

REPORT NUMBER KAR20051-04

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**HYUNDAI MOTOR CORPORATION
2001 HYUNDAI ELANTRA
4 DOOR SEDAN
NHTSA NUMBER: HYU002**

**PREPARED BY:
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ADELANTO, CALIFORNIA 92301**



DECEMBER 15, 2000

FINAL REPORT

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16. Abstract A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2001 Hyundai Elantra in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering laboratories in Adelanto, California, on December 8, 2000. The impact velocity of the Moving Deformable Barrier was 61.91 km/h, and the outside ambient temperature at the struck (drivers) side of the vehicle was 18.3°C. The target vehicle's maximum post test static crush was 330 mm located at level 2. The test vehicle's occupant performance is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 40%;">Measurement Description</th> <th style="width: 30%;">Driver SID</th> <th style="width: 30%;">Passenger SID</th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) G's</td> <td style="text-align: center;">62.2</td> <td style="text-align: center;">68.8</td> </tr> <tr> <td>Left Lower Rib (LLR) G's</td> <td style="text-align: center;">47.5</td> <td style="text-align: center;">69.3</td> </tr> <tr> <td>Lower Spine (T₁₂) G's</td> <td style="text-align: center;">51.2</td> <td style="text-align: center;">69.1</td> </tr> <tr> <td>Thoracic Trauma Index (TTI) G's</td> <td style="text-align: center;">57</td> <td style="text-align: center;">69</td> </tr> <tr> <td>Pelvis (PEV) G's</td> <td style="text-align: center;">96</td> <td style="text-align: center;">93</td> </tr> </tbody> </table>				Measurement Description	Driver SID	Passenger SID	Left Upper Rib (LUR) G's	62.2	68.8	Left Lower Rib (LLR) G's	47.5	69.3	Lower Spine (T ₁₂) G's	51.2	69.1	Thoracic Trauma Index (TTI) G's	57	69	Pelvis (PEV) G's	96	93
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SECTION 1

PURPOSE and TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test is conducted as part of the FY' 2001 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-99-D-02041. The purpose of this test is to generate comparative side impact data on a 2001 Hyundai Elantra manufactured by Hyundai Motor Corporation.

1.2 TEST PROCEDURE

The side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Crashworthiness Standards (OCS), laboratory test procedure NCAP Side Impact Testing, dated July 1997 and the corresponding KARCO Engineering Test Procedure KTP-214D, dated November 18, 1998. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT NCAP TEST

A model year 2001 Hyundai Elantra was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.91 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1484 kg. and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering in Adelanto, California, on December 8, 2000.

One (1) real-time motion picture camera and ten (10) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and SID can be found in Appendix A. Two 50th percentile adult male Side Impact Dummy's (SID's) were placed in the driver's and left rear passenger designated seating positions according to the test procedure. Each SID is instrumented with contact switches on the pelvis and thorax, and eleven accelerometers in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y, and Z axes)

The test vehicle was instrumented with twenty-five (25) structural accelerometers and the MDB was instrumented with five (5) accelerometers and a one (1) contact switch on the right bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board Test Data Acquisition System (TDAS). The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 330 mm at level 2, 1350mm rearward of the left vertical impact point. The driver SID, Serial No. 275 and the passenger SID, Serial No. 274 were calibrated just prior to this test. The SID injury criteria is summarized as follows:

Measurement	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	57	69
Peak Pelvic G's (PEV)	G's	96	93

Tests summaries and post-test observations are presented in Section 3. The vehicle, camera, and occupant measurements are presented in Section 4. Appendix A contains the still photograph prints. Appendix B contains the driver and passenger SID's, vehicle, and MDB response data traces. Appendix C contains the SID's Configuration and performance verification data. Appendix D contains the test equipment information.

SECTION 3
SIDE IMPACT DUMMY (SID) AND VEHICLE TEST DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
 Test Program: 55/28 km/h 90° Side Impact NCAP

NHTSA No.: HYU002
 Test Date: 12/08/00

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
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

TEST VEHICLE INFORMATION

Make	Hyundai
Model	Elantra
Body Style	4 Door Sedan
NHTSA No.	HYU002
VIN	KMHDN45DG1V060294
Color	Champagne
Delivery Date	11/28/00
Odometer Reading (mile)	68
Dealer	Metro Hyundai
Transmission	5-Speed Manual
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2
Engine Placement	Transverse

TEST VEHICLE OPTIONS

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Corporation	GVWR (kg)	1740
Date of Manufacture	October-00	GAWR Front (kg)	939
		GAWR Rear (kg)	839

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	210
Cold Pressure (kPa)	210	210
Recommend Tire Size	195/60/R15	195/60/R15
Tire Size on Vehicle	195/60/R15	195/60/R15
Tire Manufacturer	Michellin	Michellin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				458
Cargo Weight (RCLW) (kg)				45

DATA SHEET NO. 1...(continued)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
 Test Program: 55/28 km/h 90° Side Impact NCAP

NHTSA No.: HYU002
 Test Date: 12/08/00

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	388	250		432	325	
Right	kg	402	242		426	301	
Ratio	%	61.6	38.4		57.8	42.2	
Totals	kg	790	492	1282	858	626	1484

TARGET TEST WEIGHT CALCULATION*

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1282
Weight of 2 P572F Side Impact Dummies	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	45
Calculated Vehicle Target Weight (TVTW)	kg	1489

*Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	681	688	674	676	1002
As Tested	mm	664	675	632	641	1102
Fully Loaded	mm	665	682	631	642	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel base	mm	2612
Total Vehicle Length at Left Side	mm	3277
Total Vehicle Length at Centerline	mm	4510
Total Vehicle Length at Right Side	mm	3280
Weight of Ballast In Cargo Area	kg	26
Amount of Stoddard Solvent in Fuel Tank	Liters	51.0

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel base	mm	2612
Target Impact Point Aft of Front Axle	mm	366
Actual Impact Point Aft of Front Axle	mm	373

DATA SHEET NO. 1...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

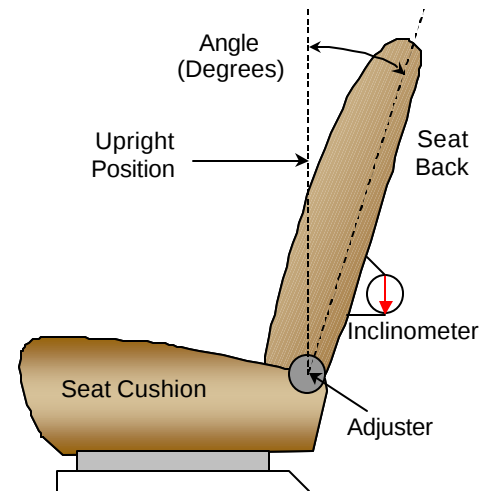
Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

NOMINAL DESIGN RIDING POSITION

The driver's seat back is positioned to the manufacturers designated angle. The procedure for the seat is as follows:

A slit is cut into fabric of the seat at the outboard edge, approximately 10-13 inches above the pivot point to expose the frame of the seat. An inclinometer is firmly placed against the flat portion of the frame surface and the seat back is adjusted to the manufacturers designated angle. The rear passenger seatback is fixed; no adjustments can be made.



FRONT SEAT ASSEMBLY

Driver seat back angle: 22.5° with a seated dummy

Rear seat back angle: 23° at headrest, fixed

SEAT FORE/AFT POSITIONS

The driver's seat is manually operated and the rear passenger seat has no adjustments. The fore/aft is set to the middle position for the driver's seat.

Driver seat fore/aft total travel: 25 seat positions

Rear seat fore/aft total travel: Fixed, no adjustment

Driver seat fore/aft position: Seat set at the 13th detent

Rear seat fore/aft position: Fixed, no adjustment

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with an adjustable "D" ring anchorage for the driver's seat position. There is 4 positions or detents. The driver's "D" ring anchorage is placed in position 3. The rear seat anchor is fixed, no adjustments.

DATA SHEET NO. 1...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

FUEL TANK CAPACITY DATA

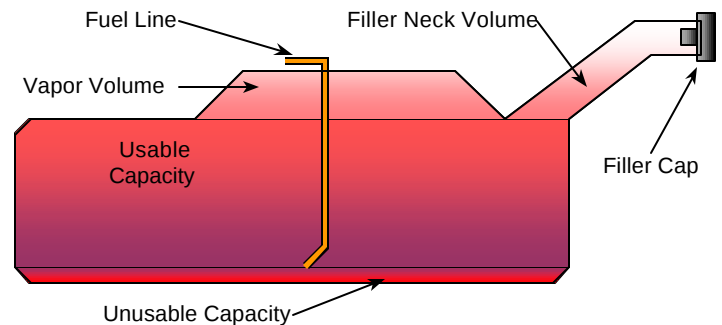
The "Usable Capacity" of the standard equipment fuel tank is: 54.8 liters

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

92-94% of "Usable Capacity" for certification to FMVSS 301 requirement: 50.4 to 51.5 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 51.0 liters

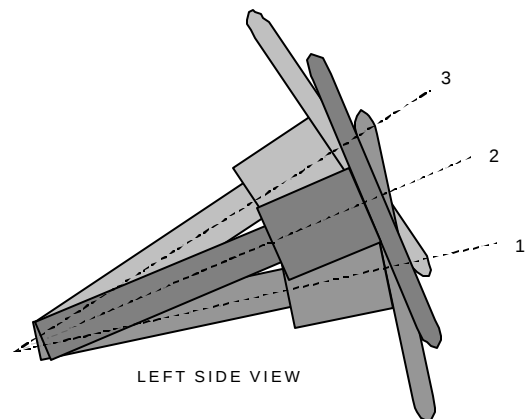
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately three (3) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 19°

Geometric center, position 2: 21.5°

Uppermost, position 3: 24°

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
Test Program: 55/28 km/h 90° Side Impact NCAP

NHTSA No.: HYU002
Test Date: 12/08/00

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	388	250		432	325	
Right	kg	402	242		426	301	
Weight Ratio	%	61.6	38.4		57.8	42.2	
Totals	kg	790	492	1282	858	626	1484

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	178	261
Level 2	Occupant H-Point	mm	330	460
Level 3	Mid Door	mm	317	584
Level 4	Window Sill	mm	272	888
Level 5	Window Top	mm	98	1342
N/A	Maximum Penetration	mm	330	

INSTRUMENTATION

Driver SID Accelerometers	11
Passenger SID Accelerometers	11
Vehicle Structure Accelerometers	25
MDB Accelerometers	5
Total	52

16mm MOVIE COVERAGE

High Speed, Vehicle On-Board	3
High Speed, Off-Board	5
High Speed, MDB On-Board	2
Real Time, Panning	1
Total	11

DATA SHEET NO. 3
MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
 Test Program: 55/28 km/h 90° Side Impact NCAP

NHTSA No.: HYU002
 Test Date: 12/08/00

MDB SPECIFICATIONS (mm)

Measurement Description	Length
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2590
C.G. Location aft of Front Axle	1127

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	384	308	
Right	kg	385	284	
Ratio	%	56.5	43.5	
Totals	kg	769	592	1361

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.91
Trap No. 2 Velocity (Redn.)	km/h	61.1 to 62.7	62.71
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE (mm)

Vertical Location			From Centerline		Max Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	161
B	Top of Bumper	533	800	Right	102
C	Mid Level	686	800	Right	157
D	Top of Stack	813	800	Right	194

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High Speed Cameras	2

DATA SHEET NO. 4
POST TEST OBSERVATIONS

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
Test Program: 55/28 km/h 90° Side Impact NCAP

NHTSA No.: HYU002
Test Date: 12/08/00

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID	Rear Seat SID
Dummy Type / Serial No.	P572F, SID / No. 275	P572F, SID / No. 274
Head Contact	Air Bag/Headrest	C-Pillar/Headrest
Upper Torso Contact	Airbag/Door Panel	Door Panel
Lower Torso Contact	Door Panel	Door Panel/Seat
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Knee/Steering column	Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Remained closed/Inoperable	Remained closed/Inoperable
Right Side Door Opening	Remained closed/Operable	Remained closed/Operable
Seat Movement	None	None
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Pillars pushed inward with no apparent failure
Sill Separation	No Apparent Visible Failure
Windshield Damage	Glazing Cracks on Struck Side Only
Window Damage	Both left side windows were broken
Other Notable Effects	No significant items to note

AIR BAG DEPLOYMENT

	Driver	Front Passenger	Rear Passenger
Front	No	No	N/A
Side	Yes	N/A	N/A

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	7 (right)
Vertical Offset	mm	+/- 20	5 (above)

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5
SID INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

THORAX AND PELVIS PEAK ACCELERATIONS, PRIMARY (FIR 100 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	62.2	39.7	-32.0	19.2	68.8	42.6	-5.7	87.2
Lower Rib (LLR)	Y	G's	47.5	14.6	-19.3	19.6	69.3	42.8	-21.0	66.6
Lower Spine (T ₁₂)	Y	G's	51.2	29.9	-11.2	64.5	69.1	44.8	-30.4	70.1
Pelvis (PEV)	Y	G's	95.5	28.5	-8.0	76.7	92.7	36.0	-6.1	82.7

THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION, PRIMARY (FIR 100 Filtered)

Location	Driver				Passenger			
	LUR	T ₁₂	TTI(g)	PEV(g)	LLR	T ₁₂	TTI(g)	PEV(g)
Primary Rib, Spine, and Pelvis	62.187	51.163	57	95	69.317	69.083	69	93

THORAX AND PELVIS PEAK ACCELERATIONS, REDUNDANT (FIR 100 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	62.3	39.6	-28.1	19.2	68.4	42.5	-5.9	87.1
Lower Rib (LLR)	Y	G's	47.1	14.6	-17.0	19.6	69.2	42.8	-19.4	66.5
Lower Spine (T ₁₂)	Y	G's	50.6	35.5	-11.4	64.3	69.6	45.1	-30.2	70.0
Pelvis (PEV)	Y	G's	95.8	28.4	-8.5	77.1	92.7	35.9	-5.1	86.2

THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION, REDUNDANT (FIR 100 Filtered)

Location	Driver				Passenger			
	LUR	T ₁₂	TTI(g)	PEV(g)	LLR	T ₁₂	TTI(g)	PEV(g)
Redundant Rib, Spine, and Pelvis	62.261	50.621	56	96	69.236	69.649	69	93

HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	8.5	162.4	-21.1	76.6	4.7	187.3	-20.6	71.3
Head CG	Y	G's	28.3	50.5	-9.6	149.7	99.3	51.9	-8.1	41.6
Head CG	Z	G's	35.1	53.3	-2.0	22.5	35.4	48.3	-42.7	56.1
Head CG Resultant	N/A	G's	45.2	51.8			99.7	52.0		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

Location	Driver				Passenger			
	HIC	T ¹	T ²	Avg G	HIC	T ¹	T ²	Avg G
Head CG	192.4	42.7	78.6	31.0	539.9	47.9	57.2	80.1

Positive Acceleration Polarities: Longitudinal (X) = Forward
 (Conforms to SAE J211) Lateral (Y) = Right
 Vertical (Z) = Down

DATA SHEET NO. 6

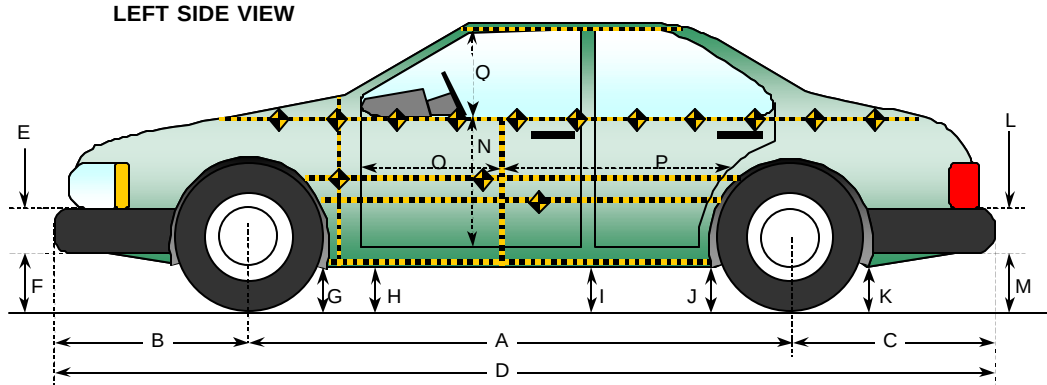
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00



All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2612	2592	20
B	Front Axle To FSOV	905	927	-22
C	Rear Axle to RSOV	987	982	5
D	Total Length at Centerline	4510	4500	10
E	Front Bumper Thickness	355	355	0
F	Front Bumper Bottom to Ground	209	232	-23
G	Sill Height at Front Wheel Well	187	226	-39
H	Sill Height at Front Door Leading Edge	187	243	-56
I	Sill Height at "B" Pillar	196	290	-94
J1	Sill Height at Rear Wheel Well	161	210	-49
J2	Pinch Weld Height at Rear Wheel Well	185	245	-60
K	Sill Height aft of Rear Wheel Well	245	305	-60
L	Rear Bumper Thickness	309	309	0
M	Rear Bumper Bottom to Ground	261	325	-64
N	Sill Height to Window Bottom Sill	594	575	19
O	Front Door Leading Edge to Impact CL	753	723	30
P	Rear Door Trailing Edge to Impact CL	1295	1240	55
Q	Front Window Opening	400	375	25
R	Right Side Length	3280	3296	-16
S	Left Side Length	3277	3240	37
T	Vehicle Width at "B" Post	1722	1576	146

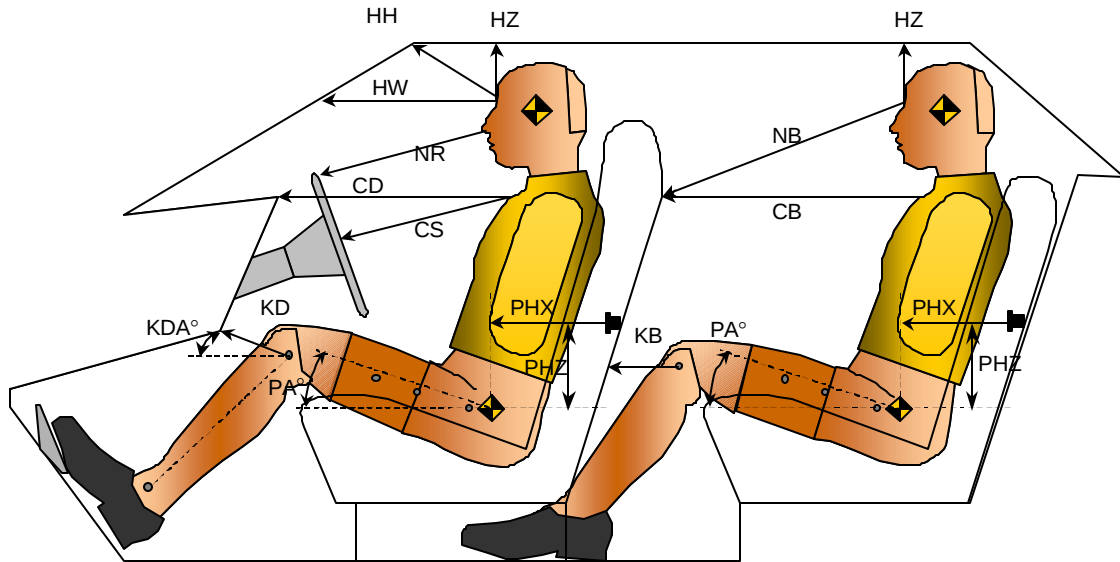
DATA SHEET NO. 7
SID LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00



Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	190	90		
HW		Head to Windshield	580			
HZ	HZ	Head to Roof	190	90	180	
NR	NB	Nose to Rim/Nose to Seatback	360	18	626	90
CD	CB	Chest to Dash or Seatback	560	4	528	17
CS		Chest to Steering Wheel	340	21		
KDL	KBL	Left Knee to Dash or Seatback	165	20	200	
KDR	KBR	Right Knee to Dash or Seatback	155		196	
PA	PA	Pelvic Angle		23		36
PHX	PHX	H-Point to Striker (X-Axis)	220		305	
PHZ	PHZ	H-Point to Striker (Z-Axis)	146		297	

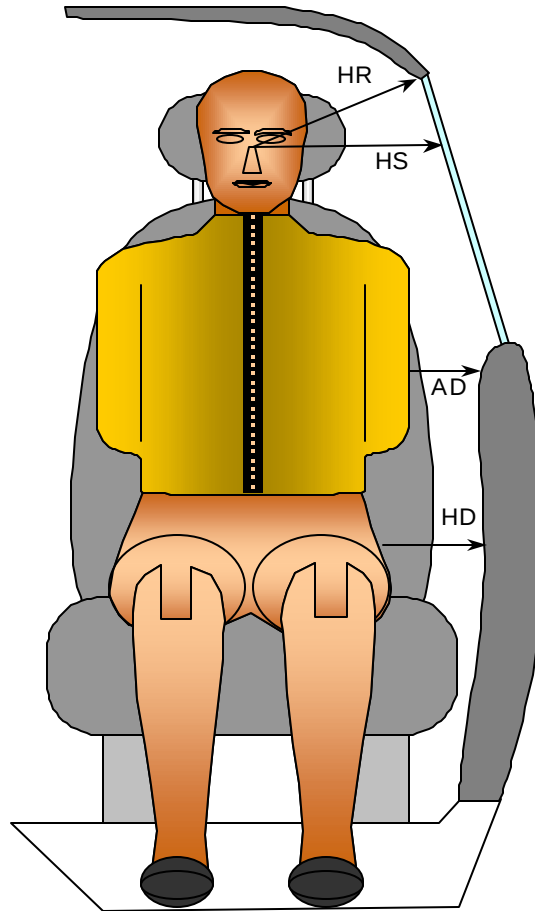
DATA SHEET NO. 8
SID LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00



FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	246	266
HS	Head to Side Window	mm	362	360
AD	Arm to Door	mm	128	129
HD	H-Point to Door	mm	147	195

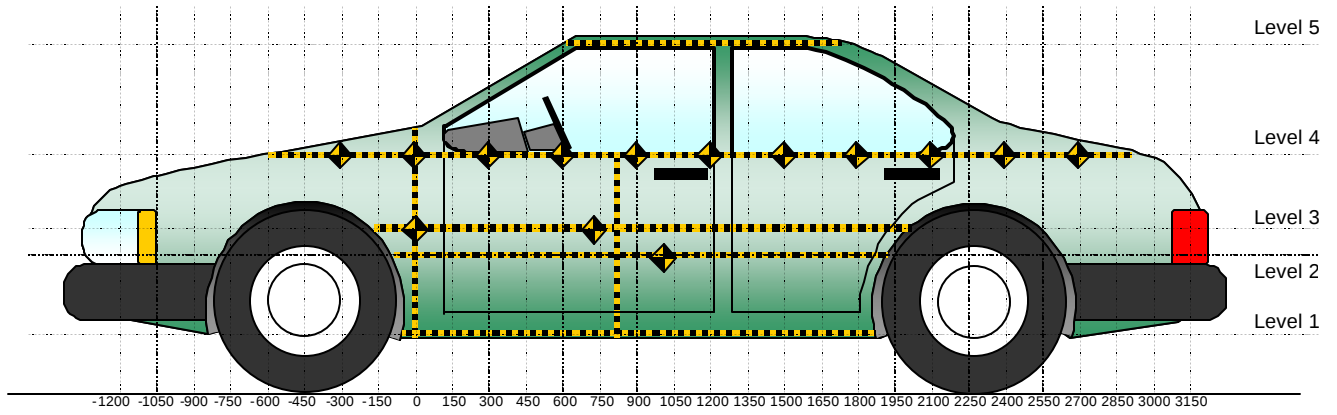
DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.

Measurements taken 900mm right of impact reference.

All measurements below in mm.

Level	Measurement Description	Height Above Ground
5	Window Top	1342
4	Window Sill	888
3	Mid Door	584
2	Occupant H-Point	460
1	Sill Top	261

DATA SHEET NO. 10 - VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
 Test Program: 55/28 km/h 90° Side Impact NCAP

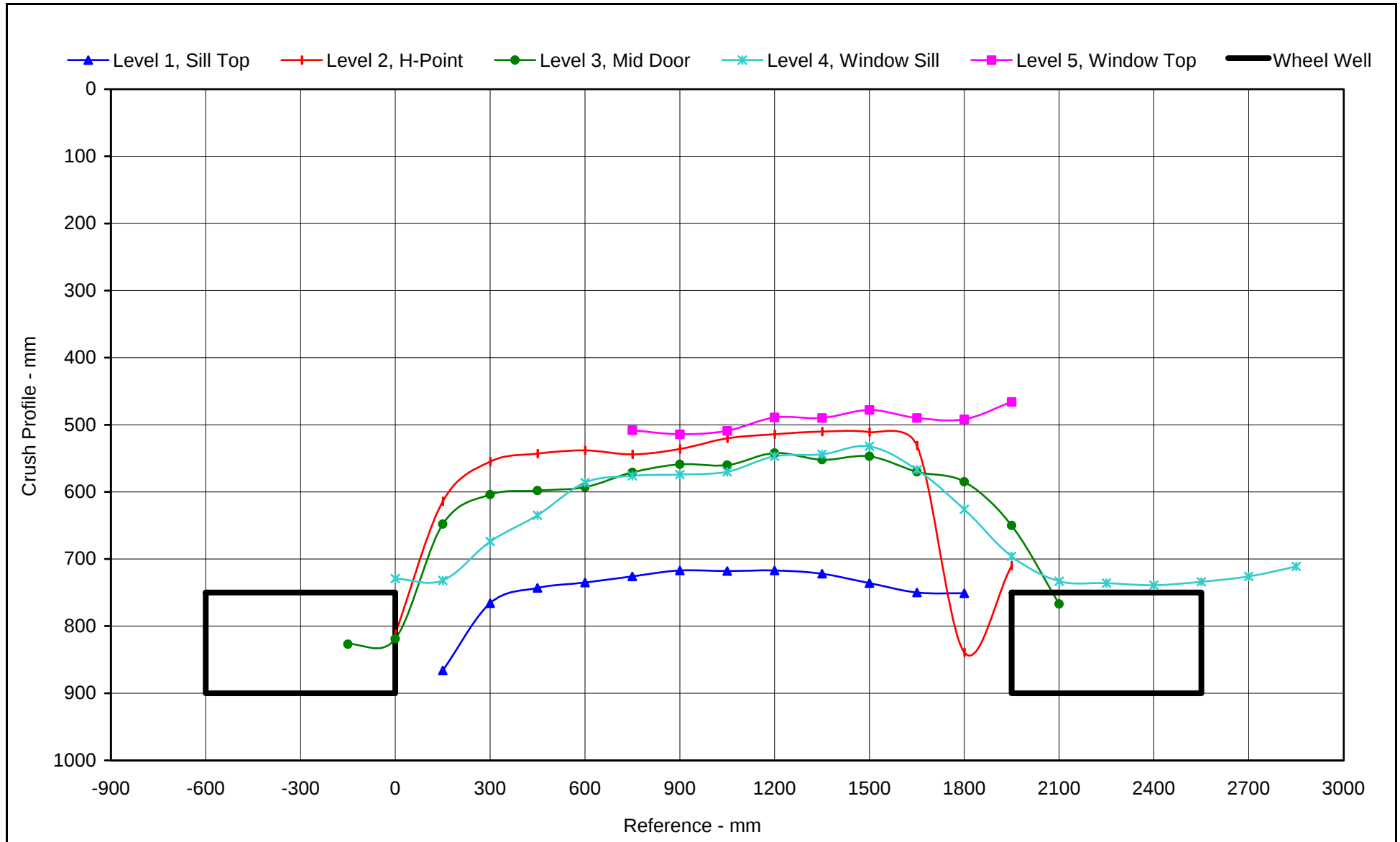
NHTSA No.: HYU002
 Test Date: 12/8/00

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			867					827					40		
0		841	866	762			812	819	729			29	47	33	
150	899	845	862	781		866	614	648	732		33	231	214	49	
300	897	844	861	784		766	555	604	674		131	289	257	110	
450	897	844	861	789		743	543	598	635		154	301	263	154	
600	896	845	861	794		735	538	593	586		161	307	268	208	
750	897	841	861	797	559	726	544	571	576	508	171	297	290	221	51
900	895	840	861	799	574	717	536	559	574	514	178	304	302	225	60
1050	895	841	861	801	577	718	520	560	570	509	177	321	301	231	68
1200	894	840	859	801	579	717	514	542	547	489	177	326	317	254	90
1350	893	840	859	804	574	722	510	552	544	490	171	330	307	260	84
1500	893	840	858	804	576	736	511	547	532	478	157	329	311	272	98
1650	894	840	857	804	572	750	531	570	567	490	144	309	287	237	82
1800	894	841	856	804	561	751	839	585	626	492	143	2	271	178	69
1950		843	855	804	529		710	650	696	466		133	205	108	63
2100			857	799				767	733				90	66	
2250				792					736					56	
2400				784					739					45	
2550				767					734					33	
2700				749					726					23	
2850				709					711					-2	
3000															

Pre-Test and Post-Test dimensions are actual distance from centerline of test vehicle.

DATA SHEET NO. 10...(continued)

18



Maximum Crush, Level 1: 178 mm at 900 mm
 Maximum Crush, Level 2: 330 mm at 1350 mm
 Maximum Crush, Level 3: 317 mm at 1200 mm
 Maximum Crush, Level 4: 272 mm at 1500 mm
 Maximum Crush, Level 5: 98 mm at 1500 mm

Test Program: 55/28 km/h 90° Side Impact NCAP No.: HYU002
 Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
 Test Date: 12/08/00



KAR20051-04

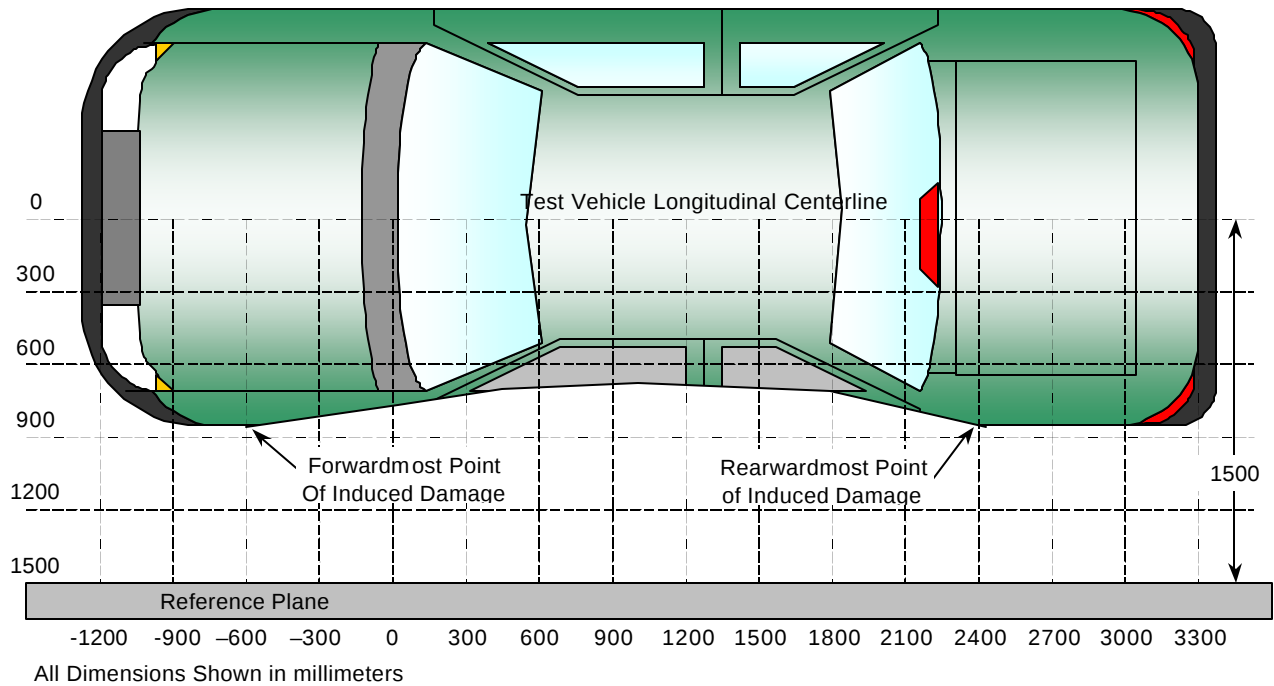
DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00



TOP VIEW

Damage Profile Distances

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	-150	3	867	827	40
2	450	2	844	543	301
3	1050	2	841	520	321
4	1650	2	840	531	309
5	2250	4	792	736	56
6	2700	4	749	726	23

Pre-Test and Post-Test measurements are distance from vehicle centerline.

DATA SHEET NO. 12

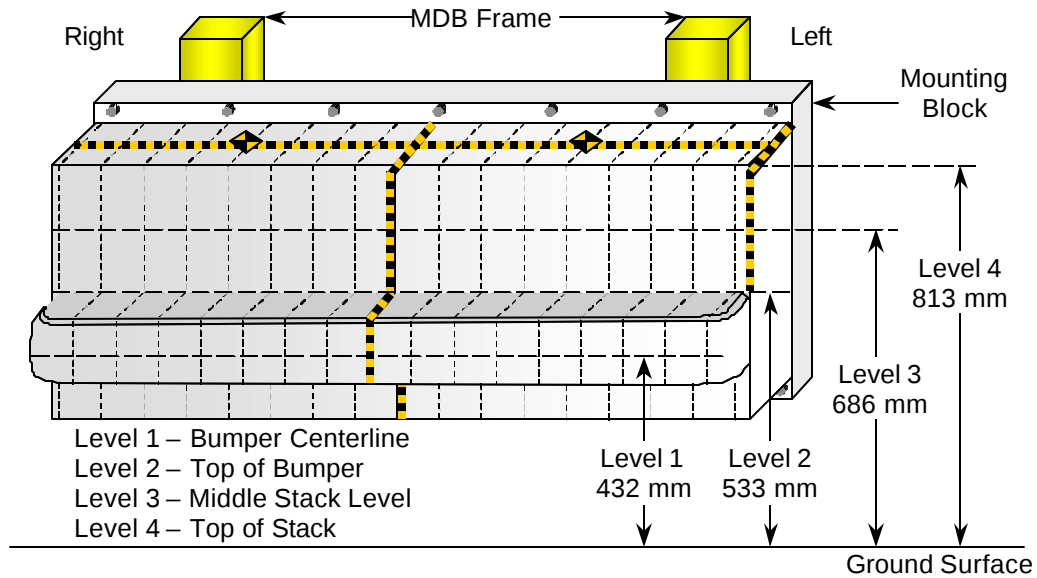
DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00



DEFORMABLE BARRIER STATIC CRUSH

Stack	Distance Right of Center								C _L	Distance Left of Center							
Level	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	110	82	66	61	66	76	77	83	84	88	94	100	105	110	116	134	161
2	52	40	28	18	19	26	27	28	32	44	53	62	66	73	76	88	102
3	70	27	-1	-8	-6	8	21	11	5	9	11	14	23	31	50	90	157
4	55	19	-9	-12	-4	18	26	12	4	8	9	14	26	52	86	133	194

All Dimensions in mm

DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

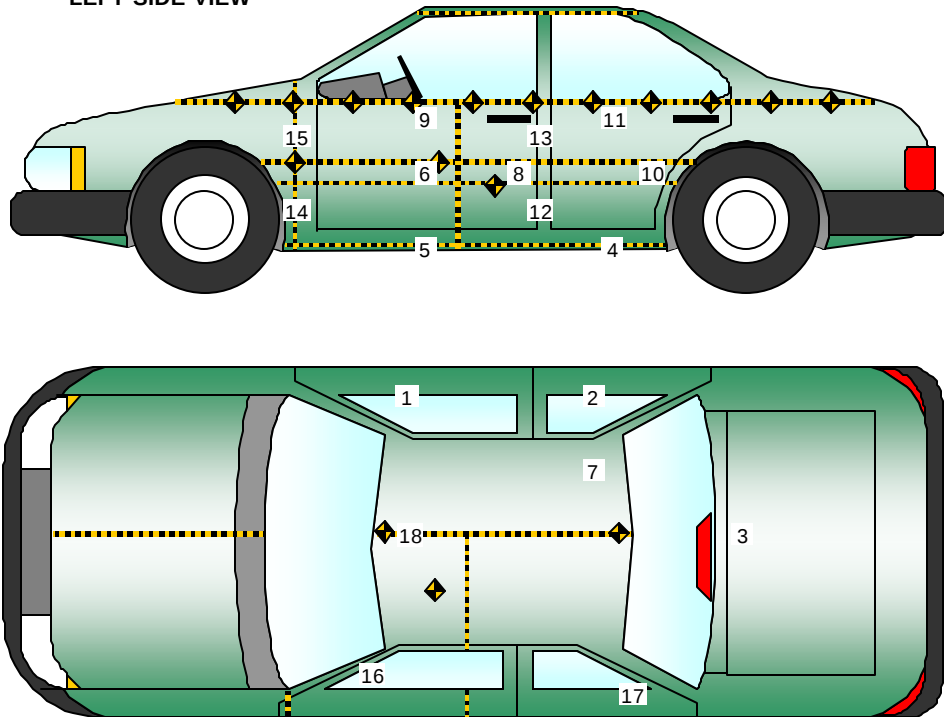
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

LEFT SIDE VIEW



No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Door
5	Left Sill at Front Door
6	Left Front Door Centerline
7	Right Rear Occupant Compartment
8	Left Front Door Mid-Rear
9	Left Front Door Upper Centerline

No.	Location
10	Left Rear Door Mid-Rear
11	Left Rear Door Upper Centerline
12	Left Lower B-Post
13	Left Middle B-Post
14	Left Lower A-Post
15	Left Middle A-Post
16	Front Seat Track
17	Rear Seat Track or Structure
18	Vehicle CG

DATA SHEET NO. 13
VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	Right Sill at Front Seat	2535	695	335	X	5.5	58.1	-6.9	14.0
					Y	20.4	6.1	-2.5	134.8
					Z	6.6	25.9	-4.8	8.5
					RES	20.6	6.1		
2	Right Sill at Rear Seat	1780	690	335	X	6.3	60.5	-6.3	14.6
					Y	24.9	7.0	-2.8	109.3
					Z	7.4	23.0	-3.5	10.3
					RES	25.1	7.0		
3	Rear Floorpan Above Axle	1005	135	480	X	7.1	26.5	-8.9	16.3
					Y	26.3	21.7	-3.0	112.7
					Z	14.5	38.9	-19.0	25.1
					RES	28.1	22.1		
4	Left Sill at Rear Door	1710	-600	210	Y	34.5	17.2	-4.3	55.4
5	Left Sill at Front Door	2445	-600	180	Y	36.3	18.2	-4.8	55.7
6	Front Door Centerline	2490	-730	815	Y	204.2	9.4	-178.8	23.5
7	Rear Occupant Compartment	2005	360	225	Y	25.1	6.8	-2.9	105.8
8	Front Door Mid-Rear	2145	-720	675	Y	124.7	6.4	-64.7	24.0
9	Front Door Upper Centerline	2440	-735	660	Y	111.2	18.4	-109.0	24.6
10	Rear Door Mid-Rear	1290	-740	675	Y	88.7	6.2	-56.8	30.1
11	Rear Door Upper Centerline	1515	-735	830	Y	186.4	18.1	-99.7	29.8
12	B-Post Lower	2050	-705	530	Y	241.0	4.5	-88.1	17.2
13	B-Post Middle	2050	-705	775	Y	157.2	5.0	-39.5	27.6
14	A-Post Lower	3090	-795	480	Y	148.3	3.2	0.0	10.4 *
15	A-Post Middle	3090	-795	735	Y	71.6	2.3	-10.8	16.8
16	Front Seat Track	2605	-585	35	Y	38.8	18.8	-19.4	23.4
17	Rear Seat Structure				Y				**
18	Vehicle CG	1930	0	335	X	4.0	60.3	-12.4	8.7
					Y	38.0	18.9	-2.1	137.0
					Z	25.4	9.0	-17.3	17.8
					RES	40.7	18.7		

* Channel failed at 10.4 Msec.

** Not installed

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

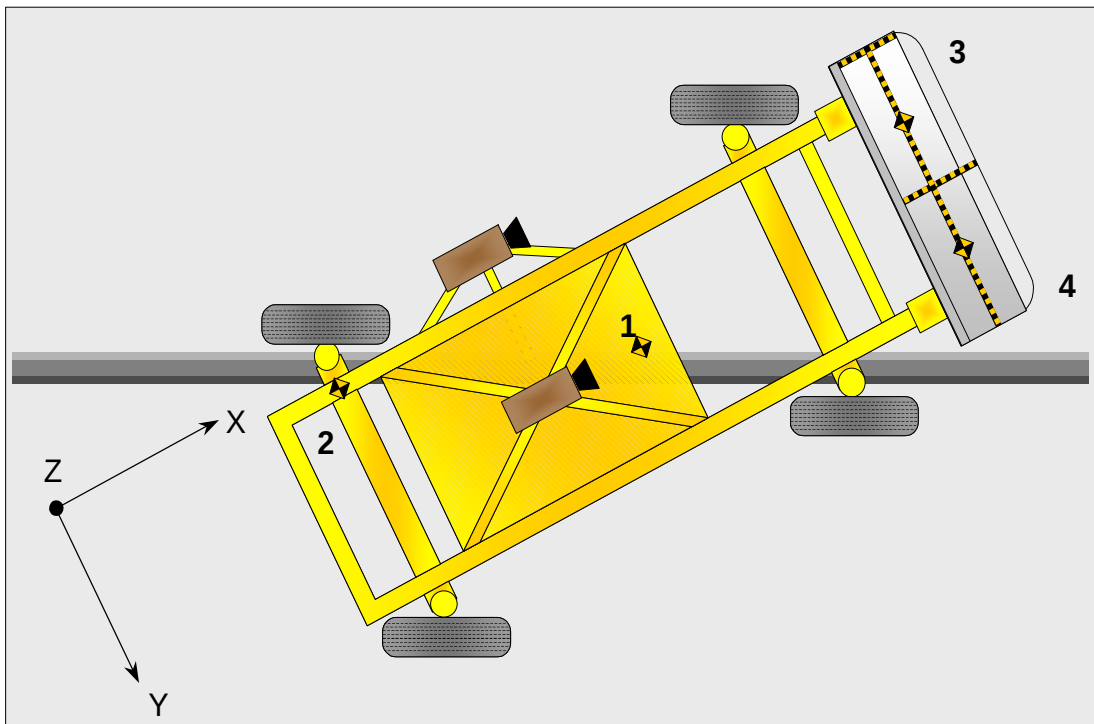
MDB ACCELEROMETER PEAK DATA AND LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	MDB CG	-1195	0	430	X	2.5	111.2	-20.1	42.2
					Y	2.8	56.2	-8.5	25.6
					Z	11.4	20.5	-12.3	26.6
					RES	22.2	42.6		
2	MDB Rear	-2642	-593	608	X	2.4	104.7	-22.6	35.2
					Y	2.2	56.5	-7.5	22.4

Reference Points X - MDB Front Axle Y - MDB Centerline Z - Ground Plane

MDB BUMPER CONTACT SWITCH DATA

Loc. No.	Contact Switch Location	Units	Peak and 50% Crossing Point			
			Max	Time	50%	Time
3	MDB Left Bumper (T=0)	% F.S	100.0	0.0	0.0	0.0
4	MDB Right Bumper	% F.S.	105.2	5.2	52.6	-0.6



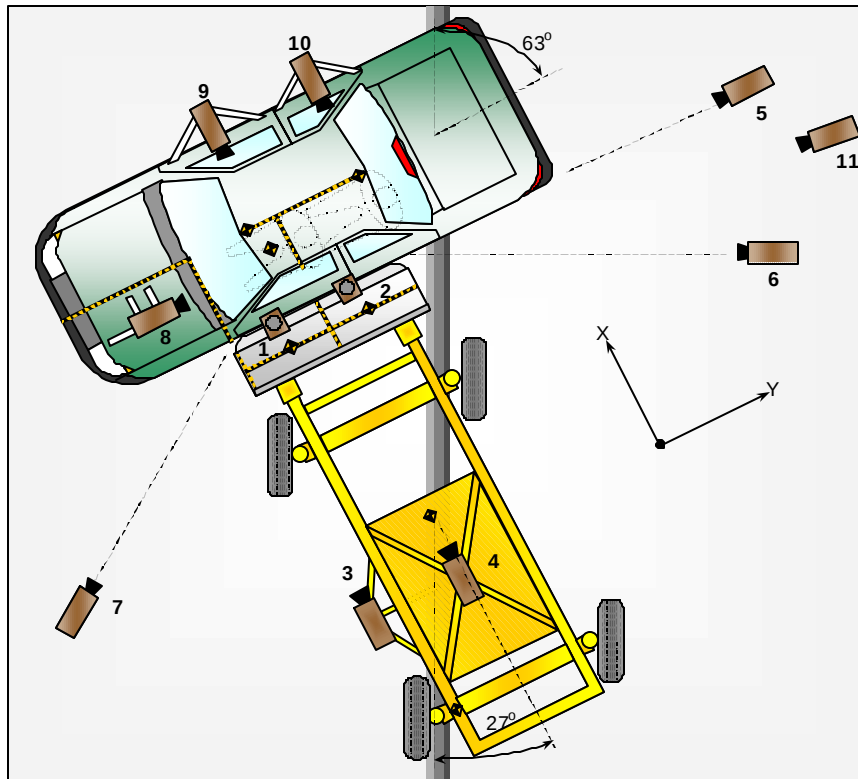
DATA SHEET NO. 15
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00



No.	Camera View	Location (mm)			Angle (deg.)	Lens (mm)	Film Speed (fr./sec.)
		X	Y	Z			
1	Overhead Overall	2260	750	5490	90	10	1010
2	Overhead Close-up	0	0	5490	90	24	1010
3	MDB Onboard, Impact Point Close-Up	2200	840	1110	7	13	970
4	MDB Onboard, Centerline of Impact	3420	660	1815	11	13	990
5	Right Side, Ground Level, Overall	8700	14820	1570	0	25	1020
6	Right Side, Ground Level, Close-up	4300	4270	1650	6	12	980
7	Left Side, Ground Level, Close-up	Did Not Run					
8	Vehicle Onboard Front SID, Front	100	2550	1250	5	10	1000
9	Vehicle Onboard Front SID, Side	1850	1420	1210	1	10	980
10	Vehicle Onboard Rear SID, Side	1975	960	970	0	19	1000
11	Real Time Coverage	3000	19300	990	2	Zoom	24

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

NHTSA No.: HYU002

Test Program: 55/28 km/h 90° Side Impact NCAP

Test Date: 12/08/00

Test Time: 11:40 AM Temperature at Time of Impact: 18.3 °C

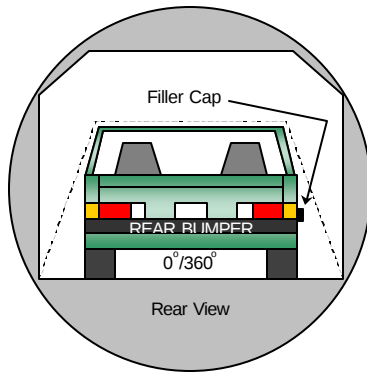
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- 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 Details: No leakage occurred

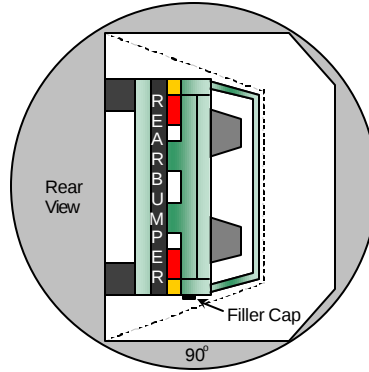
DATA SHEET NO. 17
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan
 Test Program: 55/28 km/h 90° Side Impact NCAP

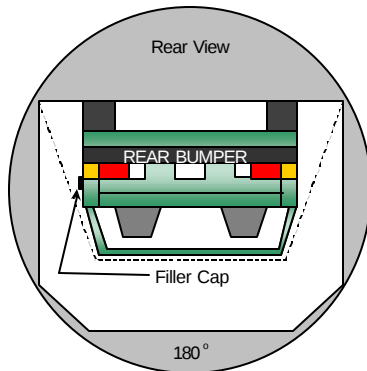
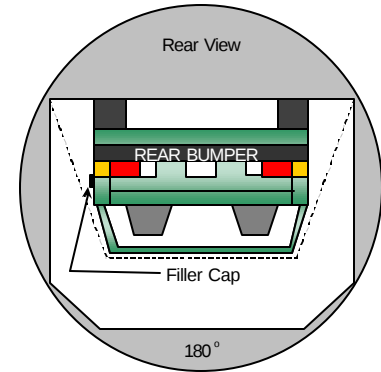
NHTSA No.: HYU002
 Test Date: 12/08/00



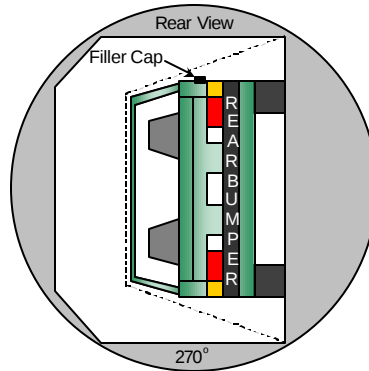
0° TO 90°



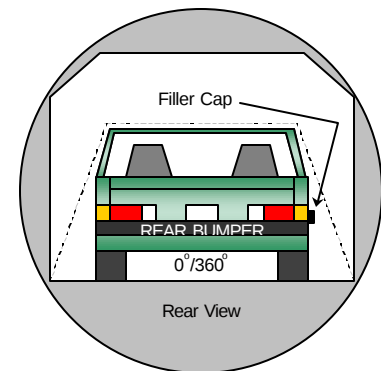
90° TO 180°



180° TO 270°



270° TO 360°



1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage locations:

No solvent leakage occurred during static rollover testing.

Rollover Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	83	300	0.0
90° to 180°	81	300	0.0
180° to 270°	78	300	0.0
270° to 360°	82	300	0.0

APPENDIX A
PHOTOGRAPHS

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Figure A-1: Left Front, as Received



Figure A-2: Right Rear, as Received



Figure A-3: Vehicle Certification Label



Figure A-4: Vehicle Tire Label



Figure A-5: Front View, Pre-Test



Figure A-6: Front View, Post-Test



Figure A-7: Rear View, Pre-Test



Figure A-8: Rear View, Post-Test



Figure A-9: Left (Impacted) Side View, Pre-Test



Figure A-11: Overhead Close-up View at Impact Position, Pre-Test



Figure A-12: Overhead Overall View, Pre-Test



Figure A-13: Overhead Overall View, Post-Test



Figure A-14: MDB Left Side View at Impact Position, Pre-Test



Figure A-15: MDB Right Side View at Impact Position, Pre-Test



Figure A-16: Impact Point Target Close-up, Pre-Test



Figure A-17: Impact Point Target Close-up, Post-Test



Figure A-18: Driver Dummy Left Side with Door Open, Pre-Test



Figure A-19: Driver Dummy Left Side, Pre-test



Figure A-20: Driver Dummy Left Side, Post-Test



Figure A-21: Driver Dummy Clearance, Pre-Test



Figure A-22: Driver Dummy Clearance, Post-Test



Figure A-23: Driver Dummy Inside View, Pre-Test



Figure A-24: Driver Dummy Inside View, Post-Test

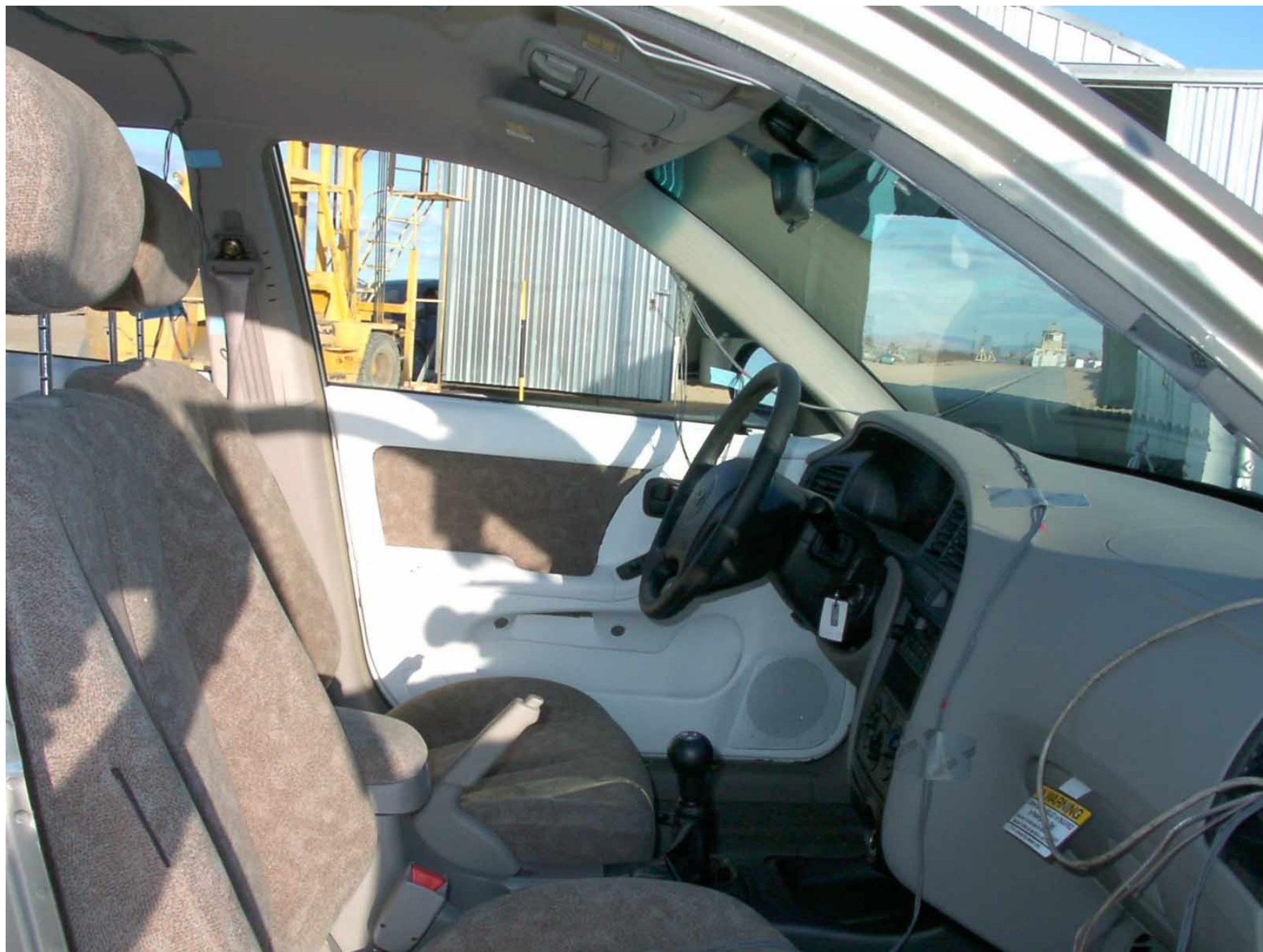


Figure A-25: Driver Door Inside View, Pre-Test



Figure A-26: Driver Dummy Contact Points Inside View, Post-Test



Figure A-27: Passenger Dummy Left Side with Door Open, Pre-Test



Figure A-28: Passenger Dummy Left Side, Pre-Test



Figure A-29: Passenger Dummy Left Side, Post-Test



Figure A-30: Passenger Dummy Clearance, Pre-Test



Figure A-31: Passenger Dummy Clearance, Post-Test



Figure A-32: Passenger Dummy Inside View, Pre-Test



Figure A-33: Passenger Dummy Inside View, Post-Test



Figure A-34: Passenger Door Inside View, Pre-Test



Figure A-35: Passenger Dummy Contact Points Inside View, Post-Test

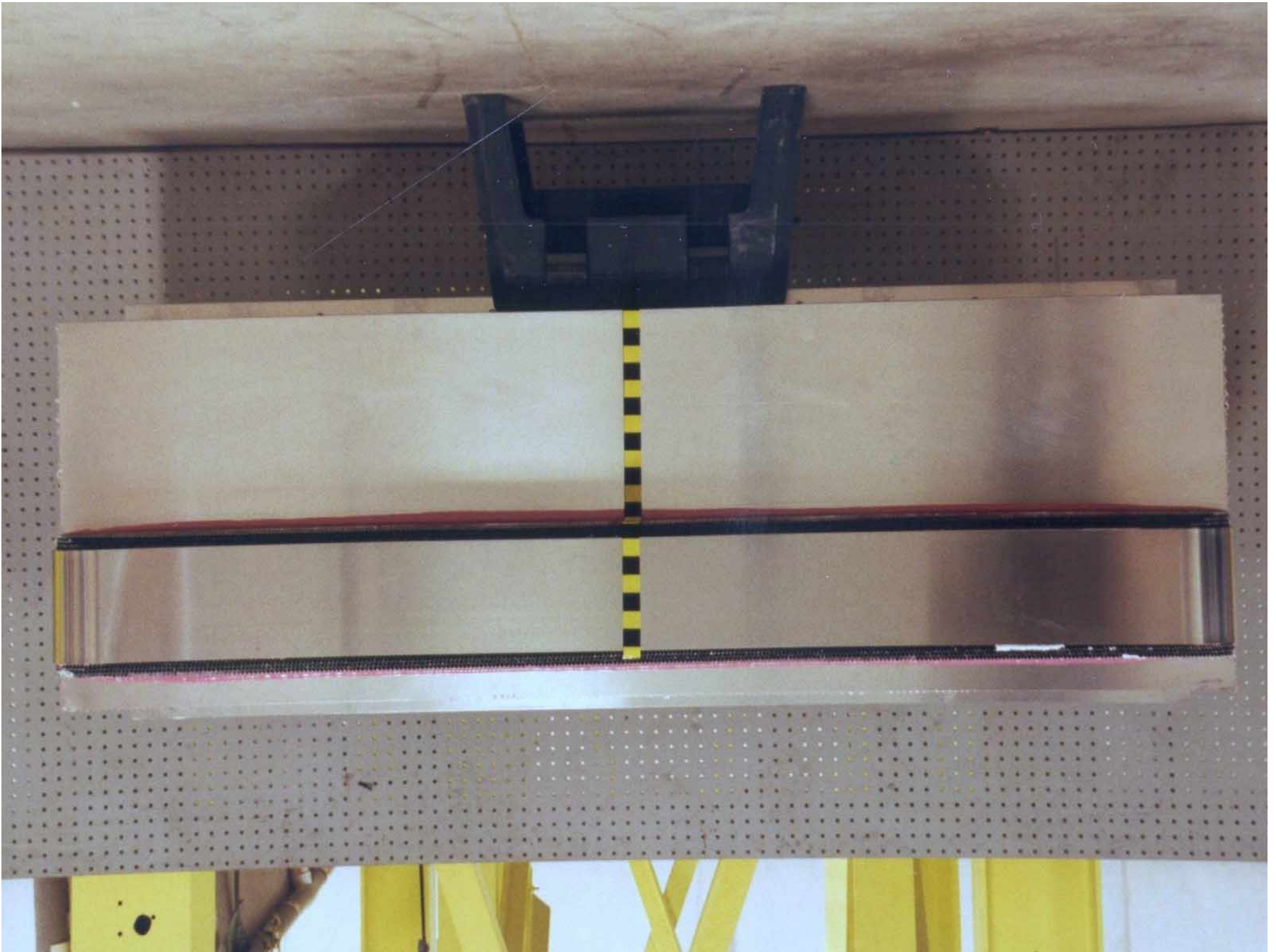


Figure A-36: Front View of Deformable Barrier, Pre-Test



Figure A-37: Front View of Deformable Barrier, Post-Test

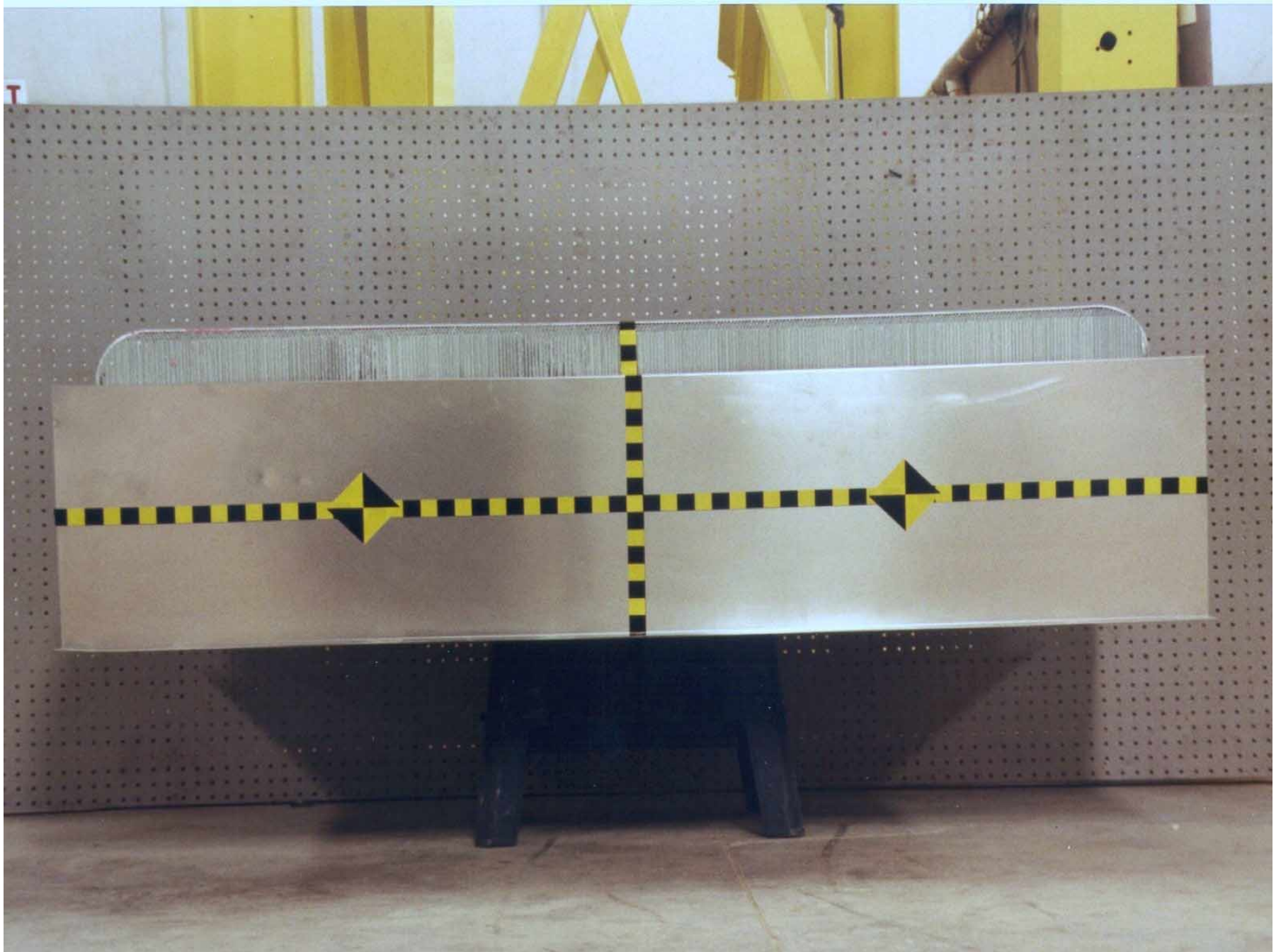


Figure A-38: Top View of Deformable Barrier, Pre-Test



Figure A-39: Top View of Deformable Barrier, Post-Test

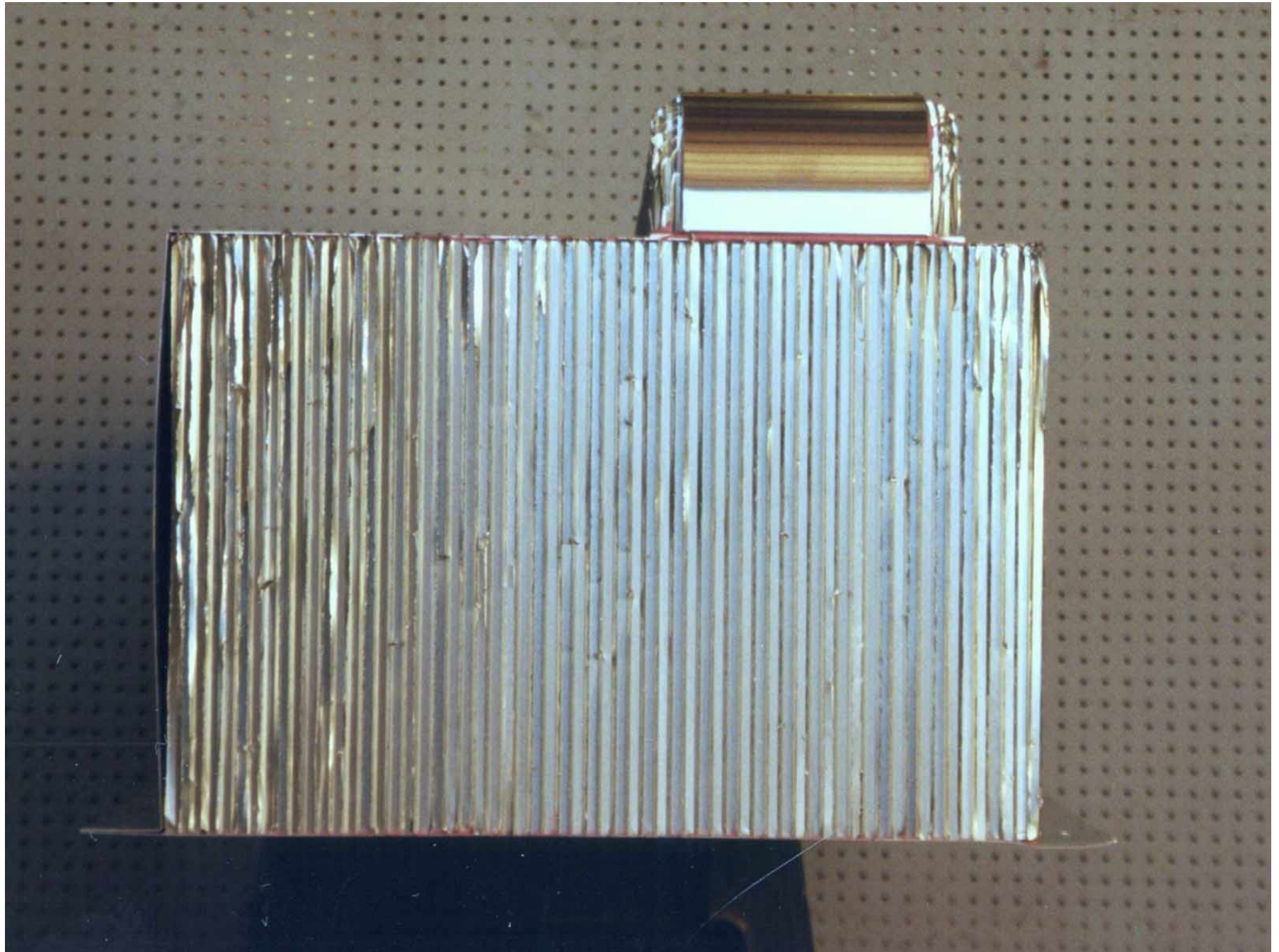


Figure A-40: Right Side View of Deformable Barrier, Pre-Test



Figure A-41: Right Side View of Deformable Barrier, Post-Test



Figure A-42: Left Side View of Deformable Barrier, Pre-Test



Figure A-43: Left Side View of Deformable Barrier, Post-Test



Figure A-44: Vehicle on Rollover Device, Top View



Figure A-45: Vehicle During Impact

APPENDIX B
SID, VEHICLE, AND MDB RESPONSE DATA

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B-4	Driver Head CG Y Velocity	B-4
B-5	Driver Head CG Z	B-5
B-6	Driver Head CG Z Velocity	B-6
B-7	Driver Head CG Resultant	B-7
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B-9	Driver Upper Rib Primary Y Velocity	B-9
B-10	Driver Lower Rib Primary Y	B-10
B-11	Driver Lower Rib Primary Y Velocity	B-11
B-12	Driver Lower Spine Primary Y	B-12
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B-15	Driver Pelvis Primary Y Velocity	B-15
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LIST OF DATA PLOTS, PASSENGER SID

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LIST OF DATA PLOTS, VEHICLE...(CONTINUED)

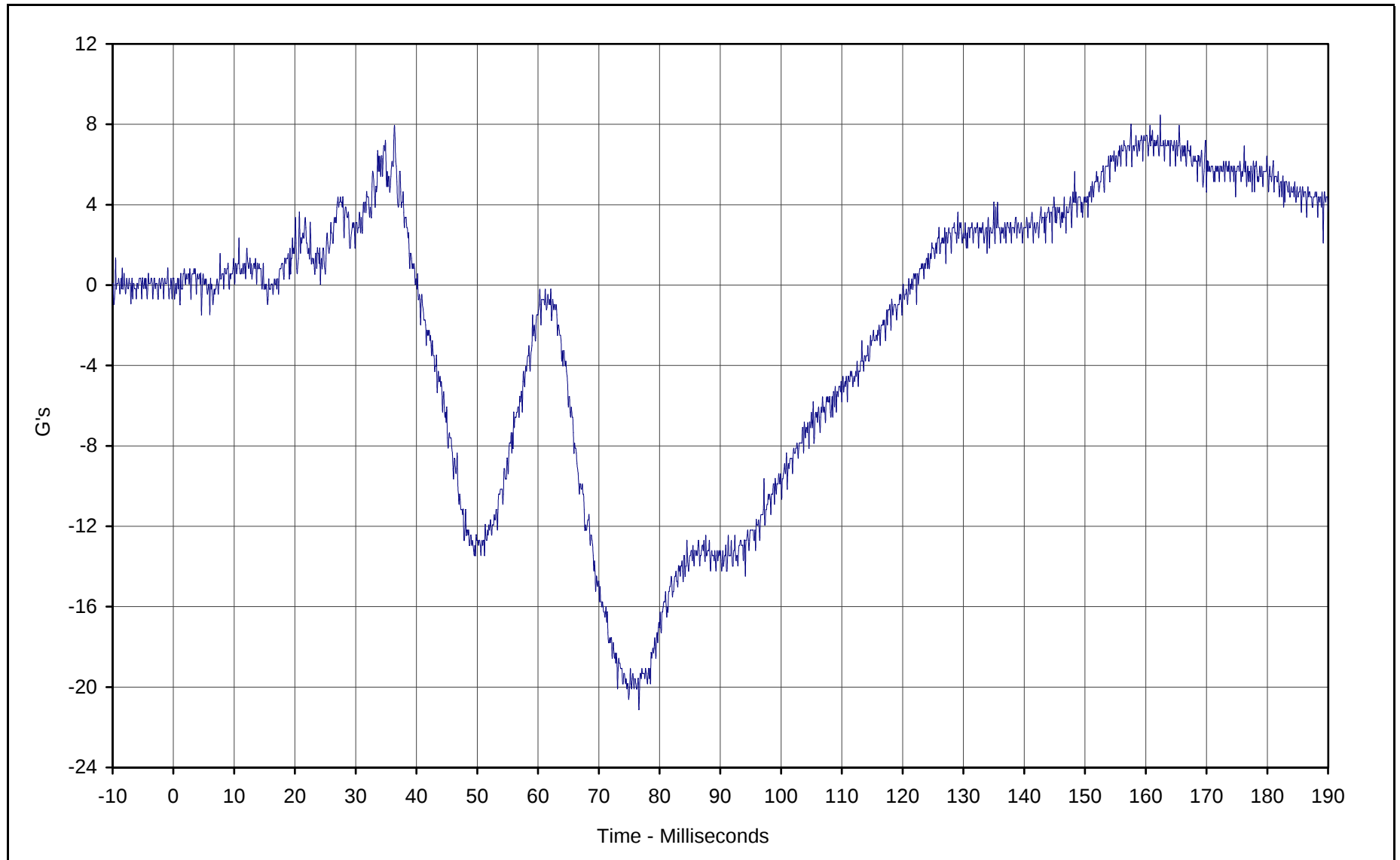
Data Plot		Page
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B-118 Moving Deformable Barrier Right Bumper Contact Time	B-118

LIST OF DATA PLOTS, FIR FILTER DATA

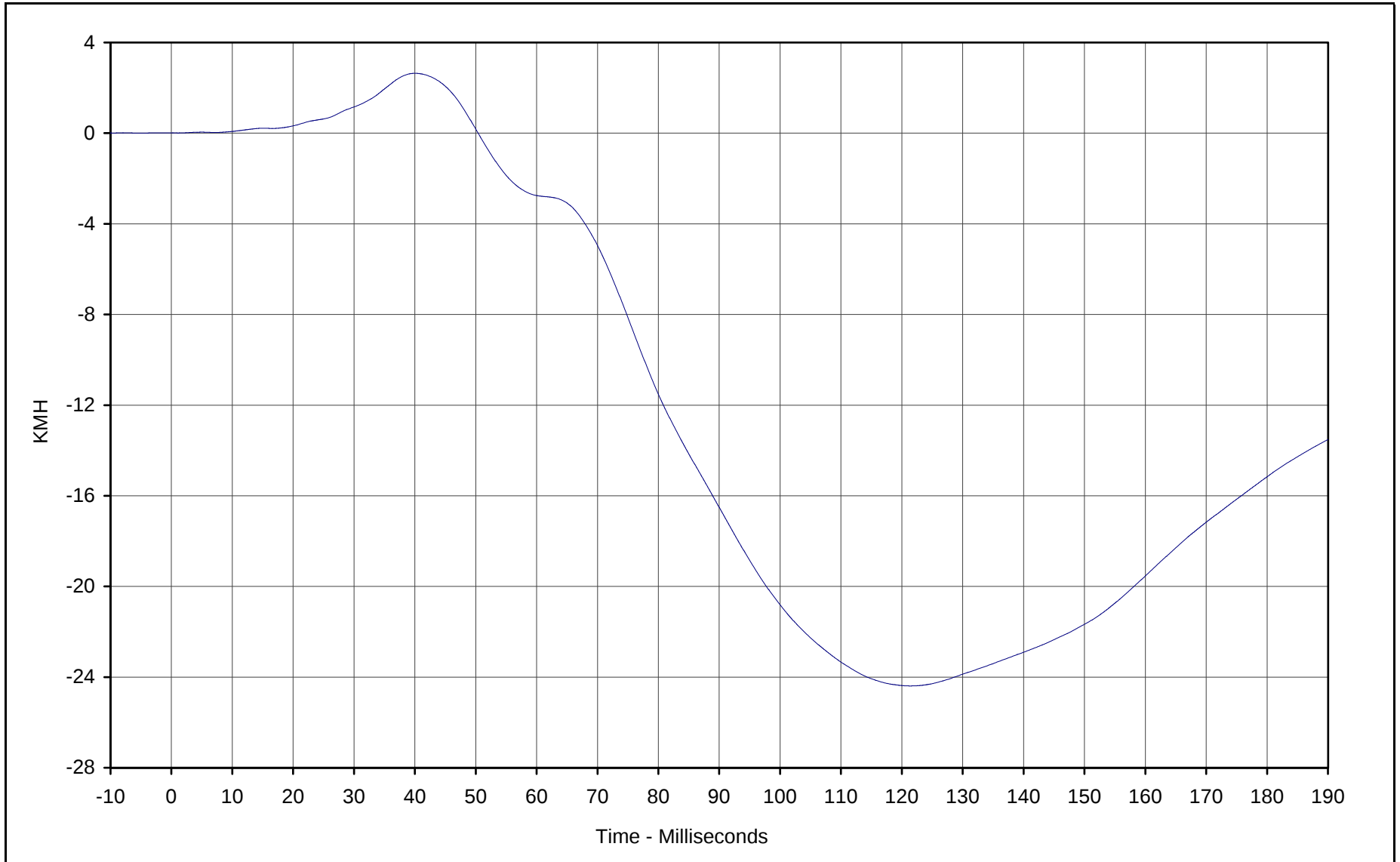
Data Plot	Page
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B-134 Passenger Pelvis Redundant Y	B-134



Curve Description: Driver Head CG X
Maximum Value: 8.5 at 162.4 Milliseconds
Minimum Value: -21.1 at 76.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-001

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

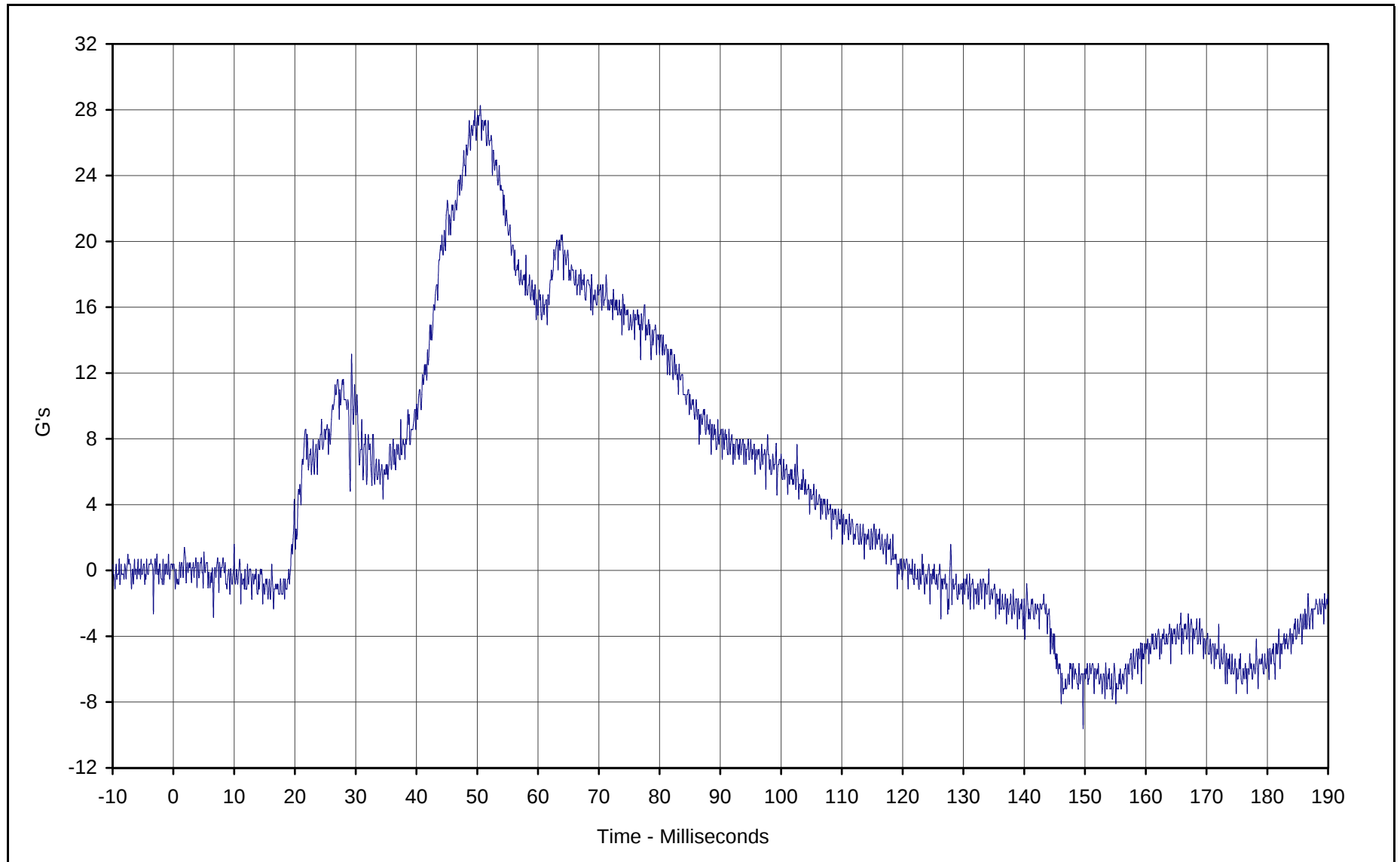




Curve Description: Driver Head CG X Velocity
Maximum Value: 2.6 at 40.1 Milliseconds
Minimum Value: -24.4 at 121.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-001

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

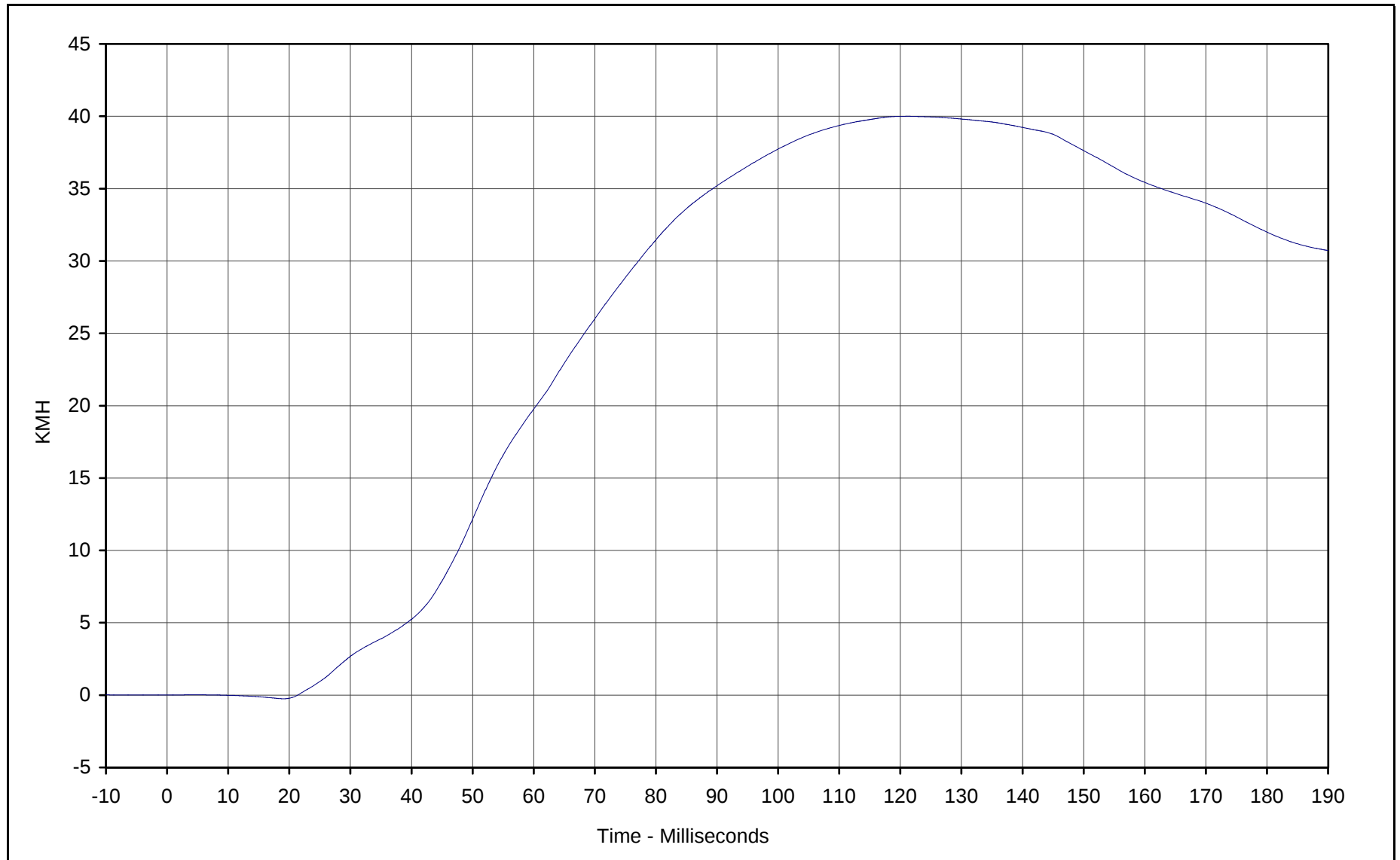




Curve Description: Driver Head CG Y
Maximum Value: 28.3 at 50.5 Milliseconds
Minimum Value: -9.6 at 149.7 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-002

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

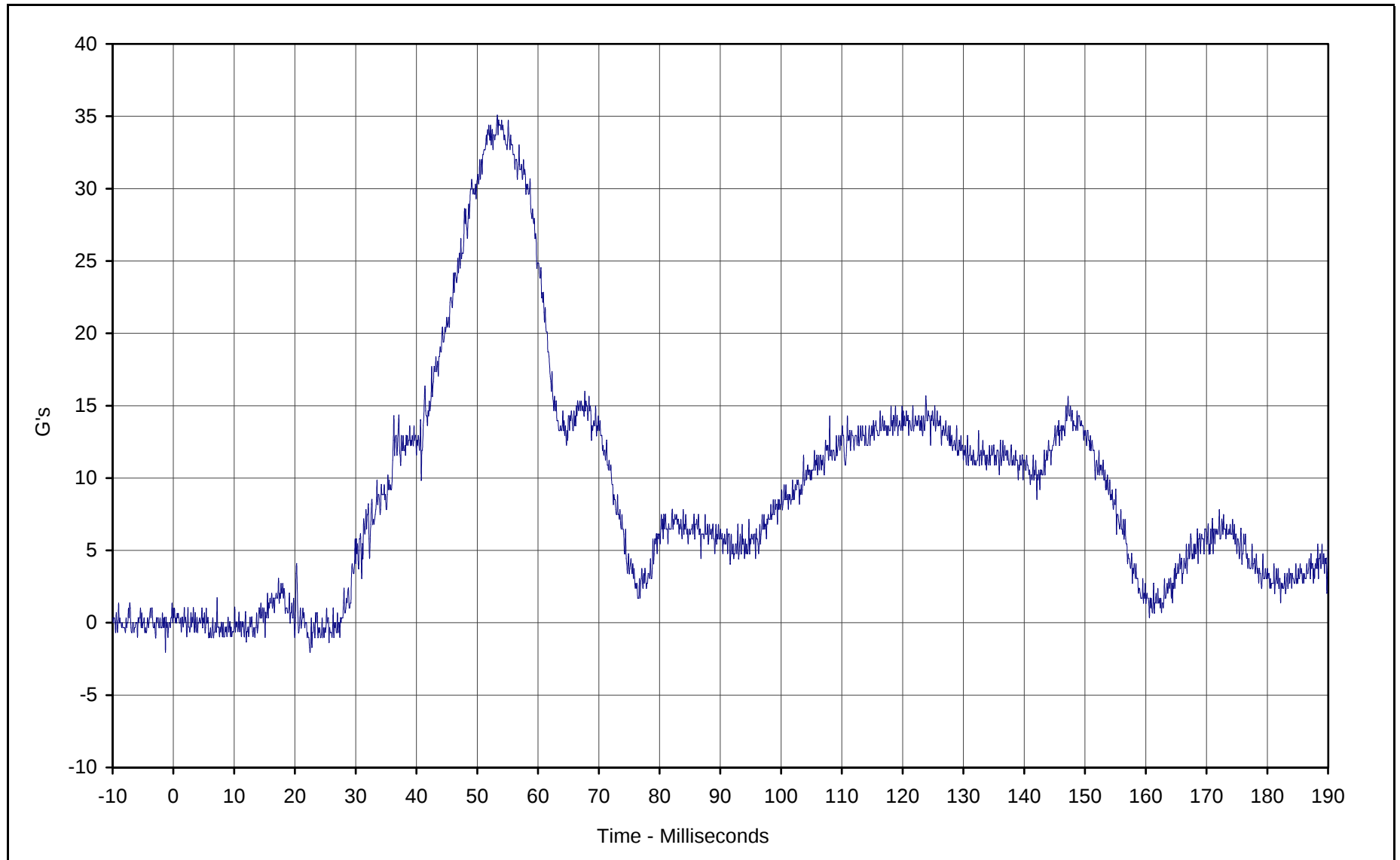




Curve Description: Driver Head CG Y Velocity
Maximum Value: 40.0 at 121.2 Milliseconds
Minimum Value: -0.3 at 19.1 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-002

