REPORT NUMBER KAR20051-01

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

HYUNDAI MOTOR COMPANY
2000 HYUNDAI SONATA GLS
4-DOOR SEDAN
NHTSA NUMBER: HYU001

3383

PREPARED BY:
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JULY 20, 2000

FINAL REPORT

PREPARED FOR:
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_____
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16. Abstract

A 55/28 km/h 90° Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2000 Hyundai Sonata GLS 4-Door Sedan in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedure for the generation of consumer information on vehicle side impact crash protection. The test was conducted at KARCO Engineering laboratories in Adelanto, California, on Juy 12, 2000.

The impact velocity of the Moving Deformable Barrier was 61.21 km/h, and the ambient temperature at the struck side (driver's) of the vehicle was 35.0 C. The target vehicle's maximum post test static crush was 411 mm located at level 2. The test vehicle's occupant performance is as follows:

Measurement Description	Driver SID	Passenger SID
Left Upper Rib (LUR) G's	51	51
Left Lower Rib (LLR) G's	48	48
Lower Spine (T_{12}) G's	72	58
Thoracic Trauma Index (TTI) G's	62	55
Pelvis (PEV) G's	95	82

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New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) Side Impact Dummy (SID)	Copies of this report are available from: National Highway Traffic Safety Admin. NHTSA Technical Reference Division 400 Seventh St., SW, Room 5108 Washington, DC 20590

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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' 2000 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 in a 2000 Hyundai Sonata GLS 4 Door Sedan manufactured by Hyundai Motor Company.

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 2000 Hyundai Sonata GLS 4 Door Sedan 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 61.21 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 1635 kg. and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering in Adelanto, California, on July 12, 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's 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 411 mm at level 2, 1350 mm rearward of the left vertical impact point. The driver SID, Serial No. 056 and the passenger SID, Serial No. 57 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	62	55
Peak Pelvic G's (PEV)	G's	95	82

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: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Eng. 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	=(tf -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: 2000 Hyundai Sonata GLS 4 door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

TEST VEHICLE INFORMATION

Make	Hyundai
Model	Sonata
Body Style	4- Door
NHTSA No.	HYU001
VIN	KMHWF35V0YA259894
Color	Silver
Delivery Date	06/23/00
Odometer Reading (mile)	114
Dealer	Drew Hyundai La Mesa
Transmission	5-Speed Manual
Final Drive	Front
Number of Cylinders	V6
Engine Displacement (L)	2.5
Engine Placement	Transverse

TEST VEHICLE OPTIONS

Front Airbags	Yes
Side Airbags	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	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Company
Date of Manufacture	February-00

GVWR (kg)	1889
GAWR Front (kg)	1034
GAWR Rear (kg)	900

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	210
Cold Pressure (kPa)	210	210
Recommend Tire Size	P205/60/R15	P205/60/R15
Tire Size on Vehicle	P205/60/R15	P205/60/R15
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	None	
Number of Occupants	2	3	0	5
Capacity Wt. (VCW) (kg)				390
Cargo Weight (RCLW) (kg)				50

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

Test Vehicle: 2000 Hyundai Sonata GLS 4 door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

TEST VEHICLE WEIGHTS

	Units	As Delivered *(UVW)*			As Tested *(ATW)*		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	440	283		476	358	
Right	kg	430	278		456	345	
Ratio	%	60.8	39.2		57.0	43.0	
Totals	kg	870	561	1431	932	703	1635

TARGET TEST WEIGHT CALCULATION*

Measured Parameter	Units	Value
Total Delivered Weight *(UVW)*	kg	1431
Weight of 2 P572F Side Impact Dummies	kg	161
Rated Cargo/Luggage Weight *(RCLW)*	kg	50
Calculated Vehicle Target Weight *(TVTW)*	kg	1642

*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	710	712	731	736	1059
As Tested	mm	700	710	702	715	1161
Fully Loaded	mm	699	715	702	715	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel base	mm	2701
Total Vehicle Length at Left Side	mm	3230
Total Vehicle Length at Centerline	mm	4710
Total Vehicle Length at Right Side	mm	3230
Weight of Ballast In Cargo Area	kg	25
Amount of Stoddard Solvent in Fuel Tank	Liters	60.4

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel base	mm	2701
Target Impact Point Aft of Front Axle	mm	410
Actual Impact Point Aft of Front Axle	mm	429

DATA SHEET NO. 1...(continued)

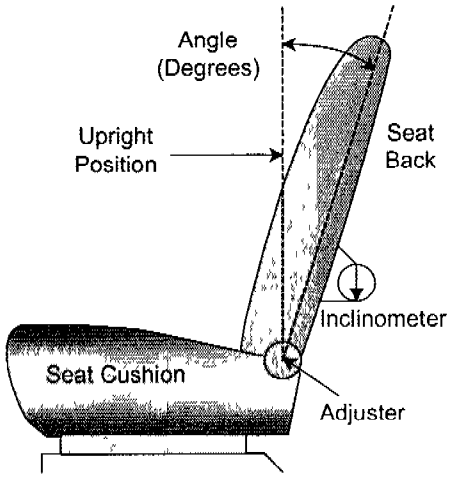
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

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: 25°

Rear seat back angle: 25° at the headrest (fixed)

SEAT FORE/AFT POSITIONS

The driver's seat is manually operated and the rear passenger seat has no adjustments. The driver's seat is equipped with manual vertical and lumbar adjustments, set to their lowest positions. The fore/aft is set to the middle position for the driver's seat.

Driver seat fore/aft total travel: 20 Seat positions

Rear seat fore/aft total travel: Seat is fixed

Driver seat fore/aft position: Seat set at the 11th Detent

Rear seat fore/aft position: Seat is fixed

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with a "D" ring anchorage for the driver's seat positions. There is 4 positions or detents, with the uppermost position numbered "1". The driver's "D" ring anchorage is placed in position 2. The rear seat anchor is fixed.

DATA SHEET NO. 1...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

FUEL TANK CAPACITY DATA

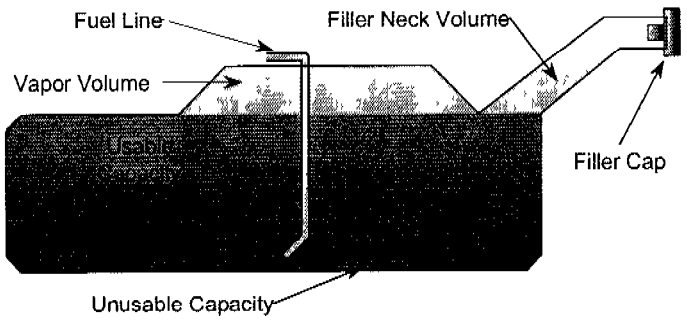
The "Usable Capacity" of the standard equipment fuel tank is: 65.0 liters

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

92-94% of "Usable Capacity" for certification to FMVSS 301 requirement: 59.8 to 61.1 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 60.4 liters

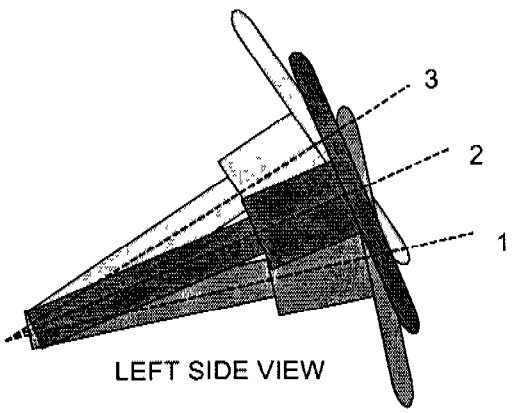
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately three (3) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender.



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: 15°

Geometric center, position 2: 22.5°

Uppermost, position 3: 30°

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2000 Hyundai Sonata GLS 4 door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

TEST VEHICLE WEIGHTS

	Units	As Delivered *(UVW)*			As Tested *(ATW)*		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	440	283		476	358	
Right	kg	430	278		456	345	
Weight Ratio	%	60.8	39.2		57.0	43.0	
Totals	kg	870	561	1431	932	703	1635

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	248	268
Level 2	Occupant H-Point	mm	411	478
Level 3	Mid Door	mm	377	592
Level 4	Window Sill	mm	335	873
Level 5	Window Top	mm	155	1332
N/A	Maximum Penetration	mm	411	596

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: 2000 Hyundai Sonata GLS 4 door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

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	61.21
Trap No. 2 Velocity (Redn.)	km/h	61.1 to 62.7	61.81
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
Row	Description	Height	Distance	Direction	Crush
A	Center of Bumper	432	500	Left	146
B	Top of Bumper	533	800	Right	155
C	Mid Level	686	800	Right	146
D	Top of Stack	813	800	Right	191

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High Speed Cameras	2

DATA SHEET NO. 4
POST TEST OBSERVATIONS

Test Vehicle: 2000 Hyundai Sonata GLS 4 door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID	Rear Seat SID
Dummy Type / Serial No.	P572F, SID / No. 056	P572F, SID / No. 057
Head Contact	Air Bag	C-Pillar,Roof,Headrest
Upper Torso Contact	Air Bag	Door Panel/Seat
Lower Torso Contact	Door Panel	Door Panel/Seat
Left Knee Contact	Right Knee & Dash Panel	Panel
Right Knee Contact	Left Knee	Left 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	Right & Left Rear Window Shattered During Impact
Other Notable Effects	No significant items to note.

AIR BAG DEPLOYMENT

	Driver	Front Passenger	Rear Passenger
Front	No Deployment	No Deployment	
Side	Deployed Properly	No Deployment	

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	19 Right
Vertical Offset	mm	+/- 20	19 Above

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5
SID INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

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

			Driver				Passenger			
Location	Axis	Units	Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	51.4	37.3	-16.2	89.8	51.4	44.4	-5.2	122.5
Lower Rib (LLR)	Y	G's	48.4	15.6	-13.4	150.5	47.8	37.0	-13.8	76.7
Lower Spine (T_{12})	Y	G's	71.8	32.3	-11.7	62.1	57.8	49.4	-11.3	64.5
Pelvis (PEV)	Y	G's	95.5	27.6	-22.1	50.1	82.2	37.6	-17.4	84.0

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

	Driver				Passenger			
Location	LUR	T_{12}	TTI(g)	PEV(g)	LUR	T_{12}	TTI(g)	PEV(g)
Primary Rib, Spine, and Pelvis	51.369	71.844	62	95	51.419	57.754	55	82

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

			Driver				Passenger			
Location	Axis	Units	Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	51.4	37.3	-16.5	89.6	51.3	44.3	-4.9	133.4
Lower Rib (LLR)	Y	G's	49.5	15.6	-11.7	150.6	49.4	37.0	-13.4	76.7
Lower Spine (T_{12})	Y	G's	72.4	32.1	-12.9	62.1	58.2	49.4	-12.6	64.4
Pelvis (PEV)	Y	G's	96.1	27.5	-22.0	50.1	81.9	37.5	-16.5	83.5

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

	Driver				Passenger			
Location	LUR	T_{12}	TTI(g)	PEV(g)	LUR	T_{12}	TTI(g)	PEV(g)
Redundant Rib, Spine, and Pelvis	51.424	72.389	62	96	51.284	58.195	55	82

HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

			Driver				Passenger			
Location	Axis	Units	Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	7.9	34.8	-16.5	77.7	13.6	49.4	-19.6	76.3
Head CG	Y	G's	17.5	45.0	-6.0	185.0	82.0	57.6	-17.9	67.4
Head CG	Z	G's	28.3	53.5	-1.8	3.4	47.8	49.0	-47.8	60.2
Head CG Resultant	N/A	G's	30.8	53.2			93.3	57.6		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

	Driver				Passenger			
Location	HIC	T^1	T^2	Avg G's	HIC	T^1	T^2	Avg G's
Head CG	83.5	33.1	69.0	22.2	560.7	46.1	64.2	62.4

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

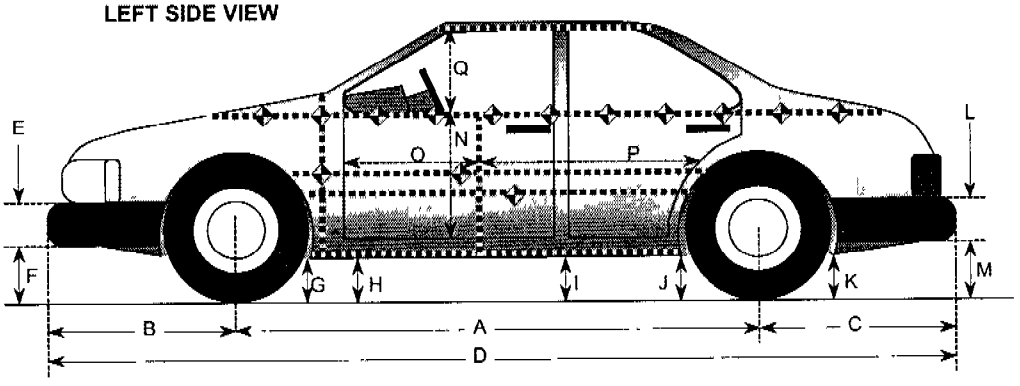
DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

LEFT SIDE VIEW



All Measurements in mm

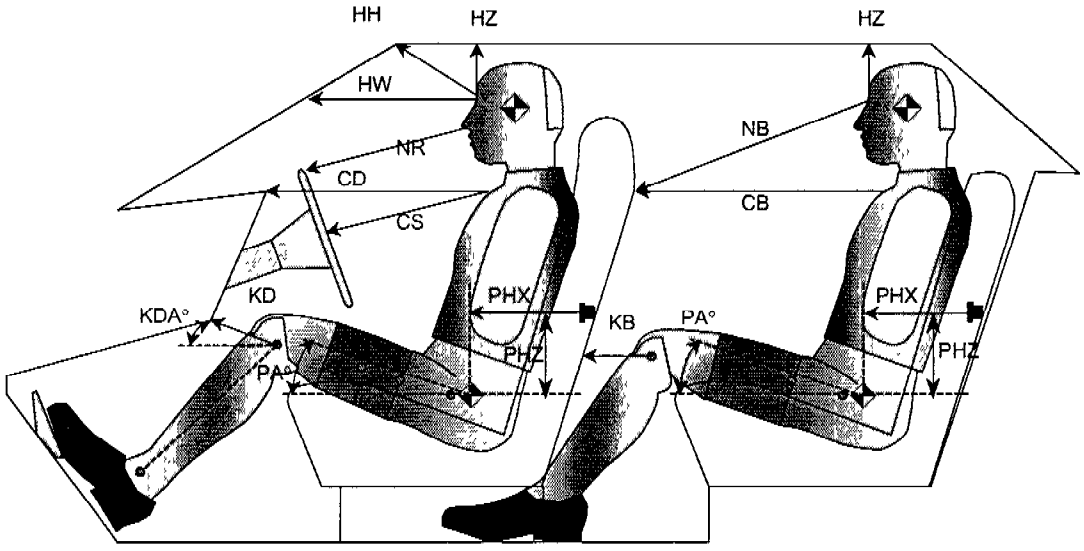
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2701	2650	51
B	Front Axle To FSOV	940	960	-20
C	Rear Axle to RSOV	1069	1062	7
D	Total Length at Centerline	4710	4680	30
E	Front Bumper Thickness	295	295	0
F	Front Bumper Bottom to Ground	227	256	-29
G	Sill Height at Front Wheel Well	210	199	11
H	Sill Height at Front Door Leading Edge	210	254	-44
I	Sill Height at "B" Pillar	208	299	-91
J1	Sill Height at Rear Wheel Well	176	197	-21
J2	Pinch Weld Height at Rear Wheel Well	206	227	-21
K	Sill Height aft of Rear Wheel Well	206	258	-52
L	Rear Bumper Thickness	315	315	0
M	Rear Bumper Bottom to Ground	261	350	-89
N	Sill Height to Window Bottom Sill	600	528	72
O	Front Door Leading Edge to Impact CL	740	660	80
P	Rear Door Trailing Edge to Impact CL	1335	1200	135
Q	Front Window Opening	411	411	0
R	Right Side Length	3230	3250	-20
S	Left Side Length	3230	3160	70
T	Vehicle Width at "B" Post	1778	1560	218

DATA SHEET NO. 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00



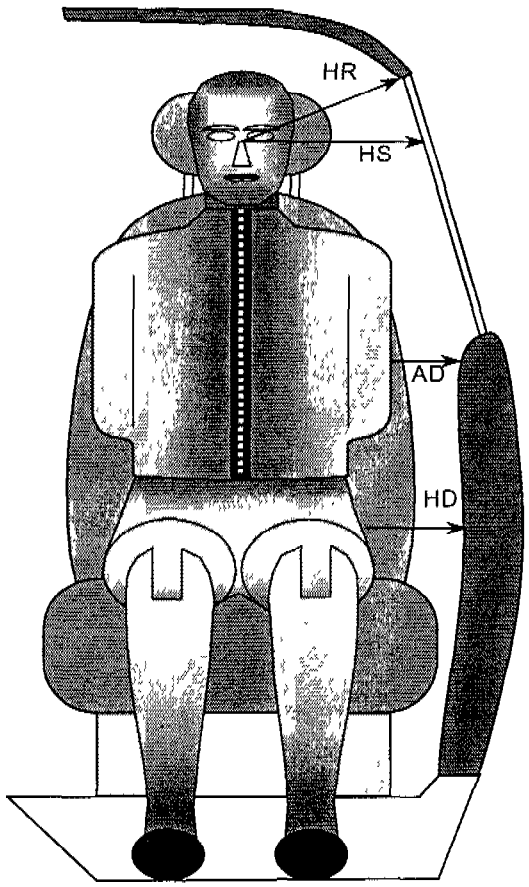
Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	409	10		
HW		Head to Windshield	620			
HZ	HZ	Head to Roof	176	90	145	90
NR	NR	Nose to Rim/Nose to Seatback	515	12	660	27
CD	CB	Chest to Dash or Seatback	560	1	525	4
CS		Chest to Steering Wheel	375	16		
KDL	KBL	Left Knee to Dash or Seatback	162	23	245	
KDR	KBR	Right Knee to Dash or Seatback	170		240	
PA	PA	Pelvic Angle		23		23.5
PHX	PHX	H-Point to Striker (X-Axis)	205		280	
PHZ	PHZ	H-Point to Striker (Z-Axis)	160		292	

DATA SHEET NO. 8

SID LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00



FRONT VIEW OF DUMMY

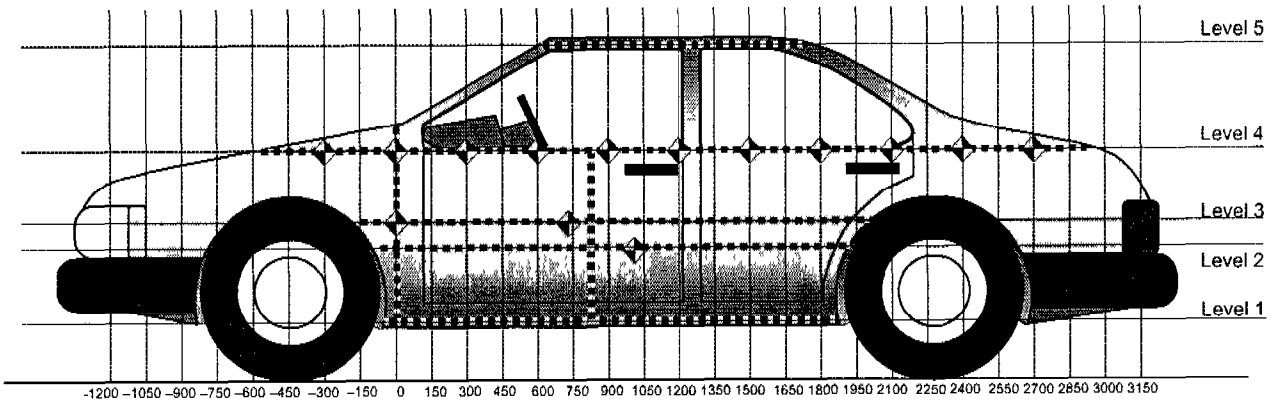
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	215	257
HS	Head to Side Window	mm	297	340
AD	Arm to Door	mm	121	114
HD	H-Point to Door	mm	145	180

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.
Measurments taken 900mm right of impact reference.
All measurements below in mm.

Level	Measurement Description	Height Above Ground
5	Window Top	1332
4	Window Sill	873
3	Mid Door	592
2	Occupant H-Point	478
1	Sill Top	268

DATA SHEET NO. 10 - VEHICLE EXTERIOR CRUSH PROFILES

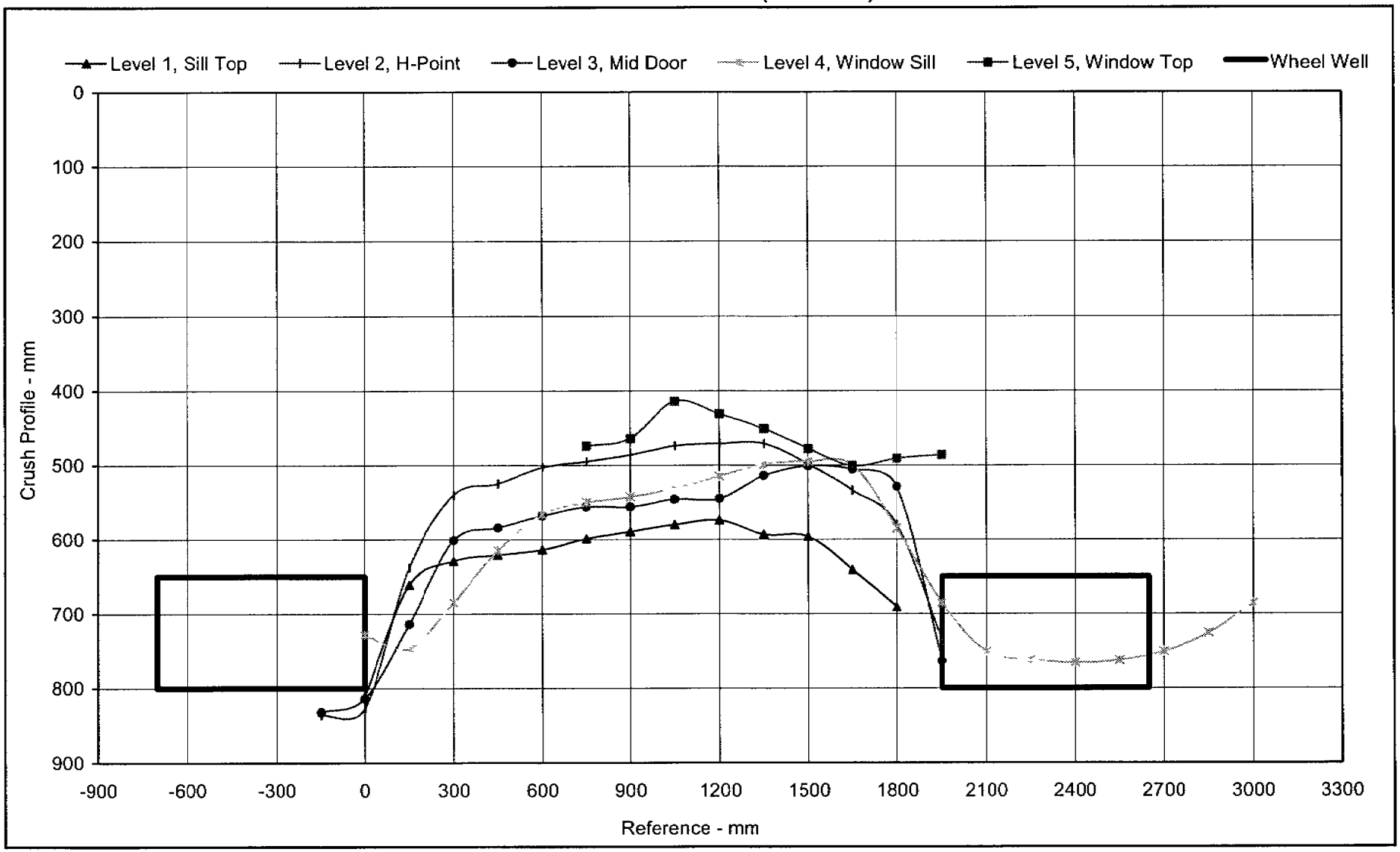
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No.: HYU001

Test Program 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

	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		877	884				836	832				41	52		
0	824	875	882	771		811	827	814	728		13	48	68	43	
150	824	881	879	802		661	638	714	746		163	243	165	56	
300	823	880	879	810		629	540	601	685		194	340	278	125	
450	820	879	878	809		621	525	584	615		199	354	294	194	
600	819	880	879	816		614	503	568	566		205	377	311	250	
750	818	880	879	821	544	599	495	556	550	474	219	385	323	271	70
900	821	880	879	825	553	589	486	556	543	464	232	394	323	282	89
1050	821	880	880	827	569	580	474	546	531	414	241	406	334	296	155
1200	822	881	879	832	570	574	471	545	515	431	248	410	334	317	139
1350	821	882	878	829	570	593	471	514	499	451	228	411	364	330	119
1500	826	881	878	830	564	596	499	501	495	478	230	382	377	335	86
1650	824	879	878	829	557	641	534	506	500	501	183	345	372	329	56
1800	823	878	877	829	544	691	580	529	585	491	132	298	348	244	53
1950		868	877	824	533		736	764	686	486		132	113	138	47
2100				820					751					69	
2250				815					762					53	
2400				806					766					40	
2550				791					763					28	
2700				771					751					20	
2850				736					726					10	
3000				695					686					9	

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

DATA SHEET NO. 10...(continued)



Maximum Crush, Level 1: 248 mm at 1200 mm
Maximum Crush, Level 2: 411 mm at 1350 mm
Maximum Crush, Level 3: 377 mm at 1500 mm
Maximum Crush, Level 4: [illegible] mm at 1500 mm
Maximum Crush, Level 5: 155 mm at 1050 mm

Test Program: 55/28 km/h 90° Side Impact NCAP No.: MY0208
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan
Test Date: 07/12/00

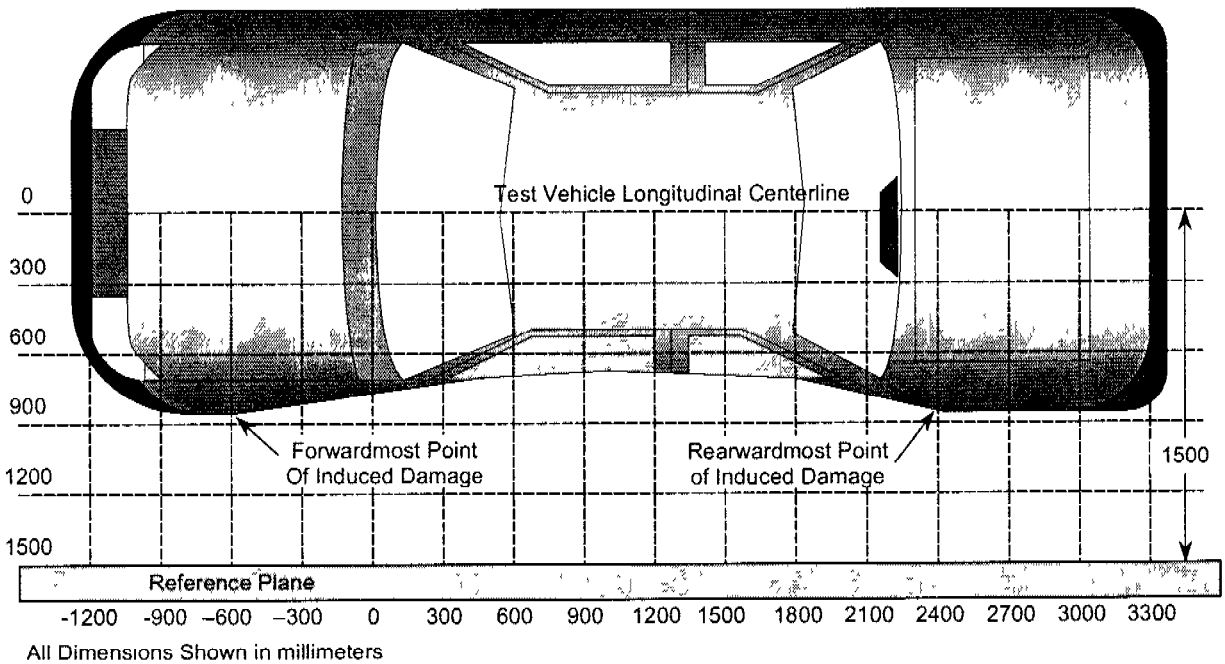
KARCO Engineering

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00



TOP VIEW

Damage Profile Distances

DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	-150 mm	3	884	832	52
2	450 mm	2	879	525	354
3	1050 mm	2	880	474	406
4	1650 mm	3	878	506	372
5	2100 mm	4	820	751	69
6	2700 mm	4	771	751	20

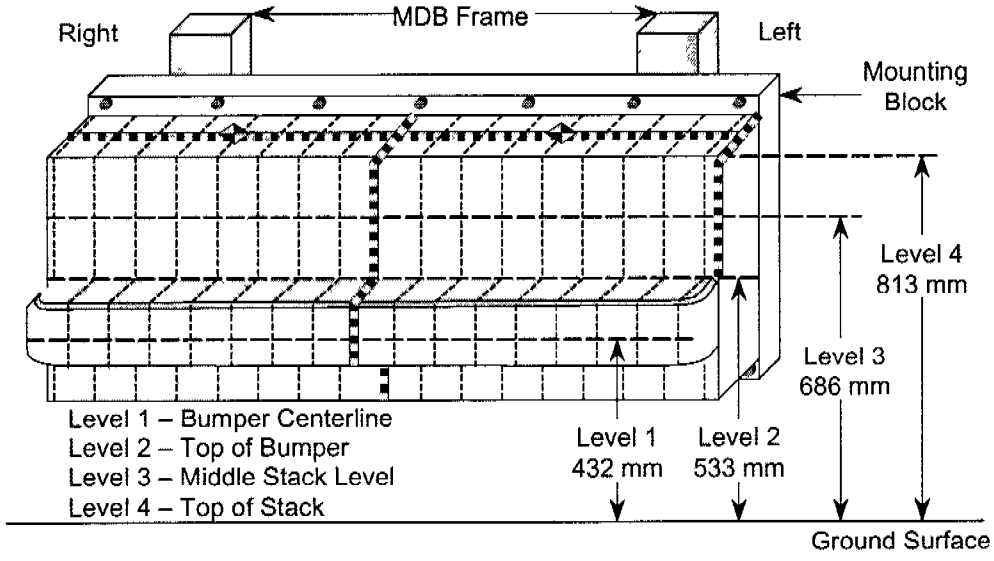
Pre-Test and Post-Test measurements are distance from vehicle centerline.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00



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	138	94	68	56	36	37	36	37	38	43	45	50	53	62	73	93	126
2	37	46	46	36	26	26	24	26	31	33	41	40	49	52	59	120	155
3	11	-17	-16	-16	-14	-9	0	-2	-3	-2	-1	5	11	16	33	68	146
4	56	-8	-24	-24	-22	-16	-4	-9	-9	-6	-2	1	11	41	89	131	191

All Dimensions in mm

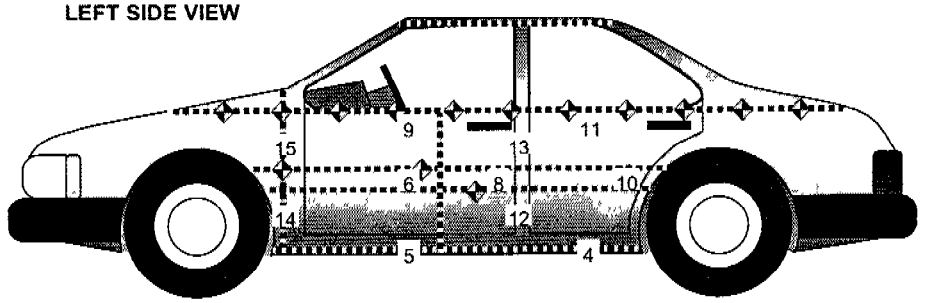
DATA SHEET NO. 13

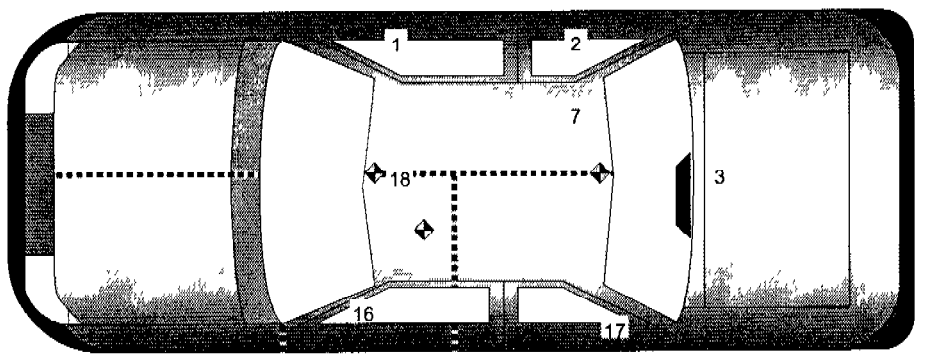
VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

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: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

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	2790	680	290	X	3.4	65.4	-4.8	16.3	
					Y	17.7	17.3	-2.2	161.0	
					Z	2.5	119.5	-4.7	9.8	
					RES	18.4	17.2			
2	Right Sill at Rear Seat	1760	685	350	X	3.0	61.8	-4.8	17.3	
					Y	18.9	36.7	-3.5	100.6	
					Z	3.1	47.6	-3.9	91.9	
					RES	18.9	36.7			
3	Rear Floorpan Above Axle	1005	0	460	X	3.3	60.3	-7.6	18.8	
					Y	20.5	37.7	-2.7	100.5	
					Z	6.8	35.9	-7.3	21.8	
					RES	21.5	36.5			
4	Left Sill at Rear Door	1960	-500	155	Y	40.1	18.8	-4.7	61.6	
5	Left Sill at Front Door	2560	-580	155	Y	37.1	17.6	-4.1	62.2	
6	Front Door Centerline	2740	-740	675	Y	234.1	9.6	-172.2	24.1	
7	Rear Occupant Compartment	2050	-335	200	Y	17.9	35.8	-2.9	101.3	
8	Front Door Mid-Rear	2310	-740	700	Y	207.5	8.2	-61.5	13.2	
9	Front Door Upper Centerline	2630	-760	830	Y	149.3	15.1	-99.7	23.2	
10	Rear Door Mid-Rear	1510	-725	630	Y	77.7	6.4	-79.4	35.6	
11	Rear Door Upper Centerline	1750	-740	790	Y	121.6	13.7	-71.3	31.5	
12	B-Post Lower	2110	-715	520	Y	137.2	5.7	-33.6	26.6	
13	B-Post Middle	2110	-715	785	Y	185.8	6.1	-37.7	15.1	
14	A-Post Lower	3175	-835	485	Y	212.0	3.2	-64.6	17.4	
15	A-Post Middle	3175	-830	690	Y	89.1	2.7	-30.7	17.2	
16	Front Seat Track	2675	-580	350	Y	0.0	0.0	0.0	0.0	*
17	Rear Seat Structure				Y					**
18	Vehicle CG	2040	0	315	X	3.0	20.0	-7.9	14.1	
					Y	25.6	14.9	-1.8	130.3	
					Z	23.3	43.2	-22.3	18.4	
					RES	29.1	14.6			

* Channel failed, check plot for time of failure.

** Not installed, no accessible mounting structure.

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No.: HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

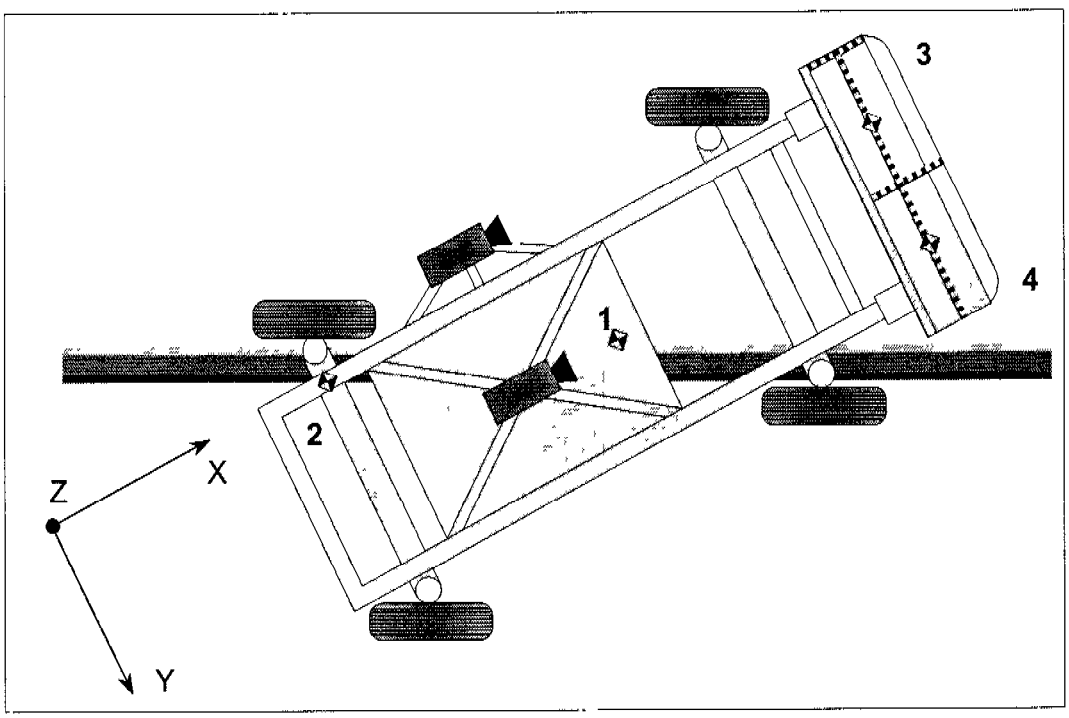
MDB ACCELEROMETER PEAK DATA AND LOCATIONS

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	2.6	114.4	-17.6	38.4
					Y	2.9	58.8	-6.1	27.0
					Z	14.7	26.6	-14.2	54.5
					RES	20.4	26.7		
2	MDB Rear	-2642	-593	608	X	2.2	108.0	-19.1	36.5
					Y	2.4	164.0	-5.7	22.3

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.	101.5	3.1	50.7	0.7

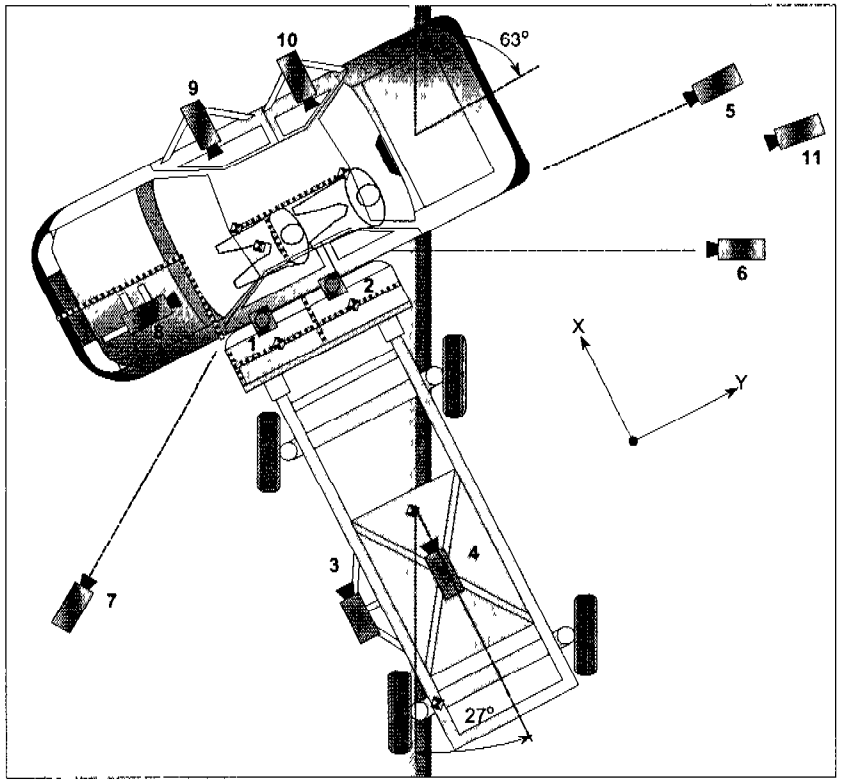


DATA SHEET NO. 15

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00



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	17820	1570	0	25	1020
6	Right Side, Ground Level, Close-up	4300	4270	1650	6	13	980
7	Left Side, Ground Level, Close-up	440	3785	1670	11	19	*
8	Vehicle Onboard Front SID, Front	400	655	1250	5	19	1000
9	Vehicle Onboard Front SID, Side	1850	1420	1210	1	10	980
10	Vehicle Onboard Rear SID, Side	1975	960	970	0	10	1000**
11	Real Time Coverage	3000	19300	990	2	N/A	24

* Excessive Film speed ** Film broken during processing, torn perforation at impact

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

Test Time: 3:25 PM Temperature at Time of Impact: 35.0 °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)

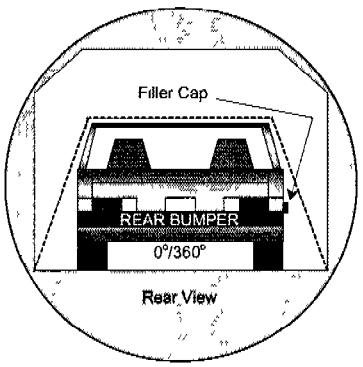
D. Spillage Details: No leakage occurred

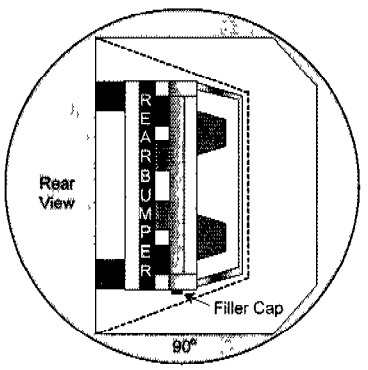
DATA SHEET NO. 17

FMVSS 301 STATIC ROLLOVER DATA SHEET

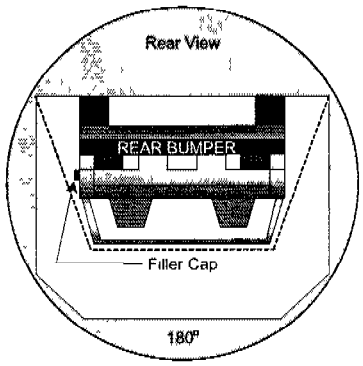
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan NHTSA No. HYU001

Test Program: 55/28 km/h 90° Side Impact NCAP Test Date: 07/12/00

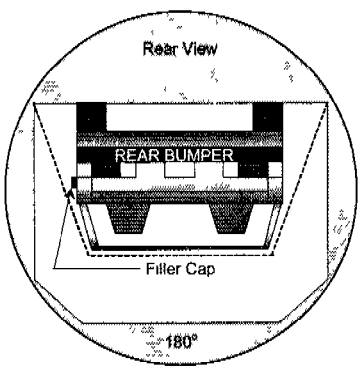




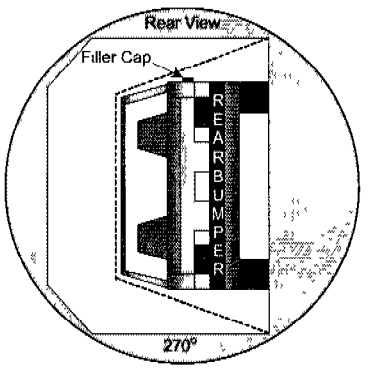
0° TO 90°

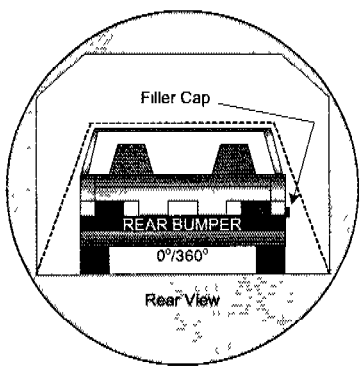


90°TO 180°



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°	81	300	0.0
90° TO 180°	83	300	0.0
180° TO 270°	77	300	0.0
270° TO 360°	80	300	0.0

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure A-1: Left Front, as Received

