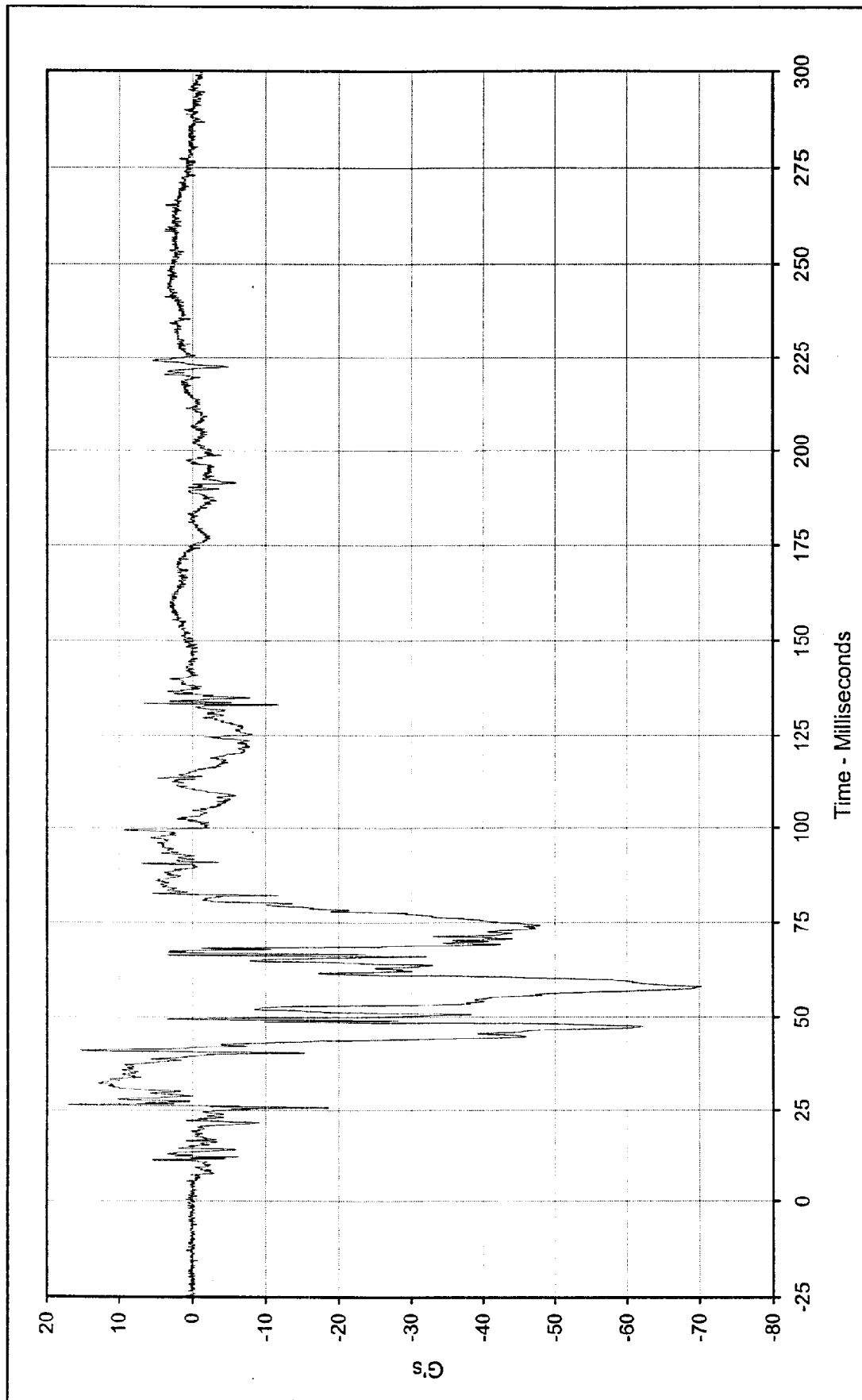






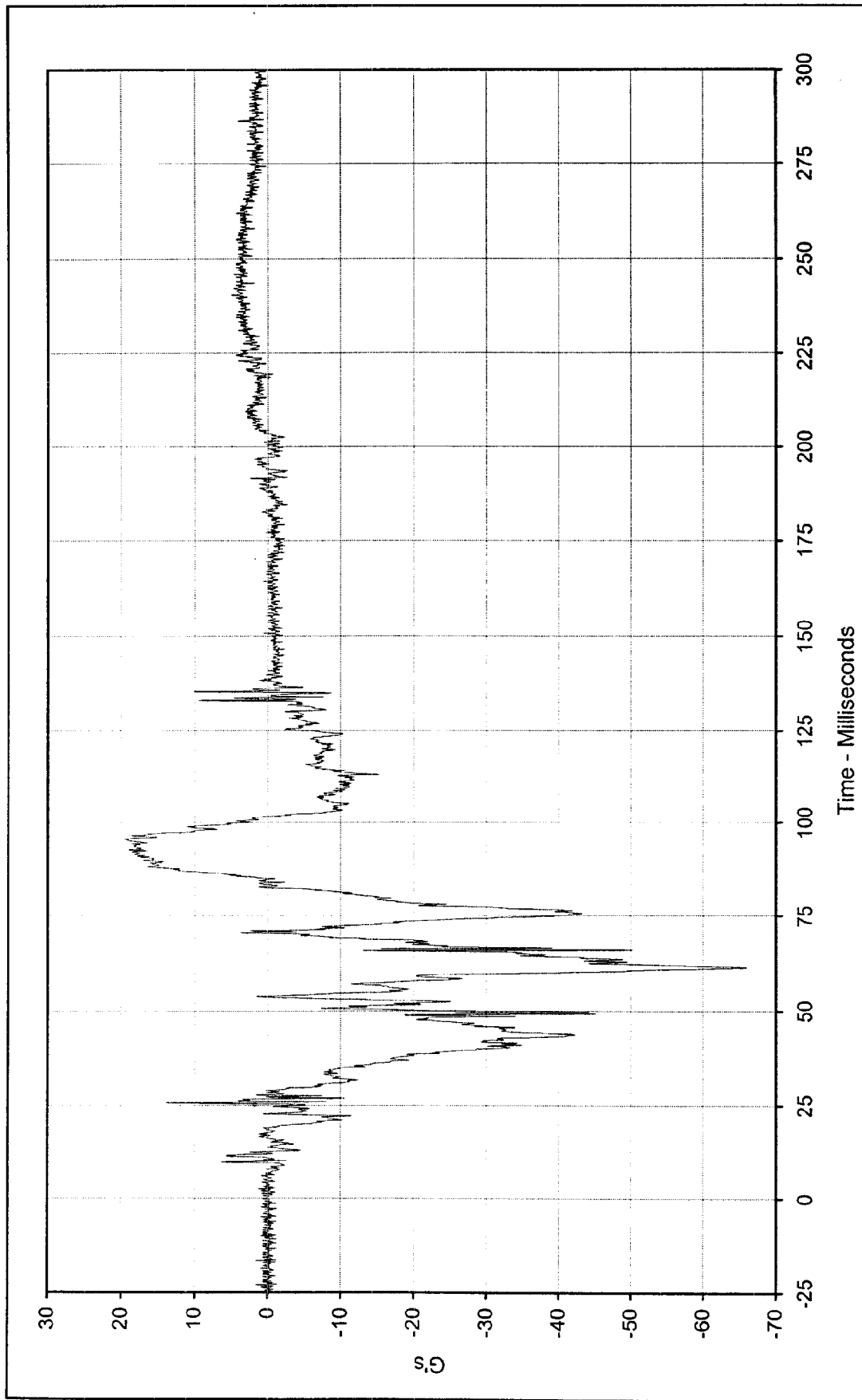
Curve Description:	Driver Left Foot Fore Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	29.0	at 28.9 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-81.5	at 26.6 Milliseconds			
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-037				





Curve Description:		Driver Right Foot Aft X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	17.0	at	26.6	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-70.3	at	58.1			
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-038					





Curve Description: Driver Right Foot Aft Z

Maximum Value: 19.5 at 95.5 Milliseconds

Minimum Value: -66.1 at 61.4 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

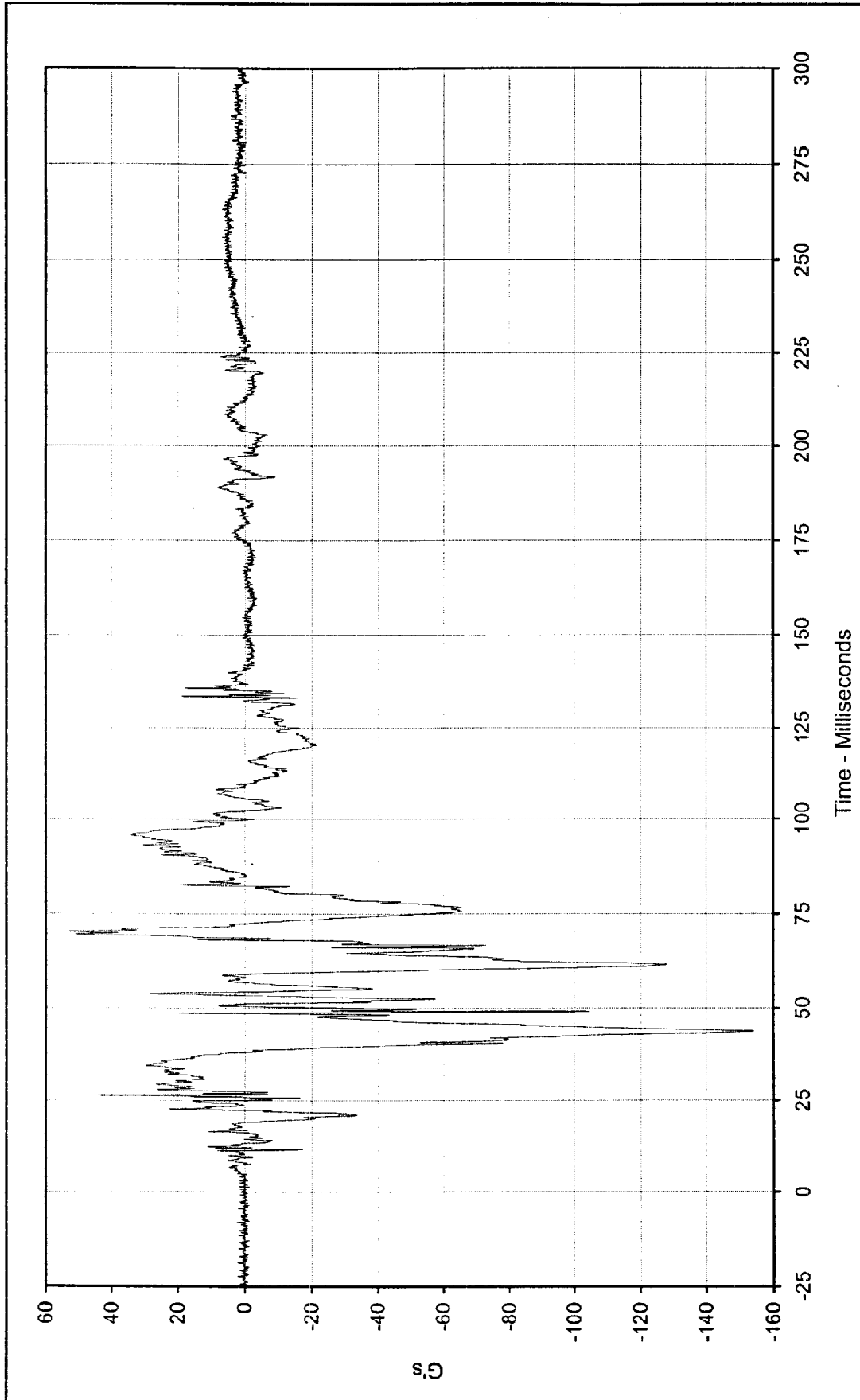
Curve Number: FIL-039

Test Program: 1999 NHTSA 35 mph NCAP

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

No.: GM0001





Curve Description: Driver Right Foot Fore Z

Maximum Value: 52.9 at 70.1 Milliseconds

Minimum Value: -154.3 at 43.6 Milliseconds

SAE Filter Class: 1000

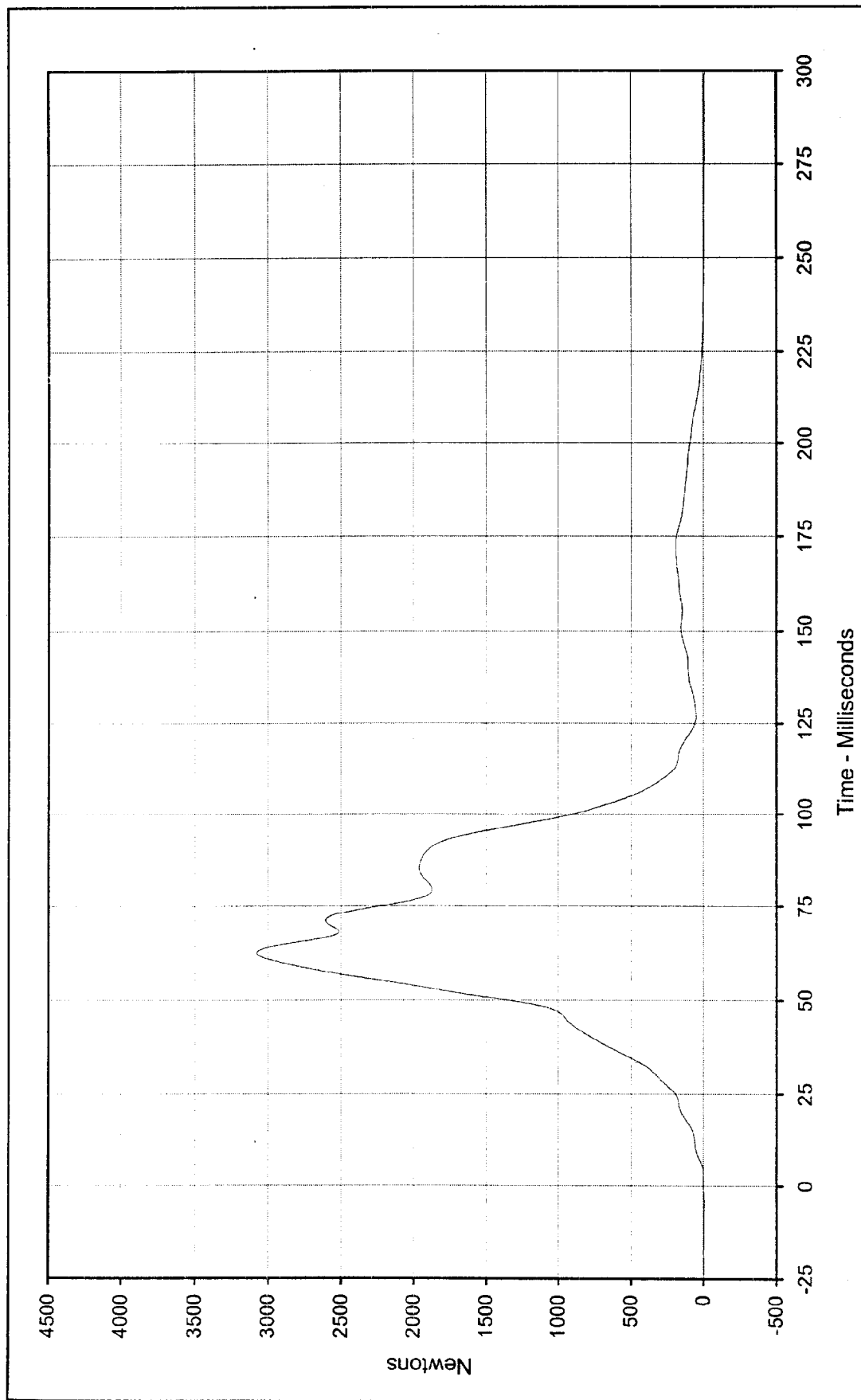
Date of Test: 5/20/99

Curve Number: FIL-040

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

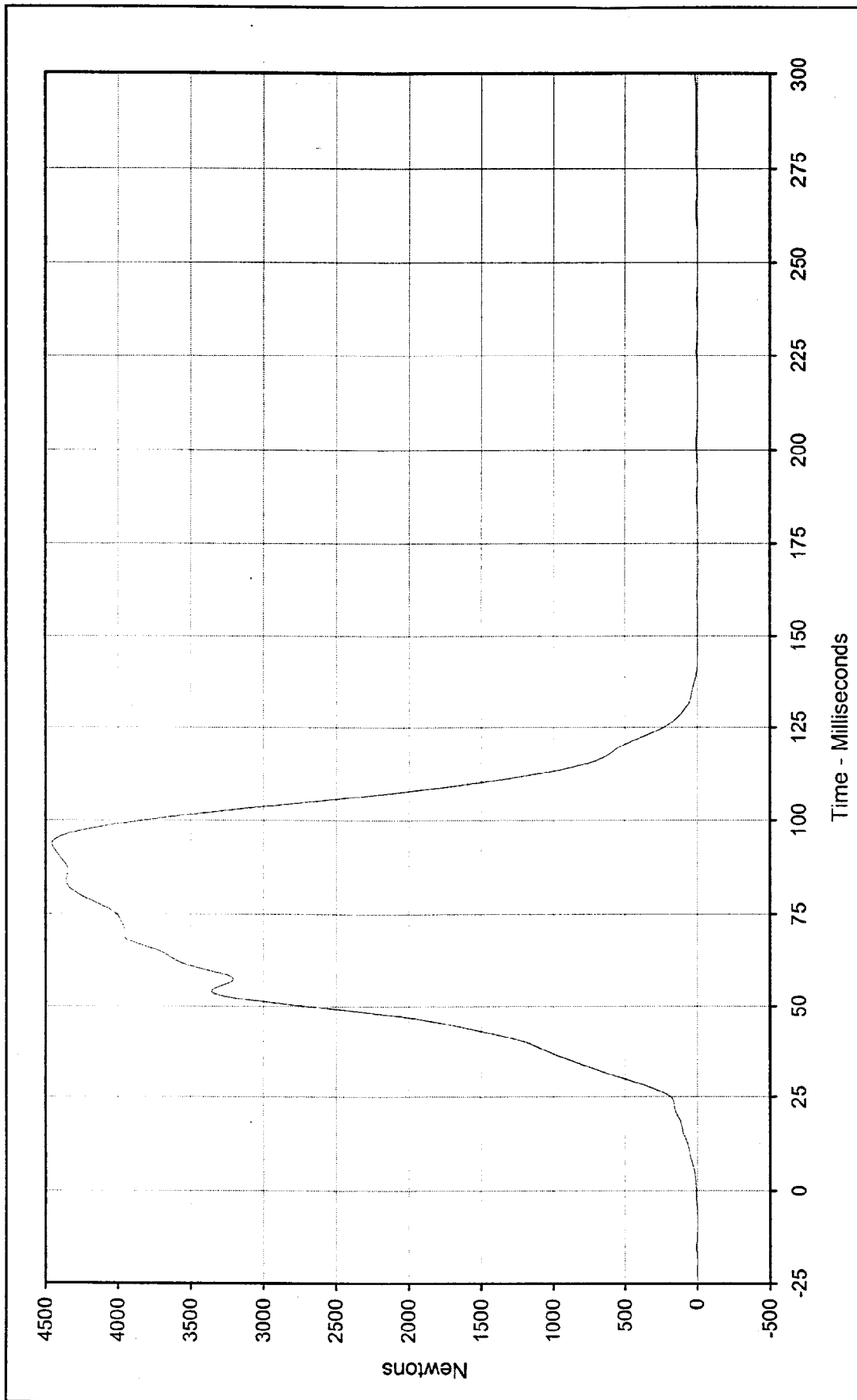
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





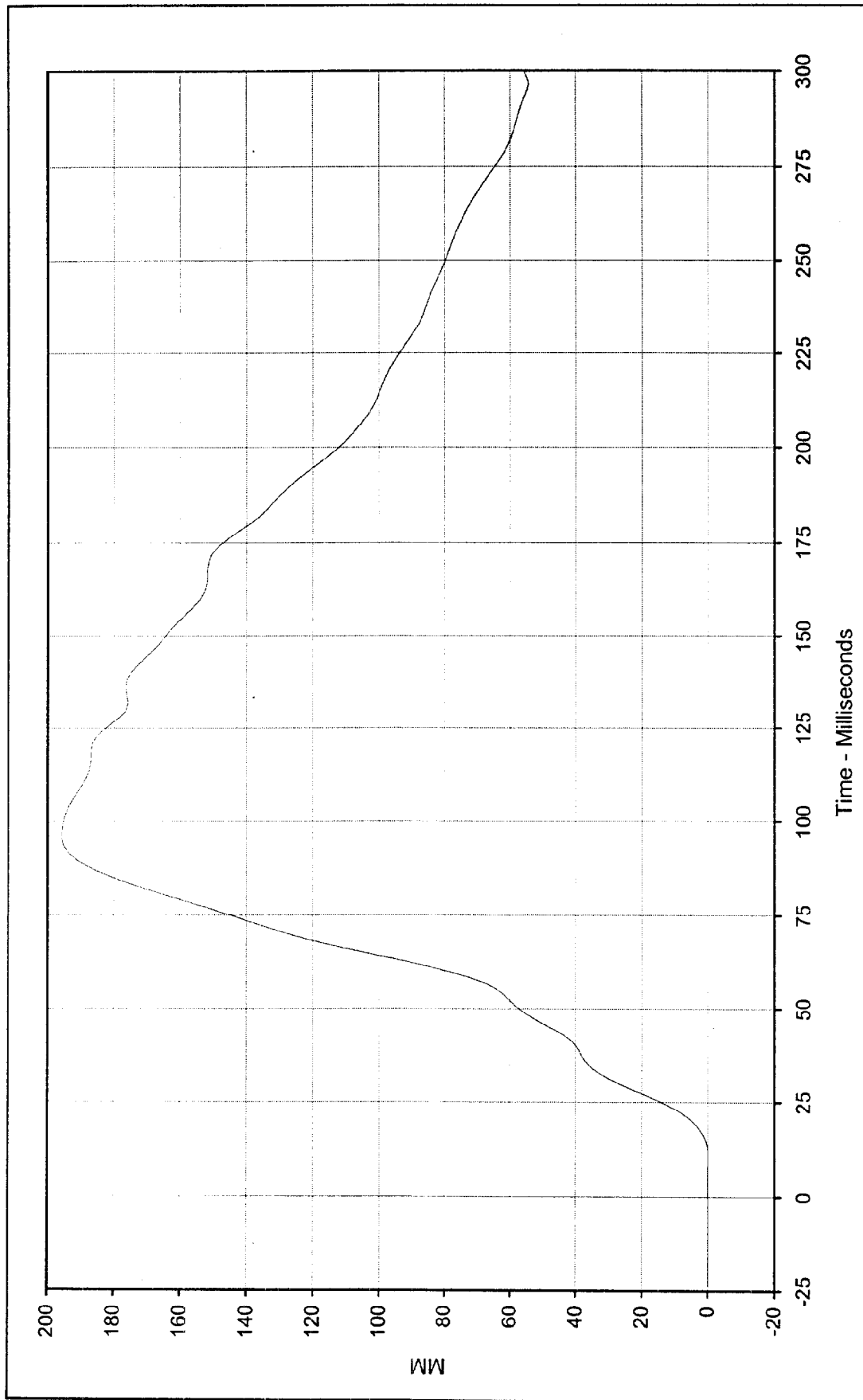
Curve Description:	Driver Lap Belt Force	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	3076.1 at 62.6 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-11.5 at 299.9 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-041			





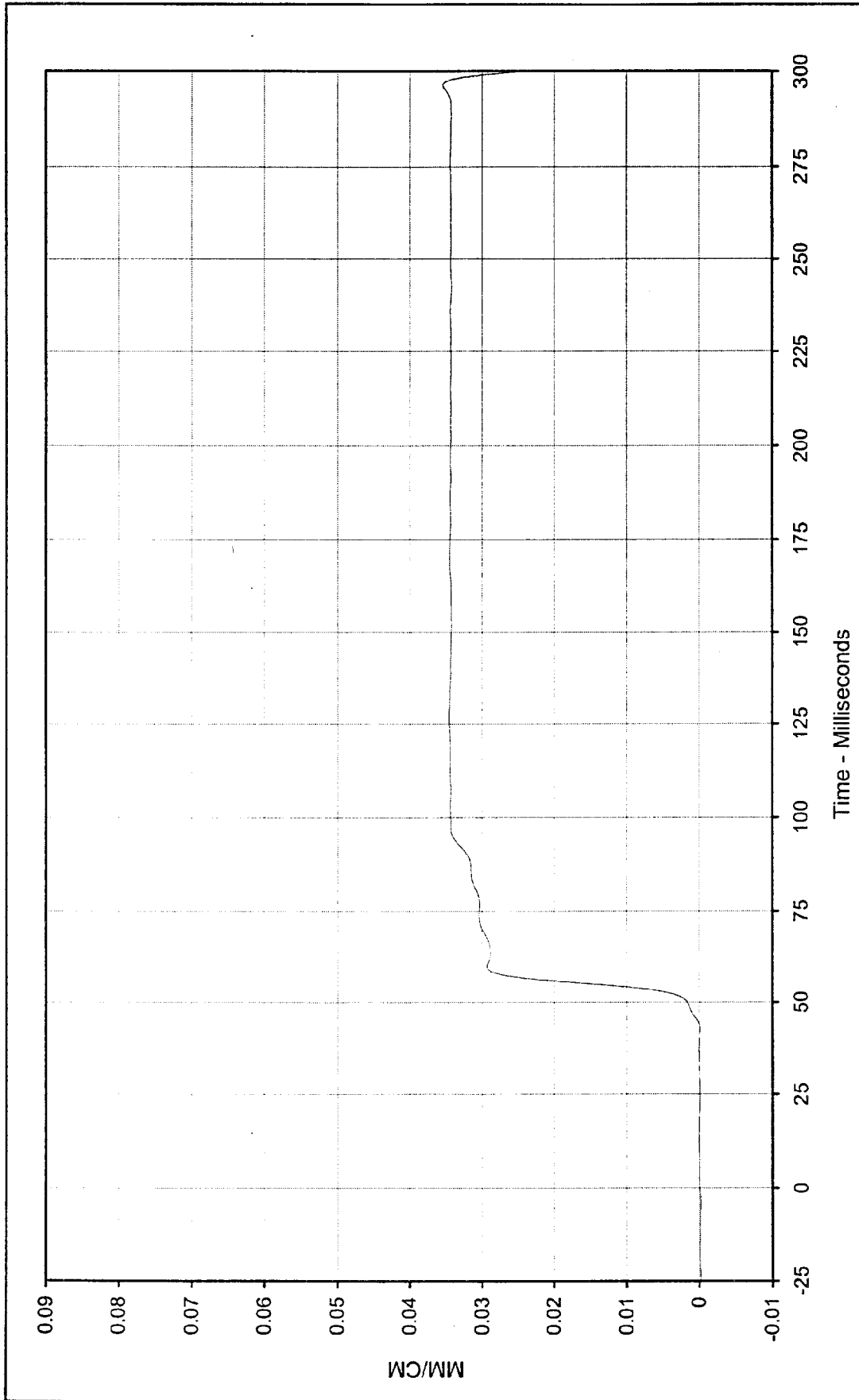
Curve Description:	Driver Shoulder Belt Force	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	4454.4 at 93.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-11.0 at 170.5 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-042			





Curve Description:		Test Program:	
Maximum Value:		1999 NHTSA 35 mph NCAP	
Minimum Value:		No.: GM0001	
SAE Filter Class:		Test Vehicle:	
Date of Test:		2000 Chevrolet Impala 4 Door Sedan	
Curve Number:			





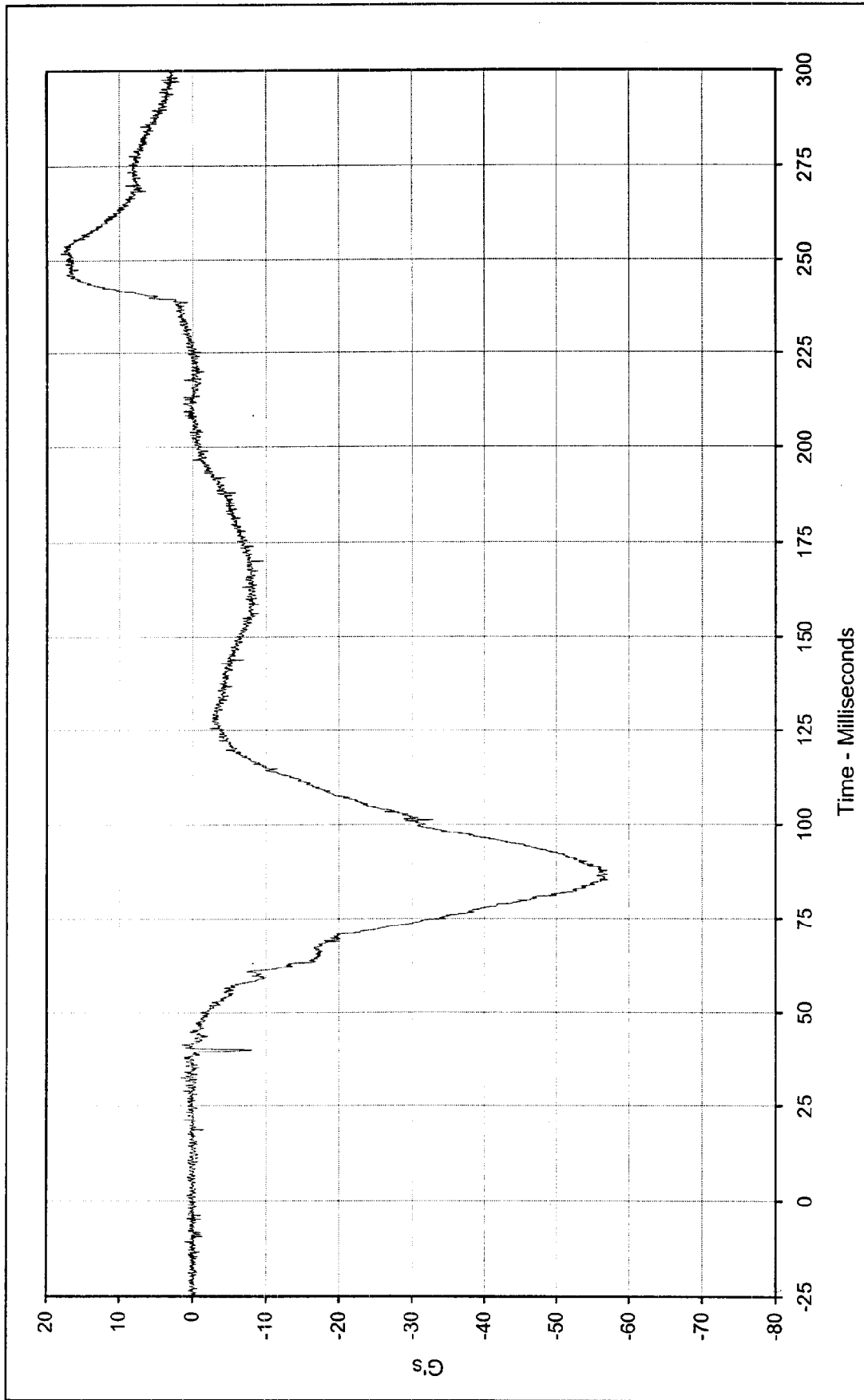
Curve Description: Driver Shoulder Belt Elongation

Maximum Value:	0.035	at	296.4	Milliseconds
Minimum Value:	0.000	at	24.9	Milliseconds
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-044			

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

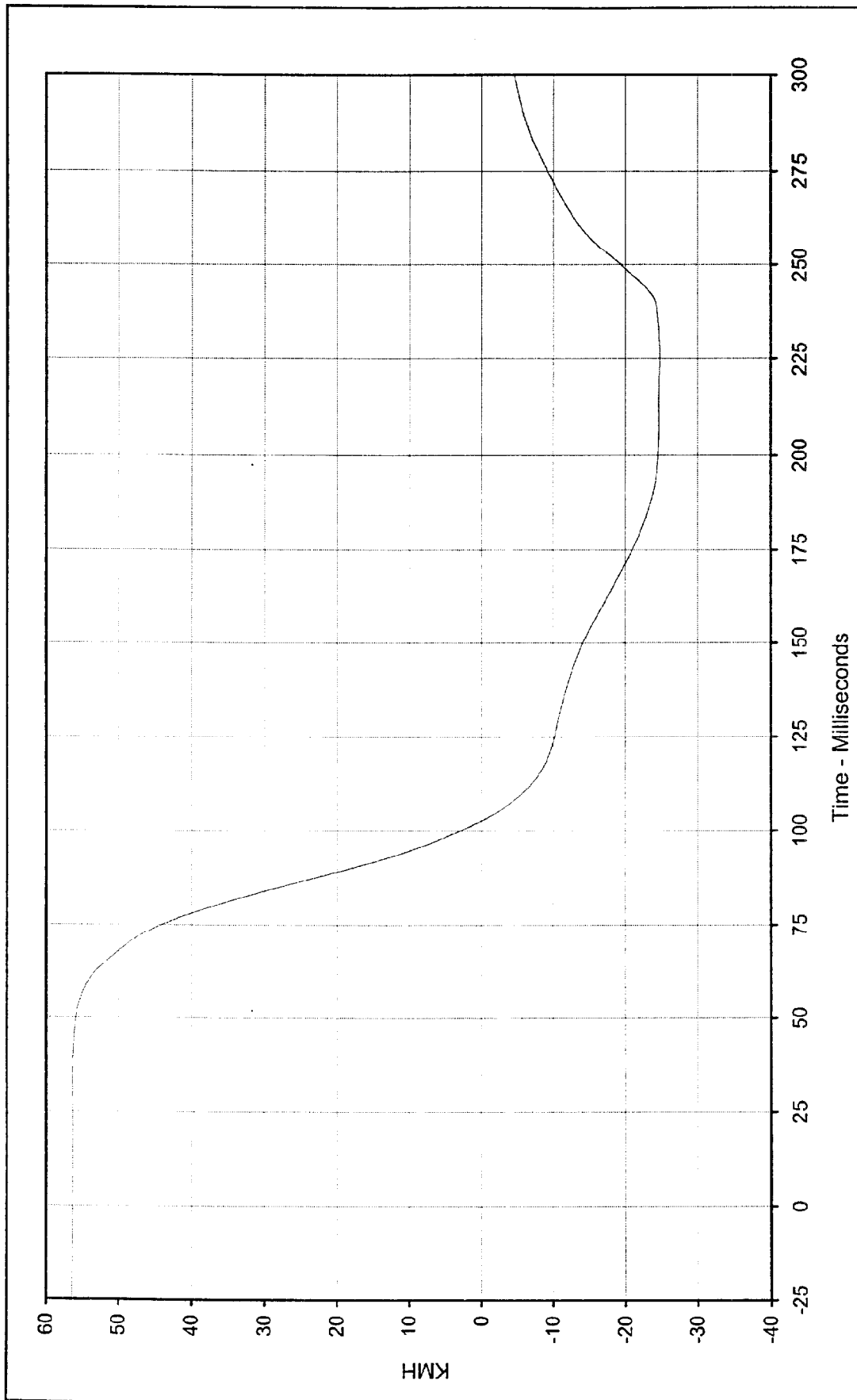




Curve Description:	Passenger Head Primary X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	18.1	at 251.9 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-57.1	at 85.2 Milliseconds			
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-045				

The logo for OKARCO Engineering. It features the word "OKARCO" in a large, bold, sans-serif font. The letter "O" is replaced by a stylized lightbulb icon. To the right of "OKARCO", the word "Engineering" is written in a smaller, italicized, sans-serif font. The entire logo is set against a black background with a white border.





Curve Description: Passenger Head Primary X Velocity

Maximum Value: 56.4 at 38.2 Milliseconds

Minimum Value: -24.8 at 226.0 Milliseconds

SAE Filter Class: 180

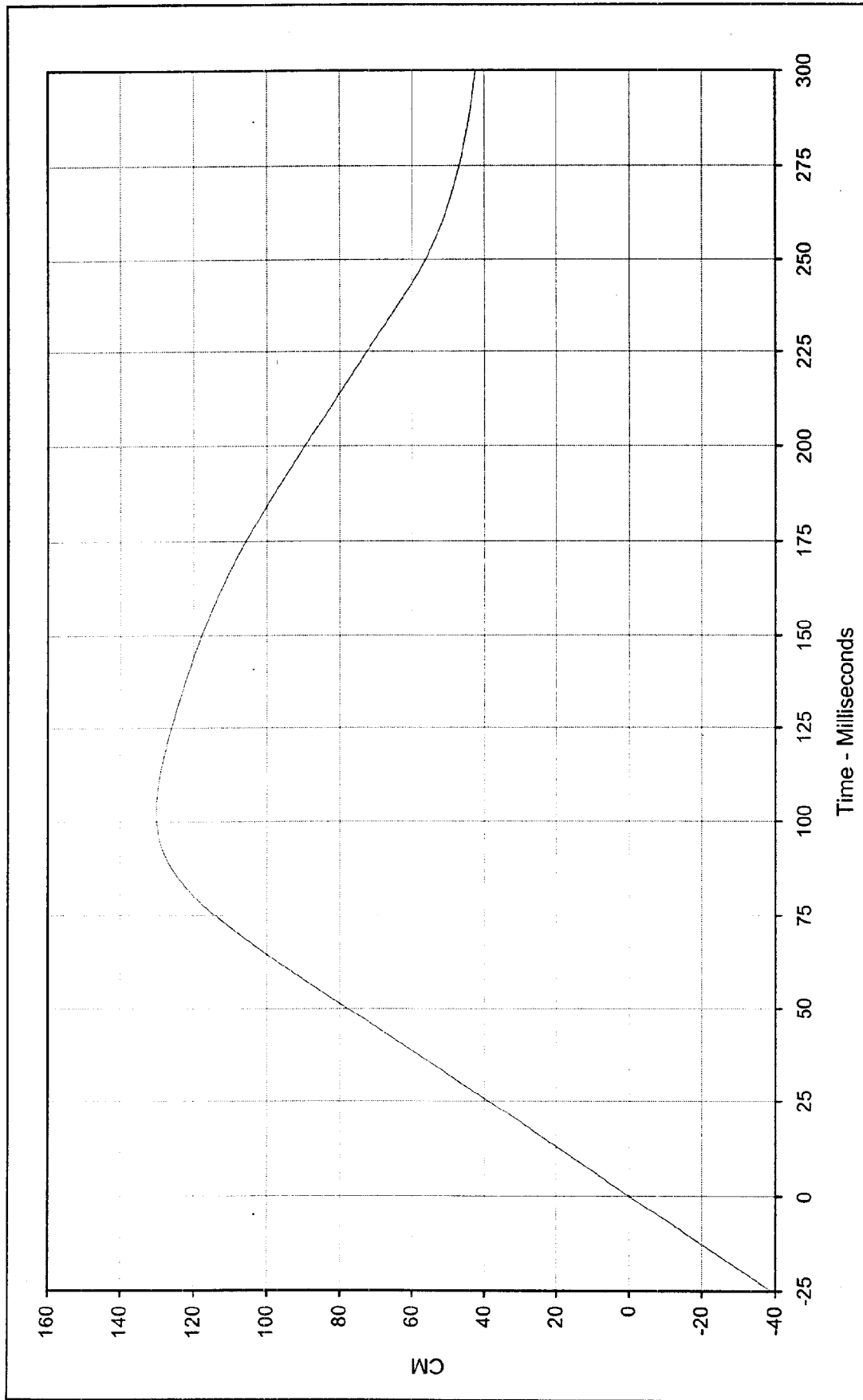
Date of Test: 5/20/99

Curve Number: IN1-045

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

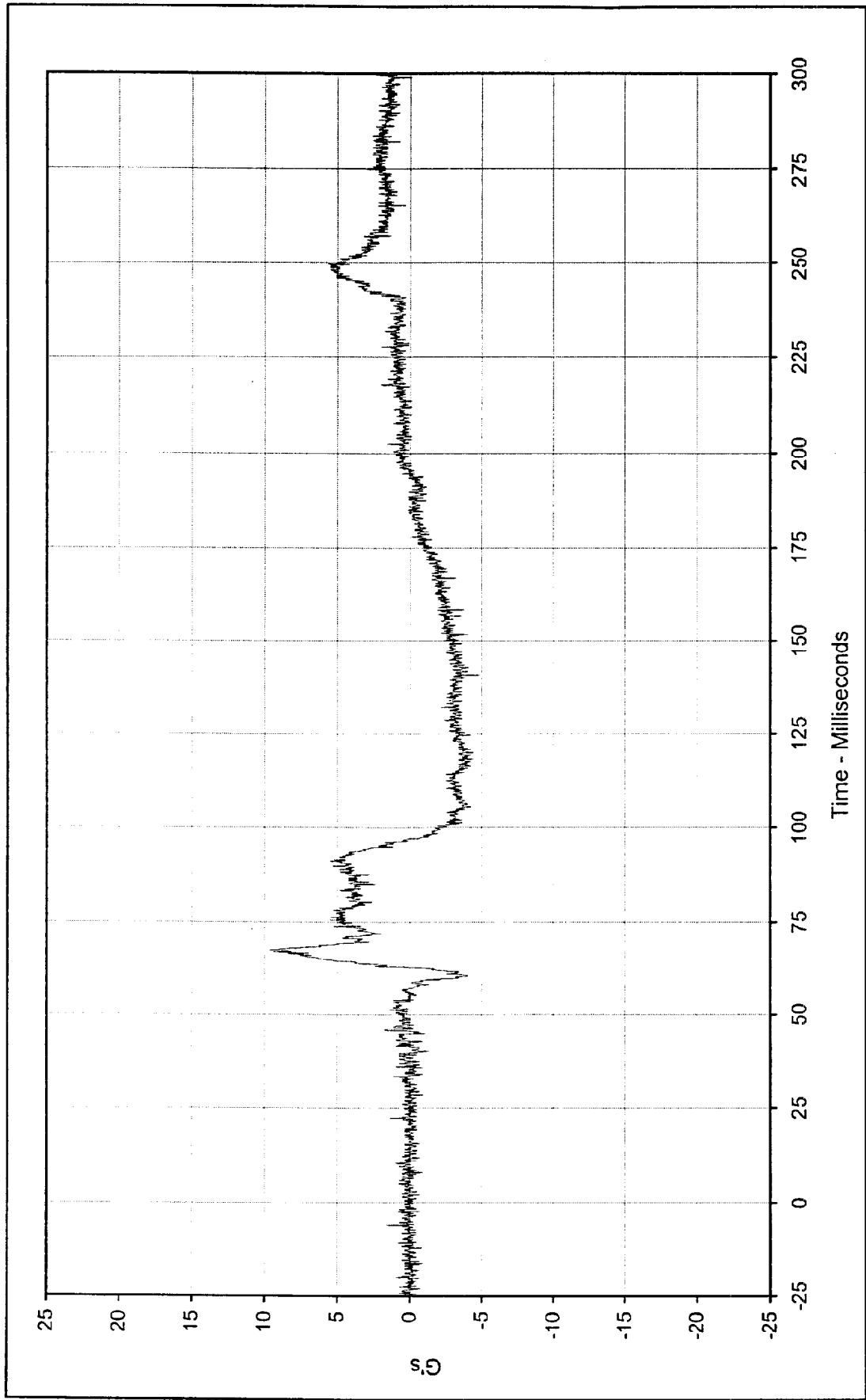
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





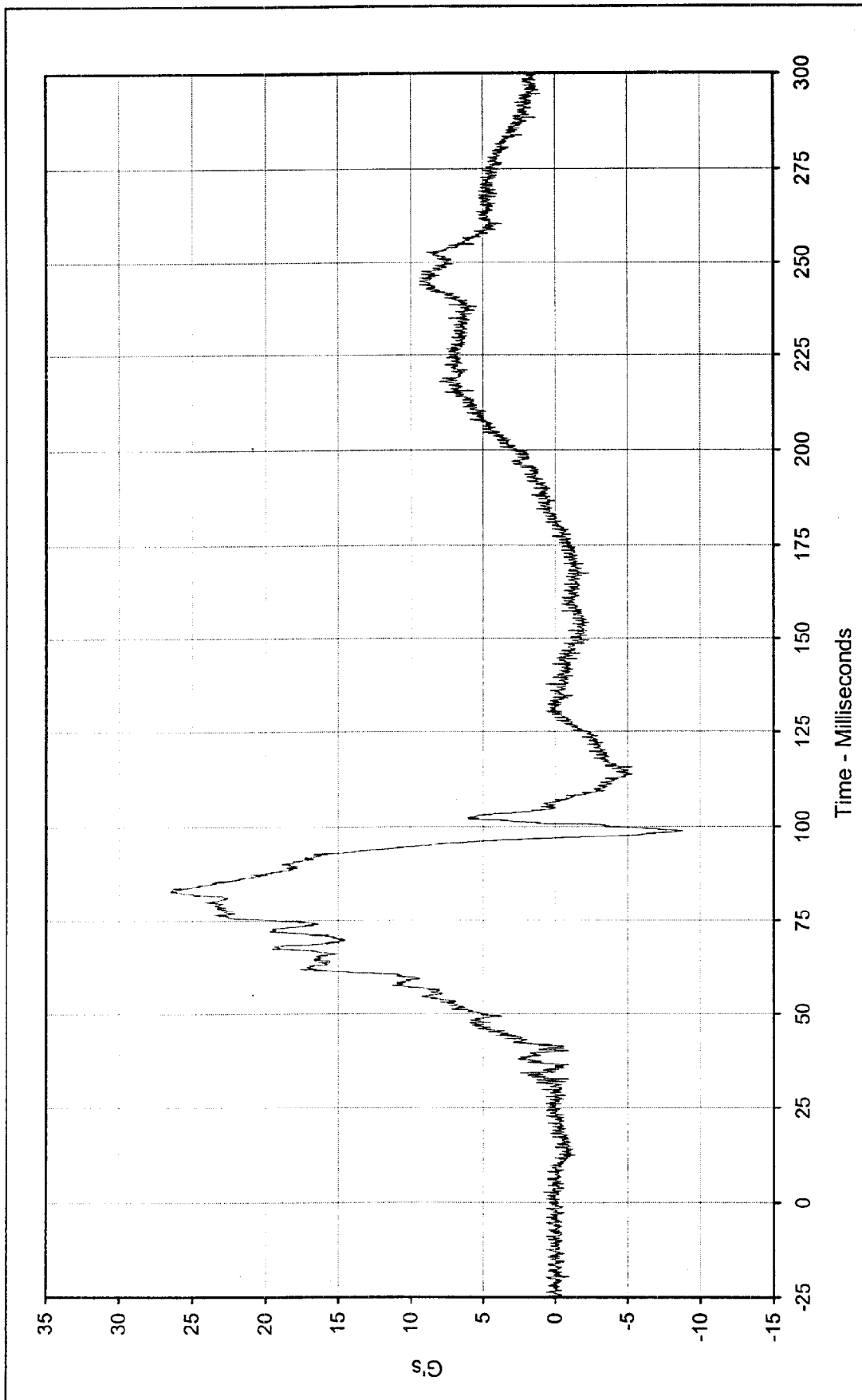
Curve Description:	Passenger Head Primary X Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	130.2 at 102.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.0 at 0.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN2-045			





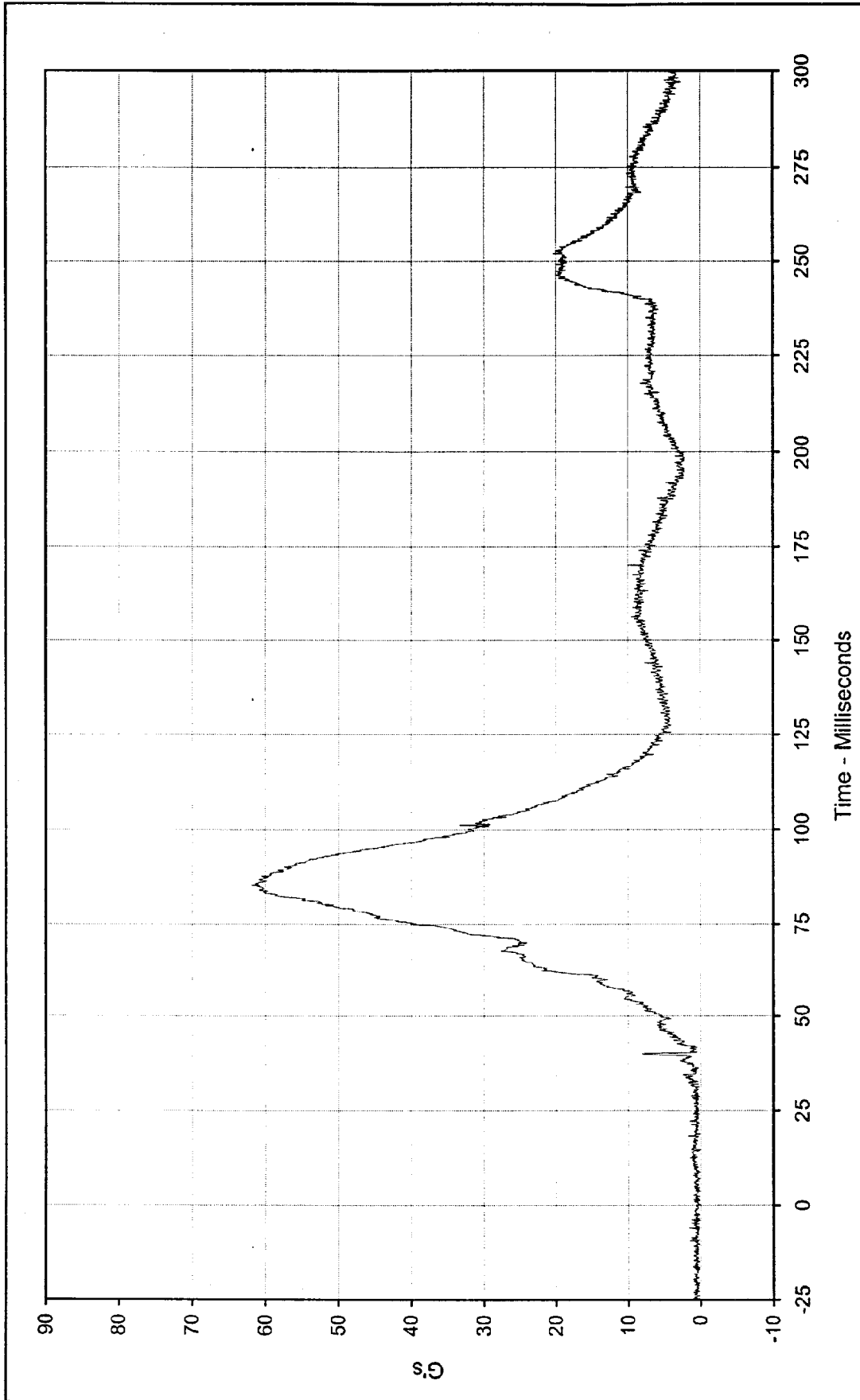
Curve Description:	Passenger Head Primary Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	9.6 at 67.3 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-4.9 at 140.5 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-046			





Curve Description:	Passenger Head Primary Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	26.5 at 83.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-8.8 at 98.8 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-047			



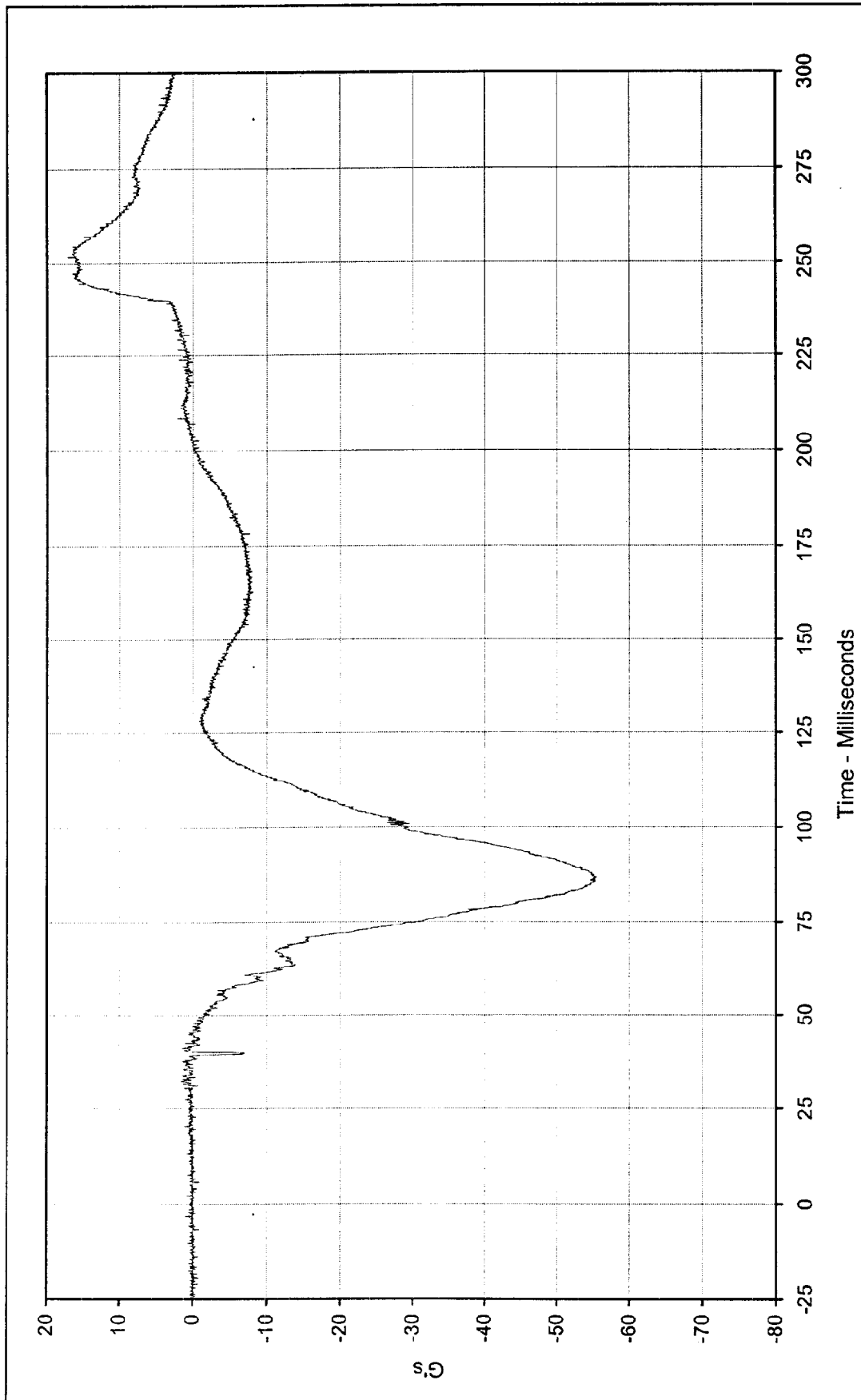


Curve Description: Passenger Head Resultant Primary

Maximum Value:	61.9	at	85.2	Milliseconds
Minimum Value:	0.1	at	7.3	Milliseconds
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	RES-045			

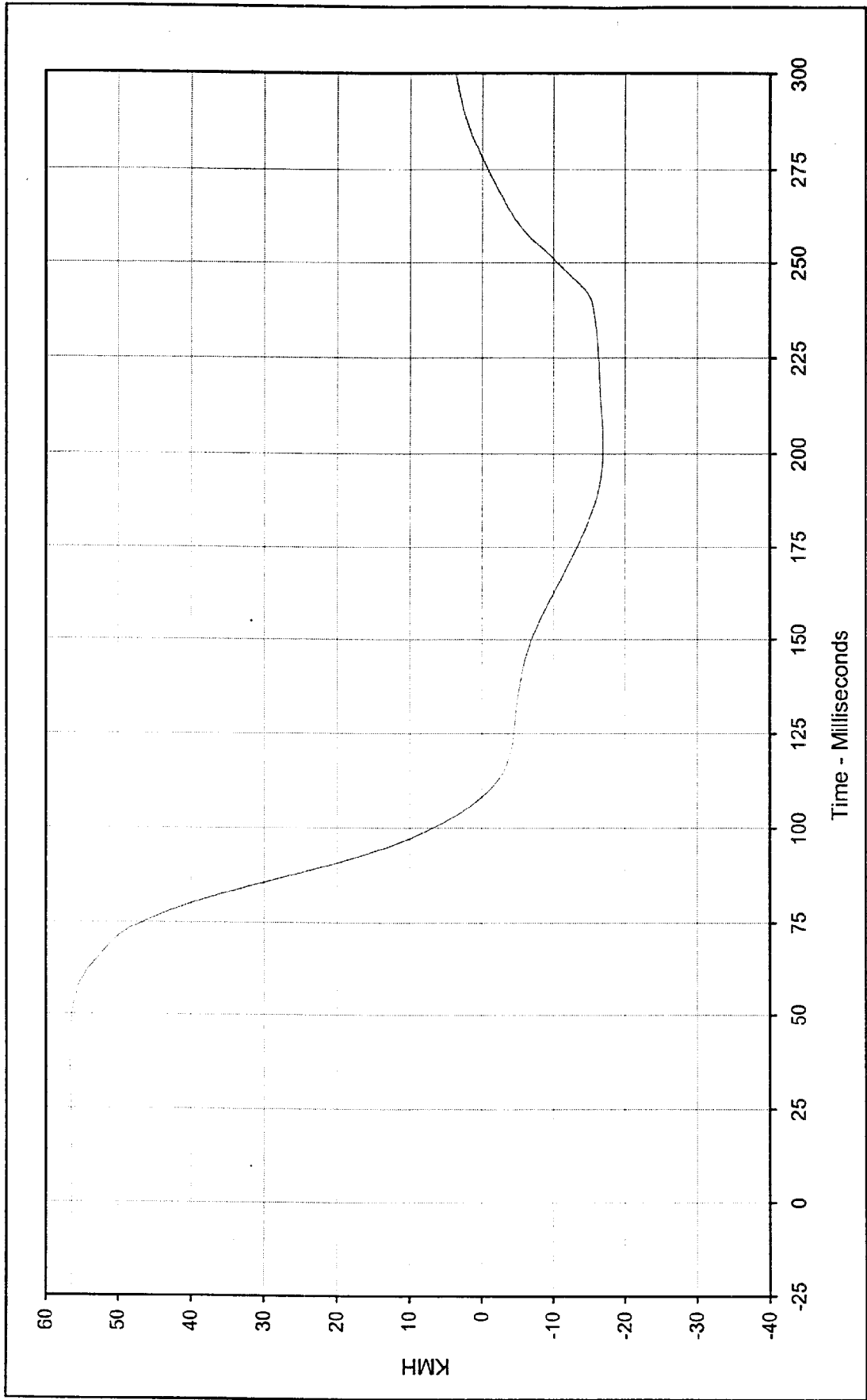
Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	





Curve Description:	Passenger Head Redundant X	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	17.2 at 251.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-55.5 at 86.7 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-048			





Curve Description: Passenger Head Redundant X Velocity

Maximum Value: 56.7 at 38.3 Milliseconds

Minimum Value: -16.9 at 201.9 Milliseconds

SAE Filter Class: 180

Date of Test: 5/20/99

Curve Number: IN1-048

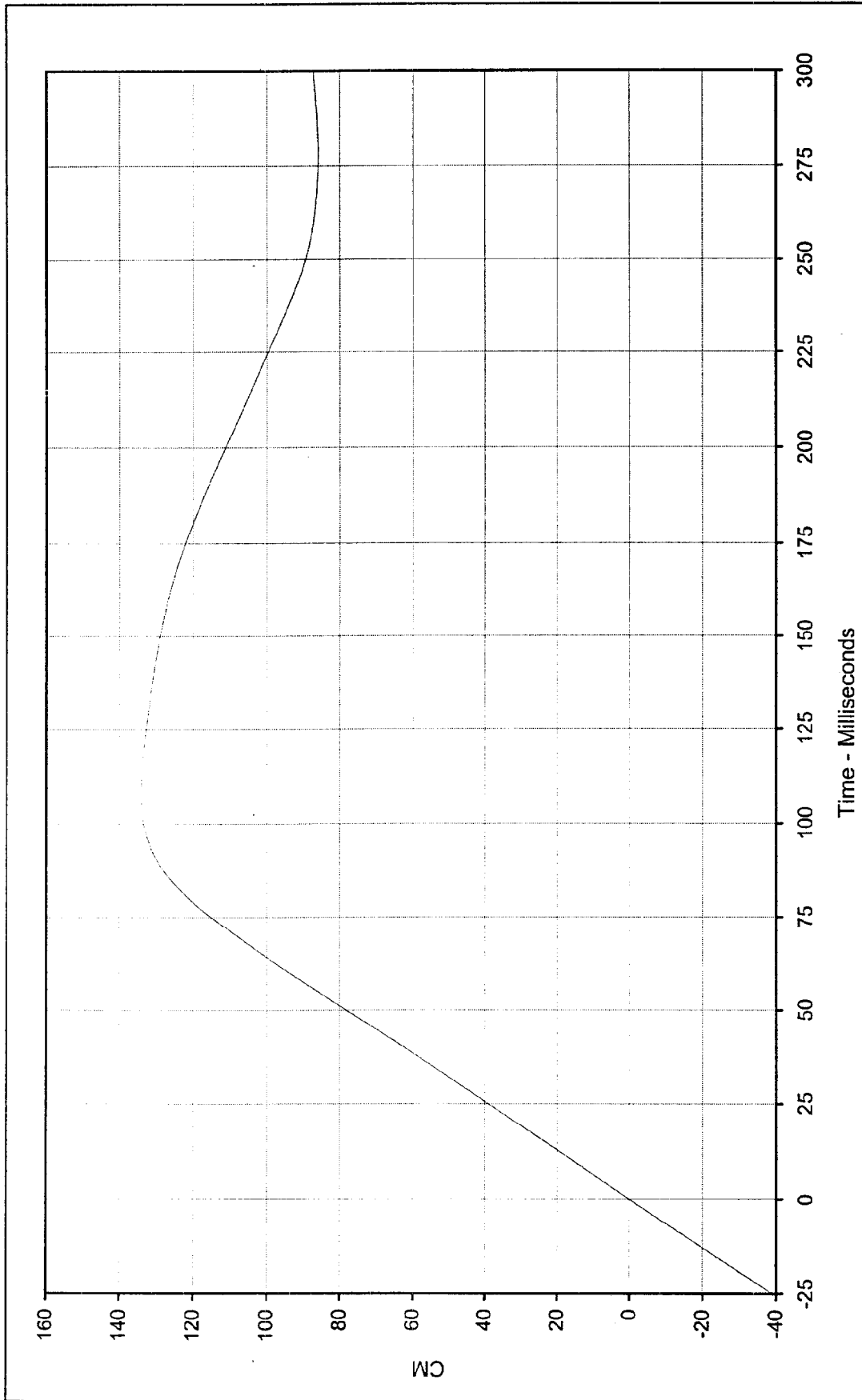
Test Program:

Test Vehicle:

1999 NHTSA 35 mph NCAP No.: GM0001

2000 Chevrolet Impala 4 Door Sedan





Curve Description: Passenger Head Redundant X Displ.

Maximum Value: 134.1 at 108.3 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

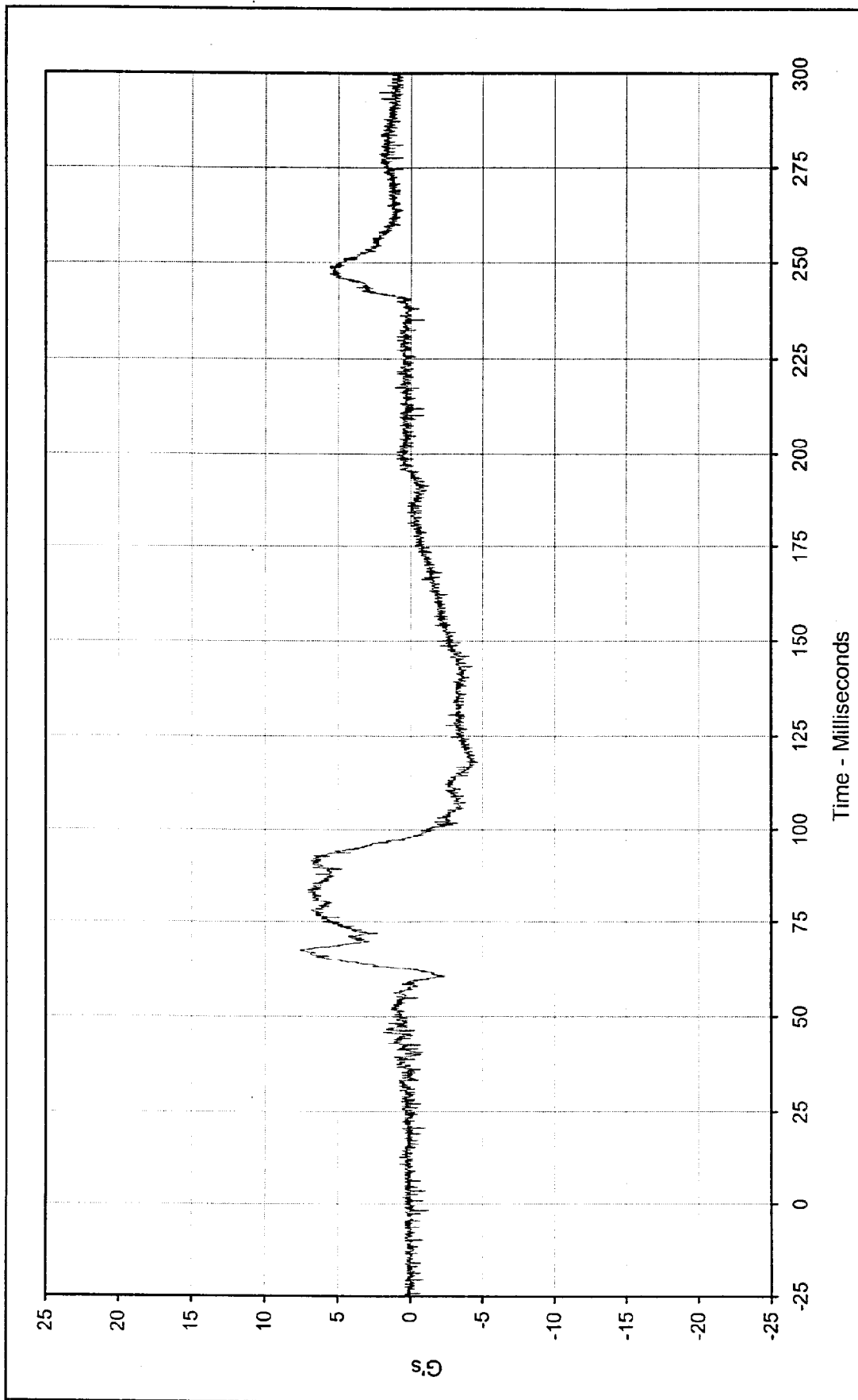
Date of Test: 5/20/99

Curve Number: IN2-048

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan



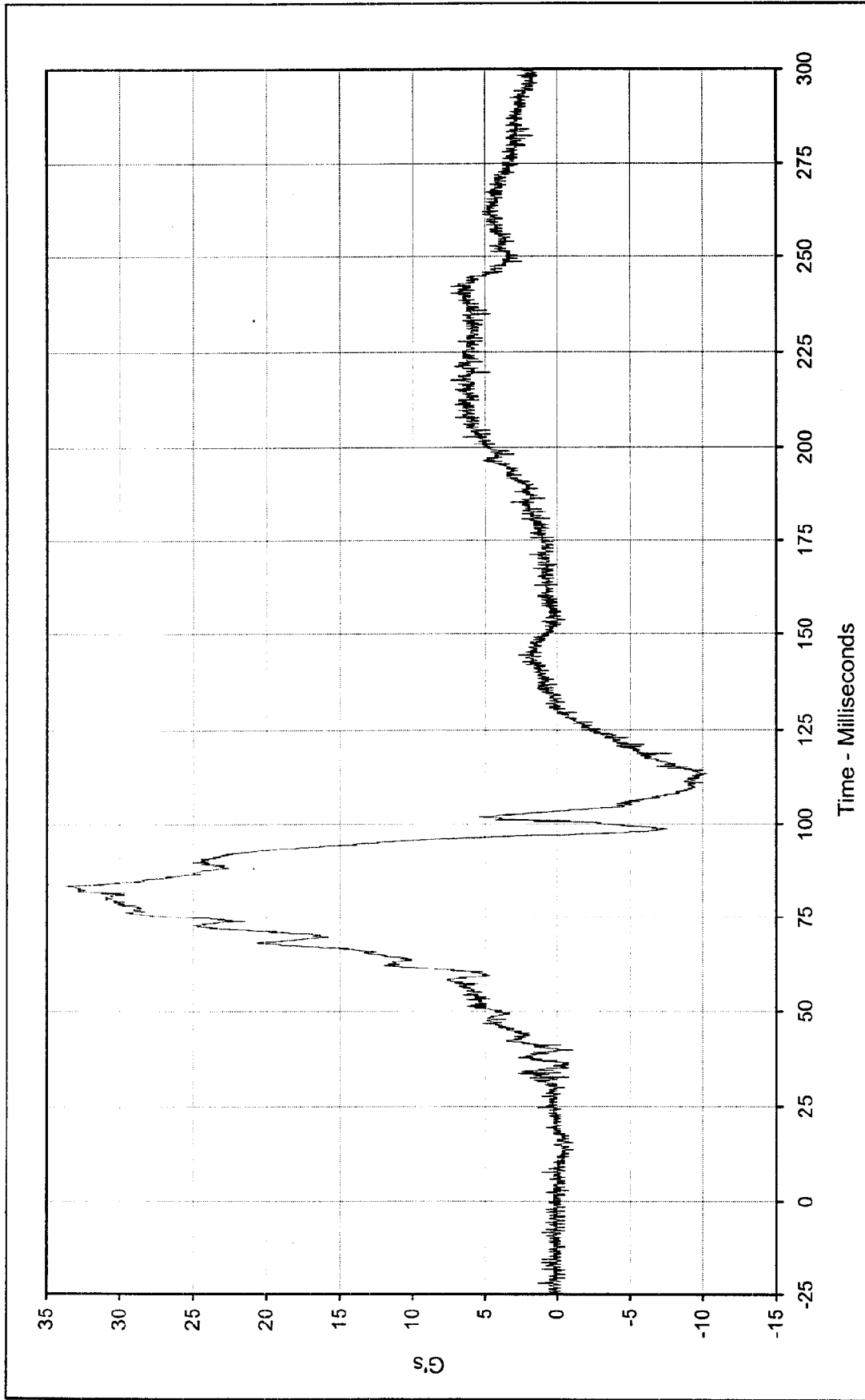


Curve Description:		Passenger Head Redundant Y		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	7.6	at	67.3	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-4.7	at	117.9	Milliseconds		
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-049					



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Curve Description: Passenger Head Redundant Z Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Maximum Value: 33.7 at 83.5 Milliseconds Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

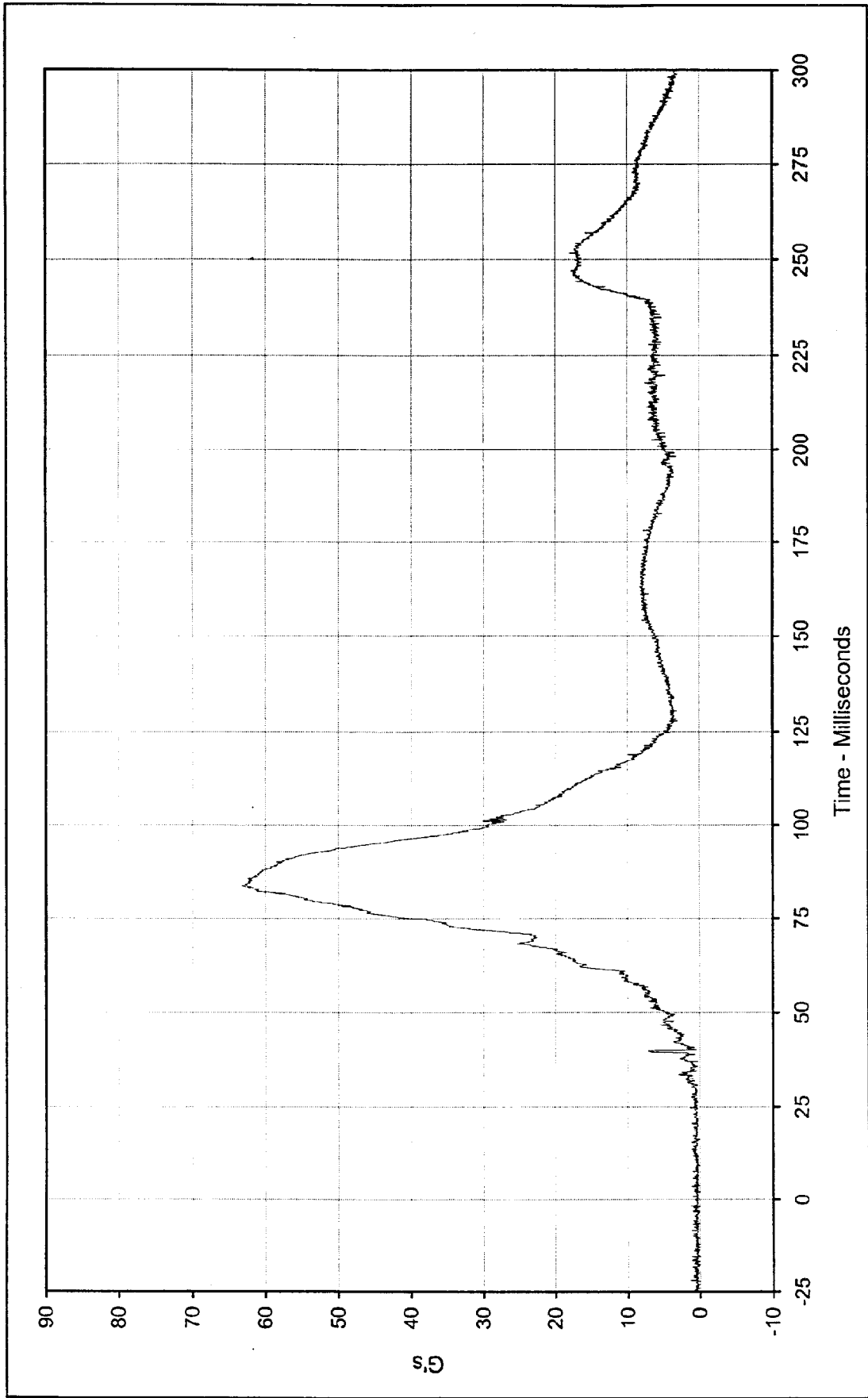
Minimum Value: -10.3 at 113.5 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

Curve Number: FIL-050





Curve Description: Passenger Head Resultant Redundant

Maximum Value: 63.3 at 83.6 Milliseconds

Minimum Value: 0.0 at 2.1 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

Curve Number: RES-048

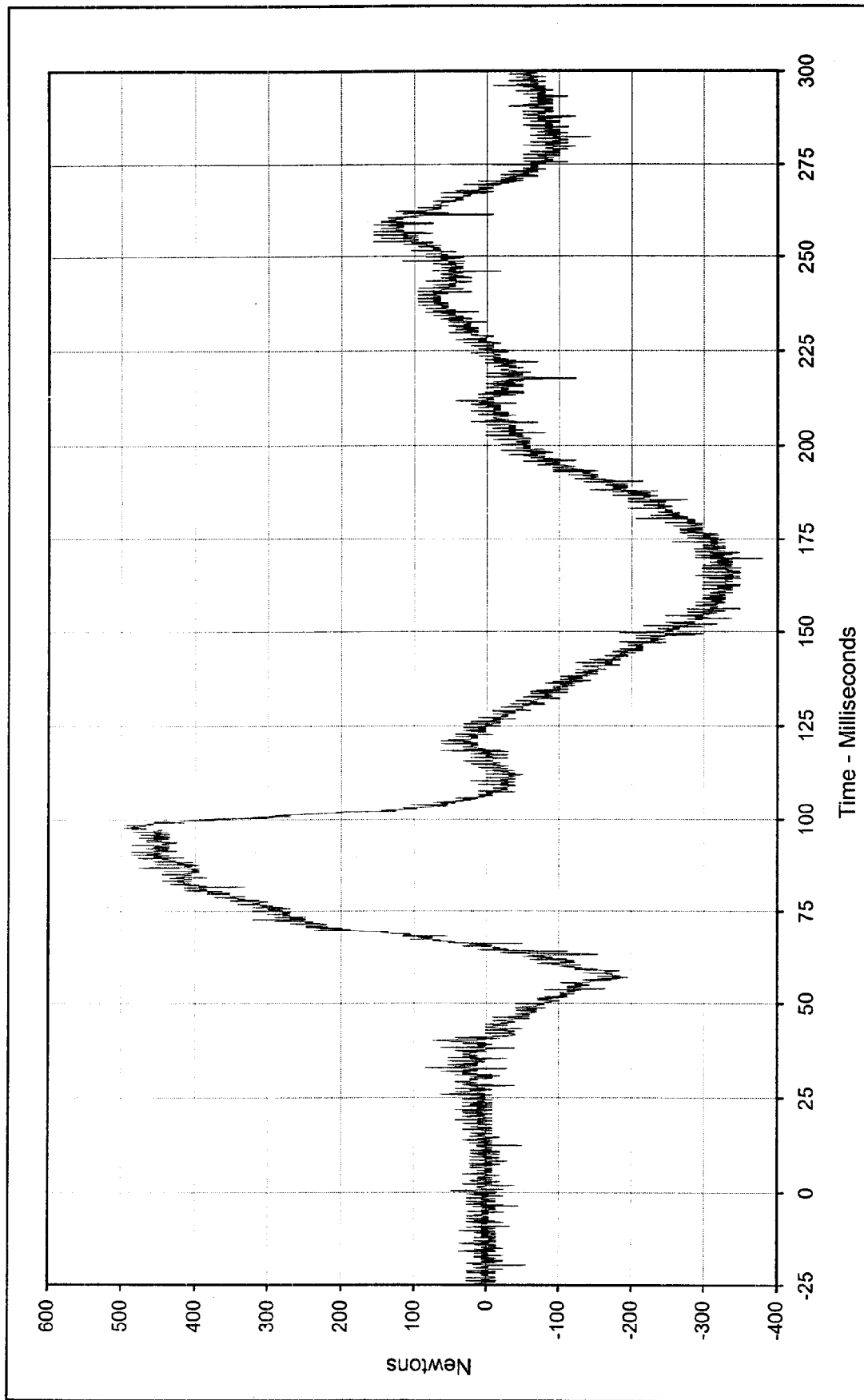
Test Program:

Test Vehicle:

1999 NHTSA 35 mph NCAP No.: GM0001

2000 Chevrolet Impala 4 Door Sedan





Curve Description: 1999 NHTSA 35 mph NCAP Test Program: No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

Passenger Neck Force X

Maximum Value: 496.6 at 97.9 Milliseconds

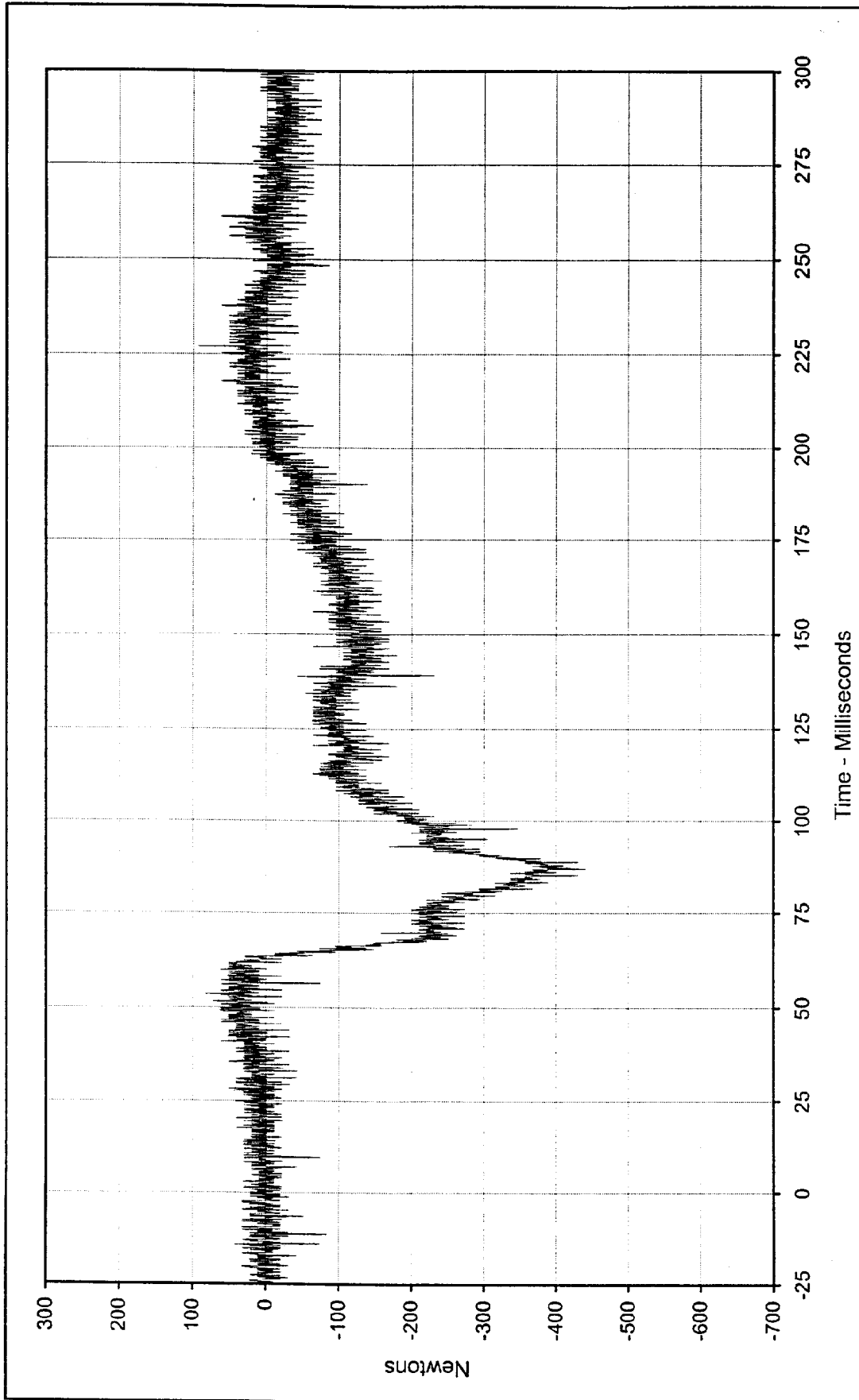
Minimum Value: -380.4 at 169.7 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

Curve Number: FIL-051





Curve Description: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Program: 2000 Chevrolet Impala 4 Door Sedan

Maximum Value: 92.7 at 227.1 Milliseconds

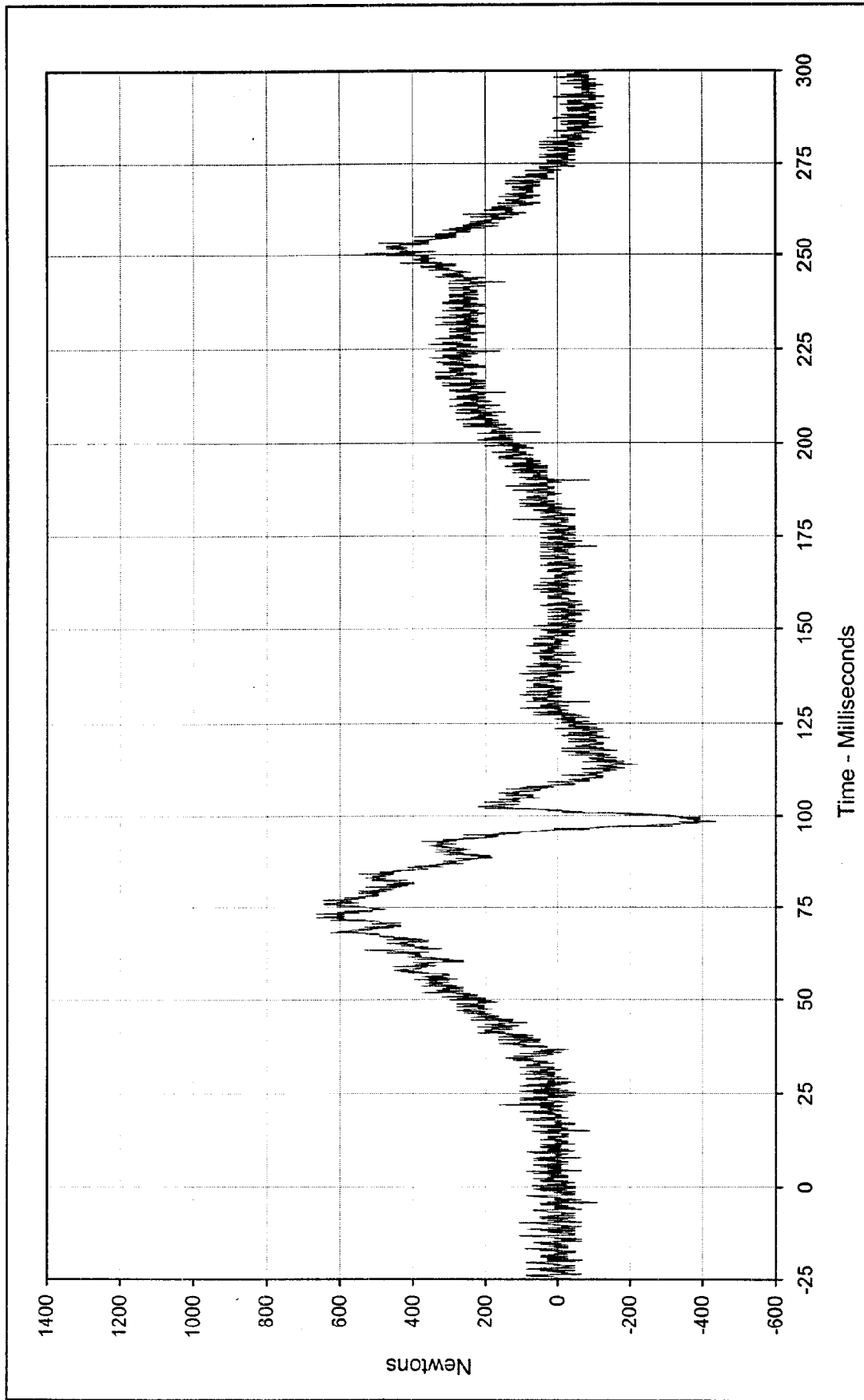
Minimum Value: -441.1 at 86.9 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

Curve Number: FIL-052

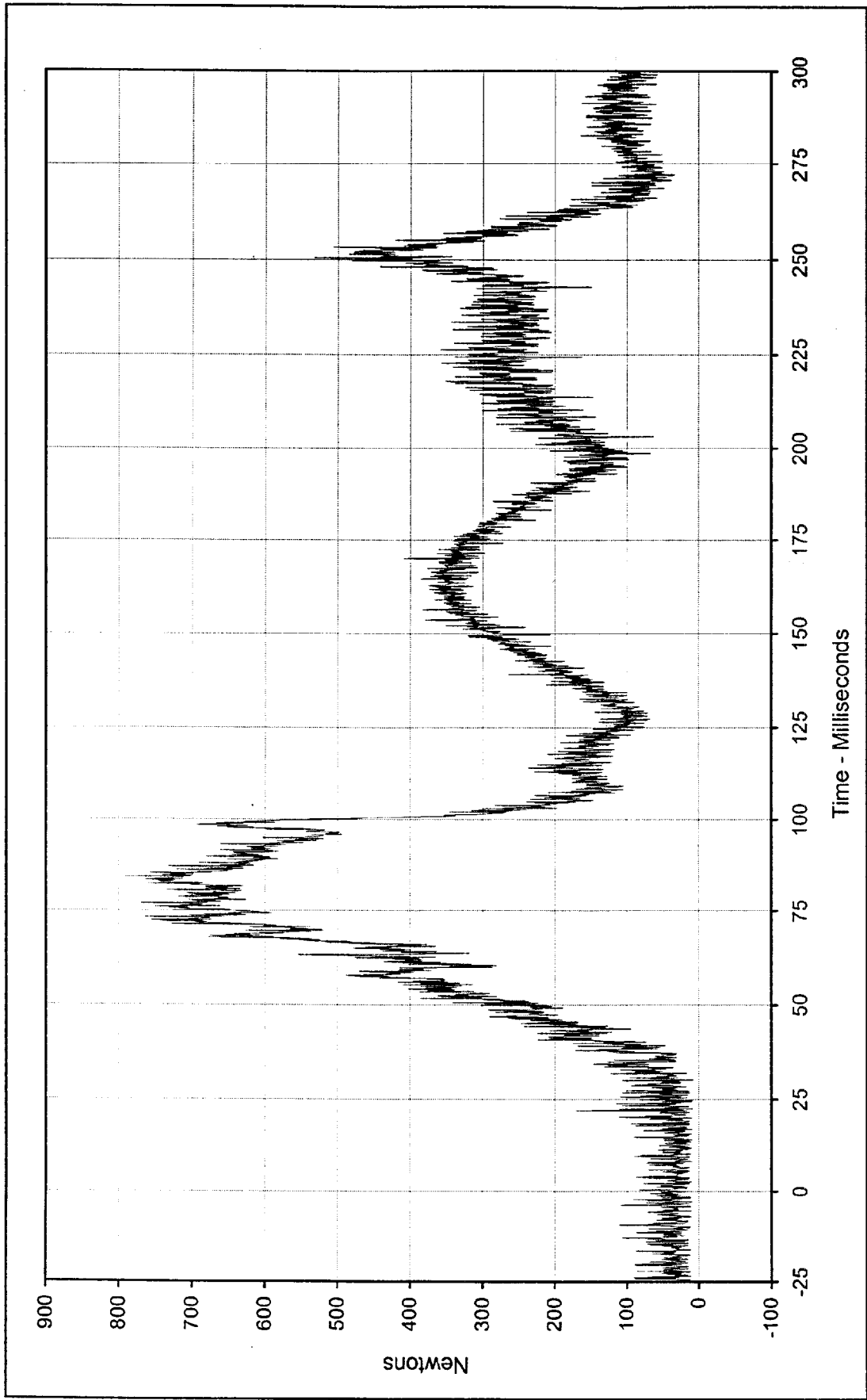




Curve Description:	Passenger Neck Force Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	665.0 at 72.2 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-434.3 at 98.6 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-053			

The logo for AKARCO Engineering features the word "AKARCO" in a bold, sans-serif font. The letter "A" is stylized to resemble a lightbulb. To the right of "AKARCO", the word "Engineering" is written in a script font. The entire logo is set against a black background with a white diagonal stripe.

