

V3021

REPORT NO. KAR-99-13

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST

FORD MOTOR COMPANY
1999 FORD ECONOLINE E-150 VAN
NHTSA NO. MX0208

PREPARED BY:
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9270 HOLLY ROAD
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FEBRUARY 22, 1999
FINAL REPORT

PREPARED FOR:
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16. <i>Abstract</i> A 35 mph (56.3 km/h) frontal barrier impact test was conducted on a 1999 FORD ECONOLINE E-150 VAN at KARCO Engineering on February 4, 1999. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301 and footwell intrusion performance. The impact velocity was 56.3 km/h. The ambient temperature at the barrier face at the time of impact was 10.55°C. The vehicle's maximum post-test static crush was 537 mm, located at the vehicle centerline. The test vehicle was equipped with a 3-point continuous belt system and second generation supplemental airbags at both frontal outboard-seating positions. With respect to FMVSS 208 "Occupant Crash Protection – Injury Criteria" the occupant injury response data summary is as follows: <table border="1"> <thead> <tr> <th><u>Injury Criteria</u></th> <th><u>Threshold Value</u></th> <th><u>Driver Dummy</u></th> <th><u>Passenger Dummy</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>1000</td> <td>536.8</td> <td>634.1</td> </tr> <tr> <td>Chest Resultant Peak 3 msec clip</td> <td>60 G's</td> <td>55.9</td> <td>54.5</td> </tr> <tr> <td>Left Femur Force</td> <td>10009 N</td> <td>-4092.2</td> <td>-4169.5</td> </tr> <tr> <td>Right Femur Force</td> <td>10009 N</td> <td>-2908.8</td> <td>-7738.6</td> </tr> </tbody> </table>				<u>Injury Criteria</u>	<u>Threshold Value</u>	<u>Driver Dummy</u>	<u>Passenger Dummy</u>	Head Injury Criteria (HIC)	1000	536.8	634.1	Chest Resultant Peak 3 msec clip	60 G's	55.9	54.5	Left Femur Force	10009 N	-4092.2	-4169.5	Right Femur Force	10009 N	-2908.8	-7738.6
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SECTION 1

PURPOSE, TEST PROCEDURE AND SUMMARY OF TEST MX0208

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 was to obtain vehicle crashworthiness, occupant restraint system performance data and lower leg data for frontal barrier impacts. The velocity used in this test was in excess of the current 30 mph (48 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 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 February 4, 1999 at a speed of 56.3 km/h. The test vehicle was instrumented with eight (8) accelerometers to measure longitudinal axis accelerations. The driver and passenger's restraint systems were instrumented with four (4) seat belt load cells to measure lap and shoulder belt tension. The specified impact velocity range was 55.5 to 57.1 km/h. The frontal barrier impact event was documented by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The test vehicle contained two (2) part 572E 50th percentile adult male anthropomorphic test devices (ATDs). Both ATDs were instrumented with head, chest and, pelvic tri-axial accelerometers, left/right femur load cells, left/right lower leg sensors and left/right foot accelerometers. In addition, chest displacement and neck six-axis load 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 channels of data were recorded with a PC based (TDAS) on-board data acquisition system. The data was digitally sampled at 10,000 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The Driver ATD (serial No. 34) and the right-front passenger ATD (serial No.35) were re-calibrated prior to this NCAP test. Injury criteria were not exceeded by either ATD during this frontal barrier impact test.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

An immovable barrier was impacted by a 1999 FORD ECONOLINE E-150 VAN at a velocity of 56.3 km/h. The test weight, with two (2) 50th percentile male ATDs, was 2441 kg. Twenty four (24) load cell barrier data channels were obtained in conducting the February 4, 1999 NCAP test. The test vehicle was equipped with a longitudinally mounted 4.2 liter, 8 cyl. engine and a 4-speed automatic transmission.

The driver's Head Injury Criteria (HIC) was 536.8, the maximum chest deceleration over three (3) milliseconds was 55.9 g and the left and right femur loads were -4092.2 and -2908.8 Newtons, respectively. Chest deflection for the driver ATD was -38.6 mm. The driver ATD head contacted the airbag and headrest, its chest and abdomen contacted the airbag, the left and right knees contacted the knee bolster.

The right front passenger's HIC was 634.1, maximum chest deceleration over three (3) milliseconds was 54.5 g and the left and right femur loads were -4169.5 and -7738.6 Newtons respectively. Chest deflection for the passenger ATD was -27.9 mm. The passenger ATD head contacted the airbag, and headrest, the chest and abdomen contacted the airbag and both knees contacted the glove box.

Seat belt spoolout, measured by on-board pullout potentiometers was 84.7 mm for the driver ATD and 332.0 mm for the passenger ATD. Shoulder belt stretch was 0.0 mm/cm for the driver ATD and 0.0 mm/cm for the passenger ATD. No data collected per manufacturers request on belt stretch

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

The test vehicle sustained a maximum static crush of 537 mm located at the vehicle centerline. Both the driver side doors and the passenger side doors opened without the aid of tools.

1.4 GENERAL COMMENTS

The 1999 FORD ECONOLINE E-150 VAN 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, vehicle and 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 restraint systems.

SECTION 2.

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

CONVERSION FACTORS USED IN THIS REPORT:

2.2 pounds (lb.)	=	1 kilogram (kg)
1 mile (mi.)	=	1.609 kilometer (km)
1 gallon (gal.)	=	3.785 liters (L)
1 pound/square inch (psi)	=	7000 Pascal (7 kPa)

DATA SHEET NO. 1

CRASH TEST SUMMARY

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

VEHICLE REBOUND

Measurements in mm	Left	Center	Right
Vehicle Rebound	723	636	718

VEHICLE STATIC CRUSH

Measurements in mm	Left	Center	Right
Pre-test Measurements	5323	5515	5323
Post-test Measurements	4913	4978	4924
Static Crush	-410	-537	-399
Average	-449		

DOOR OPENING AND SEAT TRACK INFORMATION

	Driver	Passenger
Door Opening (Front)	OPENED	OPENED
Door Opening (Rear)	OPENED	OPENED
Seat Track Shift (mm of shift)	NONE	NONE
Seat Back Failure	NONE	NONE

DUMMY INFORMATION

	Driver	Passenger
Dummy Type/No.	50% Male Hybrid III (S/N 34)	50% Male Hybrid III (S/N 35)
Data Channels	44	44
Visible Contact Points		
Head	AIR BAG/HEADREST	AIR BAG/HEADREST
Chest	AIR BAG	AIRBAG
Abdomen	AIRBAG	AIRBAG
Left Knee	KNEE BOLSTER	GLOVE BOX
Right Knee	KNEE BOLSTER	GLOVE BOX

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

TEST VEHICLE INFORMATION			
Manufacturer	FORD MOTOR COMPANY	VIN	1FTRE1423XHA52552
Manufacturing Date	12/98	Delivery Date	1/22/99
Dealer	FAIRVIEW FORD	NHTSA NO.	MX0208
Odometer Reading	49.0 mi	Fuel Type	UNLEADED
Engine Displacement	4.2 Liters	Cylinders	8
Transmission	AUTOMATIC	Final Drive	REAR
Engine Placement	LONGITUDINAL	Color	SILVER
Tire Press./Max. Cap. Front	283 kpa	Cold Tire Press. Front	283 kpa
Tire Press./Max. Cap. Rear	283 kpa	Cold Tire Press. Rear	283 kpa
Recommend Tire Size	P235/75/R15	Type of Spare	P235/75/R15
Tire Size on Vehicle	P235/75/R15	Manufacturer	MICHELEN
GVWR	3039 kg	Cargo Capacity	136 kg
GAWR Front	1469 kg	GAWR Rear	1723 kg
Air Conditioning	YES	Power Steering	YES
Power Brakes	YES	AM/FM/Cassette	NO
Disc Brakes (Front)	YES	Disc Brakes (Rear)	NO
Power Windows	NO	Tilt Steering	NO
Anti-lock Brakes (ABS)	YES	Power Seats	NO
Driver Airbag	YES	Passenger Airbag	YES

VEHICLE CAPACITY DATA: TYPE OF FRONT SEATS BUCKET SEATS

TOTAL NUMBER OF OCCUPANTS 2 OCCUPANTS x 68 kg. 136 kg

WEIGHT OF VEHICLE AS RECEIVED AT KARCO (with maximum fluids) 2159 kg

Data Sheet No. 2... (Continued)

VEHICLE CAPACITY WEIGHT (kg):

Vehicle Capacity Weight 372 kg
 Occupant Weight 136 kg
 Rated Cargo/Luggage Weight (RCLW) 136 kg

	FRONT	REAR	TOTAL
Right	611	483	1094
Left	606	459	1065
Total	1217	942	2159
Percent of Total	56.3	43.7	100%

CALCULATION OF TEST

TARGET WEIGHT (kg):

Total Delivered Weight 2159 kg
 RCLW 136 kg
 Weight of 2 P572 ATDs 152 kg
 TARGET TEST WEIGHT 2447 kg

TEST WEIGHT OF VEHICLE WITH 2 ATDs AND BALLAST

	FRONT	REAR	TOTAL
Right	649	569	1218
Left	652	571	1223
Total	1301	1140	2441
Percent of Total	53.2	46.8	100%

Weight of Ballast secured in cargo area: 54 kg Does not include cameras, instrumentation, and brake abort system.

Vehicle Components Removed For Weight Reduction:

Side mirrors, jack, tools, spare tire and paneling.

TEST VEHICLE ATTITUDE (mm)

	LF	RF	LR	RR
As Delivered	830	825	870	862
As Tested	813	810	834	837

Vehicle Wheelbase: 3505 mm

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 132.4 liters

Usable Capacity Figure Furnished by COTR = 132.4 liters

Test Volume Range (92 to 94% of Usable Capacity) = 121.8 to 124.5 liters

ACTUAL TEST VOLUME = 123.2 liters (With entire fuel system filled)

Test Fluid Type = Stoddard Solvent Specific Gravity = 0.764

Kinematic Viscosity = as per ASTM Standard D484-71 Color = Red

Type of Fuel Pump = Electric X Mechanical

Does electric pump operate with ignition switch "ON" & engine "OFF"? Yes X No

DETAILS OF FUEL SYSTEM: Key operated w/automatic shut off after a few seconds.

DATA SHEET NO. 3

POST IMPACT DATA

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

REQUIRED IMPACT VELOCITY RANGE: 55.51 km/h to 57.11 km/h

BARRIER IMPACT VELOCITY: (speed traps within 5 feet of impact plane)

Trap No. 1 = 56.3 km/h Trap No. 2 = 56.4 km/h

Distance from vehicle to barrier - -

A. entering trap = 1524 mm

B. leaving trap = 305 mm

VEHICLE STATIC CRUSH: (for Frontal and Rear Impacts Only)

Vehicle Length	Left	Center	Right
Pre-test Measurements (mm)	5323	5515	5323
Post-test Measurements (mm)	4913	4978	4924
Static Crush (mm)	-410	-537	-399

VEHICLE REBOUND: (from rigid barrier with rotational movement offsets only)

Measurements in mm	Left Front	Right Front	Left Rear	Right Rear
Vehicle Rebound X axis	N/A	N/A	N/A	N/A
Vehicle Rebound Y axis	N/A	N/A	N/A	N/A
Average X axis	N/A			
Average Y axis	N/A			

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

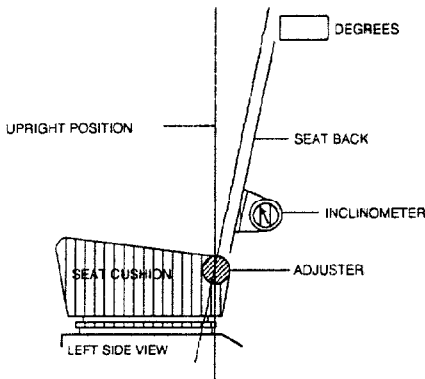
Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

1. NOMINAL DESIGN RIDING POSITION -



FRONT SEAT ASSEMBLY

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable. Indicate, if applicable, how the detents are numbered (Is the first detent "0" or "1"?).

Measurement Instructions: A special application tool with pointed probes was inserted through the fabric to make contact with the rigid portion of the lower seat frame assembly approximately 13 inches above the pivot point of the seat back. The inclinometer was placed against the flat surface of the tool and the seat back angle was measured directly from the dial face. For reference purposes the first detent from the front of the seat was identified as number "1".

Seat back angle for driver's seat = 17° w/seated dummy, taken at seat back cushion.

Measurement Instructions: A special application tool with pointed probes was inserted through the fabric to make contact with the rigid portion of the lower seat frame assembly approximately 13 inches above the pivot point of the seat back. The inclinometer was placed against the flat surface of the tool and the seat back angle was measured directly from the dial face. For reference purposes the first detent from the front of the seat was identified as number "1".

Seat back angle for passenger's seat = 20° w/seated dummy, taken at seat back cushion.

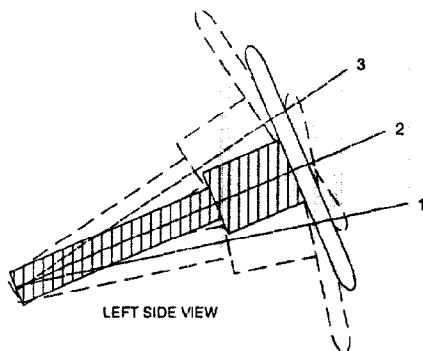
2. SEAT FORE & AFT POSITIONS:

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat: 19 seating positions, set to 10th detent from the front.

Positioning of the passenger's seat (if applicable): 19 seating positions, set to 10th detent from the front.

3. STEERING COLUMN ADJUSTMENTS:



STEERING COLUMN ASSEMBLY

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 driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

Position No. 1 is at 21°

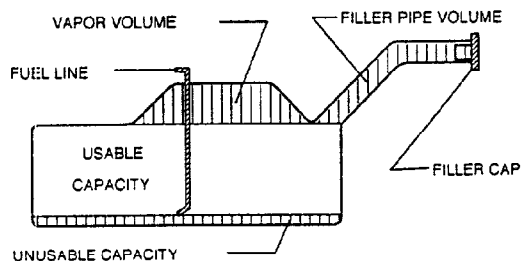
Position No. 2 is at 21°

Position No. 3 is at 21°

4. SEAT BELT UPPER ANCHORAGE: 5 Positions, set at the mid position #3.

DATA SHEET NO. 4 (continued)

5. FUEL TANK CAPACITY DATA



5.1 A. "Usable Capacity" of standard equipment fuel tank = 132.4 liters.

B. "Usable Capacity" of optional equipment fuel tank = N/A liters.

C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 = 121.8 to 124.5 liters.

VEHICLE FUEL TANK ASSEMBLY

Operational Instructions:

5.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 123.2 liters

5.3 Is vehicle equipped with electric fuel pump?

Yes X No

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.
Key operated w/automatic shut off after a few seconds.

DATA SHEET NO. 5

DUMMY POSITIONING IN VEHICLE

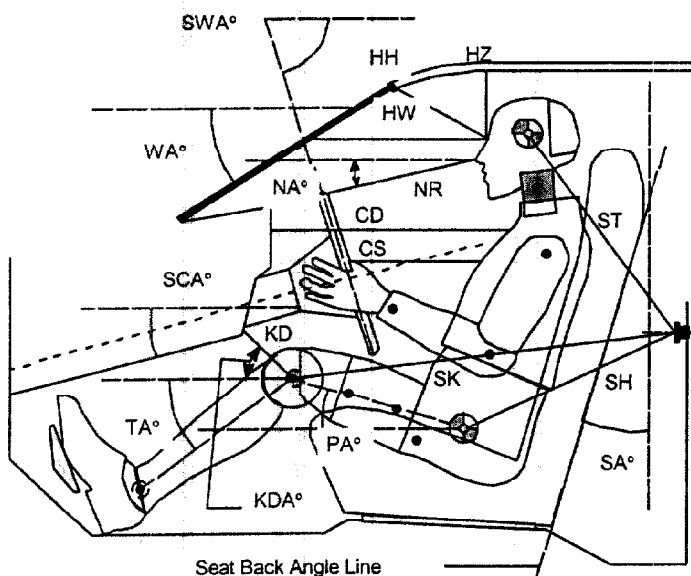
Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

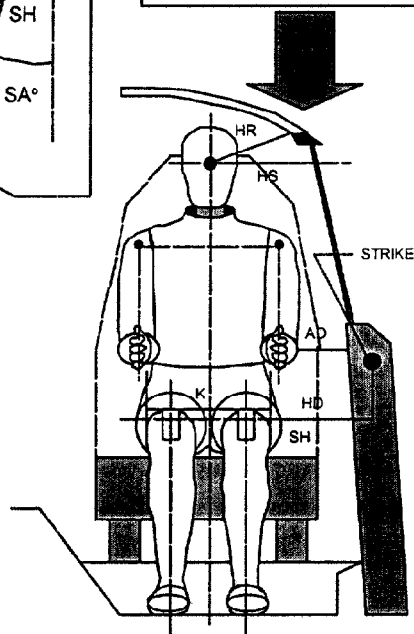
Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

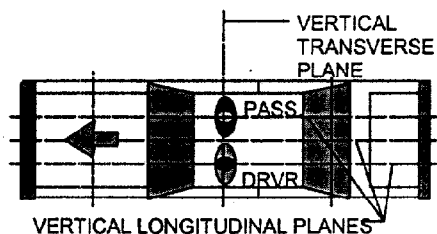
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



AD Arm to Door
HD H-Point to Door
HR Head to Side Header
HS Head to Side Window
KK Knee to Knee
SHY Striker to H-Point
(Y Direction)



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



DATA SHEET NO. 5...(continued)

DUMMY POSITIONING IN VEHICLE

FRONT SEAT MEASUREMENT TABLE

	DRIVER (Serial No. <u>34</u>)		PASS. (Serial No. <u>35</u>)	
	DISTANCE (mm)	ANGLE (°)	DISTANCE (mm)	ANGLE (°)
WA°		43		
SWA°		68		
SCA°		20		
SA°		17		20
HZ	305	90	303	90
HH	453	0	530	0
HW	662	0	730	0
HR	320		345	
NR	368	12		
CD	560		561	
CS	260	0		
RA	156	0		
KDL	152	24	148	
KDR	145		175	24
PA°		21		24.5
TA°		25		31
KK	240		160	
ST	540	77	518	4
SH	246	40	186	45
SHY	230		203	
HS	360		365	
HD	150		130	
AD	75		30	

DATA SHEET NO. 6

SEAT BELT POSITIONING DATA

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

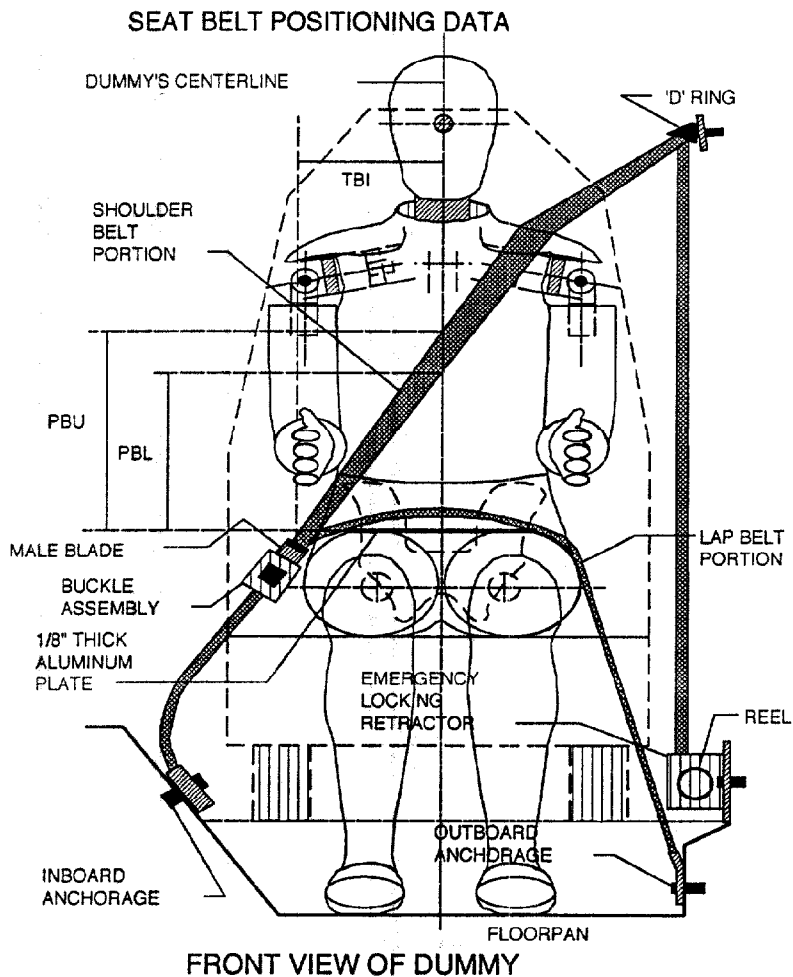
NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TCI - Dummy centerline to shoulder bolt	mm	170	170
PBU - Top surface of reference to belt upper edge	mm	320	310
PBL - Top surface of reference to belt lower edge	mm	240	230
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: 1999 FORD ECONOLINE E-150 VAN NHTSA No.: MX0208
 TEST PROGRAM: 1999 NHTSA 35 MPH NCAP TEST DATE: 2/4/99

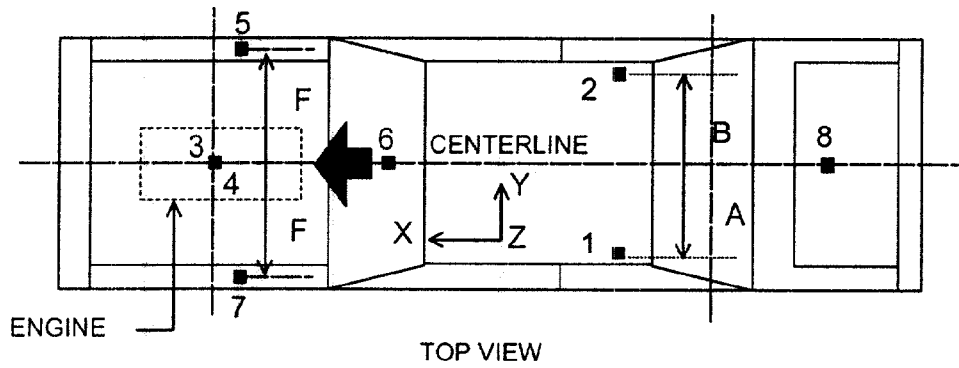
VEHICLE X-AXIS ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)			Peak Values				
		X	Y	Z	Units	Max	Time	Min	Time
1	Left Rear X-Member (Pri.)	2090	-821	655	G's	4.5	120.7	-36.2	54.2
2	Right Rear X-Member (Pri.)	1880	716	669	G's	6.2	130.2	-37.1	57.1
3	Engine Top	4310	93	935	G's	11.2	55.0	-69.7	33.5 *
4	Engine Bottom	4338	128	268	G's	19.6	59.9	-50.4	43.5 *
5	Left Brake Caliper	4625	-887	473	G's	55.4	32.7	-104.3	24.2 *
6	Right Brake Caliper	4625	887	473	G's	43.9	48.6	-79.3	12.5 *
7	Instrument Panel	4110	-81	1363	G's	53.2	82.7	-119.4	46.4
8	Left Rear X-Member (Rednt.)	2095	-756	655	G's	3.7	121.5	-36.5	54.7

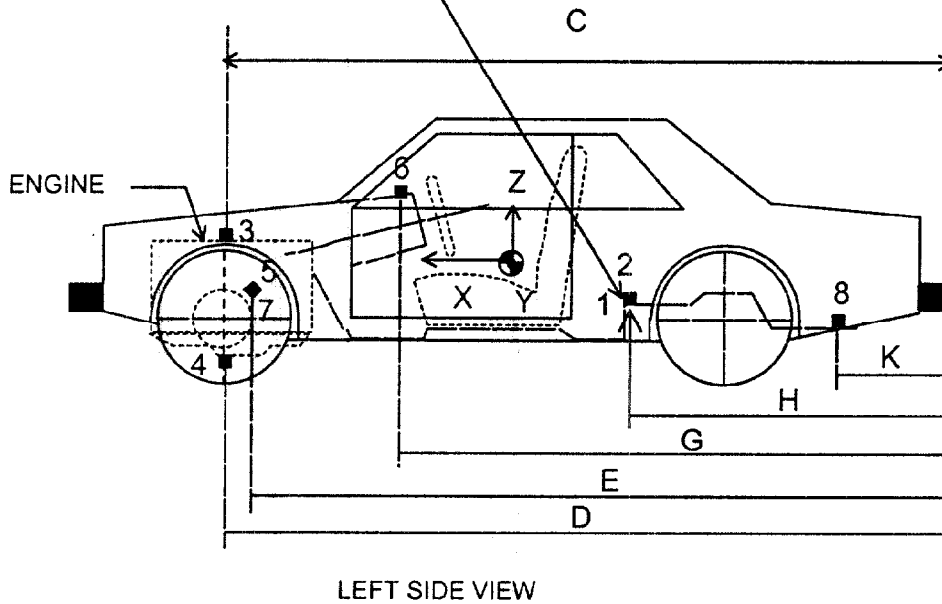
Reference Points X - From Rear Surface of Vehicle Y - Vehicle Centerline Z - Ground Plane

* Channels failed, check plots for time of failure.

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



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

TEST VEHICLE: 1999 FORD ECONOLINE E-150 VAN NHTSA No.: MX0208
 TEST PROGRAM: 1999 NHTSA 35 MPH NCAP TEST DATE: 2/4/99

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	27.8	180.7	-49.9	65.7	26.6	213.0	-62.1	79.6
Head CG	Y	G's	2.6	29.0	-6.2	175.3	10.5	93.7	-11.1	71.4
Head CG	Z	G's	25.8	45.3	-4.8	111.8	32.4	64.3	-8.3	81.6
Head CG Resultant	N/A	G's	54.4	65.7			62.2	79.9		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	10.7	143.5	-56.3	59.4	4.0	215.4	-51.7	72.3
Chest CG	Y	G's	4.8	87.2	-5.7	42.9	6.0	87.2	-13.2	30.8
Chest CG	Z	G's	11.7	46.9	-9.2	94.3	22.5	65.0	-6.3	46.1
Chest CG Resultant	N/A	G's	56.8	59.4			55.2	71.3		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	378.8	37.3	-4092.2	56.3	748.3	42.0	-4169.5	44.1
Right Femur	Z	Newtons	964.8	18.1	-2908.8	55.8	811.9	41.7	-7738.6	45.8

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shoulder Belt Force	N/A	Newtons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shoulder Belt Spoolout	N/A	MM	84.7	31.1	-57.6	208.6	332.0	82.8	-0.6	11.4
Shoulder Belt Stretch	N/A	MM/CM	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.0

* No data collected by manufacturers request.

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	536.8	46.7	45.3	81.2	634.1	51.0	61.6	95.6

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	55.9	58.1	61.1	54.5	70.3	73.3

DATA SHEET NO. 8...(continued)

TEST VEHICLE:	1999 FORD ECONOLINE E-150 VAN	NHTSA No.: MX0208
TEST PROGRAM:	1999 NHTSA 35 MPH NCAP	TEST DATE: 2/4/99

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	4.7	90.2	-62.4	56.2	5.0	118.9	-135.8	45.5
Pelvis	Y	G's	15.1	75.3	-3.3	155.8	5.5	68.5	-39.4	45.5
Pelvis	Z	G's	4.2	187.6	-27.3	65.8	5.4	267.1	-22.1	58.2

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	434.0	58.2	-609.7	107.8	785.4	66.5	-423.7	141.6
Neck Force	Y	Newtons	184.0	191.8	-141.5	91.1	310.4	96.0	-155.1	152.1
Neck Force	Z	Newtons	1523.5	51.7	-237.2	110.4	1715.6	60.9	-206.6	251.1
Neck Moment	X	N·m	9.5	178.1	-8.8	51.7	22.5	67.7	-16.9	58.4
Neck Moment	Y	N·m	57.0	58.1	-27.5	169.1	51.4	62.6	-19.4	49.1
Neck Moment	Z	N·m	8.0	297.6	-3.3	248.6	6.1	152.0	-9.5	106.5

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	7.8	94.4	-84.1	41.6	10.7	54.1	-131.9	42.6
Left Foot Aft	Z	G's	13.3	59.1	-48.6	44.7	22.1	52.9	-106.8	41.1
Left Foot Fore	Z	G's	92.8	27.8	-105.1	20.4	64.0	34.3	-165.9	41.2
Right Foot Aft	X	G's	12.3	85.1	-116.3	38.0	25.7	85.9	-97.7	66.5
Right Foot Aft	Z	G's	5.8	58.5	-67.4	35.7	46.4	58.3	-82.4	65.9
Right Foot Fore	Z	G's	36.7	29.6	-206.1	35.3	116.3	56.2	-162.9	46.1

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	7.0	105.2	-7.0	43.5	14.1	60.3	-10.0	73.5
Left Lower Moment	Y	N·m	29.2	56.1	-25.7	33.4	28.9	69.9	-77.5	43.2
Left Lower Force	Z	Newtons	123.8	110.3	-2070.5	38.0	330.0	255.6	-2396.4	89.8
Left Upper Moment	X	N·m	26.7	59.1	-14.2	272.9	14.8	45.3	-55.2	72.1
Left Upper Moment	Y	N·m	134.1	55.9	-77.9	32.9	16.5	135.0	-182.4	44.3
Right Lower Moment	X	N·m	7.3	55.6	-9.2	46.7	5.8	46.9	-60.5	58.8
Right Lower Moment	Y	N·m	16.1	84.0	-32.9	35.8	120.2	85.5	-87.4	45.3
Right Lower Force	Z	Newtons	157.6	104.7	-2427.3	39.4	397.4	47.6	-1871.5	88.1
Right Upper Moment	X	N·m	40.0	60.8	-4.5	101.8	26.1	46.2	-53.1	73.9
Right Upper Moment	Y	N·m	41.6	41.5	-56.0	36.7	23.6	79.9	-153.8	45.0

DATA SHEET NO. 8...(continued)

TEST VEHICLE: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

TEST PROGRAM: 1999 NHTSA 35 MPH NCAP

TEST DATE: 2/4/99

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	MM	0.1	10.4	-38.6	65.4	0.3	1.3	-27.9	70.2

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	27.0	179.6	-49.0	66.3	26.9	212.9	-61.8	80.7
Head CG	Y	G's	2.6	51.4	-5.4	175.4	12.8	93.6	-9.1	71.3
Head CG	Z	G's	28.8	57.8	-4.5	101.5	34.0	63.1	-8.3	91.2
Head CG Resultant	N/A	G's	54.1	64.3			62.1	80.7		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	11.4	143.5	-55.9	59.1	4.2	253.0	-50.8	72.2
Chest CG	Y	G's	4.2	85.6	-6.5	42.3	8.5	86.5	-8.0	70.9
Chest CG	Z	G's	10.0	47.0	-8.6	94.7	21.7	65.0	-9.4	46.0
Chest CG Resultant	N/A	G's	56.3	59.2			54.7	71.3		

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	525.7	46.3	46.2	82.1	624.8	50.3	60.9	95.6

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	55.4	57.8	60.8	53.4	70.3	73.3

DATA SHEET NO. 9**SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**Test Vehicle: 1999 FORD ECONOLINE E-150 VANNHTSA No.: MX0208Test Program: 1999 35 MPH FRONTAL IMPACTTest Date: 2/4/99**BELT LENGTH DATA**

Measurement Description	Units	Driver	Passenger
Retractor reel to 'D' ring	mm	800	800
Shoulder belt length as measured on ATD	mm	820	760
Lap belt length as measured on ATD	mm	840	800
Remainder of belt on reel	mm	740	855
Total belt length for continuous webbing systems	mm	3200	3215

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	36.0	300.0
As determined electronically	mm	84.7	332.0

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
Electronically from shoulder belt load cell and "D" ring	mm/cm	0*	0*
Mechanically	mm/cm	5.00	5.00

*No data collected by manufactures request.

DATA SHEET NO. 10

SUMMARY OF FMVSS 212 DATA

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

Details of windshield mounting (method of retention, type of trim, etc.):

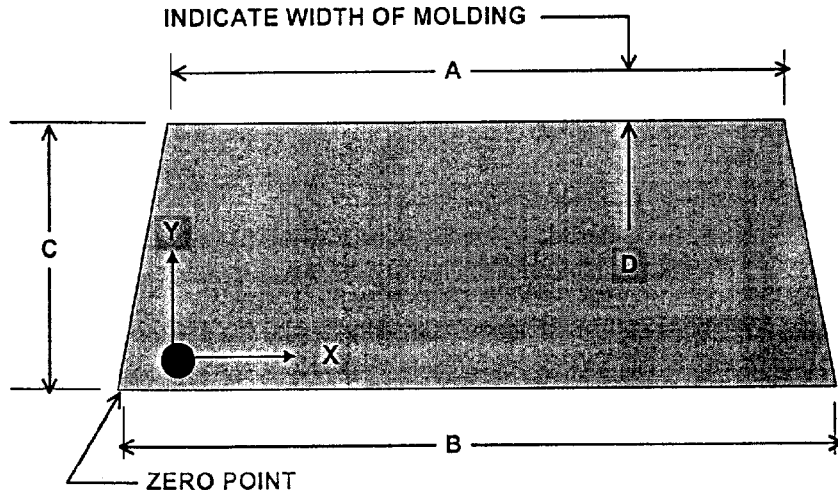
Windshield glass is secured to the vehicle frame with a rubber type adhesive, with rubber molding along the top and sides with rubber and plastic molding along the bottom.

The standard requires that the post test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

WINDSHIELD PERIPHERY MEASUREMENTS

	Units	Left Side	Right Side	Total
Pre-Test	mm	2454	2454	100%
Post-Test	mm	2454	2454	100%
Percent of retention	Percent	100%	100%	

Indicate area of retention failure.



FRONT VIEW OF WINDSHIELD

Width of molding: Top: 22 mm, Sides: 22 mm, Bottom: 0 mm

Temperature of windshield molding during test: 21.1 °C

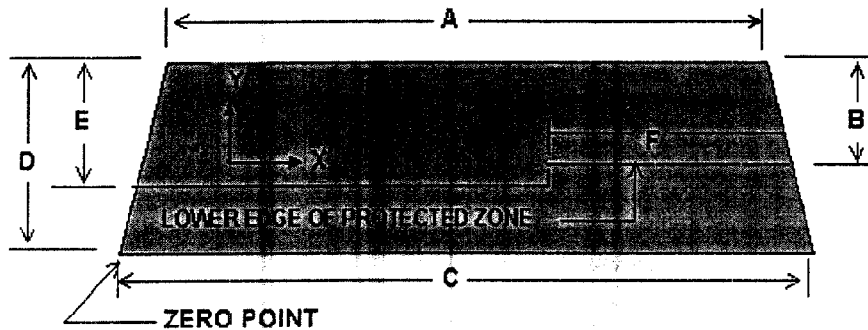
DATA SHEET NO. 11
WINDSHIELD ZONE INTRUSION FMVSS 219 (PARTIAL) DATA

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1530
B	mm	443
C	mm	1848
D	mm	765
E	mm	515
F	mm	1115

Provide all dimensions necessary to reproduce the protected area.

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 which is normally in contact with the windshield.

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

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

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

DATA SHEET NO. 12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

Test Time: 1:50 PM Temperature at Time of Impact: 10.55° C

STODDARD SOLVENT SPILLAGE MEASUREMENT:

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

DATA SHEET NO. 13

FMVSS 301 STATIC ROLLOVER DATA SHEET

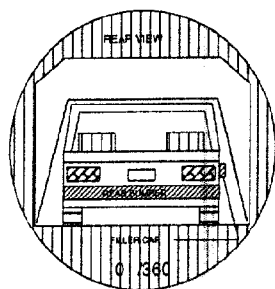
Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

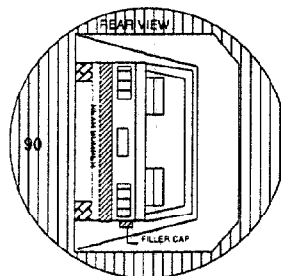
Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

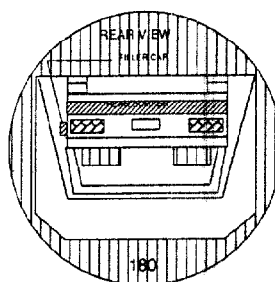
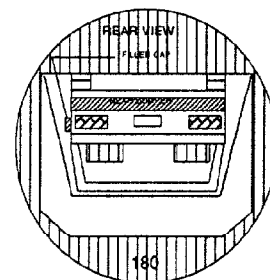
Time: 1:50 PM Temperature: 10.55 °C



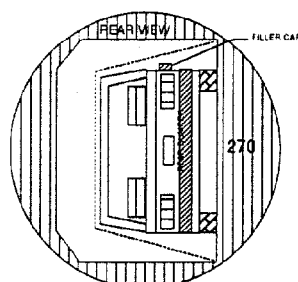
0° TO 90°



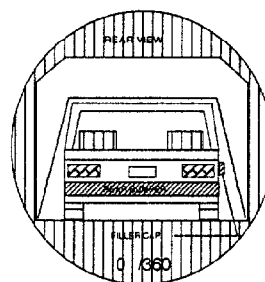
90° TO 180°



180° TO 270°



270° TO 360°



1. The specified fixture rollover rate for each 90° of rotation = 60 to 120 seconds.
2. The position hold time at each position = 300 seconds (minimum).
3. Provide details of Stoddard Solvent spillage locations:
No solvent leakage occurred during rollover testing.

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

DATA SHEET NO. 14
VEHICLE MEASUREMENTS

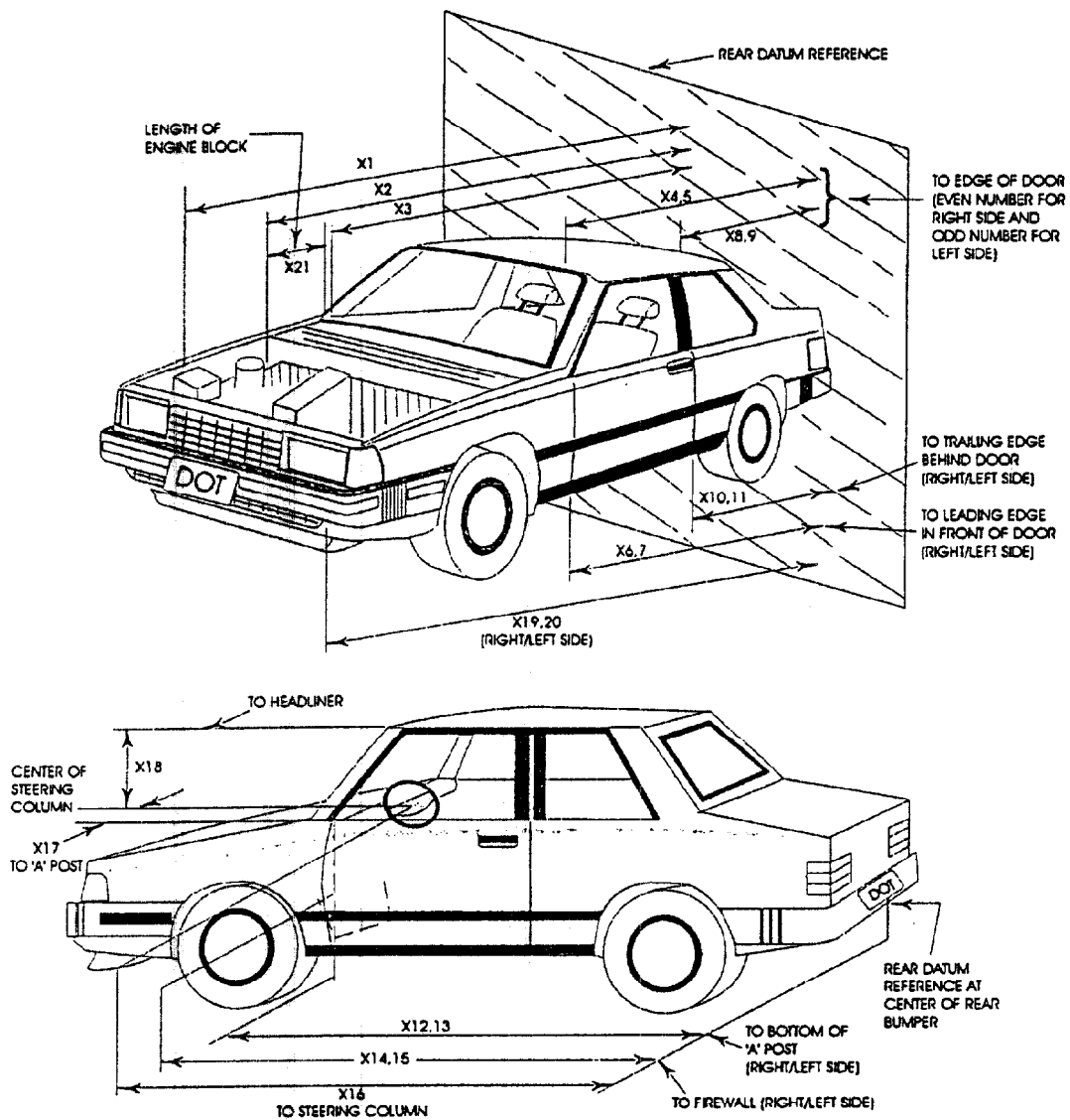
Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	5515	4978	-537
2	RSOV to front of engine	mm	4832	4773	-59
3	RSOV to firewall centerline	mm	4862	4661	-201
4	RSOV to leading edge of right door	mm	4390	4420	30
5	RSOV to leading edge of left door	mm	4405	4403	-2
6	RSOV to lower leading edge of right door	mm	4187	4217	30
7	RSOV to lower leading edge of left door	mm	4205	4204	-1
8	RSOV to upper trailing edge of right door	mm	3365	3401	36
9	RSOV to upper trailing edge of left door	mm	3372	3393	21
10	RSOV to lower trailing edge of right door	mm	3336	3362	26
11	RSOV to lower trailing edge of left door	mm	3352	3357	5
12	RSOV to bottom of right 'A' pillar	mm	4325	4352	27
13	RSOV to bottom of left 'A' pillar	mm	4335	4345	10
14	RSOV to firewall on right side	mm	4800	4691	-109
15	RSOV to firewall of left side	mm	4677	4672	-5
16	RSOV to steering column	mm	3940	4000	60
17	Center of steering column to left 'A' pillar	mm	370	390	20
18	Center of steering column to headlining	mm	545	525	-20
19	RSOV to right side of front bumper	mm	5323	4924	-399
20	RSOV to left side of front bumper	mm	5323	4913	-410
21	Length of engine block	mm	530	530	0
RD	RSOV to right side of dash panel	mm	4125	4186	61
CD	RSOV to center of dash panel	mm	4154	4200	46
LD	RSOV to left side of dash panel	mm	4210	4220	10



DATA SHEET NO. 15

CAMERA LOCATIONS

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

No.	Camera View	Location (mm)			Angle (°)	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	1990	8300	1220	1	7700	13	980
3	Left Side, No. 2	960	6100	1650	1	5520	25	1050
4	Left Side, No. 3	2970	3050	2165	13	2870	19	990
5	Left Side, No. 4	2100	8320	3060	15	7750	19	1010
6	Left Side, No. 5	2100	8320	2610	13	7760	19	1010
7	Right Side, No. 1	1900	8300	905	2	7900	19	1020
8	Right Side, No. 2	1870	8350	1575	0	7950	40	910
9	Right Side, No. 3	3100	3100	2115	9	3300	19	1000
10	Right Side, No. 4	2480	7450	1615	1	7250	35	990
11	Overhead Overall	600	0	1971	90	N/A	13	1100
12	Front View Driver	-690	310	2915	45	N/A	13	1020
13	Front View, Passenger	-690	310	2915	51	N/A	13	*
14	Pit Camera, Engine	660	0	-1600	90	N/A	10	920
15	Pit Camera, Fuel Tank	4750	0	-1800	45	N/A	12	950
16	Onboard, Driver	3540	390	1770	1	1820	13	520
17	Onboard, Passenger	3540	400	1765	2	1755	13	450

* X - Barrier Face Y - Monorail Centerline Z - Ground

* Camera started late.

DATA SHEET NO. 16
REFERENCE PHOTOGRAPH TARGETS

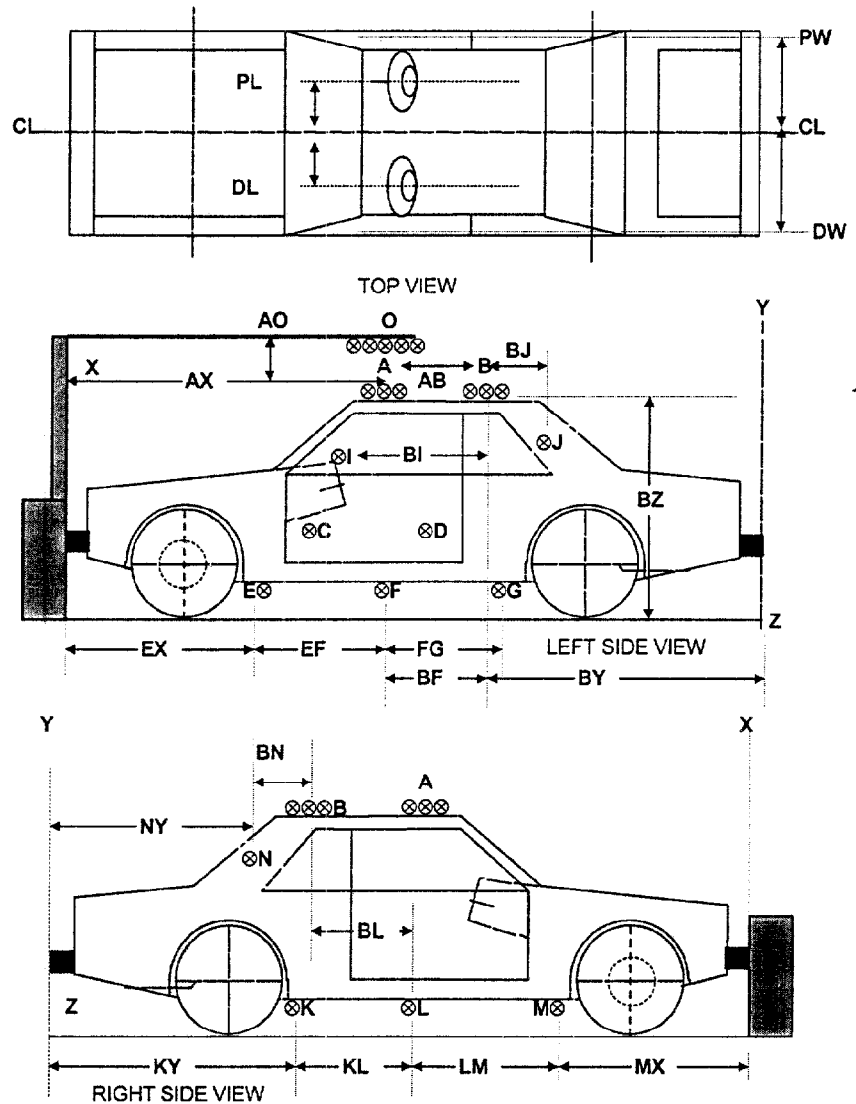
Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

Item	Value
AX	880
AB	609
AO	155
BJ	1073
BI	1030
BZ	2100
EX	1260
EF	1245
FG	1245
BF	30
BY	3065
NY	1990
BN	980
KY	1745
KL	1250
BL	50
LM	1250
MX	1280
CL/PL	450
CL/PW	886
CL/DL	450
CL/DW	886



DATA SHEET NO. 17

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

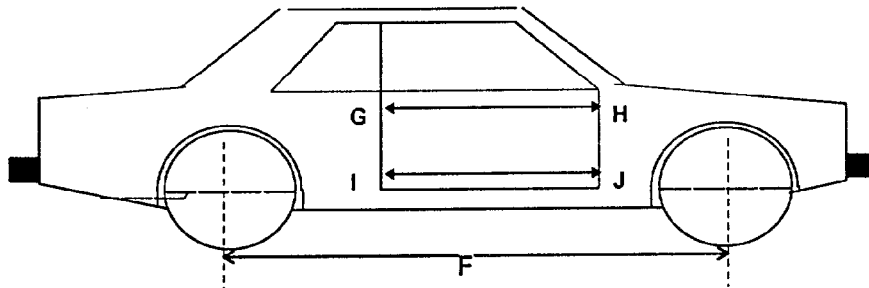
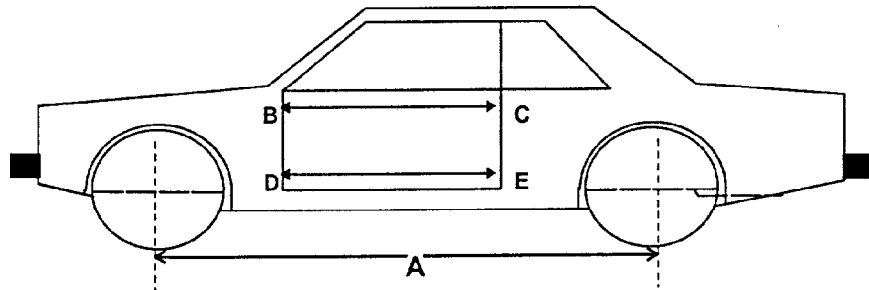
Test Date: 2/4/99

DOOR OPENING WIDTH

UNITS (mm)	LEFT SIDE		RIGHT SIDE	
MEASUREMENT	BC	DE	GH	IJ
PRE-TEST	900	804	902	810
POST-TEST	881	793	881	881
DIFFERENCE	-19	-11	-21	+71

VEHICLE WHEELBASE CHANGE

UNITS (mm)	A = LEFT SIDE WHEELBASE	F = RIGHT SIDE WHEELBASE
PRE-TEST	3505	3505
POST-TEST	3410	3380
DIFFERENCE	-95	-125



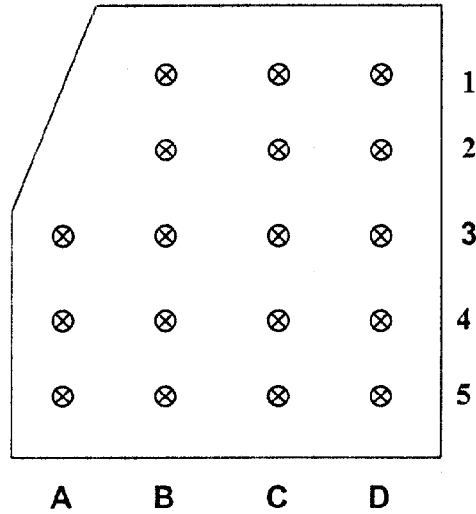
Data Sheet No. 17(Continued)

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

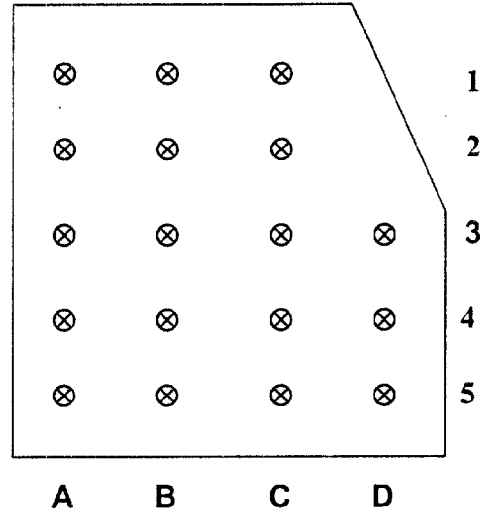
Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99



⊕ X
LEFT FRONT SEAT ANCHOR BOLT
↓
TO RSOV REFERENCE

DRIVER SIDE FLOOR PLAN



⊕ X
RIGHT FRONT SEAT ANCHOR BOLT
↓
TO RSOV REFERENCE

PASSENGER SIDE FLOORPAN

(Data Sheet No. 17Continued)

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

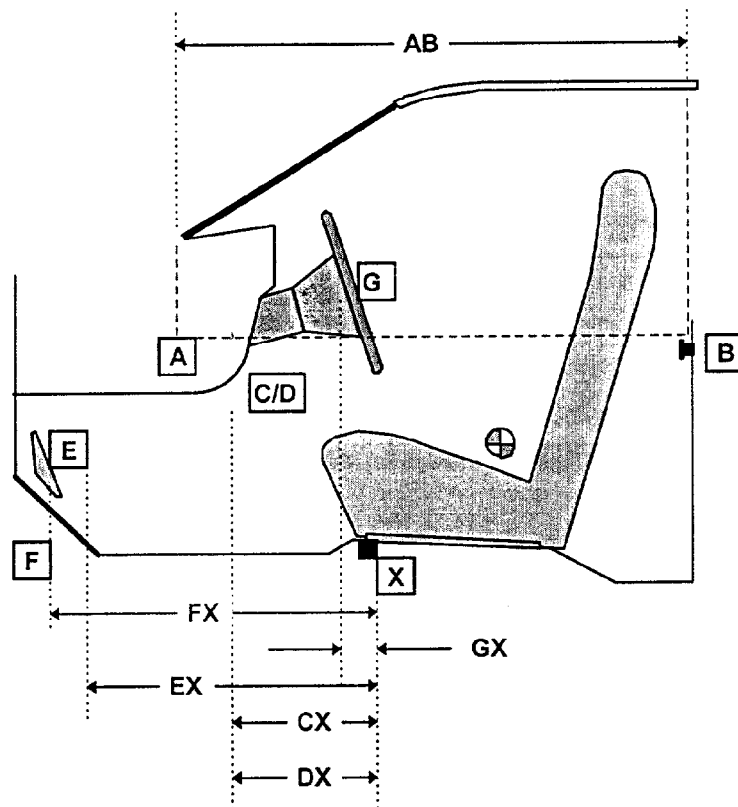
Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

DRIVER COMPARTMENT INTRUSION (Distances in mm)

REF.	DESCRIPTION	PRE-TEST	POST-TEST
AB	DOOR OPENING (INSIDE WINDOW JAM)	900	881
CX	LOWER LEFT KNEE BOLSTER TO X	430	447
DX	LOWER RIGHT KNEE BOLSTER TO X	424	403
EX	BRAKE PEDAL TO X	620	543
FX	FOOT REST TO X	605	585
GX	STEERING COLUMN HUB (CENTER) TO X	145	255

X = LEFT FRONT SEAT ANCHOR BOLT



DRIVER COMPARTMENT

(Data Sheet No. 17Continued)

DRIVER SIDE "X"

	A			B			C			D		
	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.
1				726	674	-52	705	658	-47	686	656	-30
2				625	575	-50	613	566	-47	594	558	-36
3	545	508	-37	526	496	-30	505	477	-28	486	460	-26
4	445	420	-25	434	410	-24	405	383	-22	388	361	-27
5	345	340	-5	329	326	-3	315	298	-17	295	262	-33

DRIVER SIDE "Z"

	A			B			C			D		
	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.
1				18	93	75	20	70	50	28	51	23
2				-14	30	44	-18	20	38	-18	10	28
3	-50	0	50	-48	-20	28	-49	-25	24	-40	-12	28
4	-45	-30	15	-50	-35	15	-30	-40	-10	-39	-10	29
5	-48	-40	8	-50	-56	-6	-51	-55	-4	-44	-25	19

PASSENGER SIDE "X"

	A			B			C			D		
	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.
1	697	622	-75	701	615	-86	705	610	-95			
2	599	522	-77	604	540	-64	608	550	-58			
3	498	488	-10	503	497	-6	506	502	-4	516	503	-13
4	398	393	-5	402	397	-5	405	404	-1	417	408	-9
5	297	291	-6	302	297	-5	306	307	1	317	311	-6

PASSENGER SIDE "Z"

	A			B			C			D		
	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.	PRE-TEST	POST-TEST	DIFF.
1	71	123	52	71	132	61	72	150	78			
2	0	50	50	0	52	52	1	56	55			
3	-57	-32	25	-59	-30	29	-59	-30	29	-59	-28	31
4	-57	-50	7	-57	-43	14	-57	-44	13	-55	-38	17
5	-53	-39	14	-52	-41	11	-52	-48	4	-51	-41	10

RSOV to anchor bolt
Ground level to anchor bolt

DRIVER

PRE	POST	DIFF.
3778	3778	0
N/A	N/A	

PASSENGER

PRE	POST	DIFF.
3778	3778	0
N/A	N/A	

DATA SHEET NO. 18

OFFSET BARRIER ORIENTATION

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

NOT APPLICABLE TO THIS TEST

A = VEHICLE WIDTH MEASURED AT WIDEST POINT N/A mm

B = 40% OFFSET FROM LEFT EDGE OF VEHICLE N/A mm

ACTUAL OFFSET DURING TEST N/A mm = N/A

DATA SHEET NO. 19

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99

VIN: 1FTRE1423XHA52552 Wheelbase: 3505 mm Test Weight: 2441 kg

Vehicle Size Category: FORD ECONOLINE E-150 VAN

ACCELEROMETER DATA:

LOCATION: Left and right rear floor pans

CALIBRATION PROCEDURE: 6 months/ drop test

LINEARITY: Good

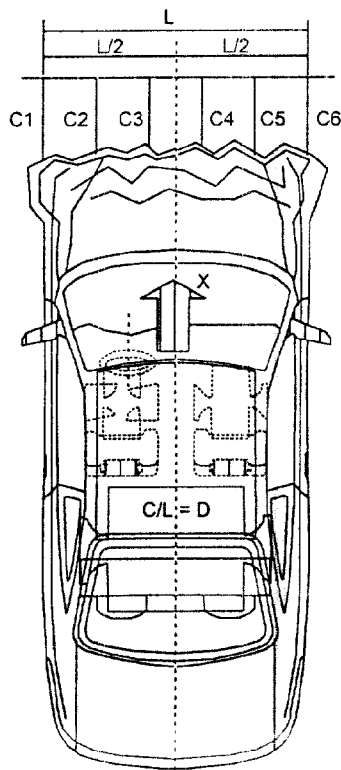
INTEGRATION ALGORITHM: NHTSA Standard

VEHICLE IMPACT SPEED: 56.3 km/h

TIME OF SEPARATION: 63.9 msec

VELOCITY CHANGE: 65.57 km/h

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: F (frontal)



IMPACT MODE: Full Frontal

CRUSH DEPTH DIMENSIONS:

C1 = 410 mm

C2 = 454 mm

C3 = 509 mm

C4 = 505 mm

C5 = 460 mm

C6 = 399 mm

MIDPOINT OF DAMAGE: Vehicle Centerline

LENGTH OF DAMAGE REGION: 1855 mm

DATA SHEET NO. 20

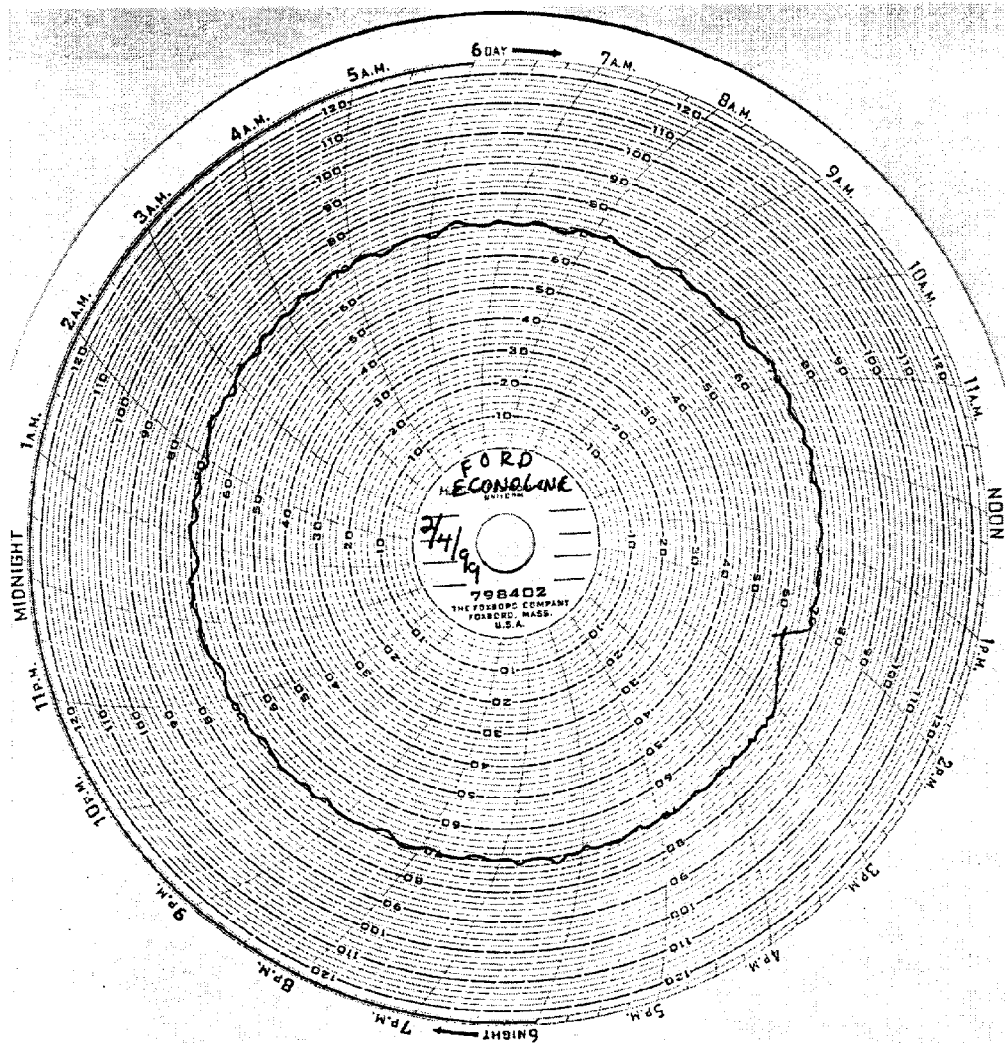
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 1999 FORD ECONOLINE E-150 VAN

NHTSA No.: MX0208

Test Program: 1999 35 MPH FRONTAL IMPACT

Test Date: 2/4/99



APPENDIX A
PHOTOGRAPHS

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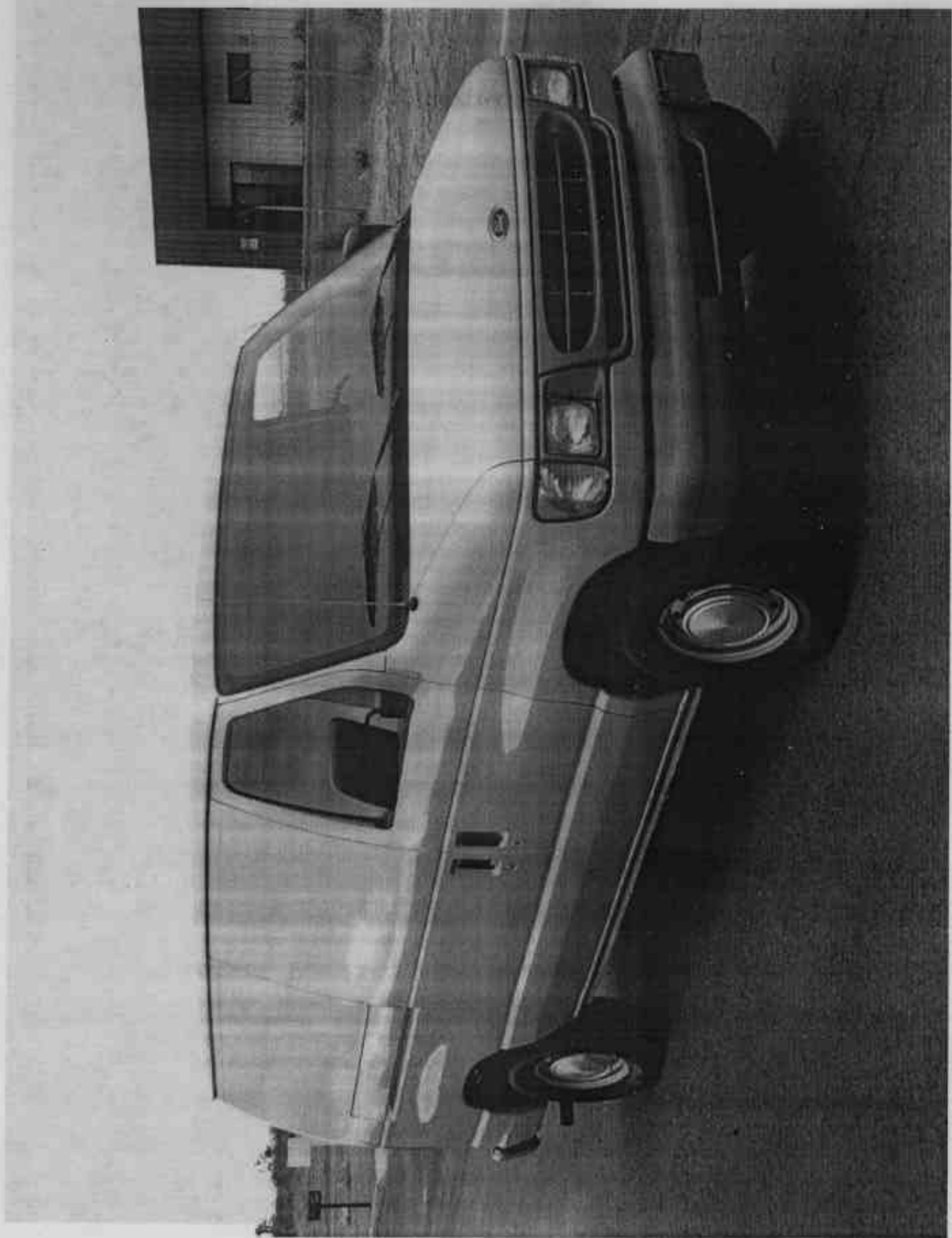