Figure A-2: Right Rear, as Received

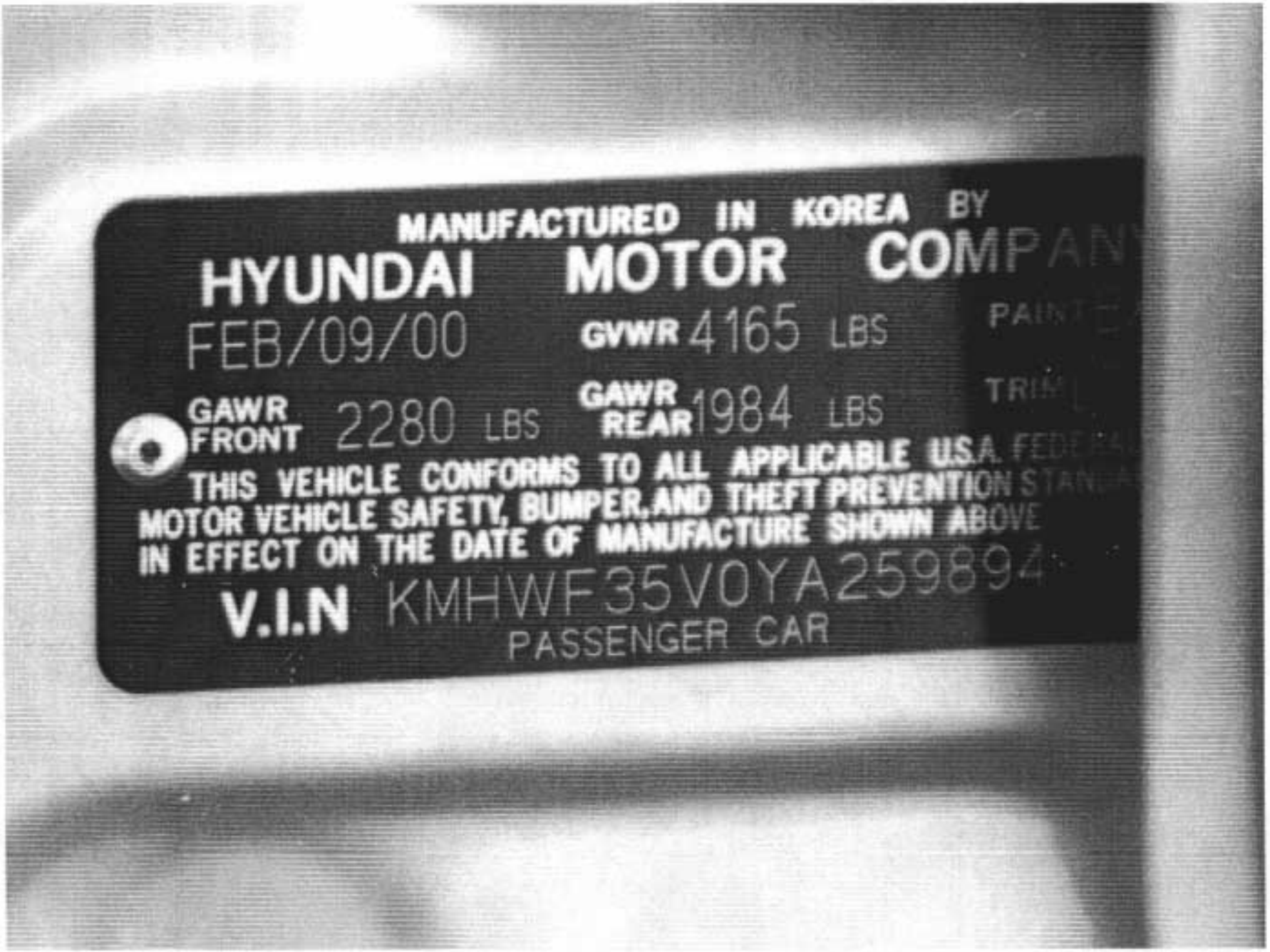


Figure A-3: Vehicle Certification Label

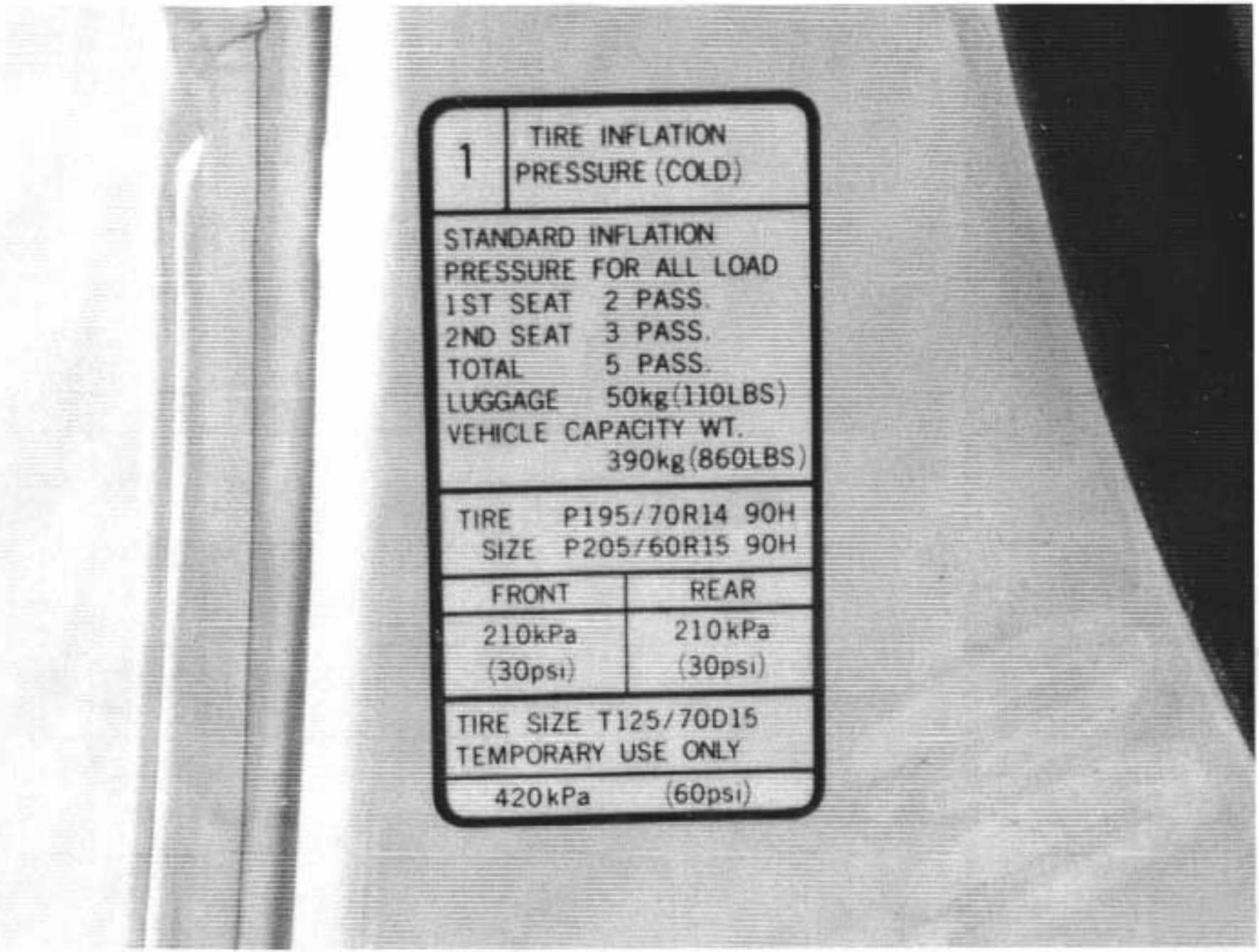


Figure A-4: Vehicle Tire Label

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

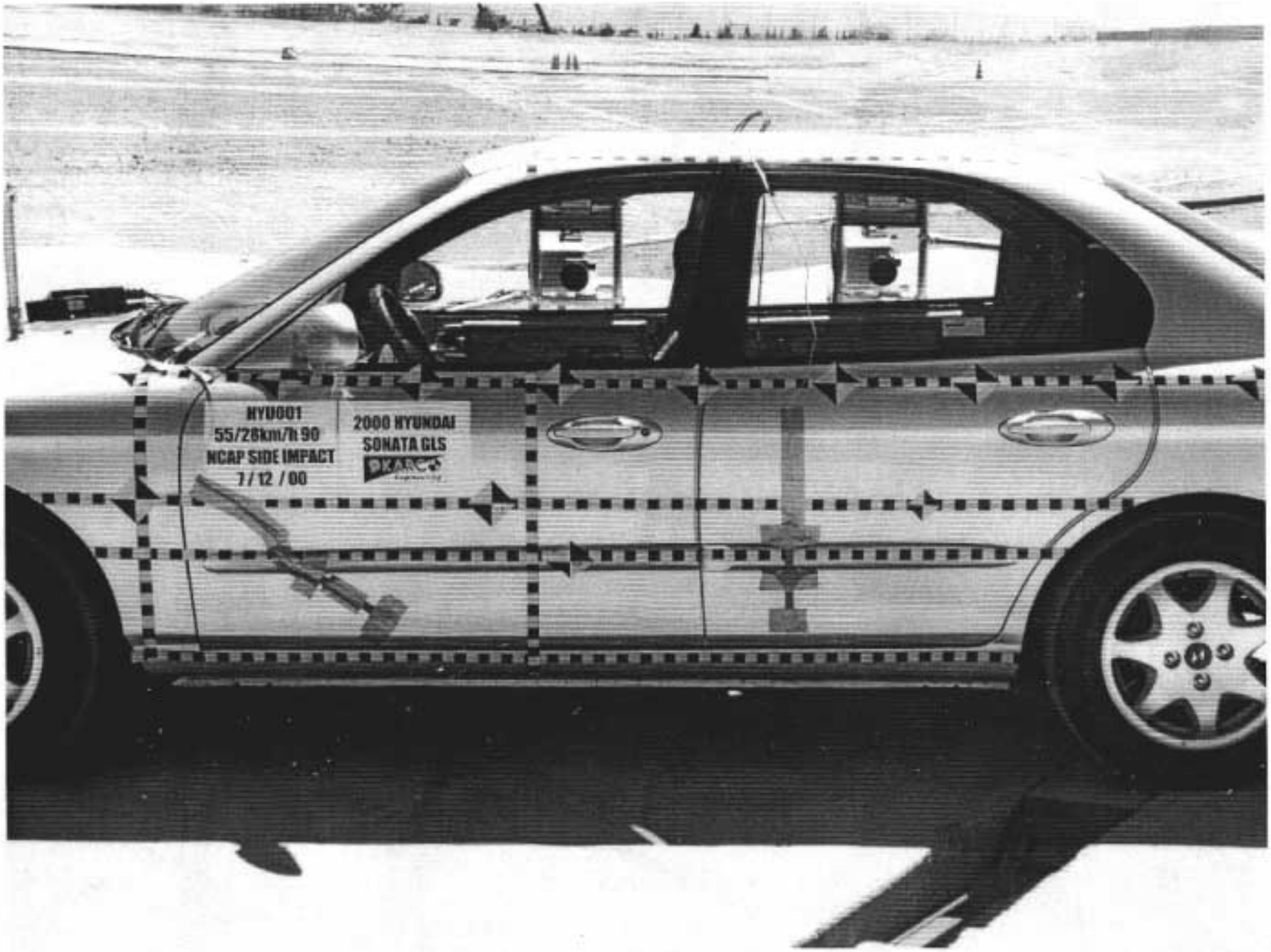


Figure A-9: Left (Impacted) Side View, Pre-Test

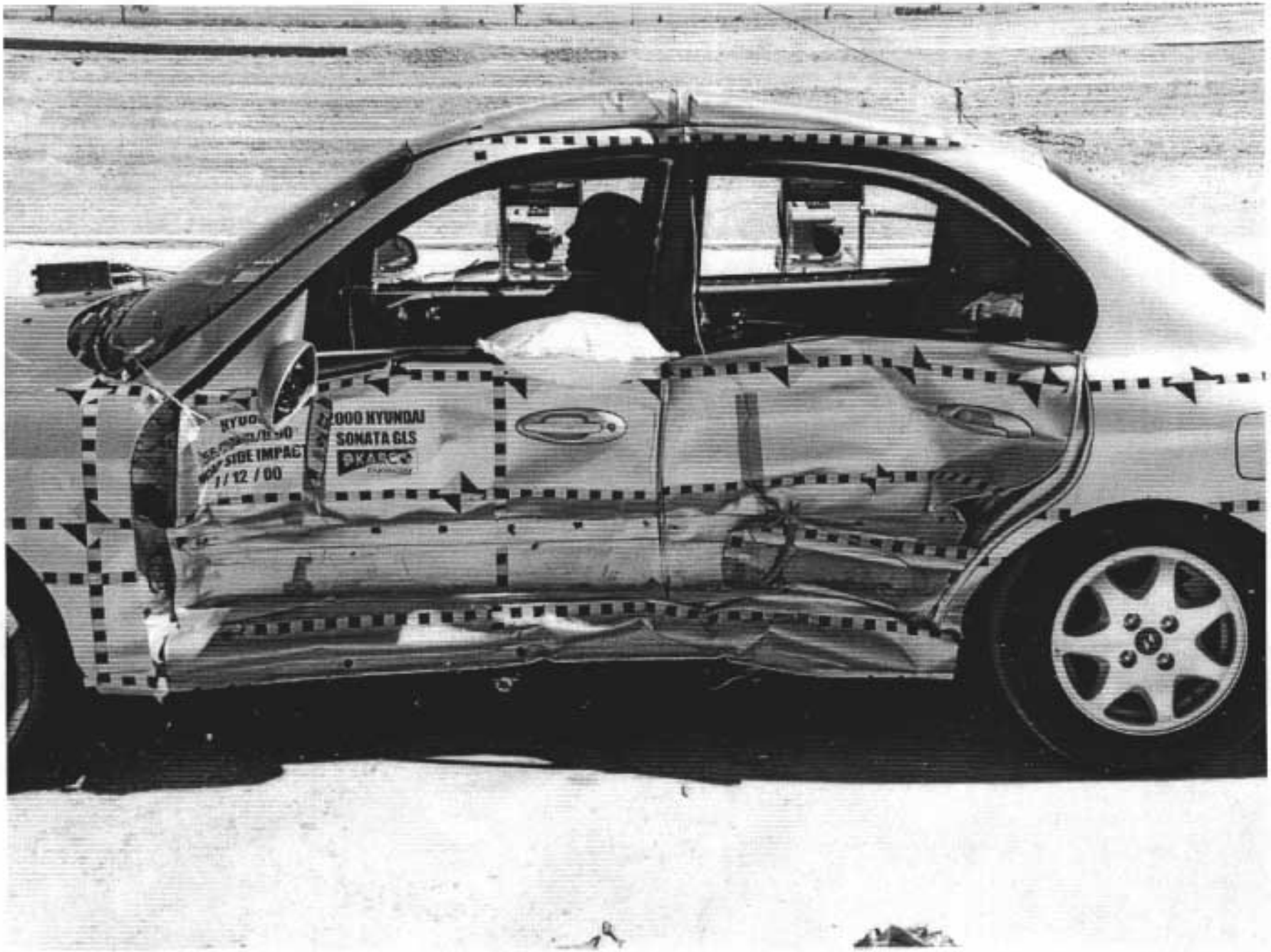


Figure A-10: Left (Impacted) Side View, Post-Test

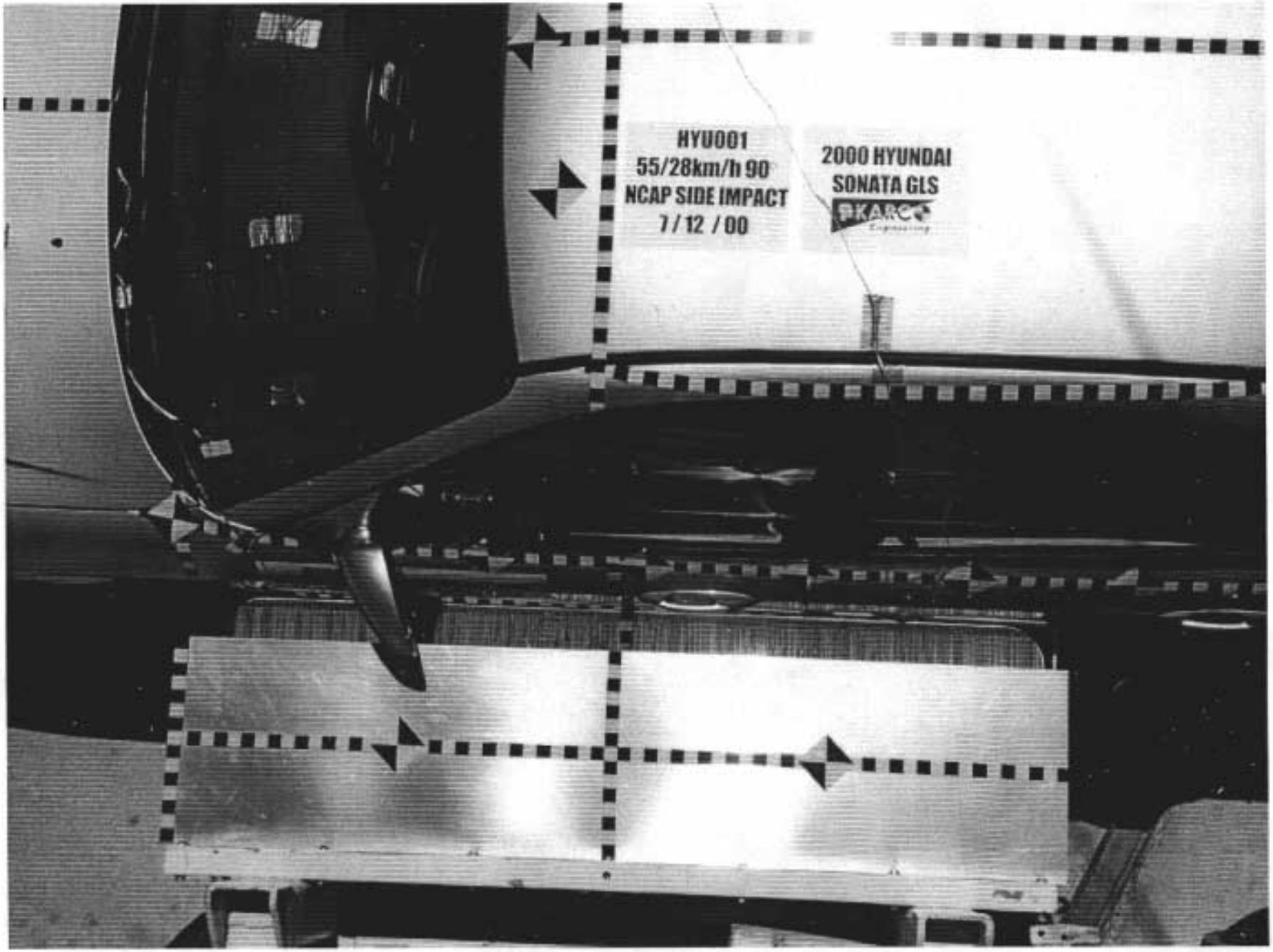


Figure A-11: Overhead Close-up View at Impact Position, Pre-Test

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

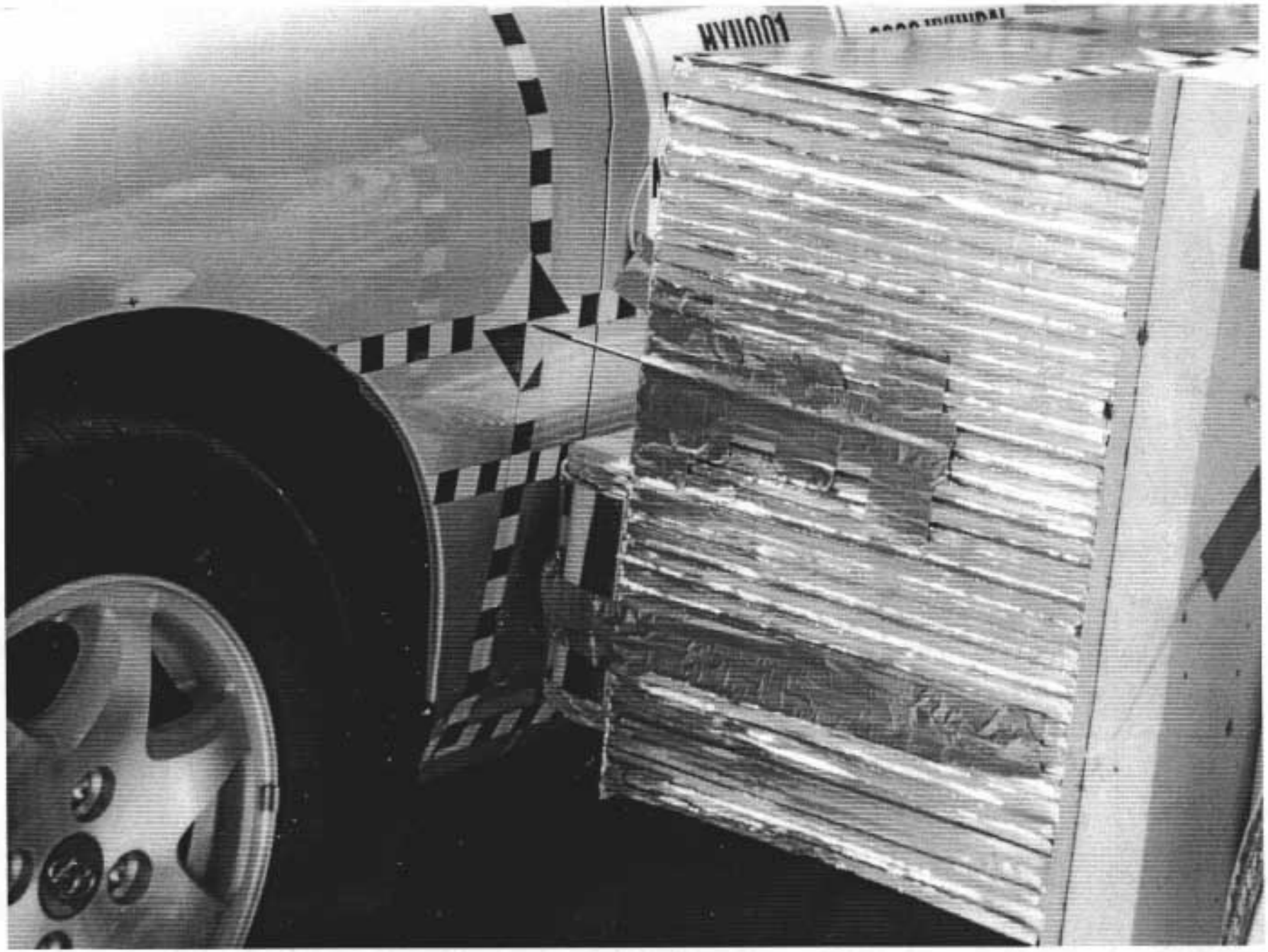


Figure A-16: Impact Point Target Close-up, Pre-Test

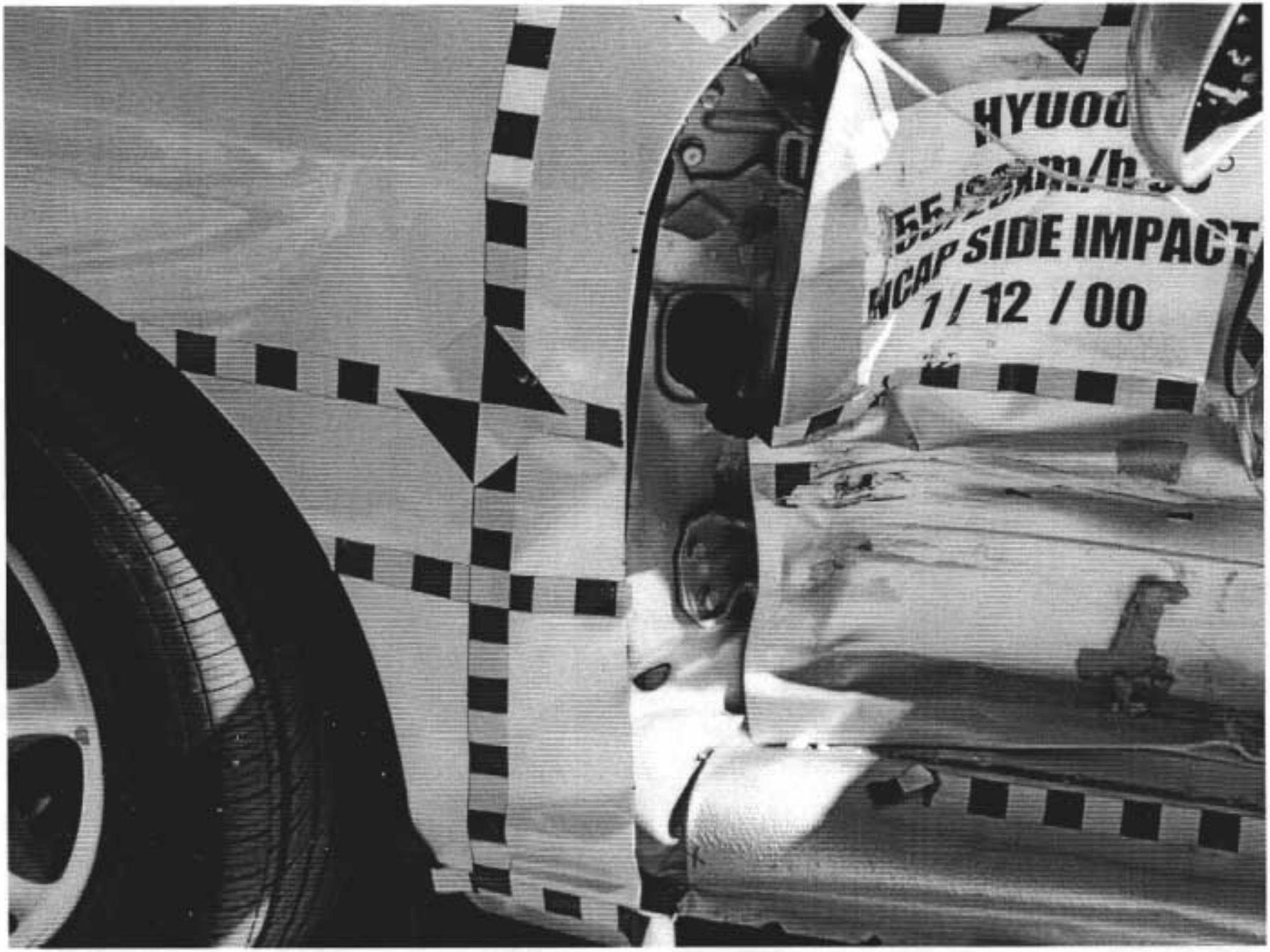


Figure A-17: Impact Point Target Close-up, Post-Test

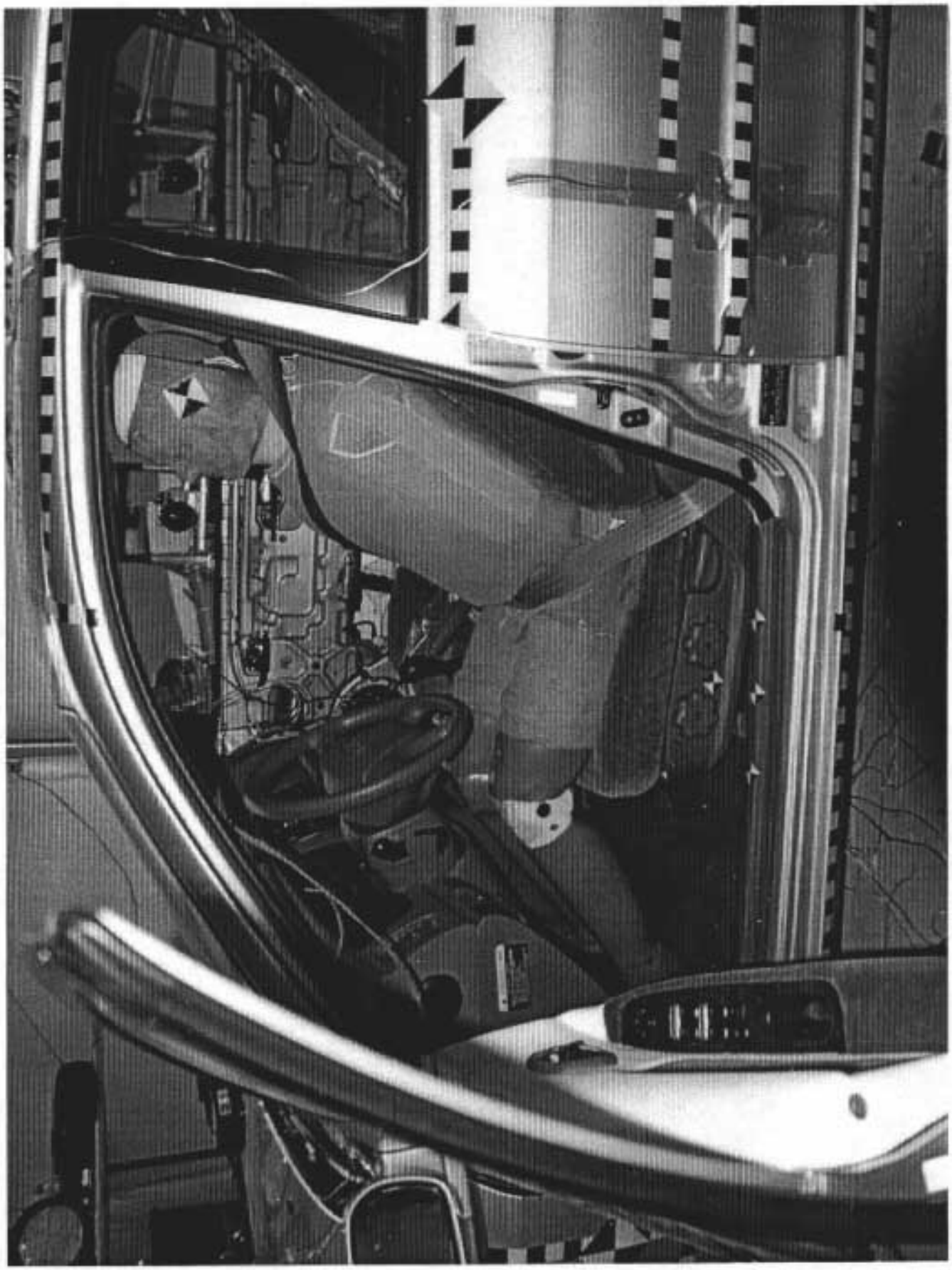


Figure A-18: Driver Dummy Left Side with Door Open, Pre-Test

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

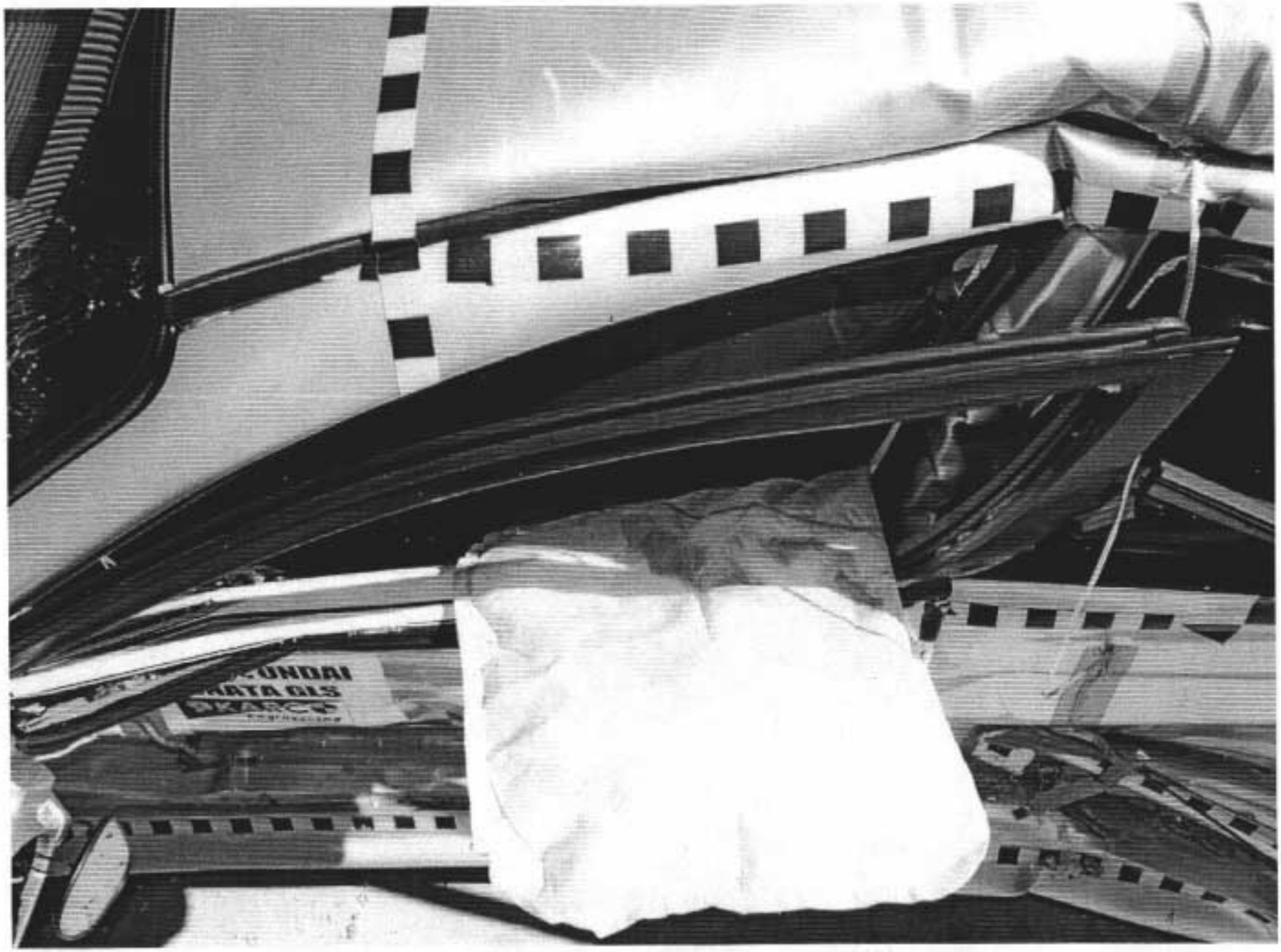


Figure A-22: Driver Dummy Clearance, Post-Test

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

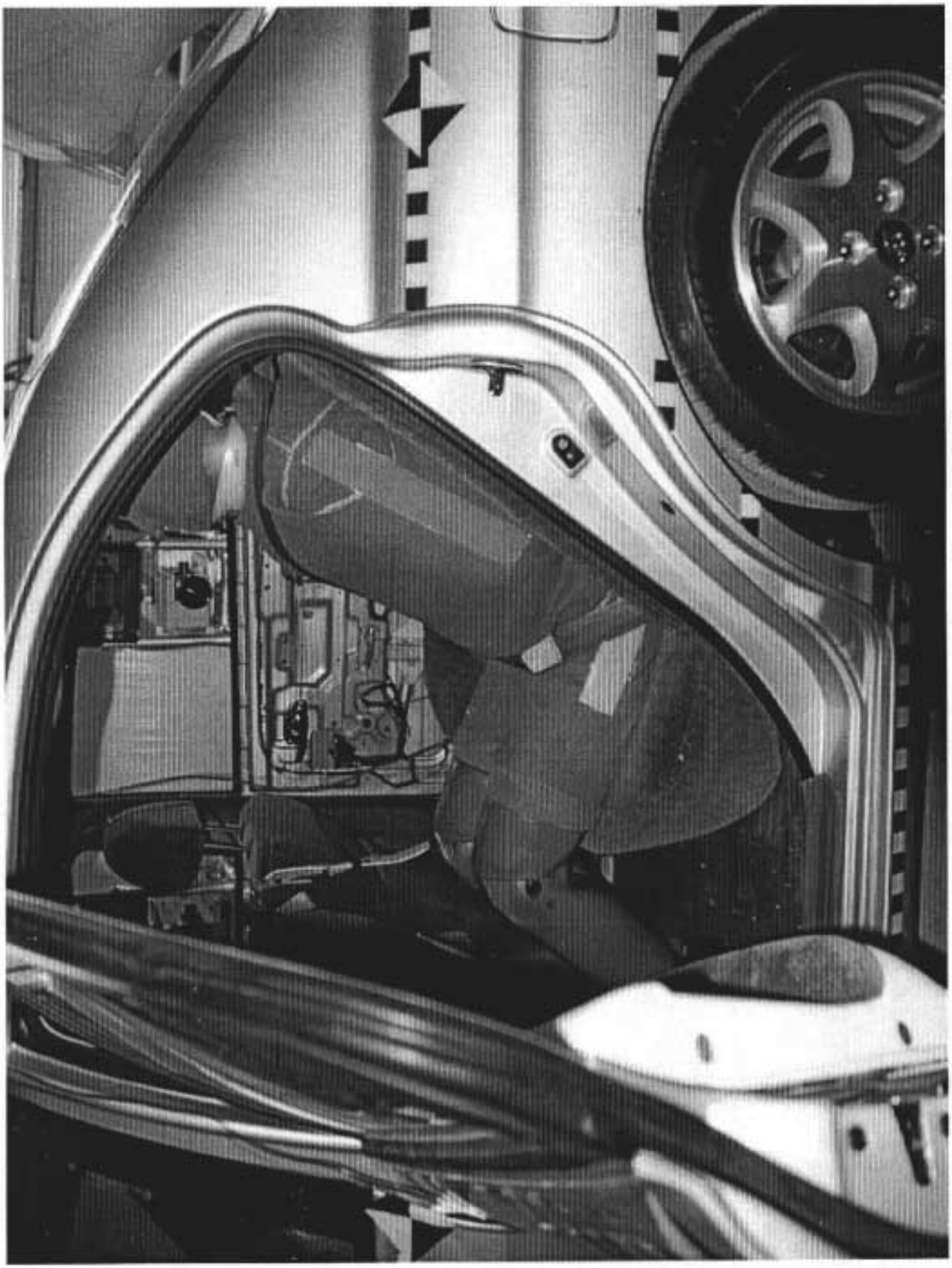


Figure A-27: Passenger Dummy Left Side with Door Open, Pre-Test

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

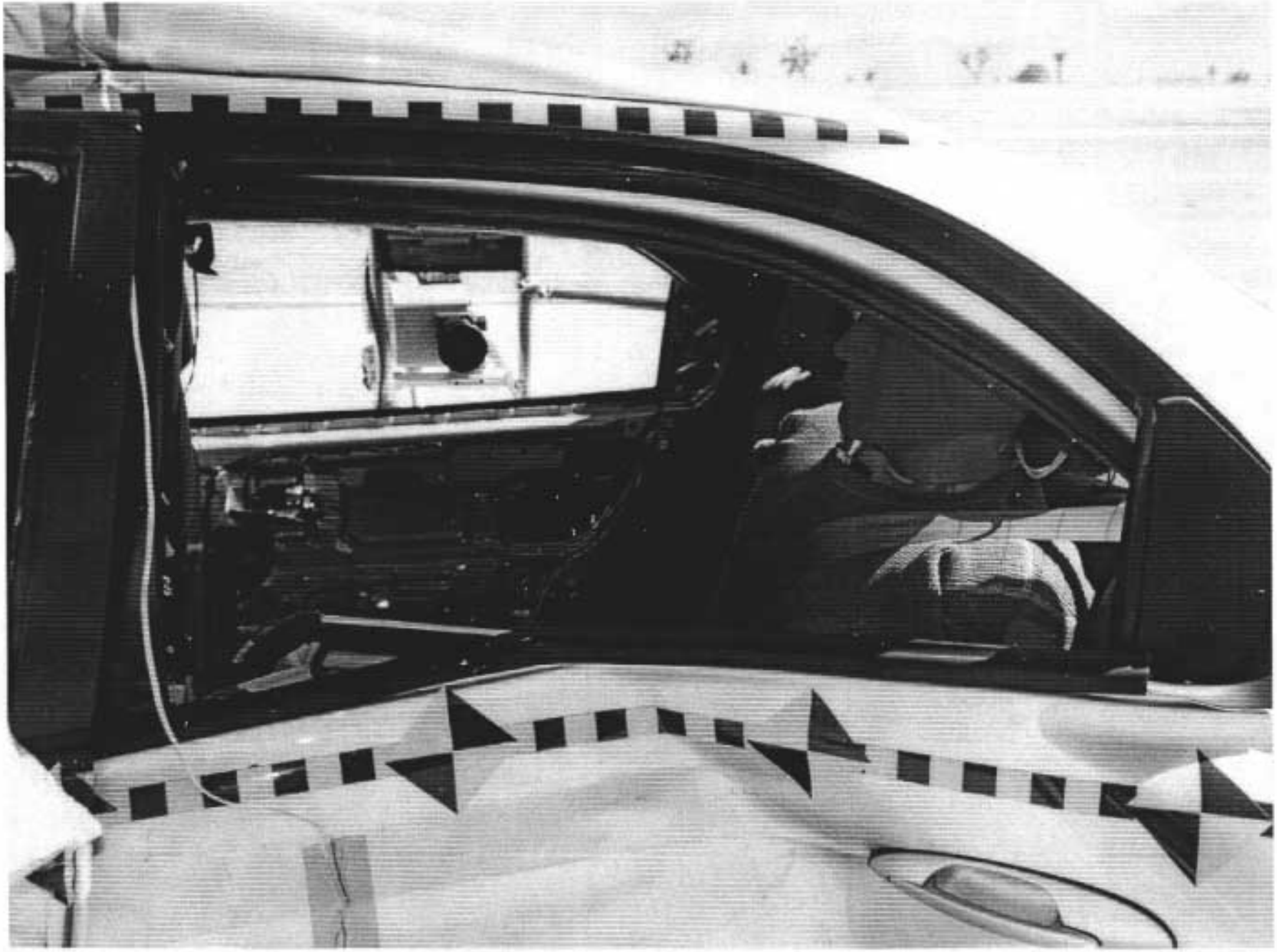


Figure A-29: Passenger Dummy Left Side, Post-Test

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

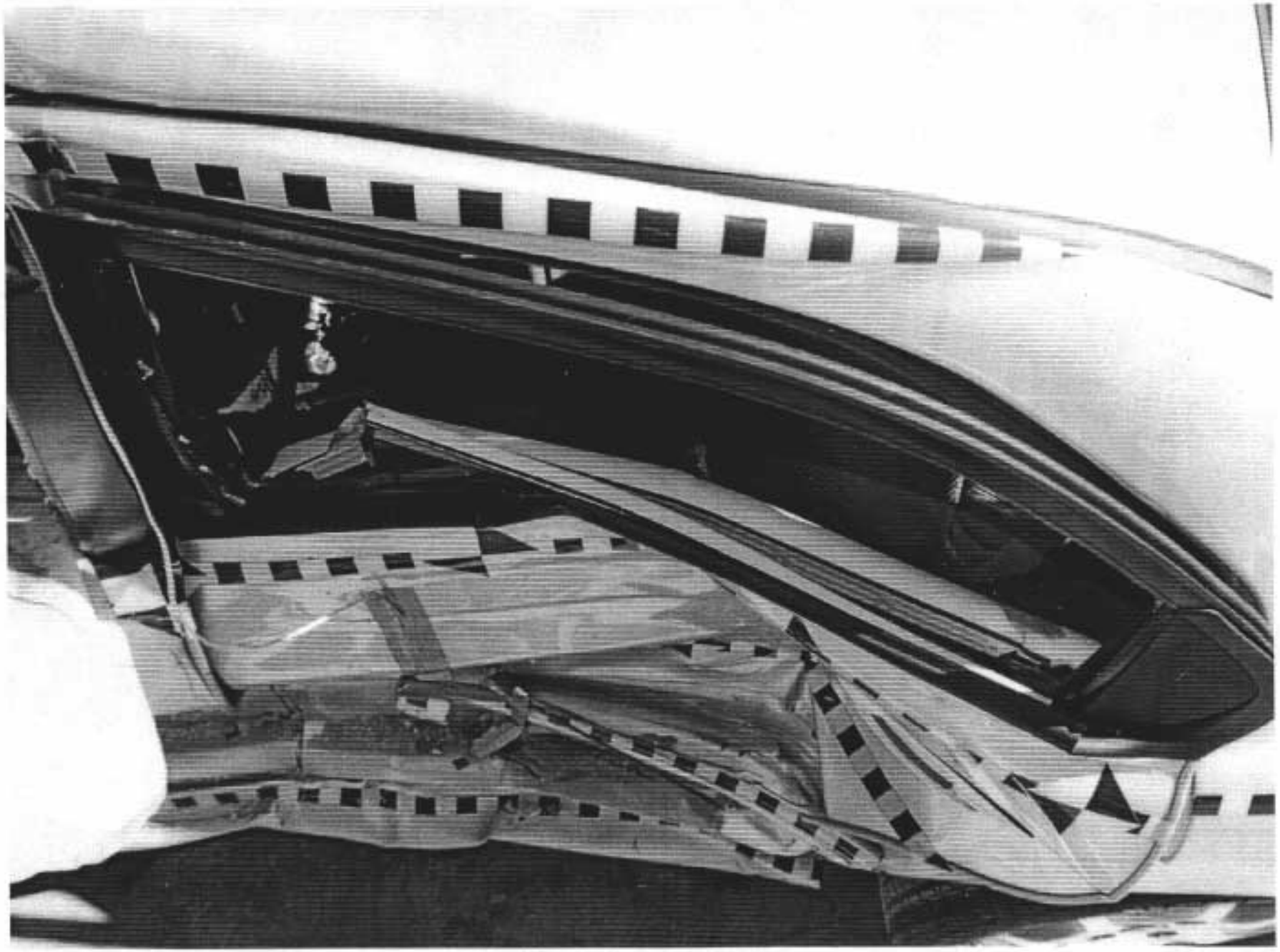


Figure A-31: Passenger Dummy Clearance, Post-Test

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

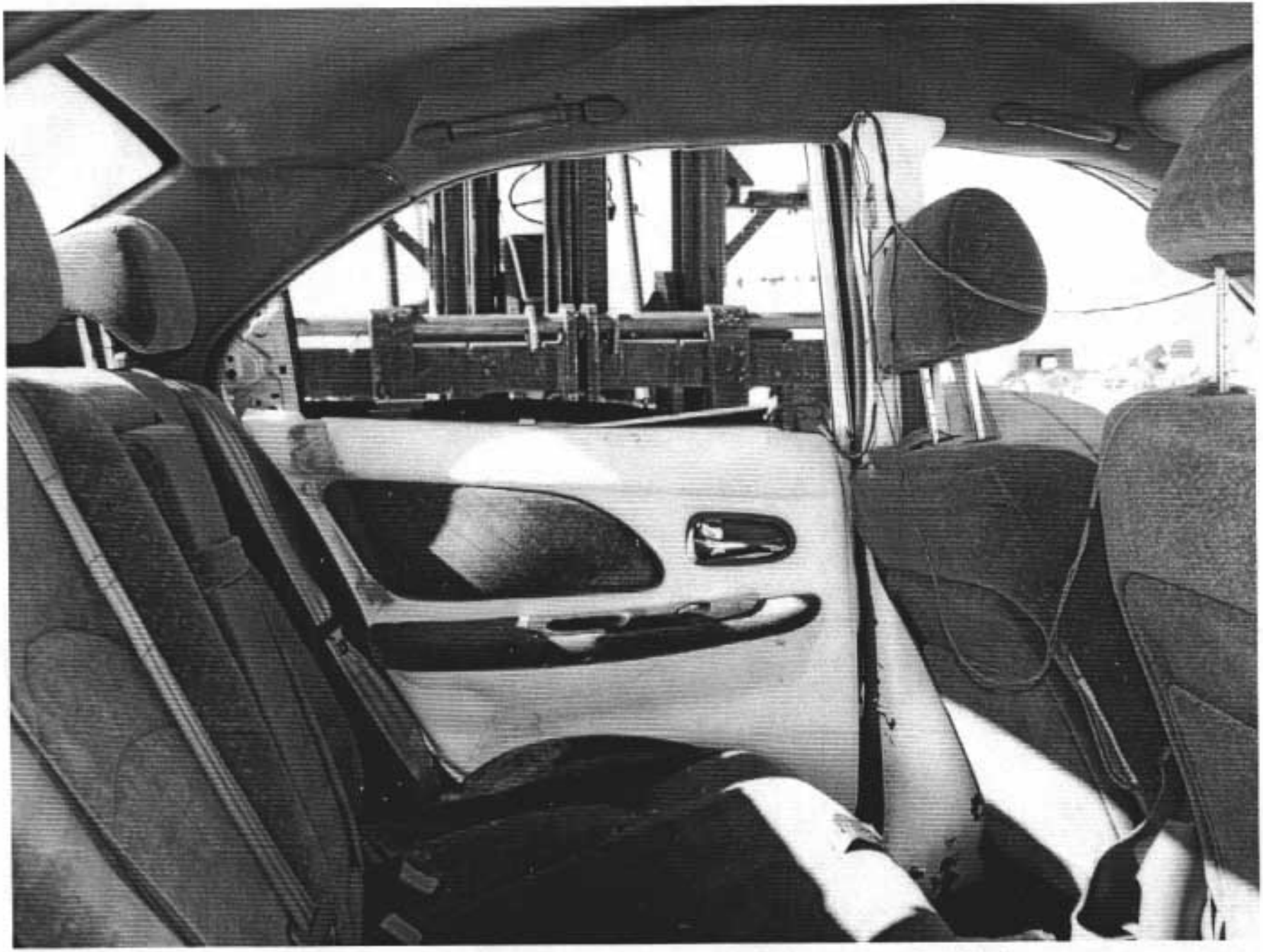


Figure A-35: Passenger Dummy Contact Points Inside View, Post-Test

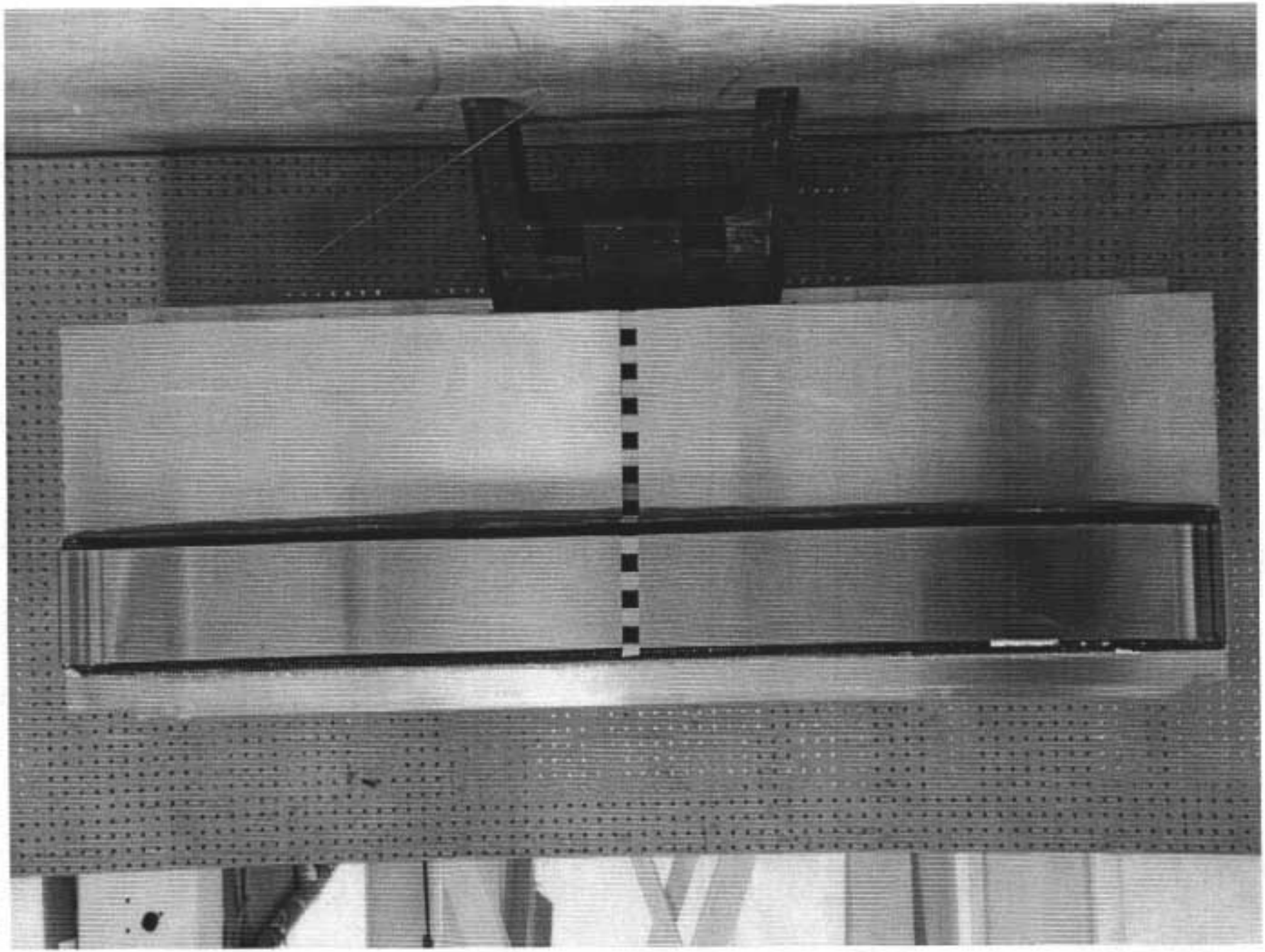


Figure A-36: Front View of Deformable Barrier, Pre-Test

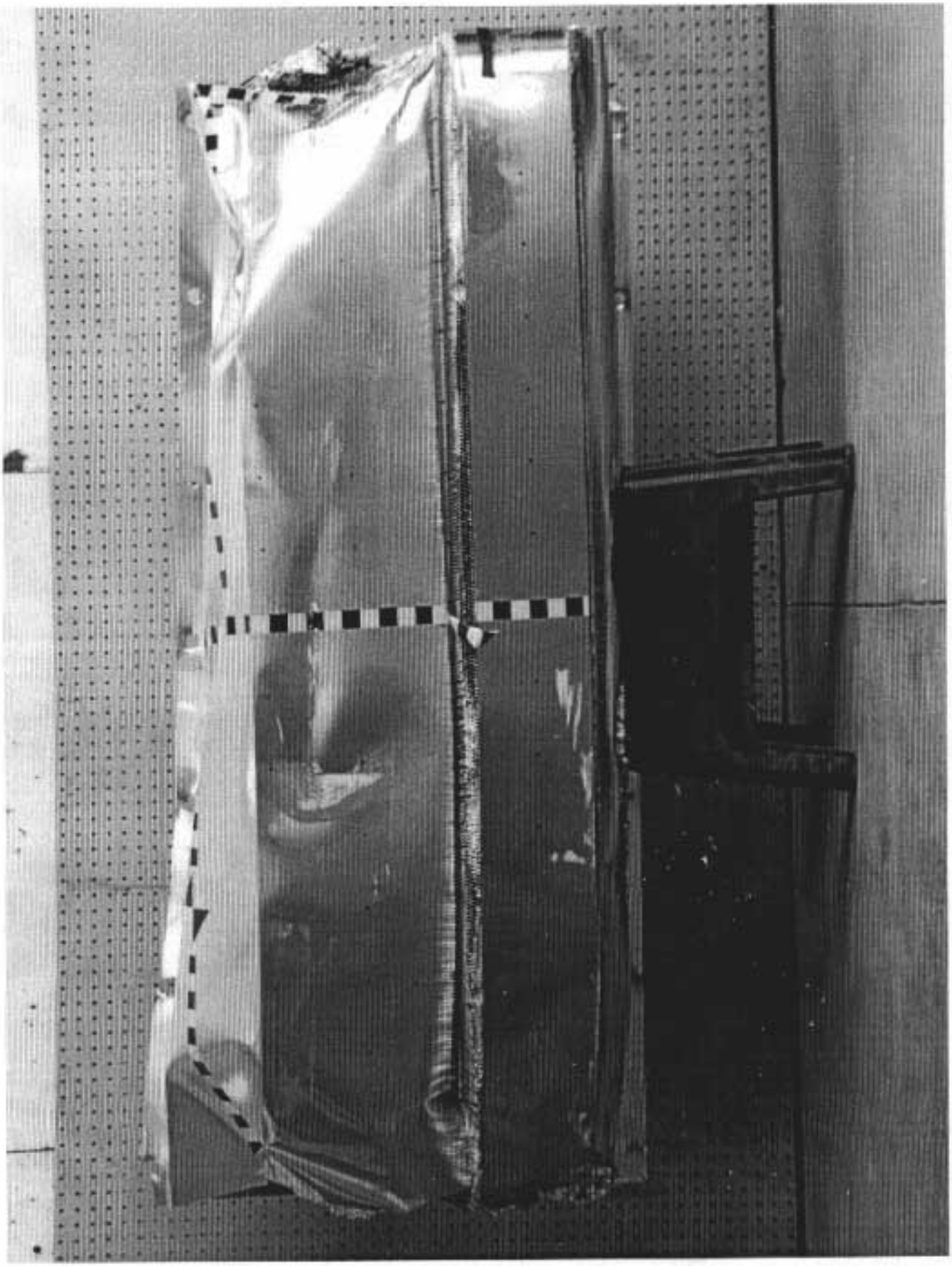


Figure A-37: Front View of Deformable Barrier, Post-Test

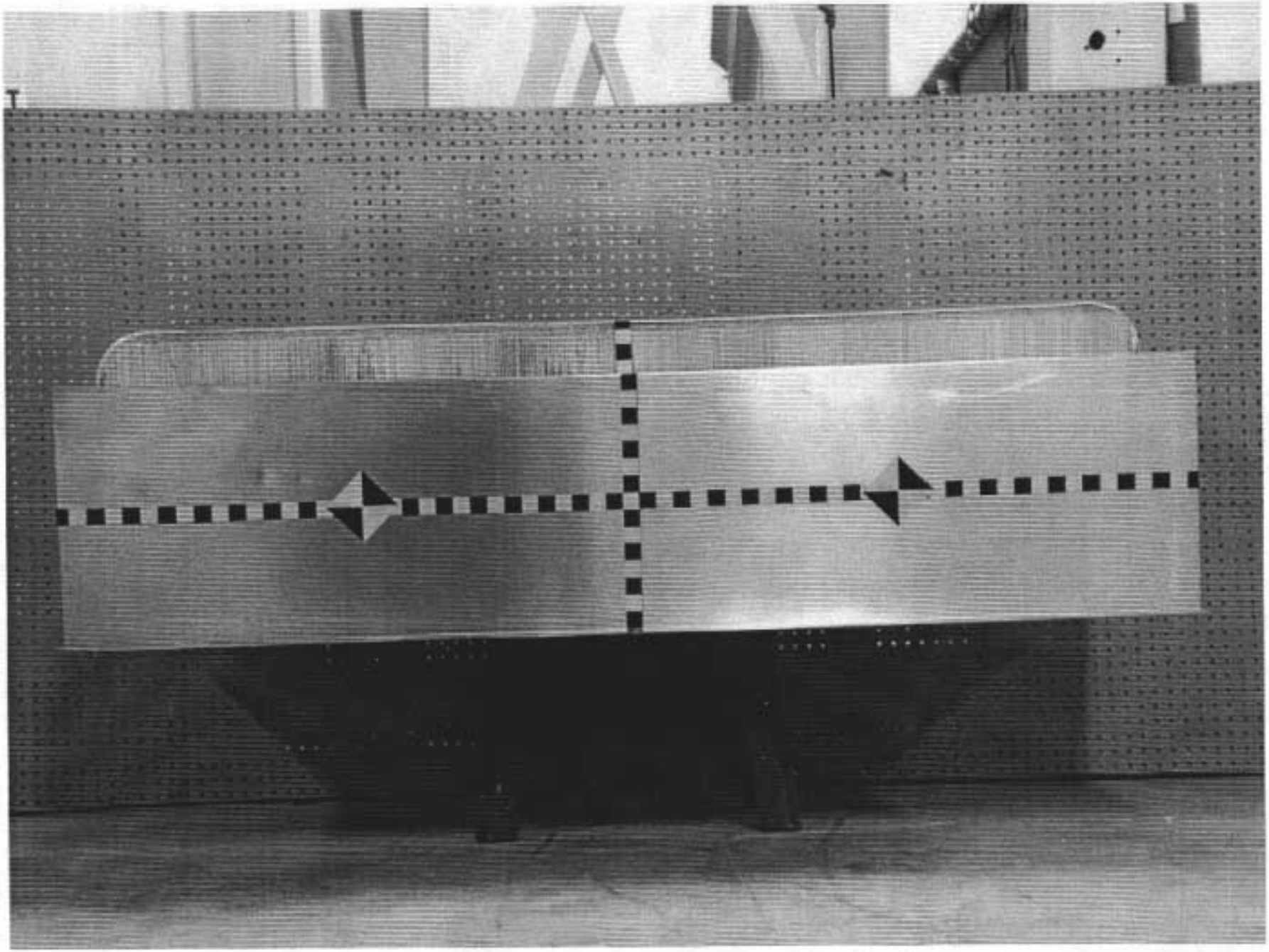


Figure A-38: Top View of Deformable Barrier, Pre-Test

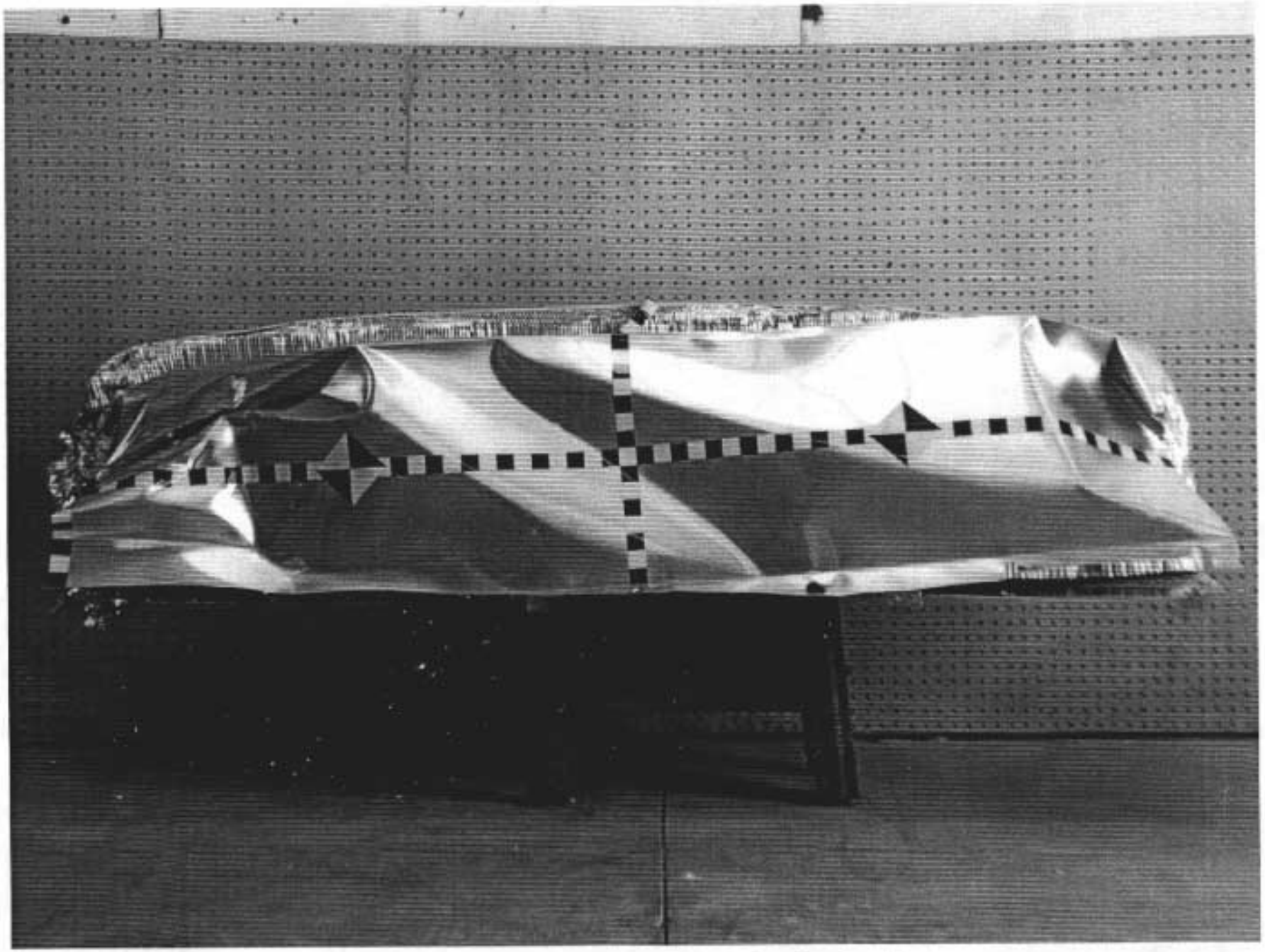


Figure A-39: Top View of Deformable Barrier, Post-Test

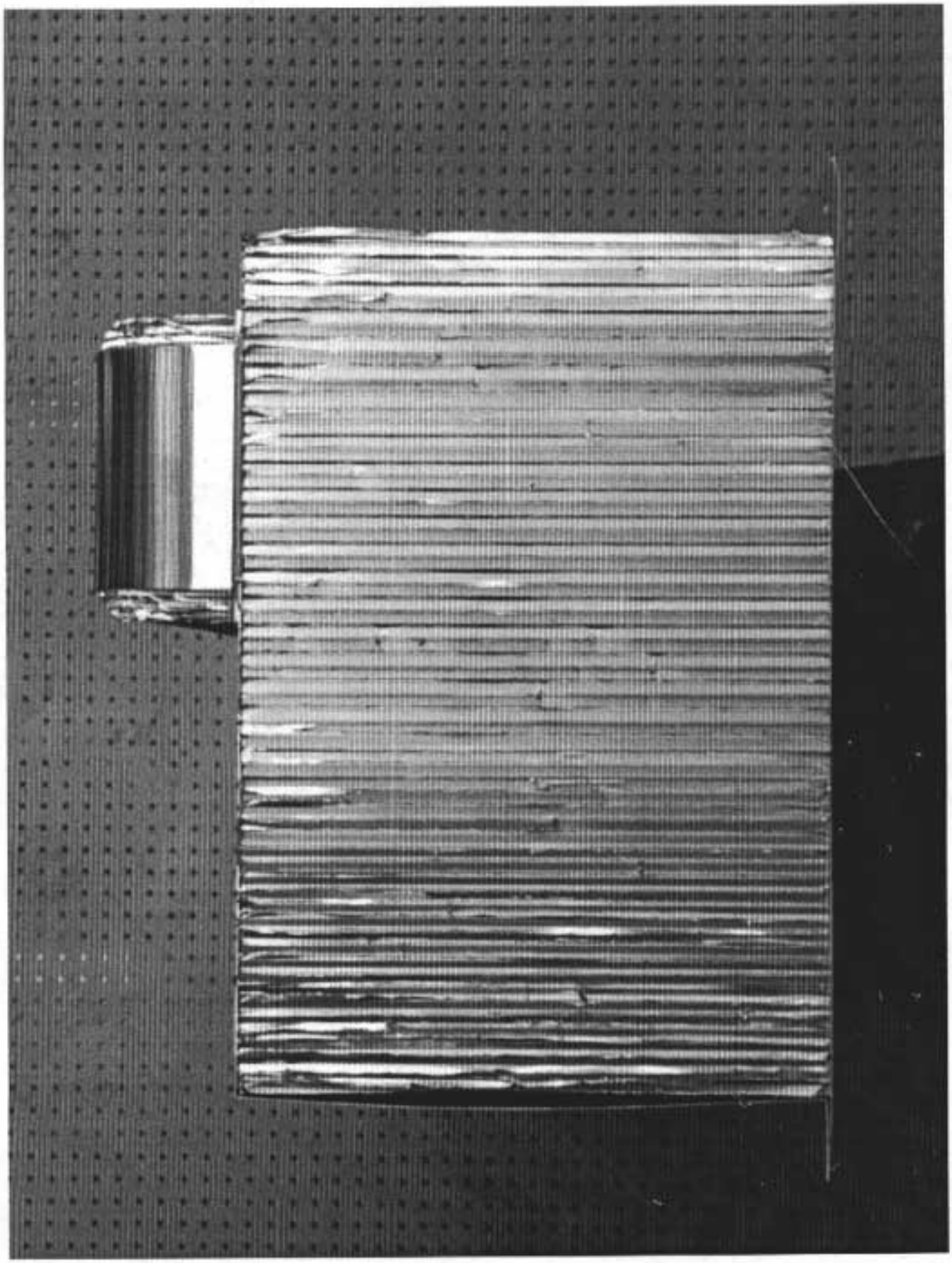


Figure A-40: Right Side View of Deformable Barrier, Pre-Test

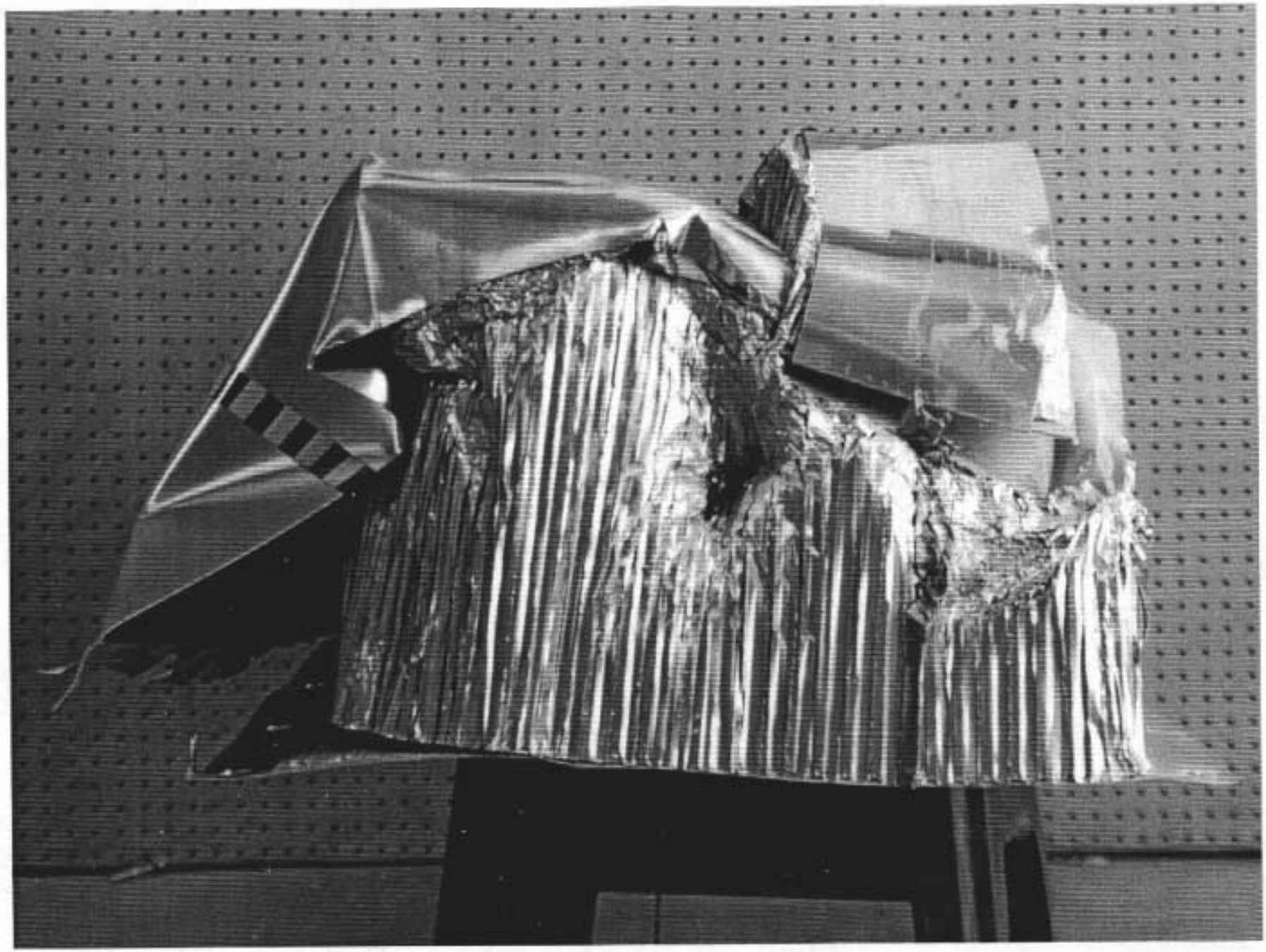


Figure A-41: Right Side View of Deformable Barrier, Post-Test

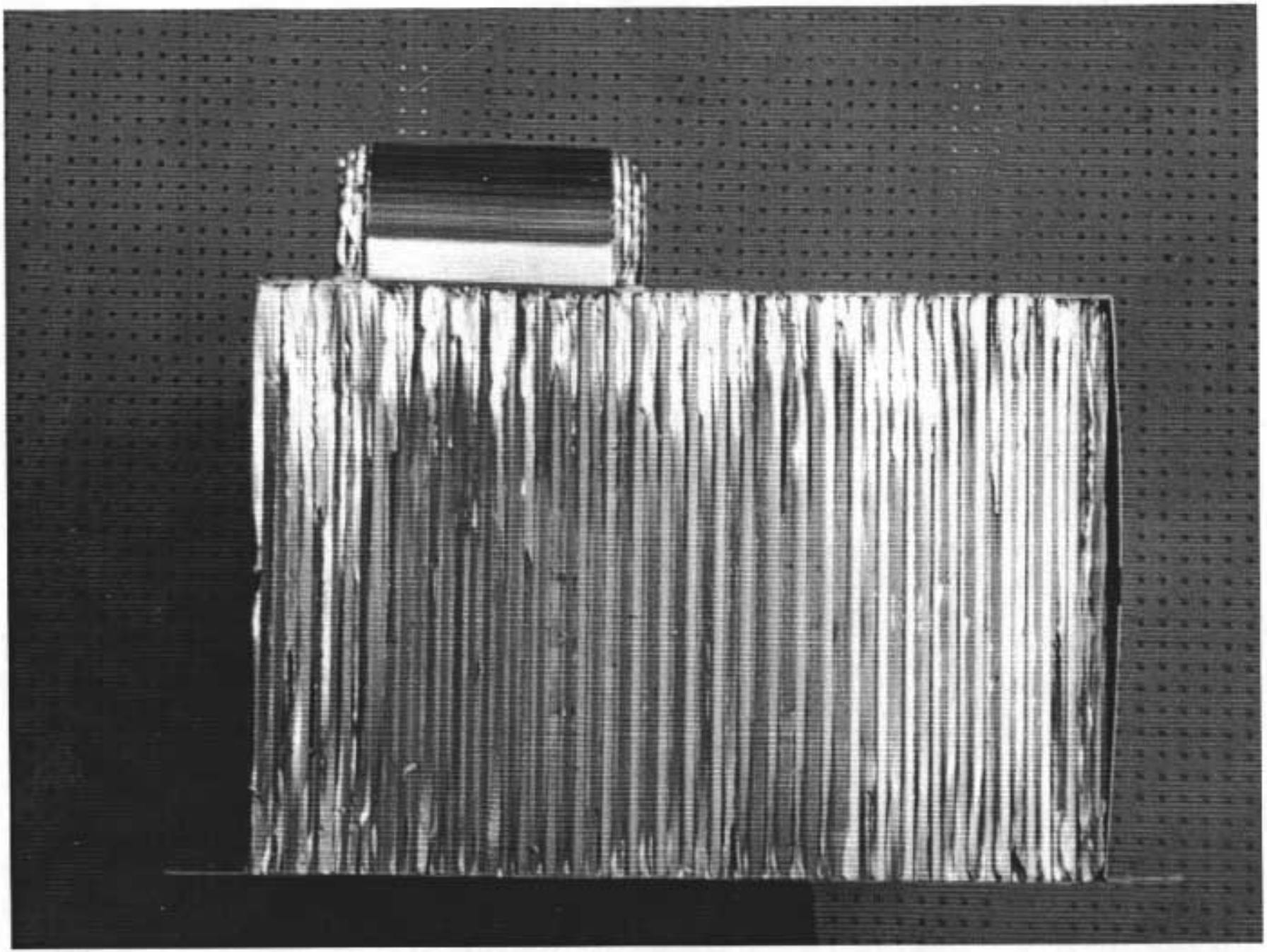


Figure A-42: Left Side View of Deformable Barrier, Pre-Test

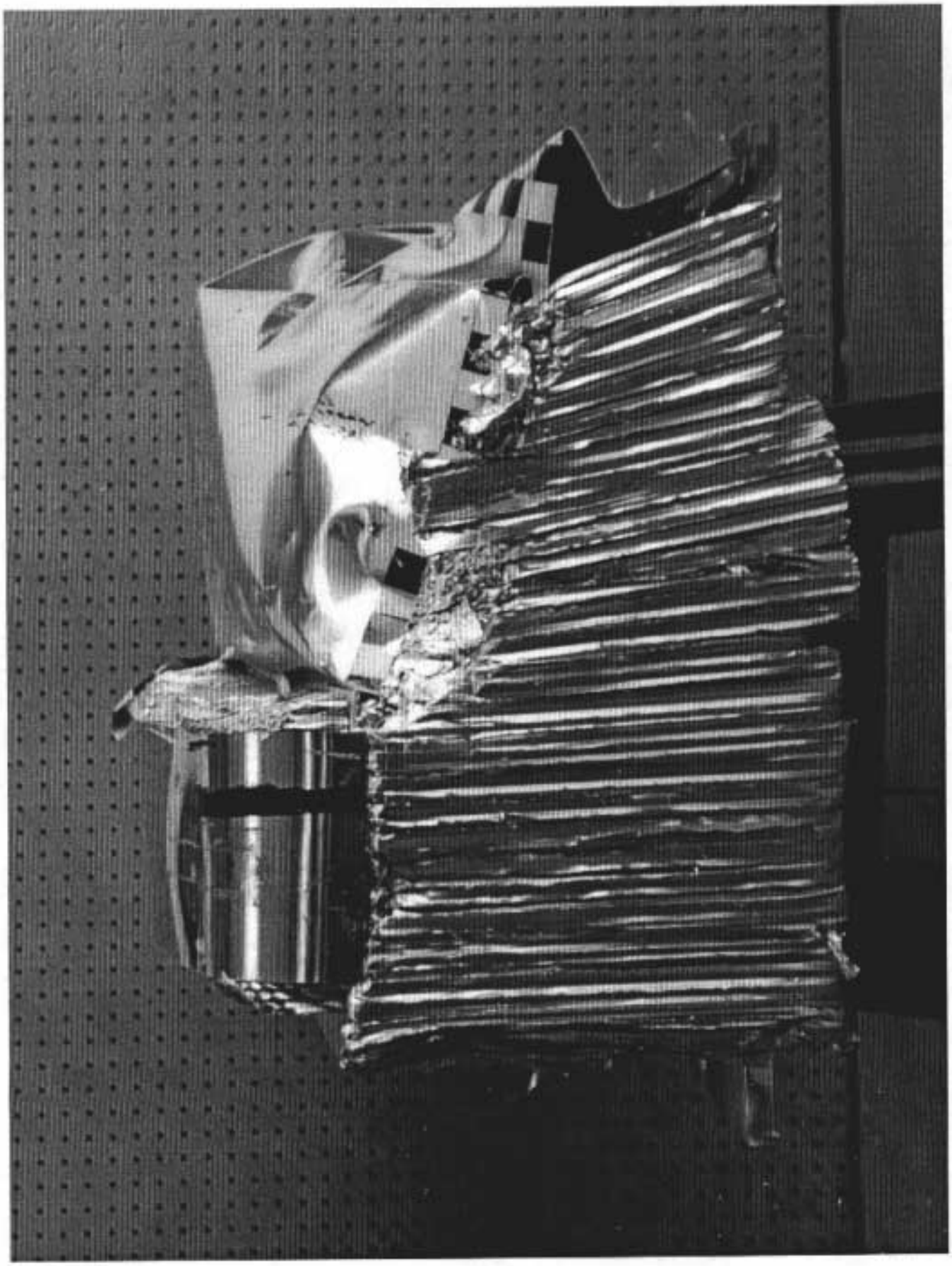


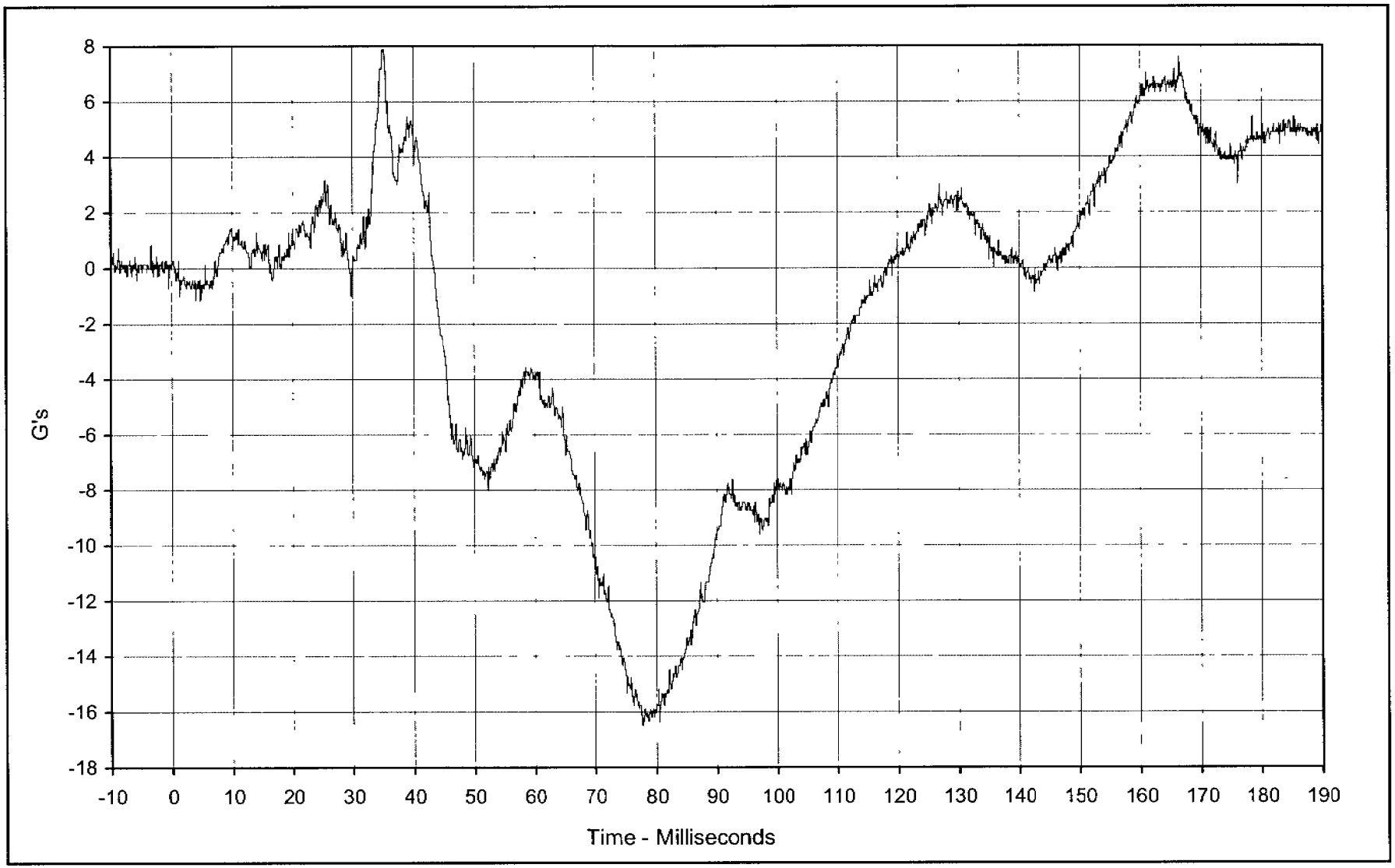
Figure A-43: Left Side View of Deformable Barrier, Post-Test

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

Figure A-45: Vehicle During Impact