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

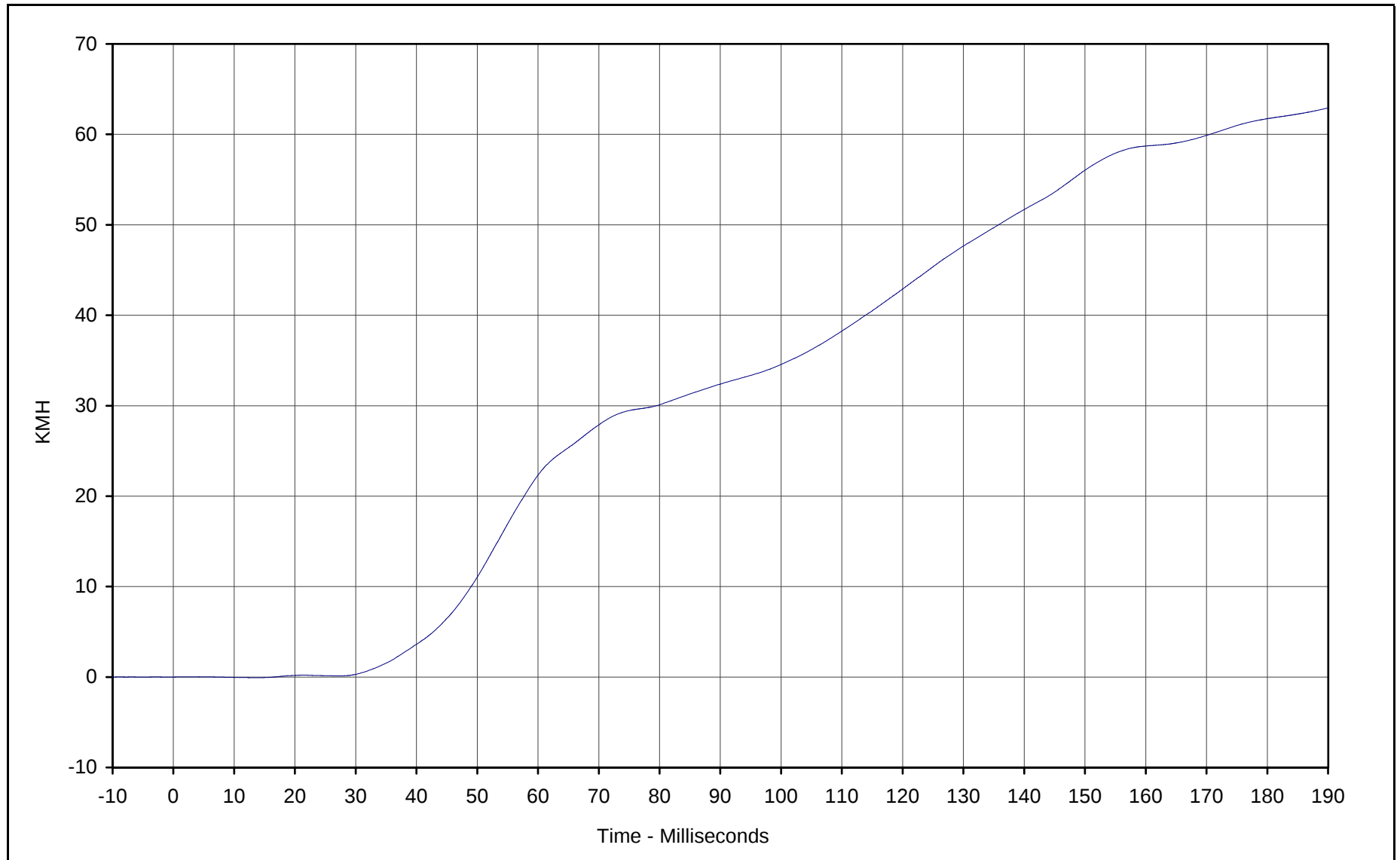




Curve Description: Driver Head CG Z
Maximum Value: 35.1 at 53.3 Milliseconds
Minimum Value: -2.0 at 22.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-003

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

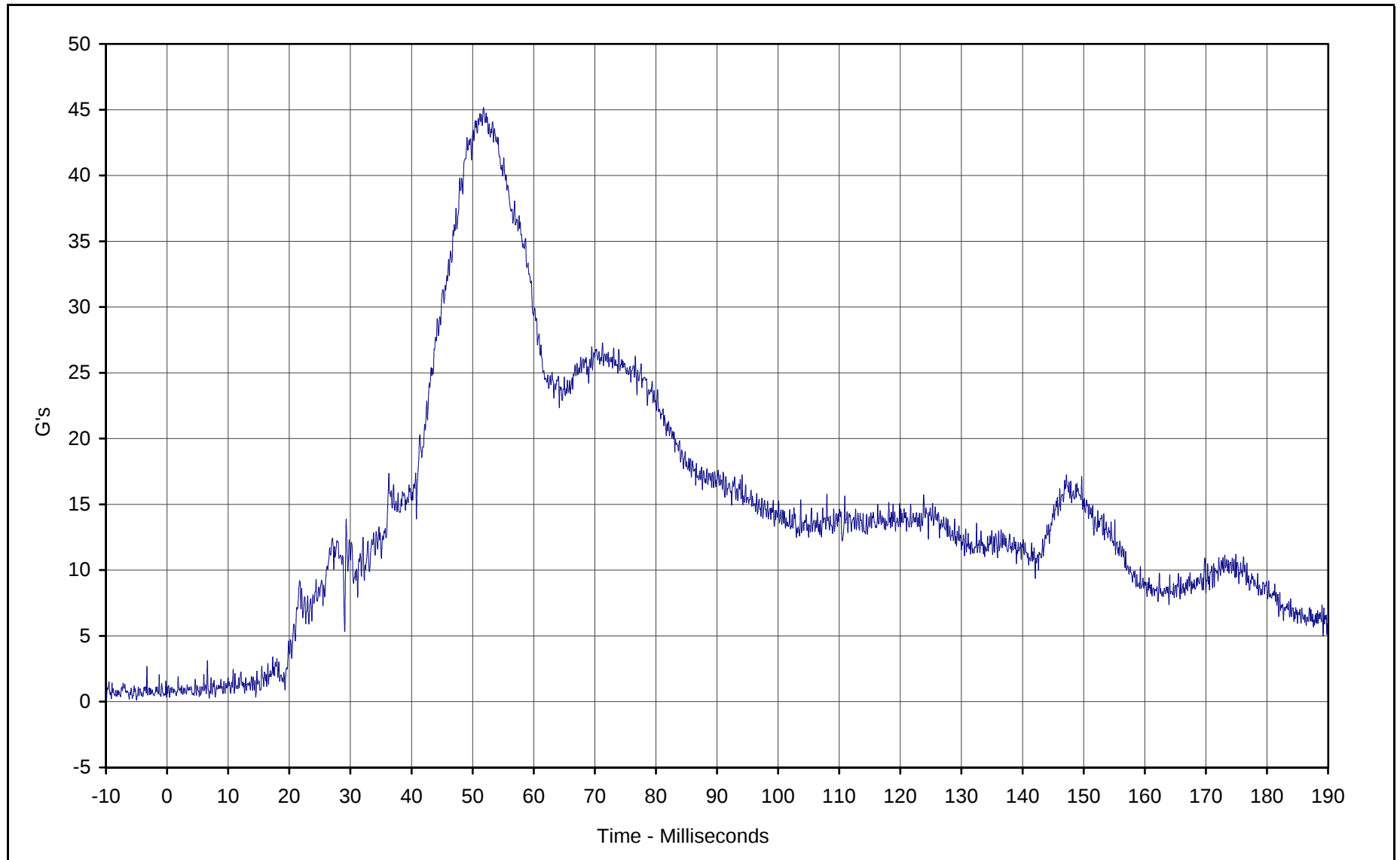




Curve Description: Driver Head CG Z Velocity
Maximum Value: 62.9 at 189.9 Milliseconds
Minimum Value: -0.1 at 13.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-003

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

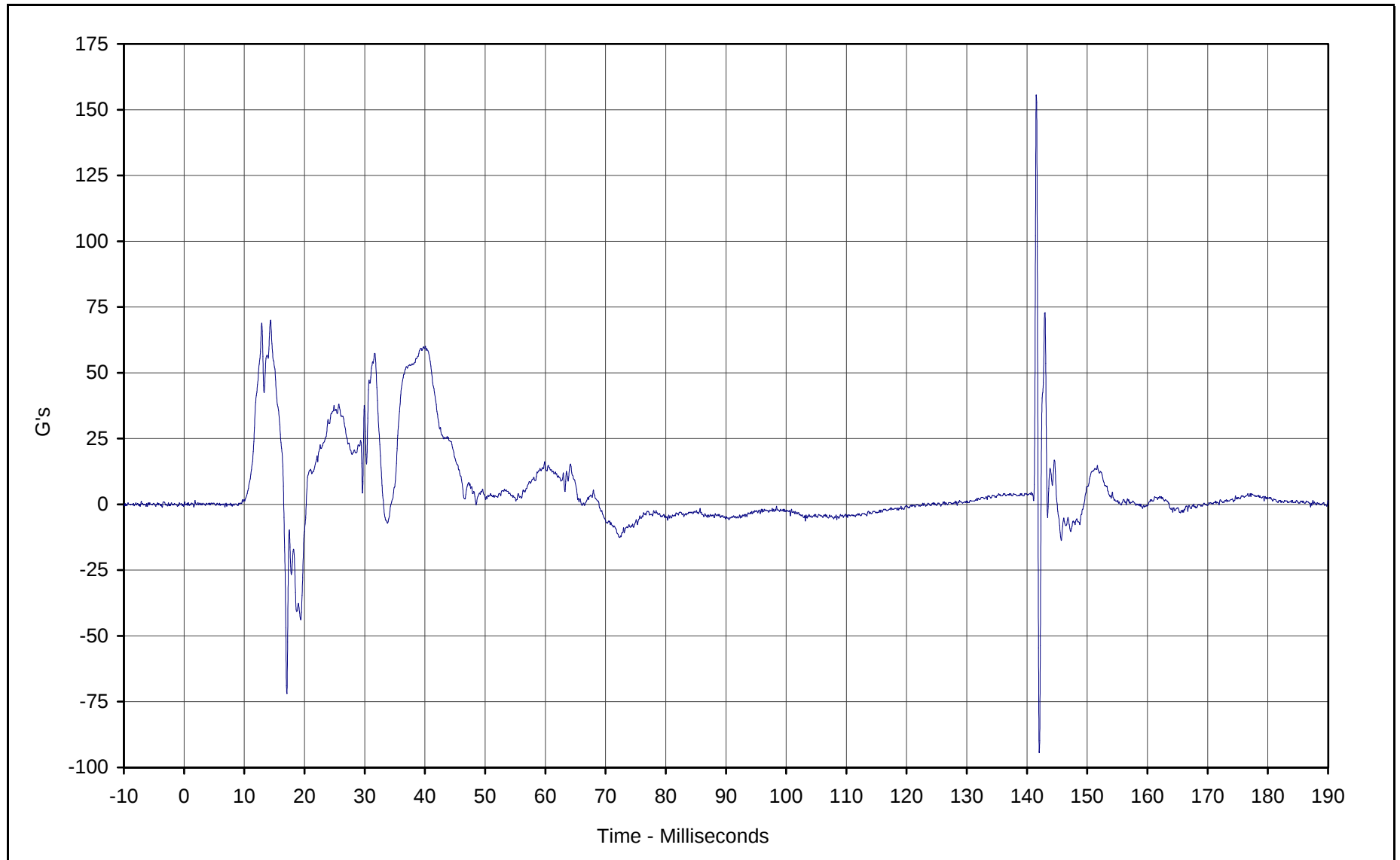




Curve Description: Driver Head CG Resultant
Maximum Value: 45.2 at 51.8 Milliseconds
Minimum Value: 0.3 at 6.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: RES-001

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

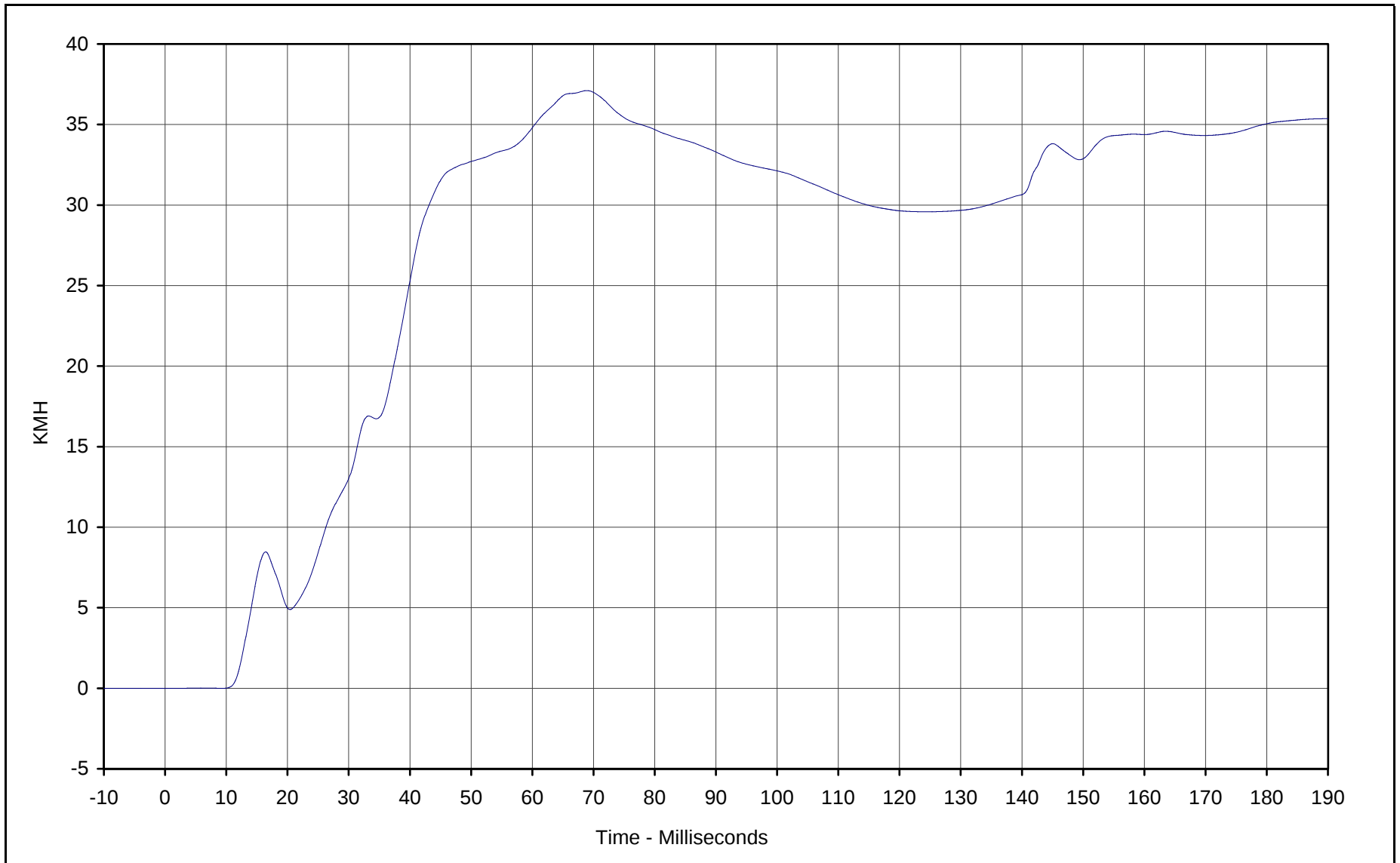




Curve Description: Driver Upper Rib Primary Y
Maximum Value: 155.4 at 141.5 Milliseconds
Minimum Value: -94.0 at 142.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-004

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Upper Rib Primary Y Velocity

Maximum Value: 37.1 at 68.9 Milliseconds

Minimum Value: 0.0 at 0.5 Milliseconds

SAE Filter Class: 180

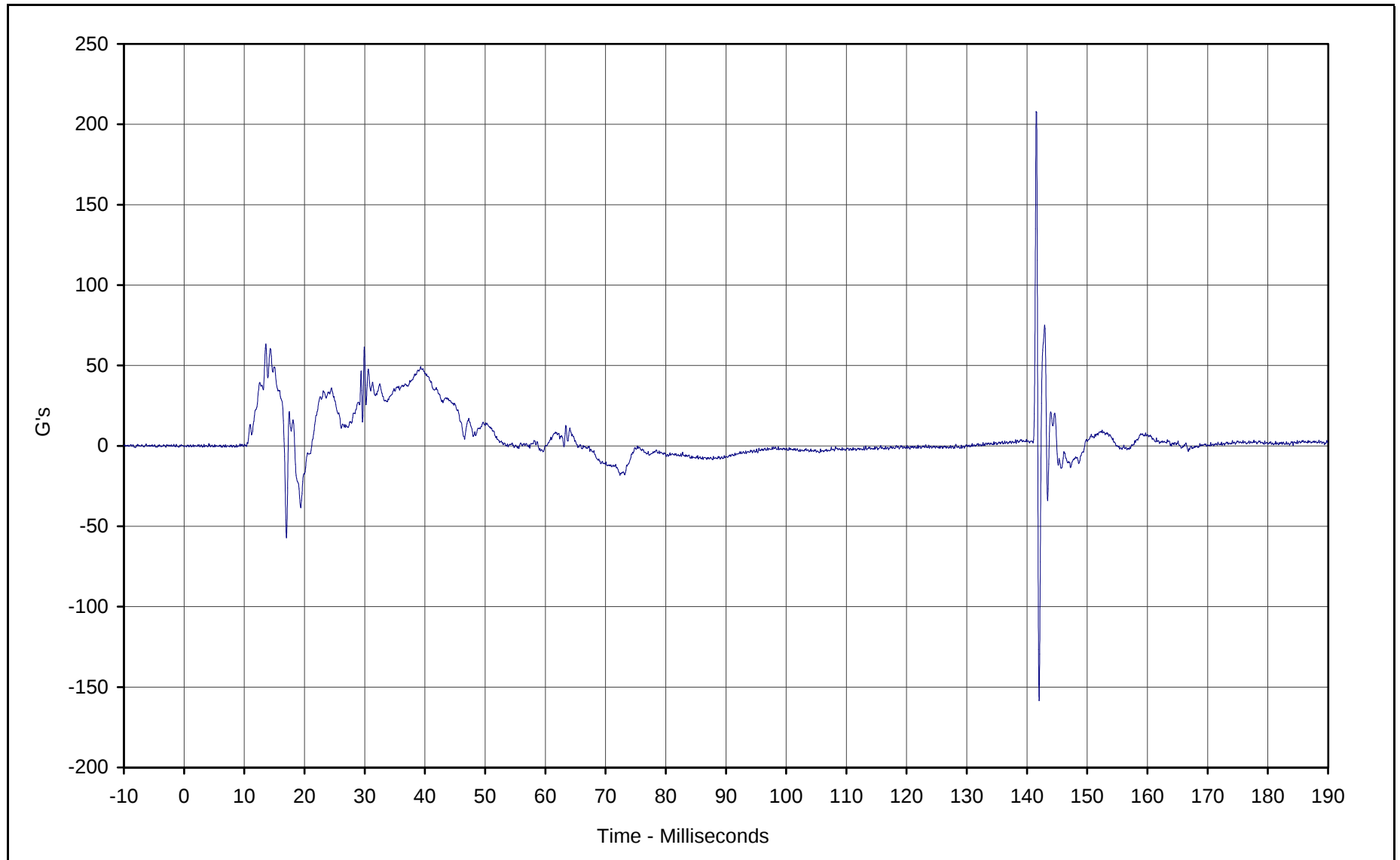
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Curve Number: IN1-004

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

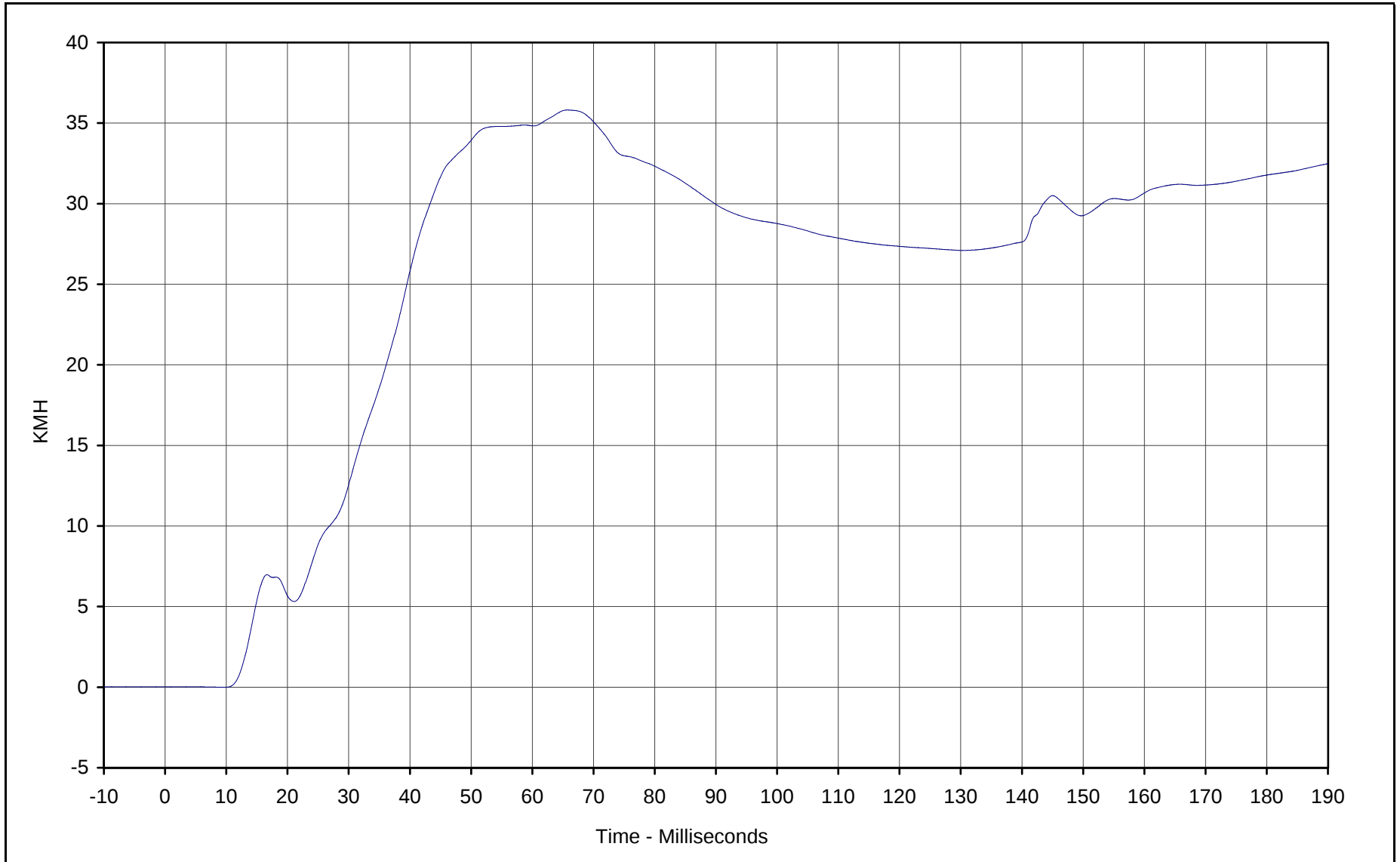




Curve Description: Driver Lower Rib Primary Y
Maximum Value: 207.9 at 141.5 Milliseconds
Minimum Value: -158.6 at 142.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-005

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

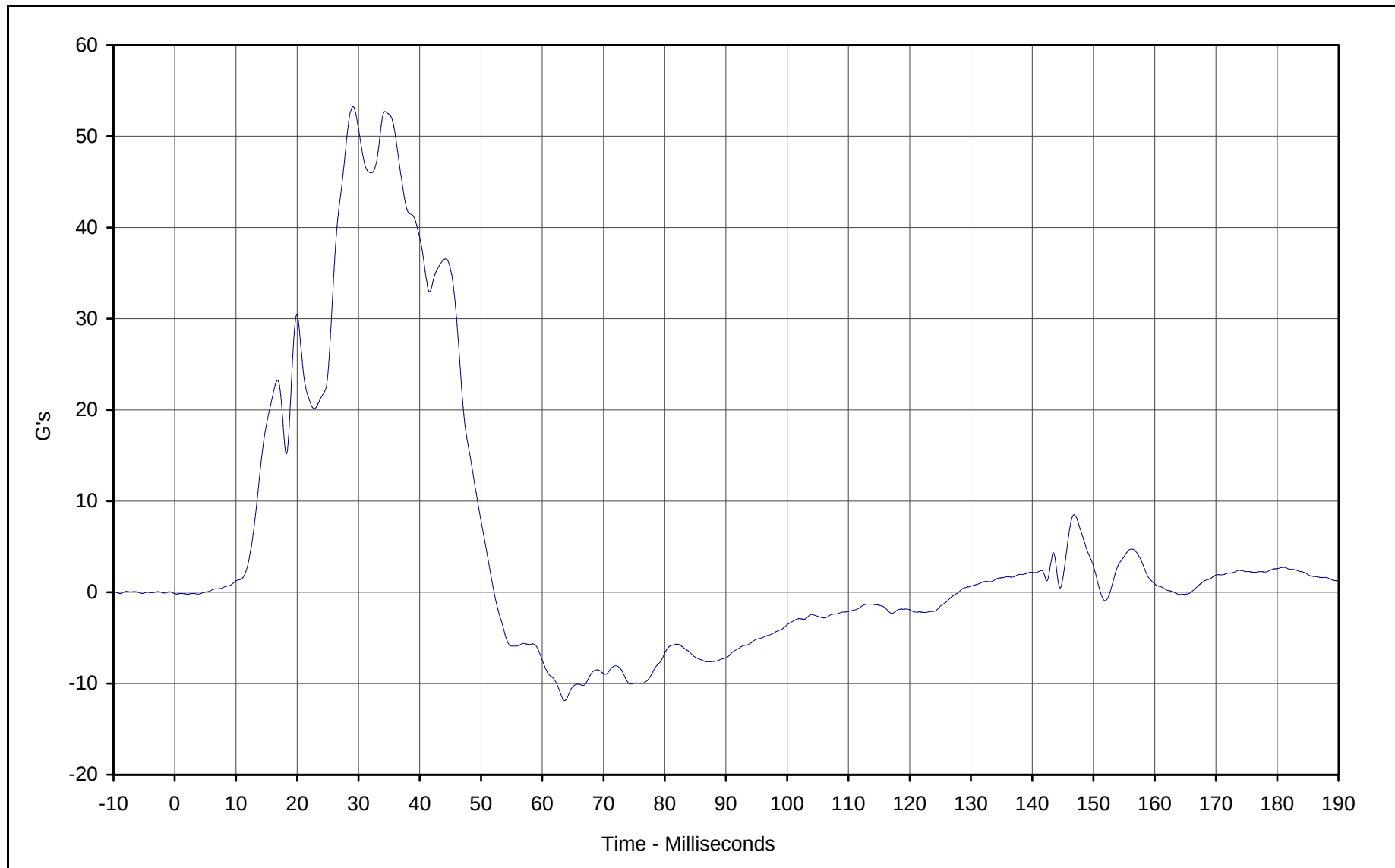




Curve Description: Driver Lower Rib Primary Y Velocity
Maximum Value: 35.8 at 65.8 Milliseconds
Minimum Value: 0.0 at 9.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-005

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

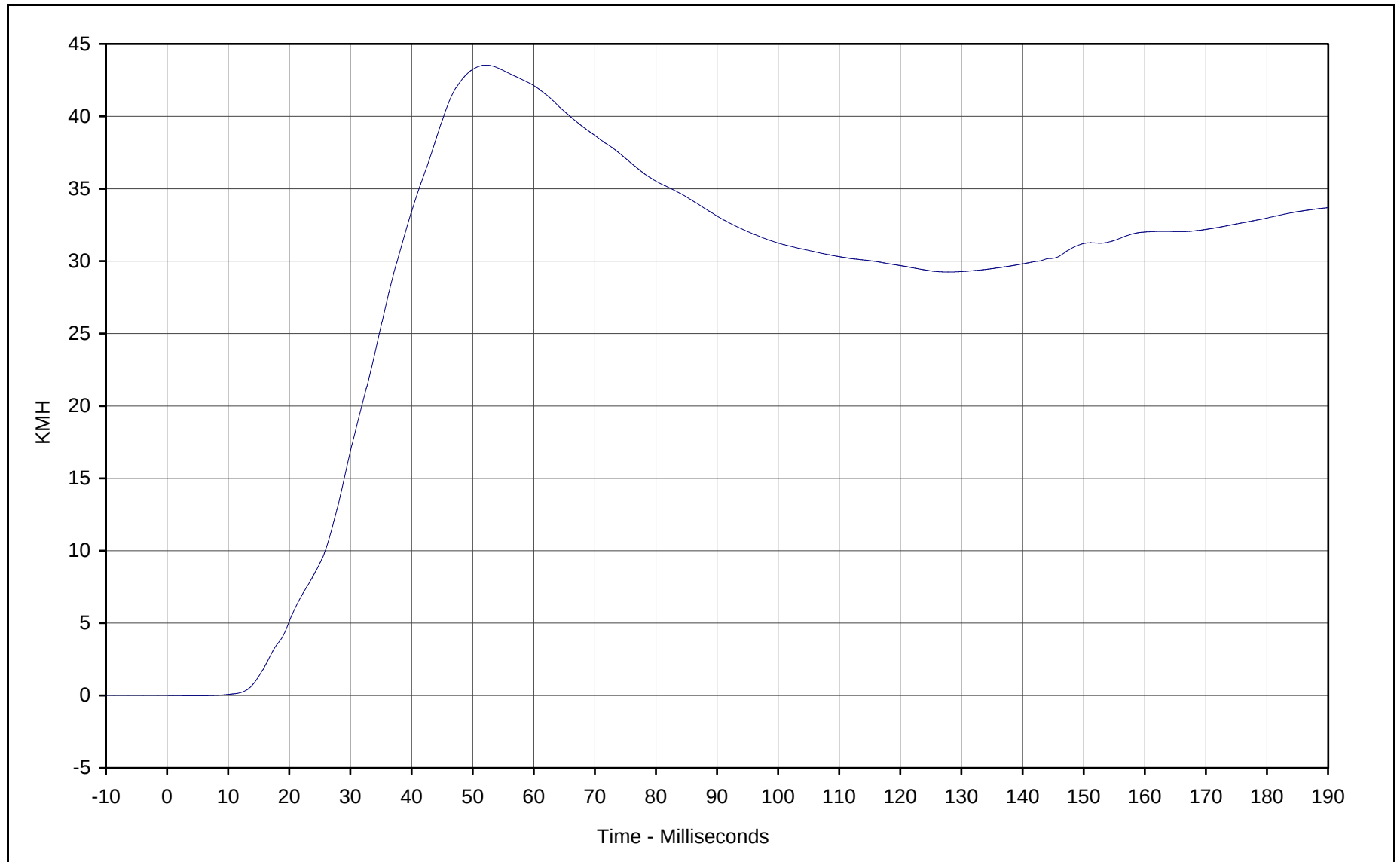




Curve Description: Driver Lower Spine Primary Y
Maximum Value: 53.3 at 29.1 Milliseconds
Minimum Value: -11.9 at 63.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: FIL-006

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Lower Spine Primary Y Velocity

Maximum Value: 43.5 at 52.1 Milliseconds

Minimum Value: 0.0 at 4.8 Milliseconds

SAE Filter Class: 180

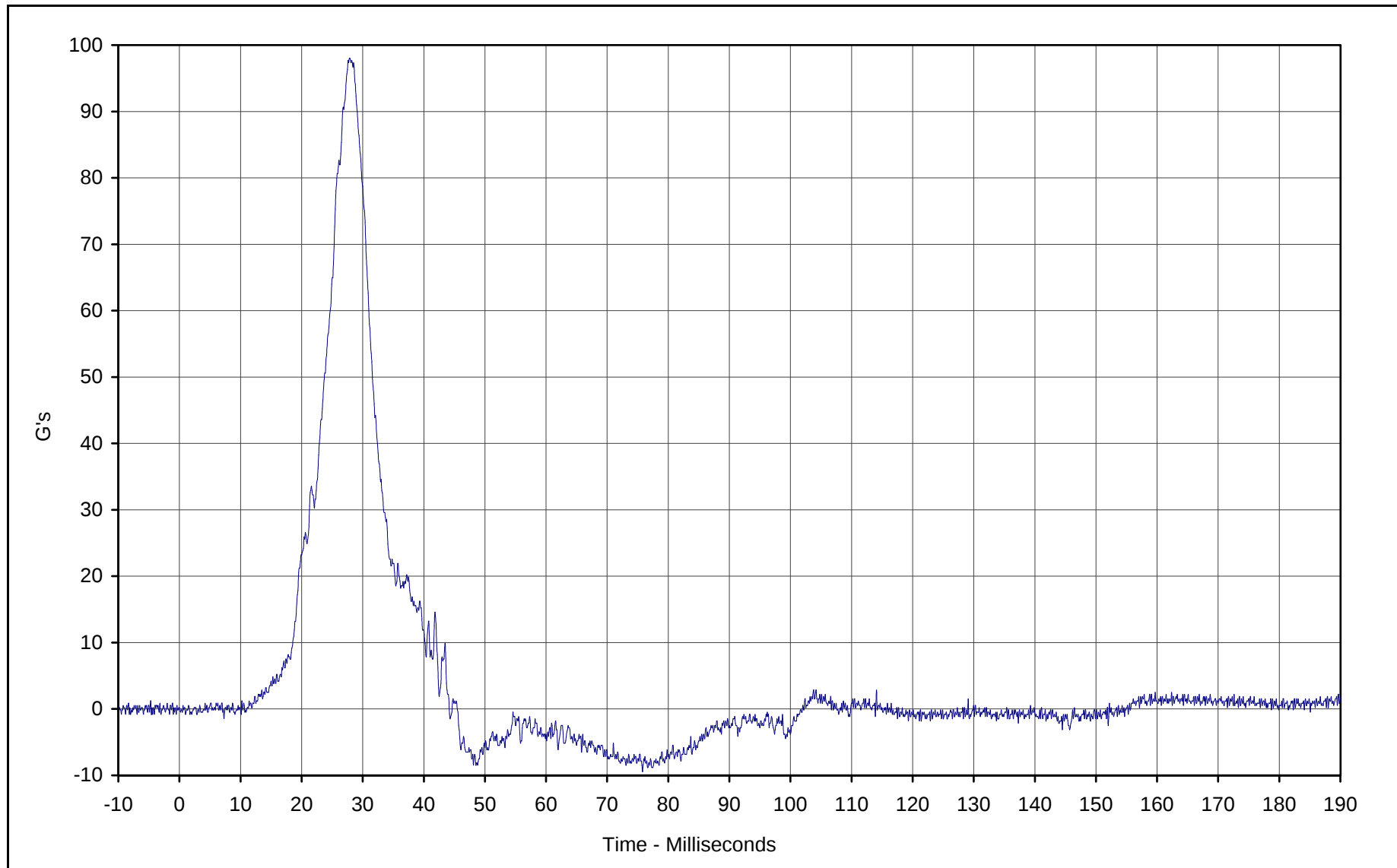
Date of Test: 12/08/00

Curve Number: IN1-006

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Pelvis Primary Y

Maximum Value: 98.0 at 27.8 Milliseconds

Minimum Value: -9.5 at 75.8 Milliseconds

SAE Filter Class: 1000

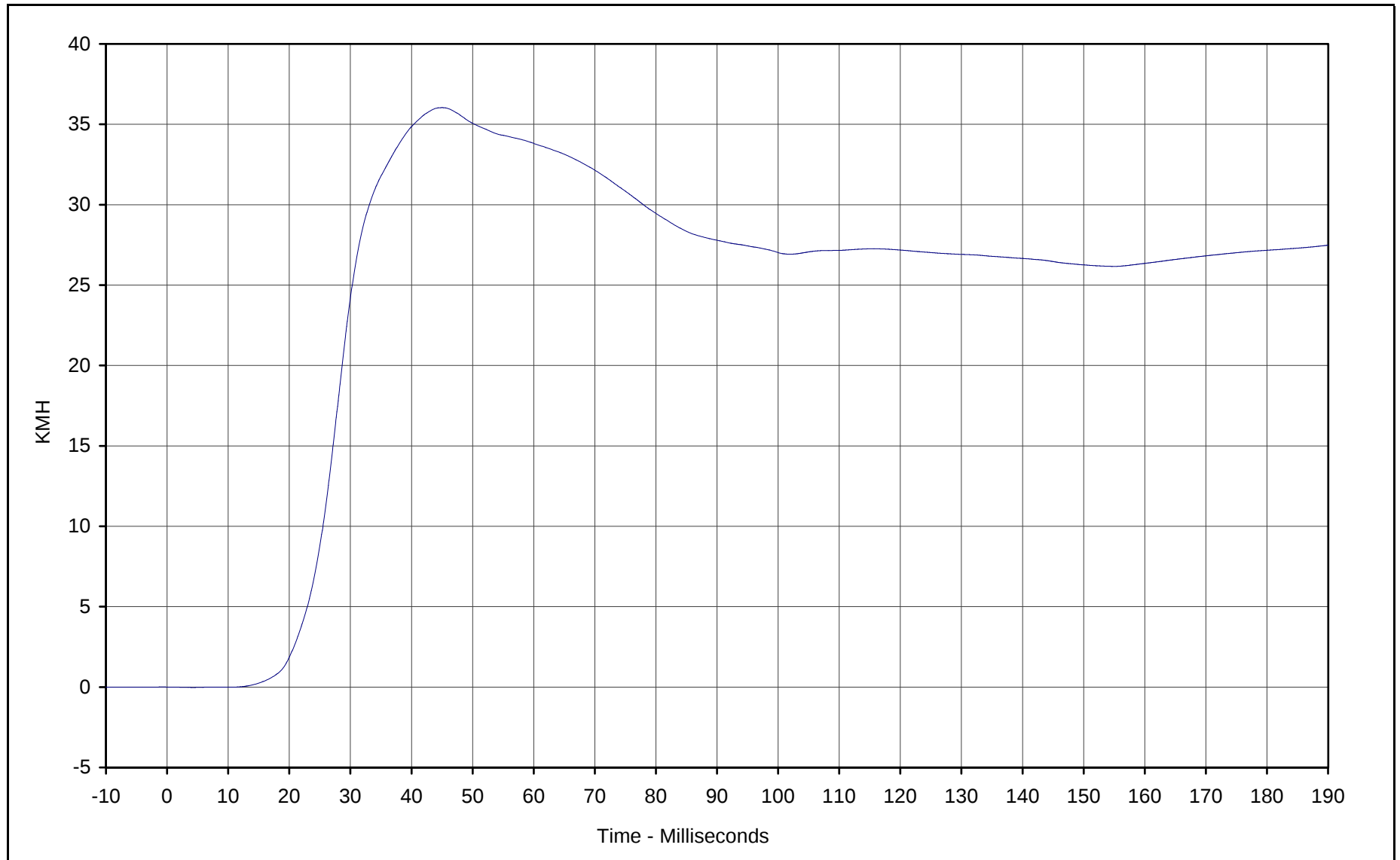
Date of Test: 12/08/00

Curve Number: FIL-007

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

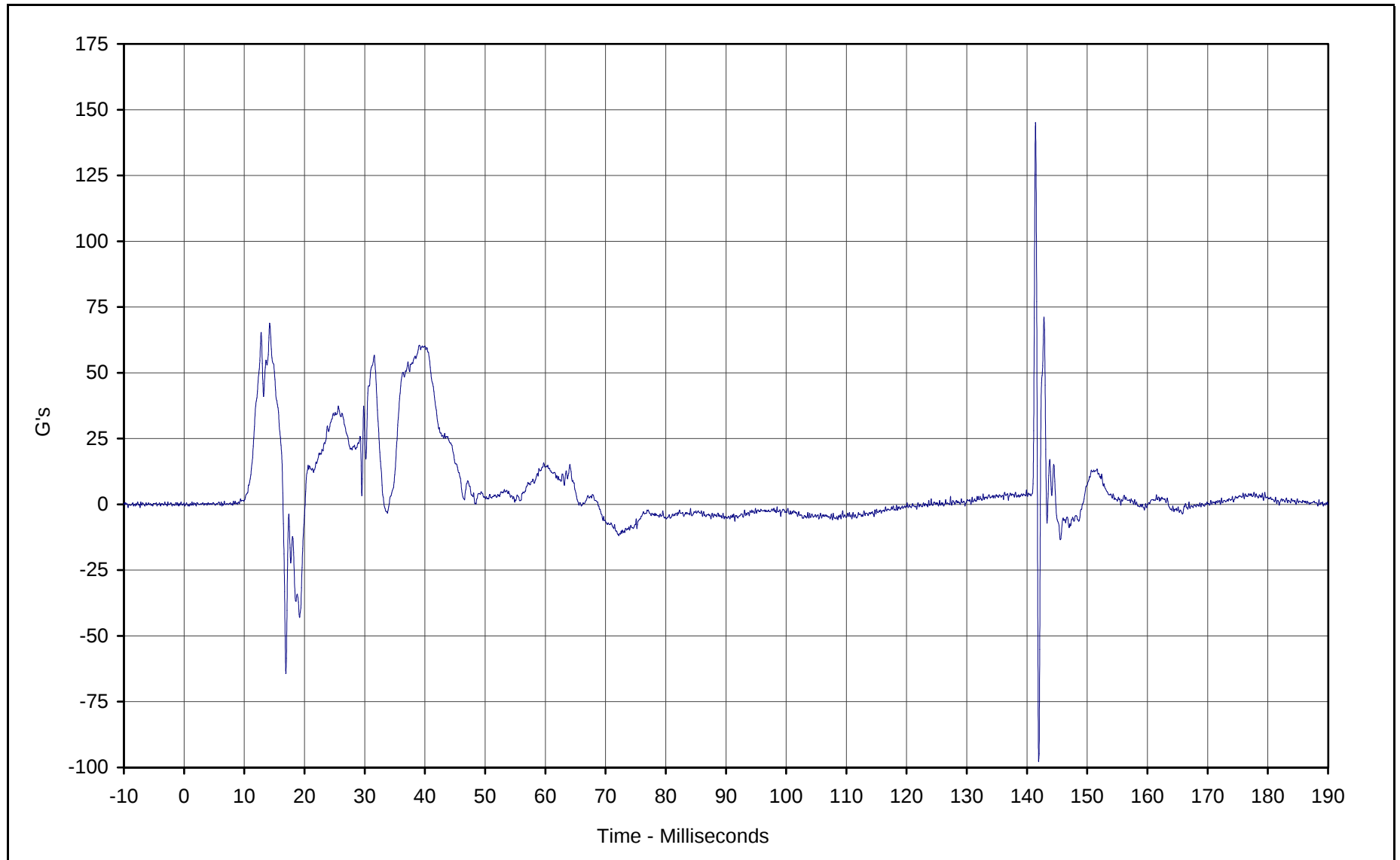




Curve Description: Driver Pelvis Primary Y Velocity
Maximum Value: 36.0 at 45.0 Milliseconds
Minimum Value: 0.0 at 4.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-007

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

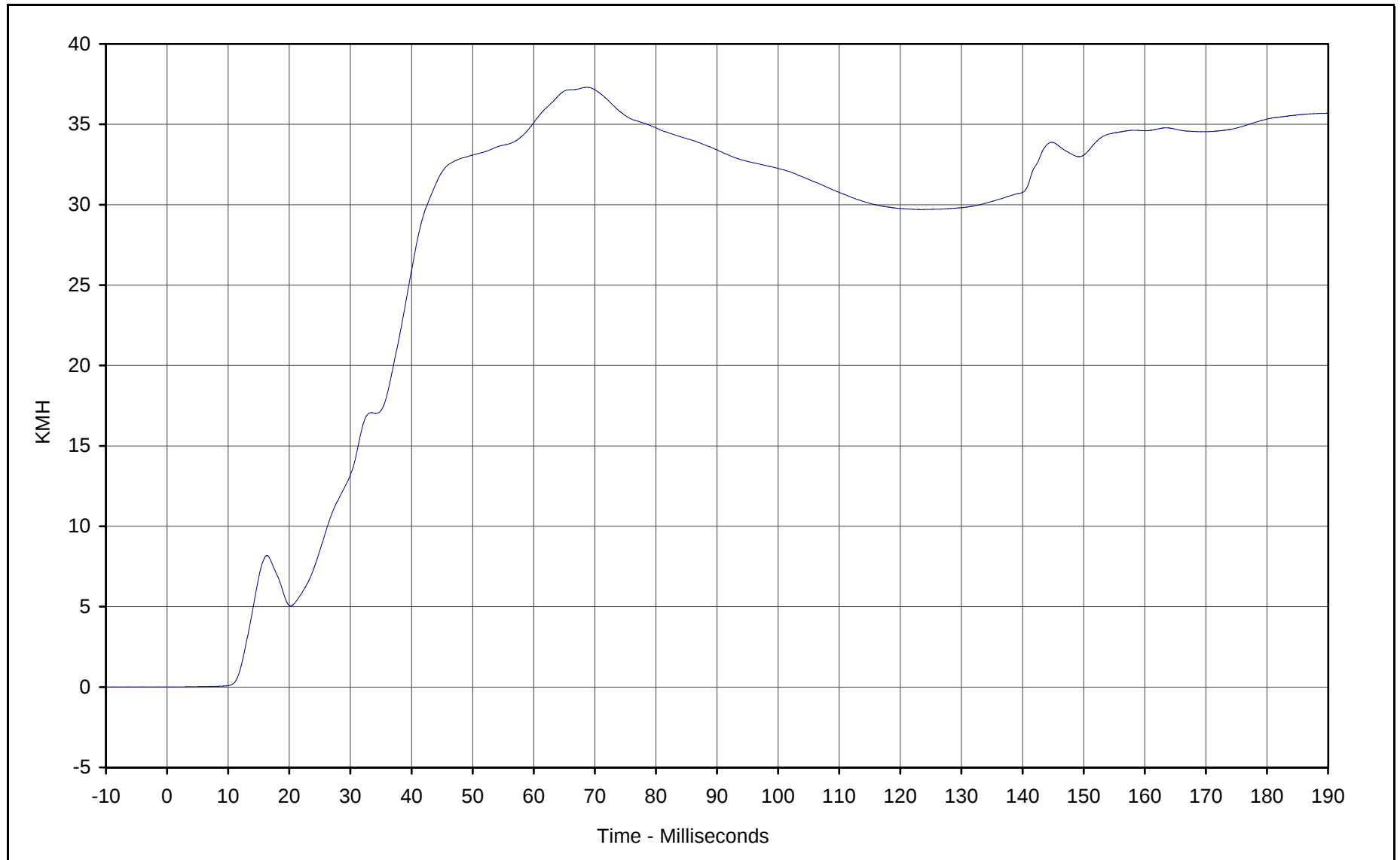




Curve Description: Driver Upper Rib Redundant Y
Maximum Value: 145.2 at 141.4 Milliseconds
Minimum Value: -97.4 at 141.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-008

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Upper Rib Redundant Y Velocity

Maximum Value: 37.3 at 68.7 Milliseconds

Minimum Value: 0.0 at 1.2 Milliseconds

SAE Filter Class: 180

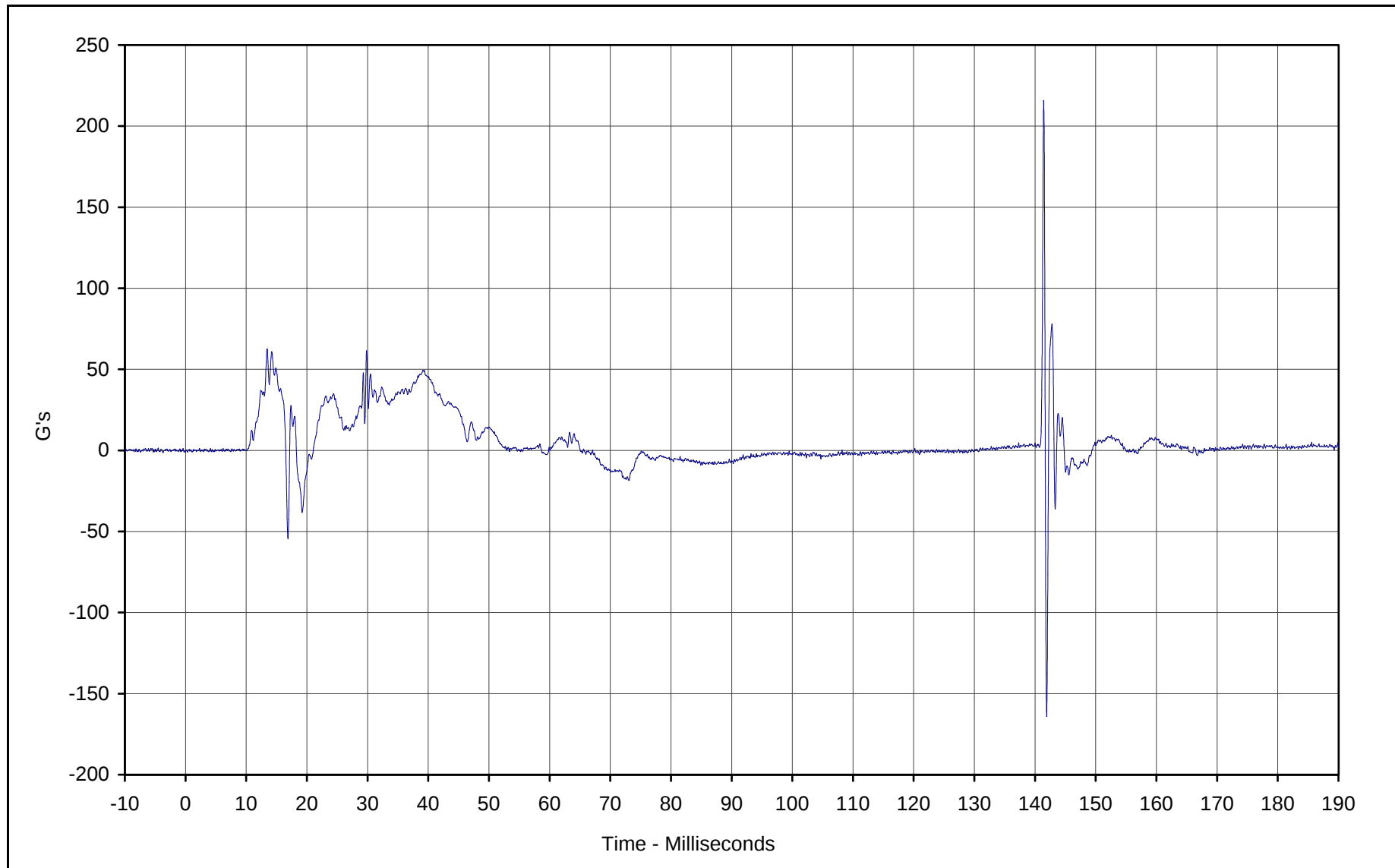
Date of Test: 12/08/00

Curve Number: IN1-008

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

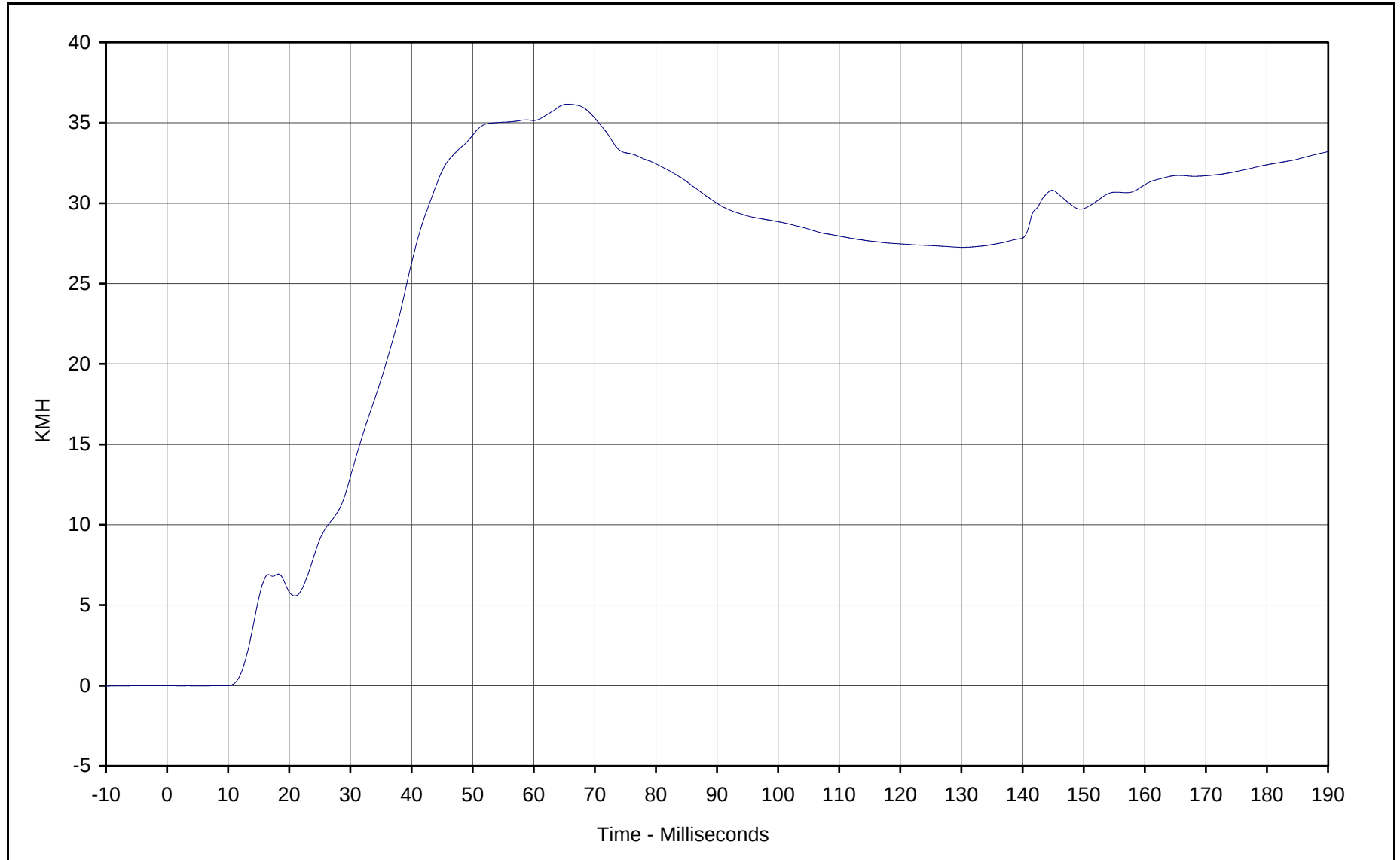




Curve Description: Driver Lower Rib Redundant Y
Maximum Value: 215.4 at 141.4 Milliseconds
Minimum Value: -164.2 at 141.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-009

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Lower Rib Redundant Y Velocity

Maximum Value: 36.2 at 65.5 Milliseconds

Minimum Value: 0.0 at 5.4 Milliseconds

SAE Filter Class: 180

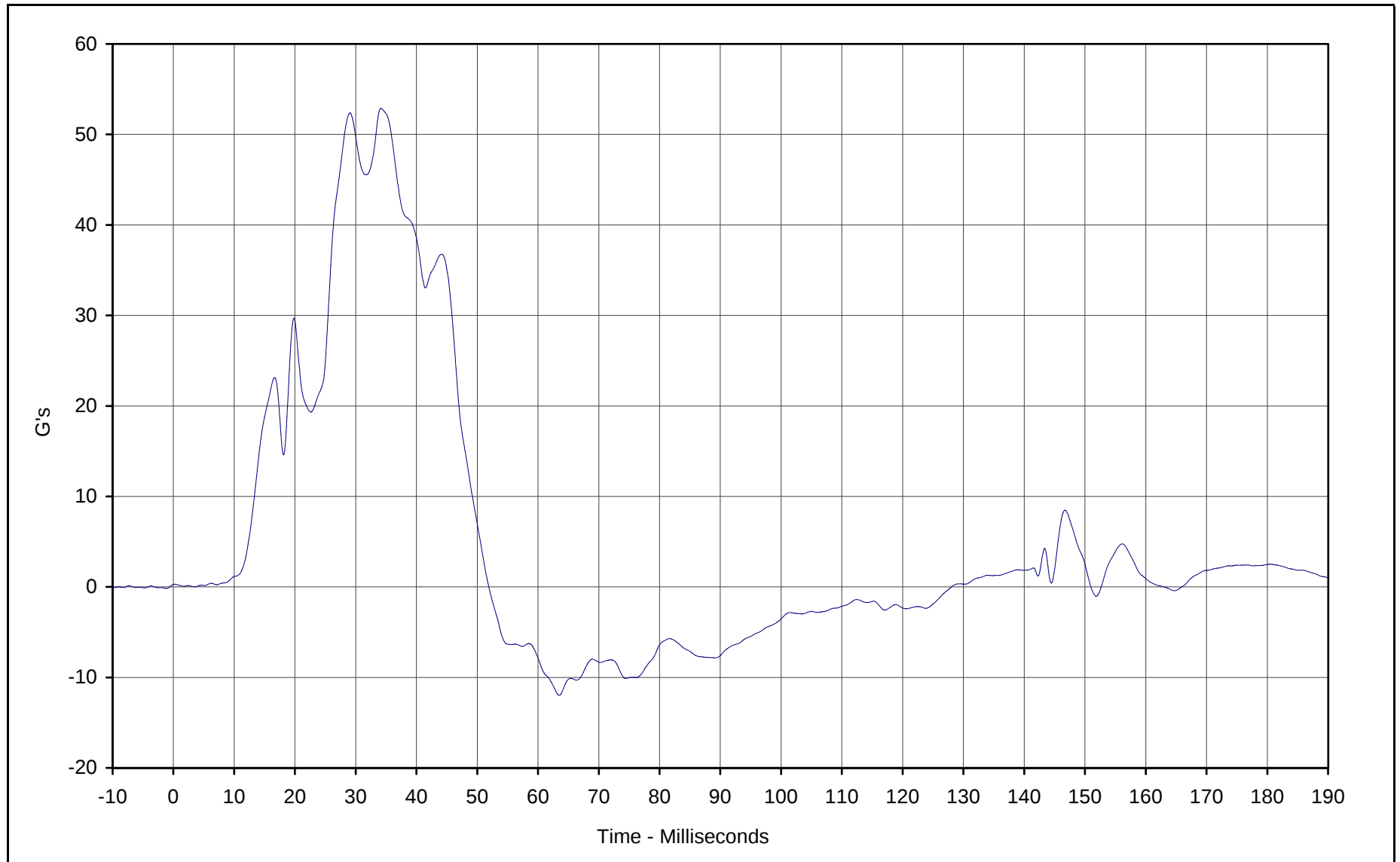
Date of Test: 12/08/00

Curve Number: IN1-009

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

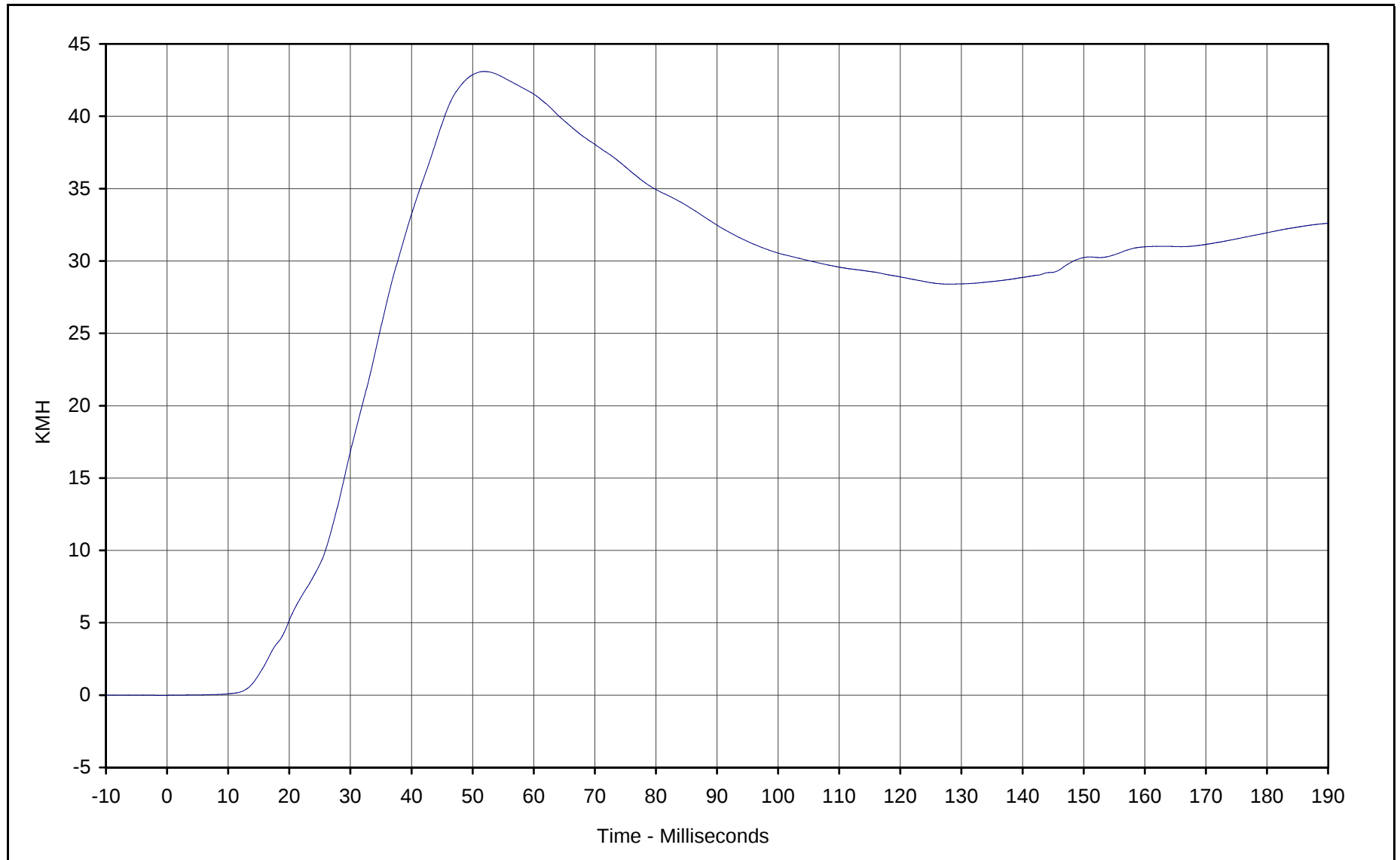




Curve Description: Driver Lower Spine Redundant Y
Maximum Value: 52.9 at 34.1 Milliseconds
Minimum Value: -12.0 at 63.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: FIL-010

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Lower Spine Redundant Y Velocity

Maximum Value: 43.1 at 51.9 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

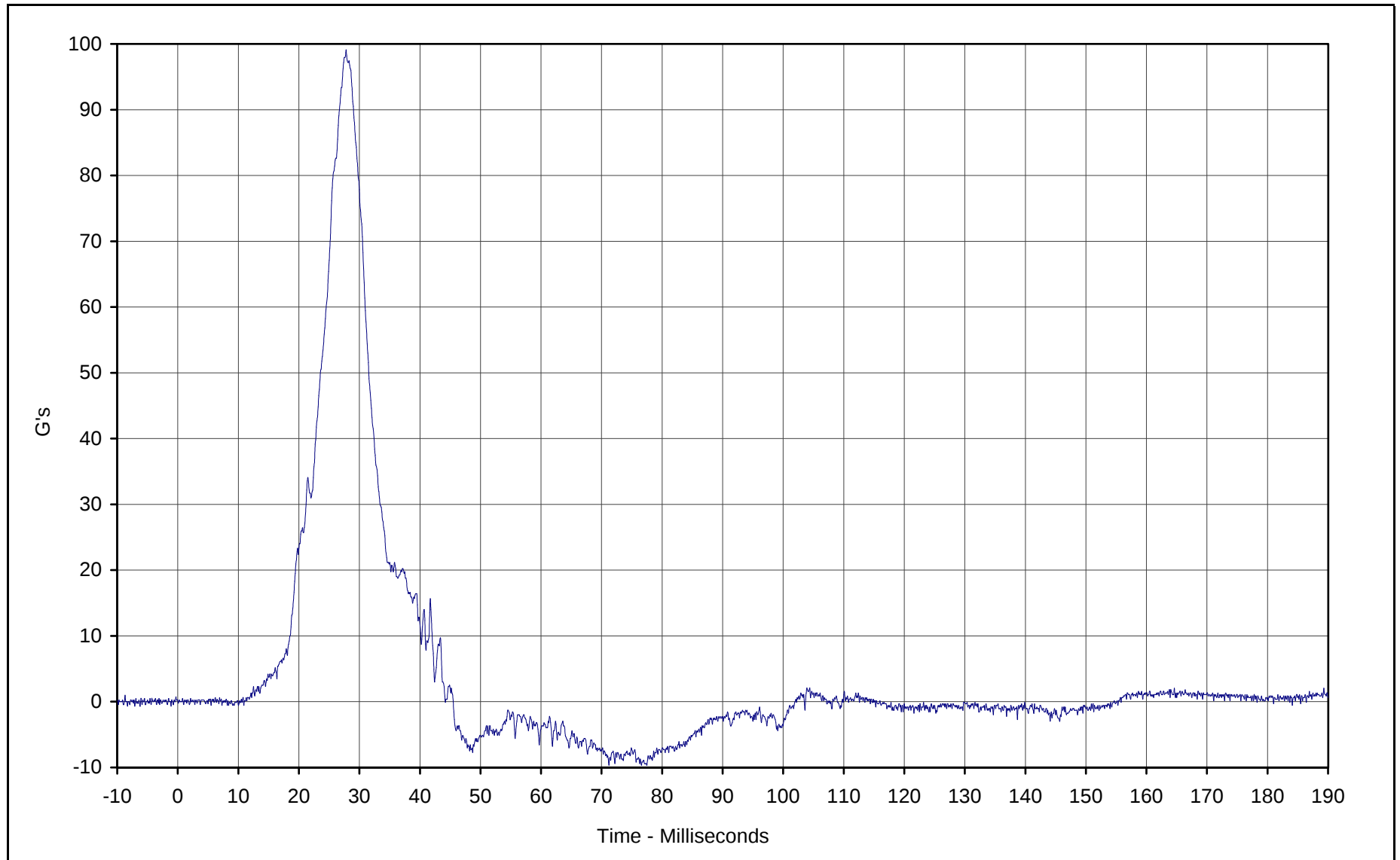
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Curve Number: IN1-0010

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

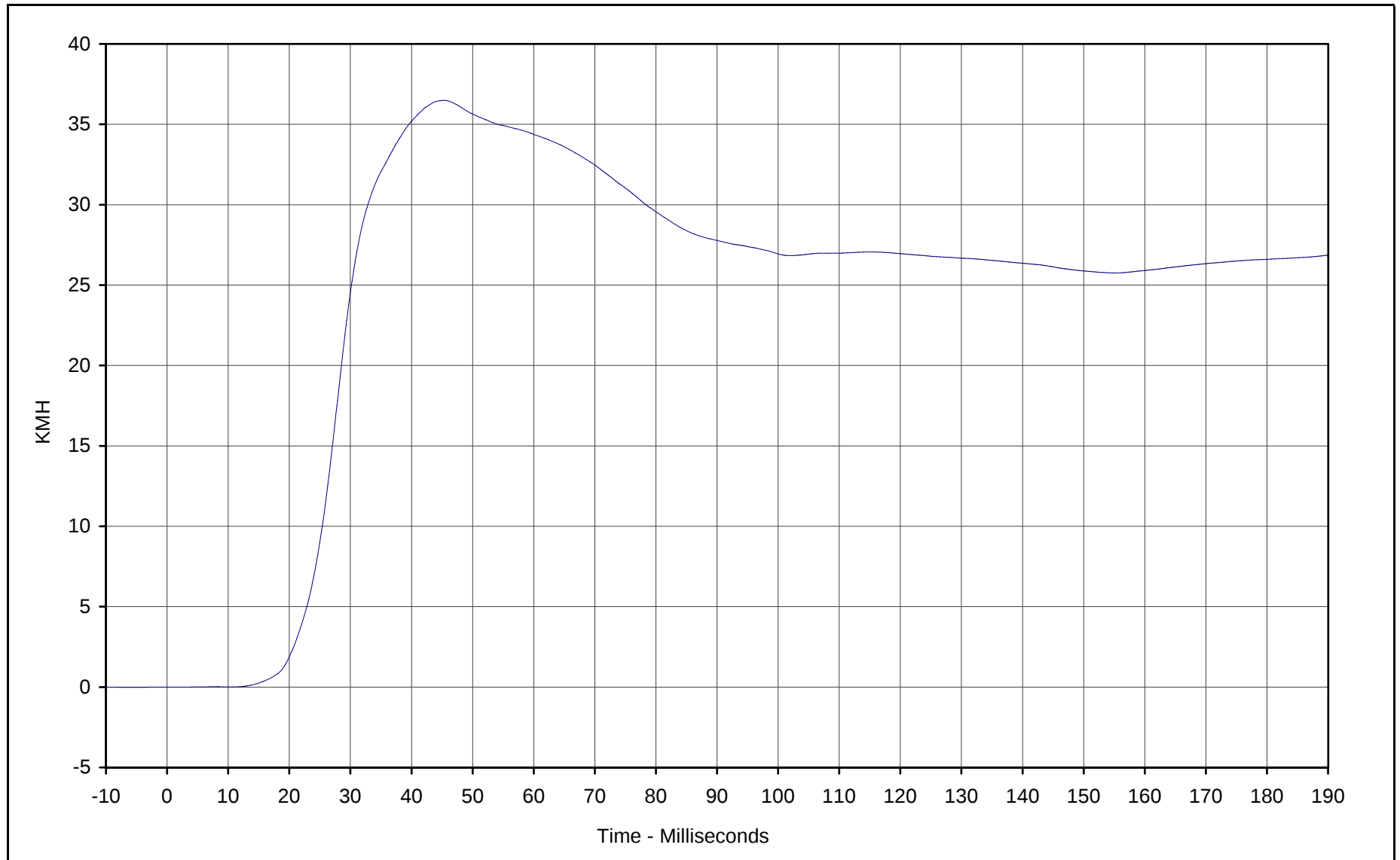




Curve Description: Driver Pelvis Redundant Y
Maximum Value: 99.1 at 27.8 Milliseconds
Minimum Value: -9.7 at 71.2 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-011

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

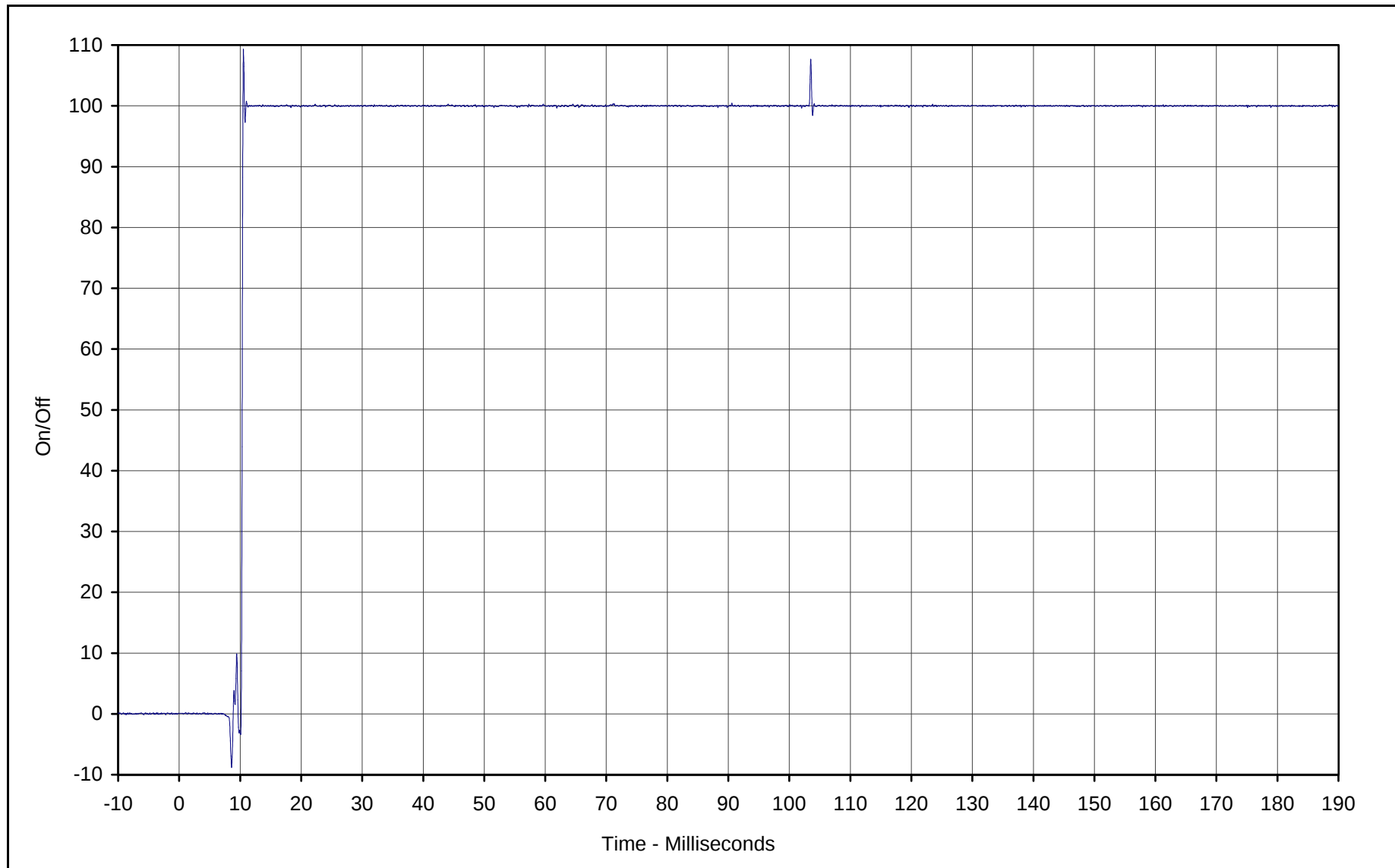




Curve Description: Driver Pelvis Redundant Y Velocity
Maximum Value: 36.5 at 45.3 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-011

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Thorax Contact

Maximum Value: 109.0 at 10.5 Milliseconds

Crossing Point: 50% at 10.4 Milliseconds

SAE Filter Class: 1000

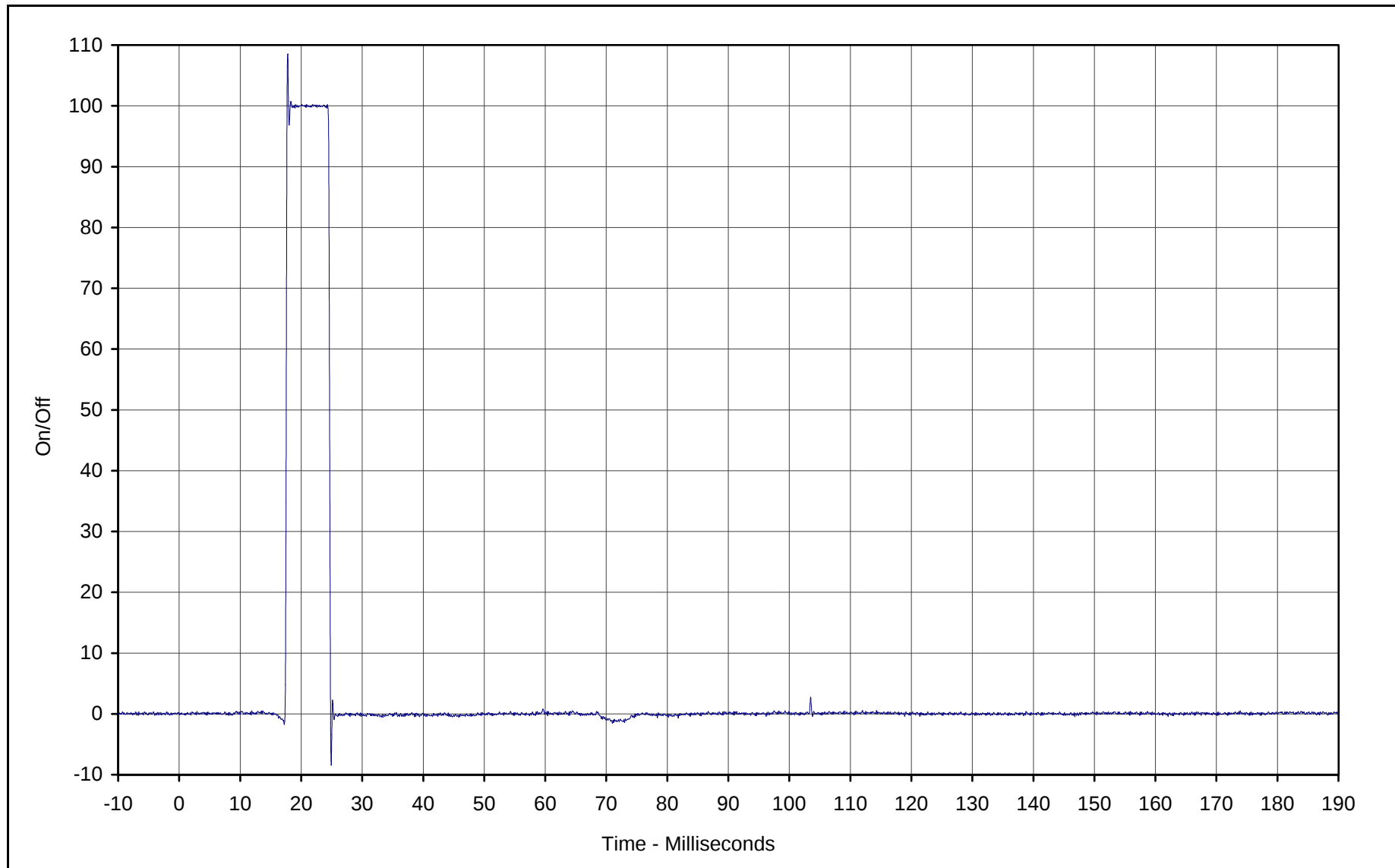
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Curve Number: FIL-012

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

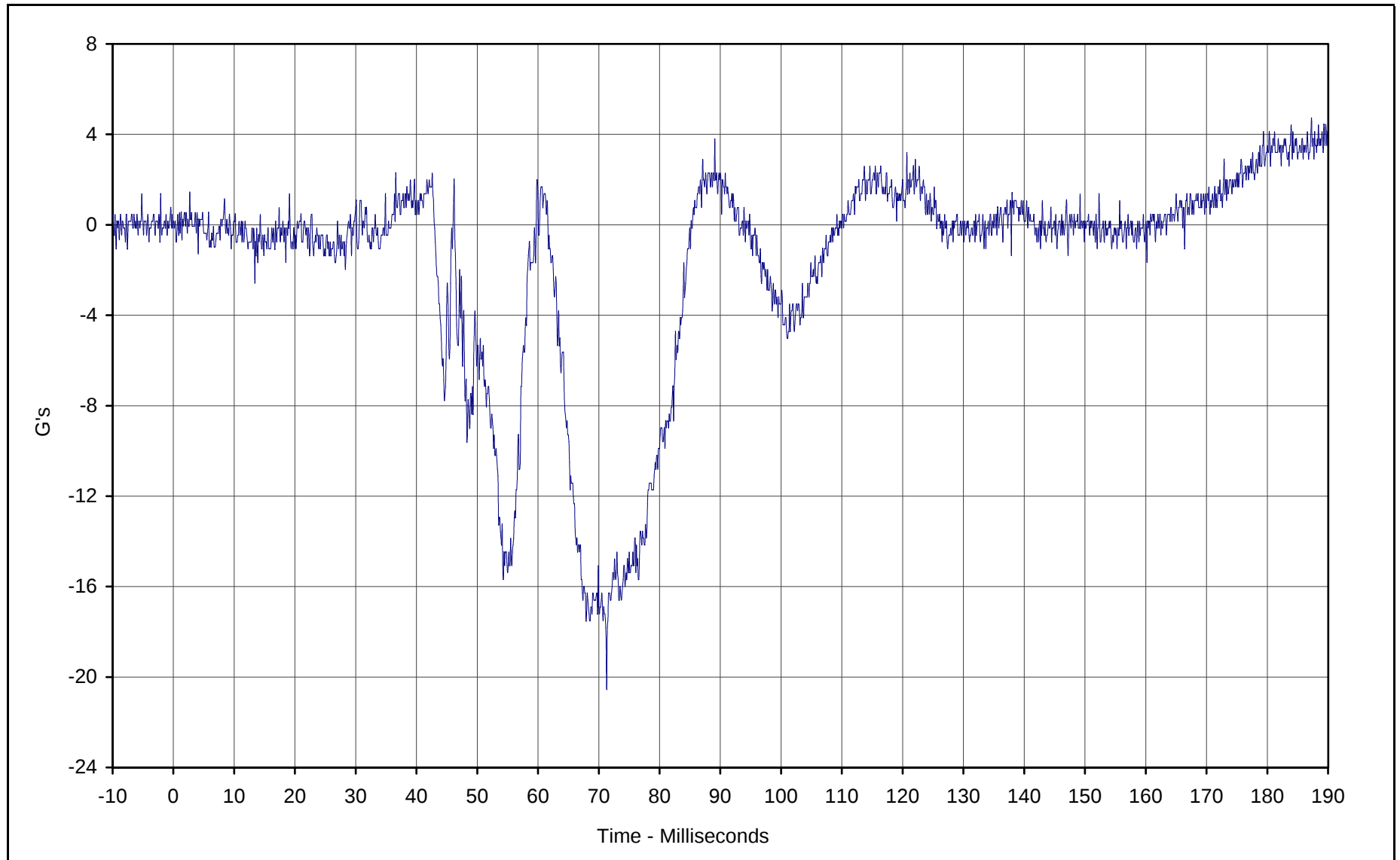




Curve Description: Driver Pelvis Contact
Maximum Value: 108.5 at 17.8 Milliseconds
Crossing Point: 50% at 17.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-013

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

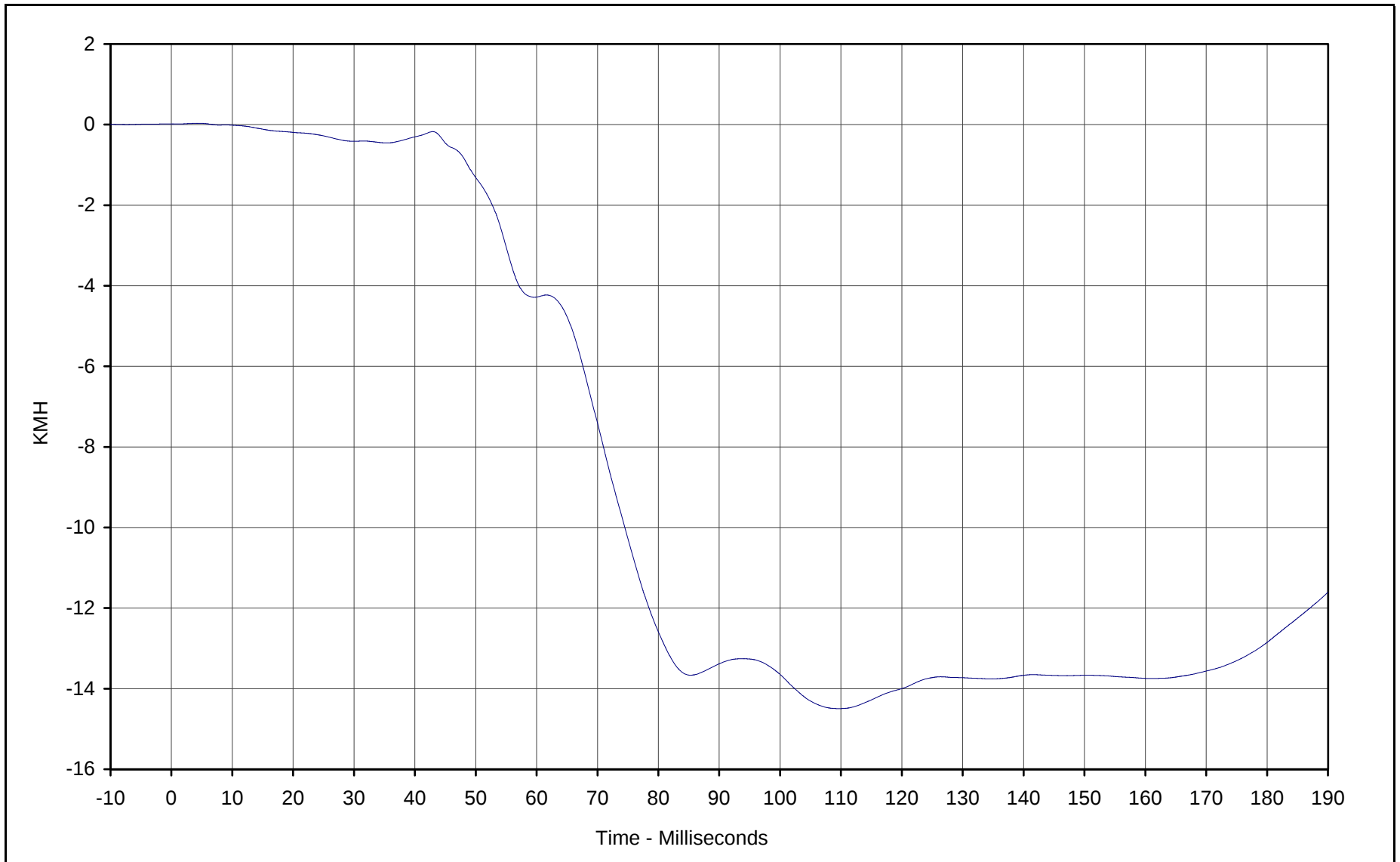




Curve Description: Pass. Head CG X
Maximum Value: 4.7 at 187.3 Milliseconds
Minimum Value: -20.6 at 71.3 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-014

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

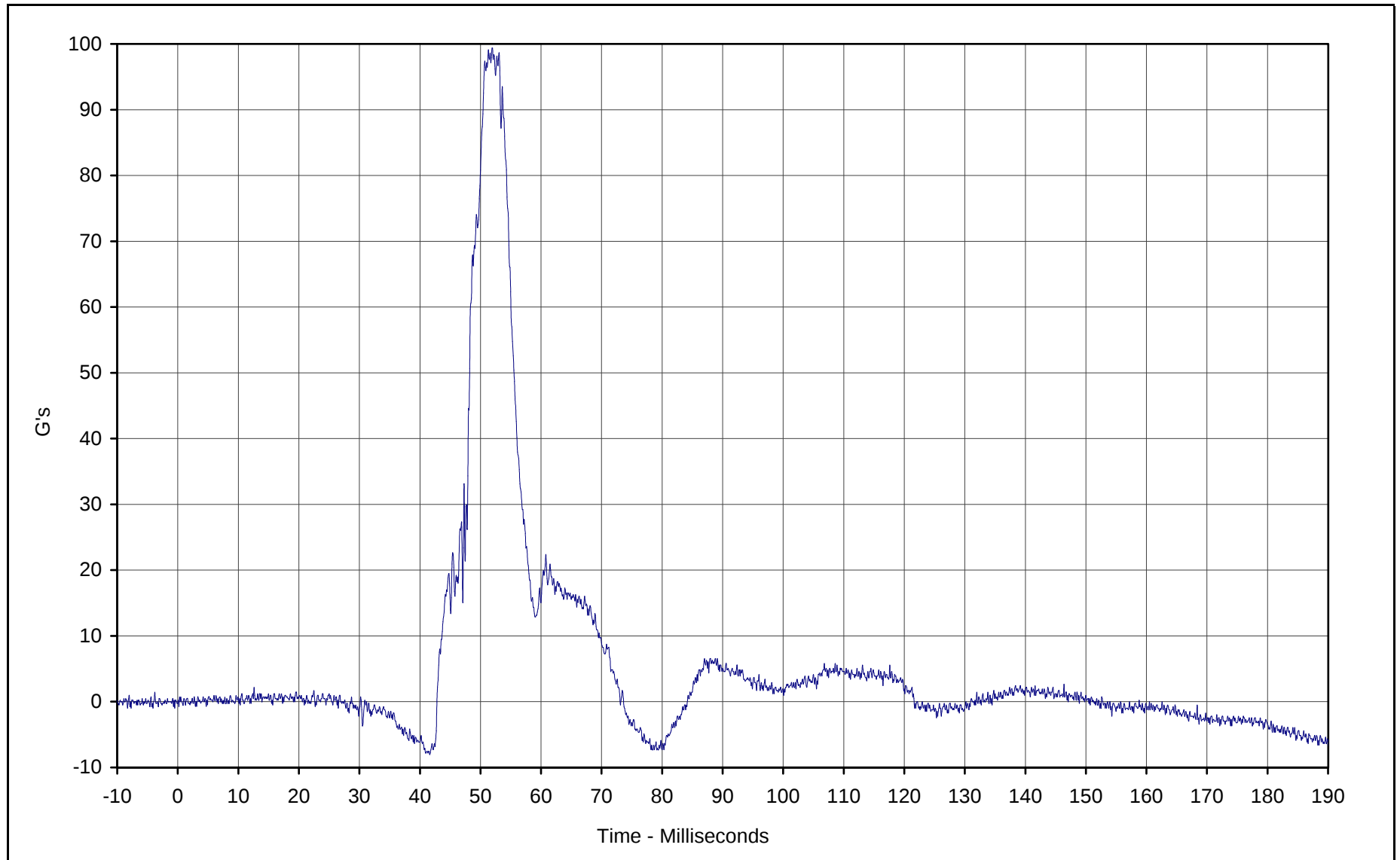




Curve Description: Pass. Head CG X Velocity
Maximum Value: 0.0 at 4.6 Milliseconds
Minimum Value: -14.5 at 109.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-014