FIGURE A-1. RIGHT FRONT AS RECEIVED

KAR99001-13

A-1

KAR99001-13

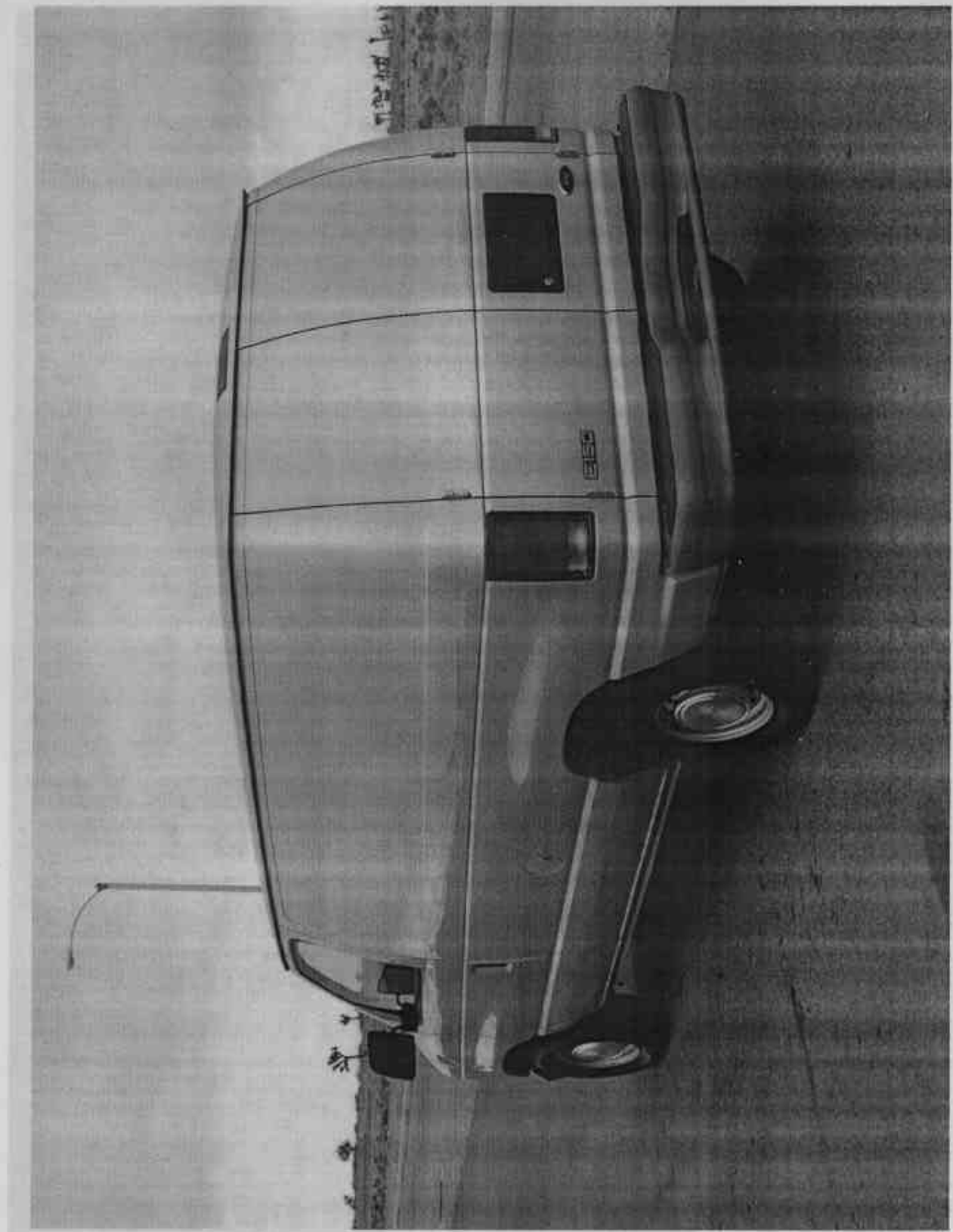


FIGURE A-2. LEFT REAR AS RECEIVED

A-2

KAR99001-13

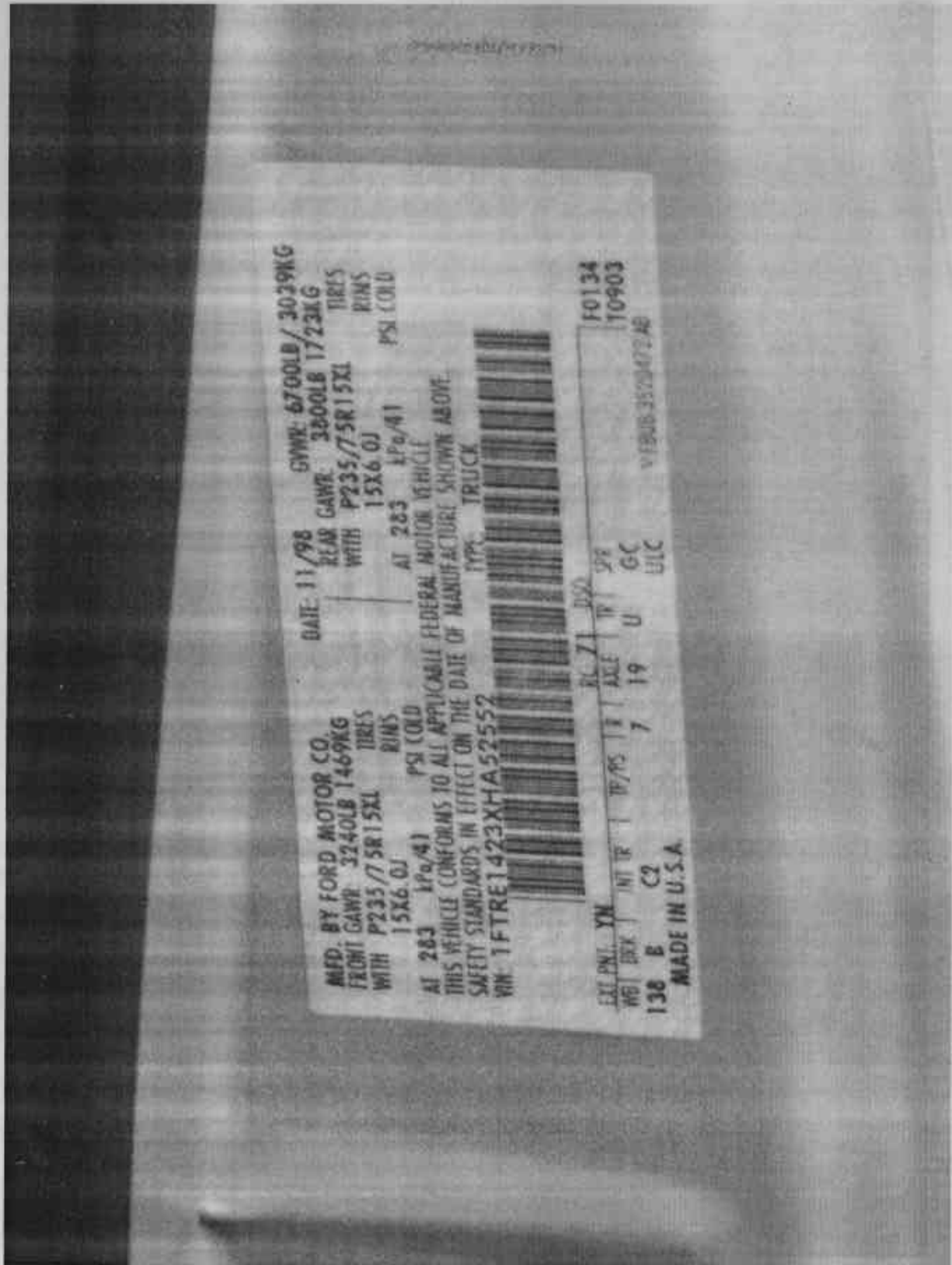


FIGURE A-3. VEHICLE CERTIFICATION LABEL



FIGURE A-4. VEHICLE TIRE PLACARD

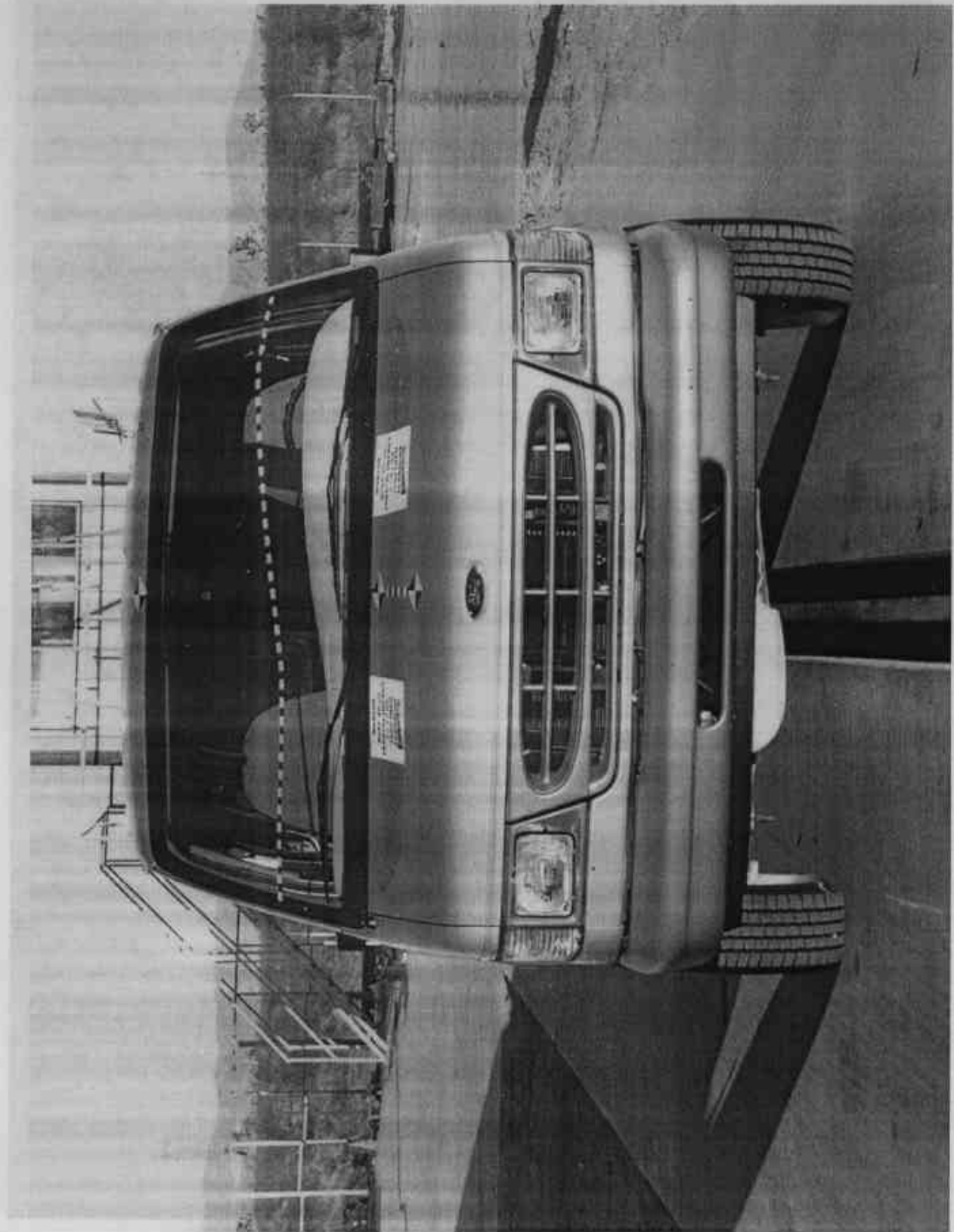


FIGURE A-5. PRETEST FRONT VIEW

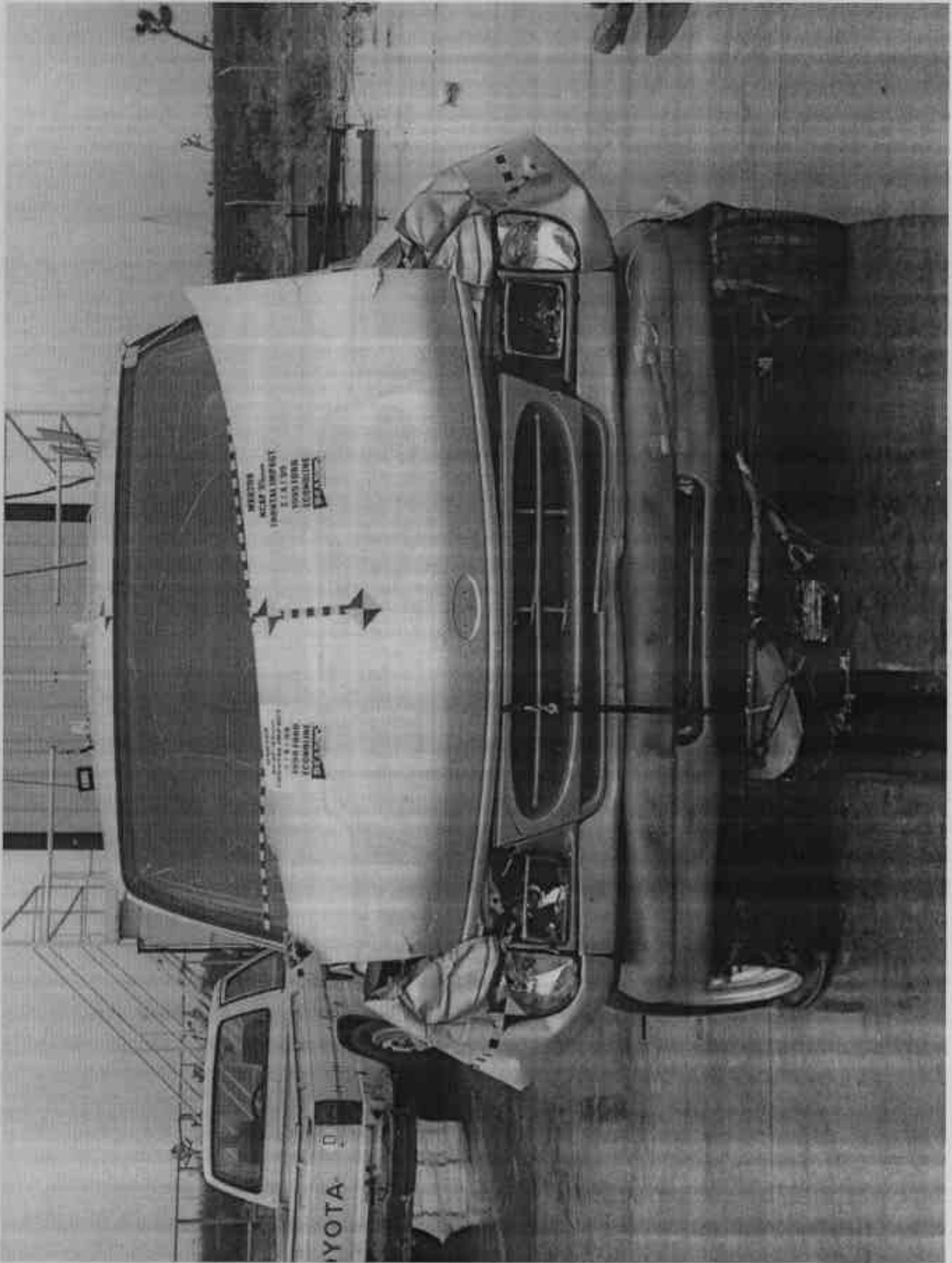


FIGURE A-6. POST TEST FRONT VIEW

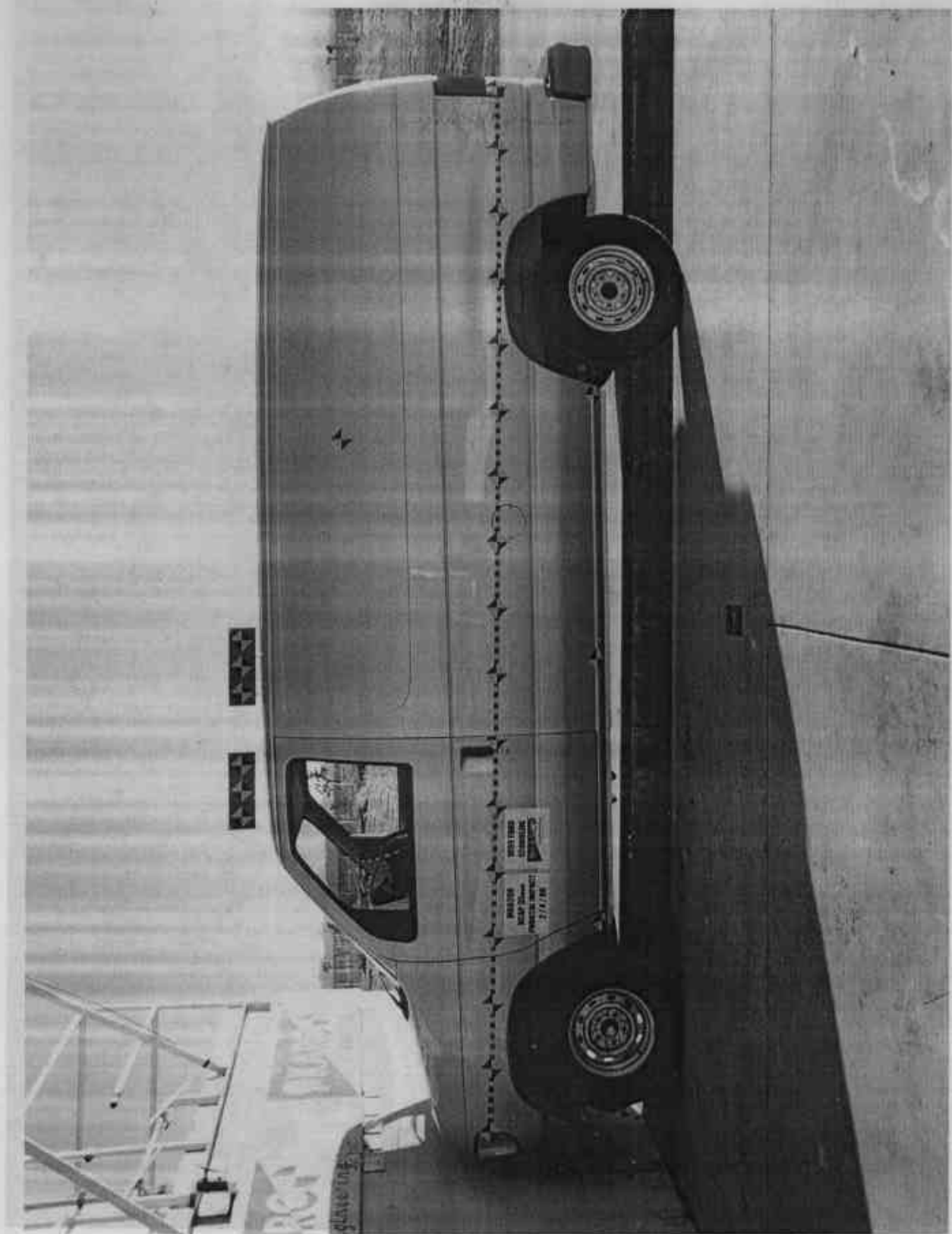


FIGURE A-7. PRETEST LEFT SIDE VIEW

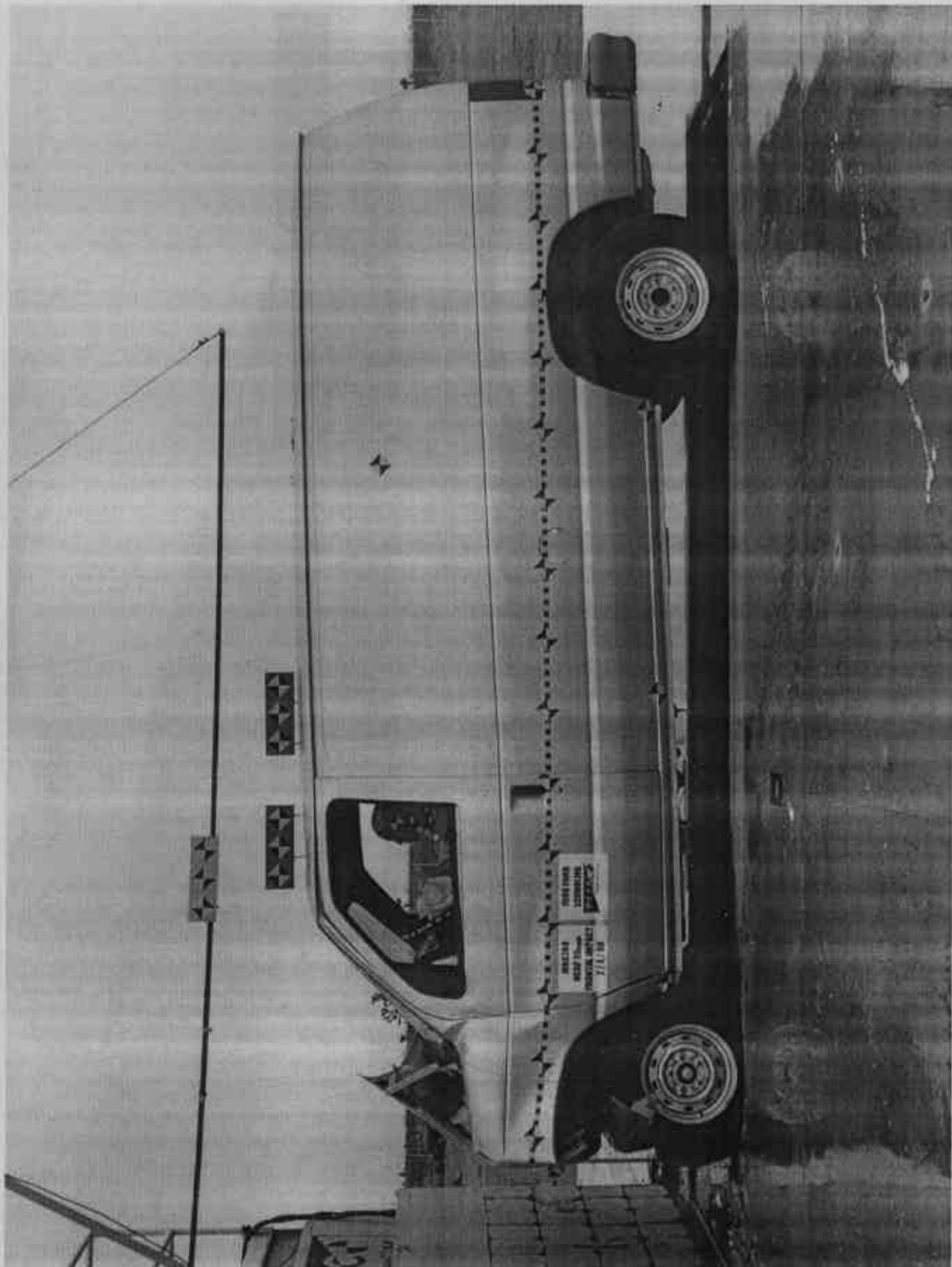


FIGURE A-8. POST TEST LEFT SIDE VIEW

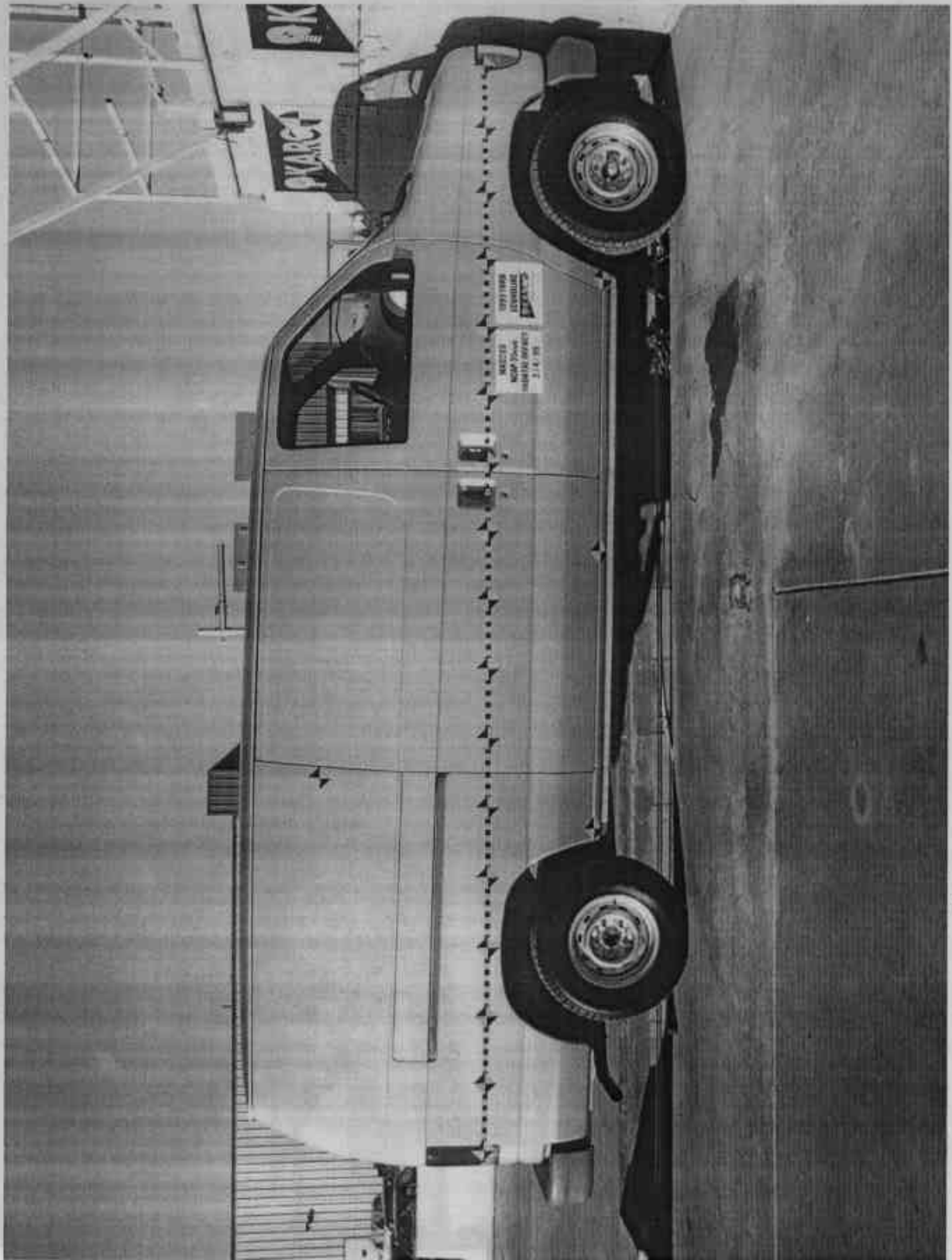


FIGURE A-9. PRETEST RIGHT SIDE VIEW



FIGURE A-10. POST TEST RIGHT SIDE VIEW

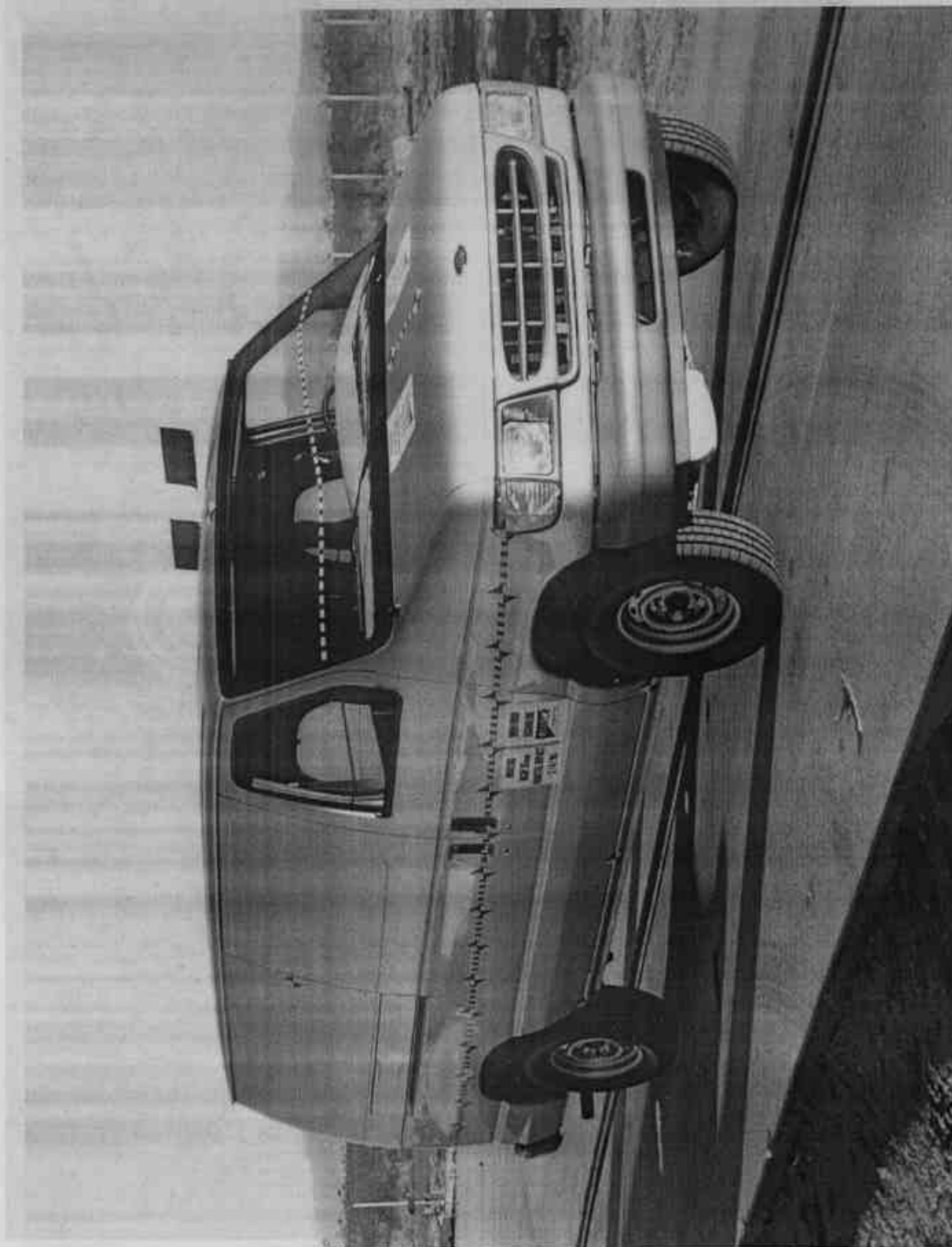


FIGURE A-11. PRETEST RIGHT FRONT VIEW

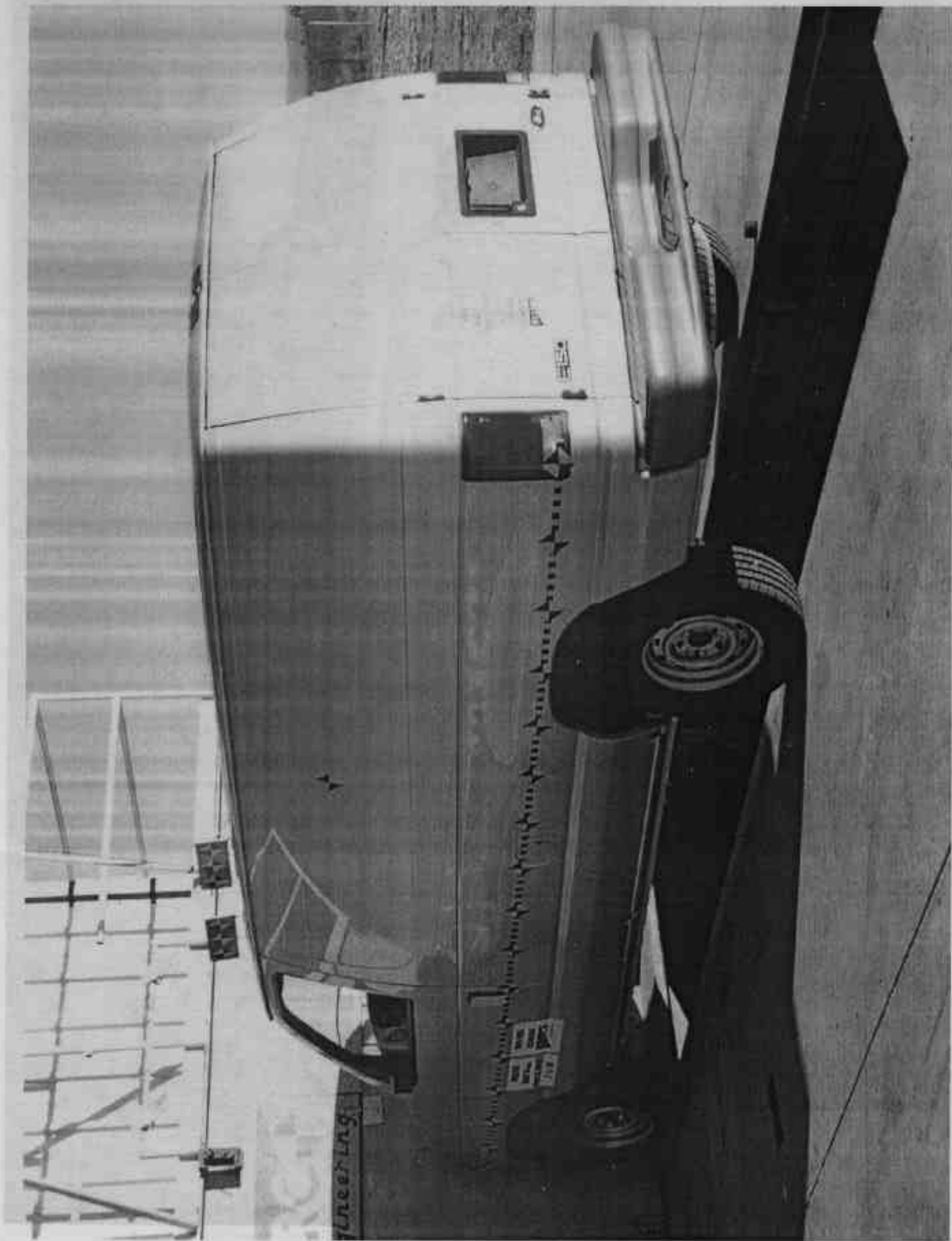


FIGURE A-13. PRETEST LEFT REAR VIEW

A-13

KAR99001-13

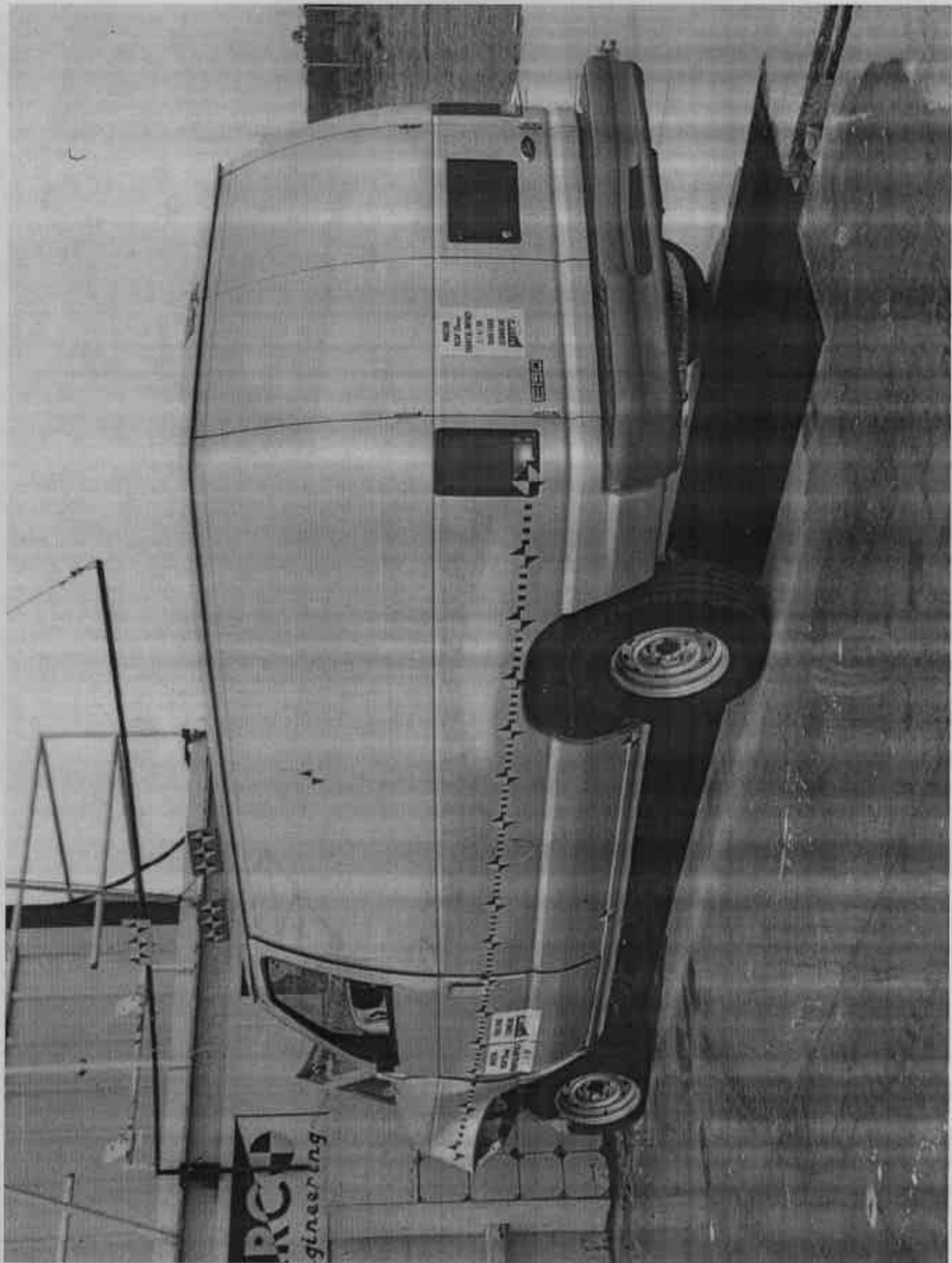


FIGURE A-14. POST TEST LEFT REAR VIEW

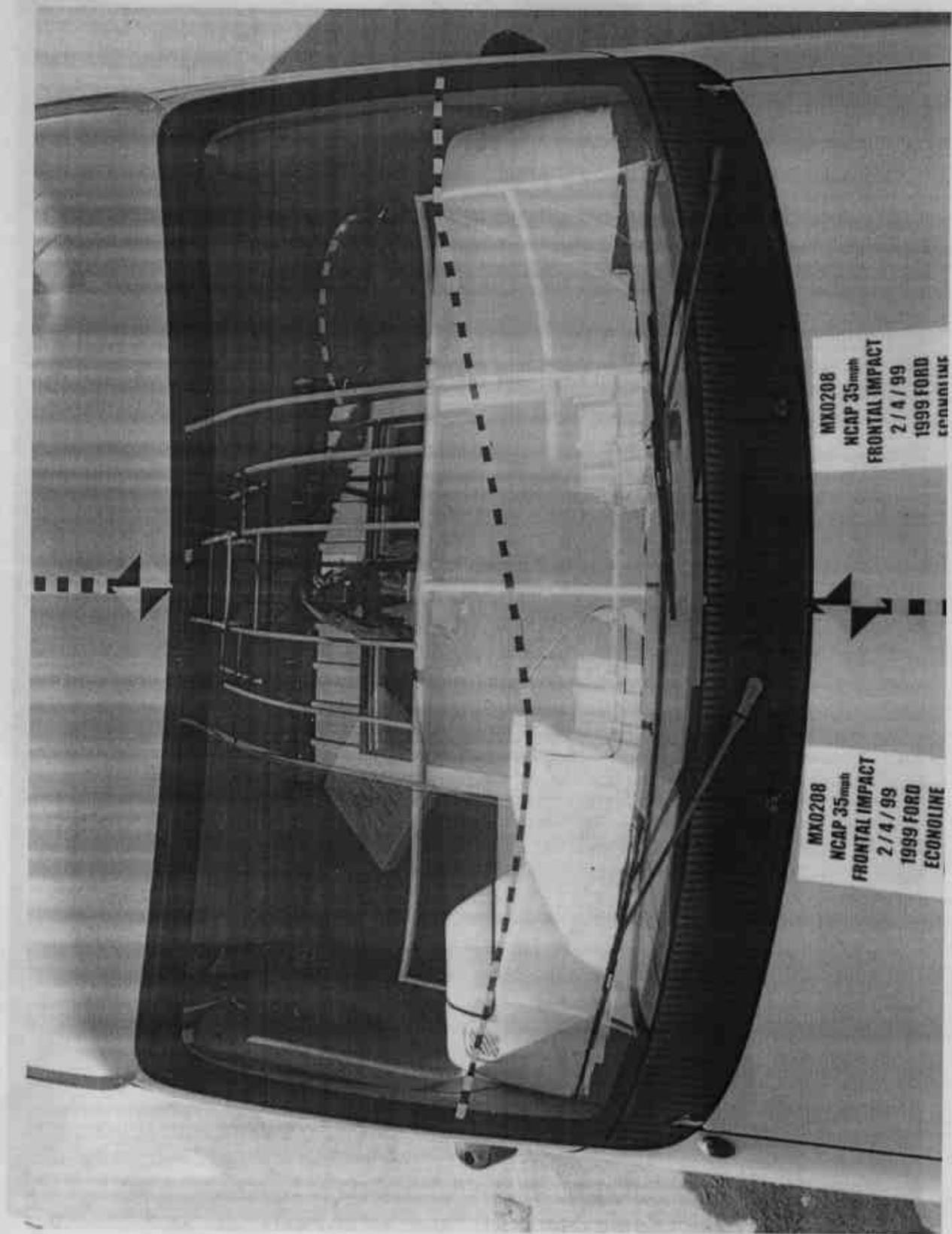


FIGURE A-15. PRETEST WINDSHIELD

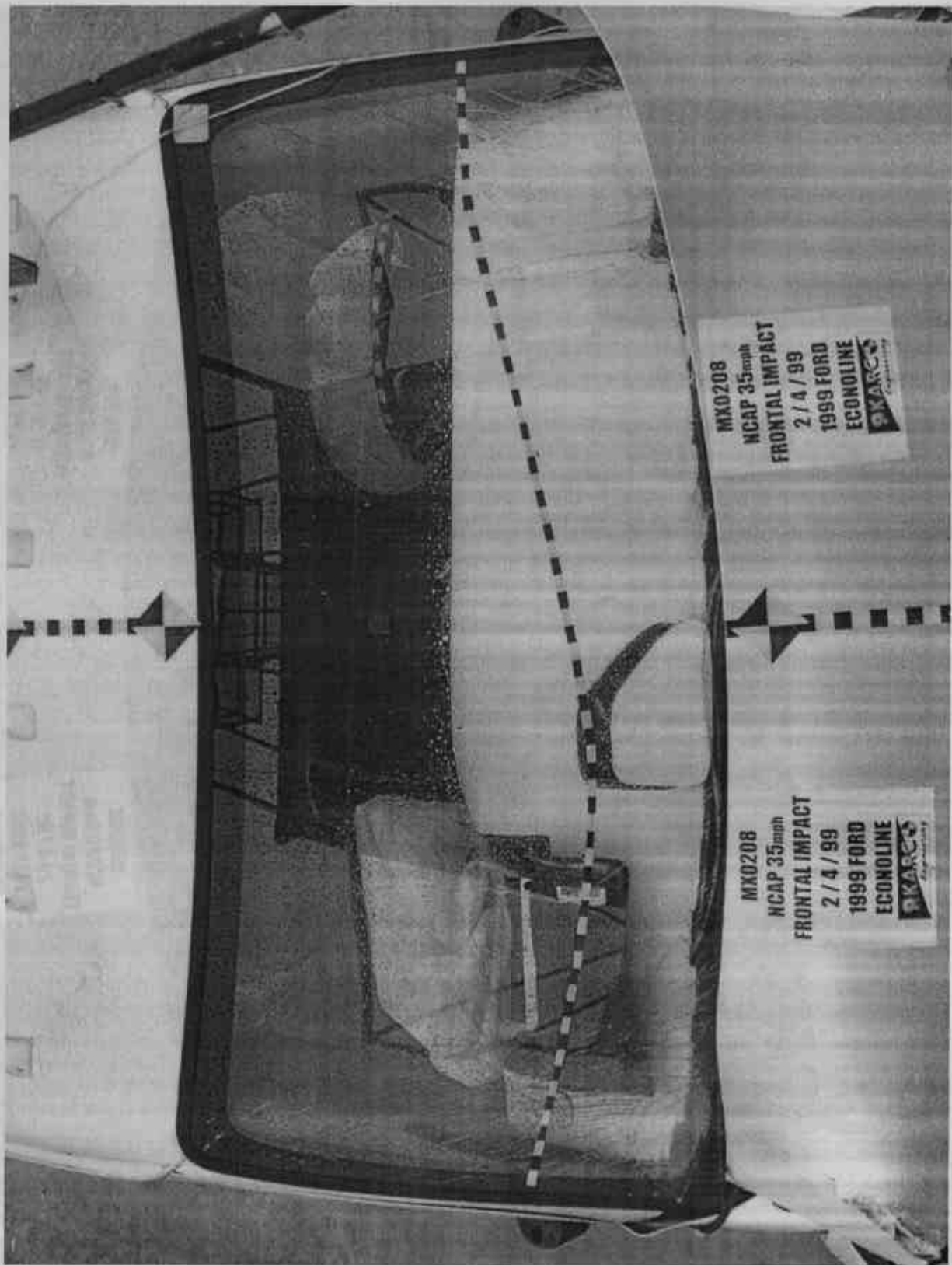


FIGURE A-16. POST TEST WINDSHIELD



FIGURE A-17. PRETEST ENGINE COMPARTMENT

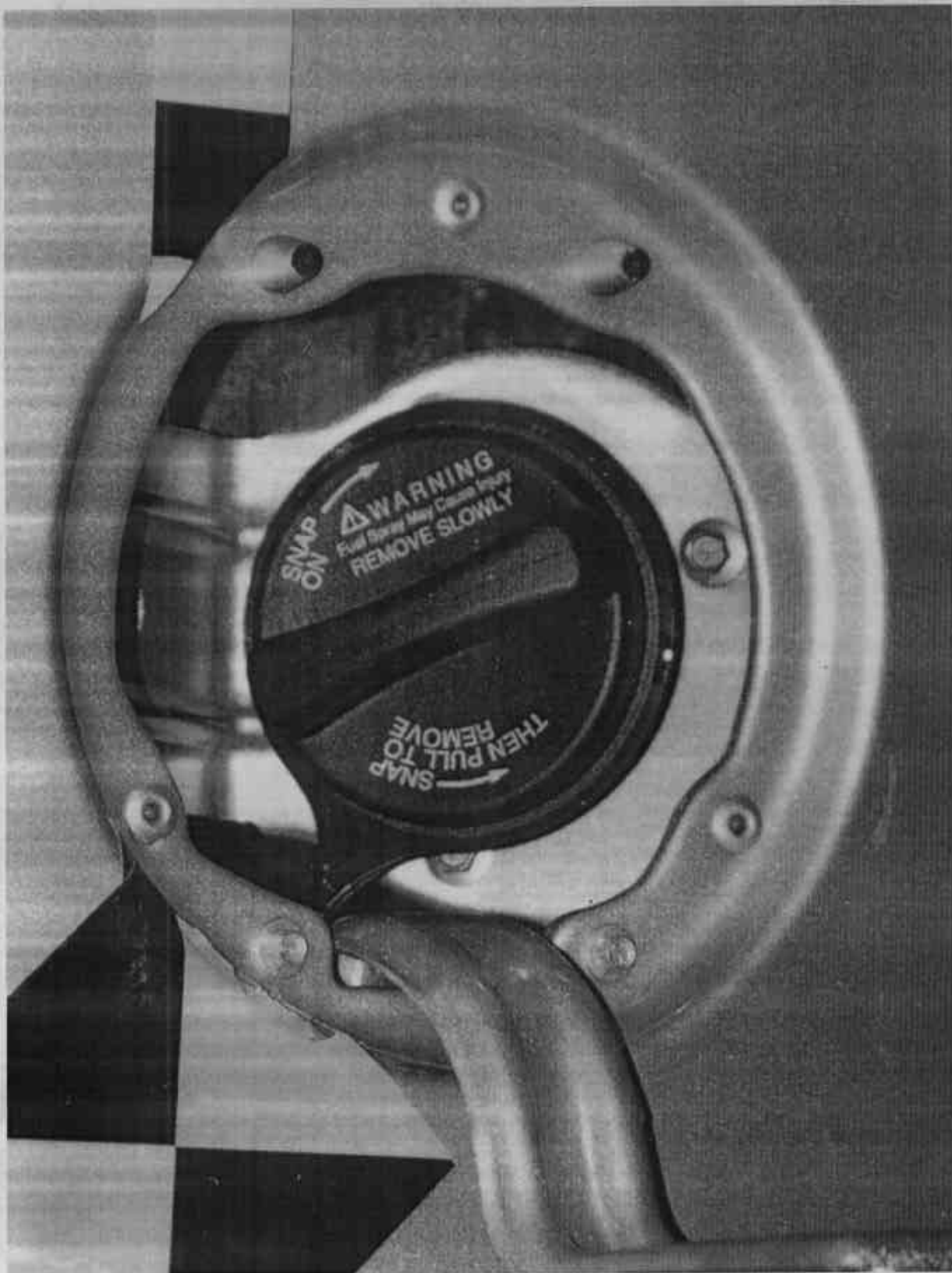


FIGURE A-19. PRETEST FUEL CAP

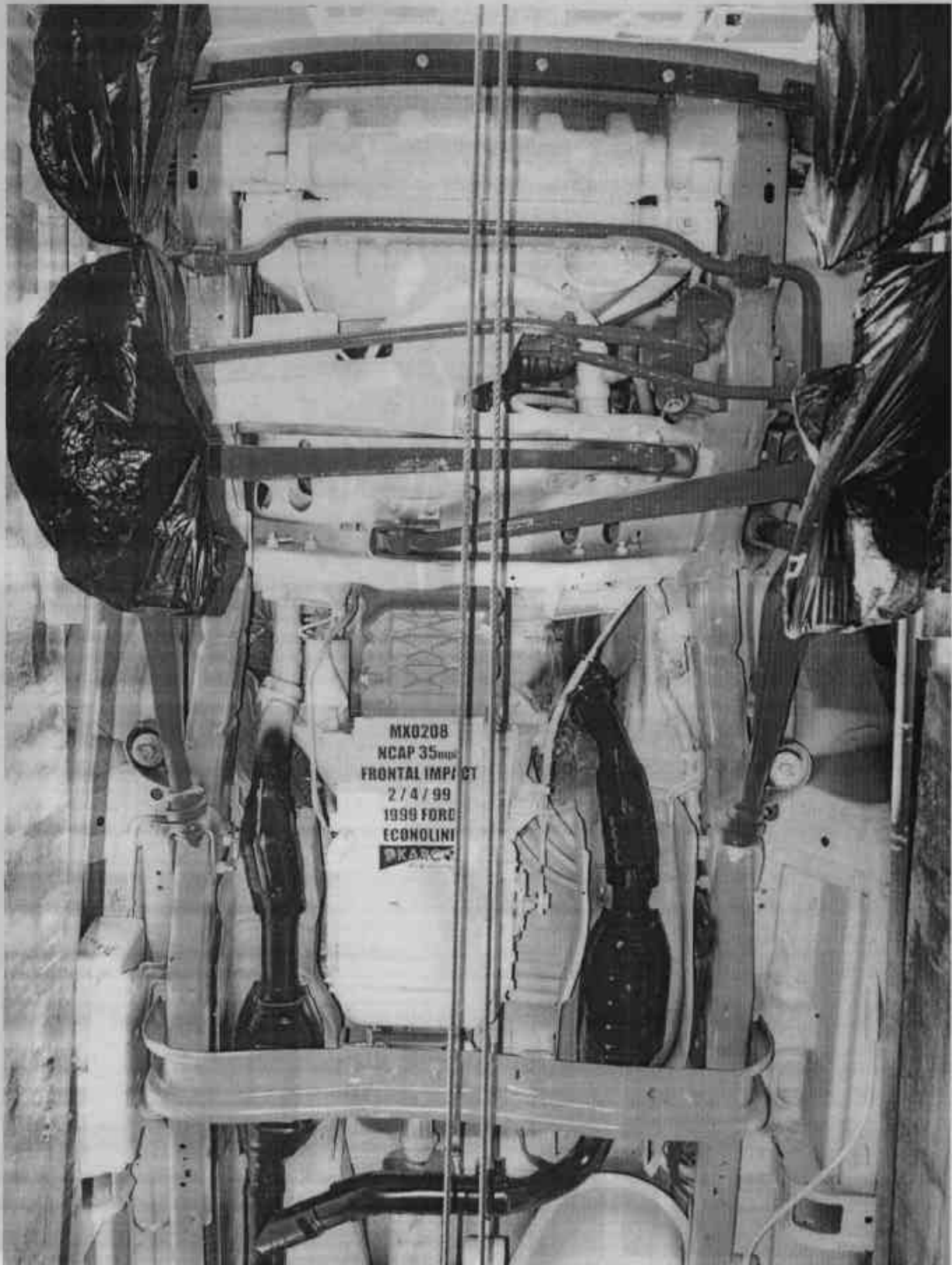


FIGURE A-21. PRETEST FRONT UNDERSIDE

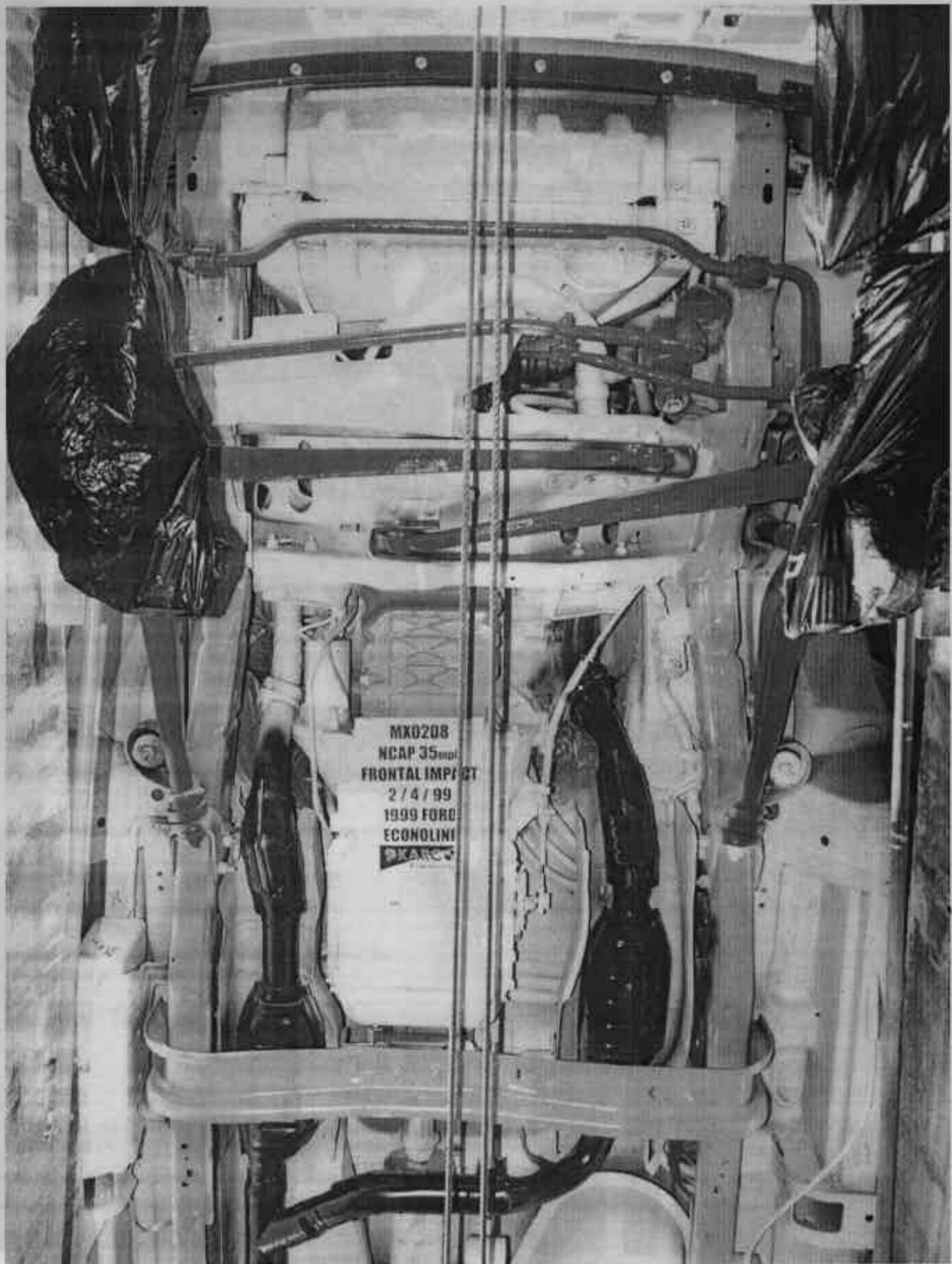


FIGURE A-21. PRETEST FRONT UNDERSIDE

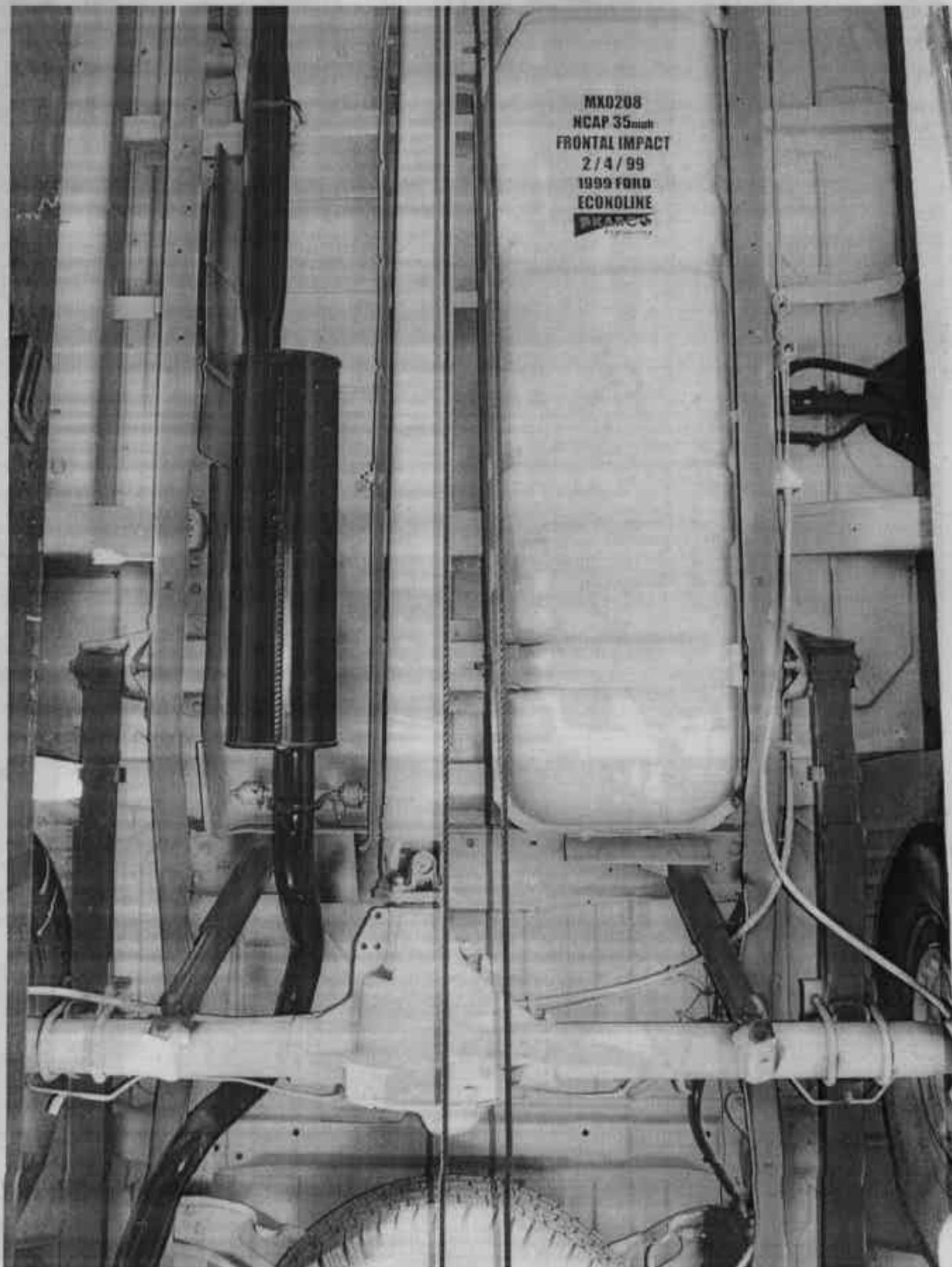


FIGURE A-23. PRETEST REAR UNDERSIDE

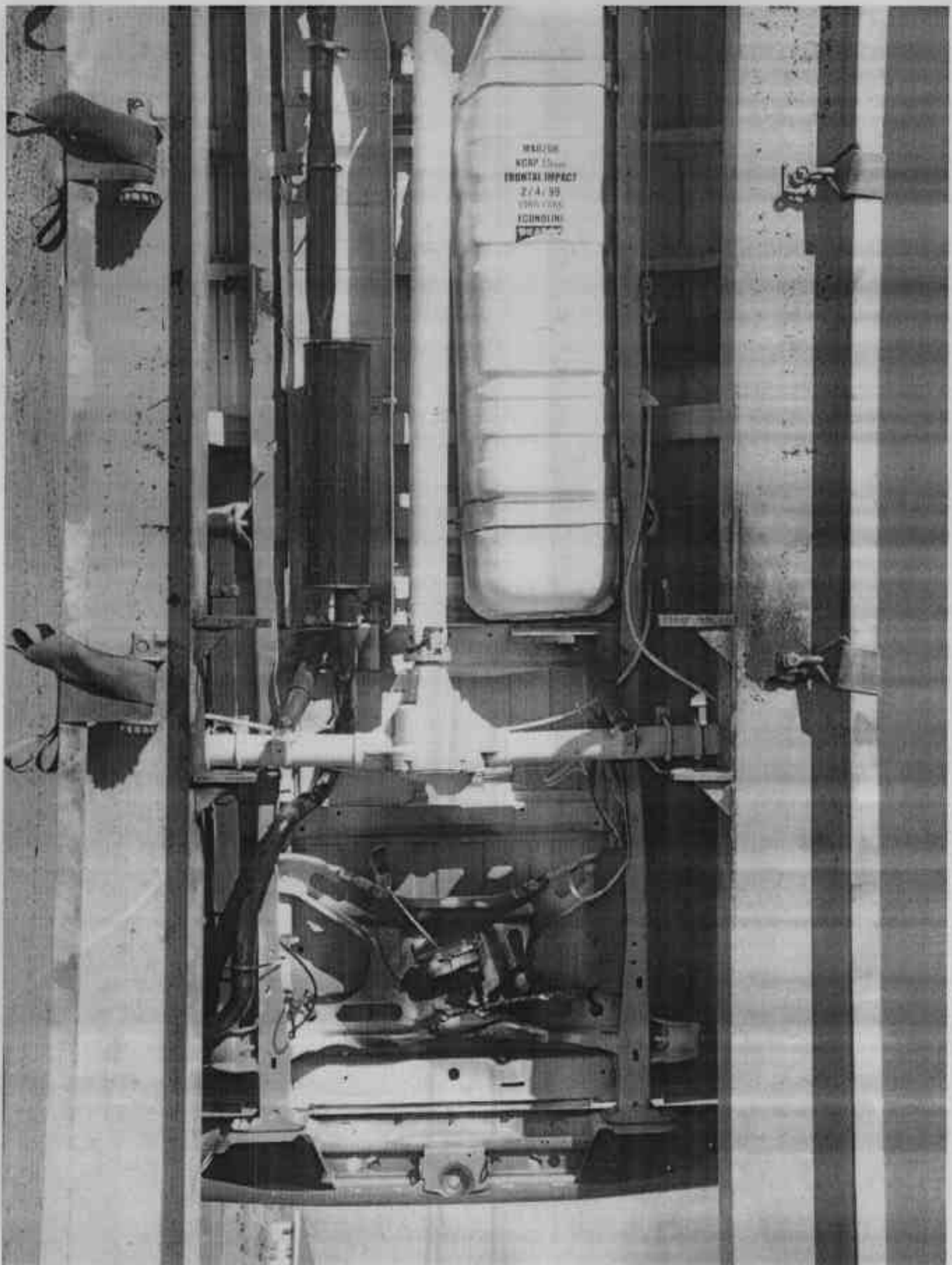


FIGURE A-24. POST TEST REAR UNDERSIDE

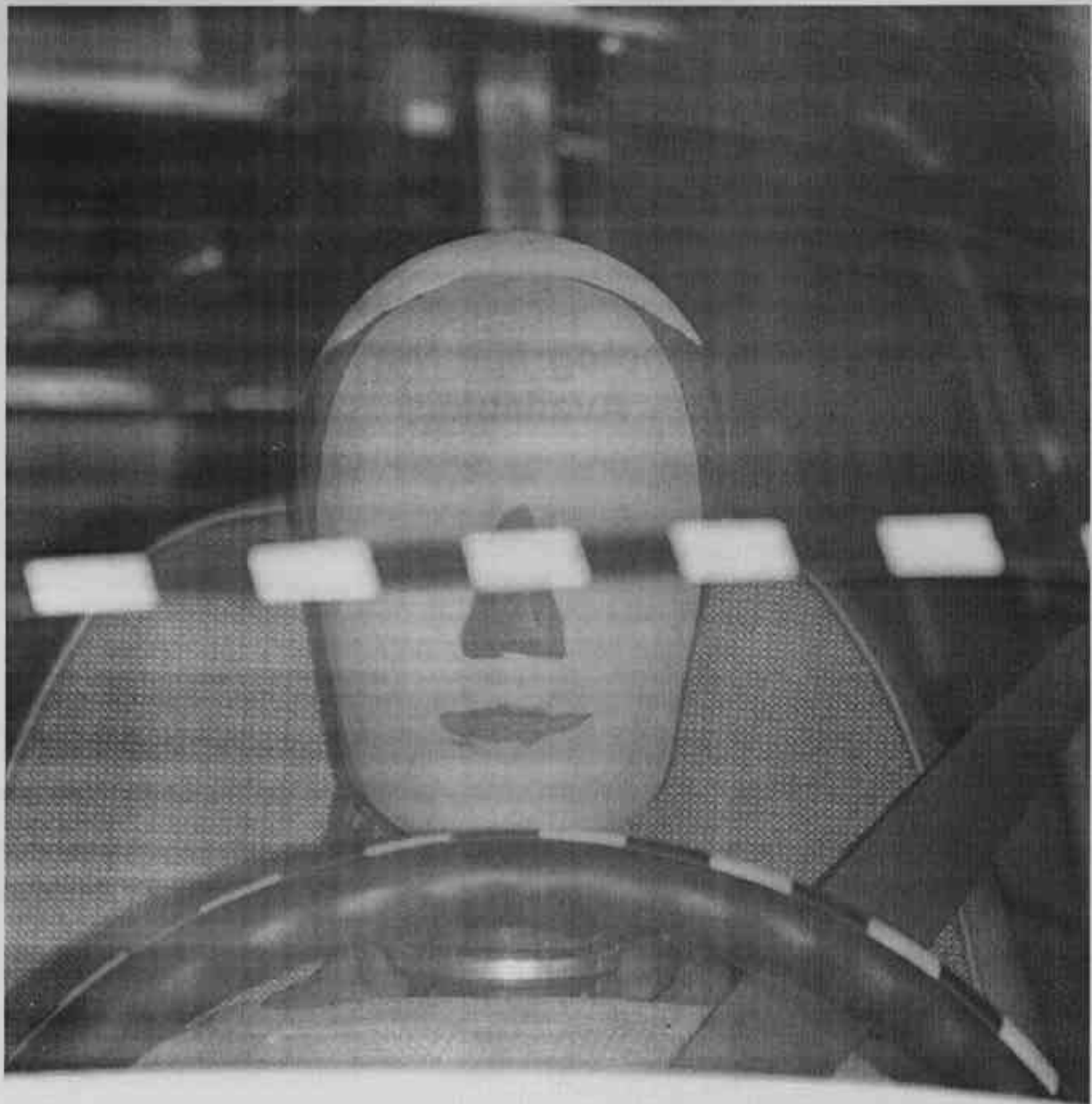


FIGURE A-25. PRETEST DRIVER DUMMY (FRONT VIEW)

**Photograph Not
Available**

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

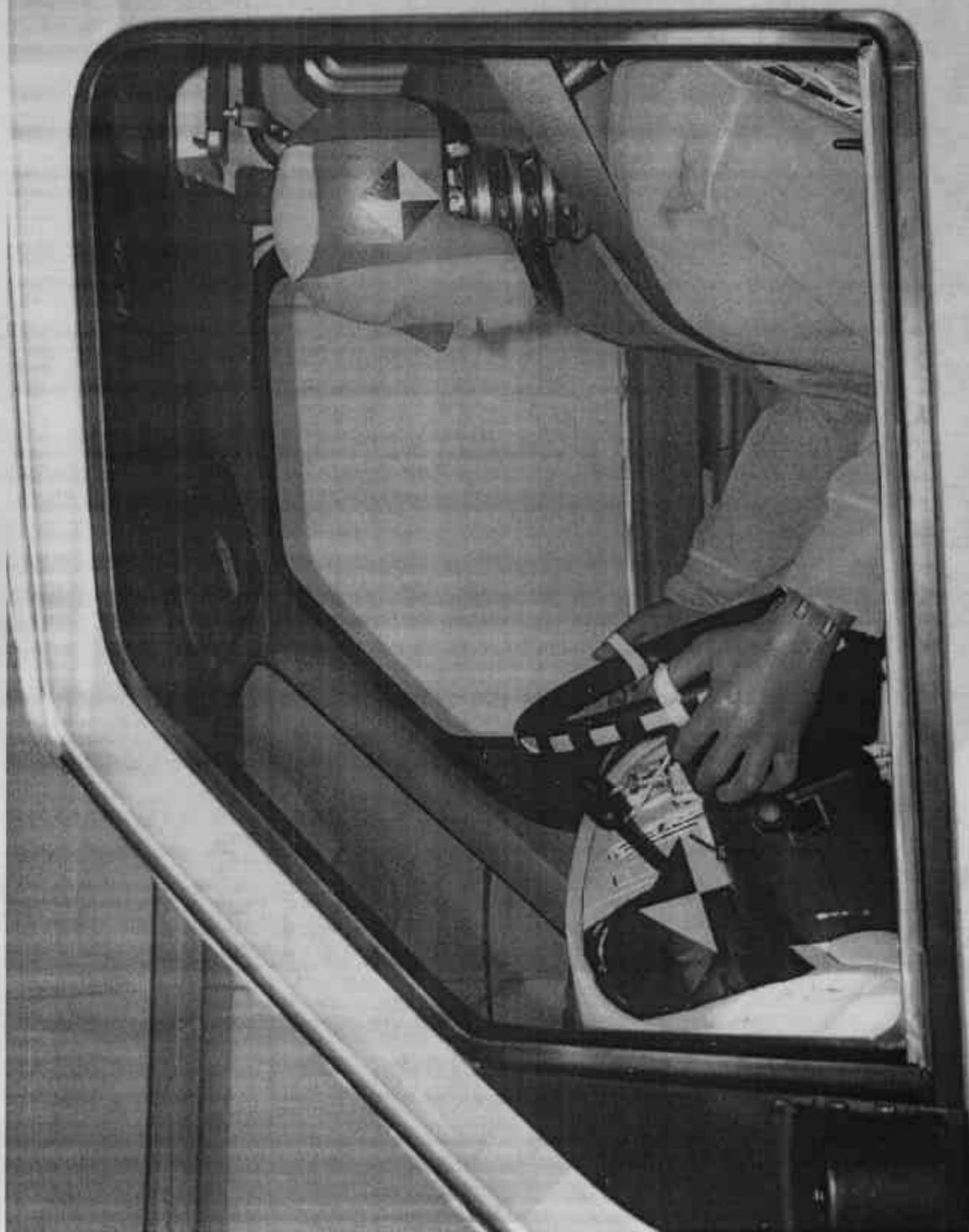


FIGURE A-27. PRETEST DRIVER DUMMY (THUR WINDOW)

KAR99001-13



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)



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



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

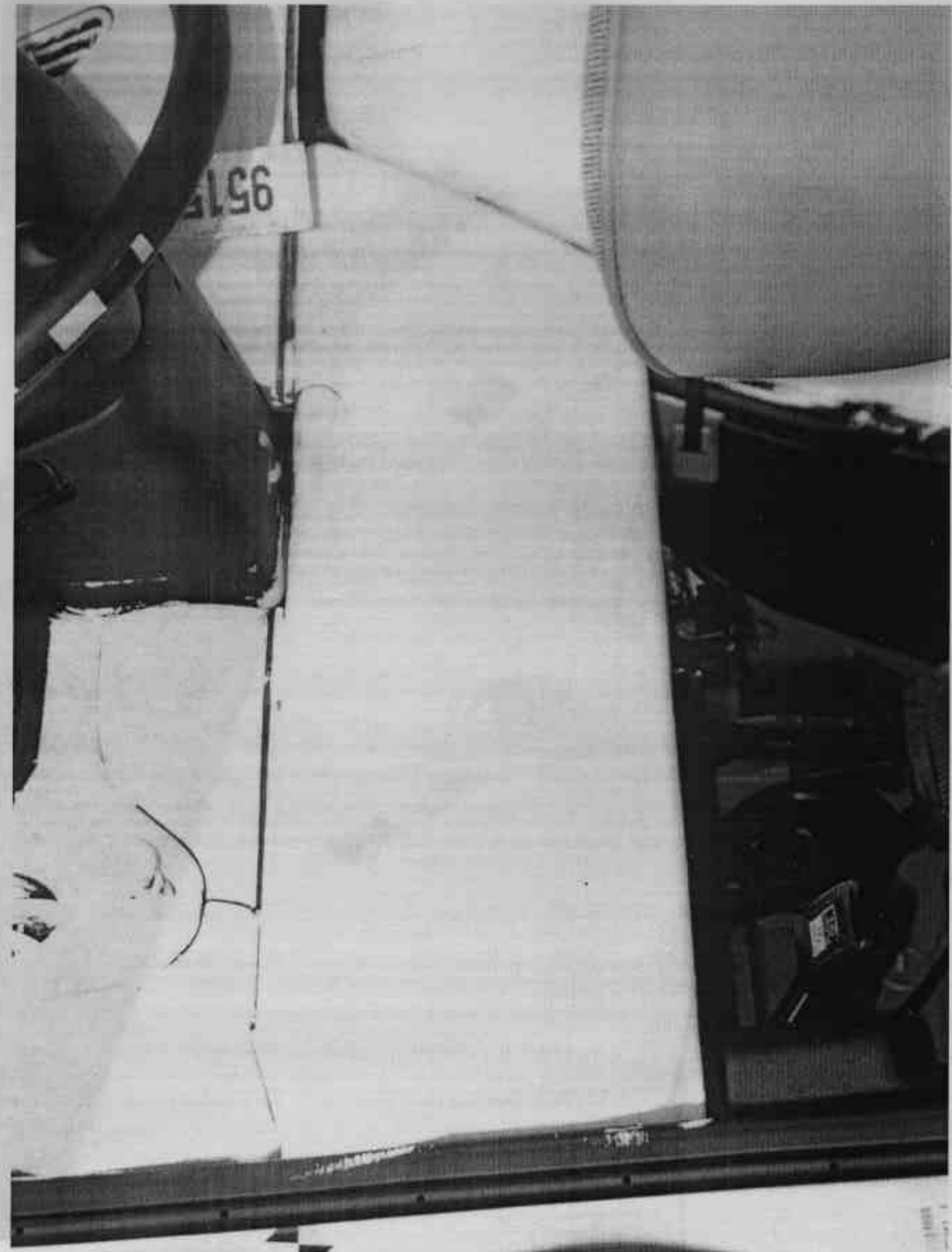


FIGURE A-35. PRETEST DRIVER KNEE BOLSTER

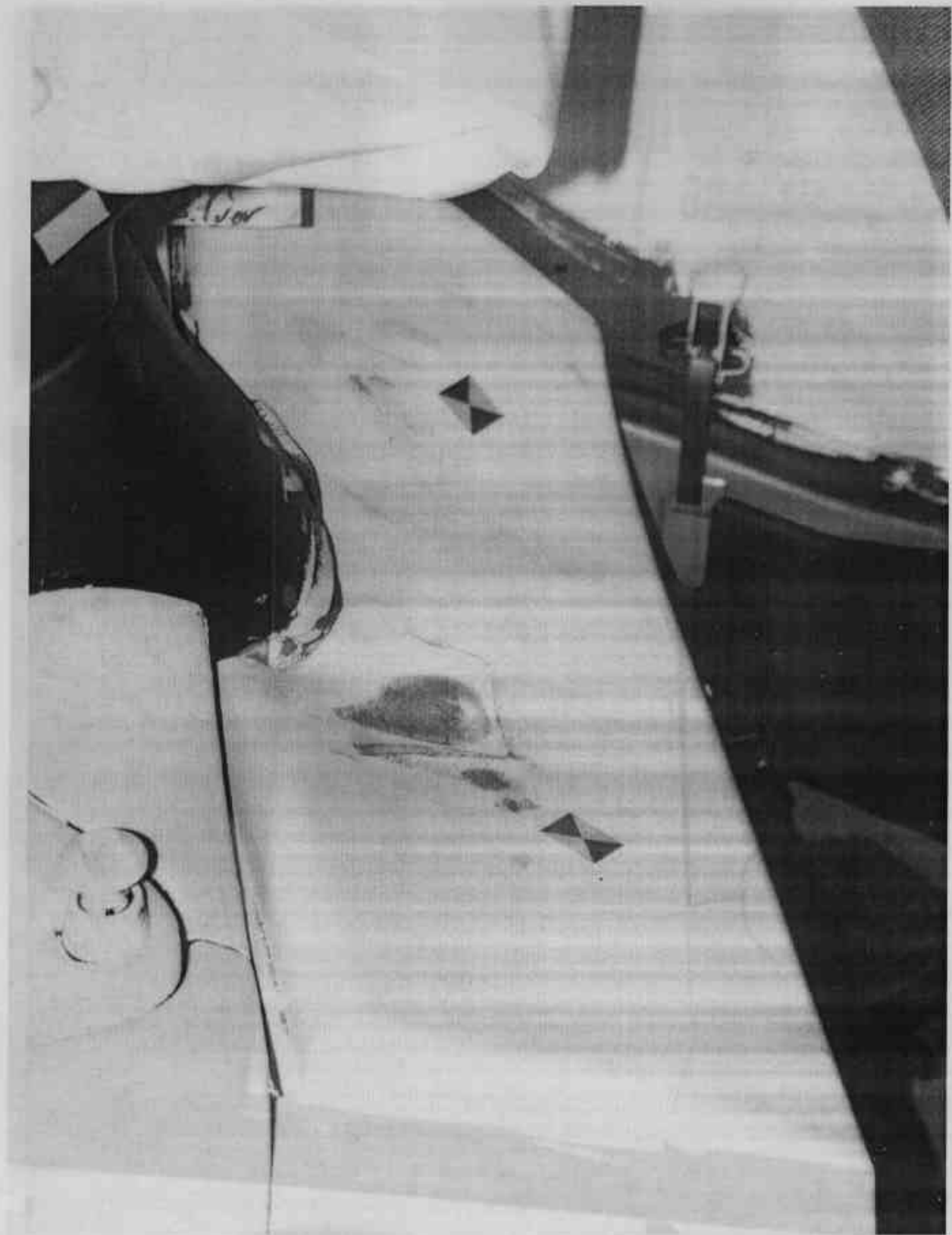


FIGURE A-36. POST TEST DRIVER KNEE BOLSTER

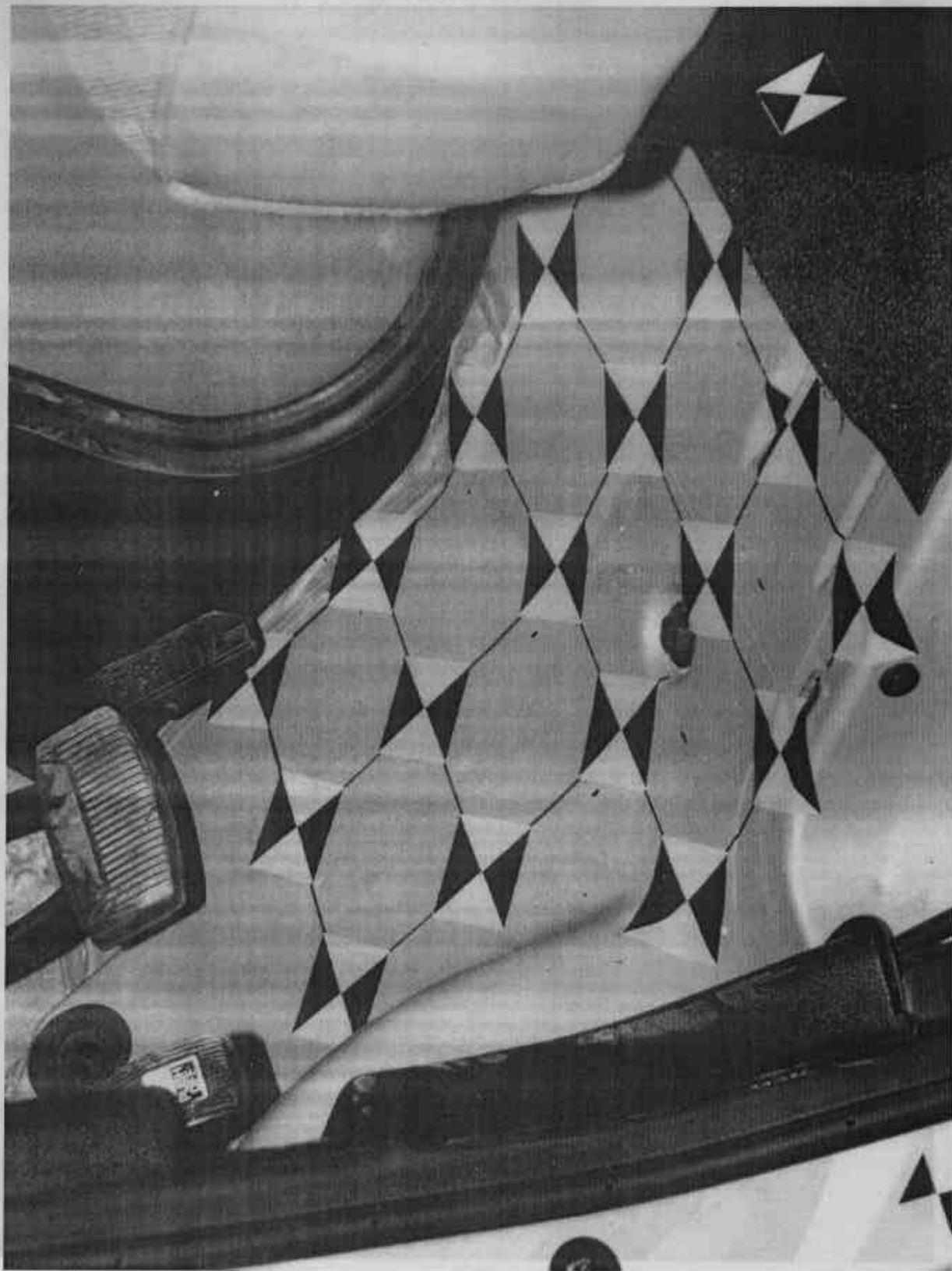


FIGURE A-37. PRETEST DRIVER SIDE FLOOR PAN

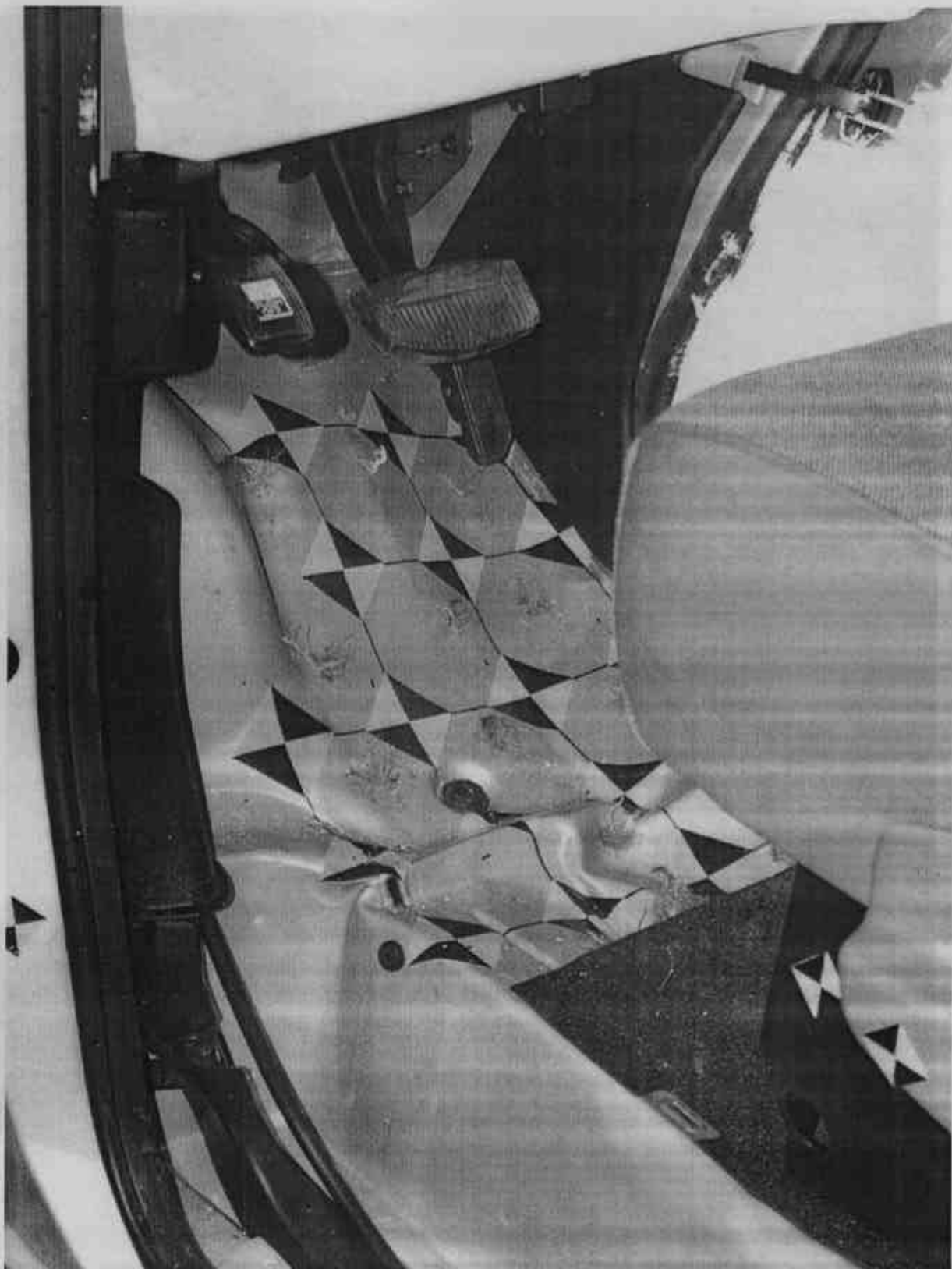


FIGURE A-38. POST TEST DRIVER SIDE FLOOR PAN

A-38

KAR99001-13

RT-1000000000

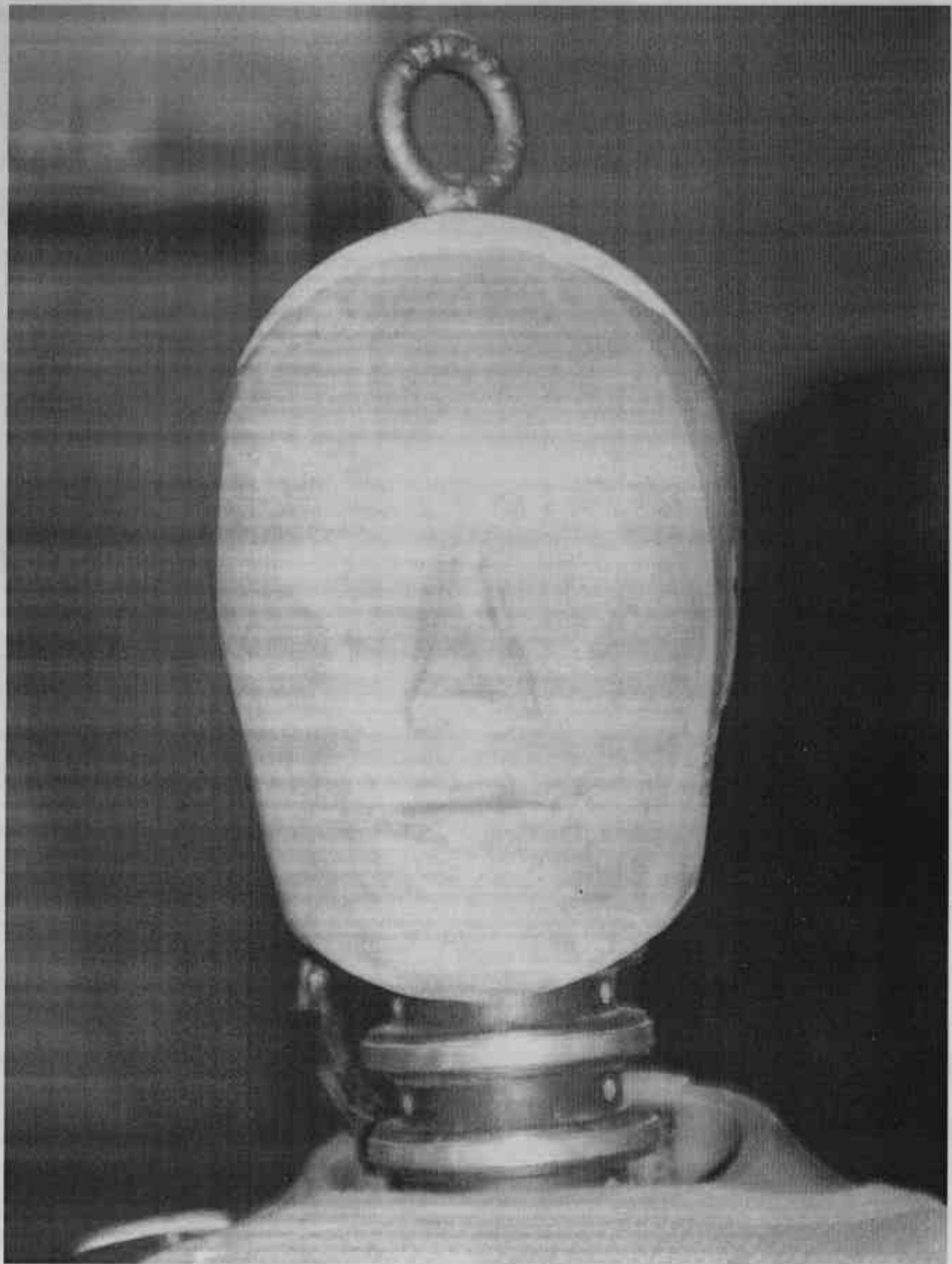


FIGURE A-39. POST TEST DRIVER HEAD

A-39

KAR99001-13

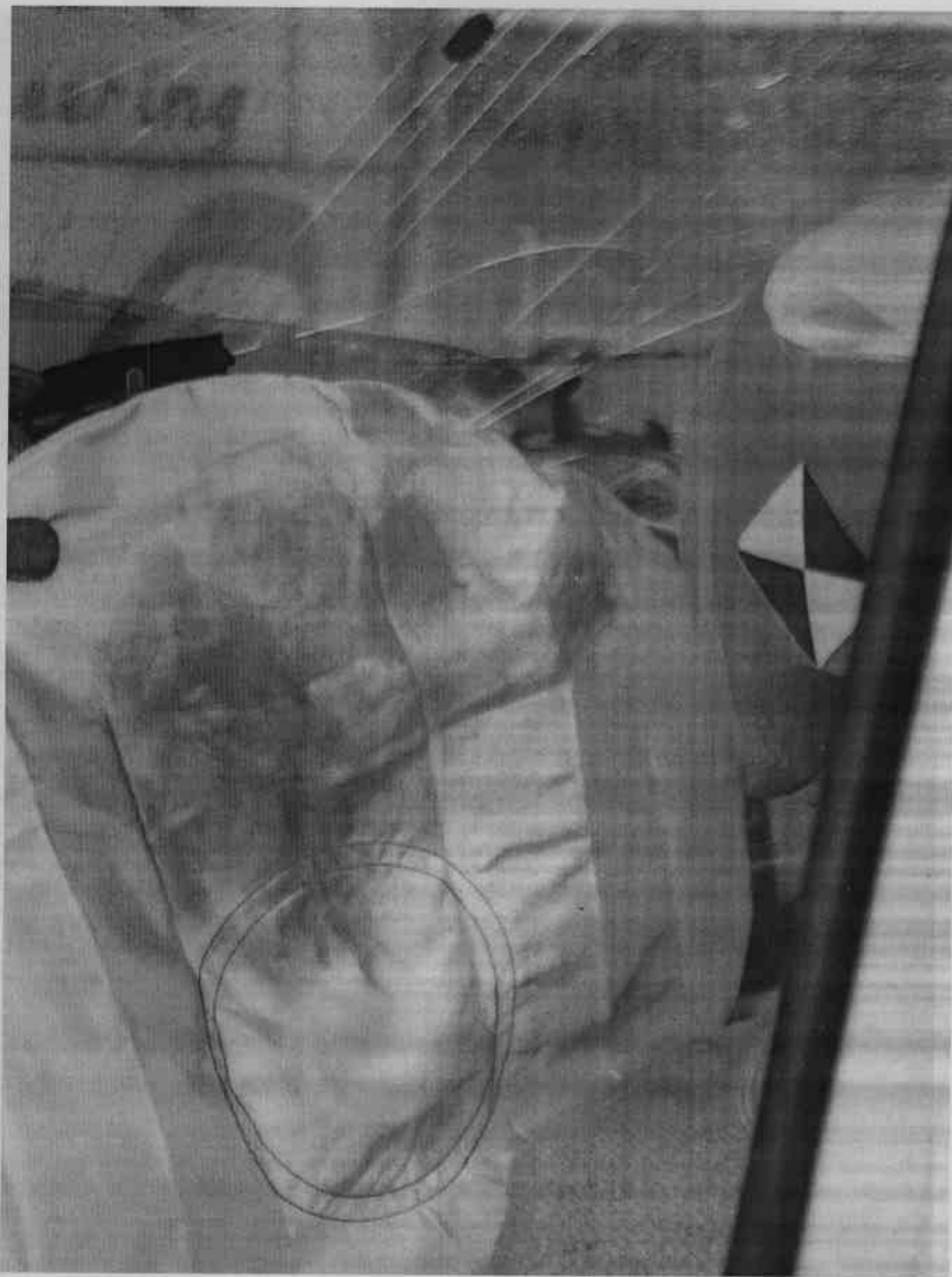


FIGURE A-40. POST TEST DRIVER DUMMY CONTACT

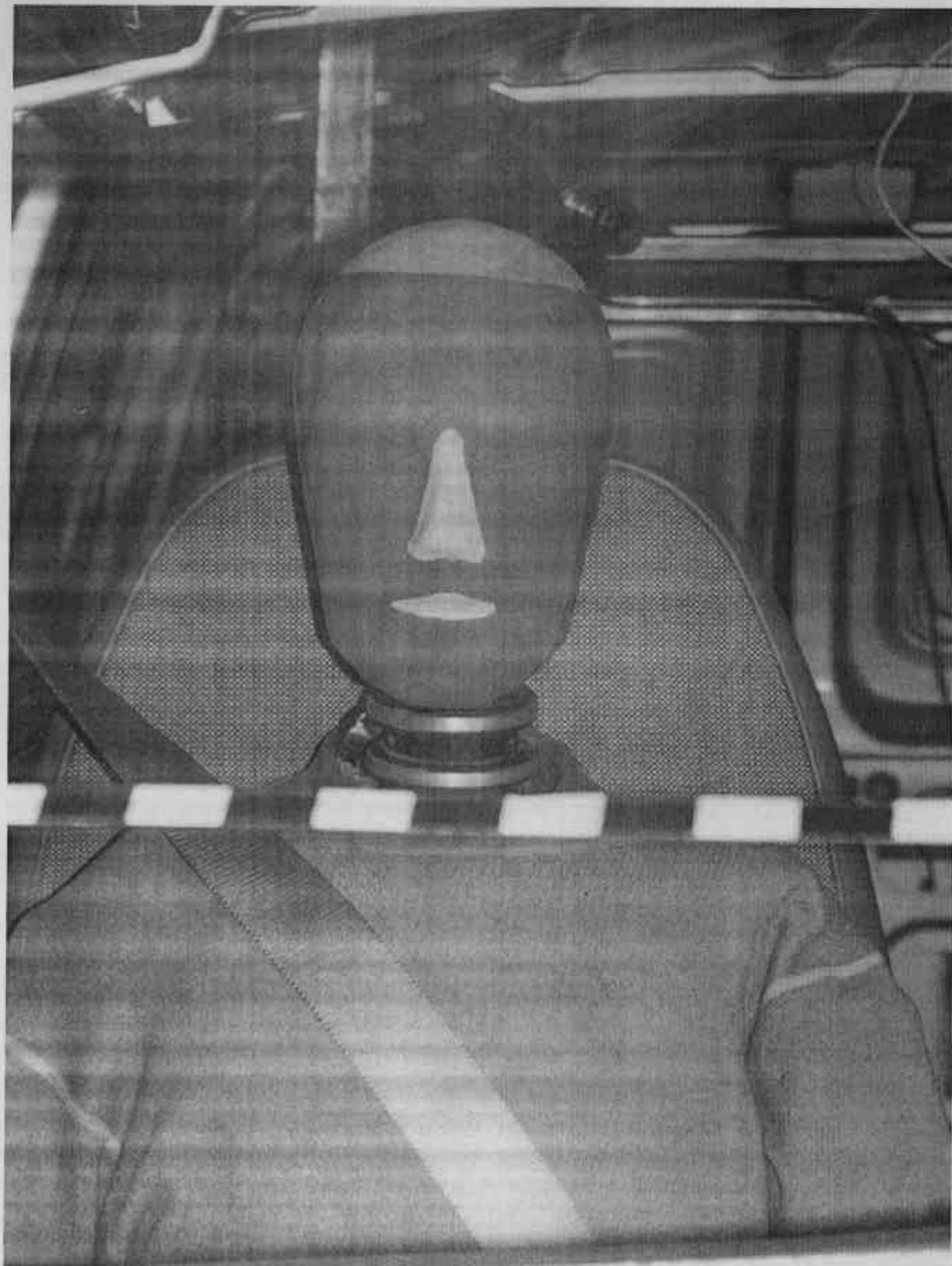


FIGURE A-41. PRETEST PASSENGER DUMMY (FRONT VIEW)

**Photograph Not
Available**

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

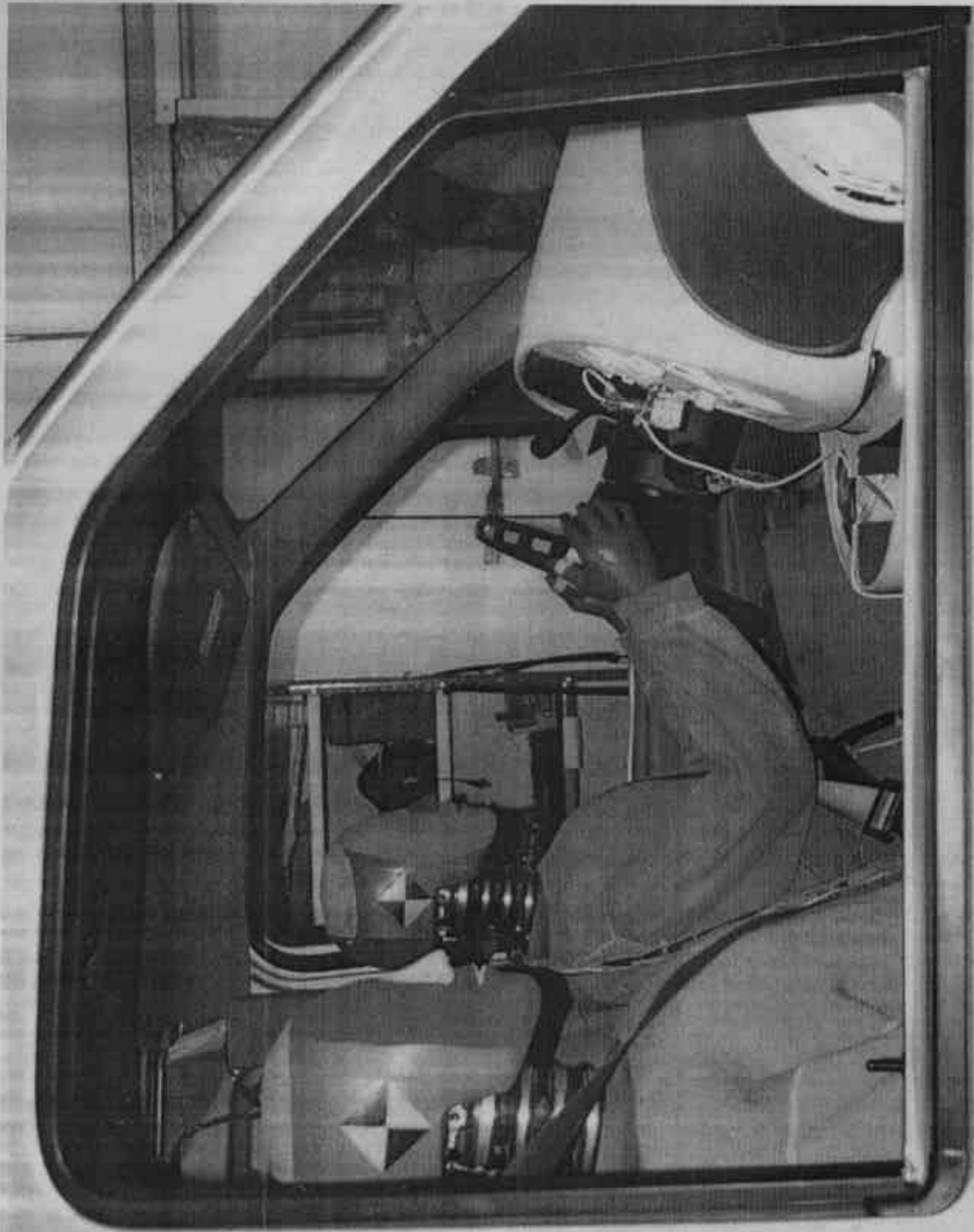


FIGURE A-43. PRETEST PASSENGER DUMMY (THRU WINDOW)

CF-100007AH



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



FIGURE A-49. PRETEST PASSENGER DUMMY FEET

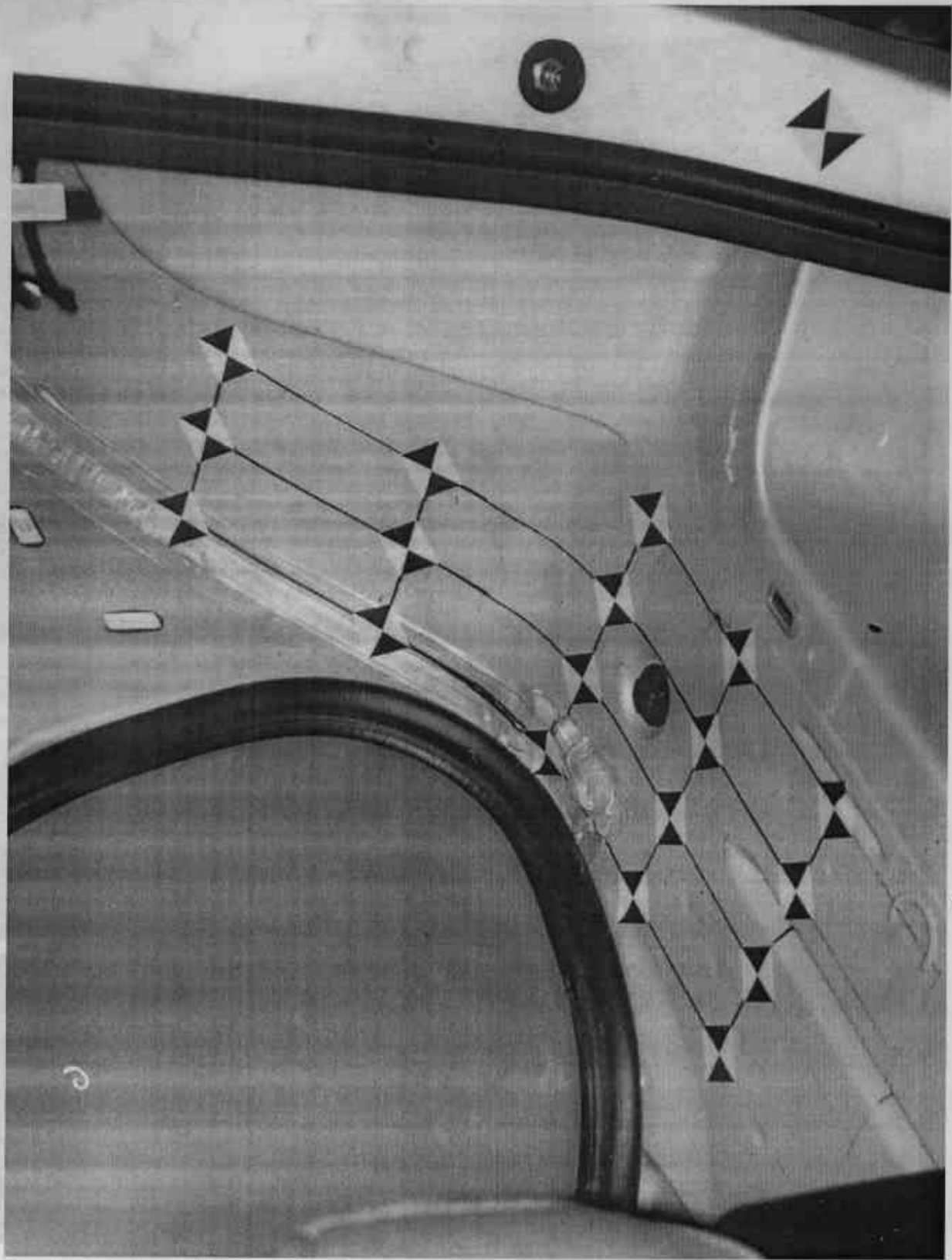


FIGURE A-51. PRETEST PASSENGER SIDE FLOOR PAN

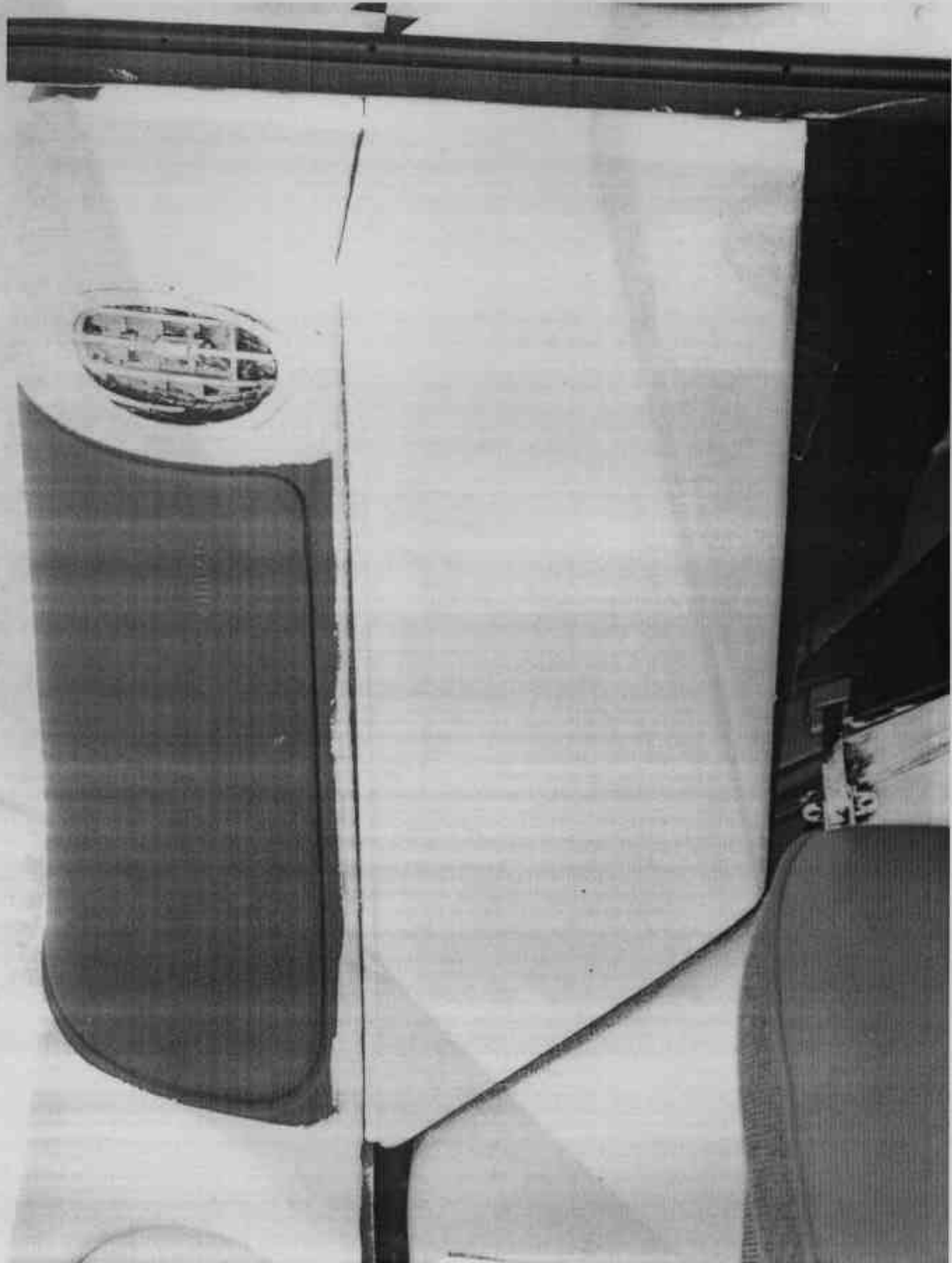


FIGURE A-53. PRETEST PASSENGER SIDE KNEE BOLSTER



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

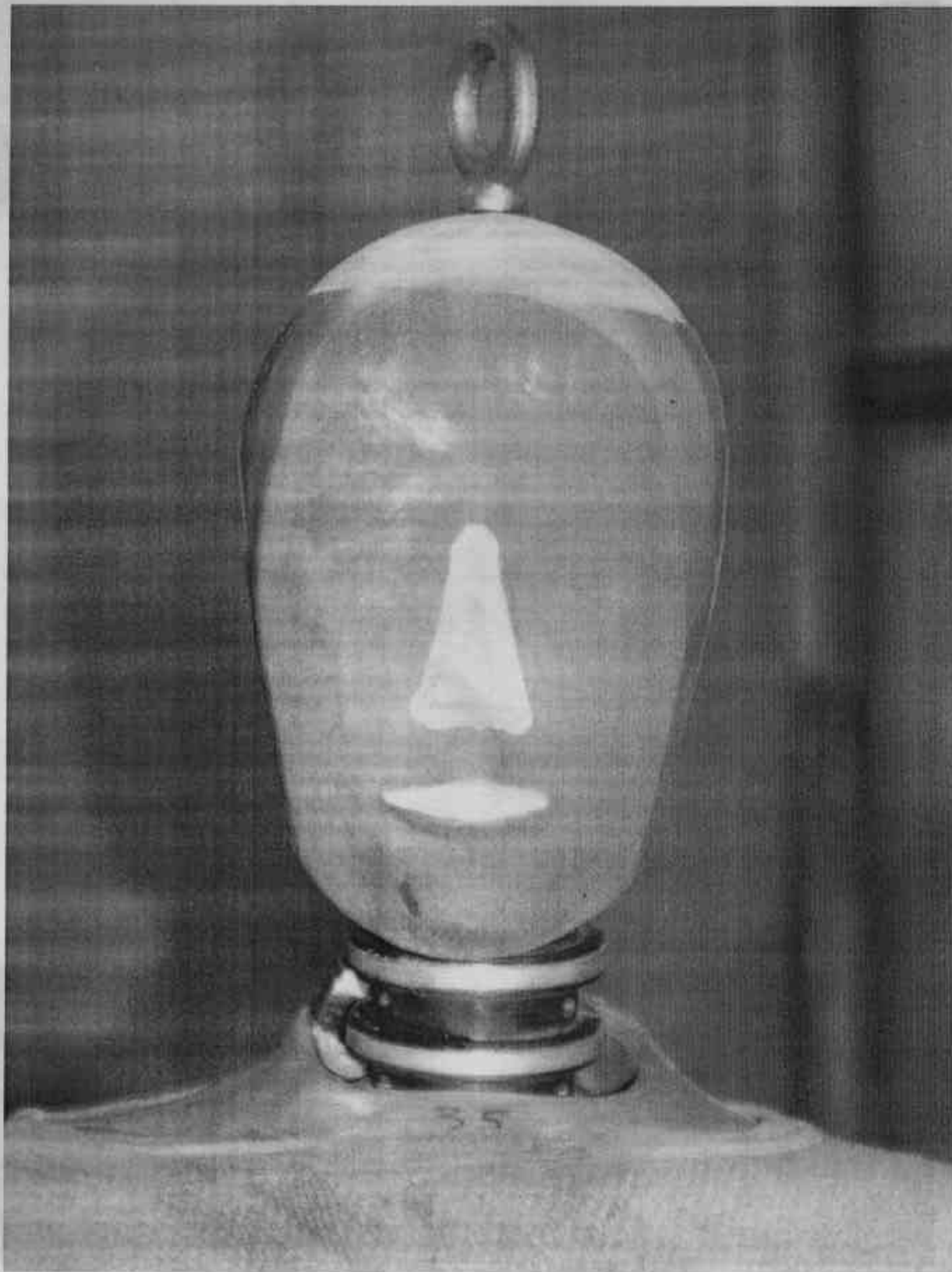


FIGURE A-55. POST TEST PASSENGER HEAD

A-55

KAR99001-13

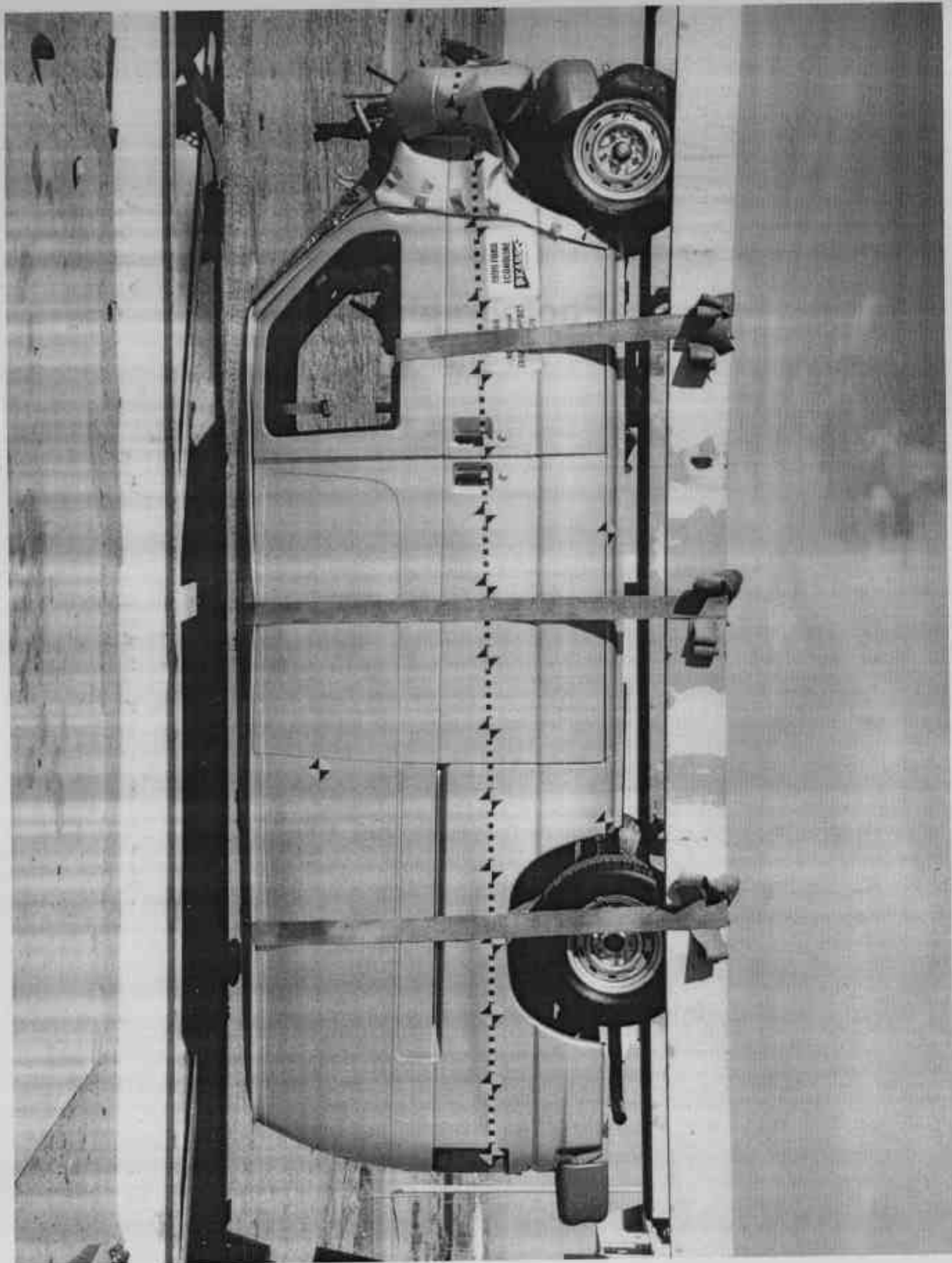


FIGURE A-57. VEHICLE ON ROLLOVER

BT-100002A31

A-57

KAR99001-13

**Photograph Not
Available**

FIGURE A-58. VEHICLE DURING IMPACT

APPENDIX B
DUMMY AND VEHICLE RESPONSE DATA TRACES

KAR99001-13

LIST OF DATA PLOTS

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B-5	Driver Head Primary Z	B-5
B-6	Driver Head Resultant Primary	B-6
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B-43	Driver Left Upper Tibia Moment Y	B-43
B-44	Driver Right Upper Tibia Moment X	B-44
B-45	Driver Right Upper Tibia Moment Y	B-45
B-46	Driver Left Lower Tibia Moment X	B-46
B-47	Driver Left Lower Tibia Moment Y	B-47
B-48	Driver Left Lower Tibia Force Z	B-48
B-49	Driver Right Lower Tibia Moment X	B-49
B-50	Driver Right Lower Tibia Moment Y	B-50
B-51	Driver Right Lower Tibia Force Z	B-51
B-52	Driver Left Foot Aft X	B-52
B-53	Driver Left Foot Aft Z	B-53
B-54	Driver Left Foot Fore Z	B-54
B-55	Driver Right Foot Aft X	B-55
B-56	Driver Right Foot Aft Z	B-56
B-57	Driver Right Foot Fore Z	B-57
B-58	Driver Lap Belt Force	B-58
B-59	Driver Shoulder Belt Force	B-59
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B-63	Passenger Head Primary X Velocity	B-63
B-64	Passenger Head Primary X Displacement	B-64
B-65	Passenger Head Primary Y	B-65
B-66	Passenger Head Primary Z	B-66
B-67	Passenger Head Resultant Primary	B-67
B-68	Passenger Head Redundant X	B-68
B-69	Passenger Head Redundant X Velocity	B-69
B-70	Passenger Head Redundant X Displacement	B-70

LIST OF DATA PLOTS...(Continued)

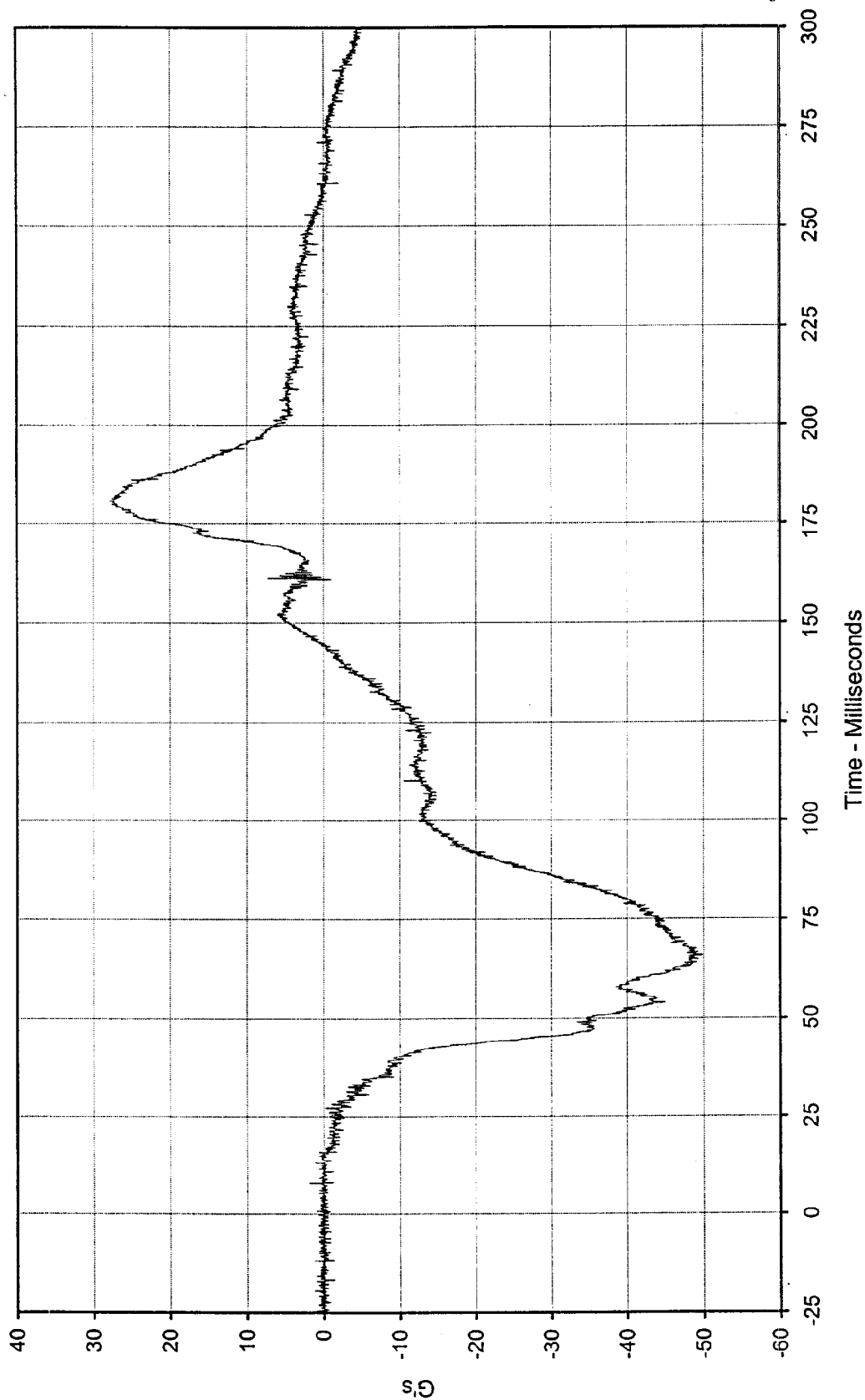
Data Plot		Page
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B-72	Passenger Head Redundant Z	B-72
B-73	Passenger Head Resultant Redundant	B-73
B-74	Passenger Neck Force X	B-74
B-75	Passenger Neck Force Y	B-75
B-76	Passenger Neck Force Z	B-76
B-77	Passenger Neck Force Resultant	B-77
B-78	Passenger Neck Moment X	B-78
B-79	Passenger Neck Moment Y	B-79
B-80	Passenger Neck Moment Z	B-80
B-81	Passenger Neck Moment Resultant	B-81
B-82	Passenger Chest Primary X	B-82
B-83	Passenger Chest Primary X Velocity	B-83
B-84	Passenger Chest Primary X Displacement	B-84
B-85	Passenger Chest Primary Y	B-85
B-86	Passenger Chest Primary Z	B-86
B-87	Passenger Chest Primary Resultant	B-87
B-88	Passenger Chest Redundant X	B-88
B-89	Passenger Chest Redundant X Velocity	B-89
B-90	Passenger Chest Redundant X Displacement	B-90
B-91	Passenger Chest Redundant Y	B-91
B-92	Passenger Chest Redundant Z	B-92
B-93	Passenger Chest Redundant Resultant	B-93
B-94	Passenger Chest Displacement X	B-94
B-95	Passenger Pelvis X	B-95
B-96	Passenger Pelvis X Velocity	B-96
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B-98	Passenger Pelvis Y	B-98
B-99	Passenger Pelvis Z	B-99
B-100	Passenger Pelvis Resultant	B-100
B-101	Passenger Left Femur Force	B-101
B-102	Passenger Right Femur Force	B-102
B-103	Passenger Left Upper Tibia Moment X	B-103
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Curve Description: Driver Head Primary X

Maximum Value: 27.8 at 180.7 Milliseconds

Minimum Value: -49.9 at 65.7 Milliseconds

SAE Filter Class: 1000

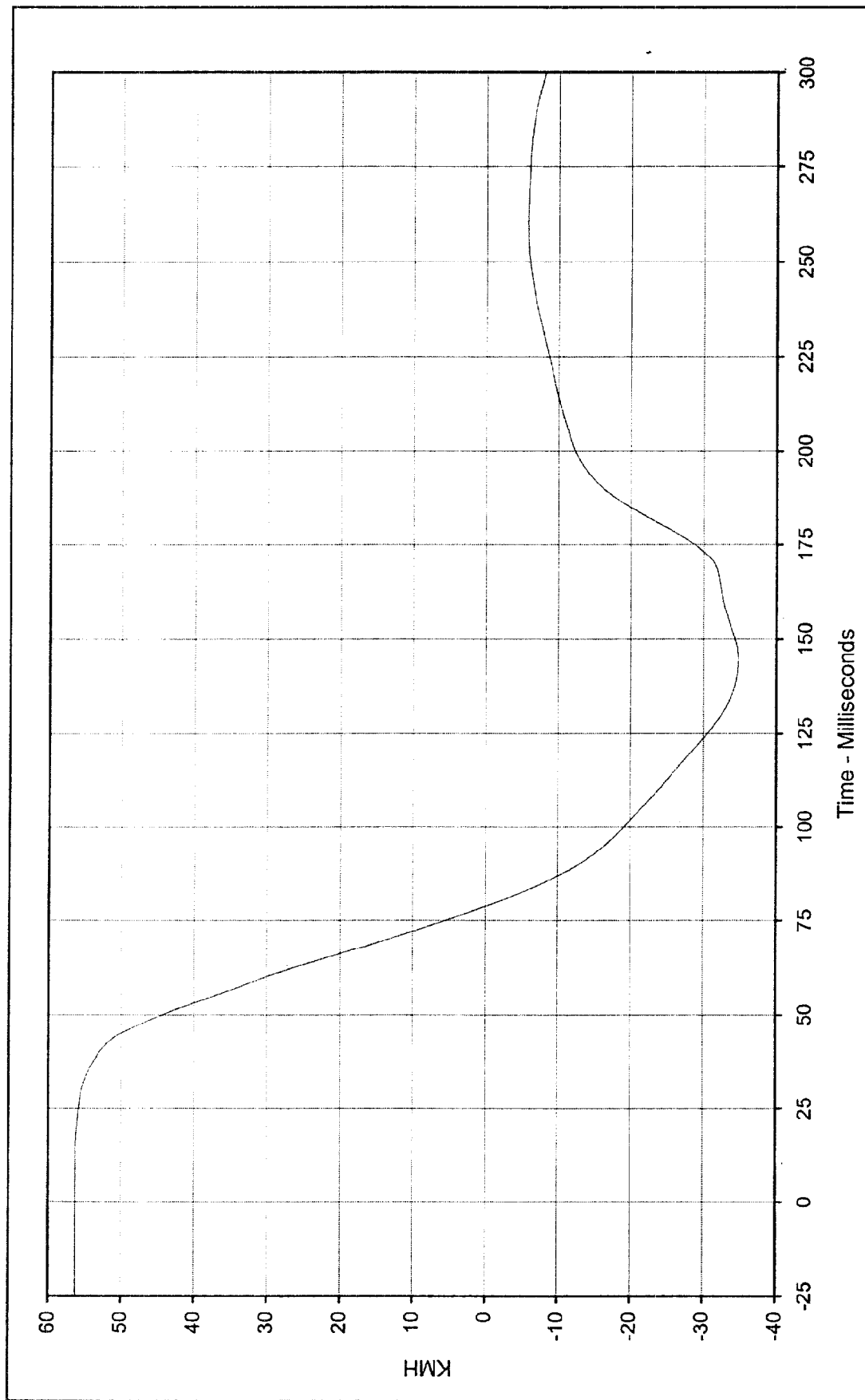
Date of Test: 2/4/99

Curve Number: FIL-001

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Driver Head Primary X Velocity Testing Program 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 56.3 at 9.6 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

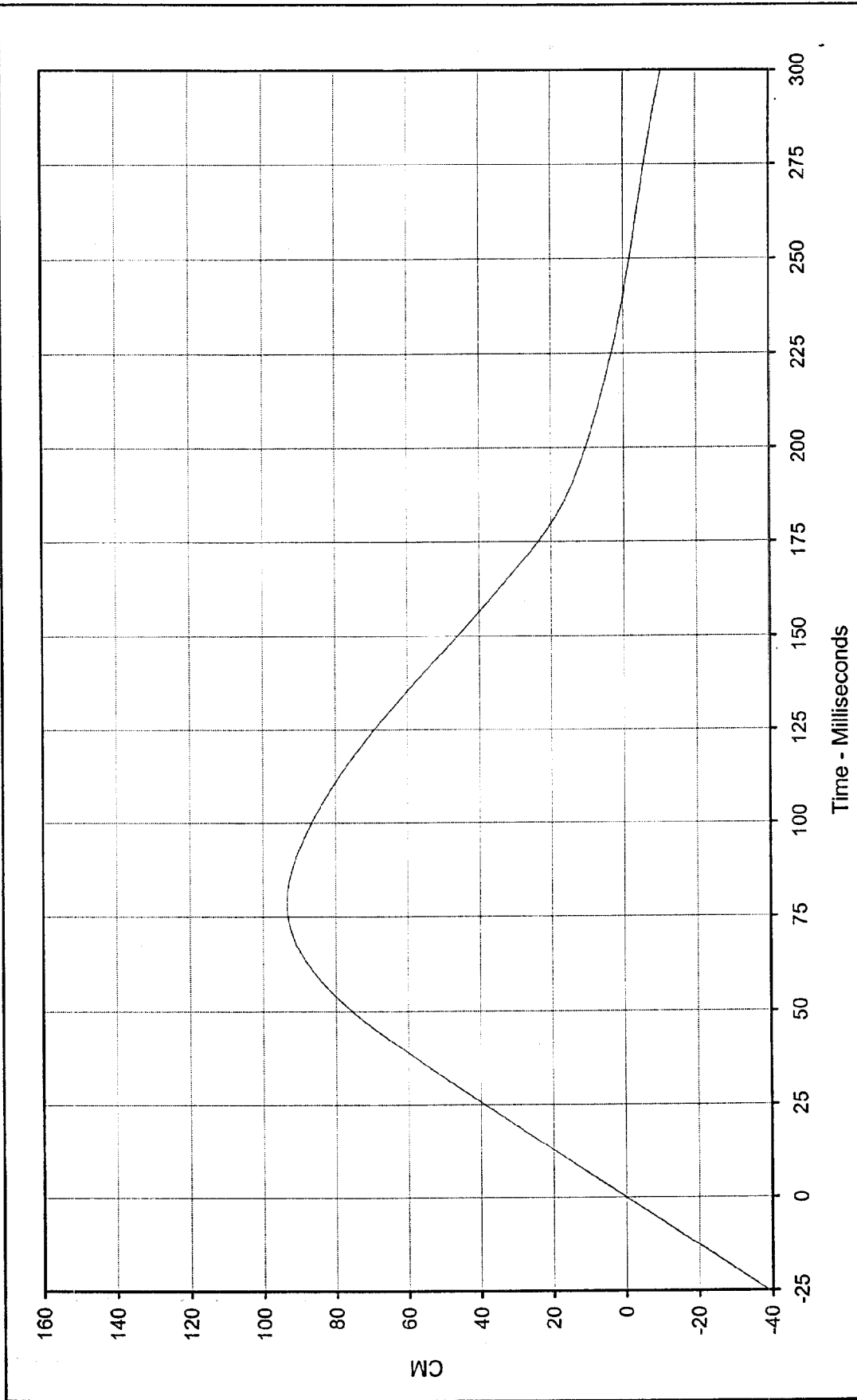
Minimum Value: -34.8 at 144.5 Milliseconds

SAE Filter Class: 180

Date of Test: 2/4/99

Curve Number: IN1-001





Curve Description: Driver Head Primary X Displ. Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 93.3 at 78.6 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

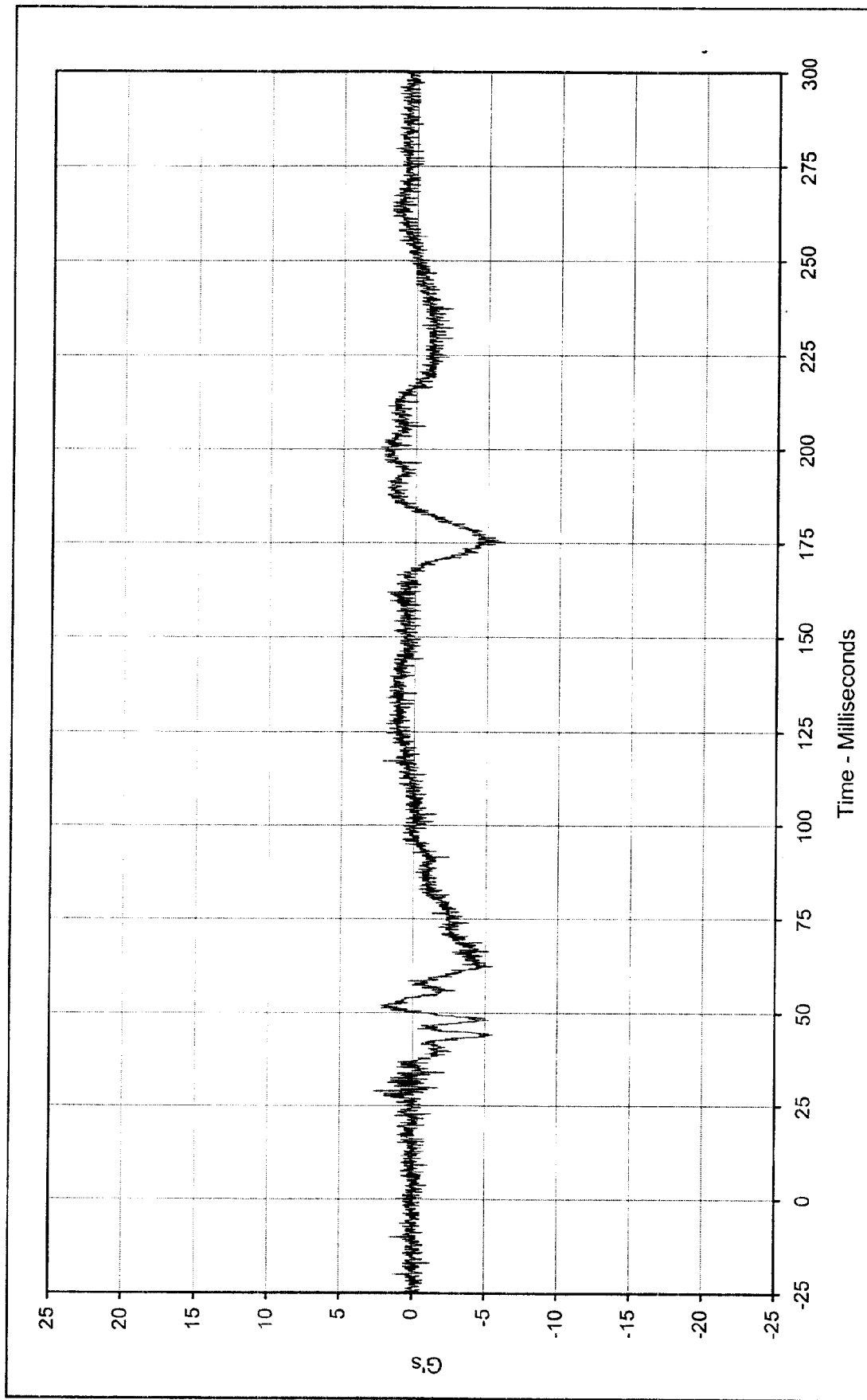
Minimum Value: -10.5 at 299.9 Milliseconds

SAE Filter Class: 180

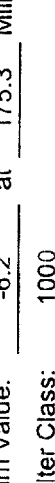
Date of Test: 2/4/99

Curve Number: IN2-001

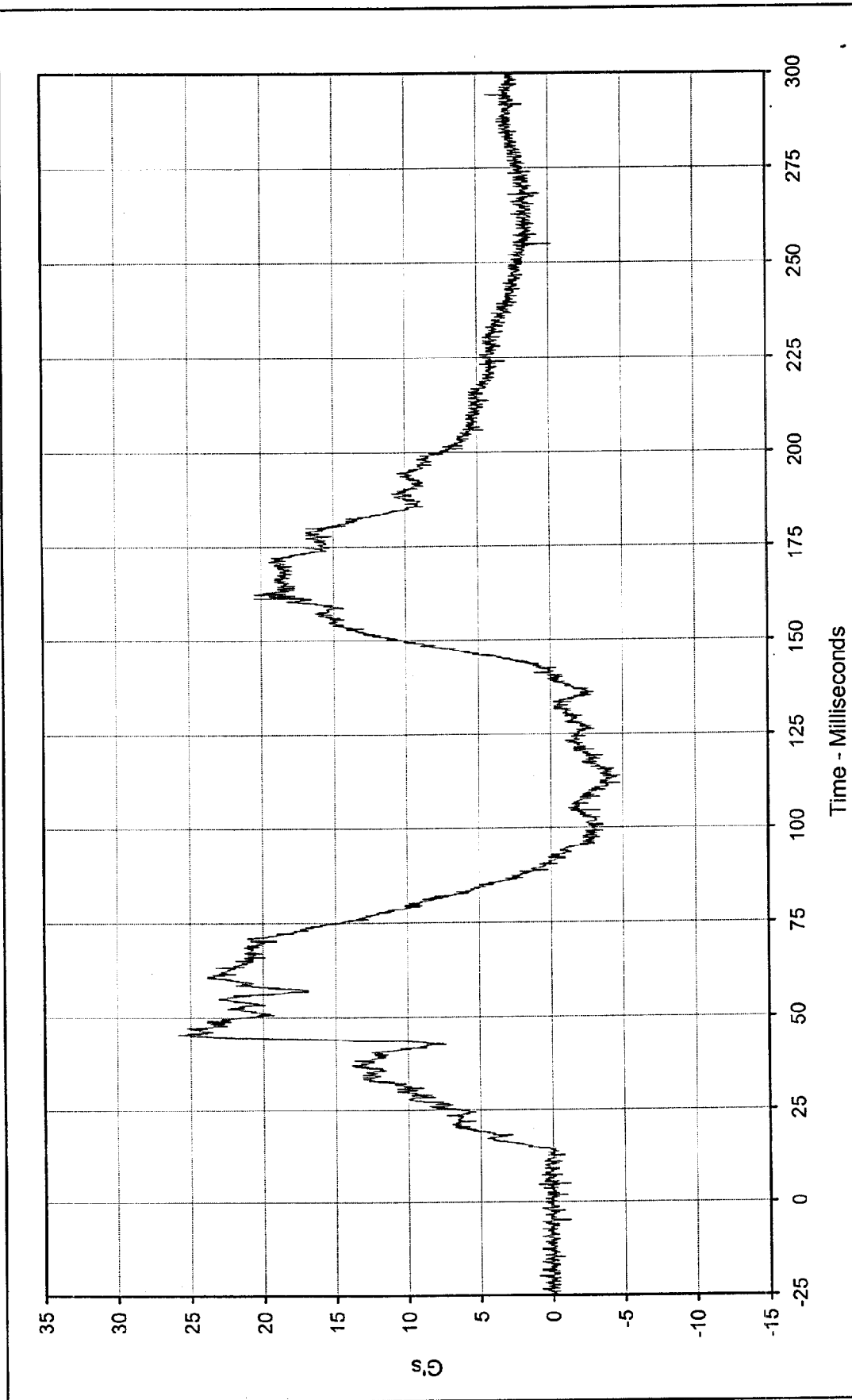




Curve Description:		Driver Head Primary Y		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	2.6	at	29.0	Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van
Minimum Value:	-6.2	at	175.3	Milliseconds		
SAE Filter Class:	1000					
Date of Test:	2/4/99					
Curve Number:	FIL-002					

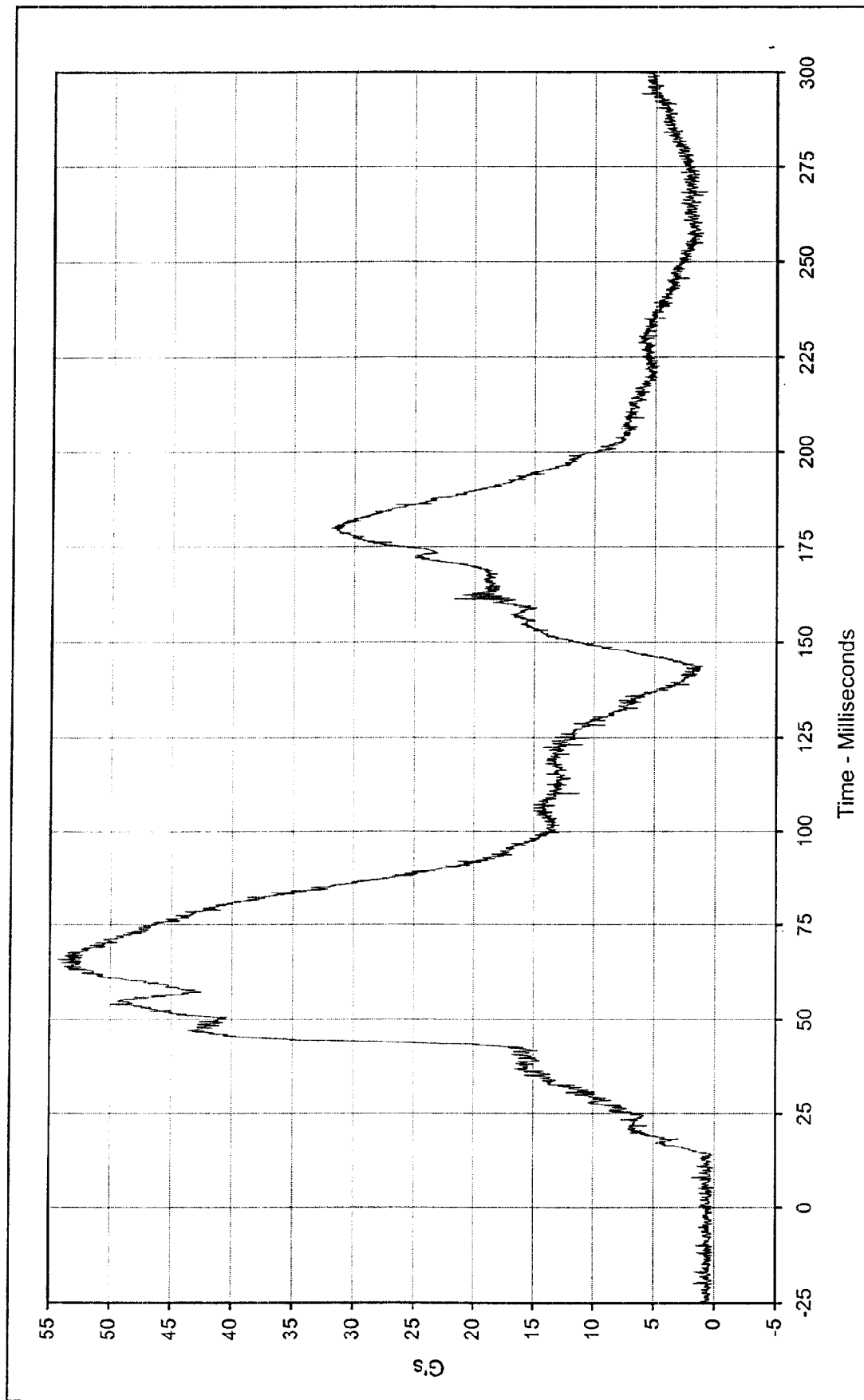






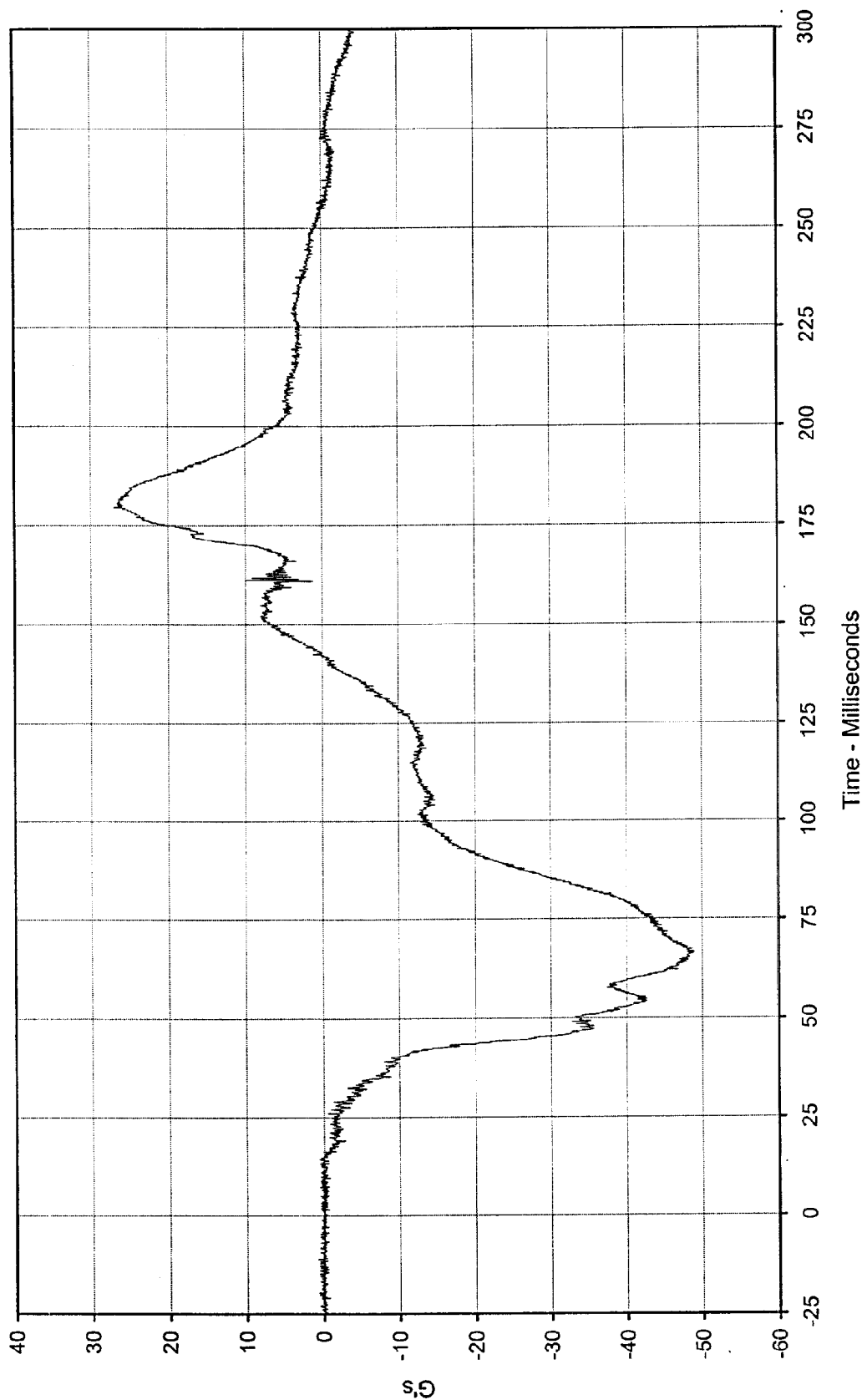
Curve Description:	Driver Head Primary Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	25.8 at 45.3 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-4.8 at 111.8 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	FIL-003			





Curve Description:	Driver Head Resultant Primary	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	54.4 at 65.7 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	0.1 at 5.1 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	RES-001			





Curve Description: Driver Head Redundant X

Maximum Value: 27.0 at 179.6 Milliseconds

Minimum Value: -49.0 at 66.3 Milliseconds

SAE Filter Class: 1000

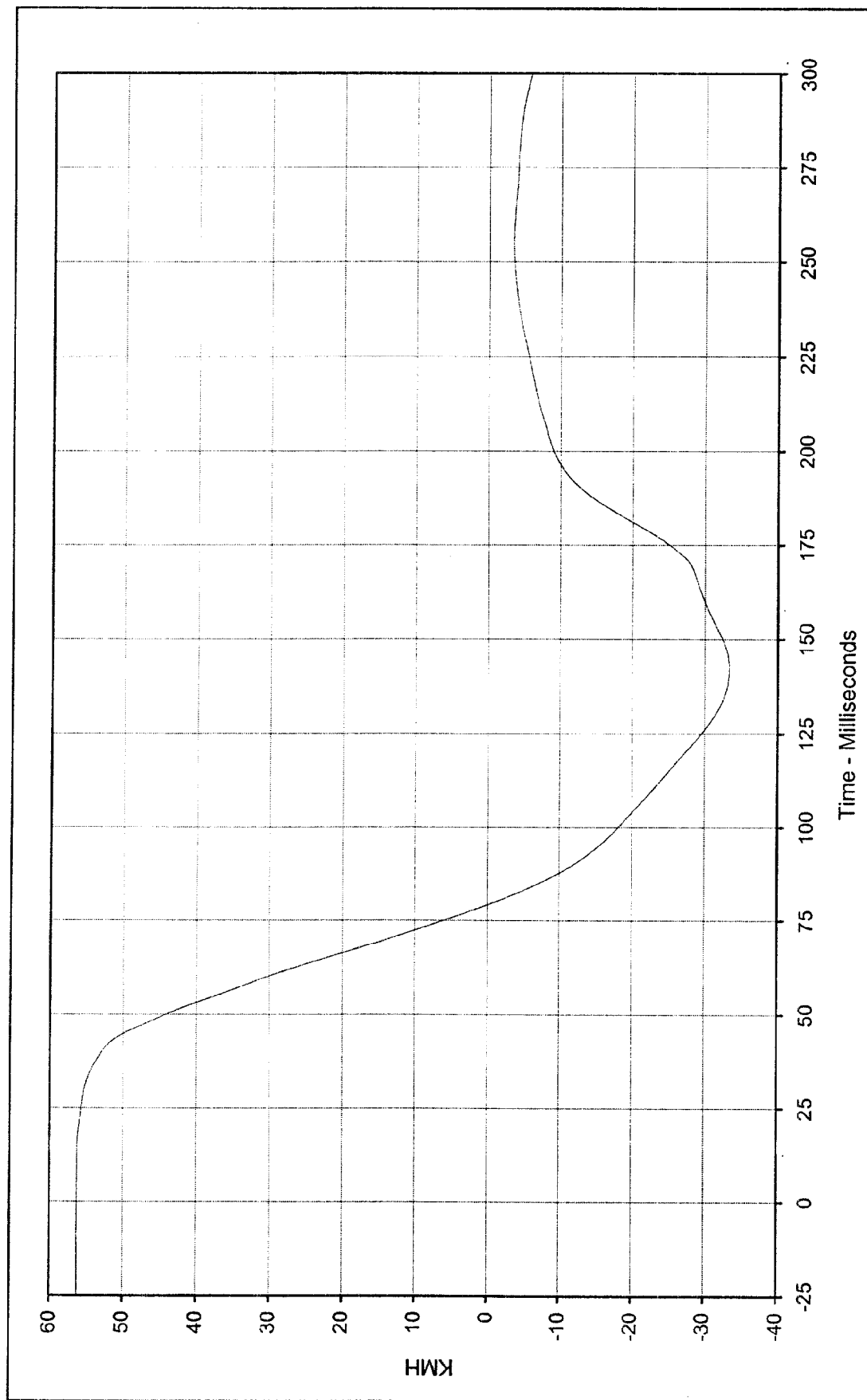
Date of Test: 2/4/99

Curve Number: FIL-004

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

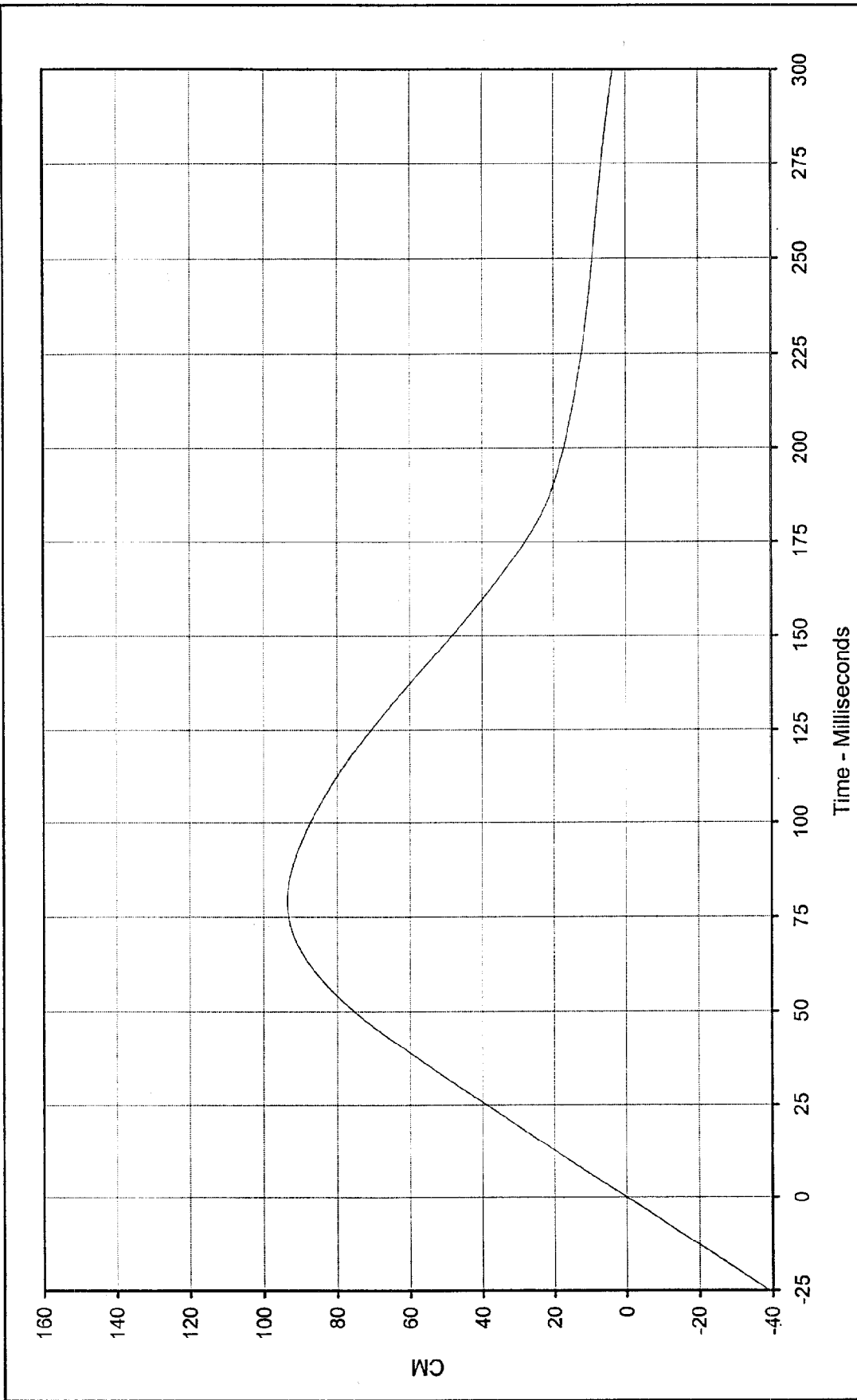
Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Driver Head Redundant X Velocity	Testing Program	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	56.3	at	0.0	Milliseconds
Minimum Value:	-33.4	at	142.1	Milliseconds
SAE Filter Class:	180			
Date of Test:	2/4/99	Test Vehicle:	1999 Ford Econoline E-150 Van	
Curve Number:	IN1-004			





Curve Description: Driver Head Redundant X Displ.