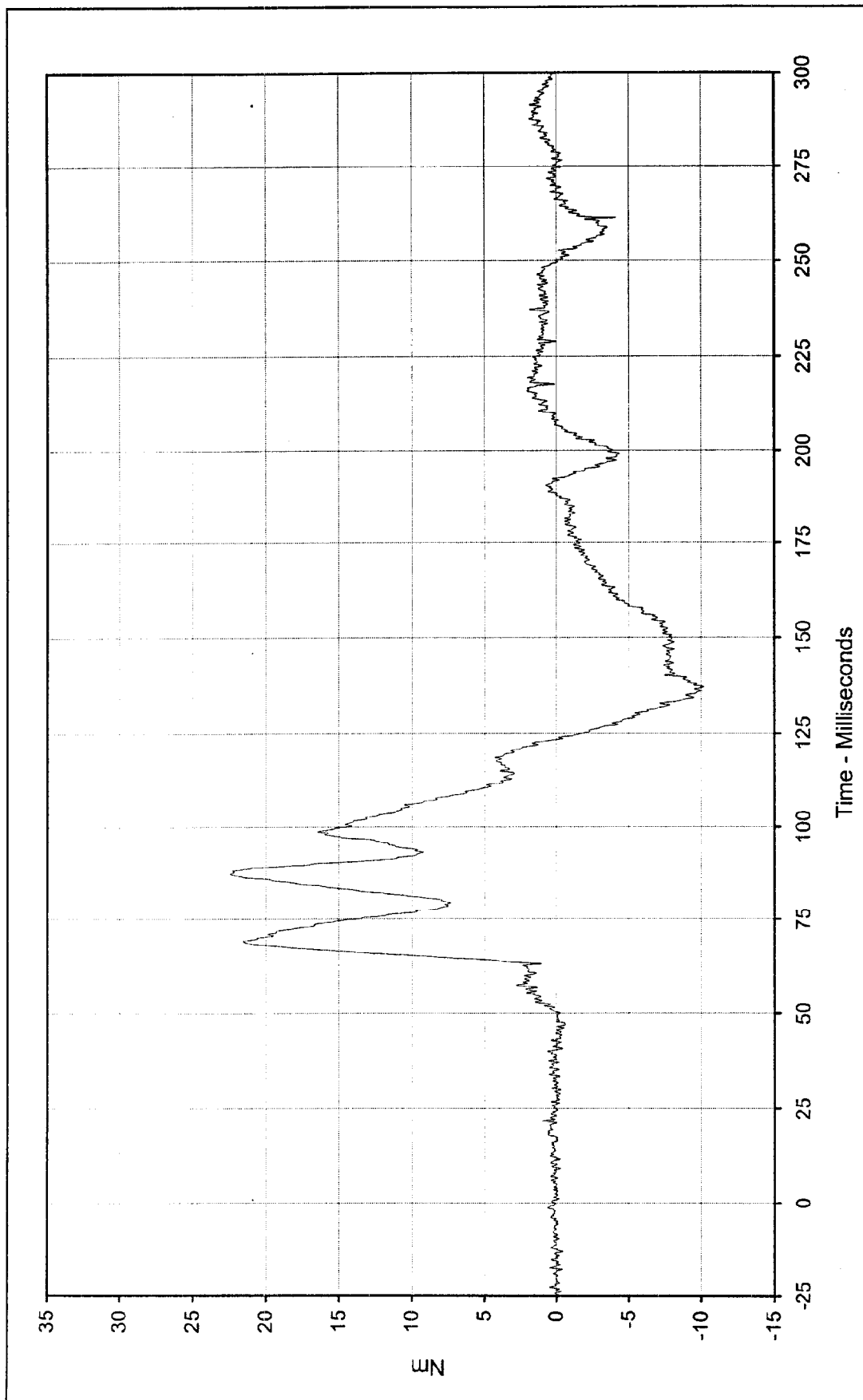




Curve Description:	Passenger Neck Force Resultant	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM00001
Maximum Value:	791.2	at	84.1	Milliseconds	Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	9.5	at	8.1	Milliseconds	
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	RES-051				

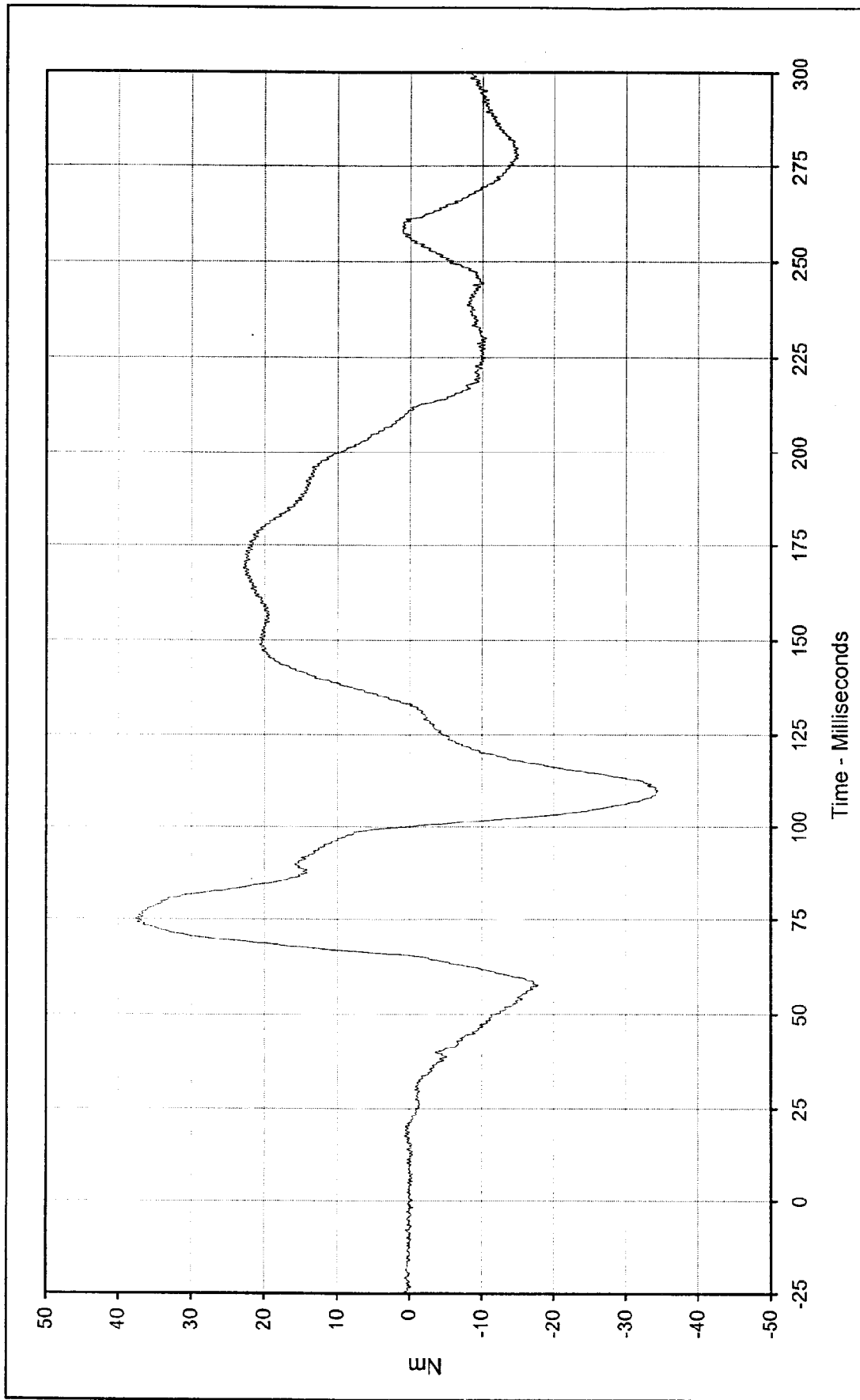






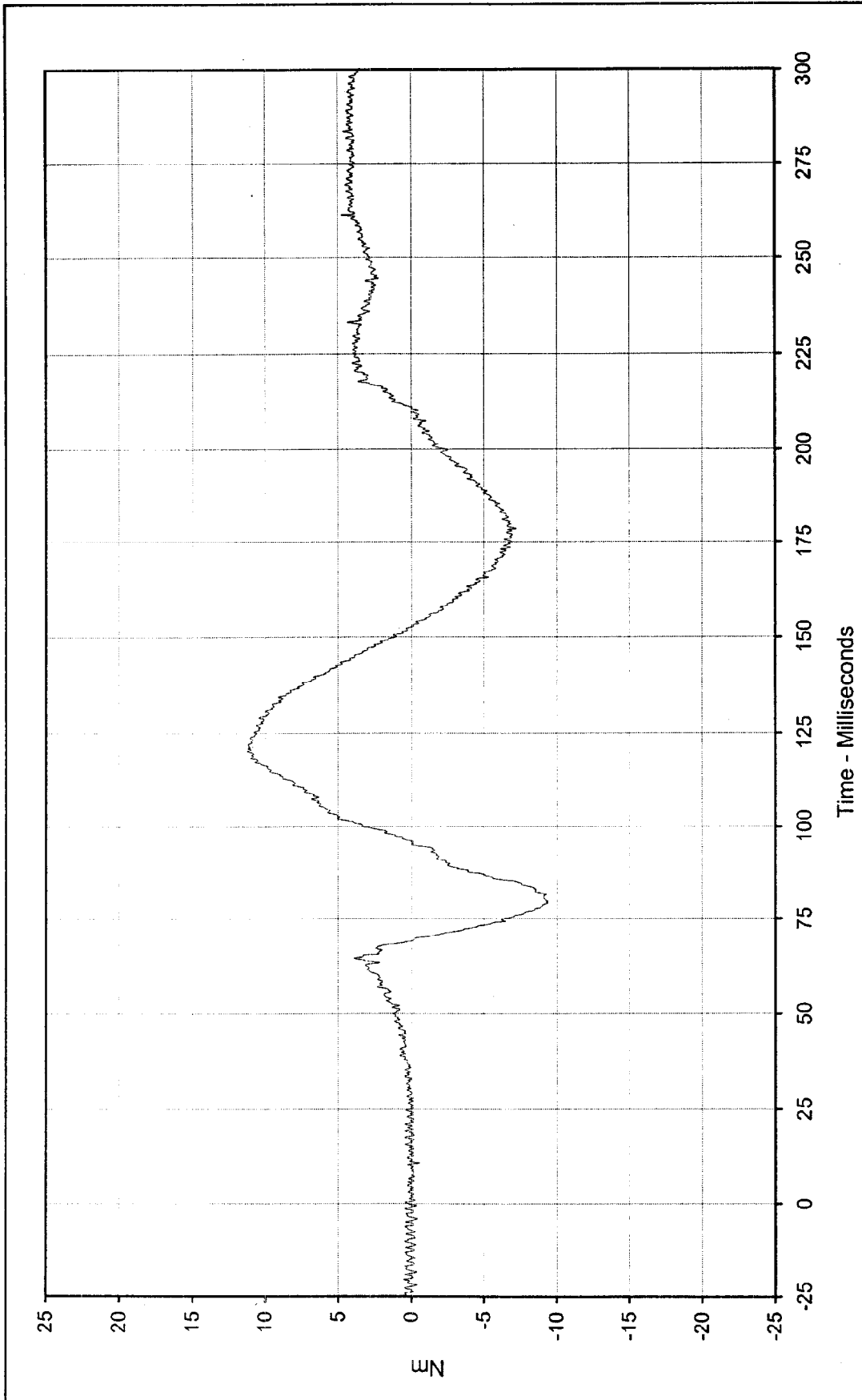
Curve Description:	Passenger Neck Moment X	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	22.4 at 87.2 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-10.2 at 137.3 Milliseconds			
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-054			





Curve Description:	Passenger Neck Moment Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	37.6 at 75.1 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-34.4 at 109.7 Milliseconds			
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-055			

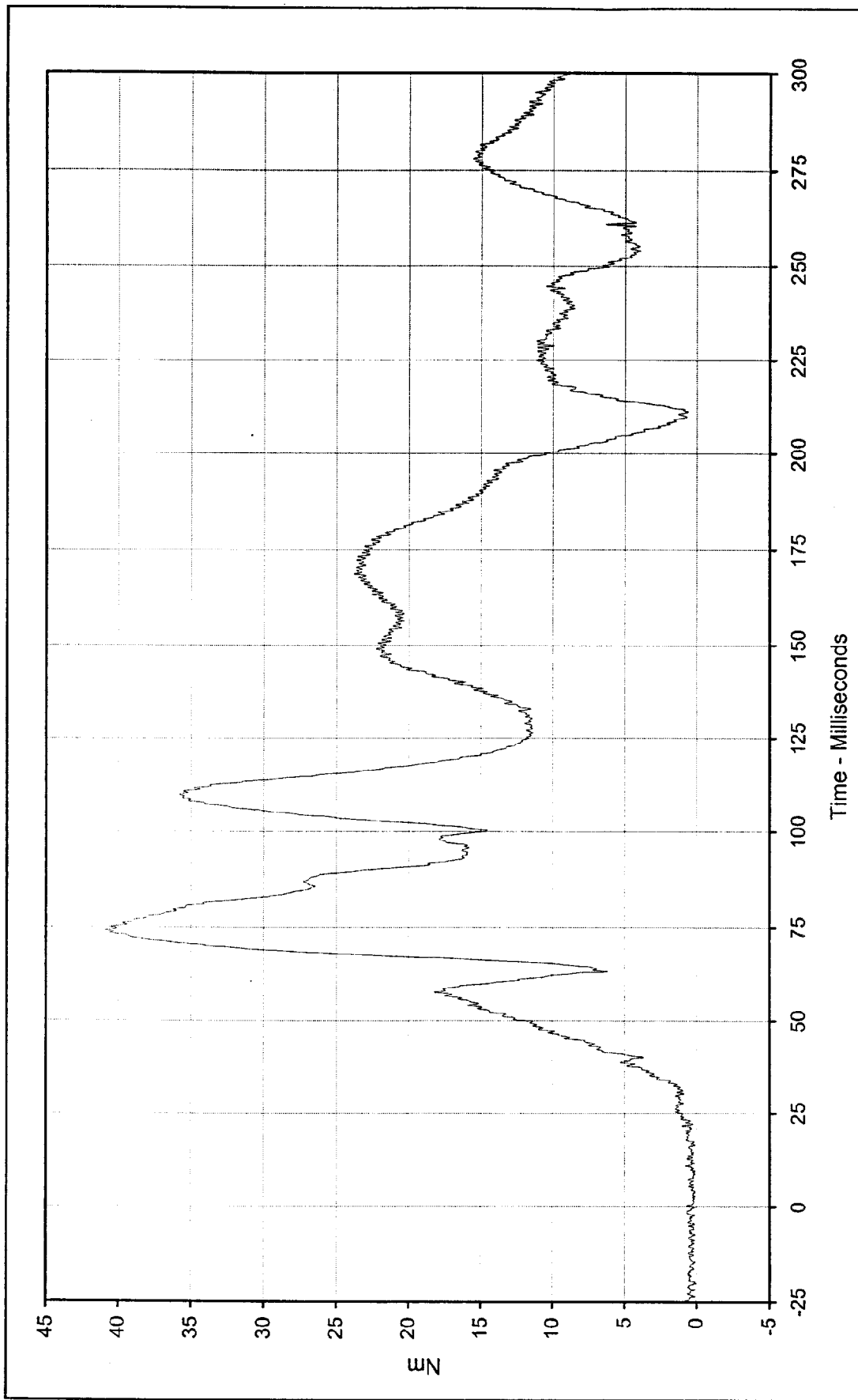




Curve Description: Passenger Neck Moment Z
 Maximum Value: 11.2 at 120.0 Milliseconds
 Minimum Value: -9.4 at 79.1 Milliseconds
 SAE Filter Class: 600
 Date of Test: 5/20/99
 Curve Number: FIL-056

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

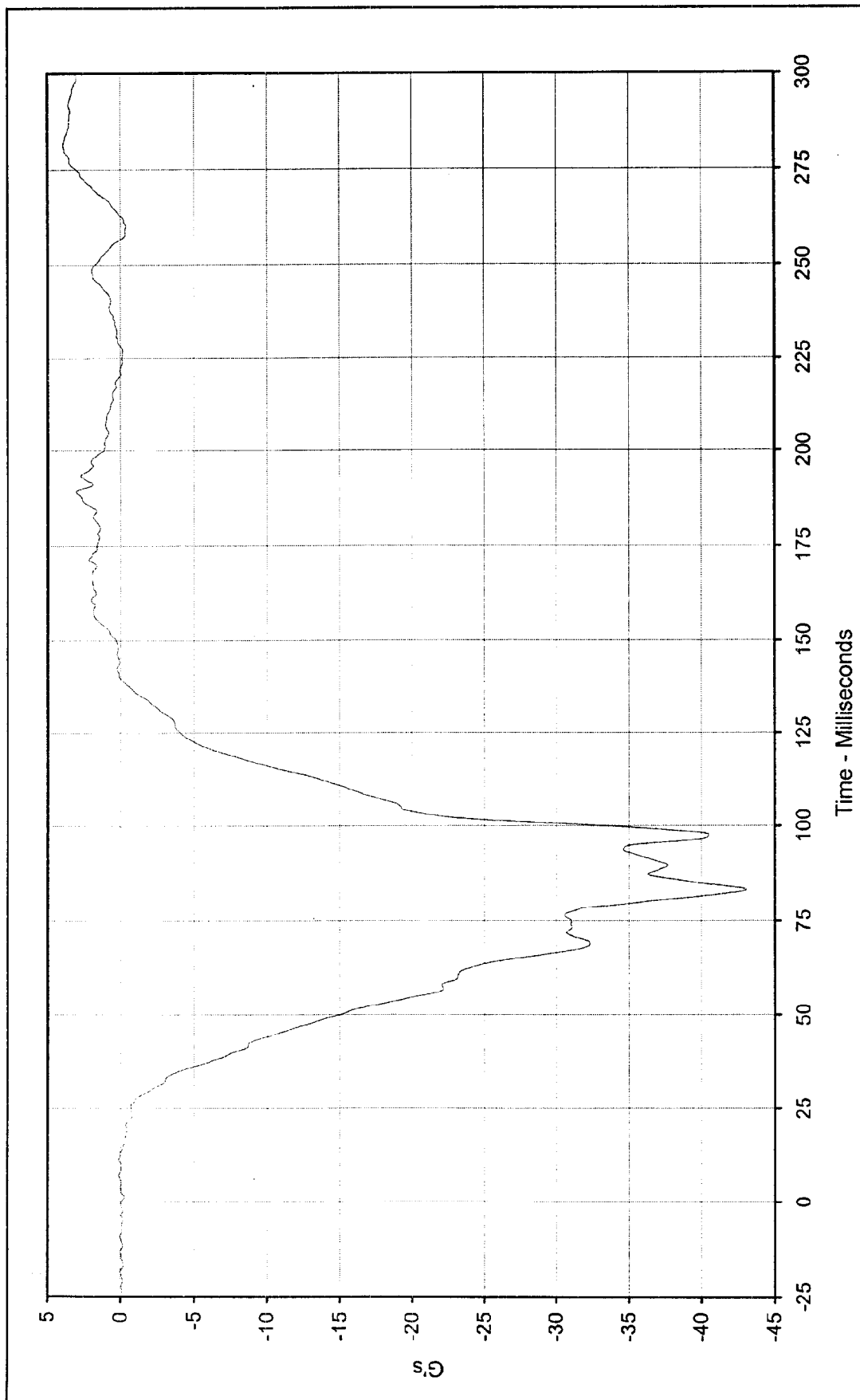




Curve Description: Passenger Neck Moment Resultant
 Maximum Value: 40.9 at 74.2 Milliseconds
 Minimum Value: 0.1 at 9.5 Milliseconds
 SAE Filter Class: 600
 Date of Test: 5/20/99
 Curve Number: RES-054

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

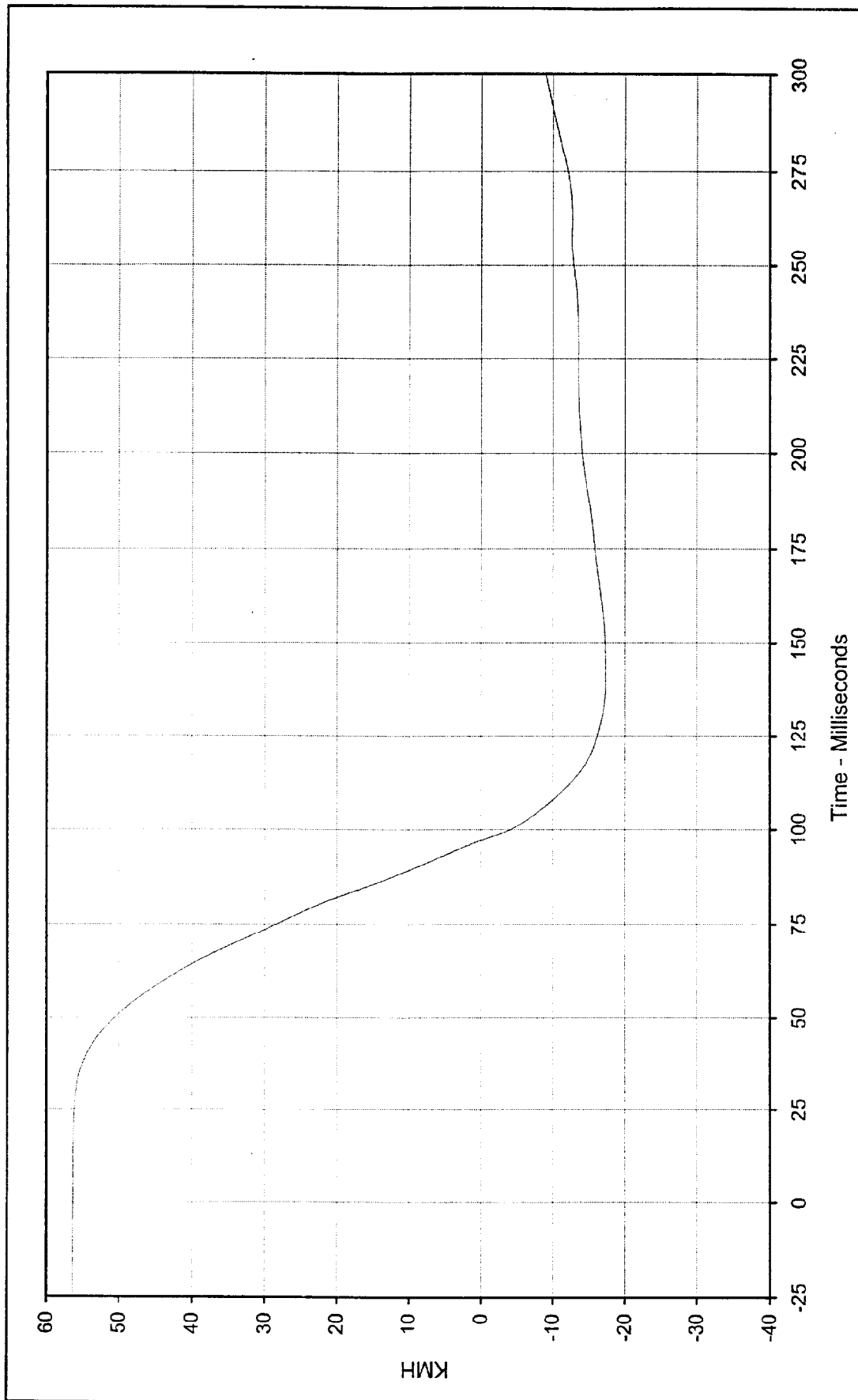




Curve Description: Passenger Chest Primary X
 Maximum Value: 3.9 at 281.3 Milliseconds
 Minimum Value: -43.1 at 83.4 Milliseconds
 SAE Filter Class: 180
 Date of Test: 5/20/99
 Curve Number: FIL-057

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Passenger Chest Primary X Velocity

Maximum Value: 56.3 at 0.0 Milliseconds

Minimum Value: -17.4 at 139.9 Milliseconds

SAE Filter Class: 180

Date of Test: 5/20/99

Curve Number: IN1-057

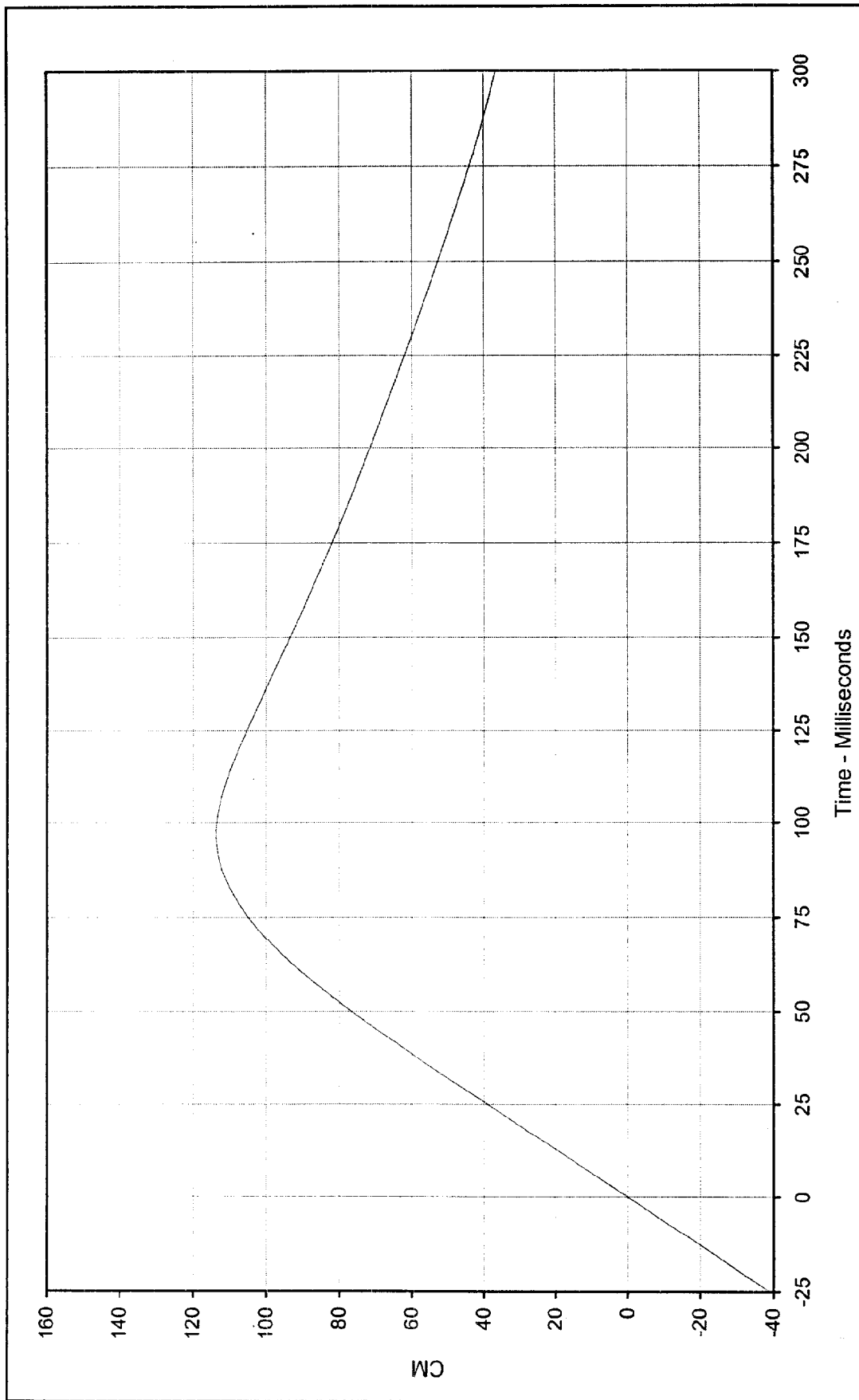
Test Program:

1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle:

2000 Chevrolet Impala 4 Door Sedan



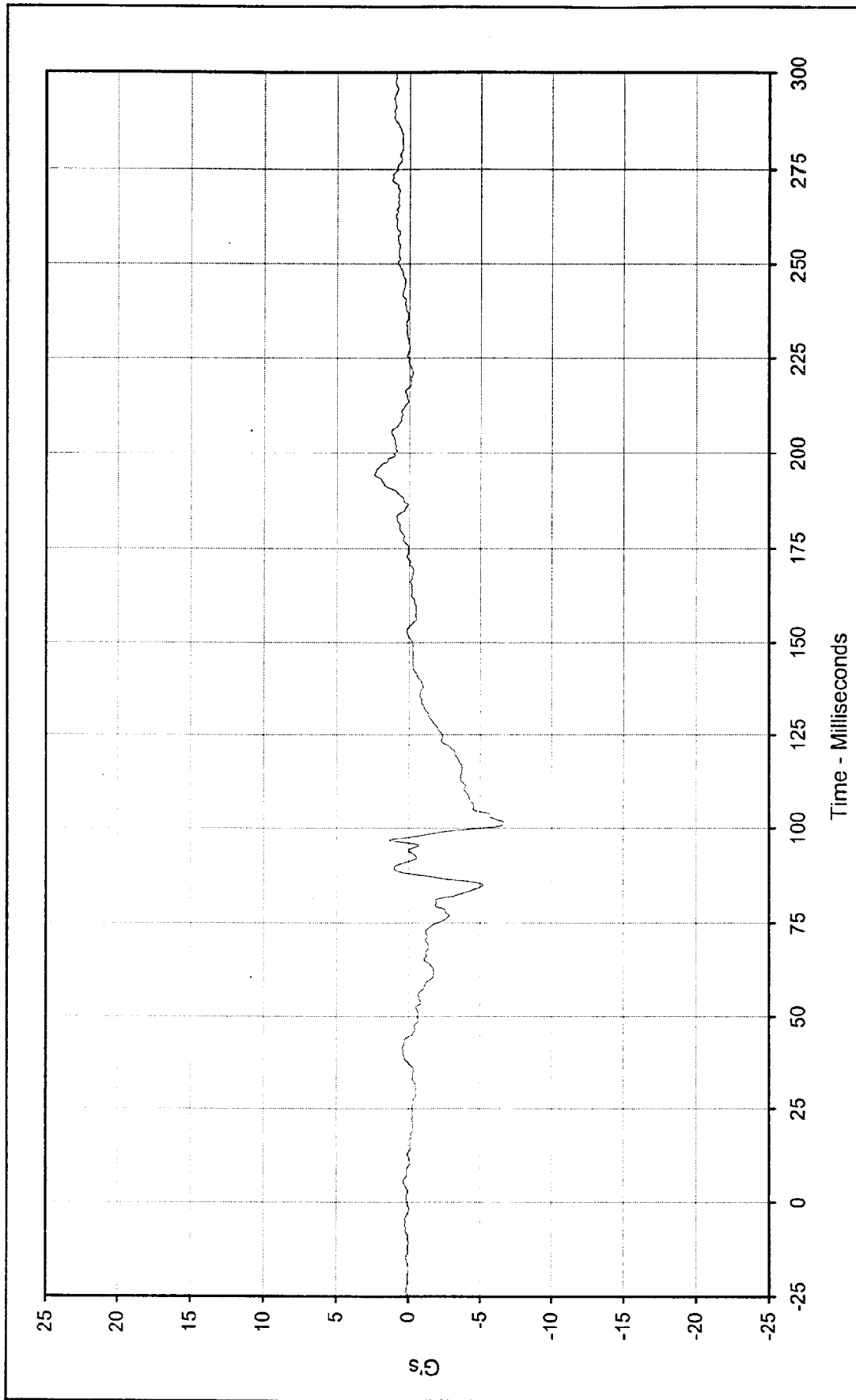


Curve Description: Passenger Chest Primary X Displ.

Maximum Value:	113.7	at	97.0	Milliseconds
Minimum Value:	0.0	at	0.0	Milliseconds
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN2-057			

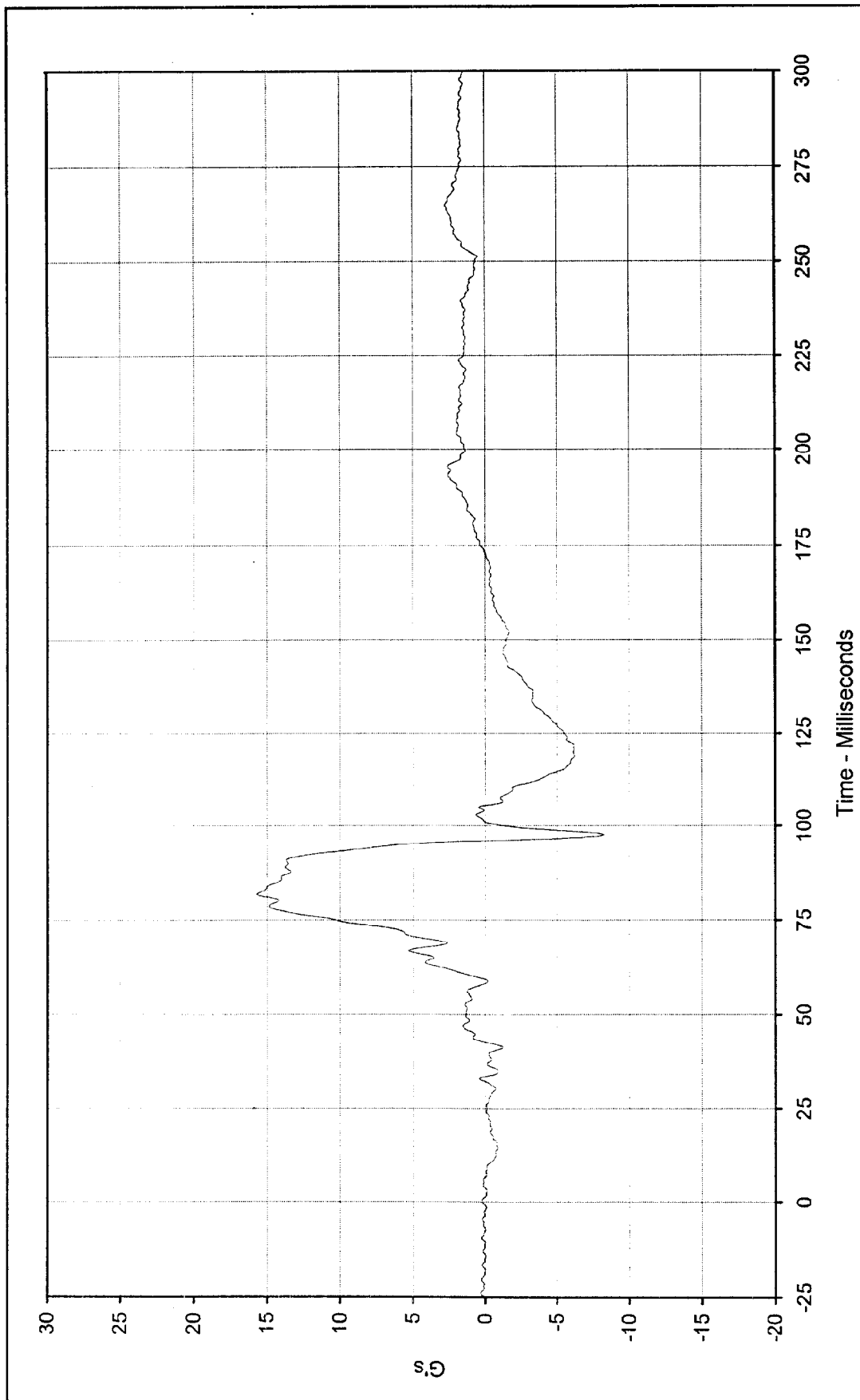
Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	





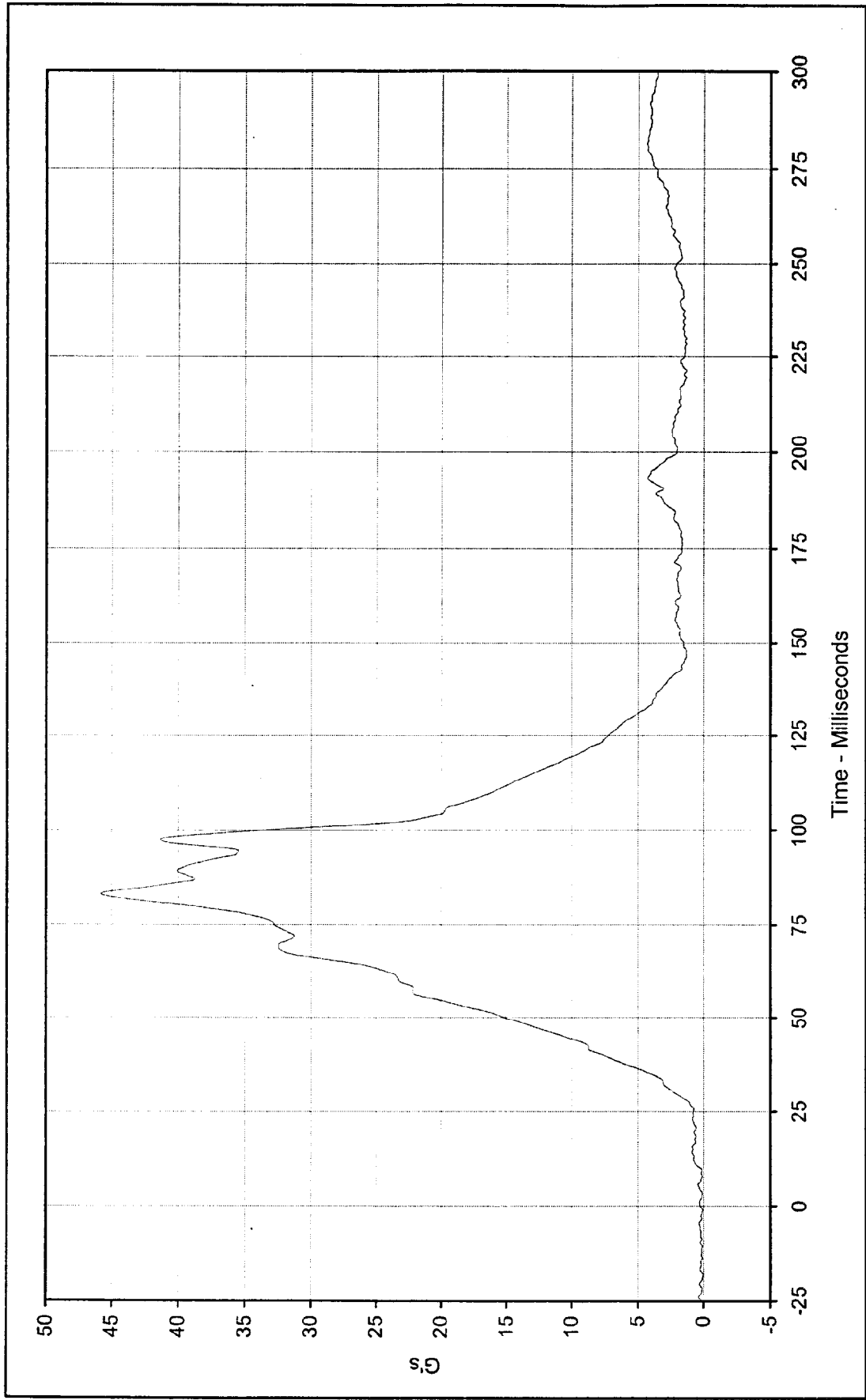
Curve Description:	Passenger Chest Primary Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	2.4	at	194.4	Milliseconds
Minimum Value:	-6.7	at	101.5	Milliseconds
SAE Filter Class:	180	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Date of Test:	5/20/99			
Curve Number:	FIL-058			





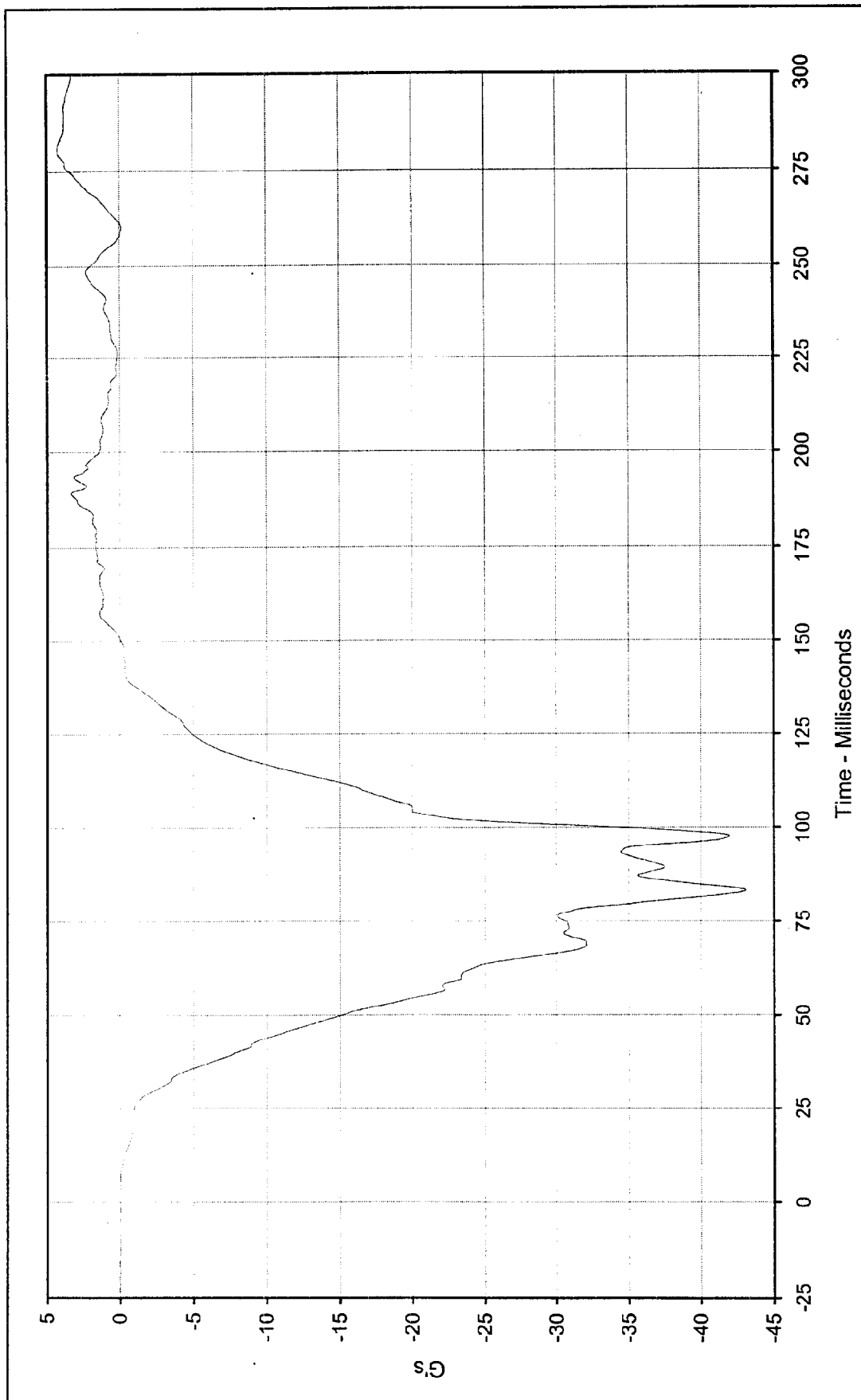
Curve Description:	Passenger Chest Primary Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	15.7 at 81.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-8.2 at 97.6 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	FIL-059			





Curve Description:	Passenger Chest Resultant Primary	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	45.8	at	83.4	Milliseconds
Minimum Value:	0.1	at	3.5	Milliseconds
SAE Filter Class:	180	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Date of Test:	5/20/99			
Curve Number:	RES-057			





Curve Description: Passenger Chest Redundant X

Test Program: 1999 NHTSA 35 mph NCAP

No.: GM0001

Maximum Value: 4.2 at 281.0 Milliseconds

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

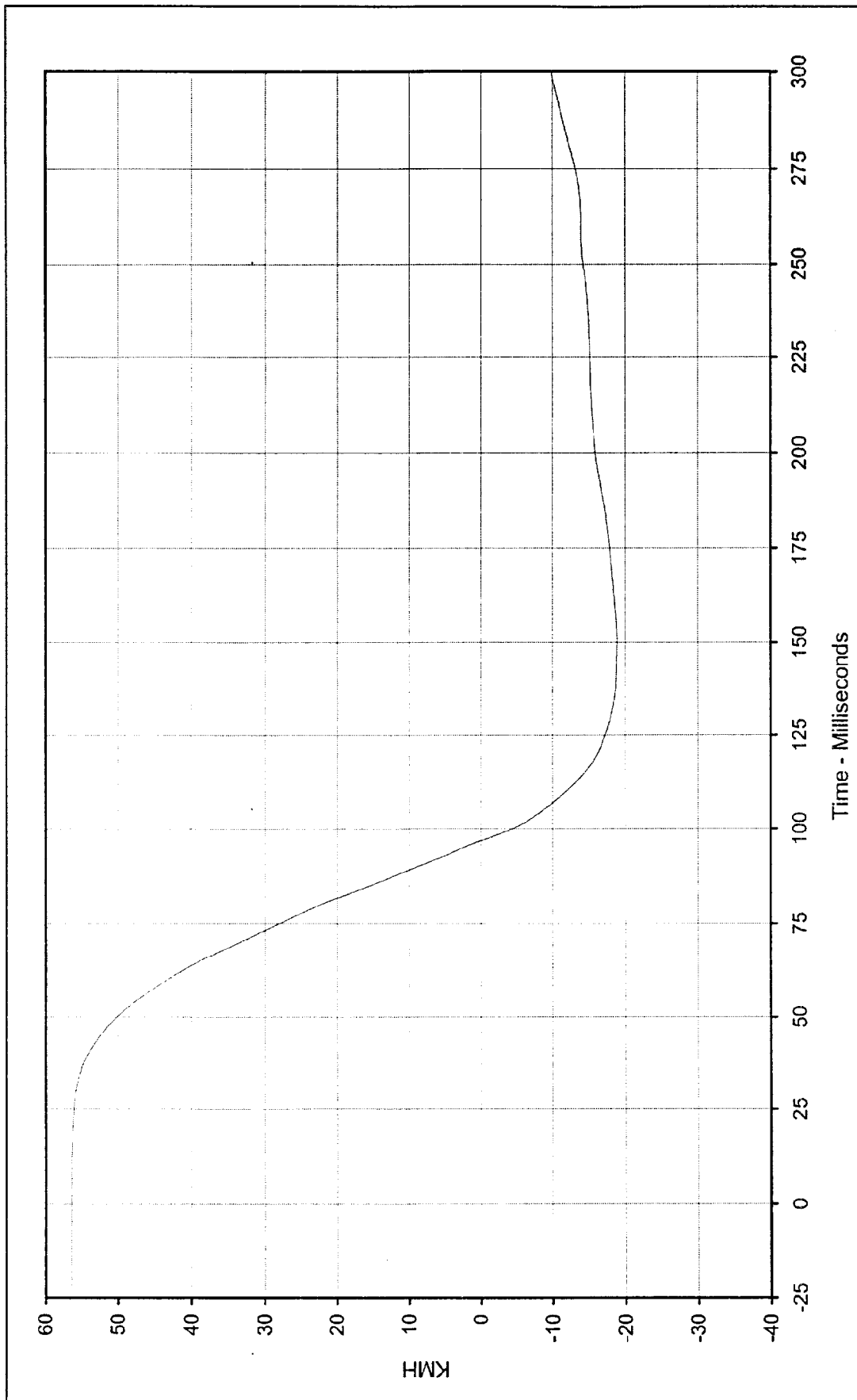
Minimum Value: -43.1 at 83.3 Milliseconds



SAE Filter Class: 180

Date of Test: 5/20/99

Curve Number: FIL-060



Curve Description: Passenger Chest Redundant X Velocity

Maximum Value: 56.4 at 3.2 Milliseconds

Minimum Value: -18.8 at 150.5 Milliseconds

SAE Filter Class: 180

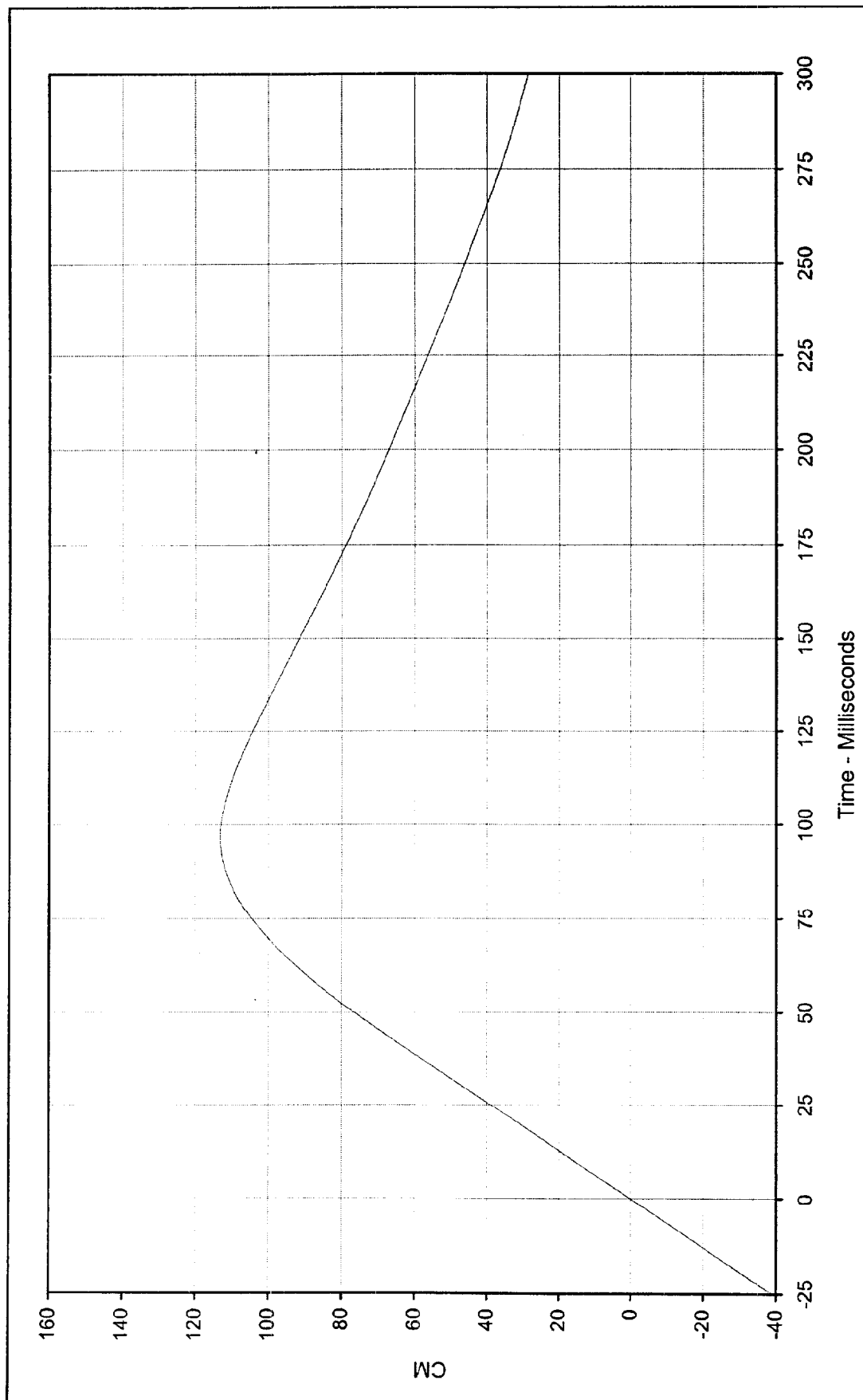
Date of Test: 5/20/99

Curve Number: IN1-060

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Passenger Chest Redundant X Displ.

Maximum Value: 113.2 at 96.8 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

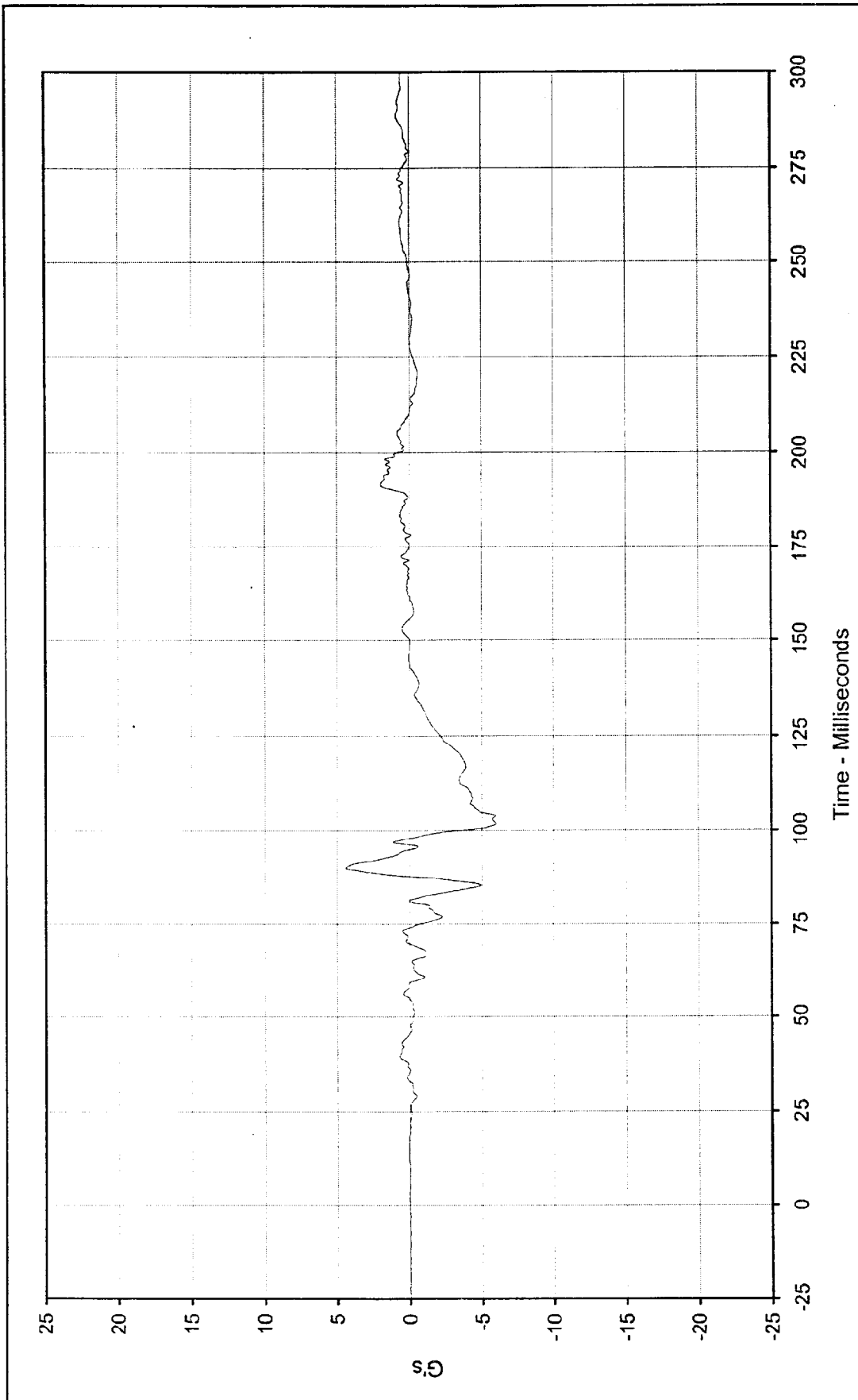
Date of Test: 5/20/99

Curve Number: IN2-060

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

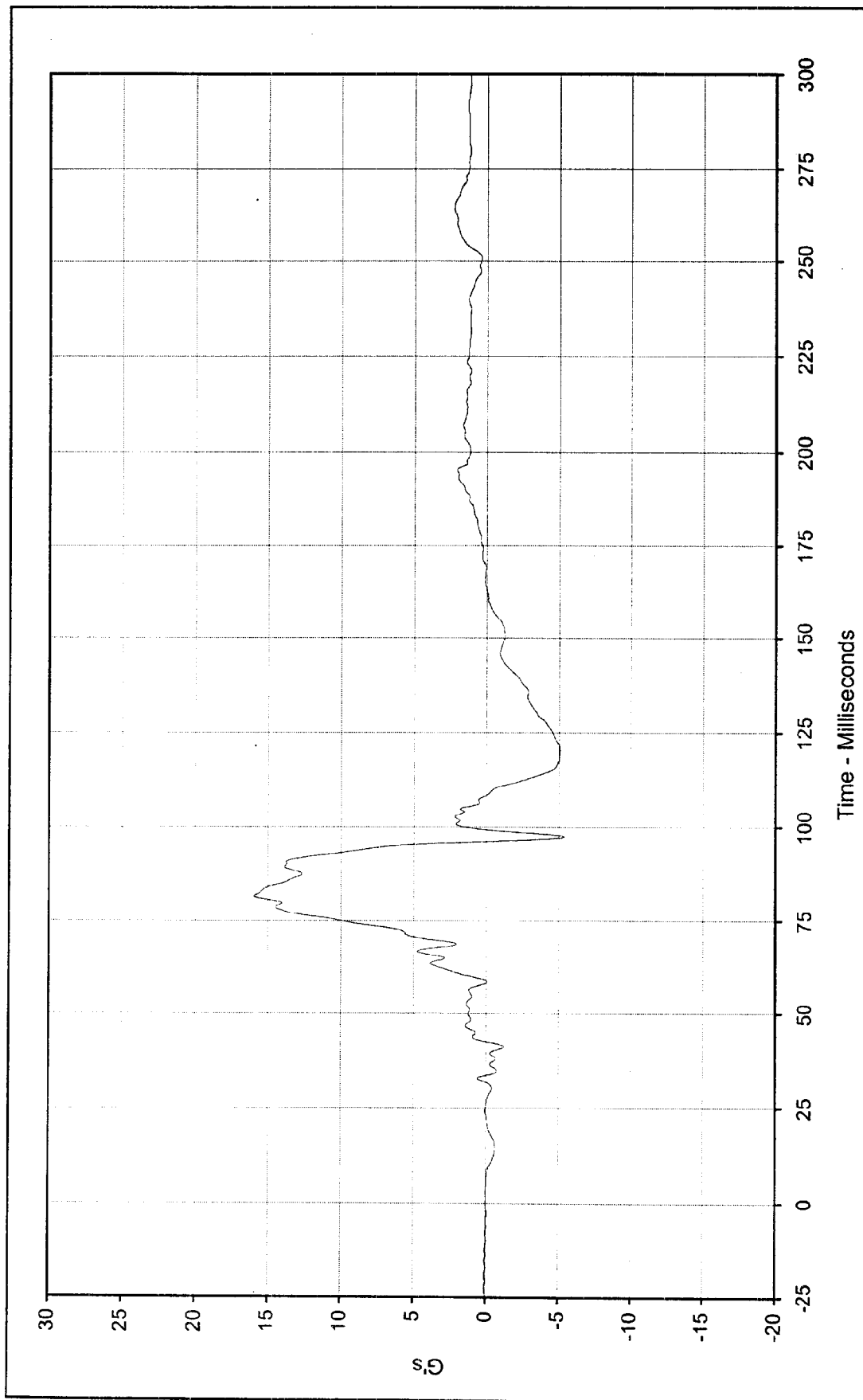
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





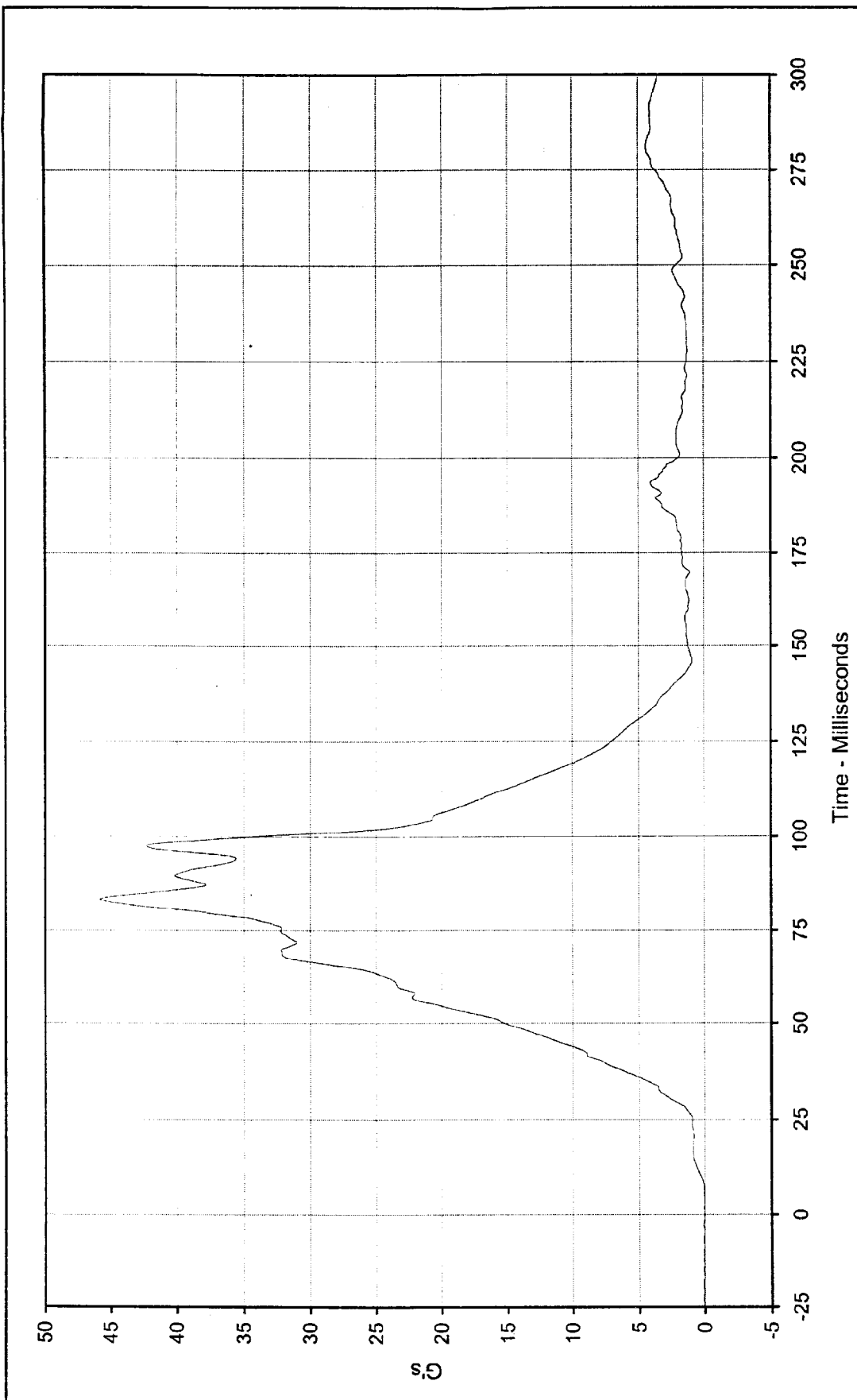
Curve Description:	Passenger Chest Redundant Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	4.4 at 90.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-6.0 at 101.8 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	FIL-061			





Curve Description:	Passenger Chest Redundant Z	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	16.0	at	81.7	Milliseconds	Test Vehicle:
Minimum Value:	-5.4	at	97.4	Milliseconds	2000 Chevrolet Impala 4 Door Sedan
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	FIL-062				