APPENDIX B

SID, VEHICLE, AND MDB RESPONSE DATA



Curve Description:	Driver Head CG X			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	7.9	at	34.8	Milliseconds	Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-16.5	at	77.7	Milliseconds	
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-001				

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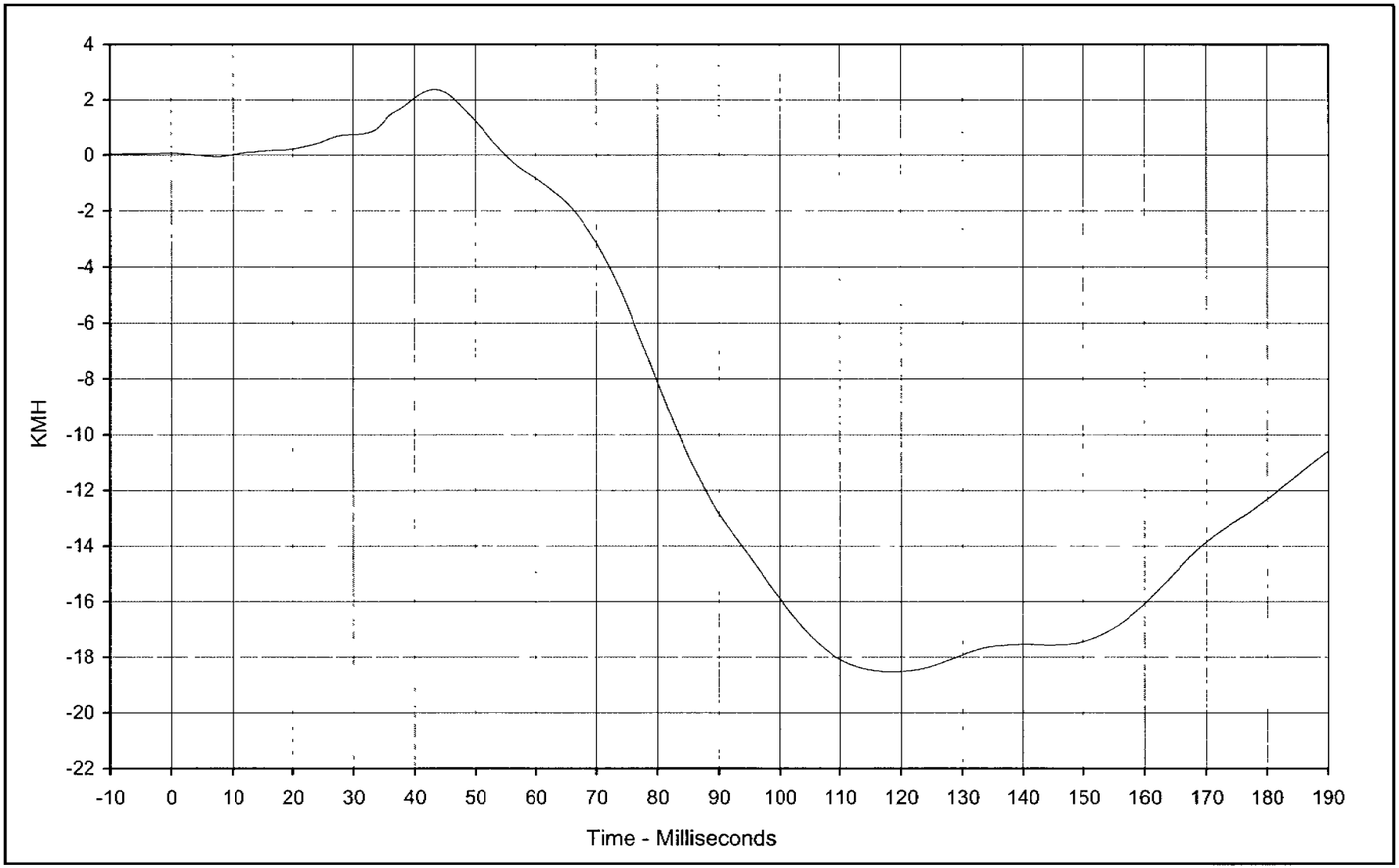
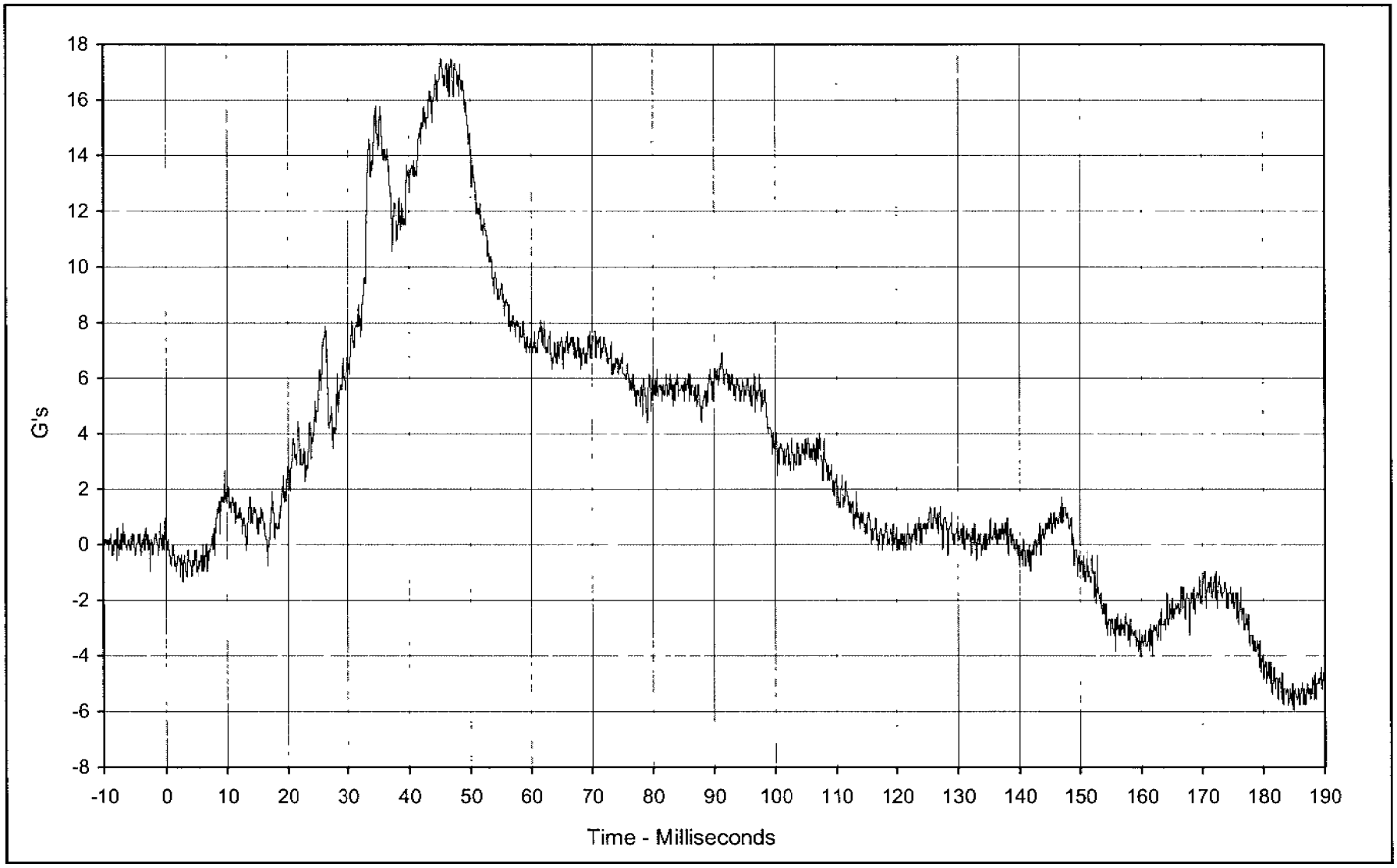


Curve Description:	Driver Head CG X Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	2.4	at	43.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-18.5	at	118.4 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-001				

KARCO Engineering



Curve Description:	Driver Head CG Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	17.5	at	45.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-6.0	at	185.0 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-002				

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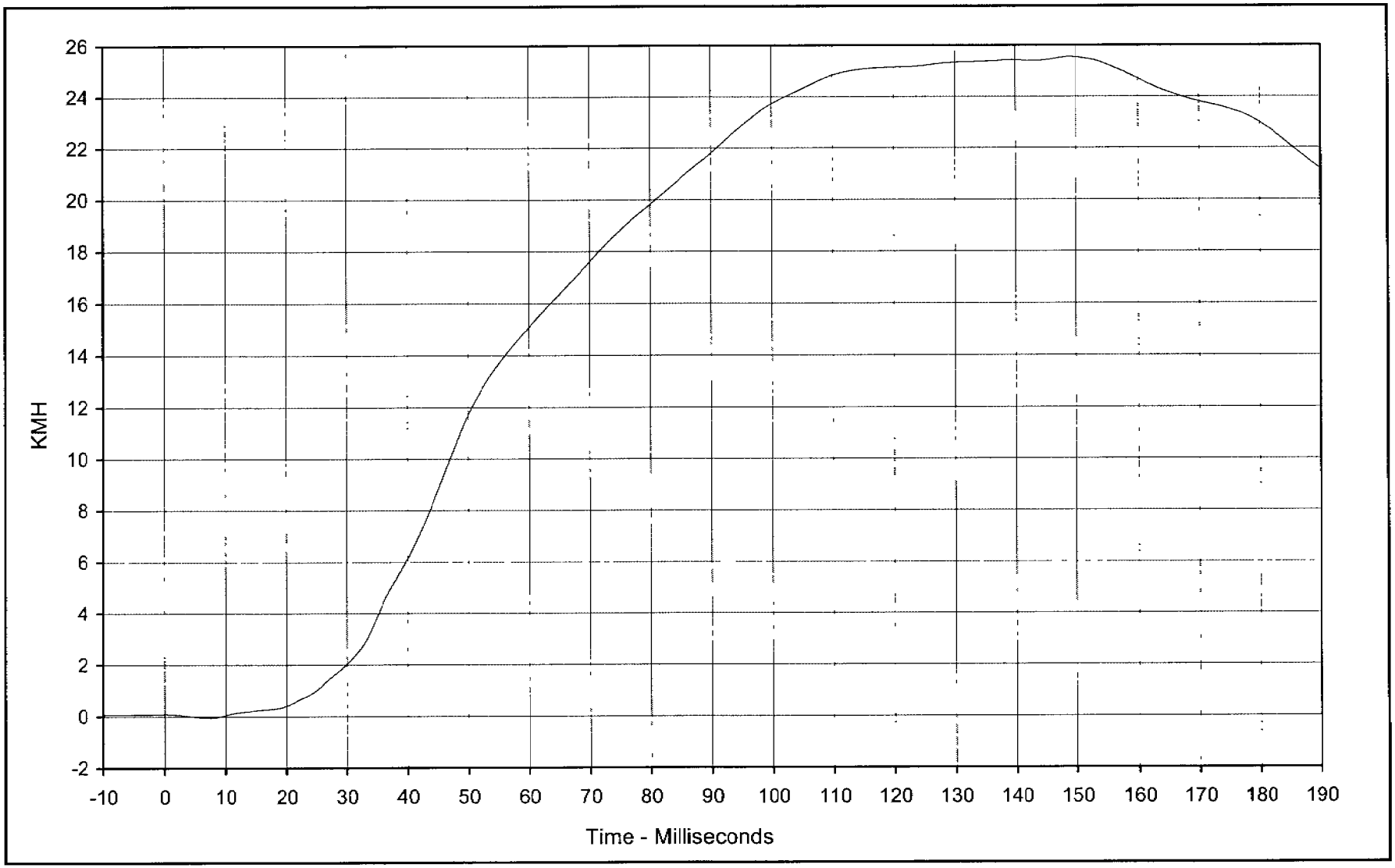

Curve Description: Driver Head CG Y Velocity

Maximum Value: 25.5 at 149.0 Milliseconds

Minimum Value: -0.1 at 7.4 Milliseconds

SAE Filter Class: 180

Date of Test: 07/12/00

Curve Number: IN1-002

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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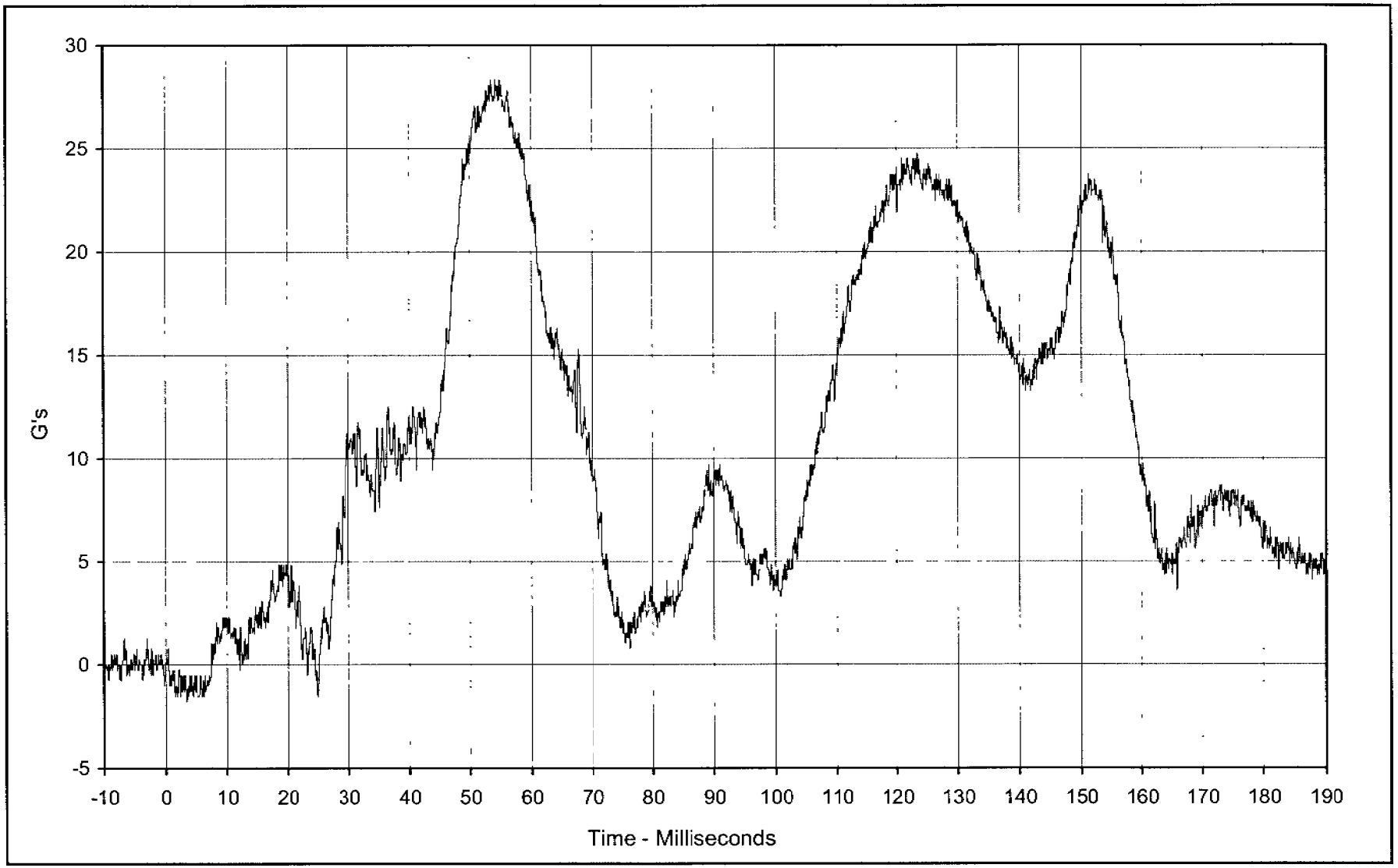

Curve Description:	Driver Head CG Z			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	28.3	at	53.5 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-1.8	at	3.4 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-003				

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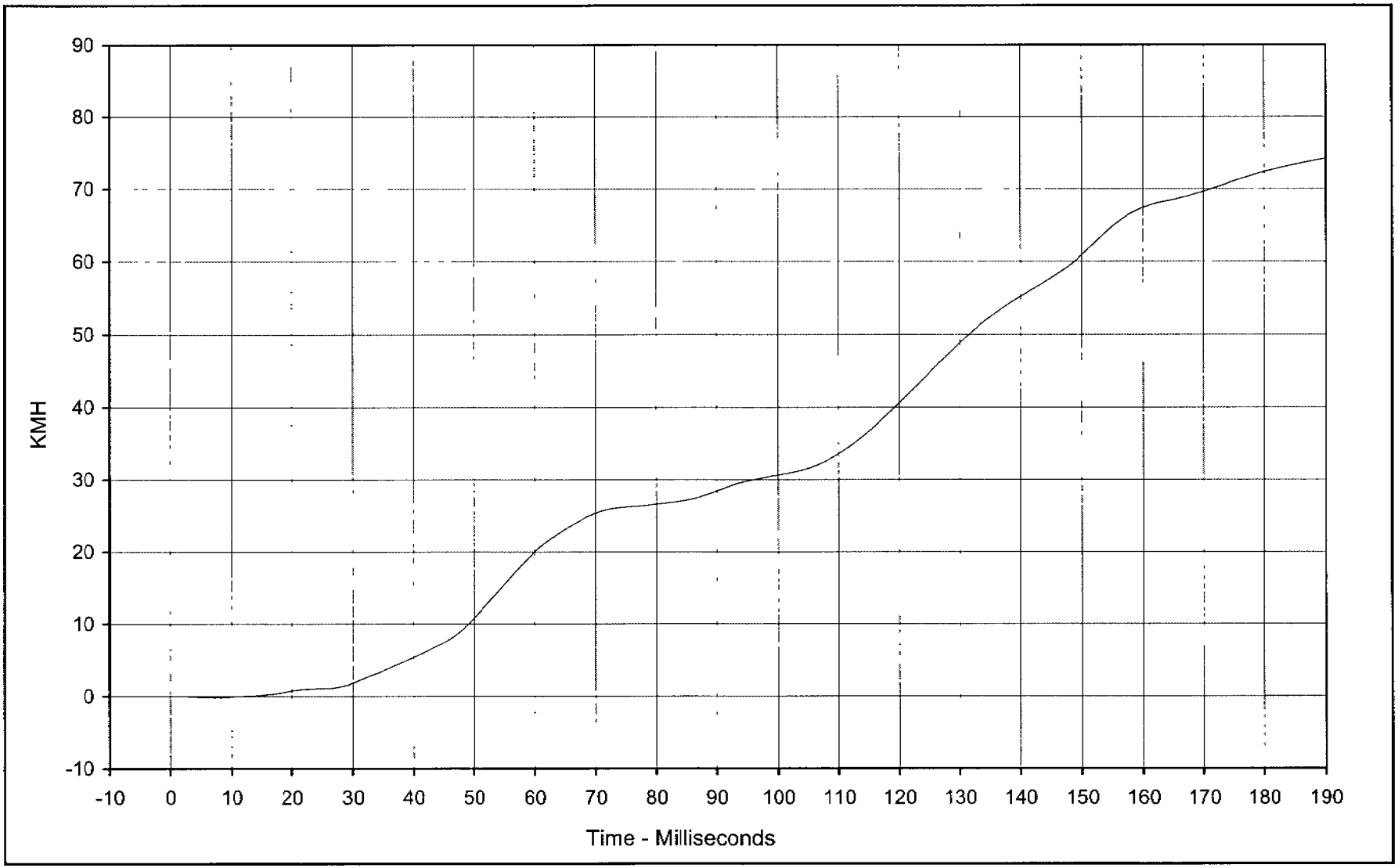

Curve Description:	Driver Head CG Z Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	74.2	at	189.9 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.2	at	7.5 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-003				

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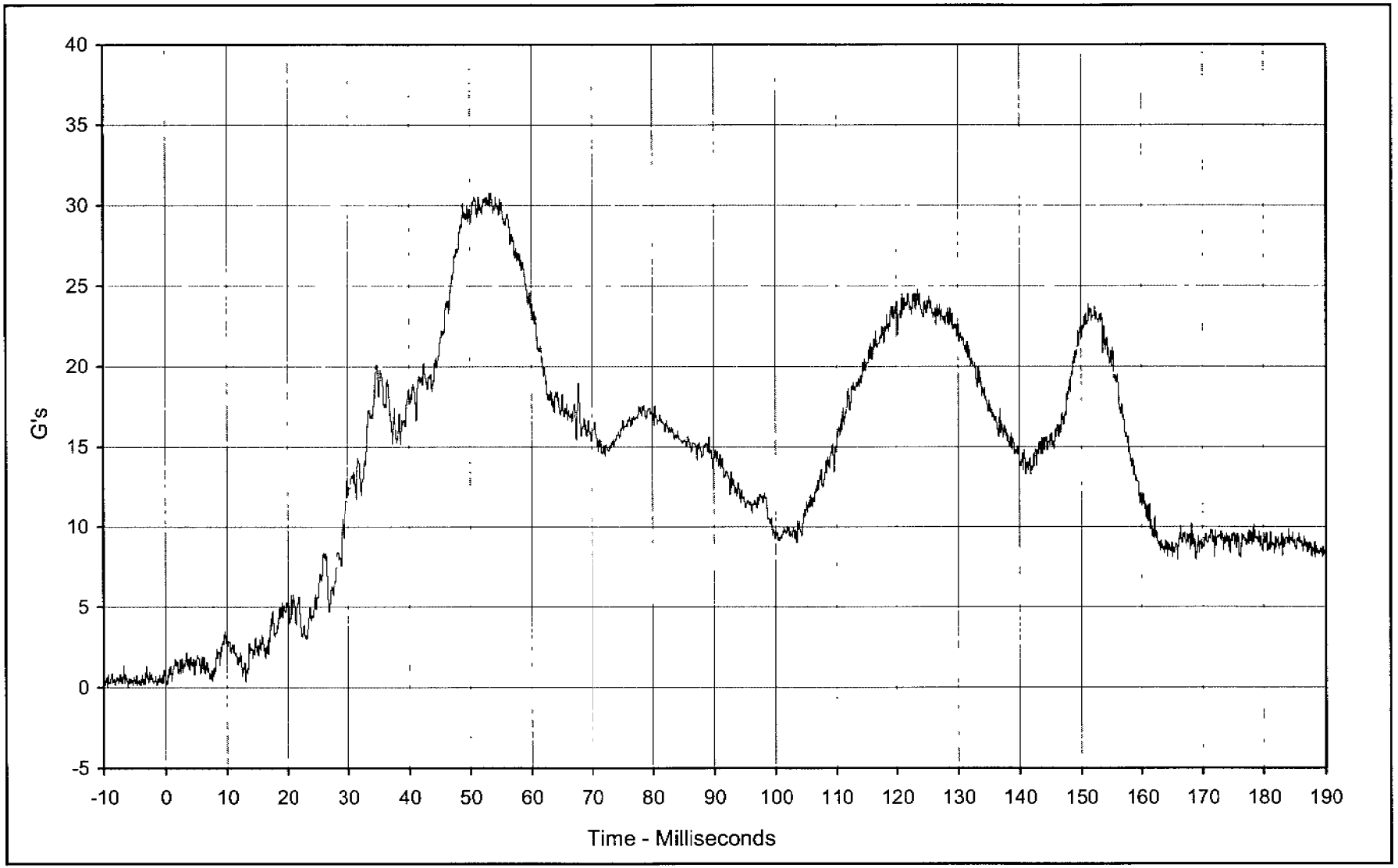
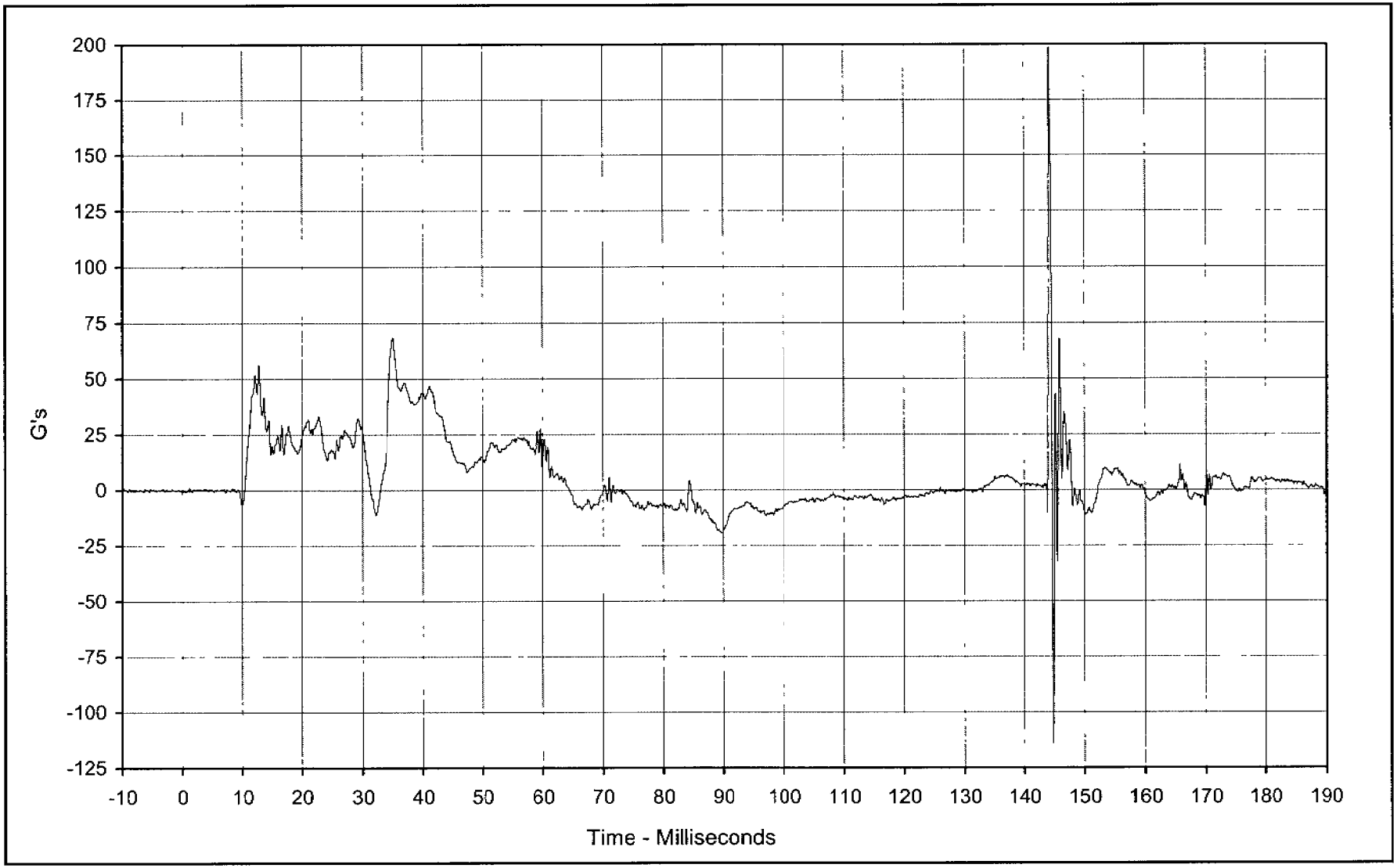


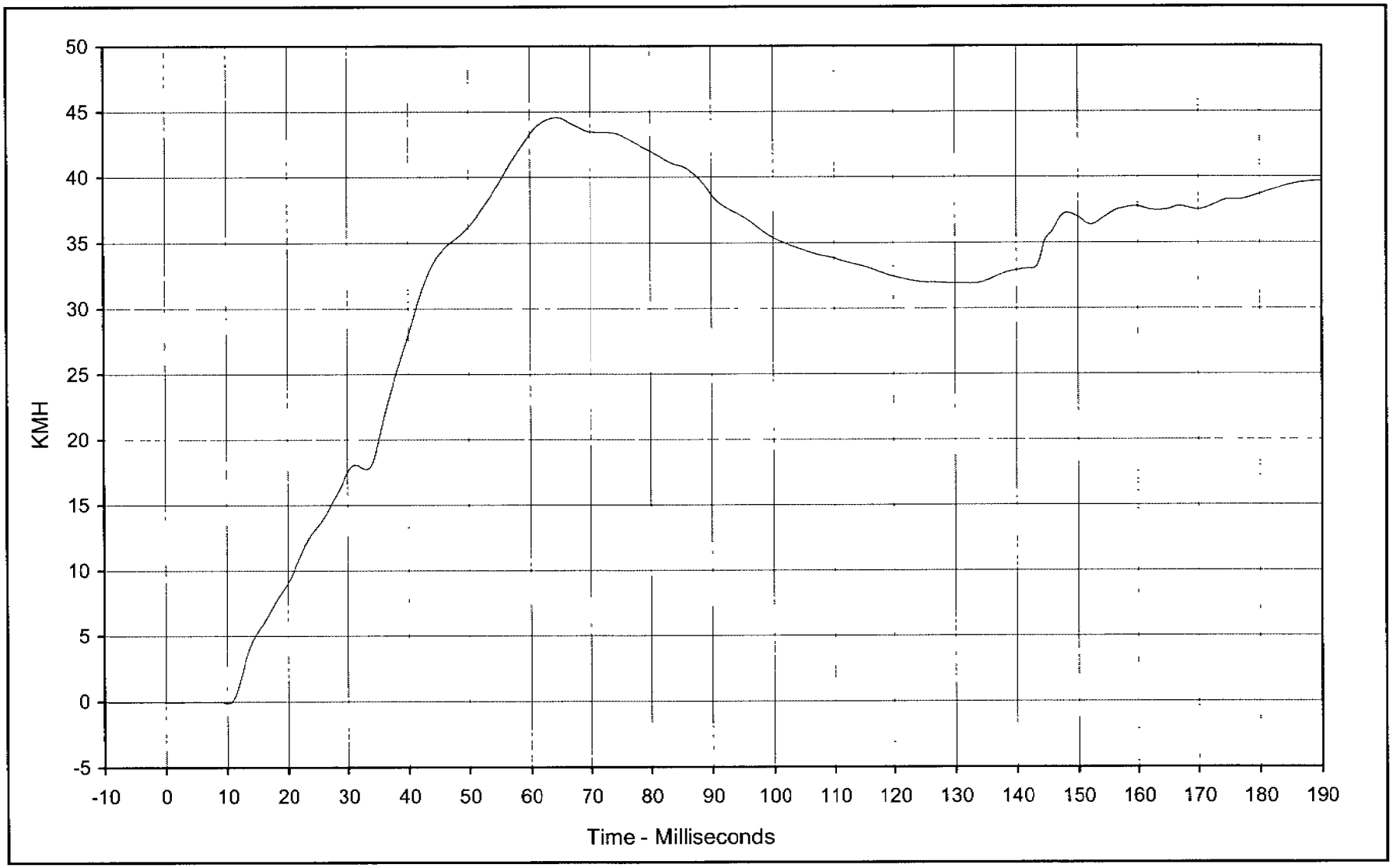
Curve Description:	Driver Head CG Resultant			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	30.8	at	53.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.1	at	0.1 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	RES-001				

KARC Engineering



Curve Description:	Driver Upper Rib Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	196.9	at	144.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-113.7	at	144.8 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-004				