Maximum Value: 93.5 at 79.1 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

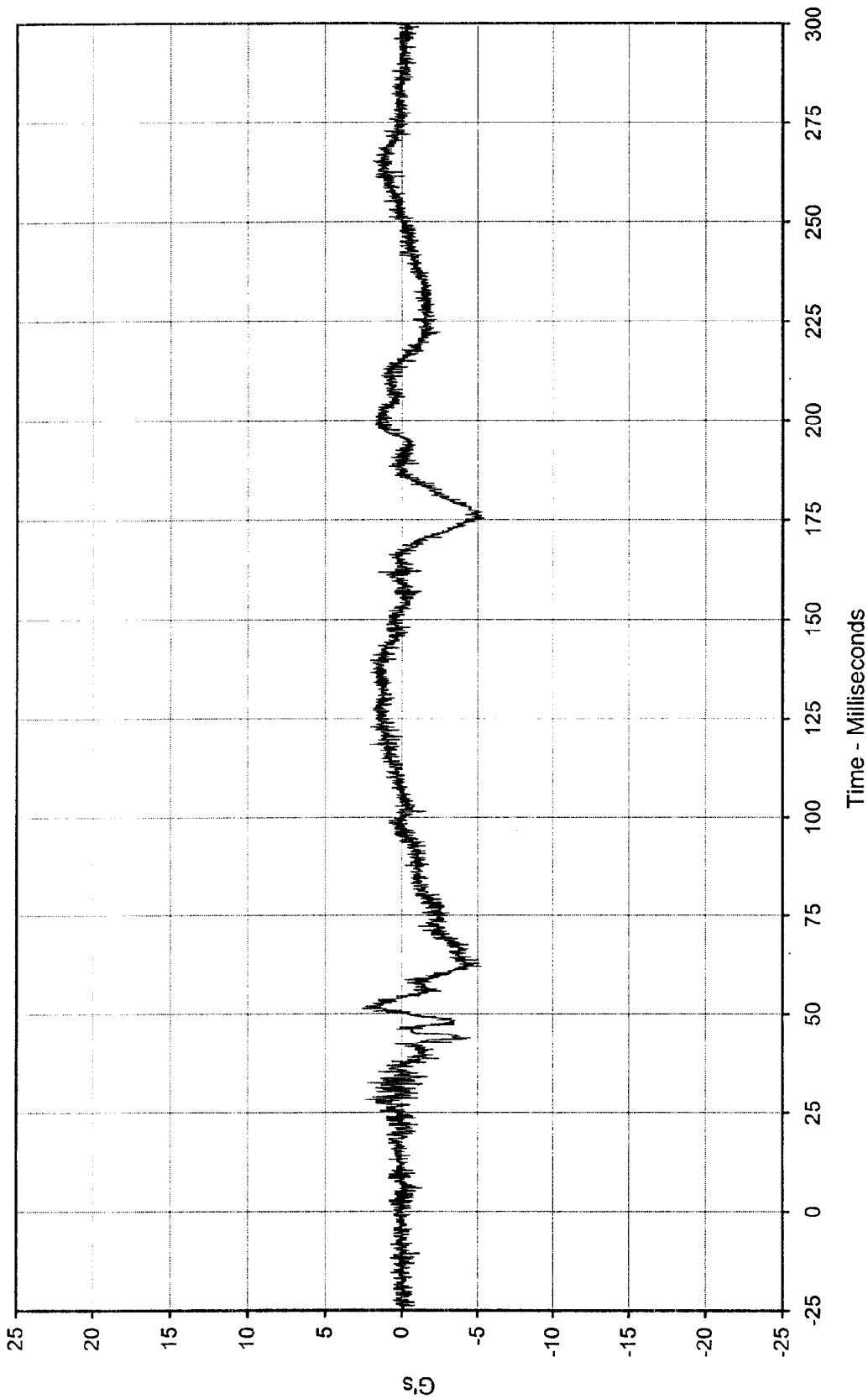
Date of Test: 2/4/99

Curve Number: IN2-004

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

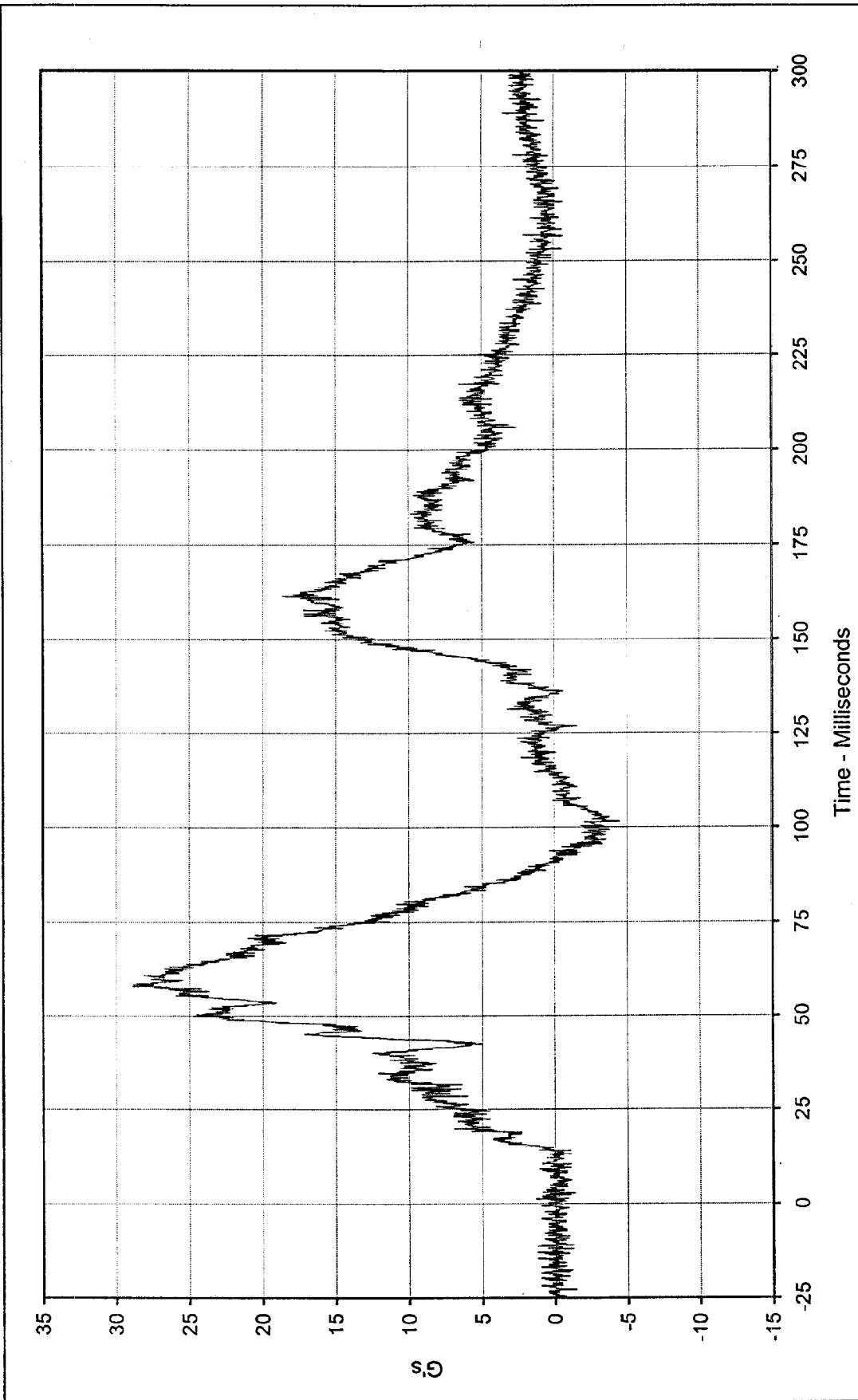
Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:		Test Program:		1999 NHTSA 35 mph NCAP No.: MX0208	
Maximum Value:	2.6	at	51.4	Milliseconds	Test Vehicle:
Minimum Value:	-5.4	at	175.4	Milliseconds	1999 Ford Econoline E-150 Van
SAE Filter Class:	1000				
Date of Test:	2/4/99				
Curve Number:	FIL-005				





Curve Description: Driver Head Redundant Z

Maximum Value: 28.8 at 57.8 Milliseconds

Minimum Value: -4.5 at 101.5 Milliseconds

SAE Filter Class: 1000

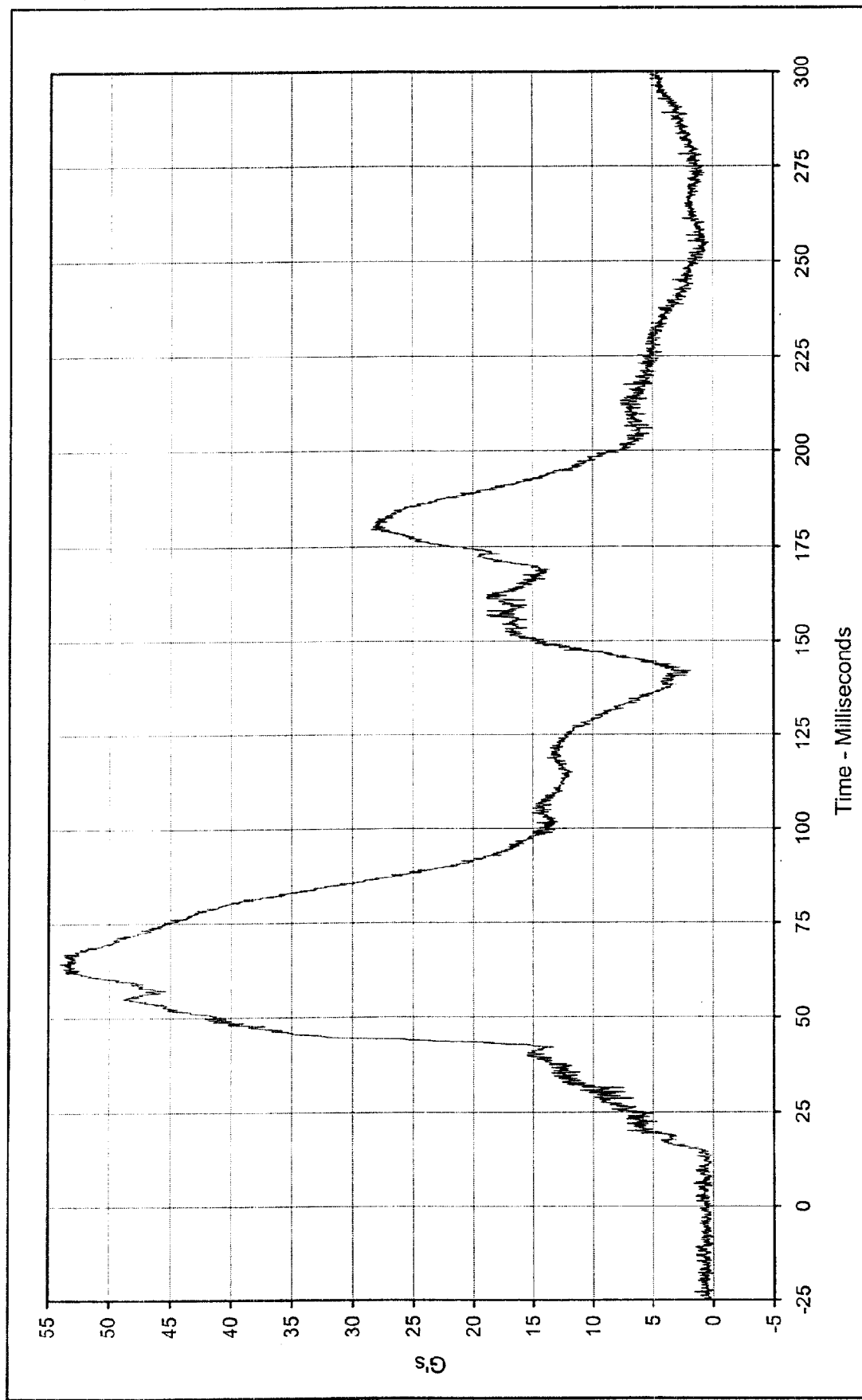
Date of Test: 2/4/99

Curve Number: FIL-006

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Driver Head Resultant Redundant

Maximum Value: 54.1 at 64.3 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 1000

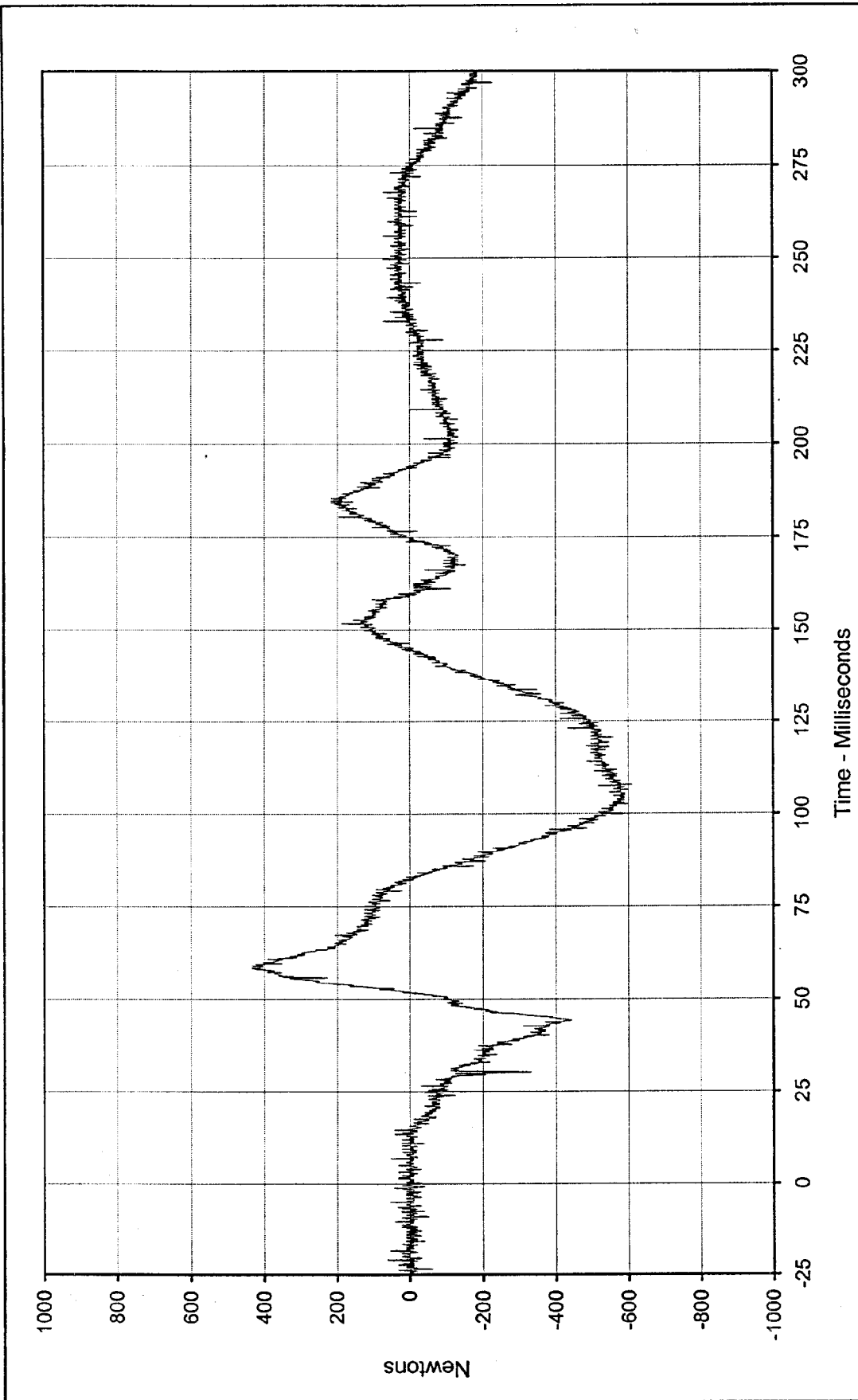
Date of Test: 2/4/99

Curve Number: RES-004

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Driver Neck Force X

Maximum Value: 434.0 at 58.2 Milliseconds

Minimum Value: -609.7 at 107.8 Milliseconds

SAE Filter Class: 1000

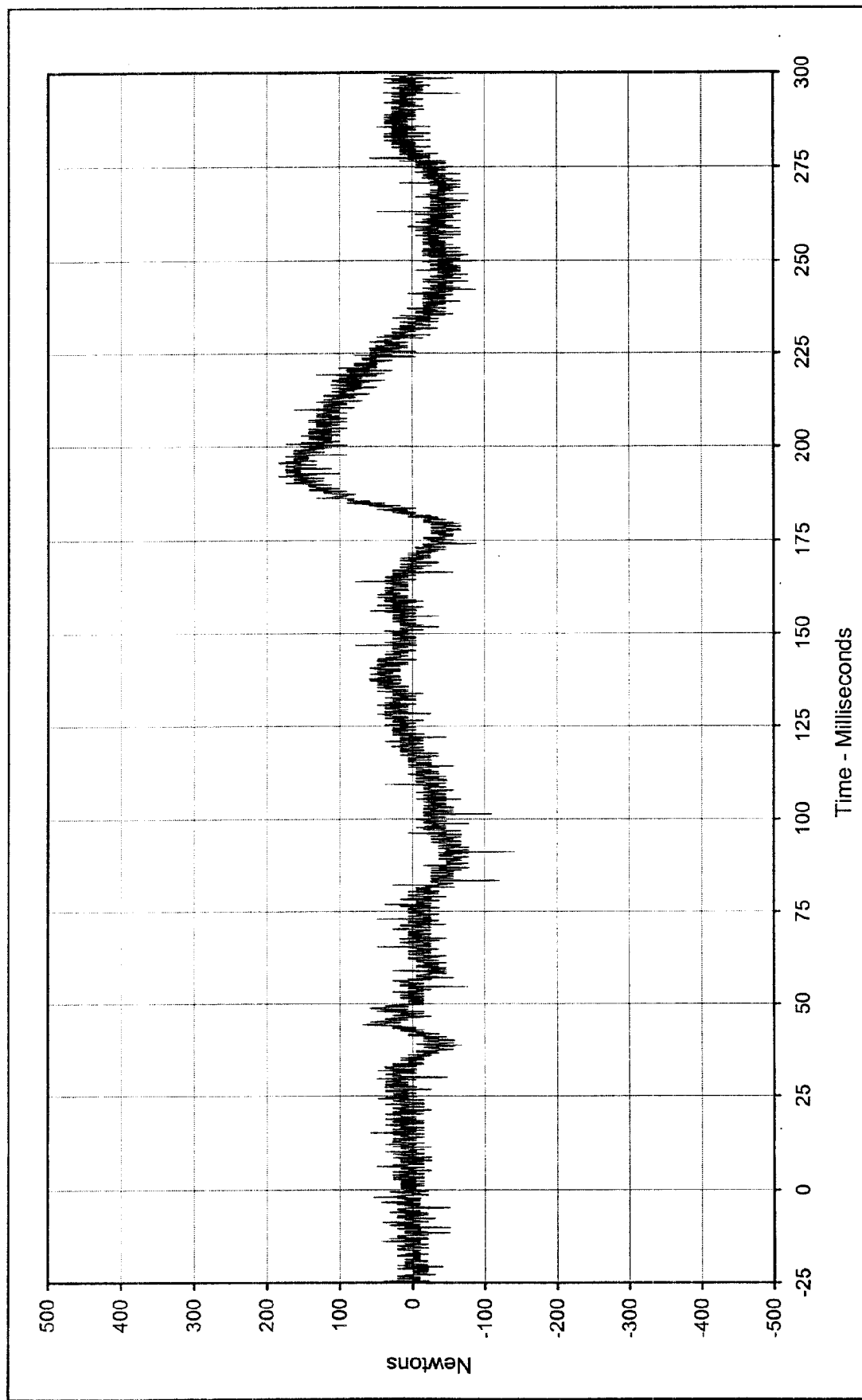
Date of Test: 2/4/99

Curve Number: FIL-007

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

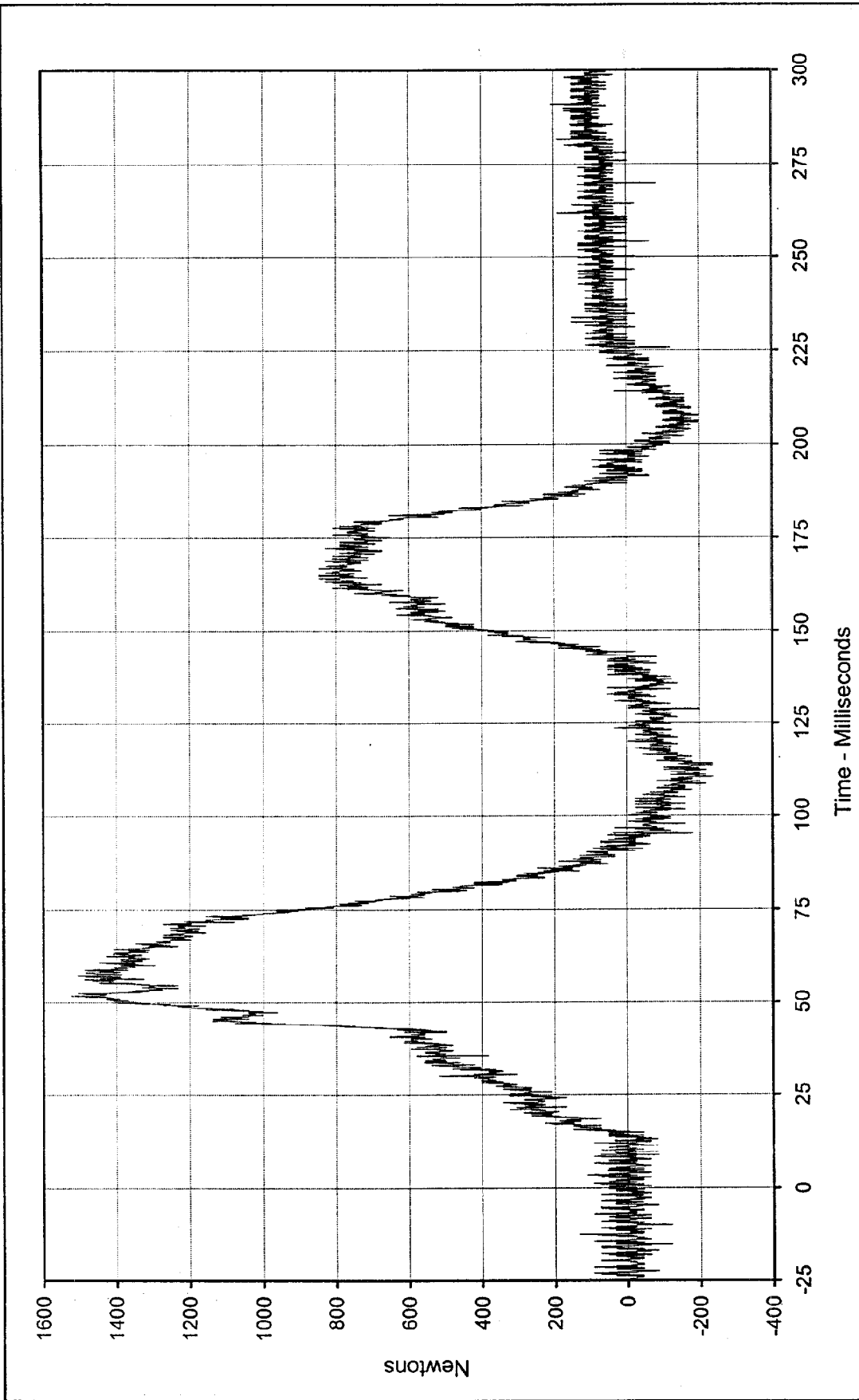




Curve Description:	Driver Neck Force Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	184.0 at 191.8 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-141.5 at 91.1 Milliseconds			



SAE Filter Class:	1000
Date of Test:	2/4/99
Curve Number:	FIL-008



Curve Description: Driver Neck Force Z

Maximum Value: 1523.5 at 51.7 Milliseconds

Minimum Value: -237.2 at 110.4 Milliseconds

SAE Filter Class: 1000

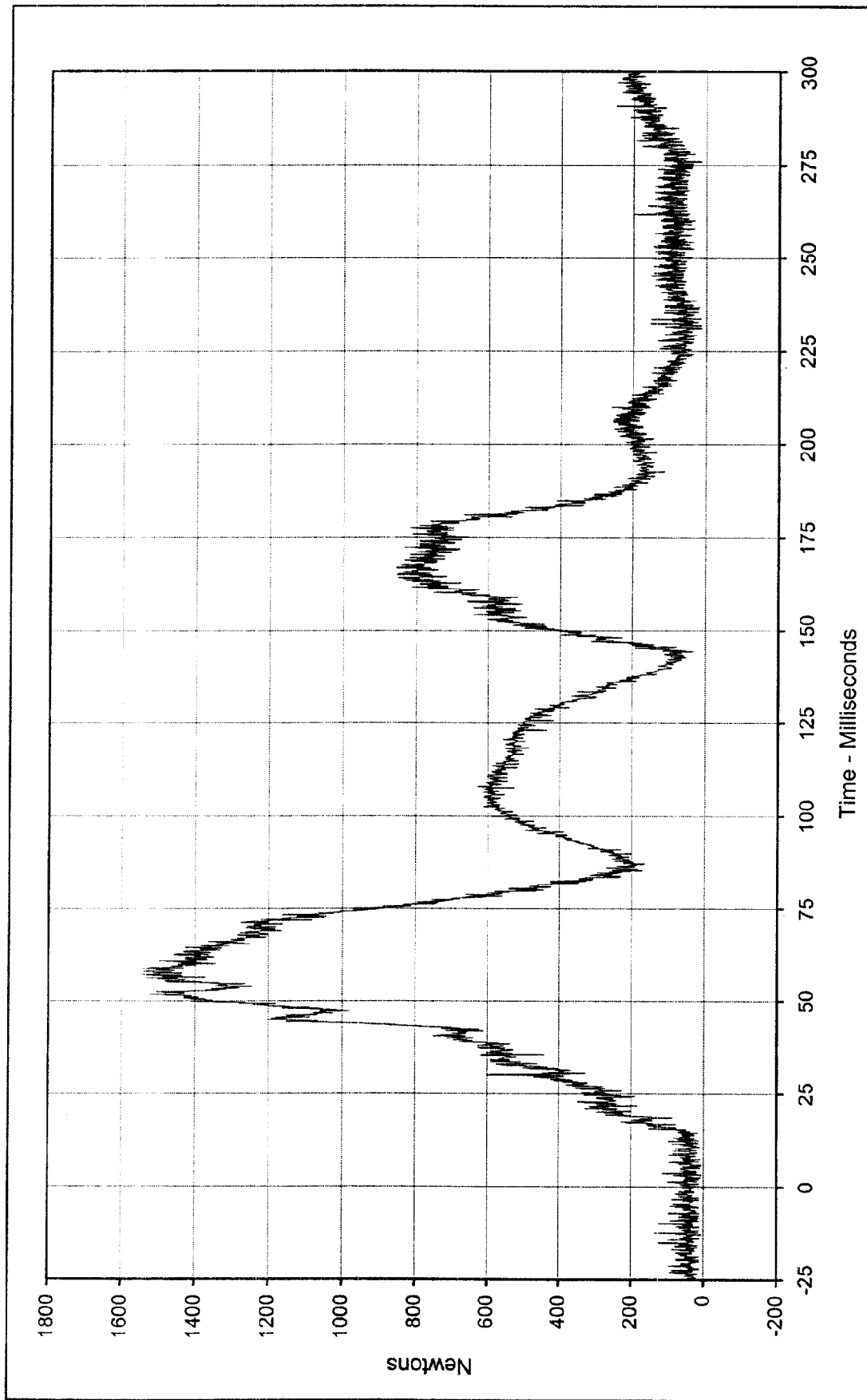
Date of Test: 2/4/99

Curve Number: FIL-009

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

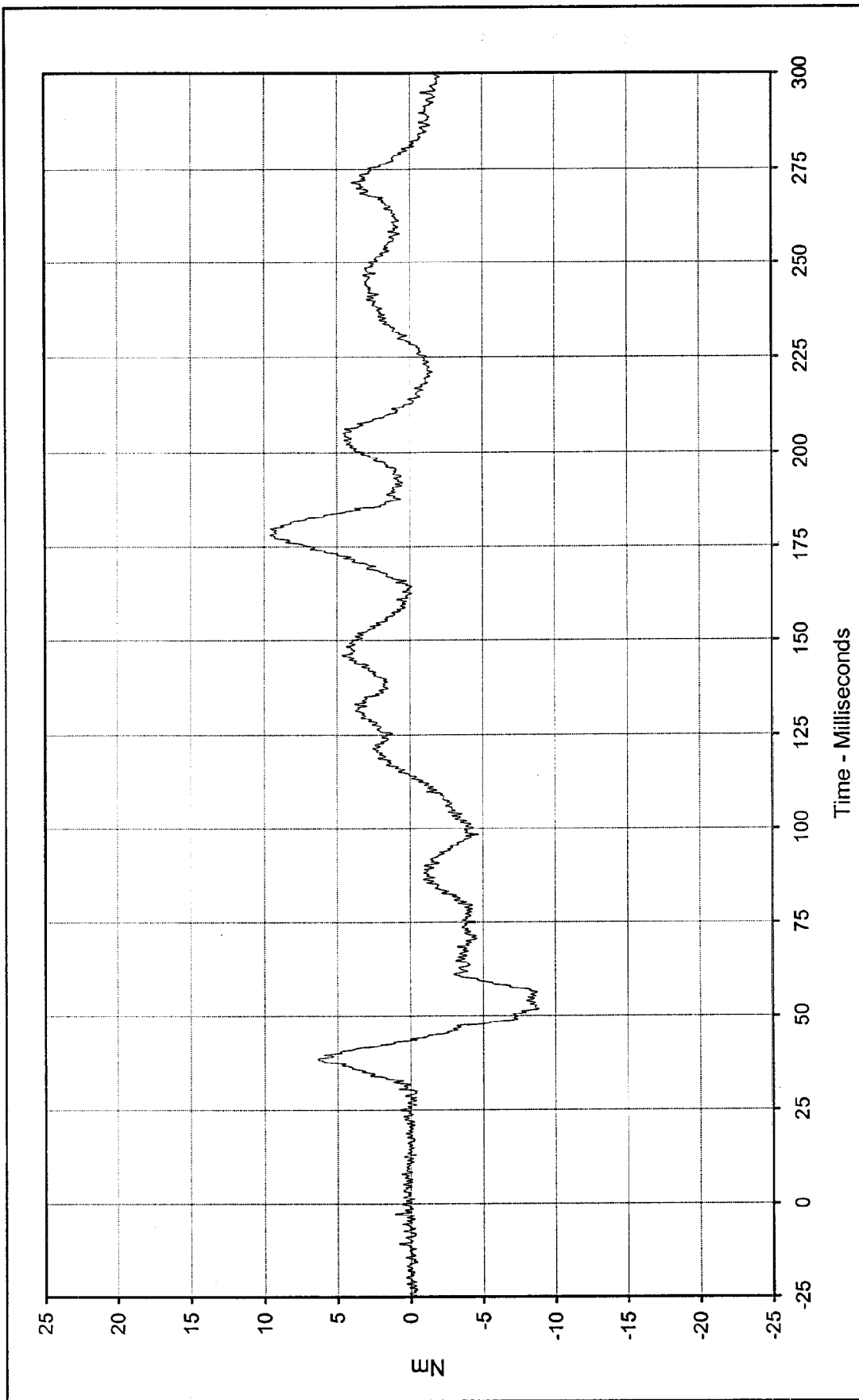
Test Vehicle: 1999 Ford Econoline E-150 Van





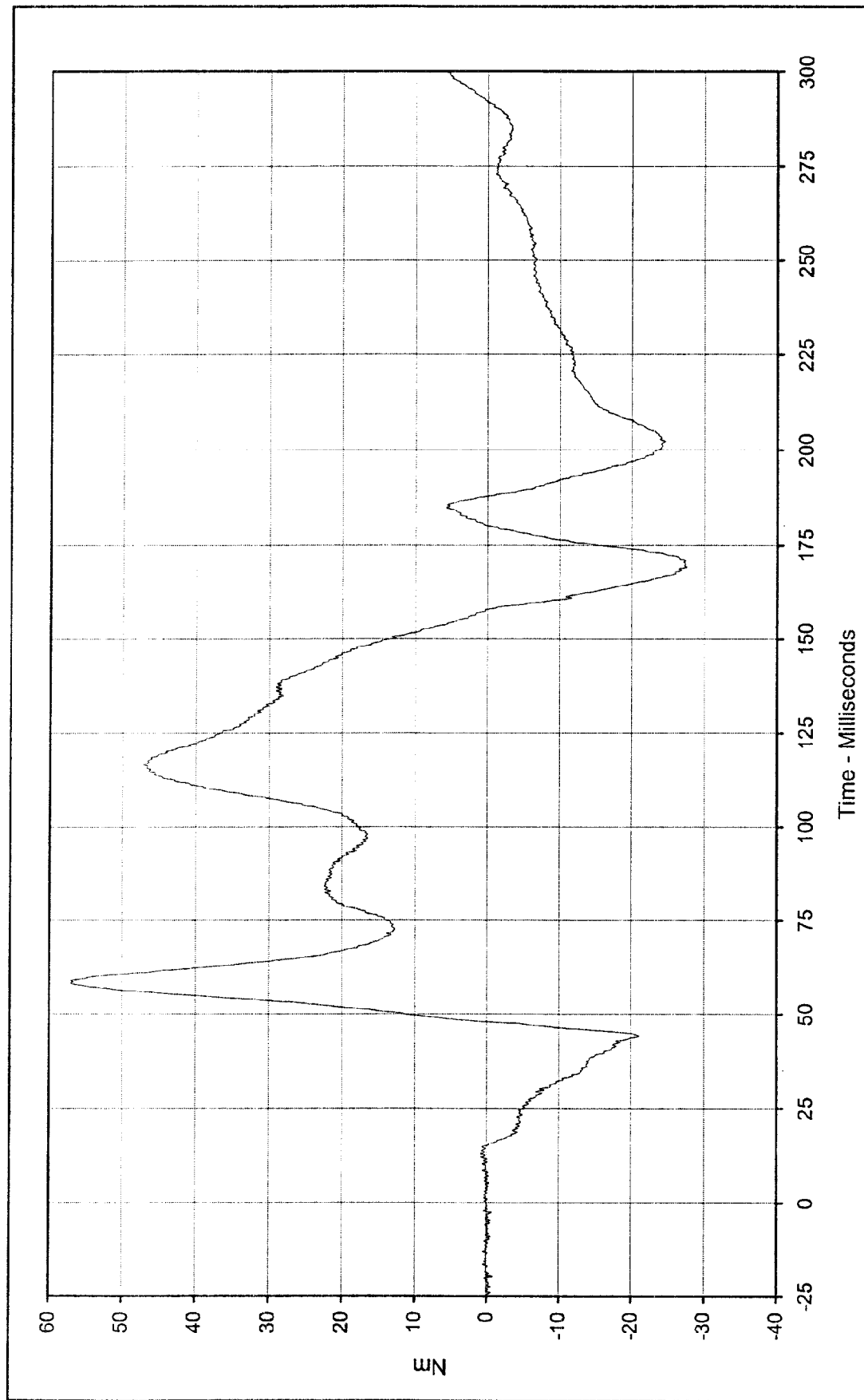
Curve Description:		Driver Neck Force Resultant		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	1545.7	at	57.1	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	7.1	at	2.5			
SAE Filter Class:	1000					
Date of Test:	2/4/99					
Curve Number:	RES-007					





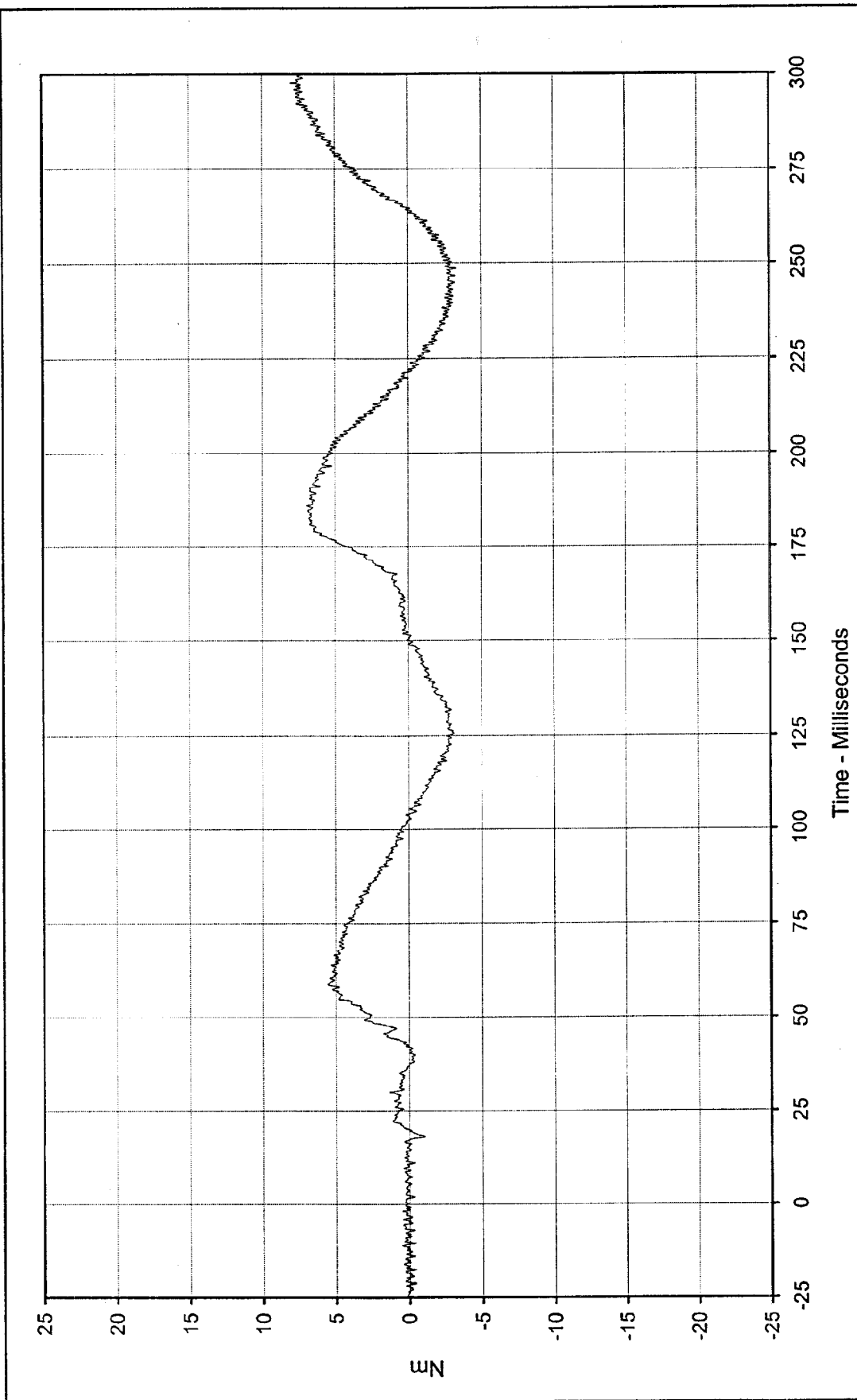
Curve Description:	Driver Neck Moment X	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	9.5 at 178.1 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-8.8 at 51.7 Milliseconds			
SAE Filter Class:	600			
Date of Test:	2/4/99			
Curve Number:	FIL-010			





Curve Description:	Driver Neck Moment Y	Test Program:	1999 NHTSA 35 mph NCAP No.: MX0208
Maximum Value:	57.0 at 58.1 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van
Minimum Value:	-27.5 at 169.1 Milliseconds		
SAE Filter Class:	600		
Date of Test:	2/4/99		
Curve Number:	FIL-011		





Curve Description: Driver Neck Moment Z

Maximum Value: 8.0 at 297.6 Milliseconds

Minimum Value: -3.3 at 248.6 Milliseconds

SAE Filter Class: 600

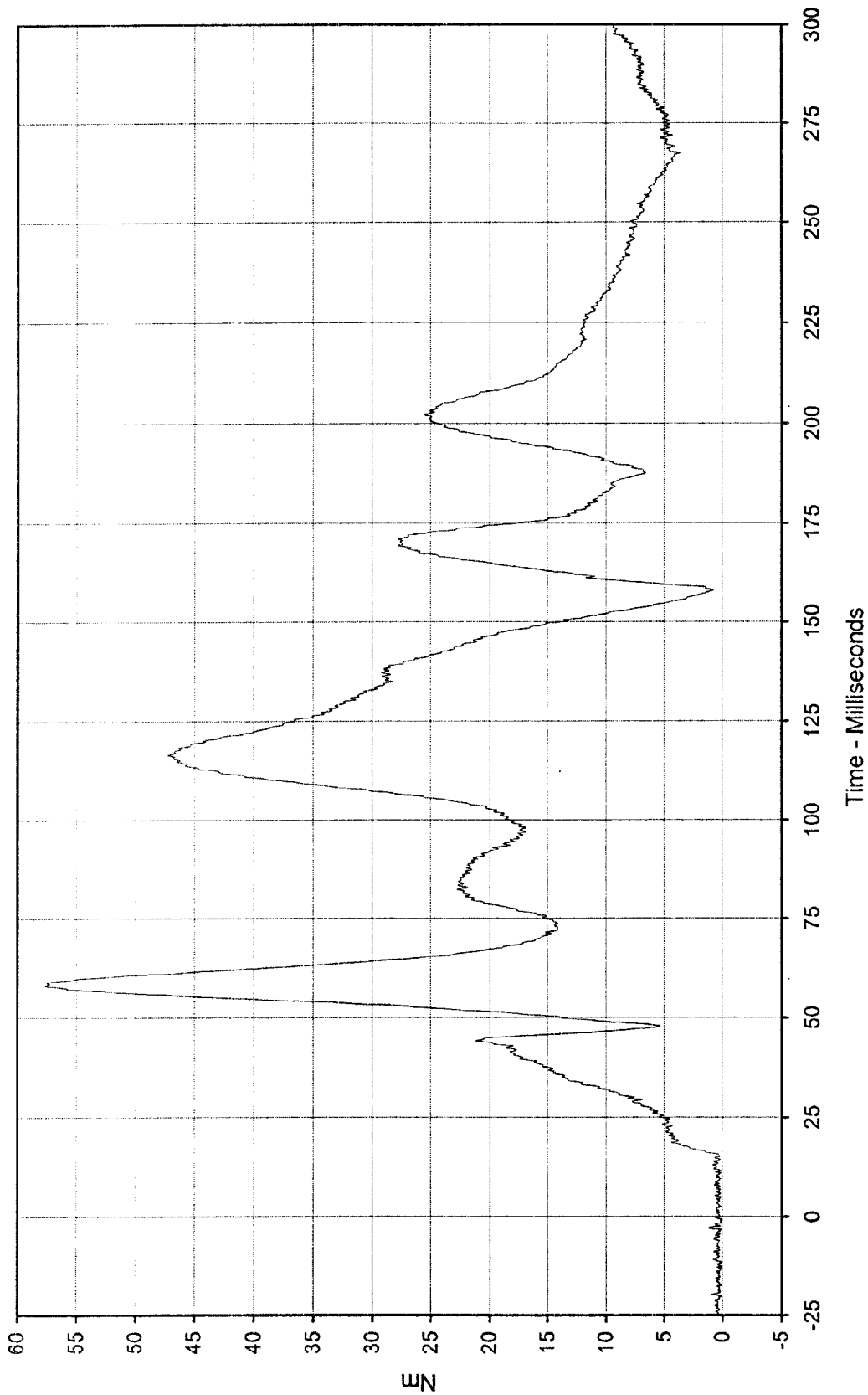
Date of Test: 2/4/99

Curve Number: FIL-012

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Driver Neck Moment Resultant Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 57.6 at 58.1 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

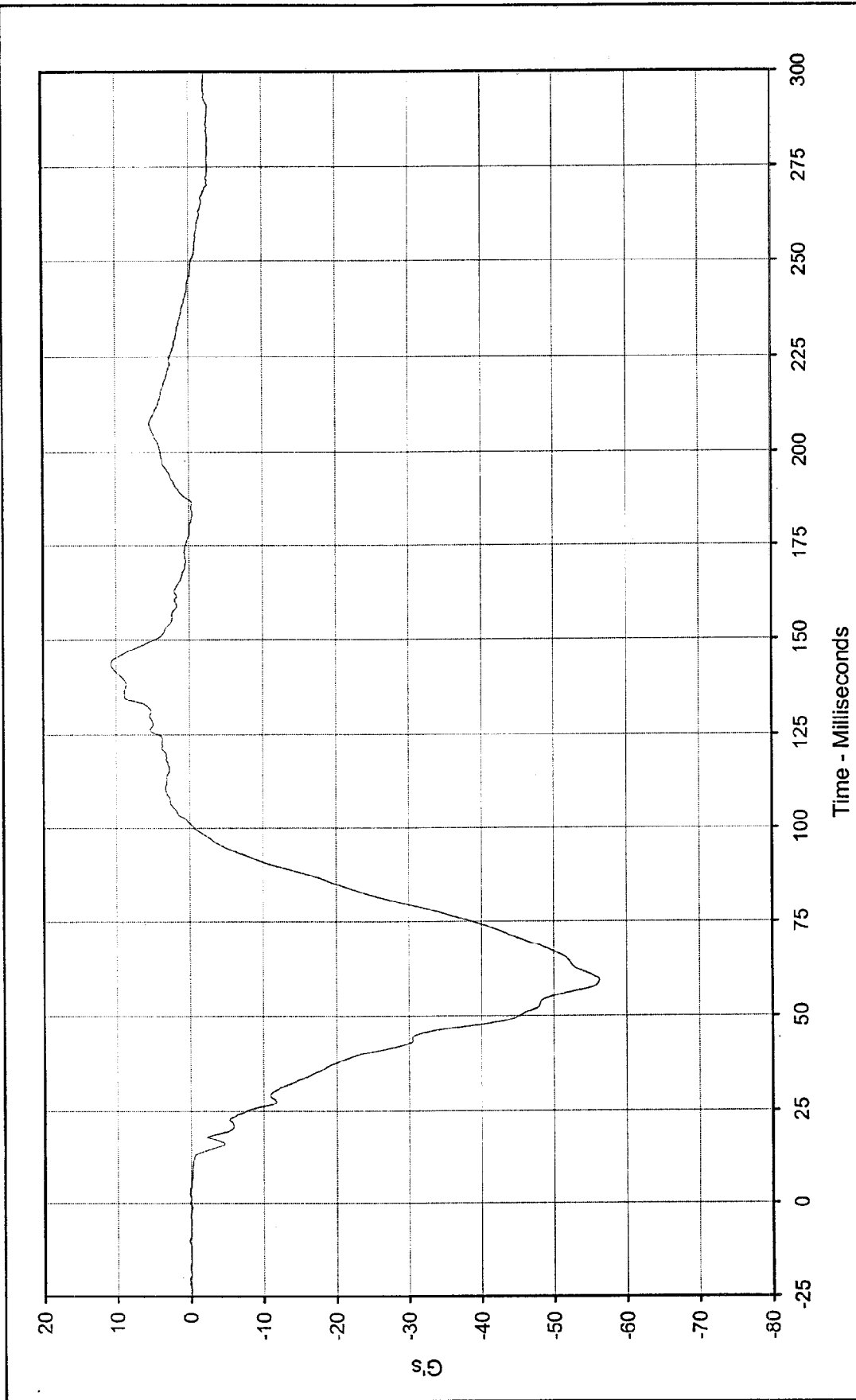
Minimum Value: 0.1 at 11.4 Milliseconds

SAE Filter Class: 600

Date of Test: 2/4/99

Curve Number: RES-010

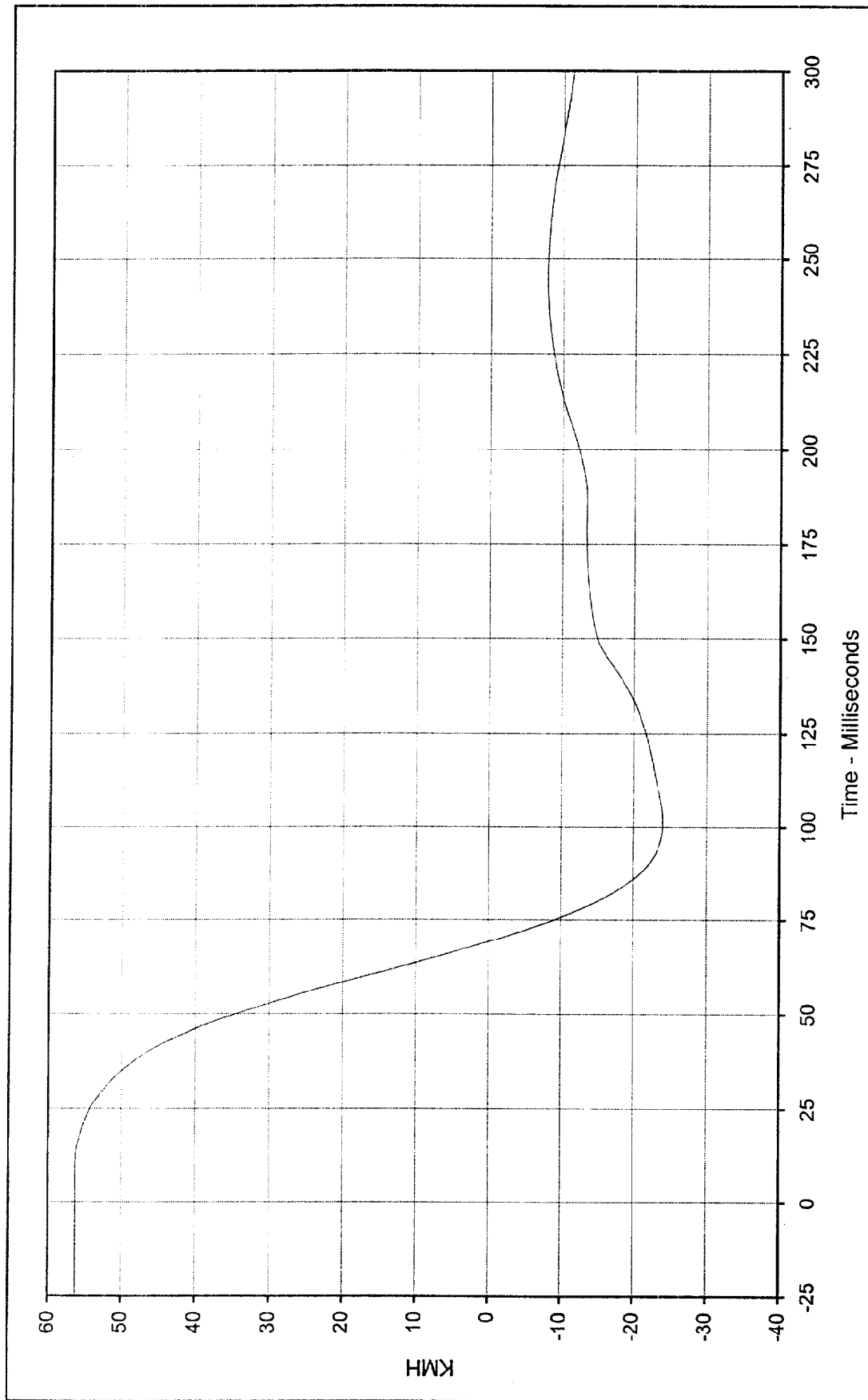




Curve Description: Driver Chest Primary X
 Maximum Value: 10.7 at 143.5 Milliseconds
 Minimum Value: -56.3 at 59.4 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: FIL-013

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Driver Chest Primary X Velocity Testing Program 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 56.3 at 4.3 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

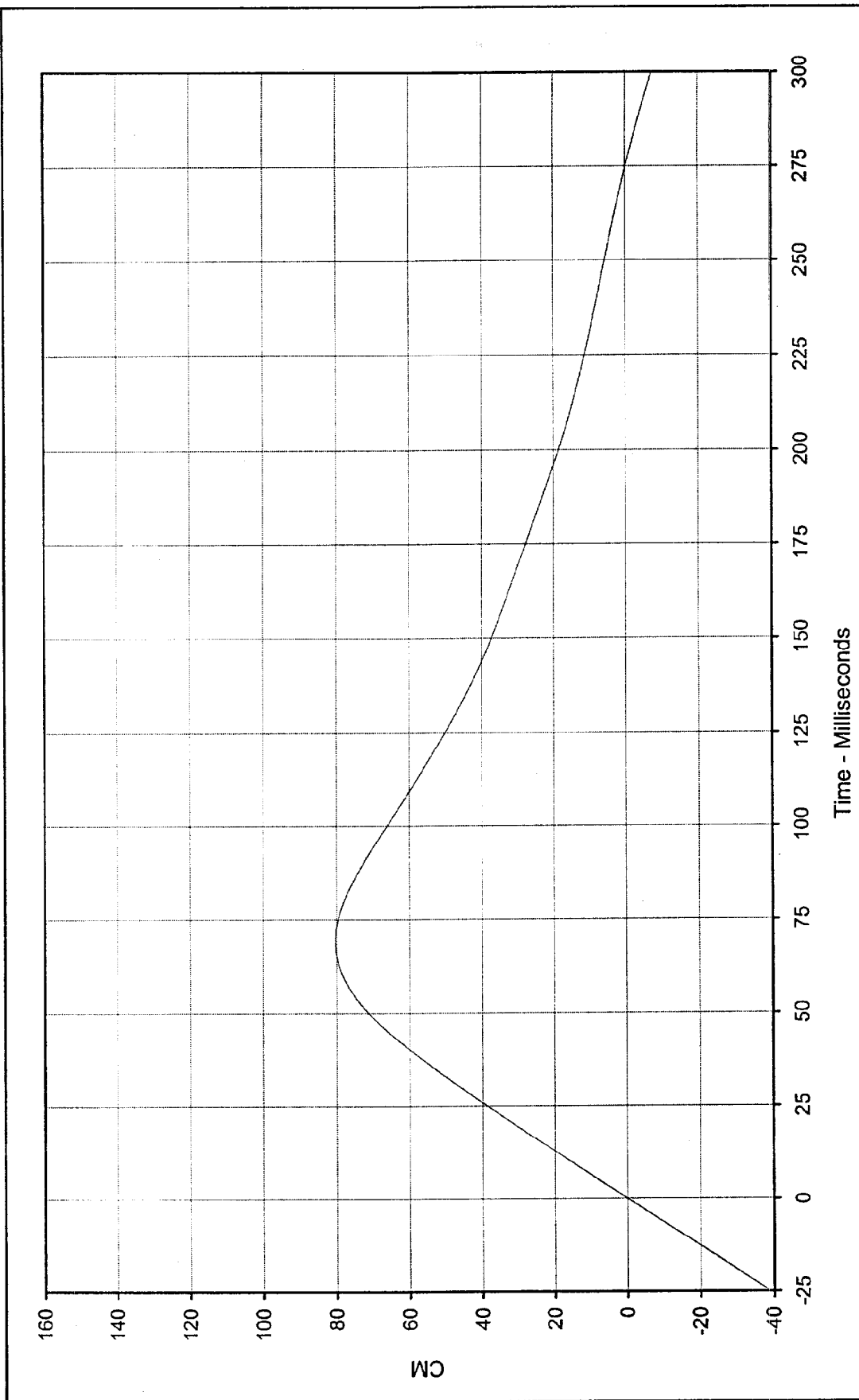
Minimum Value: -24.0 at 101.4 Milliseconds

SAE Filter Class: 180

Date of Test: 2/4/99

Curve Number: IN1-013

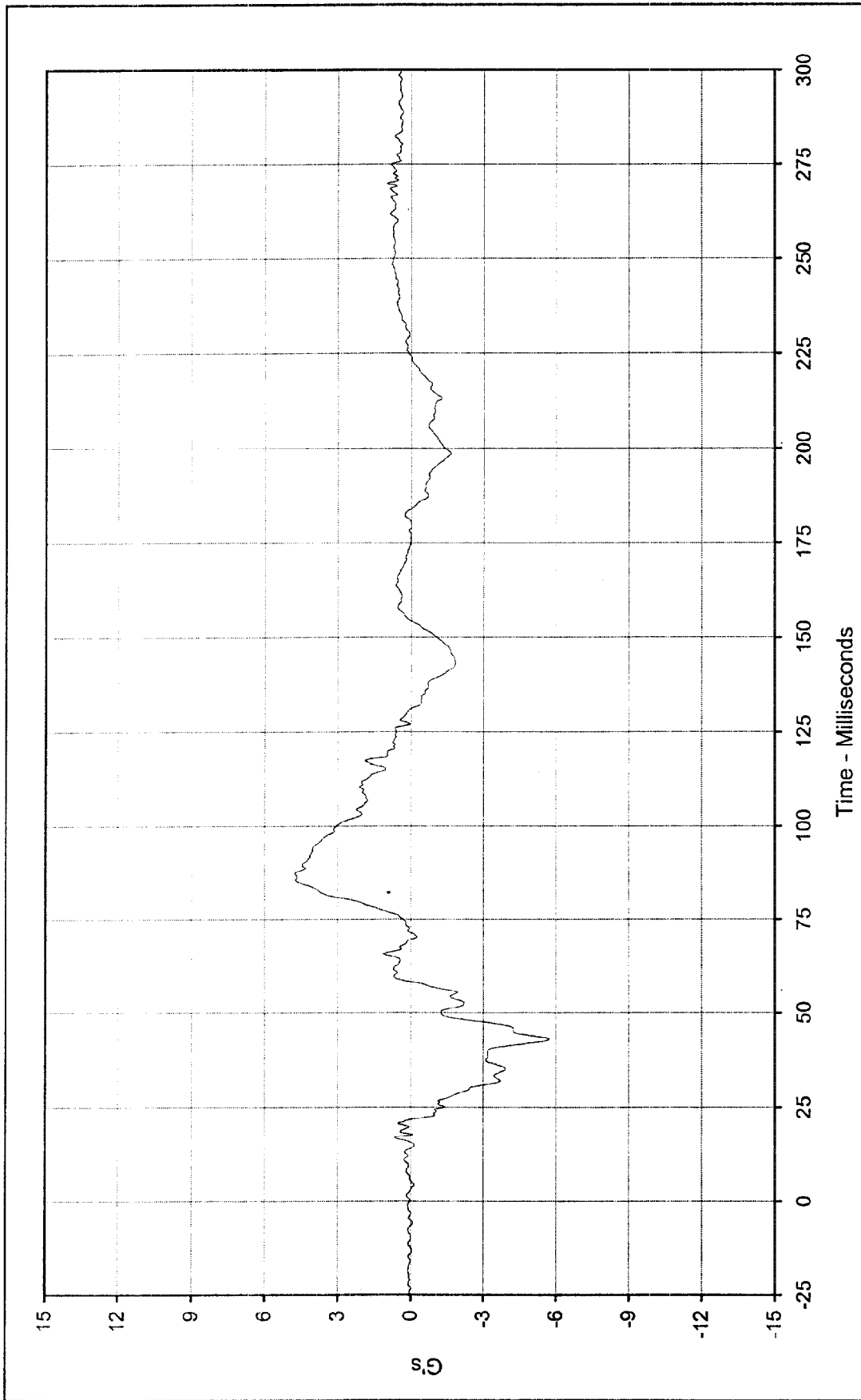




Curve Description: Driver Chest Primary X Displ.
 Maximum Value: 80.4 at 69.0 Milliseconds
 Minimum Value: -7.3 at 299.9 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN2-013

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

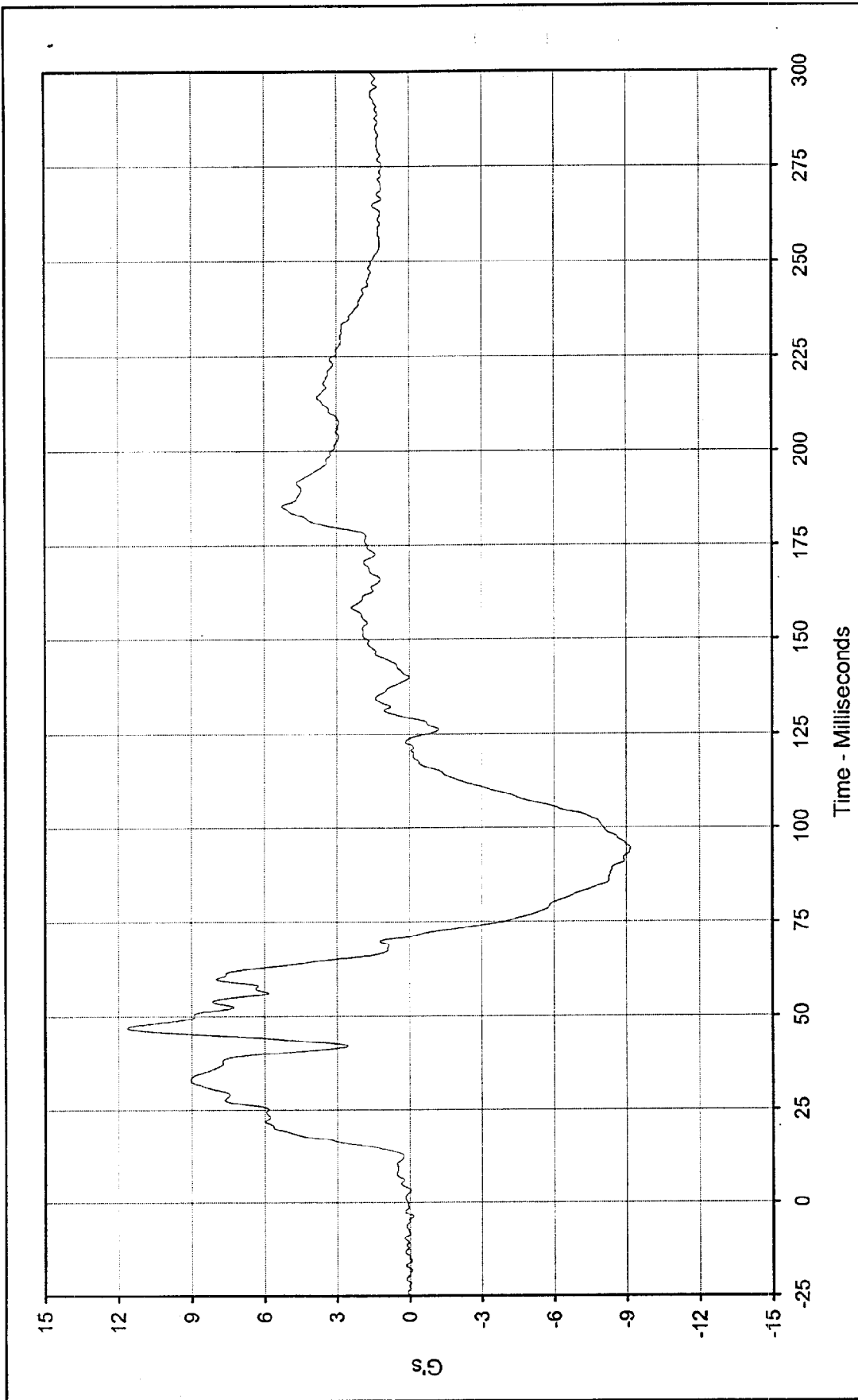




Curve Description: Driver Chest Primary Y
 Maximum Value: 4.8 at 87.2 Milliseconds
 Minimum Value: -5.7 at 42.9 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: FIL-014

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

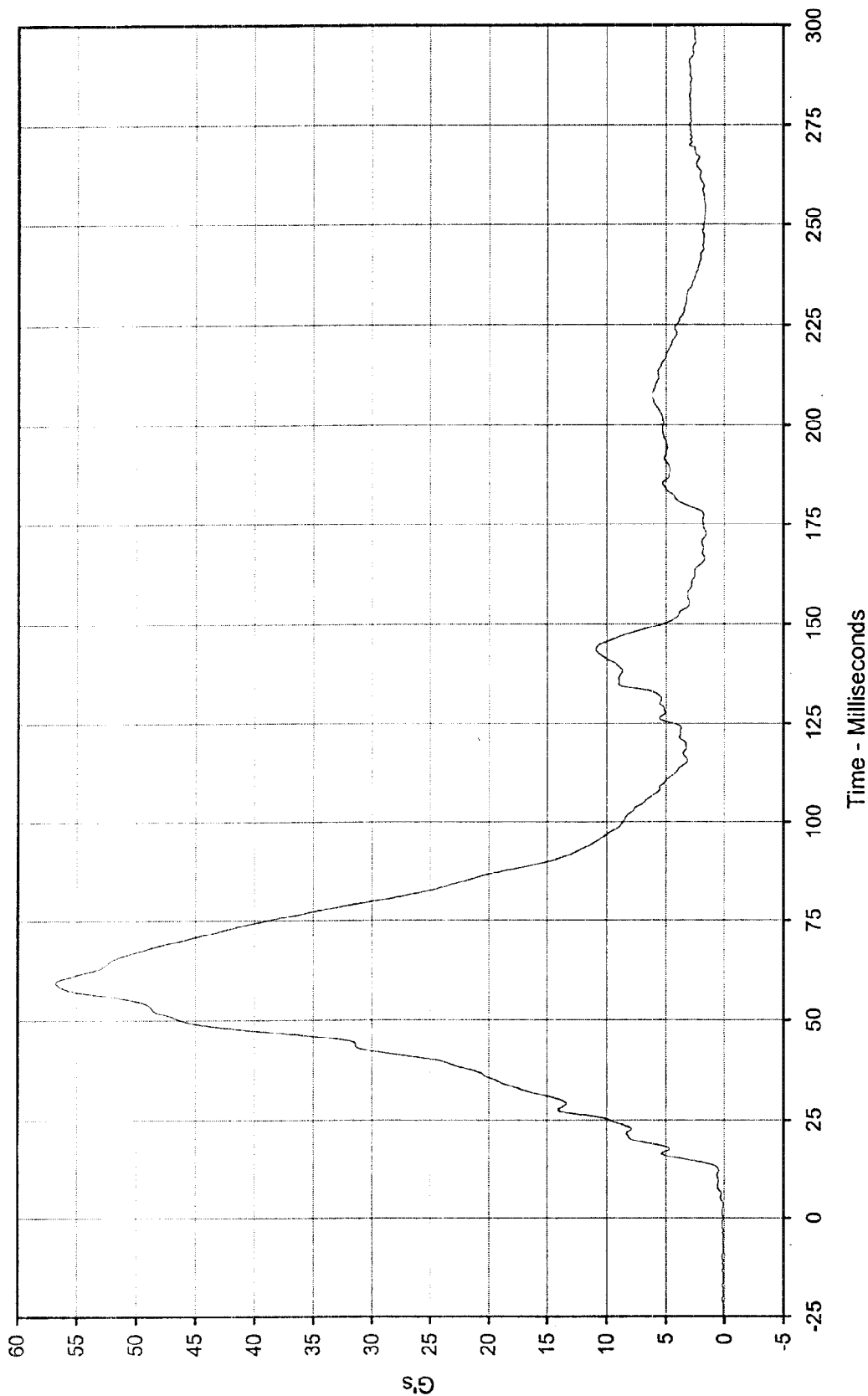




Curve Description:	Driver Chest Primary Z			Test Program:	1999 NHTSA 35 mph NCAP No.: MX0208
Maximum Value:	11.7	at	46.9	Milliseconds	Test Vehicle: 1999 Ford Econoline E-150 Van
Minimum Value:	-9.2	at	94.3	Milliseconds	
SAE Filter Class:	180				
Date of Test:	2/4/99				
Curve Number:	FIL-015				







Curve Description: Driver Chest Resultant Primary

Maximum Value: 56.8 at 59.4 Milliseconds

Minimum Value: 0.1 at 0.0 Milliseconds

SAE Filter Class: 180

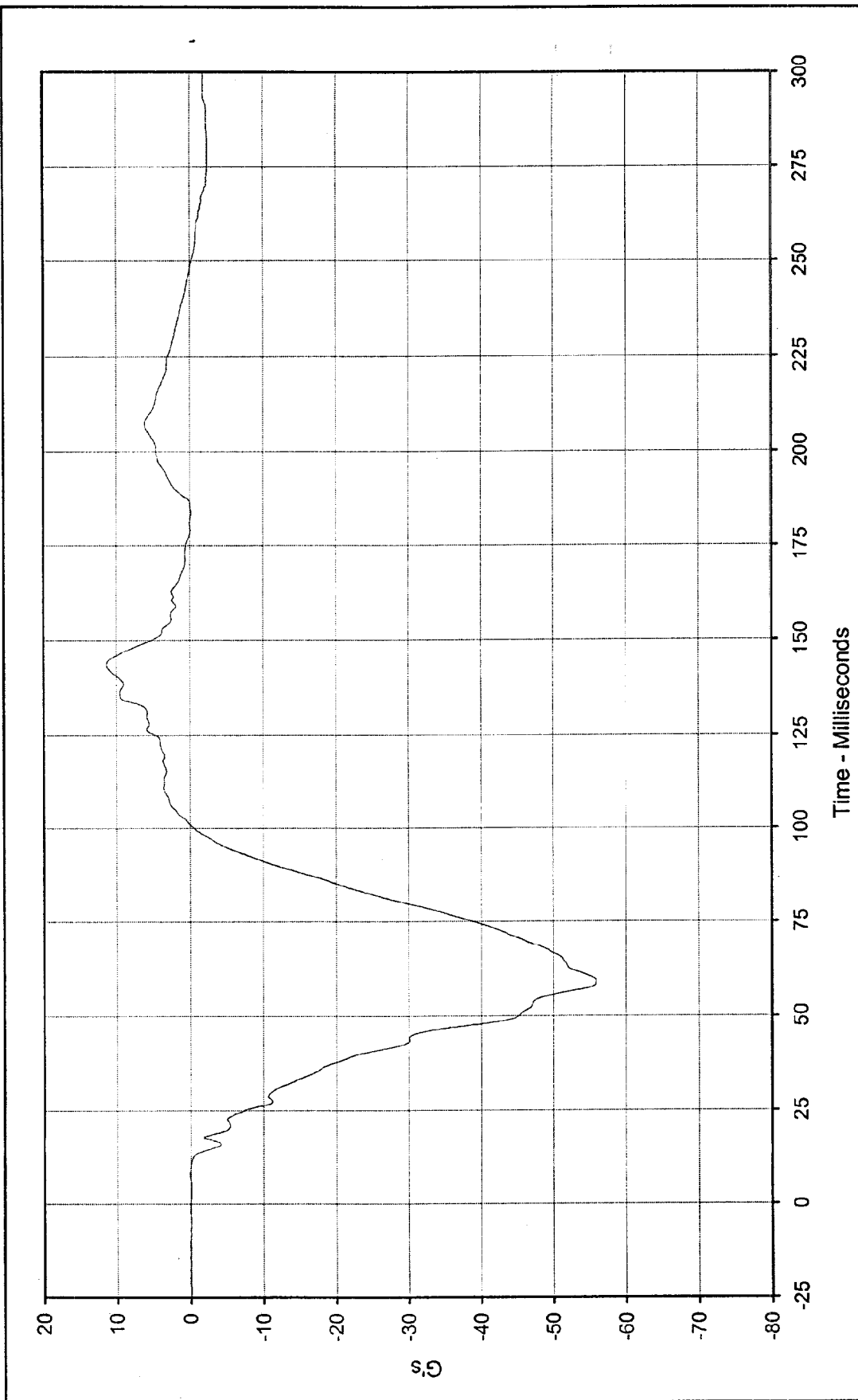
Date of Test: 2/4/99

Curve Number: RES-013

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

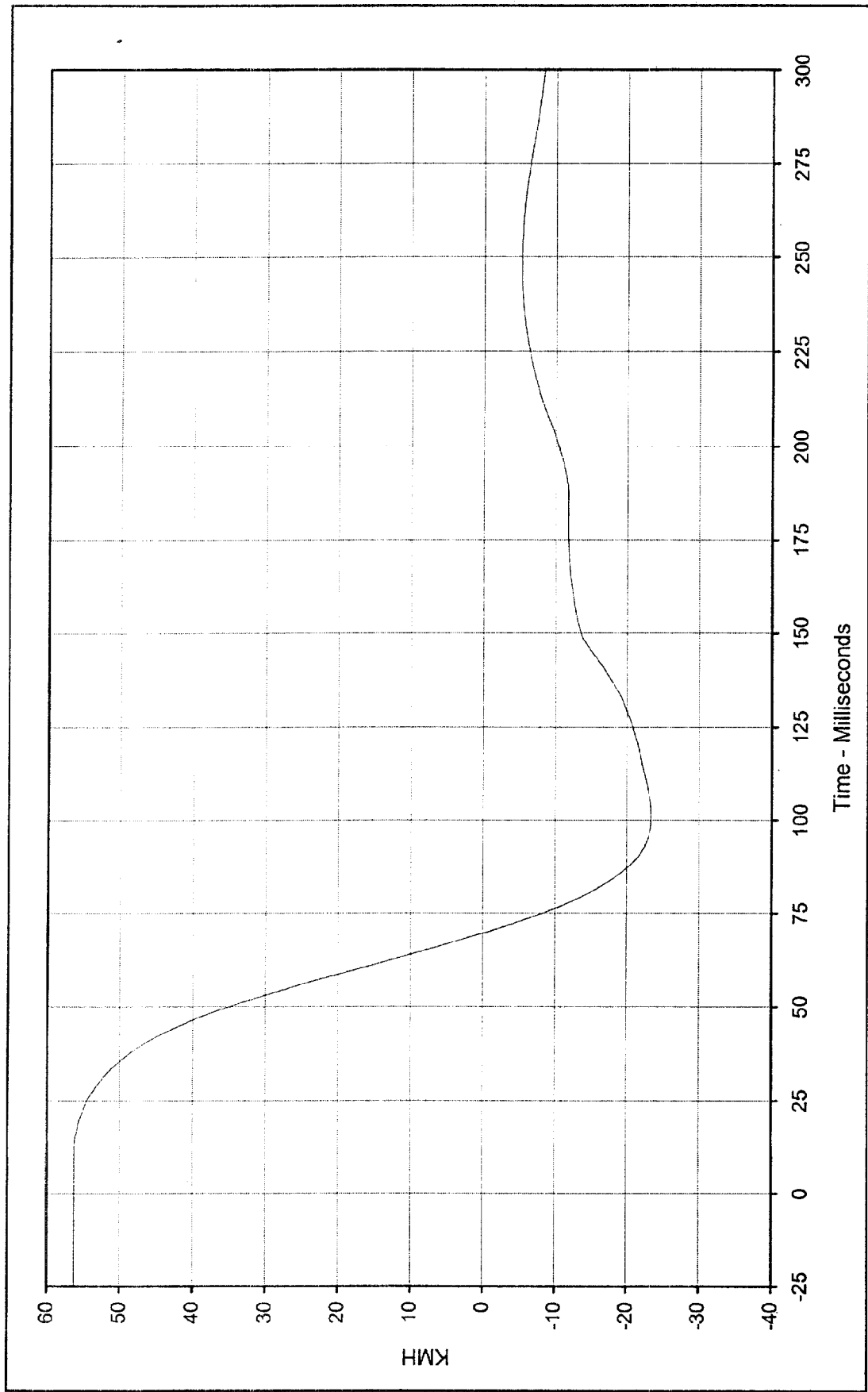
Test Vehicle: 1999 Ford Econoline E-150 Van





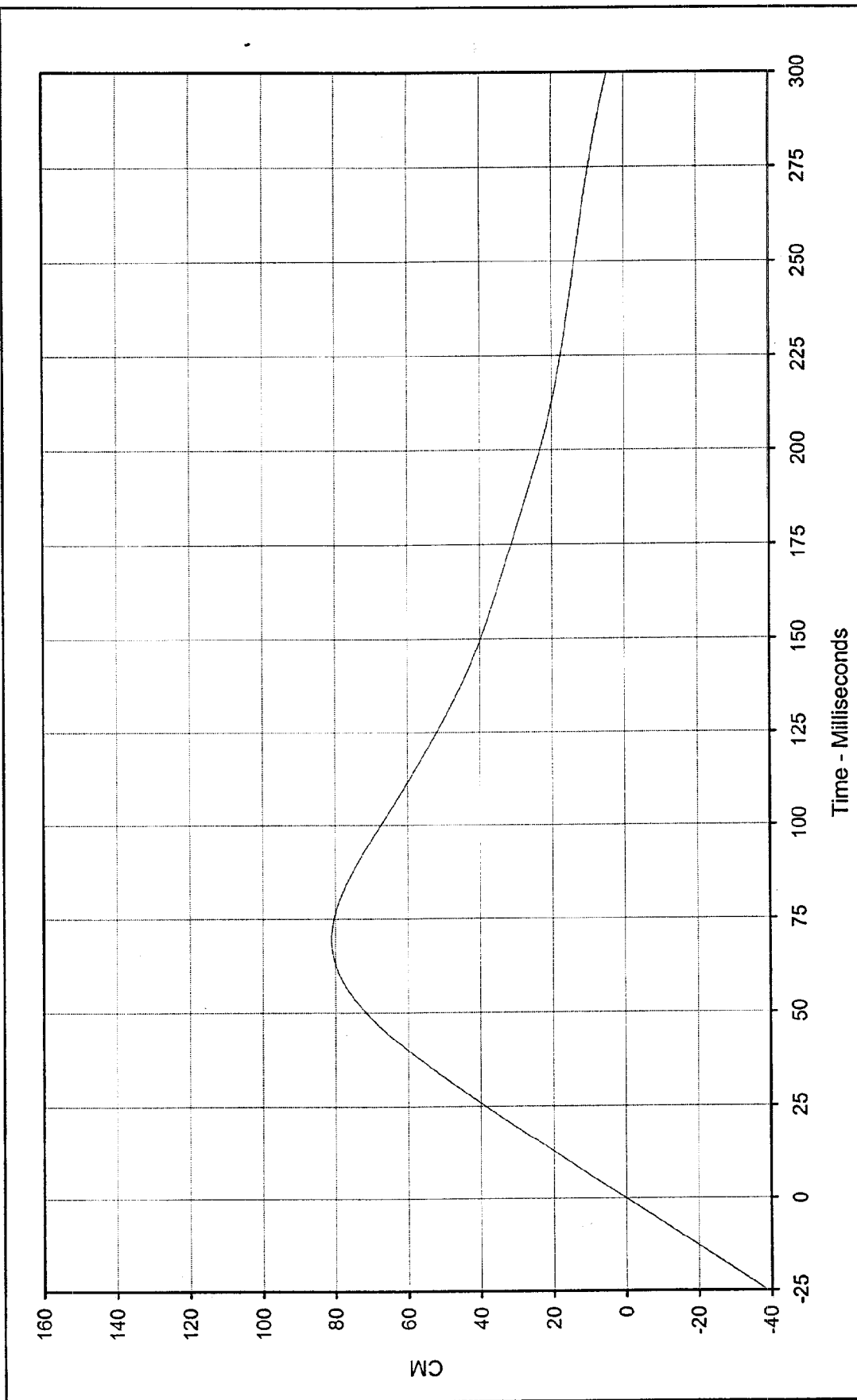
Curve Description:	Driver Chest Redundant X	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	11.4 at 143.5 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-55.9 at 59.1 Milliseconds			
SAE Filter Class:	180			
Date of Test:	2/4/99			
Curve Number:	FIL-016			





Curve Description:	Driver Chest Redundant X Velocity	Testing Program	1999 NHTSA 35 mph NCAP	No.:	MX0208
Maximum Value:	56.3	at	0.7	Milliseconds	
Minimum Value:	-23.4	at	101.0	Milliseconds	
SAE Filter Class:	180	Test Vehicle:	1999 Ford Econoline E-150 Van		
Date of Test:	2/4/99				
Curve Number:	IN1-016				





Curve Description: Driver Chest Redundant X Displ.

Maximum Value: 81.0 at 69.5 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

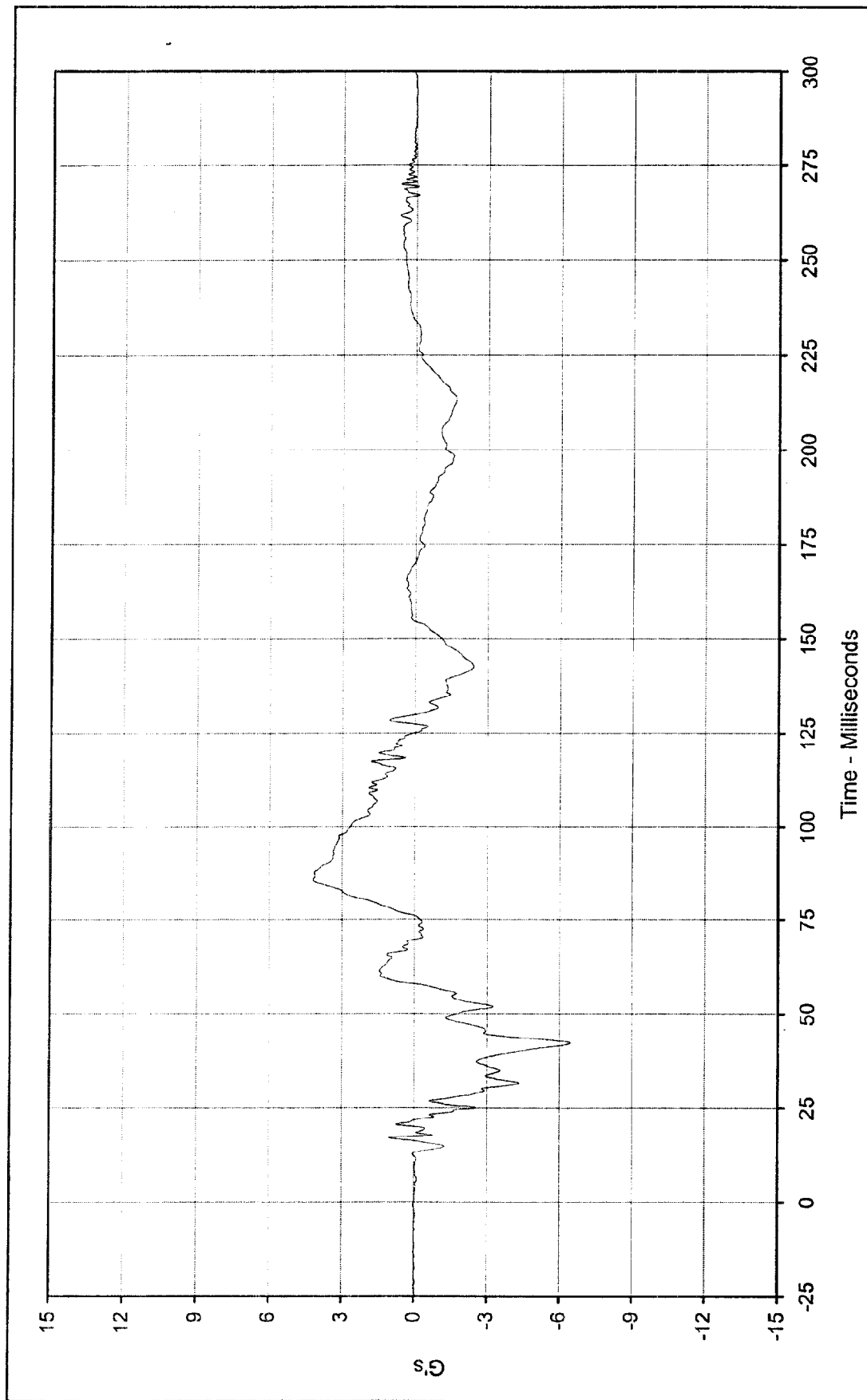
Date of Test: 2/4/99

Curve Number: IN2-016

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

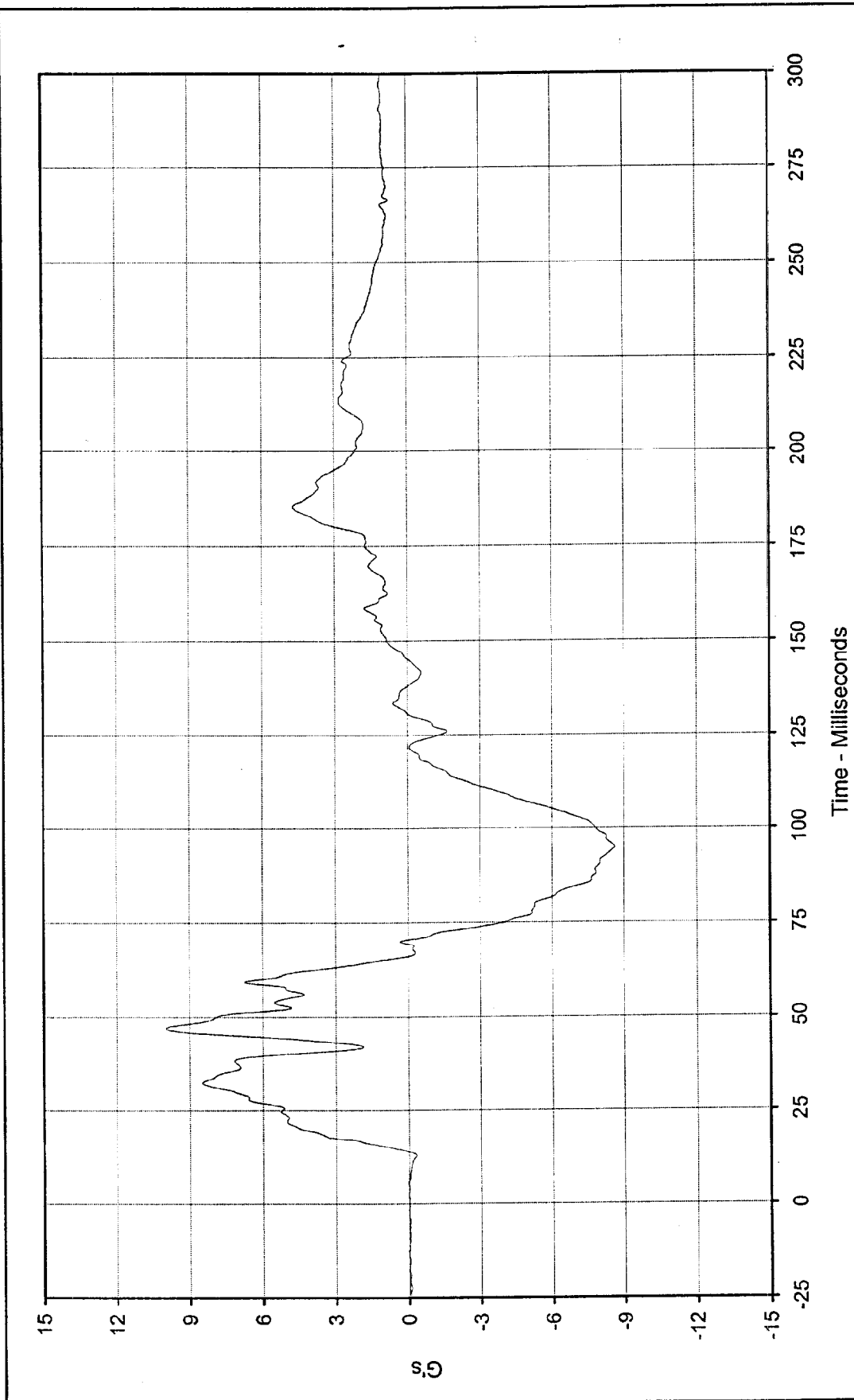
Test Vehicle: 1999 Ford Econoline E-150 Van





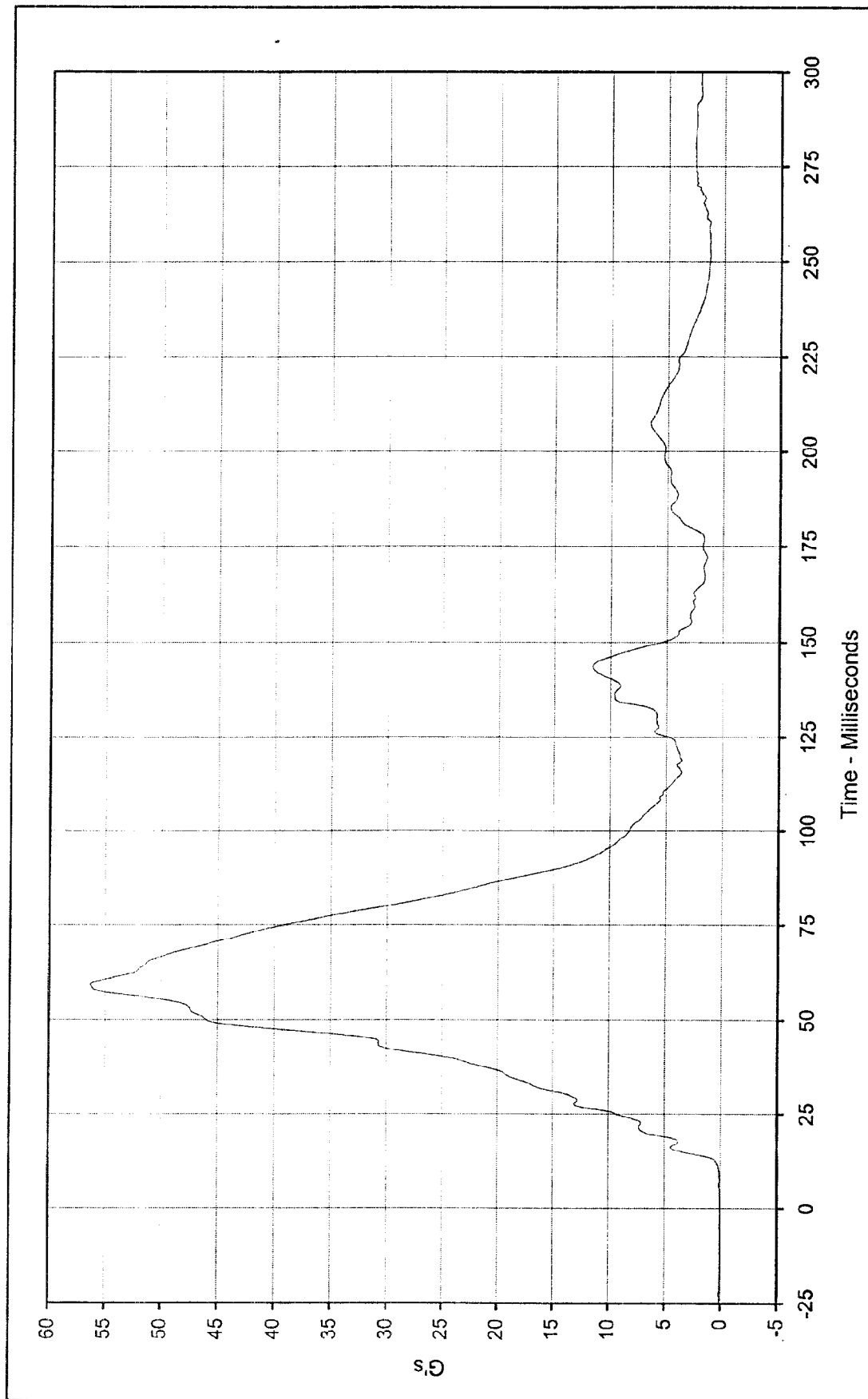
Curve Description:	Driver Chest Redundant Y		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	4.2	at 85.6	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-6.5	at 42.3			
SAE Filter Class:	180				
Date of Test:	2/4/99				
Curve Number:	FIL-017				





Curve Description:	Driver Chest Redundant Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	10.0 at 10.0 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-8.6 at 47.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	2/4/99			
Curve Number:	FIL-018			

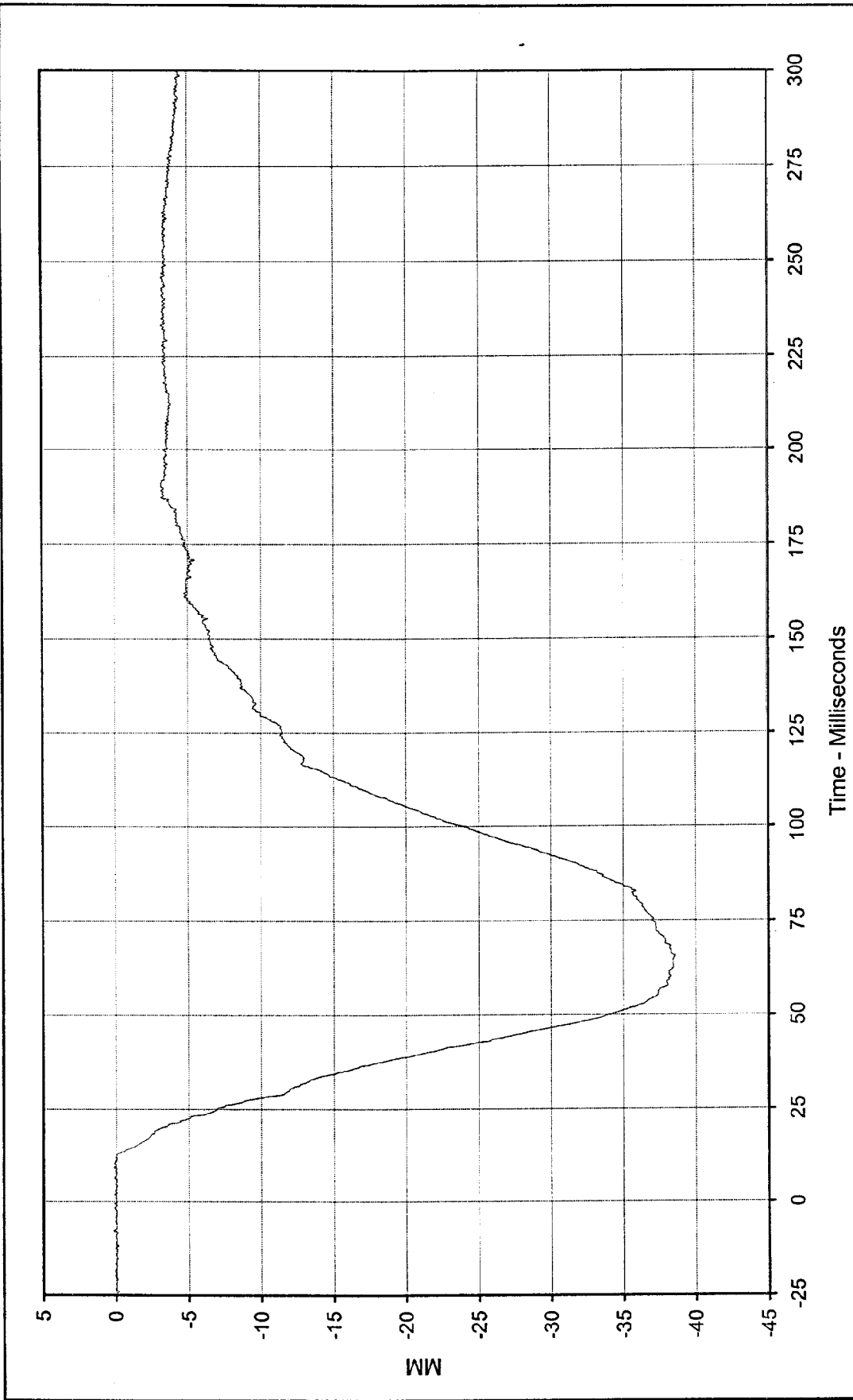




Curve Description: Driver Chest Resultant Redundant
 Maximum Value: 56.3 at 59.2 Milliseconds
 Minimum Value: 0.0 at 0.0 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: RES-016

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Driver Chest Displacement X

Maximum Value: 0.1 at 10.4 Milliseconds

Minimum Value: -38.6 at 65.4 Milliseconds

SAE Filter Class: 600

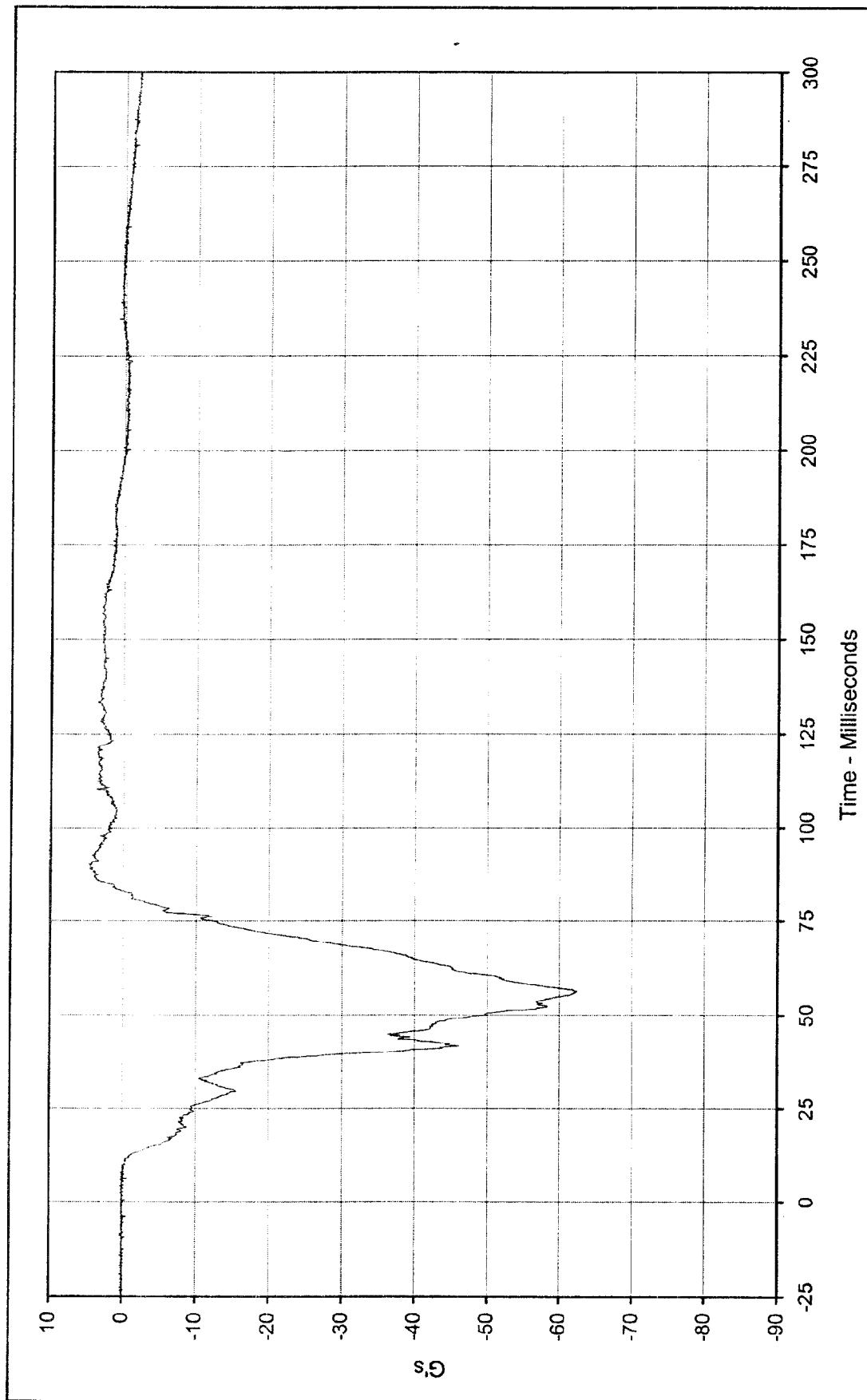
Date of Test: 2/4/99

Curve Number: FIL-019

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

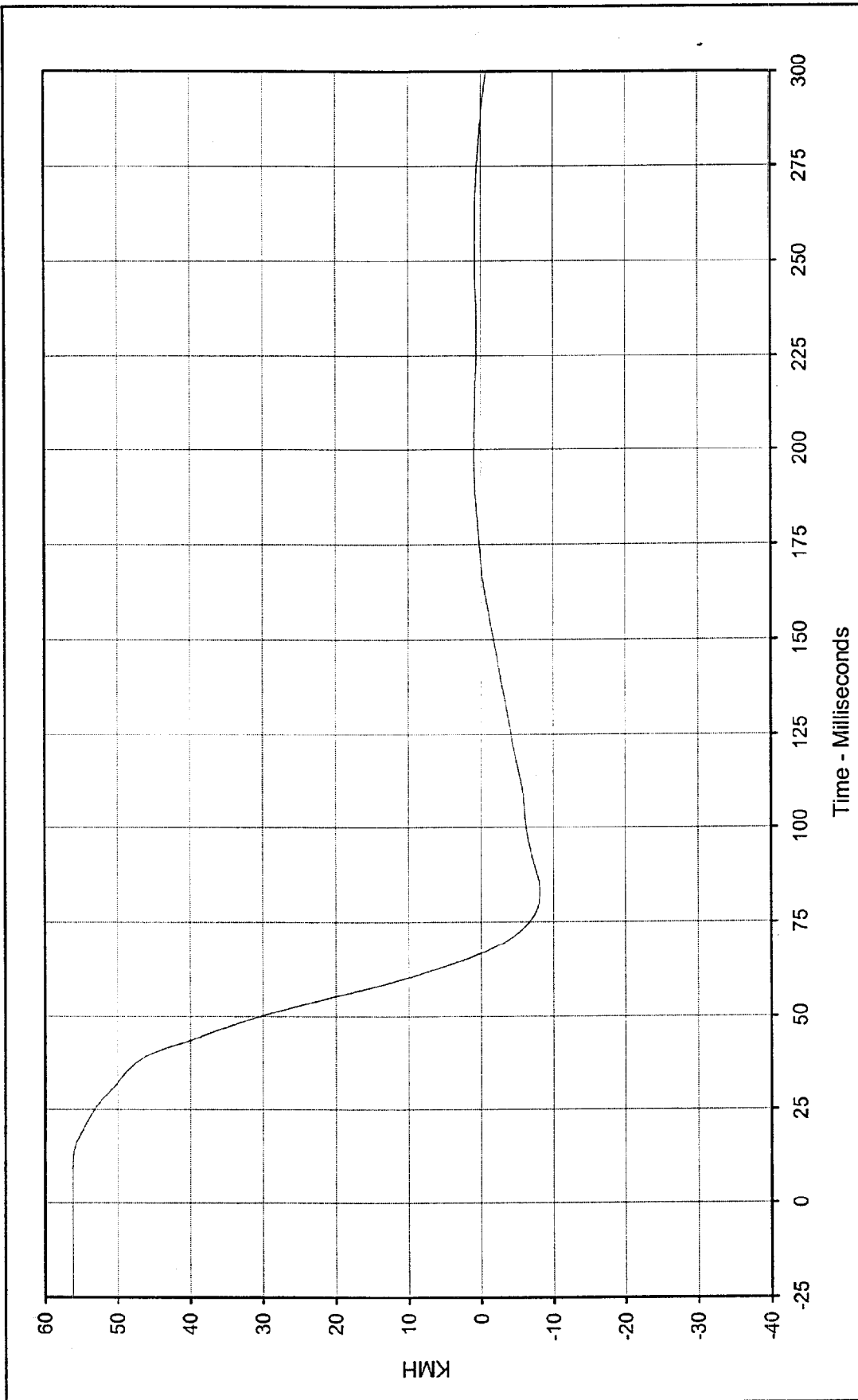




Curve Description:	Driver Pelvis X		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	4.7	at 90.2	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-62.4	at 56.2			
SAE Filter Class:	1000				
Date of Test:	2/4/99				
Curve Number:	FIL-020				

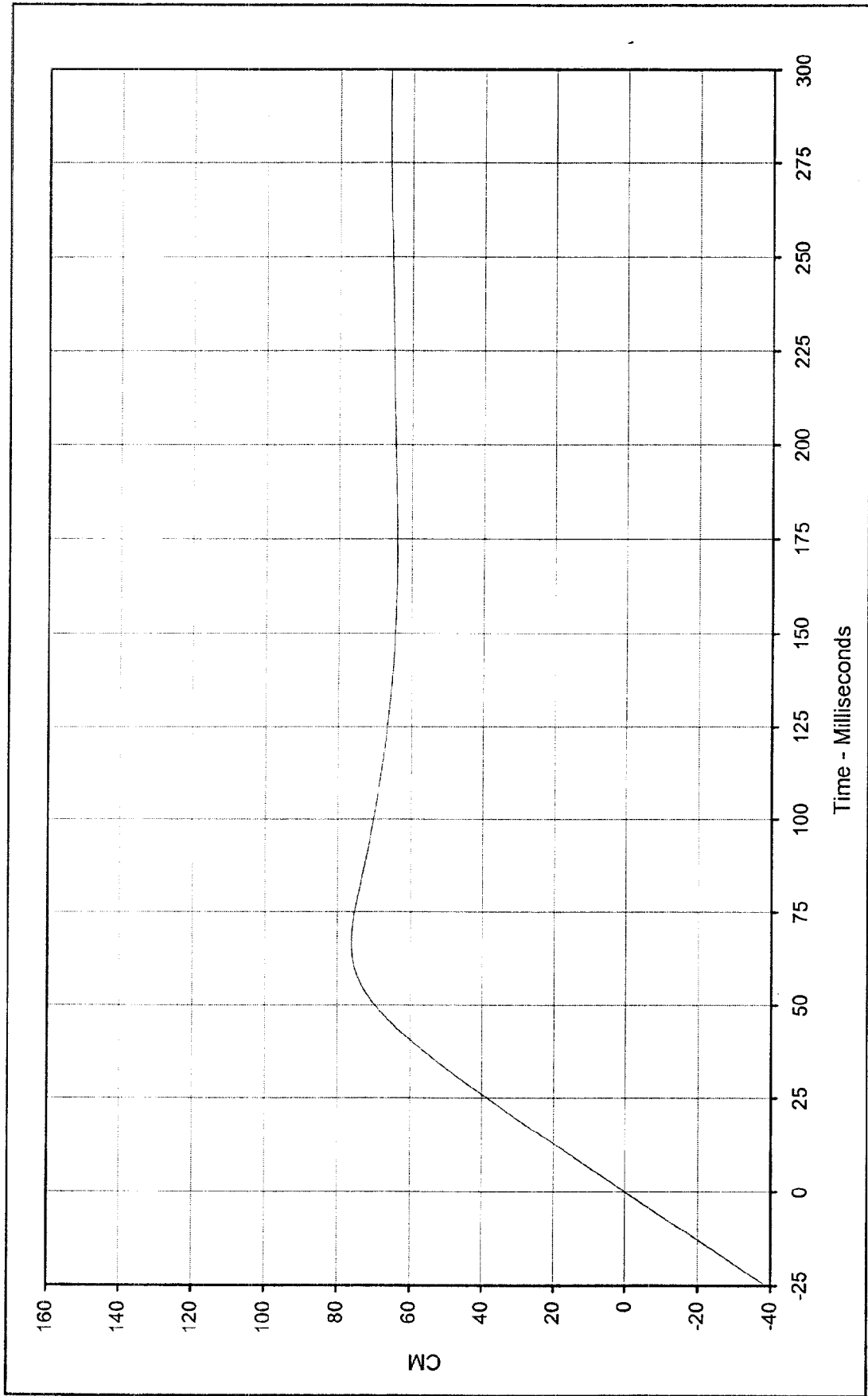






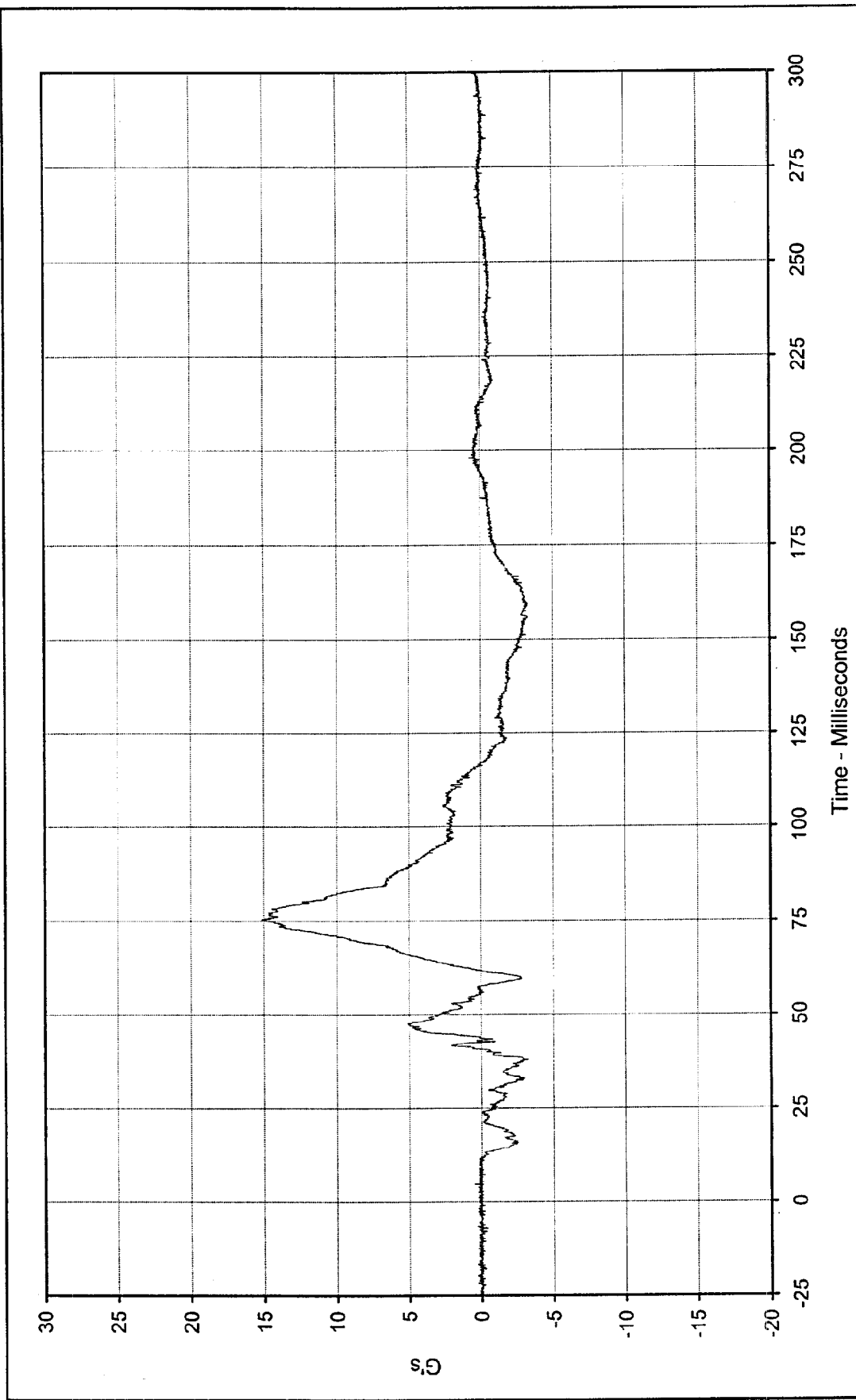
Curve Description: Testing Program 1999 NHTSA 35 mph NCAP No.: MX0208
 Maximum Value: 56.2 at 0.0 Milliseconds
 Minimum Value: -8.1 at 82.9 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN1-020





Curve Description:	Driver Pelvis X Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208		
Maximum Value:	76.2	at	66.7	Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van
Minimum Value:	0.0	at	0.0	Milliseconds		
SAE Filter Class:	180					
Date of Test:	2/4/99					
Curve Number:	IN2-020					