Curve Description: Passenger Chest Resultant Redundant

Maximum Value: 45.8 at 83.3 Milliseconds

Minimum Value: 0.0 at 0.4 Milliseconds

SAE Filter Class: 180

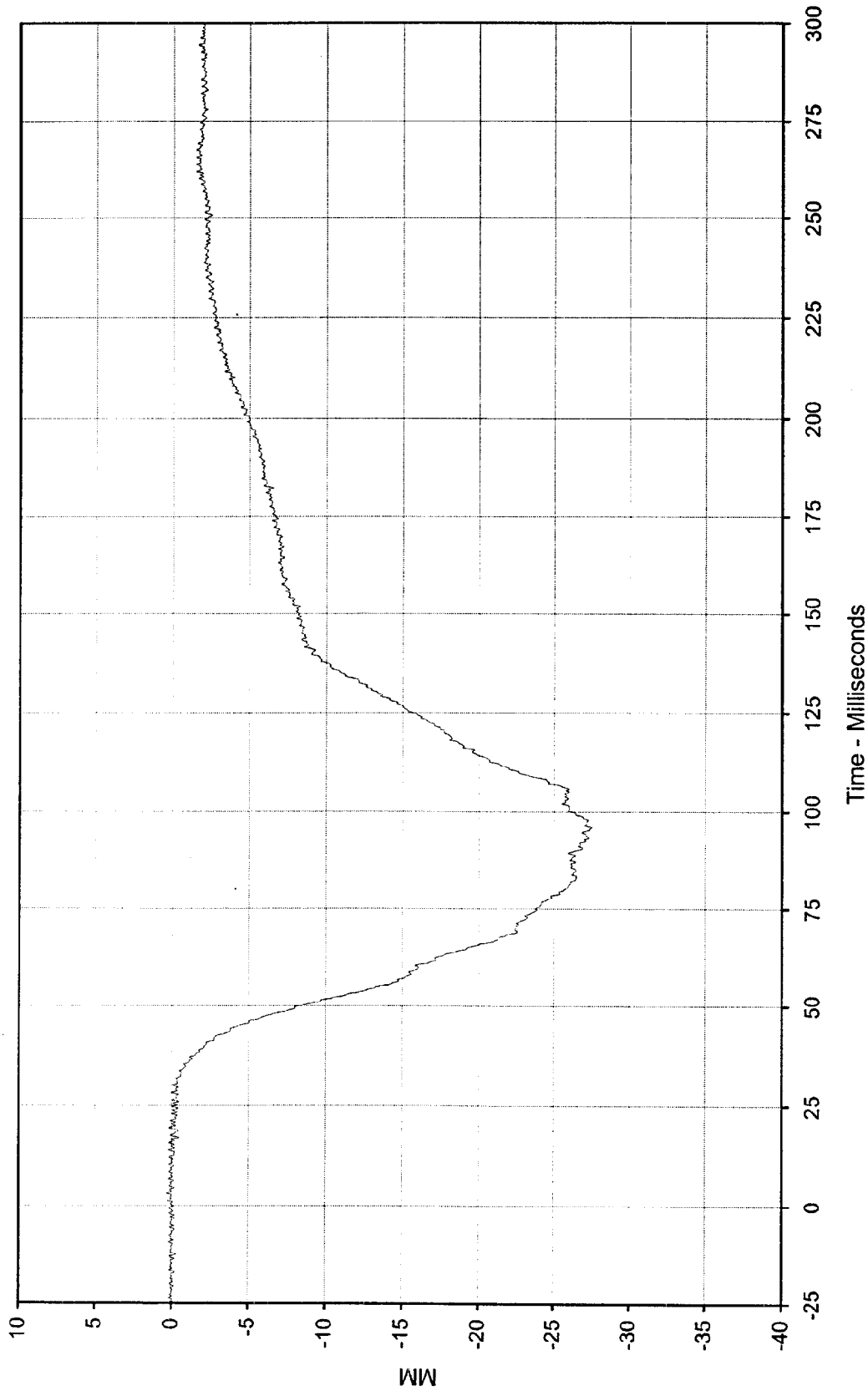
Date of Test: 5/20/99

Curve Number: RES-060

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

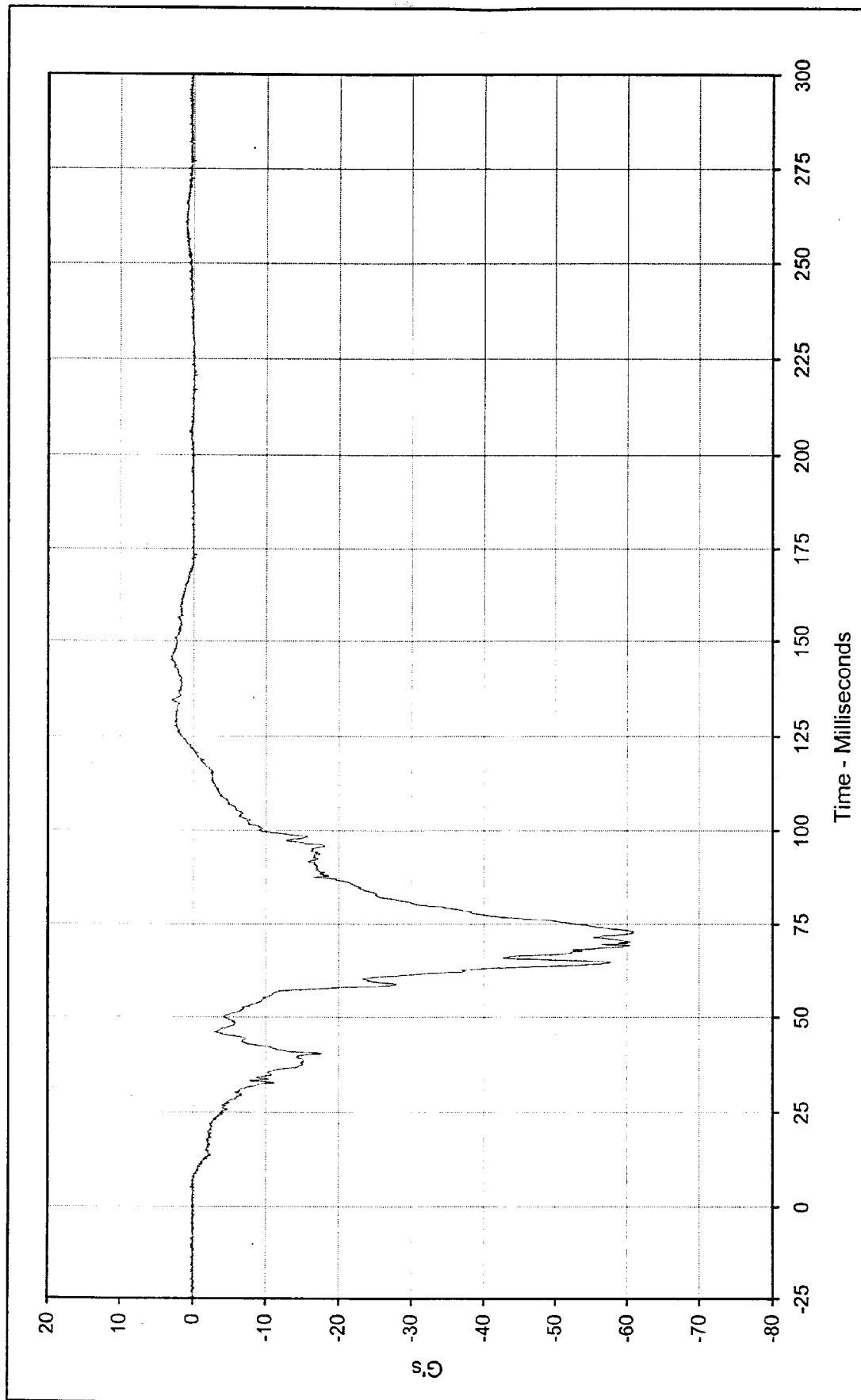




Curve Description: Passenger Chest Displacement X
 Maximum Value: 0.3 at 3.1 Milliseconds
 Minimum Value: -27.5 at 96.1 Milliseconds
 SAE Filter Class: 600
 Date of Test: 5/20/99
 Curve Number: FIL-063

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Program:

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

Maximum Value: 3.1 at 145.1 Milliseconds

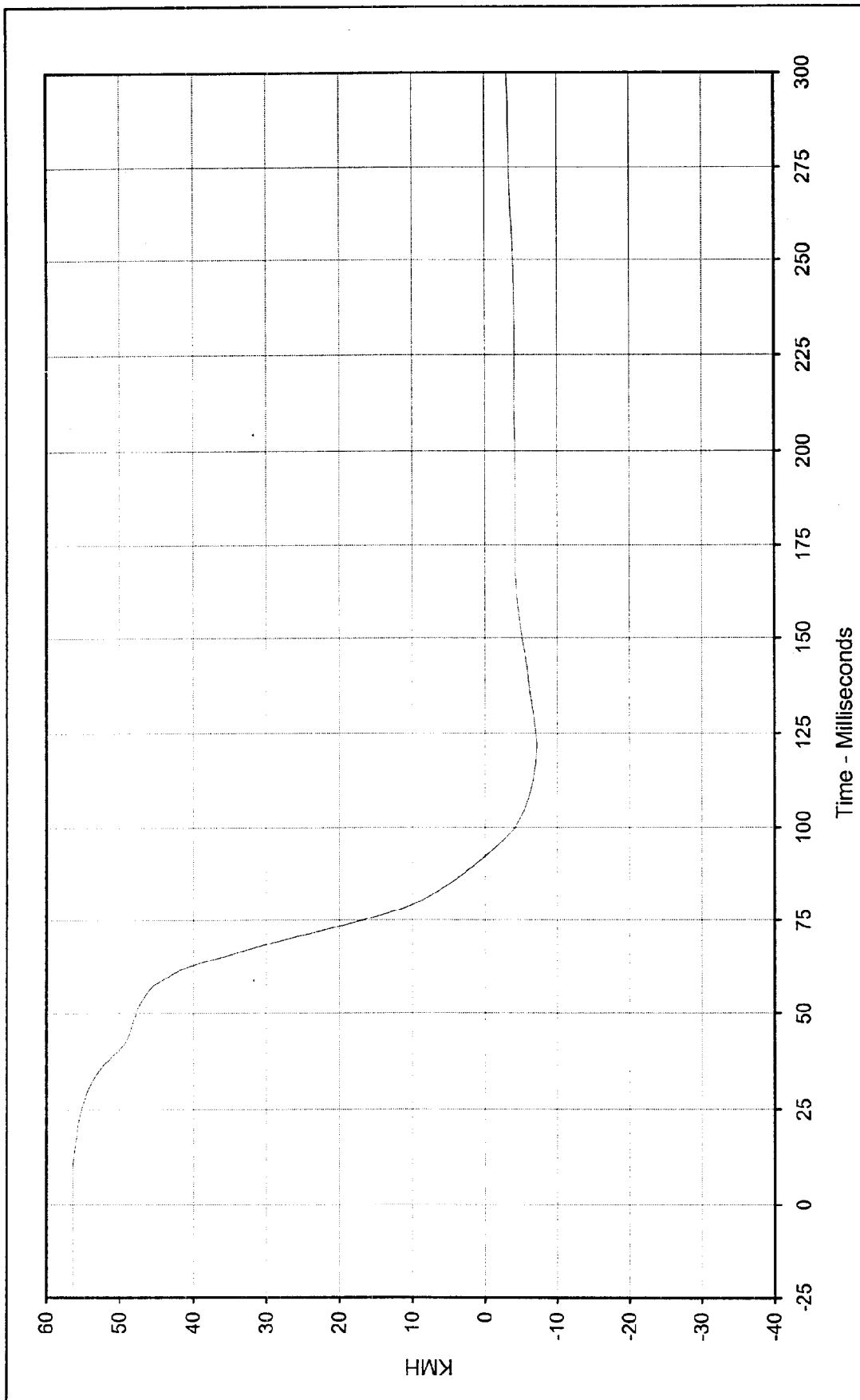
Minimum Value: -61.0 at 73.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

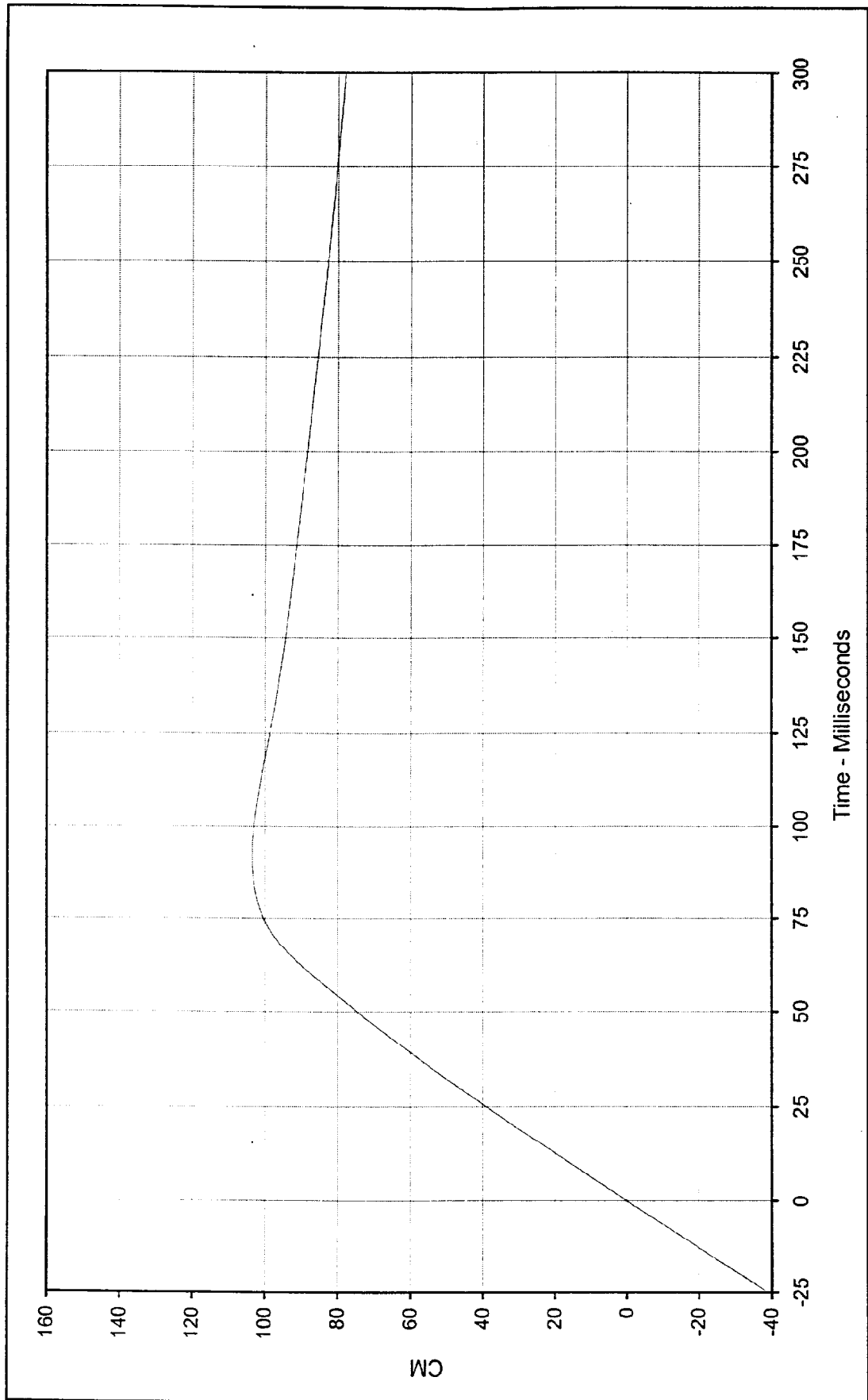
Curve Number: FIL-064





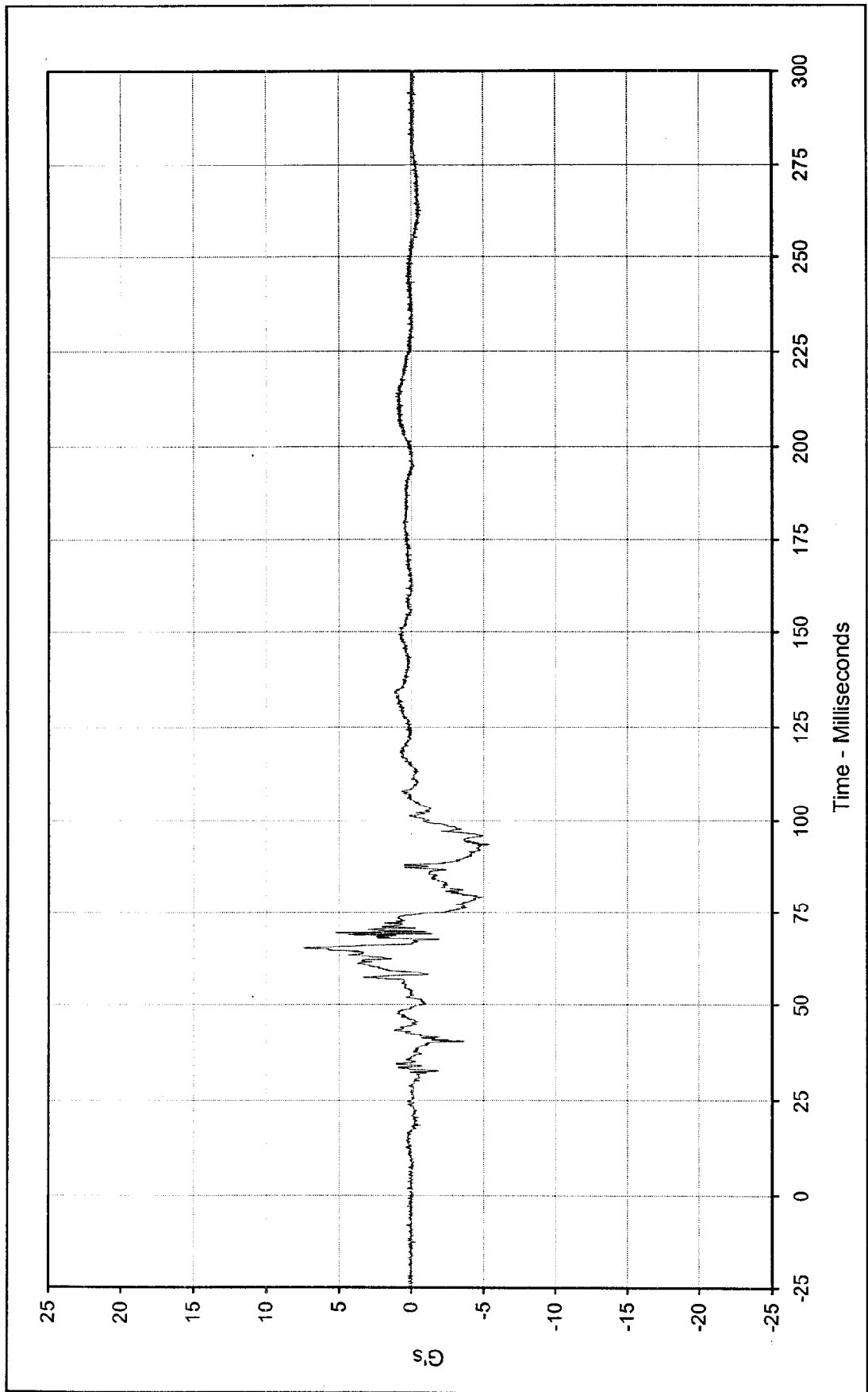
Curve Description:	Passenger Pelvis X Velocity	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	56.4	at	7.1	Milliseconds	Test Vehicle:
Minimum Value:	-7.2	at	121.5	Milliseconds	2000 Chevrolet Impala 4 Door Sedan
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	IN1-064				





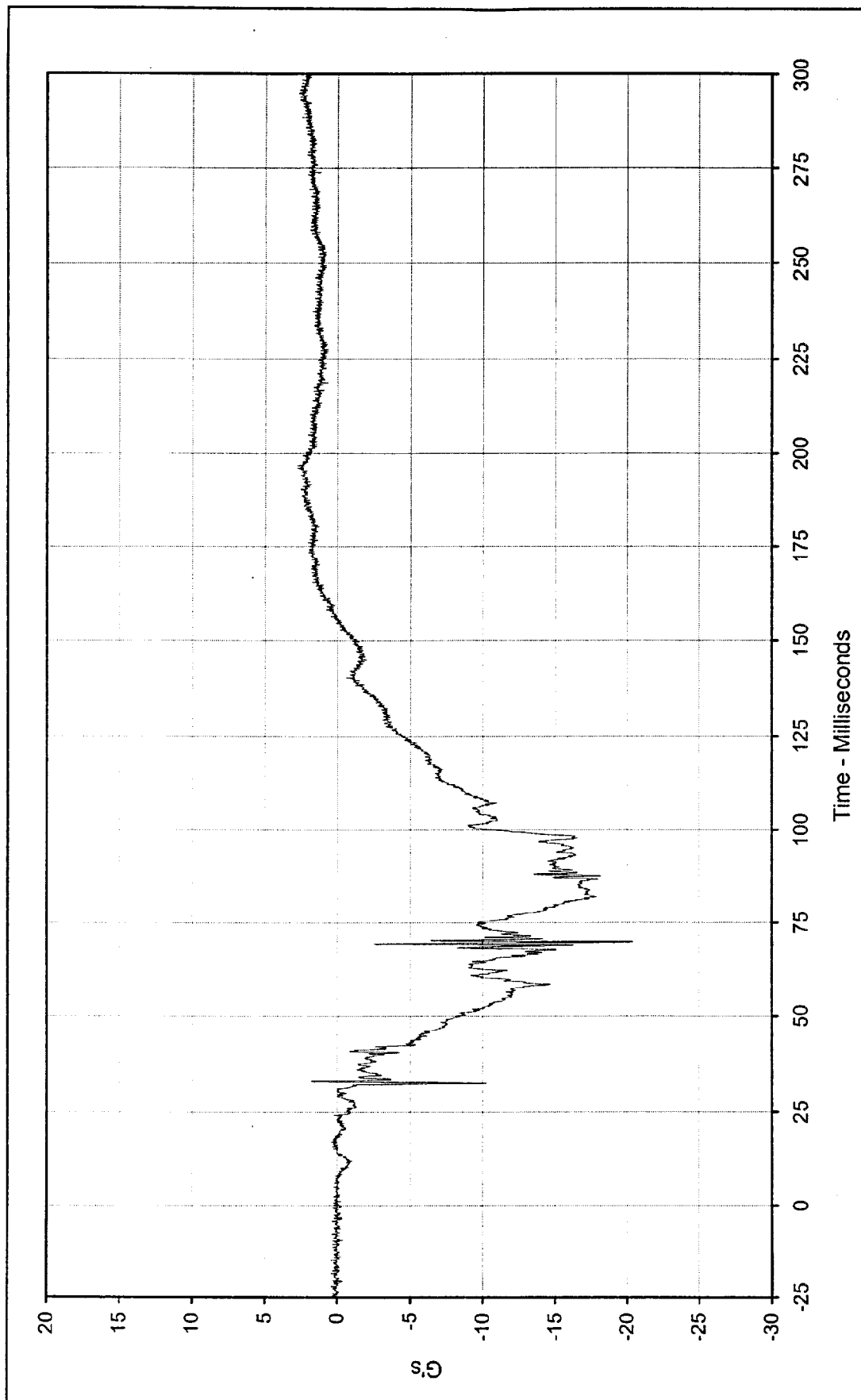
Curve Description:	Passenger Pelvis X Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	103.6 at 103.6 milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.0 at 0.0 milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN2-064			





Curve Description:	Passenger Pelvis Y		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	7.4	at 65.4	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-5.4	at 93.7			
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-065				





Curve Description: Passenger Pelvis Z

Maximum Value: 2.8 at 195.9 Milliseconds

Minimum Value: -20.4 at 69.9 Milliseconds

SAE Filter Class: 1000

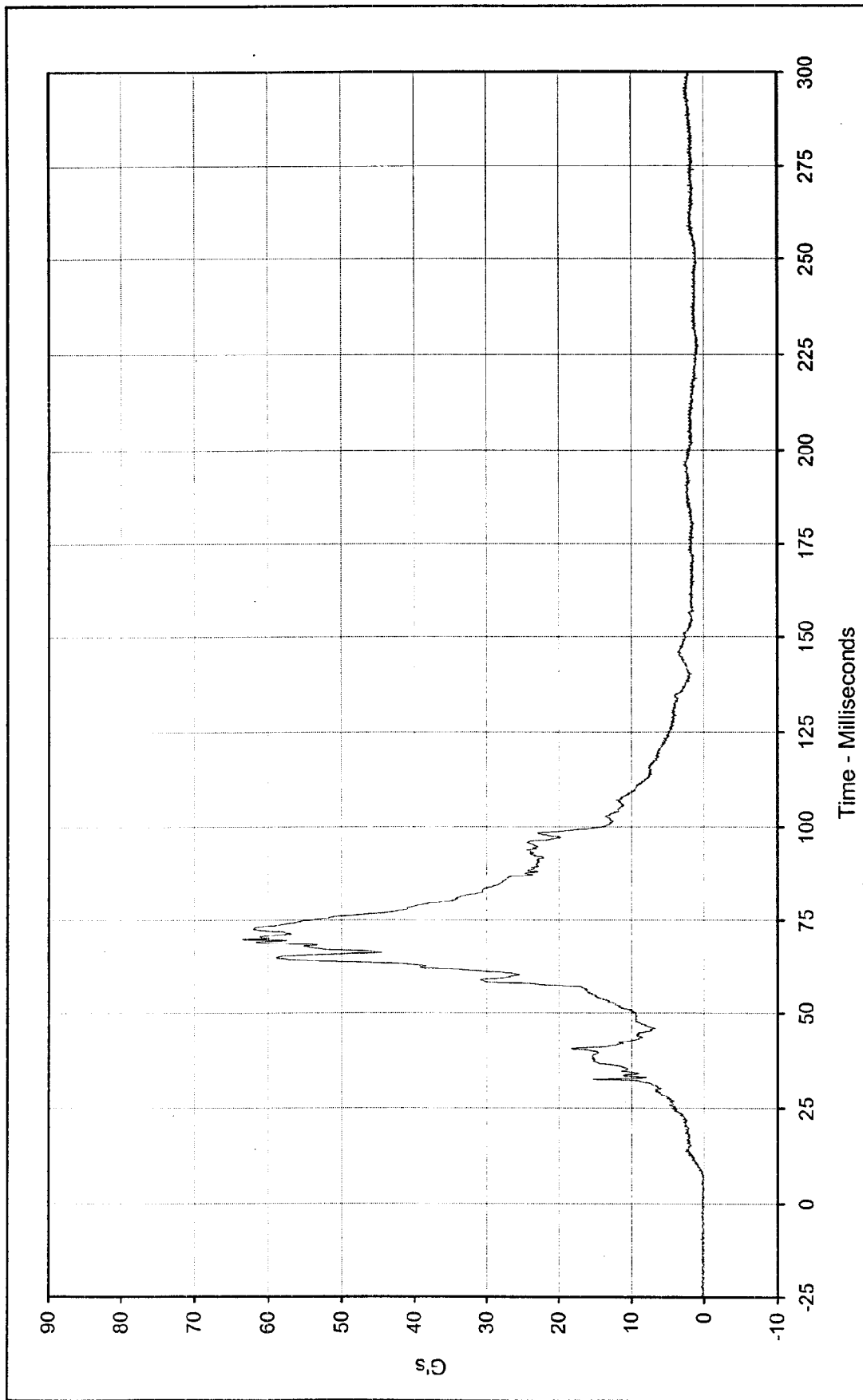
Date of Test: 5/20/99

Curve Number: FIL-066

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

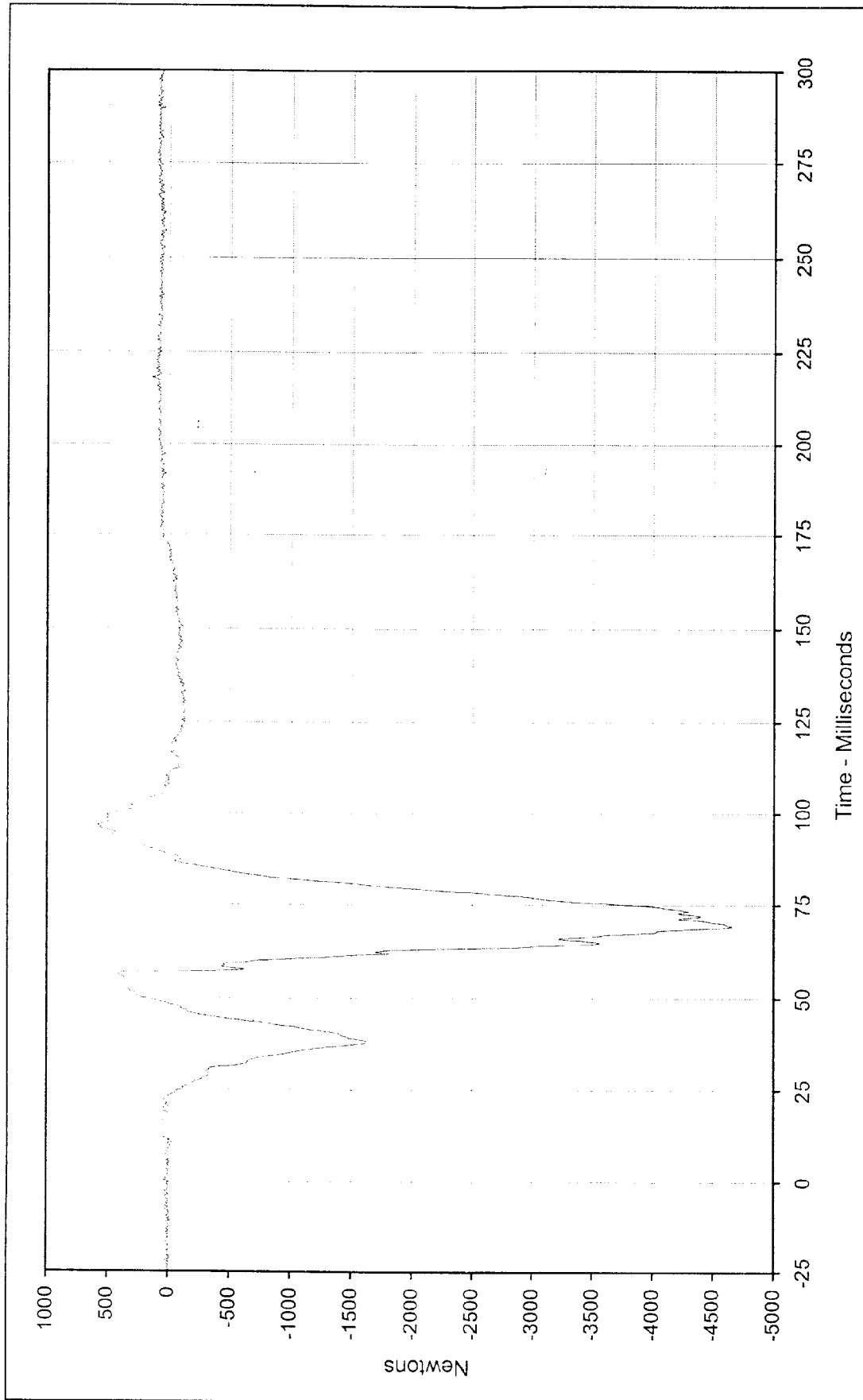
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





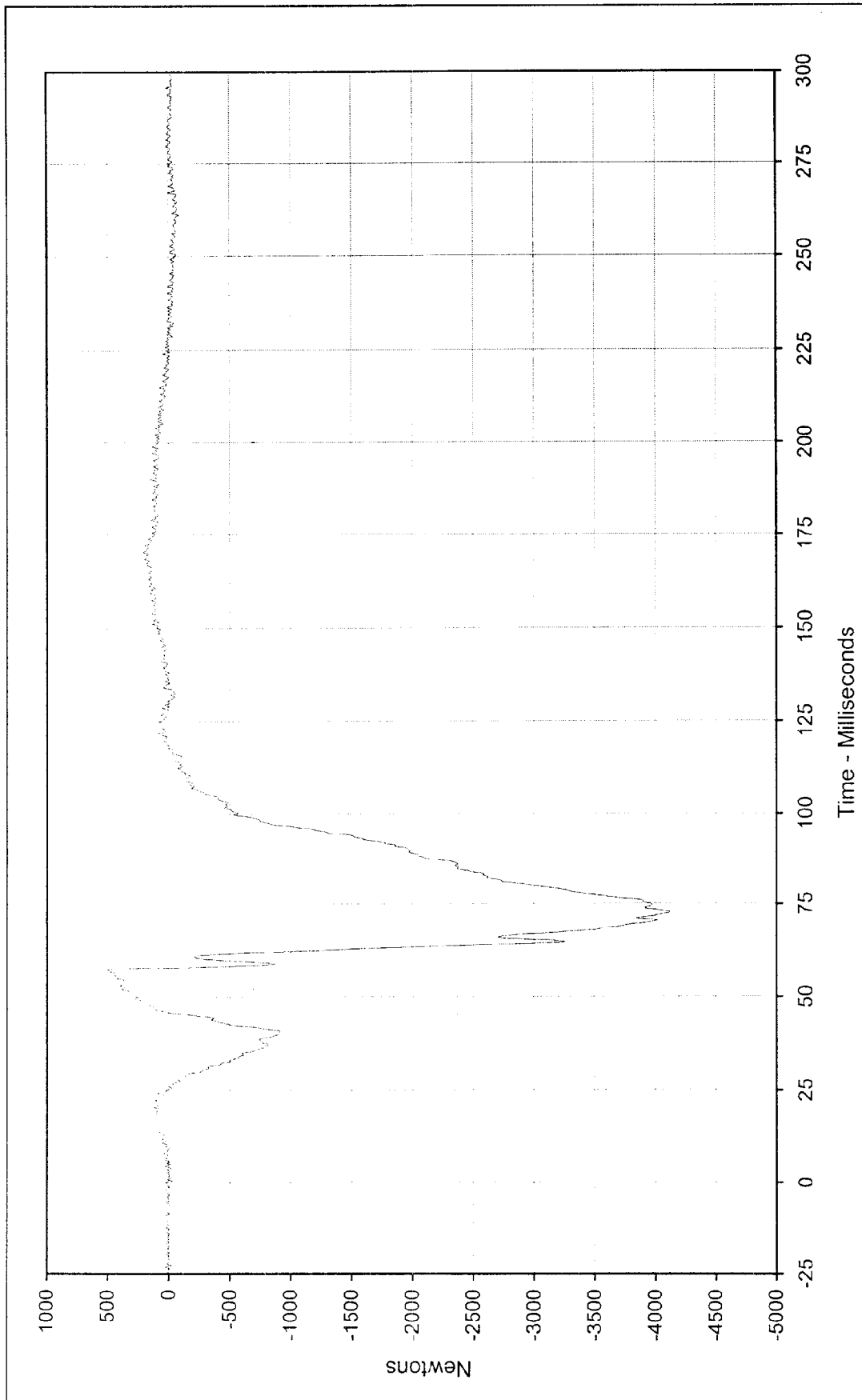
Curve Description:	Passenger Pelvis Resultant	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	63.4 at 69.9 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan		
Minimum Value:	0.1 at 3.5 Milliseconds				
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	RES-064				





Curve Description:	Passenger Left Femur Force	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	582.0 at 96.6 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-4658.5 at 69.4 Milliseconds			
AE Filter Class:	600			
of Test:	5/20/99			
umber:	FIL-067			



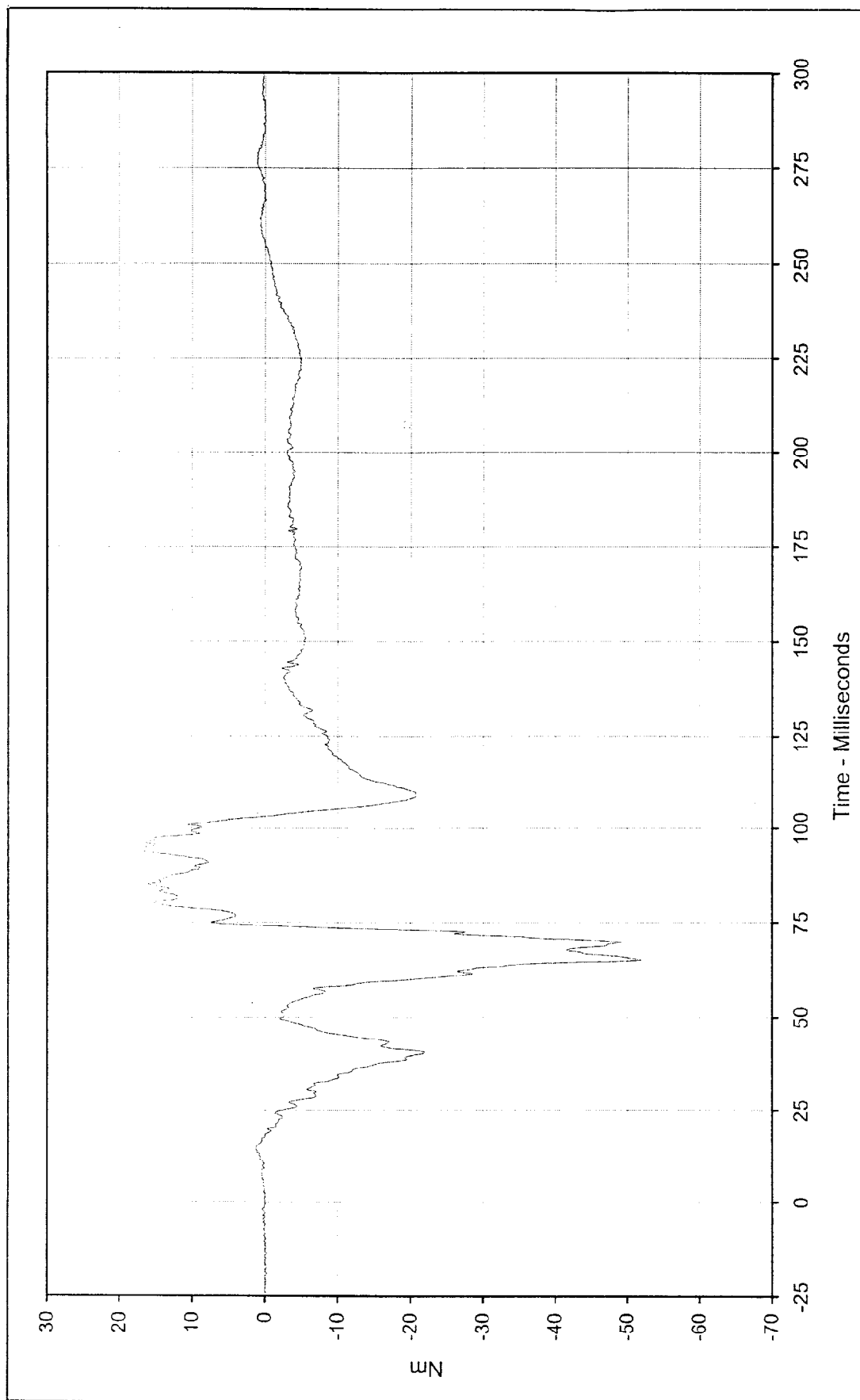


Curve Description: Passenger Right Femur Force

Maximum Value:	501.4	at	57.3	Milliseconds
Minimum Value:	-4123.7	at	72.7	Milliseconds
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-068			

Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	





Curve Description: Passenger Left Upper Tibia Moment X

Maximum Value: 17.3 at 94.3 Milliseconds

Minimum Value: -51.9 at 65.0 Milliseconds

SAE Filter Class: 600

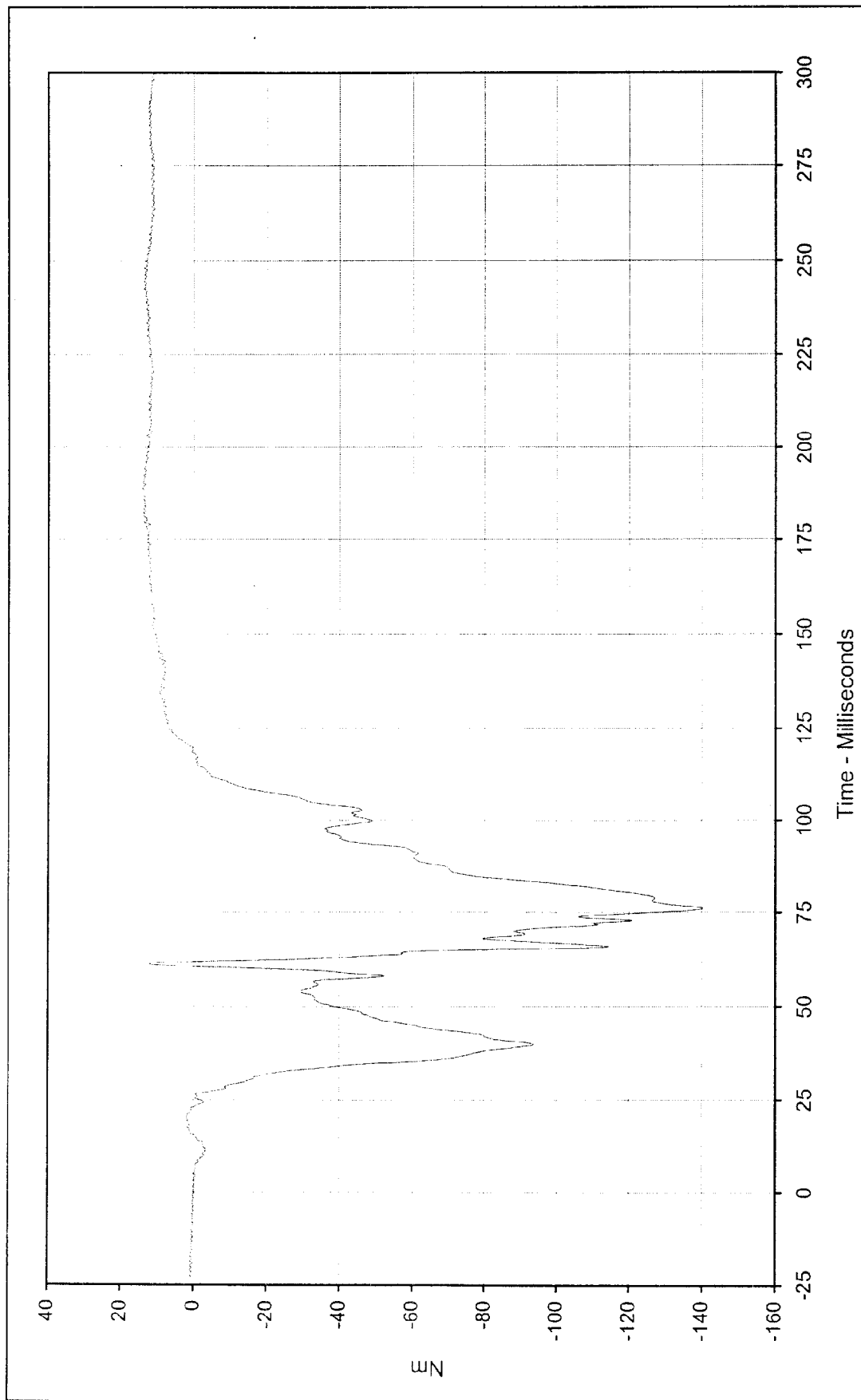
Date of Test: 5/20/99

Curve Number: FIL-069

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Passenger Left Upper Tibia Moment Y

Maximum Value: 14.3 at 188.6 Milliseconds

Minimum Value: -140.3 at 76.1 Milliseconds

SAE Filter Class: 600

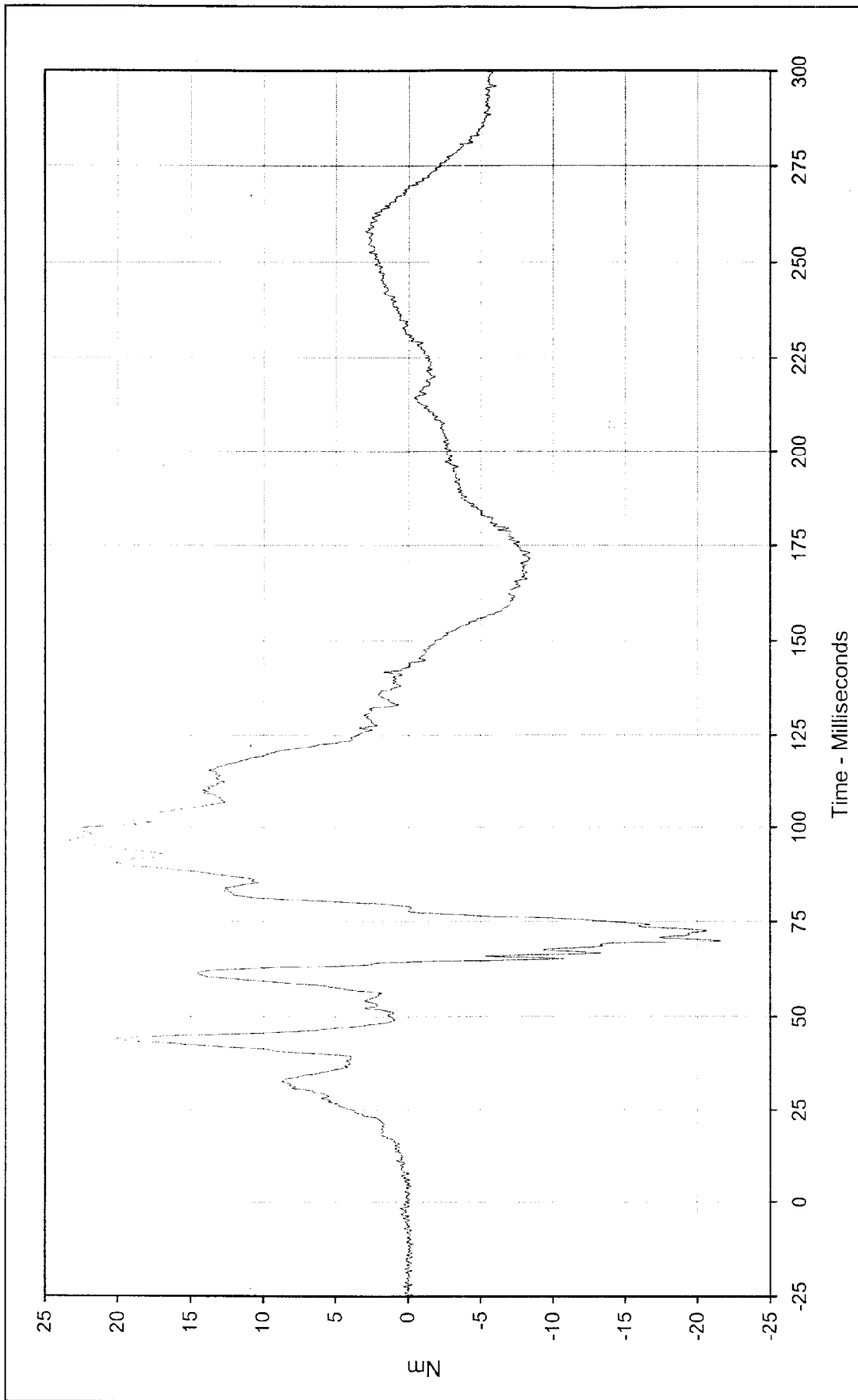
Date of Test: 5/20/99

Curve Number: FIL-070

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

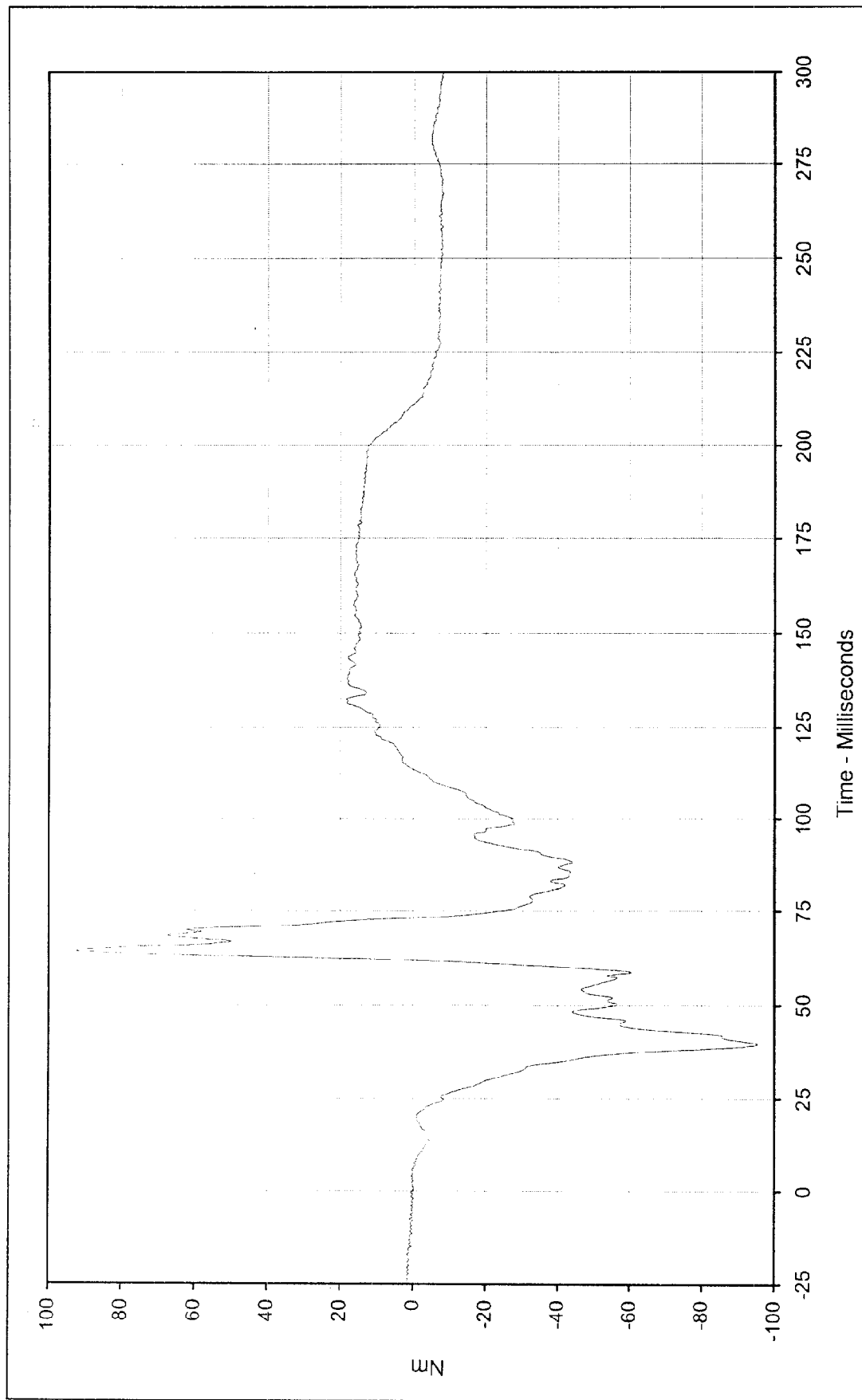




Curve Description: Passenger Right Upper Tibia Moment X				Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	23.3	at	96.4	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-21.6	at	70.0			
SAE Filter Class:	600					
Date of Test:	5/20/99					
Curve Number:	FIL-071					

The logo for KARCO Engineering. It features a stylized lightbulb with a gear-like base, followed by the word "KARCO" in a bold, sans-serif font. To the right of "KARCO" is the word "Engineering" in a script font, all enclosed within a rectangular border.





Curve Description: Passenger Right Upper Tibia Moment Y

Maximum Value: 92.4 at 64.3 Milliseconds

Minimum Value: -95.5 at 39.5 Milliseconds

SAE Filter Class: 600

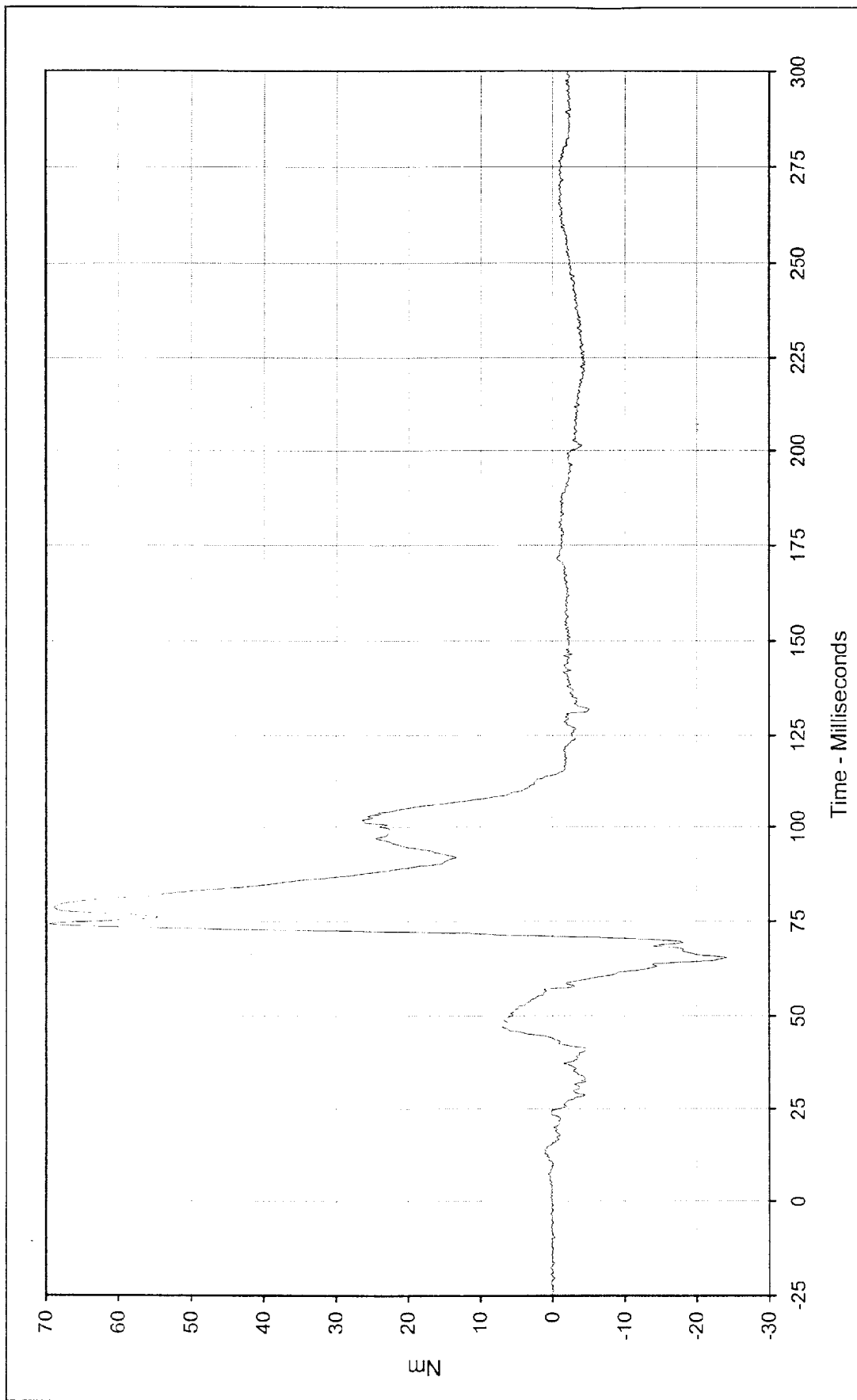
Date of Test: 5/20/99

Curve Number: FIL-072

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Passenger Left Lower Tibia Moment X Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Maximum Value: 69.5 at 74.3 Milliseconds Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

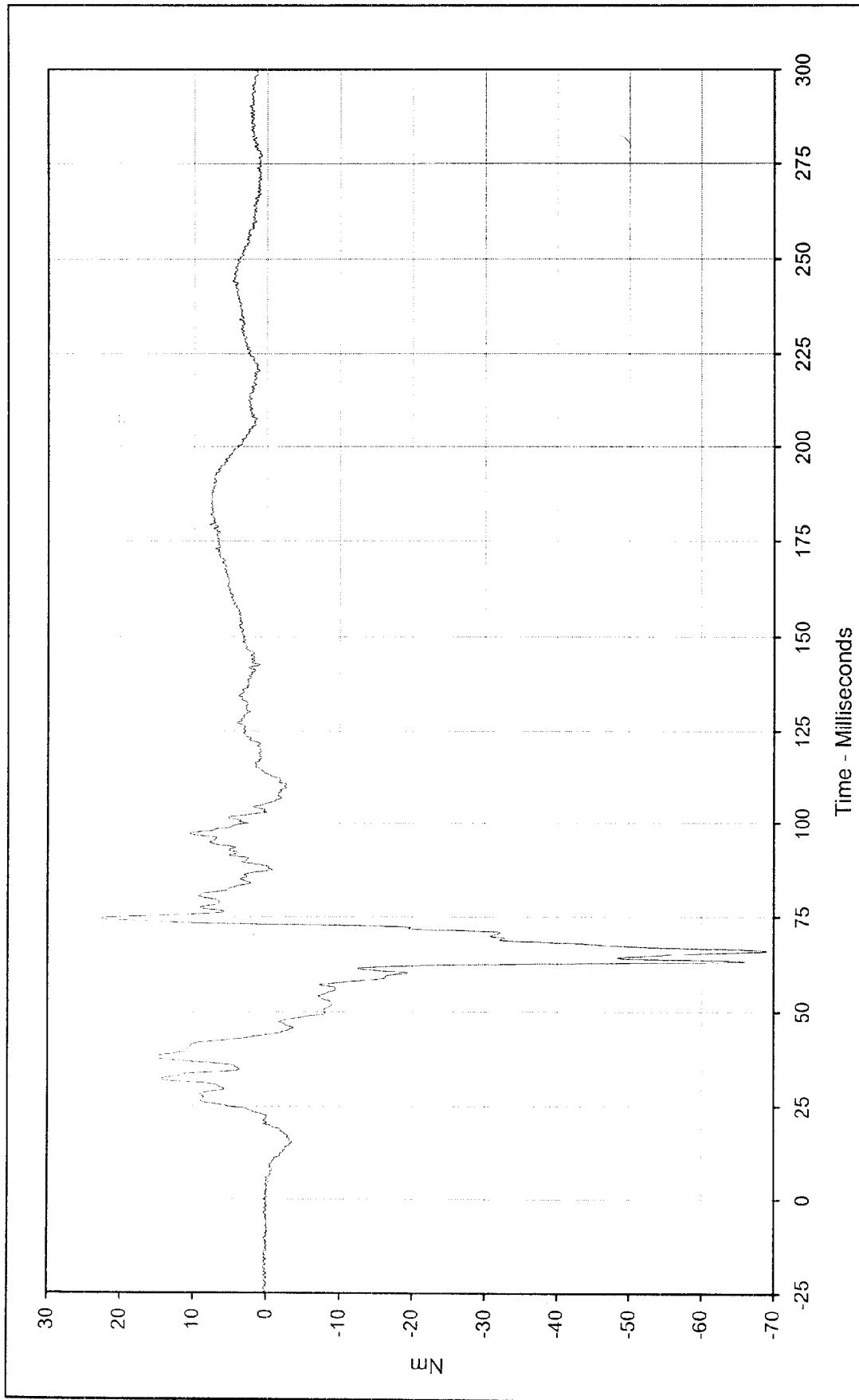
Minimum Value: -24.1 at 65.3 Milliseconds

SAE Filter Class: 600

Date of Test: 5/20/99

Curve Number: FIL-073





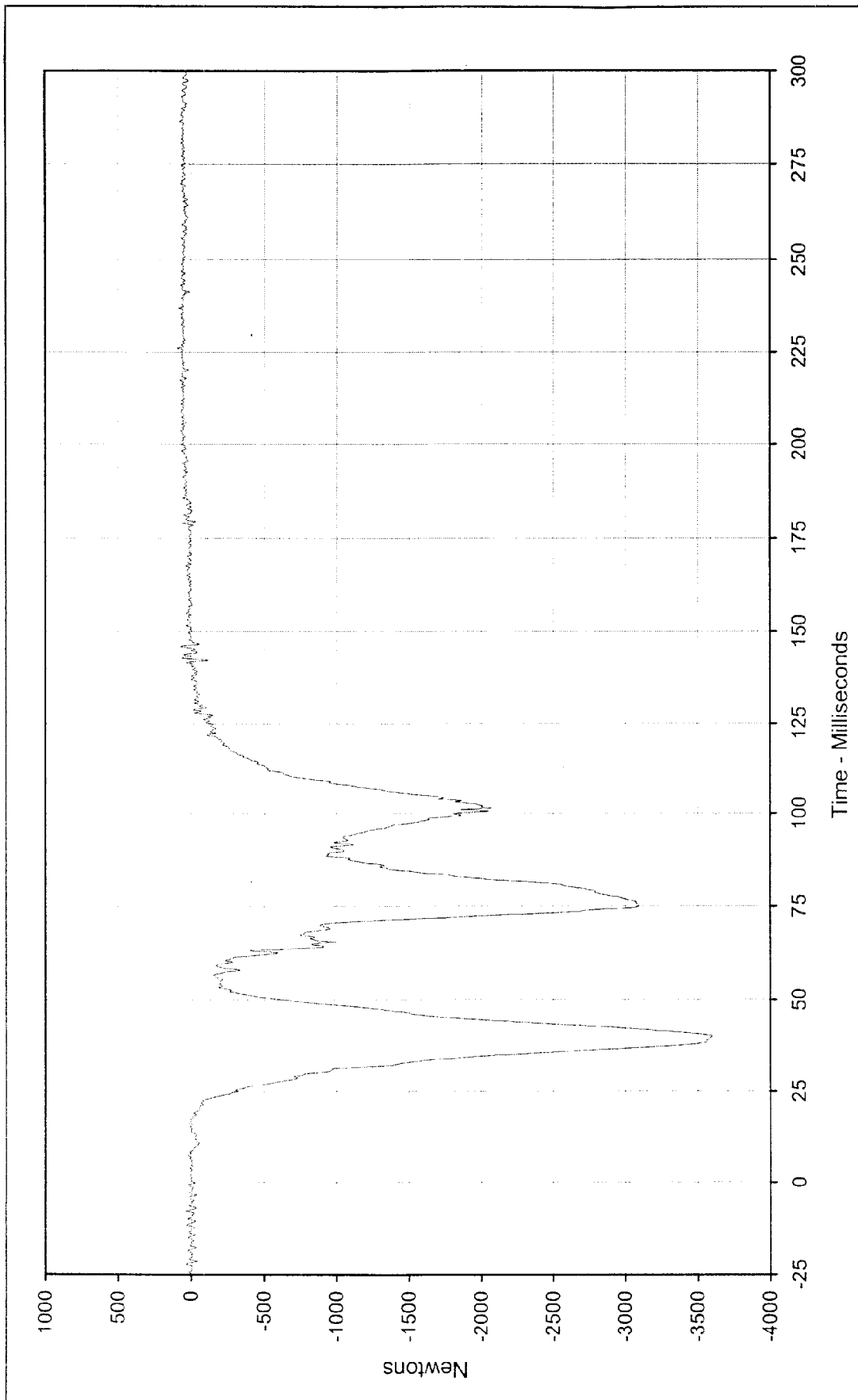
Curve Description: Passenger Left Lower Tibia Moment Y

Maximum Value:	22.6	at	74.6	Milliseconds
Minimum Value:	-69.1	at	66.0	Milliseconds
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-074			

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan



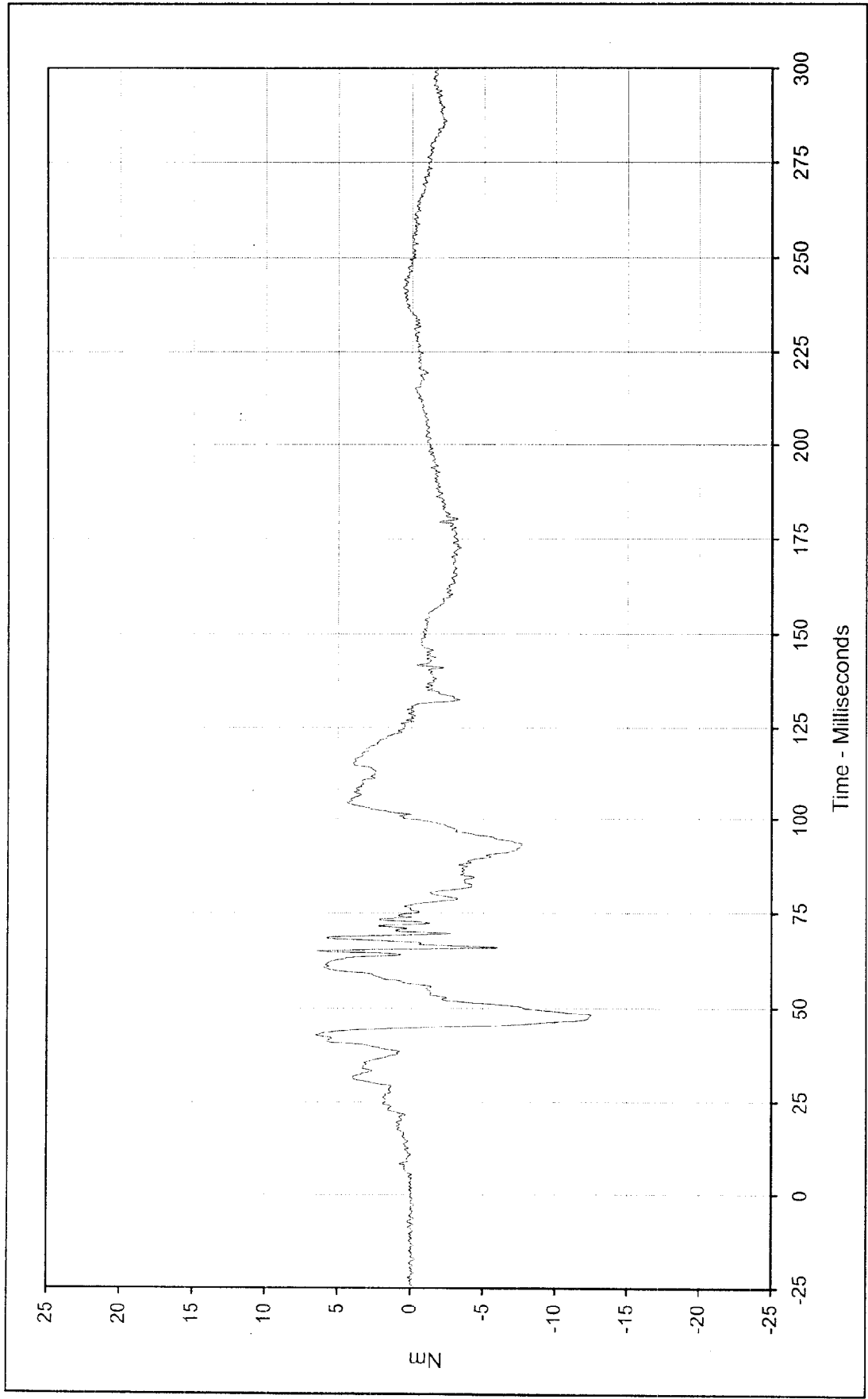


Curve Description:	Passenger Left Lower Tibia Force Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM00001
Maximum Value:	93.2	at 226.1 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-3601.7	at 40.0 Milliseconds			
SAE Filter Class:	600				
Date of Test:	5/20/99				
Curve Number:	FIL-075				



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Curve Description: Passenger Right Lower Tibia Moment X

Maximum Value: 6.5 at 42.7 Milliseconds

Minimum Value: -12.6 at 48.1 Milliseconds

SAE Filter Class: 600

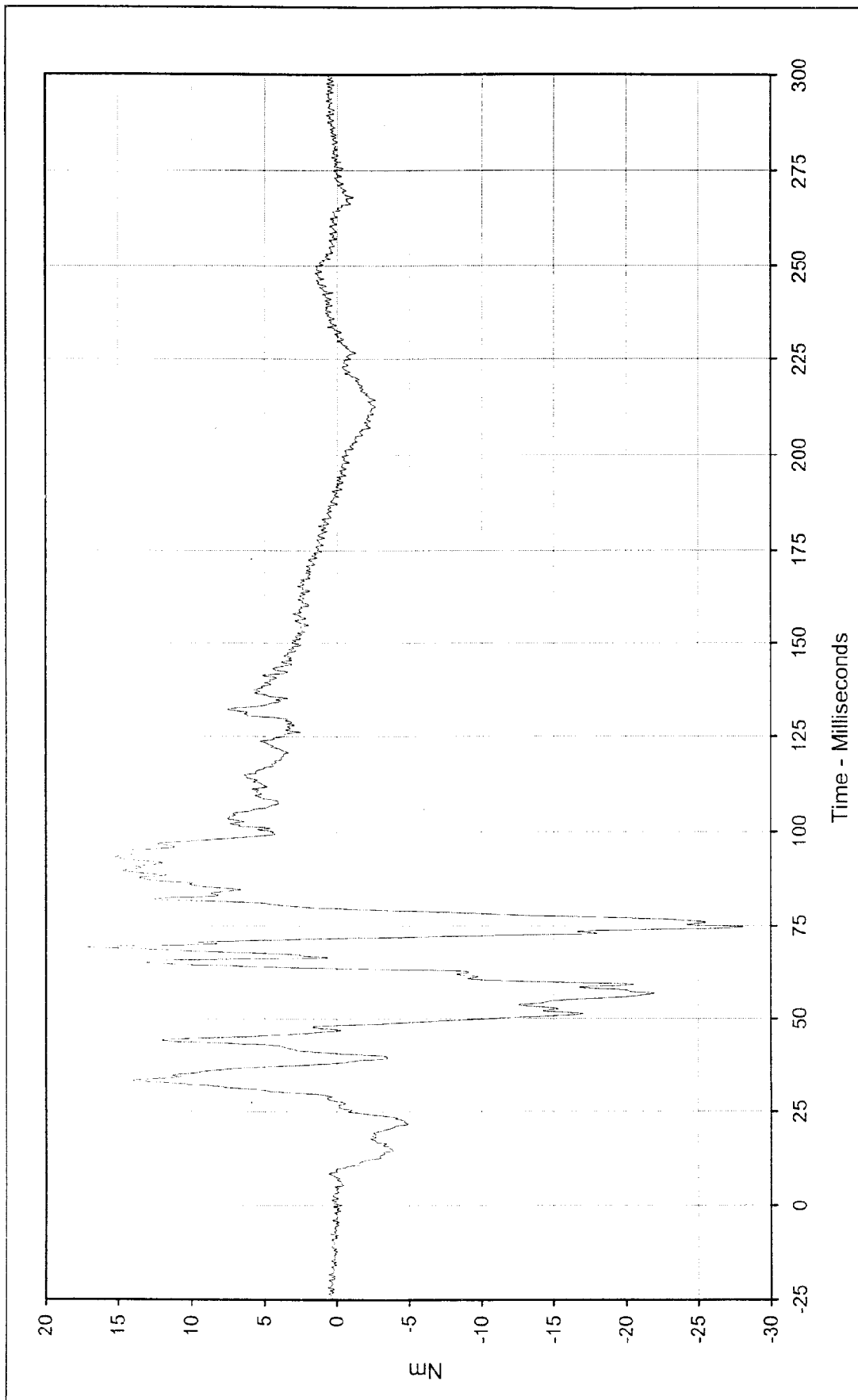
Date of Test: 5/20/99

Curve Number: FIL-076

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description: Passenger Right Lower Tibia Moment Y

Maximum Value: 17.1 at 69.2 Milliseconds

Minimum Value: -28.1 at 74.7 Milliseconds

SAE Filter Class: 600

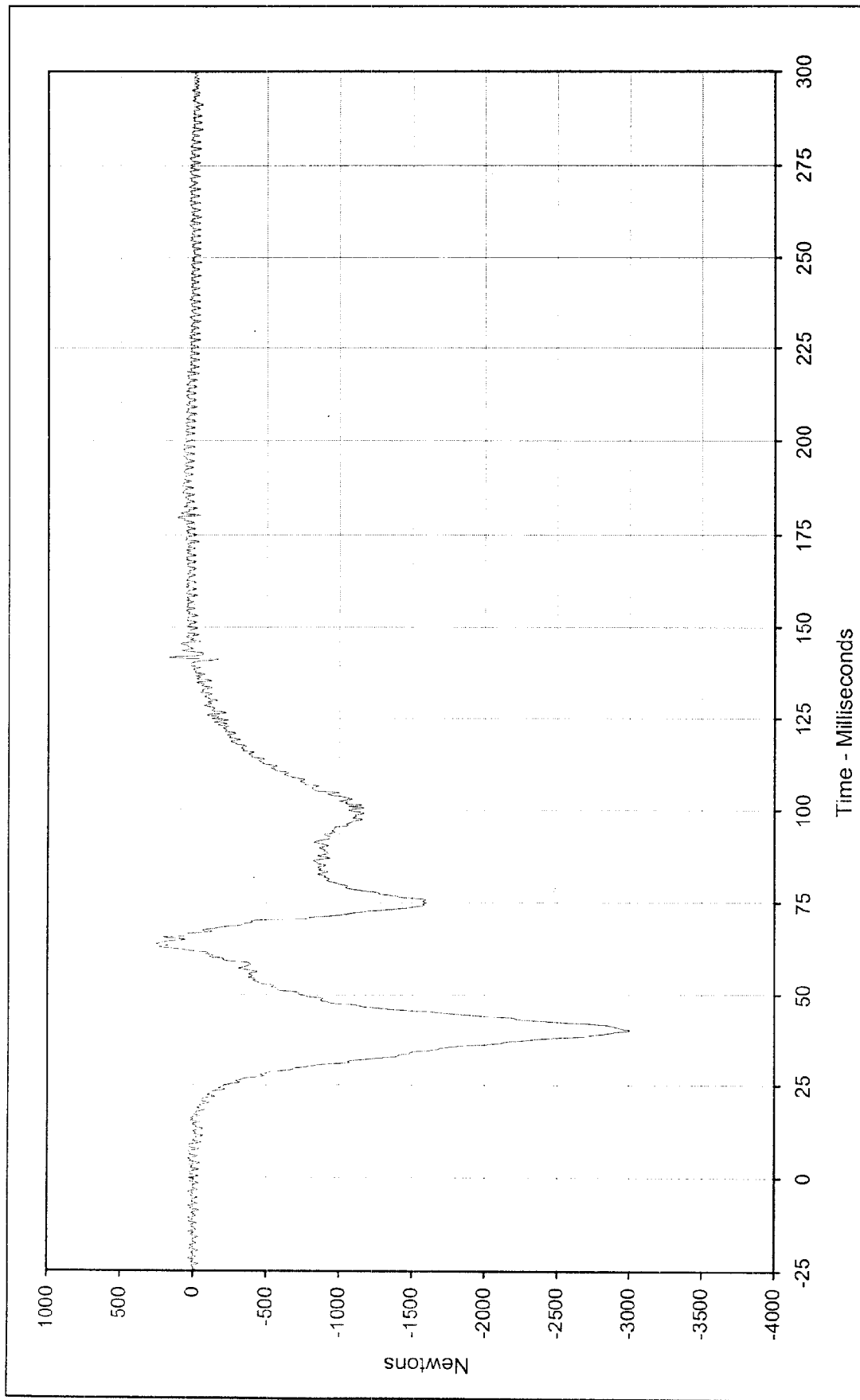
Date of Test: 5/20/99

Curve Number: FIL-077

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

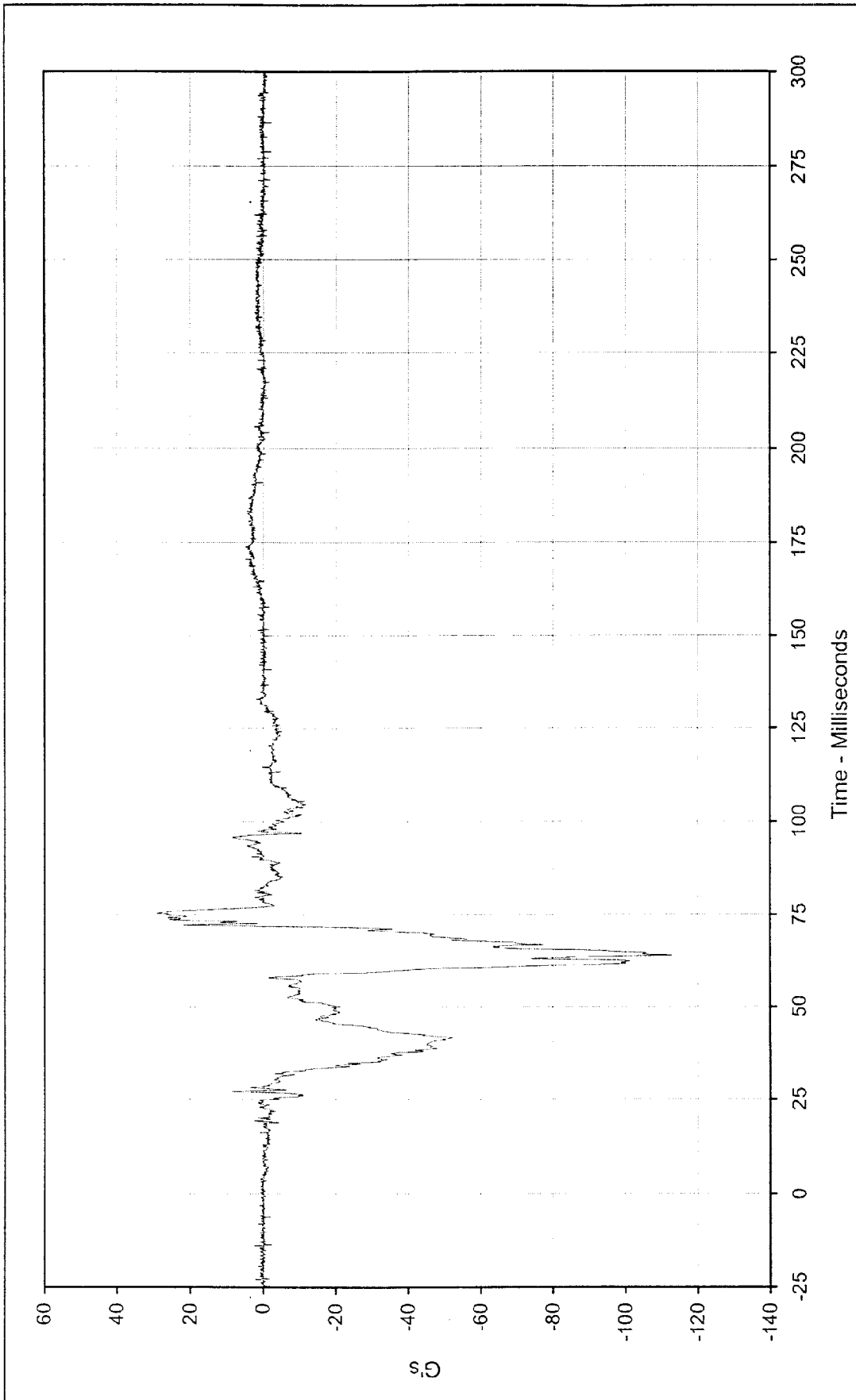




Curve Description:	Passenger Right lower Tibia Force Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	254.1	at 63.8	Milliseconds	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-3005.1	at 40.1	Milliseconds	
SAE Filter Class:	600			
Date of Test:	5/20/99			
Curve Number:	FIL-078			

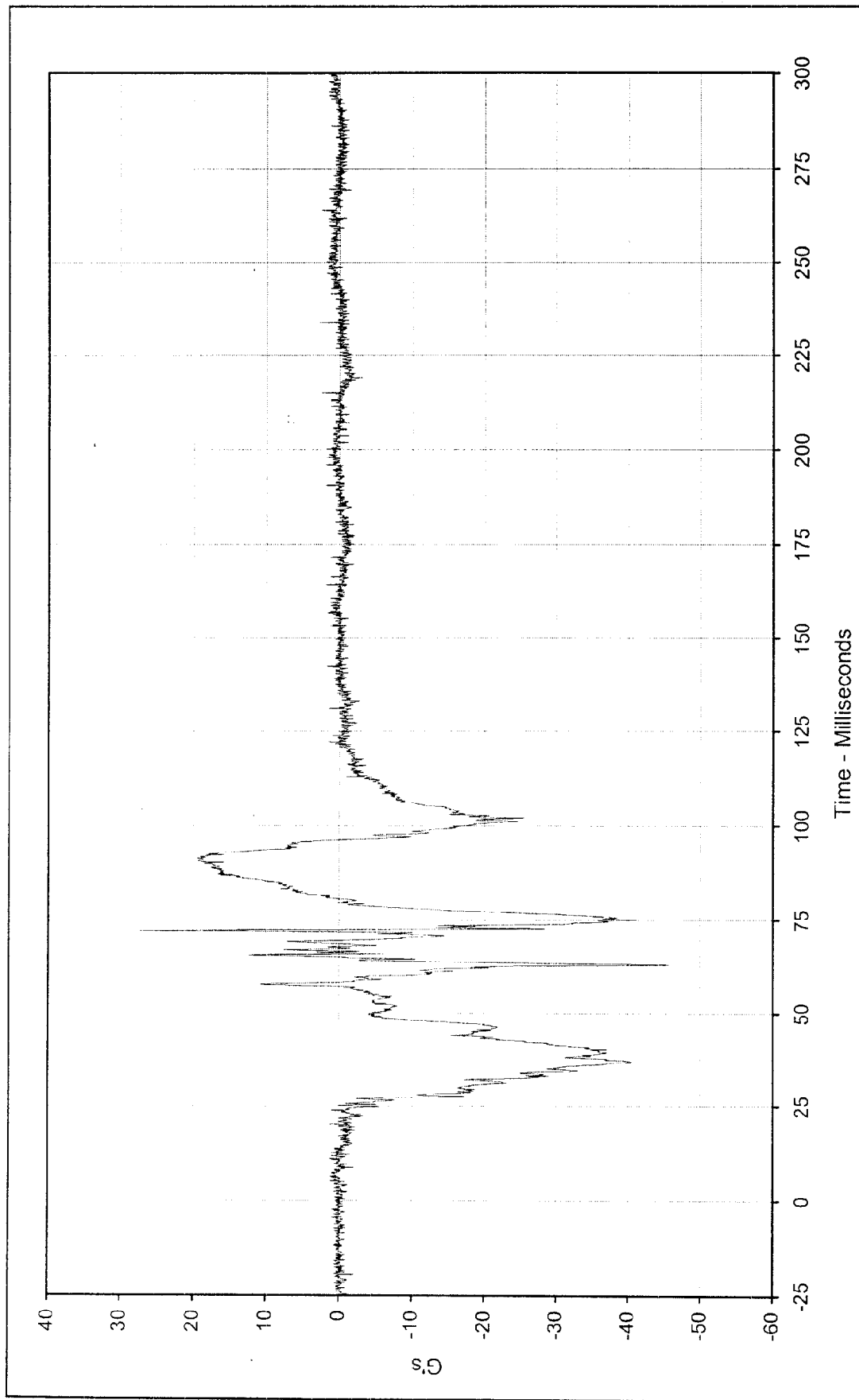
The logo for KARCO Engineering. It features the word "KARCO" in a large, bold, sans-serif font. A stylized lightbulb is integrated into the letter "A". To the right of "KARCO", the word "Engineering" is written in a smaller, italicized, sans-serif font. The entire logo is set against a black background with a white diagonal stripe running from the bottom left to the top right.