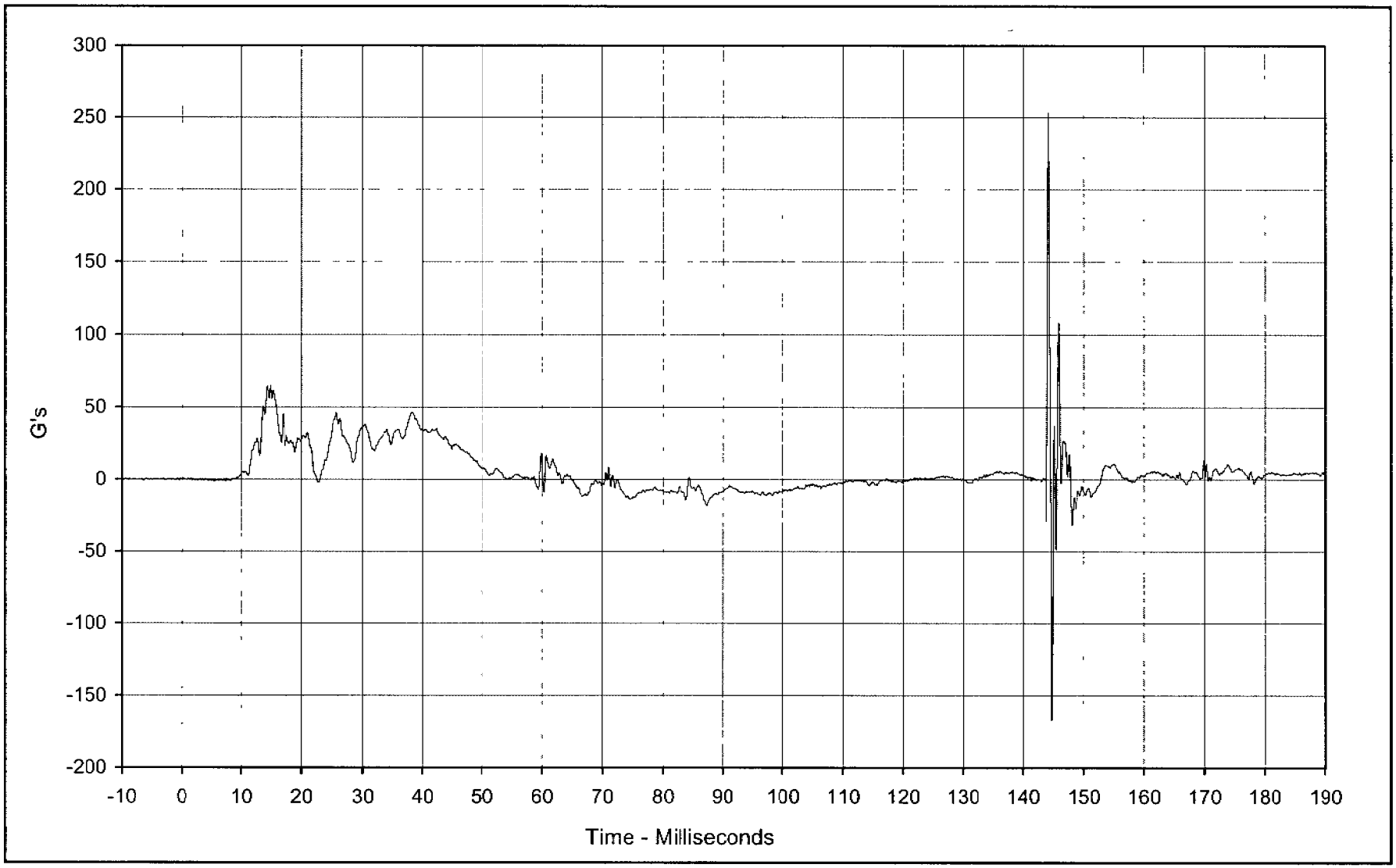
KARC Engineering



Curve Description:	Driver Upper Rib Primary Y Velocity			
Maximum Value:	44.6	at	64.4	Milliseconds
Minimum Value:	-0.1	at	10.1	Milliseconds
SAE Filter Class:	180			
Date of Test:	07/12/00			
Curve Number:	IN1-004			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Driver Lower Rib Primary Y

Maximum Value: 253.3 at 144.1 Milliseconds

Minimum Value: -166.6 at 144.7 Milliseconds

SAE Filter Class: 1000

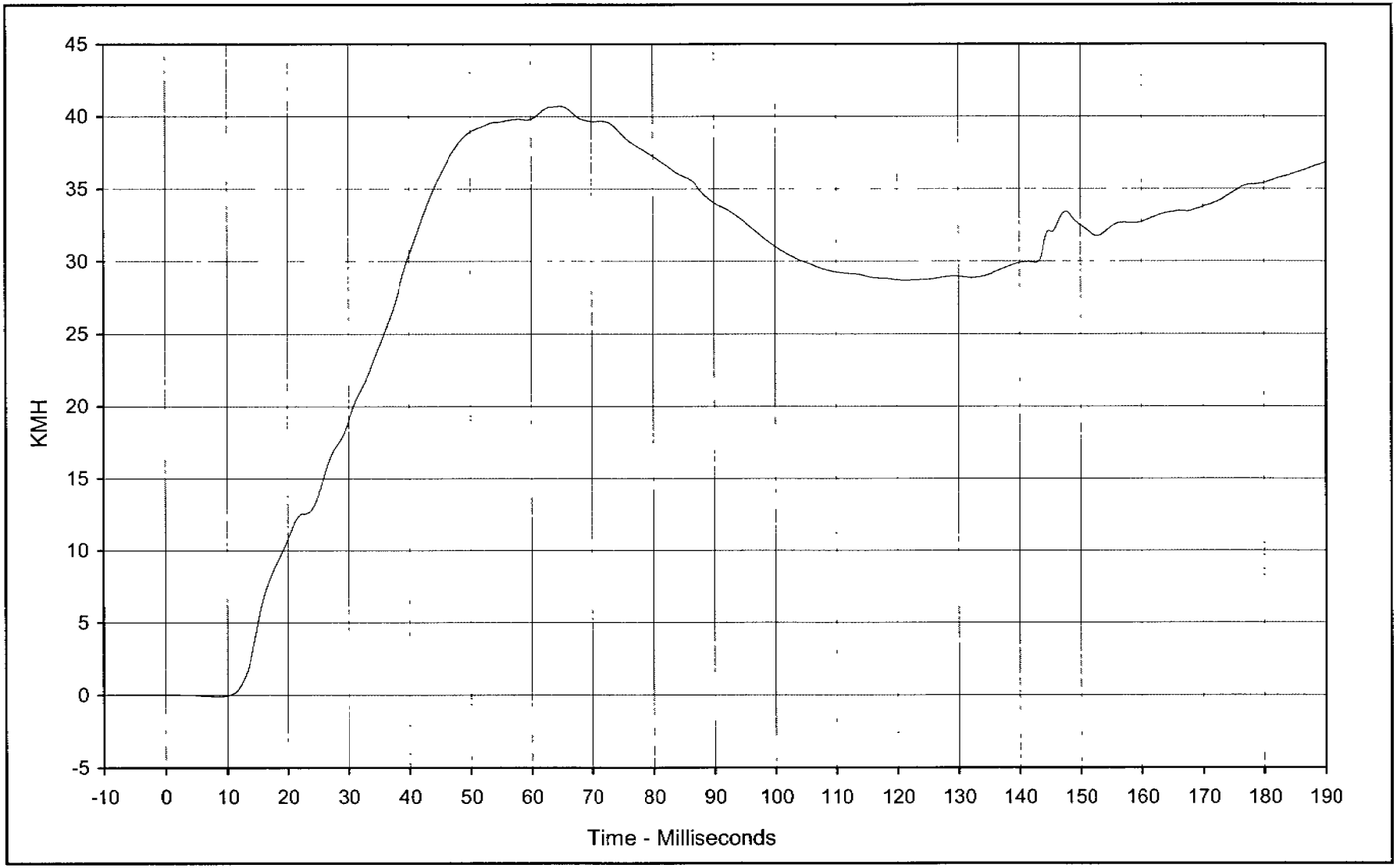
Date of Test: 07/12/00

Curve Number: FIL-005

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

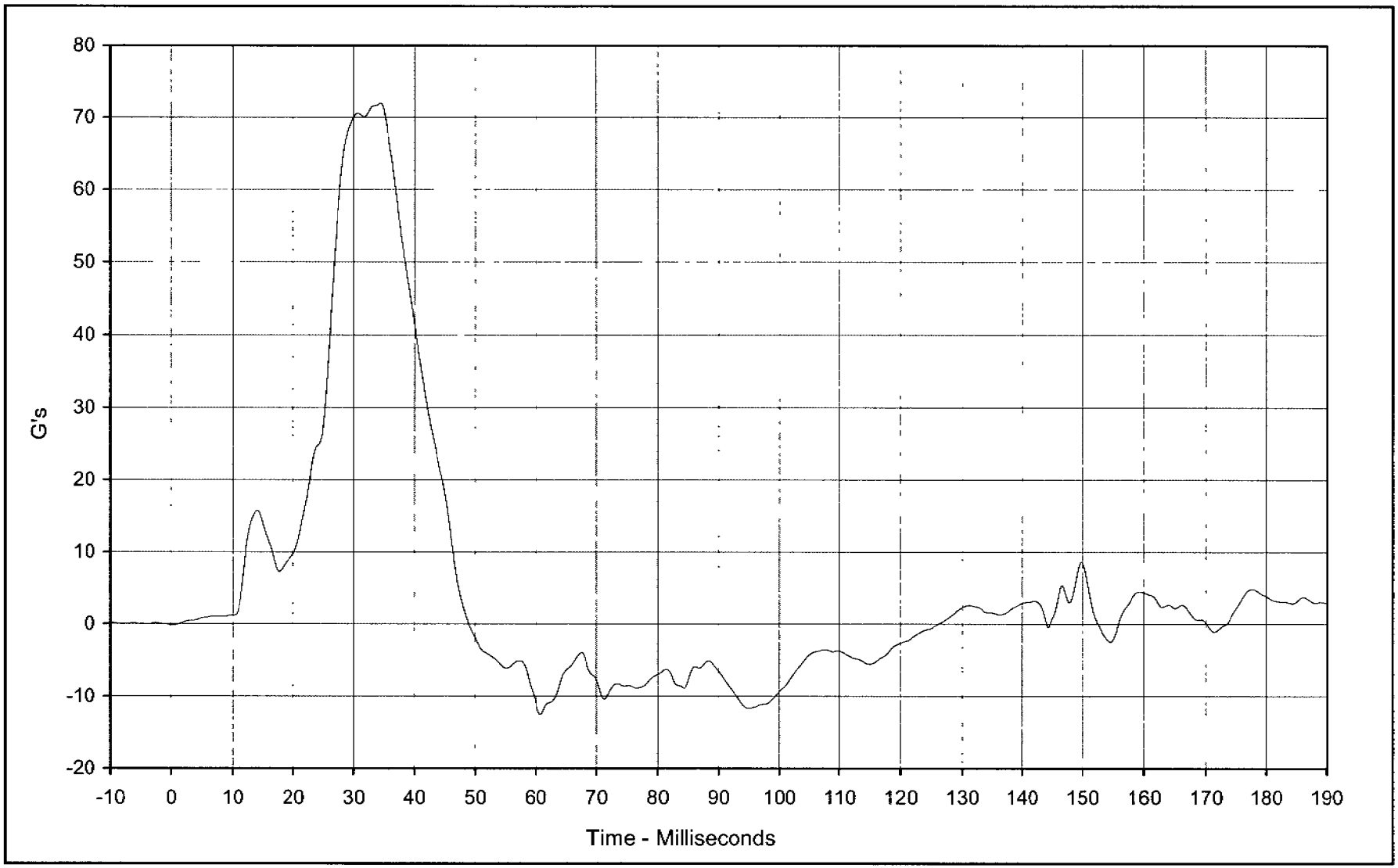
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



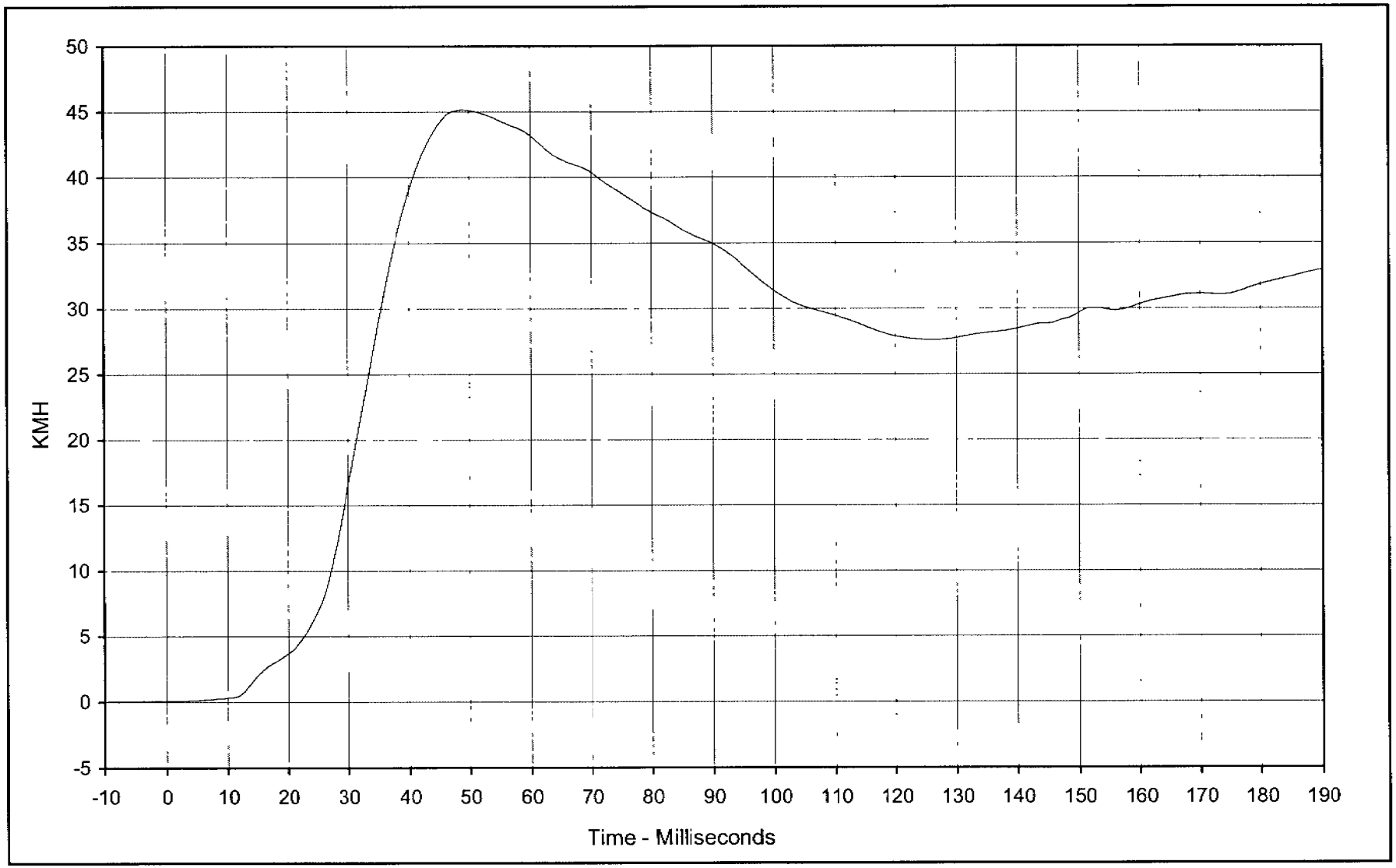
Curve Description:	Driver Lower Rib Primary Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	40.7	at	64.8 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.1	at	8.6 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-005				

KARCO Engineering



Curve Description:	Driver Lower Spine Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	72.0	at	34.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-12.5	at	60.8 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	FIL-006				

KARCO Engineering



Curve Description: Driver Lower Spine Primary Y Velocity

Maximum Value: 45.1 at 48.9 Milliseconds

Minimum Value: 0.1 at 1.2 Milliseconds

SAE Filter Class: 180

Date of Test: 07/12/00

Curve Number: IN1-006

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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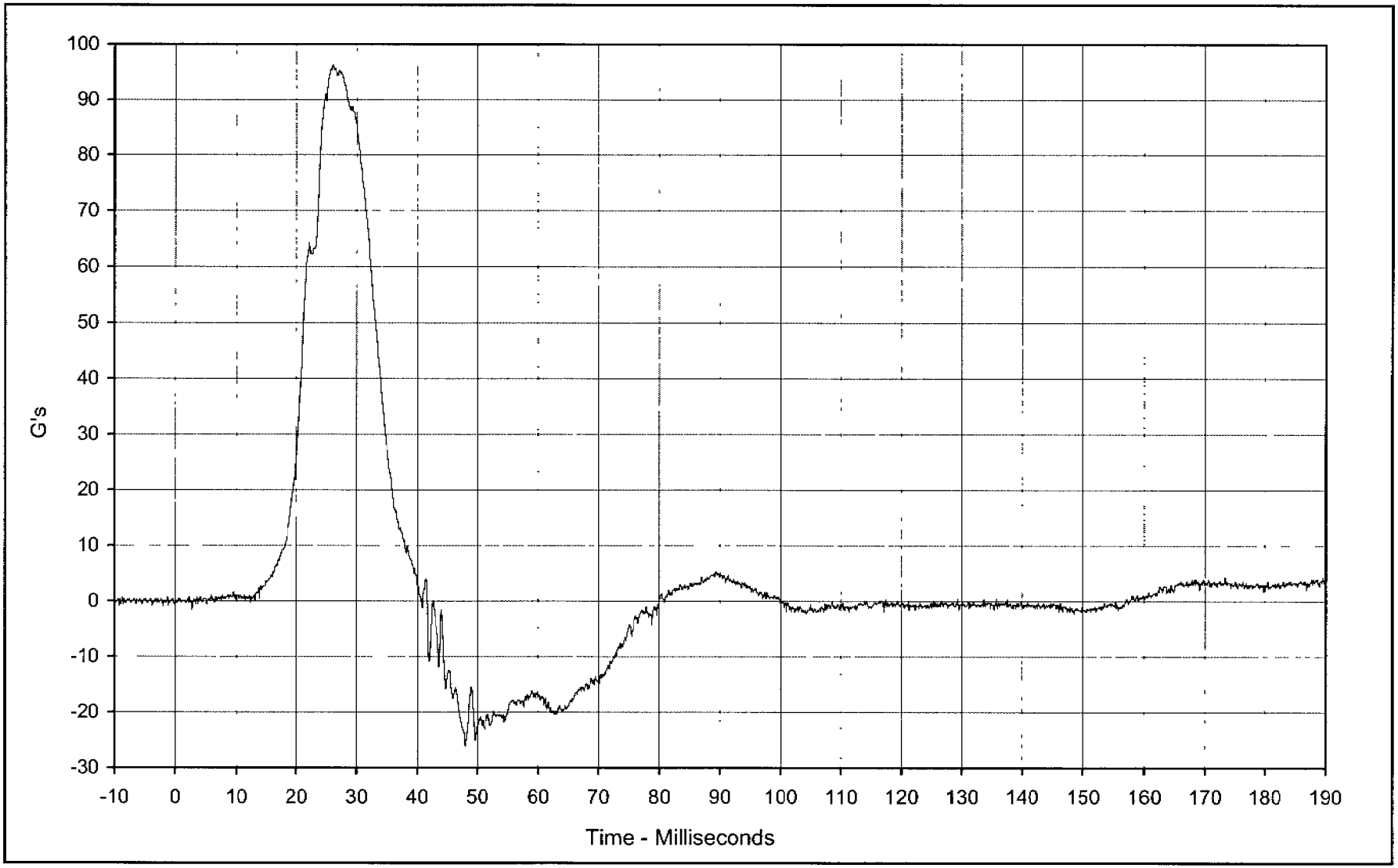
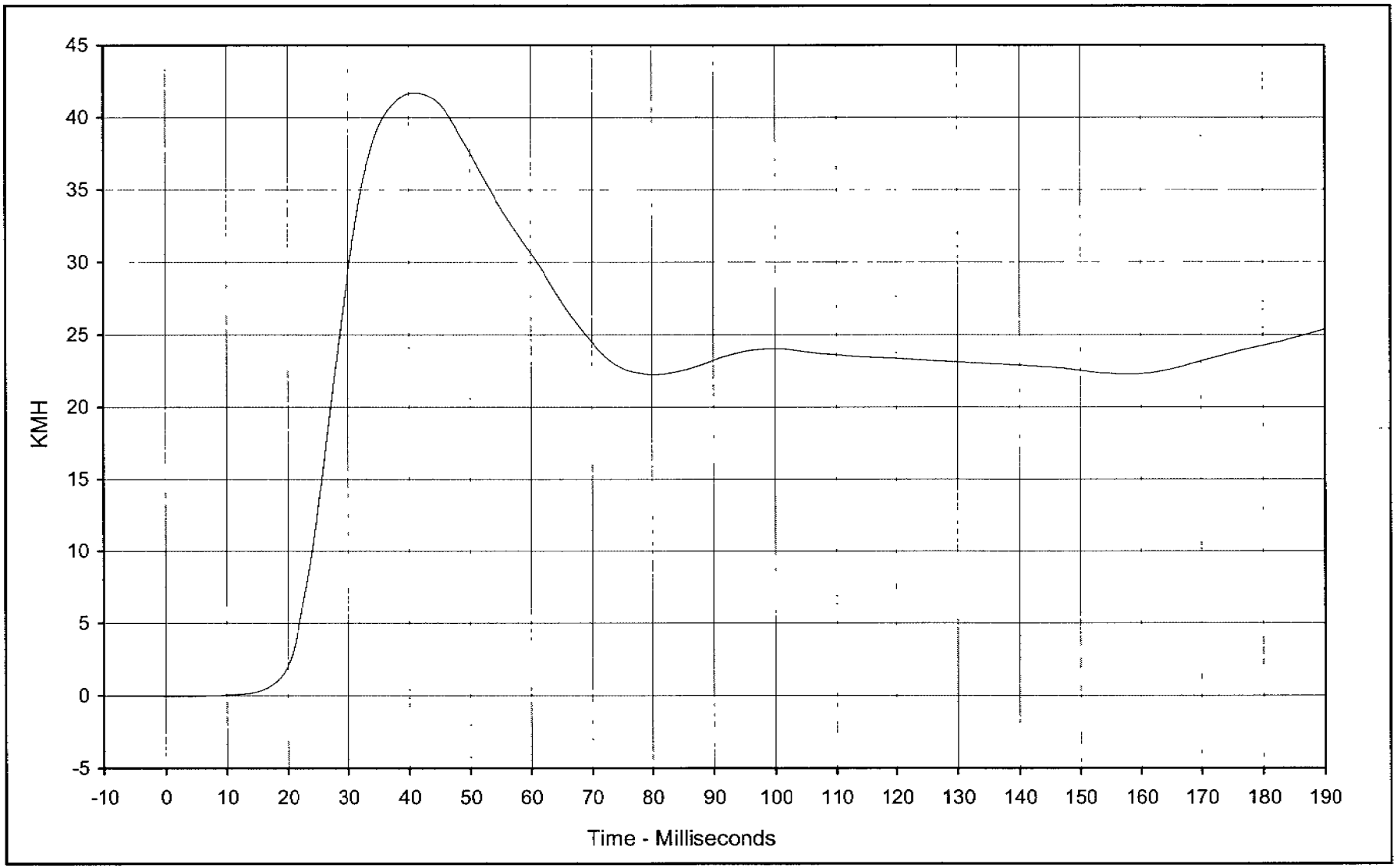
KAR20051-01



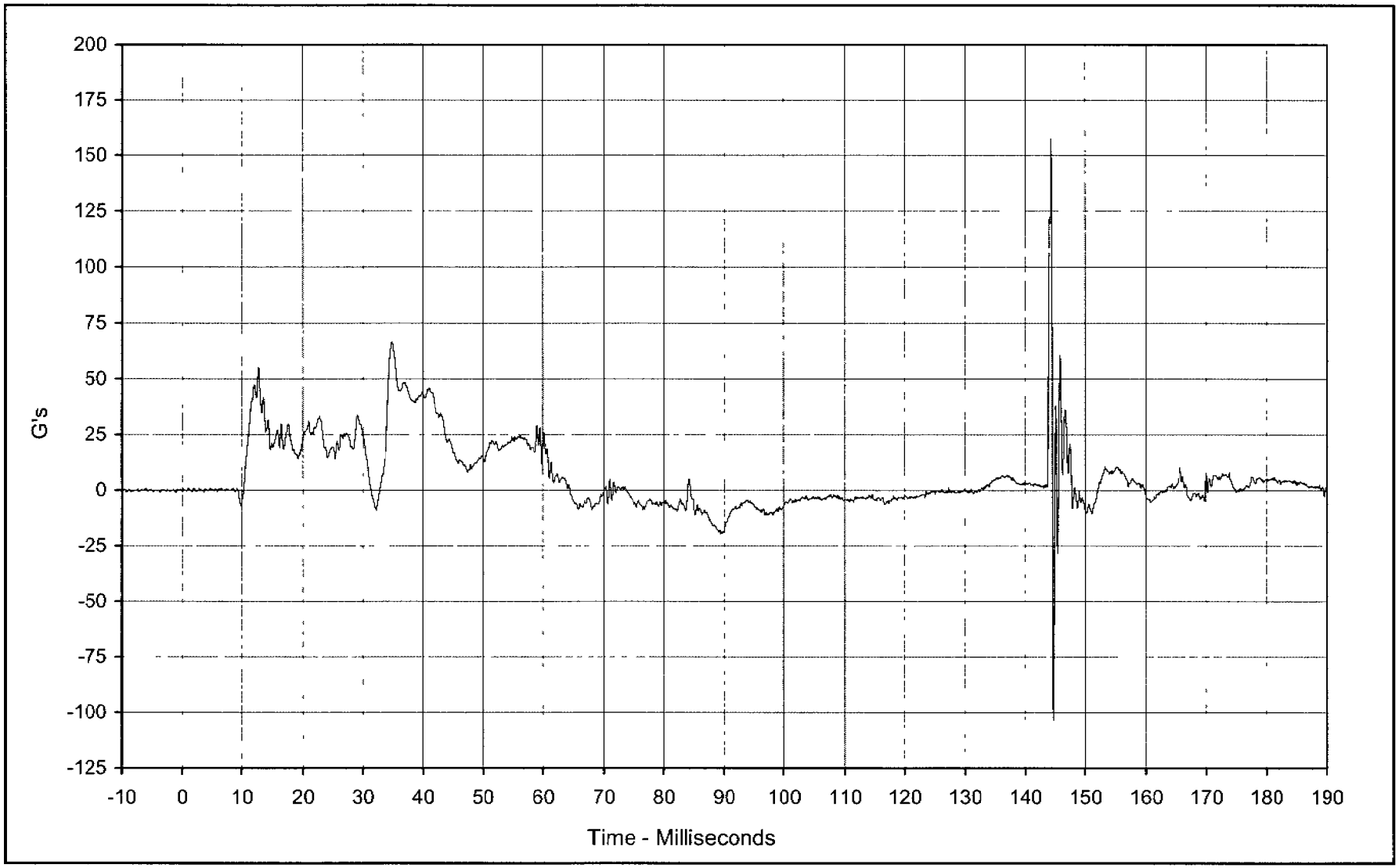
Curve Description:	Driver Pelvis Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	96.3	at	26.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-26.1	at	48.0 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-007				

KARCO Engineering



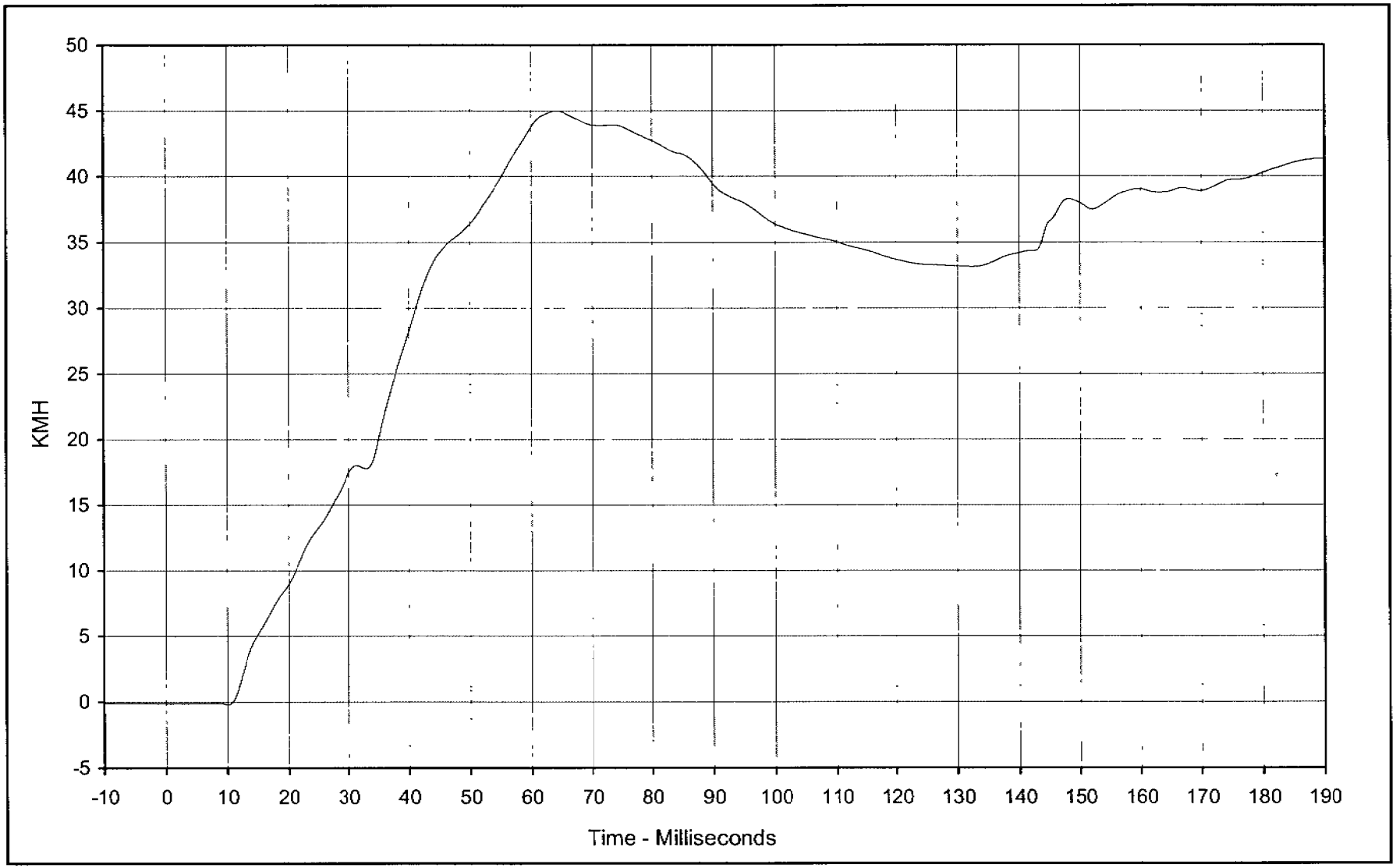
Curve Description:	Driver Pelvis Primary Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	41.7	at	41.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.0	at	3.5 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-007				

KARCO Engineering



Curve Description:	Driver Upper Rib Redundant Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	157.6	at	144.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-103.4	at	144.7 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-008				

KARCO Engineering



Curve Description: Driver Upper Rib Redundant Y Velocity

Maximum Value: 45.0 at 64.2 Milliseconds

Minimum Value: -0.2 at 10.1 Milliseconds

SAE Filter Class: 180

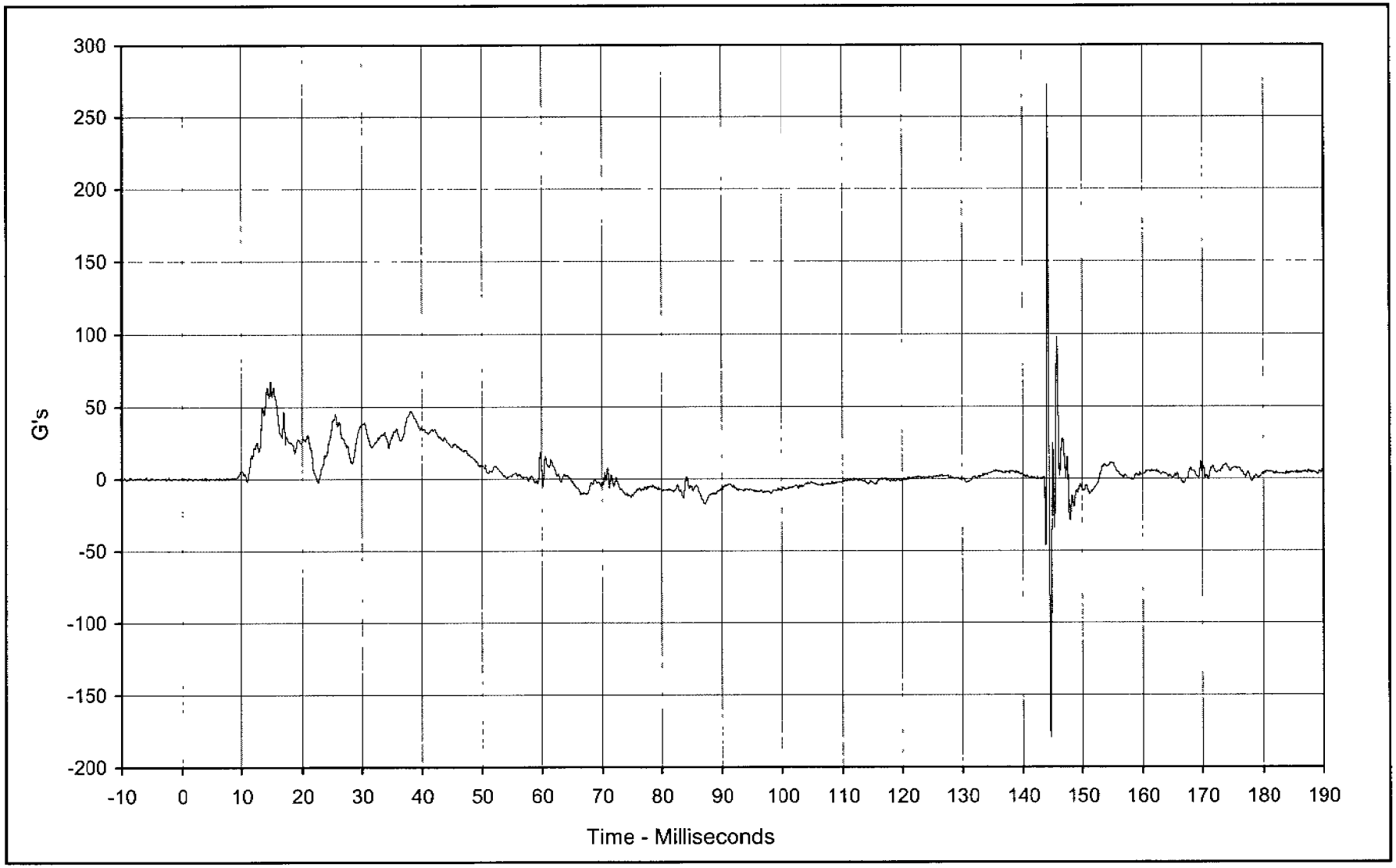
Date of Test: 07/12/00

Curve Number: IN1-008

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

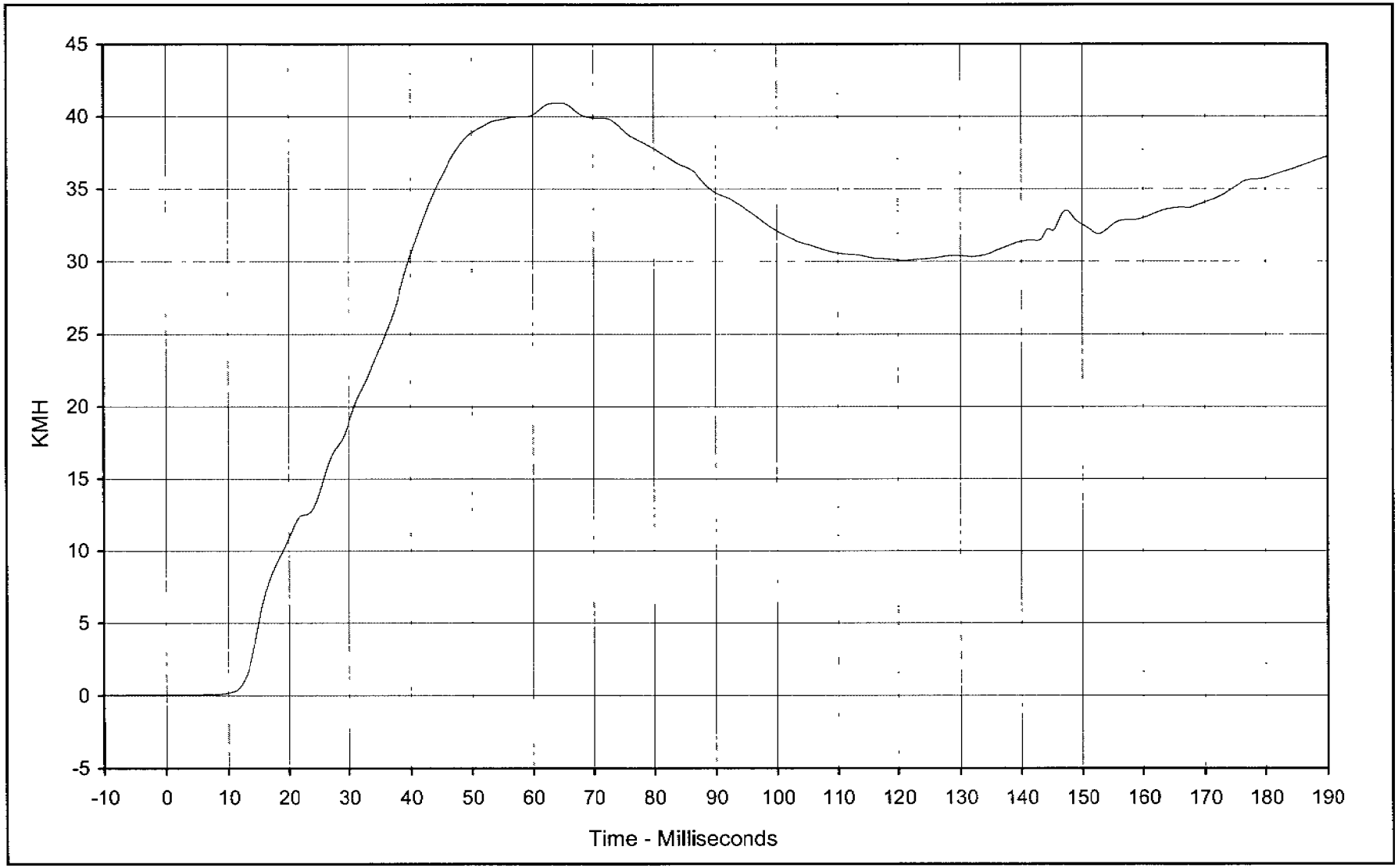
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Driver Lower Rib Redundant Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	271.7	at	144.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-179.8	at	144.6 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-009				

KARCO Engineering



Curve Description: Driver Lower Rib Redundant Y Velocity

Maximum Value: 41.0 at 64.5 Milliseconds

Minimum Value: 0.1 at 0.0 Milliseconds

SAE Filter Class: 180

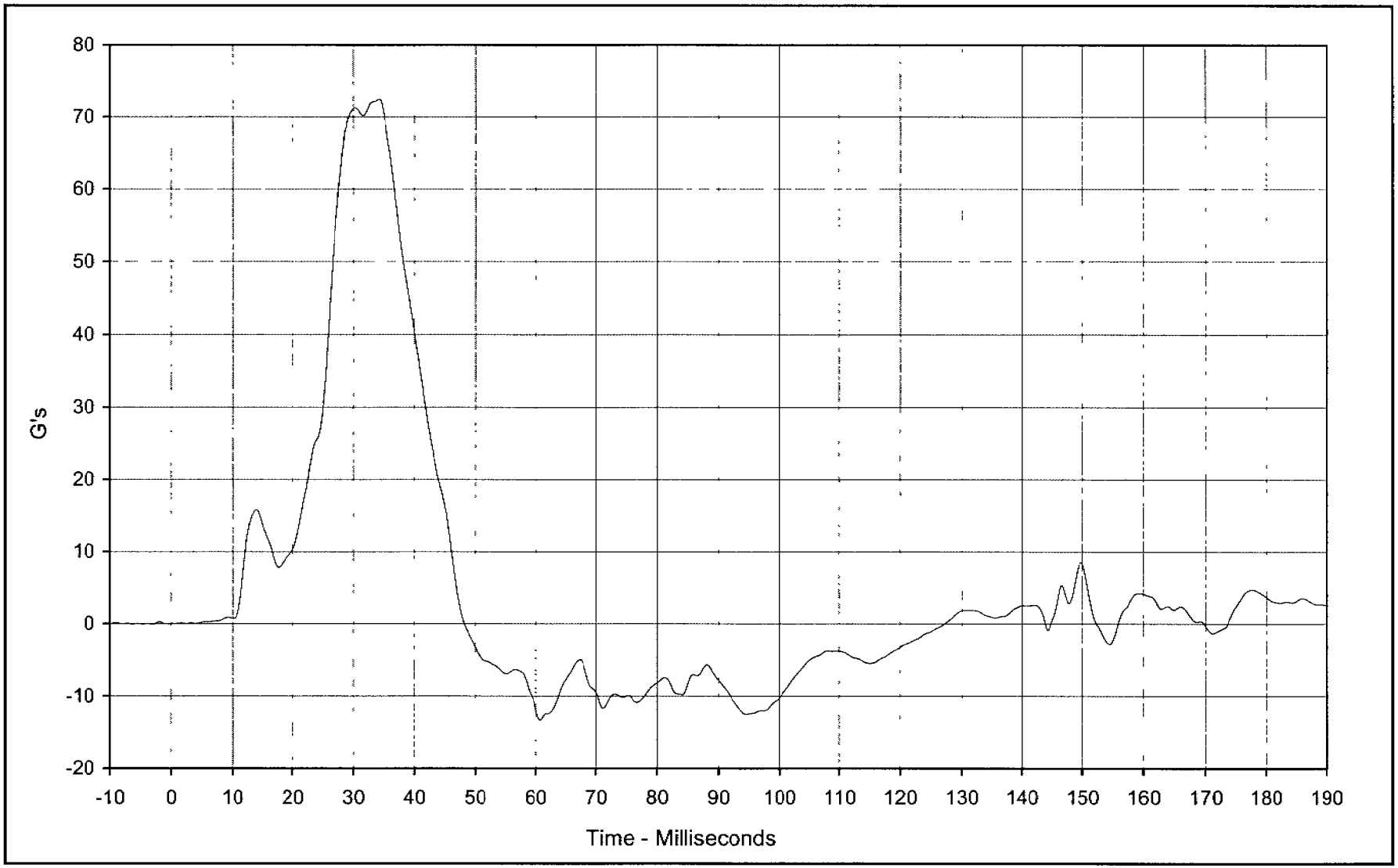
Date of Test: 07/12/00

Curve Number: IN1-009

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Driver Lower Spine Redundant Y			
Maximum Value:	72.5	at	34.1	Milliseconds
Minimum Value:	-13.4	at	60.7	Milliseconds
SAE Filter Class:	180			
Date of Test:	07/12/00			
Curve Number:	FIL-010			

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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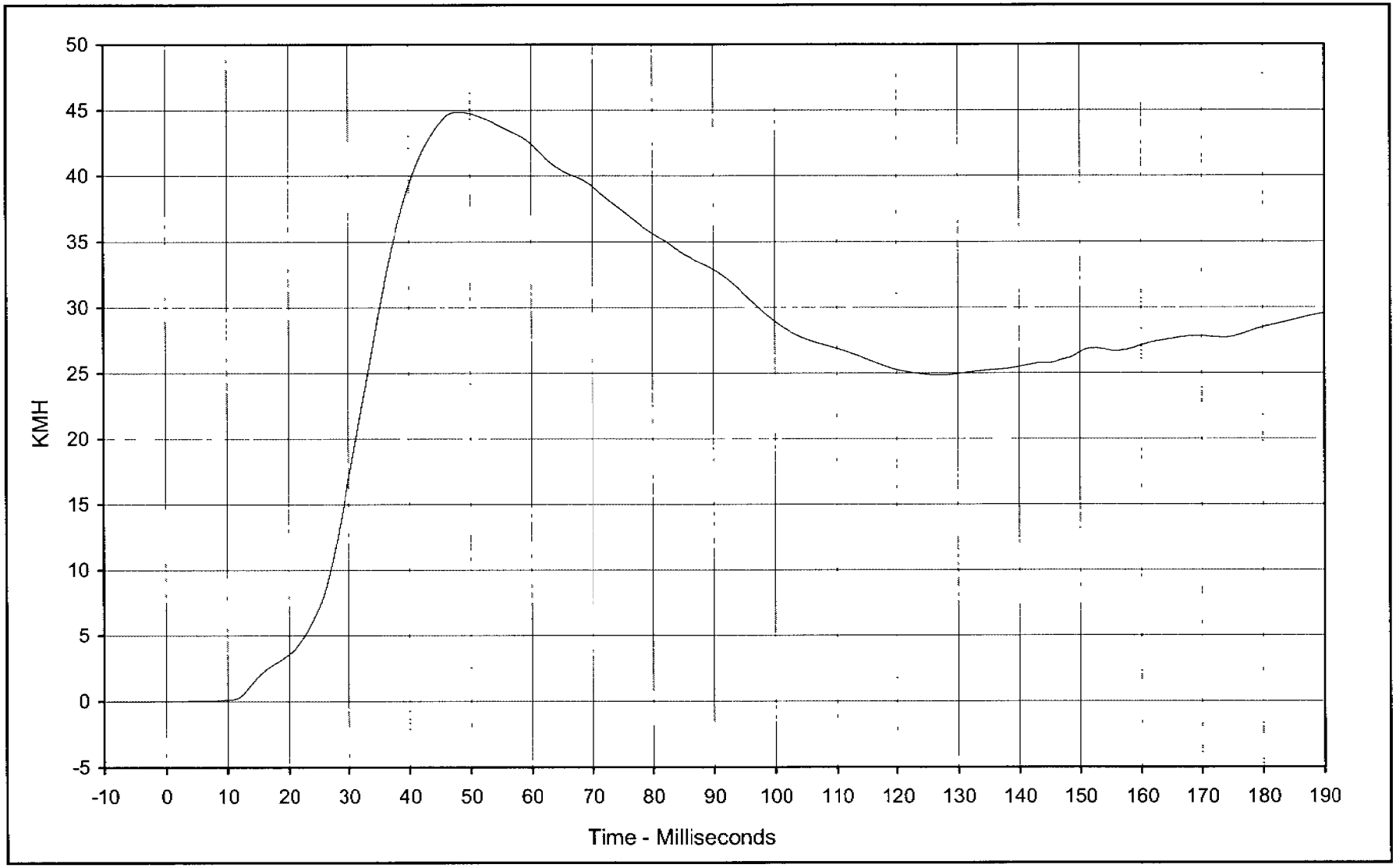

Curve Description: Driver Lower Spine Redundant Y Velocity

Maximum Value: 44.9 at 48.2 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 07/12/00

Curve Number: IN1-0010

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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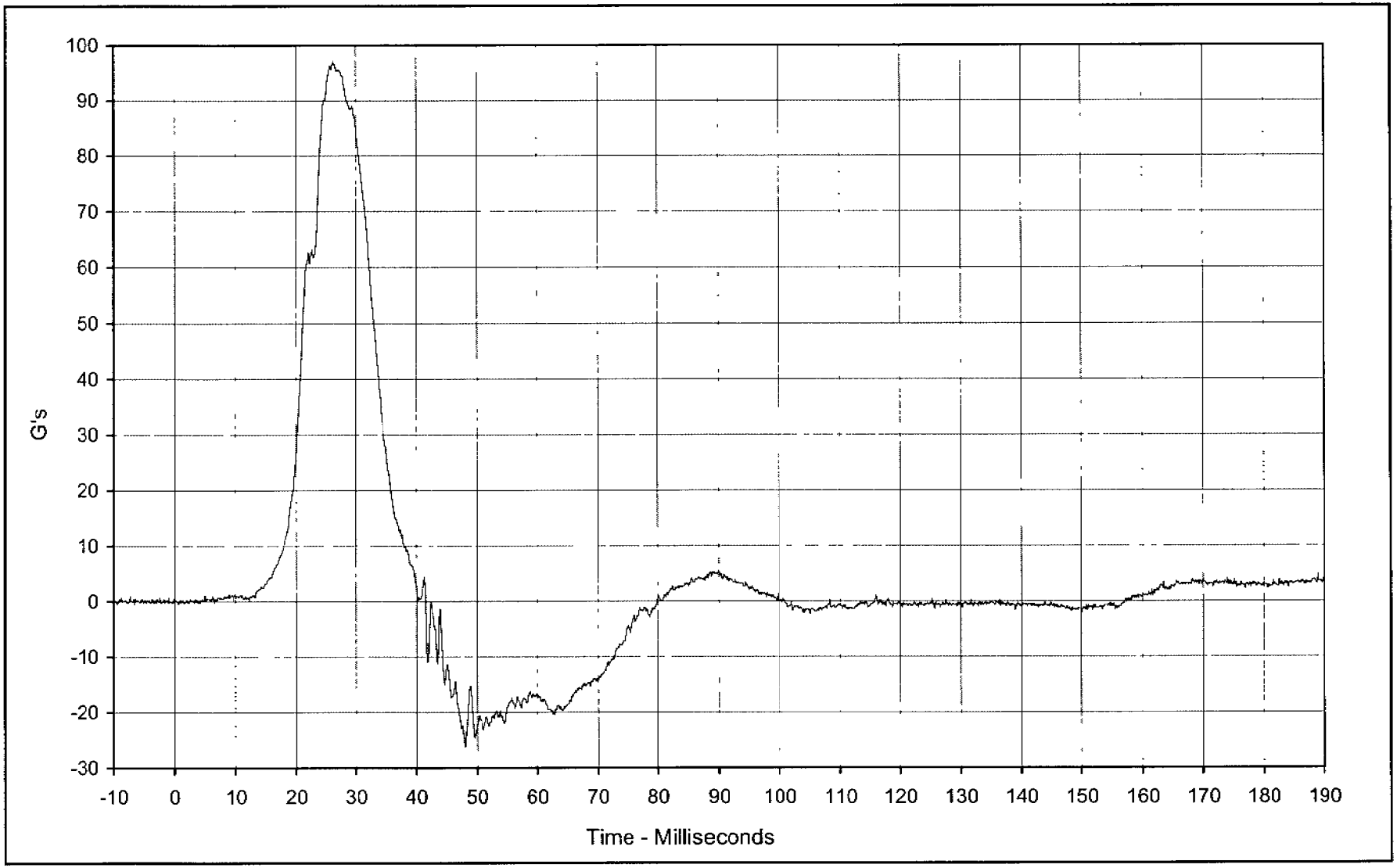
KAR20051-01



Curve Description:	Driver Pelvis Redundant Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	97.2	at	26.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-26.2	at	48.0 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-011				

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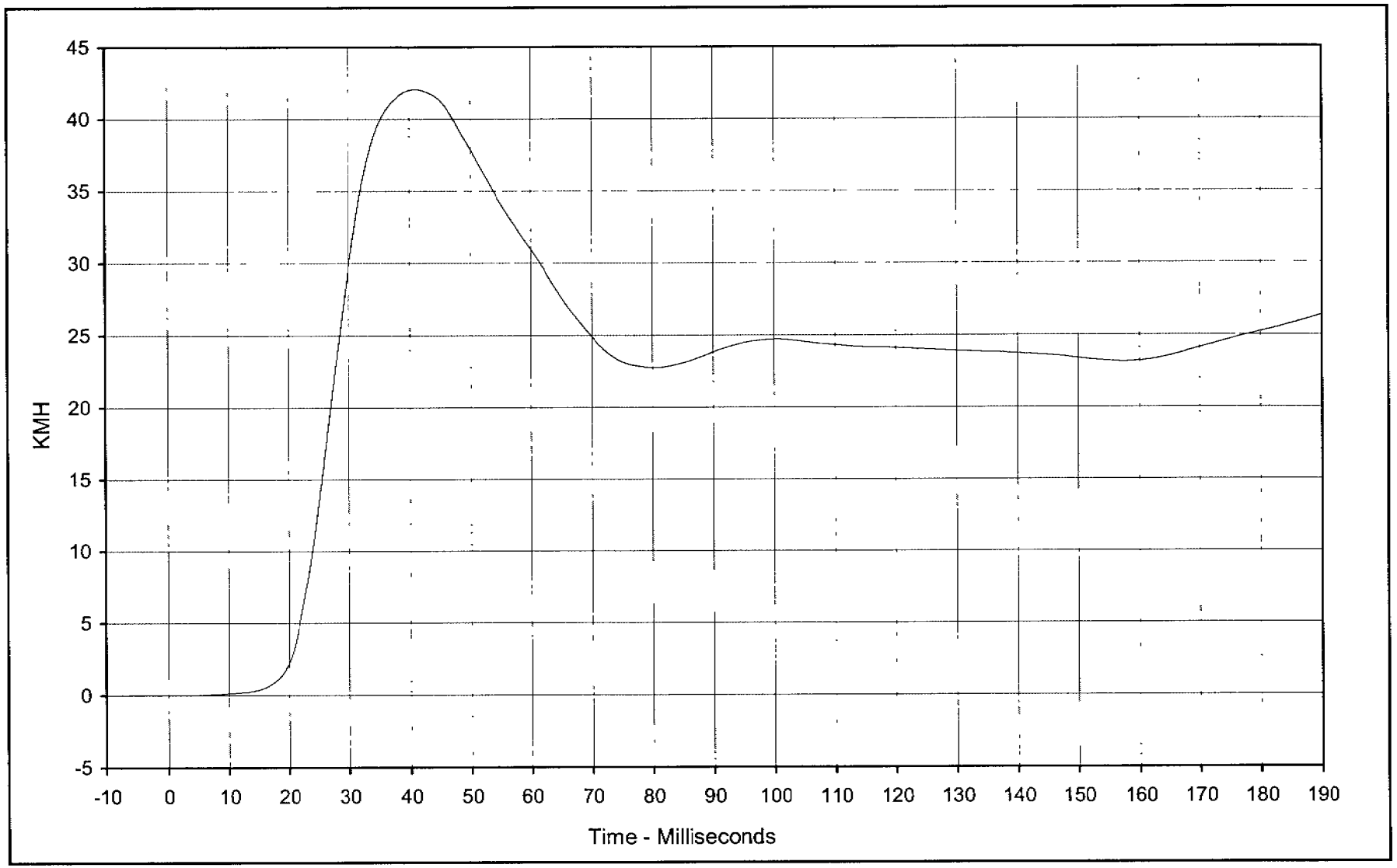


