

REPORT NUMBER KAR21129-01

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

**KIA MOTORS CORPORATION
2002 KIA RIO
4 DOOR SEDAN**

NHTSA NUMBER: KIA5001

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



DECEMBER 15, 2001

FINAL REPORT

**PREPARED FOR:
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Date of Acceptance

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Date of Acceptance

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2002 Kia Rio 4 Door Sedan at KARCO Engineering on 12/5/01. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 55.69 km/h. The ambient temperature at the barrier face at the time of impact is 12.2 degrees Celcius. The vehicle's maximum post test static crush is 481 mm to the left of the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and second generation supplemental airbags in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 35%;">Measurement Description</th> <th style="width: 15%;">Units</th> <th style="width: 15%;">Threshold</th> <th style="width: 15%;">Driver ATD</th> <th style="width: 20%;">Passenger ATD</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>N/A</td> <td>1000</td> <td>402.8</td> <td>521.2</td> </tr> <tr> <td>Max. Thorax Accel. (3 msec Clip)</td> <td>G's</td> <td>60</td> <td>52.8</td> <td>45.1</td> </tr> <tr> <td>Left Femur force</td> <td>Newtons</td> <td>10009</td> <td>-3532.2</td> <td>-6179.0</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10009</td> <td>-4447.9</td> <td>-3093.6</td> </tr> </tbody> </table>						Measurement Description	Units	Threshold	Driver ATD	Passenger ATD	Head Injury Criteria (HIC)	N/A	1000	402.8	521.2	Max. Thorax Accel. (3 msec Clip)	G's	60	52.8	45.1	Left Femur force	Newtons	10009	-3532.2	-6179.0	Right Femur Force	Newtons	10009	-4447.9	-3093.6
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SECTION 1

PURPOSE AND SUMMARY OF TEST KIA5001

1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-01-D-02005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph (48.3 km/h) requirements.

The 35 mph (56.3 km/h) frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test procedure.

1.2 SUMMARY

A load cell barrier consisting of 24 load cells was impacted by a 2002 Kia Rio 4 Door Sedan at a velocity of 55.69 km/h. The test was performed at Karco Engineering on December 5, 2001. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 35) and the right-front passenger (position 2) ATD (Serial No. 34) were calibrated one test previous to this test.

The Ninety-six (96) channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle and dummy 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 and restraint systems.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 481 mm and both the driver and the passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD head contacted the airbag and headrest, its chest and abdomen contacted the airbag, and both knees contacted the steering column and knee bolster.

The passenger's visible contact points were as follows: The passenger ATD head contacted the airbag and headrest. The chest and abdomen contacted the airbag. Both knees contacted the glove box.

Occupant injury data contained in table below.

OCCUPANT DATA SUMMARY

ATD Position	HIC	Clip (g)	Chest Disp (mm)	Left Femur (N)	Right Femur (N)	Belt Spool (mm)
Driver	402.8	52.8	-25.4	-3532.2	-4447.9	171.5
Passenger	521.2	45.1	-23.3	-6179.0	-3093.6	219.8

SECTION 2
OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

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

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2002 Kia Rio 4 Door Sedan
Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
Test Date: 12/5/01

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	55.69
Test Weight	kg	1291
Impact Angle	degrees	0
Average Rebound	mm	1429
Maximum Static Crush	mm	481

DOOR OPENING AND SEAT TRACK INFORMATION

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

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type / Serial No.	50% Male Hybrid III / No. 35	50% Male Hybrid III / No. 34
Head Contact	Airbag/Headrest	Airbag/Headrest
Chest Contact	Airbag	Airbag
Abdomen Contact	None	Airbag
Left Knee Contact	Steering Column/Knee Bolster	Glove Box
Right Knee Contact	Steering Column/Knee Bolster	Glove Box

16mm MOVIE COVERAGE

High Speed	15
Real Time	1
Total	16

DATA CHANNELS

Driver ATD Sensors	40
Passenger ATD Sensors	40
Belt Assessment Sensors	8
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	24
Total	121

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

TEST VEHICLE INFORMATION

Make	Kia
Model	Rio
Body Style	4 Door Sedan
NHTSA No.	KIA5001
VIN	KNADC123626140573
Color	Light Gold
Delivery Date	11/27/2001
Odometer Reading (mi.)	26
Dealer	Hi-Desert Kia
Transmission	3 Speed Automatic
Final Drive	Front
Type/No. Cylinders	4
Engine Displacement (L)	1.5
Engine Placement	Transverse
Driver Side Airbag	No

TEST VEHICLE OPTIONS

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Kia Motor Corporation	GVWR (kg)	1474
Date of Manufacture	September-01	GAWR Front (kg)	767
		GAWR Rear (kg)	707

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	200	200
Cold Pressure (kPa)	200	200
Recommend Tire Size	P175/65R14	P175/65R14
Tire Size on Vehicle	P175/65R14	P175/65R14
Tire Manufacturer	Kumho	Kumho

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	None	
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				375
Cargo Weight (RCLW) (kg)				35

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

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	344	216		381	270	
Right	kg	343	206		376	264	
Ratio	%	61.9	38.1		58.6	41.4	
Totals	kg	687	422	1109	757	534	1291

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1109
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Weight (RCLW)	kg	35
Calculated Vehicle Target Weight (TVTW)	kg	1296

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	628	630	622	623	922
As Tested	mm	610	611	584	586	1002

Vehicle Wheel base (mm): 2420

Weight of Ballast secured in cargo area (kg): 0

Vehicle Components Removed: Rear seat, Tail lights, Rear speakers, Trunk lid, Spare tire

* Ballast weight does not include cameras, instrumentation, and brake abort system.

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 45.0

Usable Capacity Figure Furnished by COTR (L): 45.0

Actual Test Volume with entire fuel System Filled (L): 41.9

Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.764

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

Is Vehicle Fuel Pump Electric or Mechanical?: Electric

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

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

DATA SHEET NO. 3
POST IMPACT DATA

Test Vehicle: 2002 Kia Rio 4 Door Sedan
Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
Test Date: 12/5/01

SPEED TRAP DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.51 to 57.12	55.69
Trap No. 1 Entry Distance	mm	< 1524	1524
Trap No. 1 Exit Distance	mm	< 1524	305
Trap No. 2 Velocity (Redundant)	km/h	55.51 to 57.12	55.72
Trap No. 2 Entry Distance	mm	< 1524	1524
Trap No. 2 Exit Distance	mm	< 1524	305

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4067	3689	-378
Center	mm	4202	3727	-475
Right Side	mm	4067	3670	-397

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1461
Center	mm	1394
Right Side	mm	1433
Average	mm	1429

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

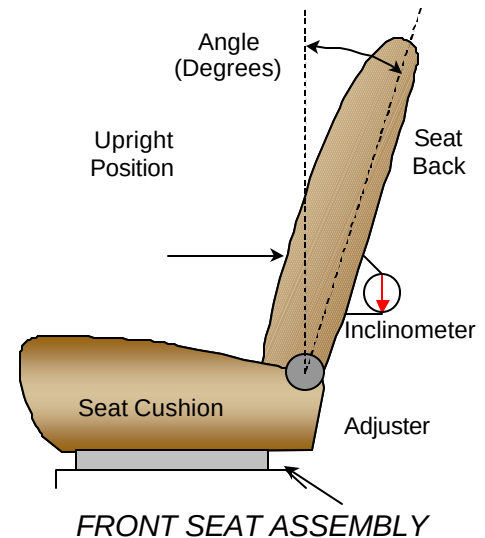
Test Vehicle: 2002 Kia Rio 4 Door Sedan
Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
Test Date: 12/5/01

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturers designated angle. The procedure is as follows: A special application tool with pointed probes is inserted through the fabric to make contact with the rigid portion of the lower seat frame assembly, approximately 13 inches above the pivot point of the seat back. An inclinometer is placed against the flat surface of the tool and the seat back angle is measured directly from the dial face.

Driver seat back angle: 24° with a seated dummy
Passenger seat back angle: 24° with a seated dummy



SEAT FORE/AFT POSITIONS

Both driver and passenger seats have 19 positions or detents. The first or forward most position is counted as number one (1). The fore/aft position is set aft of the middle position for both driver and passenger.

Driver seat fore/aft total travel: 19 seating positions or detents
Driver seat fore/aft position: 10th detent from forward most
Passenger seat fore/aft total travel: 19 seating positions or detents
Passenger seat fore/aft position: 10th detent from forward most

SEAT BELT UPPER ANCHORAGE

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

DATA SHEET NO. 4...(CONTINUED)
TEST VEHICLE INFORMATION

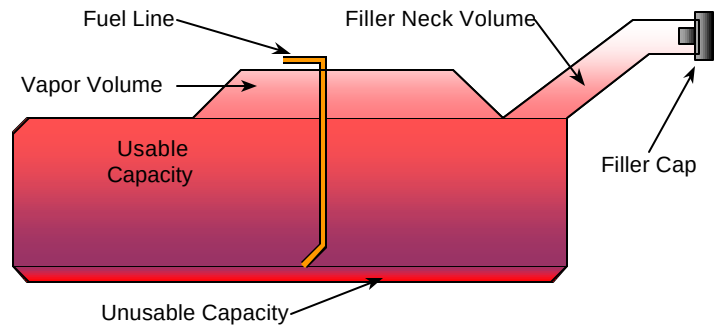
Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

FUEL TANK CAPACITY DATA

The "Usable Capacity" of the standard equipment fuel tank is:	<u>45.0</u>	liters
The "Usable Capacity" of any optional equipment fuel tank is:	<u>45.0</u>	liters
"Usable Capacity" used for certification tests FMVSS 301 requirements:	<u>41.4 to 42.3</u>	liters
Actual amount of Stoddard solvent added to vehicle for certification test:	<u>41.9</u>	liters

The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel tank filler door is located on the left rear fender.

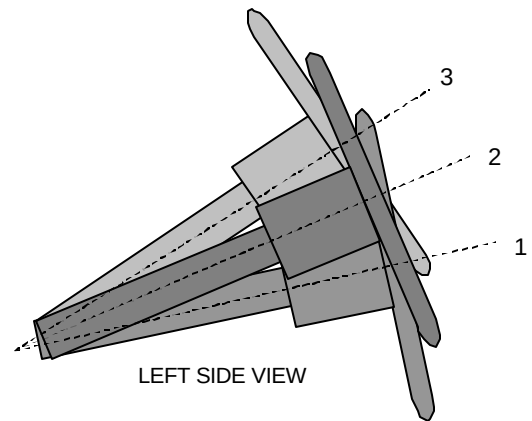


VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.

Lowermost; position 1:	<u>67°</u>
Geometric center; position 2:	<u>65°</u>
Uppermost position 3:	<u>64°</u>



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 5
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2002 Kia Rio 4 Door Sedan
Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
Test Date: 12/5/01

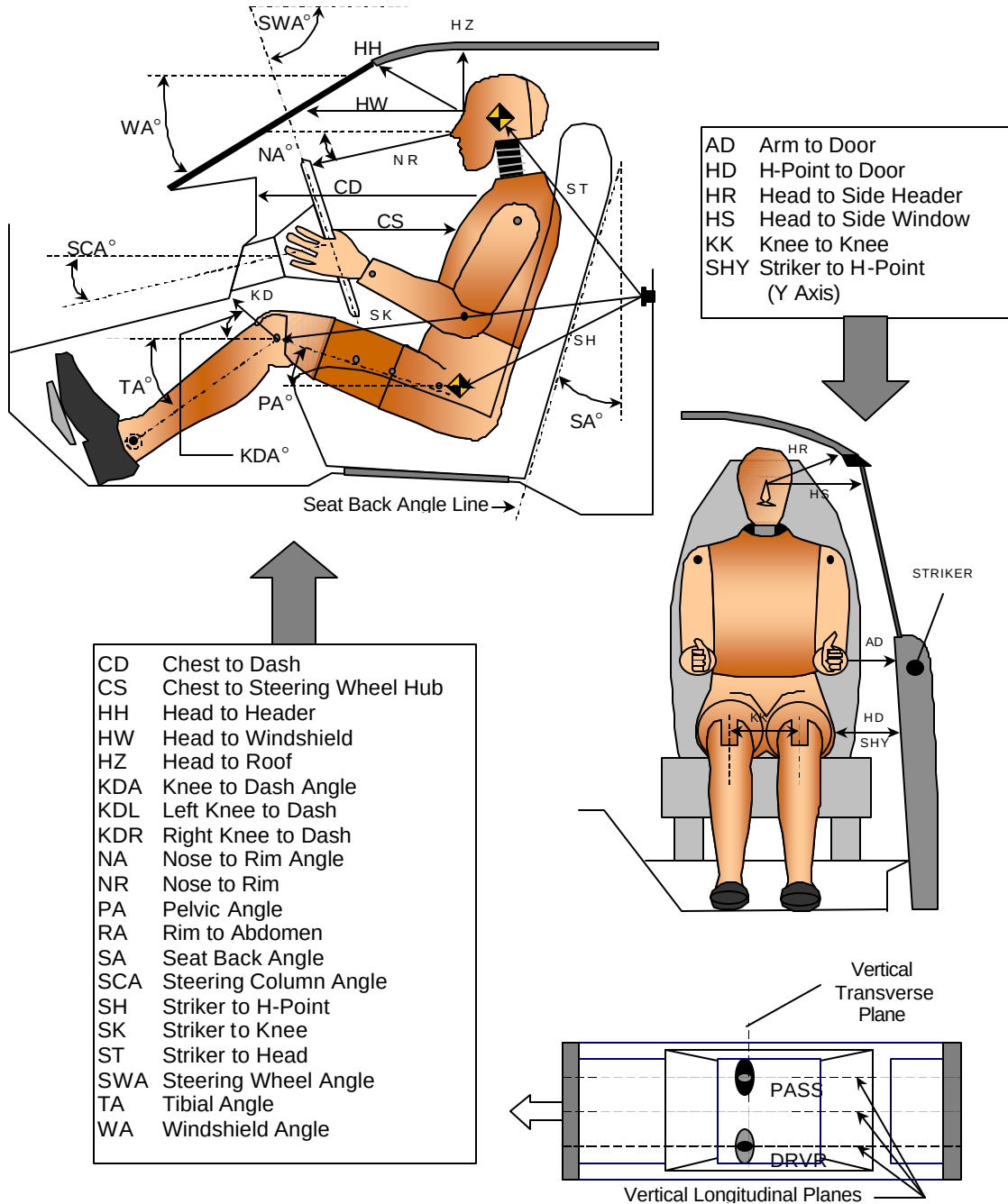
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		29		
SWA	Steering Wheel Angle		65		
SCA	Steering Column Angle		25		
SA	Seat Back Angle		25		25
HZ	Head to Roof (Z)	184	90	192	90
HH	Head to Header	333		330	
HW	Head to Windshield	570		600	
HR	Head to Side Header (Y)	215		255	
NR	Nose to Rim	420	14		
CD	Chest to Dash	557		565	
CS	Chest to Steering Hub	320			
RA	Rim to Abdomen	190			
KDL	Left Knee to Dash	208	13	182	
KDR	Right Knee to Dash	182		205	3
PA	Pelvic Angle		25		25
TA	Tibia Angle		47		38
KK	Knee to Knee (Y)	280		260	
ST	Striker to Head	518	3	561	1
SK	Striker to Knee	542	89	536	2
SH	Striker to H-Point	147		145	
SHY	Striker to H-Point (Y)	262		263	
HS	Head to Side Window	299		303	
HD	H-Point to Door (Y)	173		170	
AD	Arm to Door (Y)	115		75	

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

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

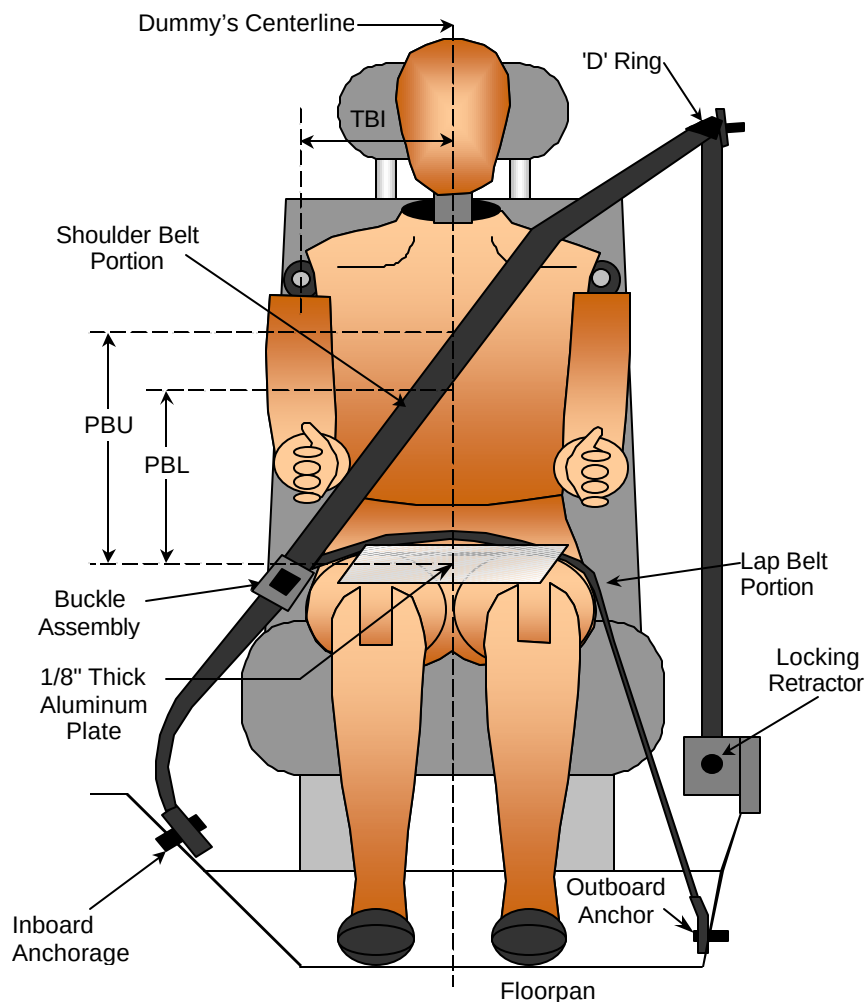


DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

DATA SHEET NO. 6 **SEATBELT POSITIONING DATA**

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy C/L to Lap/Shoulder Belt Intersect	mm	230	255
PBU - Top surface of reference to belt upper edge	mm	310	300
PBL - Top surface of reference to belt lower edge	mm	225	235
Lap Belt tension	Newton's	10	10
Shoulder Belt tension	N/A	Retractor	Retractor

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

Test Vehicle: 2002 Kia Rio 4 Door Sedan

NHTSA No.: KIA5001

Test Program: 2002 NHTSA 35mph NCAP

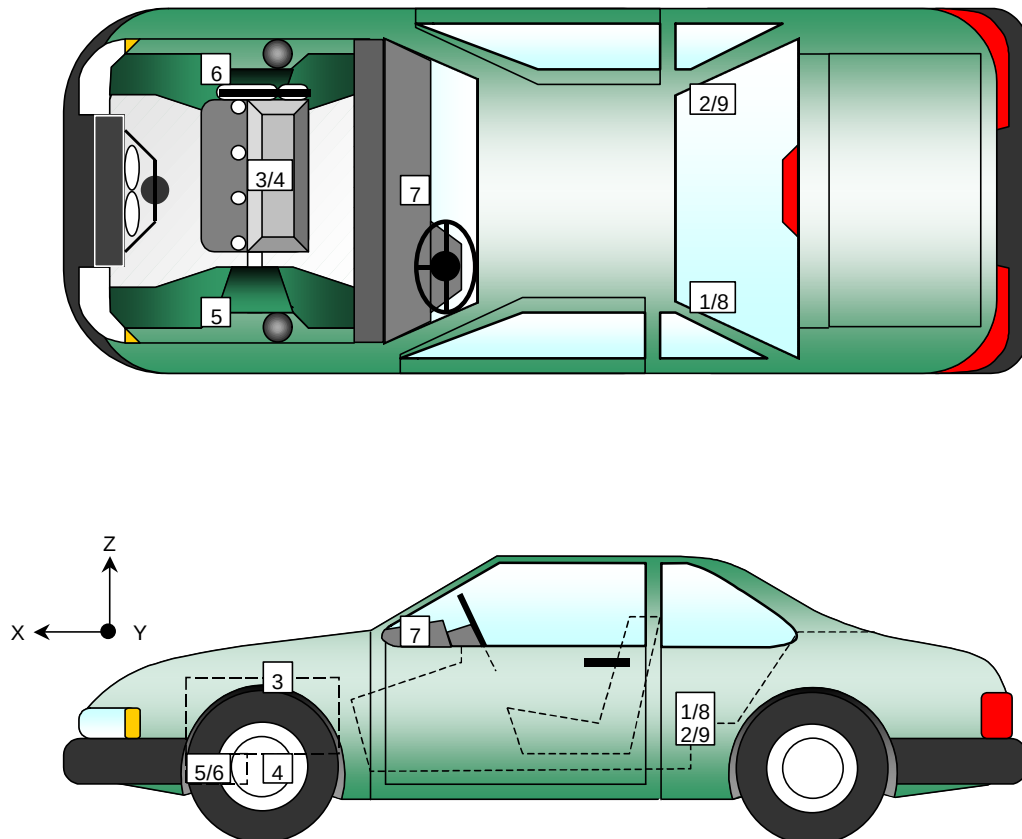
Test Date: #####

VEHICLE 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	1235	-555	290	G's	2.9	108.2	-36.4	41.9
2	Right Rear X-Member	1235	540	390	G's	3.1	135.2	-40.2	34.1
3	Engine Top	3590	0	820	G's	27.6	37.7	-186.8	28.1
4	Engine Bottom	3530	60	280	G's	0.0	30.6	-174.8	23.6*
5	Left Brake Caliper	3470	-565	250	G's	47.7	66.3	-141.4	25.6
6	Right Brake Caliper	3470	-565	250	G's	116.0	62.7	-105.0	26.4
7	Instrument Panel	2800	0	950	G's	6.8	122.5	-39.5	62.3
8	Left Rear X-Member (Z-Axis)	1235	-500	390	G's	8.9	38.3	-3.8	53.6
9	Right Rear X-Member (Z-Axis)	1235	510	390	G's	8.1	29.7	-9.6	52.3

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

* Channel failed at 30.6 msec.



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

Test Vehicle: 2002 Kia Rio 4 Door Sedan

NHTSA No.: KIA5001

Test Program: 2002 NHTSA 35mph NCAP

Test Date: 12/05/01

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	17.5	228.9	-52.7	72.4	15.9	246.6	-56.9	78.4
Head CG	Y	G's	2.9	130.5	-11.0	75.8	3.0	37.0	-18.8	74.1
Head CG	Z	G's	19.0	42.9	-9.5	75.1	18.1	62.6	-1.9	131.8
Head CG Resultant	N/A	G's	53.7	72.4			60.3	78.4		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	4.8	245.9	-55.1	72.4	4.0	263.2	-45.6	68.2
Chest CG	Y	G's	7.2	63.0	-3.7	49.5	1.6	38.6	-9.7	66.9
Chest CG	Z	G's	9.4	41.9	-9.2	65.7	11.2	77.0	-1.0	57.9
Chest CG Resultant	N/A	G's	55.5	72.4			46.6	68.2		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	805.6	79.0	-3532.2	63.2	1146.7	39.4	-6179.0	51.5
Right Femur	Z	Newtons	1850.2	67.2	-4447.9	39.6	720.0	39.3	-3093.6	54.0

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	7109.4	58.9	-72.0	10.1	7245.7	54.6	1.0	233.7
Shoulder Belt Force	N/A	Newtons	4798.8	81.6	-63.6	8.0	4907.5	79.1	-33.9	7.3
Shoulder Belt Pullout	N/A	MM	171.5	84.6	-45.4	219.5	219.8	87.7	-16.2	30.3

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G	T ¹	T ²	HIC	Avg G	T ¹	T ²
Head CG Primary	402.8	41.6	53.7	89.6	521.2	46.3	61.1	96.7

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	52.8	71.1	74.1	45.1	66.9	69.9

DATA SHEET NO. 8...(continued)

Test Vehicle: 2002 Kia Rio 4 Door Sedan

NHTSA No.: KIA5001

Test Program: 2002 NHTSA 35mph NCAP

Test Date: 12/05/01

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	5.7	42.9	-56.1	60.7	3.3	205.8	-75.7	51.6
Pelvis	Y	G's	0.9	43.4	-25.2	40.0	11.6	49.2	-7.5	60.0
Pelvis	Z	G's	13.6	40.7	-44.7	70.0	4.9	86.9	-30.9	59.8

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	351.9	74.3	-393.3	43.5	381.1	72.9	-350.2	120.2
Neck Force	Y	Newtons	297.6	81.4	-202.0	257.3	439.6	85.8	-157.0	135.1
Neck Force	Z	Newtons	1229.0	62.5	-263.4	10.7	980.5	67.5	-211.5	274.0
Neck Moment	X	N•m	2.8	25.5	-23.8	81.2	11.6	92.5	-10.6	123.2
Neck Moment	Y	N•m	30.7	125.0	-22.6	89.1	25.6	134.2	-27.5	92.3
Neck Moment	Z	N•m	13.2	90.0	-9.6	264.8	21.0	92.1	-7.0	147.4

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	23.9	60.9	-14.1	37.8	69.8	46.9	-190.3	37.2
Left Foot Aft	Z	G's	5.0	203.5	-51.4	25.3	21.3	52.5	-71.7	45.2
Left Foot Fore	Z	G's	11.6	38.6	-68.6	22.5	57.9	51.7	-114.0	45.5
Right Foot Aft	X	G's	43.9	42.8	-258.8	39.3	9.5	86.7	-91.7	36.9
Right Foot Aft	Z	G's	36.0	65.4	-349.9	39.3	8.8	57.0	-87.3	34.8
Right Foot Fore	Z	G's	33.2	48.5	-448.8	38.7	53.8	57.7	-108.6	34.9

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	46.4	56.1	-2.9	112.4	40.0	51.9	-11.0	41.7
Left Lower Moment	Y	N•m	179.1	57.8	-15.8	36.7	171.7	65.5	-86.2	38.2
Left Lower Force	Z	Newtons	423.1	62.9	-1945.5	27.1	273.7	131.8	-2471.1	36.1
Left Upper Moment	X	N•m	78.4	51.9	-9.7	201.7	20.4	82.2	-36.5	47.2
Left Upper Moment	Y	N•m	15.7	96.6	-67.7	38.6	291.1	50.7	-148.8	38.4
Right Lower Moment	X	N•m	44.8	39.3	-14.2	48.5	22.8	57.9	-5.3	30.7
Right Lower Moment	Y	N•m	63.2	44.4	-50.6	40.2	85.5	56.3	-48.4	38.5
Right Lower Force	Z	Newtons	413.1	54.6	-15979.9	39.6	641.6	45.1	-3890.3	33.2
Right Upper Moment	X	N•m	65.5	56.2	-12.0	41.9	47.6	45.2	-18.3	30.5
Right Upper Moment	Y	N•m	18.3	81.7	-430.8	39.8	151.3	49.3	-122.3	38.2

DATA SHEET NO. 8...(continued)Test Vehicle: 2002 Kia Rio 4 Door SedanNHTSA No.: KIA5001Test Program: 2002 NHTSA 35mph NCAPTest Date: 12/05/01**CHEST PEAK DISPLACEMENTS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	MM	0.2	4.2	-25.4	64.0	0.4	1.1	-23.3	88.8

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	17.0	229.0	-52.3	71.8	16.8	247.3	-55.5	76.8
Head CG	Y	G's	2.0	10.9	-11.2	74.6	2.7	37.4	-19.6	74.2
Head CG	Z	G's	18.7	42.7	-9.9	75.0	18.2	62.9	-3.0	135.6
Head CG Resultant	N/A	G's	53.5	71.8			59.8	75.6		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	4.7	245.7	-55.1	72.2	4.1	266.6	-45.4	68.3
Chest CG	Y	G's	7.3	62.9	-3.6	49.3	2.6	44.4	-9.4	67.0
Chest CG	Z	G's	9.0	41.8	-9.6	65.5	11.6	77.1	-0.9	58.0
Chest CG Resultant	N/A	G's	55.6	72.2			46.3	68.2		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G	T ¹	T ²	HIC	Avg G	T ¹	T ²
Head CG Redundant	411.4	42.0	53.4	89.3	522.4	46.3	61.0	96.7

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	53.0	70.9	73.9	45.2	67.2	70.2

DATA SHEET NO. 9
SEATBELT ASSESSMENT TEST DATA

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy C/L to Lap/Shoulder Belt Intersect	mm	230	255
PBU - Top surface of reference to belt upper edge	mm	310	300
PBL - Top surface of reference to belt lower edge	mm	225	235
Lap Belt tension	Newton's	10	10
Shoulder Belt tension	N/A	Retractor	Retractor

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to 'D' ring	mm	675	675
Shoulder belt length as measured on ATD	mm	900	815
Lap belt length as measured on ATD	mm	785	815
Remainder of belt on reel	mm	800	730
Total belt length for continuous webbing systems	mm	3160	3035

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	57.0	169.0
As determined electronically	mm	171.5	219.8

BELT STRETCH DATA

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

*Not used with shoulder belt pre-tensioner systems.

DATA SHEET NO. 10
SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

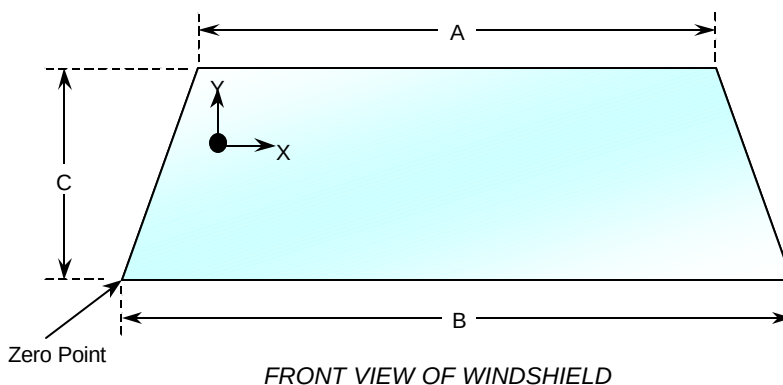
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. No molding covers the windshield periphery at any point.

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

Temperature of windshield molding during test: 21.1 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test(mm)	Post-Test (mm)	% of Retention
Left Side	1933	1933	100
Right Side	1933	1933	100
Total	3865	3865	100



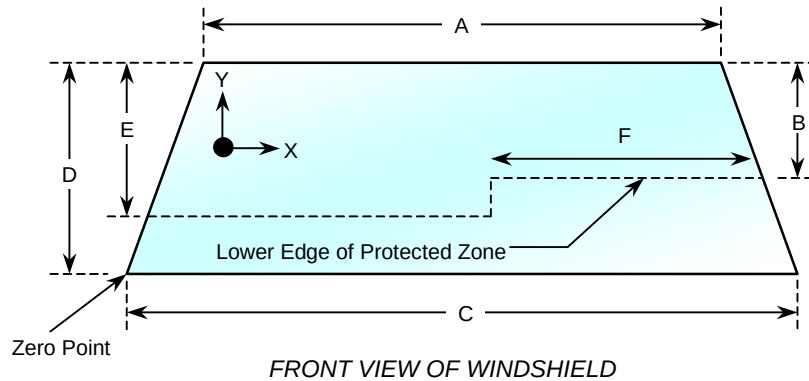
WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1065	17
B	mm	1330	10
C	mm	735	10

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

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01



**WINDSHIELD AND
PROTECTED ZONE**

Item	Units	Value
A	mm	1065
B	mm	510
C	mm	1330
D	mm	735
E	mm	448
F	mm	595

A OF PROTECTED ZONE FAILURES

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

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

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

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

DATA SHEET NO. 12
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2002 Kia Rio 4 Door Sedan NHTSA No.: KIA5001
Test Program: 2002 NHTSA 35mph NCAP Test Date: 12/5/01

Test Time: 12:40 P.M Temperature at Time of Impact 12.2 Deg. C

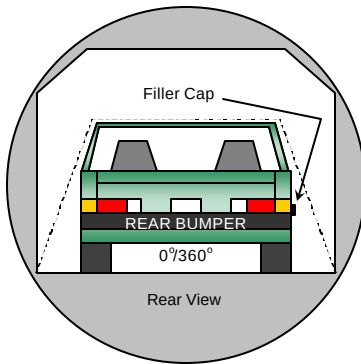
STODDARD SOLVENT SPILLAGE MEASUREMENTS

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

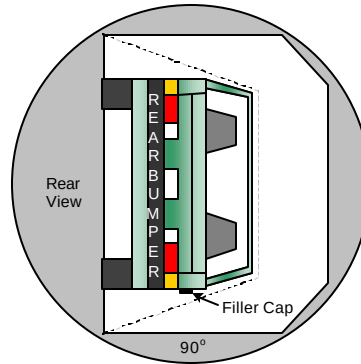
DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

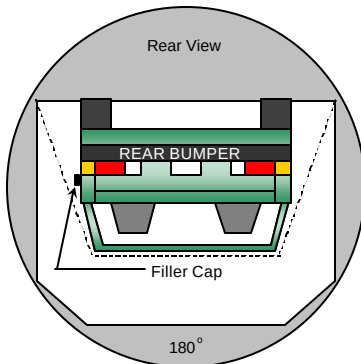
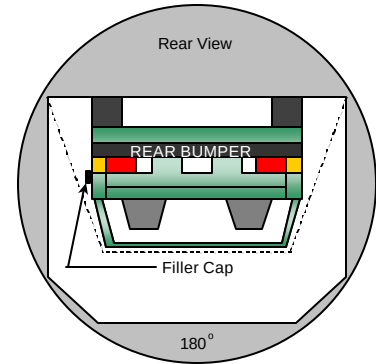
NHTSA No.: KIA5001
 Test Date: 12/5/01



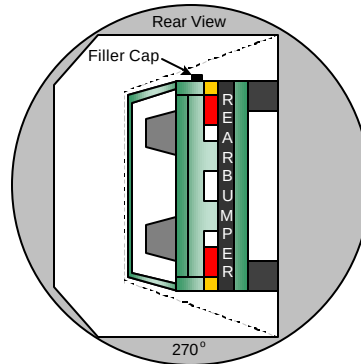
0° to 90°



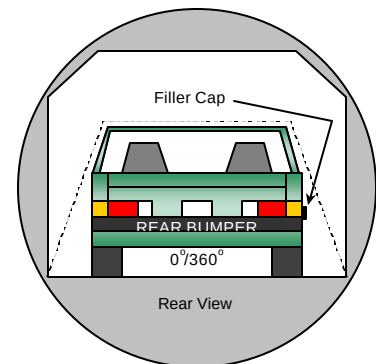
90° to 180°



180° to 270°



270° to 360°



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

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	80	300	0
90° to 180°	79	300	0
180° to 270°	77	300	0
270° to 360°	80	300	0

DATA SHEET NO. 14
VEHICLE MEASUREMENTS

Test Vehicle: 2002 Kia Rio 4 Door Sedan
Test Program: 2002 NHTSA 35mph NCAP

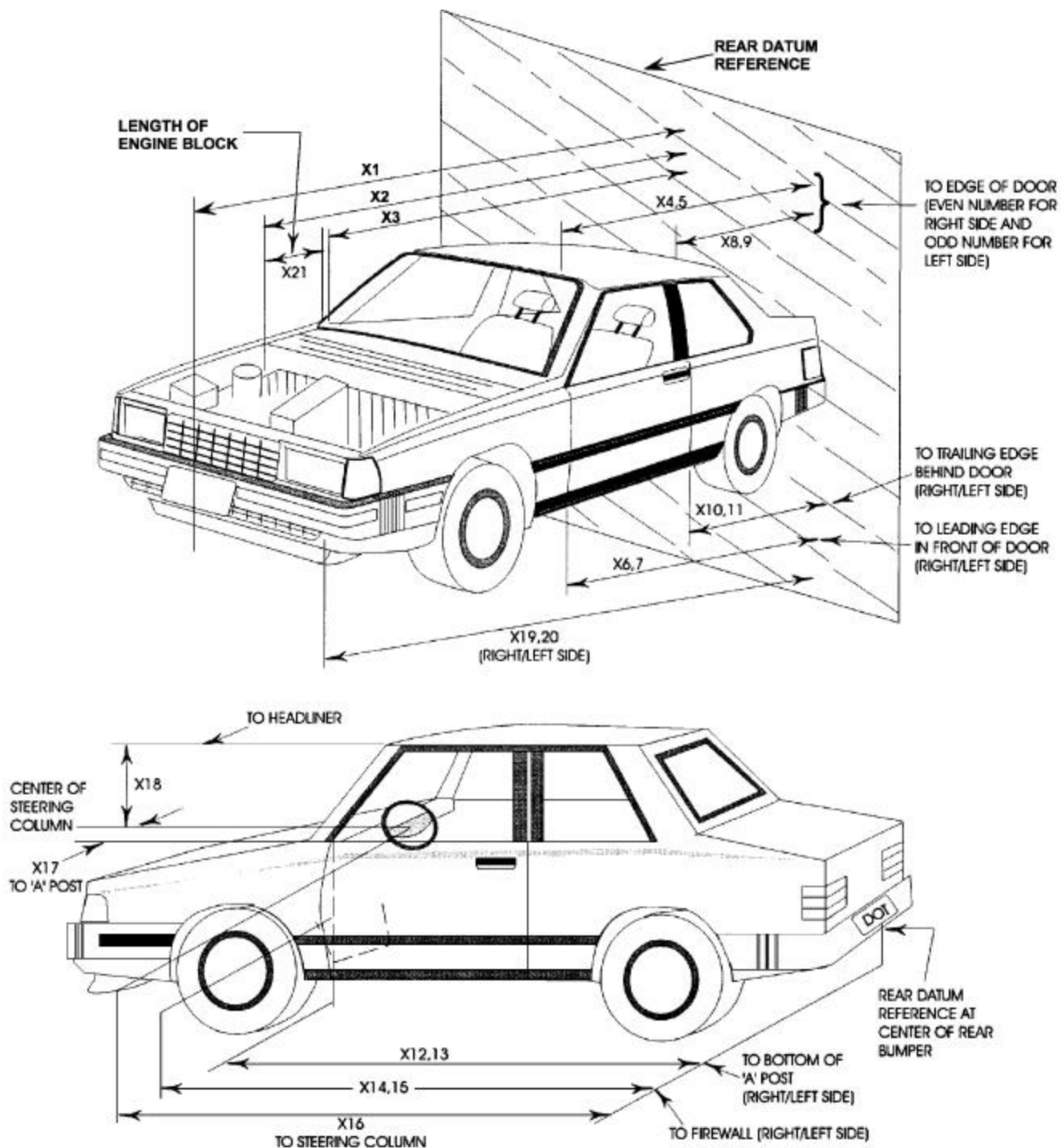
NHTSA No.: KIA5001
Test Date: 12/5/01

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4202	3727	-475
2	RSOV to front of engine	mm	3649	3451	-198
3	RSOV to firewall centerline	mm	3212	3185	-27
4	RSOV to leading edge of right door	mm	2942	2951	9
5	RSOV to leading edge of left door	mm	2949	2953	4
6	RSOV to lower leading edge of right door	mm	2933	2932	-1
7	RSOV to lower leading edge of left door	mm	2935	2942	7
8	RSOV to upper trailing edge of right door	mm	1910	1920	10
9	RSOV to upper trailing edge of left door	mm	1920	1925	5
10	RSOV to lower trailing edge of right door	mm	1923	1922	-1
11	RSOV to lower trailing edge of left door	mm	1921	1927	6
12	RSOV to bottom of right 'A' pillar	mm	2935	2937	2
13	RSOV to bottom of left 'A' pillar	mm	2959	2965	6
14	RSOV to firewall on right side	mm	3227	3131	-96
15	RSOV to firewall of left side	mm	3202	3166	-36
16	RSOV to steering column	mm	2519	2509	-10
17	Center of steering column to left 'A' pillar	mm	400	427	27
18	Center of steering column to headlining	mm	438	400	-38
19	RSOV to right side of front bumper	mm	4067	3670	-397
20	RSOV to left side of front bumper	mm	4067	3689	-378
21	Length of engine block	mm	565	565	0
RD	RSOV to right side of dash panel	mm	2756	2725	-31
CD	RSOV to center of dash panel	mm	2685	2646	-39
LD	RSOV to left side of dash panel	mm	2785	2777	-8

DATA SHEET NO. 14...(CONTINUED)
VEHICLE MEASUREMENTS

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01



DATA SHEET NO. 15
CAMERA LOCATIONS

Test Vehicle: 2002 Kia Rio 4 Door Sedan
Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
Test Date: 12/5/01

No.	Camera View	Location (mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Right Side, Real Time	3454	10973	1245	0	1651	Zoom	24
2	Left Side, No. 1	1960	-8250	880	-1	7968	13	1020
3	Left Side, No. 2	1060	-6210	1440	0	6041	25	510
4	Left Side, No. 3	6500	-10580	4640	-16	11687	65	1000
5	Left Side, No. 4	1460	-8250	3100	-16	8238	19	1010
6	Left Side, No. 5	1460	-8250	2700	-13	8151	19	990
7	Right Side, No. 1	1960	8150	730	-1	7874	19	1030
8	Right Side, No. 2	2280	8150	1450	-4	7867	35	1020
9	Right Side, No. 3	7860	8900	2800	-9	10429	80	950
10	Right Side, No. 4	2750	9600	1500	-2	9333	50	950
11	Overhead Overall	250	0	4460	-86	N/A	13	1120
12	Front View, Driver	-530	-380	2590	-43	N/A	12	1030
13	Front View, Passenger	-530	380	2590	-55	N/A	13	900
14	Pit Camera, Engine	580	0	-1360	-90	N/A	10	1130
15	Pit Camera, Fuel Tank	3760	0	-1680	-55	N/A	12	1080
16	Driver Belt	2900	-230	1000	1	N/A	13	890
17	Passenger Belt	2900	230	1000	1	N/A	13	830
18	Left Side Extra	Not Used						

X - Barrier Face Y - Monorail Centerline Z - Ground

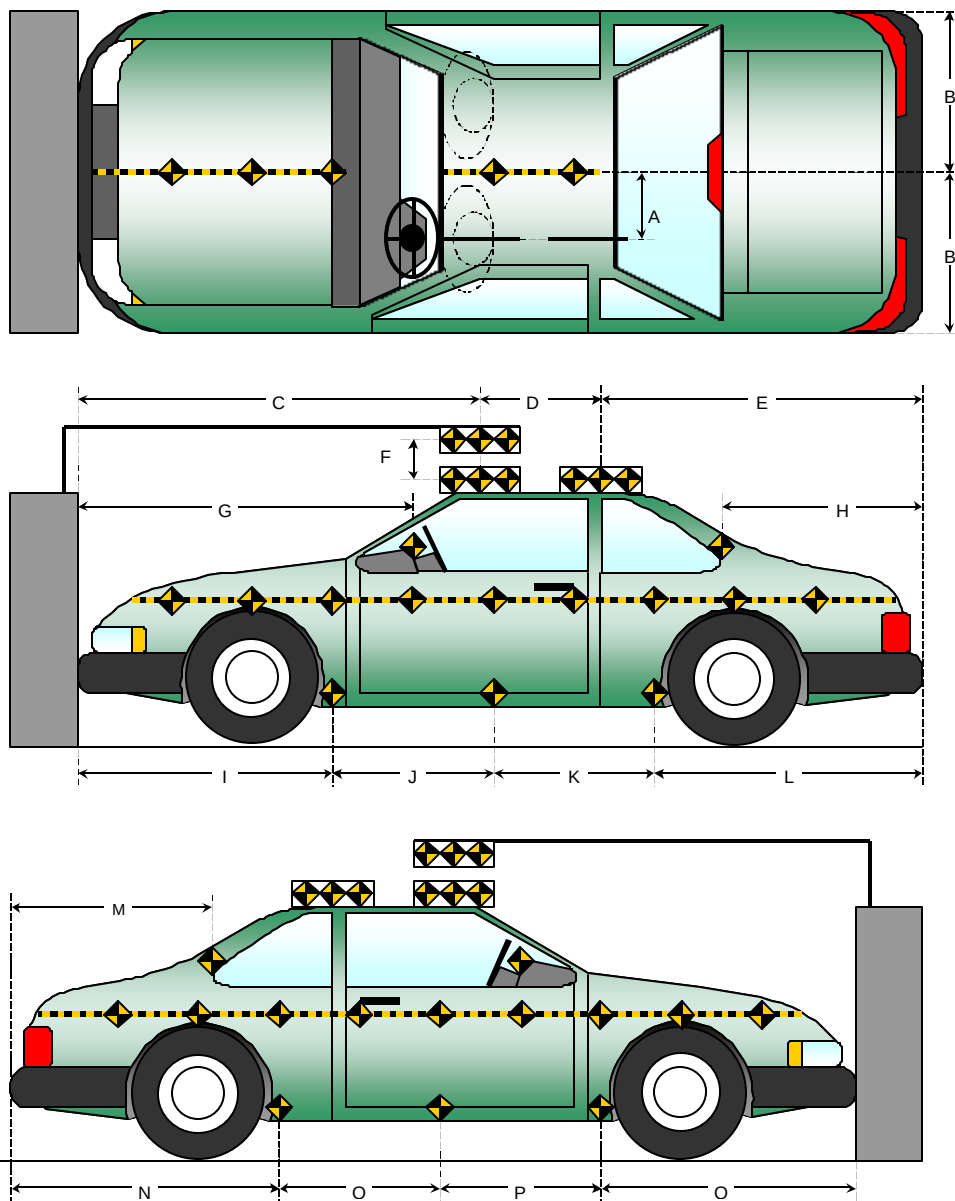
DATA SHEET NO. 16
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

in mm

Item	Value
A	325
B	822
C	2000
D	606
E	1550
F	155
G	1539
H	956
I	1223
J	819
K	817
L	1352
M	955
N	1343
O	821
P	820
Q	1222



DATA SHEET NO. 17
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

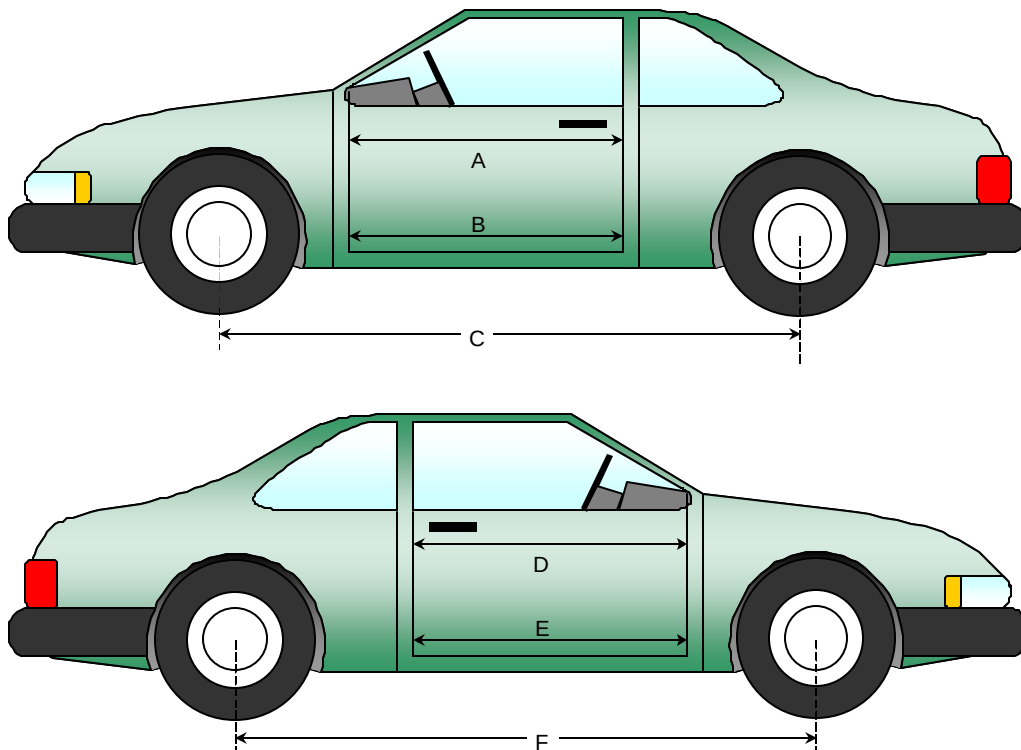
NHTSA No.: KIA5001
 Test Date: 12/5/01

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	940	932	-8
B	Left Side Lower	mm	871	871	0
D	Right Side Upper	mm	939	927	-12
E	Right Side Lower	mm	891	892	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheel base	mm	2420	2315	-105
F	Right Side Wheel base	mm	2420	2322	-98



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

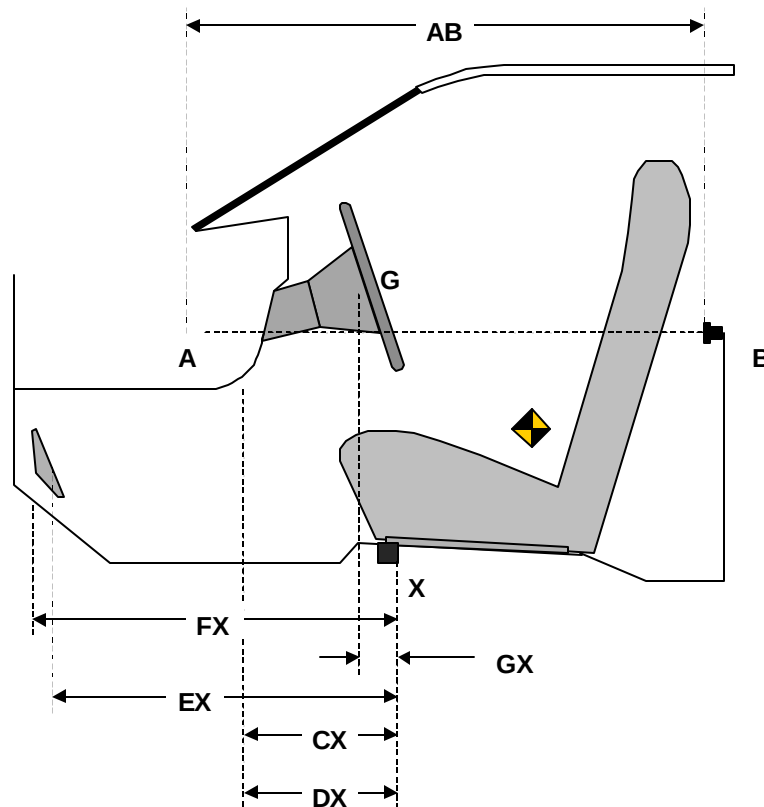
Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	940	932	-8
CX	Left Knee Bolster to X	mm	300	350	50
DX	Right Knee Bolster to X	mm	303	362	59
EX	Brake Pedal to X	mm	560	477	-83
FX	Foot Rest to X	mm	520	486	-34
GX	Center of Steering Wheel Hub to X	mm	40	110	70

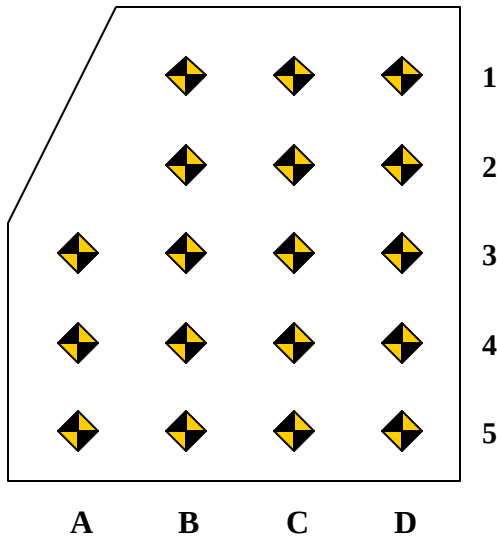
X = Left Front Seat Outboard Anchor Bolt Head



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

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01



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

Columns A through D are evenly spaced.

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

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.

DRIVER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		718	711	701		596	608	598		-122	-103	-103
2		618	615	610		541	514	495		-77	-101	-115
3	0	518	515	510	0	465	462	452	0	-53	-53	-58
4	420	418	414	410	405	387	382	363	-15	-31	-32	-47
5	320	318	314	310	305	297	292	276	-15	-21	-22	-34

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		19	18	-10		83	63	43		64	45	53
2		-76	-76	-80		-20	-5	-10		56	71	70
3	0	-97	-98	-105	0	-81	-78	-60	0	16	20	45
4	-105	-102	-103	-115	-129	-133	-126	-113	-24	-31	-23	2
5	-114	-105	-100	-120	-135	-135	-155	-152	-21	-30	-55	-32

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

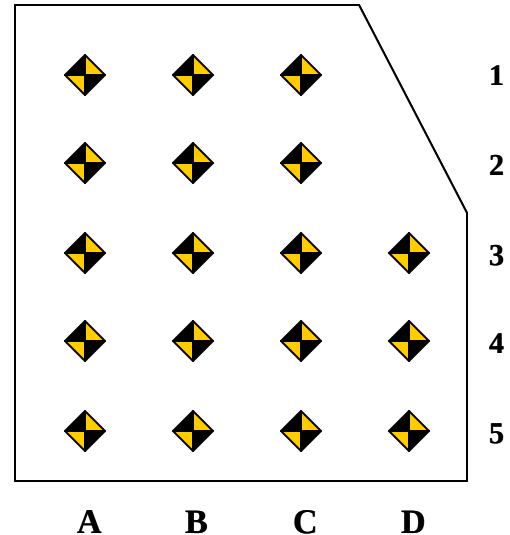
Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

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

Columns A through D are evenly spaced.

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



Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.

PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	723	733	733		567	594	576		-156	-139	-157	
2	628	638	630		542	555	551		-86	-83	-79	
3	523	528	528	532	510	512	495	507	-13	-16	-33	-25
4	426	428	428	428	424	423	428	427	-2	-5	0	-1
5	326	328	328	328	324	323	327	327	-2	-5	-1	-1

PASSENGER FLOOR PAN Z-AXIS

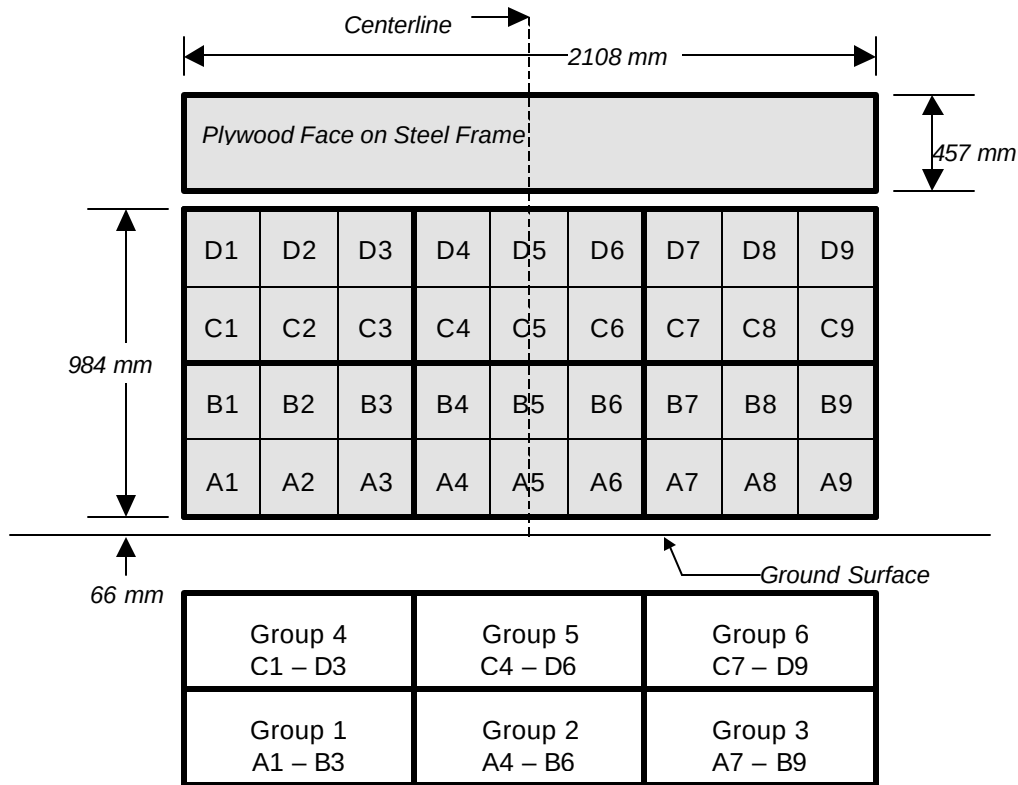
	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	51	48	56		104	107	113		53	59	57	
2	-59	-69	-65		18	19	14		77	88	79	
3	-103	-114	-90	-85	112	131	103	109	215	245	193	194
4	-109	-112	-100	-100	95	115	127	131	204	227	227	231
5	-108	-105	-95	-109	105	122	127	125	213	227	222	234

DATA SHEET NO. 18
FIXED BARRIER TYPE

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

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



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

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

DATA SHEET NO. 19
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2002 Kia Rio 4 Door Sedan
 Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
 Test Date: 12/5/01

VEHICLE INFORMATION

VIN: KNADC123626140573
 Vehicle Size Category: 4 Door Sedan

Wheel base (mm): 2420
 Test Weight (kg): 1291

ACCELEROMETER DATA

Accelerometer Location: Left rear floor pan
 Cal. Procedure/Interval: 6 months / drop test
 Integration Algorithm: NHTSA Standard
 Impact Velocity (km/h): 55.69
 Velocity Change (km/h): 67.6

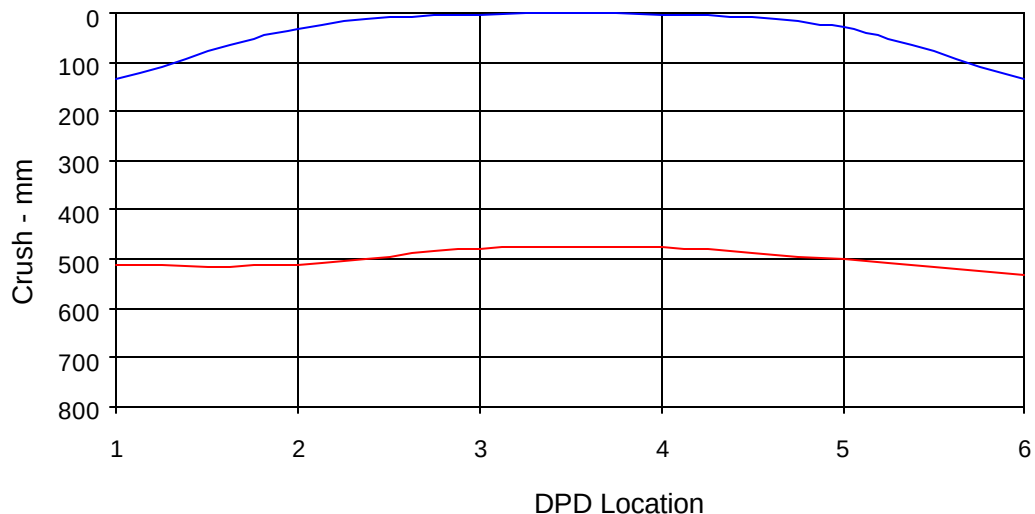
Linearity: Good

Time of Separation (msec): 66.5

CRUSH PROFILE

Collision Deformation Classification: 12FDEW6 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1248 Impact Mode: Full Frontal

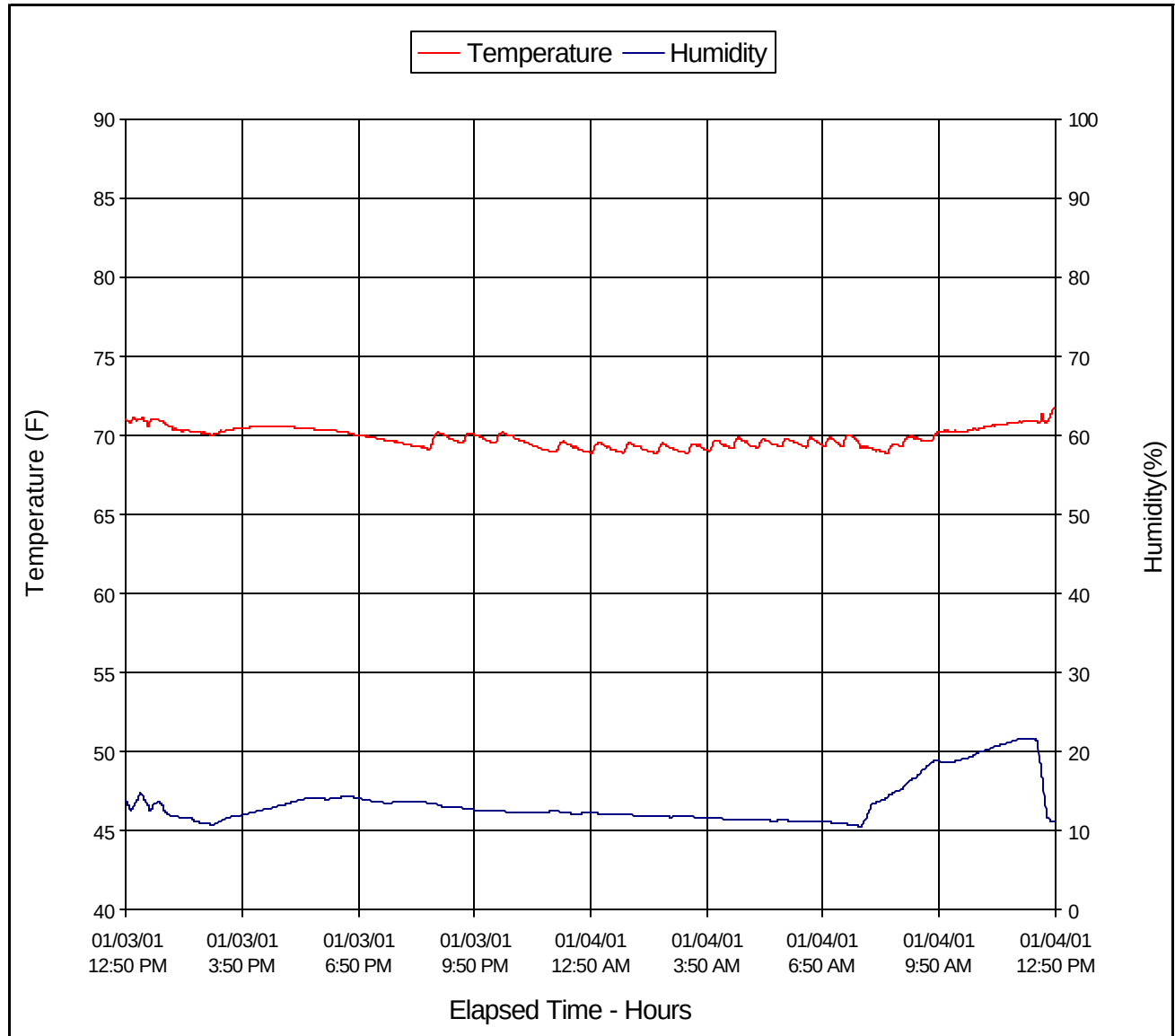
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	135	513	-378
C2	Crush zone 2 on left side	mm	30	511	-481
C3	Crush zone 3 on left side	mm	2	478	-476
C4	Crush zone 4 on right side	mm	2	477	-475
C5	Crush zone 5 on right side	mm	29	501	-472
C6	Crush zone 6 at right side	mm	135	532	-397



DATA SHEET NO. 20
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2002 Kia Rio 4 Door Sedan
Test Program: 2002 NHTSA 35mph NCAP

NHTSA No.: KIA5001
Test Date: 12/5/01



APPENDIX A

PHOTOGRAPHS

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Figure A-1: Right Front, as Received



Figure A-2: Left Rear, as Received

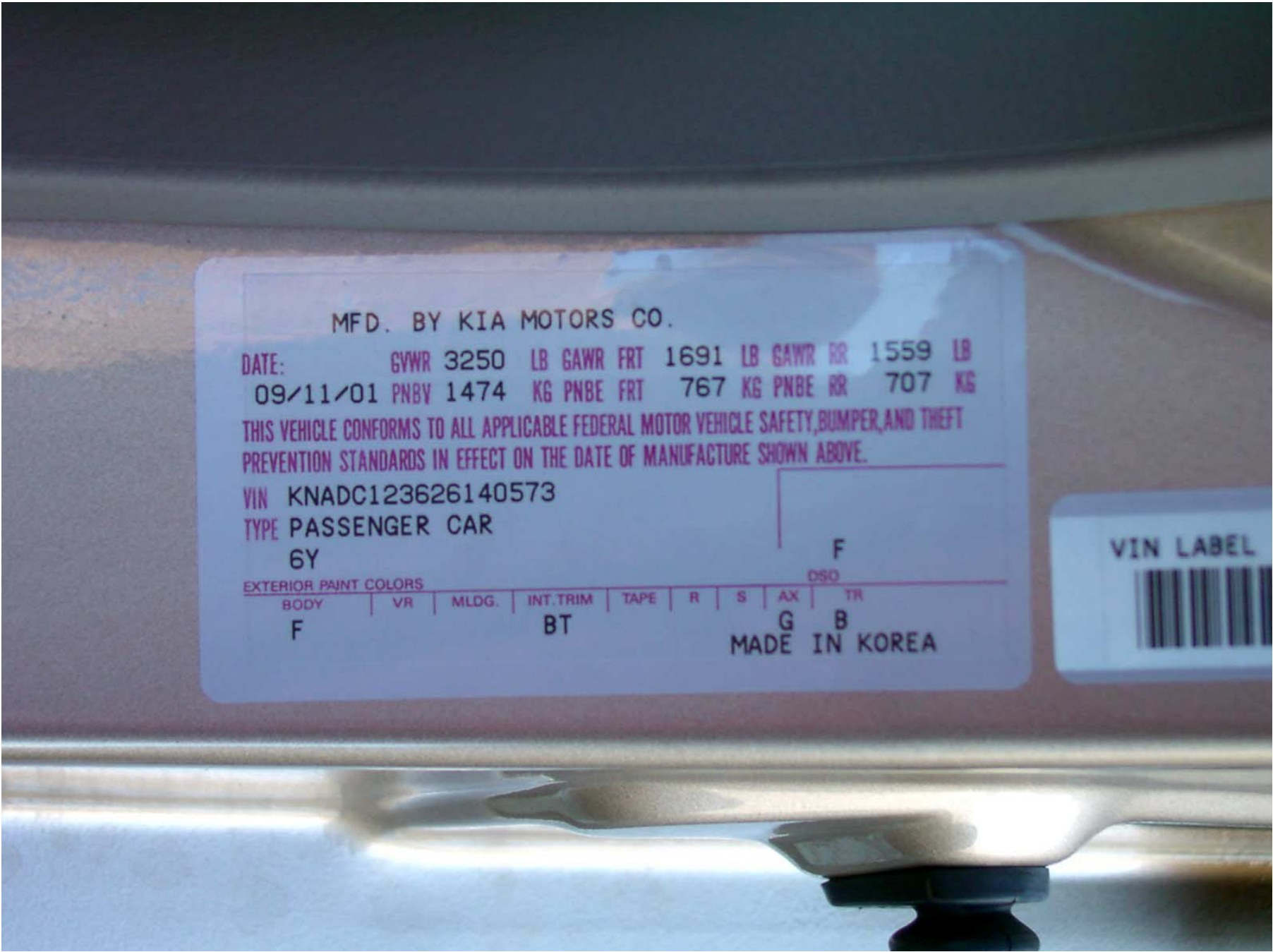


Figure A-3: Vehicle Certification Label

RIO

RECOMMENDED TIRE SIZE AND INFLATION PRESSURE (COLD)

DIMENSIONS DES PNEUS et PRESSIONS DE GONFLAGE RECOMMANDÉES (à froid)

A

LOAD RANGE CHARGE NOMINALE	TIRE SIZE (LOAD RANGE C&D NOT PERMISSIBLE) DIMENSIONS DES PNEUS (CHARGES NOMINALES C ET D NON PERMISES)	PRESSURE PRESSION			
		FRONT AVANT	REAR ARRIÈRE		
STD	P155/80R13 79T P175/70R13 82T P175/65R14 81T	29 psi 200 kPa	29 psi 200 kPa		
T	T105/70D14 TEMPORARY SPARE T105/70R14 TEMPORARY SPARE PNEU DE SECOURS PROVISOIRE	60 psi 415 kPa	60 psi 415 kPa		
TOTAL LOAD = OCCUPANTS PLUS LUGGAGE CHARGE GLOBALE = OCCUPANTS PLUS BAGAGES					
MODEL MODÈLE	MAXIMUM LOAD CHARGE MAXIMALE	OCCUPANTS OCCUPANTS	DISTRIBUTION RÉPARTITION		
			FRONT AVANT	REAR ARRIÈRE	LUGGAGE BAGAGES
ALL TOUS	827 lb/375 kg	5	2	3	77 lb/35 kg
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION			VOIR MANUEL DE CONDUCTEUR POUR DES INFORMATIONS SUPPLÉMENTAIRES		

Figure A-4: Vehicle Tire Label



Figure A-5: Front View, Pre-Test

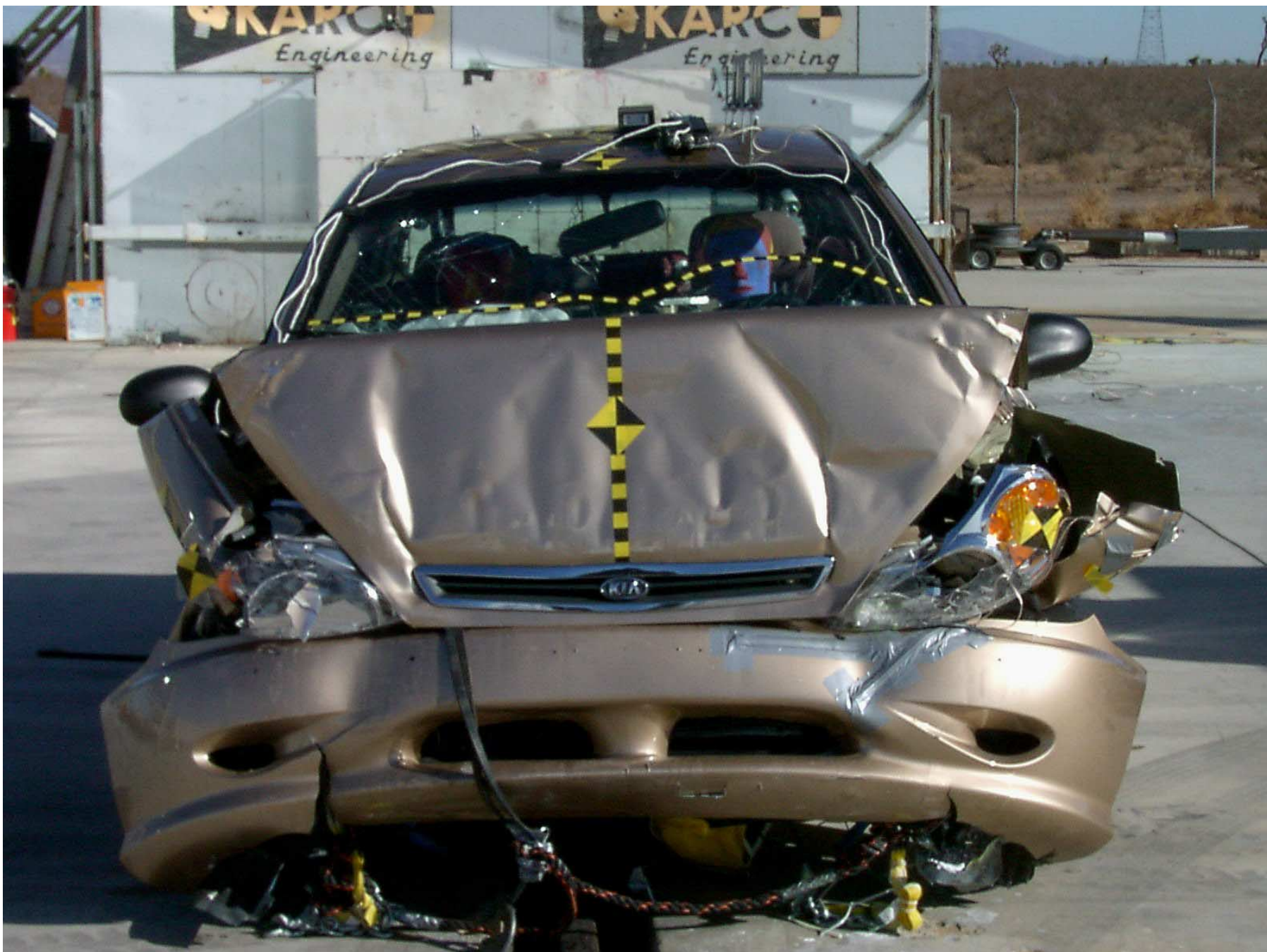


Figure A-6: Front View, Post-Test



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



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



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



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



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



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



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



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

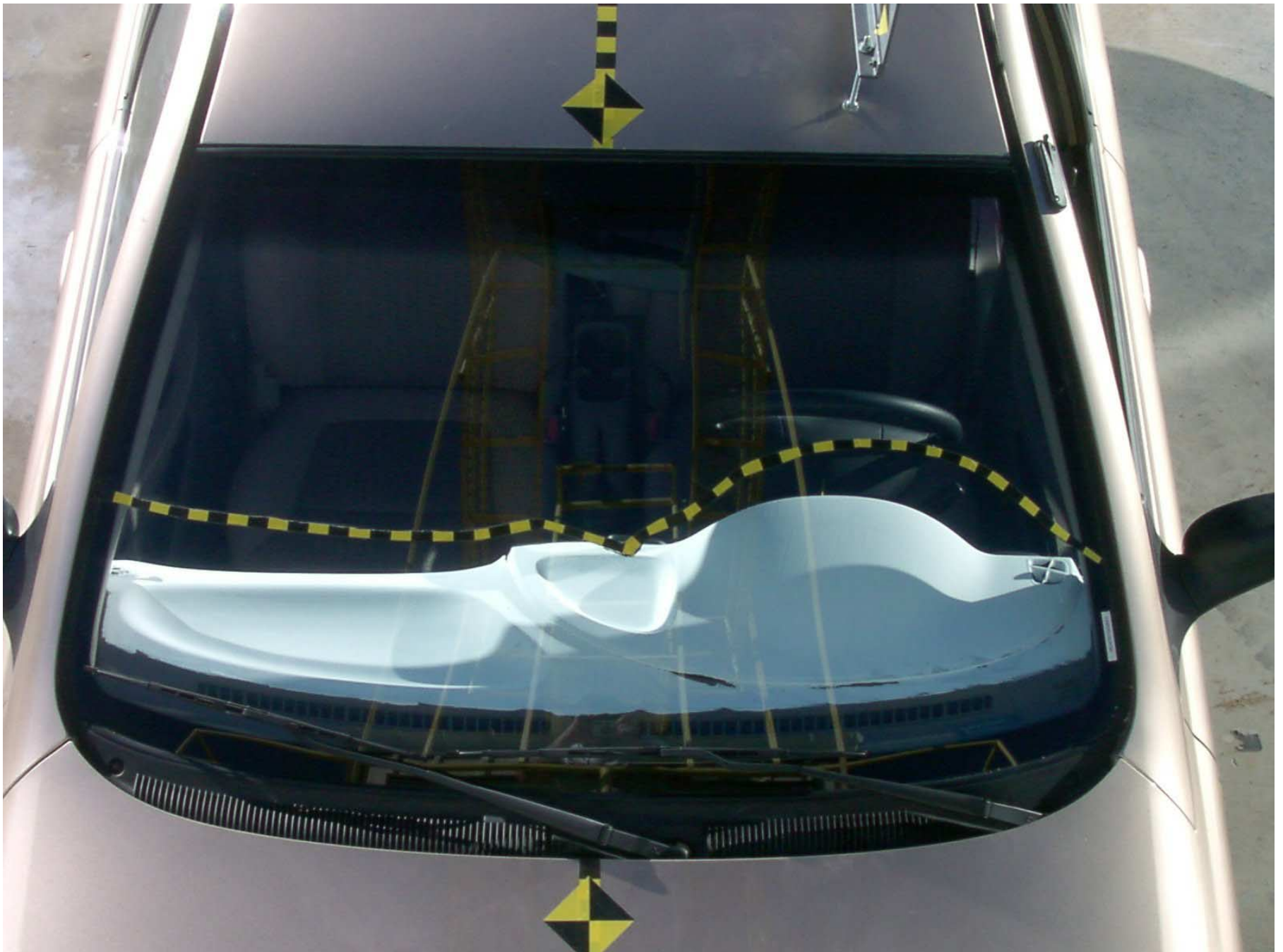


Figure A-15: Windshield, Pre-Test



Figure A-16: Windshield, Post-Test



Figure A-17: Engine Compartment, Pre-Test

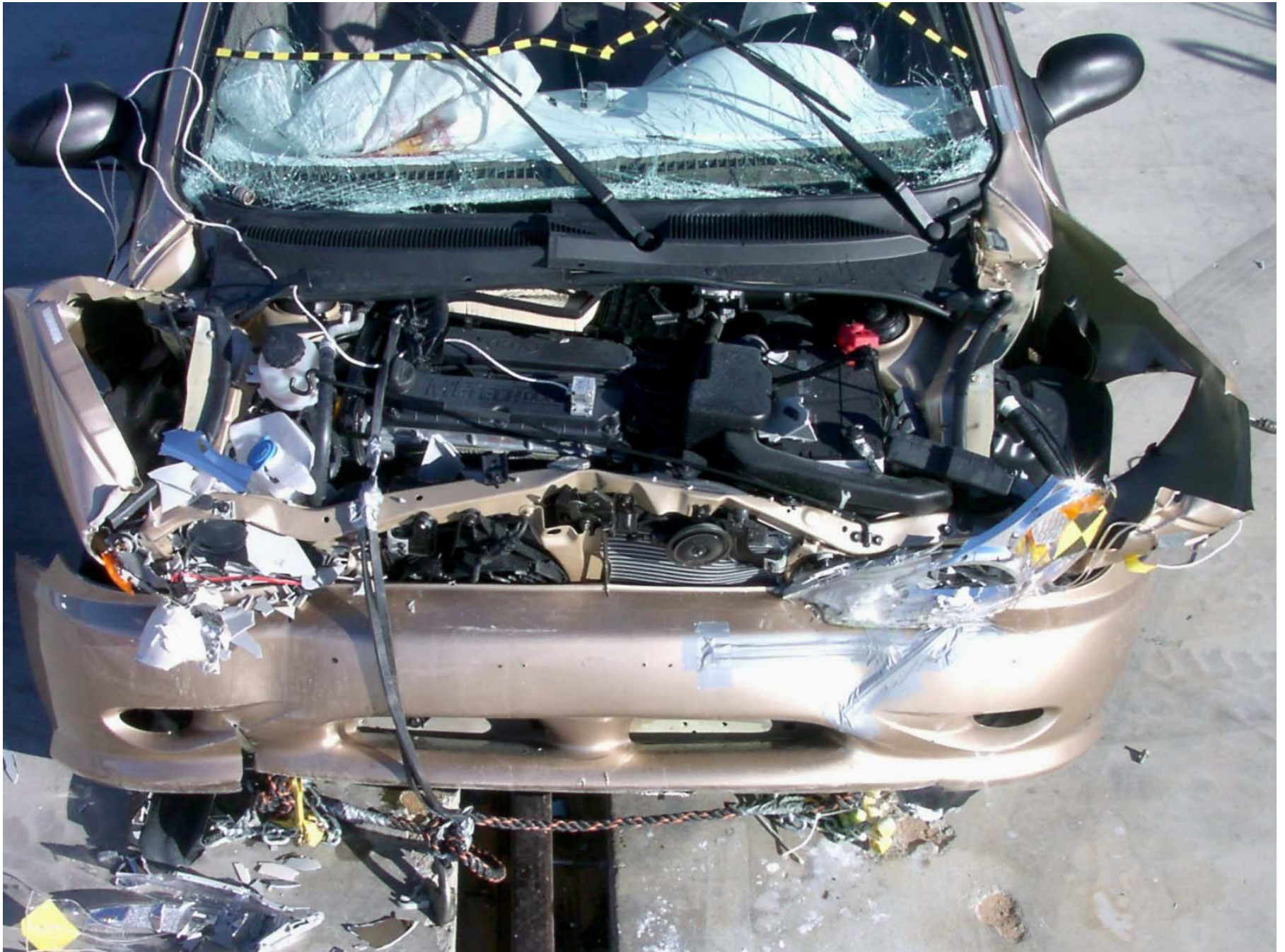


Figure A-18: Engine Compartment, Post-Test



Figure A-19: Fuel Cap, Pre-test



Figure A-20: Fuel Cap, Post-Test

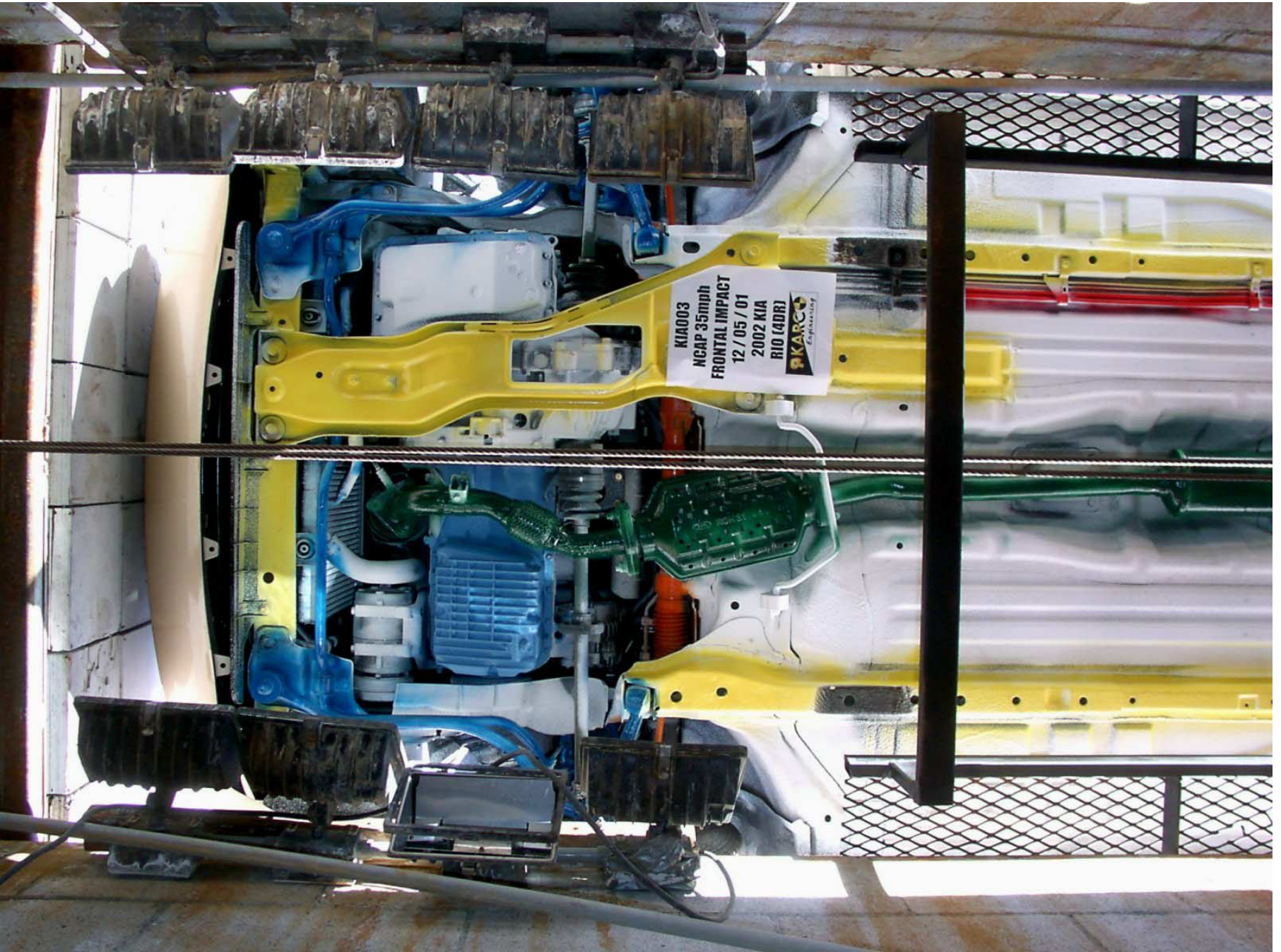


Figure A-21: Front Underside, Pre-Test

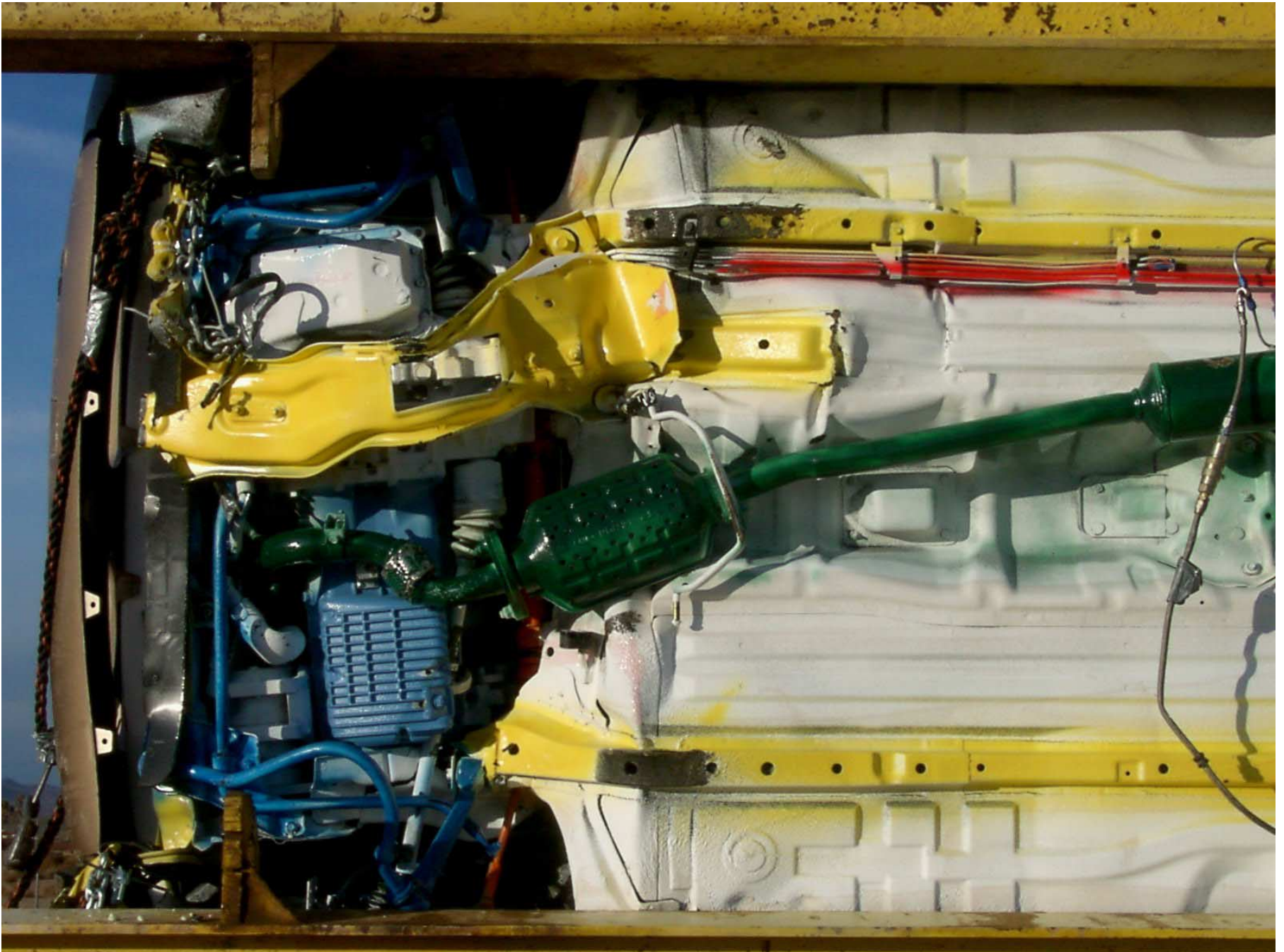


Figure A-22: Front Underside, Post-Test

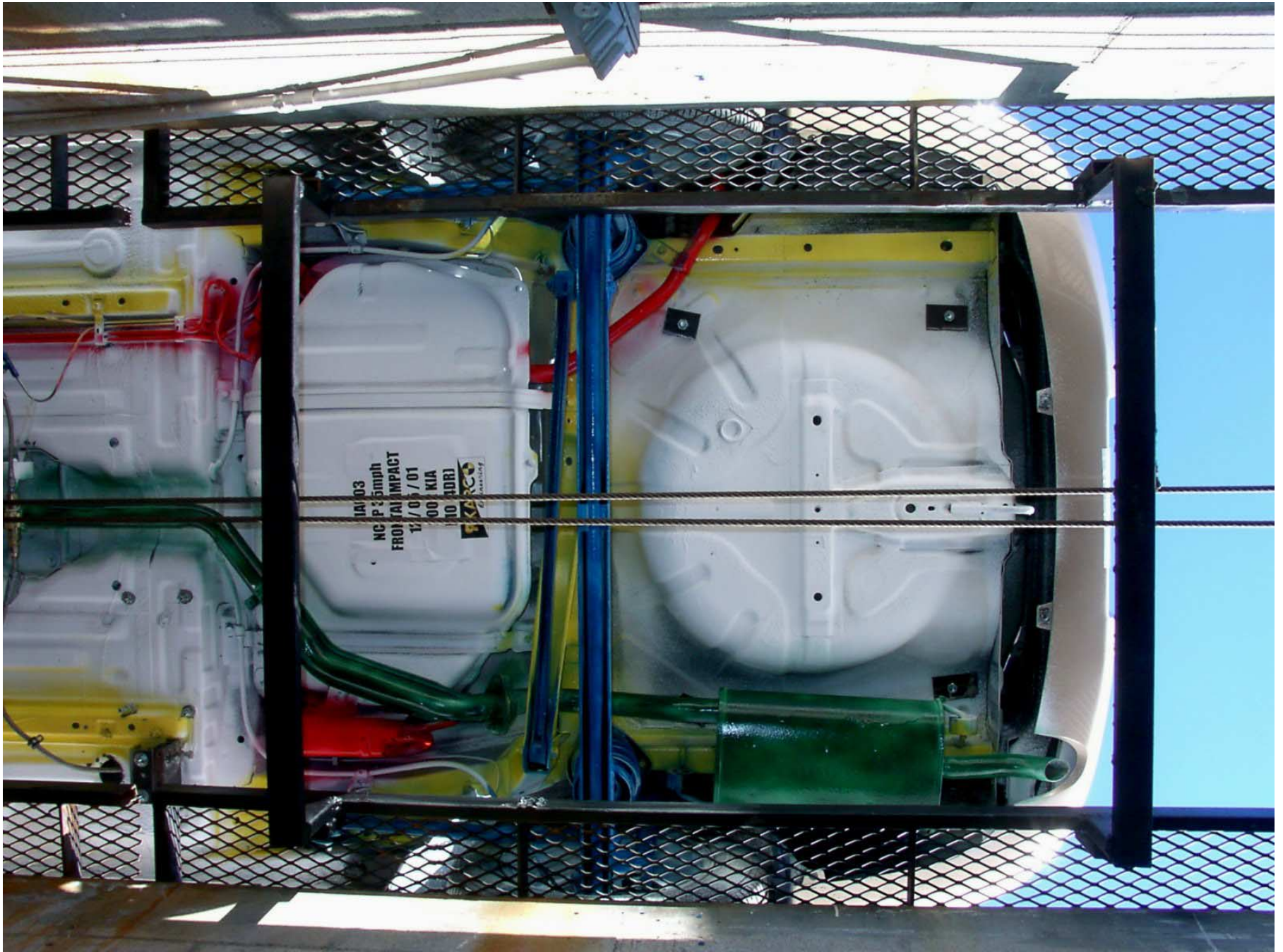


Figure A-23: Rear Underside, Pre-Test

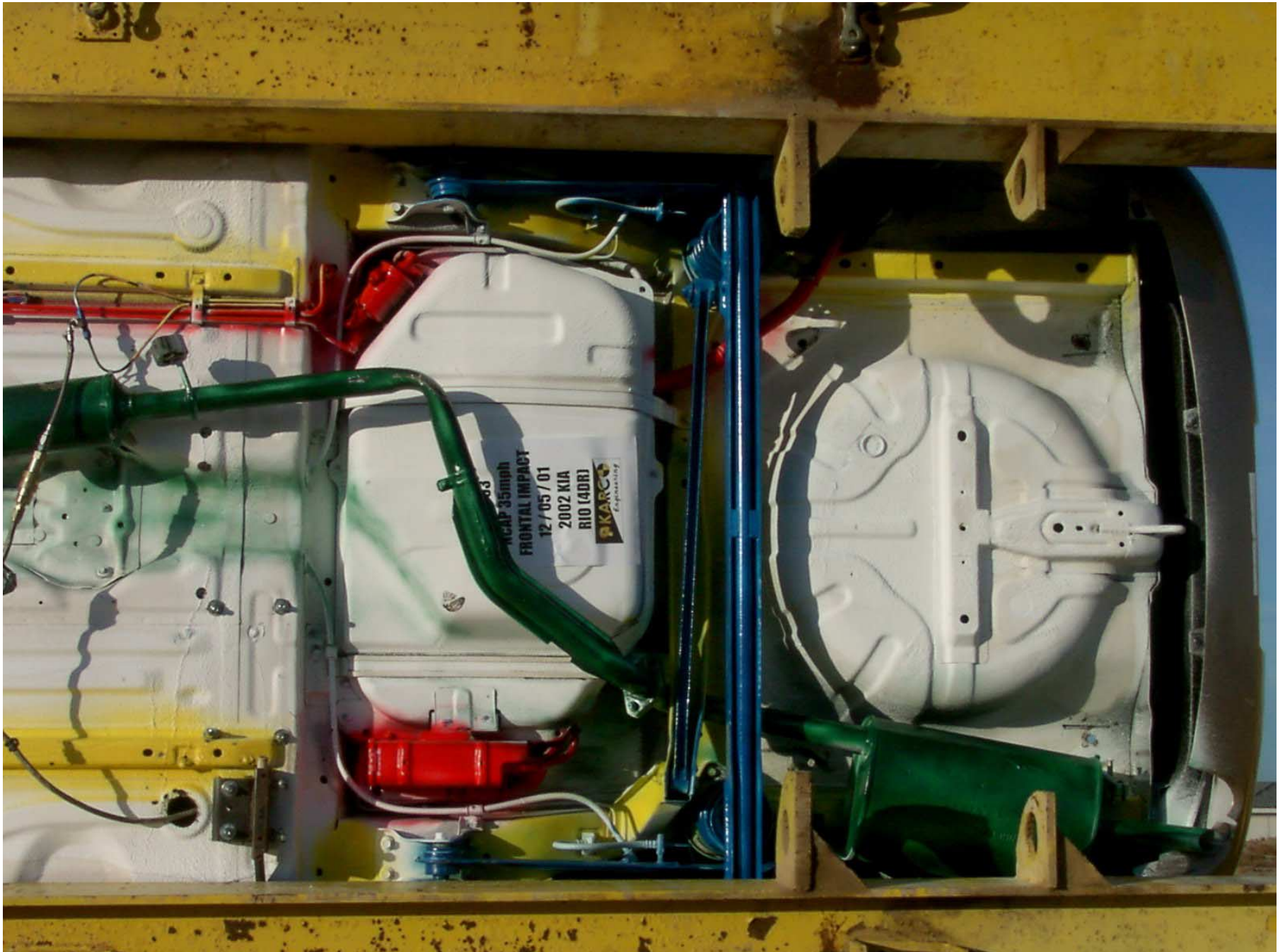


Figure A-24: Rear Underside, Post-Test

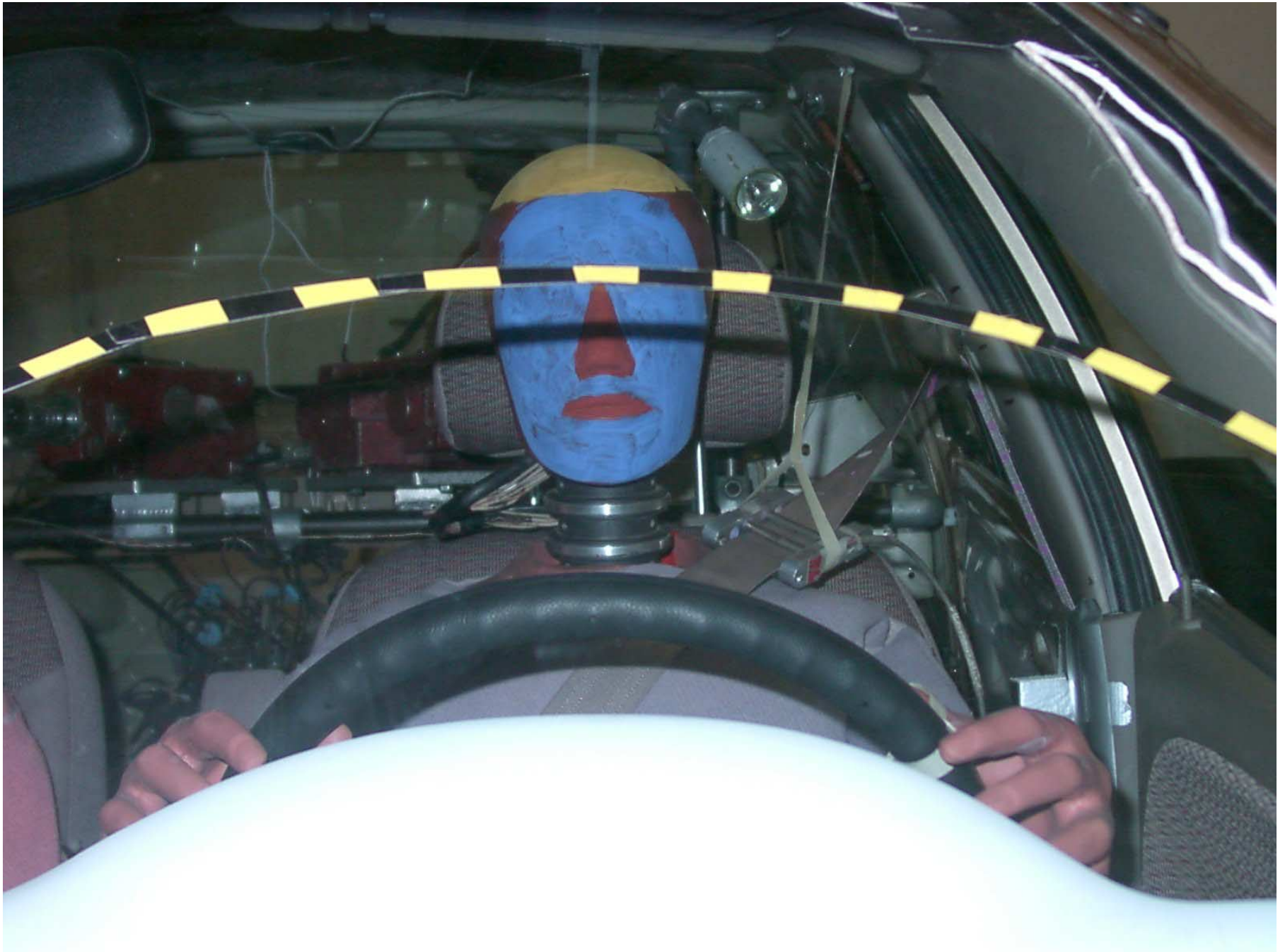


Figure A-25: Driver Dummy Front View, Pre-Test

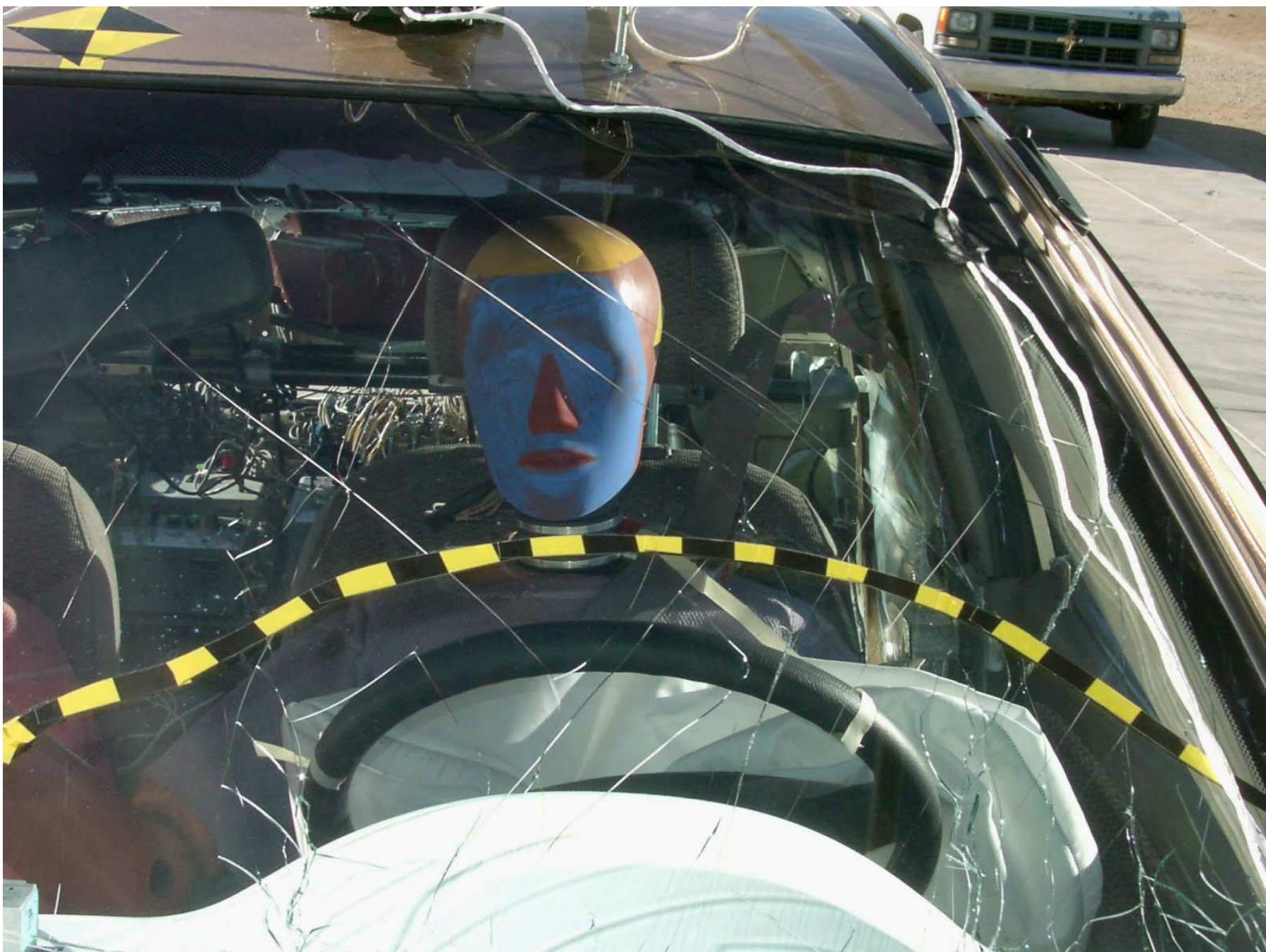


Figure A-26: Driver Dummy Front View, Post-Test



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



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



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



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



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



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

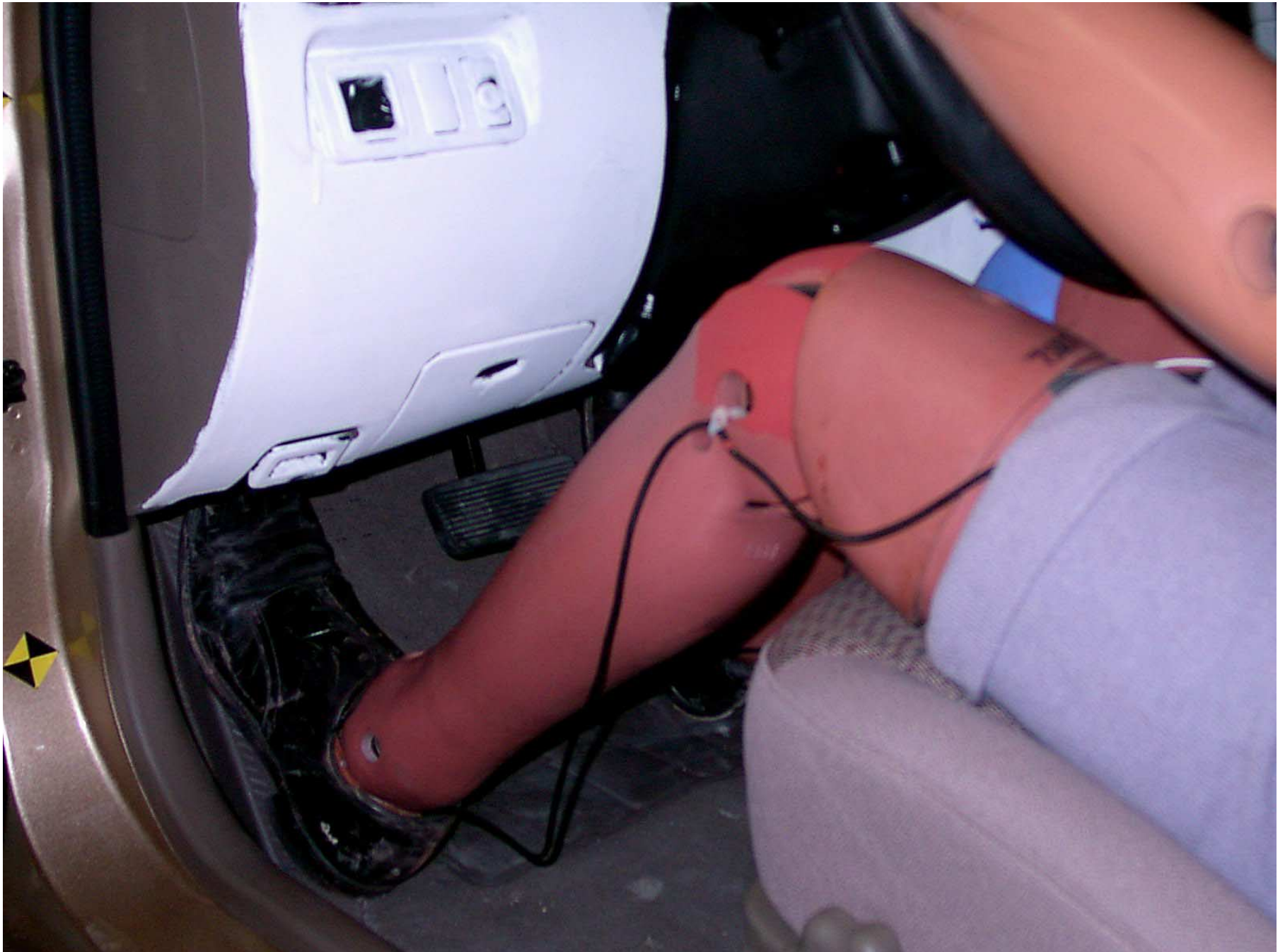


Figure A-33: Driver Dummy Feet, Pre-Test



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



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



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



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



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

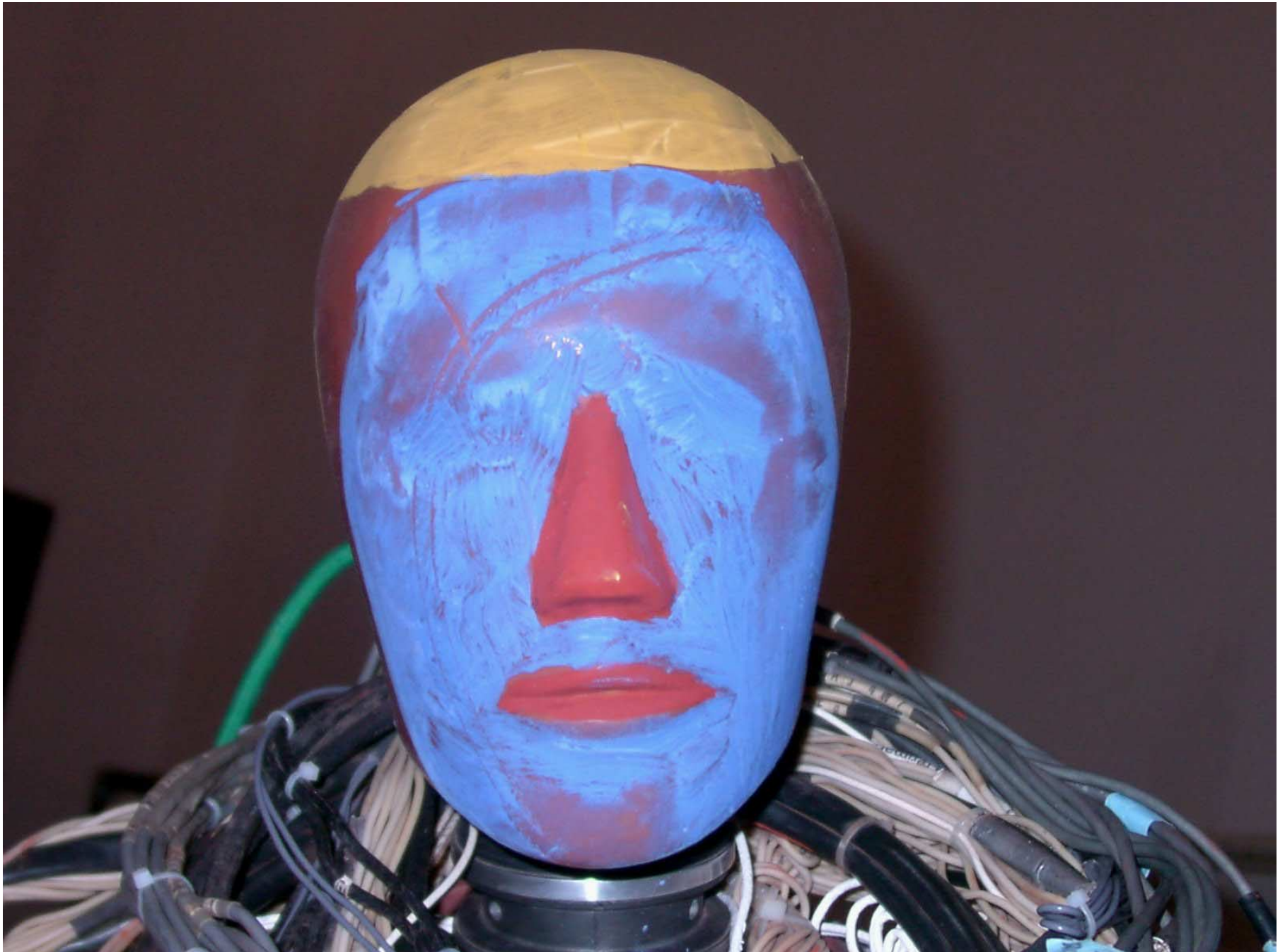


Figure A-39: Driver Dummy Head, Post-Test



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

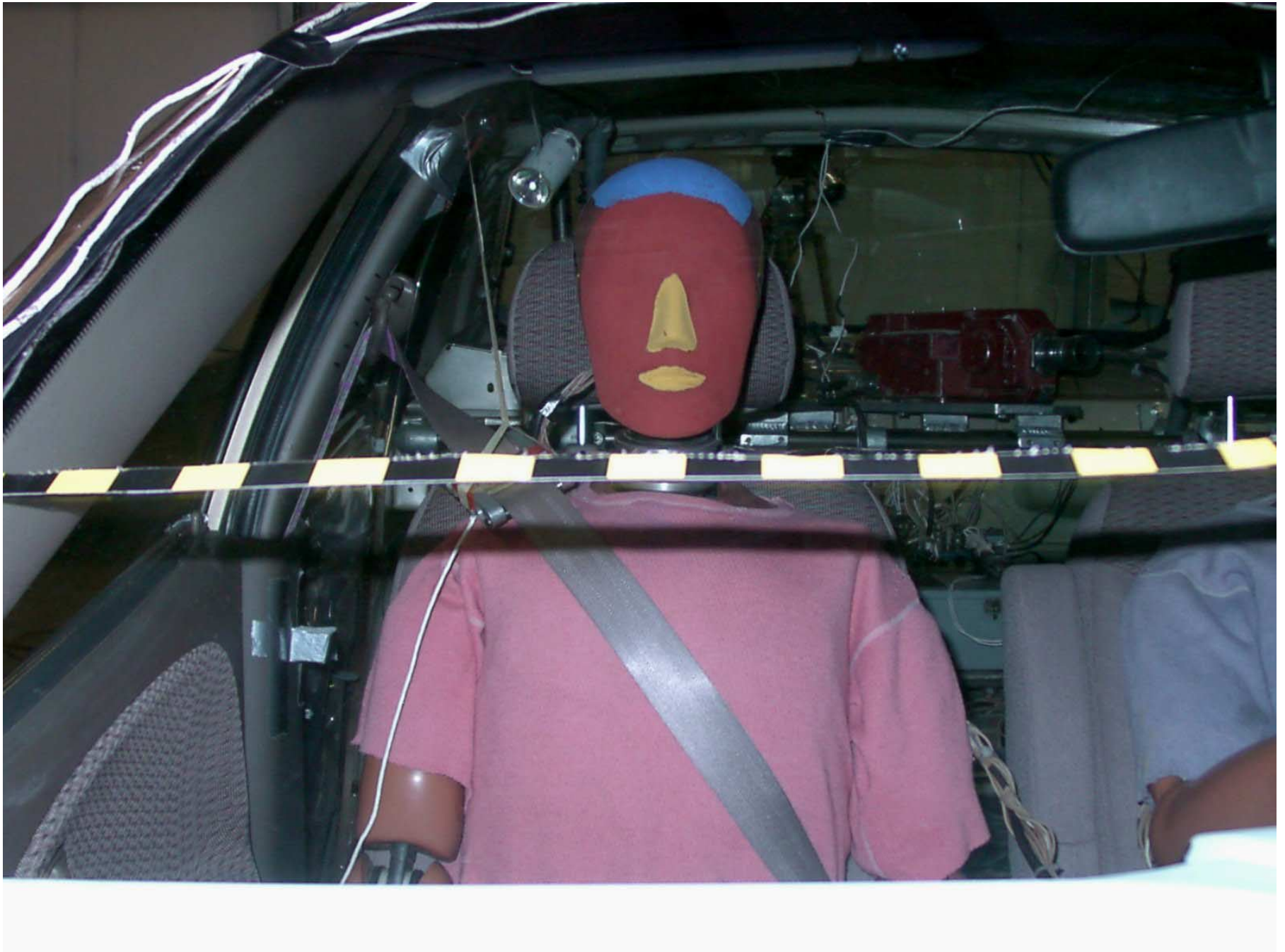


Figure A-41: Passenger Dummy Front View, Pre-Test



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



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



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



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



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

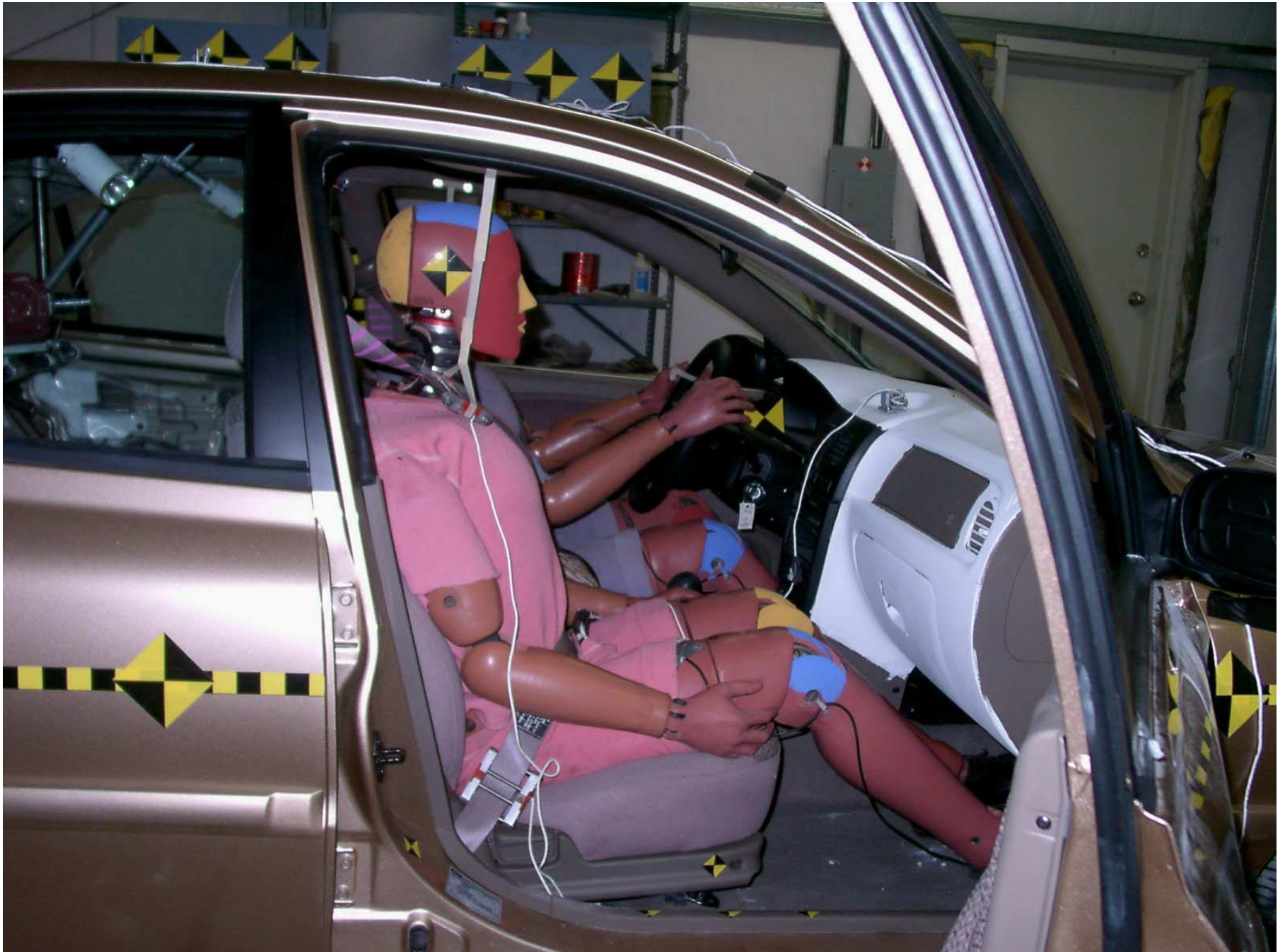


Figure A-47: Passenger Dummy 90° To Vehicle, Pre-Test



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

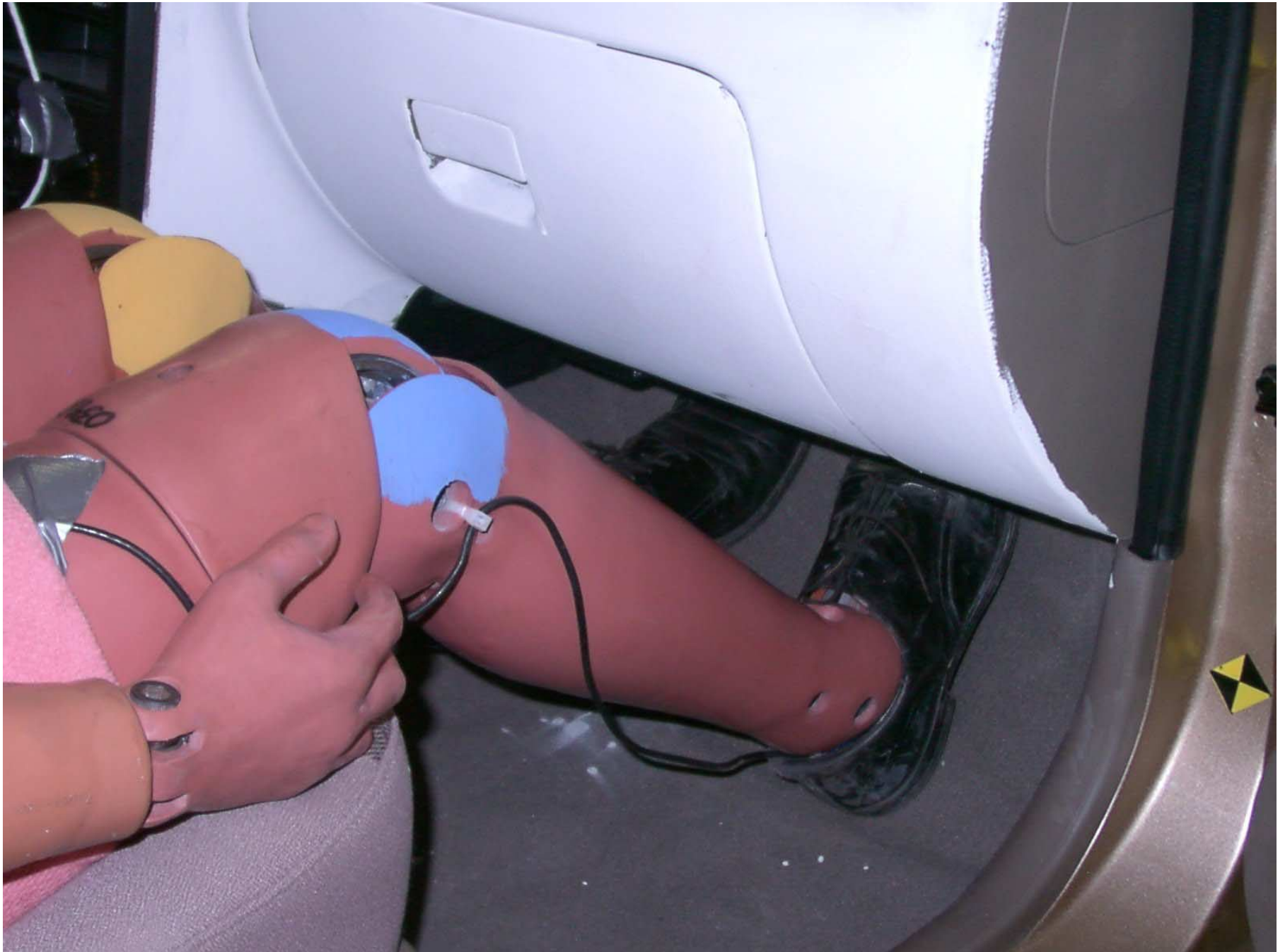


Figure A-49: Passenger Dummy Feet, Pre-Test



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



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



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



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



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



Figure A-55: Passenger Head, Post-Test



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



Figure A-57: Vehicle on Rollover Device



Figure A-58: Vehicle During Impact

APPENDIX B

DATA PLOTS

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B-2 Driver Head Primary X Velocity	B-2
B-3 Driver Head Primary X Displacement	B-3
B-4 Driver Head Primary Y	B-4
B-5 Driver Head Primary Z	B-5
B-6 Driver Head Resultant Primary	B-6
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B-20 Driver Neck Moment Resultant	B-20
B-21 Driver Chest Primary X	B-21
B-22 Driver Chest Primary X Velocity	B-22
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B-26 Driver Chest Primary Resultant	B-26
B-27 Driver Chest Redundant X	B-27
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B-59 Driver Shoulder Belt Force	B-59
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B-61 Driver Shoulder Belt Elongation	B-61