Curve Description:	Passenger Left Foot Aft X	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	29.4 at 75.5 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-112.9 at 64.0 Milliseconds			
SAE Filler Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-079			





Curve Description: Passenger Left Foot Aft Z Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Maximum Value: 27.2 at 72.0 Milliseconds Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

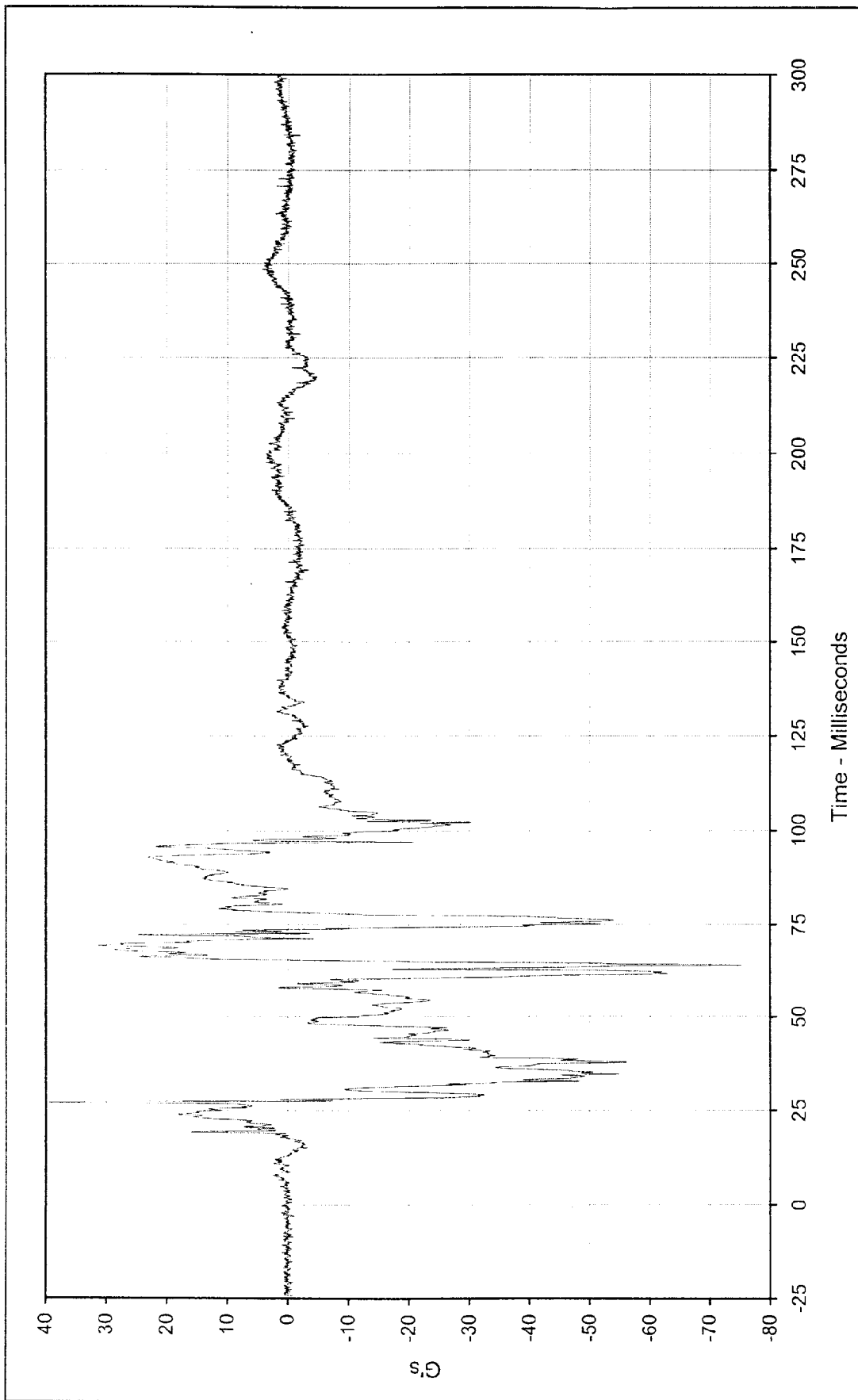
Minimum Value: -45.7 at 63.2 Milliseconds

SAE Filter Class: 1000

Date of Test: 5/20/99

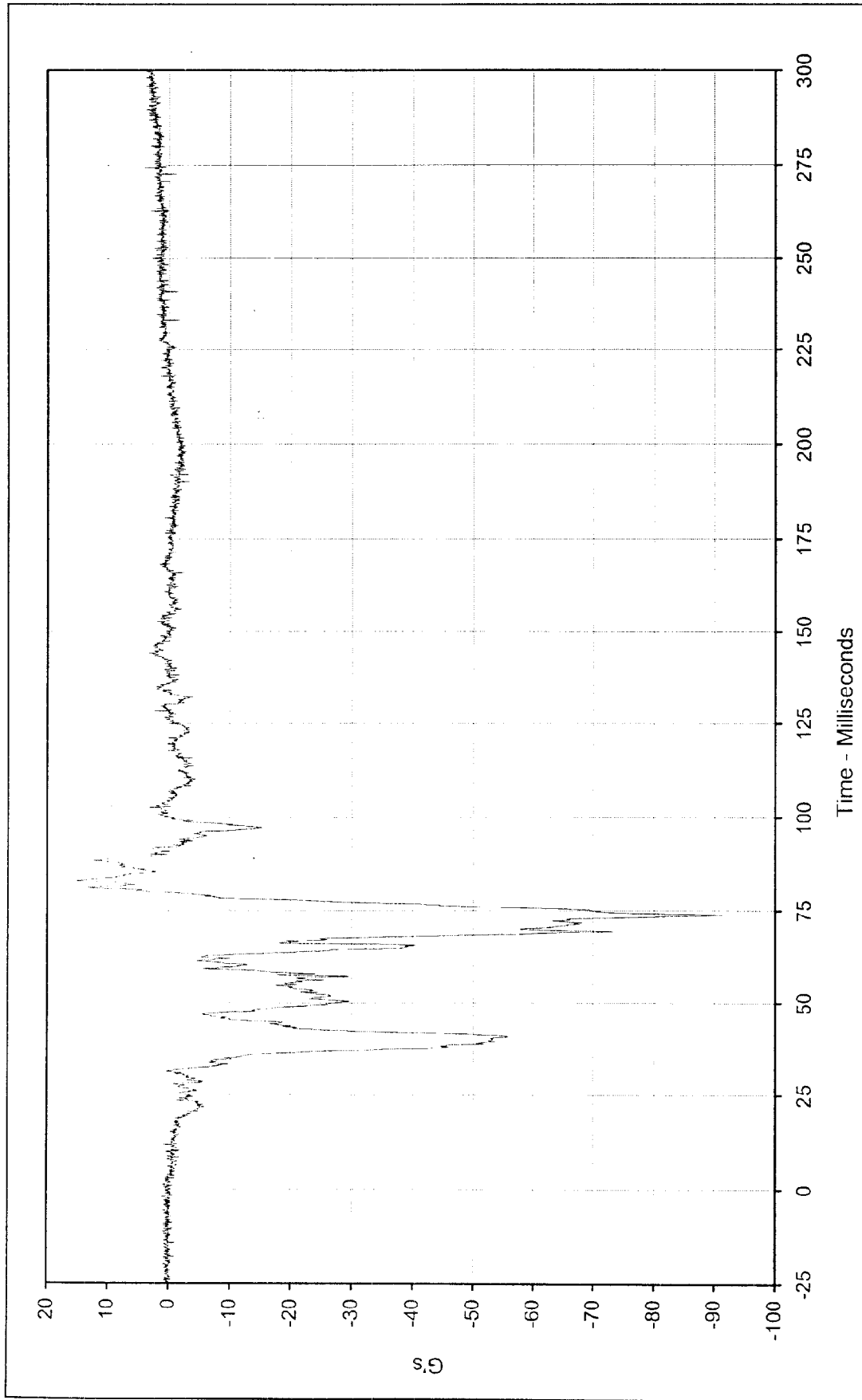
Curve Number: FIL-080





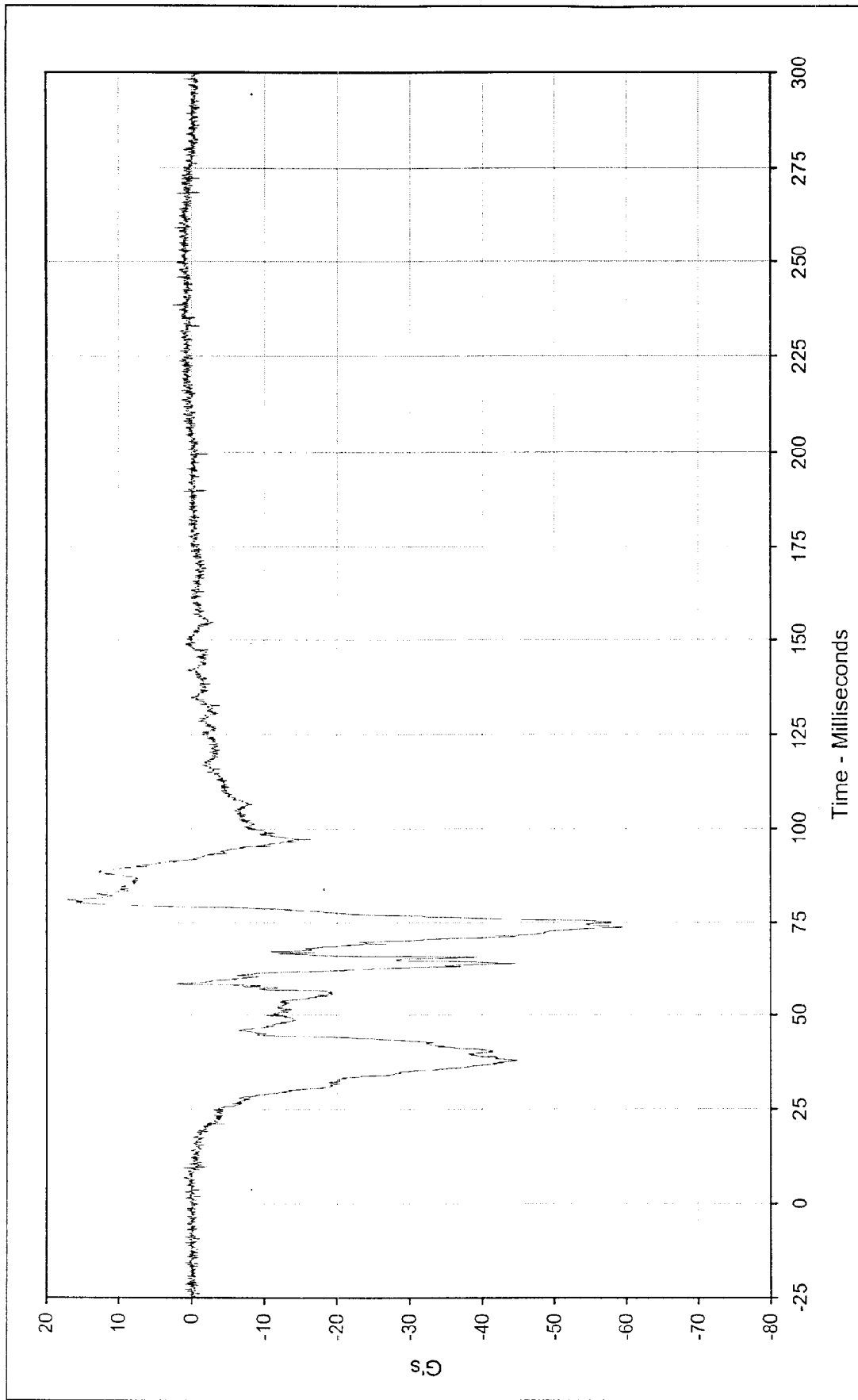
Curve Description:	Passenger Left Foot Fore Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	39.4 at 27.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-75.3 at 64.0 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-081			





Curve Description:		Passenger Right Foot Aft X		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	15.2	at	83.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-91.5	at	73.8			
SAE Filter Class:	1000					
Date of Test:	5/20/99					
Curve Number:	FIL-082					

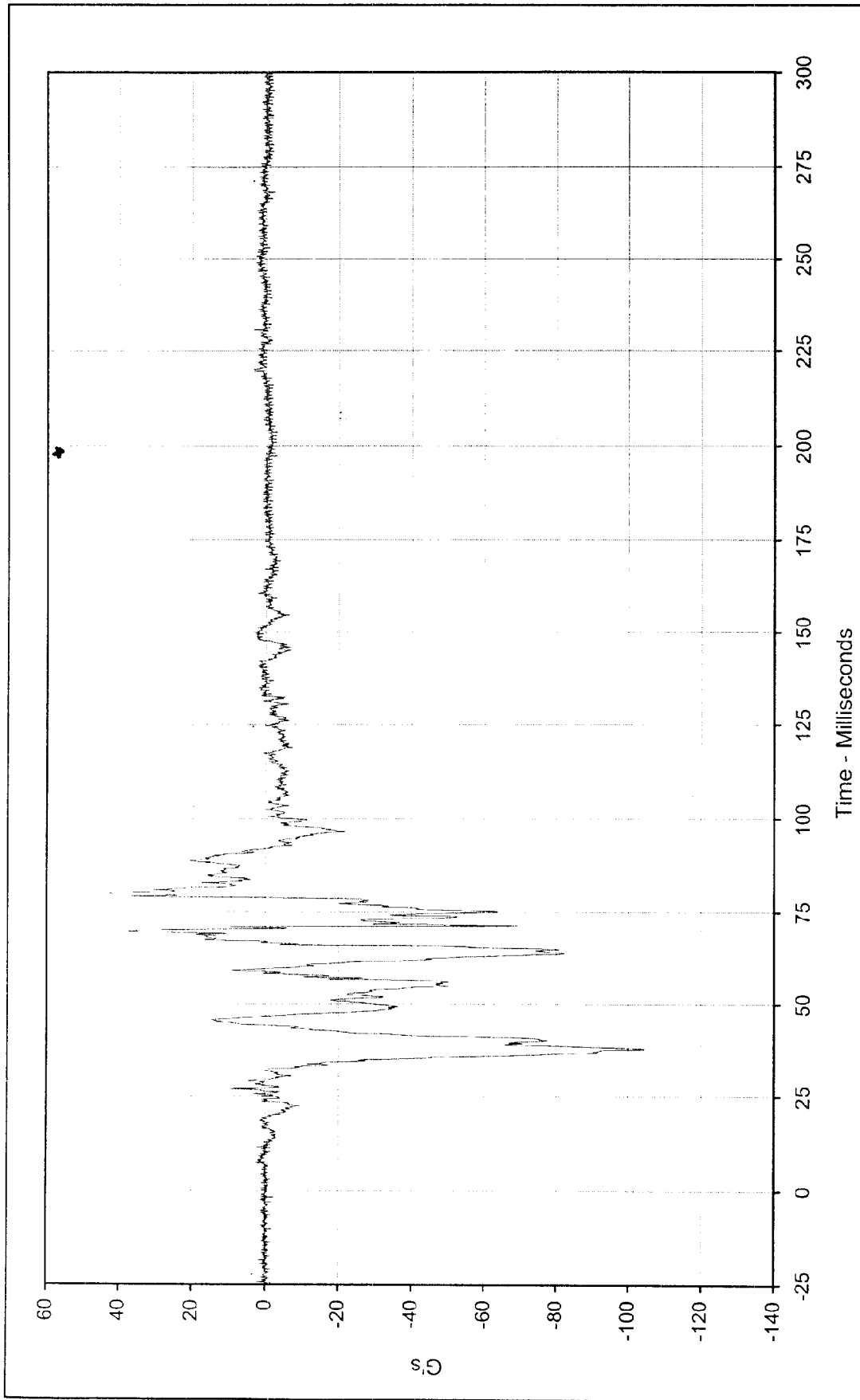




Curve Description:	Passenger Right Foot Aft Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	17.1 at 81.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-59.5 at 73.8 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	5/20/99			
Curve Number:	FIL-083			

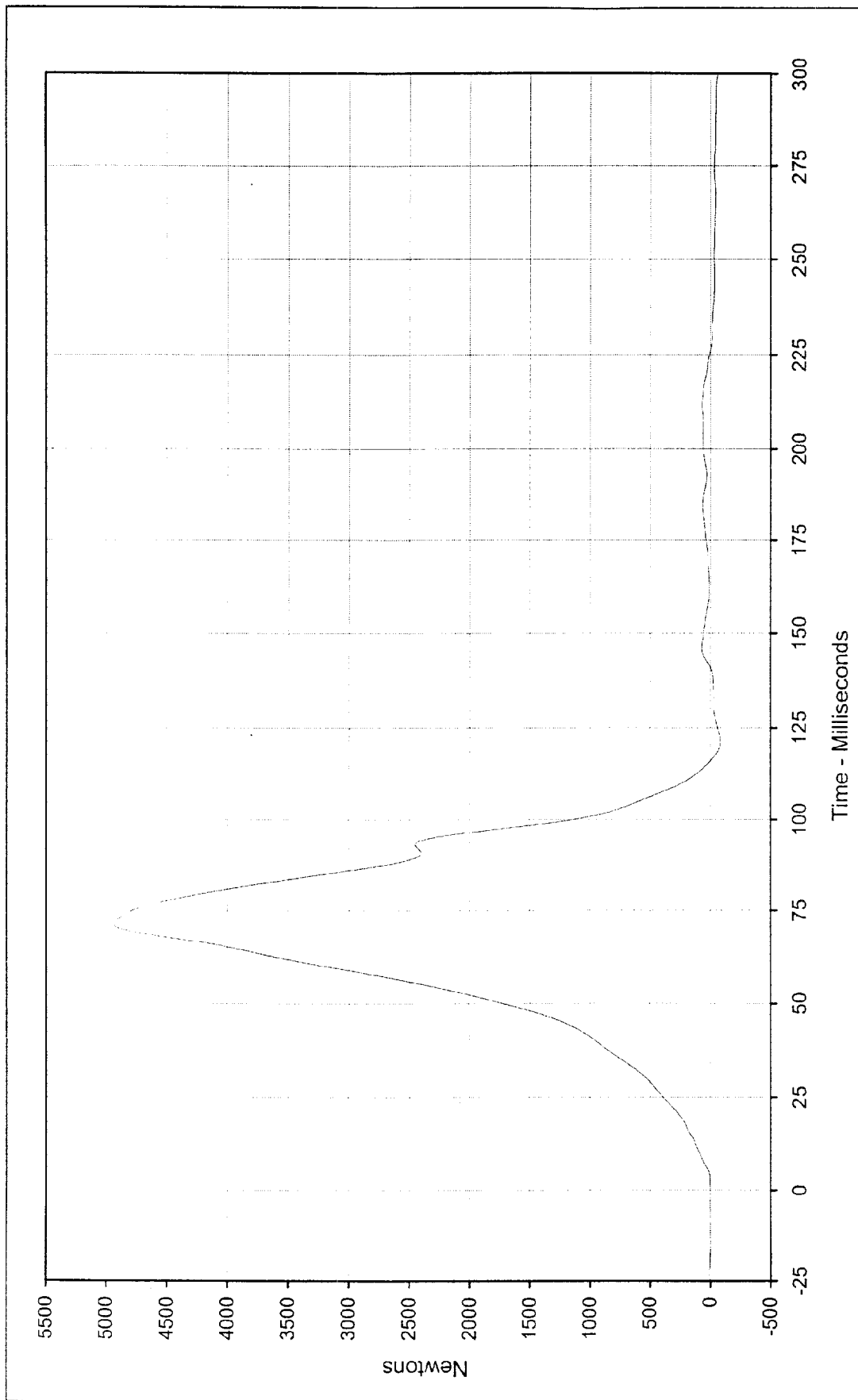






Curve Description:	Passenger Right Foot Fore Z	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	42.7 at 80.1 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan		
Minimum Value:	-104.5 at 37.7 Milliseconds				
SAE Filter Class:	1000				
Date of Test:	5/20/99				
Curve Number:	FIL-084				

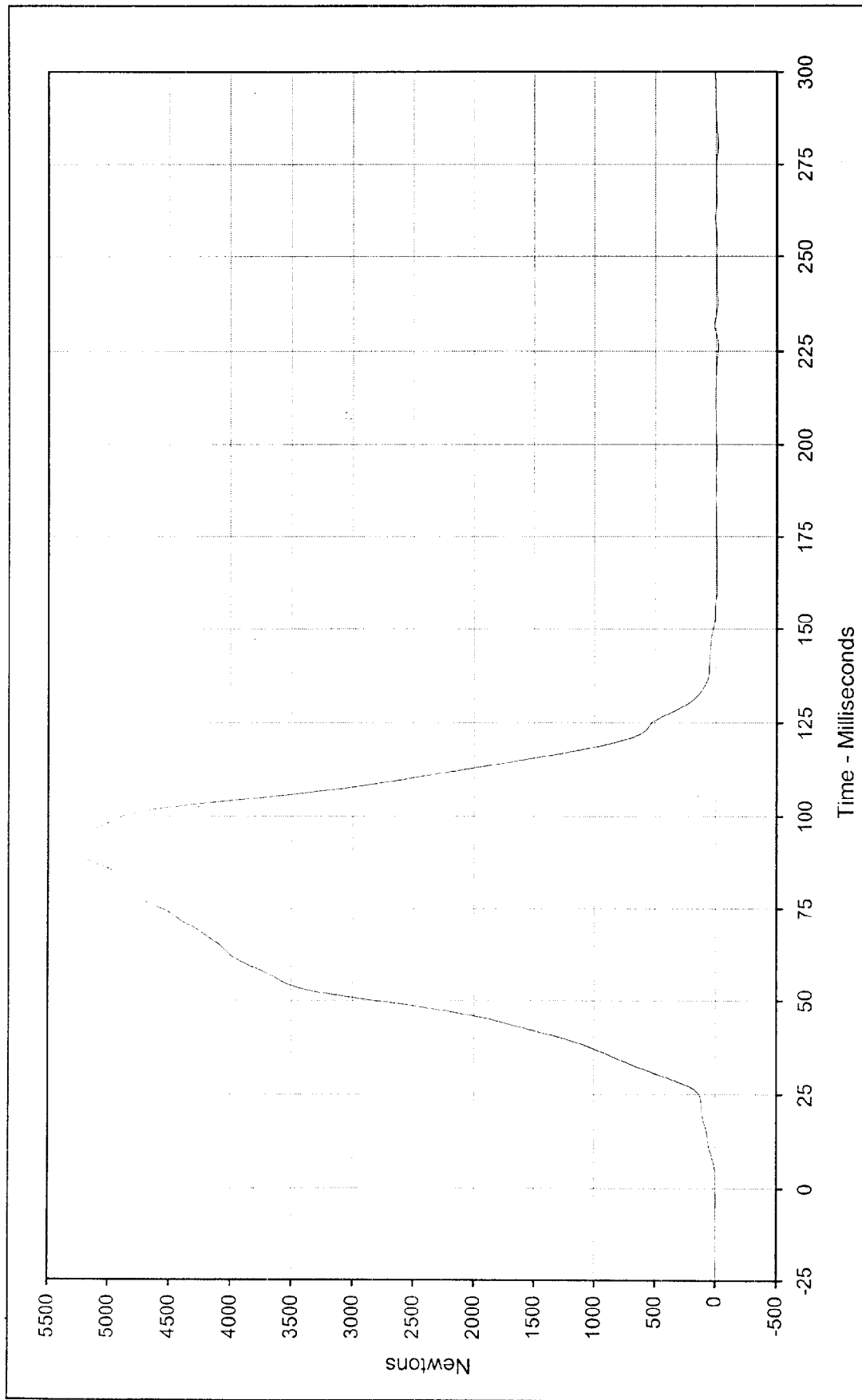




Curve Description:		Passenger Lap Belt Force		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	4938.9	at	71.3	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-84.3	at	121.1			
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-085					

The logo for QKARCO Engineering features the company name in a bold, sans-serif font. The 'Q' is stylized with a checkered pattern. To the right of the text is a circular emblem containing a checkered pattern, similar to a racing flag. The word 'Engineering' is written in a script font below the main name.

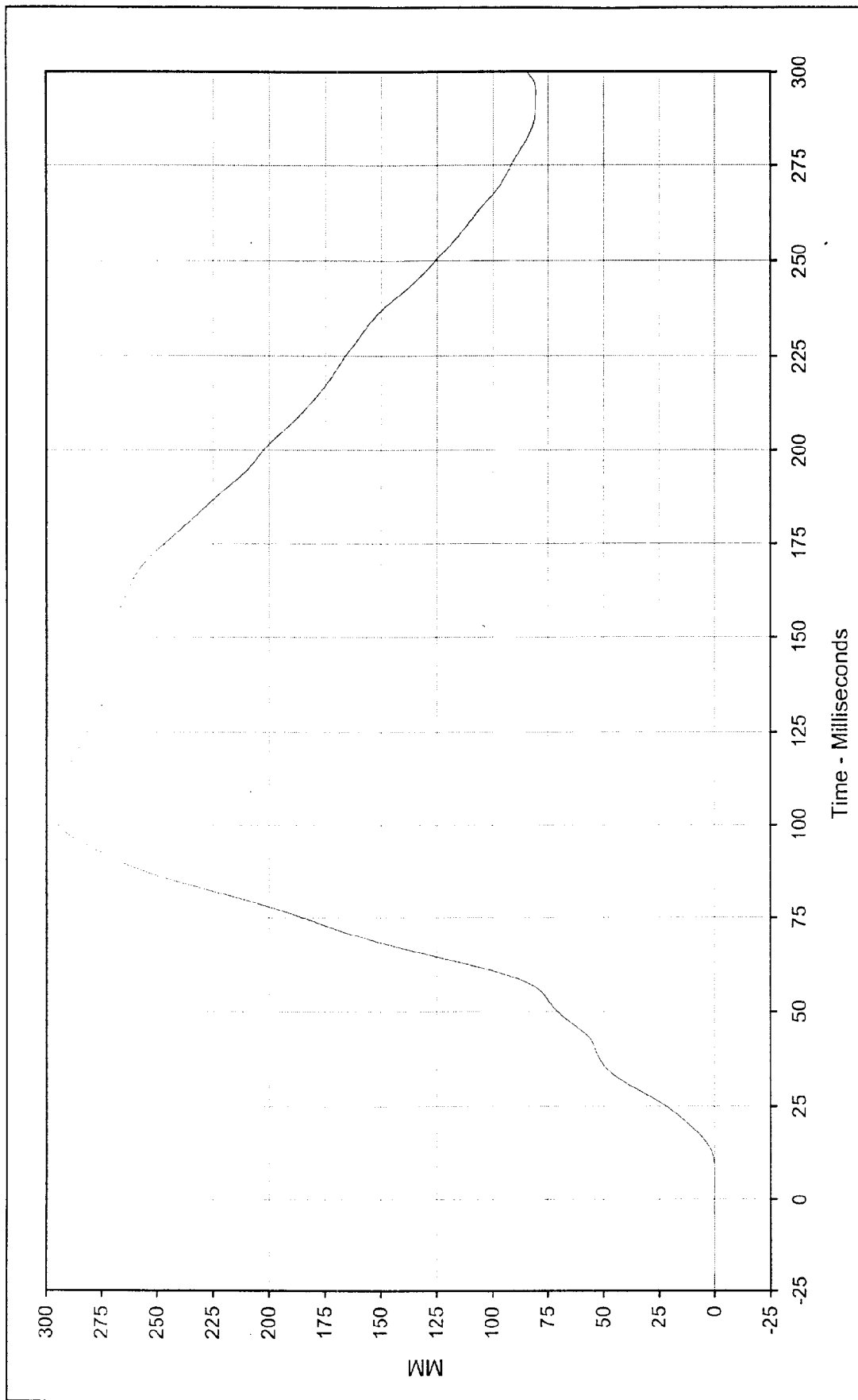




Curve Description: Passenger Shoulder Belt Force
Maximum Value: 5213.3 at 89.5 Milliseconds
Minimum Value: -19.0 at 280.4 Milliseconds
SAE Filter Class: 60
Date of Test: 5/20/99
Curve Number: FIL-086

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

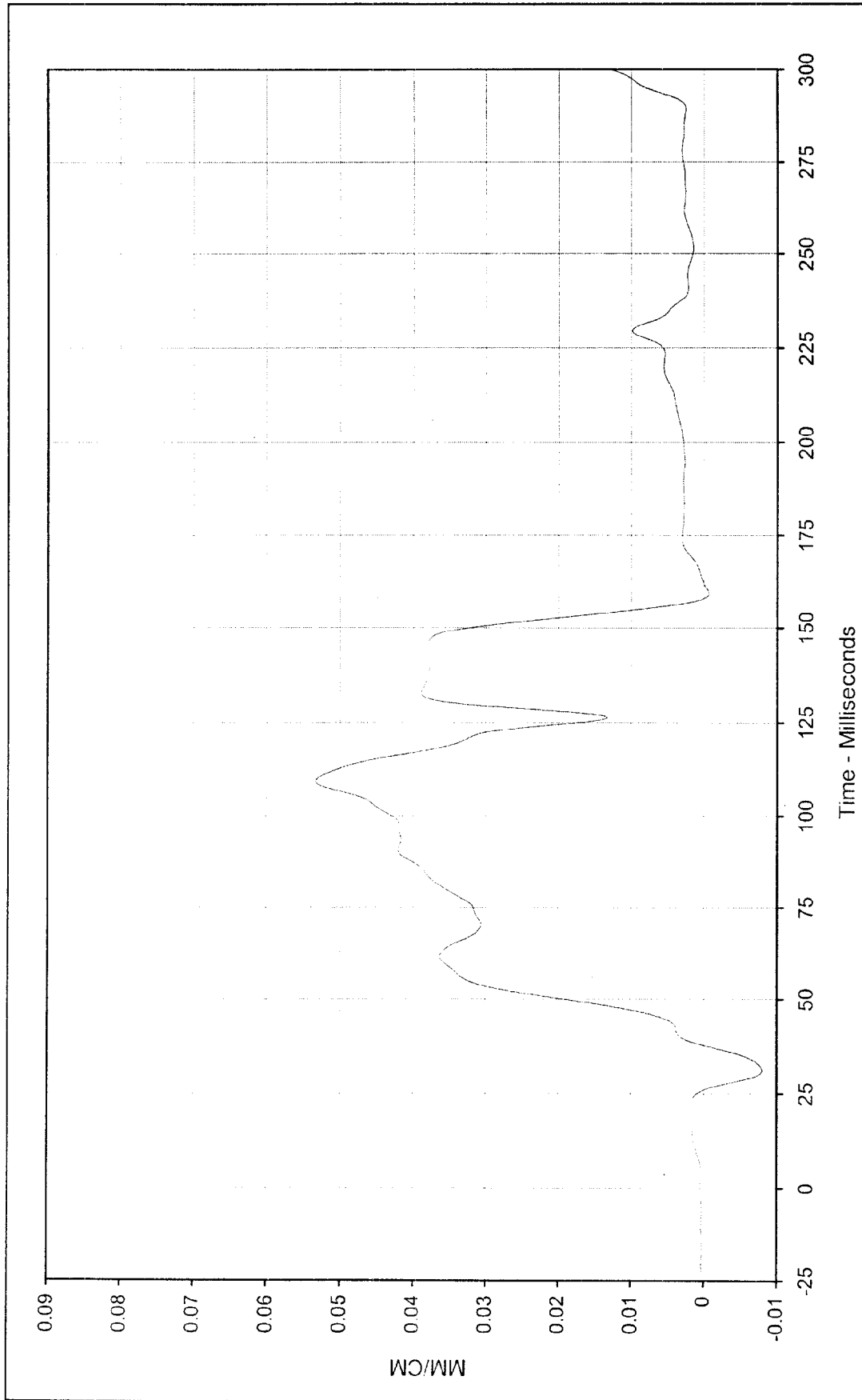




Curve Description:	Passenger Shoulder Belt Pullover		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	296.3	at 102.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-0.1	at 7.8 Milliseconds			
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-087				





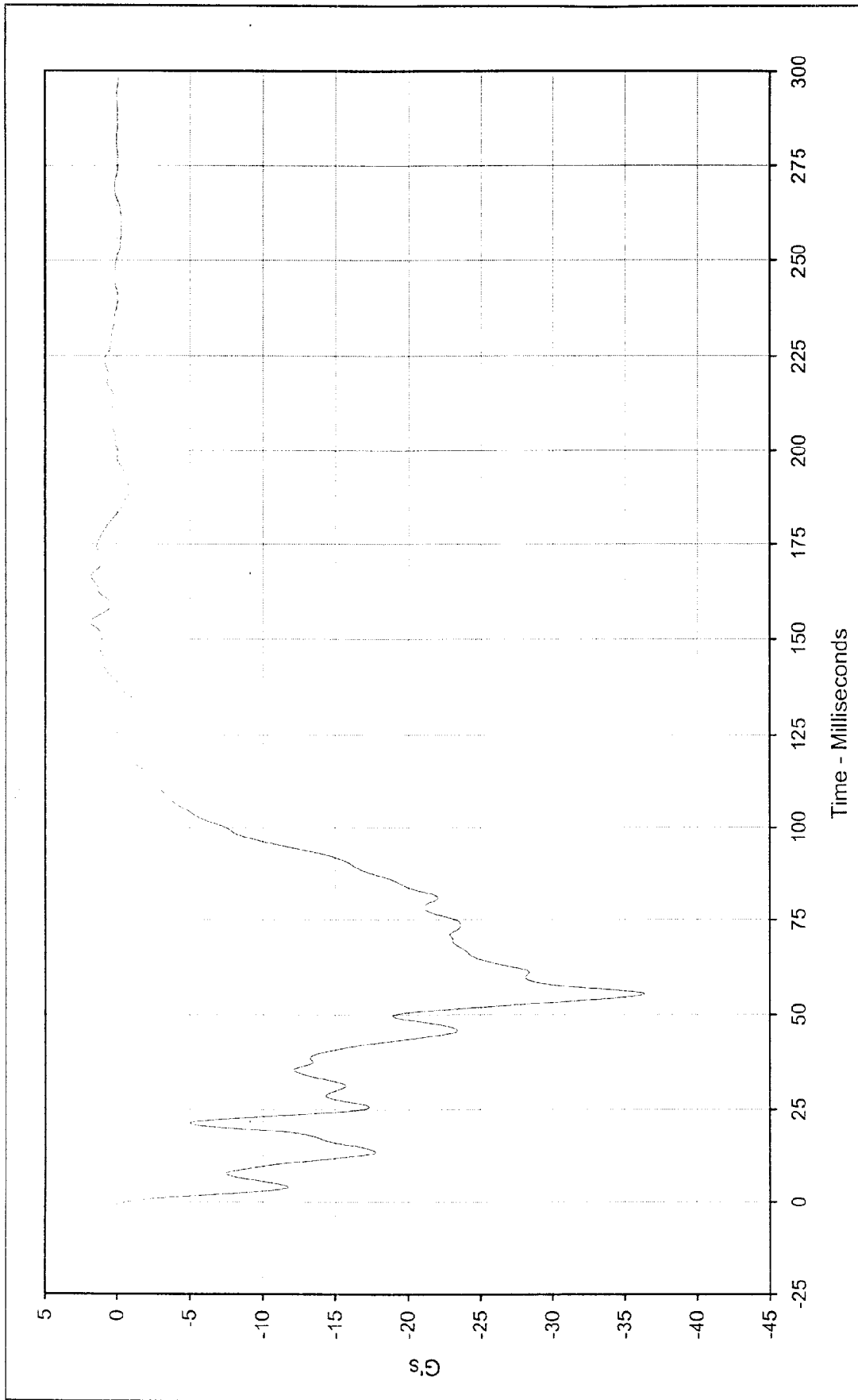


Curve Description: Passenger Shoulder Belt Elongation

Maximum Value:	0.05	at	109.3	Milliseconds
Minimum Value:	-0.01	at	31.1	Milliseconds
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-088			

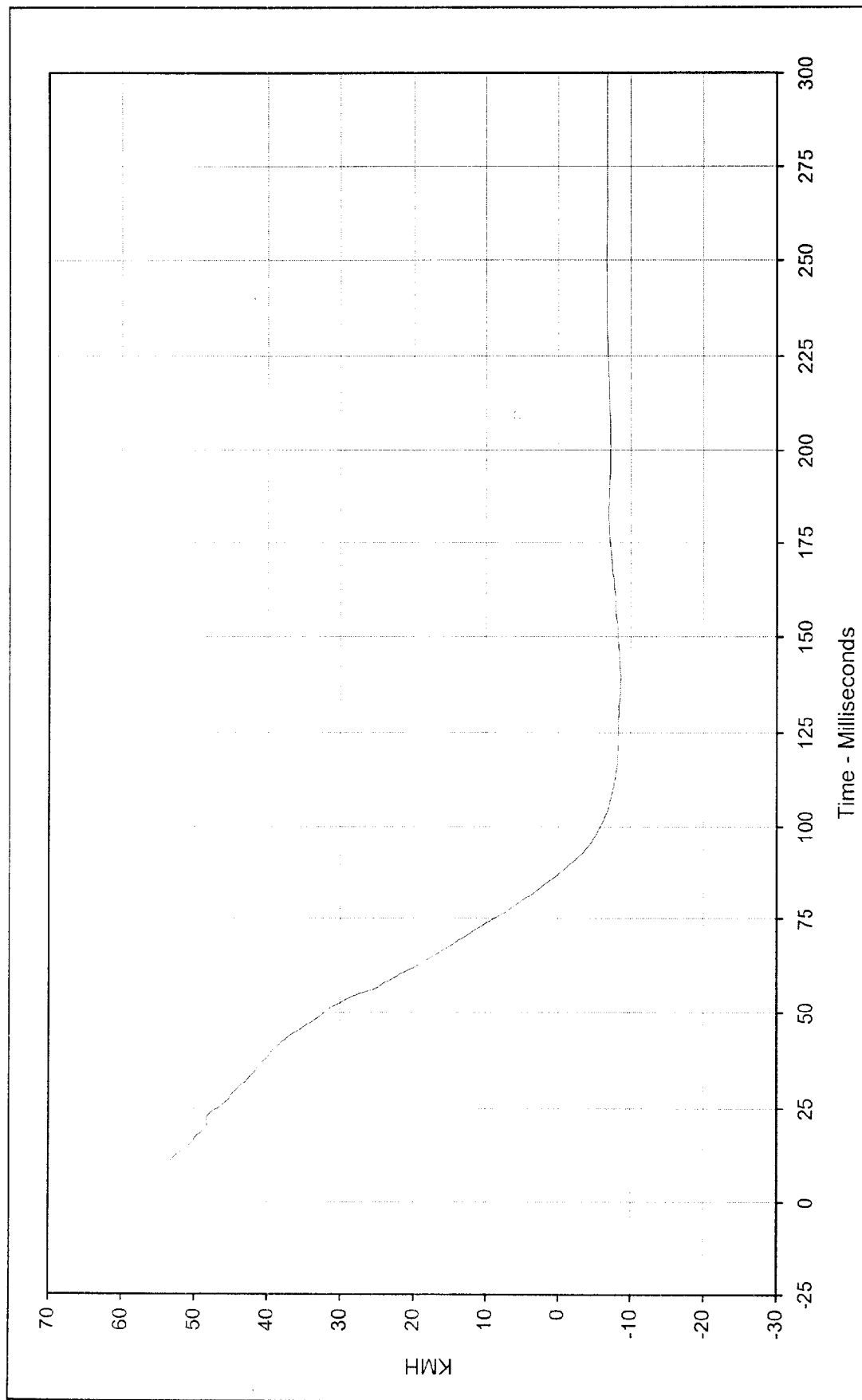
Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	





Curve Description:	Vehicle Left Rear Primary	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	1.8 at 154.3 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-36.4 at 55.3 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-089			





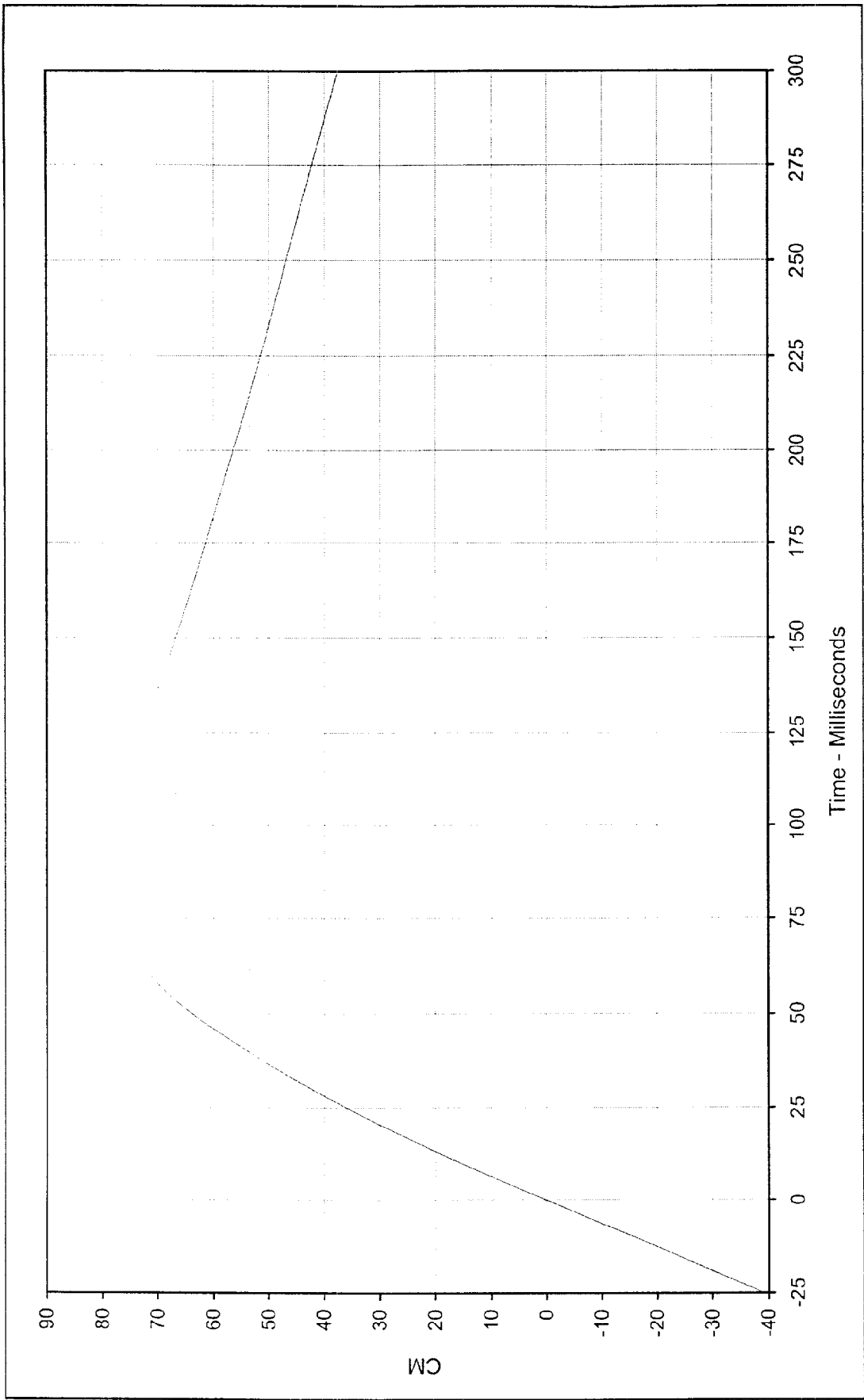
Curve Description: Vehicle Left Rear Primary Velocity

Maximum Value:	56.4	at	1.7	Milliseconds
Minimum Value:	-8.6	at	139.6	Milliseconds
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN1-089			

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

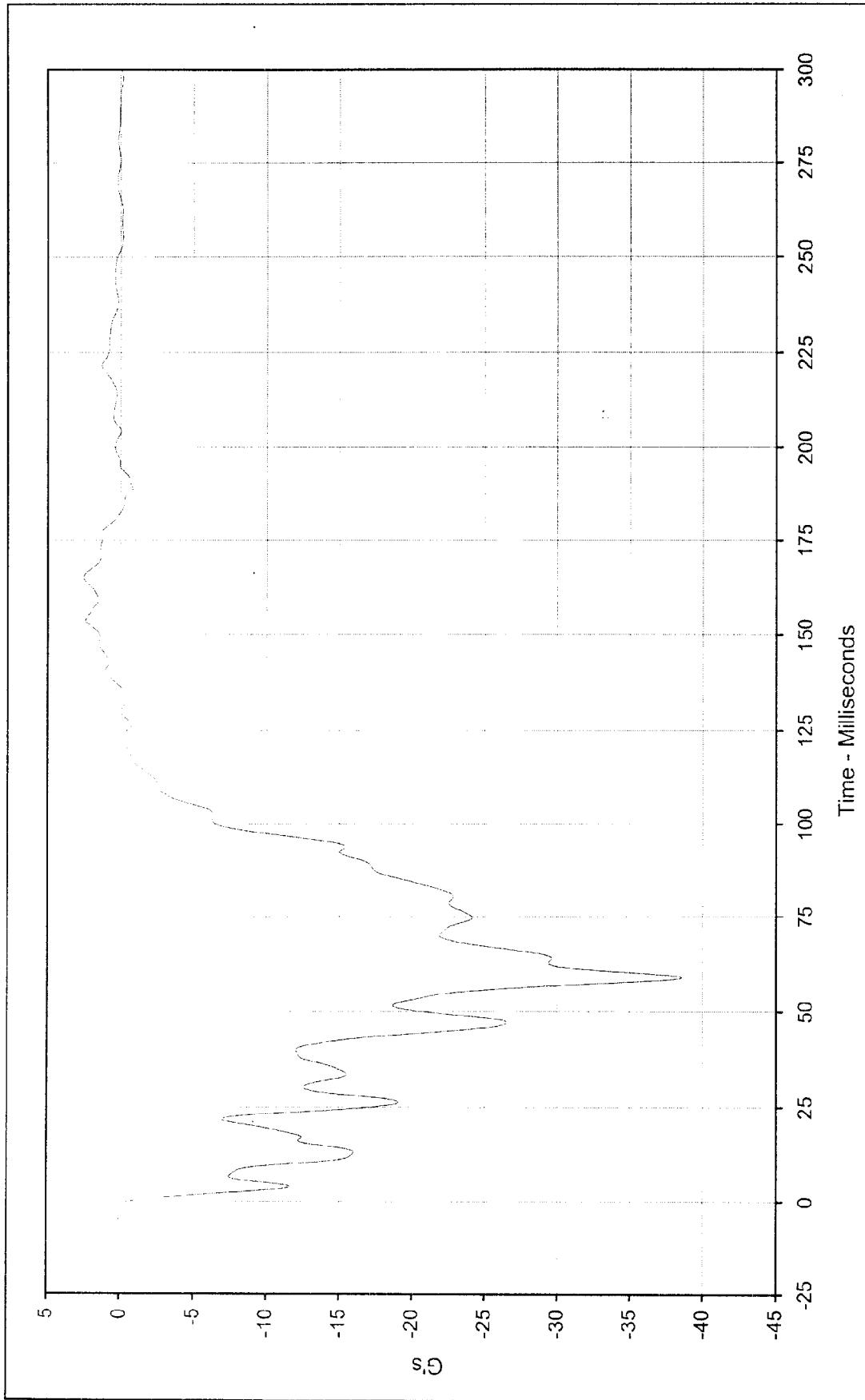




Curve Description: Vehicle Left Rear Primary Displ.
Maximum Value: 79.1 at 86.9 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 5/20/99
Curve Number: IN2-089

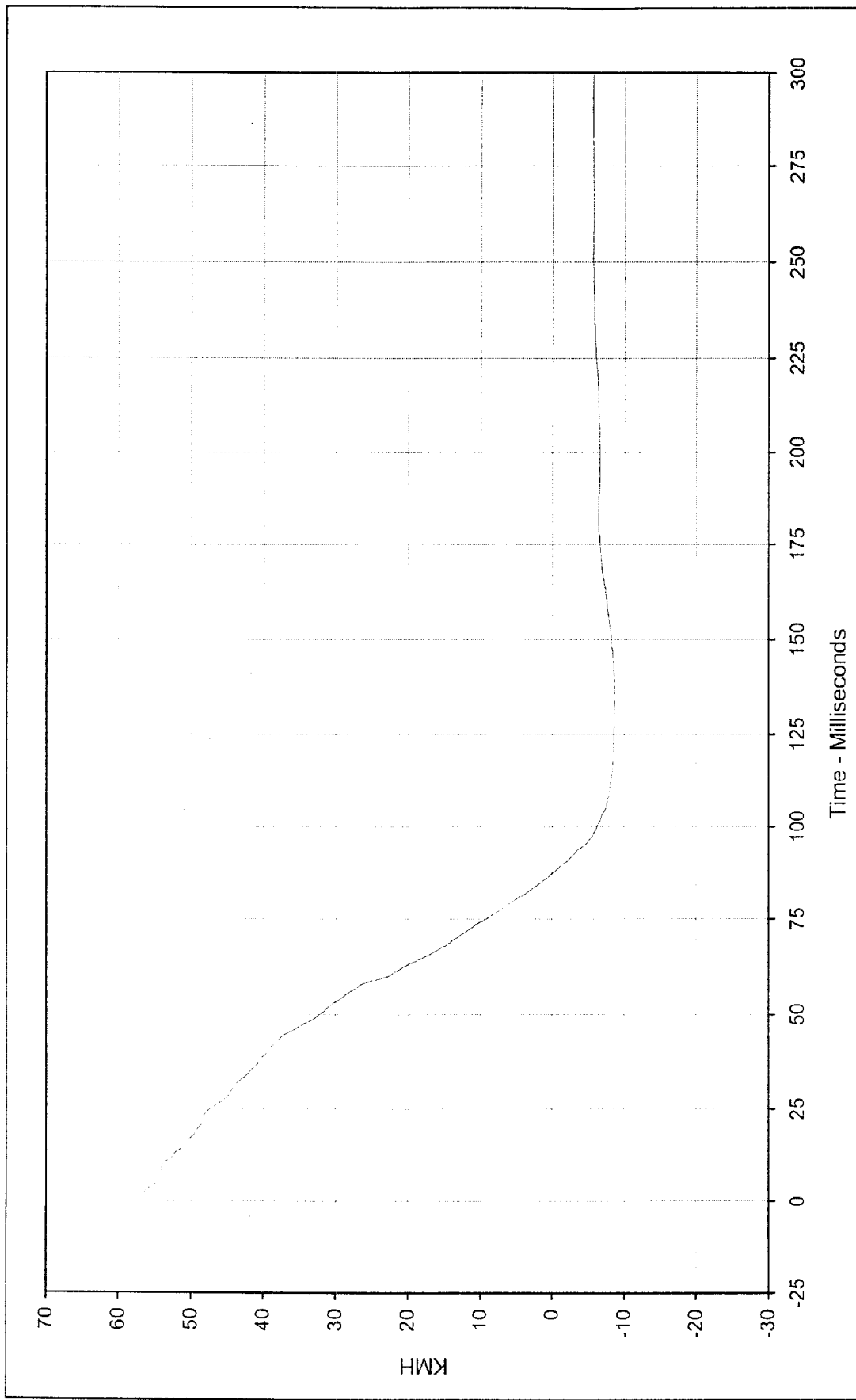
Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description:	Vehicle Right Rear Primary	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	2.5 at 165.2 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-38.6 at 58.9 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-090			





Curve Description: Vehicle Right Rear Primary Velocity Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Maximum Value: 56.4 at 1.4 Milliseconds Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

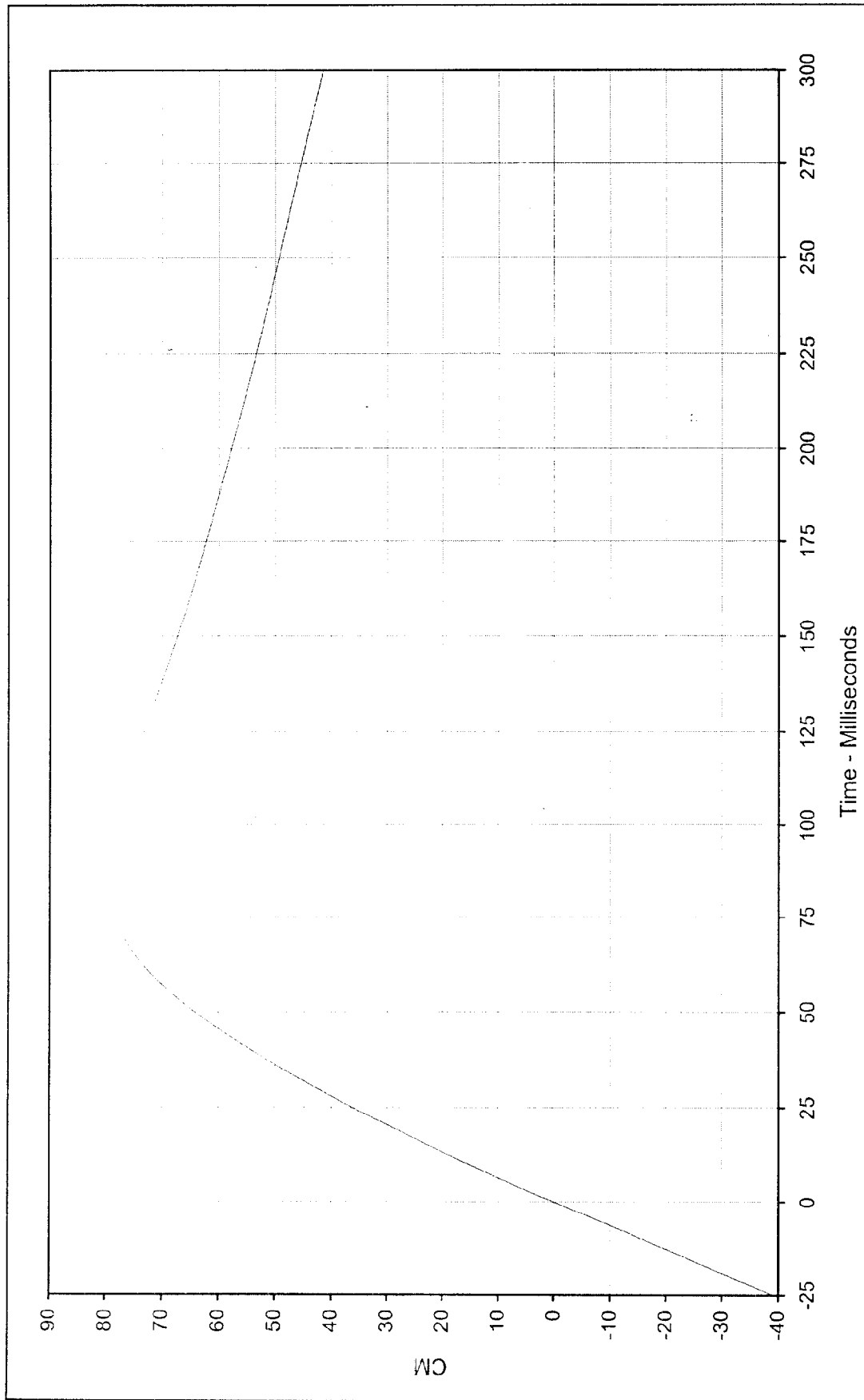
Minimum Value: -8.7 at 136.7 Milliseconds

SAE Filter Class: 180

Date of Test: 5/20/99

Curve Number: IN1-090





Curve Description: Vehicle Right Rear Primary Displ.

Maximum Value: 80.0 at 87.2 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

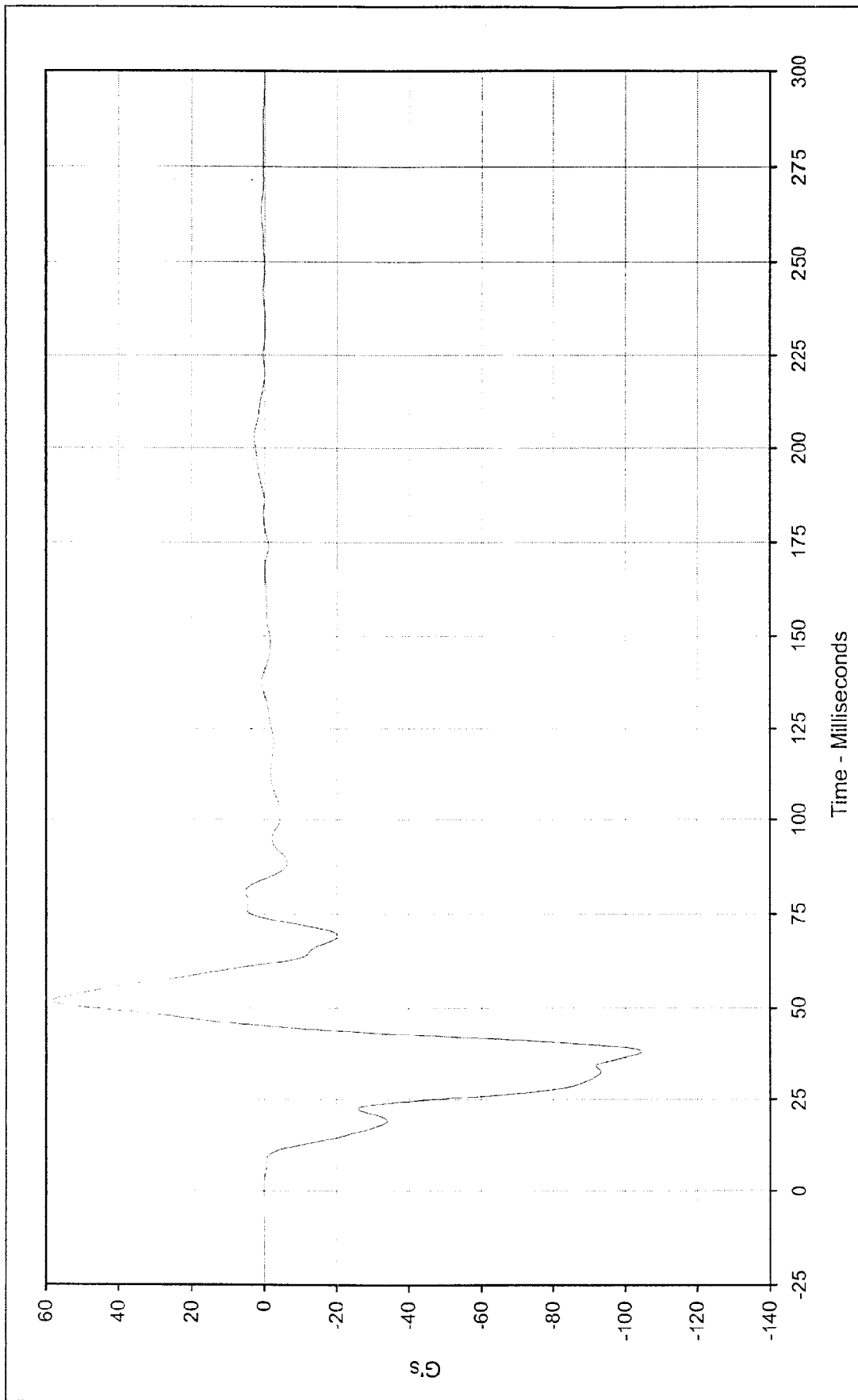
Date of Test: 5/20/99

Curve Number: IN2-090

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

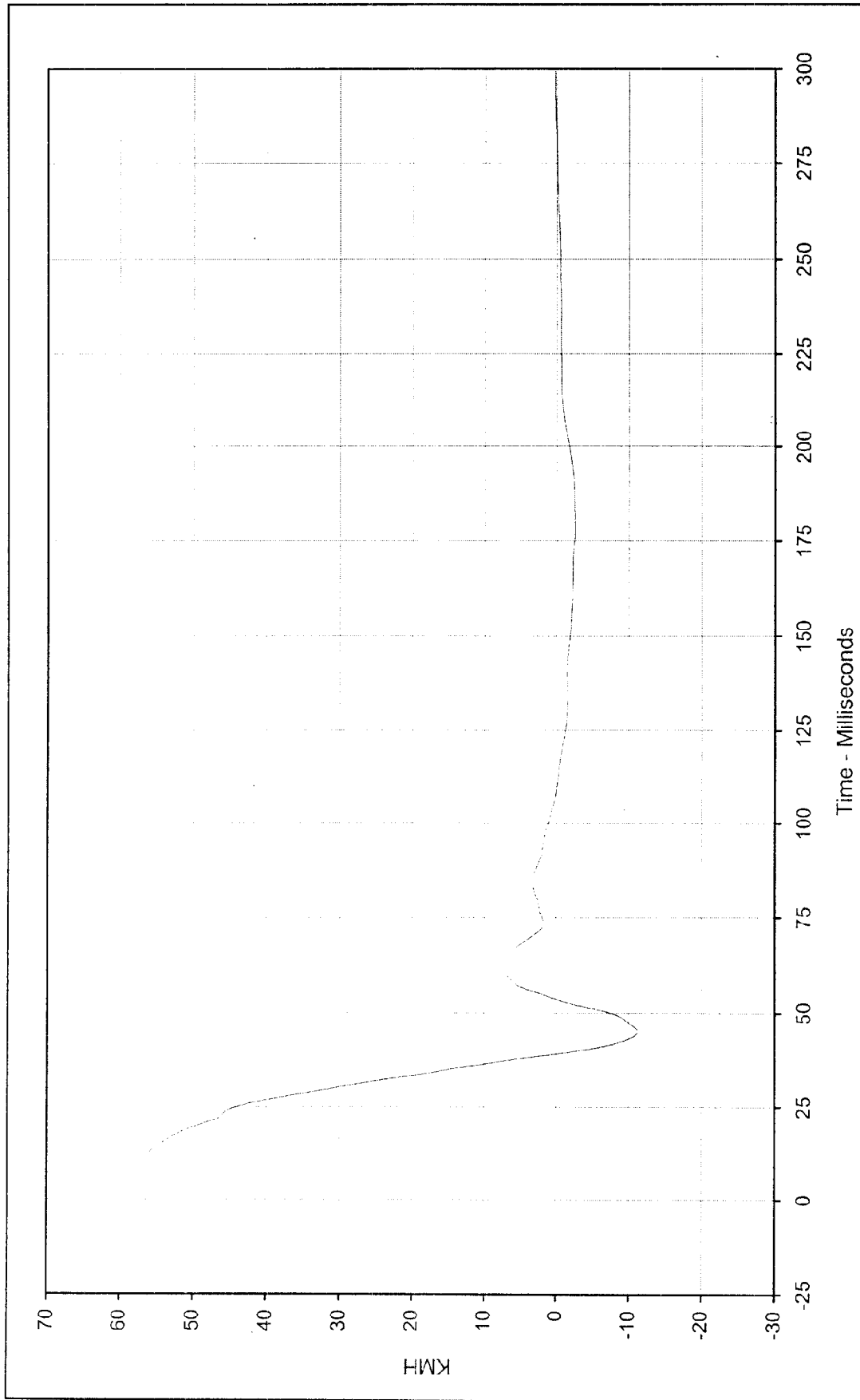
Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





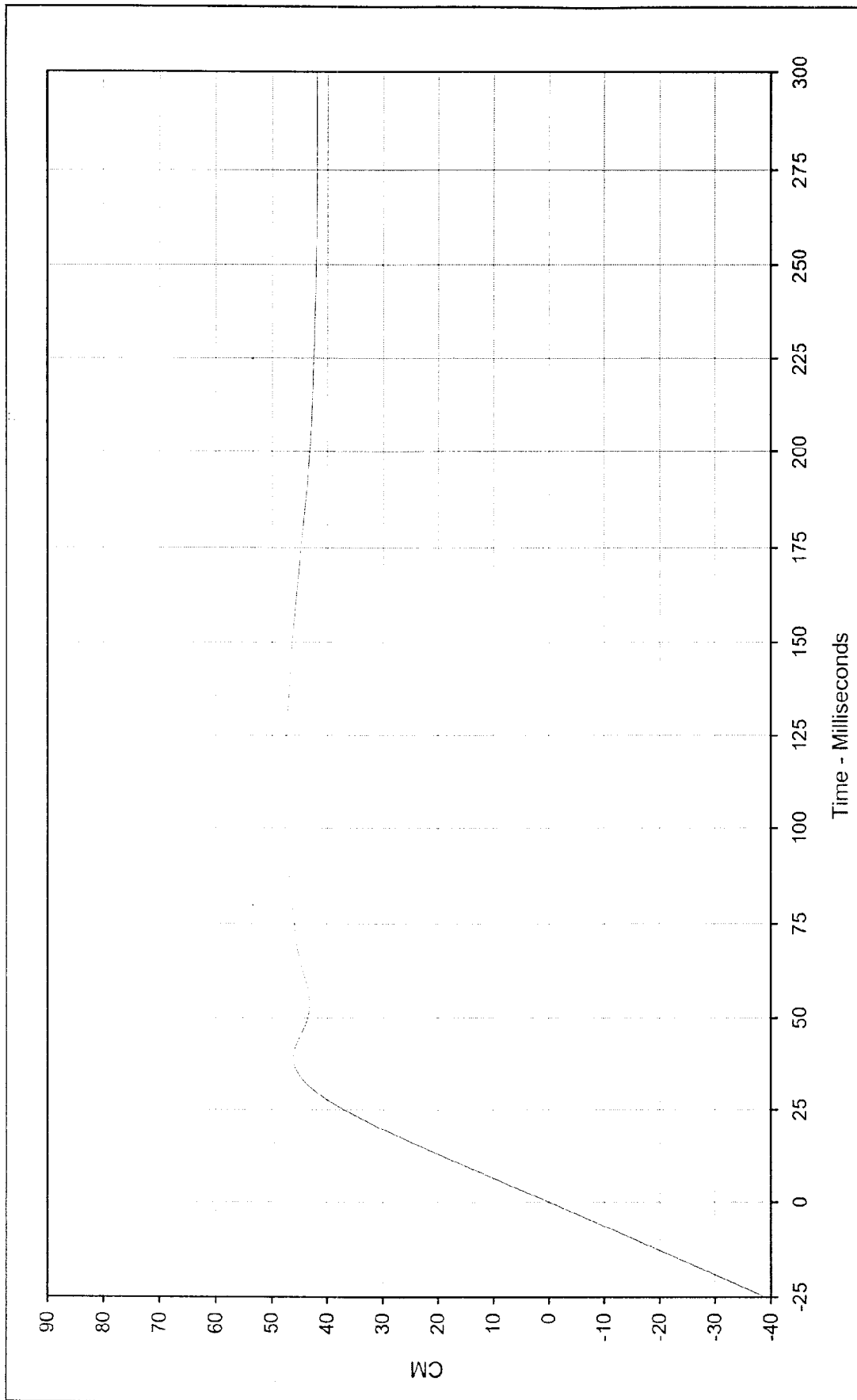
Curve Description:		Vehicle Engine Top		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	58.2	at	51.8	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-104.5	at	38.0	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-091					





Curve Description:	Vehicle Engine Top Velocity		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	56.4	at 3.9	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-11.3	at 45.1			
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	IN1-091				

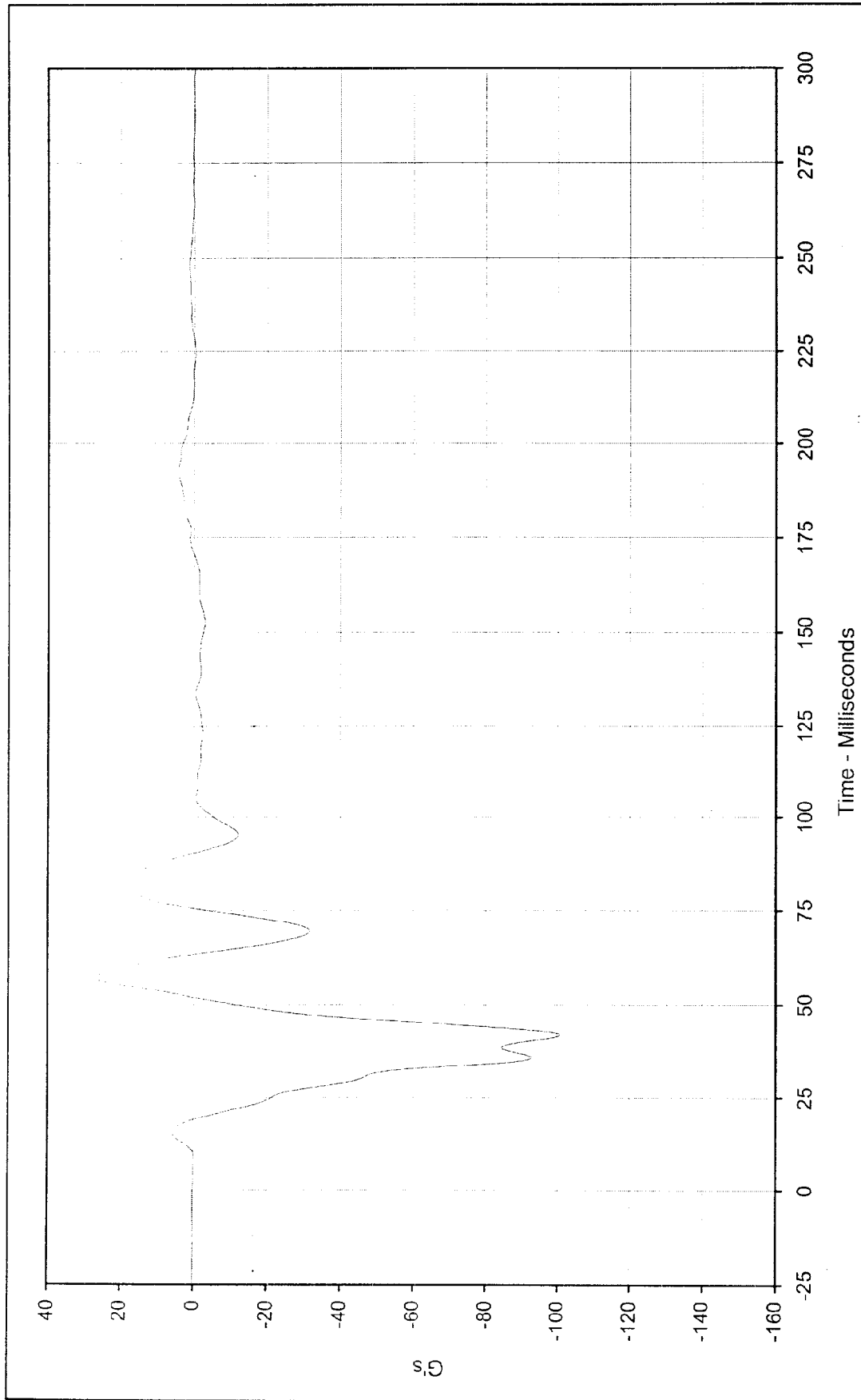




Curve Description:	Vehicle Engine Top Displ.		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	47.6	at 108.8	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.0	at 0.0			
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	IN2-091				

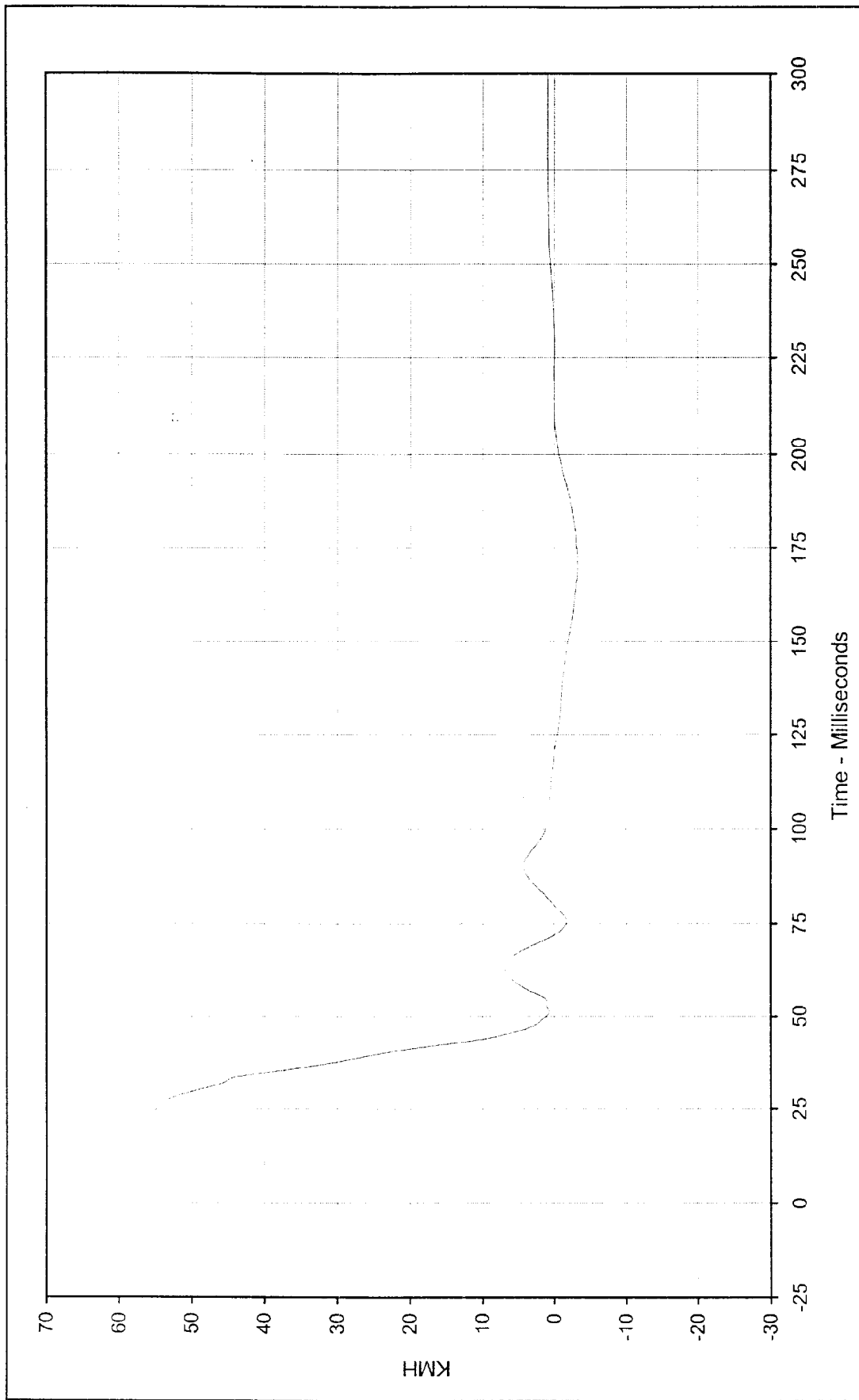
The logo for KARCO Engineering features the word "KARCO" in a large, bold, sans-serif font. A stylized lightbulb is integrated into the letter "K". To the right of "KARCO", the word "Engineering" is written in a smaller, italicized, sans-serif font. The entire logo is set against a black background with a white diagonal line running from the bottom left to the top right.