Curve Description: Driver Pelvis Redundant Y Velocity

Maximum Value: 42.1 at 41.1 Milliseconds

Minimum Value: 0.0 at 2.3 Milliseconds

SAE Filter Class: 180

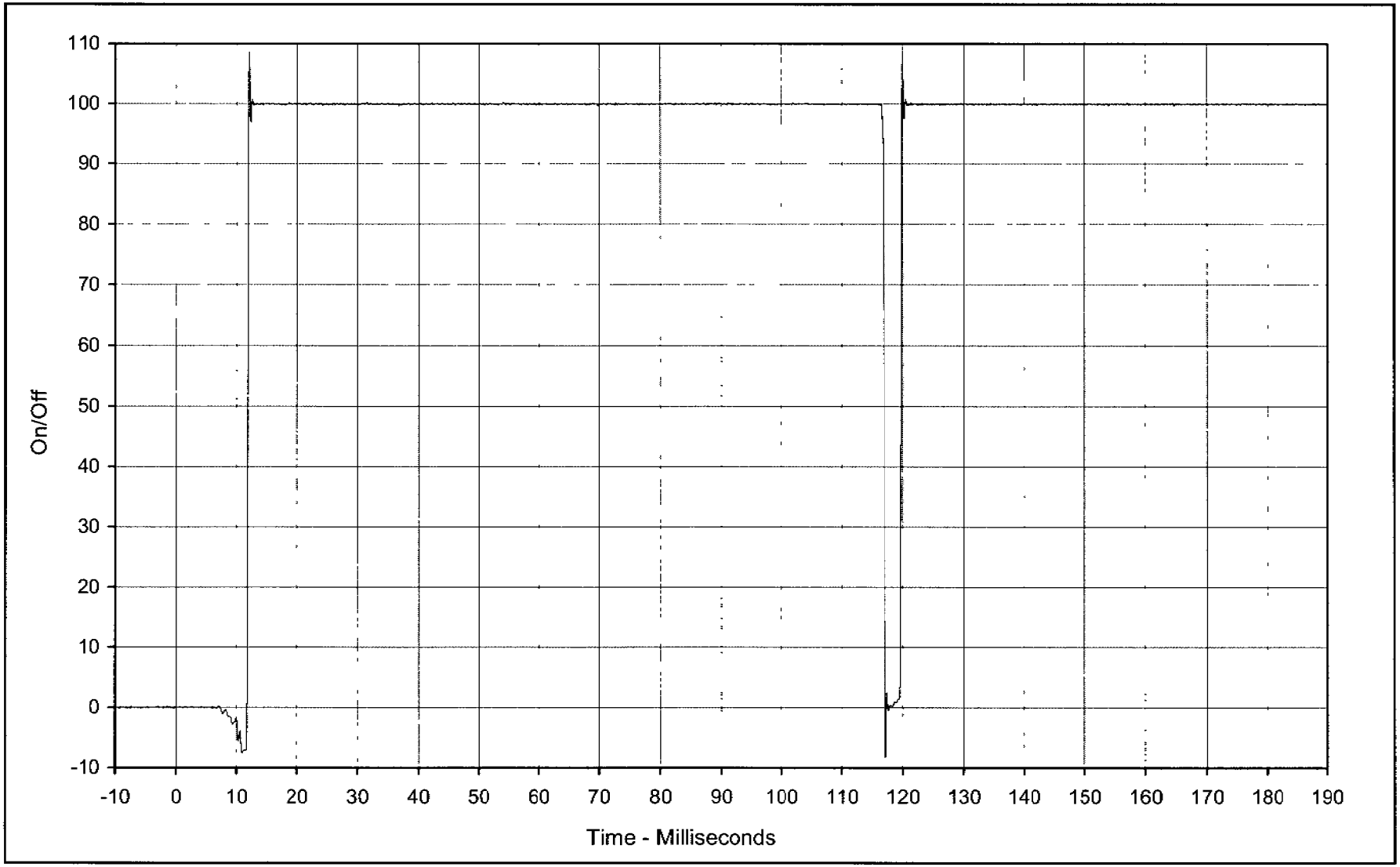
Date of Test: 07/12/00

Curve Number: IN1-011

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

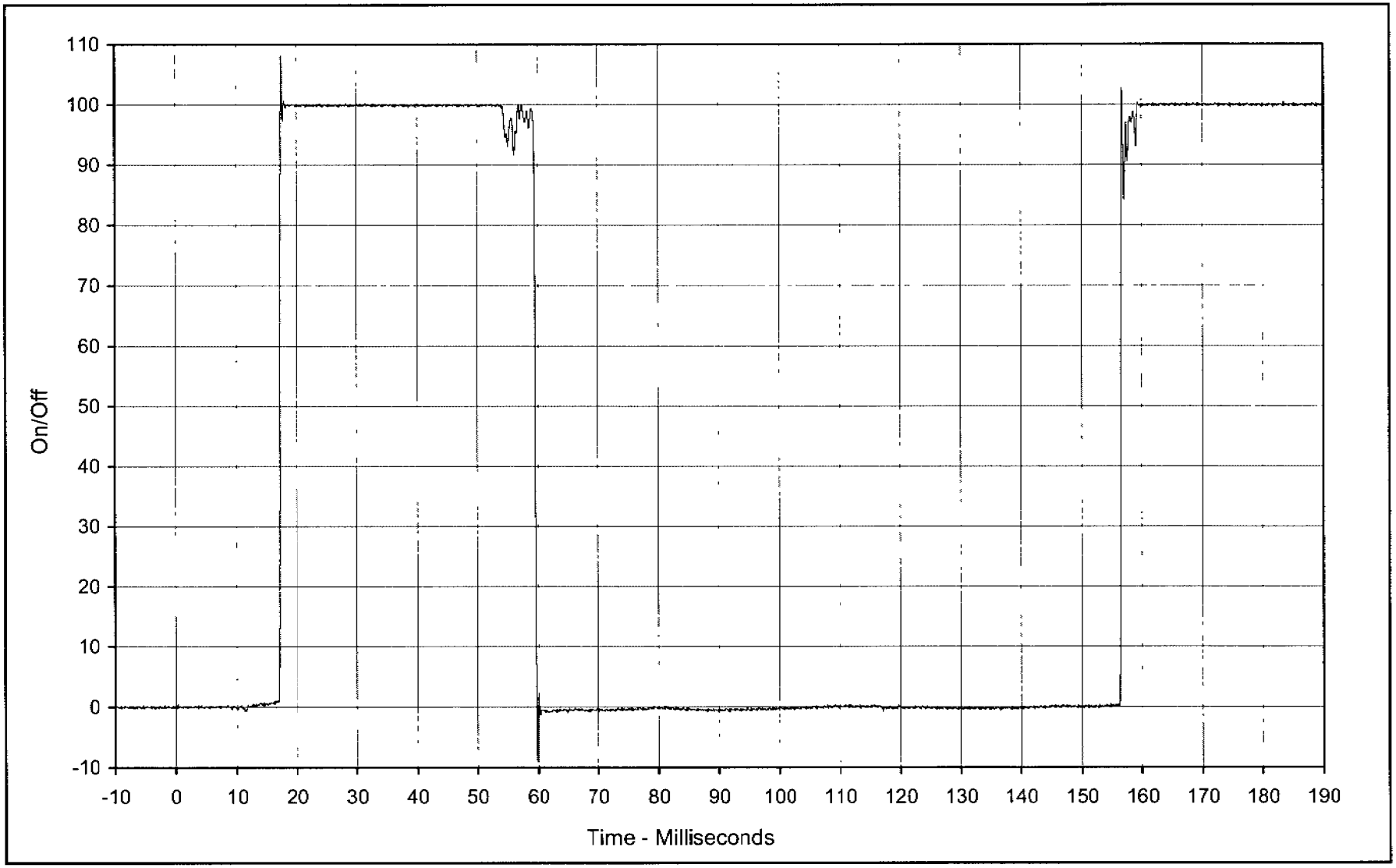
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



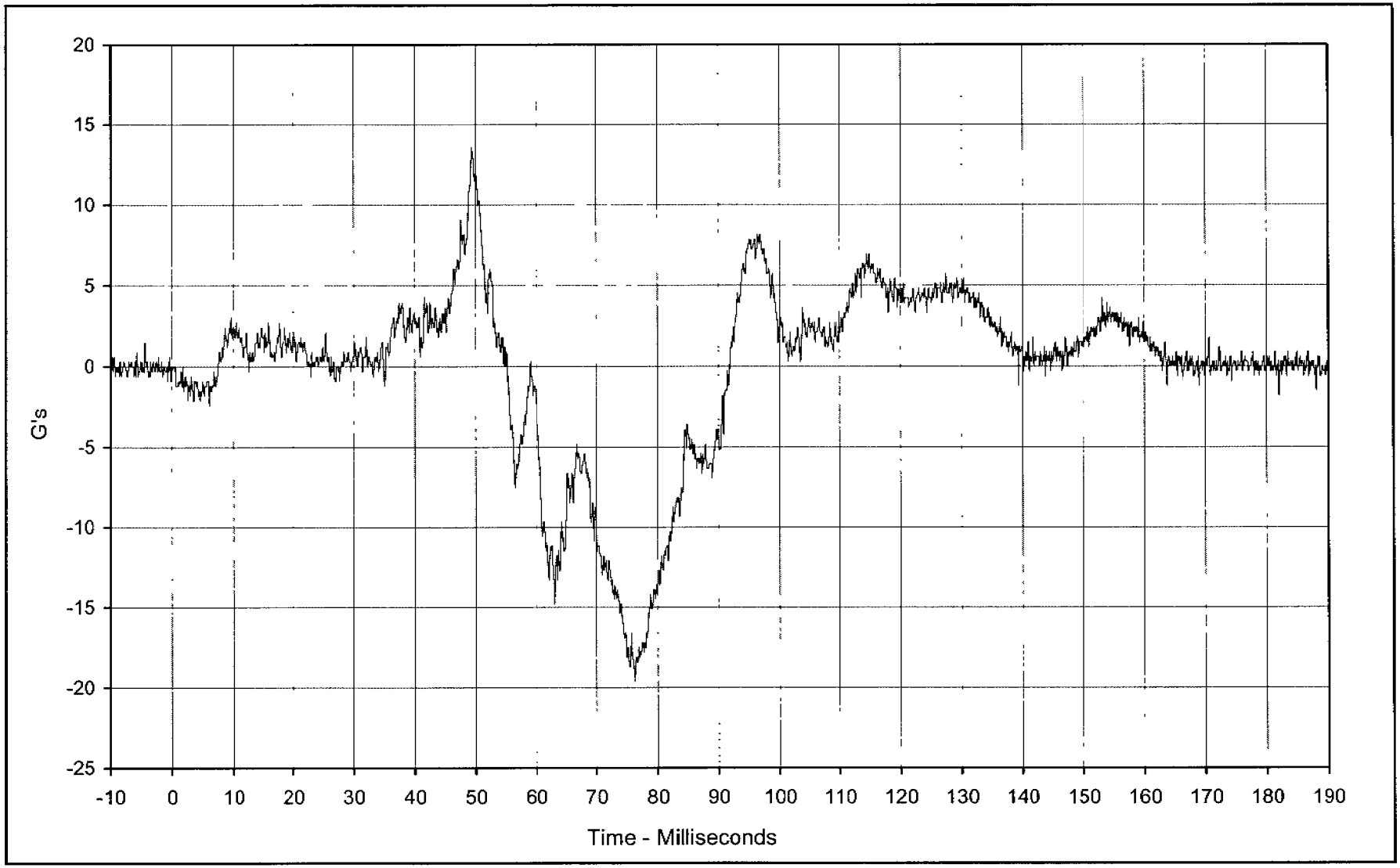
Curve Description:	Driver Thorax Contact			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	108.4	at	12.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Crossing Point:	50%	at	11.9 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-012				

KARC Engineering



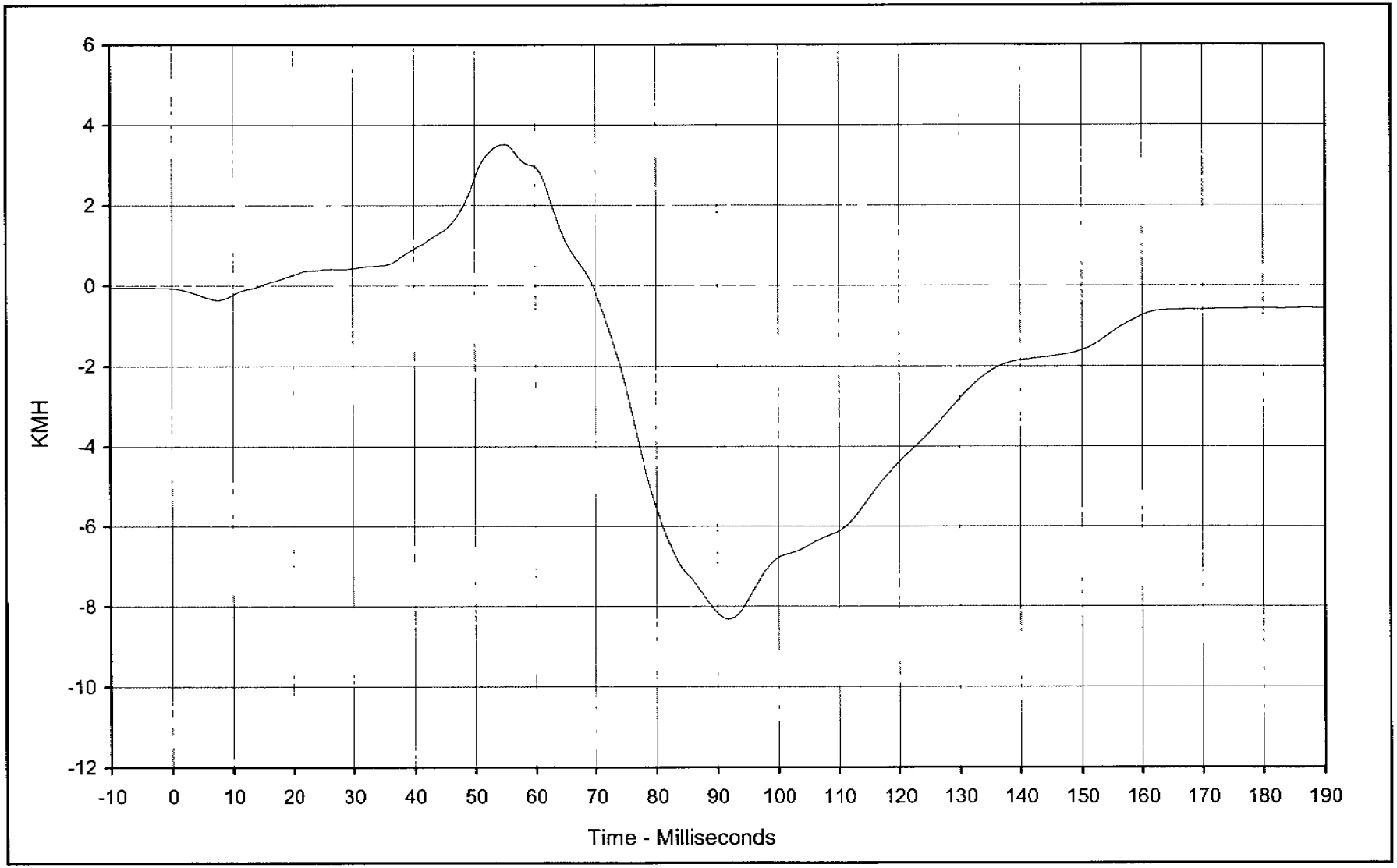
Curve Description:	Driver Pelvis Contact			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	108.1	at	17.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Crossing Point:	50%	at	17.3 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-013				

KARCO Engineering



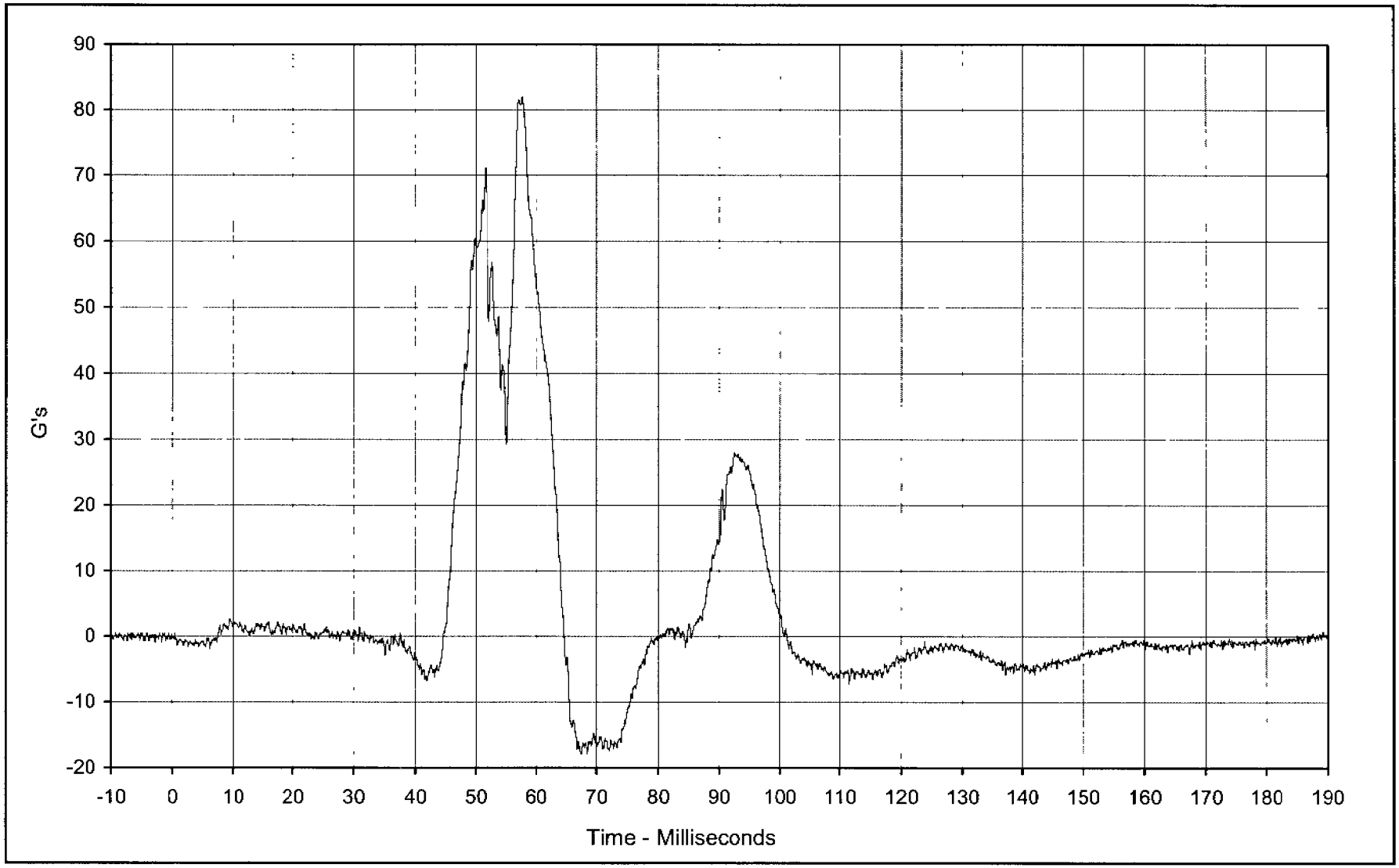
Curve Description:	Pass. Head CG X			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	13.6	at	49.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-19.6	at	76.3 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-014				

KARCO Engineering



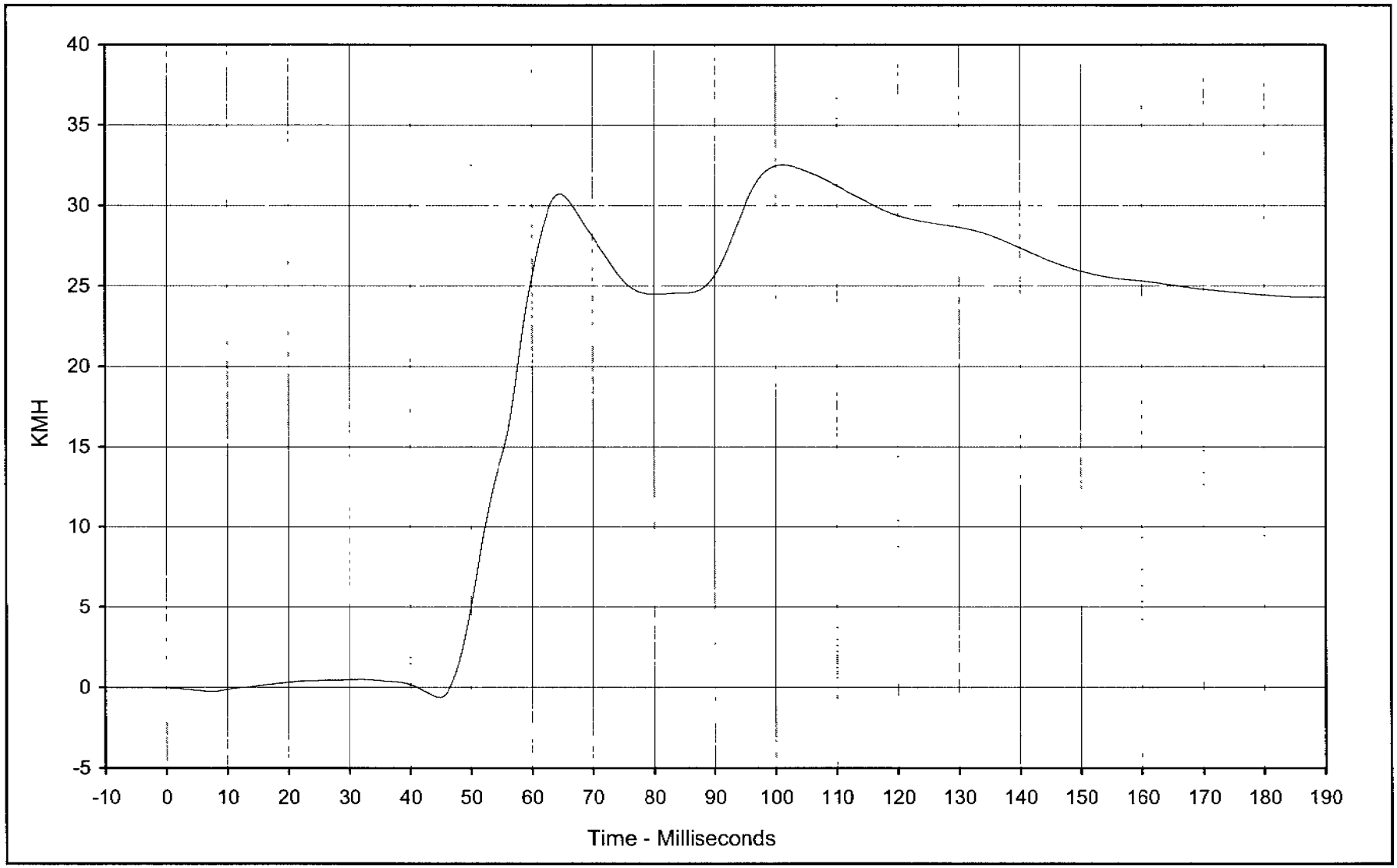
Curve Description:	Pass. Head CG X Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	3.5	at	55.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-8.3	at	91.7 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-014				

KARCO Engineering



Curve Description:	Pass. Head CG Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	82.0	at	57.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-17.9	at	67.4 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-015				

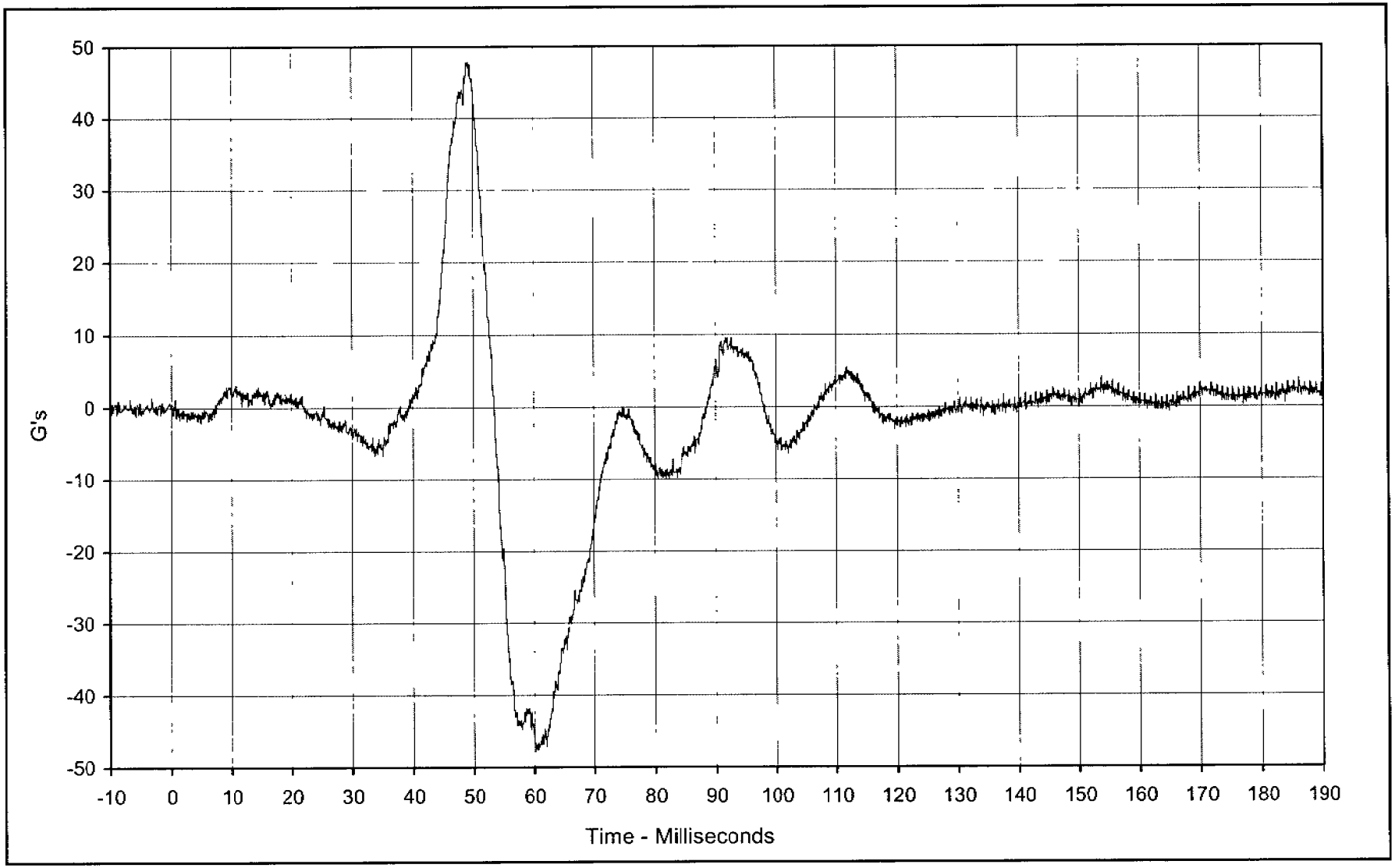
KARCO Engineering



Curve Description:	Pass. Head CG Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	32.5	at	101.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.6	at	44.8 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-015				

KARCO Engineering

KAR20051-01

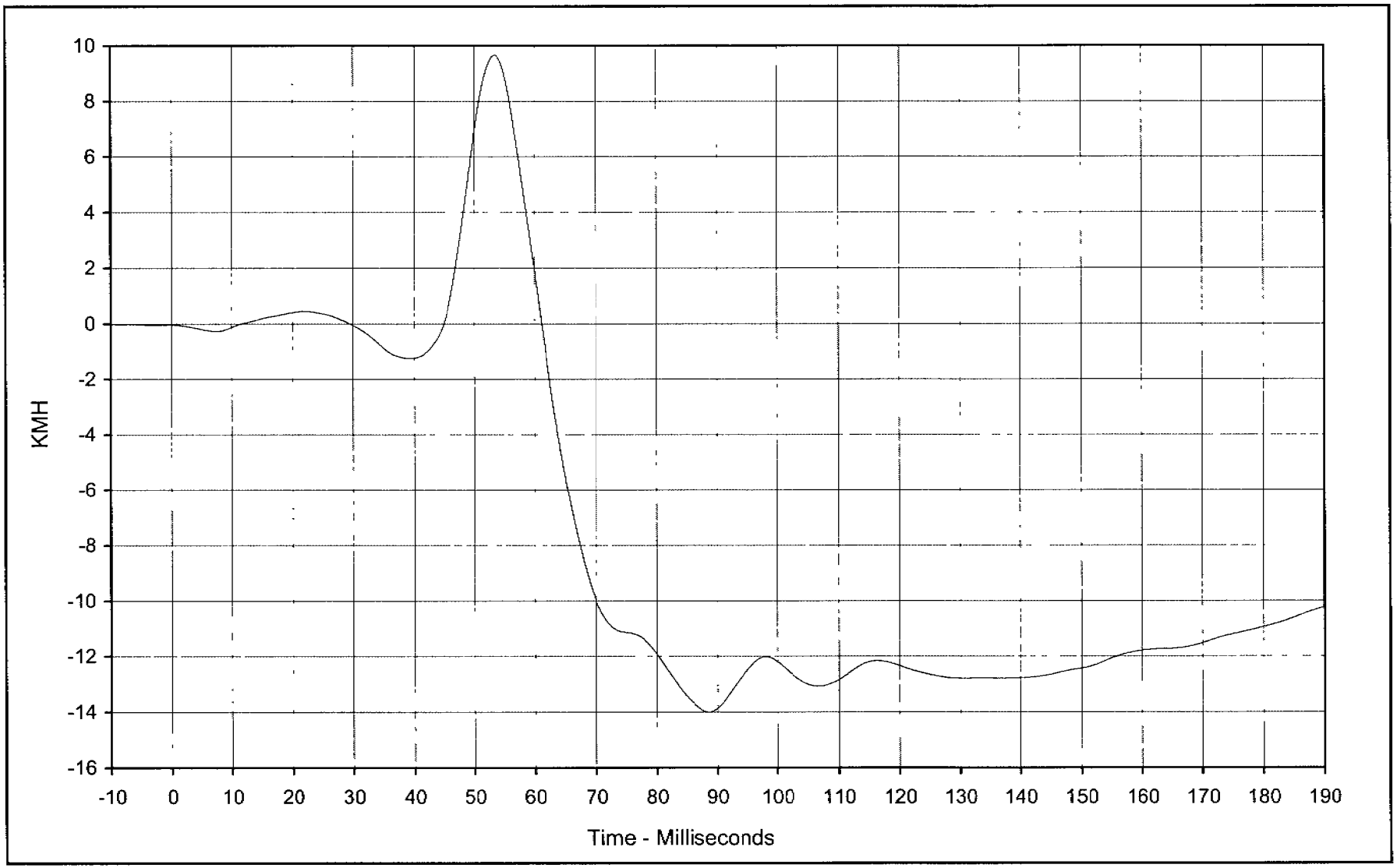


Curve Description:	Pass. Head CG Z			
Maximum Value:	47.8	at	49.0	Milliseconds
Minimum Value:	-47.8	at	60.2	Milliseconds
SAE Filter Class:	1000			
Date of Test:	07/12/00			
Curve Number:	FIL-016			

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

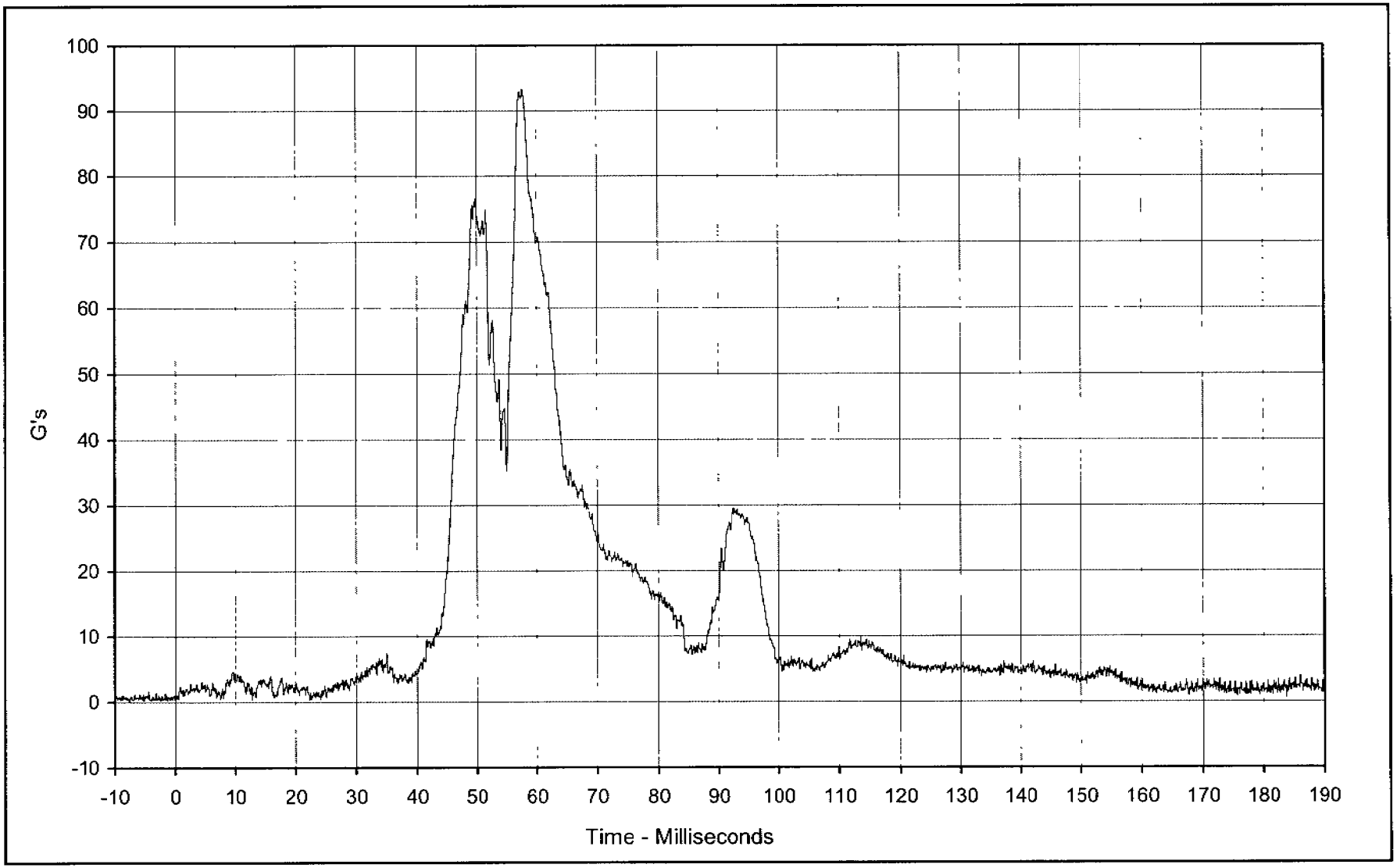
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Pass. Head CG Z Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	9.7	at	53.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-14.0	at	88.5 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-016				

KARC Engineering

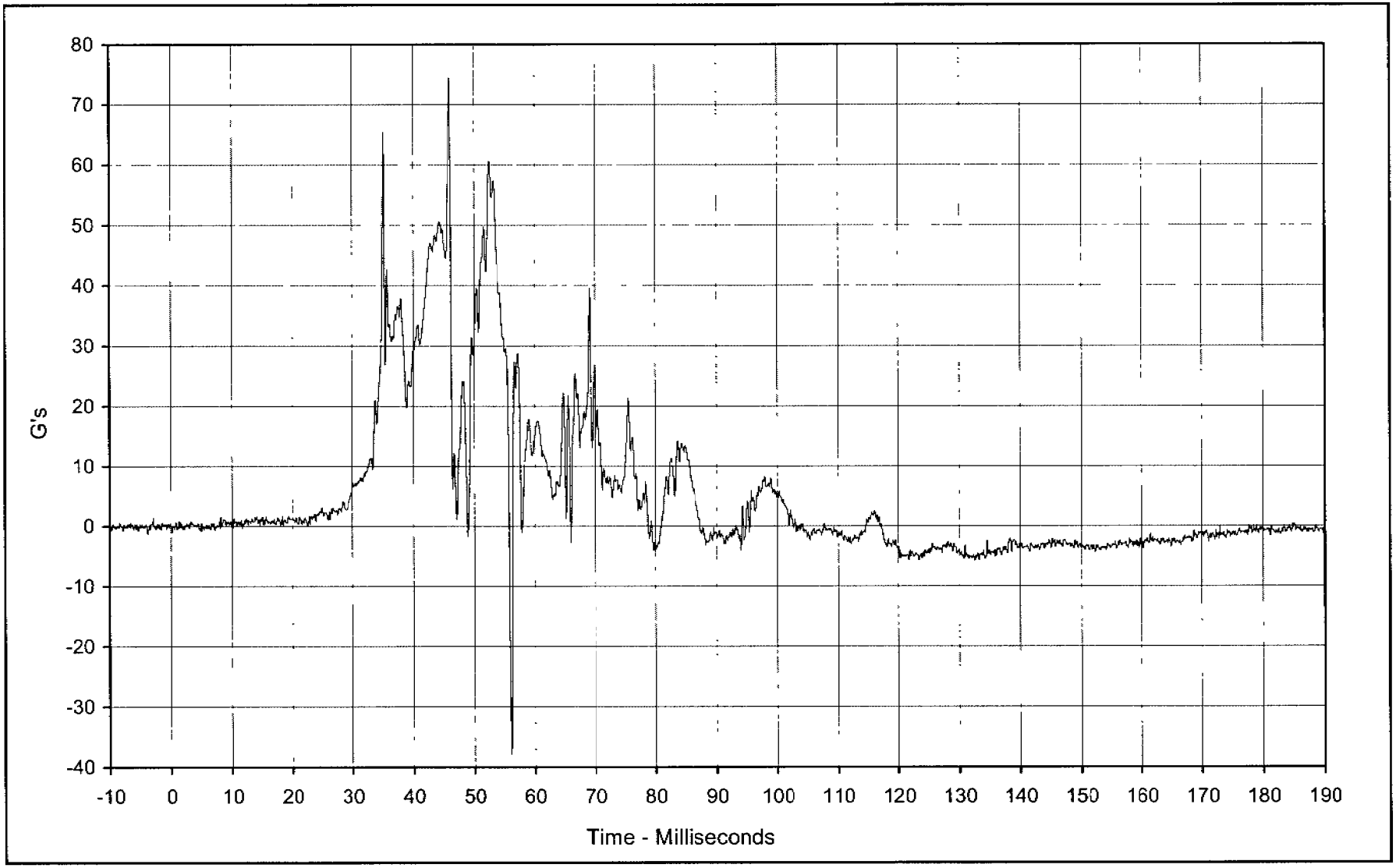


Curve Description:	Pass. Head CG Resultant			
Maximum Value:	93.3	at	57.6	Milliseconds
Minimum Value:	0.3	at	22.3	Milliseconds
SAE Filter Class:	1000			
Date of Test:	07/12/00			
Curve Number:	RES-014			

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

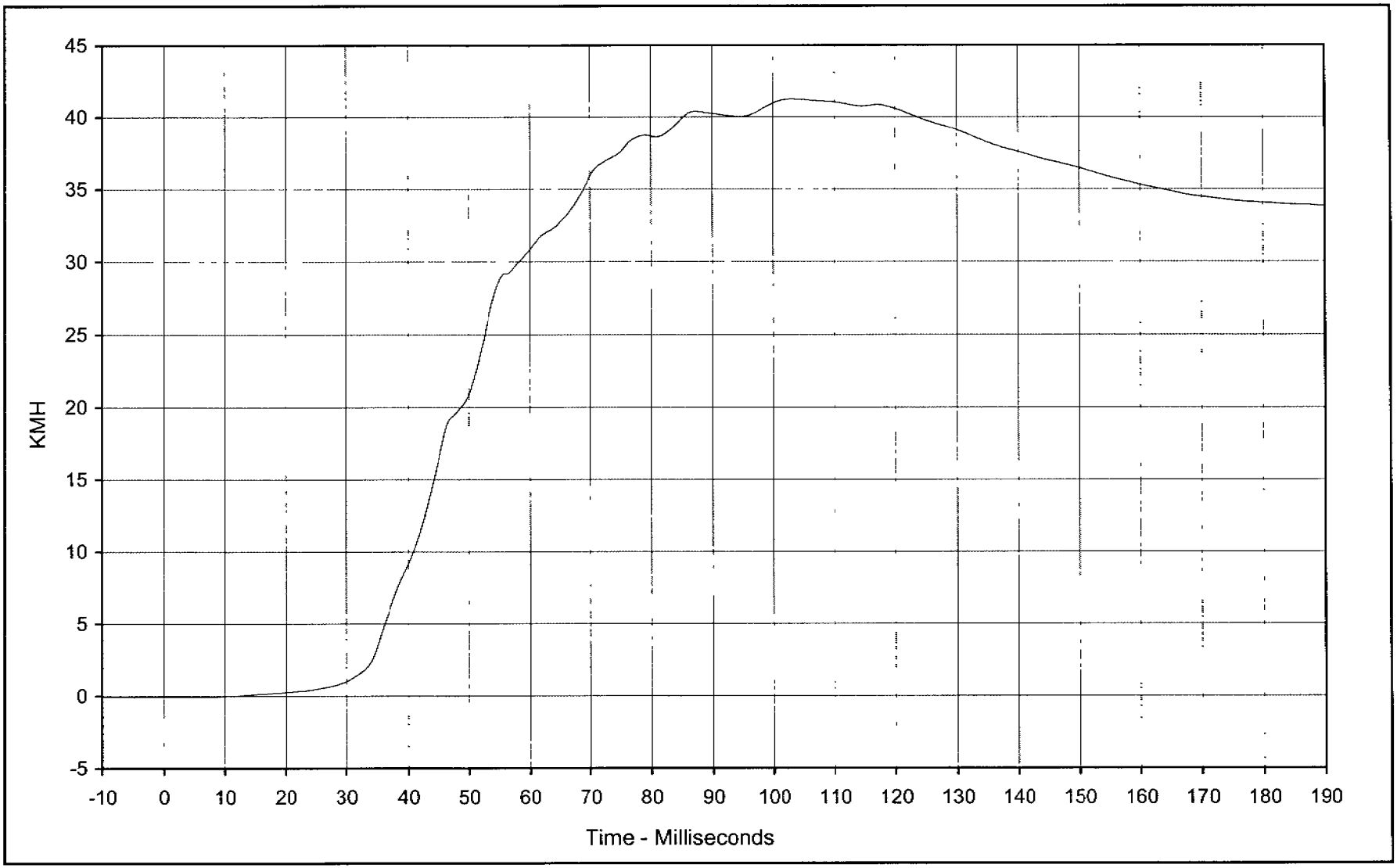
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



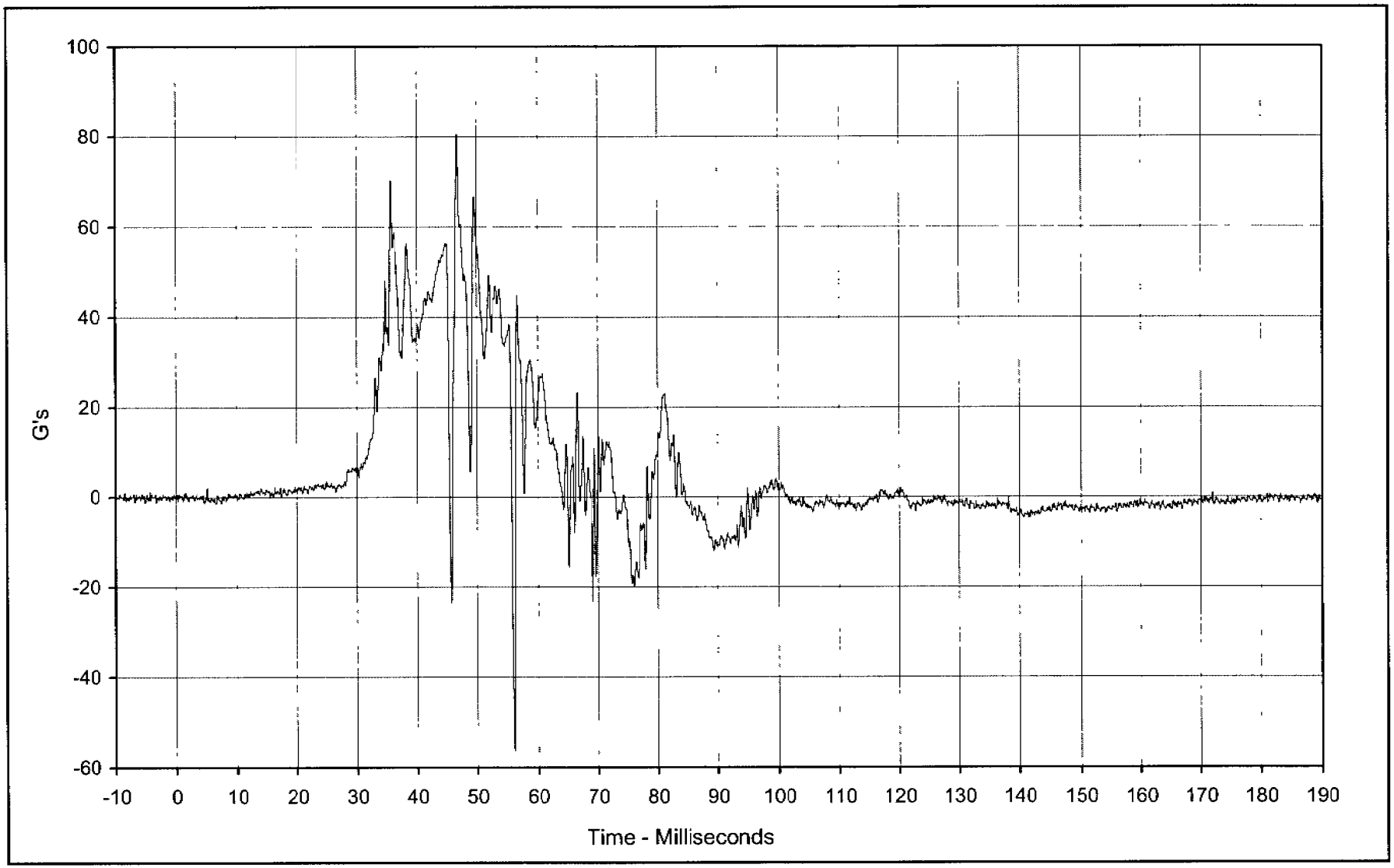
Curve Description:	Pass. Upper Rib Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	74.3	at	46.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-37.9	at	56.1 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-017				

KARC Engineering



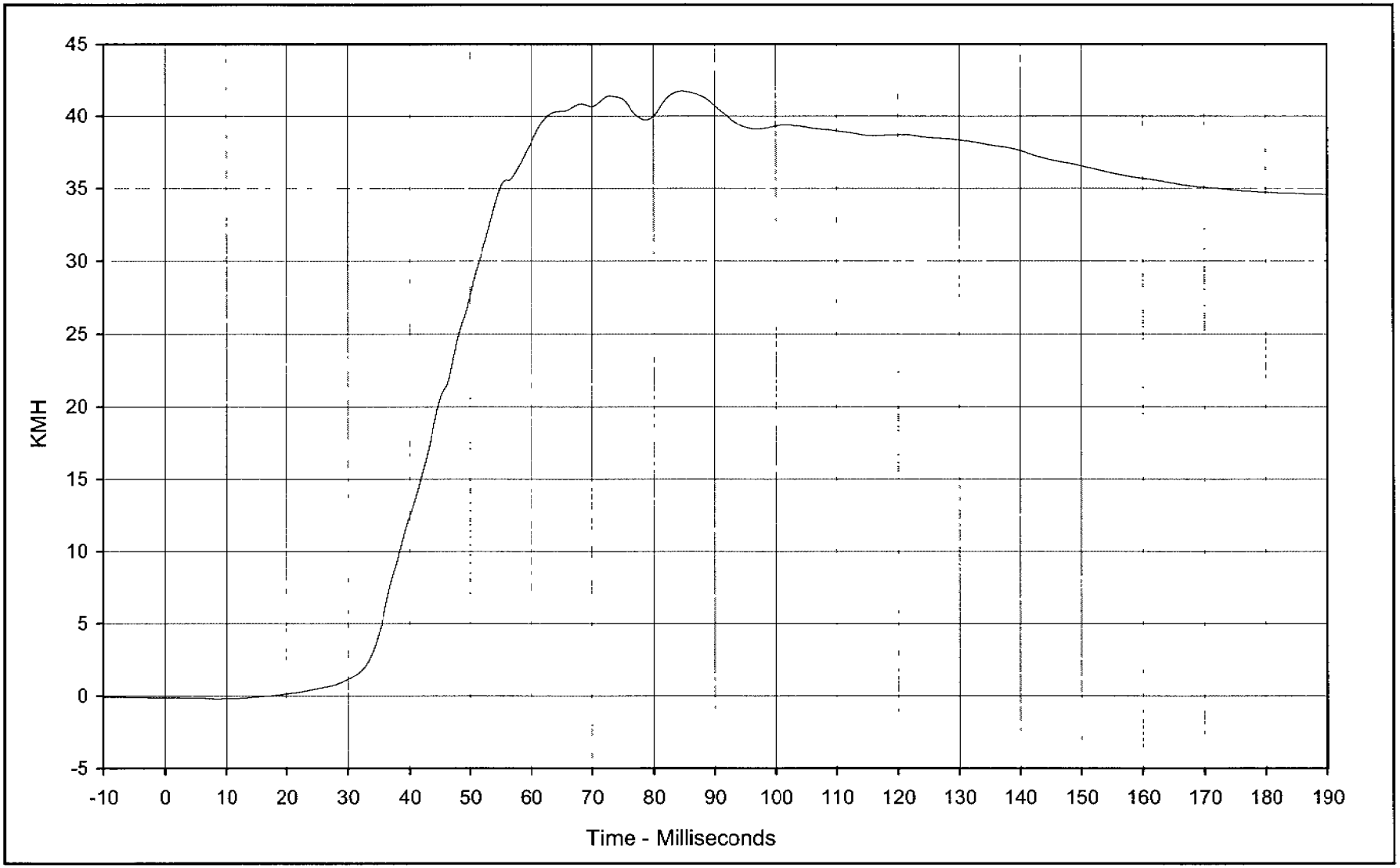
Curve Description:	Pass. Upper Rib Primary Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	41.2	at	103.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.1	at	1.1 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-017				

KARCO Engineering



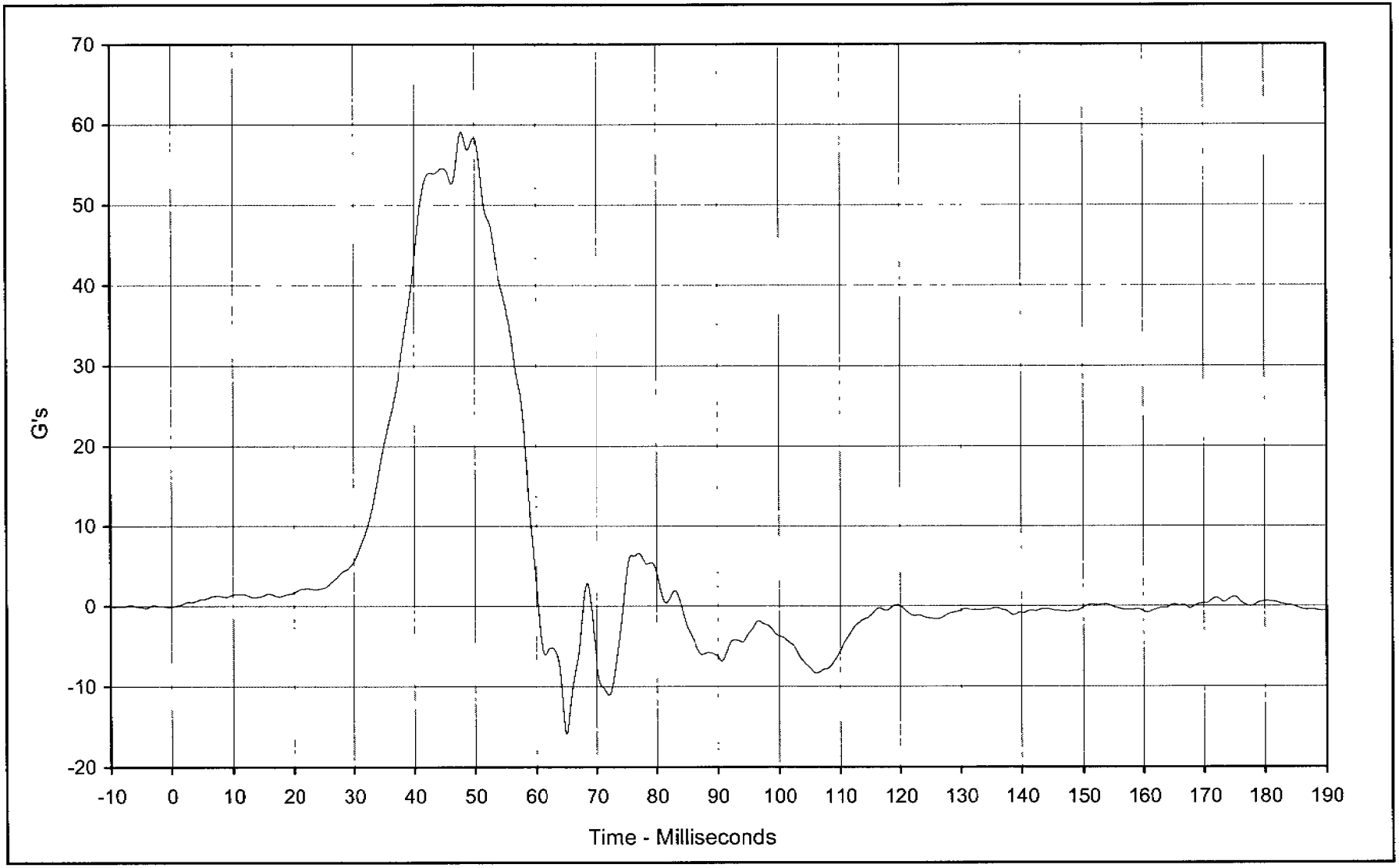
Curve Description:	Pass. Lower Rib Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	80.6	at	46.8 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-56.2	at	56.1 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-018				