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

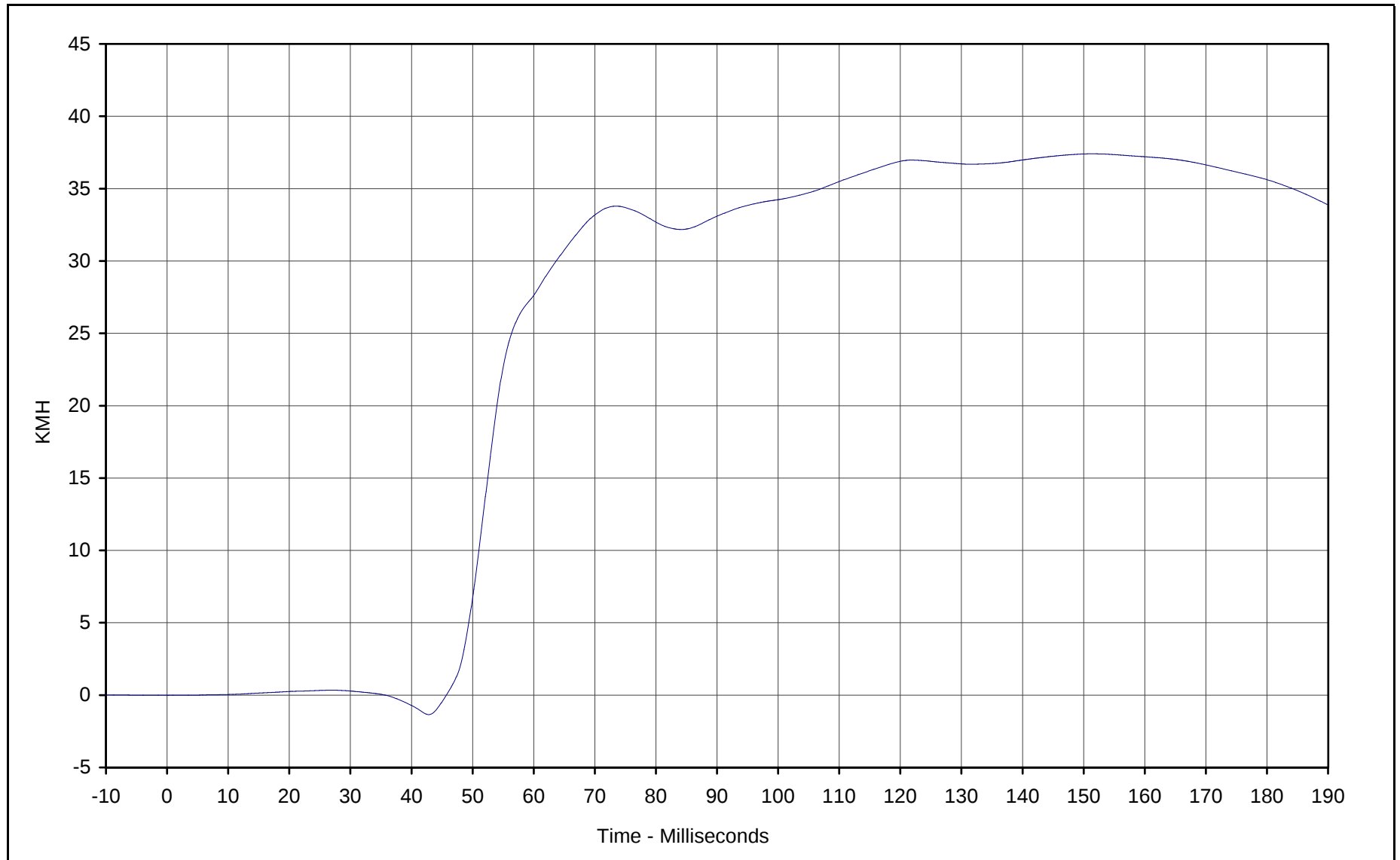




Curve Description: Pass. Head CG Y
Maximum Value: 99.3 at 51.9 Milliseconds
Minimum Value: -8.1 at 41.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-015

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

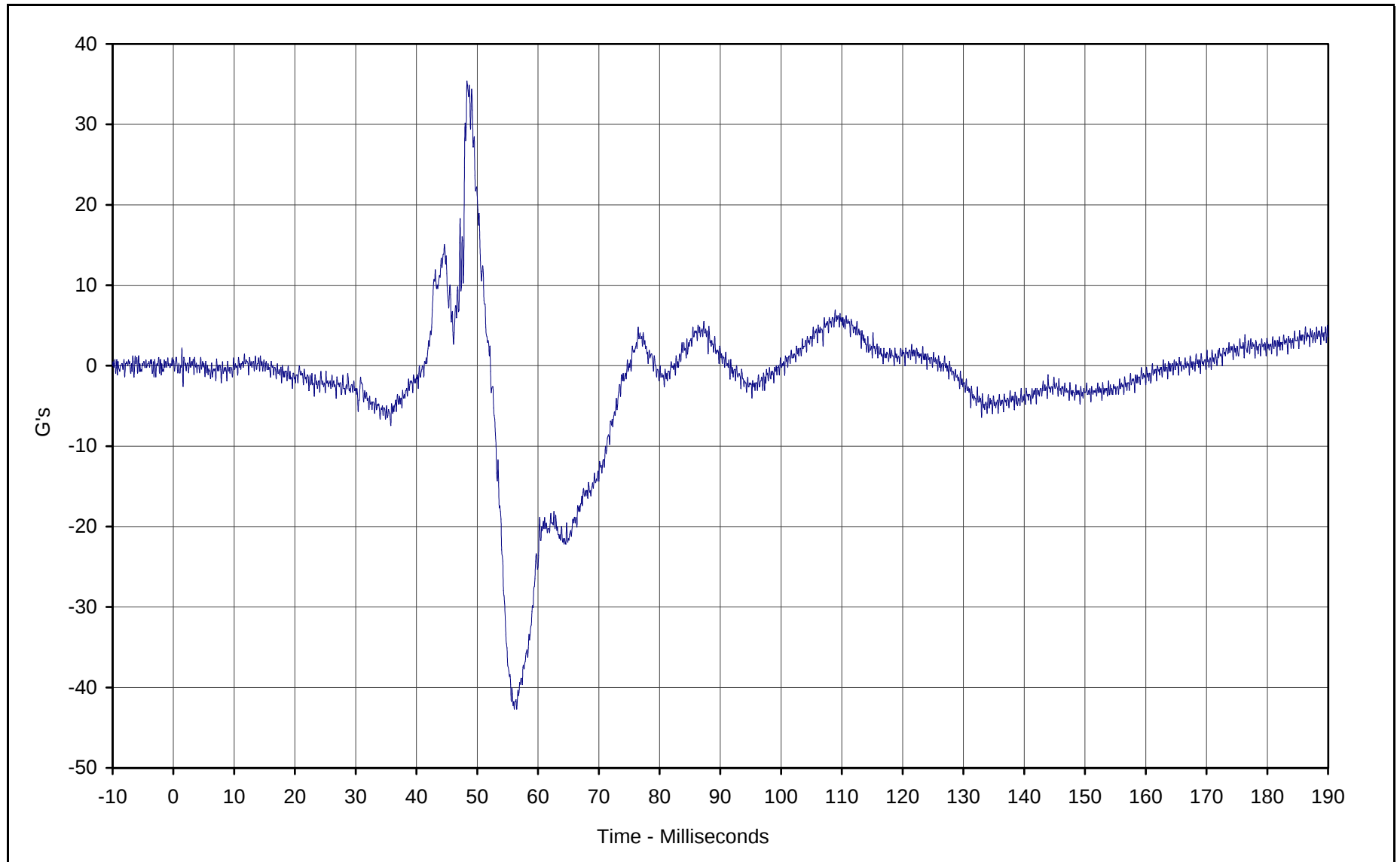




Curve Description: Pass. Head CG Y Velocity
Maximum Value: 37.4 at 151.4 Milliseconds
Minimum Value: -1.3 at 42.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-015

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

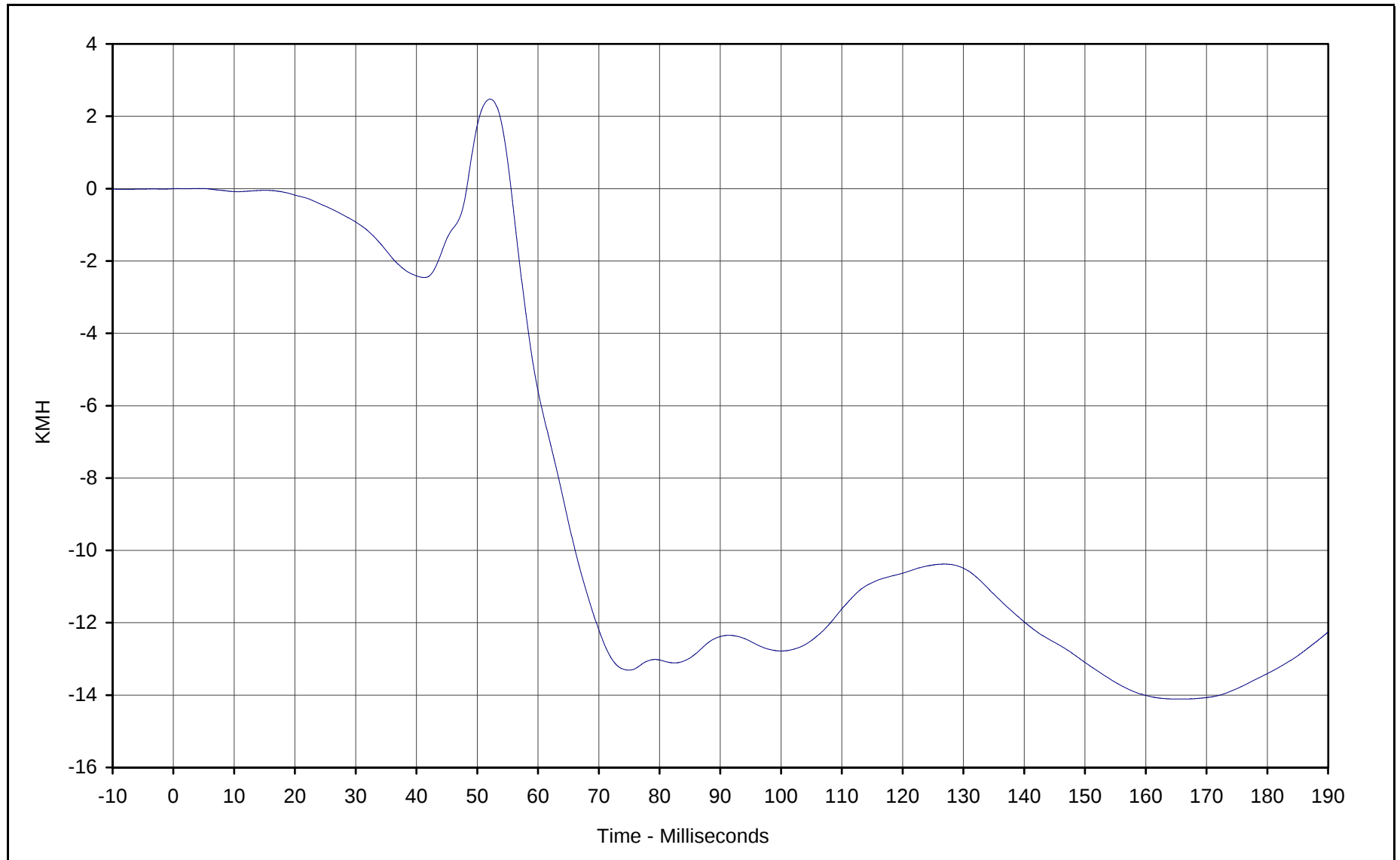




Curve Description: Pass. Head CG Z
Maximum Value: 35.4 at 48.3 Milliseconds
Minimum Value: -42.7 at 56.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-016

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

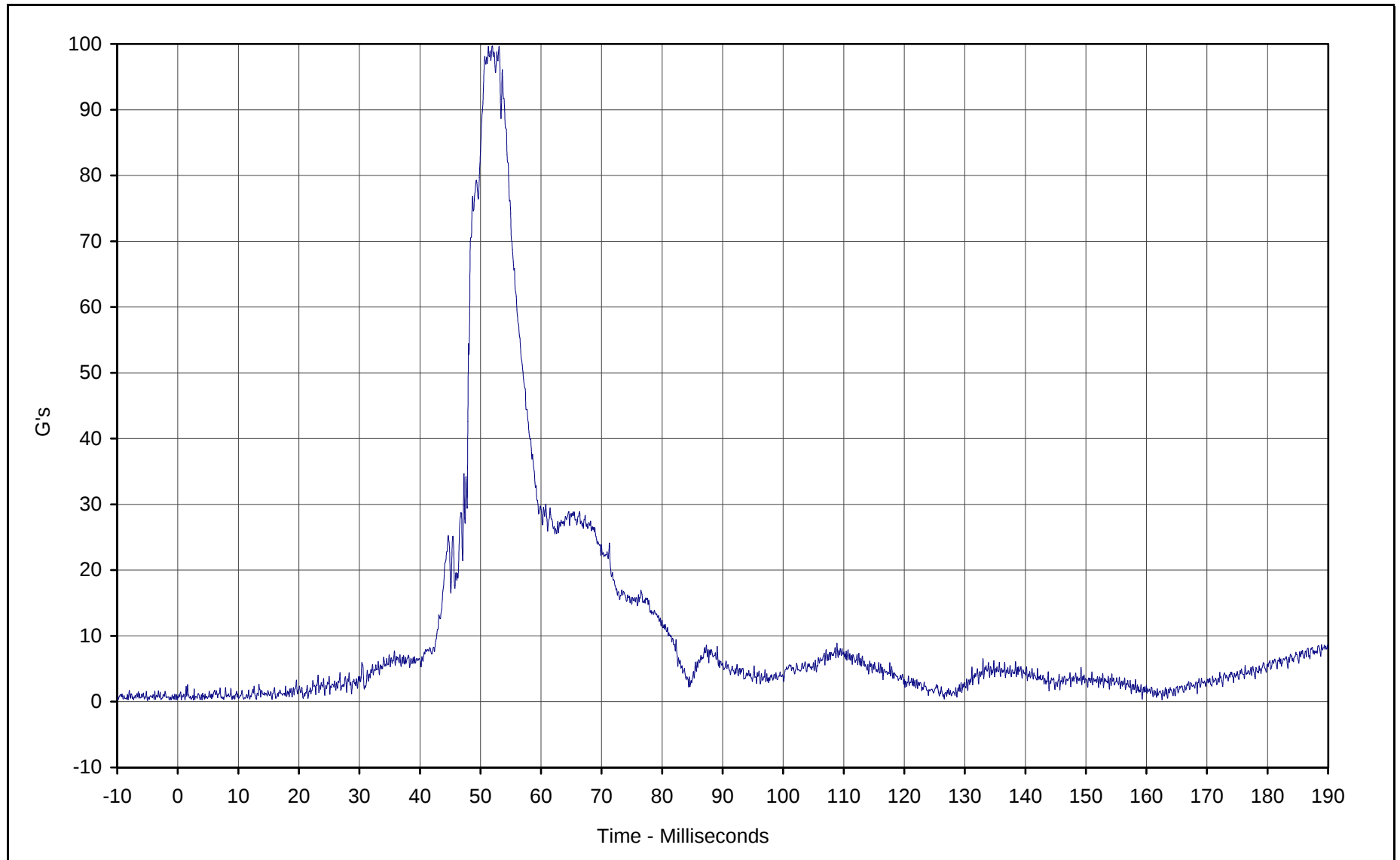




Curve Description: Pass. Head CG Z Velocity
Maximum Value: 2.5 at 52.1 Milliseconds
Minimum Value: -14.1 at 165.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-016

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

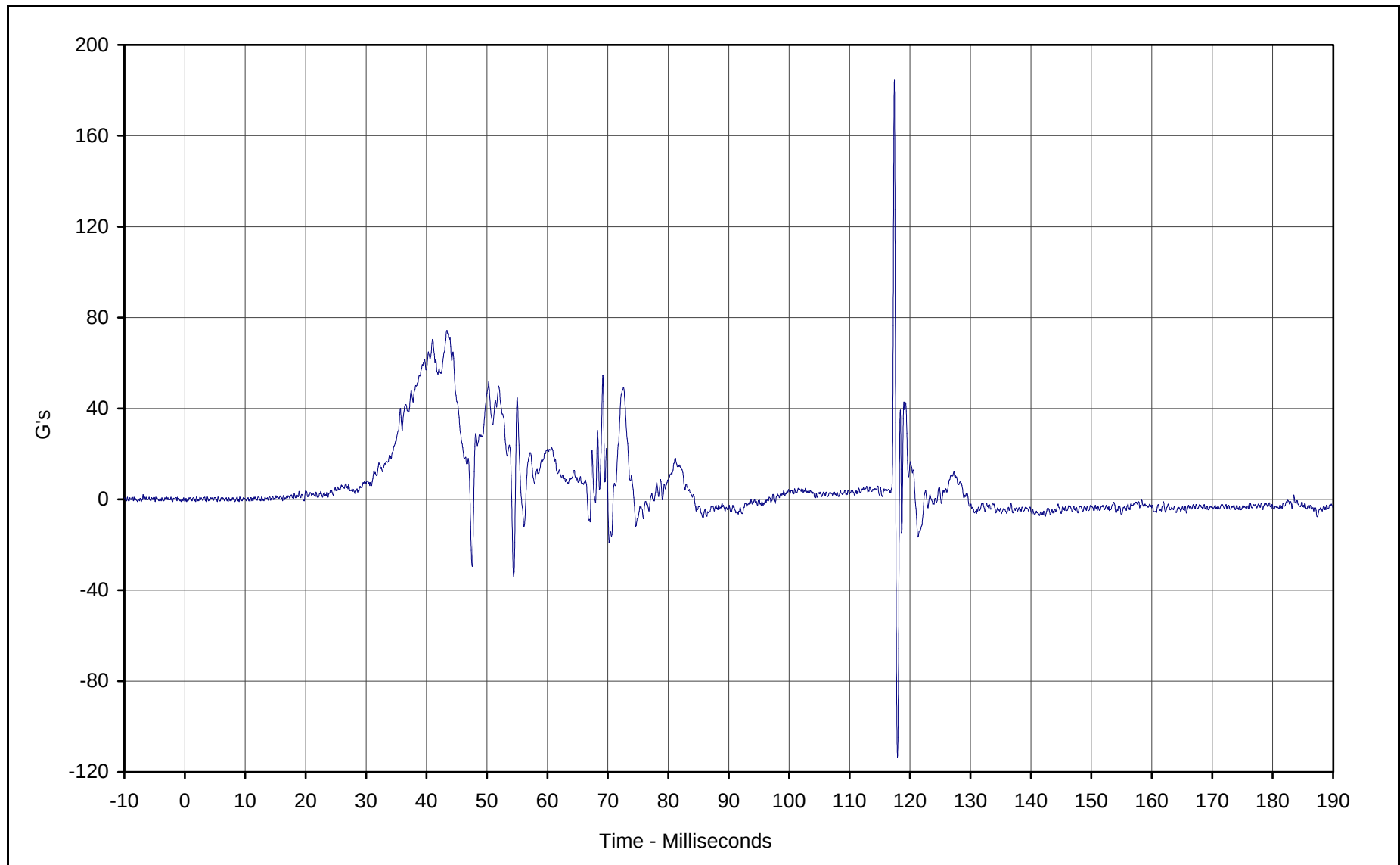




Curve Description: Pass. Head CG Resultant
Maximum Value: 99.7 at 52.0 Milliseconds
Minimum Value: 0.2 at 4.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: RES-014

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

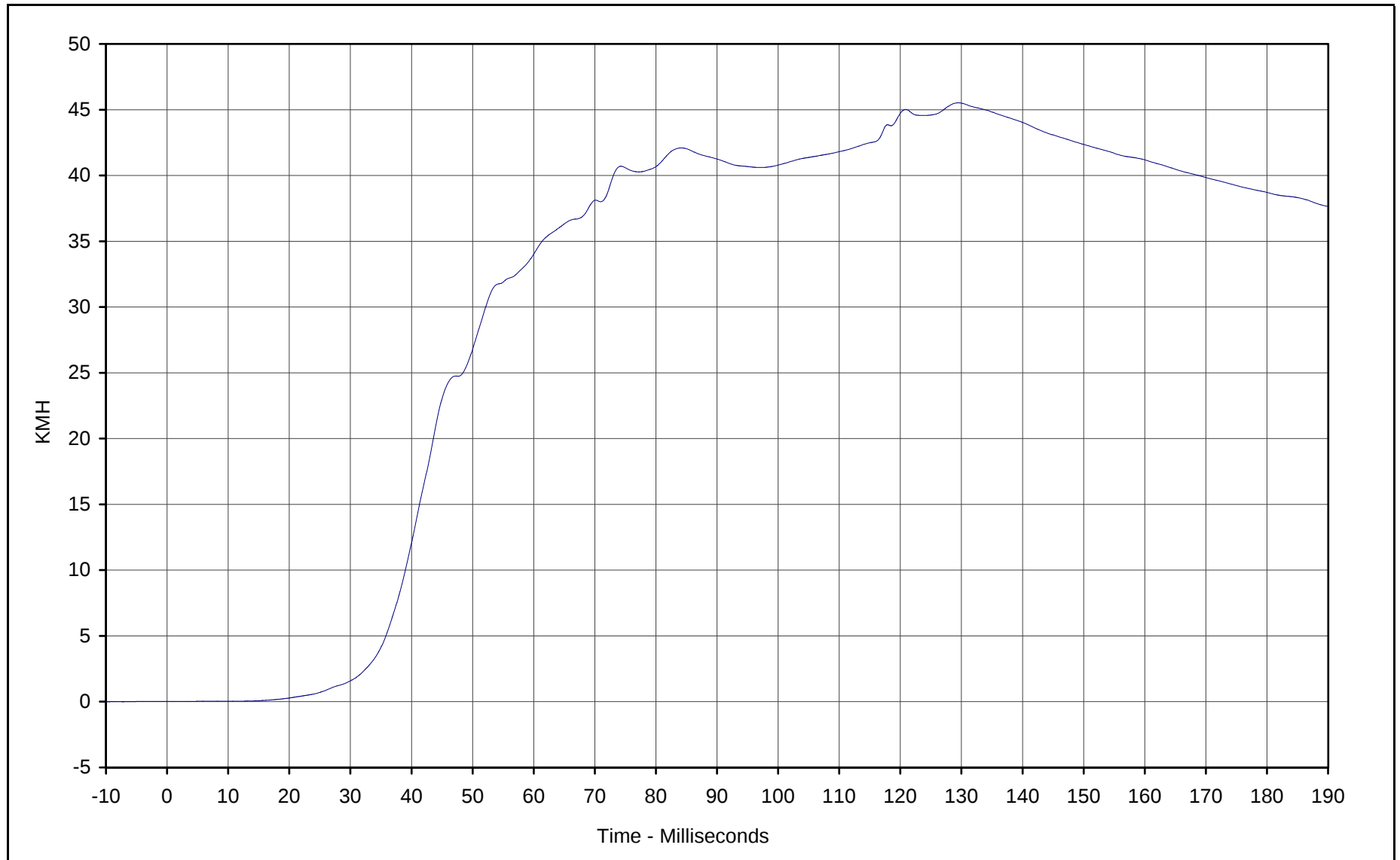




Curve Description: Pass. Upper Rib Primary Y
Maximum Value: 183.9 at 117.4 Milliseconds
Minimum Value: -113.3 at 117.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-017

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Pass. Upper Rib Primary Y Velocity

Maximum Value: 45.5 at 129.5 Milliseconds

Minimum Value: 0.0 at 0.8 Milliseconds

SAE Filter Class: 180

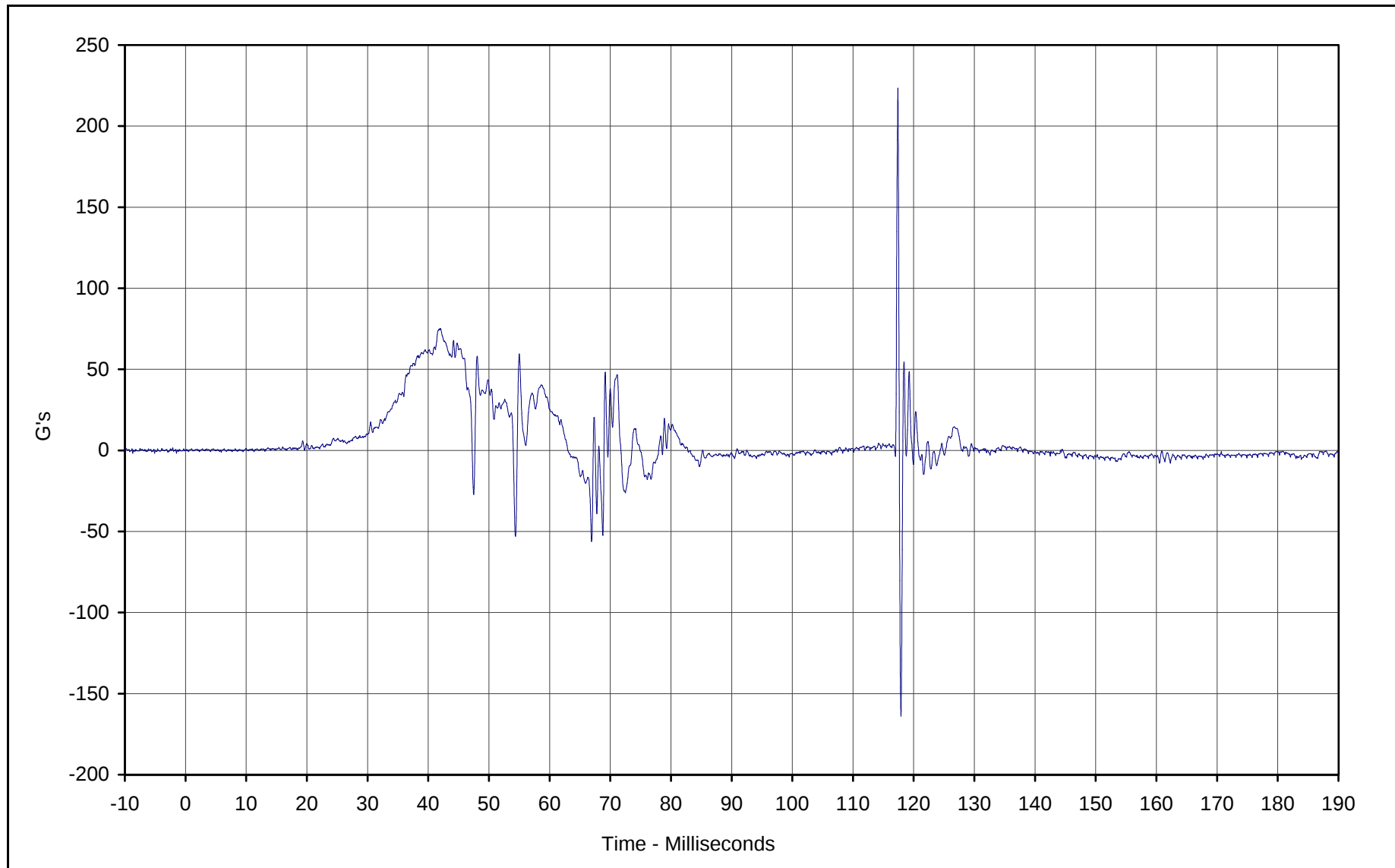
Date of Test: 12/08/00

Curve Number: IN1-017

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

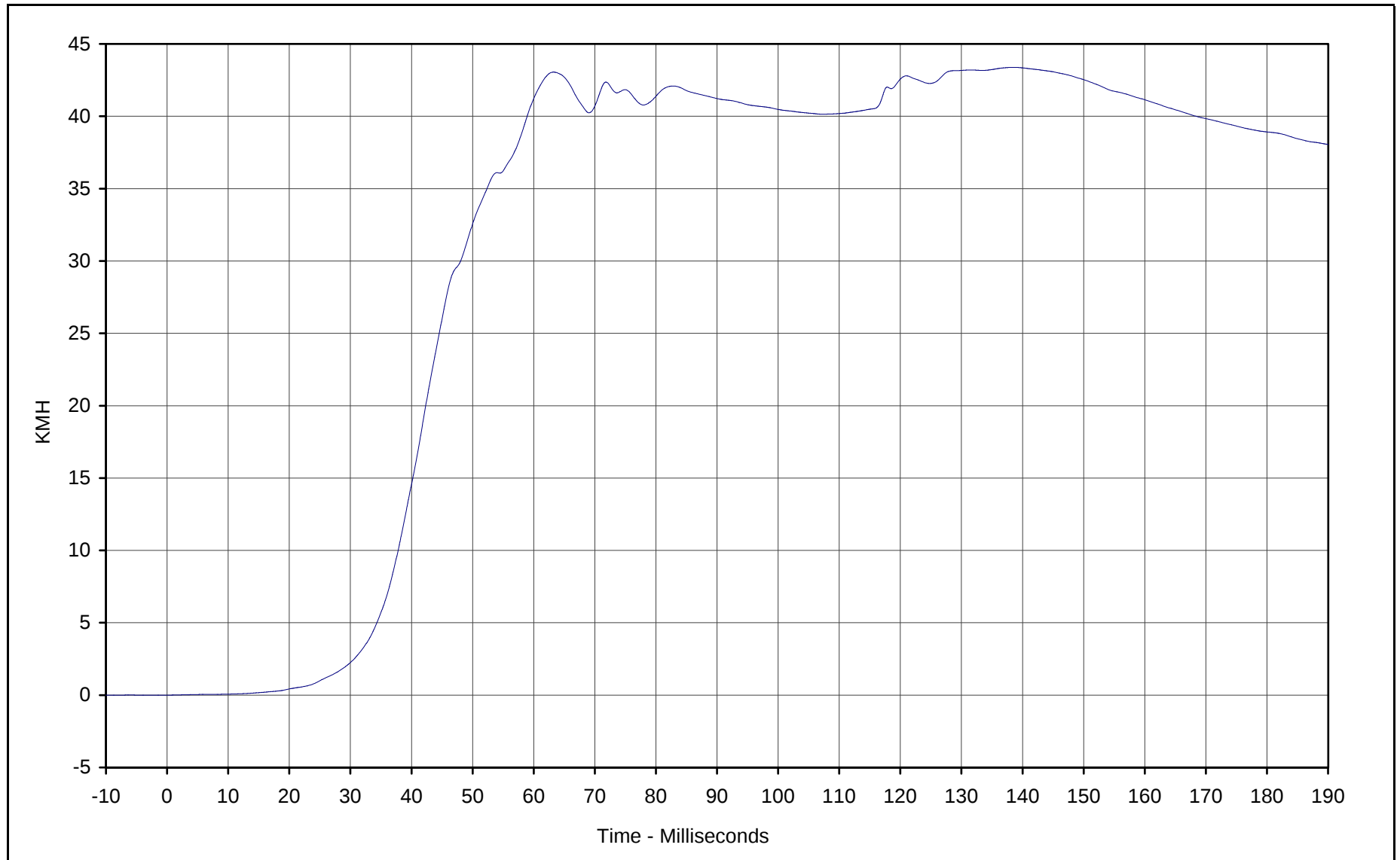




Curve Description: Pass. Lower Rib Primary Y
Maximum Value: 222.0 at 117.4 Milliseconds
Minimum Value: -163.7 at 117.9 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-018

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Pass. Lower Rib Primary Y Velocity

Maximum Value: 43.4 at 138.6 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

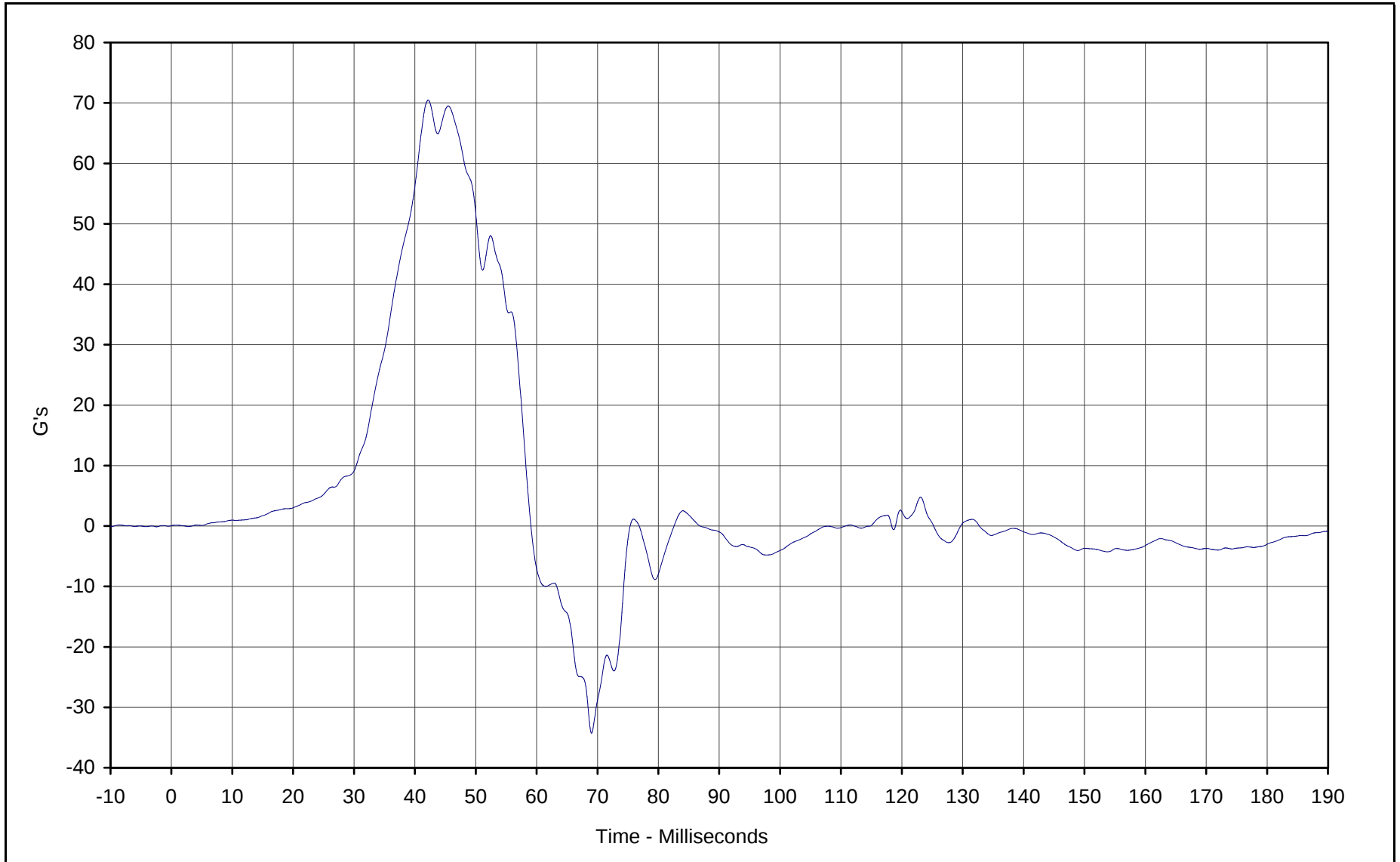
Date of Test: 12/08/00

Curve Number: IN1-018

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

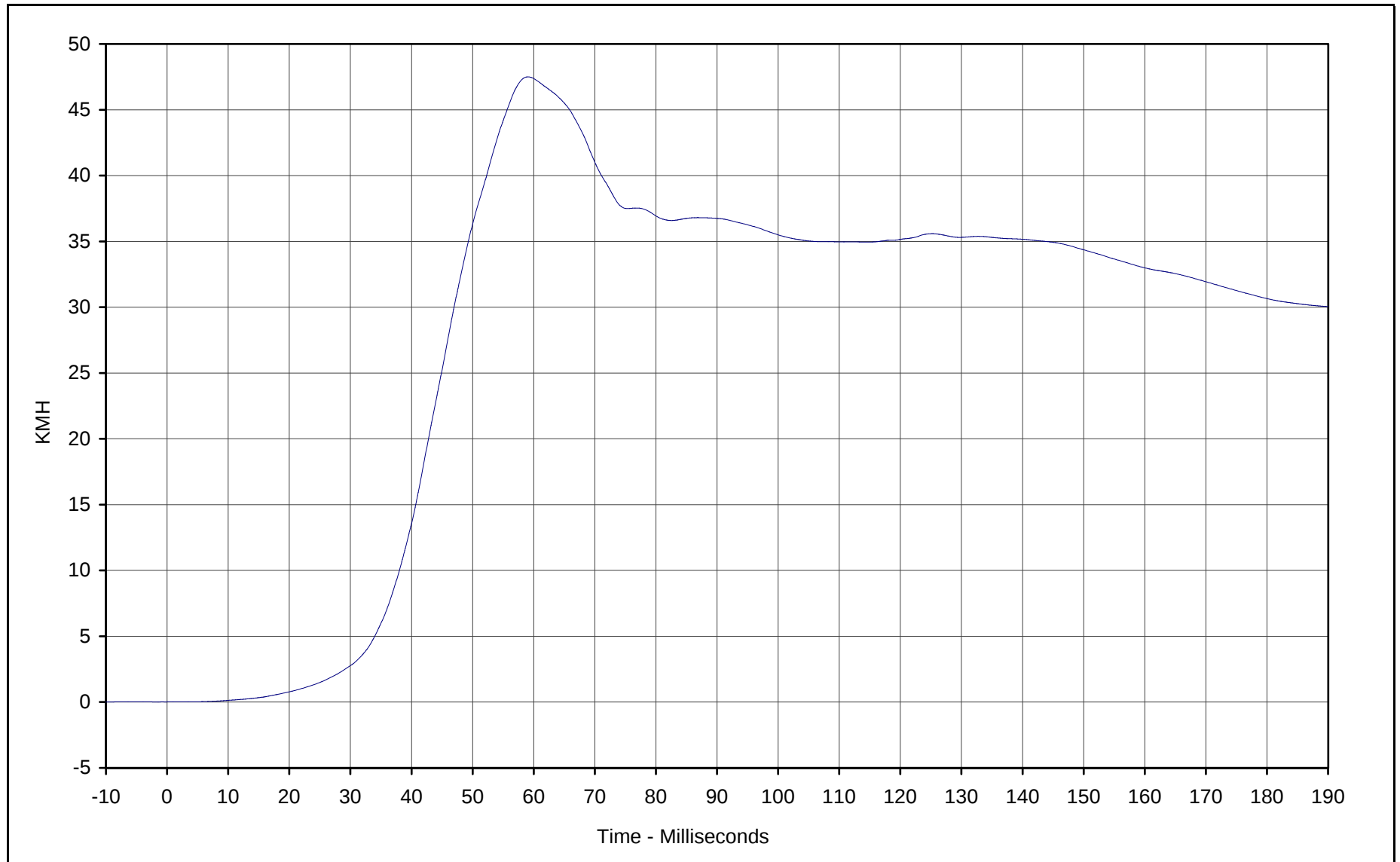




Curve Description: Pass. Lower Spine Primary Y
Maximum Value: 70.5 at 42.2 Milliseconds
Minimum Value: -34.3 at 69.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: FIL-019

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Pass. Lower Spine Primary Y Velocity

Maximum Value: 47.5 at 59.1 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

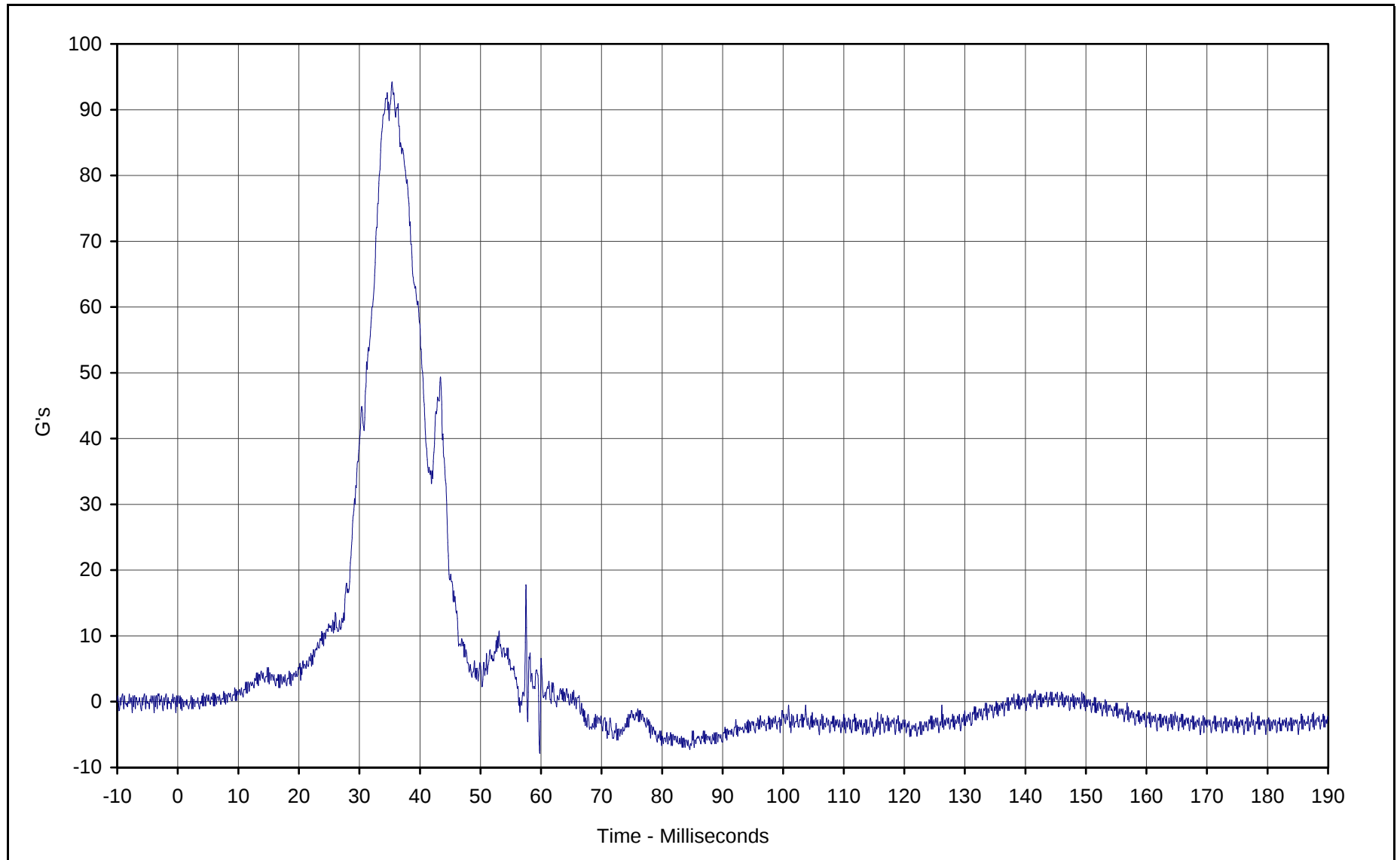
Date of Test: 12/08/00

Curve Number: IN1-019

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

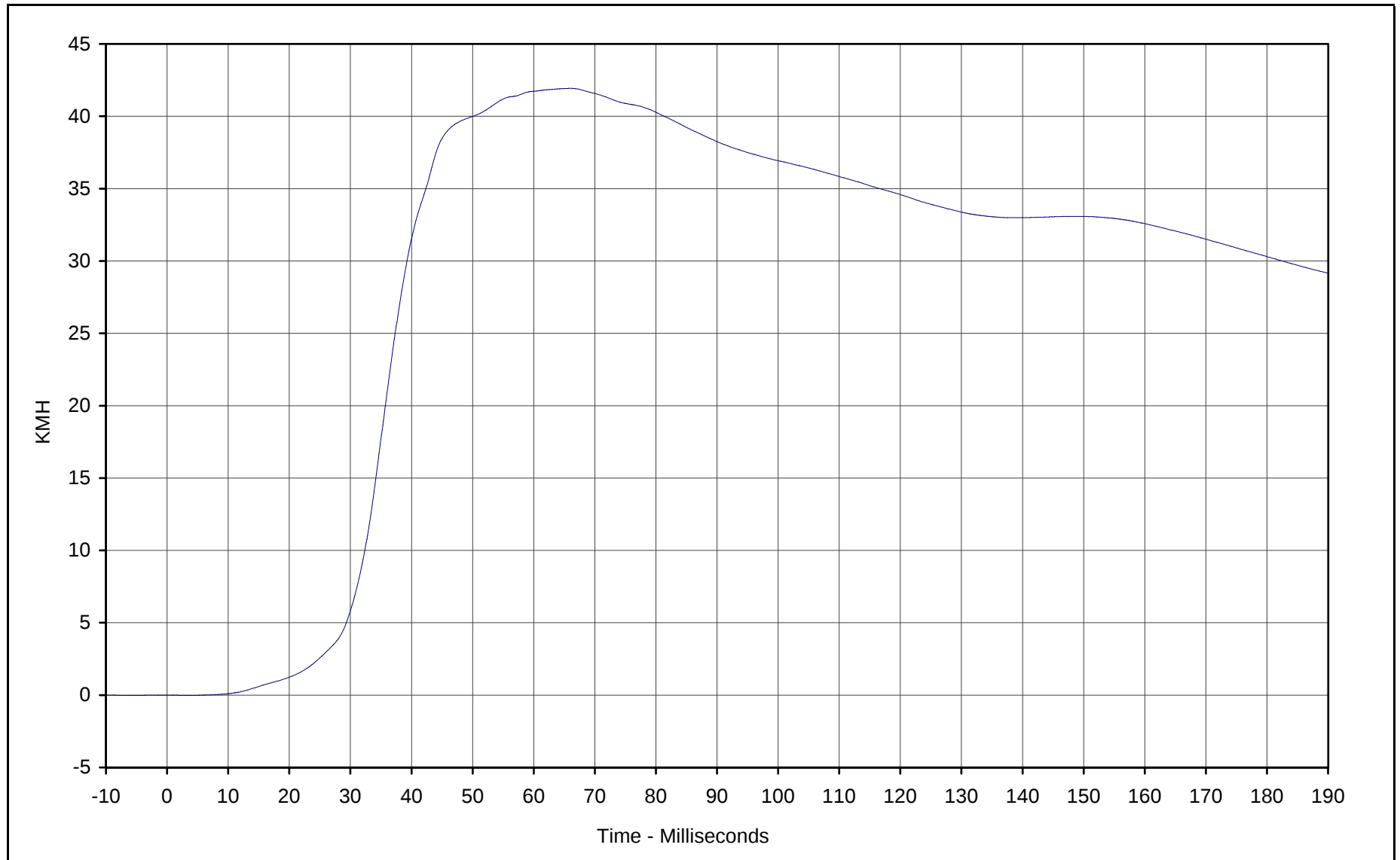




Curve Description: Pass. Pelvis Primary Y
Maximum Value: 94.2 at 35.4 Milliseconds
Minimum Value: -7.8 at 59.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-020

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

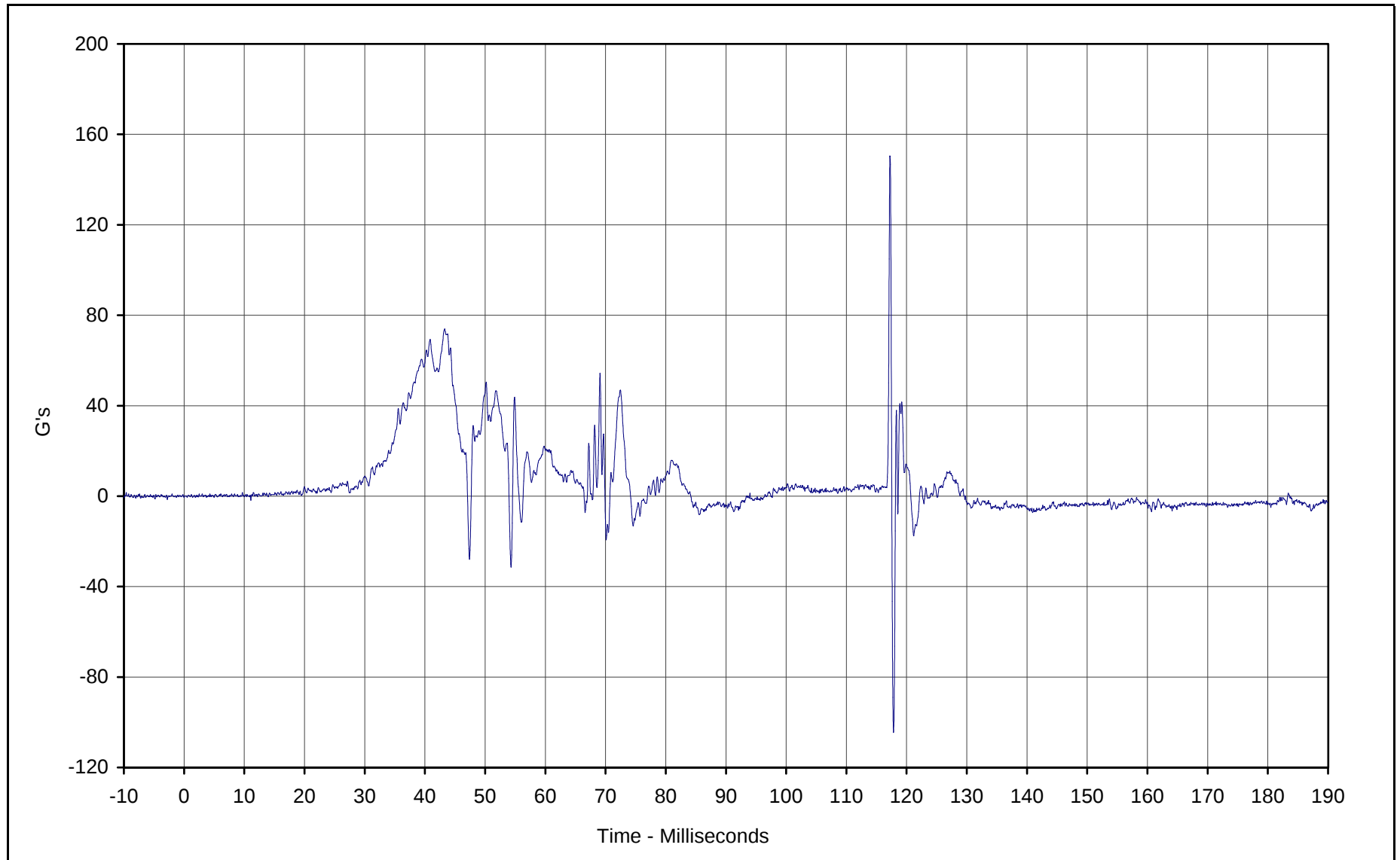




Curve Description: Pass. Pelvis Primary Y Velocity
Maximum Value: 41.9 at 66.0 Milliseconds
Minimum Value: 0.0 at 3.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-020

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

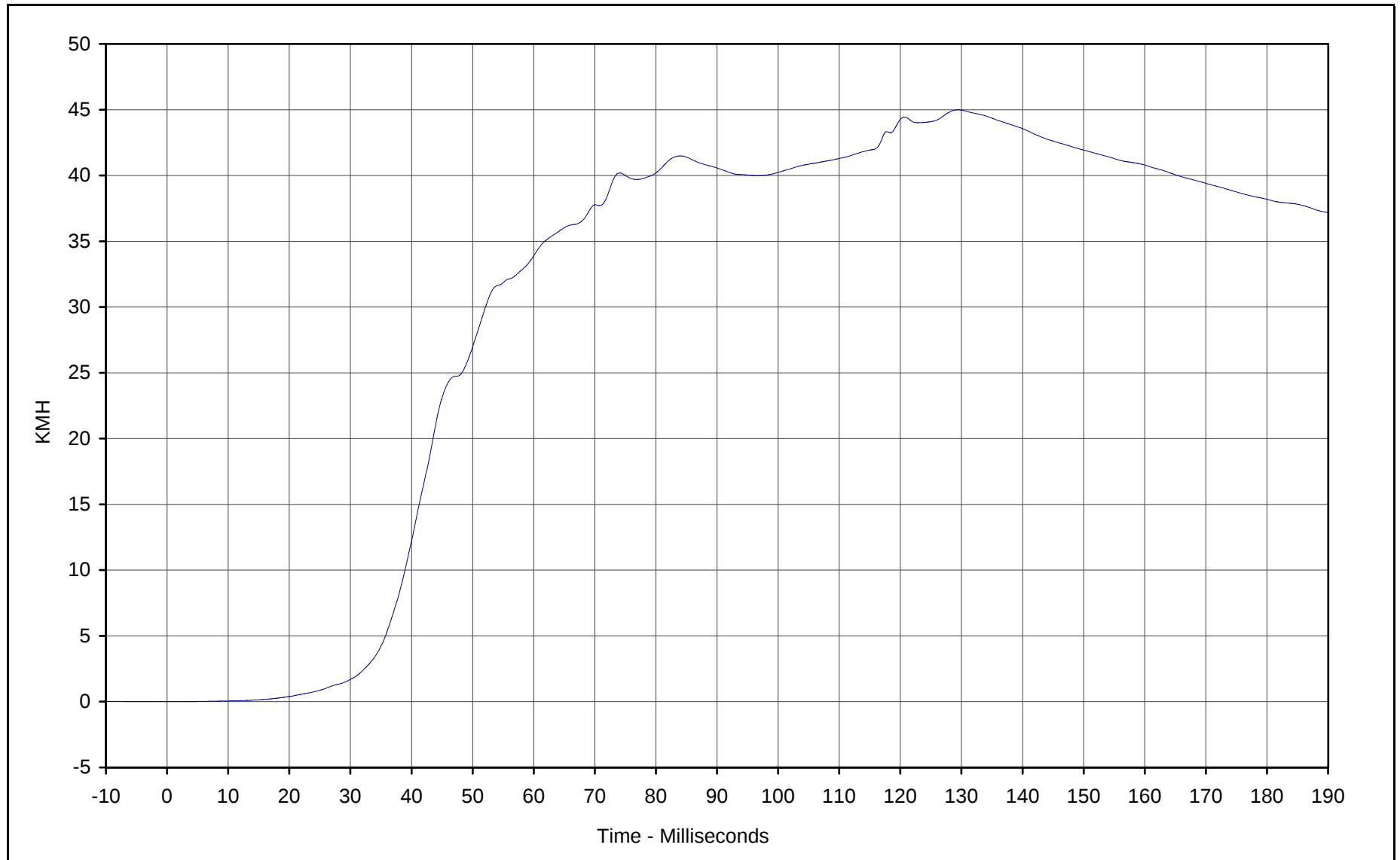




Curve Description: Pass. Upper Rib Redundant Y
Maximum Value: 150.2 at 117.2 Milliseconds
Minimum Value: -104.5 at 117.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-021

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Pass. Upper Rib Redundant Y Velocity

Maximum Value: 45.0 at 129.5 Milliseconds

Minimum Value: 0.0 at 0.3 Milliseconds

SAE Filter Class: 180

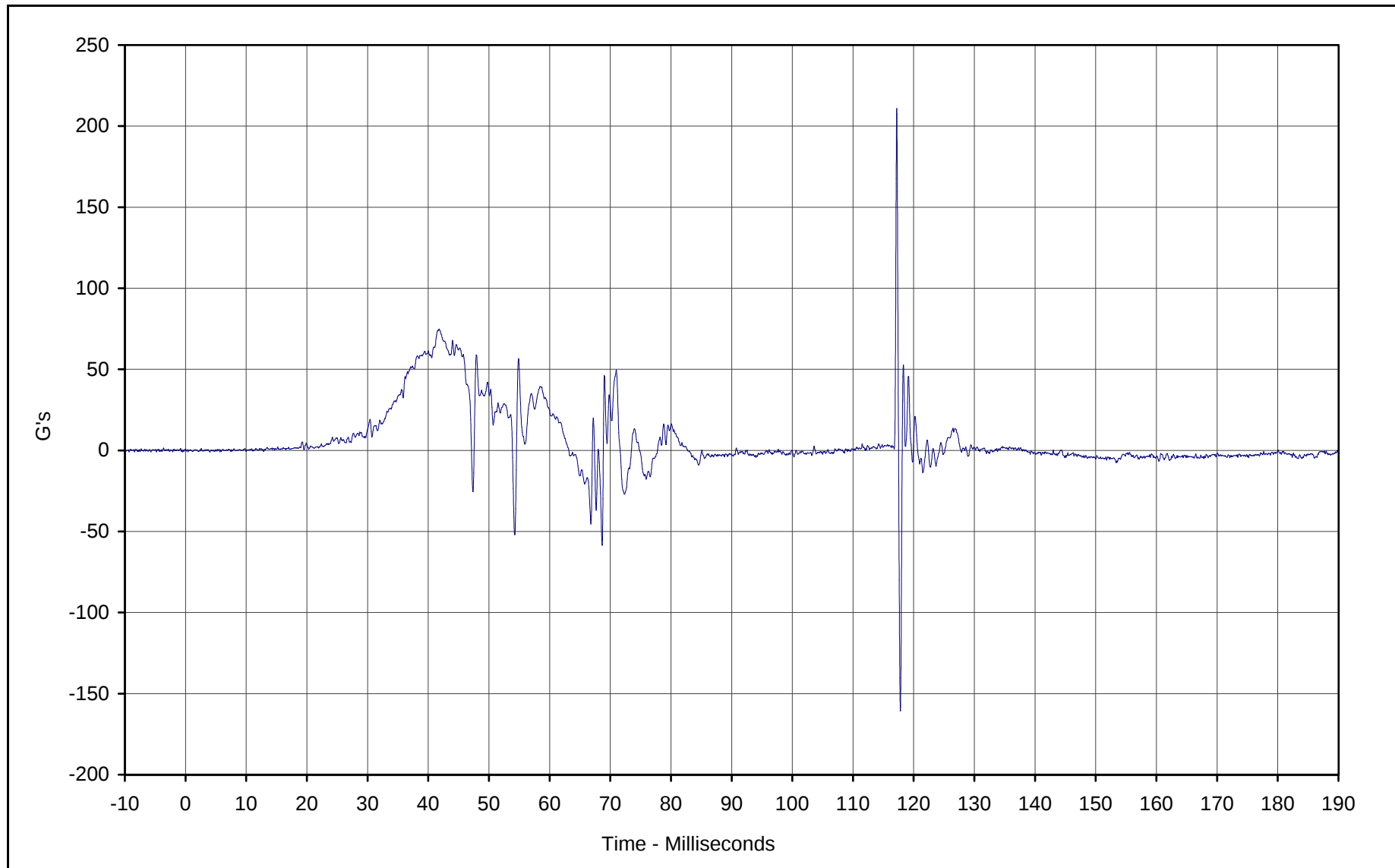
Date of Test: 12/08/00

Curve Number: IN1-021

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

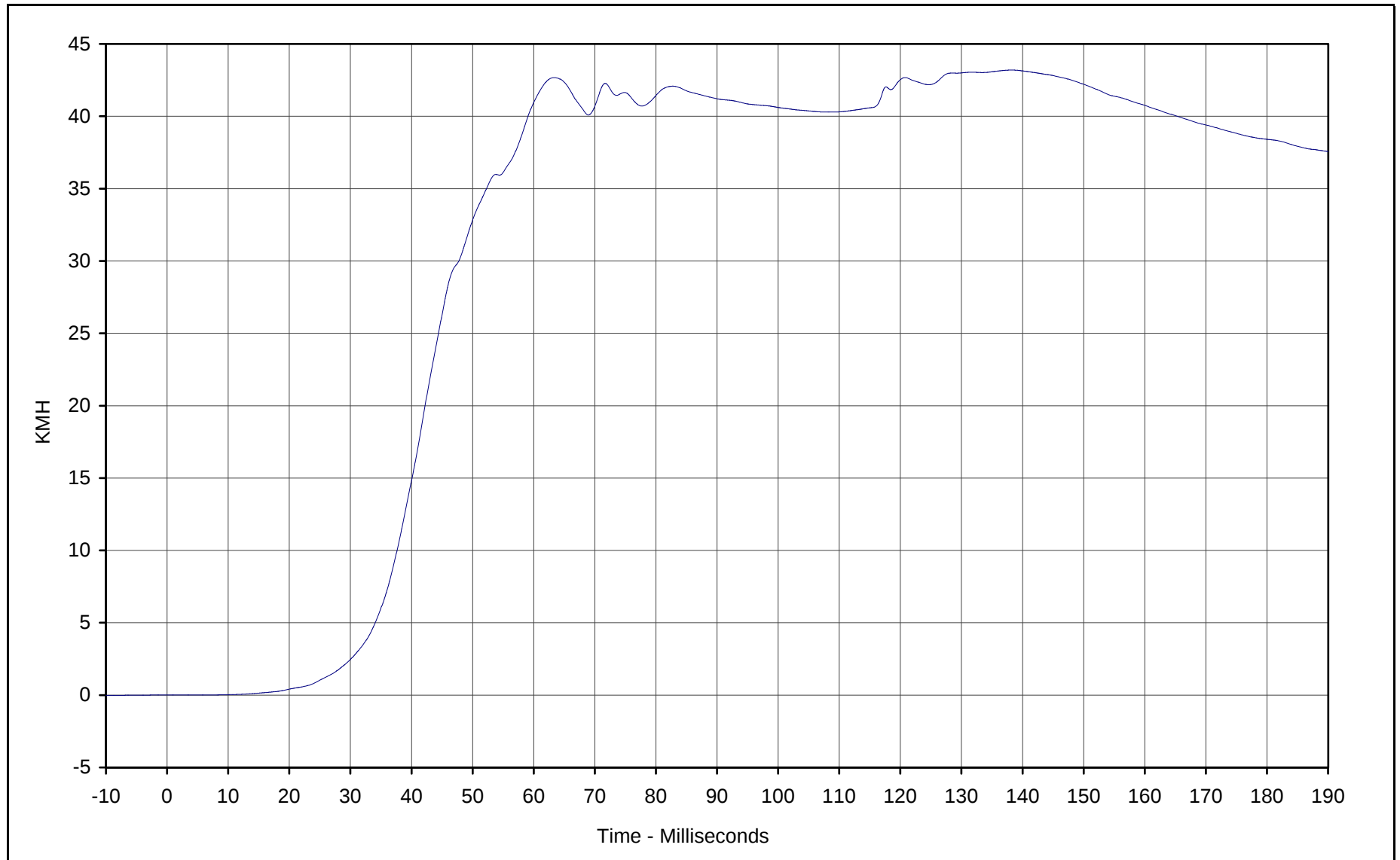




Curve Description: Pass. Lower Rib Redundant Y
Maximum Value: 210.9 at 117.2 Milliseconds
Minimum Value: -160.6 at 117.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-022

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Pass. Lower Rib Redundant Y Velocity

Maximum Value: 43.2 at 138.3 Milliseconds

Minimum Value: 0.0 at 5.5 Milliseconds

SAE Filter Class: 180

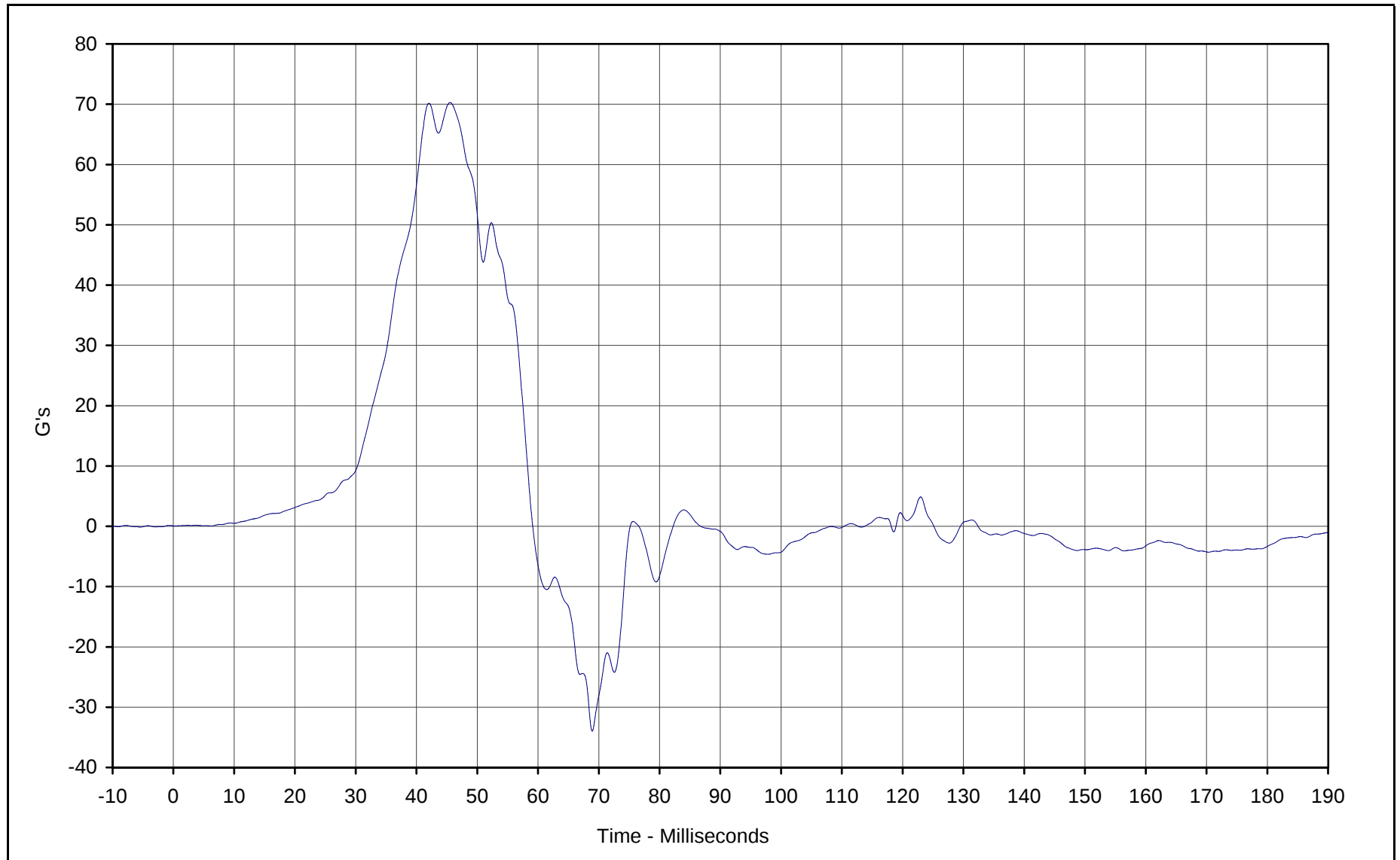
Date of Test: 12/08/00

Curve Number: IN1-022

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

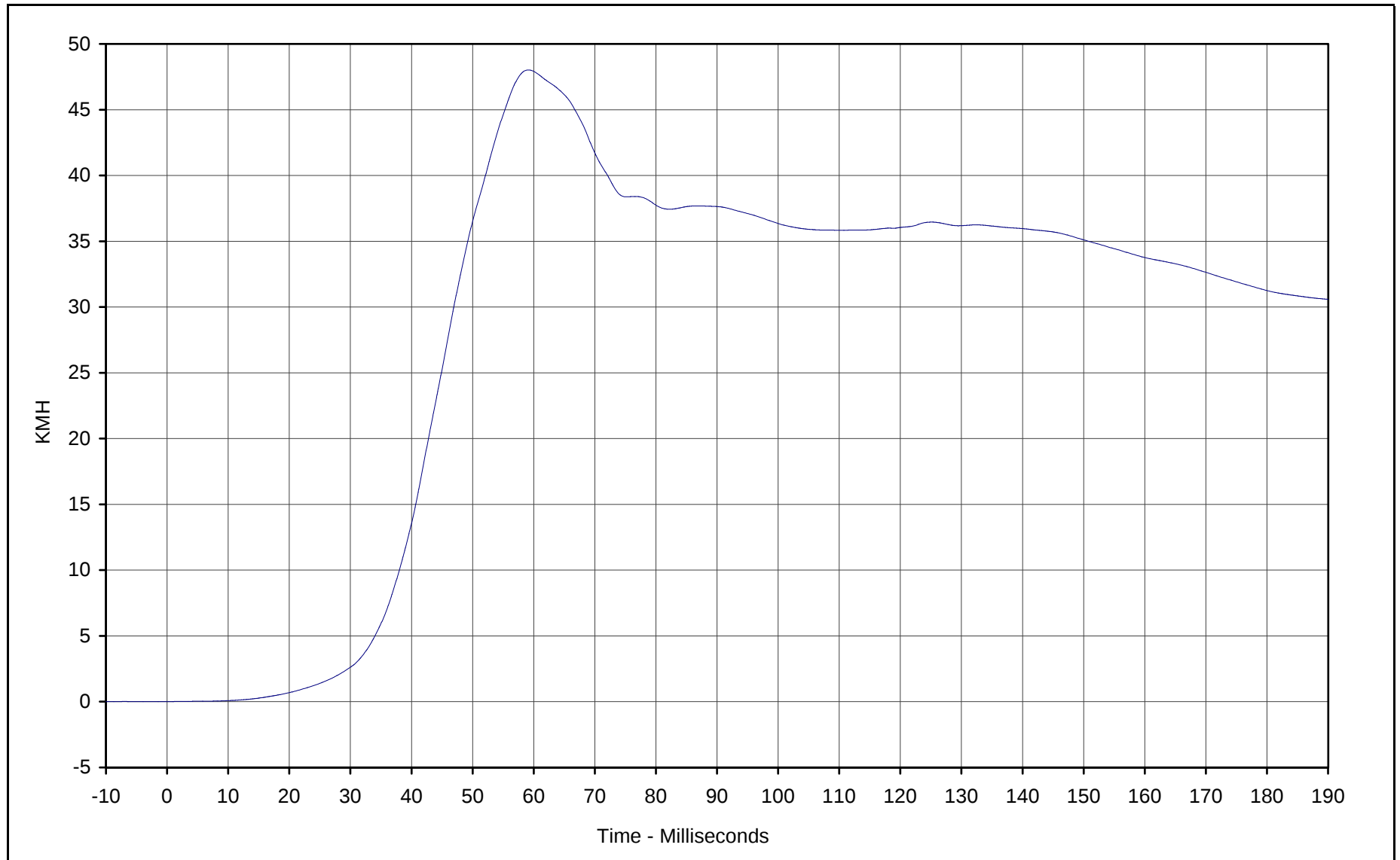




Curve Description: Pass. Lower Spine Redundant Y
Maximum Value: 70.3 at 45.5 Milliseconds
Minimum Value: -34.0 at 68.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: FIL-023

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Pass. Lower Spine Redundant Y Velocity

Maximum Value: 48.0 at 59.1 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

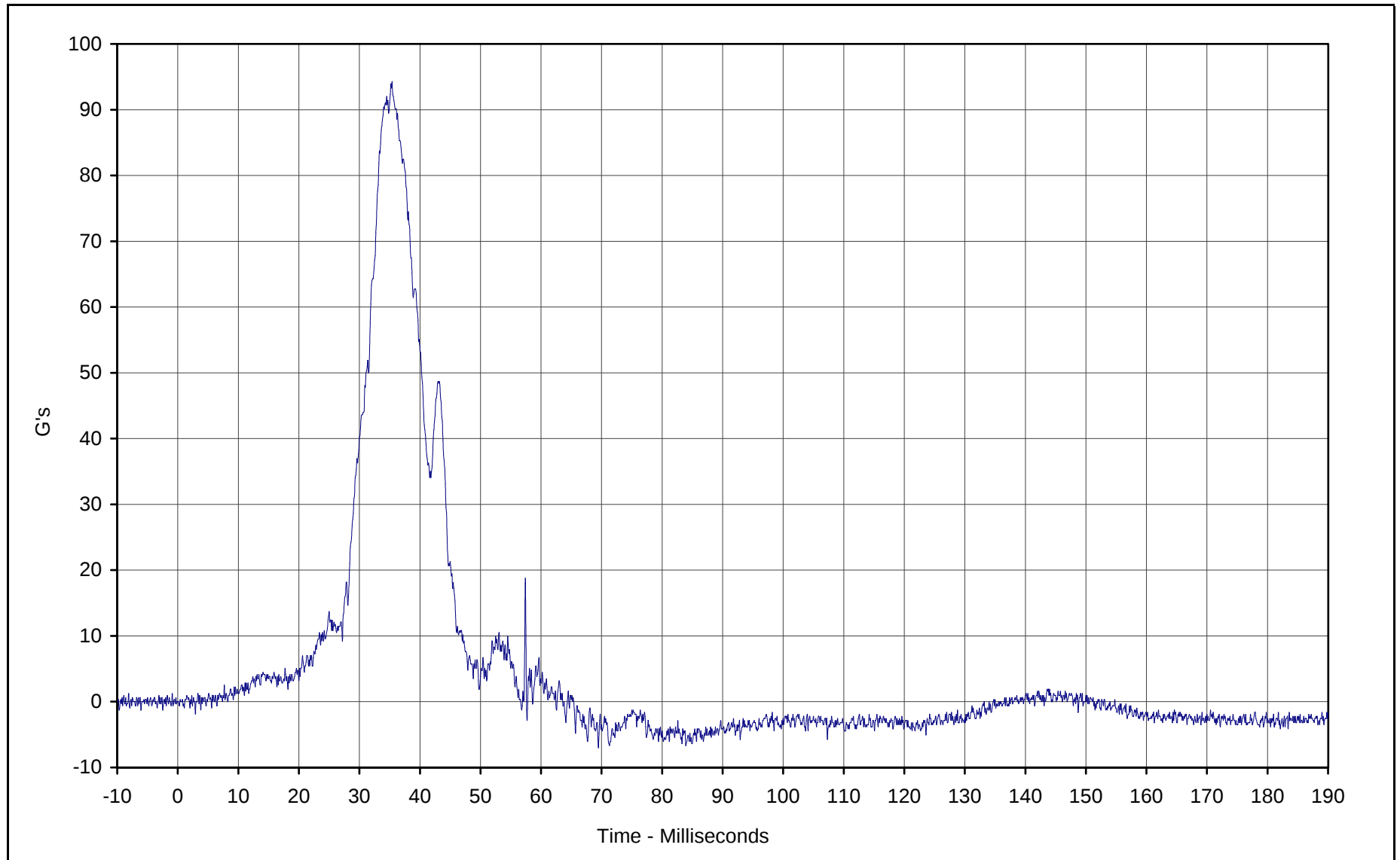
Date of Test: 12/08/00

Curve Number: IN1-023

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

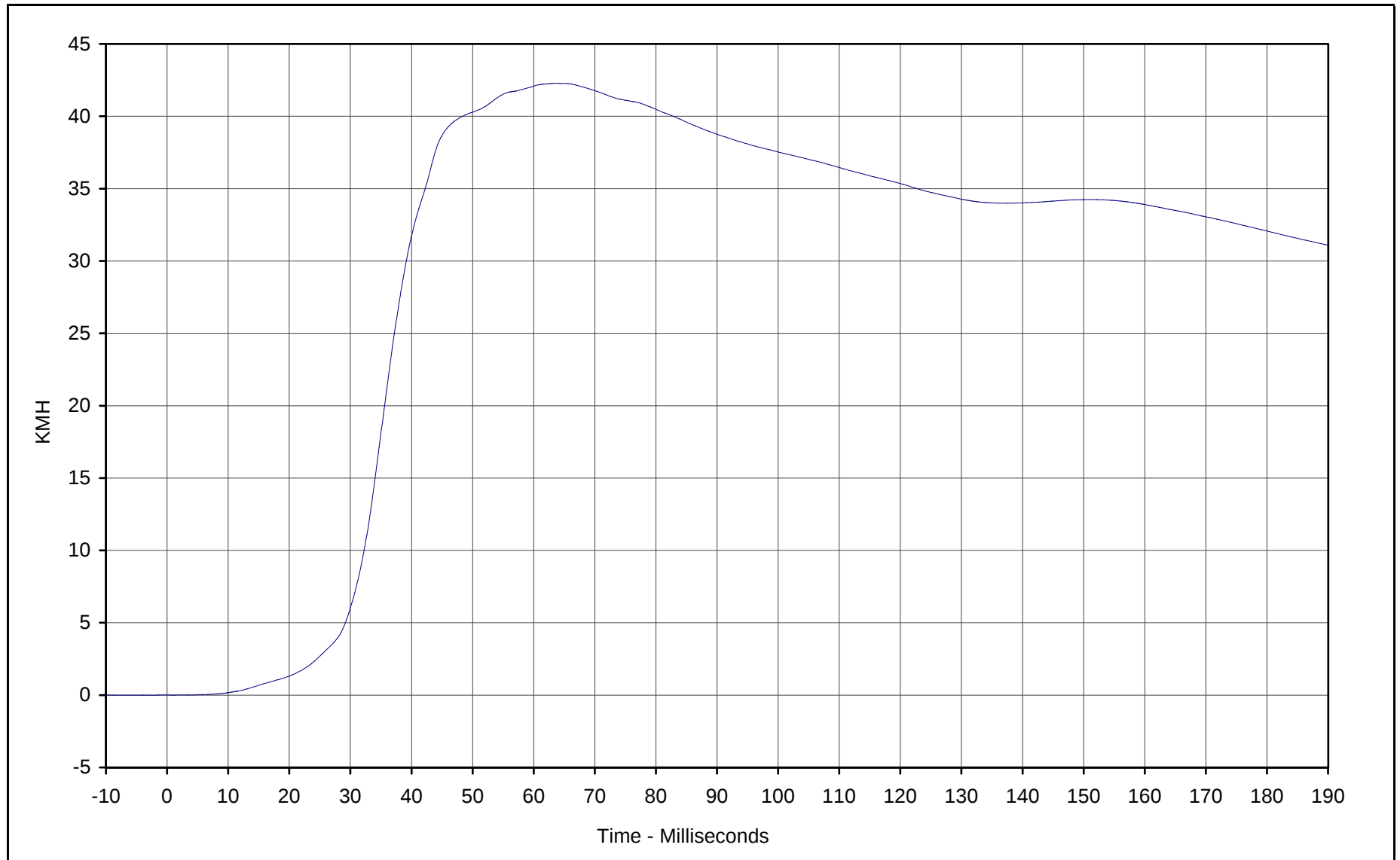




Curve Description: Pass. Pelvis Redundant Y
Maximum Value: 94.2 at 35.4 Milliseconds
Minimum Value: -7.0 at 69.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-024

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

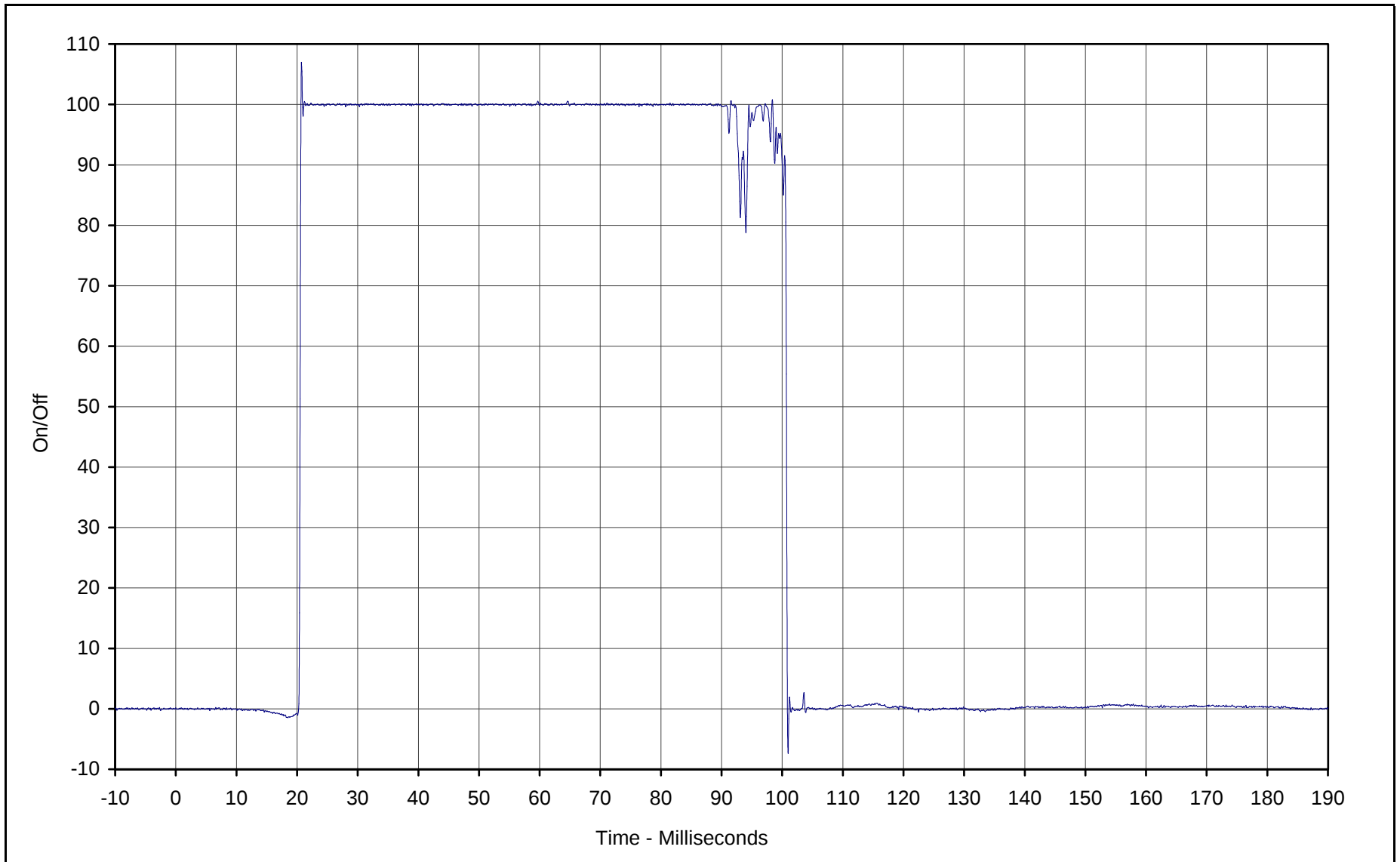




Curve Description: Pass. Pelvis Redundant Y Velocity
Maximum Value: 42.3 at 63.6 Milliseconds
Minimum Value: 0.0 at 1.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-024

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

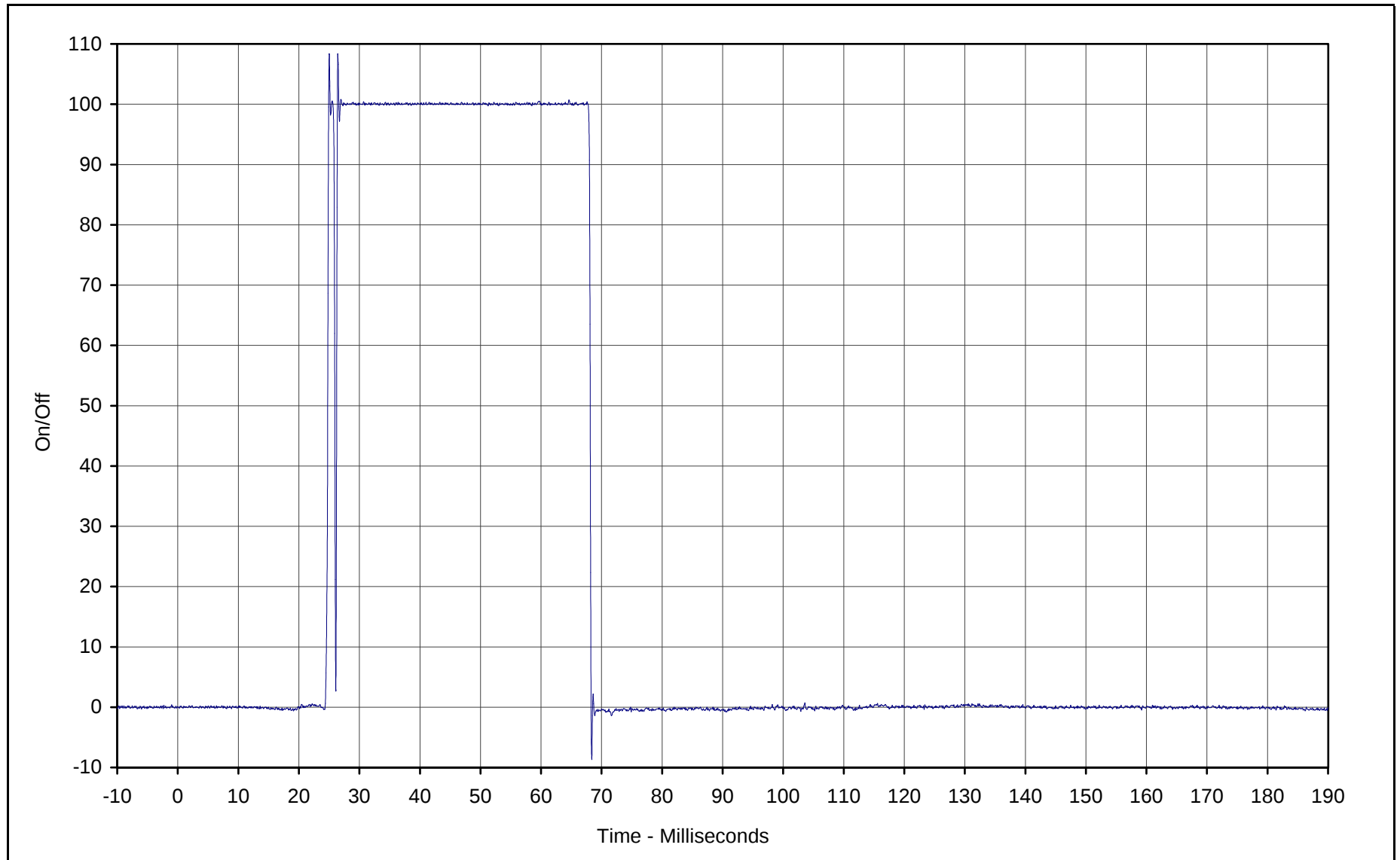




Curve Description: Pass. Thorax Contact
Maximum Value: 106.8 at 20.7 Milliseconds
Crossing Point: 50% at 20.5 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-025

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

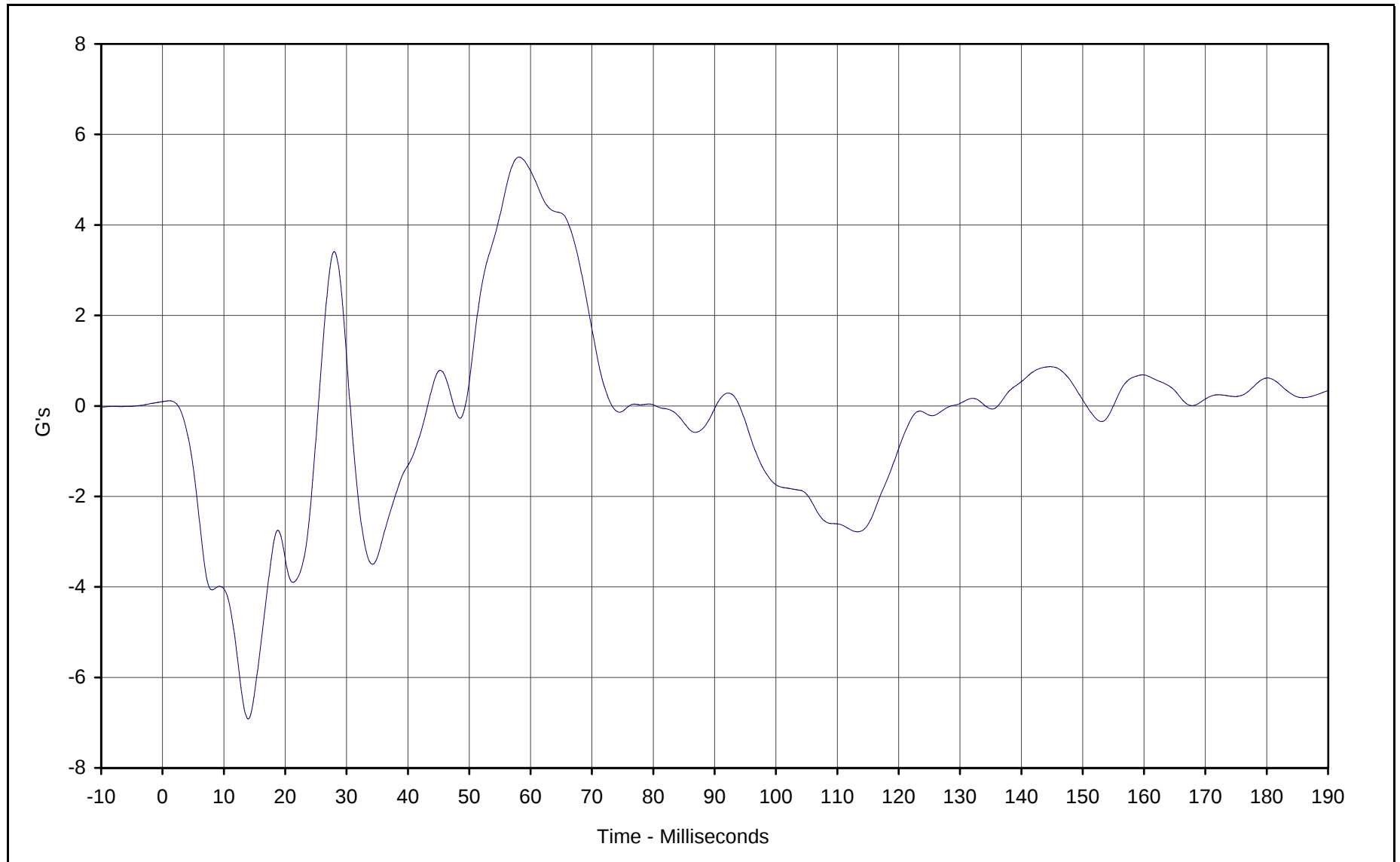




Curve Description: Pass. Pelvis Contact
Maximum Value: 108.3 at 25.0 Milliseconds
Crossing Point: 50% at 24.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-026