Curve Description: Driver Pelvis Y

Maximum Value: 15.1 at 75.3 Milliseconds

Minimum Value: -3.3 at 155.8 Milliseconds

SAE Filter Class: 1000

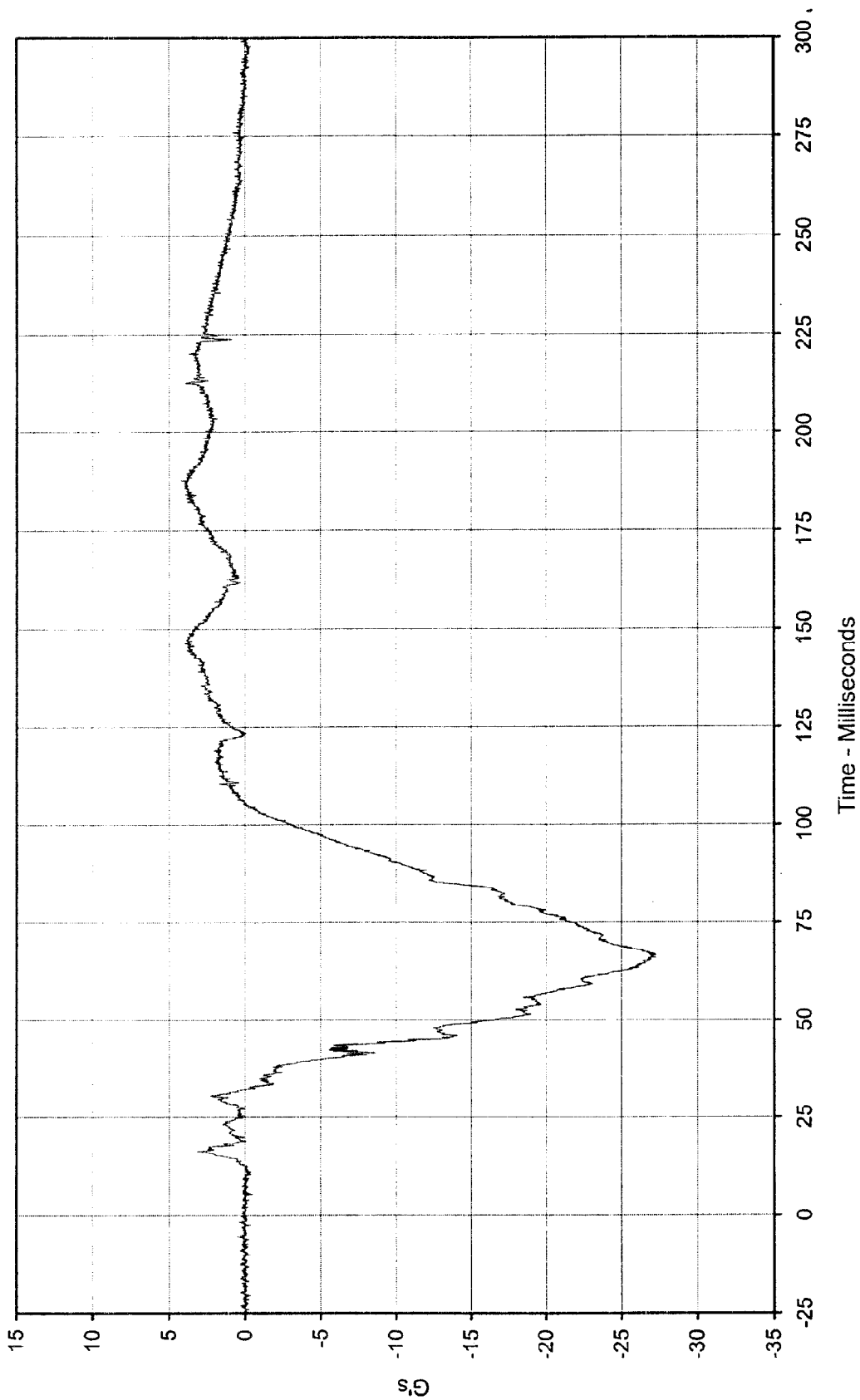
Date of Test: 2/4/99

Curve Number: FIL-021

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

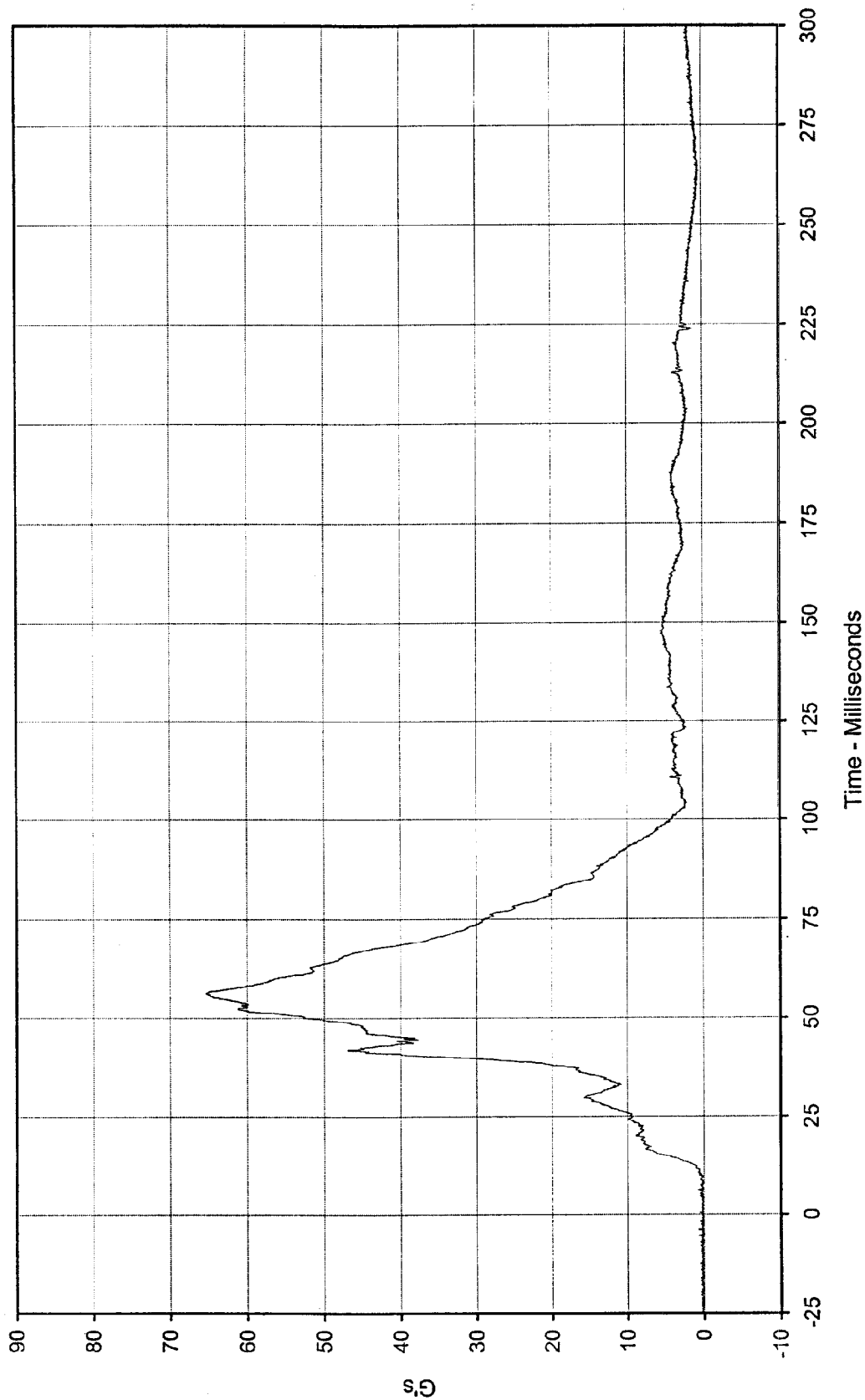
Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:		Driver Pelvis Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	4.2	at	187.6	Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van
Minimum Value:	-27.3	at	65.8	Milliseconds		
SAE Filter Class:	1000					
Date of Test:	2/4/99					
Curve Number:	FIL-022					





Curve Description: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Program: 1999 Ford Econoline E-150 Van

Driver Pelvis Resultant
Maximum Value: 65.3 at 56.2 Milliseconds

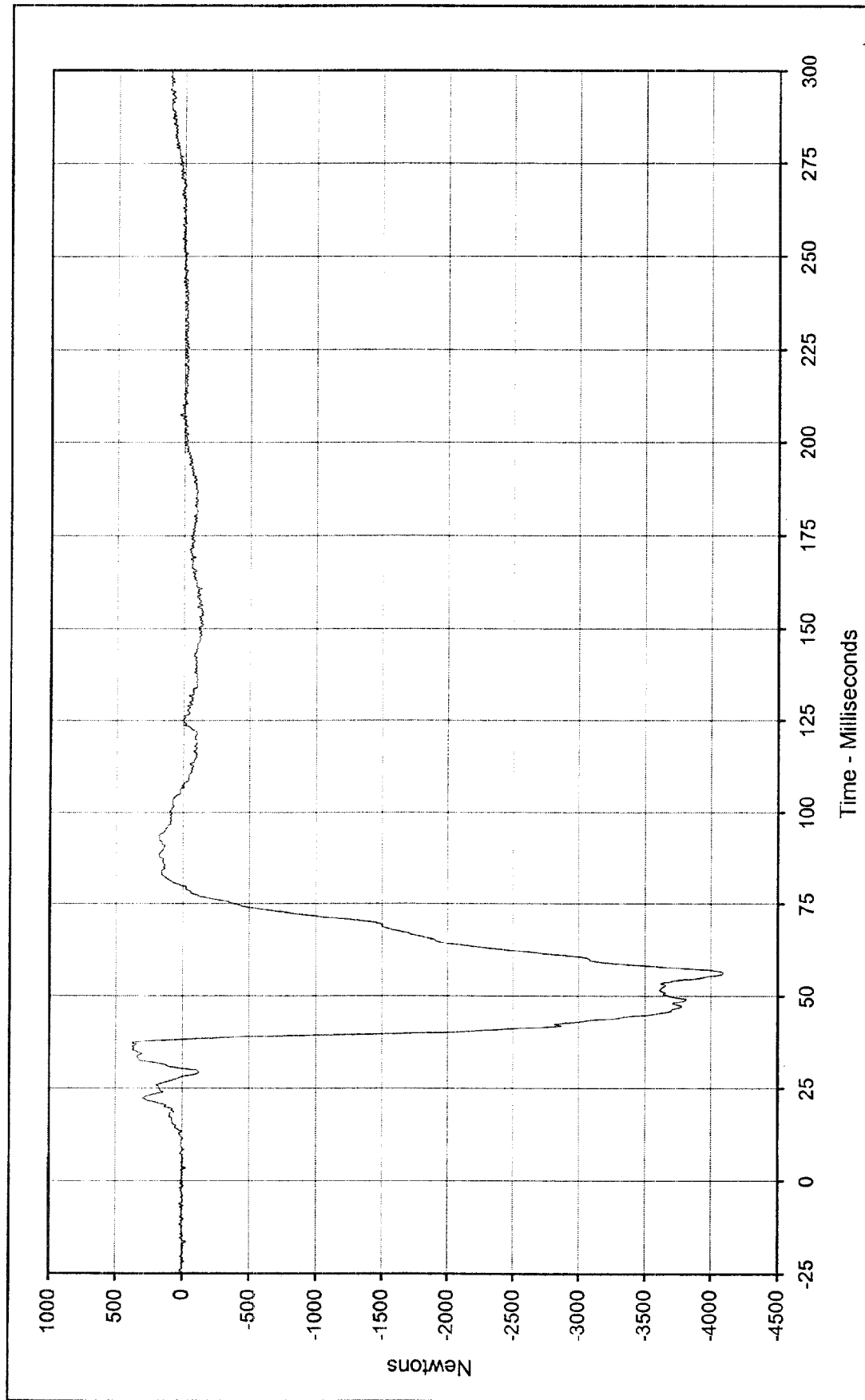
Minimum Value: 0.0 at 4.4 Milliseconds

SAE Filter Class: 1000

Date of Test: 2/4/99

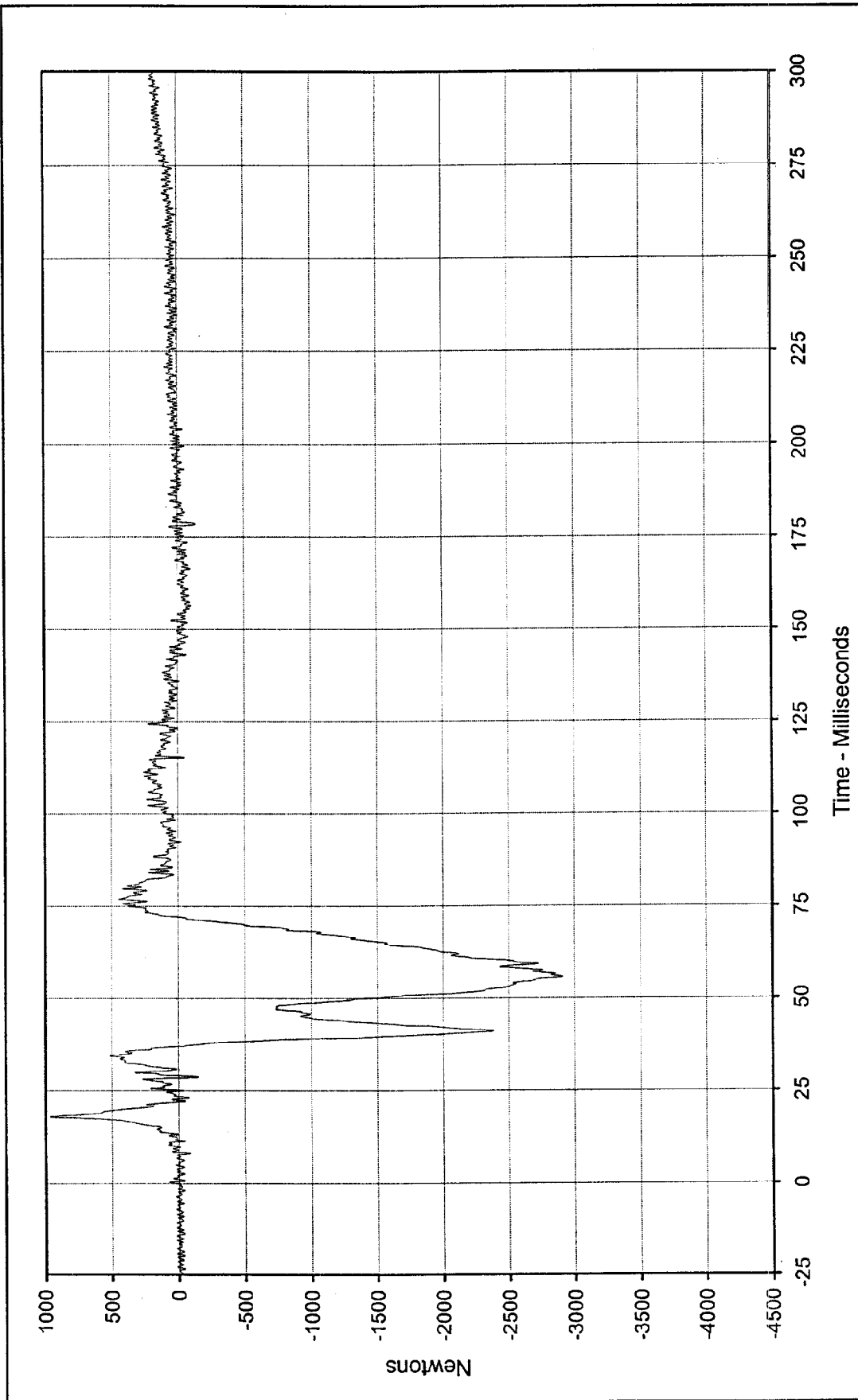
Curve Number: RES-020





Curve Description:	Driver Left Femur Force	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	378.8 at 37.3 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-4092.2 at 56.3 Milliseconds			
SAE Filter Class:	600			
Date of Test:	2/4/99			
Curve Number:	FIL-023			

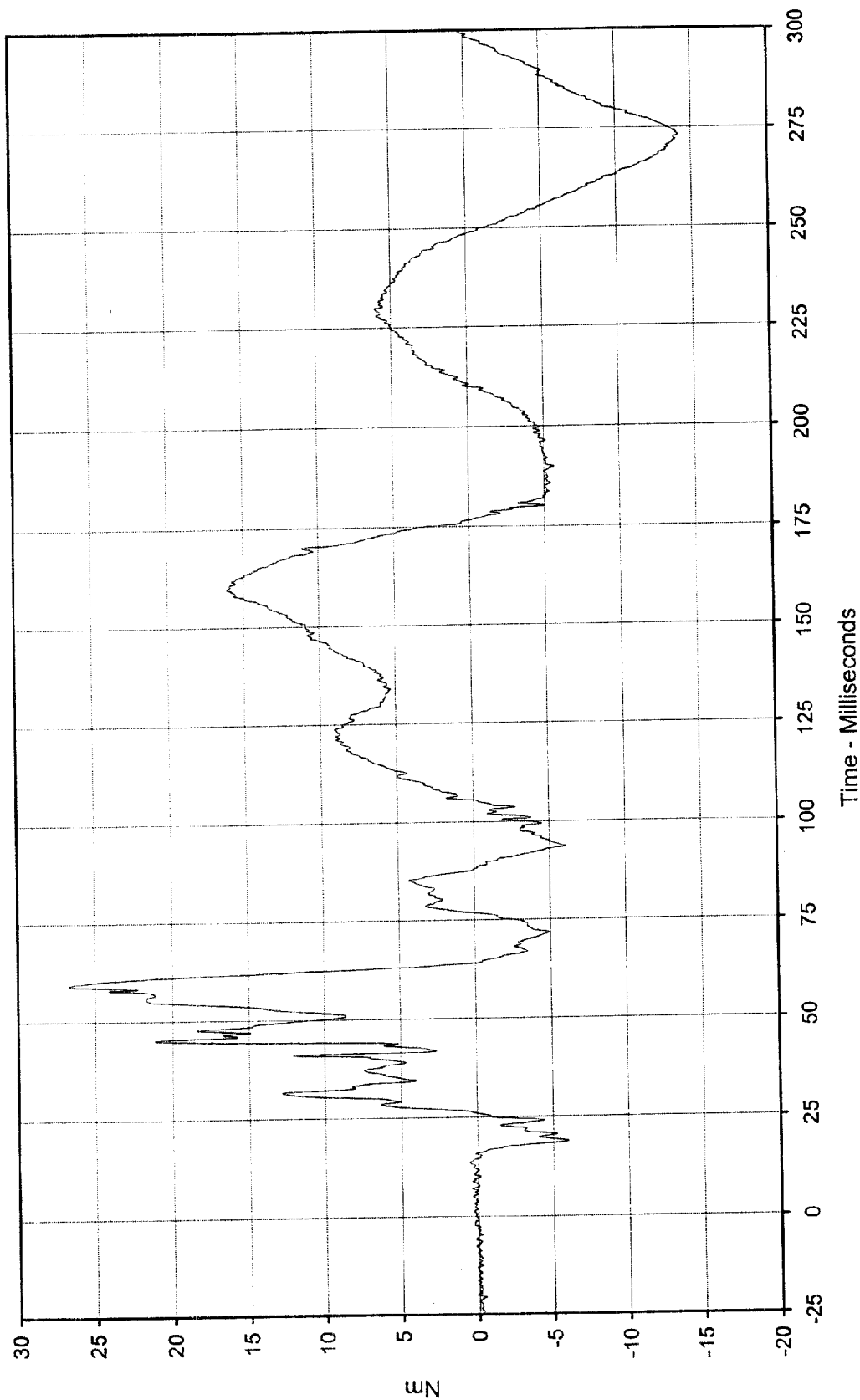




Curve Description: Driver Right Femur Force
 Maximum Value: 964.8 at 18.1 Milliseconds
 Minimum Value: -2908.8 at 55.8 Milliseconds
 SAE Filter Class: 600
 Date of Test: 2/4/99
 Curve Number: FIL-024

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

Curve Description: Driver Left Upper Tibia Moment X

Maximum Value: 26.7 at 59.1 Milliseconds

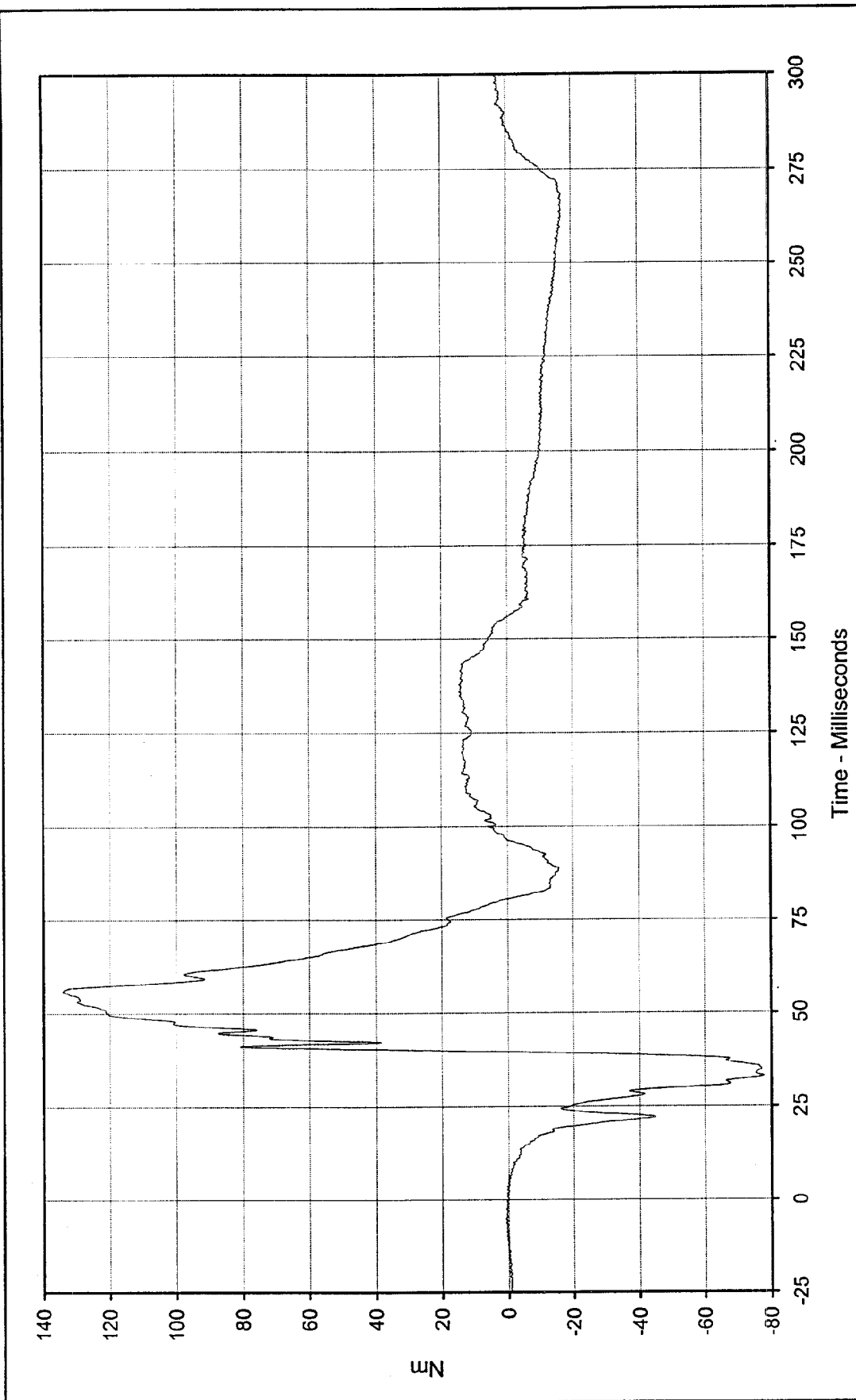
Minimum Value: -14.2 at 272.9 Milliseconds

SAE Filter Class: 600

Date of Test: 2/4/99

Curve Number: FIL-025

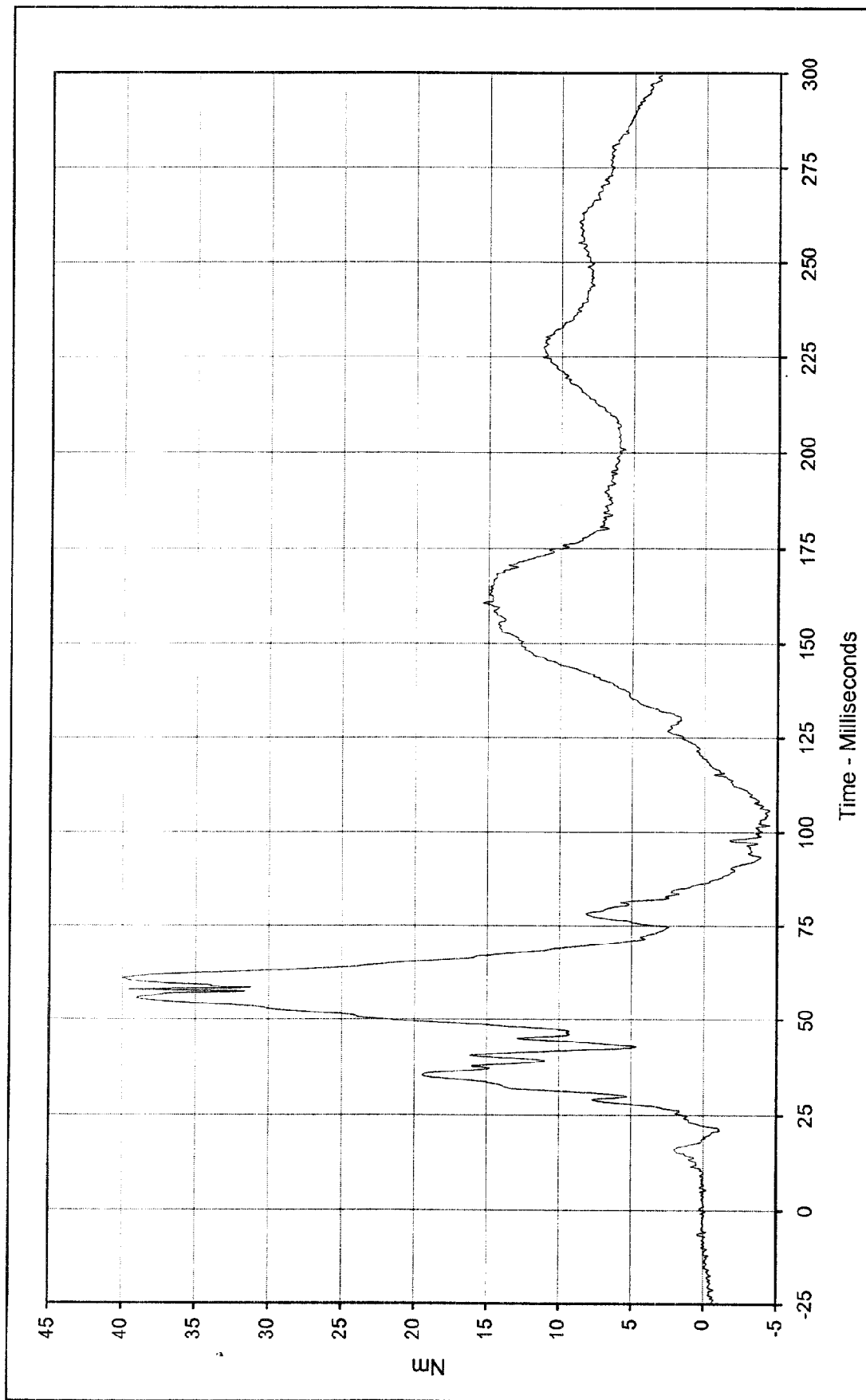




Curve Description: Driver Left Upper Tibia Moment Y
 Maximum Value: 134.1 at 55.9 Milliseconds
 Minimum Value: -77.9 at 32.9 Milliseconds
 SAE Filter Class: 600
 Date of Test: 2/4/99
 Curve Number: FIL-026

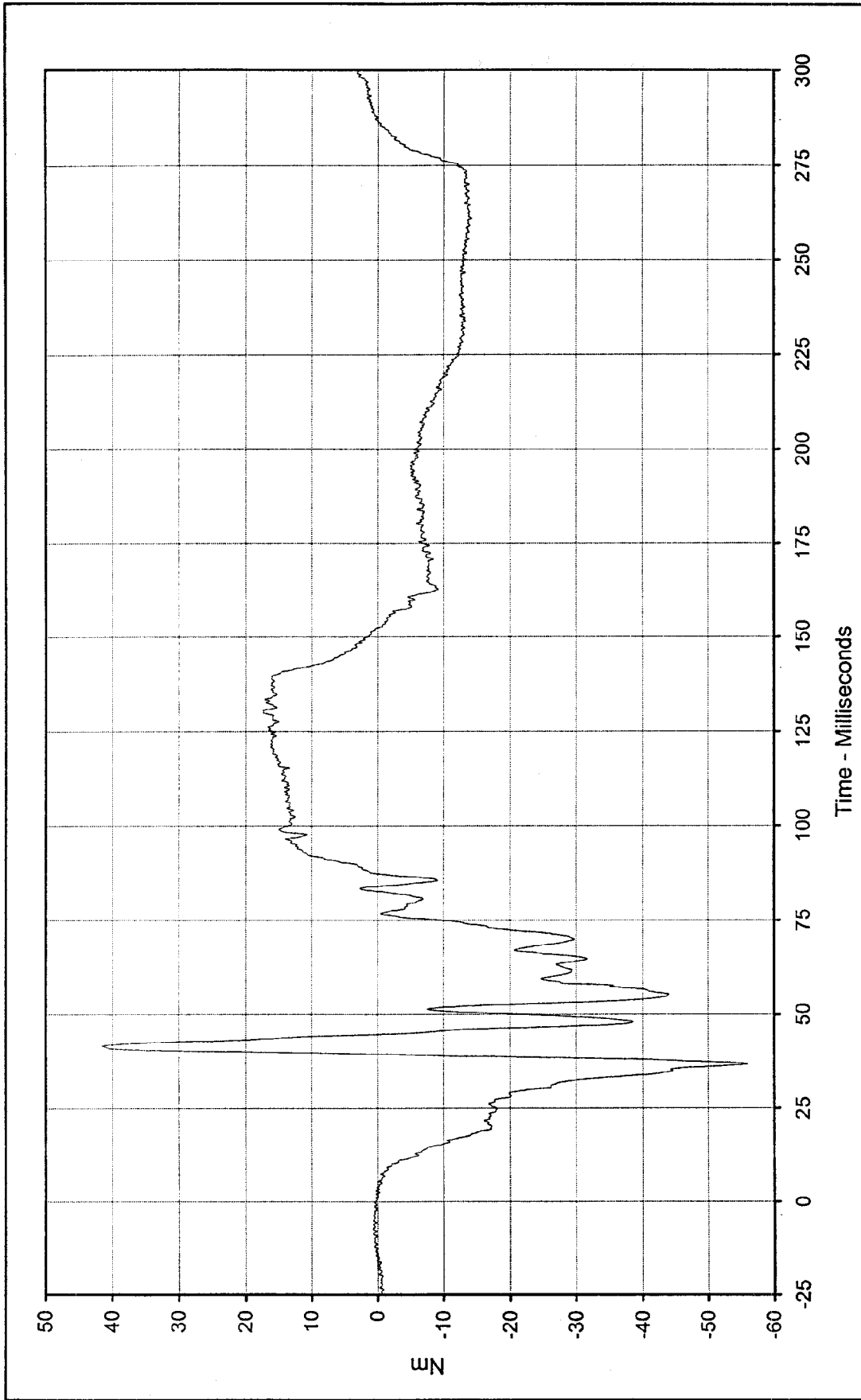
Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Driver Right Upper Tibia Moment X	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	40.0	at	60.8	Milliseconds
Minimum Value:	-4.5	at	101.8	Milliseconds
SAE Filter Class:	600			
Date of Test:	2/4/99			
Curve Number:	FIL-027	Test Vehicle:	1999 Ford Econoline E-150 Van	

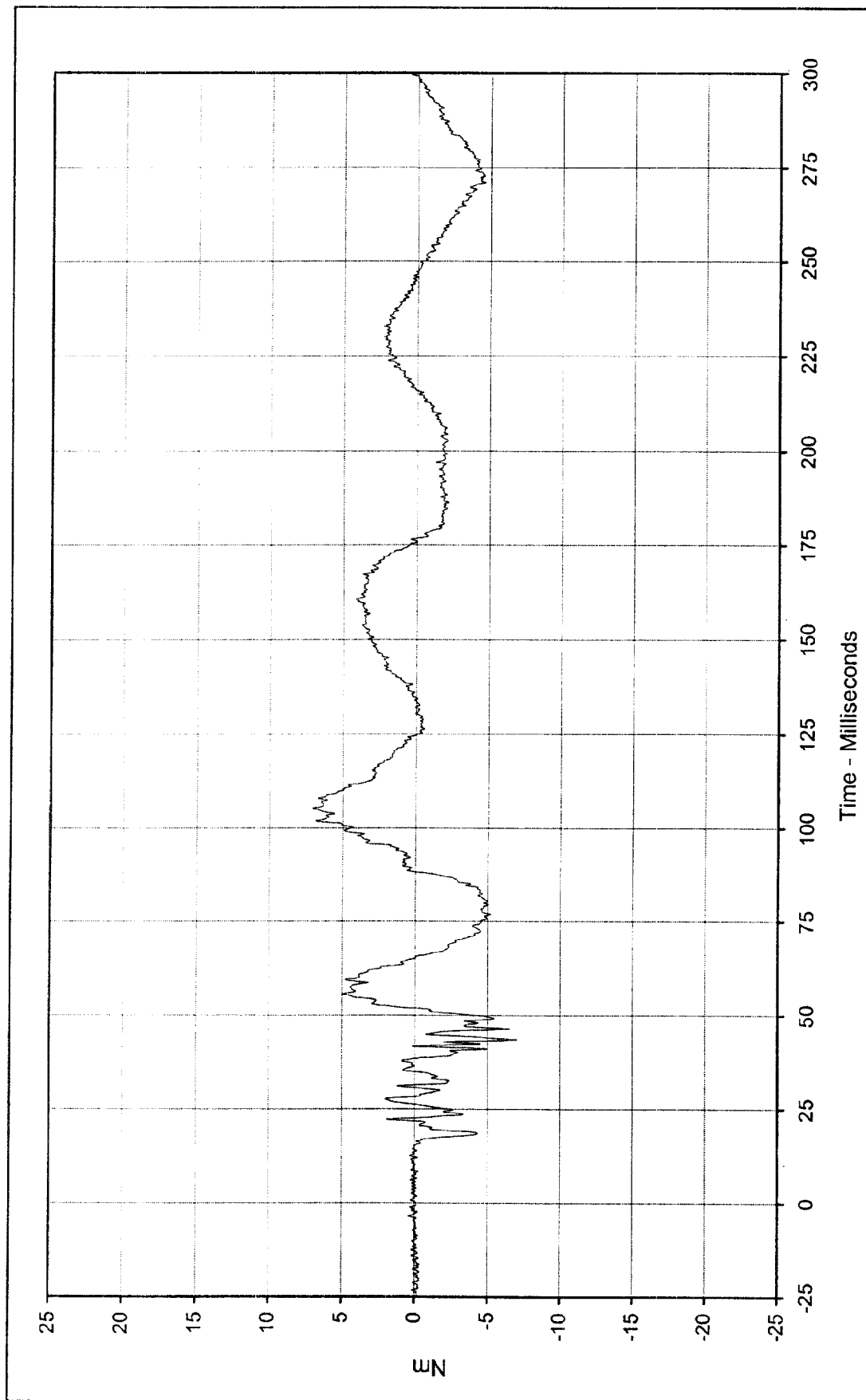




Curve Description: Driver Right Upper Tibia Moment Y
 Maximum Value: 41.6 at 41.5 Milliseconds
 Minimum Value: -56.0 at 36.7 Milliseconds
 SAE Filter Class: 600
 Date of Test: 2/4/99
 Curve Number: FIL-028

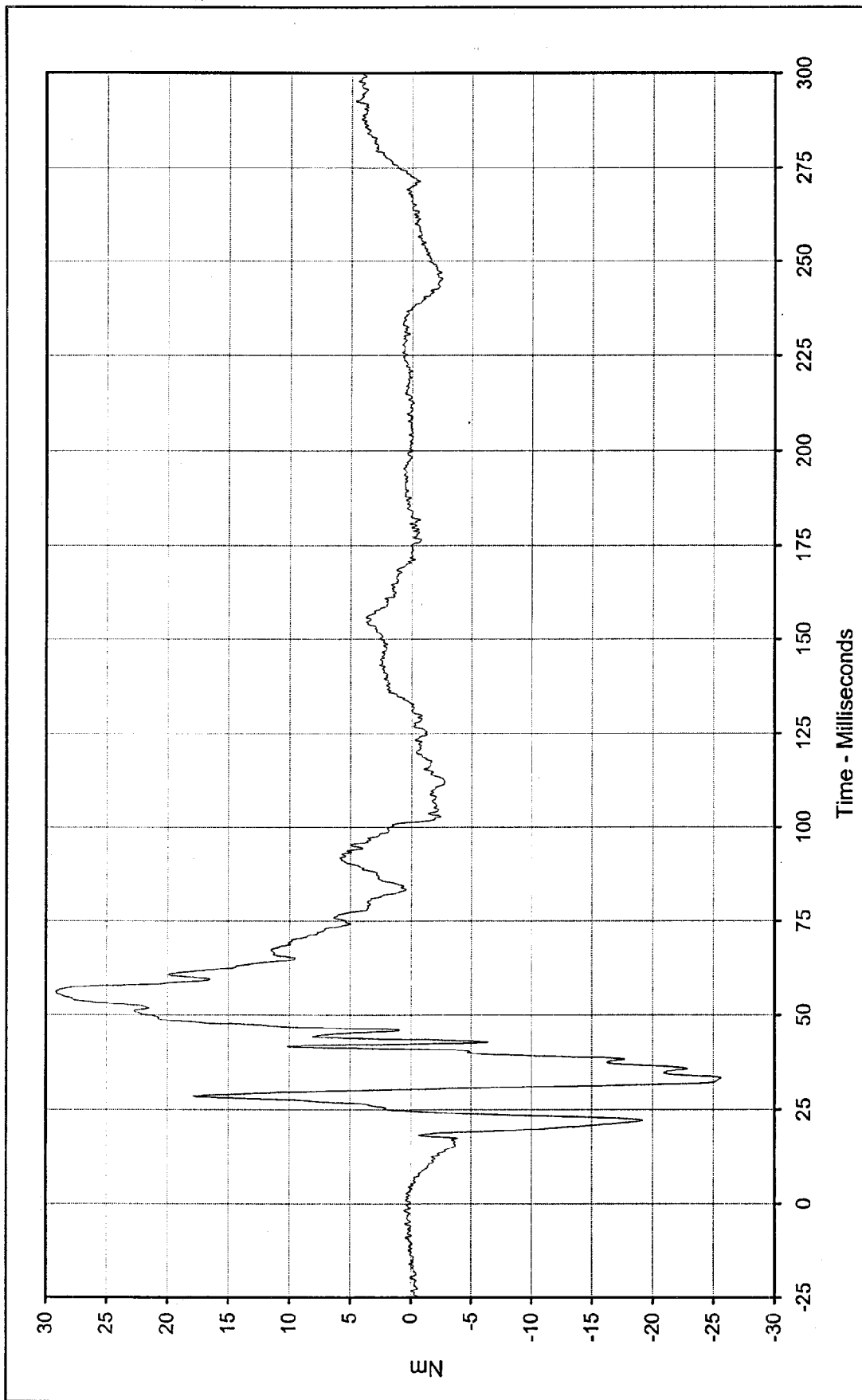
Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Driver Left Lower Tibia Moment X	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	7.0	at	105.2	Milliseconds
Minimum Value:	-7.0	at	43.5	Milliseconds
SAE Filter Class:	600	Test Vehicle:	1999 Ford Econoline E-150 Van	
Date of Test:	2/4/99			
Curve Number:	FIL-029			





Curve Description: Driver Left Lower Tibia Moment Y

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 29.2 at 56.1 Milliseconds

Test Vehicle: 1999 Ford Econoline E-150 Van

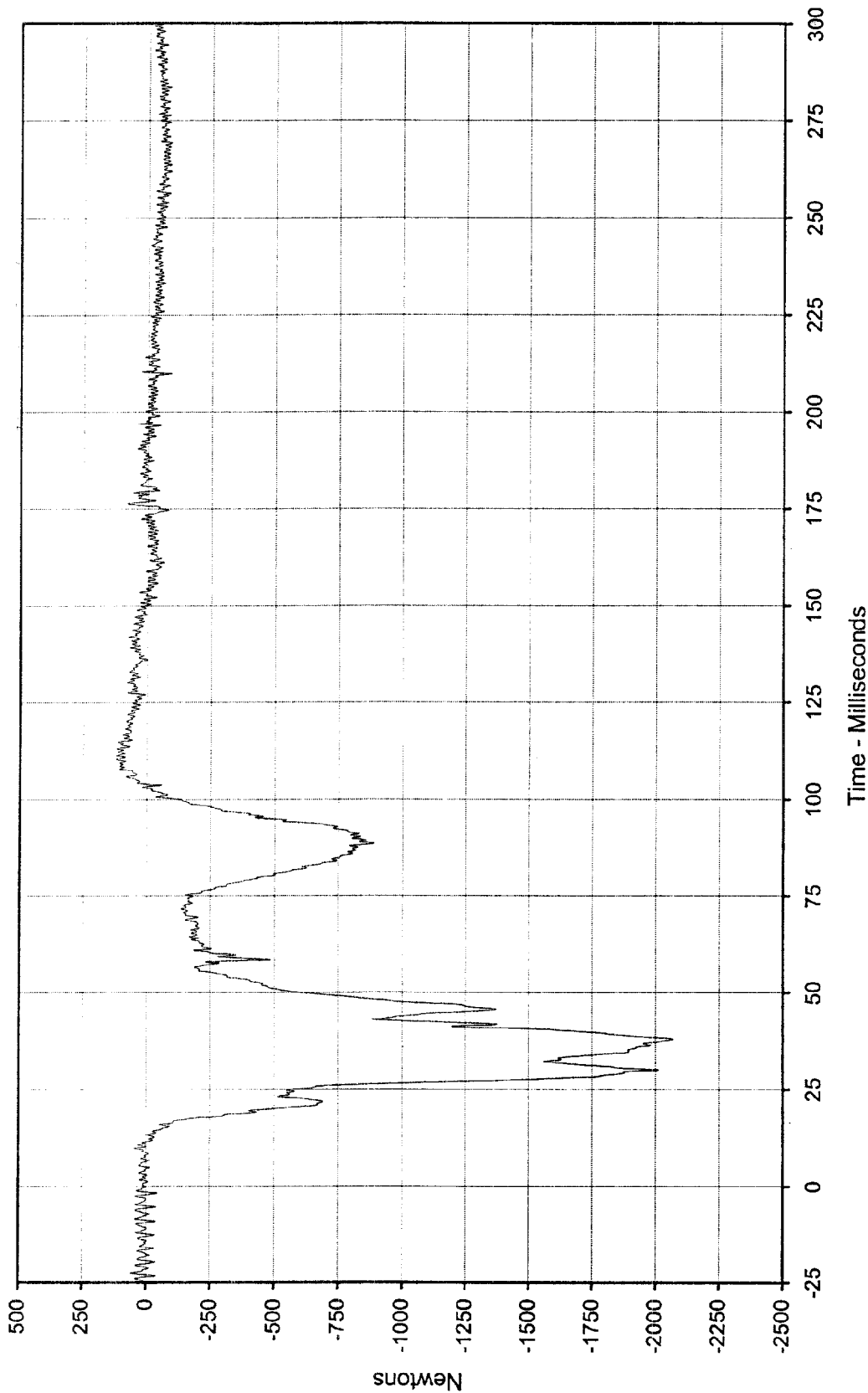
Minimum Value: -25.7 at 33.4 Milliseconds

SAE Filter Class: 600

Date of Test: 2/4/99

Curve Number: FIL-030





Curve Description: Driver Left Lower Tibia Force Z

Maximum Value: 123.8 at 110.3 Milliseconds

Minimum Value: -2070.5 at 38.0 Milliseconds

SAE Filter Class: 600

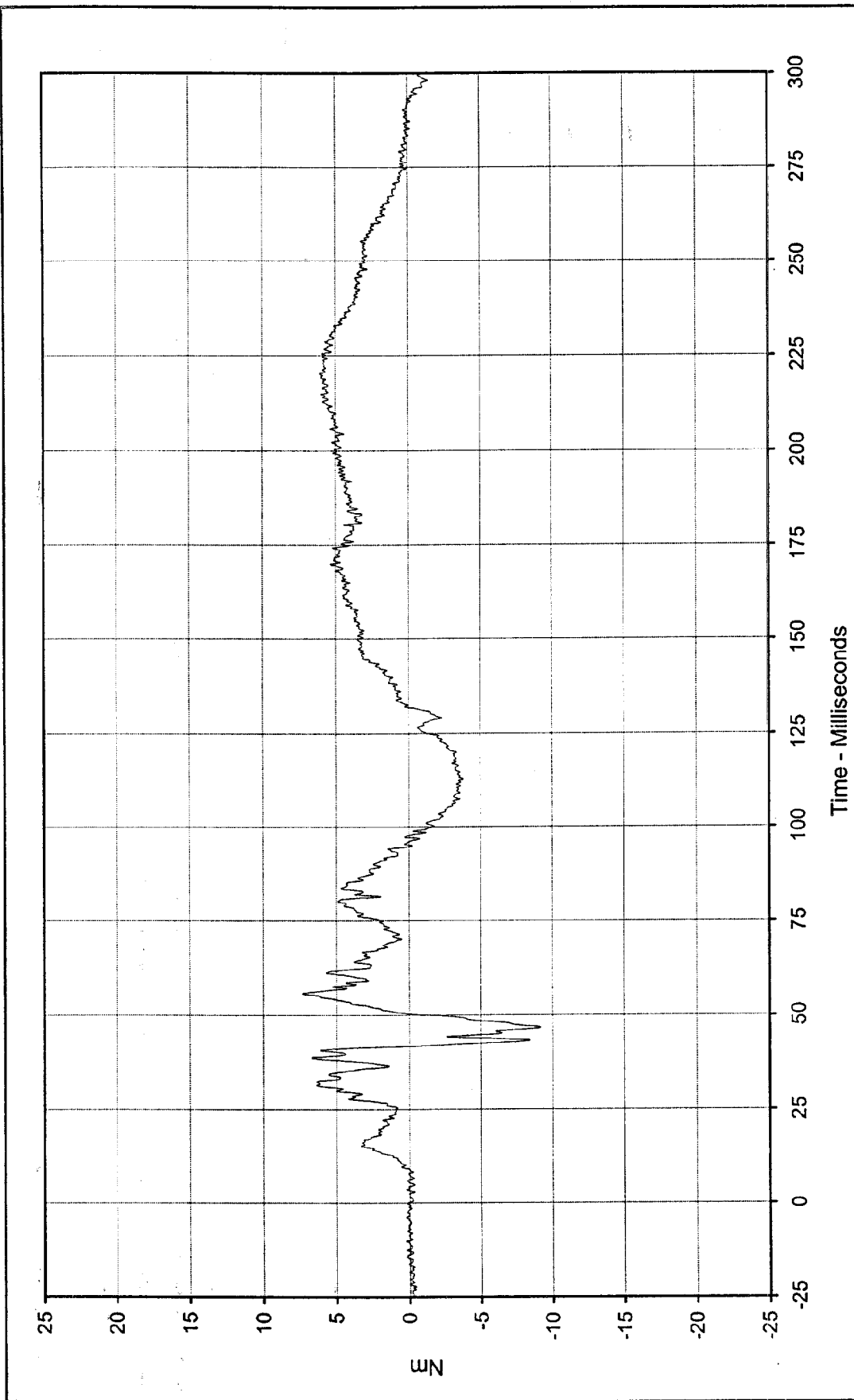
Date of Test: 2/4/99

Curve Number: FIL-031

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

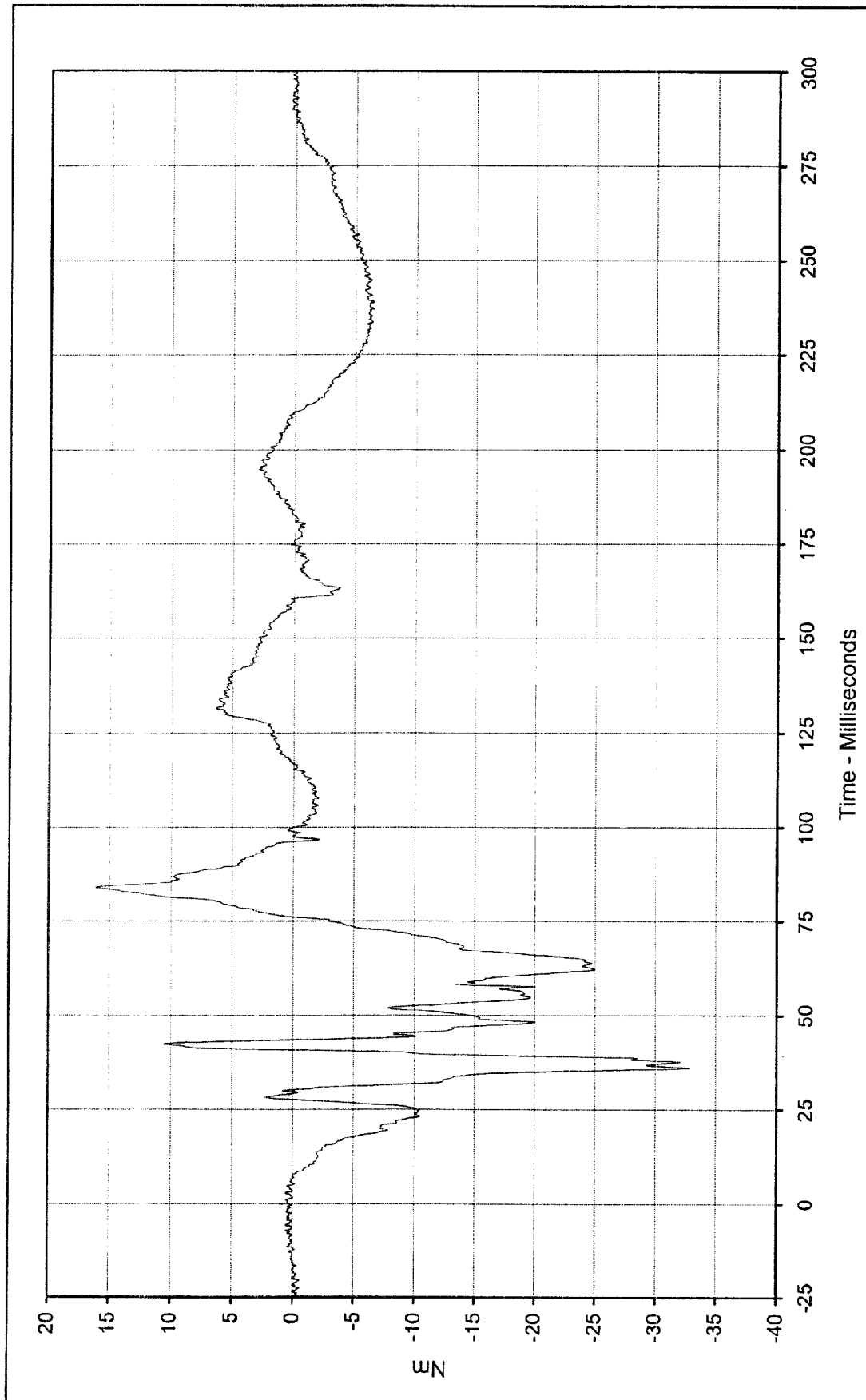




Curve Description: Driver Right Lower Tibia Moment X
 Maximum Value: 7.3 at 55.6 Milliseconds
 Minimum Value: -9.2 at 46.7 Milliseconds
 SAE Filter Class: 600
 Date of Test: 2/4/99
 Curve Number: FIL-032

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

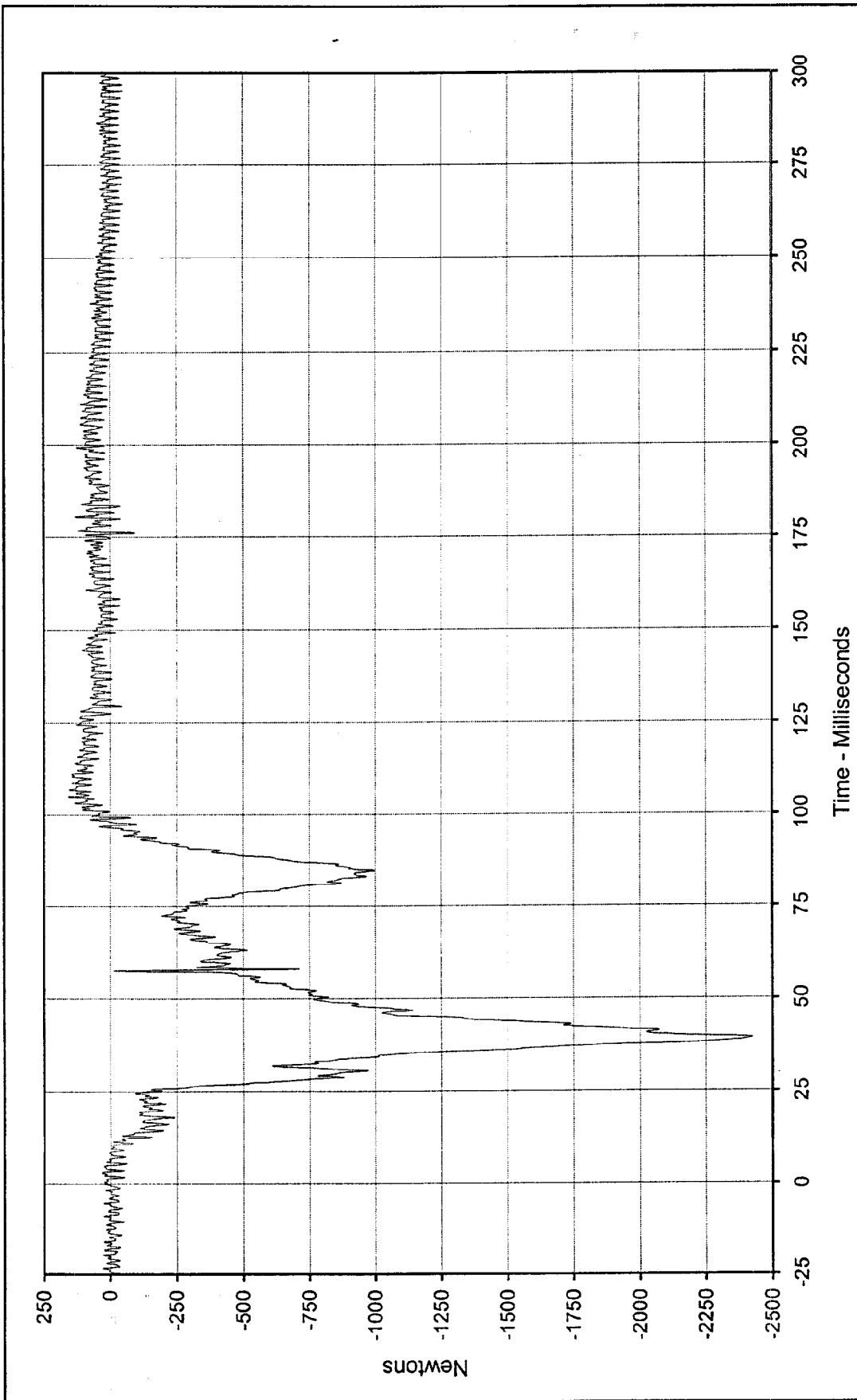




Curve Description:		Driver Right Lower Tibia Moment Y		Test Program:	1999 NHTSA 35 mph NCAP No.: MX0208
Maximum Value:	16.1	at	84.0	Milliseconds	1999 Ford Econoline E-150 Van
Minimum Value:	-32.9	at	35.8	Milliseconds	
SAE Filter Class:	600				
Date of Test:	2/4/99				
Curve Number:	FIL-033				

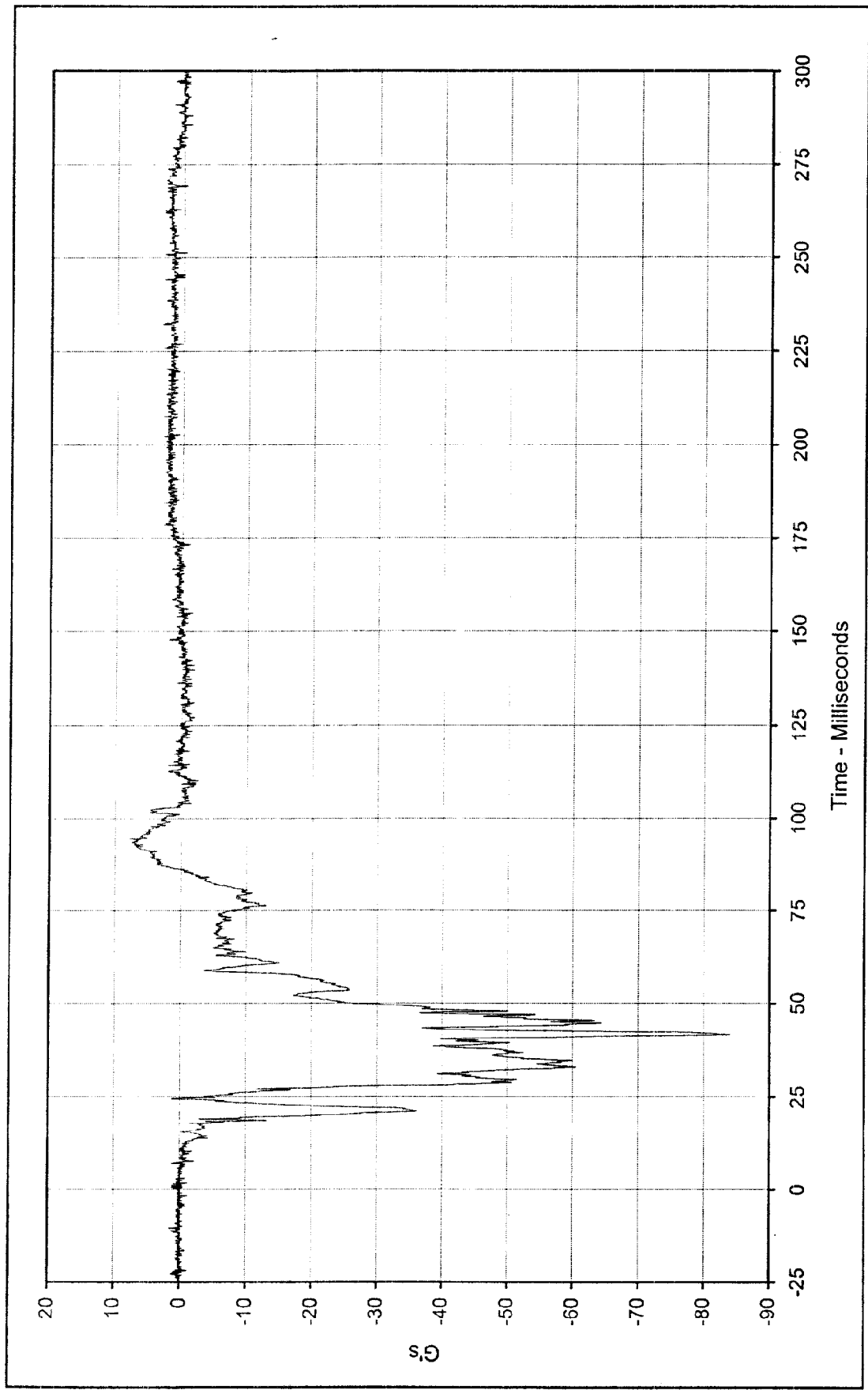






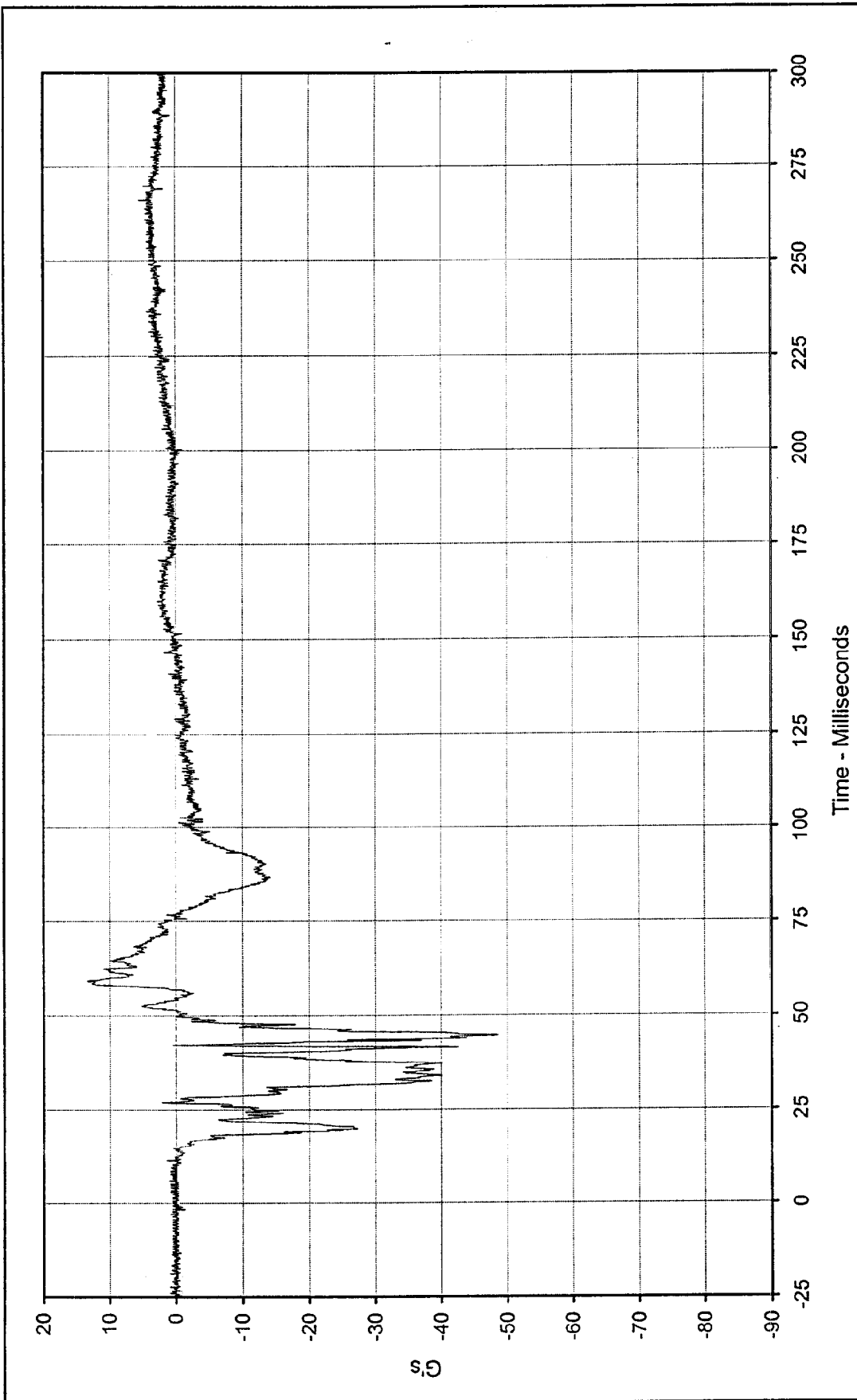
Curve Description:	Driver Right Lower Tibia Force Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	157.6 at 104.7 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-2427.3 at 39.4 Milliseconds			
SAE Filter Class:	600			
Date of Test:	2/4/99			
Curve Number:	FIL-034			





Curve Description:	Driver Left Foot Aft X		Test Program:	1999 NHTSA 35 mph NCAP No.: MX0208	
Maximum Value:	7.8	at 94.4 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-84.1	at 41.6 Milliseconds			
SAE Filter Class:	1000				
Date of Test:	2/4/99				
Curve Number:	FIL-035				

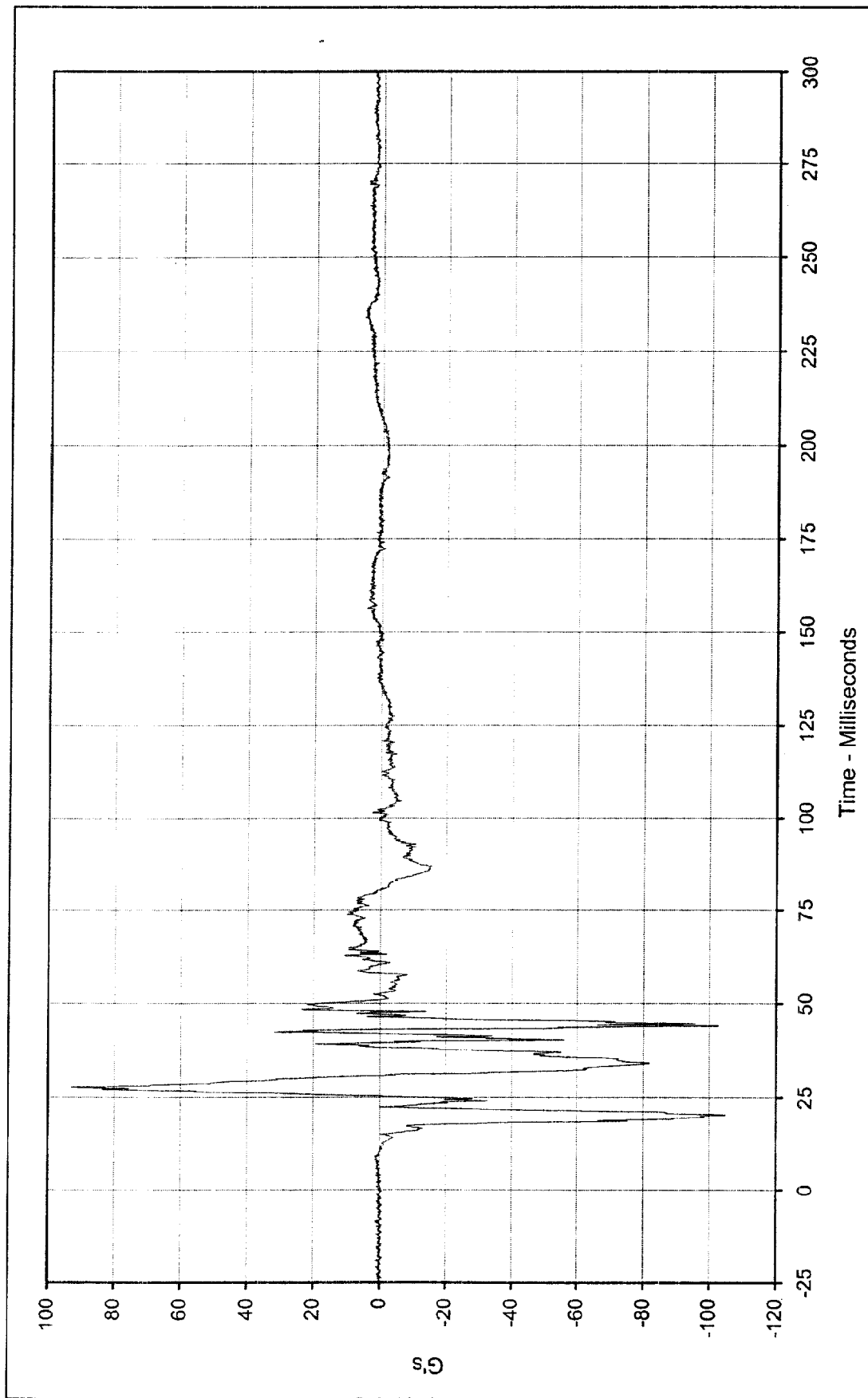




Curve Description: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Program:
 Test Vehicle: 1999 Ford Econoline E-150 Van

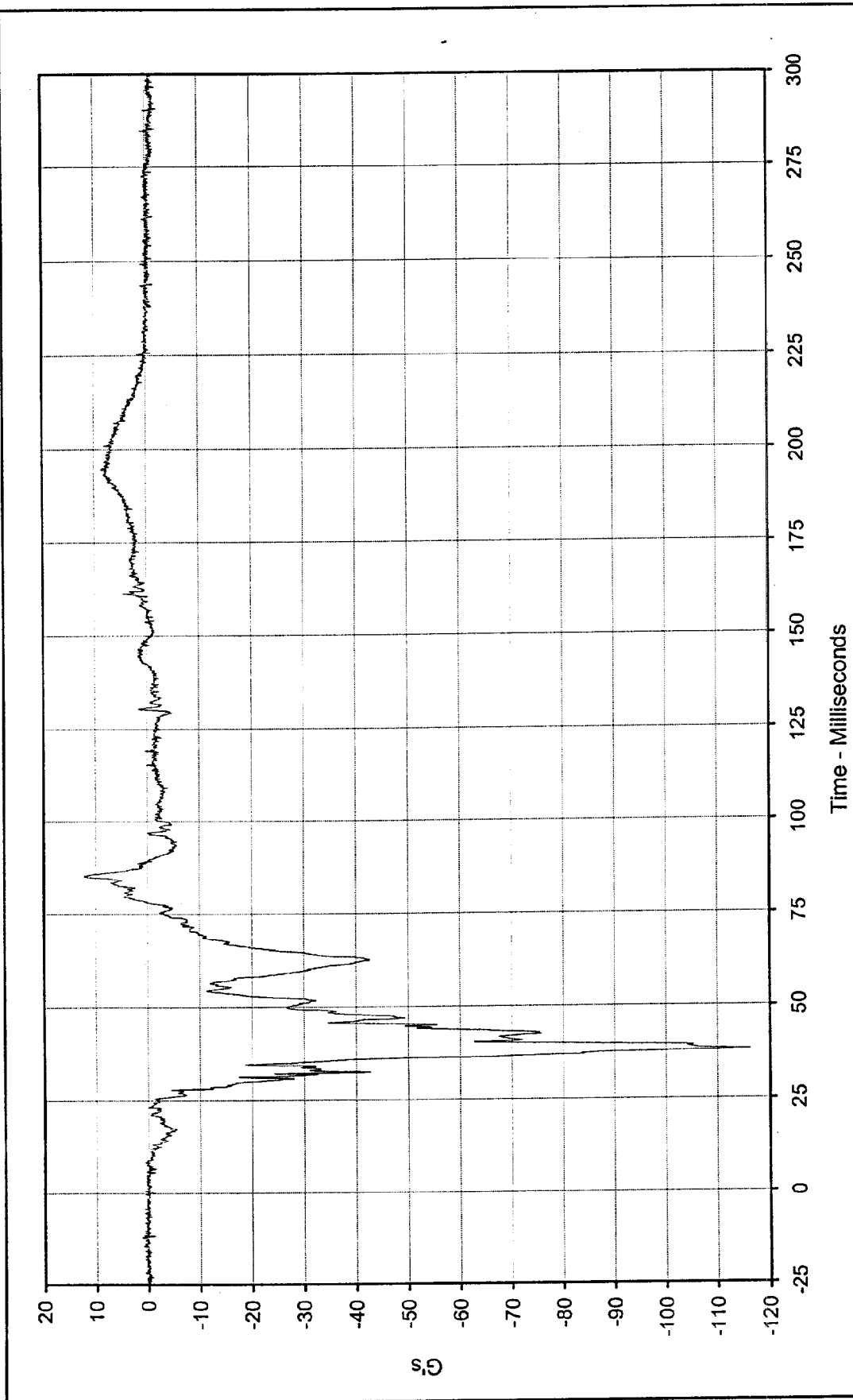
Driver Left Foot Aft Z
 Maximum Value: 13.3 at 59.1 Milliseconds
 Minimum Value: -48.6 at 44.7 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-036





Curve Description:	Driver Left Foot Fore Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	92.8 at 27.8 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-105.1 at 20.4 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	FIL-037			



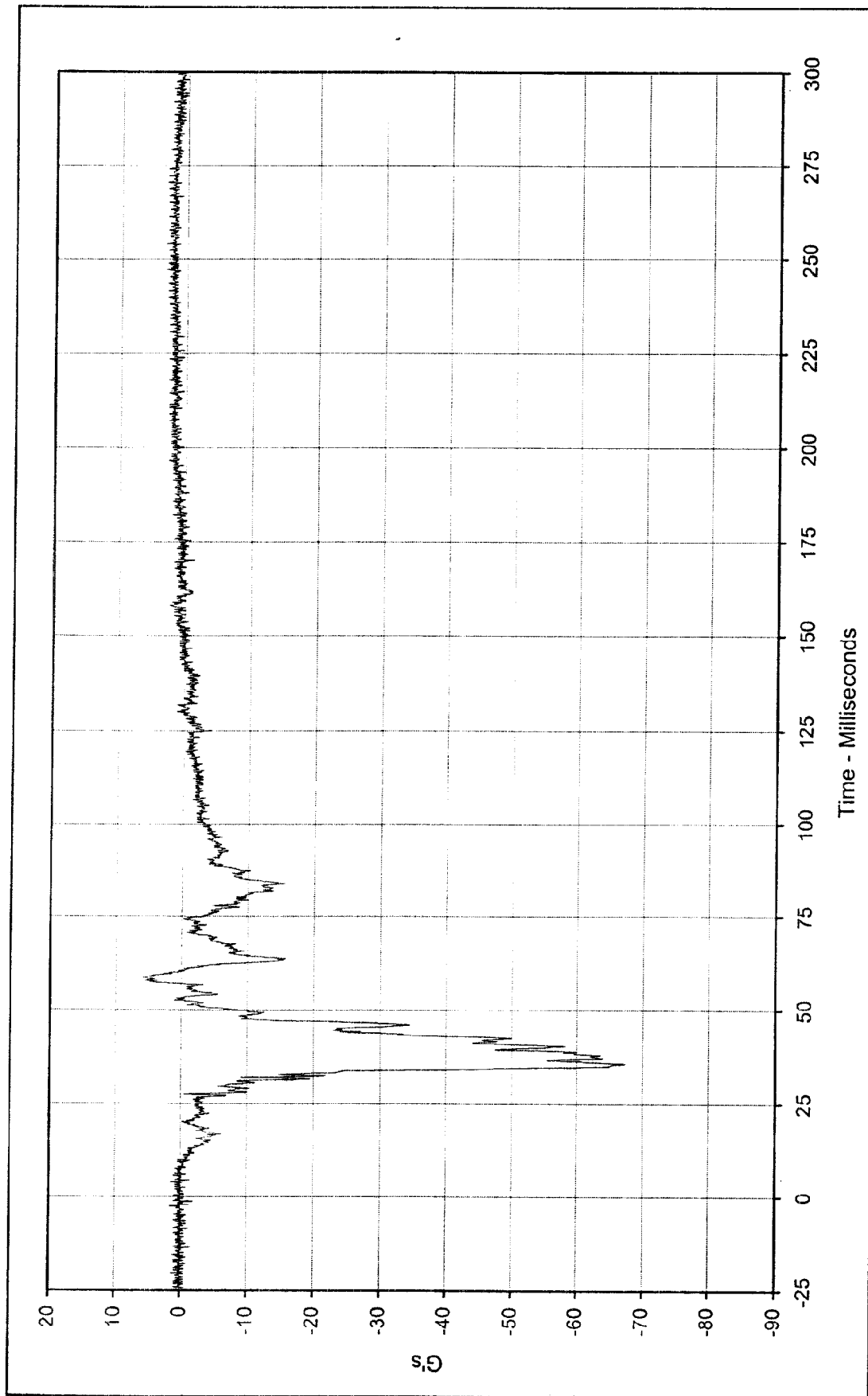


Curve Description: Driver Right Foot Aft X
 Maximum Value: 12.3 at 85.1 Milliseconds
 Minimum Value: -116.3 at 38.0 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-038

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Driver Right Foot Aft Z

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 5.8 at 58.5 Milliseconds

Test Vehicle: 1999 Ford Econoline E-150 Van

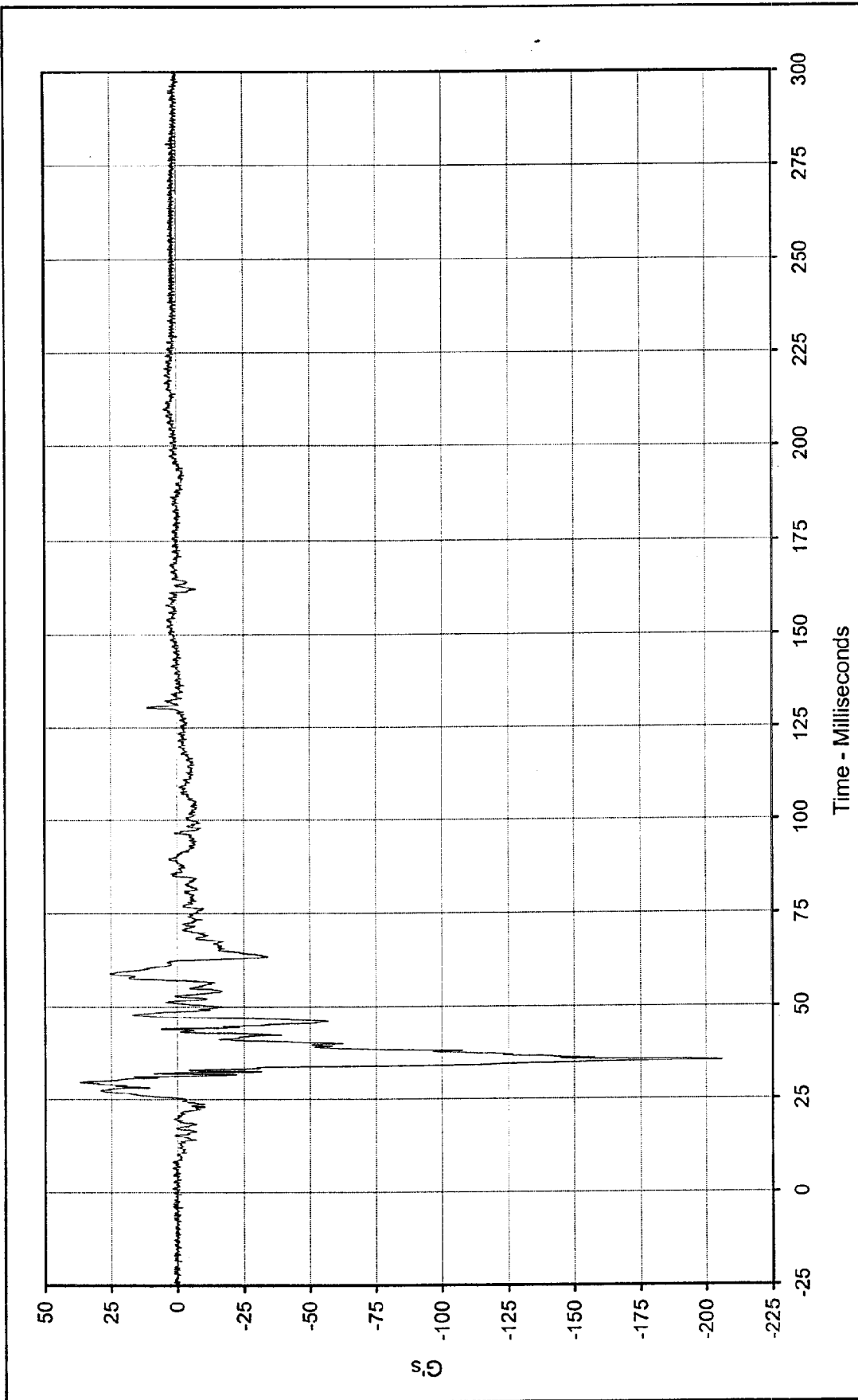
Minimum Value: -67.4 at 35.7 Milliseconds

SAE Filter Class: 1000

Date of Test: 2/4/99

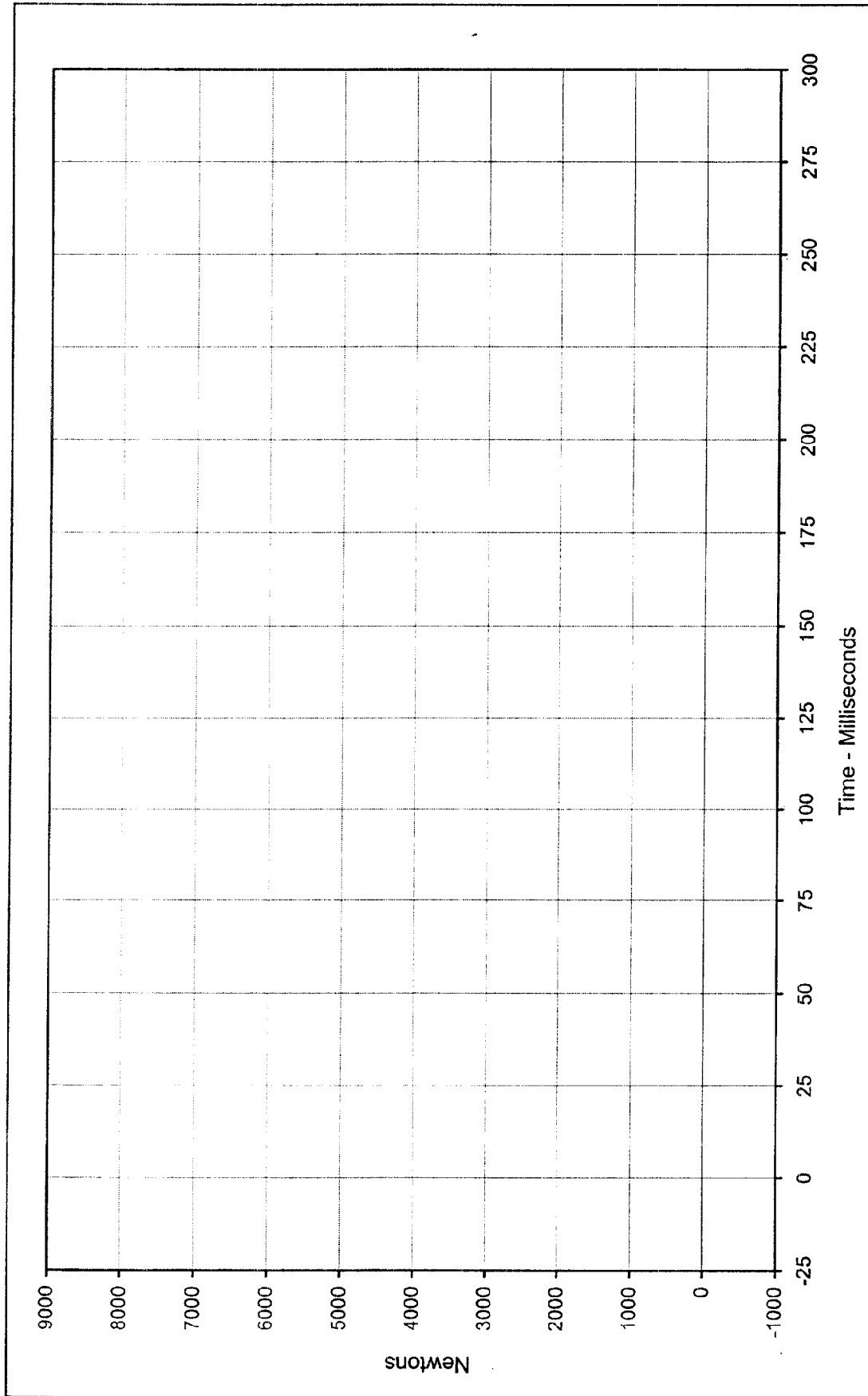
Curve Number: FIL-039





Curve Description:	Driver Right Foot Fore Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	36.7 at 29.6 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-206.1 at 35.3 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	FIL-040			





Curve Description: _____ Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 0.0 at 0.0 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

Minimum Value: 0.0 at 0.0 Milliseconds

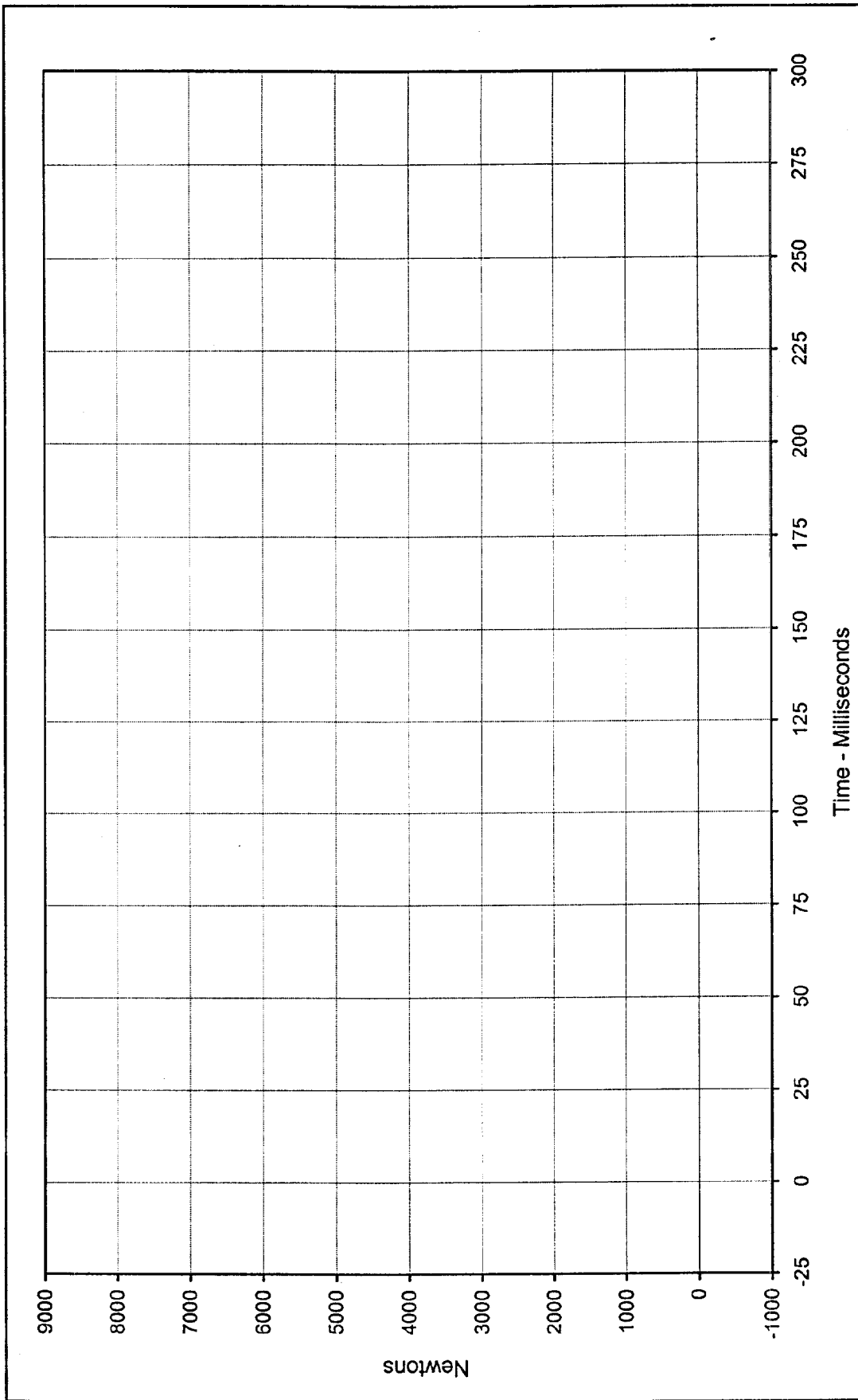
SAE Filter Class: 60

Date of Test: 2/4/99

Curve Number: FIL-041



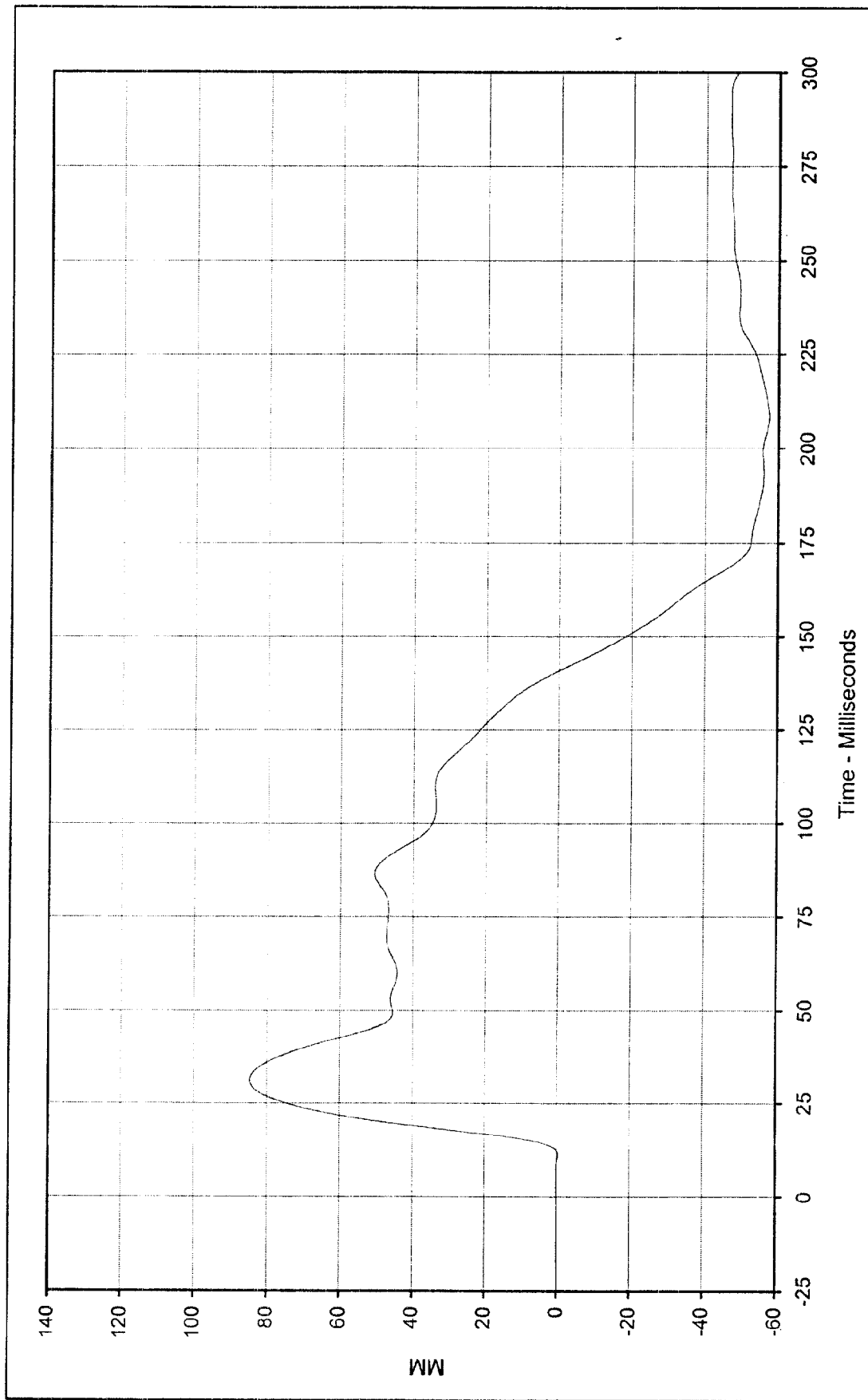
*Not used, Mfr. Request



Curve Description:	Driver Shoulder Belt Force	*	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	0.0 at 0.0	Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	0.0 at 0.0	Milliseconds			
SAE Filter Class:	60				
Date of Test:	2/4/99				
Curve Number:	FIL-042				



*Not used, Mfr. Request



B-60

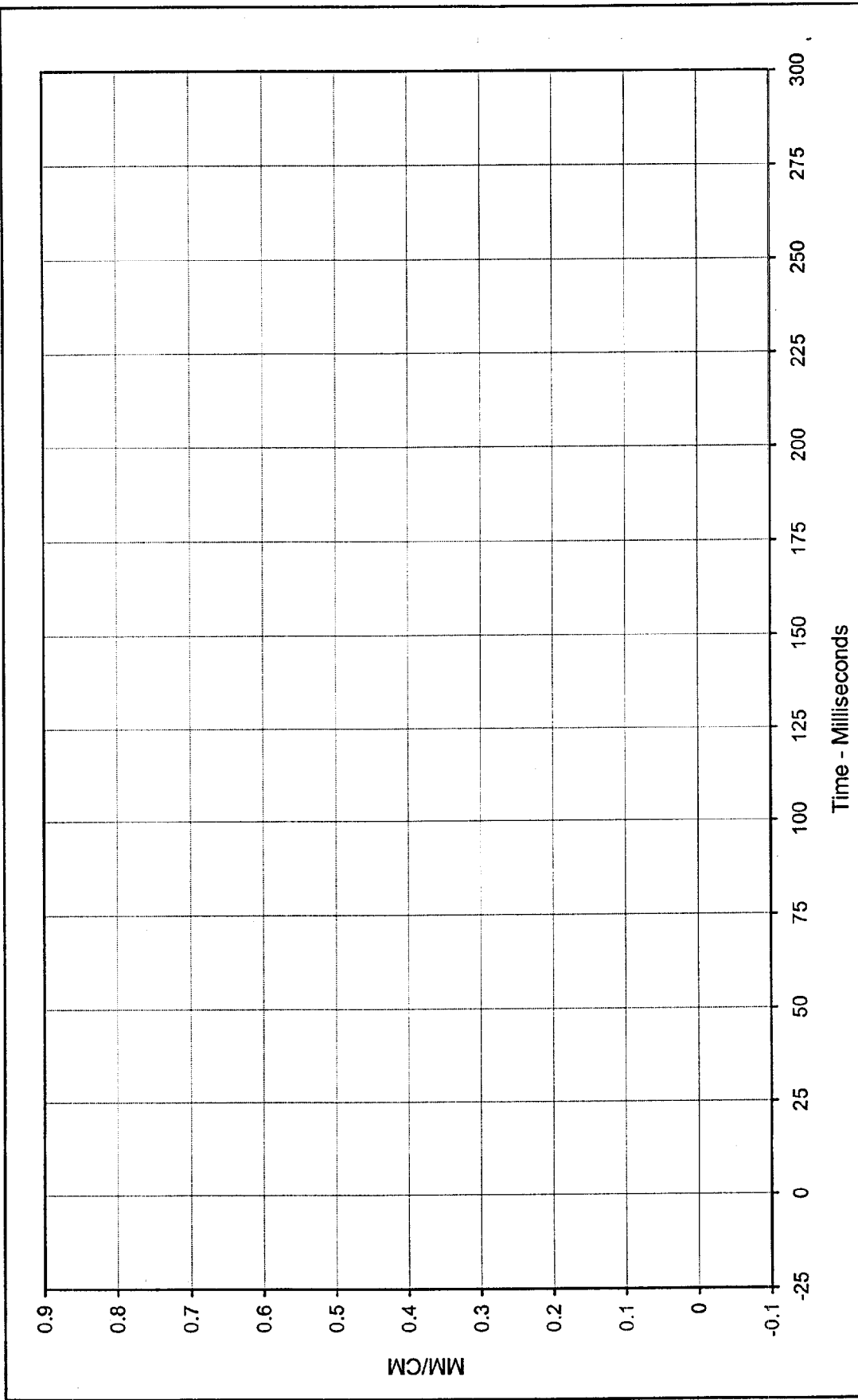
Curve Description: Driver Shoulder Belt Pullout
 Maximum Value: 84.7 at 31.1 Milliseconds
 Minimum Value: -57.6 at 208.6 Milliseconds
 SAE Filter Class: 60
 Date of Test: 2/4/99
 Curve Number: FIL-043

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van



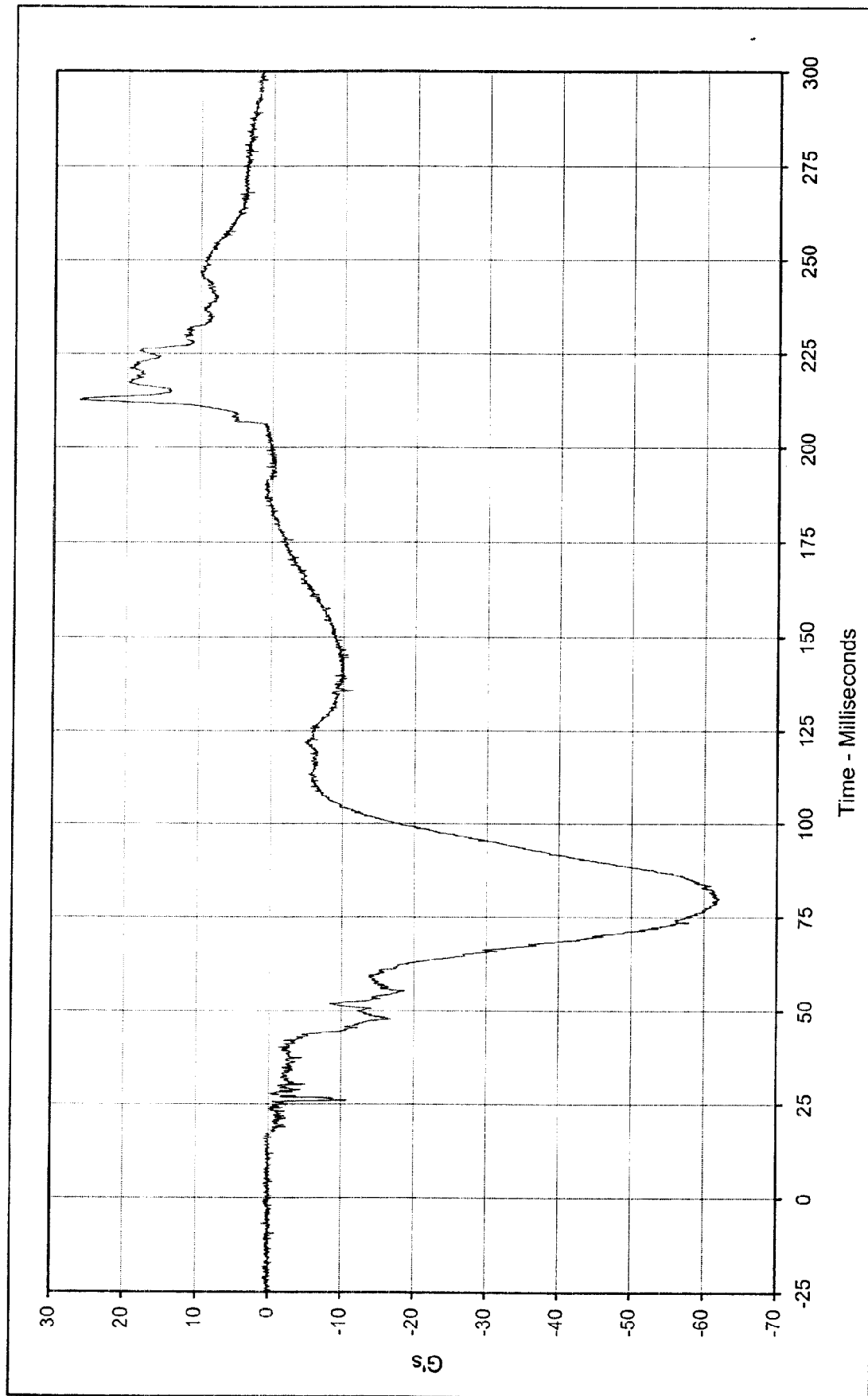
KAR99001-13



Curve Description:	Driver Shoulder Belt Elongation	*	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	0.00	at 0.0	Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van
Minimum Value:	0.00	at 0.0	Milliseconds		
SAE Filter Class:	60				
Date of Test:	2/4/99				
Curve Number:	FIL-044				



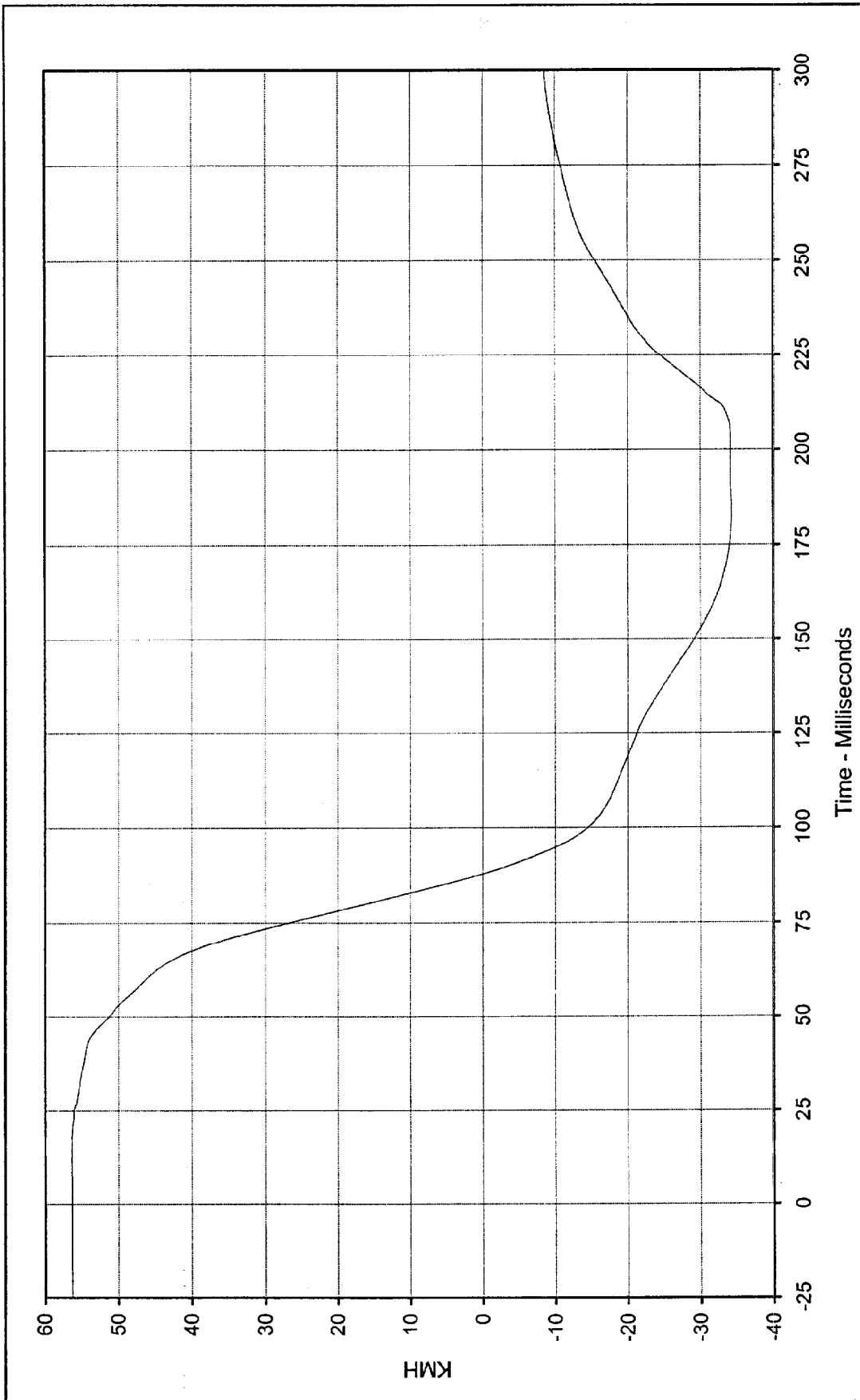
*Not used, Mfr. Request



Curve Description: Passenger Head Primary X
 Maximum Value: 26.6 at 213.0 Milliseconds
 Minimum Value: -62.1 at 79.6 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-045

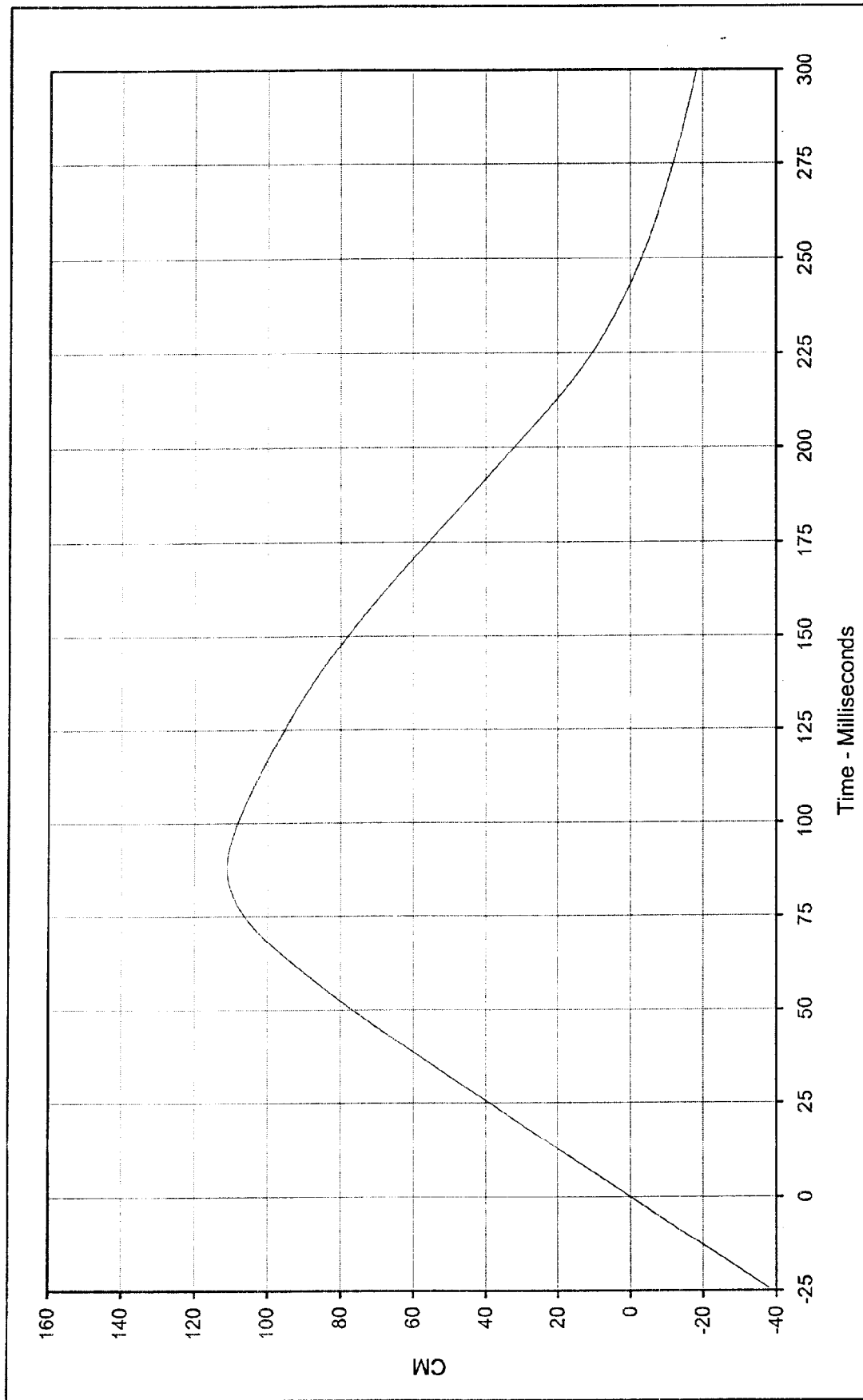
Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Passenger Head Primary X Velocity	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	56.4 at 16.6 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-34.3 at 184.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	2/4/99			
Curve Number:	IN1-045			

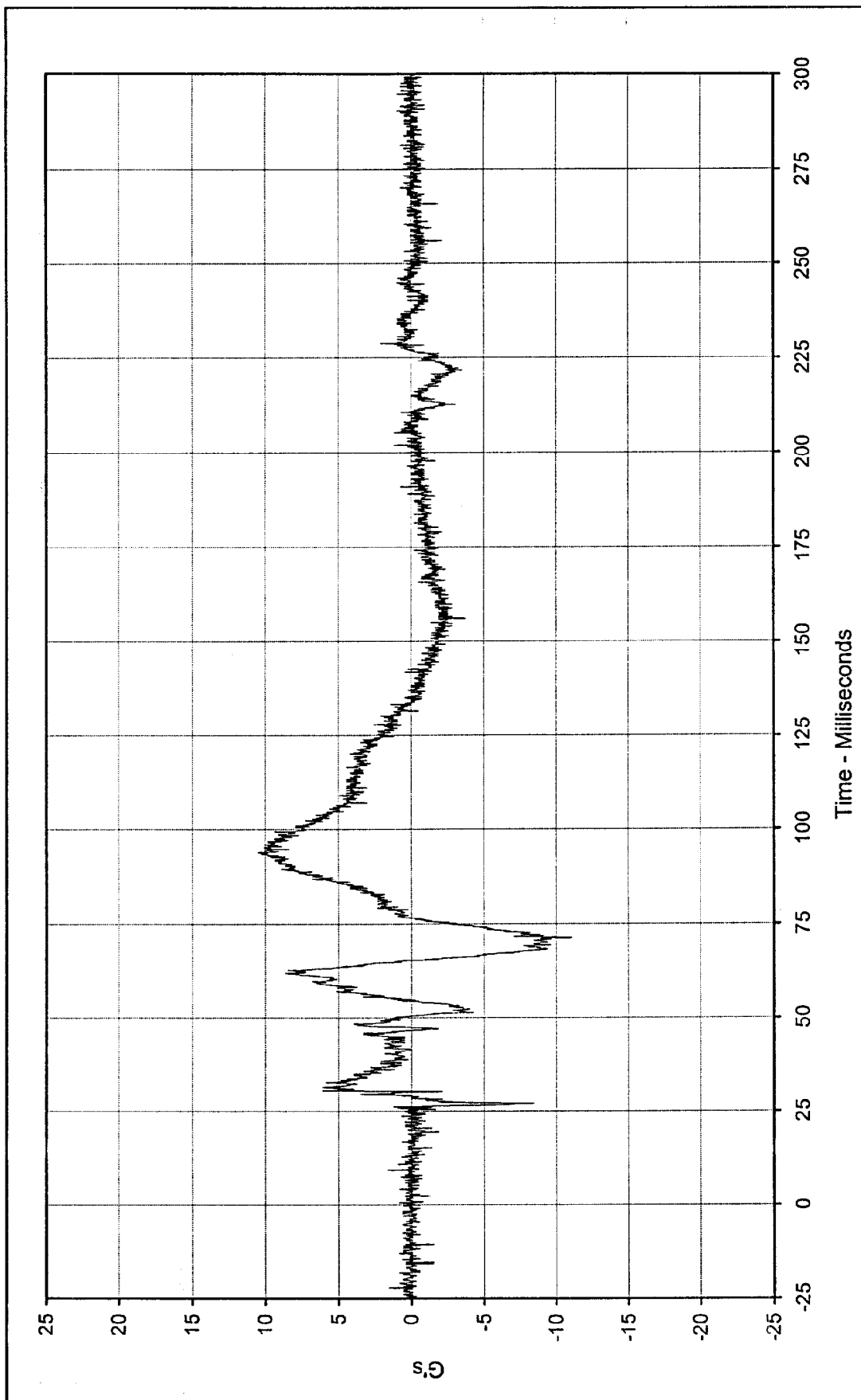




Curve Description:	Passenger Head Primary X Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	111.0 at 87.8 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-18.4 at 299.9 Milliseconds			



SAE Filter Class:	180
Date of Test:	2/4/99
Curve Number:	IN2-045

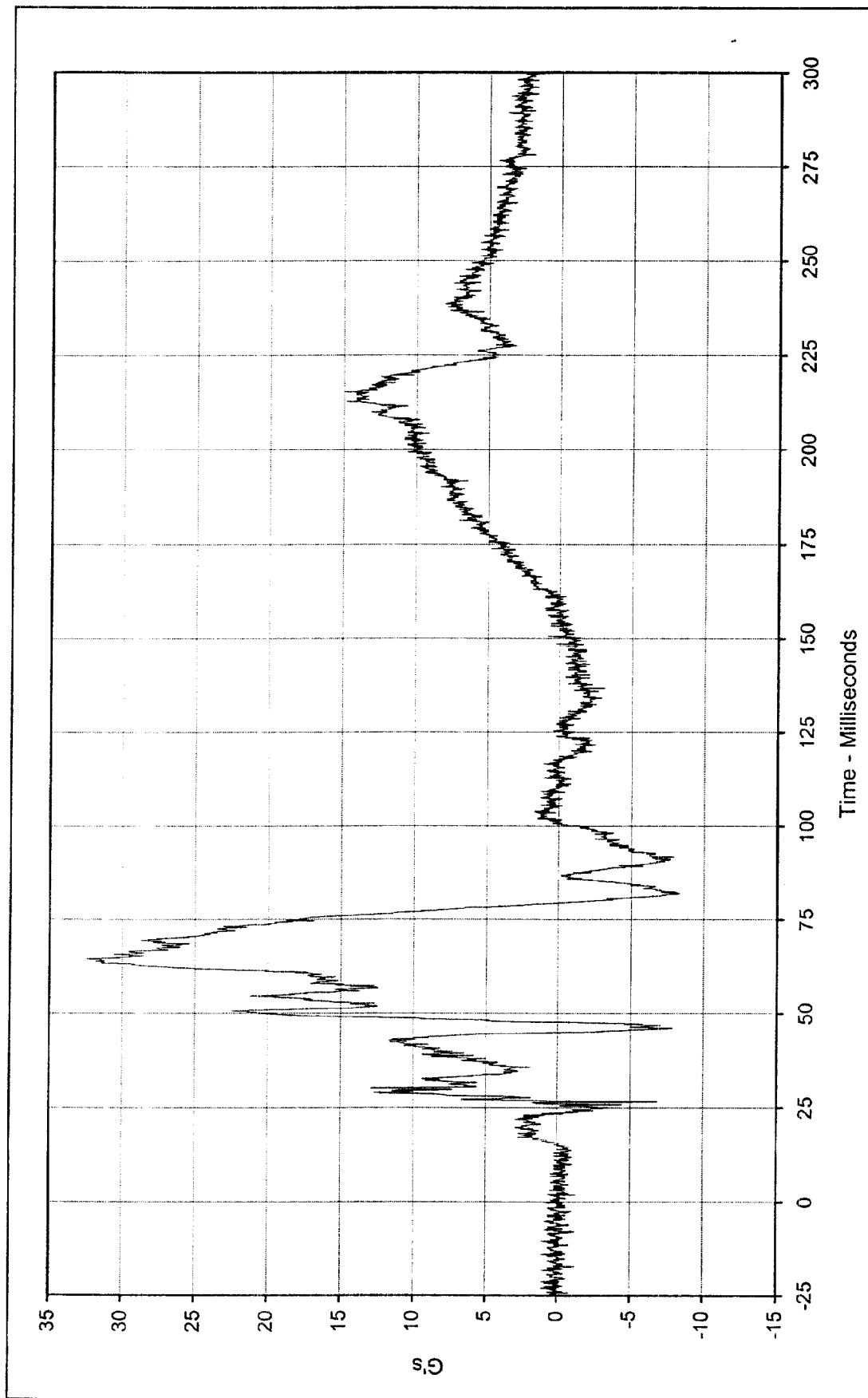


Curve Description: Passenger Head Primary Y
 Maximum Value: 10.5 at 93.7 Milliseconds
 Minimum Value: -11.1 at 71.4 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-046

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

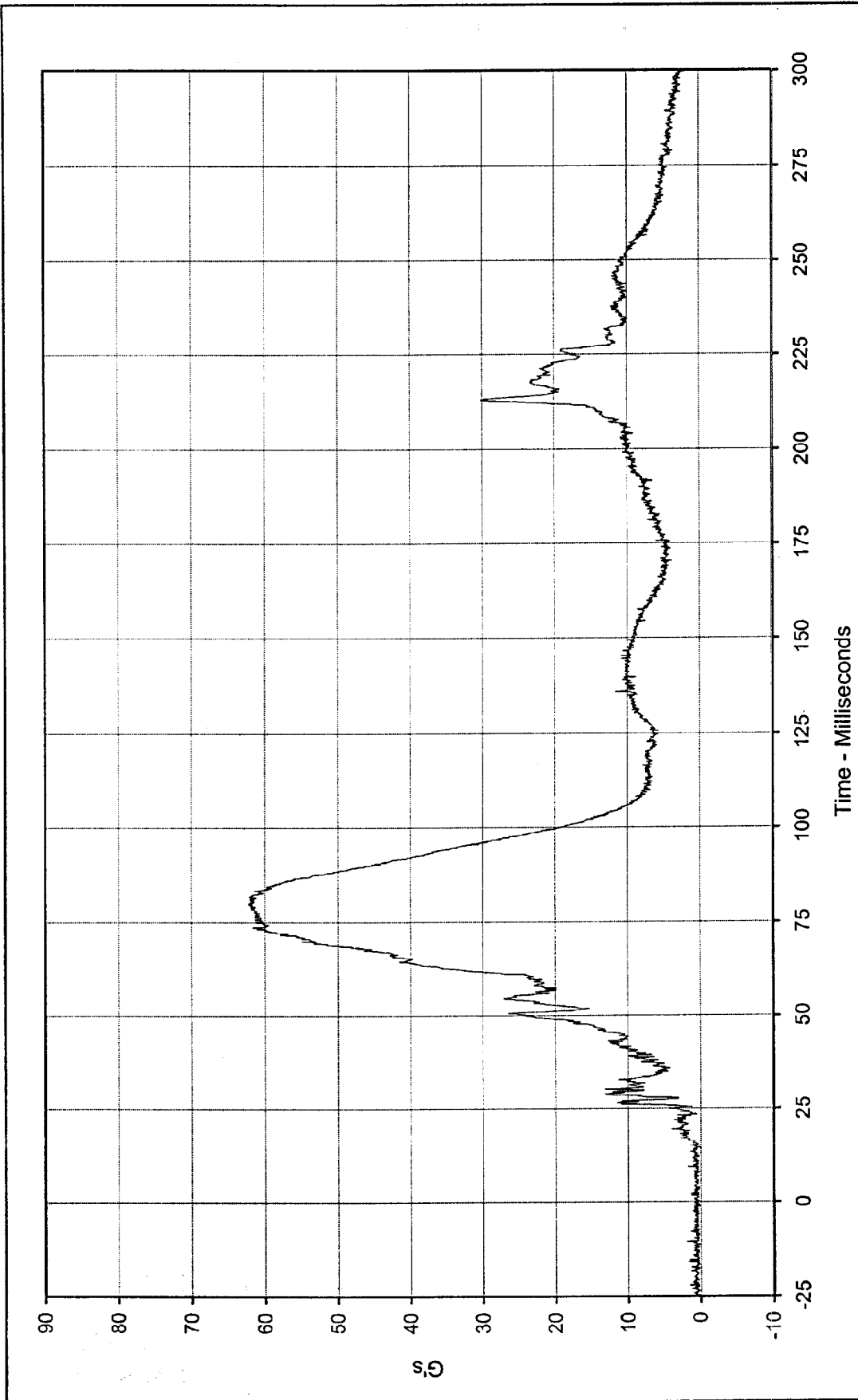




Curve Description: Passenger Head Primary Z
 Maximum Value: 32.4 at 64.3 Milliseconds
 Minimum Value: -8.3 at 81.6 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-047

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Head Resultant Primary

Maximum Value: 62.2 at 79.9 Milliseconds

Minimum Value: 0.0 at 14.6 Milliseconds

SAE Filter Class: 1000

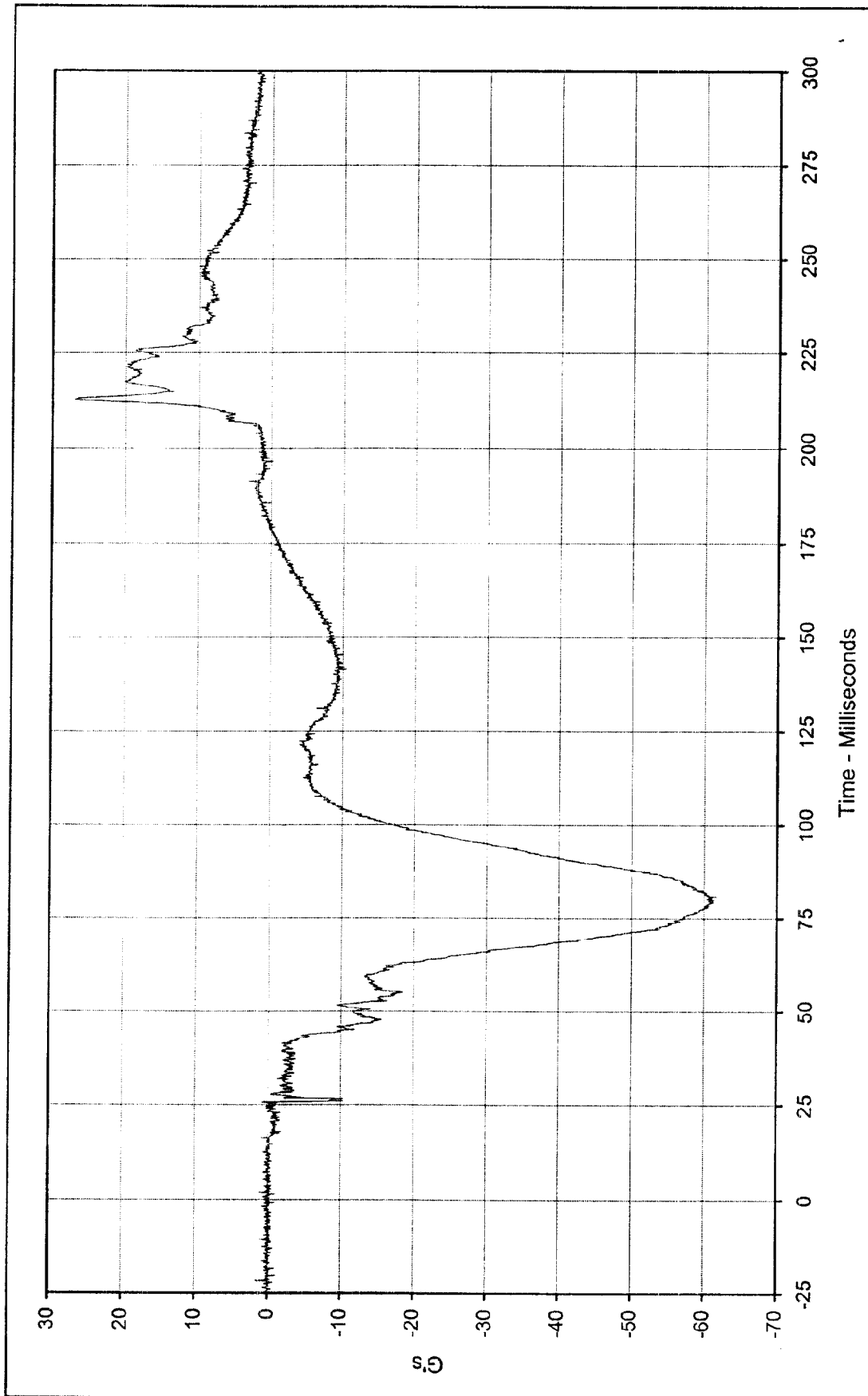
Date of Test: 2/4/99

Curve Number: RES-045

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

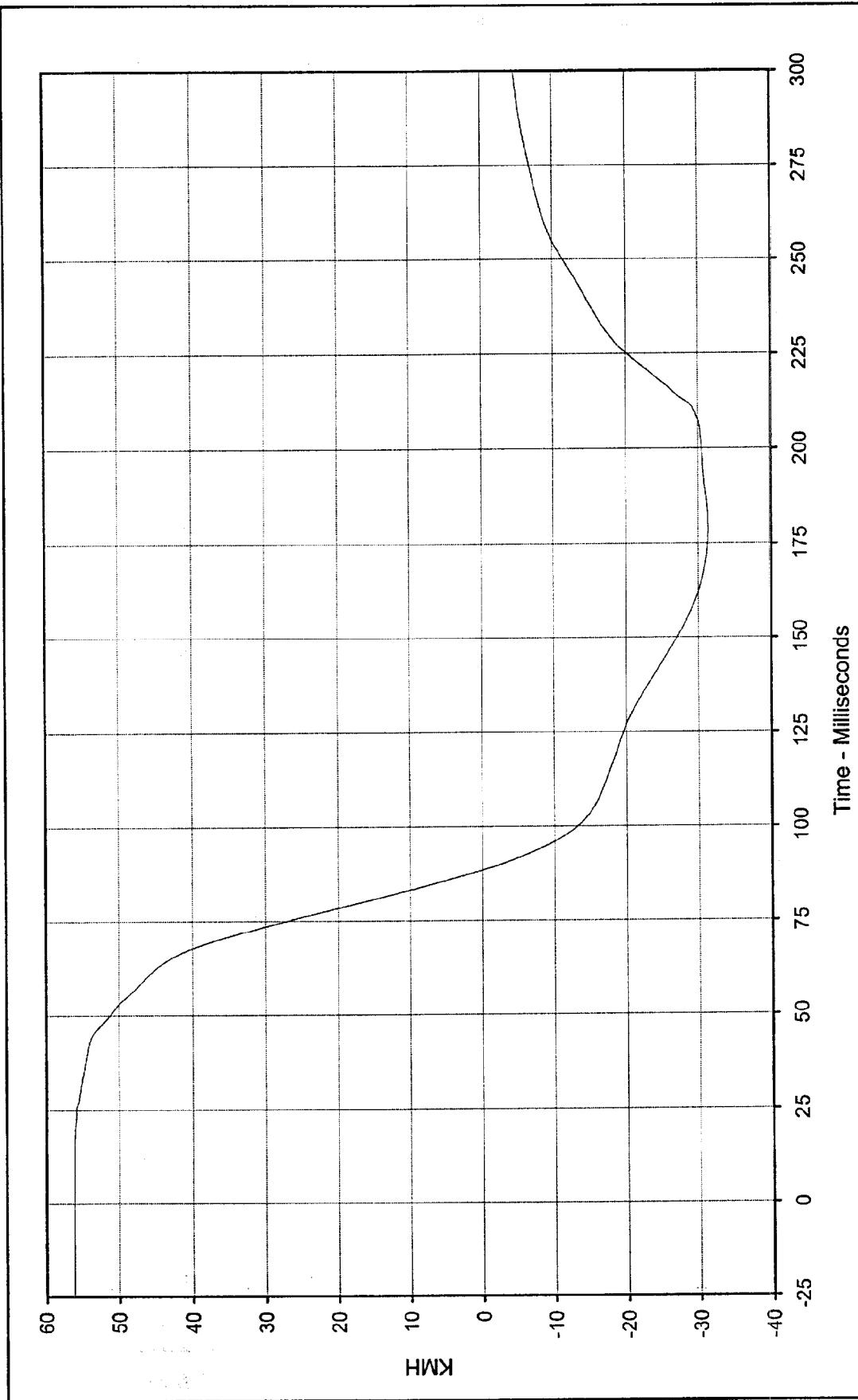




Curve Description: Passenger Head Redundant X
 Maximum Value: 26.9 at 212.9 Milliseconds
 Minimum Value: -61.8 at 80.7 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-048

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Head Redundant X Velocity

Maximum Value: 56.2 at 0.0 Milliseconds

Minimum Value: -31.4 at 179.0 Milliseconds

SAE Filter Class: 180

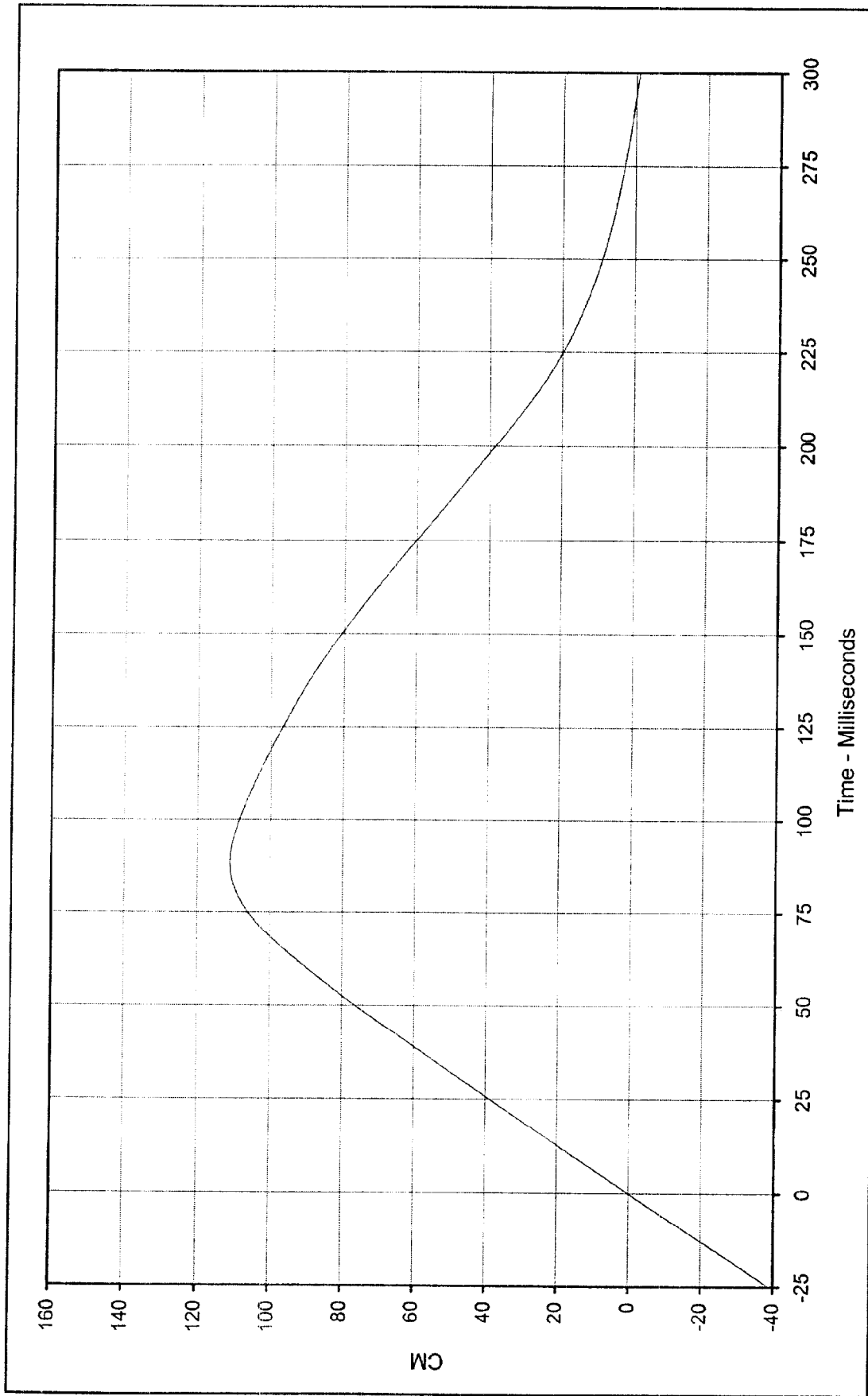
Date of Test: 2/4/99

Curve Number: IN1-048

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Head Redundant X Displ.