KARC Engineering



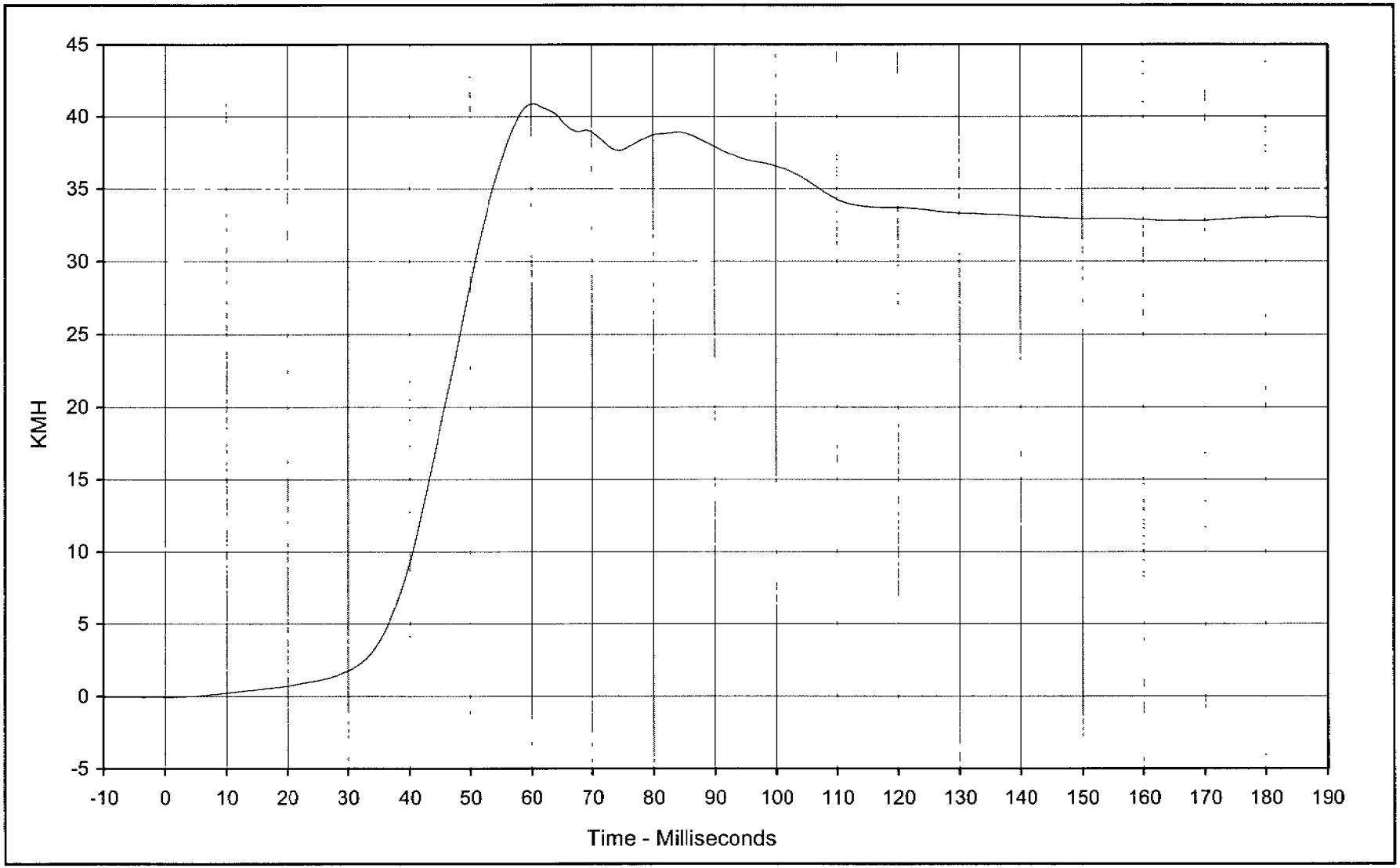
Curve Description:	Pass. Lower Rib Primary Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	41.7	at	84.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.2	at	8.5 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-018				

KARC Engineering



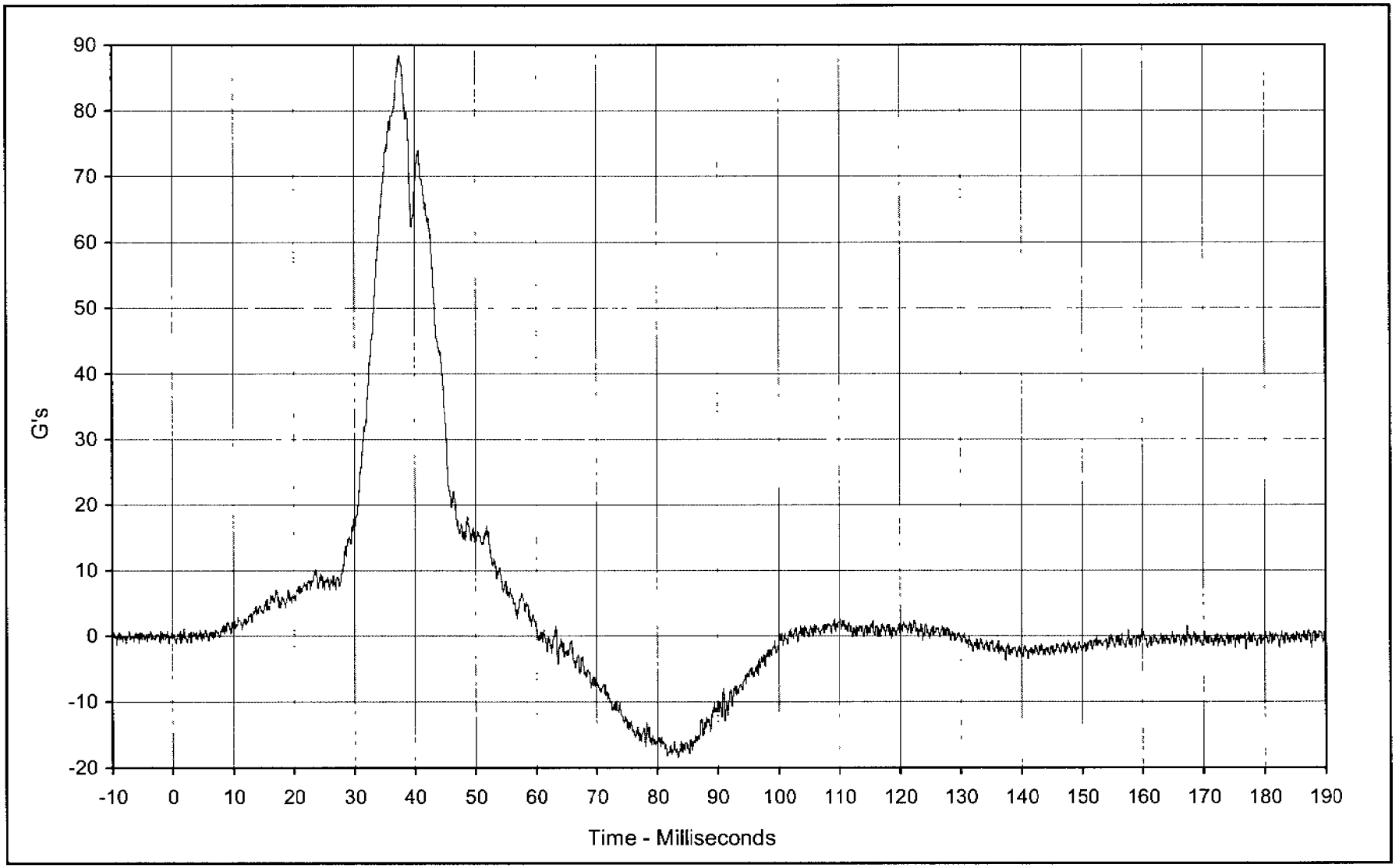
Curve Description:	Pass. Lower Spine Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	59.1	at	47.8 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-15.9	at	64.9 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	FIL-019				

KARCO Engineering



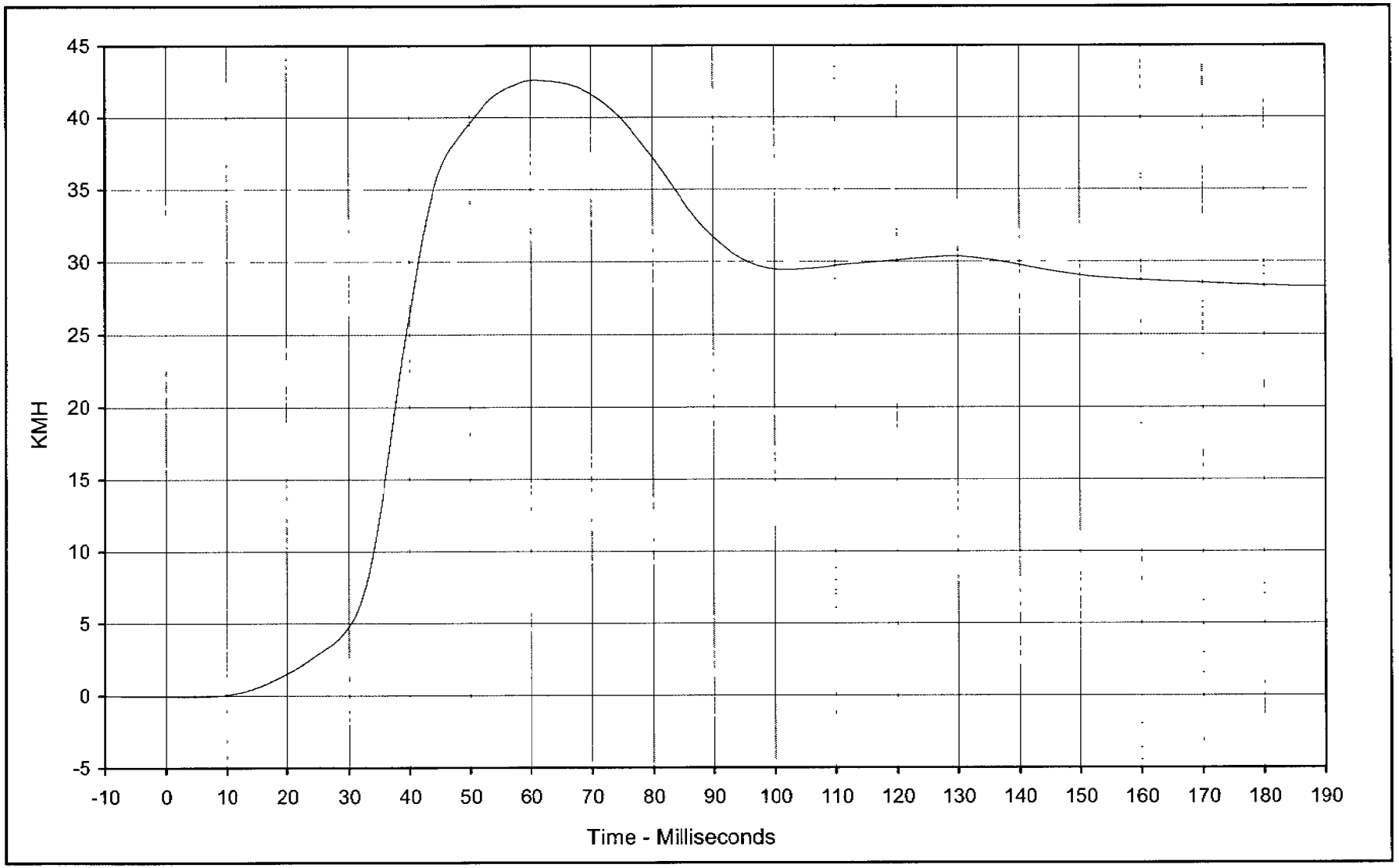
Curve Description:	Pass. Lower Spine Primary Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	40.9	at	60.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.1	at	0.5 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-019				

KARCO Engineering



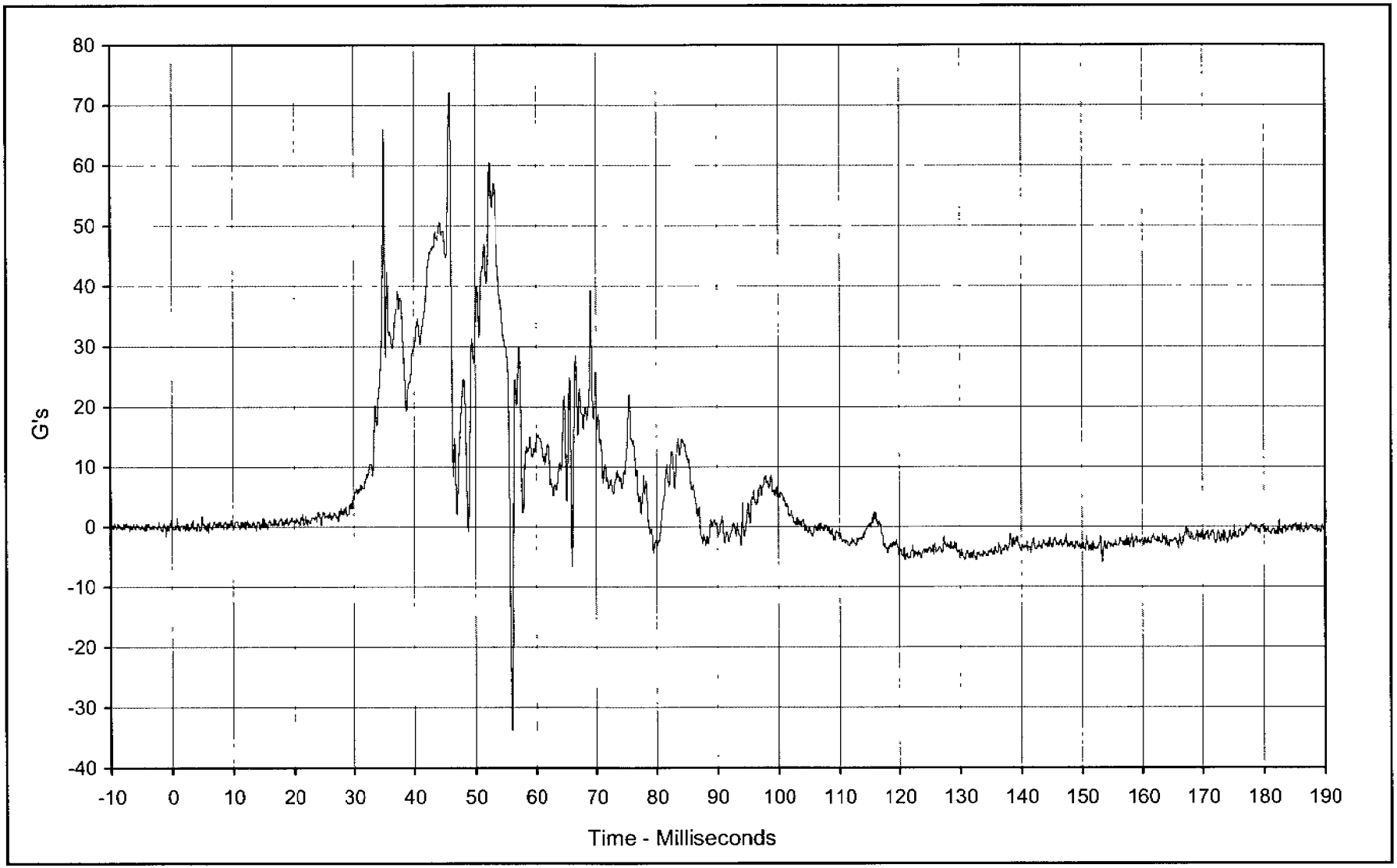
Curve Description:	Pass. Pelvis Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	88.4	at	37.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-18.5	at	83.3 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-020				

KARC Engineering



Curve Description:	Pass. Pelvis Primary Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	42.6	at	60.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.1	at	3.3 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-020				

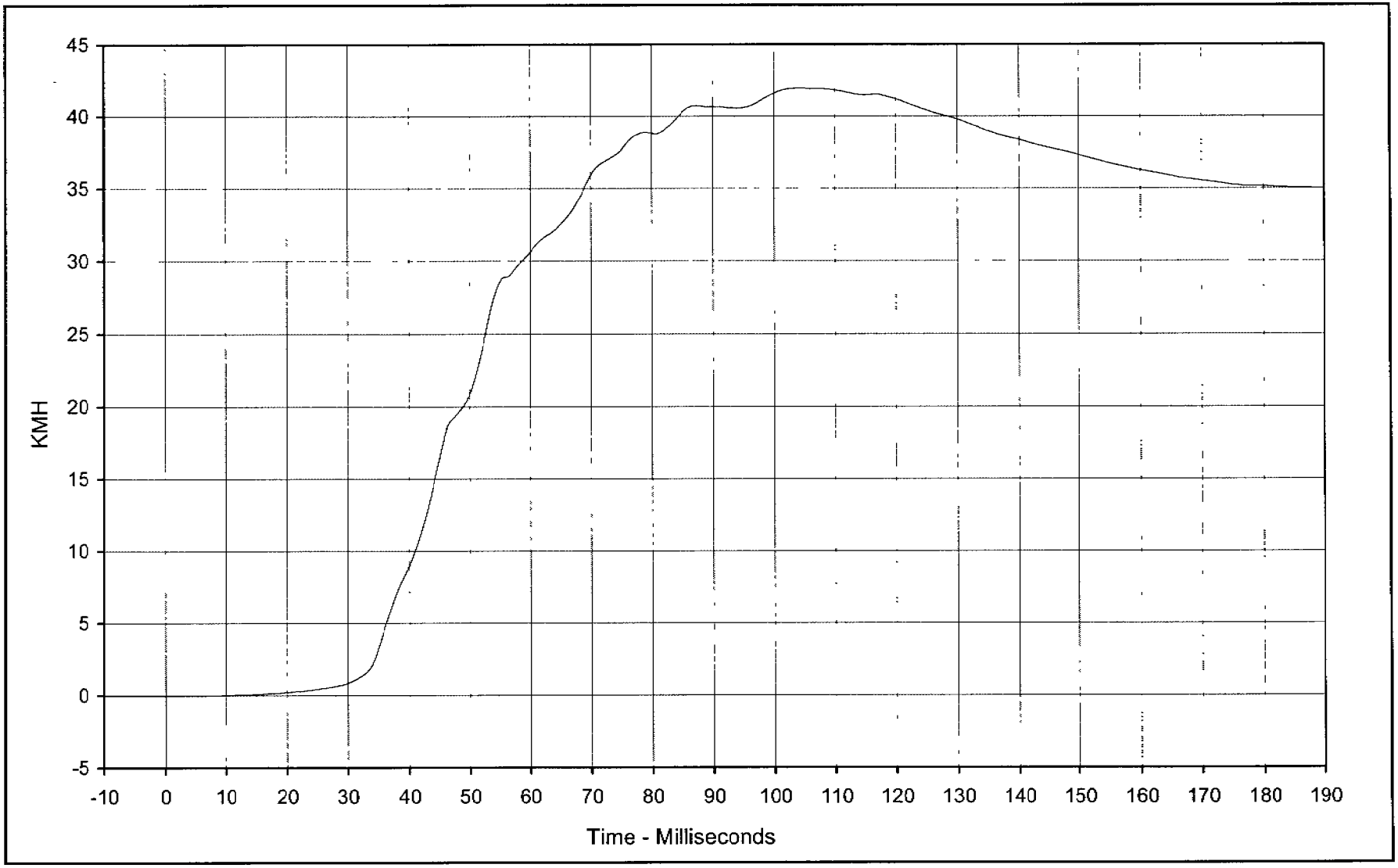
KARC Engineering



Curve Description:	Pass. Upper Rib Redundant Y				
Maximum Value:	72.1	at	45.9	Milliseconds	
Minimum Value:	-33.8	at	56.0	Milliseconds	
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-021				

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Pass. Upper Rib Redundant Y Velocity

Maximum Value: 42.0 at 104.4 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

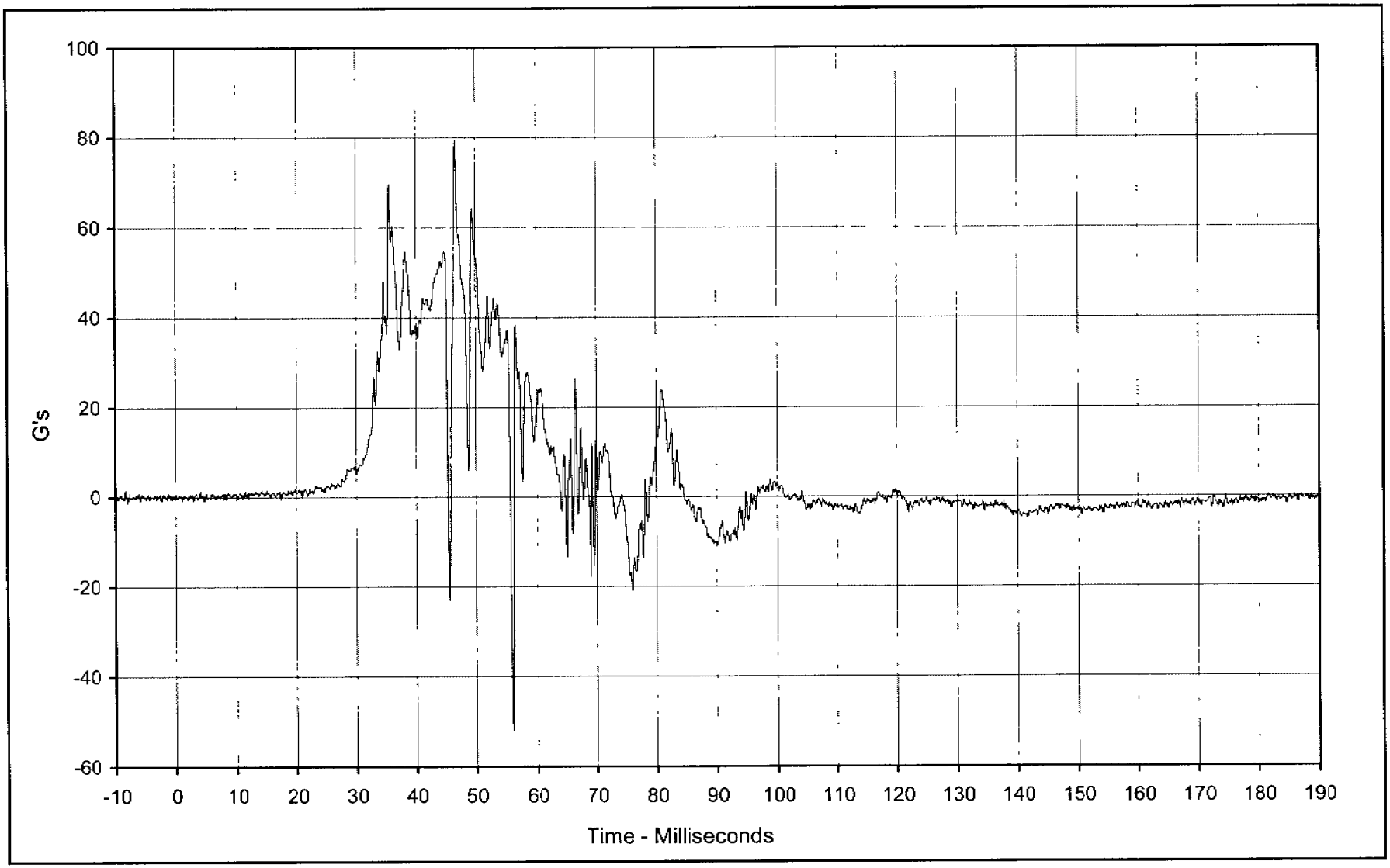
Date of Test: 07/12/00

Curve Number: IN1-021

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Pass. Lower Rib Redundant Y

Maximum Value: 79.3 at 46.7 Milliseconds

Minimum Value: -51.9 at 56.0 Milliseconds

SAE Filter Class: 1000

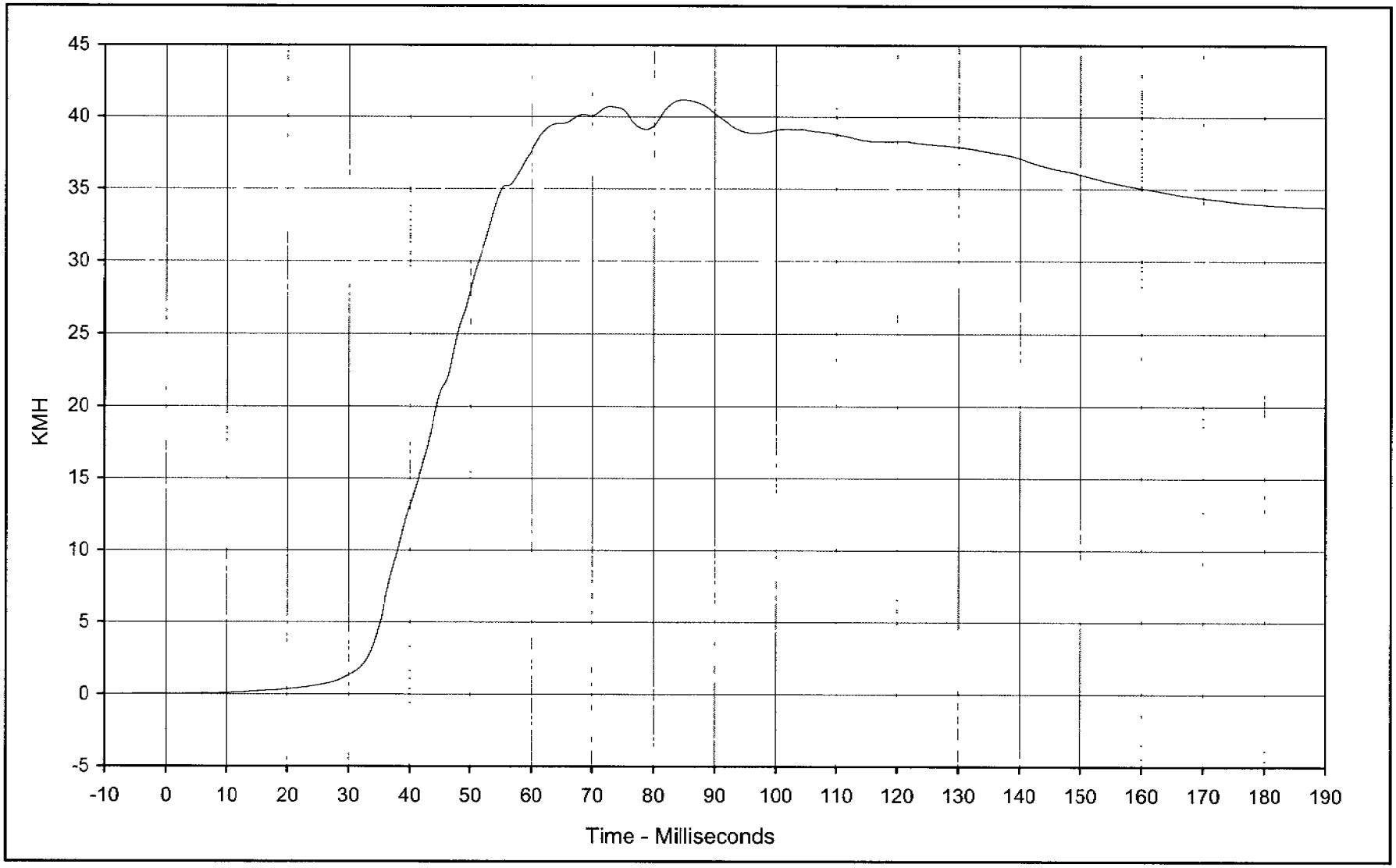
Date of Test: 07/12/00

Curve Number: FIL-022

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Pass. Lower Rib Redundant Y Velocity

Maximum Value: 41.2 at 84.7 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

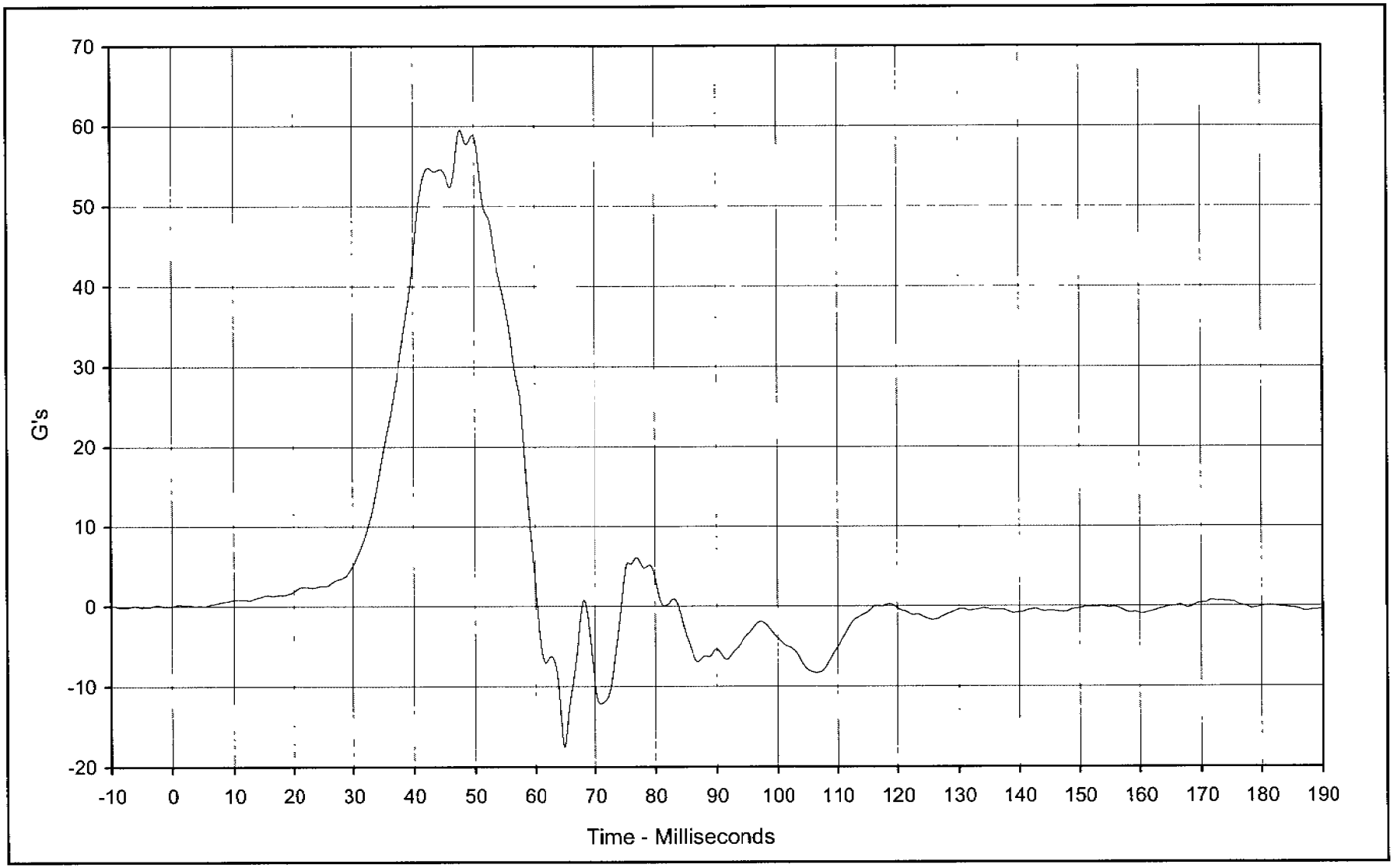
Date of Test: 07/12/00

Curve Number: IN1-022

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Pass. Lower Spine Redundant Y

Maximum Value: 59.5 at 47.8 Milliseconds

Minimum Value: -17.5 at 64.8 Milliseconds

SAE Filter Class: 180

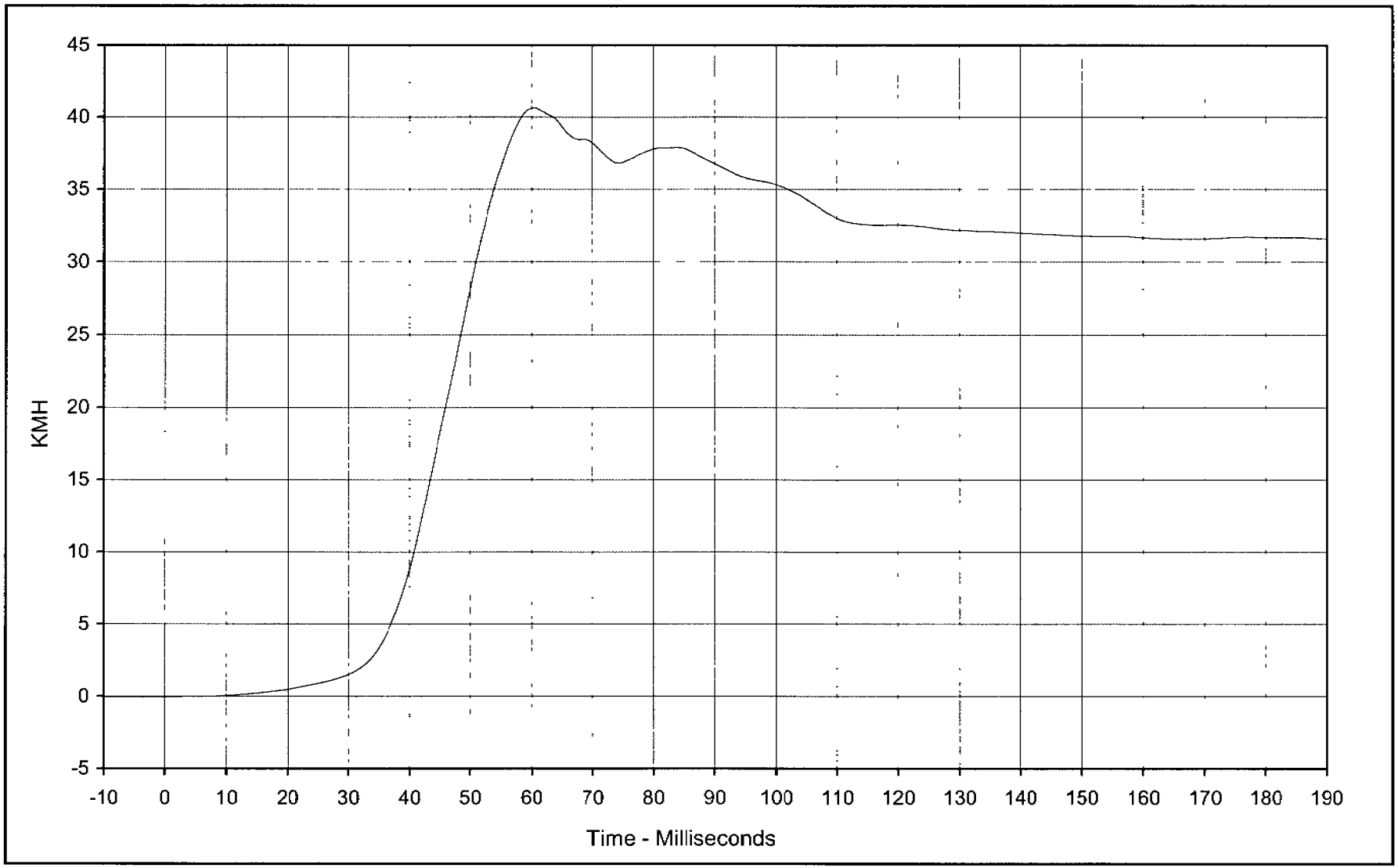
Date of Test: 07/12/00

Curve Number: FIL-023

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Pass. Lower Spine Redundant Y Velocity

Maximum Value: 40.6 at 60.3 Milliseconds

Minimum Value: 0.0 at 0.1 Milliseconds

SAE Filter Class: 180

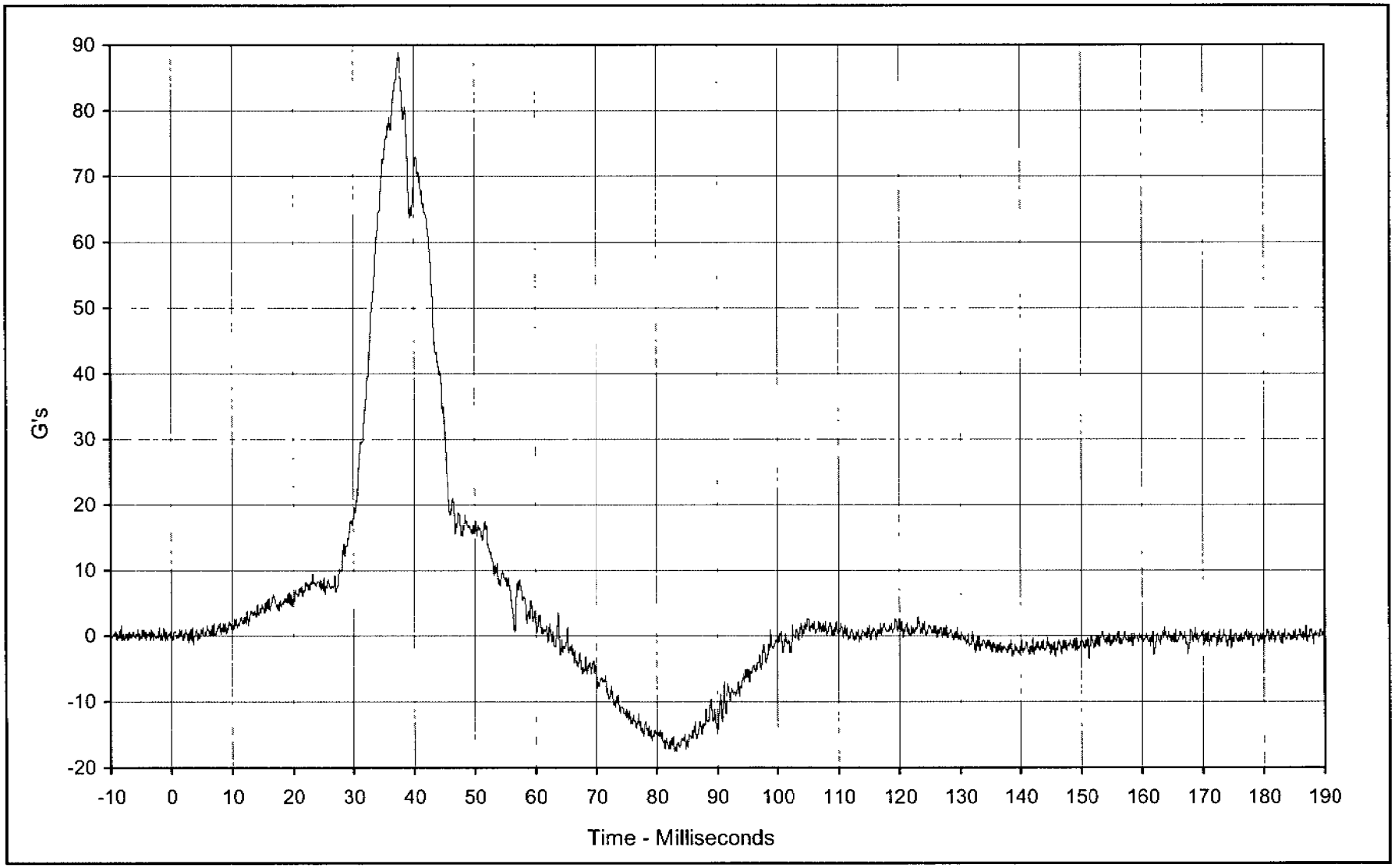
Date of Test: 07/12/00

Curve Number: IN1-023

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

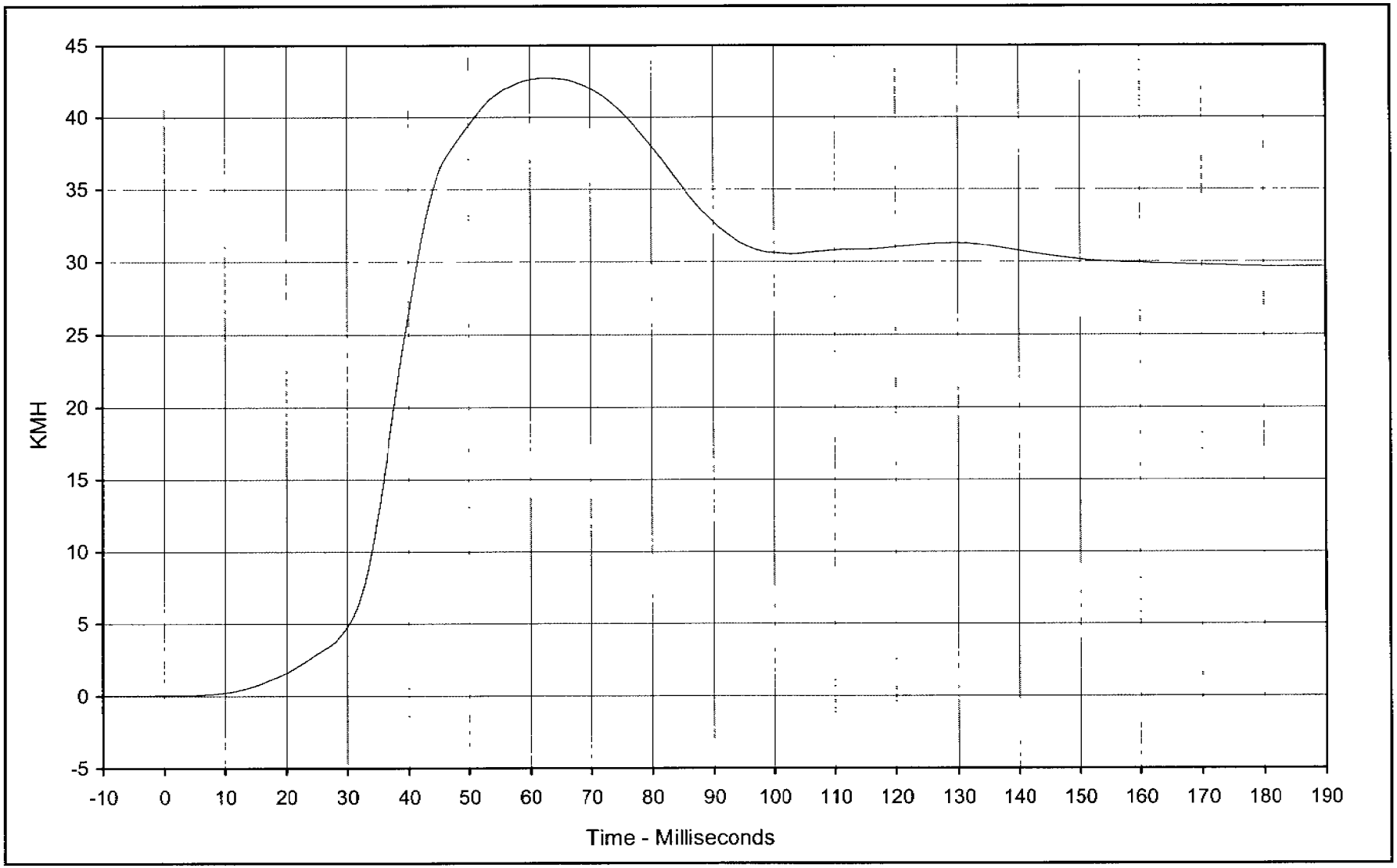
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



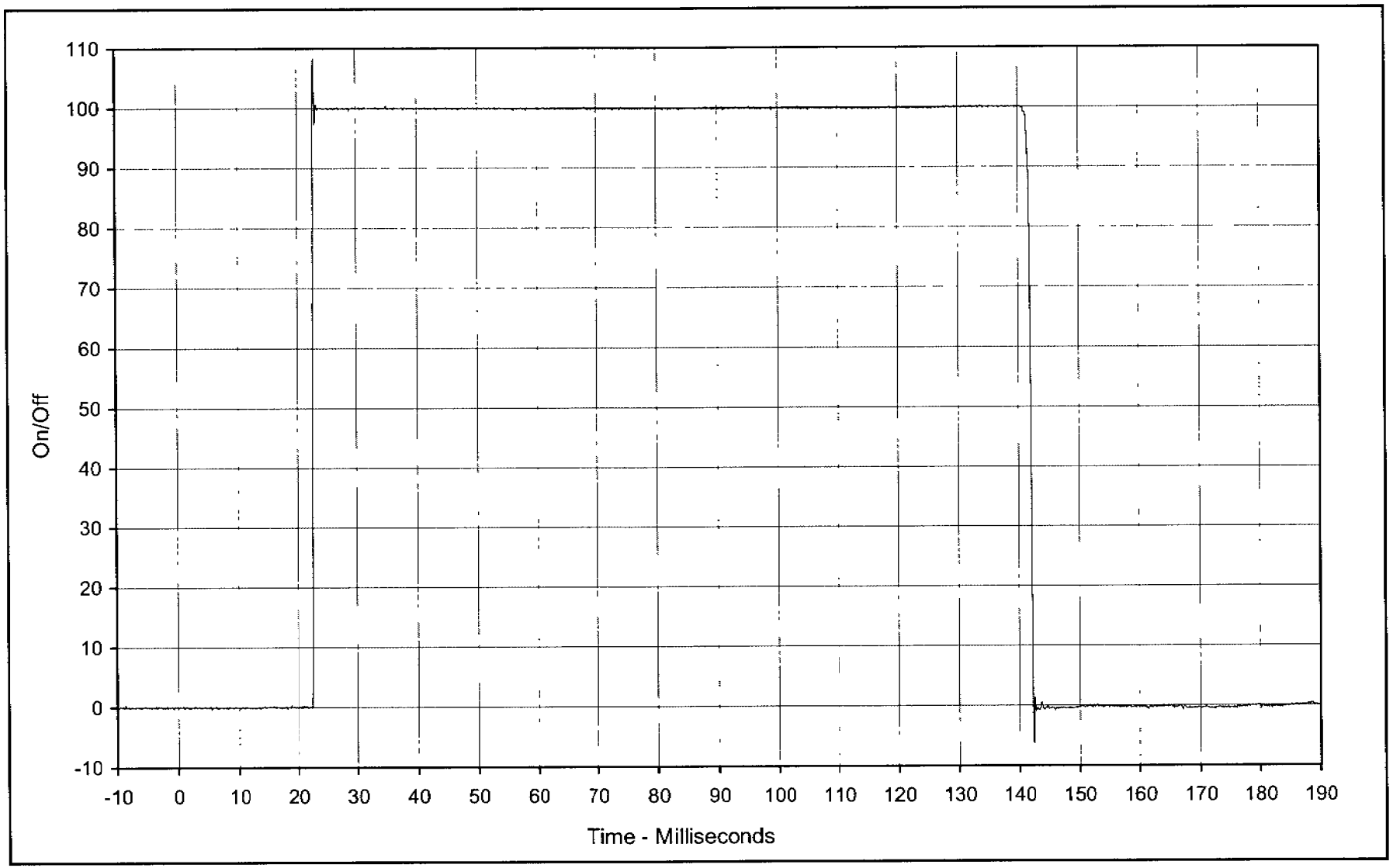
Curve Description:	Pass. Pelvis Redundant Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	88.8	at	37.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-17.5	at	82.8 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-024				

KARC Engineering



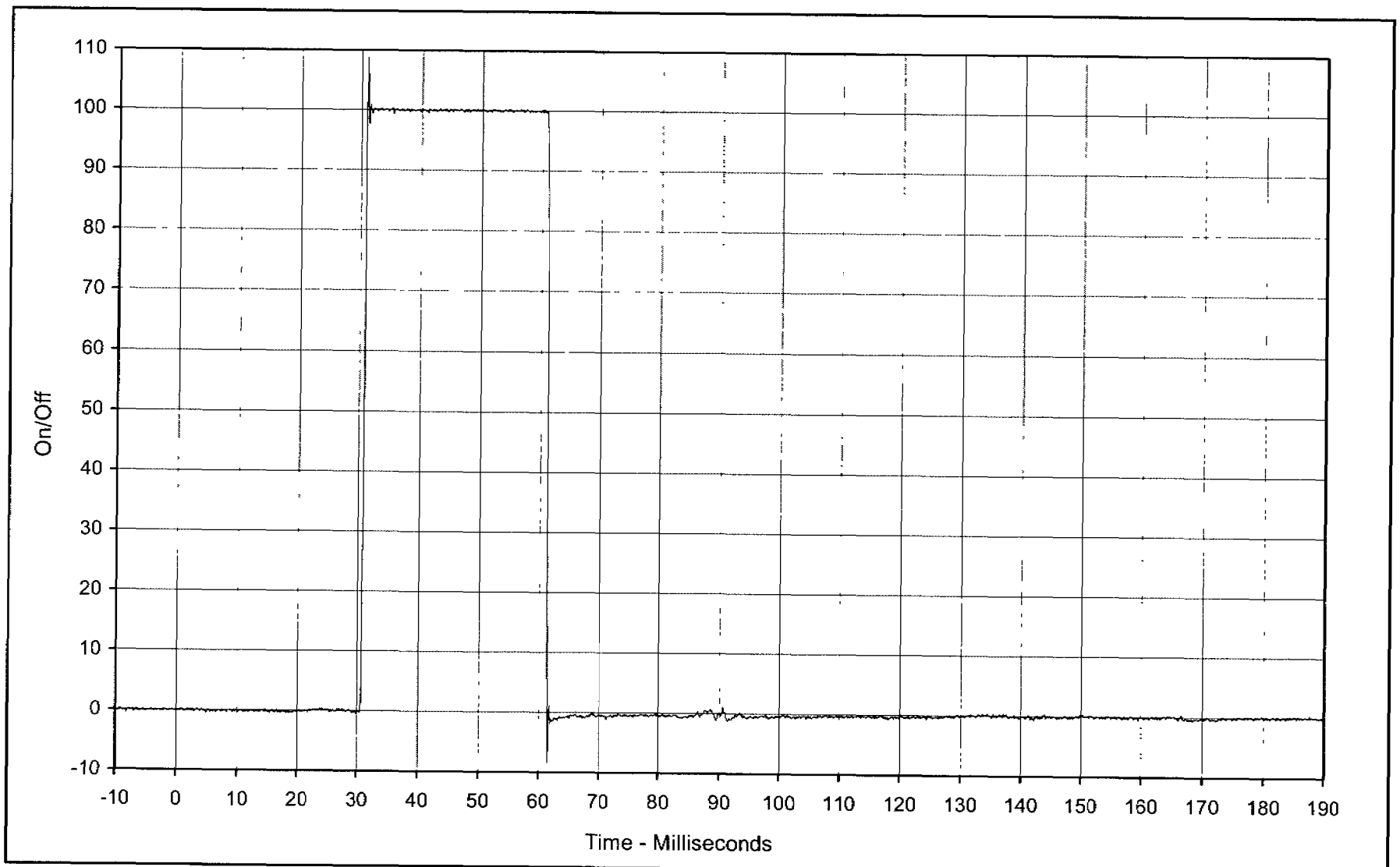
Curve Description:	Pass. Pelvis Redundant Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	42.7	at	62.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.1	at	0.0 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-024				

KARCO Engineering



Curve Description:	Pass. Thorax Contact			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	108.3	at	22.9 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Crossing Point:	50%	at	22.7 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-025				