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

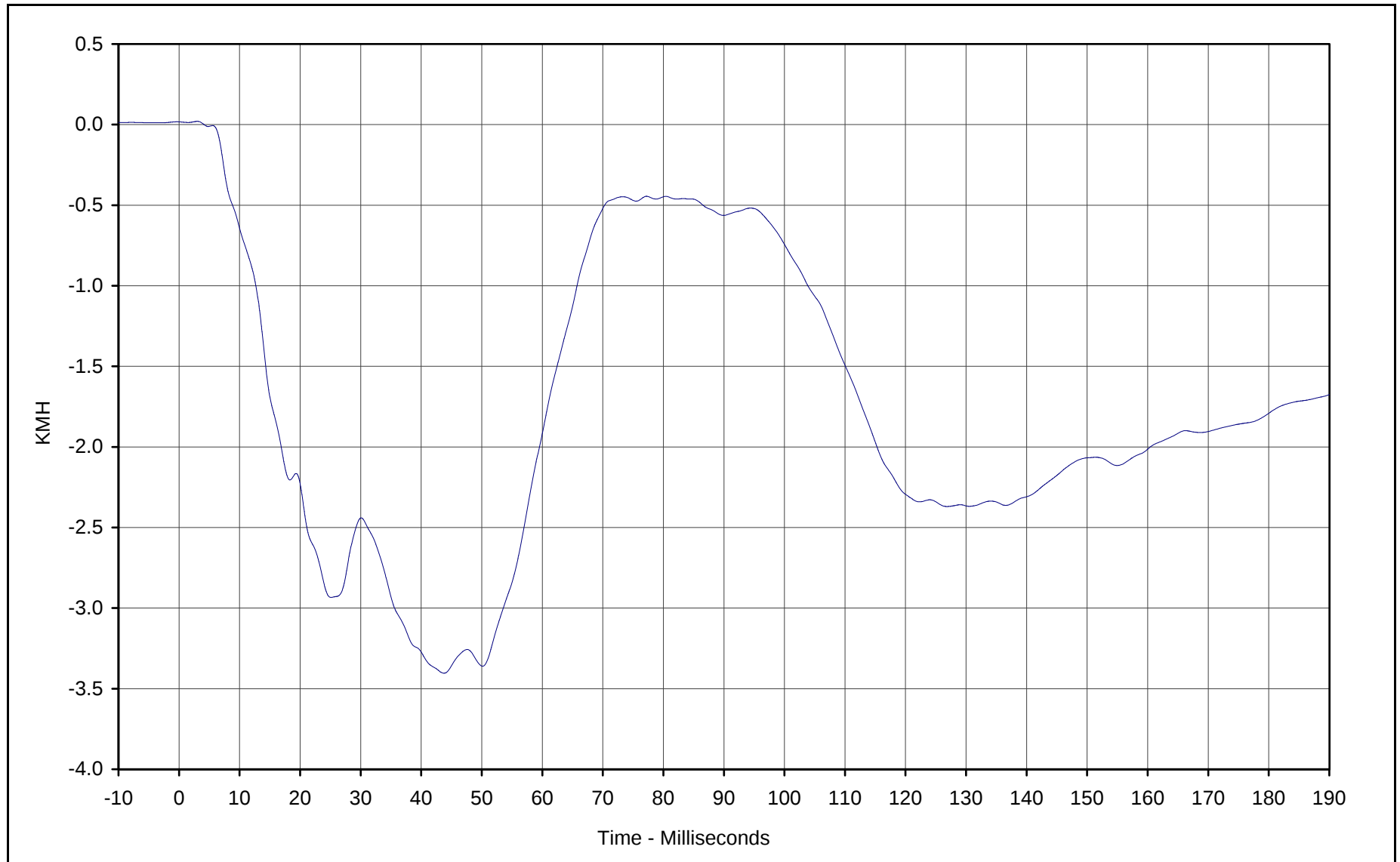




Curve Description: Right Sill at Front Seat X
Maximum Value: 5.5 at 58.1 Milliseconds
Minimum Value: -6.9 at 14.0 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-027

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

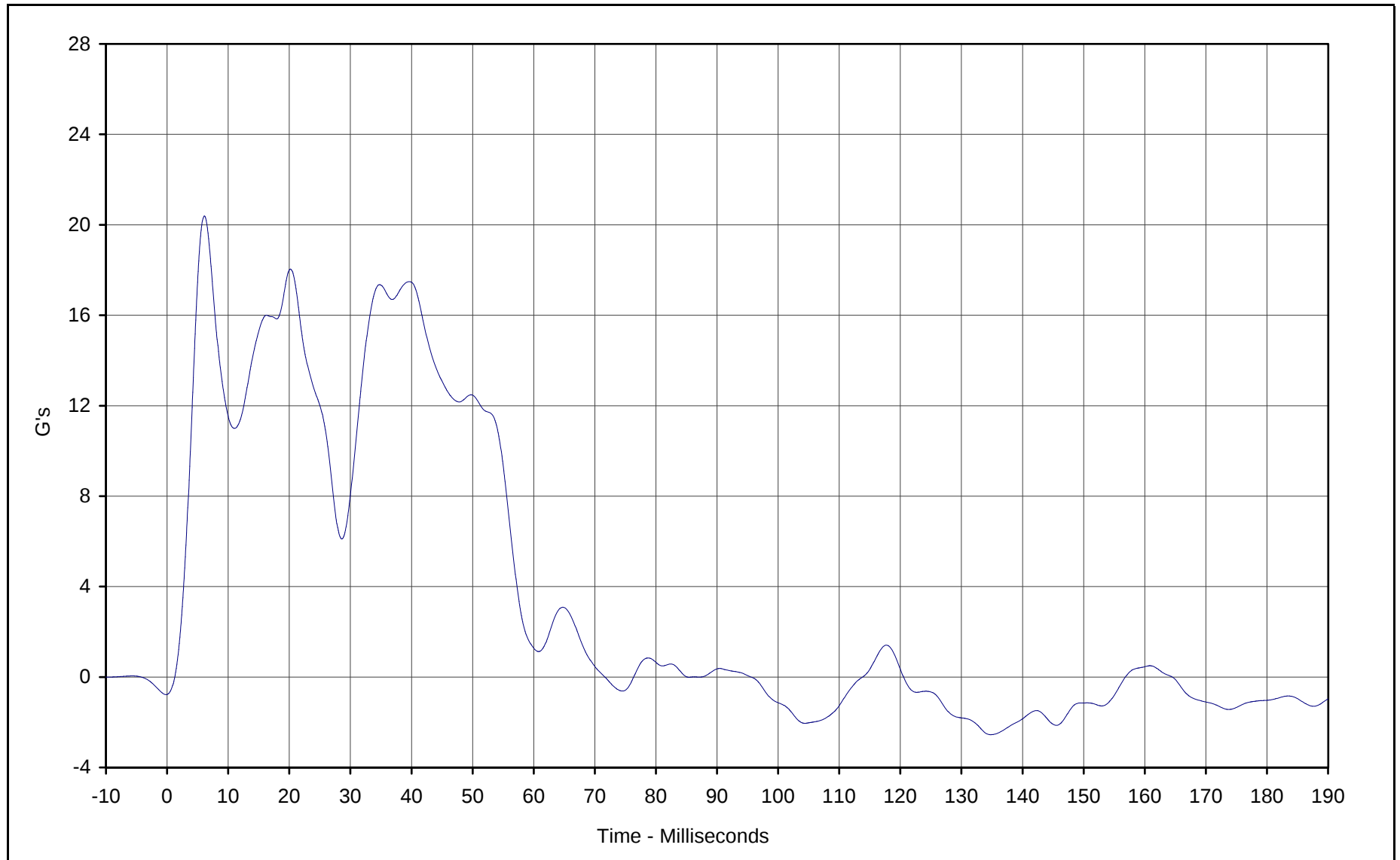




Curve Description: Right Sill at Front Seat X Velocity
Maximum Value: 0.0 at 3.0 Milliseconds
Minimum Value: -3.4 at 43.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-027

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

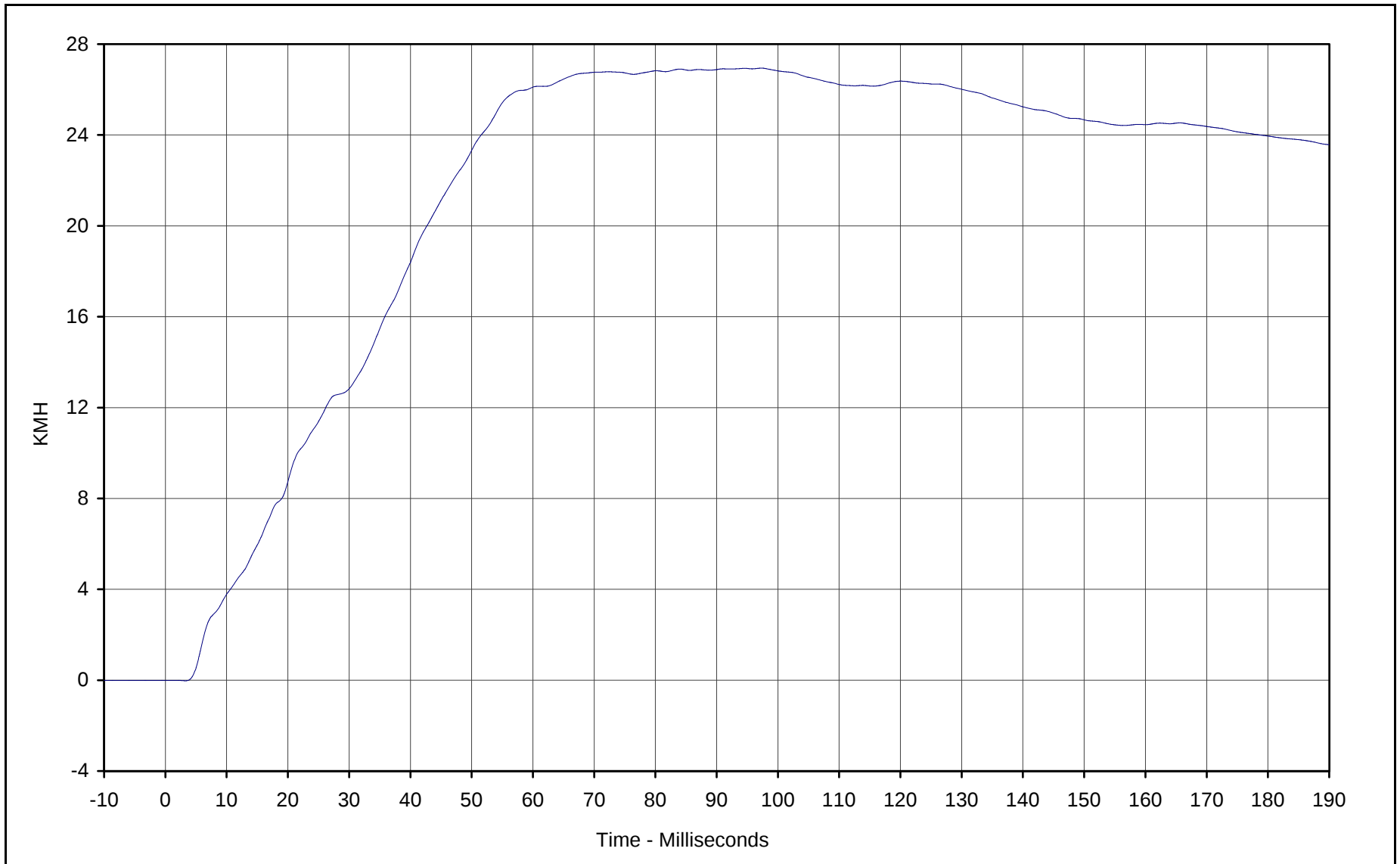




Curve Description: Right Sill at Front Seat Y
Maximum Value: 20.4 at 6.1 Milliseconds
Minimum Value: -2.5 at 134.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-028

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

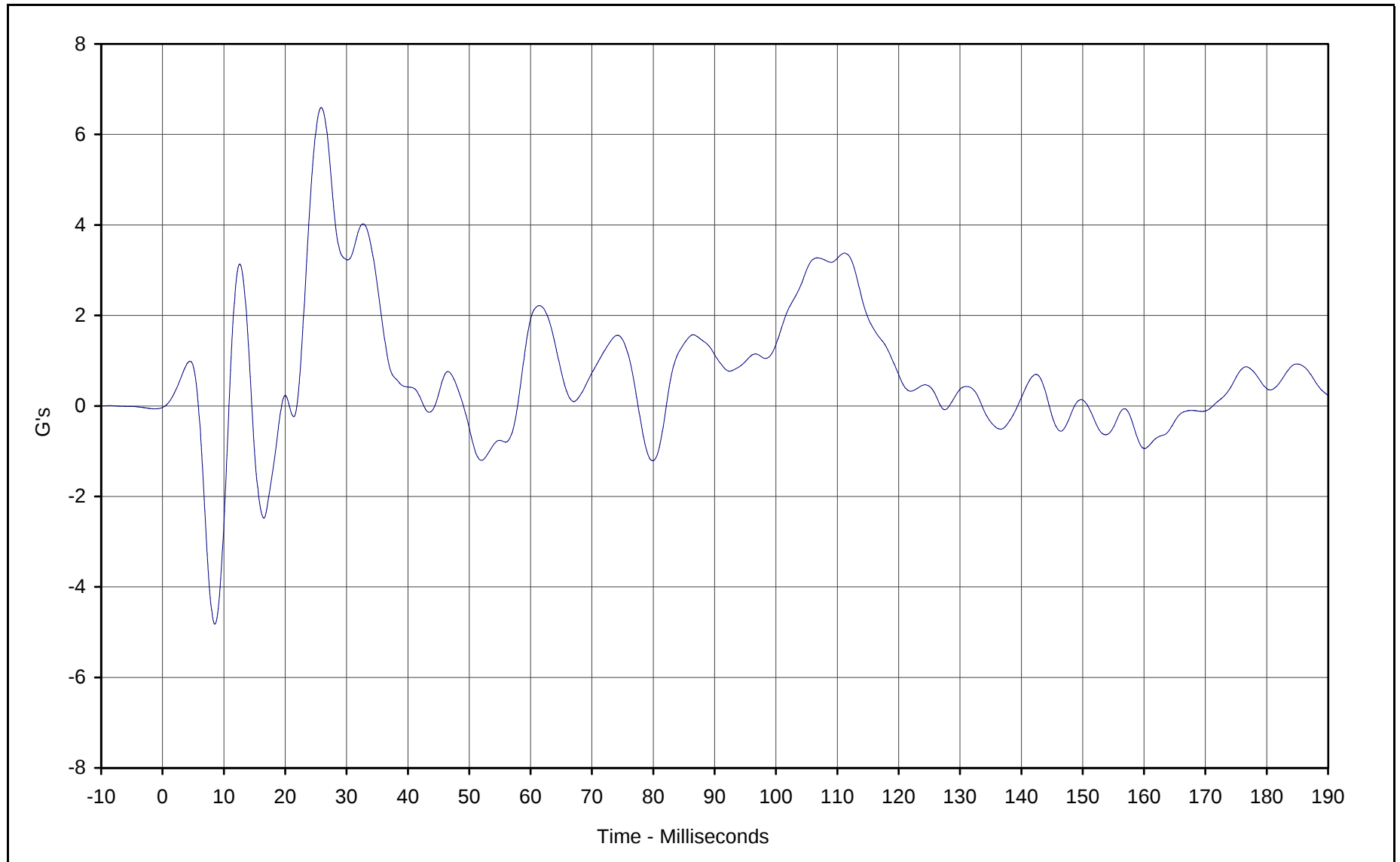




Curve Description: Right Sill at Front Seat Y Velocity
Maximum Value: 26.9 at 97.3 Milliseconds
Minimum Value: 0.0 at 3.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-028

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

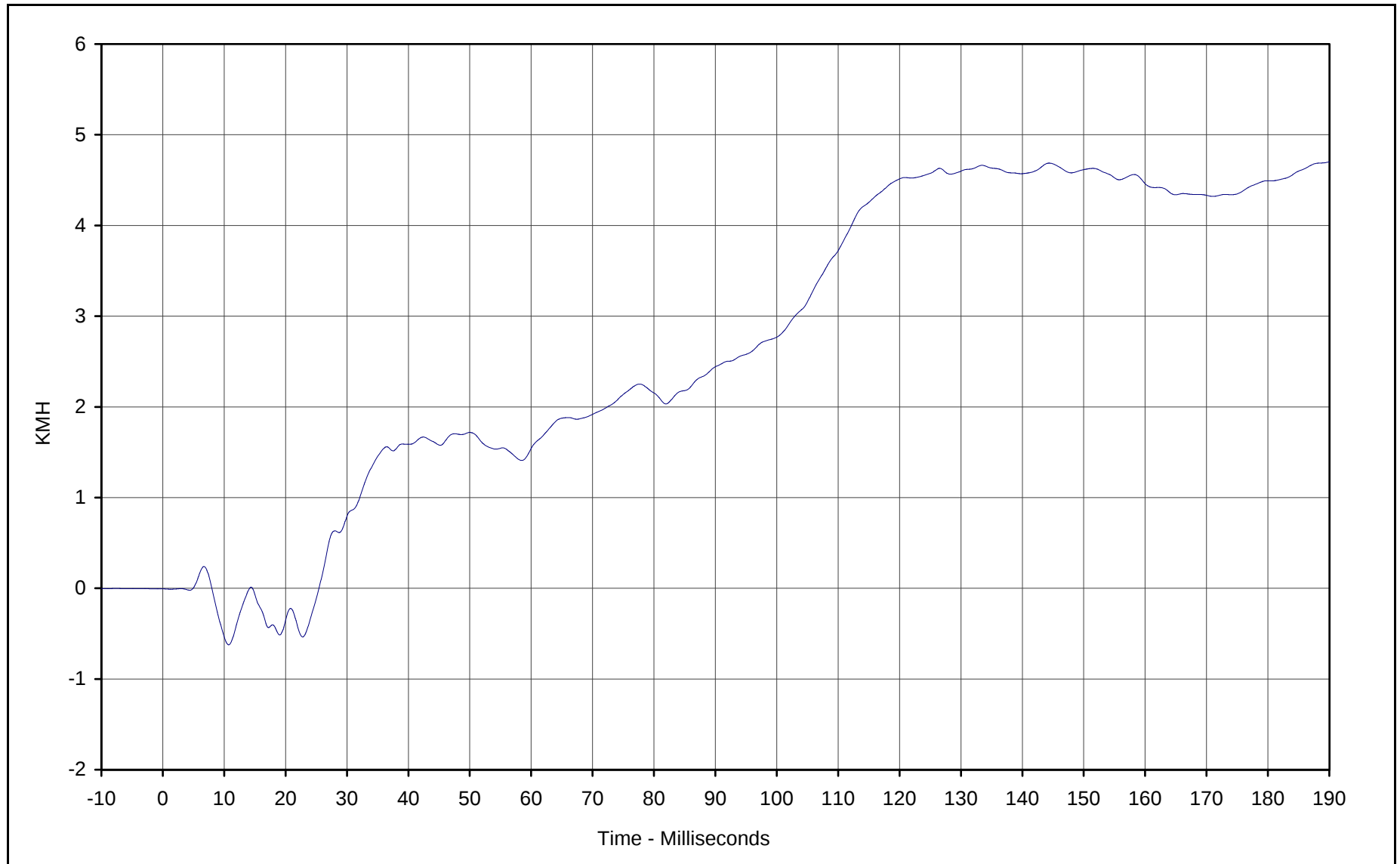




Curve Description: Right Sill at Front Seat Z
Maximum Value: 6.6 at 25.9 Milliseconds
Minimum Value: -4.8 at 8.5 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-029

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

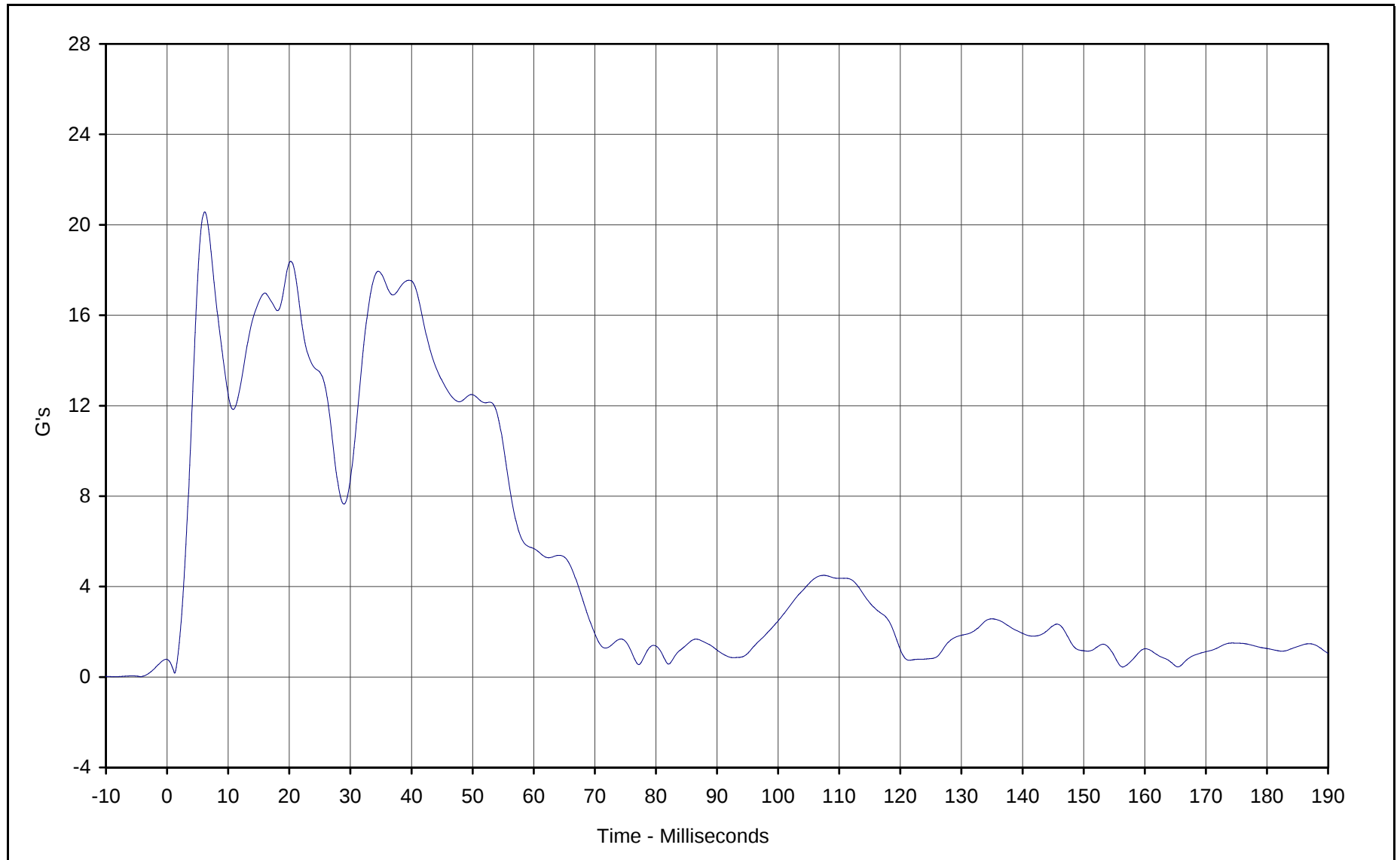




Curve Description: Right Sill at Front Seat Z Velocity
Maximum Value: 4.7 at 189.9 Milliseconds
Minimum Value: -0.6 at 10.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-029

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

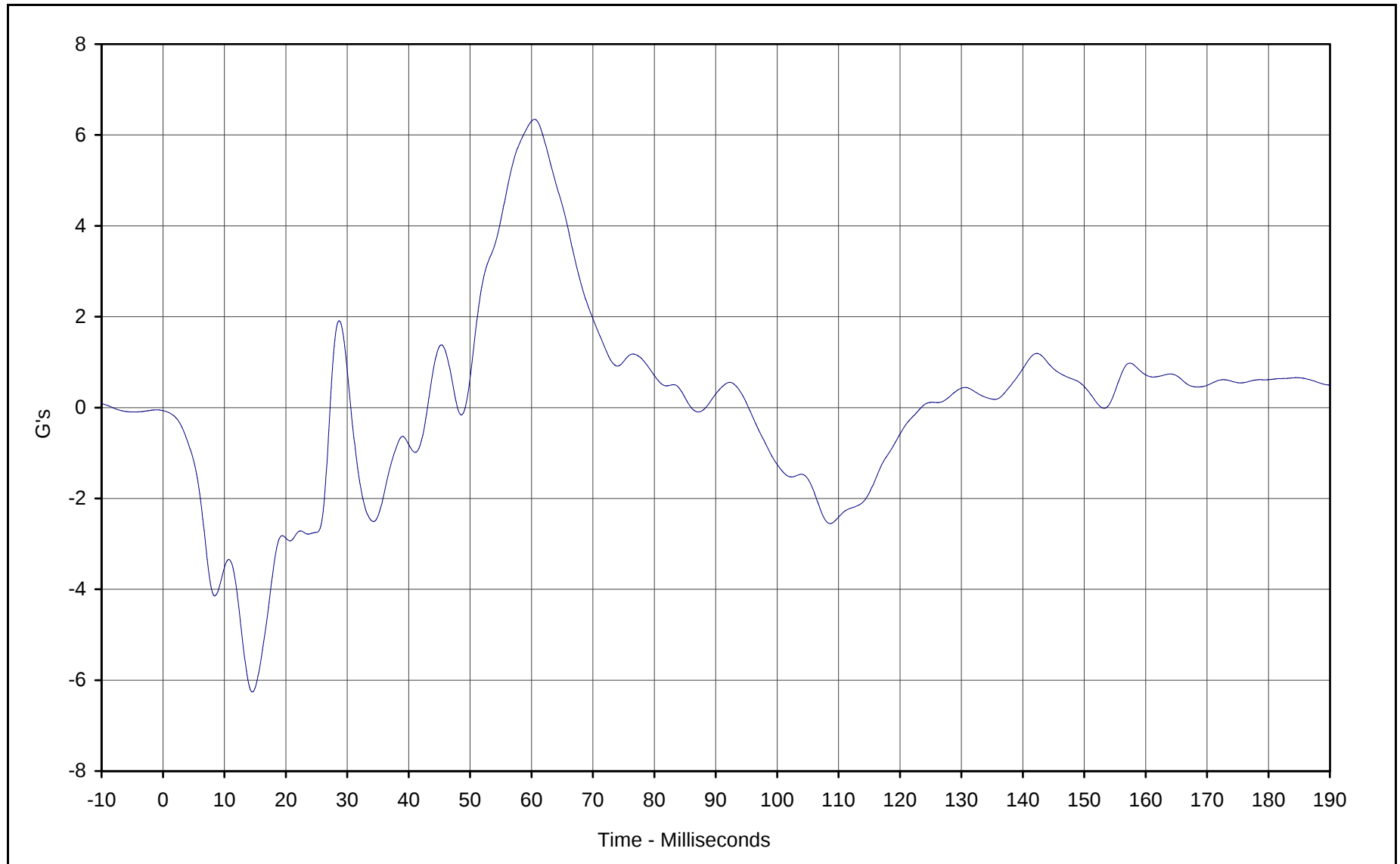




Curve Description: Right Sill at Front Seat Resultant
Maximum Value: 20.6 at 6.1 Milliseconds
Minimum Value: 0.2 at 1.2 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: RES-027

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

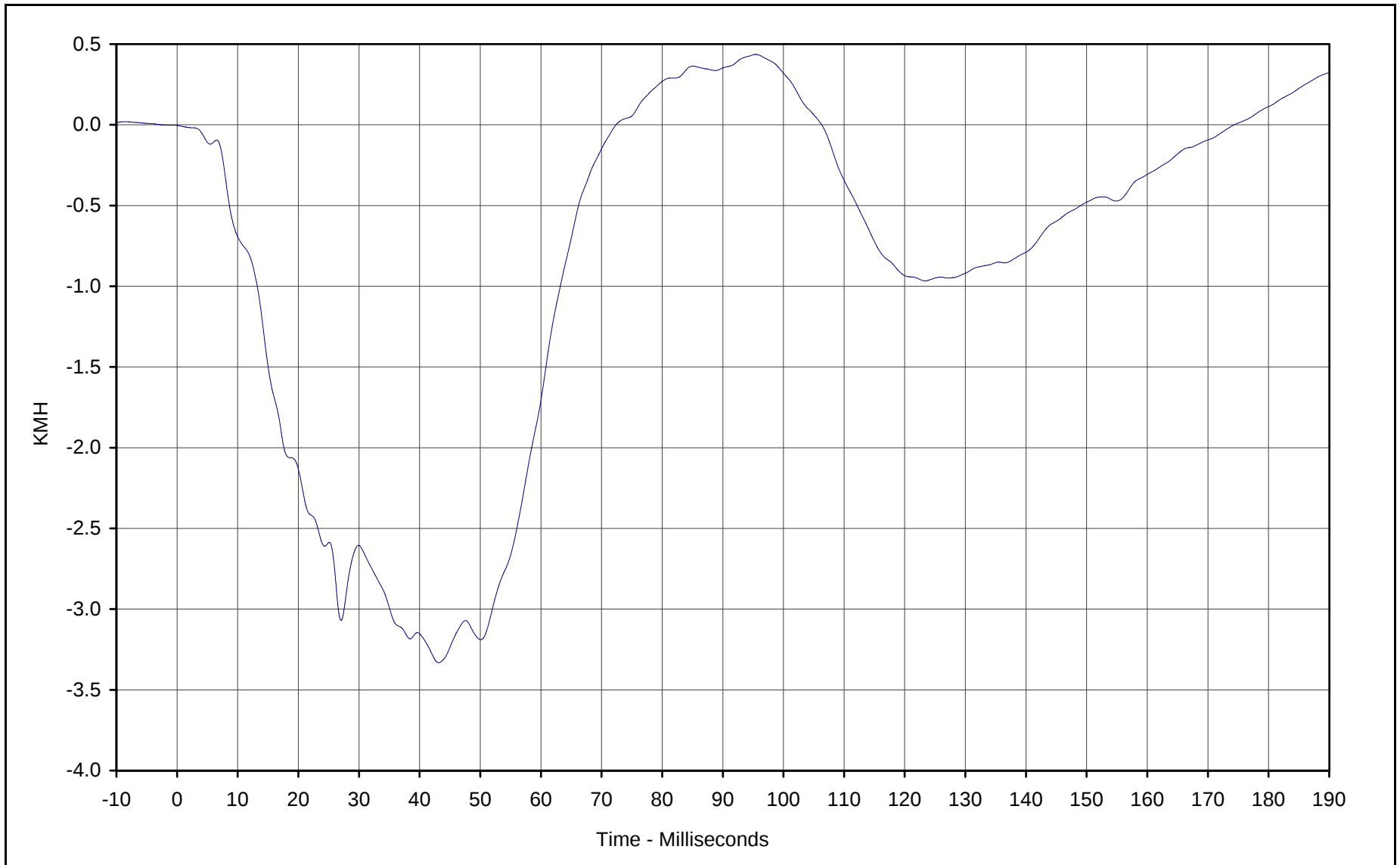




Curve Description: Right Sill at Rear Seat X
Maximum Value: 6.3 at 60.5 Milliseconds
Minimum Value: -6.3 at 14.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-030

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

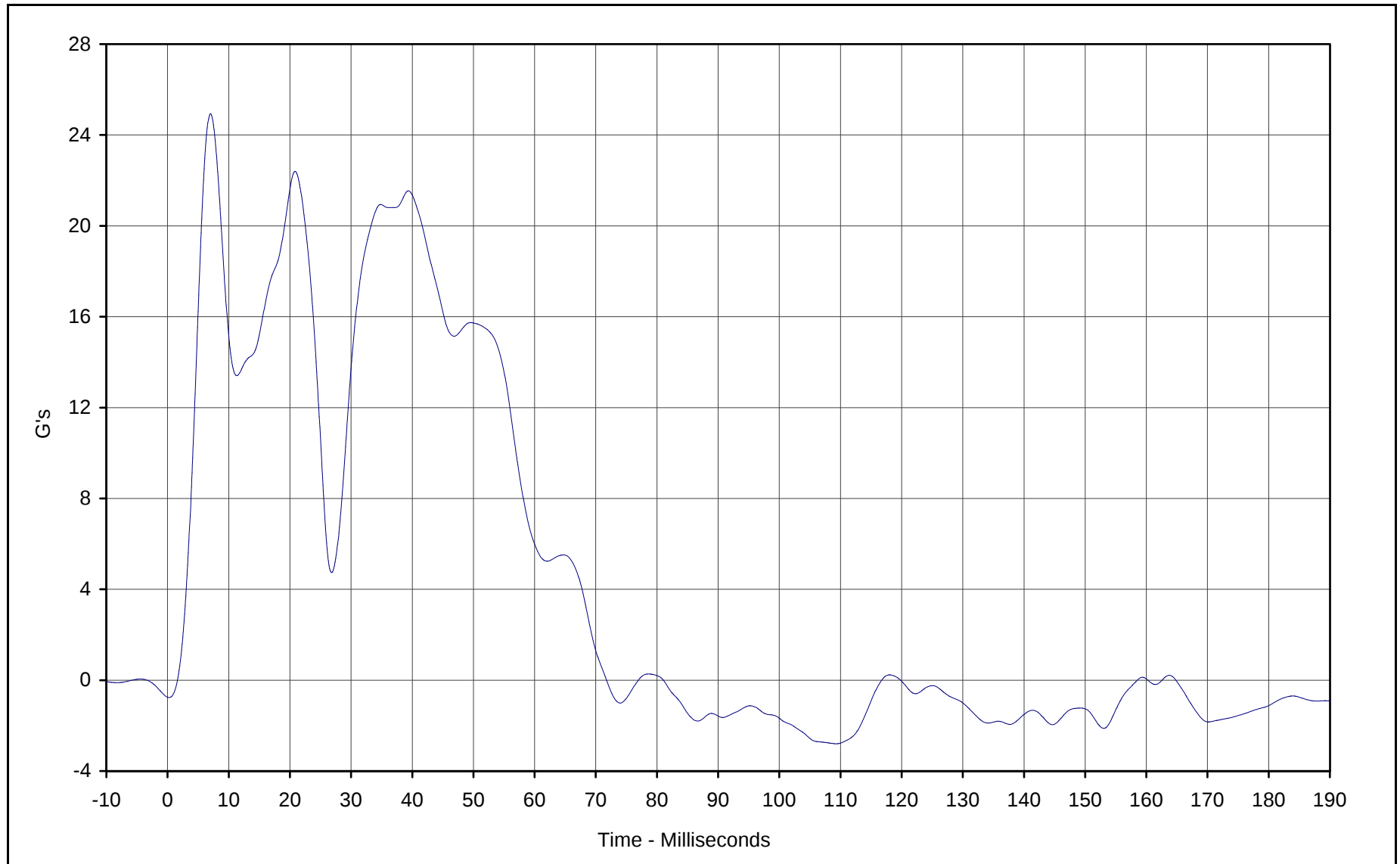




Curve Description: Right Sill at Rear Seat X Velocity
Maximum Value: 0.4 at 95.4 Milliseconds
Minimum Value: -3.3 at 43.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-030

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

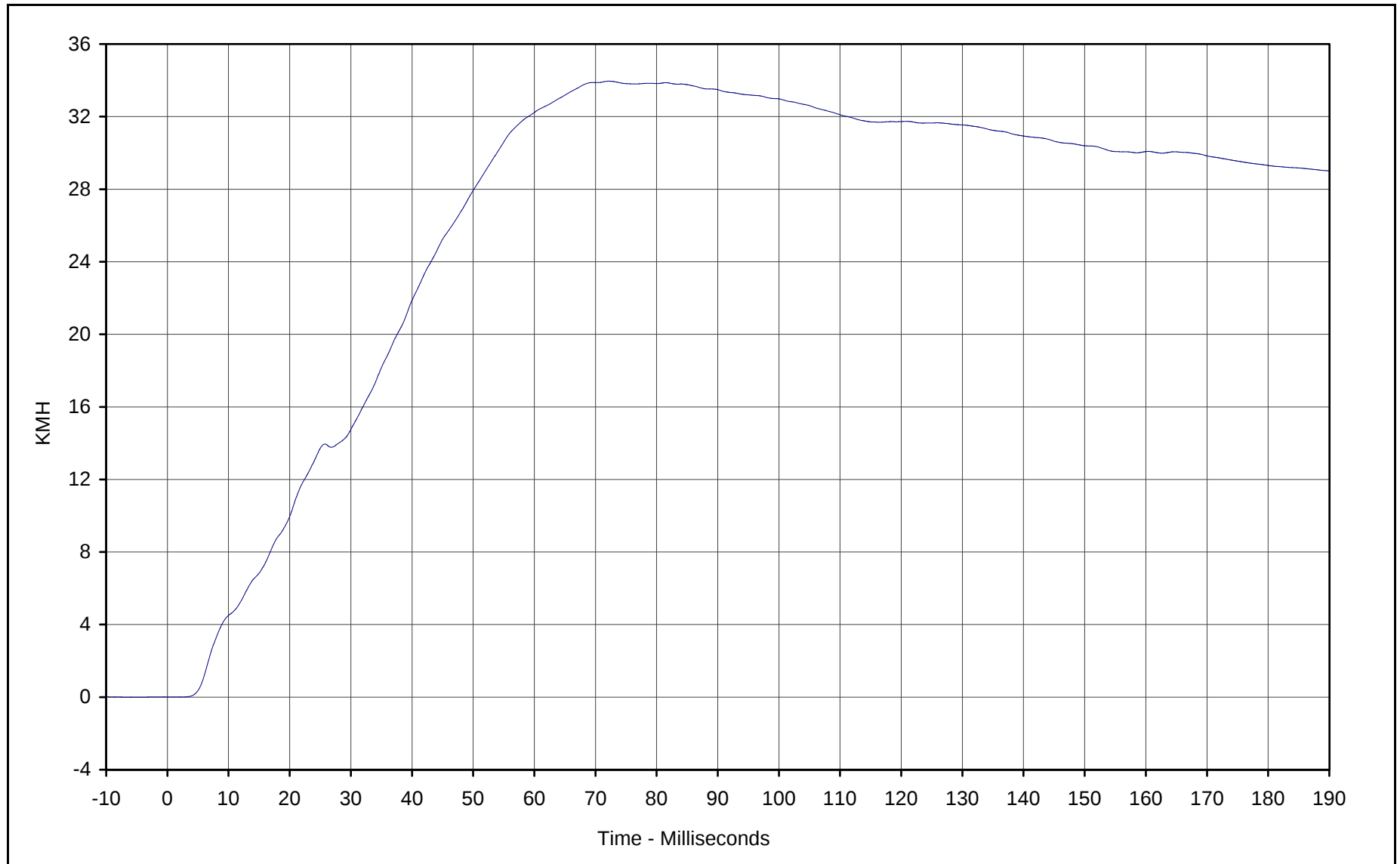




Curve Description: Right Sill at Rear Seat Y
Maximum Value: 24.9 at 7.0 Milliseconds
Minimum Value: -2.8 at 109.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-031

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

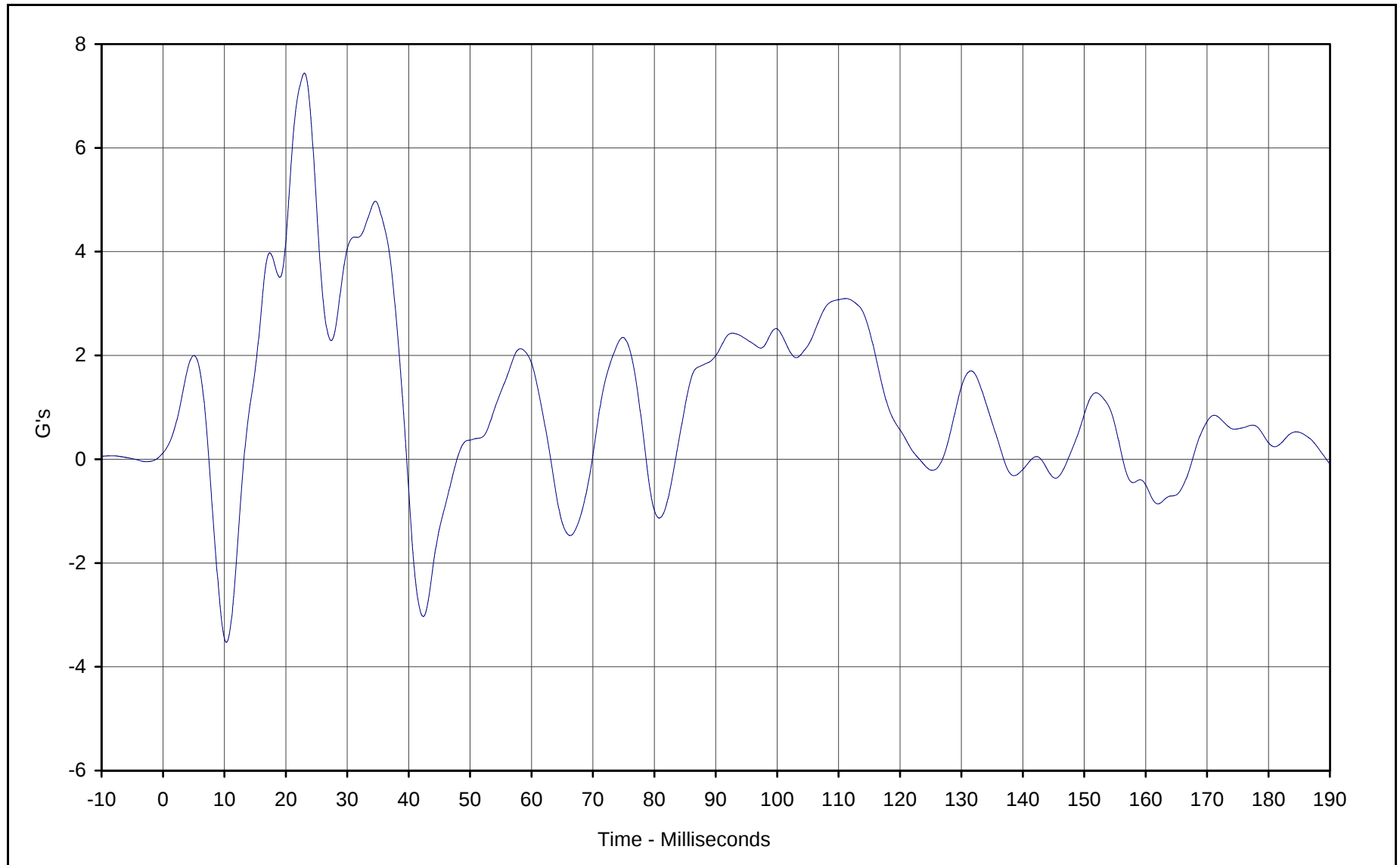




Curve Description: Right Sill at Rear Seat Y Velocity
Maximum Value: 34.0 at 72.2 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-031

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

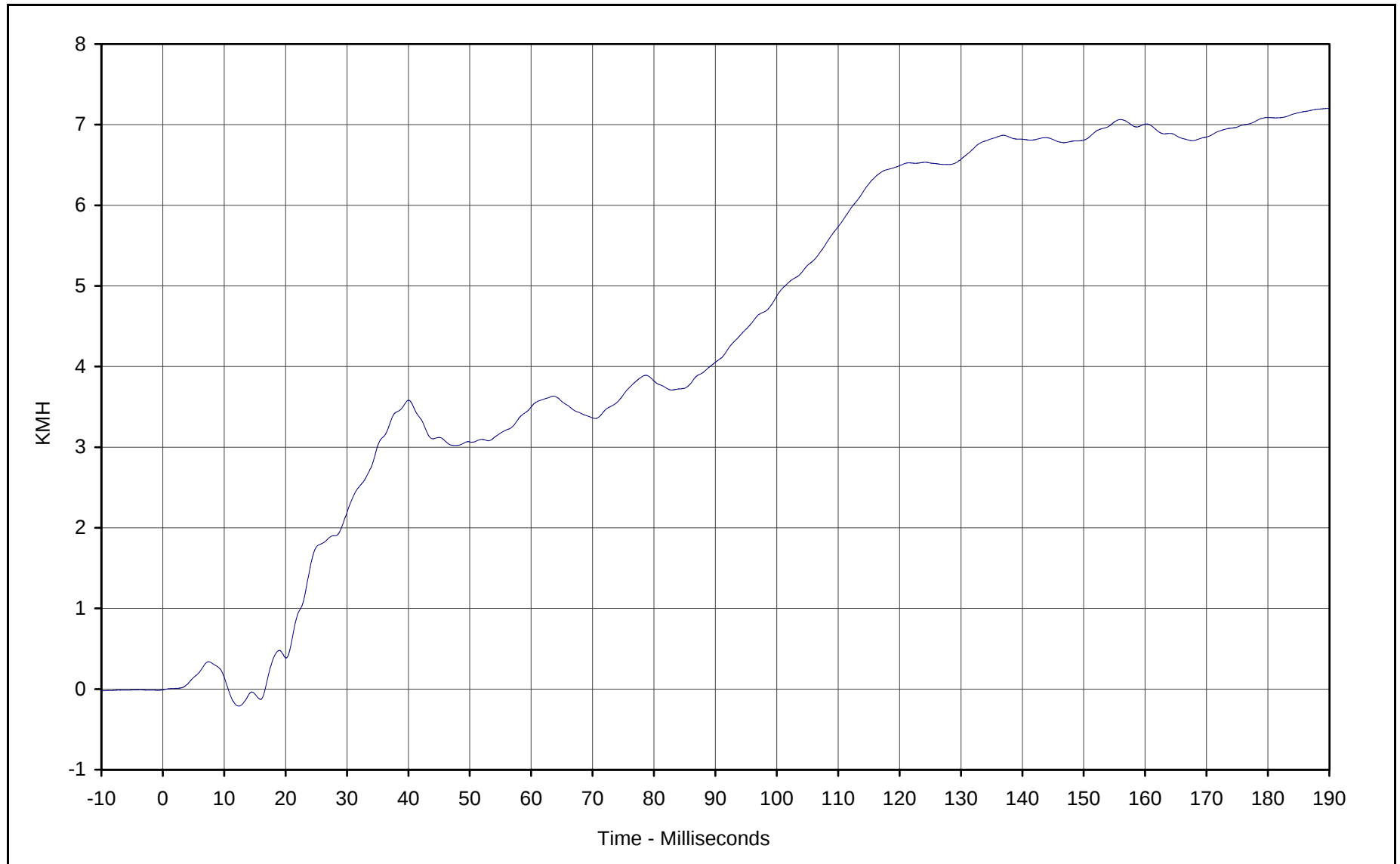




Curve Description: Right Sill at Rear Seat Z
Maximum Value: 7.4 at 23.0 Milliseconds
Minimum Value: -3.5 at 10.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-032

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

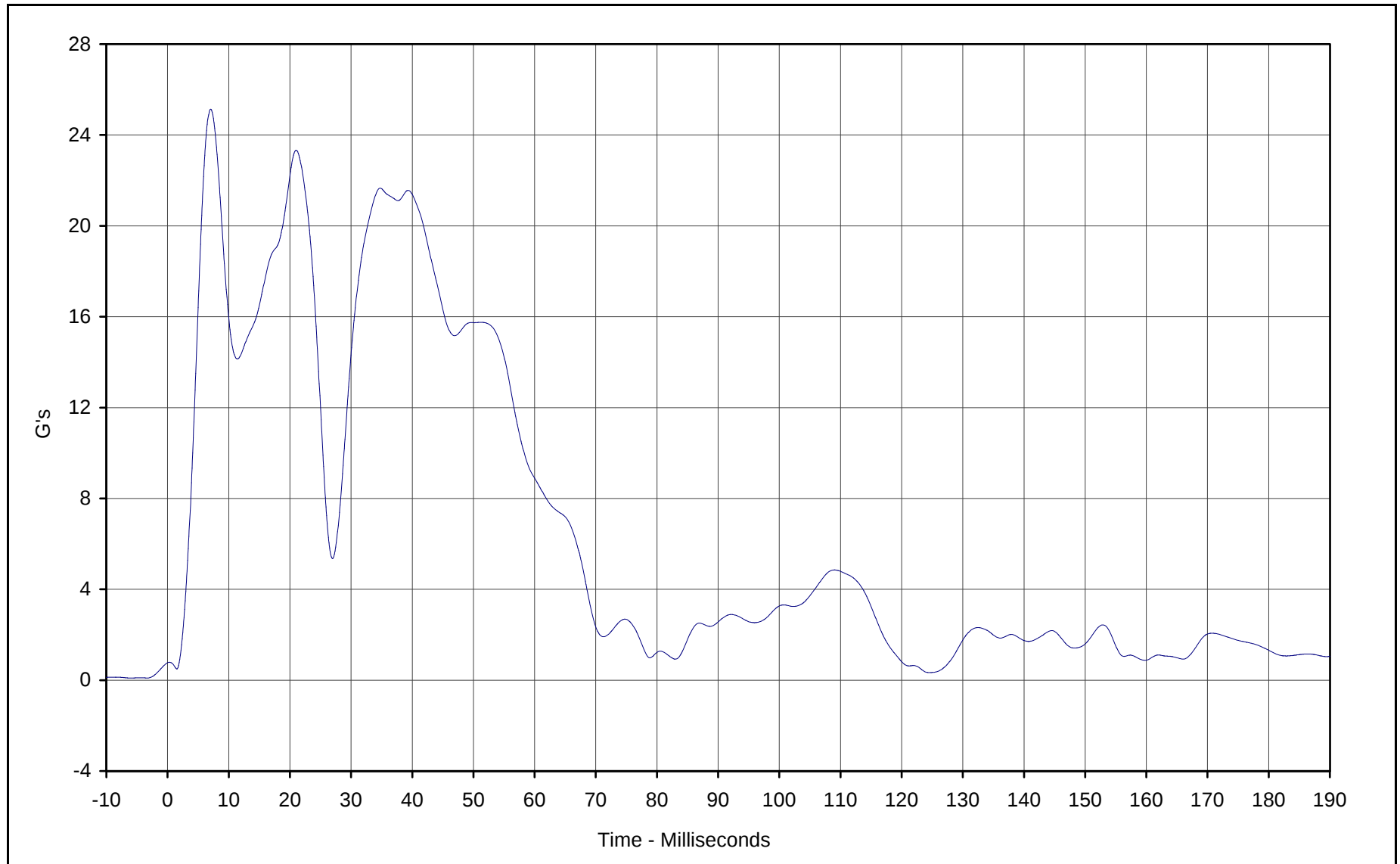




Curve Description: Right Sill at Rear Seat Z Velocity
Maximum Value: 7.2 at 189.9 Milliseconds
Minimum Value: -0.2 at 12.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-032

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

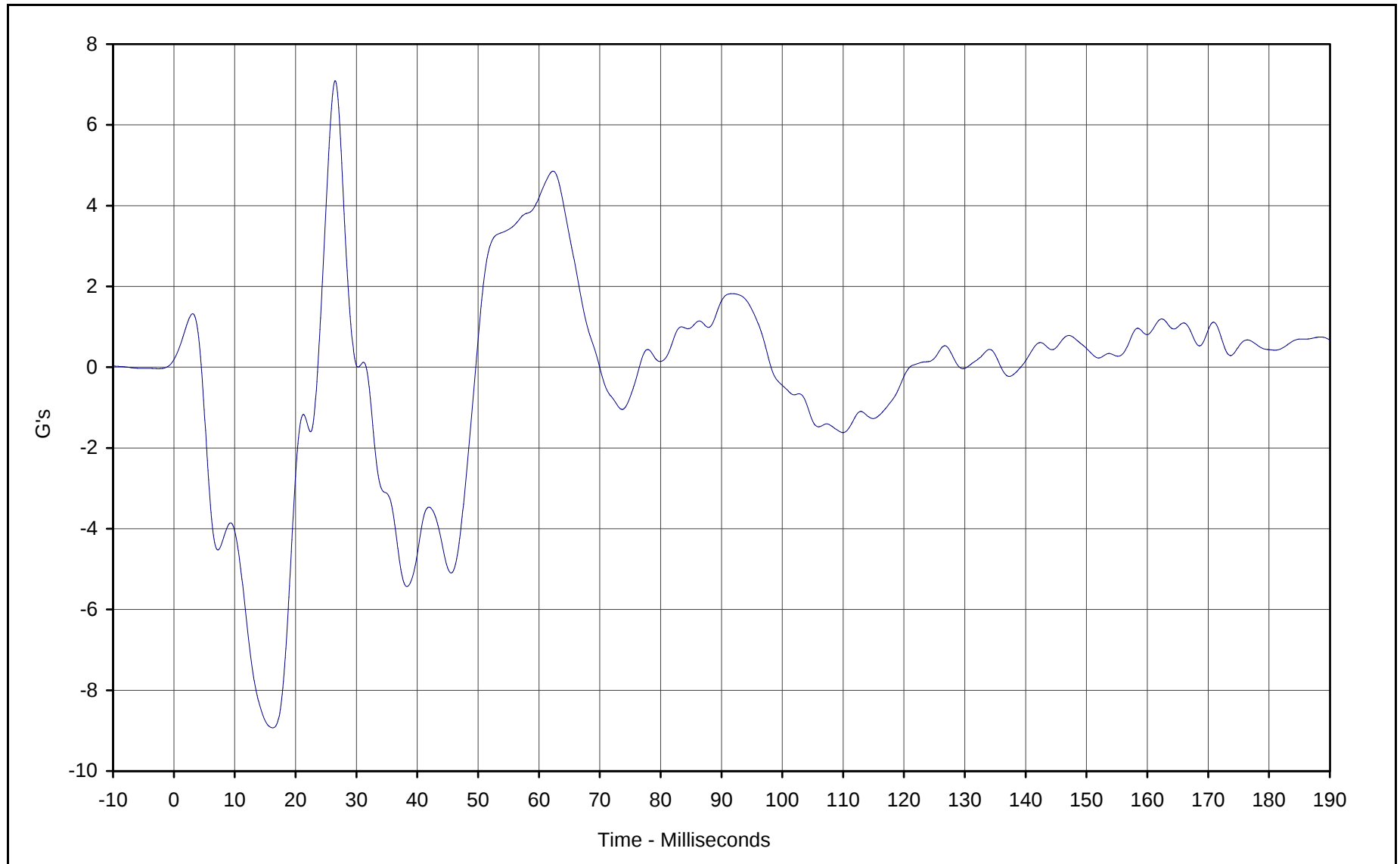




Curve Description: Right Sill at Rear Resultant
Maximum Value: 25.1 at 7.0 Milliseconds
Minimum Value: 0.3 at 124.5 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: RES-030

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

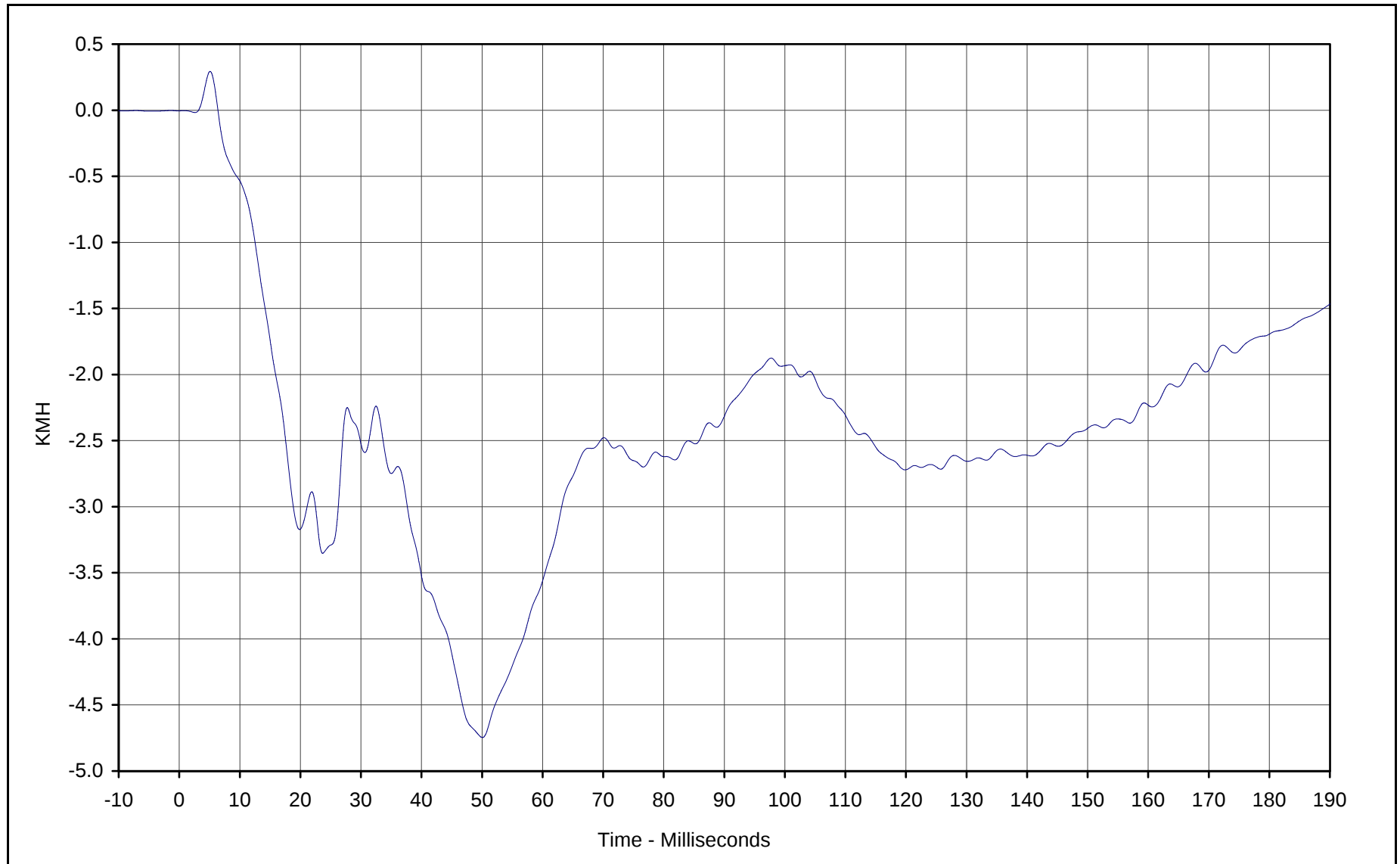




Curve Description: Rear Floor Above Axle X
Maximum Value: 7.1 at 26.5 Milliseconds
Minimum Value: -8.9 at 16.3 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-033

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

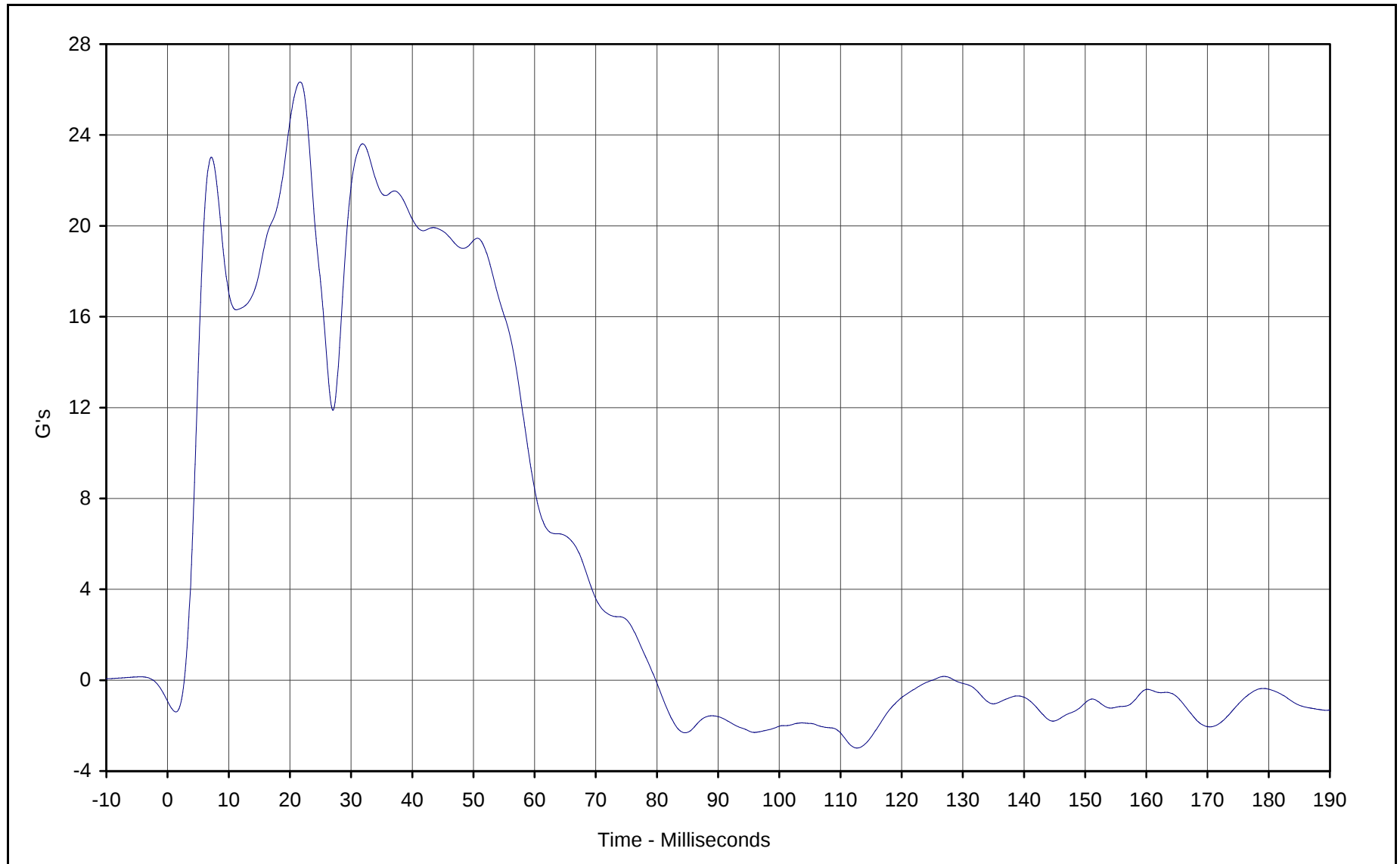




Curve Description: Rear Floor Above Axle X Velocity
Maximum Value: 0.3 at 5.1 Milliseconds
Minimum Value: -4.7 at 50.1 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-033

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

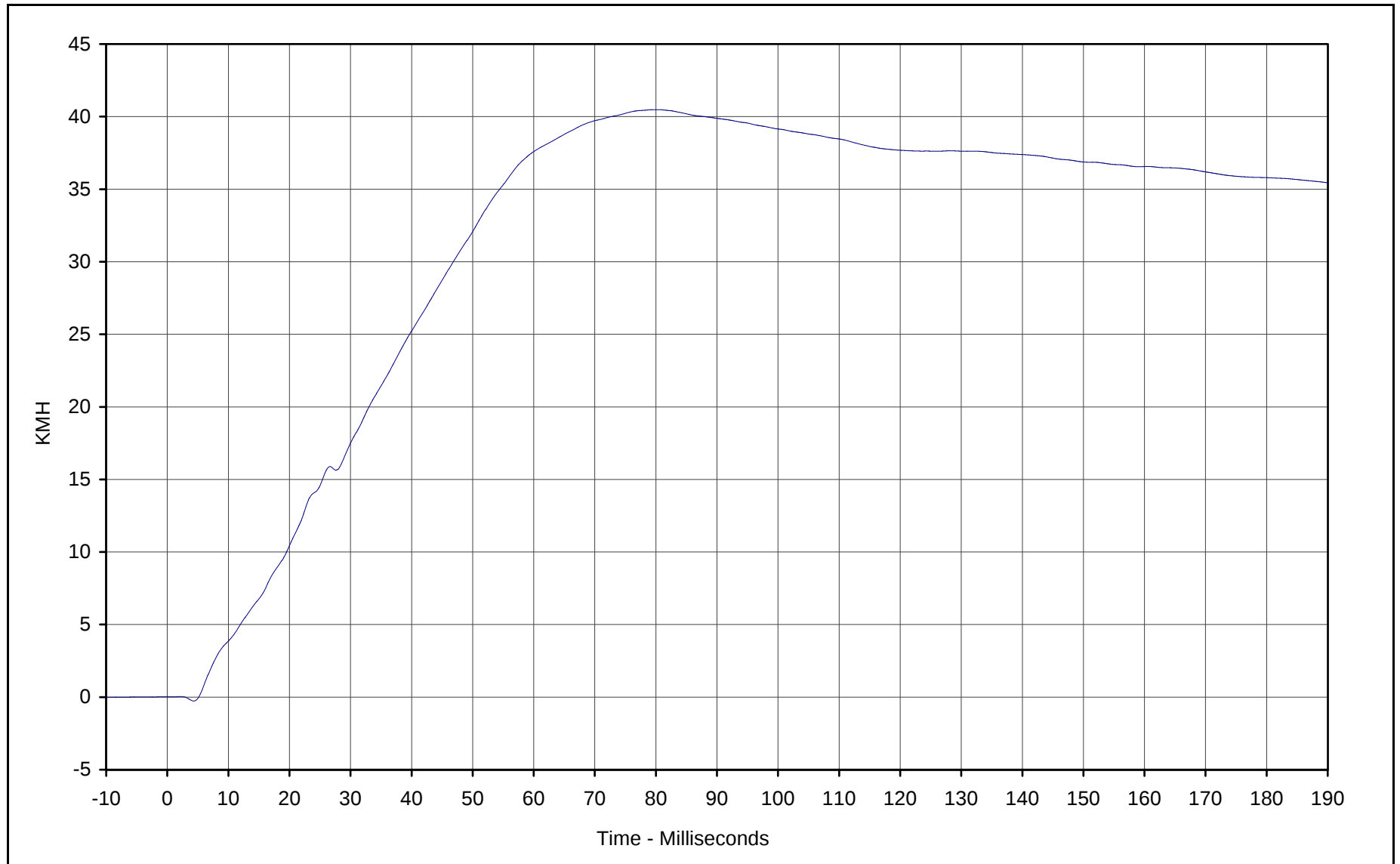




Curve Description: Rear Floor Above Axle Y
Maximum Value: 26.3 at 21.7 Milliseconds
Minimum Value: -3.0 at 112.7 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-034

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

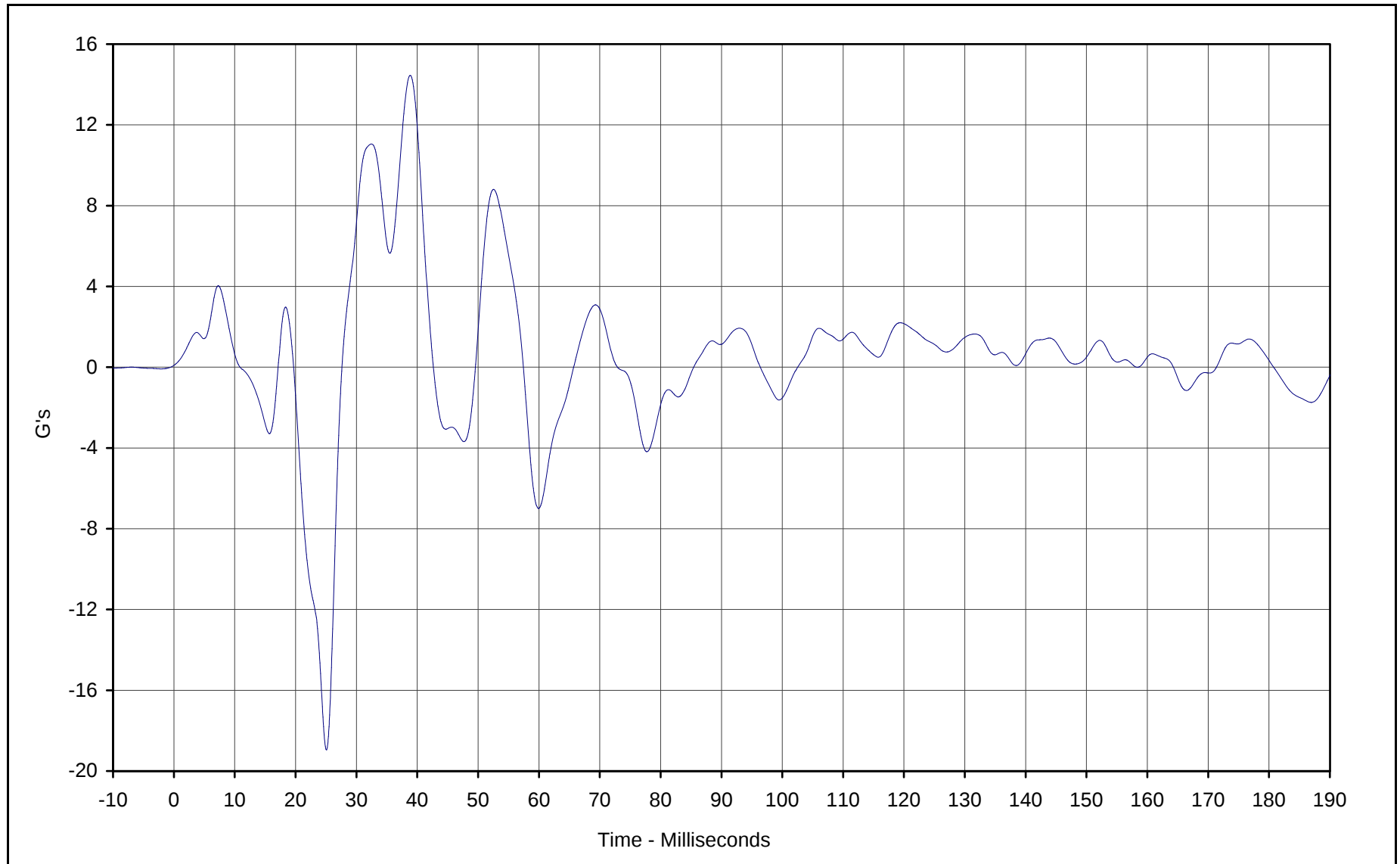




Curve Description: Rear Floor Above Axle Y Velocity
Maximum Value: 40.5 at 80.0 Milliseconds
Minimum Value: -0.3 at 4.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-034

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

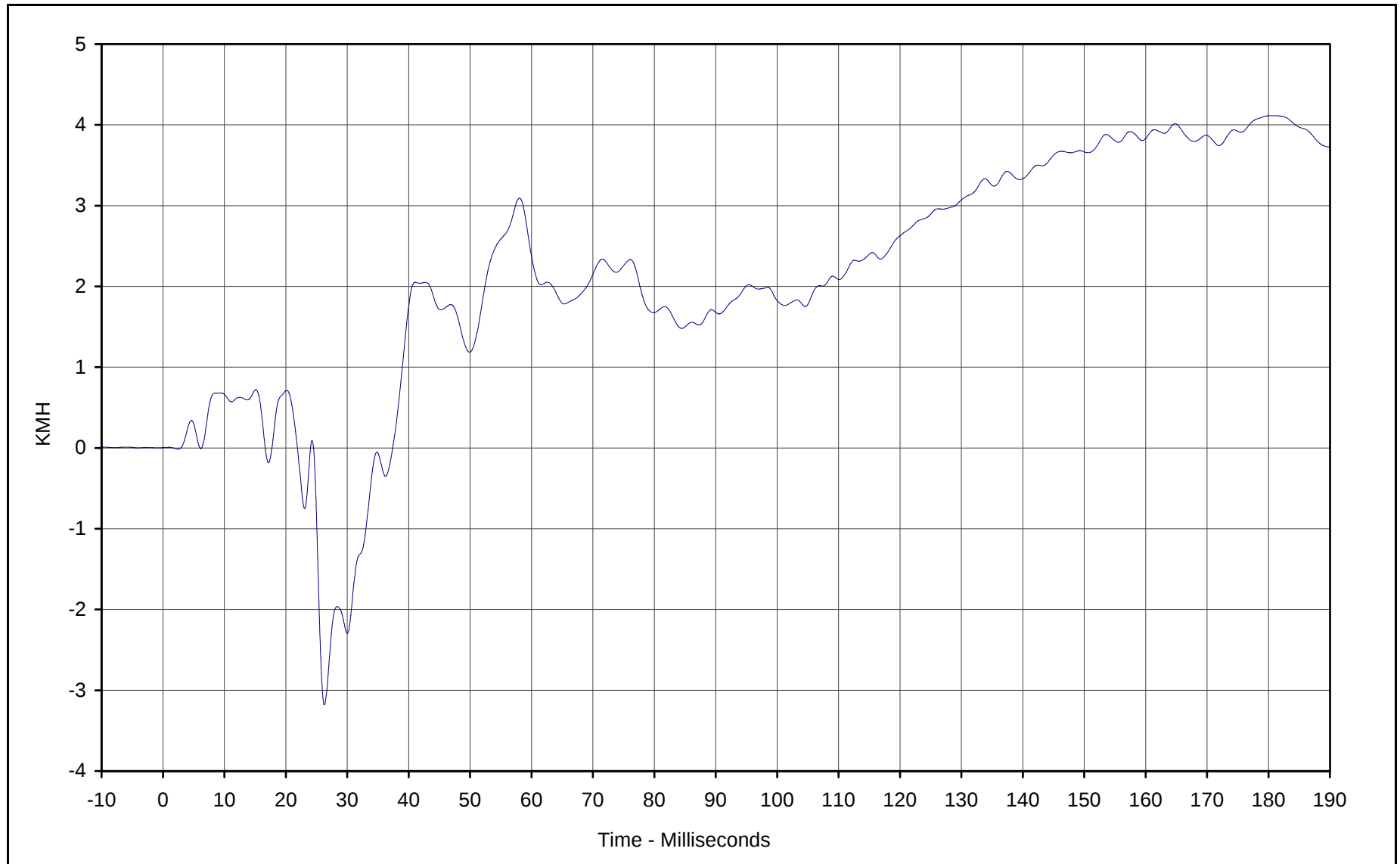




Curve Description: Rear Floor Above Axle Z
Maximum Value: 14.5 at 38.9 Milliseconds
Minimum Value: -19.0 at 25.1 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-035

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

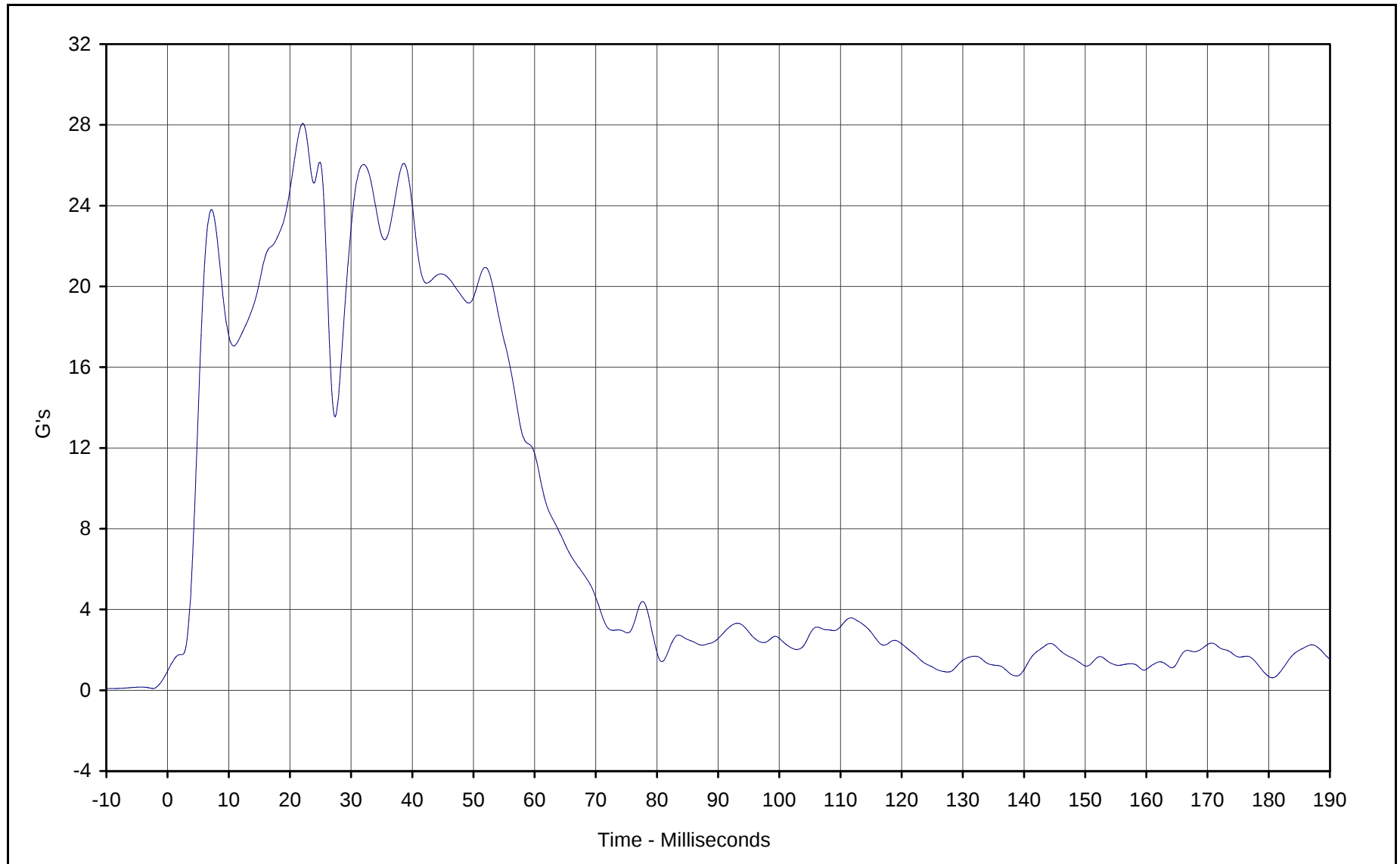




Curve Description: Rear Floor Above Axle Z Velocity
Maximum Value: 4.1 at 180.4 Milliseconds
Minimum Value: -3.2 at 26.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-035

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

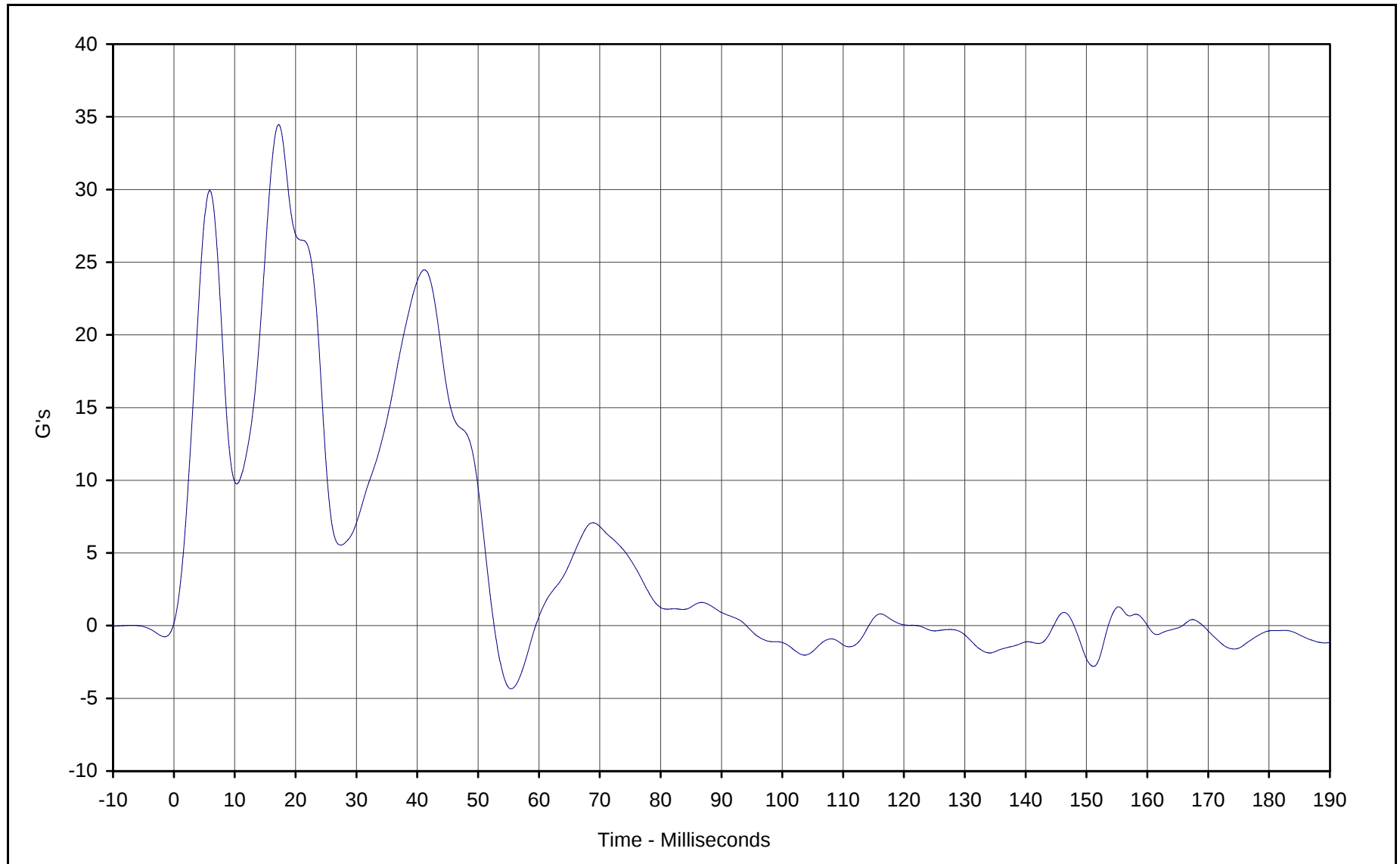




Curve Description: Rear Floor Above Axle Resultant
Maximum Value: 28.1 at 22.1 Milliseconds
Minimum Value: 0.6 at 180.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: RES-033

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

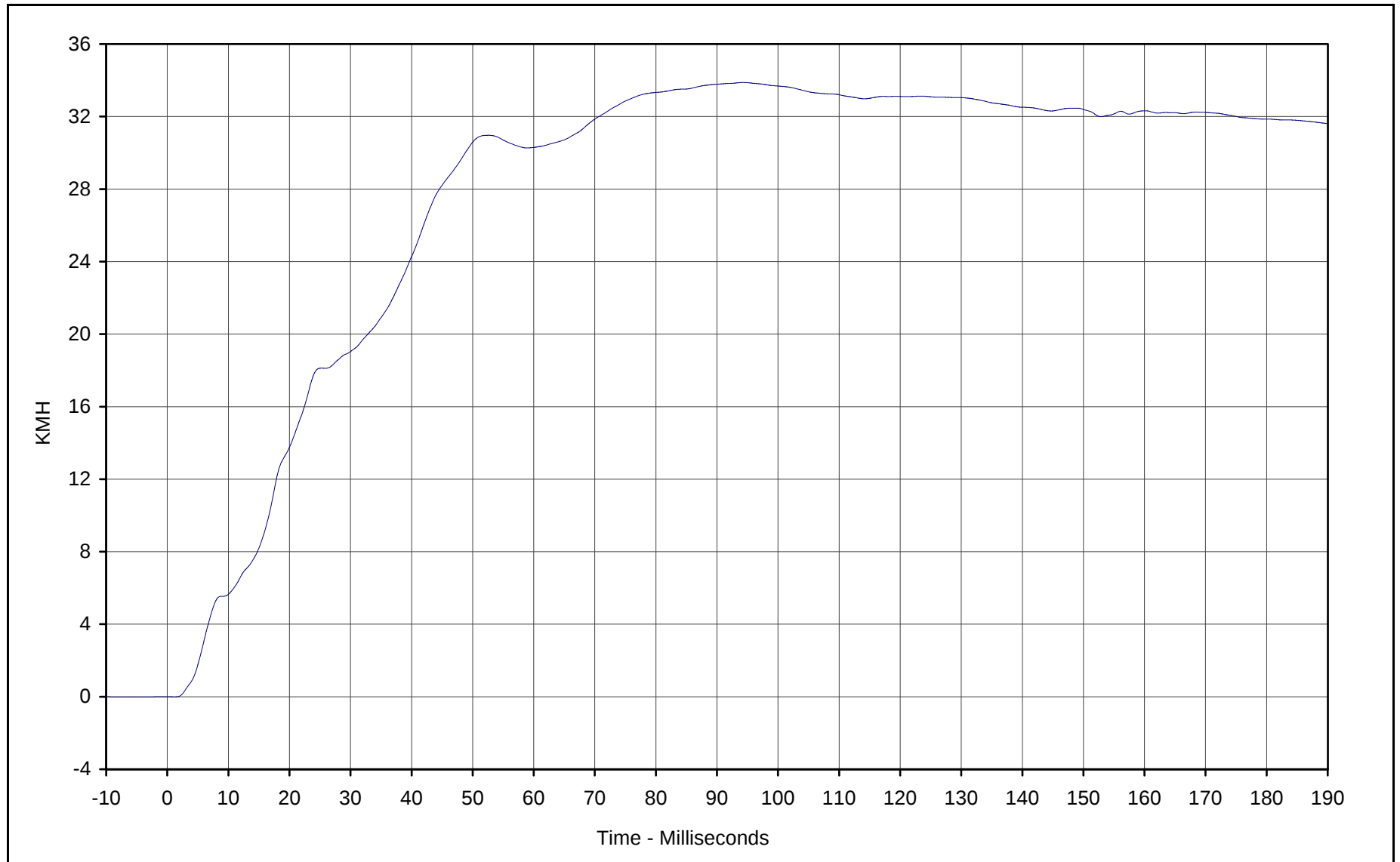




Curve Description: Left Sill at Rear Door Y
Maximum Value: 34.5 at 17.2 Milliseconds
Minimum Value: -4.3 at 55.4 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-036

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

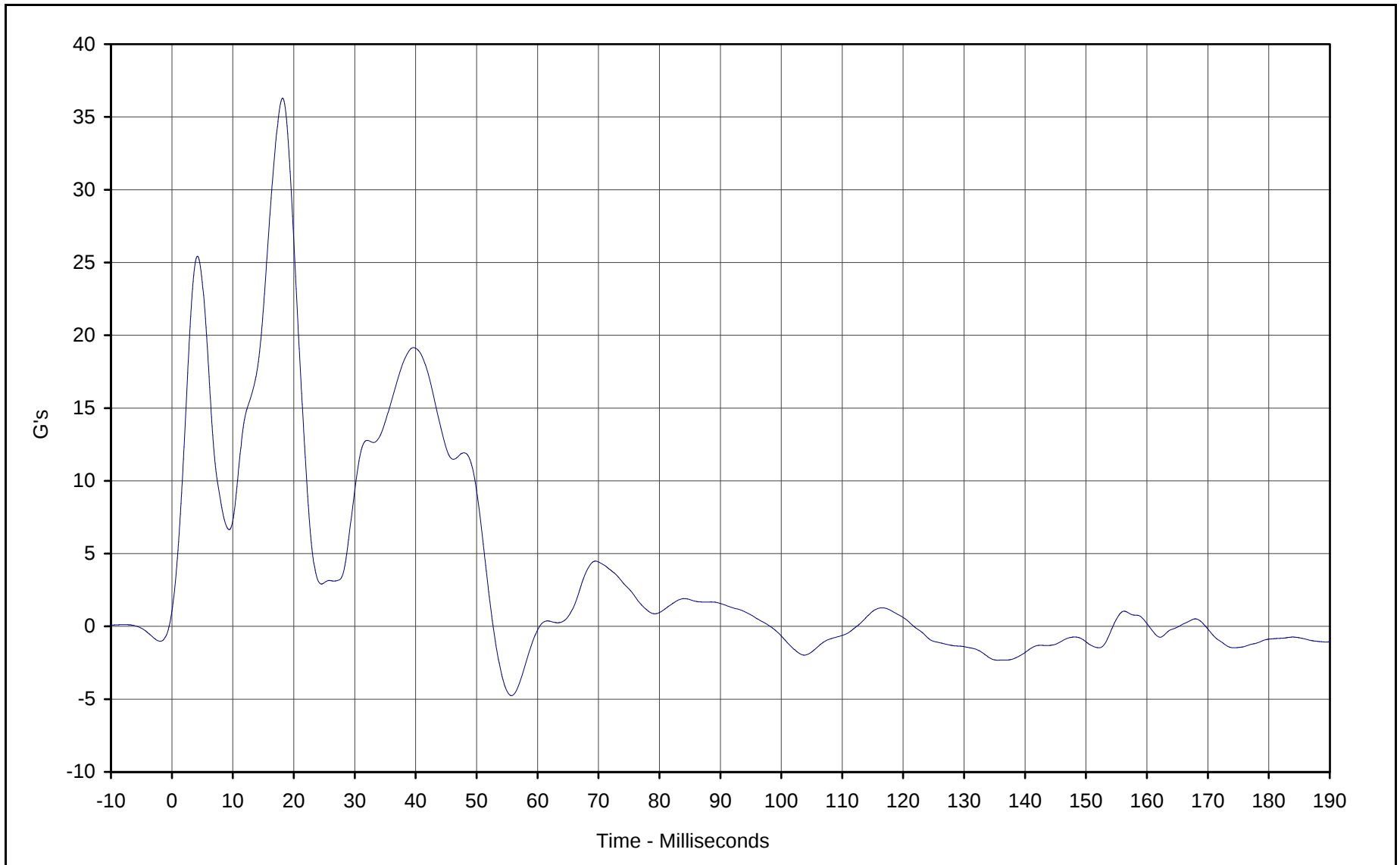




Curve Description: Left Sill at Rear Door Y Velocity
Maximum Value: 33.9 at 94.3 Milliseconds
Minimum Value: 0.0 at 1.2 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-036