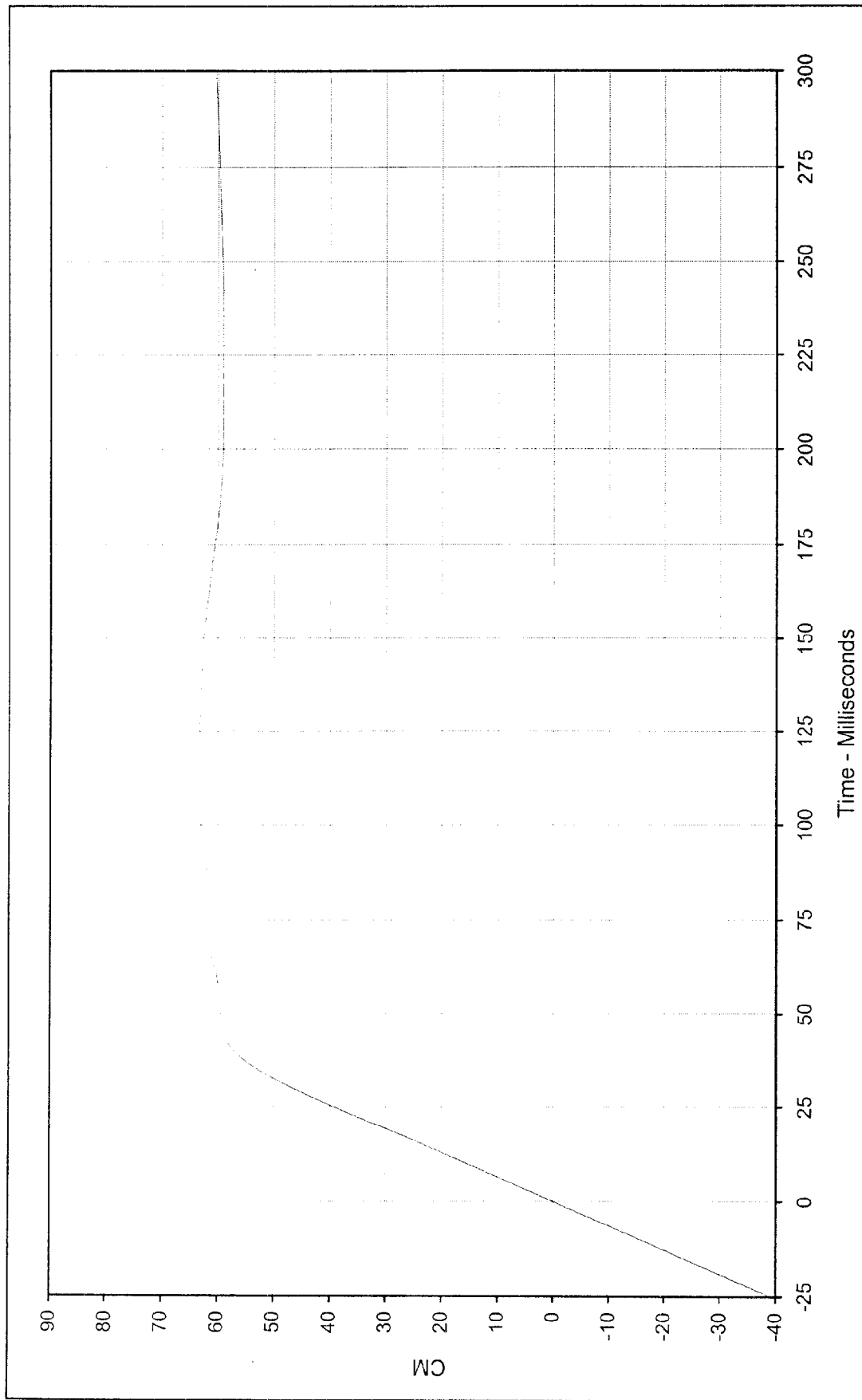
Curve Description:	Vehicle Engine Bottom		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	26.7	at 57.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-100.6	at 41.8			
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-092				





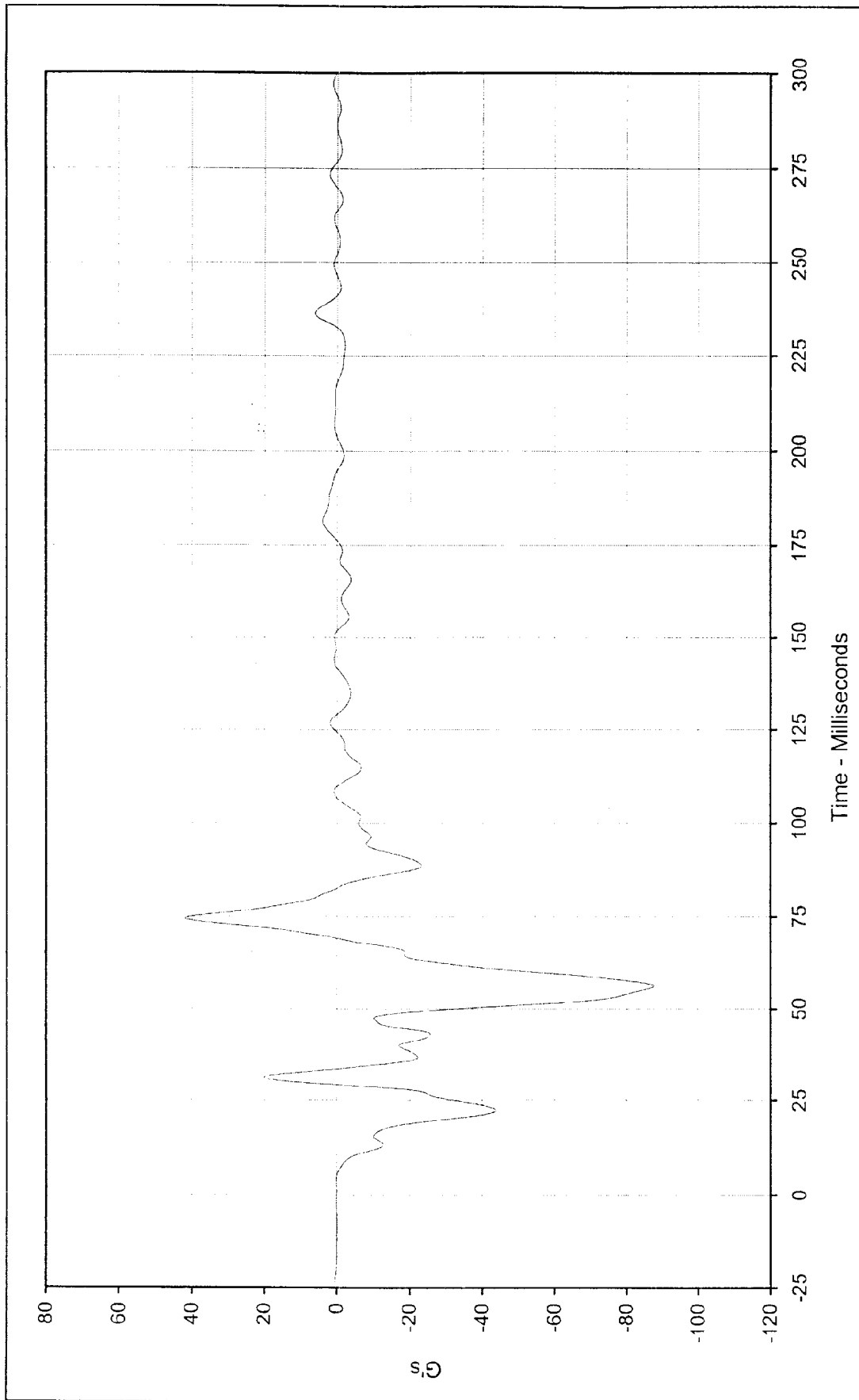
Curve Description:	Vehicle Engine Bottom Velocity	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	57.5 at 19.3 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-3.2 at 170.4 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN1-092			





Curve Description:	Vehicle Engine Bottom Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	63.3 at 120.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.1 at 0.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN2-092			



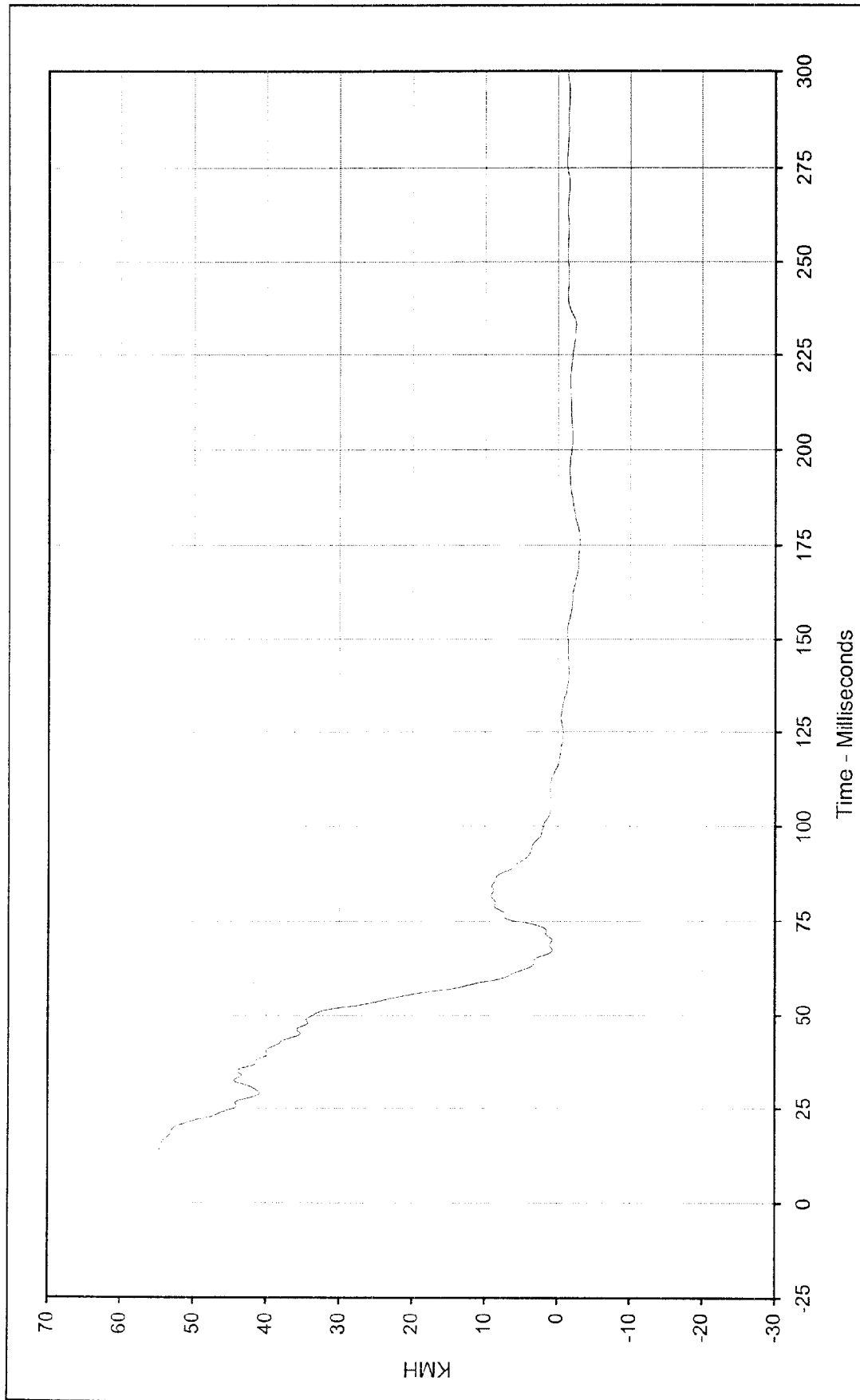


Curve Description:		Vehicle Left Brake Caliper		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:		41.7	at	74.5	Milliseconds	Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
Minimum Value:		-87.6	at	56.2	Milliseconds	
SAE Filter Class:		60				
Date of Test:		5/20/99				
Curve Number:		FIL-093				



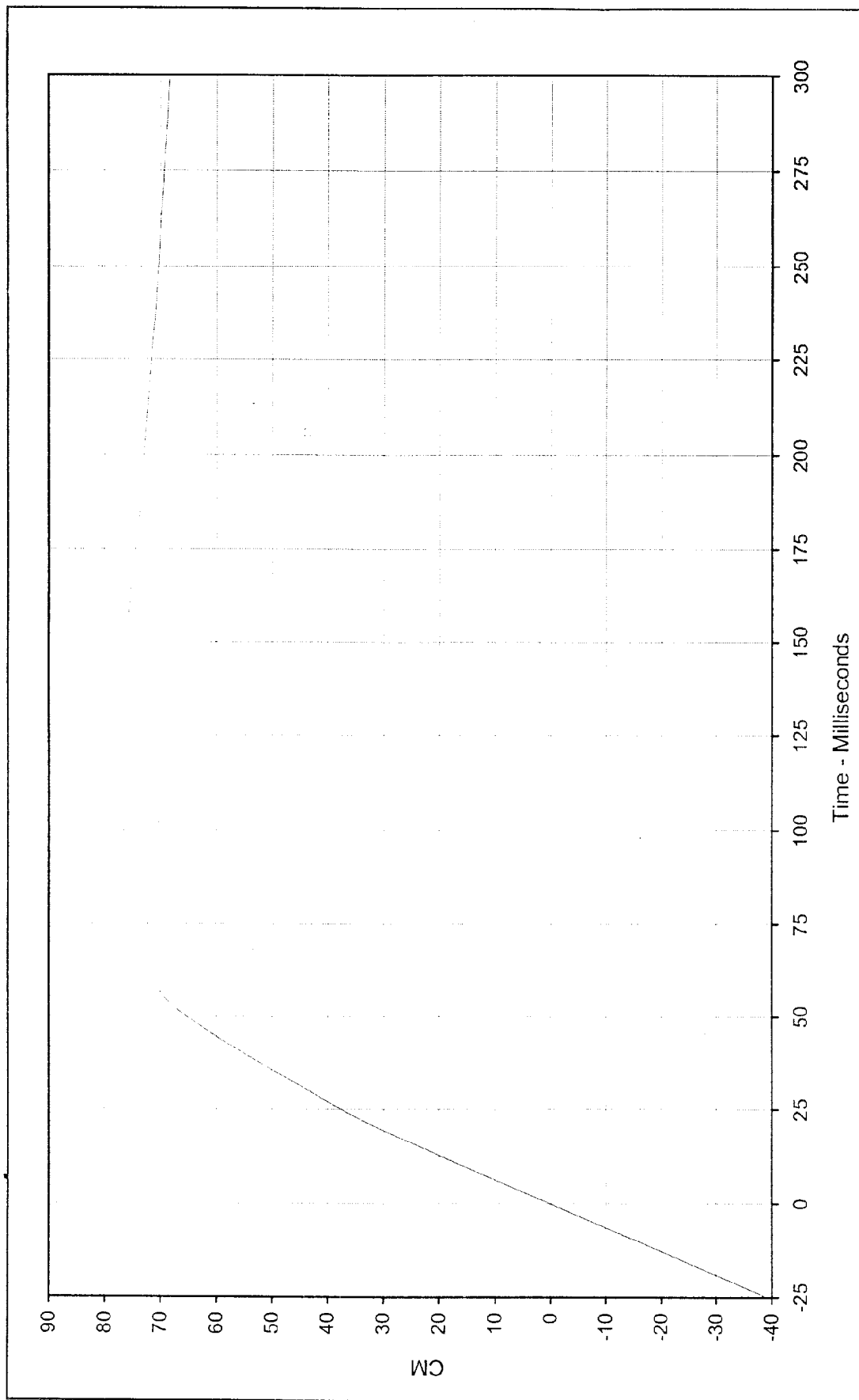
KARCO
Engineering





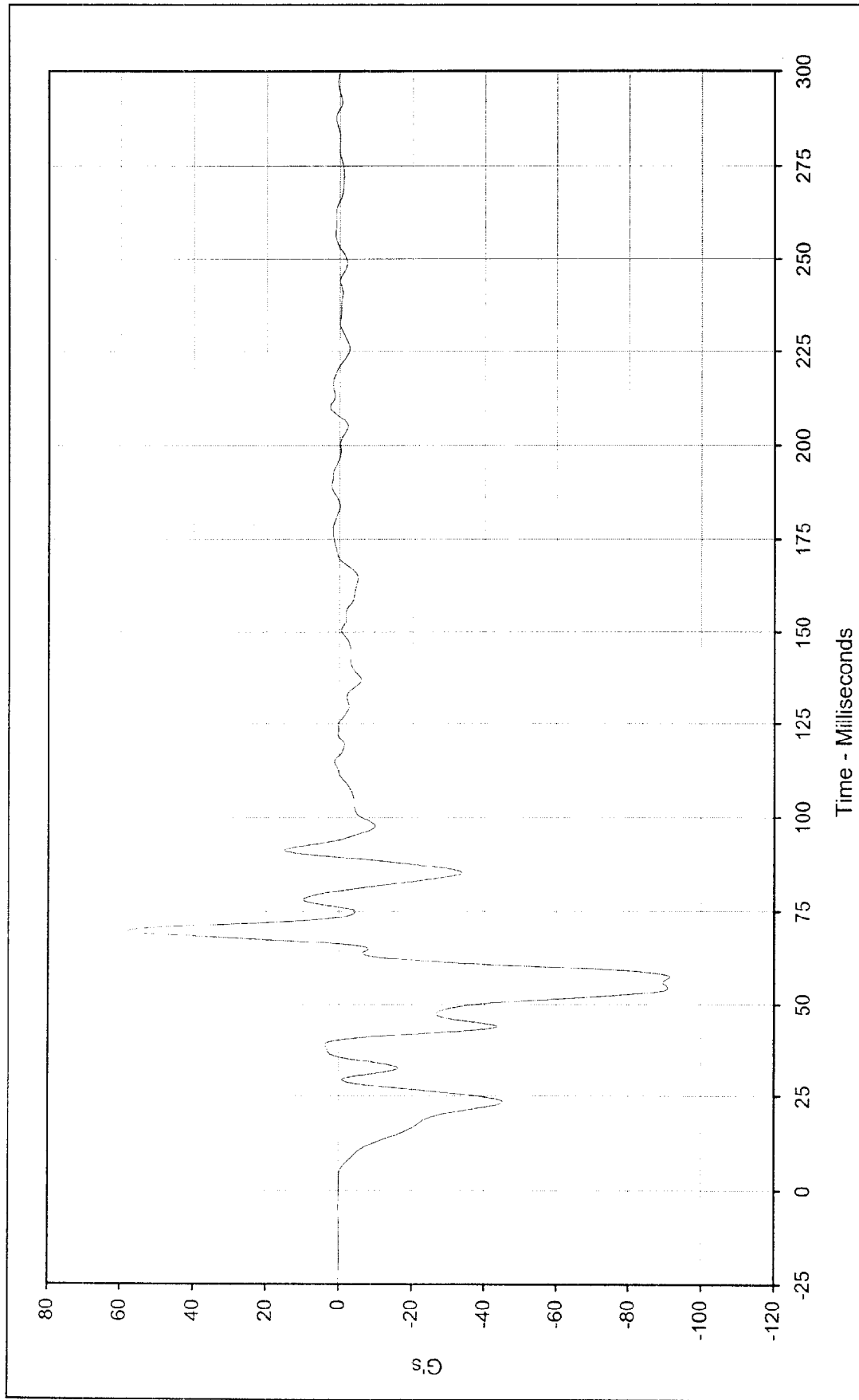
Curve Description:		Test Program:		1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	56.5	at	6.2	Milliseconds	
Minimum Value:	-3.1	at	175.8	Milliseconds	
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	IN1-093				
		Test Vehicle:		2000 Chevrolet Impala 4 Door Sedan	





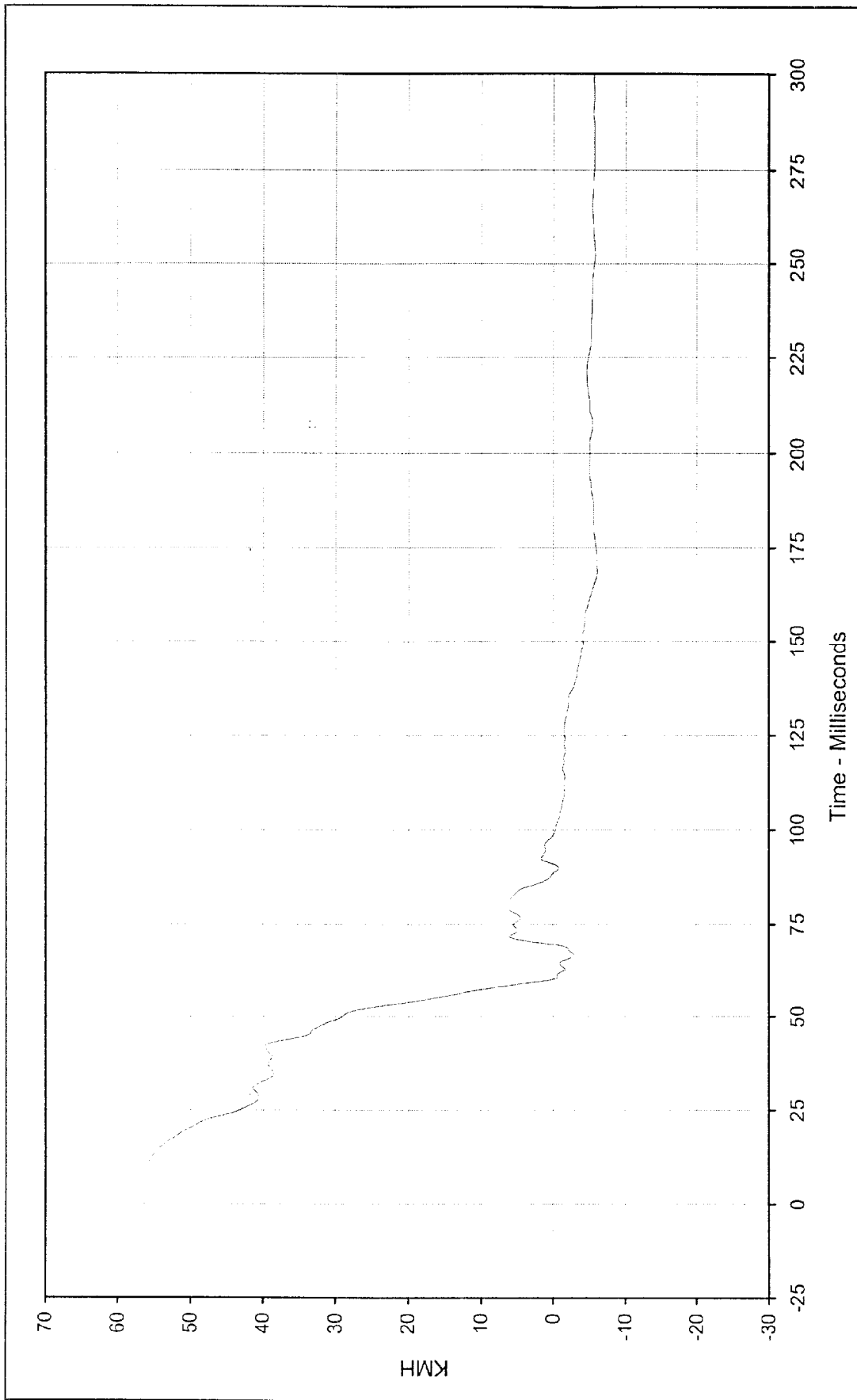
Curve Description:	Vehicle Left Brake Caliper Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	76.9 at 115.8 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.1 at 0.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN2-093			





Curve Description:	Vehicle Right Brake Caliper	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	57.8 at 69.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-91.4 at 57.4 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-094			

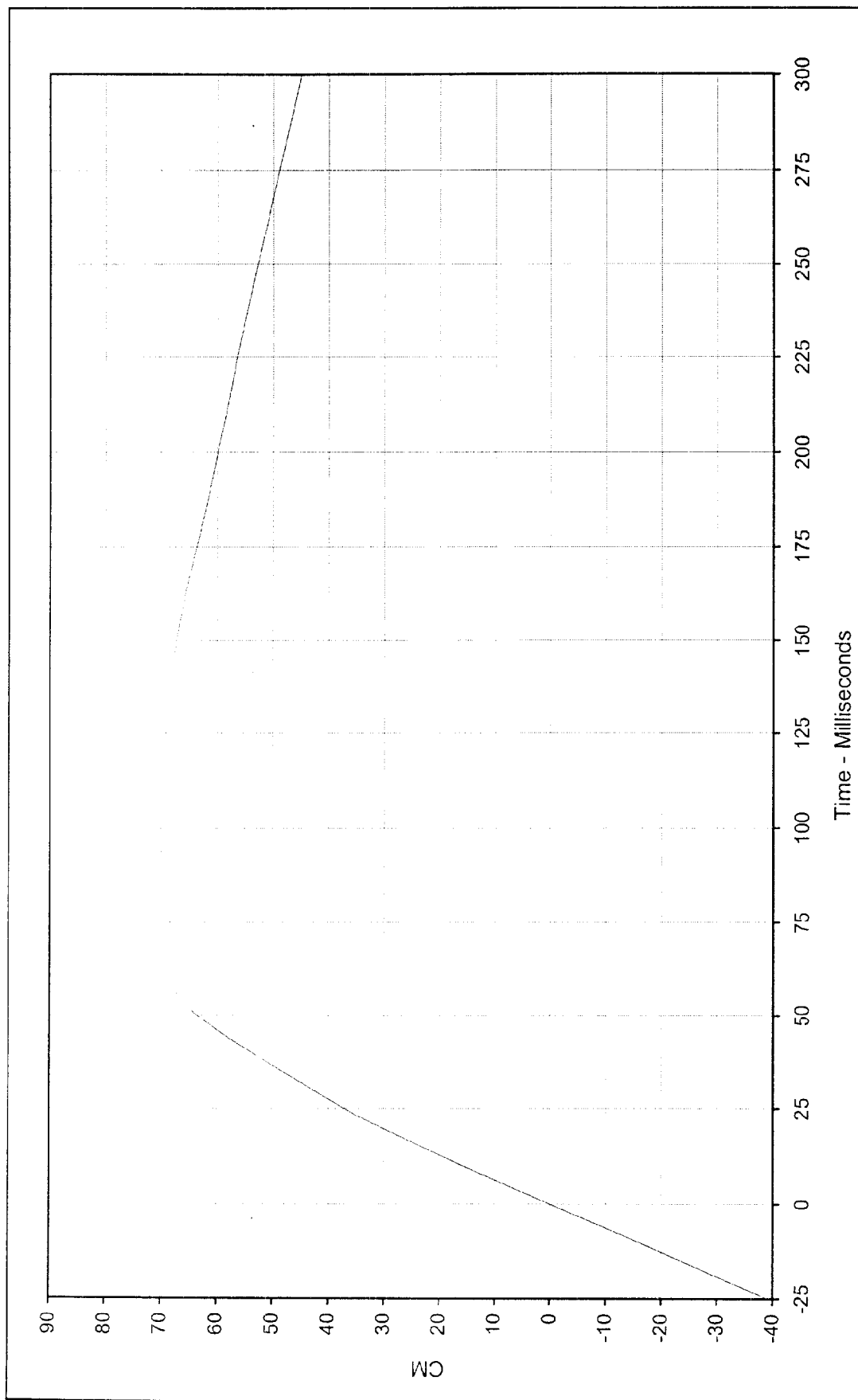




Curve Description:	Vehicle Right Brake Caliper Velocity		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	56.4	at 0.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-6.1	at 168.8 Milliseconds			
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	IN1-094				

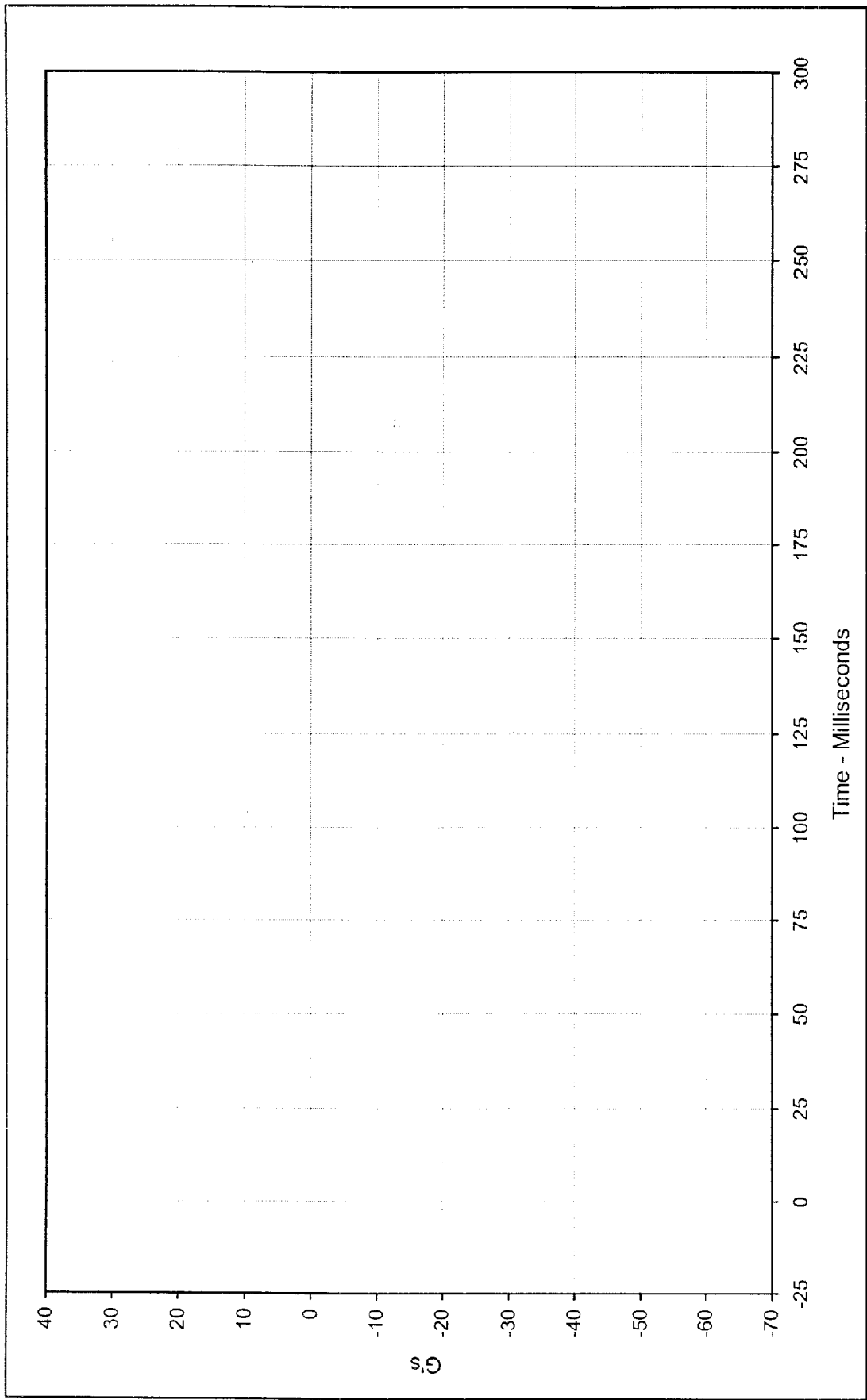






Curve Description:	Vehicle Right Brake Caliper Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	70.0	at	98.7	Milliseconds
Minimum Value:	0.0	at	0.0	Milliseconds
SAE Filter Class:	180			
Date of Test:	5/20/99	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Curve Number:	IN2-094			

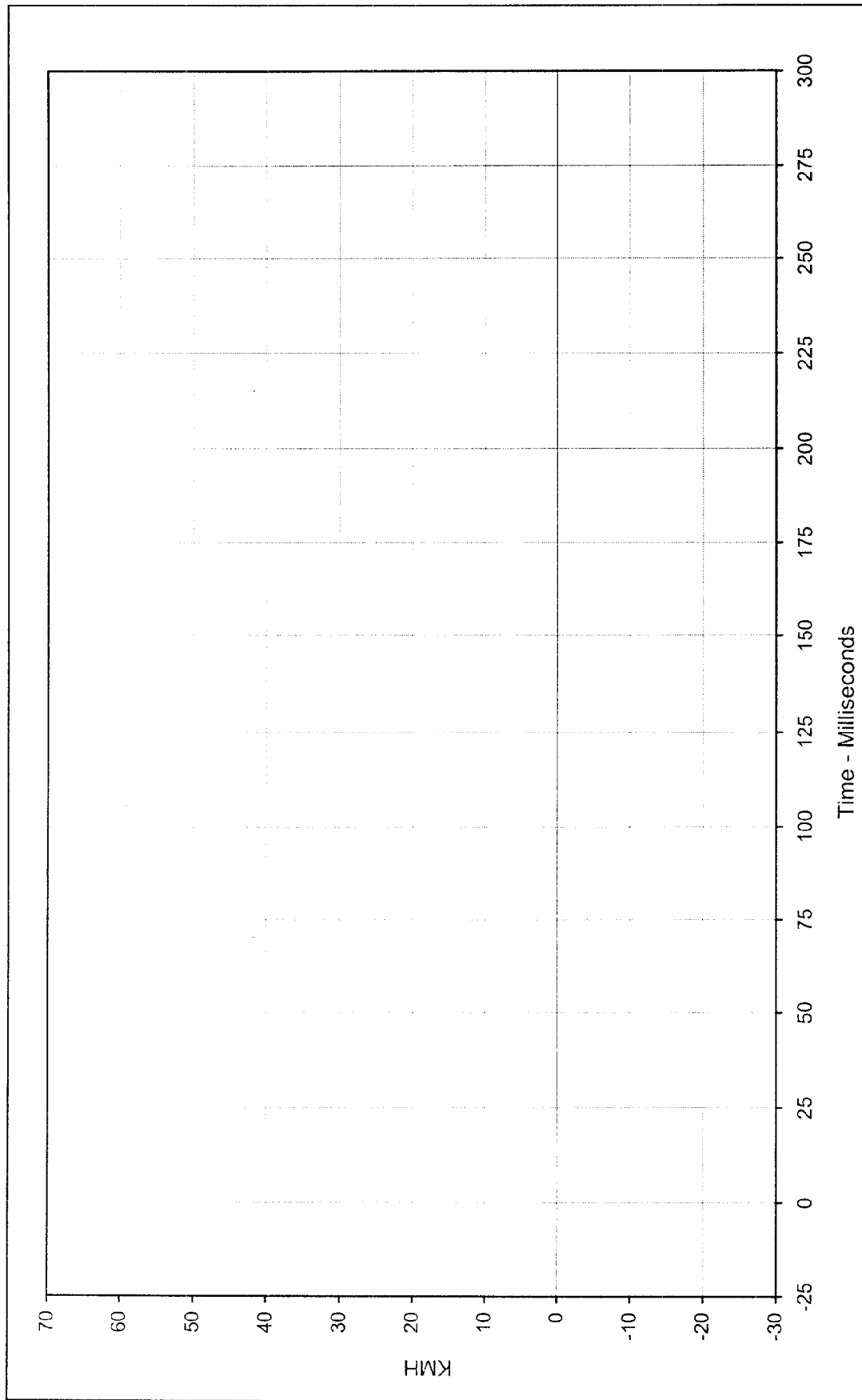




Curve Description:	Vehicle Instrument Panel		*	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	0.0	at	0.0	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	0.0	at	0.0	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-095					



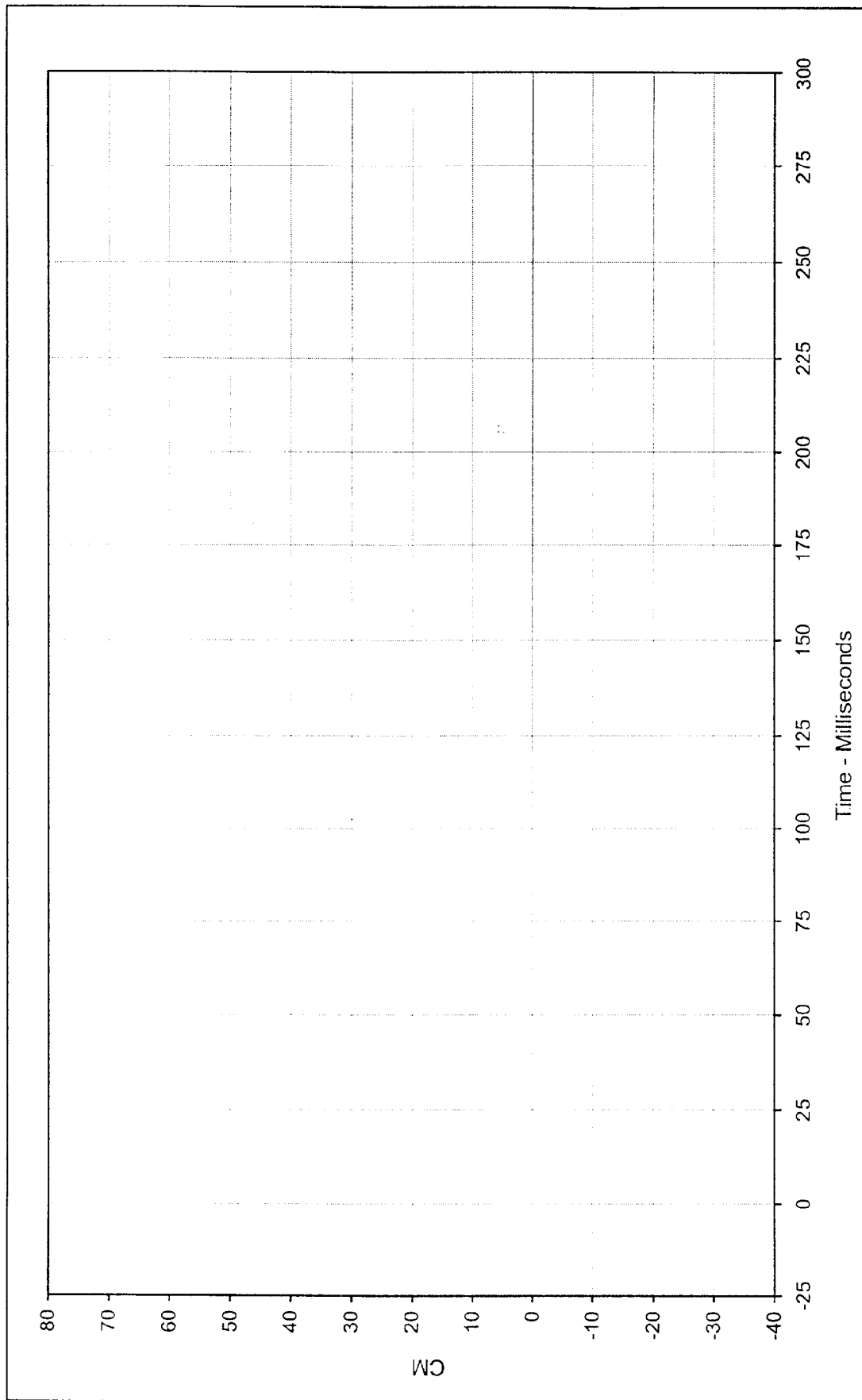
* Not Used



Curve Description:	Vehicle Instrument Panel Velocity *	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	0.0 at 0.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.0 at 0.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN1-095			



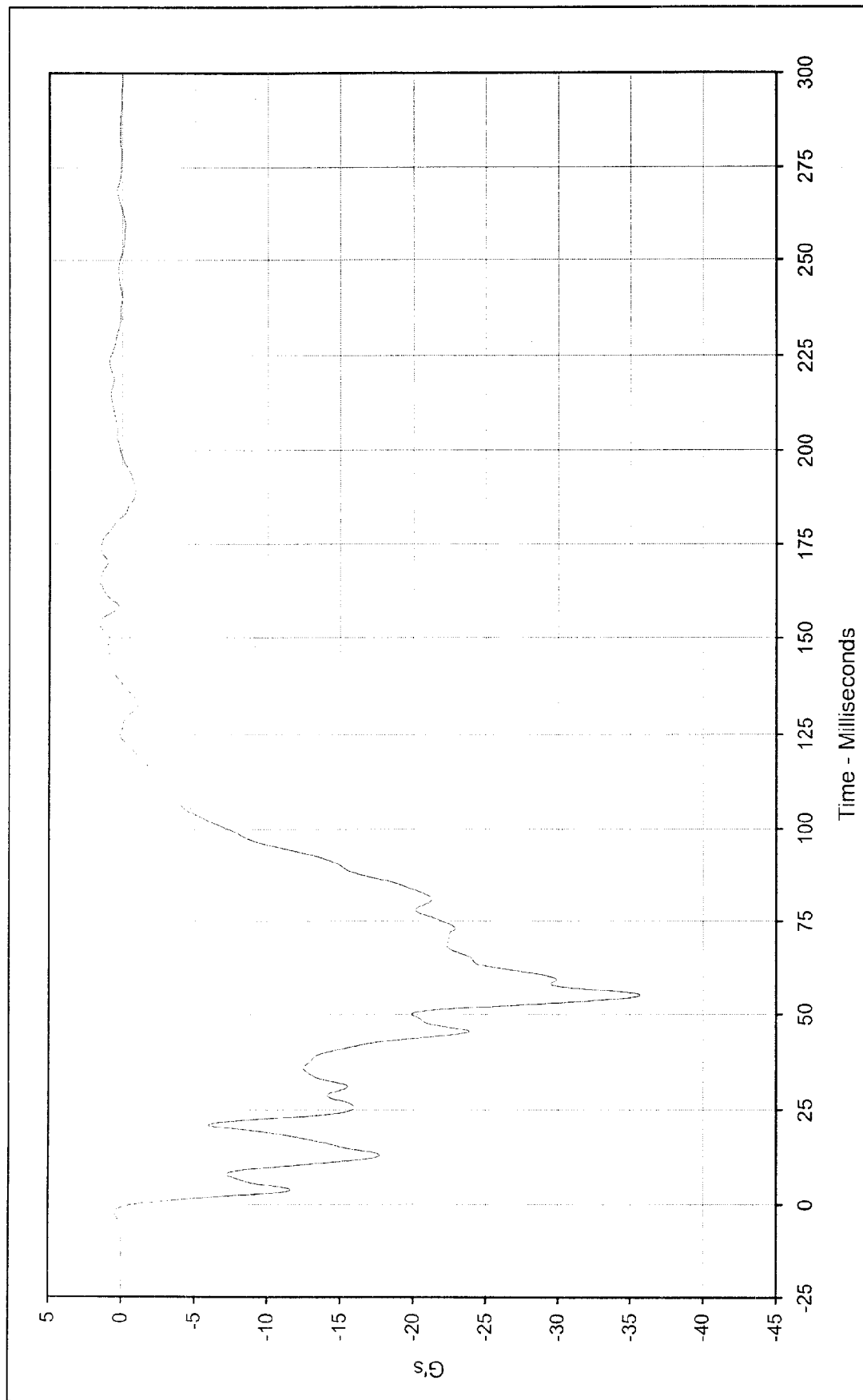
* Not Used



Curve Description:	Vehicle Instrument Panel Displ.	*	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	0.0	at 0.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.0	at 0.0			
SAE Filter Class:	180				
Date of Test:	5/20/99				
Curve Number:	IN2-095				



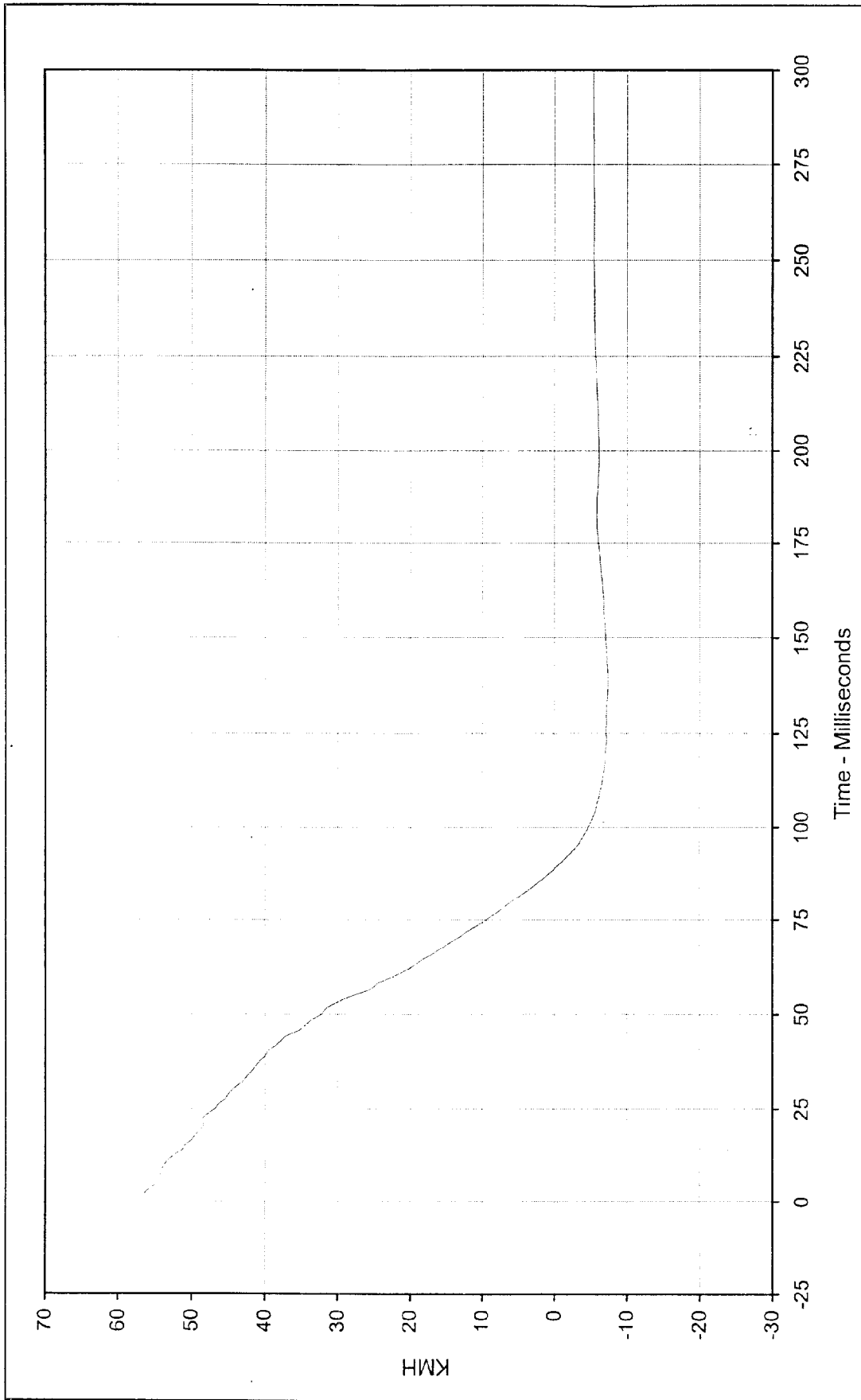
* Not Used



Curve Description:	Vehicle Left Rear Redundant		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	1.6	at 154.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-35.7	at 54.9			
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL -096				







Curve Description: Vehicle Left Rear Redundant Velocity

Maximum Value: 56.4 at 1.6 Milliseconds

Minimum Value: -7.4 at 138.5 Milliseconds

SAE Filter Class: 180

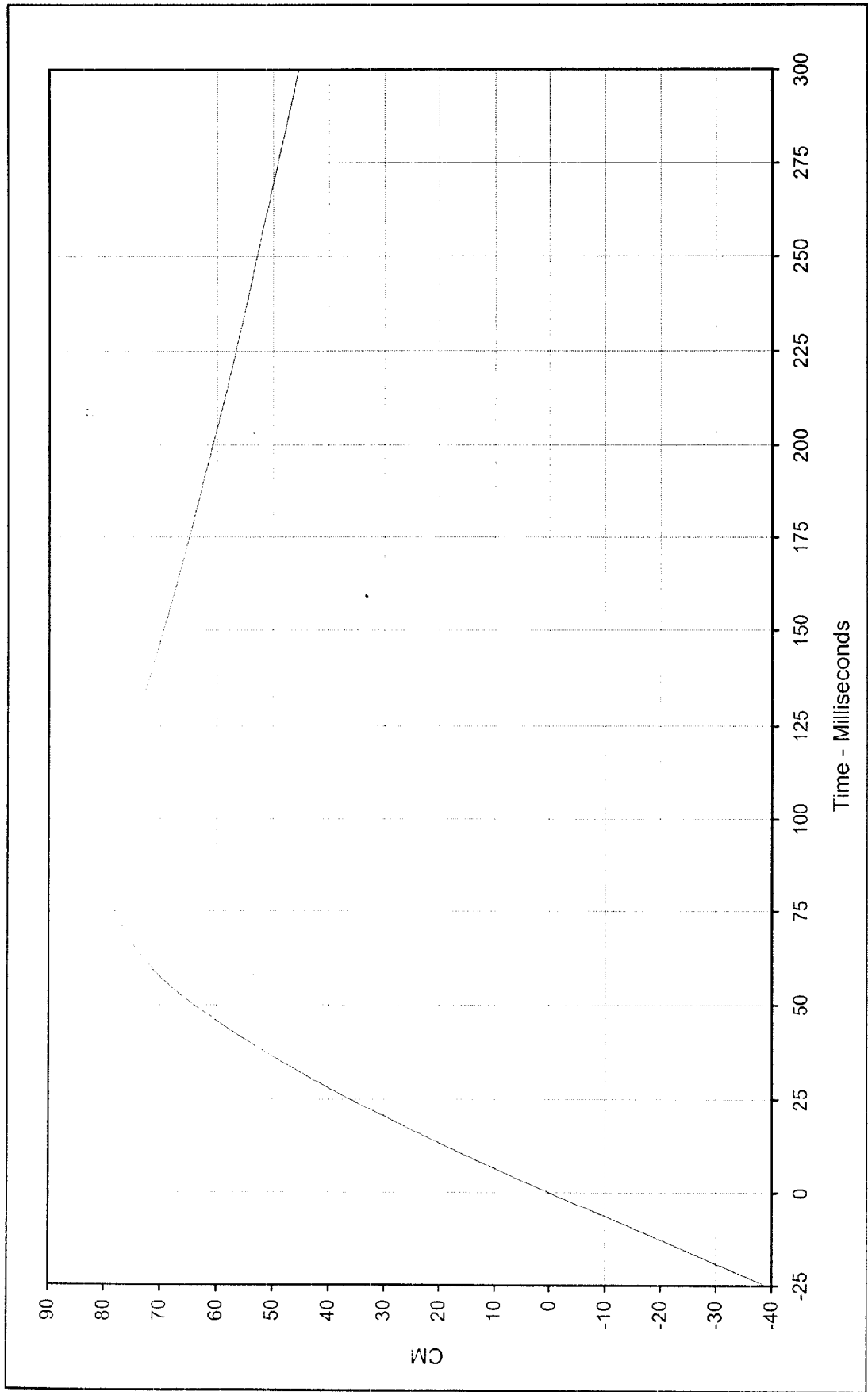
Date of Test: 5/20/99

Curve Number: IN1-096

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





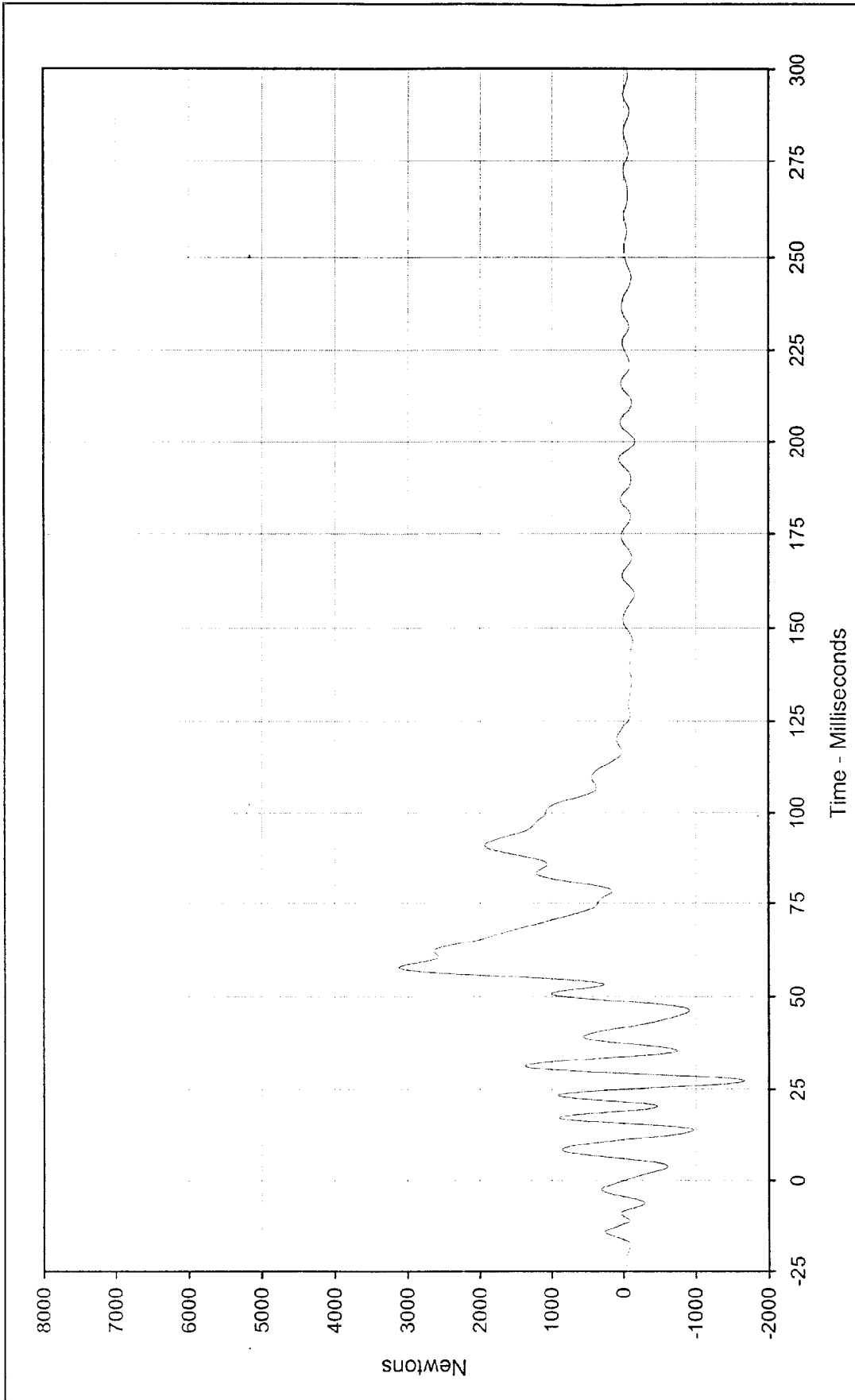
Curve Description:	Vehicle Left Rear Redundant Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	79.8 at 88.6 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	0.0 at 0.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	5/20/99			
Curve Number:	IN2-096			



APPENDIX C
LOAD CELL BARRIER INFORMATION

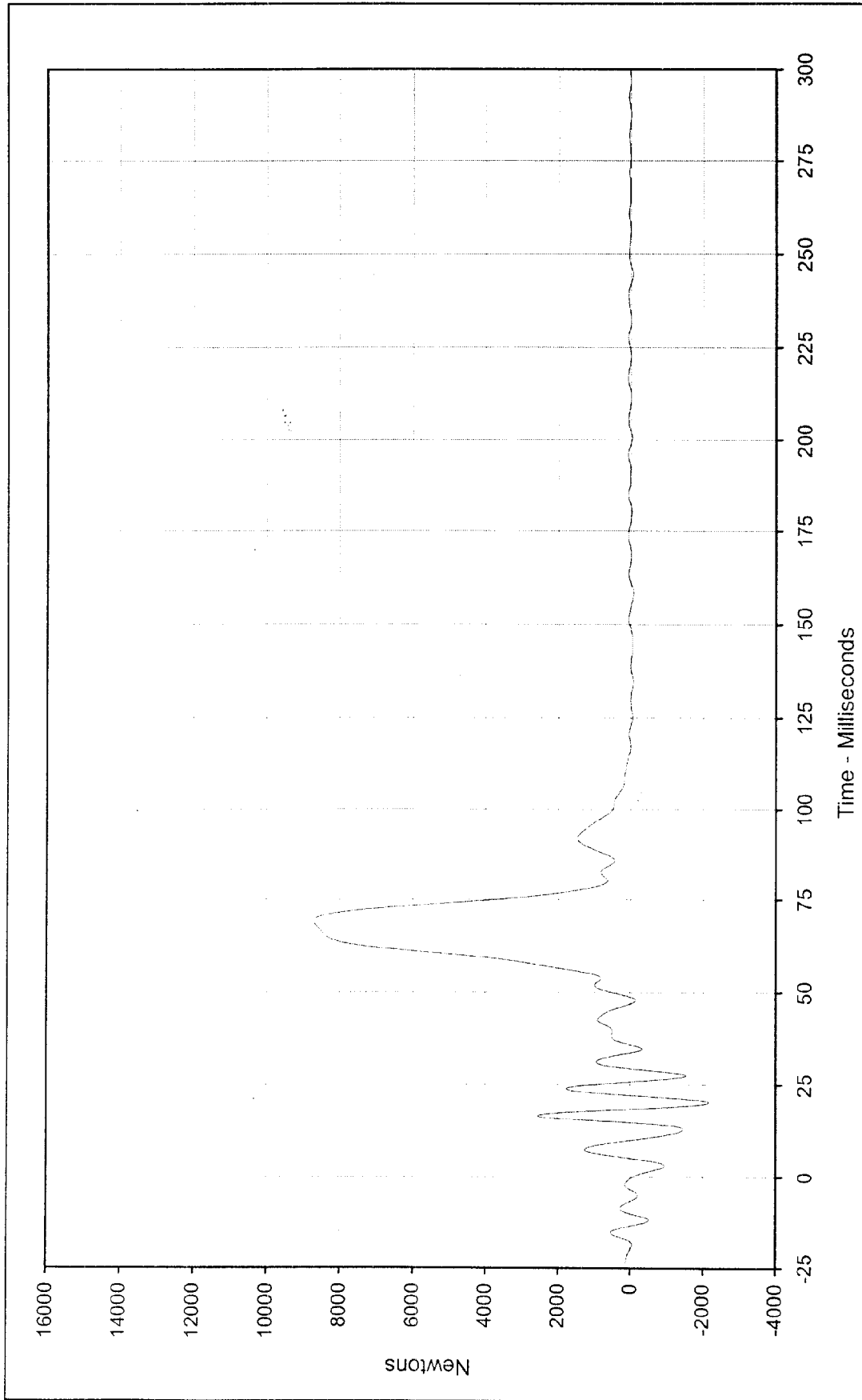
LIST OF LOAD CELL BARRIER DATA PLOTS

Data Plot		Page
C-1	Barrier Force Location A2	C-1
C-2	Barrier Force Location A3	C-2
C-3	Barrier Force Location A4	C-3
C-4	Barrier Force Location A5	C-4
C-5	Barrier Force Location A6	C-5
C-6	Barrier Force Location A7	C-6
C-7	Barrier Force Location A8	C-7
C-8	Barrier Force Location A9	C-8
C-9	Barrier Force Location B2	C-9
C-10	Barrier Force Location B3	C-10
C-11	Barrier Force Location B4	C-11
C-12	Barrier Force Location B5	C-12
C-13	Barrier Force Location B6	C-13
C-14	Barrier Force Location B7	C-14
C-15	Barrier Force Location B8	C-15
C-16	Barrier Force Location B9	C-16
C-17	Barrier Force Location C2	C-17
C-18	Barrier Force Location C3	C-18
C-19	Barrier Force Location C4	C-19
C-20	Barrier Force Location C5	C-20
C-21	Barrier Force Location C6	C-21
C-22	Barrier Force Location C7	C-22
C-23	Barrier Force Location C8	C-23
C-24	Barrier Force Location C9	C-24
C-25	Barrier Force Sum Group 1	C-25
C-26	Barrier Force Sum Group 2	C-26
C-27	Barrier Force Sum Group 3	C-27
C-28	Barrier Force Sum Group 4	C-28
C-29	Barrier Force Sum Group 5	C-29
C-30	Barrier Force Sum Group 6	C-30
C-31	Barrier Force Sum Total	C-31
C-32	Barrier Force Sum Total vs. Dynamic Crush	C-32
C-33	Barrier Load Cell Summary Data	C-33



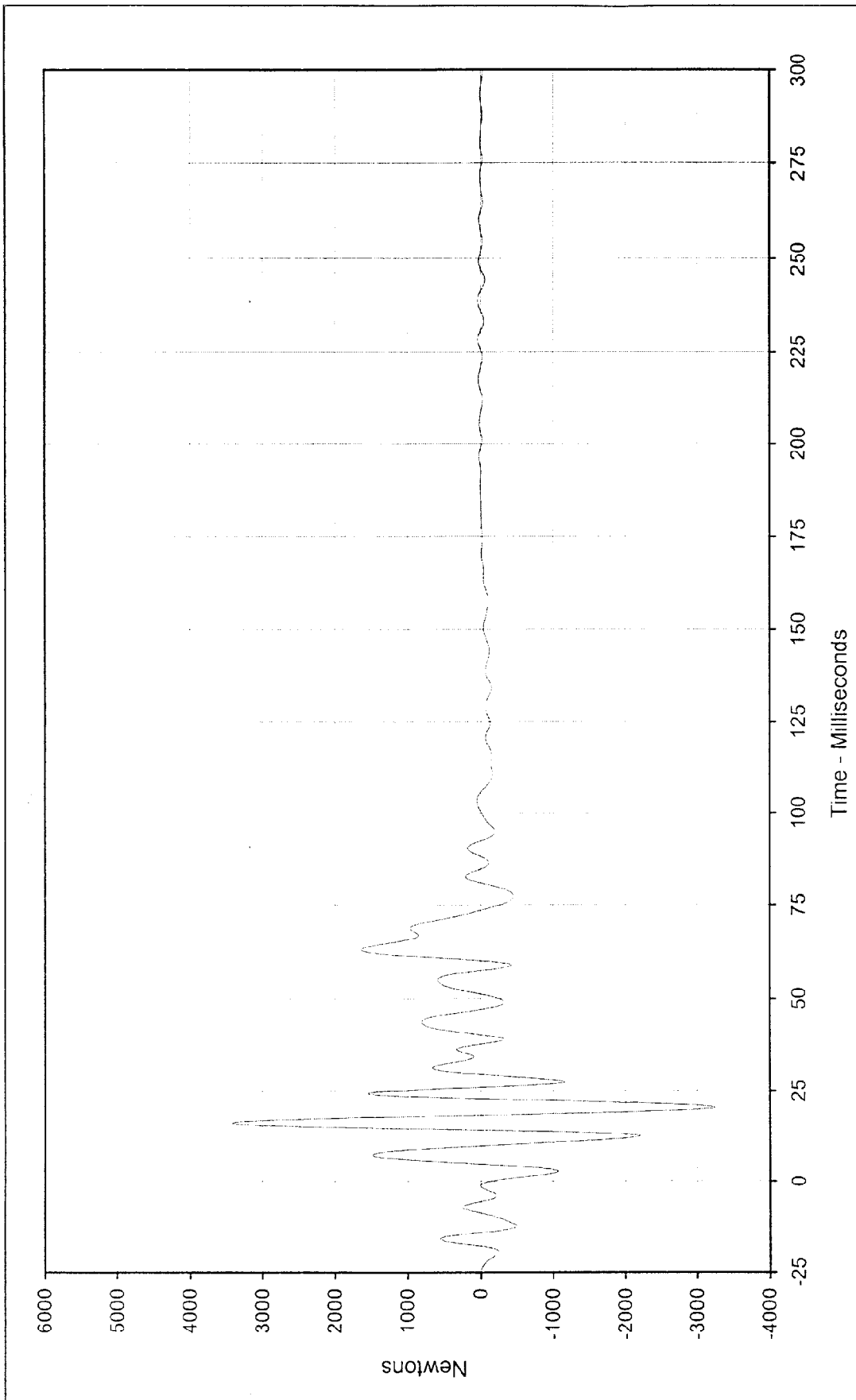
Curve Description:		Barrier Force A2		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	3121.5	at	57.9	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-1664.5	at	27.3	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-099					





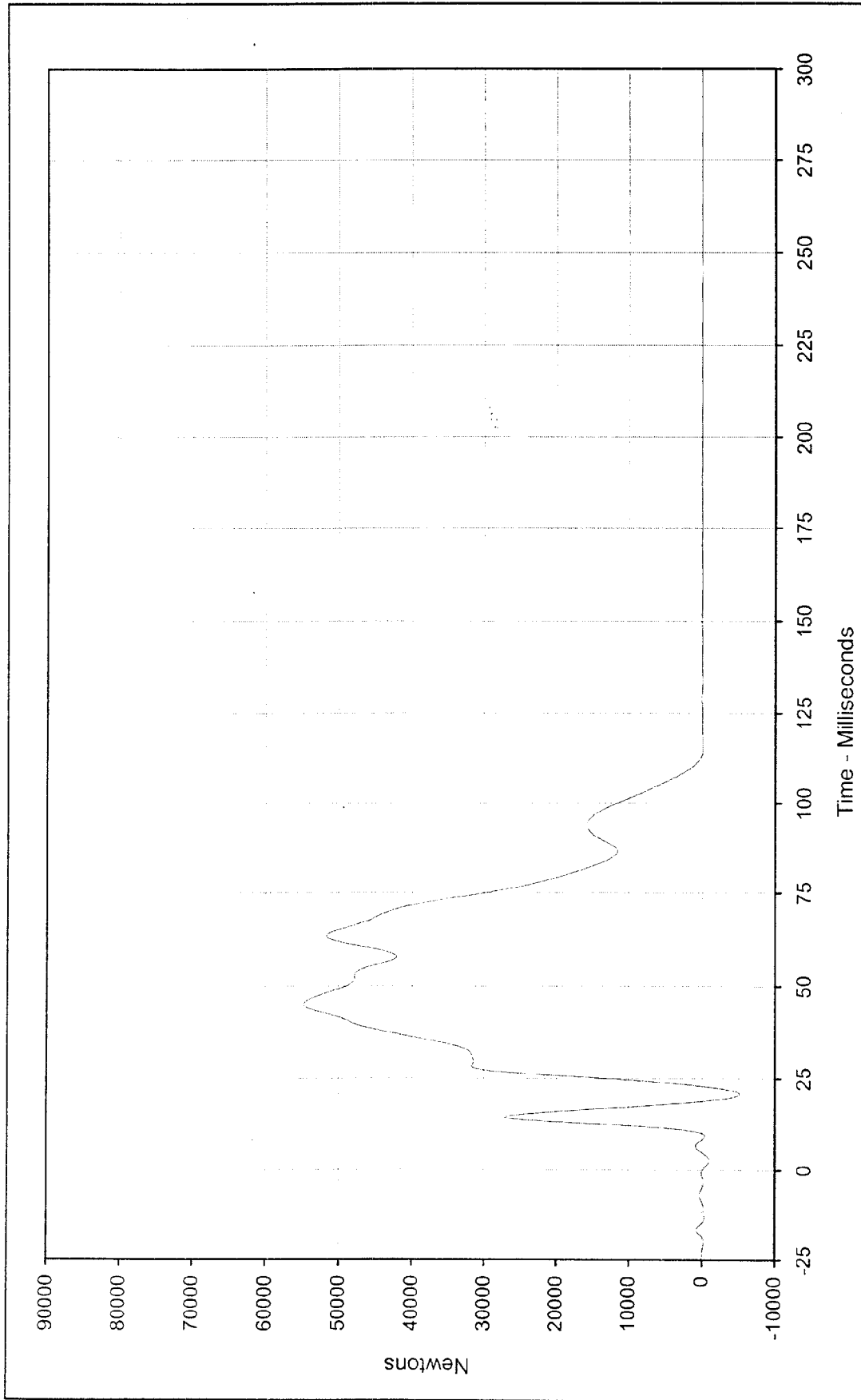
Curve Description:	Barrier Force A3	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	8704.6 at 69.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-2169.3 at 20.4 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-100			





Curve Description:		Barrier Force A4		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	3419.7	at	16.4	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-3244.4	at	20.5	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-101					

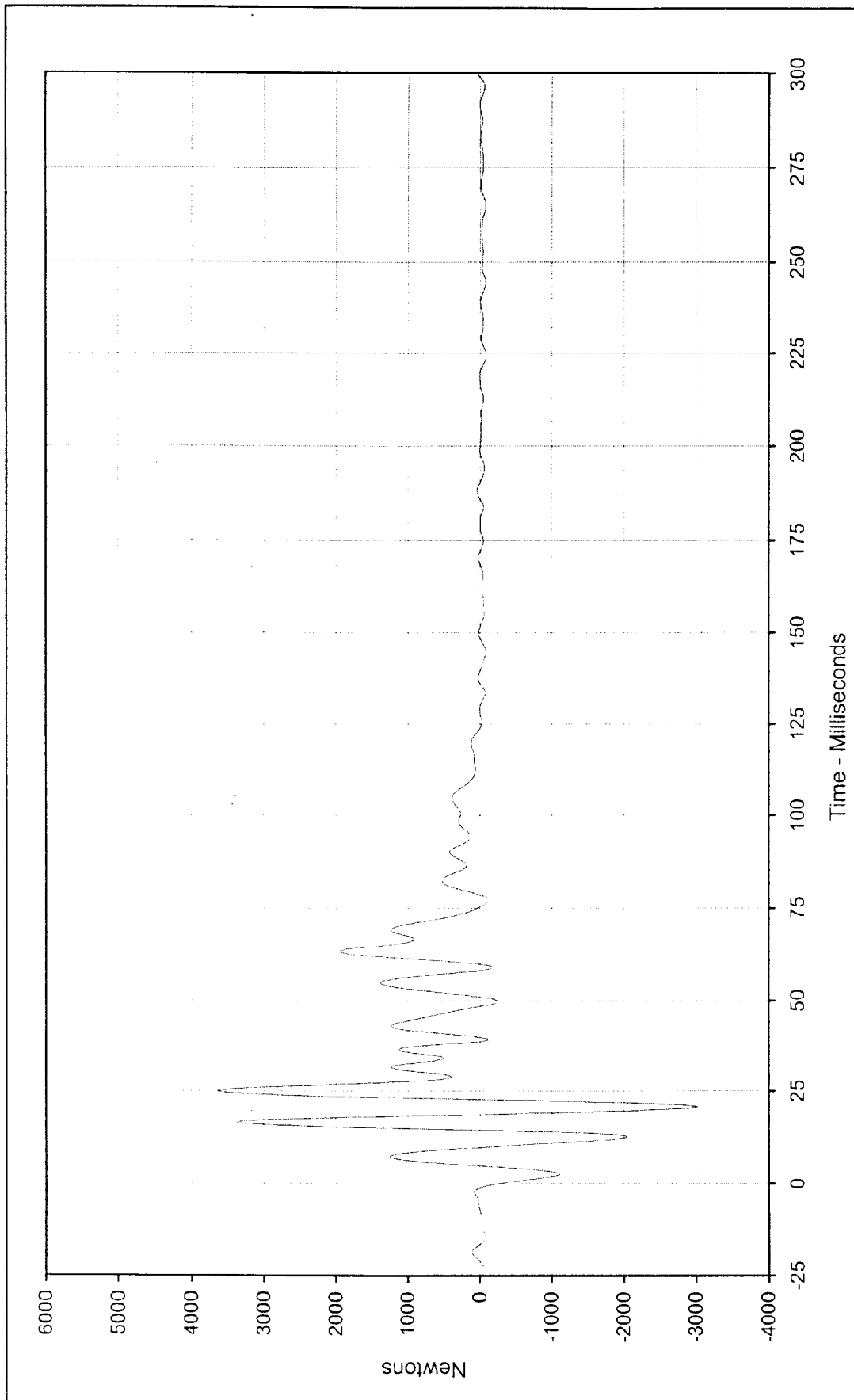




Curve Description:	Barrier Force A5		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	54790.0	at 45.0	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-5232.0	at 20.8			
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-102				

The logo for KARCO Engineering. It features the word "KARCO" in a large, bold, sans-serif font. A stylized checkered flag is positioned behind the letter "O". To the right of "KARCO", the word "Engineering" is written in a smaller, italicized, sans-serif font. The entire logo is set against a black background with a white diagonal stripe.