KARC Engineering



Curve Description: Pass. Pelvis Contact

Maximum Value: 108.6 at 31.0 Milliseconds

Crossing Point: 50% at 30.9 Milliseconds

SAE Filter Class: 1000

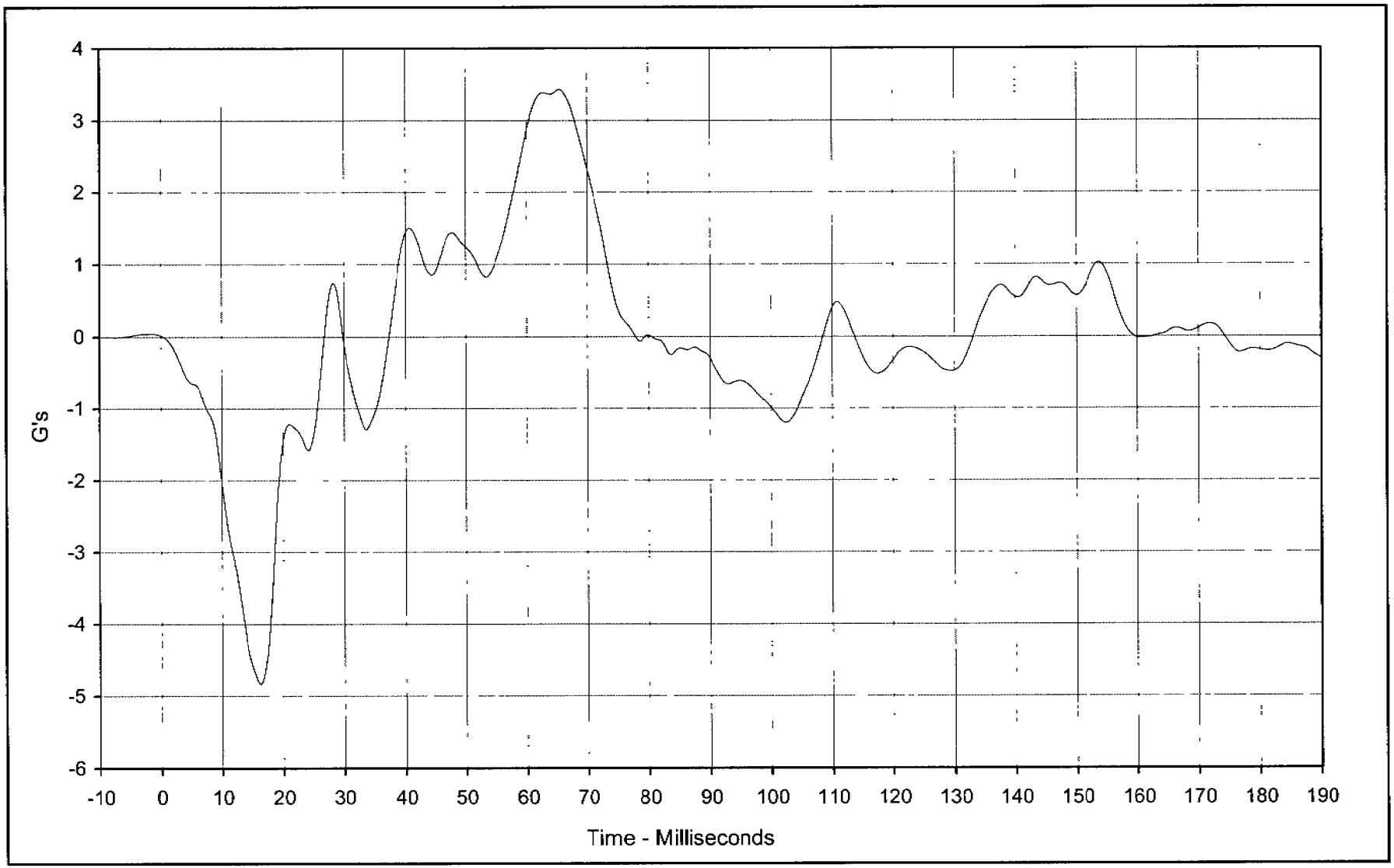
Date of Test: 07/12/00

Curve Number: FIL-026

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

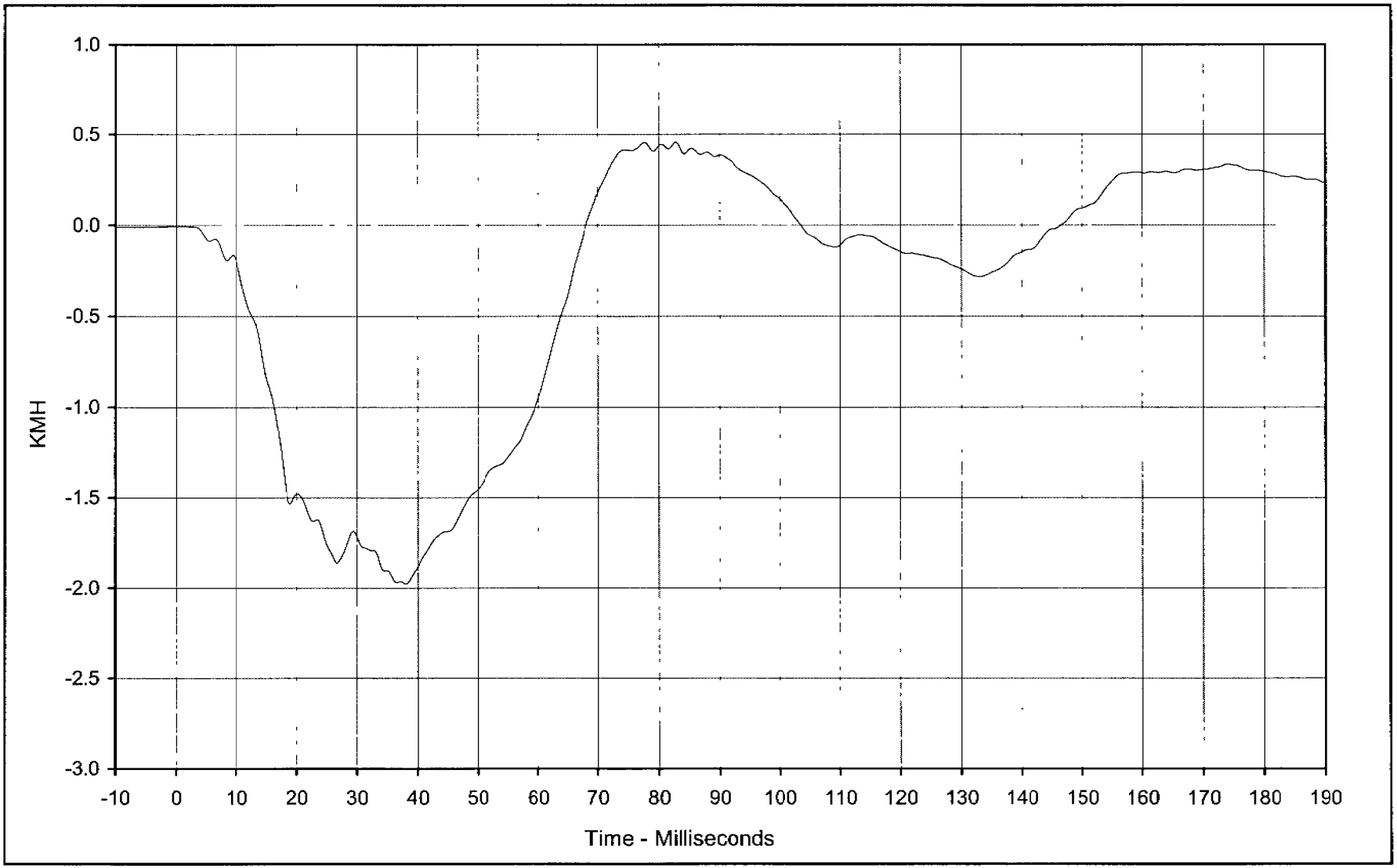
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Right Sill at Front Seat X			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	3.4	at	65.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-4.8	at	16.3 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-027				

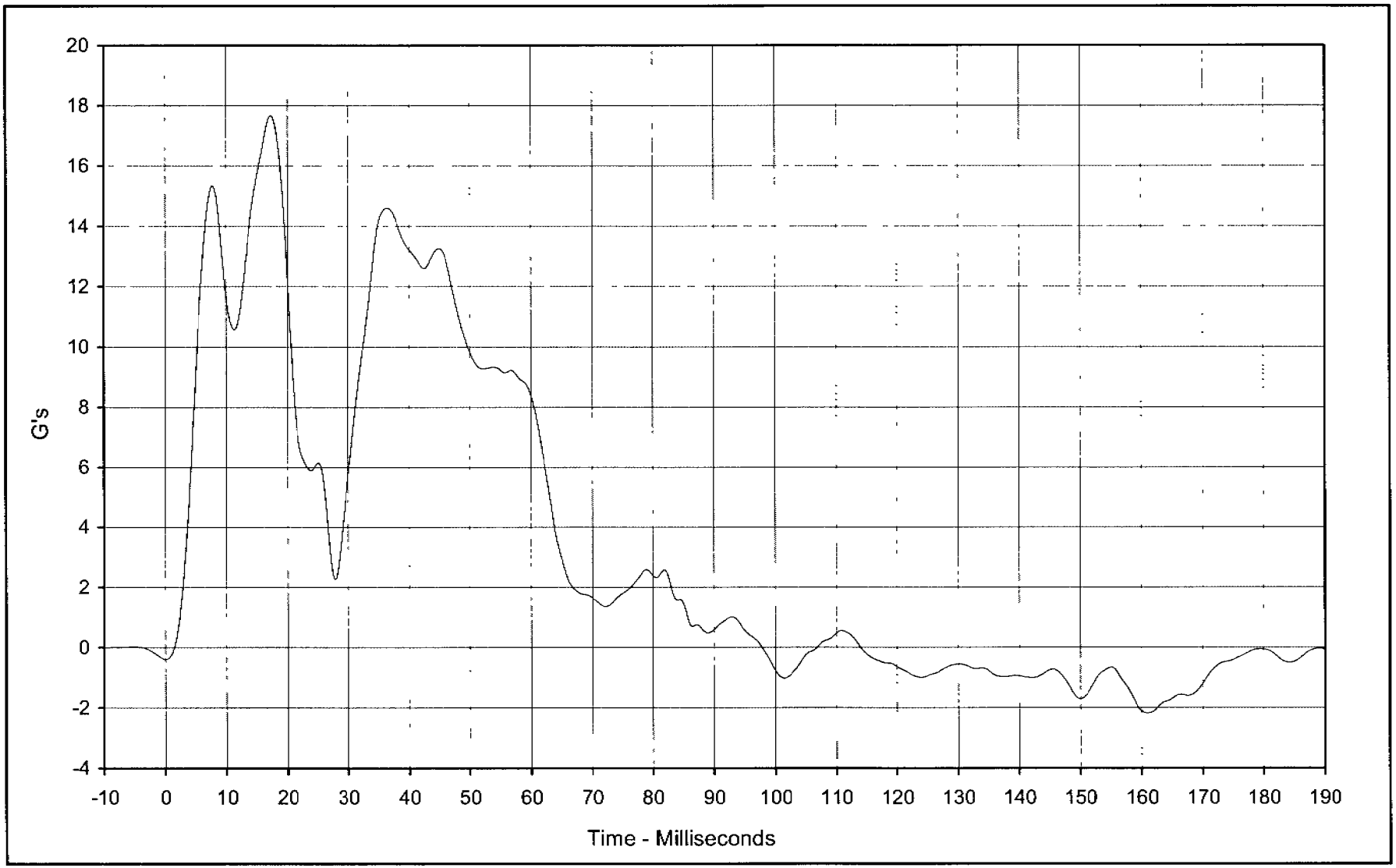
KARC Engineering



Curve Description:	Right Sill at Front Seat X Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	0.5	at	82.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-2.0	at	38.0 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-027				

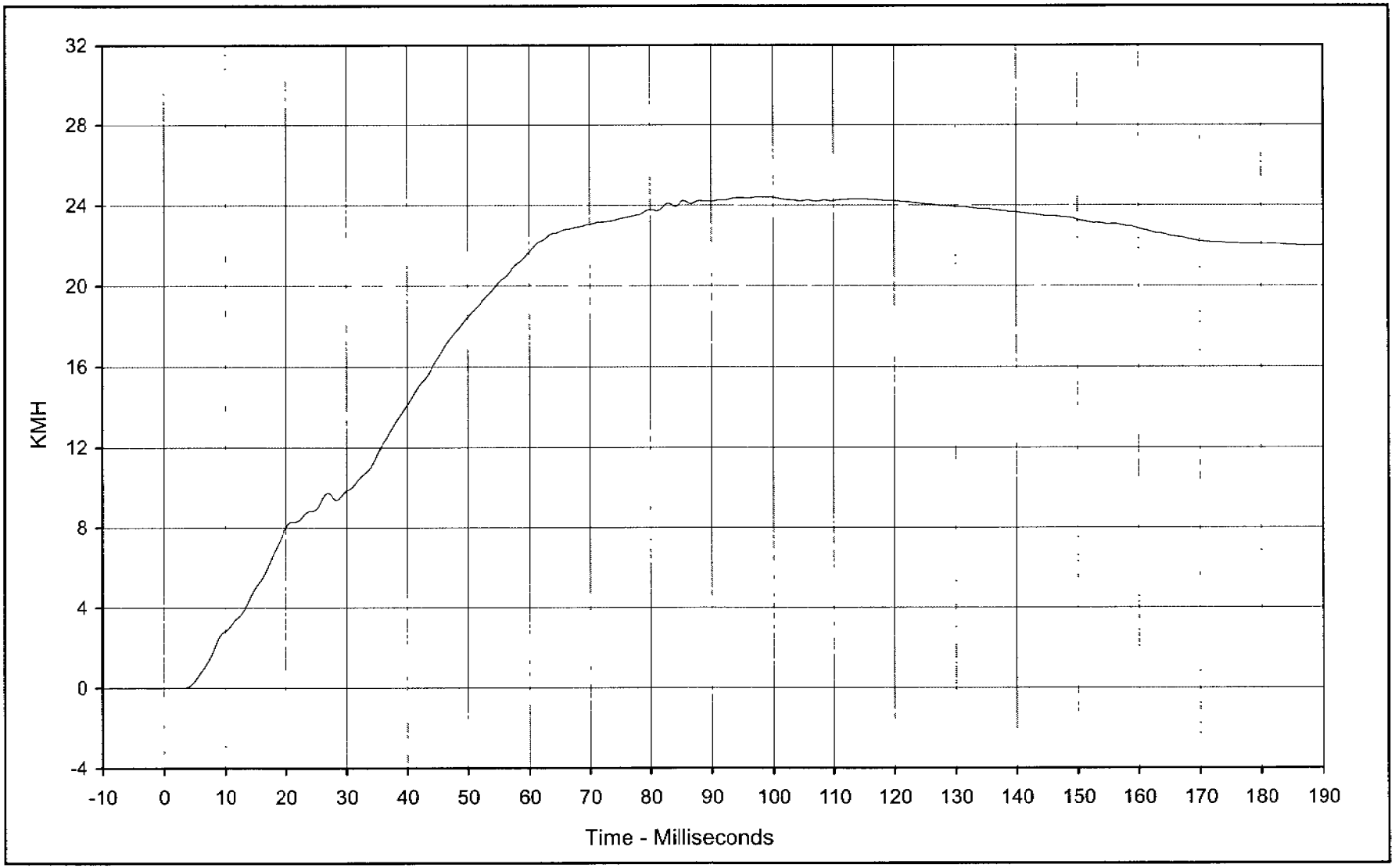
KARCO Engineering

KAR20051-01



Curve Description:	Right Sill at Front Seat Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	17.7	at	17.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-2.2	at	161.0 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-028				

KARC Engineering



Curve Description: Right Sill at Front Seat Y Velocity

Maximum Value: 24.4 at 97.7 Milliseconds

Minimum Value: 0.0 at 3.0 Milliseconds

SAE Filter Class: 180

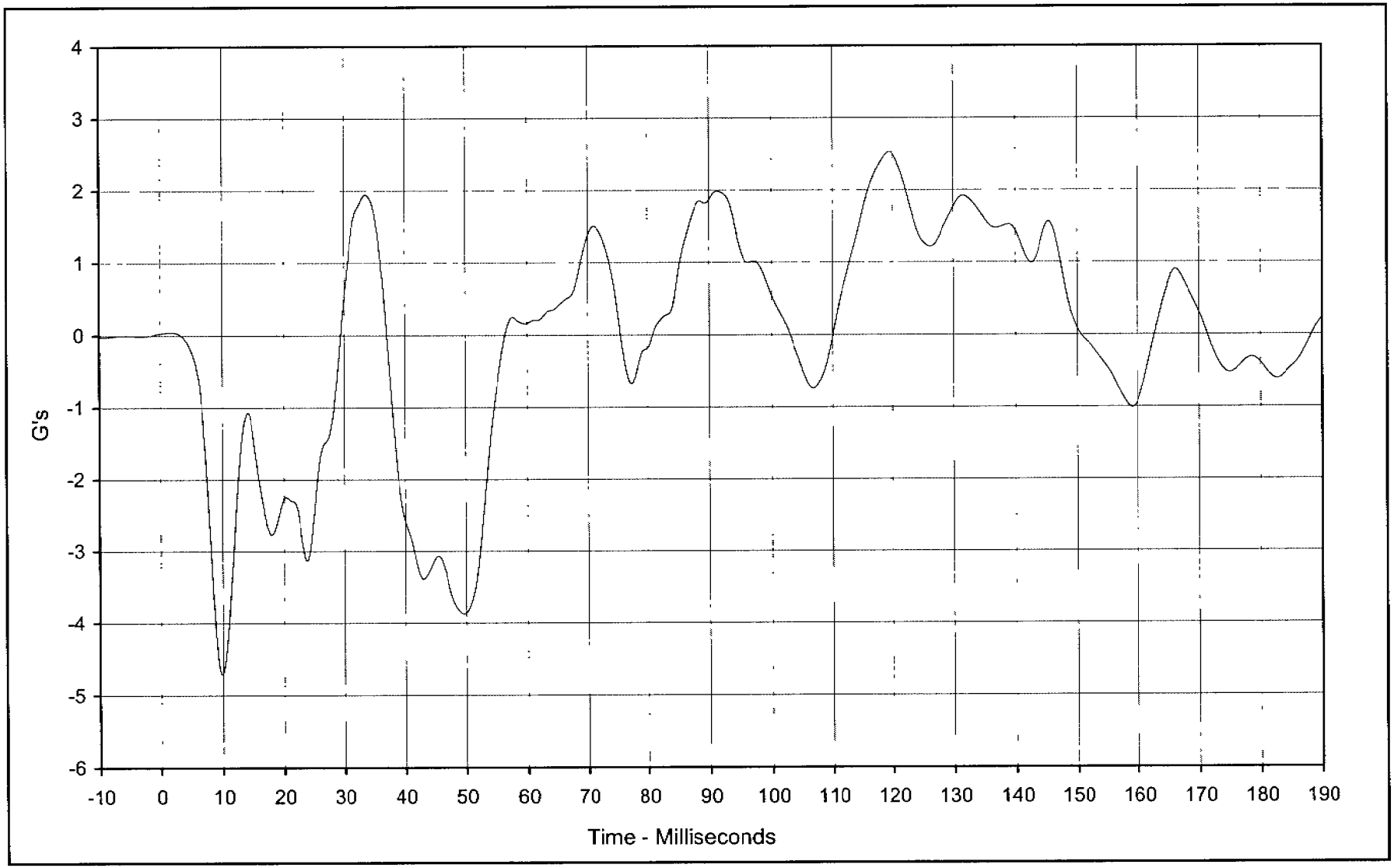
Date of Test: 07/12/00

Curve Number: IN1-028

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

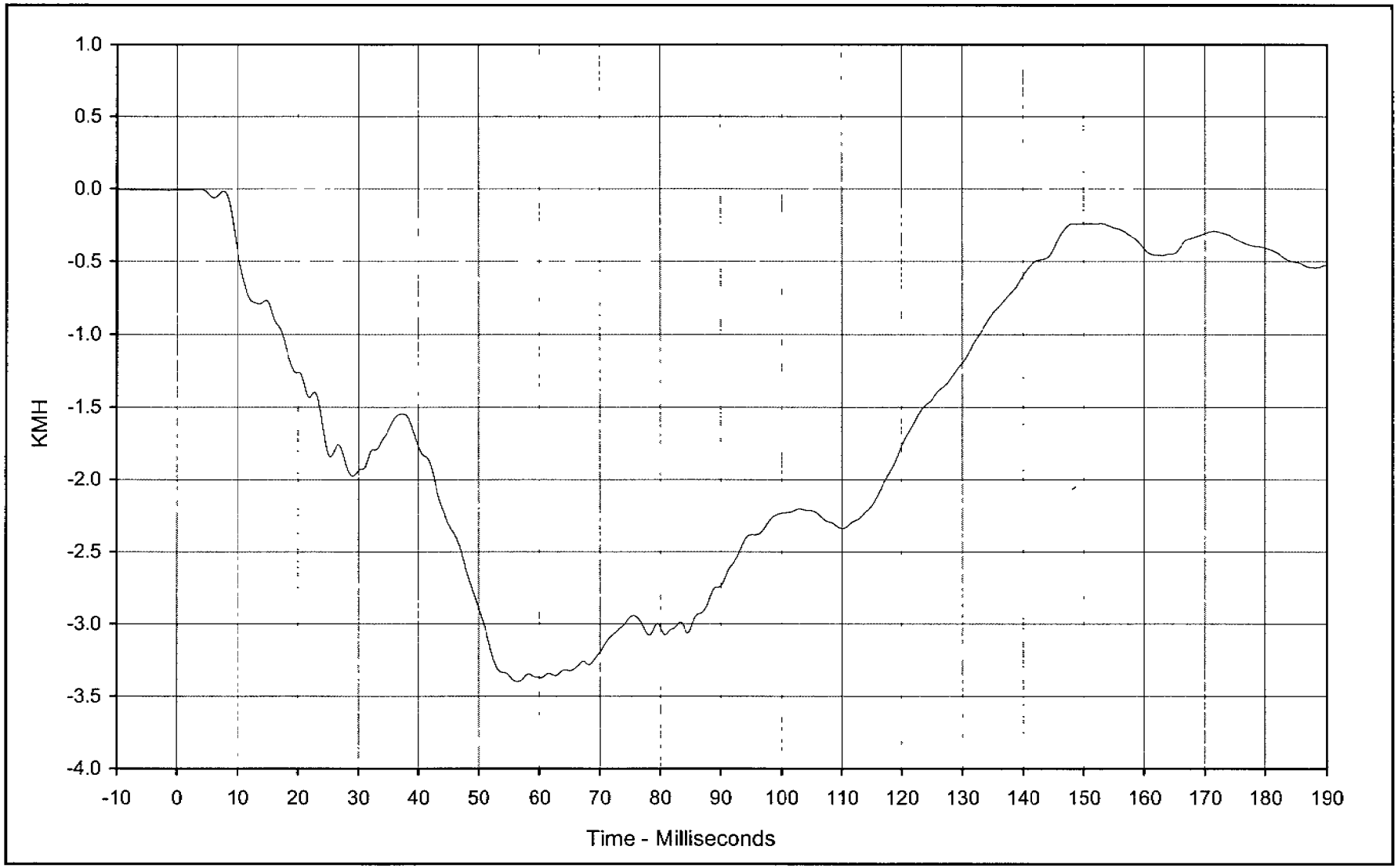
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



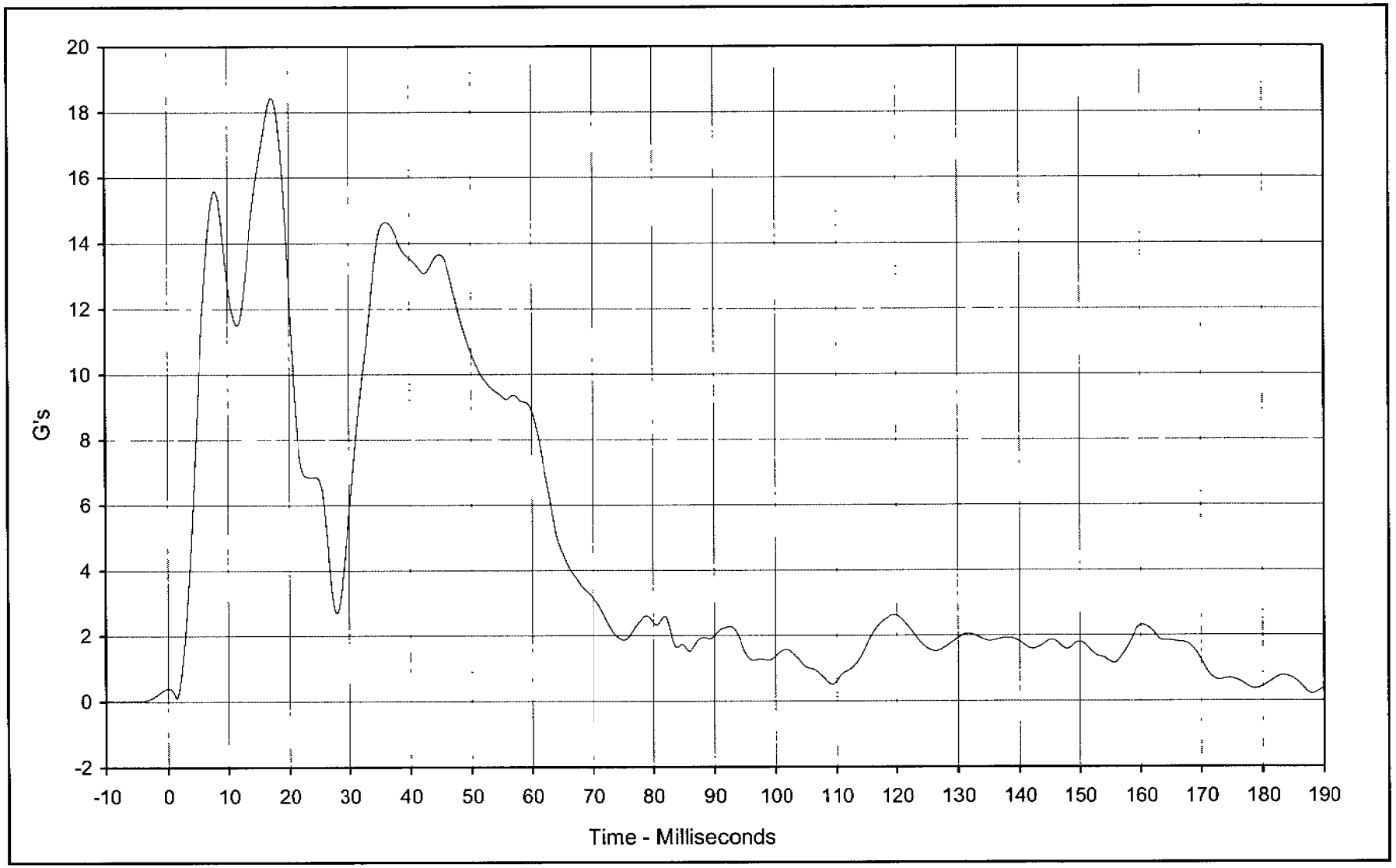
Curve Description:	Right Sill at Front Seat Z			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	2.5	at	119.5 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-4.7	at	9.8 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-029				

KARC Engineering



Curve Description:	Right Sill at Front Seat Z Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	0.0	at	3.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-3.4	at	56.2 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-029				

KARCO Engineering



Curve Description:	Right Front Sill Resultant			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	18.4	at	17.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.1	at	1.4 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	RES-027				

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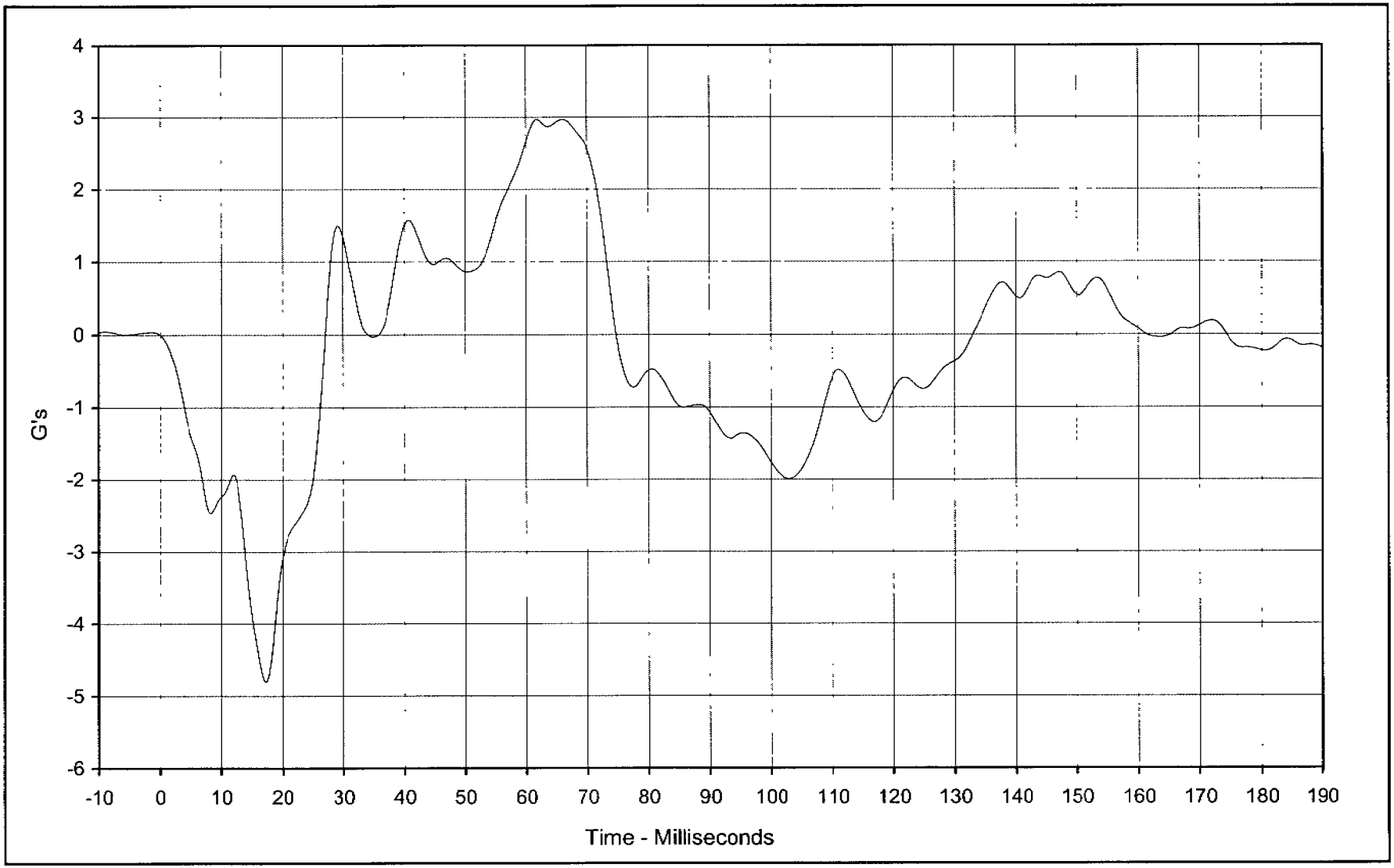
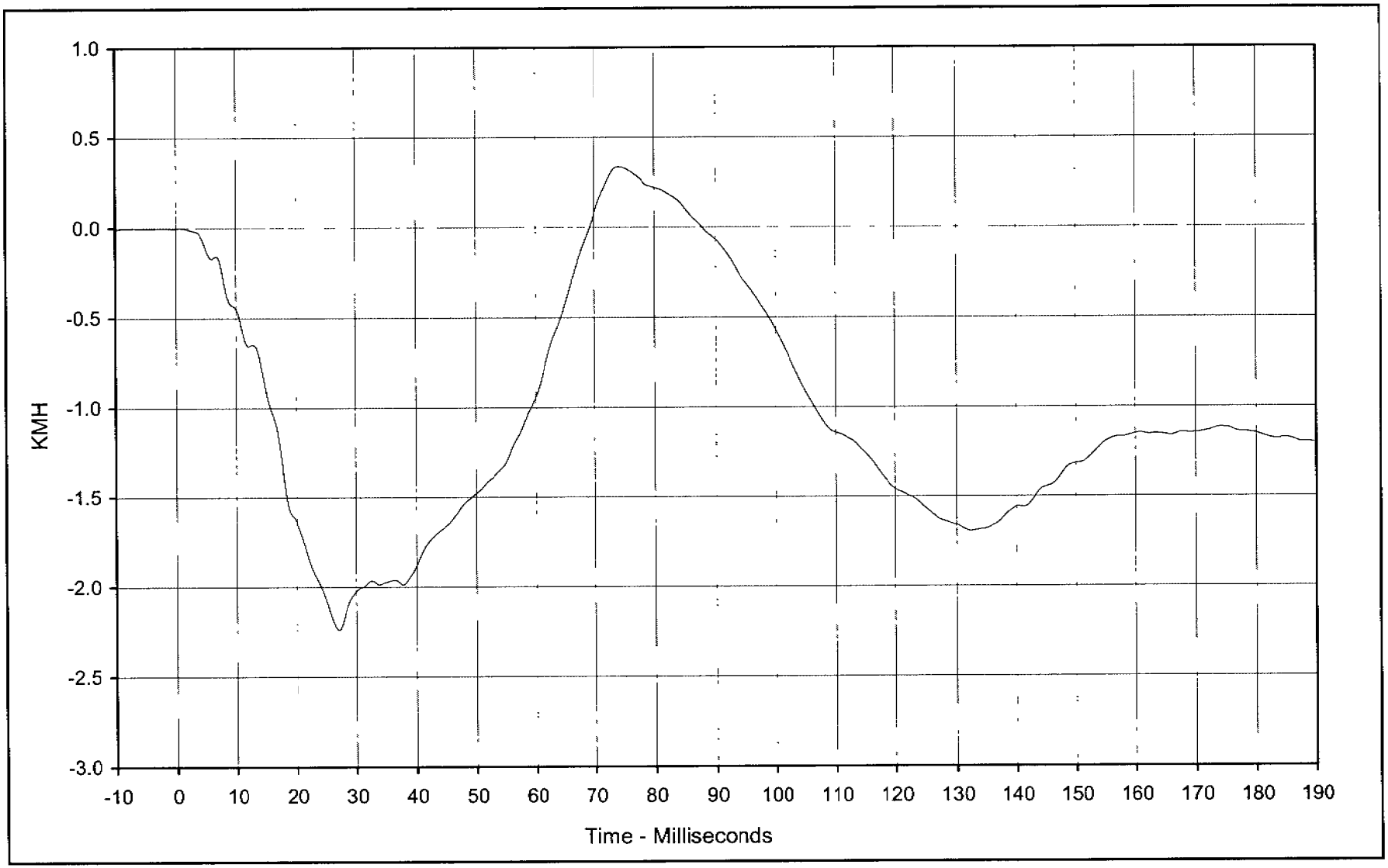


Curve Description:	Right Sill at Rear Seat X			
Maximum Value:	3.0	at	61.8	Milliseconds
Minimum Value:	-4.8	at	17.3	Milliseconds
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	FIL-030			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Right Sill at Rear Seat X Velocity

Maximum Value: 0.3 at 74.1 Milliseconds

Minimum Value: -2.2 at 27.0 Milliseconds

SAE Filter Class: 180

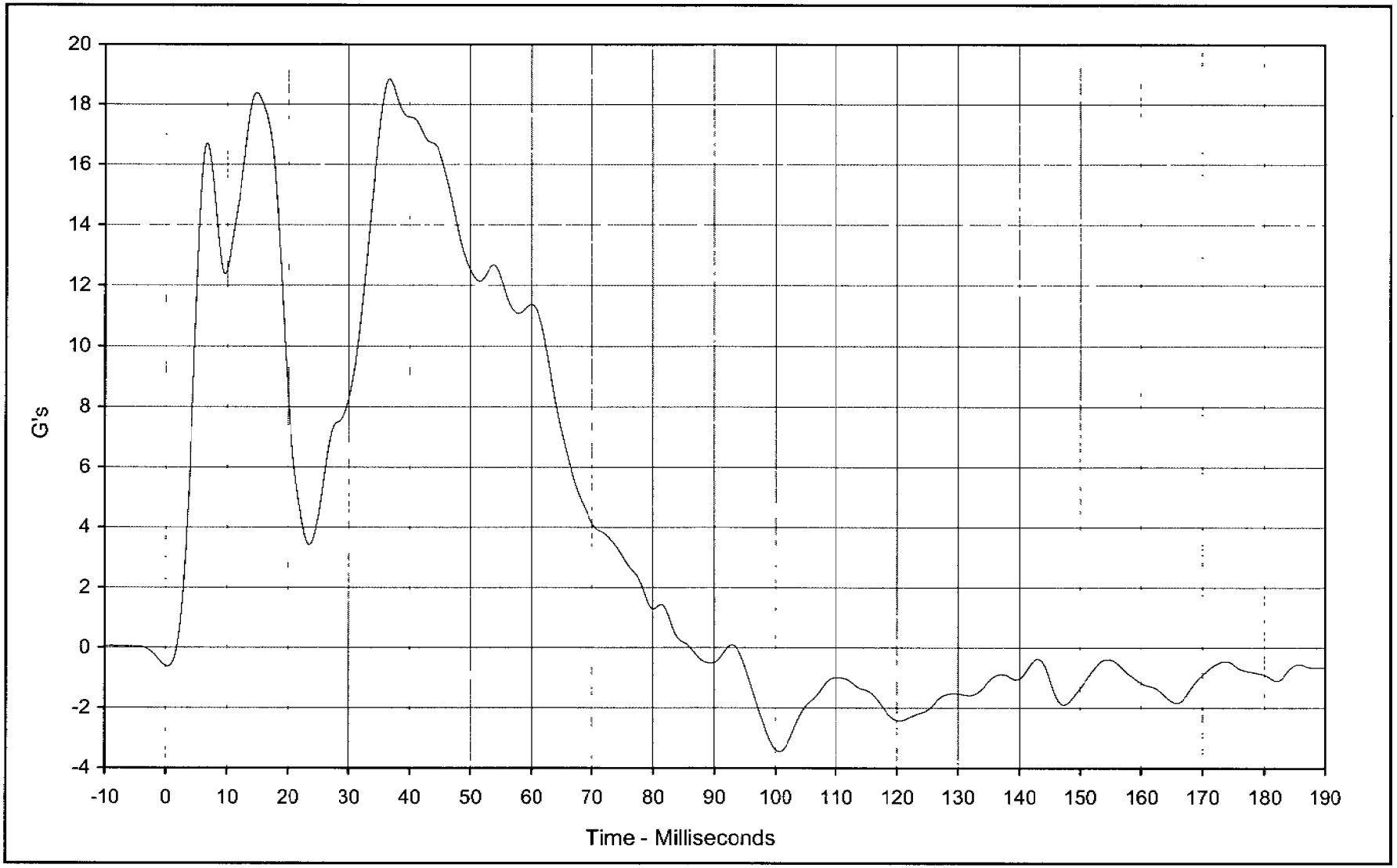
Date of Test: 07/12/00

Curve Number: IN1-030

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

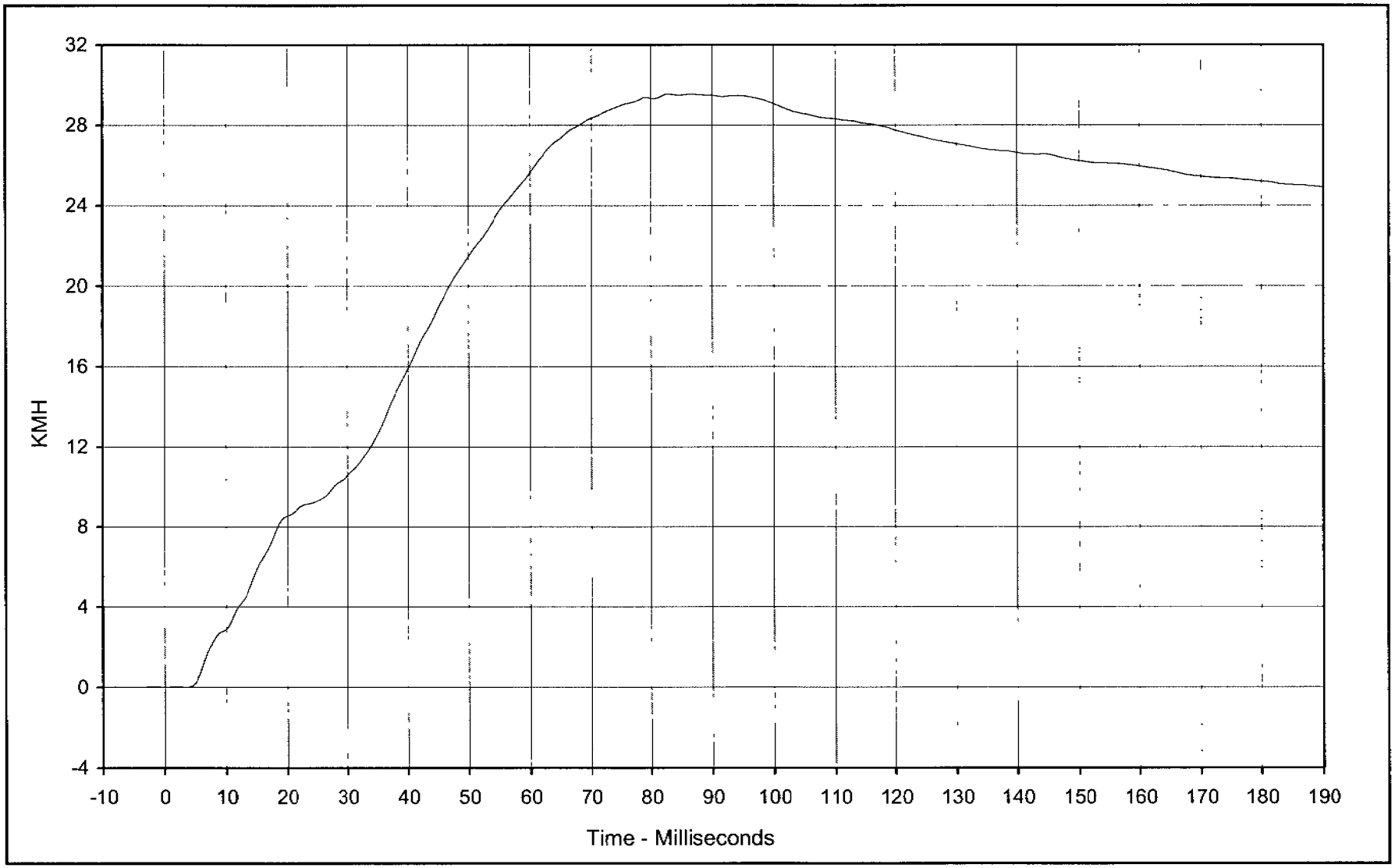
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Right Sill At Rear Seat Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	18.9	at	36.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-3.5	at	100.6 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-031				

KARC Engineering



Curve Description: Right Sill at Rear Seat Y Velocity

Maximum Value: 29.6 at 82.8 Milliseconds

Minimum Value: 0.0 at 3.6 Milliseconds

SAE Filter Class: 180

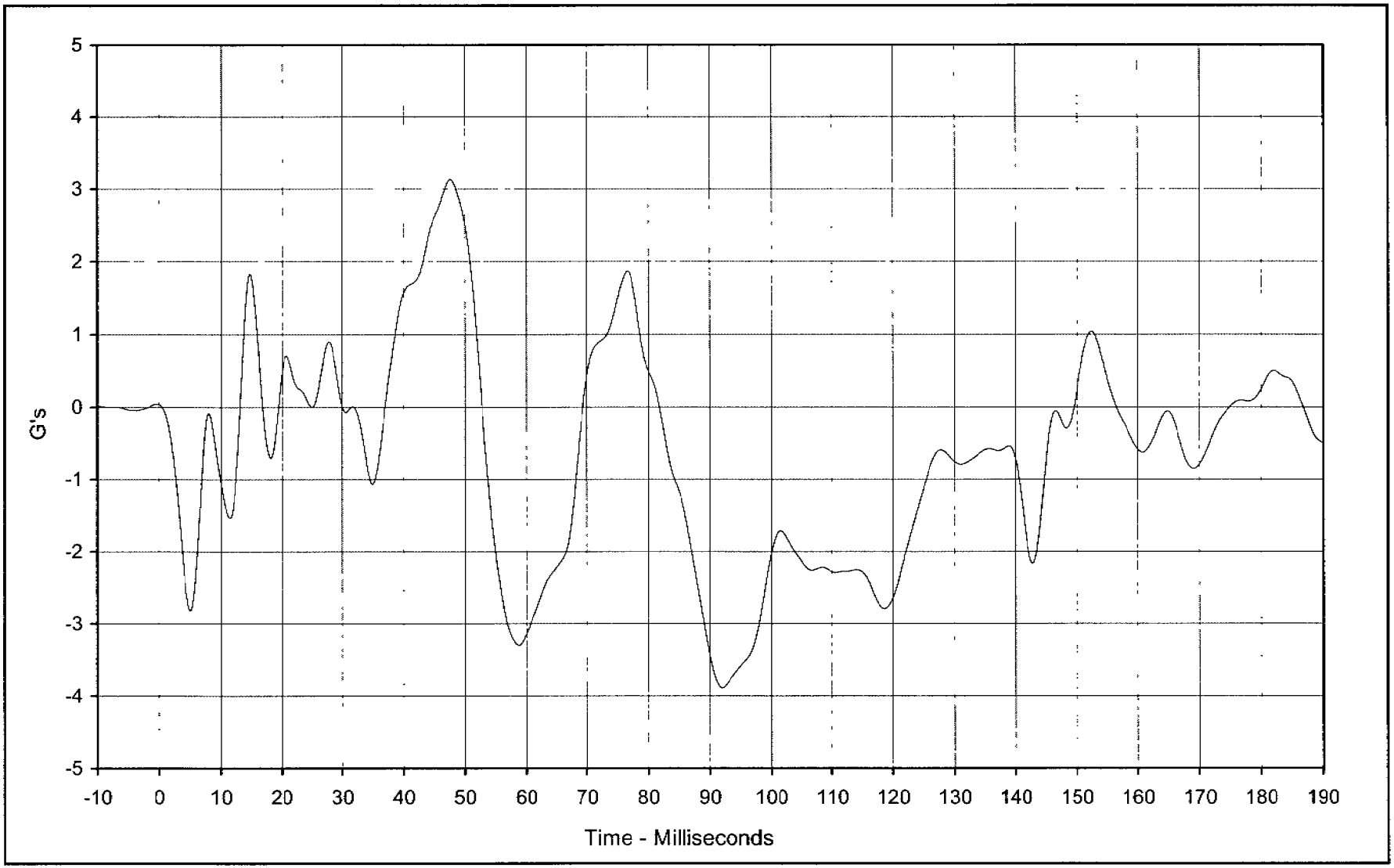
Date of Test: 07/12/00

Curve Number: IN1-031

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

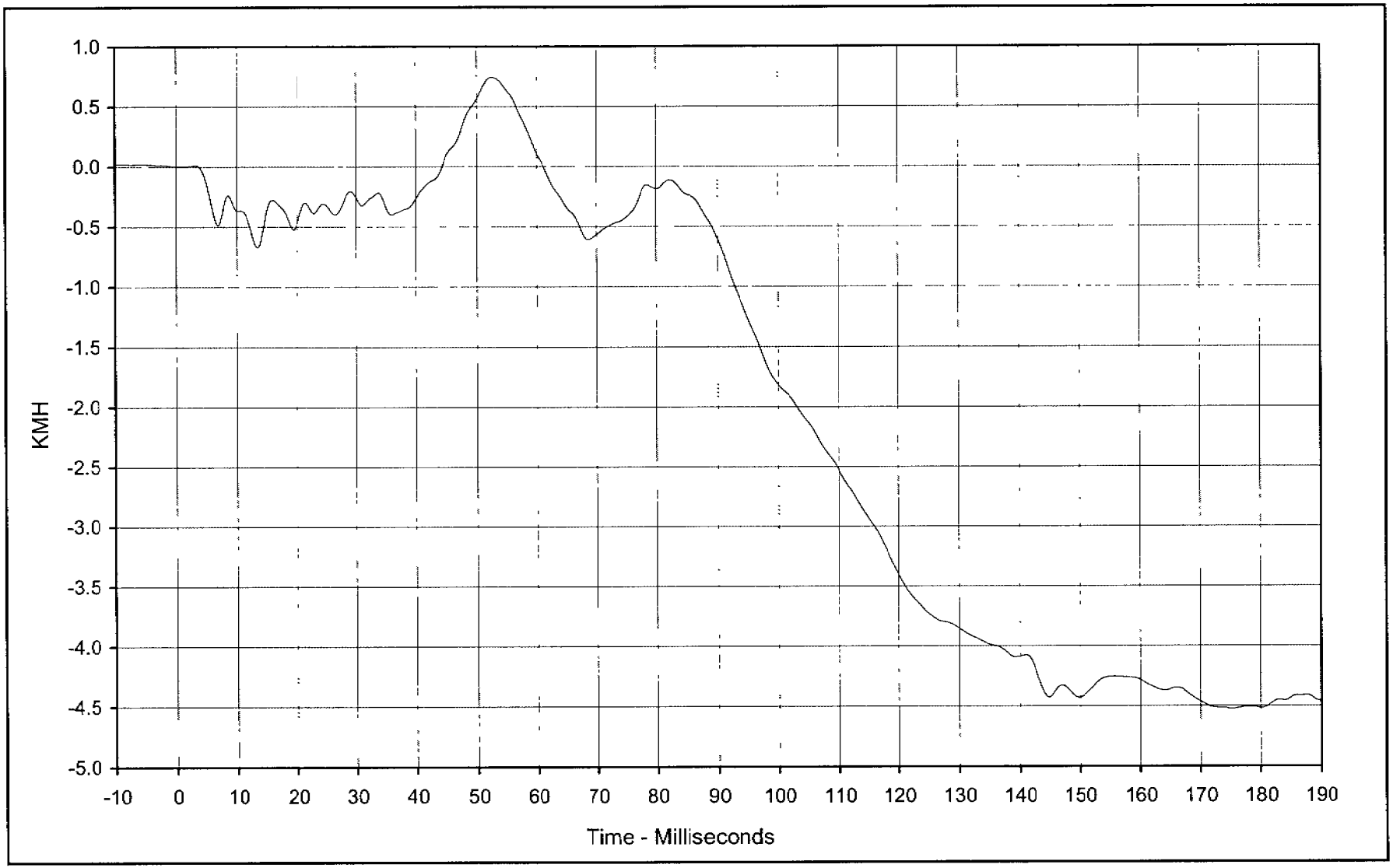
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Right Sill At Rear Seat Z			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	3.1	at	47.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-3.9	at	91.9 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-032				

KARCO Engineering



Curve Description: Right Sill at Rear Seat Z Velocity

Maximum Value: 0.7 at 52.4 Milliseconds

Minimum Value: -4.5 at 175.2 Milliseconds

SAE Filter Class: 180

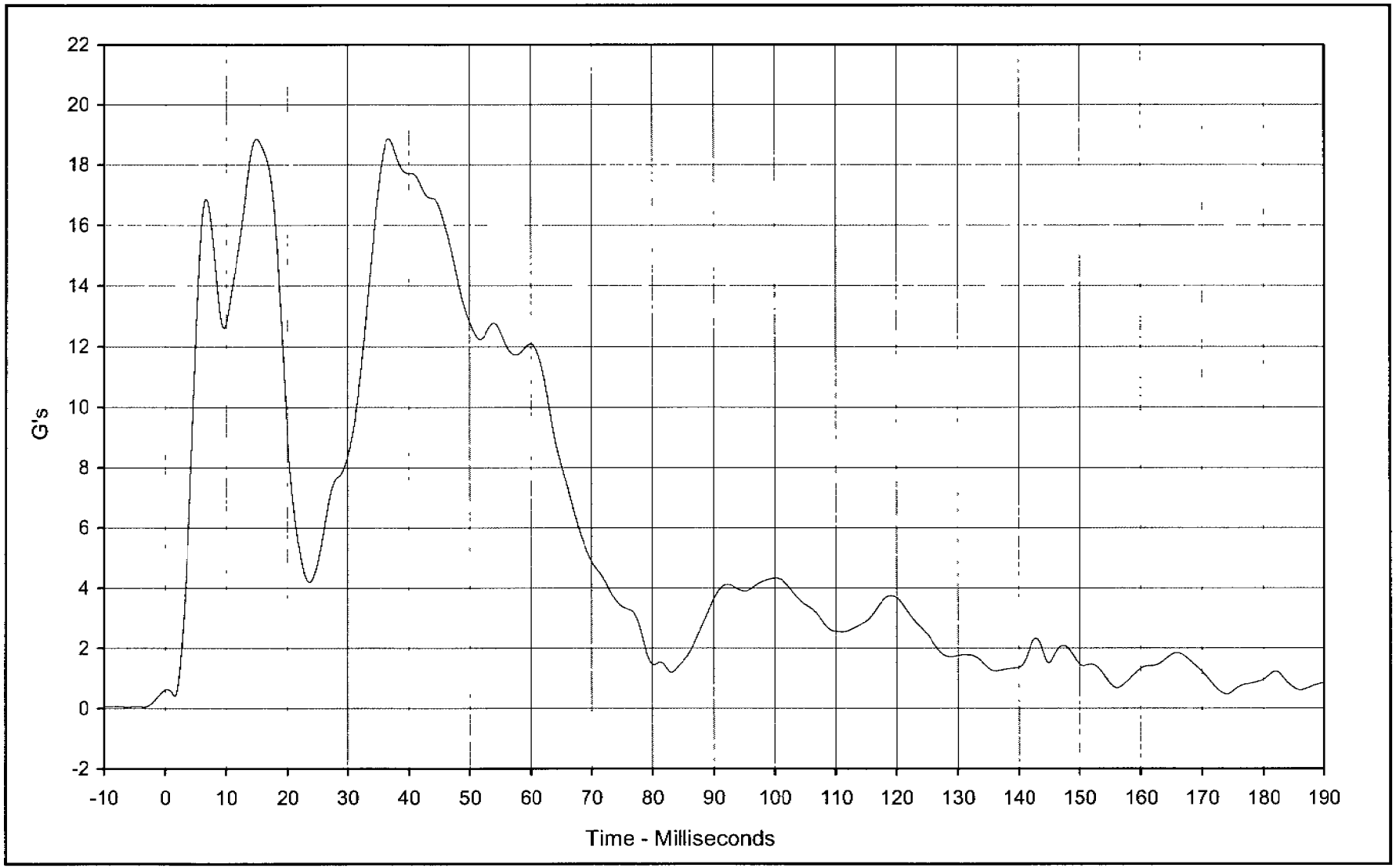
Date of Test: 07/12/00

Curve Number: IN1-032

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Right Rear Sill Resultant			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	18.9	at	36.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.4	at	1.5 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	RES-030				