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

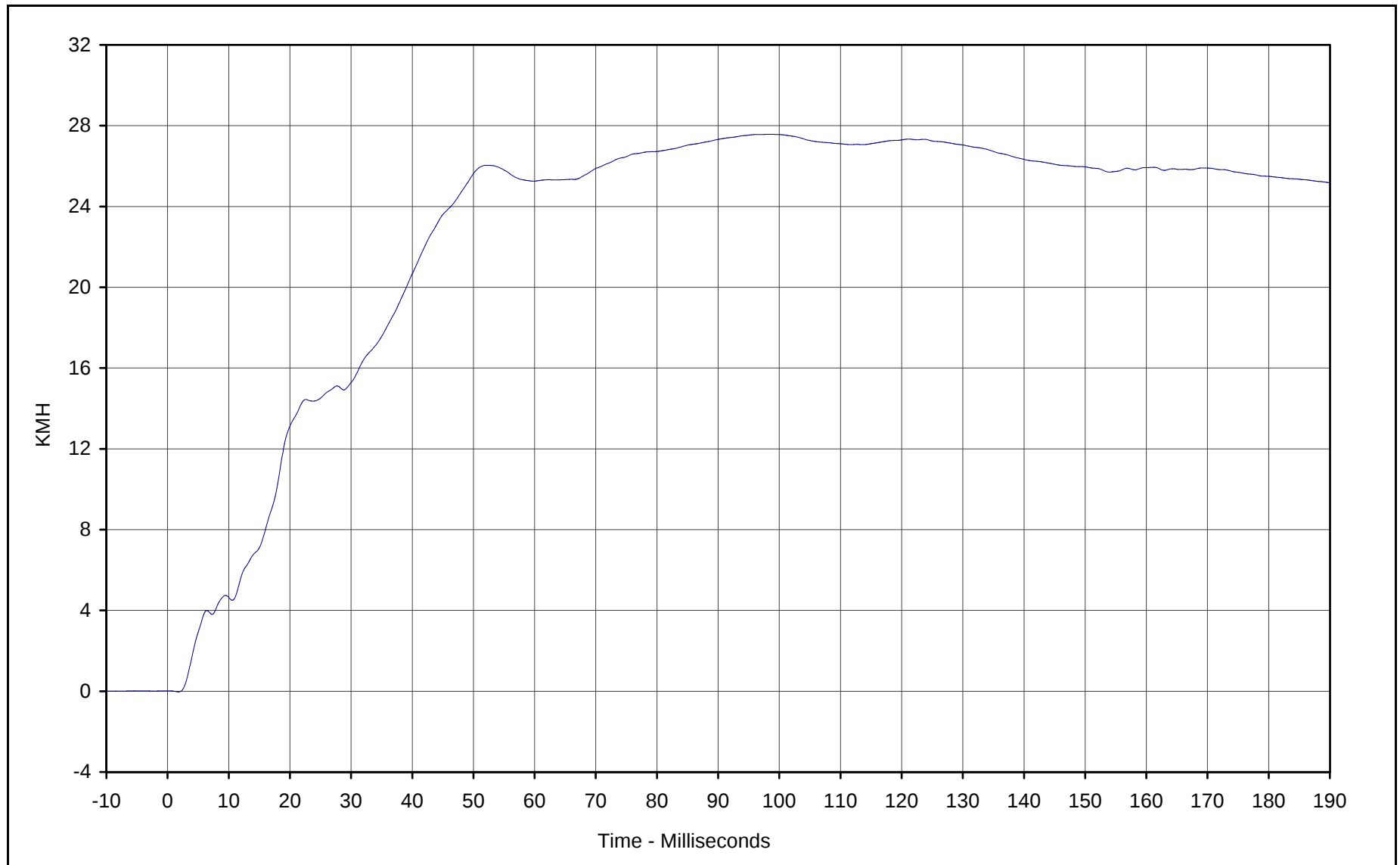




Curve Description: Left Sill at Front Door Y
Maximum Value: 36.3 at 18.2 Milliseconds
Minimum Value: -4.8 at 55.7 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-037

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

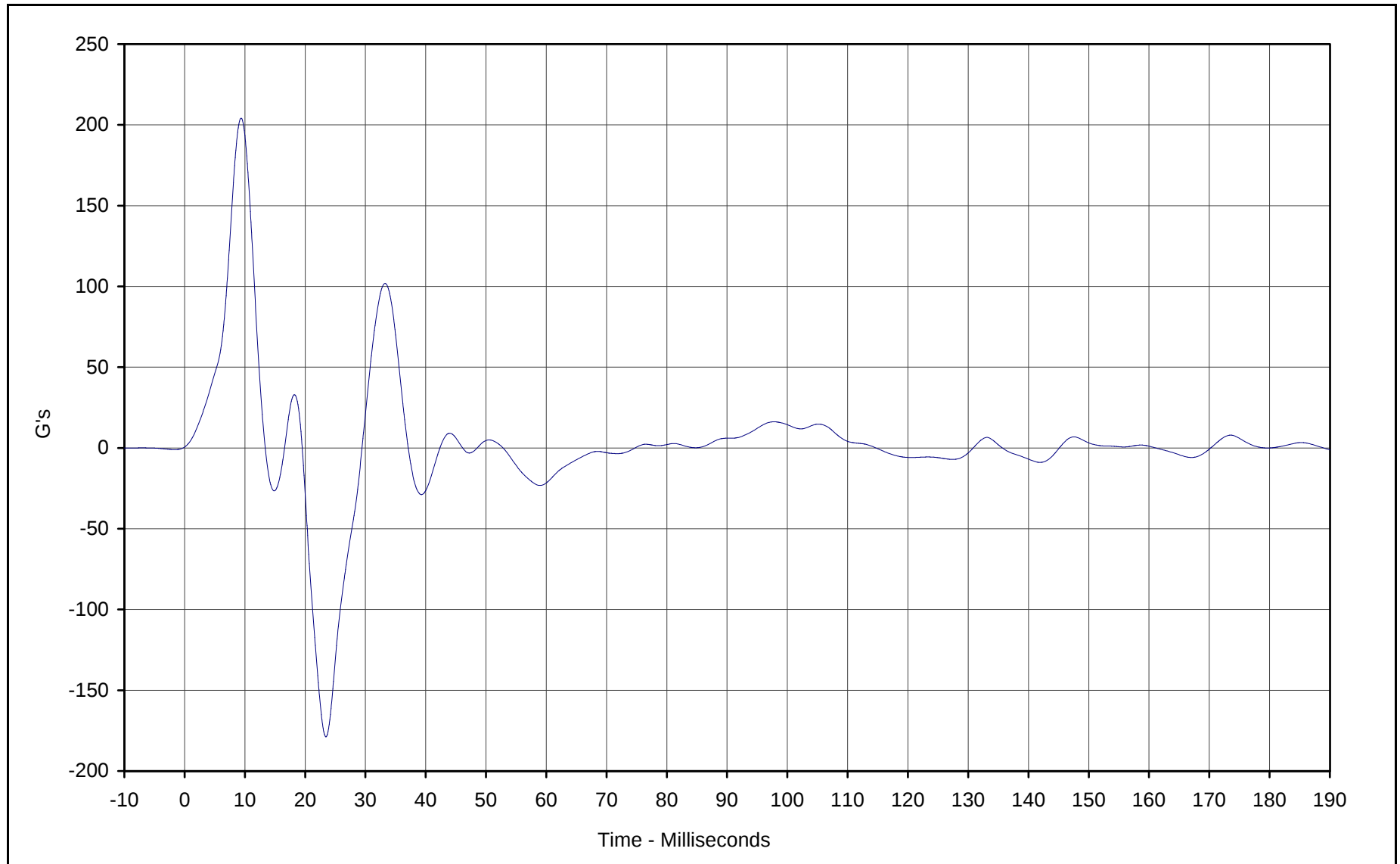




Curve Description: Left Sill at Front Door Y Velocity
Maximum Value: 27.6 at 98.3 Milliseconds
Minimum Value: 0.0 at 1.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-037

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

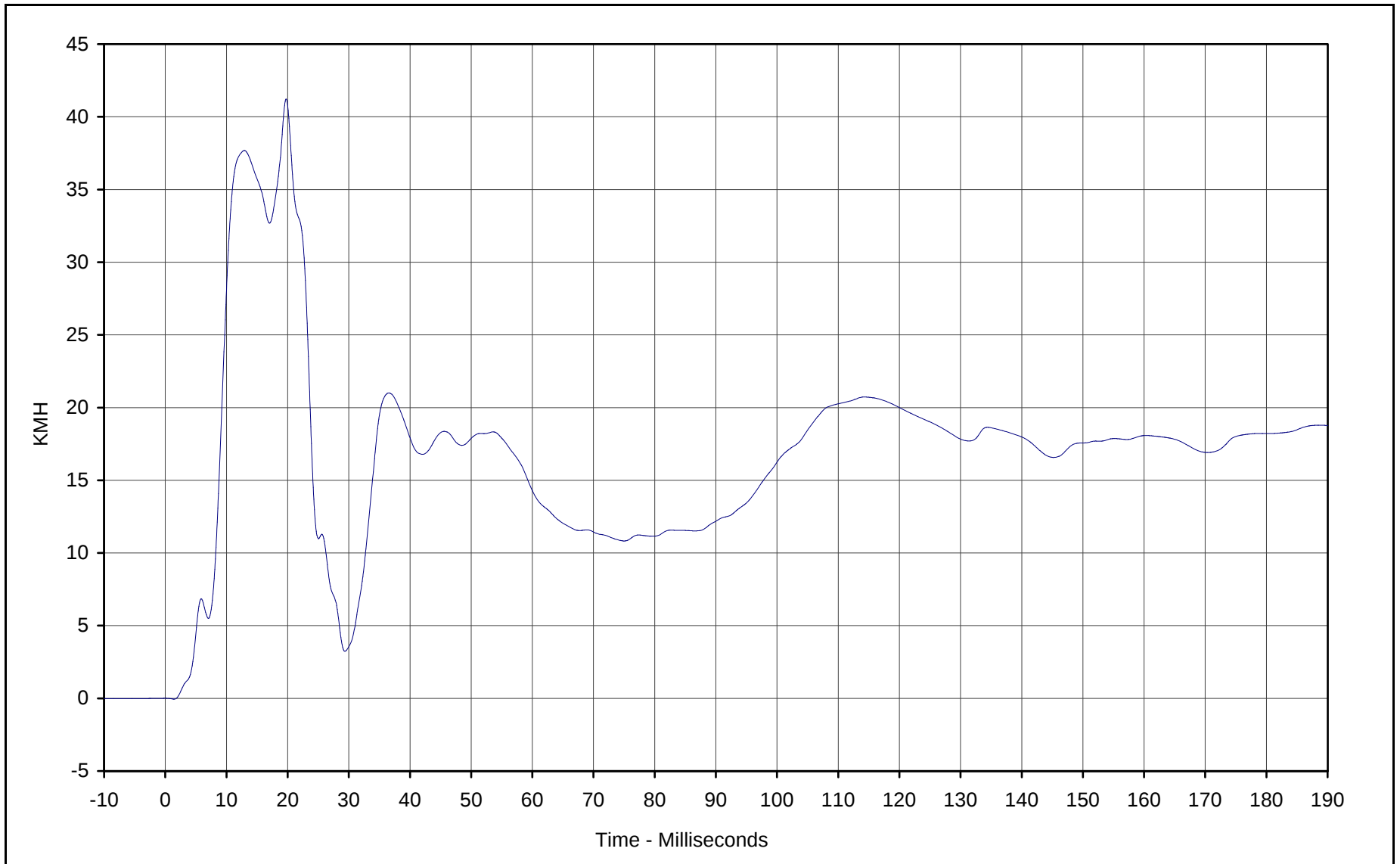




Curve Description: Left Front Door Centerline Y
Maximum Value: 204.2 at 9.4 Milliseconds
Minimum Value: -178.8 at 23.5 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-038

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

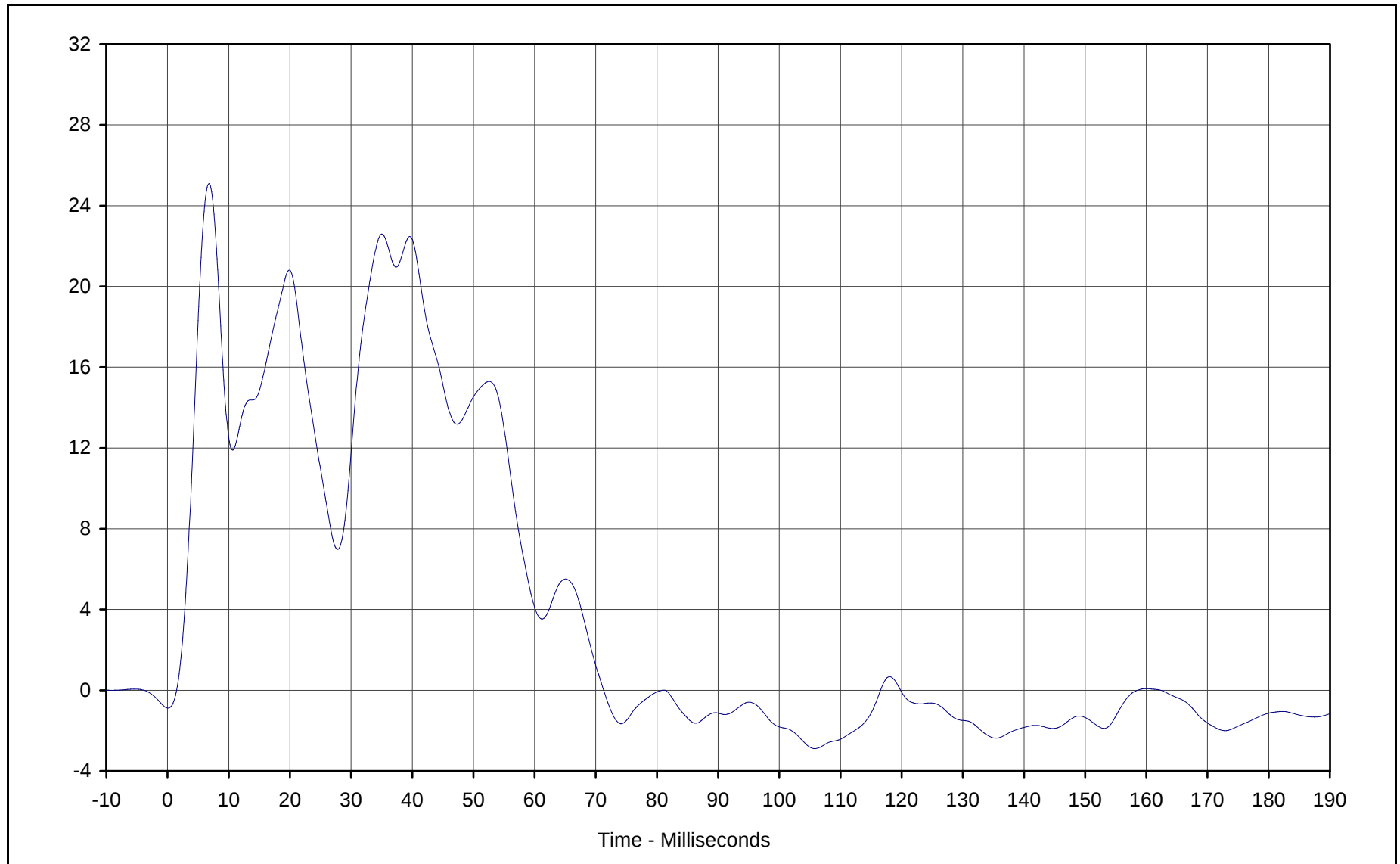




Curve Description: Left Front Door CL Y Velocity
Maximum Value: 41.2 at 19.8 Milliseconds
Minimum Value: -0.1 at 1.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-038

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

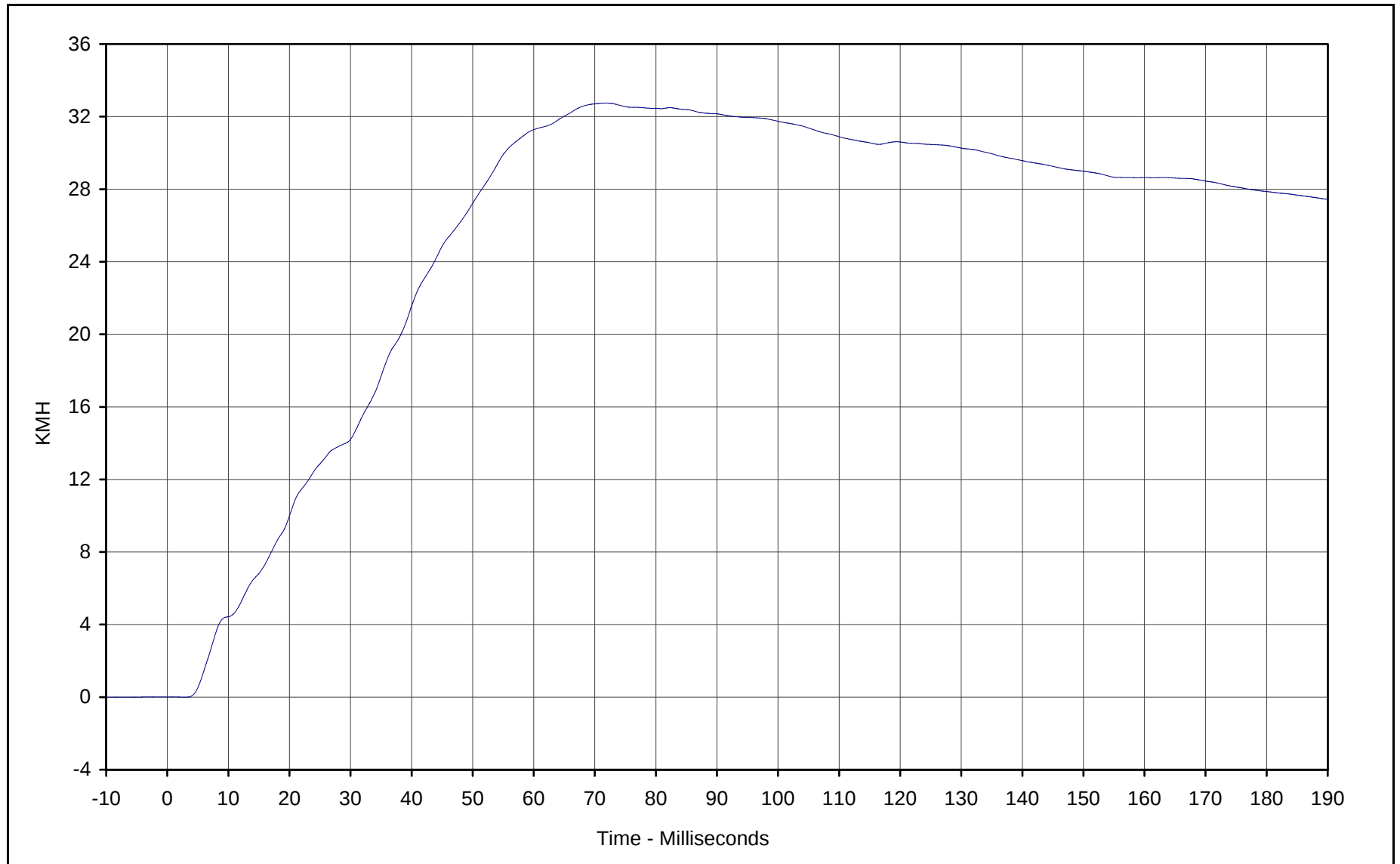




Curve Description: Right Rear Occ. Compartment Y
Maximum Value: 25.1 at 6.8 Milliseconds
Minimum Value: -2.9 at 105.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-039

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

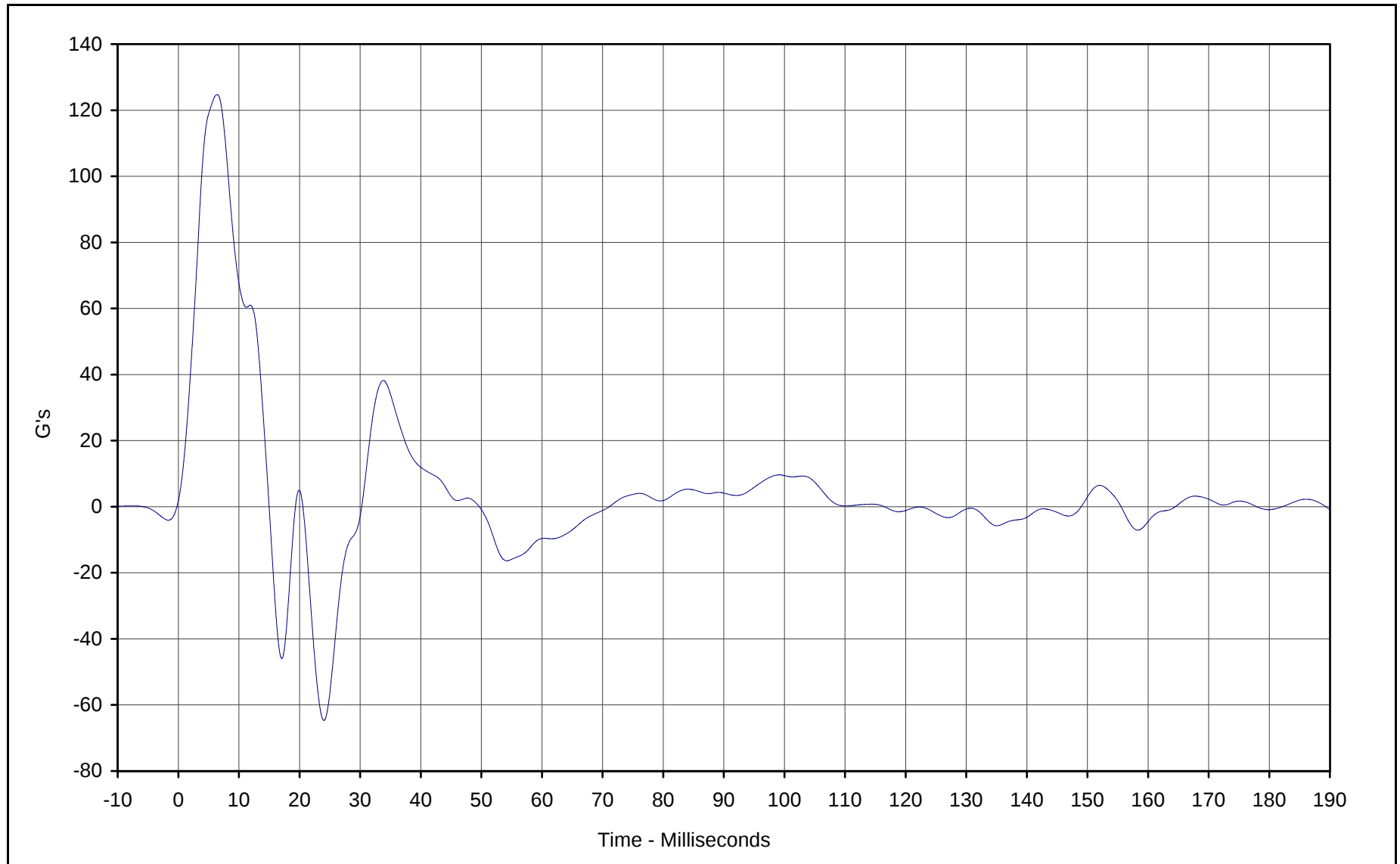




Curve Description: Right Rear Occ. Comp. Y Velocity
Maximum Value: 32.7 at 71.6 Milliseconds
Minimum Value: 0.0 at 3.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-039

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

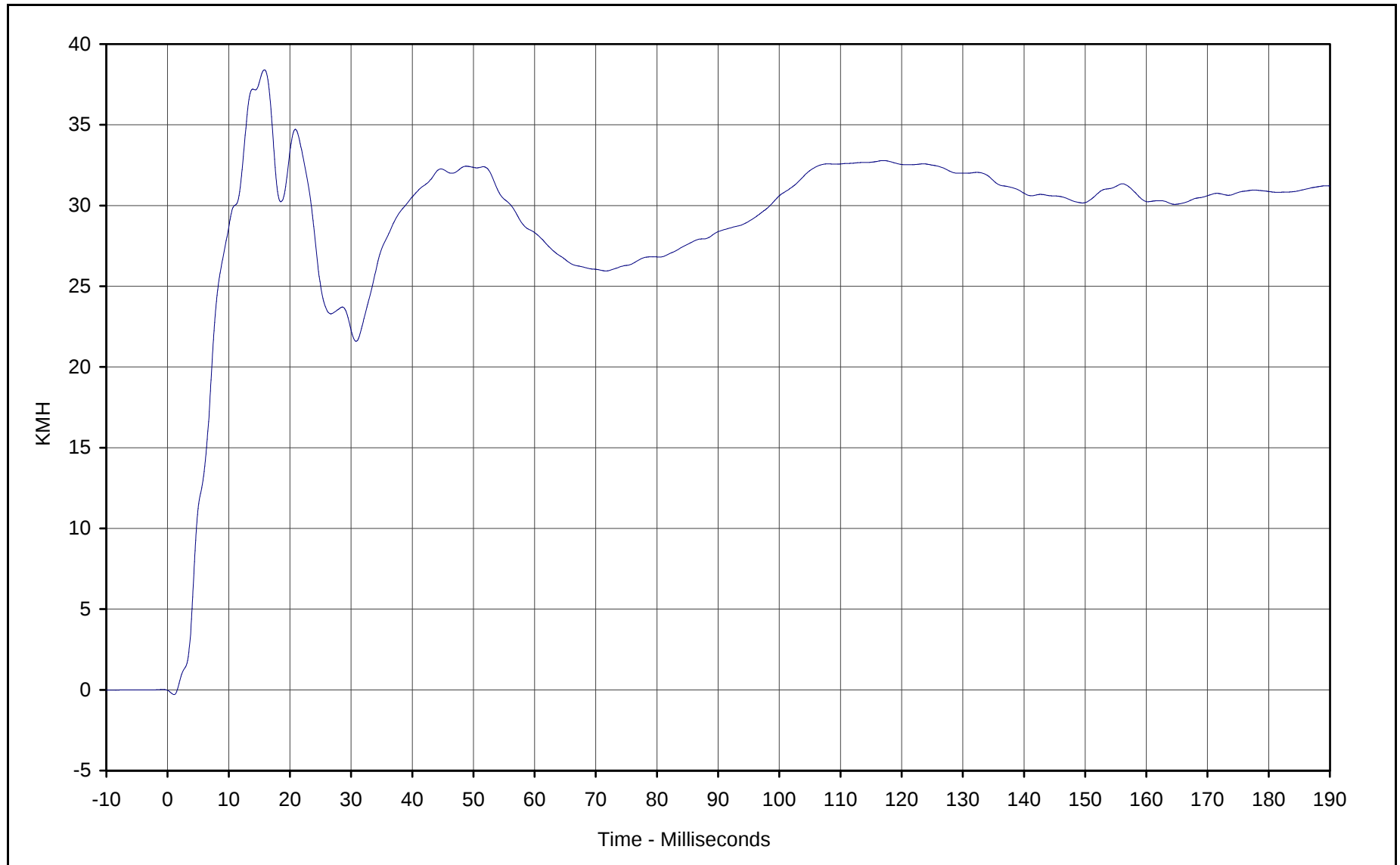




Curve Description: Left Front Door Mid Rear Y
Maximum Value: 124.7 at 6.4 Milliseconds
Minimum Value: -64.7 at 24.0 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-040

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

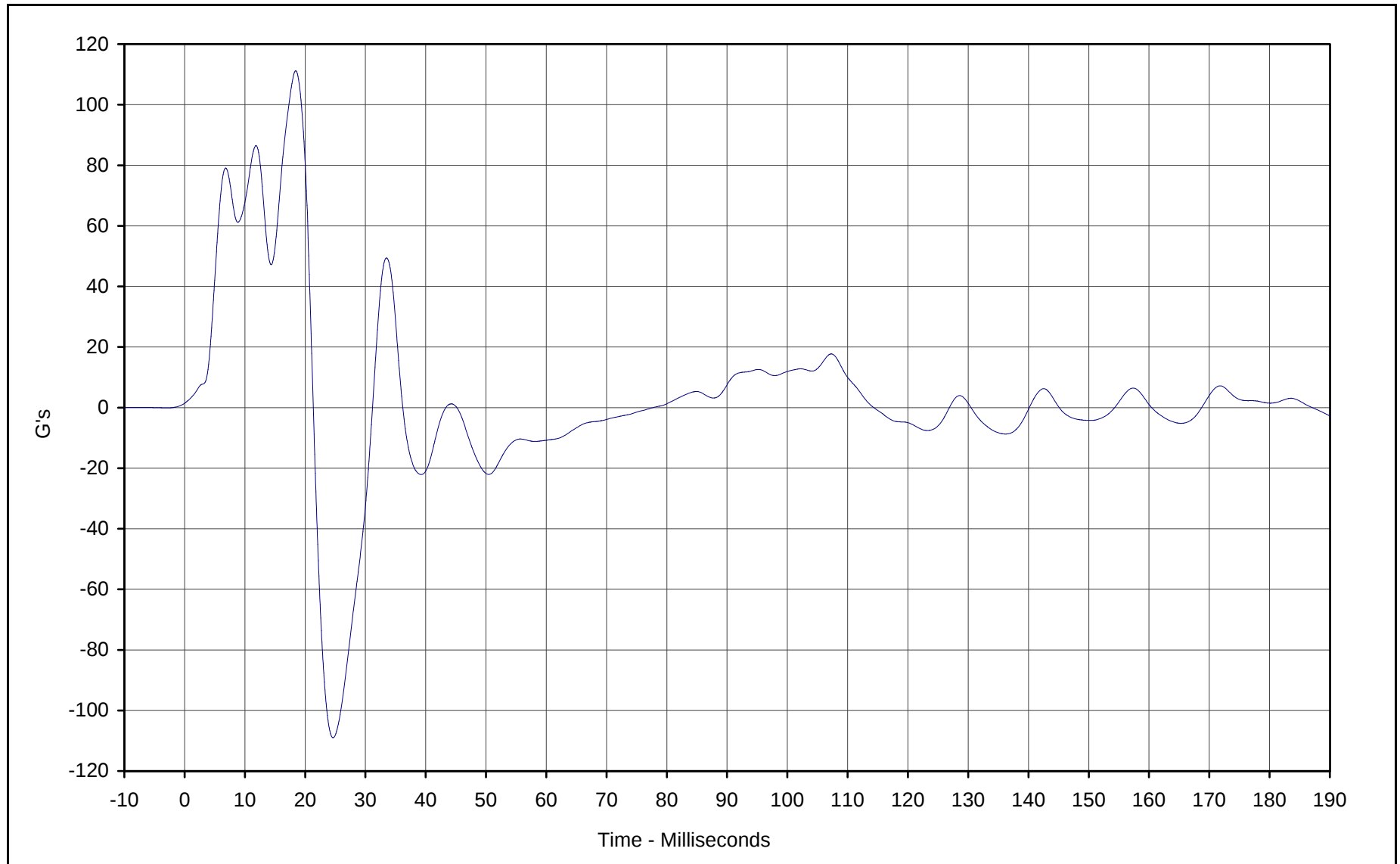




Curve Description: Left Front Door Mid Rear Y Velocity
Maximum Value: 38.4 at 15.8 Milliseconds
Minimum Value: -0.3 at 1.1 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-040

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

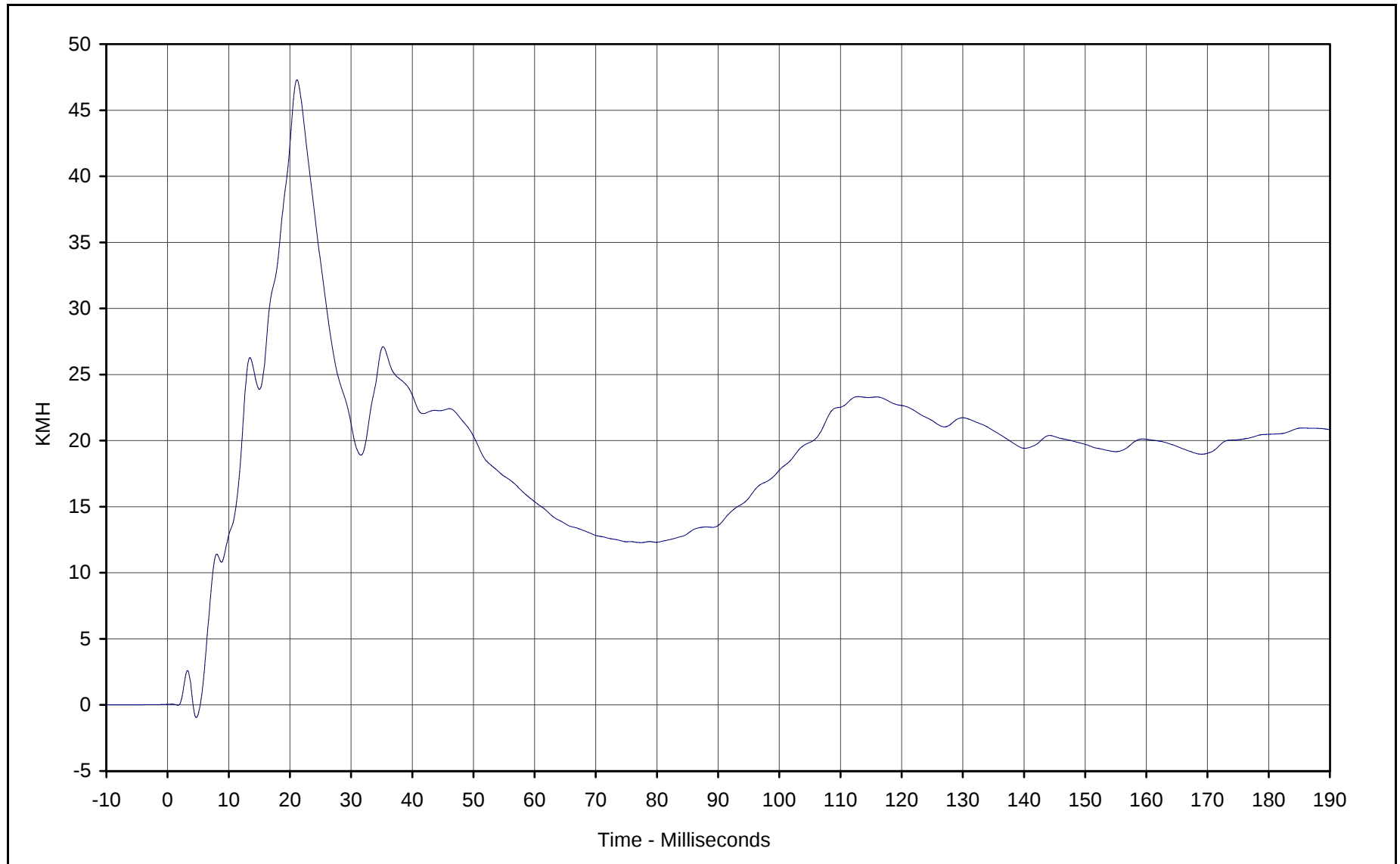




Curve Description: Left Front Door Upper CL Y
Maximum Value: 111.2 at 18.4 Milliseconds
Minimum Value: -109.0 at 24.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-041

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Left Front Door Upper CL Y Velocity

Maximum Value: 47.3 at 21.2 Milliseconds

Minimum Value: -1.0 at 4.7 Milliseconds

SAE Filter Class: 180

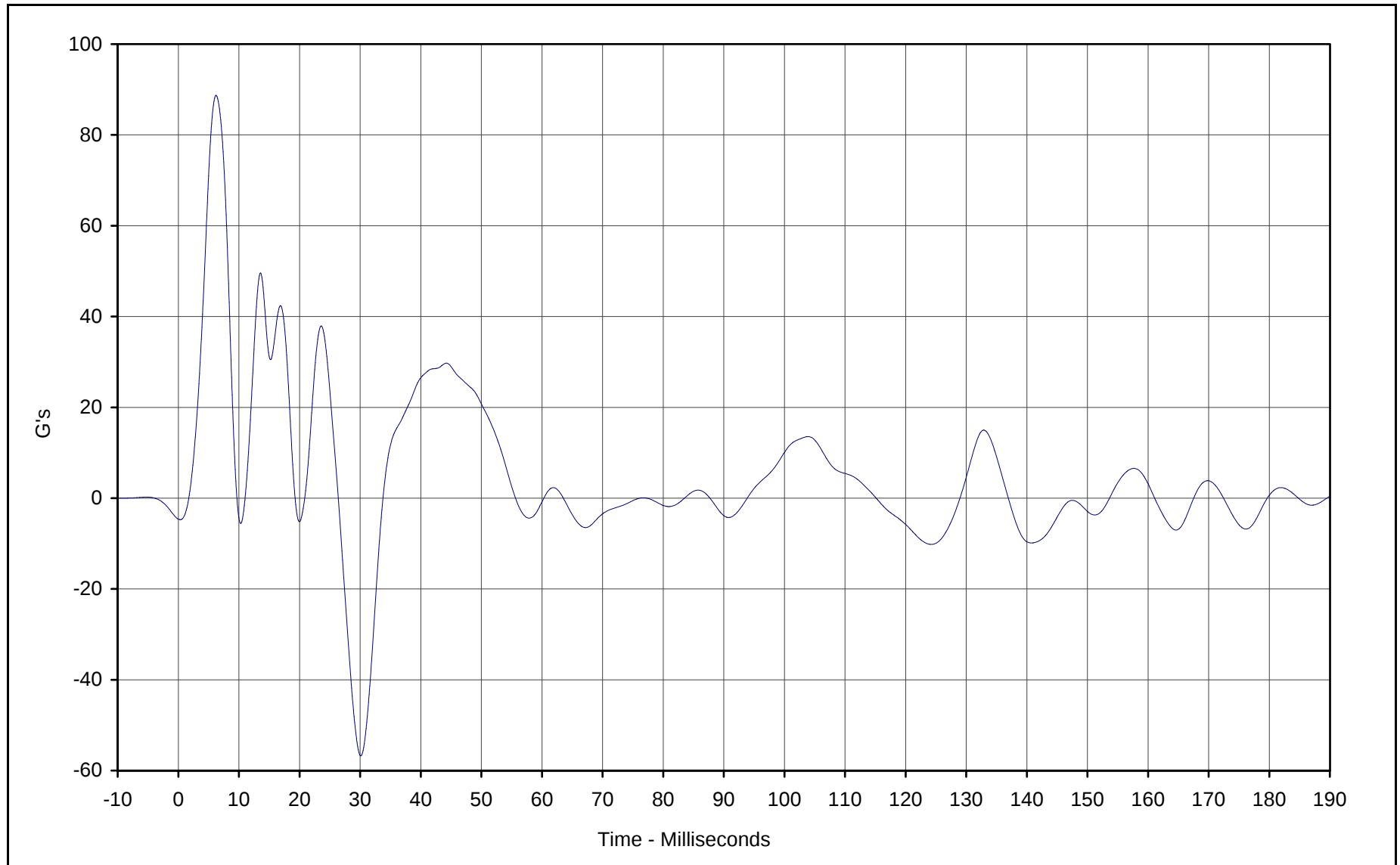
Date of Test: 12/08/00

Curve Number: IN1-041

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

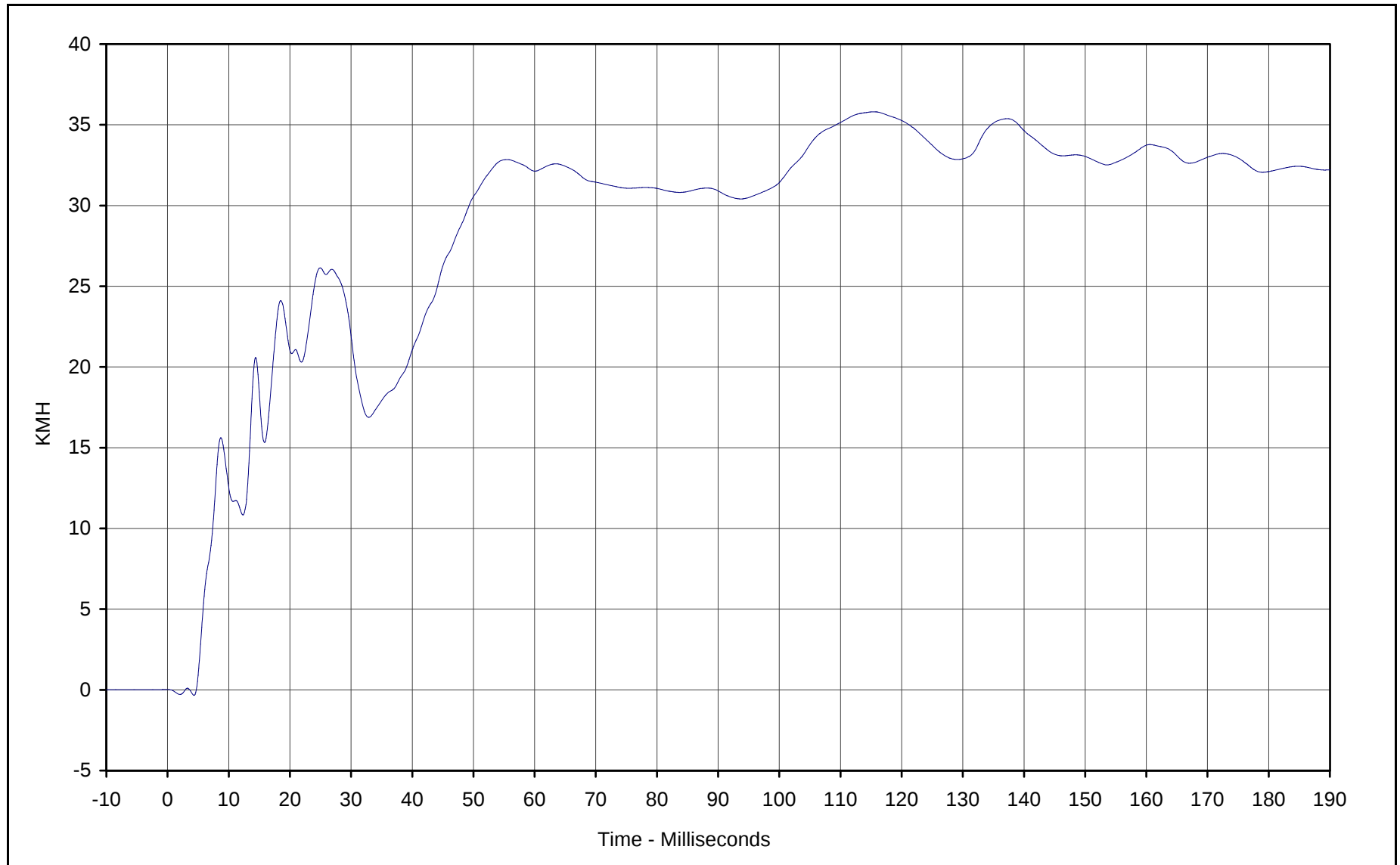




Curve Description: Left Rear Door Mid Rear Y
Maximum Value: 88.7 at 6.2 Milliseconds
Minimum Value: -56.8 at 30.1 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-042

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

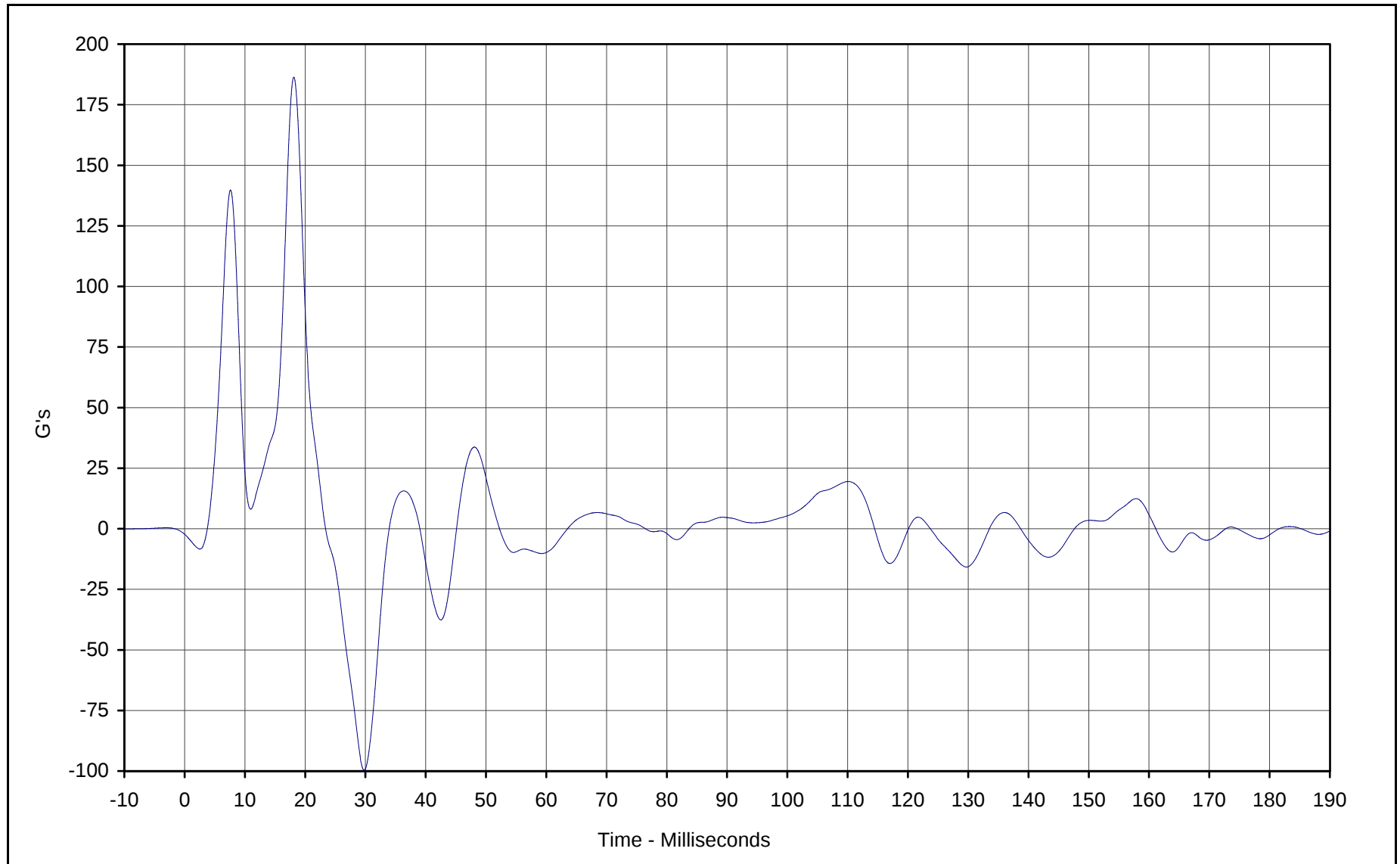




Curve Description: Left Rear Door Mid Rear Y Velocity
Maximum Value: 35.8 at 115.4 Milliseconds
Minimum Value: -0.3 at 4.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-042

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

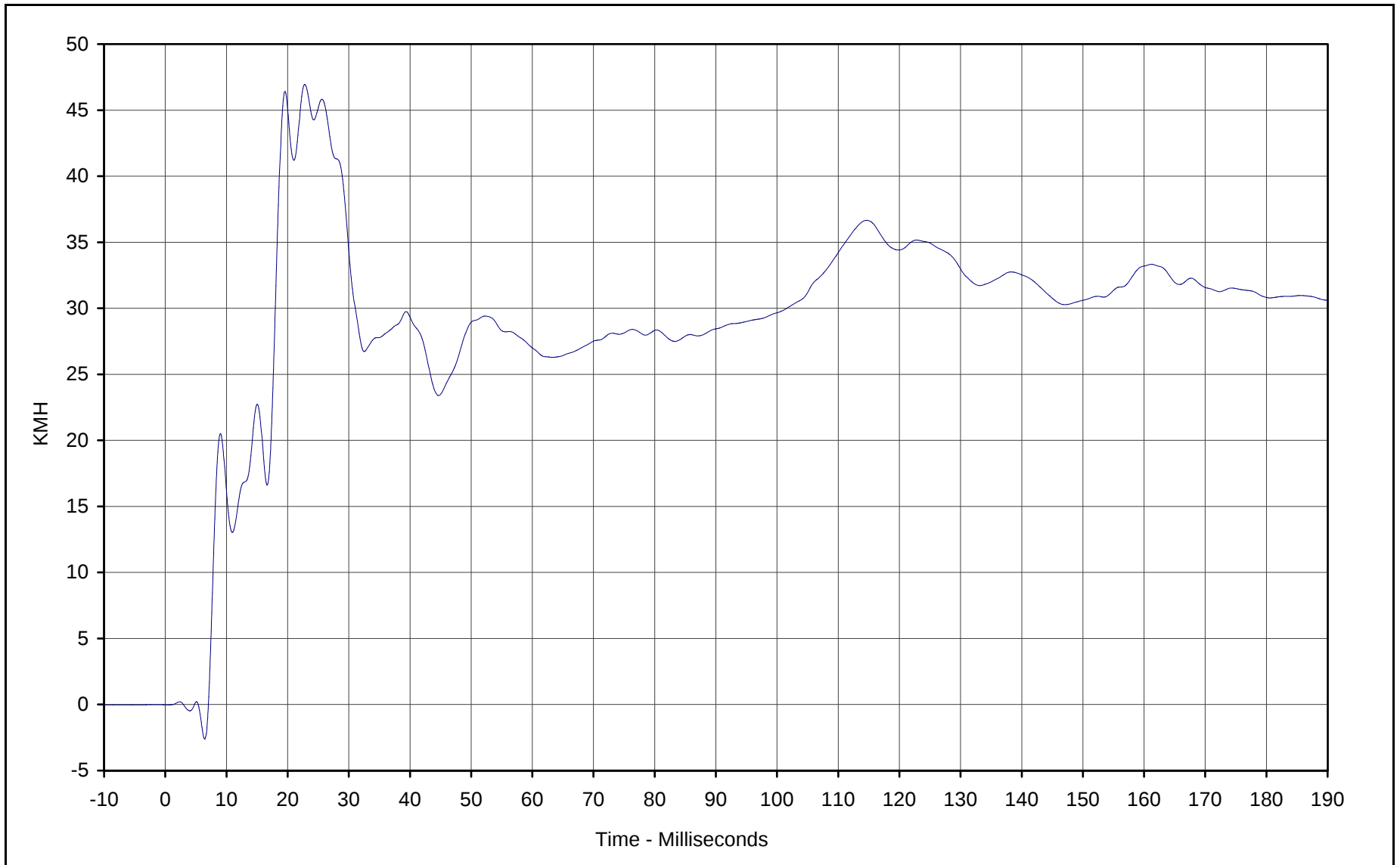




Curve Description: Left Rear Door Upper CL Y
Maximum Value: 186.4 at 18.1 Milliseconds
Minimum Value: -99.7 at 29.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-043

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

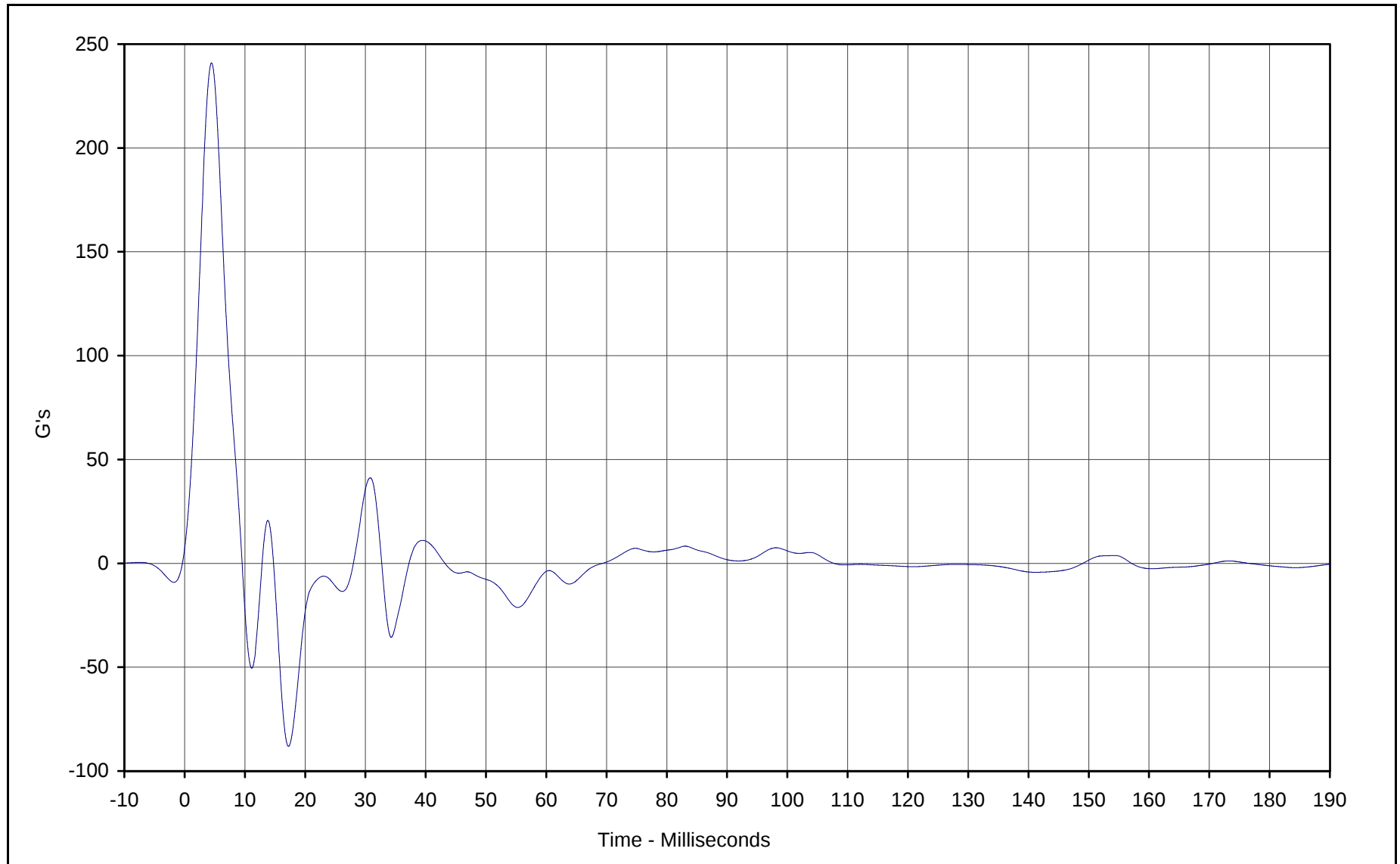




Curve Description: Left Rear Door Upper CL Y Velocity
Maximum Value: 47.0 at 22.8 Milliseconds
Minimum Value: -2.6 at 6.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-043

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

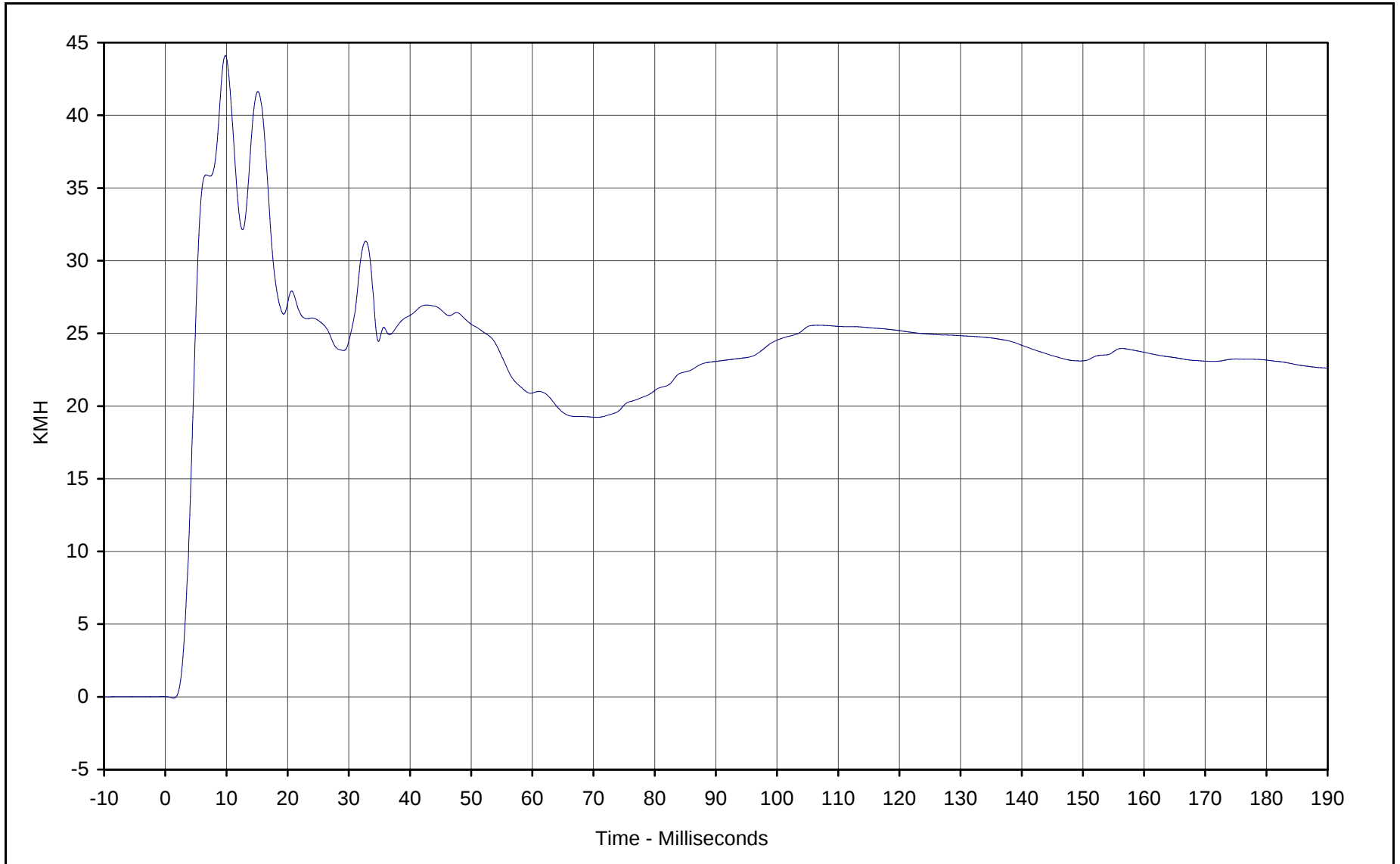




Curve Description: Left B-Post Lower Y
Maximum Value: 241.0 at 4.5 Milliseconds
Minimum Value: -88.1 at 17.2 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-044

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

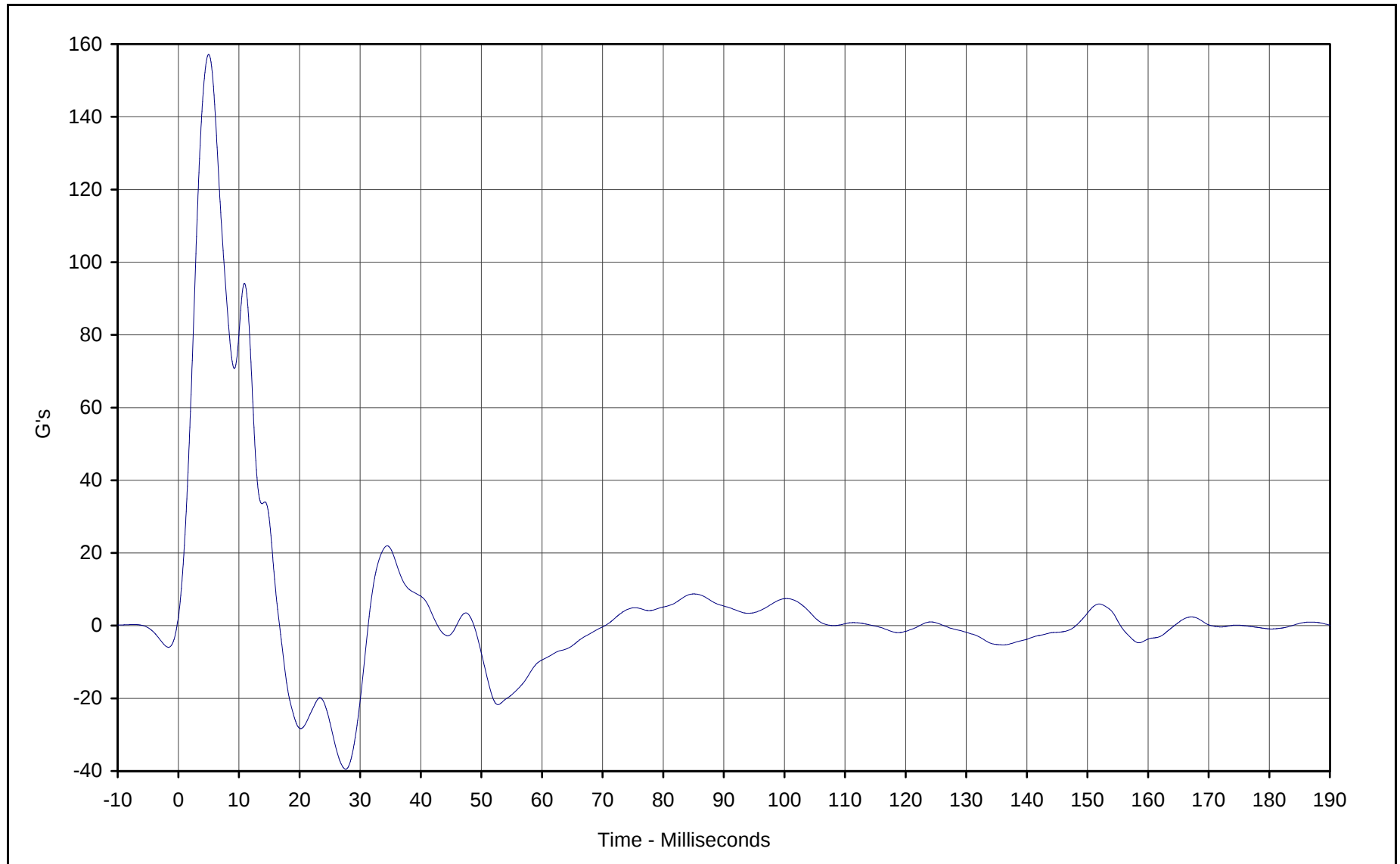




Curve Description: Left B-Post Lower Y Velocity
Maximum Value: 44.1 at 9.8 Milliseconds
Minimum Value: -0.1 at 1.4 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-044

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

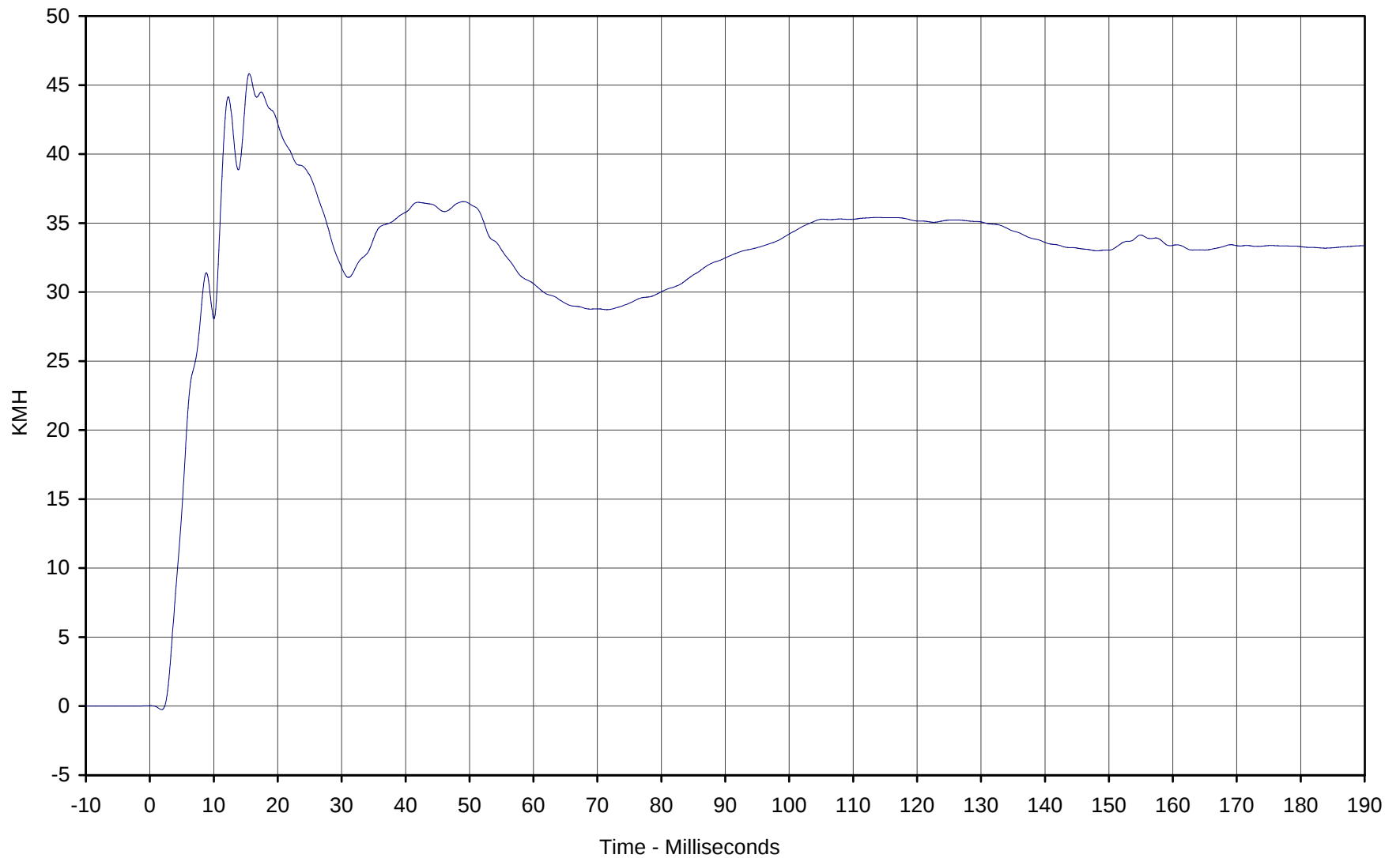




Curve Description: Left B-Post Middle Y
Maximum Value: 157.2 at 5.0 Milliseconds
Minimum Value: -39.5 at 27.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-045

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

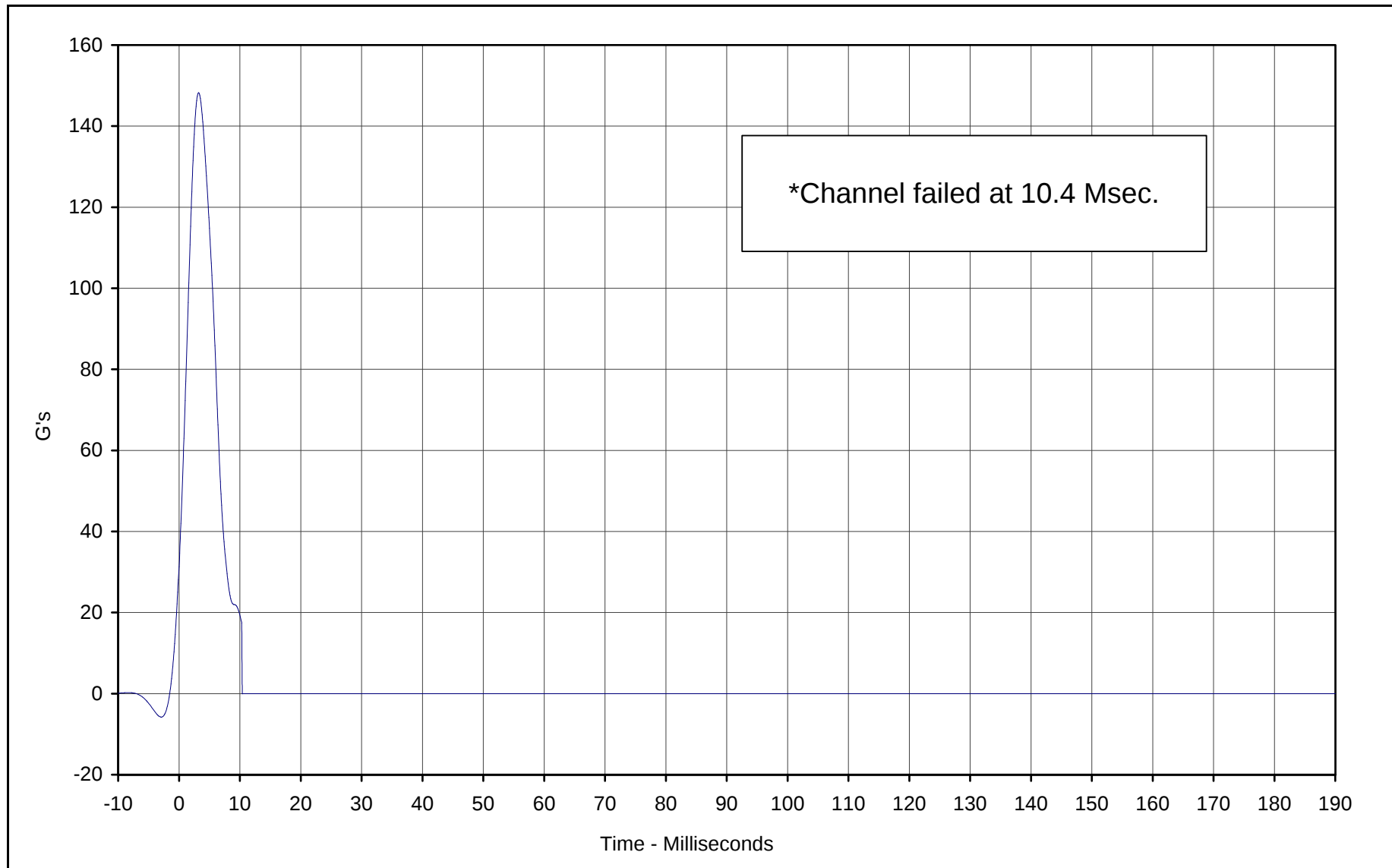




Curve Description: Left B-Post Middle Y Velocity
Maximum Value: 45.8 at 15.6 Milliseconds
Minimum Value: -0.3 at 1.9 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-045

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Left A-Post Lower Y *

Maximum Value: 148.3 at 3.2 Milliseconds

Minimum Value: 0.0 at 10.4 Milliseconds

SAE Filter Class: 60

Date of Test: 12/08/00

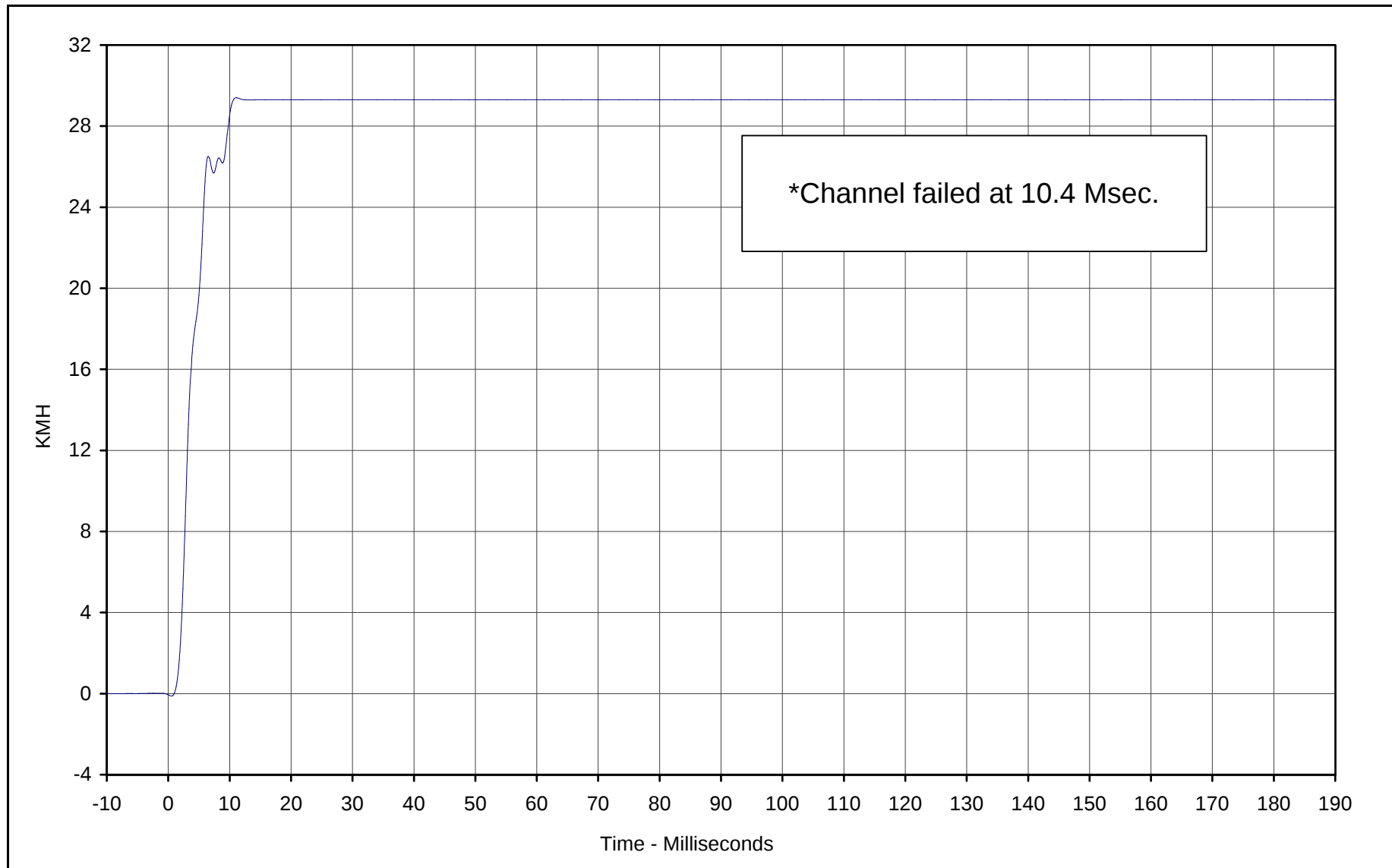
Curve Number: FIL-046

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

*Channel failed at 10.4 Msec.





Curve Description: Left A-Post Lower Y Velocity *

Maximum Value: 29.4 at 11.1 Milliseconds

Minimum Value: -0.1 at 0.5 Milliseconds

SAE Filter Class: 180

Date of Test: 12/08/00

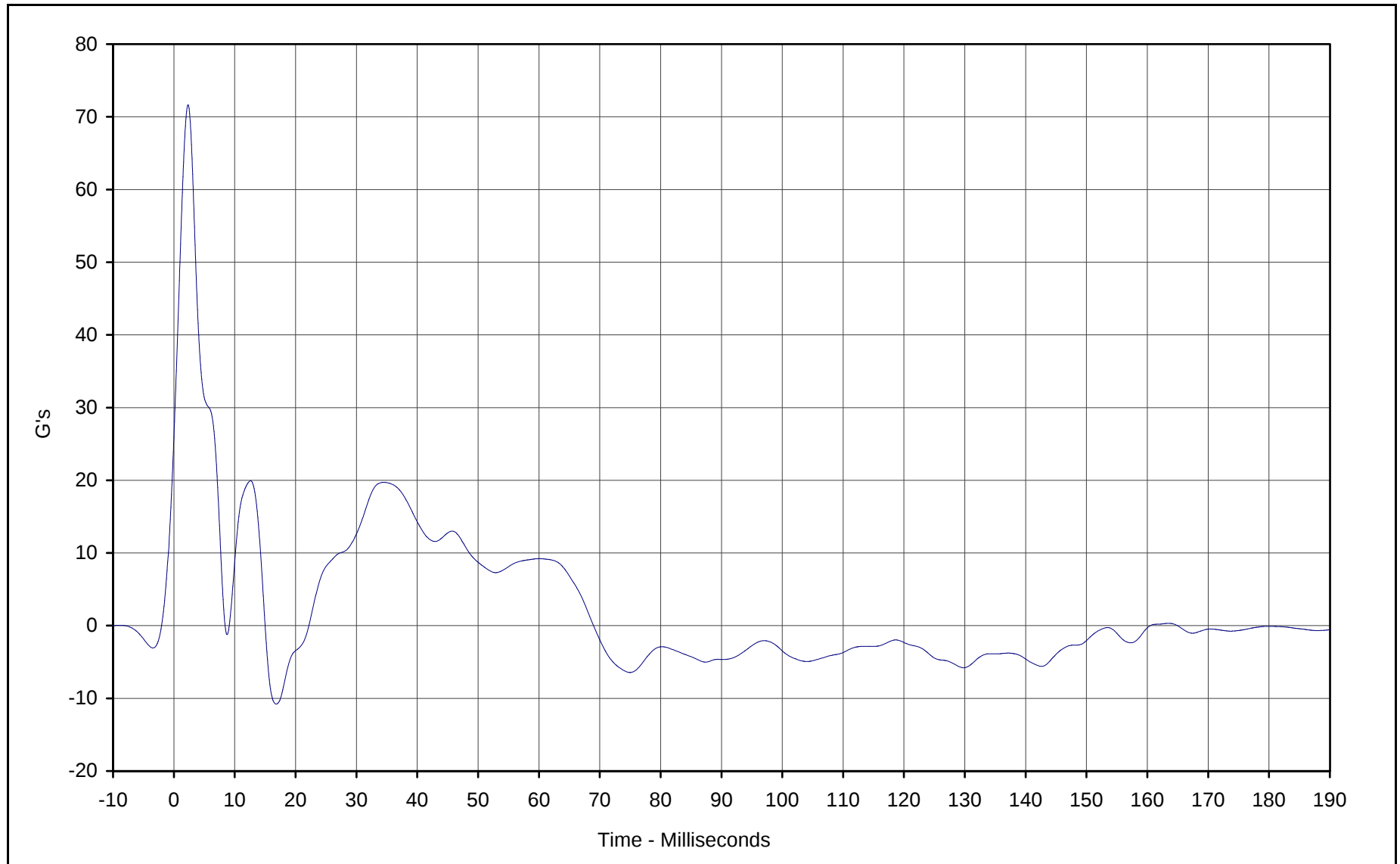
Curve Number: IN1-046

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

*Channel failed at 10.4 Msec.