Maximum Value: 111.0 at 88.2 Milliseconds

Minimum Value: -0.8 at 299.9 Milliseconds

SAE Filter Class: 180

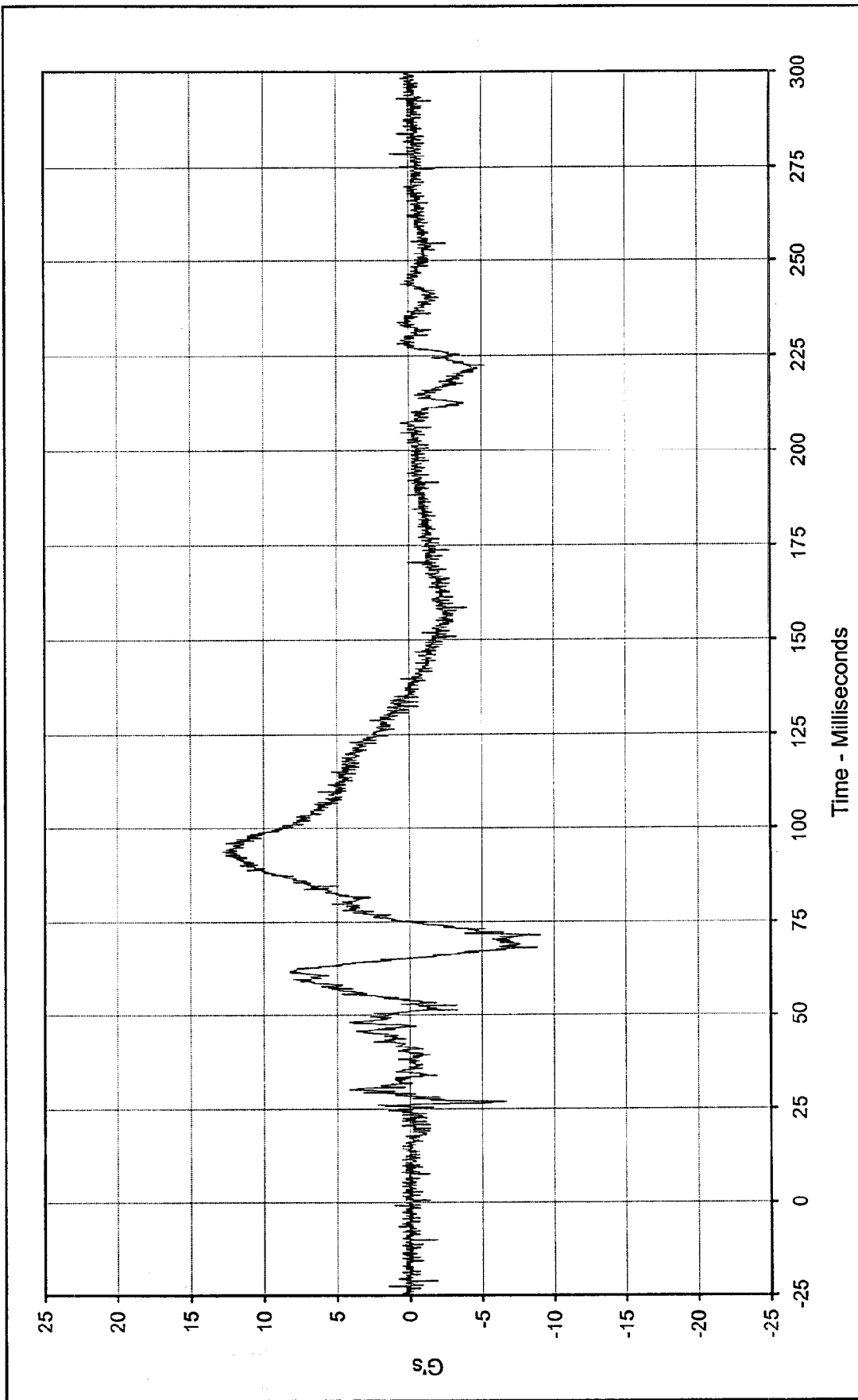
Date of Test: 2/4/99

Curve Number: IN2-048

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

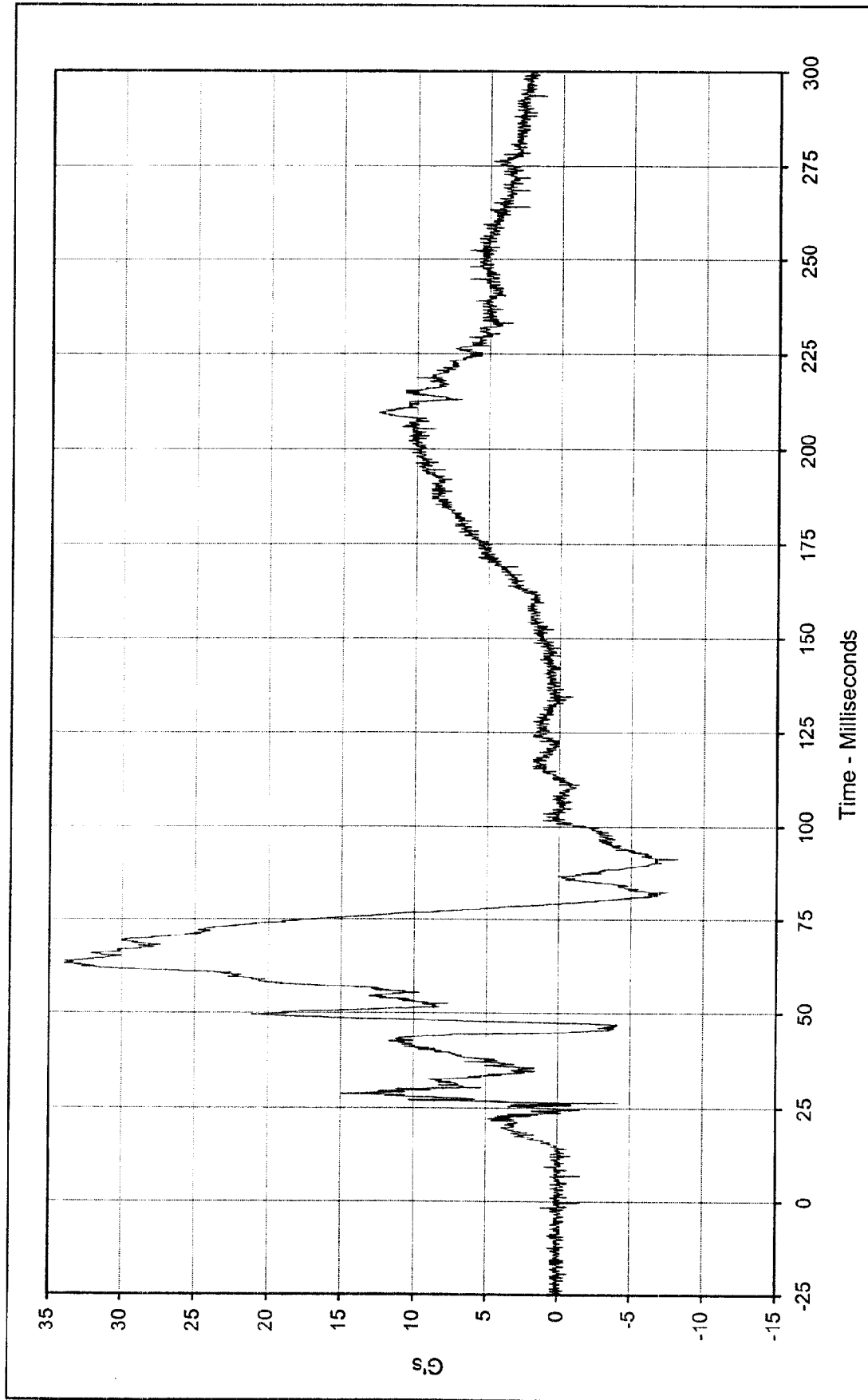




Curve Description: Passenger Head Redundant Y
 Maximum Value: 12.8 at 93.6 Milliseconds
 Minimum Value: -9.1 at 71.3 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-049

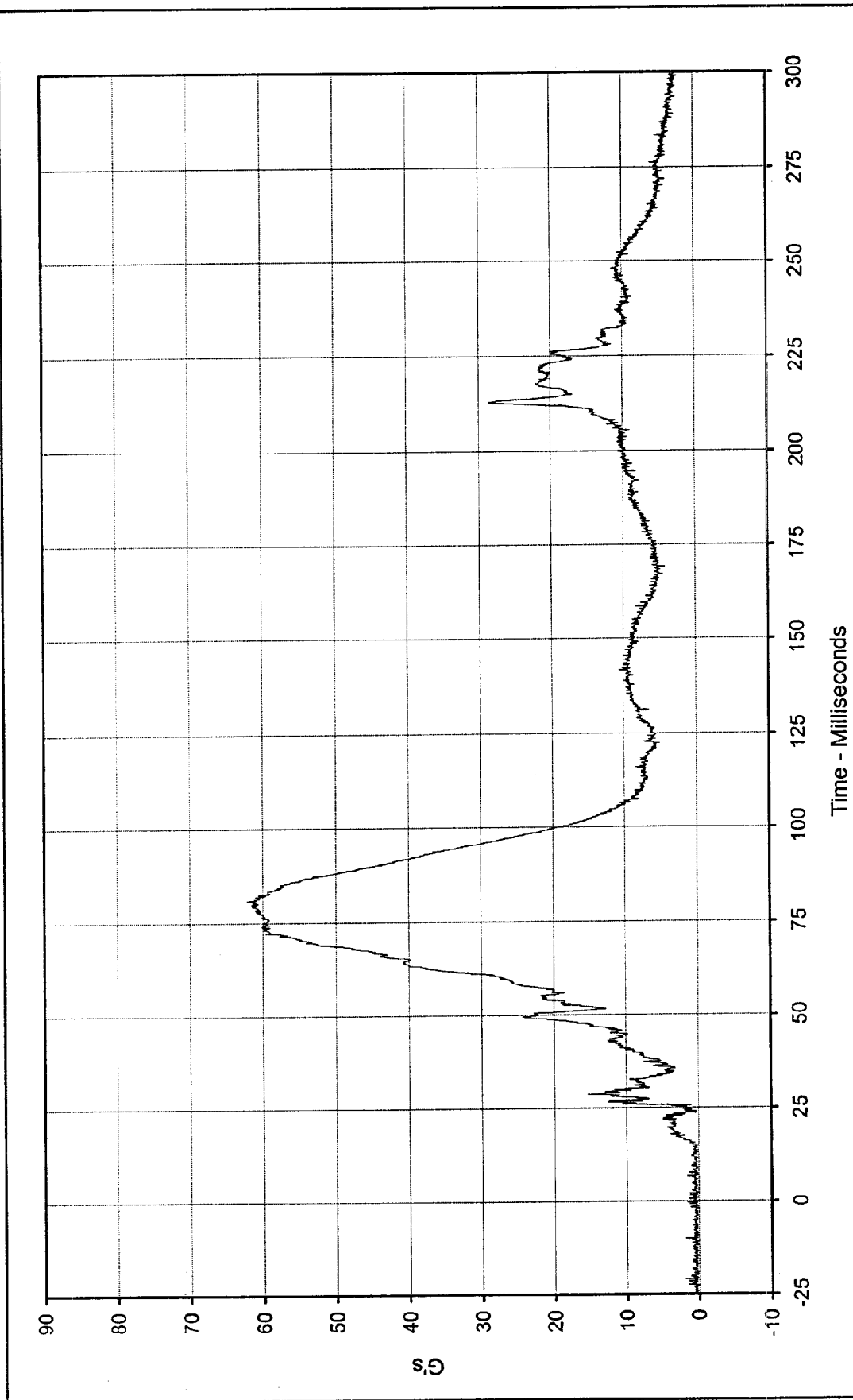
Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Passenger Head Redundant Z	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	34.0 at 63.1 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-8.3 at 91.2 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	FIL-050			





Curve Description: Passenger Head Resultant Redundant

Maximum Value: 62.1 at 80.7 Milliseconds

Minimum Value: 0.1 at 0.9 Milliseconds

SAE Filter Class: 1000

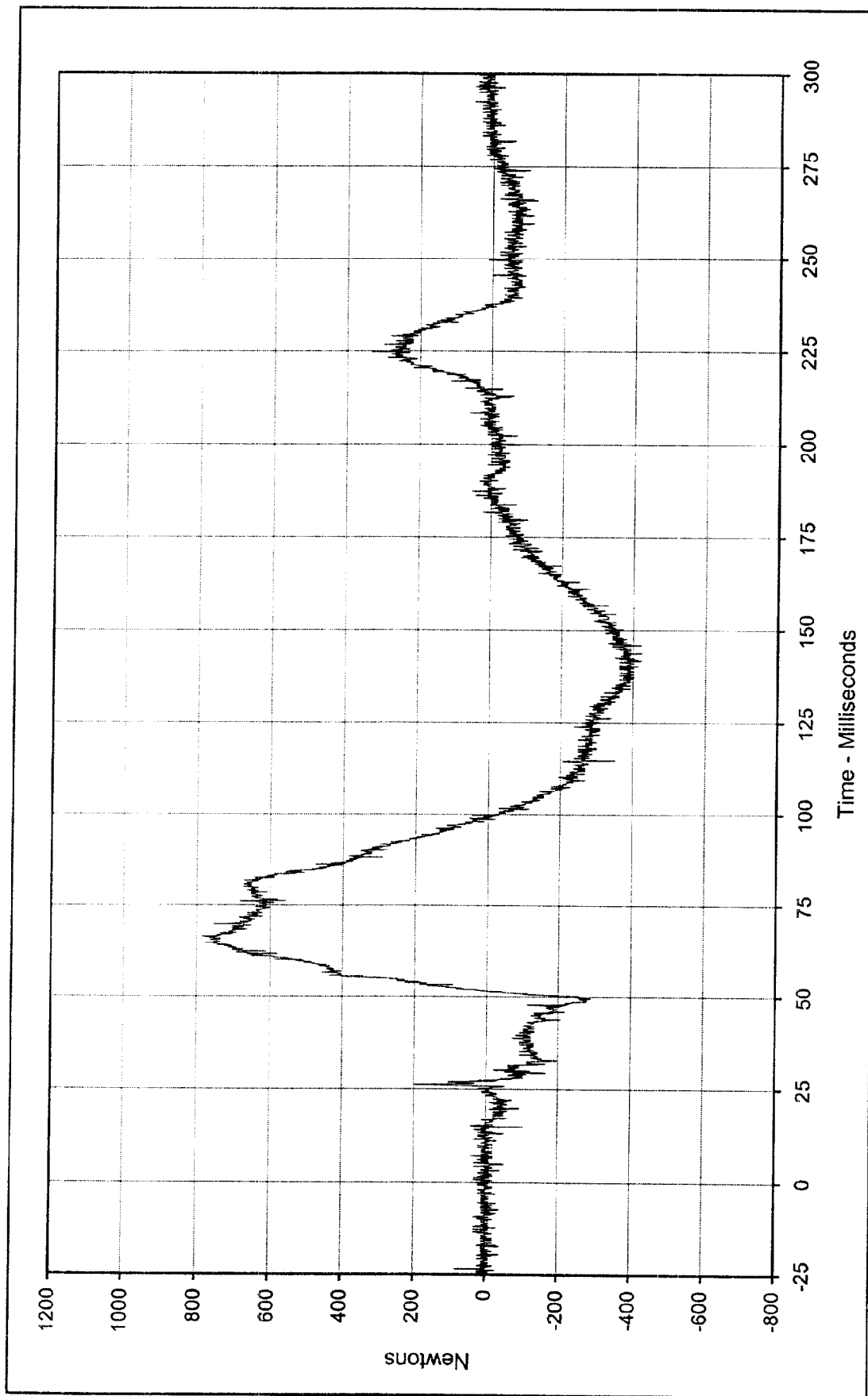
Date of Test: 2/4/99

Curve Number: RES-048

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

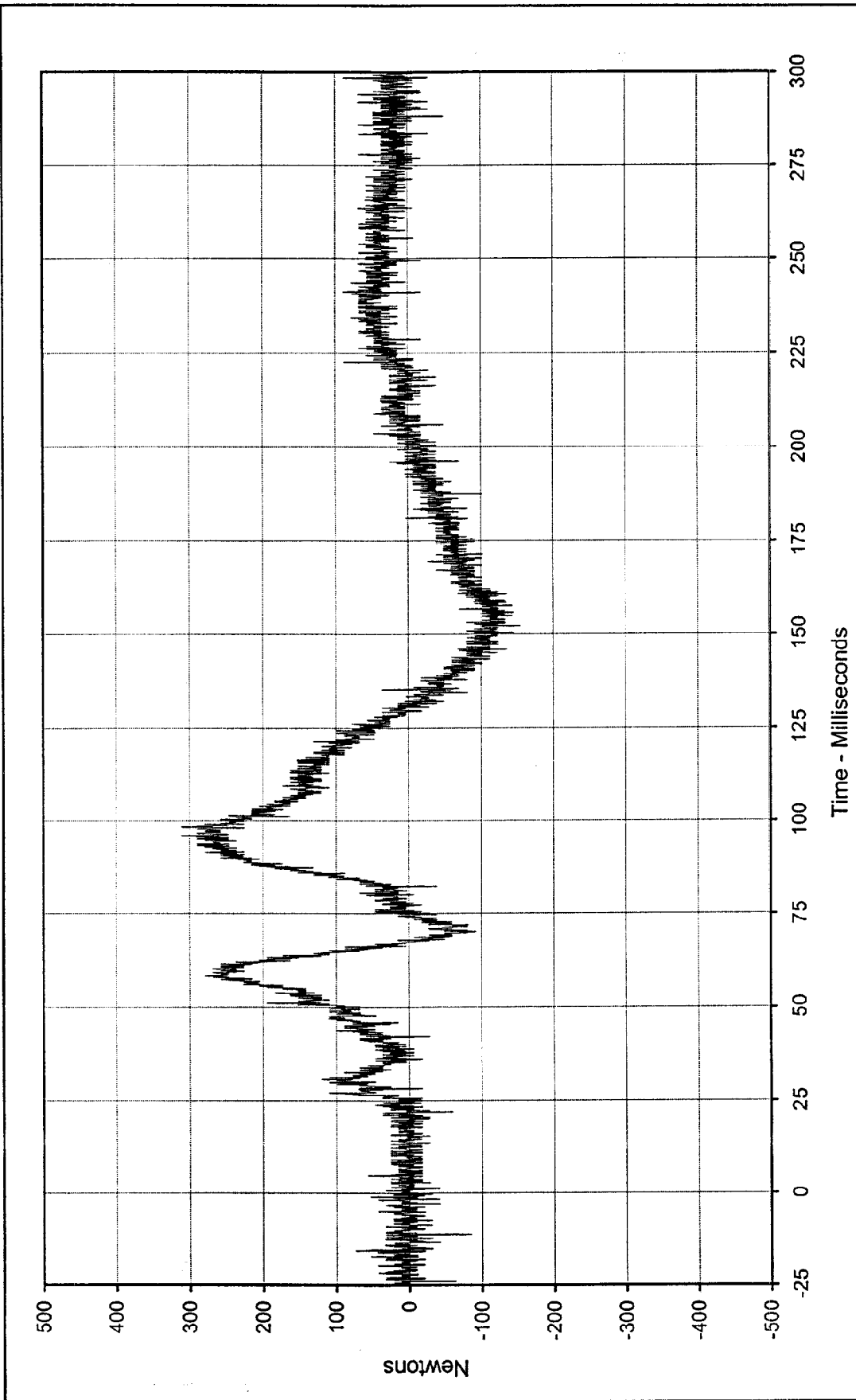
Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Passenger Neck Force X	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	785.4 at 66.5 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-423.7 at 141.6 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	FIL-051			

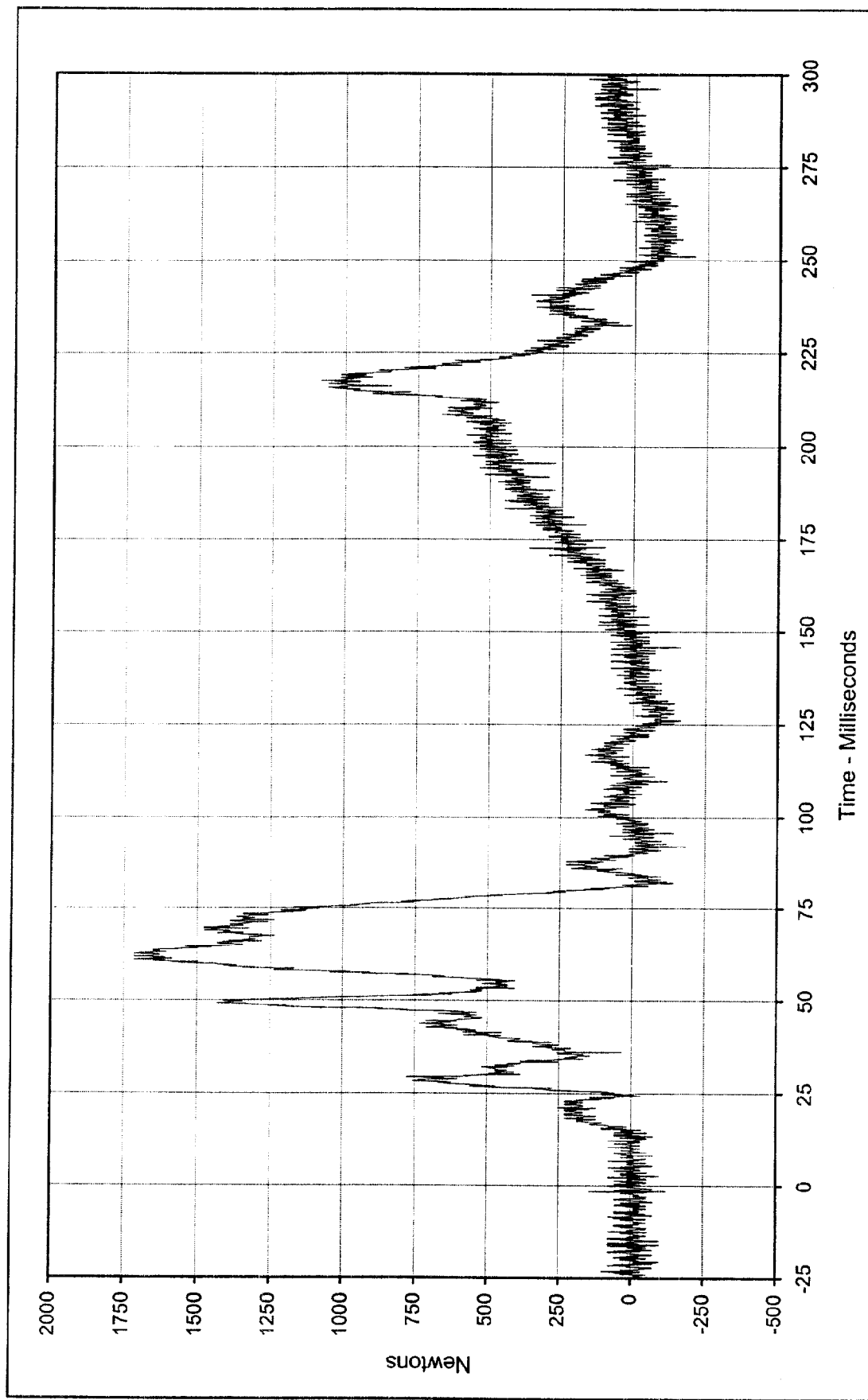




Curve Description: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Program:
 Test Vehicle: 1999 Ford Econoline E-150 Van

Passenger Neck Force Y
 Maximum Value: 310.4 at 96.0 Milliseconds
 Minimum Value: -155.1 at 152.1 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-052

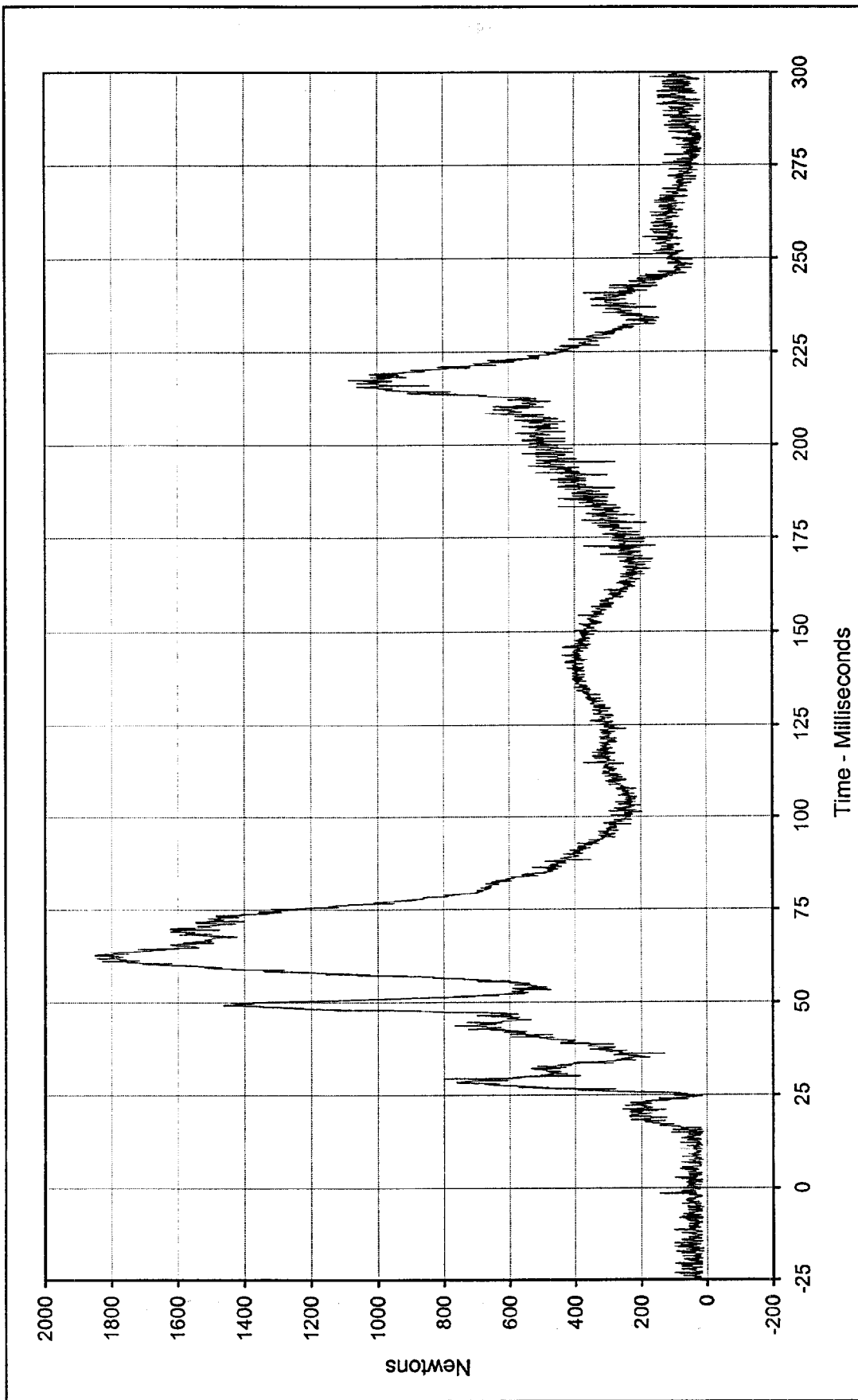




Curve Description:	Passenger Neck Force Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	1715.6	at 60.9	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-206.6	at 251.1			
SAE Filter Class:	1000				
Date of Test:	2/4/99				
Curve Number:	FIL-053				

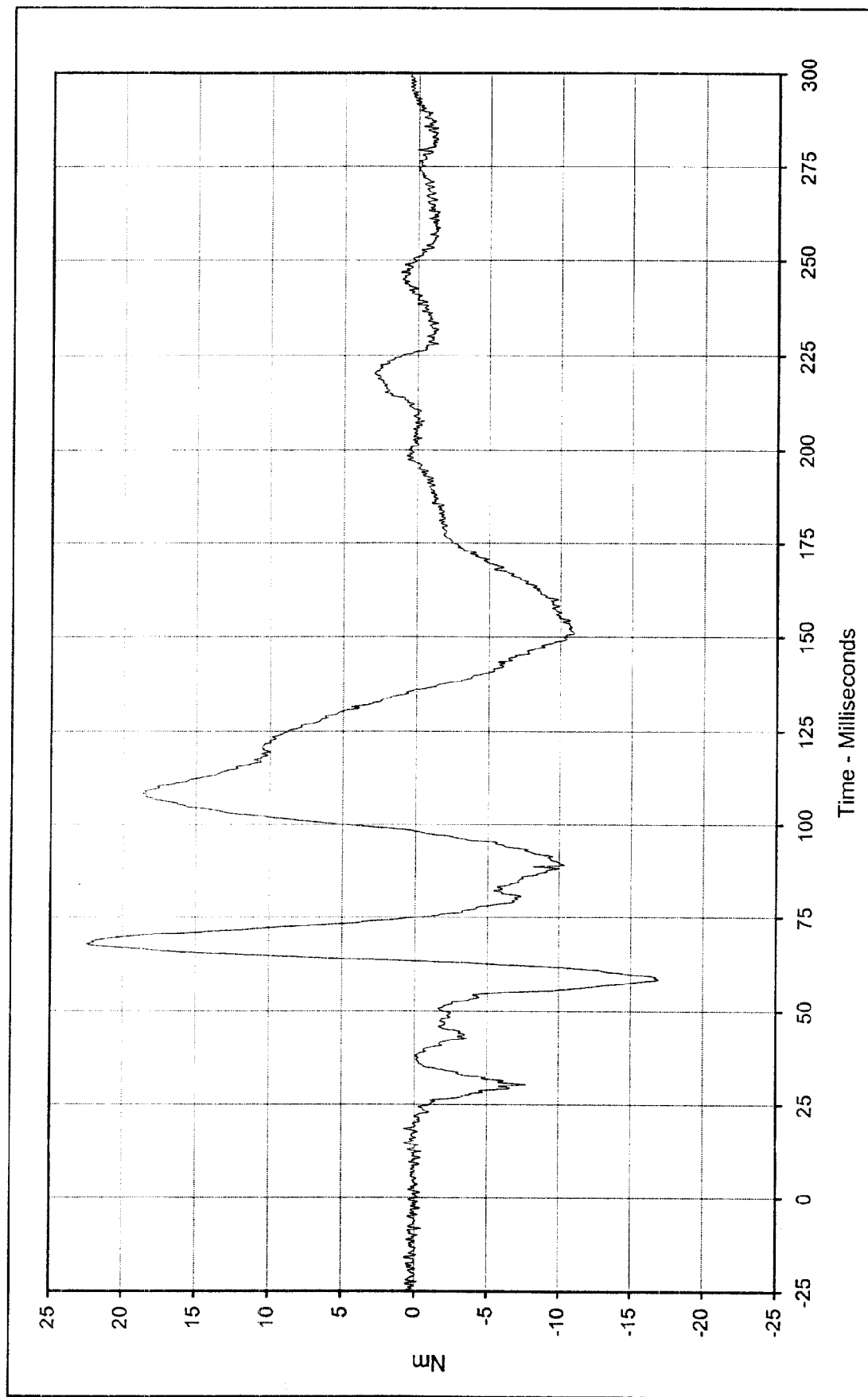






Curve Description:	Passenger Neck Force Resultant	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	1852.6 at 62.6 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	10.6 at 7.4 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	RES-051			

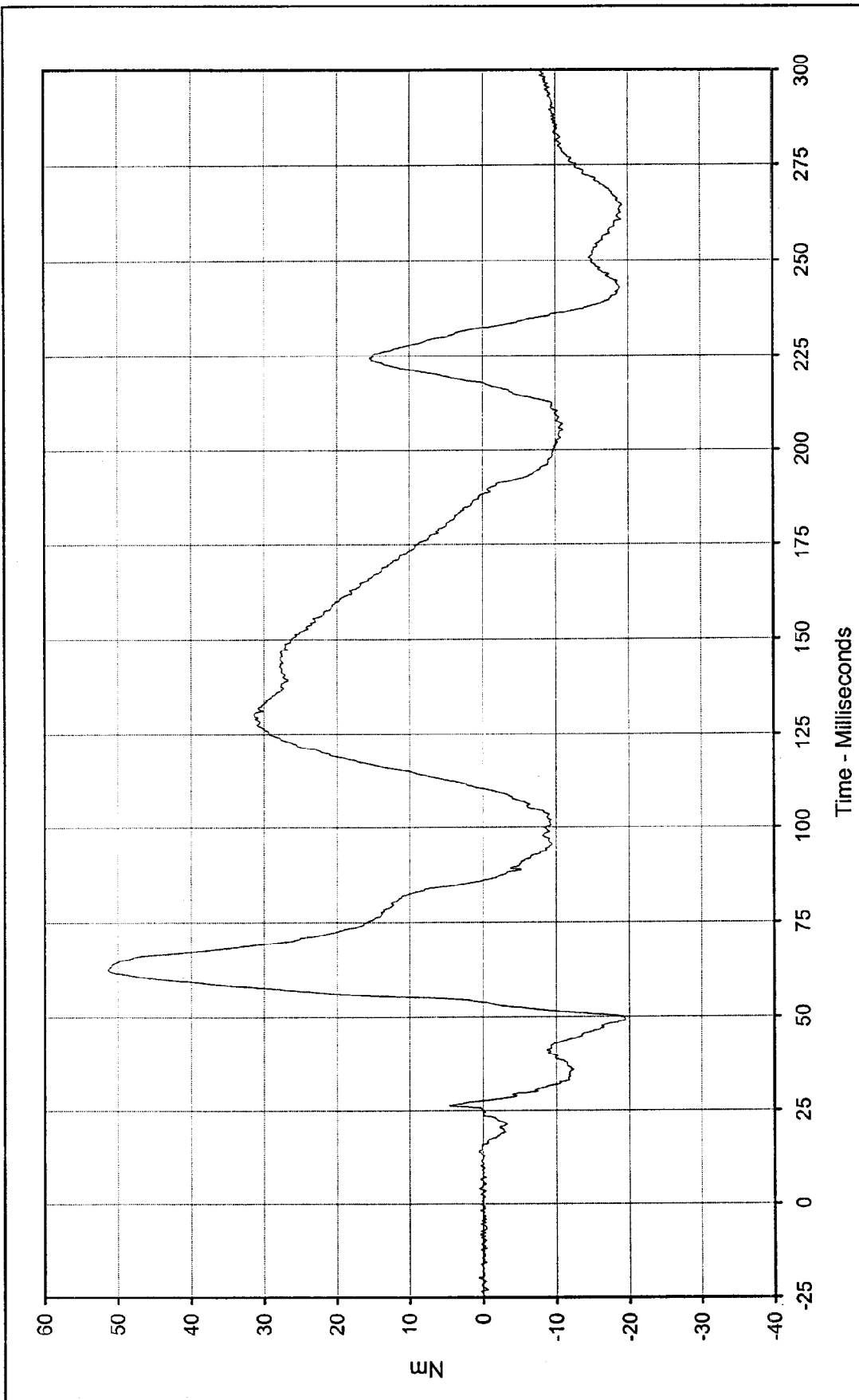




Curve Description:		Passenger Neck Moment X		Test Program:	1999 NHTSA 35 mph NCAP No.: MX0208
Maximum Value:	22.5	at	67.7	Milliseconds	1999 Ford Econoline E-150 Van
Minimum Value:	-16.9	at	58.4	Milliseconds	
SAE Filter Class:	600				
Date of Test:	2/4/99				
Curve Number:	FIL-054				



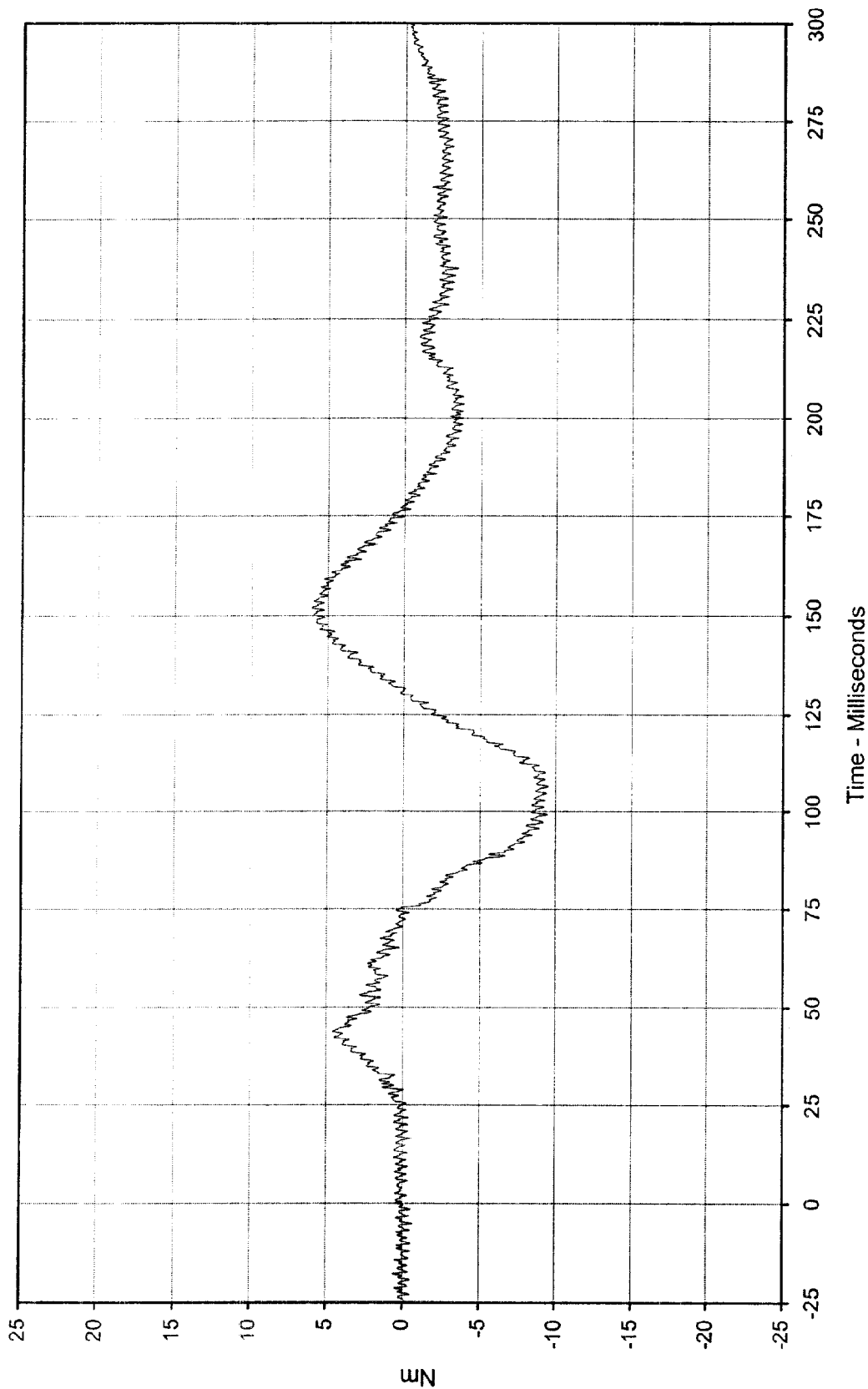




Curve Description:	Passenger Neck Moment Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	51.4 at 62.6 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-19.4 at 49.1 Milliseconds			



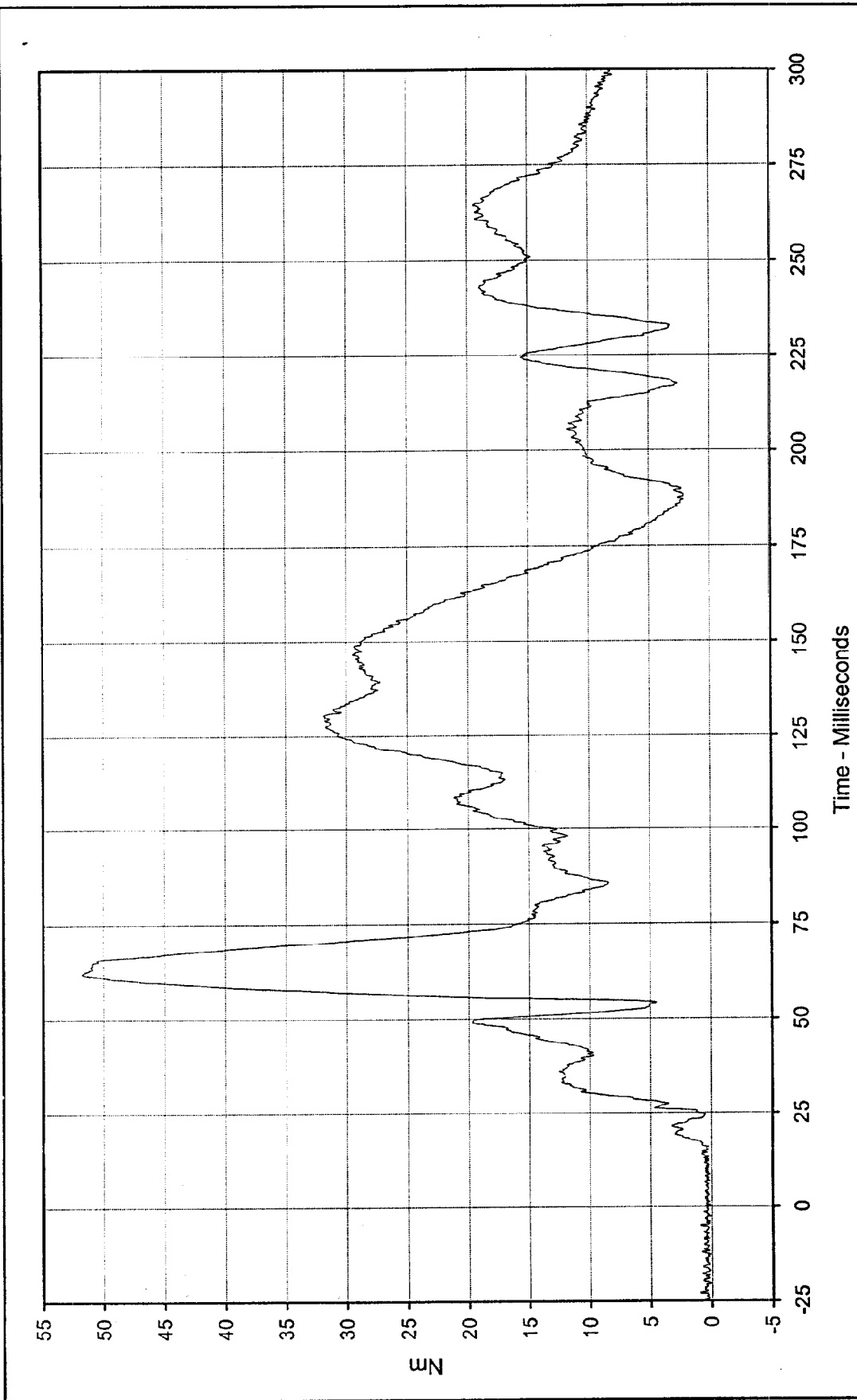
SAE Filter Class:	600
Date of Test:	2/4/99
Curve Number:	FIL-055



Curve Description:	Passenger Neck Moment Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	6.1	at 152.0	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-9.5	at 106.5			
SAE Filter Class:	600				
Date of Test:	2/4/99				
Curve Number:	FIL-056				







Curve Description: Passenger Neck Moment Resultant

Maximum Value: 51.8 at 62.1 Milliseconds

Minimum Value: 0.1 at 0.4 Milliseconds

SAE Filter Class: 600

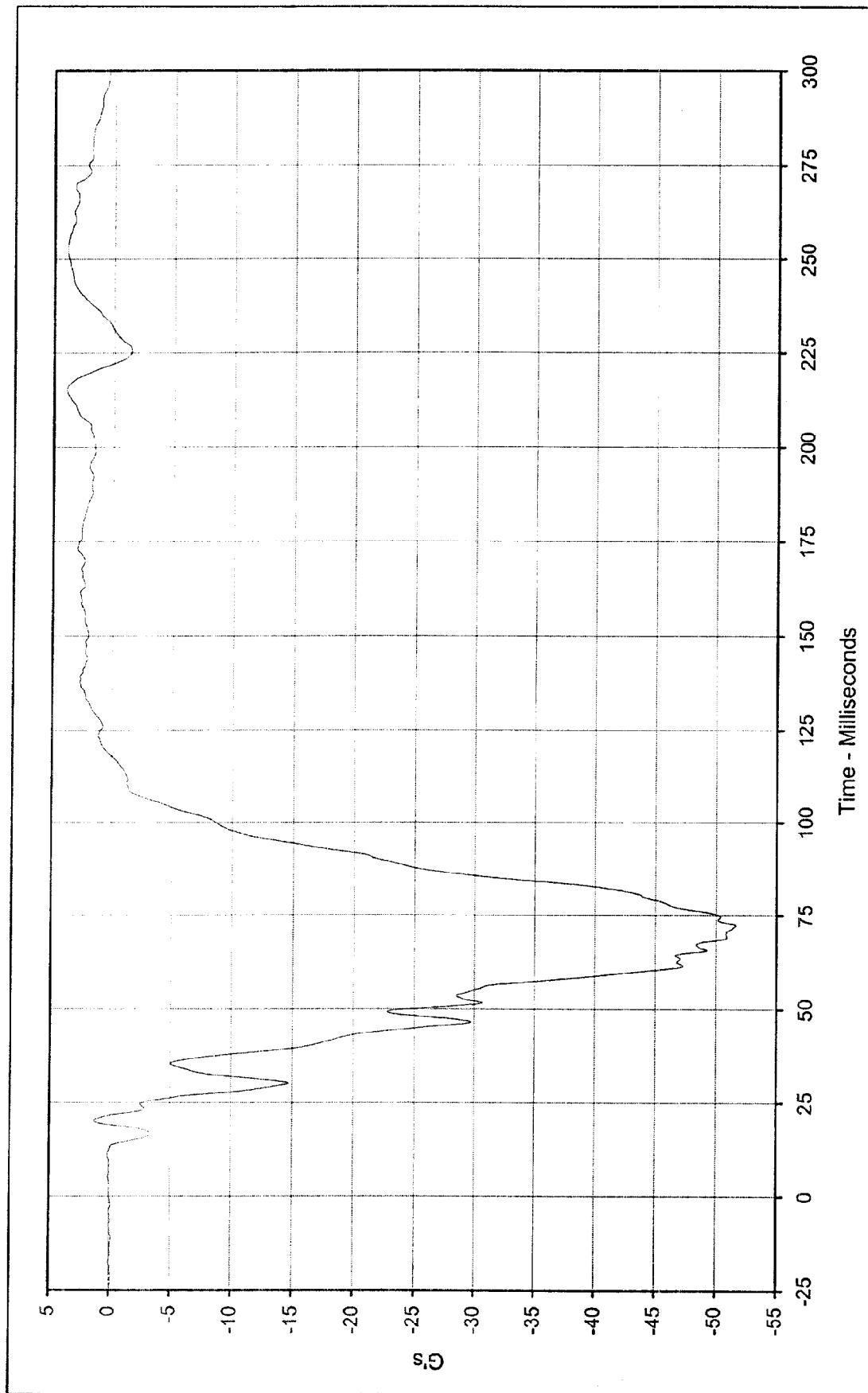
Date of Test: 2/4/99

Curve Number: RES-054

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

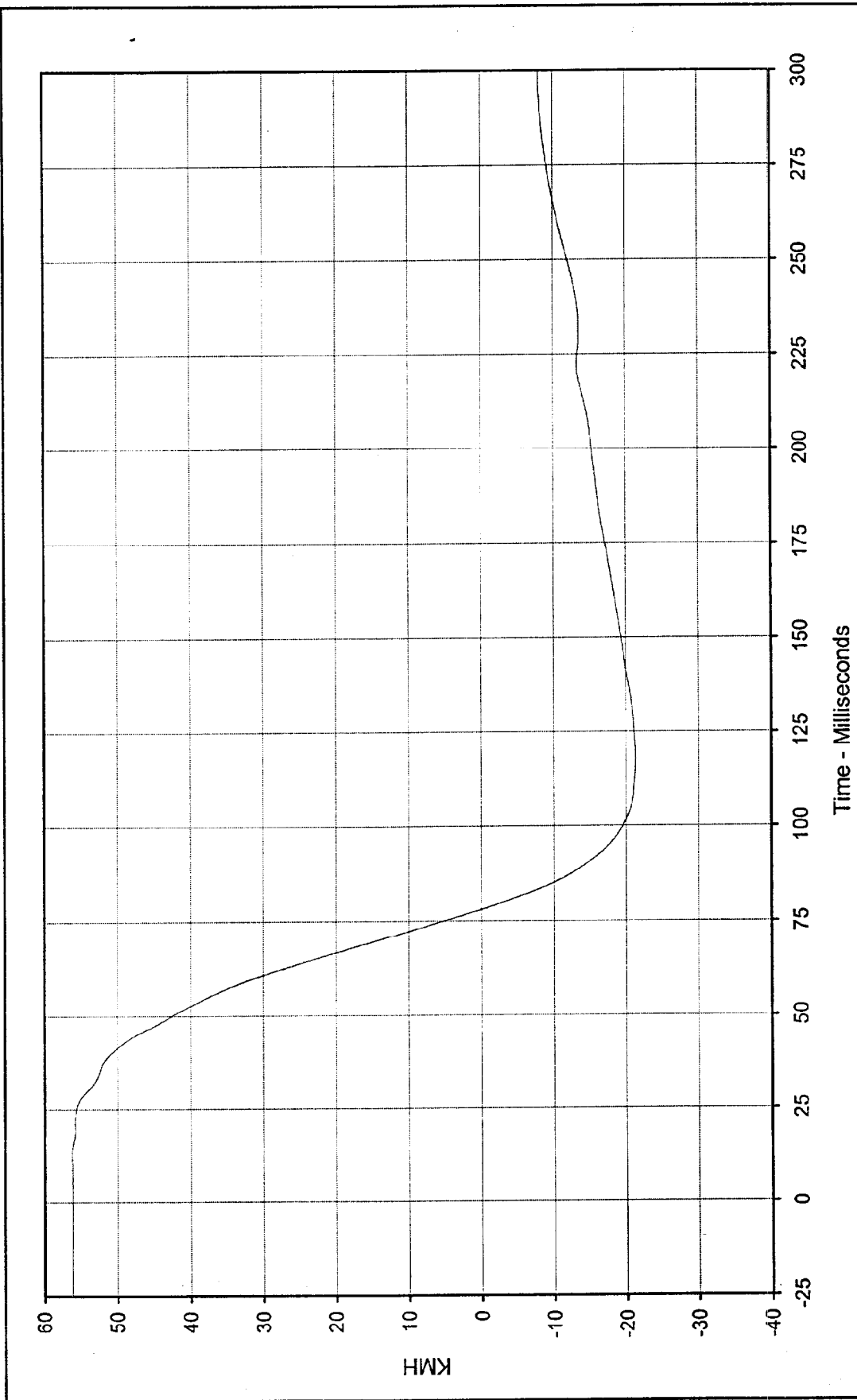




Curve Description: Passenger Chest Primary X
 Maximum Value: 4.0 at 215.4 Milliseconds
 Minimum Value: -51.7 at 72.3 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: FIL-057

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

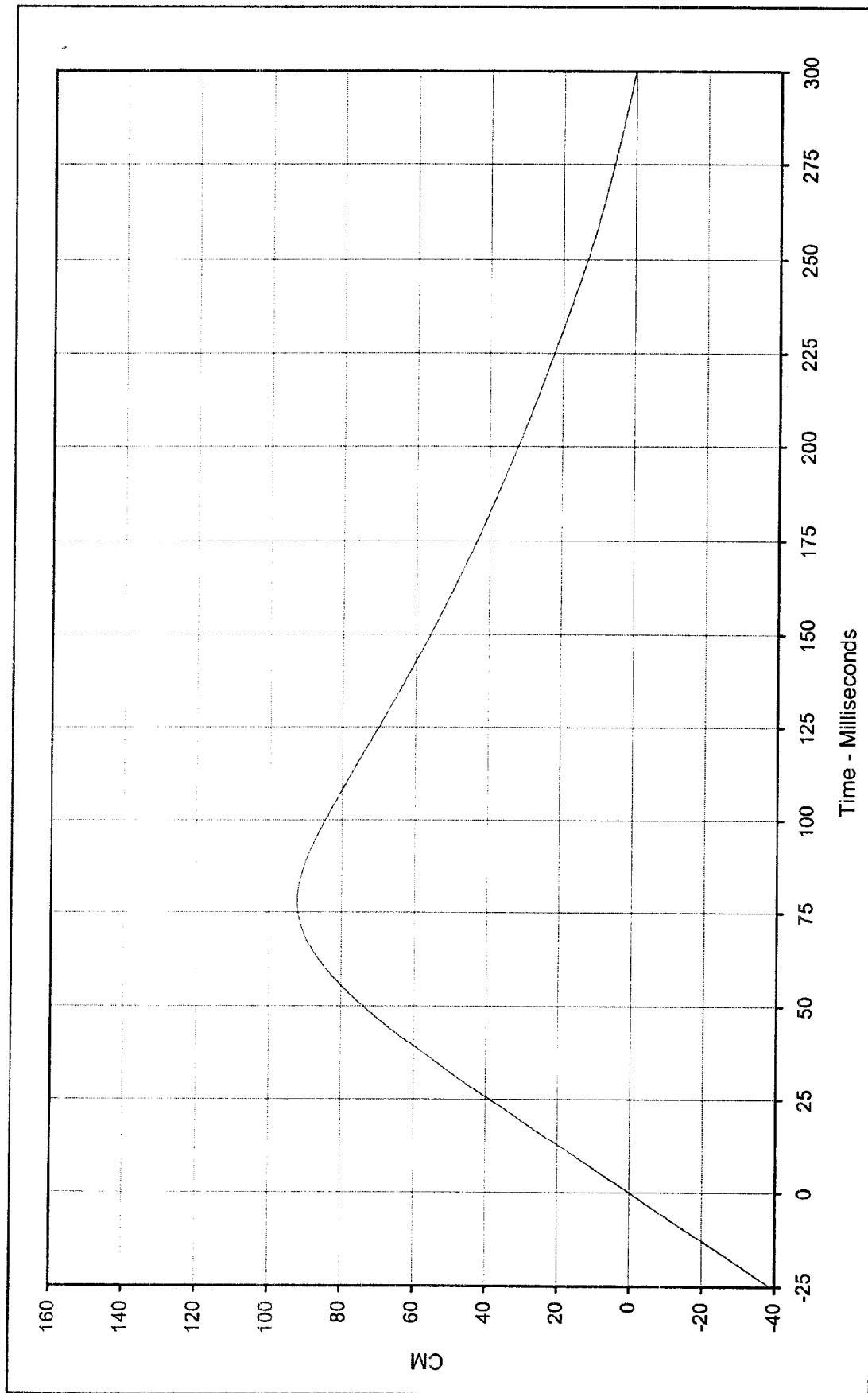




Curve Description: Passenger Chest Primary X Velocity
 Maximum Value: 56.2 at 12.8 Milliseconds
 Minimum Value: -21.3 at 117.6 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN1-057

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Chest Primary X Displ.

Maximum Value: 92.2 at 78.1 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

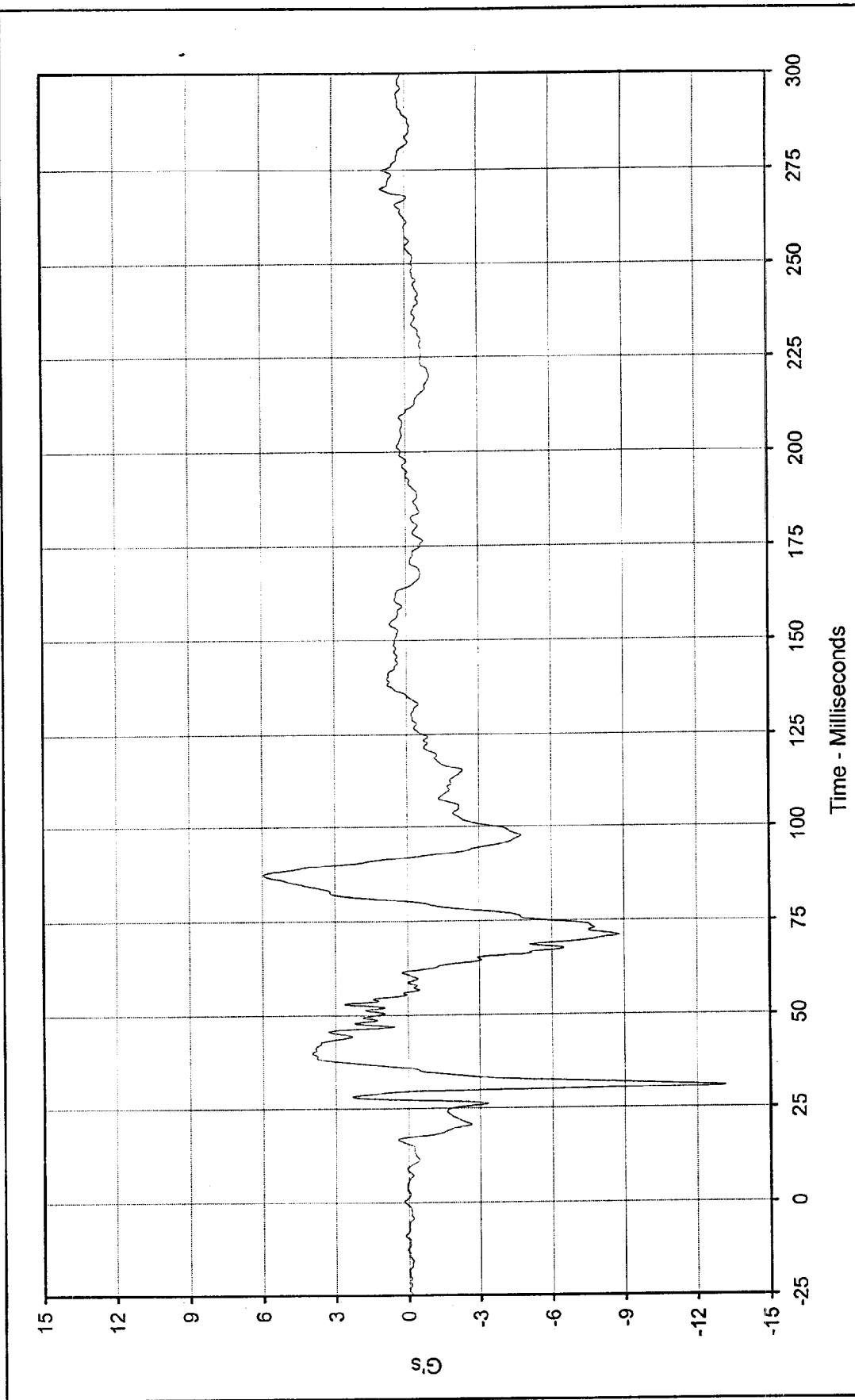
Date of Test: 2/4/99

Curve Number: IN2-057

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

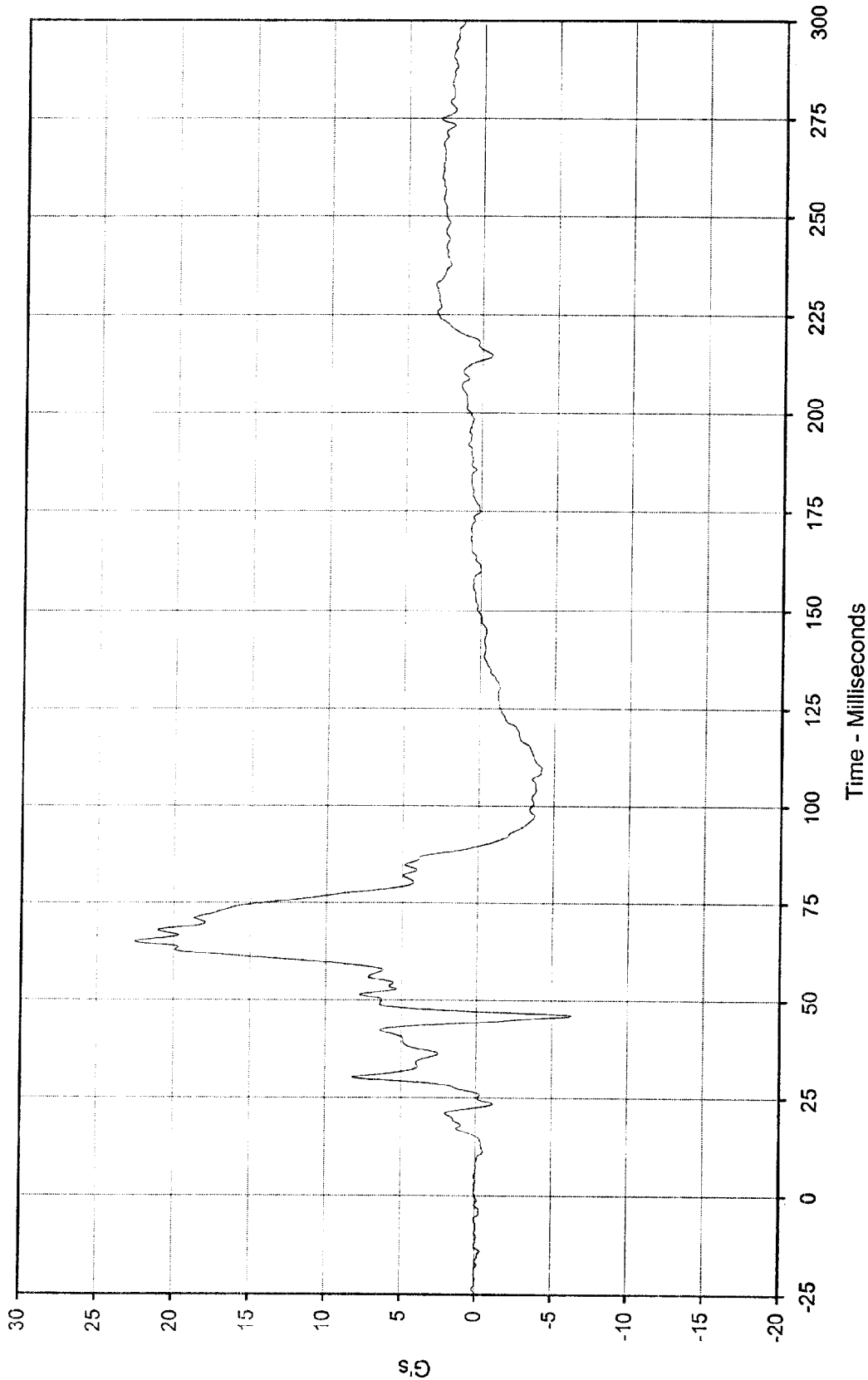
Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Passenger Chest Primary Y	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	6.0 at 87.2 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-13.2 at 30.8 Milliseconds			
SAE Filter Class:	180			
Date of Test:	2/4/99			
Curve Number:	FIL-058			



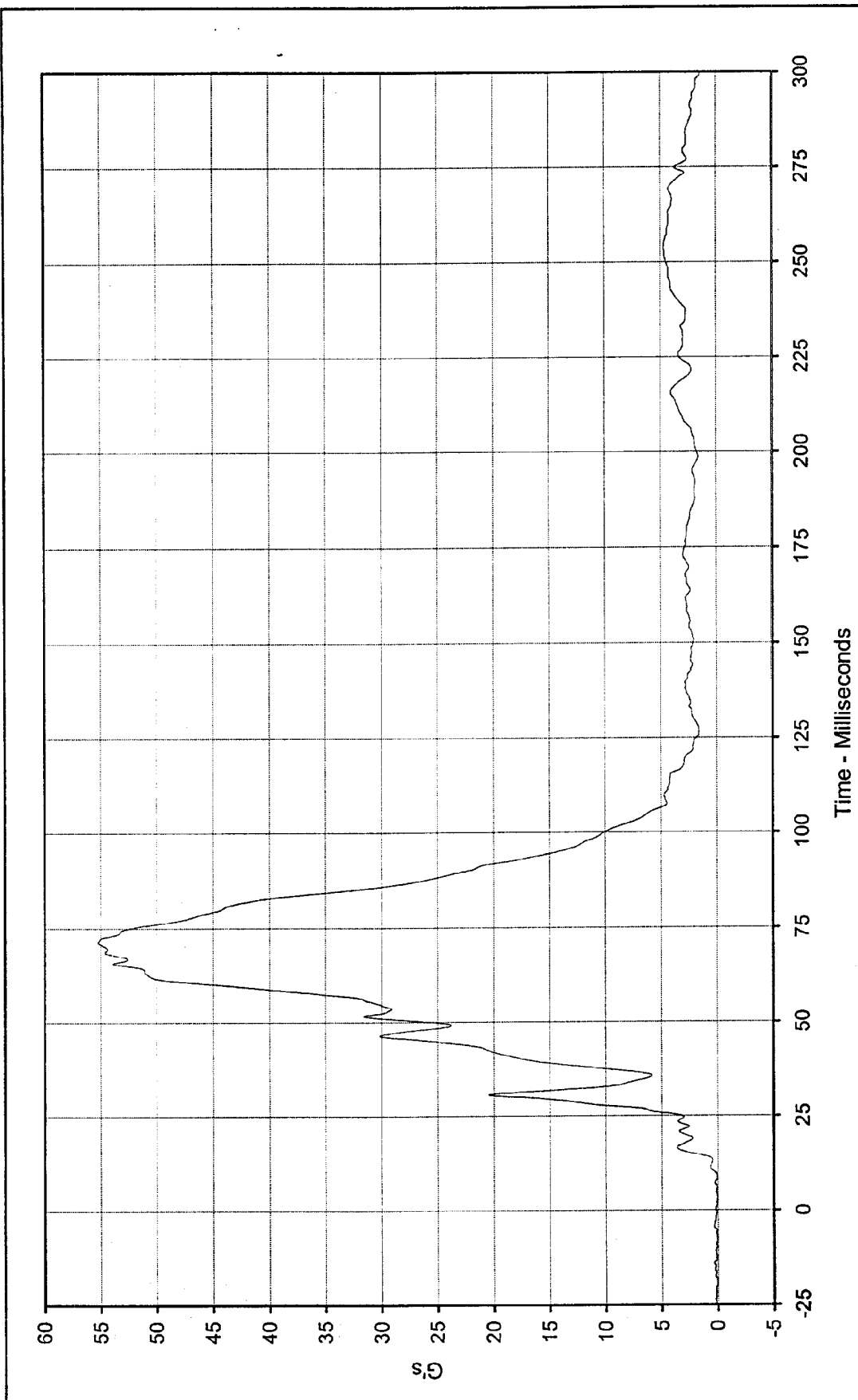


Curve Description: Passenger Chest Primary Z
 Maximum Value: 22.5 at 65.0 Milliseconds
 Minimum Value: -6.3 at 46.1 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: FIL-059

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

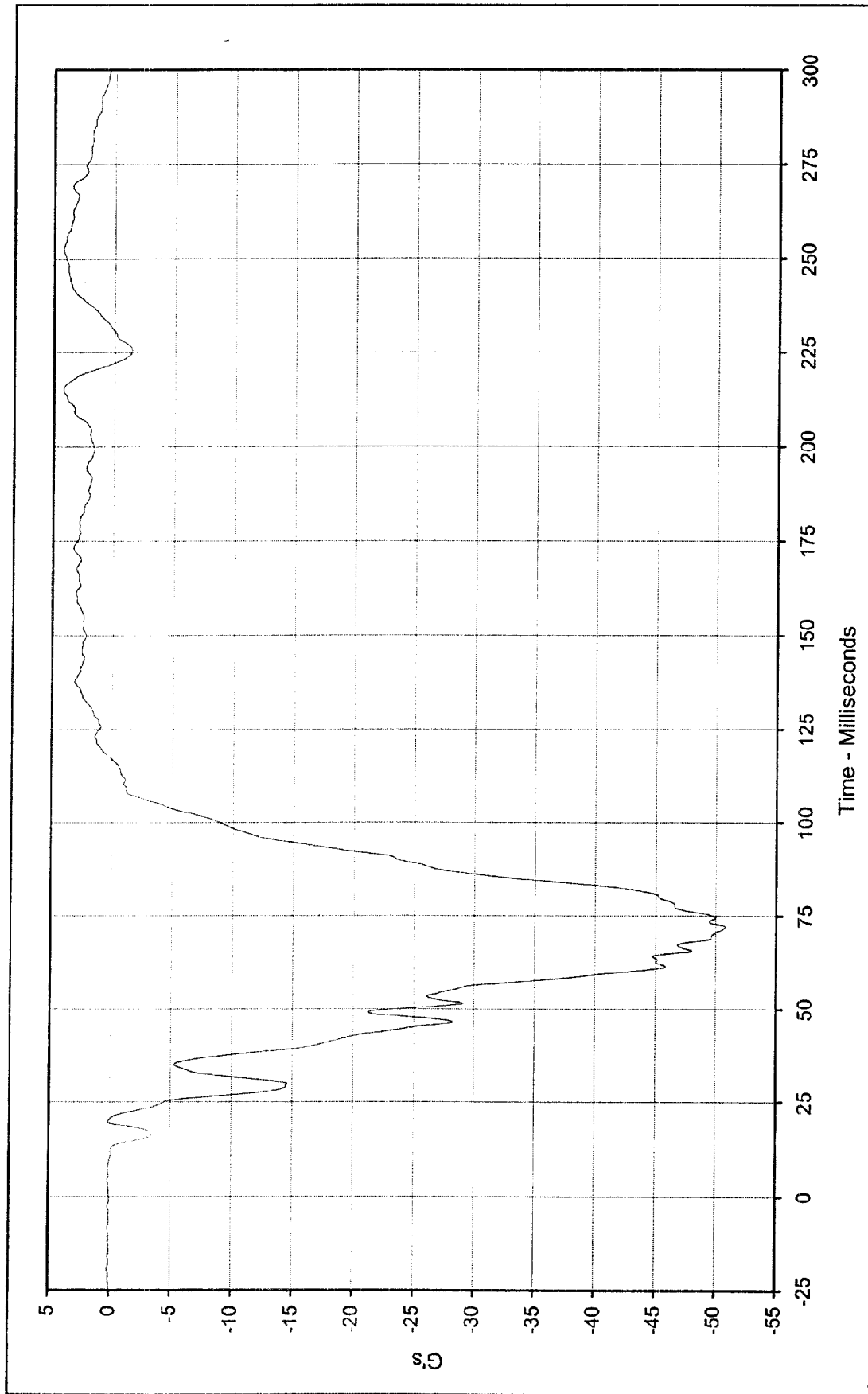




Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

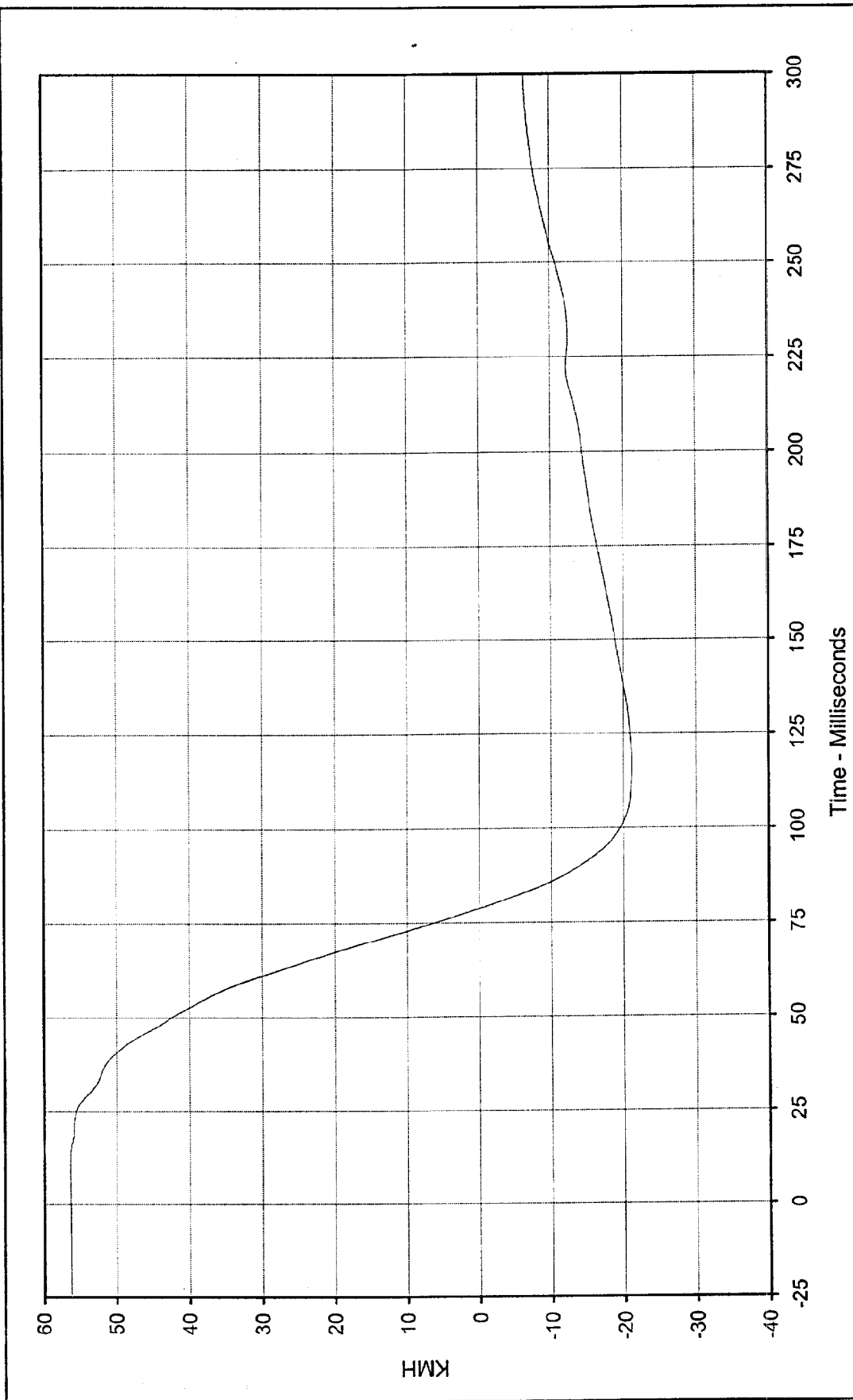
Curve Description: Passenger Chest Resultant Primary
 Maximum Value: 55.2 at 71.3 Milliseconds
 Minimum Value: 0.0 at 3.3 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: RES-057





Curve Description:	Passenger Chest Redundant X		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	4.2	at 253.0 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-50.8	at 72.2 Milliseconds			
SAE Filter Class:	180				
Date of Test:	2/4/99				
Curve Number:	FIL-060				





Curve Description: Passenger Chest Redundant X Velocity

Maximum Value: 56.4 at 10.2 Milliseconds

Minimum Value: -21.2 at 116.9 Milliseconds

SAE Filter Class: 180

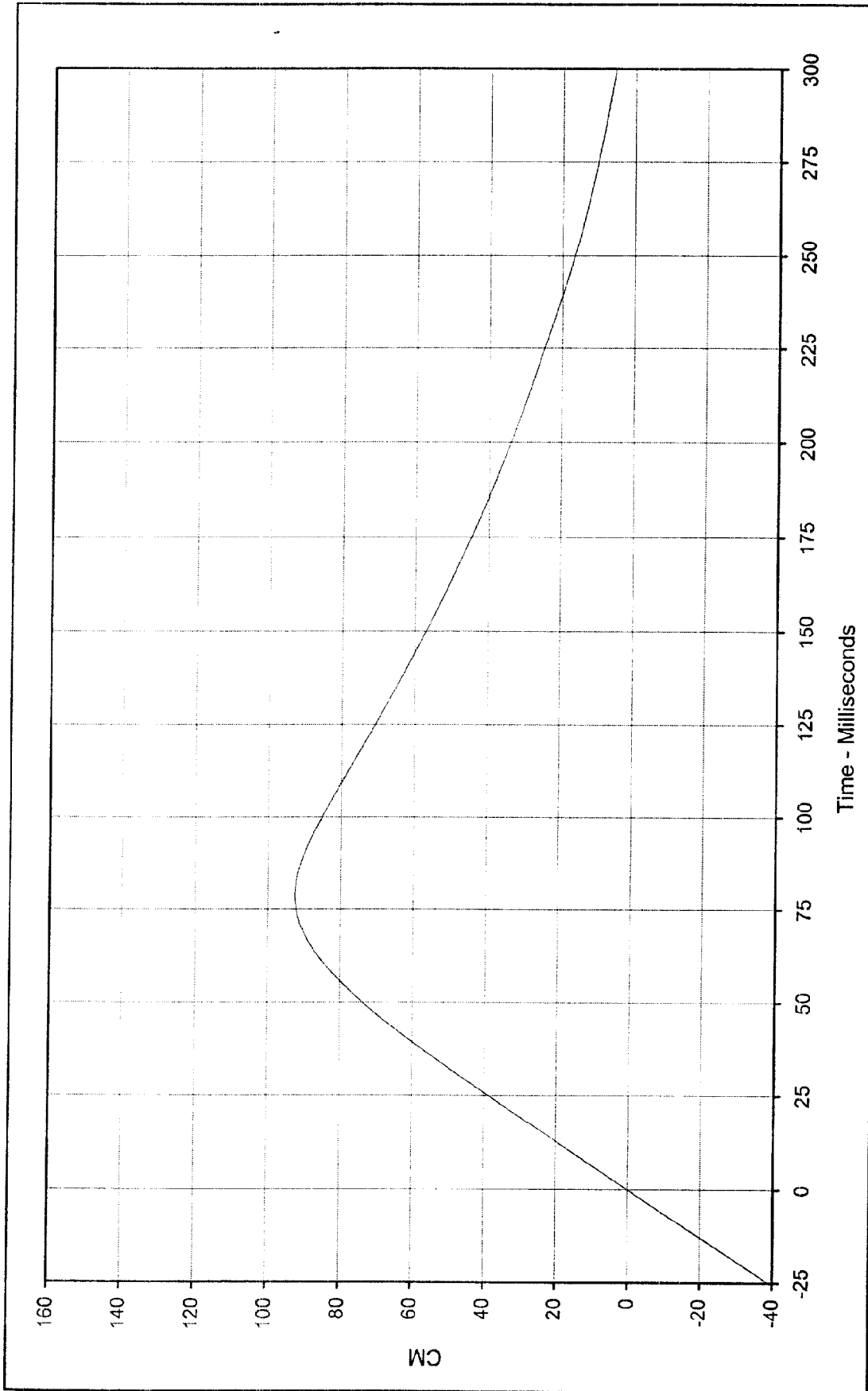
Date of Test: 2/4/99

Curve Number: IN1-060

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Chest Redundant X Displ.

Maximum Value: 92.5 at 78.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

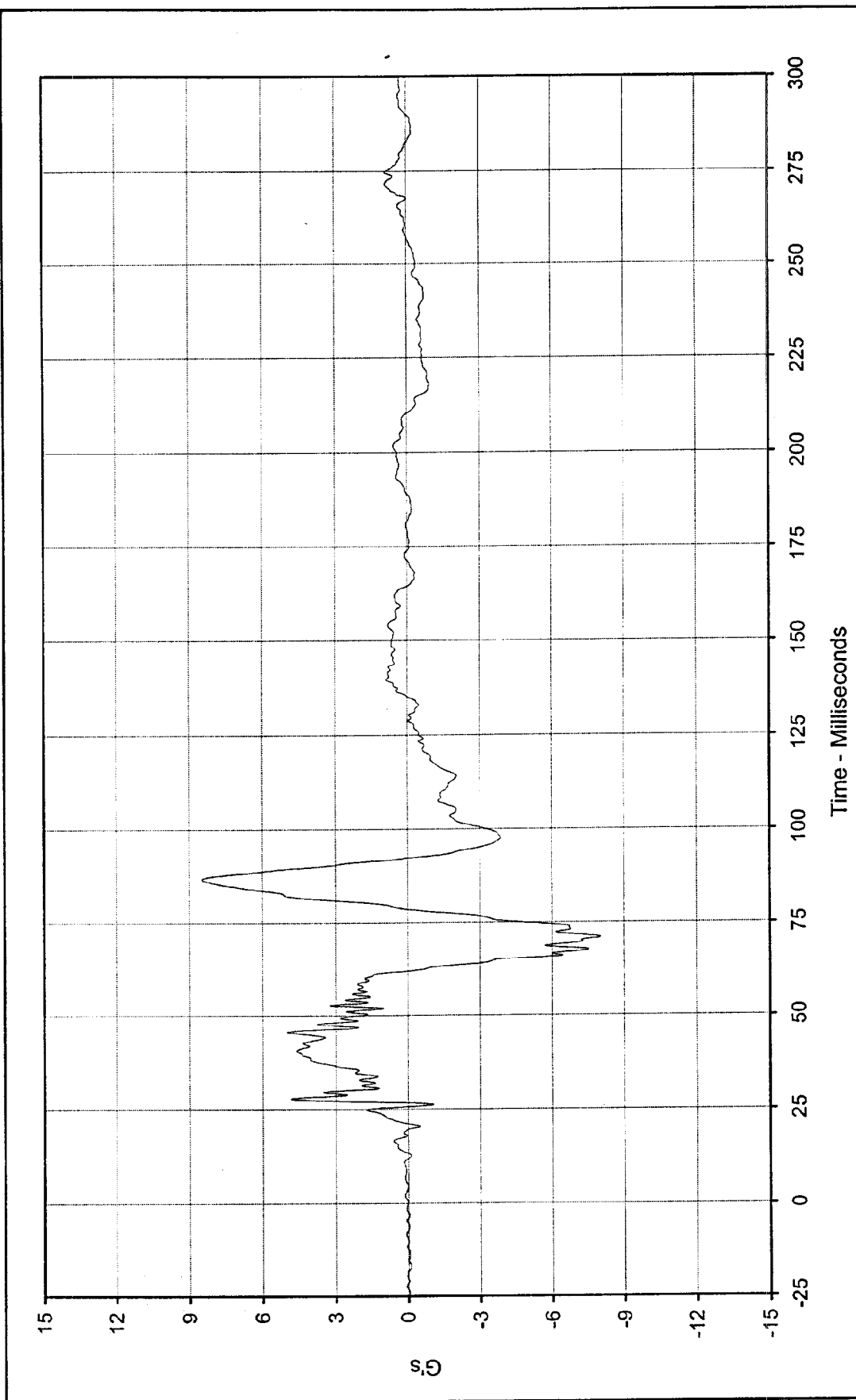
Date of Test: 2/4/99

Curve Number: IN2-060

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

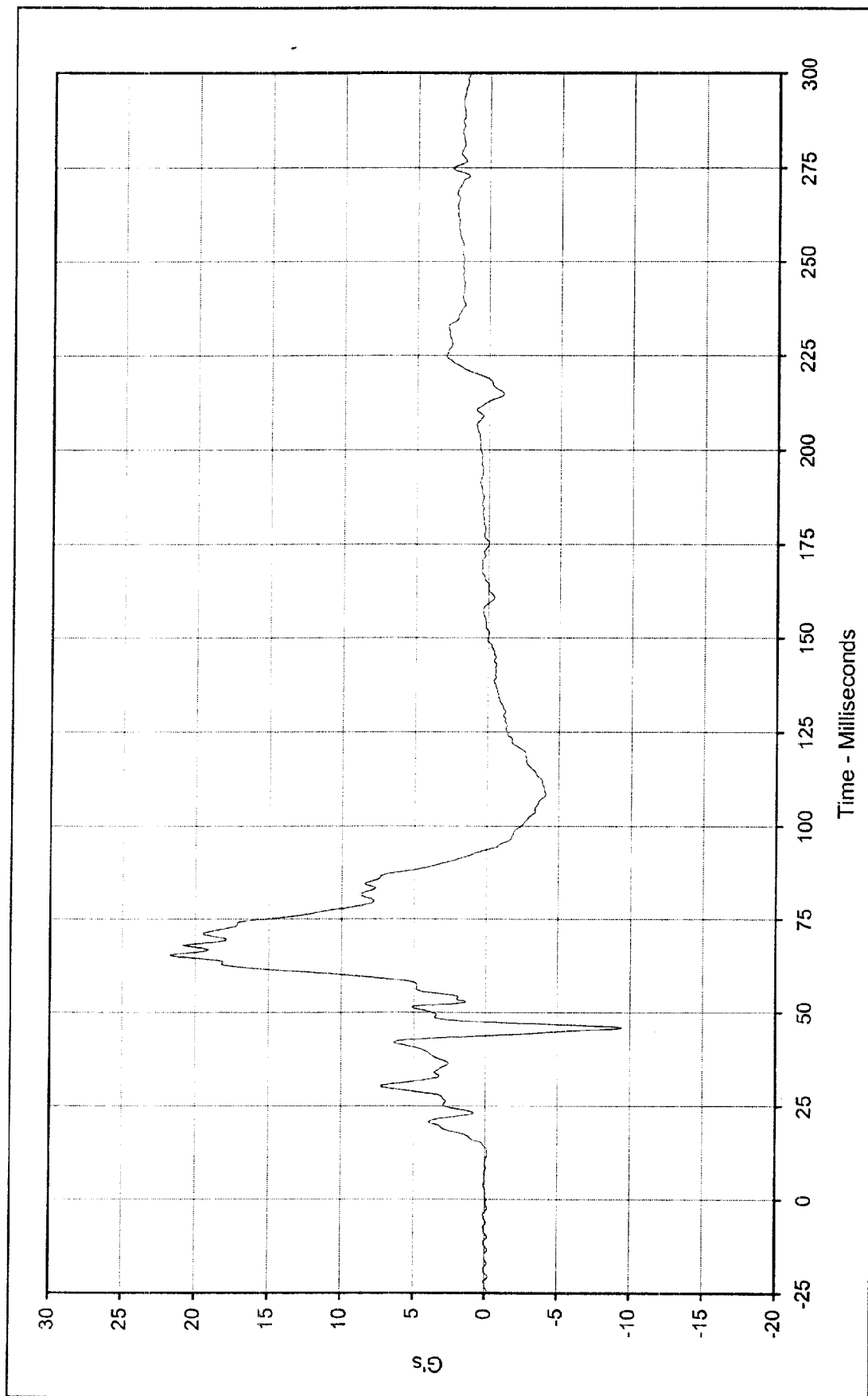




Curve Description: Passenger Chest Redundant Y
 Maximum Value: 8.5 at 86.5 Milliseconds
 Minimum Value: -8.0 at 70.9 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: FIL-061

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van



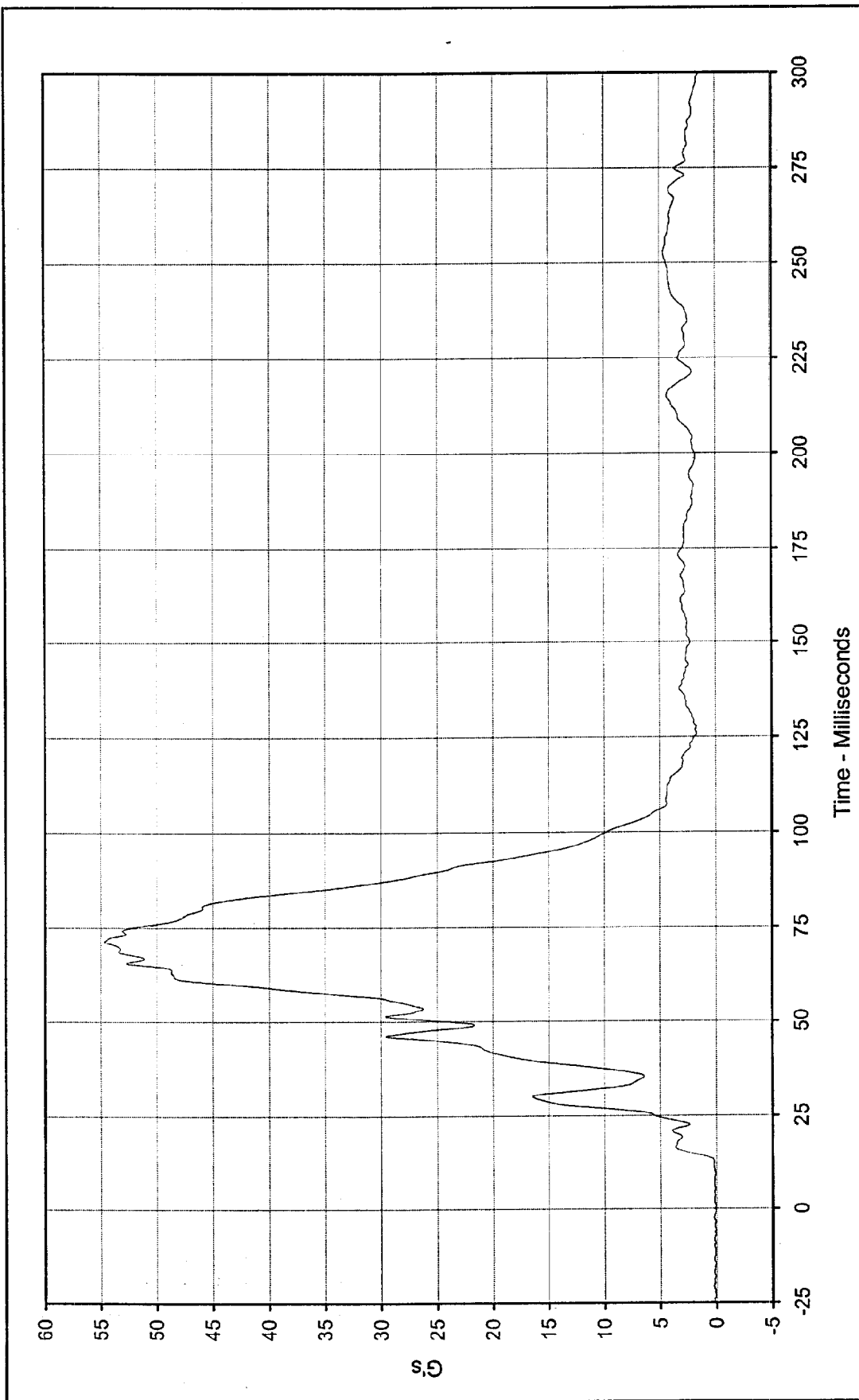


Curve Description:	Passenger Chest Redundant Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	21.7	at 65.0	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-9.4	at 46.0			
SAE Filter Class:	180				
Date of Test:	2/4/99				
Curve Number:	FIL-062				



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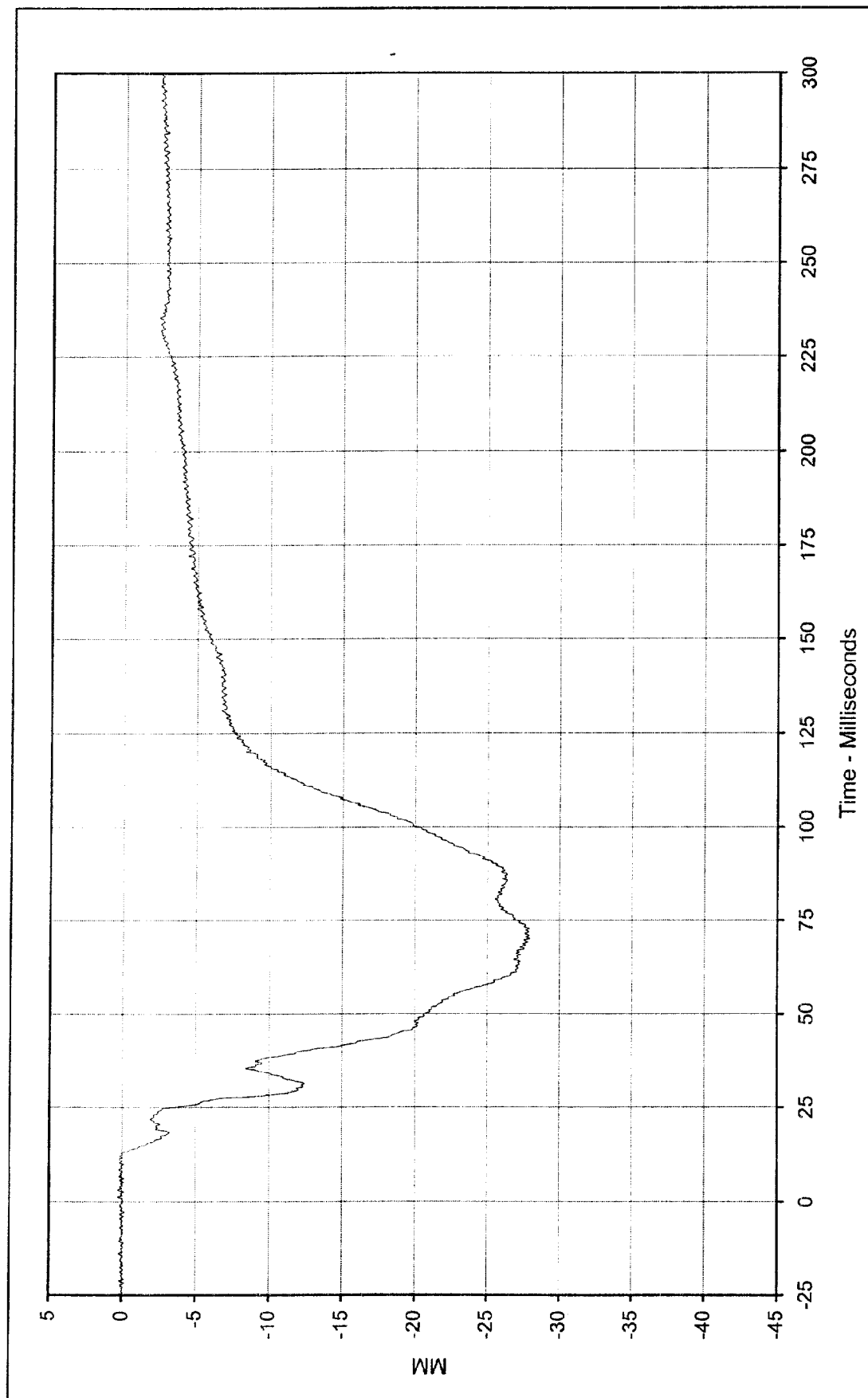




Curve Description: Passenger Chest Resultant Redundant
 Maximum Value: 54.7 at 71.3 Milliseconds
 Minimum Value: 0.1 at 0.6 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: RES-060