Curve Description: 1999 NHTSA 35 mph NCAP No.: GM0001

Maximum Value: 3634.1 at 25.0 Milliseconds

Minimum Value: -3033.5 at 20.7 Milliseconds

SAE Filter Class: 60

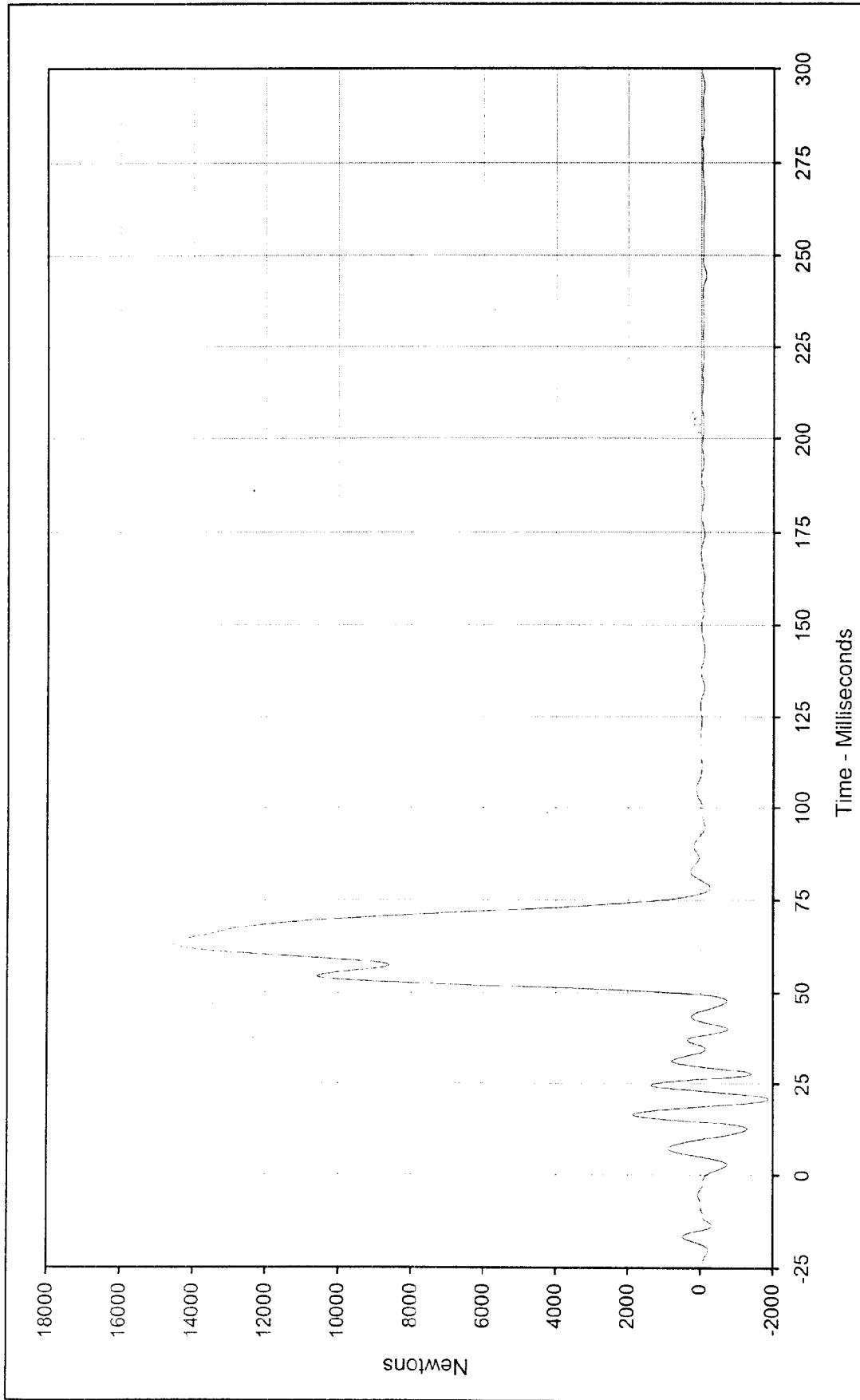
Date of Test: 5/20/99

Curve Number: FIL-103

Test Program:

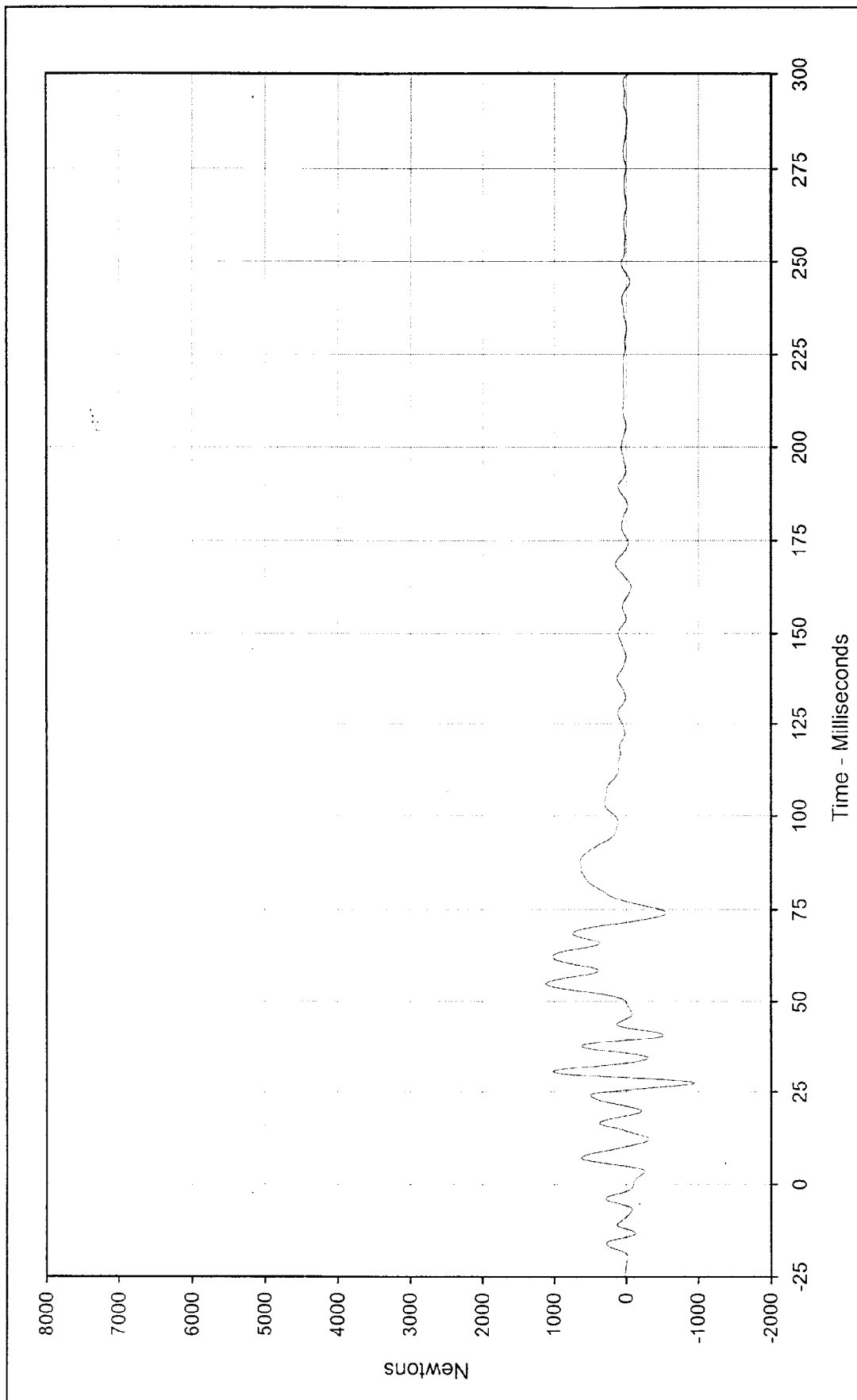
Test Vehicle:





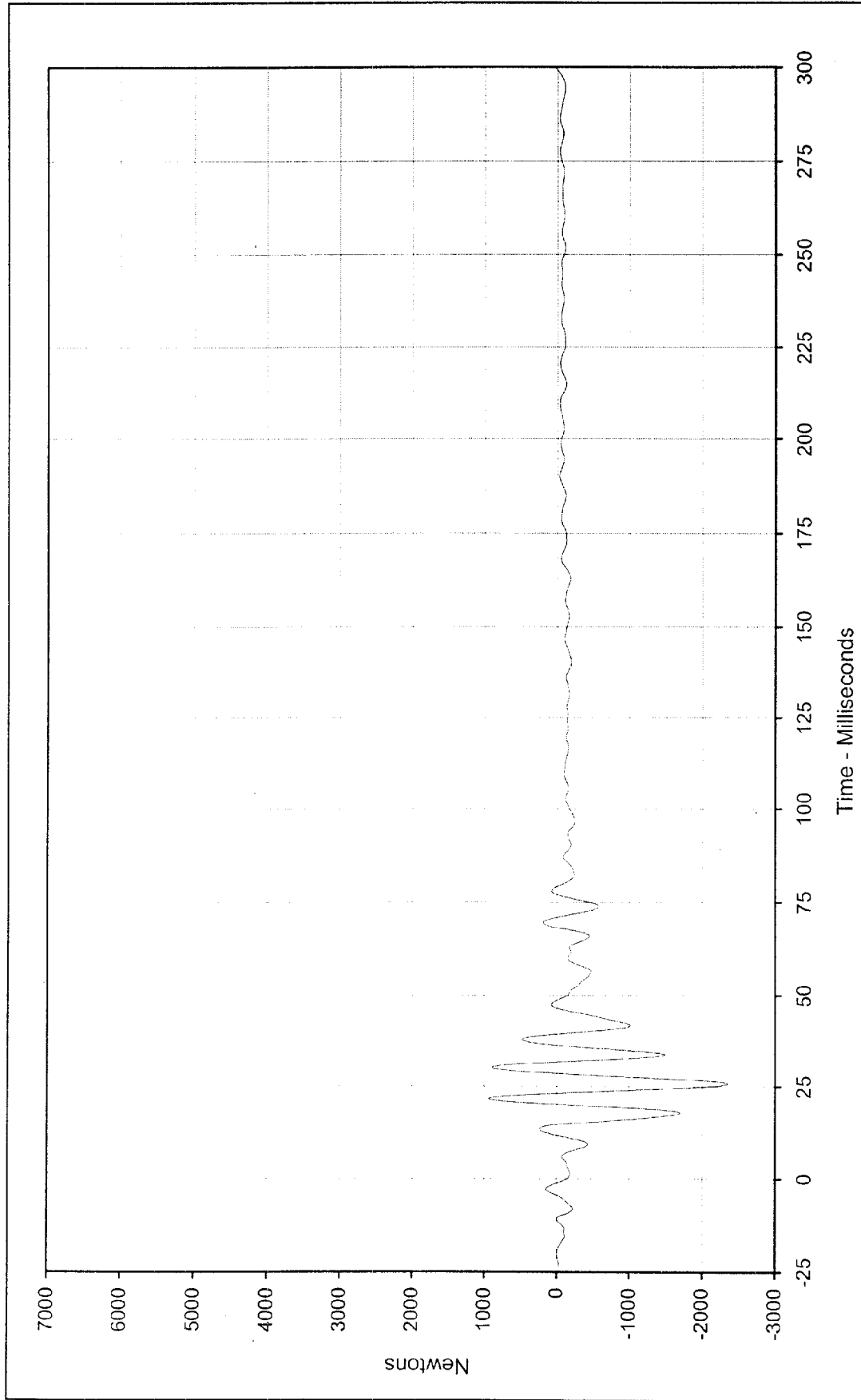
Curve Description:	Barrier Force A7		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
	Maximum Value:	14555.4	at	63.3	Milliseconds
	Minimum Value:	-1879.8	at	20.8	Milliseconds
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-104				
			Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	





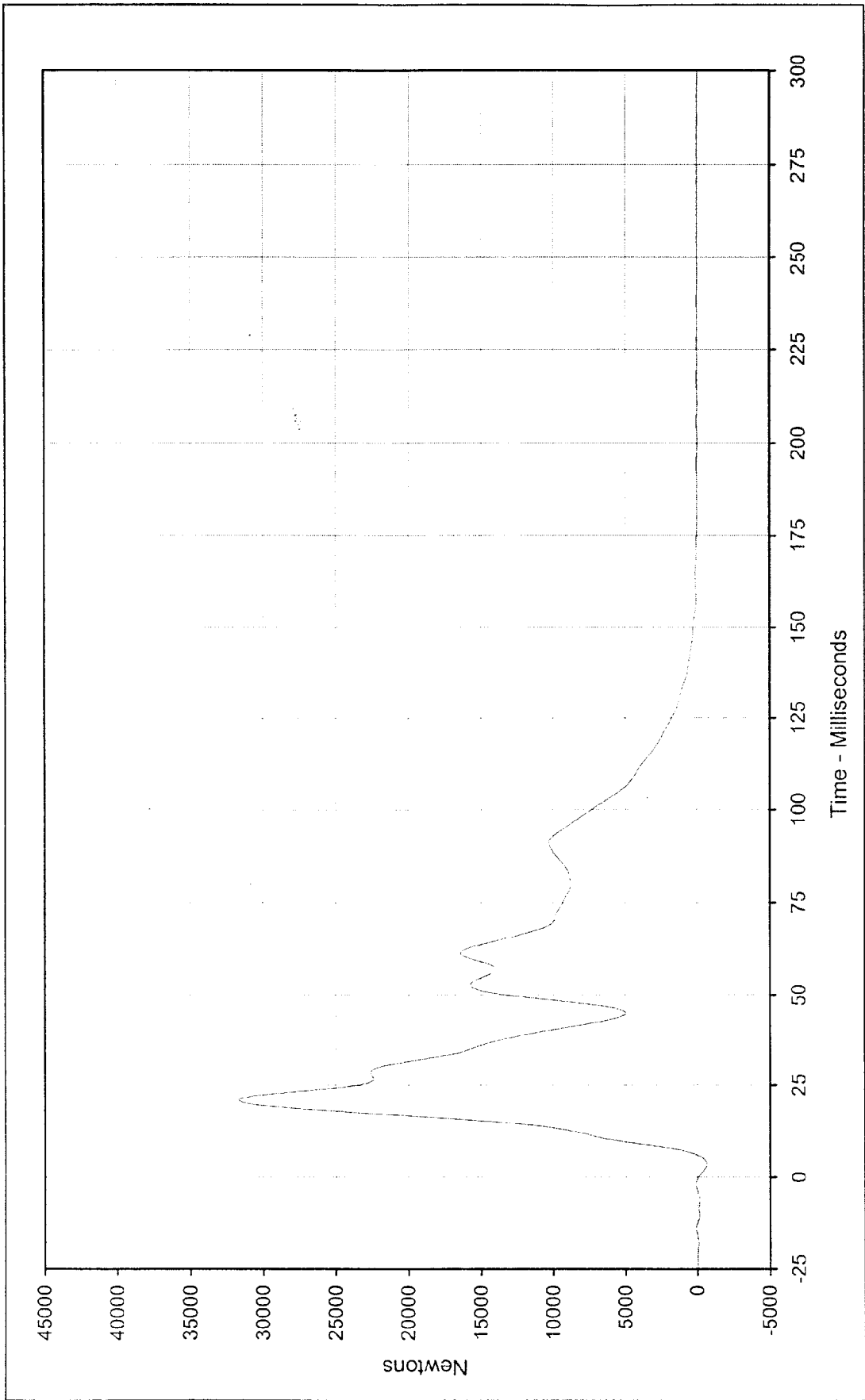
Curve Description:	Barrier Force A8		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	1118.9	at 54.9 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-945.6	at 27.4 Milliseconds			
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-105				





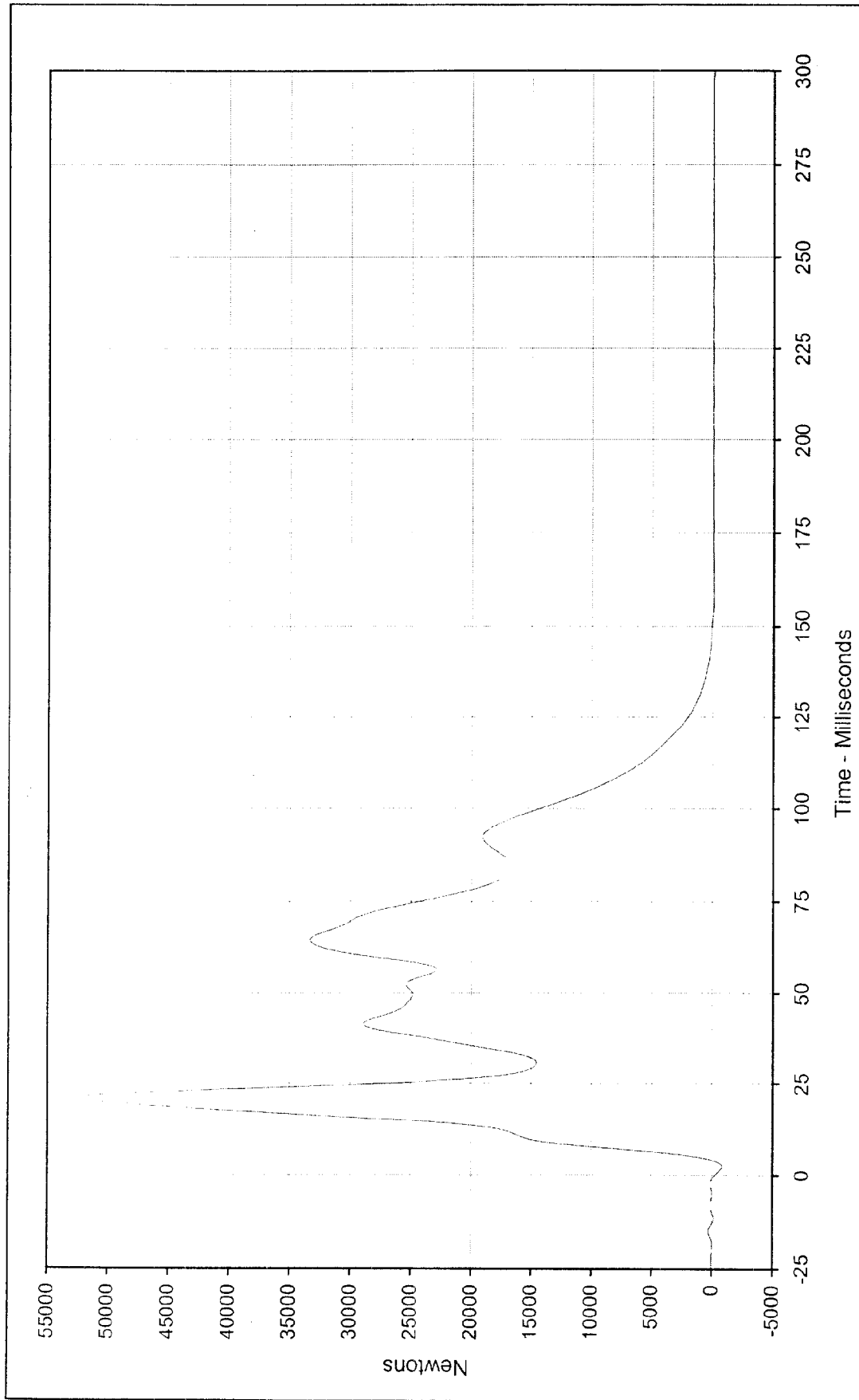
Curve Description:	Barrier Force A9		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	938.6	at 21.7	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-2354.0	at 25.7			
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-106				





Curve Description:	Barrier Force B2	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	31687.4 at 21.0 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-659.2 at 3.4 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-108			

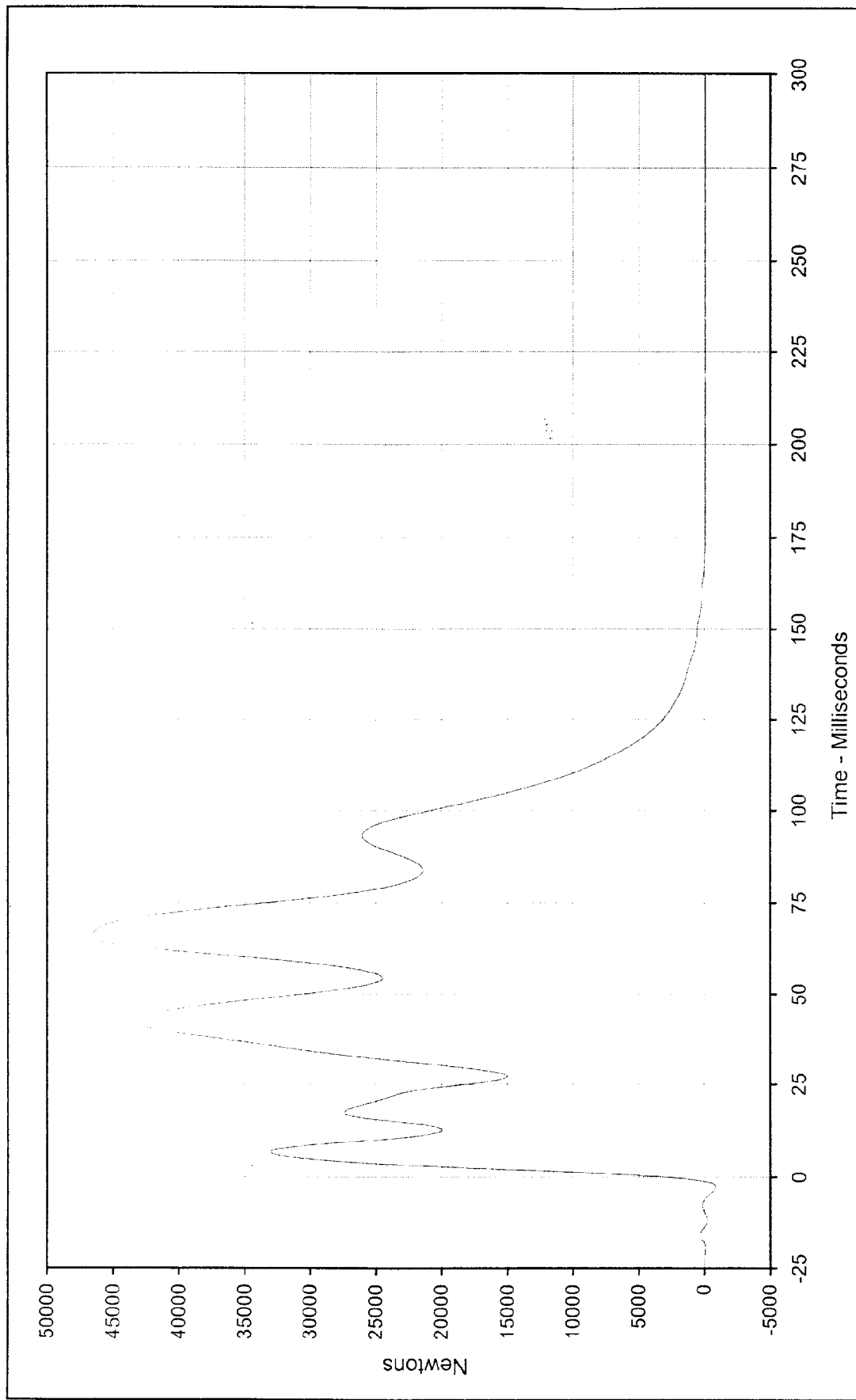




Curve Description:	Barrier Force B3			Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	52281.0	at	21.0	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-853.0	at	2.3	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-109					







Curve Description: Barrier Force B4 Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001

Maximum Value: 46542.4 at 66.2 Milliseconds Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan

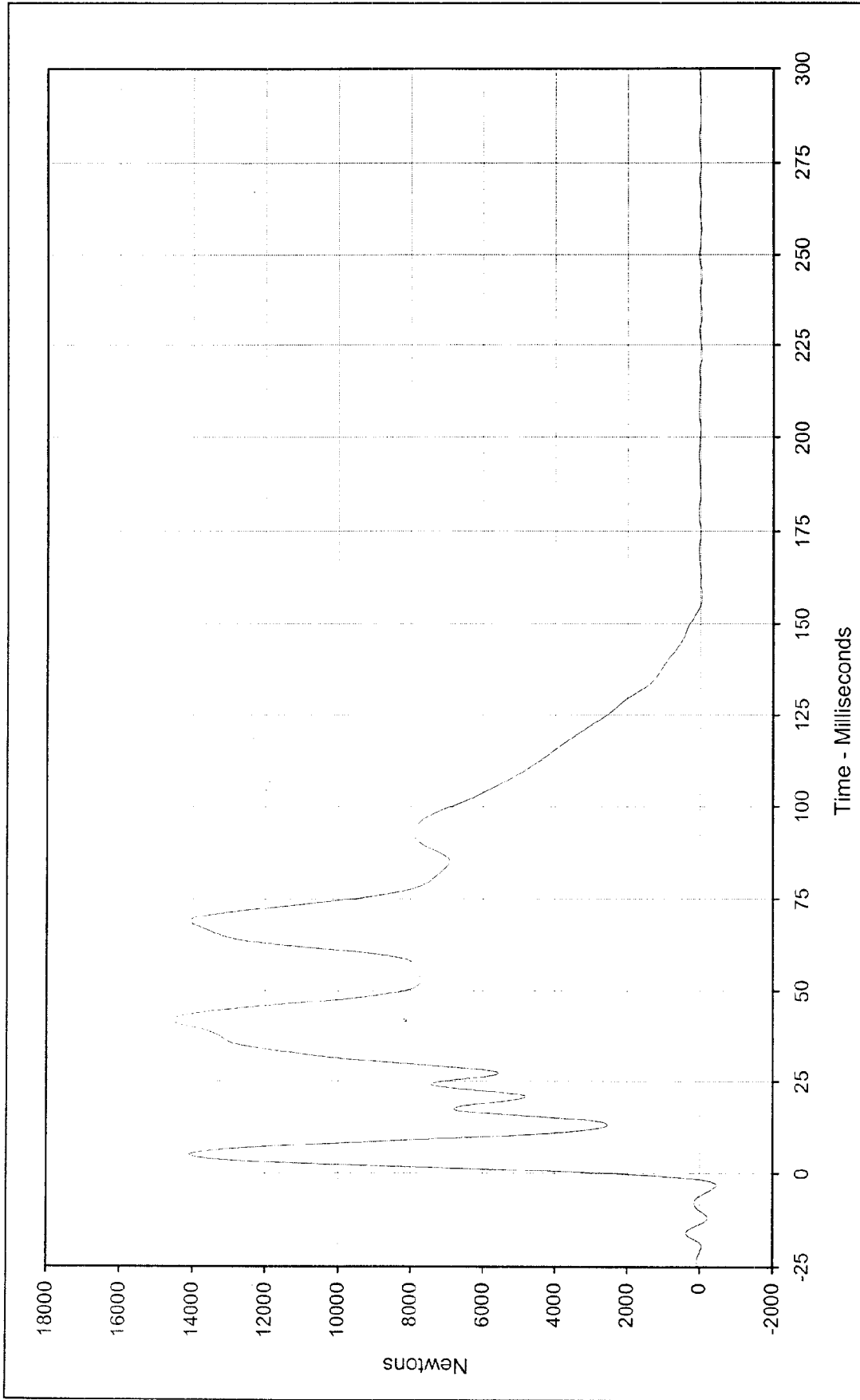
Minimum Value: -95.8 at 234.2 Milliseconds

SAE Filter Class: 60

Date of Test: 5/20/99

Curve Number: FIL-110

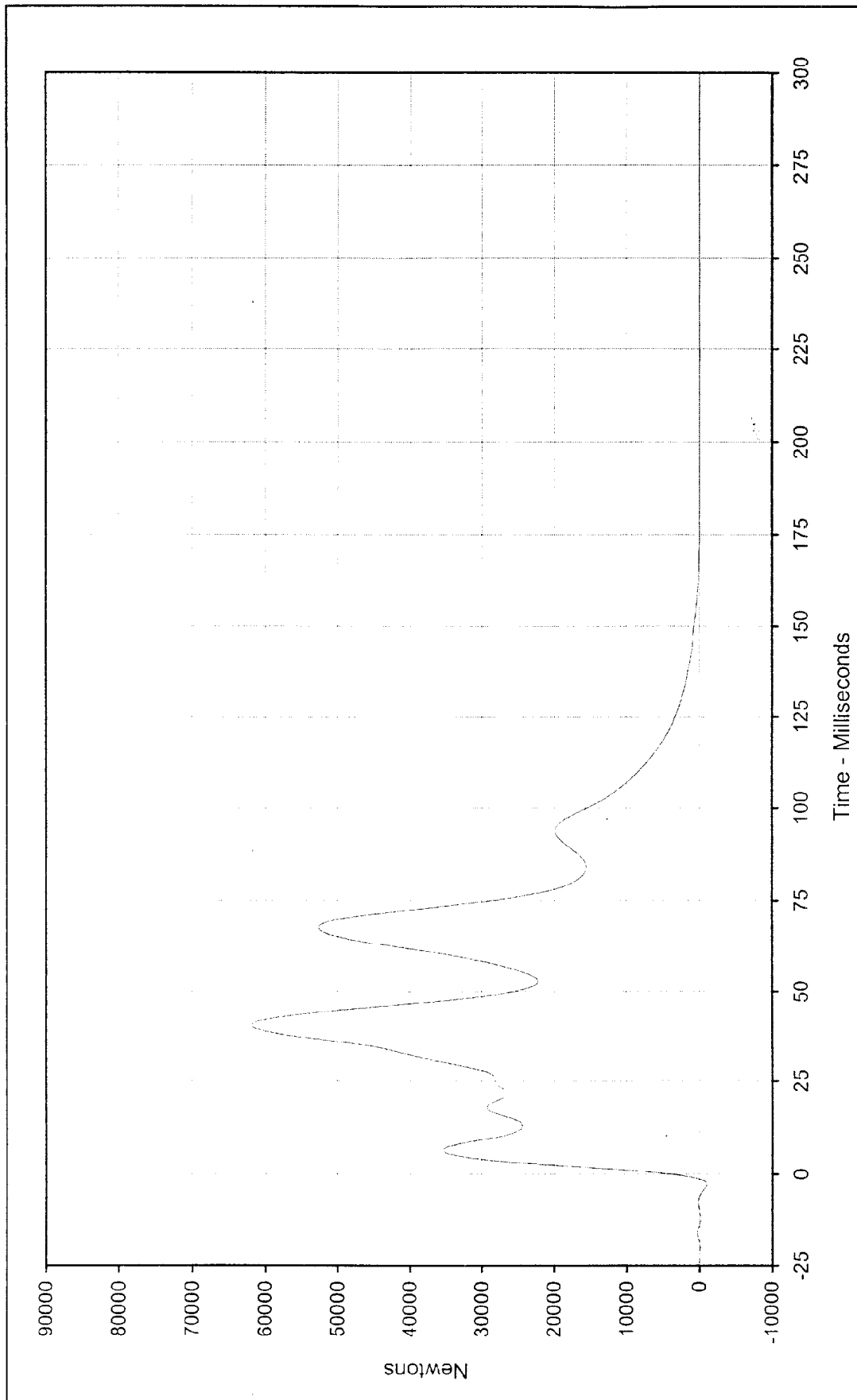




Curve Description:	Barrier Force B5		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	14541.3	at 41.7	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-50.8	at 158.1	Milliseconds		
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-111				

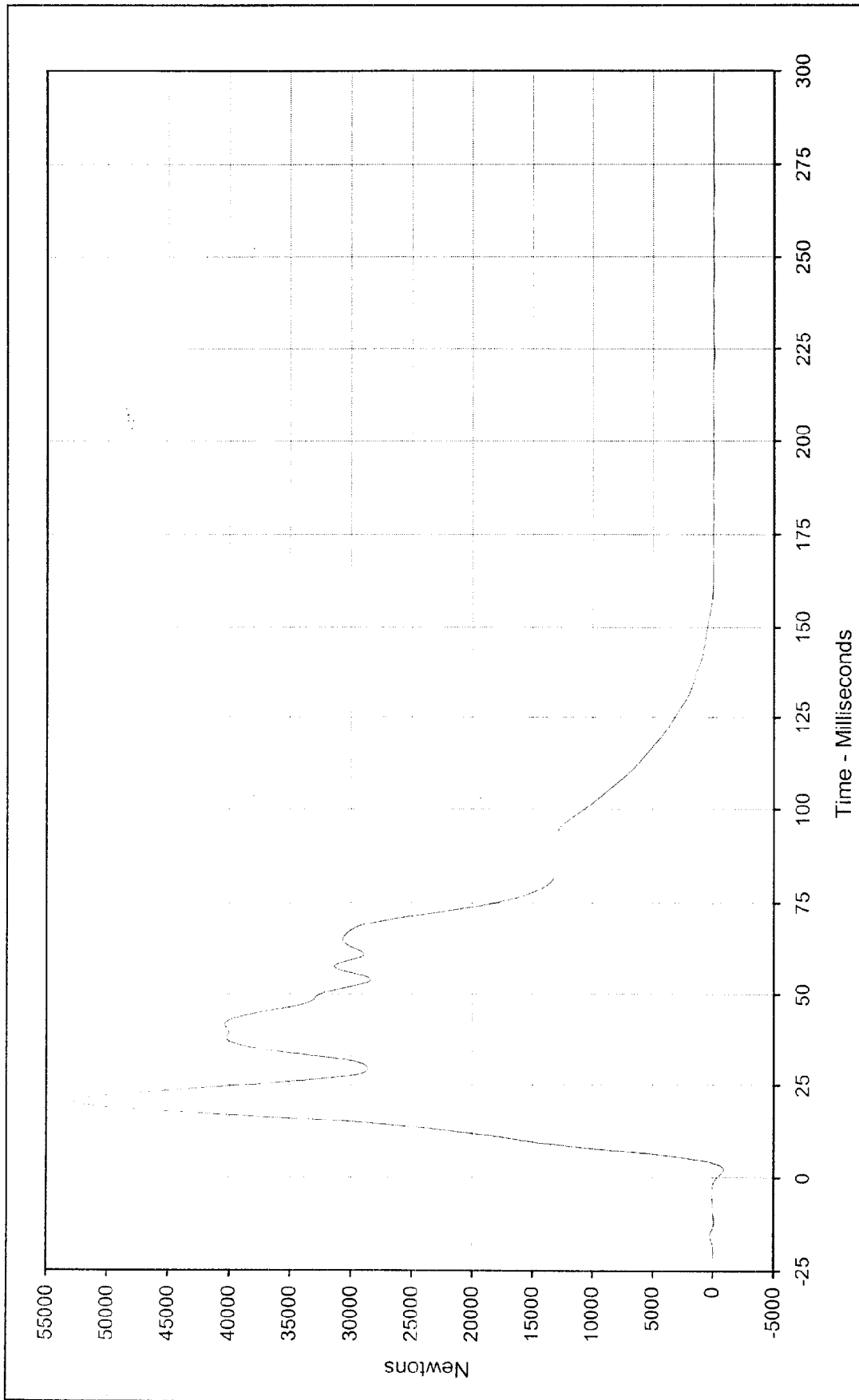
The logo for KARCO Engineering features the word "KARCO" in a large, bold, sans-serif font. A stylized lightbulb is integrated into the letter "A". To the right of "KARCO", the word "Engineering" is written in a smaller, italicized, sans-serif font. The entire logo is set against a black background with a white border.





Curve Description:		Barrier Force B6		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	61841.7	at	40.6	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-121.9	at	223.2	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-112					

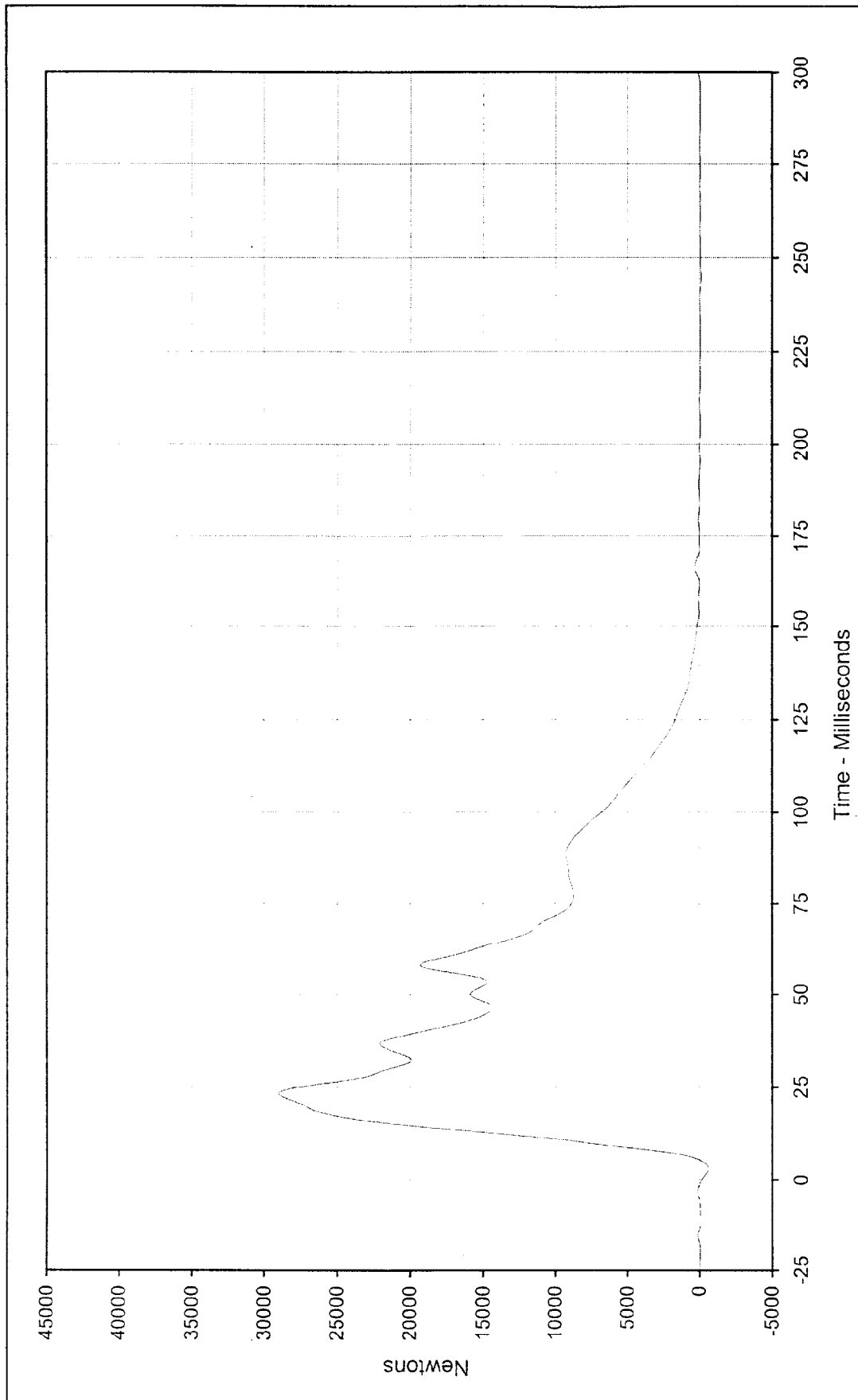




Curve Description: Barrier Force B7
 Maximum Value: 52768.3 at 20.4 Milliseconds
 Minimum Value: -915.7 at 2.3 Milliseconds
 SAE Filter Class: 60
 Date of Test: 5/20/99
 Curve Number: FIL-113

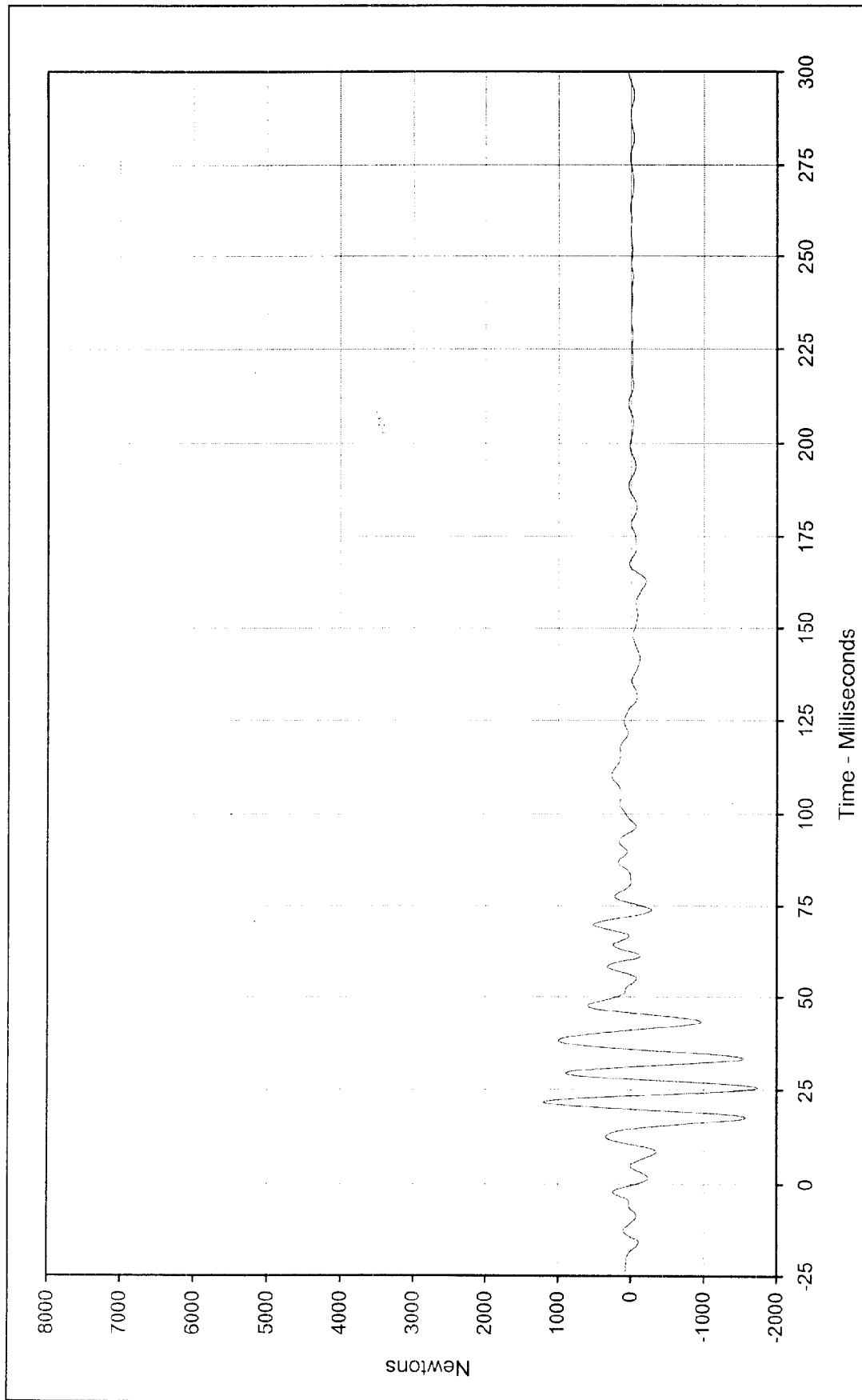
Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan





Curve Description:		Barrier Force B8		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	29000.0	at	23.3	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-629.1	at	3.0	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-114					

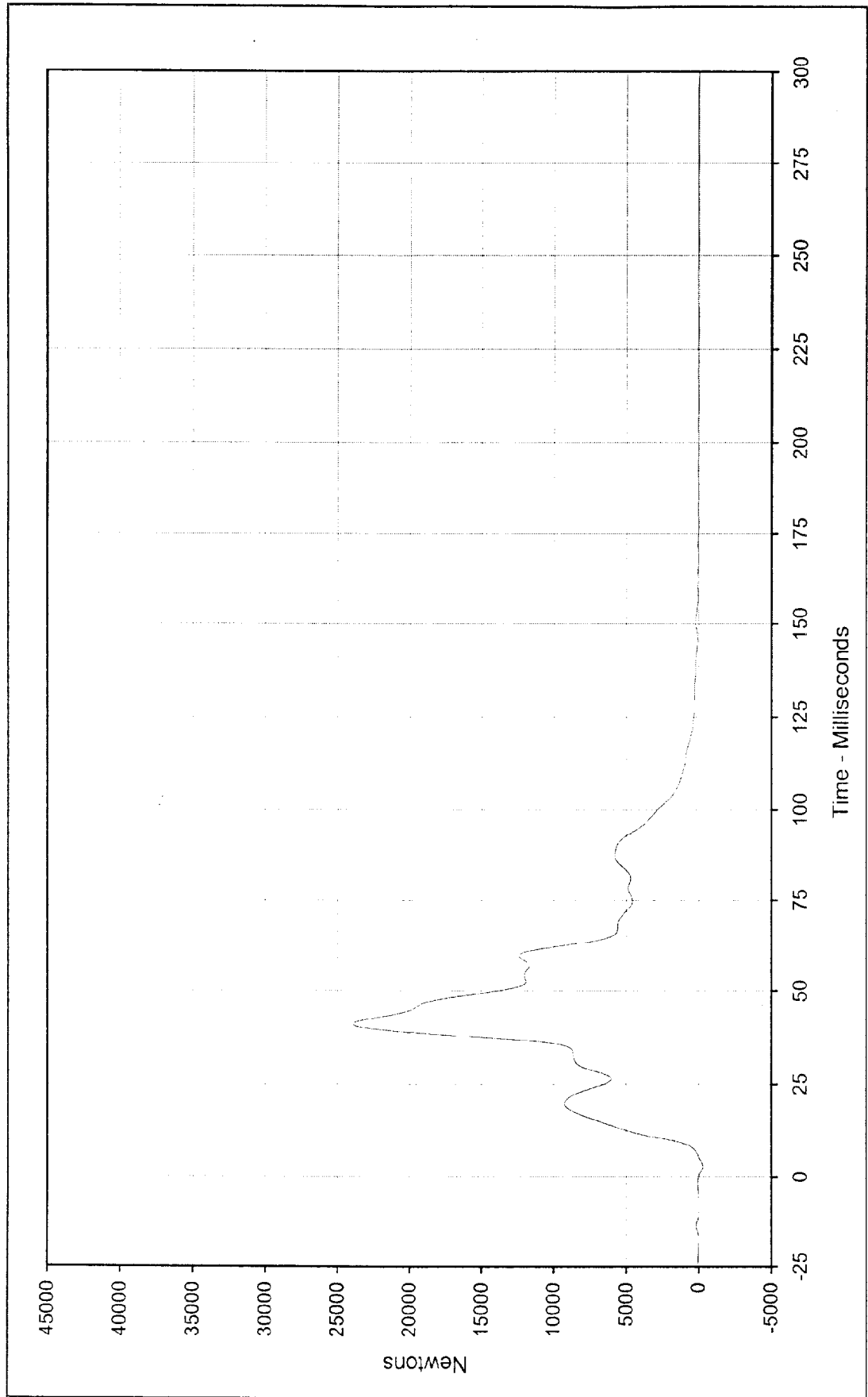




Curve Description:	Barrier Force B9				Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	1196.3	at	21.8	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-1741.3	at	25.6	Milliseconds			
SAE Filter Class:	60						
Date of Test:	5/20/99						
Curve Number:	FIL-115						

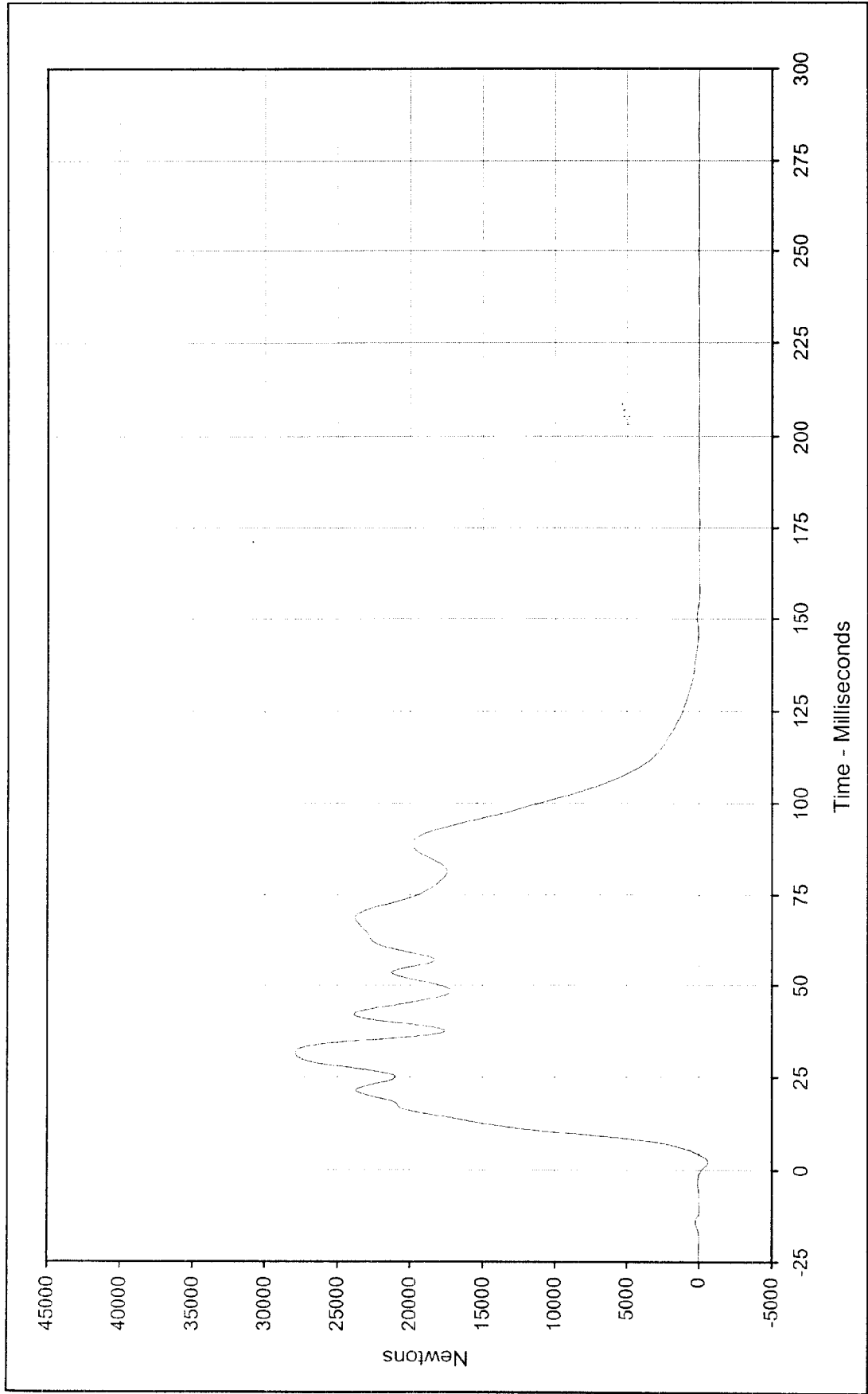
The logo for KARCO Engineering. It features the word "KARCO" in a large, bold, sans-serif font. To the right of "KARCO" is a circular emblem containing a checkered pattern. Below "KARCO" and to the right of the emblem, the word "Engineering" is written in a smaller, italicized, sans-serif font.





Curve Description:	Barrier Force C2	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	23961.3 at 41.2 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-305.3 at 2.7 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-117			

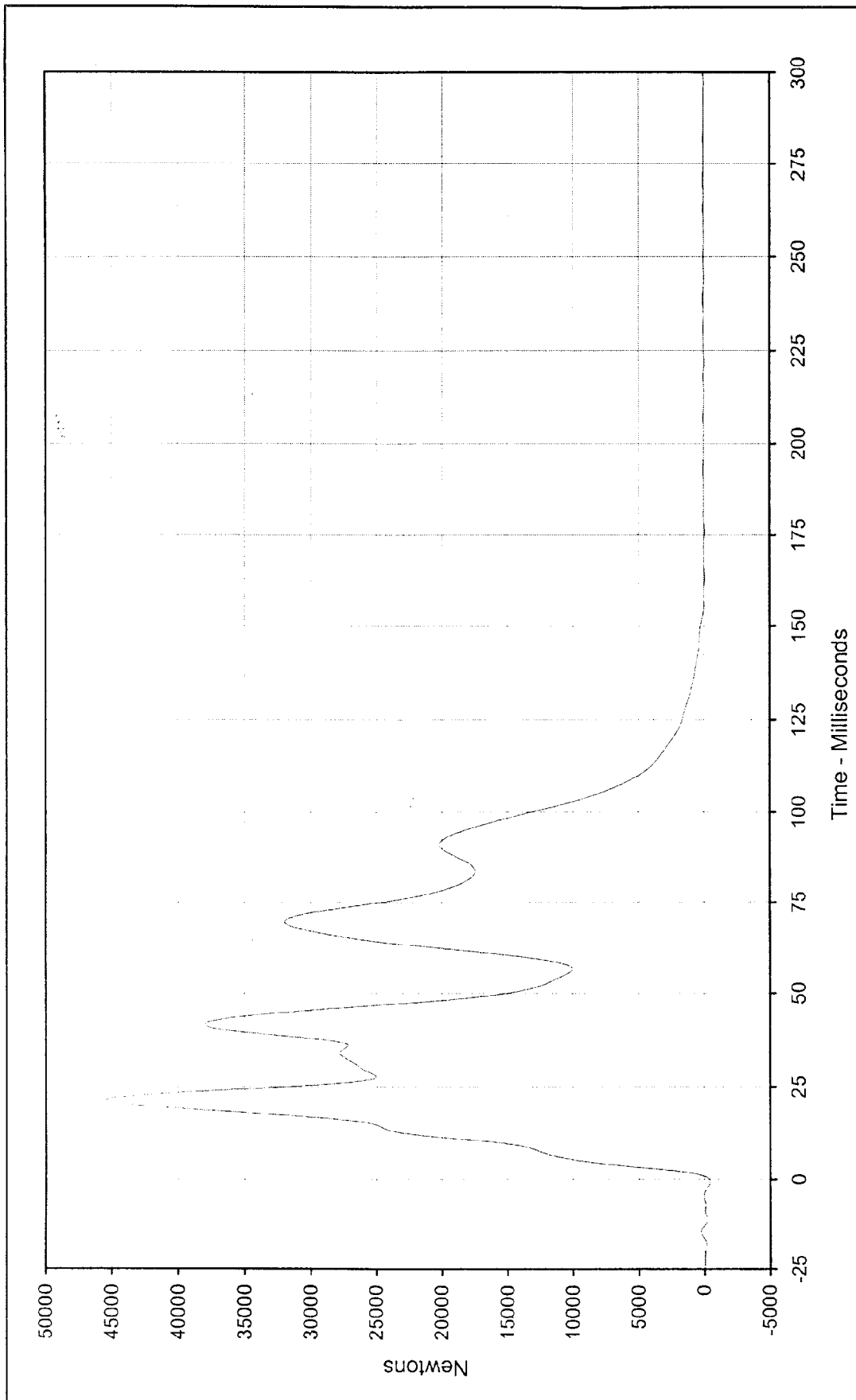




Curve Description:	Barrier Force C3		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	27875.7	at 31.6	Milliseconds		
Minimum Value:	-637.5	at 2.2	Milliseconds	2000 Chevrolet Impala 4 Door Sedan	
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-118				

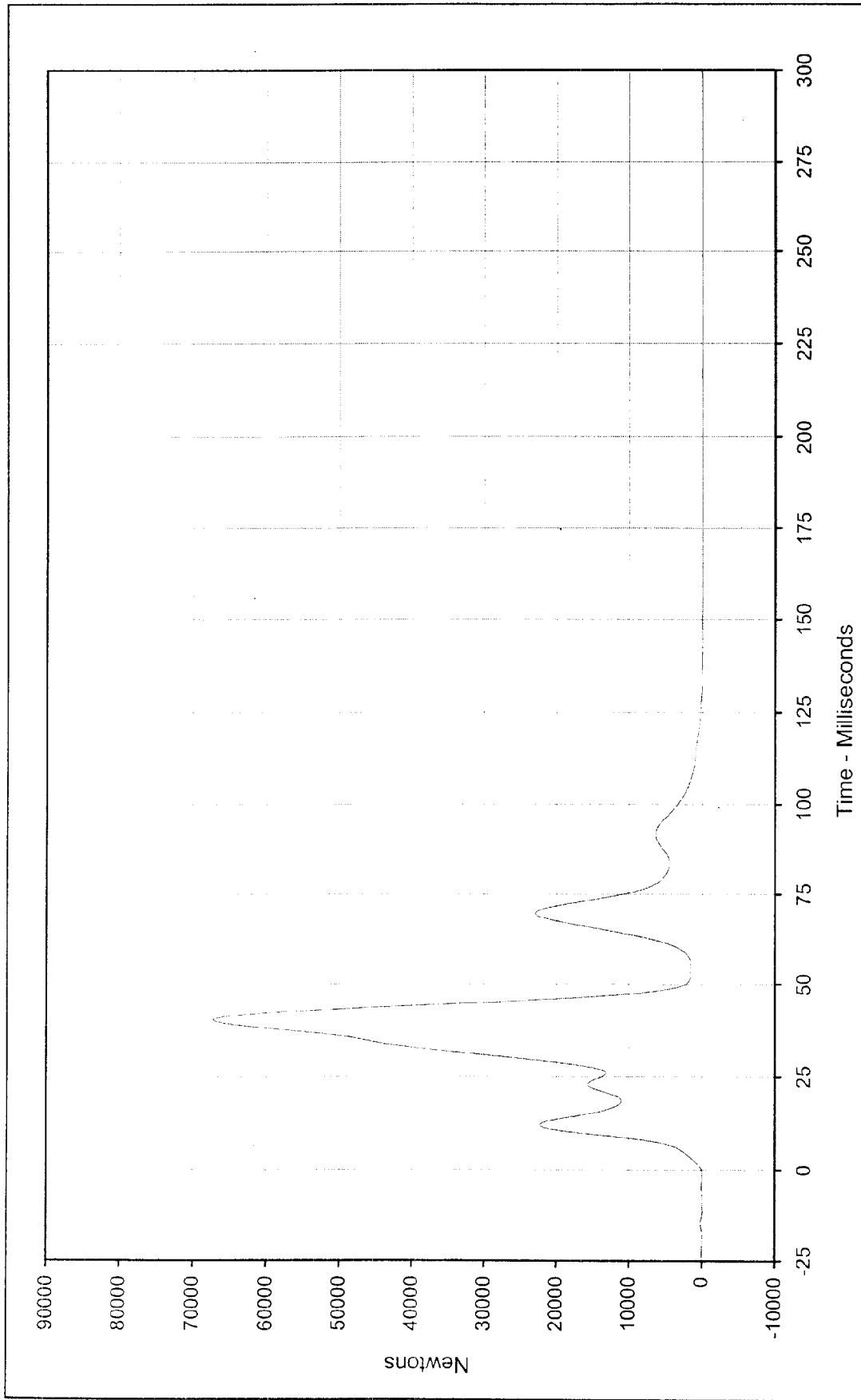






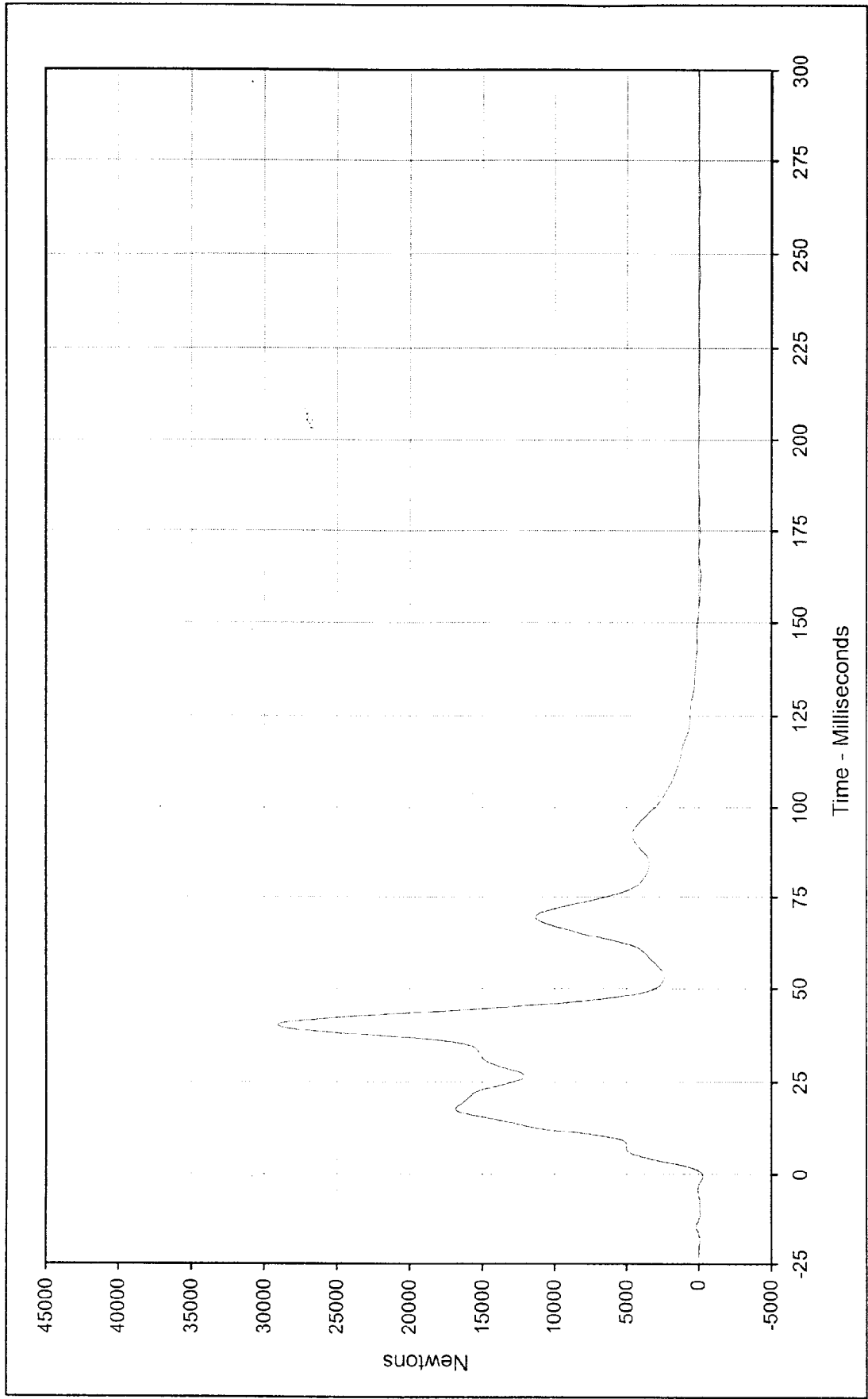
Curve Description:		Barrier Force C4		Test Program:	1999 NHTSA 35 mph NCAP	No.: GM00001
Maximum Value:	45450.4	at	21.5	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-387.3	at	0.0	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-119					





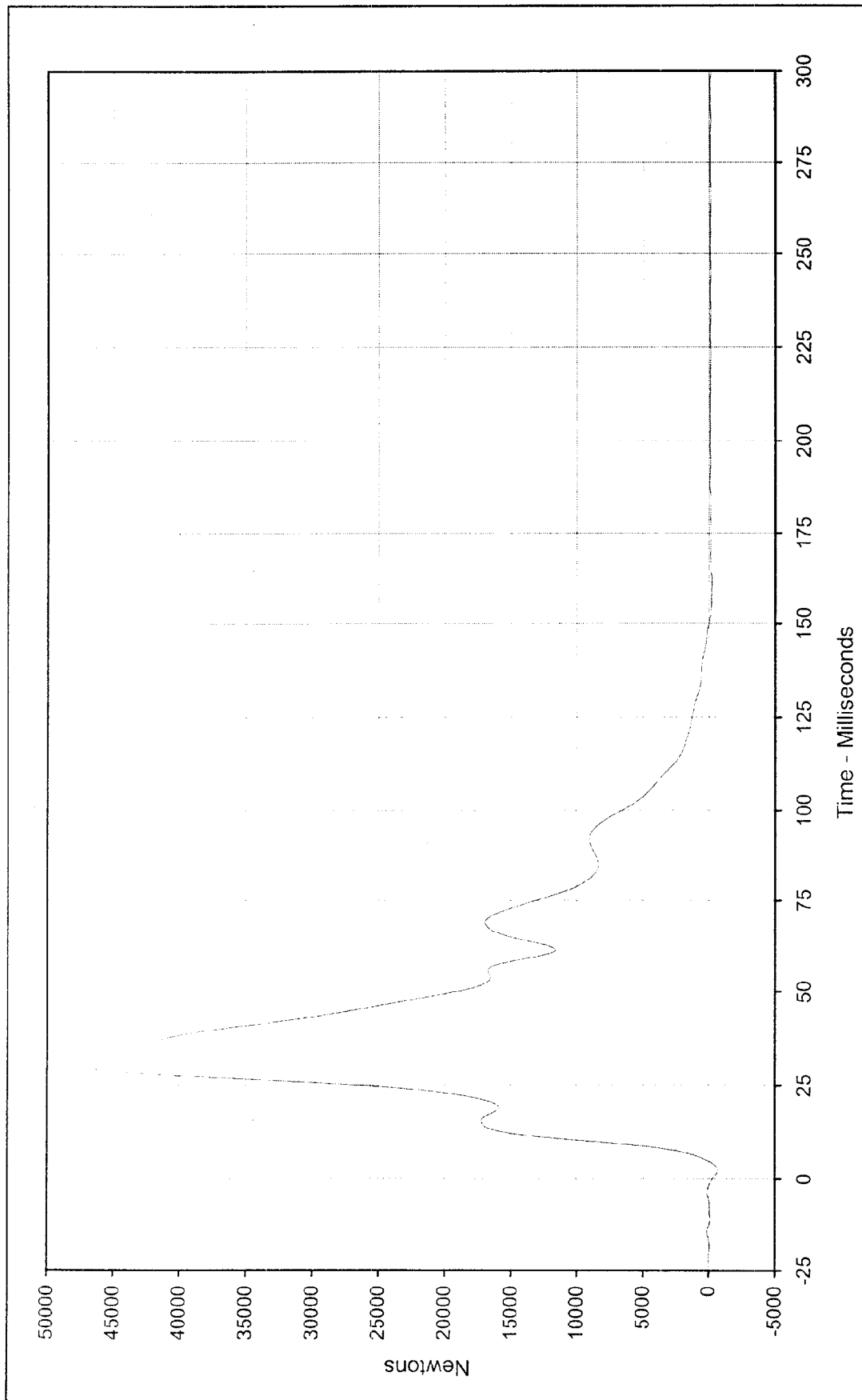
Curve Description:	Barrier Force C5	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	67191.3	at	40.3	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-110.4	at	157.8		
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-120				





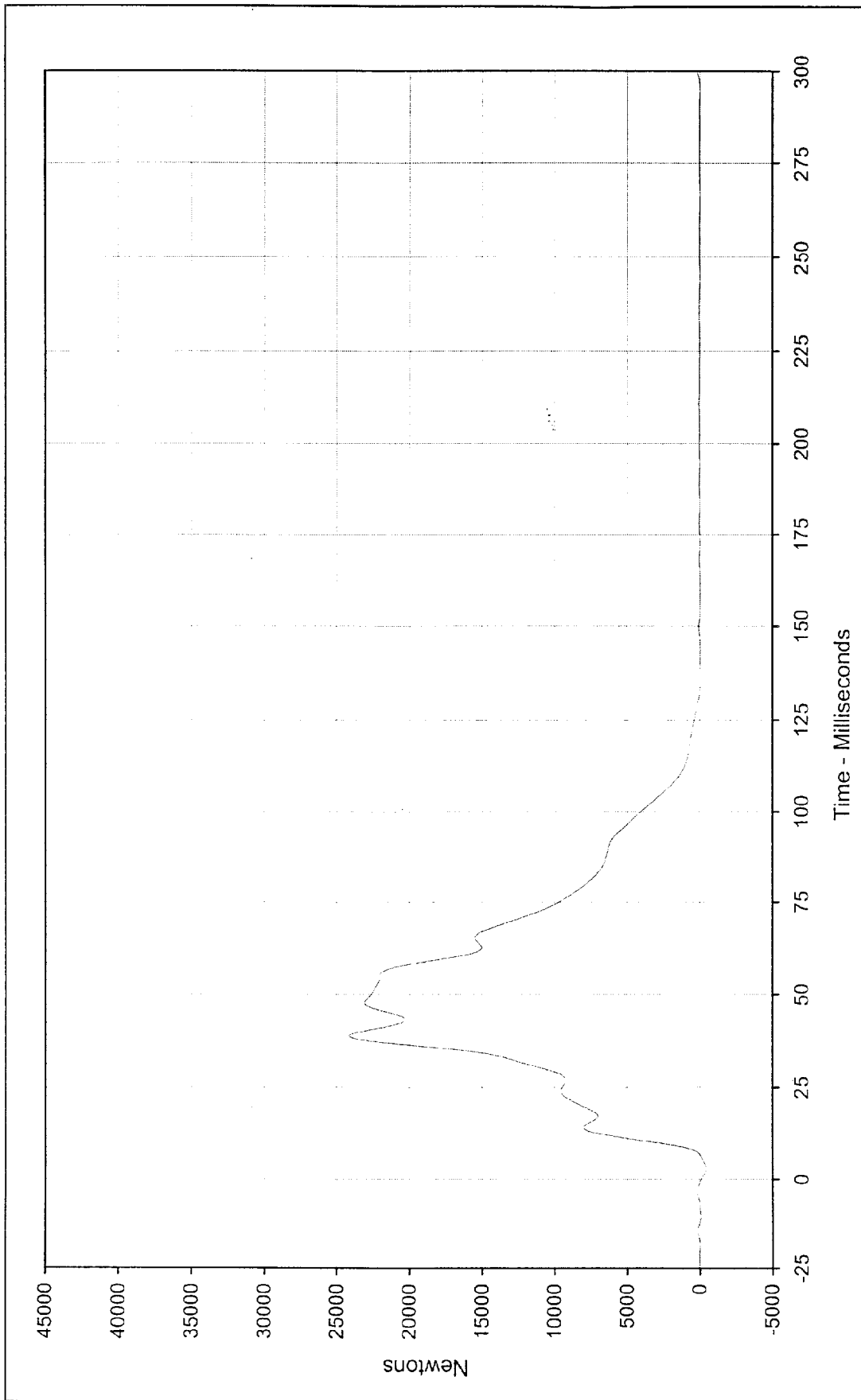
Curve Description:	Barrier Force C6	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	29062.9 at 40.3 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-264.0 at 0.0 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-121			





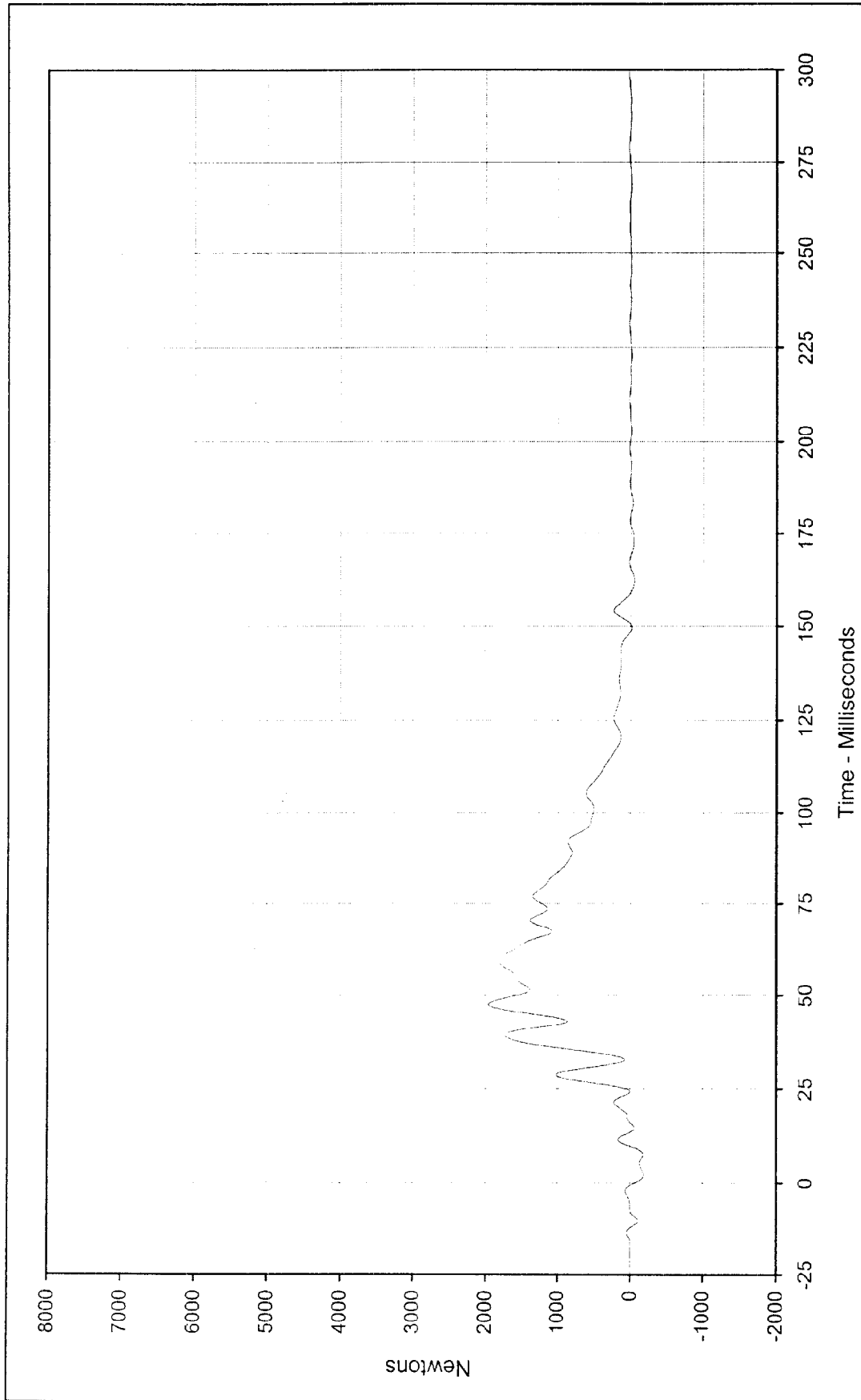
Curve Description:	Barrier Force C7	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	47555.1 at 30.7 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan		
Minimum Value:	-6933.9 at 2.3 Milliseconds				
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	FIL-122				





Curve Description:	Barrier Force C8	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	24174.5 at 38.9 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-433.7 at 2.9 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	FIL-123			

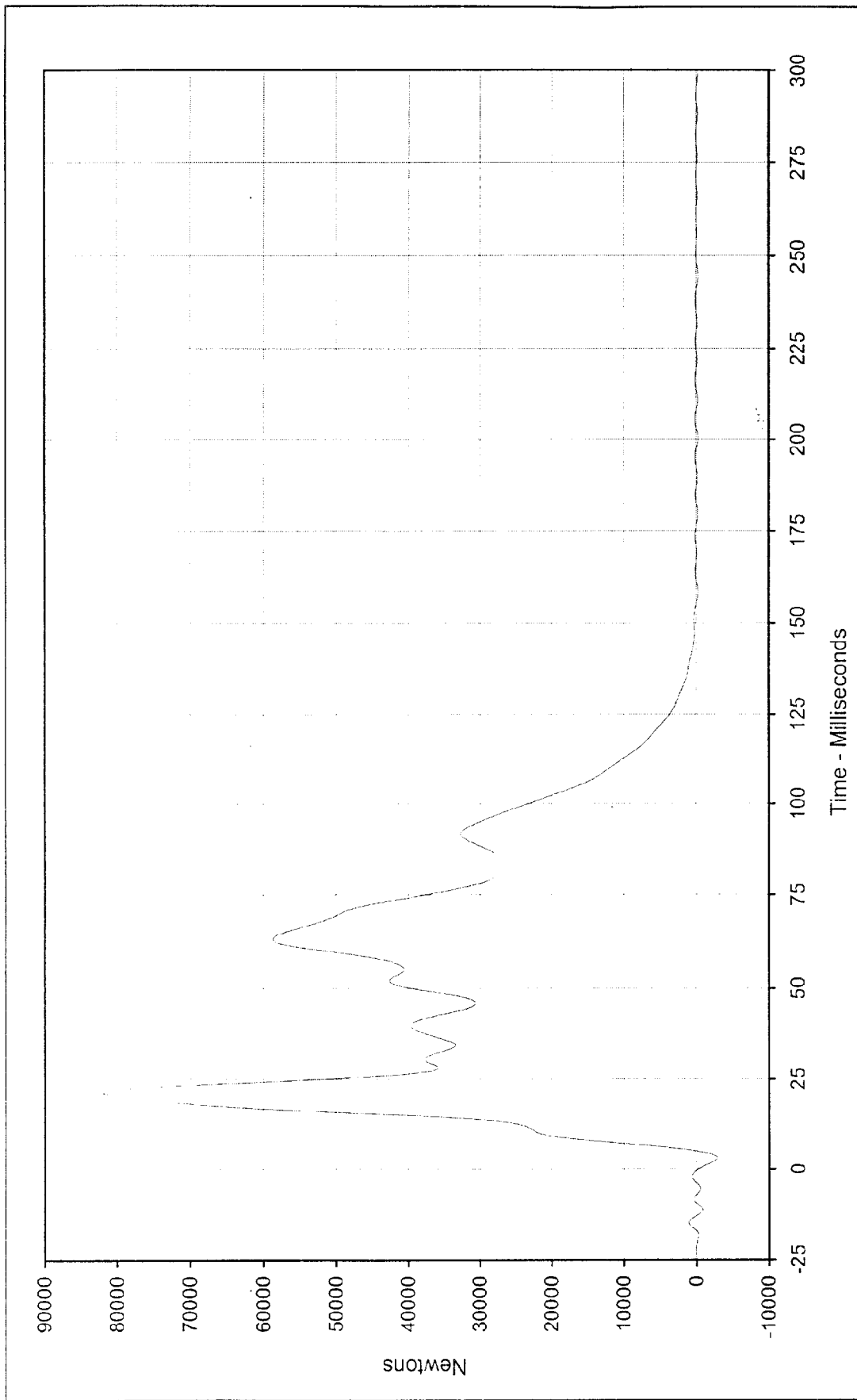




Curve Description:	Barrier Force C9			Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	1963.1	at	47.6	Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan
Minimum Value:	-188.4	at	2.1	Milliseconds		
SAE Filter Class:	60					
Date of Test:	5/20/99					
Curve Number:	FIL-124					

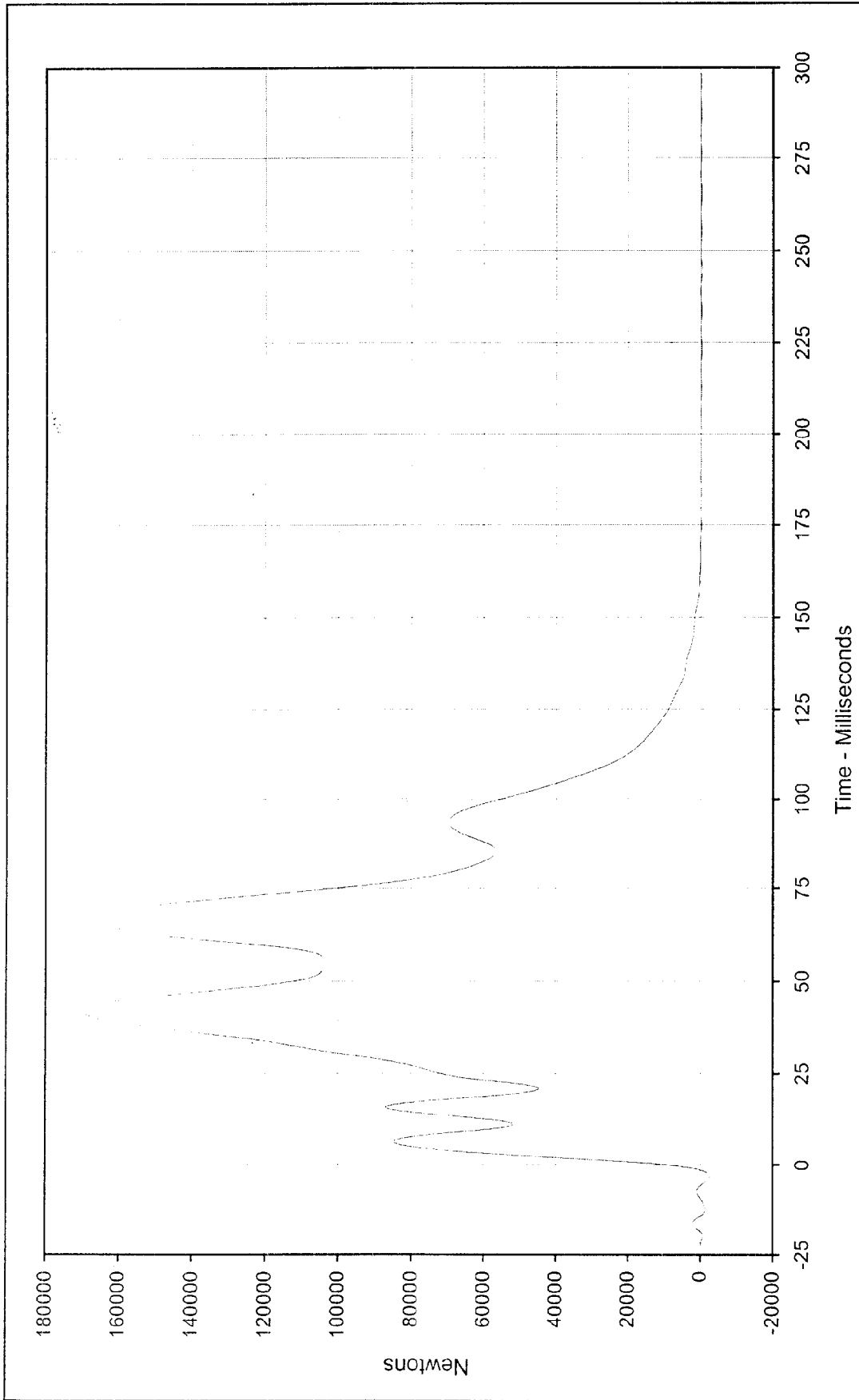
The logo for KARCO Engineering features a stylized lightbulb with a gear-like base, positioned to the left of the word "KARCO" in a bold, sans-serif font. Below "KARCO", the word "Engineering" is written in a script font. The entire logo is set against a black background with a white diagonal stripe.