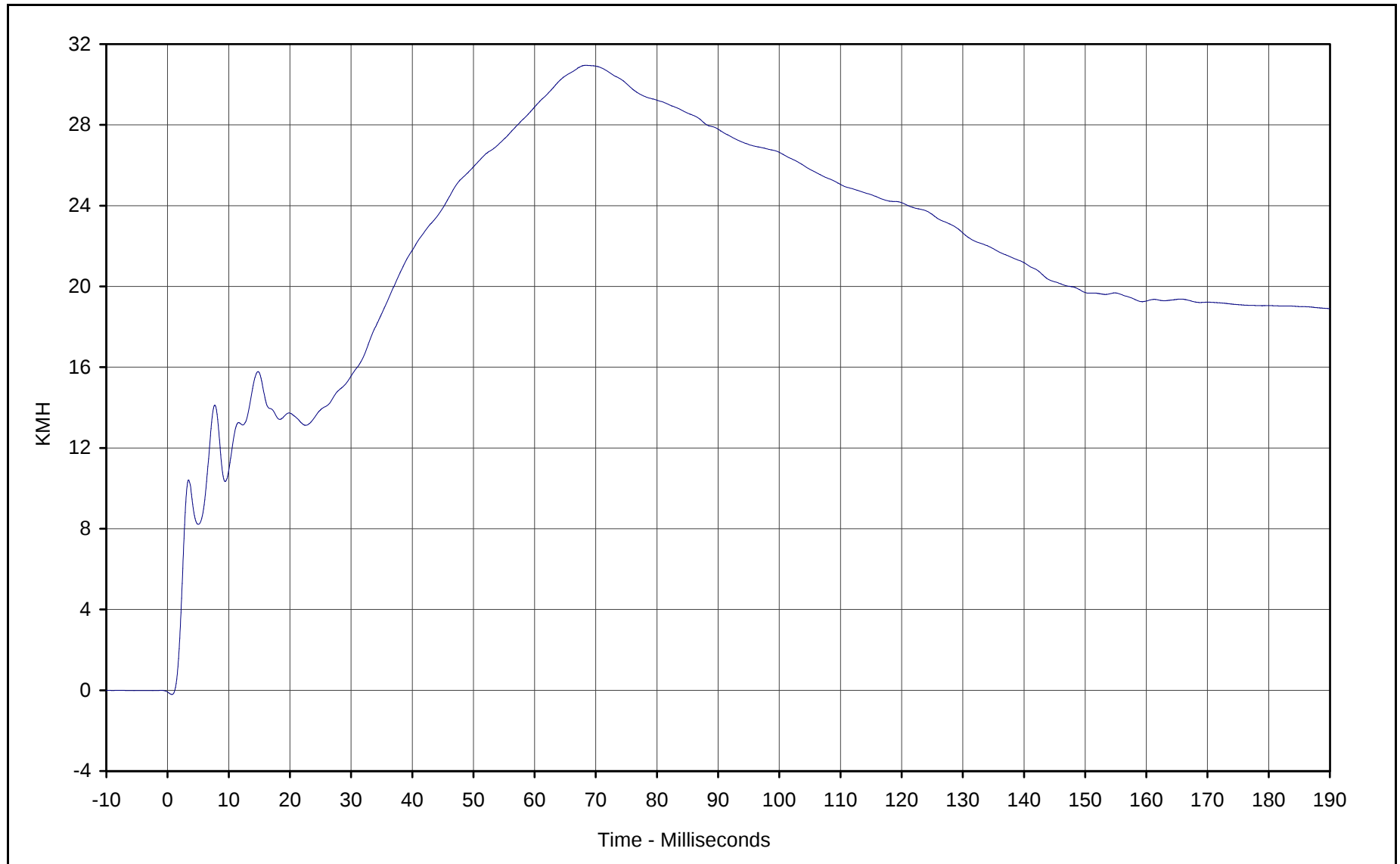




Curve Description: Left A-Post Middle Y
Maximum Value: 71.6 at 2.3 Milliseconds
Minimum Value: -10.8 at 16.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-047

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

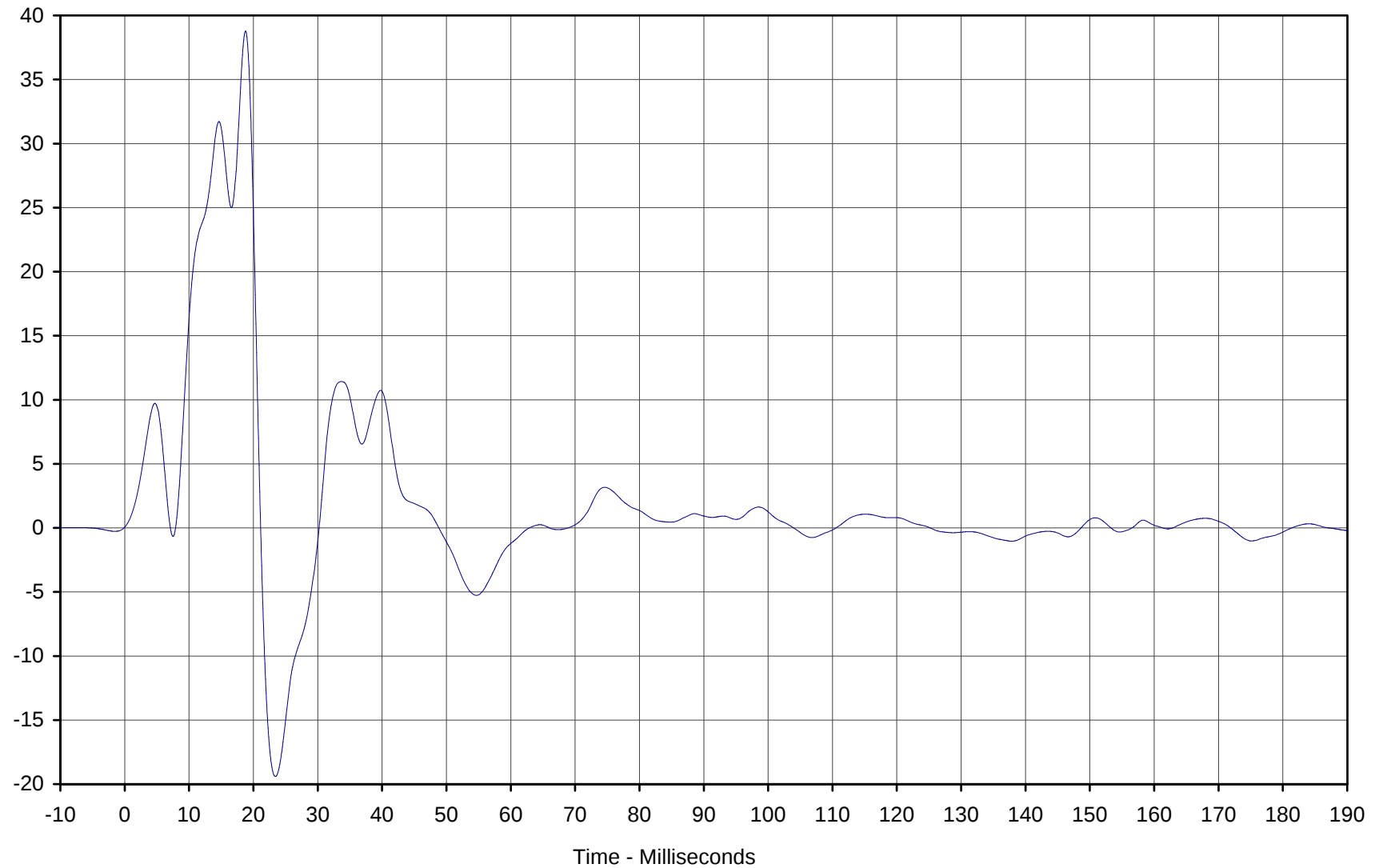




Curve Description: Left A-Post Middle Y Velocity
Maximum Value: 30.9 at 68.3 Milliseconds
Minimum Value: -0.2 at 0.7 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-047

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

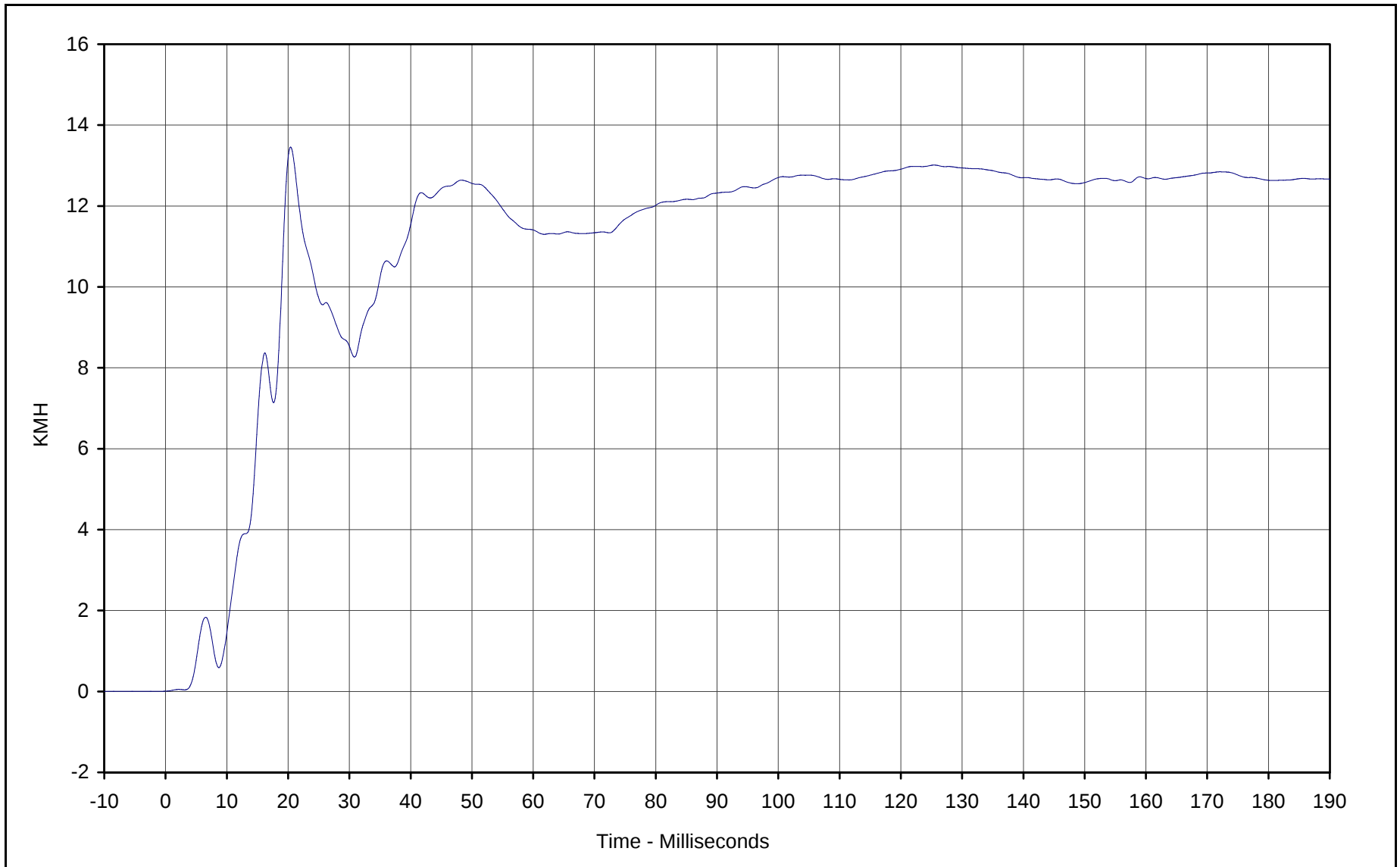




Curve Description: Left Front Seat Track Y
Maximum Value: 38.8 at 18.8 Milliseconds
Minimum Value: -19.4 at 23.4 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-048

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

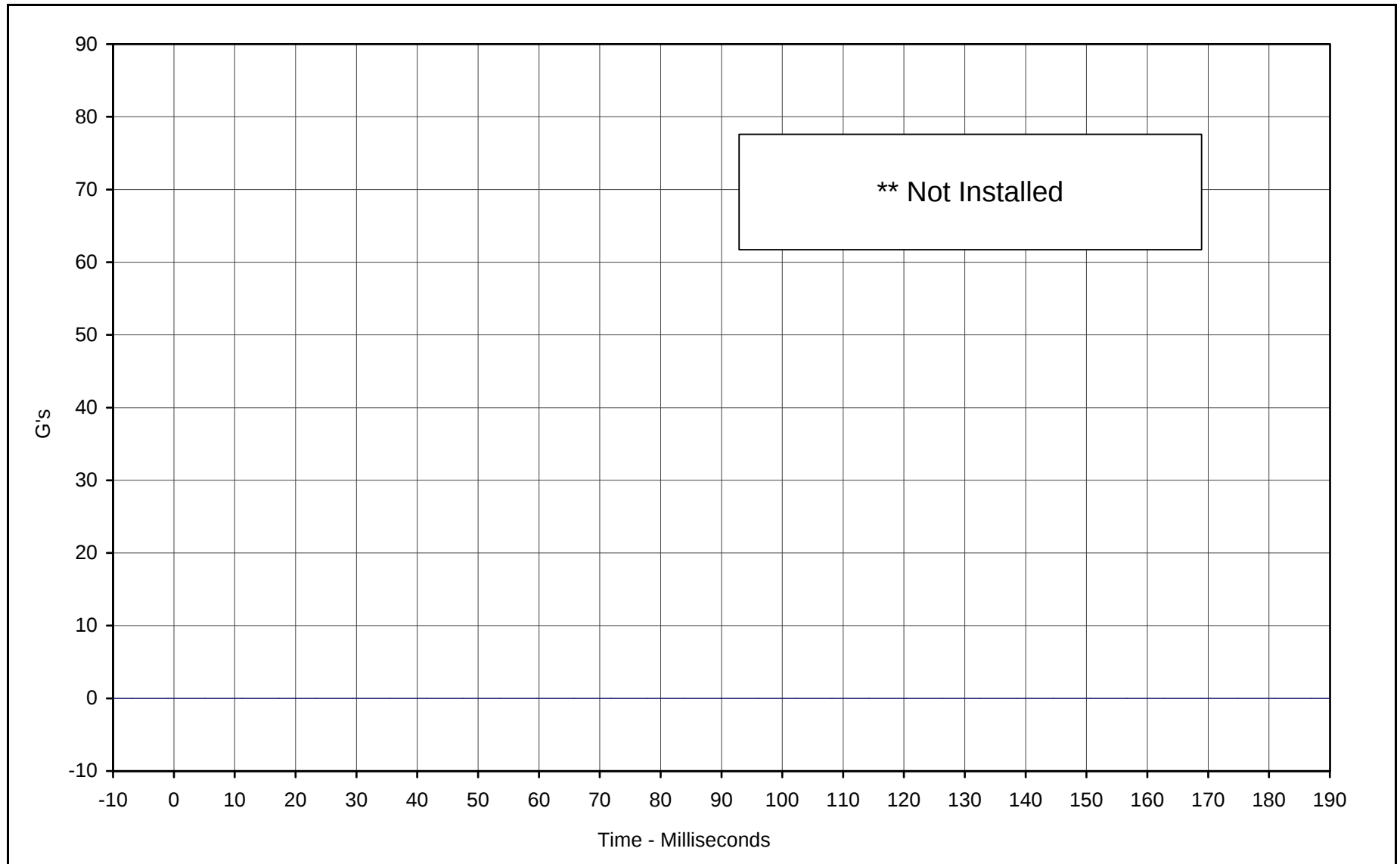




Curve Description: Left Front Seat Track Y Velocity
Maximum Value: 13.5 at 20.4 Milliseconds
Minimum Value: 0.0 at 0.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-048

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Left Rear Seat Structure Y **

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 12/08/00

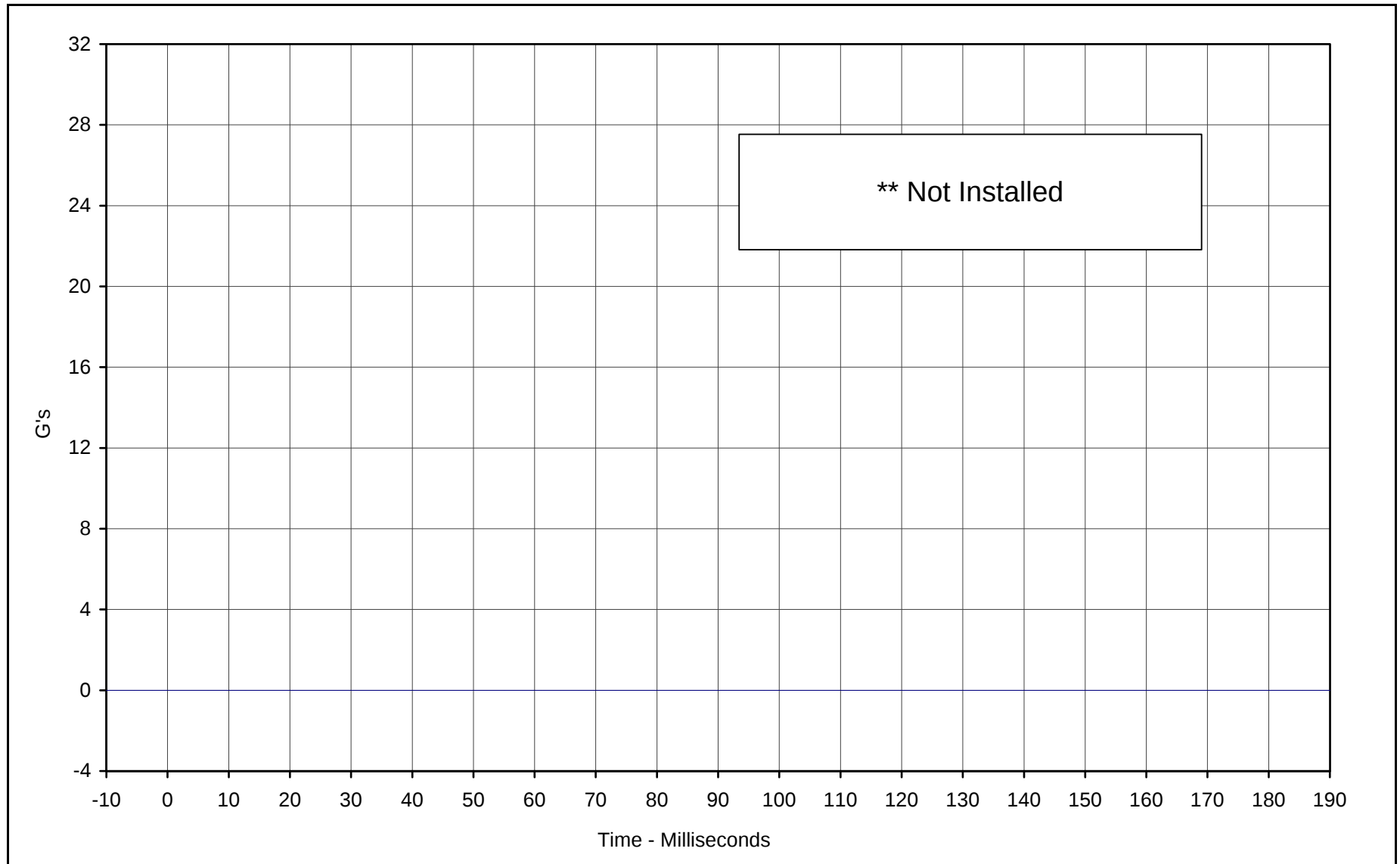
Curve Number: FIL-049

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

** Not Installed





Curve Description: Left Rear Seat Structure Y Velocity **

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: none

Date of Test: 12/08/00

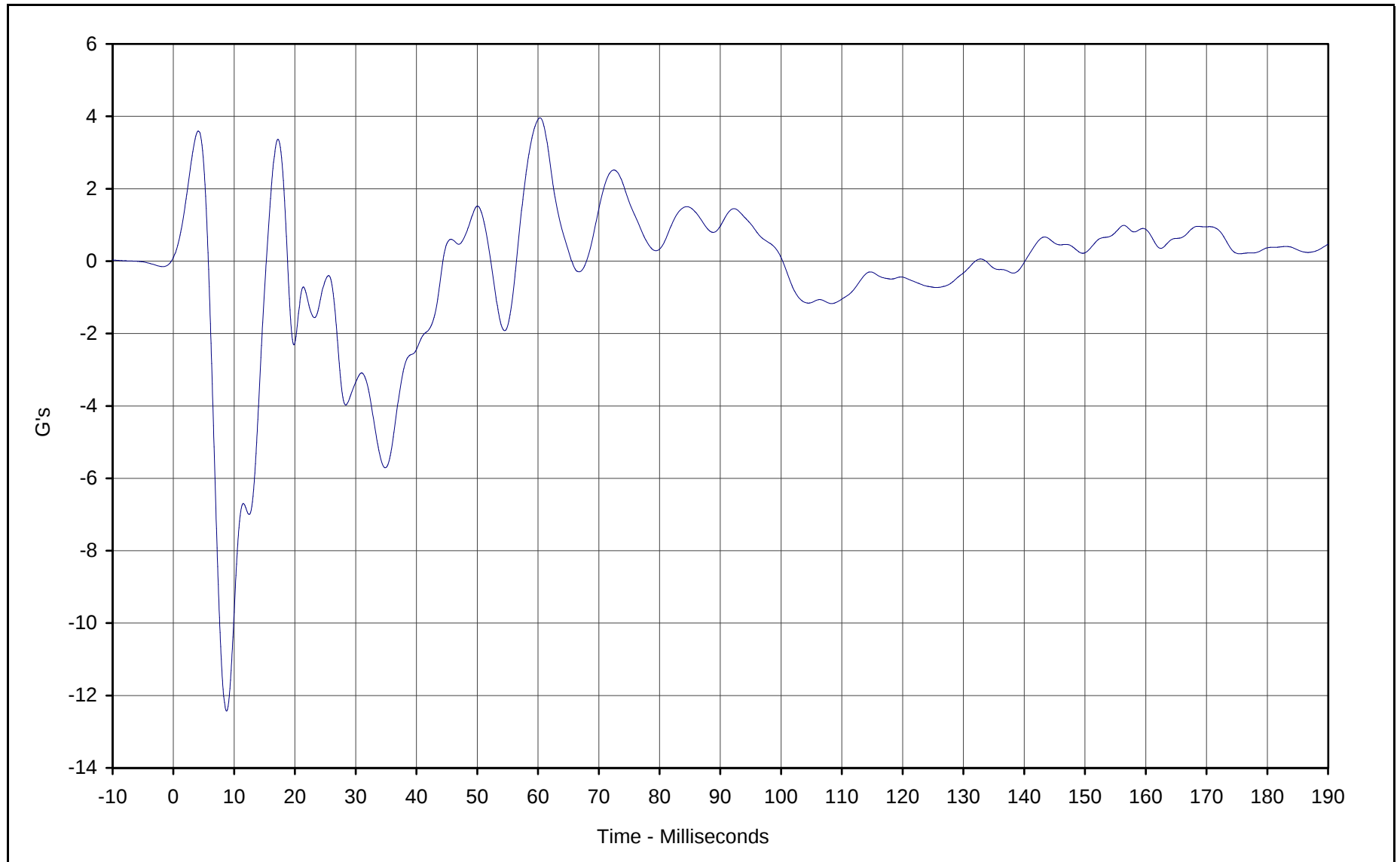
Curve Number: IN1-049

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

** Not Installed

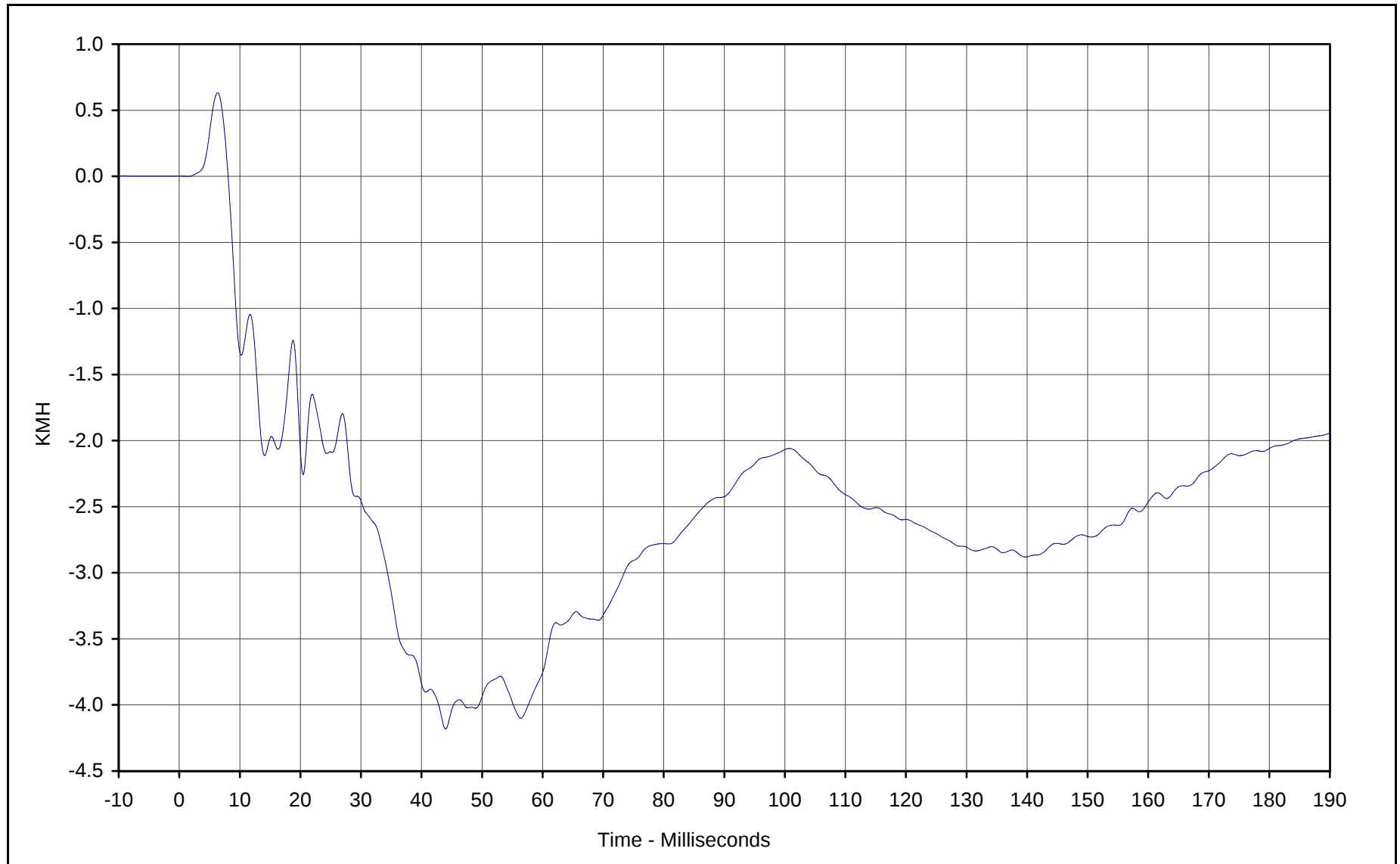




Curve Description: Vehicle CG X
Maximum Value: 4.0 at 60.3 Milliseconds
Minimum Value: -12.4 at 8.7 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-050

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

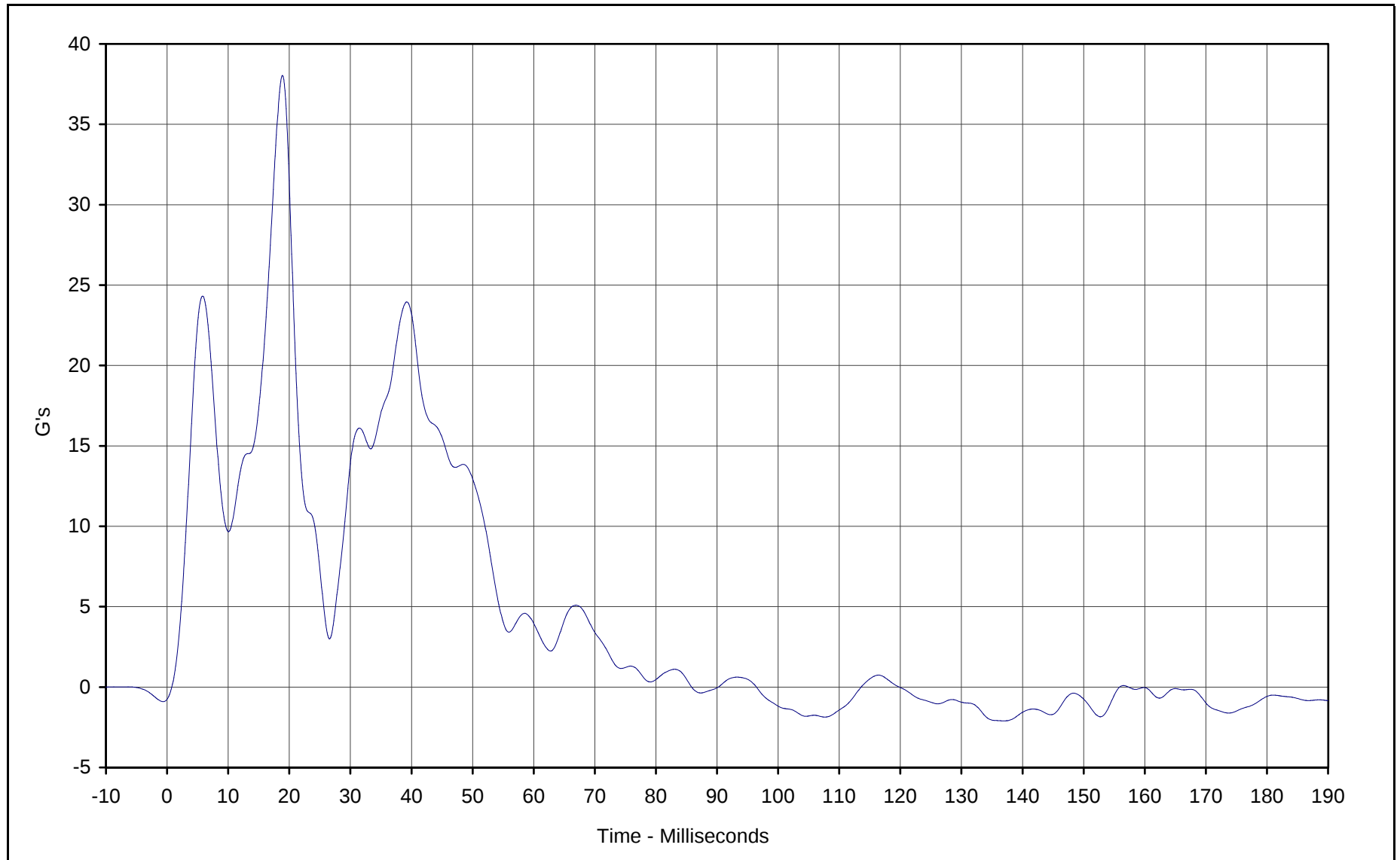




Curve Description: Vehicle CG X Velocity
Maximum Value: 0.6 at 6.4 Milliseconds
Minimum Value: -4.2 at 44.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-050

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

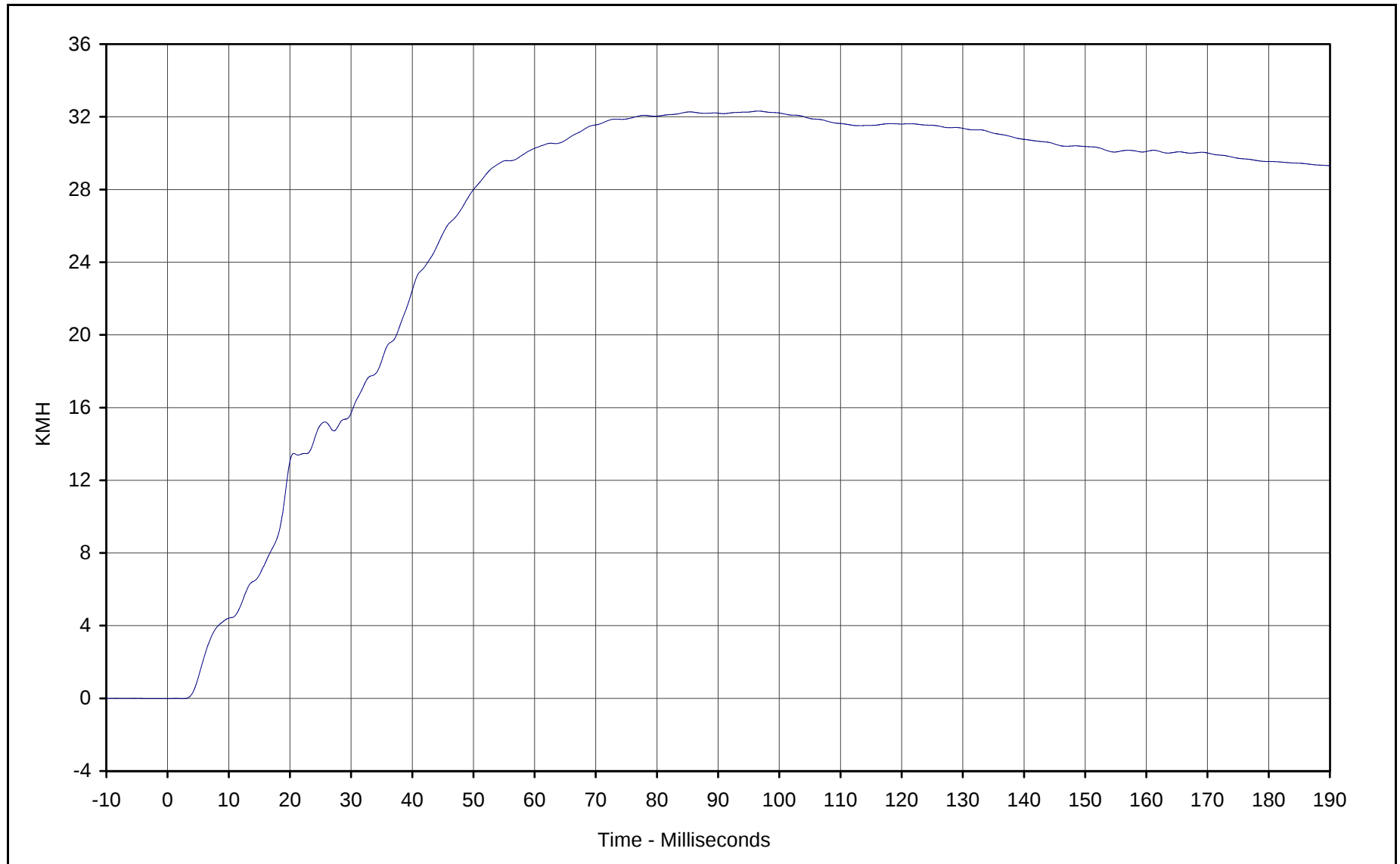




Curve Description: Vehicle CG Y
Maximum Value: 38.0 at 18.9 Milliseconds
Minimum Value: -2.1 at 137.0 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-051

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

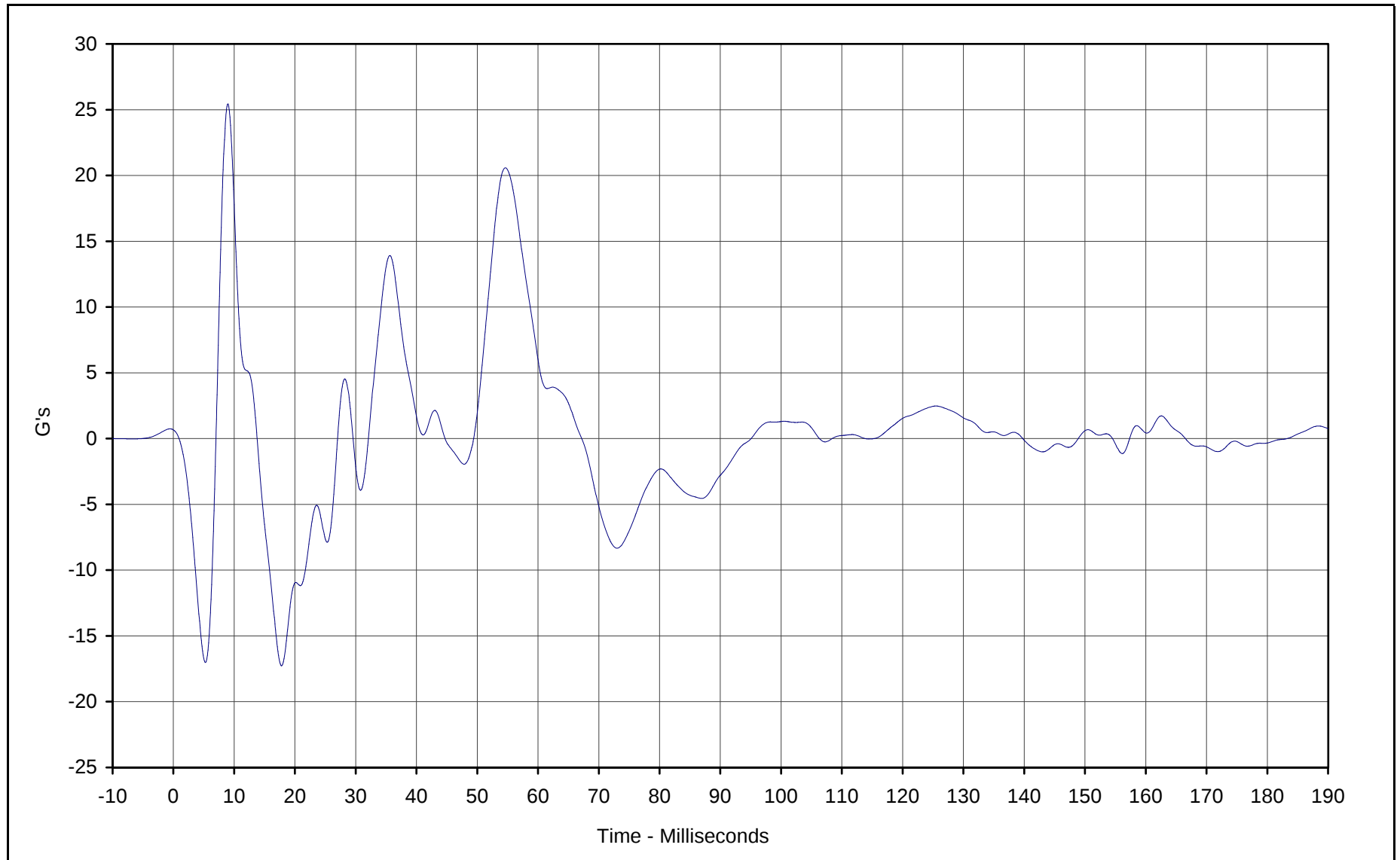




Curve Description: Vehicle CG Y Velocity
Maximum Value: 32.3 at 96.6 Milliseconds
Minimum Value: 0.0 at 2.6 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-051

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

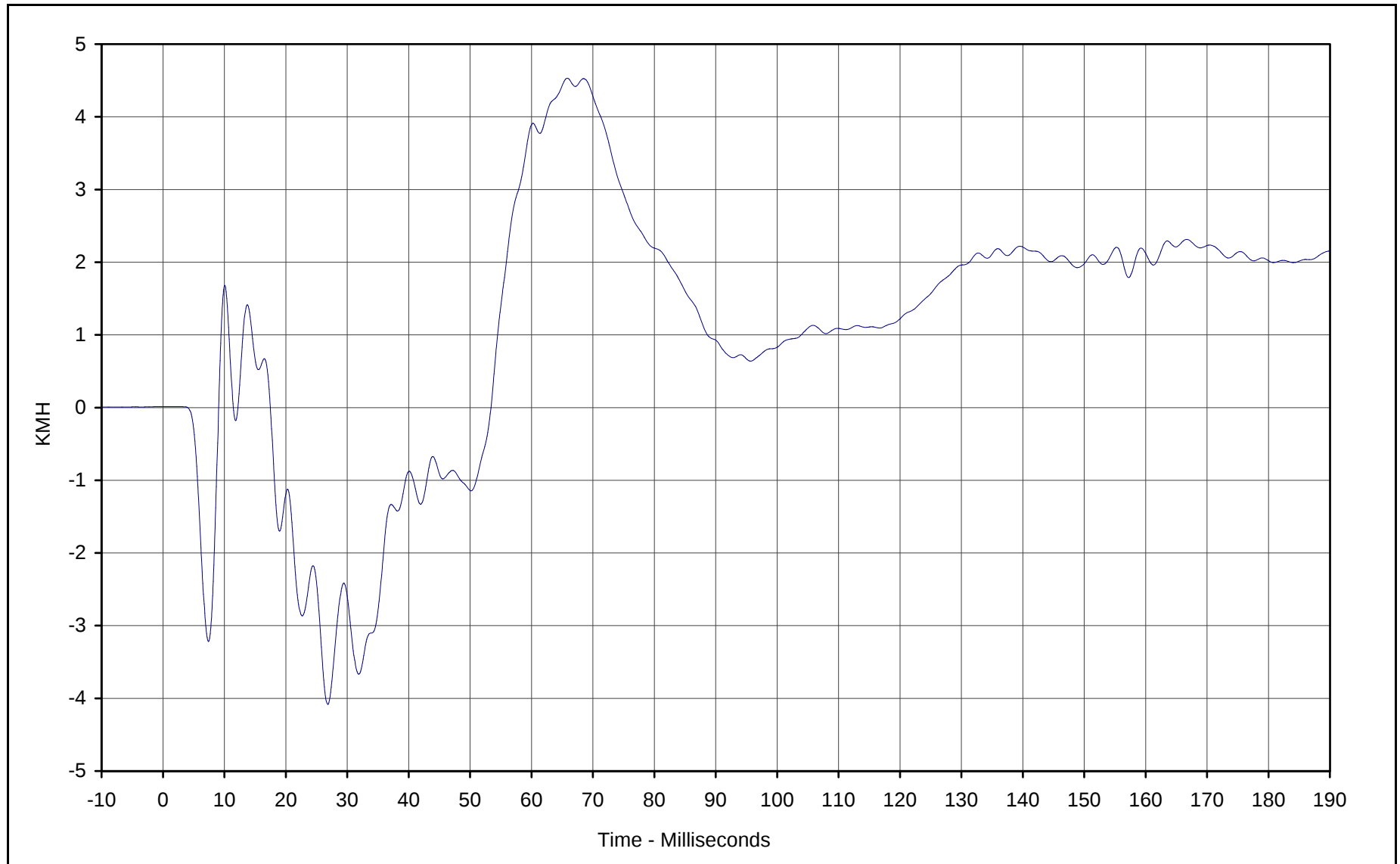




Curve Description: Vehicle CG Z
Maximum Value: 25.4 at 9.0 Milliseconds
Minimum Value: -17.3 at 17.8 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-052

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

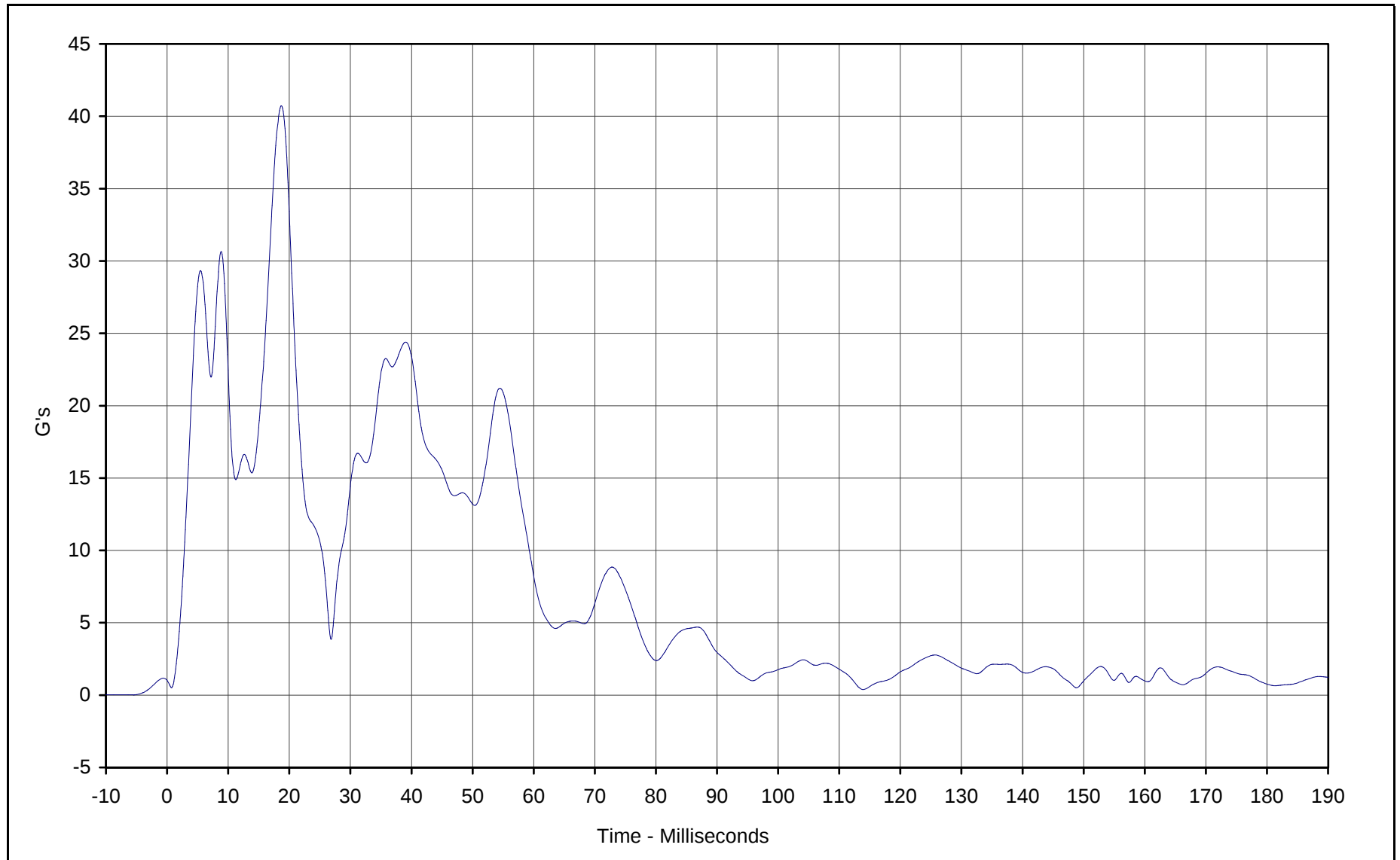




Curve Description: Vehicle CG Z Velocity
Maximum Value: 4.5 at 65.9 Milliseconds
Minimum Value: -4.1 at 26.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-052

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

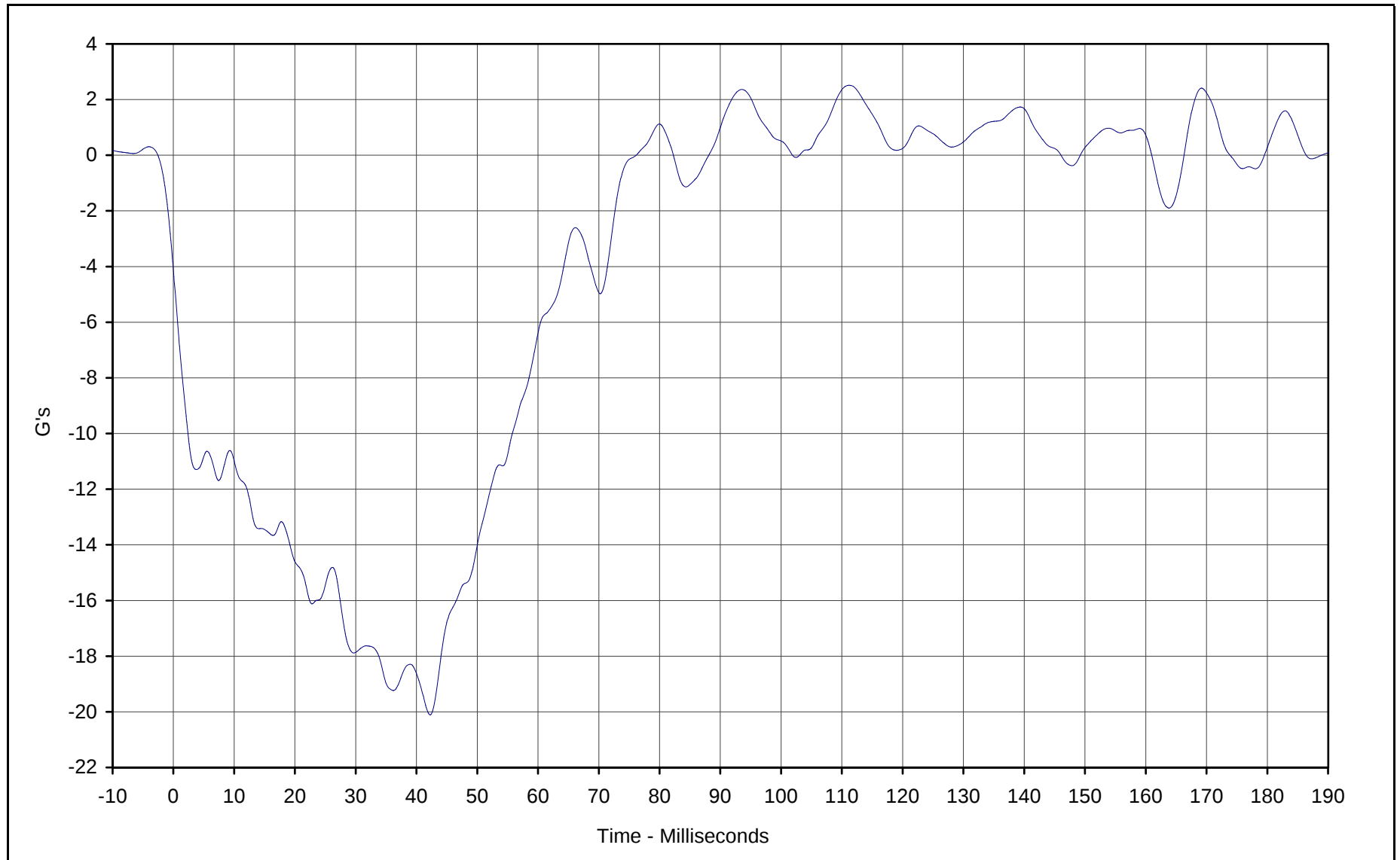




Curve Description: Vehicle CG Resultant
Maximum Value: 40.7 at 18.7 Milliseconds
Minimum Value: 0.4 at 113.9 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: RES-050

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

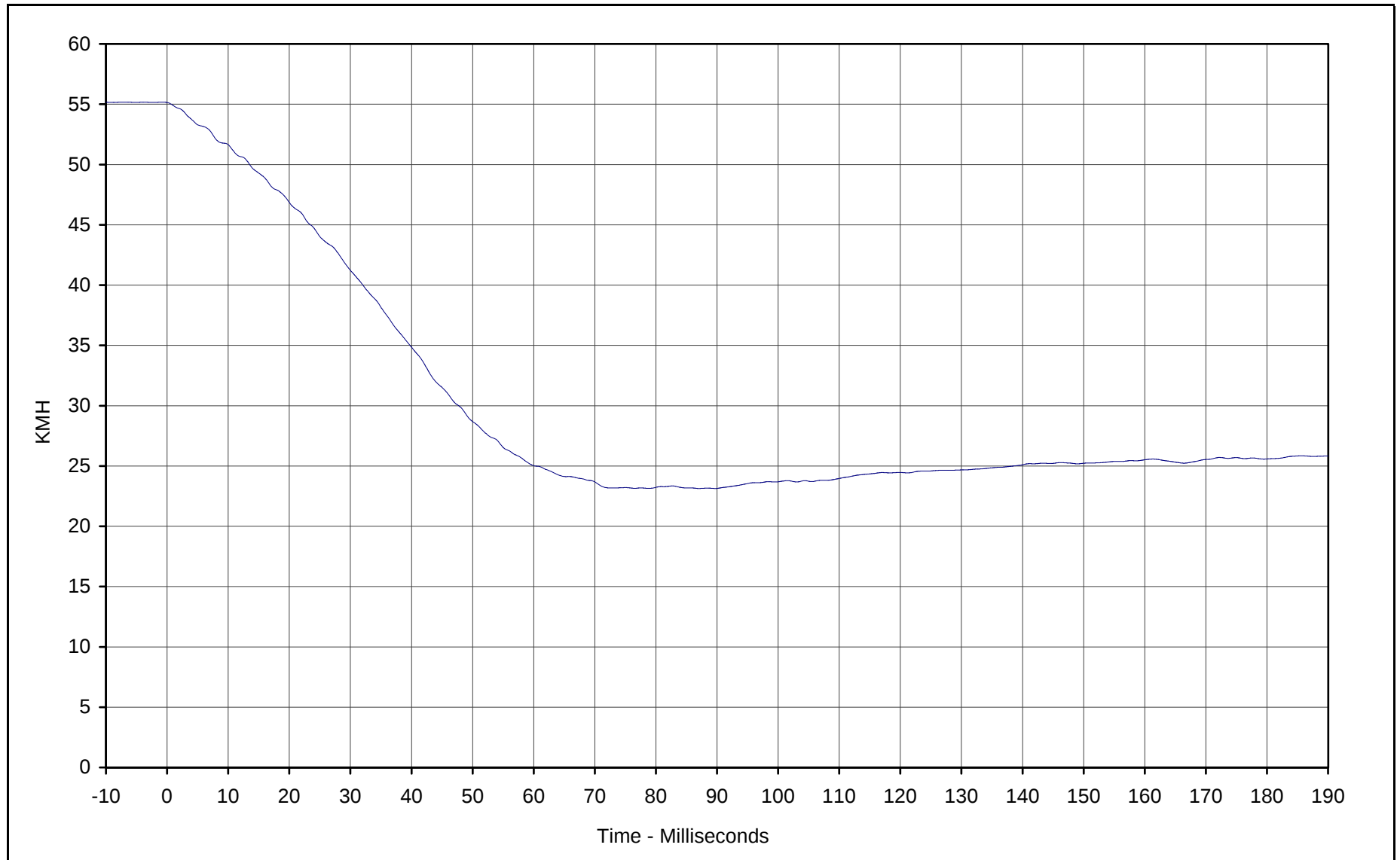




Curve Description: MDB CG X
Maximum Value: 2.5 at 111.2 Milliseconds
Minimum Value: -20.1 at 42.2 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-053

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

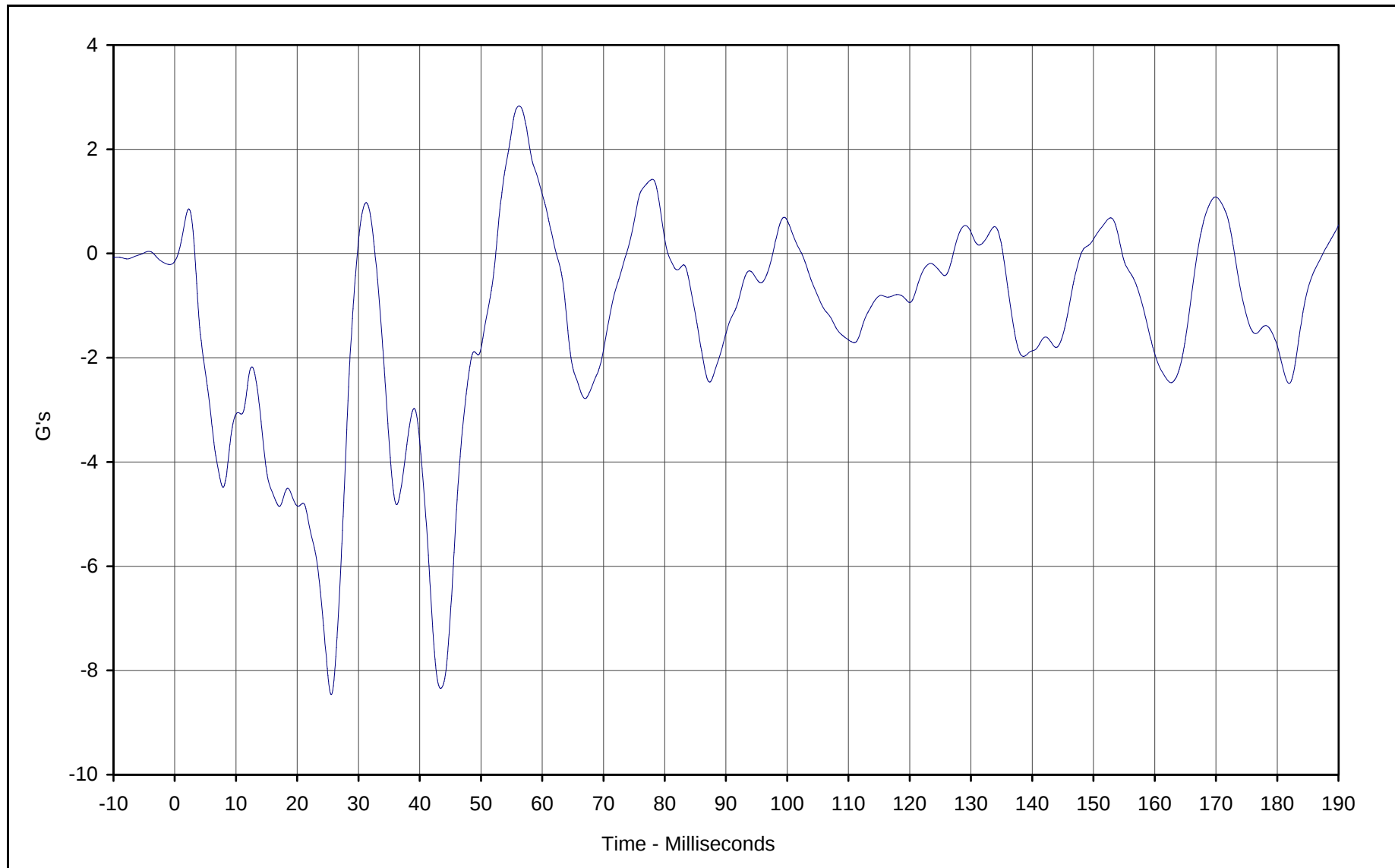




Curve Description: MDB CG X Velocity
Maximum Value: 55.1 at 0.0 Milliseconds
Minimum Value: 23.1 at 87.0 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-053

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

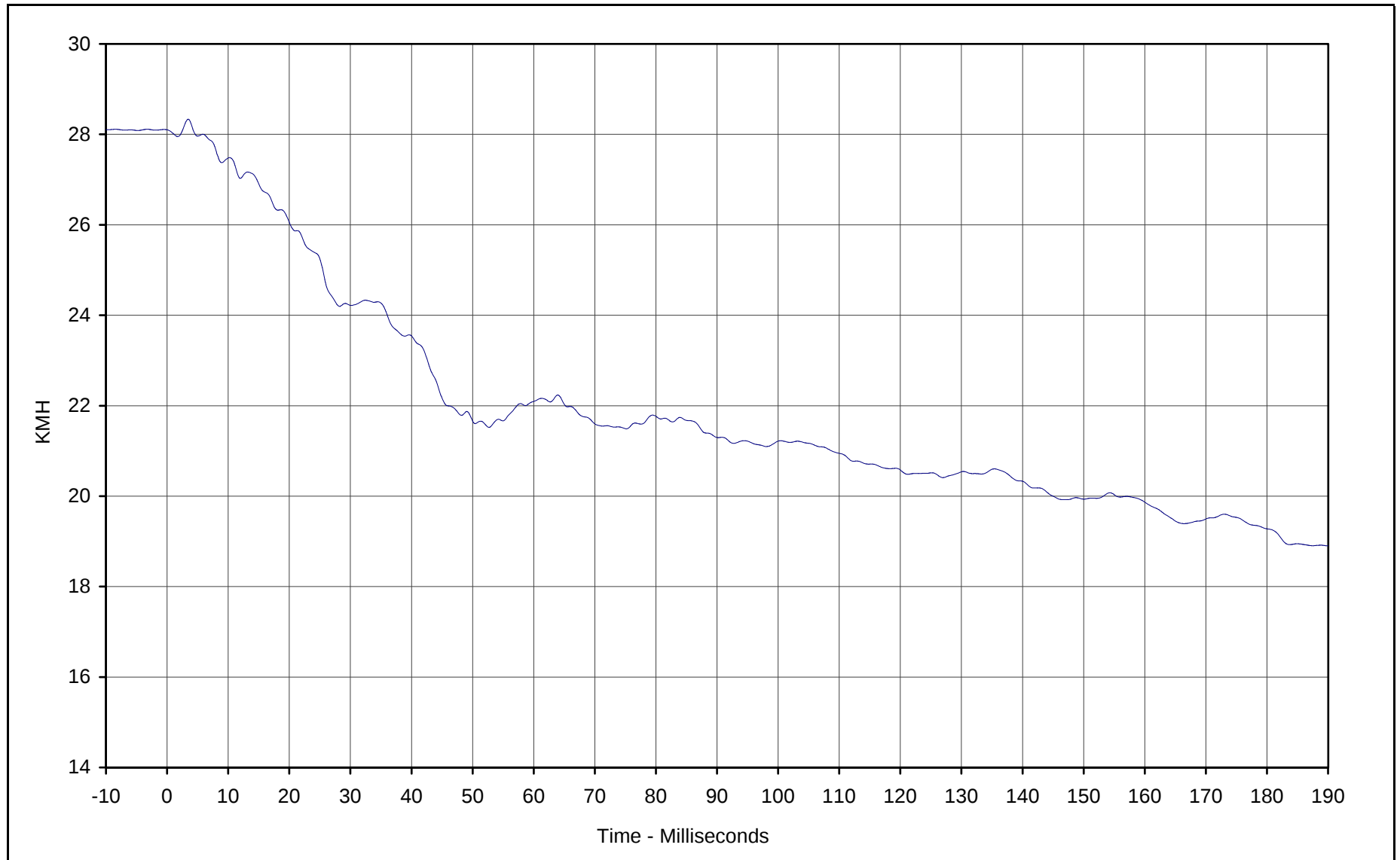




Curve Description: MDB CG Y
Maximum Value: 2.8 at 56.2 Milliseconds
Minimum Value: -8.5 at 25.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-054

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

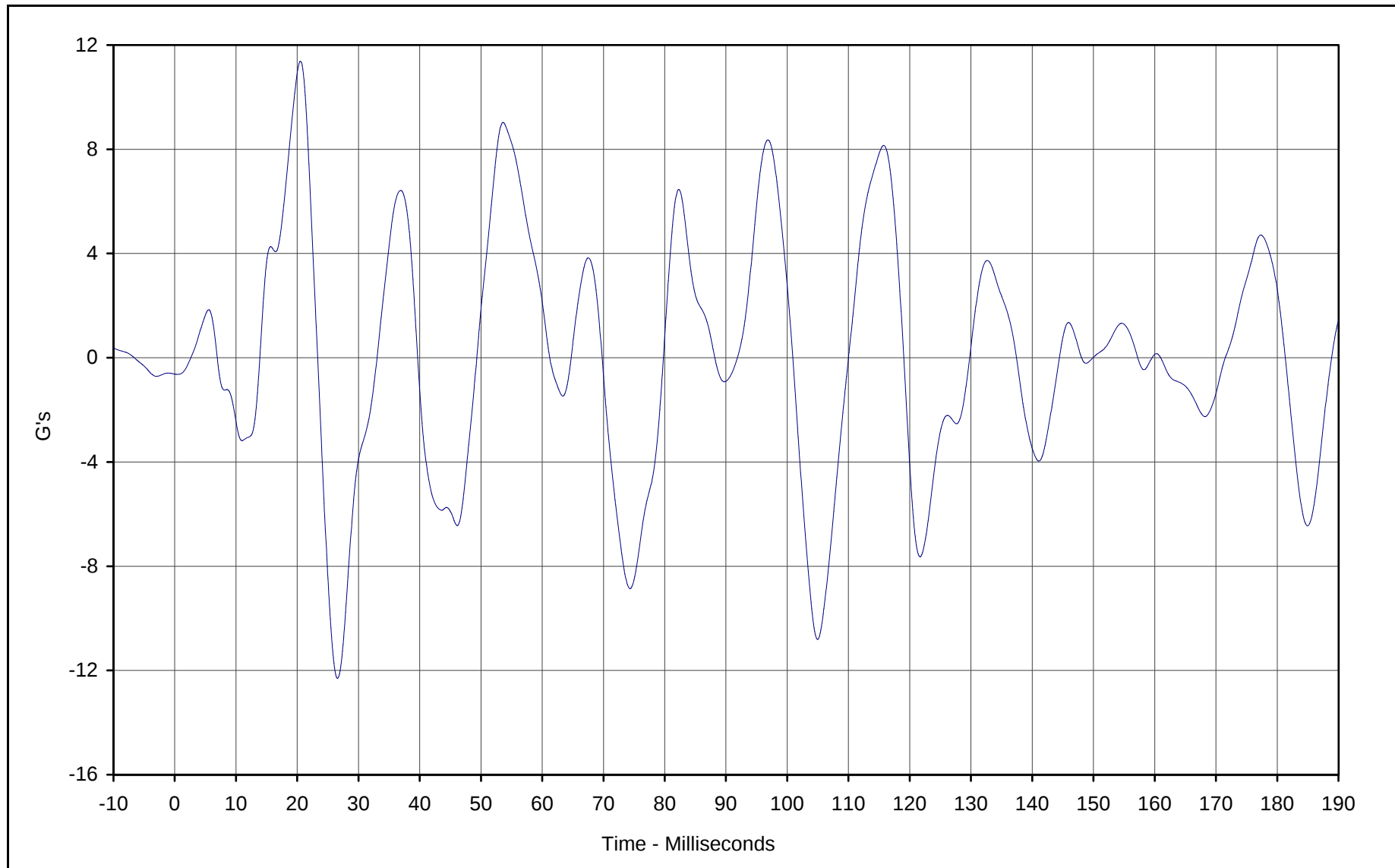




Curve Description: MDB CG Y Velocity
Maximum Value: 28.3 at 3.5 Milliseconds
Minimum Value: 18.9 at 189.8 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-054

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

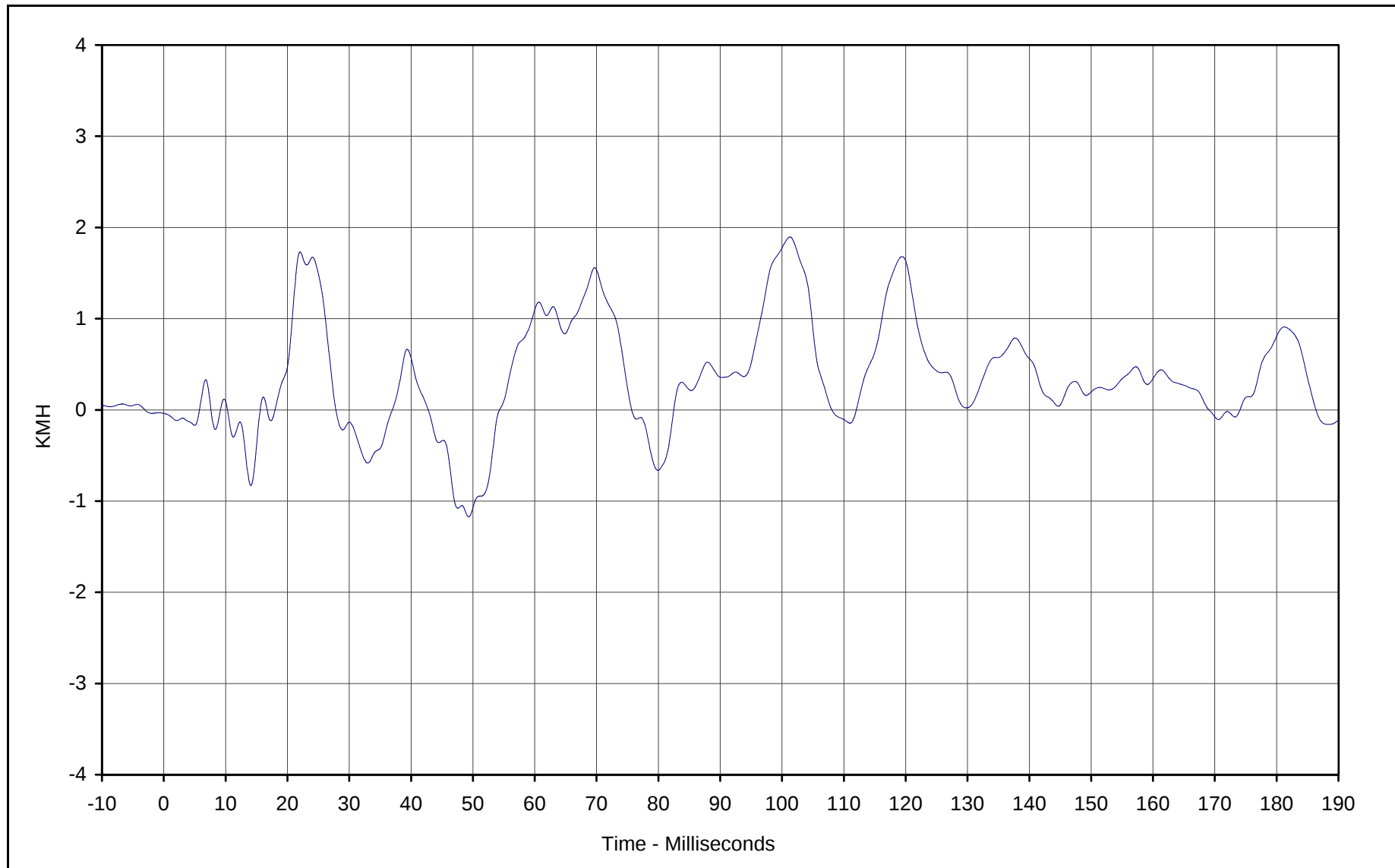




Curve Description: MDB CG Z
Maximum Value: 11.4 at 20.5 Milliseconds
Minimum Value: -12.3 at 26.6 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-055

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

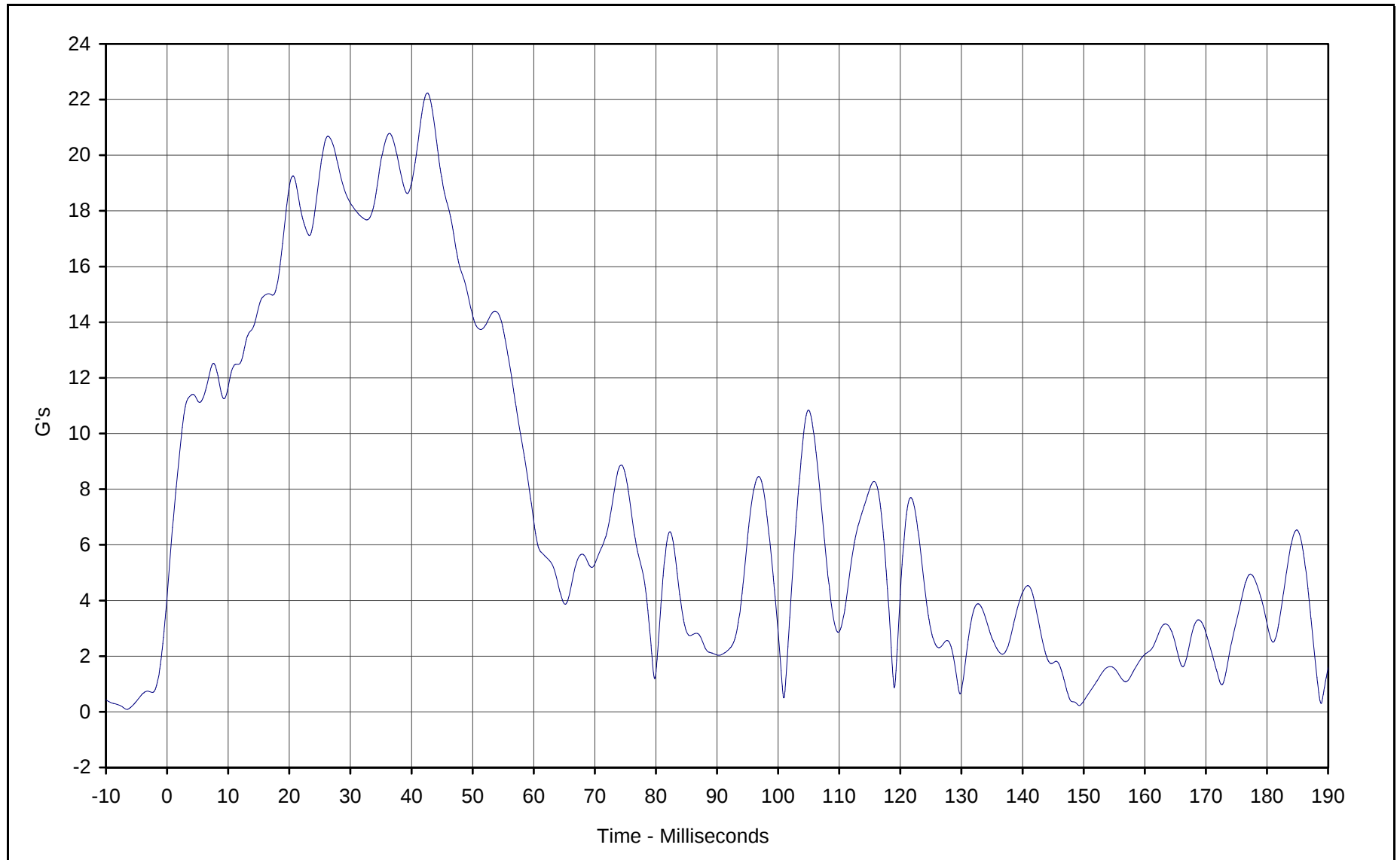




Curve Description: MDB CG Z Velocity
Maximum Value: 1.9 at 101.3 Milliseconds
Minimum Value: -1.2 at 49.3 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-055

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: MDB CG Resultant

Maximum Value: 22.2 at 42.6 Milliseconds

Minimum Value: 0.2 at 149.3 Milliseconds

SAE Filter Class: 60

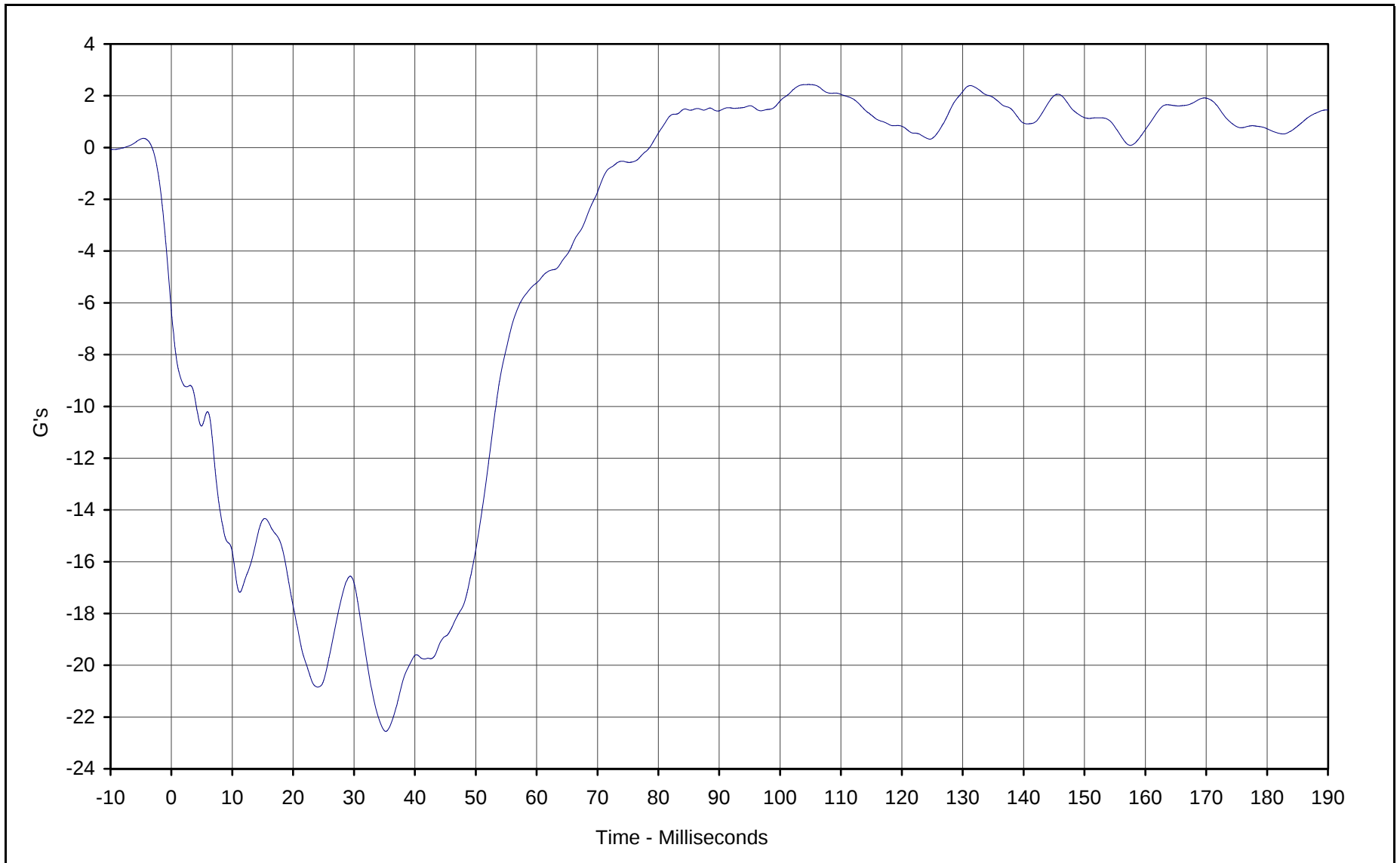
Date of Test: 12/08/00

Curve Number: RES-053

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

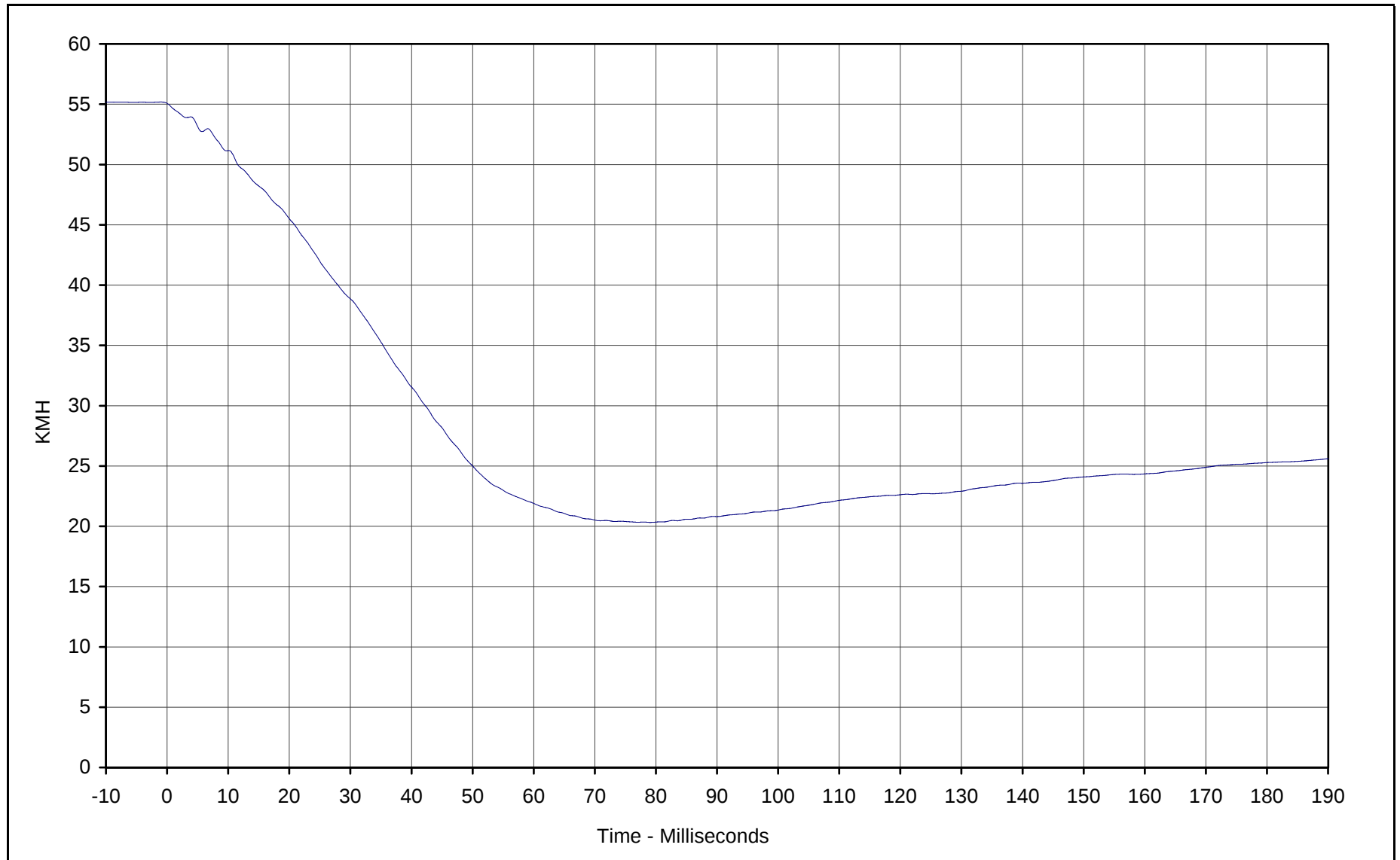




Curve Description: MDB Rear X
Maximum Value: 2.4 at 104.7 Milliseconds
Minimum Value: -22.6 at 35.2 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-056

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

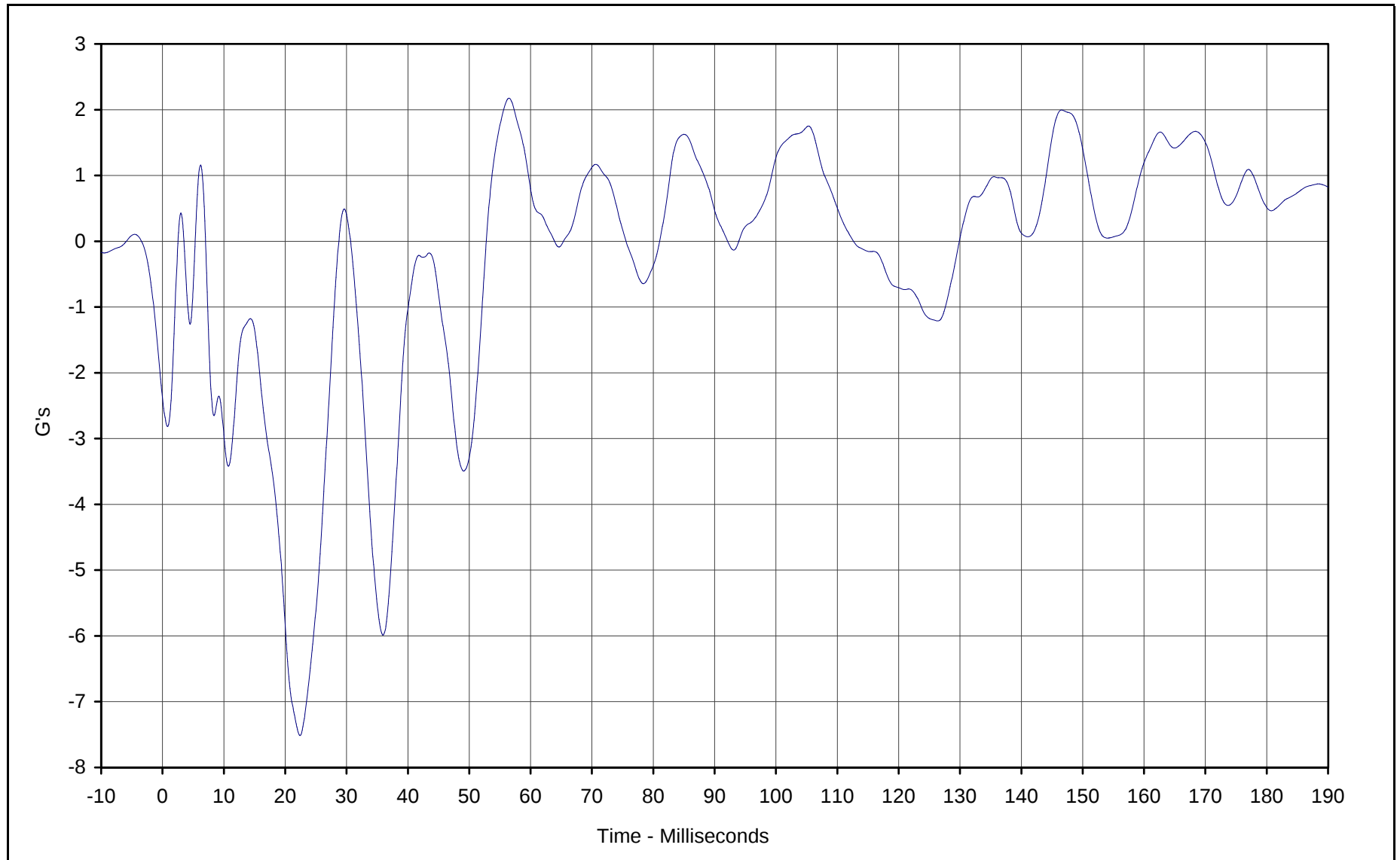




Curve Description: MDB Rear X Velocity
Maximum Value: 55.1 at 0.0 Milliseconds
Minimum Value: 20.3 at 79.1 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-056

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

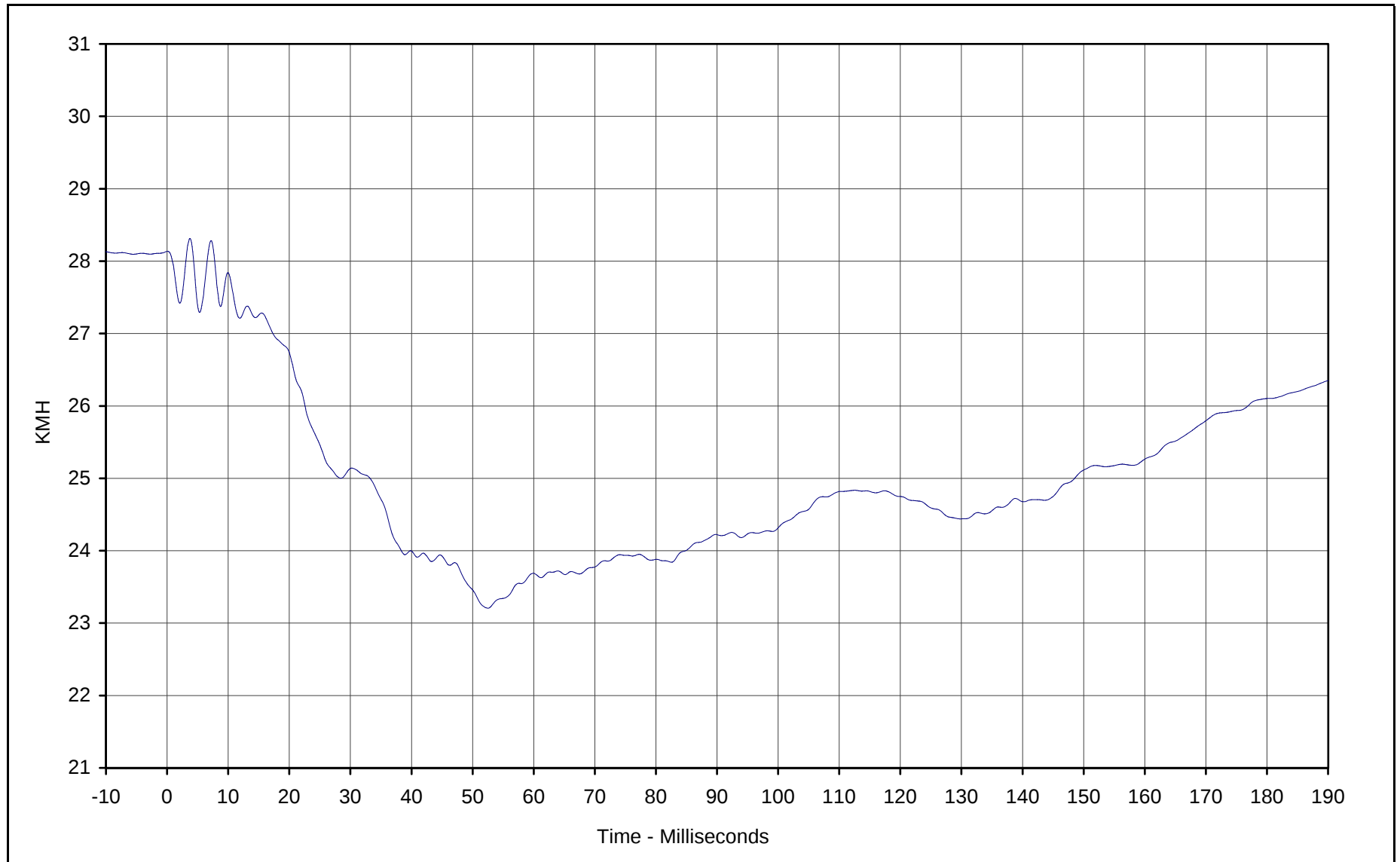




Curve Description: MDB Rear Y
Maximum Value: 2.2 at 56.5 Milliseconds
Minimum Value: -7.5 at 22.4 Milliseconds
SAE Filter Class: 60
Date of Test: 12/08/00
Curve Number: FIL-057

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

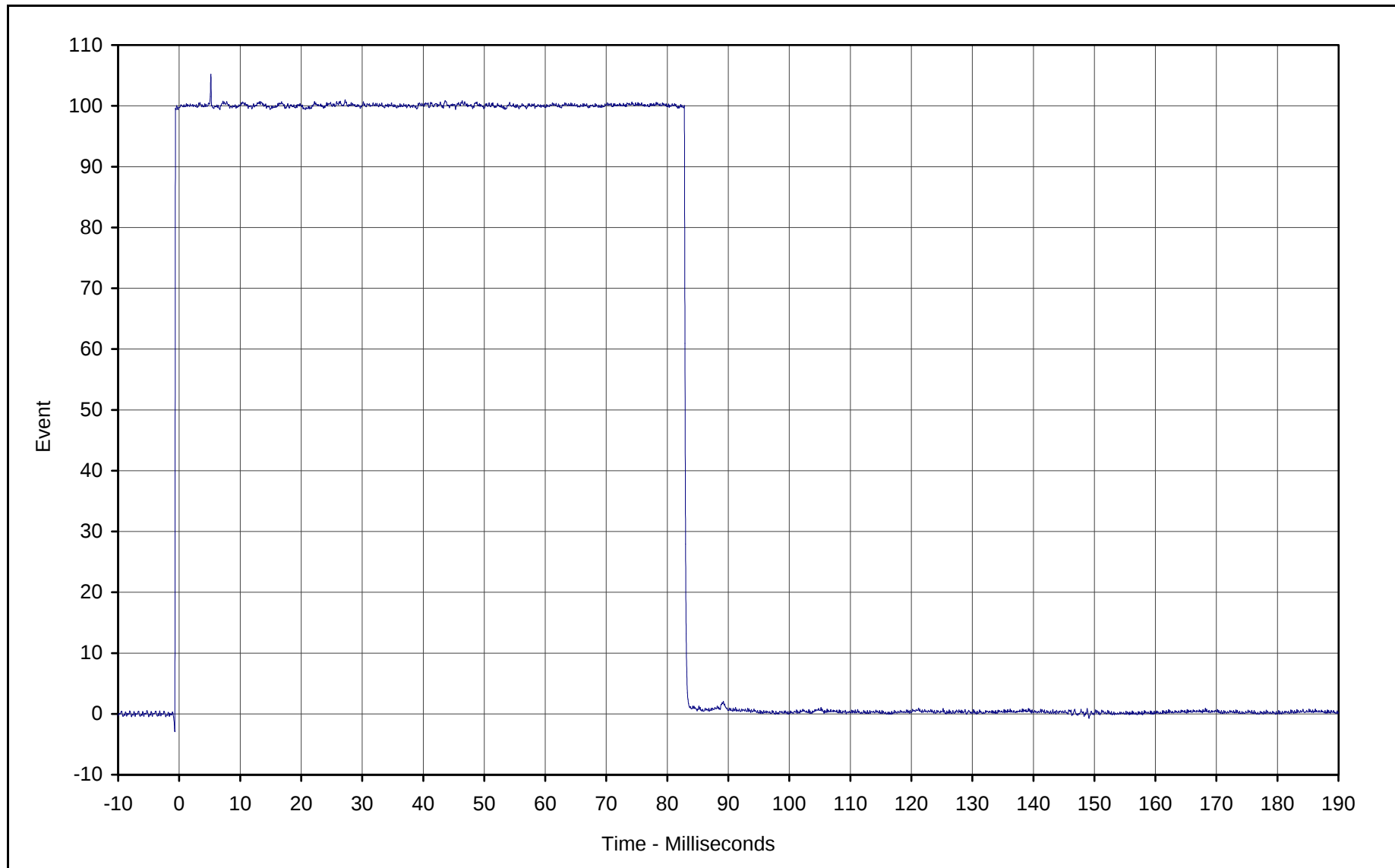




Curve Description: MDB Rear Y Velocity
Maximum Value: 28.3 at 3.7 Milliseconds
Minimum Value: 23.2 at 52.5 Milliseconds
SAE Filter Class: 180
Date of Test: 12/08/00
Curve Number: IN1-057

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

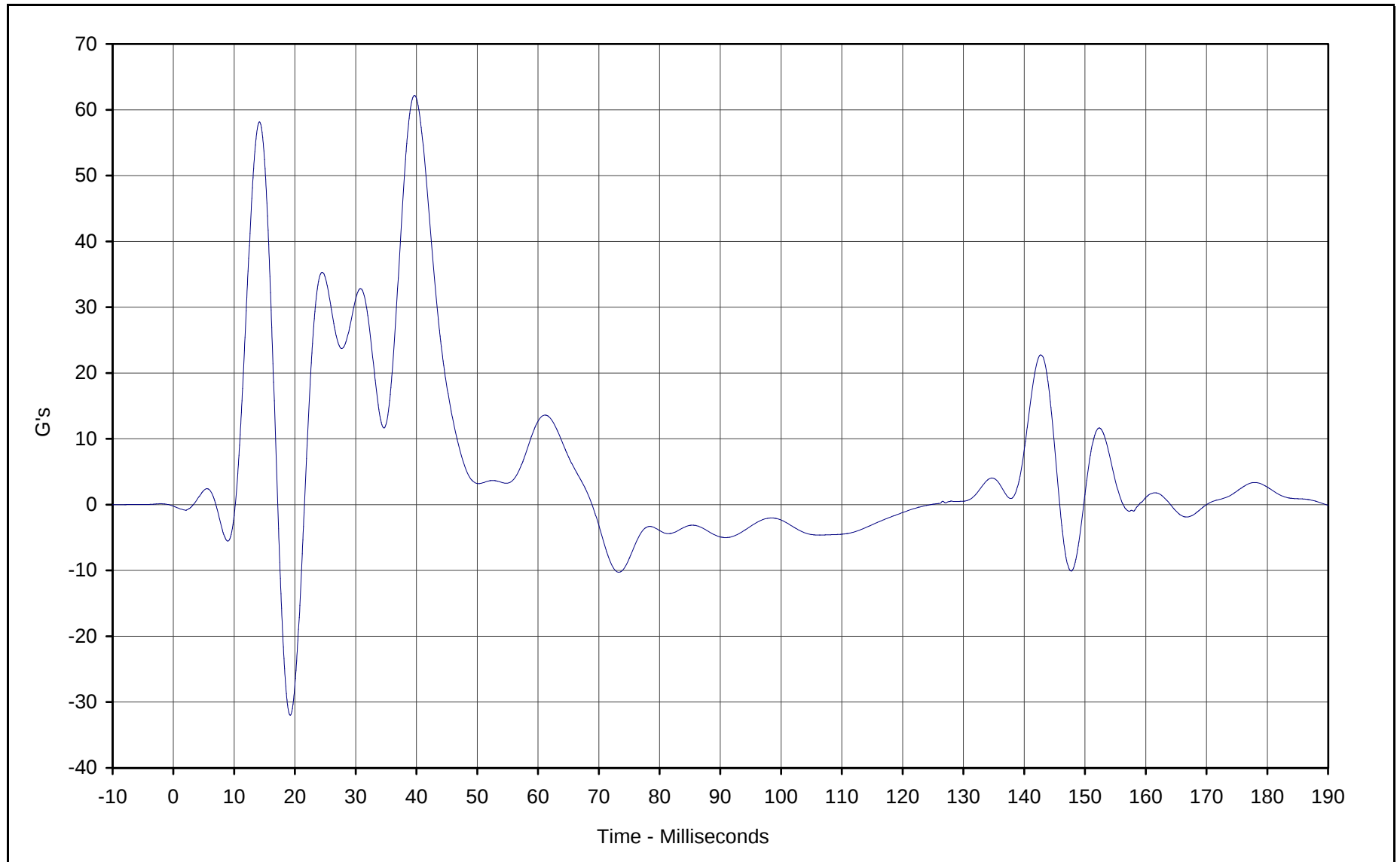




Curve Description: MDB Right Bumper Contact
Maximum Value: 105.2 at 5.2 Milliseconds
Crossing Point: 50% at -0.6 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/08/00
Curve Number: FIL-058

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

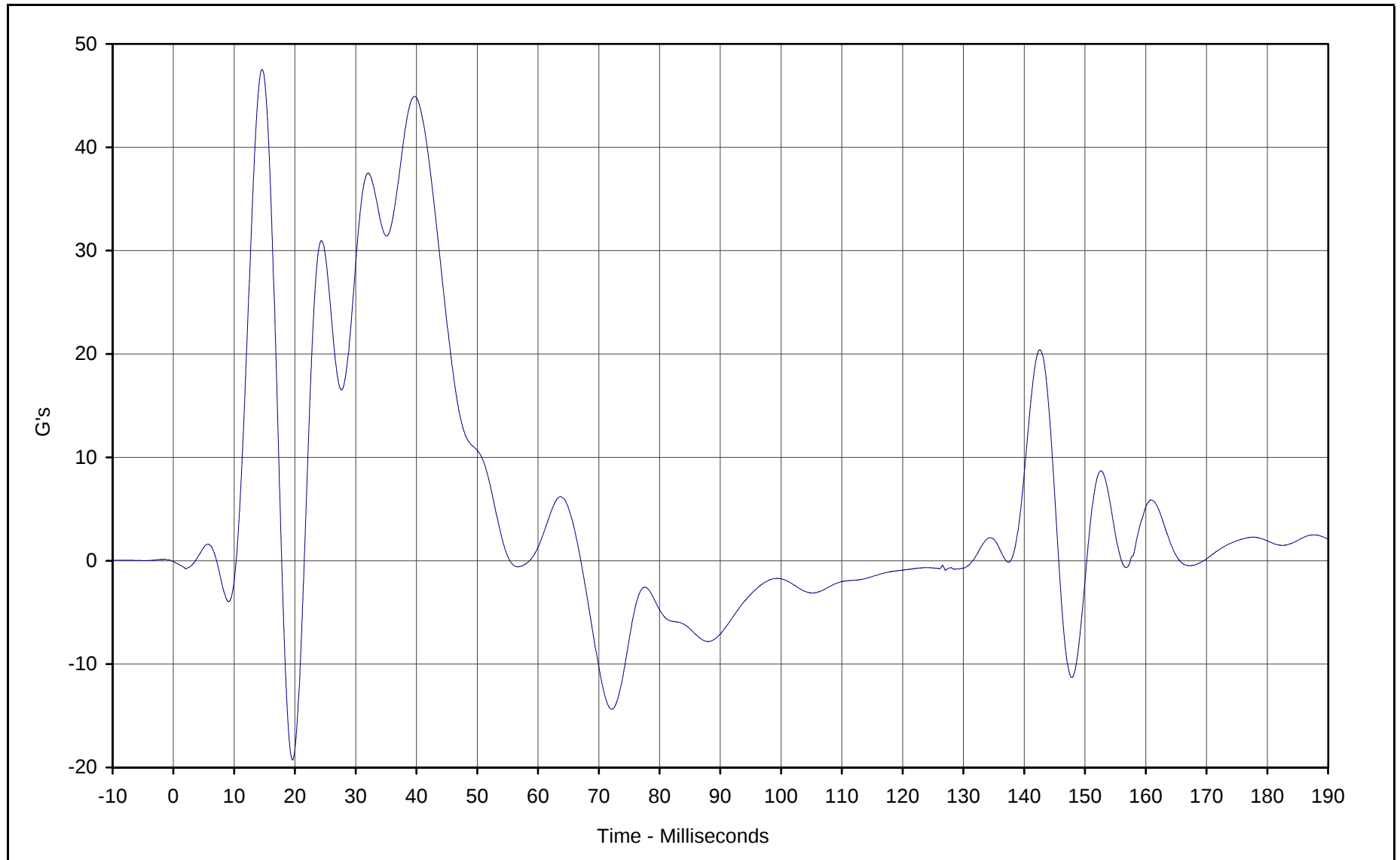




Curve Description: Driver Upper Rib Primary Y
Maximum Value: 62.2 at 39.7 Milliseconds
Minimum Value: -32.0 at 19.2 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-004