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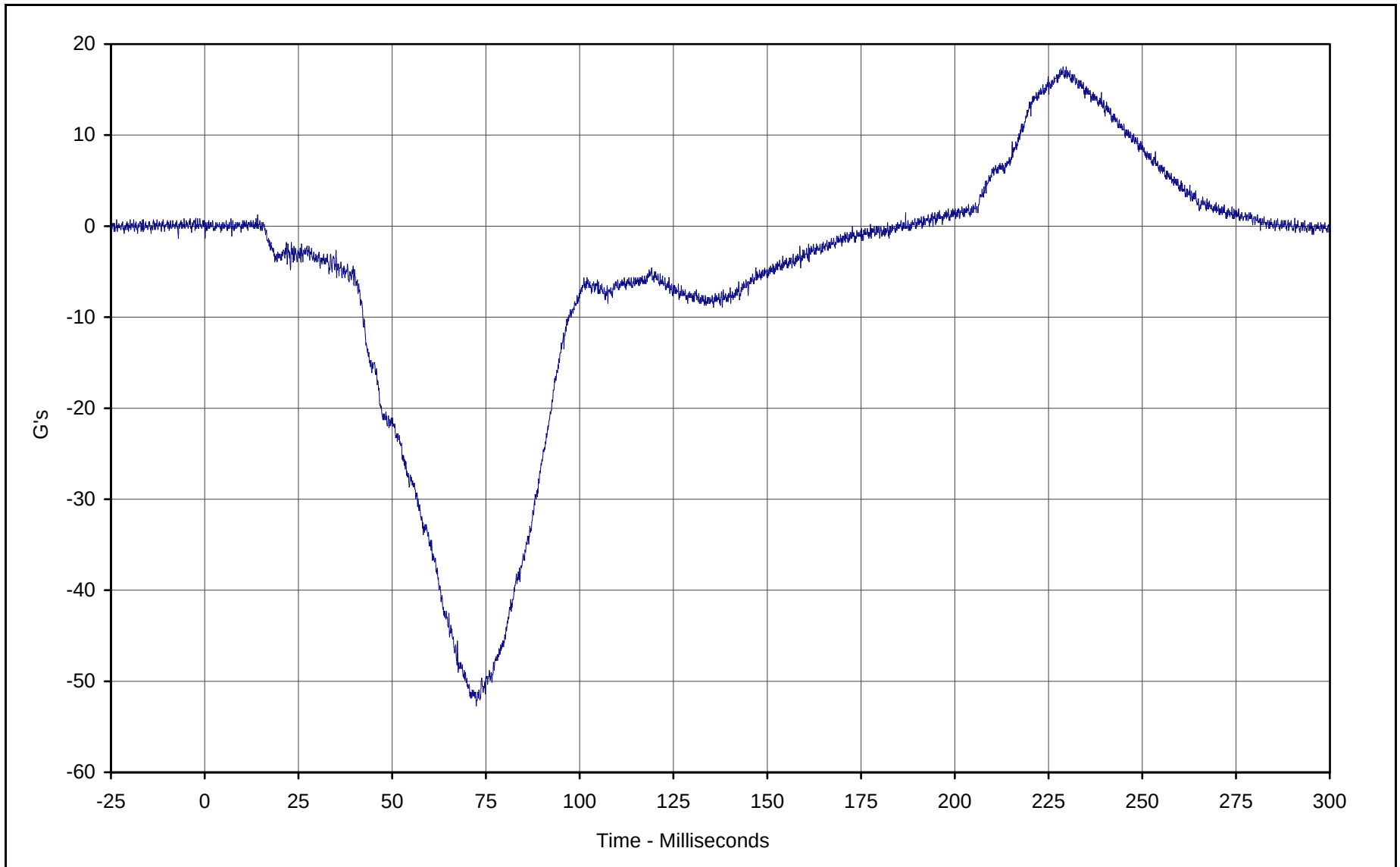
Data Plot	Page
B-62	Passenger Head Primary X
B-63	Passenger Head Primary X Velocity
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B-65	Passenger Head Primary Y
B-66	Passenger Head Primary Z
B-67	Passenger Head Resultant Primary
B-68	Passenger Head Redundant X
B-69	Passenger Head Redundant X Velocity
B-70	Passenger Head Redundant X Displacement
B-71	Passenger Head Redundant Y
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B-75	Passenger Neck Force Y
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B-105	Passenger Right Upper Tibia Moment X	B-105
B-106	Passenger Right Upper Tibia Moment Y	B-106
B-107	Passenger Left Lower Tibia Moment X	B-107
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B-122	Passenger Shoulder Belt Elongation	B-122

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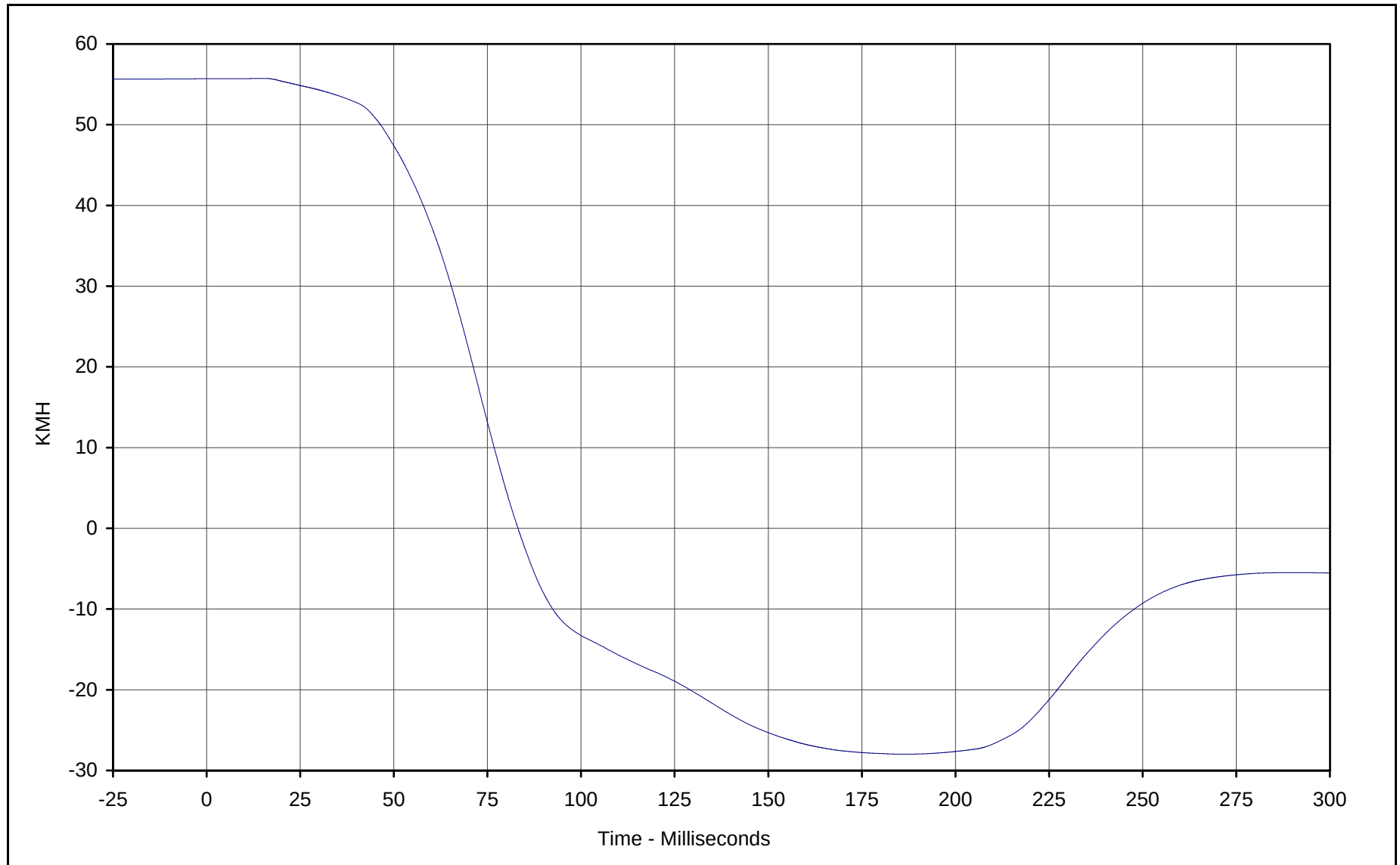
Data Plot		Page
B-123	Vehicle Left Rear Primary	B-123
B-124	Vehicle Left Rear Primary Velocity	B-124
B-125	Vehicle Left Rear Primary Displacement	B-125
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B-143	Vehicle Instrument Panel Displacement	B-143
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B-145	Vehicle Left Rear Z Velocity	B-145
B-146	Vehicle Left Rear Z Displacement	B-146
B-147	Vehicle Right Rear Z	B-147
B-148	Vehicle Right Rear Z Velocity	B-148
B-149	Vehicle Right Rear Z Displacement	B-149



Curve Description: Driver Head Primary X
Maximum Value: 17.5 at 228.9 Milliseconds
Minimum Value: -52.7 at 72.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-001

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

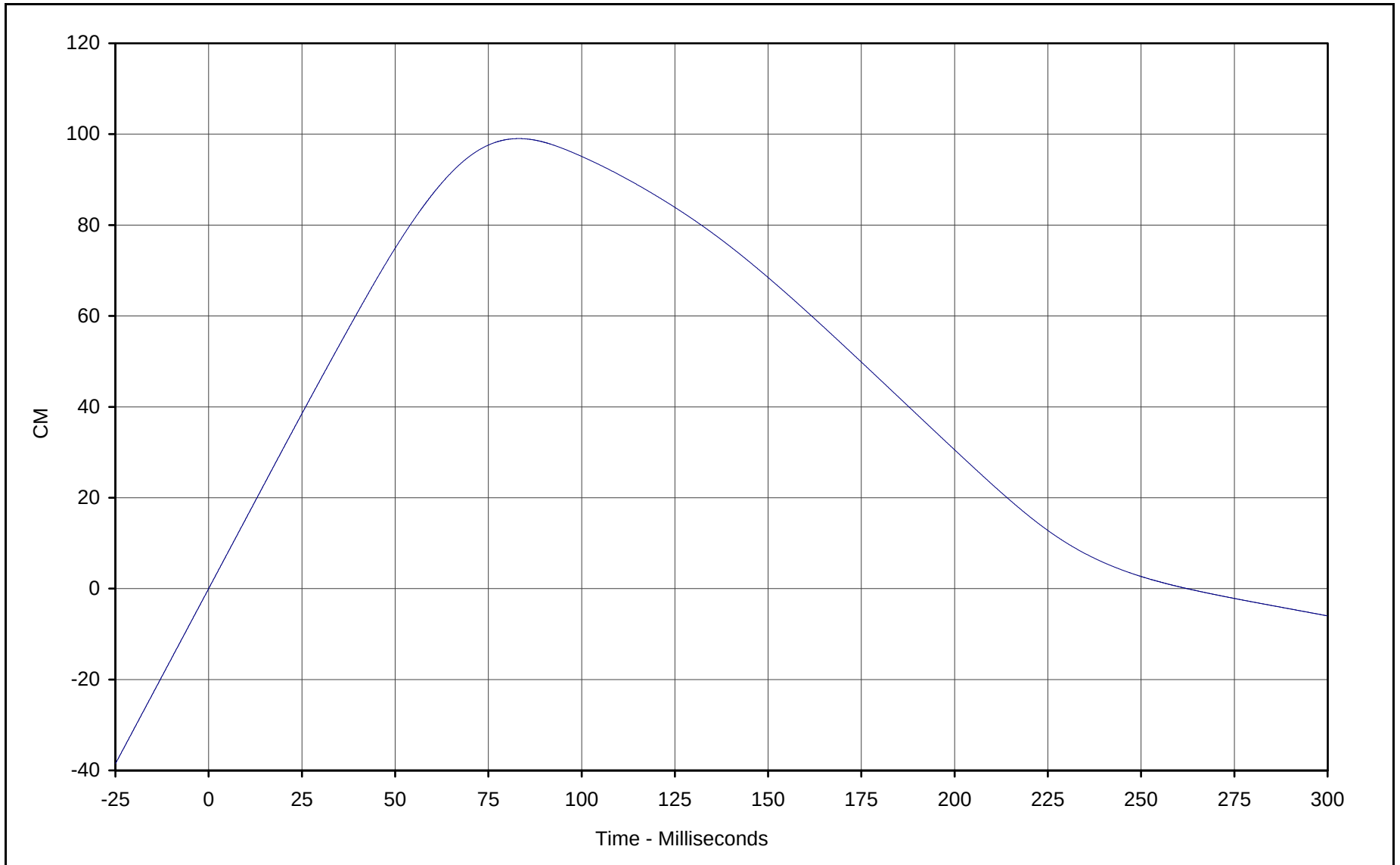




Curve Description: Driver Head Primary X Velocity
Maximum Value: 55.7 at 15.4 Milliseconds
Minimum Value: -28.0 at 185.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-001

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

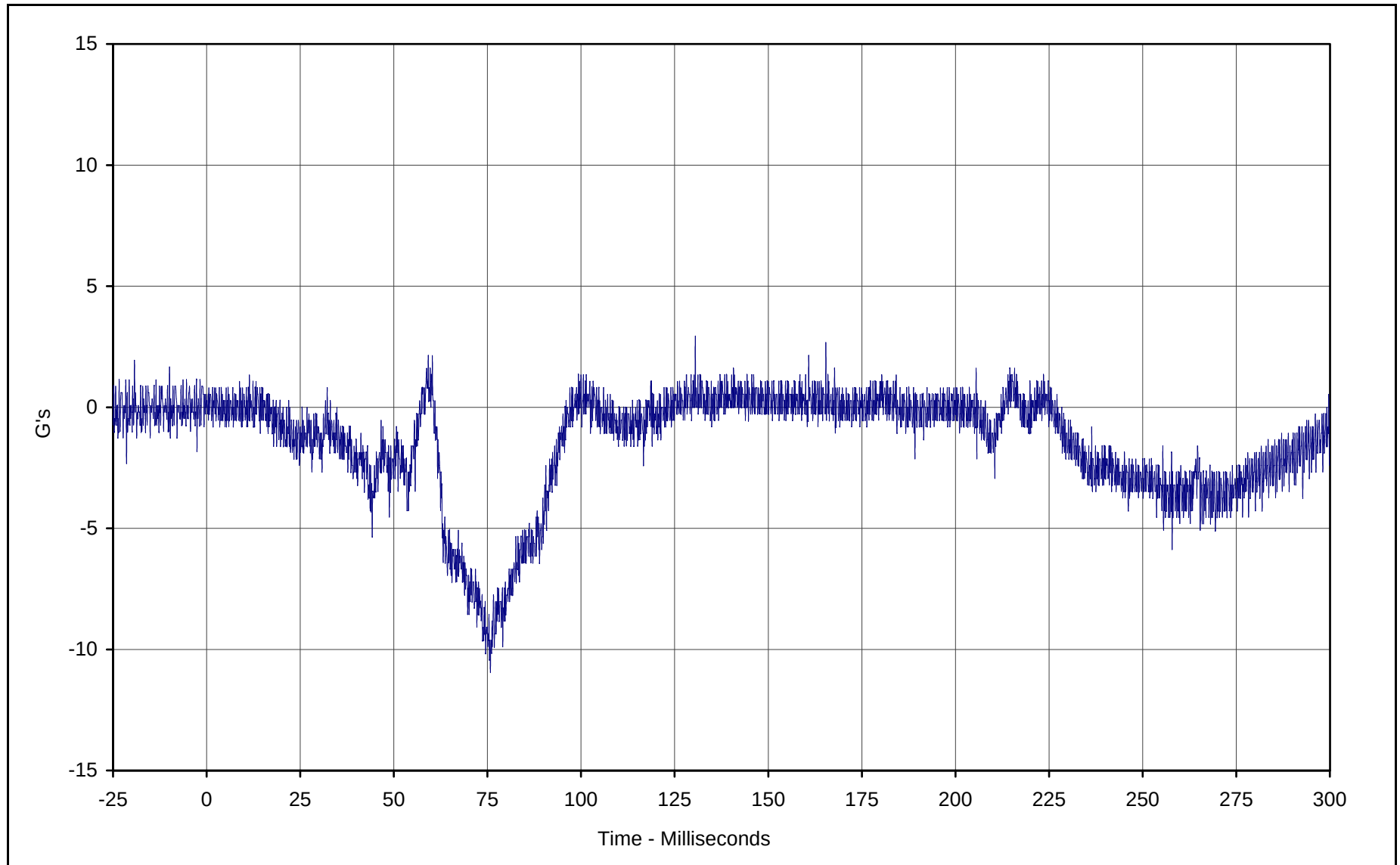




Curve Description: Driver Head Primary X Displ.
Maximum Value: 99.0 at 83.2 Milliseconds
Minimum Value: -6.0 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-001

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

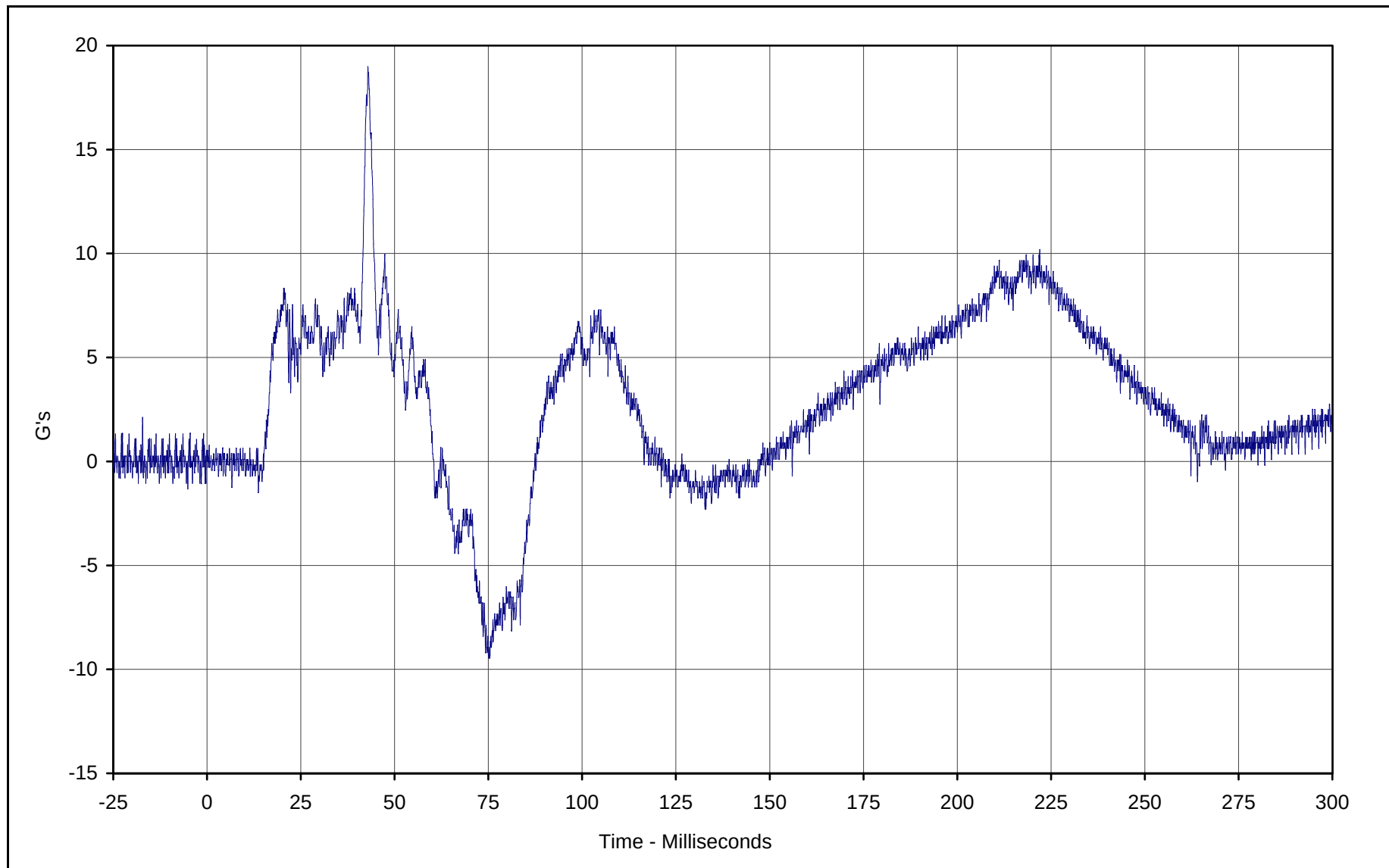




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Maximum Value: 2.9 at 130.5 Milliseconds
Minimum Value: -11.0 at 75.8 Milliseconds
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Date of Test: 12/5/01
Curve Number: FIL-002

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

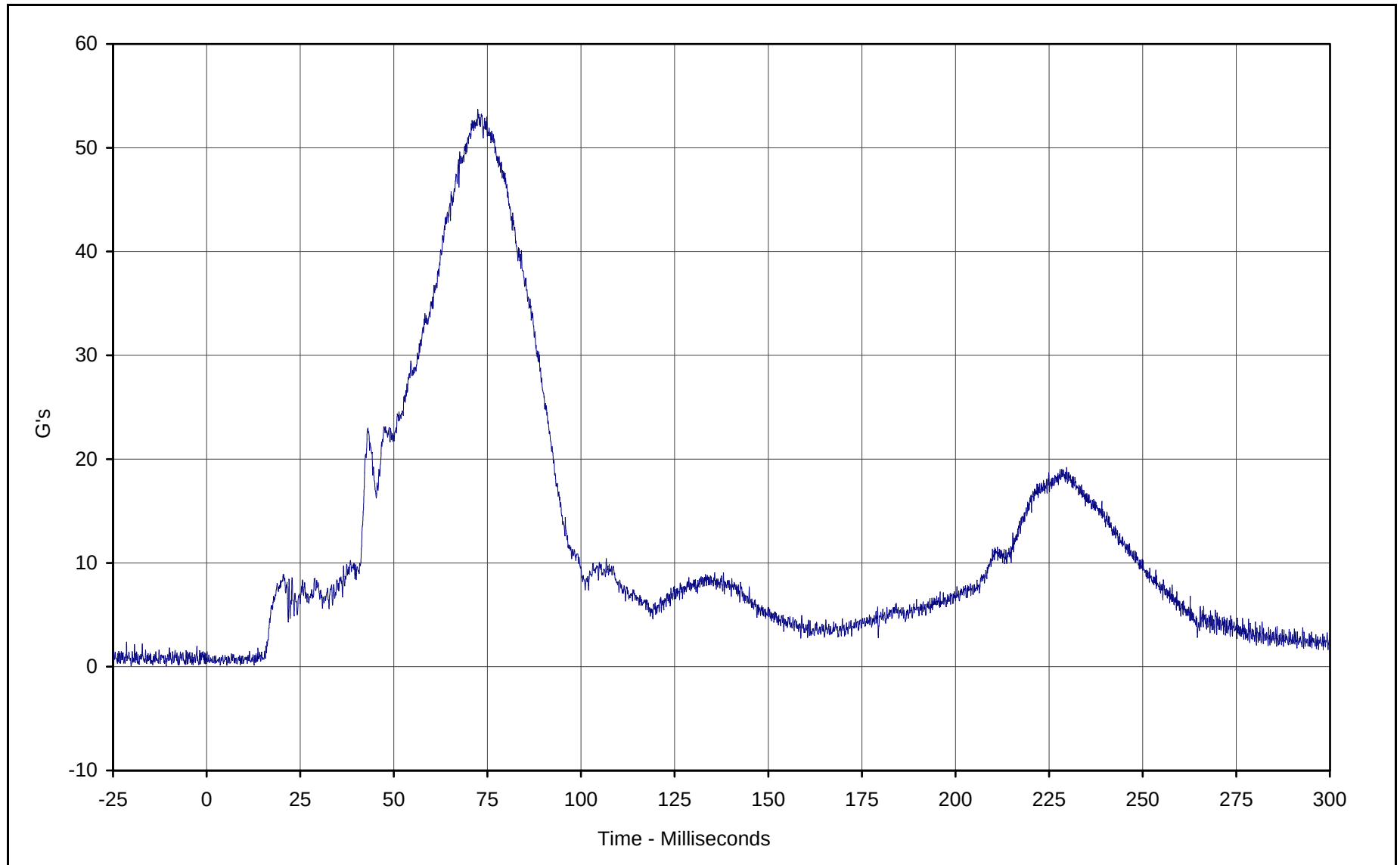




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Minimum Value: -9.5 at 75.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-003

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



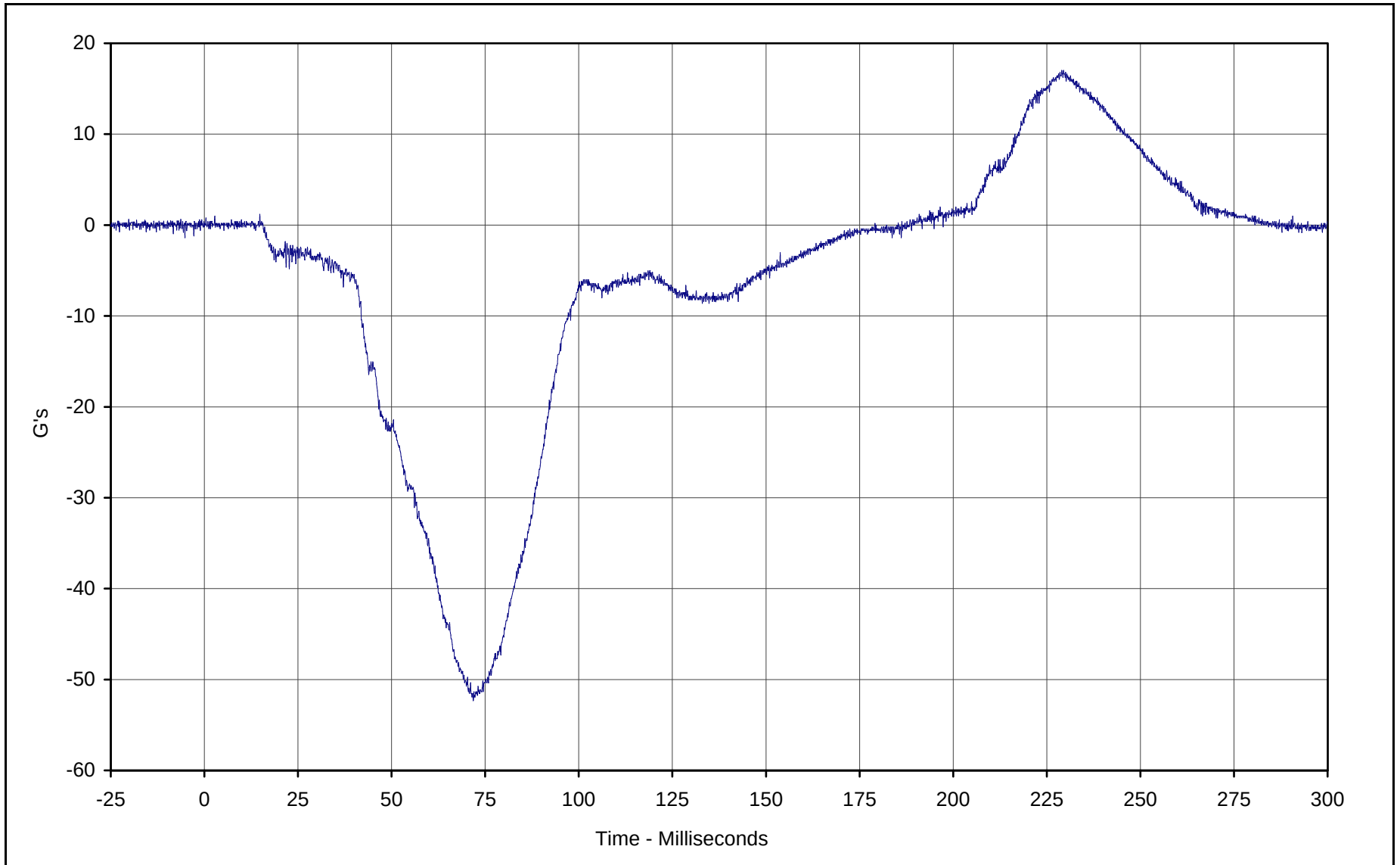


Curve Description: Driver Head Resultant Primary
Maximum Value: 53.7 at 72.4 Milliseconds
Minimum Value: 0.2 at 3.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: RES-001

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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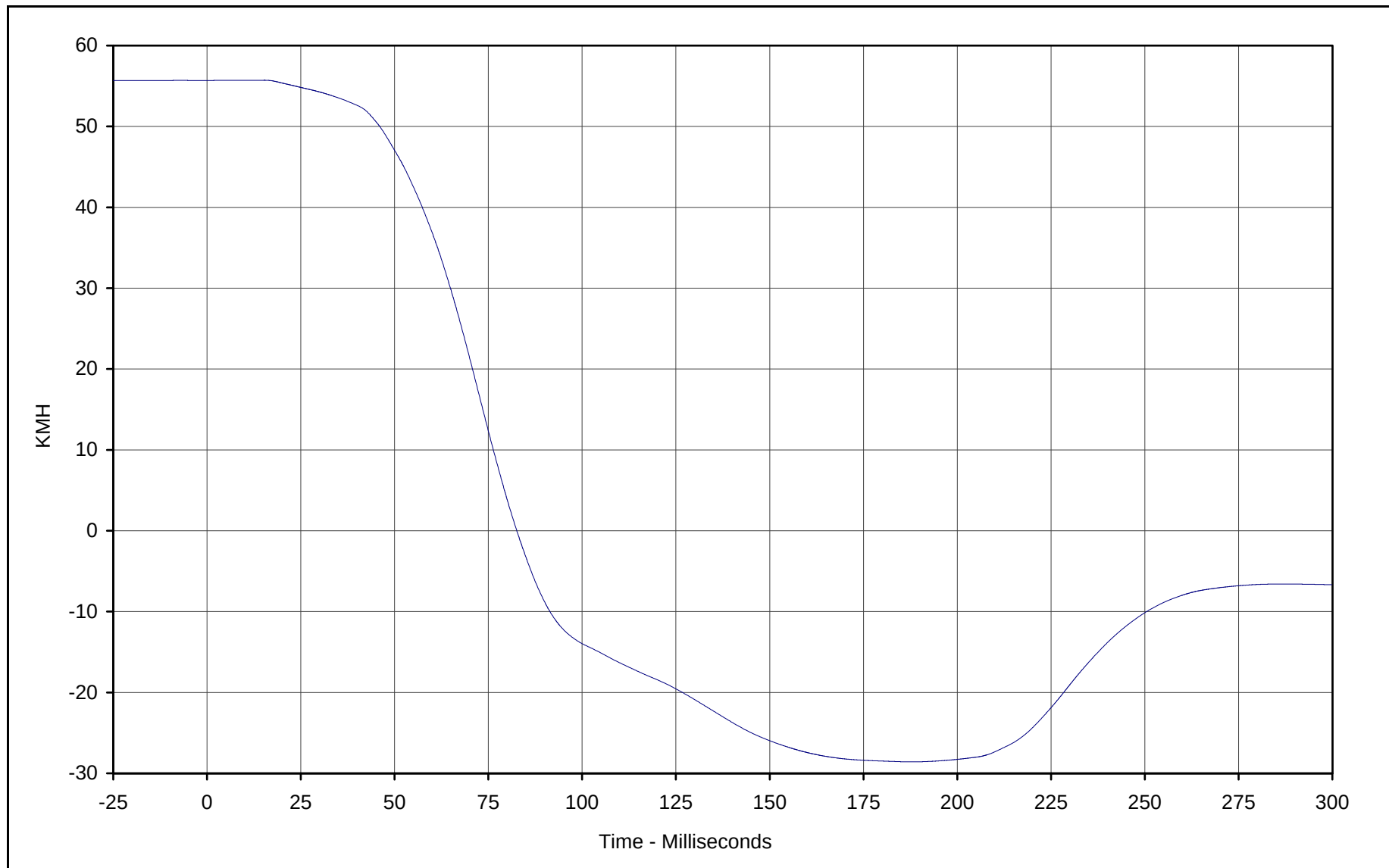
Curve Description: Driver Head Redundant X
Maximum Value: 17.0 at 229.0 Milliseconds
Minimum Value: -52.3 at 71.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-004

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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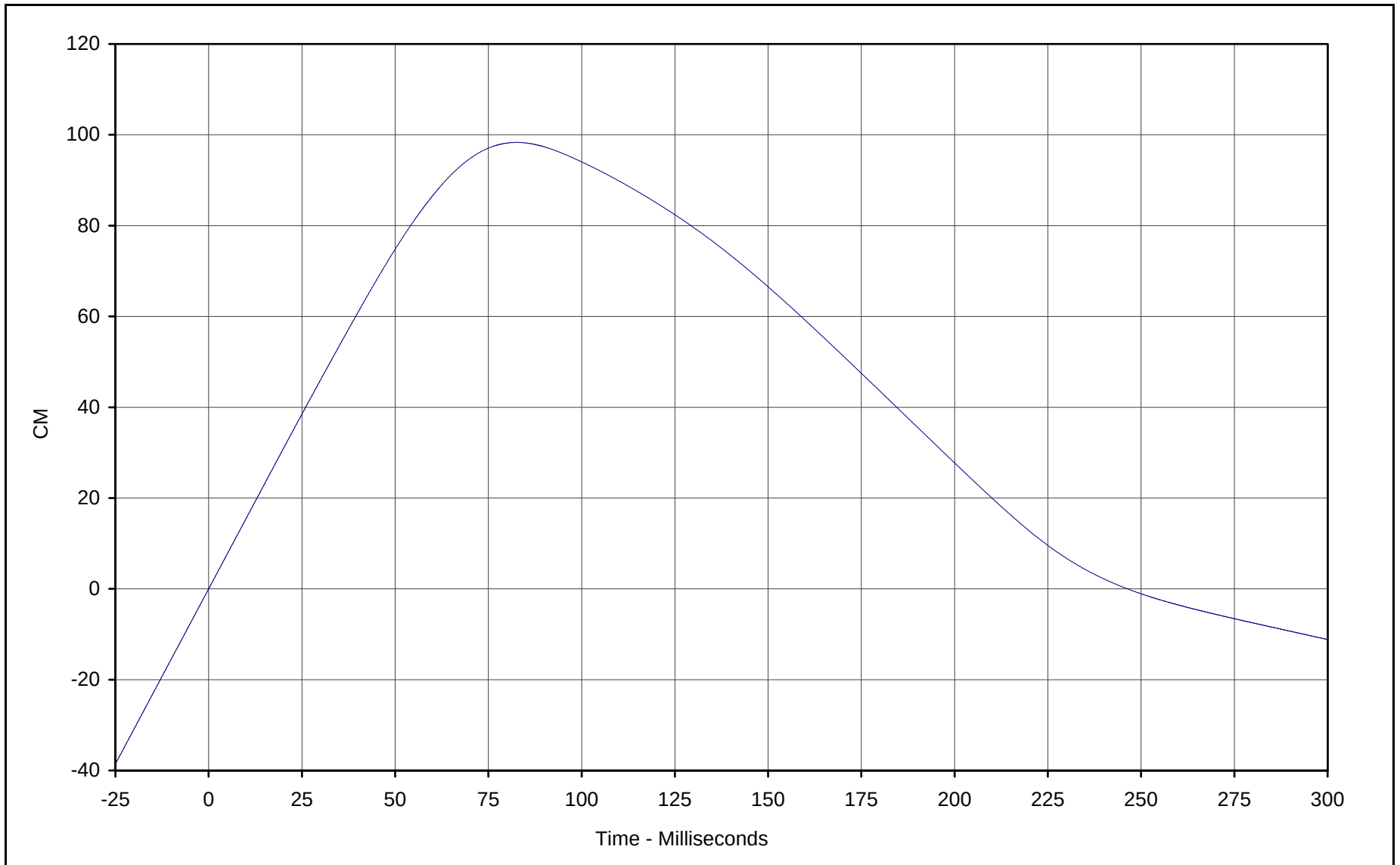


Curve Description: Driver Head Redundant X Velocity
Maximum Value: 55.7 at 15.4 Milliseconds
Minimum Value: -28.6 at 188.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-004

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

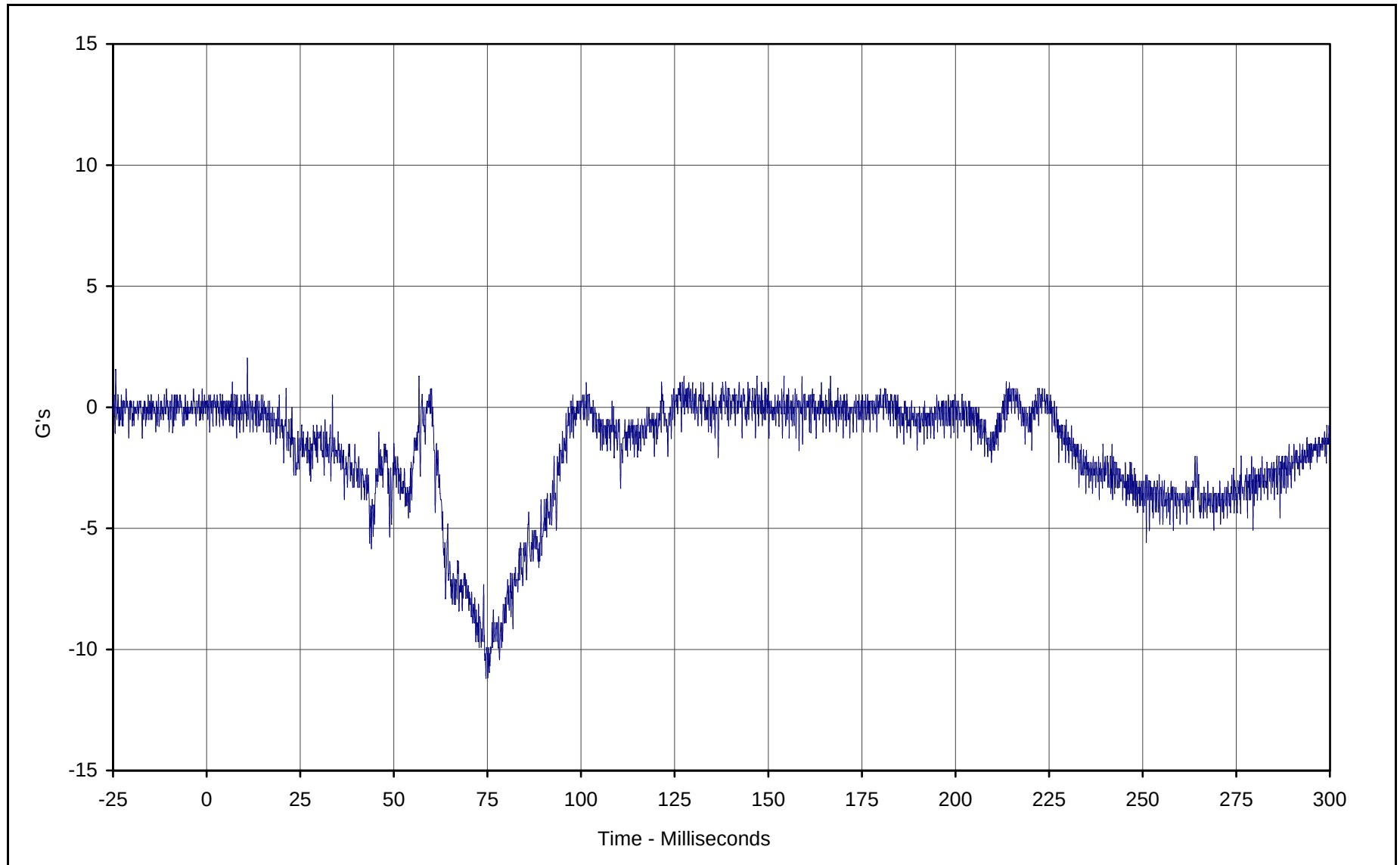


Curve Description: Driver Head Redundant X Displ.
Maximum Value: 98.3 at 82.6 Milliseconds
Minimum Value: -11.2 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-004

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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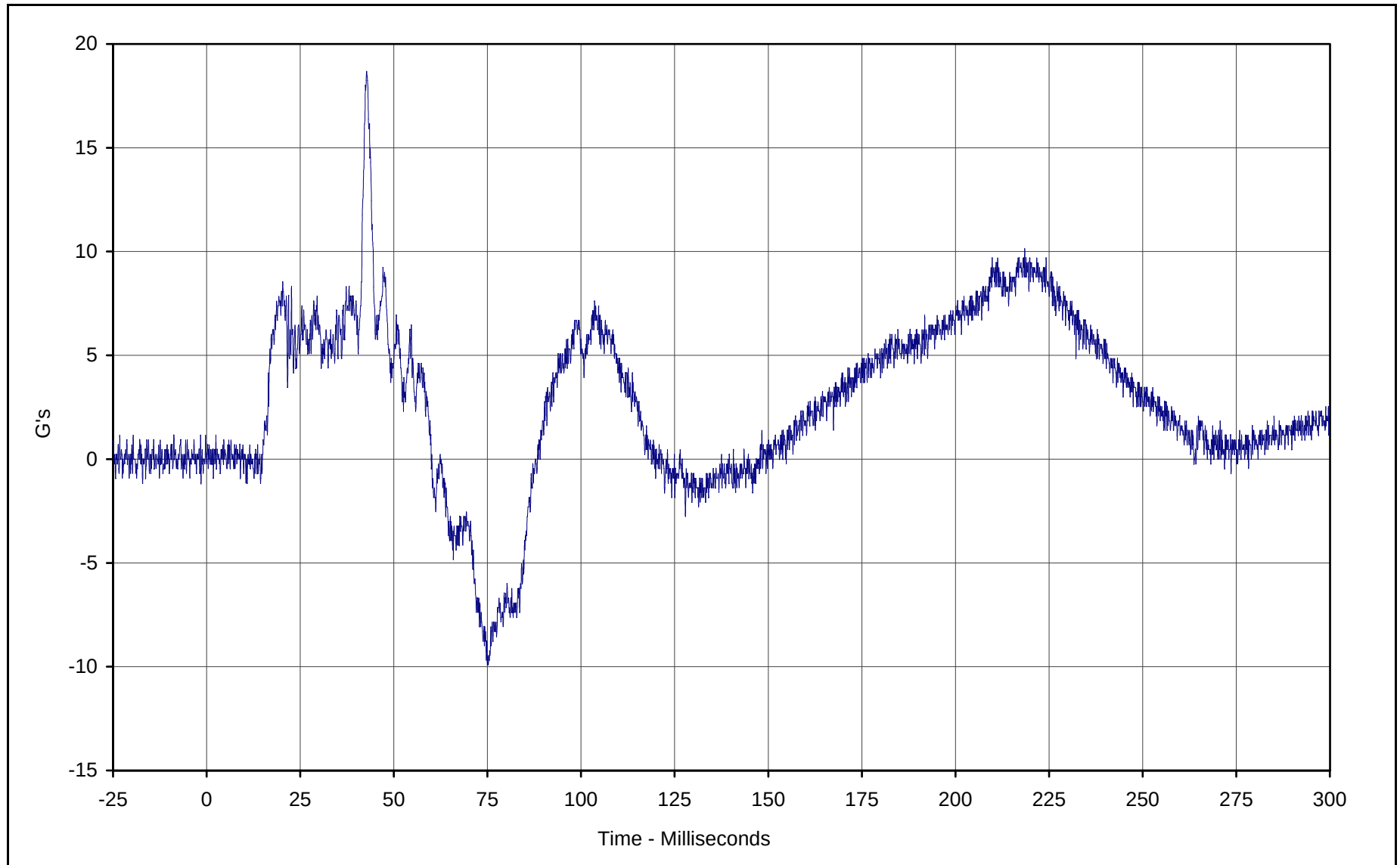


Curve Description: Driver Head Redundant Y
Maximum Value: 2.0 at 10.9 Milliseconds
Minimum Value: -11.2 at 74.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-005

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



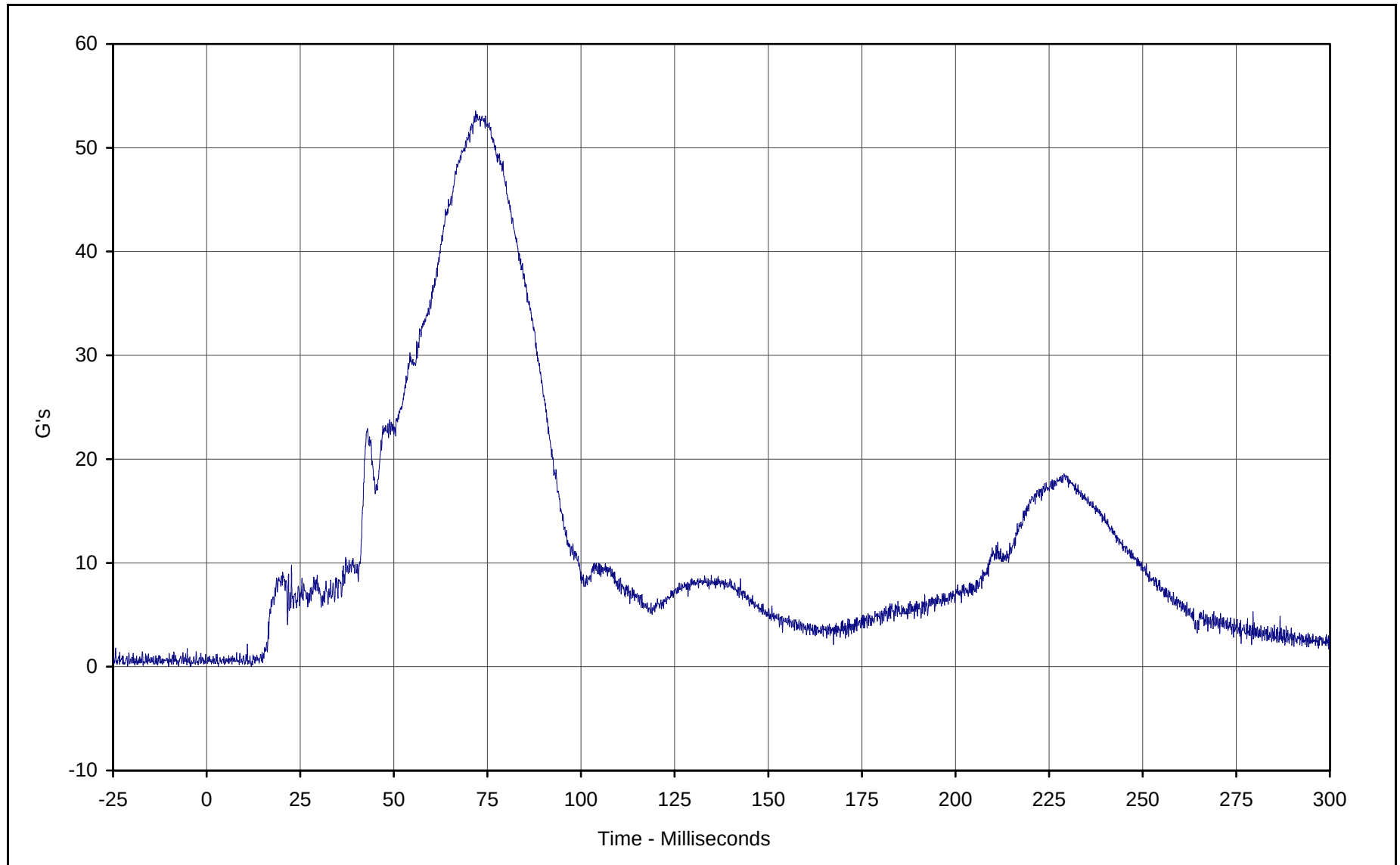
KAR21129-01



Curve Description: Driver Head Redundant Z
Maximum Value: 18.7 at 42.7 Milliseconds
Minimum Value: -9.9 at 75.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-006

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

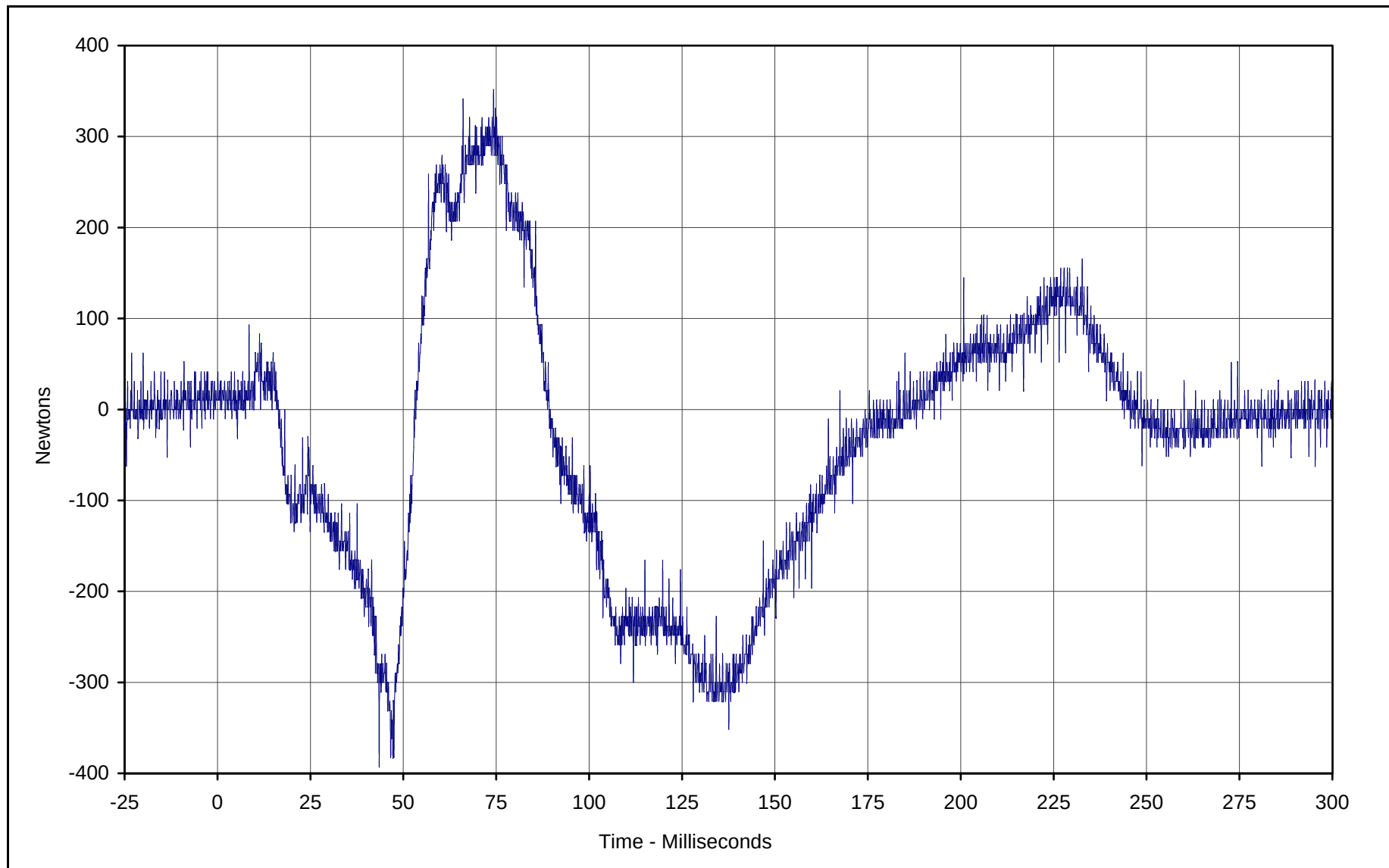




Curve Description: Driver Head Resultant Redundant
Maximum Value: 53.5 at 71.8 Milliseconds
Minimum Value: 0.0 at 3.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: RES-004

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

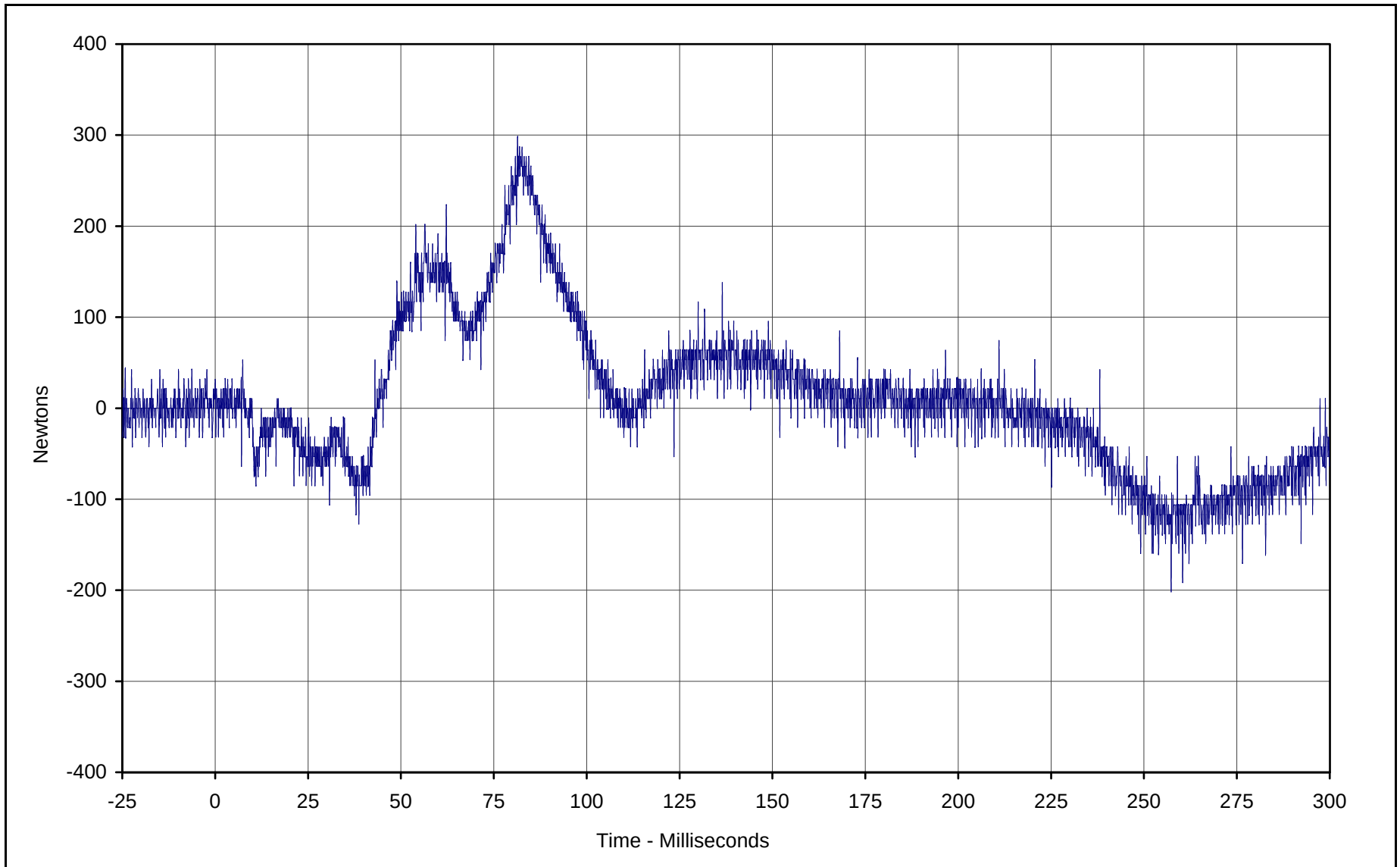




Curve Description: Driver Neck Force X
Maximum Value: 351.9 at 74.3 Milliseconds
Minimum Value: -393.3 at 43.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-007

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

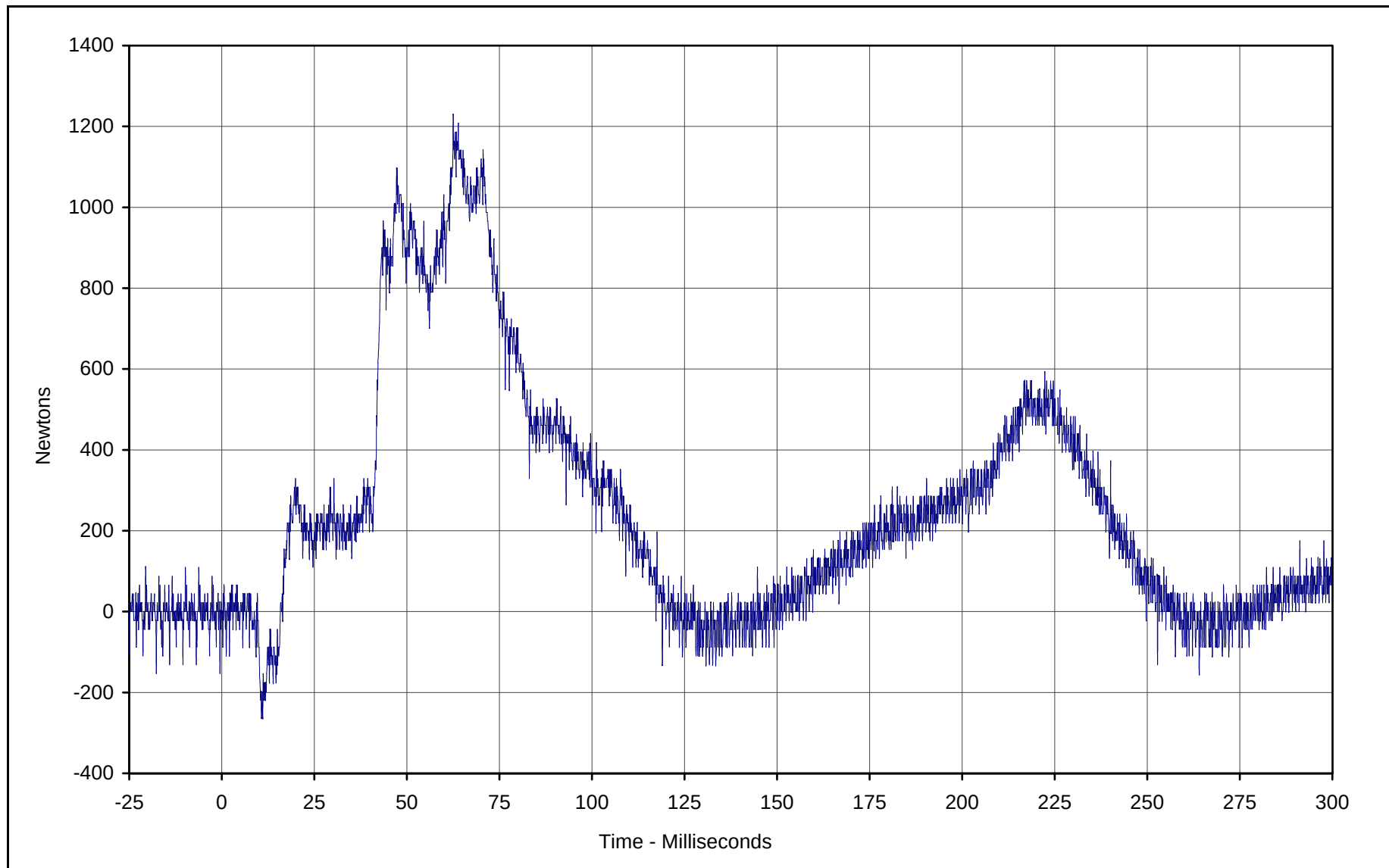




Curve Description: Driver Neck Force Y
Maximum Value: 297.6 at 81.4 Milliseconds
Minimum Value: -202.0 at 257.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-008

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

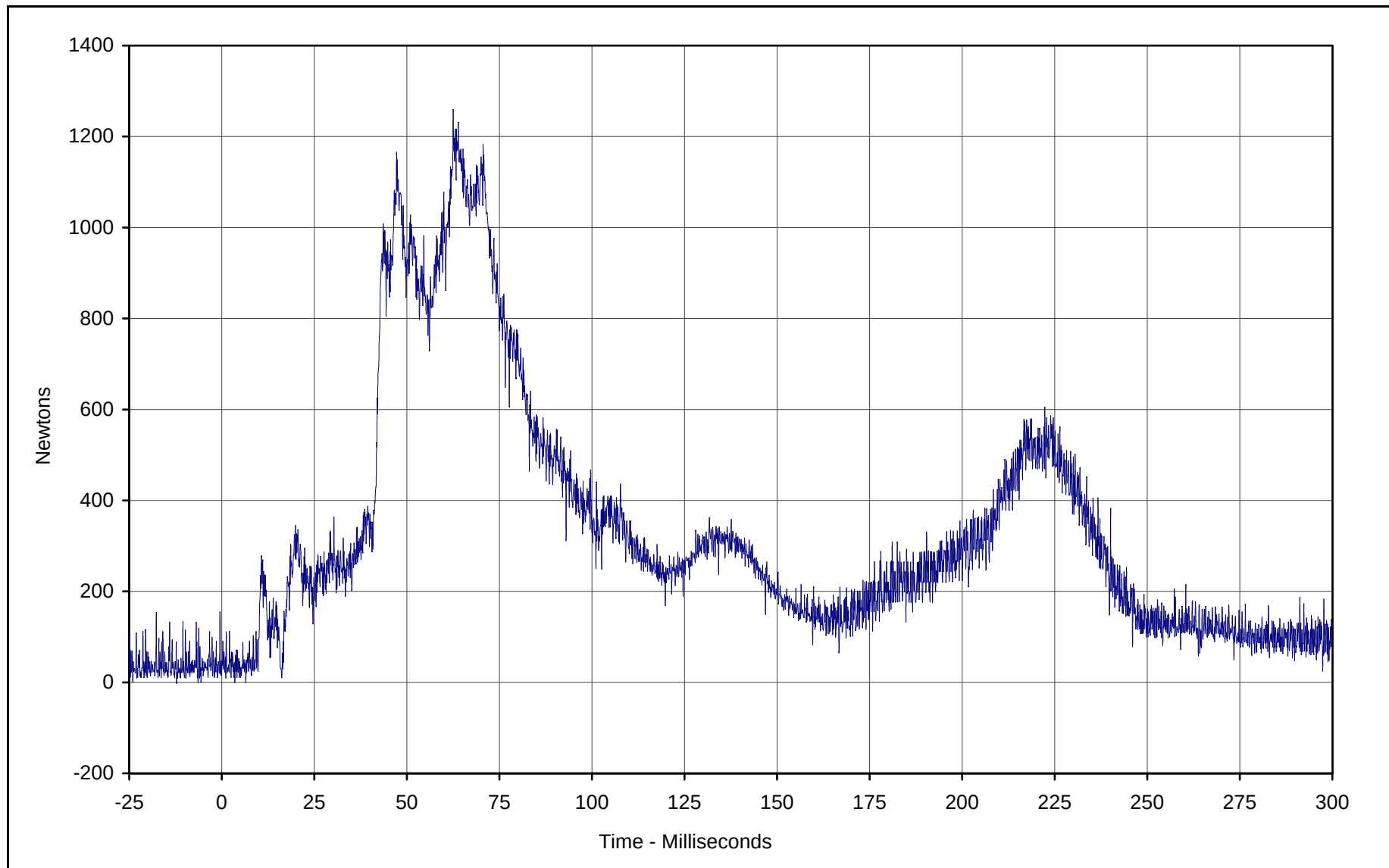




Curve Description: Driver Neck Force Z
Maximum Value: 1229.0 at 62.5 Milliseconds
Minimum Value: -263.4 at 10.7 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-009

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

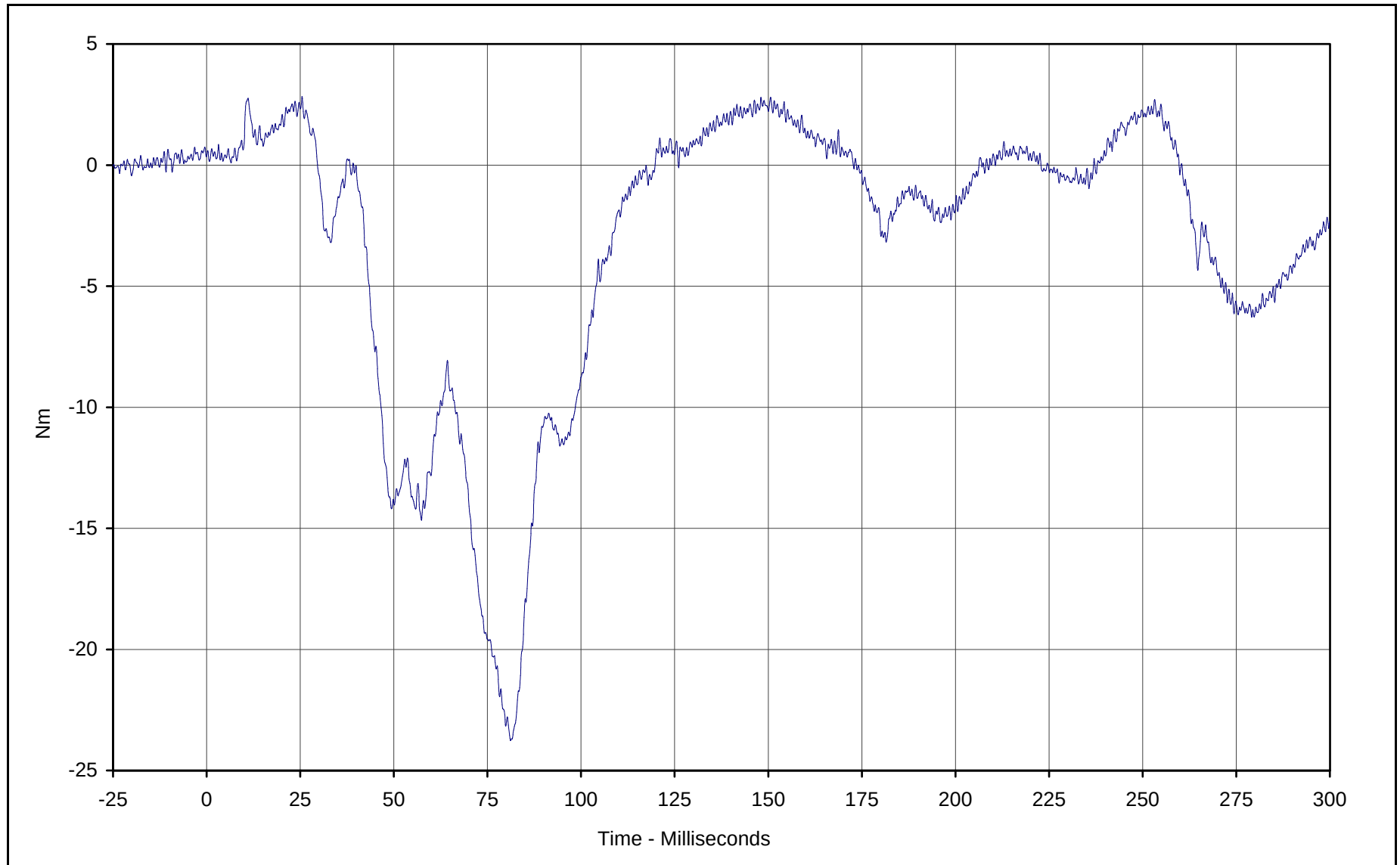




Curve Description: Driver Neck Force Resultant
Maximum Value: 1258.7 at 62.5 Milliseconds
Minimum Value: 0.0 at 3.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: RES-007

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

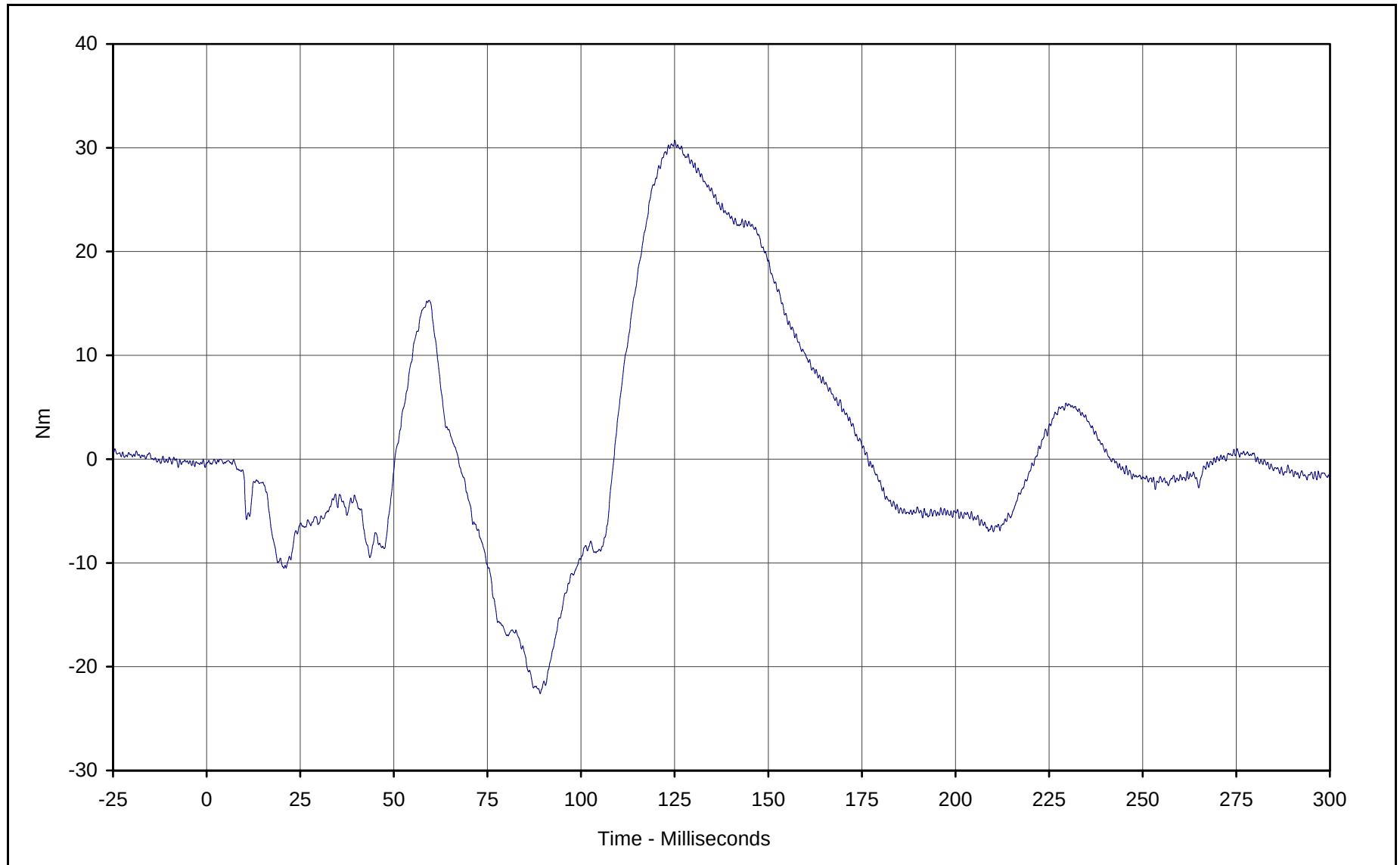




Curve Description: Driver Neck Moment X
Maximum Value: 2.8 at 25.5 Milliseconds
Minimum Value: -23.8 at 81.2 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-010

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

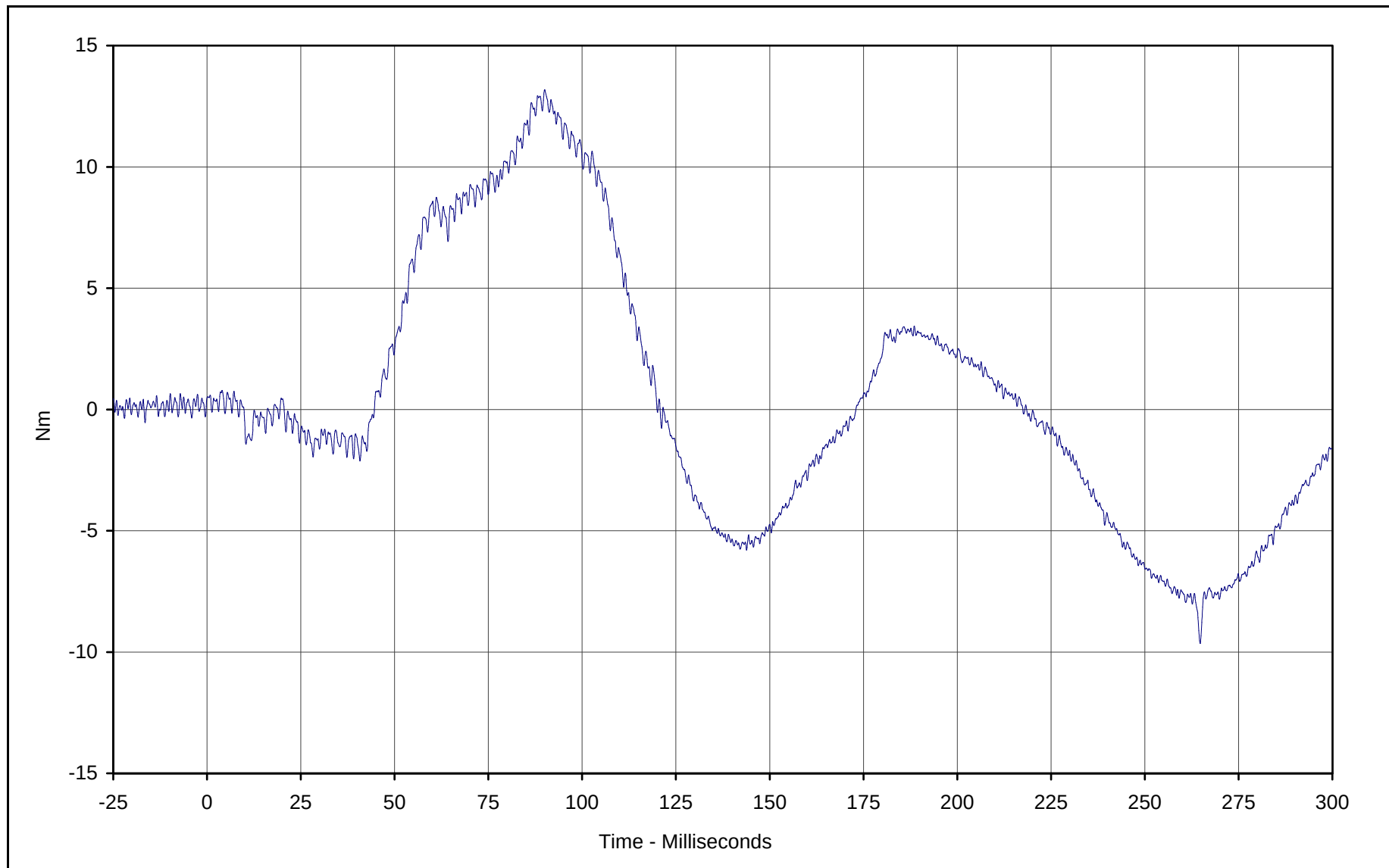




Curve Description: Driver Neck Moment Y
Maximum Value: 30.7 at 125.0 Milliseconds
Minimum Value: -22.6 at 89.1 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-011

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

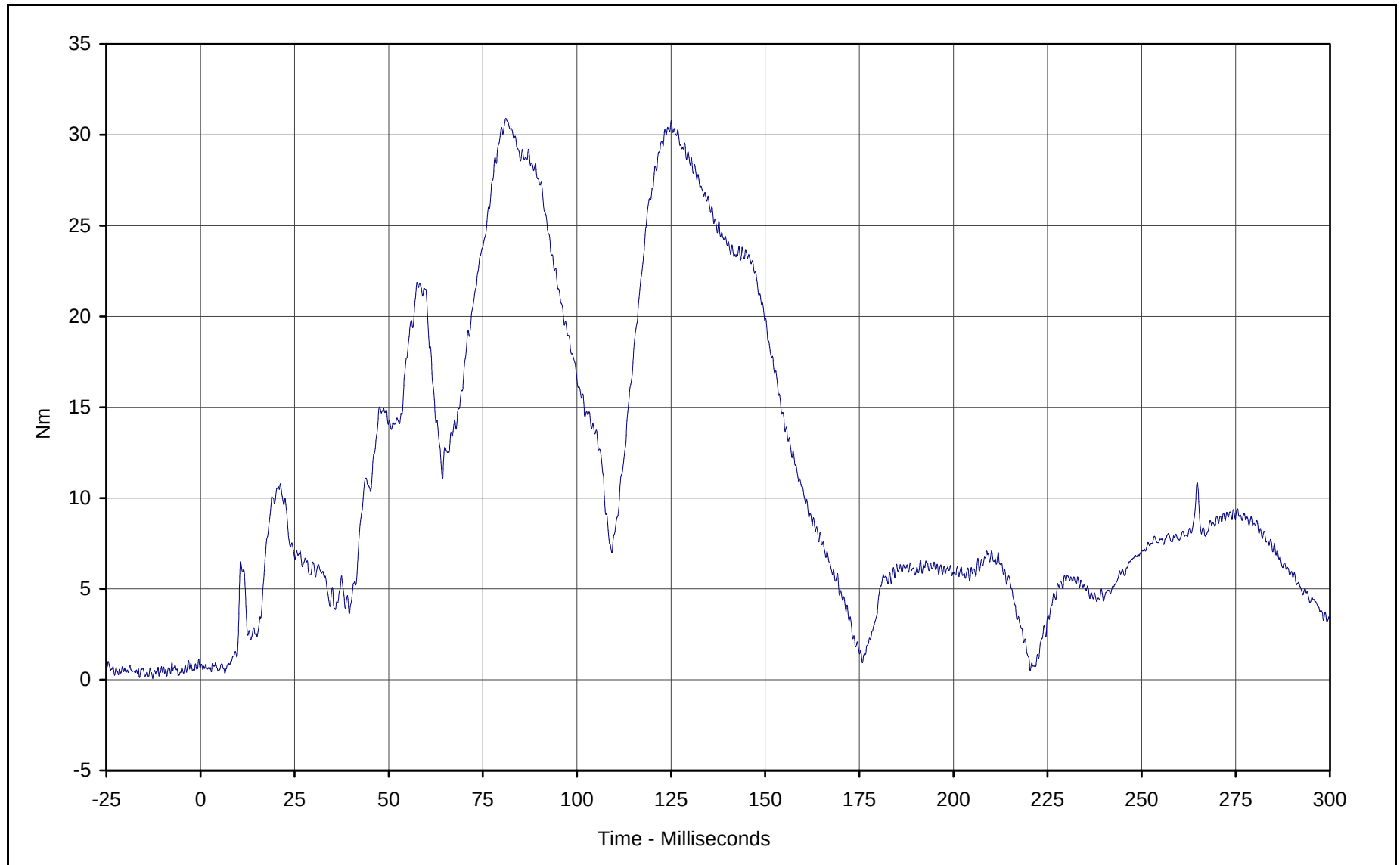




Curve Description: Driver Neck Moment Z
Maximum Value: 13.2 at 90.0 Milliseconds
Minimum Value: -9.6 at 264.8 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-012

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

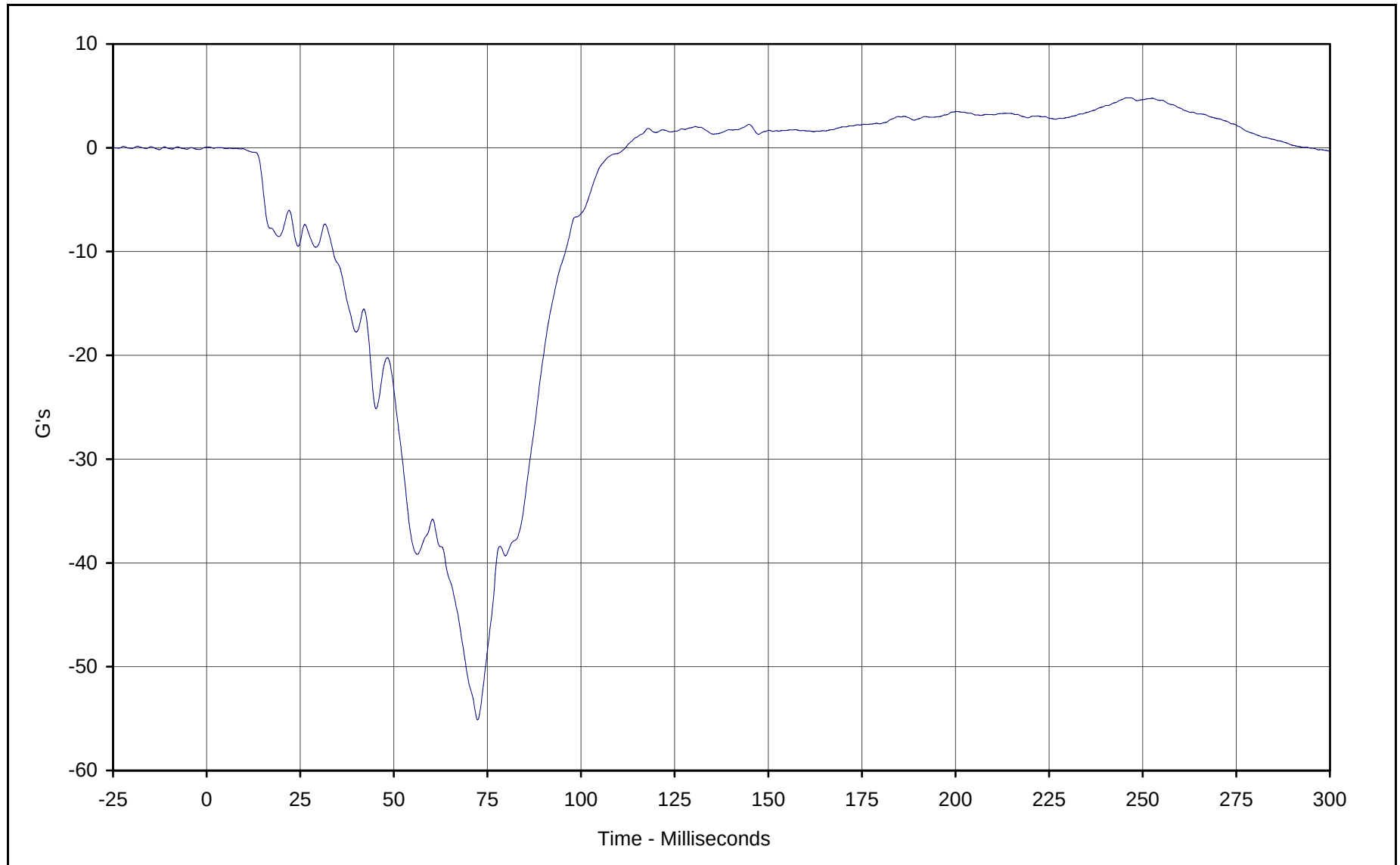




Curve Description: Driver Neck Moment Resultant
Maximum Value: 30.9 at 81.1 Milliseconds
Minimum Value: 0.3 at 6.5 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: RES-010

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



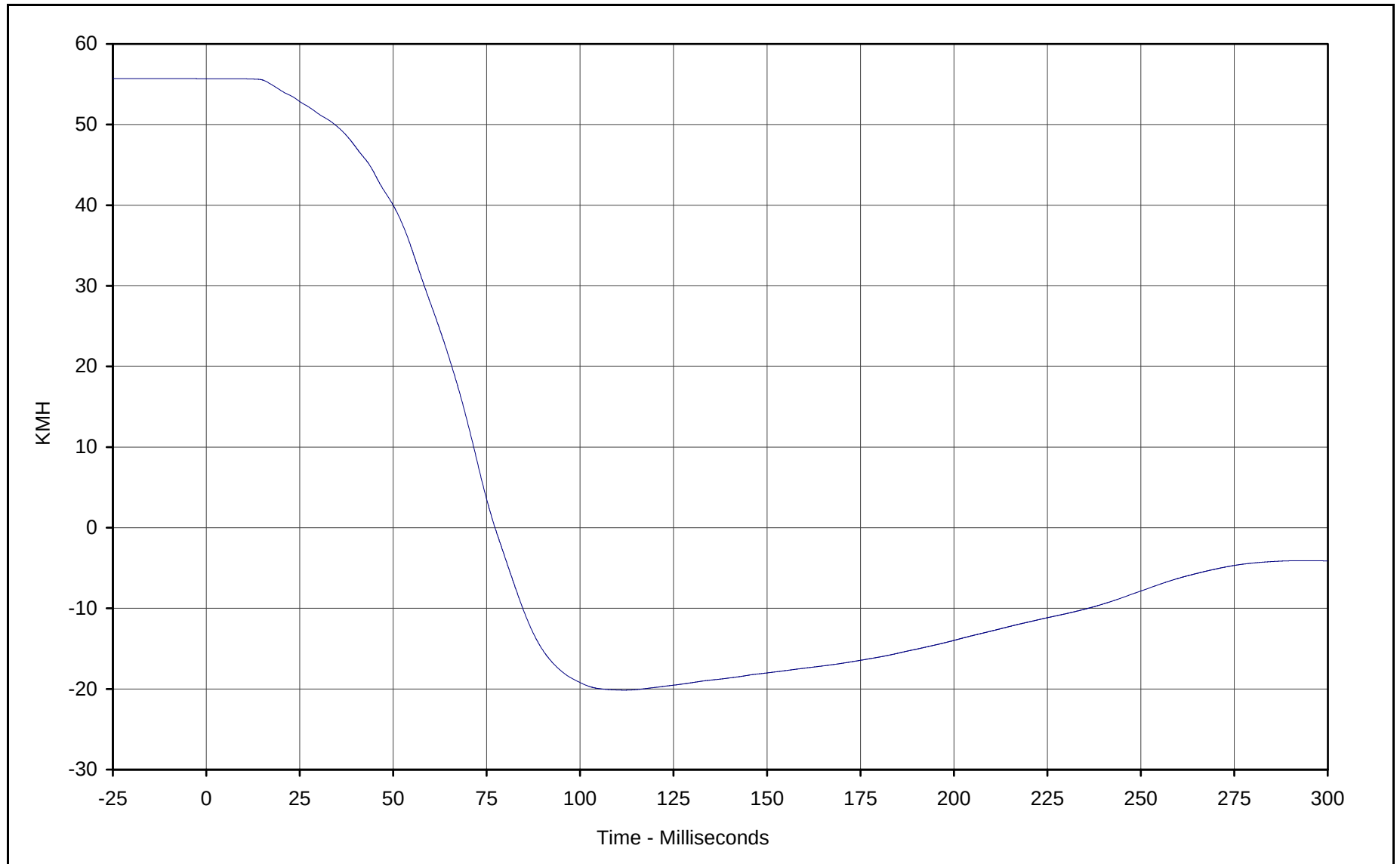


Curve Description: Driver Chest Primary X
Maximum Value: 4.8 at 245.9 Milliseconds
Minimum Value: -55.1 at 72.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-013

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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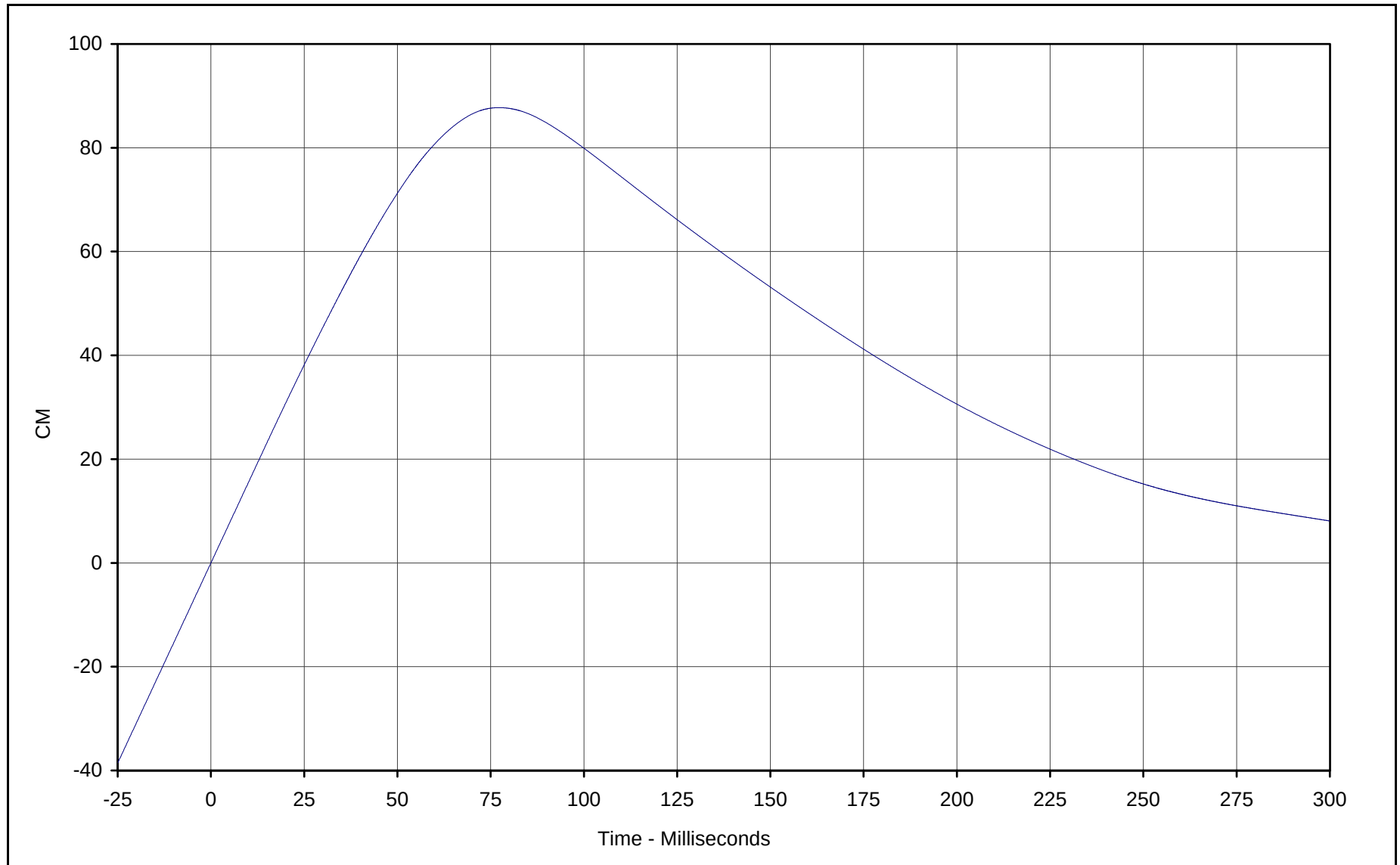


Curve Description: Driver Chest Primary X Velocity
Maximum Value: 55.7 at 1.4 Milliseconds
Minimum Value: -20.1 at 111.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-013

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



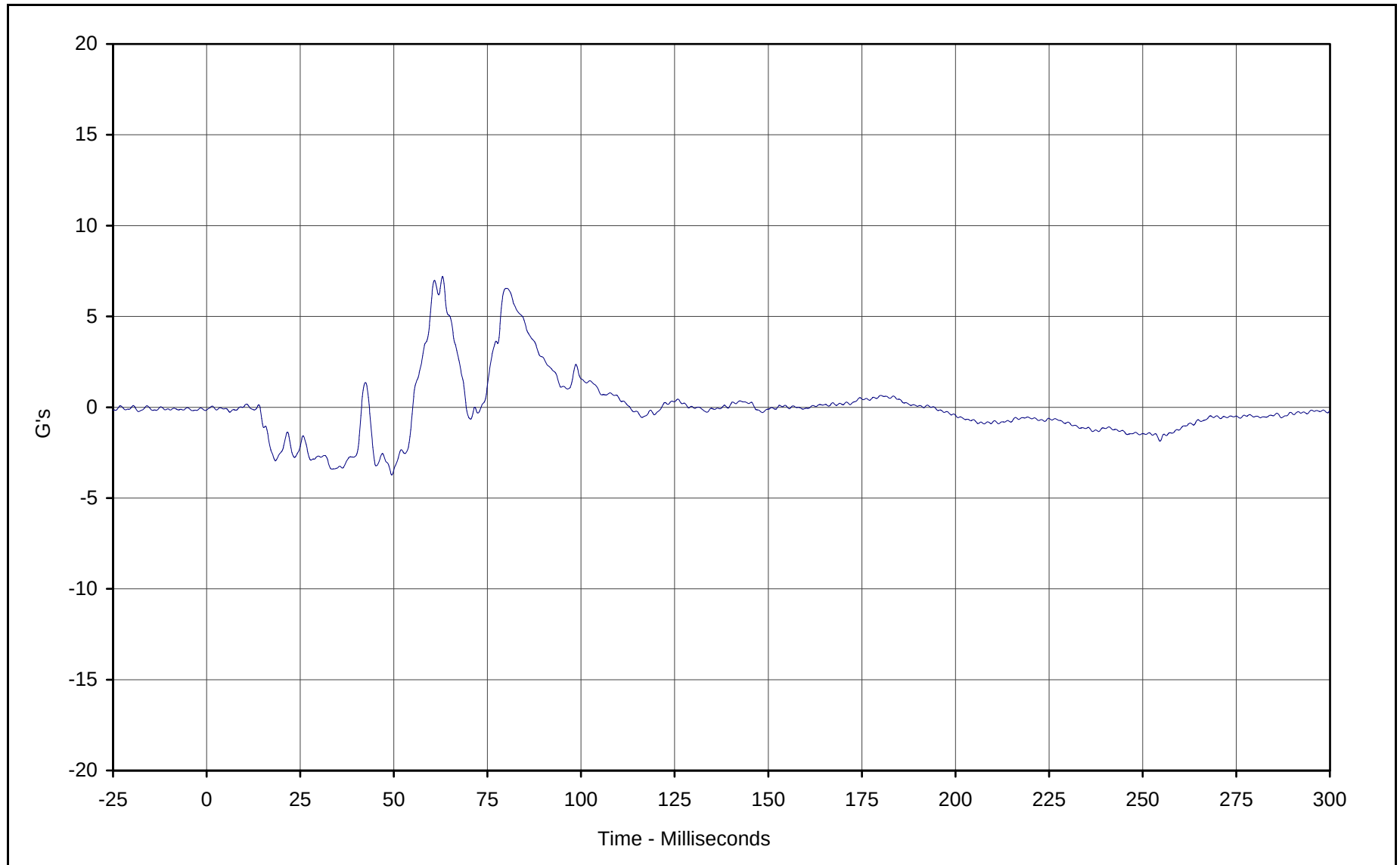
KAR21129-01



Curve Description: Driver Chest Primary X Displ.
Maximum Value: 87.7 at 77.2 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-013

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



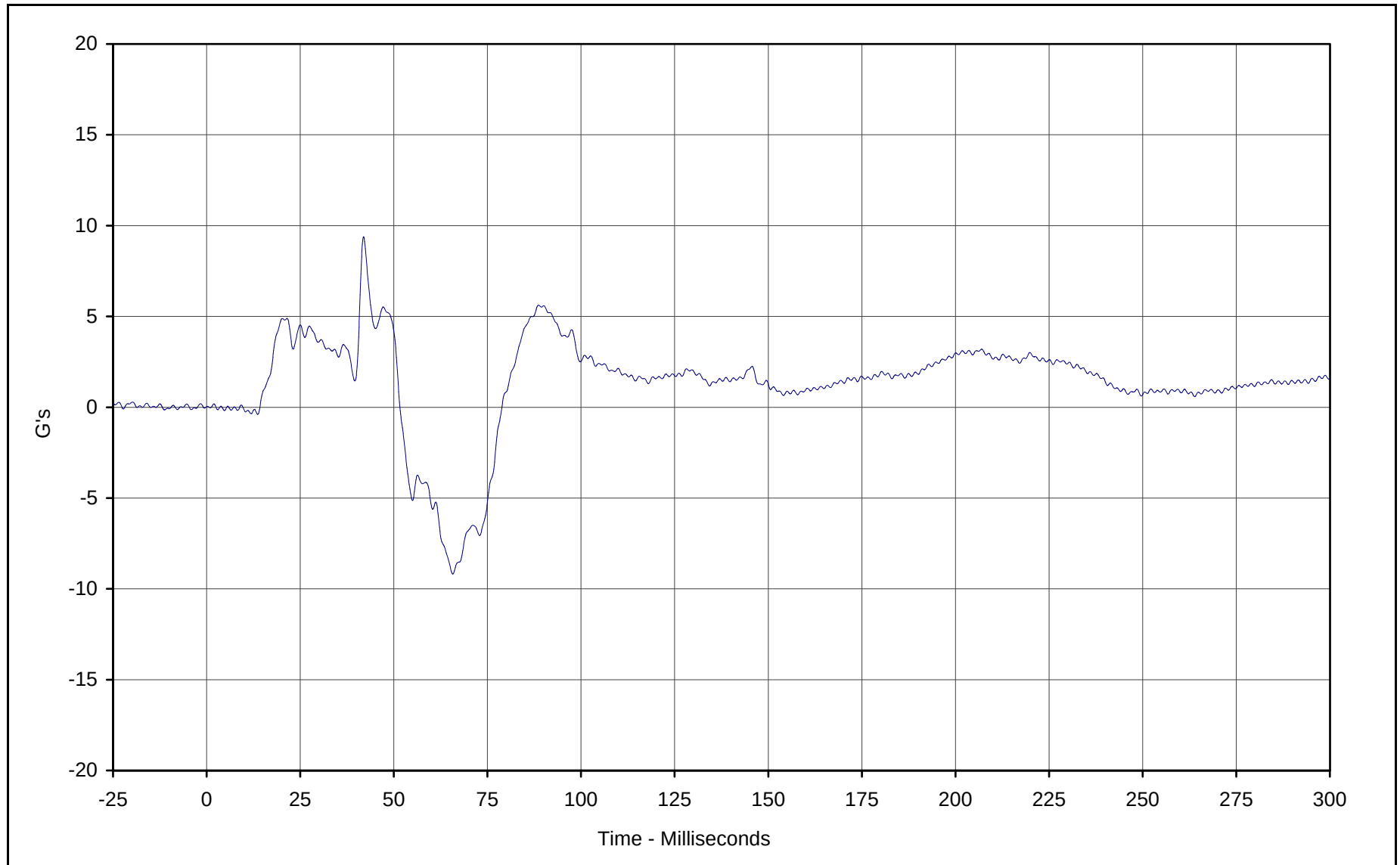


Curve Description: Driver Chest Primary Y
Maximum Value: 7.2 at 63.0 Milliseconds
Minimum Value: -3.7 at 49.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-014

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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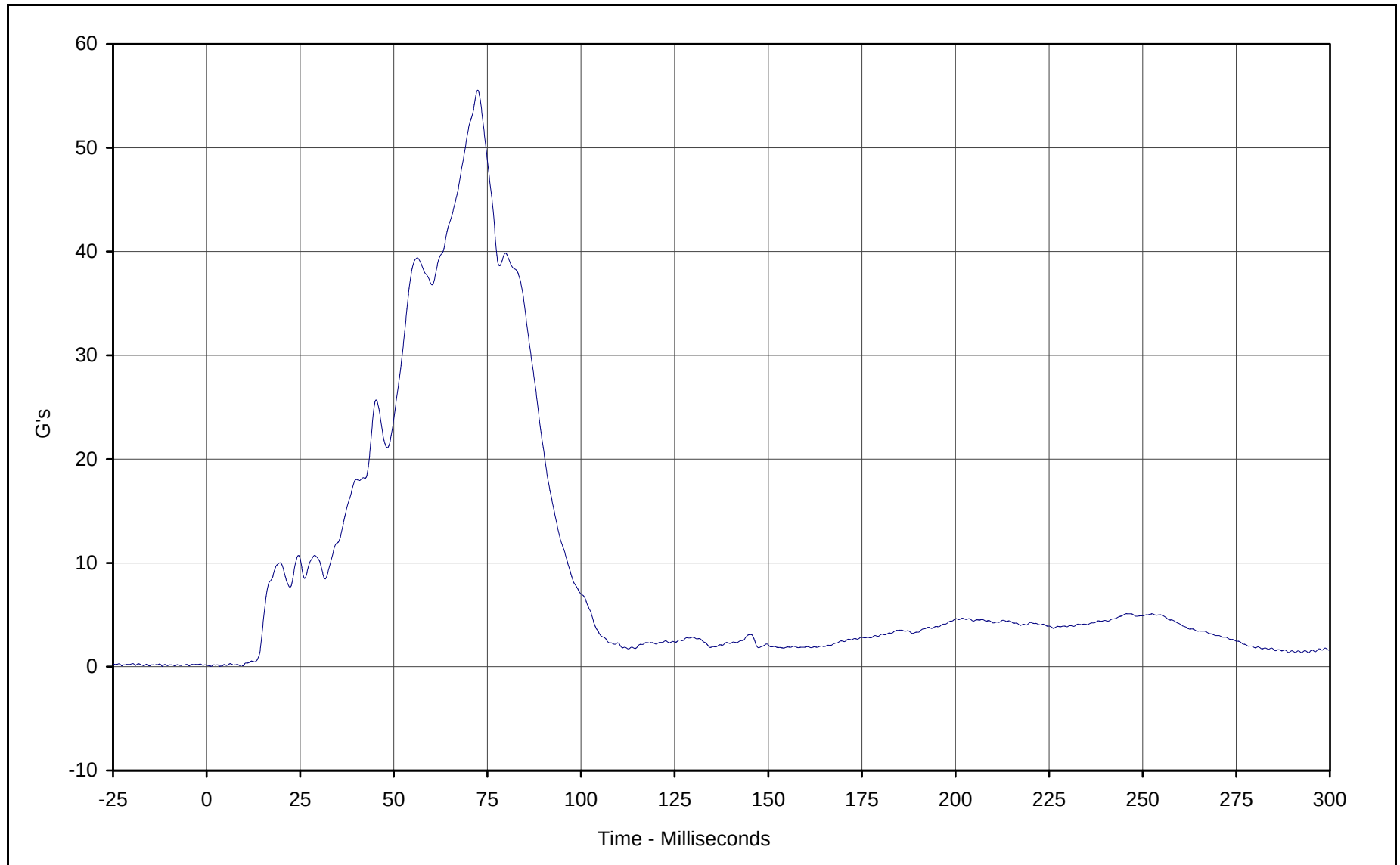


Curve Description: Driver Chest Primary Z
Maximum Value: 9.4 at 41.9 Milliseconds
Minimum Value: -9.2 at 65.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-015

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



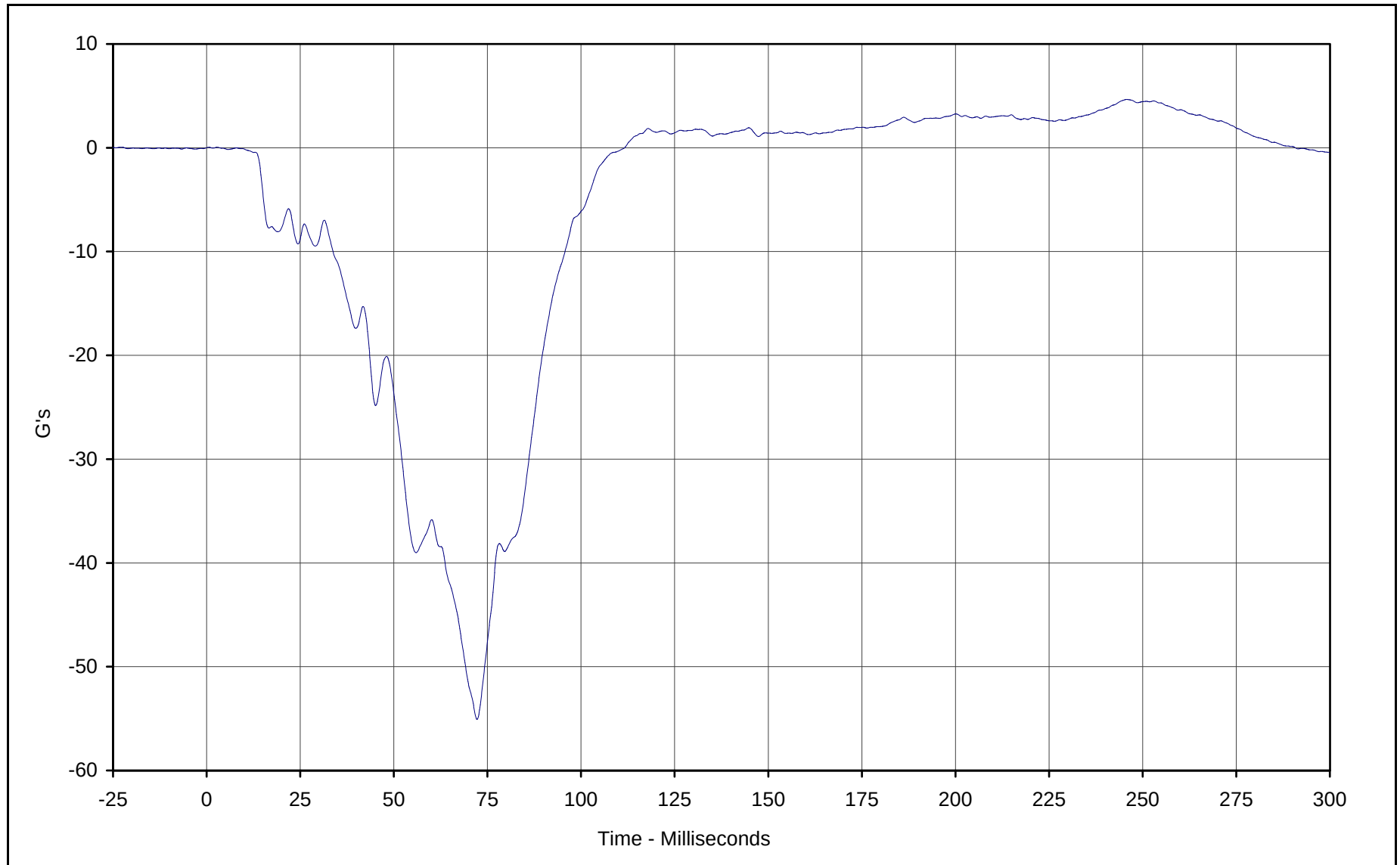
KAR21129-01



Curve Description: Driver Chest Resultant Primary
Maximum Value: 55.5 at 72.4 Milliseconds
Minimum Value: 0.0 at 3.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: RES-013

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



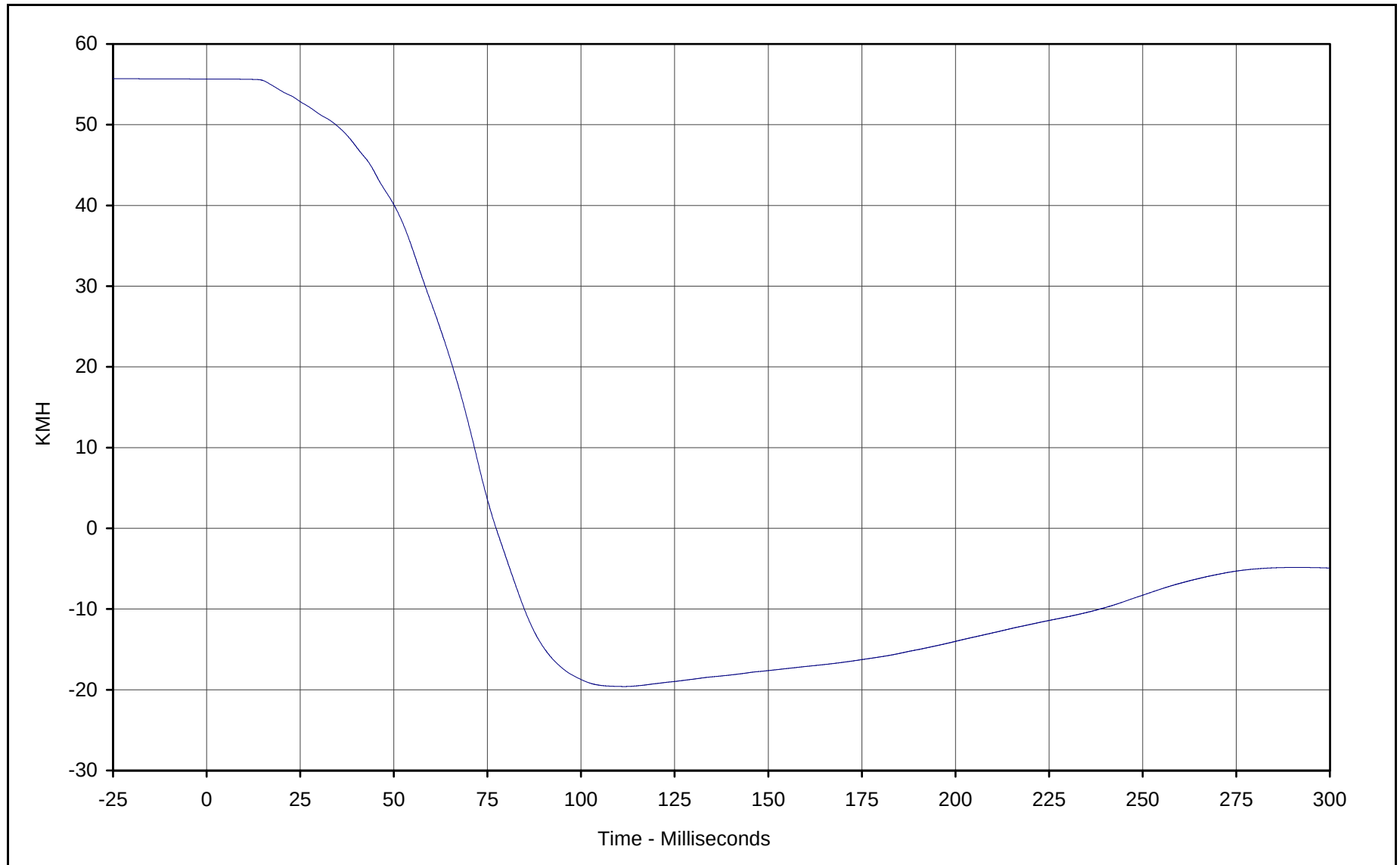


Curve Description: Driver Chest Redundant X
Maximum Value: 4.7 at 245.7 Milliseconds
Minimum Value: -55.1 at 72.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-016

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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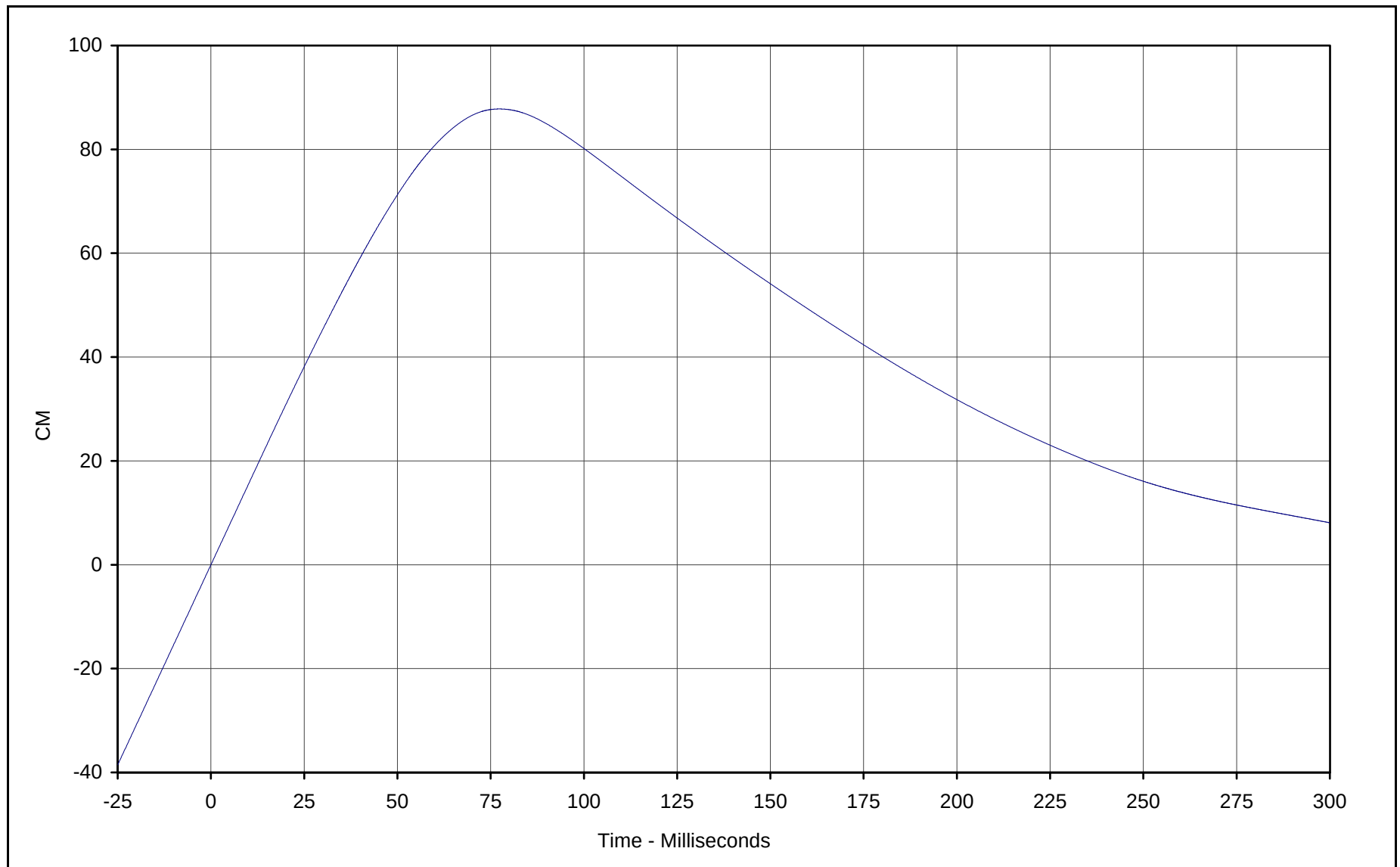


Curve Description: Driver Chest Redundant X Velocity
Maximum Value: 55.7 at 3.5 Milliseconds
Minimum Value: -19.6 at 111.6 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-016

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

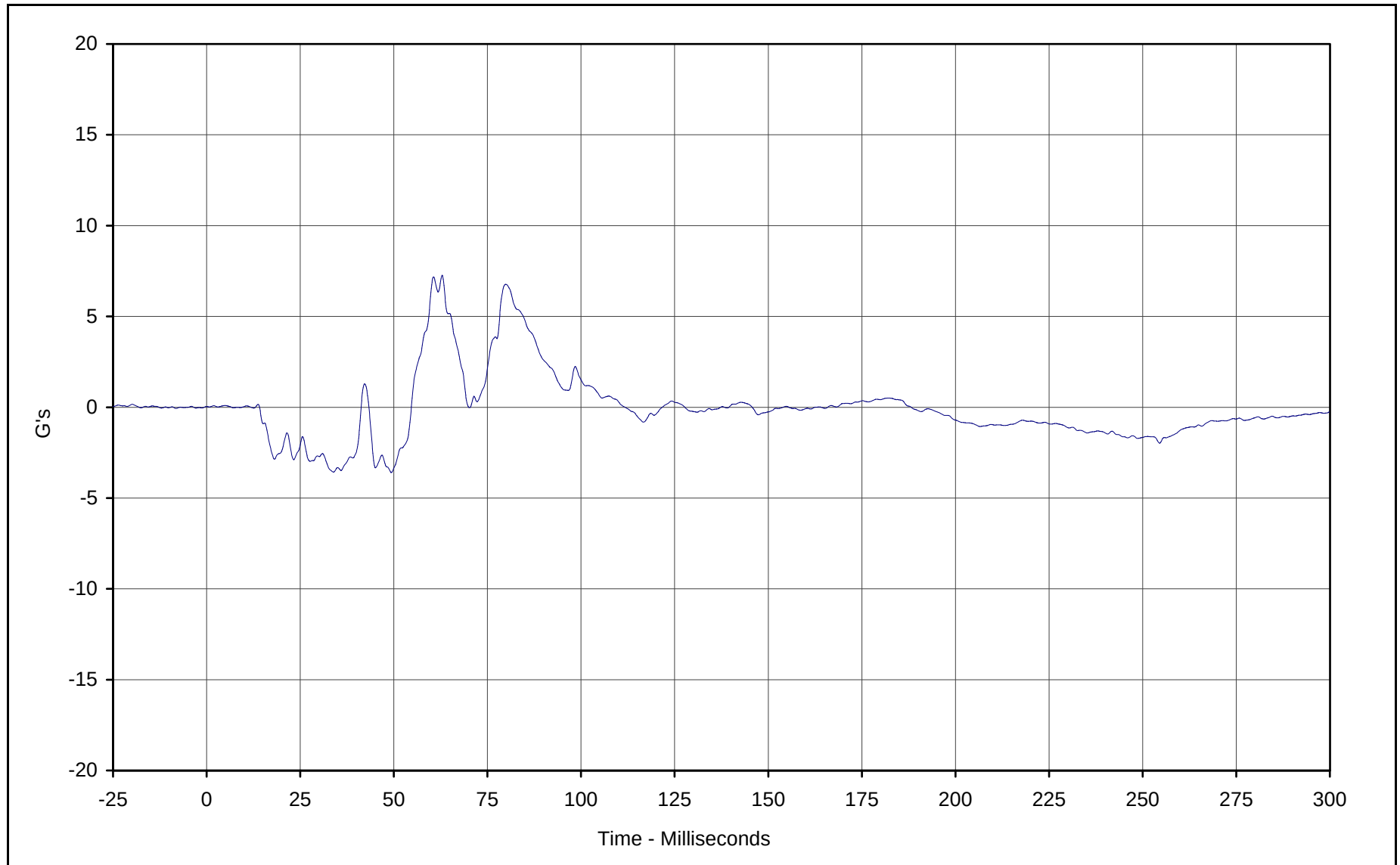


Curve Description: Driver Chest Redundant X Displ.
Maximum Value: 87.8 at 77.3 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-016

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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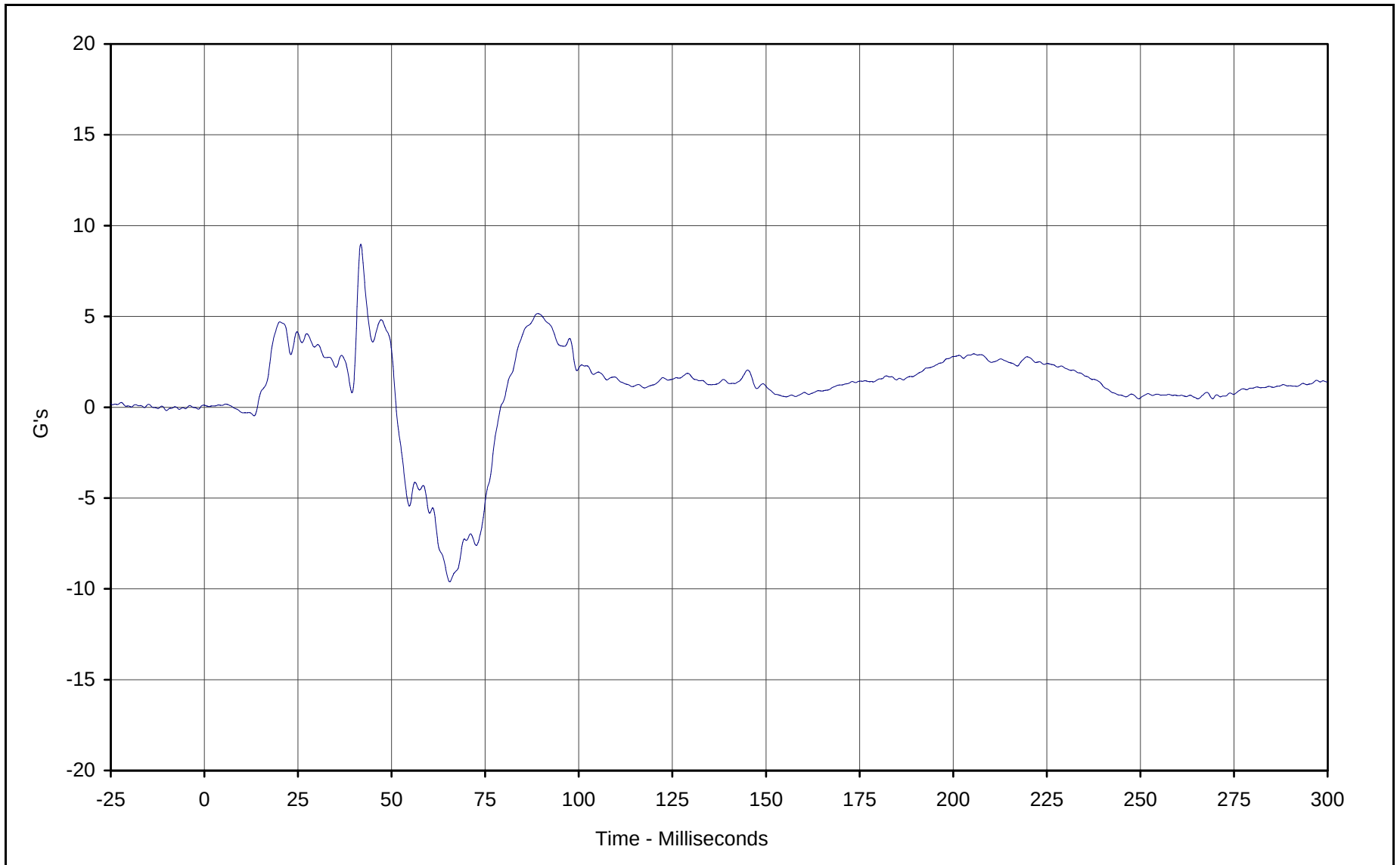


Curve Description: Driver Chest Redundant Y
Maximum Value: 7.3 at 62.9 Milliseconds
Minimum Value: -3.6 at 49.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-017