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Chest Displacement X

Maximum Value: 0.3 at 1.3 Milliseconds

Minimum Value: -27.9 at 70.2 Milliseconds

SAE Filter Class: 600

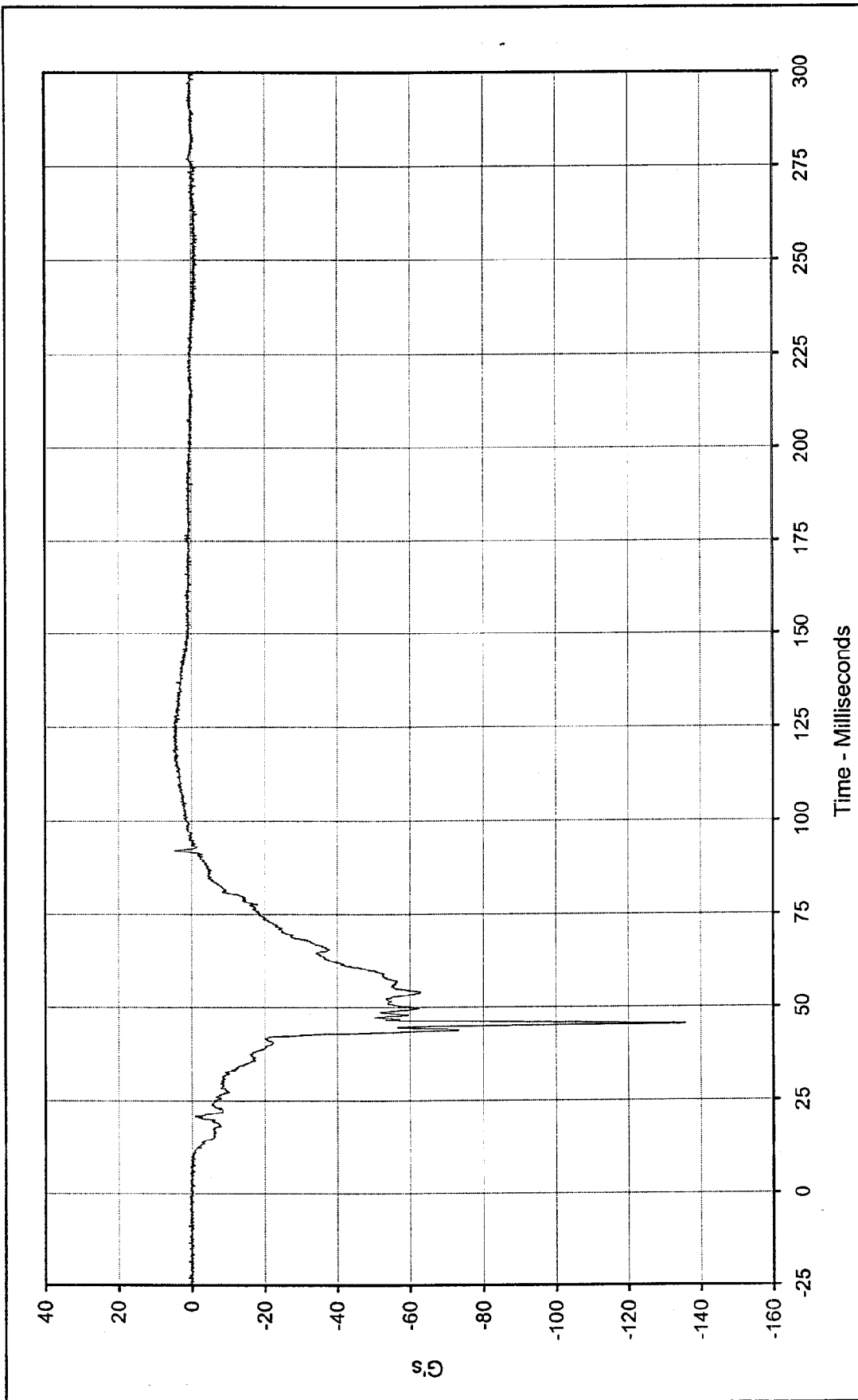
Date of Test: 2/4/99

Curve Number: FIL-063

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

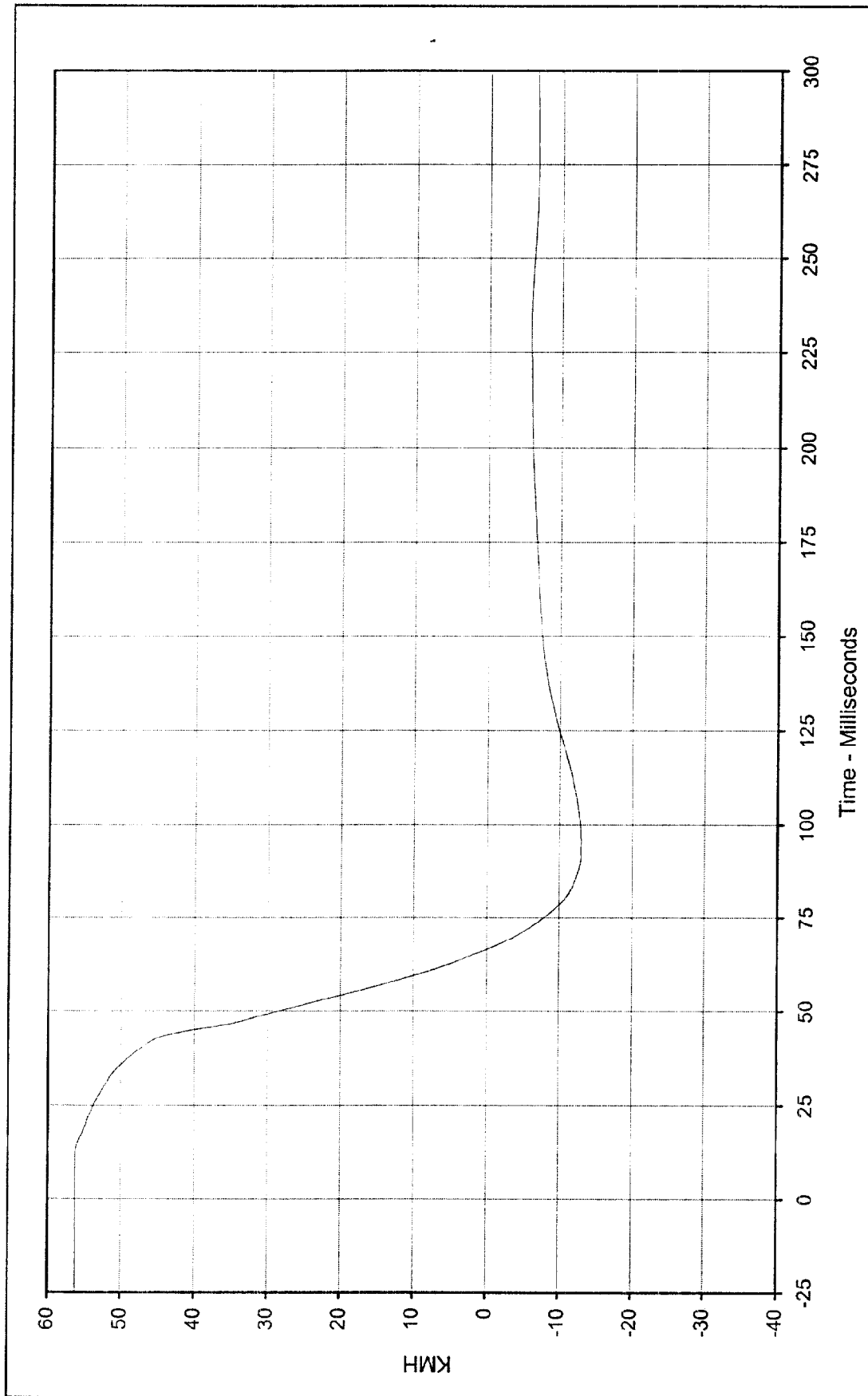




Curve Description: Passenger Pelvis X
 Maximum Value: 5.0 at 118.9 Milliseconds
 Minimum Value: -135.8 at 45.5 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-064

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Pelvis X Velocity Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 56.3 at 0.0 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

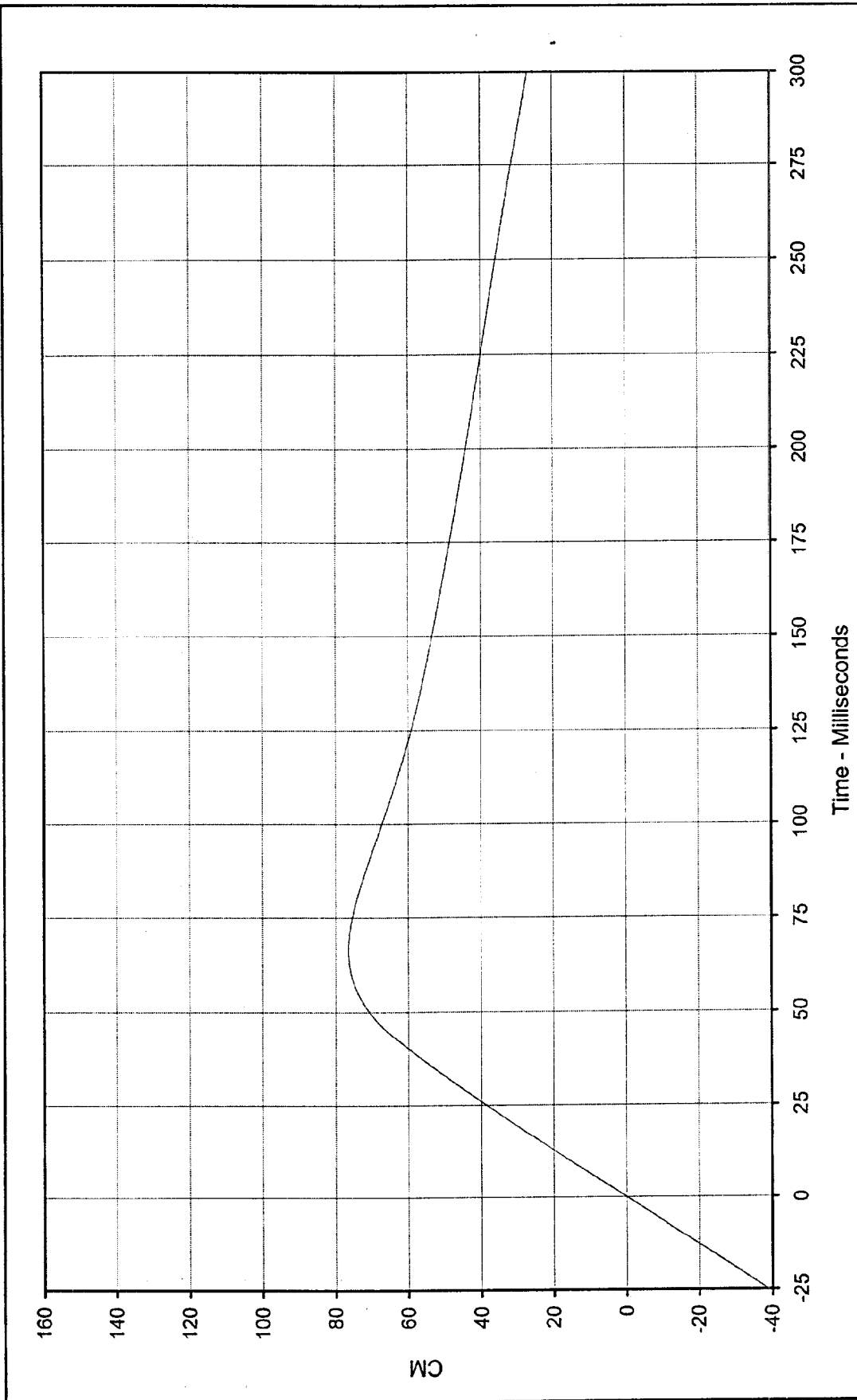
Minimum Value: -13.0 at 91.3 Milliseconds

SAE Filter Class: 180

Date of Test: 2/4/99

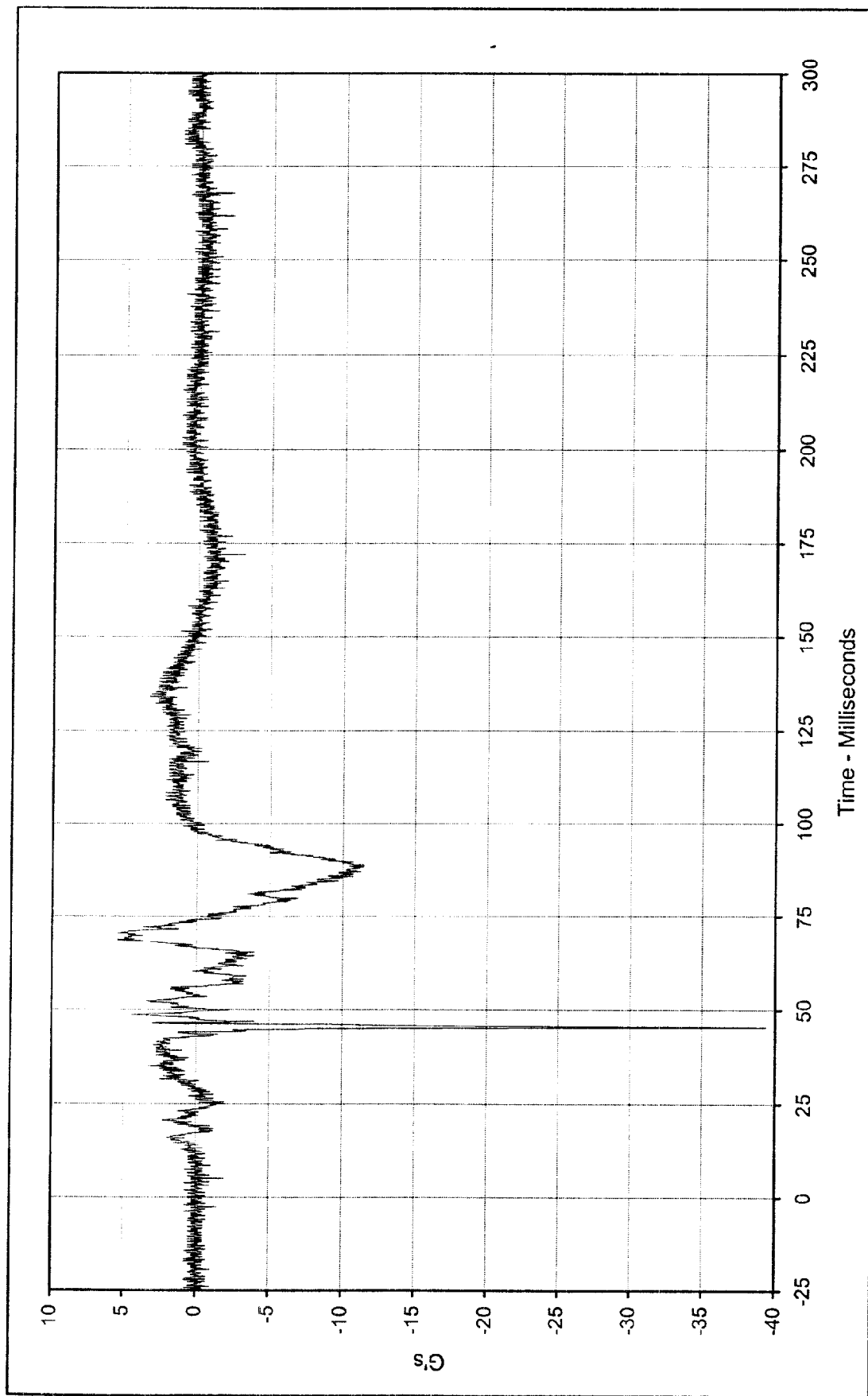
Curve Number: IN1-064





Curve Description:	Passenger Pelvis X Displ.	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	76.5 at 66.3 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	0.0 at 0.0 Milliseconds			
SAE Filter Class:	180			
Date of Test:	2/4/99			
Curve Number:	IN2-064			



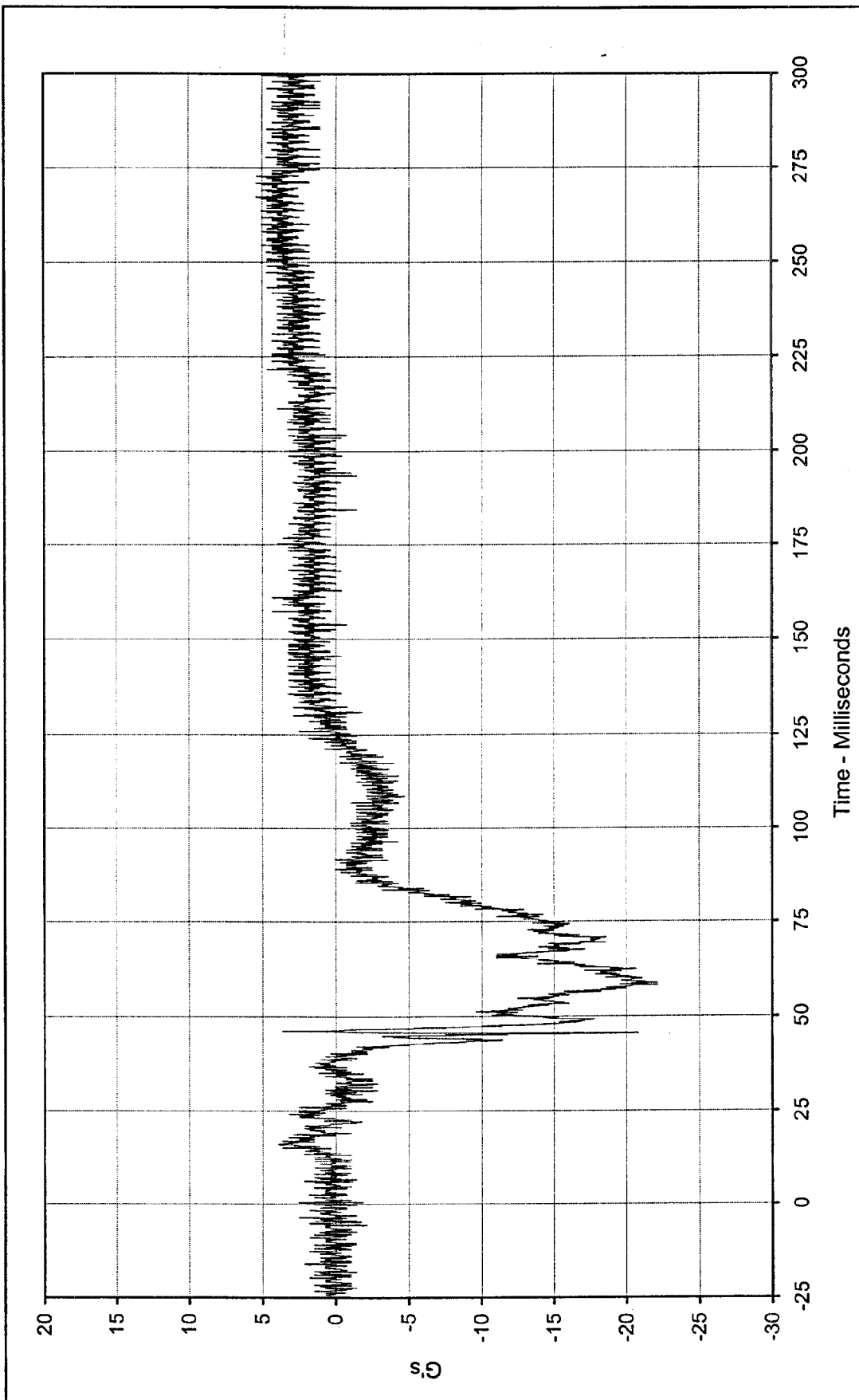


Curve Description:	Passenger Pelvis Y		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	5.5	at 68.5	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-39.4	at 45.5			
SAE Filter Class:	1000				
Date of Test:	2/4/99				
Curve Number:	FIL-065				



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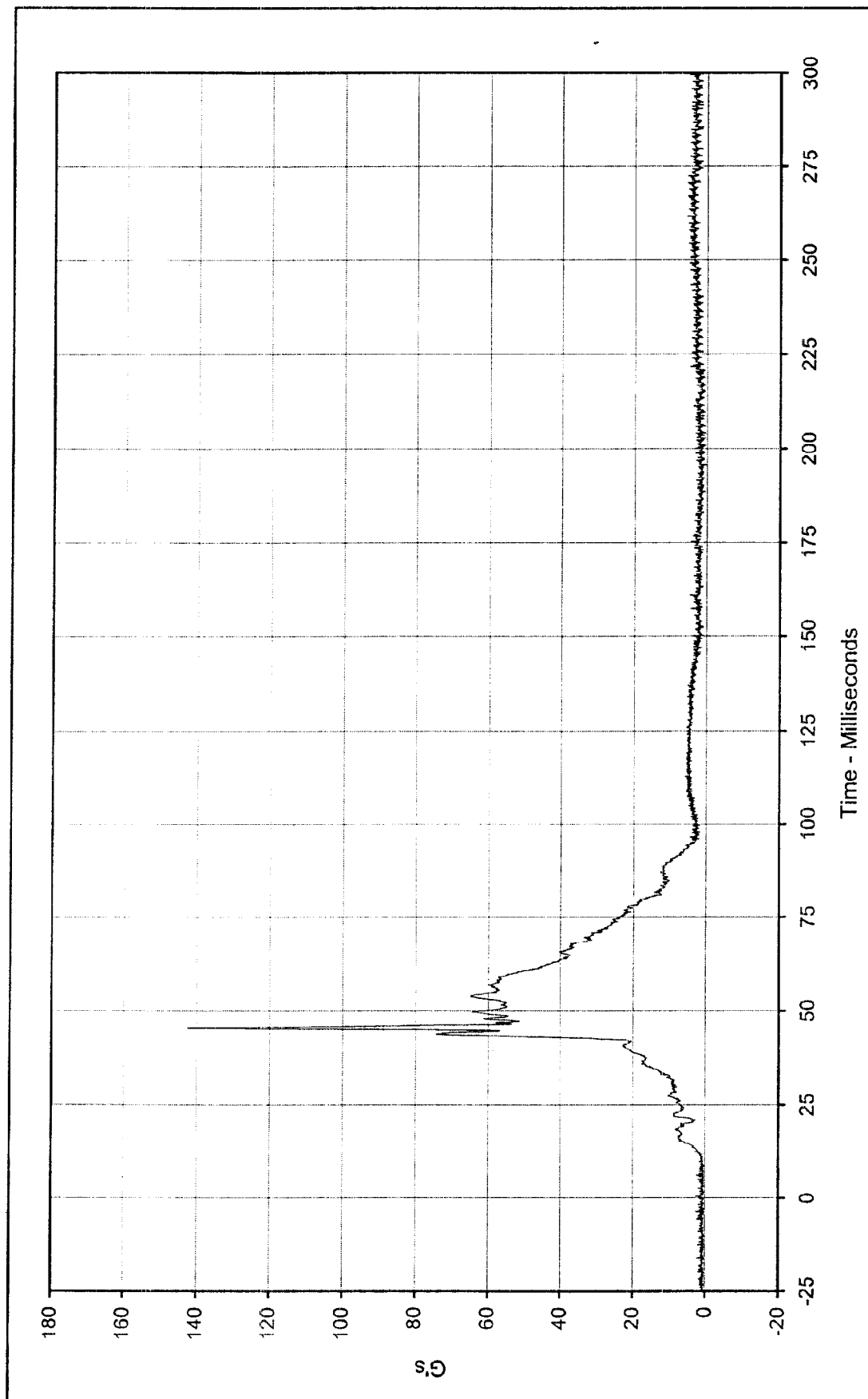




Curve Description:	Passenger Pelvis Z		Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	5.4	at 267.1	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-22.1	at 58.2			
SAE Filter Class:	1000				
Date of Test:	2/4/99				
Curve Number:	FIL-066				

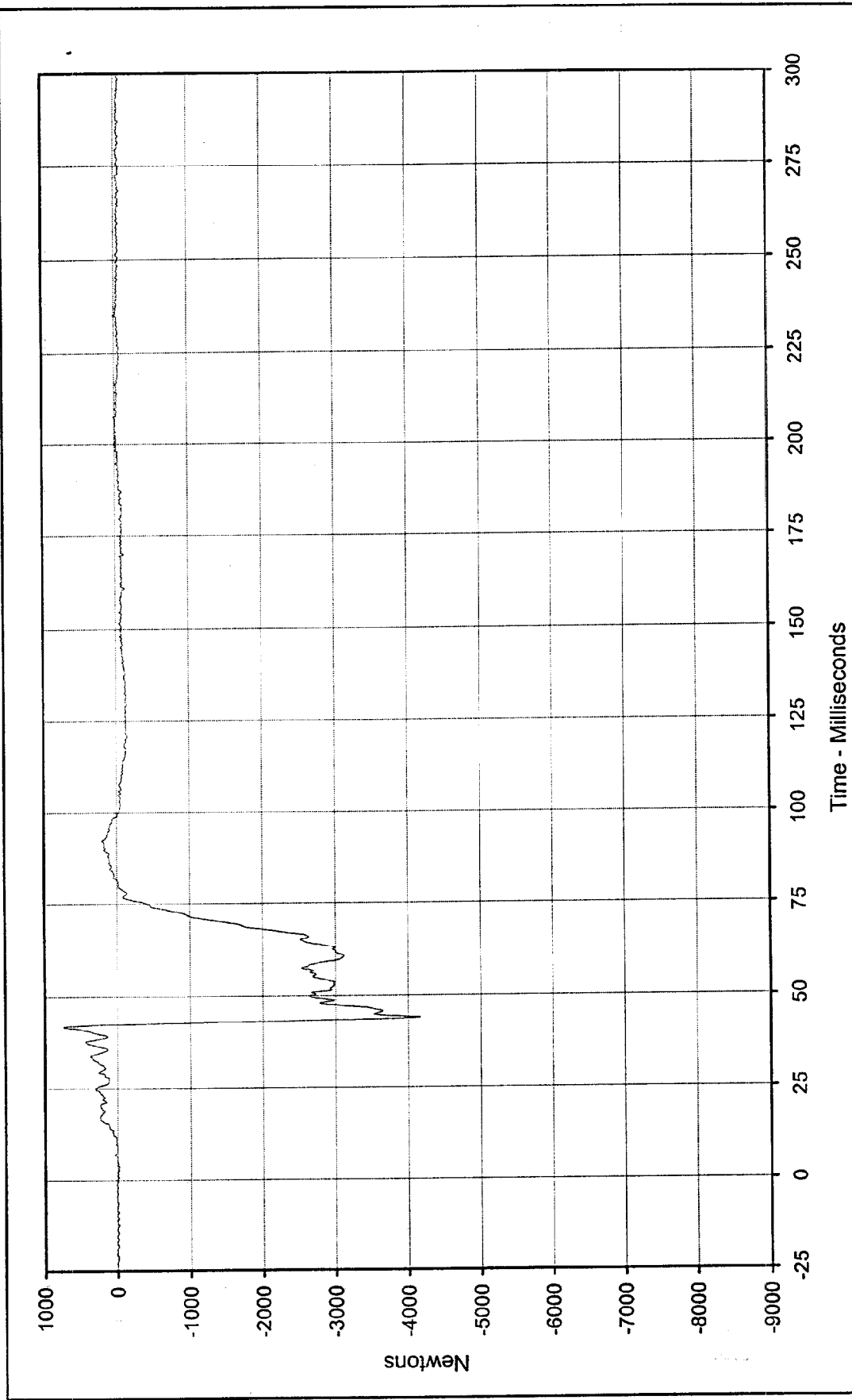
The logo for KARCO Engineering. It features a stylized lightbulb with a gear-like base, followed by the word "KARCO" in large, bold, sans-serif capital letters. To the right of "KARCO" is the word "Engineering" in a smaller, italicized, sans-serif font. The entire logo is set against a dark background with a diagonal line.





Curve Description:		Test Program:	
Passenger Pelvis Resultant		1999 NHTSA 35 mph NCAP No.: MX0208	
Maximum Value:	142.5 at 45.5 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van
Minimum Value:	0.0 at 1.5 Milliseconds		
SAE Filter Class:	1000		
Date of Test:	2/4/99		
Curve Number:	RES-064		

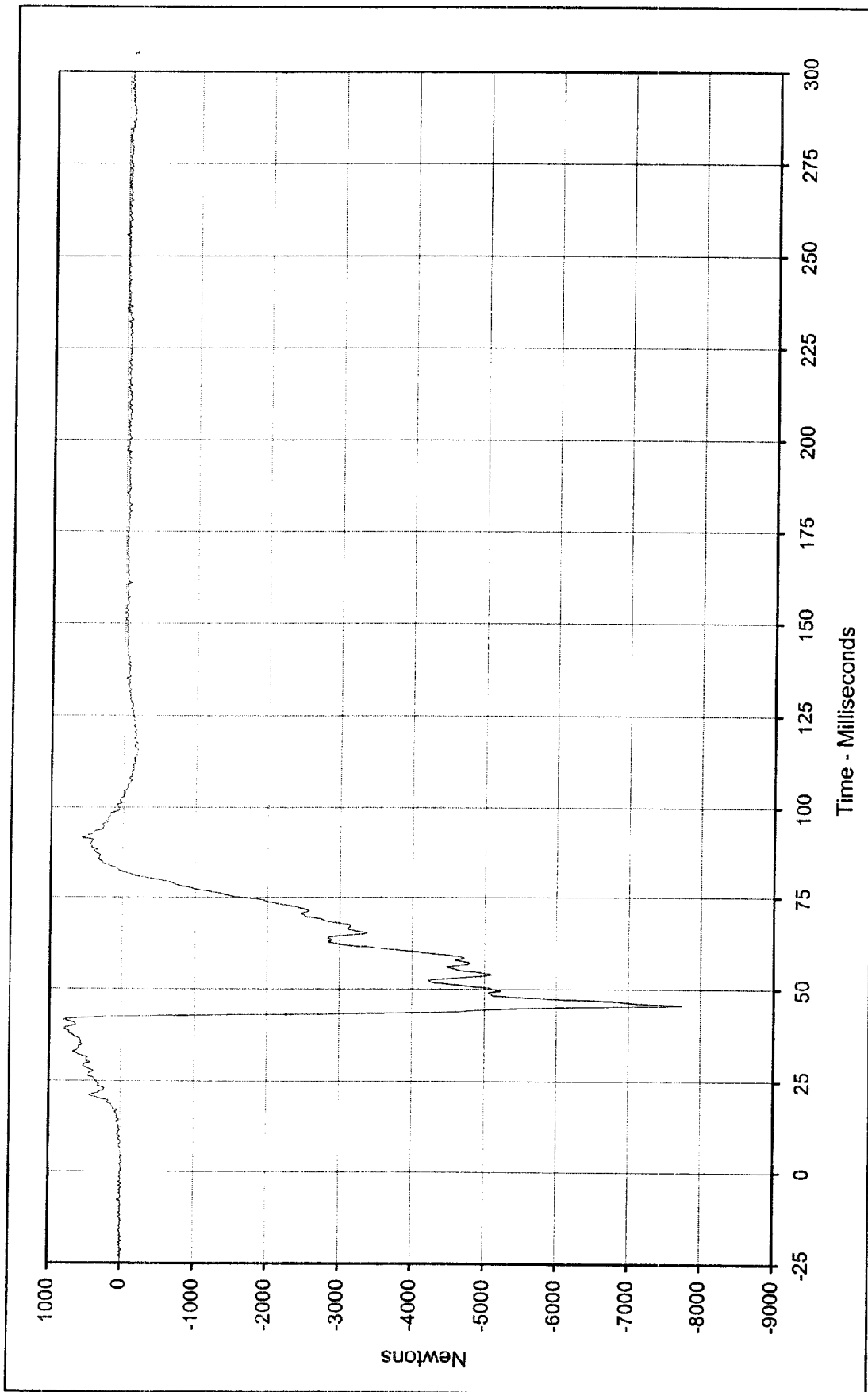




Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

Curve Description: Passenger Left Femur Force
 Maximum Value: 748.3 at 42 Milliseconds
 Minimum Value: -4169.5 at 44.1 Milliseconds
 SAE Filter Class: 600
 Date of Test: 2/4/99
 Curve Number: FIL-067





Curve Description: Passenger Right Femur Force

Maximum Value: 811.9 at 41.7 Milliseconds

Minimum Value: -7738.6 at 45.8 Milliseconds

SAE Filter Class: 600

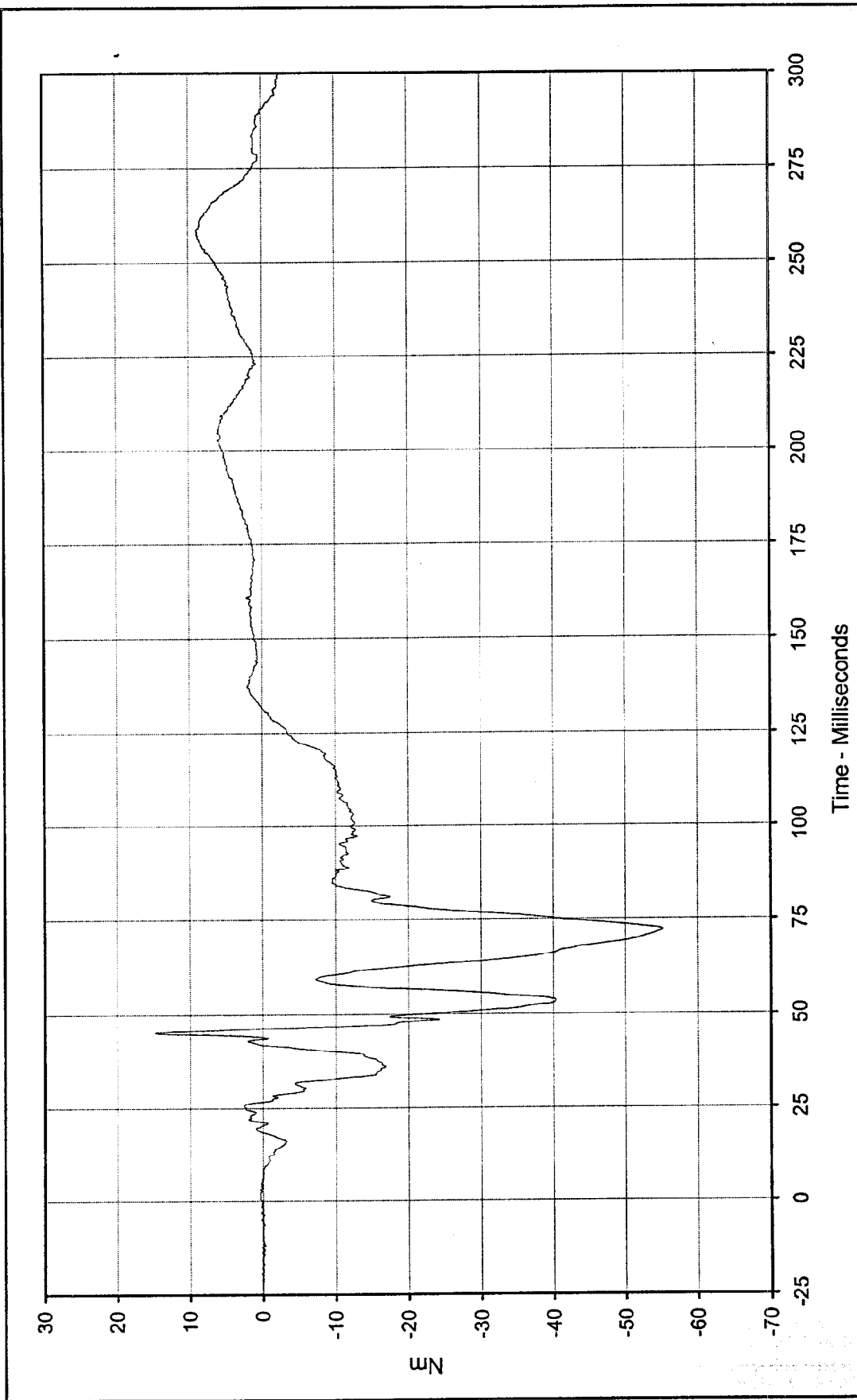
Date of Test: 2/4/99

Curve Number: FIL-068

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Left Upper Tibia Moment X

Maximum Value: 14.8 at 45.3 Milliseconds

Minimum Value: -55.2 at 72.1 Milliseconds

SAE Filter Class: 600

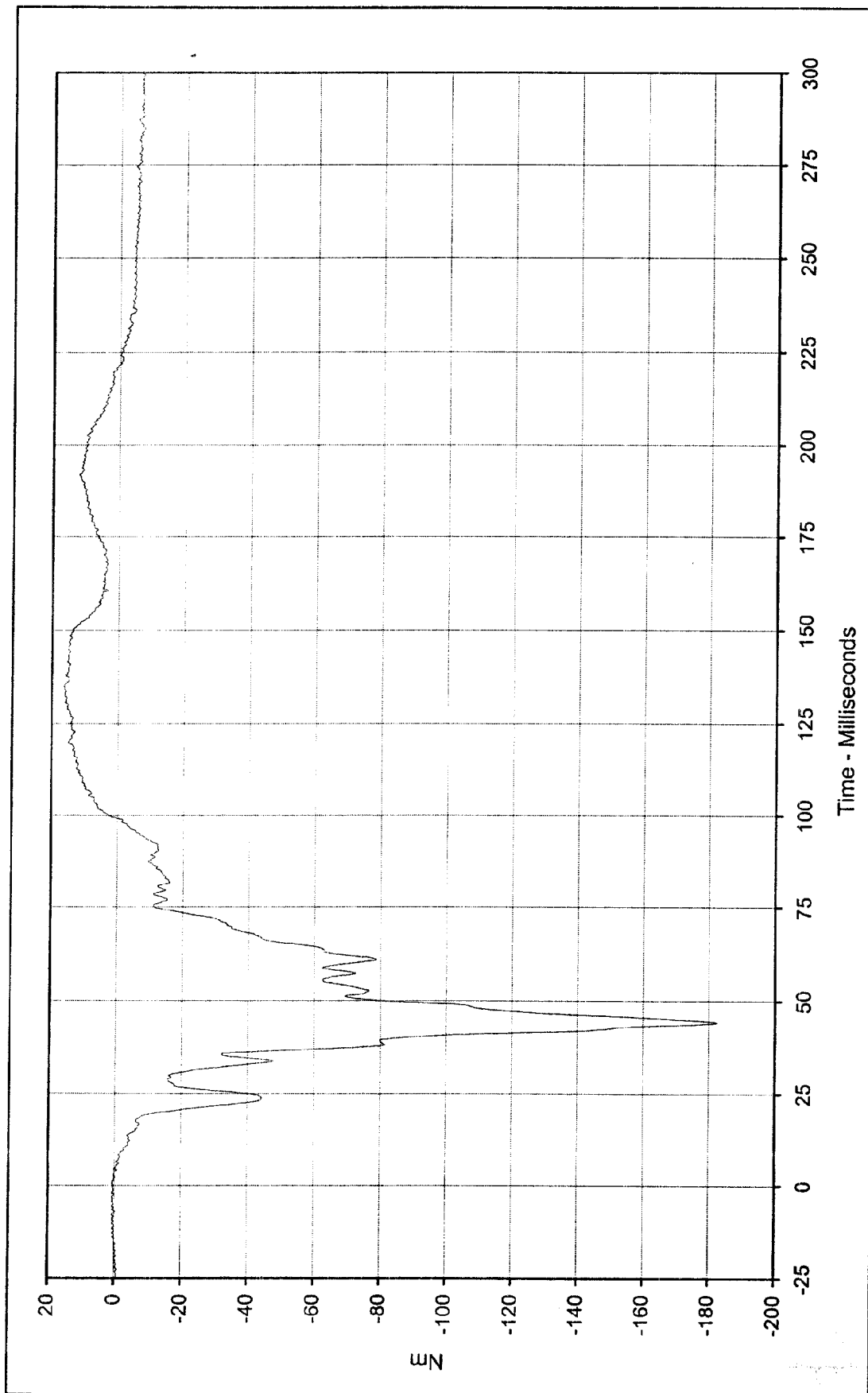
Date of Test: 2/4/99

Curve Number: FIL-069

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Left Upper Tibia Moment Y

Maximum Value: 16.5 at 135.0 Milliseconds

Minimum Value: -182.4 at 44.3 Milliseconds

SAE Filter Class: 600

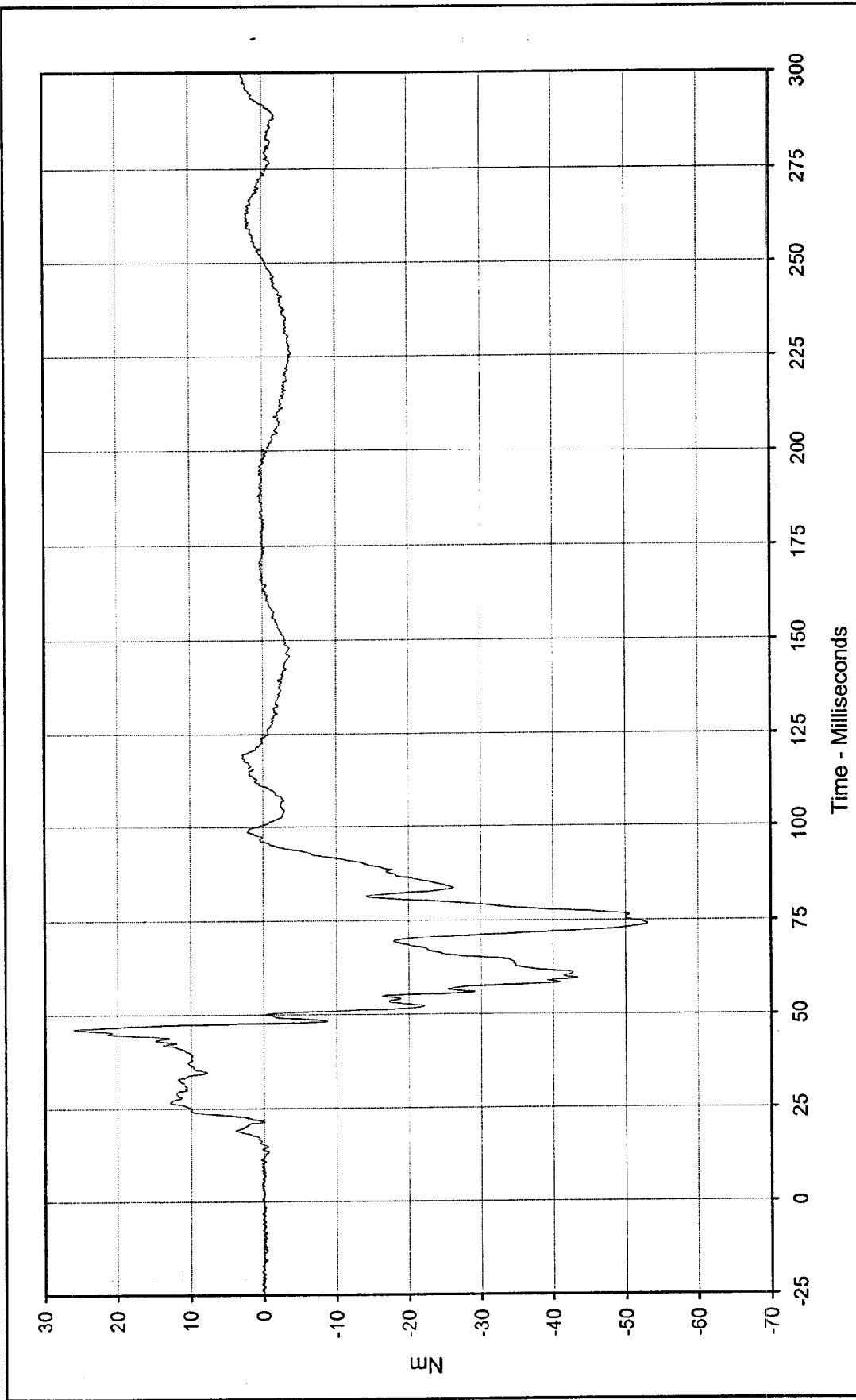
Date of Test: 2/4/99

Curve Number: FIL-070

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Right Upper Tibia Moment X

Maximum Value: 26.1 at 46.2 Milliseconds

Minimum Value: -53.1 at 73.9 Milliseconds

SAE Filter Class: 600

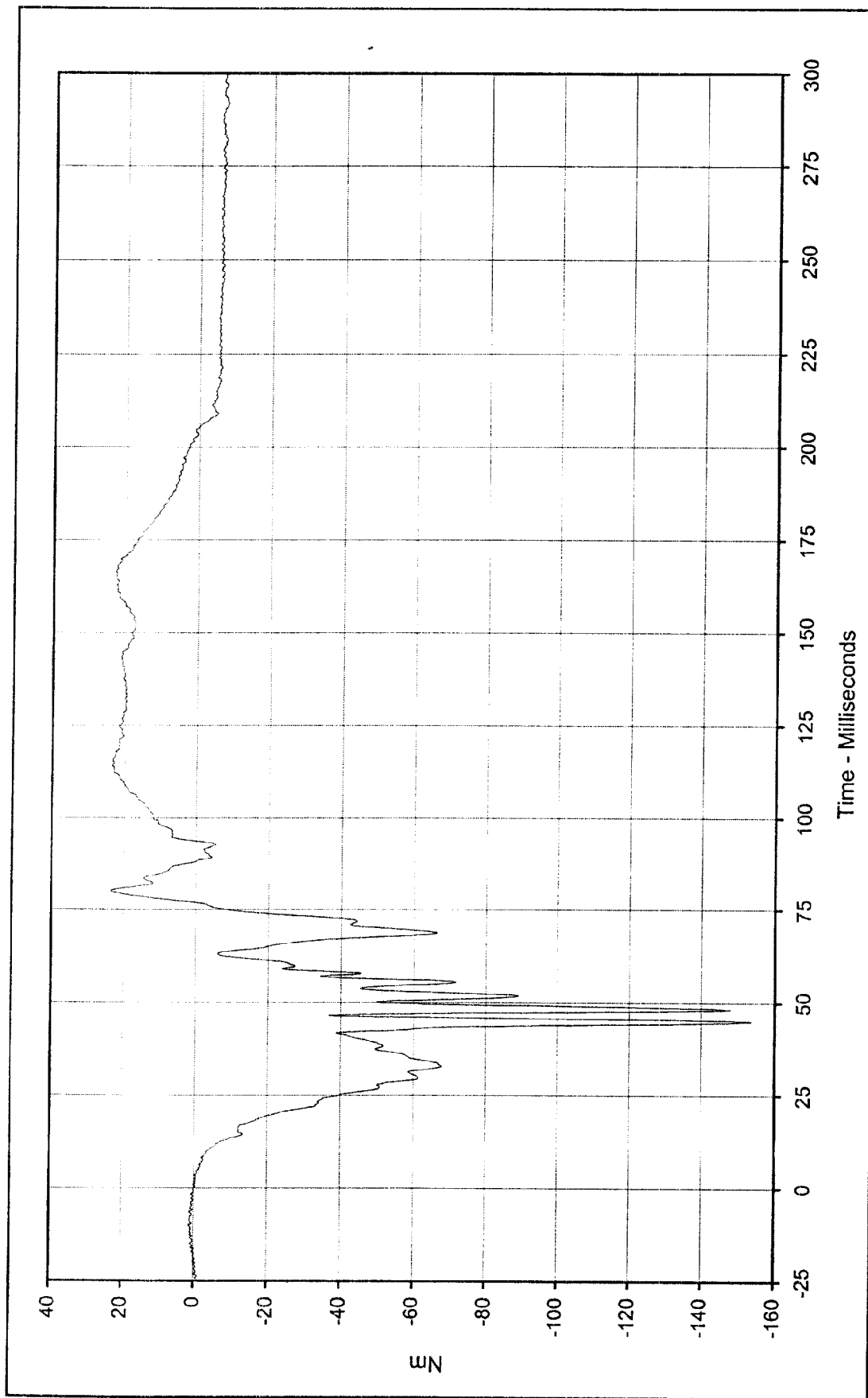
Date of Test: 2/4/99

Curve Number: FIL-071

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Right Upper Tibia Moment Y

Maximum Value: 23.6 at 79.9 Milliseconds

Minimum Value: -153.8 at 45.0 Milliseconds

SAE Filter Class: 600

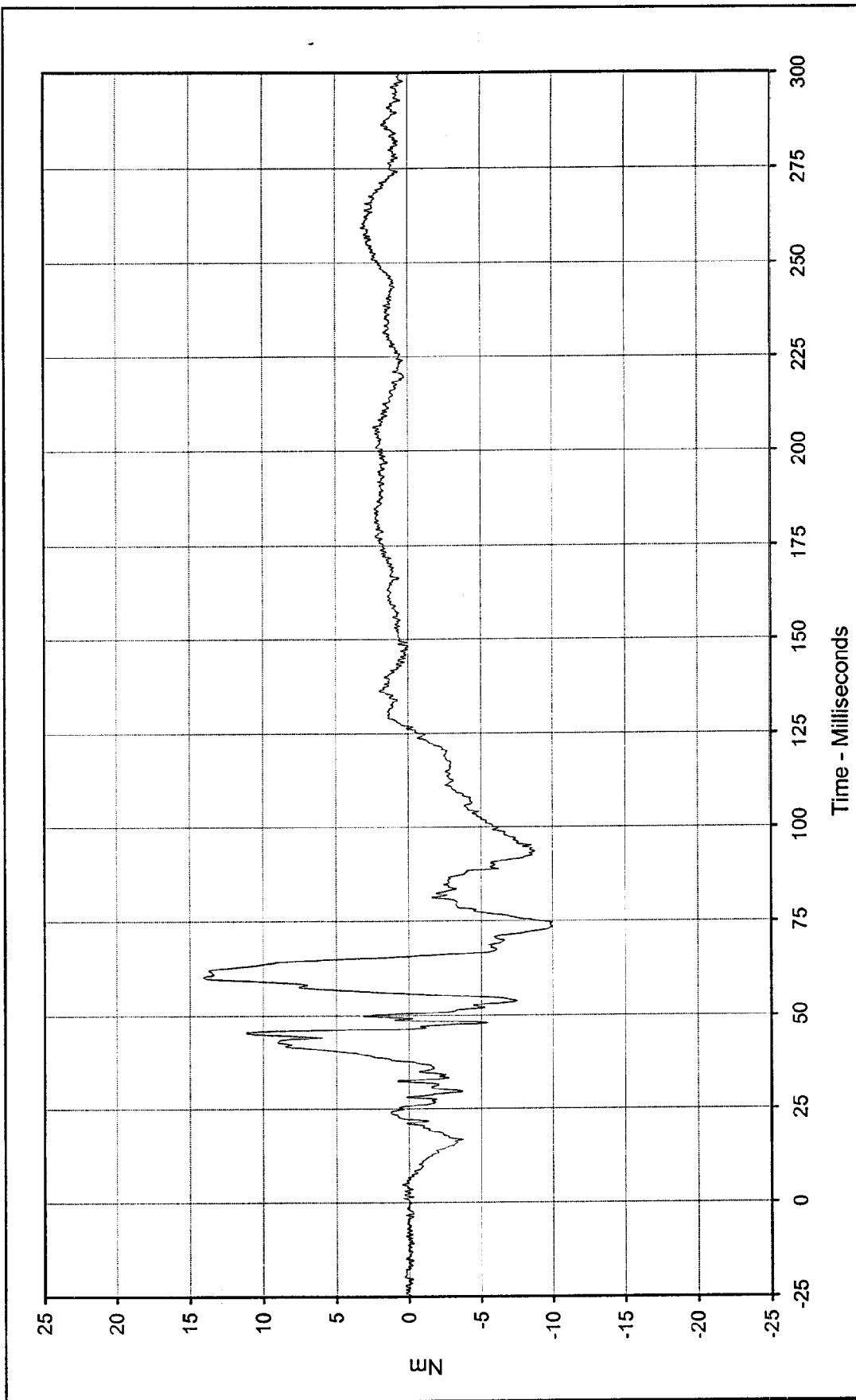
Date of Test: 2/4/99

Curve Number: FIL-072

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

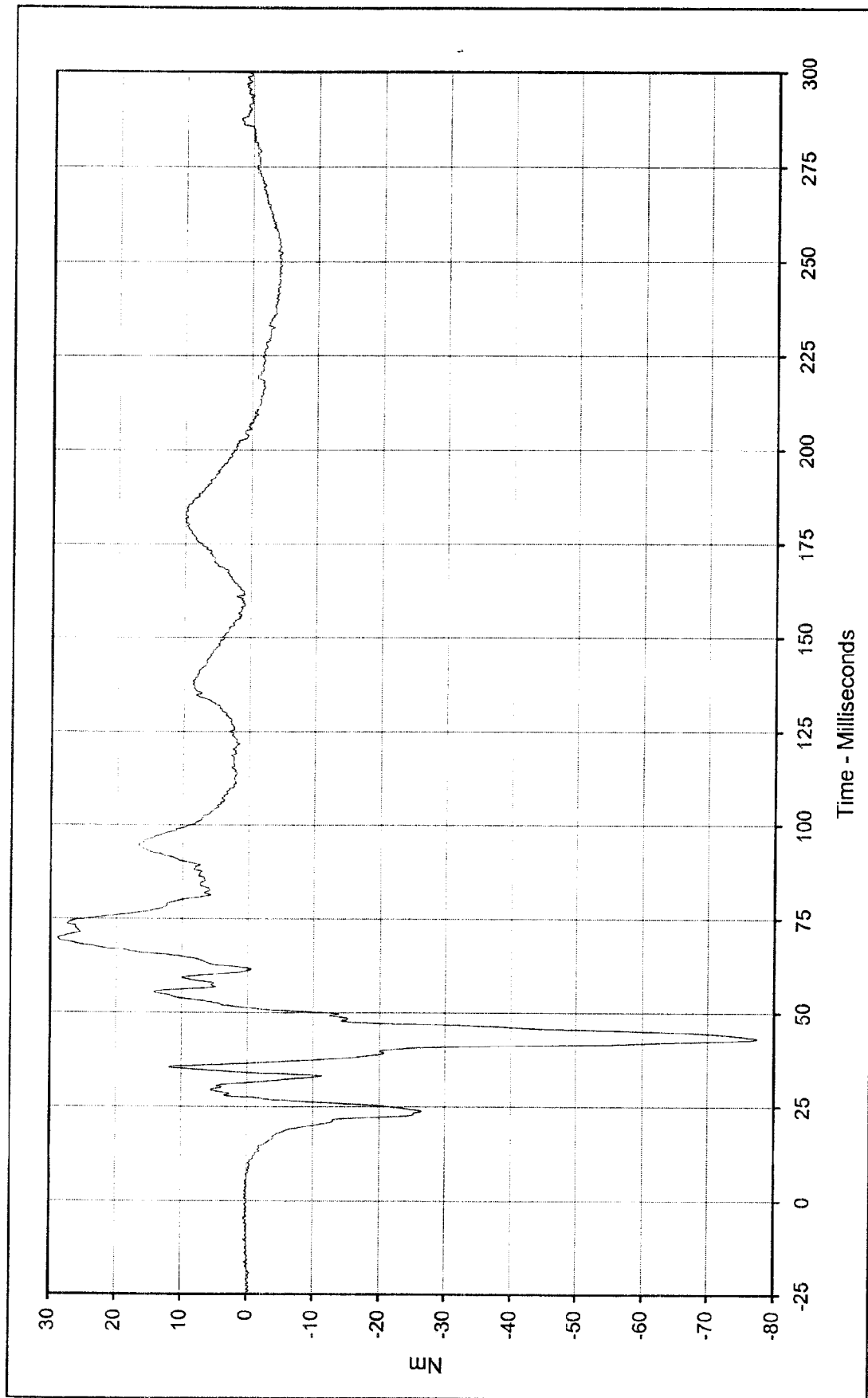




Curve Description: Passenger Left Lower Tibia Moment X
 Maximum Value: 14.1 at 60.3 Milliseconds
 Minimum Value: -10.0 at 73.5 Milliseconds
 SAE Filter Class: 600
 Date of Test: 2/4/99
 Curve Number: FIL-073

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Left Lower Tibia Moment Y

Maximum Value: 28.9 at 69.9 Milliseconds

Minimum Value: -77.5 at 43.2 Milliseconds

SAE Filter Class: 600

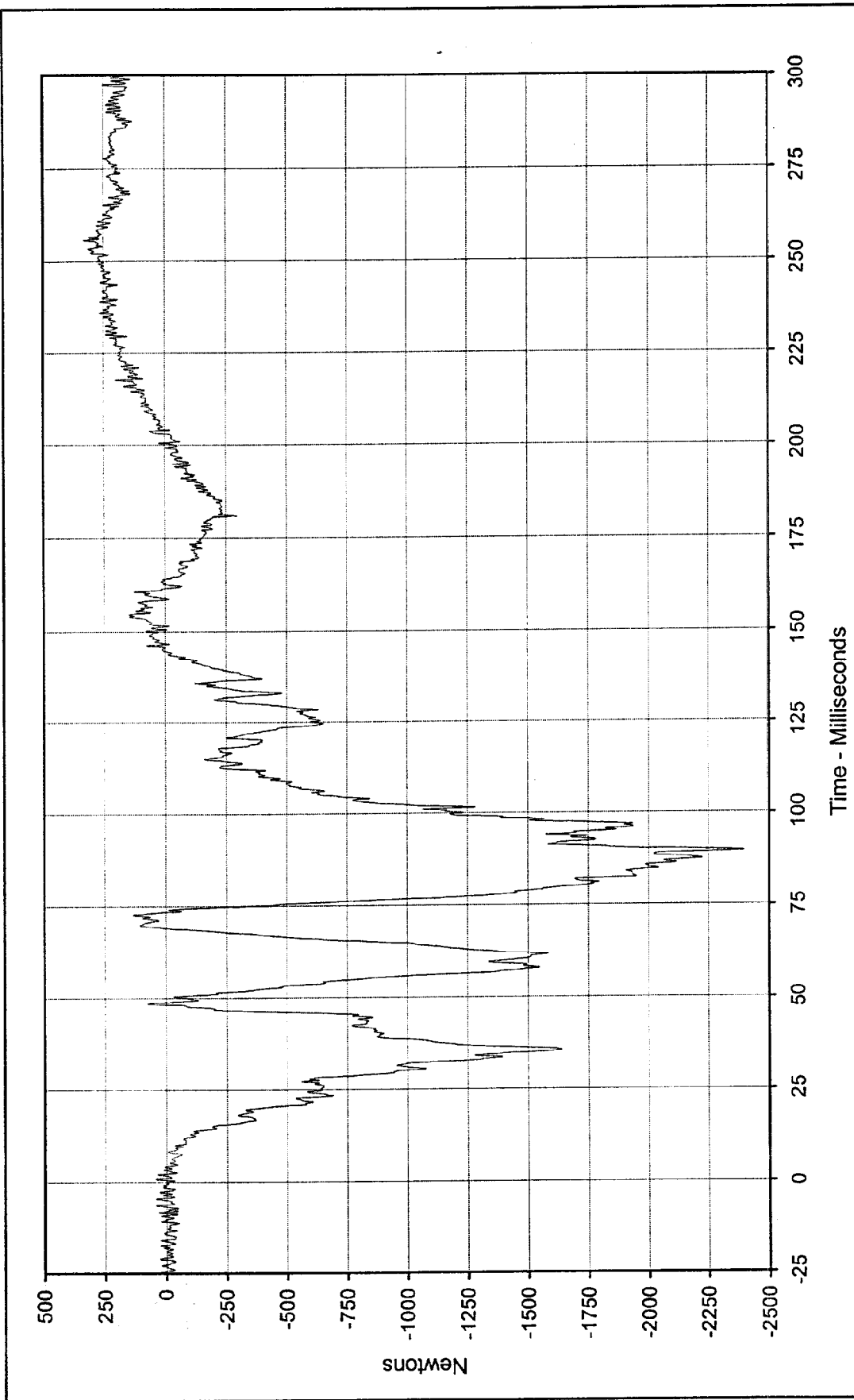
Date of Test: 2/4/99

Curve Number: FIL-074

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Left Lower Tibia Force Z

Maximum Value: 330.0 at 255.6 Milliseconds

Minimum Value: -2396.4 at 89.8 Milliseconds

SAE Filter Class: 600

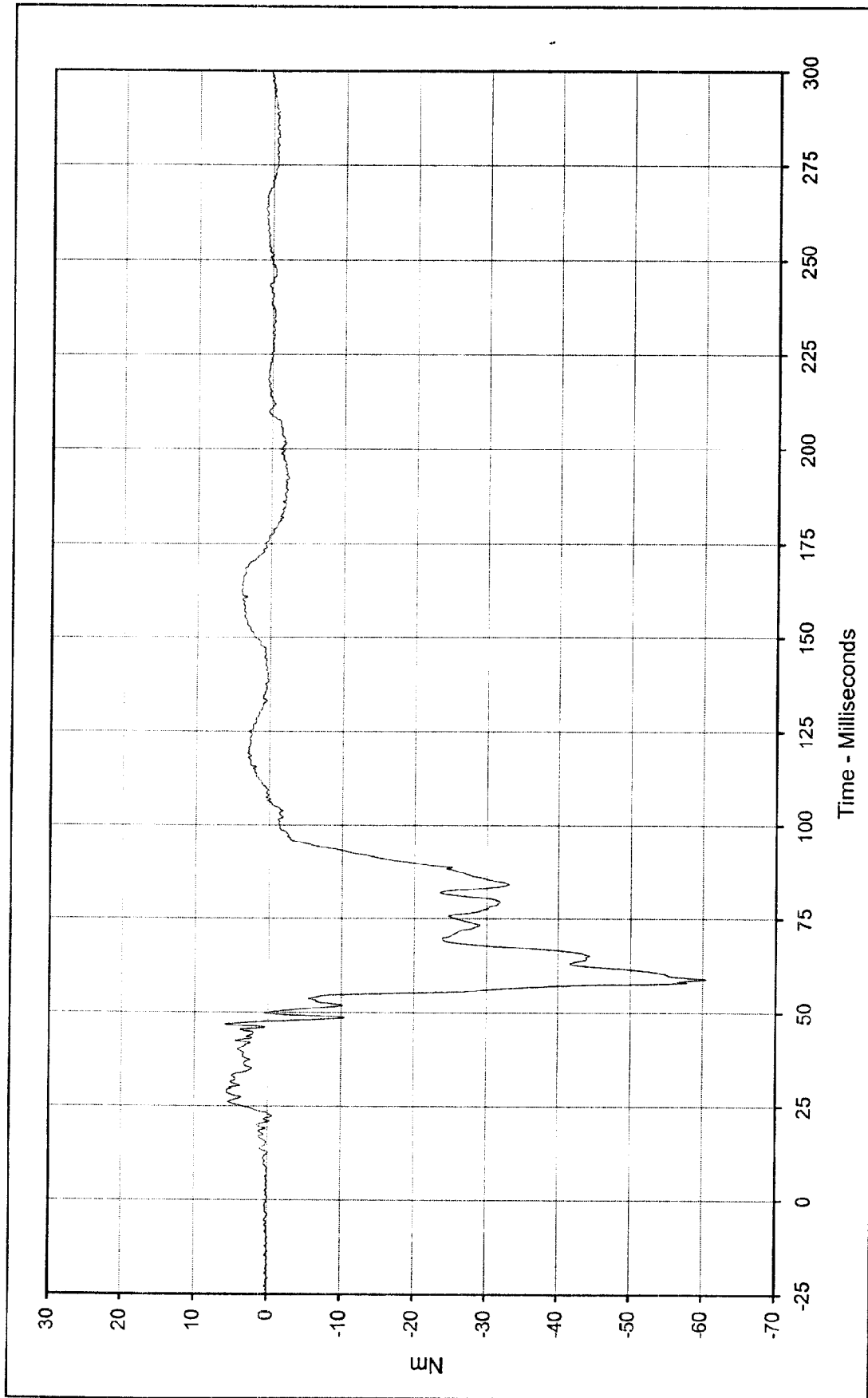
Date of Test: 2/4/99

Curve Number: FIL-075

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Right Lower Tibia Moment X

Maximum Value: 5.8

at 46.9

Milliseconds

Minimum Value: -60.5

at 58.8

Milliseconds

SAE Filter Class: 600

Date of Test: 2/4/99

Curve Number: FIL-076

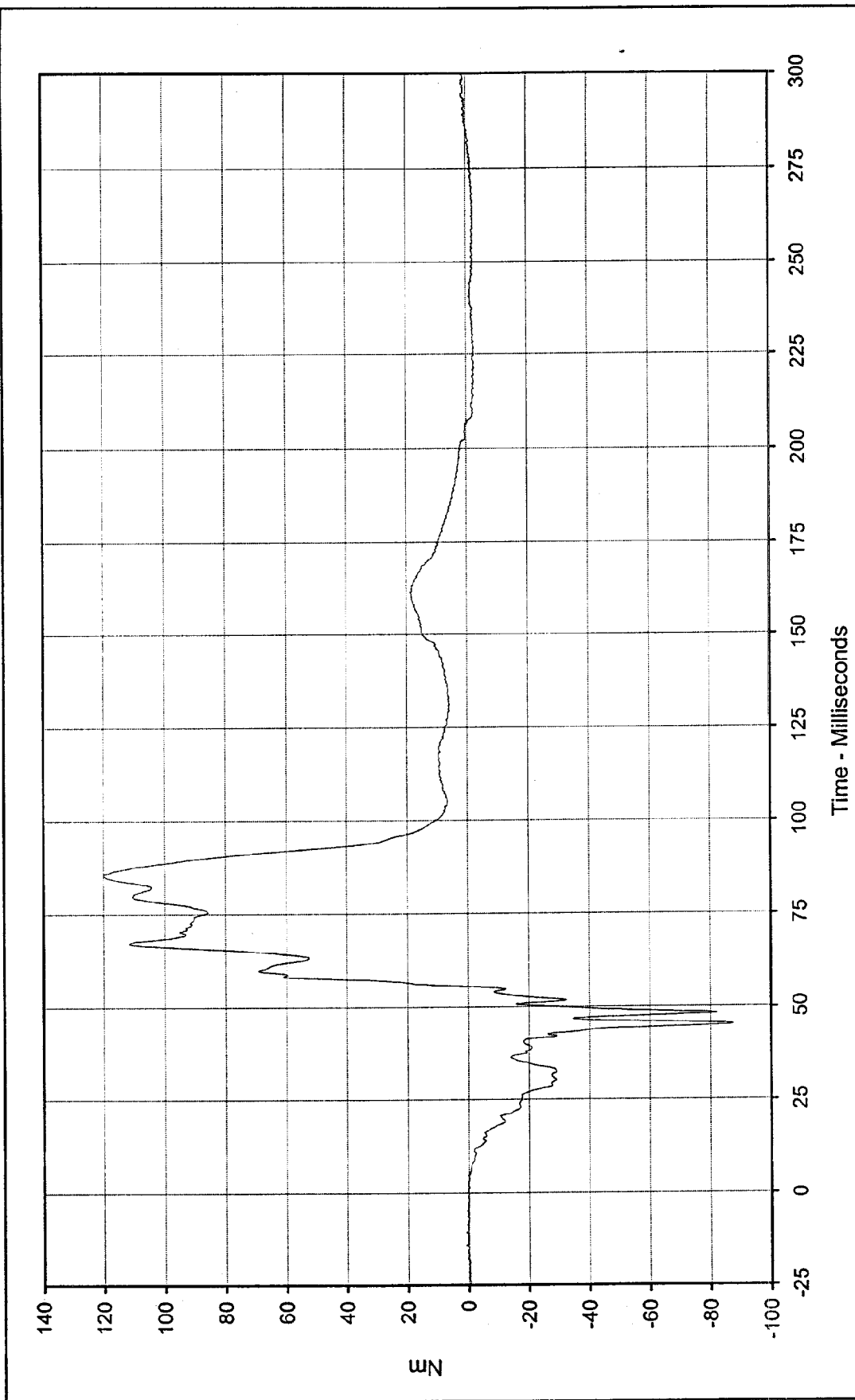
Test Program:

1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle:

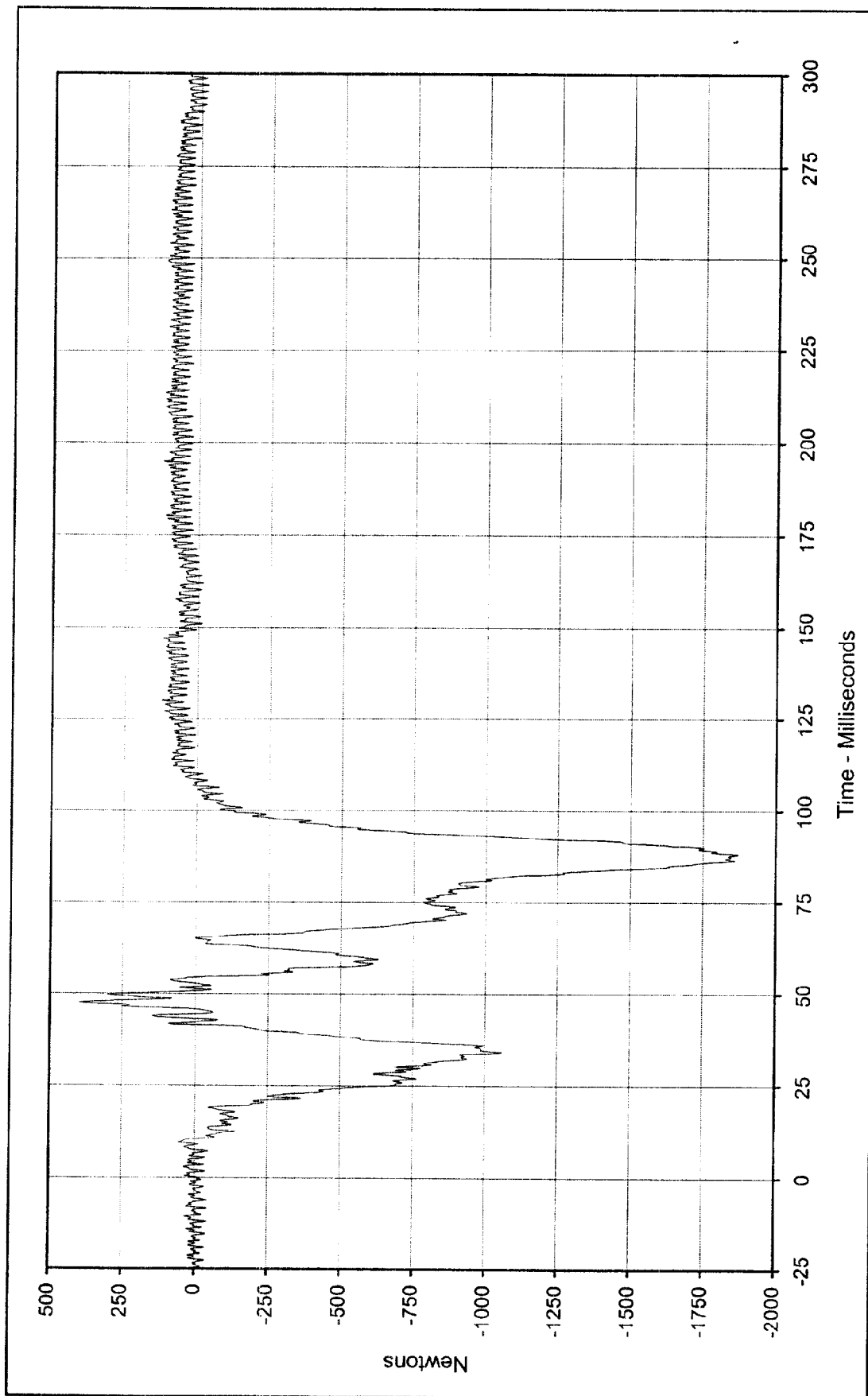
1999 Ford Econoline E-150 Van





Curve Description: Passenger Right Lower Tibia Moment Y	Test Program: 1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value: 120.2 at 85.5 Milliseconds	Test Vehicle: 1999 Ford Econoline E-150 Van	
Minimum Value: -87.4 at 45.3 Milliseconds		
SAE Filter Class: 600		
Date of Test: 2/4/99		
Curve Number: FIL-077		





Curve Description: Passenger Right lower Tibia Force Z

Maximum Value: 397.4 at 47.6 Milliseconds

Minimum Value: -1871.5 at 88.1 Milliseconds

SAE Filter Class: 600

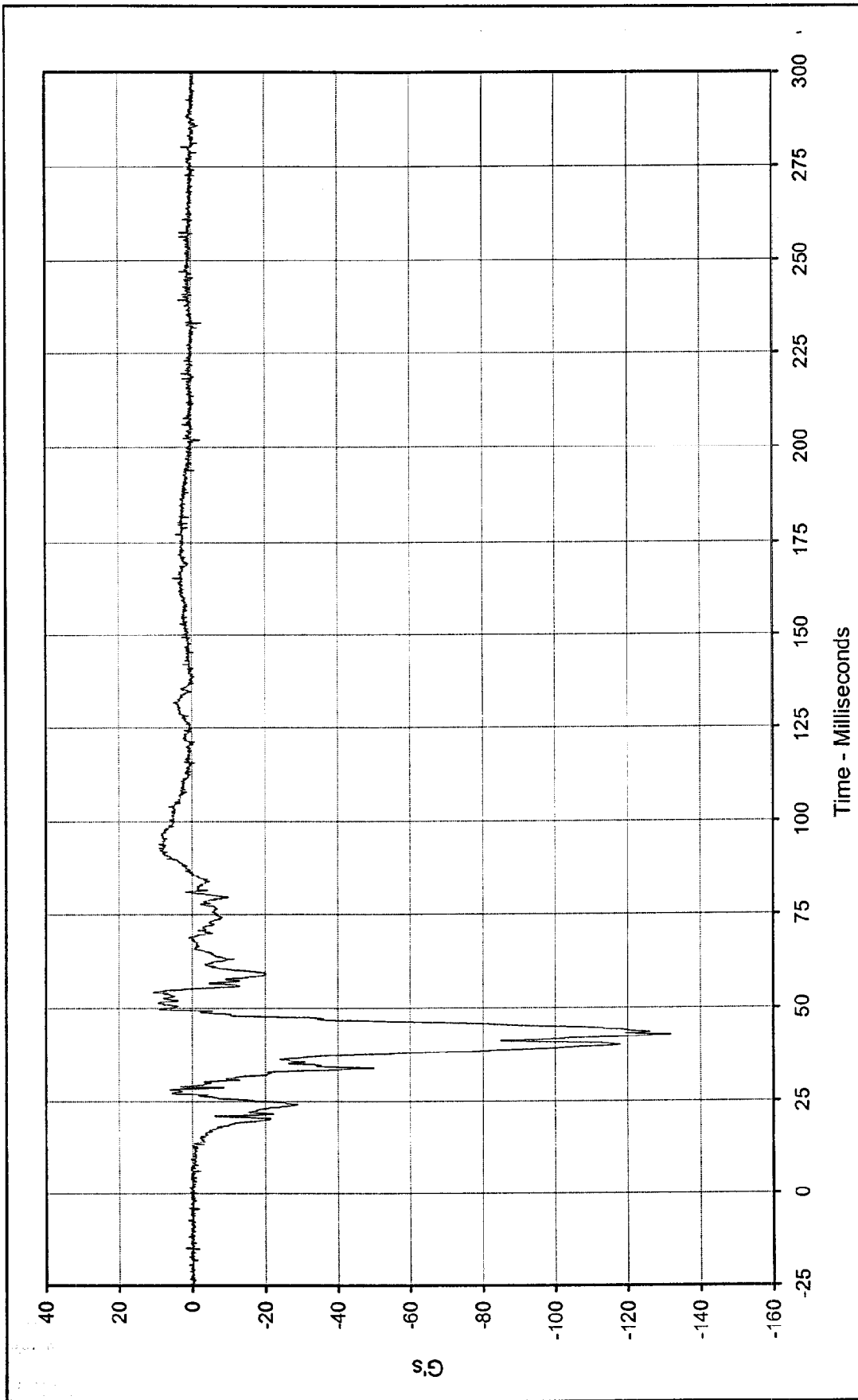
Date of Test: 2/4/99

Curve Number: FIL-078

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Left Foot Aft X

Maximum Value: 10.7 at 54.1 Milliseconds

Minimum Value: -131.9 at 42.6 Milliseconds

SAE Filter Class: 1000

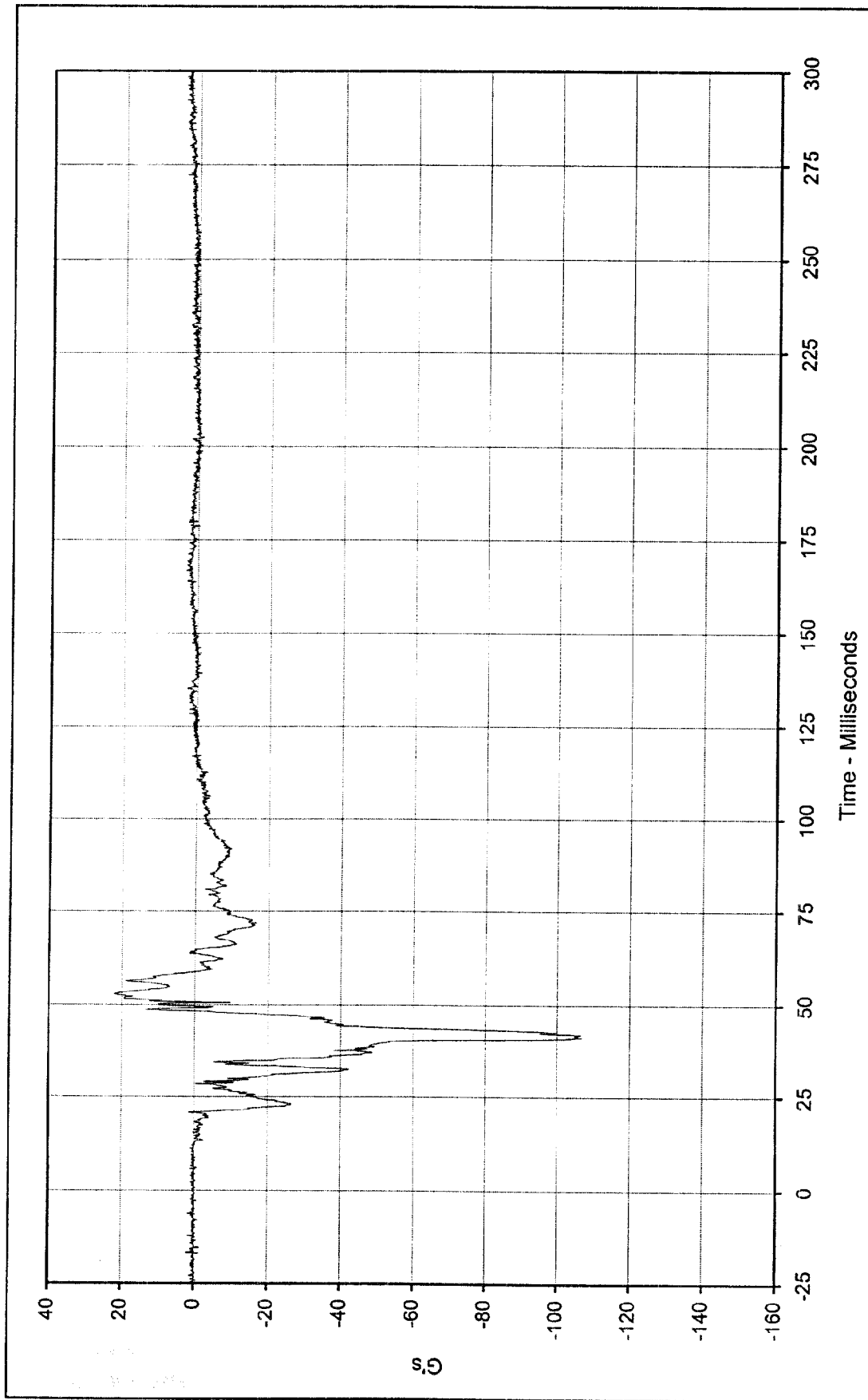
Date of Test: 2/4/99

Curve Number: FIL-079

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

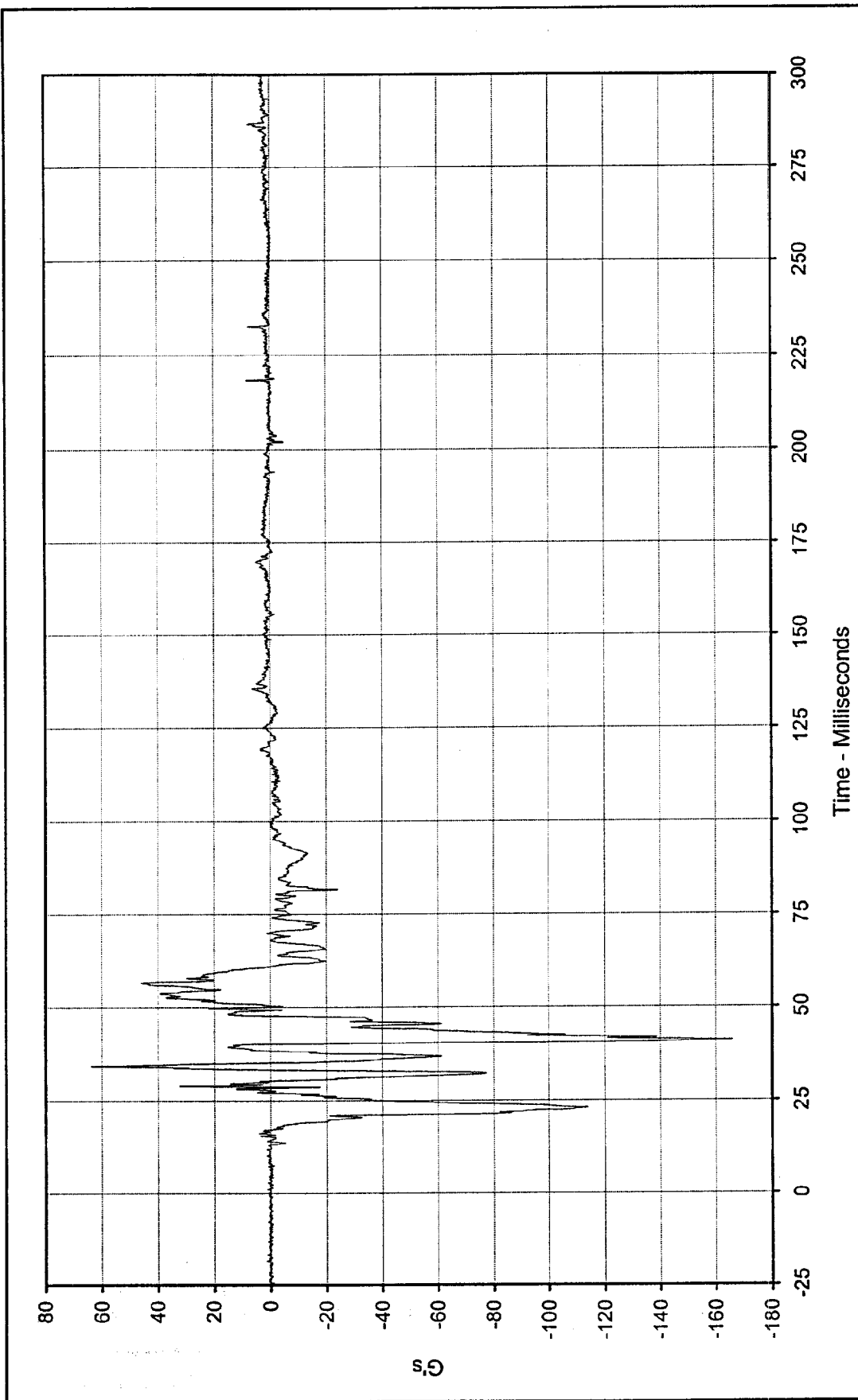




Curve Description: Passenger Left Foot Aft Z
 Maximum Value: 22.1 at 52.9 Milliseconds
 Minimum Value: -106.8 at 41.1 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-080

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

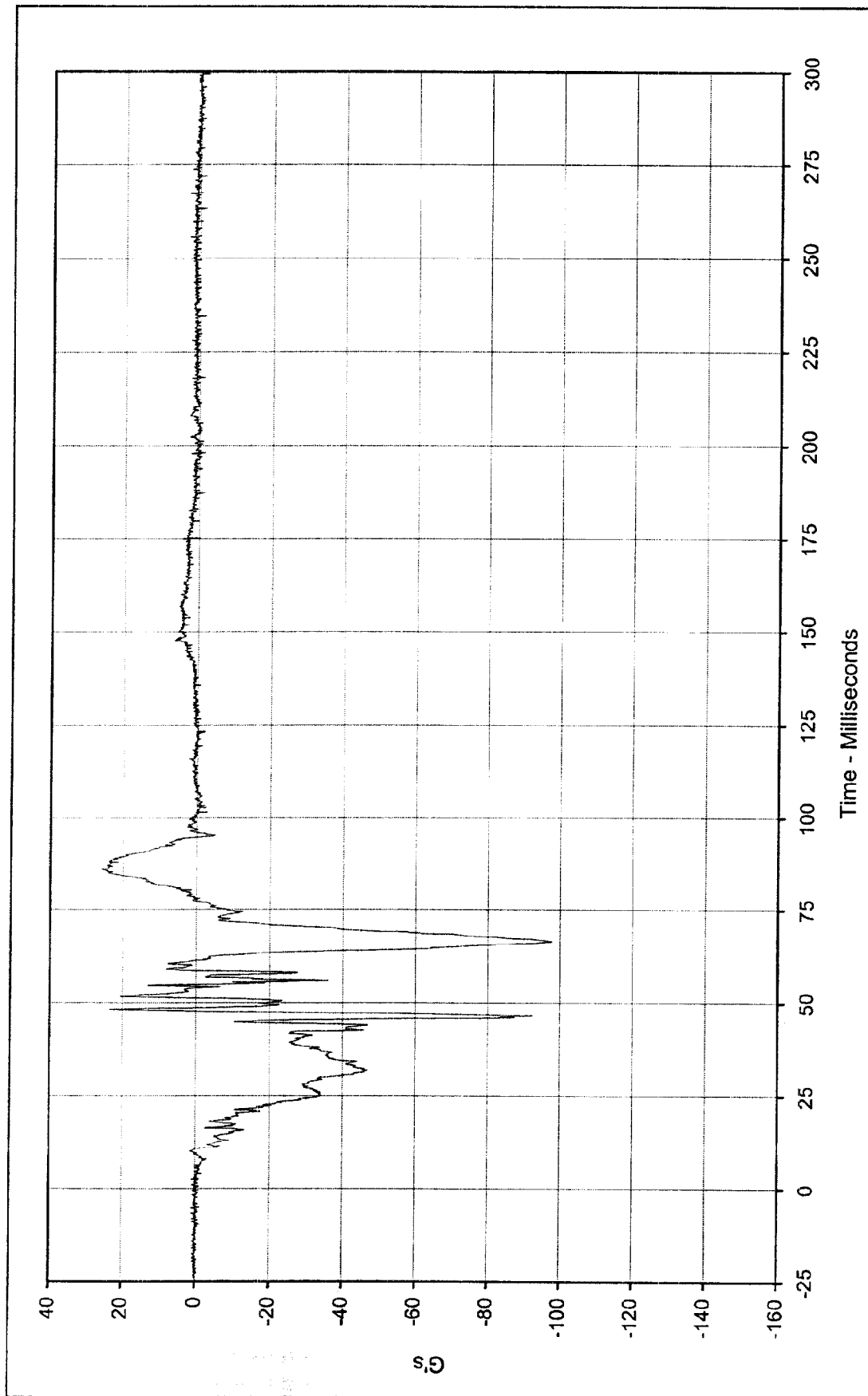




Curve Description: Passenger Left Foot Fore Z
 Maximum Value: 64.0 at 34.3 Milliseconds
 Minimum Value: -165.9 at 41.2 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-081

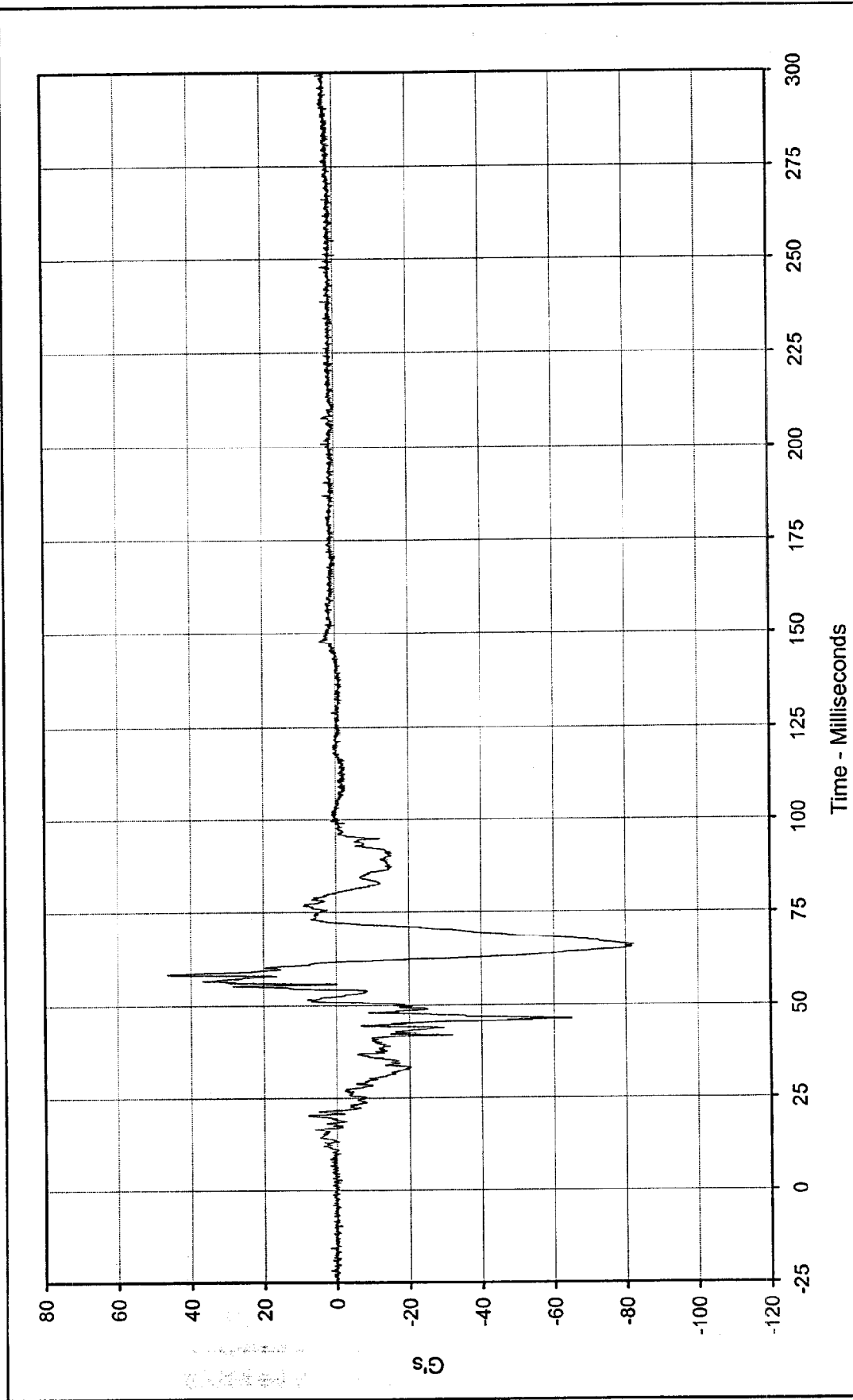
Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Passenger Right Foot Aft X	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	25.7 at 85.9 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-97.7 at 66.5 Milliseconds			
SAE Filter Class:	1000			
Date of Test:	2/4/99			
Curve Number:	FIL-082			

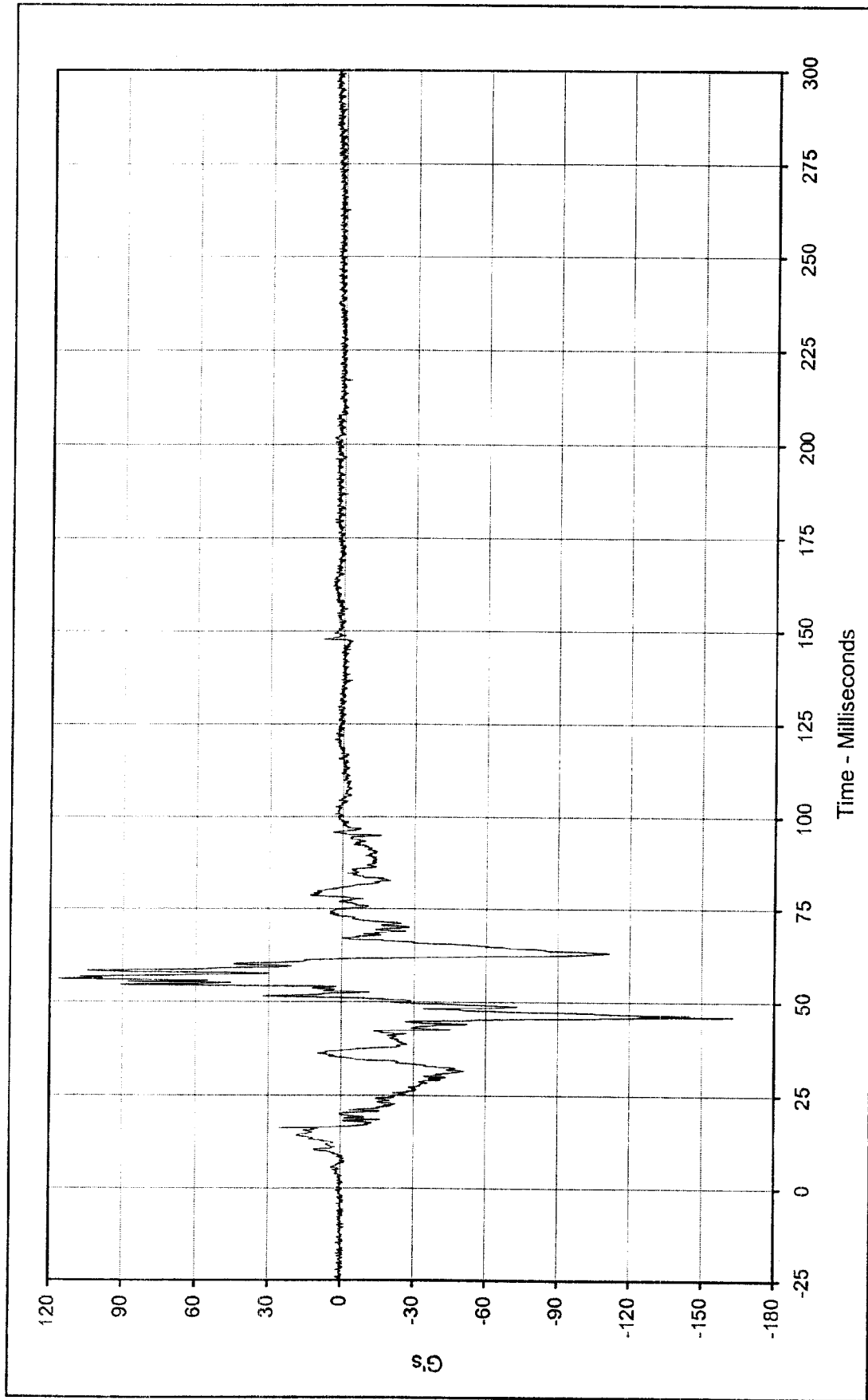




Curve Description: Passenger Right Foot Aft Z
 Maximum Value: 46.4 at 58.3 Milliseconds
 Minimum Value: -82.4 at 65.9 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-083

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

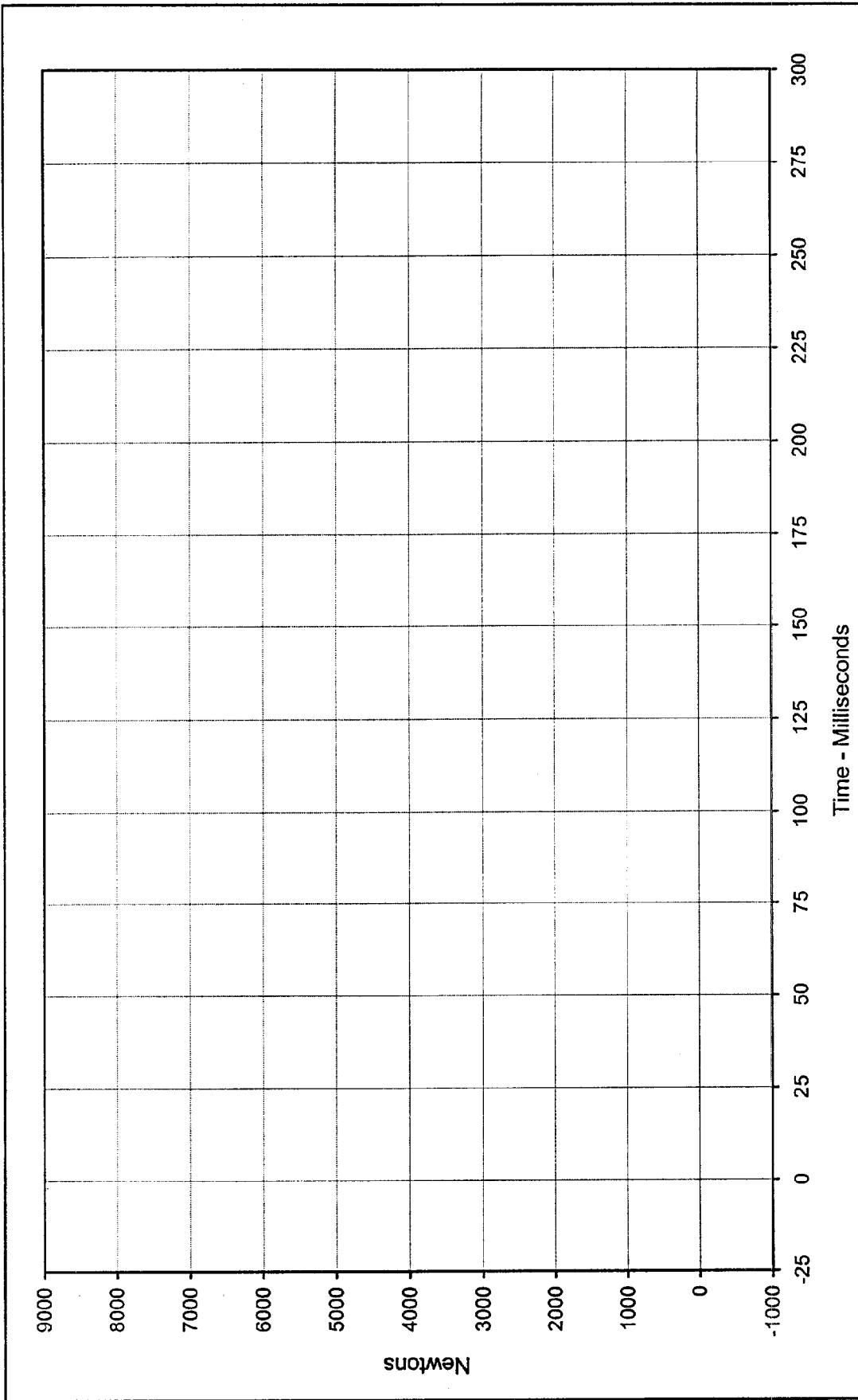




Curve Description: Passenger Right Foot Fore Z
 Maximum Value: 116.3 at 56.2 Milliseconds
 Minimum Value: -162.9 at 46.1 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 2/4/99
 Curve Number: FIL-084

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

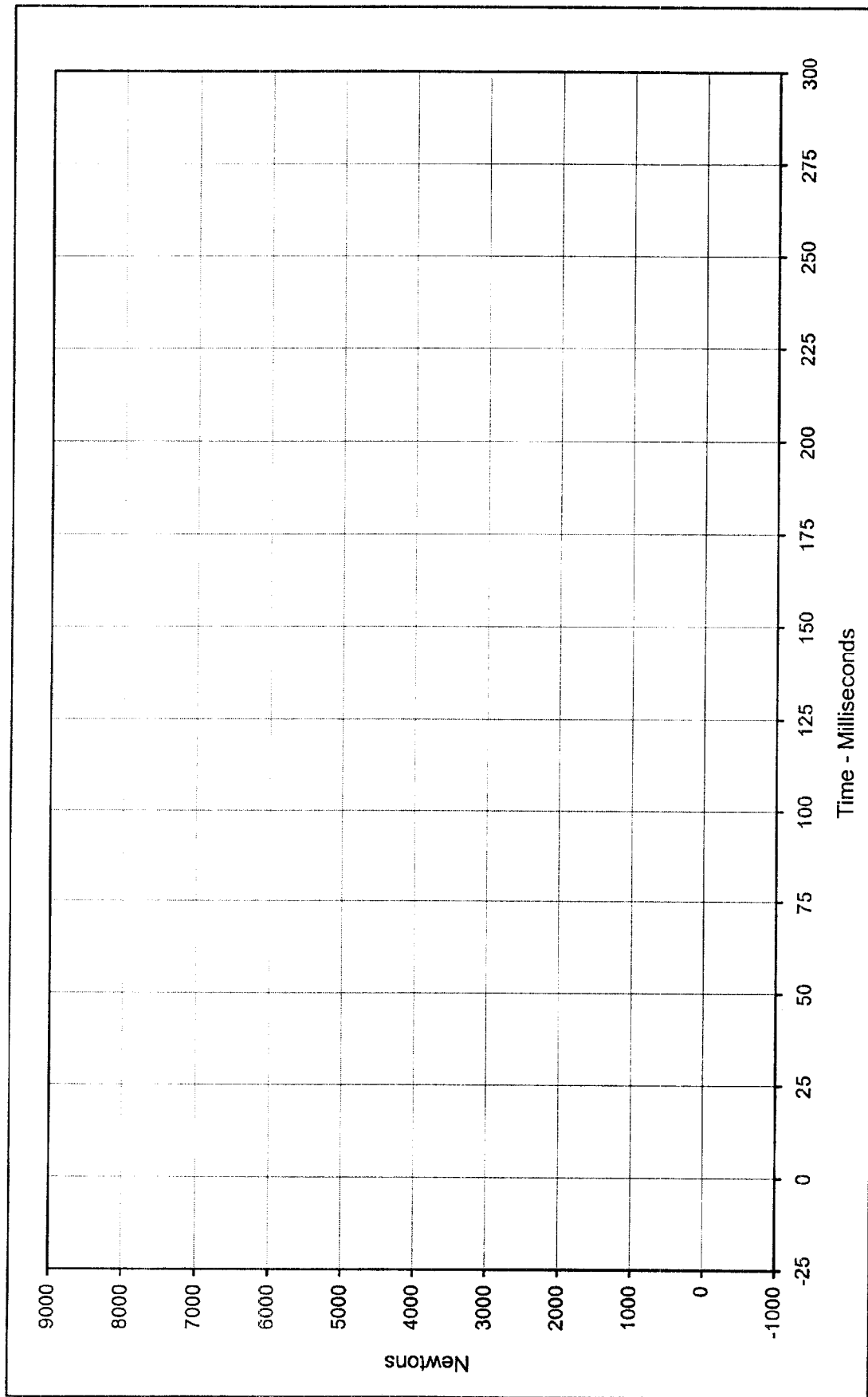




Curve Description:	Passenger Lap Belt Force	*	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	0.0	at	0.0	Milliseconds	Test Vehicle:
Minimum Value:	0.0	at	0.0	Milliseconds	1999 Ford Econoline E-150 Van
SAE Filter Class:	60				
Date of Test:	2/4/99				
Curve Number:	FIL-085				



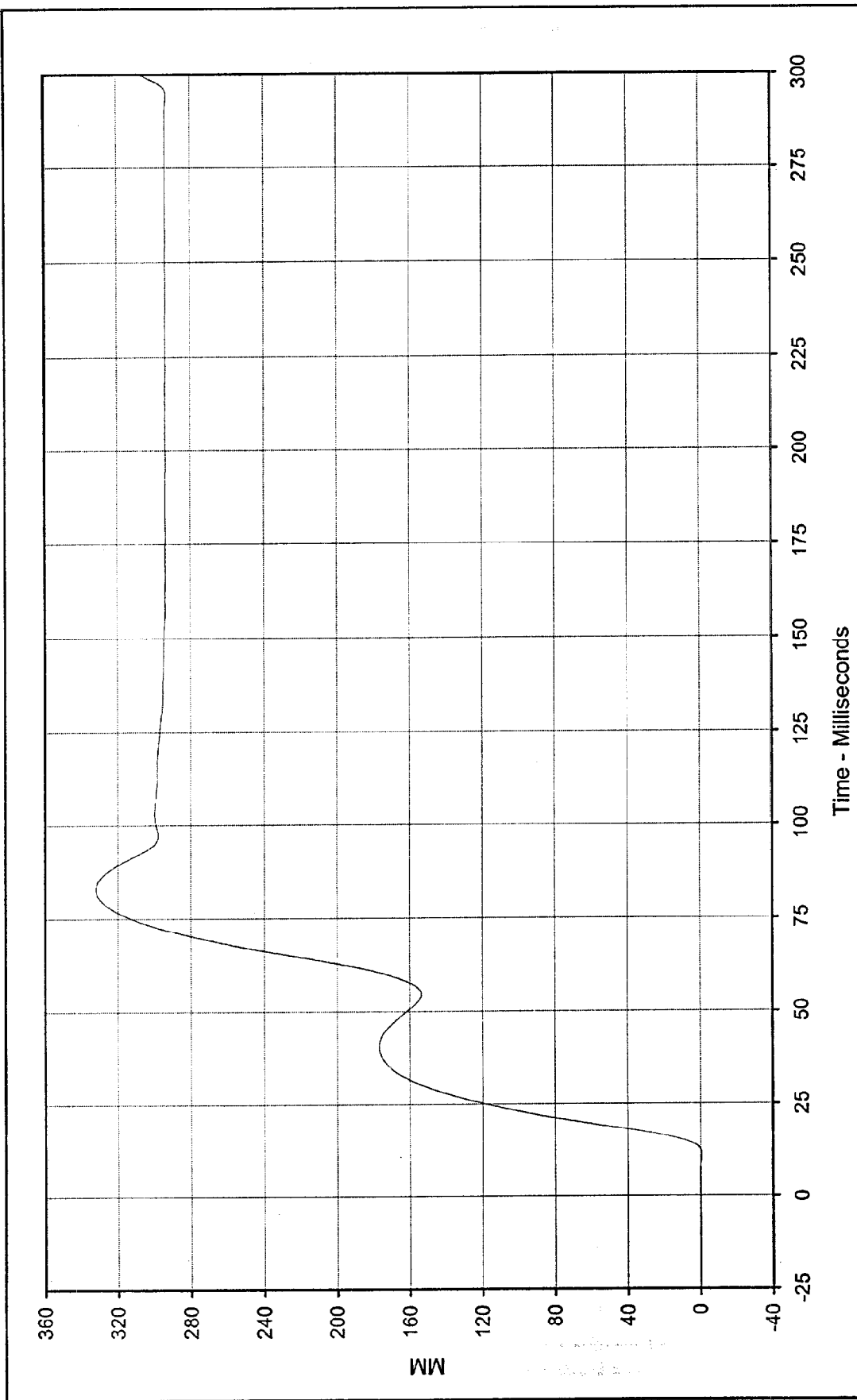
*Not used, Mfr. Request



Curve Description:	Passenger Shoulder Belt Force	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	0.0 at 0.0 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	0.0 at 0.0 Milliseconds			
SAE Filter Class:	60			
Date of Test:	2/4/99			
Curve Number:	FIL-086			



*Not used, Mfr. Request



Curve Description: Passenger Shoulder Belt Pullout

Maximum Value: 332.0 at 82.8 Milliseconds

Minimum Value: -0.6 at 11.4 Milliseconds

SAE Filter Class: 60

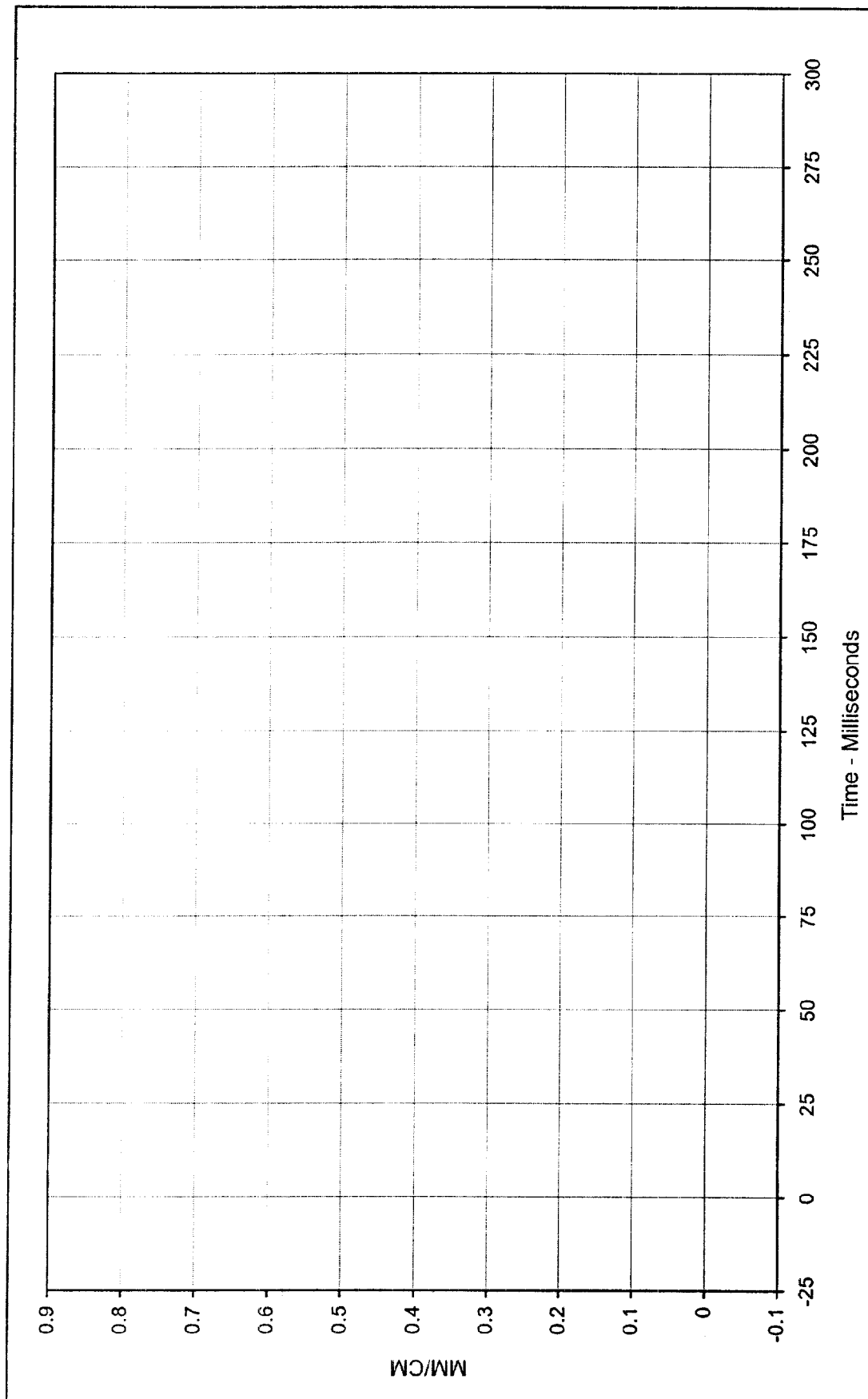
Date of Test: 2/4/99

Curve Number: FIL-087

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Passenger Shoulder Belt Elongation * Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 0.00 at 0.0 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

Minimum Value: 0.00 at 0.0 Milliseconds

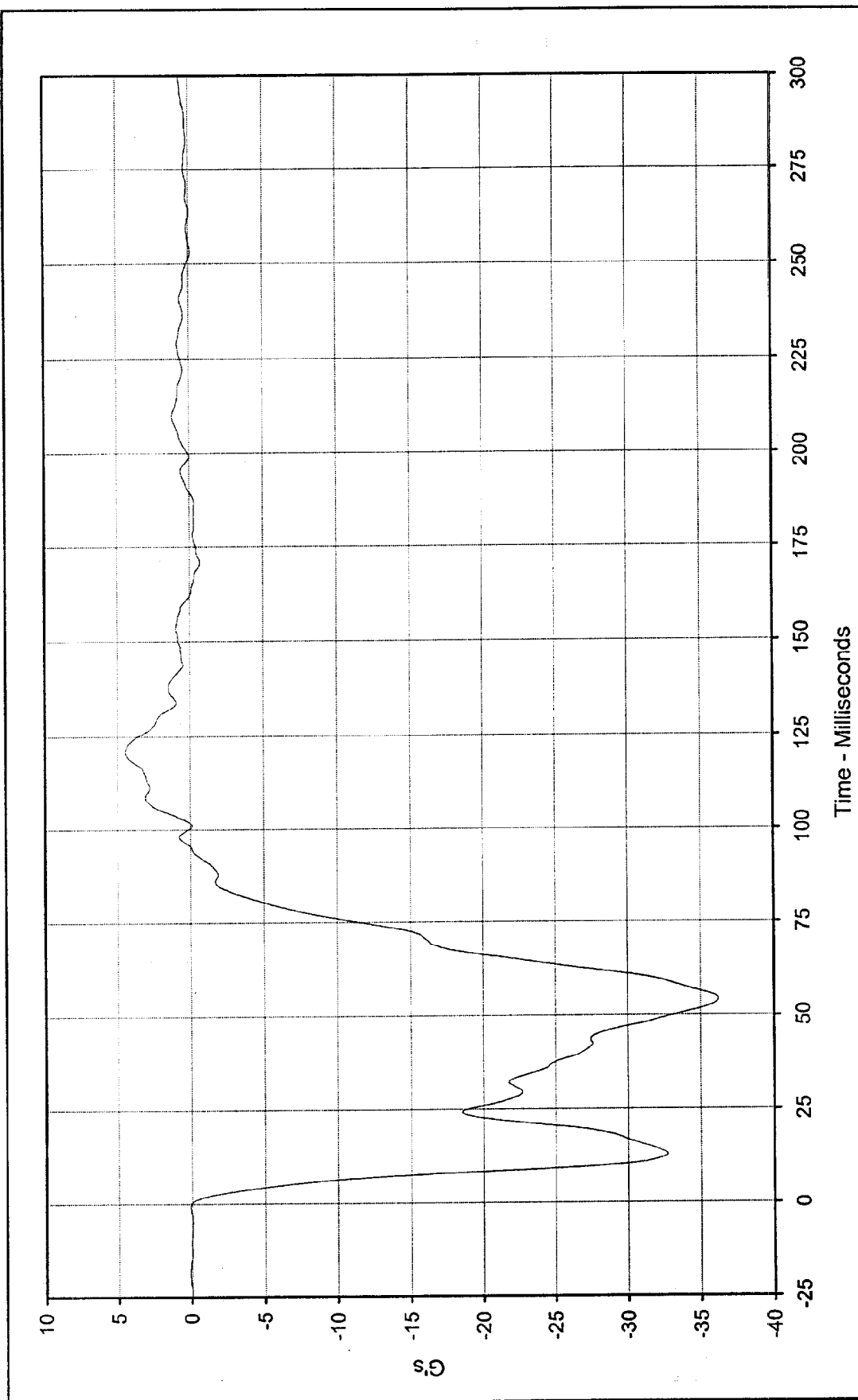
SAE Filter Class: 60

Date of Test: 2/4/99

Curve Number: FIL-088



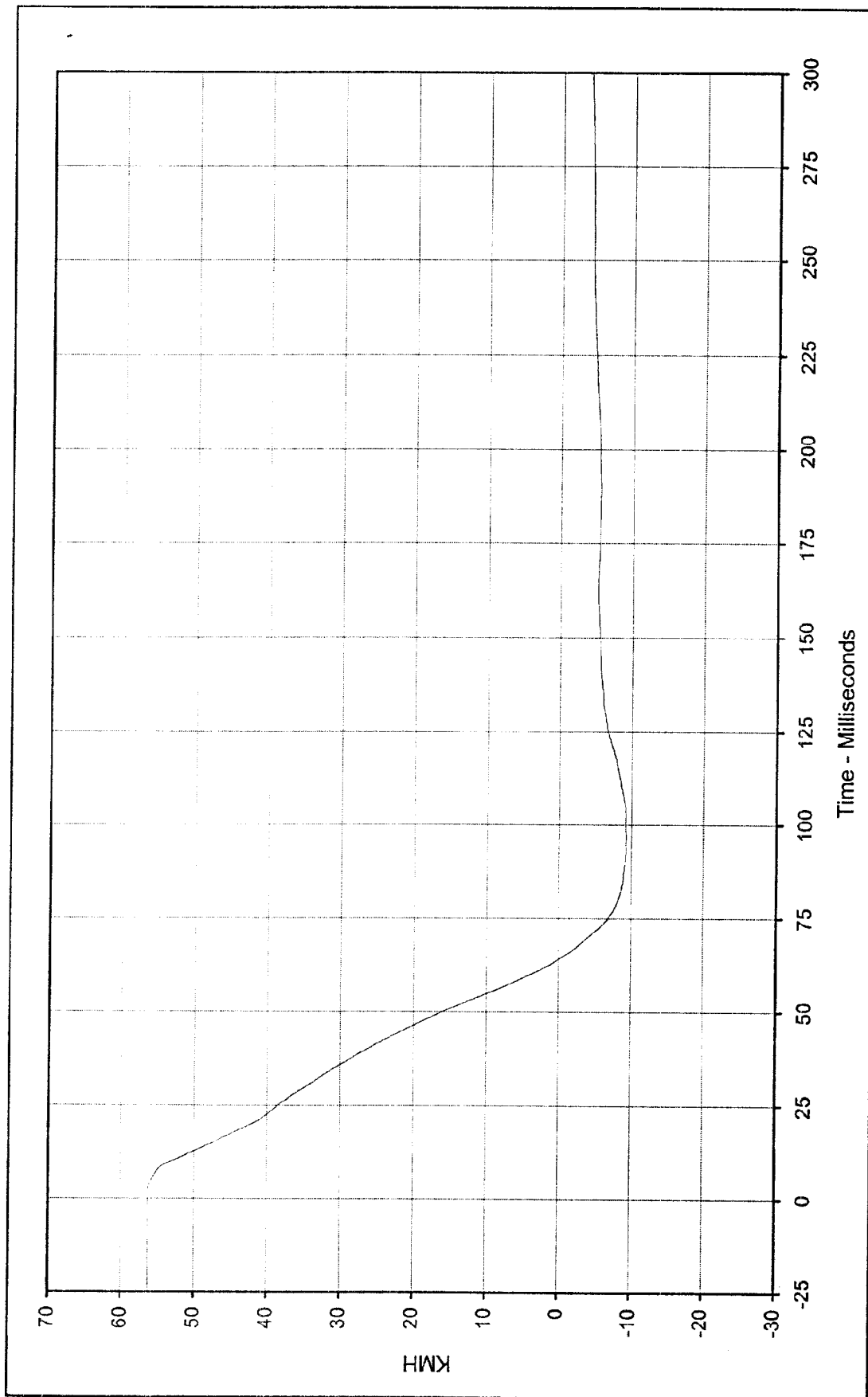
*Not used, Mfr. Request



Curve Description: Vehicle Left Rear Primary Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
Maximum Value: 4.5 at 120.7 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van
Minimum Value: -36.2 at 54.2 Milliseconds