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

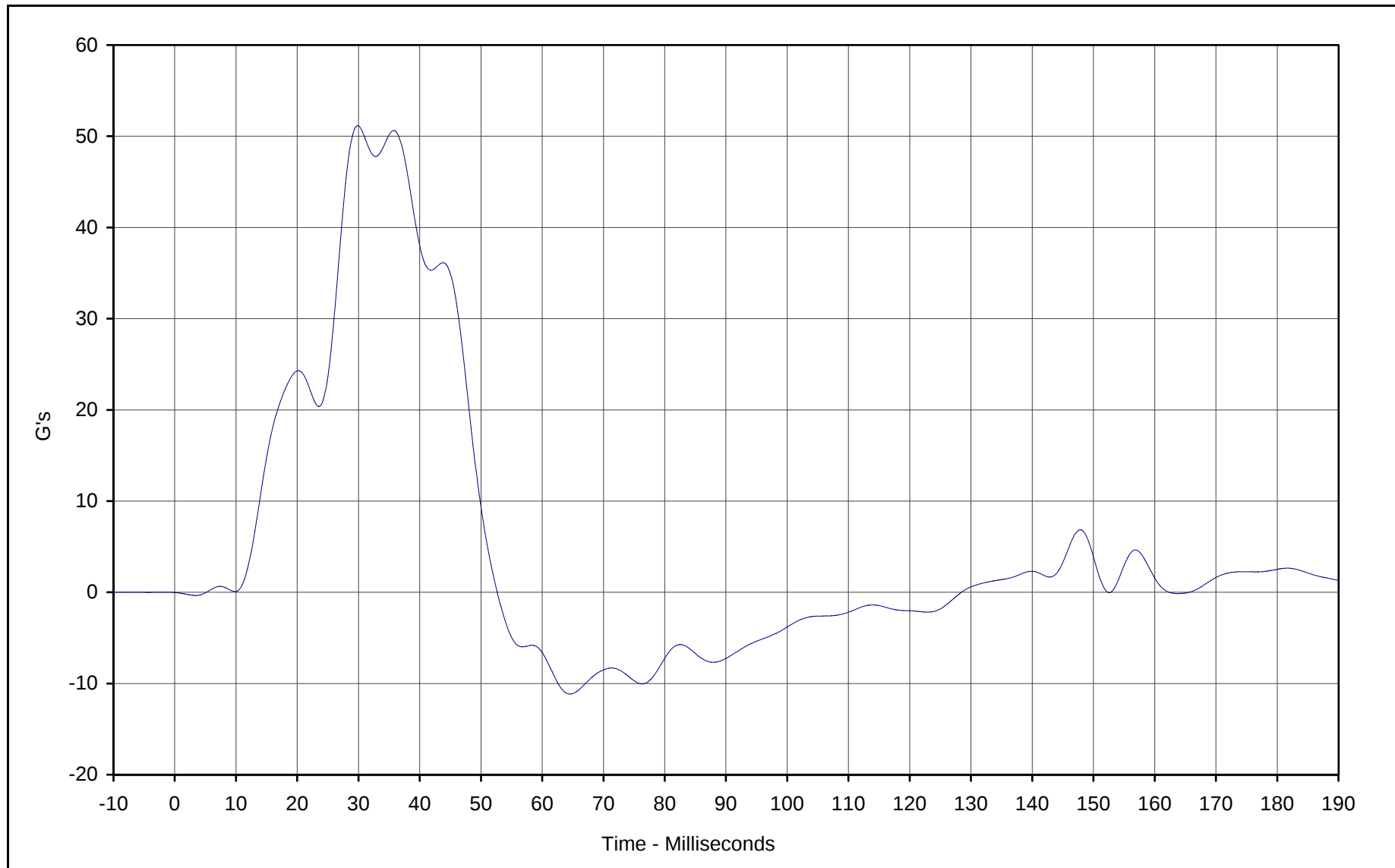




Curve Description: Driver Lower Rib Primary Y
Maximum Value: 47.5 at 14.6 Milliseconds
Minimum Value: -19.3 at 19.6 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-005

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Driver Lower Spine Primary Y

Maximum Value: 51.2 at 29.9 Milliseconds

Minimum Value: -11.2 at 64.5 Milliseconds

SAE Filter Class: FIR 100

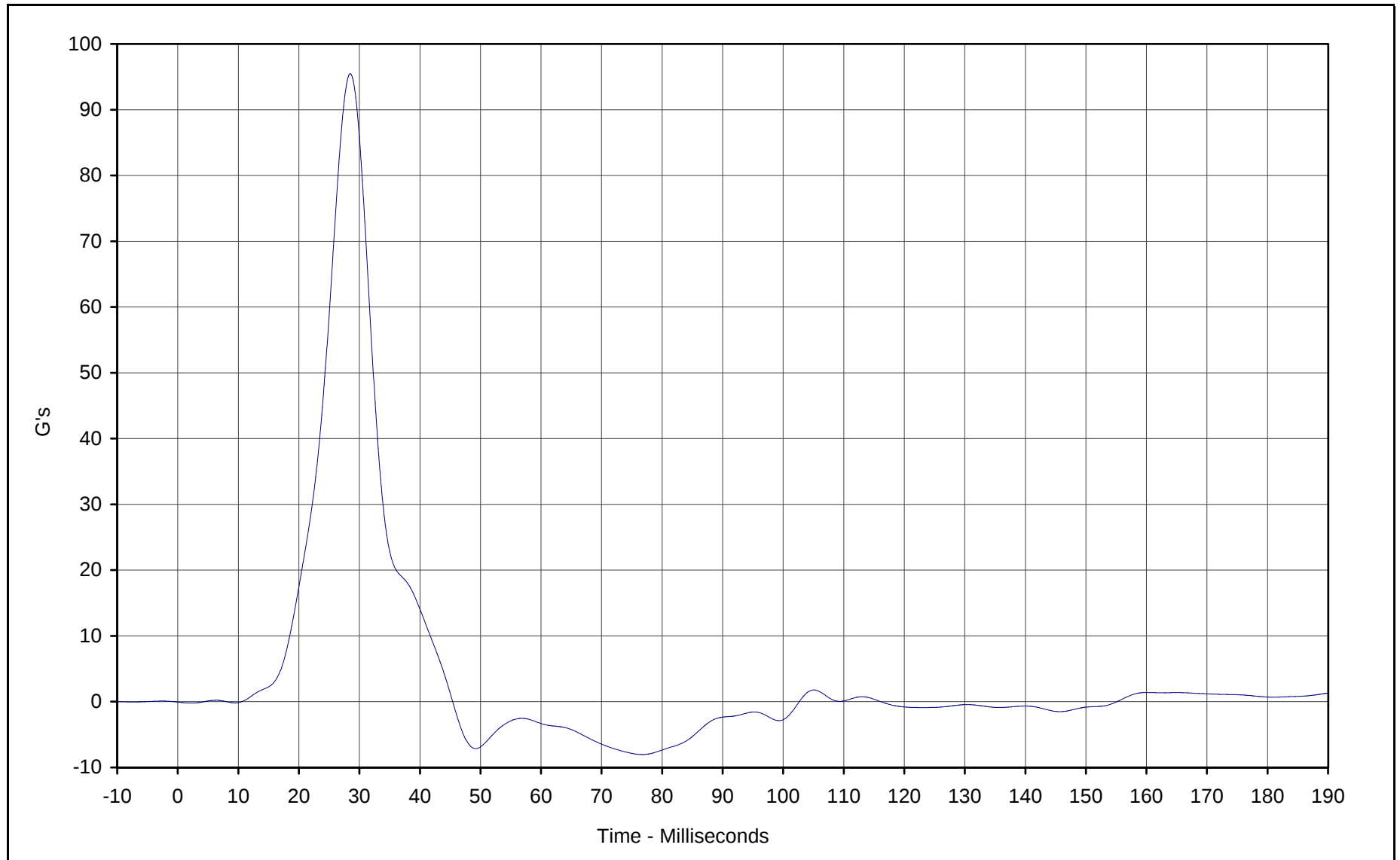
Date of Test: 12/08/00

Curve Number: FIR-006

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002

Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

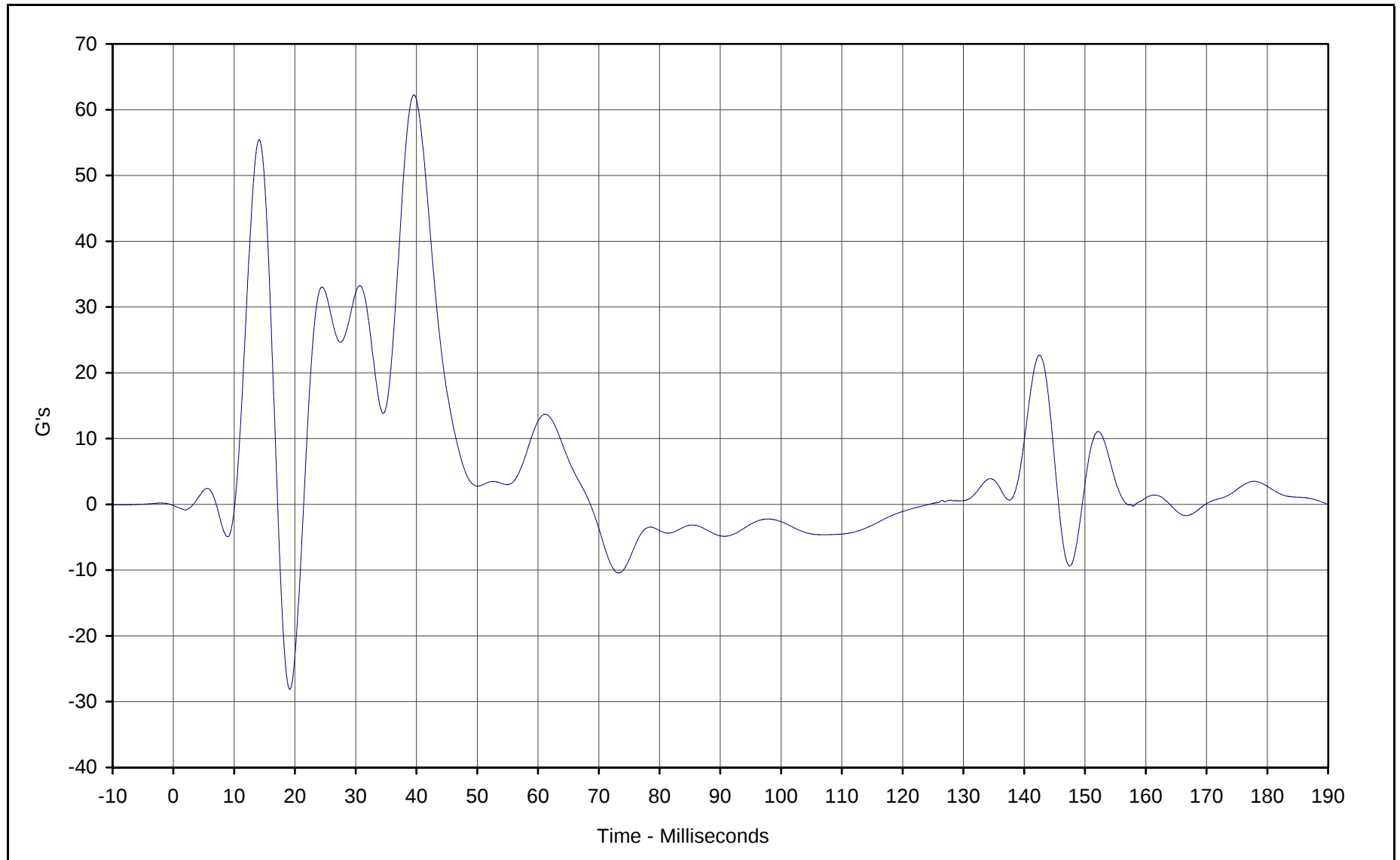




Curve Description: Driver Pelvis Primary Y
Maximum Value: 95.5 at 28.5 Milliseconds
Minimum Value: -8.0 at 76.7 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-007

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

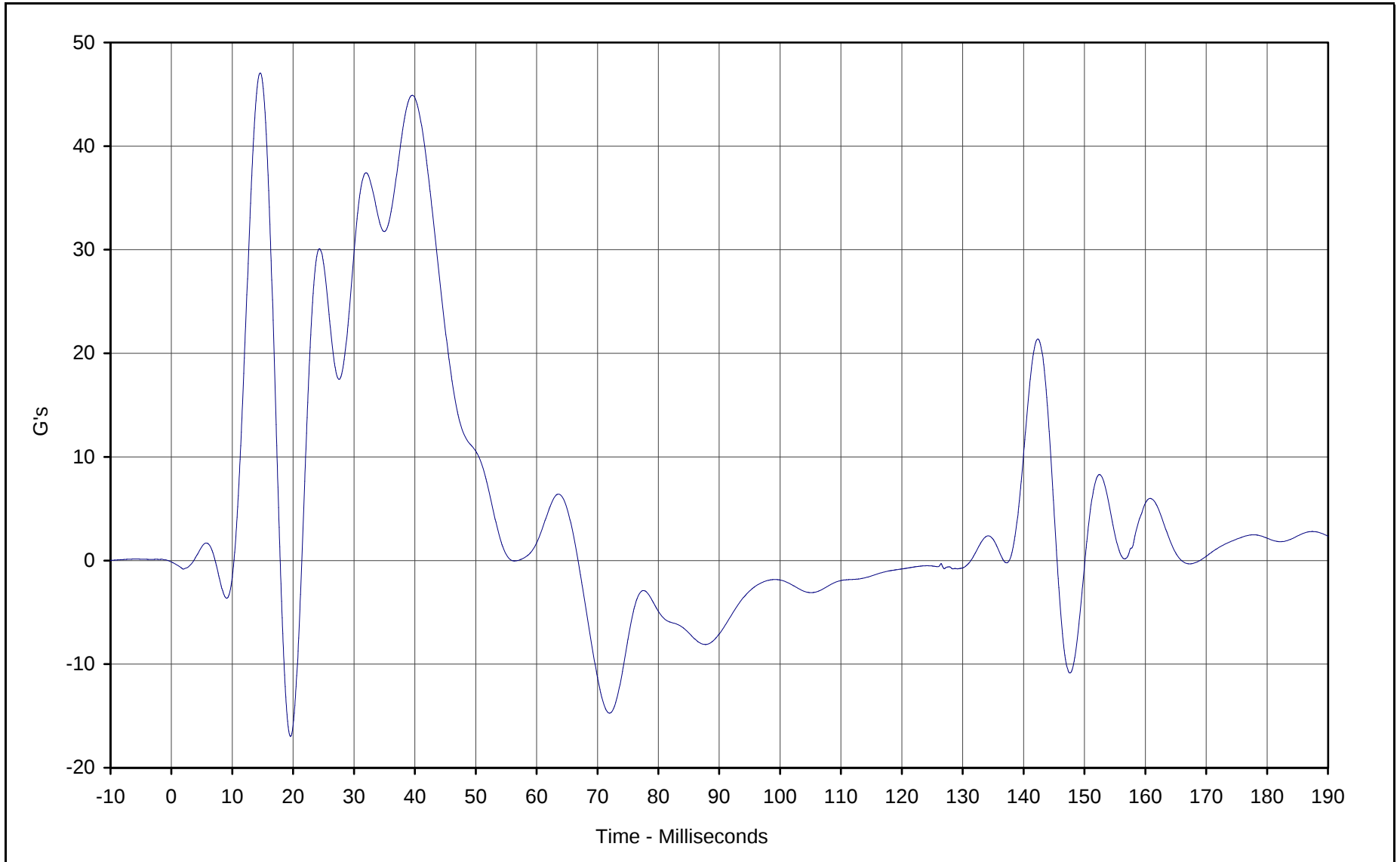




Curve Description: Driver Upper Rib Redundant Y
Maximum Value: 62.3 at 39.6 Milliseconds
Minimum Value: -28.1 at 19.2 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-008

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

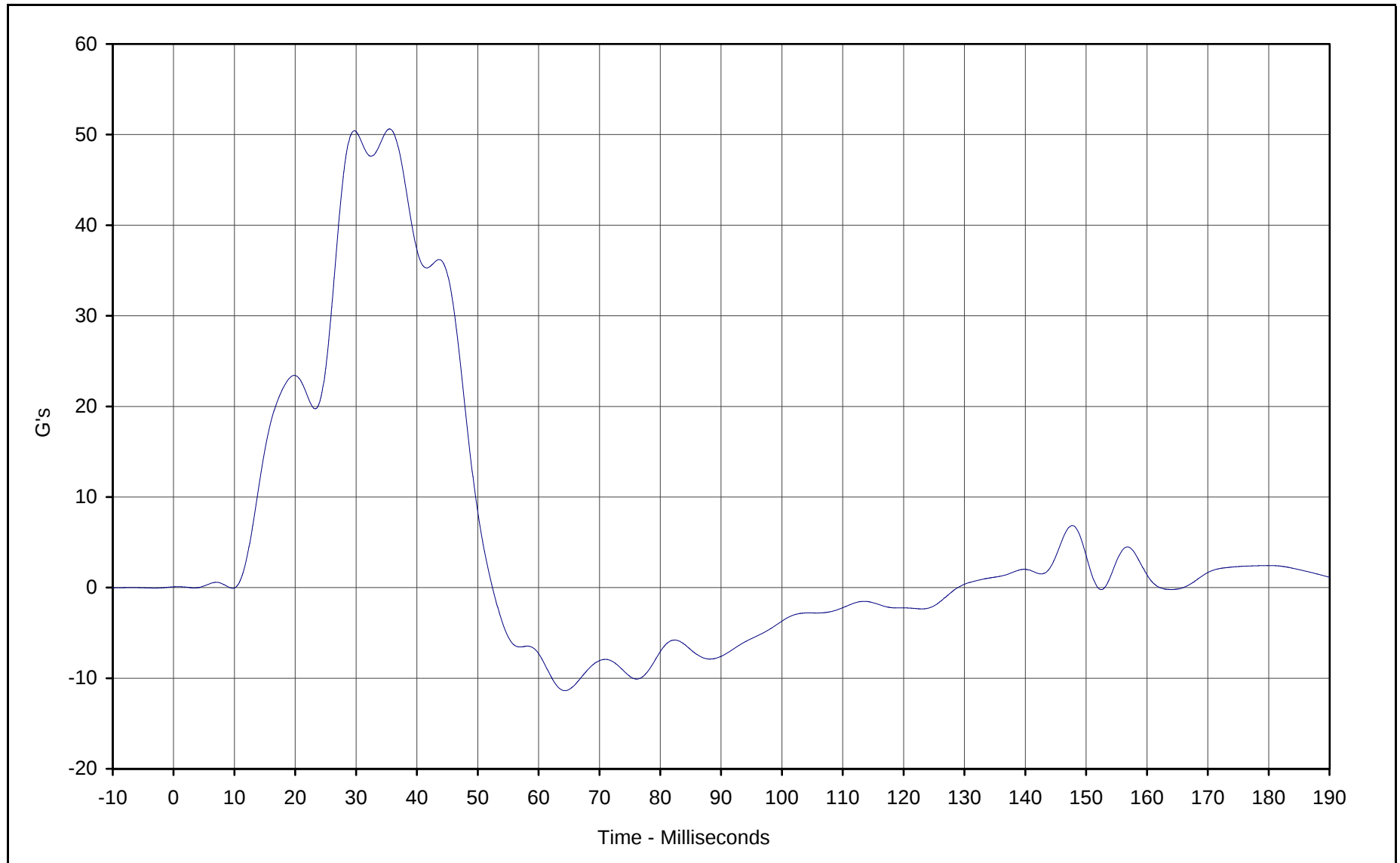




Curve Description: Driver Lower Rib Redundant Y
Maximum Value: 47.1 at 14.6 Milliseconds
Minimum Value: -17.0 at 19.6 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-009

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

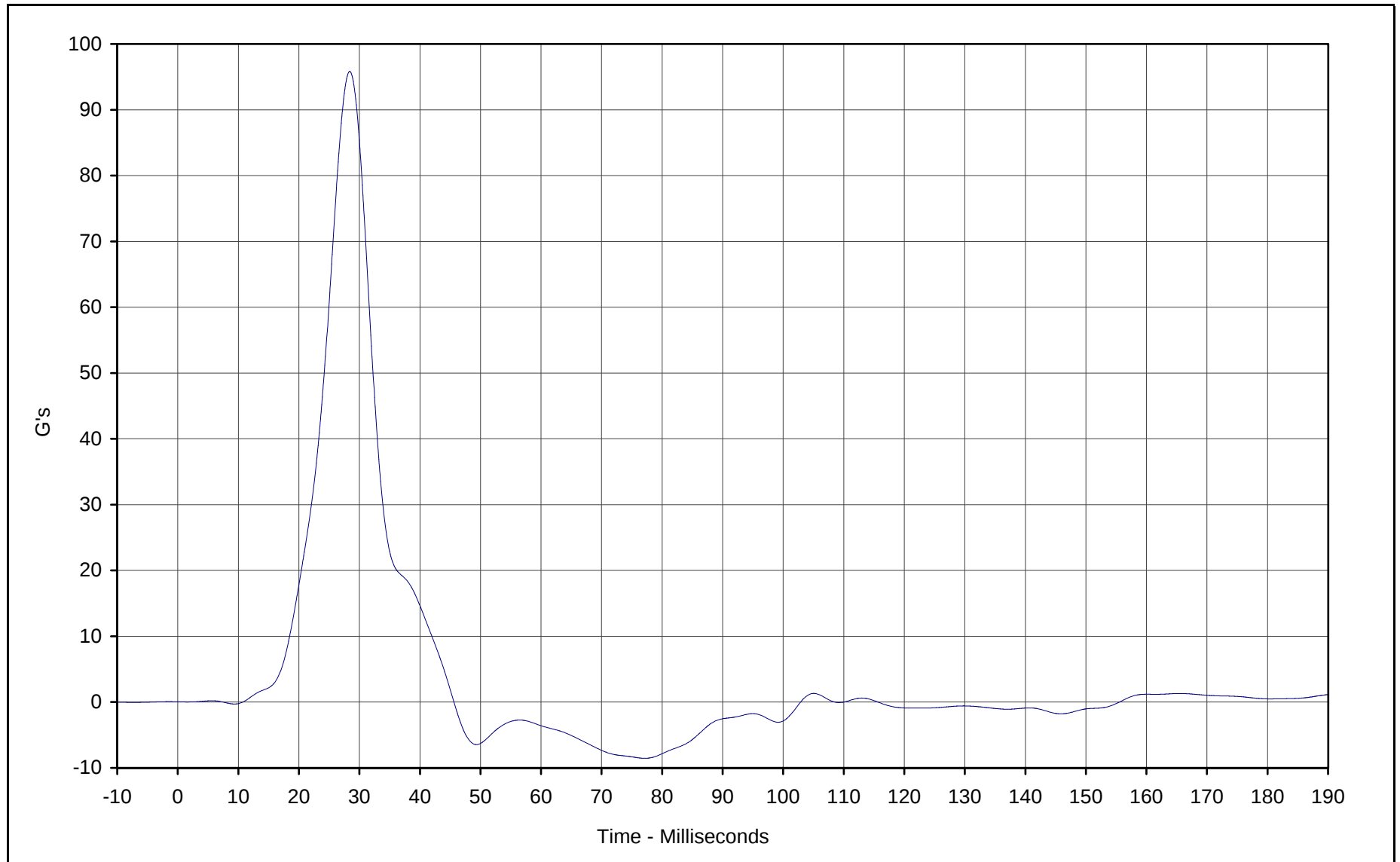




Curve Description: Driver Lower Spine Redundant Y
Maximum Value: 50.6 at 35.5 Milliseconds
Minimum Value: -11.4 at 64.3 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-010

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

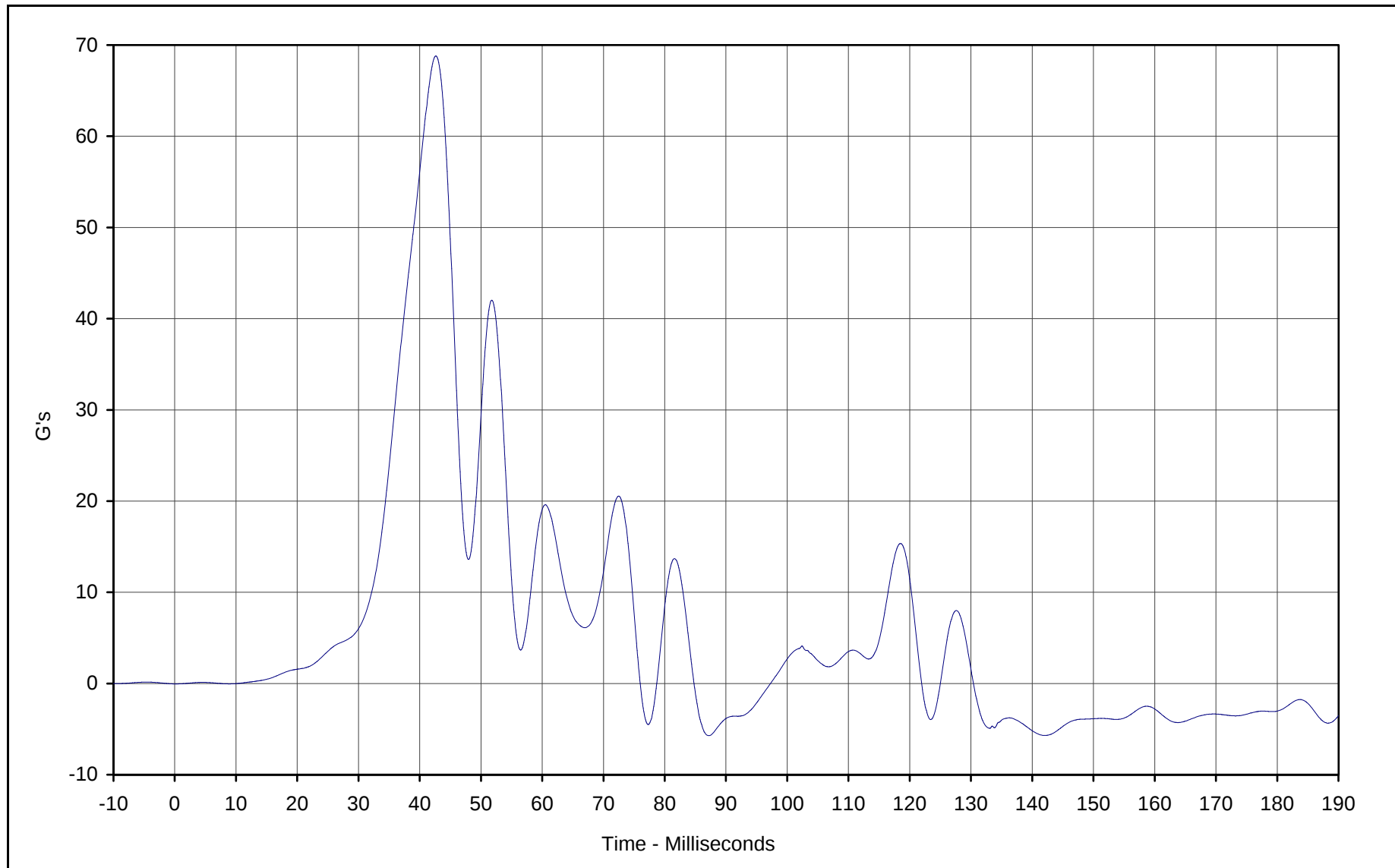




Curve Description: Driver Pelvis Redundant Y
Maximum Value: 95.8 at 28.4 Milliseconds
Minimum Value: -8.5 at 77.1 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-011

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

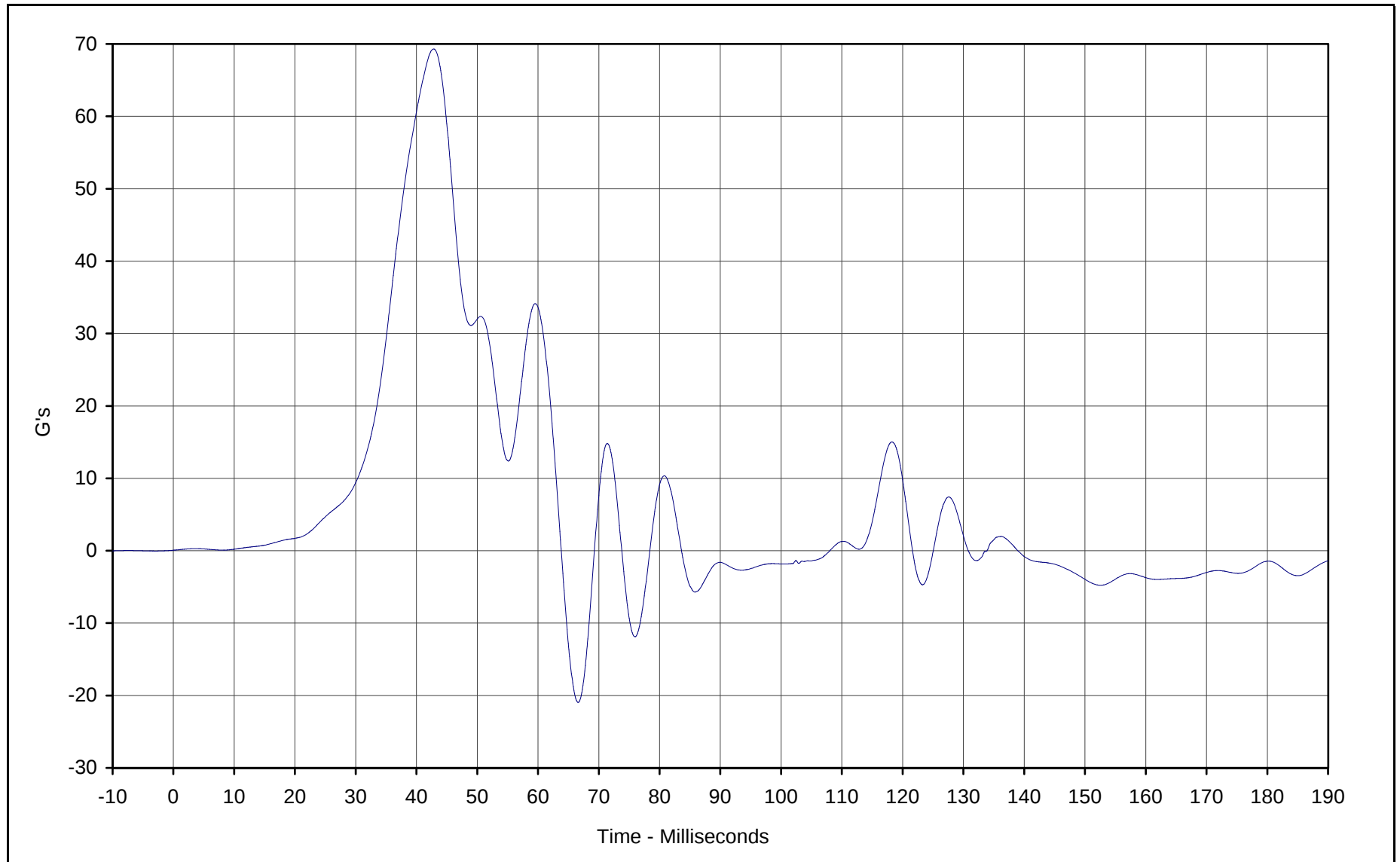




Curve Description: Pass. Upper Rib Primary Y
Maximum Value: 68.8 at 42.6 Milliseconds
Minimum Value: -5.7 at 87.2 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-017

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

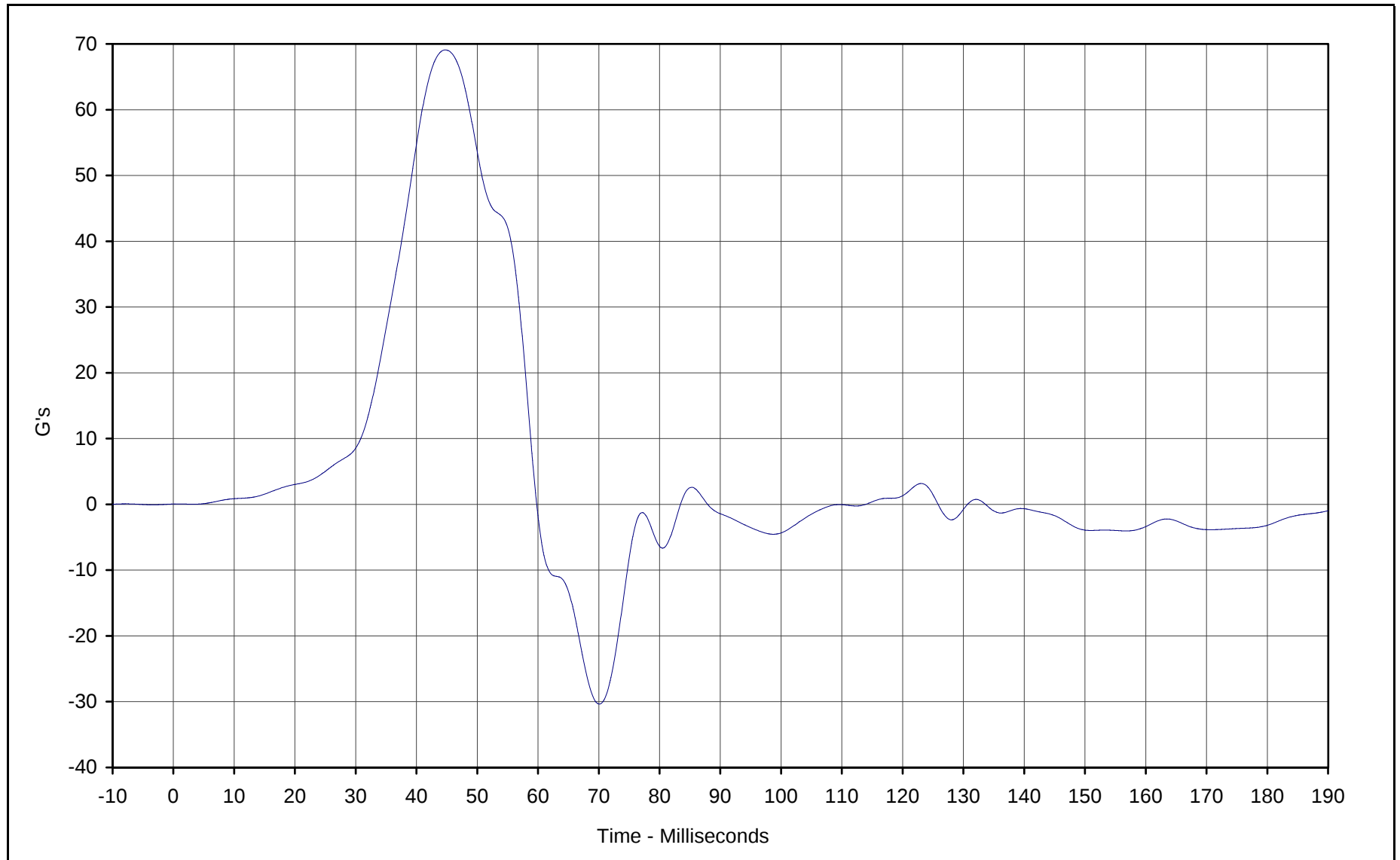




Curve Description: Pass. Lower Rib Primary Y
Maximum Value: 69.3 at 42.8 Milliseconds
Minimum Value: -21.0 at 66.6 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-018

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

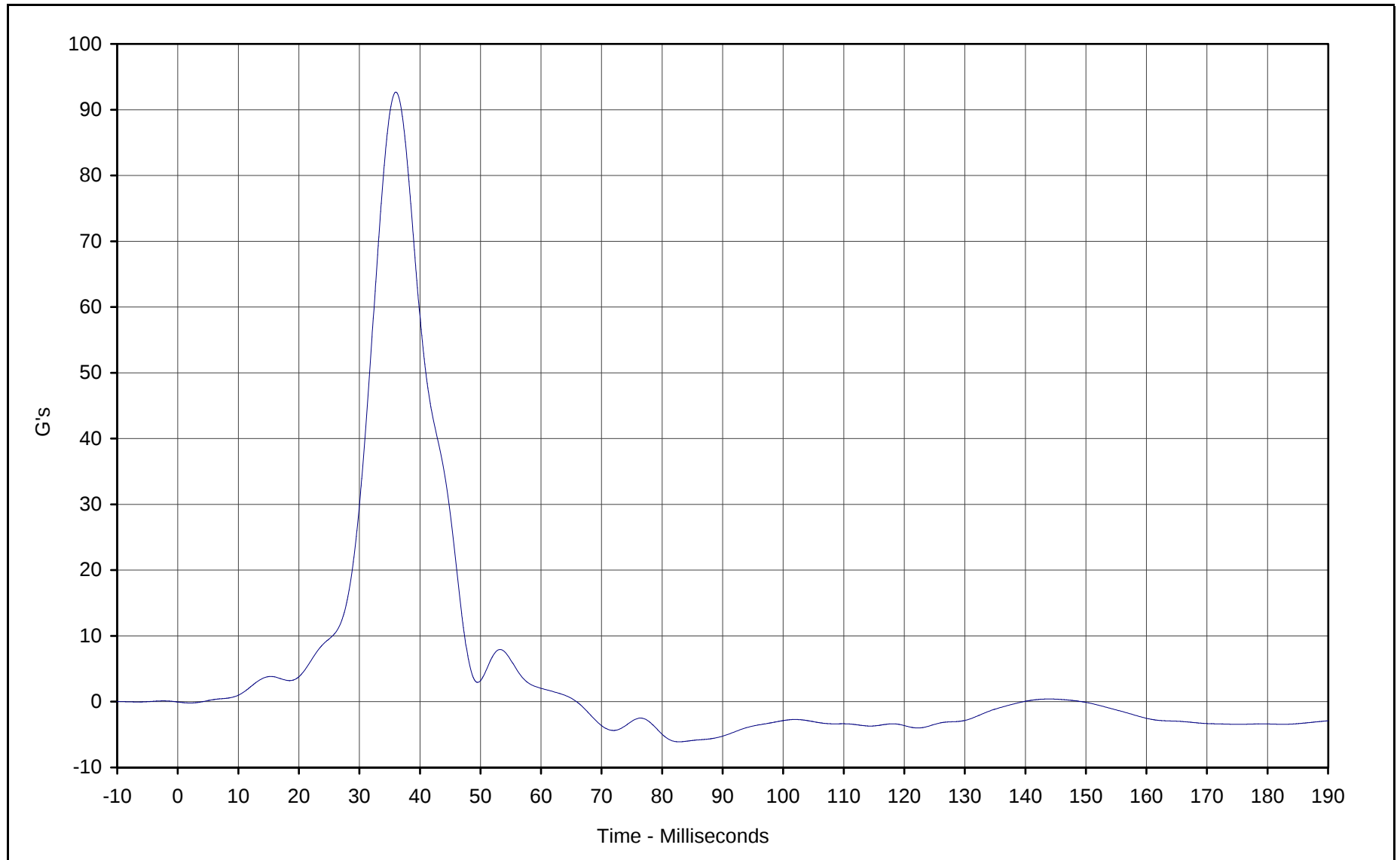




Curve Description: Pass. Lower Spine Primary Y
Maximum Value: 69.1 at 44.8 Milliseconds
Minimum Value: -30.4 at 70.1 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-019

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

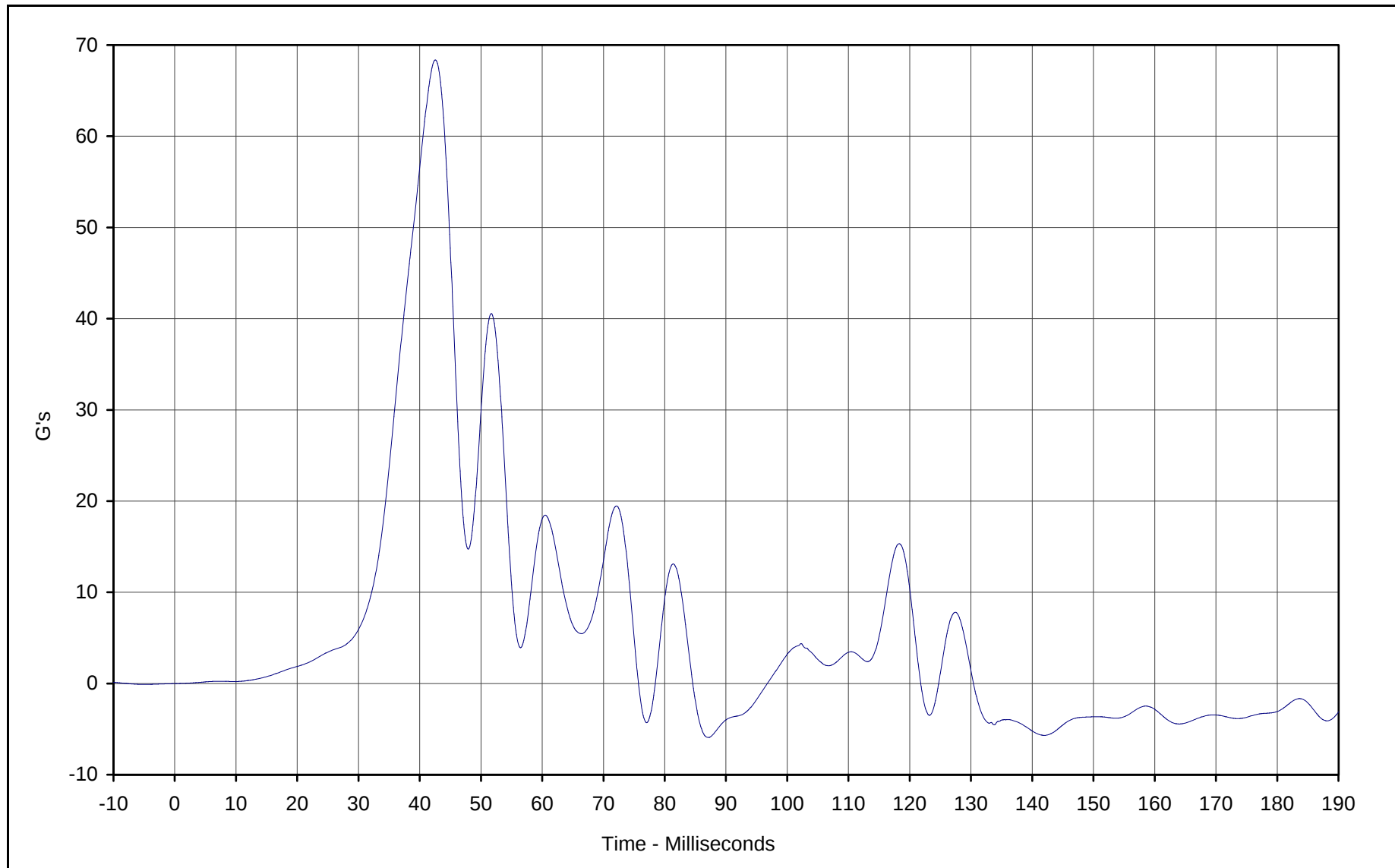




Curve Description: Pass. Pelvis Primary Y
Maximum Value: 92.7 at 36.0 Milliseconds
Minimum Value: -6.1 at 82.7 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-020

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

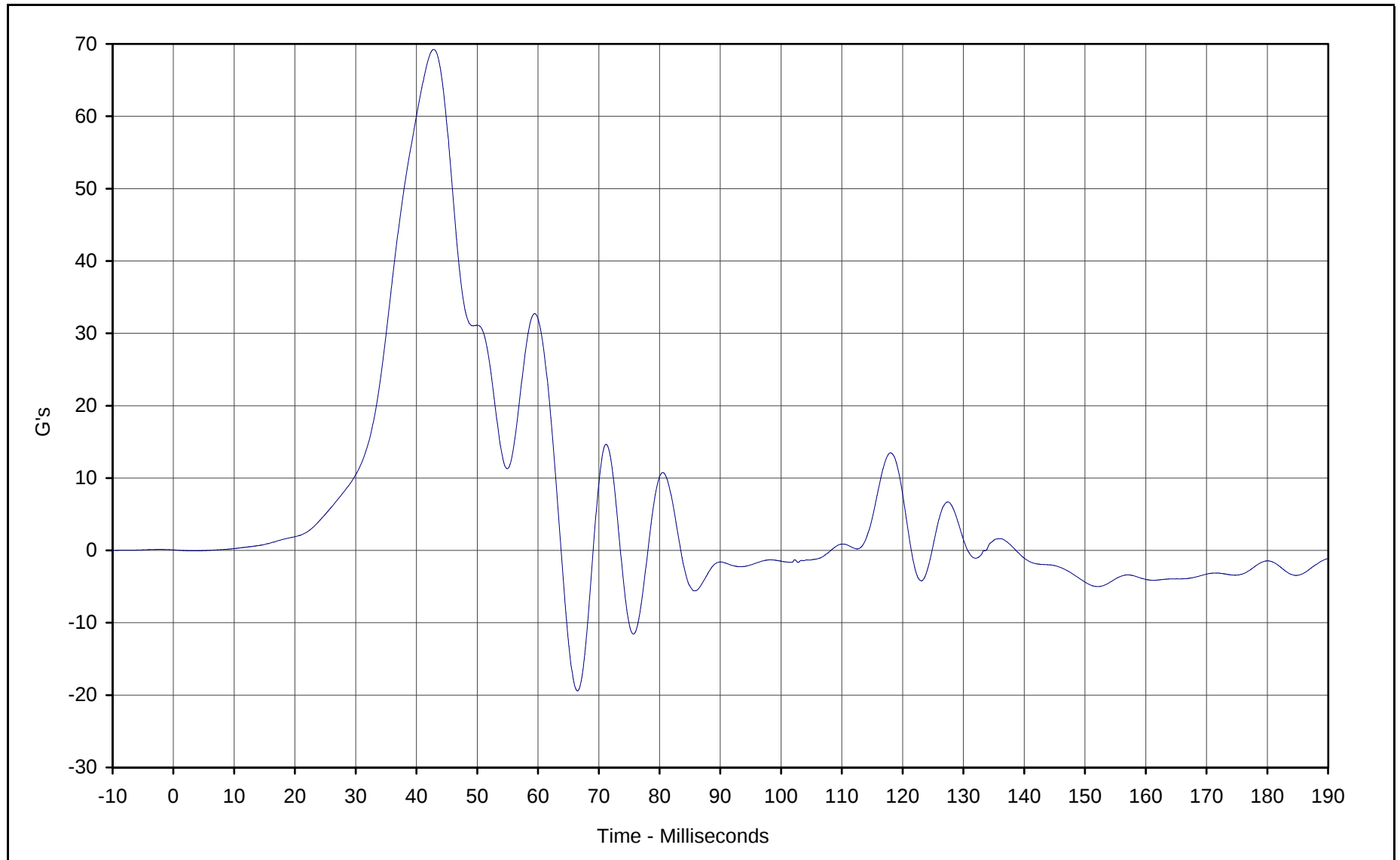




Curve Description: Pass. Upper Rib Redundant Y
Maximum Value: 68.4 at 42.5 Milliseconds
Minimum Value: -5.9 at 87.1 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-021

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

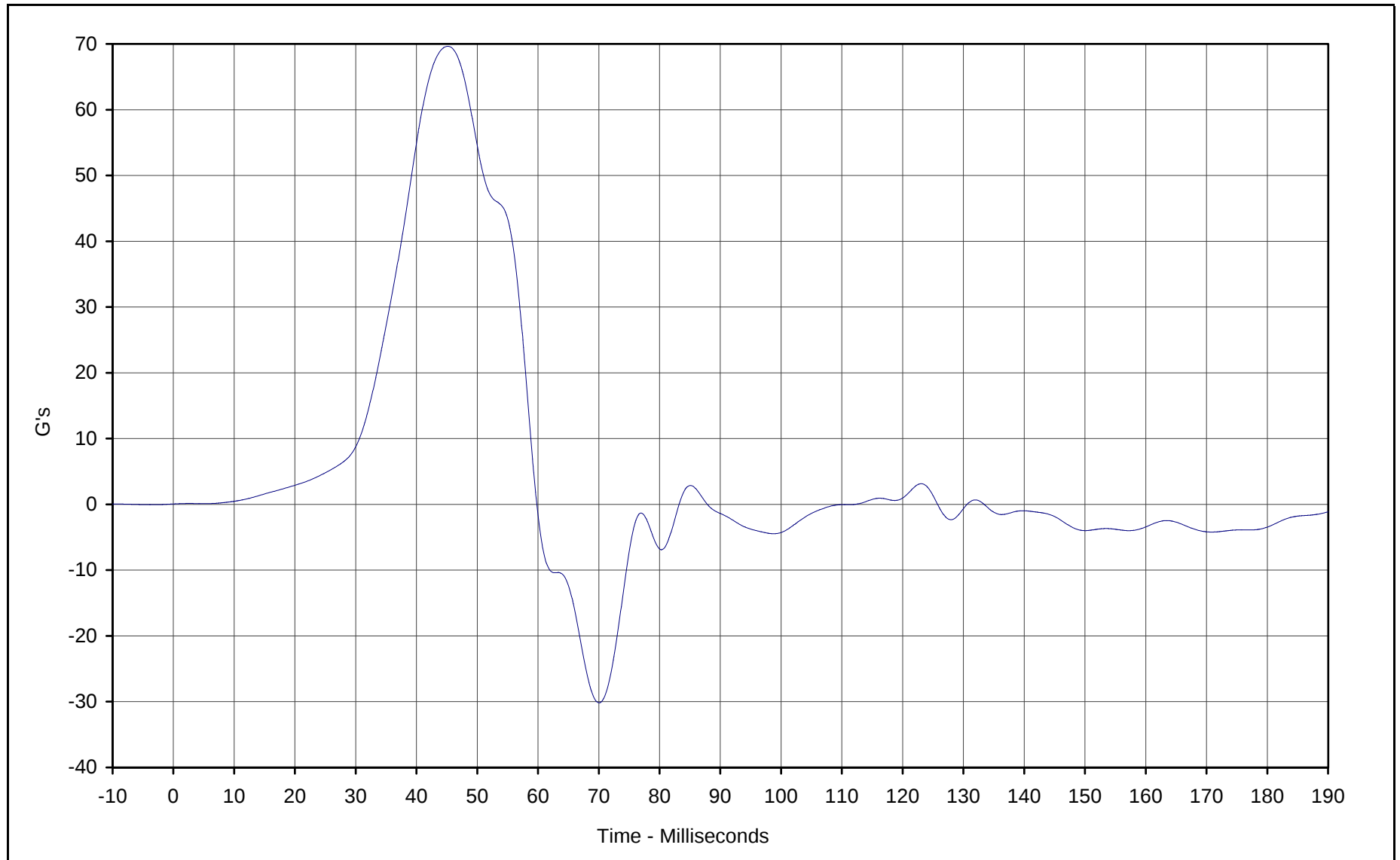




Curve Description: Pass. Lower Rib Redundant Y
Maximum Value: 69.2 at 42.8 Milliseconds
Minimum Value: -19.4 at 66.5 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-022

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan

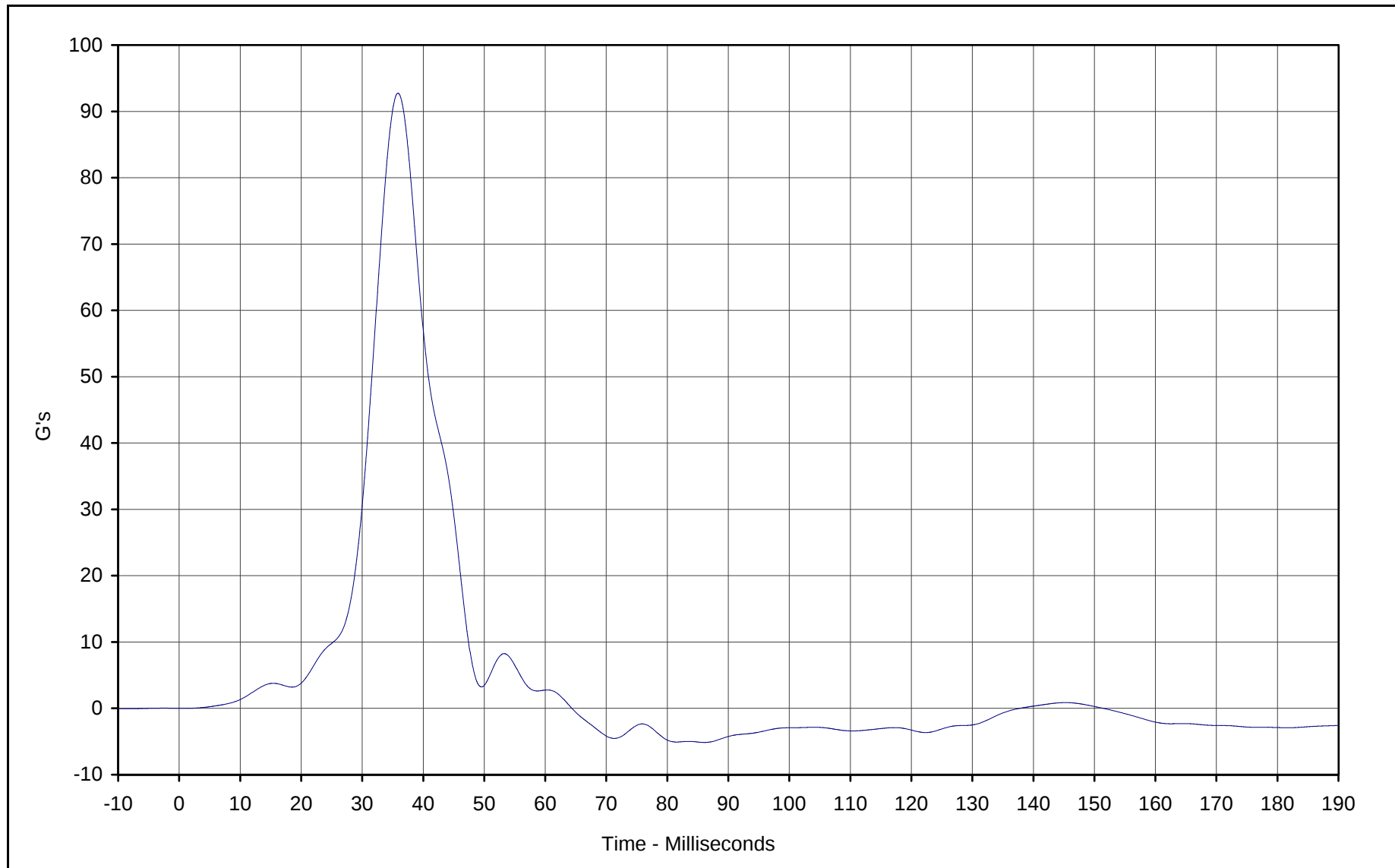




Curve Description: Pass. Lower Spine Redundant Y
Maximum Value: 69.6 at 45.1 Milliseconds
Minimum Value: -30.2 at 70.0 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-023

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan





Curve Description: Pass. Pelvis Redundant Y
Maximum Value: 92.7 at 35.9 Milliseconds
Minimum Value: -5.1 at 86.2 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/08/00
Curve Number: FIR-024

Test Program: 55/28 km/h Side Impact NCAP No.: HYU002
Test Vehicle: 2001 Hyundai Elantra 4 Door Sedan



APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
PRE-TEST SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA



Performance Verification Data Side Impact Dummy (SID) External Dimensions

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	906	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	512	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	365	Pass
Overall Test Results				Pass

Laboratory Technician

December 7, 2000

Test Date

Approved By

Date



Performance Verification Data Side Impact Dummy (SID) Thorax Lateral Impact

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: TI11A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	41.3	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	40.7	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.3	Pass
Overall Test Results				Pass

Laboratory Technician

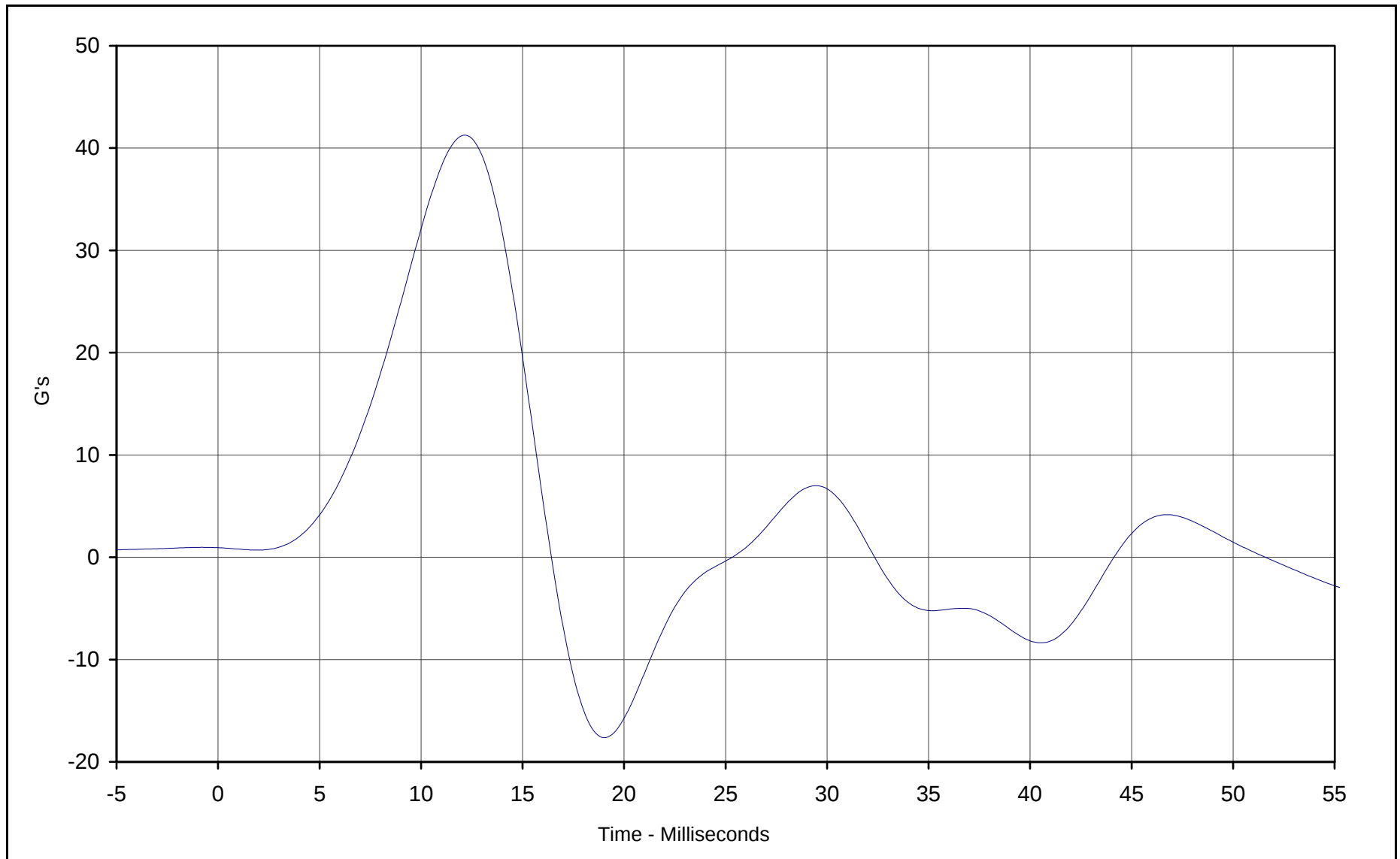
December 6, 2000

Test Date

Approved By

Date

C-3



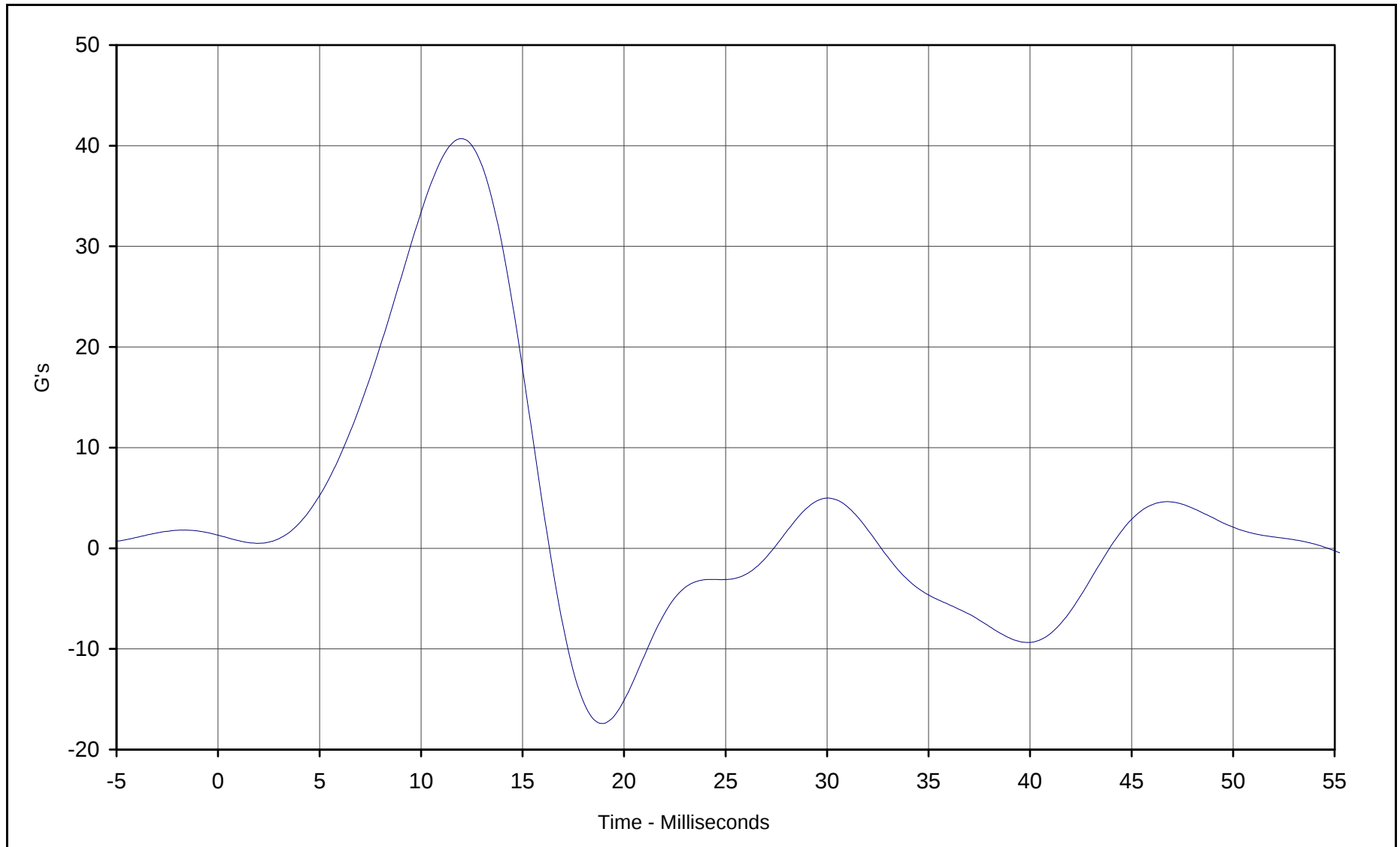
Curve Description: Left Upper Rib Y Acceleration
Maximum Value: 41.3 at 12.1 Milliseconds
Minimum Value: -17.6 at 19.0 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/6/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 274 Test I.D.: TI11A



KAR20051-04

C-4



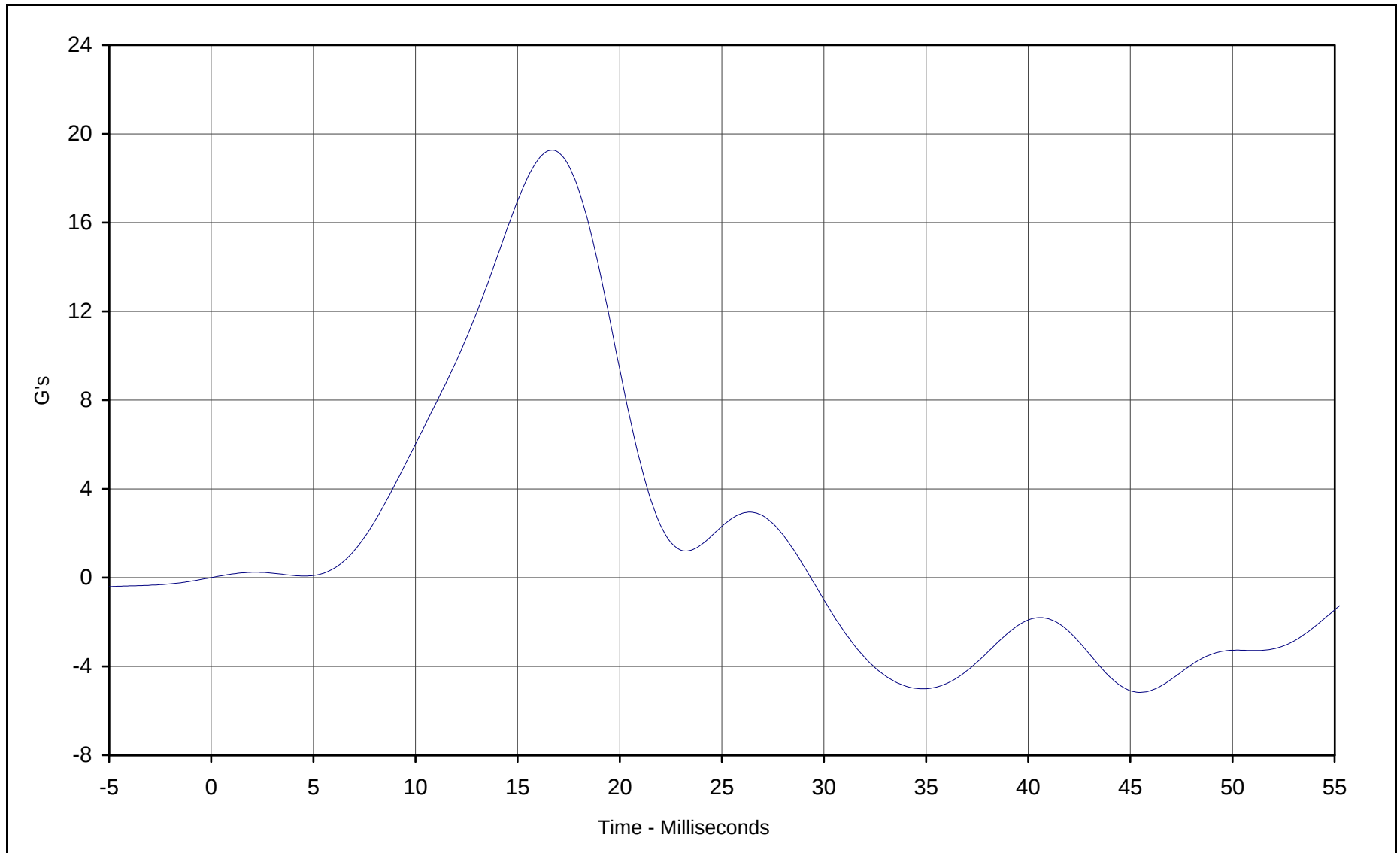
Curve Description: Left Lower Rib Y Acceleration
Maximum Value: 40.7 at 12.0 Milliseconds
Minimum Value: -17.4 at 18.9 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/6/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 274 Test I.D.: TI11A



KAR20051-04

C-5



Curve Description: Lower Spine Y Acceleration

Maximum Value: 19.3 at 16.7 Milliseconds

Minimum Value: -5.2 at 45.5 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 12/6/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 274 Test I.D.: TI11A



KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Left Side Pelvis Lateral Impact

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: PI11E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Pelvis Acceleration	G's	40.0 to 60.0	56.3	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	5.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

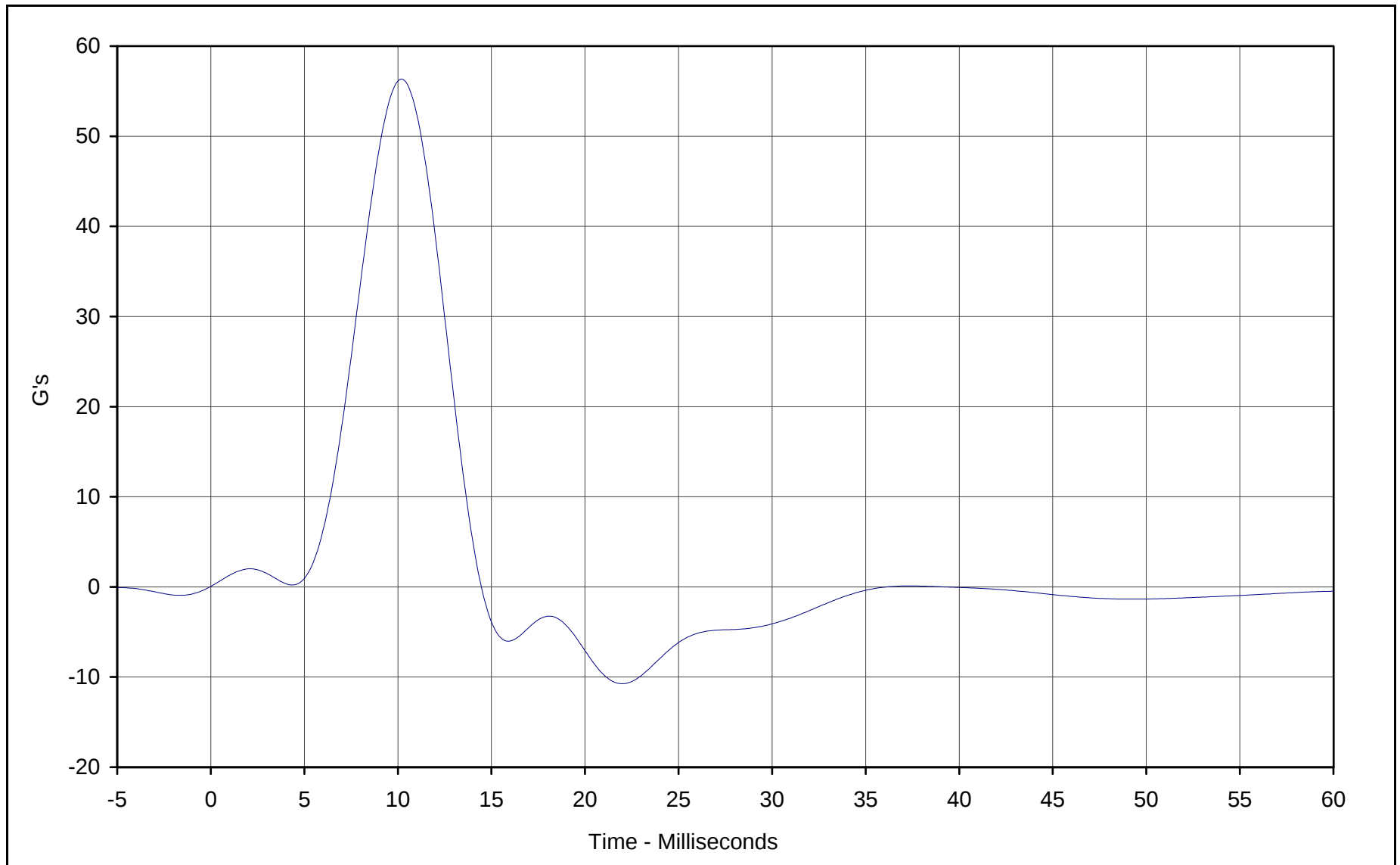
December 6, 2000

Test Date

Approved By

Date

C-7



Curve Description: Pelvis Y Axis Acceleration
Maximum Value: 56.3 at 10.2 Milliseconds
Minimum Value: -10.7 at 22.0 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/6/00

Test Program: Left Side Pelvis Lateral Impact
Test Information: SID S/N: 274 Test I.D.: PI11E



KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Abdominal Compression Test

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: AB12C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force at 0.5 Inches of Displacement	Pounds	23.0 to 36.0	29.4	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	42.8	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	59.5	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	81.9	Pass
Overall Test Results				Pass

Laboratory Technician

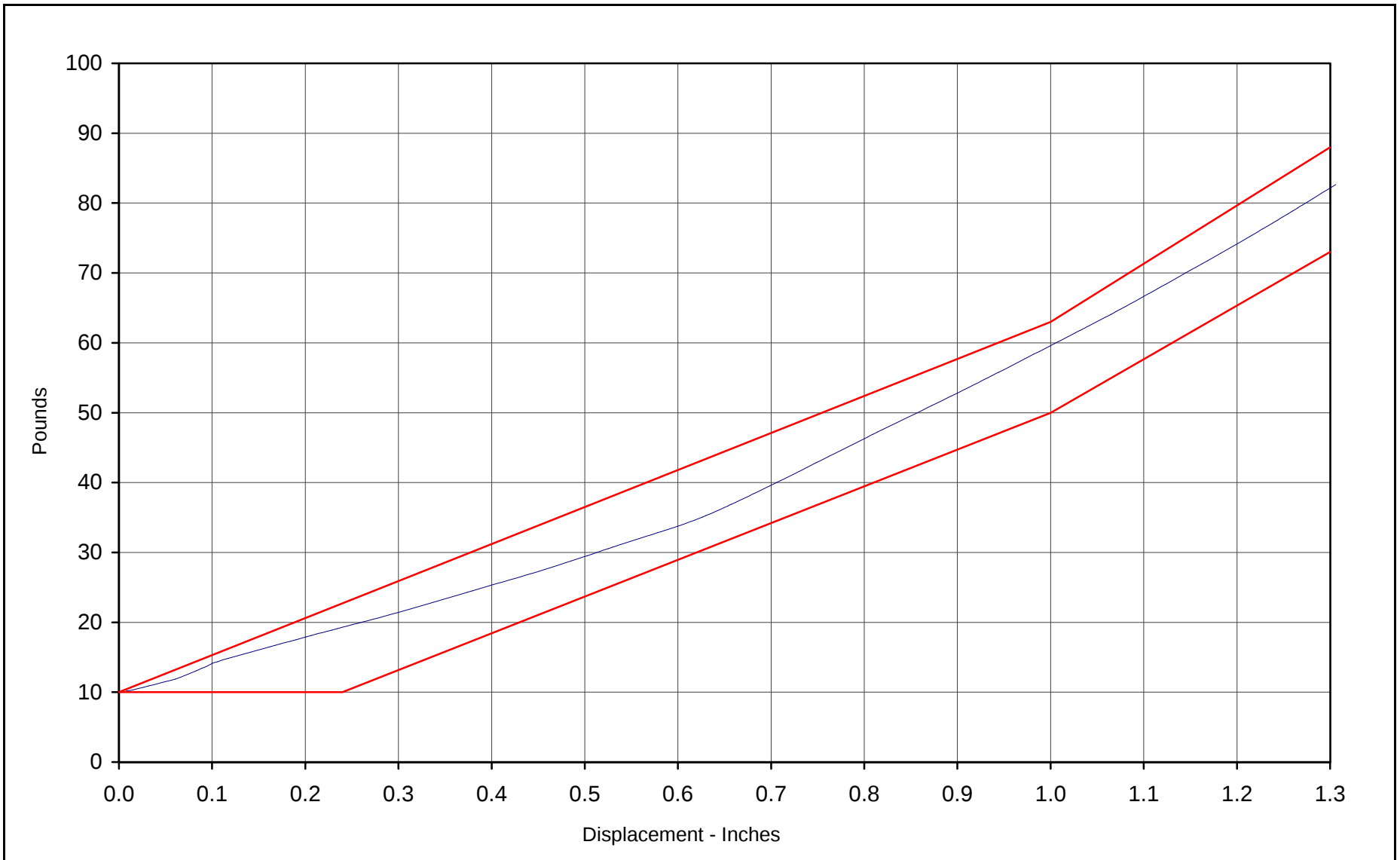
December 6, 2000

Test Date

Approved By

Date

C-9

Curve Description: Abdomen Force vs. DisplacementForce at 0.5 In.: 29.4 PoundsForce at 0.75 In.: 42.8 PoundsForce at 1.0 In.: 59.5 PoundsForce at 1.3 In.: 81.9 PoundsDate of Test: 12/6/00Test Program: Hybrid II Abdominal CompressionTest Information: SID S/N: 274 Test I.D.: AB12C

KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Head Drop Calibration

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: HD12C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	237.3	Pass
Peak Lateral Acceleration	G's	≤10.0	7.3	Pass
Time Above 100 G's	Msec.	0.9 to 1.5	1.0	Pass
Is Resultant Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

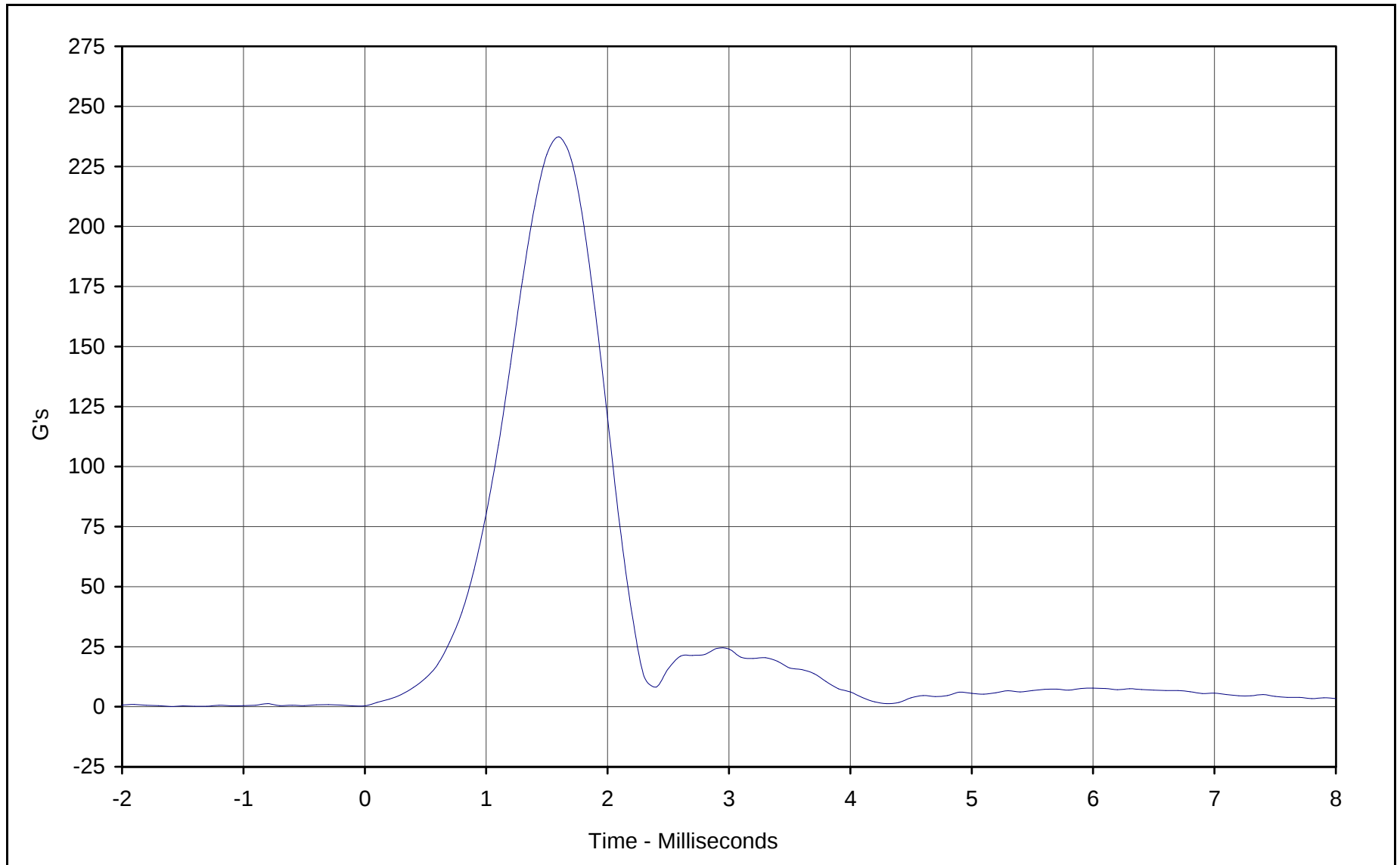
December 7, 2000

Test Date

Approved By

Date

C-11

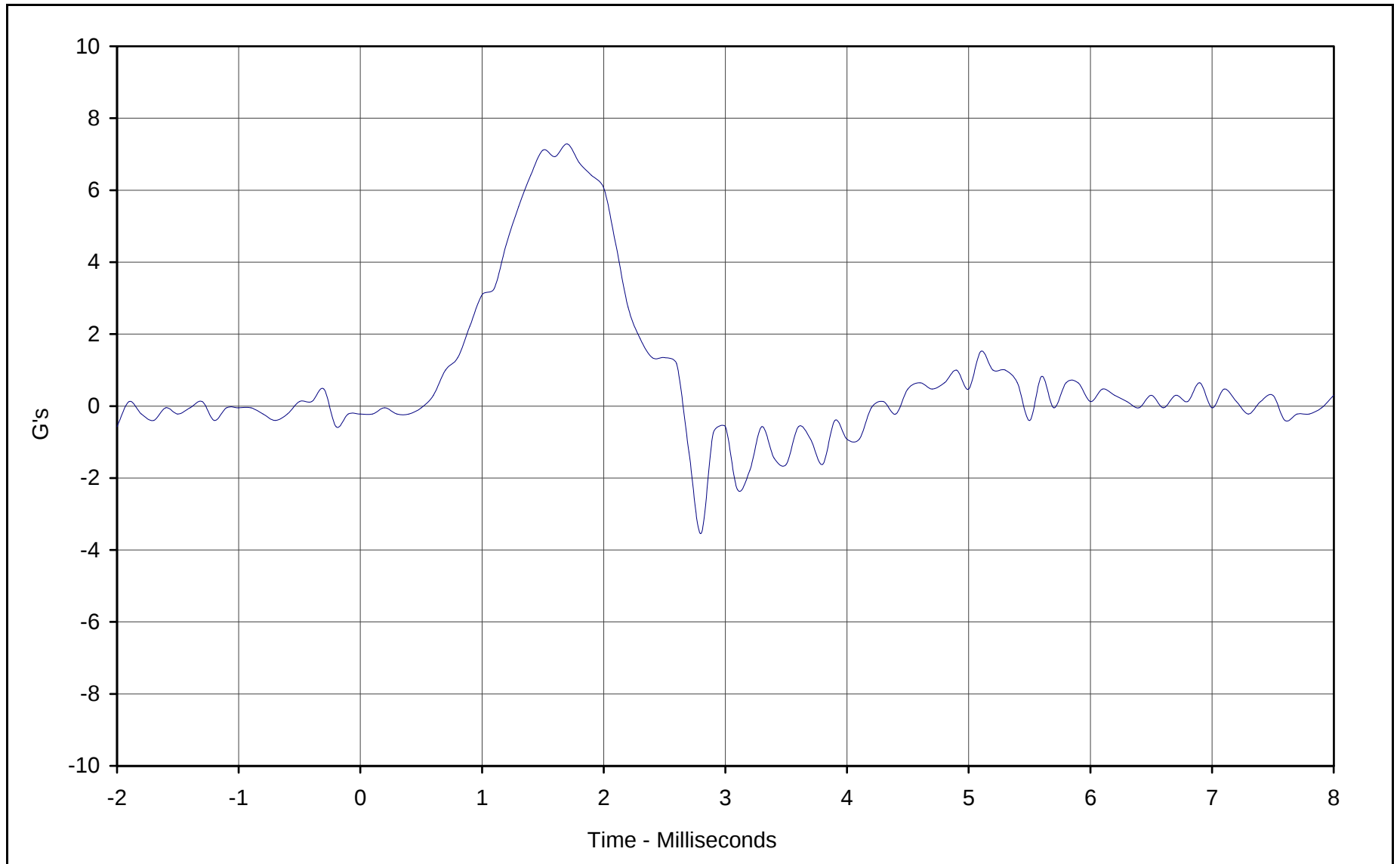


Curve Description: Head Resultant Acceleration
Maximum Value: 237.3 at 1.6 Milliseconds
Minimum Value: 0.4 at 0.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/7/00

Test Program: Hybrid II Head Drop Calibration
Test Information: SID S/N: 274 Test I.D.: HD12C



KAR20051-04



Curve Description: Head Y Axis Acceleration
Maximum Value: 7.3 at 1.7 Milliseconds
Minimum Value: -3.5 at 2.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/7/00

Test Program: Hybrid II Head Drop Calibration
Test Information: SID S/N: 274 Test I.D.: HD12C





Performance Verification Data Side Impact Dummy (SID) External Dimensions

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	905	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	515	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	360	Pass
Overall Test Results				Pass

Laboratory Technician

December 7, 2000

Test Date

Approved By

Date



Performance Verification Data Side Impact Dummy (SID) Thorax Lateral Impact

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: TI11B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	42.7	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	41.2	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.0	Pass
Overall Test Results				Pass

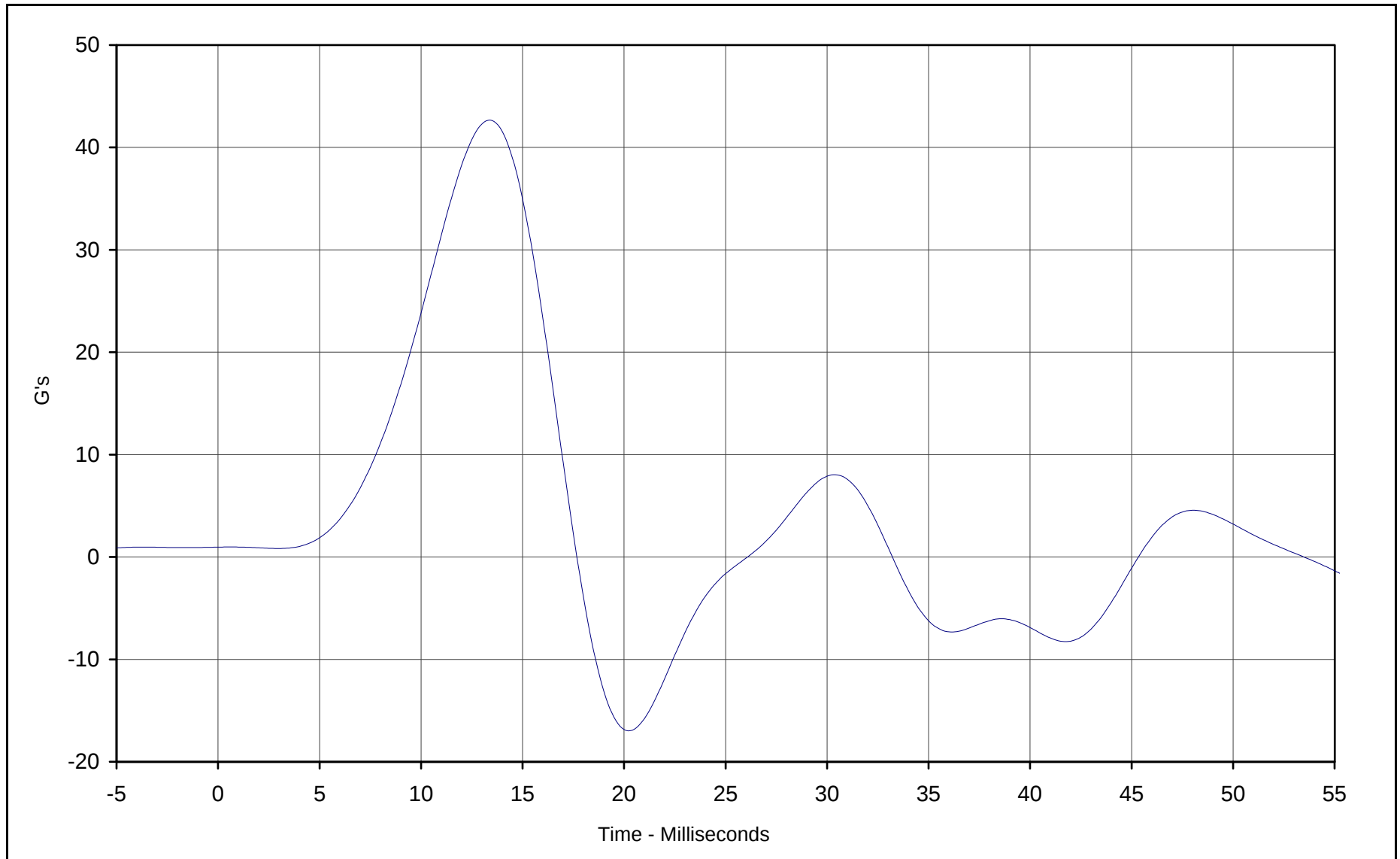
Laboratory Technician

December 6, 2000

Test Date

Approved By

Date



Curve Description: Left Upper Rib Y Acceleration

Maximum Value: 42.7 at 13.4 Milliseconds

Minimum Value: -17.0 at 20.2 Milliseconds

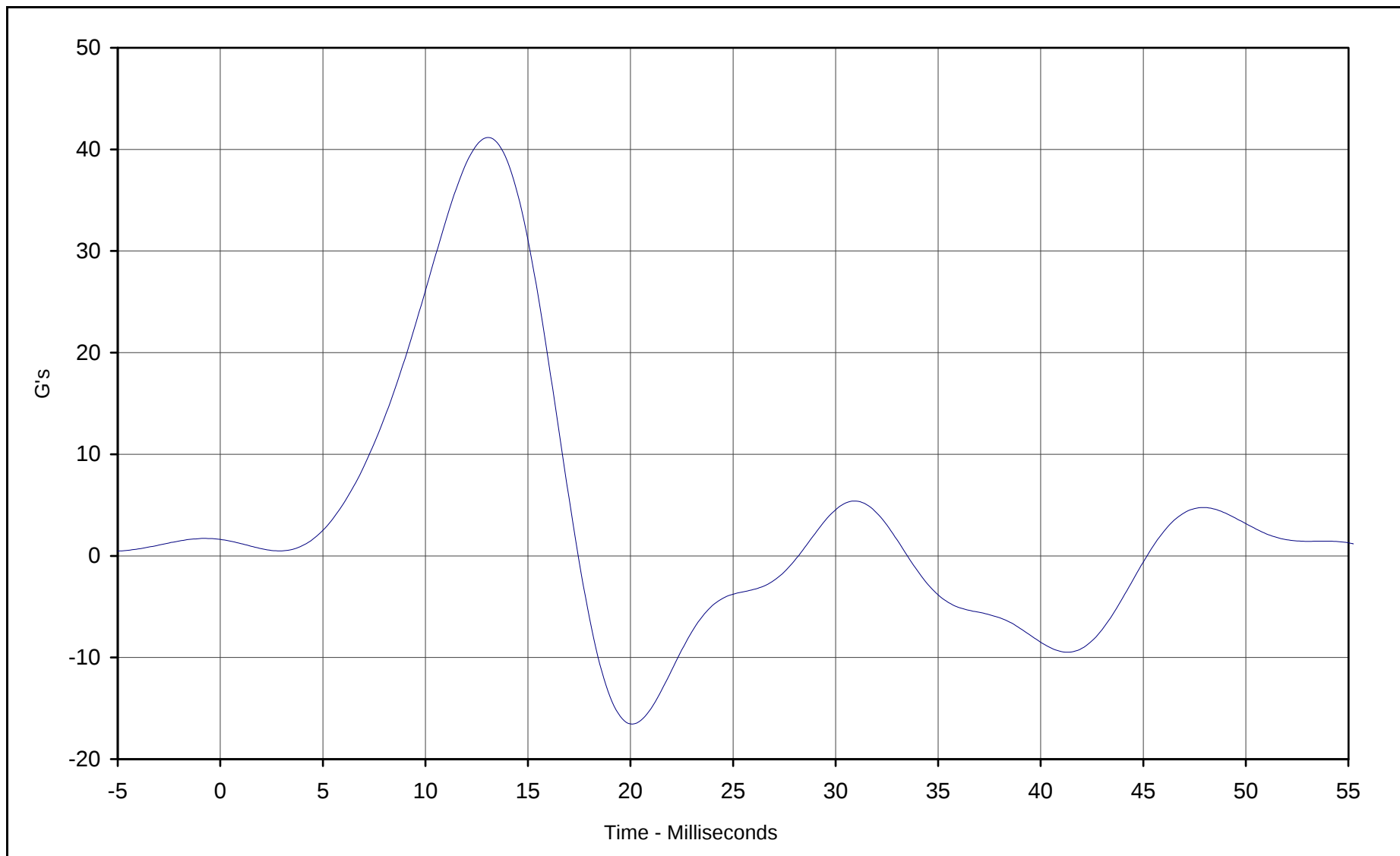
SAE Filter Class: FIR 100

Date of Test: 12/6/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 275 Test I.D.: TI11B