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

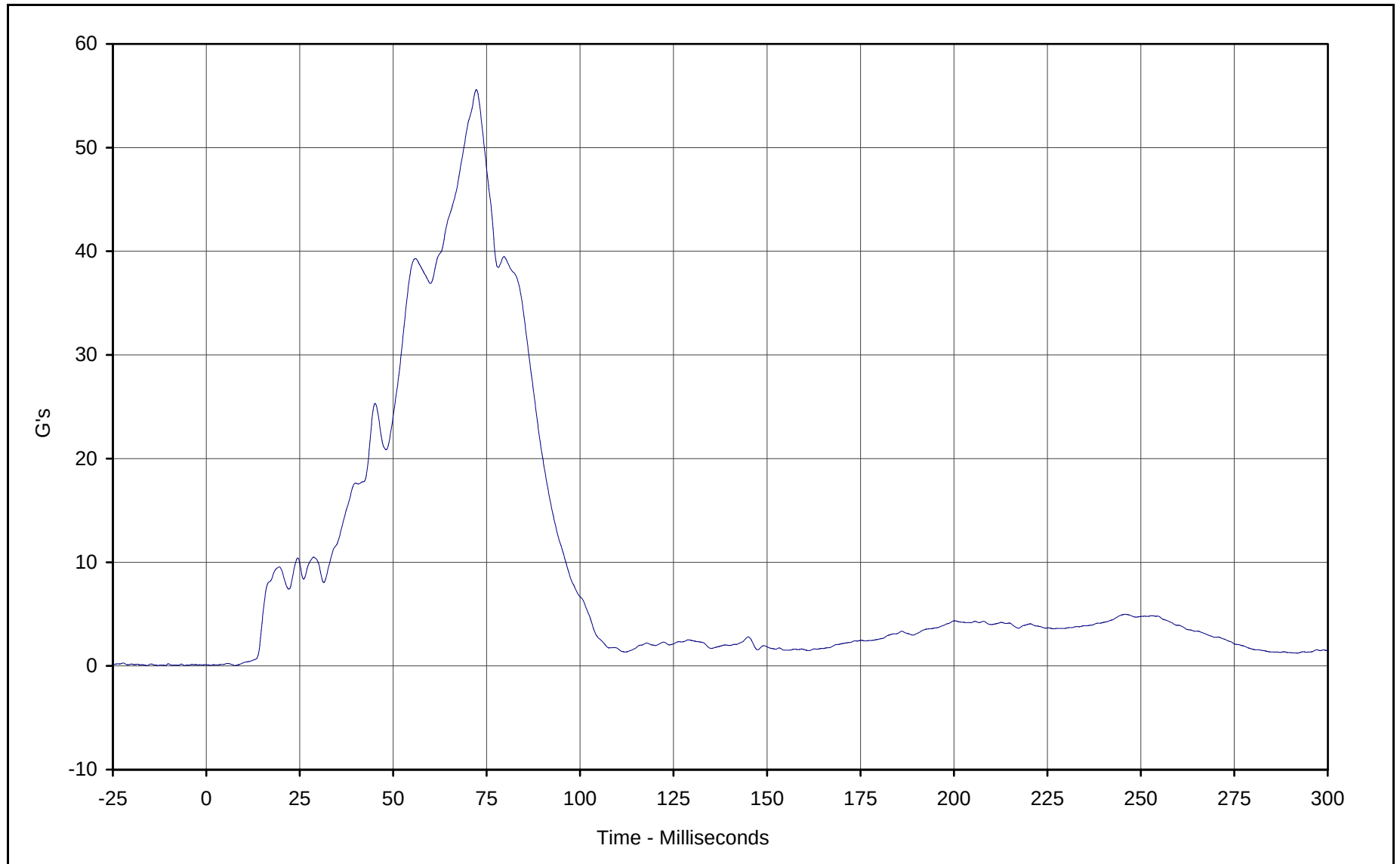


Curve Description: Driver Chest Redundant Z
Maximum Value: 9.0 at 41.8 Milliseconds
Minimum Value: -9.6 at 65.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-018

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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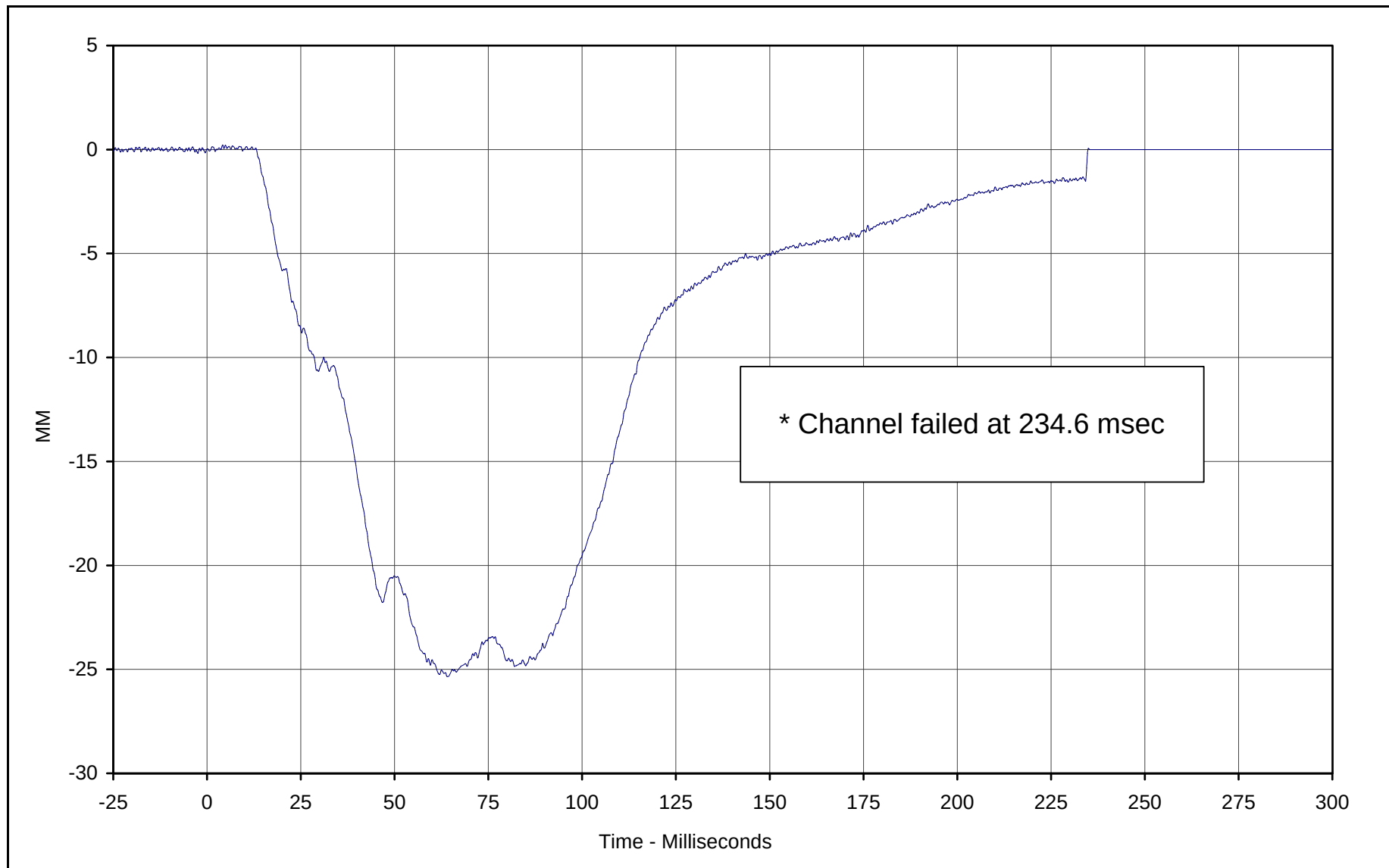


Curve Description: Driver Chest Resultant Redundant
Maximum Value: 55.6 at 72.2 Milliseconds
Minimum Value: 0.0 at 7.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: RES-016

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Driver Chest Displacement X *

Maximum Value: 0.2 at 4.2 Milliseconds

Minimum Value: -25.4 at 64.0 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

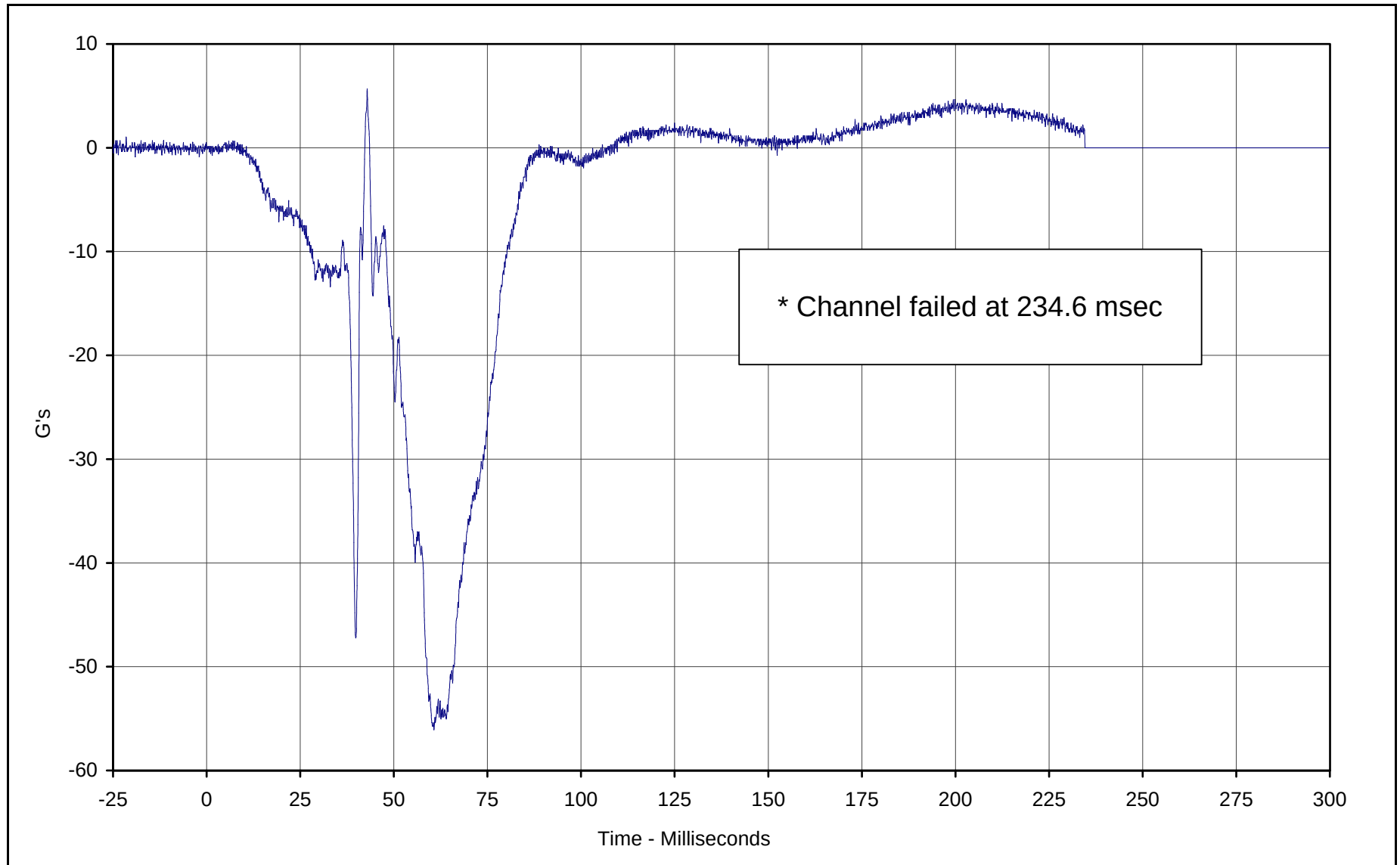
Curve Number: FIL-019

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec





Curve Description: Driver Pelvis X *

Maximum Value: 5.7 at 42.9 Milliseconds

Minimum Value: -56.1 at 60.7 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

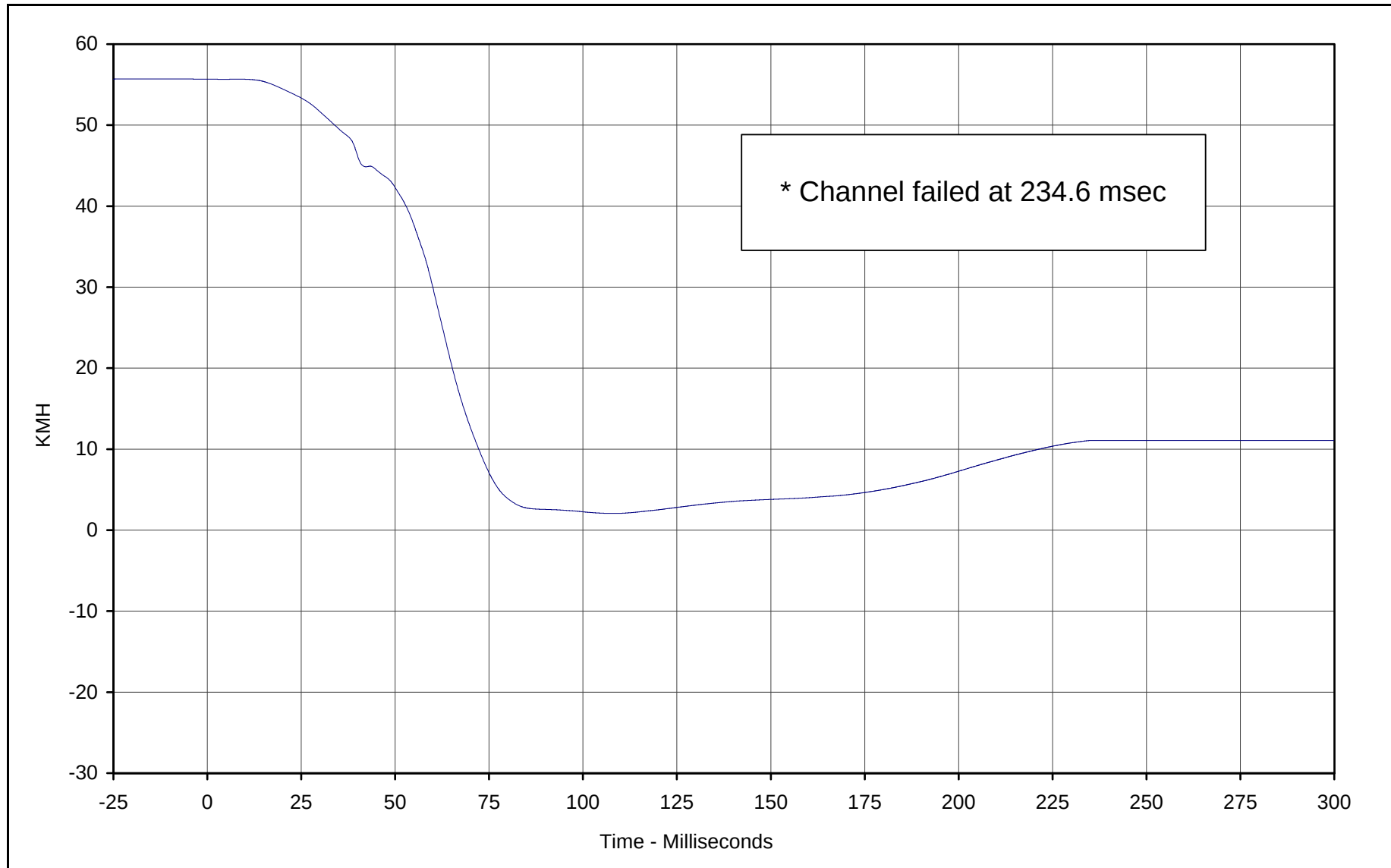
Curve Number: FIL-020

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec





Curve Description: Driver Pelvis X Velocity *

Maximum Value: 55.7 at 0.2 Milliseconds

Minimum Value: 2.1 at 108.6 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

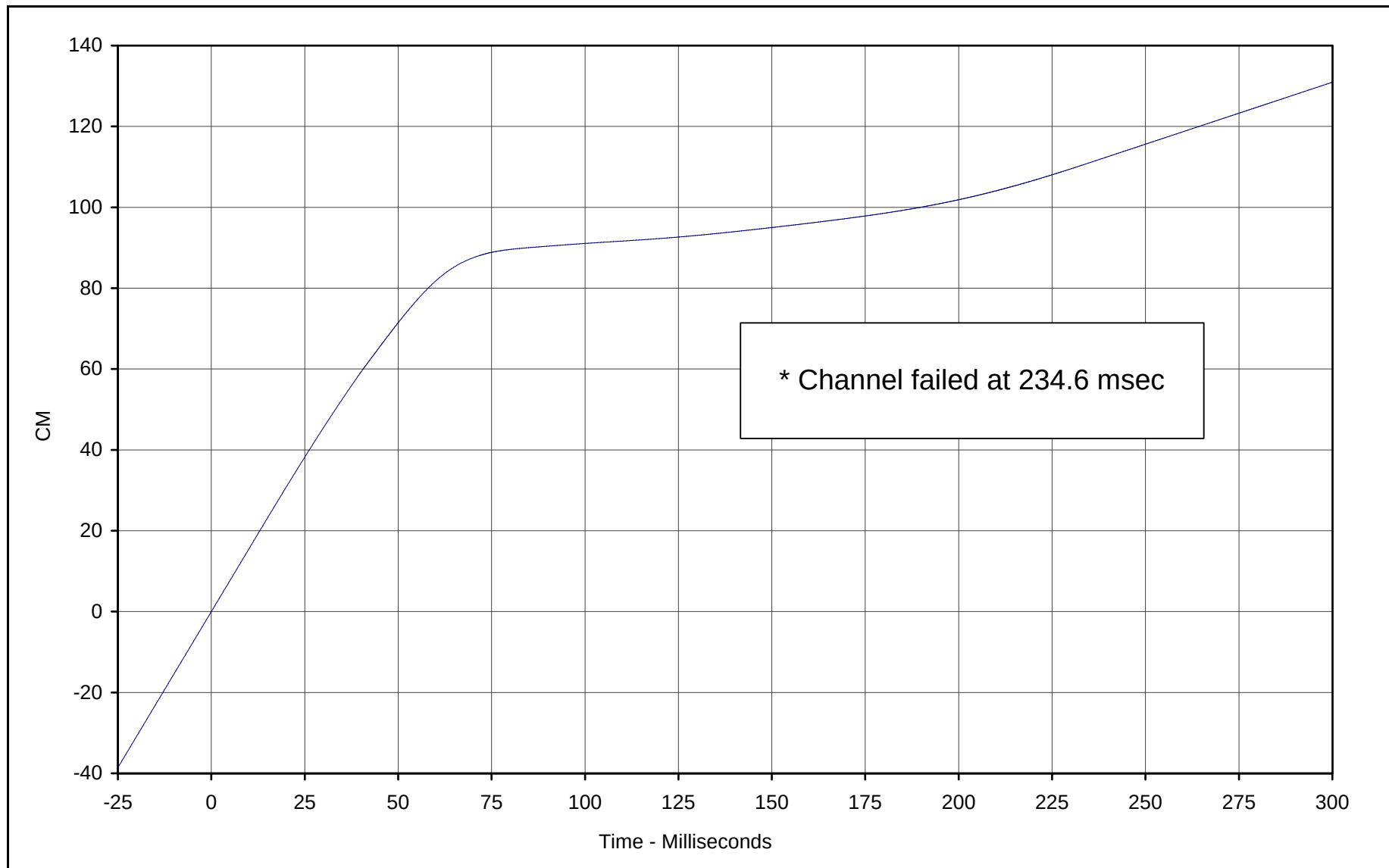
Curve Number: IN1-020

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec





Curve Description: Driver Pelvis X Displ. *

Maximum Value: 130.9 at 299.9 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

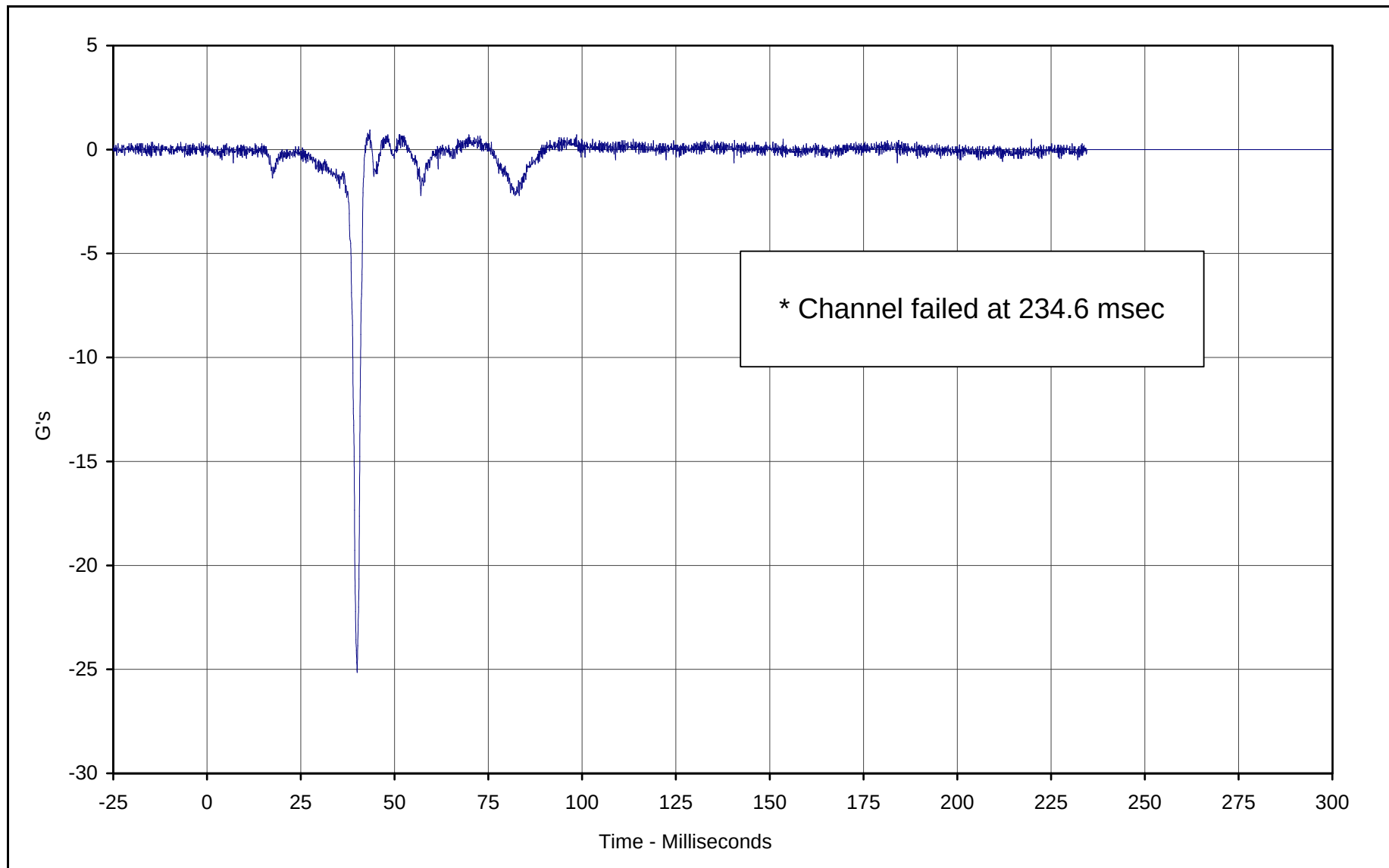
Curve Number: IN2-020

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec





Curve Description: Driver Pelvis Y *

Maximum Value: 0.9 at 43.4 Milliseconds

Minimum Value: -25.2 at 40.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

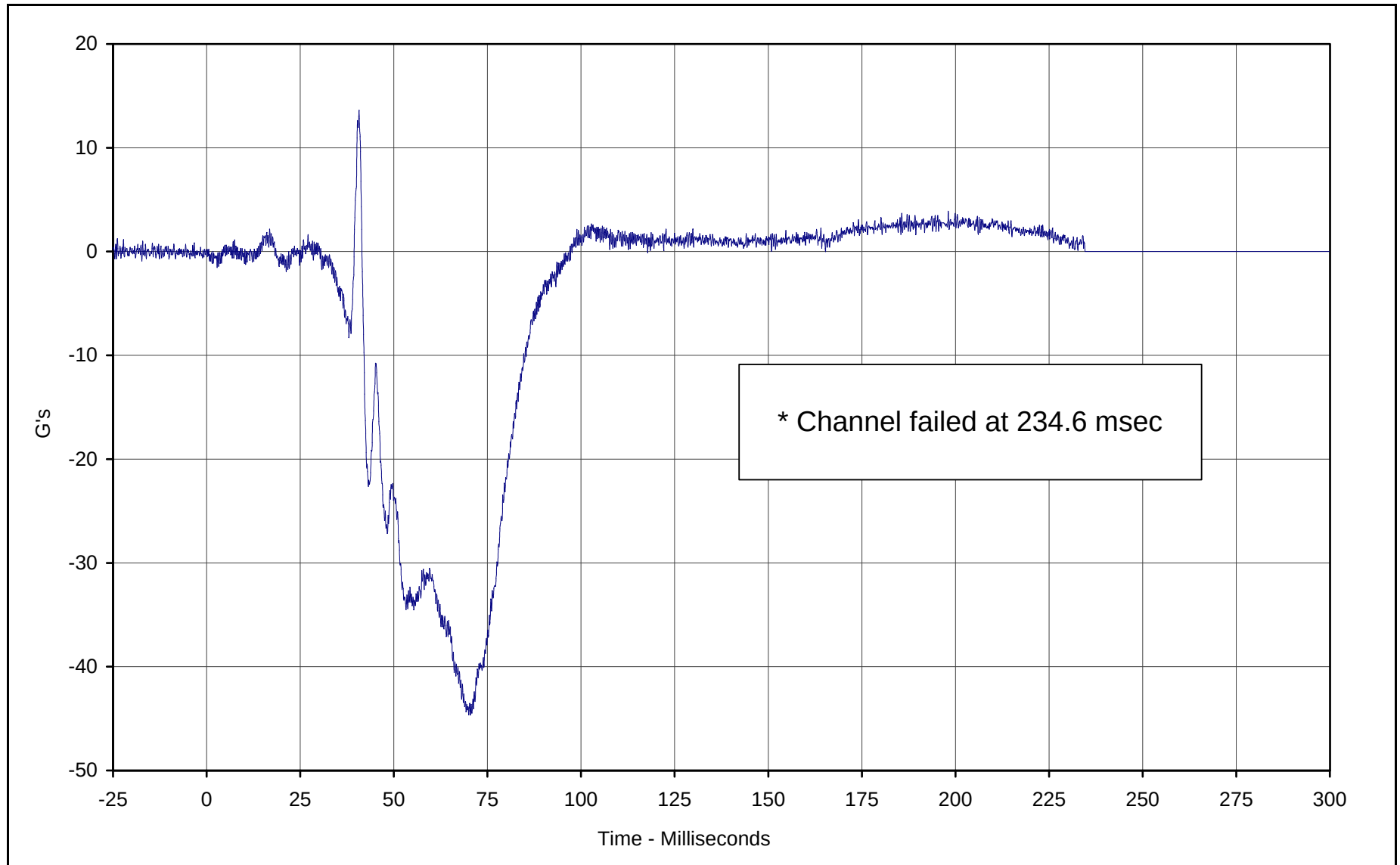
Curve Number: FIL-021

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec





Curve Description: Driver Pelvis Z *

Maximum Value: 13.6 at 40.7 Milliseconds

Minimum Value: -44.7 at 70.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

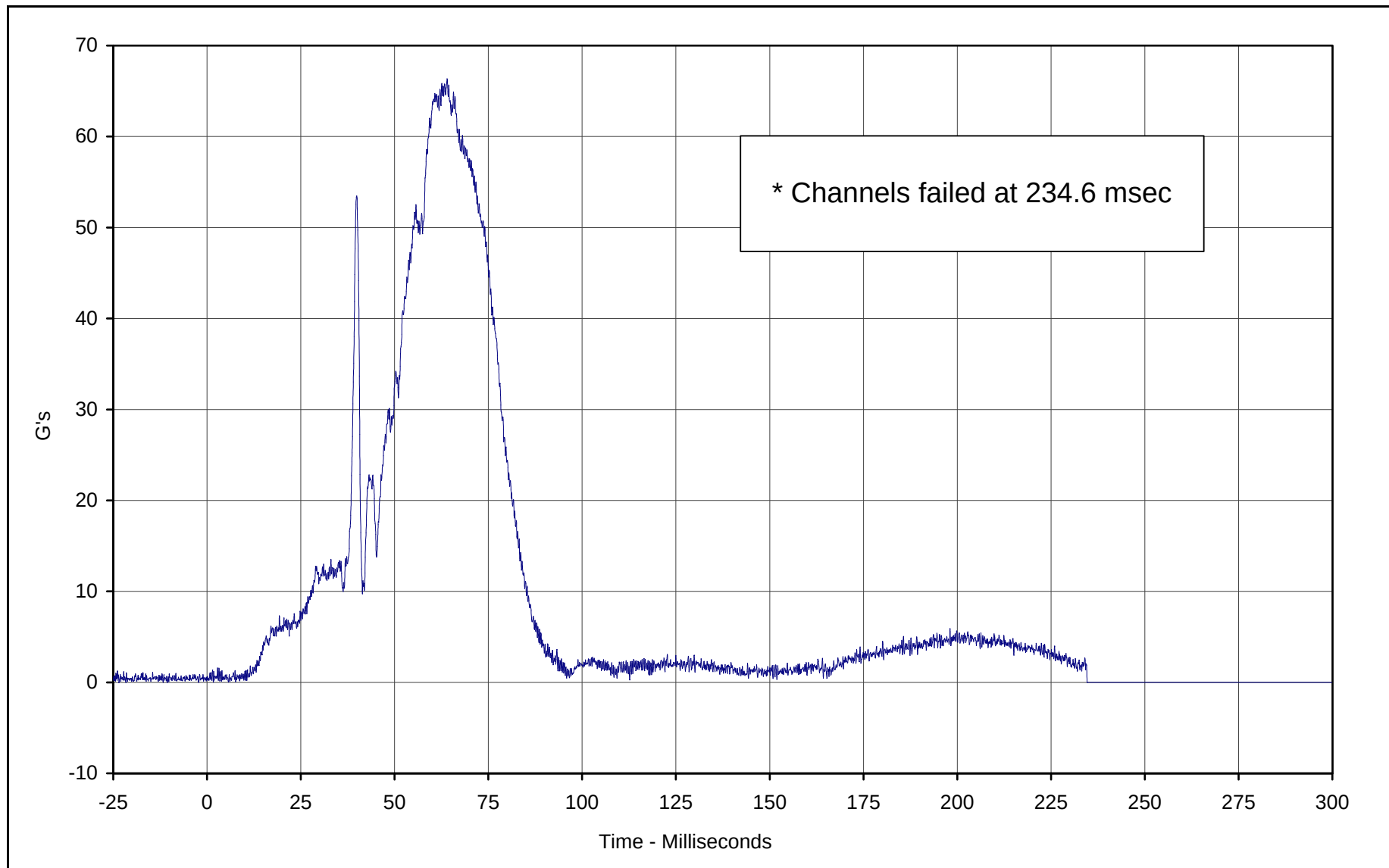
Curve Number: FIL-022

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec





Curve Description: Driver Pelvis Resultant *

Maximum Value: 66.4 at 64.0 Milliseconds

Minimum Value: 0.0 at 234.6 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

Curve Number: RES-020

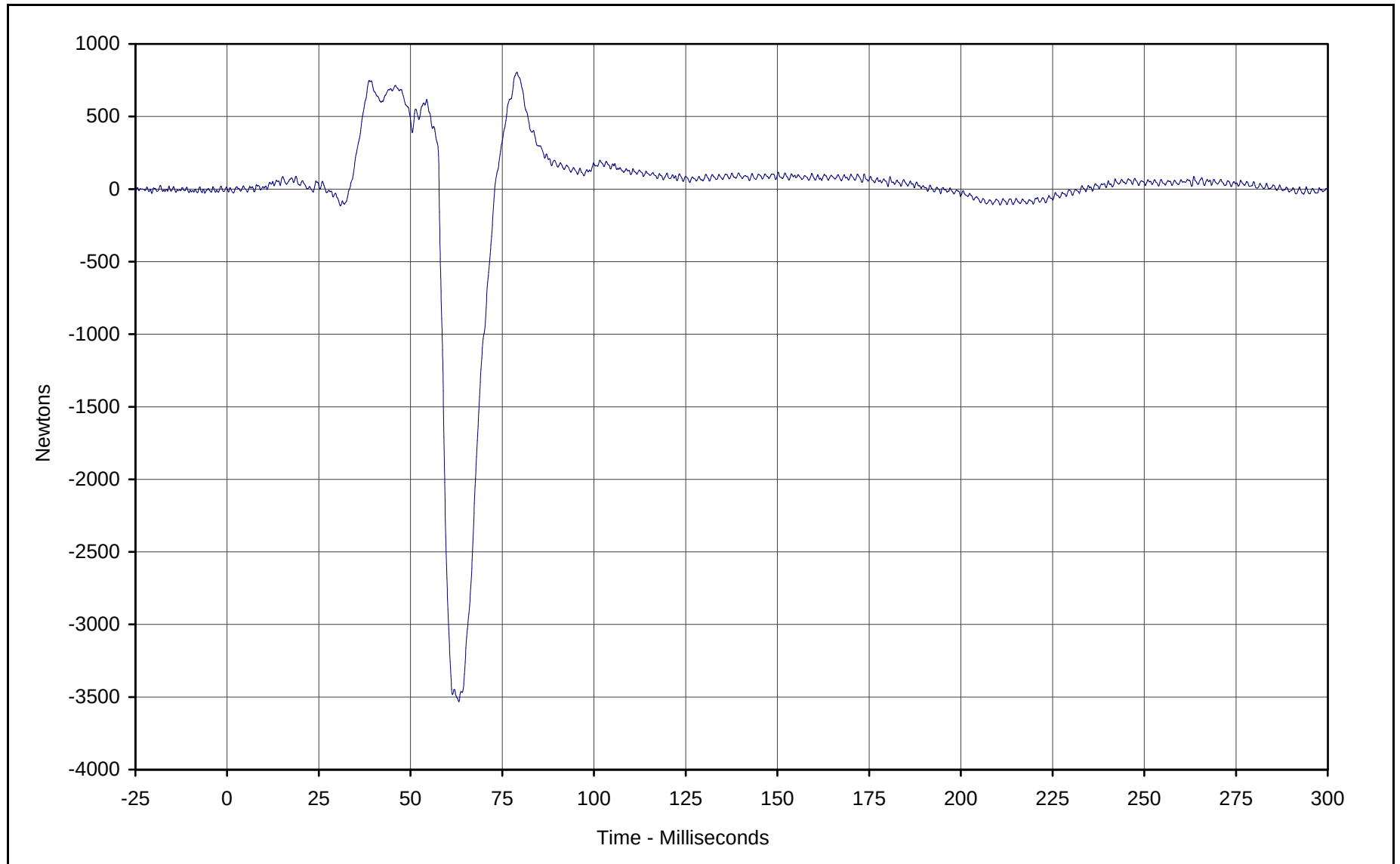
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channels failed at 234.6 msec



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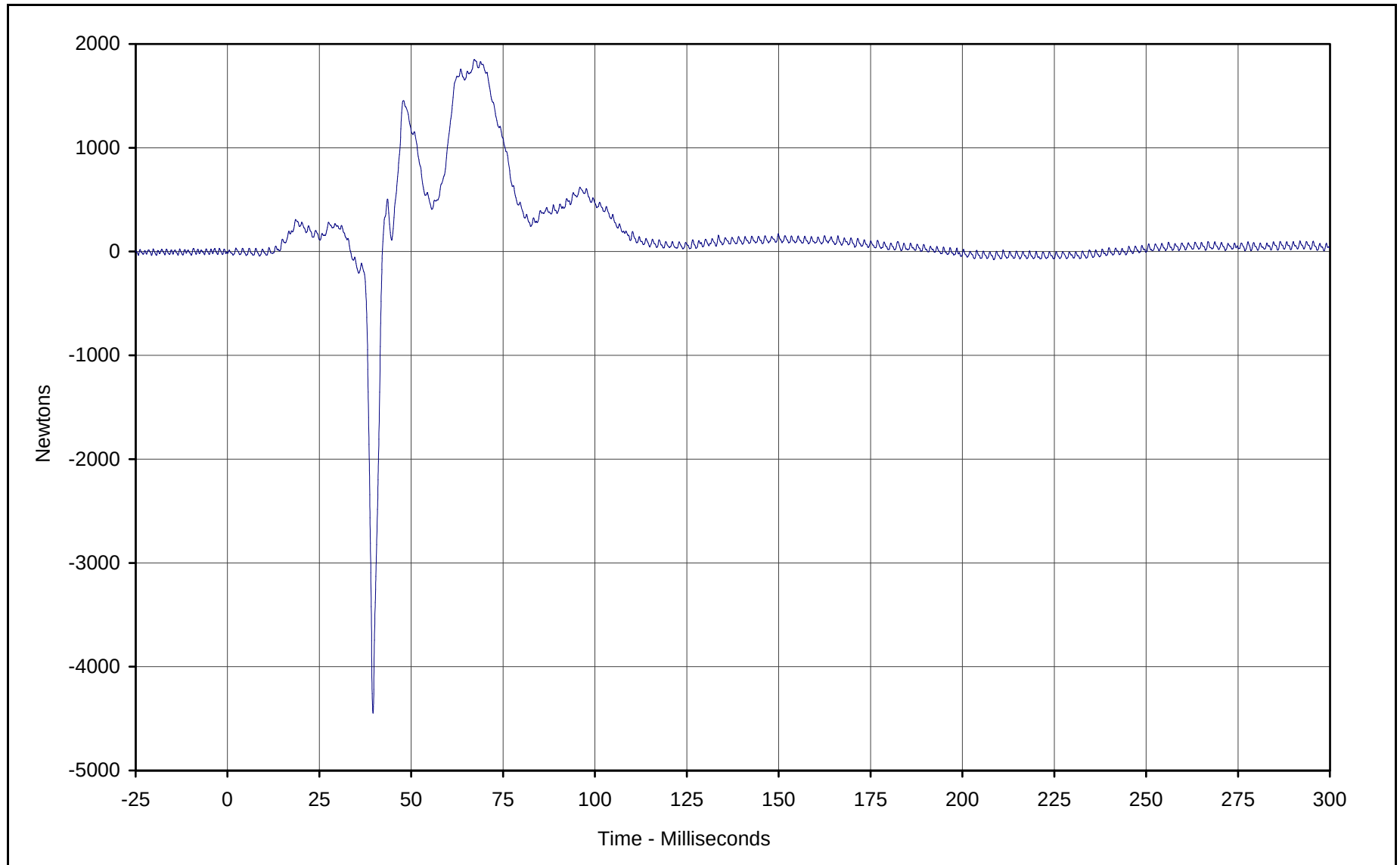
Curve Description: Driver Left Femur Force
Maximum Value: 805.6 at 79.0 Milliseconds
Minimum Value: -3532.2 at 63.2 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-023

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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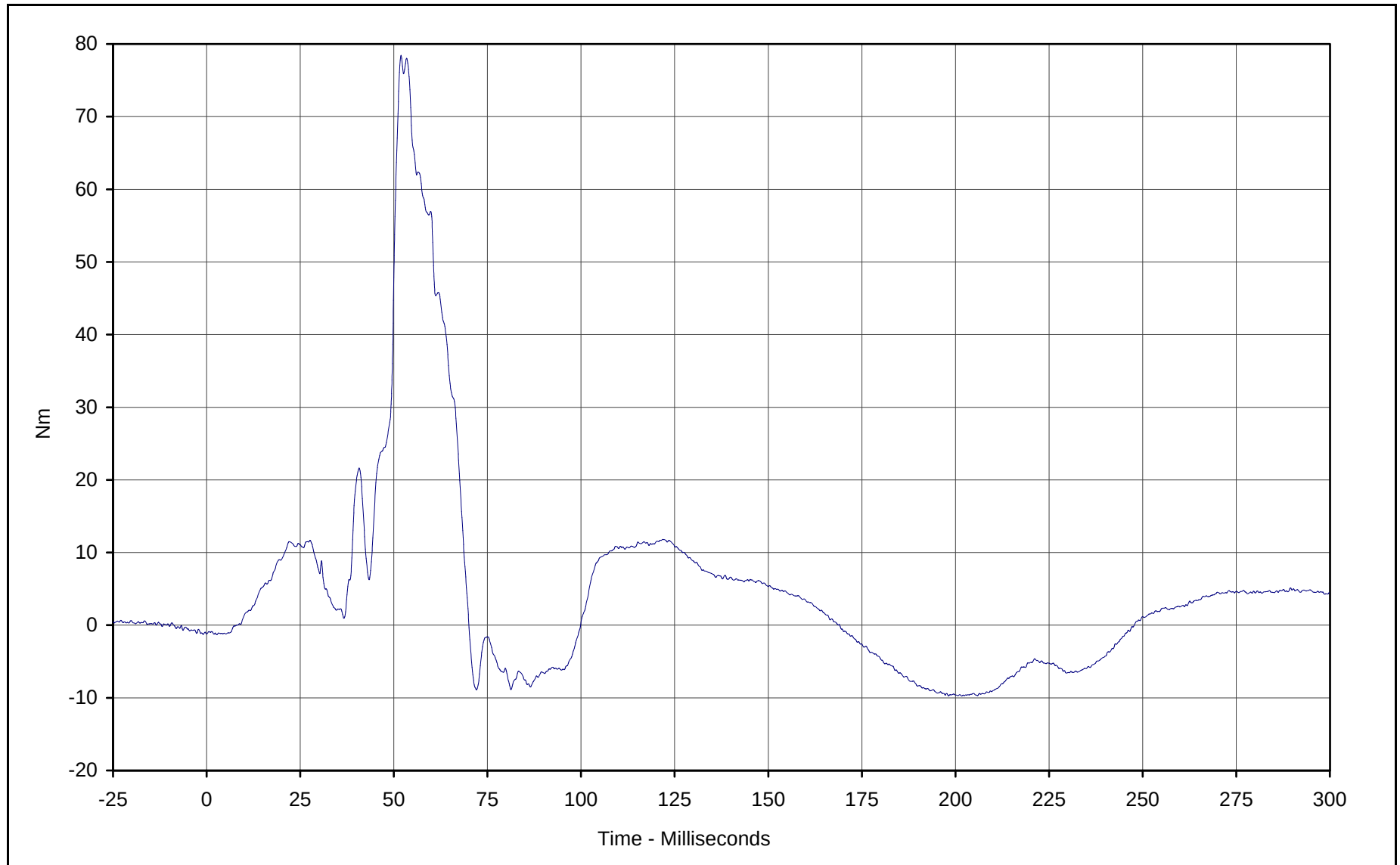


Curve Description: Driver Right Femur Force
Maximum Value: 1850.2 at 67.2 Milliseconds
Minimum Value: -4447.9 at 39.6 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-024

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

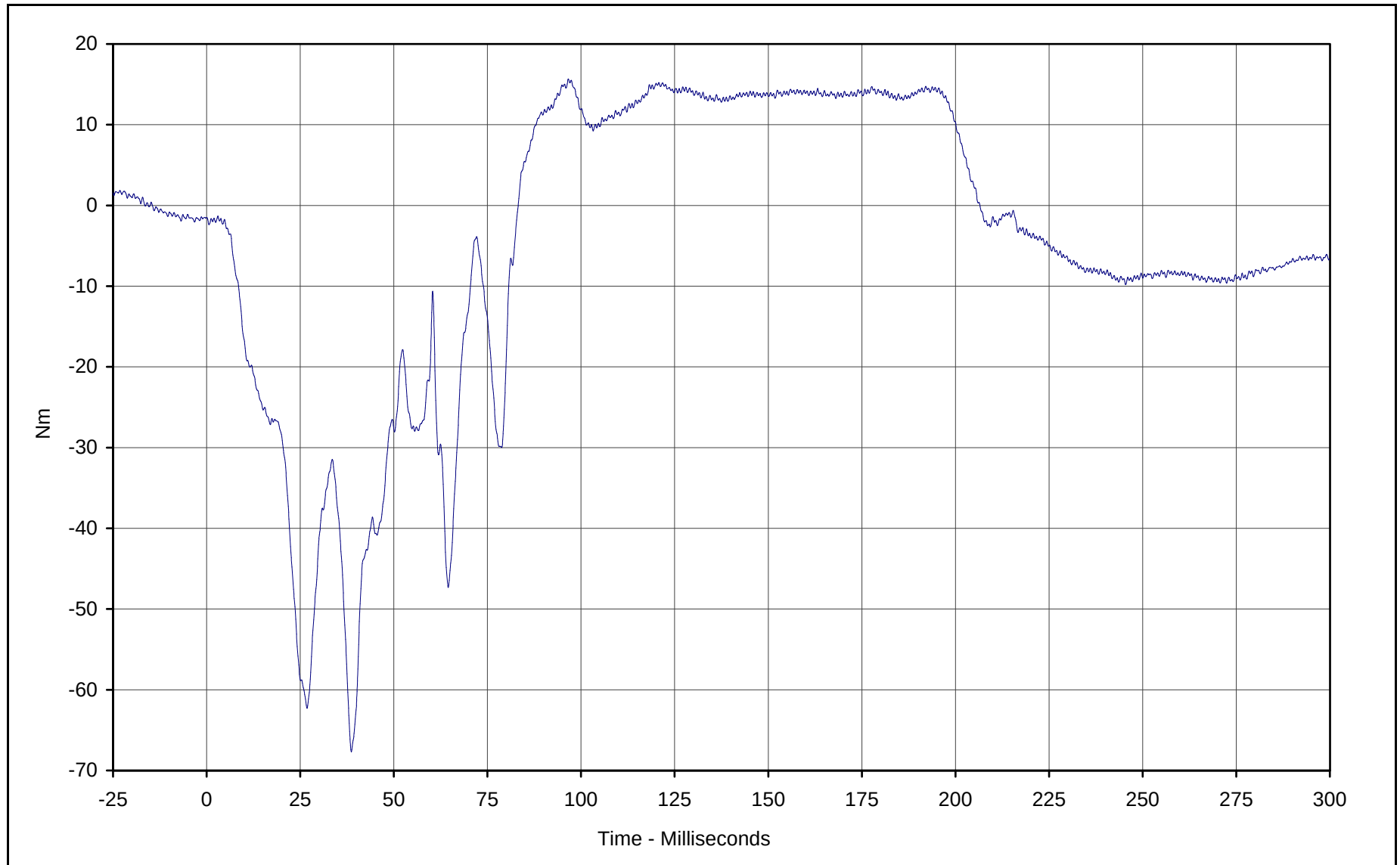


Curve Description: Driver Left Upper Tibia Moment X
Maximum Value: 78.4 at 51.9 Milliseconds
Minimum Value: -9.7 at 201.7 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-025

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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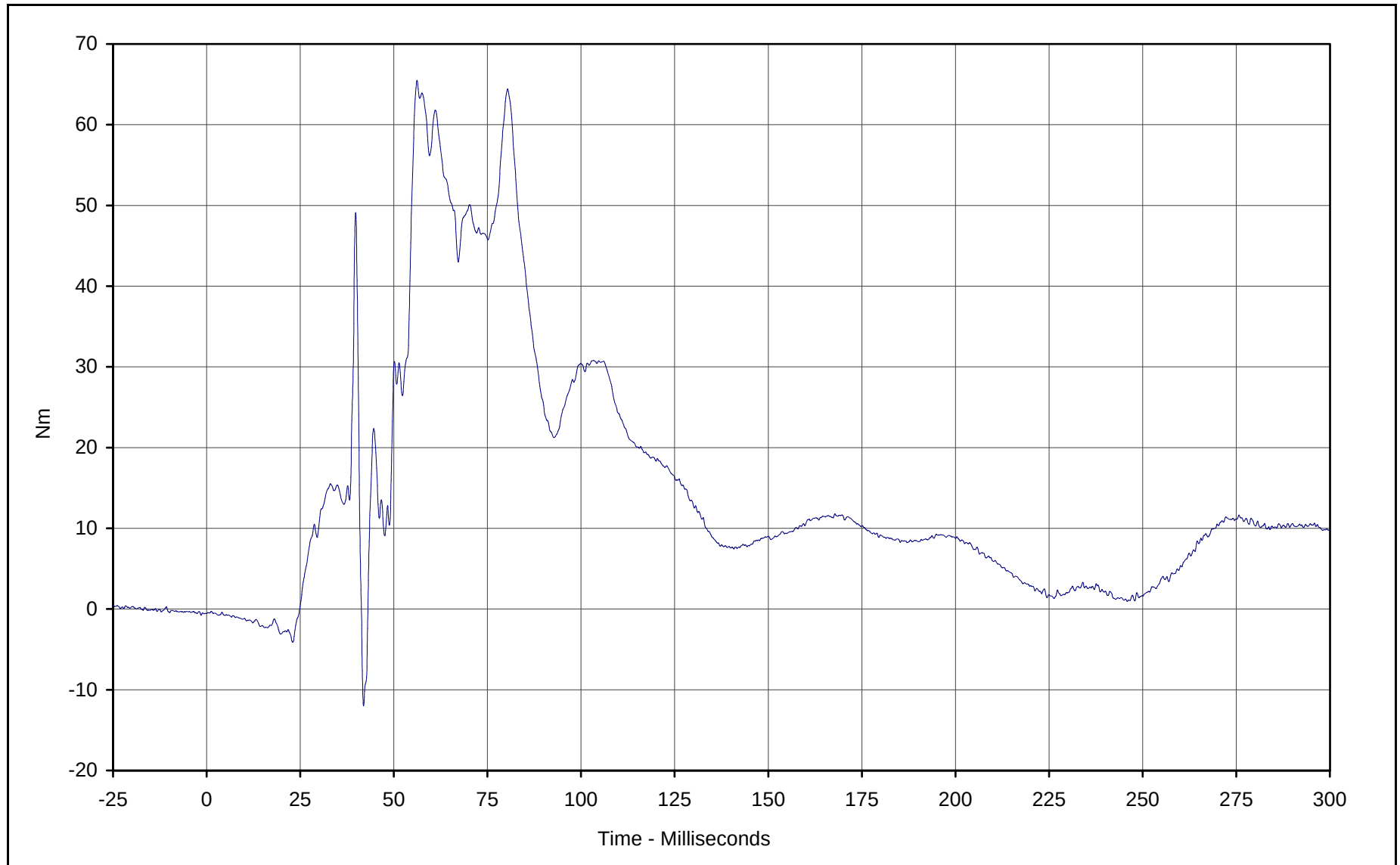


Curve Description: Driver Left Upper Tibia Moment Y
Maximum Value: 15.7 at 96.6 Milliseconds
Minimum Value: -67.7 at 38.6 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-026

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

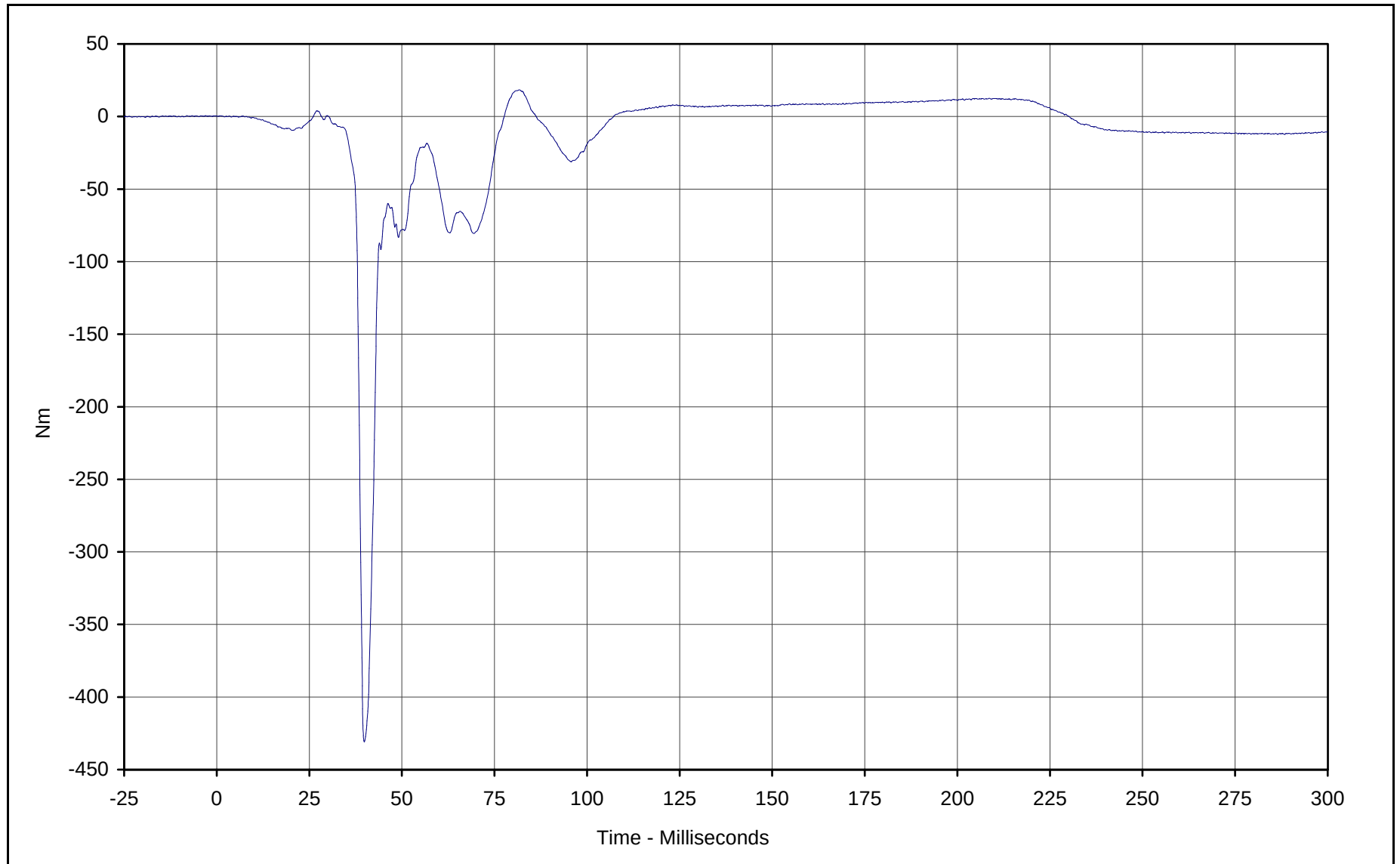


Curve Description: Driver Right Upper Tibia Moment X
Maximum Value: 65.5 at 56.2 Milliseconds
Minimum Value: -12.0 at 41.9 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-027

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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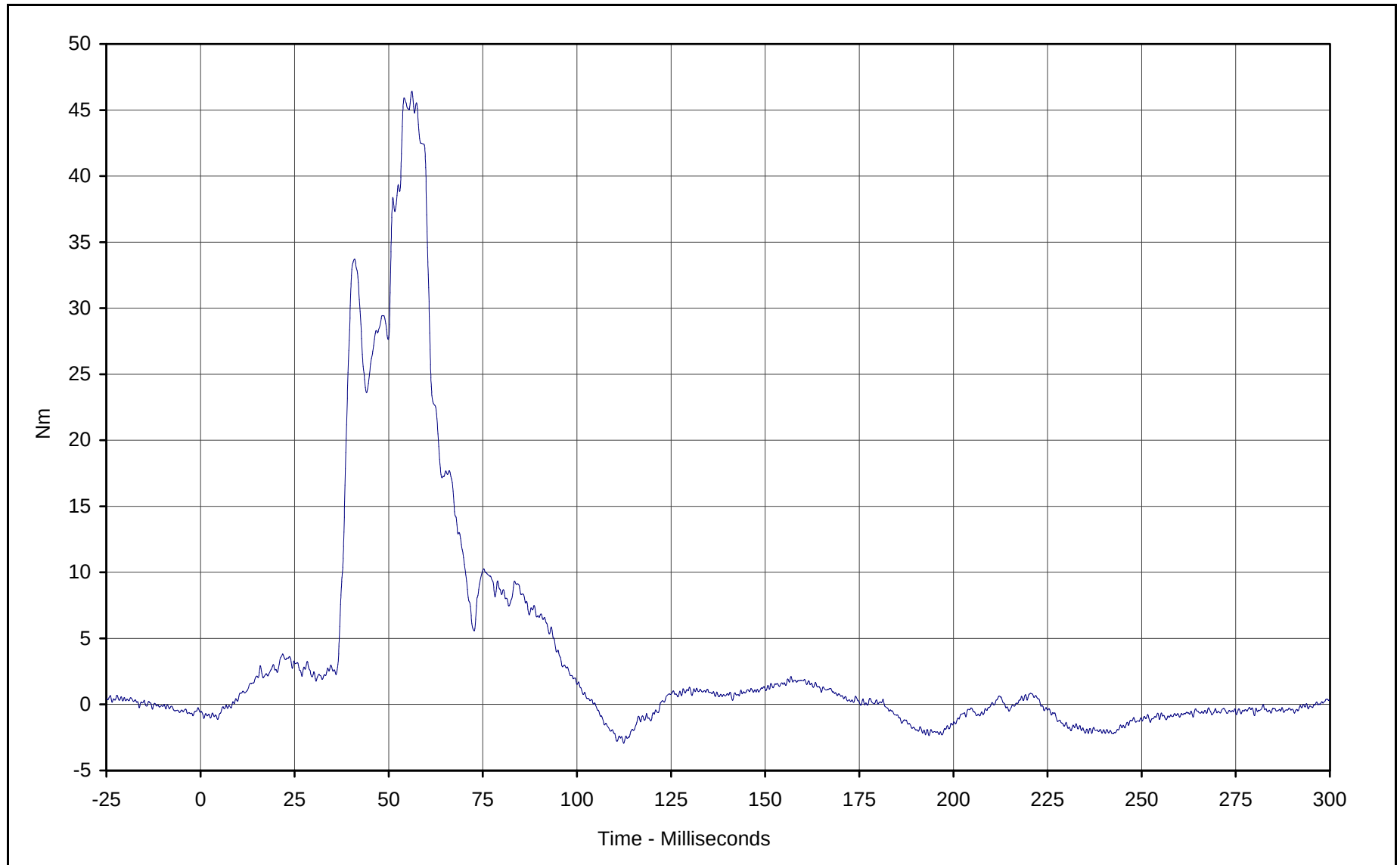


Curve Description: Driver Right Upper Tibia Moment Y
Maximum Value: 18.3 at 81.7 Milliseconds
Minimum Value: -430.8 at 39.8 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-028

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

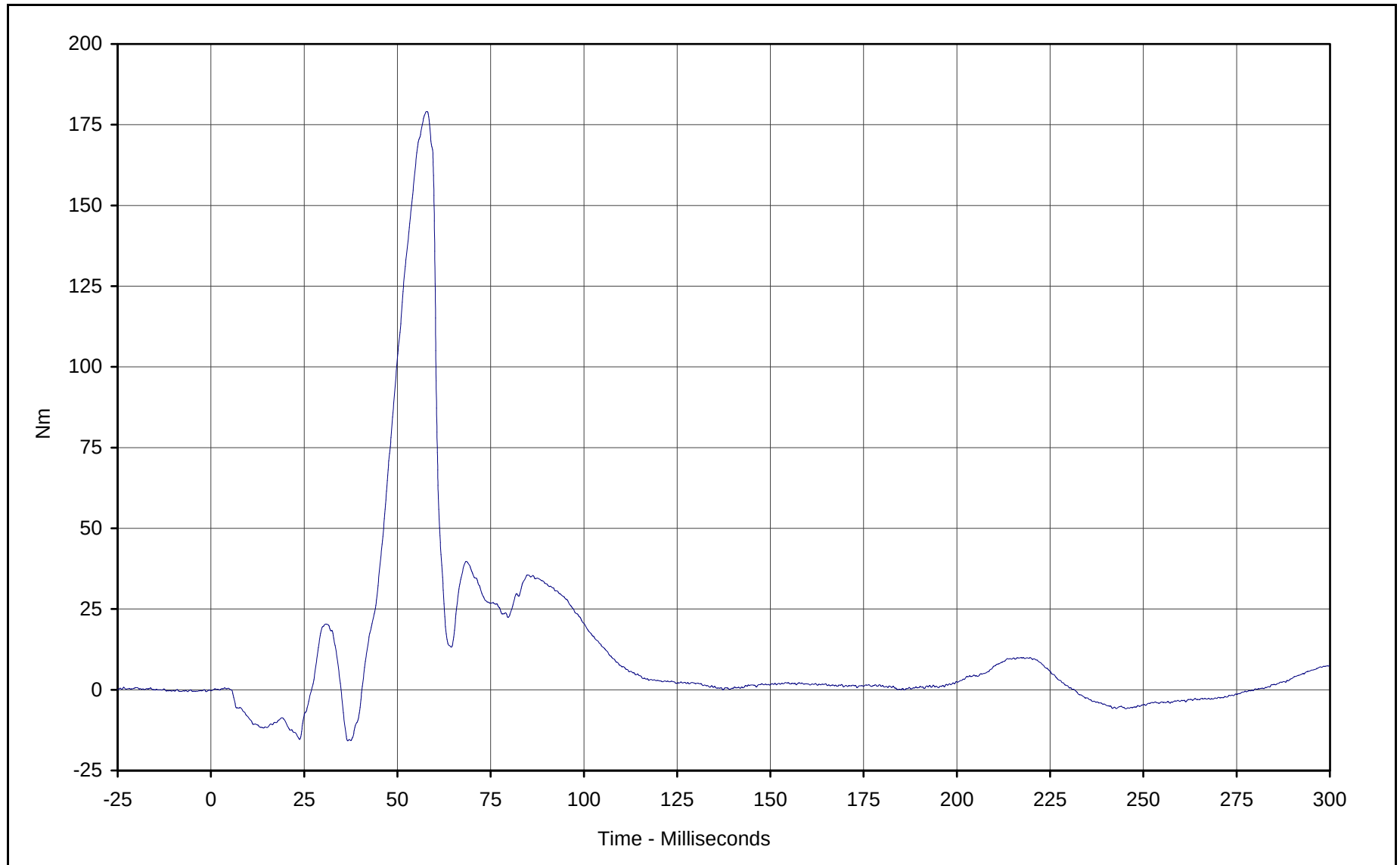


Curve Description: Driver Left Lower Tibia Moment X
Maximum Value: 46.4 at 56.1 Milliseconds
Minimum Value: -2.9 at 112.4 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-029

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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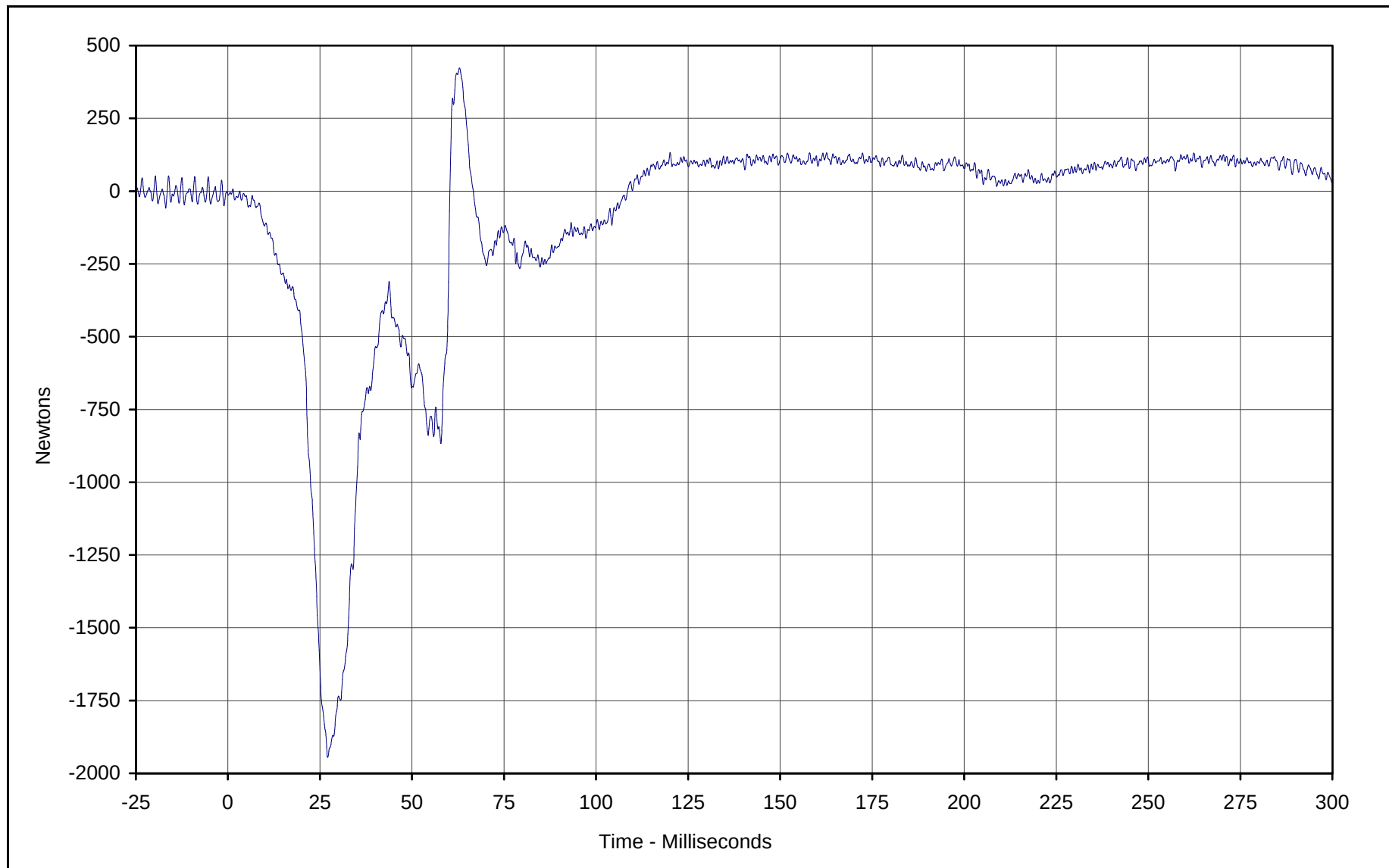


Curve Description: Driver Left Lower Tibia Moment Y
Maximum Value: 179.1 at 57.8 Milliseconds
Minimum Value: -15.8 at 36.7 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-030

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



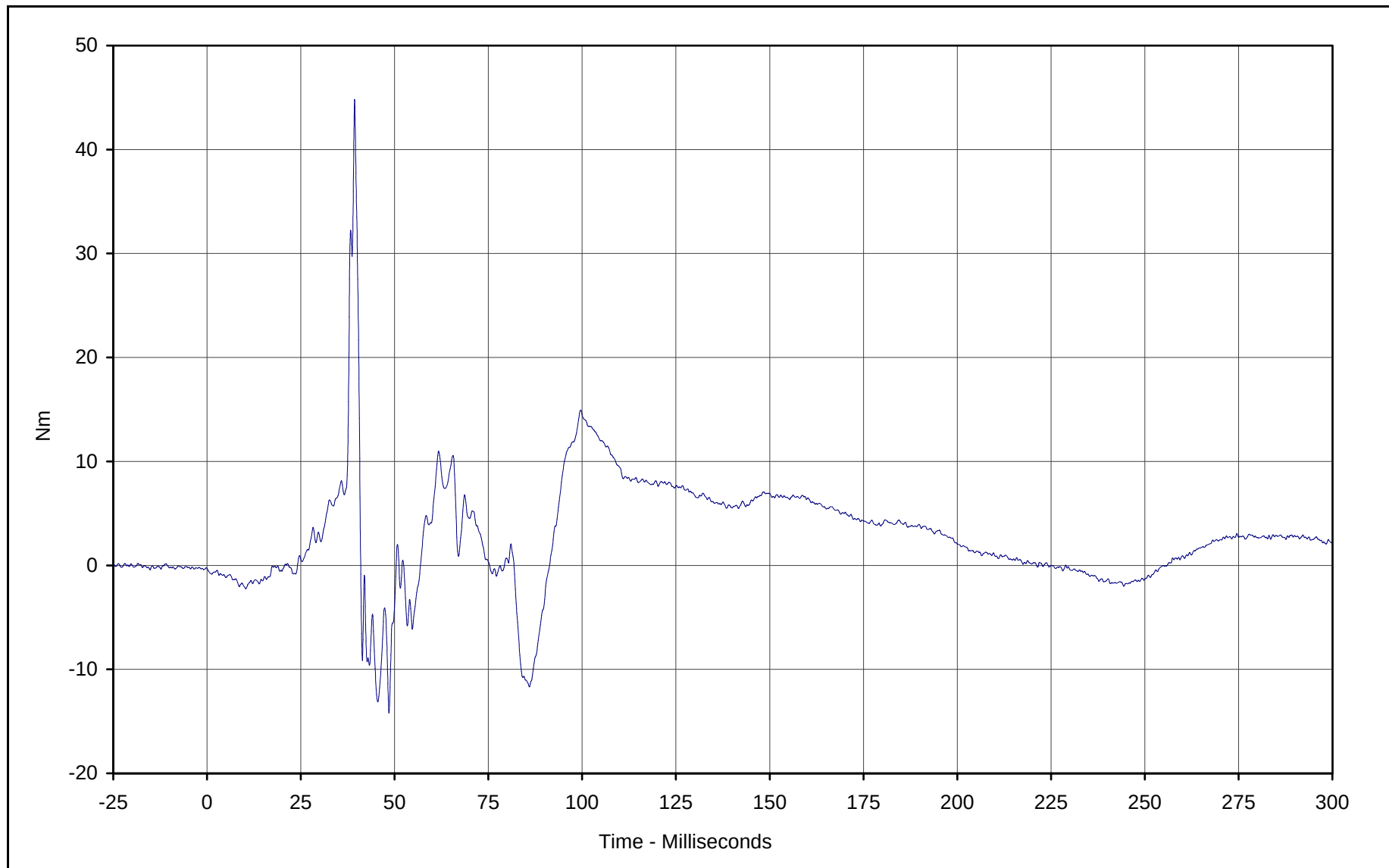
KAR21129-01



Curve Description: Driver Left Lower Tibia Force Z
Maximum Value: 423.1 at 62.9 Milliseconds
Minimum Value: -1945.5 at 27.1 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-031

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



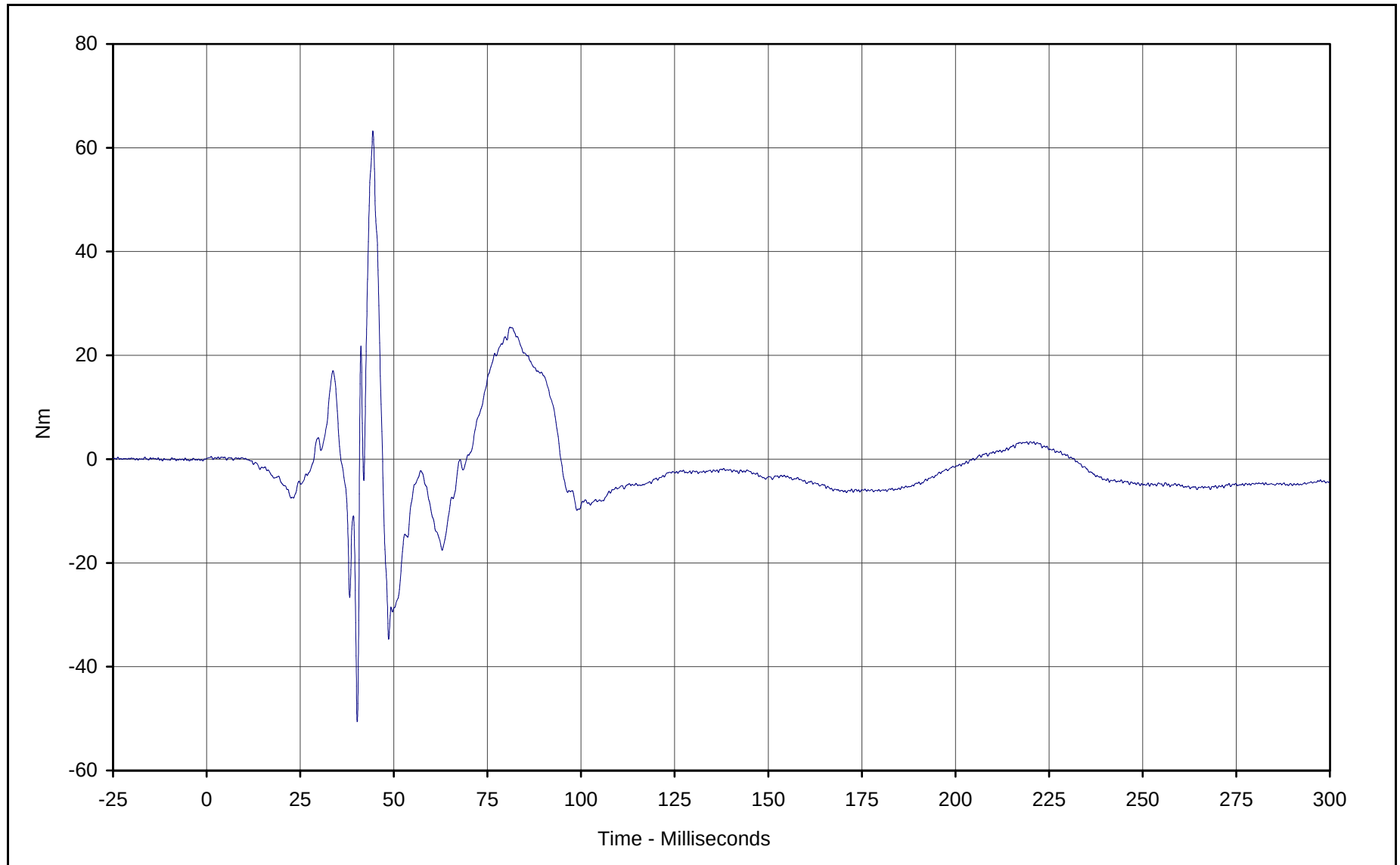


Curve Description: Driver Right Lower Tibia Moment X
Maximum Value: 44.8 at 39.3 Milliseconds
Minimum Value: -14.2 at 48.5 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-032

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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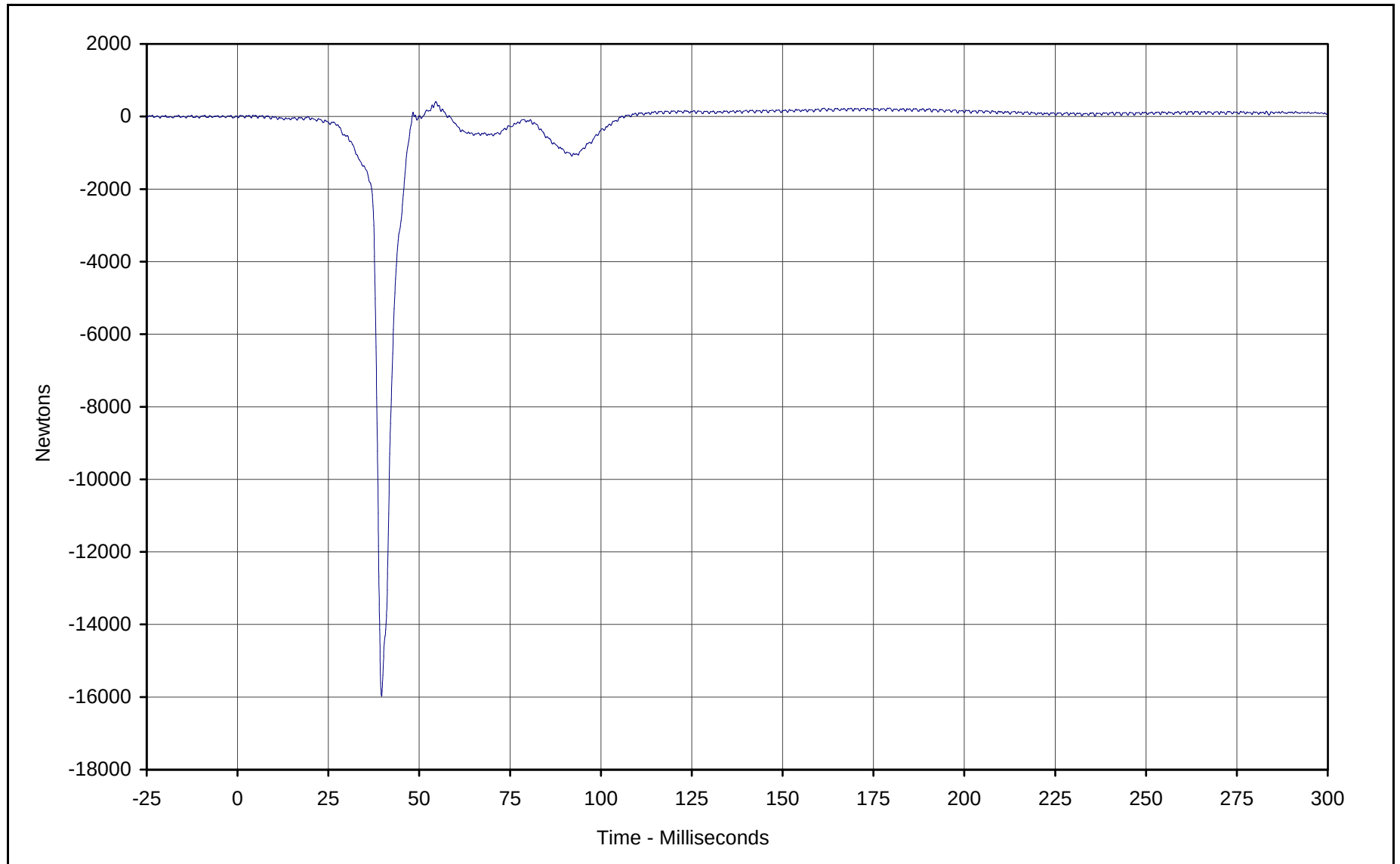
Curve Description: Driver Right Lower Tibia Moment Y
Maximum Value: 63.2 at 44.4 Milliseconds
Minimum Value: -50.6 at 40.2 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-033

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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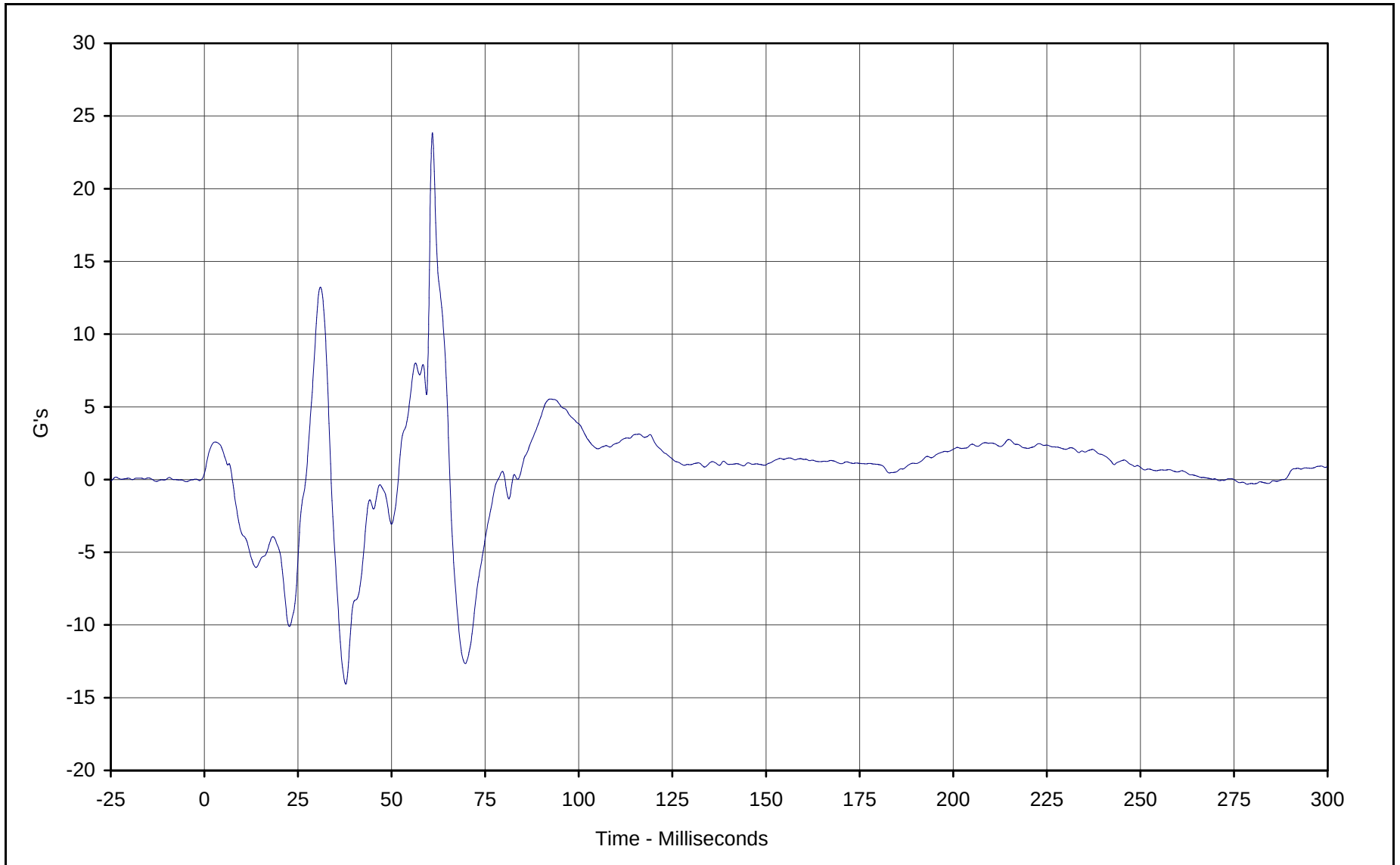
Curve Description: Driver Right Lower Tibia Force Z
Maximum Value: 413.1 at 54.6 Milliseconds
Minimum Value: -15979.9 at 39.6 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-034

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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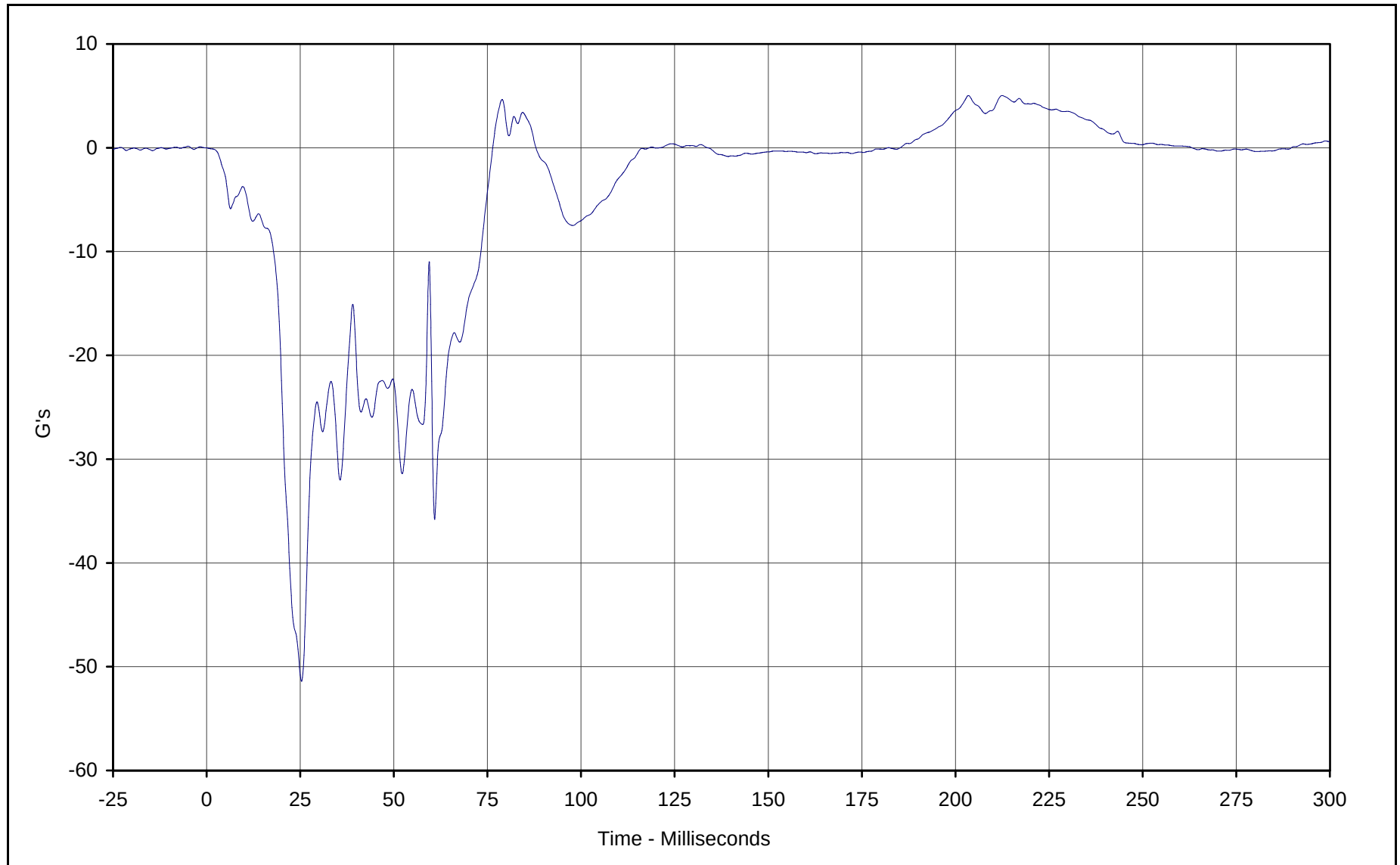


Curve Description: Driver Left Foot Aft X
Maximum Value: 23.9 at 60.9 Milliseconds
Minimum Value: -14.1 at 37.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-035

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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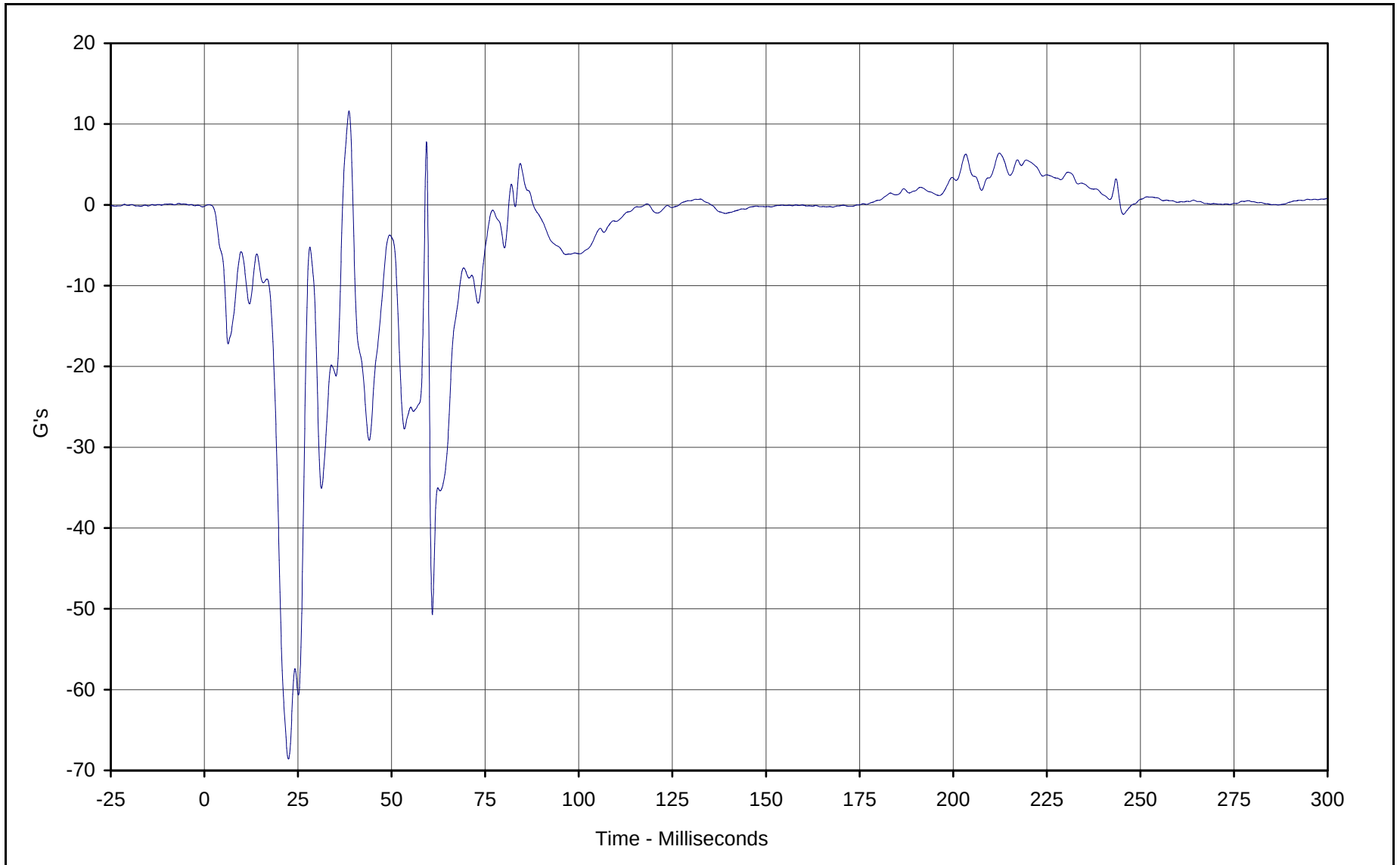


Curve Description: Driver Left Foot Aft Z
Maximum Value: 5.0 at 203.5 Milliseconds
Minimum Value: -51.4 at 25.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-036

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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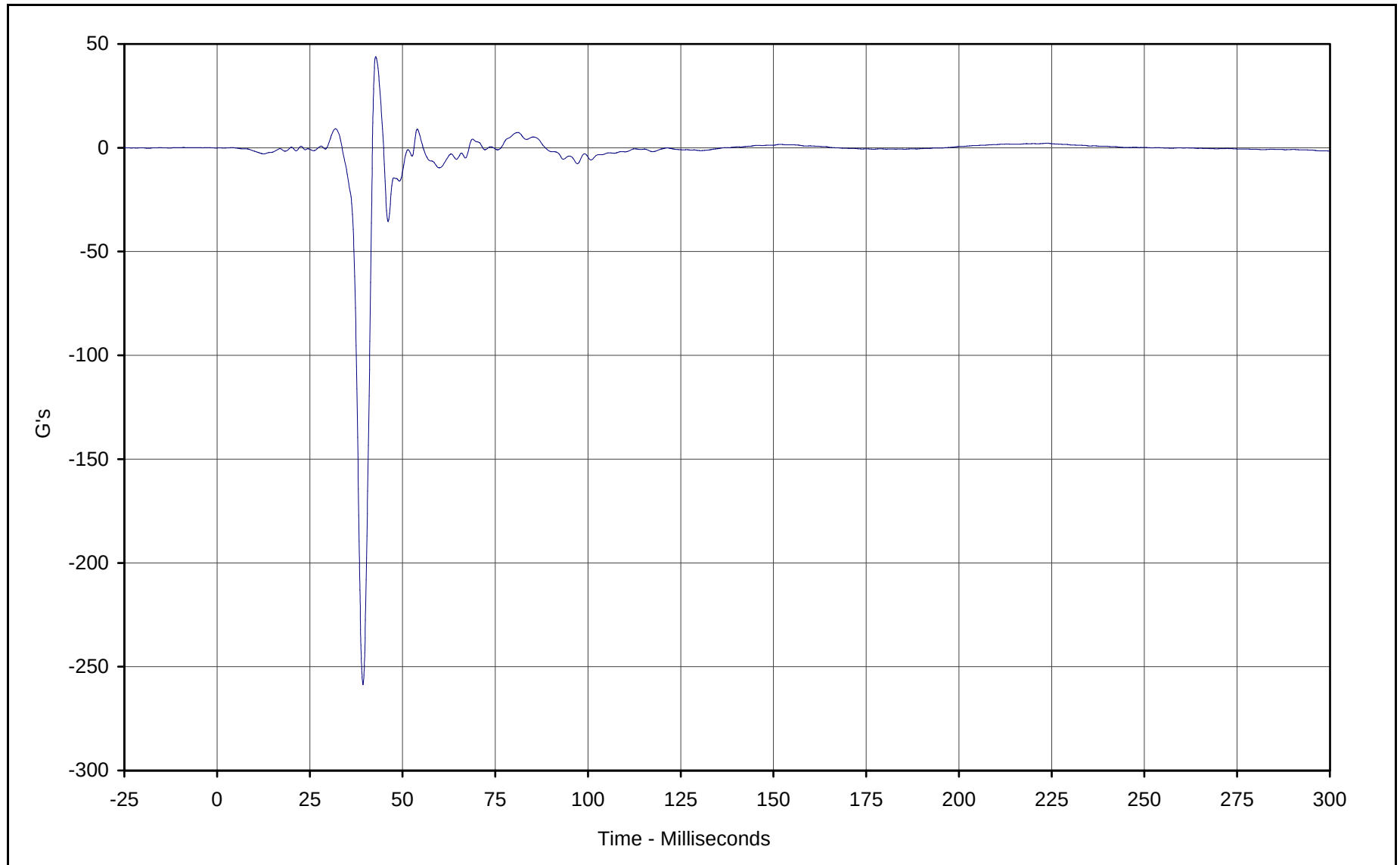
Curve Description: Driver Left Foot Fore Z
Maximum Value: 11.6 at 38.6 Milliseconds
Minimum Value: -68.6 at 22.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-037

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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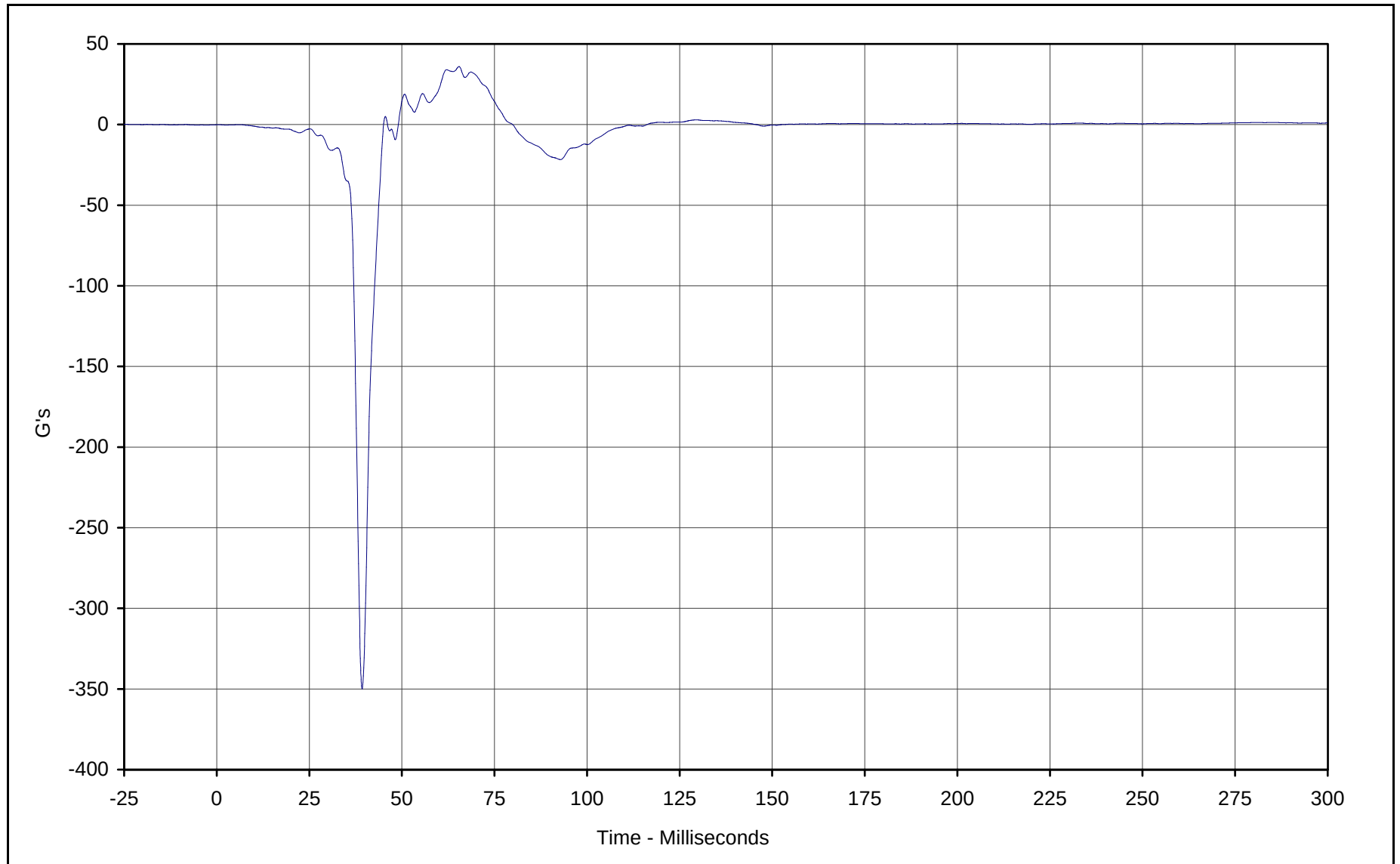
Curve Description: Driver Right Foot Aft X
Maximum Value: 43.9 at 42.8 Milliseconds
Minimum Value: -258.8 at 39.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-038

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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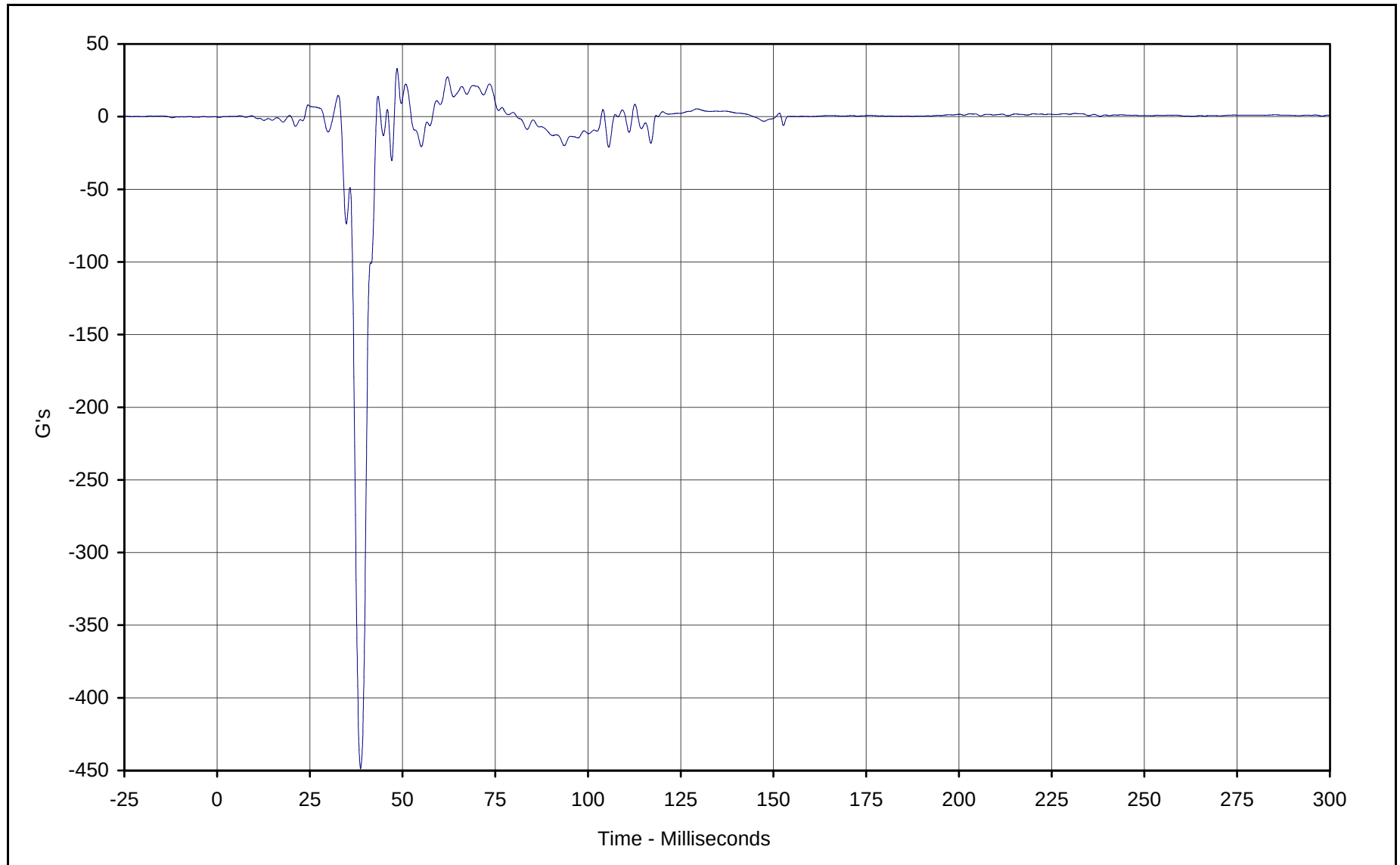


Curve Description: Driver Right Foot Aft Z
Maximum Value: 36.0 at 65.4 Milliseconds
Minimum Value: -349.9 at 39.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-039

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

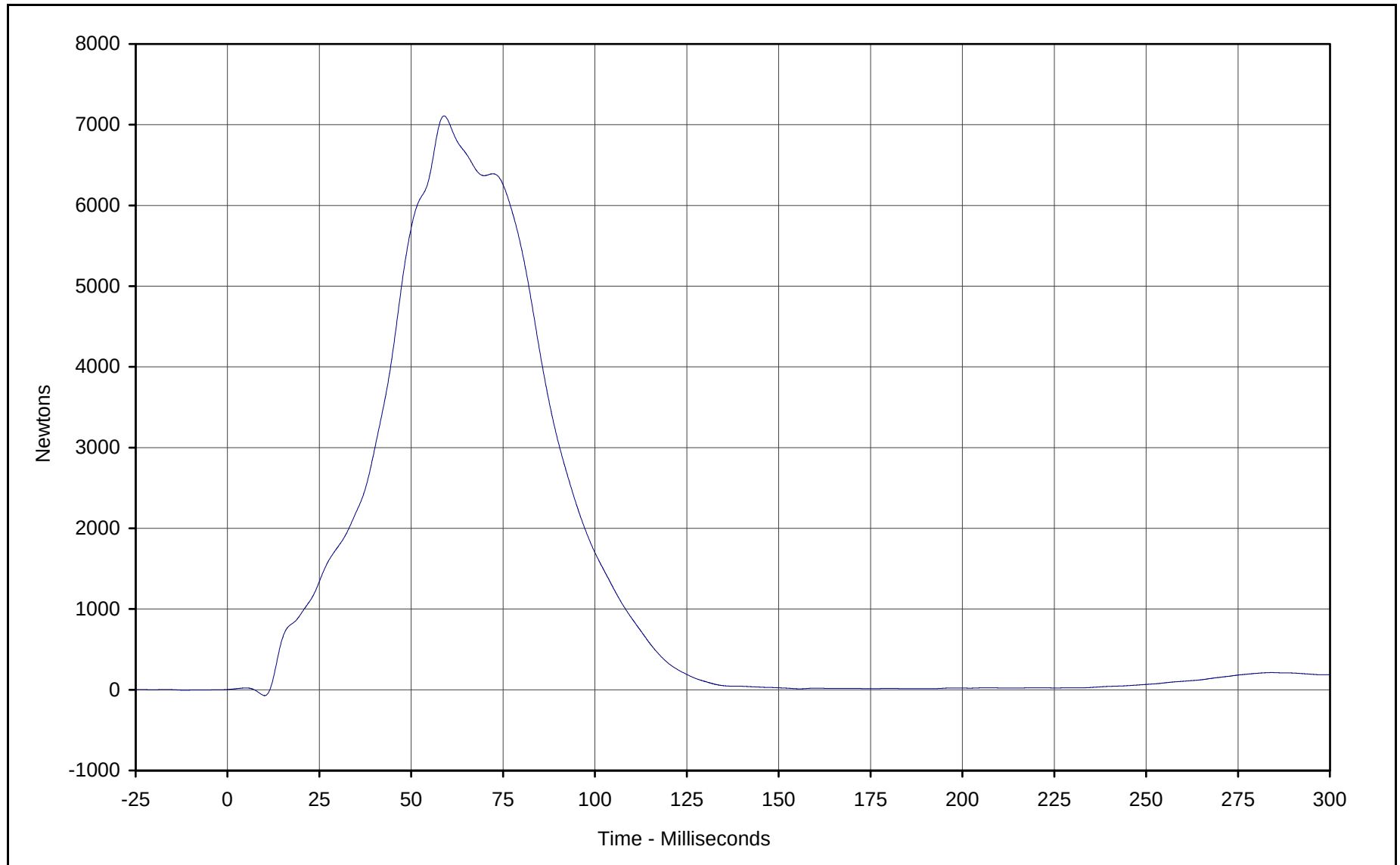


Curve Description: Driver Right Foot Fore Z
Maximum Value: 33.2 at 48.5 Milliseconds
Minimum Value: -448.8 at 38.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-040

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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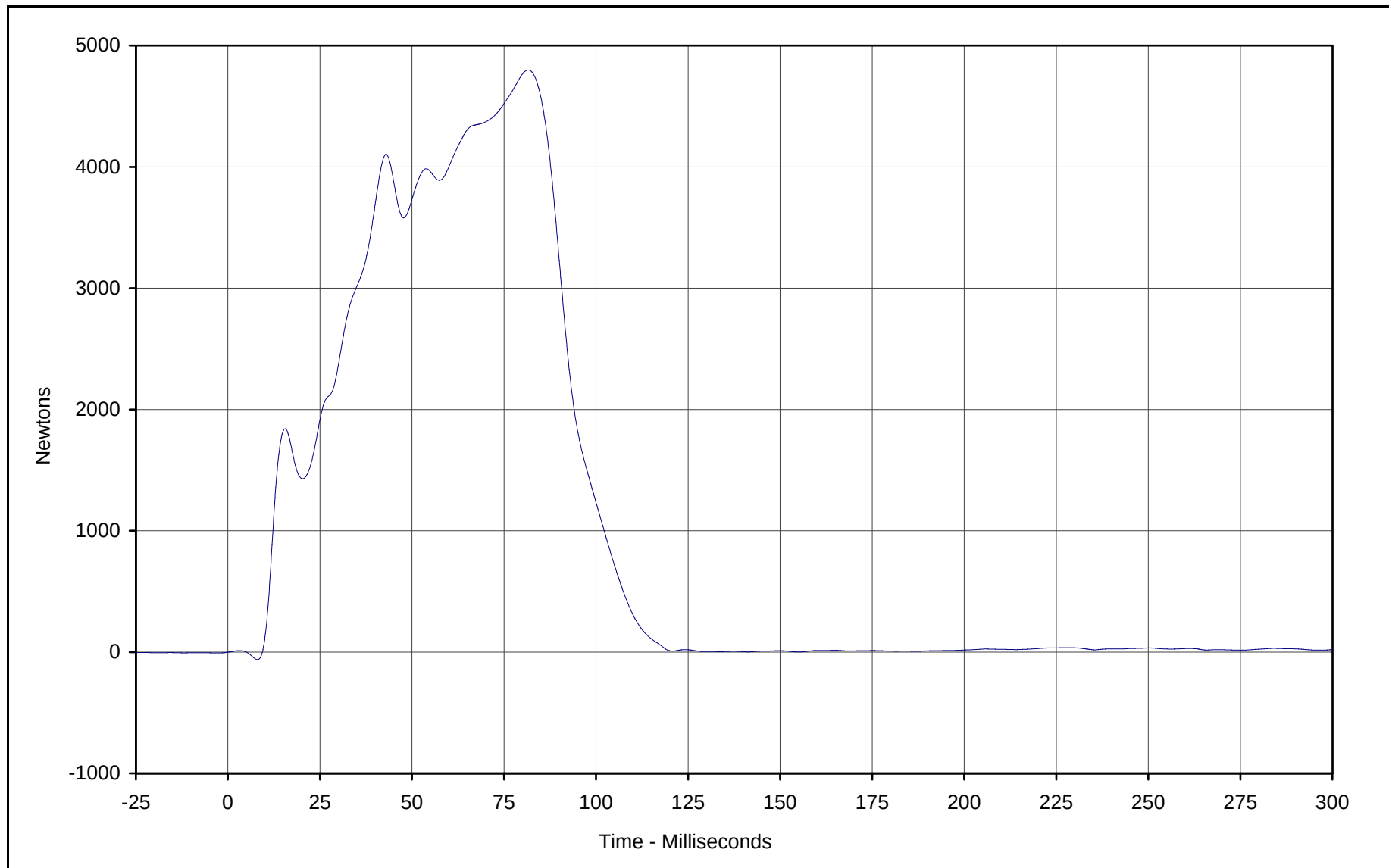


Curve Description: Driver Lap Belt Force
Maximum Value: 7109.4 at 58.9 Milliseconds
Minimum Value: -72.0 at 10.1 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-041

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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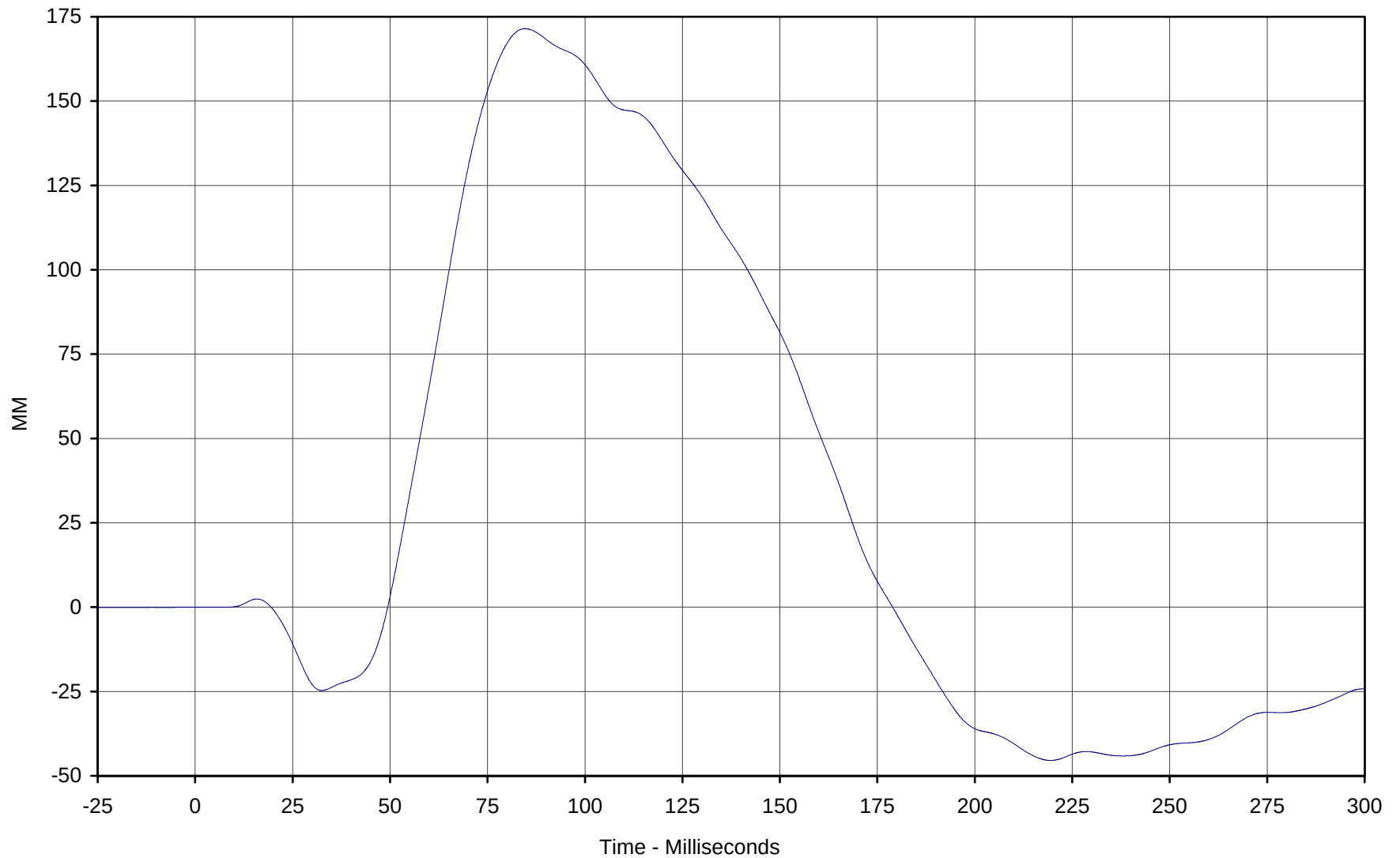


Curve Description: Driver Shoulder Belt Force
Maximum Value: 4798.8 at 81.6 Milliseconds
Minimum Value: -63.6 at 8.0 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-042

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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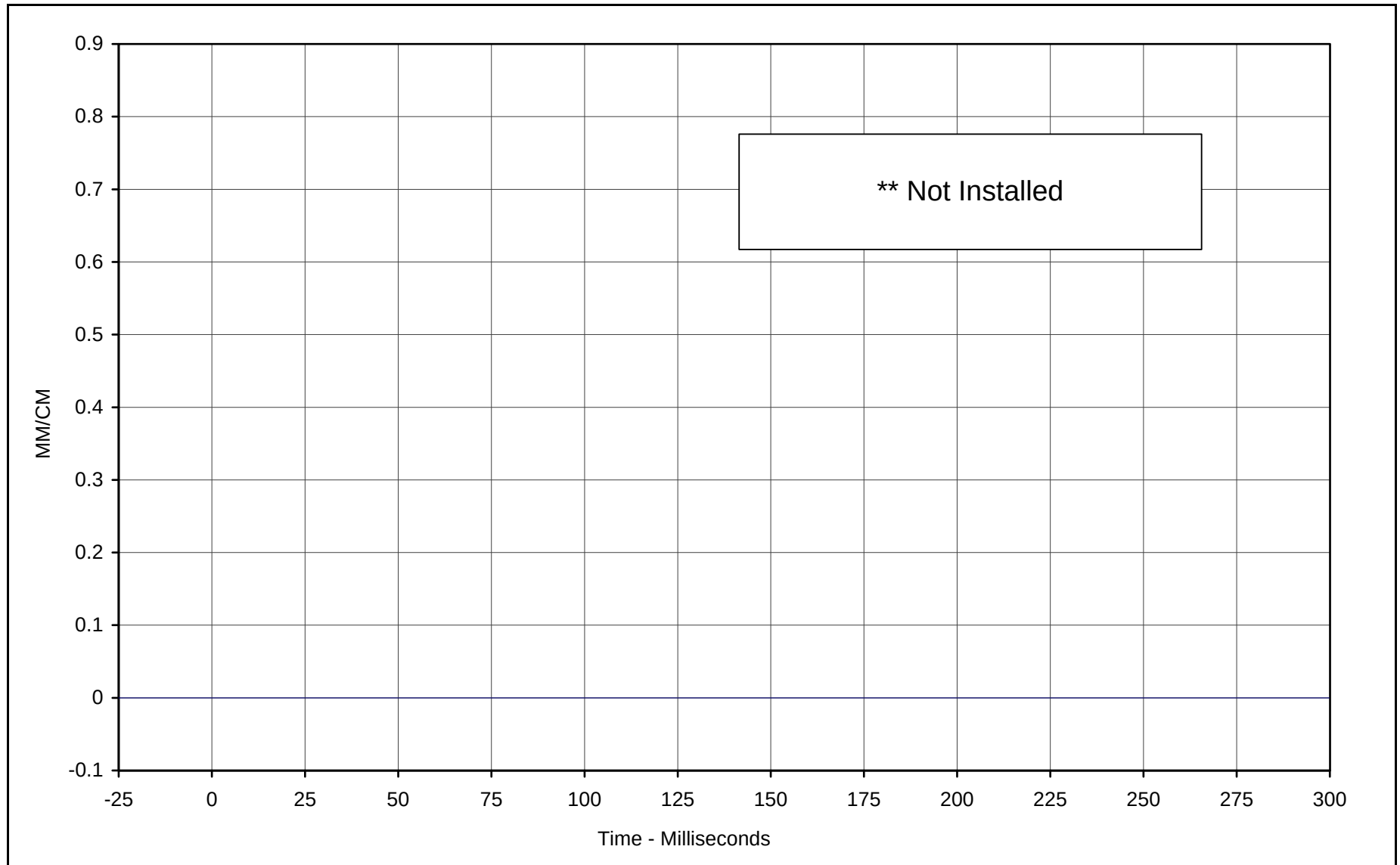


Curve Description: Driver Shoulder Belt Pullout
Maximum Value: 171.5 at 84.6 Milliseconds
Minimum Value: -45.4 at 219.5 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-043

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Driver Shoulder Belt Elongation **

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

Curve Number: FIL-044

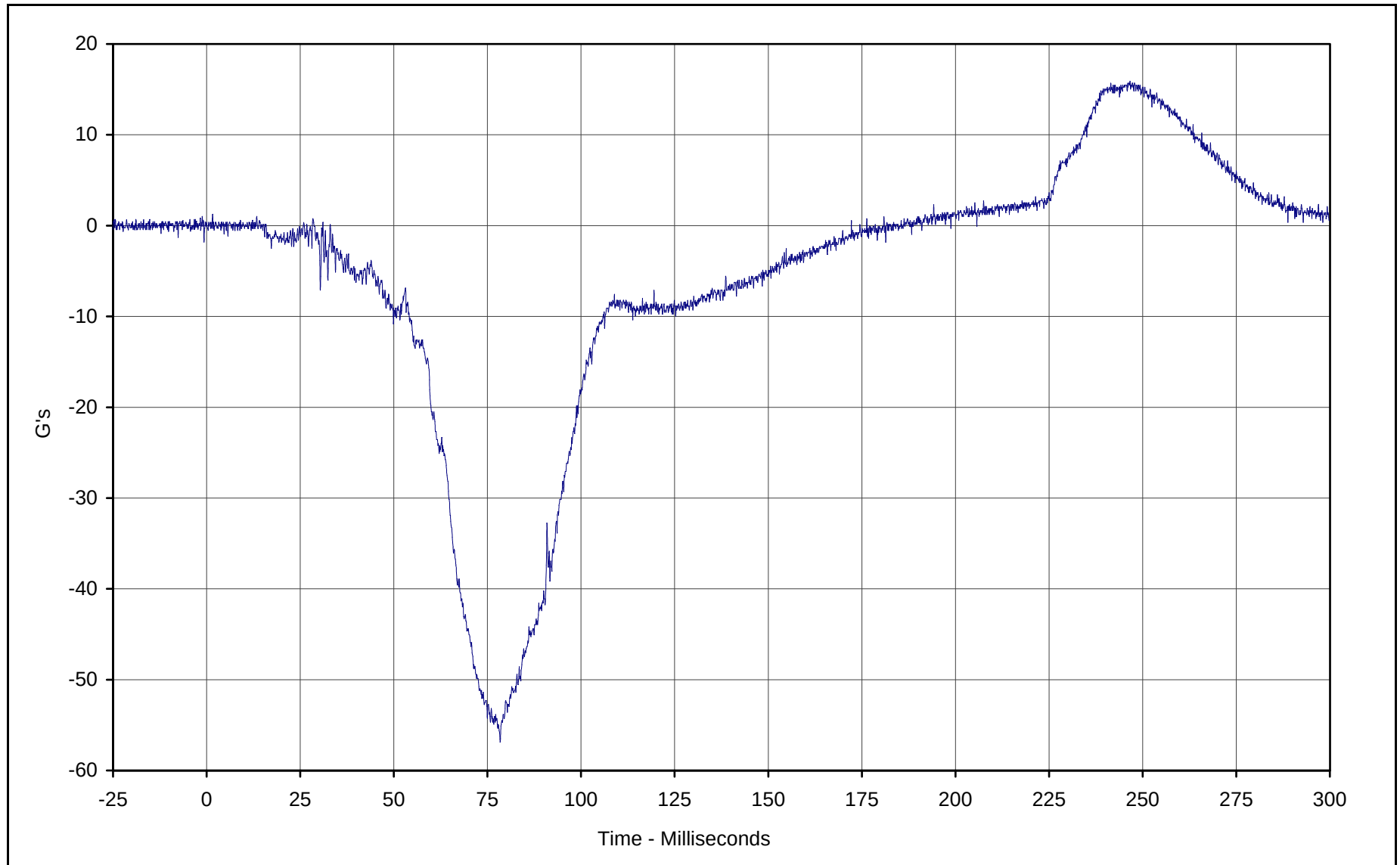
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

** Not installed



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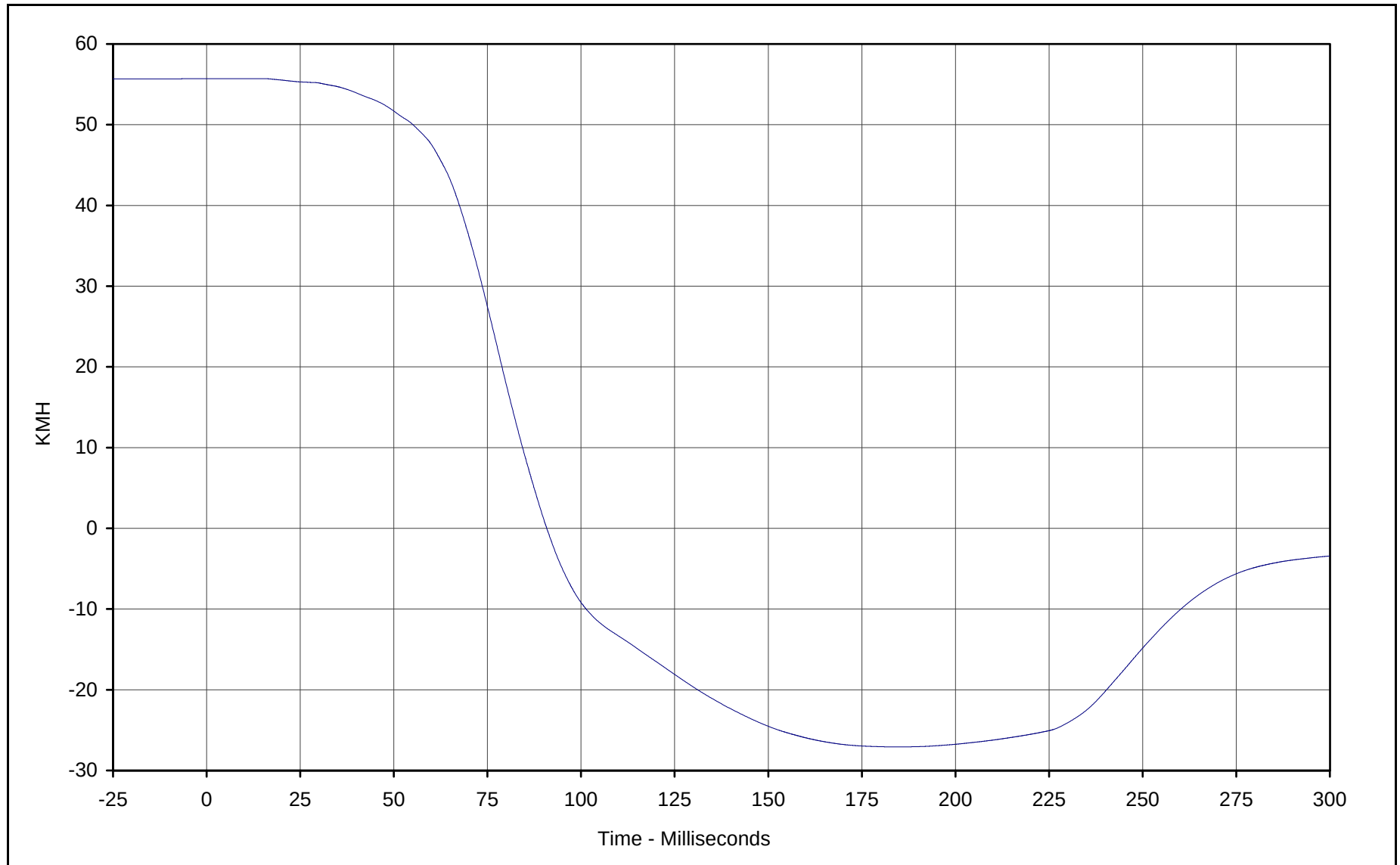