SAE Filter Class: 60
Date of Test: 2/4/99
Curve Number: FIL-089



Curve Description: Vehicle Left Rear Primary Velocity

Maximum Value: 56.3 at 1.4 Milliseconds

Minimum Value: -9.3 at 96.4 Milliseconds

SAE Filter Class: 180

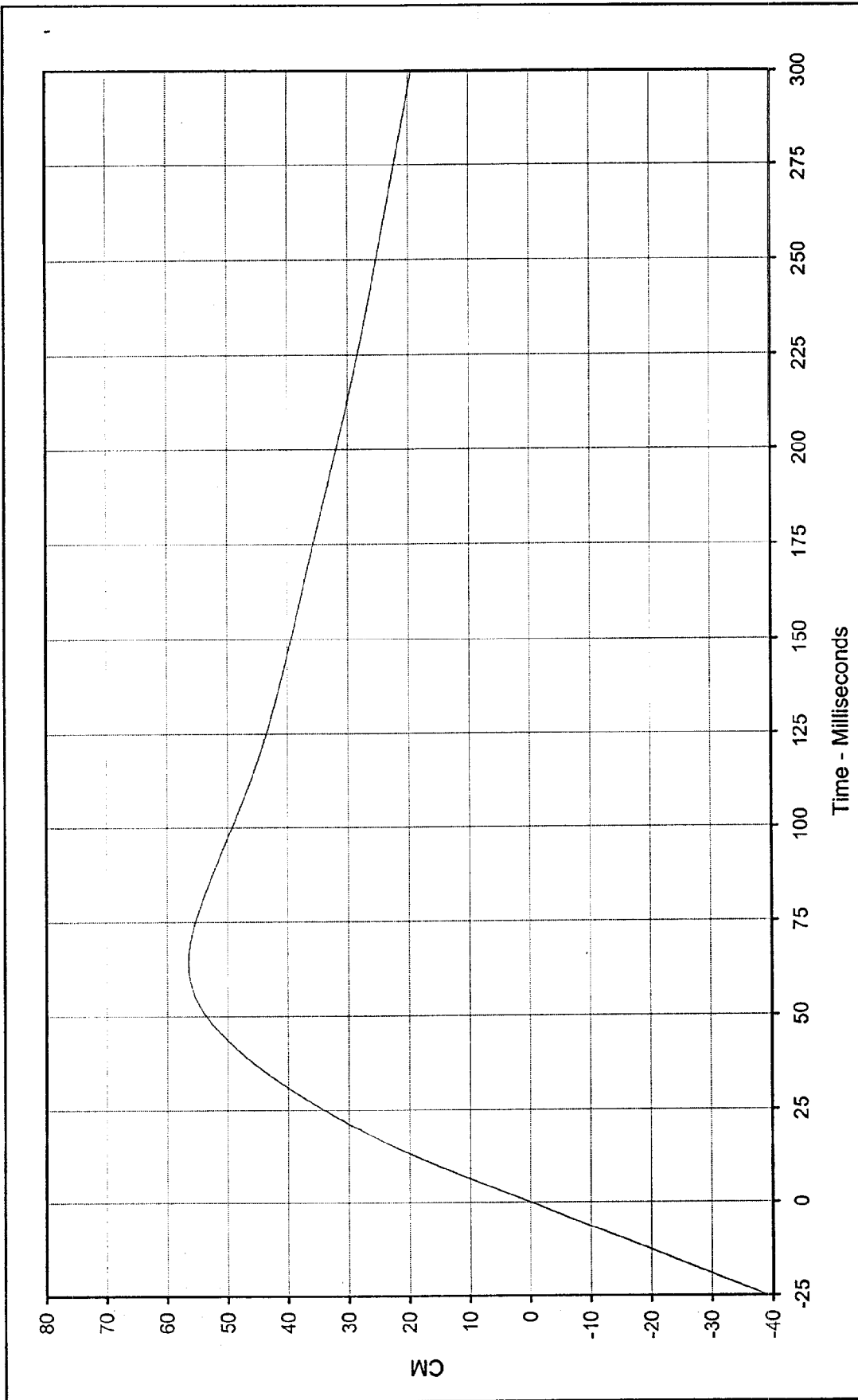
Date of Test: 2/4/99

Curve Number: IN1-089

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

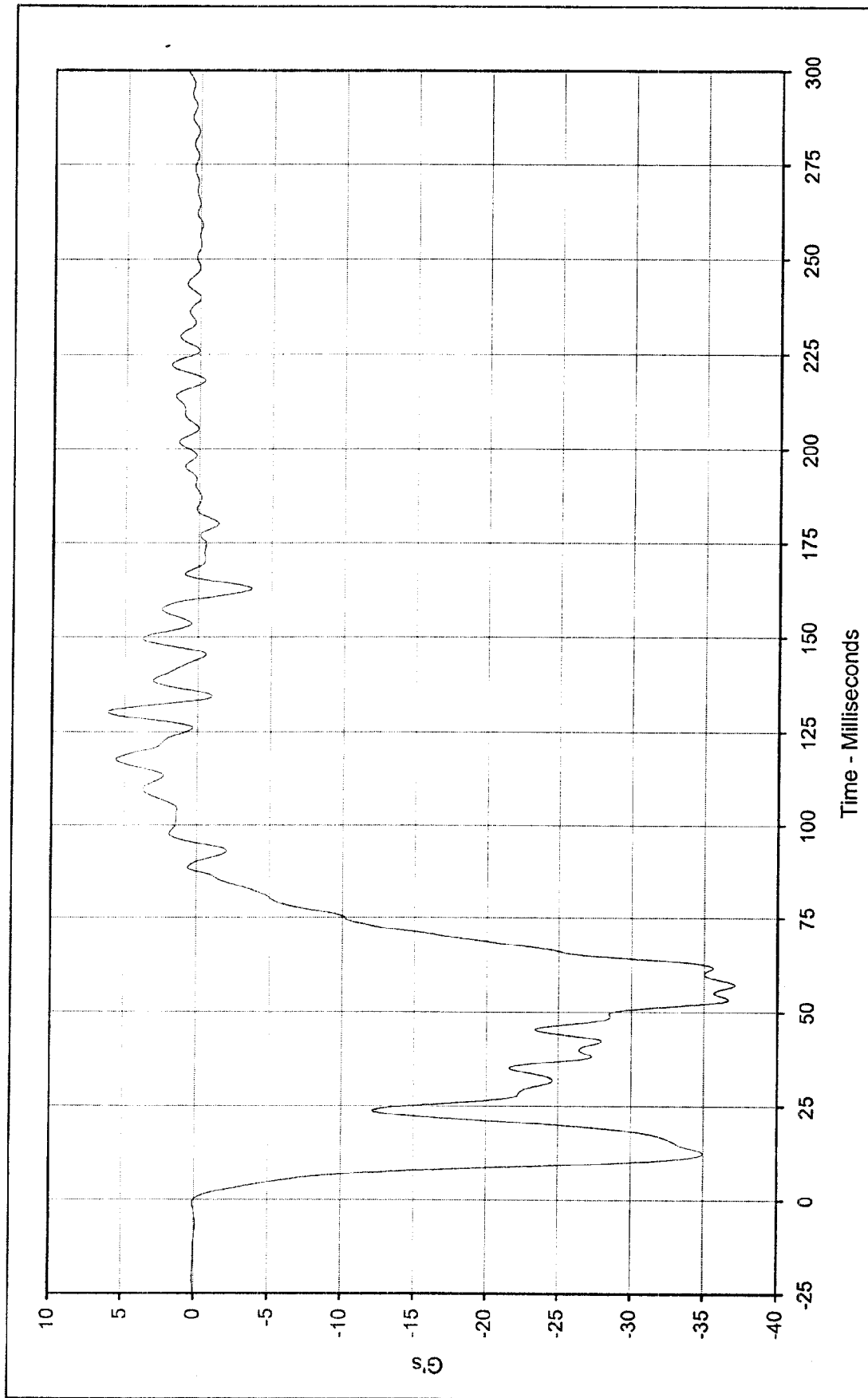




Curve Description: Vehicle Left Rear Primary Displ.
 Maximum Value: 56.4 at 63.8 Milliseconds
 Minimum Value: 0.0 at 0.0 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN2-089

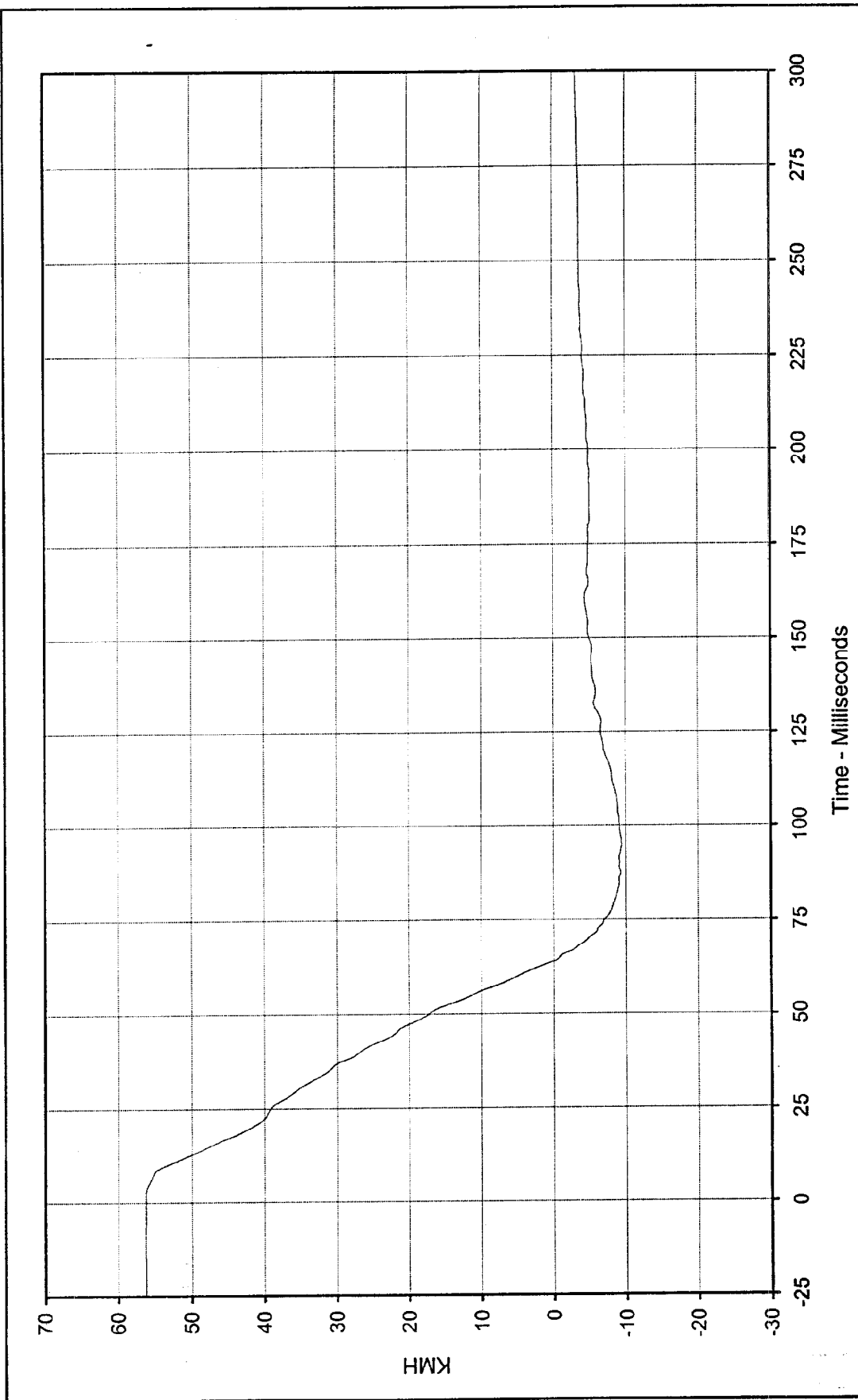
Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description:	Vehicle Right Rear Primary	Test Program:	1999 NHTSA 35 mph NCAP	No.: MX0208
Maximum Value:	6.2 at 130.2 Milliseconds	Test Vehicle:	1999 Ford Econoline E-150 Van	
Minimum Value:	-37.1 at 57.1 Milliseconds			
SAE Filter Class:	60			
Date of Test:	2/4/99			
Curve Number:	FIL-090			

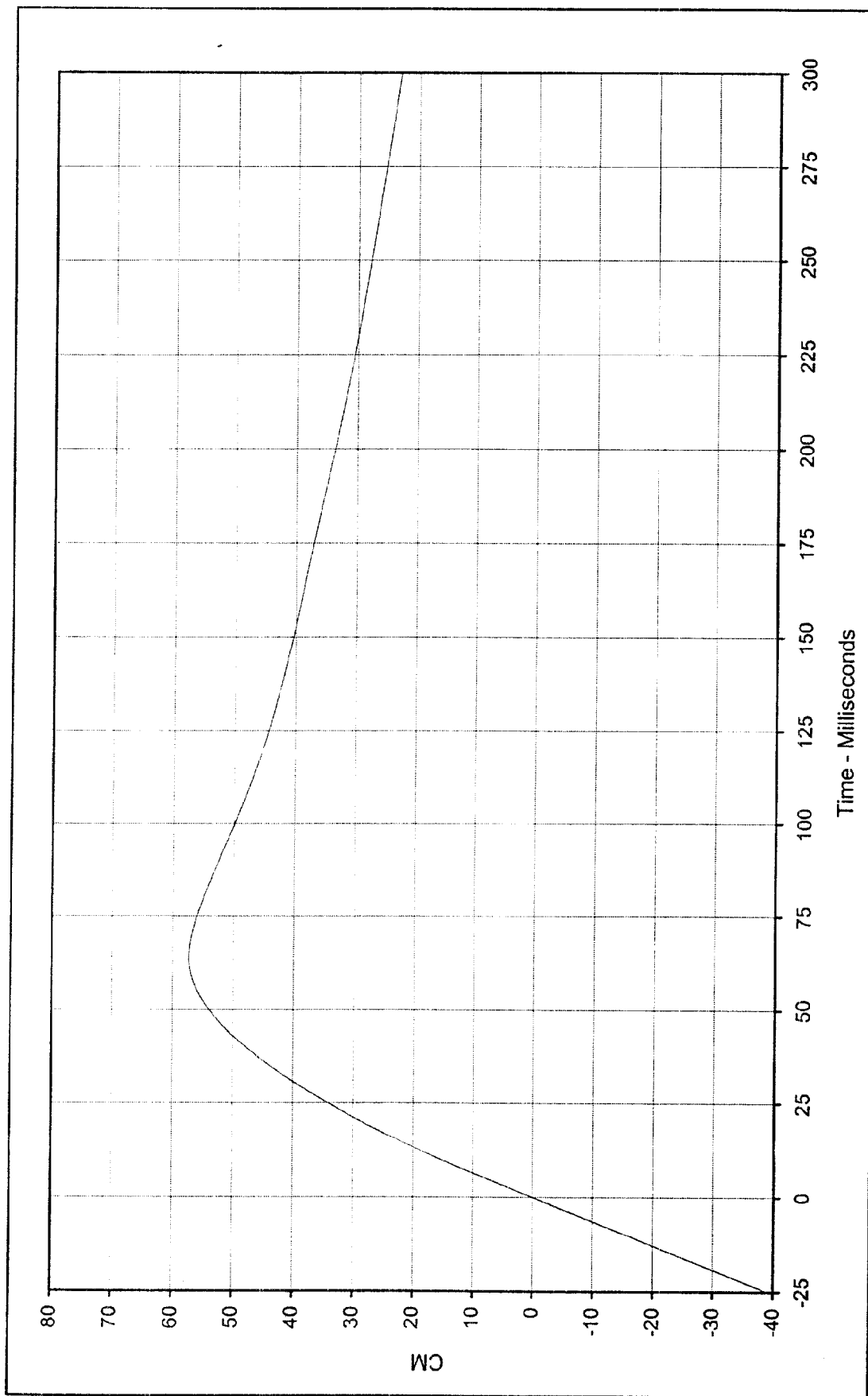




Curve Description: Vehicle Right Rear Primary Velocity
 Maximum Value: 56.3 at 1.7 Milliseconds
 Minimum Value: -9.4 at 94.6 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN1-090

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Vehicle Right Rear Primary Displ.

Maximum Value: 57.3 at 63.8 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

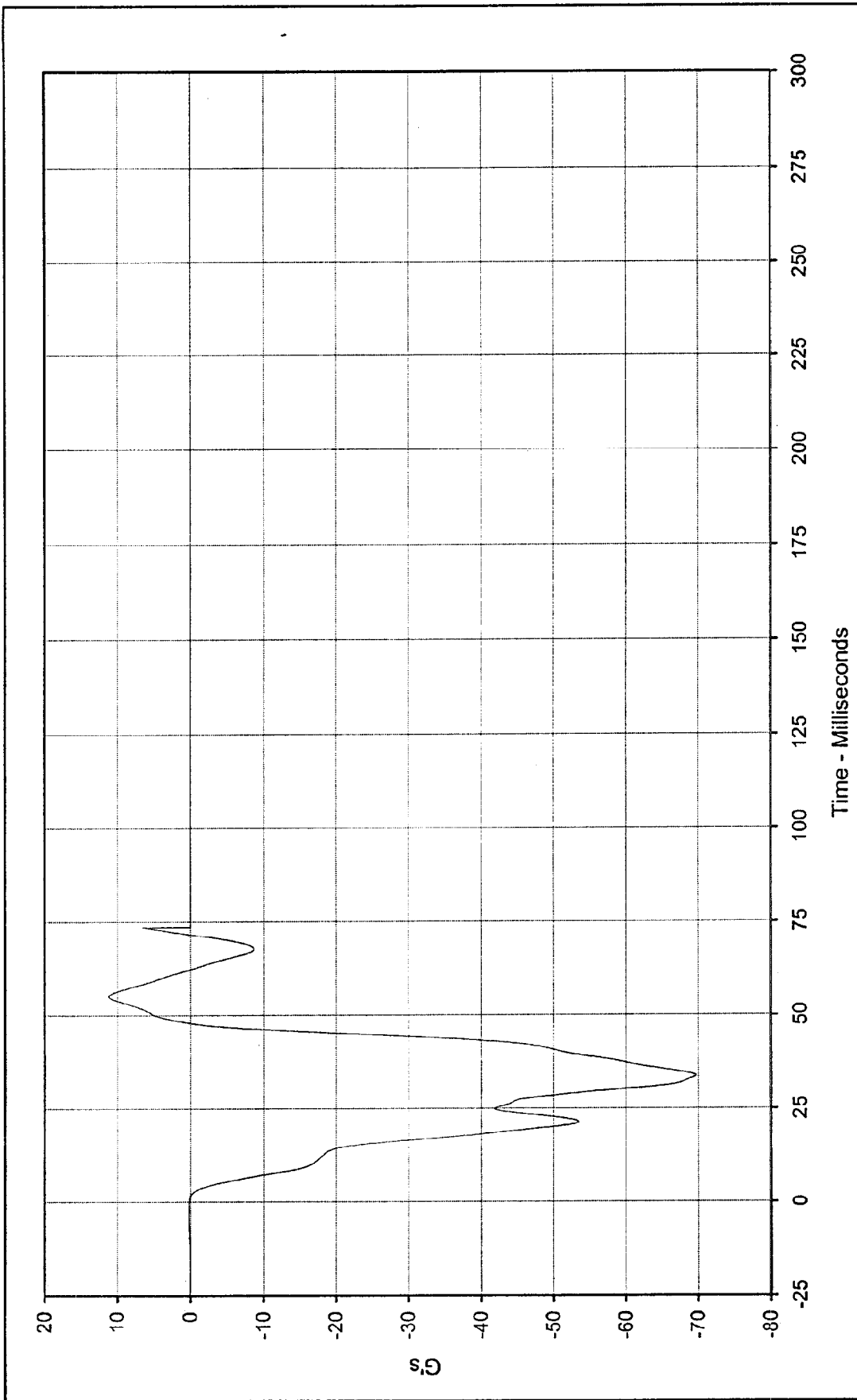
Date of Test: 2/4/99

Curve Number: IN2-090

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

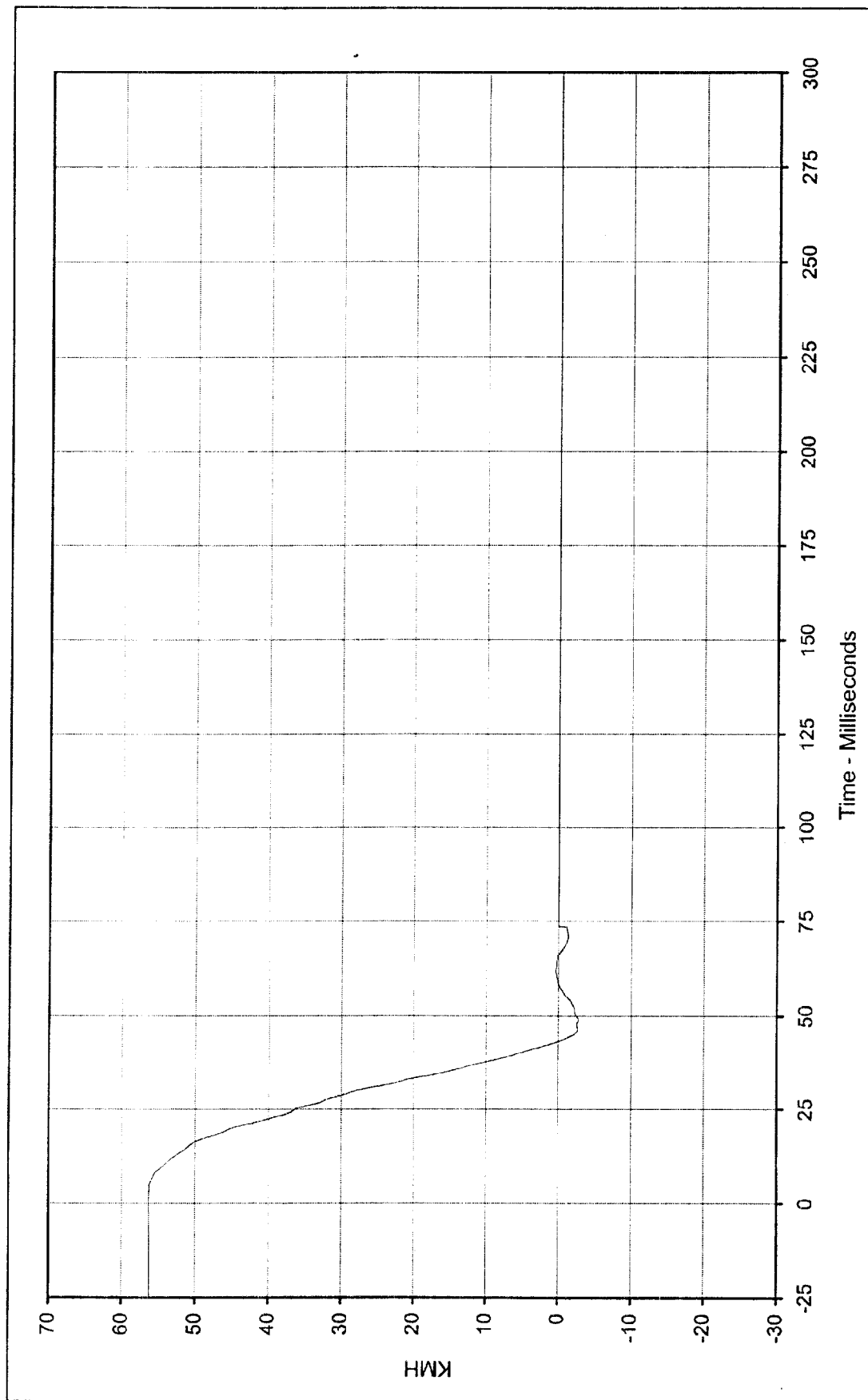




Curve Description: Vehicle Engine Top *
 Maximum Value: 11.2 at 55.0 Milliseconds
 Minimum Value: -69.7 at 33.5 Milliseconds
 SAE Filter Class: 60
 Date of Test: 2/4/99
 Curve Number: FIL-091



* Channel failed at 73.6 msec.



Curve Description: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Program: 1999 Ford Econoline E-150 Van

Test Vehicle:

Maximum Value: 56.3 at 0.0 Milliseconds

Minimum Value: -2.8 at 48.9 Milliseconds

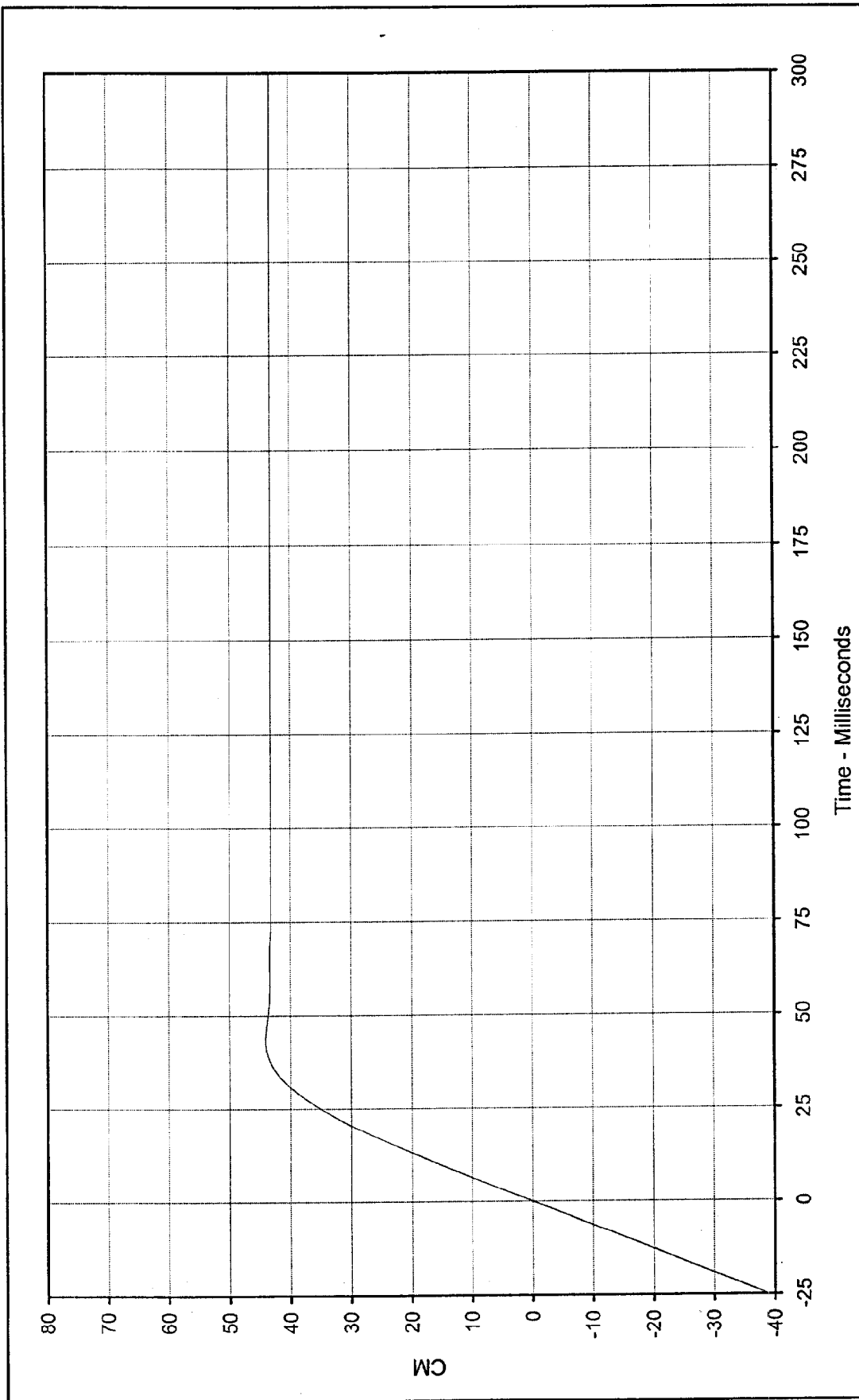
SAE Filter Class: 180

Date of Test: 2/4/99

Curve Number: IN1-091



* Channel Failed at 73.6 Msec.



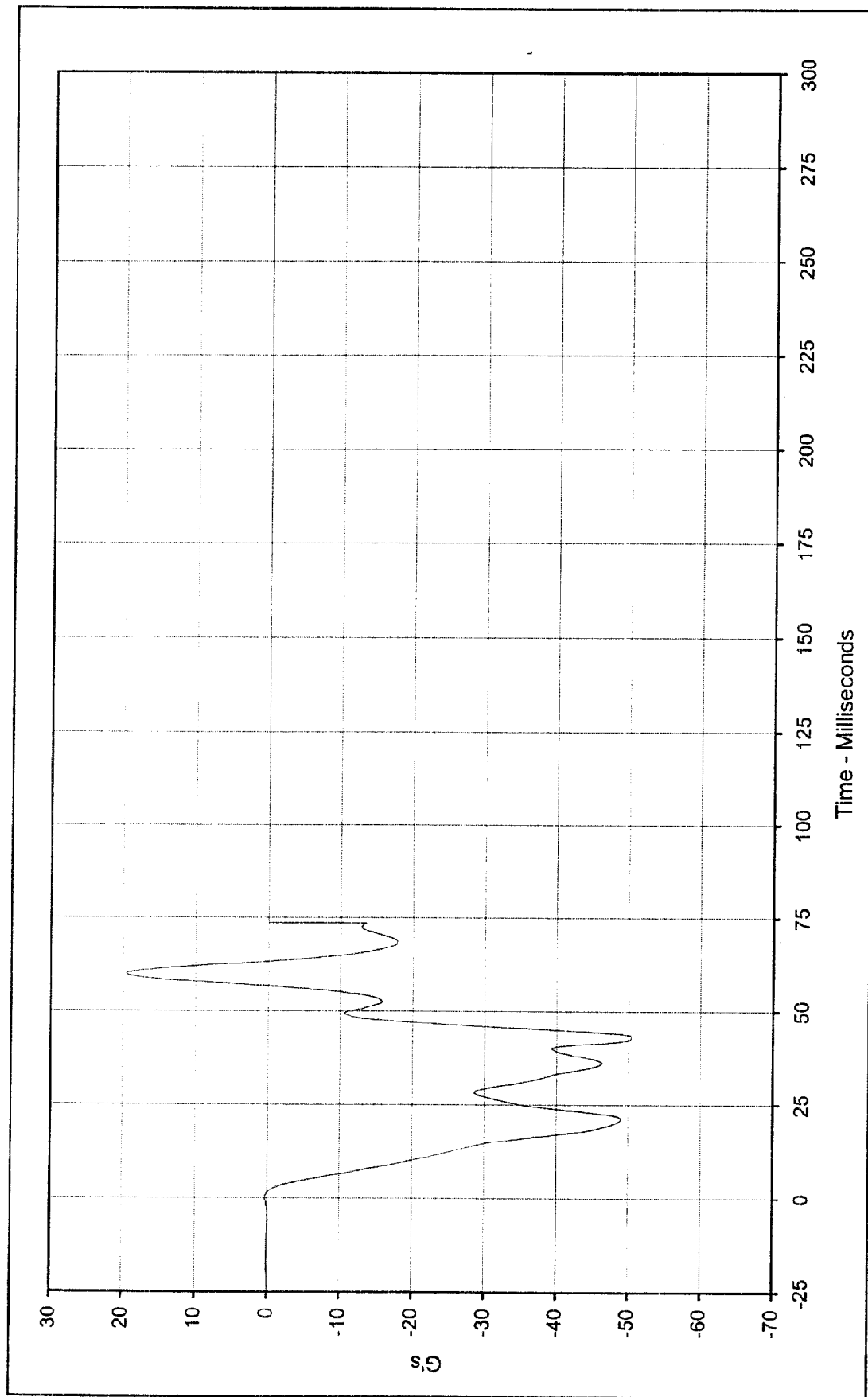
Curve Description: Vehicle Engine Top Displacement *
 Maximum Value: 44.1 at 43.2 Milliseconds
 Minimum Value: 0.0 at 0.0 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN2-091

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van



* Channel Failed at 73.6 Msec.

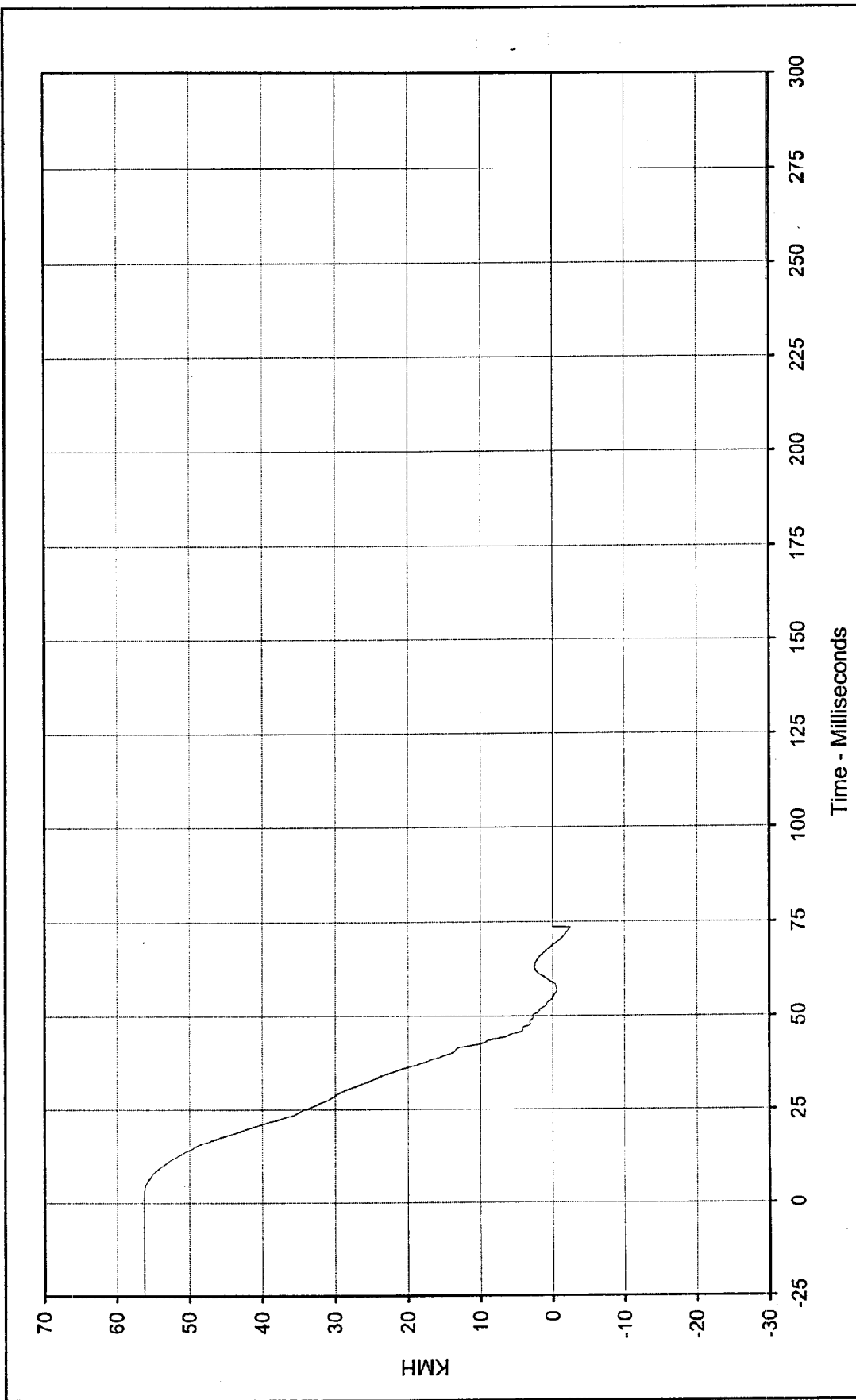


Curve Description: Vehicle Engine Bottom *
 Maximum Value: 19.6 at 59.9 Milliseconds
 Minimum Value: -50.4 at 43.5 Milliseconds
 SAE Filter Class: 60
 Date of Test: 2/4/99
 Curve Number: FIL-092

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van



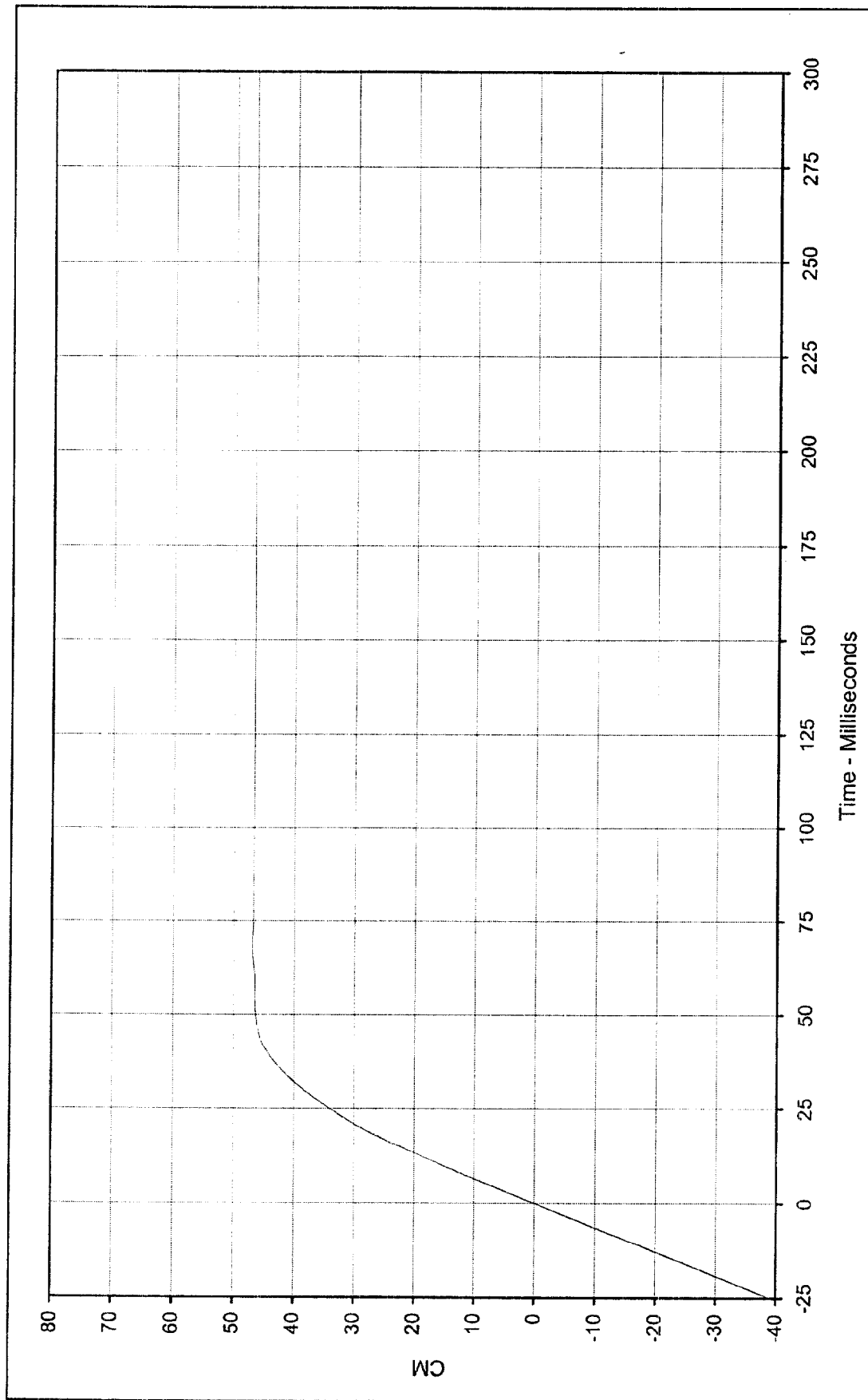
* Channel failed at 73.6 msec.



Curve Description: Vehicle Engine Bottom Velocity * Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
Maximum Value: 56.2 at 1.4 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van
Minimum Value: -2.5 at 73.5 Milliseconds
SAE Filter Class: 180
Date of Test: 2/4/99
Curve Number: IN1-092



* Channel Failed at 73.6 Msec.



Curve Description: Vehicle Engine Bottom Displacement *

Maximum Value: 46.9 at 68.8 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 2/4/99

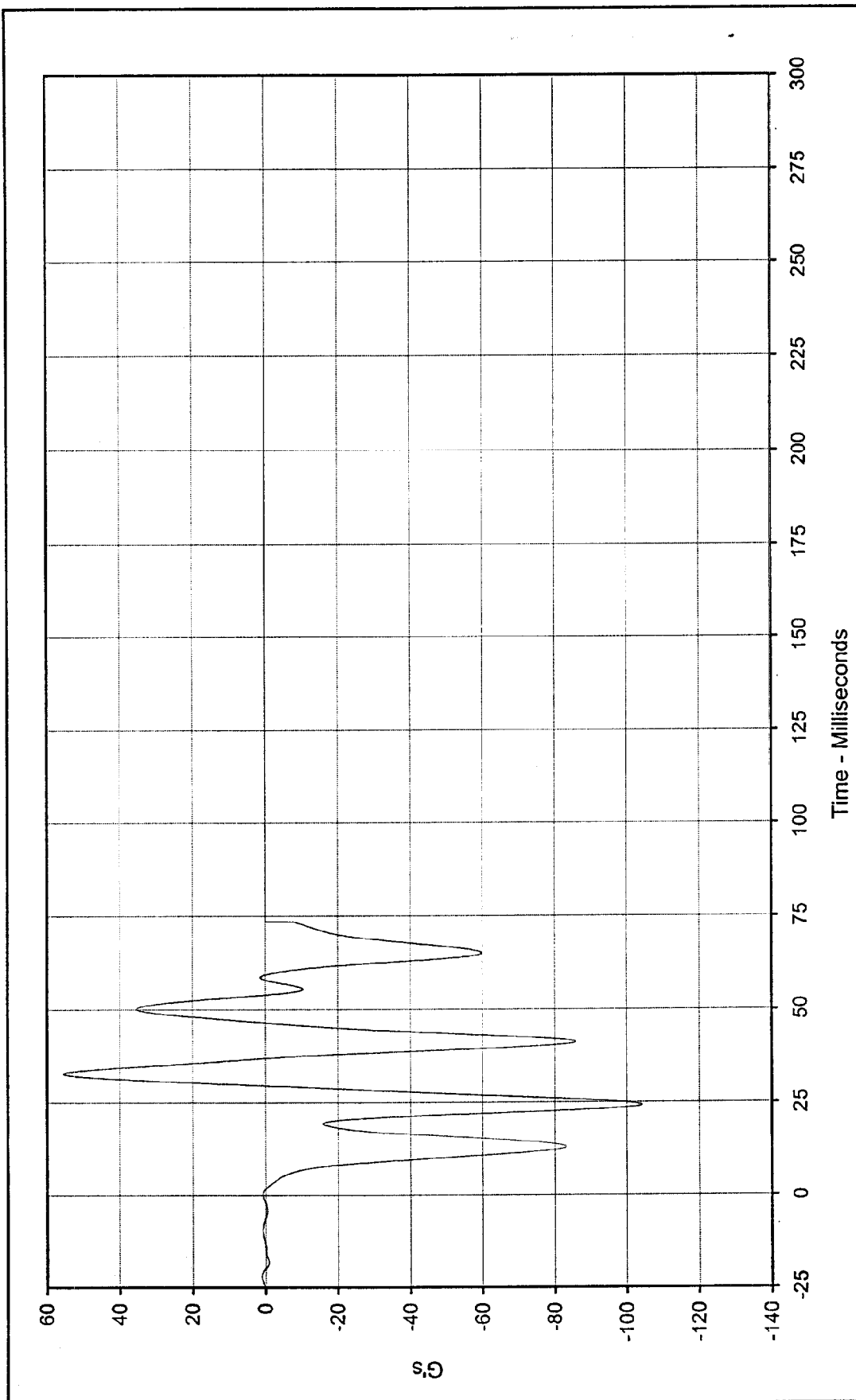
Curve Number: IN2-092

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van



* Channel Failed at 73.6 Msec.



Curve Description: Vehicle Left Brake Caliper * Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 55.4 at 32.7 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

Minimum Value: -104.3 at 24.2 Milliseconds

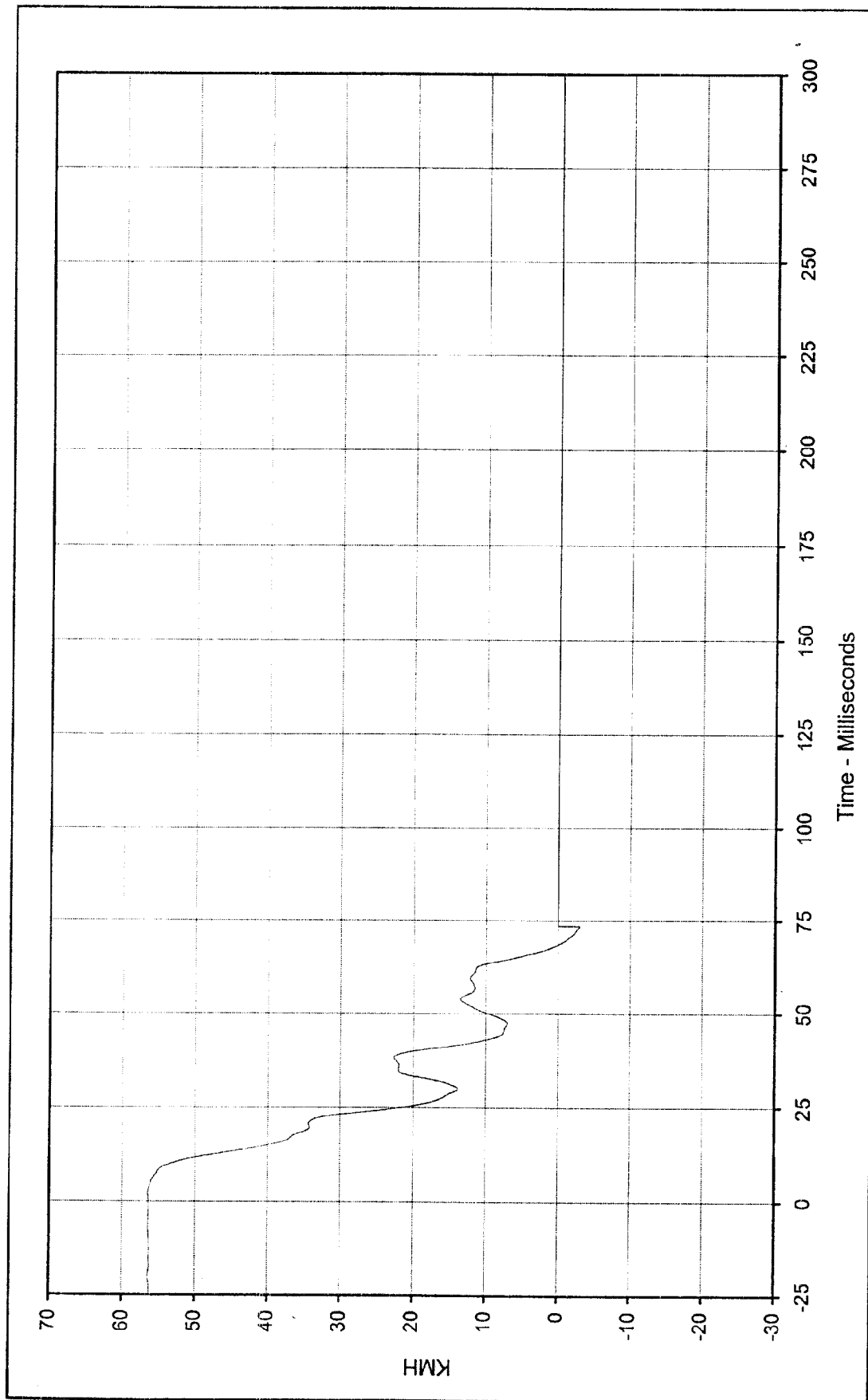
SAE Filter Class: 60

Date of Test: 2/4/99

Curve Number: FIL-093



* Channel failed at 73.6 msec.



Curve Description: Vehicle Left Brake Caliper Velocity *

Maximum Value: 56.5 at 2.1 Milliseconds

Minimum Value: -3.0 at 73.5 Milliseconds

SAE Filter Class: 180

Date of Test: 2/4/99

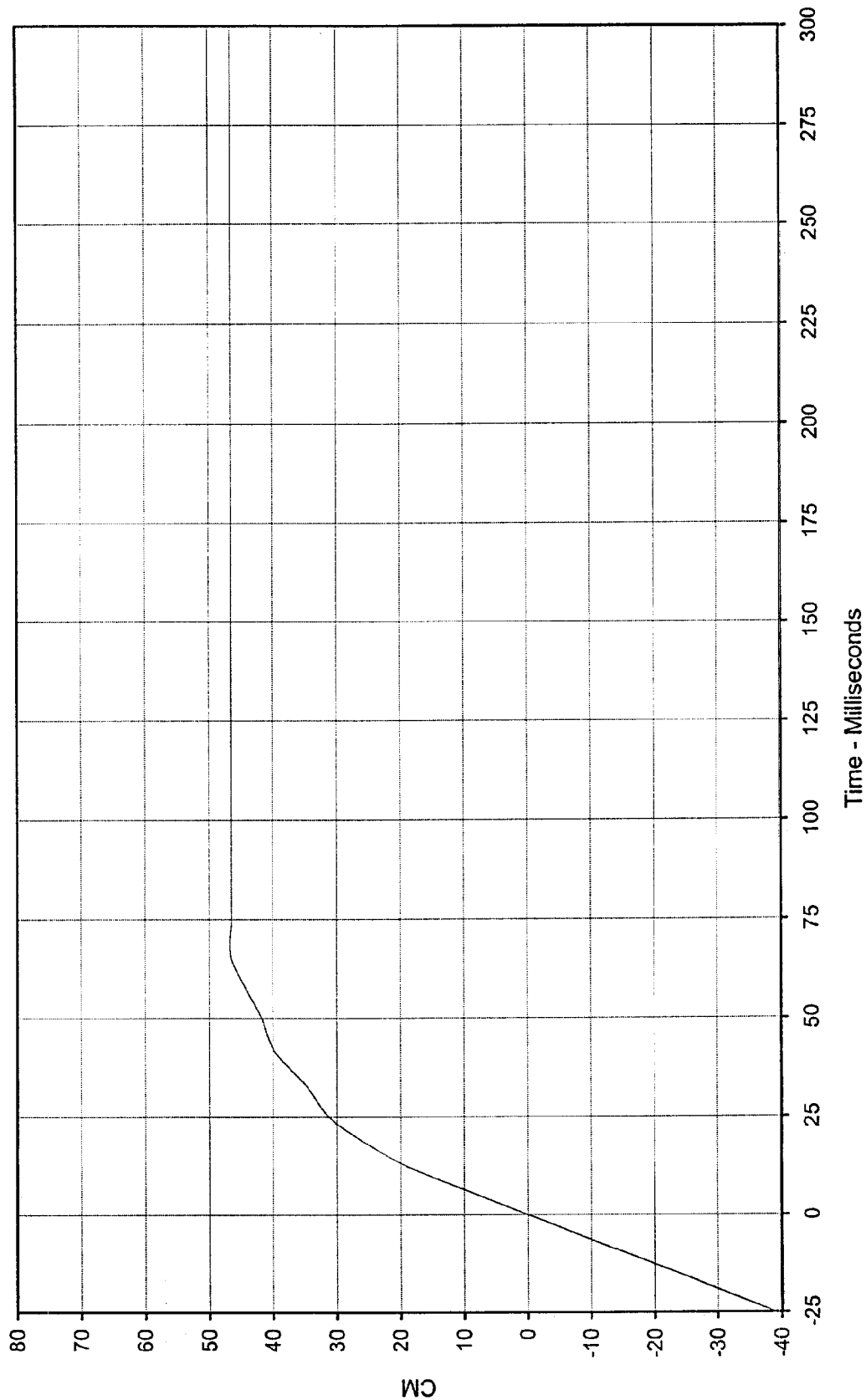
Curve Number: IN1-093

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van



* Channel Failed at 73.6 Msec.

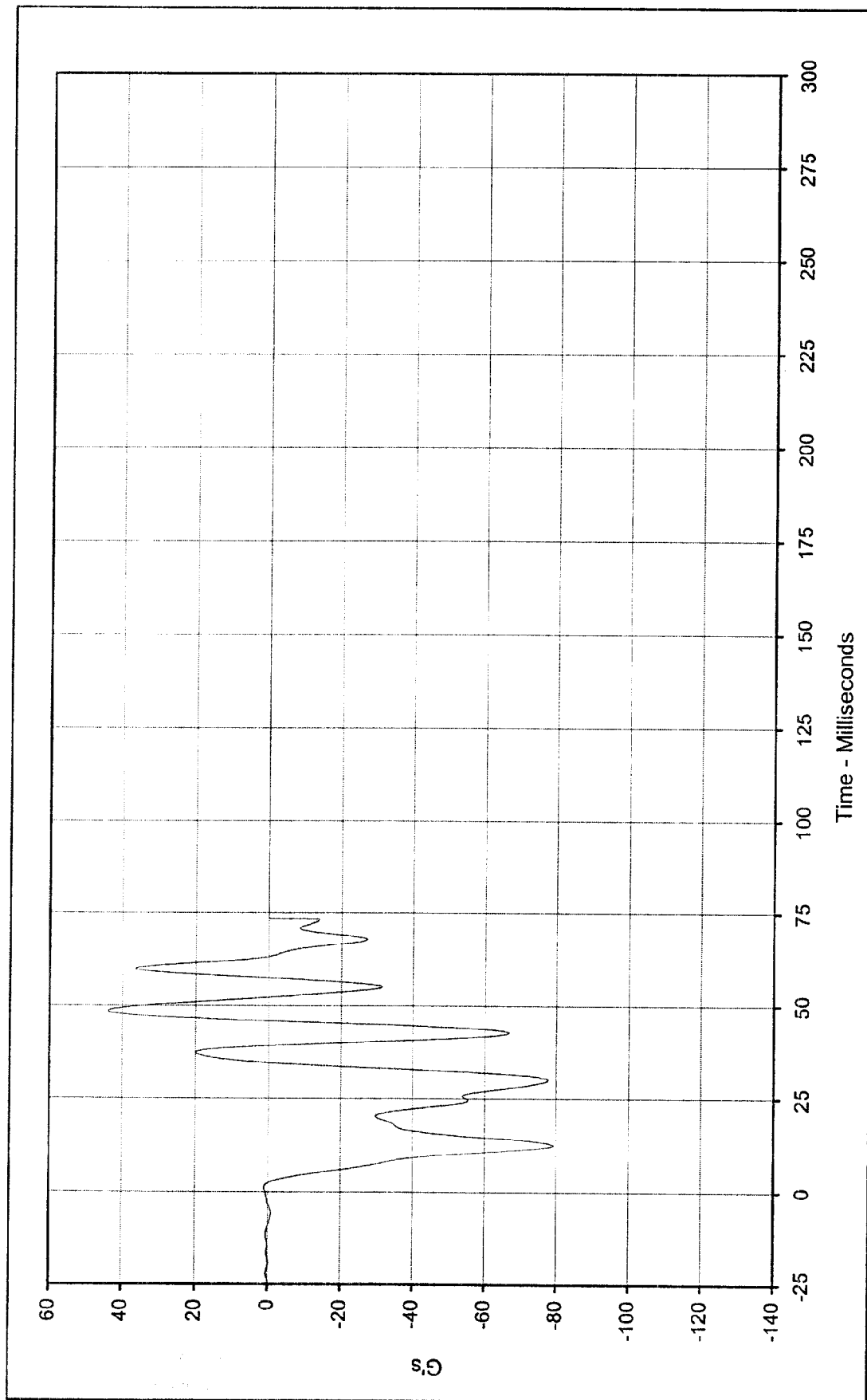


Curve Description: Vehicle Left Brake Caliper Displ. *
 Maximum Value: 46.7 at 68.4 Milliseconds
 Minimum Value: 0.0 at 0.0 Milliseconds



SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN2-093

* Channel Failed at 73.6 Msec.

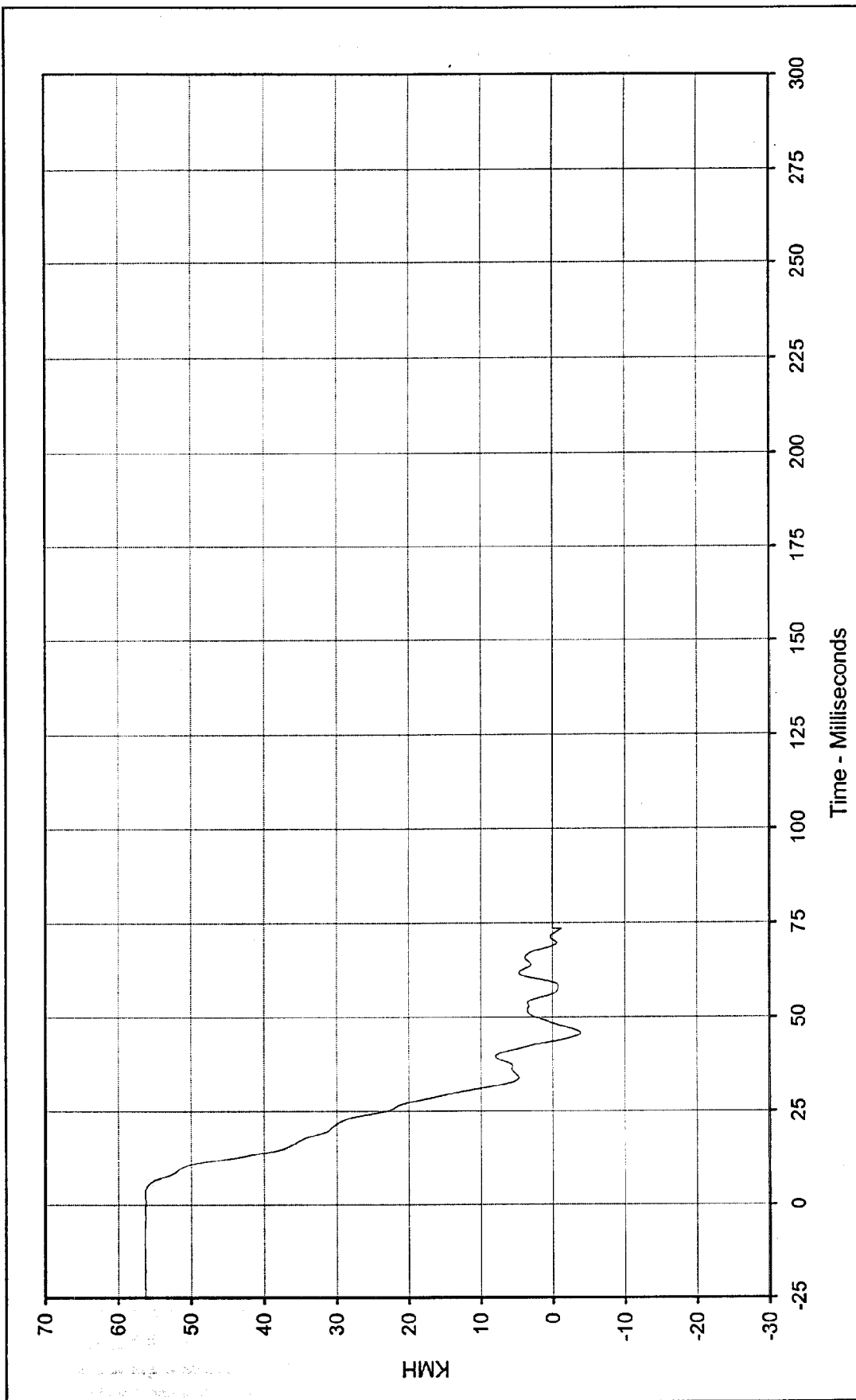


Curve Description: Vehicle Right Brake Caliper *
 Maximum Value: 43.9 at 48.6 Milliseconds
 Minimum Value: -79.3 at 12.5 Milliseconds
 SAE Filter Class: 60
 Date of Test: 2/4/99
 Curve Number: FIL-094

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van



* Channel failed at 73.6 msec.



Curve Description: Vehicle Right Brake Caliper Velocity * Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Maximum Value: 56.3 at 3.0 Milliseconds Test Vehicle: 1999 Ford Econoline E-150 Van

Minimum Value: -3.9 at 45.7 Milliseconds

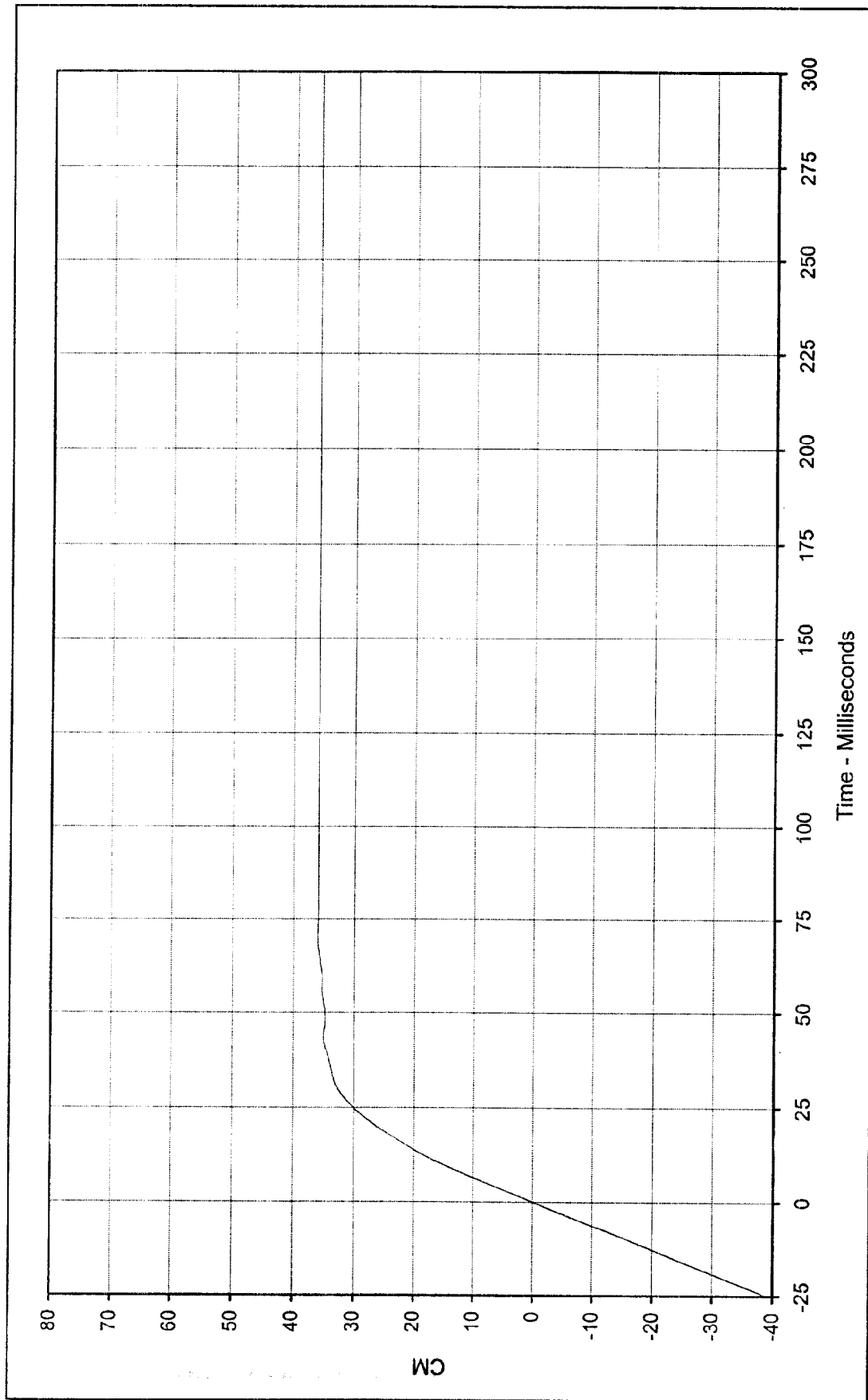
SAE Filter Class: 180

Date of Test: 2/4/99

Curve Number: IN1-094



* Channel Failed at 73.6 Msec.

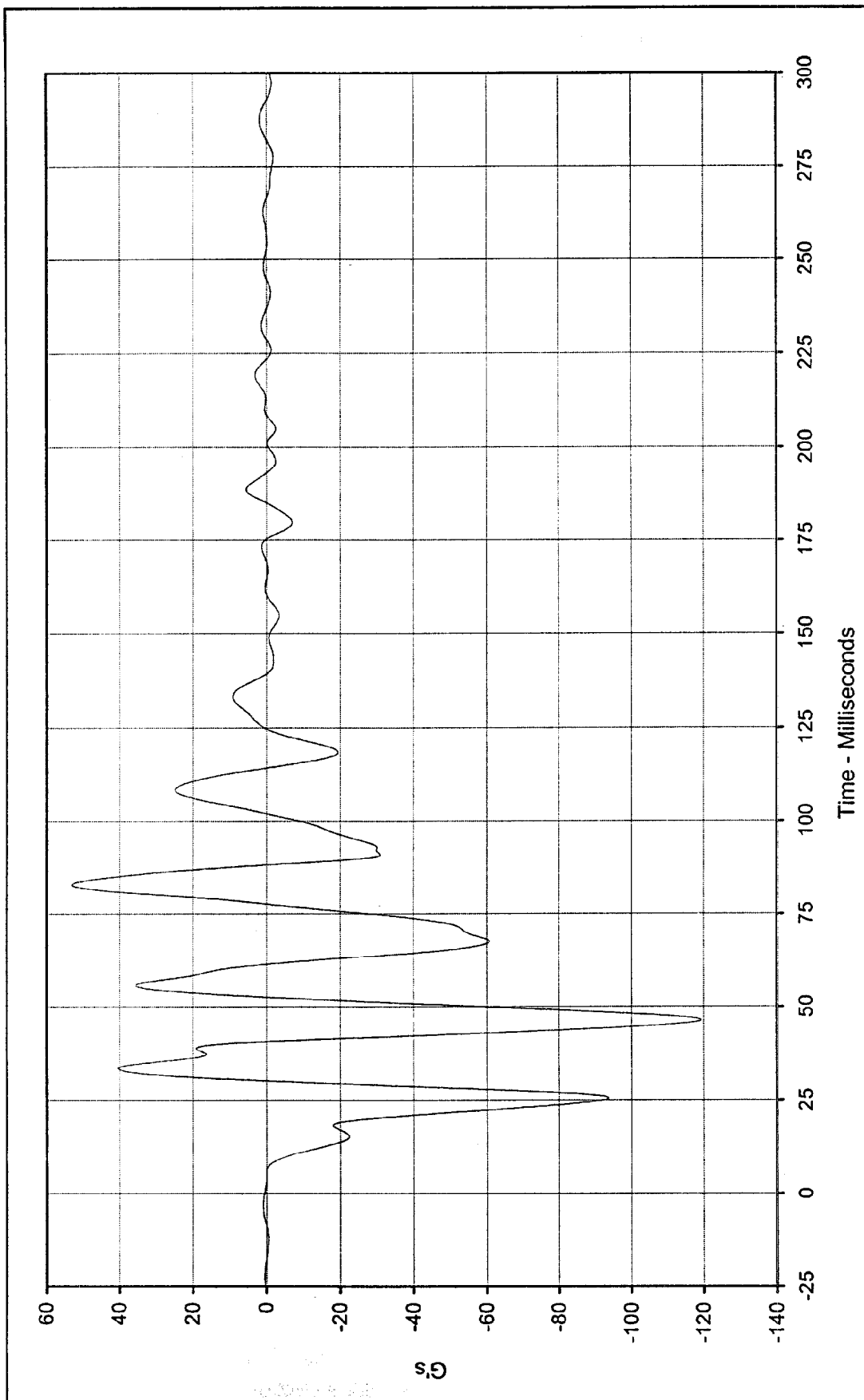


Curve Description: Vehicle Right Brake Caliper Displ. *
 Maximum Value: 36.0 at 68.9 Milliseconds
 Minimum Value: 0.0 at 0.0 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN2-094

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van



* Channel Failed at 73.6 Msec.



Curve Description: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Program: 1999 Ford Econoline E-150 Van

Vehicle Instrument Panel

Maximum Value: 53.2 at 82.7 Milliseconds

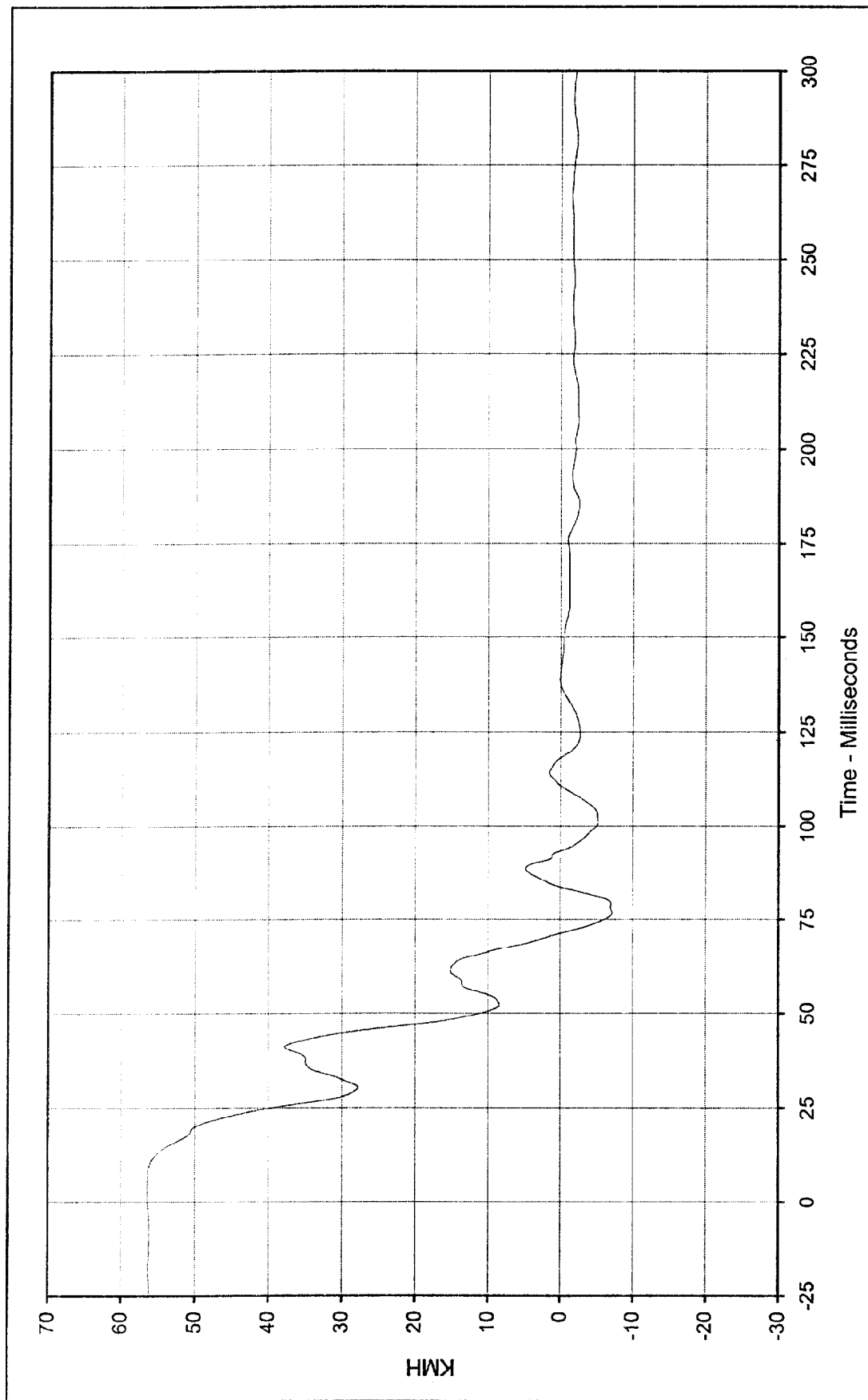
Minimum Value: -119.4 at 46.4 Milliseconds

SAE Filter Class: 60

Date of Test: 2/4/99

Curve Number: FIL-095

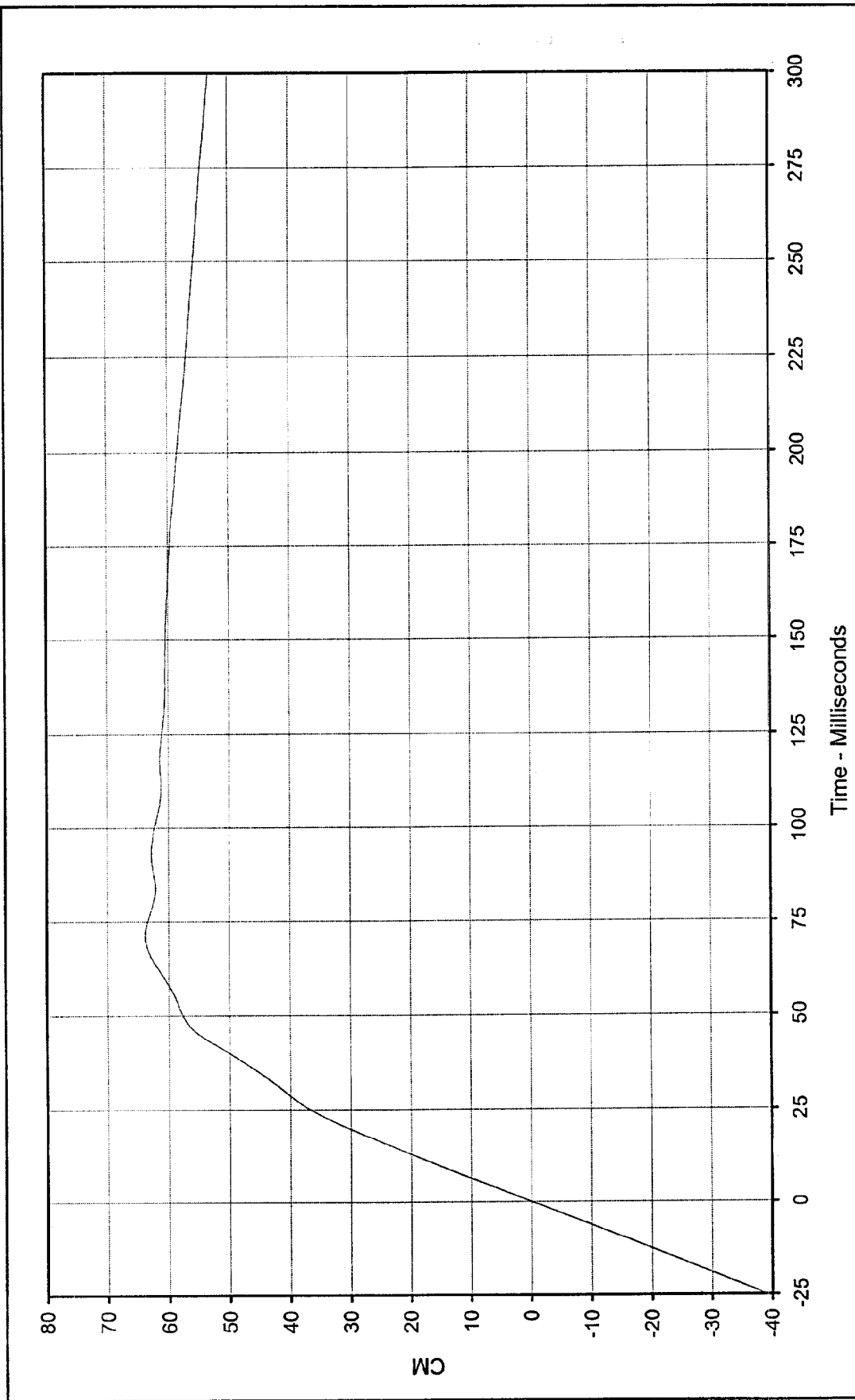




Curve Description: Vehicle Instrument Panel Velocity
 Maximum Value: 56.4 at 2.8 Milliseconds
 Minimum Value: -7.1 at 76.6 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN1-095

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Vehicle Instrument Panel Displacement

Maximum Value: 63.8 at 71.3 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

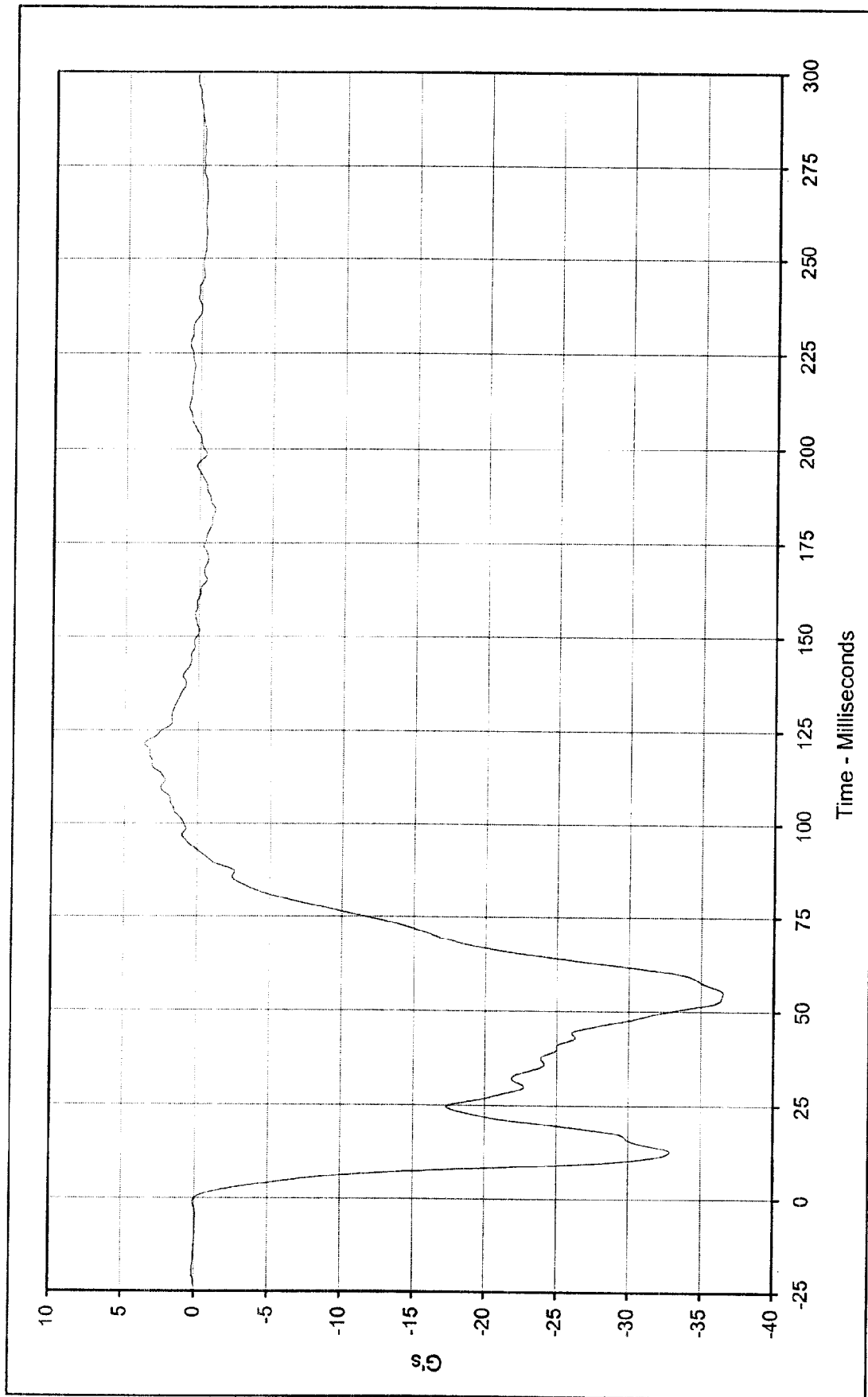
Date of Test: 2/4/99

Curve Number: IN2-095

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van

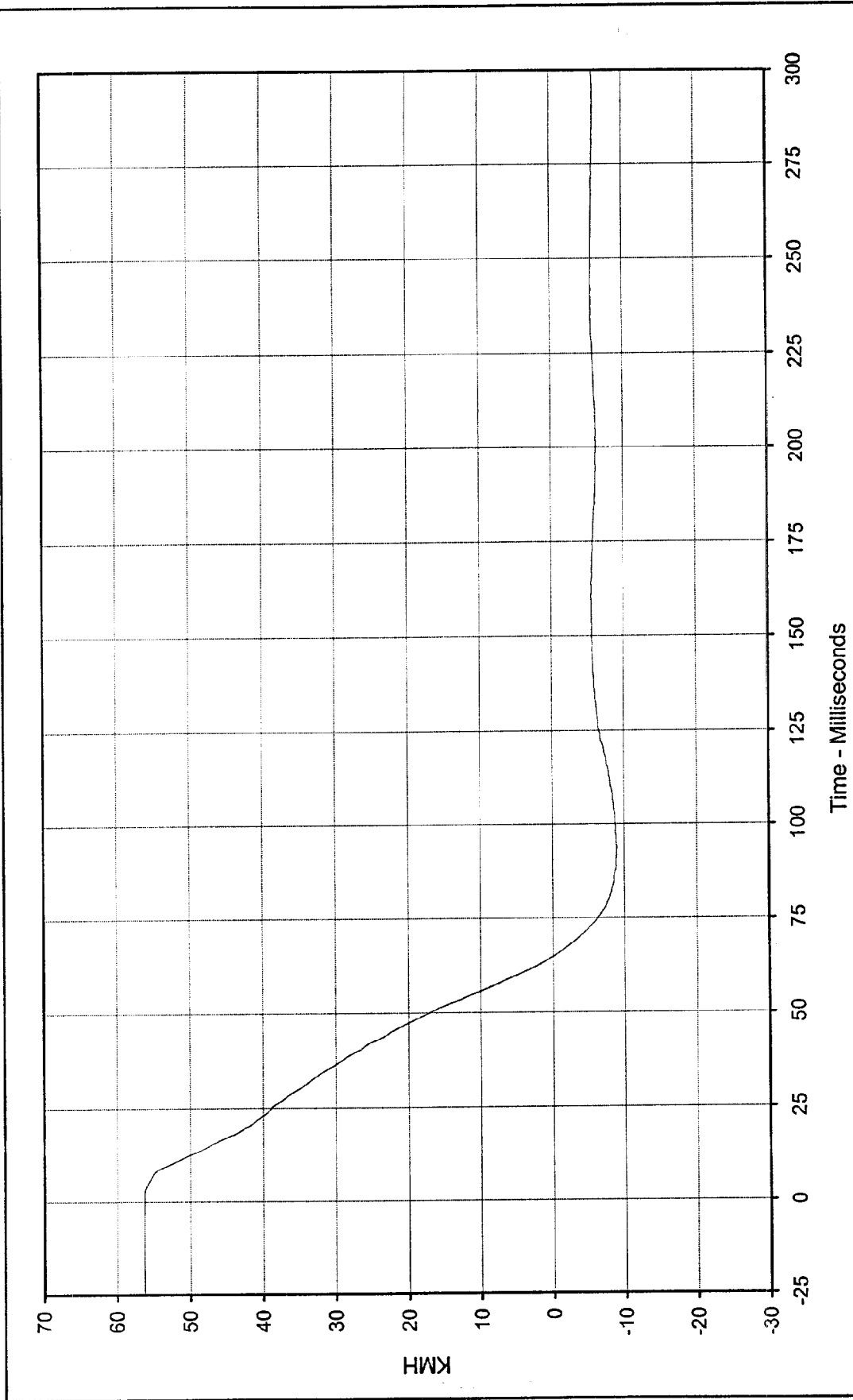




Curve Description: Vehicle Left Rear Redundant
 Maximum Value: 3.7 at 121.5 Milliseconds
 Minimum Value: -36.5 at 54.7 Milliseconds
 SAE Filter Class: 60
 Date of Test: 2/4/99
 Curve Number: FIL-096

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van

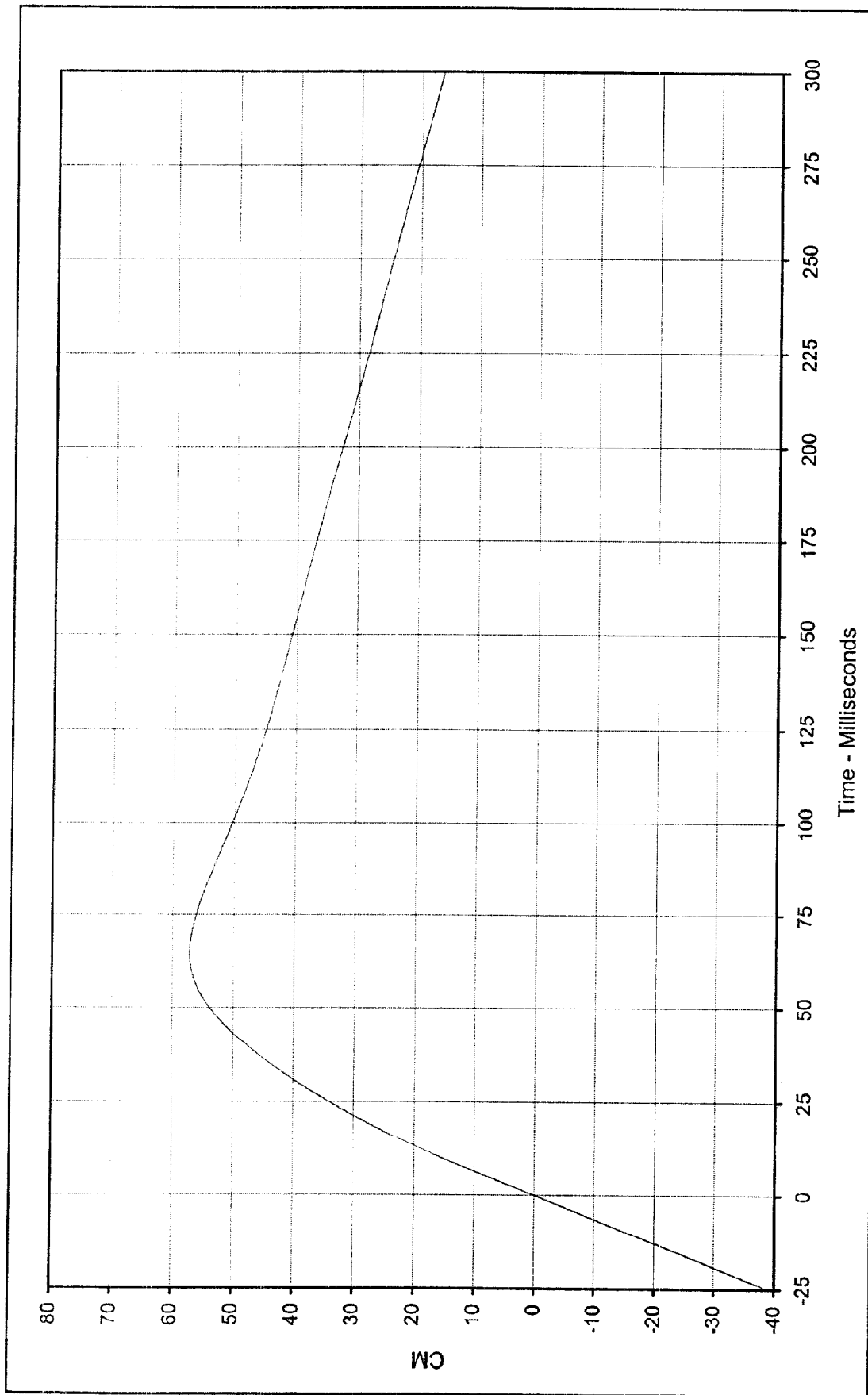




Curve Description: Vehicle Left Rear Redundant Velocity
 Maximum Value: 56.3 at 0.4 Milliseconds
 Minimum Value: -9.0 at 93.6 Milliseconds
 SAE Filter Class: 180
 Date of Test: 2/4/99
 Curve Number: IN1-096

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208
 Test Vehicle: 1999 Ford Econoline E-150 Van





Curve Description: Vehicle Left Rear Redundant Displ.

Maximum Value: 57.2 at 64.5 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 2/4/99

Curve Number: IN2-096

Test Program: 1999 NHTSA 35 mph NCAP No.: MX0208

Test Vehicle: 1999 Ford Econoline E-150 Van



APPENDIX C

LOAD CELL BARRIER INFORMATION

NO DATA COLLECTED FOR THIS TEST

APPENDIX D
INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

KAR99001-13

1999 NHTSA 35 mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D Serial Number 34
2/4/99
1999 Ford Econoline E-150 Van

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 34

2/4/99

1999 Ford Econoline E-150 Van

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
25	UP. TIBIA LEFT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
26	UP. TIBIA LEFT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
27	UP. TIBIA RIGHT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
28	UP. TIBIA RIGHT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
29	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
30	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
31	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
32	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
33	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
34	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
35	FOOT LEFT	X	KEIC003X	Accel., Foot Triax	I.C. Sensor	3031-500	G
36	FOOT LEFT	Y	KEIC003Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
37	FOOT LEFT	Z	KEIC003Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
38	FOOT RIGHT	X	KEIC004X	Accel., Foot Triax	I.C. Sensor	3031-500	G
39	FOOT RIGHT	Y	KEIC004Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
40	FOOT RIGHT	Z	KEIC004Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
41	LAP BELT FORCE	X	KELC001	Load cell, Seat belt	Lebow	3371	N
42	SHOULDER BELT FORCE	X	KELC002	Load cell, Seat belt	Lebow	3371	N
43	SHOULDER BELT SPOOL	X	KEPP001	Pullout pot	Celesco	PTX101-0030	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 35
2/4/99
1999 Ford Econoline E-150 Van

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
45	HEAD, PRIMARY	X	GPAC027	Accel., 1/2 bridge	Endevco	7264-2000	G
46	HEAD, PRIMARY	Y	GPAC002	Accel., 1/2 bridge	Endevco	7264-2000	G
47	HEAD, PRIMARY	Z	GPAC003	Accel., 1/2 bridge	Endevco	7264-2000	G
48	HEAD, REDUNDANT	X	GPAC032	Accel., 1/2 bridge	Endevco	7264-2000	G
49	HEAD, REDUNDANT	Y	GPAC021	Accel., 1/2 bridge	Endevco	7264-2000	G
50	HEAD, REDUNDANT	Z	GPAC026	Accel., 1/2 bridge	Endevco	7264-2000	G
51	NECK FORCE	X	GPUN01FX	Load cell, six axis neck	R. A. Denton	1716A	N
52	NECK FORCE	Y	GPUN01FY	Load cell, six axis neck	R. A. Denton	1716A	N
53	NECK FORCE	Z	GPUN01FZ	Load cell, six axis neck	R. A. Denton	1716A	N
54	NECK MOMENT	X	GPUN01MX	Load cell, six axis neck	R. A. Denton	1716A	Nm
55	NECK MOMENT	Y	GPUN01MY	Load cell, six axis neck	R. A. Denton	1716A	Nm
56	NECK MOMENT	Z	GPUN01MZ	Load cell, six axis neck	R. A. Denton	1716A	Nm
57	CHEST, PRIMARY	X	GPAC005	Accel., 1/2 bridge	Endevco	7264-2000	G
58	CHEST, PRIMARY	Y	GPAC011	Accel., 1/2 bridge	Endevco	7264-2000	G
59	CHEST, PRIMARY	Z	GPAC010	Accel., 1/2 bridge	Endevco	7264-2000	G
60	CHEST, REDUNDANT	X	GPAC034	Accel., 1/2 bridge	Endevco	7264-2000	G
61	CHEST, REDUNDANT	Y	GPAC023	Accel., 1/2 bridge	Endevco	7264-2000	G
62	CHEST, REDUNDANT	Z	GPAC020	Accel., 1/2 bridge	Endevco	7264-2000	G
63	CHEST DISPLACEMENT	X	GPCP002	Rotary Pot Chest	Servo	14CBI	MM
64	PELVIS, PRIMARY	X	GPAC025	Accel., 1/2 bridge	Endevco	7264-2000	G
65	PELVIS, PRIMARY	Y	GPAC022	Accel., 1/2 bridge	Endevco	7264-2000	G
66	PELVIS, PRIMARY	Z	GPAC019	Accel., 1/2 bridge	Endevco	7264-2000	G
67	LEFT FEMUR FORCE	Z	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 35

2/4/99

1999 Ford Econoline E-150 Van

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	KELC003	Load cell, Seat belt	Lebow	3371	N
86	SHOULDER BELT FORCE	X	KELC004	Load cell, Seat belt	Lebow	3371	N
87	SHOULDER BELT SPOOL	X	KEPP001	Pullout pot	Celesco	PTX101-0030	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
2/4/99
1999 Ford Econoline E-150 Van

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

KAR99001-13



Hybrid III Calibration Data Sheet

50TH Percentile Male

Left Knee Impact Test

ATD Serial No.: 34

Part Serial No.: N/A

Test I.D.: KI02C

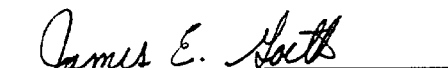
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	2.073 to 2.134	2.091	Pass
Peak Probe Force	Newtons	4715 to 5782	5292.5	Pass
Overall Test Results				Pass



Laboratory Technician

January 23, 1999

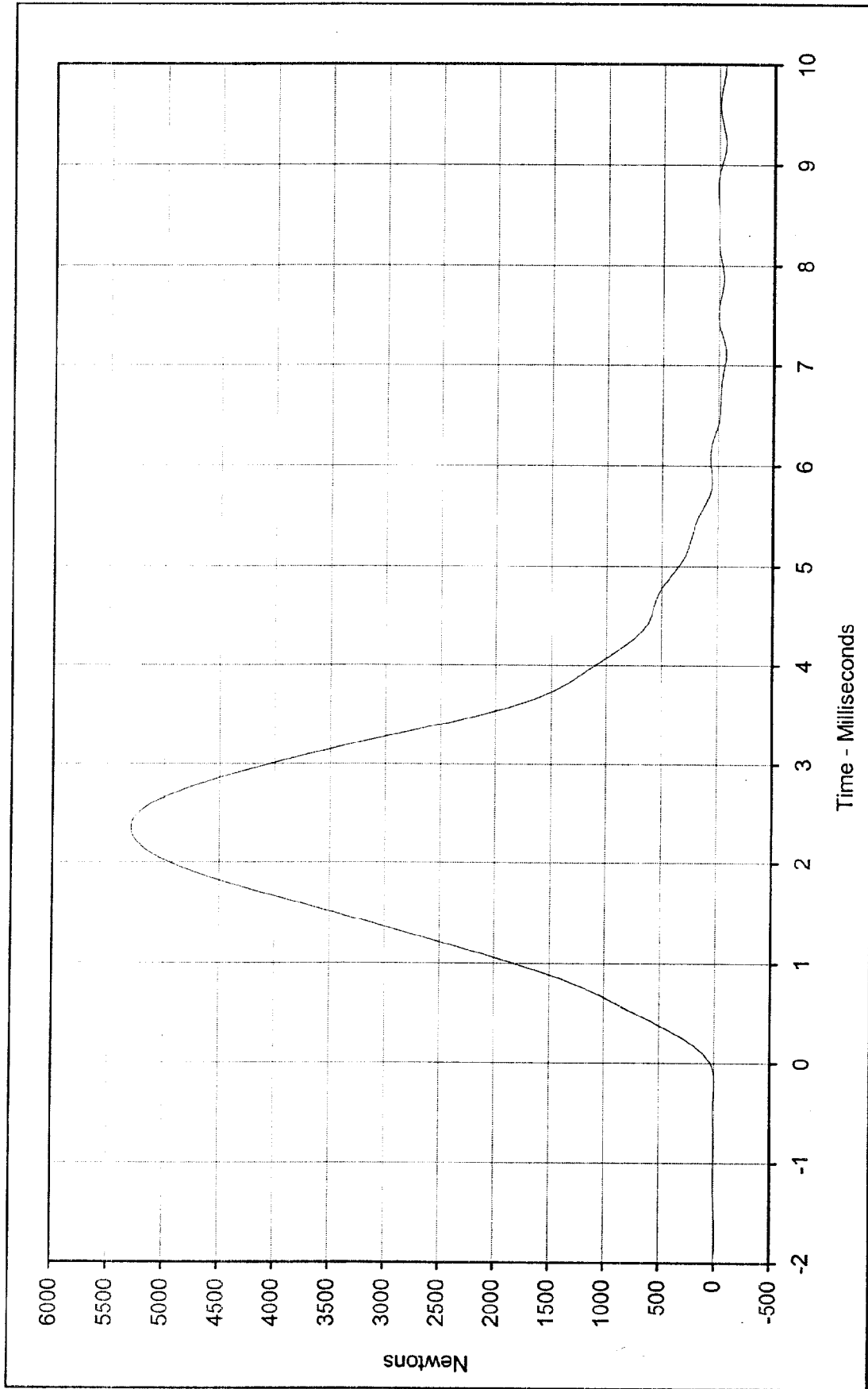
Test Date



Approved By

1/26/99

Date



Testing Program: Hybrid III Left Knee Impact Test
 Test Information: Part S/N: N/A Test I.D.: K102C

Curve Description: Probe Force
 Maximum Value: 5292.5 at 2.4 Milliseconds
 Minimum Value: -67.0 at 7.1 Milliseconds
 SAE Filter Class: 600
 Date of Test: 1/23/99
 ATD Serial No.: 34





Hybrid III Calibration Data Sheet

50TH Percentile Male

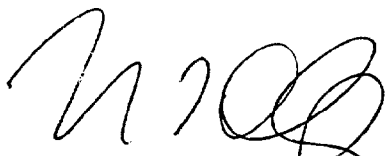
Right Knee Impact Test

ATD Serial No.: 34

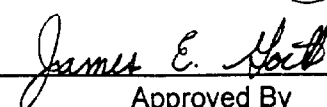
Part Serial No.: N/A

Test I.D.: KI02D

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	2.087	Pass
Peak Probe Force	Newtons	4715 to 5782	5480.7	Pass
Overall Test Results				Pass



Laboratory Technician



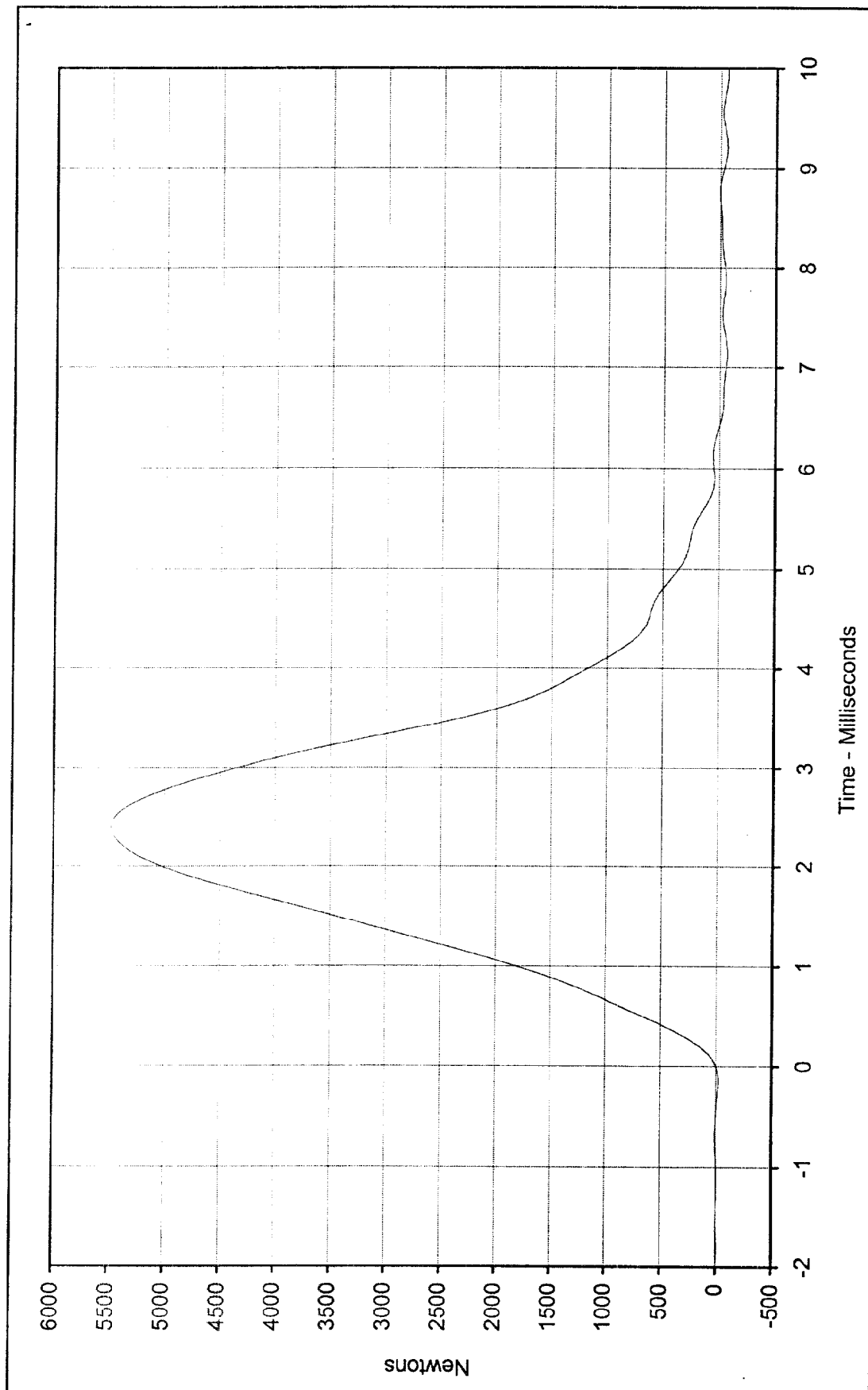
Approved By

January 23, 1999

Test Date

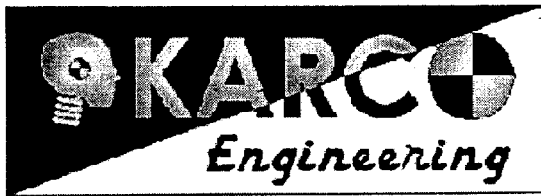
1/26/99

Date



Curve Description:	Testing Program	Hybrid III Right Knee Impact Test
Maximum Value:	Test Information:	Part S/N: N/A Test I.D.: KI02D
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.: 034

Part Serial No.: N/A

Test I.D.: HD01D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	242.9	Pass
Peak Lateral Acceleration	G's	≤15.0	2.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

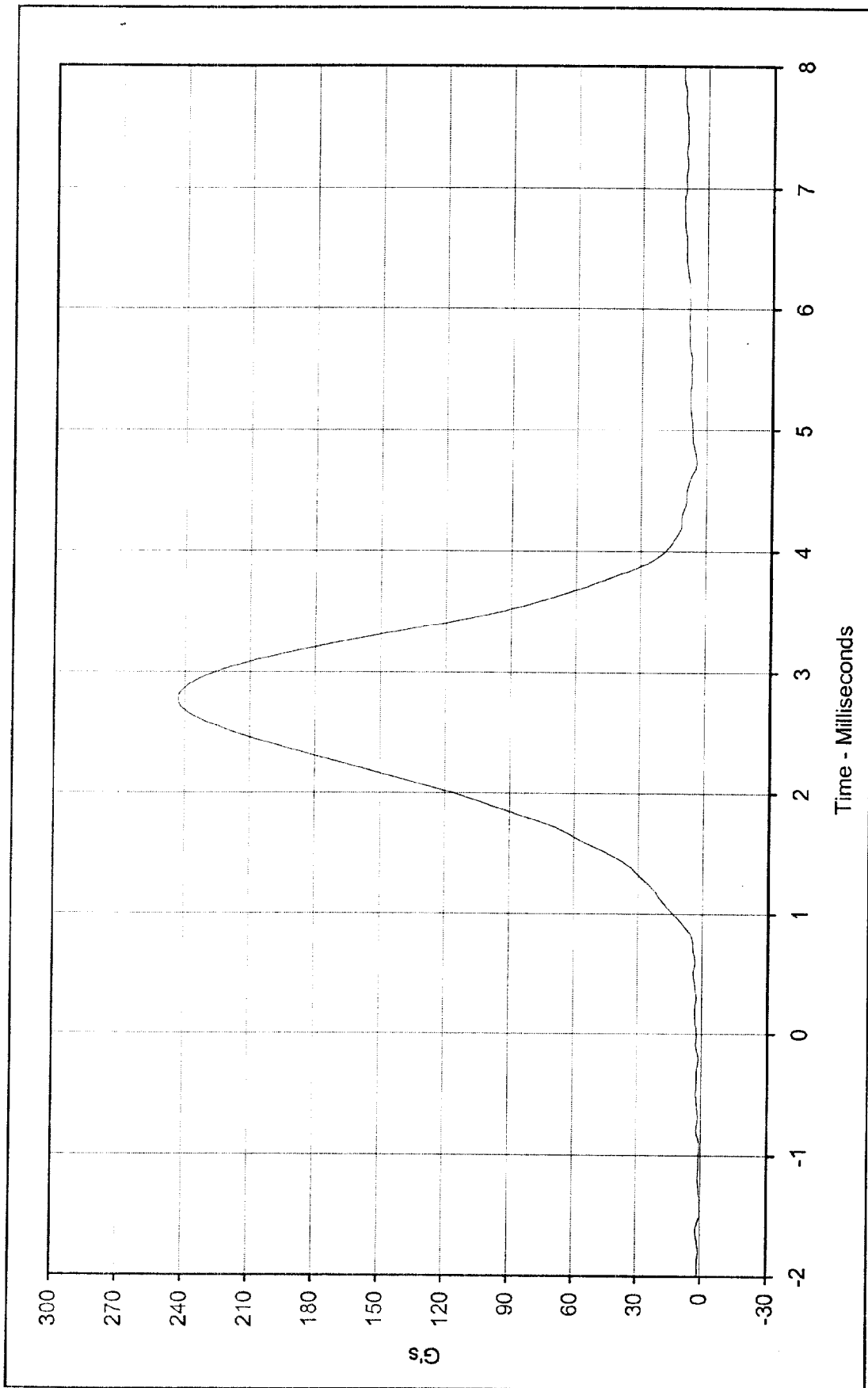
January 23, 1999

Test Date

Approved By

1/26/99

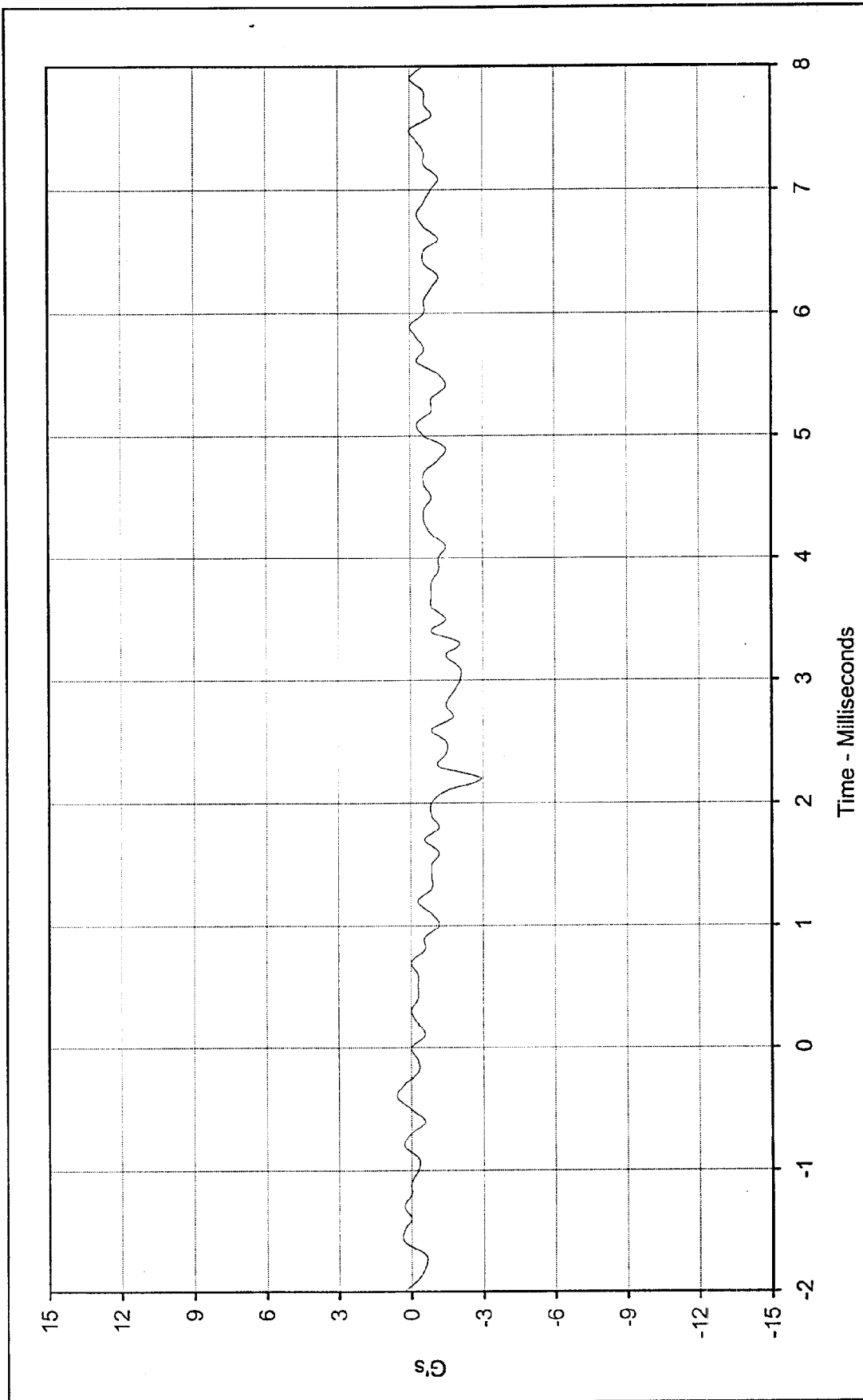
Date



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

Maximum Value: 242.9 at 2.8 Milliseconds
 Minimum Value: 0.4 at -1.5 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 1/23/99
 ATD Serial No.: 034