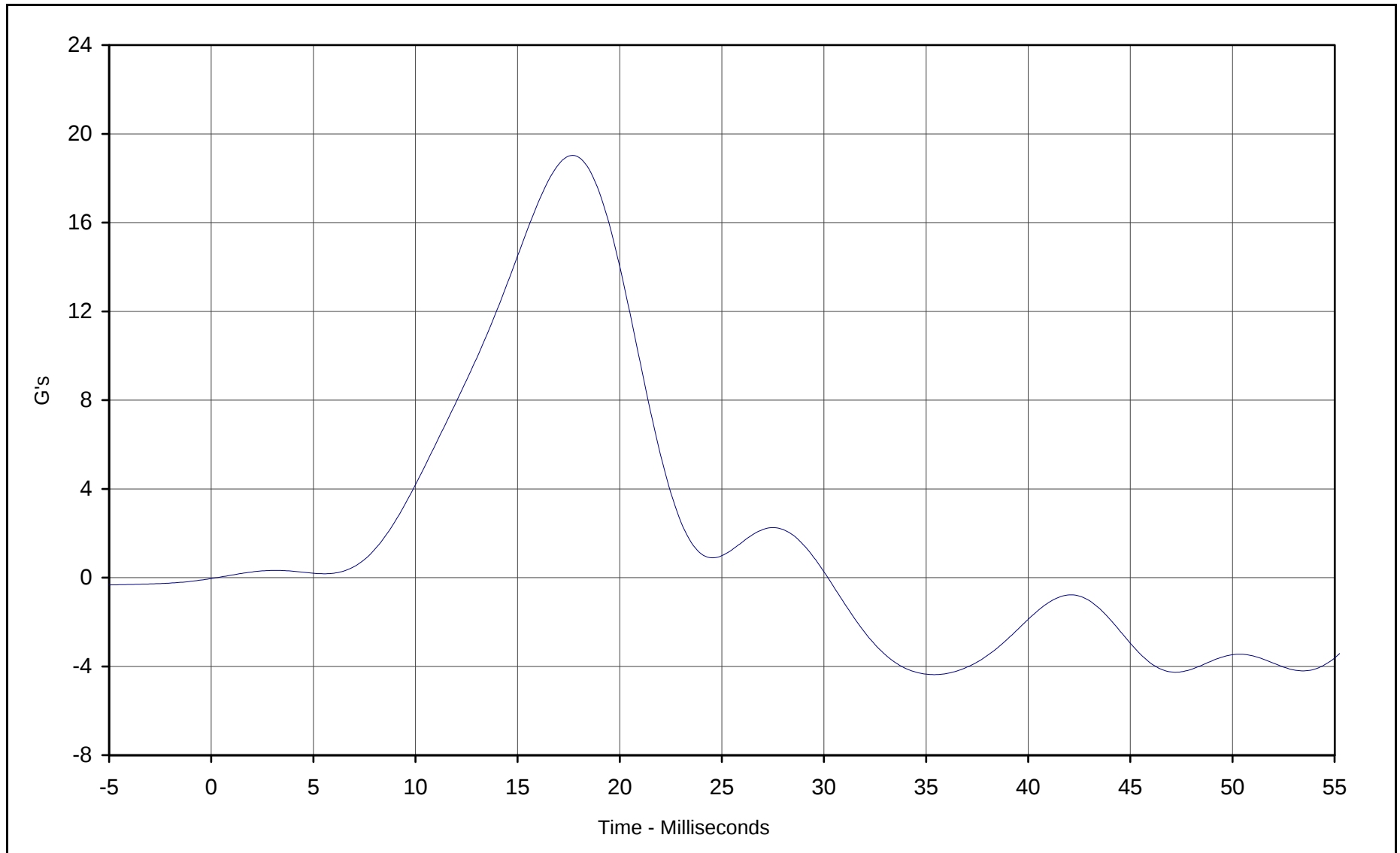




Curve Description: Left Lower Rib Y Acceleration
Maximum Value: 41.2 at 13.1 Milliseconds
Minimum Value: -16.5 at 20.1 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/6/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 275 Test I.D.: TI11B





Curve Description: Lower Spine Y Acceleration
Maximum Value: 19.0 at 17.7 Milliseconds
Minimum Value: -4.4 at 35.4 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/6/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 275 Test I.D.: TI11B





Performance Verification Data Side Impact Dummy (SID) Left Side Pelvis Lateral Impact

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: PI11F

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Pelvis Acceleration	G's	40.0 to 60.0	58.0	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	5.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

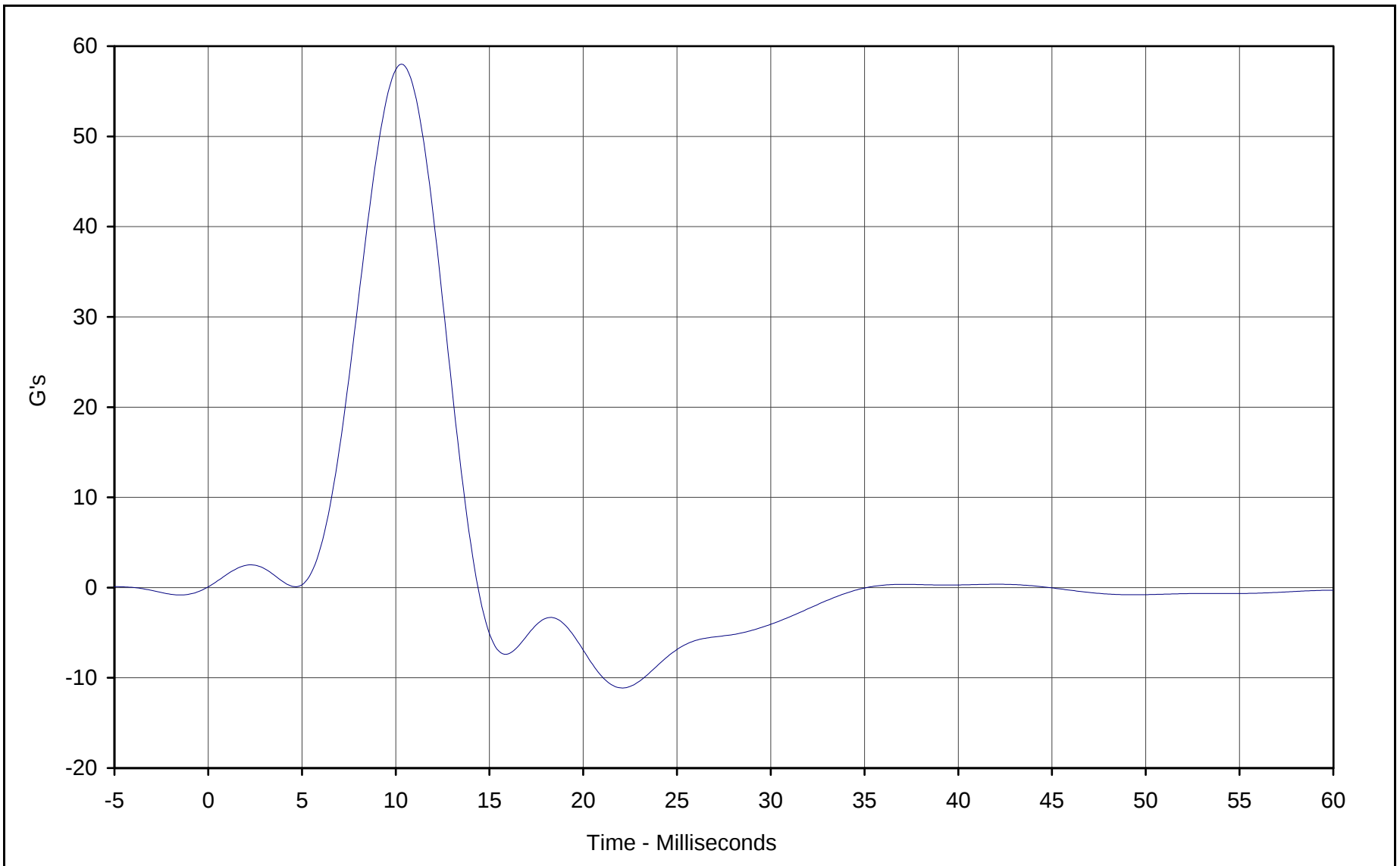
Laboratory Technician

December 6, 2000

Test Date

Approved By

Date



Curve Description: Pelvis Y Axis Acceleration
Maximum Value: 58.0 at 10.3 Milliseconds
Minimum Value: -11.1 at 22.1 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/6/00

Test Program: Left Side Pelvis Lateral Impact
Test Information: SID S/N: 275 Test I.D.: PI11F





Performance Verification Data Side Impact Dummy (SID) Abdominal Compression Test

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: AB12D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force at 0.5 Inches of Displacement	Pounds	23.0 to 36.0	29.0	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	43.2	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	59.8	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	83.5	Pass
Overall Test Results				Pass

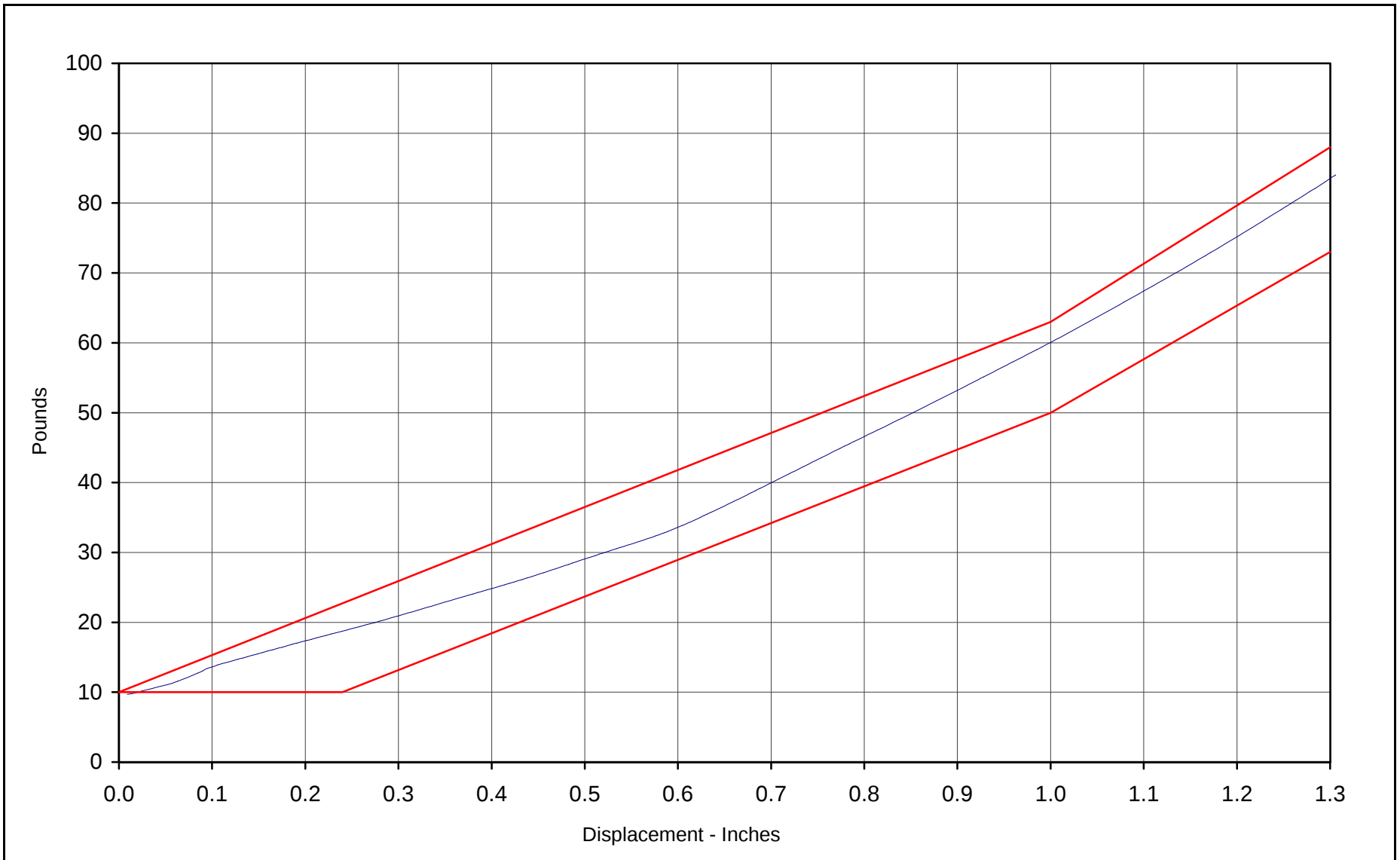
Laboratory Technician

December 6, 2000

Test Date

Approved By

Date



Curve Description: Abdomen Force vs. Displacement

Force at 0.5 In.: 29.0 Pounds

Force at 0.75 In.: 43.2 Pounds

Force at 1.0 In.: 59.8 Pounds

Force at 1.3 In.: 83.5 Pounds

Date of Test: 12/6/00

Test Program: Hybrid II Abdominal Compression

Test Information: SID S/N: 275 Test I.D.: AB12D





Performance Verification Data Side Impact Dummy (SID) Head Drop Calibration

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: HD12D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	241.7	Pass
Peak Lateral Acceleration	G's	≤10.0	5.8	Pass
Time Above 100 G's	Msec.	0.9 to 1.5	1.0	Pass
Is Resultant Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

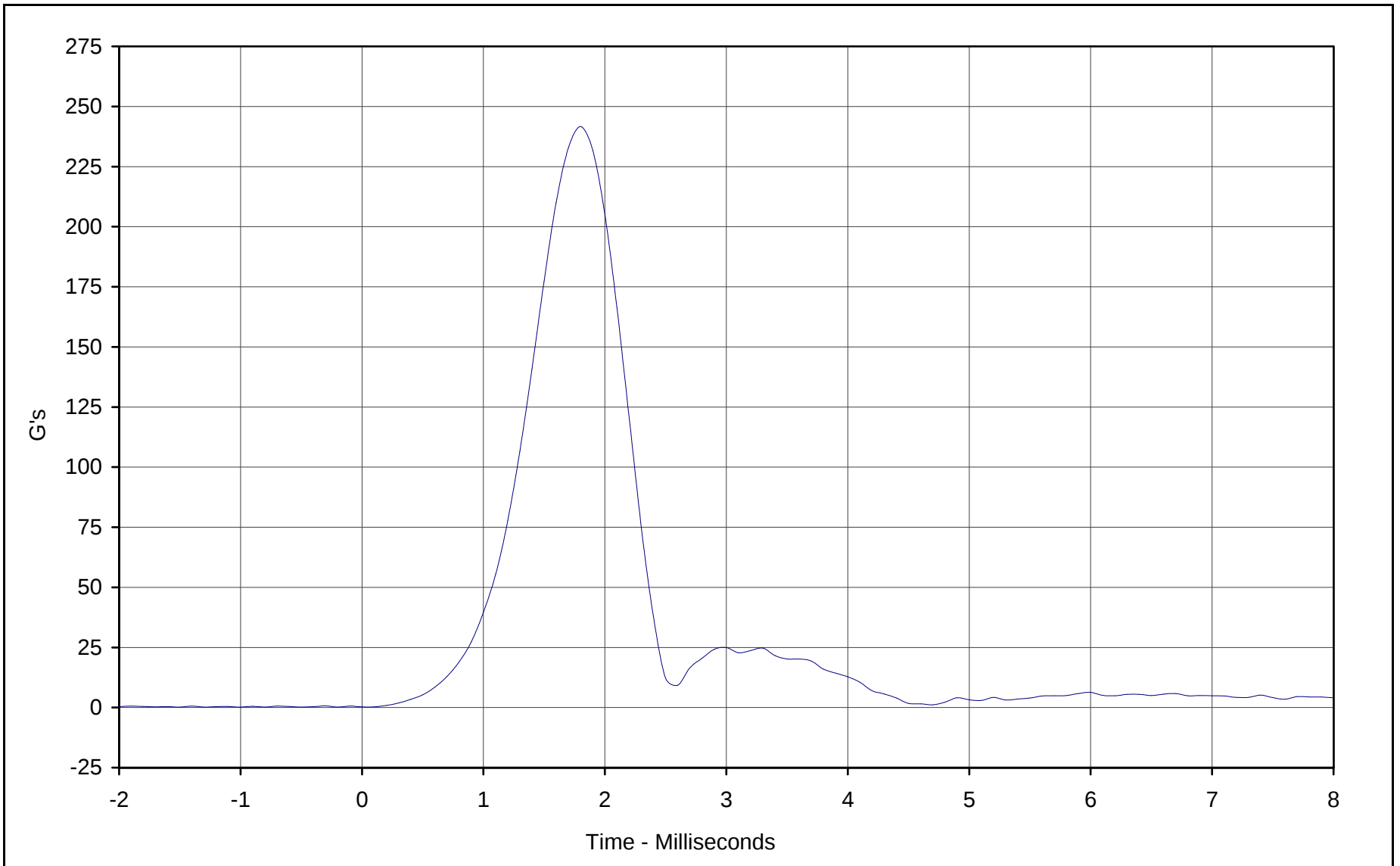
December 7, 2000

Test Date

Approved By

Date

C-23

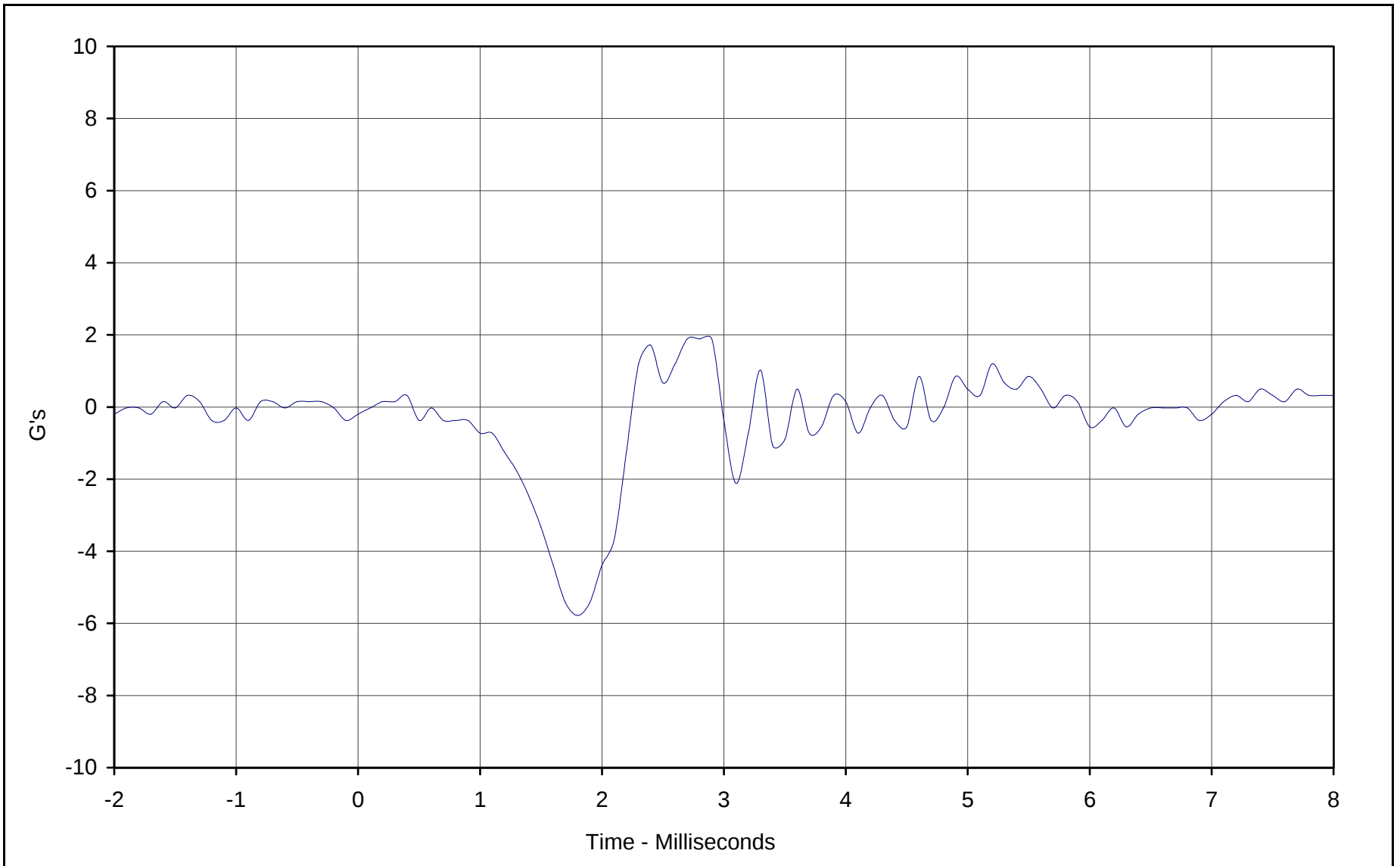


Curve Description: Head Resultant Acceleration
Maximum Value: 241.7 at 1.8 Milliseconds
Minimum Value: 0.3 at 0.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/7/00

Test Program: Hybrid II Head Drop Calibration
Test Information: SID S/N: 275 Test I.D.: HD12D



KAR20051-04



Curve Description: Head Y Axis Acceleration
Maximum Value: 1.9 at 2.7 Milliseconds
Minimum Value: -5.8 at 1.8 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/7/00

Test Program: Hybrid II Head Drop Calibration
Test Information: SID S/N: 275 Test I.D.: HD12D



APPENDIX C
POST-TEST SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA



Performance Verification Data Side Impact Dummy (SID) External Dimensions

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	906	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	512	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	365	Pass
Overall Test Results				Pass

Laboratory Technician

December 11, 2000

Test Date

Approved By

Date



Performance Verification Data Side Impact Dummy (SID) Thorax Lateral Impact

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: TI11C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	42.0	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	41.1	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	21.8	Pass
Overall Test Results				Pass

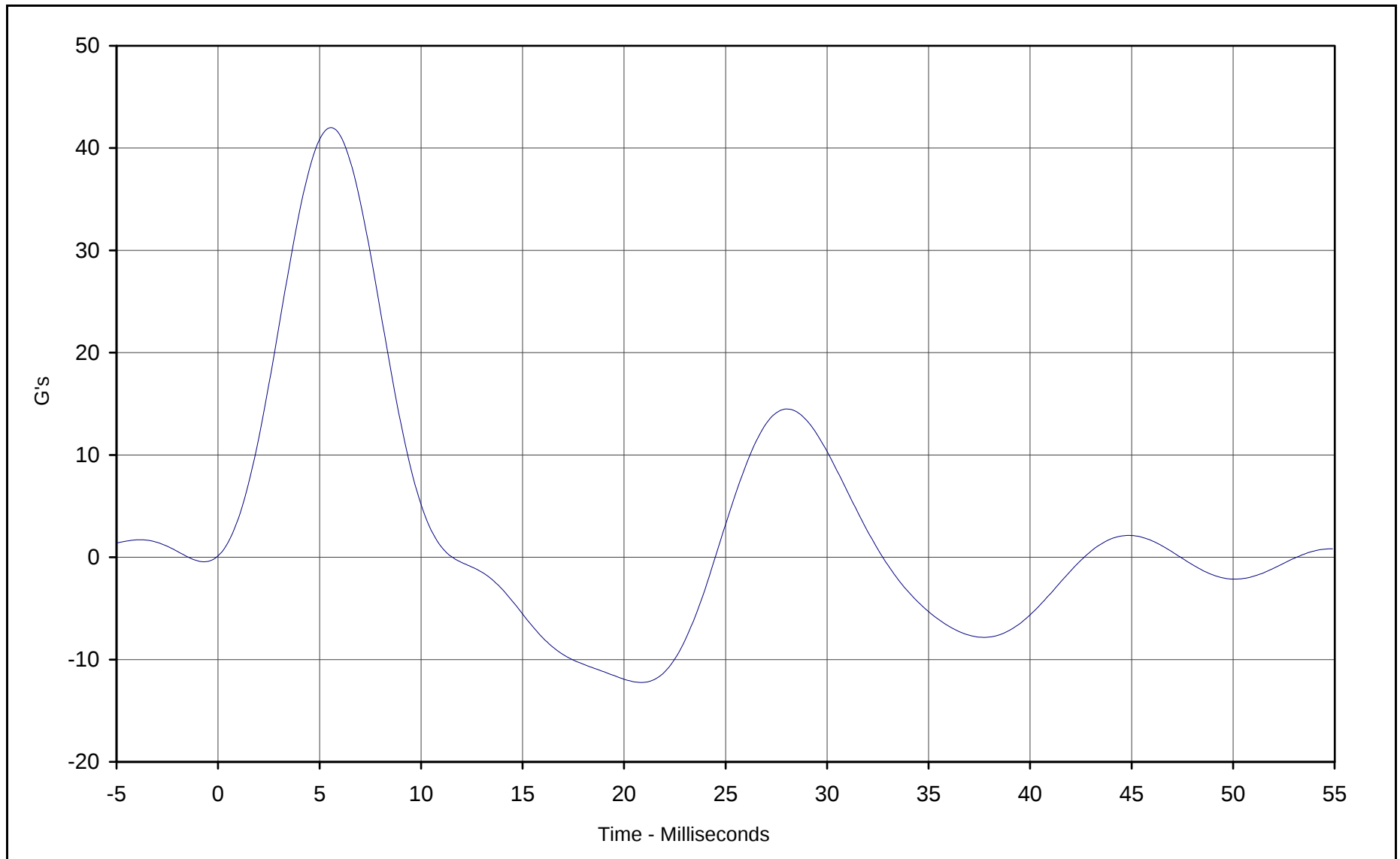
Laboratory Technician

December 9, 2000

Test Date

Approved By

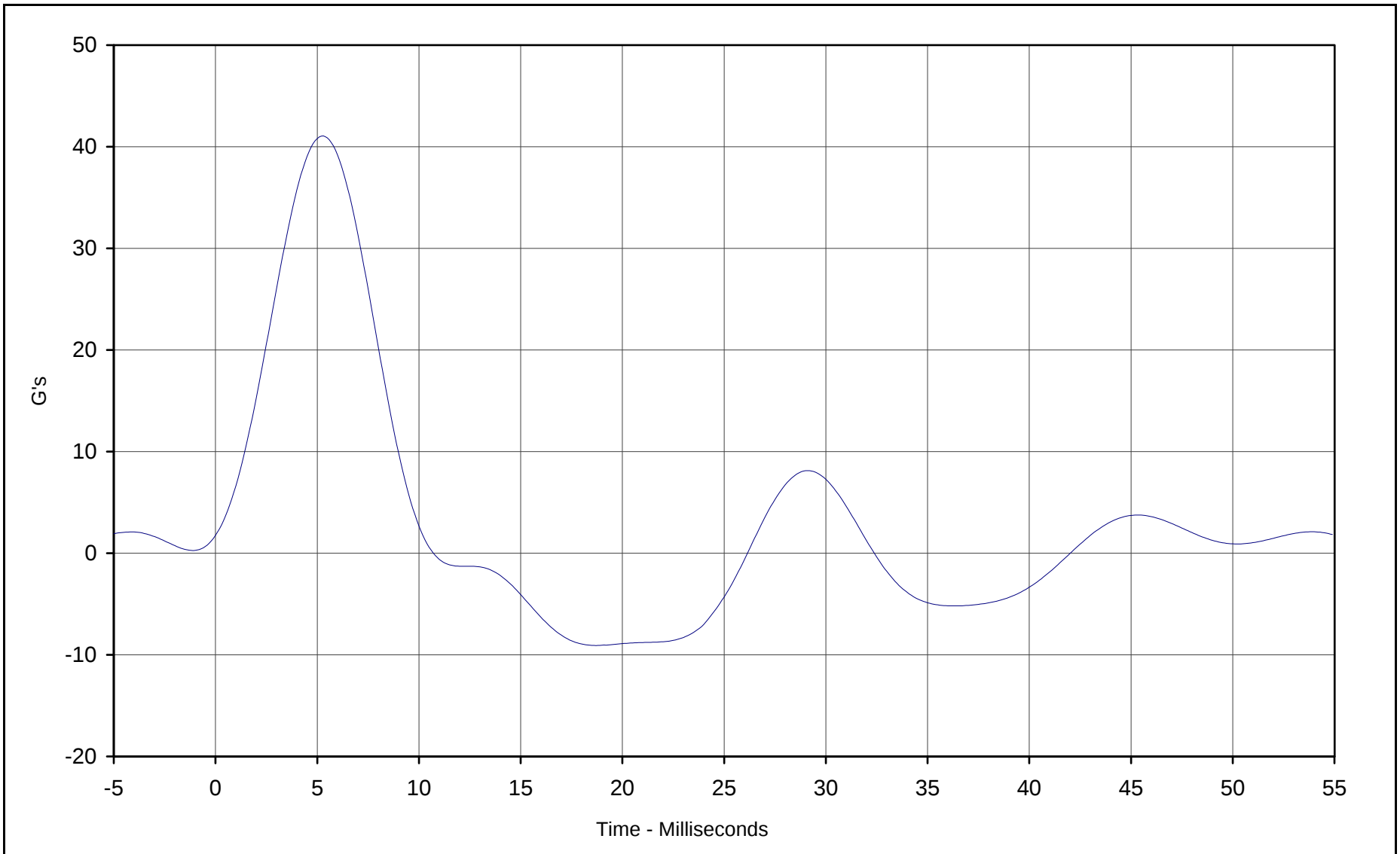
Date



Curve Description: Left Upper Rib Y Acceleration
Maximum Value: 42.0 at 5.6 Milliseconds
Minimum Value: -12.2 at 20.8 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/9/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 274 Test I.D.: TI11C





Curve Description: Left Lower Rib Y Acceleration

Maximum Value: 41.1 at 5.3 Milliseconds

Minimum Value: -9.1 at 18.7 Milliseconds

SAE Filter Class: FIR 100

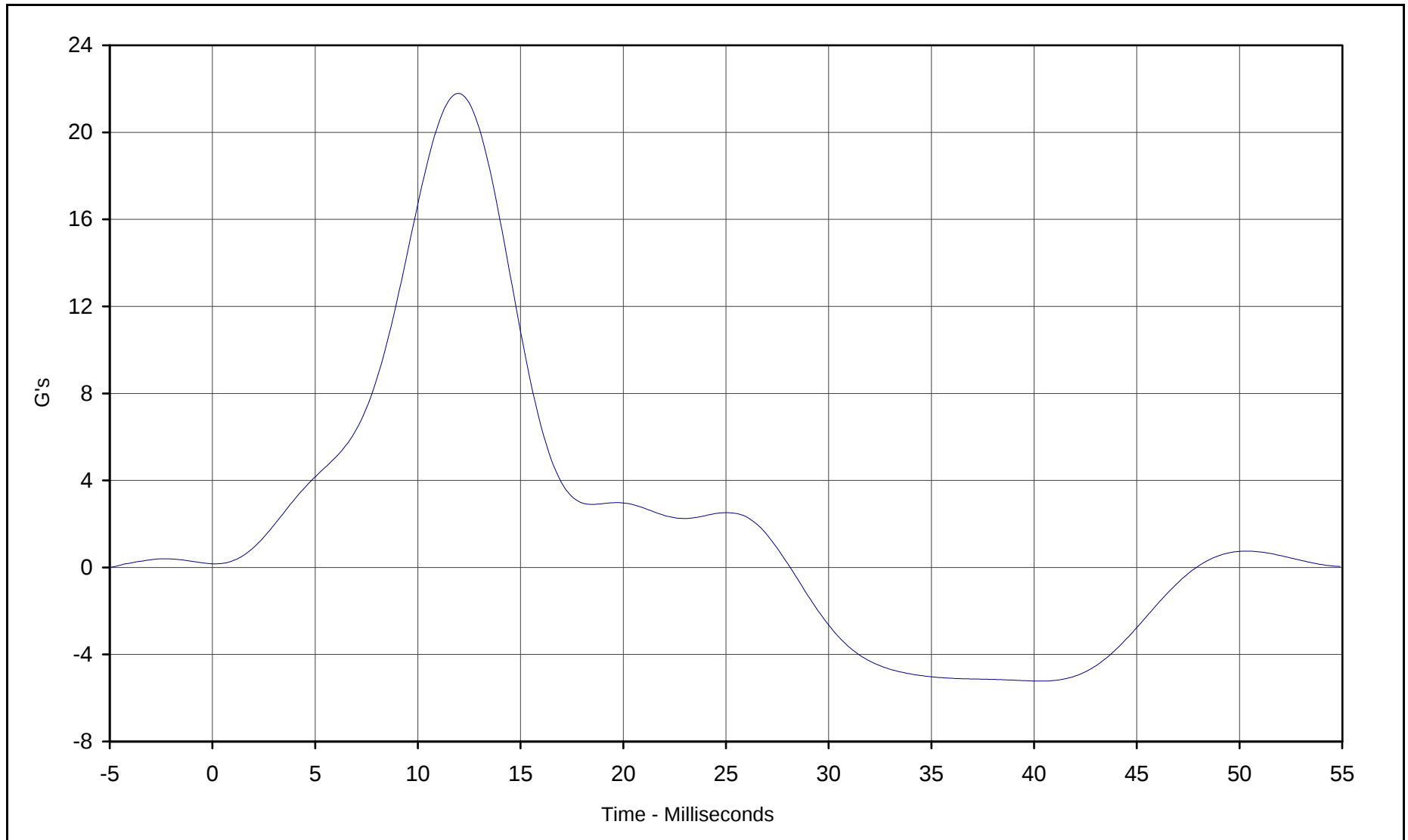
Date of Test: 12/9/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 274 Test I.D.: TI11C



C-29



Curve Description: Lower Spine Y Acceleration
Maximum Value: 21.8 at 12.0 Milliseconds
Minimum Value: -5.2 at 40.3 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/9/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 274 Test I.D.: TI11C



KAR20051-04



Performance Verification Data

Side Impact Dummy (SID)

Left Side Pelvis Lateral Impact

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: PI11G

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Pelvis Acceleration	G's	40.0 to 60.0	41.1	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	6.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

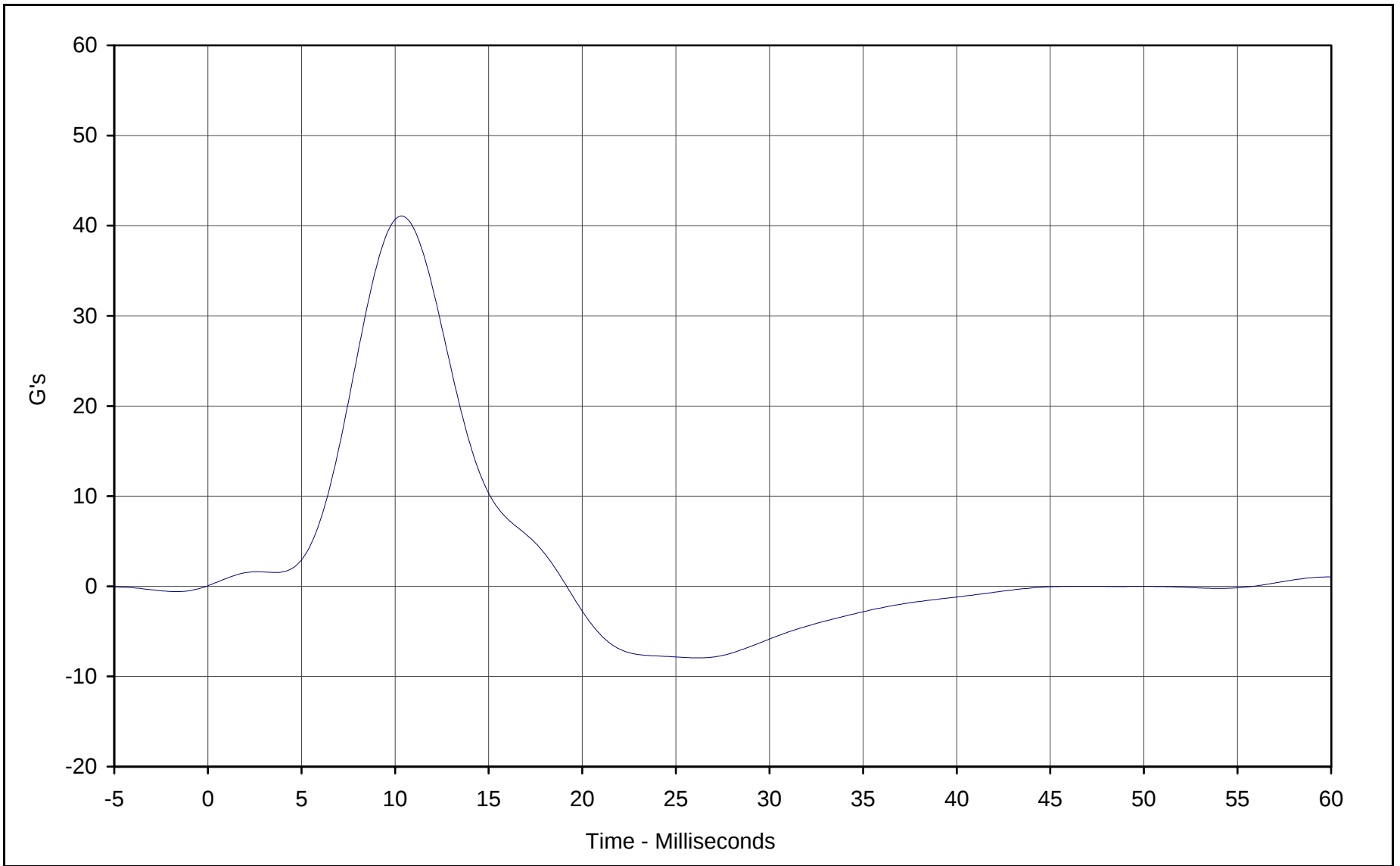
December 9, 2000

Test Date

Approved By

Date

C-31



Curve Description: Pelvis Y Axis Acceleration
Maximum Value: 41.1 at 10.3 Milliseconds
Minimum Value: -7.9 at 26.2 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/9/00

Test Program: Left Side Pelvis Lateral Impact
Test Information: SID S/N: 274 Test I.D.: PI11G



KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Abdominal Compression Test

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: AB12E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force at 0.5 Inches of Displacement	Pounds	23.0 to 36.0	29.3	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	42.7	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	59.4	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	82.2	Pass
Overall Test Results				Pass

Laboratory Technician

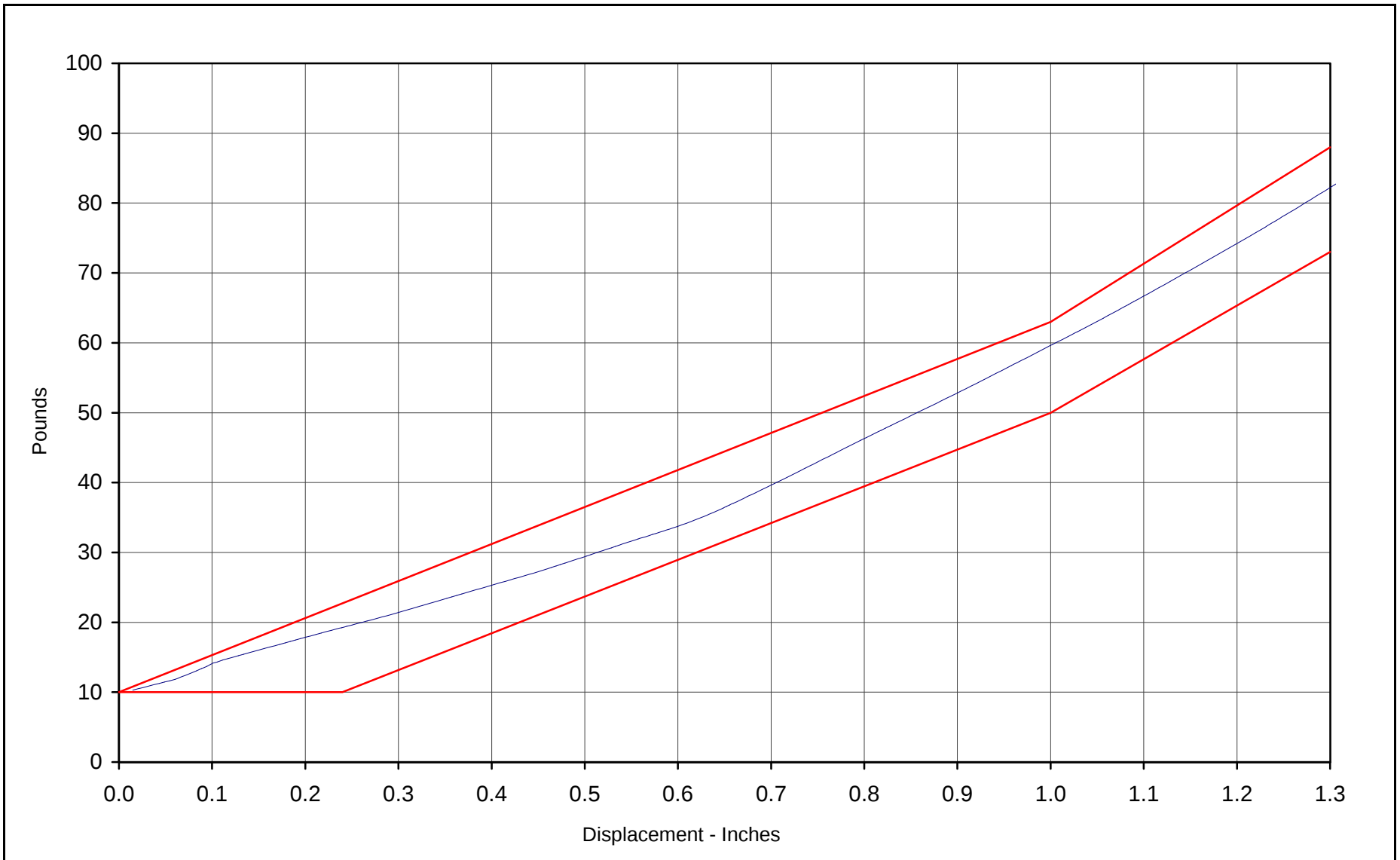
December 10, 2000

Test Date

Approved By

Date

C-33

Curve Description: Abdomen Force vs. DisplacementForce at 0.5 In.: 29.3 PoundsForce at 0.75 In.: 42.7 PoundsForce at 1.0 In.: 59.4 PoundsForce at 1.3 In.: 82.2 PoundsDate of Test: 12/10/00Test Program: Hybrid II Abdominal CompressionTest Information: SID S/N: 274 Test I.D.: AB12E

KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Head Drop Calibration

ATD Serial No.: 274

Part Serial No.: N/A

Test I.D.: HD12E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	250.5	Pass
Peak Lateral Acceleration	G's	≤10.0	4.5	Pass
Time Above 100 G's	Msec.	0.9 to 1.5	1.0	Pass
Is Resultant Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

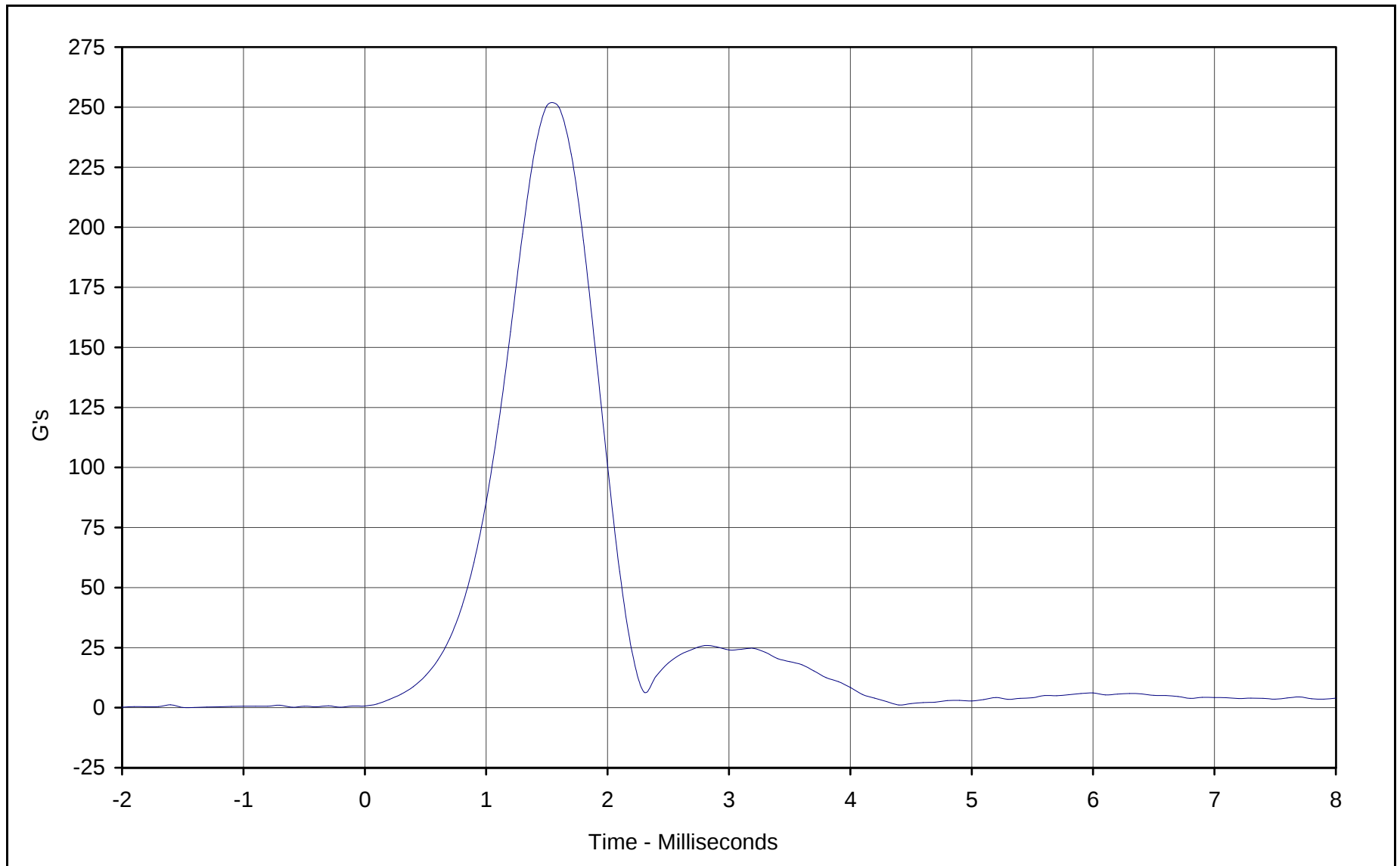
December 10, 2000

Test Date

Approved By

Date

C-35

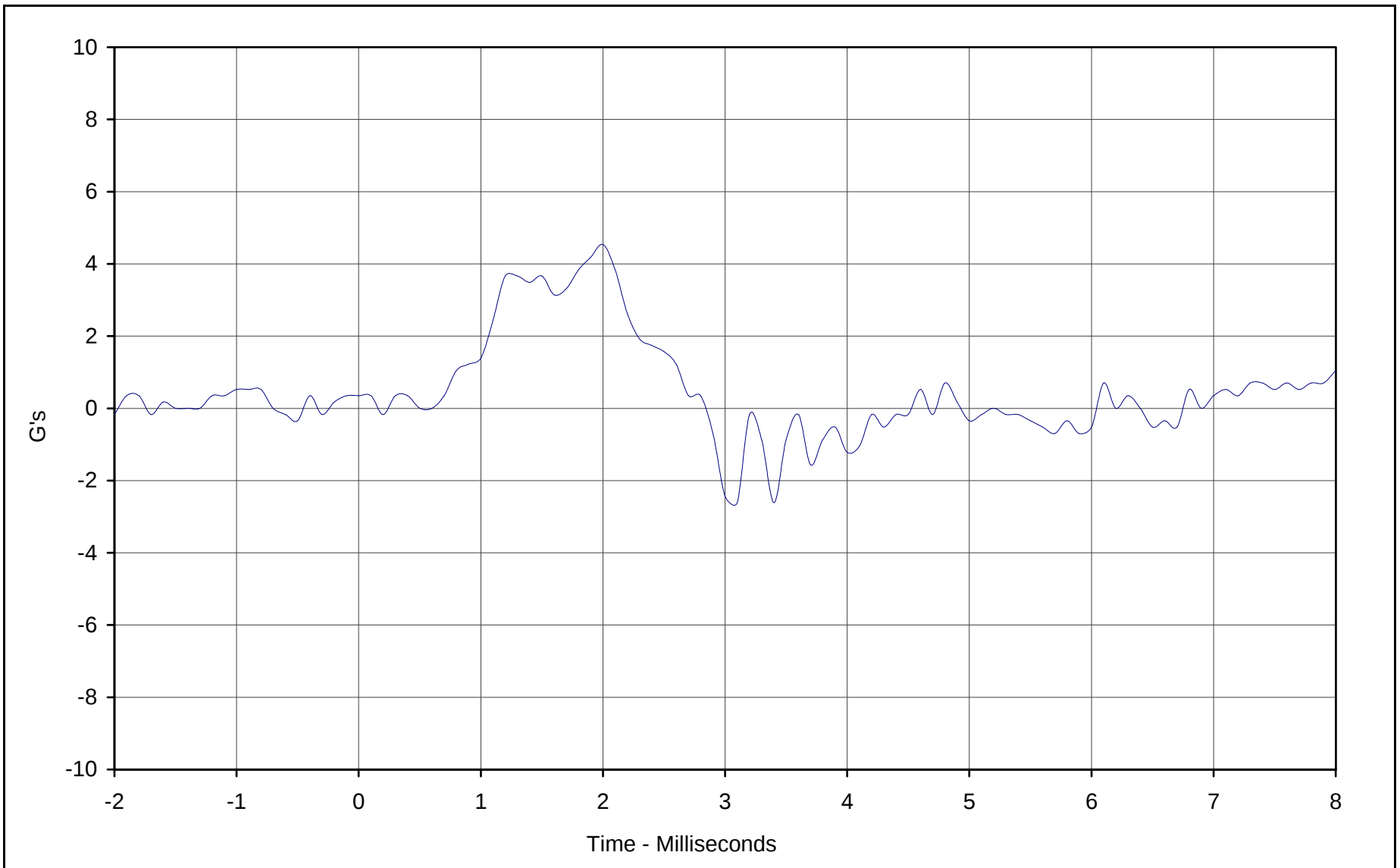


Curve Description: Head Resultant Acceleration
Maximum Value: 250.5 at 1.5 Milliseconds
Minimum Value: 0.7 at 0.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/10/00

Test Program: Hybrid II Head Drop Calibration
Test Information: SID S/N: 274 Test I.D.: HD12E



KAR20051-04



Curve Description: Head Y Axis Acceleration
Maximum Value: 4.5 at 2 Milliseconds
Minimum Value: -2.6 at 3.1 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/10/00

Test Program: Hybrid II Head Drop Calibration
Test Information: SID S/N: 274 Test I.D.: HD12E





Performance Verification Data Side Impact Dummy (SID) External Dimensions

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.4 to 22.1	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	905	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	360	Pass
Overall Test Results				Pass

Laboratory Technician

December 11, 2000

Test Date

Approved By

Date



Performance Verification Data

Side Impact Dummy (SID)

Thorax Lateral Impact

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: TI11D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	38.8	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	38.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	21.1	Pass
Overall Test Results				Pass

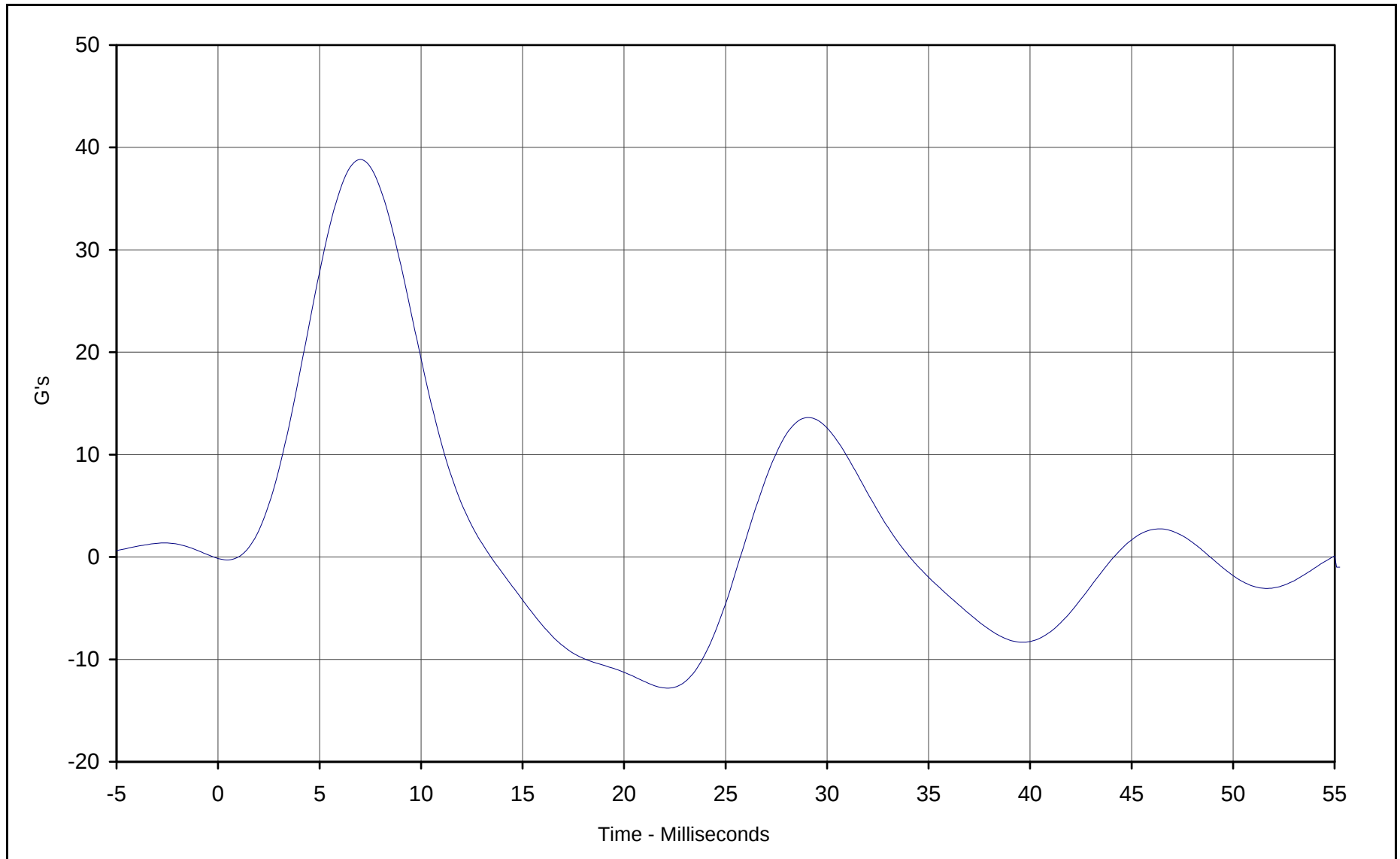
Laboratory Technician

December 9, 2000

Test Date

Approved By

Date



Curve Description: Left Upper Rib Y Acceleration

Maximum Value: 38.8 at 7.0 Milliseconds

Minimum Value: -12.8 at 22.2 Milliseconds

SAE Filter Class: FIR 100

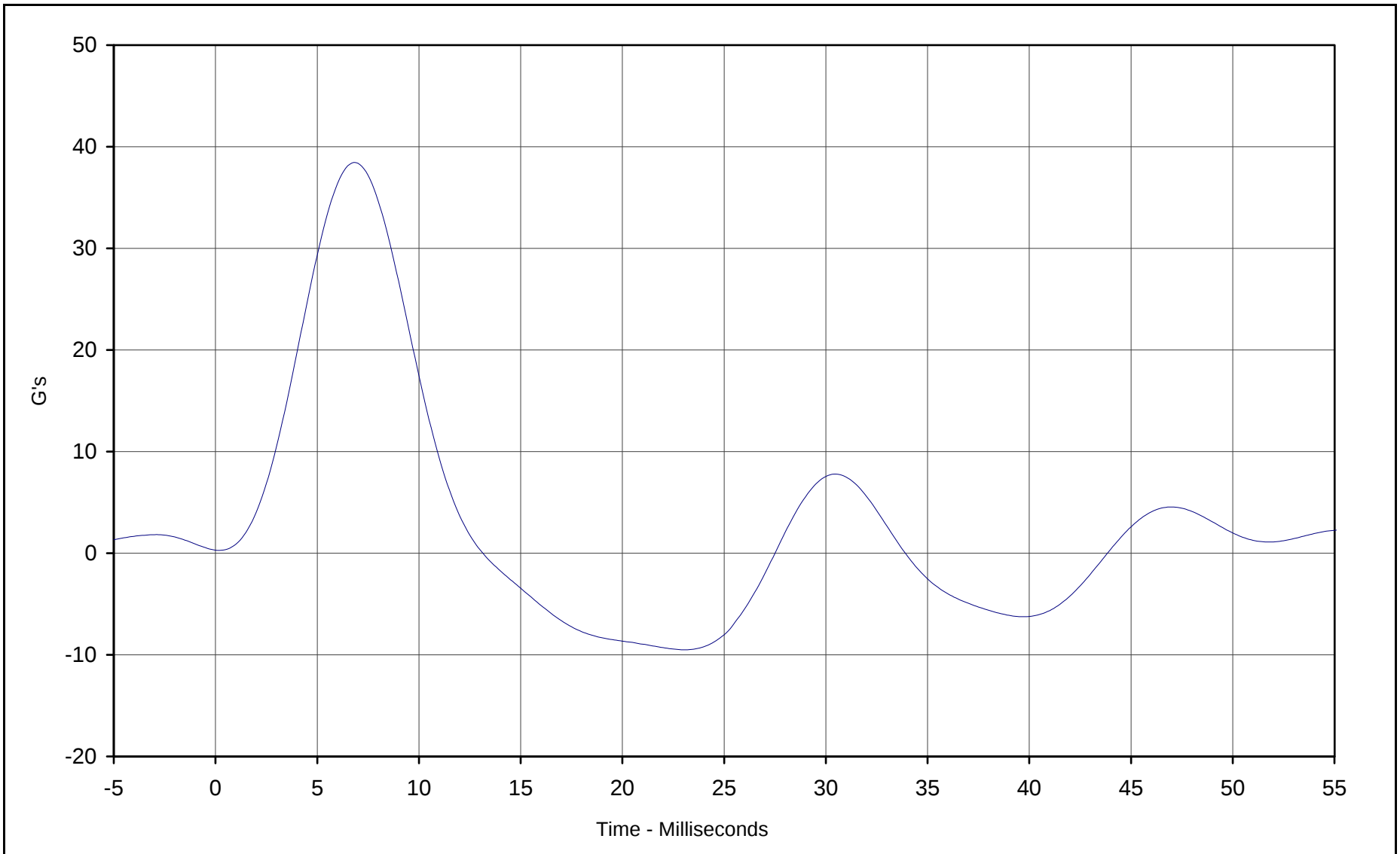
Date of Test: 12/9/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 275 Test I.D.: TI11D



C-40



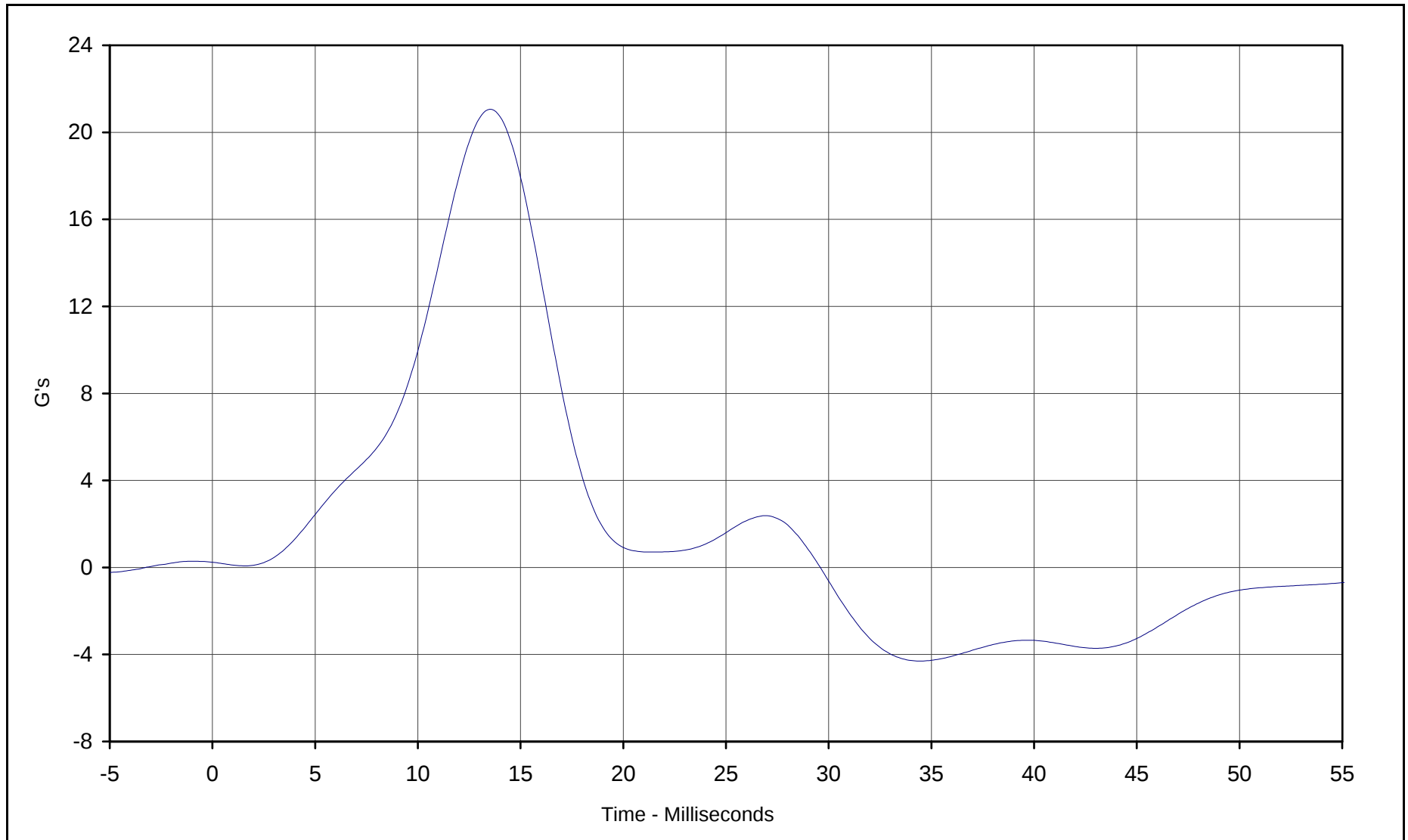
Curve Description: Left Lower Rib Y Acceleration
Maximum Value: 38.4 at 6.8 Milliseconds
Minimum Value: -9.5 at 23.0 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/9/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 275 Test I.D.: TI11D



KAR20051-04

C-41



Curve Description: Lower Spine Y Acceleration
Maximum Value: 21.1 at 13.5 Milliseconds
Minimum Value: -4.3 at 34.4 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/9/00

Test Program: SID Thorax Lateral Impact Test
Test Information: SID S/N: 275 Test I.D.: TI11D



KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Left Side Pelvis Lateral Impact

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: PI11H

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Pelvis Acceleration	G's	40.0 to 60.0	41.9	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	6.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

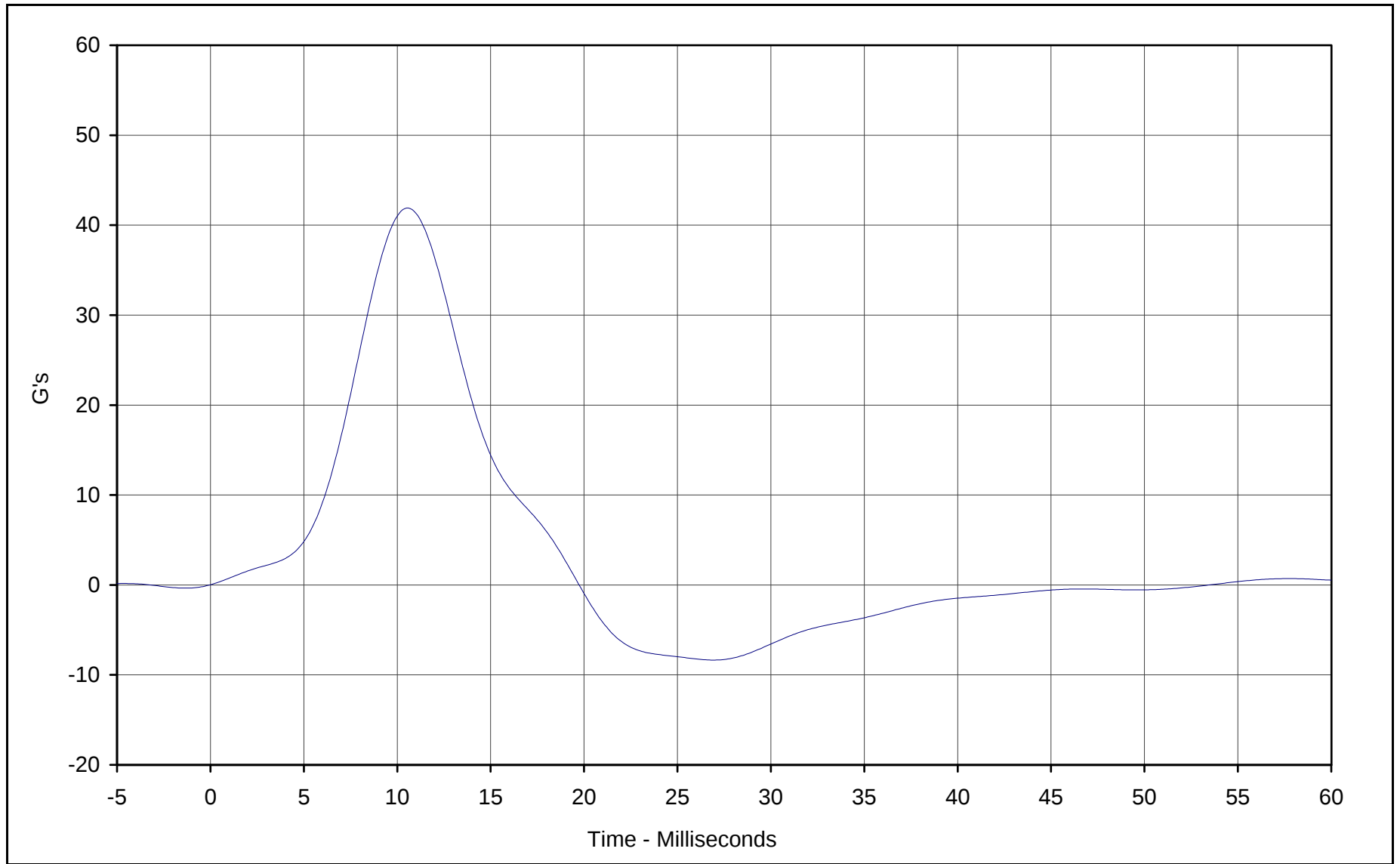
December 9, 2000

Test Date

Approved By

Date

C-43



Curve Description: Pelvis Y Axis Acceleration
Maximum Value: 41.9 at 10.6 Milliseconds
Minimum Value: -8.3 at 26.9 Milliseconds
SAE Filter Class: FIR 100
Date of Test: 12/9/00

Test Program: Left Side Pelvis Lateral Impact
Test Information: SID S/N: 275 Test I.D.: PI11H



KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Abdominal Compression Test

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: AB12F

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force at 0.5 Inches of Displacement	Pounds	23.0 to 36.0	29.5	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	42.5	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	59.4	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	81.6	Pass
Overall Test Results				Pass

Laboratory Technician

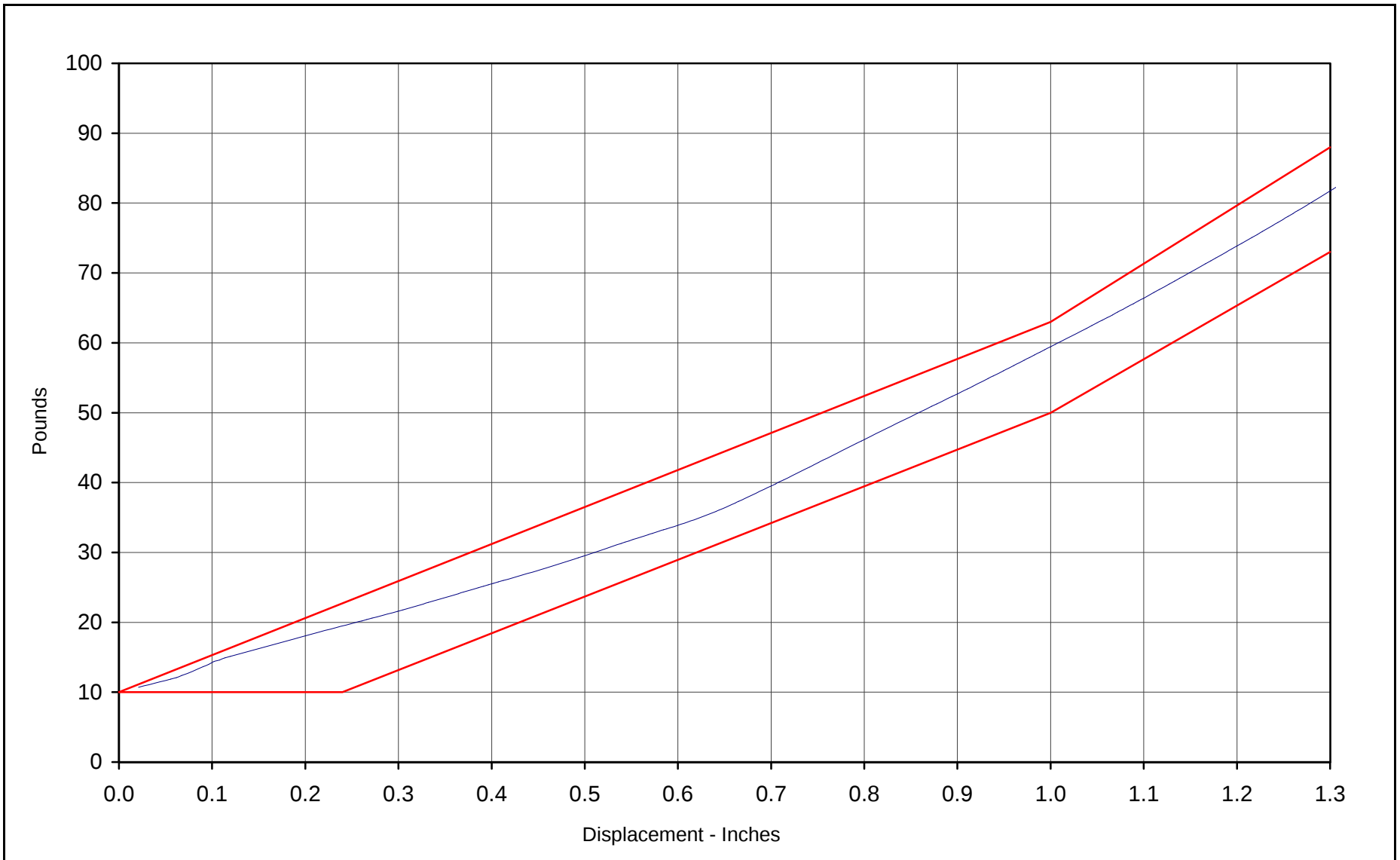
December 10, 2000

Test Date

Approved By

Date

C-45

Curve Description: Abdomen Force vs. DisplacementForce at 0.5 In.: 29.5 PoundsForce at 0.75 In.: 42.5 PoundsForce at 1.0 In.: 59.4 PoundsForce at 1.3 In.: 81.6 PoundsDate of Test: 12/10/00Test Program: Hybrid II Abdominal CompressionTest Information: SID S/N: 275 Test I.D.: AB12F

KAR20051-04



Performance Verification Data Side Impact Dummy (SID) Head Drop Calibration

ATD Serial No.: 275

Part Serial No.: N/A

Test I.D.: HD12F

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	244.1	Pass
Peak Lateral Acceleration	G's	≤10.0	4.8	Pass
Time Above 100 G's	Msec.	0.9 to 1.5	1.0	Pass
Is Resultant Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

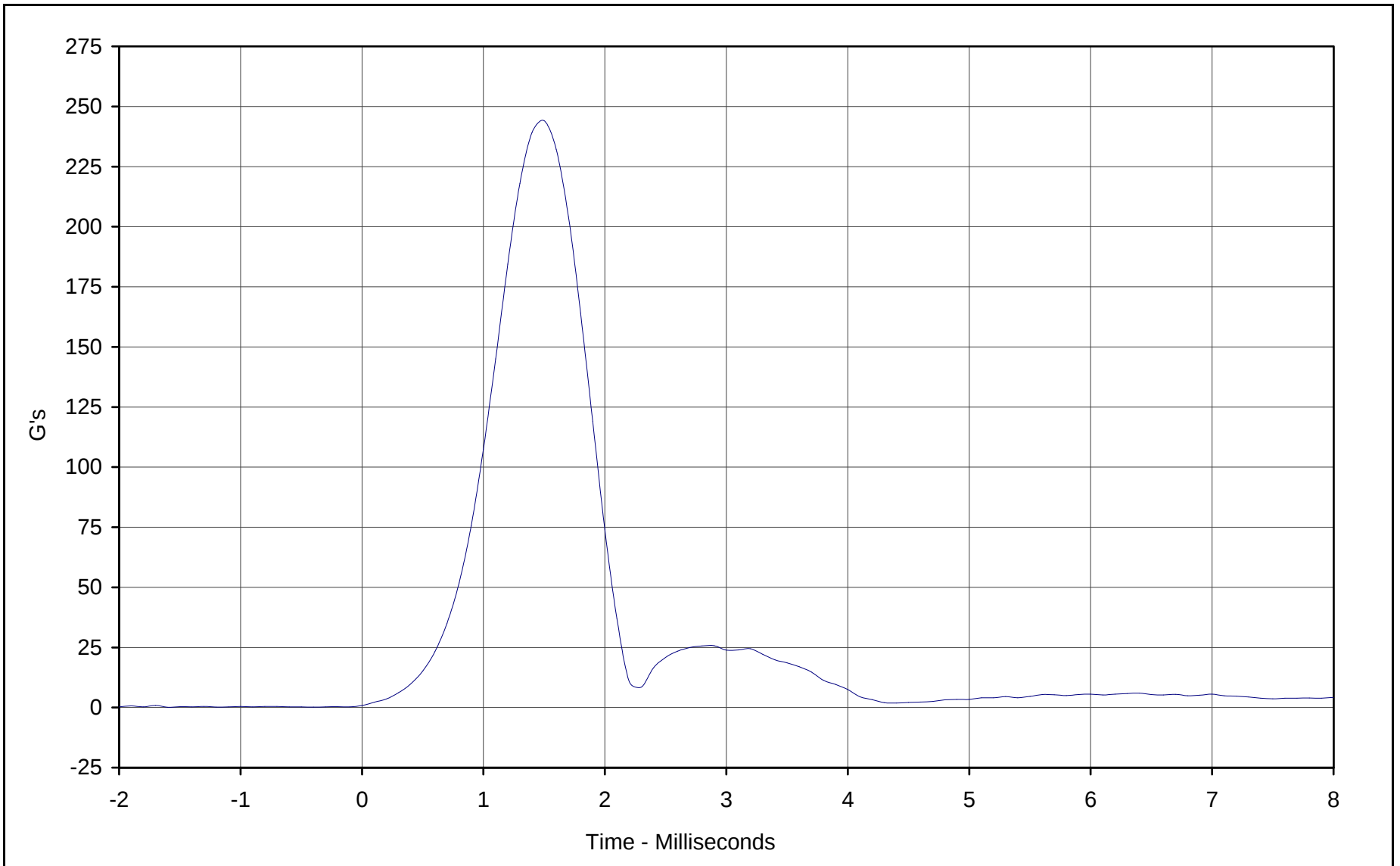
December 10, 2000

Test Date

Approved By

Date

C-47



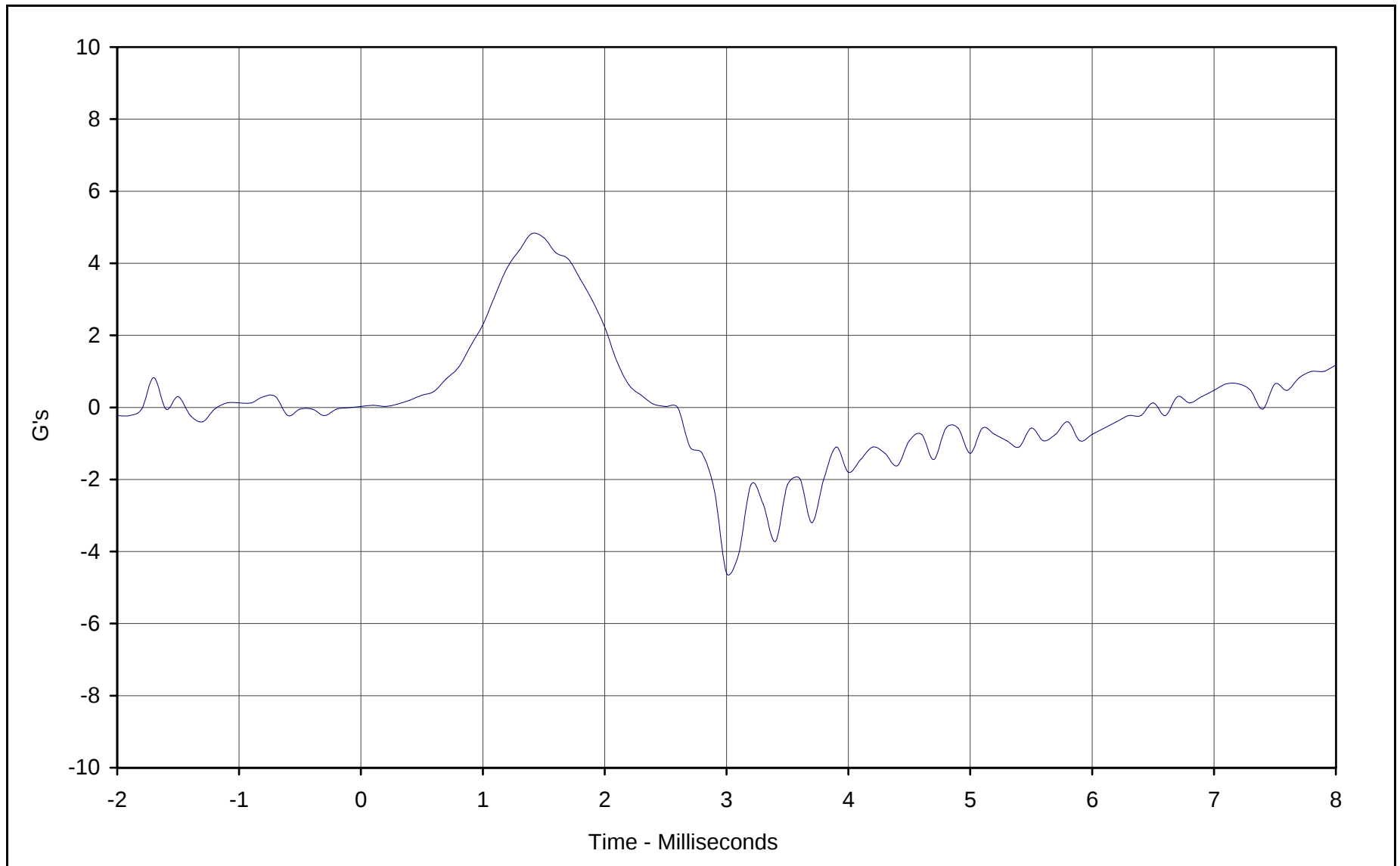
Curve Description: Head Resultant Acceleration
Maximum Value: 244.1 at 1.5 Milliseconds
Minimum Value: 0.8 at 0.0 Milliseconds
SAE Filter Class: 1000
Date of Test: 12/10/00

Test Program: Hybrid II Head Drop Calibration
Test Information: SID S/N: 275 Test I.D.: HD12F



KAR20051-04

C-48



Curve Description: Head Y Axis Acceleration

Maximum Value:	4.8	at	1.4	Milliseconds
Minimum Value:	-4.6	at	3	Milliseconds
SAE Filter Class:	1000			
Date of Test:	12/10/00			

Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 275 Test I.D.: HD12F



KAR20051-04

APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Driver S.I.D. Serial Number 274
12/08/00
2001 Hyundai Elantra 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	Head CG	X	KEAC086	Accel.,1/2 bridge	Endevco	7264-2000X	G
2	Head CG	Y	KEAC087	Accel.,1/2 bridge	Endevco	7264-2000Y	G
3	Head CG	Z	KEAC088	Accel.,1/2 bridge	Endevco	7264-2000Z	G
4	Upper Rib Primary	Y	KEAC070	Accel.,1/2 bridge	Endevco	7264-2000X	G
5	Lower Rib, Primary	Y	KEAC071	Accel.,1/2 bridge	Endevco	7264-2000Y	G
6	Lower Spine, Primary	Y	KEAC072	Accel.,1/2 bridge	Endevco	7264-2000Z	G
7	Pelvis, Primary	Y	KEAC090	Accel.,Full bridge	Endevco	7264-2000X	G
8	Upper Rib Redundant	Y	KEAC076	Accel.,1/2 bridge	Endevco	7264-2000X	G
9	Lower Rib, Redundant	Y	KEAC077	Accel.,1/2 bridge	Endevco	7264-2000Y	G
10	Lower Spine, Redundant	Y	KEAC078	Accel.,1/2 bridge	Endevco	7264-2000Z	G
11	Pelvis, Redundant	Y	KEAC089	Accel.,1/2 bridge	Endevco	7264-2000X	G
12	Thorax Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%
13	Pelvis Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Passenger S.I.D. Serial Number 275
12/08/00
2001 Hyundai Elantra 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
14	Head CG	X	KEAC069	Accel.,1/2 bridge	Endevco	7264-2000X	G
15	Head CG	Y	KEAC080	Accel.,1/2 bridge	Endevco	7264-2000Y	G
16	Head CG	Z	KEAC082	Accel.,1/2 bridge	Endevco	7264-2000Z	G
17	Upper Rib Primary	Y	KEAC066	Accel.,1/2 bridge	Endevco	7264-2000X	G
18	Lower Rib, Primary	Y	KEAC067	Accel.,1/2 bridge	Endevco	7264-2000Y	G
19	Lower Spine, Primary	Y	KEAC068	Accel.,1/2 bridge	Endevco	7264-2000Z	G
20	Pelvis, Primary	Y	KEAC079	Accel.,1/2 bridge	Endevco	7264-2000X	G
21	Upper Rib Redundant	Y	KEAC073	Accel.,1/2 bridge	Endevco	7264-2000X	G
22	Lower Rib, Redundant	Y	KEAC074	Accel.,1/2 bridge	Endevco	7264-2000Y	G
23	Lower Spine, Redundant	Y	KEAC075	Accel.,1/2 bridge	Endevco	7264-2000Z	G
24	Pelvis, Redundant	Y	KEAC081	Accel.,1/2 bridge	Endevco	7264-2000X	G
25	Thorax Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%
26	Pelvis Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Vehicle Accelerometers
12/08/00

2001 Hyundai Elantra 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
27	Right at Sill Front Seat	X	KETX2A	Accel., Triax	I.C. Sensor	3031-200	G
28	Right at Sill Front Seat	Y	KETX2B	Accel., Triax	I.C. Sensor	3031-200	G
29	Right at Sill Front Seat	Z	KETX2C	Accel., Triax	I.C. Sensor	3031-200	G
30	Right at Sill Rear Seat	X	KETX3A	Accel., Triax	I.C. Sensor	3031-500	G
31	Right at Sill Rear Seat	Y	KETX3B	Accel., Triax	I.C. Sensor	3031-500	G
32	Right at Sill Rear Seat	Z	KETX3C	Accel., Triax	I.C. Sensor	3031-500	G
33	Rear Floorpan Above Axle	X	KETX4A	Accel., Triax	I.C. Sensor	3031-500	G
34	Rear Floorpan Above Axle	Y	KETX4B	Accel., Triax	I.C. Sensor	3031-500	G
35	Rear Floorpan Above Axle	Z	KETX4C	Accel., Triax	I.C. Sensor	3031-500	G
36	Left Sill at Rear Door	Y	KEVA012	Accel., Vehicle block	I.C. Sensor	3031-500	G
37	Left Sill at Front Door	Y	KEVA001	Accel., Vehicle block	I.C. Sensor	3031-500	G
38	Left Front Door Centerline	Y	ICST004X	Accel., Triax	I.C. Sensor	3031-500	G
39	Rear Occupant Compartment	Y	KEVA006	Accel., Vehicle block	I.C. Sensor	3031-200	G
40	Left Front Door Mid-Rear	Y	ICST004Y	Accel., Triax	I.C. Sensor	3031-500	G
41	Left Front Door Upper Centerline	Y	ICST004Z	Accel., Triax	I.C. Sensor	3031-500	G
42	Rear Door Mid-Rear	Y	ICST005X	Accel., Triax	I.C. Sensor	3031-500	G
43	Rear Door Upper Centerline	Y	ICST005Y	Accel., Triax	I.C. Sensor	3031-500	G
44	B-Post Lower	Y	KEBX2A	Accel., Biax	I.C. Sensor	3031-500	G
45	B-Post Middle	Y	KEBX2B	Accel., Biax	I.C. Sensor	3031-500	G
46	A-Post Lower	Y	KEBX1A	Accel., Biax	I.C. Sensor	3031-200	G
47	A-Post Middle	Y	KEBX1B	Accel., Biax	I.C. Sensor	3031-500	G
48	Front Seat Track	Y	KEIC008Y	Single	I.C. Sensor	3031-500	G
49	Rear Seat Structure	Y	N/A	N/A	N/A	N/A	N/A
50	Vehicle CG	X	KETX2A	Accel., Triax	I.C. Sensor	3031-200	G
51	Vehicle CG	Y	KETX2B	Accel., Triax	I.C. Sensor	3031-200	G
52	Vehicle CG	Z	KETX2C	Accel., Triax	I.C. Sensor	3031-200	G

**55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Moving Deformable Barrier
12/08/00
2001 Hyundai Elantra 4 Door Sedan**

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
53	MDB CG	X	ICST001X	Accel., Triax	I.C. Sensor	3031-100	G
54	MDB CG	Y	ICST001Y	Accel., Triax	I.C. Sensor	3031-100	G
55	MDB CG	Z	ICST001Z	Accel., Triax	I.C. Sensor	3031-100	G
56	MDB Rear Centerline	X	ICST002X	Accel., Biax	I.C. Sensor	3031-100	G
57	MDB Rear Centerline	Y	ICST002Y	Accel., Biax	I.C. Sensor	3031-100	G
58	Right Bumper Contact	N/A	T0	Contact Switch	Tapeswitch	40 oz. Grey	%