Curve Description: Passenger Head Primary X
Maximum Value: 15.9 at 246.6 Milliseconds
Minimum Value: -56.9 at 78.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-045

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Head Primary X Velocity

Maximum Value: 55.7 at 14.7 Milliseconds

Minimum Value: -27.1 at 185.6 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

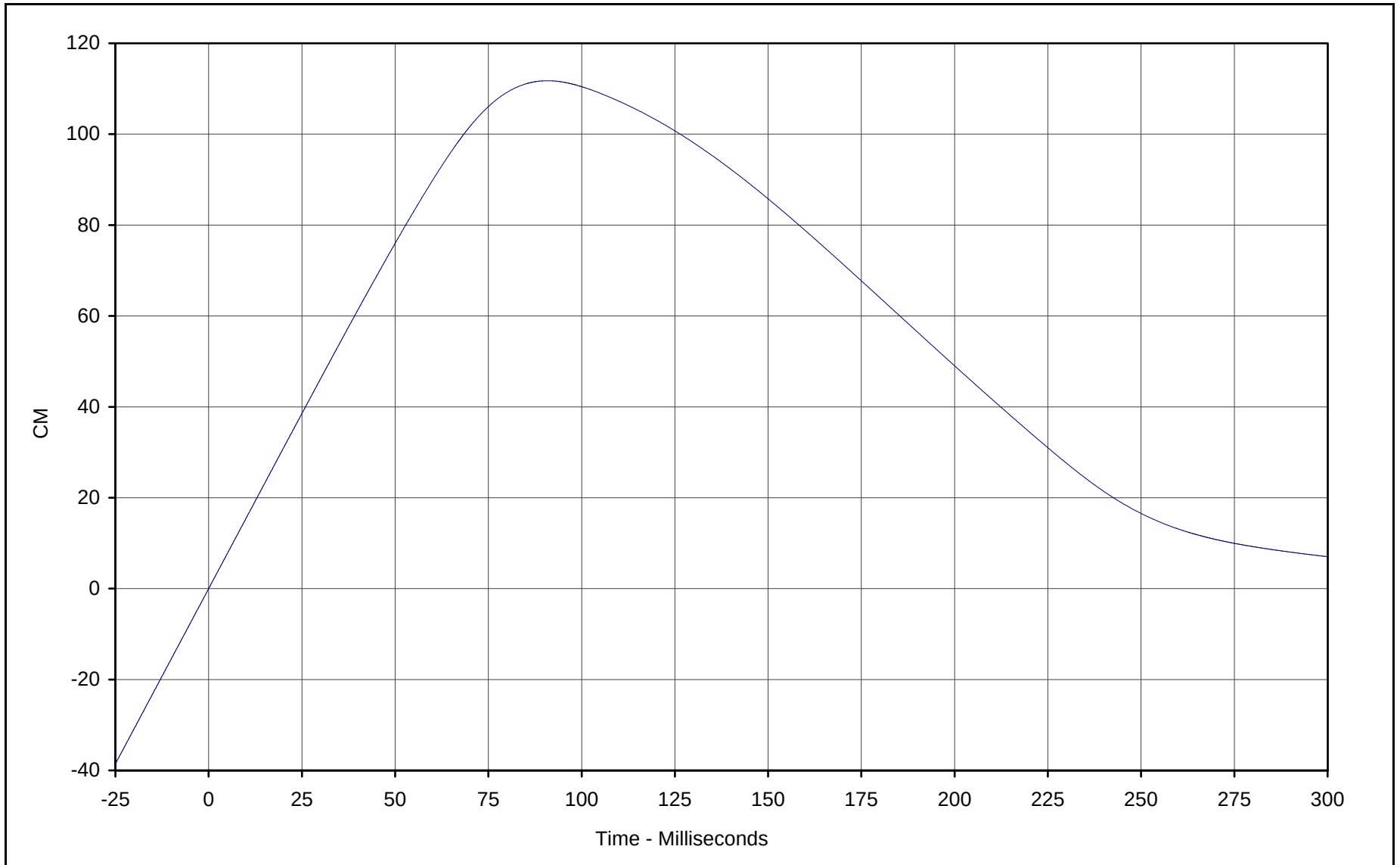
Curve Number: IN1-045

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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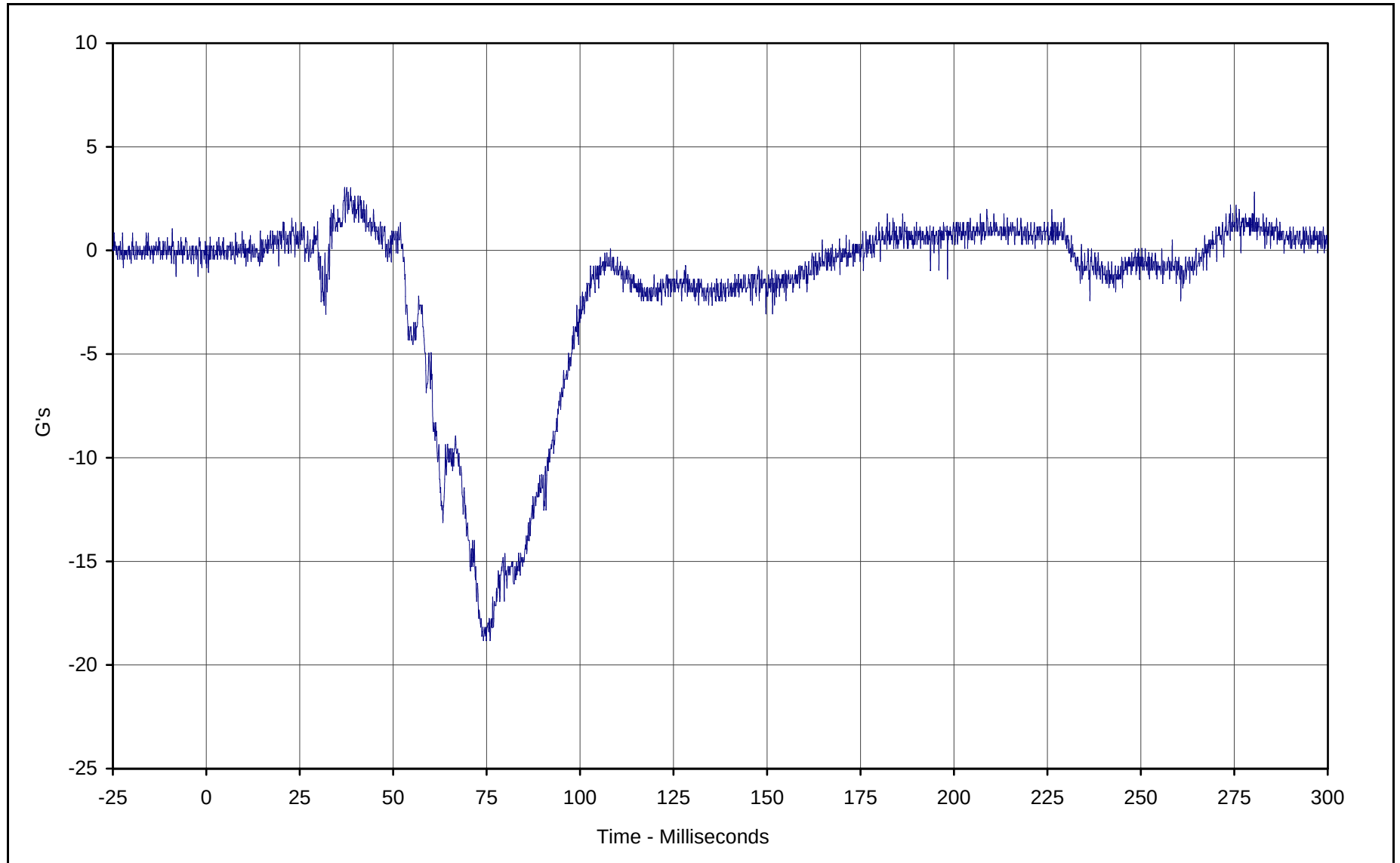
Curve Description: Passenger Head Primary X Displ.
Maximum Value: 111.8 at 90.8 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-045

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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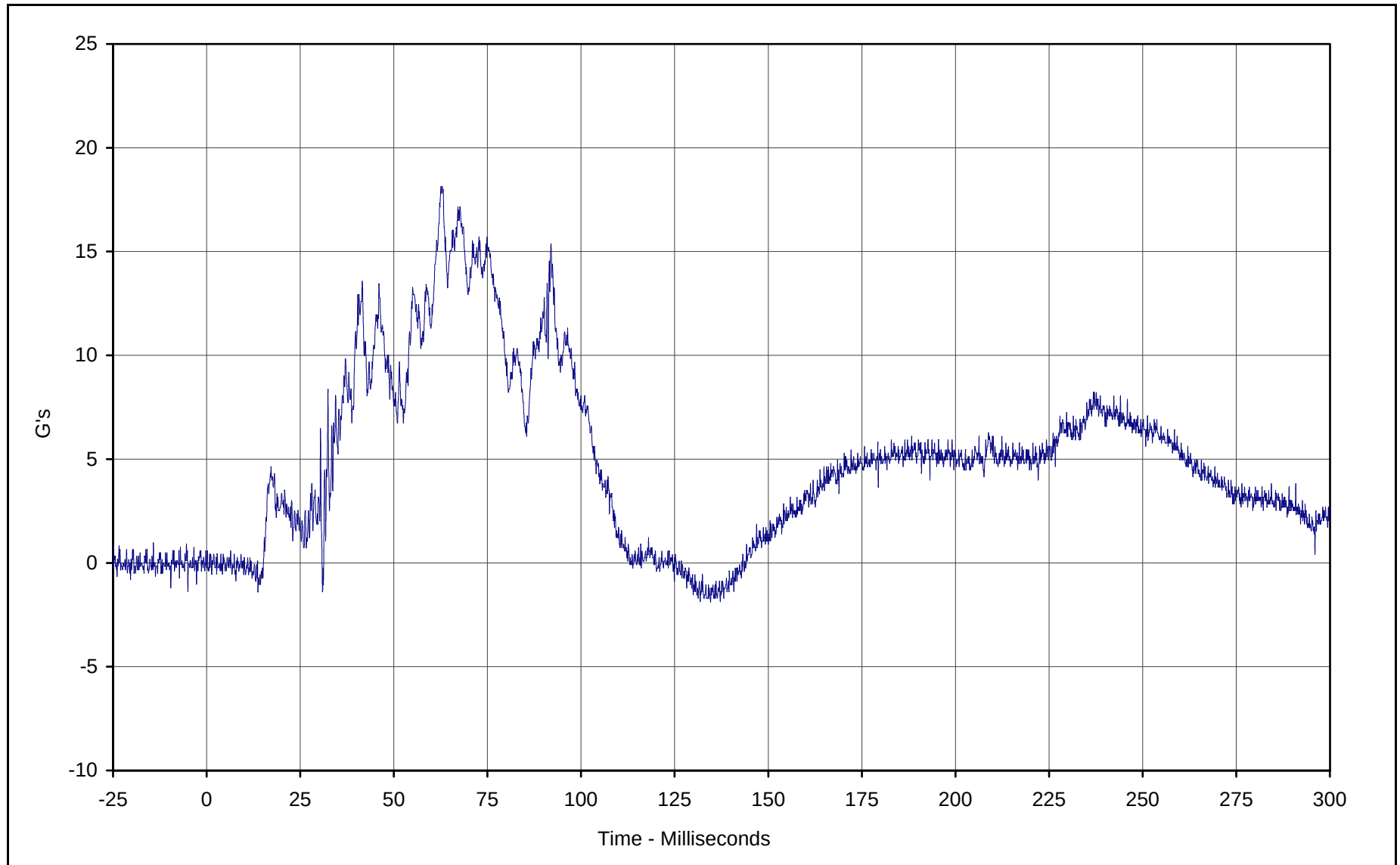


Curve Description: Passenger Head Primary Y
Maximum Value: 3.0 at 37.0 Milliseconds
Minimum Value: -18.8 at 74.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-046

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

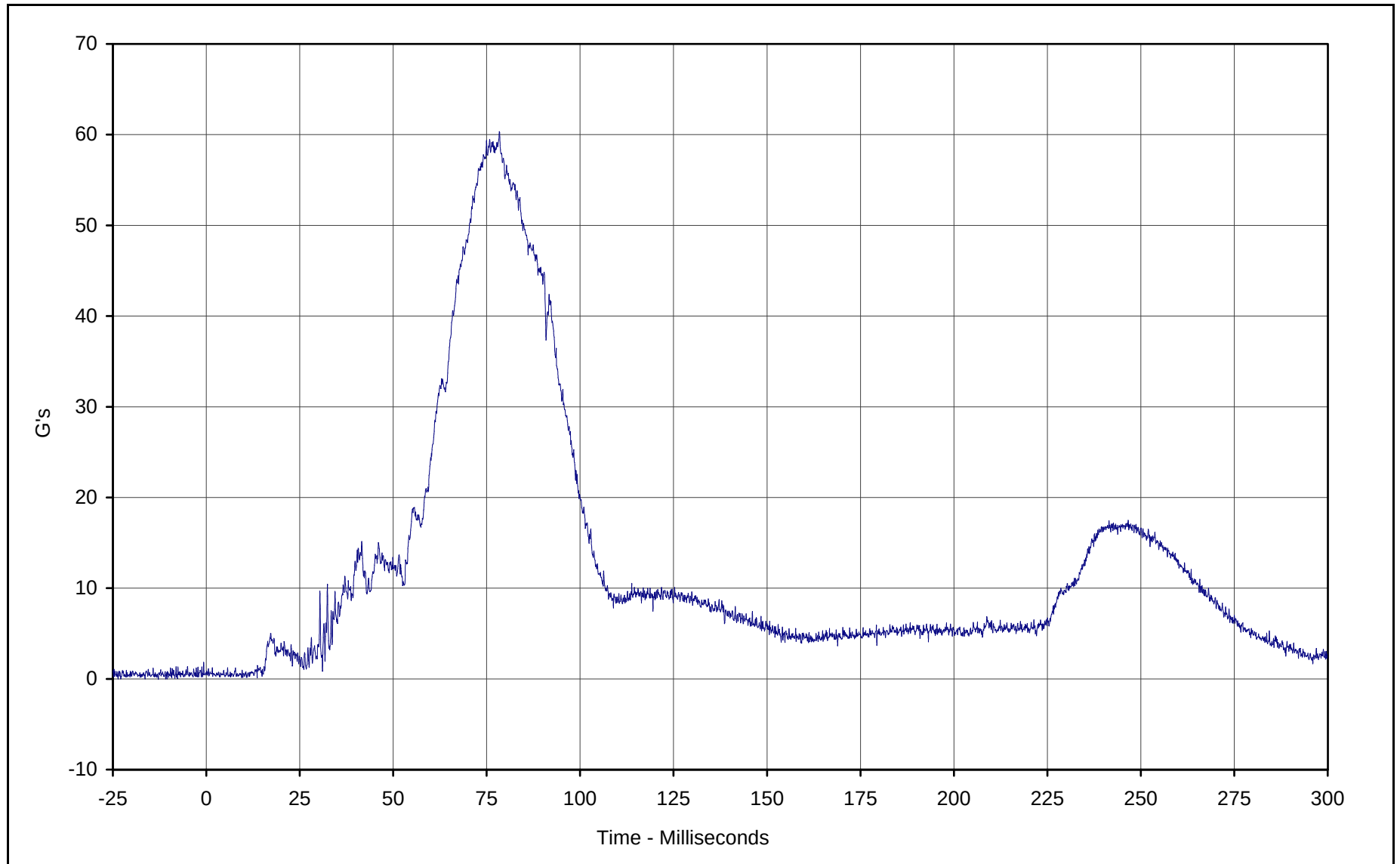


Curve Description: Passenger Head Primary Z
Maximum Value: 18.1 at 62.6 Milliseconds
Minimum Value: -1.9 at 131.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-047

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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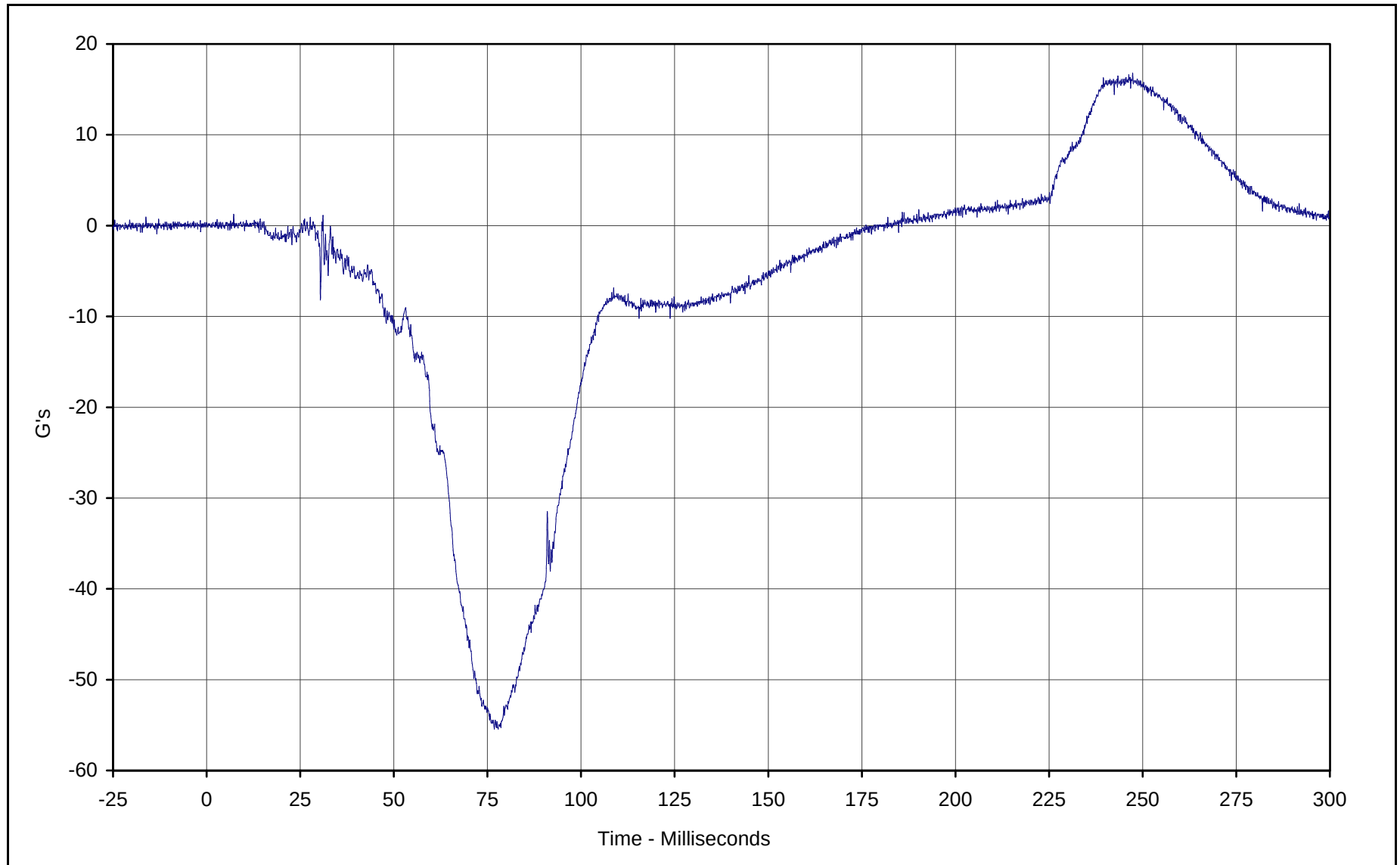
Curve Description: Passenger Head Resultant Primary
Maximum Value: 60.3 at 78.4 Milliseconds
Minimum Value: 0.2 at 13.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: RES-045

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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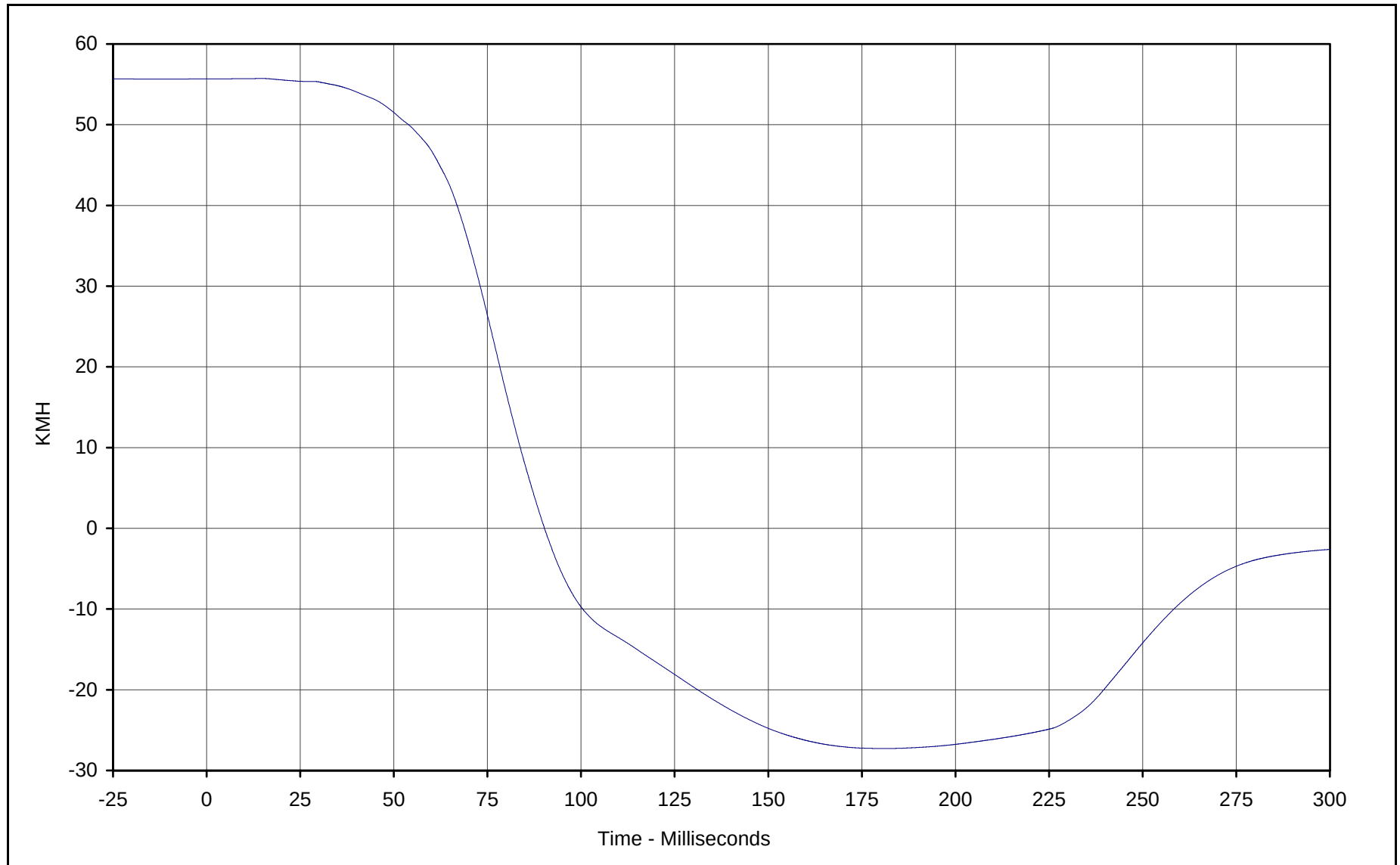


Curve Description: Passenger Head Redundant X
Maximum Value: 16.8 at 247.3 Milliseconds
Minimum Value: -55.5 at 76.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-048

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Head Redundant X Velocity

Maximum Value: 55.7 at 14.9 Milliseconds

Minimum Value: -27.3 at 181.1 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

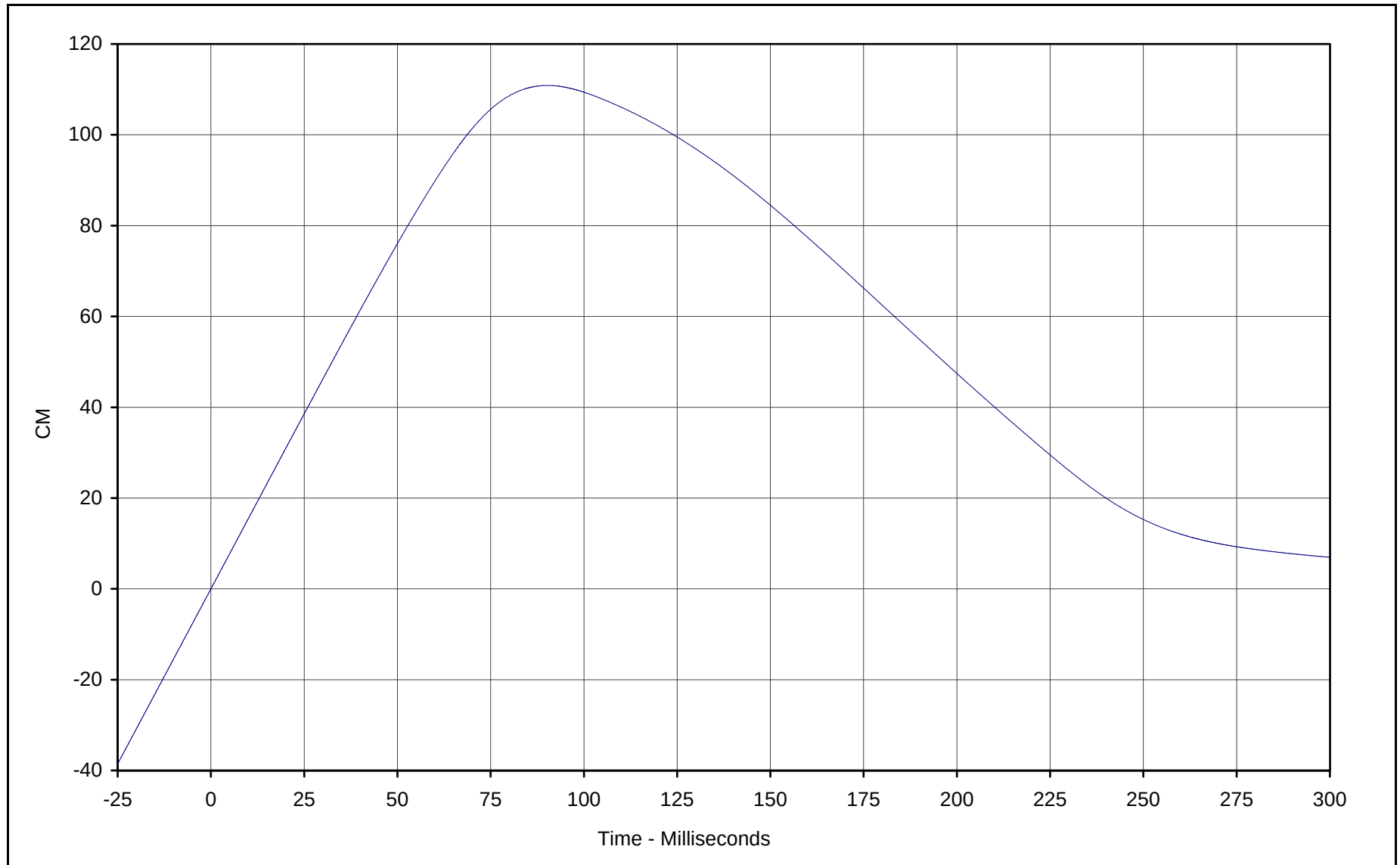
Curve Number: IN1-048

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Head Redundant X Displ.

Maximum Value: 110.9 at 90.2 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

Curve Number: IN2-048

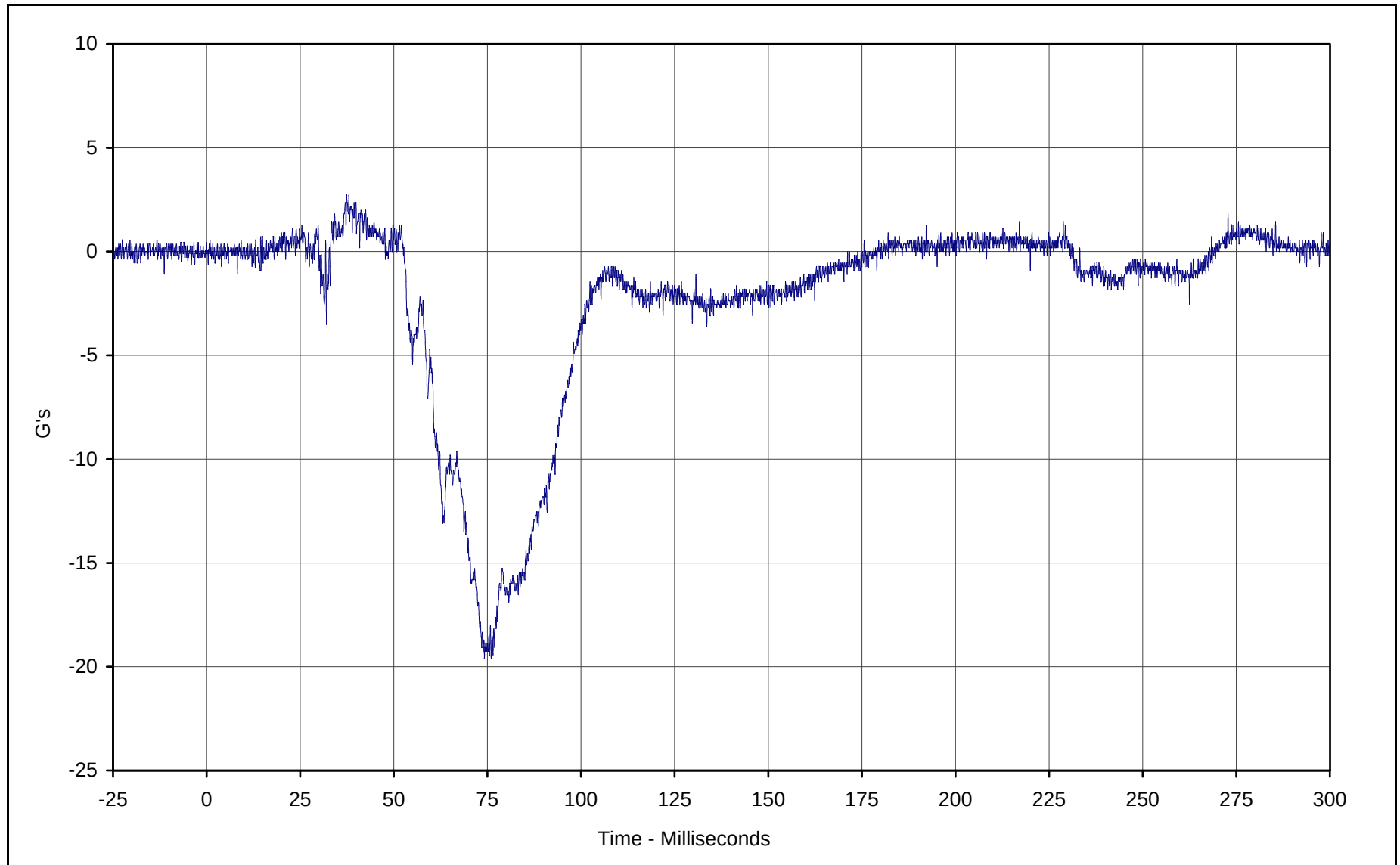
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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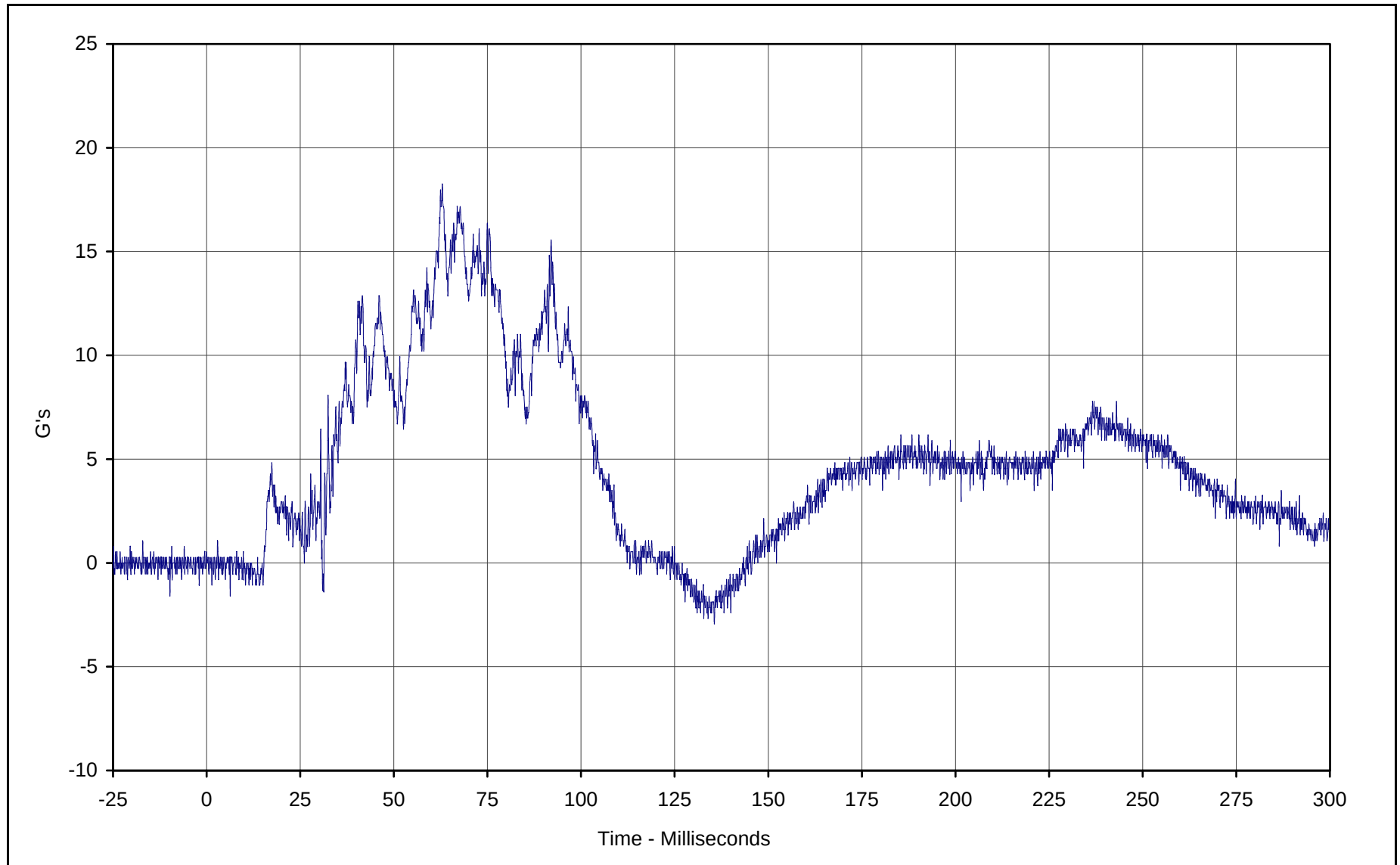


Curve Description: Passenger Head Redundant Y
Maximum Value: 2.7 at 37.4 Milliseconds
Minimum Value: -19.6 at 74.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-049

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

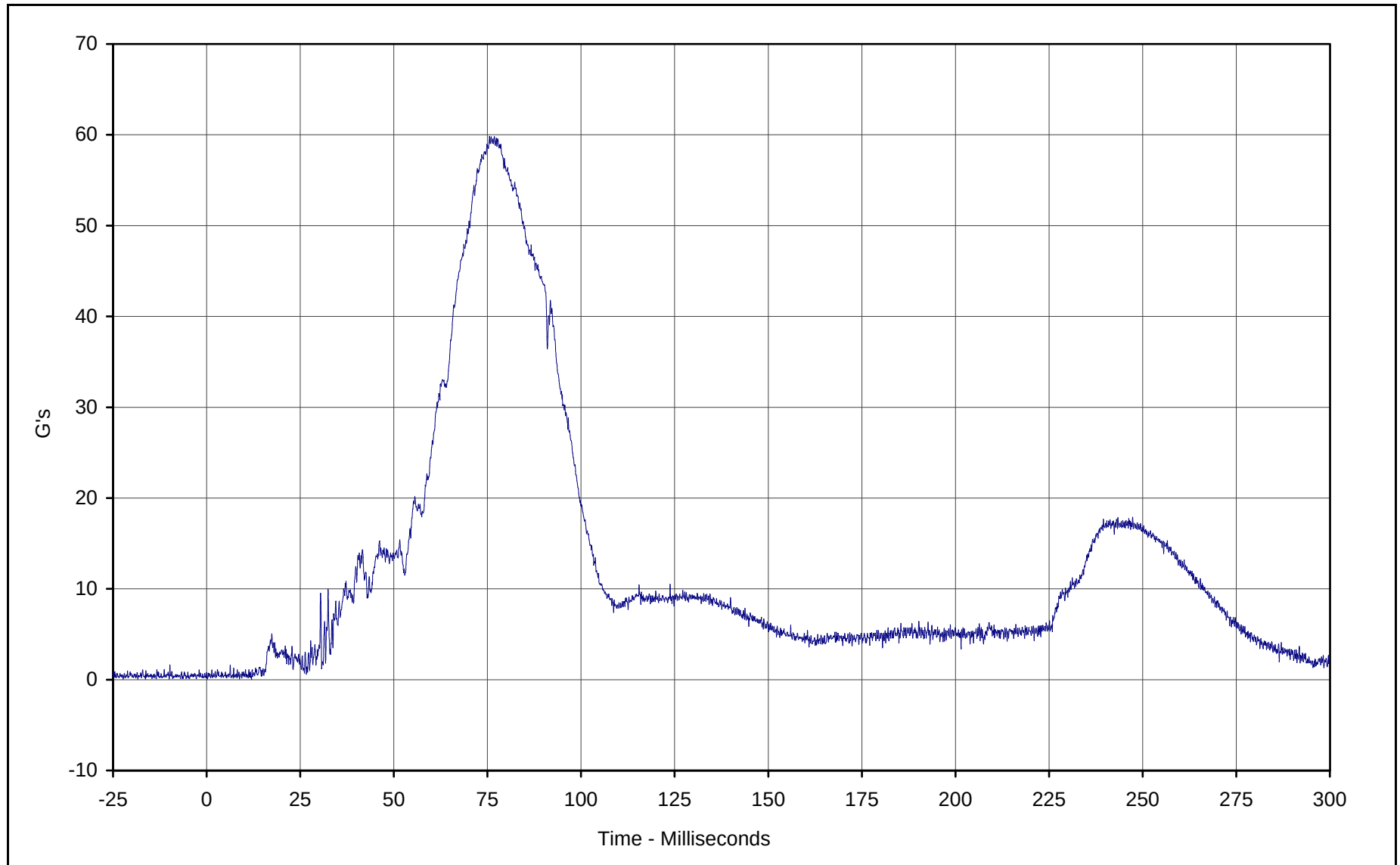


Curve Description: Passenger Head Redundant Z
Maximum Value: 18.2 at 62.9 Milliseconds
Minimum Value: -3.0 at 135.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-050

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Head Resultant Redundant

Maximum Value: 59.8 at 75.6 Milliseconds

Minimum Value: 0.1 at 8.8 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

Curve Number: RES-048

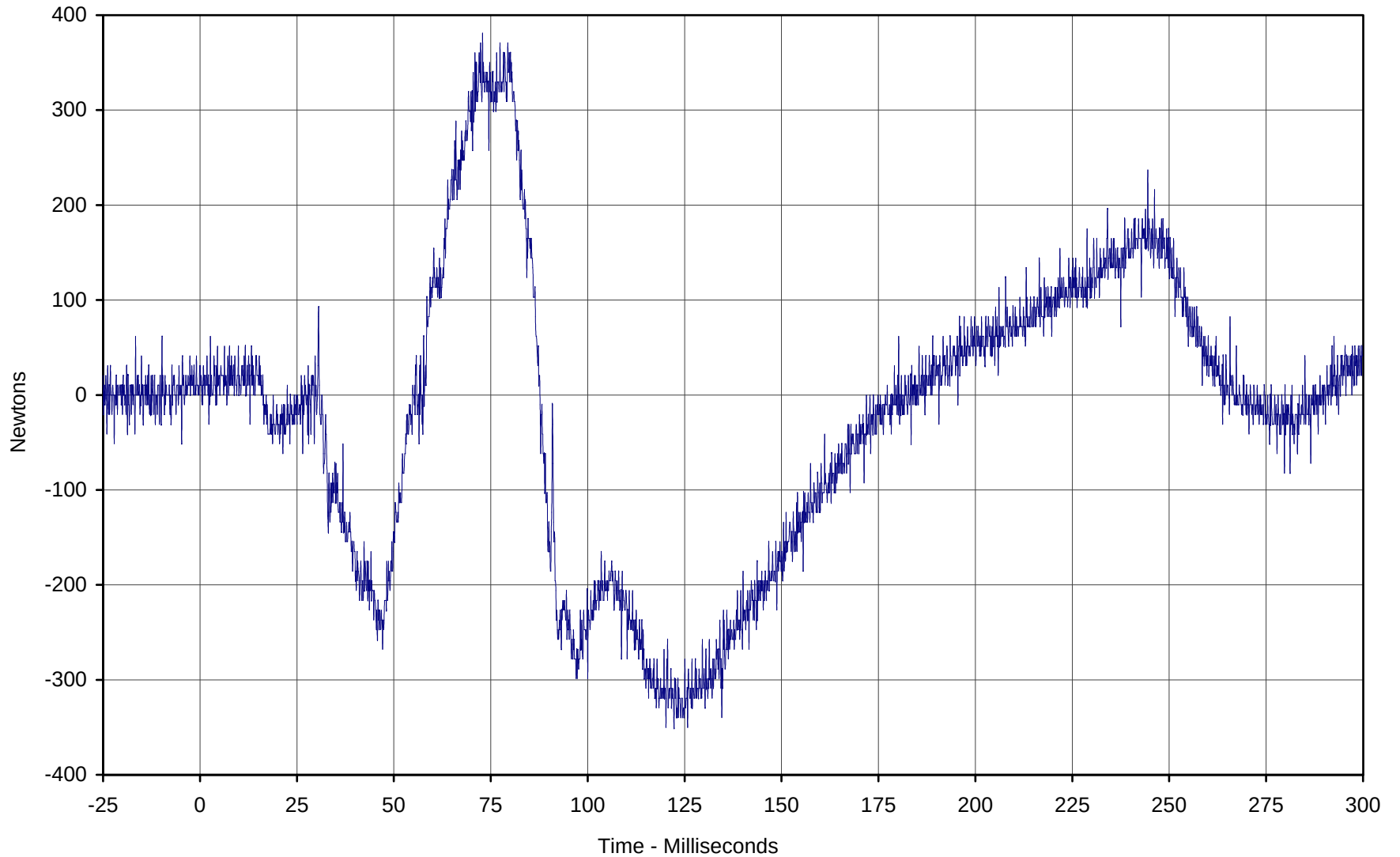
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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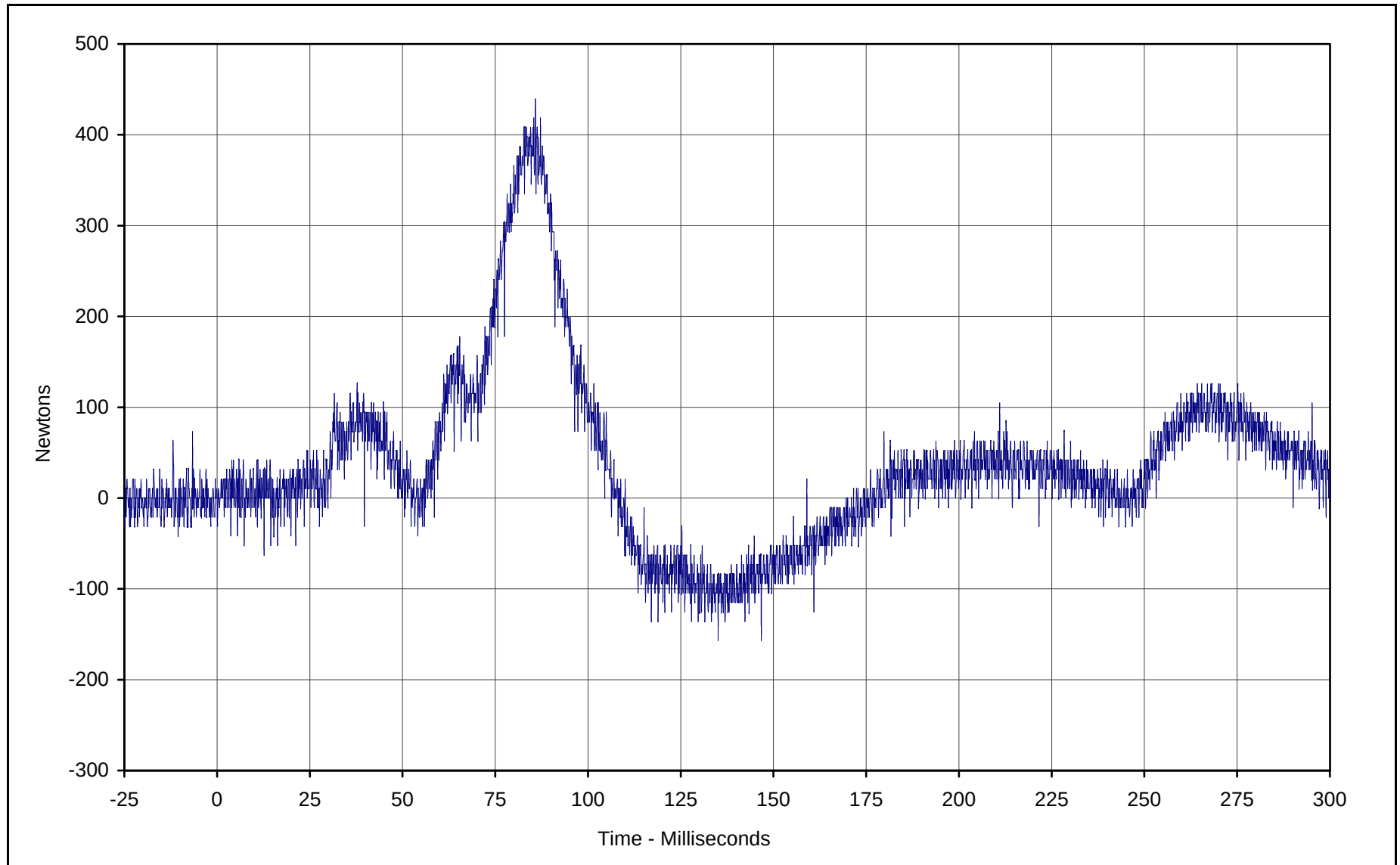
Curve Description: Passenger Neck Force X
Maximum Value: 381.1 at 72.9 Milliseconds
Minimum Value: -350.2 at 120.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-051

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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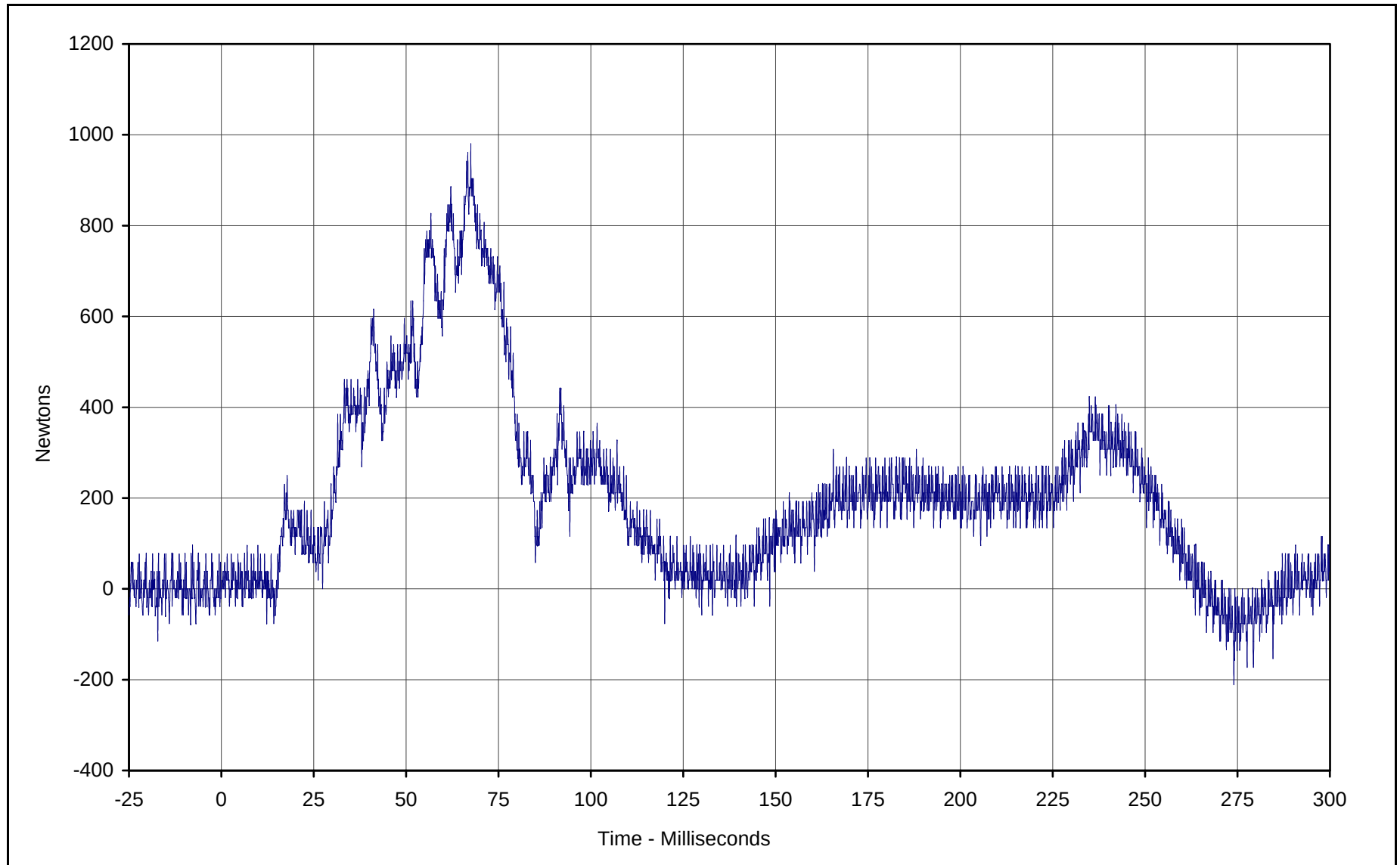


Curve Description: Passenger Neck Force Y
Maximum Value: 439.6 at 85.8 Milliseconds
Minimum Value: -157.0 at 135.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-052

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



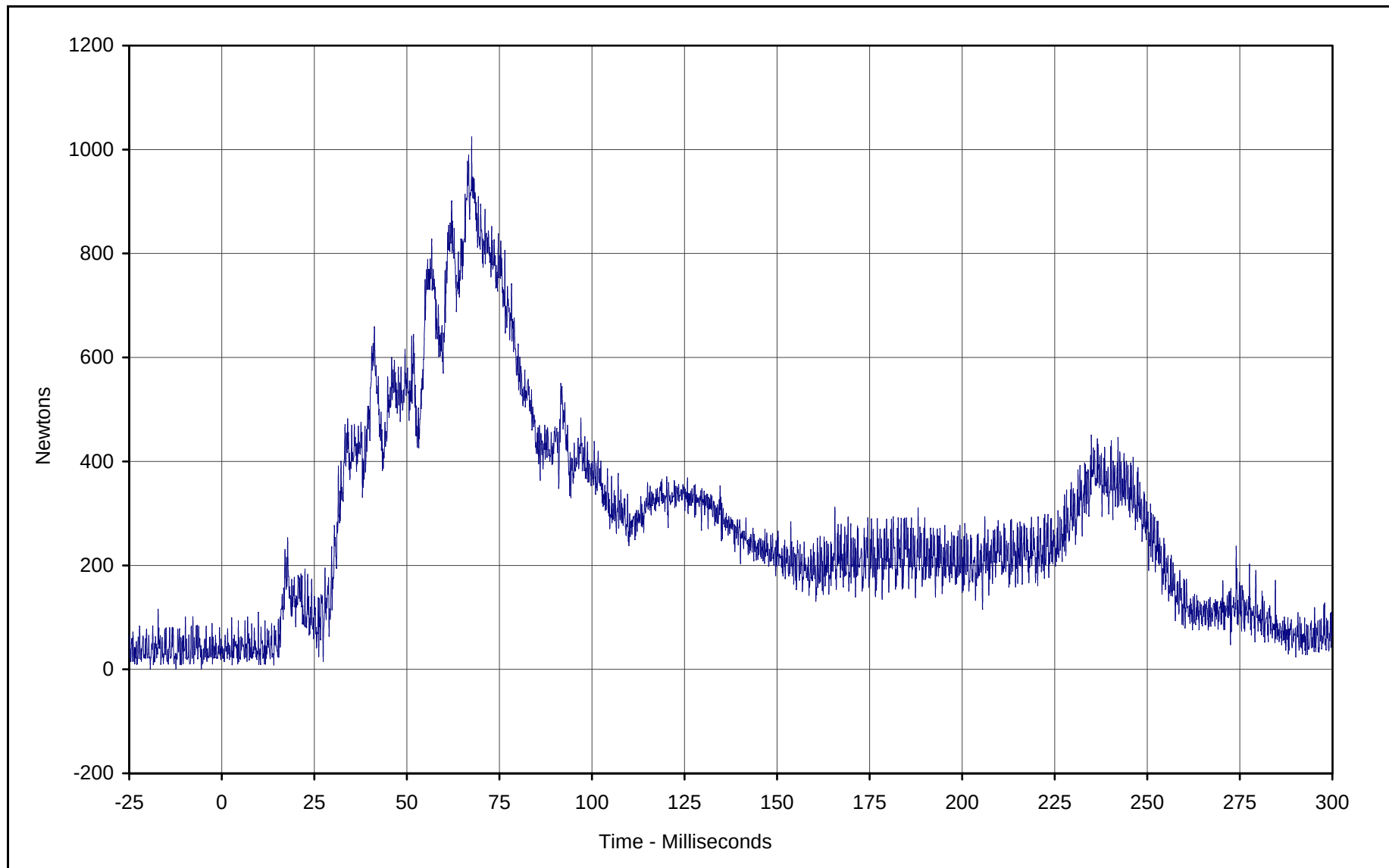
KAR21129-01



Curve Description: Passenger Neck Force Z
Maximum Value: 980.5 at 67.5 Milliseconds
Minimum Value: -211.5 at 274.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: FIL-053

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

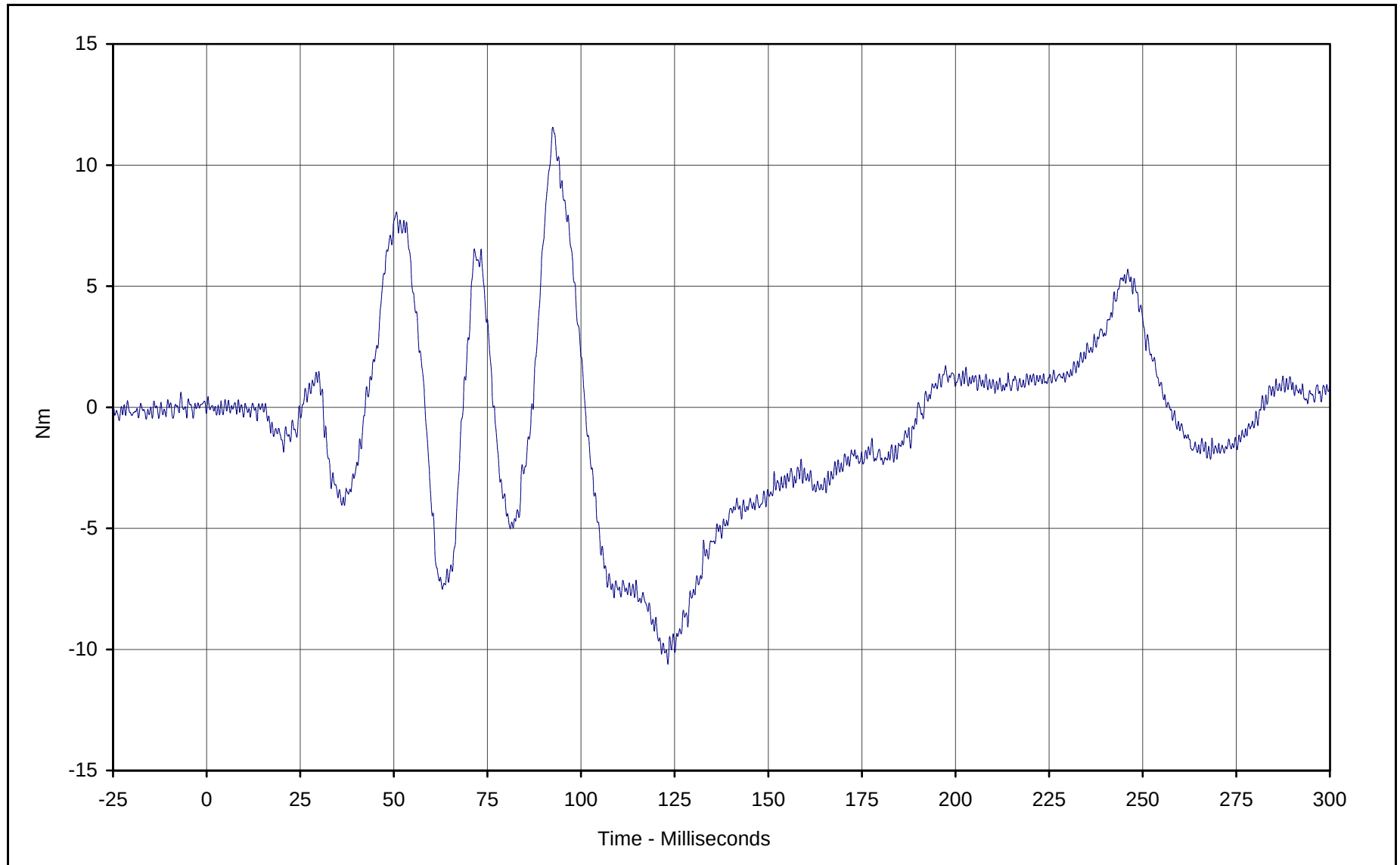




Curve Description: Passenger Neck Force Resultant
Maximum Value: 1024.6 at 67.5 Milliseconds
Minimum Value: 10.3 at 4.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/5/01
Curve Number: RES-051

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

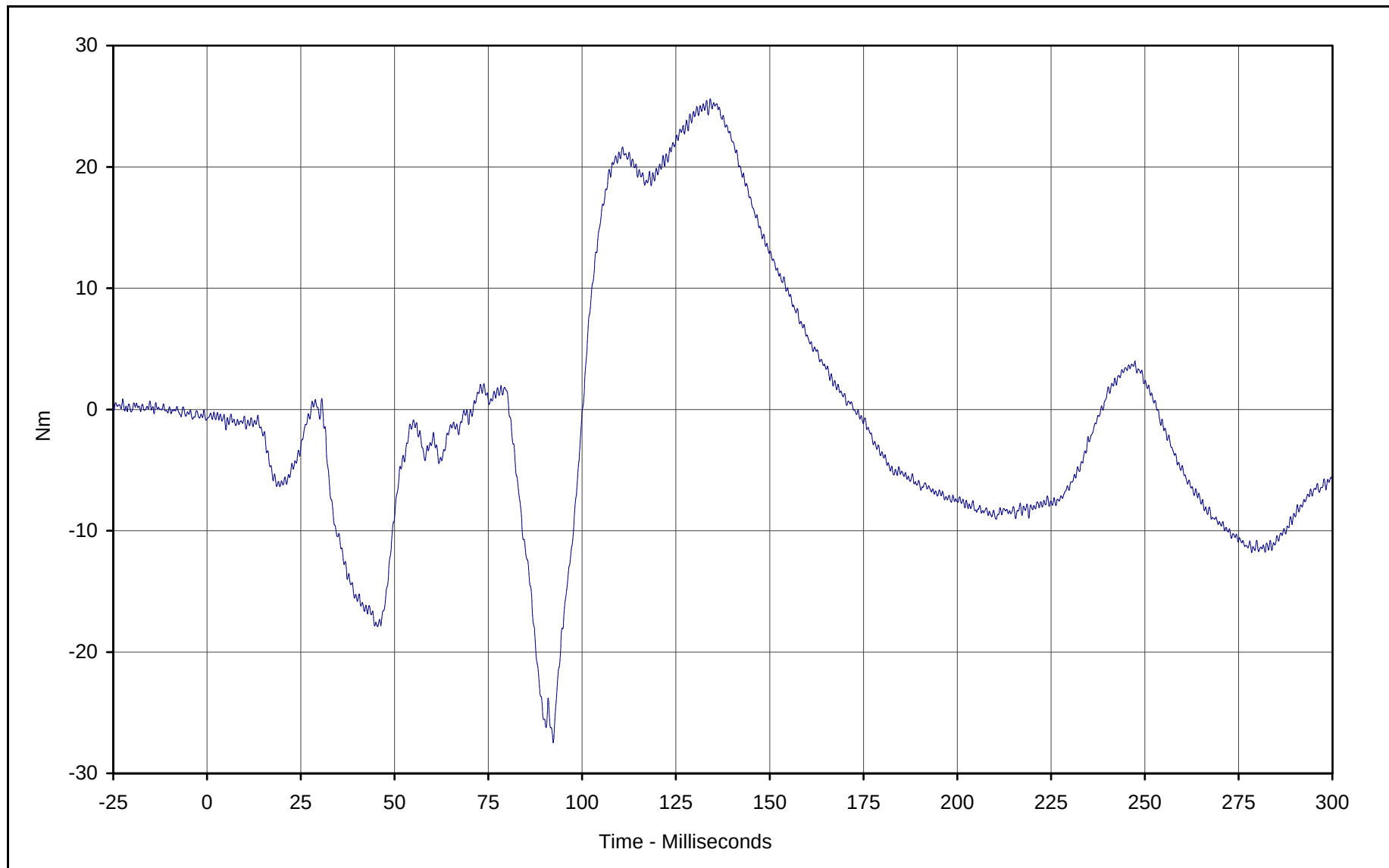




Curve Description: Passenger Neck Moment X
Maximum Value: 11.6 at 92.5 Milliseconds
Minimum Value: -10.6 at 123.2 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-054

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



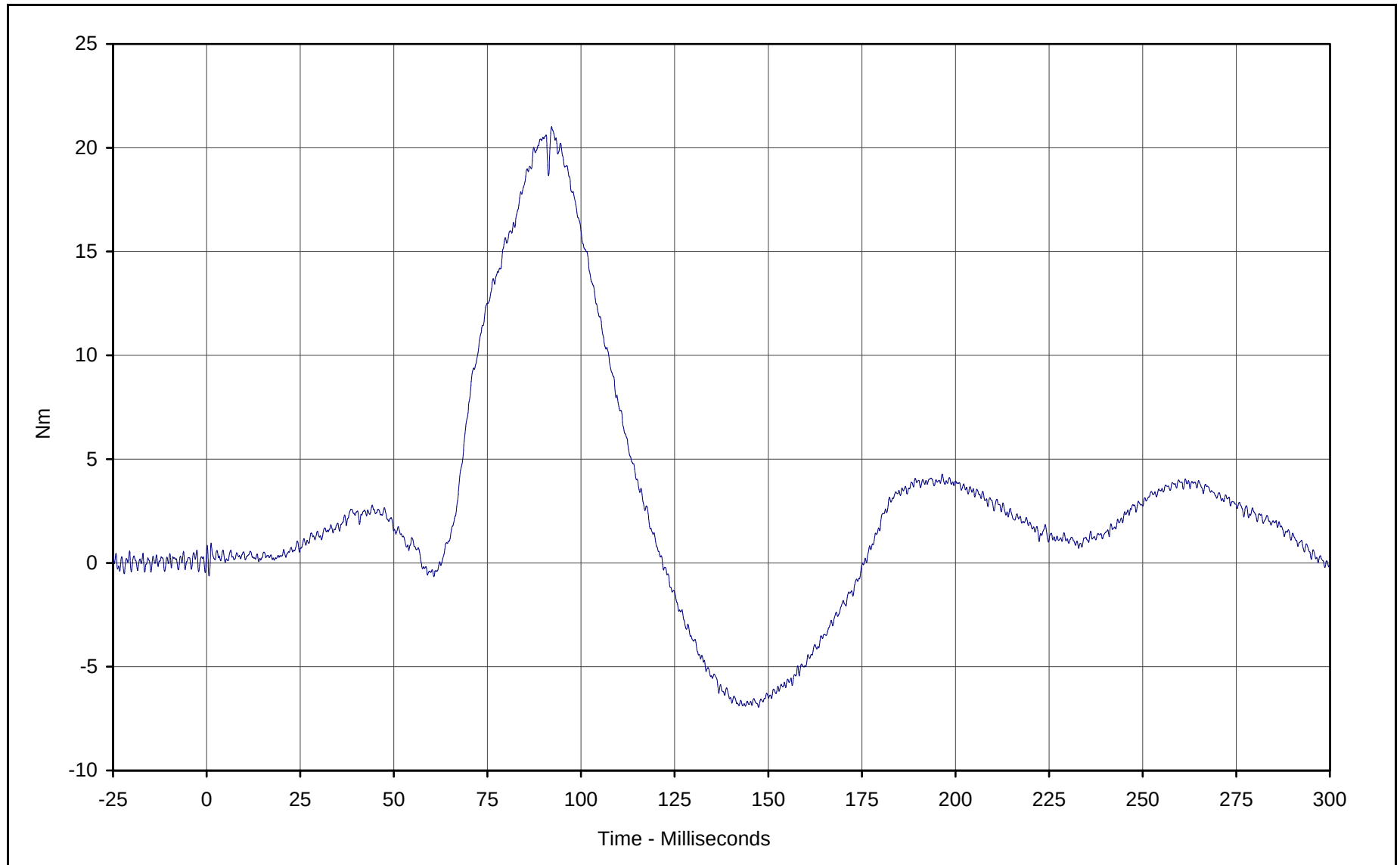


Curve Description: Passenger Neck Moment Y
Maximum Value: 25.6 at 134.2 Milliseconds
Minimum Value: -27.5 at 92.3 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-055

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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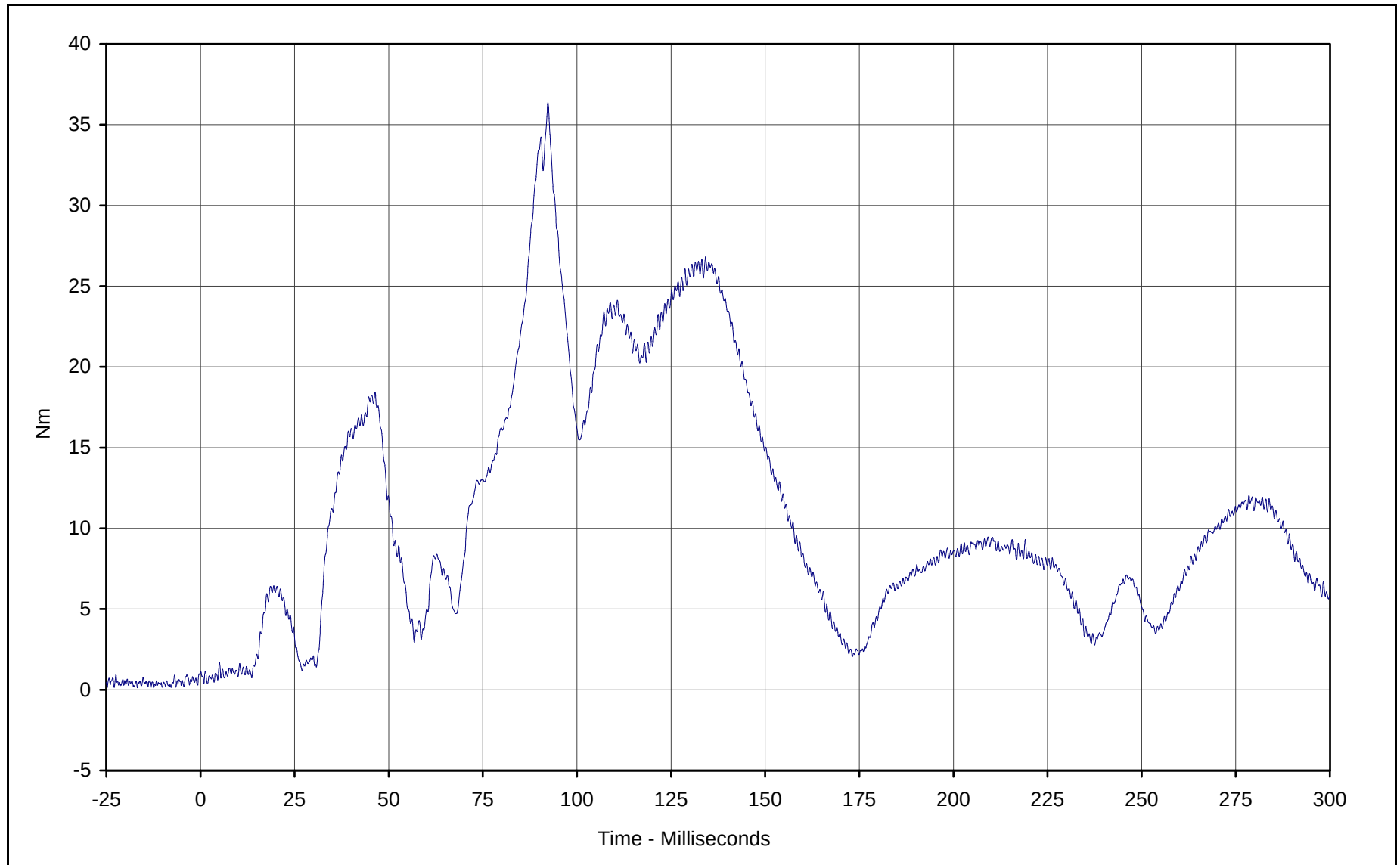


Curve Description: Passenger Neck Moment Z
Maximum Value: 21.0 at 92.1 Milliseconds
Minimum Value: -7.0 at 147.4 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-056

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

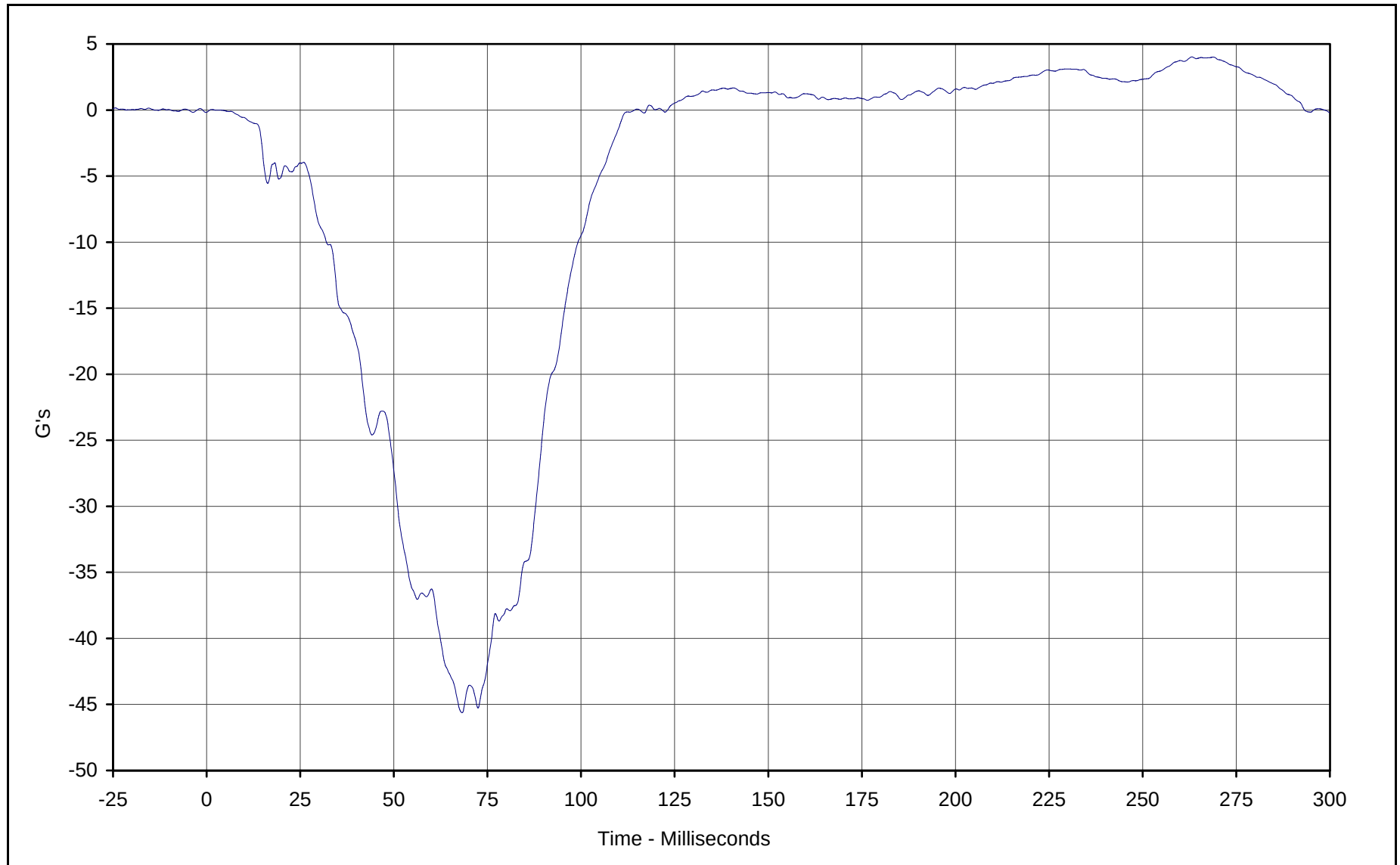


Curve Description: Passenger Neck Moment Resultant
Maximum Value: 36.4 at 92.3 Milliseconds
Minimum Value: 0.4 at 0.9 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: RES-054

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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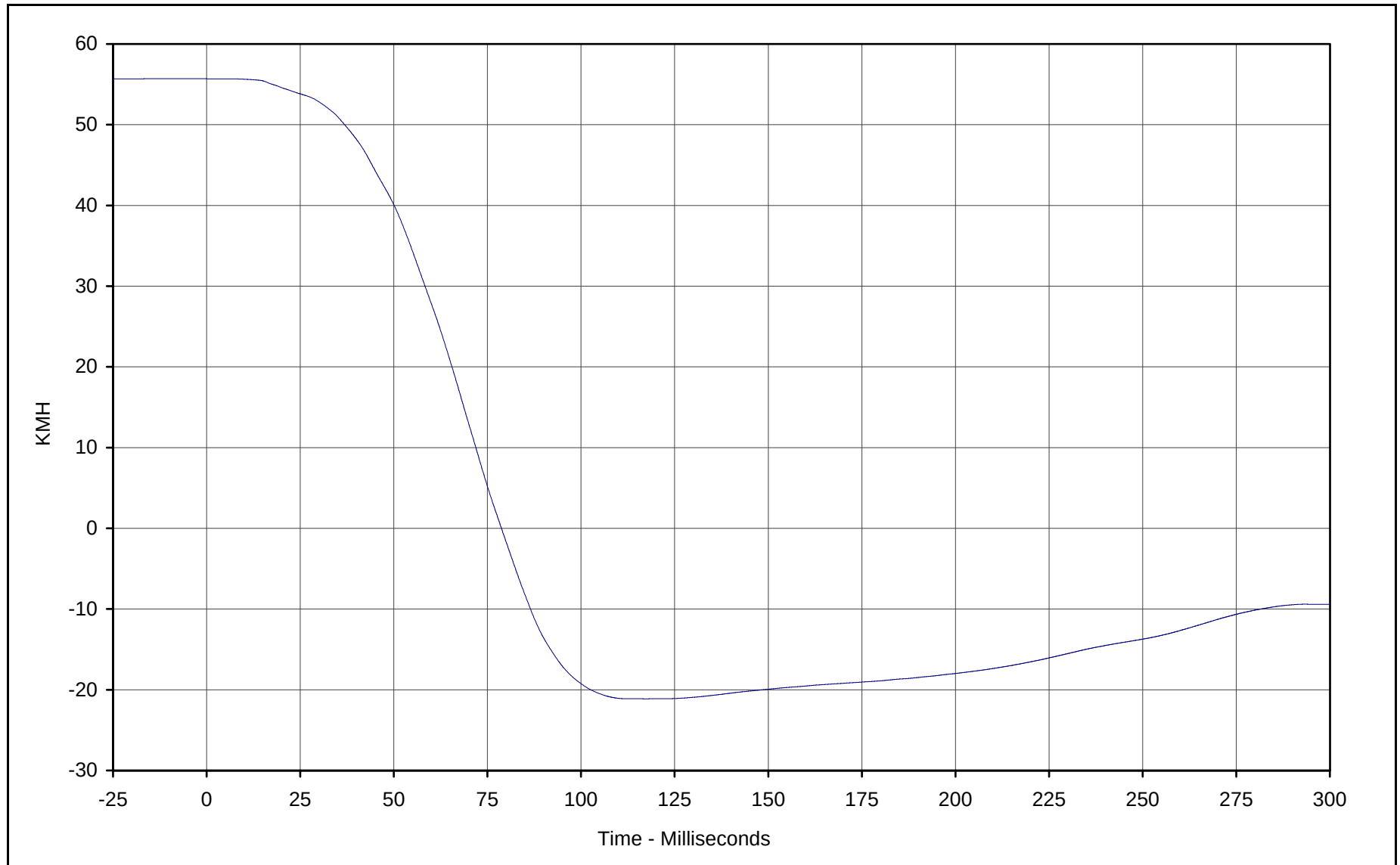
Curve Description: Passenger Chest Primary X
Maximum Value: 4.0 at 263.2 Milliseconds
Minimum Value: -45.6 at 68.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-057

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Chest Primary X Velocity
Maximum Value: 55.7 at 0.0 Milliseconds
Minimum Value: -21.1 at 117.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-057

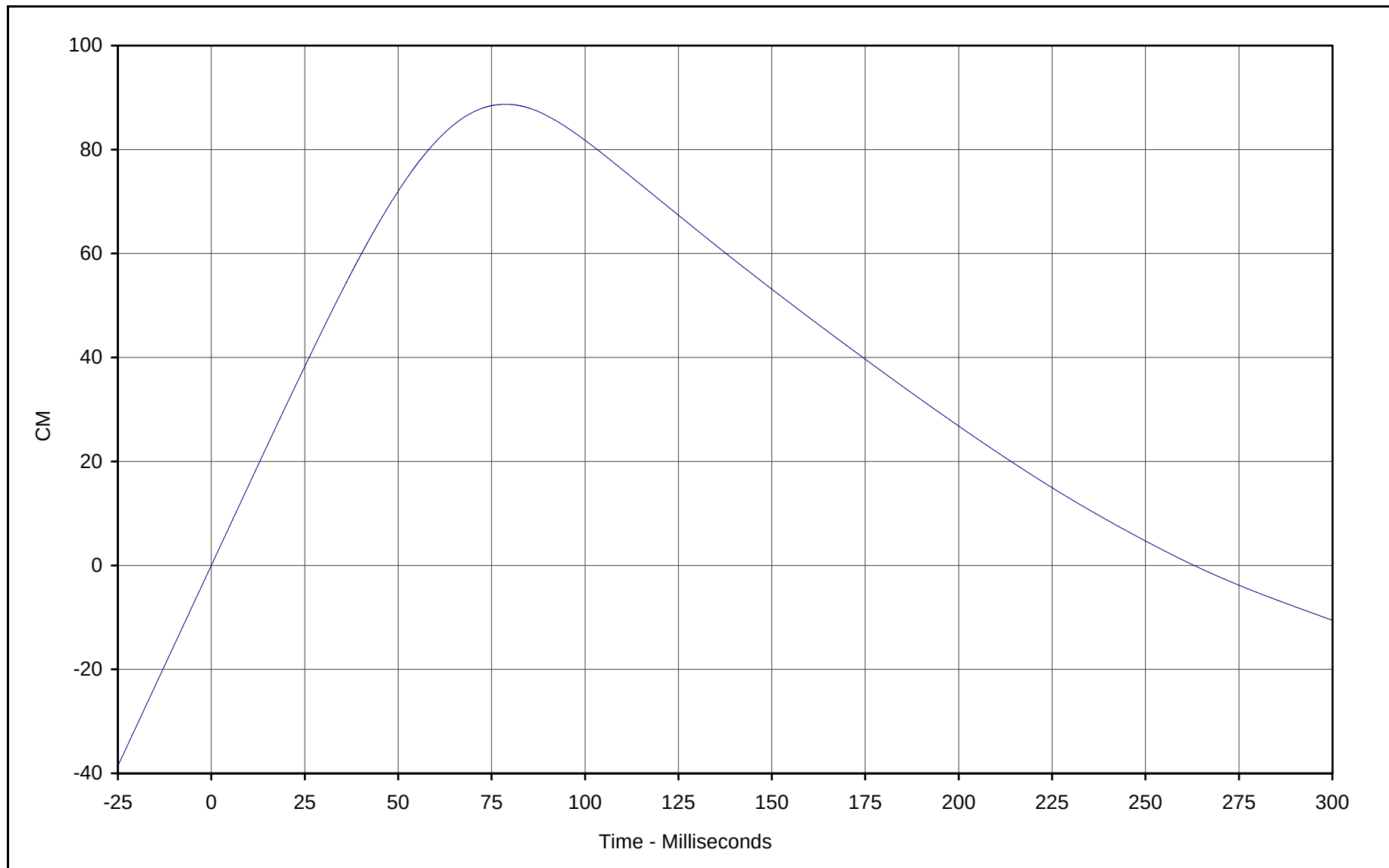
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

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KAR21129-01

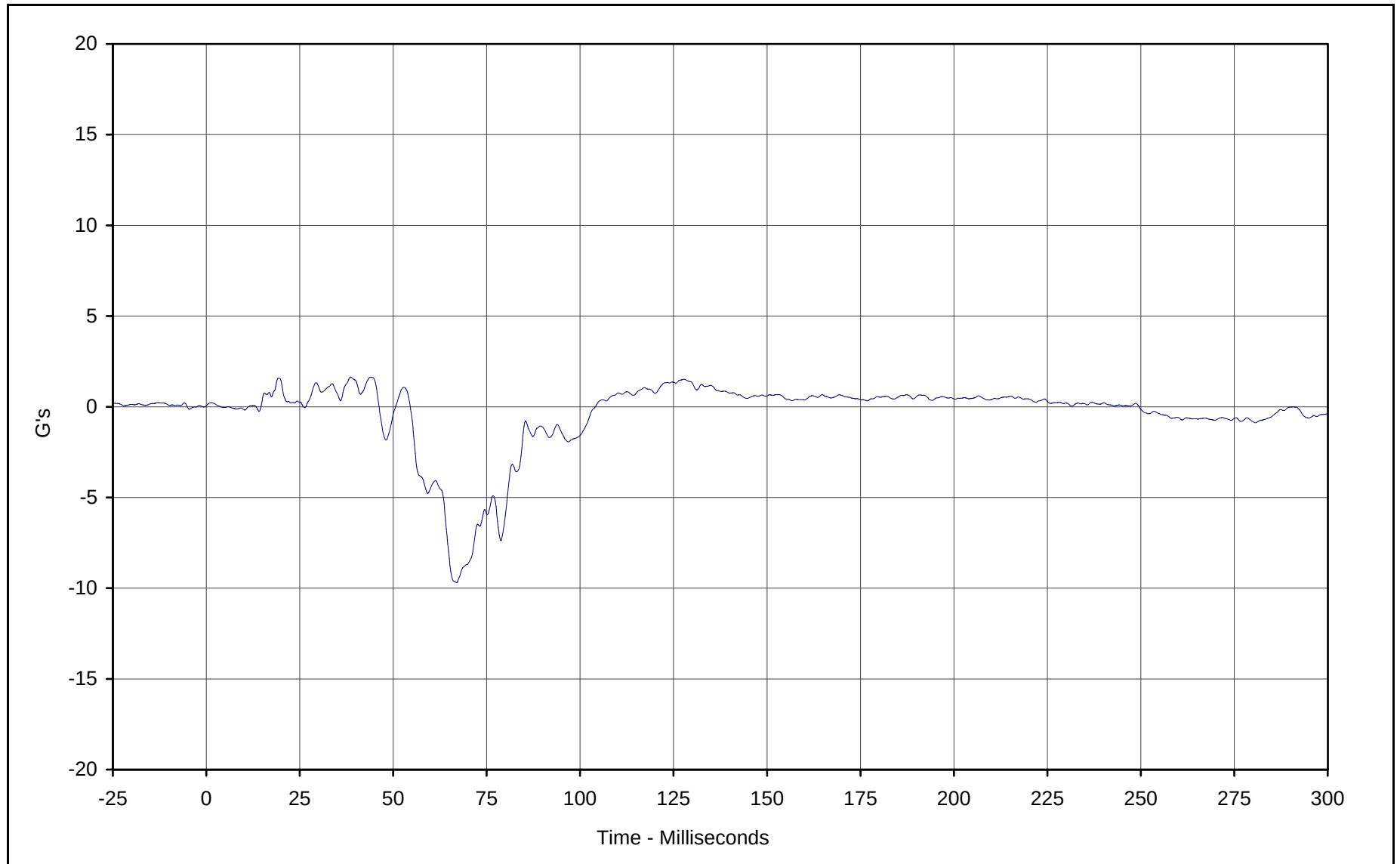


Curve Description: Passenger Chest Primary X Displ.
Maximum Value: 88.7 at 78.7 Milliseconds
Minimum Value: -10.5 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-057

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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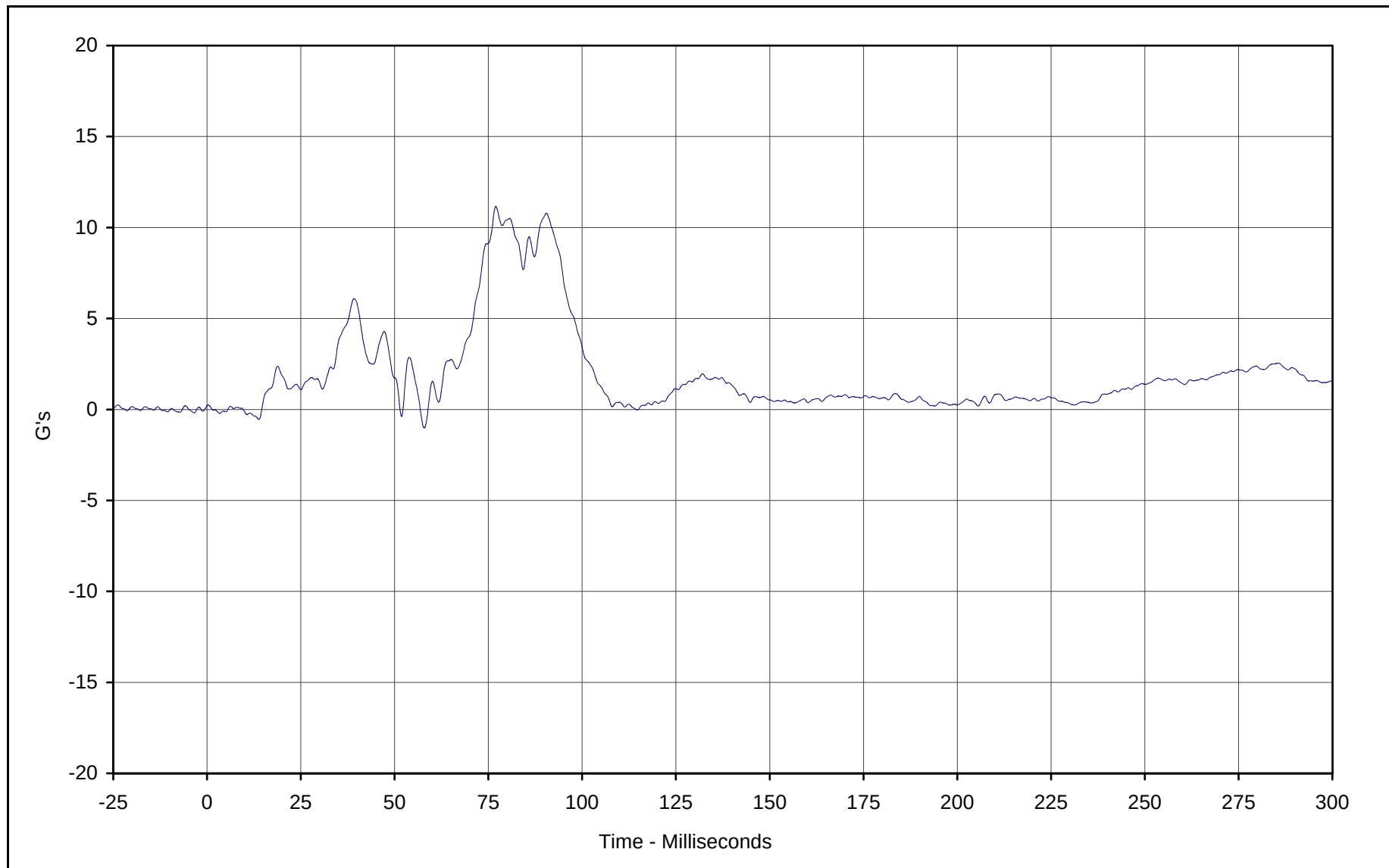


Curve Description: Passenger Chest Primary Y
Maximum Value: 1.6 at 38.6 Milliseconds
Minimum Value: -9.7 at 66.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-058

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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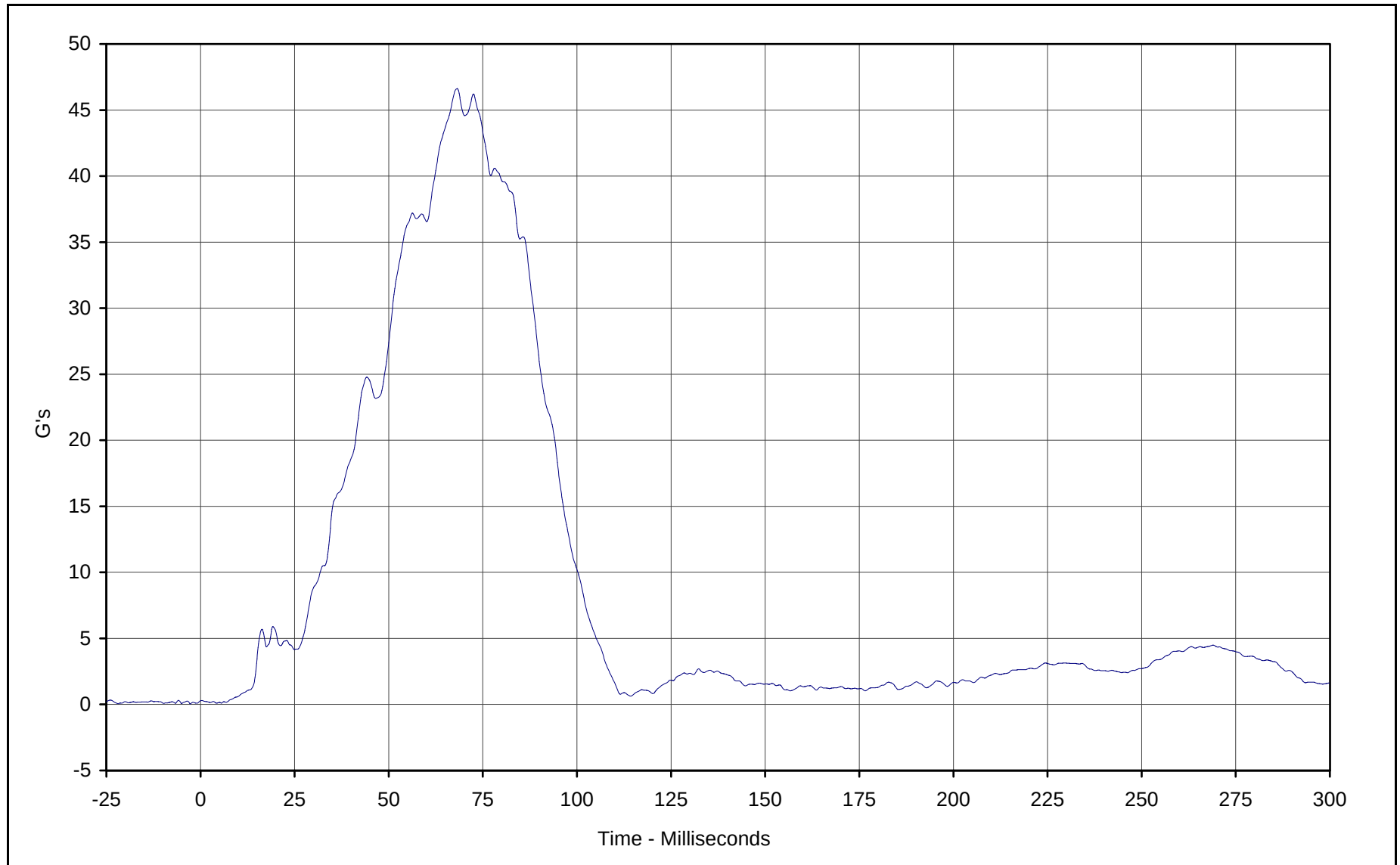


Curve Description: Passenger Chest Primary Z
Maximum Value: 11.2 at 77.0 Milliseconds
Minimum Value: -1.0 at 57.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-059

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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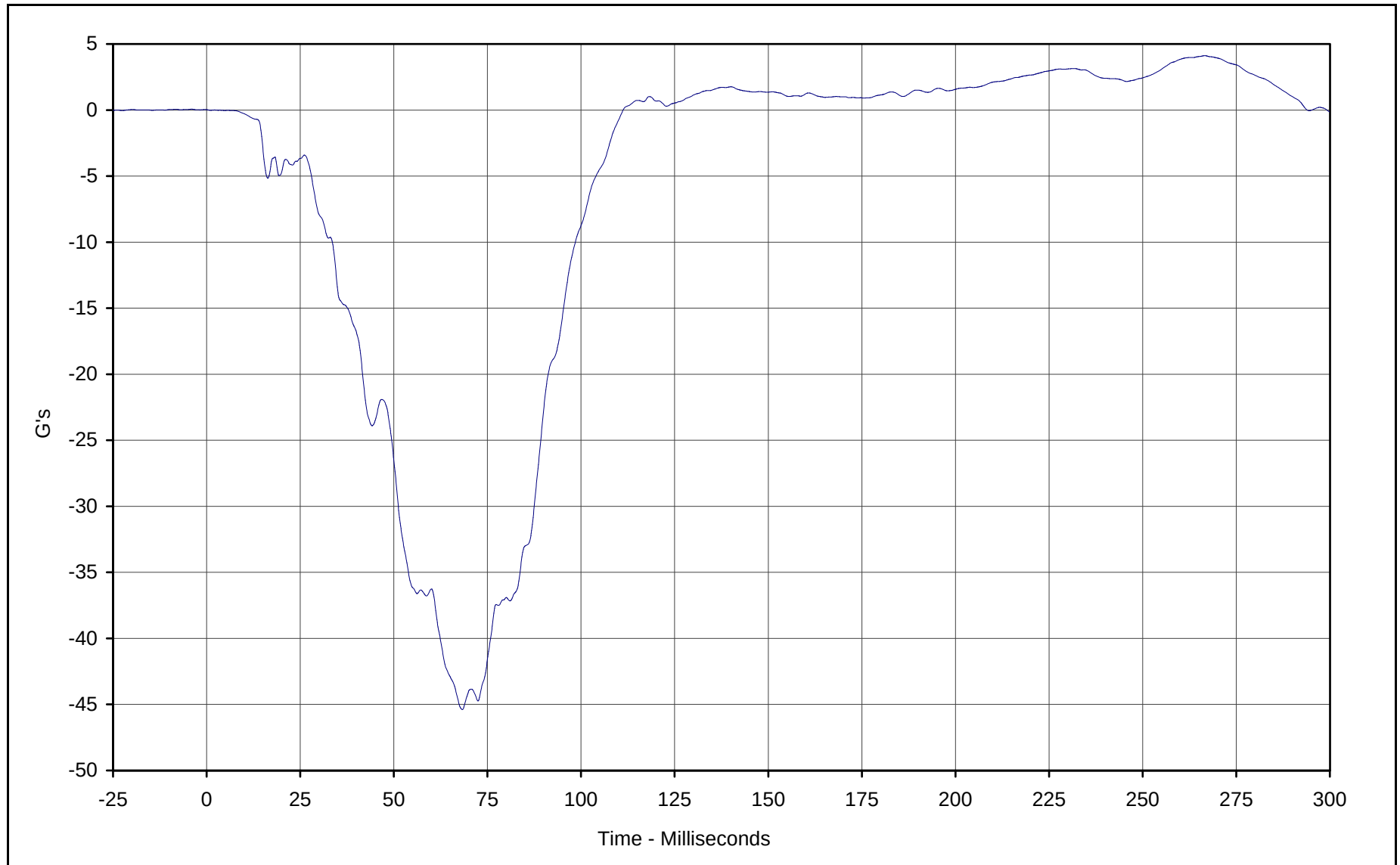
Curve Description: Passenger Chest Resultant Primary
Maximum Value: 46.6 at 68.2 Milliseconds
Minimum Value: 0.1 at 4.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: RES-057

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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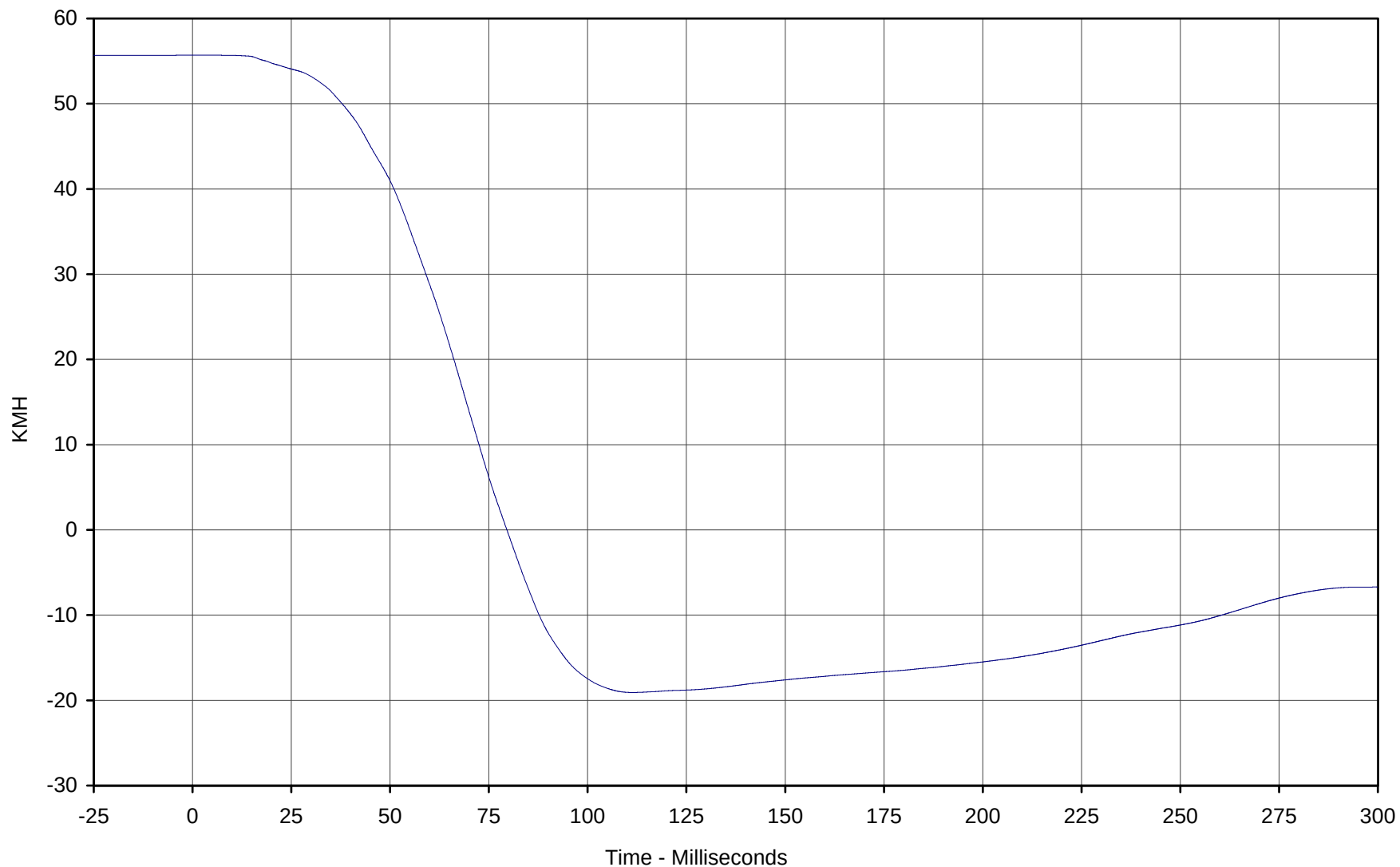
Curve Description: Passenger Chest Redundant X
Maximum Value: 4.1 at 266.6 Milliseconds
Minimum Value: -45.4 at 68.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-060

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Chest Redundant X Velocity

Maximum Value: 55.7 at 0.5 Milliseconds

Minimum Value: -19.1 at 111.2 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

Curve Number: IN1-060

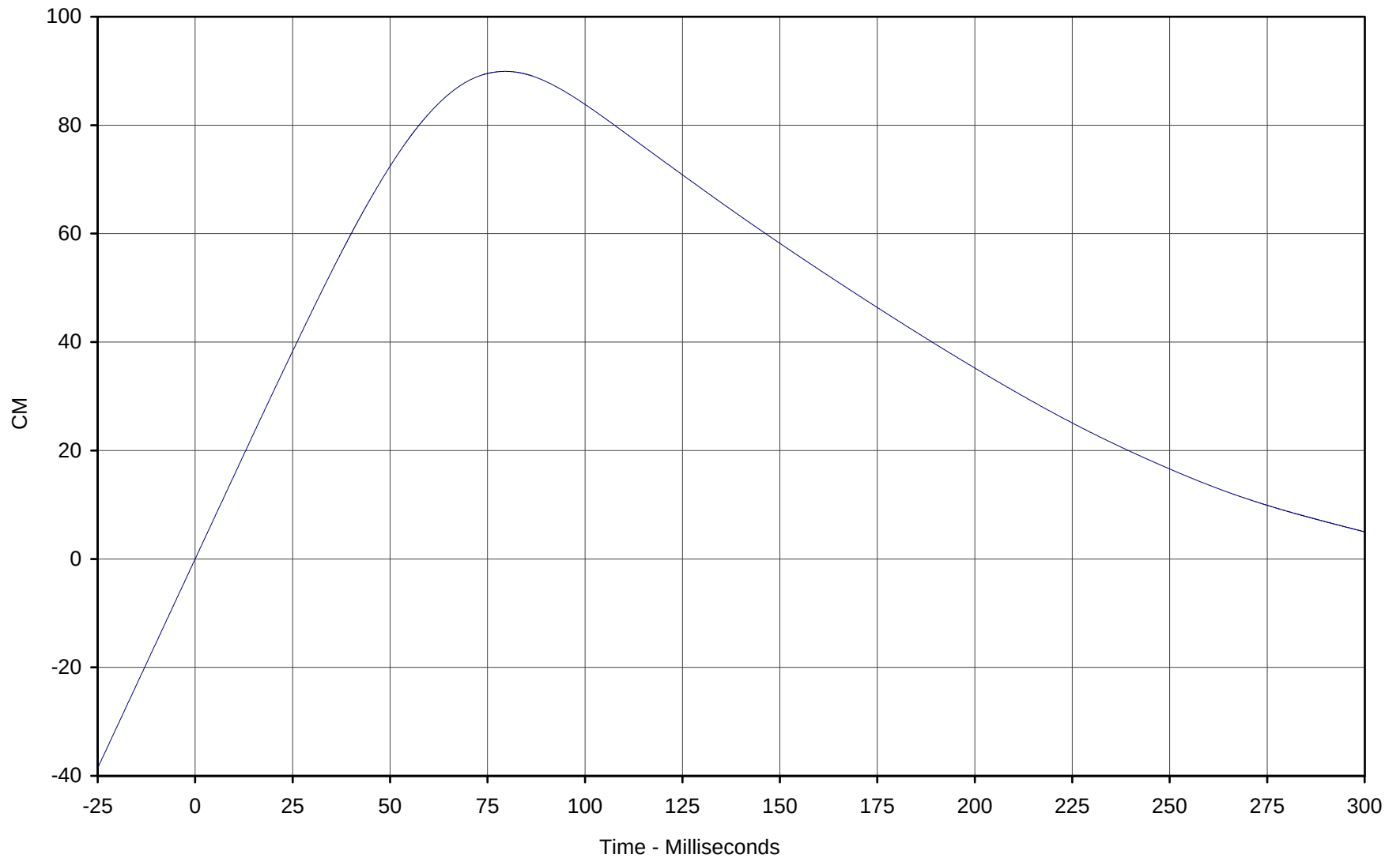
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Chest Redundant X Displ.