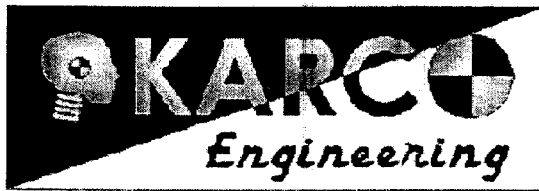




Testing Program Hybrid III Head Drop Calibration (Male)
 Test Information: S/N of Part: N/A Test I.D.: HD01D

Curve Description: Head Acceleration Y Axis
 Maximum Value: 0.6 at -0.4 Milliseconds
 Minimum Value: -2.9 at 2.2 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 1/23/99
 ATD Serial No.: 034





Hybrid III Calibration Data Sheet

50TH Percentile Male

Thorax Impact Test

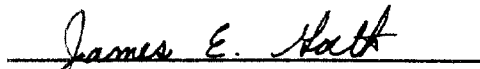
ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: CH02F

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	6.67	Pass
Peak Probe Force	Newtons	5159 to 5893	5358	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.55	Pass
Internal Hysteresis	%	69 to 85	73.6	Pass
Overall Test Results				Pass


Laboratory Technician

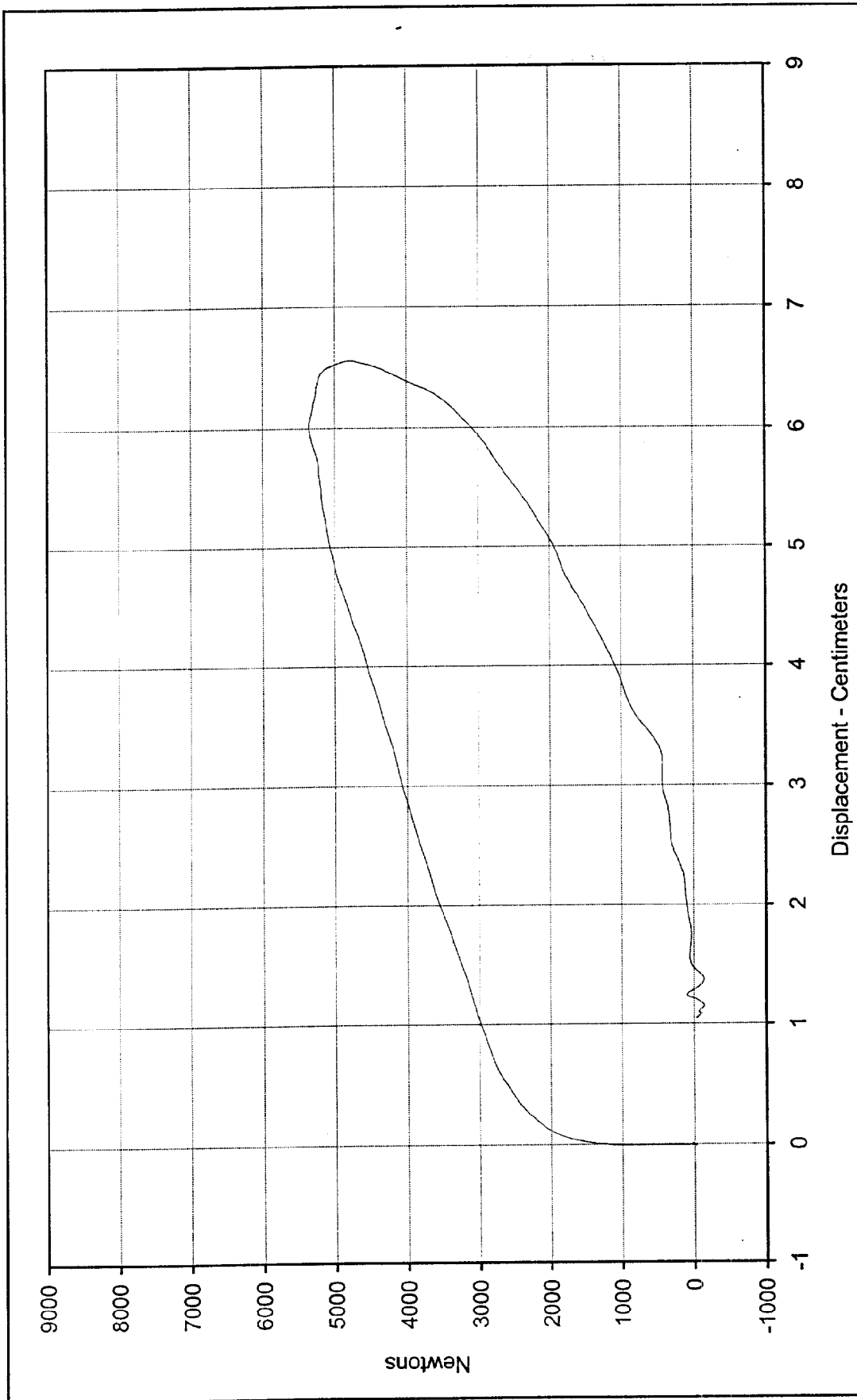

Approved By

January 24, 1999

Test Date

1/26/99

Date

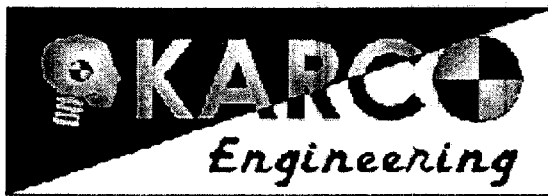


Testing Program: Hybrid III Thorax Impact Test
 Test Information: S/N of Part: N/A Test I.D.: CH02F



Curve Description: Probe Force vs. Chest Displacement

Probe Force:	5358.3	Newton
Chest Displ.:	6.55	Centimeters
SAE Filter Class:	180	
Date of Test:	1/24/99	
ATD Serial No.:	034	



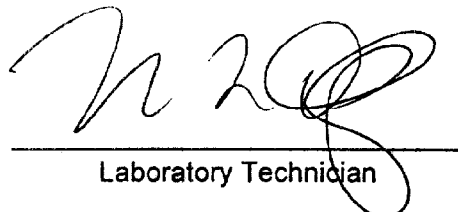
Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 034Part Serial No.: N/ATest I.D.: NF01C

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.90	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.7	Pass
	20 Msec.	G's	17.6 to 22.6	19.7	Pass
	30 Msec.	G's	12.5 to 18.5	18.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.3	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.4	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	68.3	Pass
	Time	Msec.	57.0 to 64.0	63.2	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	113.6	Pass
Moment About Occipital Condyle	Maximum	N • m	84.1 to 108.5	89.3	Pass
	Time	Msec.	47.0 to 58.0	53.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	99.3	Pass
Overall Test Results				Pass	


Laboratory Technician

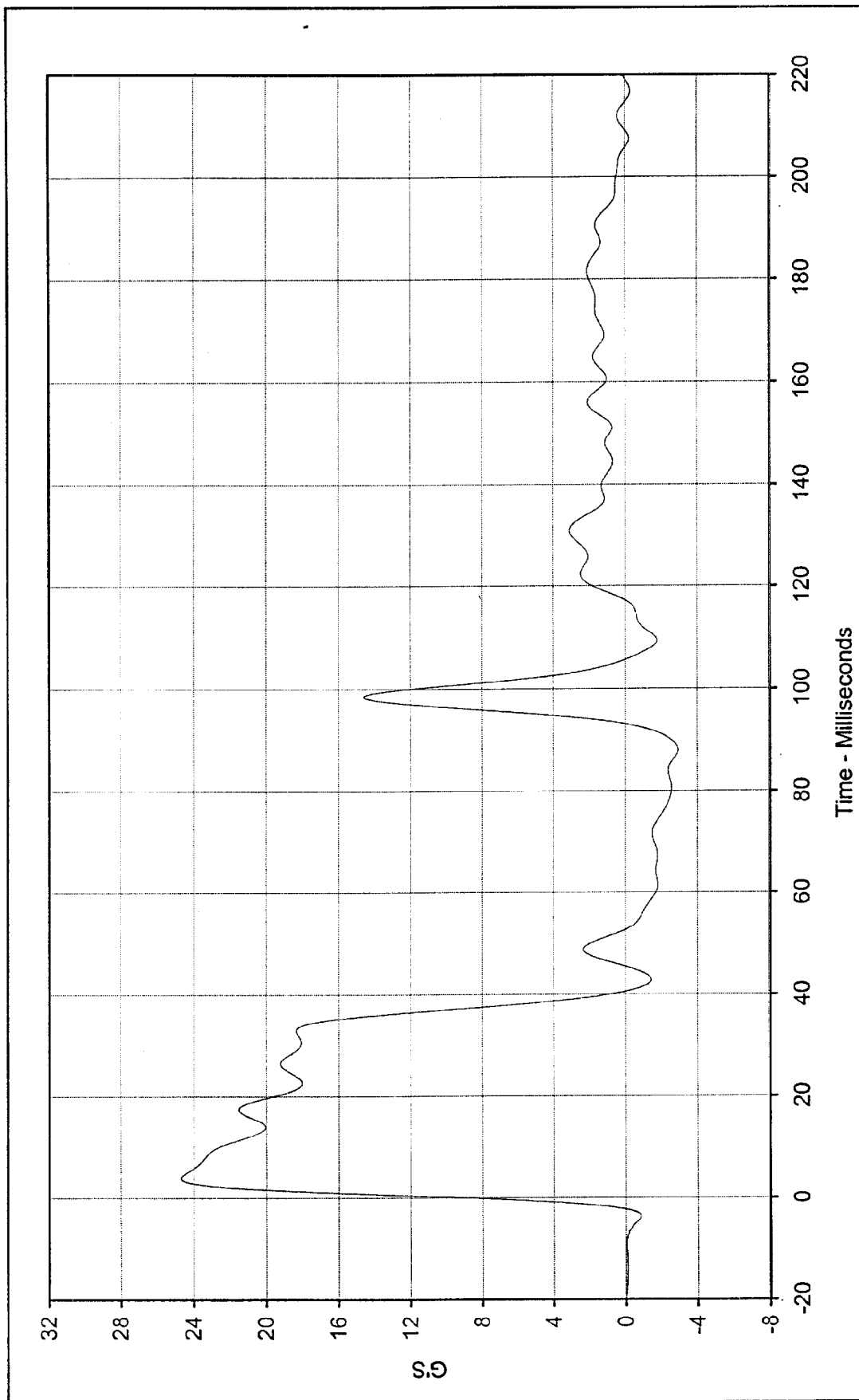
January 24, 1999

Test Date


Approved By

1/26/99

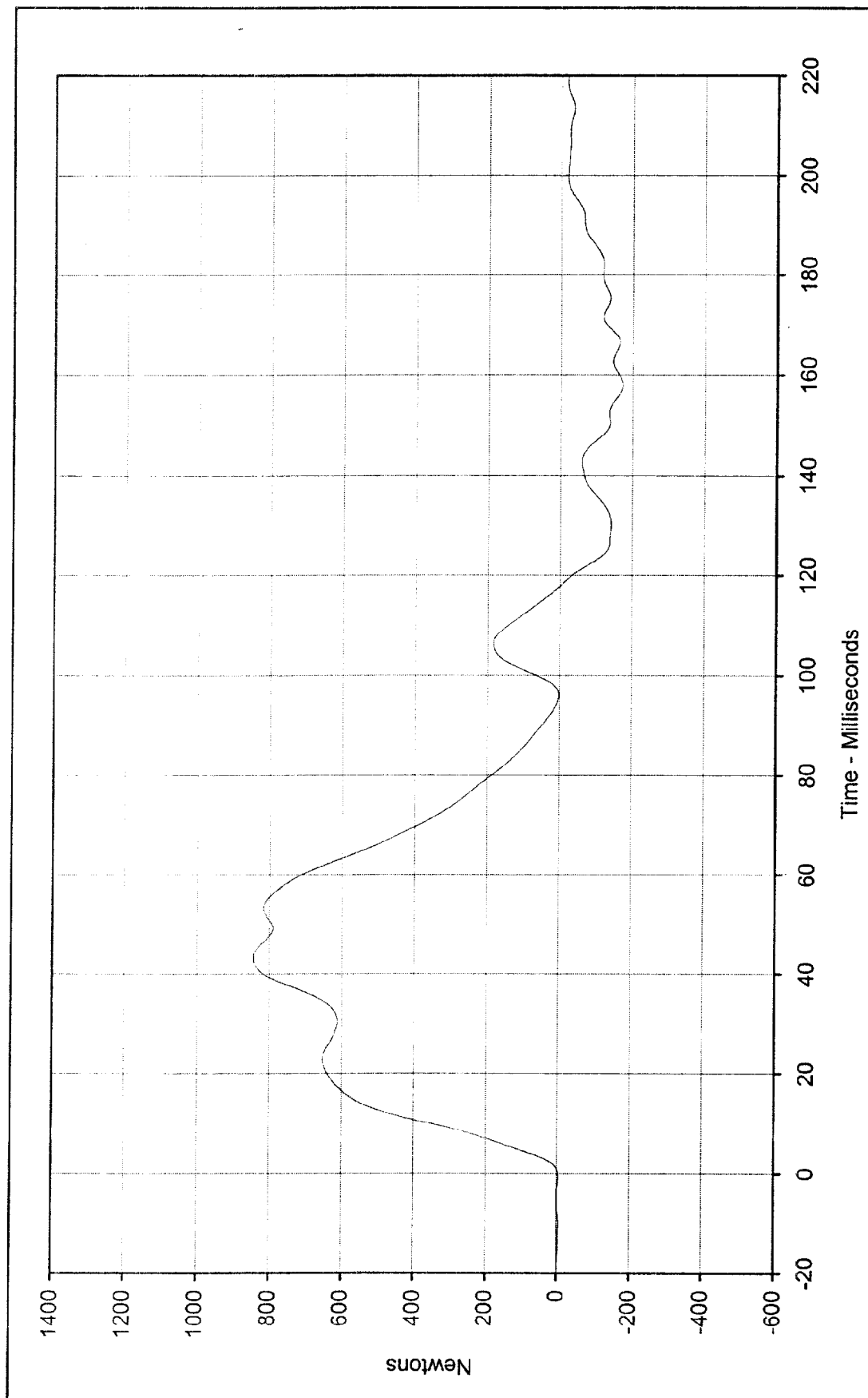
Date



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

Curve Description: Pendulum Deceleration
 Maximum Value: 24.7 at 4.0 Milliseconds
 Minimum Value: -2.9 at 88.0 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 034

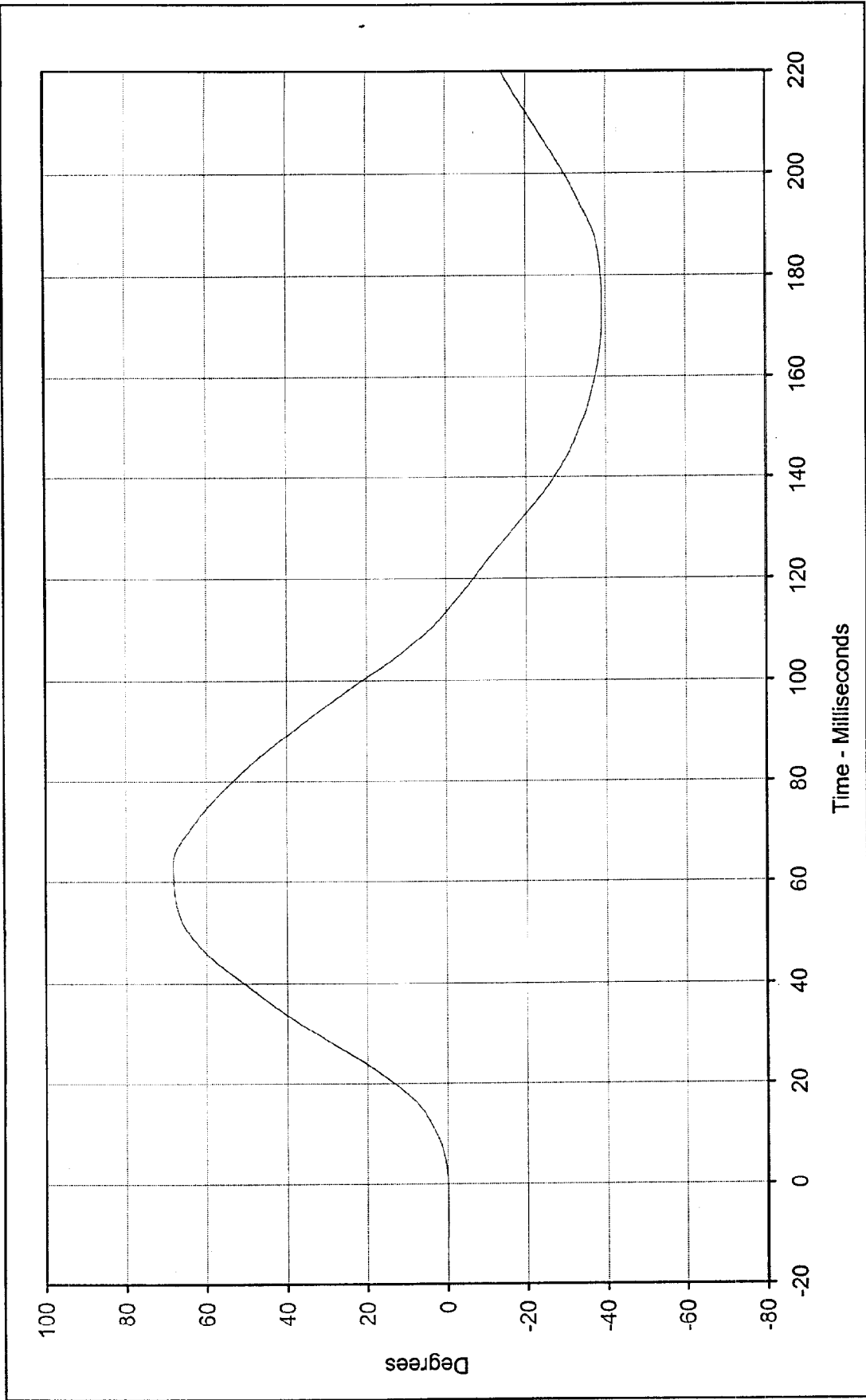




Curve Description: Neck Force X
 Maximum Value: 843.9 at 43.3 Milliseconds
 Minimum Value: -172.3 at 158.0 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 034

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

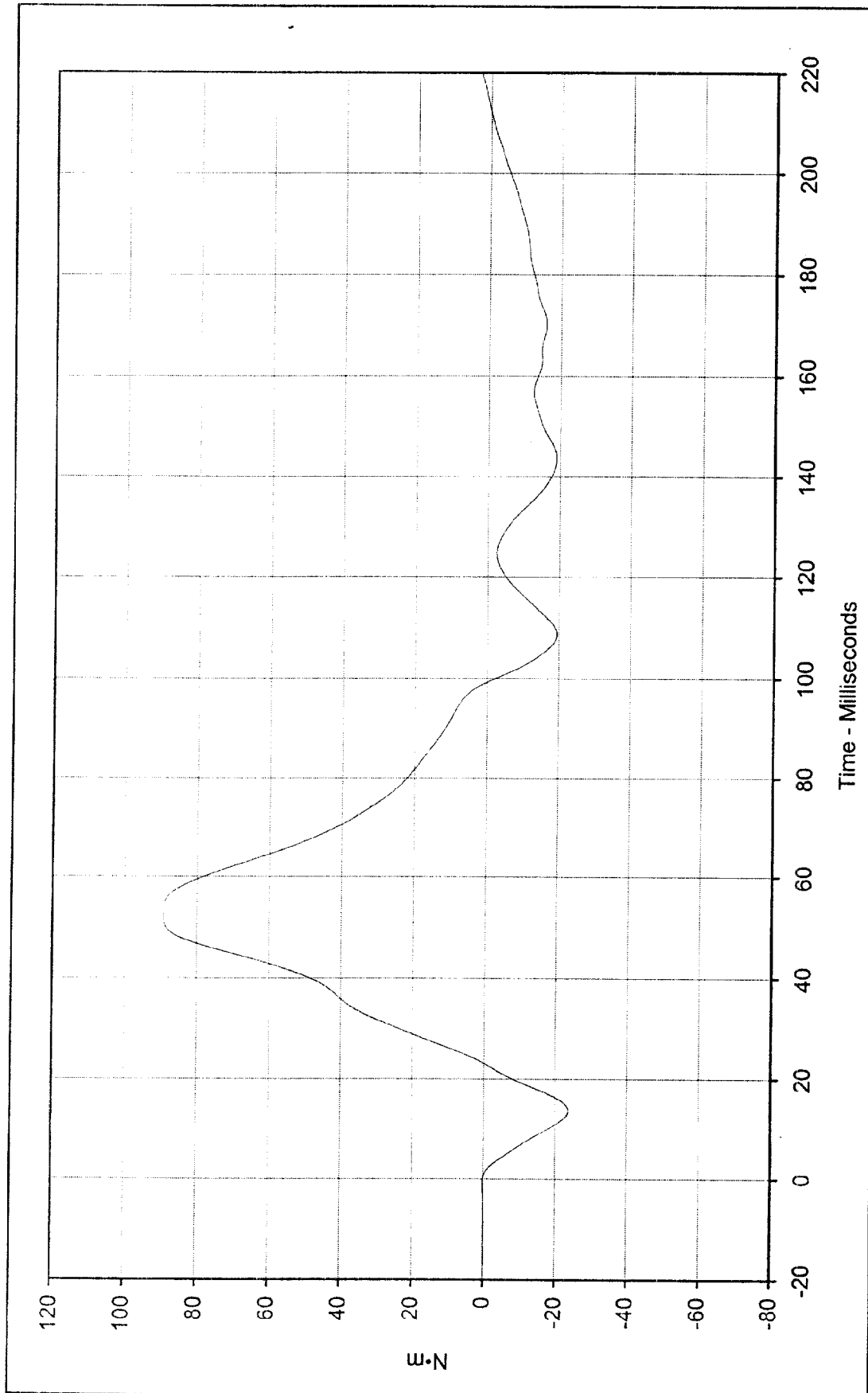




Testing Program: Hybrid III Neck Flexion Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NF01C



Curve Description: "D" Plane Rotation
 Maximum Value: 68.3 at 63.2 Milliseconds
 Minimum Value: -39.1 at 174.7 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 034



Curve Description: Moment About Occipital Condyles
 Maximum Value: 89.3 at 53.1 Milliseconds
 Minimum Value: -23.7 at 13.7 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 034

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





Hybrid III Calibration Data Sheet

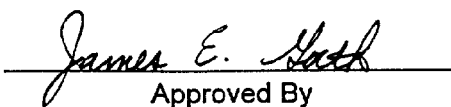
50TH Percentile Male

Neck Extension Test

ATD Serial No.: 034Part Serial No.: N/ATest I.D.: NE01D

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	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	19.7	Pass
	20 Msec.	G's	14.0 to 19.0	18.2	Pass
	30 Msec.	G's	11.0 to 16.0	14.7	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	14.7	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	42.8	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	96.8	Pass
	Time	Msec.	72.0 to 82.0	74.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	153.2	Pass
Moment About Occipital Condyle	Maximum	N • m	-52.9 to- 79.9	-69.4	Pass
	Time	Msec.	65.0 to 79.0	68.1	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	140.9	Pass
Overall Test Results					Pass


Laboratory Technician

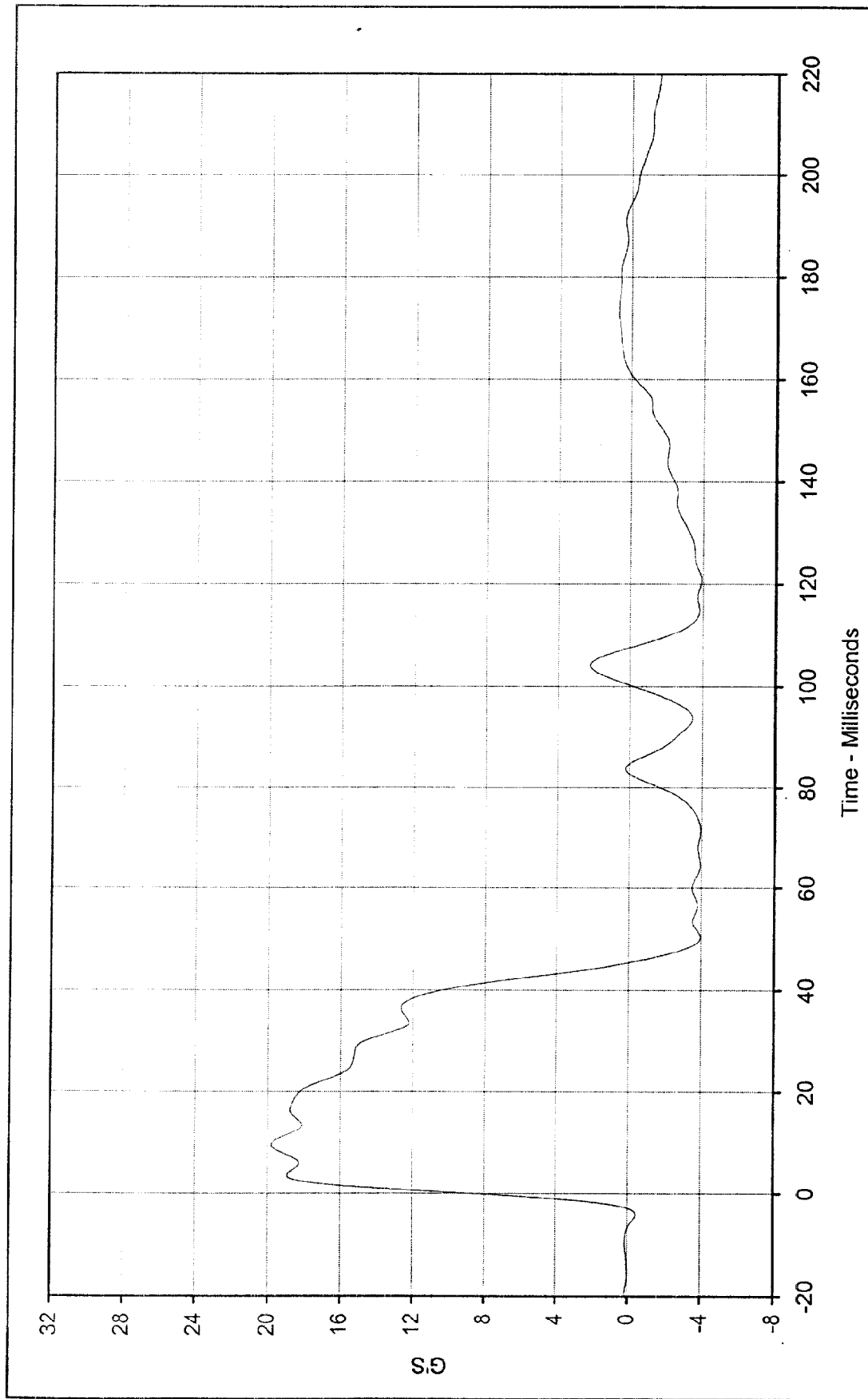

Approved By

January 24, 1999

Test Date

1/26/99

Date



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

Maximum Value: 19.8 at 9.5 Milliseconds

Minimum Value: -4.0 at 50.3 Milliseconds

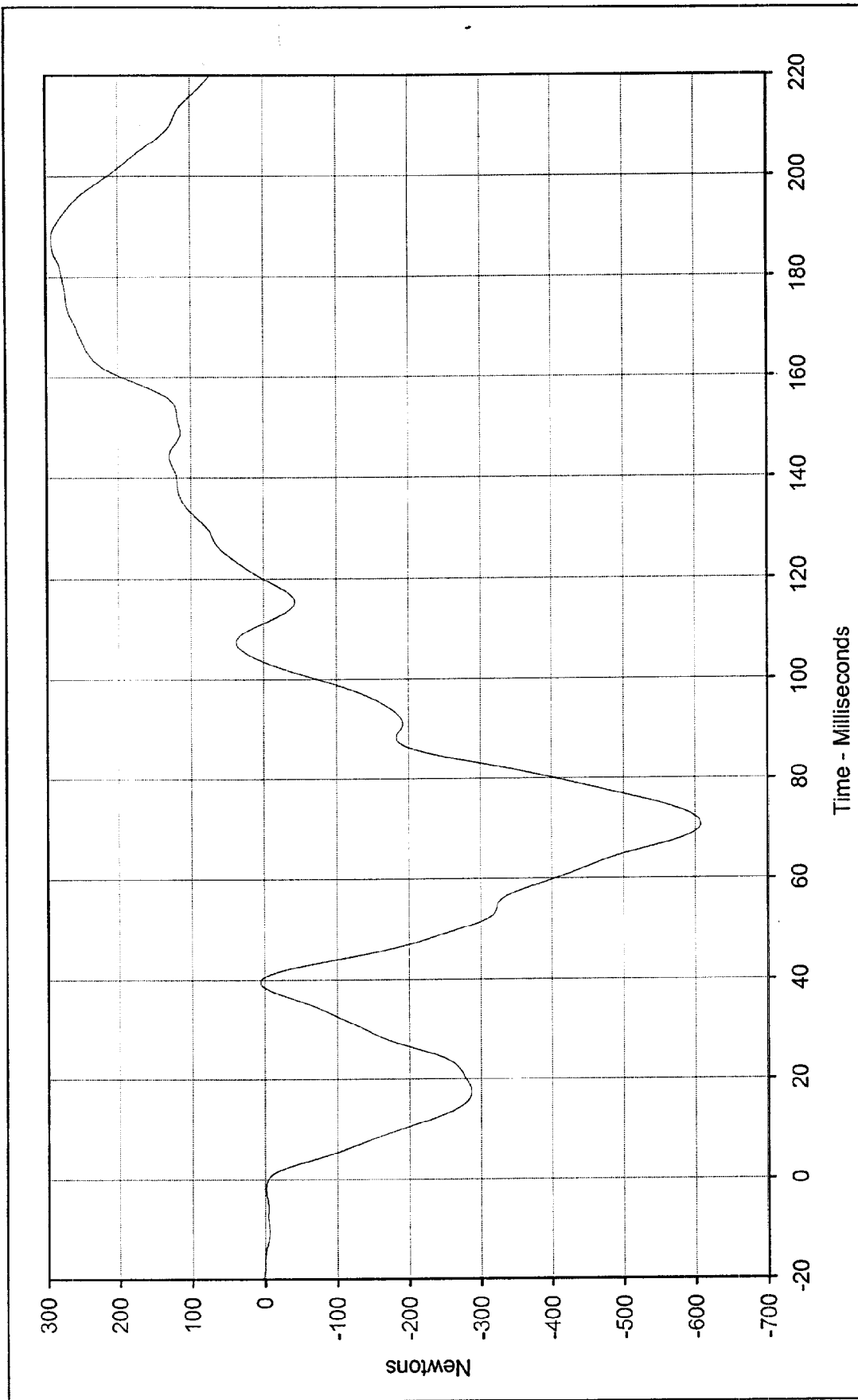
SAE Filter Class: 60

Date of Test: 1/24/99

ATD Serial No.: 034

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





Testing Program: Hybrid III Neck Extension Test (Male)

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

Curve Description: Neck Force X

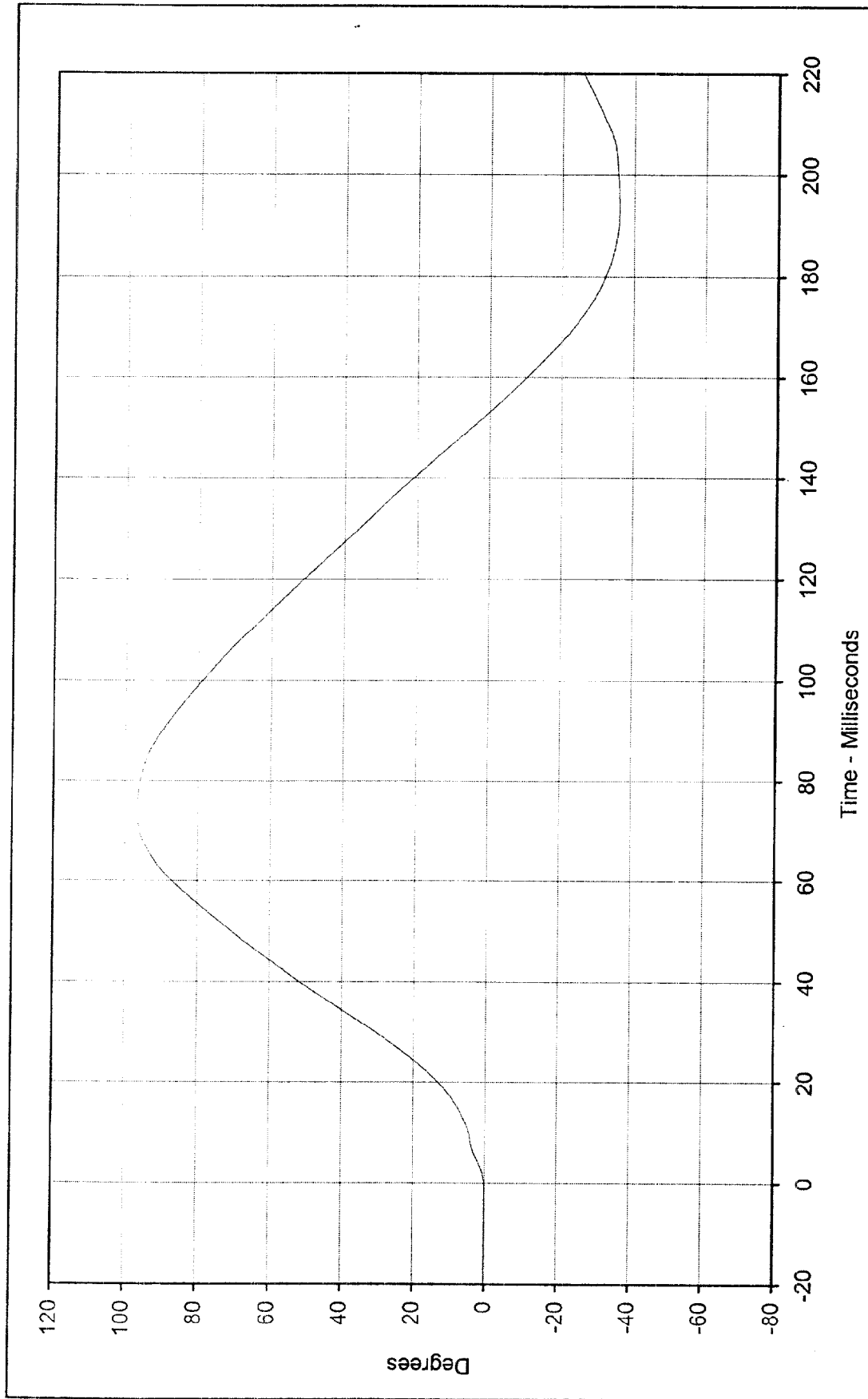
Maximum Value:	292.4	at	187.8	Milliseconds
Minimum Value:	-607.9	at	70.6	Milliseconds

SAE Filter Class: 60

Date of Test: 1/24/99

ATD Serial No.: 034



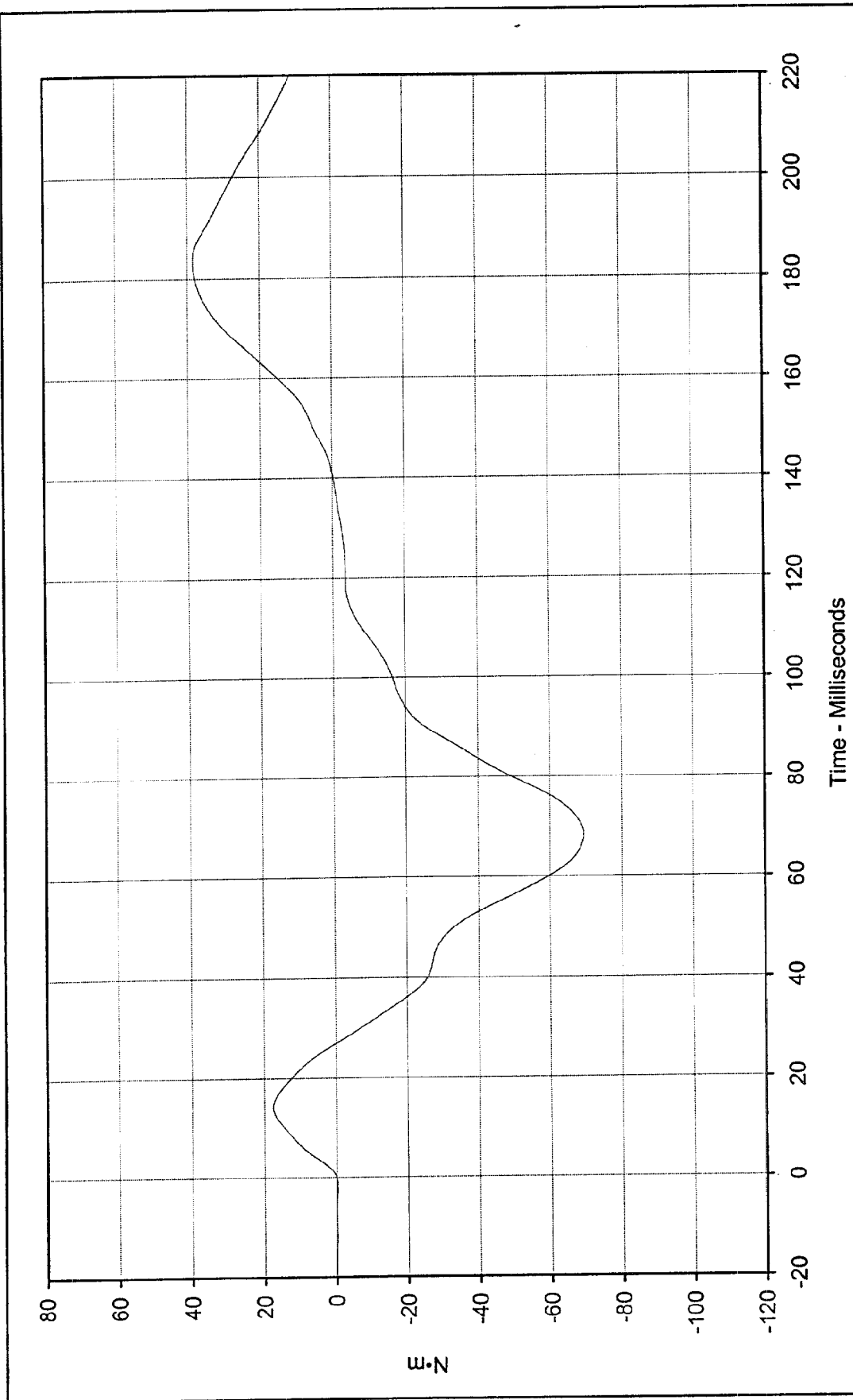


Curve Description: "D" Plane Rotation
 Maximum Value: 96.8 at 74.5 Milliseconds
 Minimum Value: -35.8 at 193.4 Milliseconds

SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 034

Testing Program Hybrid III Neck Extension Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NE01D





Testing Program: Hybrid III Neck Extension Test (Male)

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

Curve Description: Moment About Occipital Condyles

Maximum Value: 38.4 at 183.5 Milliseconds

Minimum Value: -69.4 at 68.1 Milliseconds

SAE Filter Class: 60

Date of Test: 1/24/99

ATD Serial No.: 034





Hybrid III Calibration Data Sheet

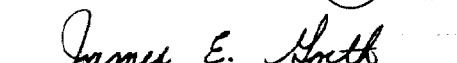
50TH Percentile Male

External Measurements

ATD Serial No.: 034Part 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	885.0	Pass
B - Shoulder pivot height	mm	505.5 to 520.7	510.0	Pass
C - "H" point height	mm	83.8 to 88.9	84.0	Pass
D - "H" point from seat back	mm	134.6 to 139.7	138.5	Pass
E - Shoulder pivot from back	mm	83.8 to 94.0	85.0	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	300.0	Pass
H - Skull cap to back line	mm	40.6 to 45.7	43.0	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	209.0	Pass
K - Buttock to knee length	mm	579.1 to 604.5	581.0	Pass
L - Popliteal length	mm	429.3 to 454.7	444.0	Pass
M - Knee pivot height	mm	485.1 to 500.4	491.0	Pass
N - Buttock popliteal length	mm	452.1 to 477.5	465.0	Pass
O - Chest depth	mm	213.4 to 228.6	221.0	Pass
P - Foot length	mm	251.5 to 266.7	260.0	Pass
V - Shoulder breadth	mm	421.6 to 436.9	434.0	Pass
W - Foot breadth	mm	91.4 to 106.7	98.0	Pass
Y - Chest circumference	mm	970.3 to 1000.8	995.0	Pass
Z - Waist circumference	mm	835.7 to 866.1	850.0	Pass
AA - Location for chest circumference	mm	429.3 to 434.3	435.0	Pass
BB - Location for waist circumference	mm	226.1 to 231.1	228.0	Pass
Overall Test Results				Pass


Laboratory Technician

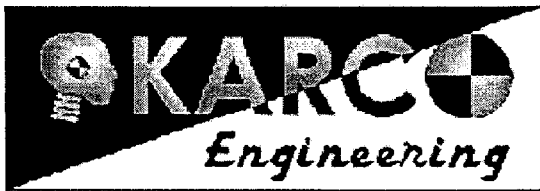

Approved By

January 25, 1999

Test Date

1/26/99

Date



Hybrid III Calibration Data Sheet

50TH Percentile Male

Left Knee Impact Test

ATD Serial No.: 35

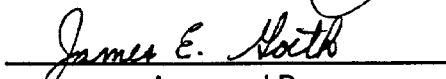
Part Serial No.: n/a

Test I.D.: KI02A

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	2.076	Pass
Peak Probe Force	Newtons	4715 to 5782	5139.3	Pass
Overall Test Results				Pass



Laboratory Technician



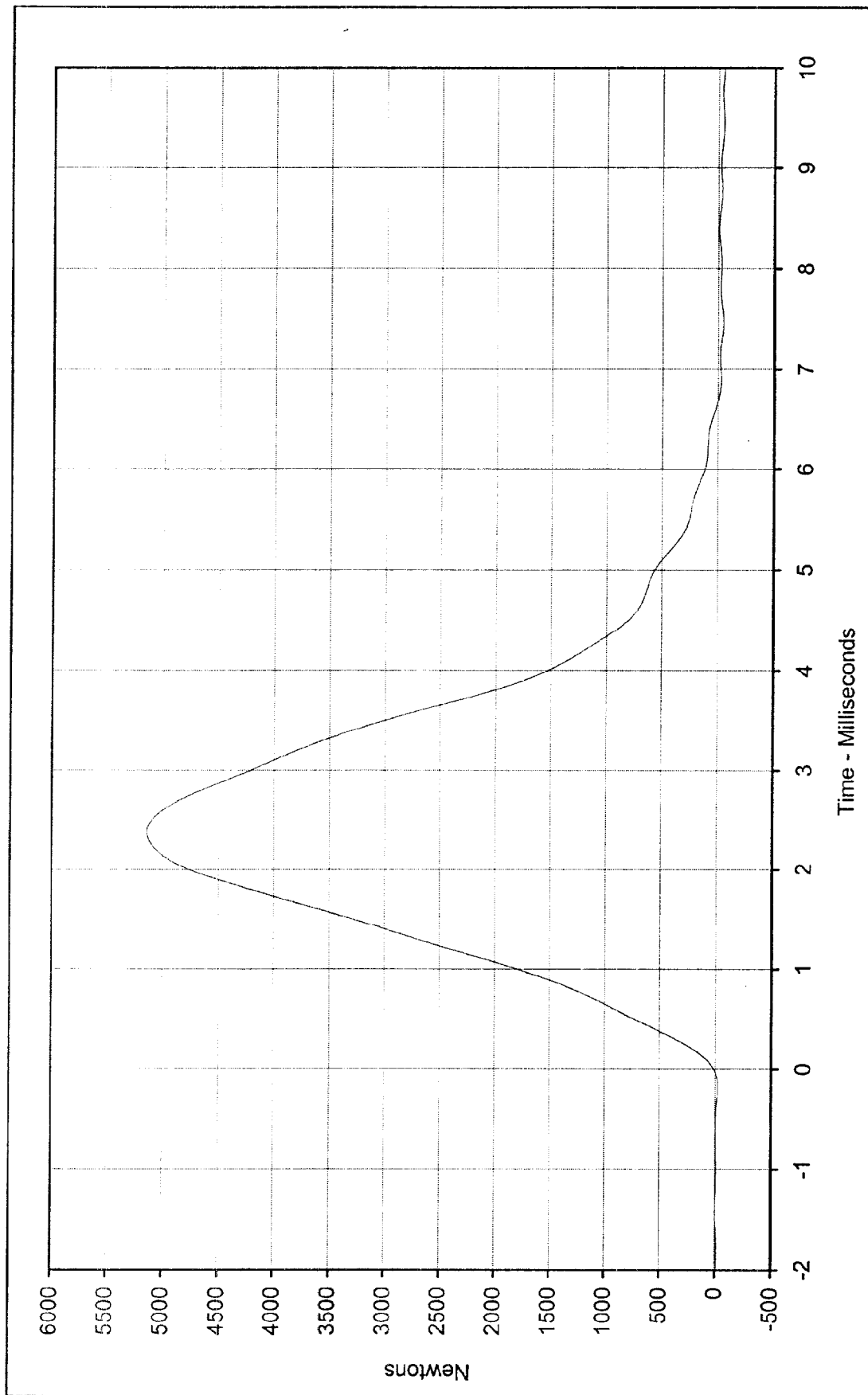
Approved By

January 23, 1999

Test Date

1/26/99

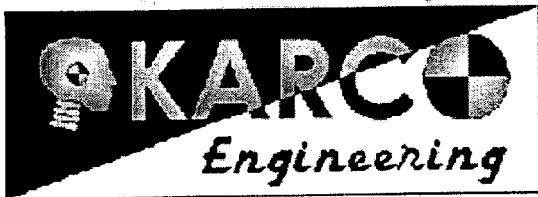
Date



Curve Description: Hybrid III Left Knee Impact Test
 Testing Program: Part S/N: n/a Test I.D.: K102A

Maximum Value: 5139.3 at 2.4 Milliseconds
 Minimum Value: -46.1 at 7.5 Milliseconds
 SAE Filter Class: 600
 Date of Test: 1/23/99
 ATD Serial No.: 35





Hybrid III Calibration Data Sheet

50TH Percentile Male

Right Knee Impact Test

ATD Serial No.: 35

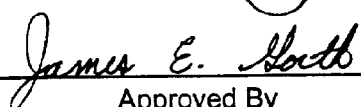
Part Serial No.: N/A

Test I.D.: KI02B

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	2.092	Pass
Peak Probe Force	Newtons	4715 to 5782	5643.7	Pass
Overall Test Results				Pass



Laboratory Technician



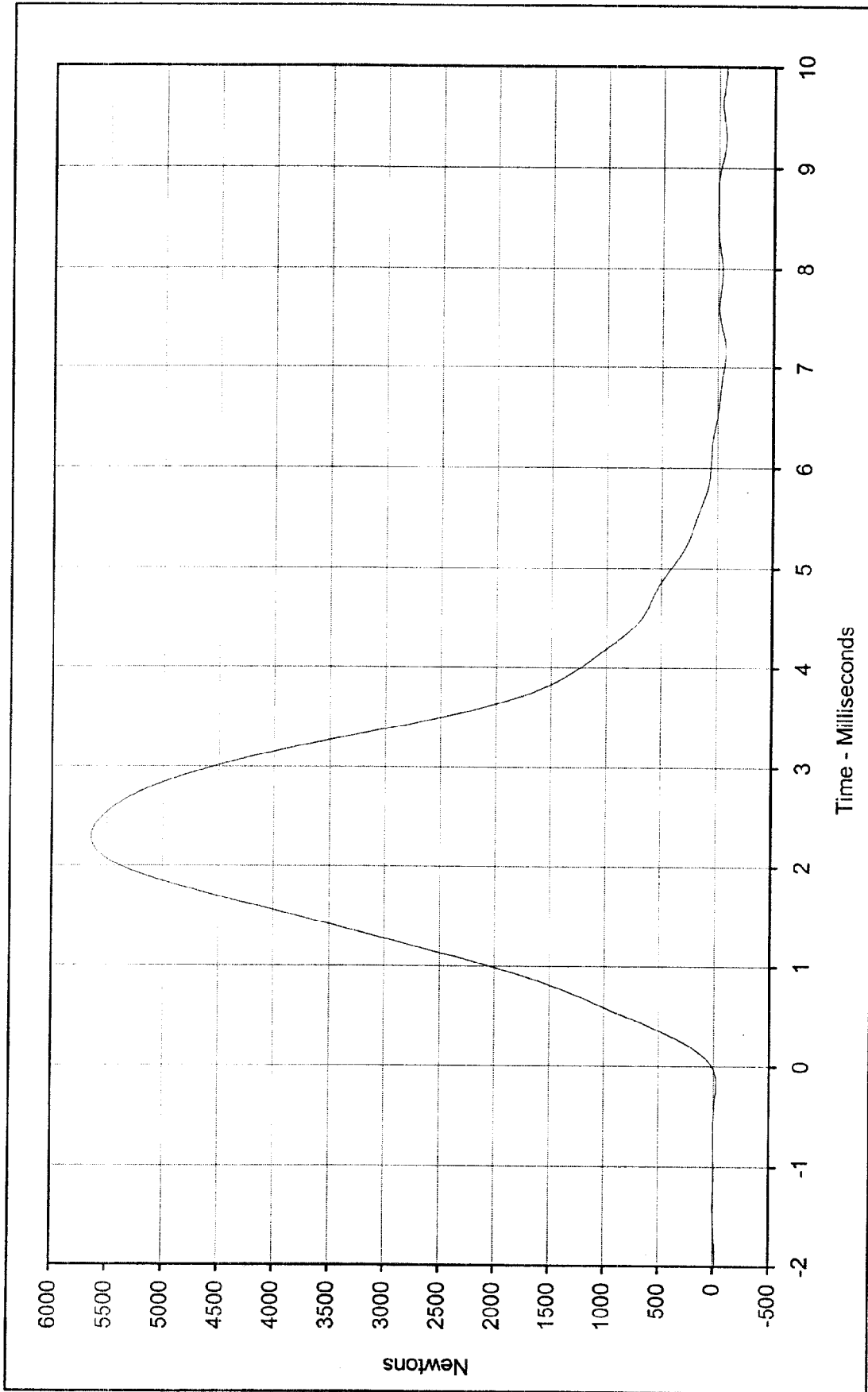
Approved By

January 23, 1999

Test Date

1/26/99

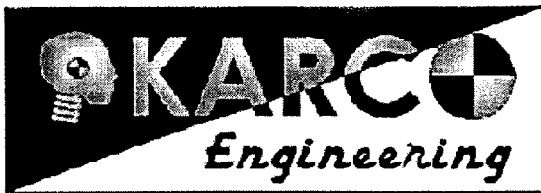
Date



Testing Program: Hybrid III Right Knee Impact Test
 Test Information: Part S/N: N/A Test I.D.: KI02B

Curve Description: Probe Force
 Maximum Value: 5643.7 at 2.3 Milliseconds
 Minimum Value: -68.0 at 7.2 Milliseconds
 SAE Filter Class: 600
 Date of Test: 1/23/99
 ATD Serial No.: 35





Hybrid III Calibration Data Sheet

50TH Percentile Male

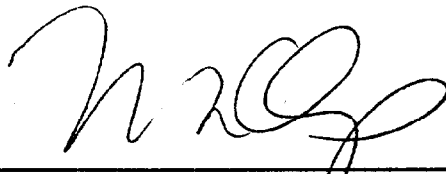
Head Drop Calibration

ATD Serial No.: 035

Part Serial No.: N/A

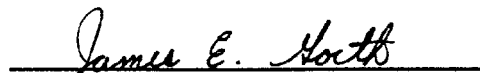
Test I.D.: HD01C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	261.2	Pass
Peak Lateral Acceleration	G's	≤15.0	4.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

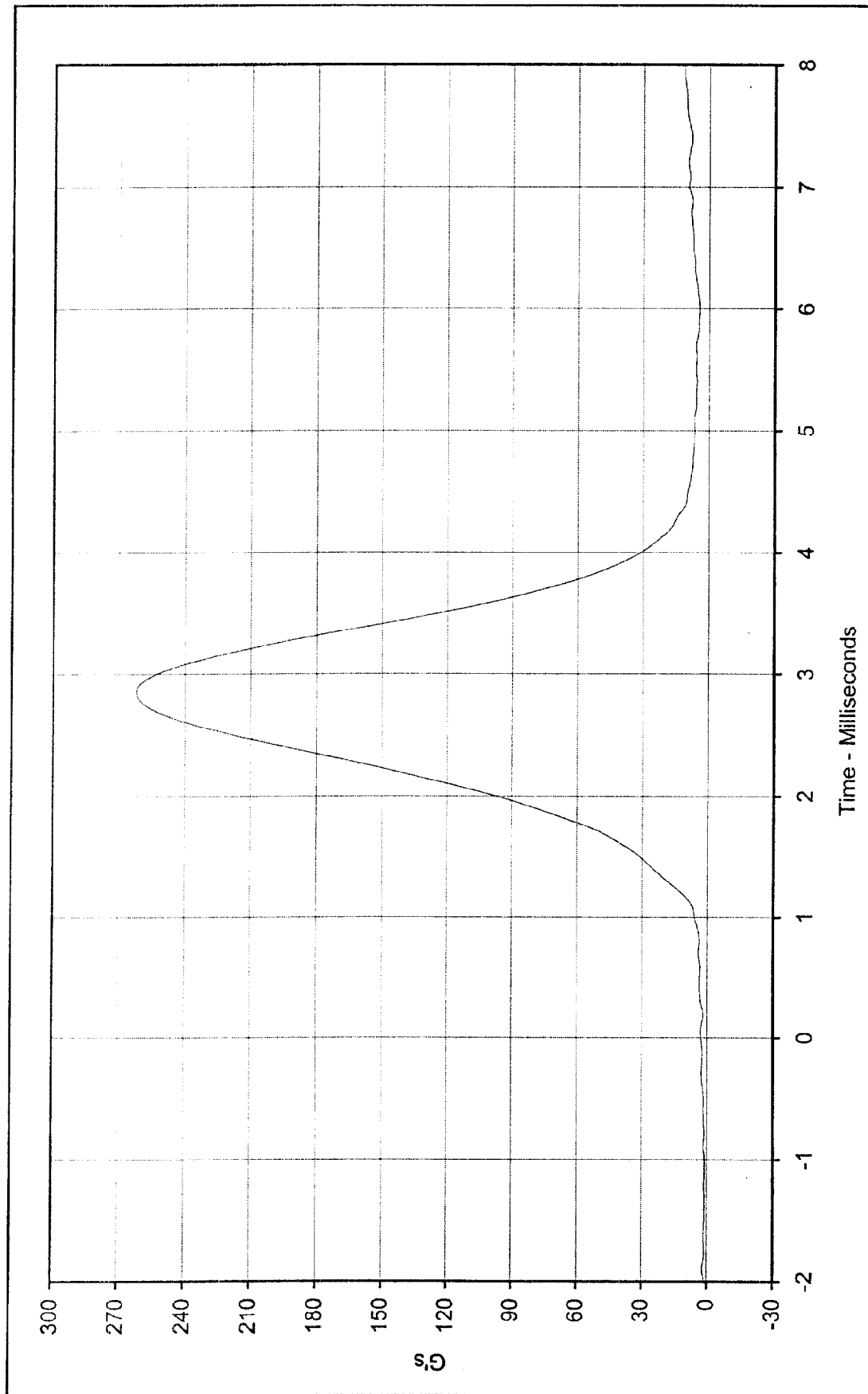
January 23, 1999

Test Date


Approved By

1/26/99

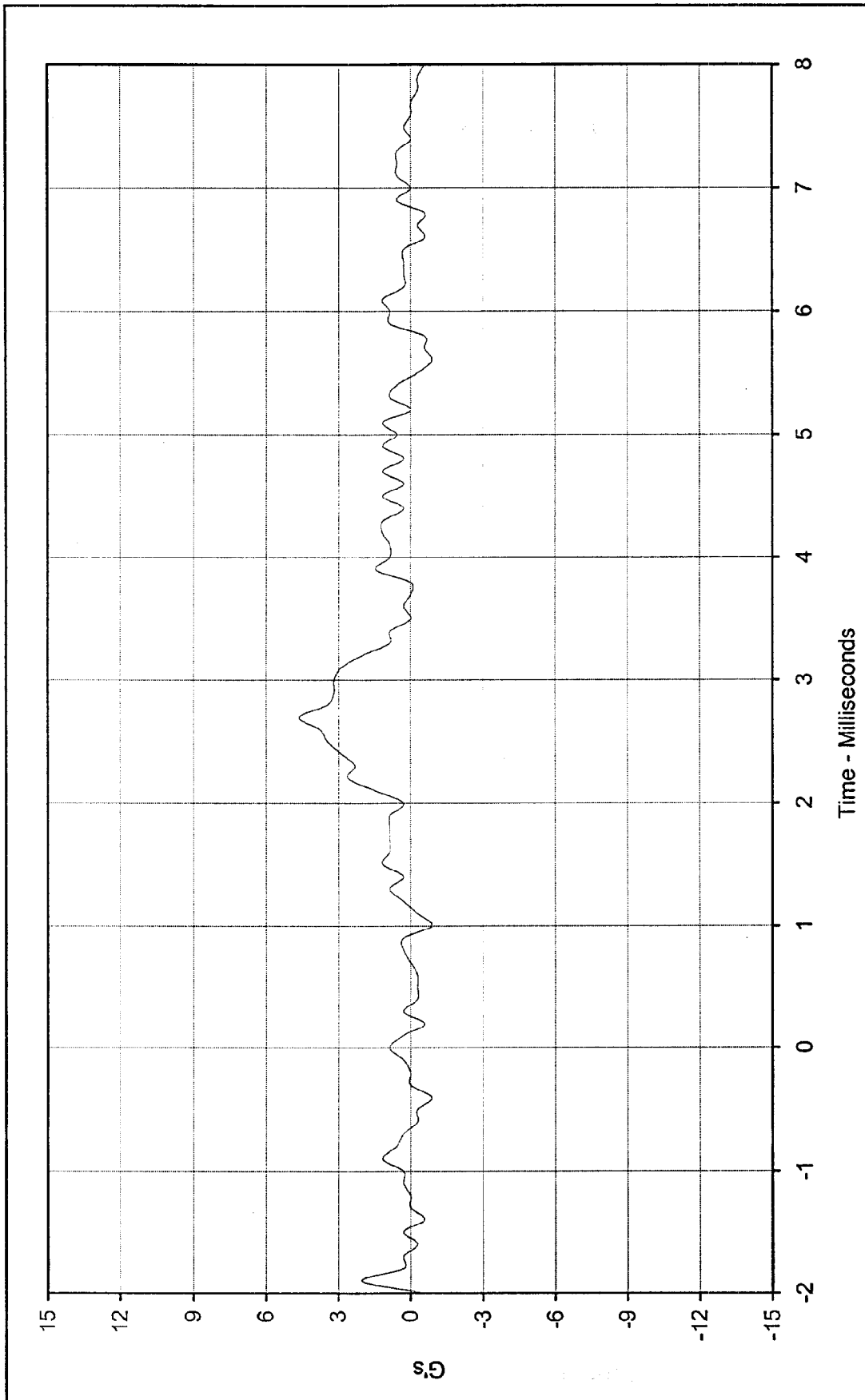
Date



Curve Description: Head Resultant Acceleration
 Maximum Value: 261.2 at 2.9 Milliseconds
 Minimum Value: 0.9 at -1.0 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 1/23/99
 ATD Serial No.: 035

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





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

Curve Description: Head Acceleration Y Axis
 Maximum Value: 4.6 at 2.7 Milliseconds
 Minimum Value: -0.9 at -0.4 Milliseconds
 SAE Filter Class: 1000
 Date of Test: 1/23/99
 ATD Serial No.: 035





Hybrid III Calibration Data Sheet

50TH Percentile Male

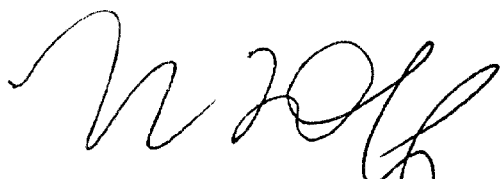
Thorax Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: CH02B

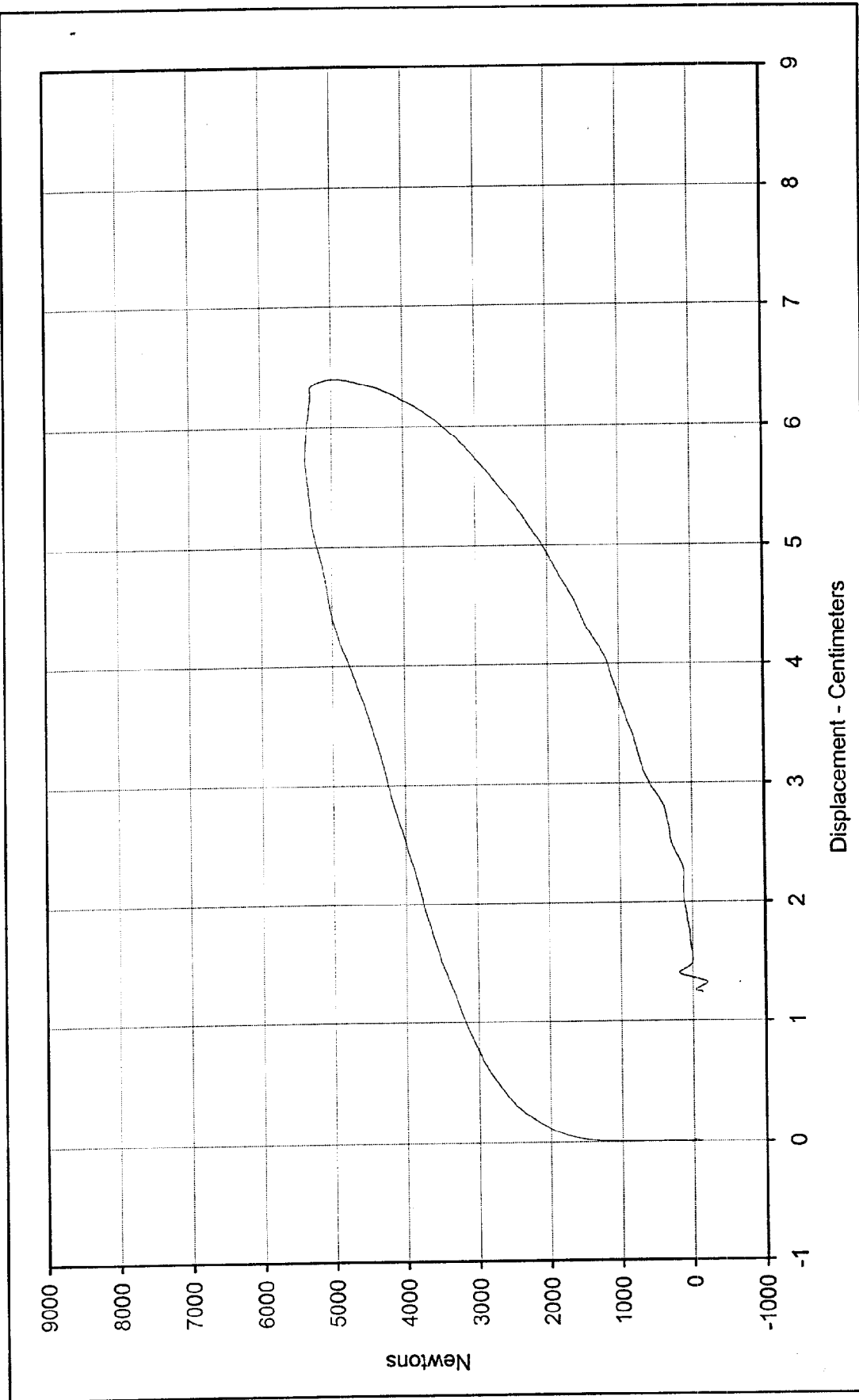
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	6.58 to 6.82	6.65	Pass
Peak Probe Force	Newtons	5159 to 5893	5374	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.39	Pass
Internal Hysteresis	%	69 to 85	73.9	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

January 24, 1999
Test Date

1/26/99
Date



Curve Description:	Probe Force vs. Chest Displacement	Testing Program	Hybrid III Thorax Impact Test
Probe Force:	5374.2 Newtons	Test Information:	S/N of Part: N/A Test I.D.: CH02B
Chest Displ.:	6.39 Centimeters		
SAE Filter Class:	180		
Date of Test:	1/24/99		
ATD Serial No.:	035		





Hybrid III Calibration Data Sheet

50TH Percentile Male

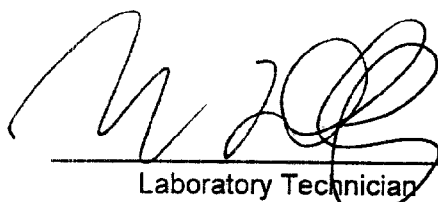
Neck Flexion Test

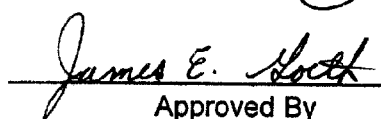
ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: NF01D

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.94	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	26.2	Pass
	20 Msec.	G's	17.6 to 22.6	22.3	Pass
	30 Msec.	G's	12.5 to 18.5	18.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.7	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	72.0	Pass
	Time	Msec.	57.0 to 64.0	60.9	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	118.9	Pass
Moment About Occipital Condyle	Maximum	N • m	84.1 to 108.5	88.8	Pass
	Time	Msec.	47.0 to 58.0	56.6	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	102.1	Pass
			Overall Test Results		Pass


Laboratory Technician

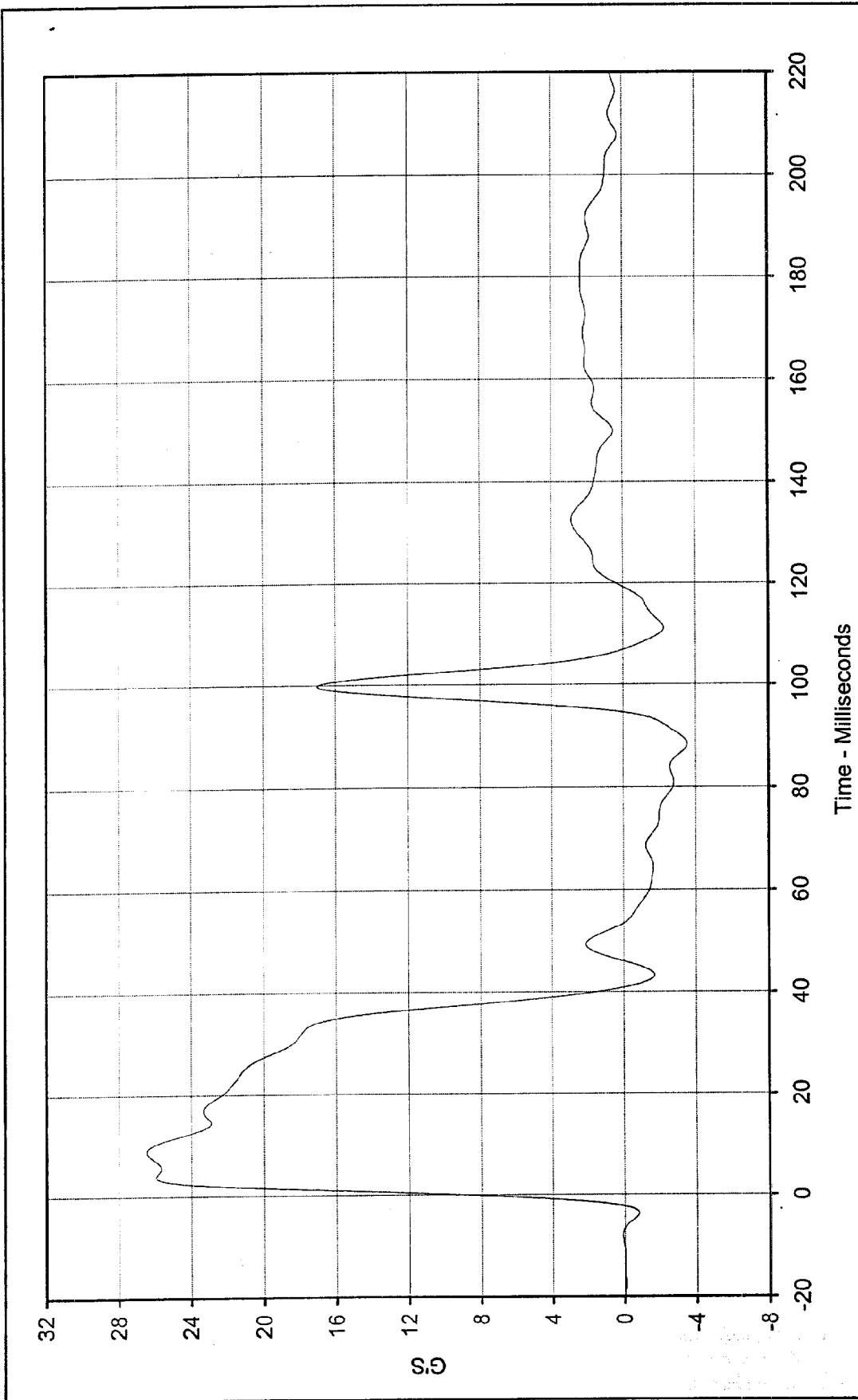

Approved By

January 24, 1999

Test Date

1/24/99

Date



Curve Description: Hybrid III Neck Flexion Test (Male)

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

Pendulum Deceleration

Maximum Value: 26.5 at 8.9 Milliseconds

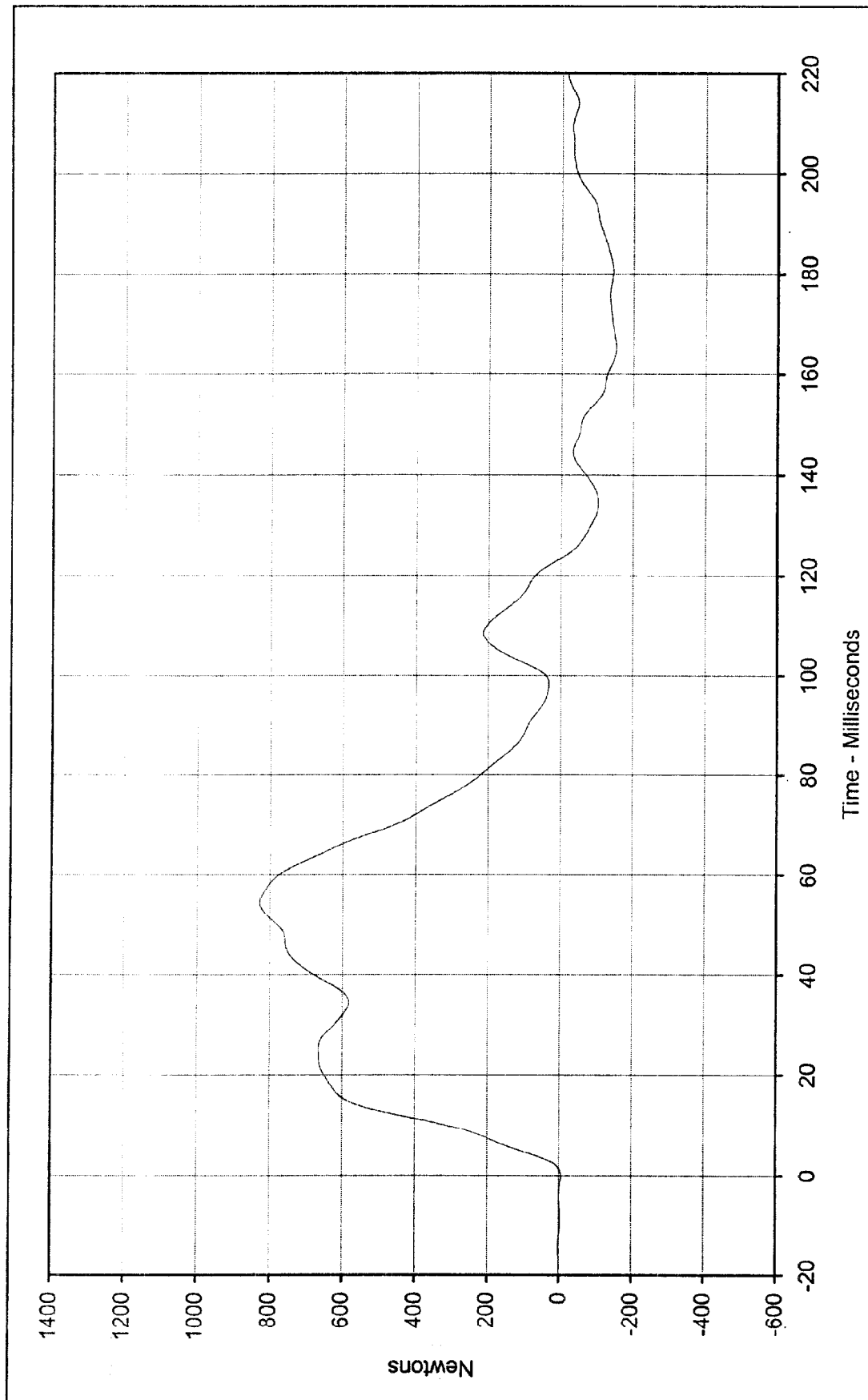
Minimum Value: -3.5 at 88.3 Milliseconds

SAE Filter Class: 60

Date of Test: 1/24/99

ATD Serial No.: 035





Curve Description: Neck Force X Testing Program Hybrid III Neck Flexion Test (Male)

Maximum Value: 828.0 at 54.4 Milliseconds Test Information: S/N of Part: N/A Test I.D.: NF01D

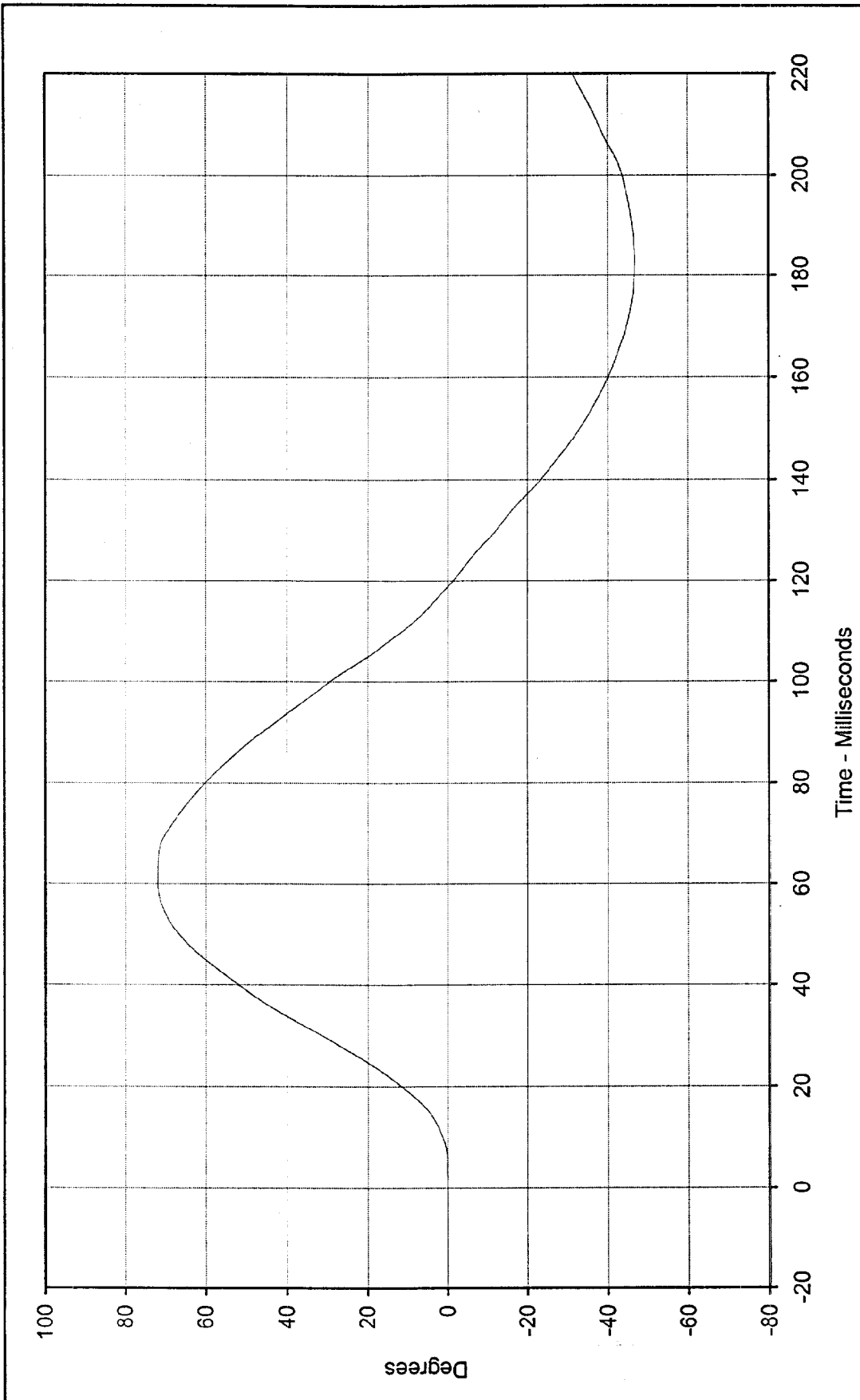
Minimum Value: -151.7 at 165.2 Milliseconds

SAE Filter Class: 60

Date of Test: 1/24/99

ATD Serial No.: 035

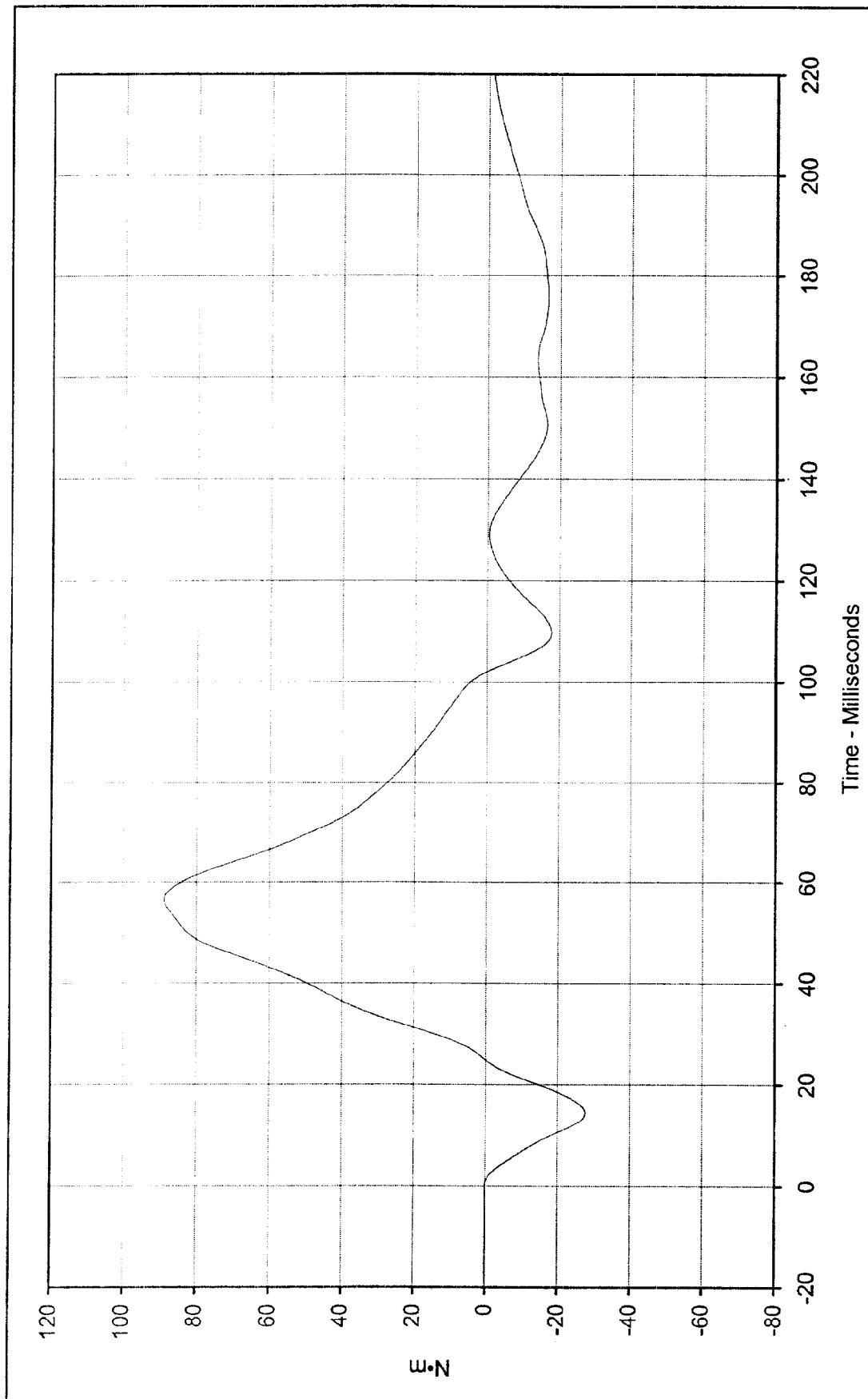




Testing Program: Hybrid III Neck Flexion Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NF01D

Curve Description: "D" Plane Rotation
 Maximum Value: 72.0 at 60.9 Milliseconds
 Minimum Value: -46.7 at 182.9 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 035

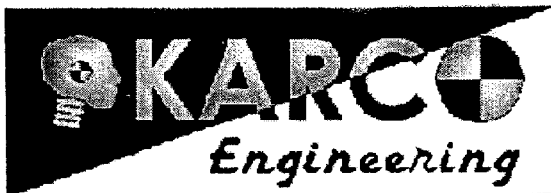




Curve Description: Moment About Occipital Condyles
 Maximum Value: 88.8 at 56.6 Milliseconds
 Minimum Value: -27.6 at 14.4 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 035

Testing Program Hybrid III Neck Flexion Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NF01D





Hybrid III Calibration Data Sheet

50TH Percentile Male

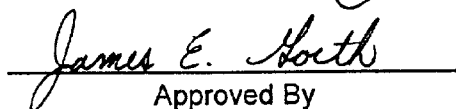
Neck Extension Test

ATD Serial No.: 035Part Serial No.: N/ATest I.D.: NE01C

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.7	Pass
	20 Msec.	G's	14.0 to 19.0	15.9	Pass
	30 Msec.	G's	11.0 to 16.0	13.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	13.9	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	43.3	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	101.0	Pass
	Time	Msec.	72.0 to 82.0	79.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	158.2	Pass
Moment About Occipital Condyle	Maximum	N • m	-52.9 to- 79.9	-72.0	Pass
	Time	Msec.	65.0 to 79.0	69.9	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	141.0	Pass
Overall Test Results					Pass



Laboratory Technician



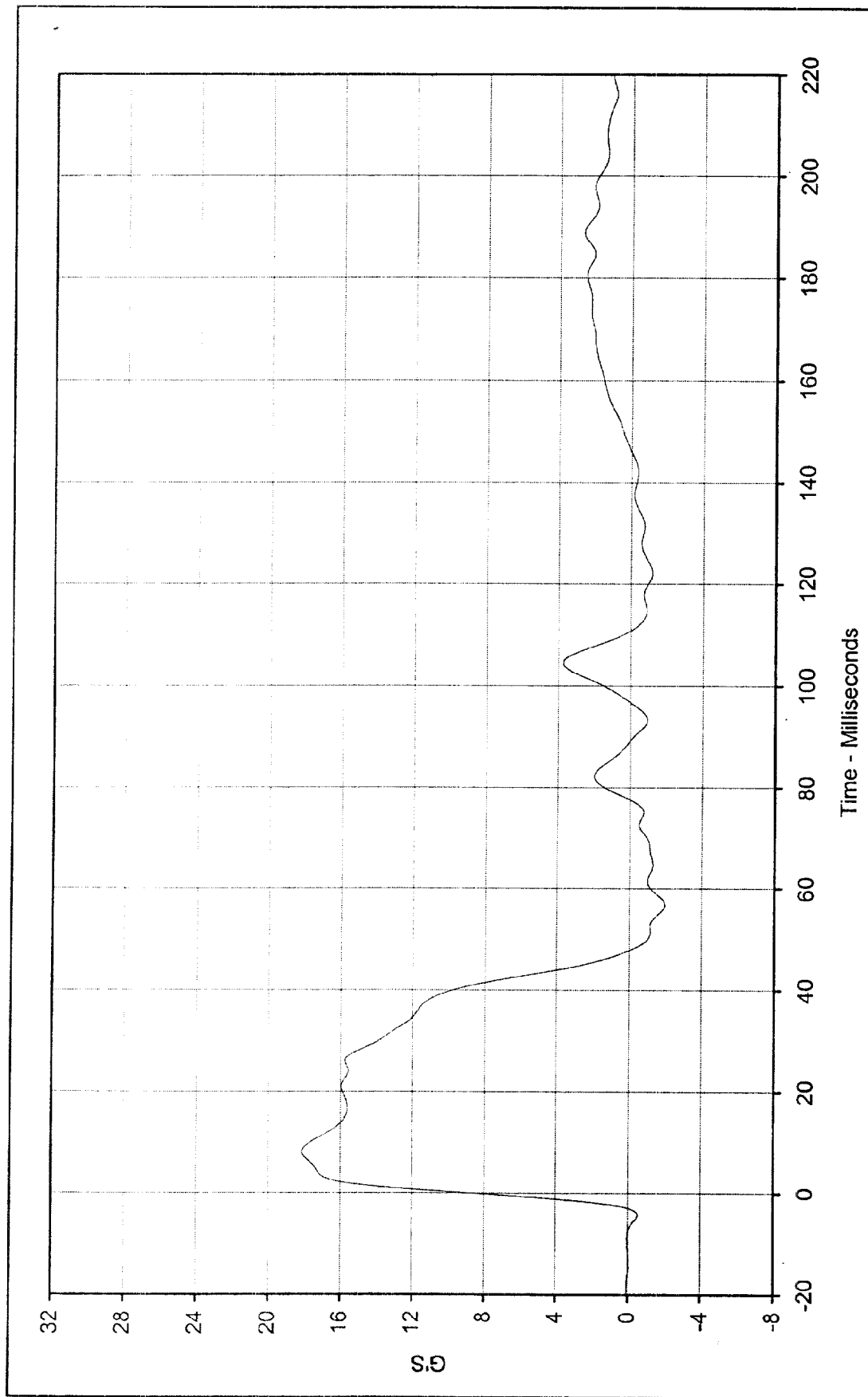
James E. North
Approved By

January 24, 1999

Test Date

1/26/99

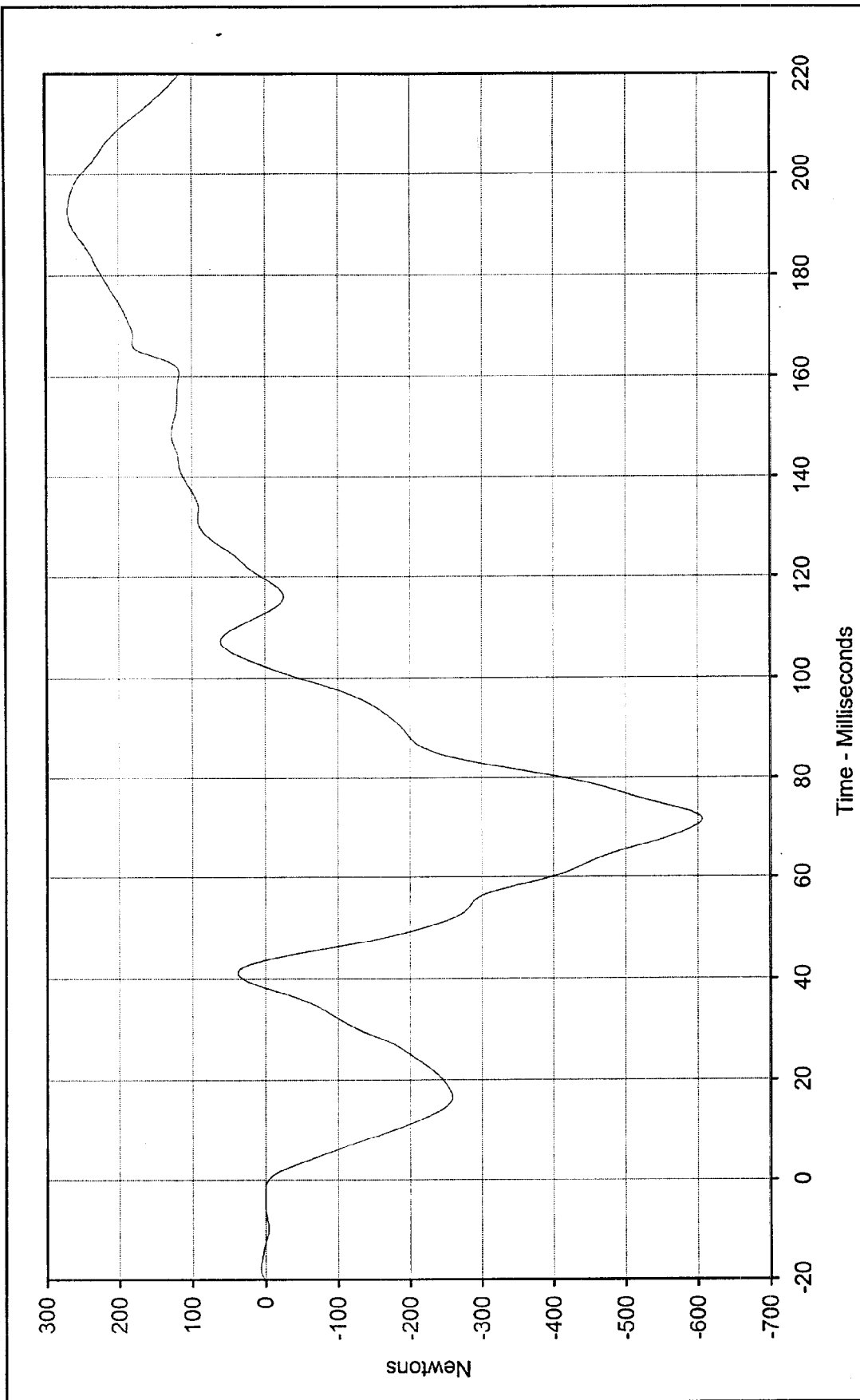
Date



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

Maximum Value: 18.1 at 8.1 Milliseconds
 Minimum Value: -2.0 at 56.8 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 035

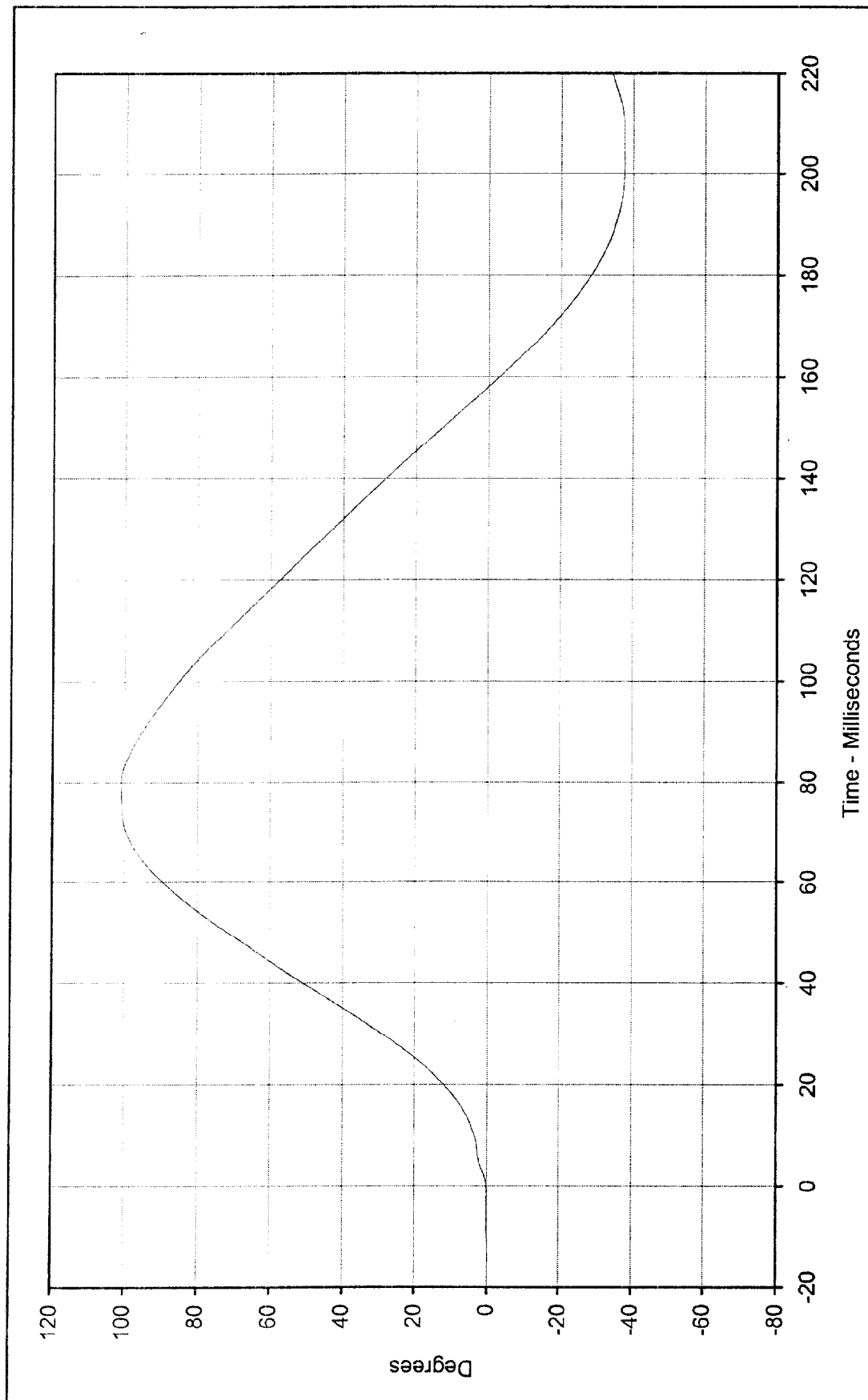




Curve Description: Neck Force X
 Maximum Value: 269.8 at 192.8 Milliseconds
 Minimum Value: -606.3 at 71.6 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 035

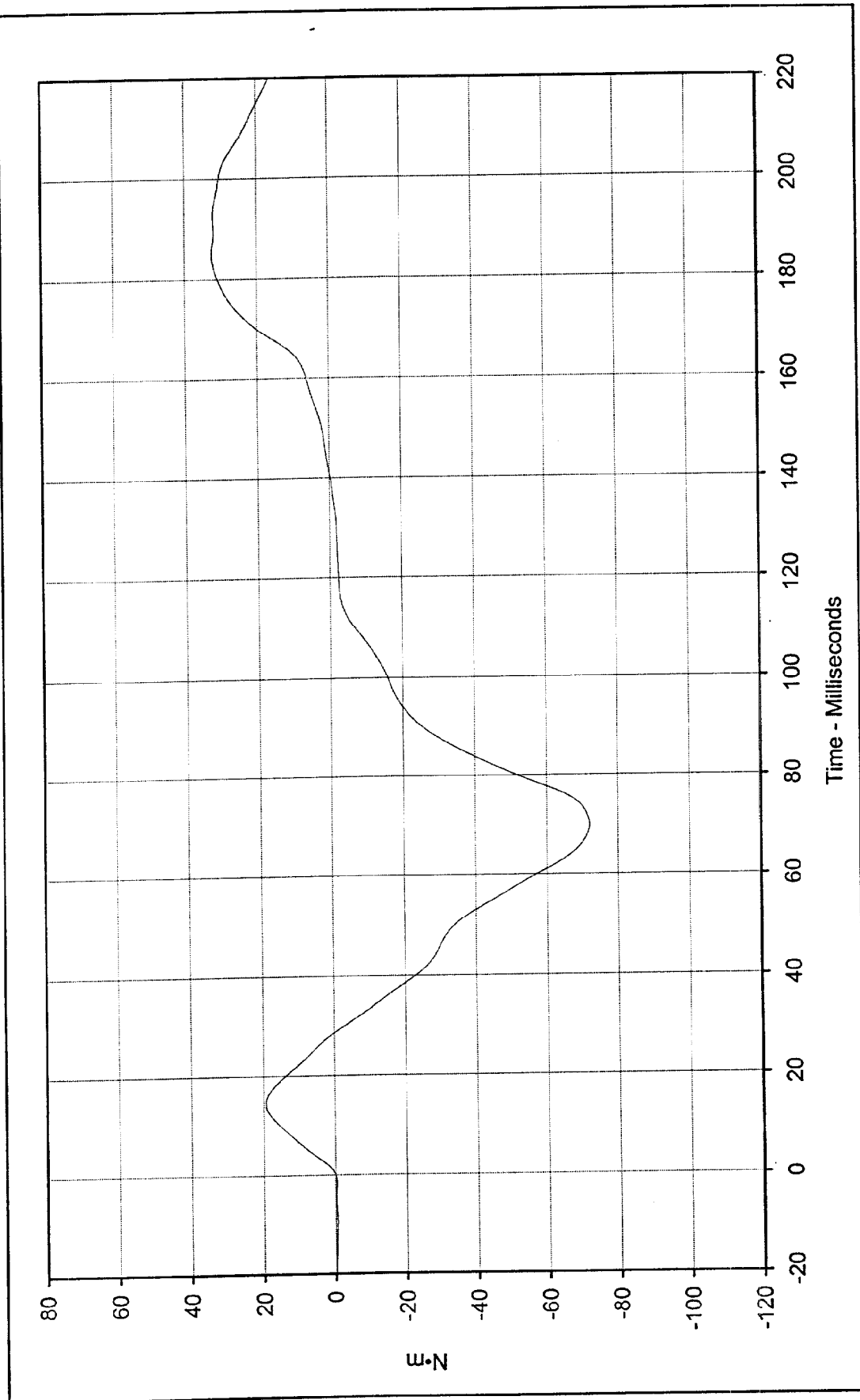
Testing Program: Hybrid III Neck Extension Test (Male)
 Test Information: S/N of Part: N/A Test I.D.: NE01C





Curve Description: _____ Testing Program Hybrid III Neck Extension Test (Male)
 Maximum Value: 101.0 at 79.5 Milliseconds
 Minimum Value: -37.5 at 201.6 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 035





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

Curve Description: Moment About Occipital Condyles
 Maximum Value: 32.5 at 184.9 Milliseconds
 Minimum Value: -72.0 at 69.9 Milliseconds
 SAE Filter Class: 60
 Date of Test: 1/24/99
 ATD Serial No.: 035





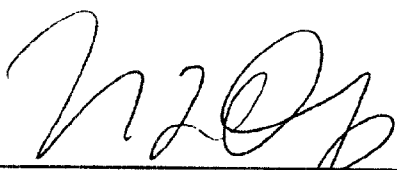
Hybrid III Calibration Data Sheet

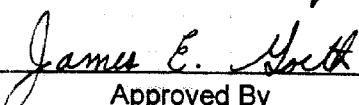
50TH Percentile Male

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	885.0	Pass
B - Shoulder pivot height	mm	505.5 to 520.7	510.0	Pass
C - "H" point height	mm	83.8 to 88.9	84.0	Pass
D - "H" point from seat back	mm	134.6 to 139.7	138.5	Pass
E - Shoulder pivot from back	mm	83.8 to 94.0	85.0	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	300.0	Pass
H - Skull cap to back line	mm	40.6 to 45.7	43.0	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	208.0	Pass
K - Buttock to knee length	mm	579.1 to 604.5	600.0	Pass
L - Popliteal length	mm	429.3 to 454.7	444.0	Pass
M - Knee pivot height	mm	485.1 to 500.4	491.0	Pass
N - Buttock popliteal length	mm	452.1 to 477.5	470.0	Pass
O - Chest depth	mm	213.4 to 228.6	221.0	Pass
P - Foot length	mm	251.5 to 266.7	260.0	Pass
V - Shoulder breadth	mm	421.6 to 436.9	434.0	Pass
W - Foot breadth	mm	91.4 to 106.7	100.0	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	435.0	Pass
BB - Location for waist circumference	mm	226.1 to 231.1	228.0	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

January 25, 1999

Test Date



Date

APPENDIX F
VEHICLE OWNER'S MANUAL
OCCUPANT RESTRAINT INSTRUCTIONS

KAR99001-13

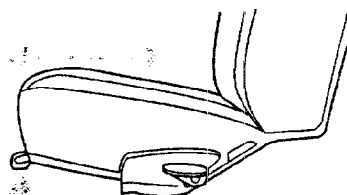
Seating and safety restraints

SEATING

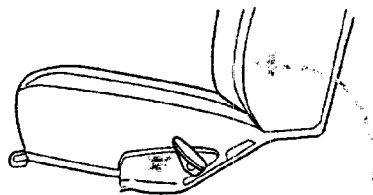
Adjusting the front manual seat

-  Never adjust the driver's seat or seatback when the vehicle is moving.
-  Do not pile cargo higher than the seatbacks to avoid injuring people in a collision or sudden stop.
-  Always drive and ride with your seatback upright and the lap belt snug and low across the hips.

Lift handle to move seat forward or backward.



Pull lever up to adjust seatback.

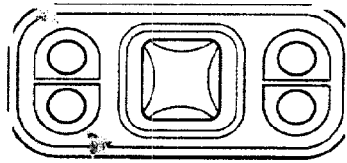


Seating and safety restraints

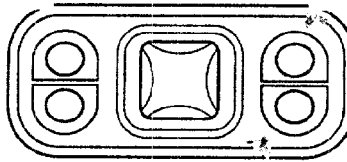
Adjusting the front power seat (if equipped)

-  Never adjust the driver's seat or seatback when the vehicle is moving.
-  Do not pile cargo higher than the seatbacks to avoid injuring people in a collision or sudden stop.
-  Always drive and ride with your seatback upright and the lap belt snug and low across the hips.

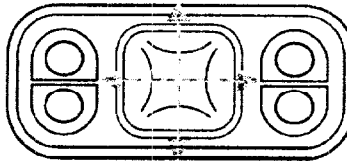
Press to raise or lower the front portion of the seat cushion.



Press to raise or lower the rear portion of the seat cushion.



Press the control to move the seat forward, backward, up or down.

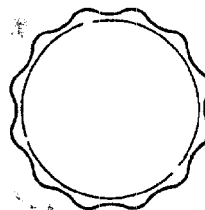


Seating and safety restraints

Using the manual lumbar support

Turn the lumbar support control clockwise to increase firmness.

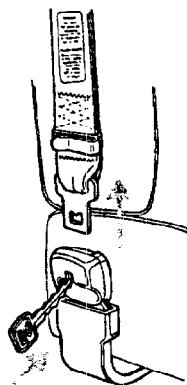
Turn the lumbar support control counterclockwise to increase softness.



Rear bench seat

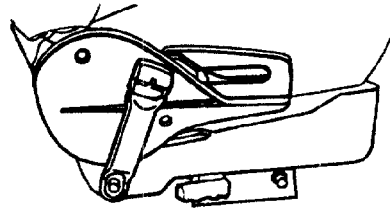
To remove the seats:

1. Disengage the lap/shoulder belt from the seat by inserting a key or small screwdriver into the slot in the detachable anchor and lifting upward.



Seating and safety restraints

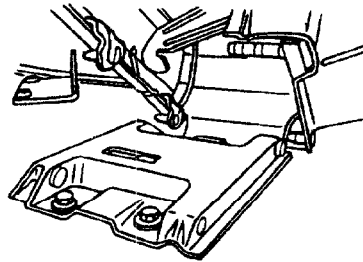
2. Pull the seat latch handle, then pull the seat toward the right side of the vehicle to disengage four pins from the floor mount.
3. Remove the seat.



To install the seats:

 Check to see that the seat and seatback is latched securely in position. Keep floor area free of objects that would prevent proper seat engagement. Never attempt to adjust the seat while the vehicle is in motion.

1. Position the seat to the floor mount.
2. Engage the four pins into the floor mount hole and push the seat toward the left side of the vehicle to fully engage.



3. Pull the seat latch handle downward to lock the seat in position.
4. Make sure the safety belt is not twisted, then insert the seat belt tongue into detachable anchor until you hear a "click" and feel the latch engage.

SAFETY RESTRAINTS

Safety restraints precautions

-  Always drive and ride with your seatback upright and the lap belt snug and low across the hips.
-  To prevent the risk of injury, make sure children sit where they can be properly restrained.

Seating and safety restraints

 Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision.

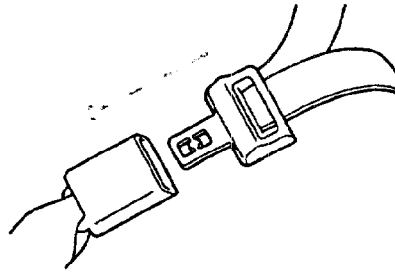
 All occupants of the vehicle, including the driver, should always properly wear their safety belts, even when an air bag SRS is provided.

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

 Each seating position in your vehicle has a specific safety belt assembly which is made up of one buckle and one tongue that are designed to be used as a pair. 1) Use the shoulder belt on the outside shoulder only, Never wear the shoulder belt under the arm. 2) Never swing the safety belt around your neck over the inside shoulder. 3) Never use a single belt for more than one person.

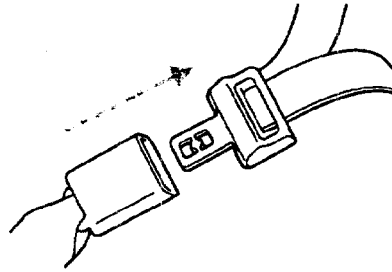
Combination lap and shoulder belts

1. Insert the belt tongue into the proper buckle (the buckle closest to the direction the tongue is coming from) until you hear a snap and feel it latch. Make sure the tongue is securely fastened in the buckle.



Seating and safety restraints

2. To unfasten, push the release button and remove the tongue from the buckle.



The front and rear outboard safety restraints in the vehicle are combination lap and shoulder belts. The front and rear seat passenger outboard safety belts have two types of locking modes described below:

Vehicle sensitive mode

The vehicle sensitive mode is the normal retractor mode, allowing free shoulder belt length adjustment to your movements and locking in response to vehicle movement. For example, if the driver brakes suddenly or turns a corner sharply, or the vehicle receives an impact of 8 km/h (5 mph) or more, the combination safety belts will lock to help reduce forward movement of the driver and passengers.

Automatic locking mode

In this mode, the shoulder belt is automatically pre-locked. The belt will still retract to remove any slack in the shoulder belt.

The automatic locking mode is not available on the driver safety belt.

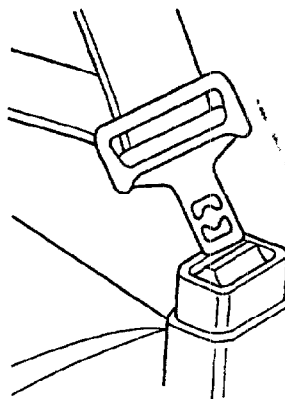
When to use the automatic locking mode

- When a tight lap/shoulder fit is desired.
- Anytime a child safety seat is installed in a passenger front or outboard rear seating position (if equipped). Refer to *Safety Restraints for Children* or *Safety Seats for Children* later in this chapter.

Seating and safety restraints

How to use the automatic locking mode

- Buckle the combination lap and shoulder belt.



- Grasp the shoulder portion and pull downward until the entire belt is extracted.



- Allow the belt to retract. As the belt retracts, you will hear a clicking sound. This indicates the safety belt is now in the automatic locking mode.

How to disengage the automatic locking mode

Disconnect the combination lap/shoulder belt and allow it to retract completely to disengage the automatic locking mode and activate the vehicle sensitive (emergency) locking mode.

Safety belt buckle pretensioner

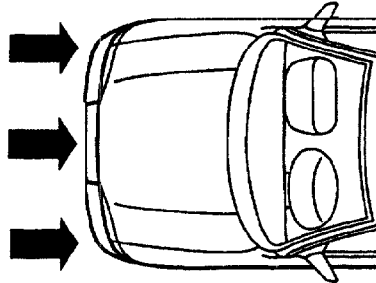
Your vehicle is equipped with safety belt buckle pretensioners at the driver and front passenger seating positions.

Seating and safety restraints

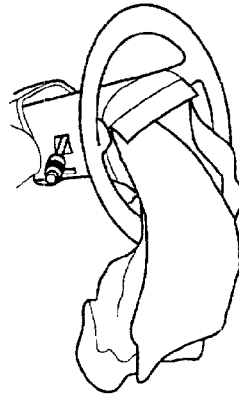
How does the air bag supplemental restraint system work?

The air bag SRS is designed to activate when the vehicle sustains sufficient longitudinal deceleration sufficient to cause the sensors to close an electrical circuit that initiates air bag inflation.

The fact that the air bags did not inflate in a collision does not mean that something is wrong with the system. Rather, it means the forces were not of the type sufficient to cause activation. Air bags are designed to inflate in frontal and near-frontal collisions, not rollover, side-impact, or rear-impacts.



The air bags inflate and deflate rapidly upon activation. After air bag deployment, it is normal to notice a smoke-like, powdery residue or smell the burnt propellant. This may consist of cornstarch, talcum powder (to lubricate the bag) or sodium compounds (e.g., baking soda) that result from the combustion process that inflates the air bag. Small amounts of sodium hydroxide may be present which may irritate the skin and eyes, but none of the residue is toxic.



While the system is designed to help reduce serious injuries, it may also cause minor burns, abrasions, swelling or temporary hearing loss. Because air bags must inflate rapidly and with considerable force, there is the risk of death or serious injuries such as fractures, facial and eye injuries or internal injuries, particularly to occupants who are not properly restrained or are otherwise out of position at the time of air bag deployment. Thus, it is extremely important that occupants be properly restrained as far away from the air bag module as possible while maintaining vehicle control.

Seating and safety restraints



Several air bag system components get hot after inflation. Do not touch them after inflation.



If the air bag is deployed, the air bag will not **function** again and must be replaced **immediately**. If the air bag is not replaced, the unrepaired area will increase the risk of injury in a collision.

The SRS consists of:

- driver and passenger air bag modules (which include the inflators and air bags),
- one or more impact and safing sensors,
- a readiness light and tone
- and the electrical wiring which connects the components.

The diagnostic module monitors its own internal circuits and the supplemental air bag electrical system warning (including the impact sensors), the system wiring, the air bag system readiness light, the air bag back up power and the air bag ignitors.

Determining if the system is operational

The SRS uses a readiness light in the instrument cluster or a tone to indicate the condition of the system. Refer to the *Air bag readiness* section in the *Instrumentation* chapter. Routine maintenance of the air bag is not required.

A difficulty with the system is indicated by one or more of the following:

- The readiness light will either flash or stay lit.
- The readiness light will not illuminate immediately after ignition is turned on.
- A series of five beeps will be heard. The tone pattern will repeat periodically until the problem and light are repaired.



If any of these things happen, even intermittently, have the SRS serviced at your dealership or by a qualified technician immediately. Unless serviced, the system may not function properly in the event, of a collision.