Curve Description:	Barrier Force Sum Group 1	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	81899.6 at 21.3 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-2888.3 at 2.9 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	SUM-001			

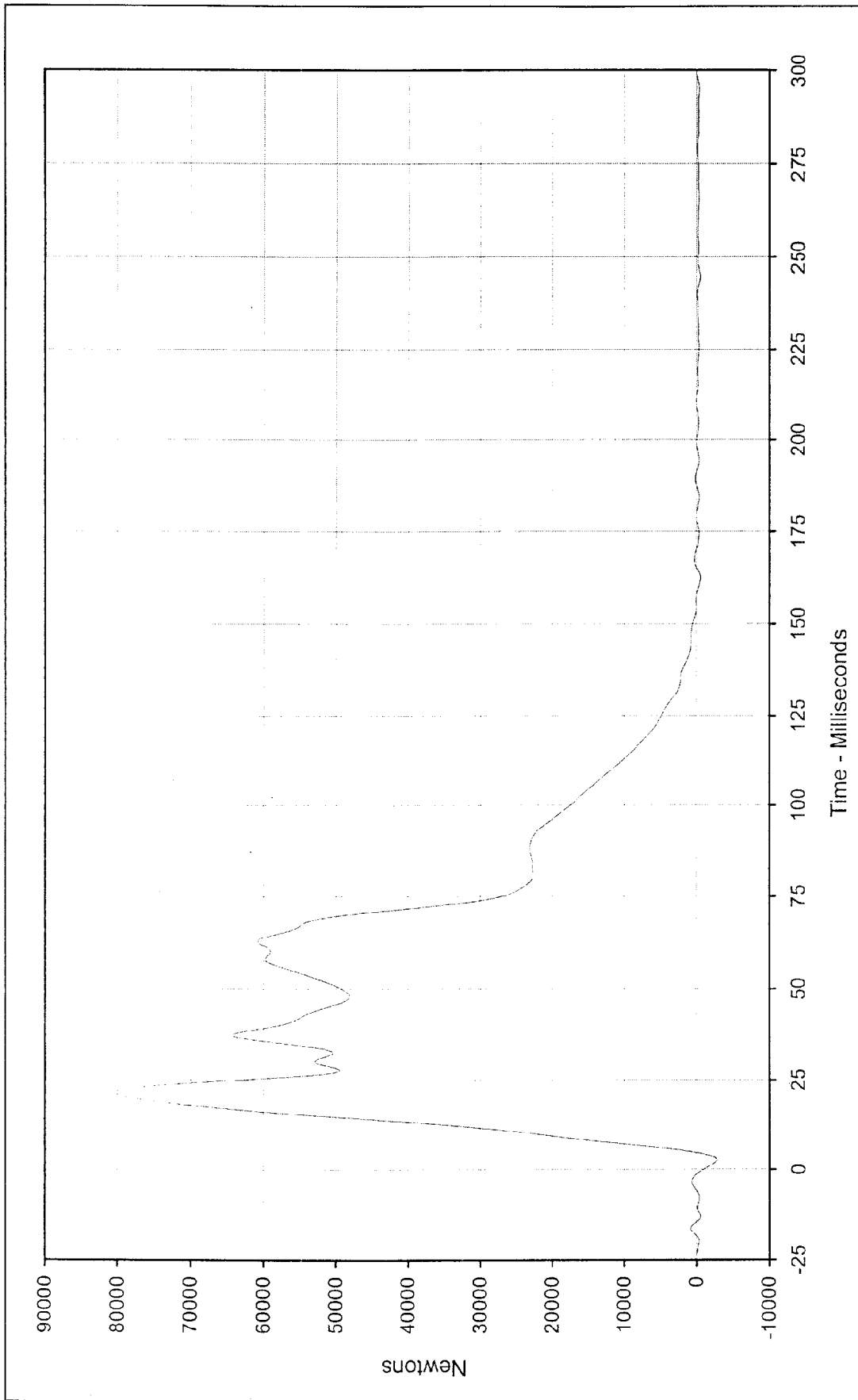




Curve Description:	Barrier Force Sum Group 2	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	169952.7 at 42.2 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-372.4 at 244.8 Milliseconds			

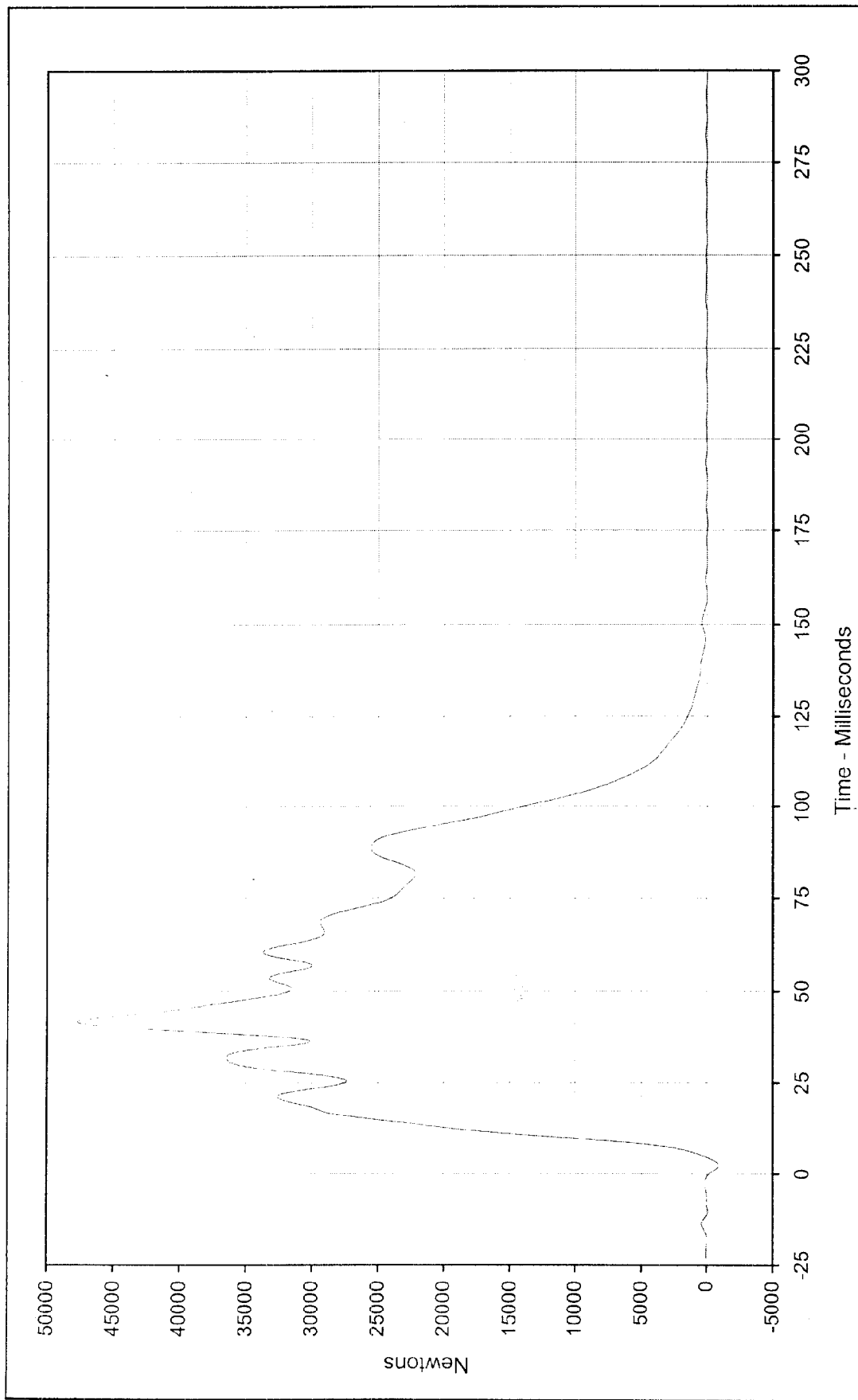


SAE Filter Class:	60
Date of Test:	5/20/99
Curve Number:	SUM-002



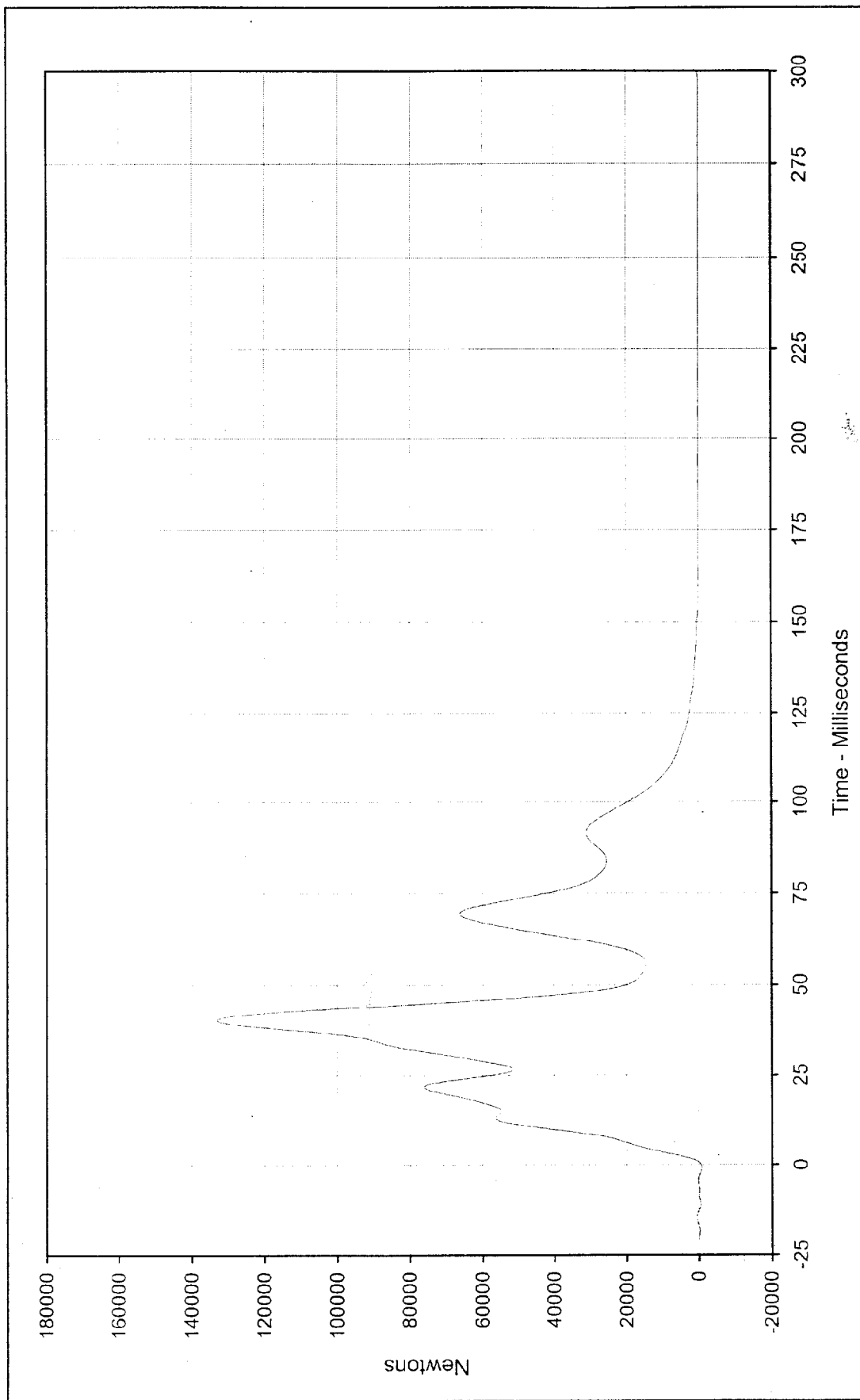
Curve Description:	Barrier Force Sum Group 3	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	80326.6 at 21.5 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-2815.2 at 2.6 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	SUM-003			





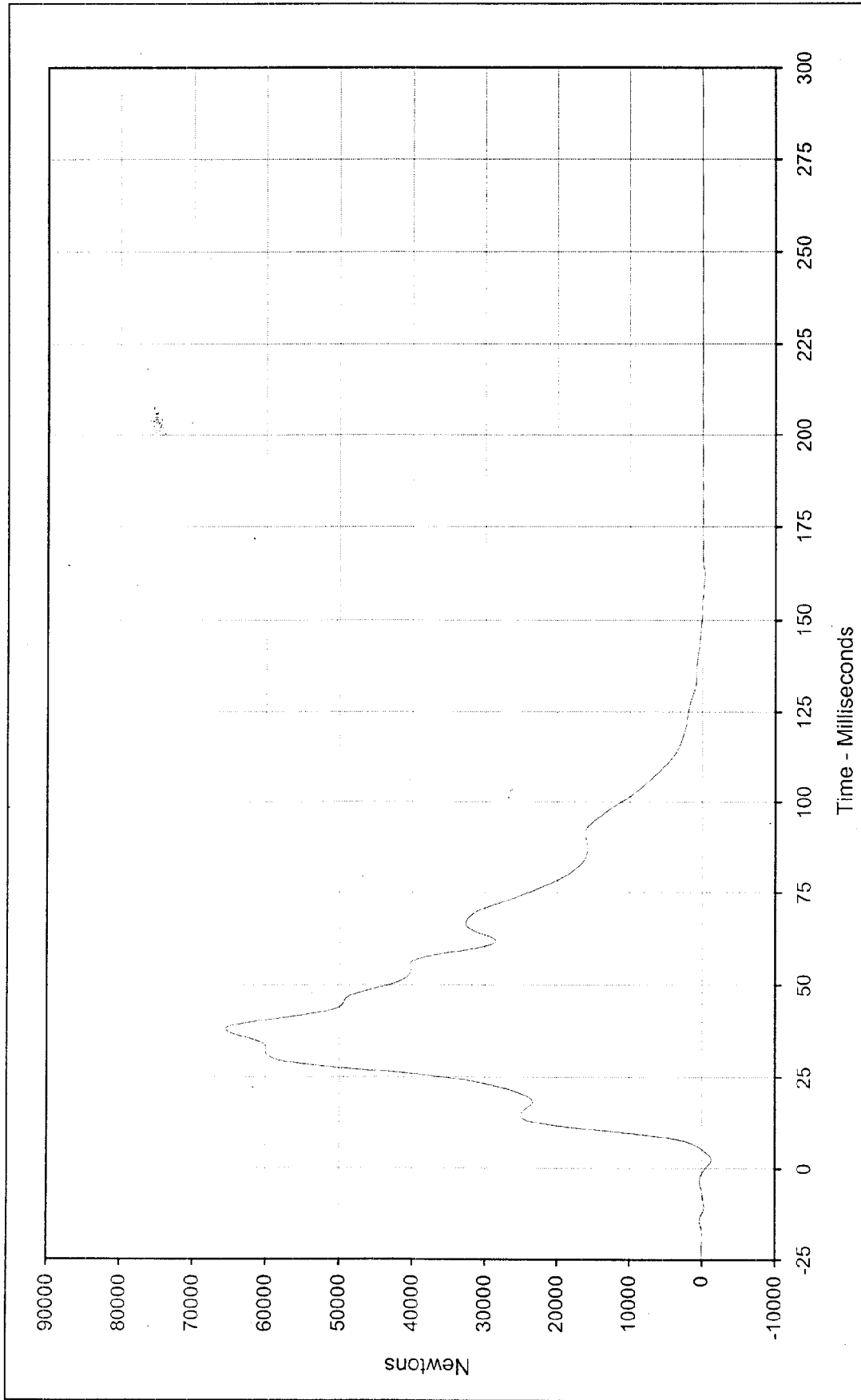
Curve Description:	Barrier Force Sum Group 4	Test Program:	1999 NHTSA 35 mph NCAP	No.: GM0001
Maximum Value:	47674.7 at 41.5 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan	
Minimum Value:	-927.2 at 2.4 Milliseconds			
SAE Filter Class:	60			
Date of Test:	5/20/99			
Curve Number:	SUM-004			





Curve Description:	Barrier Force Sum Group 5	Test Program:	1999 NHTSA 35 mph NCAP	No.:	GM0001
Maximum Value:	133055.4 at 40.6 Milliseconds	Test Vehicle:	2000 Chevrolet Impala 4 Door Sedan		
Minimum Value:	-612.9 at 0.0 Milliseconds				
SAE Filter Class:	60				
Date of Test:	5/20/99				
Curve Number:	SUM-005				

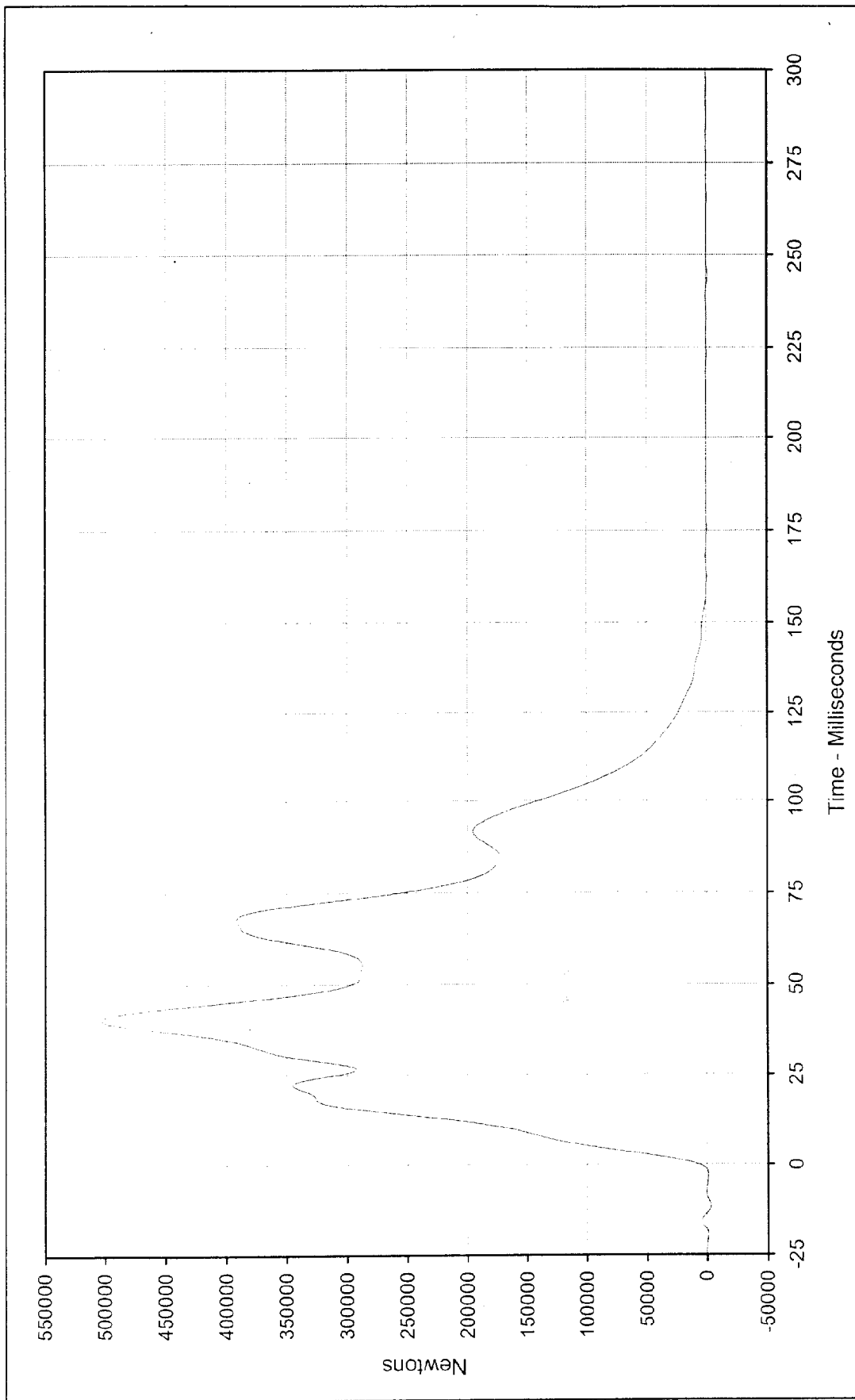




Curve Description: Barrier Force Sum Group 6
 Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Maximum Value: 65490.0 at 38.0 Milliseconds
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan
 Minimum Value: -1296.3 at 2.5 Milliseconds

SAE Filter Class: 60
 Date of Test: 5/20/99
 Curve Number: SUM-006

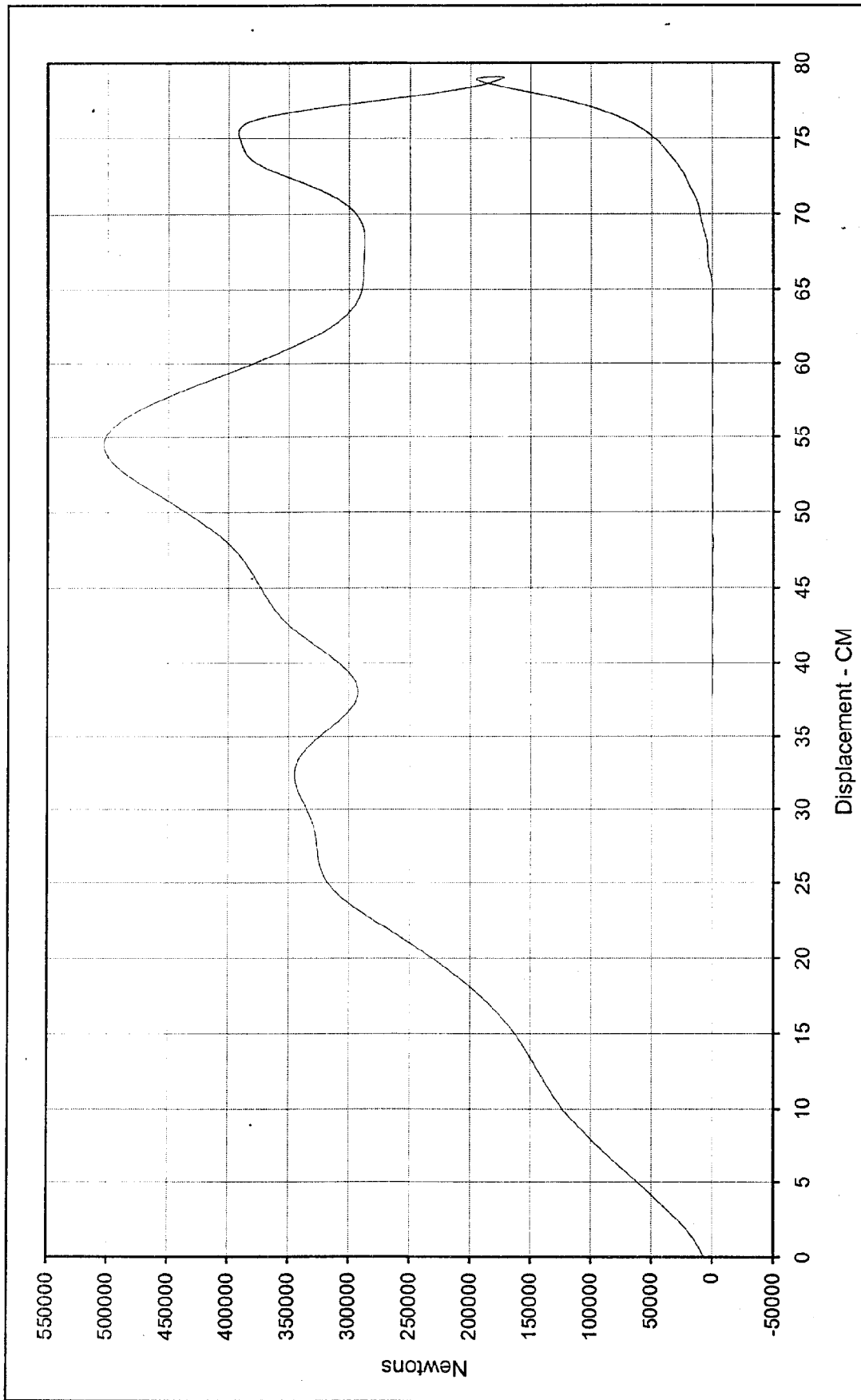




Curve Description: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Program: 2000 Chevrolet Impala 4 Door Sedan
 Test Vehicle:

Barrier Force Sum Total
 Maximum Value: 503088.8 at 40.6 Milliseconds
 Minimum Value: -1373.9 at 244.8 Milliseconds
 SAE Filter Class: 60
 Date of Test: 5/20/99
 Curve Number: SUM-007





Curve Description: Sum Force Total vs. Dynamic Crush
 Maximum Displ.: 79.1 at 86.9 Milliseconds
 Maximum Force: 503088.8 at 40.6 Milliseconds
 Measured Energy: 223,524 joules
 Date of Test: 5/20/99
 Curve Number: XVY-001

Test Program: 1999 NHTSA 35 mph NCAP No.: GM0001
 Test Vehicle: 2000 Chevrolet Impala 4 Door Sedan



BARRIER LOAD CELL SUMMARY DATA

TEST VEHICLE: 2000 CHEVROLET IMPALA 4 DOOR SEDAN NHTSA No.: GM0001
 TEST PROGRAM: 1999 NHTSA 35 MPH NCAP TEST DATE: 5/20/99

BARRIER LOAD CELL PEAK FORCES

Location	Units	Max	Time	Min	Time
Barrier Force A2	Newtons	3121.5	57.9	-1664.5	27.3
Barrier Force A3	Newtons	3704.3	69.0	-2189.3	20.4
Barrier Force A4	Newtons	3419.7	16.4	-3244.4	20.5
Barrier Force A5	Newtons	54790.0	45.0	-5232.0	20.8
Barrier Force A6	Newtons	3634.1	25.0	-3033.5	20.7
Barrier Force A7	Newtons	14555.4	63.3	-1879.8	20.8
Barrier Force A8	Newtons	1118.9	54.9	-945.6	27.4
Barrier Force A9	Newtons	938.6	21.7	-2354.0	25.7
Barrier Force B2	Newtons	31687.4	21.0	-659.2	3.4
Barrier Force B3	Newtons	52281.0	21.0	-853.0	2.3
Barrier Force B4	Newtons	46542.4	66.2	-95.8	234.2
Barrier Force B5	Newtons	14541.3	41.7	-50.8	158.1
Barrier Force B6	Newtons	61841.7	40.6	-121.9	223.2
Barrier Force B7	Newtons	52768.3	20.4	-915.7	2.3
Barrier Force B8	Newtons	29000.0	23.3	-629.1	3.0
Barrier Force B9	Newtons	1196.3	21.8	-1741.3	25.6
Barrier Force C2	Newtons	23961.3	41.2	-305.3	2.7
Barrier Force C3	Newtons	27875.7	31.6	-637.5	2.2
Barrier Force C4	Newtons	45450.4	21.5	-387.3	0.0
Barrier Force C5	Newtons	67191.3	40.3	-110.4	157.8
Barrier Force C6	Newtons	29062.9	40.3	-264.0	0.0
Barrier Force C7	Newtons	47555.1	30.7	-693.9	2.3
Barrier Force C8	Newtons	24174.5	38.9	-433.7	2.9
Barrier Force C9	Newtons	1963.1	47.6	-188.4	2.1
Barrier Force Sum No.1	Newtons	81899.6	21.3	-2888.3	2.9
Barrier Force Sum No.2	Newtons	169952.7	42.2	-372.4	244.8
Barrier Force Sum No.3	Newtons	80326.6	21.5	-2815.2	2.6
Barrier Force Sum No.4	Newtons	47674.7	41.5	-927.2	2.4
Barrier Force Sum No.5	Newtons	133055.4	40.6	-612.9	0.0
Barrier Force Sum No.6	Newtons	65490.0	38.0	-1296.3	2.5
Barrier Force Sum Total	Newtons	503088.8	40.6	-1373.9	244.8

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

APPENDIX D
INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

1999 NHTSA 35 mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D Serial Number 35
5/20/99

2000 Chevrolet Impala 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	HEAD, PRIMARY	X	KEAC039	Accel., 1/2 bridge	Endevco	7264-2000	G
2	HEAD, PRIMARY	Y	KEAC038	Accel., 1/2 bridge	Endevco	7264-2000	G
3	HEAD, PRIMARY	Z	KEAC027	Accel., 1/2 bridge	Endevco	7264-2000	G
4	HEAD, REDUNDANT	X	KEAC031	Accel., 1/2 bridge	Endevco	7264-2000	G
5	HEAD, REDUNDANT	Y	KEAC032	Accel., 1/2 bridge	Endevco	7264-2000	G
6	HEAD, REDUNDANT	Z	KEAC026	Accel., 1/2 bridge	Endevco	7264-2000	G
7	NECK FORCE	X	GPUN02FX	Load cell, six axis neck	R. A. Denton	1716A	N
8	NECK FORCE	Y	GPUN02FY	Load cell, six axis neck	R. A. Denton	1716A	N
9	NECK FORCE	Z	GPUN02FZ	Load cell, six axis neck	R. A. Denton	1716A	N
10	NECK MOMENT	X	GPUN02MX	Load cell, six axis neck	R. A. Denton	1716A	Nm
11	NECK MOMENT	Y	GPUN02MY	Load cell, six axis neck	R. A. Denton	1716A	Nm
12	NECK MOMENT	Z	GPUN02MZ	Load cell, six axis neck	R. A. Denton	1716A	Nm
13	CHEST , PRIMARY	X	GPAC031	Accel., 1/2 bridge	Endevco	7264-2000	G
14	CHEST , PRIMARY	Y	GPAC024	Accel., 1/2 bridge	Endevco	7264-2000	G
15	CHEST , PRIMARY	Z	GPAC029	Accel., 1/2 bridge	Endevco	7264-2000	G
16	CHEST , REDUNDANT	X	KEAC023	Accel., 1/2 bridge	Endevco	7264-200	G
17	CHEST , REDUNDANT	Y	KEAC022	Accel., 1/2 bridge	Endevco	7264-200	G
18	CHEST , REDUNDANT	Z	KEAC024	Accel., 1/2 bridge	Endevco	7264-200	G
19	CHEST DISPLACEMENT	X	GPCP001	Rotary Pot Chest	Servo	14CBI	MM
20	PELVIS, PRIMARY	X	KEAC019	Accel., 1/2 bridge	Endevco	7264-200	G
21	PELVIS, PRIMARY	Y	KEAC020	Accel., 1/2 bridge	Endevco	7264-200	G
22	PELVIS, PRIMARY	Z	KEAC021	Accel., 1/2 bridge	Endevco	7264-200	G
23	LEFT FEMUR FORCE	Z	KEFF002	Load cell, Femur	R.A. Denton	2121	N
24	RIGHT FEMUR FORCE	Z	KEFF003	Load cell, Femur	R.A. Denton	2121	N

1999 NHTSA 35 mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D Serial Number 35
5/20/99
2000 Chevrolet Impala 4 Door Sedan

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

1999 NHTSA 35 mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D Serial Number 34
5/20/99
2000 Chevrolet Impala 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
45	HEAD, PRIMARY	X	GPAC027	Accel., 1/2 bridge	Endevco	7264-2000	G
46	HEAD, PRIMARY	Y	GPAC002	Accel., 1/2 bridge	Endevco	7264-2000	G
47	HEAD, PRIMARY	Z	GPAC003	Accel., 1/2 bridge	Endevco	7264-2000	G
48	HEAD, REDUNDANT	X	GPAC032	Accel., 1/2 bridge	Endevco	7264-2000	G
49	HEAD, REDUNDANT	Y	GPAC021	Accel., 1/2 bridge	Endevco	7264-2000	G
50	HEAD, REDUNDANT	Z	GPAC025	Accel., 1/2 bridge	Endevco	7264-2000	G
51	NECK FORCE	X	GPUN01FX	Load cell, six axis neck	R. A. Denton	1716A	N
52	NECK FORCE	Y	GPUN01FY	Load cell, six axis neck	R. A. Denton	1716A	N
53	NECK FORCE	Z	GPUN01FZ	Load cell, six axis neck	R. A. Denton	1716A	N
54	NECK MOMENT	X	GPUN01MX	Load cell, six axis neck	R. A. Denton	1716A	Nm
55	NECK MOMENT	Y	GPUN01MY	Load cell, six axis neck	R. A. Denton	1716A	Nm
56	NECK MOMENT	Z	GPUN01MZ	Load cell, six axis neck	R. A. Denton	1716A	Nm
57	CHEST, PRIMARY	X	GPAC005	Accel., 1/2 bridge	Endevco	7264-2000	G
58	CHEST, PRIMARY	Y	GPAC011	Accel., 1/2 bridge	Endevco	7264-2000	G
59	CHEST, PRIMARY	Z	GPAC010	Accel., 1/2 bridge	Endevco	7264-2000	G
60	CHEST, REDUNDANT	X	GPAC031	Accel., 1/2 bridge	Endevco	7264-2000	G
61	CHEST, REDUNDANT	Y	GPAC023	Accel., 1/2 bridge	Endevco	7264-2000	G
62	CHEST, REDUNDANT	Z	GPAC020	Accel., 1/2 bridge	Endevco	7264-2000	G
63	CHEST DISPLACEMENT	X	GPCP002	Rotary Pot Chest	Servo	14CBI	MM
64	PELVIS, PRIMARY	X	GPAC025	Accel., 1/2 bridge	Endevco	7264-2000	G
65	PELVIS, PRIMARY	Y	GPAC022	Accel., 1/2 bridge	Endevco	7264-2000	G
66	PELVIS, PRIMARY	Z	GPAC019	Accel., 1/2 bridge	Endevco	7264-2000	G
67	LEFT FEMUR FORCE	Z	KEFF001	Load cell, Femur	R.A. Denton	2121	N
68	RIGHT FEMUR FORCE	Z	GPLC001	Load cell, Femur	G.S.E.	2430	N

1999 NHTSA 35 mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D Serial Number 34
5/20/99

2000 Chevrolet Impala 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
69	UP. TIBIA LEFT MOM.	X	GPU09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
70	UP. TIBIA LEFT MOM.	Y	GPU09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
71	UP. TIBIA RIGHT MOM.	X	GPU09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
72	UP. TIBIA RIGHT MOM.	Y	GPU09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
73	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
74	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
75	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
76	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
77	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
78	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
79	FOOT LEFT	X	KEIC002X	Accel., Foot Triax	I.C. Sensor	3031-500	G
80	FOOT LEFT	Y	KEIC002Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
81	FOOT LEFT	Z	KEIC002Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
82	FOOT RIGHT	X	KEIC001X	Accel., Foot Triax	I.C. Sensor	3031-500	G
83	FOOT RIGHT	Y	KEIC001Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
84	FOOT RIGHT	Z	KEIC001Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
85	LAP BELT FORCE	X	KELC0003	Load cell, Seat belt	Lebow	3371	N
86	SHOULDER BELT FORCE	X	KELC0004	Load cell, Seat belt	Lebow	3371	N
87	SHOULDER BELT SPOOL	X	KEPP001	Pullout pot	Celresco	PTX101-0030	CM
88	SHOULDER BELT ELONG.	X	KEEP001	Linear pot., belt stretch	E.T.I.	LCP8-10 10K	MM/CM

1999 NHTSA 35 mph NCAP
Instrumentation Data Channel Assignments
Vehicle Accelerometers
5/20/99
2000 Chevrolet Impala 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
89	Left Rear X-Member (Pri.)	X	KEVA005	Accel., Vehicle block	I.C. Sensor	3031-500	G
90	Right Rear X-Member (Pri.)	X	KEVA006	Accel., Vehicle block	I.C. Sensor	3031-200	G
91	Engine Top	X	KEVA011	Accel., Vehicle block	I.C. Sensor	3031-200	G
92	Engine Bottom	X	KEVA007	Accel., Vehicle block	I.C. Sensor	3031-500	G
93	Left Brake Caliper	X	KEVA008	Accel., Vehicle block	I.C. Sensor	3031-500	G
94	Right Brake Caliper	X	KEVA009	Accel., Vehicle block	I.C. Sensor	3031-500	G
95	Instrument Panel	X	KEVA004	Accel., Vehicle block	I.C. Sensor	3031-500	G
96	Left Rear X-Member (Rednt.)	X	KEVA010	Accel., Vehicle block	I.C. Sensor	3031-200	G

APPENDIX E
DUMMY CALIBRATION DATA



Hybrid III Calibration Data Sheet

50TH Percentile Male

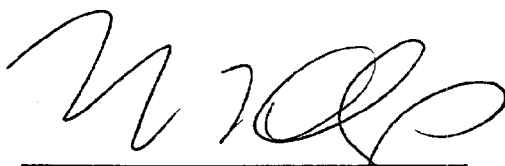
Left Knee Impact Test

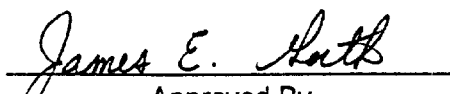
ATD Serial No.: 34

Part Serial No.: N/A

Test I.D.: KN04A

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	2.094	Pass
Peak Probe Force	Newtons	4715 to 5782	5574.2	Pass
Overall Test Results				Pass


Laboratory Technician

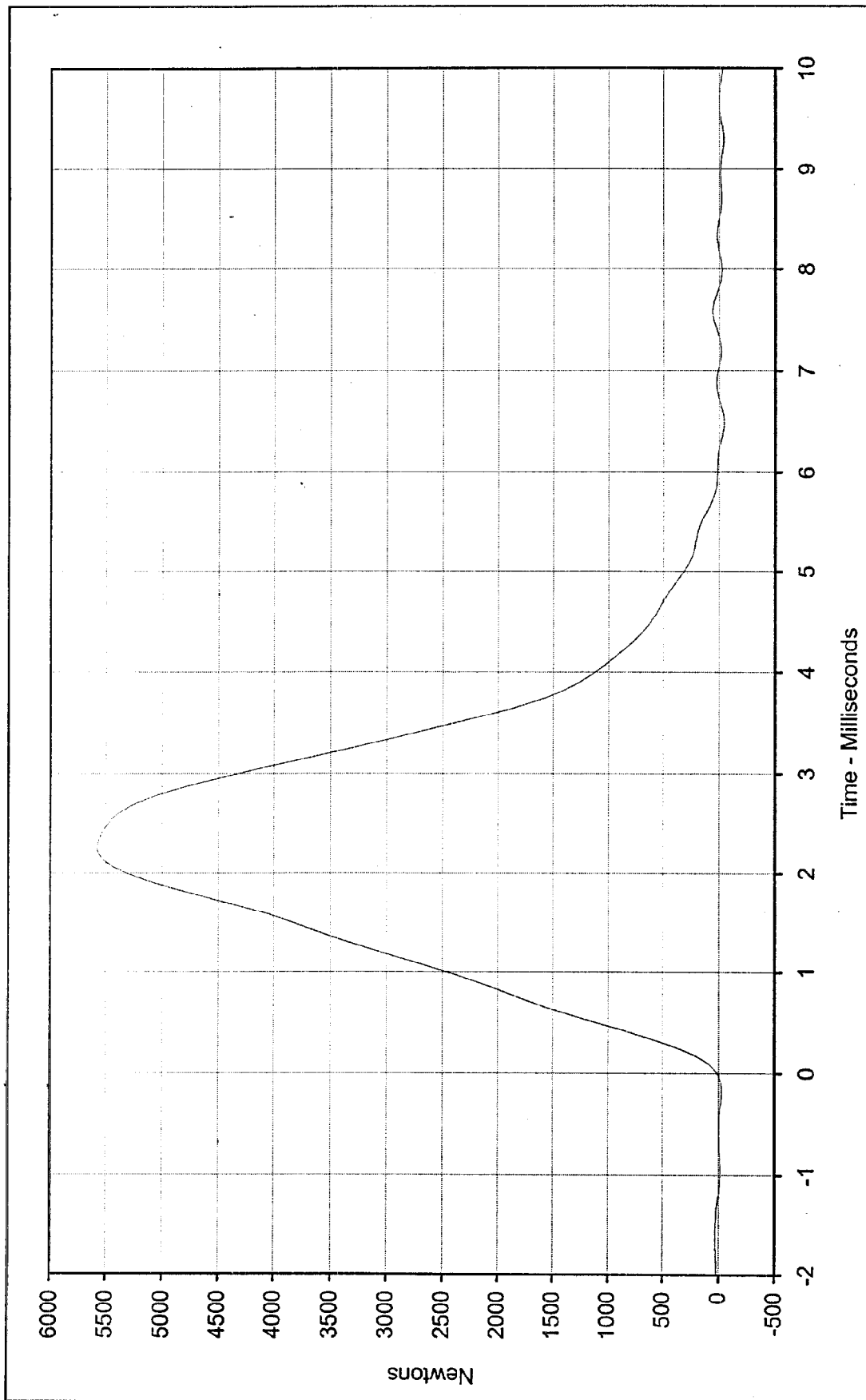

Approved By

March 24, 1999

Test Date

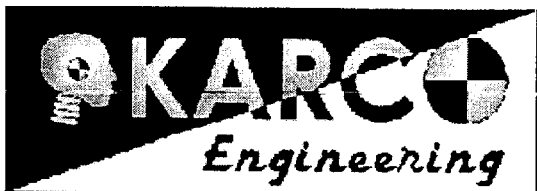
3/24/99

Date



Curve Description: Hybrid III Left Knee Impact Test
 Maximum Value: 5574.2 at 2.3 Milliseconds
 Minimum Value: -45.8 at 6.5 Milliseconds
 SAE Filter Class: 600
 Date of Test: 3/24/99
 ATD Serial No.: 34





Hybrid III Calibration Data Sheet

50TH Percentile Male

Right Knee Impact Test

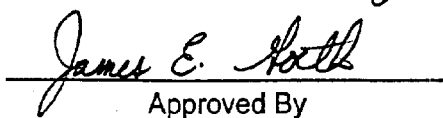
ATD Serial No.: 34

Part Serial No.: N/A

Test I.D.: KN04B

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	2.101	Pass
Peak Probe Force	Newtons	4715 to 5782	5694.5	Pass
Overall Test Results				Pass


Laboratory Technician

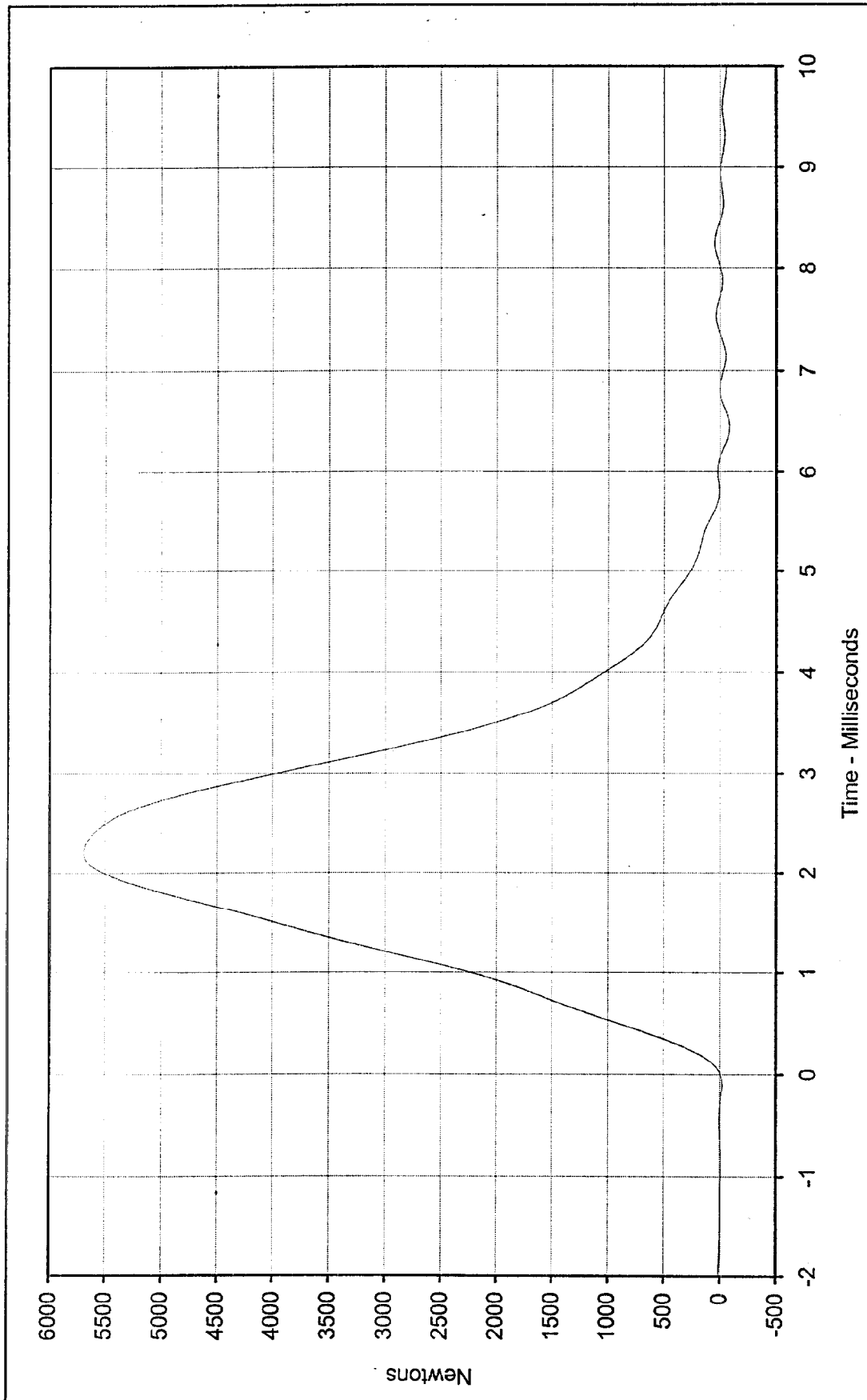

Approved By

March 24, 1999

Test Date

3/24/99

Date



Curve Description:	Testing Program	Hybrid III Right Knee Impact Test
Maximum Value:	Part S/N:	N/A
Minimum Value:	Test I.D.:	KN04B



Probe Force	5694.5	at	2.2	Milliseconds
SAE Filter Class:	-82.8	at	6.4	Milliseconds
Date of Test:	600			
ATD Serial No.:	3/24/99			
	34			



Hybrid III Calibration Data Sheet

50TH Percentile Male

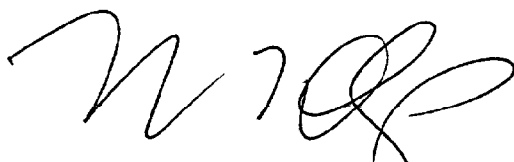
Head Drop Calibration

ATD Serial No.: 034

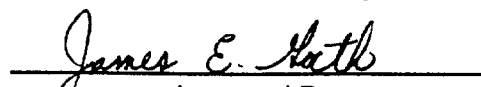
Part Serial No.: N/A

Test I.D.: HD04A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	255.6	Pass
Peak Lateral Acceleration	G's	≤15.0	3.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Laboratory Technician



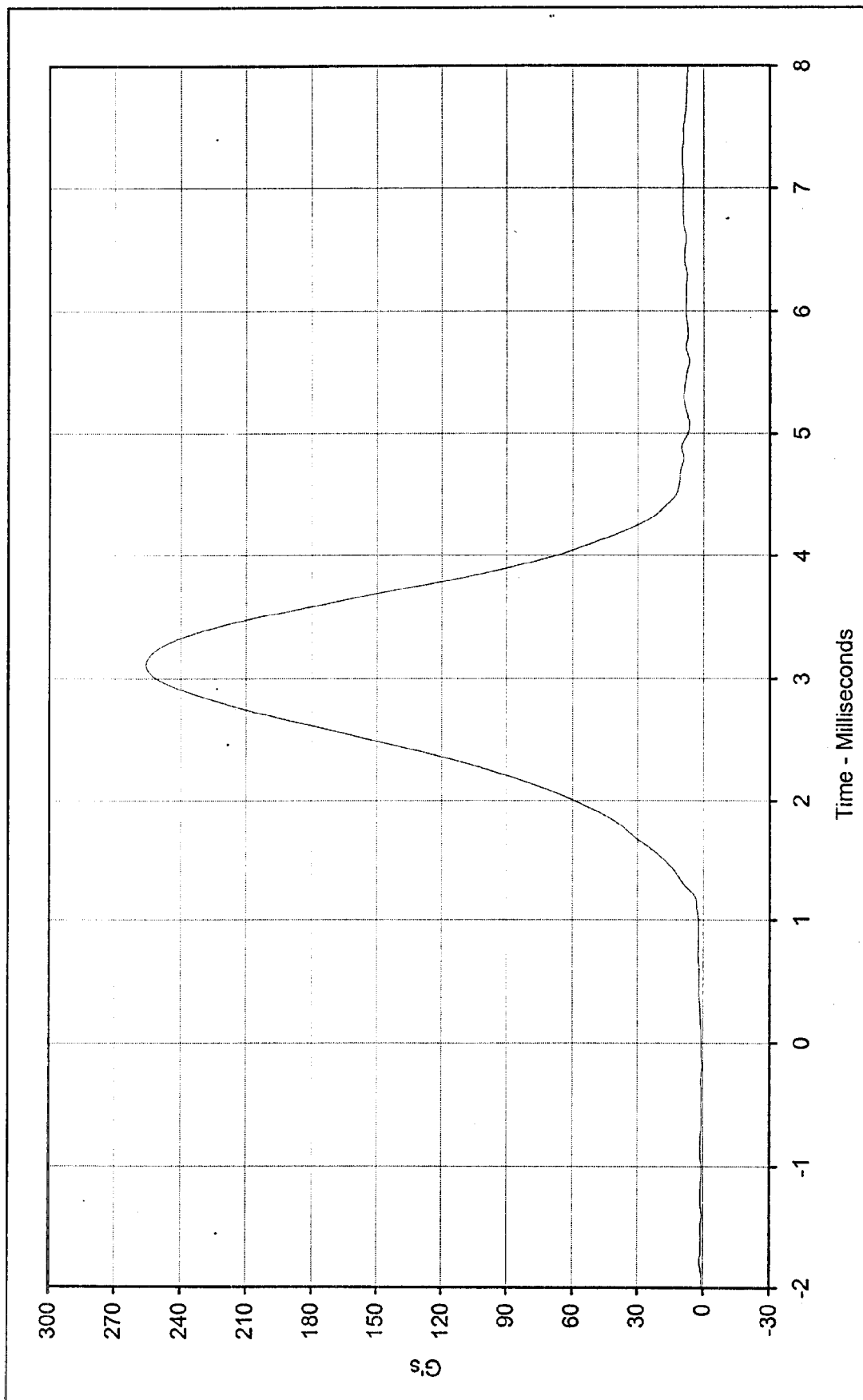
Approved By

March 24, 1999

Test Date

3/24/99

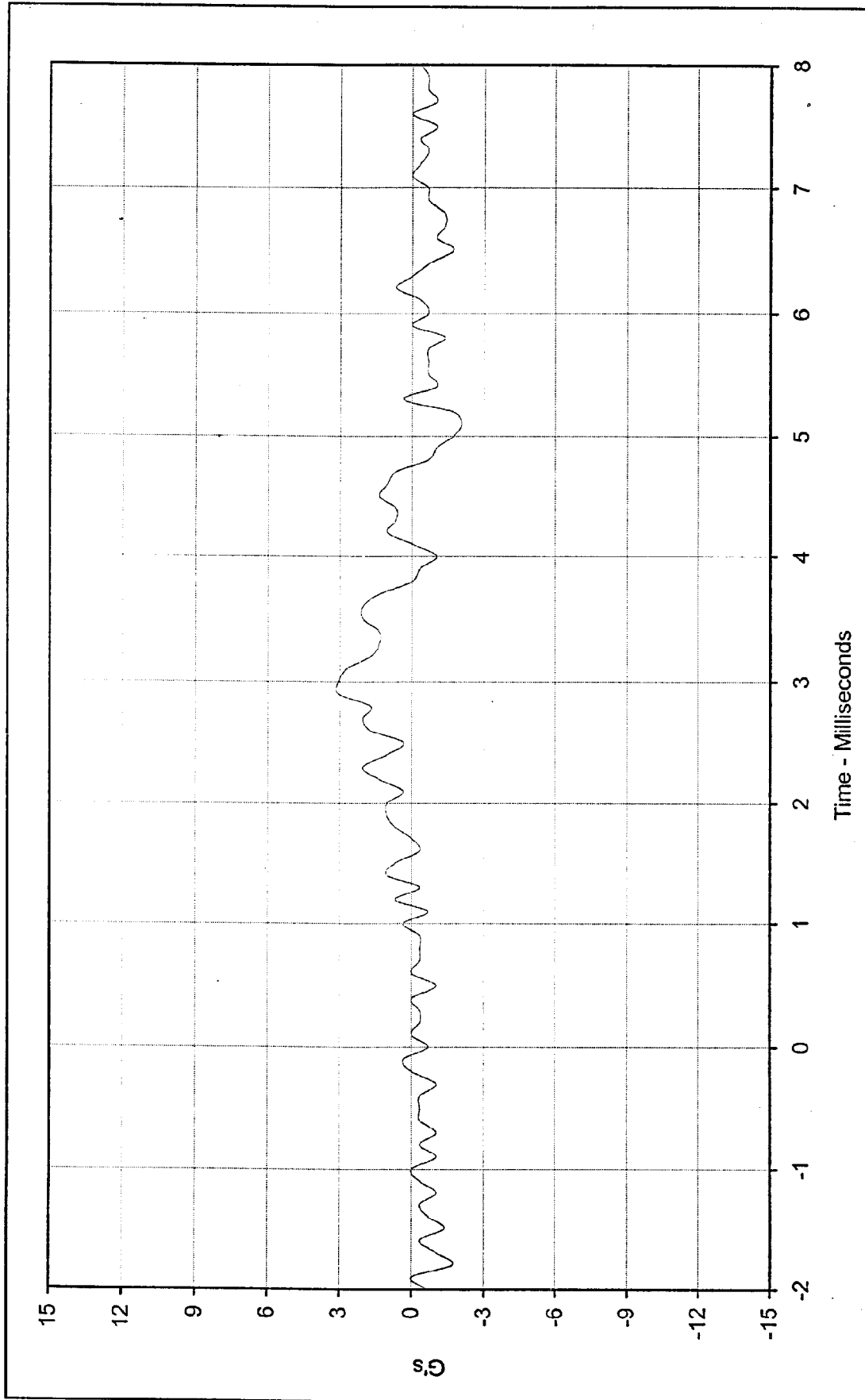
Date



Curve Description: Hybrid III Head Drop Calibration (Male)

Maximum Value: 255.6 at 3.1 Milliseconds
 Minimum Value: 0.4 at -0.2 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 3/24/99
 ATD Serial No.: 034





Curve Description: Head Acceleration Y Axis
 Maximum Value: 3.1 at 2.9 Milliseconds
 Minimum Value: -2.0 at 5.1 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 3/24/99
 ATD Serial No.: 034

Testing Program: Hybrid III Head Drop Calibration (Male)
 Test Information: S/N of Part: N/A Test I.D.: HD04A





Hybrid III Calibration Data Sheet

50TH Percentile Male

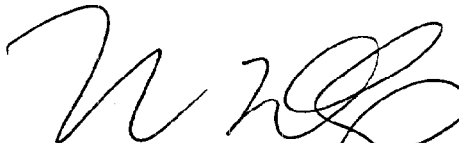
Thorax Impact Test

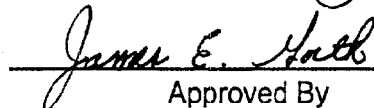
ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: CH04A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	6.58 to 6.82	6.66	Pass
Peak Probe Force	Newtons	5159 to 5893	5836	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.41	Pass
Internal Hysteresis	%	69 to 85	78.7	Pass
Overall Test Results				Pass


Laboratory Technician

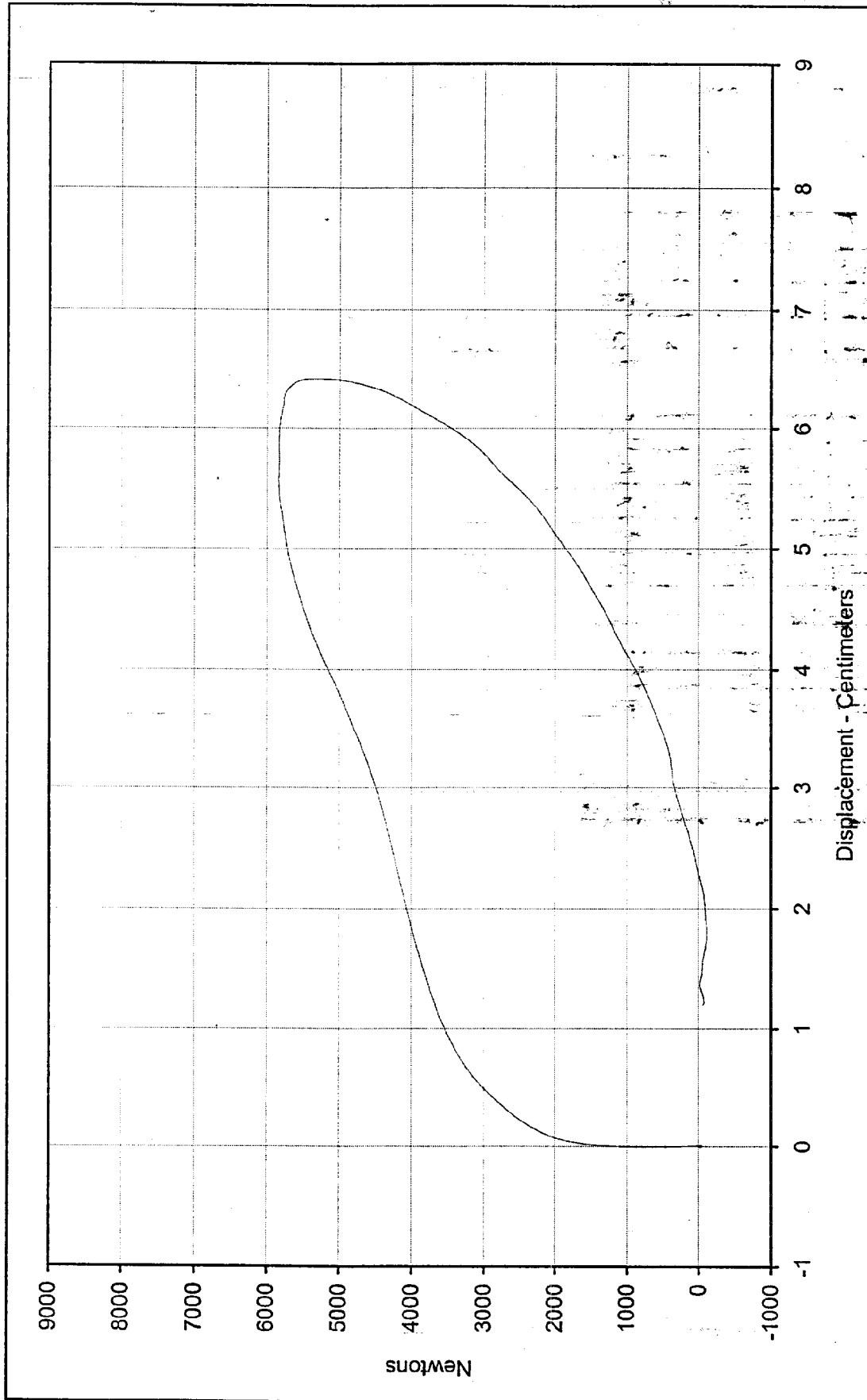

Approved By

April 27, 1999

Test Date

4/27/99

Date



Curve Description: <u>Probe Force vs. Chest Displacement</u>		Testing Program: <u>Hybrid III Thorax Impact Test</u>
Probe Force:	<u>5836.0</u> Newtons	Test Information: <u>S/N of Part: N/A</u> Test I.D.: <u>CH04A</u>
Chest Displ.:	<u>6.41</u> Centimeters	
SAE Filter Class:	<u>180</u>	
Date of Test:	<u>4/27/99</u>	
ATD Serial No.:	<u>034</u>	





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 034

Part Serial No.: N/A

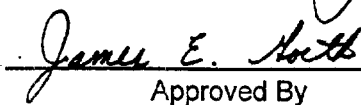
Test I.D.: NF04A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.1	Pass
	20 Msec.	G's	17.6 to 22.6	21.4	Pass
	30 Msec.	G's	12.5 to 18.5	18.0	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.0	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	37.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	65.9	Pass
	Time	Msec.	57.0 to 64.0	59.1	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	113.2	Pass
Moment About Occipital Condyle	Maximum	N • m	84.1 to 108.5	89.5	Pass
	Time	Msec.	47.0 to 58.0	49.6	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	97.9	Pass
Overall Test Results					Pass


Laboratory Technician

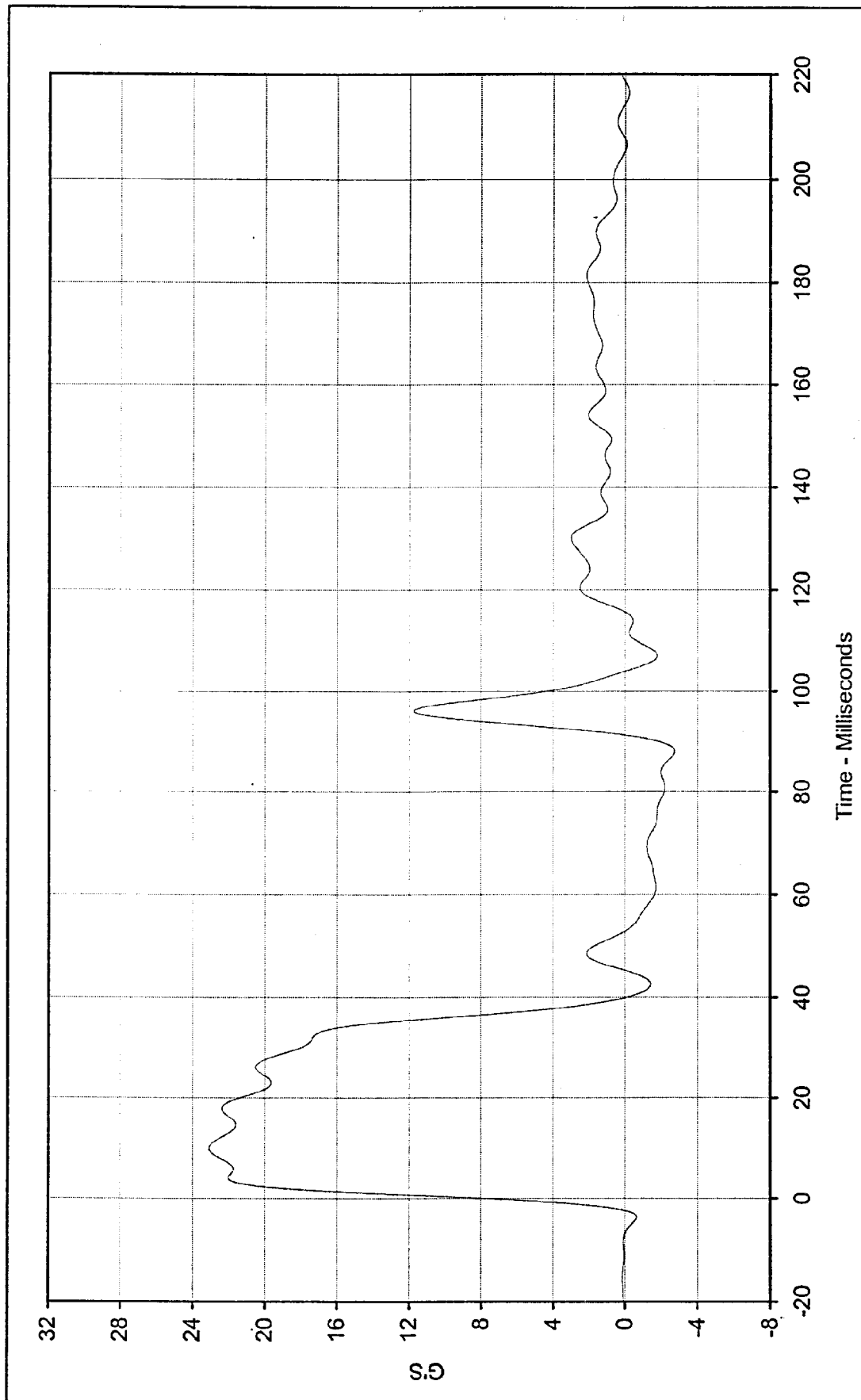
March 22, 1999

Test Date


Approved By

3/22/99

Date



Curve Description: Pendulum Deceleration Testing Program Hybrid III Neck Flexion Test (Male)

Maximum Value: 23.1 at 9.9 Milliseconds Test Information: S/N of Part: N/A Test I.D.: NF04A

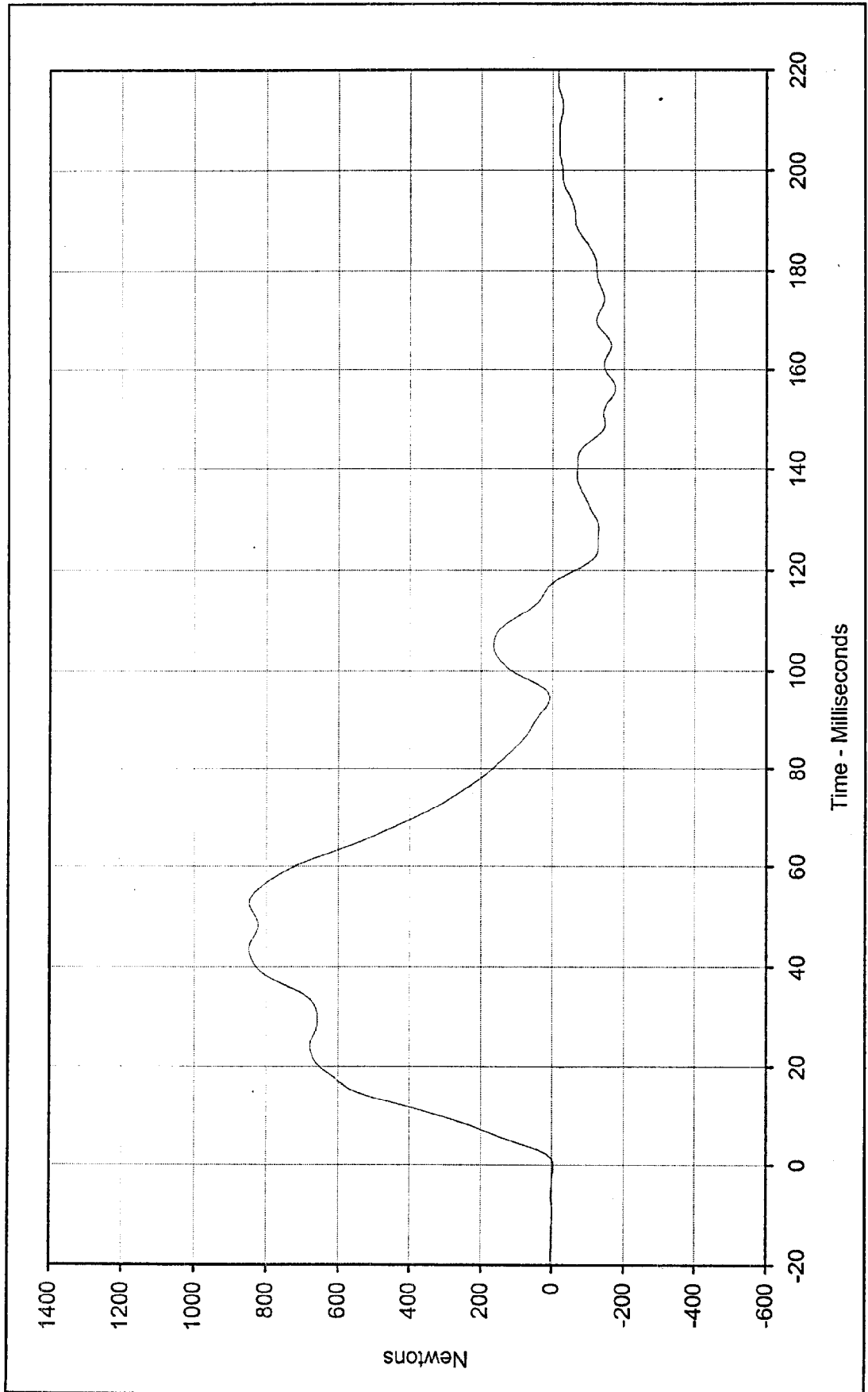
Minimum Value: -2.7 at 88.0 Milliseconds

SAE Filter Class: 60

Date of Test: 3/22/99

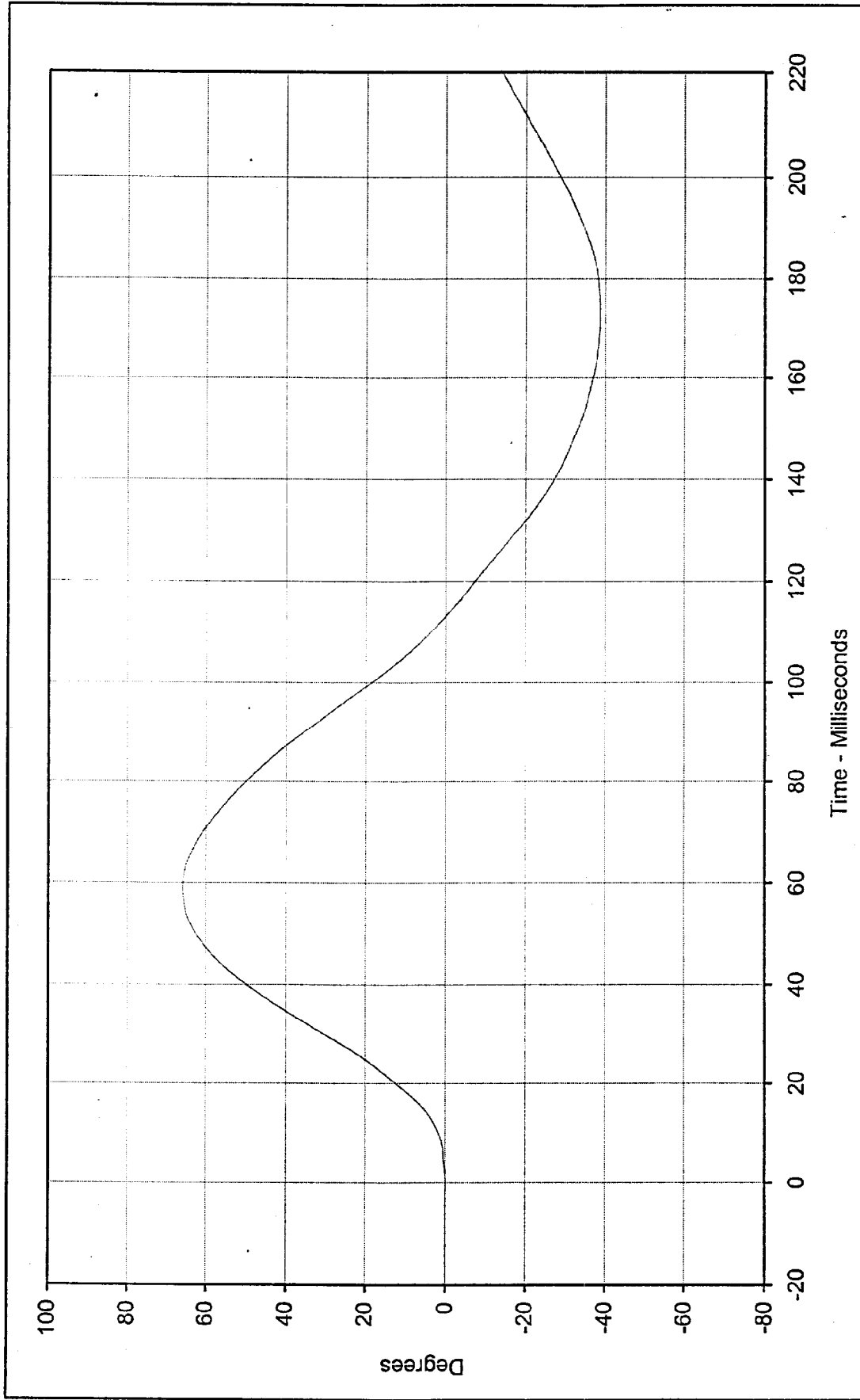
ATD Serial No.: 034





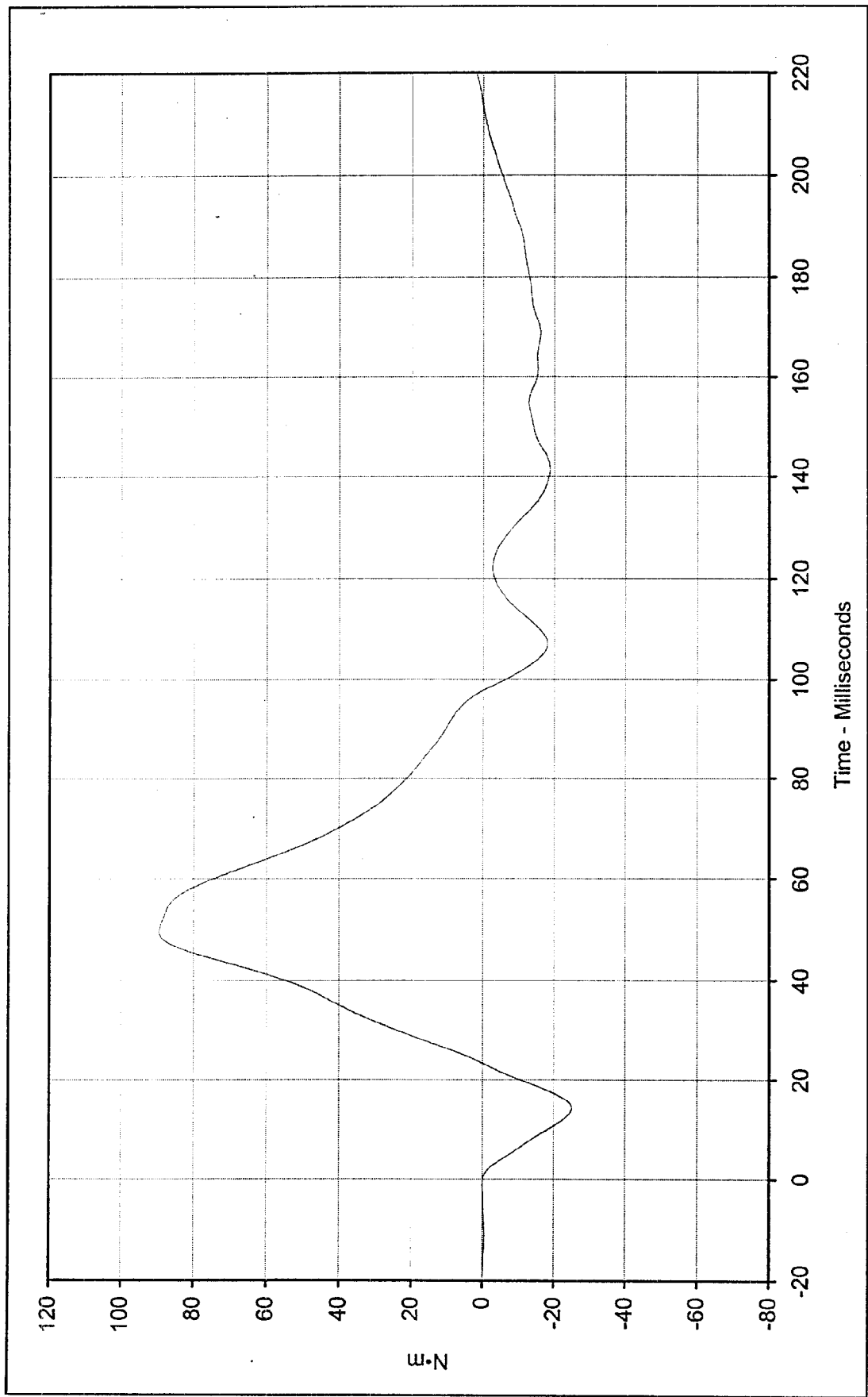
Curve Description:	Neck Force X	Testing Program	Hybrid III Neck Flexion Test (Male)
Maximum Value:	848.1 at 43.5 Milliseconds	Test Information:	S/N of Part: N/A Test I.D.: NF04A
Minimum Value:	-174.9 at 156.2 Milliseconds		
SAE Filter Class:	60		
Date of Test:	3/22/99		
ATD Serial No.:	034		





Curve Description:	"D" Plane Rotation		Testing Program	Hybrid III Neck Flexion Test (Male)
Maximum Value:	65.9	at 59.1 Milliseconds	Test Information:	S/N of Part: N/A Test I.D.: NF04A
Minimum Value:	-38.7	at 172.3 Milliseconds		
SAE Filter Class:	60			
Date of Test:	3/22/99			
ATD Serial No.:	034			





Curve Description: Moment About Occipital Condyles
Maximum Value: 89.5 at 49.6 Milliseconds
Minimum Value: -25.0 at 14.2 Milliseconds
SAE Filter Class: 60
Date of Test: 3/22/99
ATD Serial No.: 034

Testing Program Hybrid III Neck Flexion Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NF04A





Hybrid III Calibration Data Sheet

50TH Percentile Male

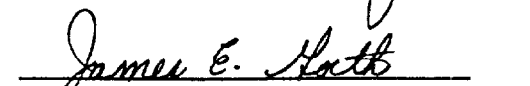
Neck Extension Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NE04A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.16	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.2	Pass
	20 Msec.	G's	14.0 to 19.0	15.7	Pass
	30 Msec.	G's	11.0 to 16.0	13.3	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	13.3	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	45.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	87.0	Pass
	Time	Msec.	72.0 to 82.0	80.6	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	158.6	Pass
Moment About Occipital Condyle	Maximum	N • m	-52.9 to- 79.9	-62.5	Pass
	Time	Msec.	65.0 to 79.0	66.3	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	136.4	Pass
Overall Test Results					Pass

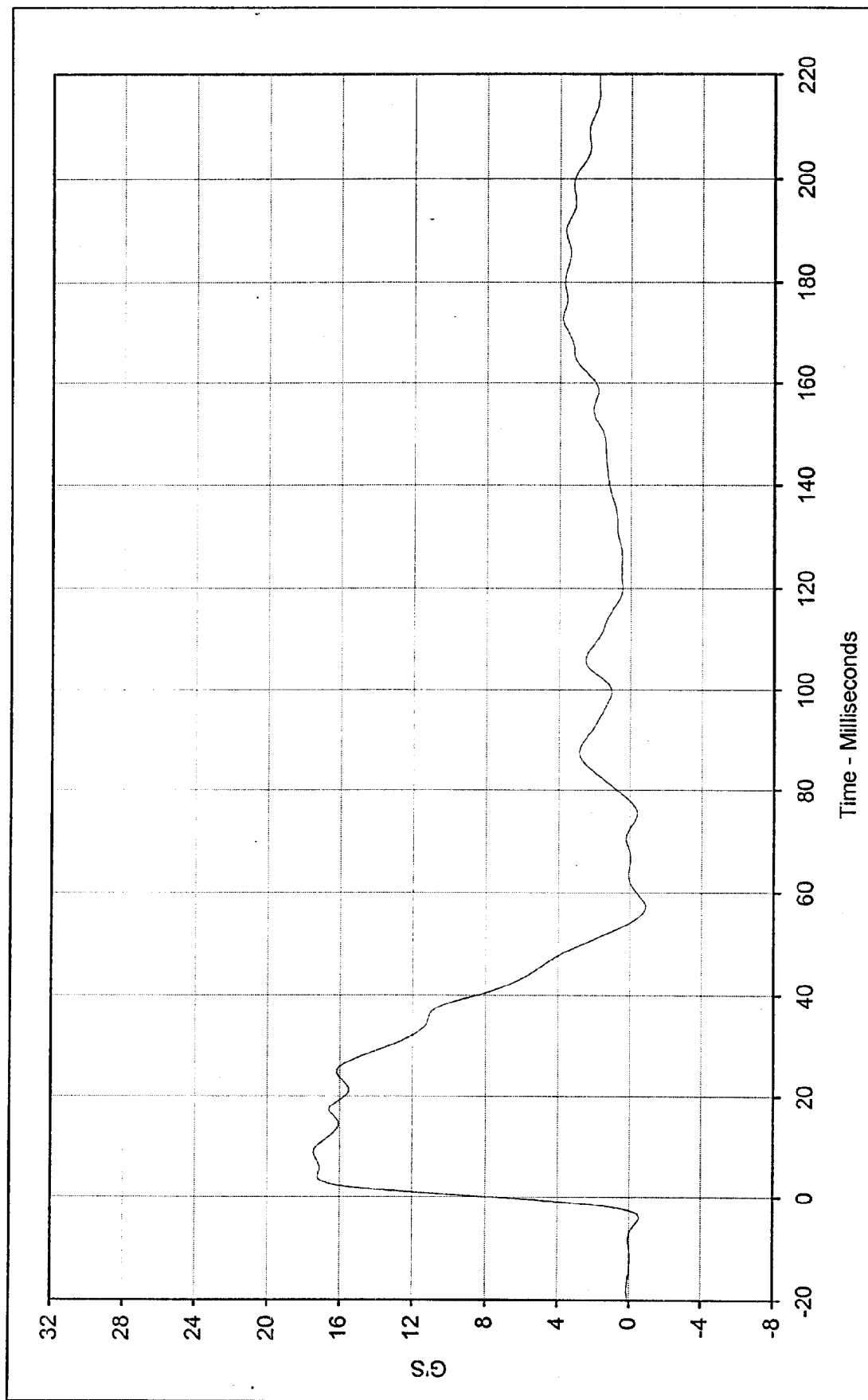

 Laboratory Technician

 Approved By

March 22, 1999

Test Date

3/22/99

Date



Curve Description: Pendulum Deceleration Testing Program Hybrid III Neck Extension Test (Male)

Maximum Value: 17.5 at 8.8 Milliseconds Test Information: S/N of Part: N/A Test I.D.: NE04A

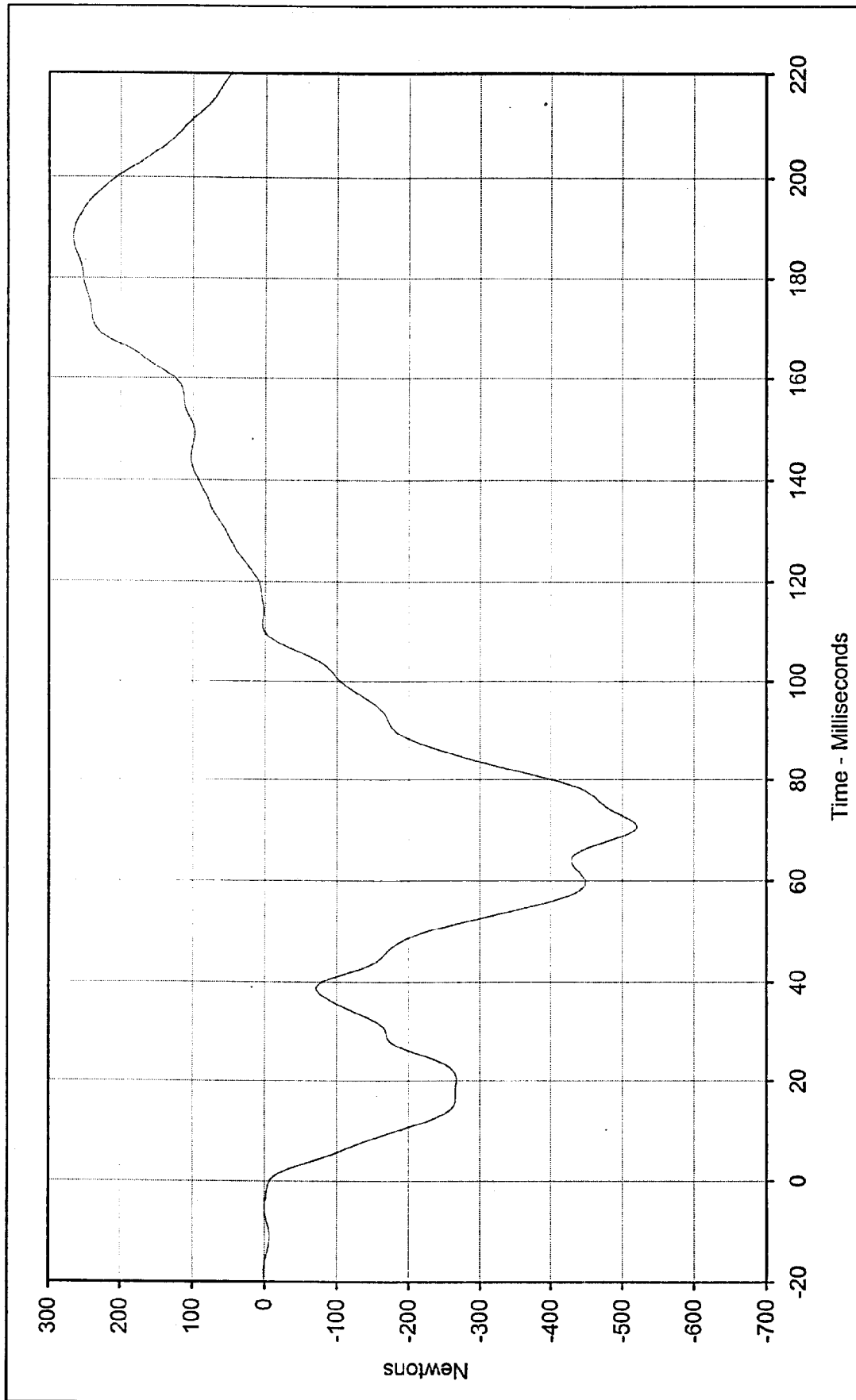
Minimum Value: -0.9 at 57.1 Milliseconds