Maximum Value: 89.9 at 79.6 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

Curve Number: IN2-060

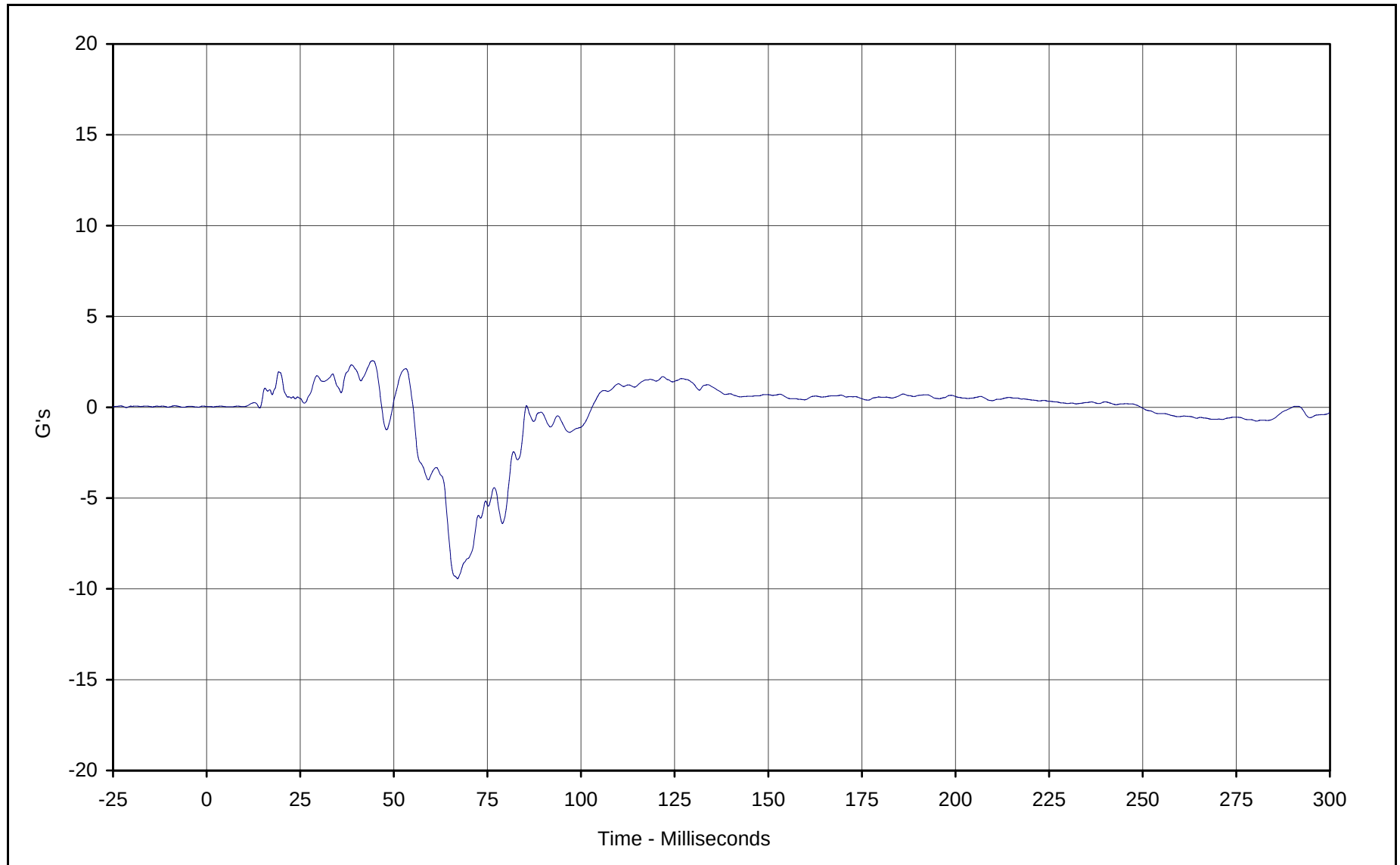
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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B-91



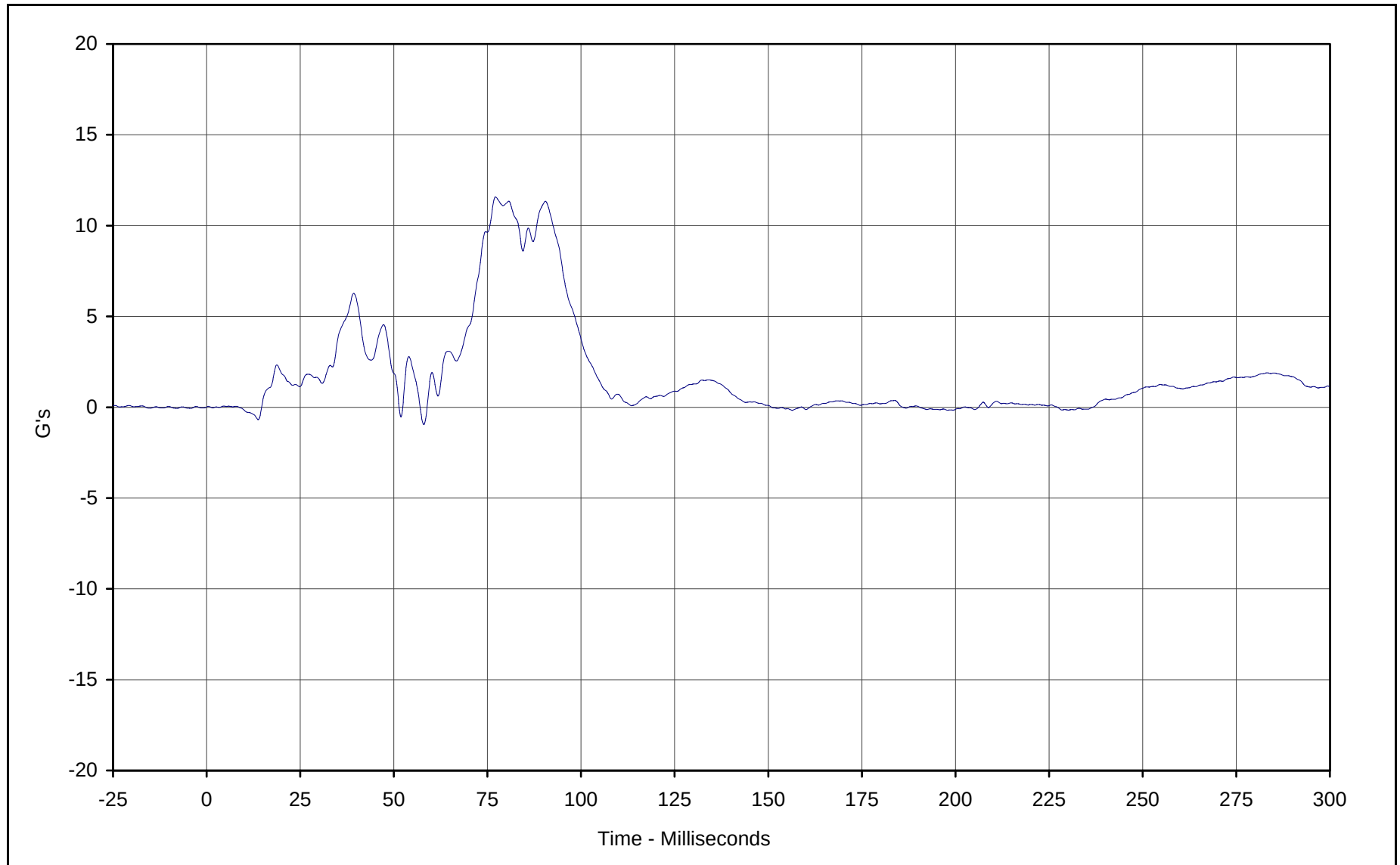
Curve Description: Passenger Chest Redundant Y
Maximum Value: 2.6 at 44.4 Milliseconds
Minimum Value: -9.4 at 67.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-061

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

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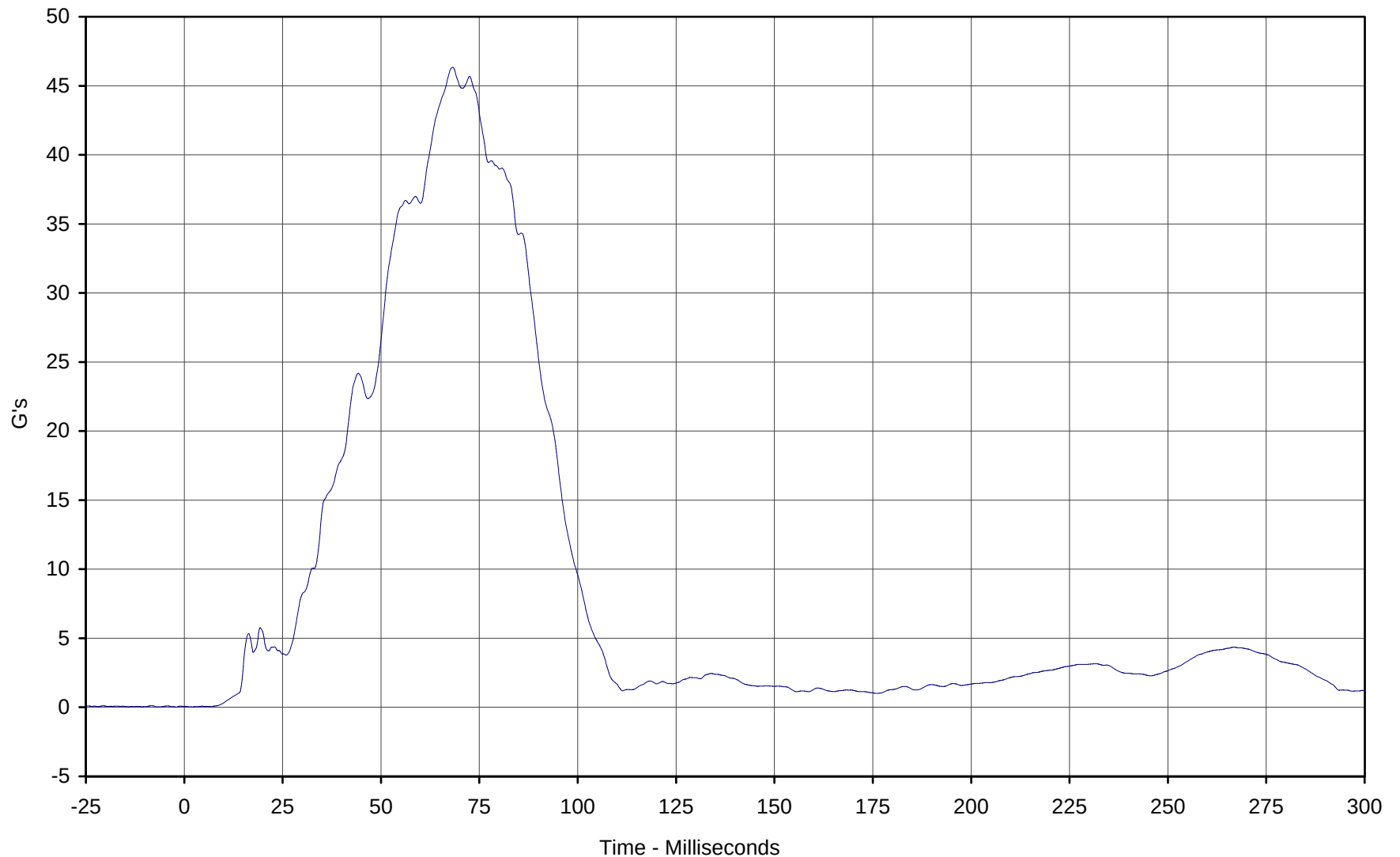
Curve Description: Passenger Chest Redundant Z
Maximum Value: 11.6 at 77.1 Milliseconds
Minimum Value: -0.9 at 58.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-062

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Chest Resultant Redundant

Maximum Value: 46.3 at 68.2 Milliseconds

Minimum Value: 0.0 at 2.1 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

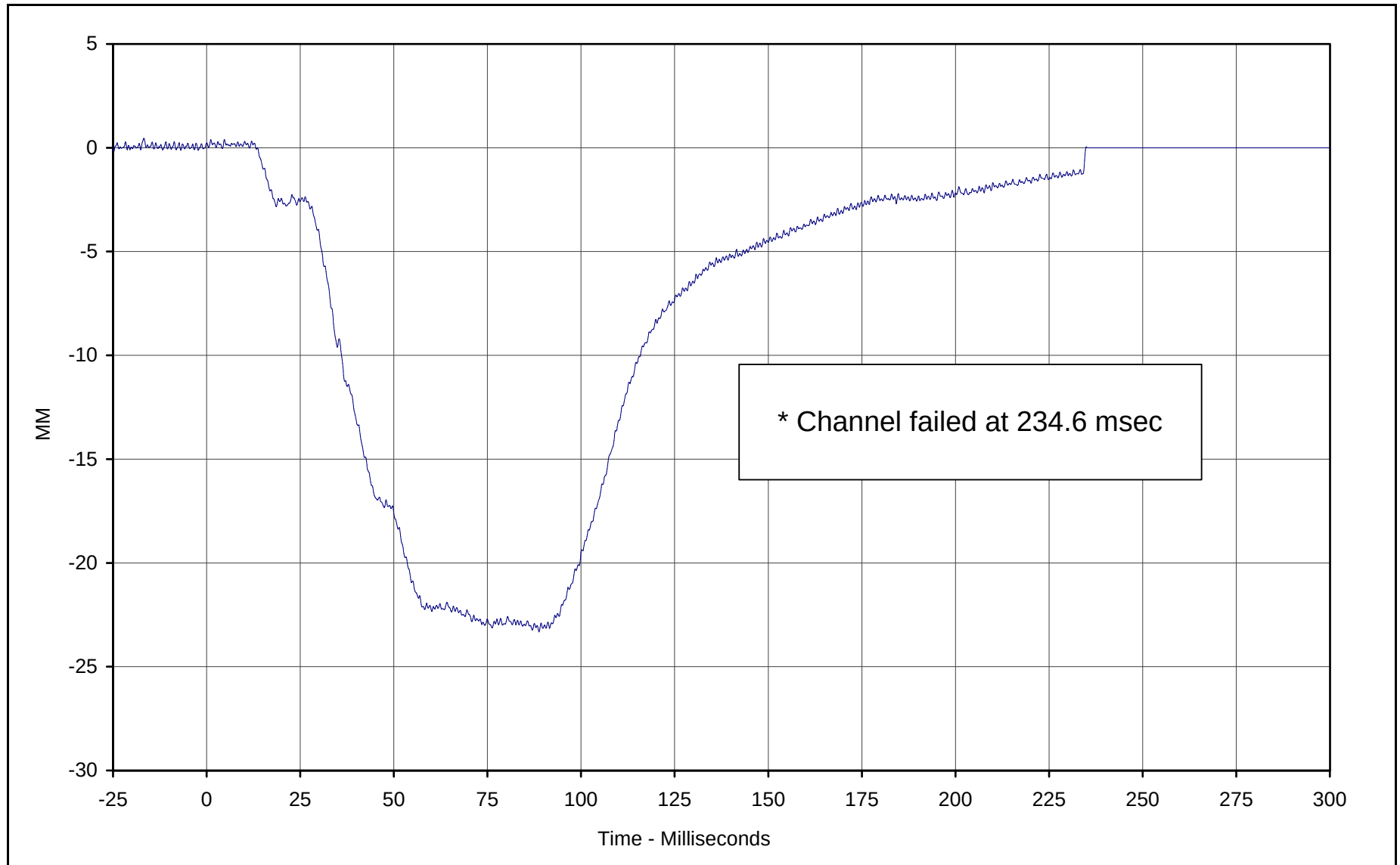
Curve Number: RES-060

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01



Curve Description: Passenger Chest Displacement X *

Maximum Value: 0.4 at 1.1 Milliseconds

Minimum Value: -23.3 at 88.8 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

Curve Number: FIL-063

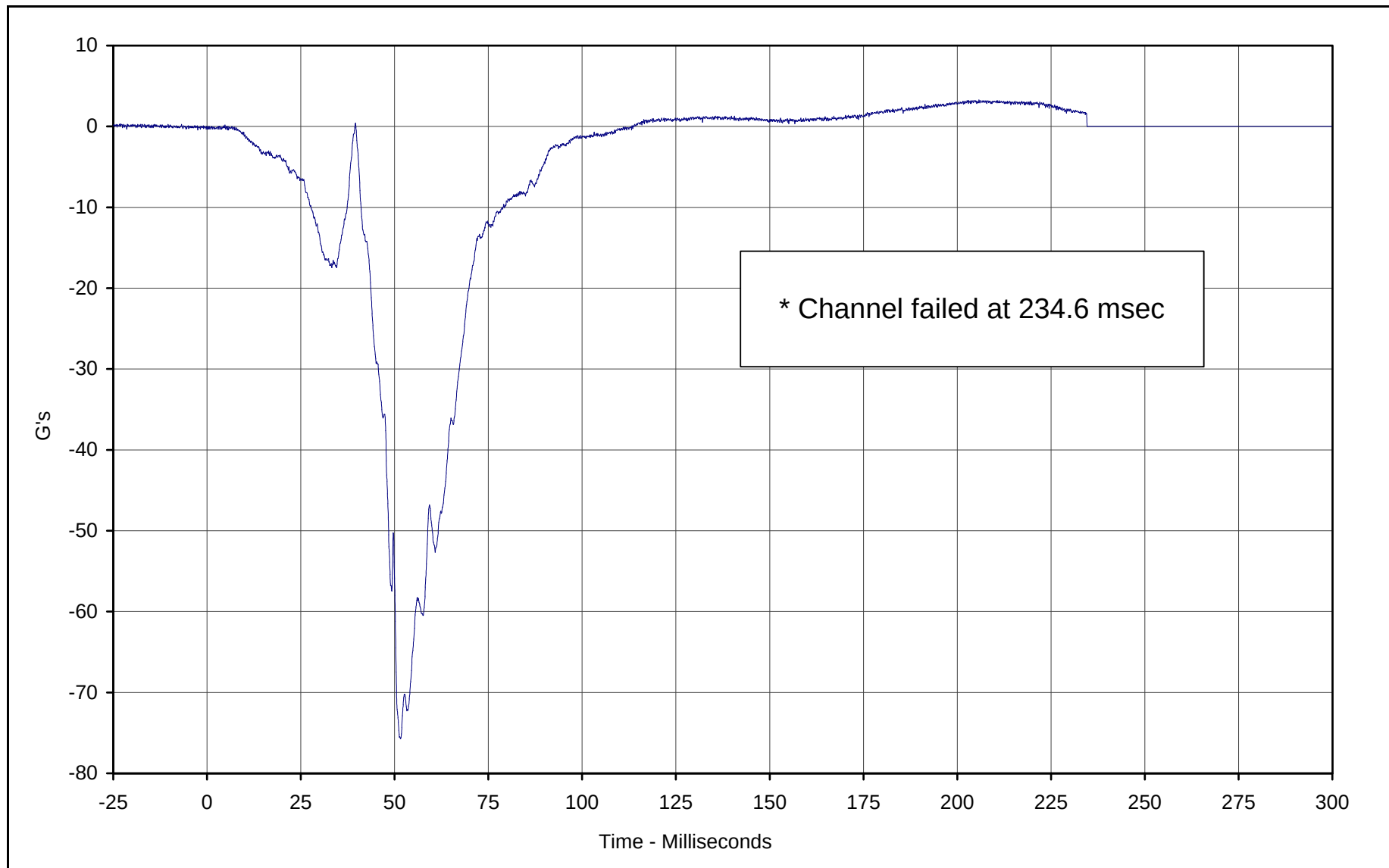
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec



B-95



Curve Description: Passenger Pelvis X *

Maximum Value: 3.3 at 205.8 Milliseconds

Minimum Value: -75.7 at 51.6 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

Curve Number: FIL-064

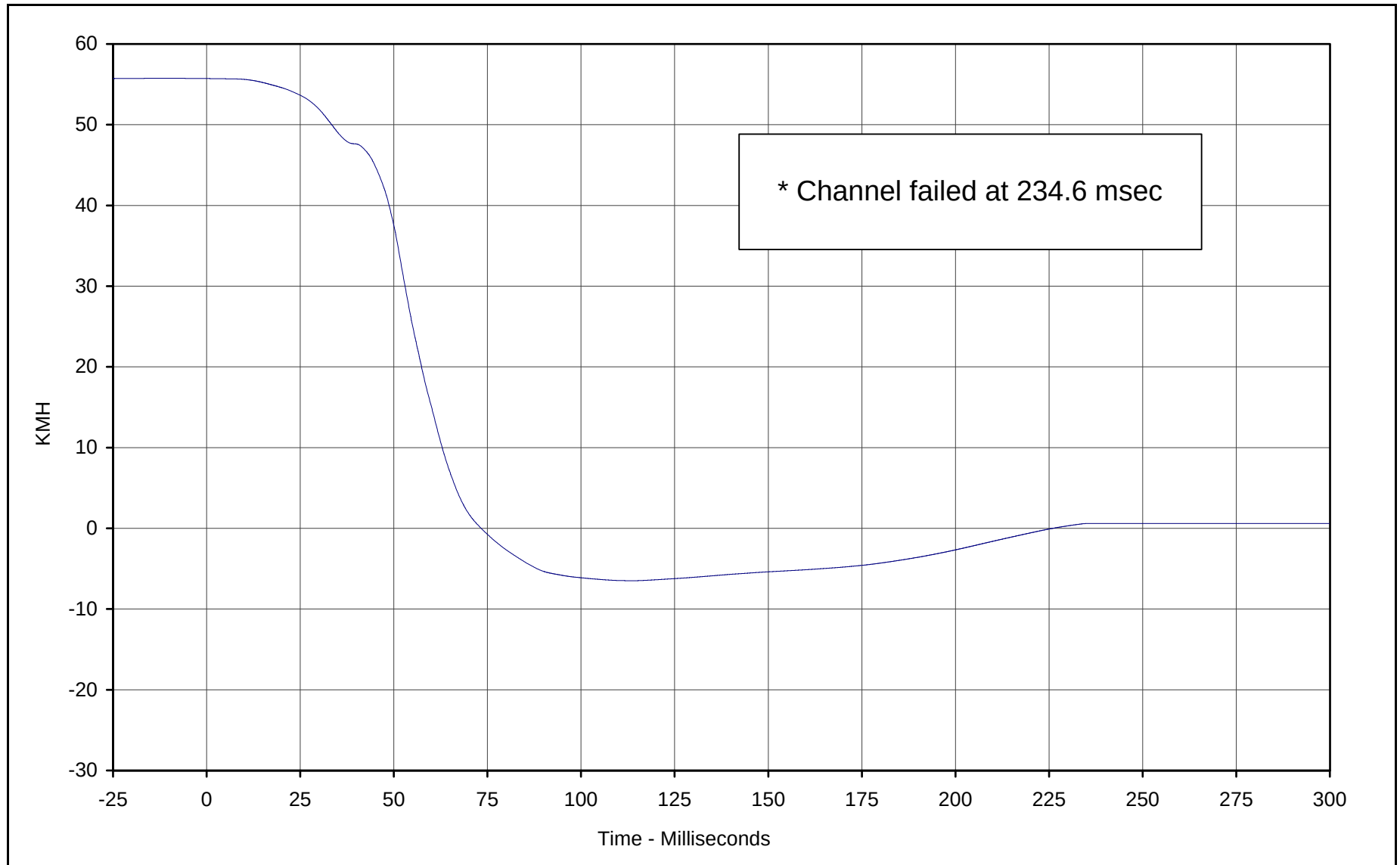
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec



KAR21129-01



Curve Description: Passenger Pelvis X Velocity *

Maximum Value: 55.7 at 0.0 Milliseconds

Minimum Value: -6.5 at 113.6 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

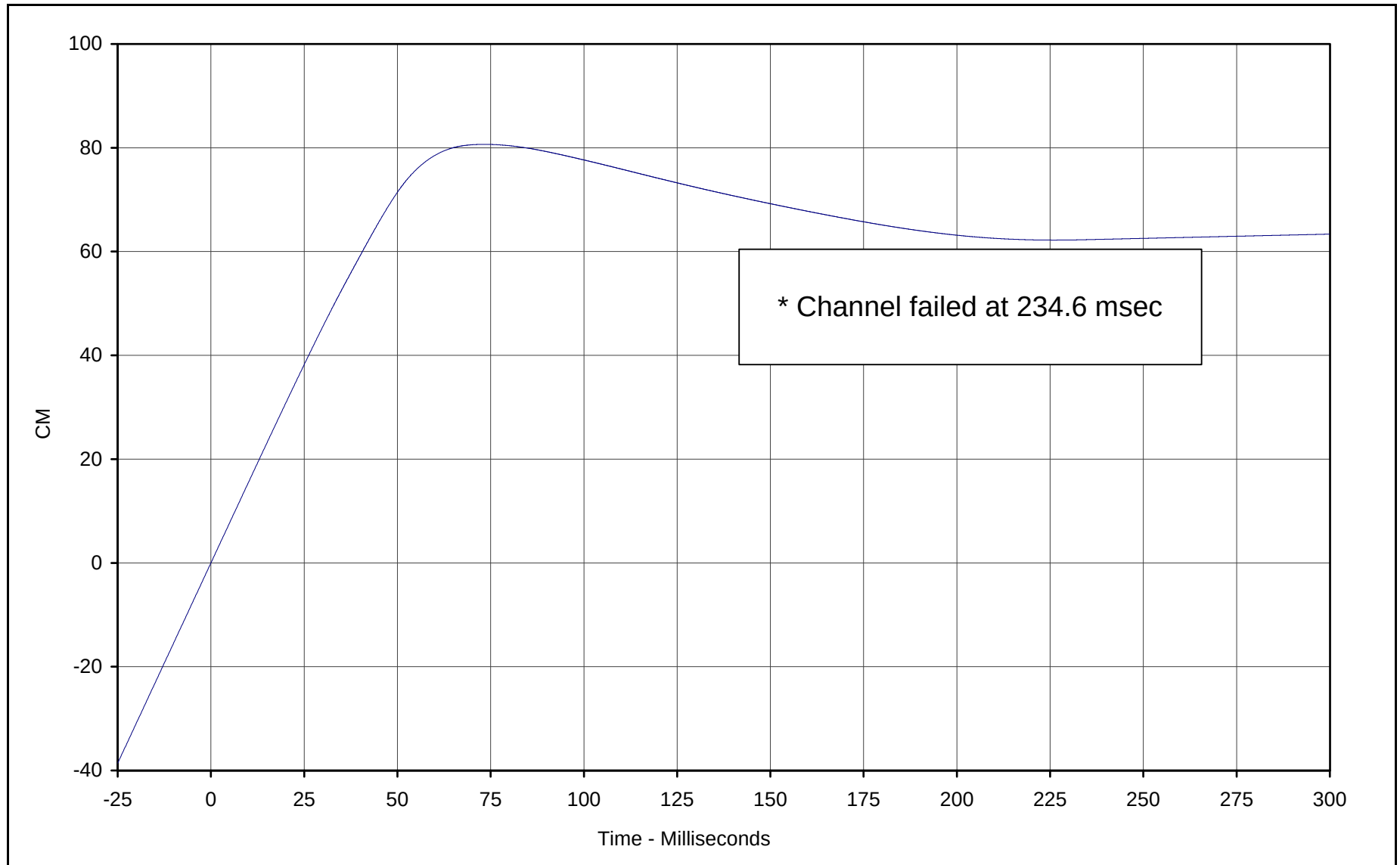
Curve Number: IN1-064

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec





Curve Description: Passenger Pelvis X Displ. *

Maximum Value: 80.7 at 73.3 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

Curve Number: IN2-064

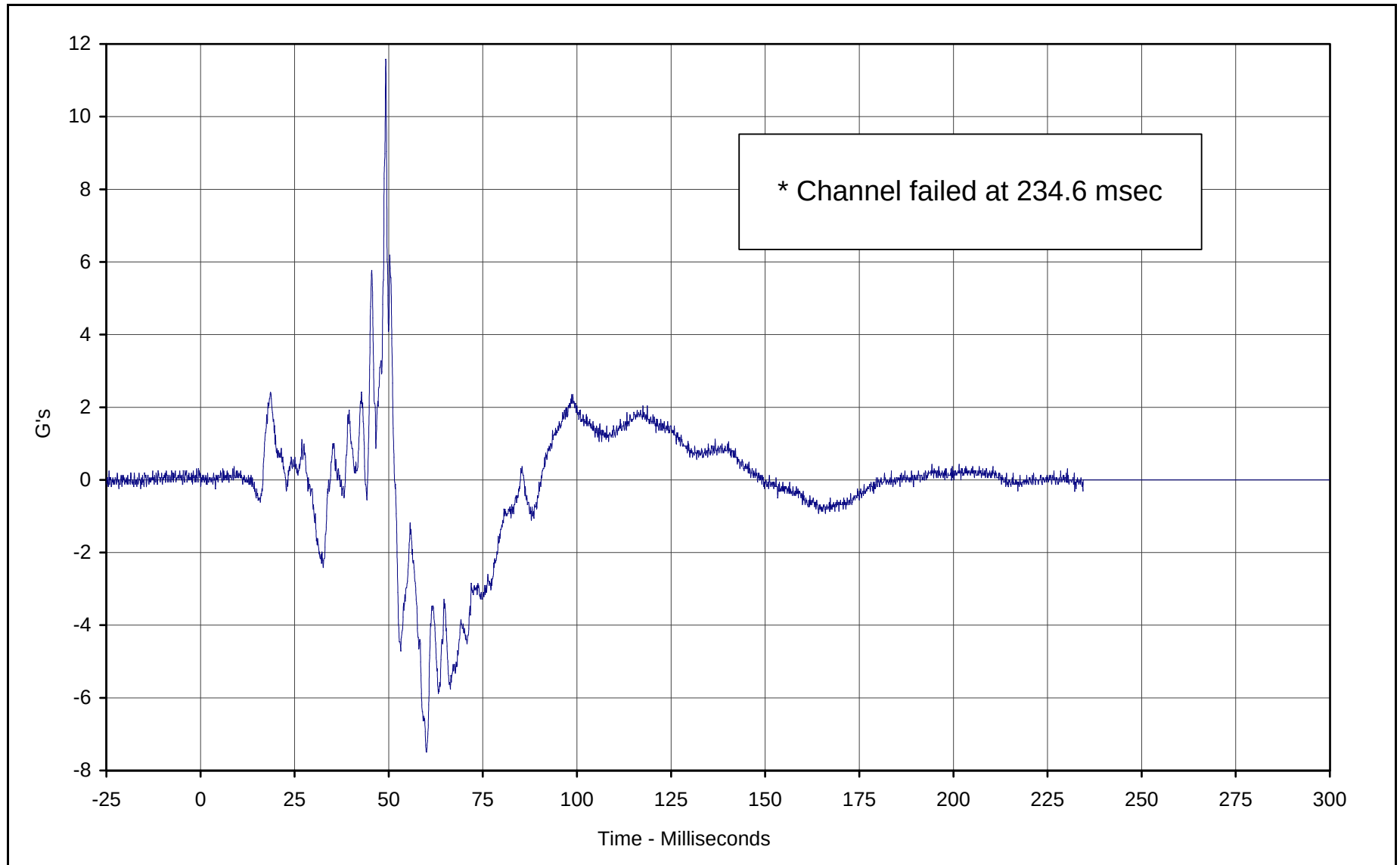
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec



B-98



Curve Description: Passenger Pelvis Y *

Maximum Value: 11.6 at 49.2 Milliseconds

Minimum Value: -7.5 at 60.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

Curve Number: FIL-065

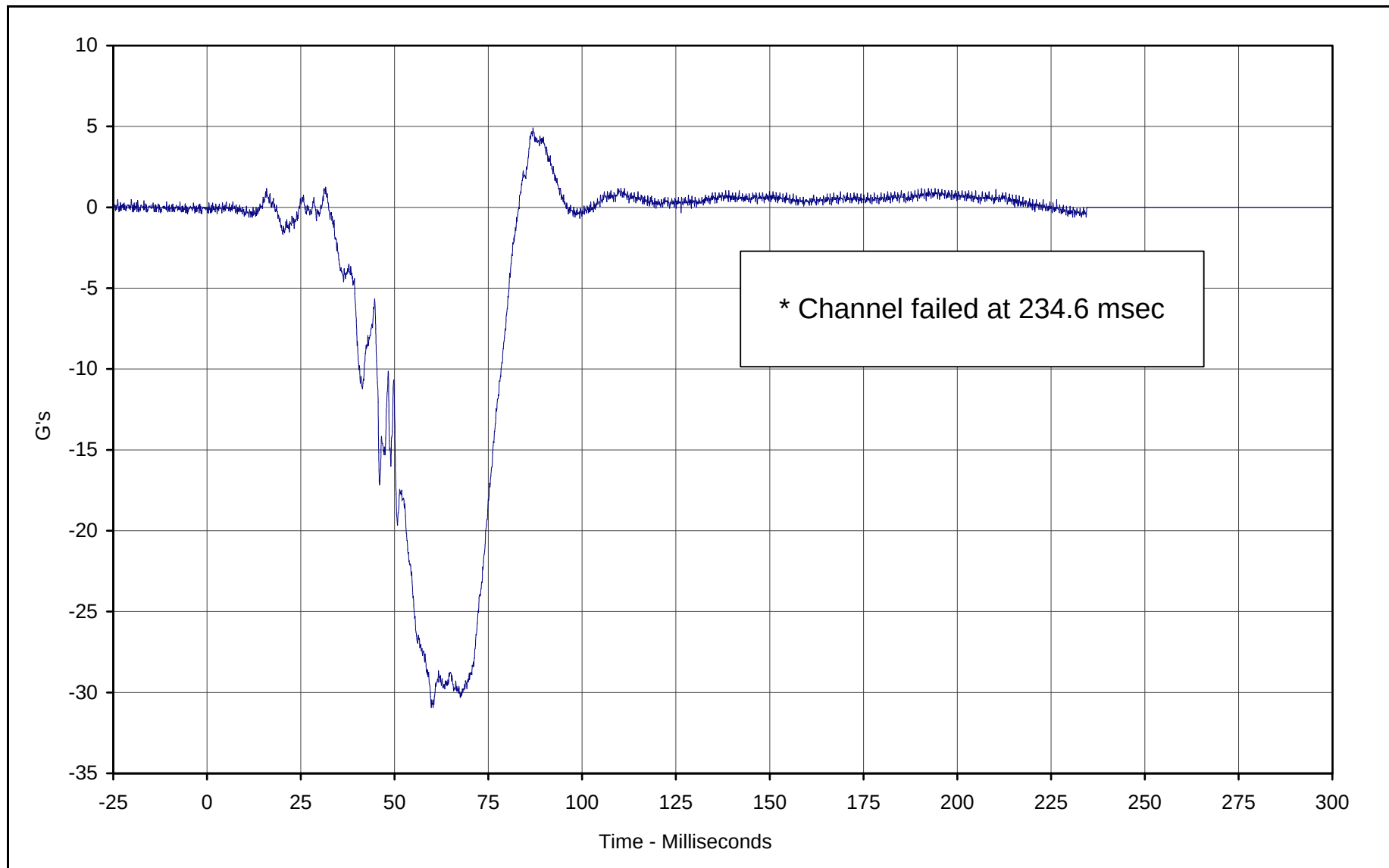
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec



KAR21129-01



Curve Description: Passenger Pelvis Z *

Maximum Value: 4.9 at 86.9 Milliseconds

Minimum Value: -30.9 at 59.8 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

Curve Number: FIL-066

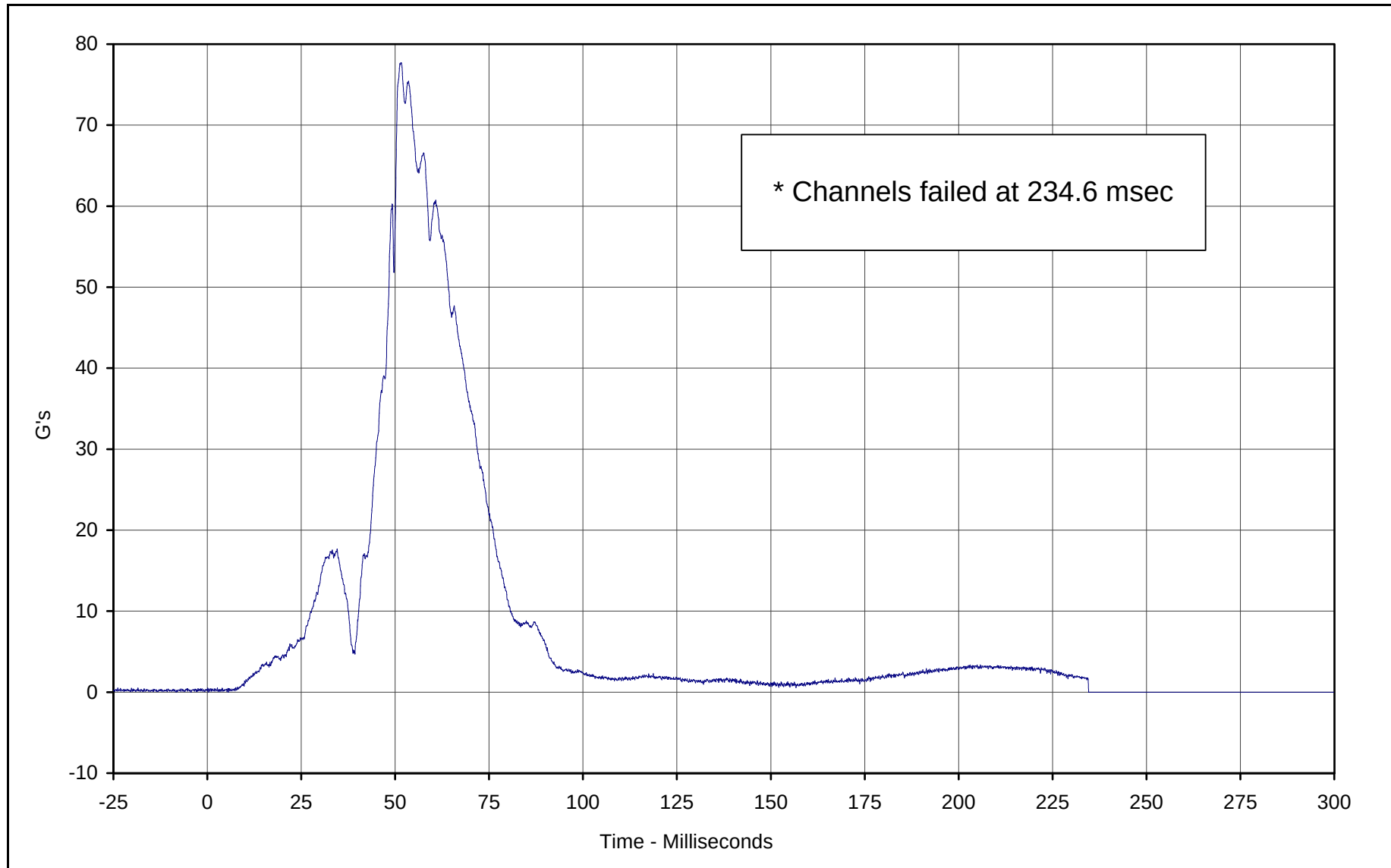
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 234.6 msec



B-100



Curve Description: Passenger Pelvis Resultant *

Maximum Value: 77.7 at 51.6 Milliseconds

Minimum Value: 0.0 at 0.2 Milliseconds

SAE Filter Class: 1000

Date of Test: 12/5/01

Curve Number: RES-064

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

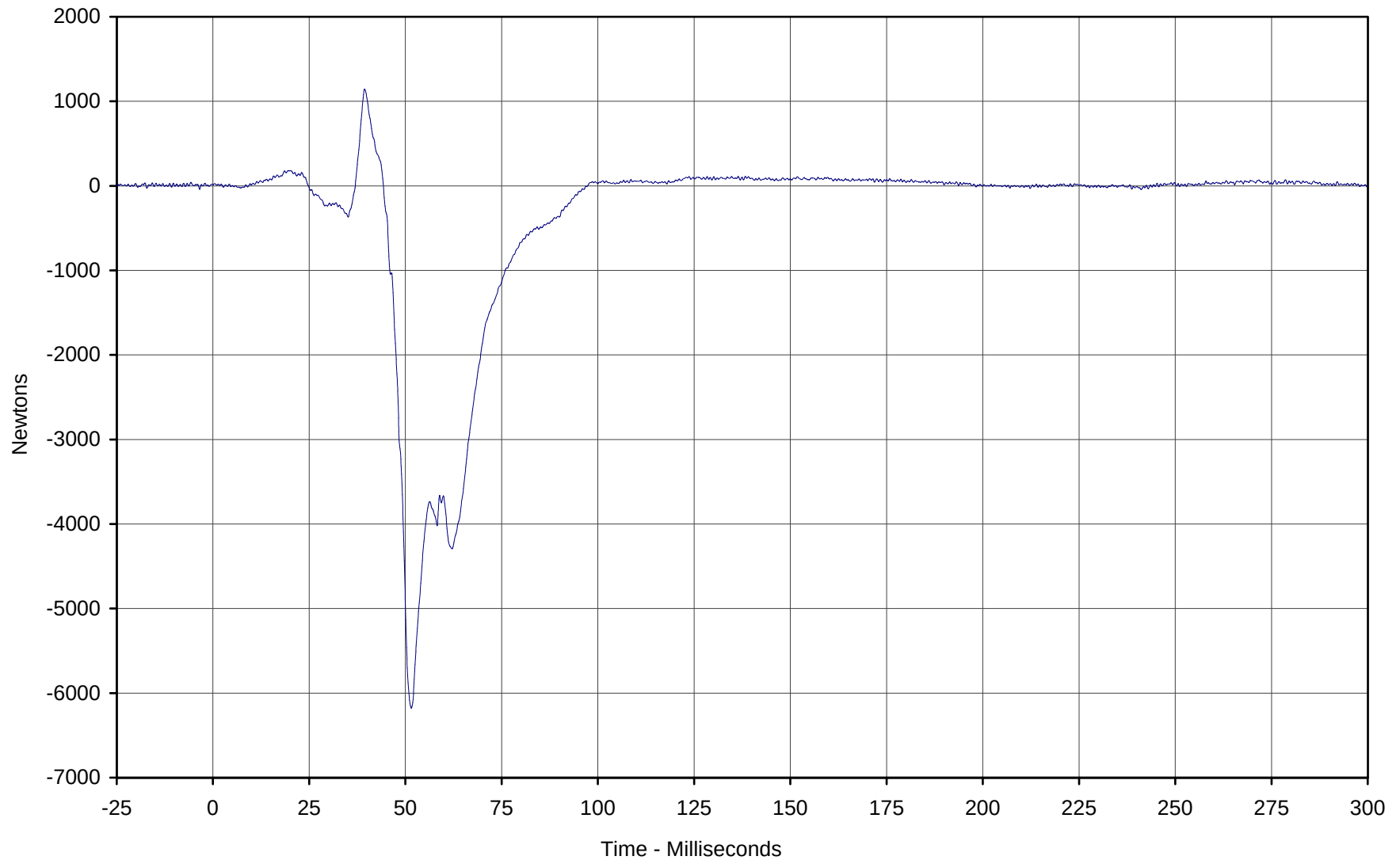
Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channels failed at 234.6 msec



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B-101



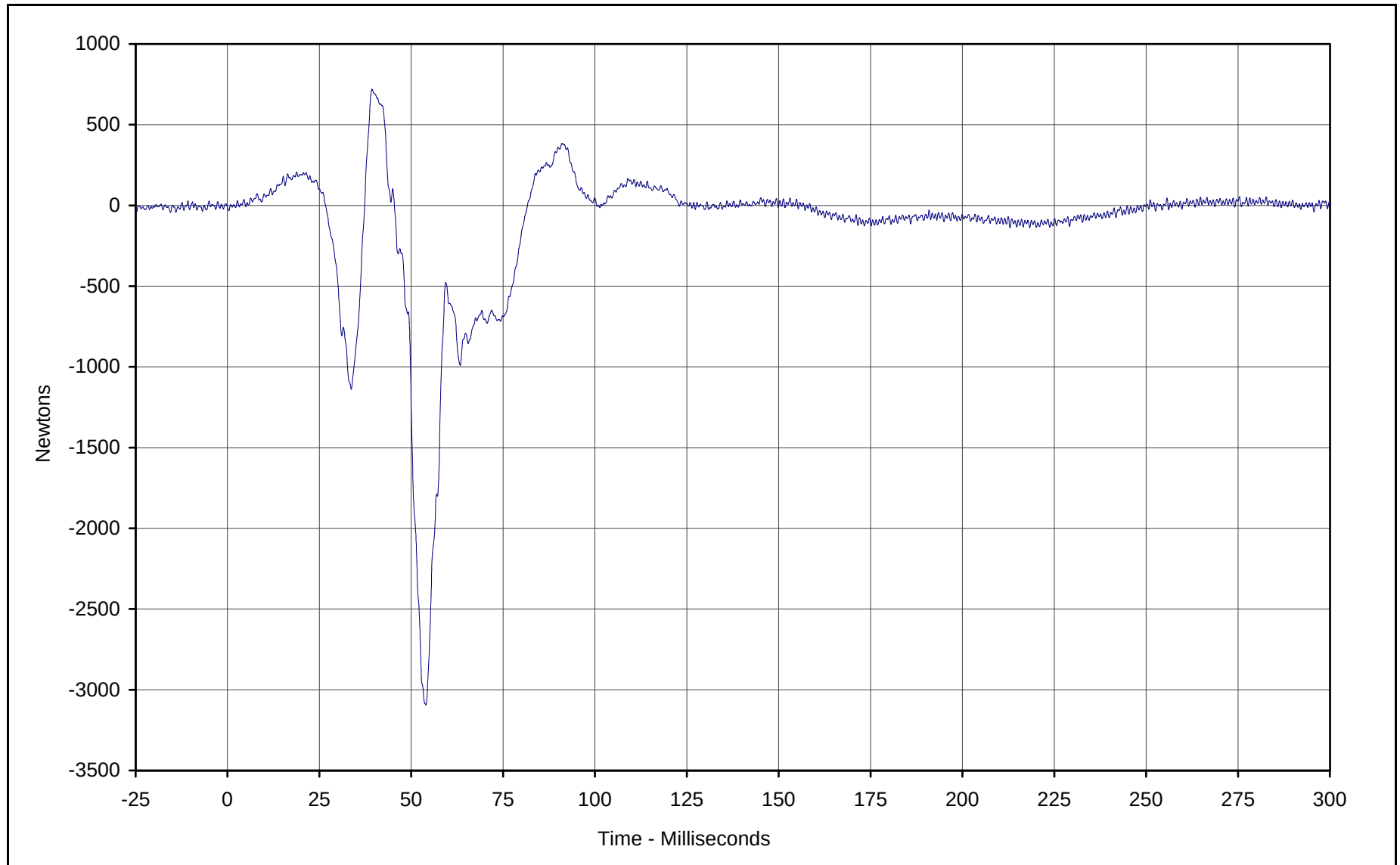
Curve Description: Passenger Left Femur Force
Maximum Value: 1146.7 at 39.4 Milliseconds
Minimum Value: -6179.0 at 51.5 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-067

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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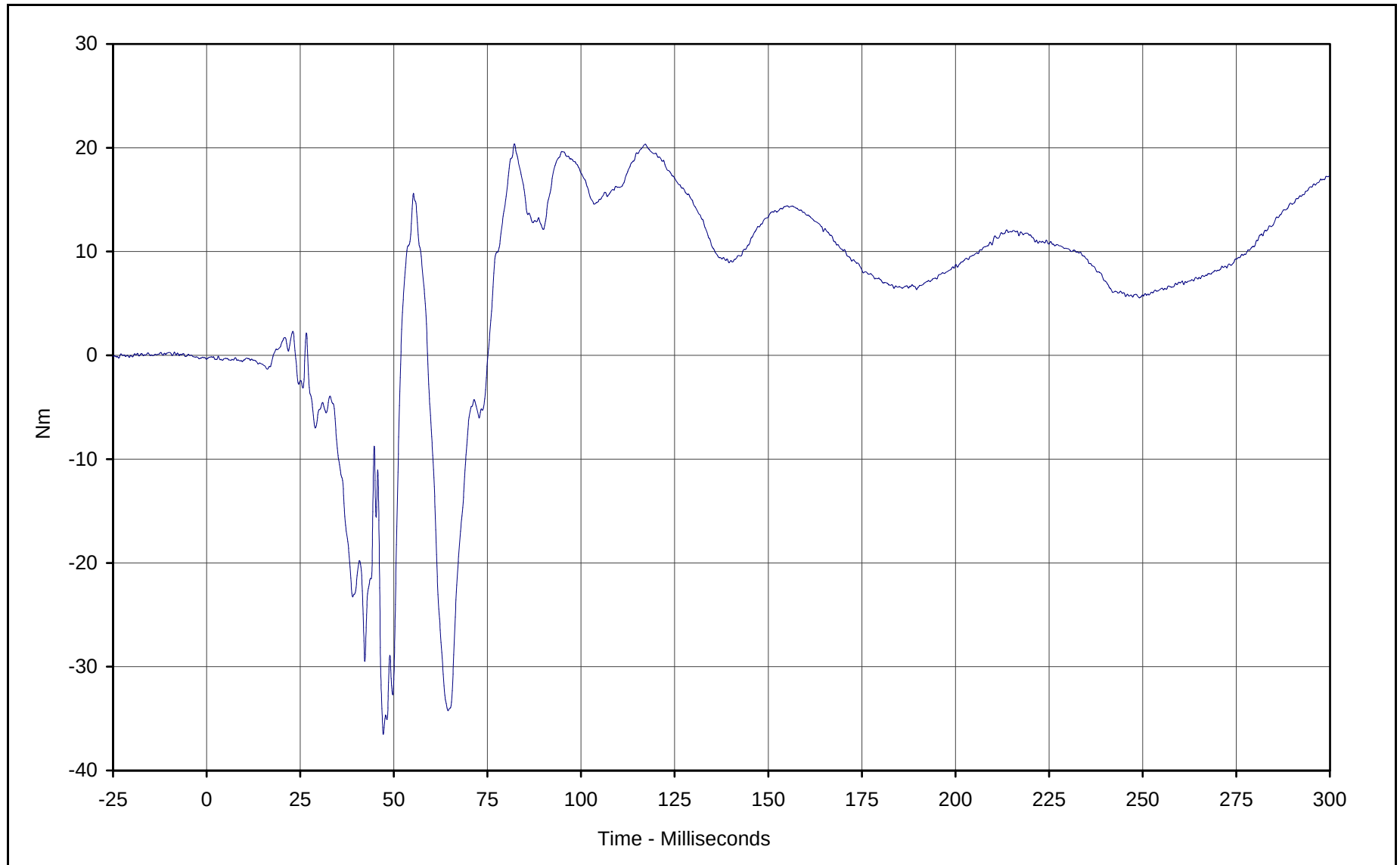
Curve Description: Passenger Right Femur Force
Maximum Value: 720.0 at 39.3 Milliseconds
Minimum Value: -3093.6 at 54.0 Milliseconds
SAE Filter Class: 600
Date of Test: 12/5/01
Curve Number: FIL-068

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Left Upper Tibia Moment X

Maximum Value: 20.4 at 82.2 Milliseconds

Minimum Value: -36.5 at 47.2 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

Curve Number: FIL-069

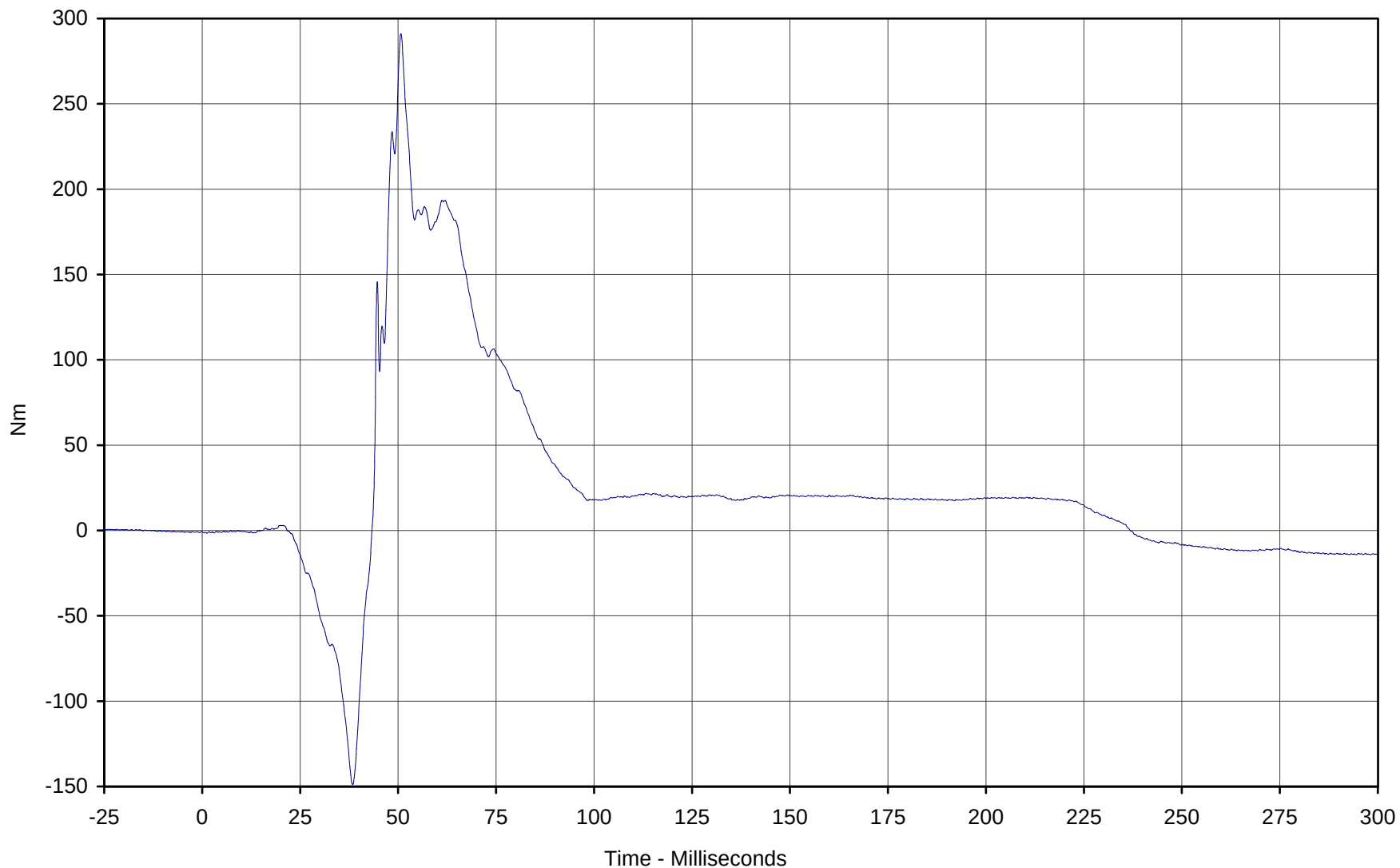
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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B-104



Curve Description: Passenger Left Upper Tibia Moment Y

Maximum Value: 291.1 at 50.7 Milliseconds

Minimum Value: -148.8 at 38.4 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

Curve Number: FIL-070

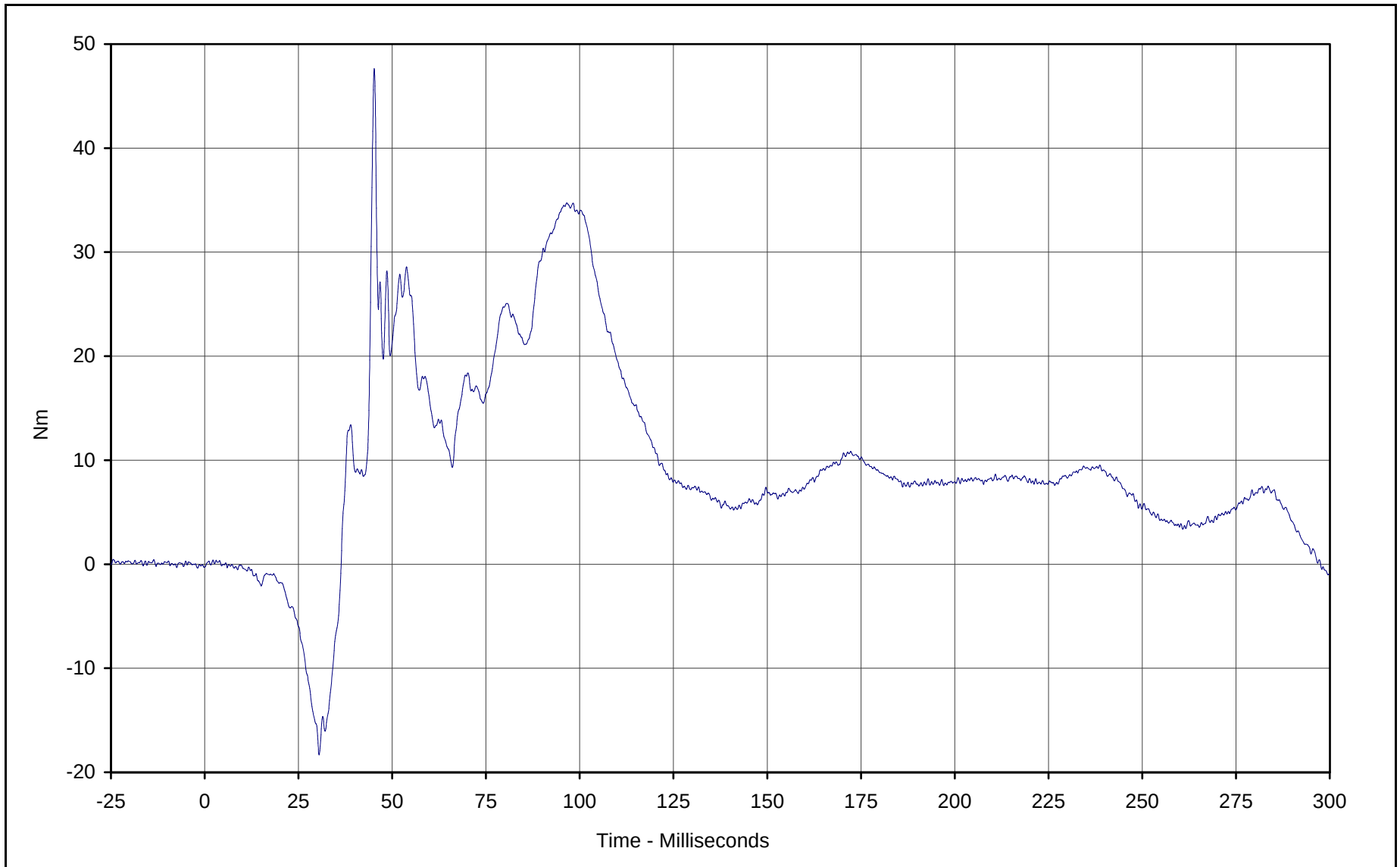
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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B-105



Curve Description: Passenger Right Upper Tibia Moment X

Maximum Value: 47.6 at 45.2 Milliseconds

Minimum Value: -18.3 at 30.5 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

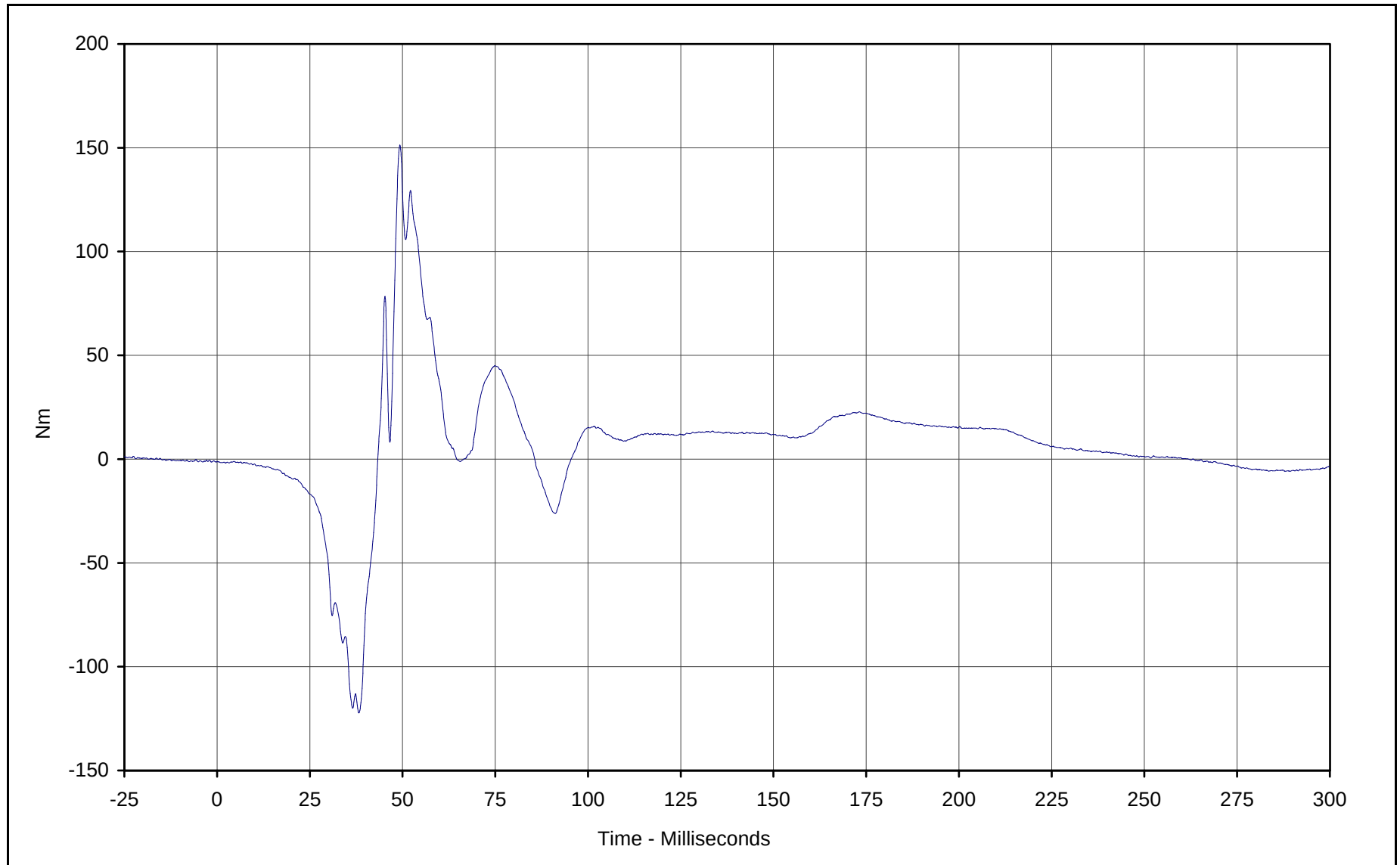
Curve Number: FIL-071

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Right Upper Tibia Moment Y

Maximum Value: 151.3 at 49.3 Milliseconds

Minimum Value: -122.3 at 38.2 Milliseconds

SAE Filter Class: 600

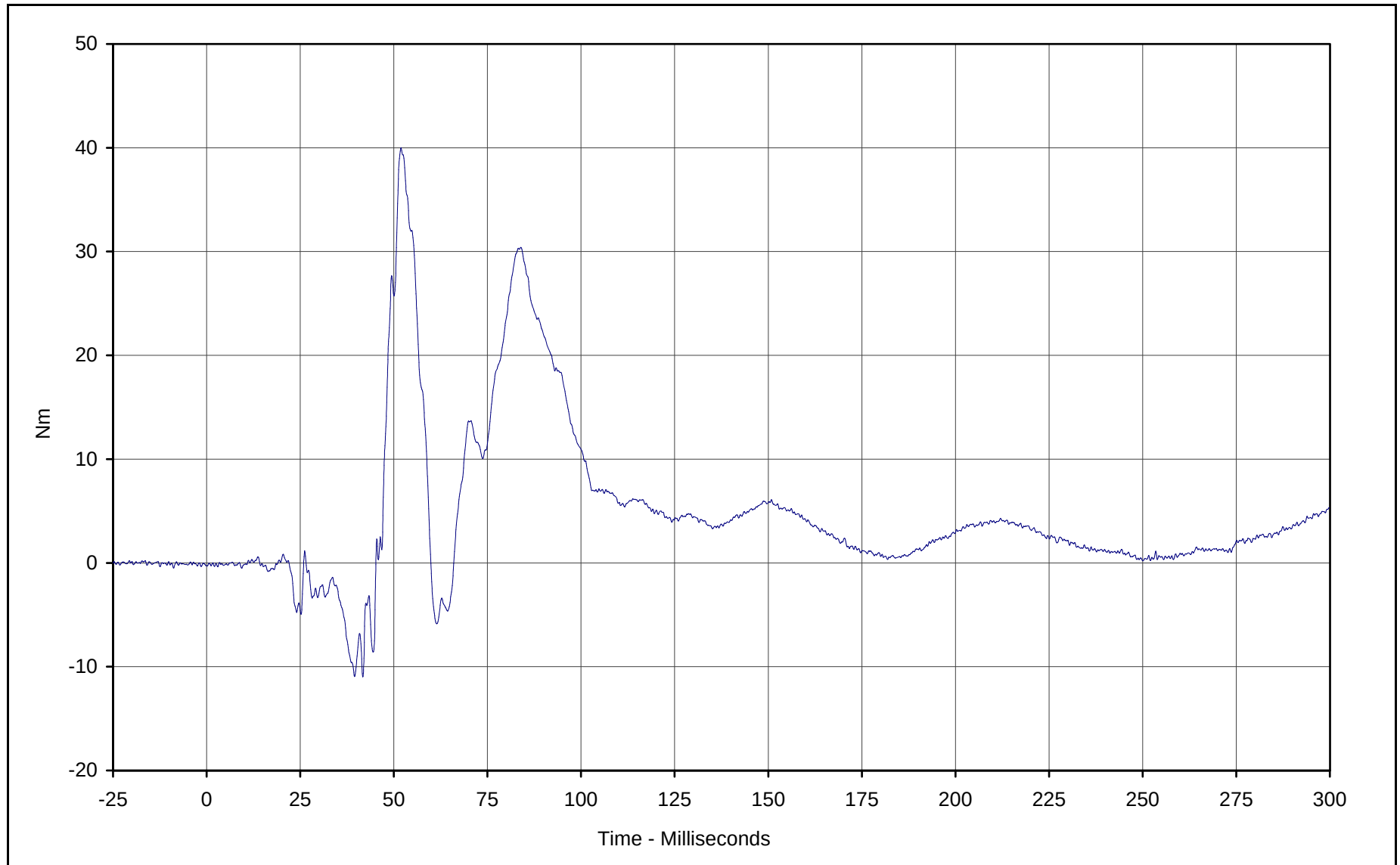
Date of Test: 12/5/01

Curve Number: FIL-072

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan





Curve Description: Passenger Left Lower Tibia Moment X

Maximum Value: 40.0 at 51.9 Milliseconds

Minimum Value: -11.0 at 41.7 Milliseconds

SAE Filter Class: 600

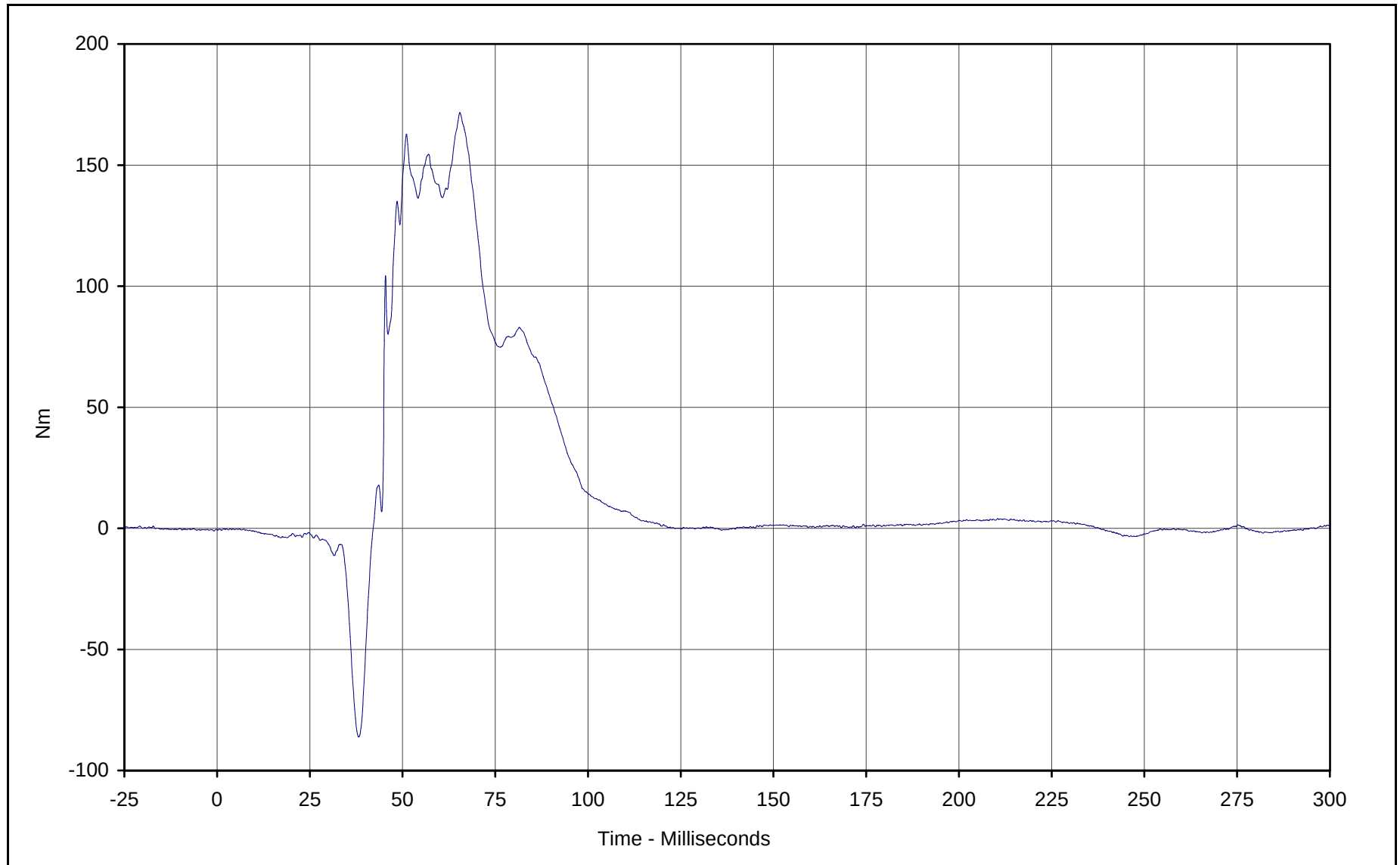
Date of Test: 12/5/01

Curve Number: FIL-073

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan





Curve Description: Passenger Left Lower Tibia Moment Y

Maximum Value: 171.7 at 65.5 Milliseconds

Minimum Value: -86.2 at 38.2 Milliseconds

SAE Filter Class: 600

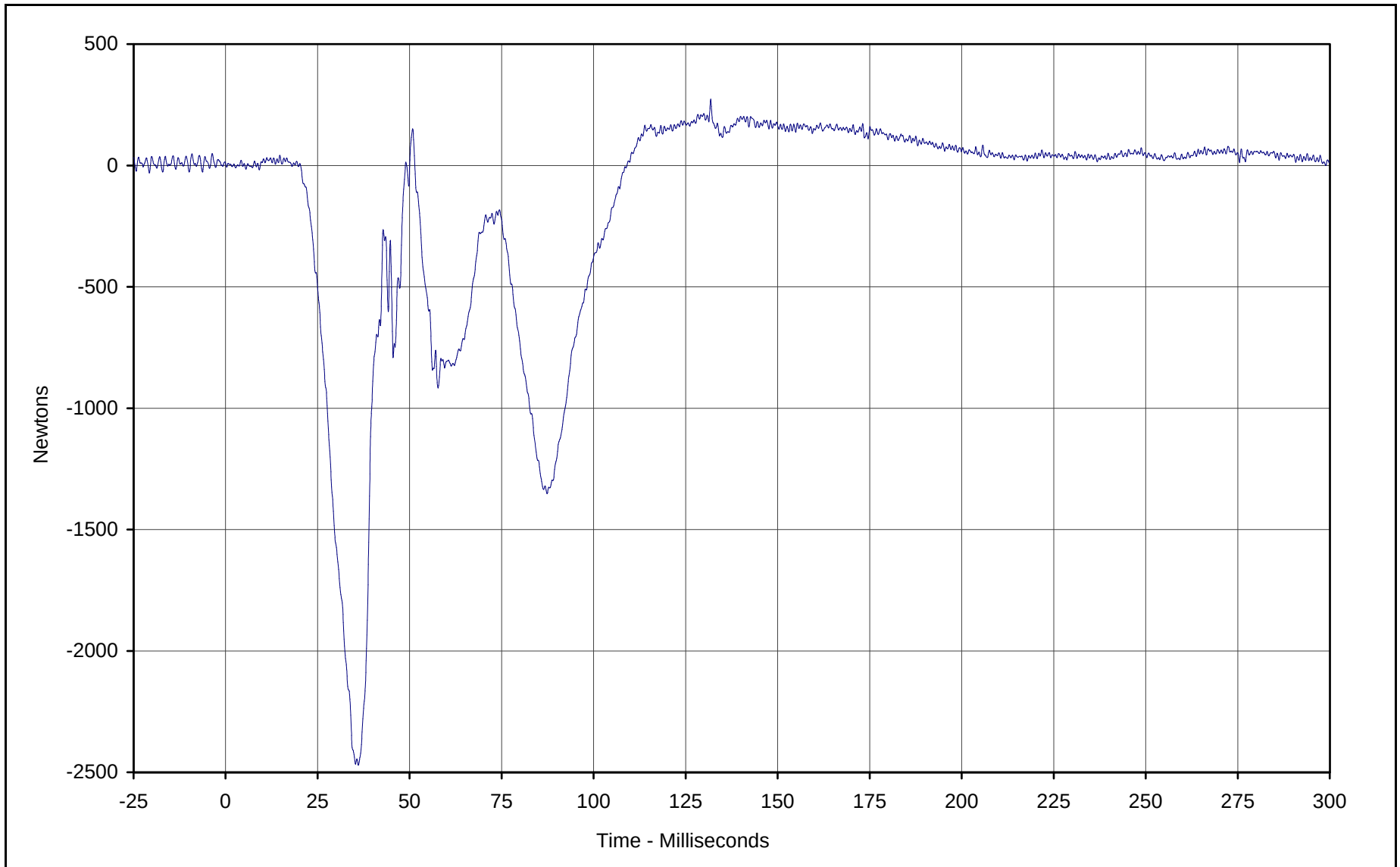
Date of Test: 12/5/01

Curve Number: FIL-074

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan





Curve Description: Passenger Left Lower Tibia Force Z

Maximum Value: 273.7 at 131.8 Milliseconds

Minimum Value: -2471.1 at 36.1 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

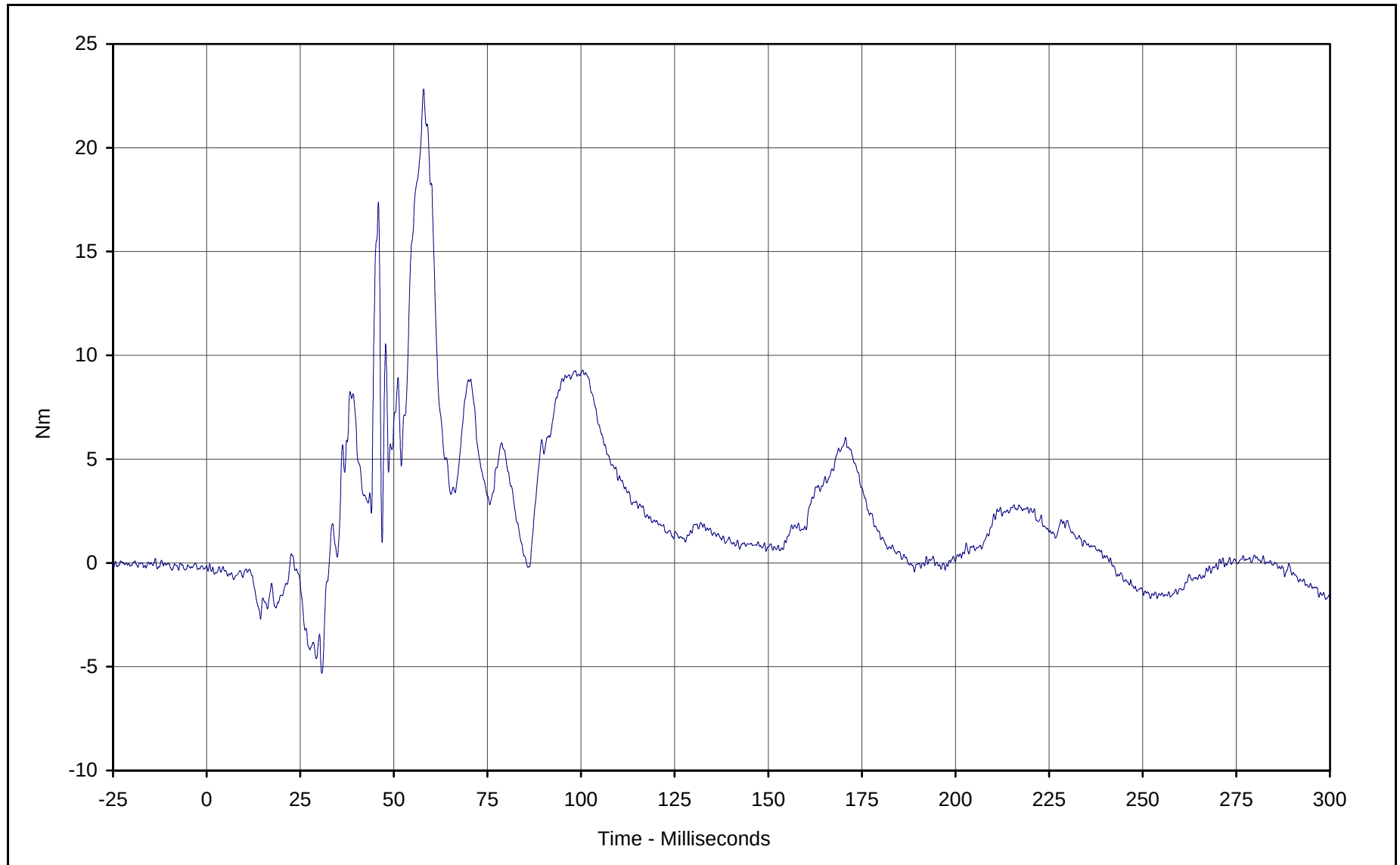
Curve Number: FIL-075

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Right Lower Tibia Moment X

Maximum Value: 22.8 at 57.9 Milliseconds

Minimum Value: -5.3 at 30.7 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

Curve Number: FIL-076

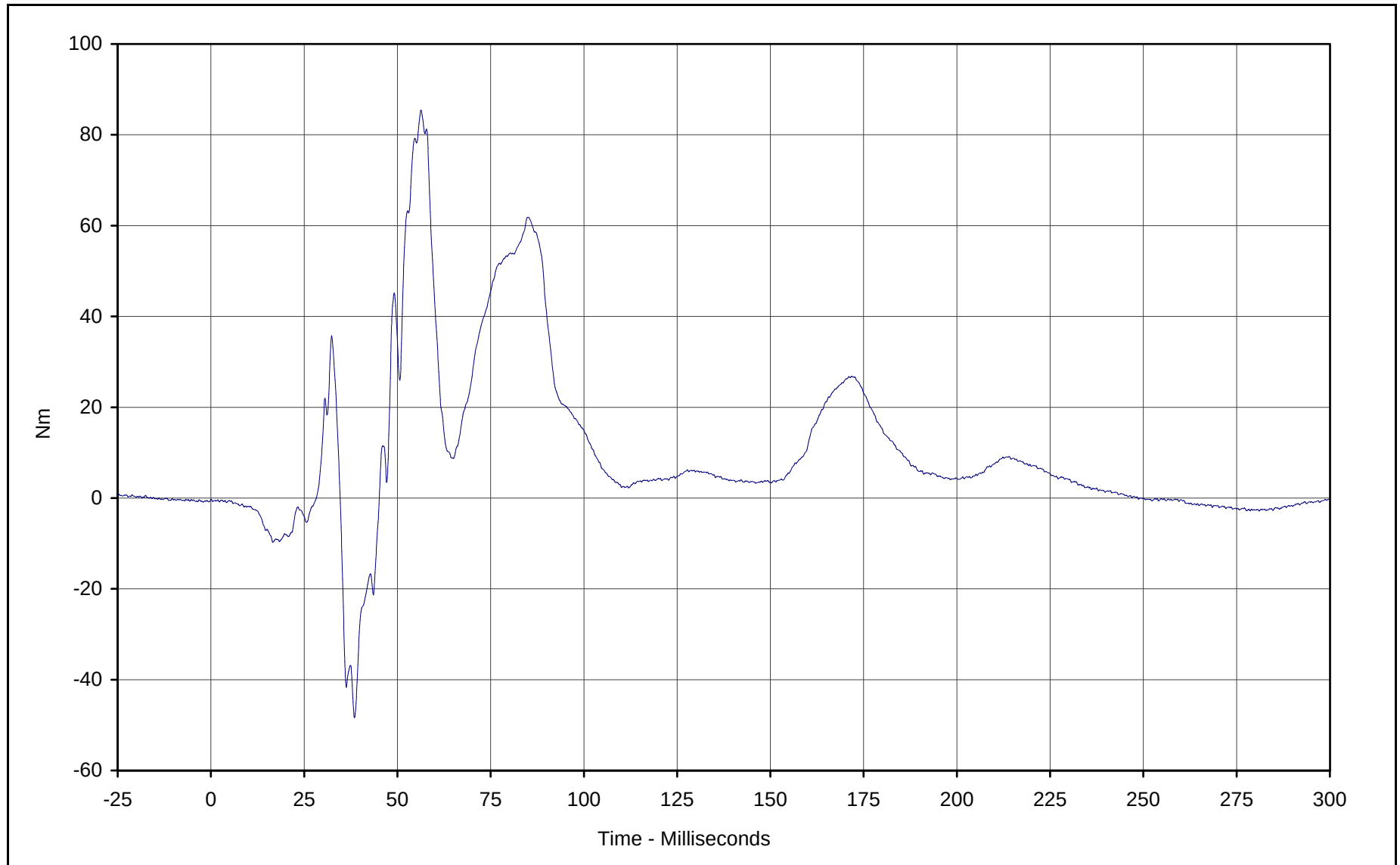
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Right Lower Tibia Moment Y

Maximum Value: 85.5 at 56.3 Milliseconds

Minimum Value: -48.4 at 38.5 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

Curve Number: FIL-077

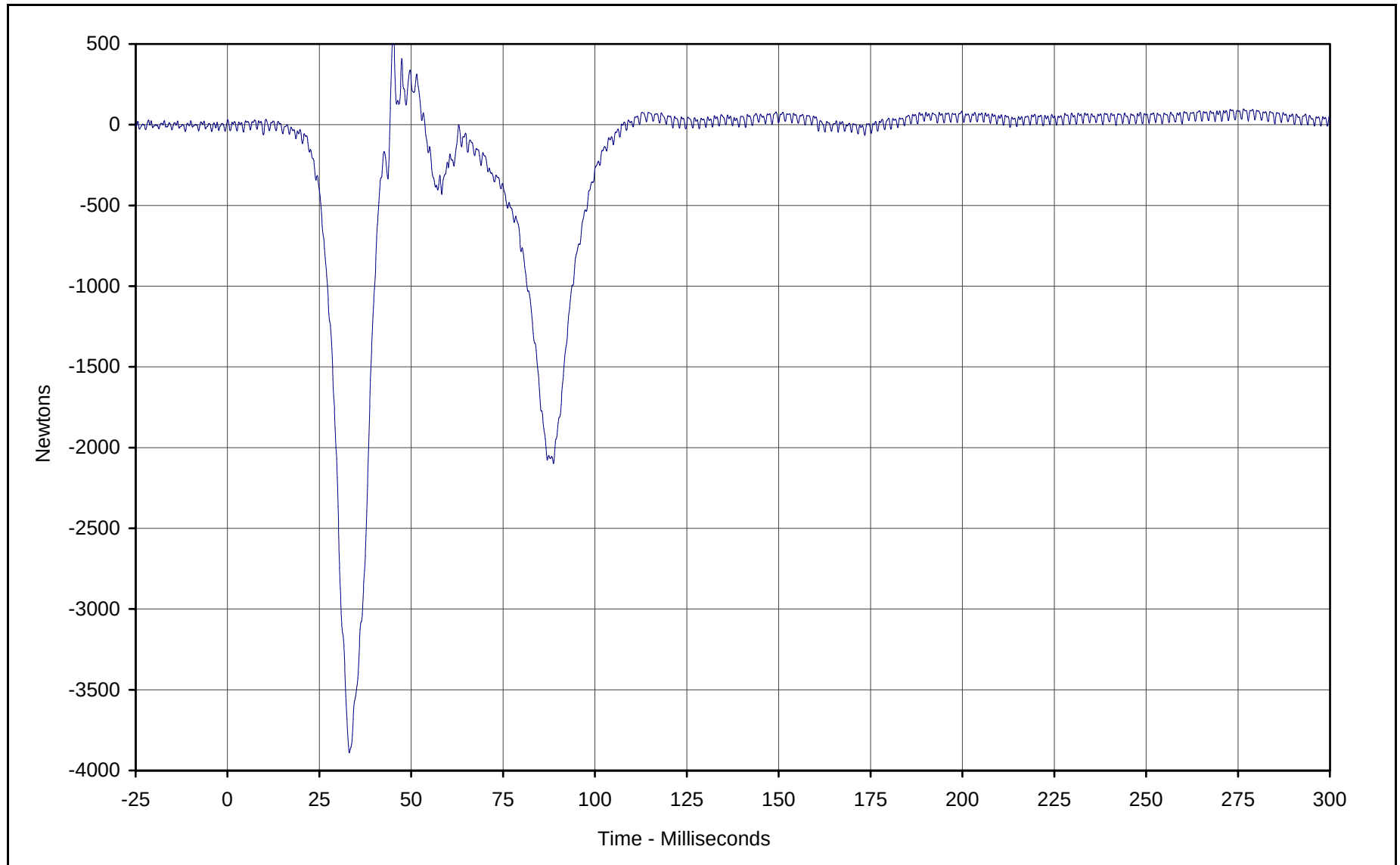
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Right lower Tibia Force Z

Maximum Value: 641.6 at 45.1 Milliseconds

Minimum Value: -3890.3 at 33.2 Milliseconds

SAE Filter Class: 600

Date of Test: 12/5/01

Curve Number: FIL-078

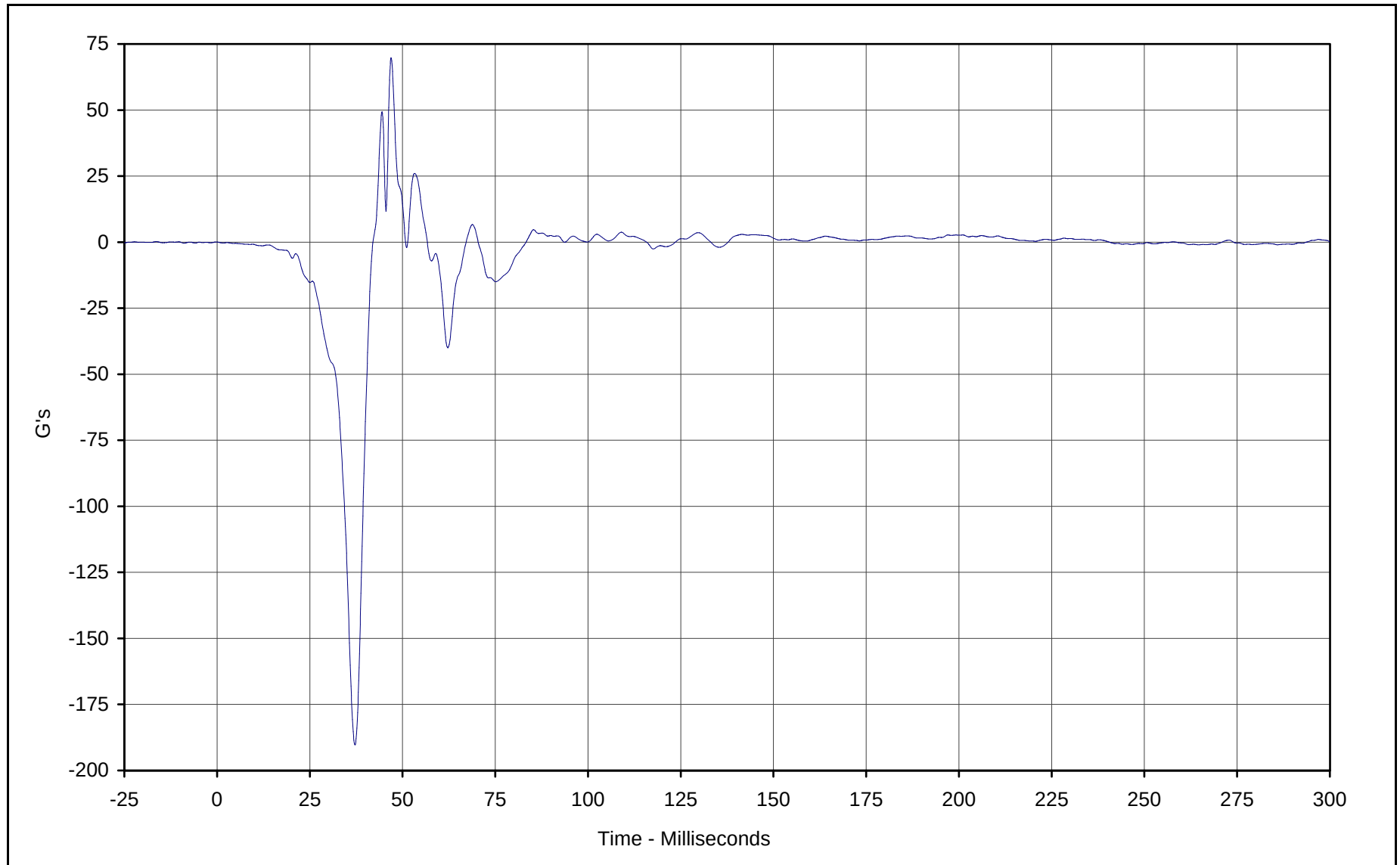
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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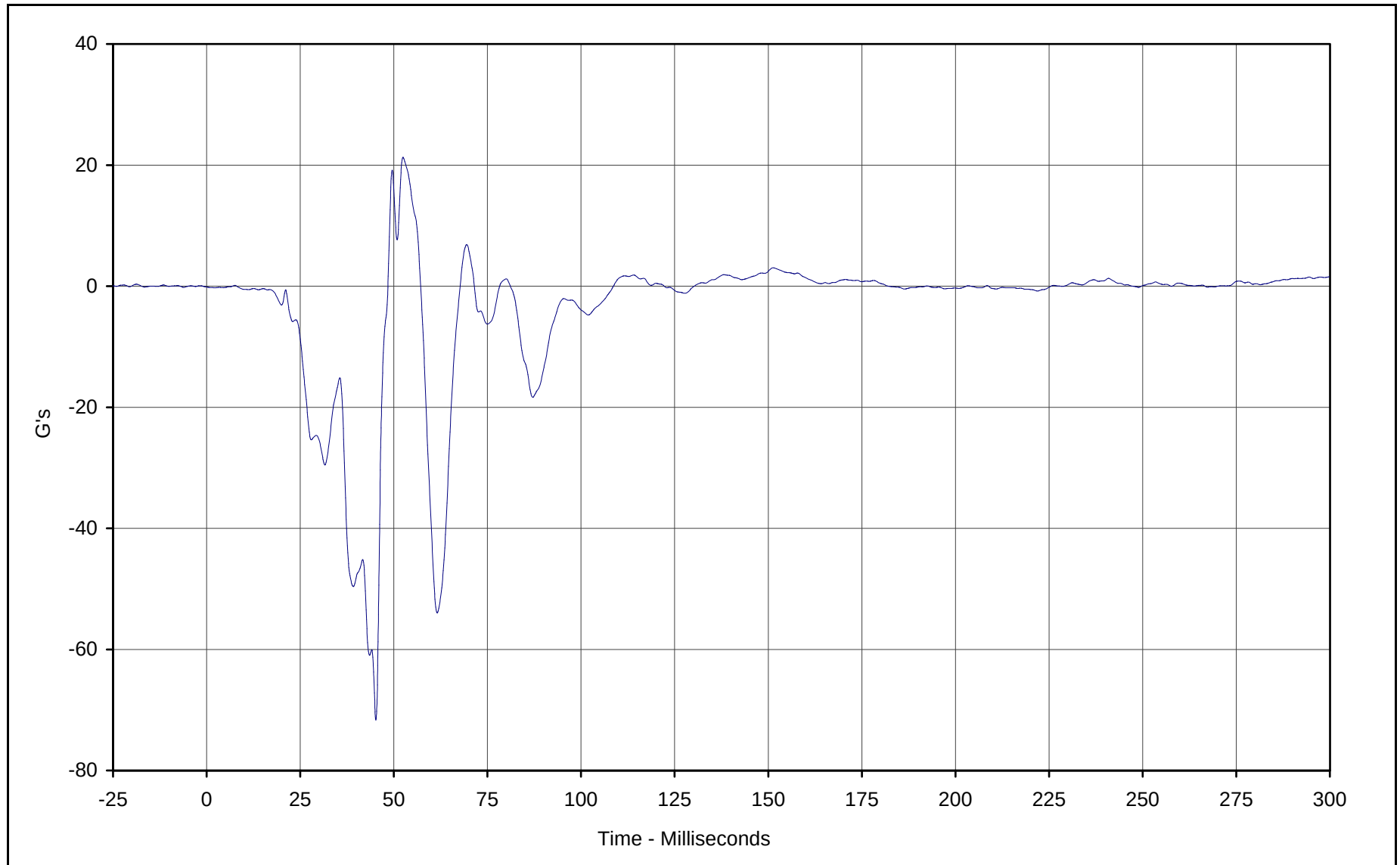
Curve Description: Passenger Left Foot Aft X
Maximum Value: 69.8 at 46.9 Milliseconds
Minimum Value: -190.3 at 37.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-079

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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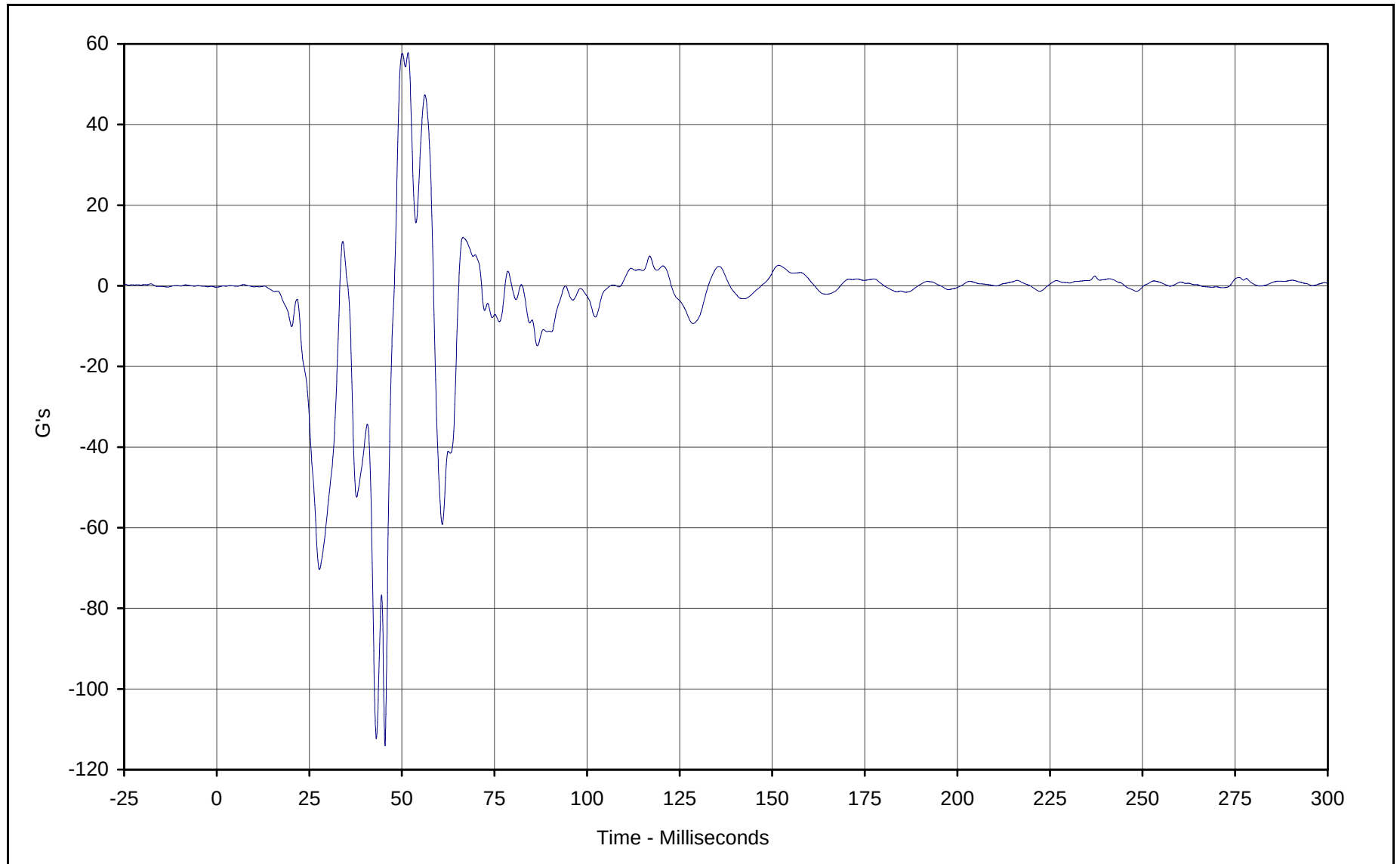
Curve Description: Passenger Left Foot Aft Z
Maximum Value: 21.3 at 52.5 Milliseconds
Minimum Value: -71.7 at 45.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-080

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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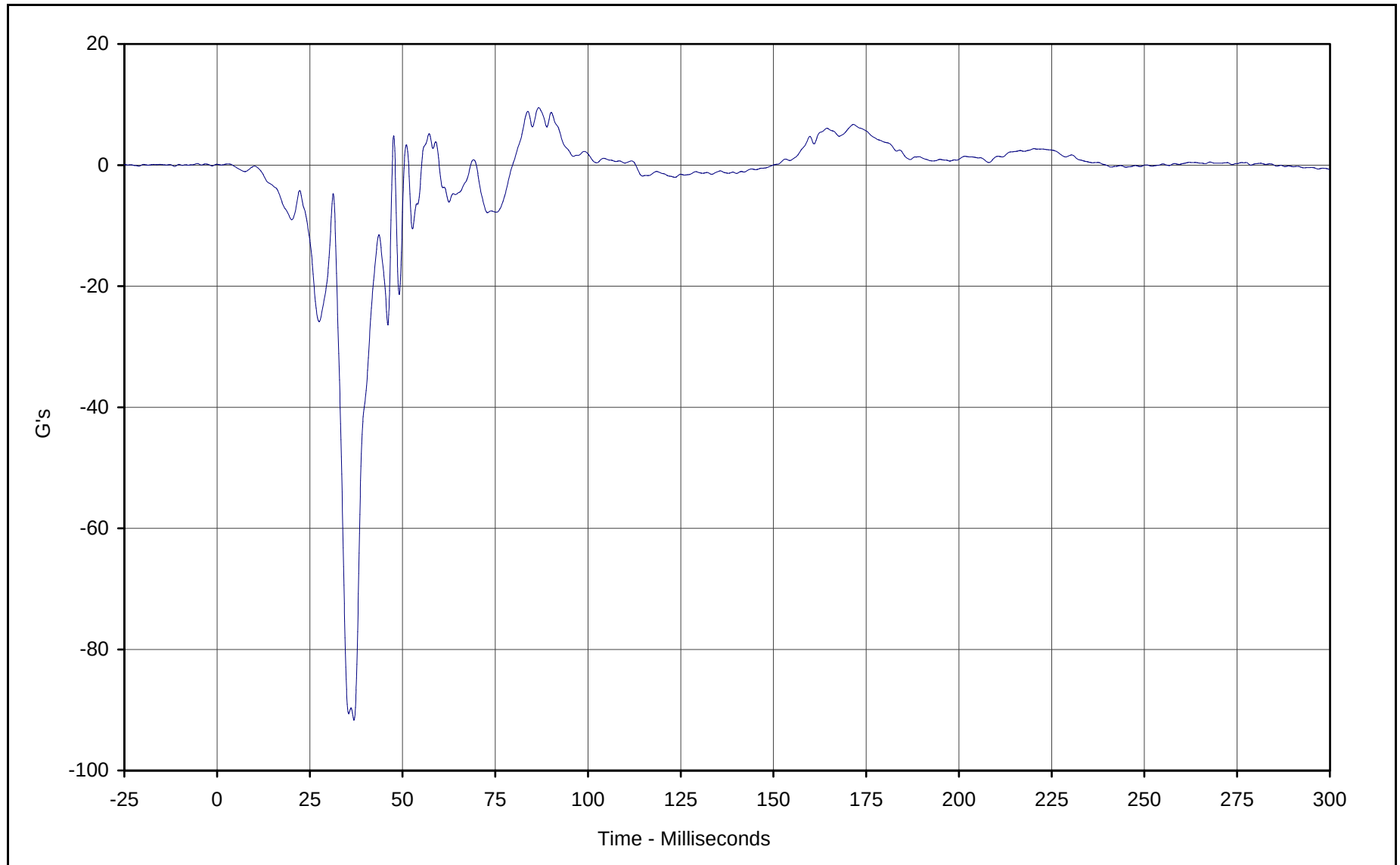
Curve Description: Passenger Left Foot Fore Z
Maximum Value: 57.9 at 51.7 Milliseconds
Minimum Value: -114.0 at 45.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-081

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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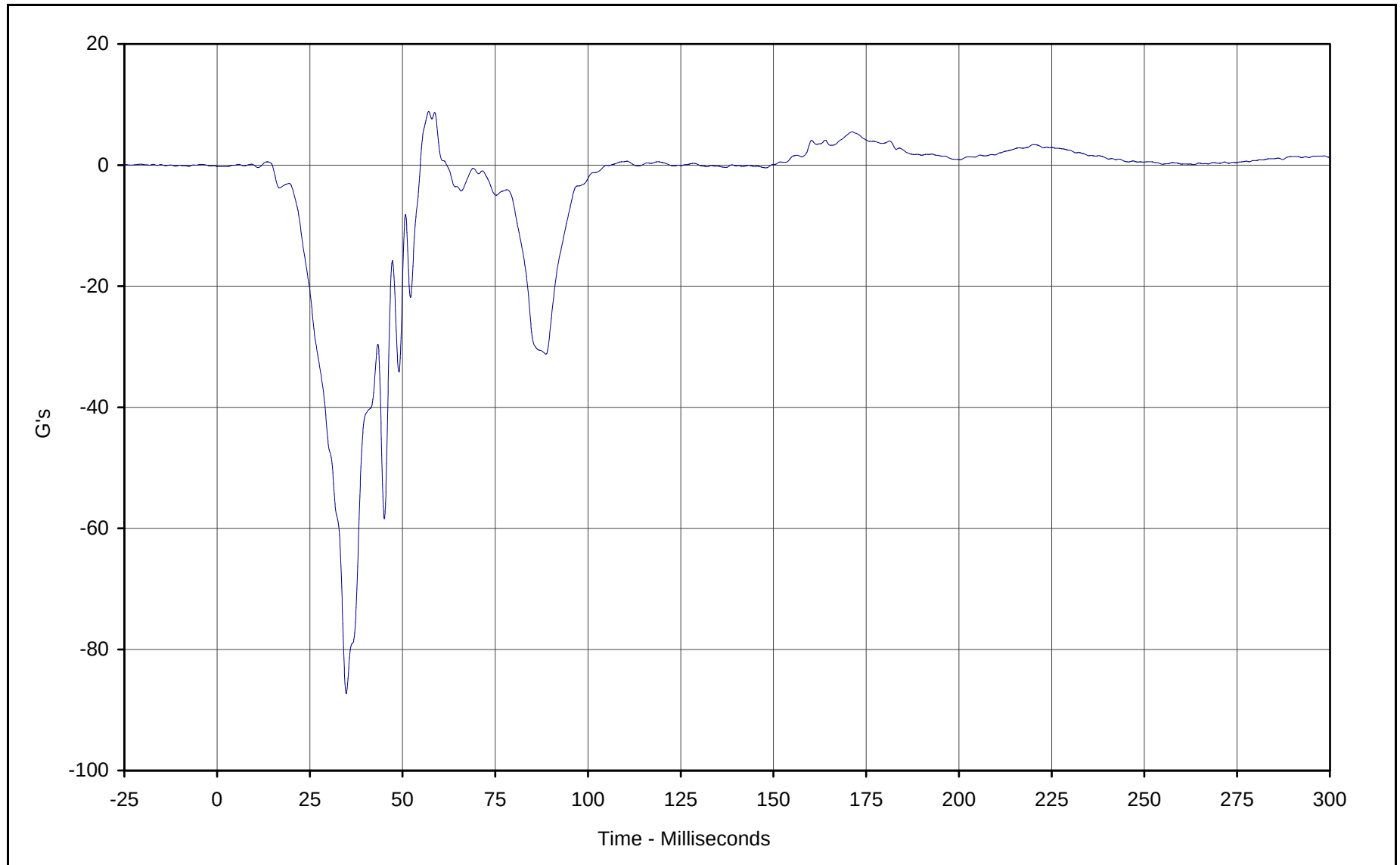
Curve Description: Passenger Right Foot Aft X
Maximum Value: 9.5 at 86.7 Milliseconds
Minimum Value: -91.7 at 36.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-082

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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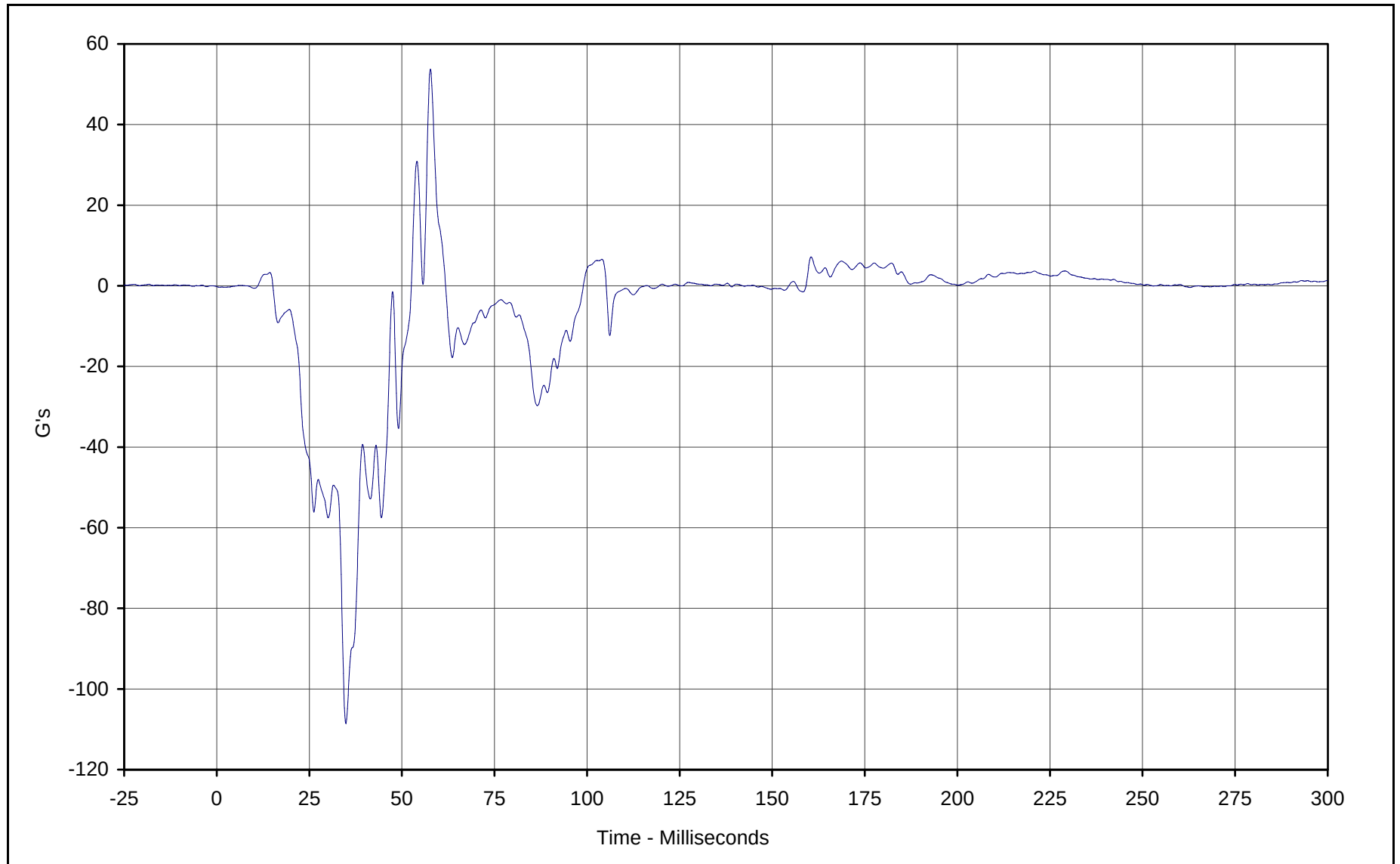
Curve Description: Passenger Right Foot Aft Z
Maximum Value: 8.8 at 57.0 Milliseconds
Minimum Value: -87.3 at 34.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-083

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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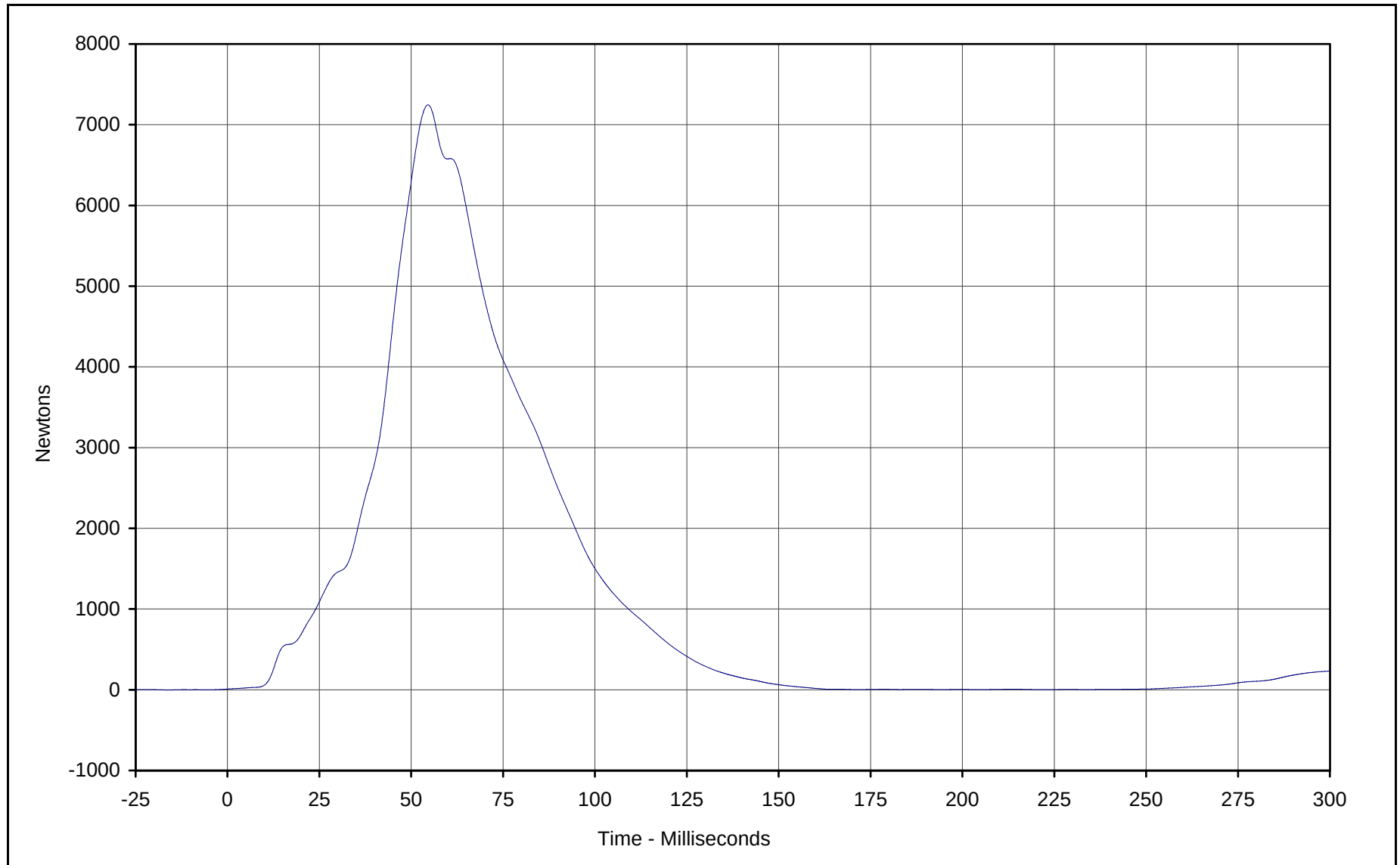
Curve Description: Passenger Right Foot Fore Z
Maximum Value: 53.8 at 57.7 Milliseconds
Minimum Value: -108.6 at 34.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: FIL-084

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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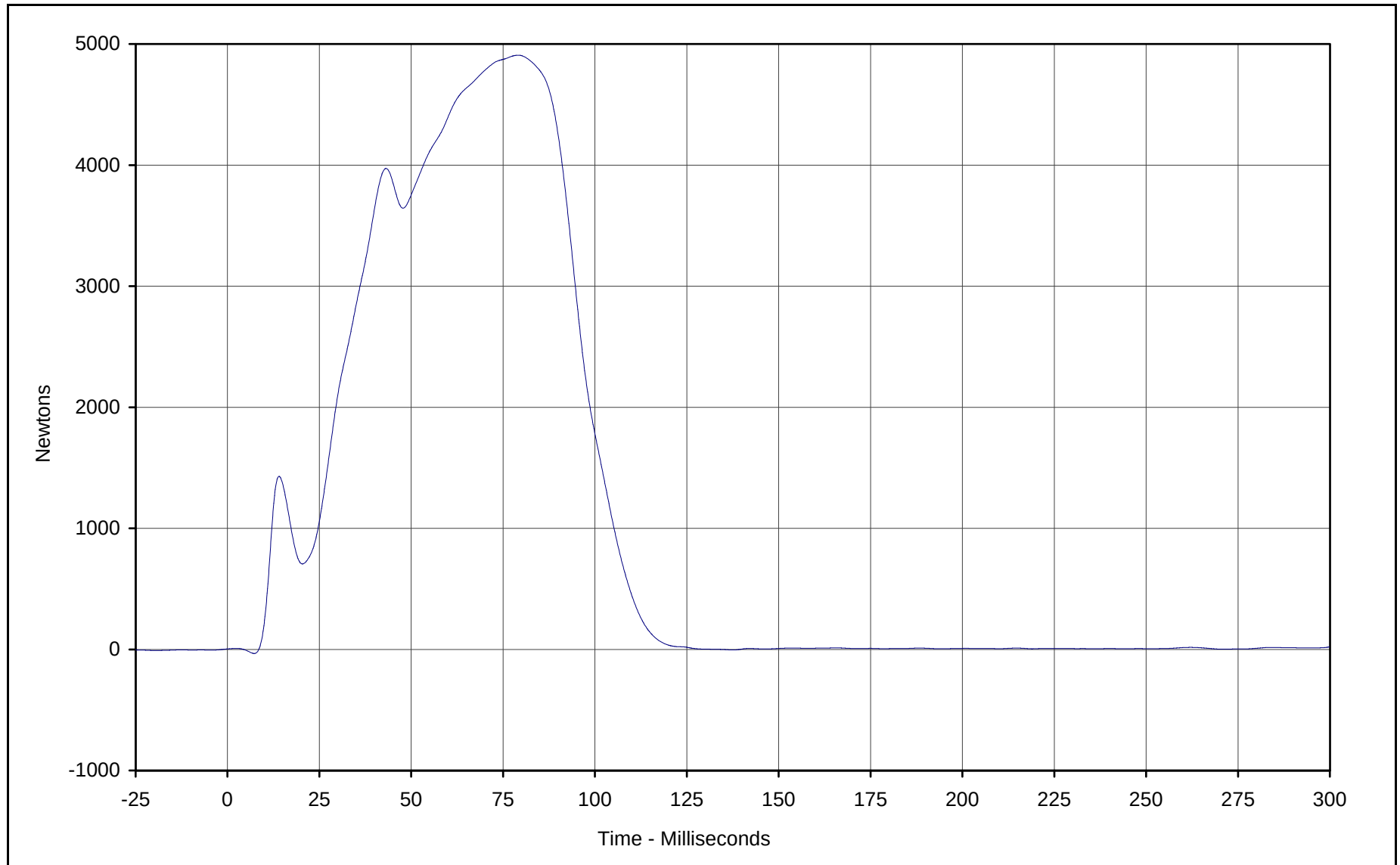
Curve Description: Passenger Lap Belt Force
Maximum Value: 7245.7 at 54.6 Milliseconds
Minimum Value: 1.0 at 233.7 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-085

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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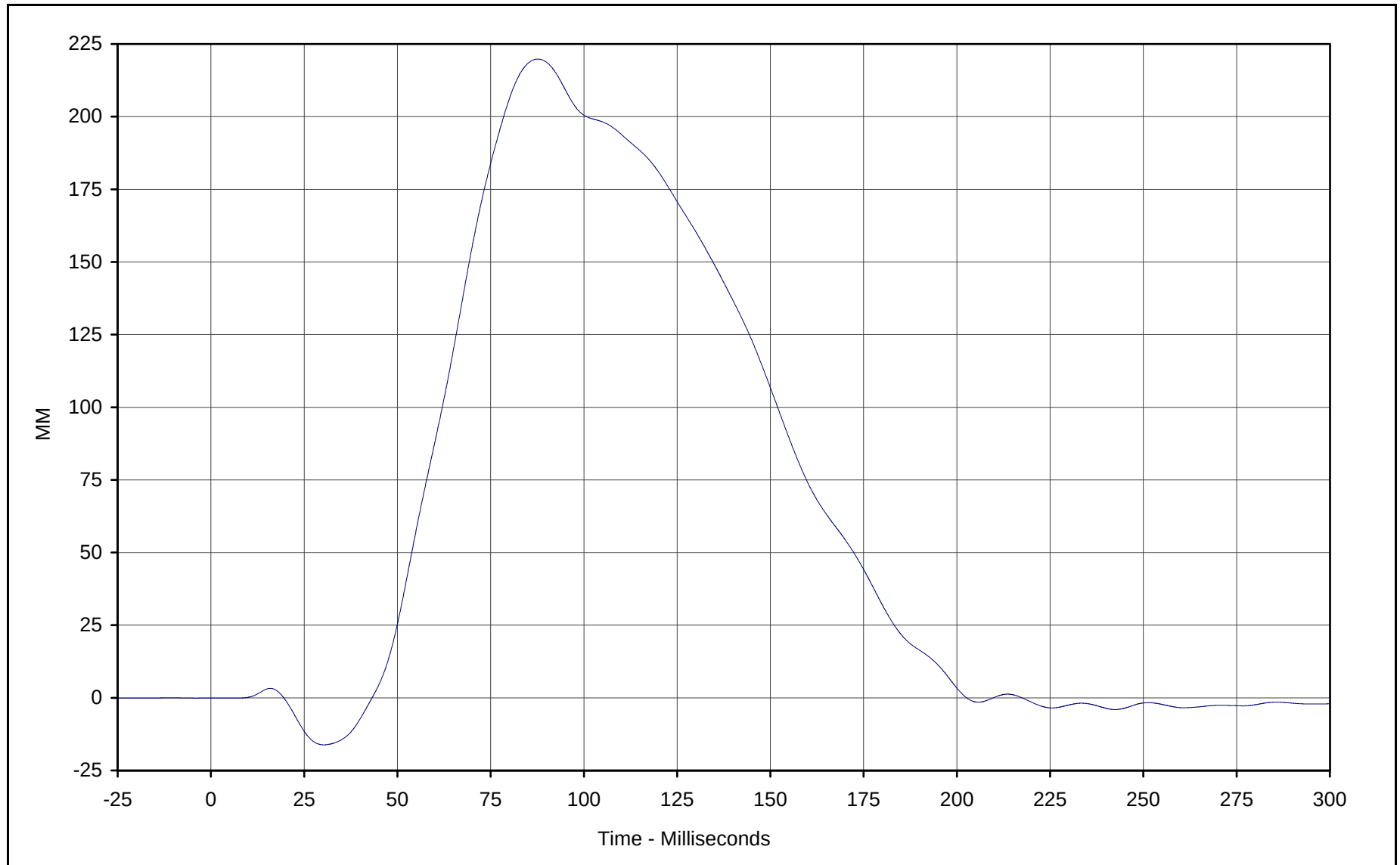
Curve Description: Passenger Shoulder Belt Force
Maximum Value: 4907.5 at 79.1 Milliseconds
Minimum Value: -33.9 at 7.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-086

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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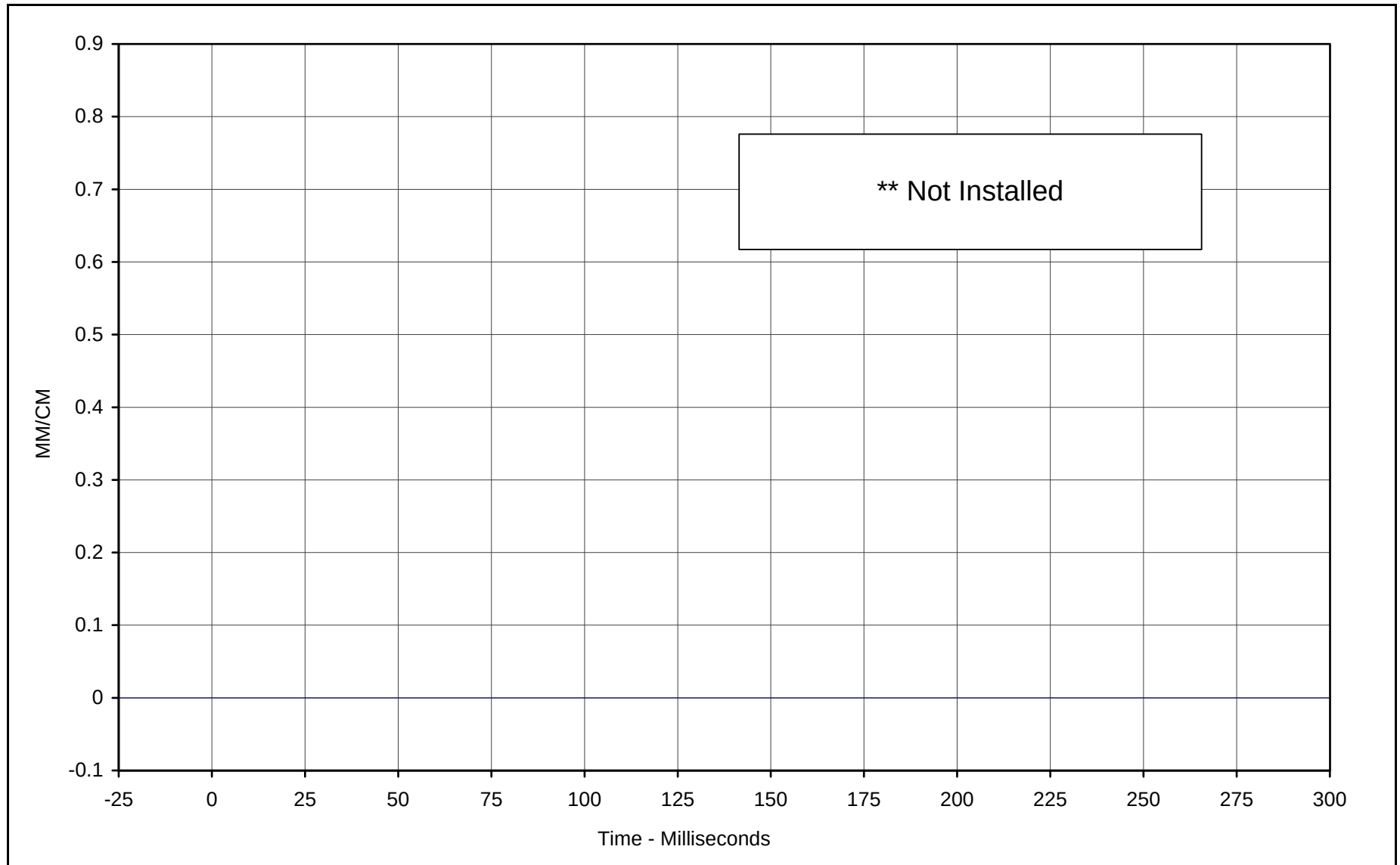
Curve Description: Passenger Shoulder Belt Pullout
Maximum Value: 219.8 at 87.7 Milliseconds
Minimum Value: -16.2 at 30.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-087

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Passenger Shoulder Belt Elongation **

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Maximum Value: 0.0 at 0.0 Milliseconds

Test Vehicle: 2002 Kia Rio 4 Door Sedan

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

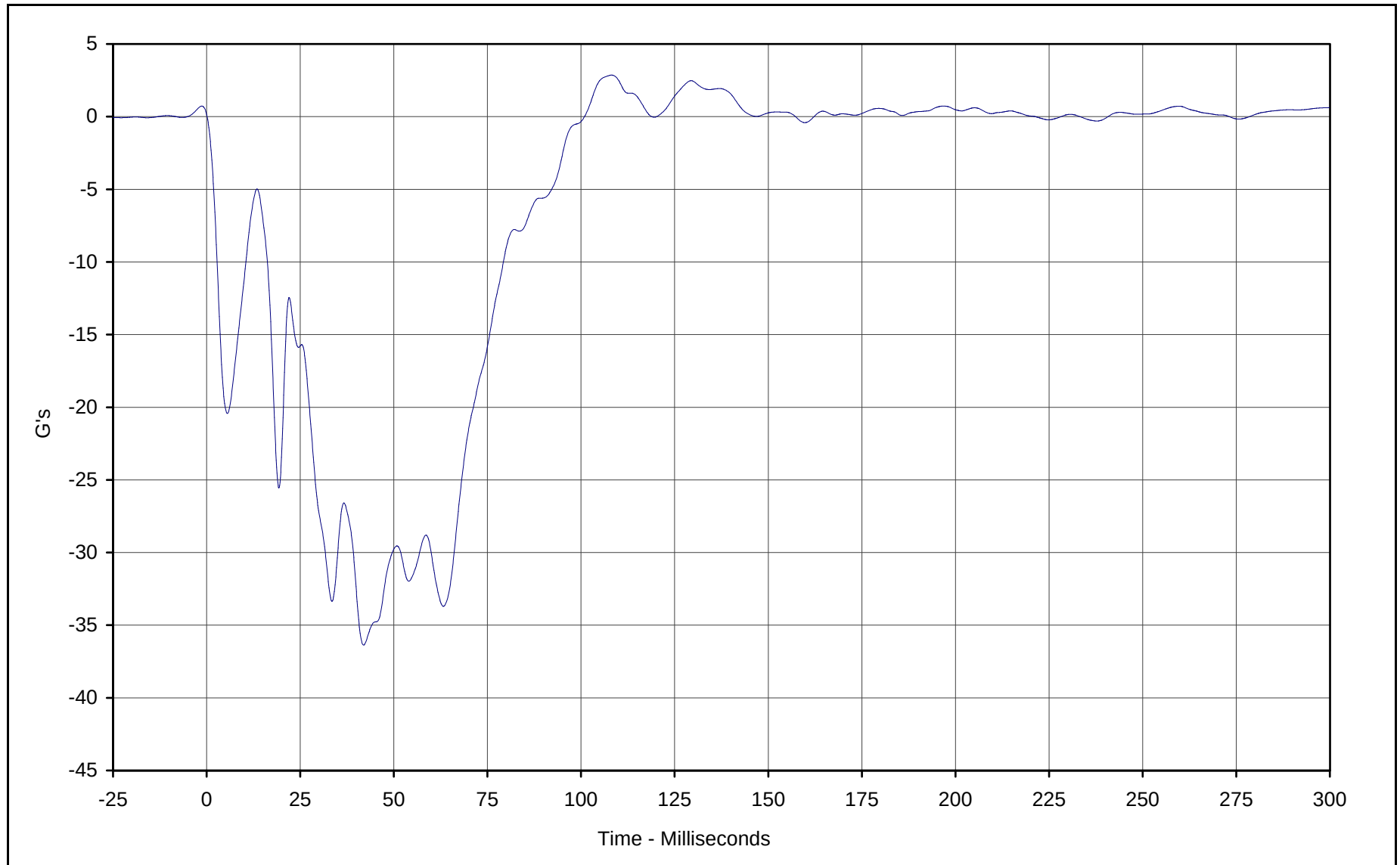
Curve Number: FIL-088

** Not installed



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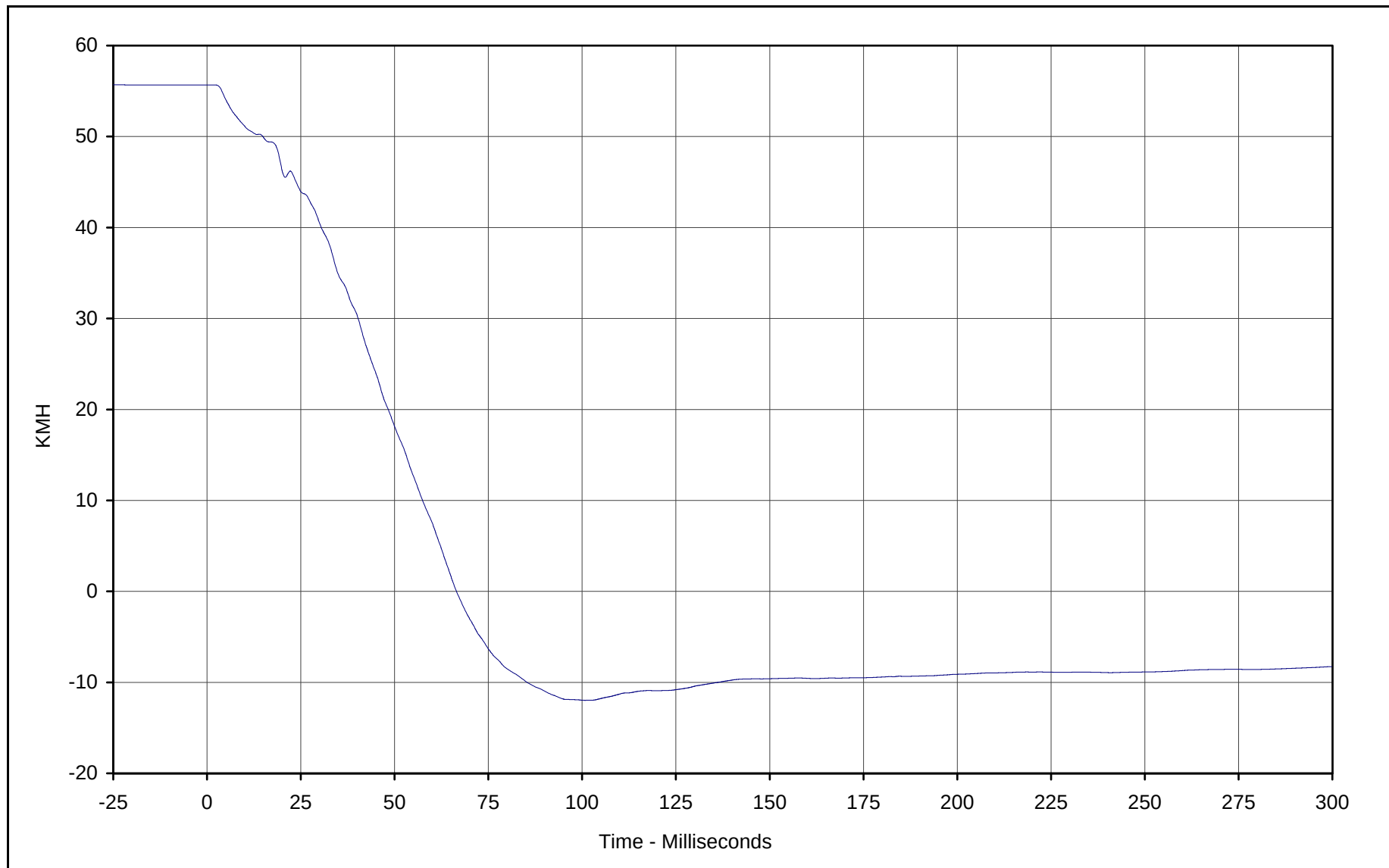
Curve Description: Vehicle Left Rear X
Maximum Value: 2.9 at 108.2 Milliseconds
Minimum Value: -36.4 at 41.9 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-089

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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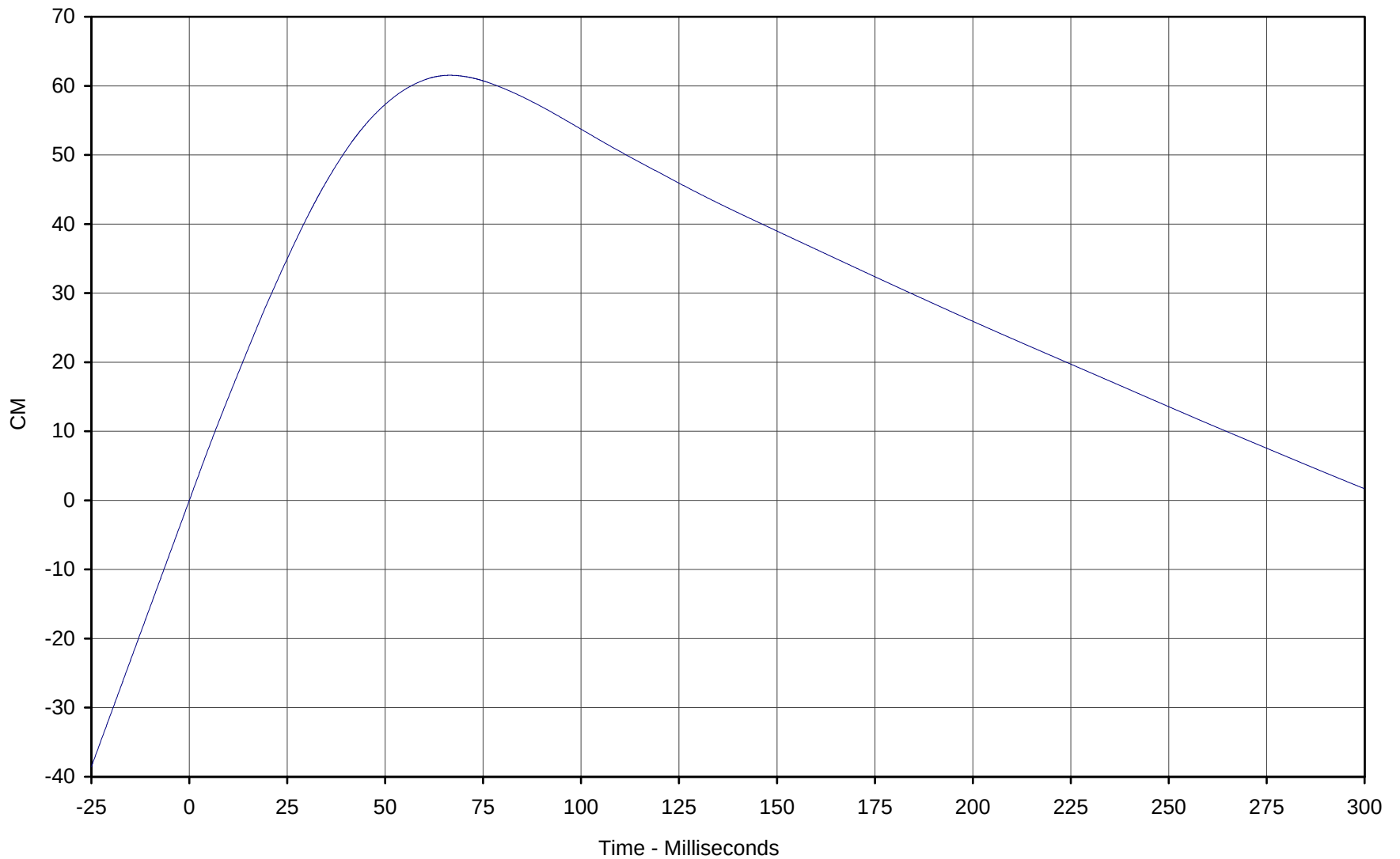
Curve Description: Vehicle Left Rear X Velocity
Maximum Value: 55.7 at 1.9 Milliseconds
Minimum Value: -12.0 at 100.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-089

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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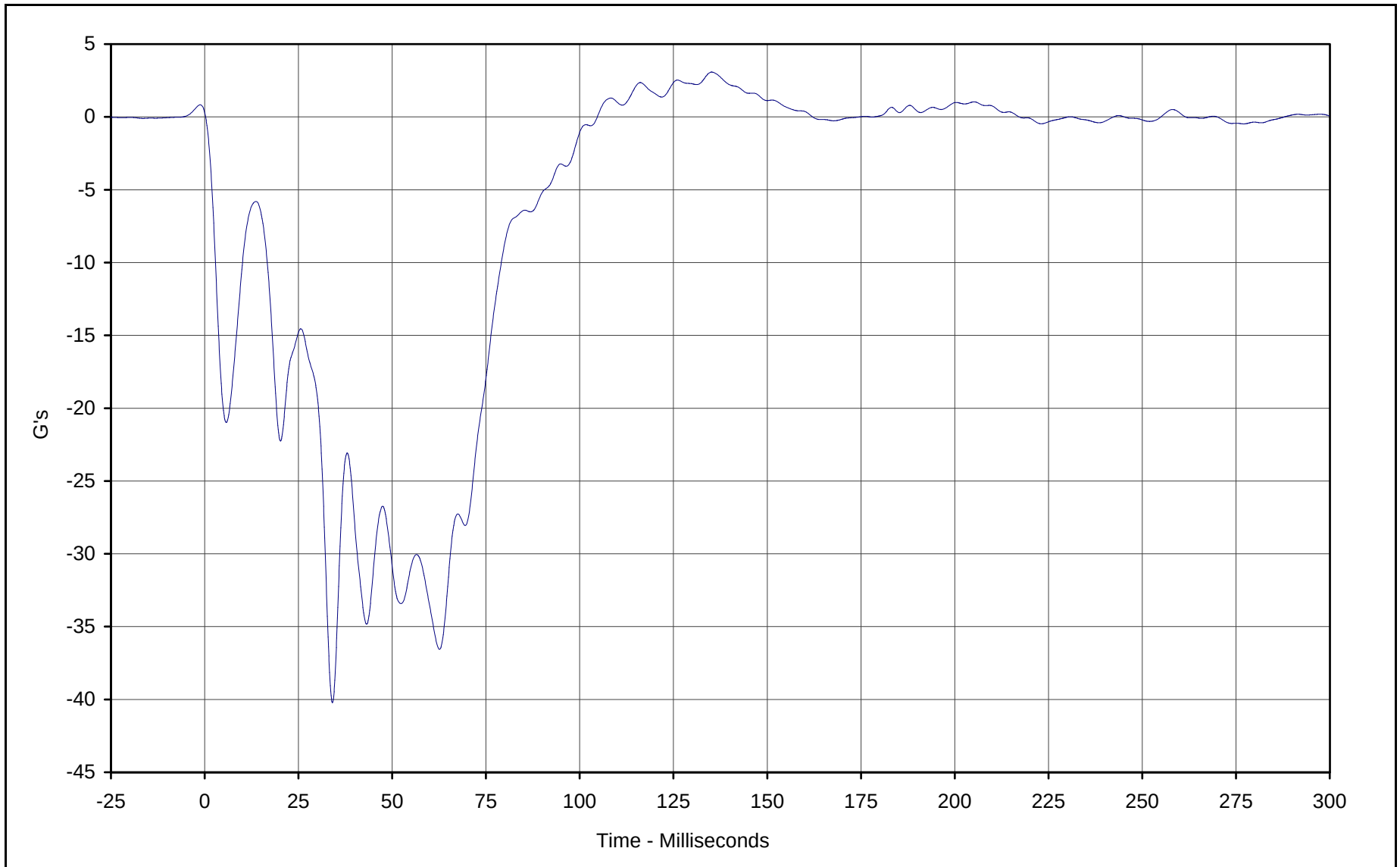
Curve Description: Vehicle Left Rear X Displ.
Maximum Value: 61.5 at 66.5 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-089

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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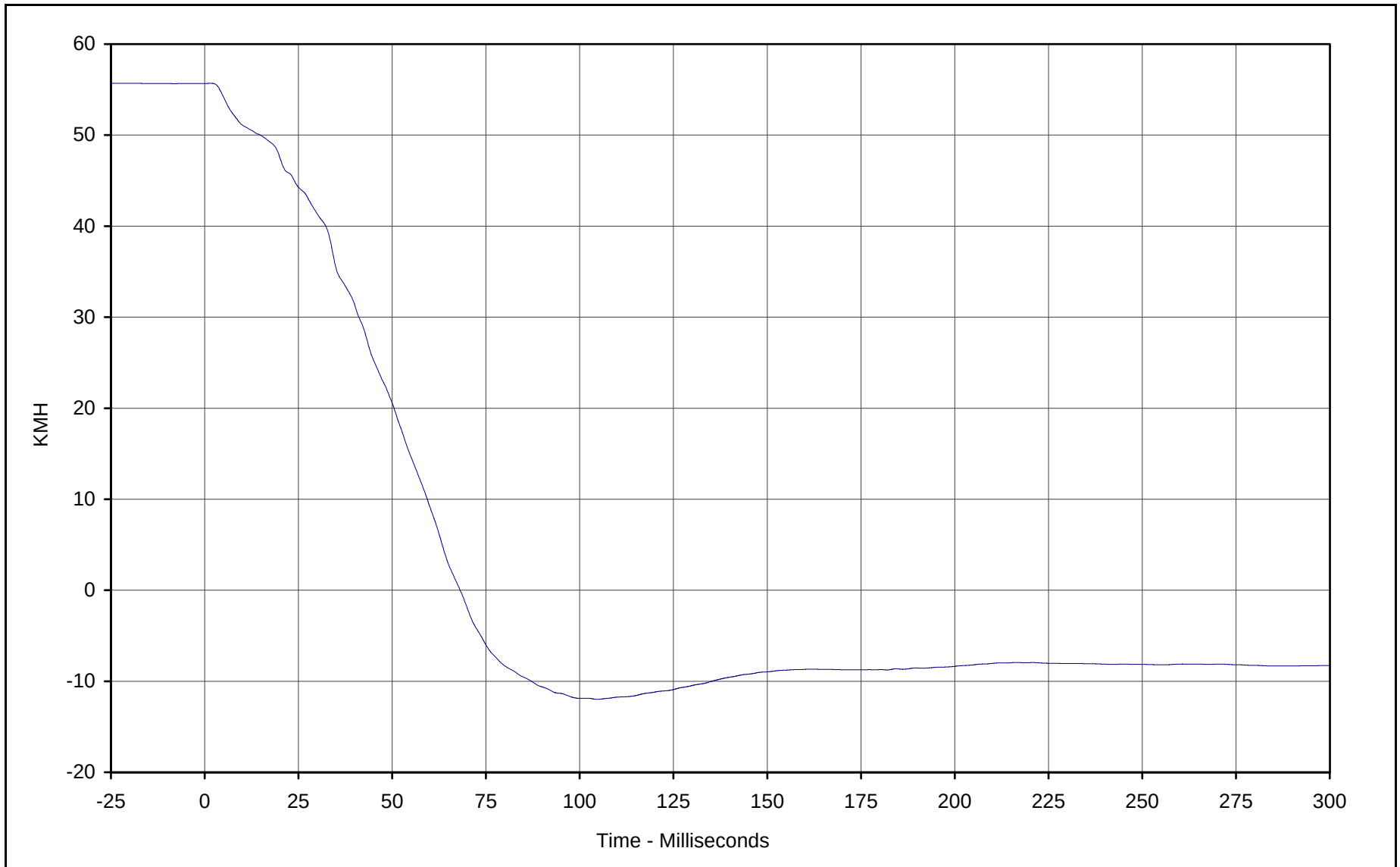
Curve Description: Vehicle Right Rear X
Maximum Value: 3.1 at 135.2 Milliseconds
Minimum Value: -40.2 at 34.1 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-090

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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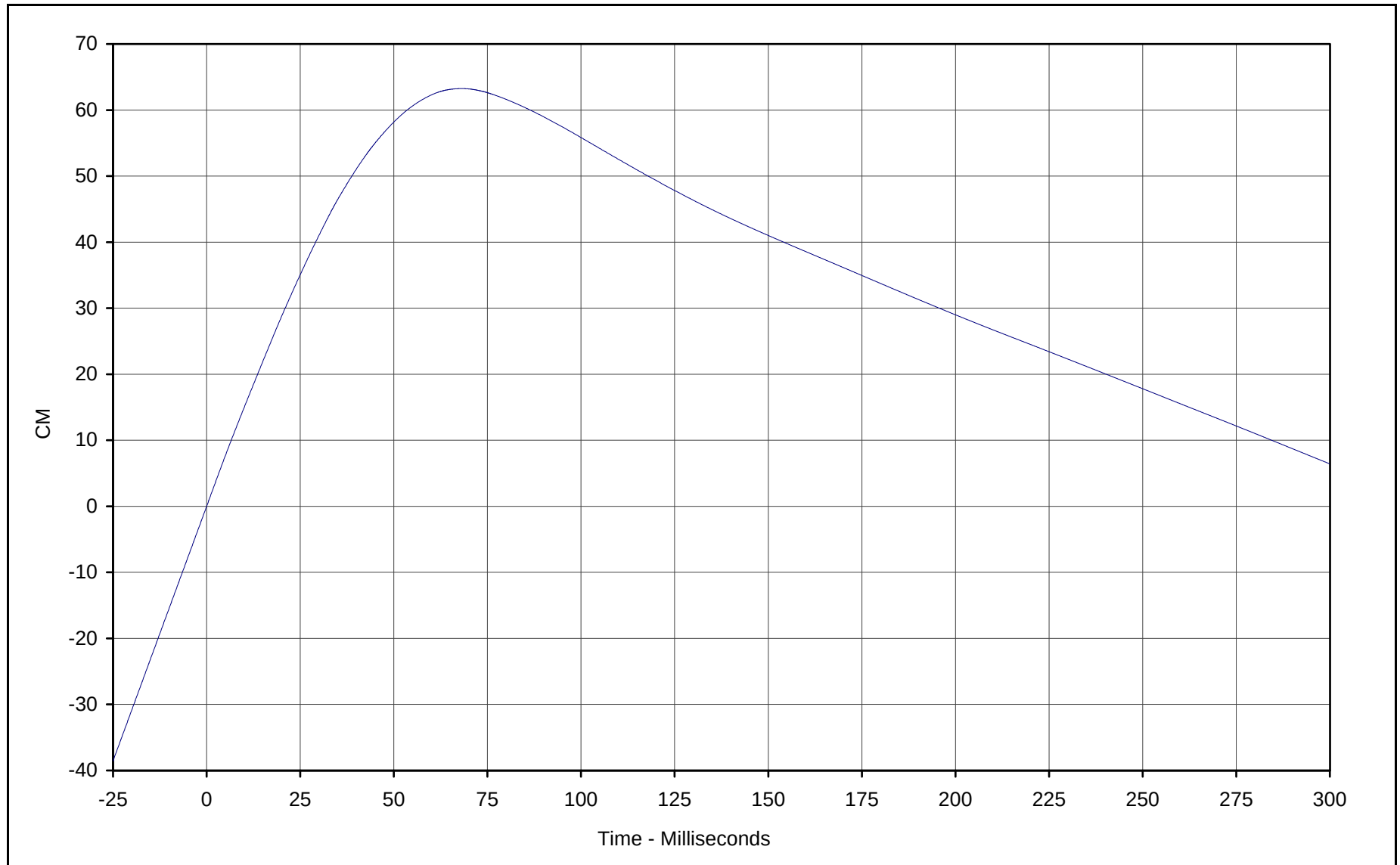
Curve Description: Vehicle Right Rear X Velocity
Maximum Value: 55.7 at 1.7 Milliseconds
Minimum Value: -12.0 at 104.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-090

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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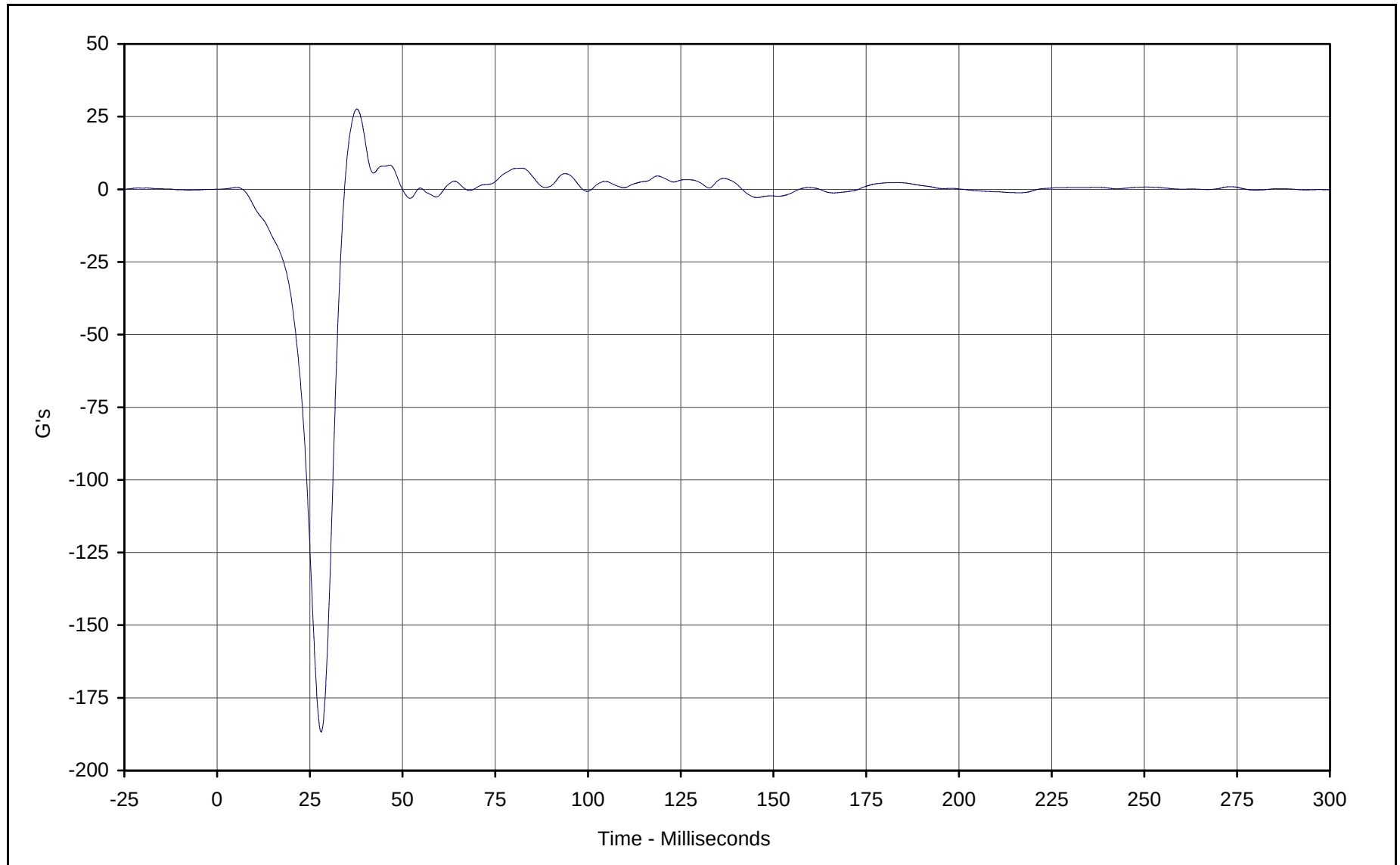
Curve Description: Vehicle Right Rear X Displ.
Maximum Value: 63.2 at 68.1 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-090

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Vehicle Engine Top

Maximum Value: 27.6 at 37.7 Milliseconds

Minimum Value: -186.8 at 28.1 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

Curve Number: FIL-091

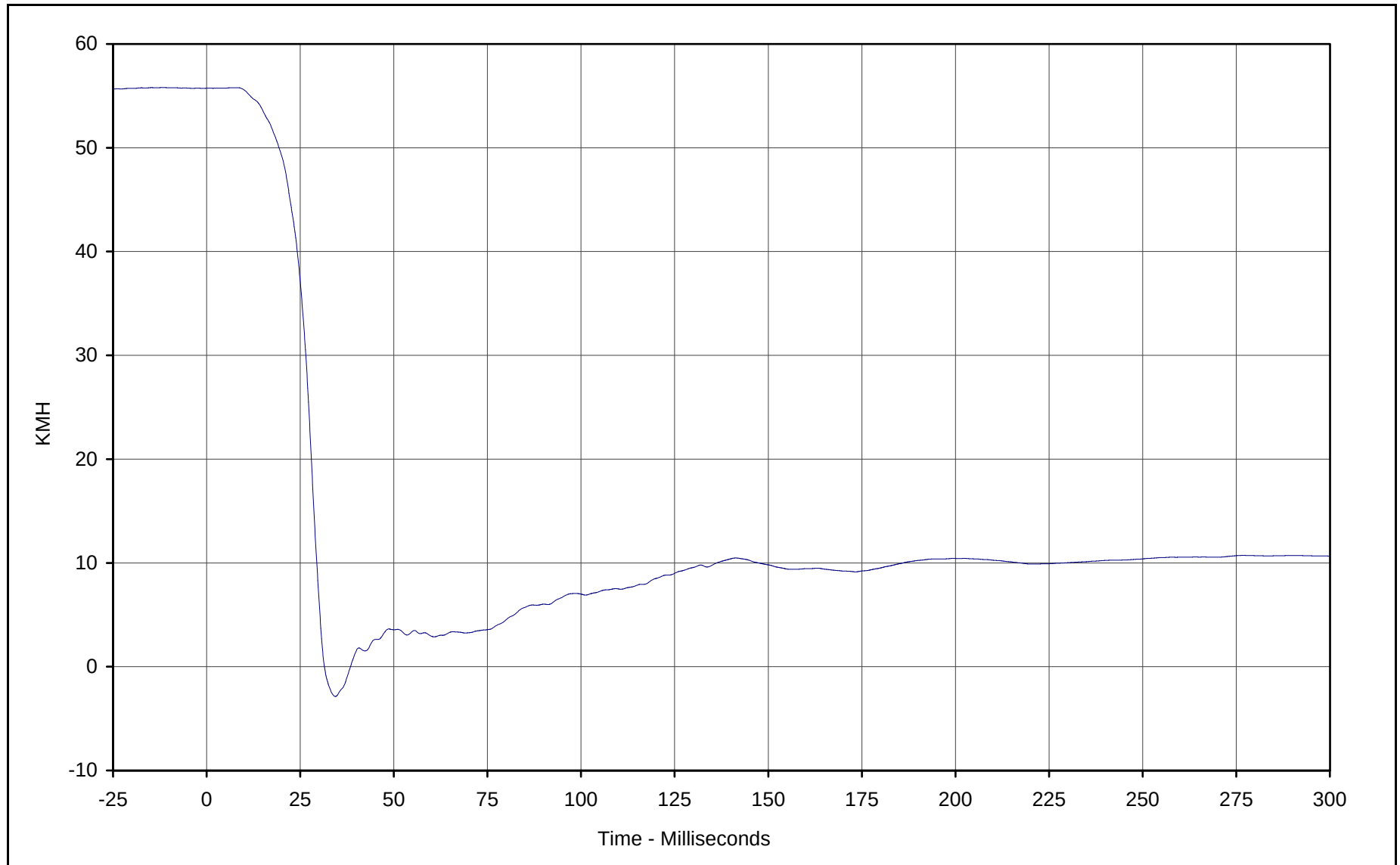
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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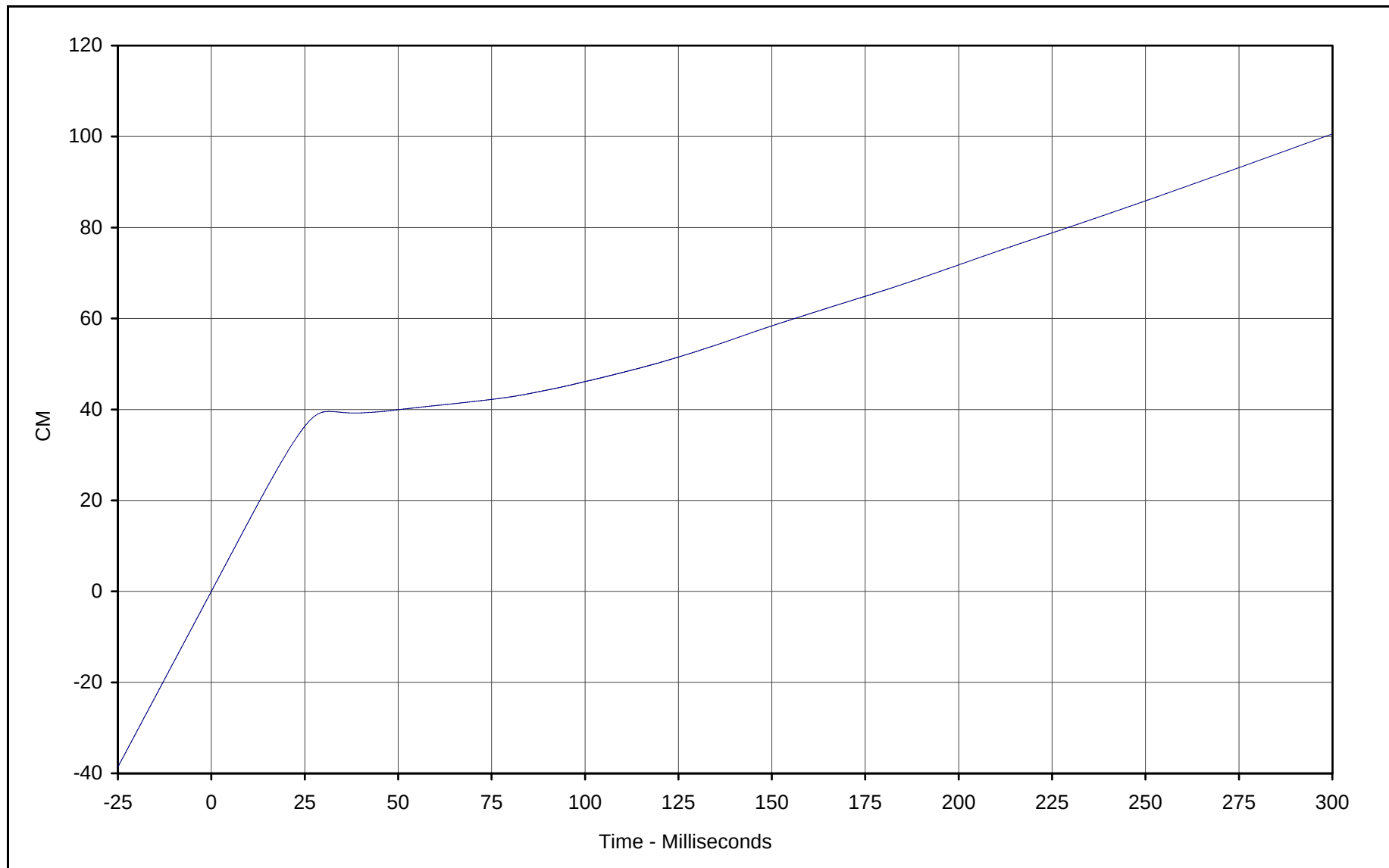
Curve Description: Vehicle Engine Top Velocity
Maximum Value: 55.8 at 6.8 Milliseconds
Minimum Value: -2.9 at 34.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-091

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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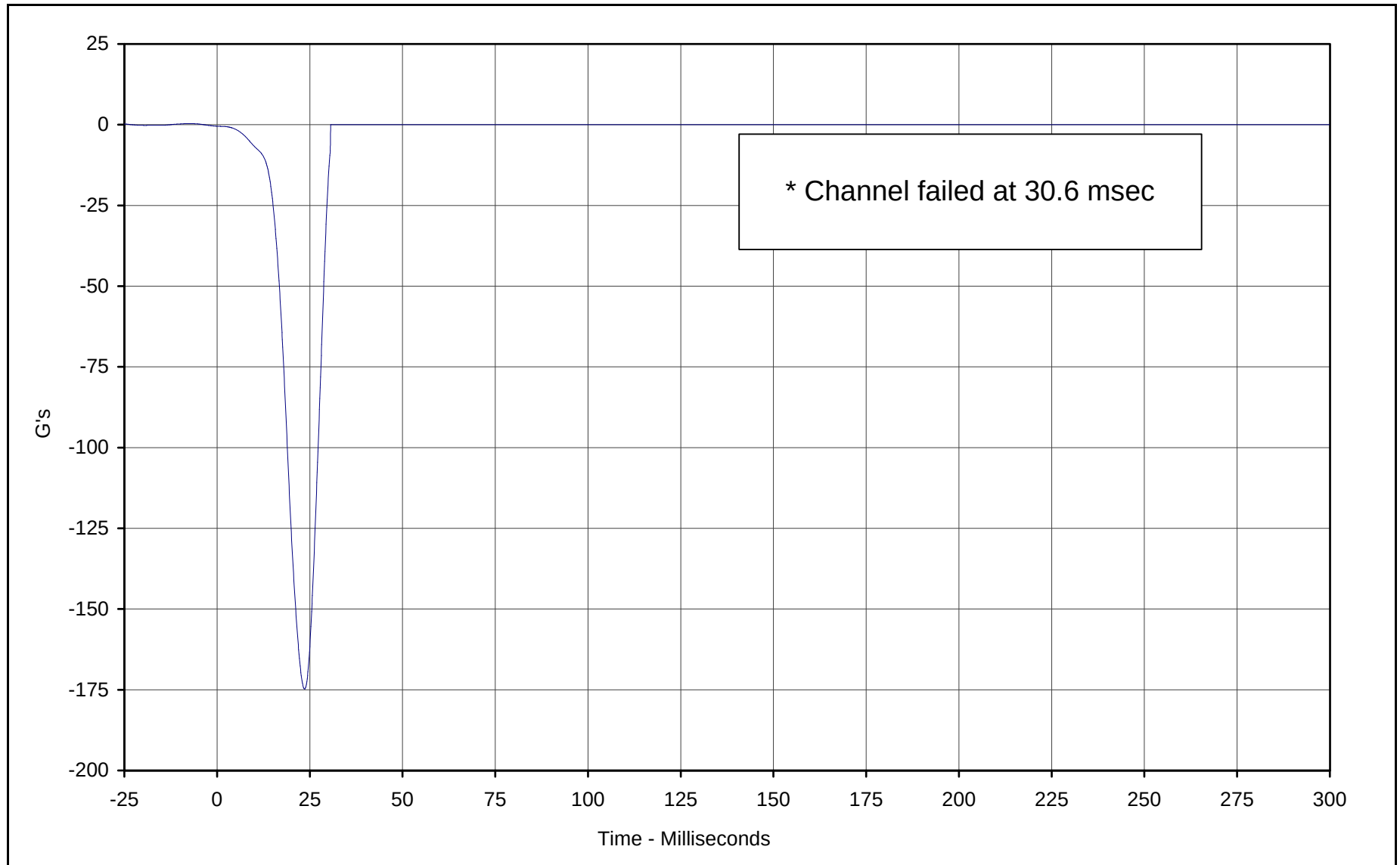


Curve Description: Vehicle Engine Top Displ.
Maximum Value: 100.5 at 299.9 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-091

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01



Curve Description: Vehicle Engine Bottom *

Maximum Value: 0.0 at 30.6 Milliseconds

Minimum Value: -174.8 at 23.6 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

Curve Number: FIL-092

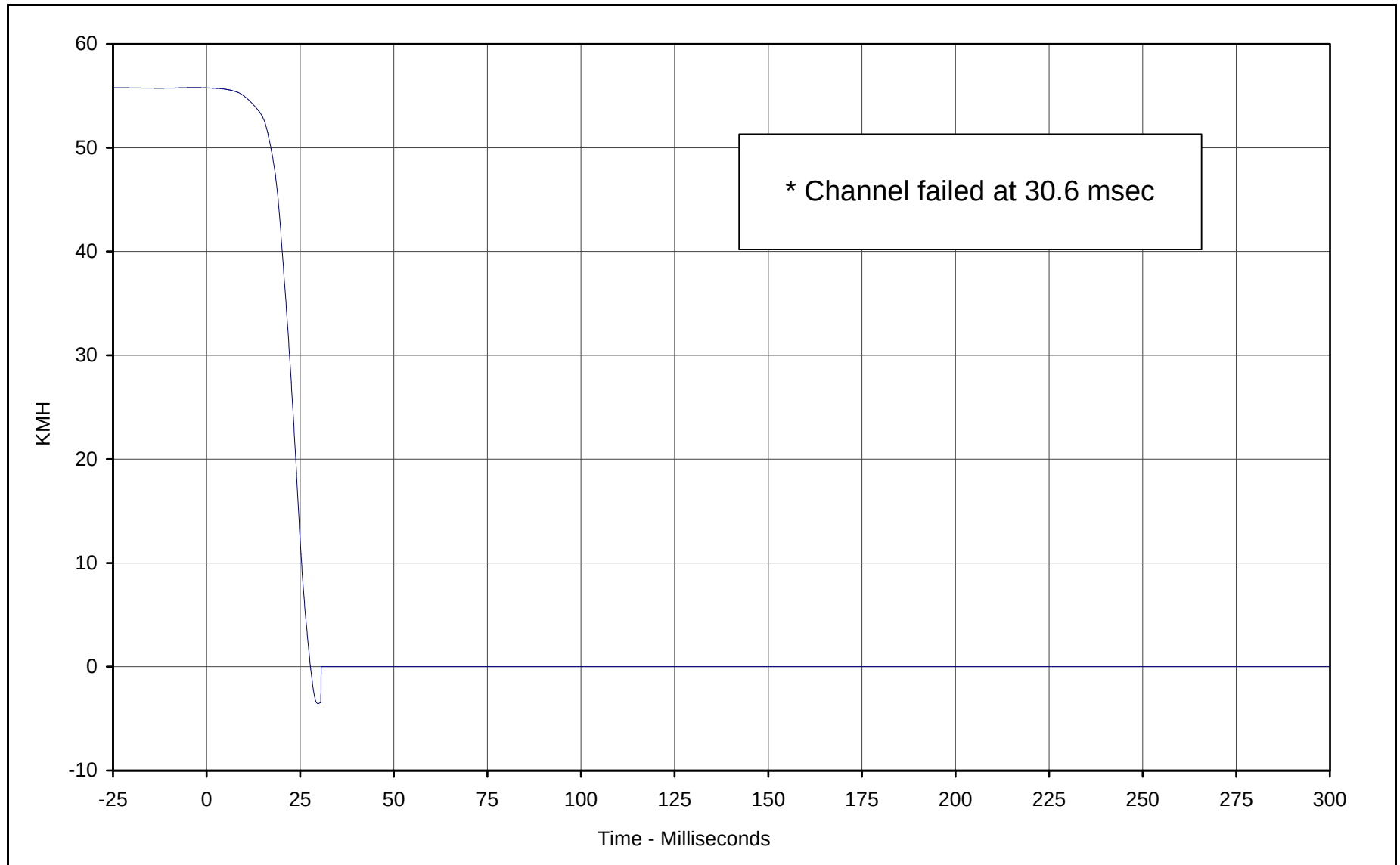
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 30.6 msec



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Curve Description: Vehicle Engine Bottom Velocity *

Maximum Value: 55.8 at 0.0 Milliseconds

Minimum Value: -3.6 at 29.7 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

Curve Number: IN1-092

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

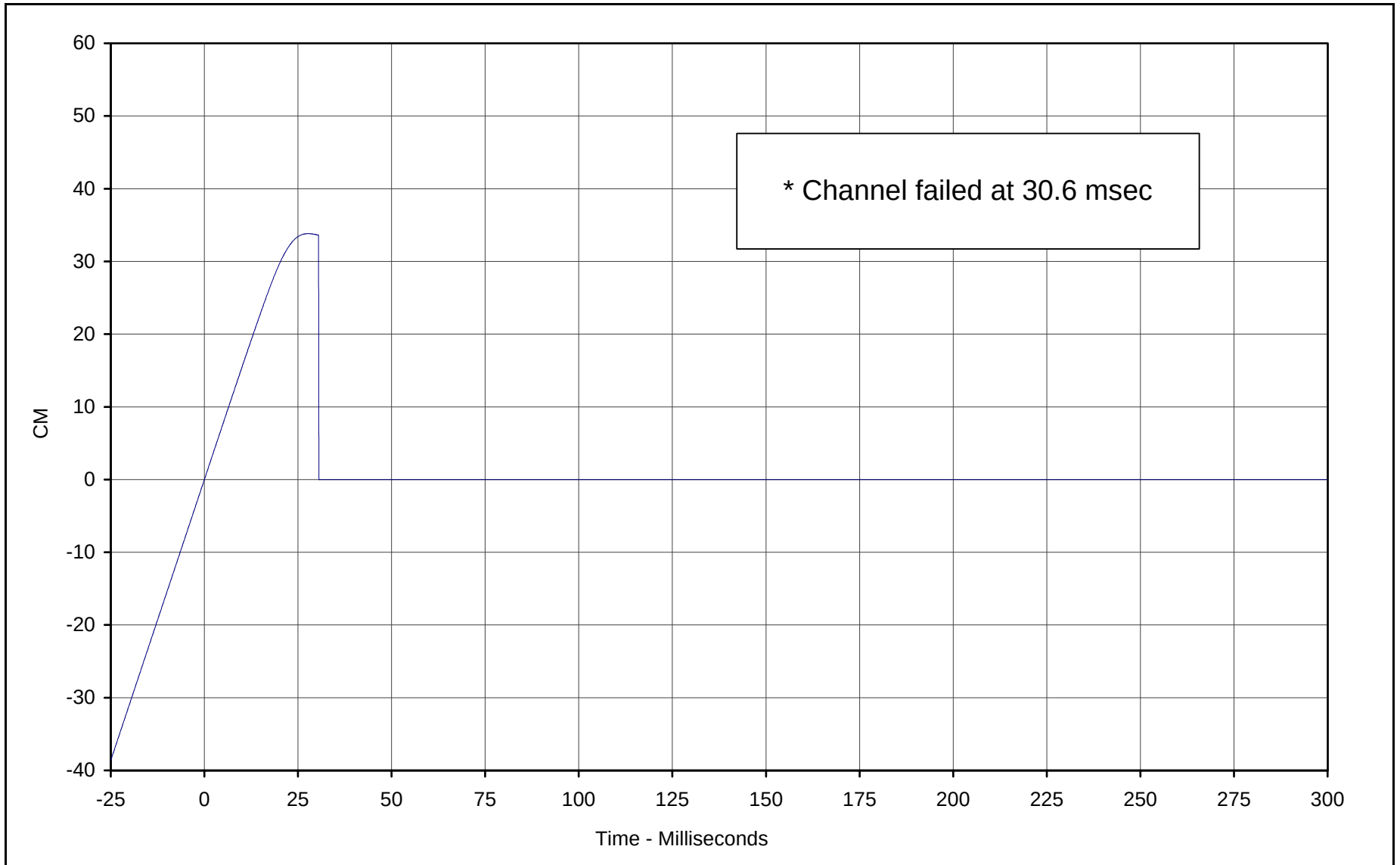
Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 30.6 msec



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B-134



Curve Description: Vehicle Engine Bottom Displ. *

Maximum Value: 33.8 at 27.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 12/5/01

Curve Number: IN2-092

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

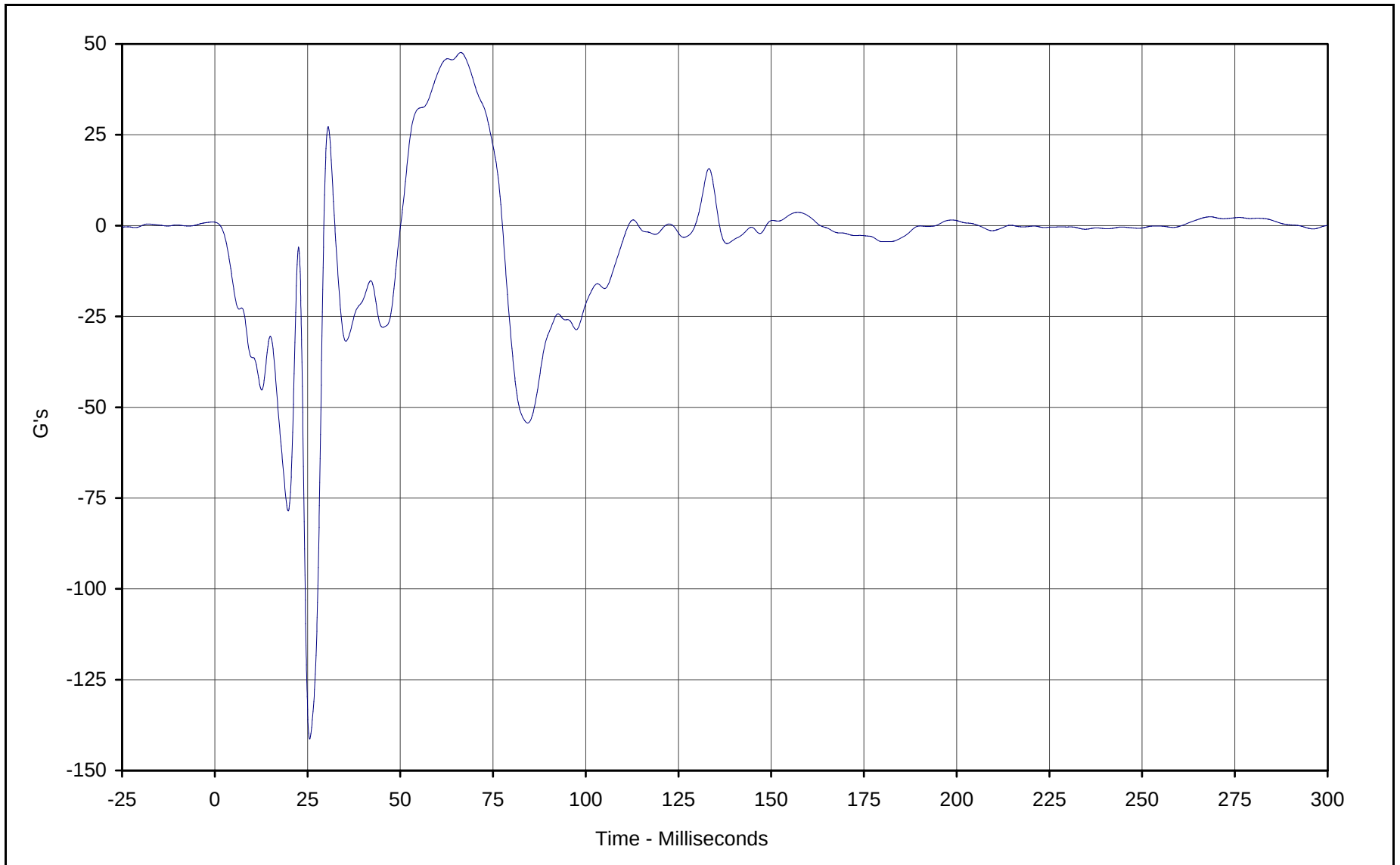
Test Vehicle: 2002 Kia Rio 4 Door Sedan

* Channel failed at 30.6 msec



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B-135



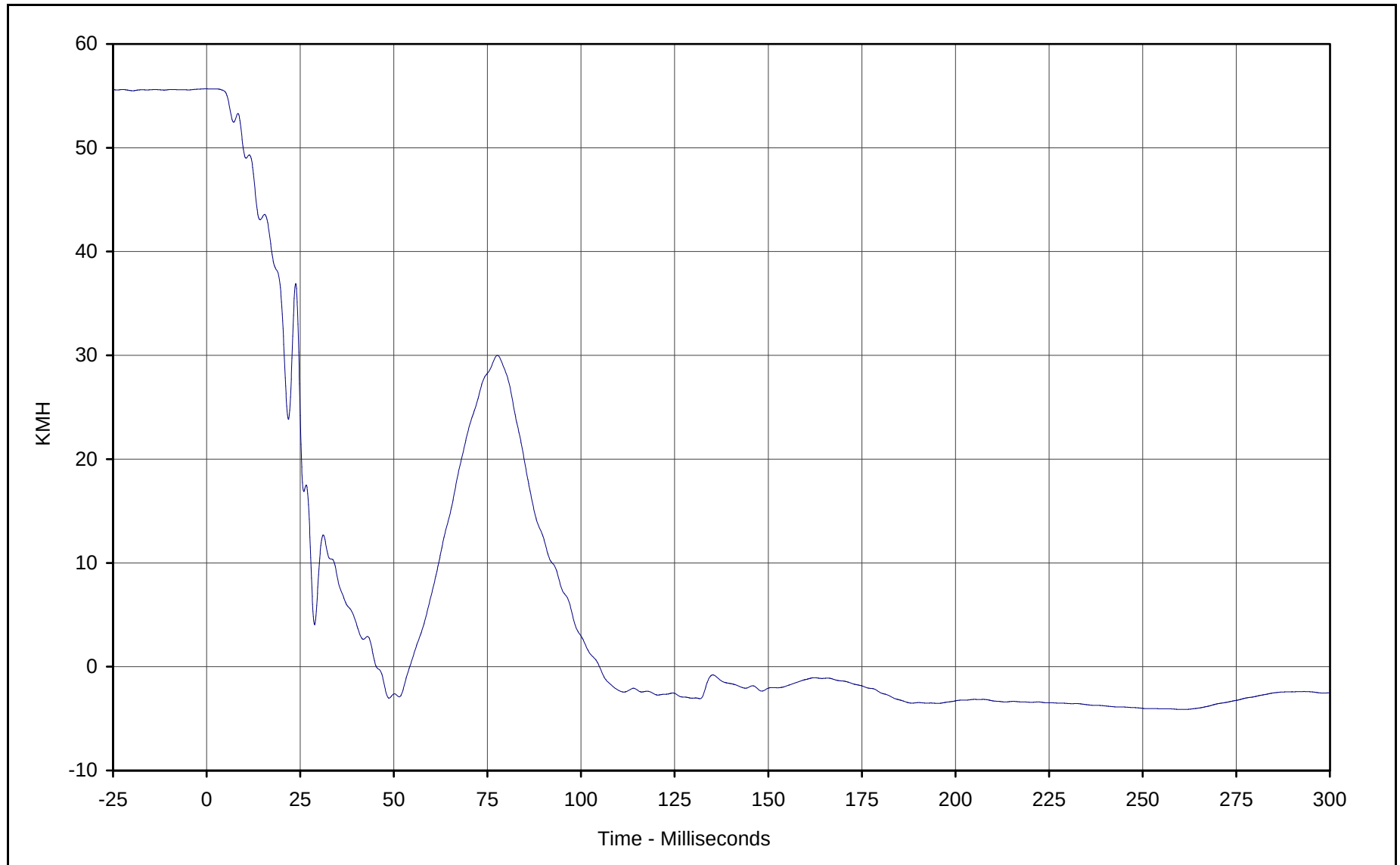
Curve Description: Vehicle Left Brake Caliper
Maximum Value: 47.7 at 66.3 Milliseconds
Minimum Value: -141.4 at 25.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-093

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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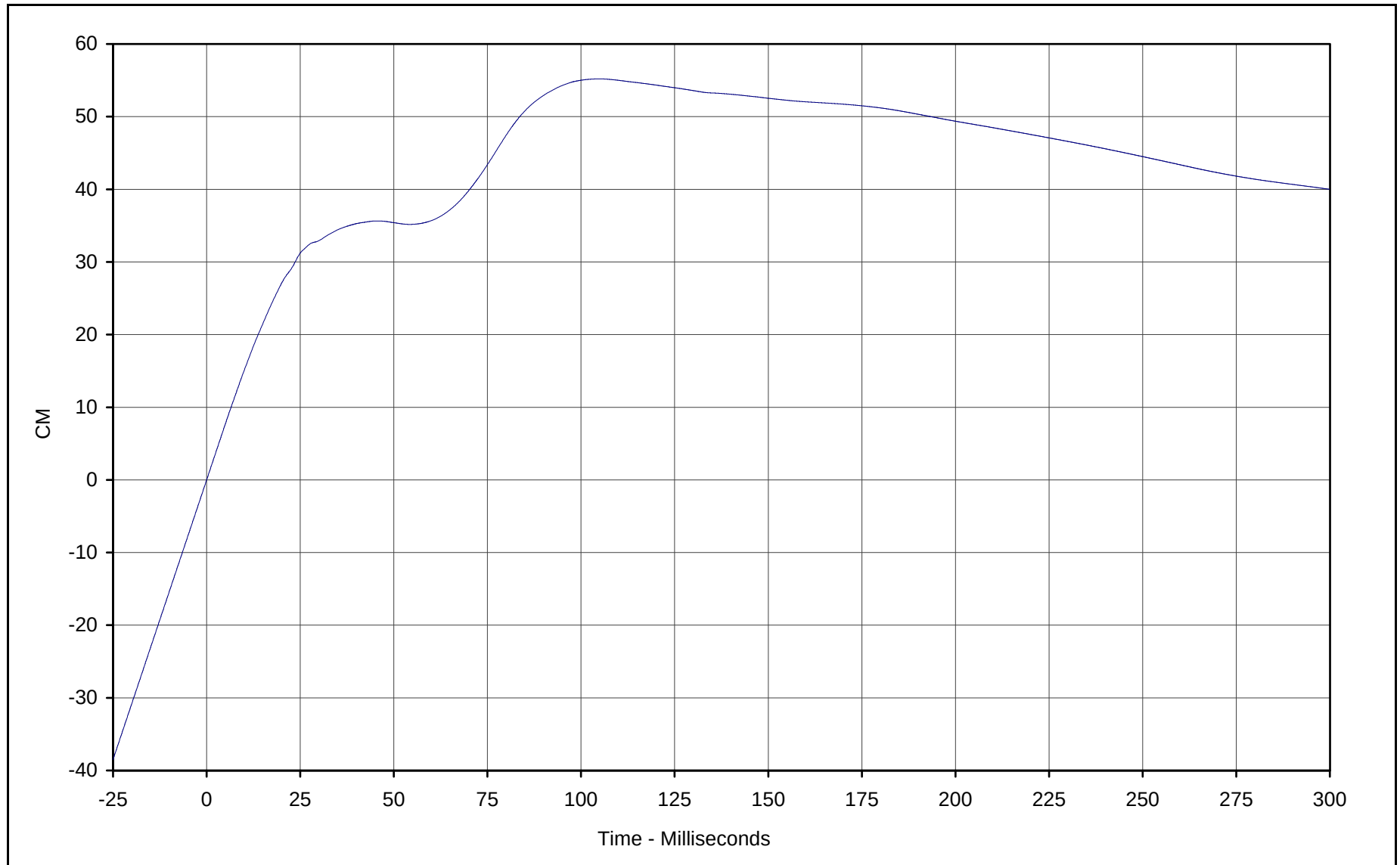
Curve Description: Vehicle Left Brake Caliper Velocity
Maximum Value: 55.7 at 0.0 Milliseconds
Minimum Value: -4.1 at 260.1 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-093

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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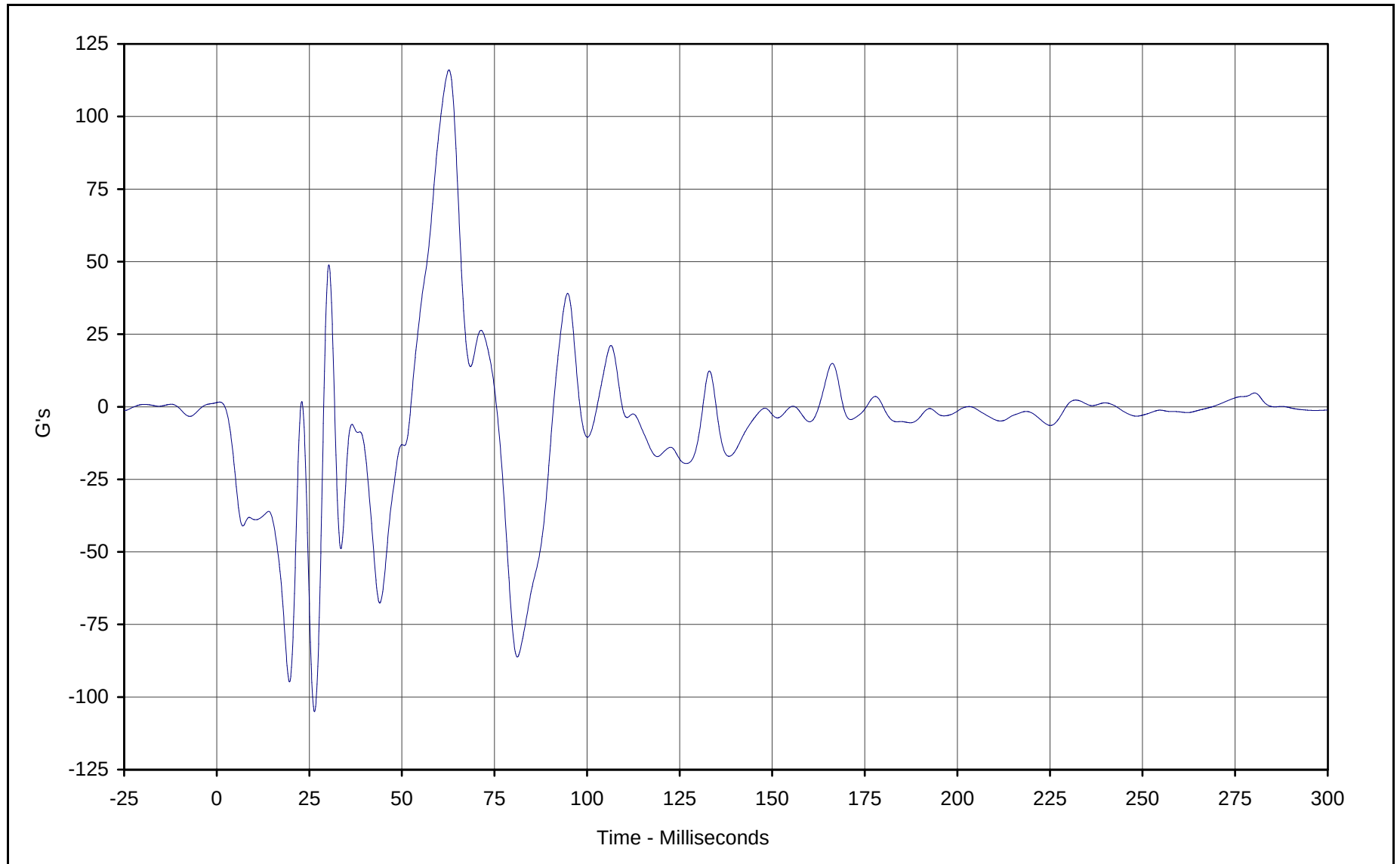
Curve Description: Vehicle Left Brake Caliper Displ.
Maximum Value: 55.2 at 104.9 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-093

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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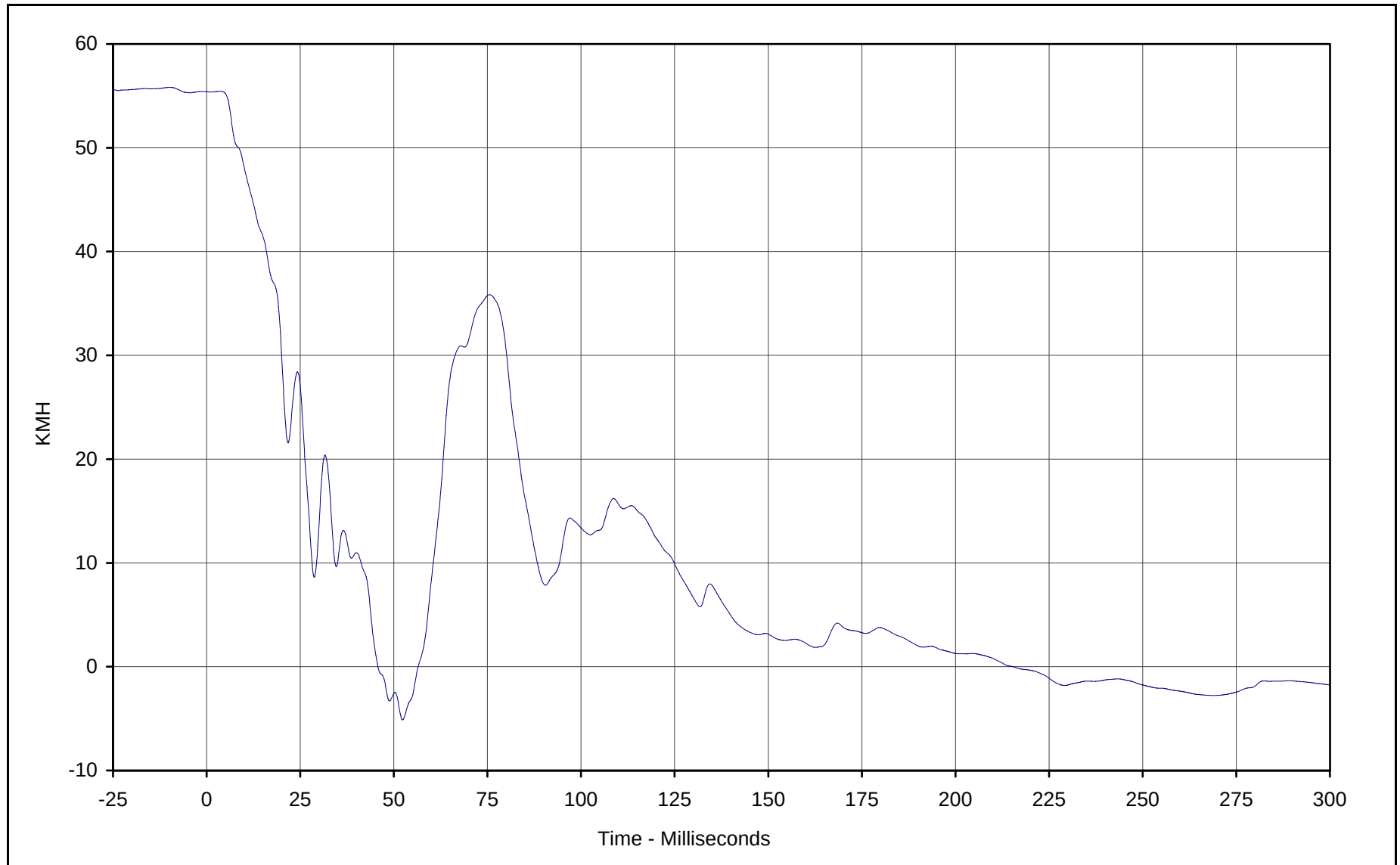
Curve Description: Vehicle Right Brake Caliper
Maximum Value: 116.0 at 62.7 Milliseconds
Minimum Value: -105.0 at 26.4 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-094

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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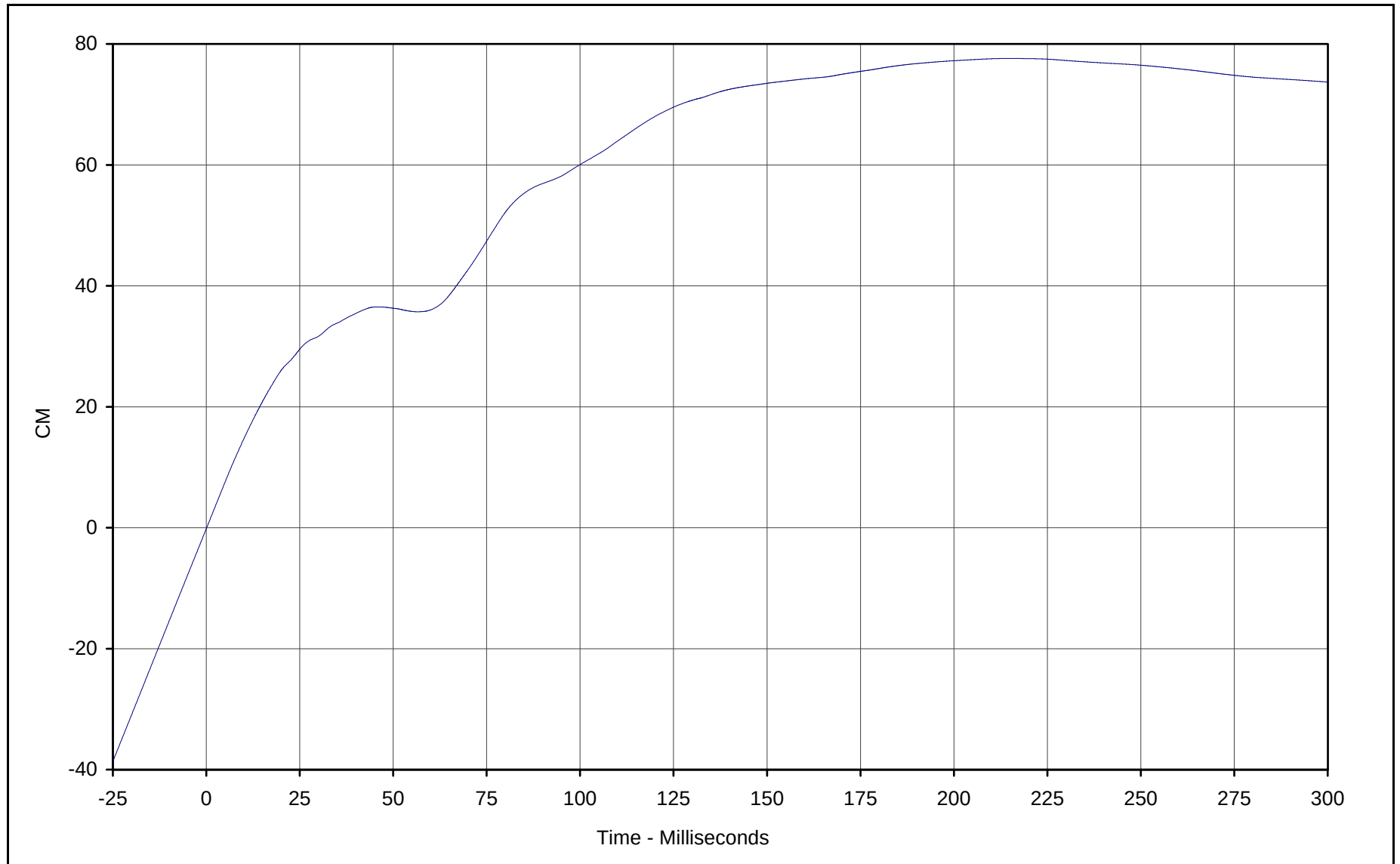
Curve Description: Vehicle Right Brake Caliper Velocity
Maximum Value: 55.4 at 3.6 Milliseconds
Minimum Value: -5.1 at 52.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-094

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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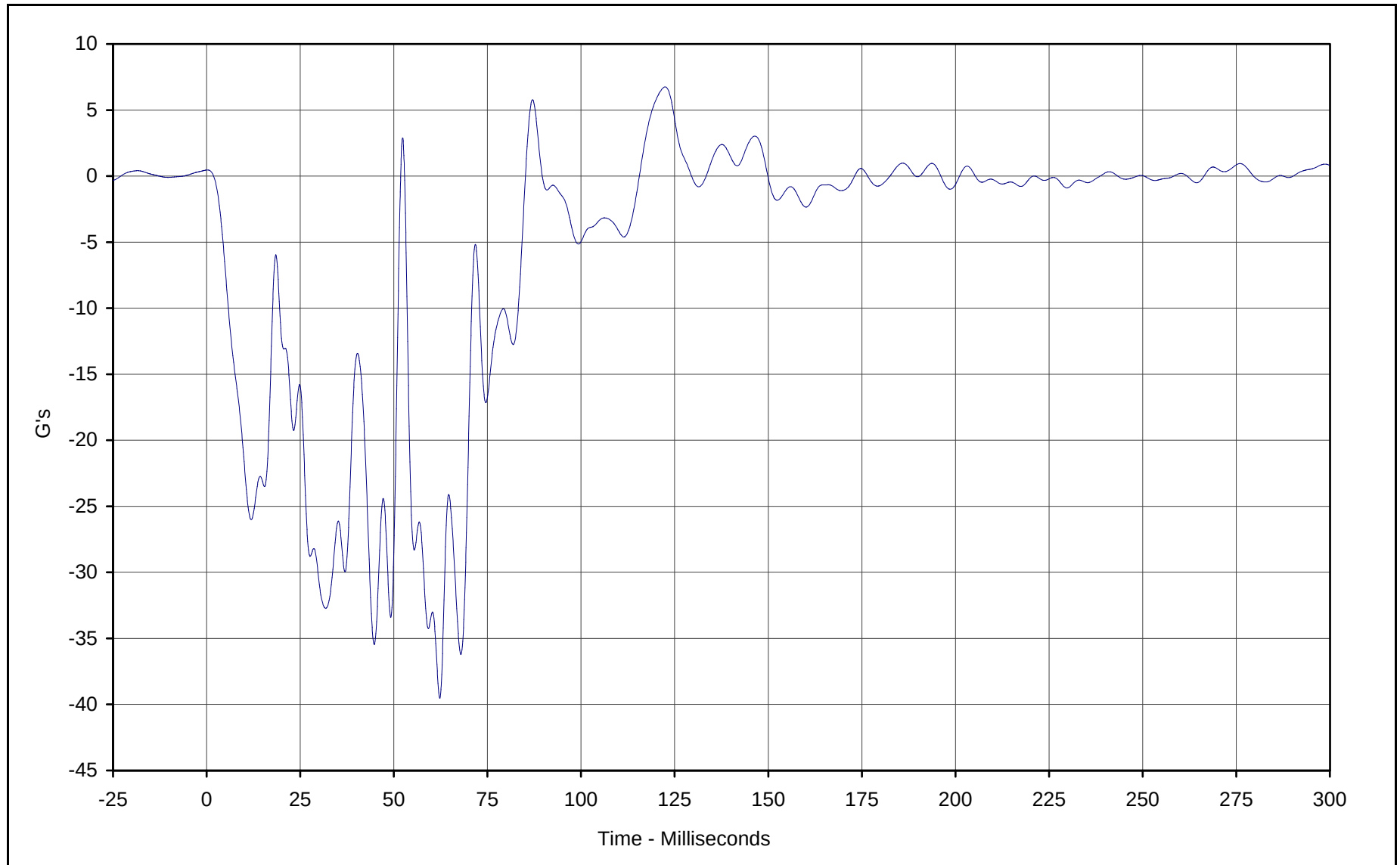
Curve Description: Vehicle Right Brake Caliper Displ.
Maximum Value: 77.6 at 215.3 Milliseconds
Minimum Value: -0.2 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-094

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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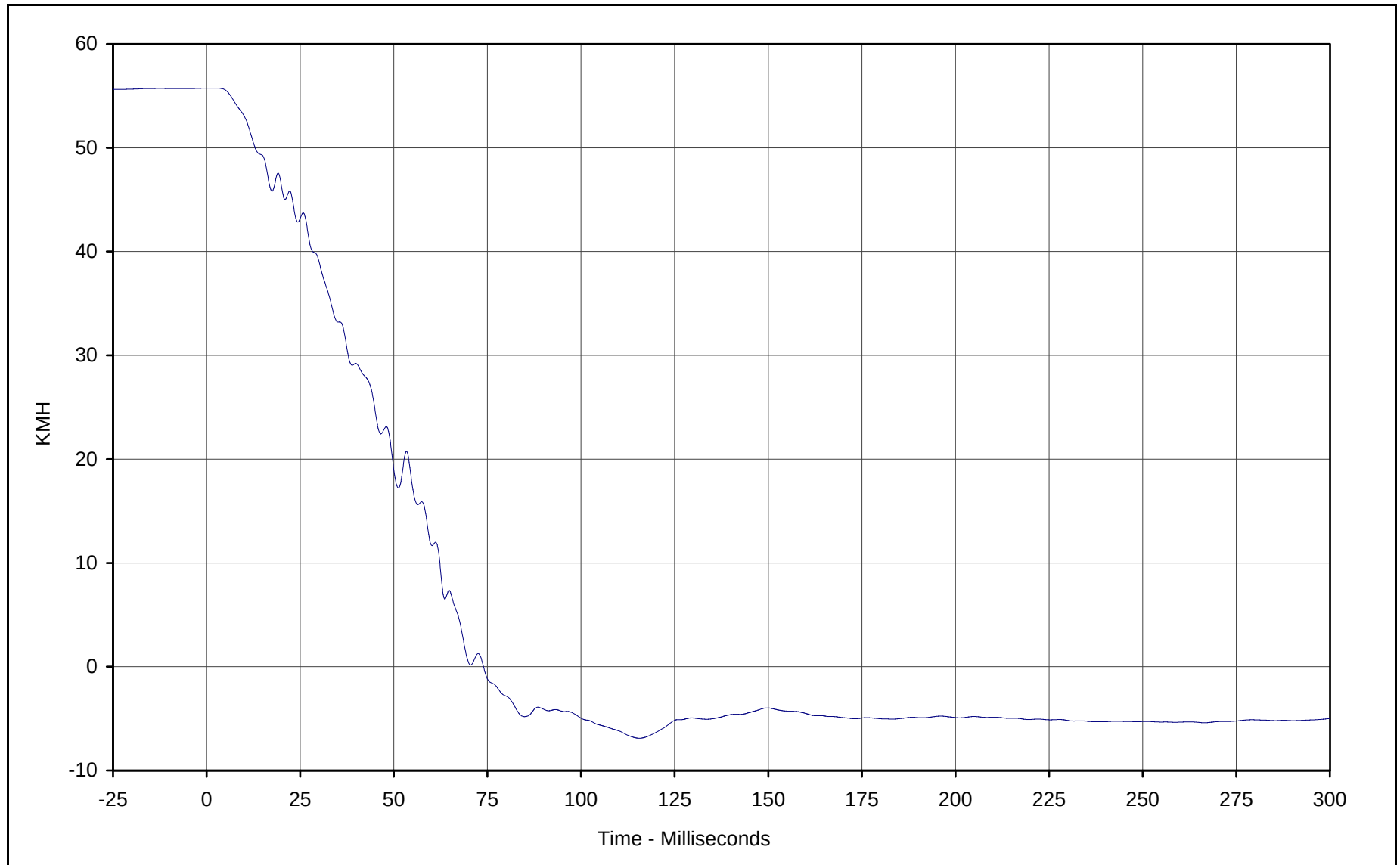
Curve Description: Vehicle Instrument Panel
Maximum Value: 6.8 at 122.5 Milliseconds
Minimum Value: -39.5 at 62.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-095

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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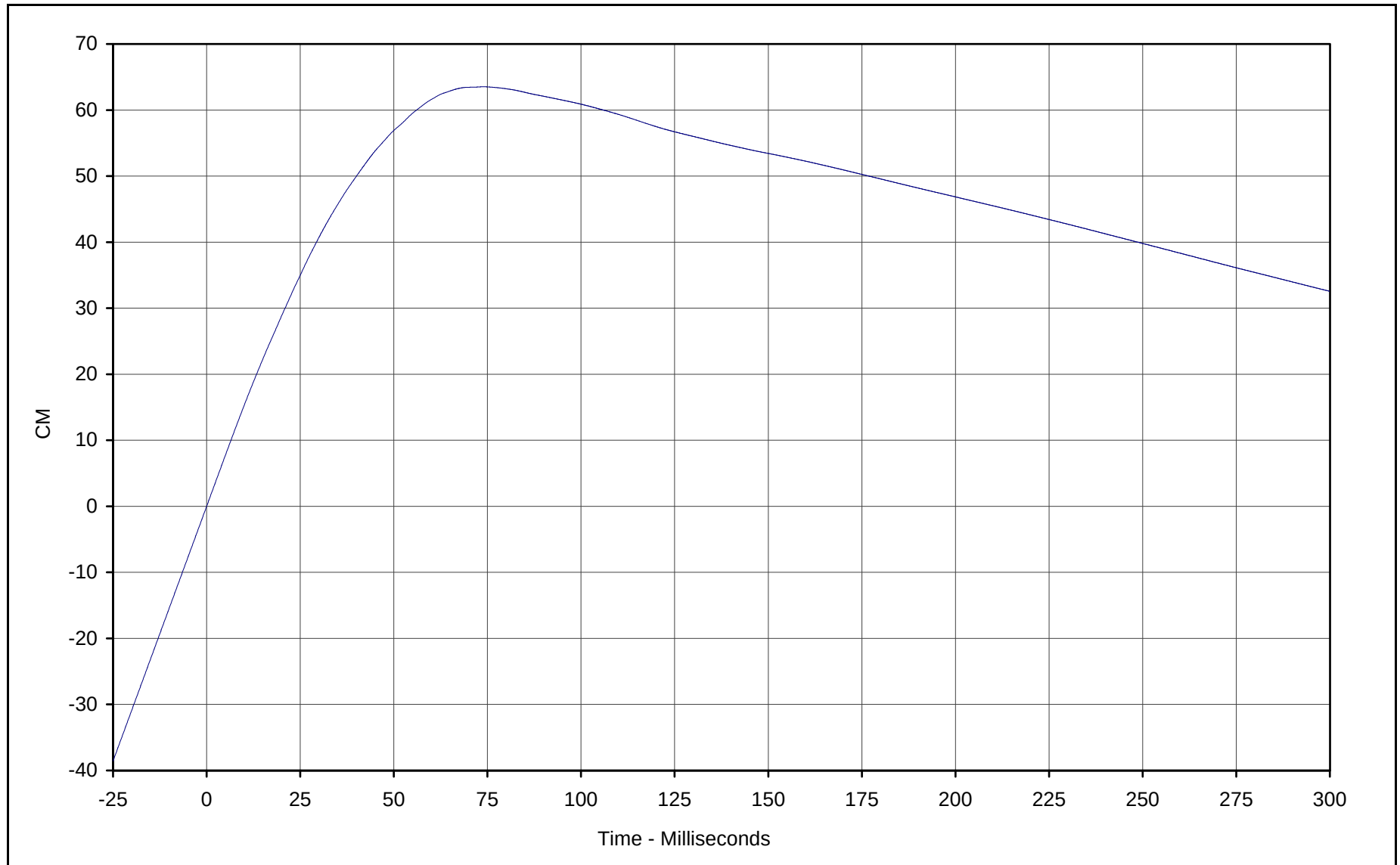
Curve Description: Vehicle Instrument Panel Velocity
Maximum Value: 55.7 at 2.7 Milliseconds
Minimum Value: -6.9 at 115.6 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-095

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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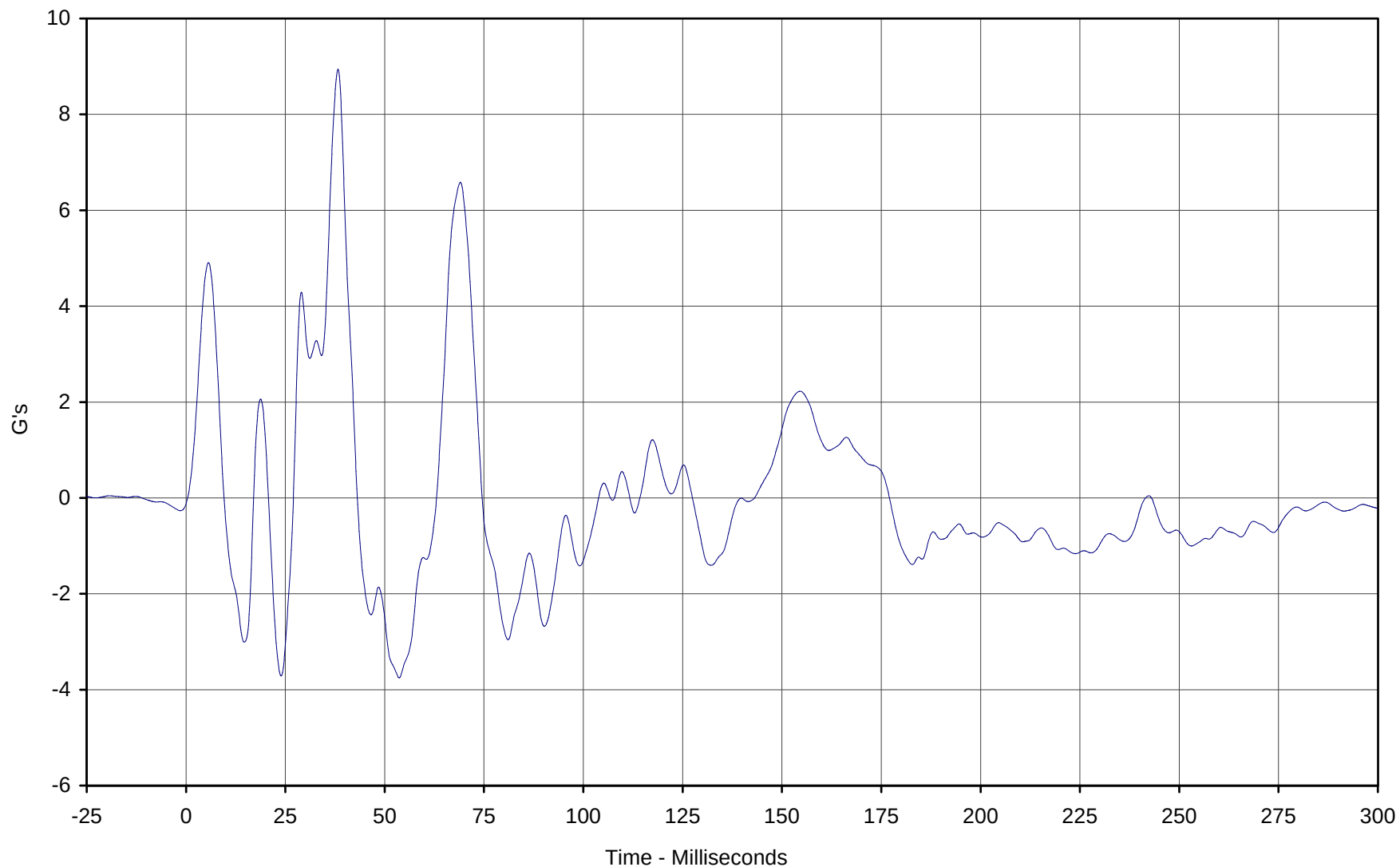
Curve Description: Vehicle Instrument Panel Displ.
Maximum Value: 63.5 at 73.9 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-095

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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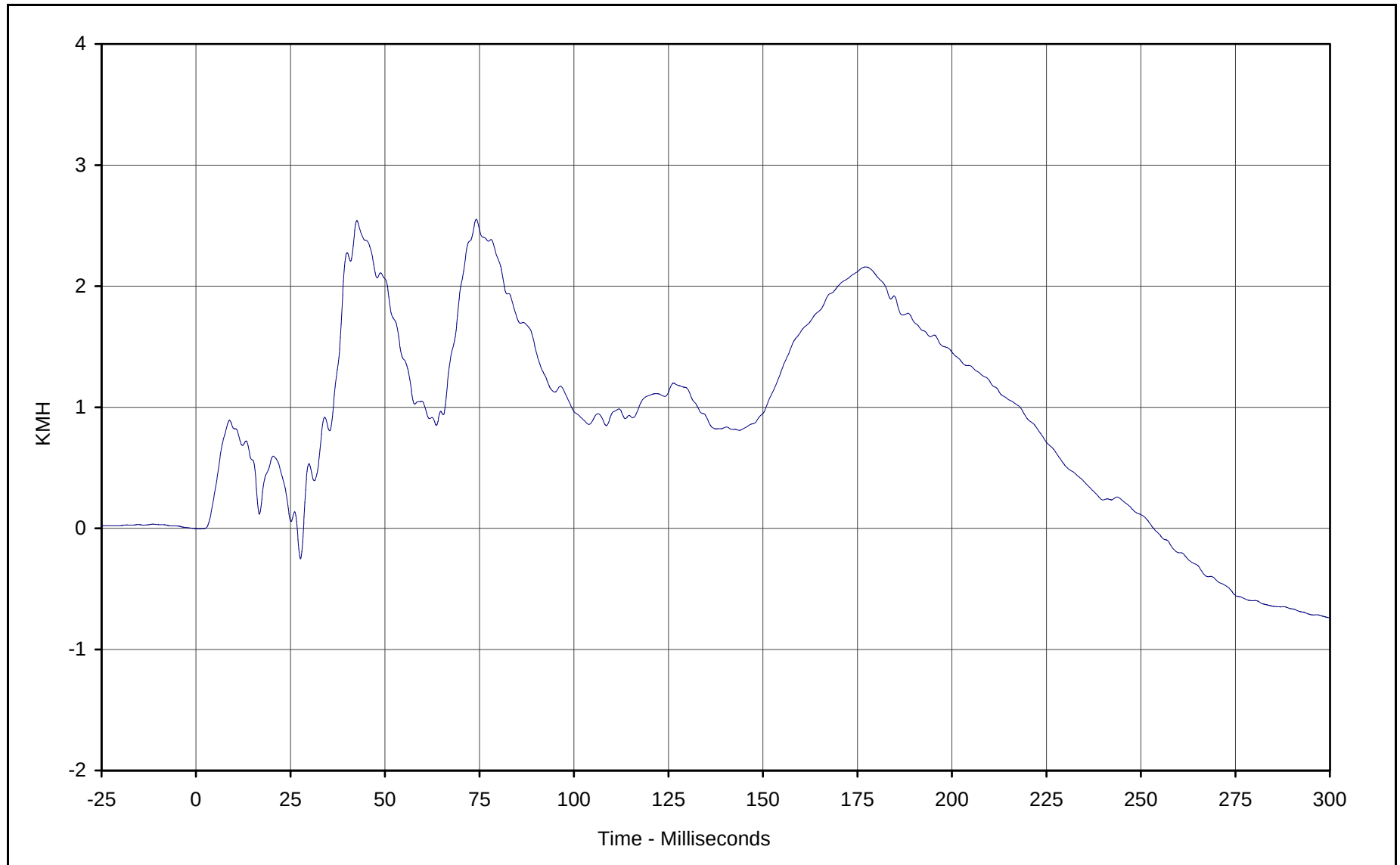
Curve Description: Vehicle Left Rear Z
Maximum Value: 8.9 at 38.3 Milliseconds
Minimum Value: -3.8 at 53.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-096

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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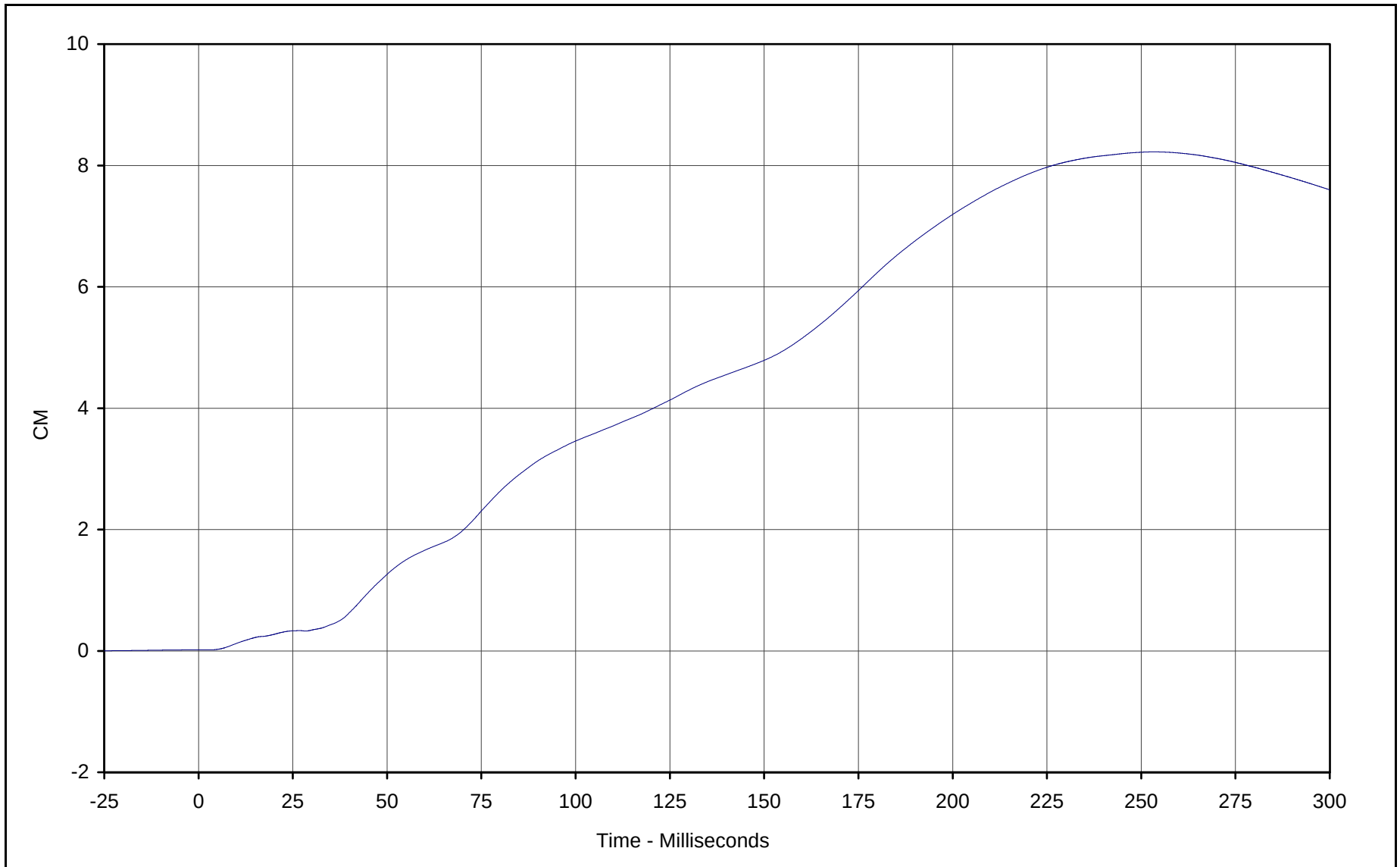


Curve Description: Vehicle Left Rear Z Velocity
Maximum Value: 2.6 at 74.2 Milliseconds
Minimum Value: -0.7 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-096

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



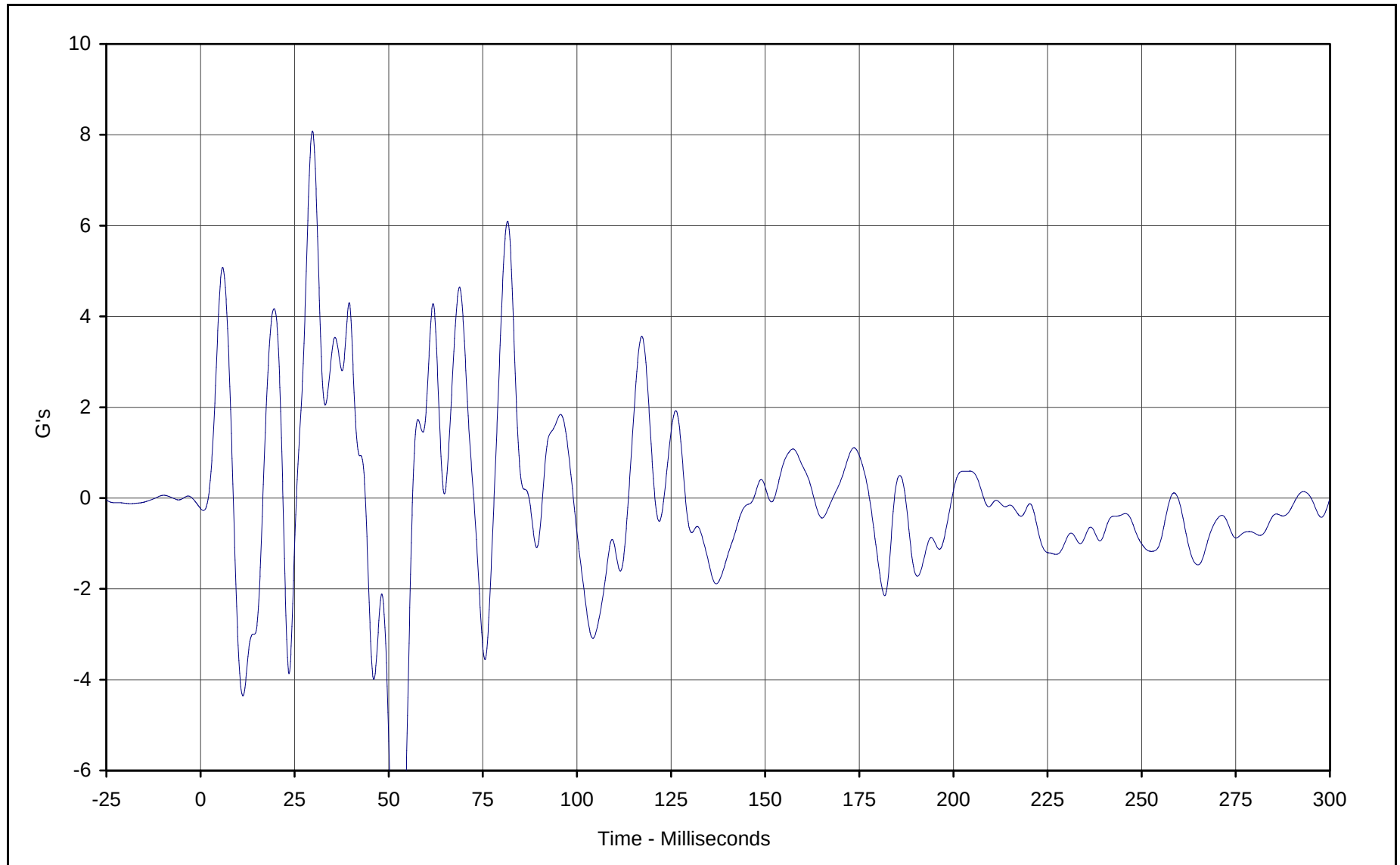
KAR21129-01



Curve Description: Vehicle Left Rear Z Displ.
Maximum Value: 8.2 at 253.3 Milliseconds
Minimum Value: 0.0 at 2.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-096

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



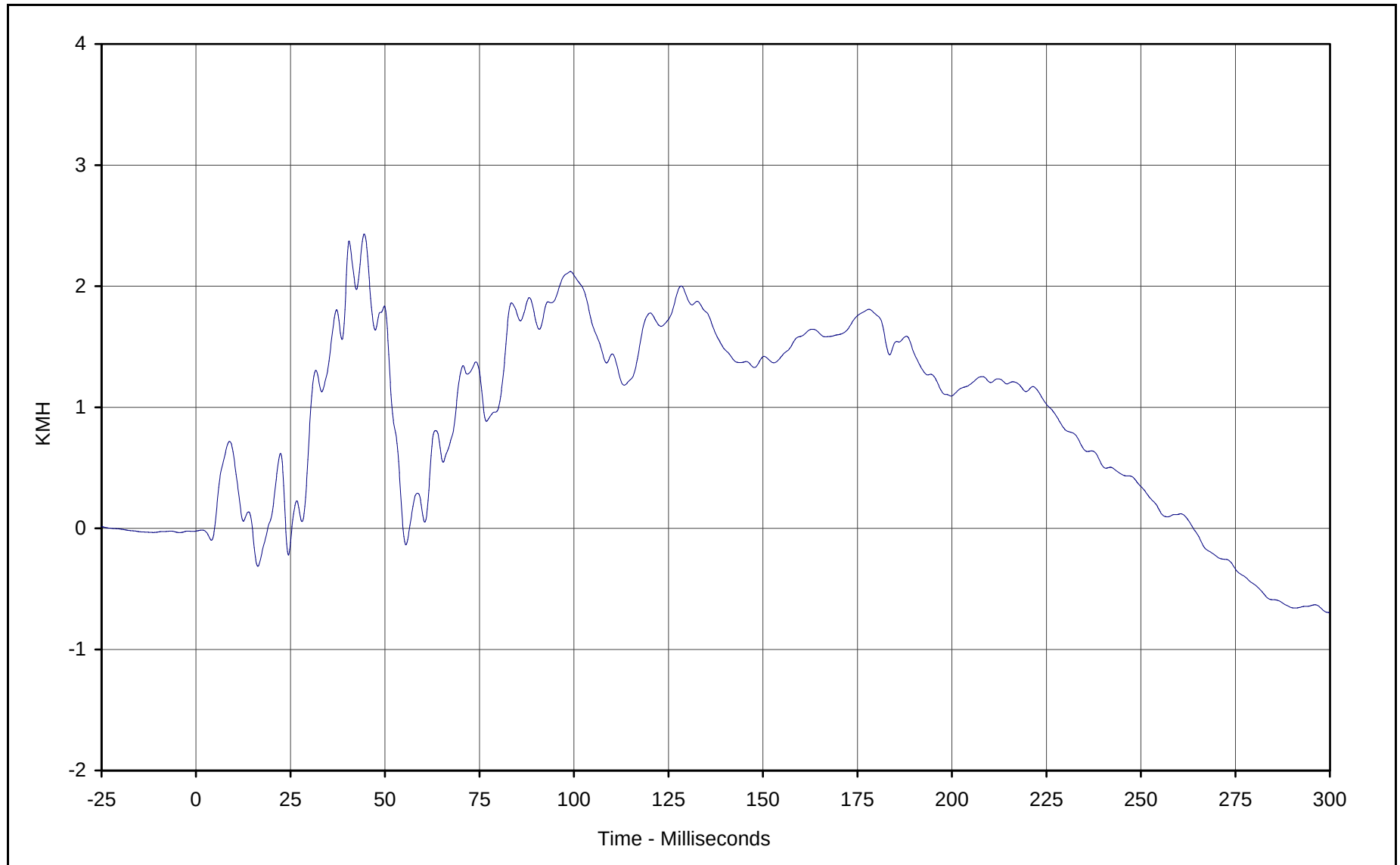


Curve Description: Vehicle Right Rear Z
Maximum Value: 8.1 at 29.7 Milliseconds
Minimum Value: -9.6 at 52.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-097

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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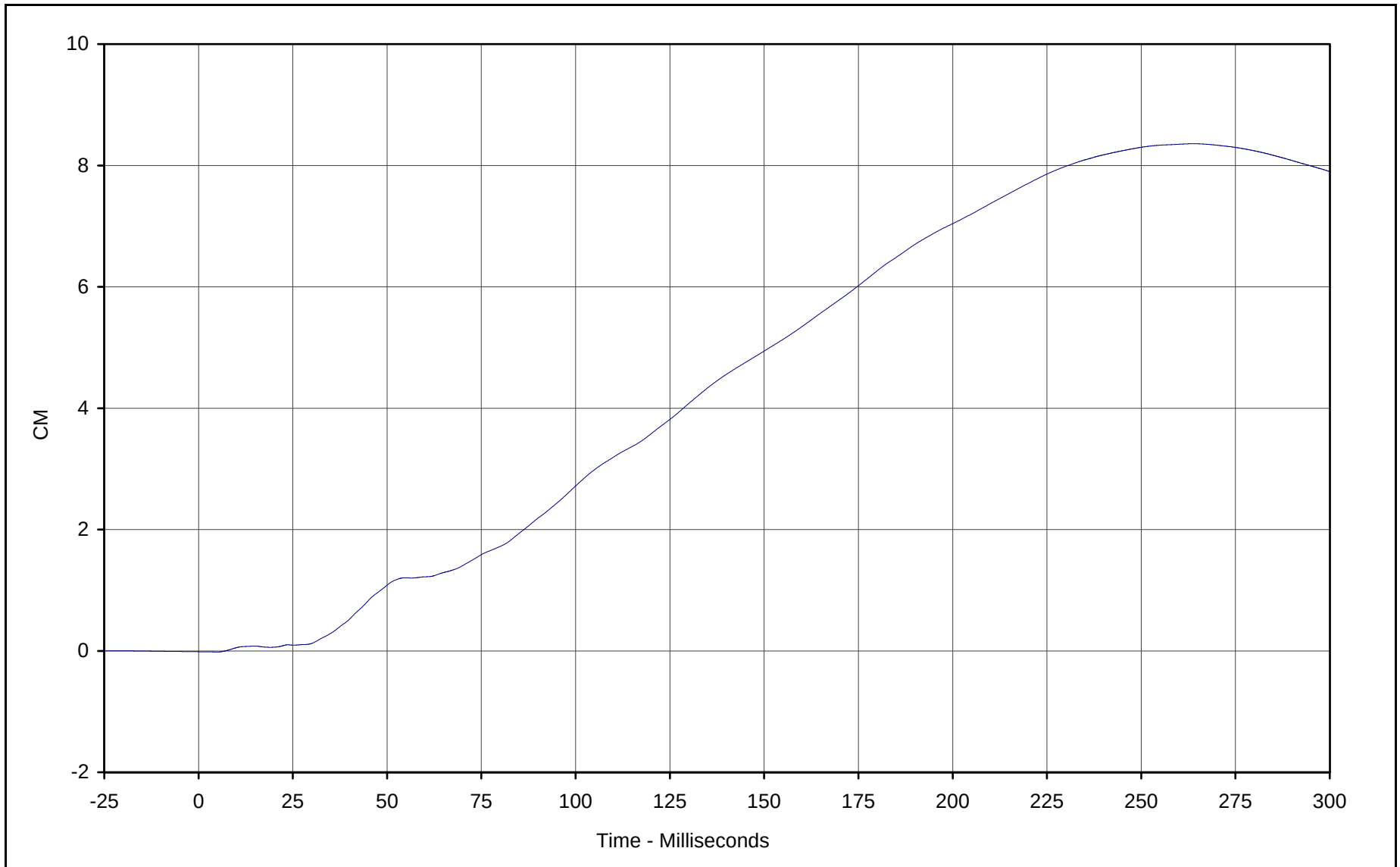


Curve Description: Vehicle Right Rear Z Velocity
Maximum Value: 2.4 at 44.5 Milliseconds
Minimum Value: -0.7 at 299.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN1-097

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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Curve Description: Vehicle Right Rear Z Displ.
Maximum Value: 8.4 at 263.9 Milliseconds
Minimum Value: 0.0 at 4.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/5/01
Curve Number: IN2-097

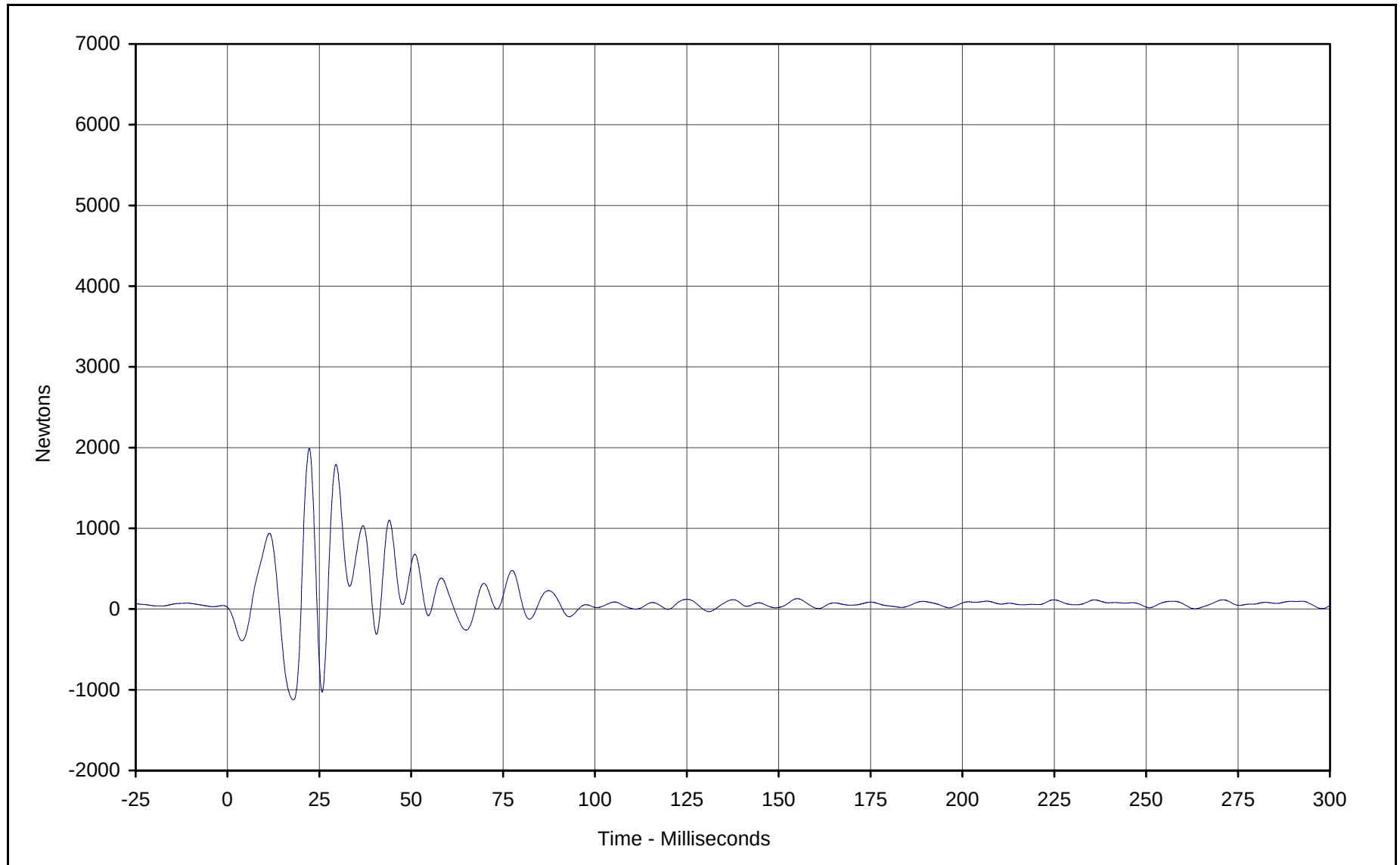
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



APPENDIX C

LOAD CELL BARRIER DATA PLOTS

C-1



Curve Description: Barrier Force A2

Maximum Value: 1990.3 at 22.3 Milliseconds

Minimum Value: -1126.9 at 17.9 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

Curve Number: FIL-099

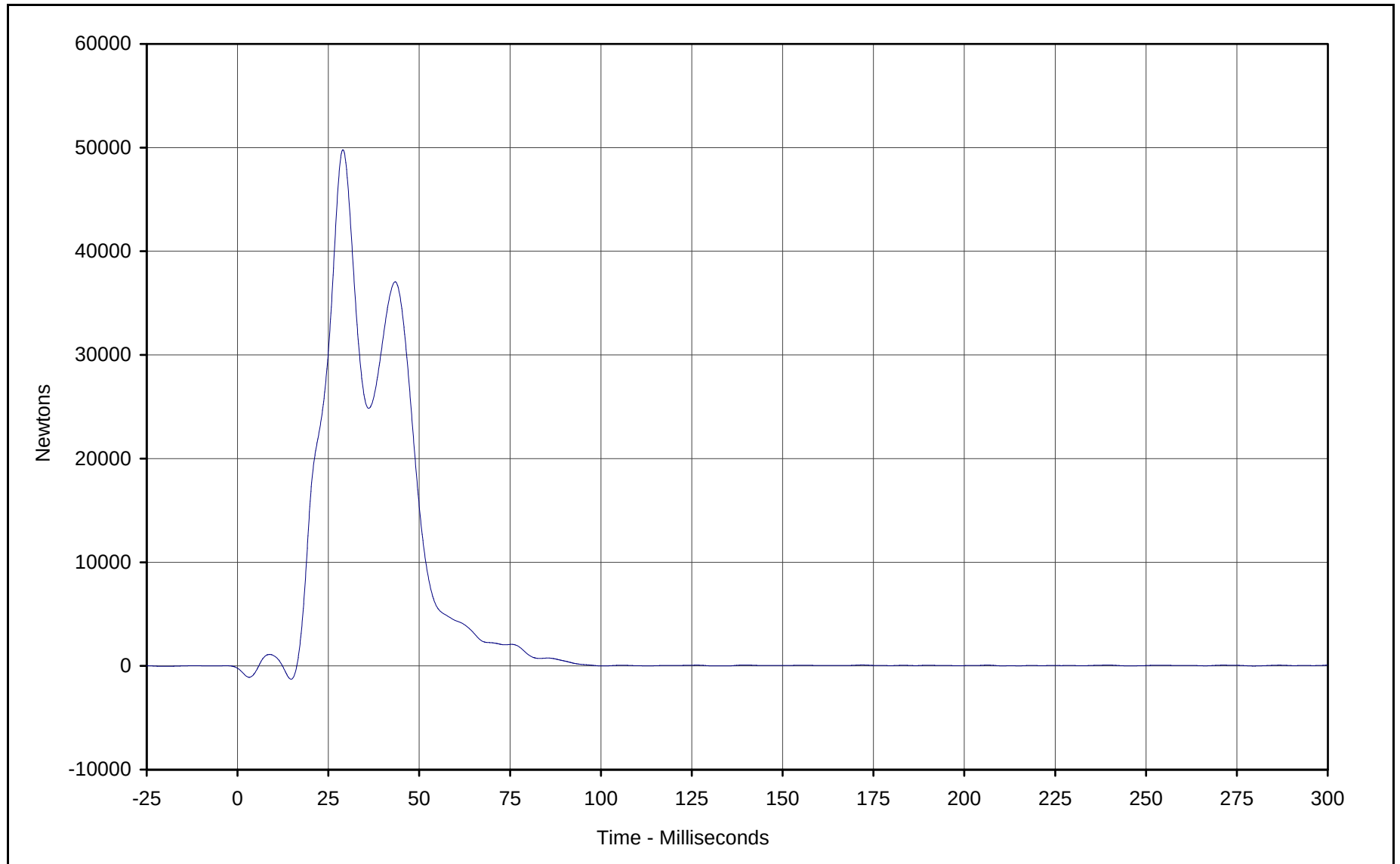
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

C-2

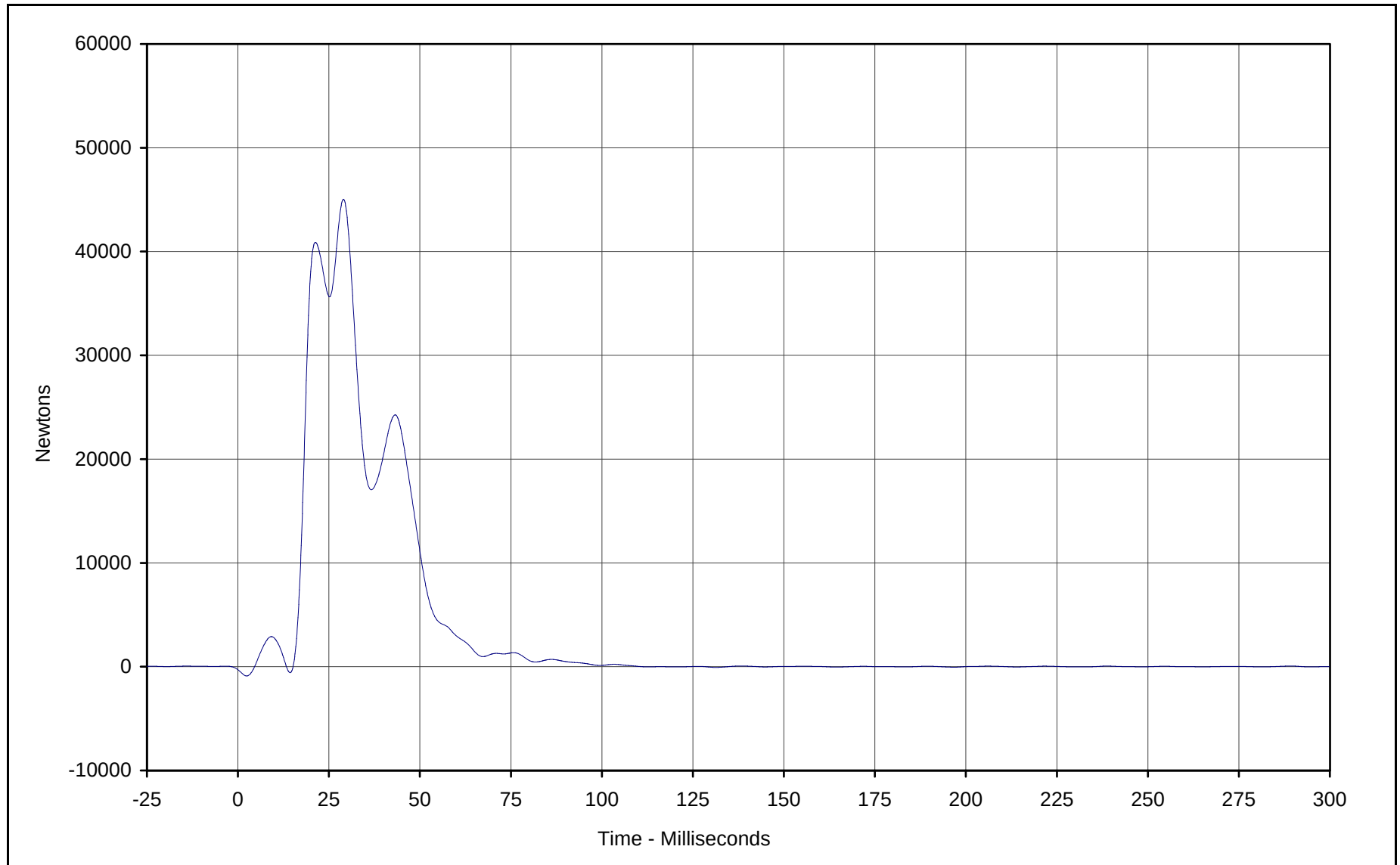


Curve Description: Barrier Force A3
Maximum Value: 49799.7 at 29.0 Milliseconds
Minimum Value: -1281.2 at 14.7 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-100

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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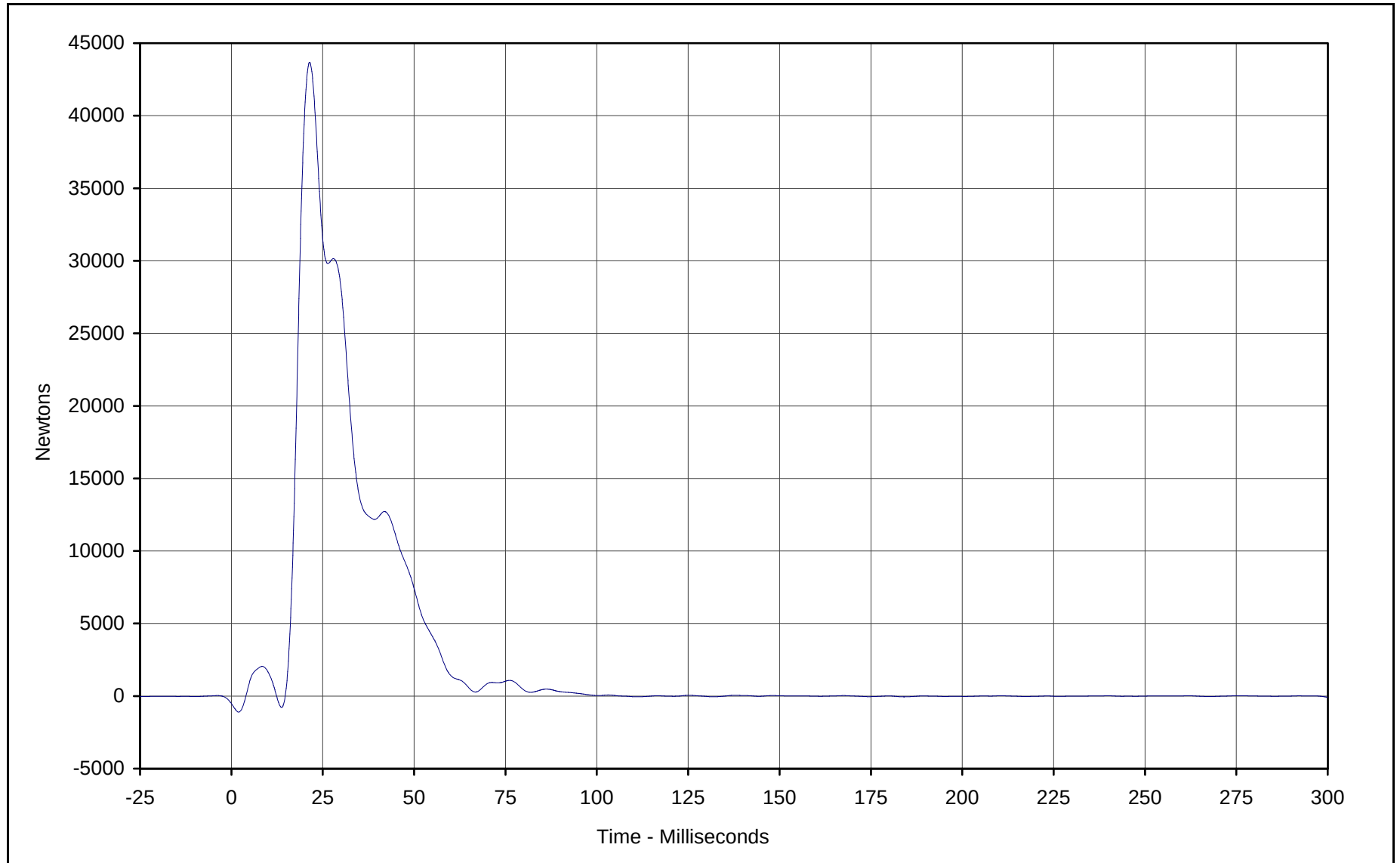


Curve Description: Barrier Force A4
Maximum Value: 45037.7 at 29.0 Milliseconds
Minimum Value: -893.0 at 2.4 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-101

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



C-4



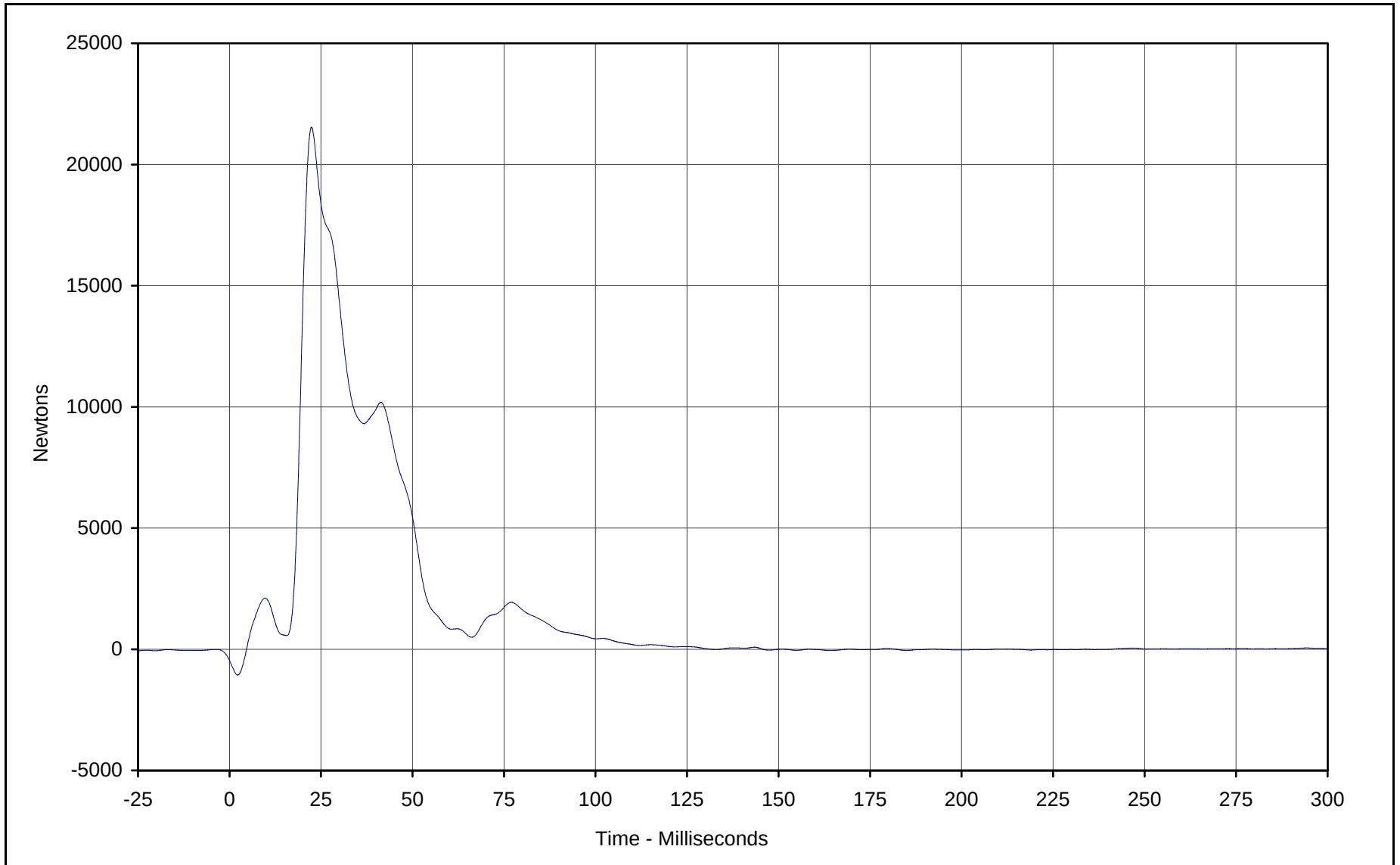
Curve Description: Barrier Force A5
Maximum Value: 43683.4 at 21.4 Milliseconds
Minimum Value: -1103.7 at 2.0 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-102

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-5



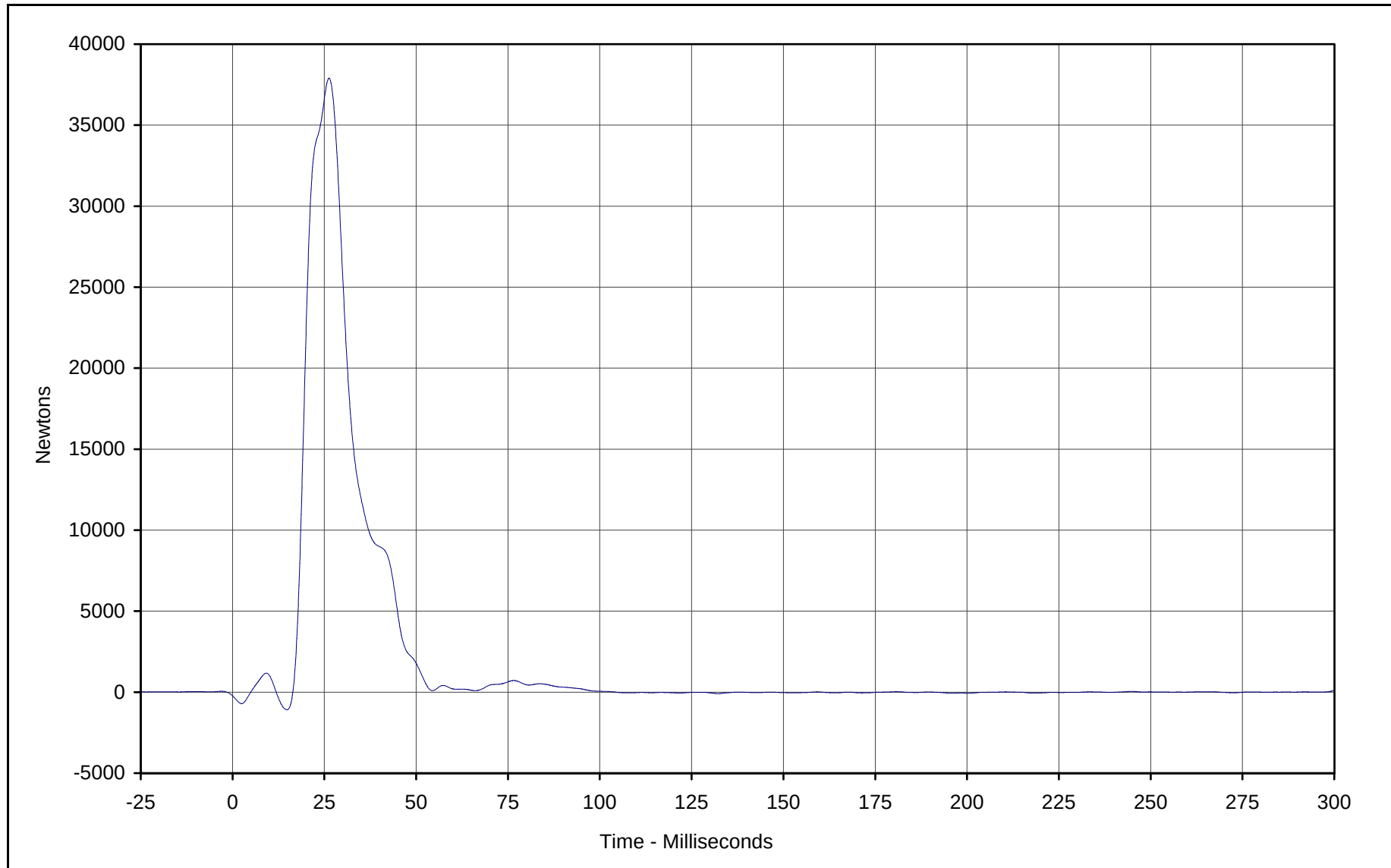
Curve Description: Barrier Force A6
Maximum Value: 21537.9 at 22.4 Milliseconds
Minimum Value: -1066.0 at 2.2 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-103

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-6



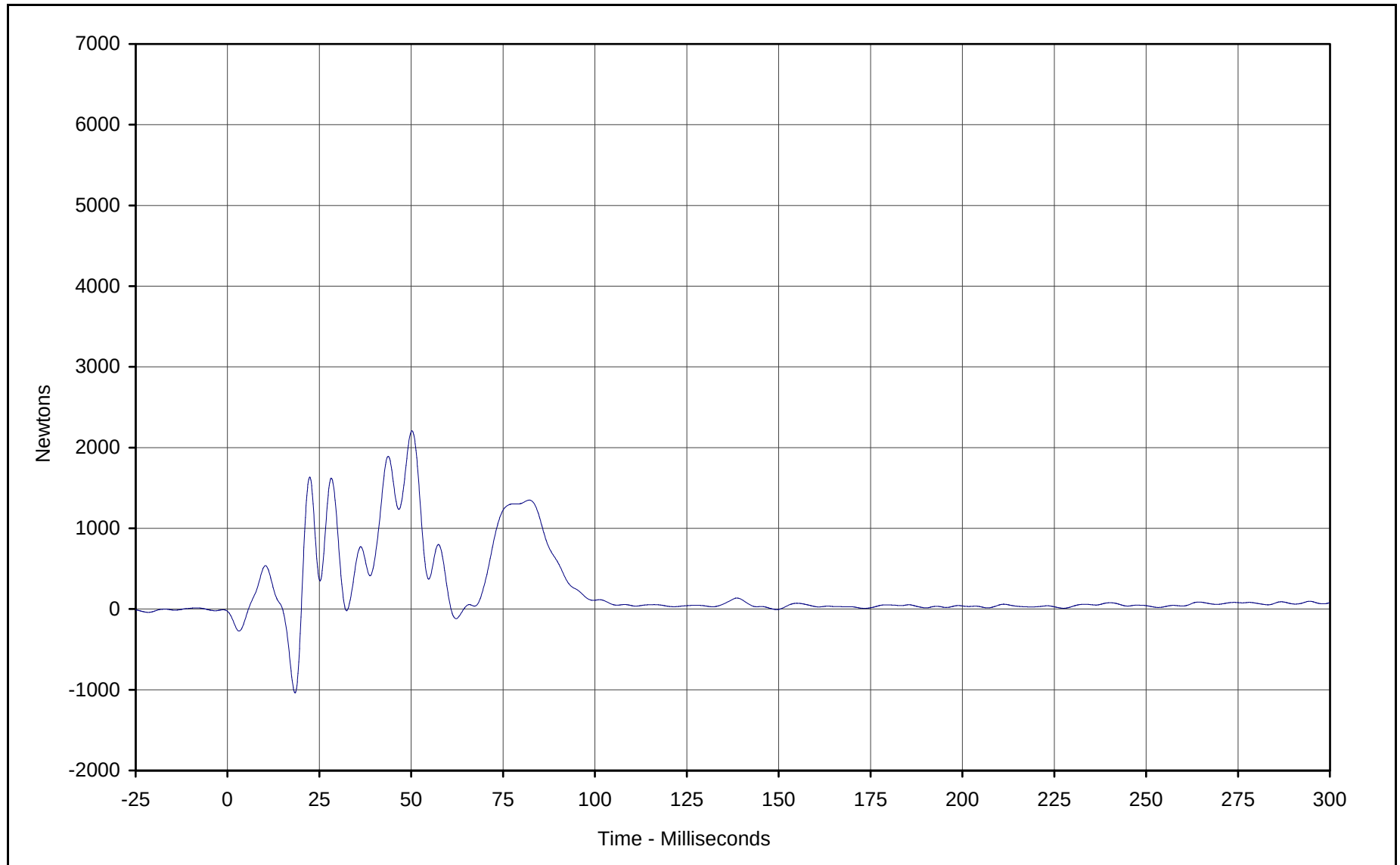
Curve Description: Barrier Force A7
Maximum Value: 37896.5 at 26.3 Milliseconds
Minimum Value: -1085.0 at 14.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-104

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-7



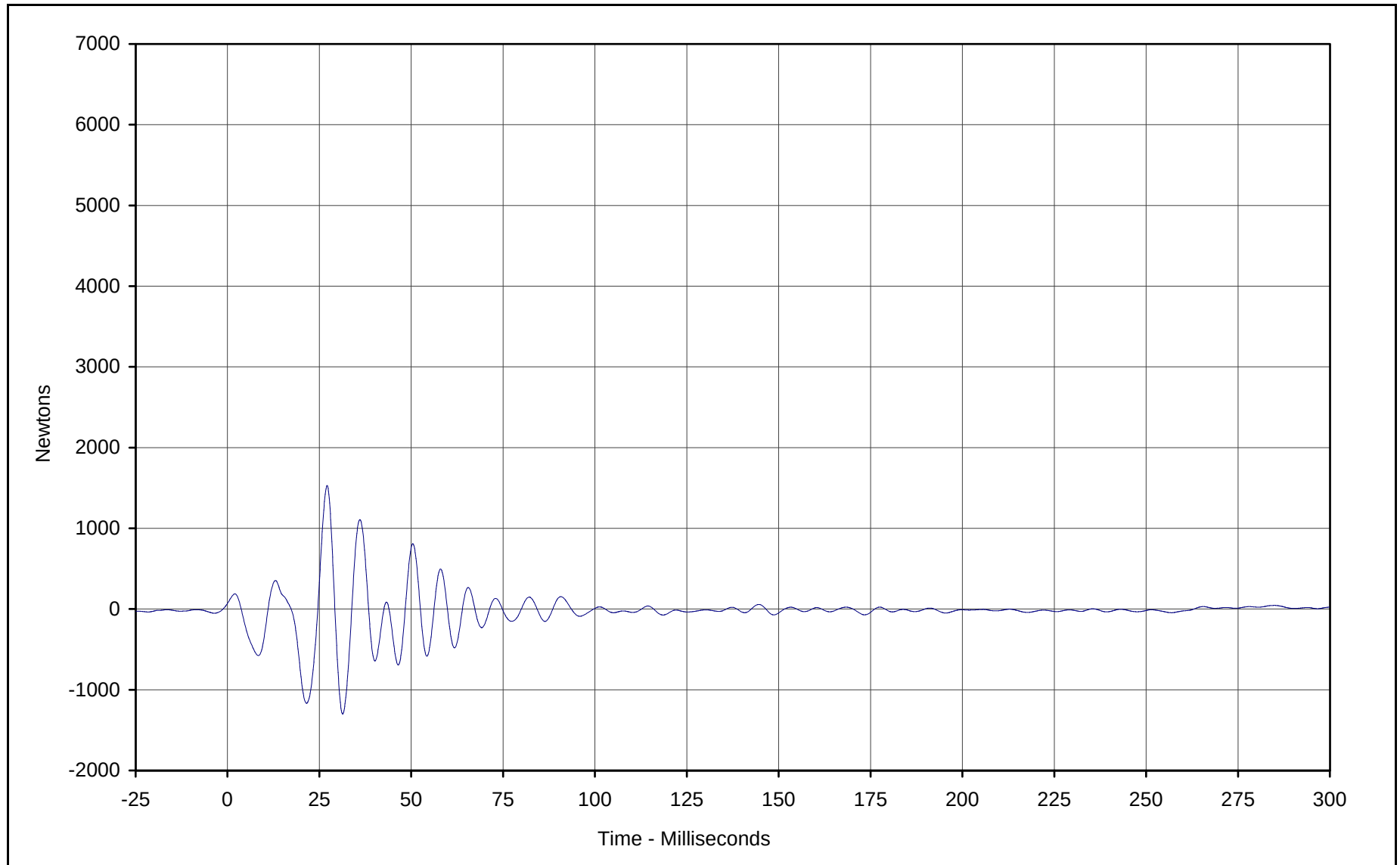
Curve Description: Barrier Force A8
Maximum Value: 2208.5 at 50.2 Milliseconds
Minimum Value: -1039.1 at 18.4 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-105

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-8



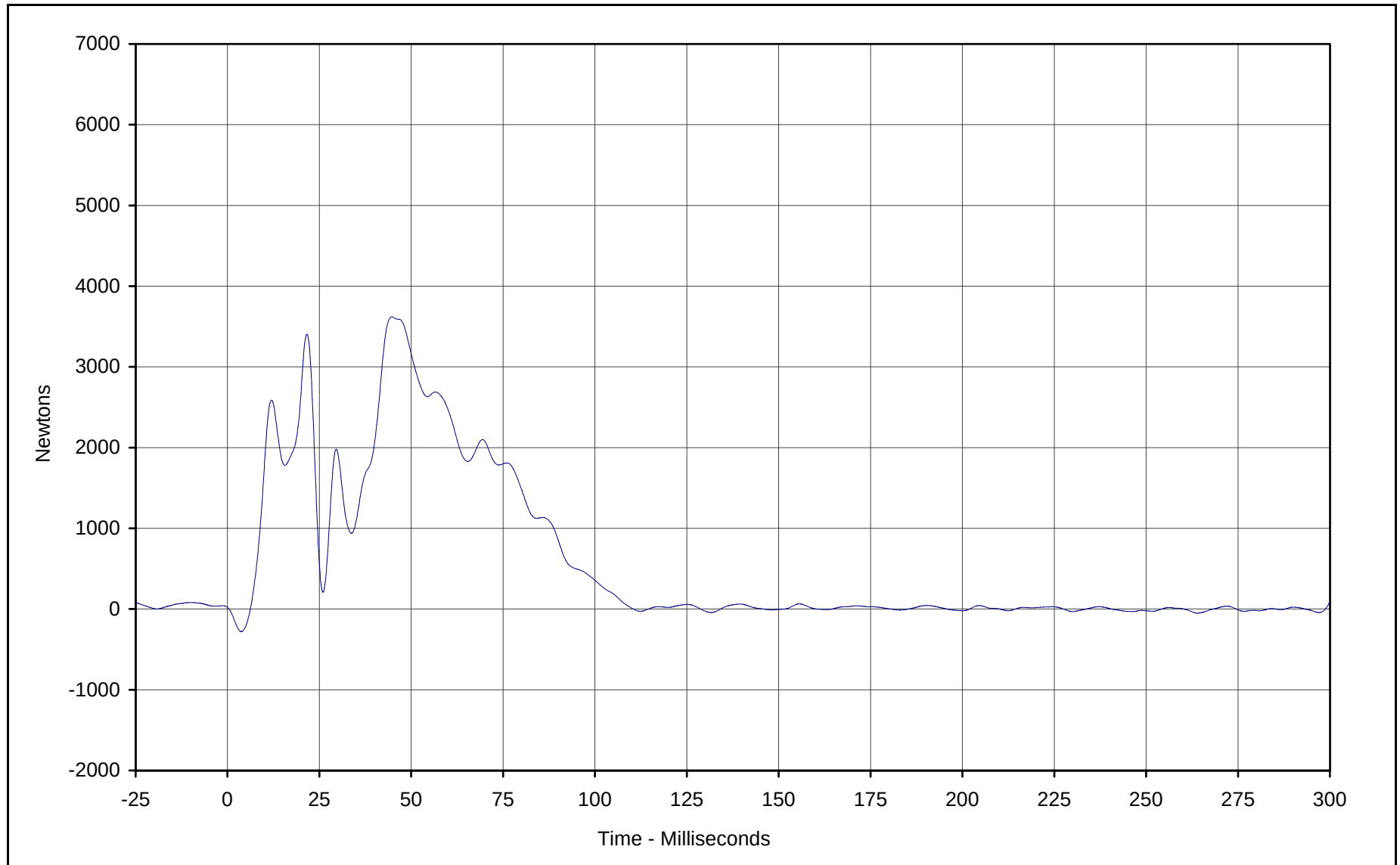
Curve Description: Barrier Force A9
Maximum Value: 1529.2 at 27.1 Milliseconds
Minimum Value: -1300.1 at 31.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-106