SAE Filter Class: 60

Date of Test: 3/22/99

ATD Serial No.: 034

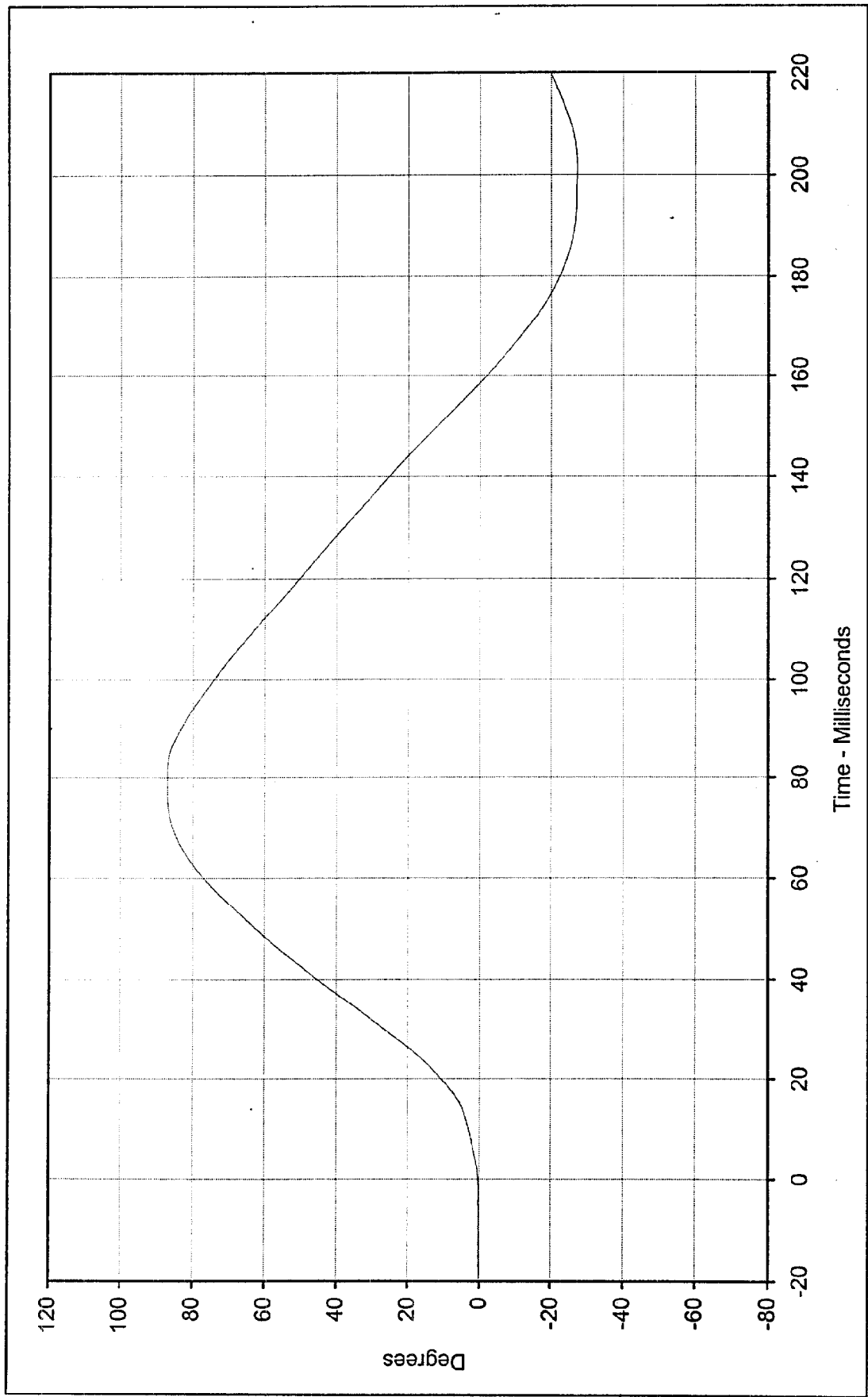




Testing Program Hybrid III Neck Extension Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NE04A

Curve Description: Neck Force X
 Maximum Value: 266.9 at 188.2 Milliseconds
 Minimum Value: -520.0 at 70.7 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/22/99
 ATD Serial No.: 034

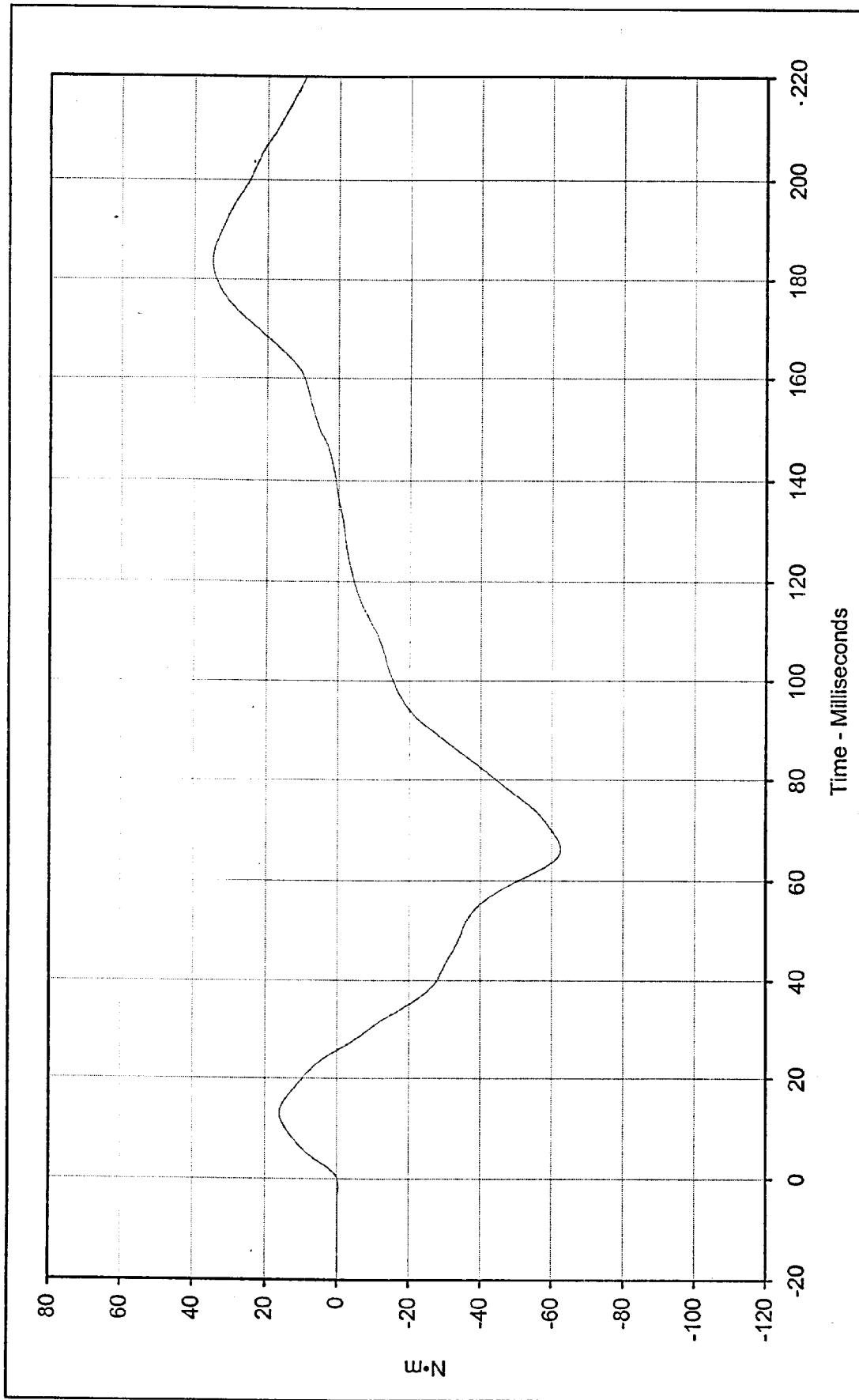




Curve Description: _____
Maximum Value: 87.0 at 80.6 Milliseconds
Minimum Value: -27.2 at 201.5 Milliseconds
SAE Filter Class: 60
Date of Test: 3/22/99
ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)
Test Information: S/N of Part: N/A Test I.D.: NE04A





E-19

Curve Description:	Moment About Occipital Condyles		Testing Program	Hybrid III Neck Extension Test (Male)
Maximum Value:	35.0	at 183.8	Test Information:	S/N of Part: N/A Test I.D.: NE04A
Minimum Value:	-62.5	at 66.3		
SAE Filter Class:	60			
Date of Test:	3/22/99			
ATD Serial No.:	034			



KAR99001-18



Hybrid III Calibration Data Sheet

50TH Percentile Male

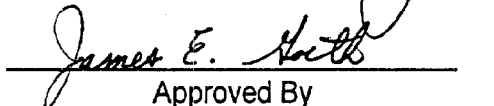
External Measurements

ATD Serial No.: 034

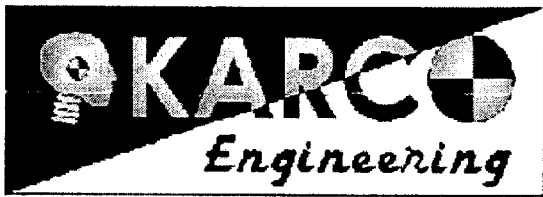
Part Serial No.: N/A

Test I.D.: N/A

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	21.9	Pass
Laboratory relative humidity	%	10 to 70	35	Pass
A - Total sitting height	mm	878.8 to 889.0	885.0	Pass
B - Shoulder pivot height	mm	505.5 to 520.7	516.0	Pass
C - "H" point height	mm	83.8 to 88.9	87.0	Pass
D - "H" point from seat back	mm	134.6 to 139.7	137.0	Pass
E - Shoulder pivot from back	mm	83.8 to 94.0	87.0	Pass
F - Thigh clearance	mm	139.7 to 154.9	152.0	Pass
G - Elbow back to wrist pivot	mm	289.6 to 304.8	302.0	Pass
H - Skull cap to back line	mm	40.6 to 45.7	44.0	Pass
I - Shoulder to elbow length	mm	330.2 to 345.4	340.0	Pass
J - Elbow rest height	mm	190.5 to 210.8	209.0	Pass
K - Buttock to knee length	mm	579.1 to 604.5	602.0	Pass
L - Popliteal length	mm	429.3 to 454.7	450.0	Pass
M - Knee pivot height	mm	485.1 to 500.4	486.0	Pass
N - Buttock popliteal length	mm	452.1 to 477.5	475.0	Pass
O - Chest depth	mm	213.4 to 228.6	226.0	Pass
P - Foot length	mm	251.5 to 266.7	261.0	Pass
V - Shoulder breadth	mm	421.6 to 436.9	430.0	Pass
W - Foot breadth	mm	91.4 to 106.7	105.0	Pass
Y - Chest circumference	mm	970.3 to 1000.8	995.0	Pass
Z - Waist circumference	mm	835.7 to 866.1	860.0	Pass
AA - Location for chest circumference	mm	429.3 to 434.3	432.0	Pass
BB - Location for waist circumference	mm	226.1 to 231.1	228.0	Pass
Overall Test Results				Pass


 Laboratory Technician

 Approved By

May 5, 1999
 Test Date
 5/5/99
 Date



Hybrid III Calibration Data Sheet

50TH Percentile Male

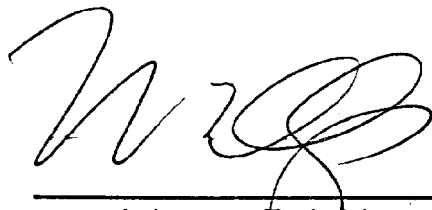
Left Knee Impact Test

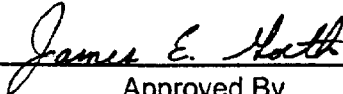
ATD Serial No.: 35

Part Serial No.: N/A

Test I.D.: KN04C

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	2.095	Pass
Peak Probe Force	Newtons	4715 to 5782	5644.1	Pass
Overall Test Results				Pass



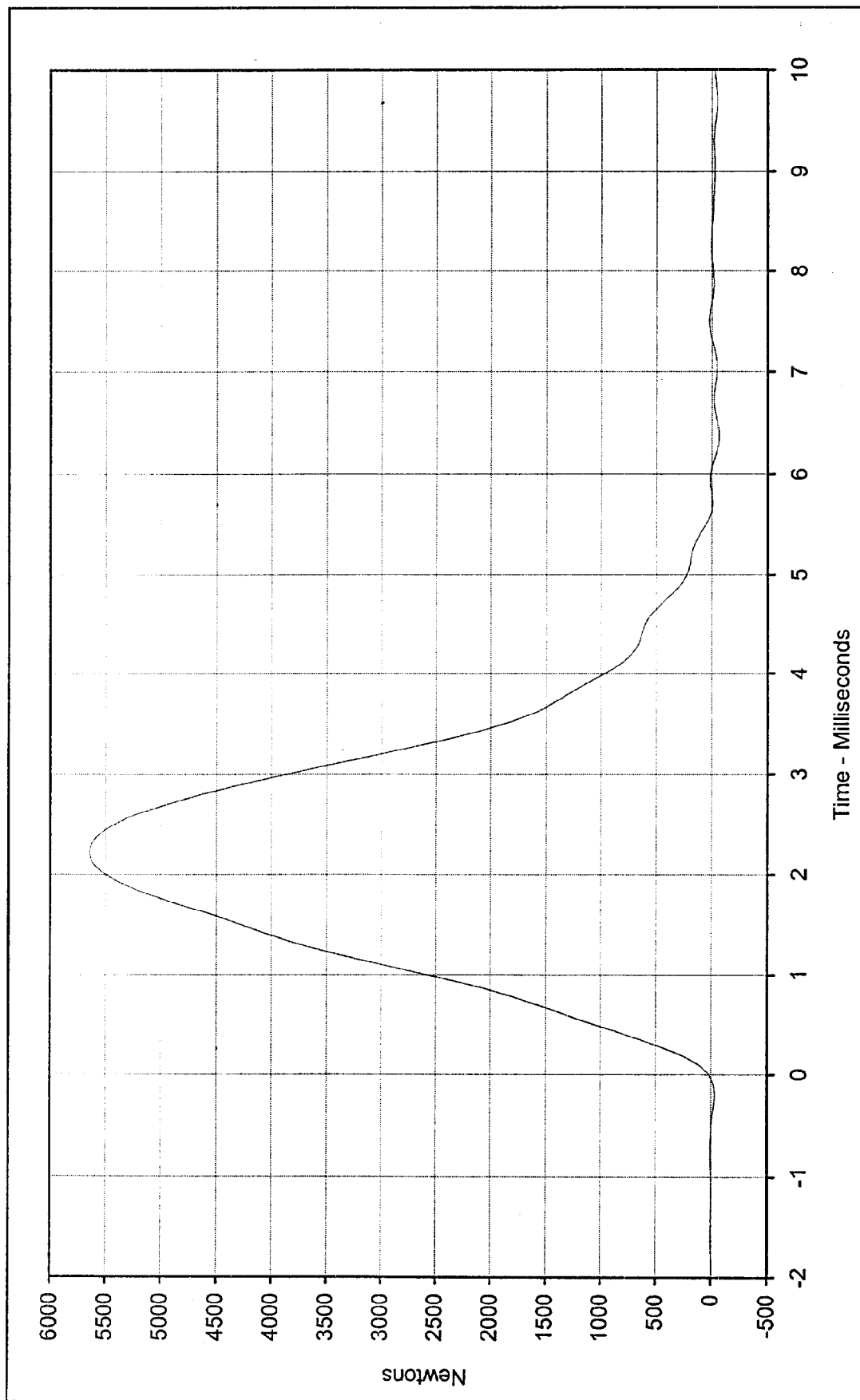
Laboratory Technician


Approved By

March 24, 1999

Test Date


Date



Curve Description:	Testing Program	Hybrid III Left Knee Impact Test
Maximum Value:	Test Information:	Part S/N: N/A Test I.D.: KN04C
Minimum Value:		
SAE Filter Class:		
Date of Test:		
ATD Serial No.:		





Hybrid III Calibration Data Sheet

50TH Percentile Male

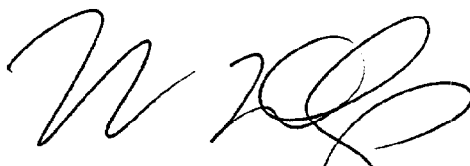
Right Knee Impact Test

ATD Serial No.: 35

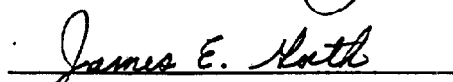
Part Serial No.: N/A

Test I.D.: KN04D

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	2.093	Pass
Peak Probe Force	Newtons	4715 to 5782	5157.4	Pass
Overall Test Results				Pass



Laboratory Technician



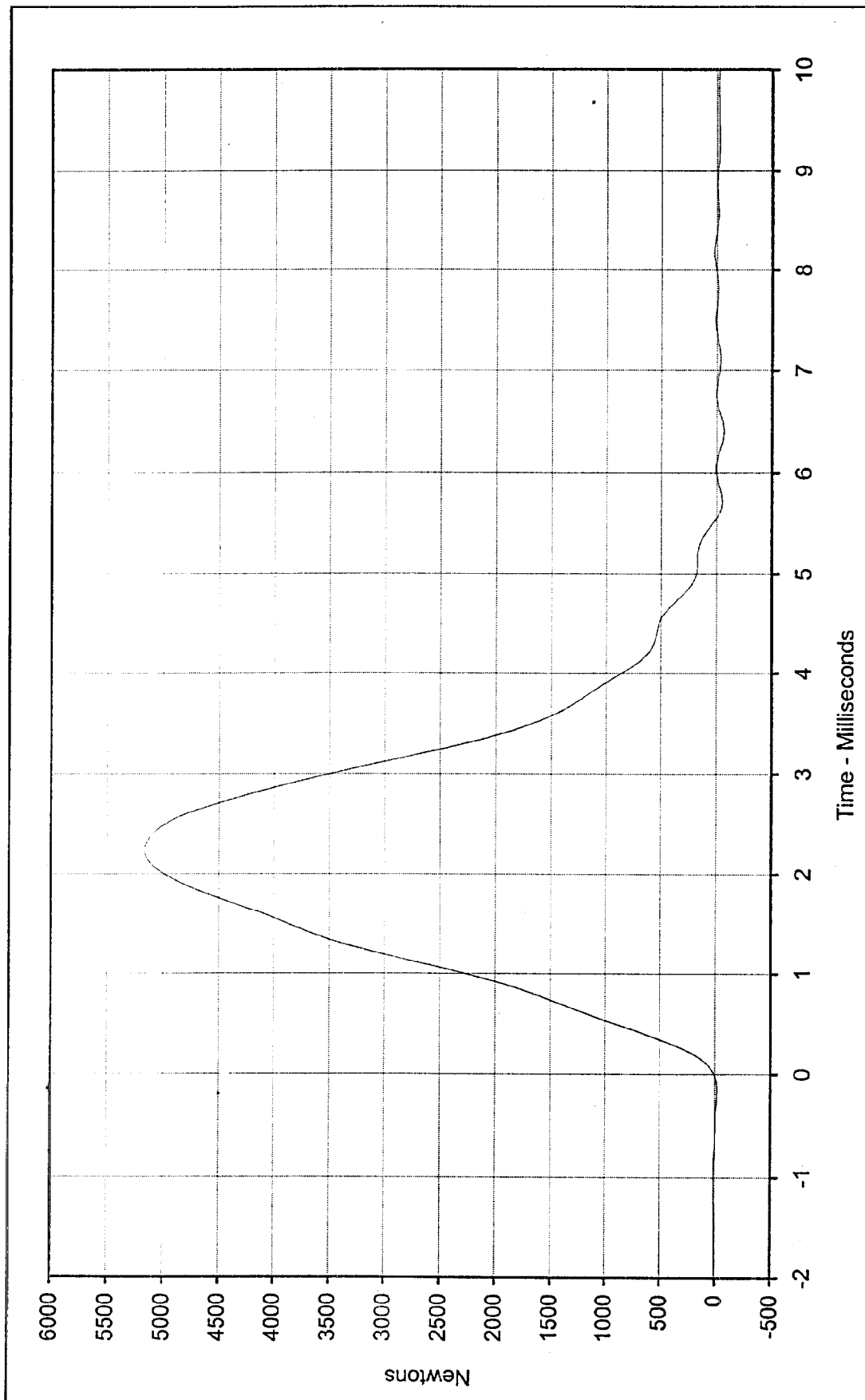
Approved By

March 24, 1999

Test Date

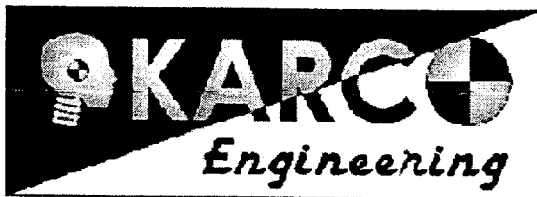
3/24/99

Date



Curve Description:	Testing Program	Hybrid III Right Knee Impact Test
Maximum Value:	Test Information:	Part S/N: N/A Test I.D.: KN04D
Minimum Value:		
SAE Filter Class:		
Date of Test:		
ATD Serial No.:		





Hybrid III Calibration Data Sheet

50TH Percentile Male

Head Drop Calibration

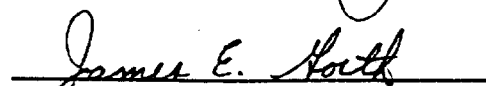
ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: HD04B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	273.3	Pass
Peak Lateral Acceleration	G's	≤15.0	4.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

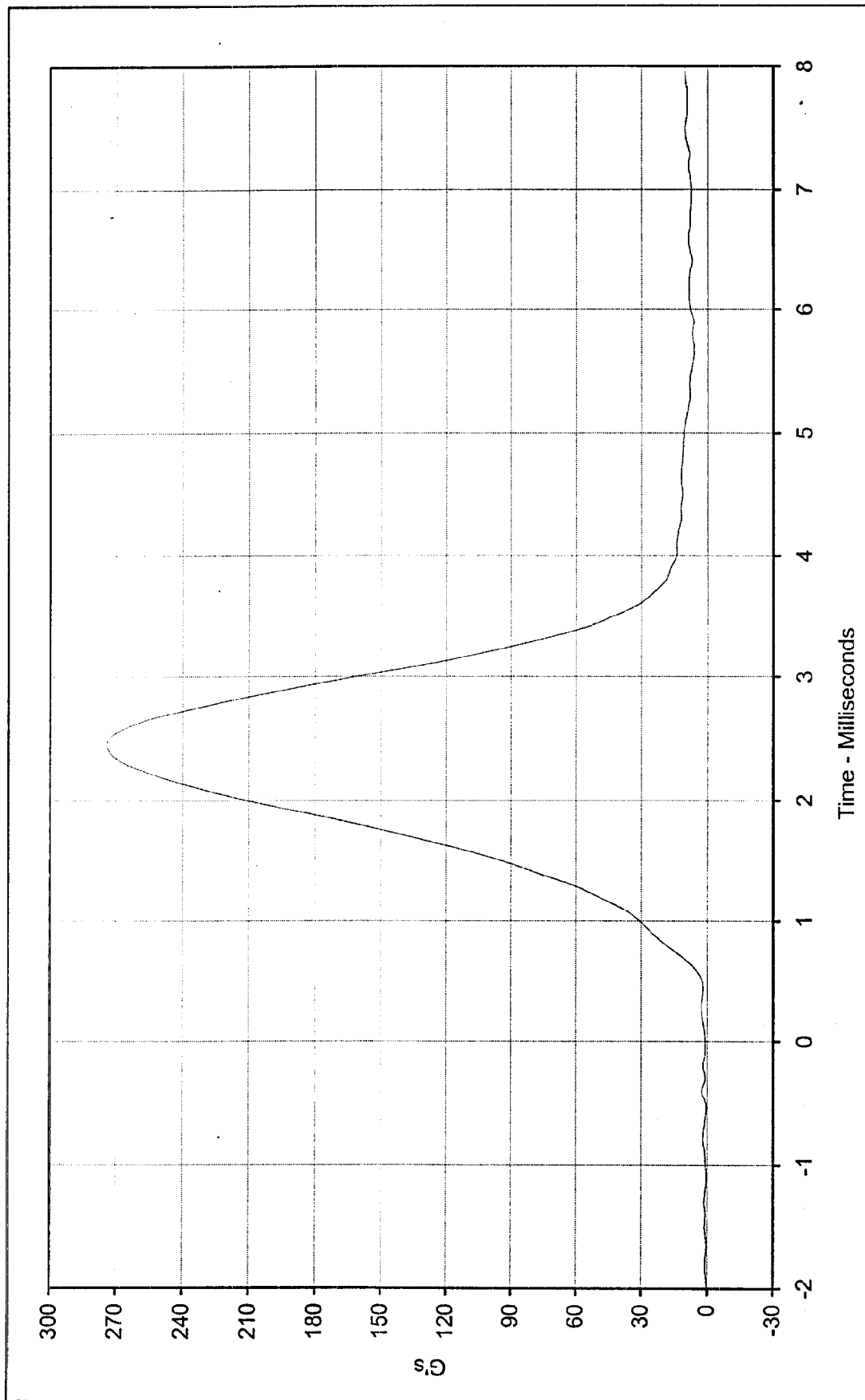

Approved By

March 24, 1999

Test Date

3/24/99

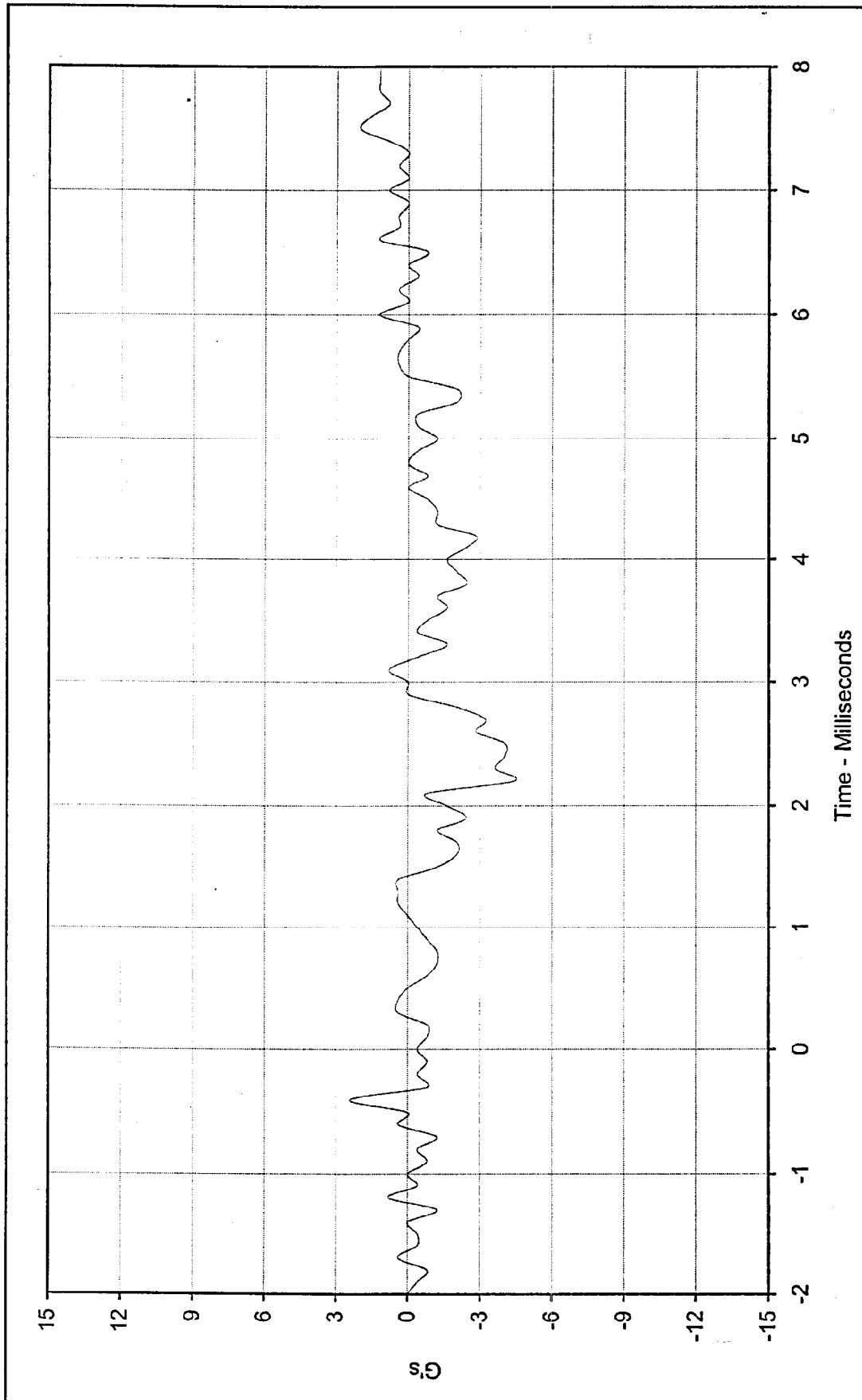
Date



Testing Program: Hybrid III Head Drop Calibration (Male)
 Test Information: S/N of Part: N/A Test I.D.: HD04B



Curve Description: Head Resultant Acceleration
 Maximum Value: 273.3 at 2.5 Milliseconds
 Minimum Value: 0.3 at -2.0 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 3/24/99
 ATD Serial No.: 035



Testing Program Hybrid III Head Drop Calibration (Male)
 Test Information: S/N of Part: N/A Test I.D.: HD04B



Curve Description: Head Acceleration Y Axis
 Maximum Value: 2.4 at -0.4 Milliseconds
 Minimum Value: -4.4 at 2.2 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 3/24/99
 ATD Serial No.: 035



Hybrid III Calibration Data Sheet

50TH Percentile Male

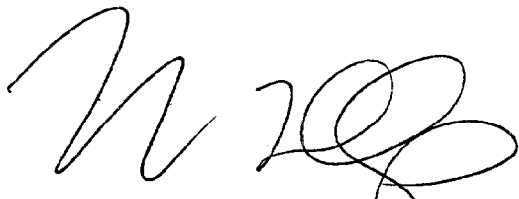
Thorax Impact Test

ATD Serial No.: 035

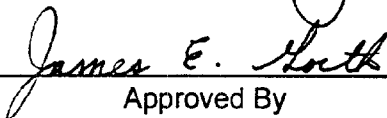
Part Serial No.: N/A

Test I.D.: CH05A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	6.58 to 6.82	6.69	Pass
Peak Probe Force	Newtons	5159 to 5893	5728	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.86	Pass
Internal Hysteresis	%	69 to 85	77.2	Pass
Overall Test Results				Pass



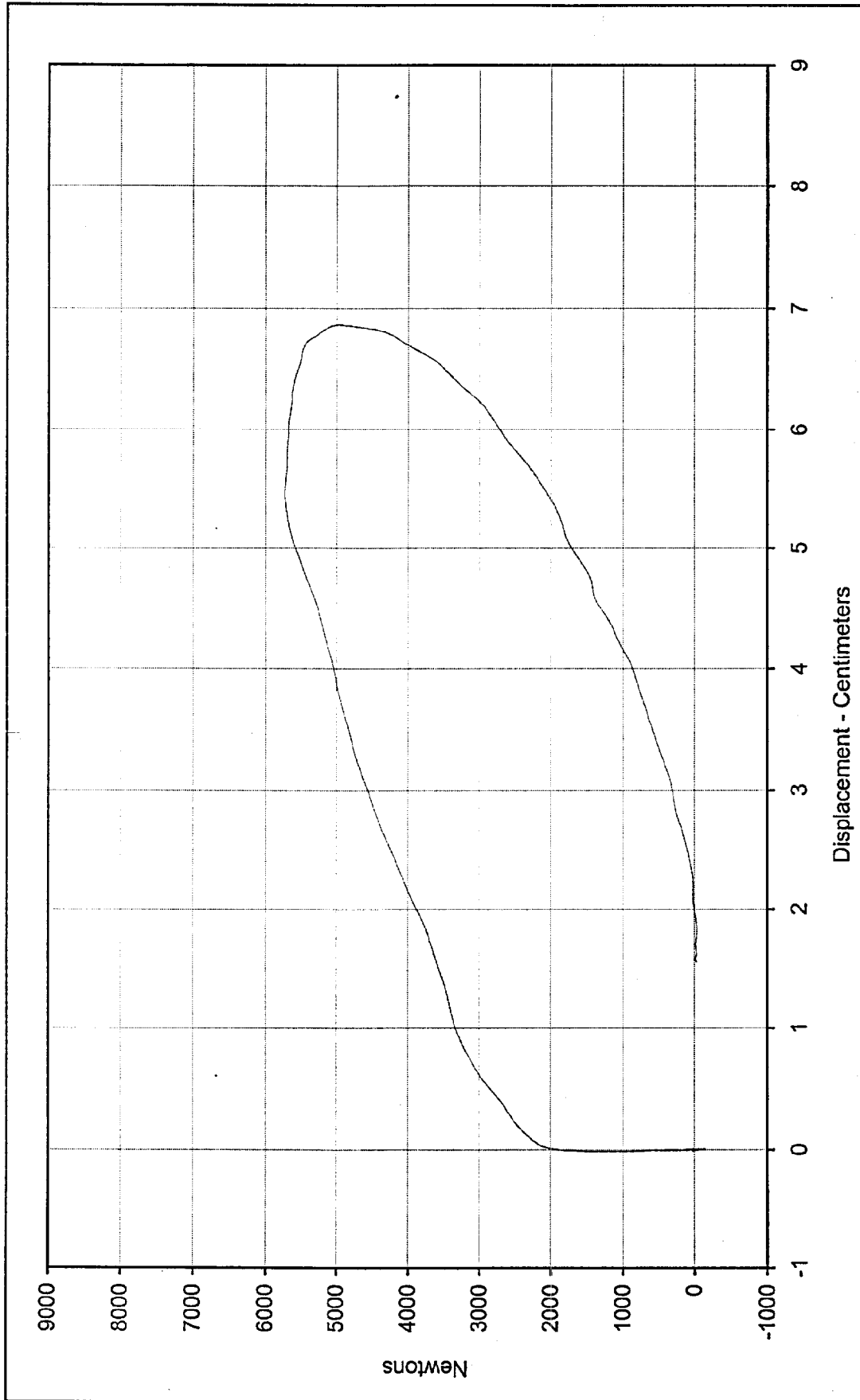
Laboratory Technician



Approved By

May 3, 1999
Test Date

5/3/99
Date



Curve Description:	Probe Force vs. Chest Displacement	Testing Program	Hybrid III Thorax Impact Test
Probe Force:	5727.9 Newtons	Test Information:	S/N of Part: N/A Test I.D.: CH05A

Chest Displ.:	6.86 Centimeters
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SAE Filter Class:	180
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Date of Test:	5/3/99
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ATD Serial No.:	035
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Hybrid III Calibration Data Sheet

50TH Percentile Male

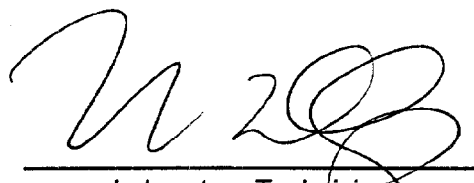
Neck Flexion Test

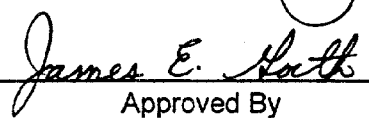
ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NF04B

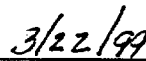
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.2	Pass
	20 Msec.	G's	17.6 to 22.6	21.3	Pass
	30 Msec.	G's	12.5 to 18.5	18.5	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.5	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	40.4	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	66.0	Pass
	Time	Msec.	57.0 to 64.0	62.2	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	119.1	Pass
Moment About Occipital Condyle	Maximum	N • m	84.1 to 108.5	85.4	Pass
	Time	Msec.	47.0 to 58.0	55.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	102.1	Pass
Overall Test Results					Pass


 Laboratory Technician

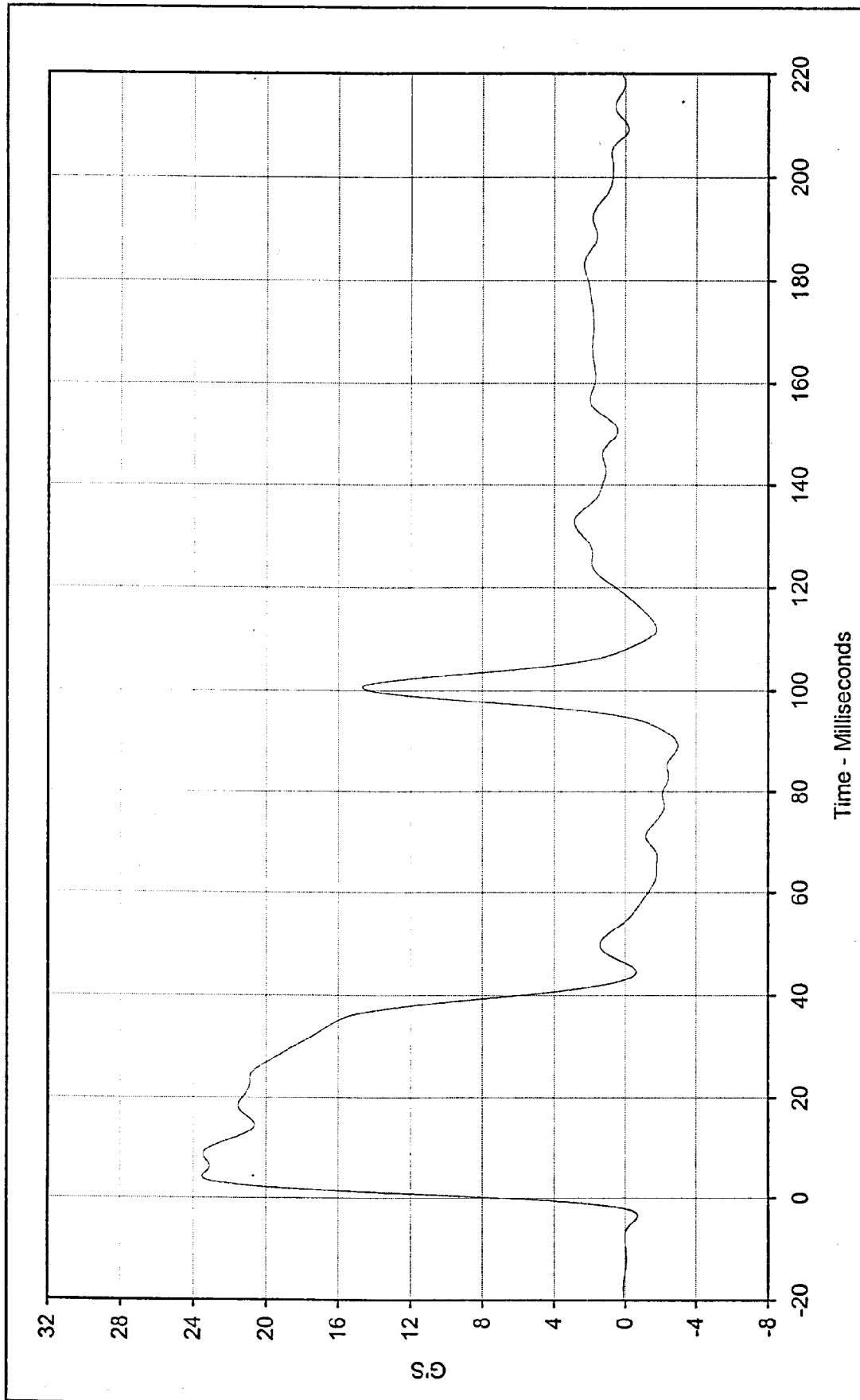

 Approved By

March 22, 1999

Test Date



Date



Curve Description: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF04B

Pendulum Deceleration

Maximum Value: 23.5 at 4.3 Milliseconds

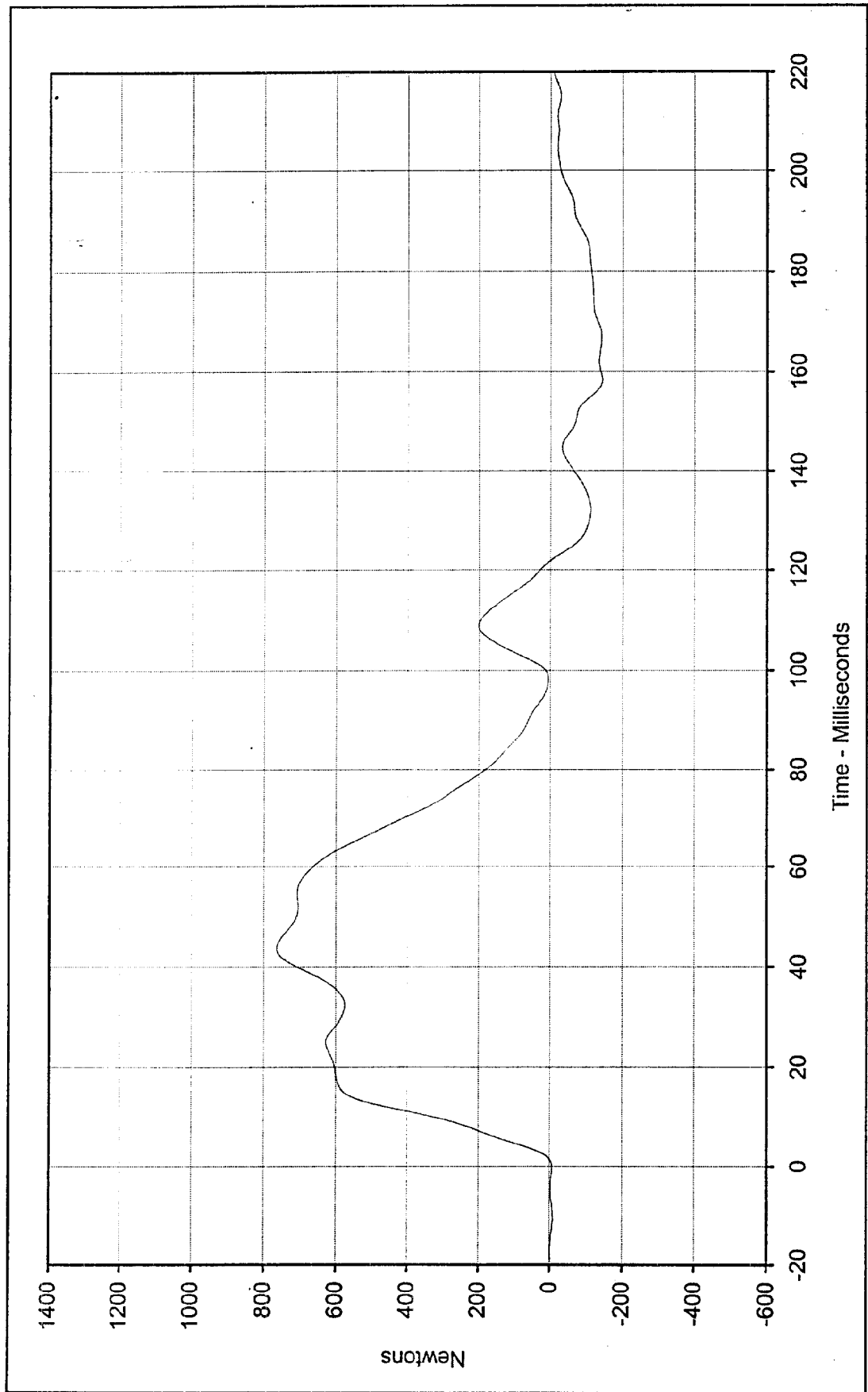
Minimum Value: -3.0 at 89.1 Milliseconds

SAE Filter Class: 60

Date of Test: 3/22/99

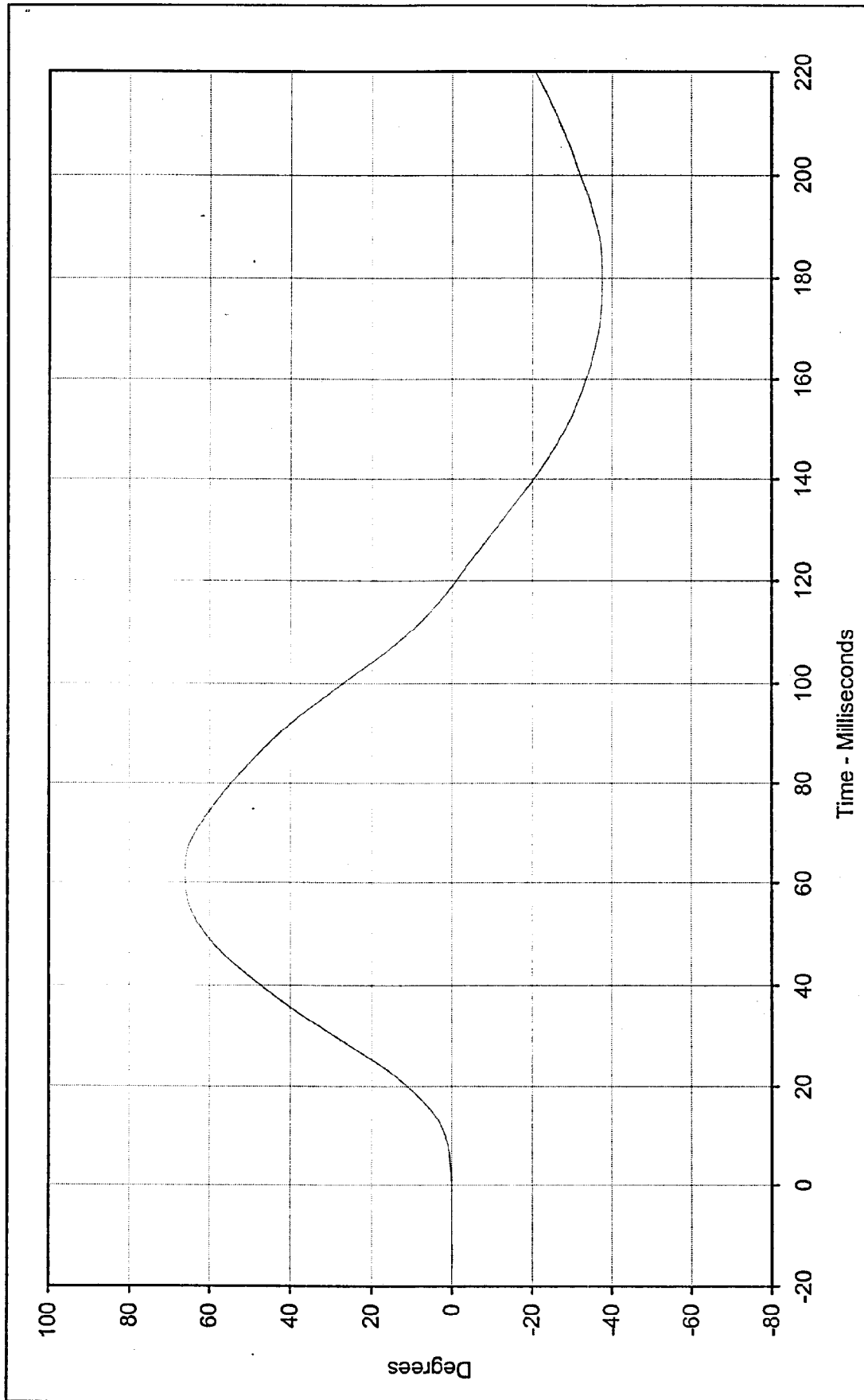
ATD Serial No.: 035





Curve Description:	Neck Force X	Testing Program	Hybrid III Neck Flexion Test (Male)
Maximum Value:	764.1 at 43.6 Milliseconds	Test Information:	S/N of Part: N/A Test I.D.: NF04B
Minimum Value:	-143.6 at 158.3 Milliseconds		
SAE Filter Class:	60		
Date of Test:	3/22/99		
ATD Serial No.:	035		





Curve Description: "D" Plane Rotation Testing Program Hybrid III Neck Flexion Test (Male)

Maximum Value: 66.0 at 62.2 Milliseconds

Minimum Value: -37.5 at 179.7 Milliseconds

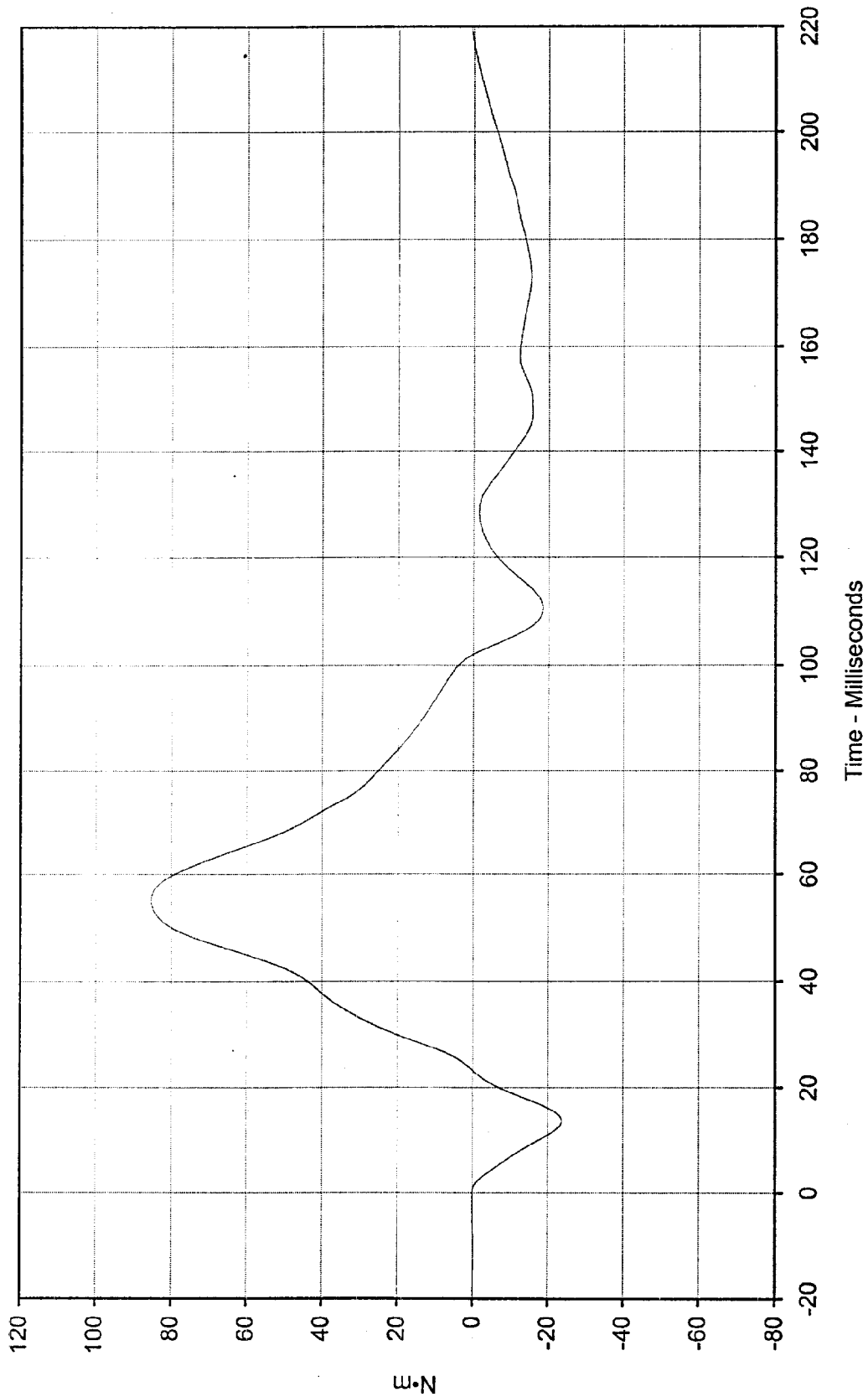
SAE Filter Class: 60

Date of Test: 3/22/99

ATD Serial No.: 035

Test Information: S/N of Part: N/A Test I.D.: NF04B





Curve Description: Moment About Occipital Condyles

Maximum Value: 85.4 at 55.0 Milliseconds

Minimum Value: -23.7 at 13.7 Milliseconds

SAE Filter Class: 60

Date of Test: 3/22/99

ATD Serial No.: 035

Testing Program Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF04B





Hybrid III Calibration Data Sheet

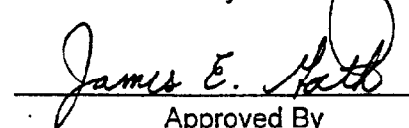
50TH Percentile Male

Neck Extension Test

ATD Serial No.: 035Part Serial No.: N/ATest I.D.: NE04B

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.18	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.8	Pass
	20 Msec.	G's	14.0 to 19.0	16.5	Pass
	30 Msec.	G's	11.0 to 16.0	12.5	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	12.5	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	45.4	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	93.7	Pass
	Time	Msec.	72.0 to 82.0	78.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	160.3	Pass
Moment About Occipital Condyle	Maximum	N • m	-52.9 to- 79.9	-66.2	Pass
	Time	Msec.	65.0 to 79.0	66.6	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	136.7	Pass
Overall Test Results					Pass


Laboratory Technician

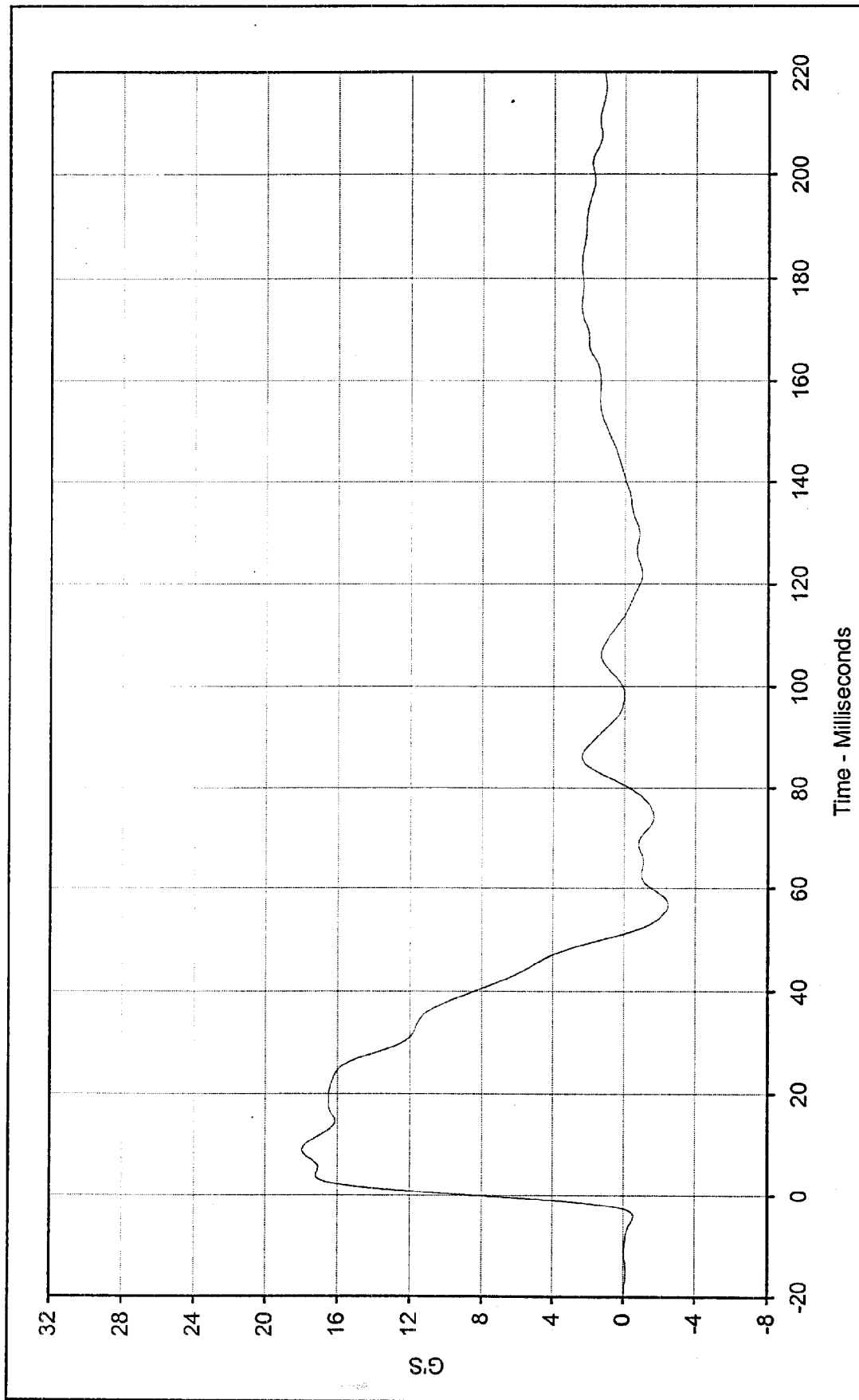

Approved By

March 22, 1999

Test Date

3/22/99

Date



Curve Description: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE04B

Pendulum Deceleration

Maximum Value: 18.0 at 9.0 Milliseconds

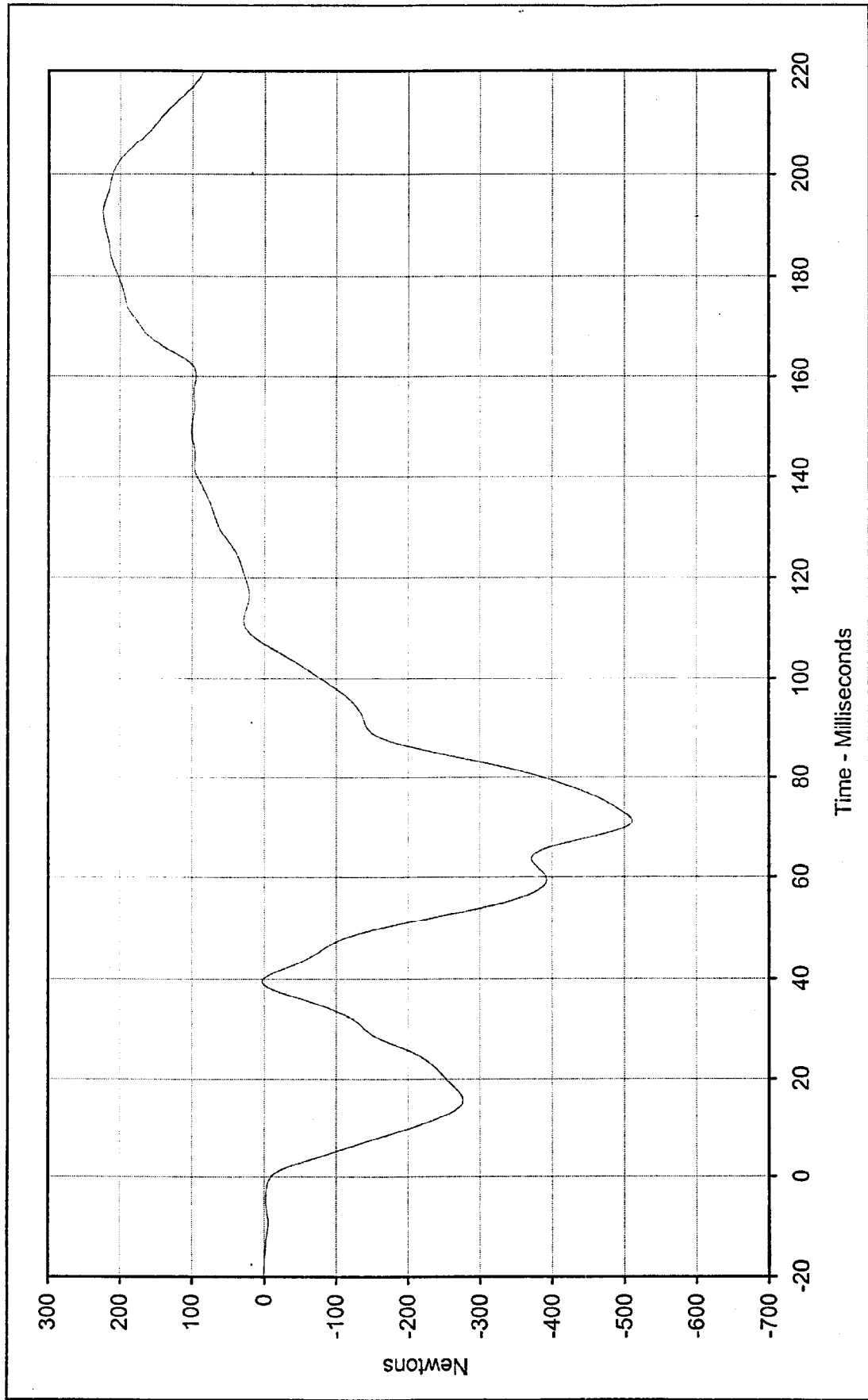
Minimum Value: -2.5 at 56.7 Milliseconds

SAE Filter Class: 60

Date of Test: 3/22/99

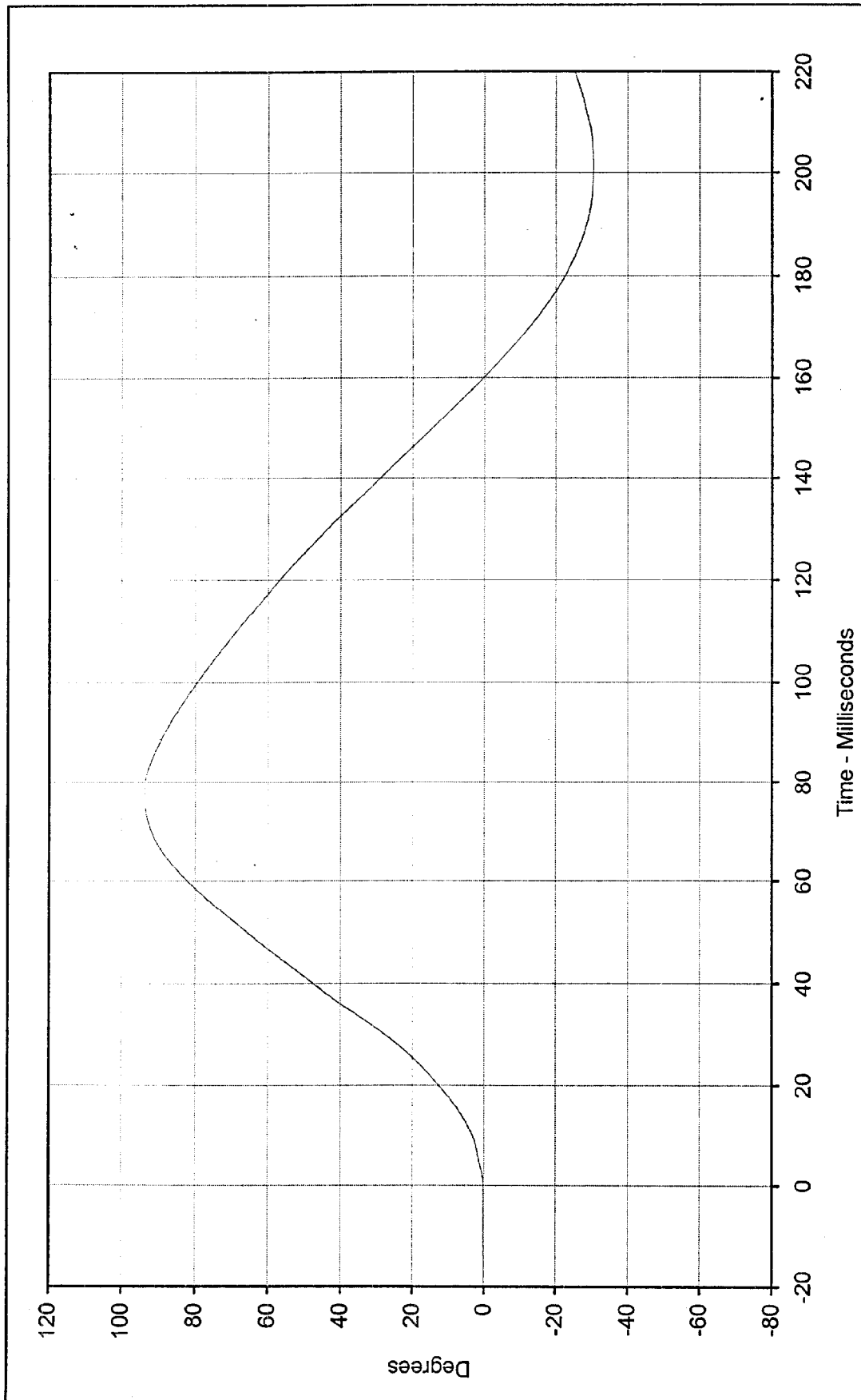
ATD Serial No.: 035





Curve Description:	Neck Force X	Testing Program	Hybrid III Neck Extension Test (Male)
Maximum Value:	223.8 at 192.7 Milliseconds	Test Information:	S/N of Part: N/A Test I.D.: NE04B
Minimum Value:	-510.5 at 71.1 Milliseconds		
SAE Filter Class:	60		
Date of Test:	3/22/99		
ATD Serial No.:	035		

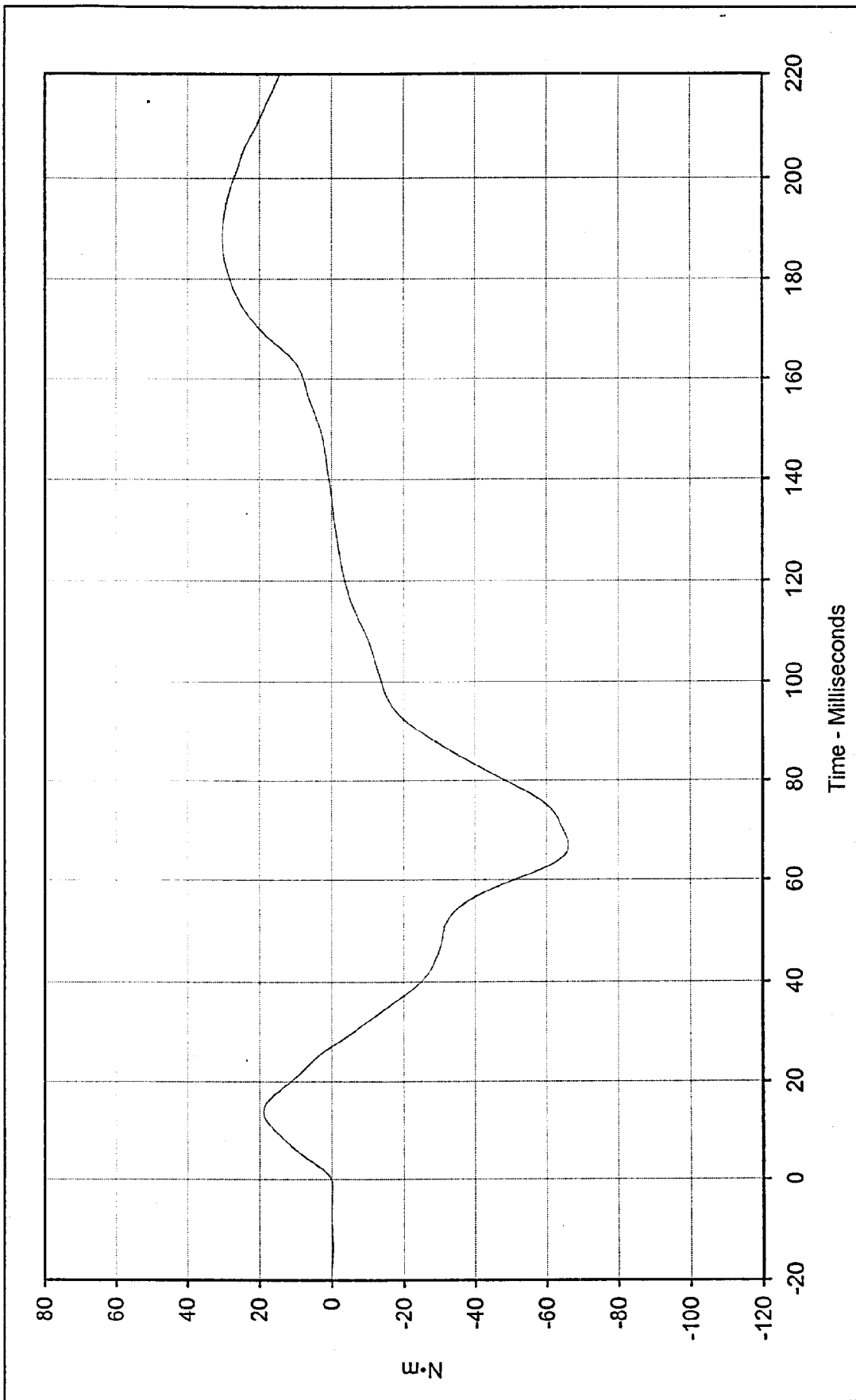




Testing Program Hybrid III Neck Extension Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NE04B

Curve Description: "D" Plane Rotation
 Maximum Value: 93.7 at 78.0 Milliseconds
 Minimum Value: -30.4 at 201.5 Milliseconds
 SAE Filter Class: 60
 Date of Test: 3/22/99
 ATD Serial No.: 035





Curve Description: Moment About Occipital Condyles

Maximum Value: 30.4 at 188.4 Milliseconds

Minimum Value: -66.2 at 66.6 Milliseconds

SAE Filter Class: 60

Date of Test: 3/22/99

ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE04B





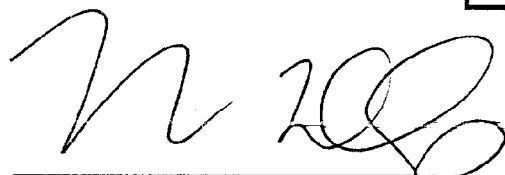
Hybrid III Calibration Data Sheet

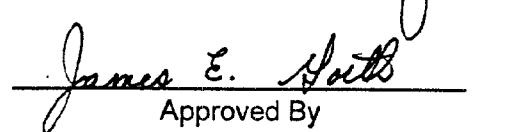
50TH Percentile Male

External Measurements

ATD Serial No.: 035Part Serial No.: N/ATest I.D.: N/A

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	21.9	Pass
Laboratory relative humidity	%	10 to 70	35	Pass
A - Total sitting height	mm	878.8 to 889.0	888.0	Pass
B - Shoulder pivot height	mm	505.5 to 520.7	519.0	Pass
C - "H" point height	mm	83.8 to 88.9	87.0	Pass
D - "H" point from seat back	mm	134.6 to 139.7	136.0	Pass
E - Shoulder pivot from back	mm	83.8 to 94.0	86.0	Pass
F - Thigh clearance	mm	139.7 to 154.9	152.0	Pass
G - Elbow back to wrist pivot	mm	289.6 to 304.8	295.0	Pass
H - Skull cap to back line	mm	40.6 to 45.7	44.0	Pass
I - Shoulder to elbow length	mm	330.2 to 345.4	335.0	Pass
J - Elbow rest height	mm	190.5 to 210.8	200.0	Pass
K - Buttock to knee length	mm	579.1 to 604.5	595.0	Pass
L - Popliteal length	mm	429.3 to 454.7	440.0	Pass
M - Knee pivot height	mm	485.1 to 500.4	498.0	Pass
N - Buttock popliteal length	mm	452.1 to 477.5	474.0	Pass
O - Chest depth	mm	213.4 to 228.6	222.0	Pass
P - Foot length	mm	251.5 to 266.7	261.0	Pass
V - Shoulder breadth	mm	421.6 to 436.9	430.0	Pass
W - Foot breadth	mm	91.4 to 106.7	103.0	Pass
Y - Chest circumference	mm	970.3 to 1000.8	979.0	Pass
Z - Waist circumference	mm	835.7 to 866.1	860.0	Pass
AA - Location for chest circumference	mm	429.3 to 434.3	430.0	Pass
BB - Location for waist circumference	mm	226.1 to 231.1	229.0	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

May 5, 1999

Test Date

5/5/99

Date

APPENDIX F
VEHICLE OWNER'S MANUAL
OCCUPANT RESTRAINT INSTRUCTIONS

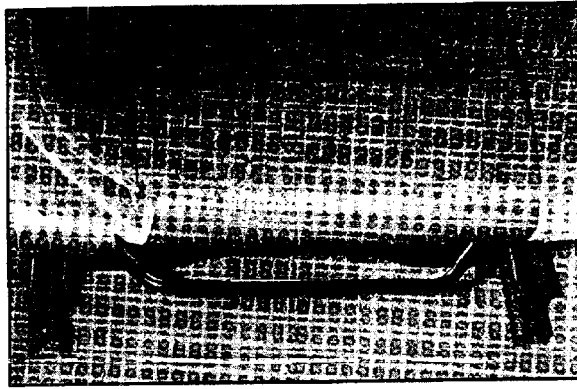
Seats and Seat Controls

This section tells you how to adjust the seats and explains reclining seatbacks and head restraints.

Manual Front Seat

CAUTION:

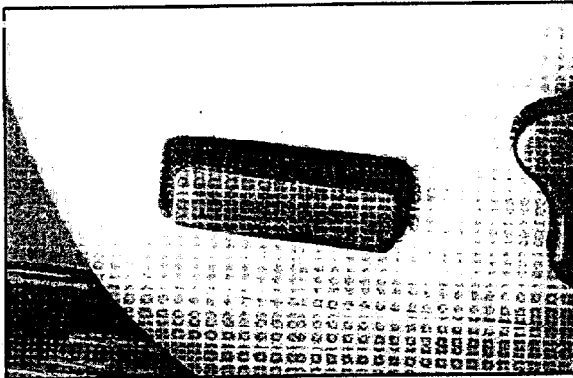
You can lose control of the vehicle if you try to adjust a manual driver's seat while the vehicle is moving. The sudden movement could startle and confuse you, or make you push a pedal when you don't want to. Adjust the driver's seat only when the vehicle is not moving.



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

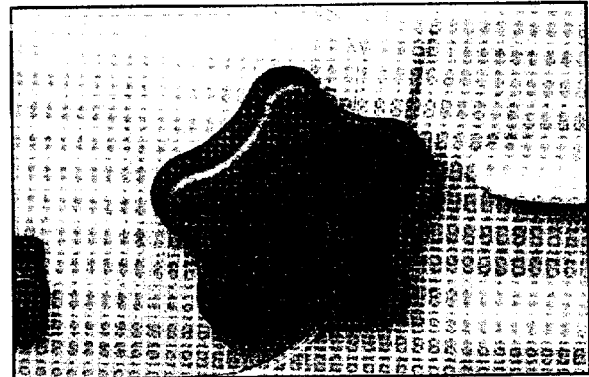
1-2

6-Way Power Driver's Seat (If Equipped)



This switch is designed to control the movements of your seat cushion. It is located on the left side of the driver's seat cushion. To move the seat forward or rearward, push the switch forward or rearward. To raise or lower the seat, push the switch up or down. To raise or lower the front portion of your seat, push the front of the switch up or down. To raise or lower the rear portion of your seat, push the rear of the switch up or down.

Manual Lumbar (If Equipped)



The knob that controls this feature is located on the left side of the driver's seat. Turn the knob toward the front of the vehicle to increase lumbar support. Turn the knob toward the rear of the vehicle to decrease lumbar support.

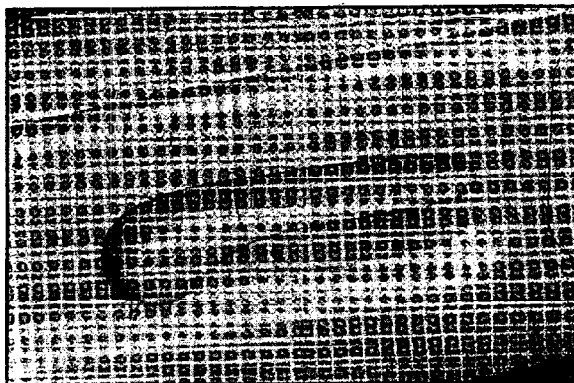
1-3

Heated Front Seat (If Equipped)

If your vehicle is equipped with this feature, both the driver's and passenger's heated seat switches are on the outboard side of the seat near the front.

Press LO to warm the seat to a lower temperature. Press HI to warm the seat to a higher temperature. To turn this feature off, place the switch in the center position.

Reclining Front Seatbacks

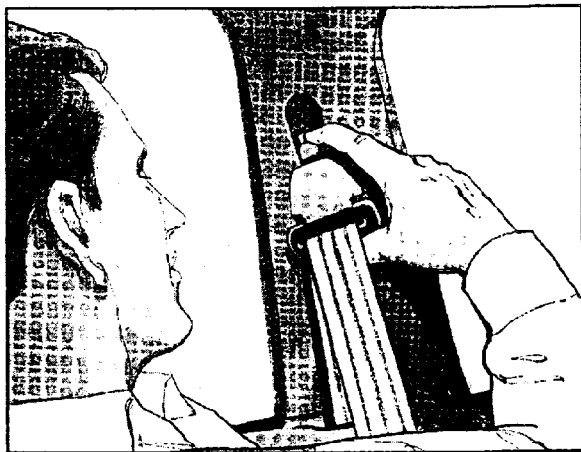


Lift the lever to release the seatback, then move the seatback to where you want it. Release the lever to lock the seatback in place. Pull up on the lever without pushing on the seatback, and the seatback will move forward.

1-4

Shoulder Belt Height Adjuster

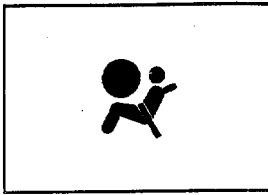
Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.



To move it down, squeeze the release lever and the shoulder belt guide as shown 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 squeezing the release lever to make sure it has locked into position.

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

1-16



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.

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.

1-25

The driver's window switch has an express-down feature. This switch is labeled AUTO. Tap the rear of the switch, and the driver's window will open a small amount. If the rear of the switch is pressed all the way down, the window will go all the way down.

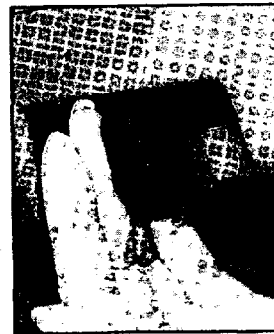
To stop the window while it is lowering, press the front of the switch. To raise the window, press and hold the front of the switch.

The driver's window controls also include a lock-out switch. Press LOCK to stop front and rear passengers from using their window switches. The driver can still control all the windows with the lock on. Press the other side of the LOCK button for normal window operation.

Horn

Press anywhere near the horn symbols on your steering wheel pad to sound the horn.

Tilt Wheel Adjustable Steering Column



A tilt steering wheel allows you to adjust the steering wheel before you drive.

You can also raise it to the highest level to give your legs more room when you exit and enter the vehicle.

To tilt the wheel, hold the steering wheel and pull the lever. Move the steering wheel to a comfortable level, then release the lever to lock the wheel into place.

2-37