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-9



Curve Description: Barrier Force B2

Maximum Value: 3620.6 at 44.8 Milliseconds

Minimum Value: -278.2 at 3.7 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

Curve Number: FIL-108

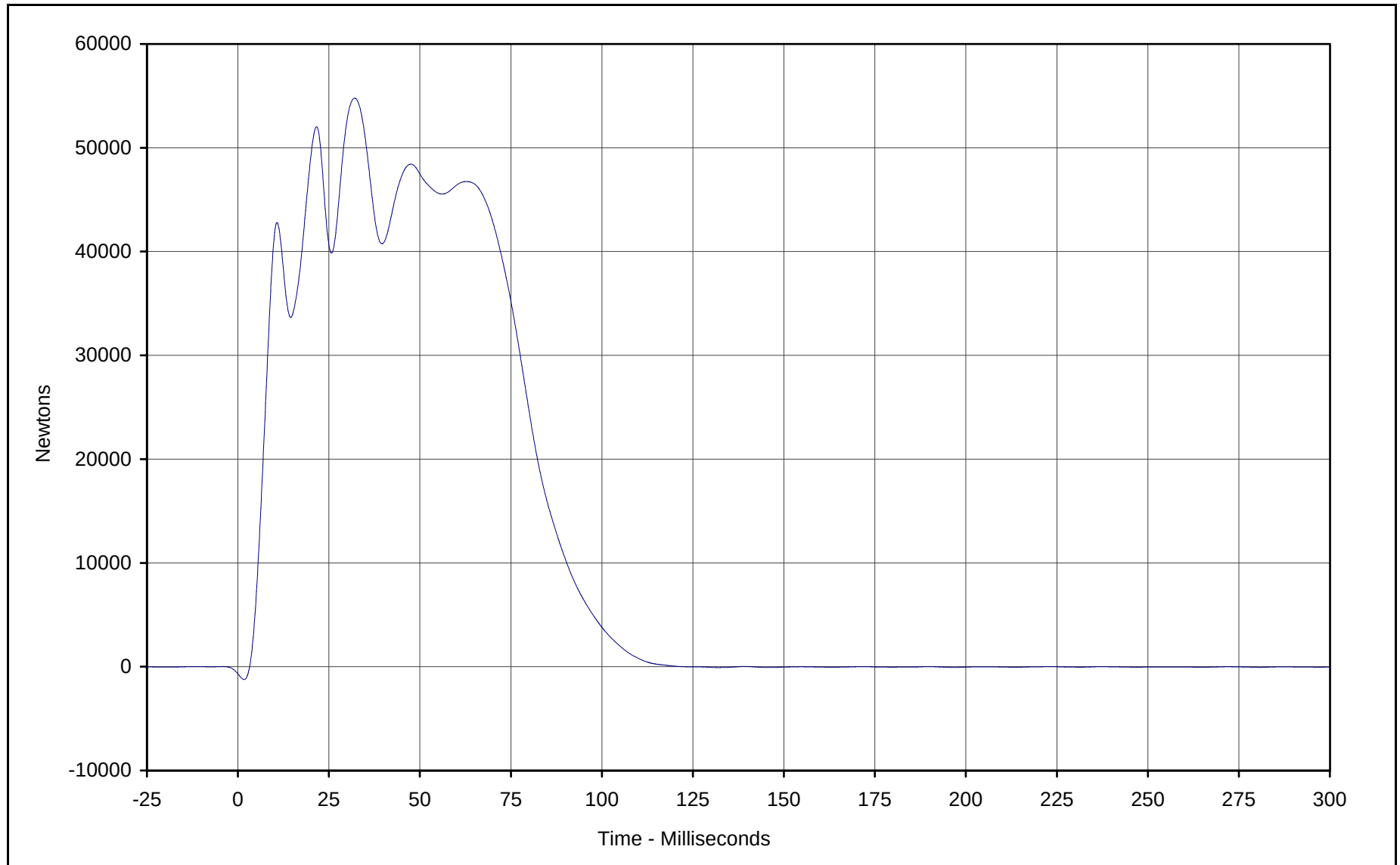
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-10



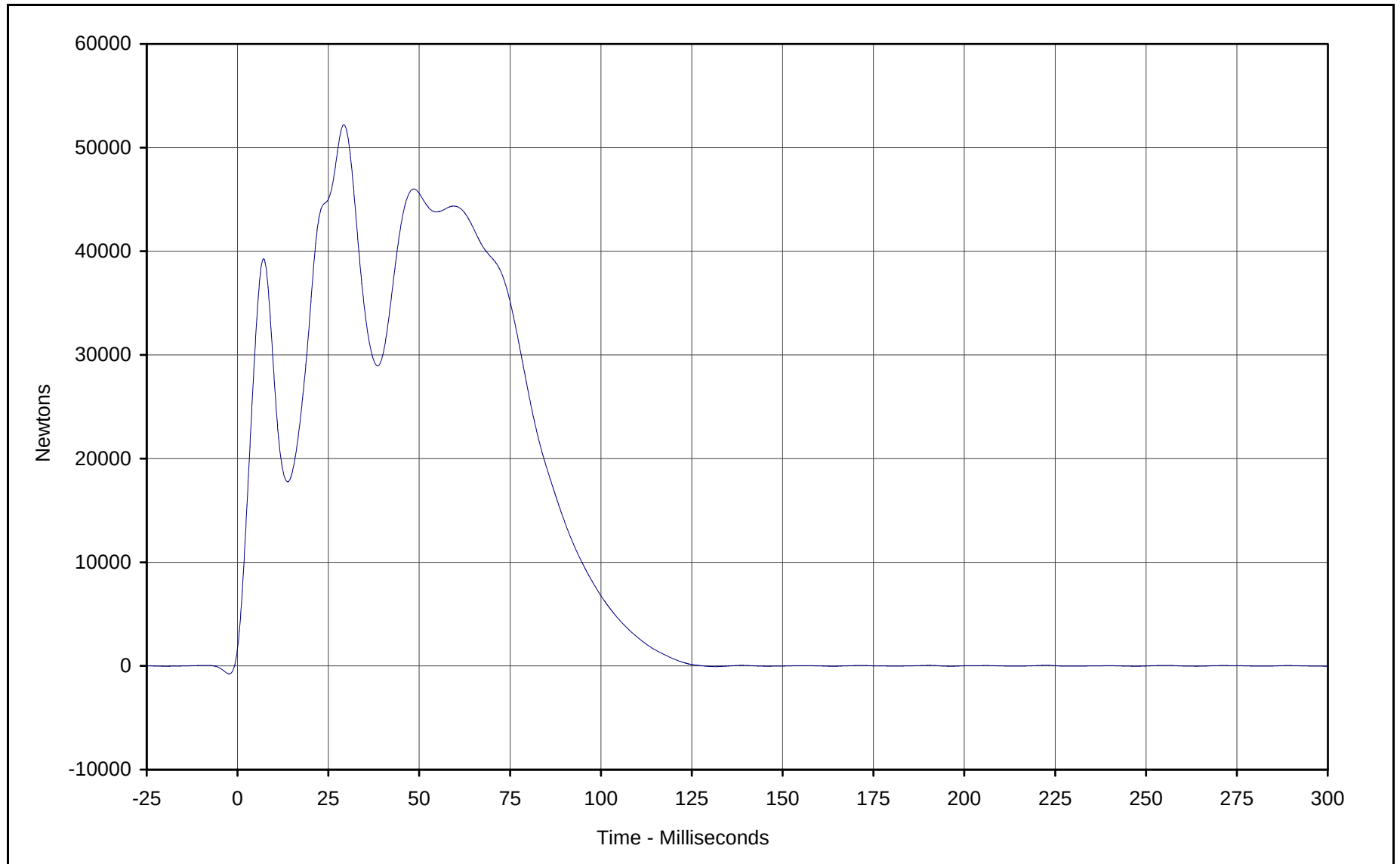
Curve Description: Barrier Force B3
Maximum Value: 54782.3 at 32.1 Milliseconds
Minimum Value: -1237.3 at 1.7 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-109

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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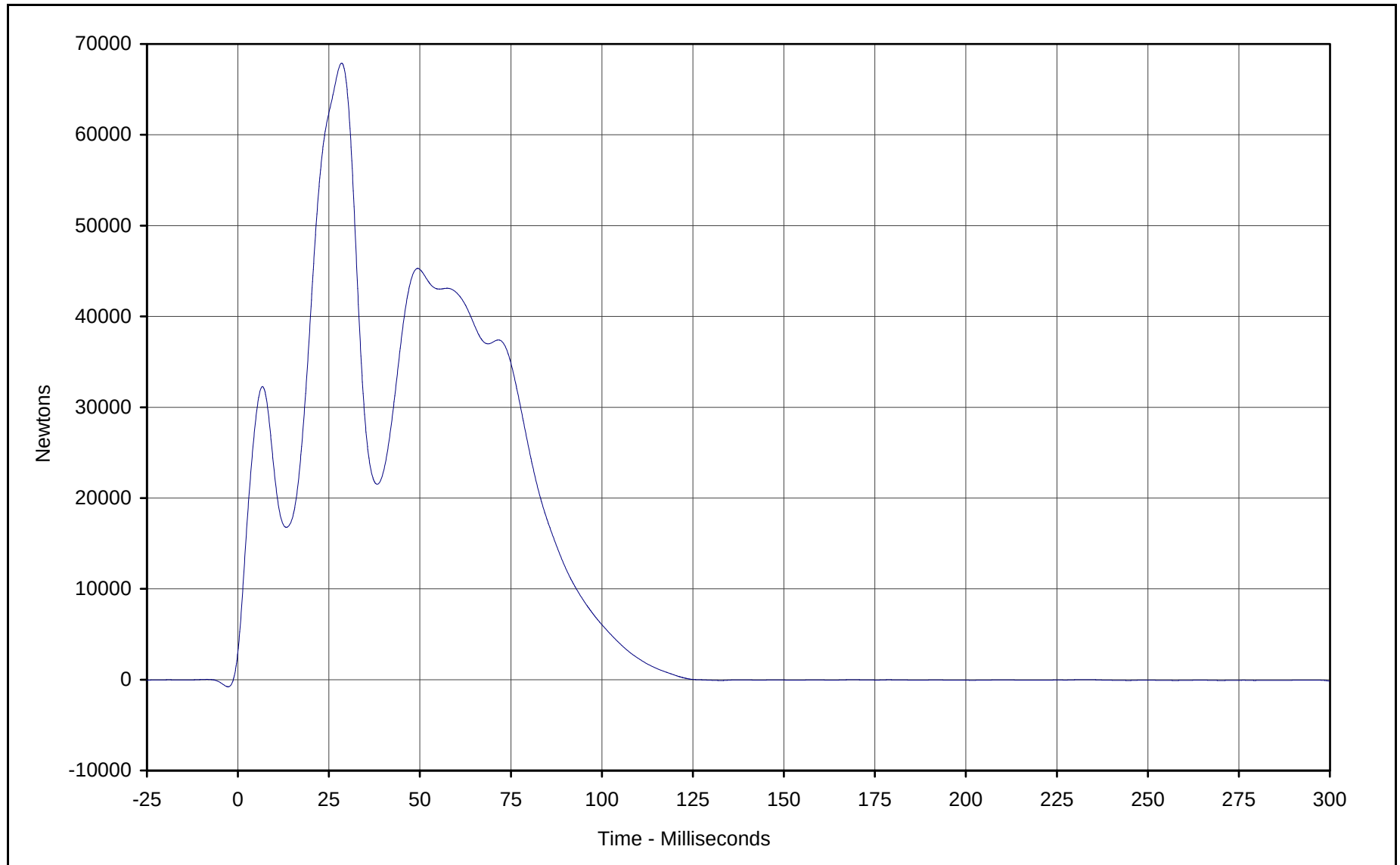
Curve Description: Barrier Force B4
Maximum Value: 52203.6 at 29.3 Milliseconds
Minimum Value: -65.0 at 131.5 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-110

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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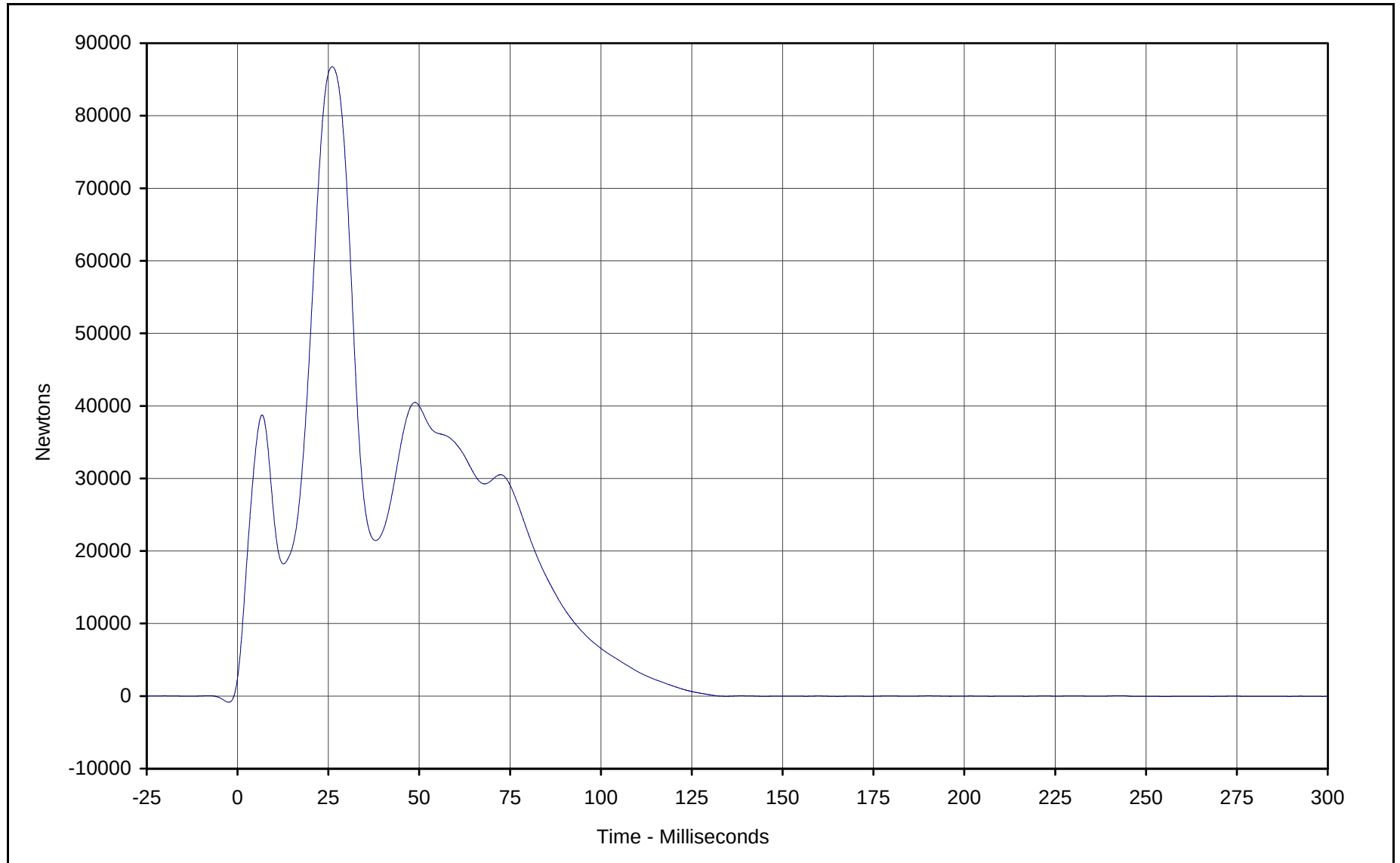
Curve Description: Barrier Force B5
Maximum Value: 67893.3 at 28.5 Milliseconds
Minimum Value: -157.1 at 299.9 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-111

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

C-13



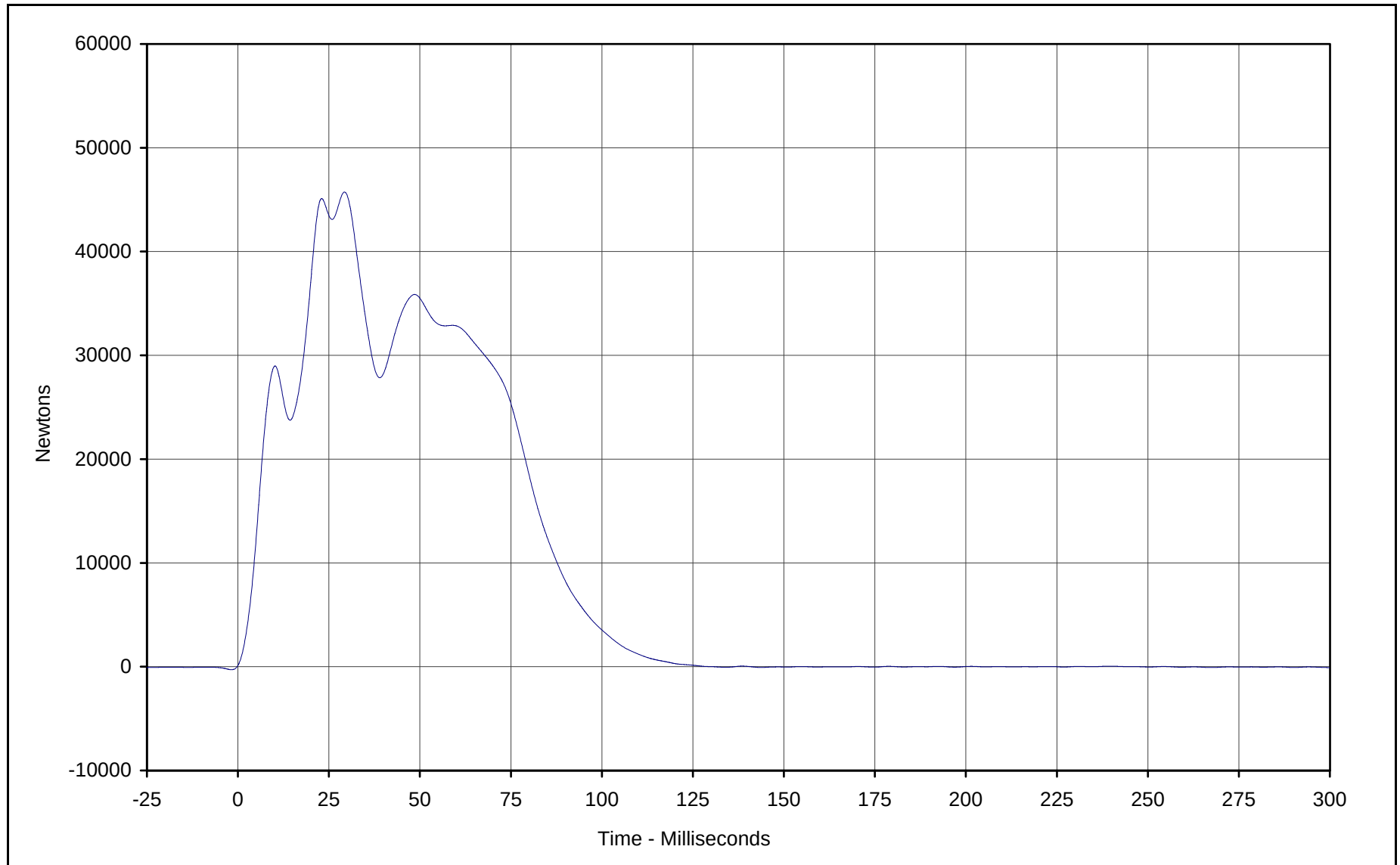
Curve Description: Barrier Force B6
Maximum Value: 86748.9 at 26.1 Milliseconds
Minimum Value: -57.8 at 255.0 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-112

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

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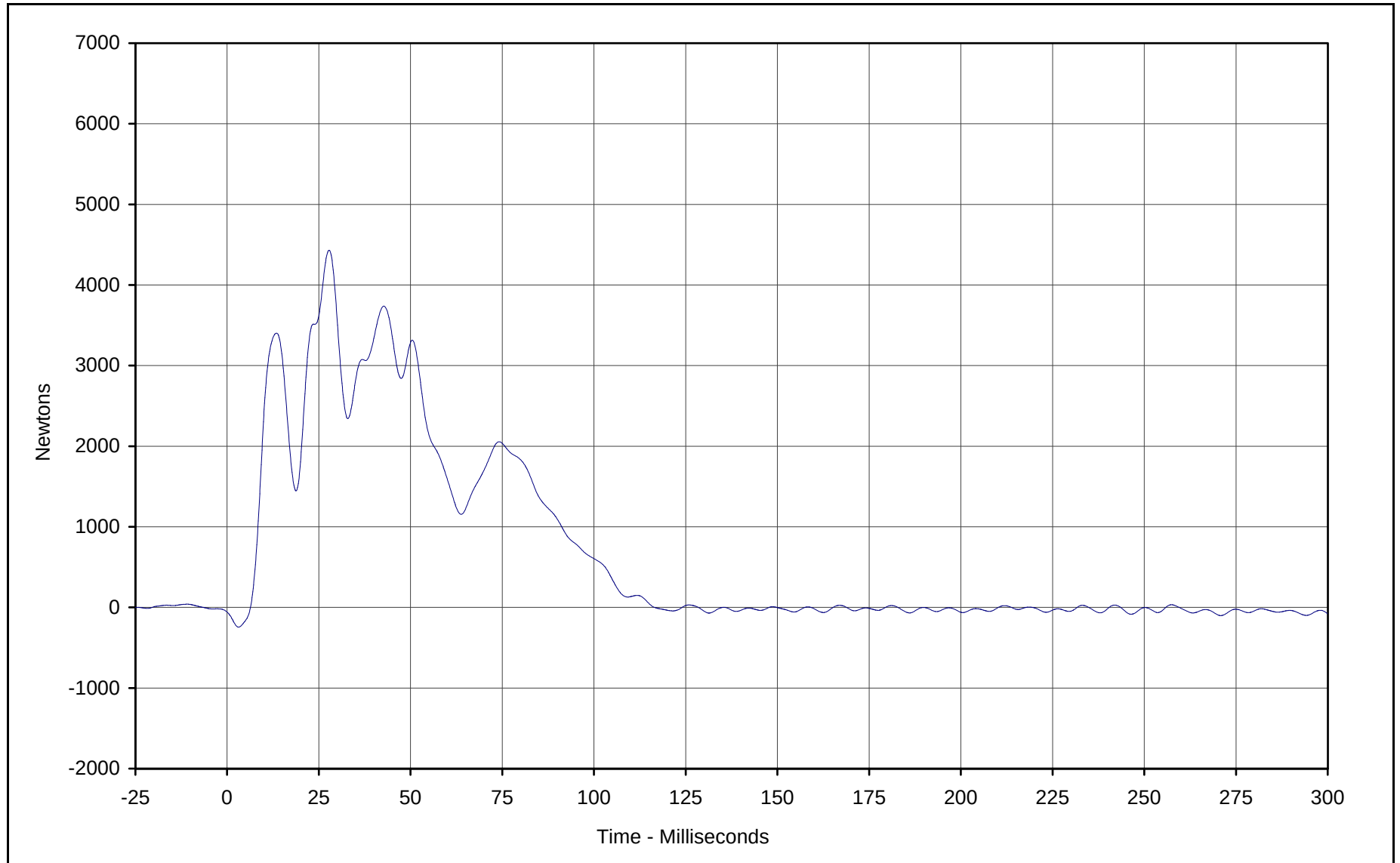
Curve Description: Barrier Force B7
Maximum Value: 45737.9 at 29.3 Milliseconds
Minimum Value: -90.3 at 299.9 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-113

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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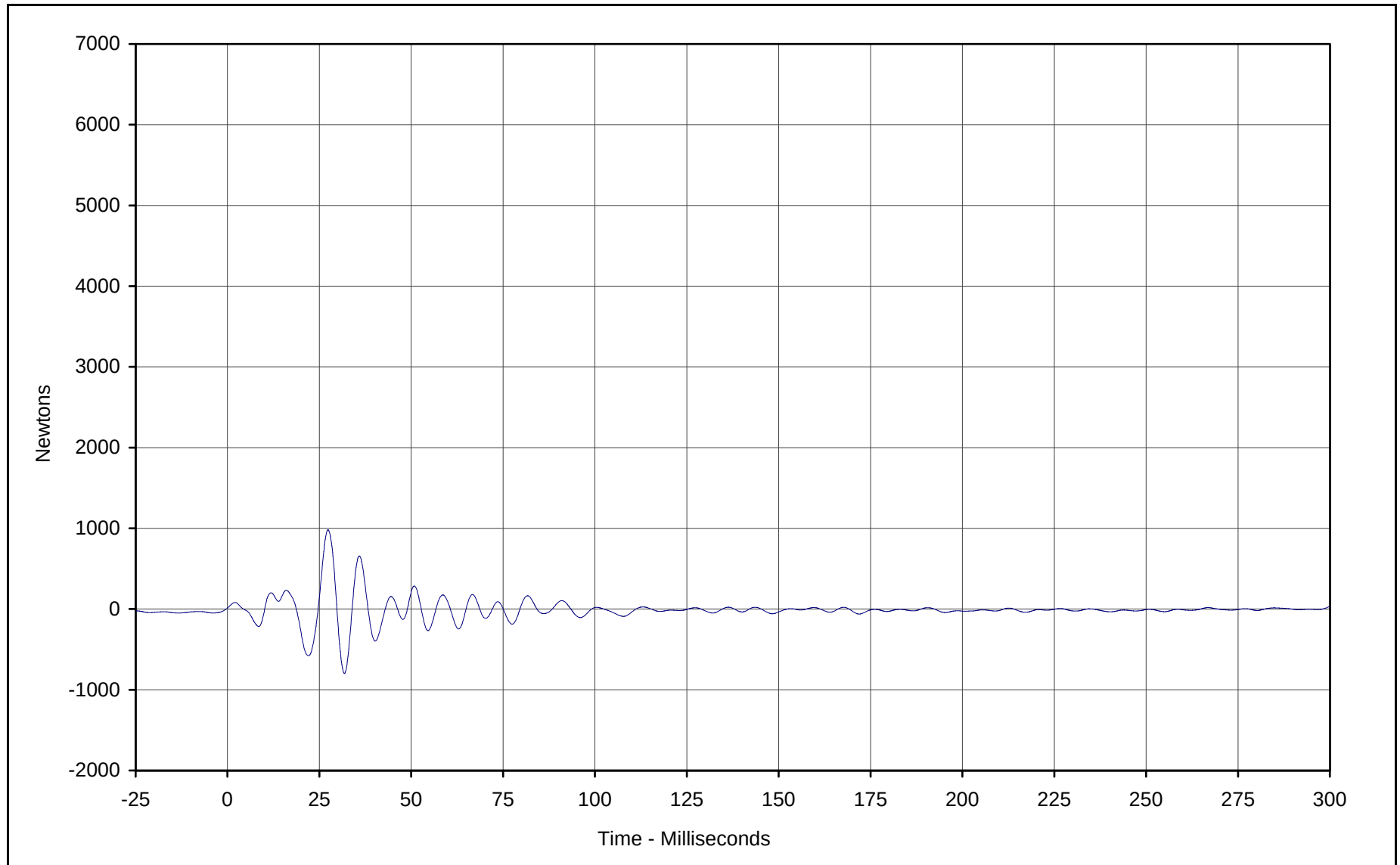


Curve Description: Barrier Force B8
Maximum Value: 4430.6 at 27.8 Milliseconds
Minimum Value: -244.7 at 3.1 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-114

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

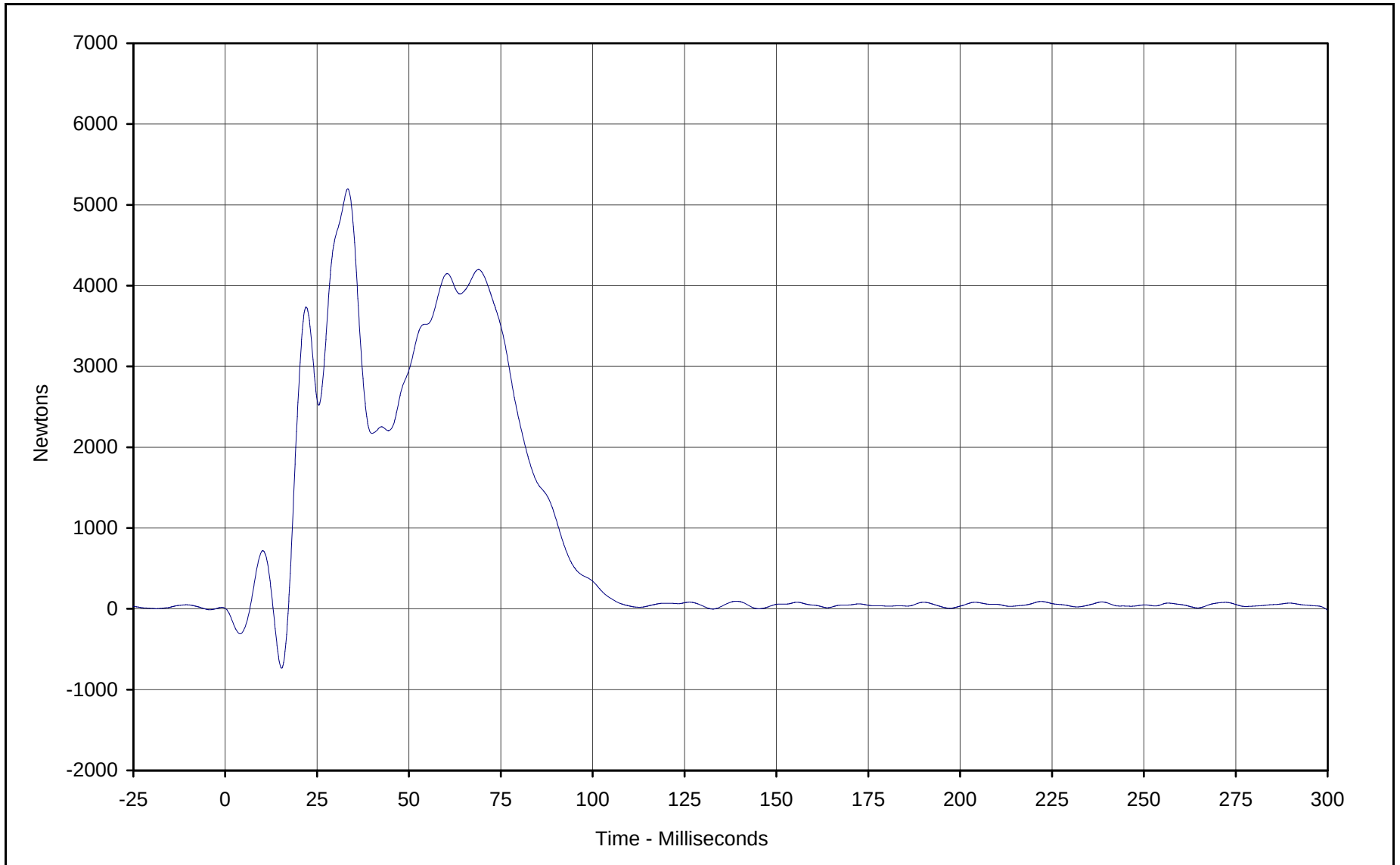


Curve Description: Barrier Force B9
Maximum Value: 981.3 at 27.4 Milliseconds
Minimum Value: -797.9 at 31.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-115

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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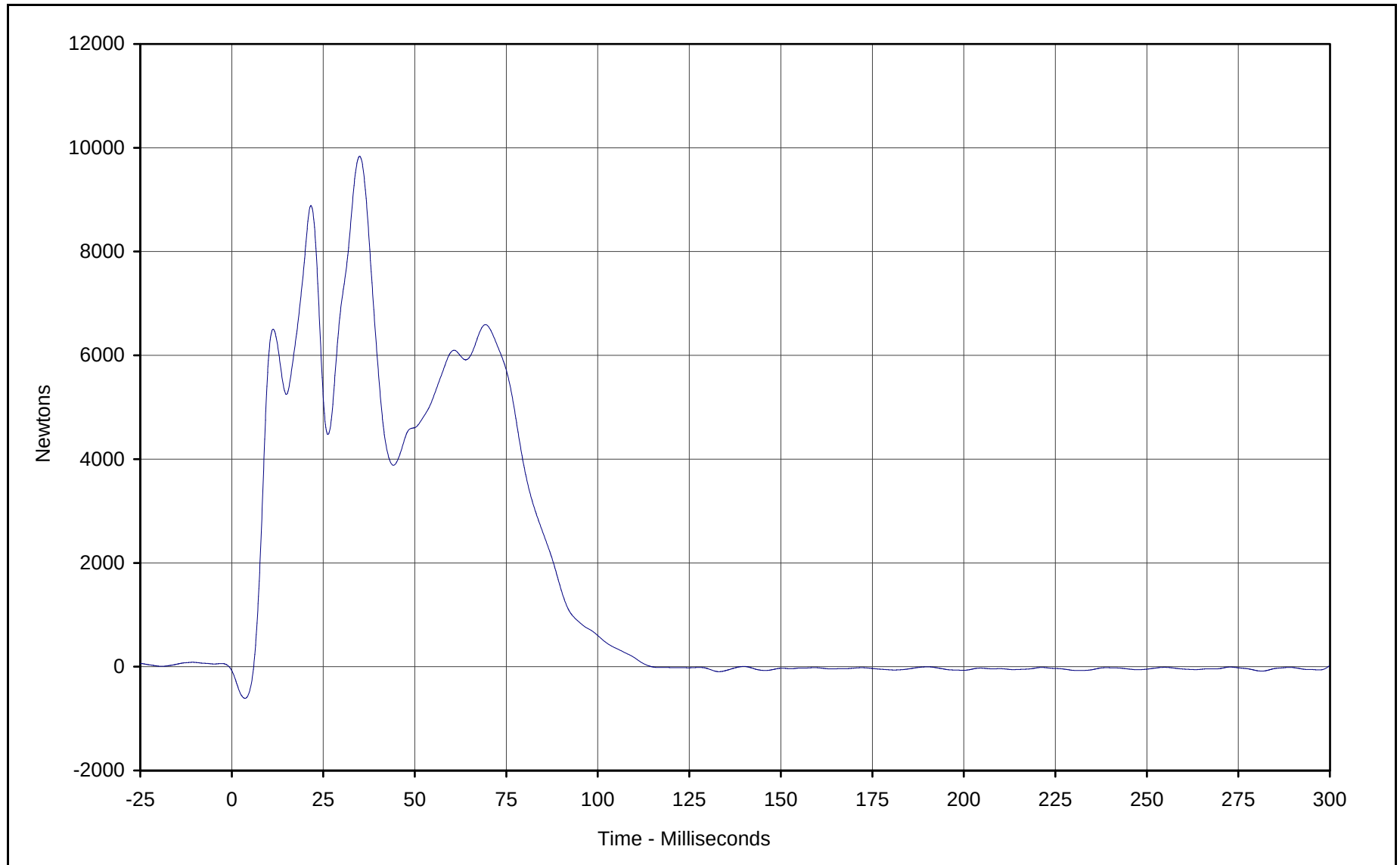
Curve Description: Barrier Force C2
Maximum Value: 5196.4 at 33.3 Milliseconds
Minimum Value: -734.8 at 15.4 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-117

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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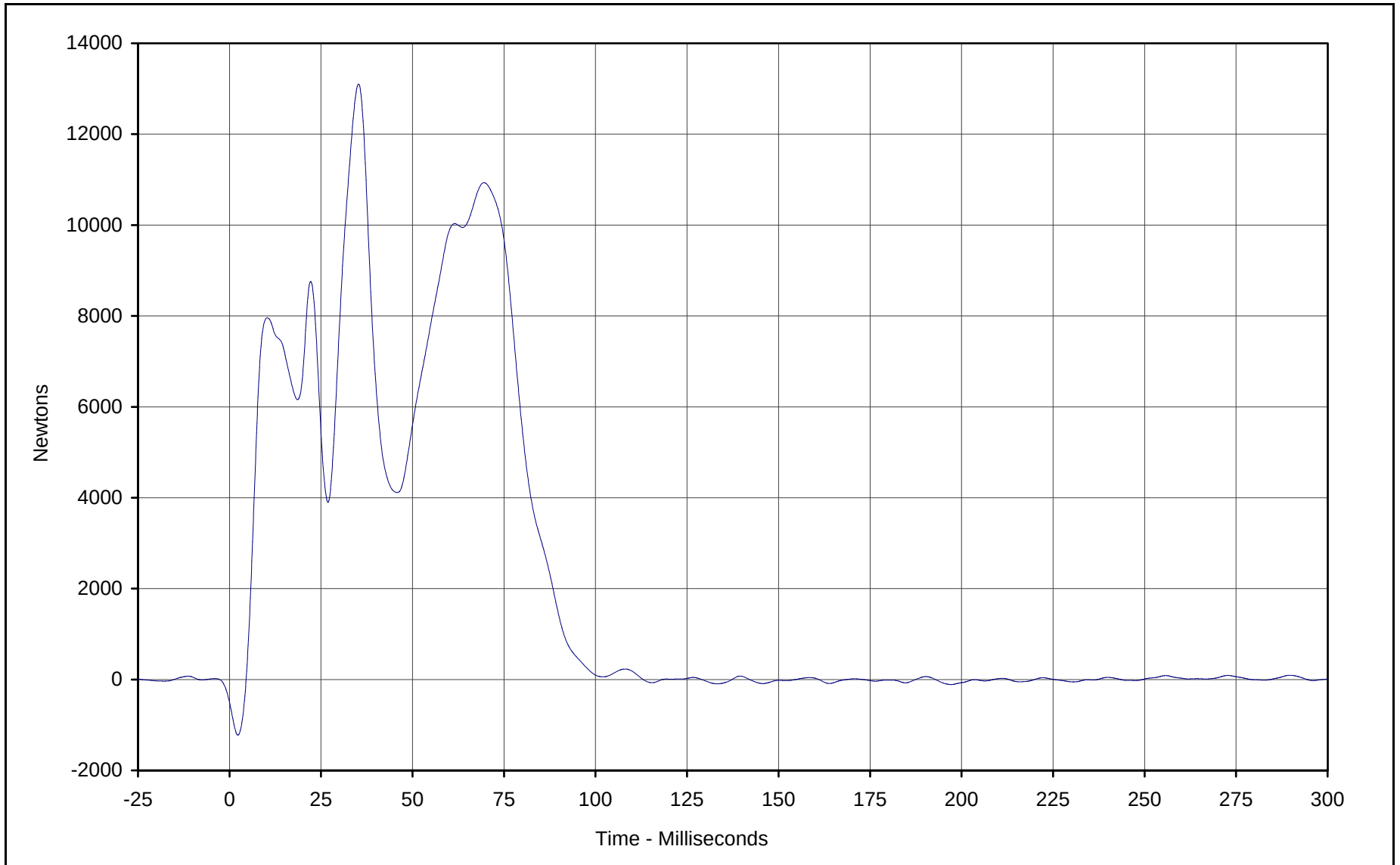
Curve Description: Barrier Force C3
Maximum Value: 9834.4 at 34.9 Milliseconds
Minimum Value: -610.2 at 3.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-118

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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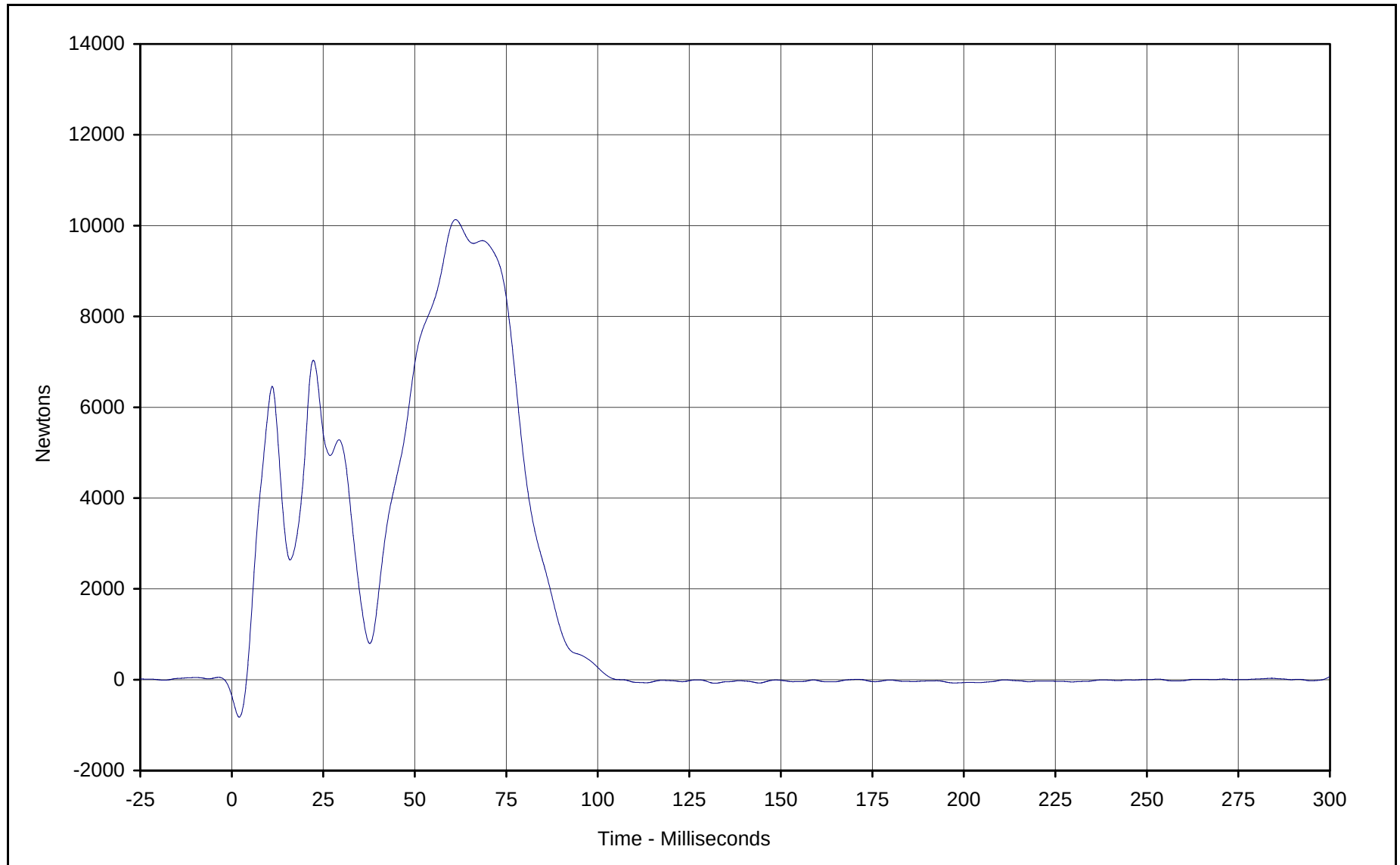
Curve Description: Barrier Force C4
Maximum Value: 13105.1 at 35.2 Milliseconds
Minimum Value: -1222.8 at 2.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-119

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

C-20



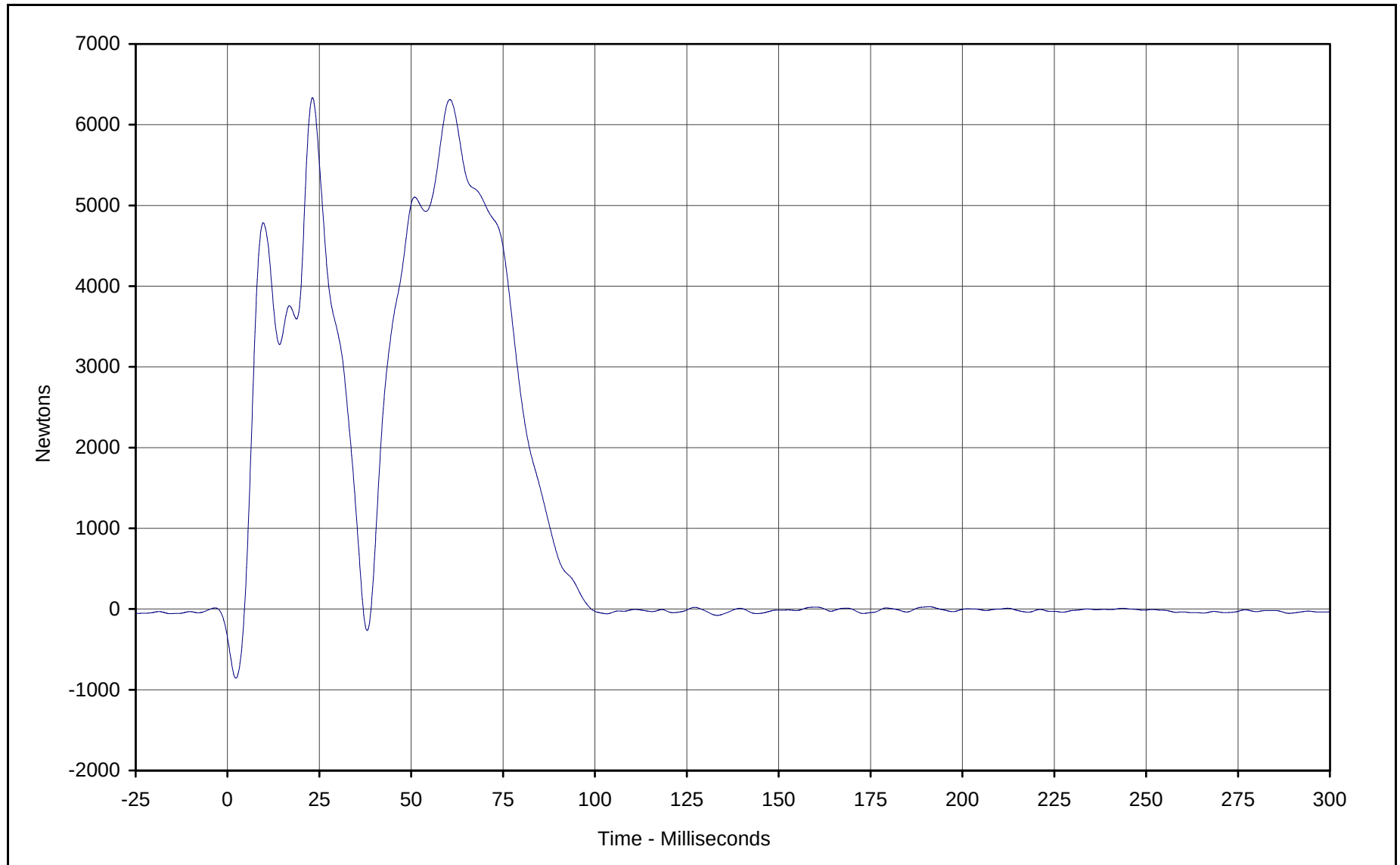
Curve Description: Barrier Force C5
Maximum Value: 10131.6 at 61.1 Milliseconds
Minimum Value: -825.9 at 2.0 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-120

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-21



Curve Description: Barrier Force C6

Maximum Value: 6334.6 at 23.1 Milliseconds

Minimum Value: -857.1 at 2.3 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

Curve Number: FIL-121

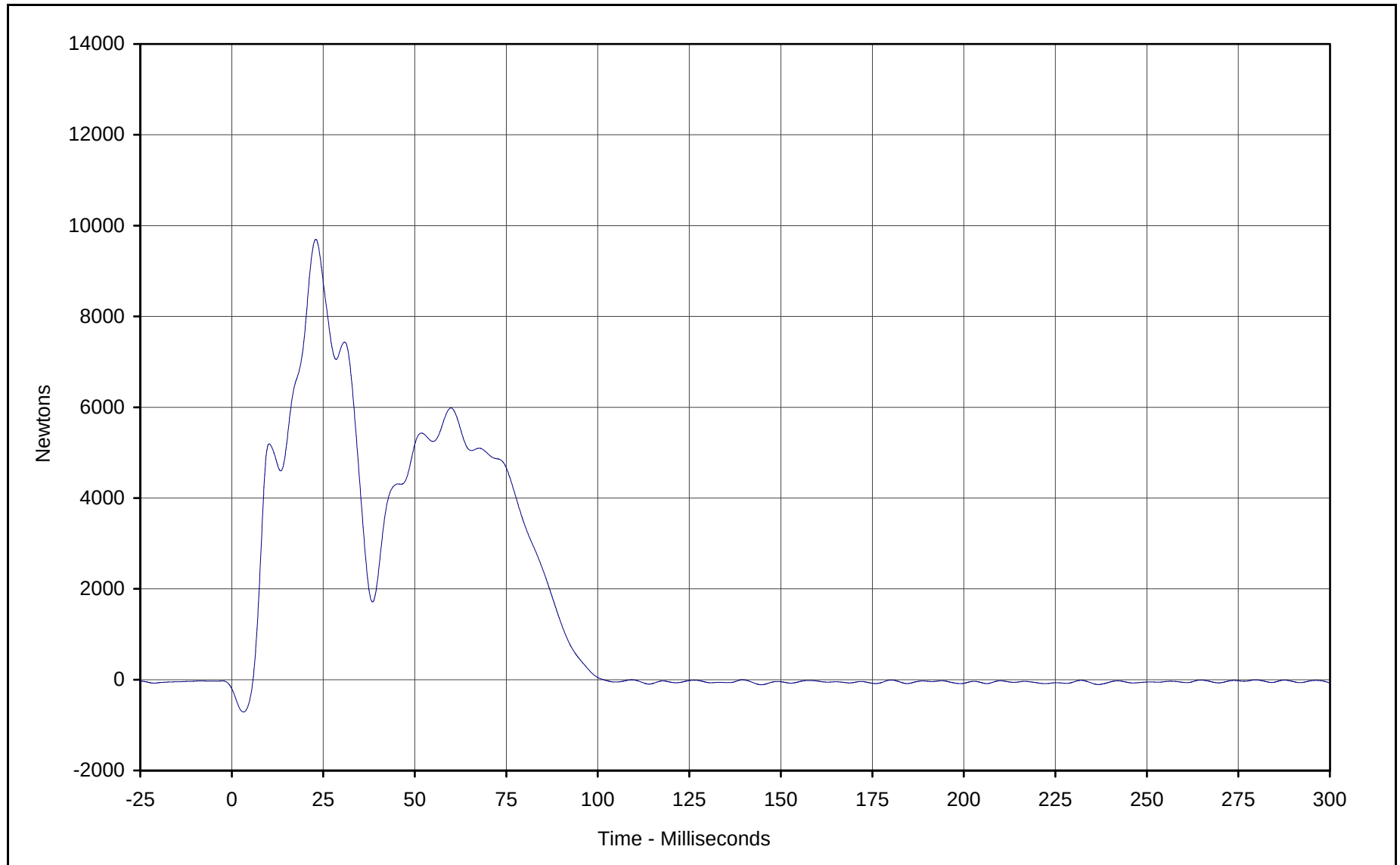
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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C-22



Curve Description: Barrier Force C7

Maximum Value: 9697.1 at 22.9 Milliseconds

Minimum Value: -711.1 at 3.2 Milliseconds

SAE Filter Class: 60

Date of Test: 12/5/01

Curve Number: FIL-122

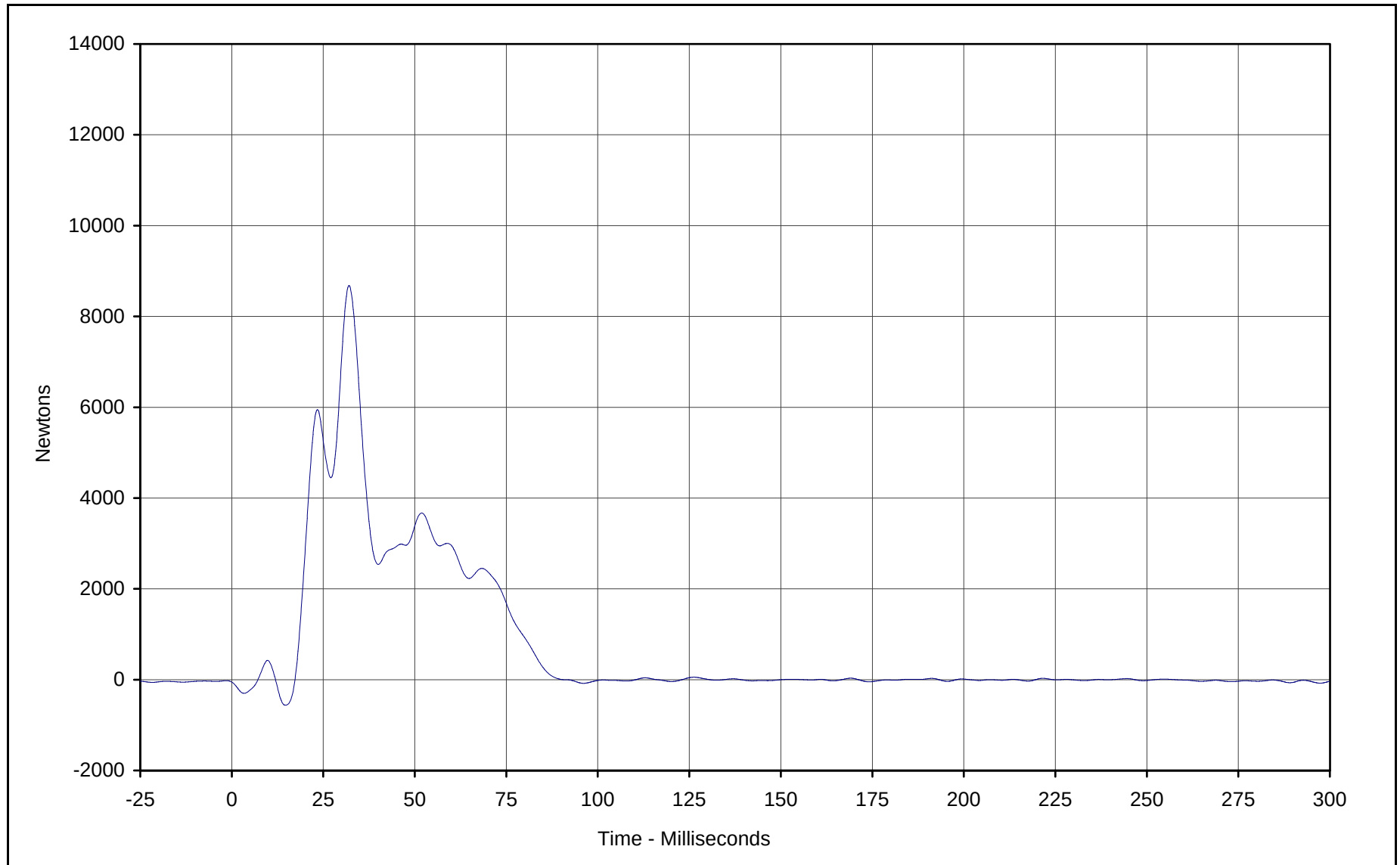
Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



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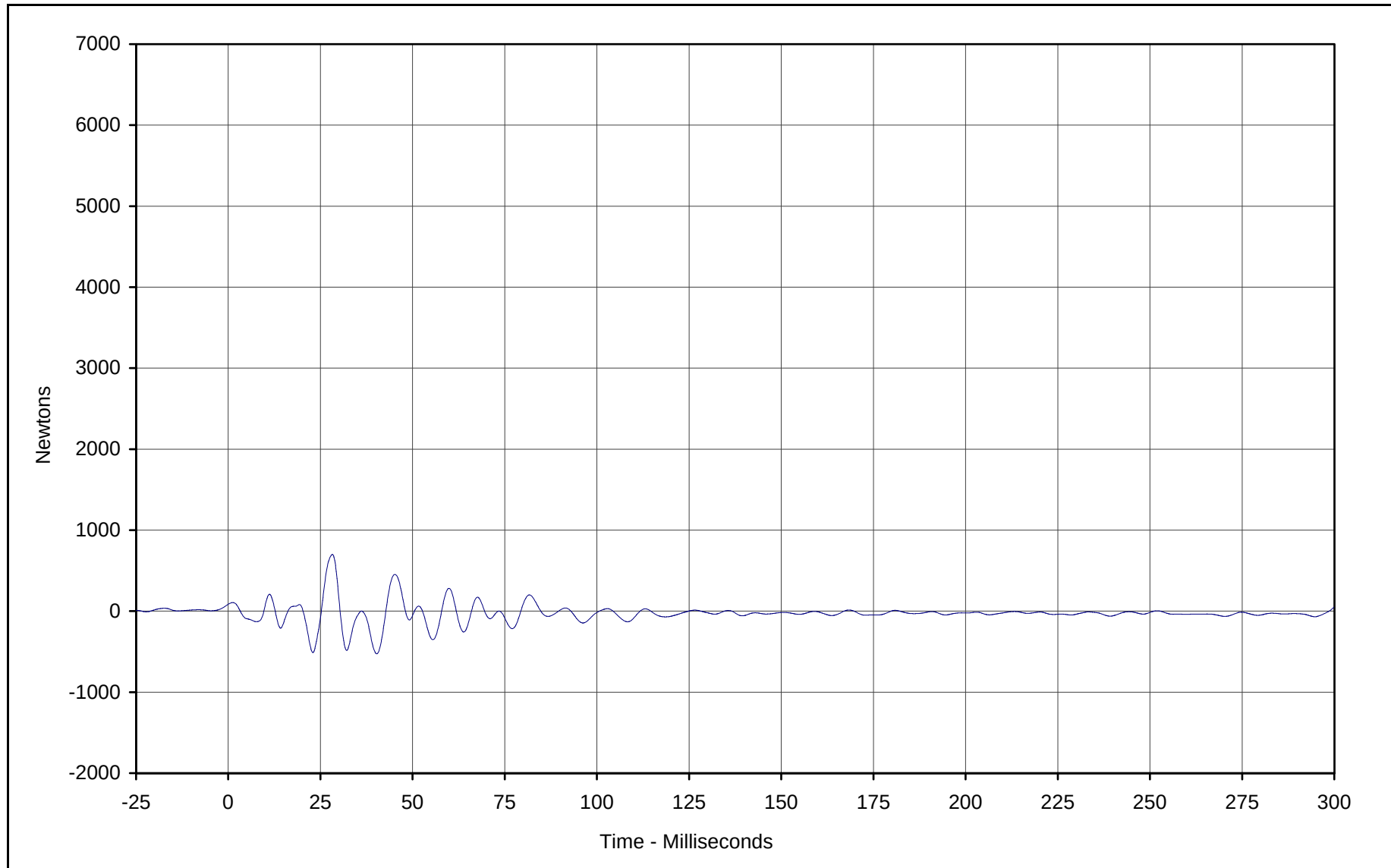
Curve Description: Barrier Force C8
Maximum Value: 8682.2 at 32.0 Milliseconds
Minimum Value: -561.6 at 14.7 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-123

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

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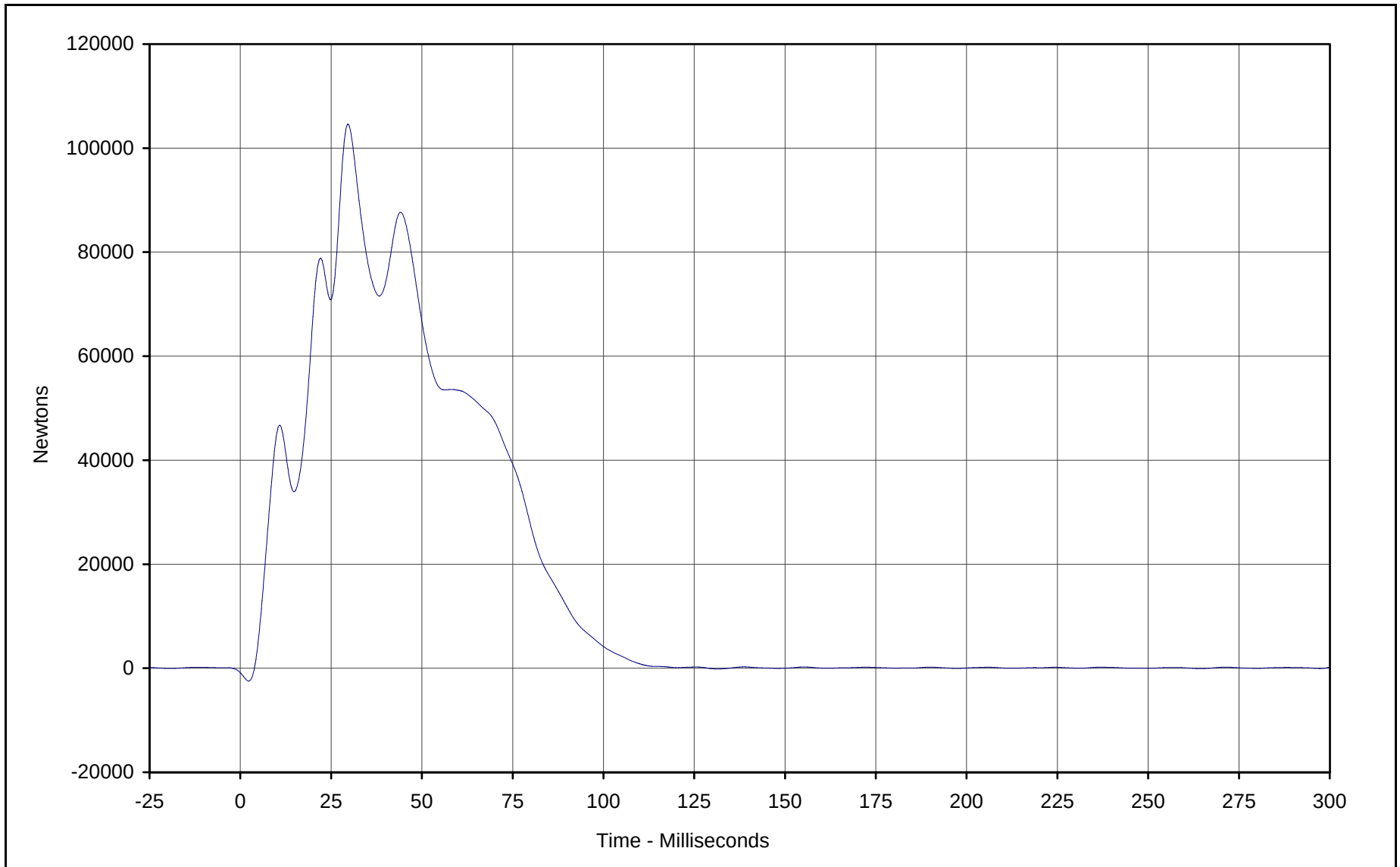
Curve Description: Barrier Force C9
Maximum Value: 700.1 at 28.2 Milliseconds
Minimum Value: -527.2 at 40.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: FIL-124

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

C-25

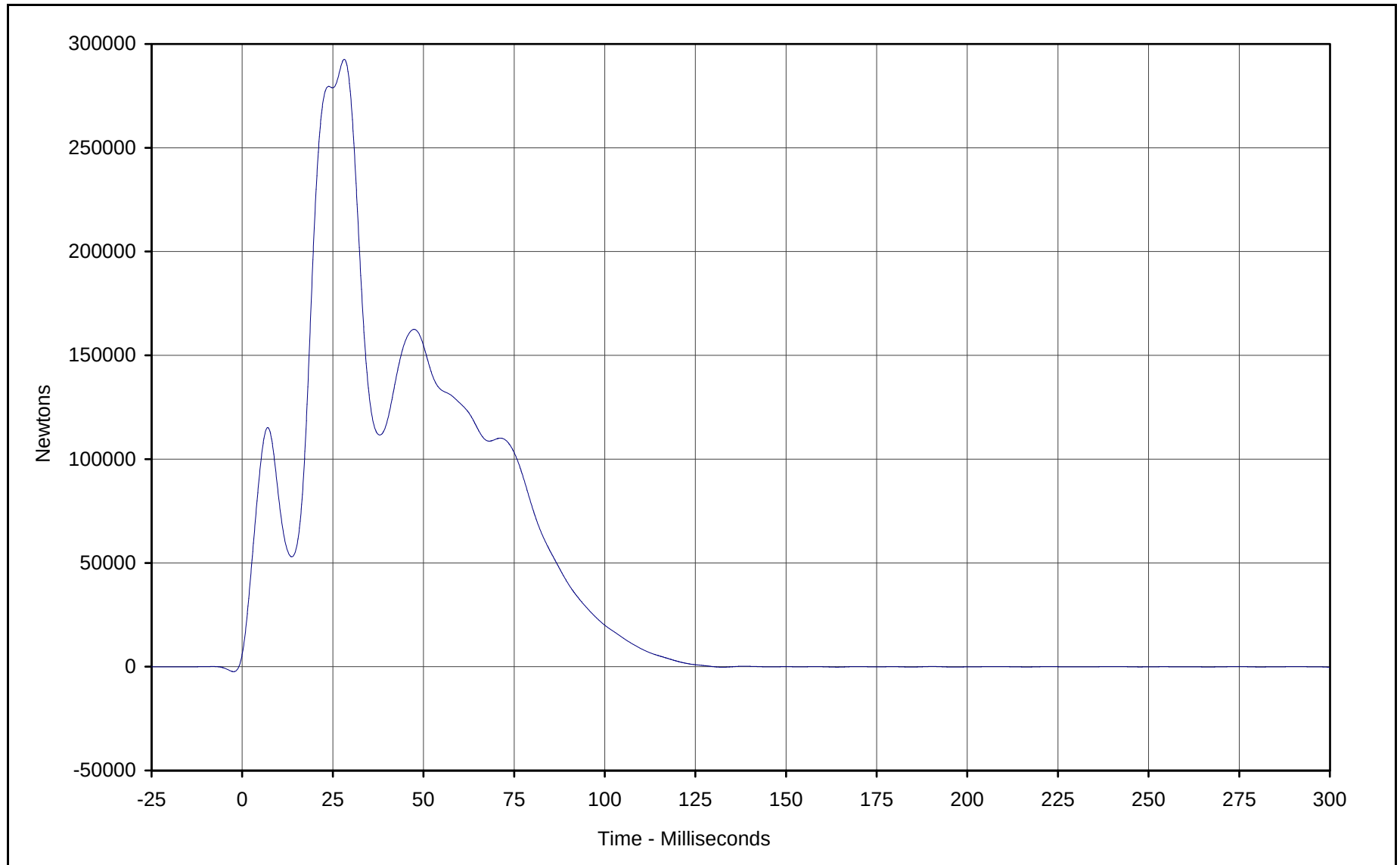


Curve Description: Barrier Force Sum Group 1
Maximum Value: 104599.0 at 29.6 Milliseconds
Minimum Value: -2461.6 at 2.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: SUM-001

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



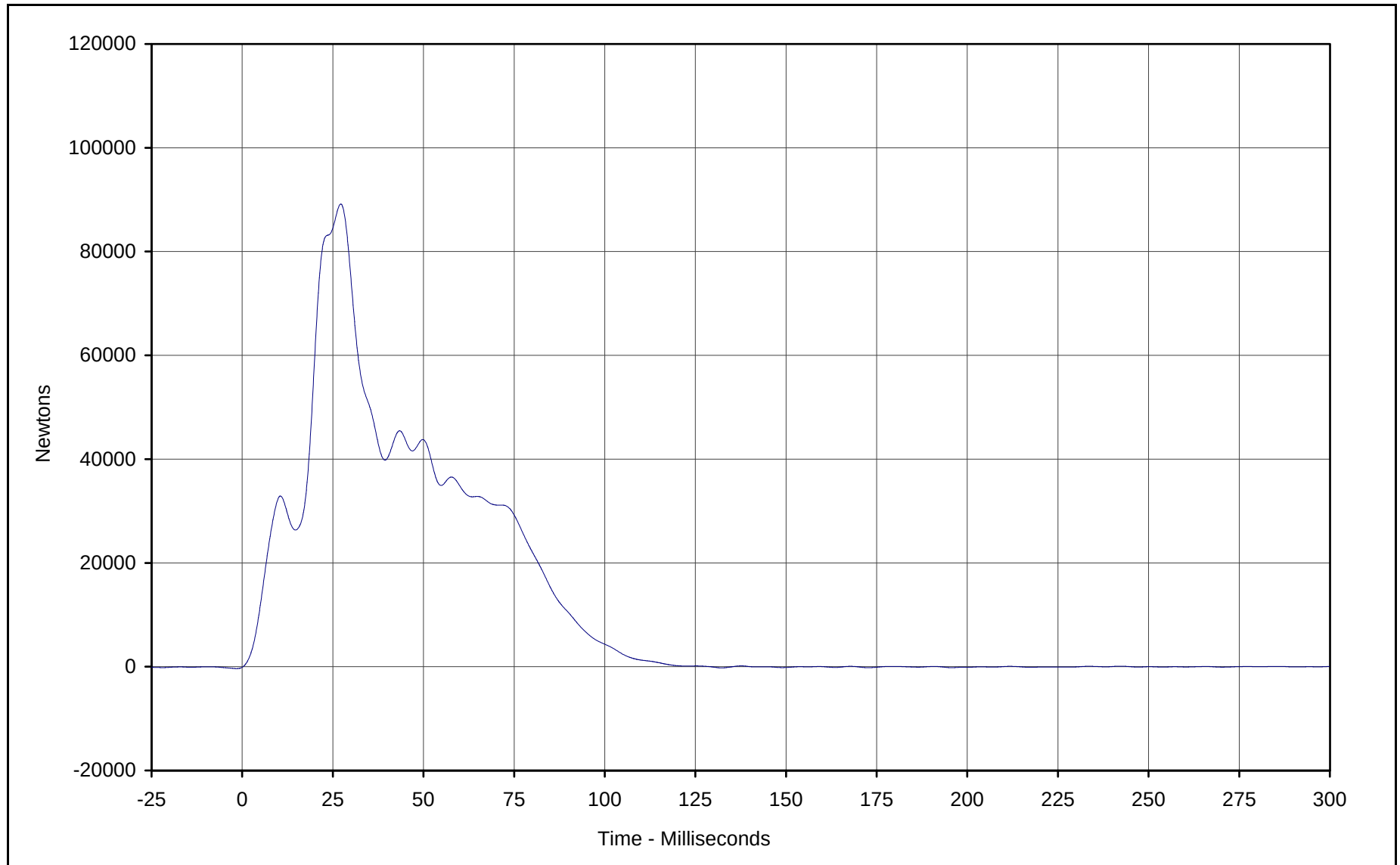
KAR21129-01



Curve Description: Barrier Force Sum Group 2
Maximum Value: 292616.9 at 28.2 Milliseconds
Minimum Value: -298.1 at 299.9 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: SUM-002

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

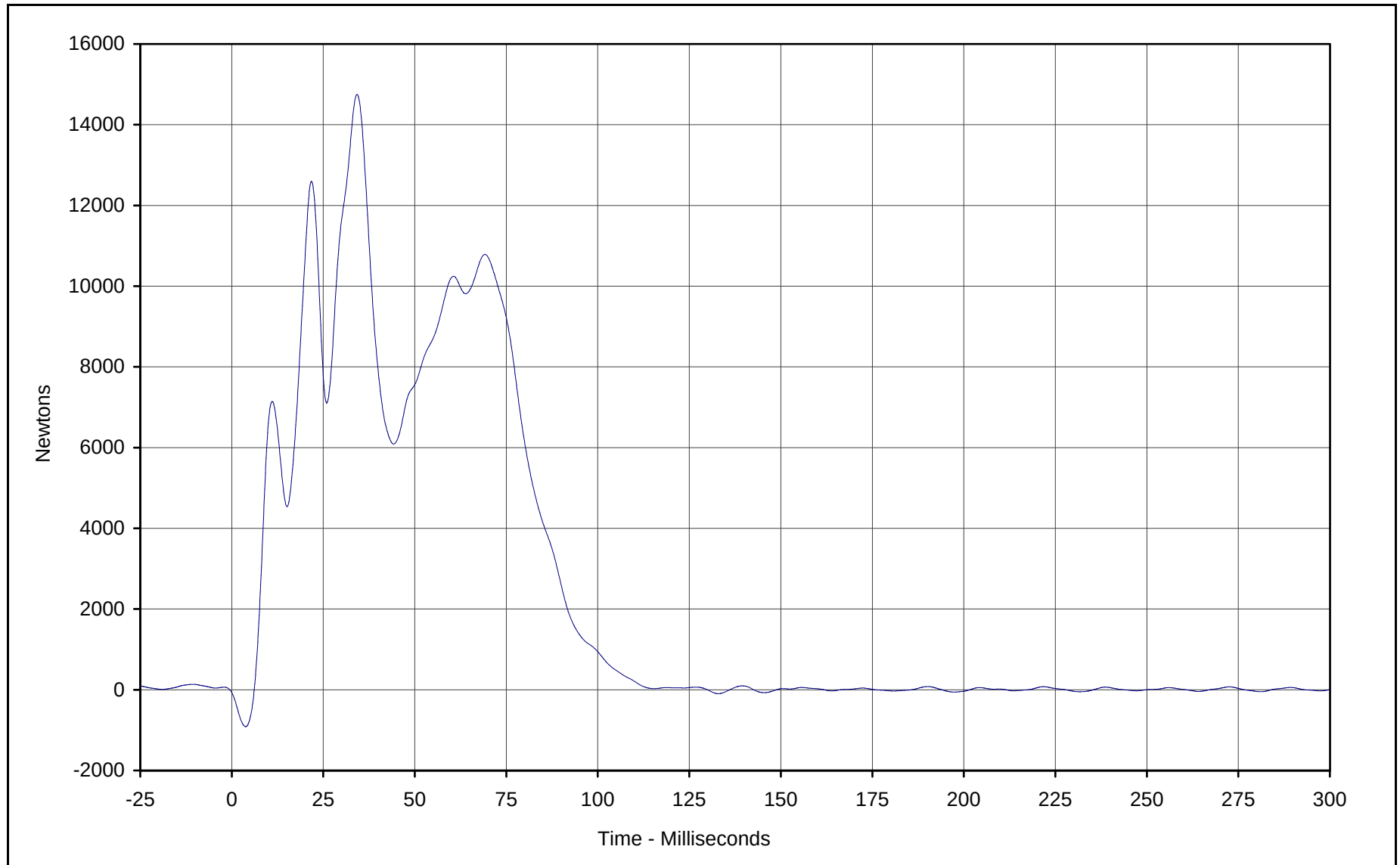




Curve Description: Barrier Force Sum Group 3
Maximum Value: 89162.0 at 27.2 Milliseconds
Minimum Value: -230.1 at 132.2 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: SUM-003

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan

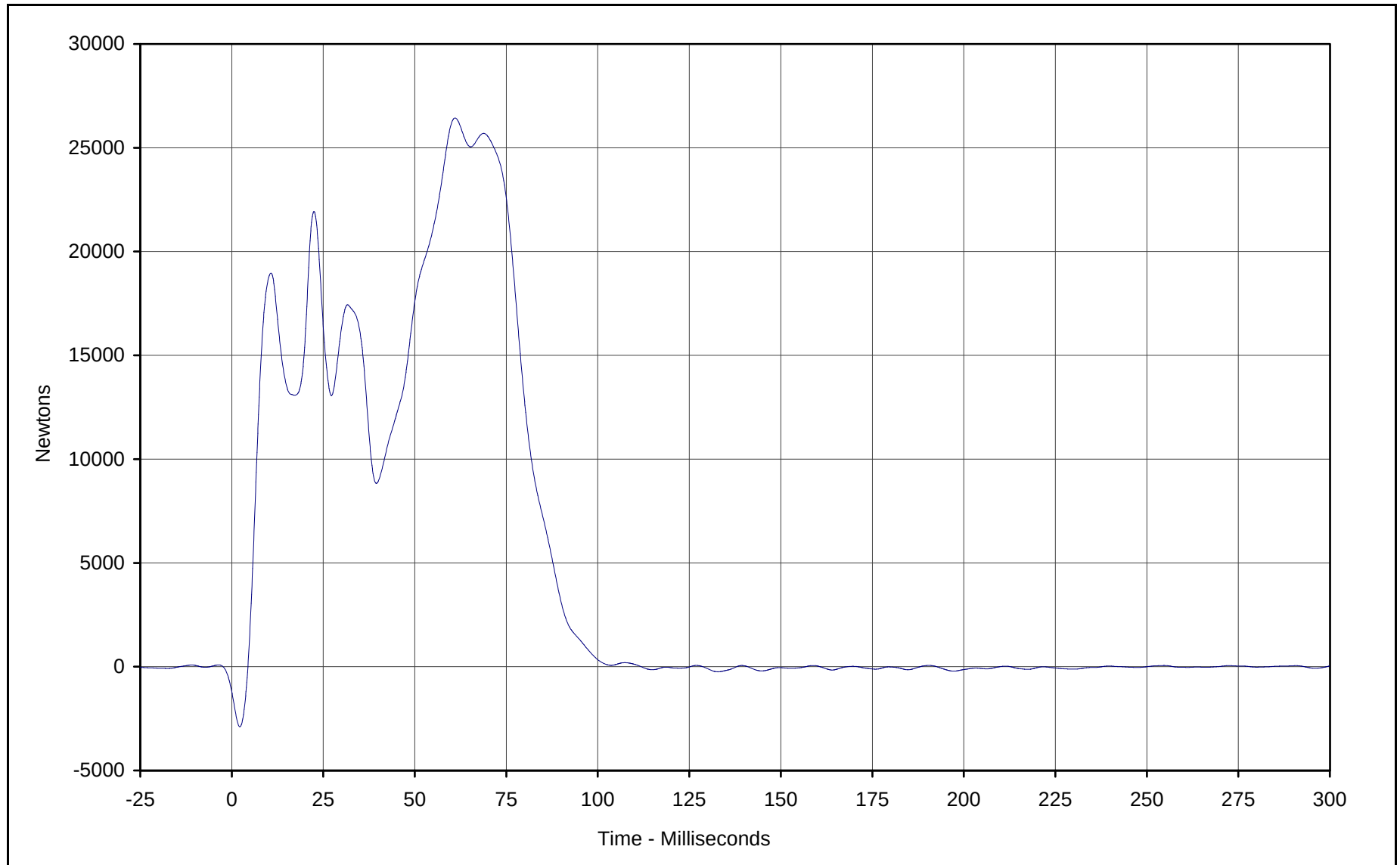




Curve Description: Barrier Force Sum Group 4
Maximum Value: 14752.0 at 34.2 Milliseconds
Minimum Value: -914.5 at 3.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: SUM-004

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



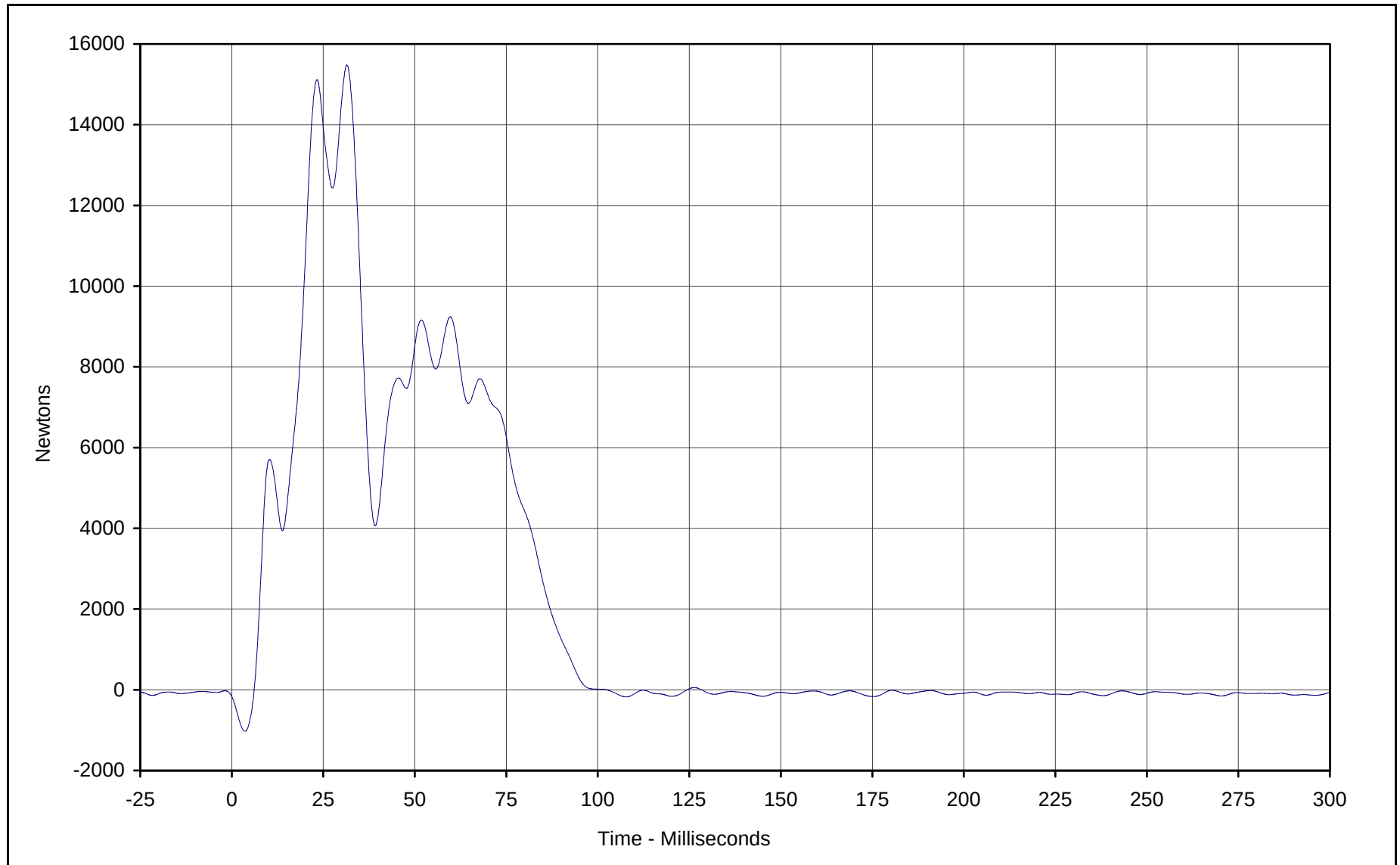


Curve Description: Barrier Force Sum Group 5
Maximum Value: 26435.9 at 61.0 Milliseconds
Minimum Value: -2898.0 at 2.2 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: SUM-005

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



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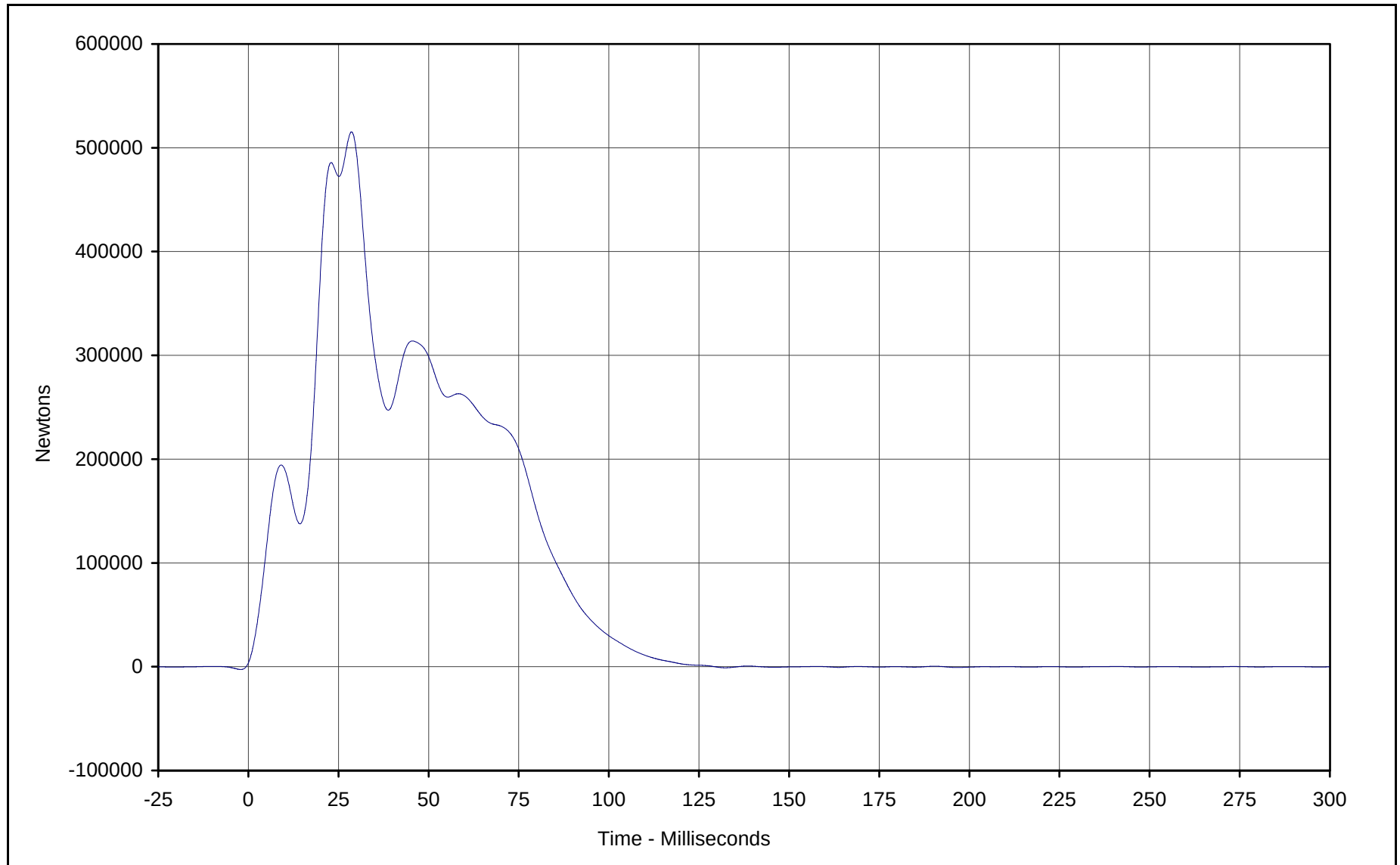
Curve Description: Barrier Force Sum Group 6
Maximum Value: 15482.4 at 31.5 Milliseconds
Minimum Value: -1027.8 at 3.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: SUM-006

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

C-31



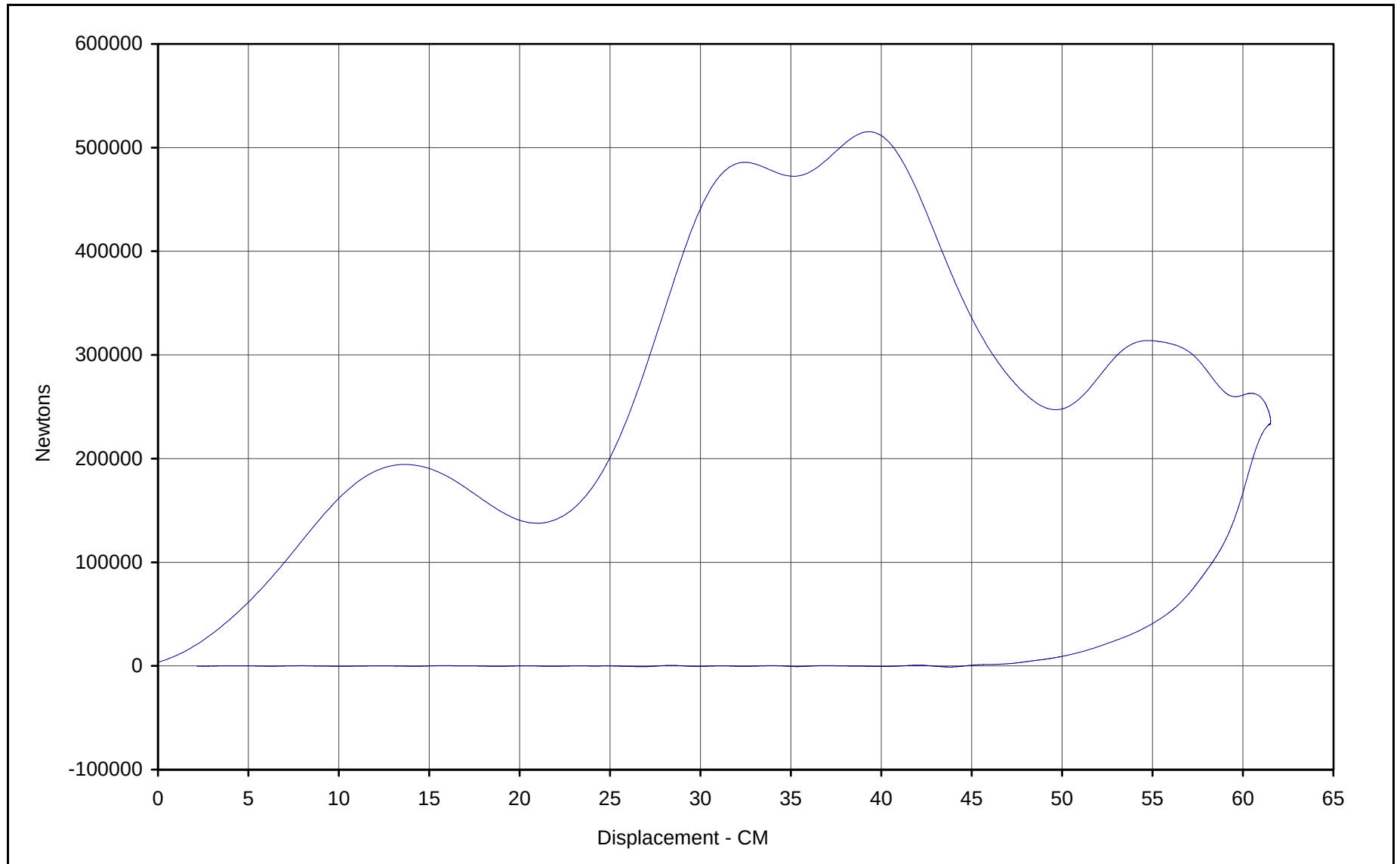
Curve Description: Barrier Force Sum Total
Maximum Value: 515298.7 at 28.6 Milliseconds
Minimum Value: -1056.6 at 132.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/5/01
Curve Number: SUM-007

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001
Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

C-32



Curve Description: Sum Force Total vs. Dynamic Crush

Maximum Displ.: 61.5 at 66.5 Milliseconds

Maximum Force: 515,299 at 28.6 Milliseconds

Measured Energy: 156,043 joules

Date of Test: 12/5/01

Curve Number: XVY-001

Test Program: 2002 NHTSA 35mph NCAP No.: KIA5001

Test Vehicle: 2002 Kia Rio 4 Door Sedan



KAR21129-01

BARRIER LOAD CELL SUMMARY DATATest Vehicle: 2002 Kia Rio 4 Door SedanNHTSA No.: KIA5001Test Program: 2002 NHTSA 35mph NCAPTest Date: 12/5/01**BARRIER LOAD CELL PEAK FORCES**

Location	Units	Max	Time	Min	Time
Barrier Force A2	Newtons	1990.3	22.3	-1126.9	17.9
Barrier Force A3	Newtons	49799.7	29.0	-1281.2	14.7
Barrier Force A4	Newtons	45037.7	29.0	-893.0	2.4
Barrier Force A5	Newtons	43683.4	21.4	-1103.7	2.0
Barrier Force A6	Newtons	21537.9	22.4	-1066.0	2.2
Barrier Force A7	Newtons	37896.5	26.3	-1085.0	14.8
Barrier Force A8	Newtons	2208.5	50.2	-1039.1	18.4
Barrier Force A9	Newtons	1529.2	27.1	-1300.1	31.3
Barrier Force B2	Newtons	3620.6	44.8	-278.2	3.7
Barrier Force B3	Newtons	54782.3	32.1	-1237.3	1.7
Barrier Force B4	Newtons	52203.6	29.3	-65.0	131.5
Barrier Force B5	Newtons	67893.3	28.5	-157.1	299.9
Barrier Force B6	Newtons	86748.9	26.1	-57.8	255.0
Barrier Force B7	Newtons	45737.9	29.3	-90.3	299.9
Barrier Force B8	Newtons	4430.6	27.8	-244.7	3.1
Barrier Force B9	Newtons	981.3	27.4	-797.9	31.8
Barrier Force C2	Newtons	5196.4	33.3	-734.8	15.4
Barrier Force C3	Newtons	9834.4	34.9	-610.2	3.6
Barrier Force C4	Newtons	13105.1	35.2	-1222.8	2.3
Barrier Force C5	Newtons	10131.6	61.1	-825.9	2.0
Barrier Force C6	Newtons	6334.6	23.1	-857.1	2.3
Barrier Force C7	Newtons	9697.1	22.9	-711.1	3.2
Barrier Force C8	Newtons	8682.2	32.0	-561.6	14.7
Barrier Force C9	Newtons	700.1	28.2	-527.2	40.3
Barrier Force Sum Group 1	Newtons	104599.0	29.6	-2461.6	2.3
Barrier Force Sum Group 2	Newtons	292616.9	28.2	-298.1	299.9
Barrier Force Sum Group 3	Newtons	89162.0	27.2	-230.1	132.2
Barrier Force Sum Group 4	Newtons	14752.0	34.2	-914.5	3.8
Barrier Force Sum Group 5	Newtons	26435.9	61.0	-2898.0	2.2
Barrier Force Sum Group 6	Newtons	15482.4	31.5	-1027.8	3.6
Barrier Force Sum Total	Newtons	515298.7	28.6	-1056.6	132.3

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

APPENDIX D

INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

2002 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D. Serial Number 35
12/5/01
2002 Kia Rio 4 Door Sedan

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

2002 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Driver A.T.D. Serial Number 35
12/5/01
2002 Kia Rio 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
25	UP. TIBIA LEFT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
26	UP. TIBIA LEFT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
27	UP. TIBIA RIGHT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
28	UP. TIBIA RIGHT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
29	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
30	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
31	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
32	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
33	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
34	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
35	FOOT LEFT	X	KEIC003X	Accel., Foot Triax	I.C. Sensor	3031-500	G
36	FOOT LEFT	Y	KEIC003Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
37	FOOT LEFT	Z	KEIC003Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
38	FOOT RIGHT	X	KEIC004X	Accel., Foot Triax	I.C. Sensor	3031-500	G
39	FOOT RIGHT	Y	KEIC004Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
40	FOOT RIGHT	Z	KEIC004Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
41	LAP BELT FORCE	X	KELC001	Load cell, Seat belt	Lebow	3371	N
42	SHOULDER BELT FORCE	X	KELC002	Load cell, Seat belt	Lebow	3371	N
43	SHOULDER BELT SPOOL	X	KEPP001	Pullout pot	Celesco	PTX101-0030	CM
44	SHOULDER BELT ELONG.	X	KEEP001	Linear pot., belt stretch	E.T.I.	LCP8-10 10K	MM/CM

2002 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Passenger A.T.D. Serial Number 34
12/5/01
2002 Kia Rio 4 Door Sedan

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

2002 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Passenger A.T.D. Serial Number 34
12/5/01
2002 Kia Rio 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
69	UP. TIBIA LEFT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
70	UP. TIBIA LEFT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
71	UP. TIBIA RIGHT MOM.	X	GPOT09MX	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
72	UP. TIBIA RIGHT MOM.	Y	GPOT09MY	2 ch., Upper tibia gage	R. A. Denton	1583	Nm
73	LWR. TIBIA LEFT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
74	LWR. TIBIA LEFT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
75	LWR. TIBIA LEFT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
76	LWR. TIBIA RIGHT MOM.	X	GPLT09MX	3 ch., lower tibia gage	R. A. Denton	3093	Nm
77	LWR. TIBIA RIGHT MOM.	Y	GPLT09MY	3 ch., lower tibia gage	R. A. Denton	3093	Nm
78	LWR. TIBIA RIGHT FORCE	Z	GPLT09FZ	3 ch., lower tibia gage	R. A. Denton	3093	N
79	FOOT LEFT	X	KEIC002X	Accel., Foot Triax	I.C. Sensor	3031-500	G
80	FOOT LEFT	Y	KEIC002Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
81	FOOT LEFT	Z	KEIC002Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
82	FOOT RIGHT	X	KEIC001X	Accel., Foot Triax	I.C. Sensor	3031-500	G
83	FOOT RIGHT	Y	KEIC001Y	Accel., Foot Triax	I.C. Sensor	3031-500	G
84	FOOT RIGHT	Z	KEIC001Z	Accel., Foot Triax	I.C. Sensor	3031-500	G
85	LAP BELT FORCE	X	KELC003	Load cell, Seat belt	Lebow	3371	N
86	SHOULDER BELT FORCE	X	KELC004	Load cell, Seat belt	Lebow	3371	N
87	SHOULDER BELT SPOOL	X	KEPP001	Pullout pot	Celesco	PTX101-0030	MM
88	SHOULDER BELT ELONG.	X	KEEP001	Linear pot., belt stretch	E.T.I.	LCP8-10 10K	MM/CM

2002 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Vehicle Accelerometers and Reference Channel
12/5/01
2002 Kia Rio 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
89	Left Rear	X	KEVA002	Accel., Pre-Amp	I.C.S/Karco	3031-500	G
90	Right Rear	X	KEVA006	Accel., Vehicle block	I.C. Sensor	3031-200	G
91	Engine Top	X	KEVA012	Accel., Vehicle block	I.C. Sensor	3031-500	G
92	Engine Bottom	X	KEVA008	Accel., Vehicle block	I.C. Sensor	3031-500	G
93	Left Brake Caliper	X	KEVA007	Accel., Vehicle block	I.C. Sensor	3031-500	G
94	Right Brake Caliper	X	KEVA001	Accel., Vehicle block	I.C. Sensor	3031-500	G
95	Instrument Panel	X	KEVA011	Accel., Vehicle block	I.C. Sensor	3031-200	G
96	Left Rear	Z	KEVA010	Accel., Vehicle block	I.C. Sensor	3031-200	G
97	Right Rear	Z	KEVA005	Accel., Vehicle block	I.C. Sensor	3031-500	G

**2002 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Rigid Load Cell Barrier
12/5/01
2002 Kia Rio 4 Door Sedan**

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
98	BARRIER FORCE A1	X	BARRIER	Not Used	N/A	N/A	N/A
99	BARRIER FORCE A2	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
100	BARRIER FORCE A3	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
101	BARRIER FORCE A4	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
102	BARRIER FORCE A5	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
103	BARRIER FORCE A6	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
104	BARRIER FORCE A7	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
105	BARRIER FORCE A8	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
106	BARRIER FORCE A9	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
107	BARRIER FORCE B1	X	BARRIER	Not Used	N/A	N/A	N/A
108	BARRIER FORCE B2	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
109	BARRIER FORCE B3	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
110	BARRIER FORCE B4	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
111	BARRIER FORCE B5	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
112	BARRIER FORCE B6	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
113	BARRIER FORCE B7	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
114	BARRIER FORCE B8	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
115	BARRIER FORCE B9	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N

**2002 NHTSA 35mph NCAP
Instrumentation Data Channel Assignments
Rigid Load Cell Barrier
12/5/01
2002 Kia Rio 4 Door Sedan**

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
116	BARRIER FORCE C1	X	BARRIER	Not Used	N/A	N/A	N/A
117	BARRIER FORCE C2	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
118	BARRIER FORCE C3	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
119	BARRIER FORCE C4	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
120	BARRIER FORCE C5	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
121	BARRIER FORCE C6	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
122	BARRIER FORCE C7	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
123	BARRIER FORCE C8	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
124	BARRIER FORCE C9	X	BARRIER	Load Cell, LCB	Lebow	1220-FS	N
125	BARRIER FORCE D1	X	BARRIER	Not Used	N/A	N/A	N/A
126	BARRIER FORCE D2	X	BARRIER	Not Used	N/A	N/A	N/A
127	BARRIER FORCE D3	X	BARRIER	Not Used	N/A	N/A	N/A
128	BARRIER FORCE D4	X	BARRIER	Not Used	N/A	N/A	N/A
129	BARRIER FORCE D5	X	BARRIER	Not Used	N/A	N/A	N/A
130	BARRIER FORCE D6	X	BARRIER	Not Used	N/A	N/A	N/A
131	BARRIER FORCE D7	X	BARRIER	Not Used	N/A	N/A	N/A
132	BARRIER FORCE D8	X	BARRIER	Not Used	N/A	N/A	N/A
133	BARRIER FORCE D9	X	BARRIER	Not Used	N/A	N/A	N/A

APPENDIX E

DUMMY CALIBRATION DATA



Hybrid III Calibration Data Sheet

Hybrid III 50th Percentile Male

Knee Impact Test

ATD Serial No.: 034

Location: Left Knee

Test I.D.: LK05C

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
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5631	Pass
Overall Test Results				Pass

ATD Serial No.: 034

Location: Right Knee

Test I.D.: RK06C

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
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	5638	Pass
Overall Test Results				Pass

Laboratory Technician

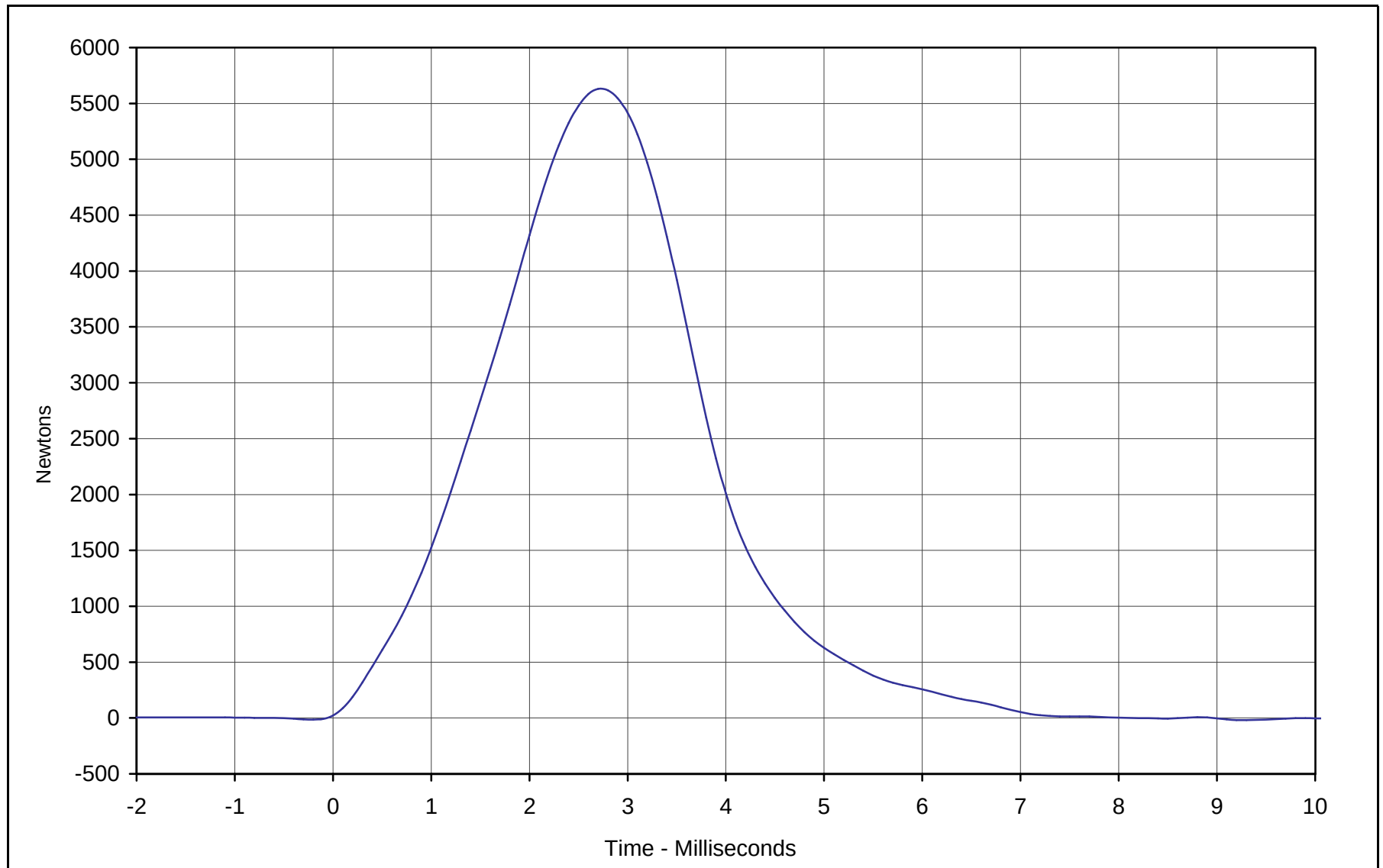
November 28, 2001

Test Date

E-1

KAR21129-01

E-2

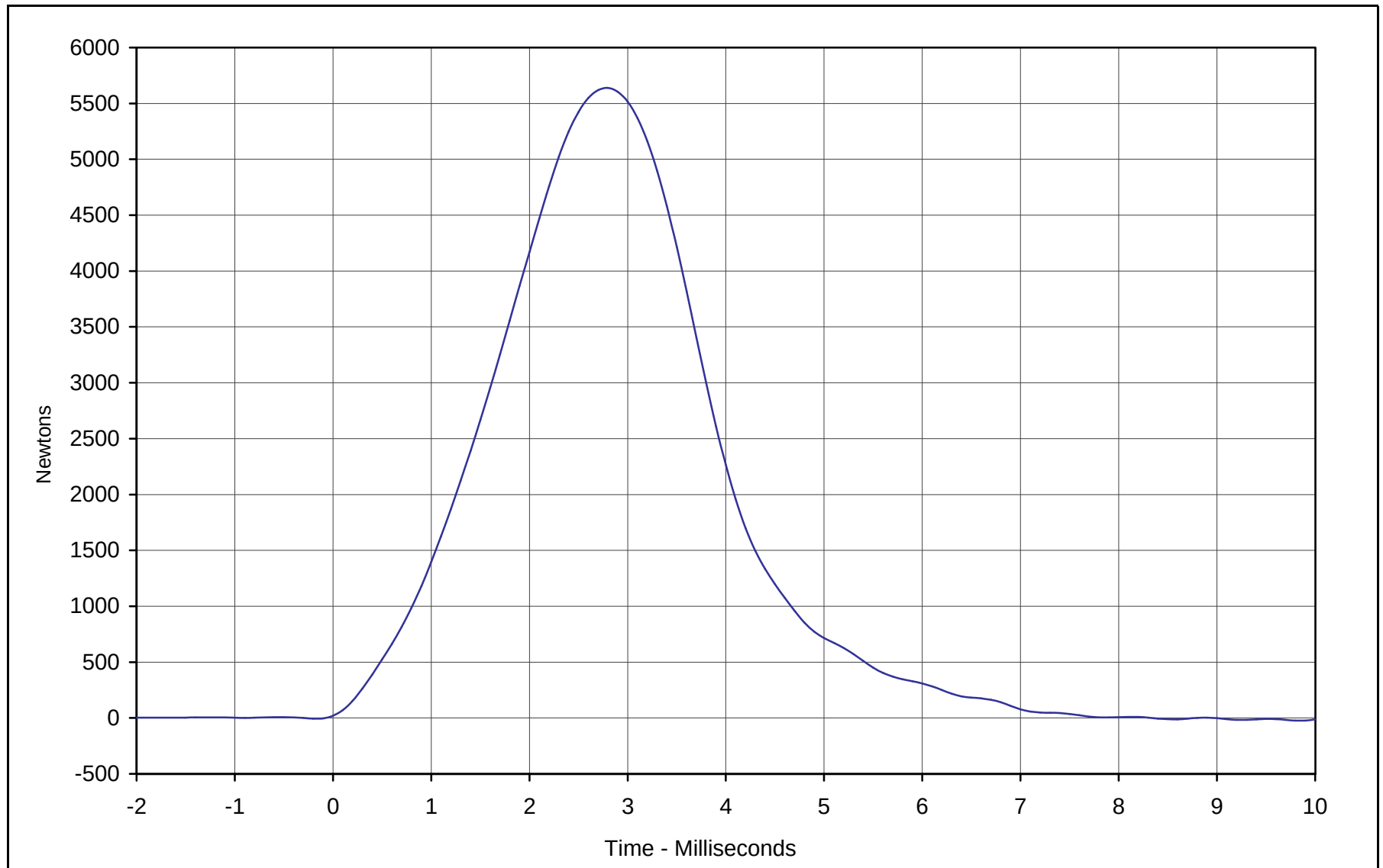


Curve Description: Probe Force
Maximum Value: 5631.1 at 2.7 Milliseconds
Minimum Value: -15.1 at -0.2 Milliseconds
SAE Filter Class: 600
Date of Test: 11/28/01
ATD Serial No.: 034

Test Program: Hybrid III Knee Impact Test
Test Information: Location: Left Knee Test I.D.: LK05C



KAR21129-01



Curve Description: Probe Force
Maximum Value: 5638.4 at 2.8 Milliseconds
Minimum Value: -5.5 at -0.2 Milliseconds
SAE Filter Class: 600
Date of Test: 11/28/01
ATD Serial No.: 034

Test Program: Hybrid III Knee Impact Test
Test Information: Location: Right Knee Test I.D.: RK06C





Hybrid III Calibration Data Sheet

50TH Percentile Male

Head Drop Calibration

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: HD05B

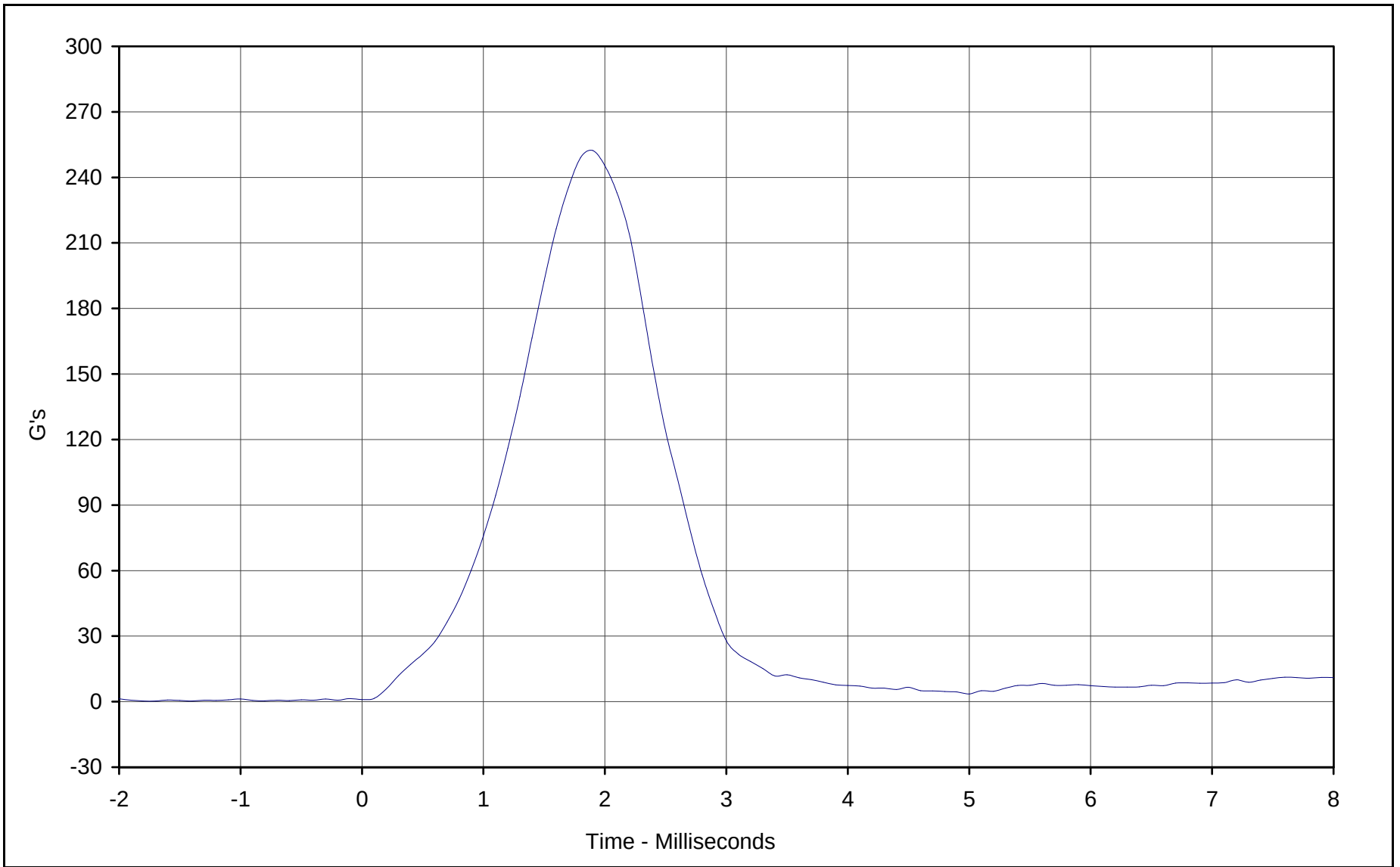
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	252.3	Pass
Peak Lateral Acceleration	G's	≤15.0	11.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

November 28, 2001

Test Date

E-5



Curve Description: Head Resultant Acceleration

Maximum Value:	<u>252.3</u>	at	<u>1.9</u>	Milliseconds
Minimum Value:	<u>0.3</u>	at	<u>-1.7</u>	Milliseconds
SAE Filter Class:	<u>1000</u>			
Date of Test:	<u>11/28/01</u>			
ATD Serial No.:	<u>034</u>			

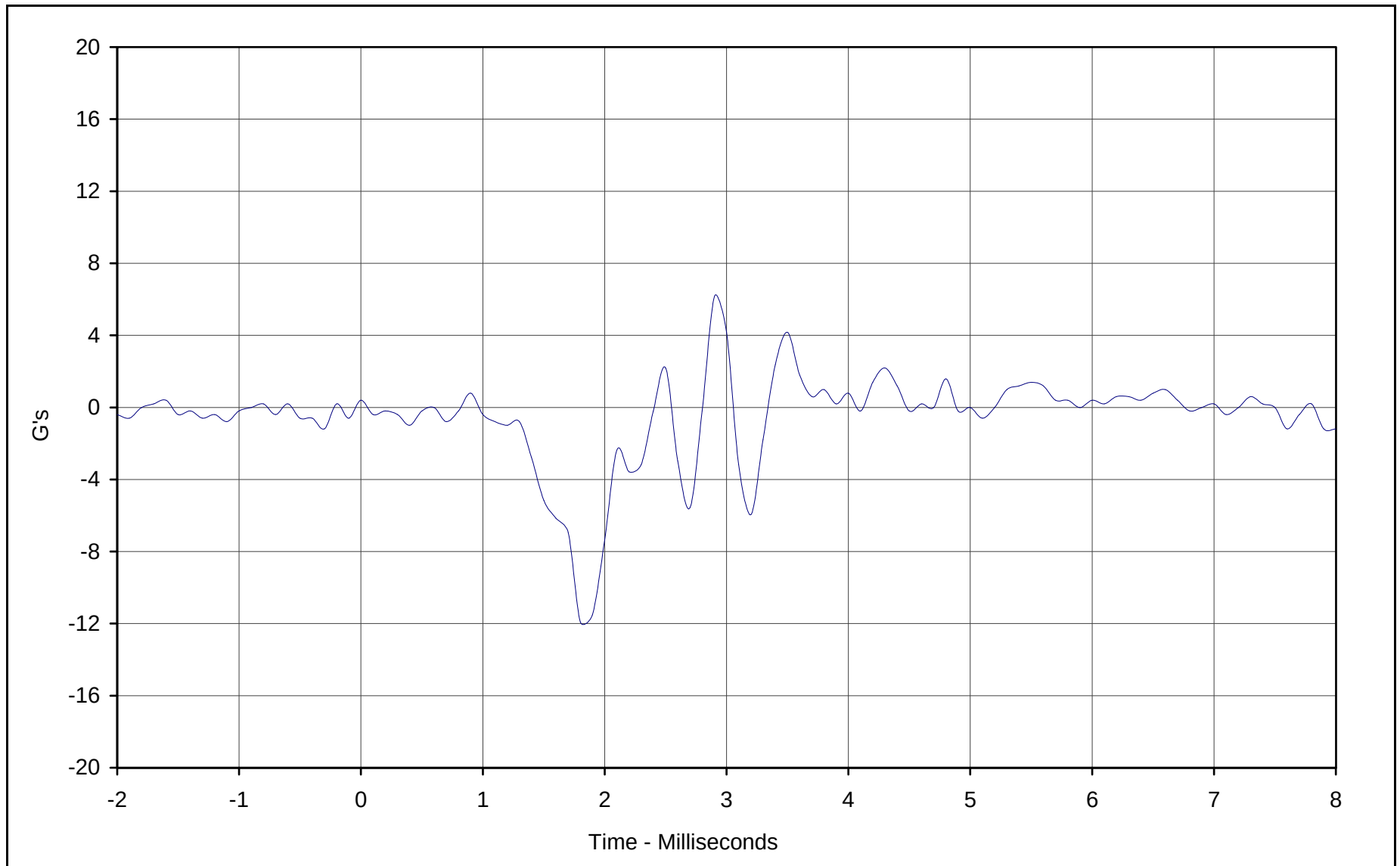
Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD05B



KAR21129-01

E-6



Curve Description: Head Acceleration Y Axis

Maximum Value: 6.2 at 2.9 Milliseconds

Minimum Value: -11.9 at 1.8 Milliseconds

SAE Filter Class: 1000

Date of Test: 11/28/01

ATD Serial No.: 034

Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD05B



KAR21129-01



Hybrid III Calibration Data Sheet

50TH Percentile Male

Thorax Impact Test

ATD Serial No.: 034

Part Serial No.: N/A

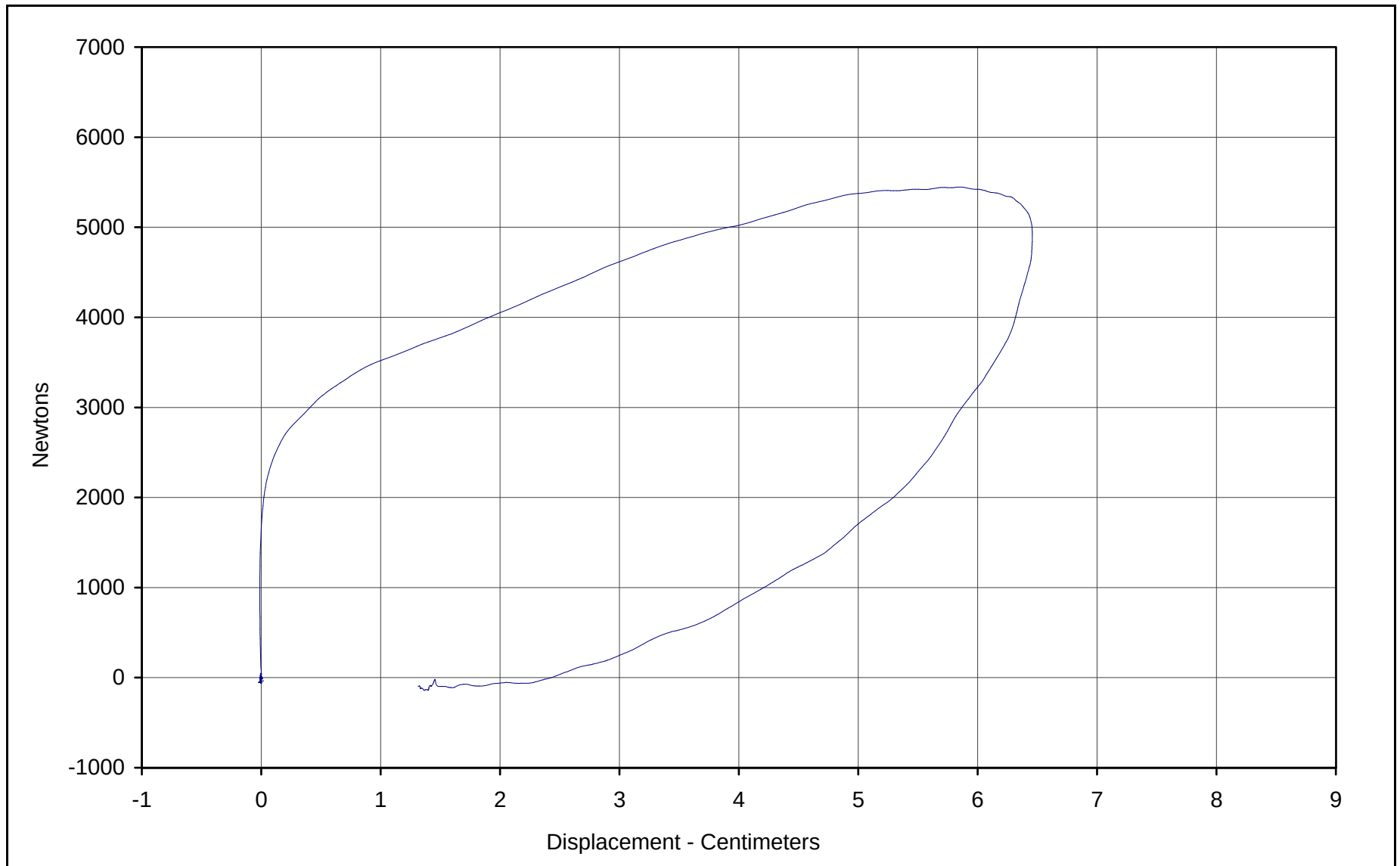
Test I.D.: CH11A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.61	Pass
Peak Probe Force	Newtons	5159 to 5893	5447	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.46	Pass
Internal Hysteresis	%	69 to 85	79.6	Pass
Overall Test Results				Pass

Laboratory Technician

November 29, 2001

Test Date



Curve Description: Probe Force vs. Chest Displacement

Probe Force: 5447.1 Newtons

Chest Displ.: 6.46 Centimeters

SAE Filter Class: 180

Date of Test: 11/29/01

ATD Serial No.: 034

Testing Program: Hybrid III Thorax Impact Test

Test Information: S/N of Part: N/A Test I.D.: CH11A





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NF11A

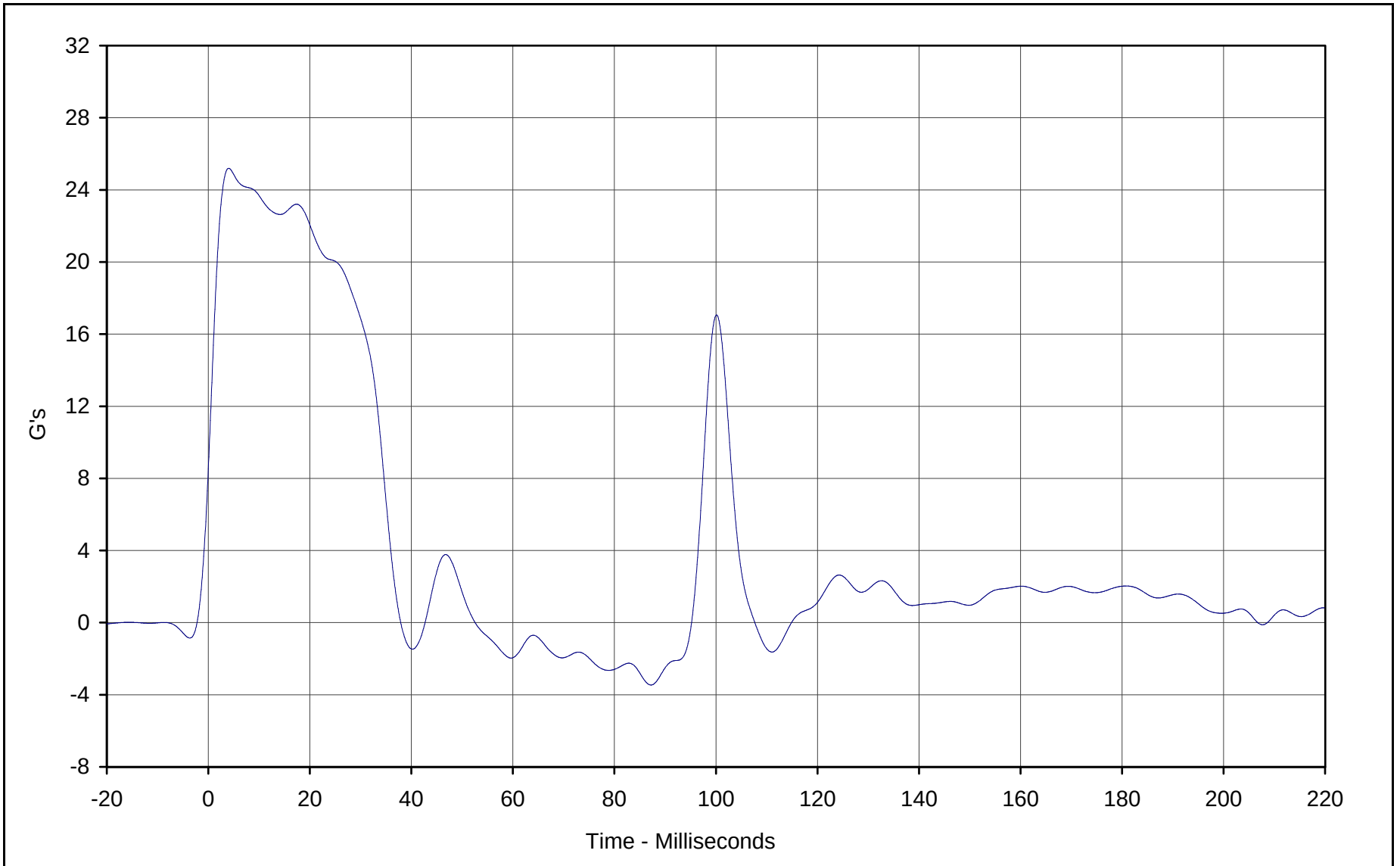
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.89	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.7	Pass
	20 Msec.	G's	17.6 to 22.6	22.1	Pass
	30 Msec.	G's	12.5 to 18.5	16.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	35.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	68.6	Pass
	Time	Msec.	57.0 to 64.0	60.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	116.4	Pass
Moment About Occipital Condyle	Maximum	N•m	84.1 to 108.5	90.3	Pass
	Time	Msec.	47.0 to 58.0	48.3	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	99.7	Pass
Overall Test Results					Pass

Laboratory Technician

November 27, 2001

Test Date

E-10



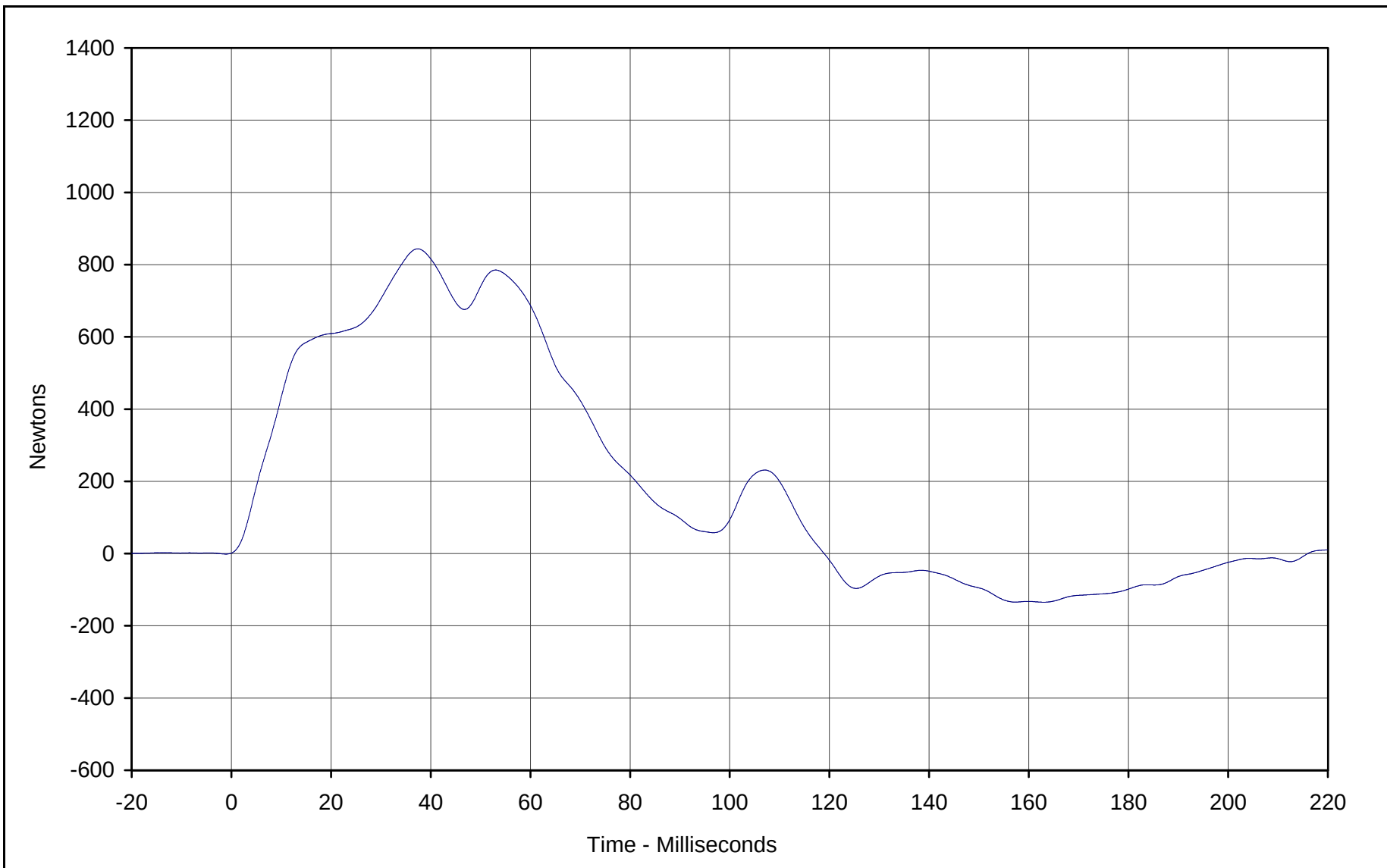
Curve Description:	Pendulum Deceleration		
Maximum Value:	25.2	at	4.0 Milliseconds
Minimum Value:	-3.5	at	87.2 Milliseconds
SAE Filter Class:	60		
Date of Test:	11/27/01		
ATD Serial No.:	034		

Testing Program:	Hybrid III Neck Flexion Test (Male)
Test Information:	S/N of Part: N/A Test I.D.: NF11A



KAR21129-01

E-11



Curve Description: Neck Force X

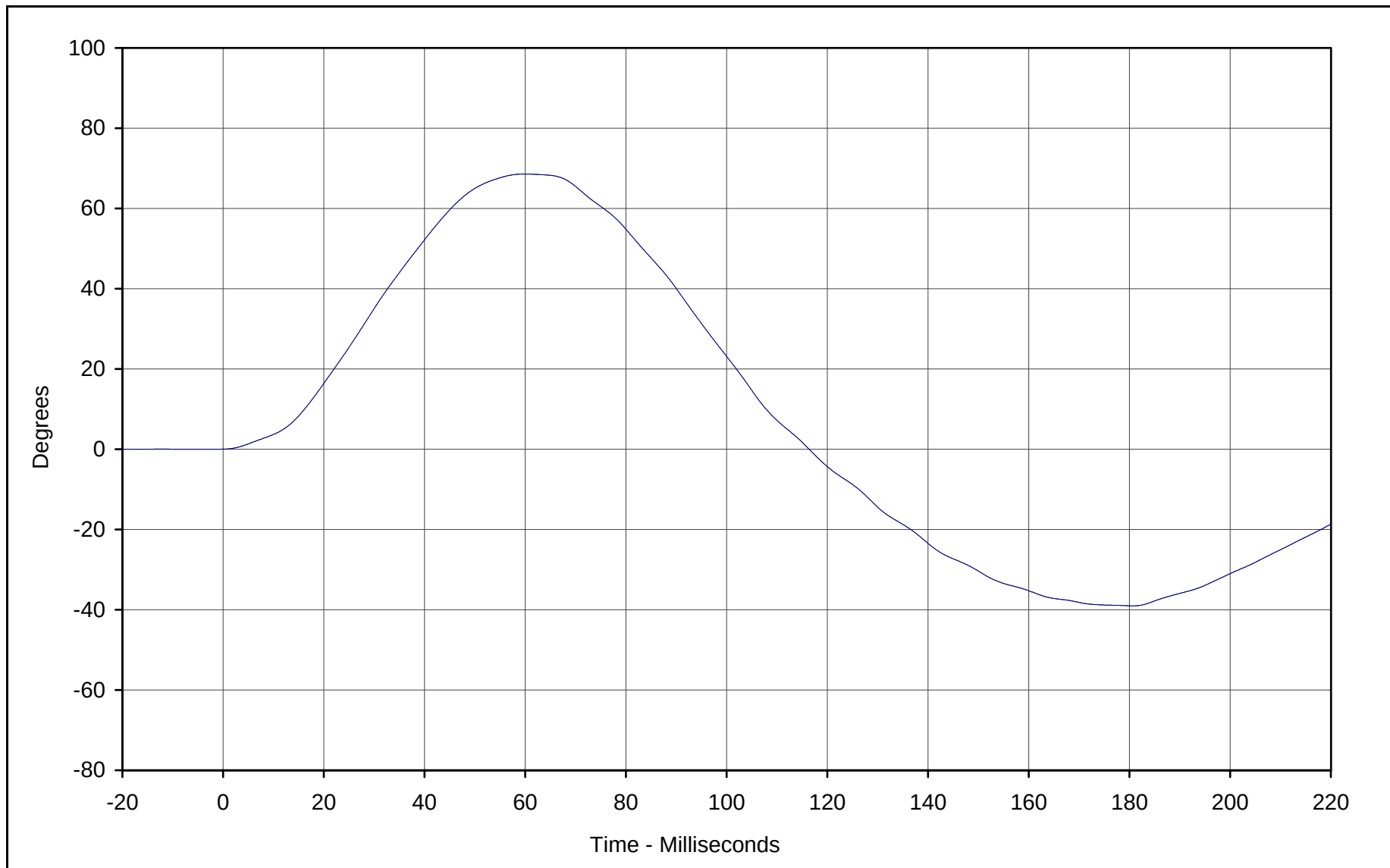
Maximum Value:	843.8	at	37.4	Milliseconds
Minimum Value:	-134.7	at	163.0	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF11A



KAR21129-01



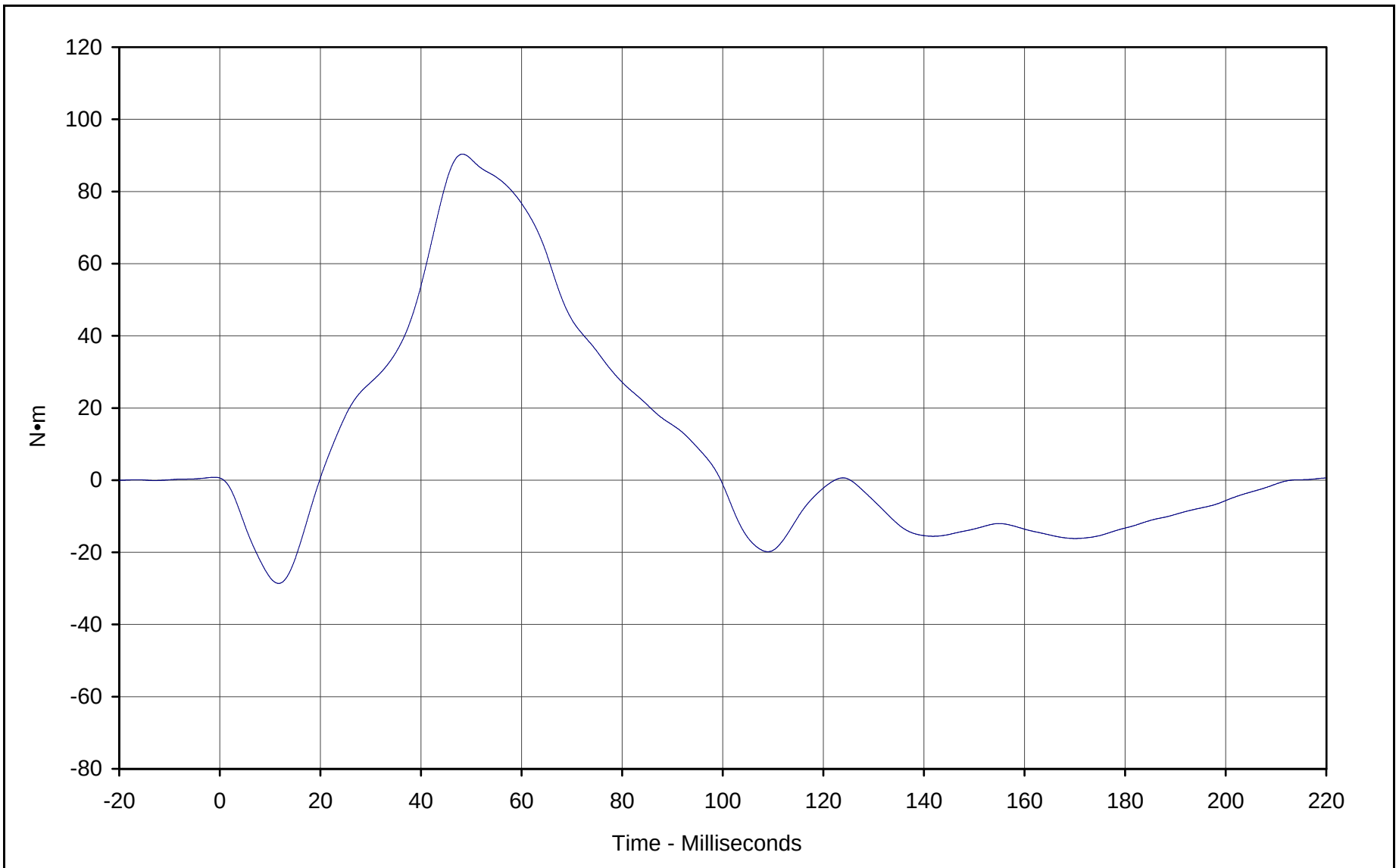
Curve Description: "D" Plane Rotation

Maximum Value:	68.6	at	60.0	Milliseconds
Minimum Value:	-39.0	at	180.7	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF11A





Curve Description: Moment About Occipital Condyles
Maximum Value: 90.3 at 48.3 Milliseconds
Minimum Value: -28.6 at 11.7 Milliseconds
SAE Filter Class: 60
Date of Test: 11/27/01
ATD Serial No.: 034

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF11A





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Extension Test

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: NE11A

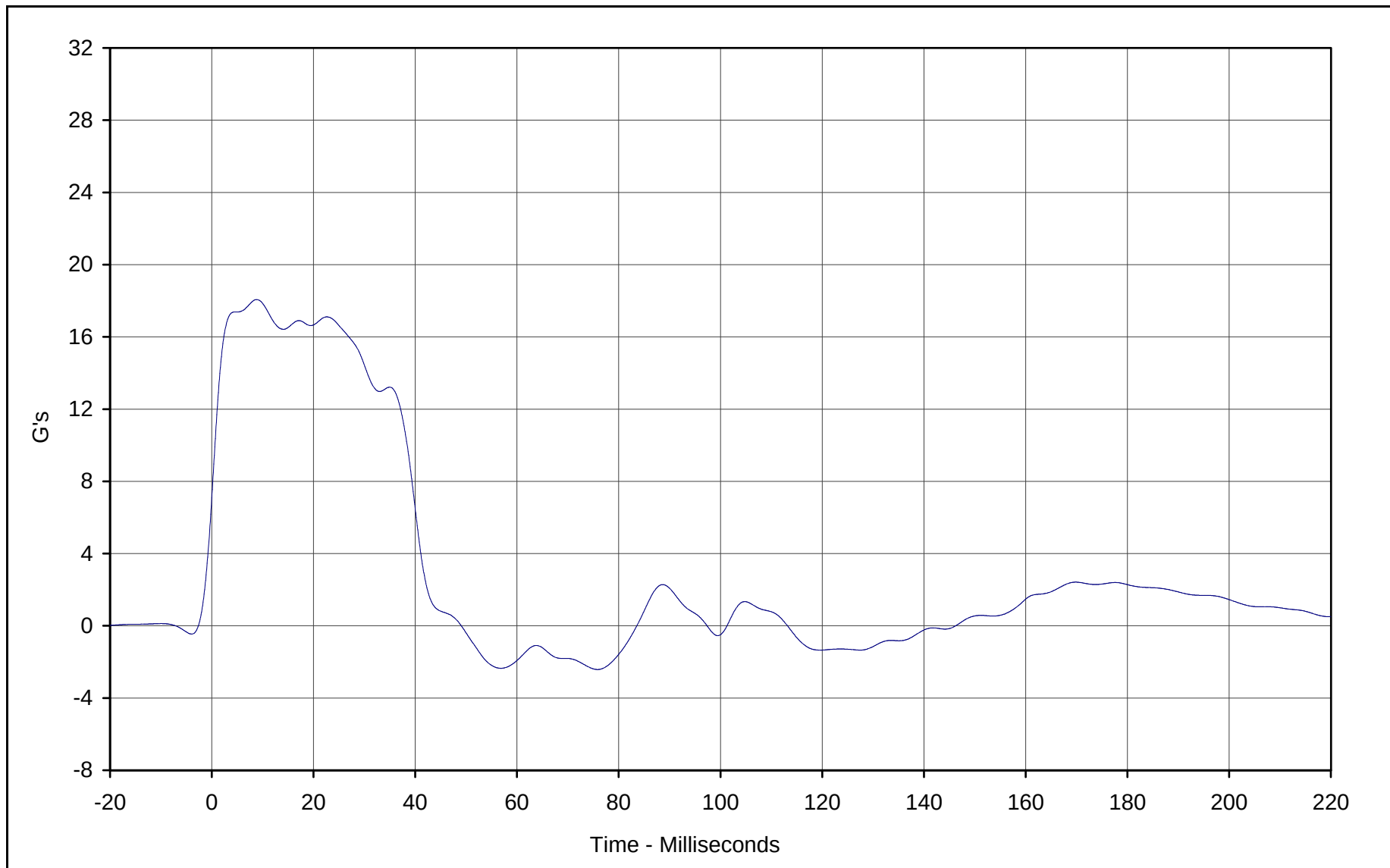
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.10	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.9	Pass
	20 Msec.	G's	14.0 to 19.0	16.7	Pass
	30 Msec.	G's	11.0 to 16.0	14.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	14.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	40.7	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	95.2	Pass
	Time	Msec.	72.0 to 82.0	75.2	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	156.5	Pass
Moment About Occipital Condyle	Maximum	N•m	-52.9 to- 79.9	-72.9	Pass
	Time	Msec.	65.0 to 79.0	66.6	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	137.2	Pass
Overall Test Results					Pass

Laboratory Technician

November 27, 2001

Test Date

E-15



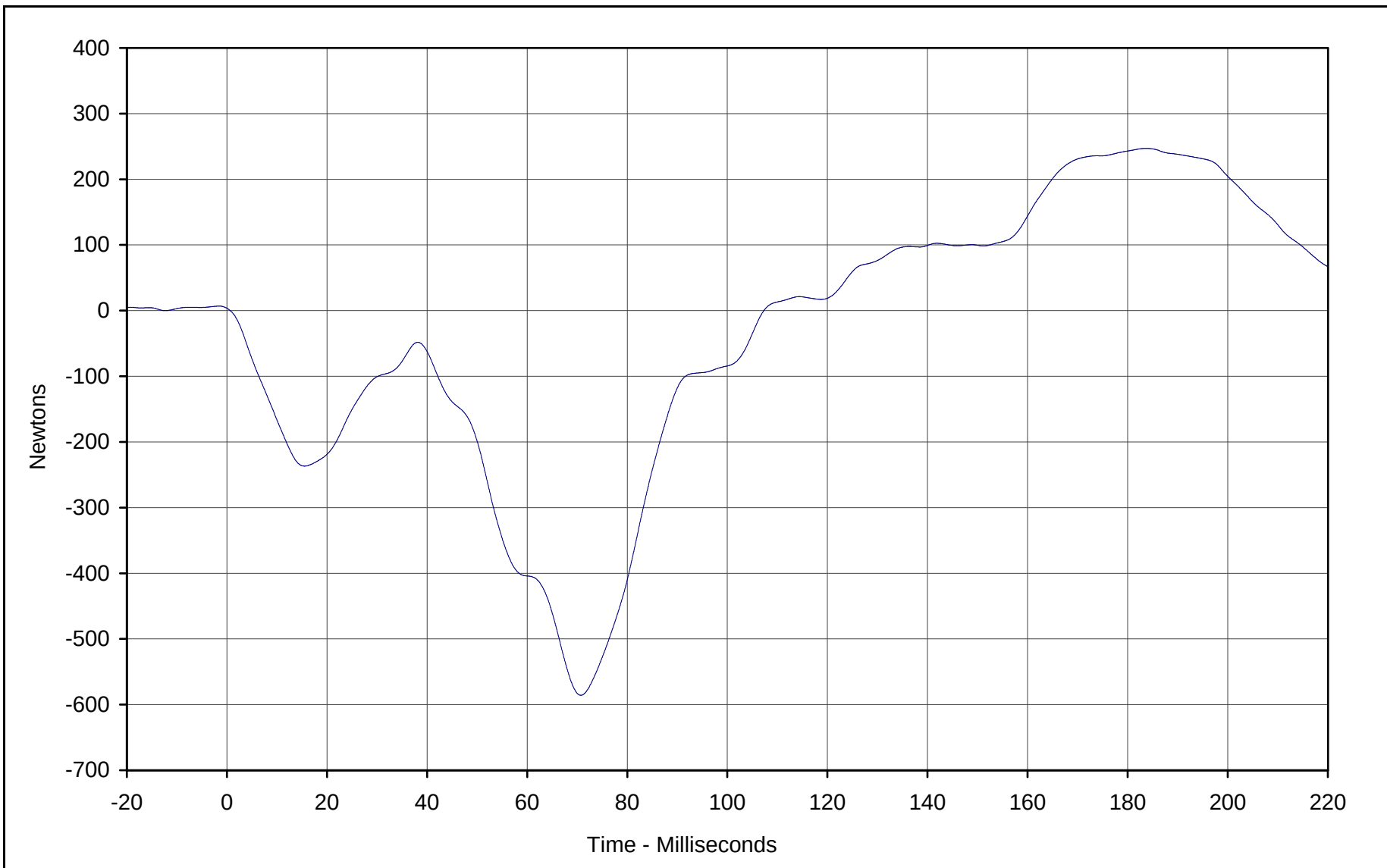
Curve Description:	Pendulum Deceleration		
Maximum Value:	18.1	at	8.8 Milliseconds
Minimum Value:	-2.4	at	75.8 Milliseconds
SAE Filter Class:	60		
Date of Test:	11/27/01		
ATD Serial No.:	034		

Testing Program:	Hybrid III Neck Extension Test (Male)
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Test Information:	S/N of Part: N/A Test I.D.: NE11A
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KAR21129-01



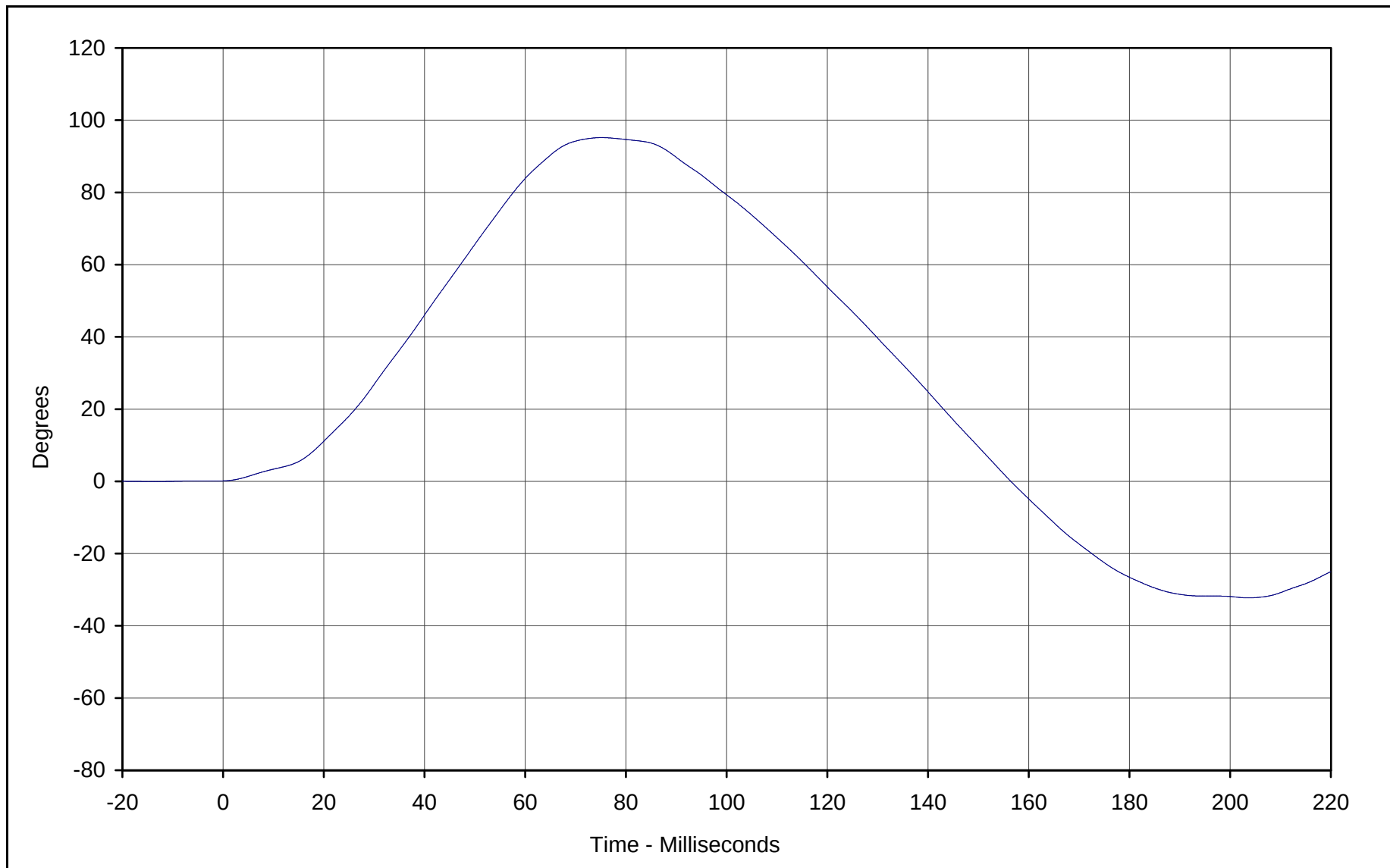
Curve Description: Neck Force X

Maximum Value:	247.0	at	183.7	Milliseconds
Minimum Value:	-585.9	at	70.7	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE11A





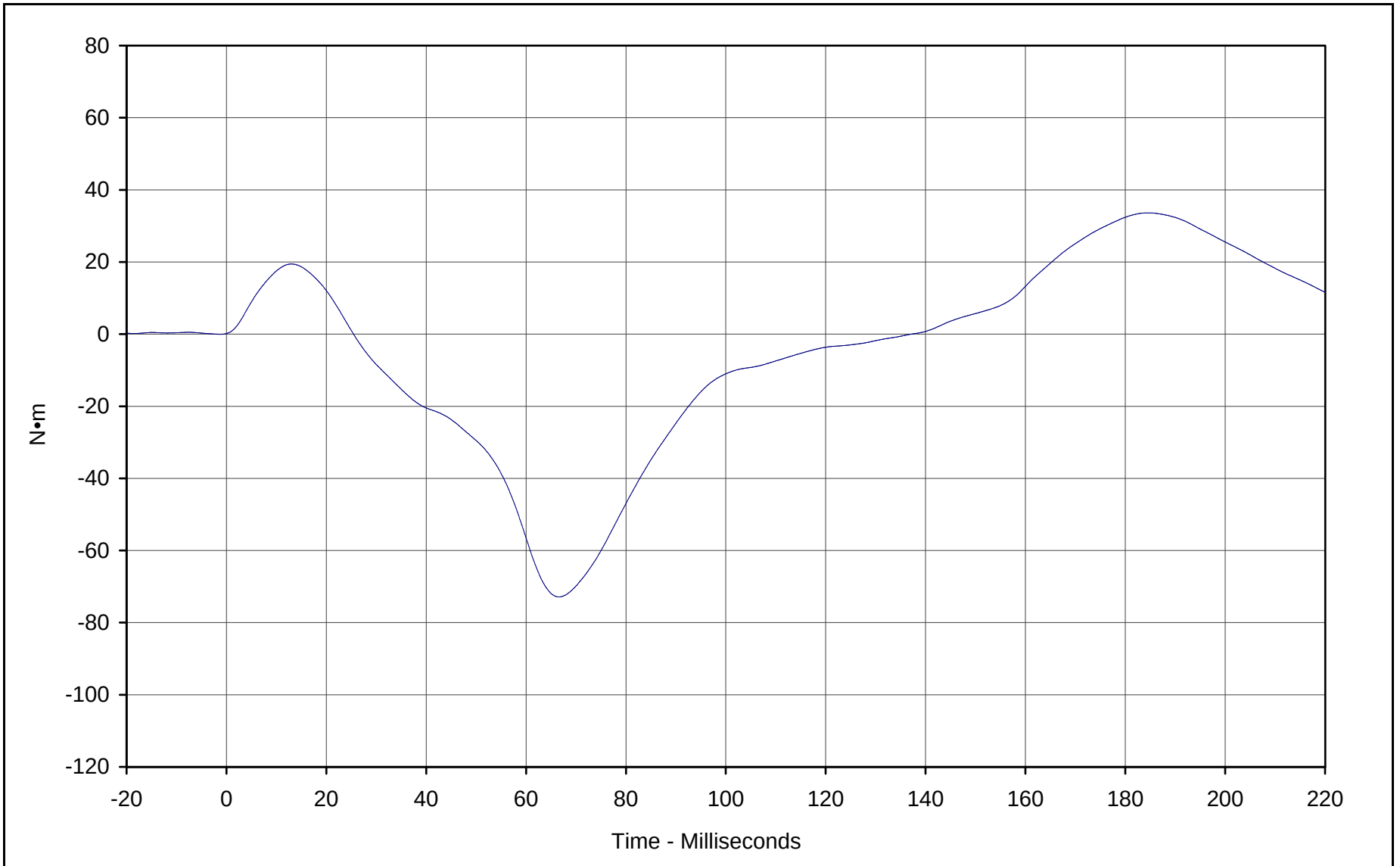
Curve Description: "D" Plane Rotation

Maximum Value:	95.2	at	75.2	Milliseconds
Minimum Value:	-32.3	at	203.6	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	034			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE11A





Curve Description: Moment About Occipital Condyles

Maximum Value: 33.6 at 184.5 Milliseconds

Minimum Value: -72.9 at 66.6 Milliseconds

SAE Filter Class: 60

Date of Test: 11/27/01

ATD Serial No.: 034

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE11A





Hybrid III Calibration Data Sheet

50TH Percentile Male

External Measurements

ATD Serial No.: 034

Part Serial No.: N/A

Test I.D.: N/A

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	20.9	Pass
Laboratory relative humidity	%	10 to 70	43	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	510	Pass
C - "H" point height	mm	84 to 89	88	Pass
D - "H" point from seat back	mm	135 to 140	135	Pass
E - Shoulder pivot from back	mm	84 to 94	92	Pass
F - Thigh clearance	mm	140 to 155	145	Pass
G - Elbow back to wrist pivot	mm	290 to 305	295	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	342	Pass
J - Elbow rest height	mm	190 to 211	205	Pass
K - Buttock to knee length	mm	579 to 604	585	Pass
L - Popliteal length	mm	429 to 455	435	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	475	Pass
O - Chest depth	mm	213 to 229	220	Pass
P - Foot length	mm	251 to 267	265	Pass
V - Shoulder breadth	mm	422 to 437	425	Pass
W - Foot breadth	mm	91 to 107	100	Pass
Y - Chest circumference	mm	970 to 1001	985	Pass
Z - Waist circumference	mm	836 to 866	860	Pass
AA - Location for chest circumference	mm	429 to 434	430	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Laboratory Technician

December 3, 2001

Test Date



Hybrid III Calibration Data Sheet

Hybrid III 50th Percentile Male

Knee Impact Test

ATD Serial No.: 035

Location: Left Knee

Test I.D.: LK06A

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
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5623	Pass
Overall Test Results				Pass

ATD Serial No.: 035

Location: Right Knee

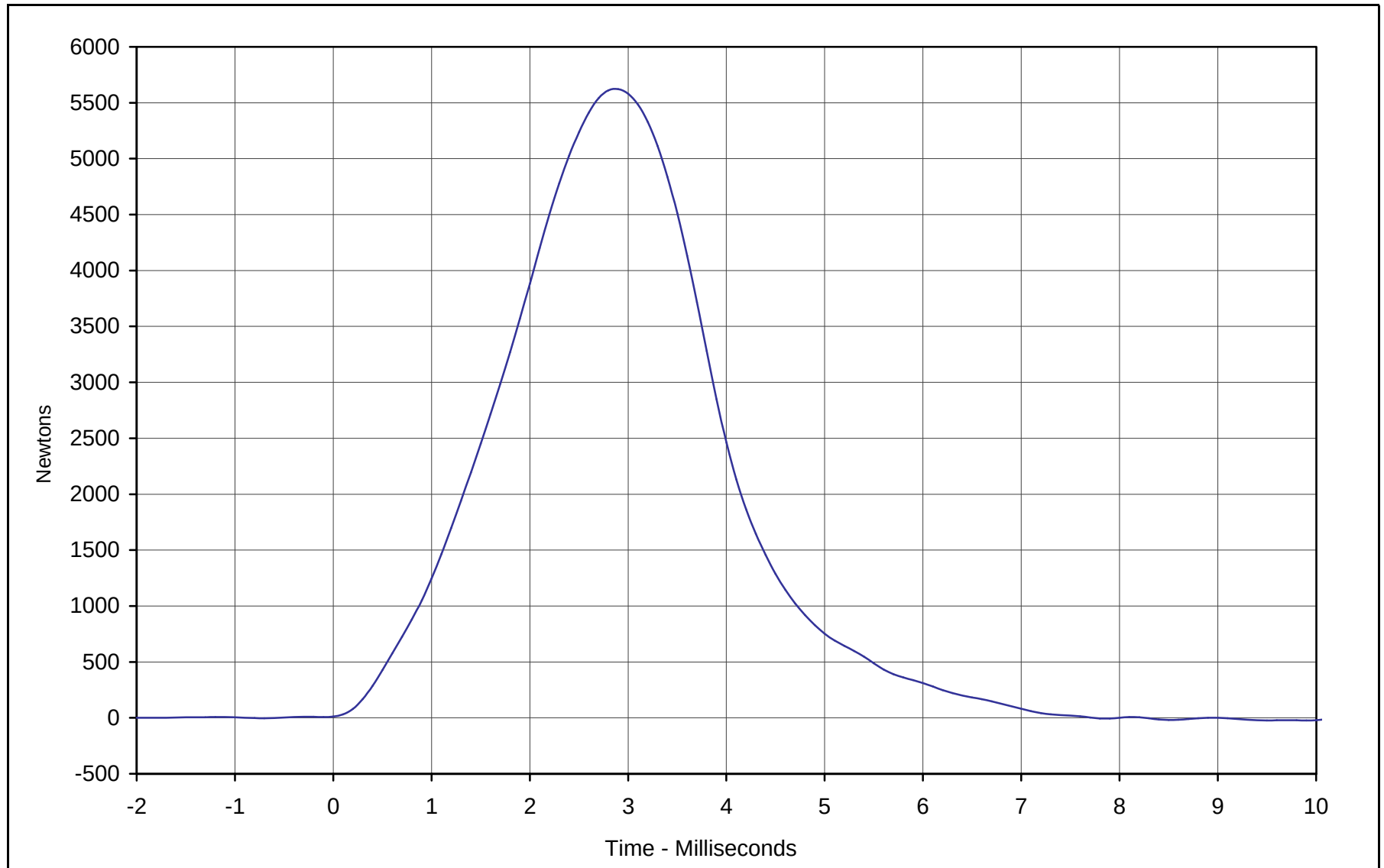
Test I.D.: RK06B

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
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	5820	Fail
Overall Test Results				Fail

Laboratory Technician

November 28, 2001

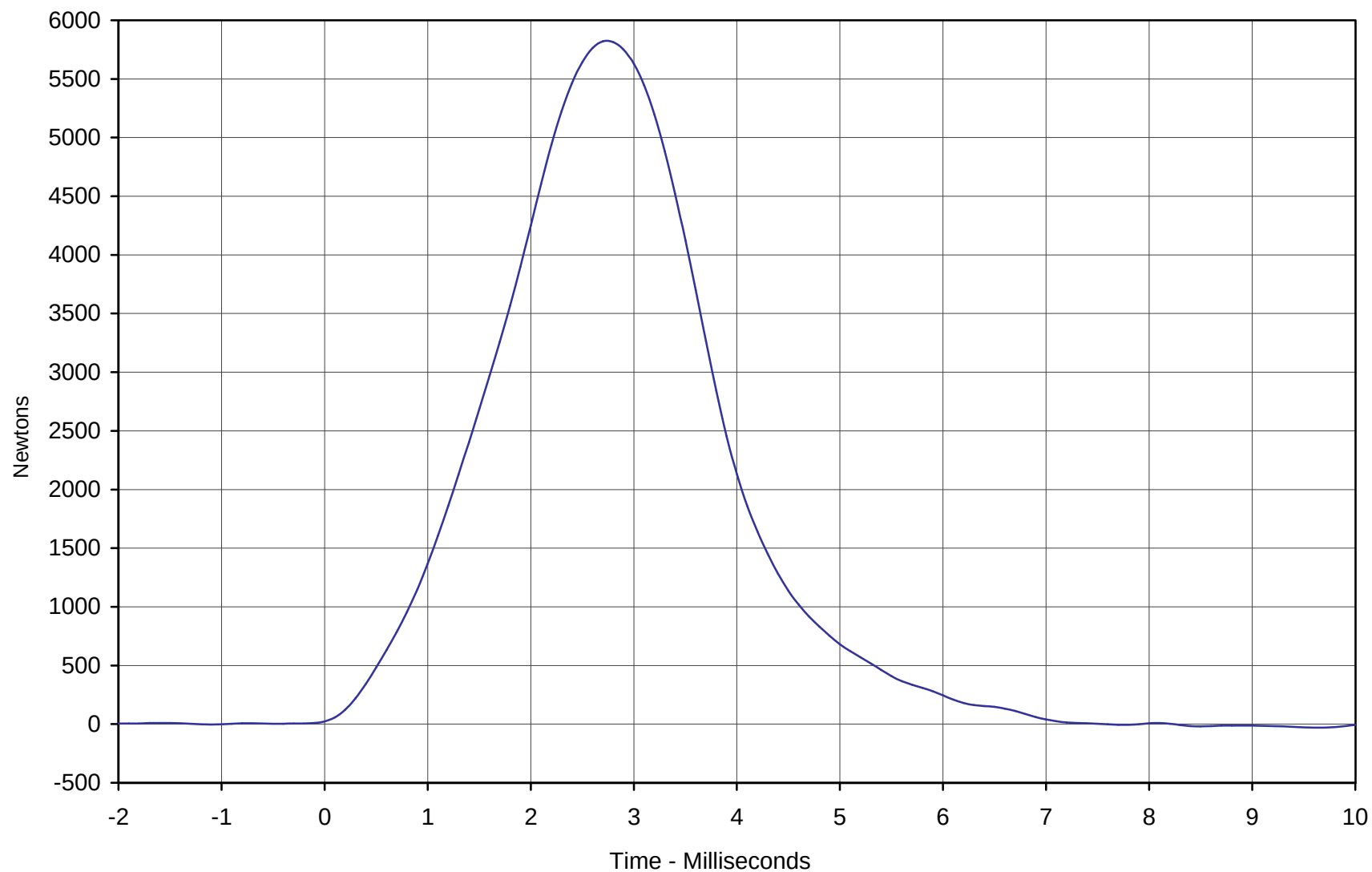
Test Date



Curve Description: Probe Force
Maximum Value: 5622.6 at 2.9 Milliseconds
Minimum Value: -6.1 at 7.9 Milliseconds
SAE Filter Class: 600
Date of Test: 11/28/01
ATD Serial No.: 035

Test Program: Hybrid III Knee Impact Test
Test Information: Location: Left Knee Test I.D.: LK06A





Curve Description: Probe Force
Maximum Value: 5820.3 at 2.7 Milliseconds
Minimum Value: -5.7 at 7.7 Milliseconds
SAE Filter Class: 600
Date of Test: 11/28/01
ATD Serial No.: 035

Test Program: Hybrid III Knee Impact Test
Test Information: Location: Right Knee Test I.D.: RK06B





Hybrid III Calibration Data Sheet

50TH Percentile Male

Head Drop Calibration

ATD Serial No.: 035

Part Serial No.: N/A

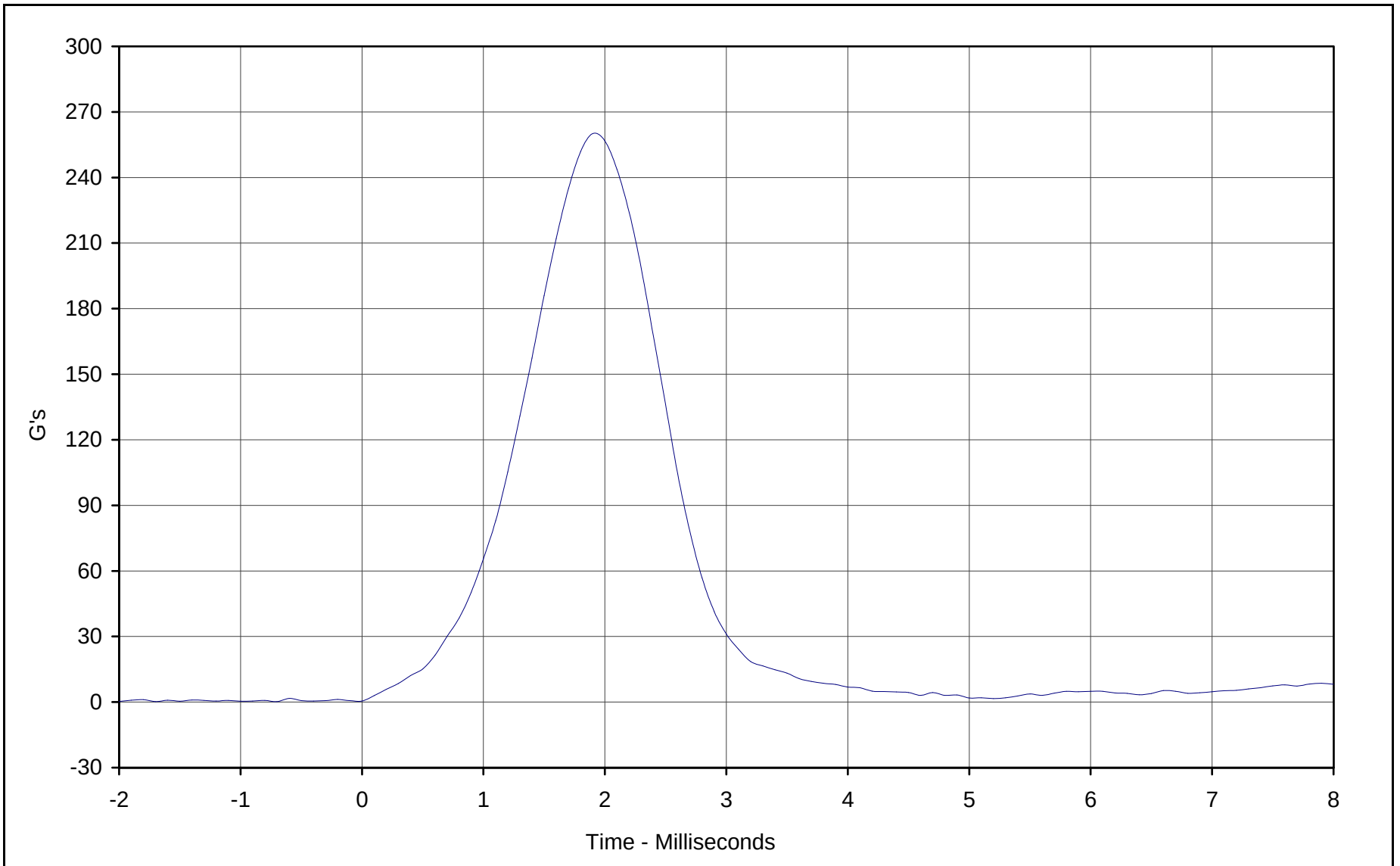
Test I.D.: HD05C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	260.1	Pass
Peak Lateral Acceleration	G's	≤15.0	5.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

November 28, 2001
Test Date

E-24



Curve Description: Head Resultant Acceleration

Maximum Value:	<u>260.1</u>	at	<u>1.9</u>	Milliseconds
Minimum Value:	<u>0.2</u>	at	<u>-0.7</u>	Milliseconds
SAE Filter Class:	<u>1000</u>			
Date of Test:	<u>11/28/01</u>			
ATD Serial No.:	<u>035</u>			

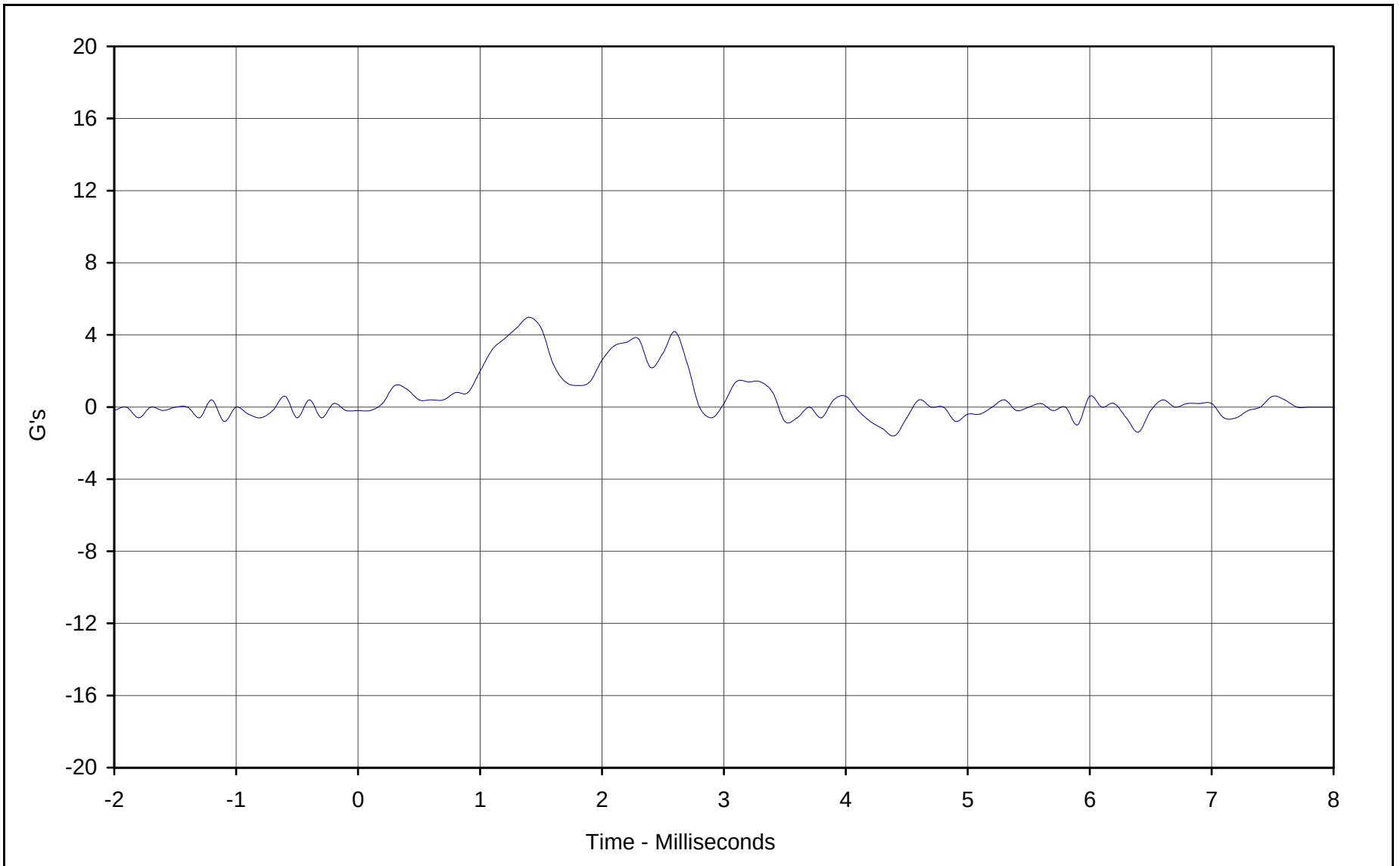
Testing Program: Hybrid III Head Drop Calibration (Male)

Test Information: S/N of Part: N/A Test I.D.: HD05C



KAR21129-01

E-25



Curve Description: Head Acceleration Y Axis
Maximum Value: 5.0 at 1.4 Milliseconds
Minimum Value: -1.6 at 4.4 Milliseconds
SAE Filter Class: 1000
Date of Test: 11/28/01
ATD Serial No.: 035

Testing Program: Hybrid III Head Drop Calibration (Male)
Test Information: S/N of Part: N/A Test I.D.: HD05C



KAR21129-01



Hybrid III Calibration Data Sheet

50TH Percentile Male

Thorax Impact Test

ATD Serial No.: 035

Part Serial No.: N/A

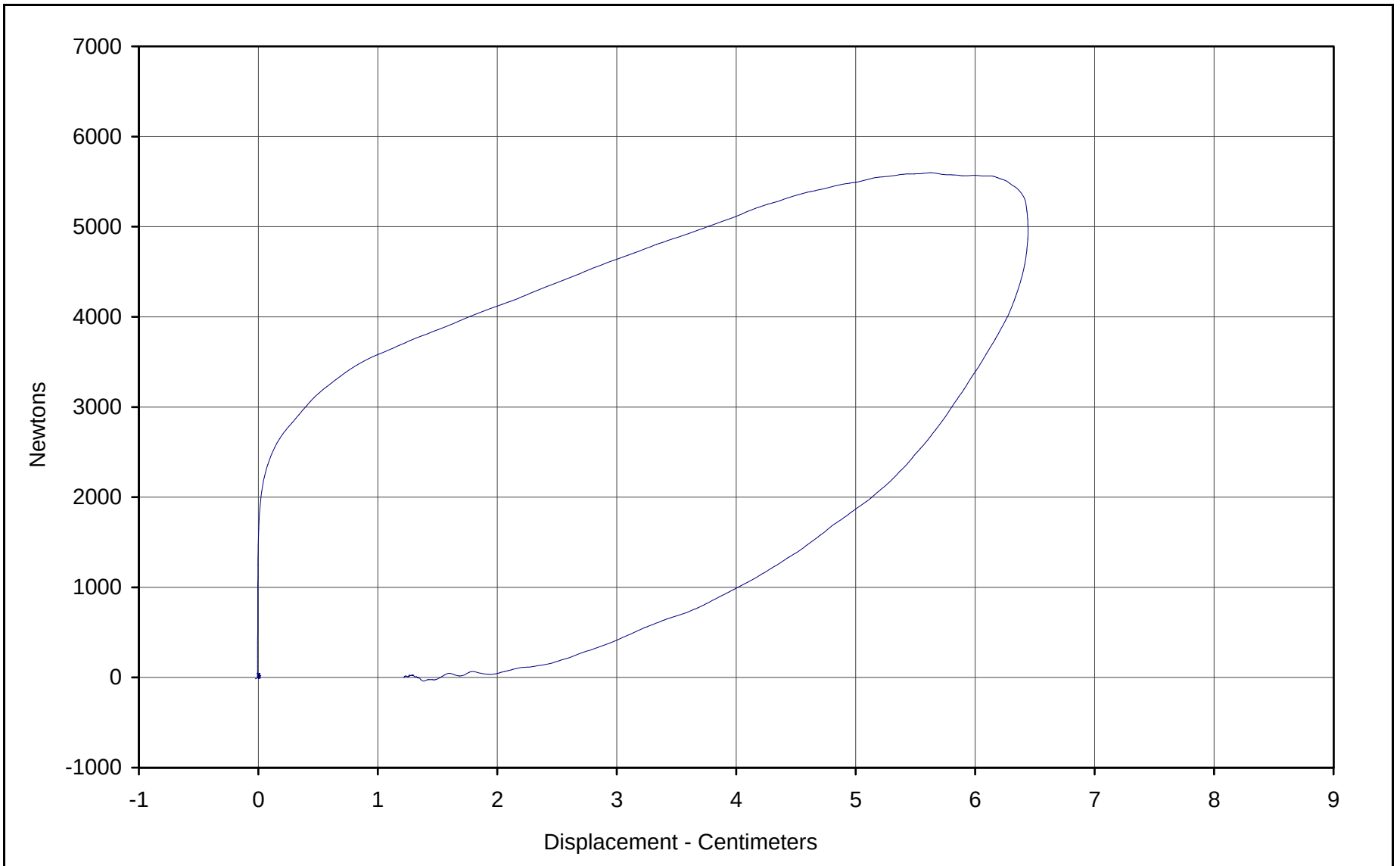
Test I.D.: CH11B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.61	Pass
Peak Probe Force	Newtons	5159 to 5893	5597	Pass
Peak Sternum Displacement	CM	6.35 to 7.26	6.44	Pass
Internal Hysteresis	%	69 to 85	77.6	Pass
Overall Test Results				Pass

Laboratory Technician

November 29, 2001

Test Date



Curve Description: Probe Force vs. Chest Displacement

Probe Force: 5597.3 Newtons

Chest Displ.: 6.44 Centimeters

SAE Filter Class: 180

Date of Test: 11/29/01

ATD Serial No.: 035

Testing Program: Hybrid III Thorax Impact Test

Test Information: S/N of Part: N/A Test I.D.: CH11B





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Flexion Test

ATD Serial No.: 035

Part Serial No.: N/A

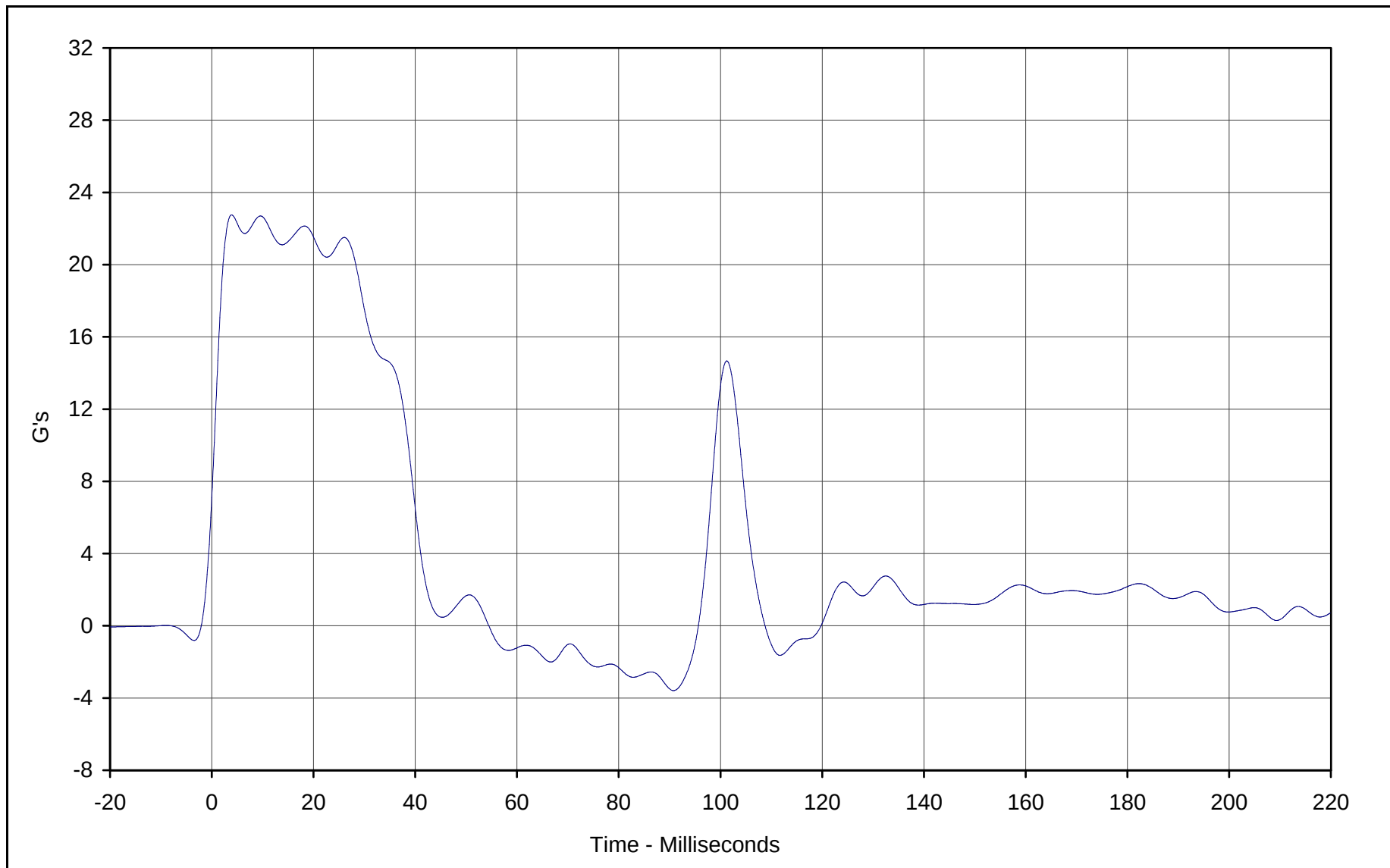
Test I.D.: NF11B

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.89	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.6	Pass
	20 Msec.	G's	17.6 to 22.6	21.5	Pass
	30 Msec.	G's	12.5 to 18.5	17.5	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.5	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	40.7	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	68.8	Pass
	Time	Msec.	57.0 to 64.0	60.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	119.4	Pass
Moment About Occipital Condyle	Maximum	N·m	84.1 to 108.5	89.9	Pass
	Time	Msec.	47.0 to 58.0	53.5	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	101.5	Pass
Overall Test Results					Pass

Laboratory Technician

November 27, 2001

Test Date



Curve Description: Pendulum Deceleration

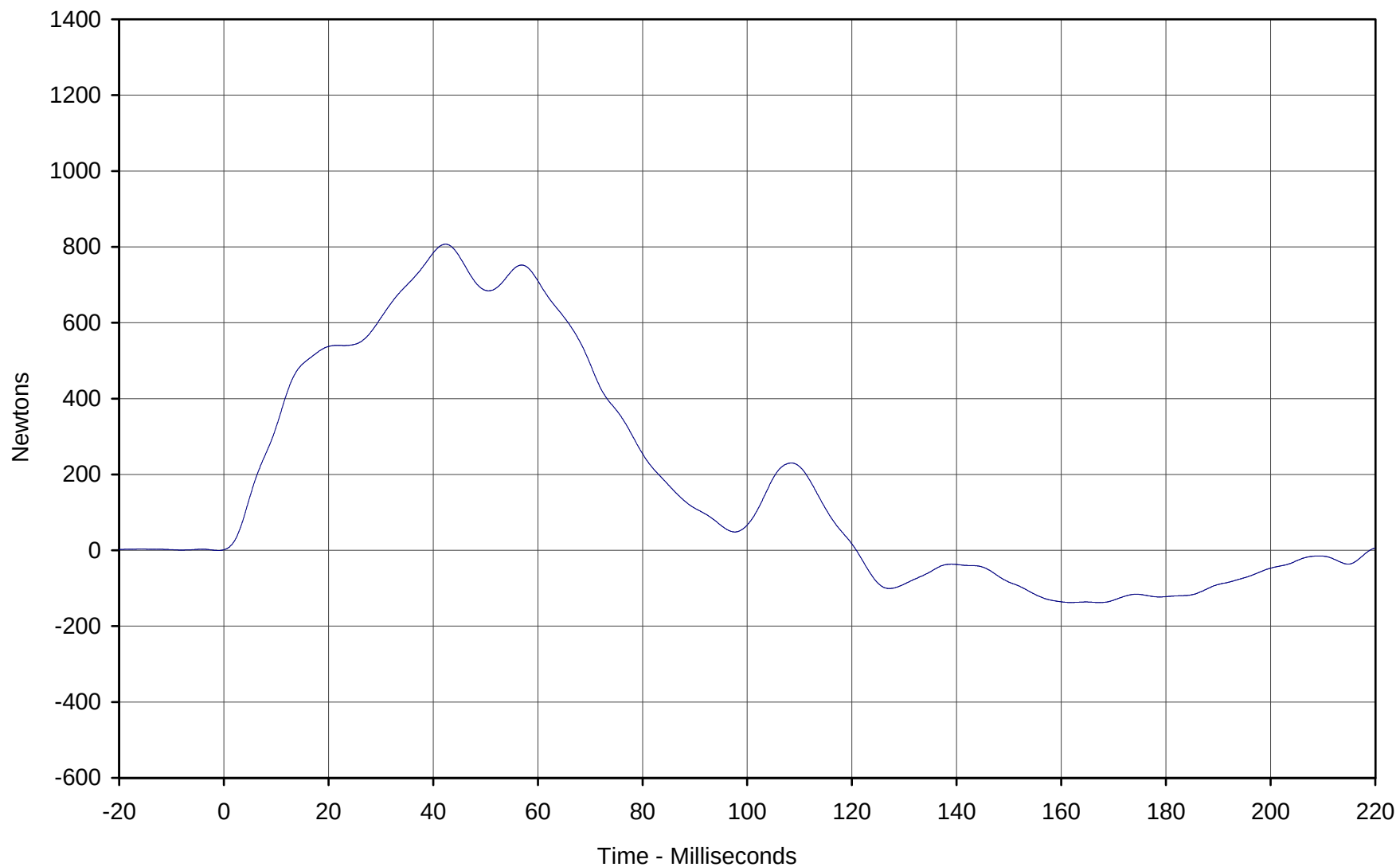
Maximum Value:	<u>22.8</u>	at	<u>3.9</u>	Milliseconds
Minimum Value:	<u>-3.6</u>	at	<u>90.8</u>	Milliseconds
SAE Filter Class:	<u>60</u>			
Date of Test:	<u>11/27/01</u>			
ATD Serial No.:	<u>035</u>			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF11B



E-30



Curve Description: Neck Force X

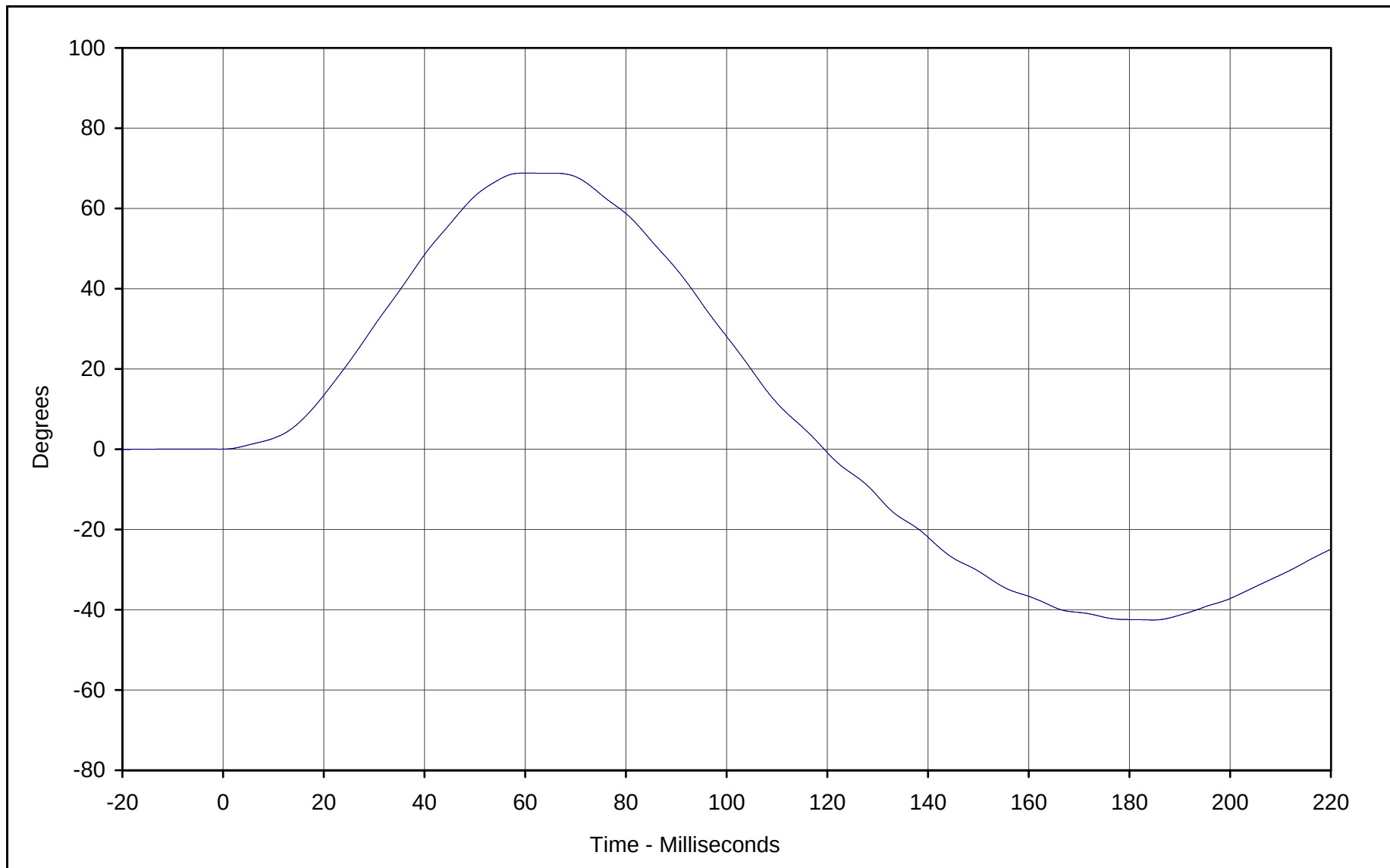
Maximum Value:	807.1	at	42.4	Milliseconds
Minimum Value:	-137.8	at	167.3	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF11B



KAR21129-01



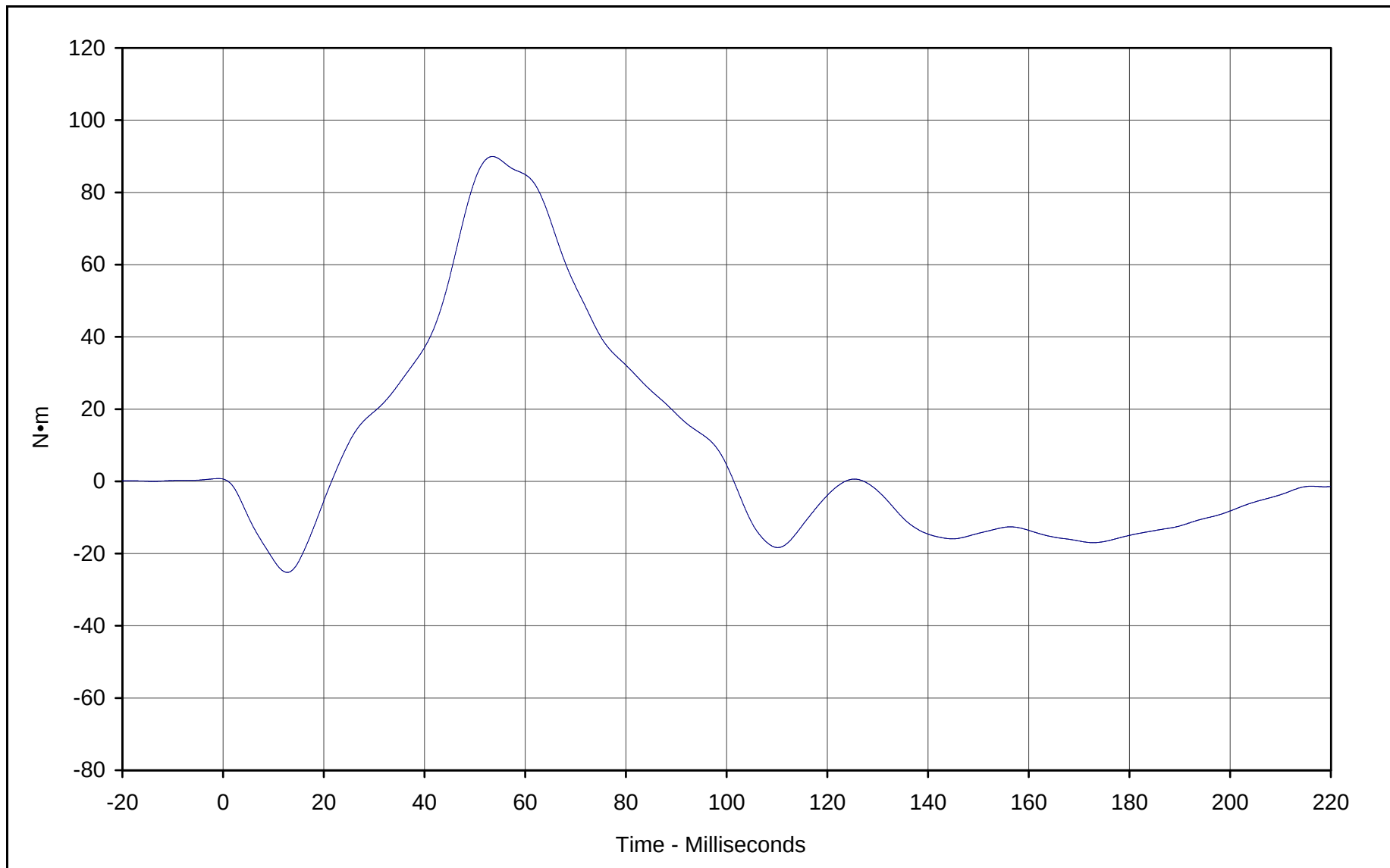
Curve Description: "D" Plane Rotation

Maximum Value:	68.8	at	60.0	Milliseconds
Minimum Value:	-42.6	at	184.6	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF11B





Curve Description: Moment About Occipital Condyles
Maximum Value: 89.9 at 53.5 Milliseconds
Minimum Value: -25.2 at 12.7 Milliseconds
SAE Filter Class: 60
Date of Test: 11/27/01
ATD Serial No.: 035

Testing Program: Hybrid III Neck Flexion Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NF11B





Hybrid III Calibration Data Sheet

50TH Percentile Male

Neck Extension Test

ATD Serial No.: 035

Part Serial No.: N/A

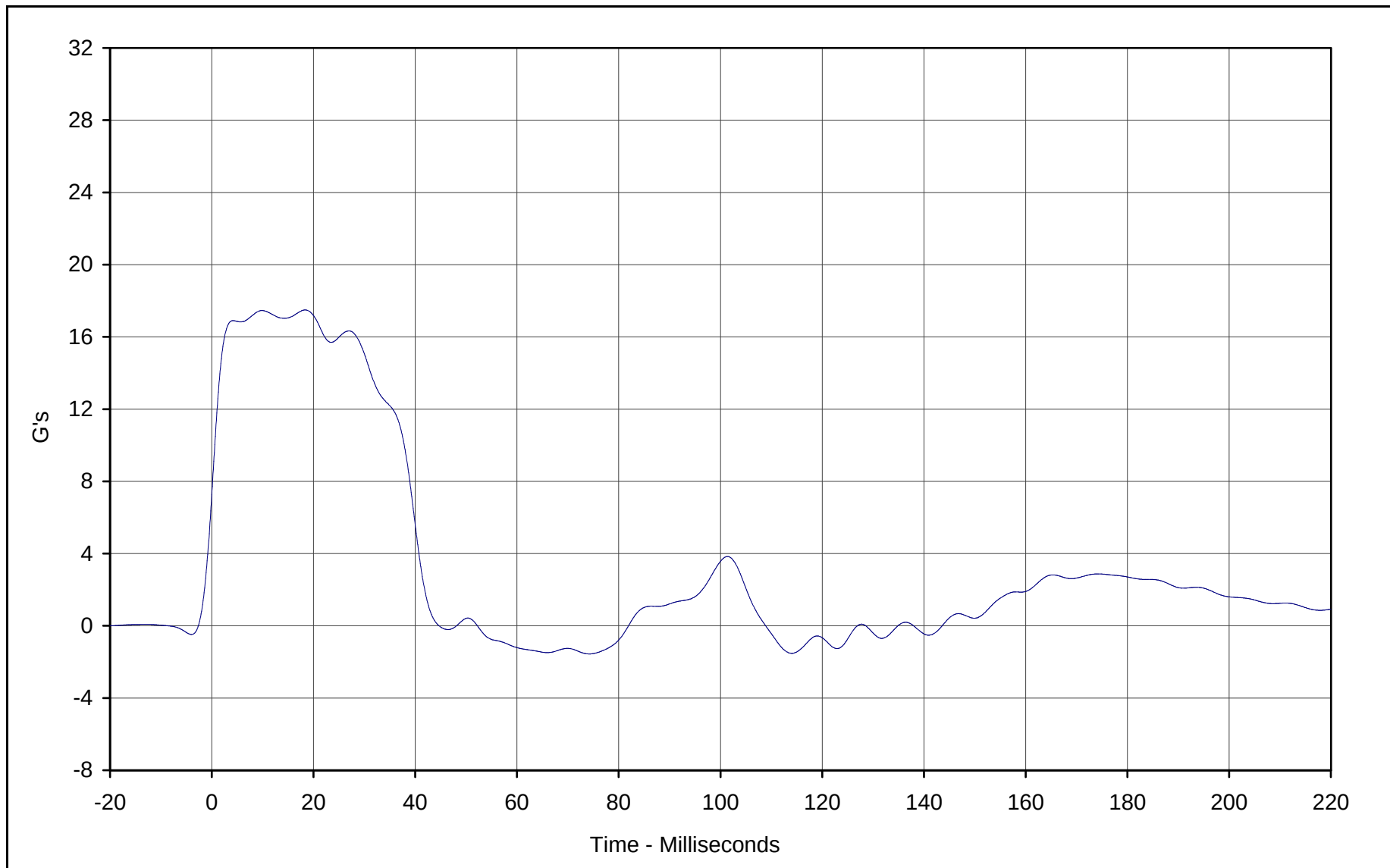
Test I.D.: NE11B

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.10	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.5	Pass
	20 Msec.	G's	14.0 to 19.0	17.2	Pass
	30 Msec.	G's	11.0 to 16.0	15.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	40.3	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	97.2	Pass
	Time	Msec.	72.0 to 82.0	75.1	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	154.0	Pass
Moment About Occipital Condyle	Maximum	N•m	-52.9 to- 79.9	-75.2	Pass
	Time	Msec.	65.0 to 79.0	66.4	Pass
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	136.2	Pass
Overall Test Results					Pass

Laboratory Technician

November 27, 2001

Test Date



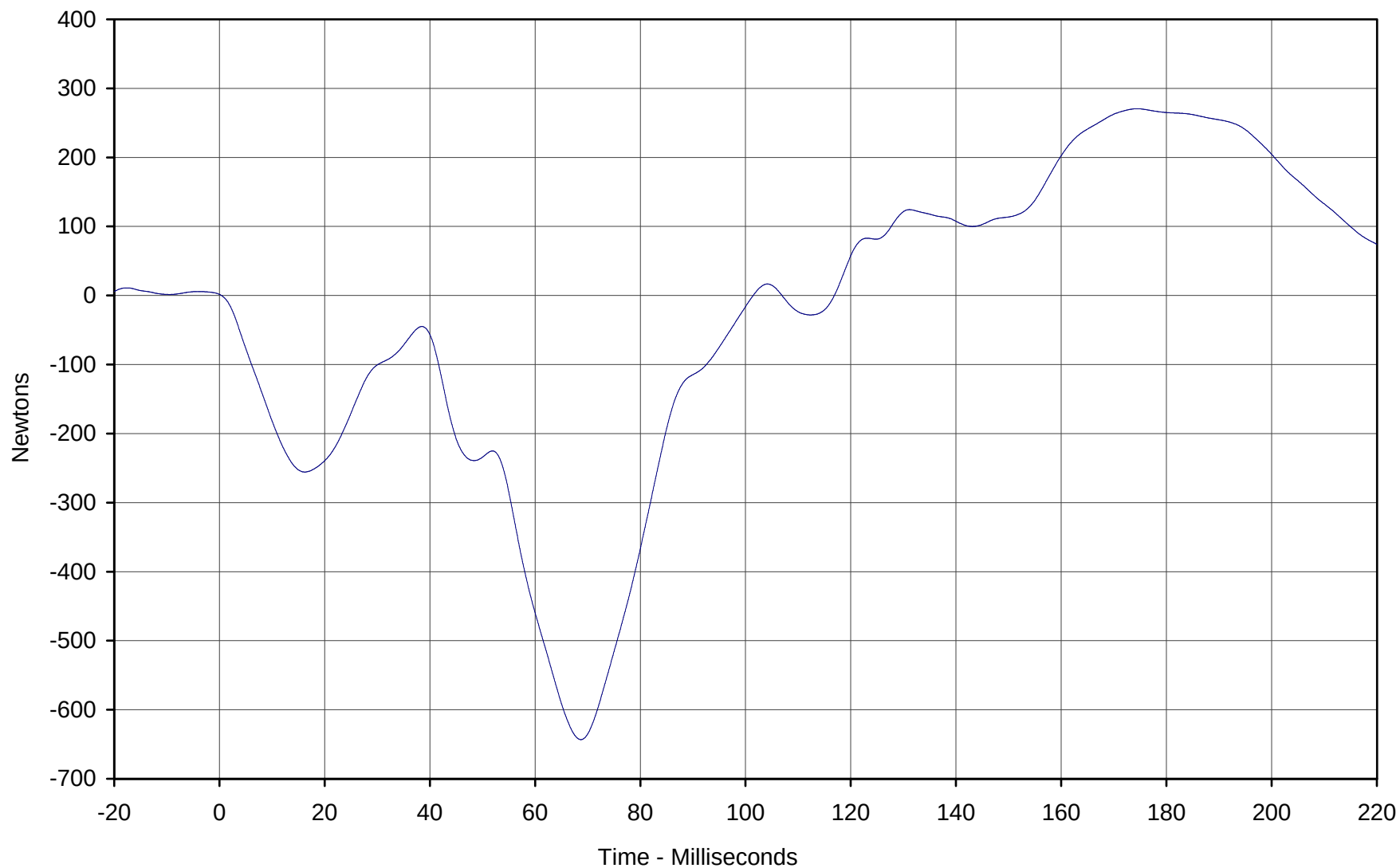
Curve Description:	Pendulum Deceleration		
Maximum Value:	17.5	at	18.3 Milliseconds
Minimum Value:	-1.6	at	74.2 Milliseconds
SAE Filter Class:	60		
Date of Test:	11/27/01		
ATD Serial No.:	035		

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE11B



E-35



Curve Description: Neck Force X

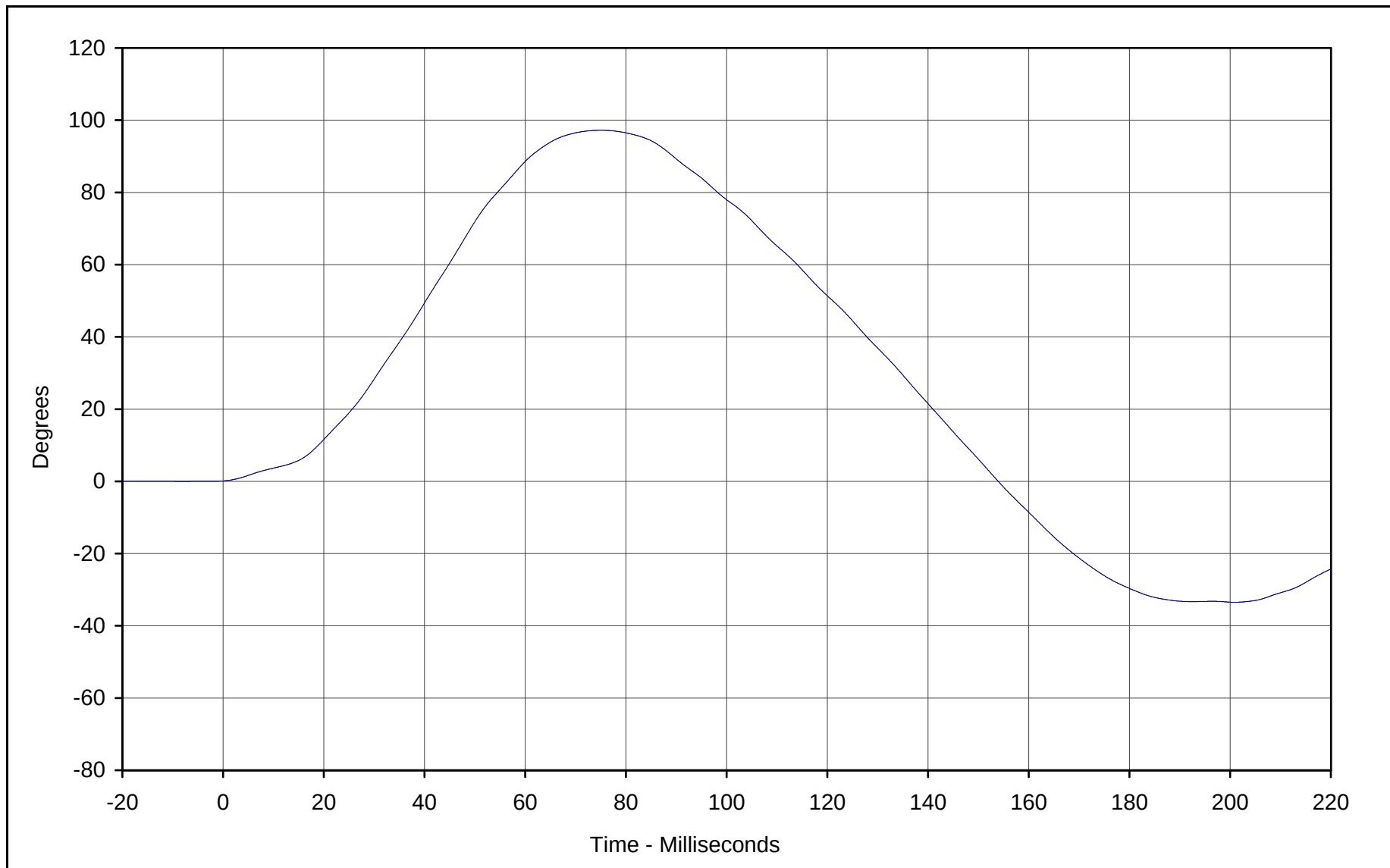
Maximum Value:	270.5	at	174.4	Milliseconds
Minimum Value:	-643.3	at	68.7	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE11B



KAR21129-01



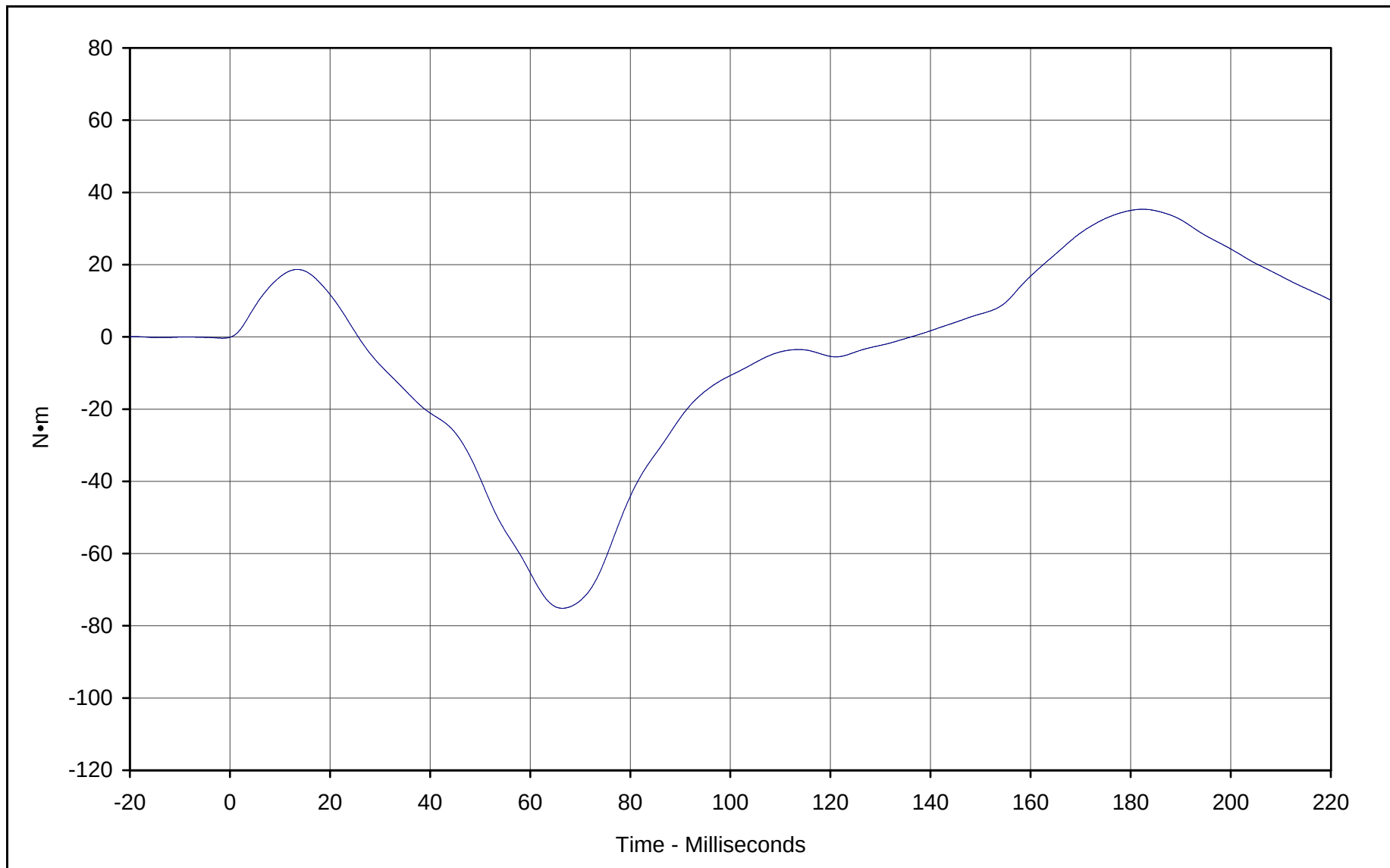
Curve Description: "D" Plane Rotation

Maximum Value:	97.2	at	75.1	Milliseconds
Minimum Value:	-33.5	at	200.9	Milliseconds
SAE Filter Class:	60			
Date of Test:	11/27/01			
ATD Serial No.:	035			

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE11B





Curve Description: Moment About Occipital Condyles

Maximum Value: 35.3 at 182.4 Milliseconds

Minimum Value: -75.2 at 66.4 Milliseconds

SAE Filter Class: 60

Date of Test: 11/27/01

ATD Serial No.: 035

Testing Program: Hybrid III Neck Extension Test (Male)

Test Information: S/N of Part: N/A Test I.D.: NE11B





Hybrid III Calibration Data Sheet

50TH Percentile Male

External Measurements

ATD Serial No.: 035

Part Serial No.: N/A

Test I.D.: N/A

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	20.9	Pass
Laboratory relative humidity	%	10 to 70	43	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	135	Pass
E - Shoulder pivot from back	mm	84 to 94	85	Pass
F - Thigh clearance	mm	140 to 155	150	Pass
G - Elbow back to wrist pivot	mm	290 to 305	295	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	210	Pass
K - Buttock to knee length	mm	579 to 604	590	Pass
L - Popliteal length	mm	429 to 455	435	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	460	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	265	Pass
V - Shoulder breadth	mm	422 to 437	430	Pass
W - Foot breadth	mm	91 to 107	100	Pass
Y - Chest circumference	mm	970 to 1001	990	Pass
Z - Waist circumference	mm	836 to 866	850	Pass
AA - Location for chest circumference	mm	429 to 434	430	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Laboratory Technician

December 3, 2001

Test Date

APPENDIX F

VEHICLE OWNER'S MANUAL

OCCUPANT RESTRAINT INSTRUCTIONS

Seats

⚠ WARNING - Drivers

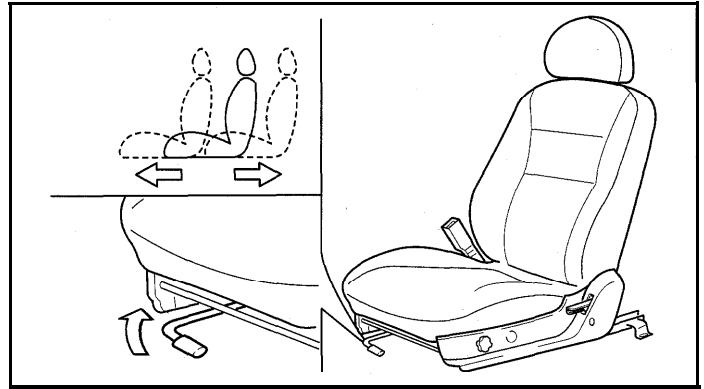
- Never adjust the driver's seat or seatback when the vehicle is moving. Doing so could cause loss of control, and serious personal injury or death.
- Do not allow packages or other objects to interfere with the normal position of a seatback. These objects may prevent the seatback from locking, which could result in serious injury or death in the event of a sudden stop or collision.
- Always drive and ride with your seatback upright and the lap portion of the safety belt snug and low across the hips.
- If a child is riding in the front passenger seat, they should always ride with the seatback in the fully upright position.

A WARNING - Passengers

To reduce the risk of sliding under the lap portion of the lap/shoulder belt, and potentially suffering serious personal injury or death in the event of a collision, do not use the front seatback in a reclined position while the vehicle is in motion. If a seat is reclined, the occupant's hip could slide under or out of the lap portion of the lap/shoulder belt during a collision. If that occurs, the occupant may no longer be properly restrained, and the safety belt could apply restraint forces to the unprotected abdomen resulting in serious personal injury or death. Therefore, keep the seatbacks in a comfortably upright position whenever the vehicle is in motion.

Front Seat Adjustment

Moving the Front Seat Forward and Backward (Both Seats)



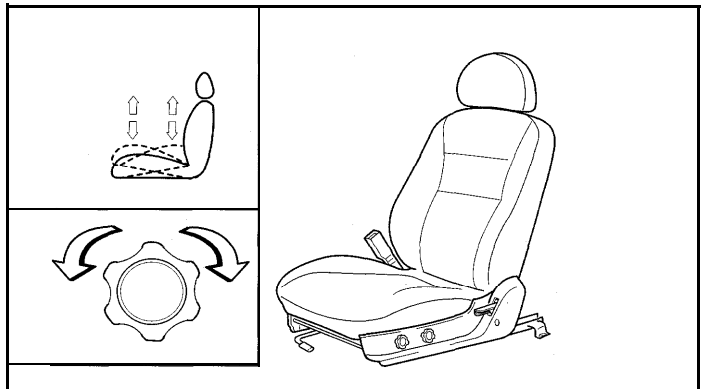
AS2B03011

To move the seat forward or backward;

1. Pull the seat slide adjustment lever under the front edge of the seat cushion up and hold it.
2. Slide the seat to the position you desire.
3. Release the lever and make sure the seat is locked in place.

2-7

Adjusting the Height of Driver's Seat Cushion (Driver's Side-If Equipped)



AS2B04013A

To change the height of the seat cushion, rotate the knob located on the outside of the seat cushion.

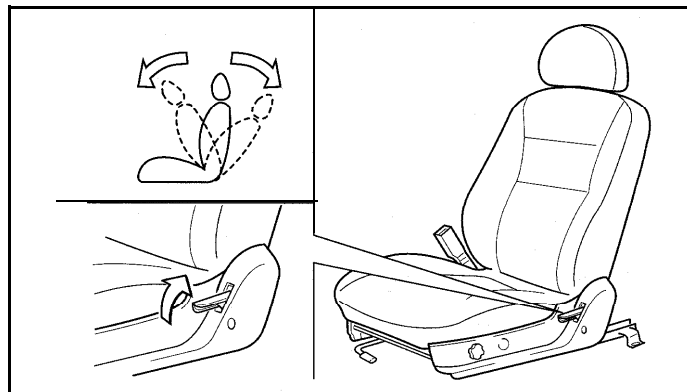
- To lower the seat cushion, rotate the knob toward the front of the vehicle.
- To raise the seat cushion, rotate the knob toward the rear of the vehicle.

Knowing Your Vehicle

CAUTION

Do not place anything under the front seats. Loose objects might interfere with the seat slide mechanism or possibly roll out from under the seat and interfere with the operation of the brake, clutch or accelerator foot pedals.

Adjusting the Front Seatback Recliner (Both Seats)



AS2B03012

To recline the seatback;

1. Lean forward slightly and lift up on the seatback recline lever located on the outside of the seat, toward the rear.
2. Lean back on the seat and adjust the back of the seat to the position you desire.
3. Release the lever and make sure the seatback is located in place. (The lever **MUST** return to its original position for the seatback to lock.)

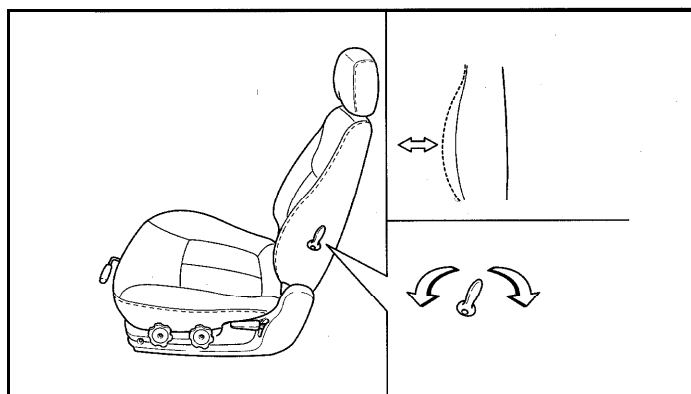
3-8

Knowing Your Vehicle

A WARNING

Before starting the vehicle, adjust the driver's seat and headrest to the proper position. After doing so, you should adjust the day/night rearview mirror and the outside rearview mirror.

Lumbar Support (If Equipped)

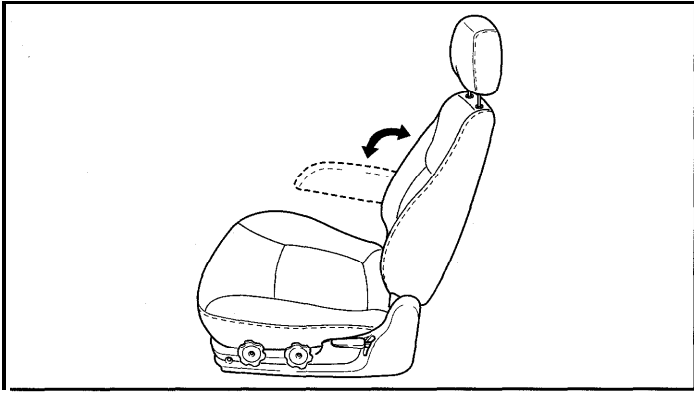


1S4104009A

You can adjust the lumbar support by moving the lever on the side of the driver's seatback. Pivoting the lever toward the front of the vehicle increases the lumbar support. Pivoting the lever toward the rear of the vehicle decreases the lumbar support.

3-10

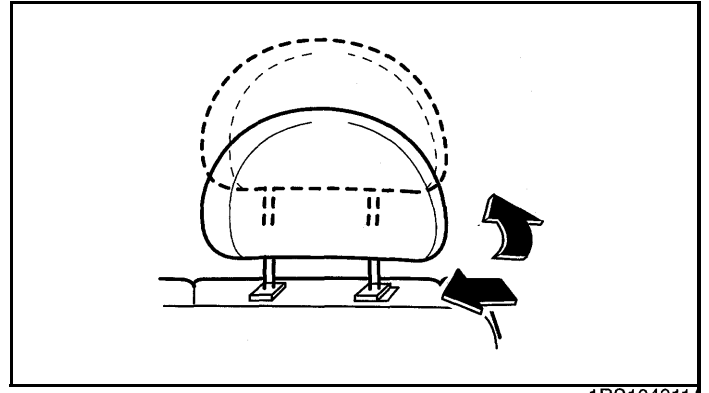
Armrest (If Equipped)



1B3104009

To use the armrest, pull it down from the side of the seatback.

Adjustable Headrest

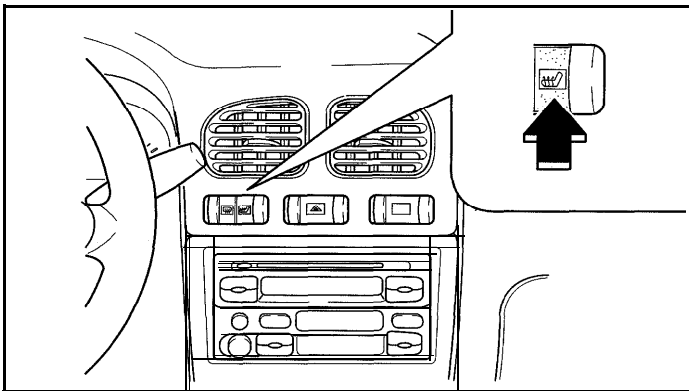


1RS104011A

To raise the headrest, simply pull it up to the desired position. To lower the headrest, press the release lever on the left side grommet, while pushing the headrest down to the desired position. To remove the headrest, raise it as far as it can go then press the release lever while pulling upward.

3-11

Heating the Front Seats (If Equipped)

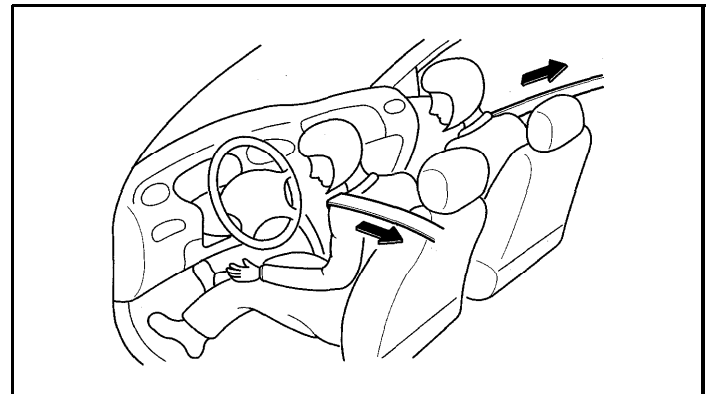


1B310300

The front seats are electrically heated when the switches and the ignition are ON. The thermostat regulates seat temperature by depressing the corresponding switch shown as above. To deactivate the heating system of front seats, depress the corresponding switch once again.

Safety Belts

Pretensioner Seat Belt (If Equipped)



AS2B03105

Your vehicle is equipped with driver's and front passenger's pretensioner seat belts. The purpose of the pre-tensioner is to make sure that the seat belts fit tightly against the occupant's body in certain frontal collisions.

The pre-tensioner seat belts can be activated together with the airbags, where the frontal collision is severe enough.

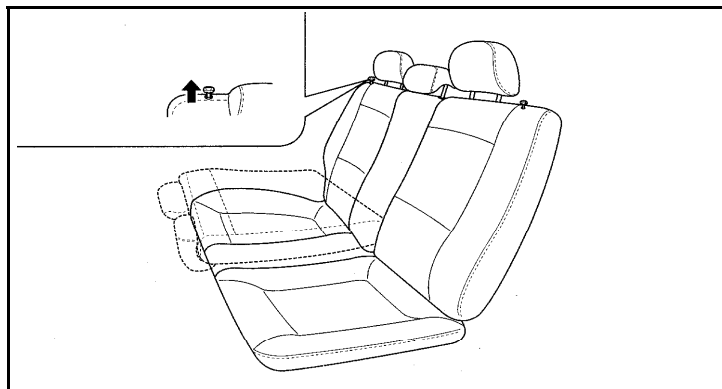
3-15

Knowing Your Vehicle

A WARNING — Headrests

- To reduce the risk of head and neck injuries, do not operate the vehicle with the headrest removed or improperly positioned.
- Do not attempt to adjust the driver's headrest while driving.
- Adjust the top of the headrest so that it is even with the top of your ears in order to reduce the chance of injury in the event of a collision.

Split Folding Rear Seat (If Equipped)

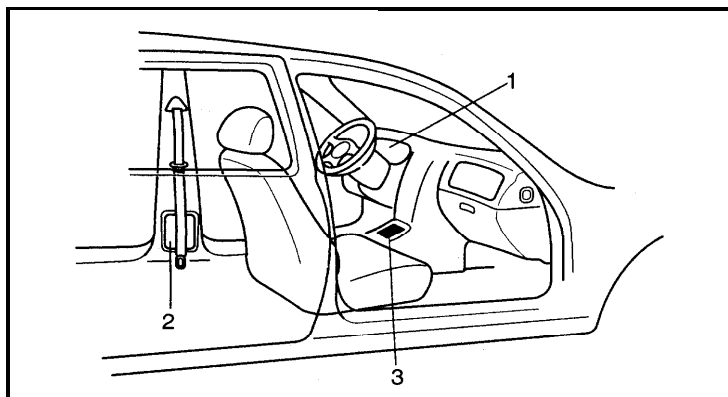


The rear seatbacks fold forward to provide additional cargo space and to provide an access to the trunk area.

- To fold the rear seatback(s) down, pull the unlock knob located in the top of the seatbacks, then fold the seatback forward and down.
- To raise the seatback, lift and push it firmly until it clicks into place.
- When you return the seatback to its original position, reposition the rear safety belts so that they can be used by rear seat passengers.

3-12

Knowing Your Vehicle



The pre-tensioner seat belt operates in the same way as an Emergency Locking Retractor (ELR) type of seat belt. When the ignition switch is in the "ON" position and if the vehicle stops suddenly, or if the occupant tries to lean forward too quickly, the seat belt retractor will lock into position. However, in certain frontal collisions, the pretensioner will activate and pull the seat belt into tighter contact against the occupant's body. The seat belt pre-tensioner system consists mainly of the following components.

Their locations are shown in the illustration.

1. SRS airbag warning light

2. Seatbelt pre-tensioner assembly
3. SRS control module.

A WARNING

To obtain maximum benefit from a pre-tensioner seat belt :

- The seat belt must be worn correctly.
- The seat belt must be adjusted to the correct position.

* NOTICE

- Both the driver's and front passenger's pre-tensioner seat belts will be activated in certain frontal collisions. The pre-tensioner seat belts can be activated, where the frontal collision is severe enough, together with the airbag. The pretensioners will be activated under these conditions even if there is no one on the seat at the time of the collision.
- When the pre-tensioner seat belts are activated, a loud noise may be heard and fine dust, which may appear to be smoke, may be visible in the passenger compartments and they are not hazardous.

(Continued)

3-16

(Continued)

- Although it is harmless, the fine dust may cause skin irritation and should not be breathed for prolonged periods. Wash your hands and face thoroughly after an accident in which the pretensioner seat belts were activated.

CAUTION

- *Because the sensor that activates the SRS air-bag is connected with pre-tensioner seat belt, the SRS airbag warning light  on the instrument panel will illuminate for approximately 6 seconds after the ignition key has been turned to the "ON" position, and then it should be turned off.*
- *If the pre-tensioner seat belt is not working properly, this warning light will illuminate even if there is no malfunction of SRS airbag system. **If** the SRS airbag warning light does not illuminate when the ignition key is turned to "ON", or if it remains illuminated after illuminating for approximately 6 seconds, or if it illuminates while the vehicle is being driven, please have an Authorized Kia Dealer inspect the pre-tensioner seat belt or SRS airbag system as soon as possible.*

A WARNING

- **Pre-tensioners are designed to operate only one time. After activation, pretensioner seat belts must be replaced. All seat belts, of any type, should always be replaced after they have been worn during a collision.**
- **The Pre-tensioner seat belt assembly mechanisms become hot during activation. Do not touch the pretensioner seat belt assemblies for several minutes after they have been activated.**
- **Do not attempt to inspect or replace the pre-tensioner seat belts yourself. This must be done by an authorized Kia dealer.**
- **Do not strike the pre-tensioner seat belt assemblies.**
- **Do not attempt to service or repair the pre-tensioner seat belt system in any manner.**

(Continued)

3-17

To help you remember to fasten your safety belt, a warning light may come on and a chime may sound. See Safety Belt Warning on page 4-27.

All seats, except the center rear seat, have lap / shoulder belts. The center rear seat has a lap belt.

Inertial locks in the safety belt retractors allow all of the lap / shoulder safety belts to remain unlocked during normal vehicle operation. This allows the occupants some freedom of movement and increased comfort while using the safety belts. If a force is applied to the vehicle, such as a strong stop, a sharp turn, or a collision, the safety belt retractors will automatically lock the safety belts.

Since the inertial locks do not require a collision in order to lock-up, you may become aware of the safety belts locking while braking or going around sharp corners .

The center rear seat safety belt does not have an inertial lock so it is always in a locked condition. Whenever possible, use the center rear seat position to install your child restraint. The center rear seat is the best position to install your child restraint. However, if the center seat is unavailable, a child restraint may be installed in the front passenger seat or in the rear outboard seats using the special auto lock mode feature provided with the safety belt.

The front passenger safety belt and rear outboard safety belts have been designed to allow a child restraint to be used in these positions without an added locking clip. These safety belts normally lock only under extreme or emergency conditions (this is the emergency lock mode which uses the locking retractor). However, they can be adjusted so that they remain fixed and locked when a child restraint is placed in those positions (this auto lock mode should only be used to secure a child restraint). See page 3-26 for instructions on how to place the safety belt in the auto lock mode.

The driver's safety belt can only operate in the emergency lock mode.

A WARNING -Twisted Safety Belts
Never drive or ride with a twisted or jammed safety belt. If you cannot untwist or unjam the safety belt, see your Kia dealer or the nearest qualified technician immediately.

3-19

Knowing Your Vehicle

(Continued)

- Improper handling of the pre-tensioner seat belt assemblies, and failure to heed the warnings not to strike, modify, inspect, replace, service or repair the pretensioner seat belt assemblies may lead to improper operation or inadvertent activation and serious injury.

Always wear the seat belts when driving or riding in a motor vehicle.

Safety Belt Restraint System

A WARNING

The driver and all passengers should always use the safety belts provided in order to minimize the risk of severe bodily injury.

We strongly recommend that the driver and all passengers be properly restrained at all times by using the safety belts provided with the vehicle. Proper use of the safety belts decreases the risk of severe injury or death in accidents or sudden stops. In most states and in Canada, the law requires their use.

Safety belts provide the best restraint when:

- the seatback is upright
- the occupant is sitting upright (not slouched)
- the lap belt portion of the safety belt is snug and low on the hips
- the shoulder belt portion of the safety belt is snug against the chest
- the knees are straight forward

3-18

Knowing Your Vehicle

⚠ WARNING -Safety Belt Usage

Each seating position in your vehicle has a specific safety belt assembly which includes a buckle and tongue that are designed to be used together. 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 to fit over the inside shoulder. 3) Never use a single belt for more than one person.

⚠ WARNING - After a Collision

- Lap/shoulder belt assemblies may be stretched or damaged when subjected to the stress and forces of a collision.

A safety belt must be replaced if any part of the “Replace Belt” label is visible. You won’t see this label unless your restraint system has been heavily loaded in a collision. This “Replace Belt” label shown in the picture in the next column, is located on the front belts near the door opening.

The entire restraint system should be inspected following any collision. All belts, retractors, anchors and hardware damaged by a collision should be replaced before the vehicle is operated again.

3-20



AS2603054

⚠ WARNING - Safety Belt Care

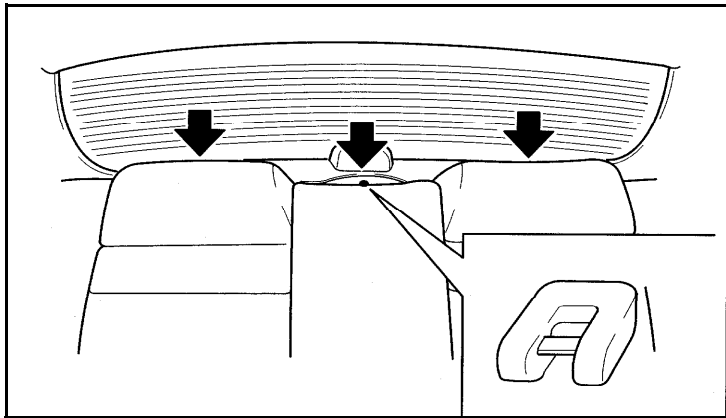
- Safety belts should be inspected periodically for excessive wear or damage. Pull out each belt fully and look for excessive fraying, cuts, burns or other damage. Make sure that the lap/shoulder belts return smoothly and easily into the retractor. Check the latches to make sure they latch and release without interference or delay. Any belt not in good condition or in good working order should be promptly replaced.

⚠ CAUTION - Damage to Safety Belts

Never close the doors on any part of the lap or shoulder belt. It can damage the safety belt or buckle which could increase the risk of injury in case of an accident.

3-21

Child Restraint Anchorage Position (If Equipped)



AS2B03062A

The child restraint anchor fittings are installed on the shelf behind the rear seat.

A WARNING - Child Restraint Anchor Fitting

- Infants and small children should be restrained at all times in an approved child restraint designed for your vehicle.
- Child restraint anchorage is designed to withstand only those loads imposed by correctly fitted child restraints. Under no circumstances are they to be used for adult seat belts or harnesses or for attaching other items or equipment to the vehicle.
- The standard 30 mm bolt and spacers provided with the child restraint **MUST NOT** be used. Additional non-standard bolt and spacers may be obtained from an Authorized Kia Dealer.
- Check that the child restraint system is secured by pushing and pulling it in different directions. Incorrectly fitted child restraint may swing, twist, tip or come away causing death or injury.

3-31

Knowing Your Vehicle

Restraint of Pregnant Women

Pregnant women should wear lap/shoulder belt assemblies whenever possible according to specific recommendations by their doctors. The lap portion of the belt should be worn AS SNUGLY AND AS LOW AS POSSIBLE.

**WARNING - Pregnant women**
Pregnant women must never place the lap portion of the safety belt over the area of the abdomen where the fetus is located or above the abdomen.

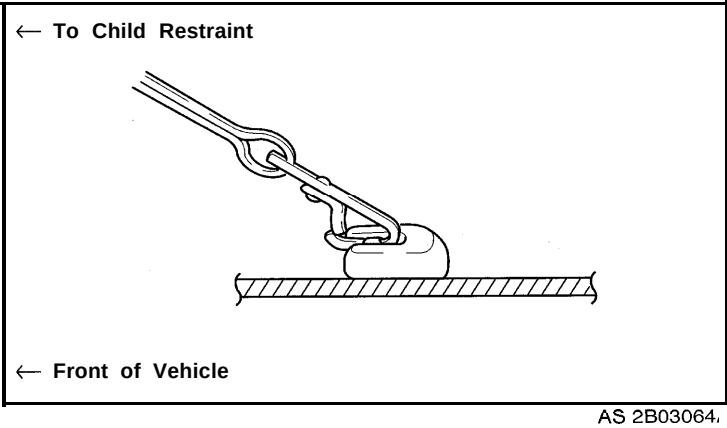
Restraint of Infants and Small Children

Small children and infants should be restrained by an approved child restraint system to help protect them while riding in a vehicle.
Never allow a child to stand or kneel on the seat of a moving vehicle. Never allow a safety belt to be placed around both a child and an adult or around two children at the same time.

**WARNING - Children on Laps**
Never hold a child on your lap or in your arms in a moving vehicle. Even a very strong person cannot hold onto a child in the event of even a minor collision.

Knowing Your Vehicle

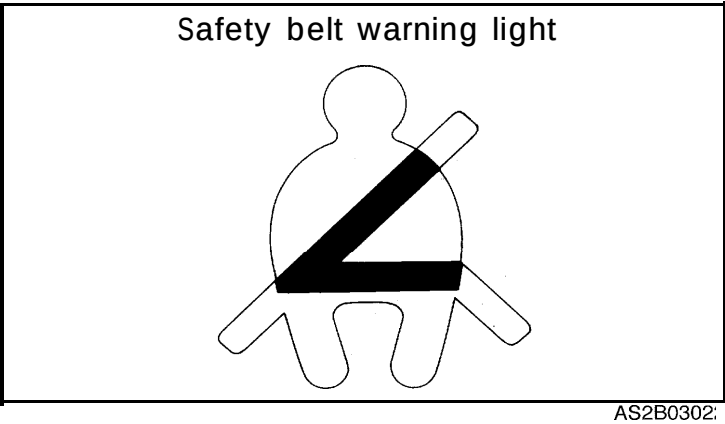
Placement of a child restraint System (If Equipped)



To install the child restraint on the rear seat, use the anchorage fitting located on the shelf behind the rear seat.

Safety Belt Warning Light and Chime

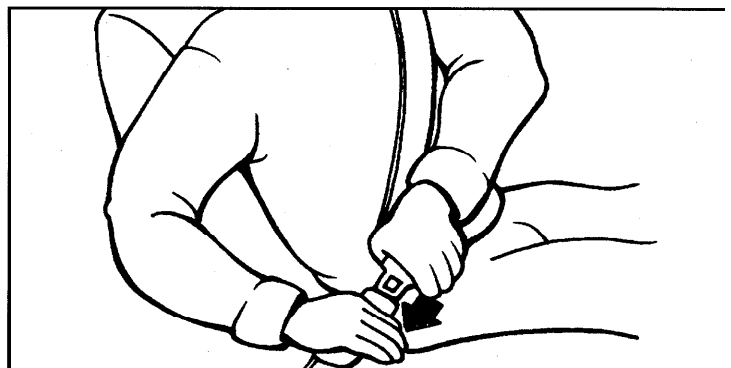
If the driver's lap / shoulder belt is not fastened when the key is turned ON, the safety belt warning chime sounds for approximately six seconds and the safety belt warning light illuminates for approximately six seconds.



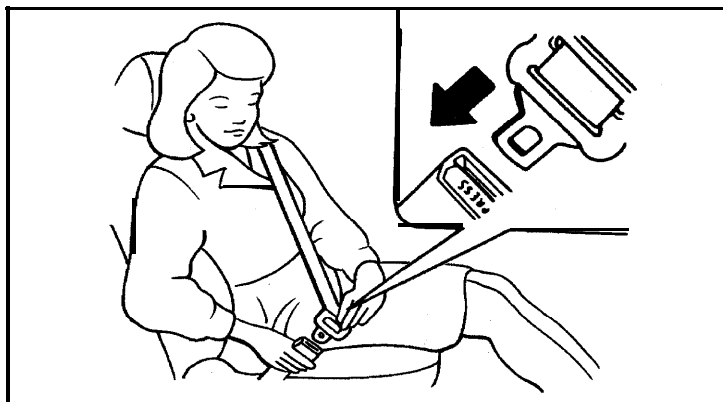
Front Lap/Shoulder Belt

To fasten the front lap/shoulder belt:

1. Grasp the buckle and tongue plate.
2. Slowly pull the lap/shoulder belt out from the retractor.



AS2B03023



AS2B0302

3. Insert the tongue plate into the open end of the buckle until an audible “click” is heard, indicating the belt is locked in the buckle.

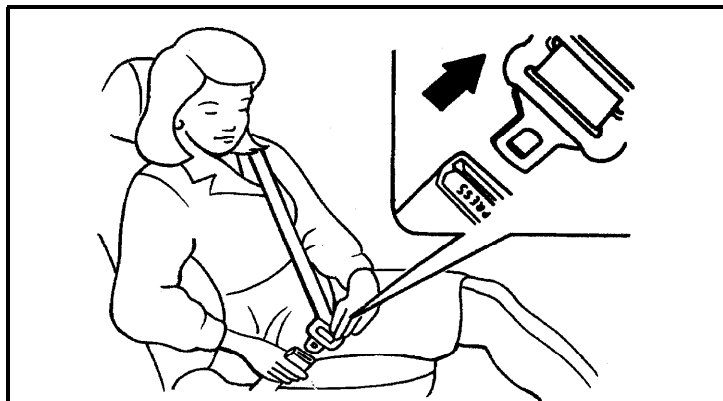
3-33

⚠ WARNING - Front Safety Belts

- The front seatbacks should always remain in a comfortable, upright position while the vehicle is in motion. The safety belt system will provide the most protection with the seatbacks in an upright position.
- Never wear the shoulder portion of the safety belt under the outside arm or behind the back.
- Never wear the shoulder portion of the safety belt across the neck or face.
- Wear the lap portion of the safety belt as low on the hips as possible. Be sure the lap belt fits snugly around the hips. Never wear the lap belt over your waist.
- Never drive or ride with a twisted or jammed safety belt. If you cannot untwist or unjam the safety belt, see the nearest Kia dealer or qualified technician immediately.
- Never use a single belt to restrain more than one person at a time.

Failure to follow these warnings will increase the risk and severity of injury in an accident.

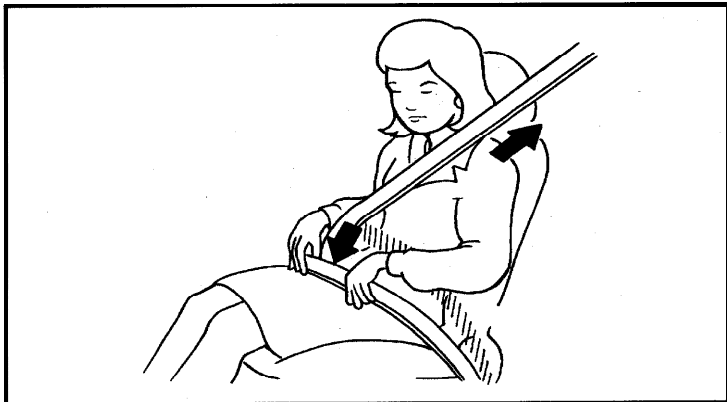
To Unfasten the Front Lap/Shoulder Belt:
Press the release button on the buckle.



AS2B03027

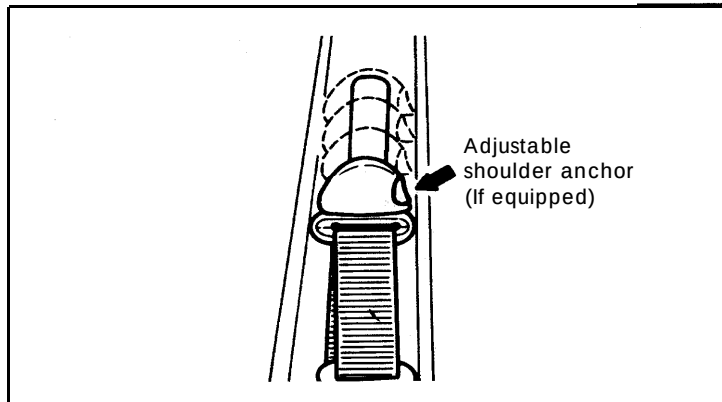
3-35

Knowing Your Vehicle



AS2B03025

4. Position the lap portion of the belt across your lap as **LOW ON THE HIPS** as possible to reduce the risk of sliding under it during an accident. Adjust the belt to a **SNUG FIT** by pulling up on the shoulder portion of the safety belt. The belt retractor applies tension to the belt in order to take up excess webbing automatically and to maintain tension on the belt. For maximum safety, do not put any excess slack into the safety belt.



136-07010

5. Adjust the shoulder anchor position to your size. To raise the anchor position, pull the knob and push the anchor up. To lower the anchor position, pull the knob and slide the anchor down. After adjustment, make sure the anchor is locked in position.

3-34

Knowing Your Vehicle

Rear Safety Belts

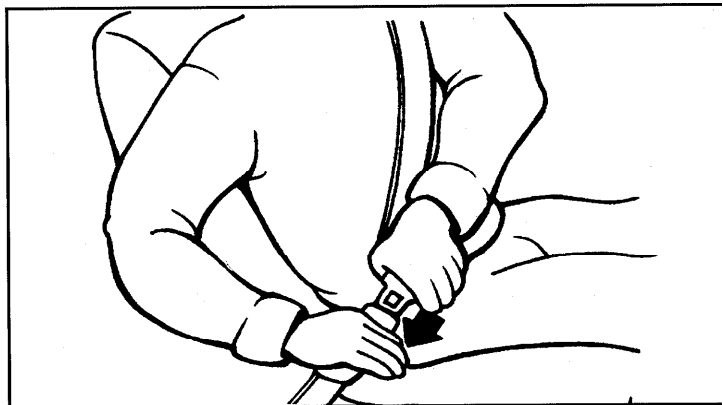
Two kinds of safety belts are provided:

- Lap/shoulder belts for people who sit on the out-board sides of the vehicle.
- A lap belt for people who sit in the center of the rear seat.

Rear Lap/Shoulder Belt

To Fasten:

1. Grasp the buckle with one hand and the tongue plate with the other.
2. Slowly pull the lap/shoulder belt out.



AS2B0302

3. Insert the tongue plate into the open end of the buckle until an audible "click" is heard, indicating the belt is locked.
4. Position the lap portion of the belt across your lap as **LOW ON THE HIPS** as possible to reduce the risk of sliding under it during an accident.

3-36