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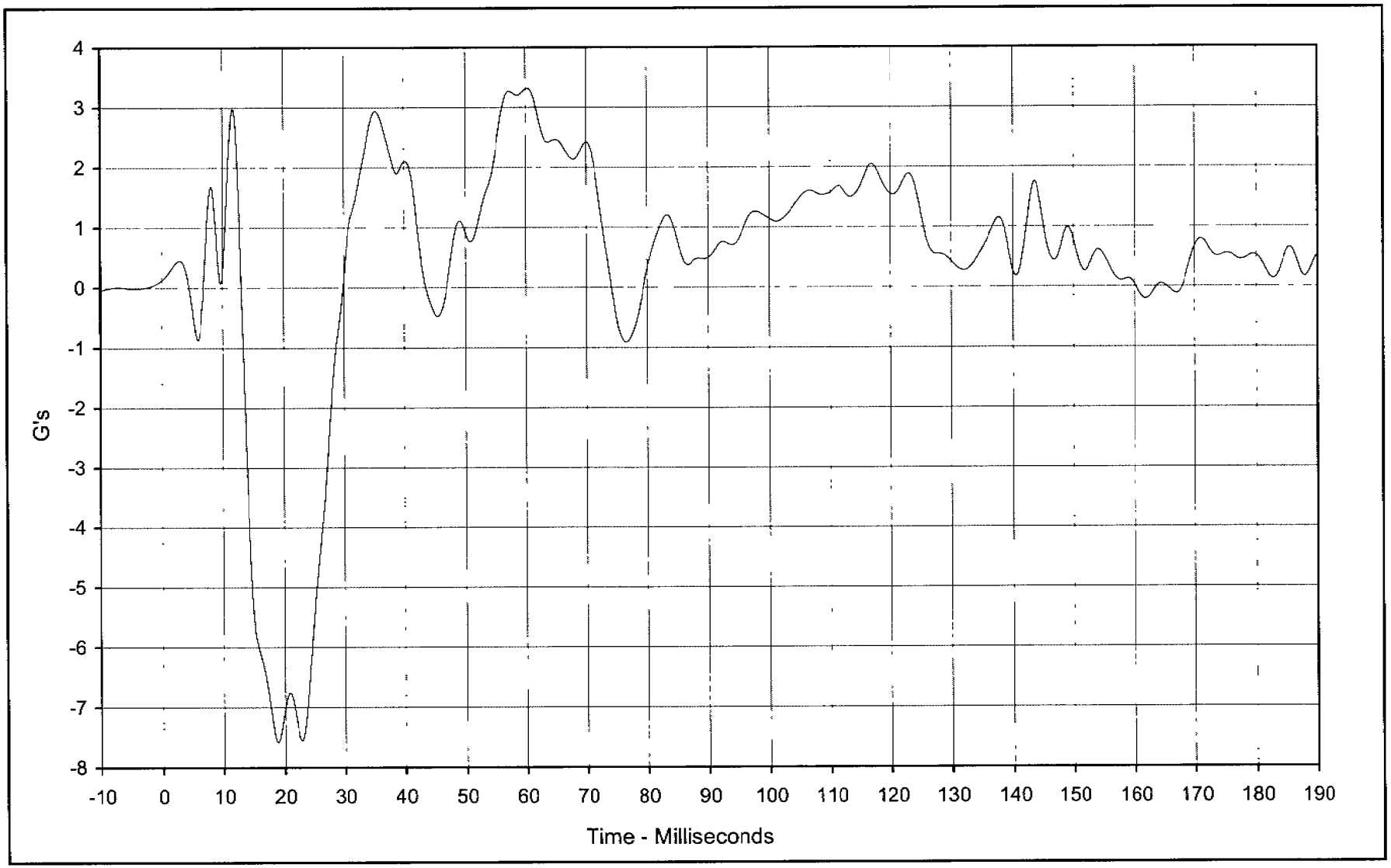
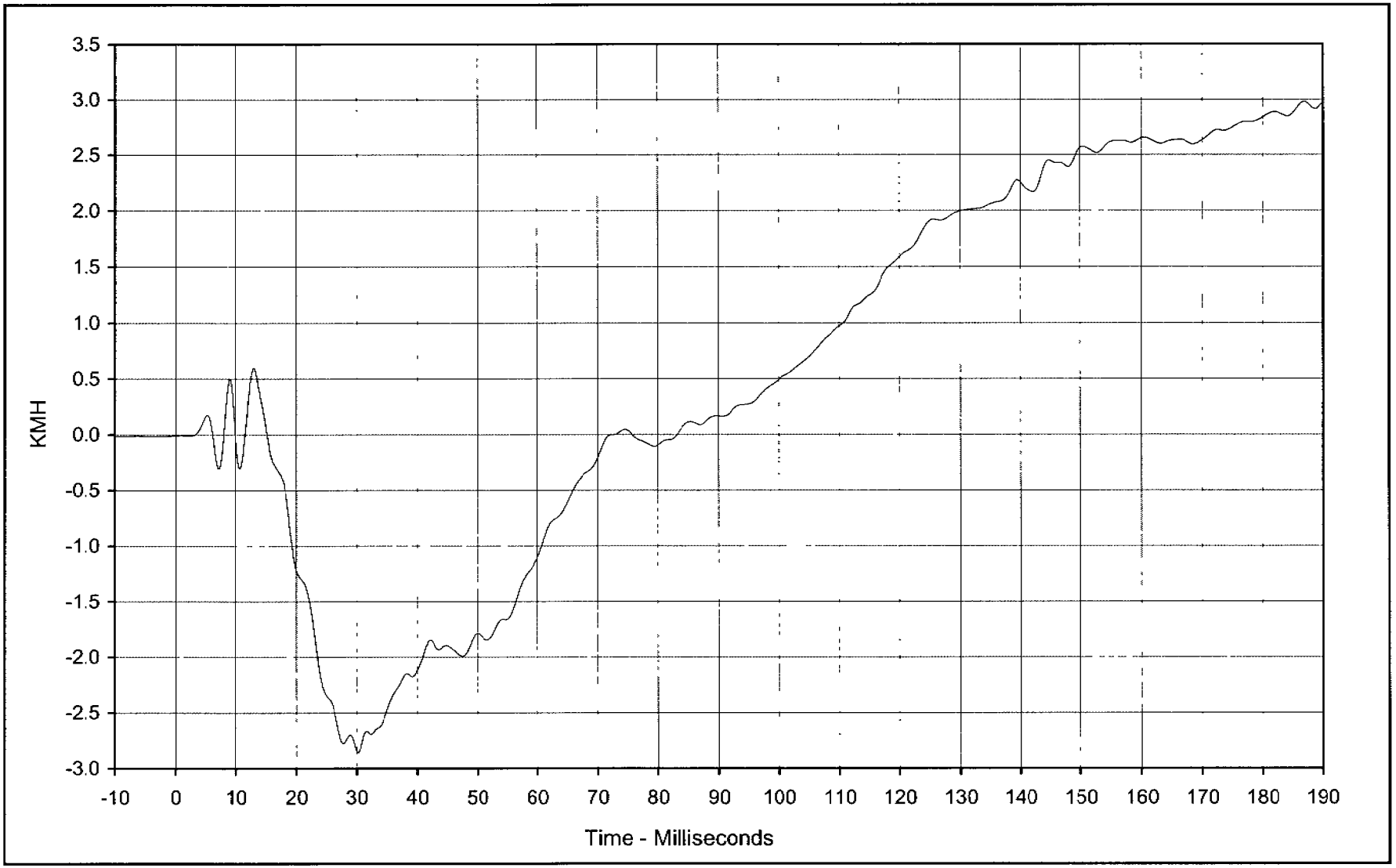


Curve Description:	Rear Floor Above Axle X			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	3.3	at	60.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-7.6	at	18.8 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-033				

KARC Engineering



Curve Description:	Rear Floorpan Above Axle X			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	3.0	at	186.9 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-2.9	at	30.2 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-033				

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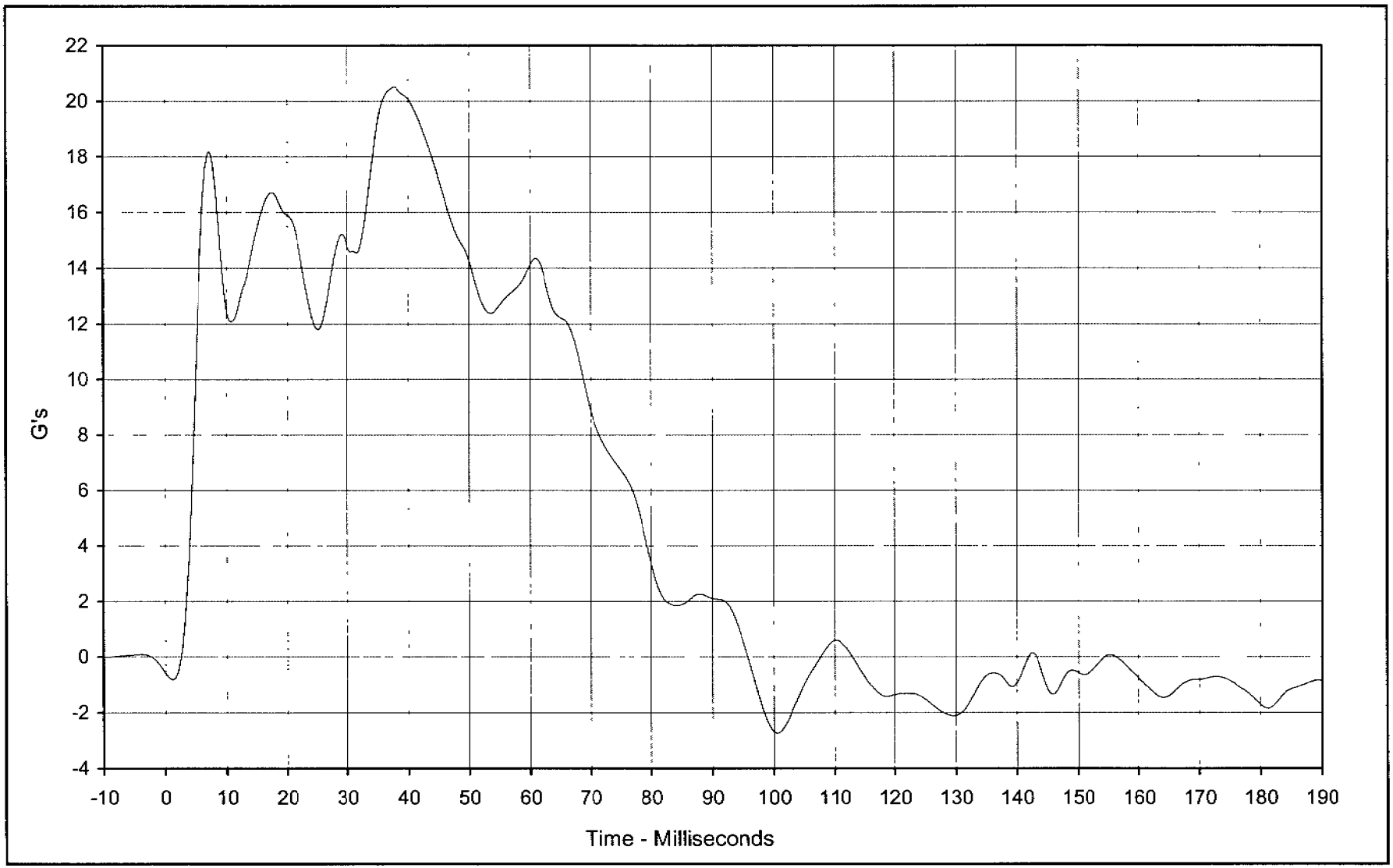

Curve Description:	Rear Floor Above Axle Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	20.5	at	37.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-2.7	at	100.5 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-034				

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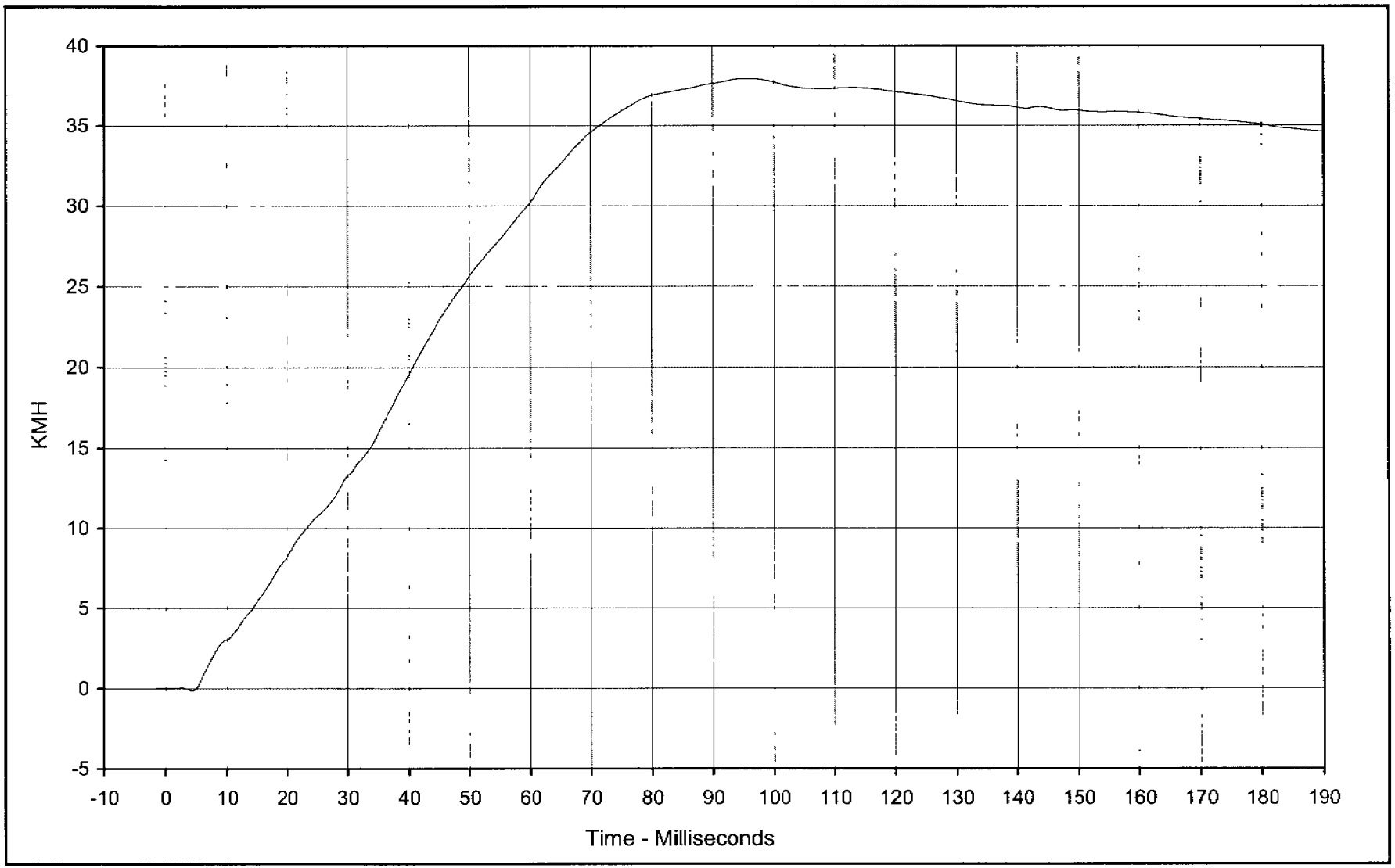

Curve Description:	Rear Floorpan Above Axle Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	37.9	at	95.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.1	at	4.4 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-034				

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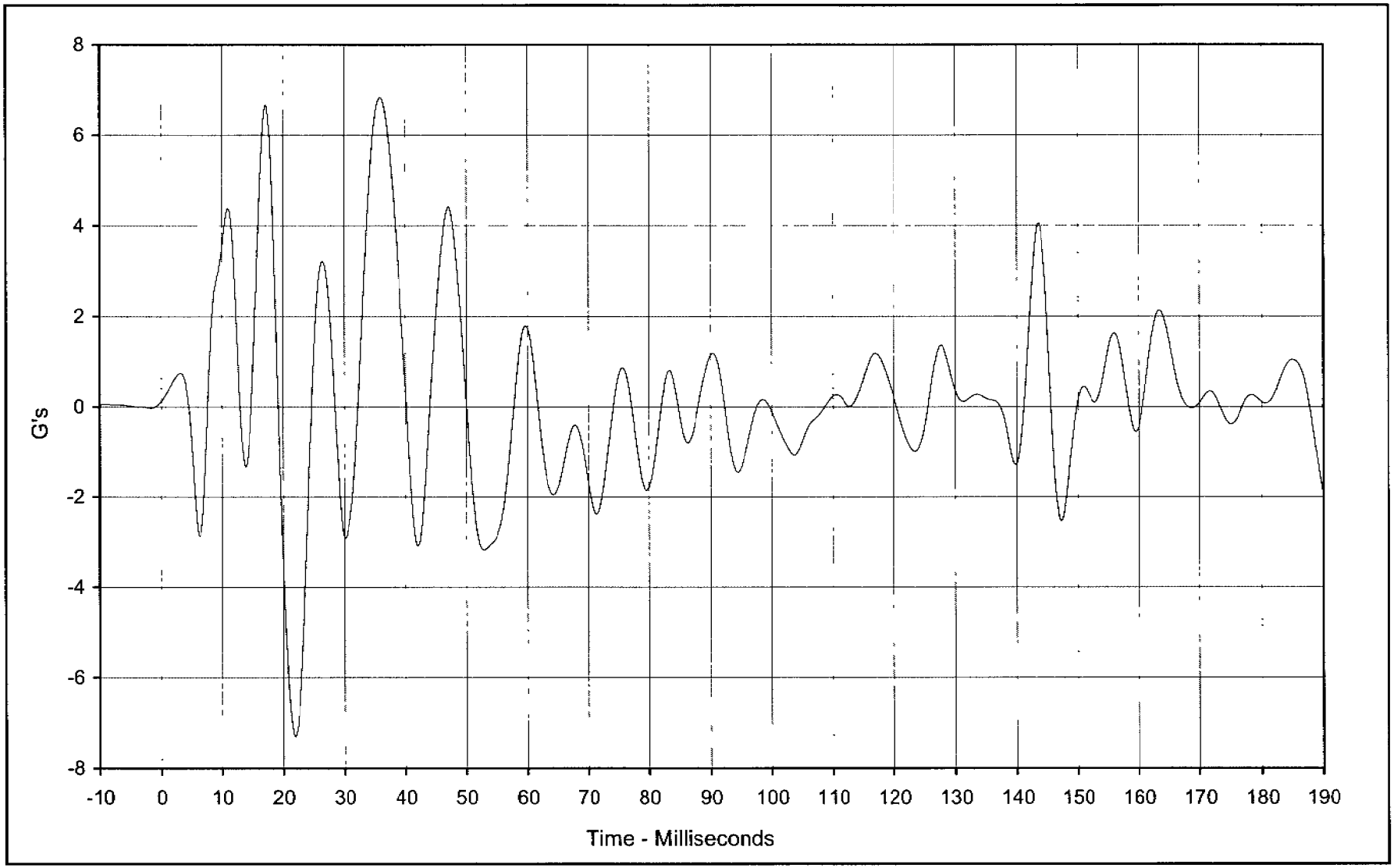

Curve Description:	Rear Floor Above Axle Z			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	6.8	at	35.9 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-7.3	at	21.8 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-035				

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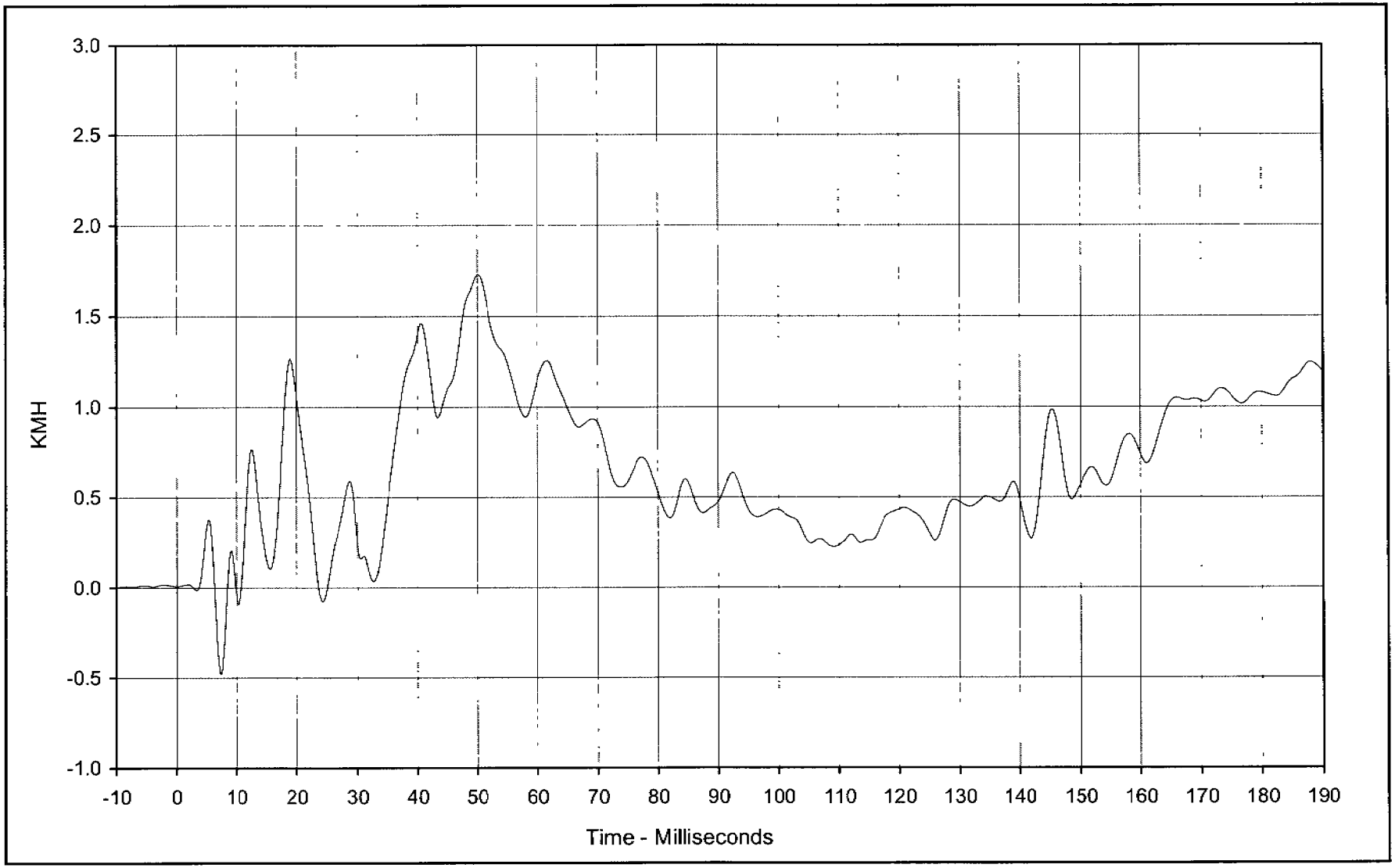

Curve Description:	Rear Floorpan Above Axle Z			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	1.7	at	50.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.5	at	7.4 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-035				

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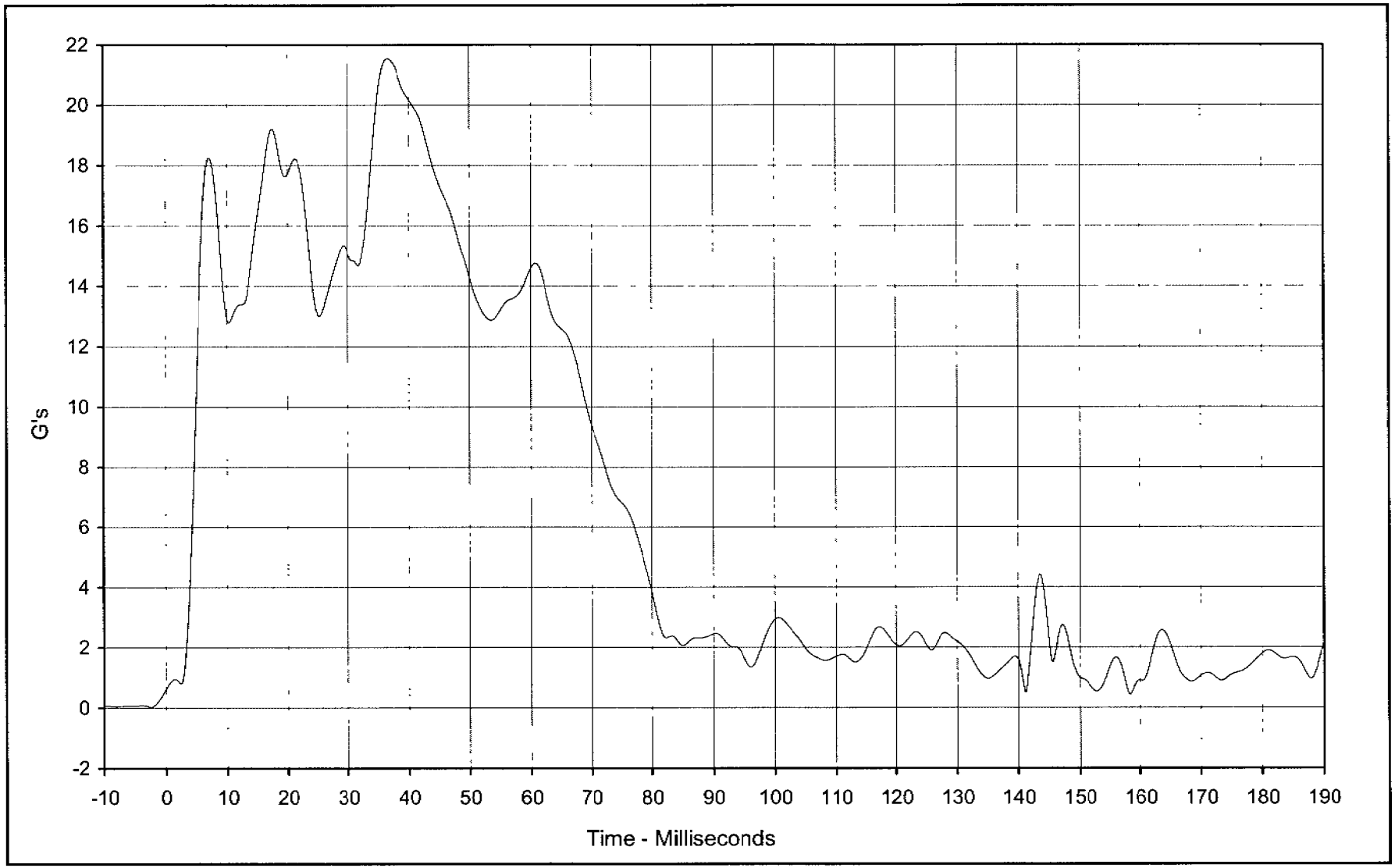

Curve Description:	Rear Floor Above Axle Resultant		Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	21.5	at 36.5 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.4	at 158.2 Milliseconds		
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	RES-033			

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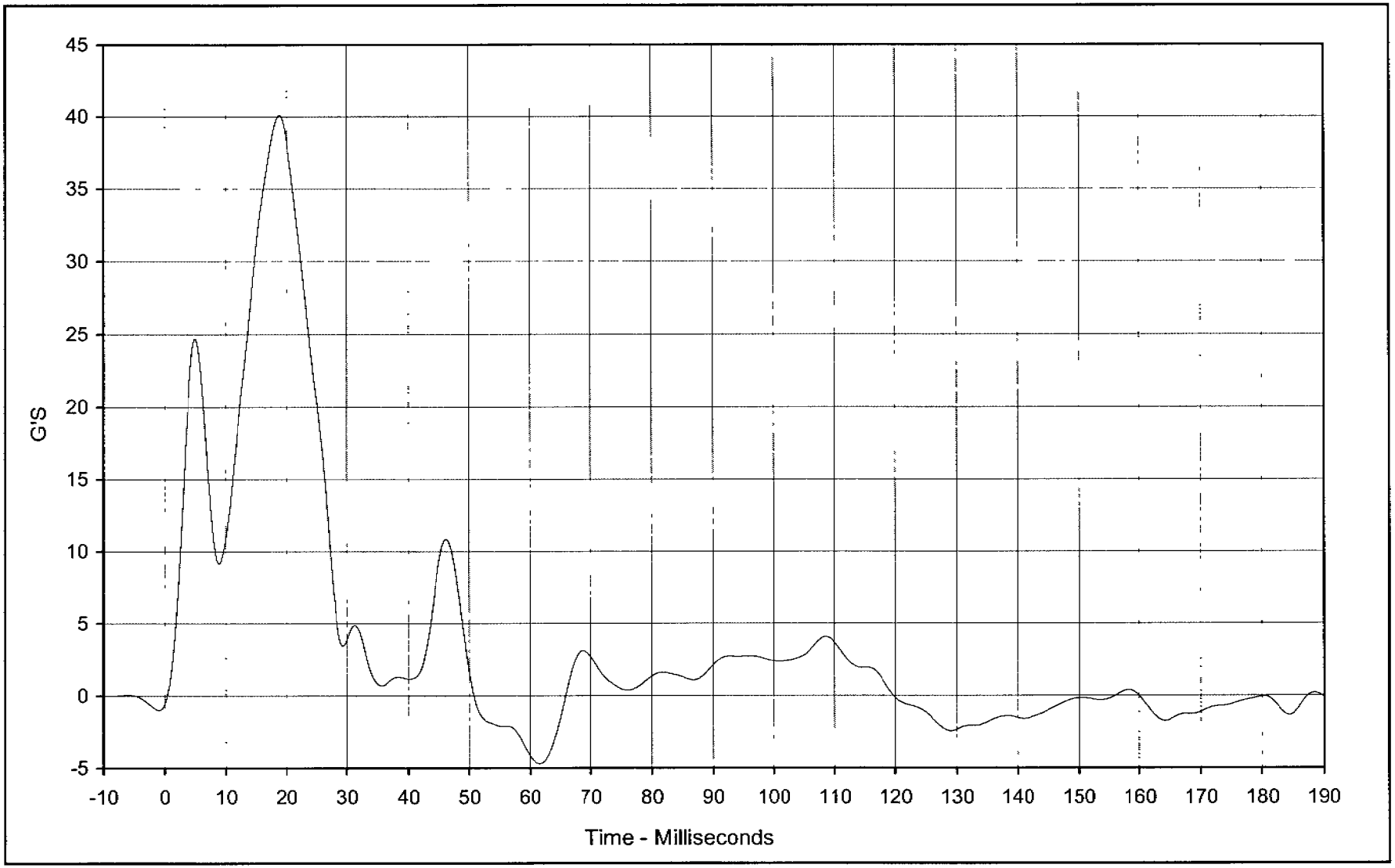

Curve Description:	Left Sill at Rear Door Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	40.1	at	18.8 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-4.7	at	61.6 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-036				

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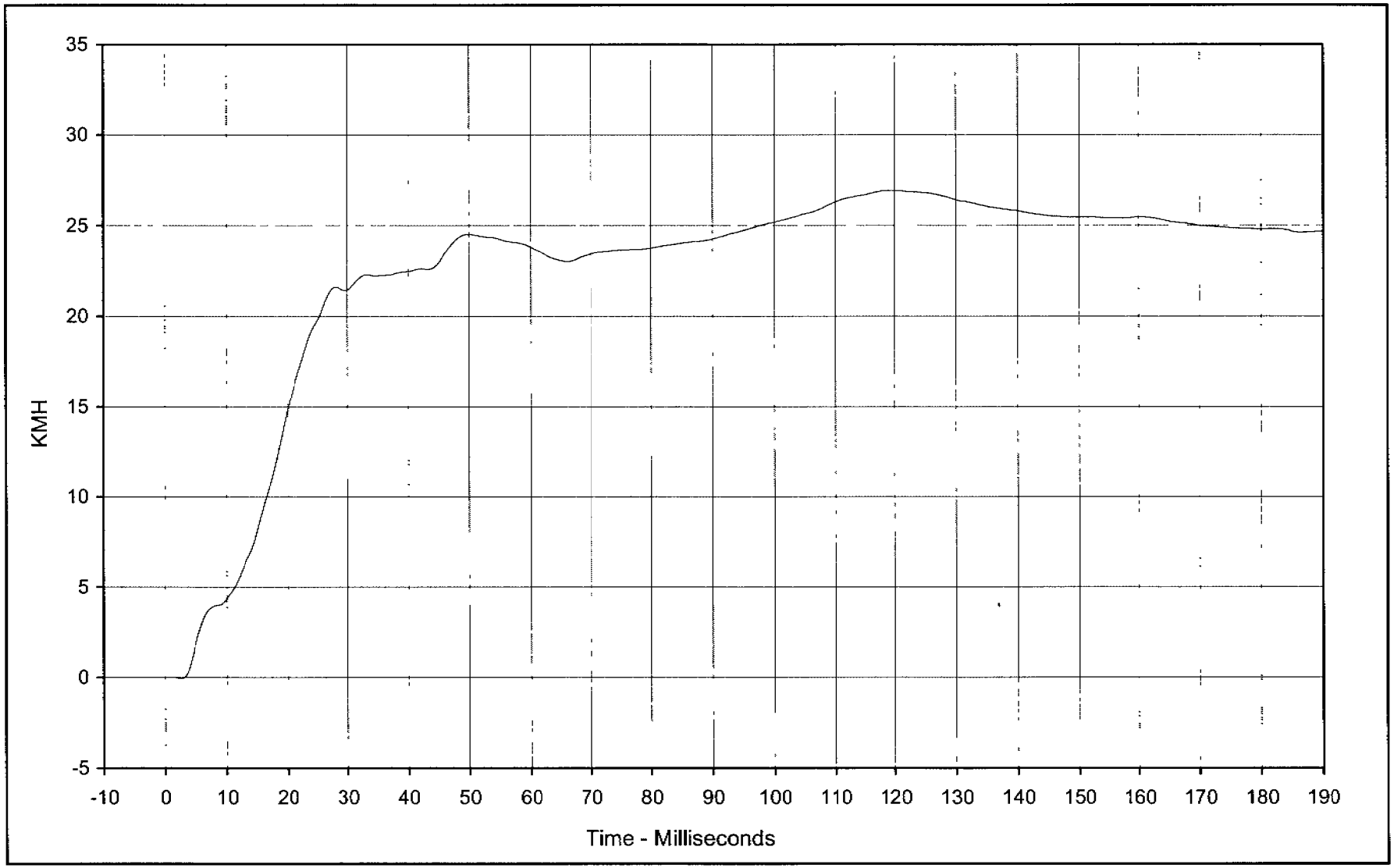
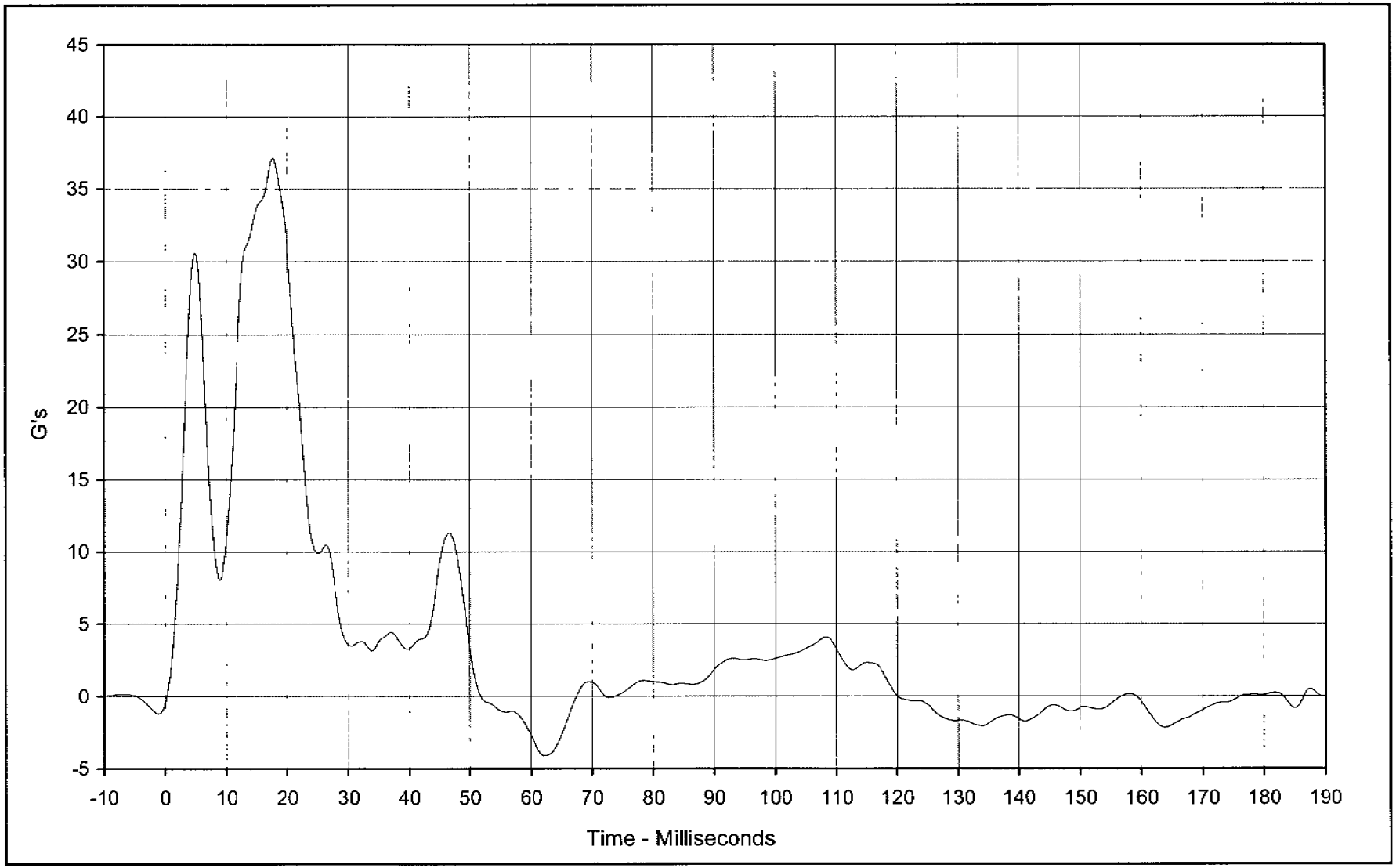


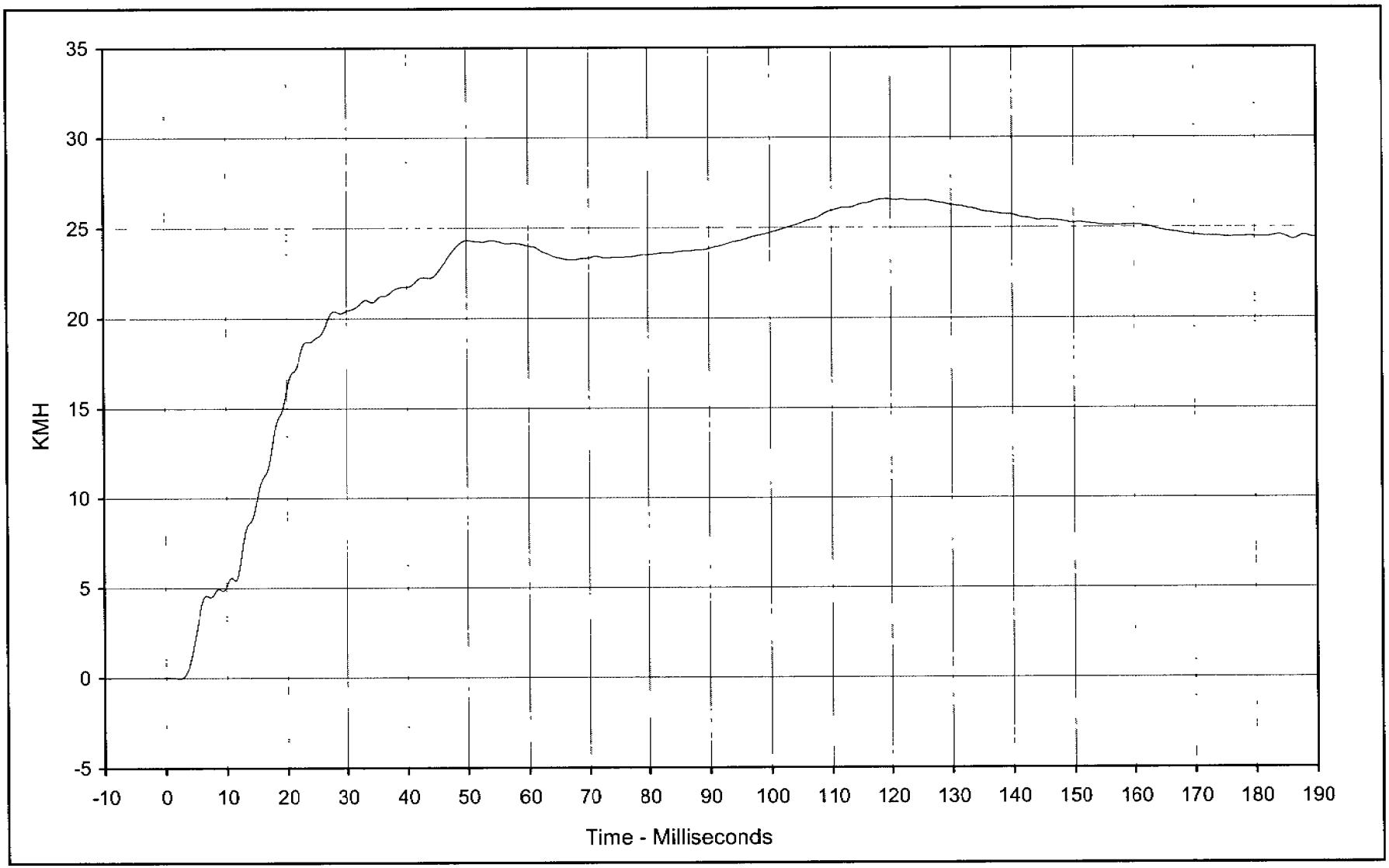
Curve Description:	Left Sill at Rear Door Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	26.9	at	118.9 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.1	at	2.6 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-036				

KARC Engineering



Curve Description:	Left Sill at Front Door Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	37.1	at	17.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-4.1	at	62.2 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-037				

KARCO Engineering



Curve Description: Left Sill at Front Door Y Velocity

Maximum Value: 26.6 at 119.3 Milliseconds

Minimum Value: 0.0 at 2.2 Milliseconds

SAE Filter Class: 180

Date of Test: 07/12/00

Curve Number: IN1-037

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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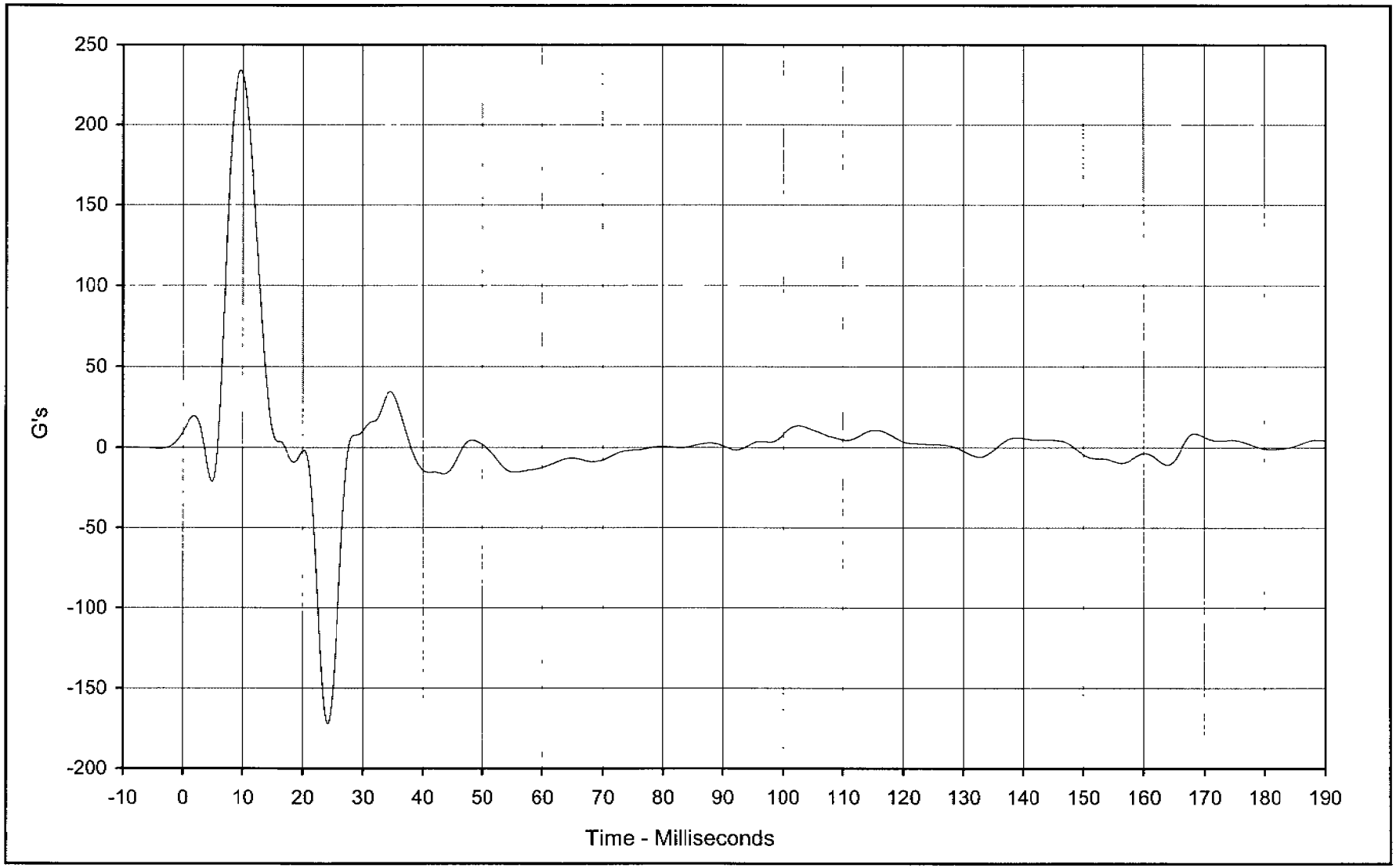

Curve Description:	Left Front Door Centerline Y			
Maximum Value:	234.1	at	9.6	Milliseconds
Minimum Value:	-172.2	at	24.1	Milliseconds
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	FIL-038			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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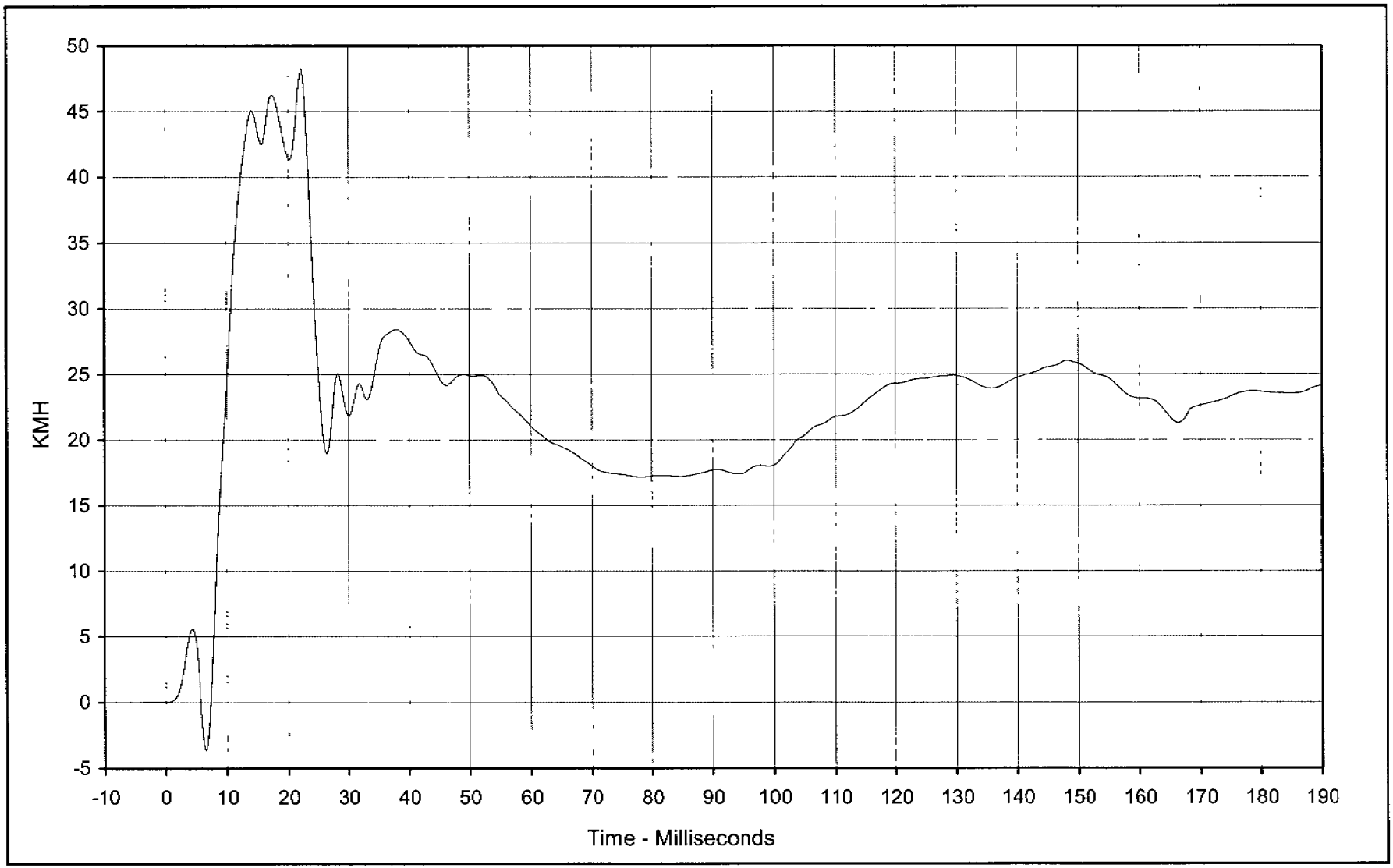
KAR20051-01



Curve Description:	Left Front Door CL Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	48.3	at	22.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-3.6	at	6.6 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-038				

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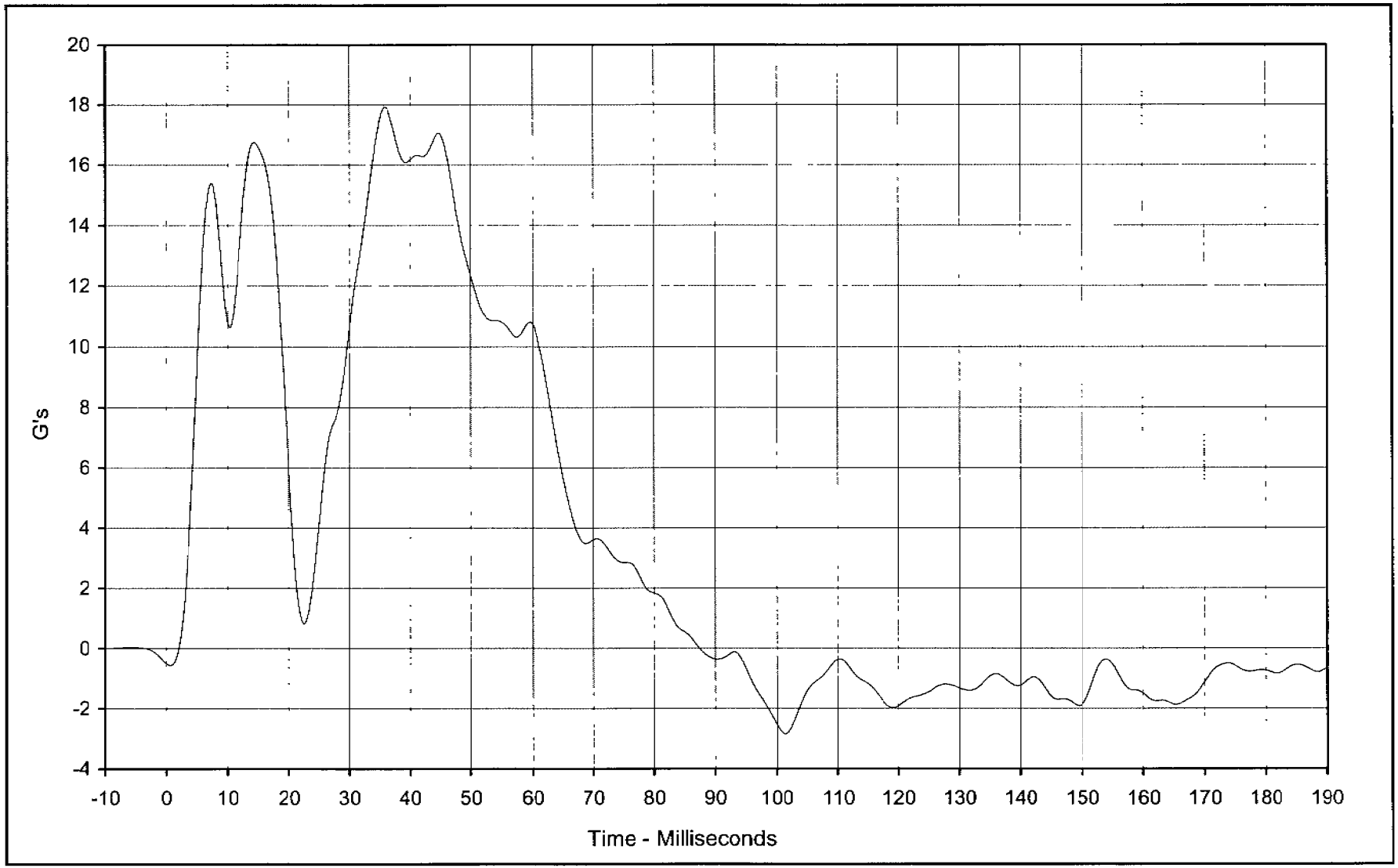

Curve Description:	Right Rear Occ. Compartment Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	17.9	at	35.8 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-2.9	at	101.3 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-039				

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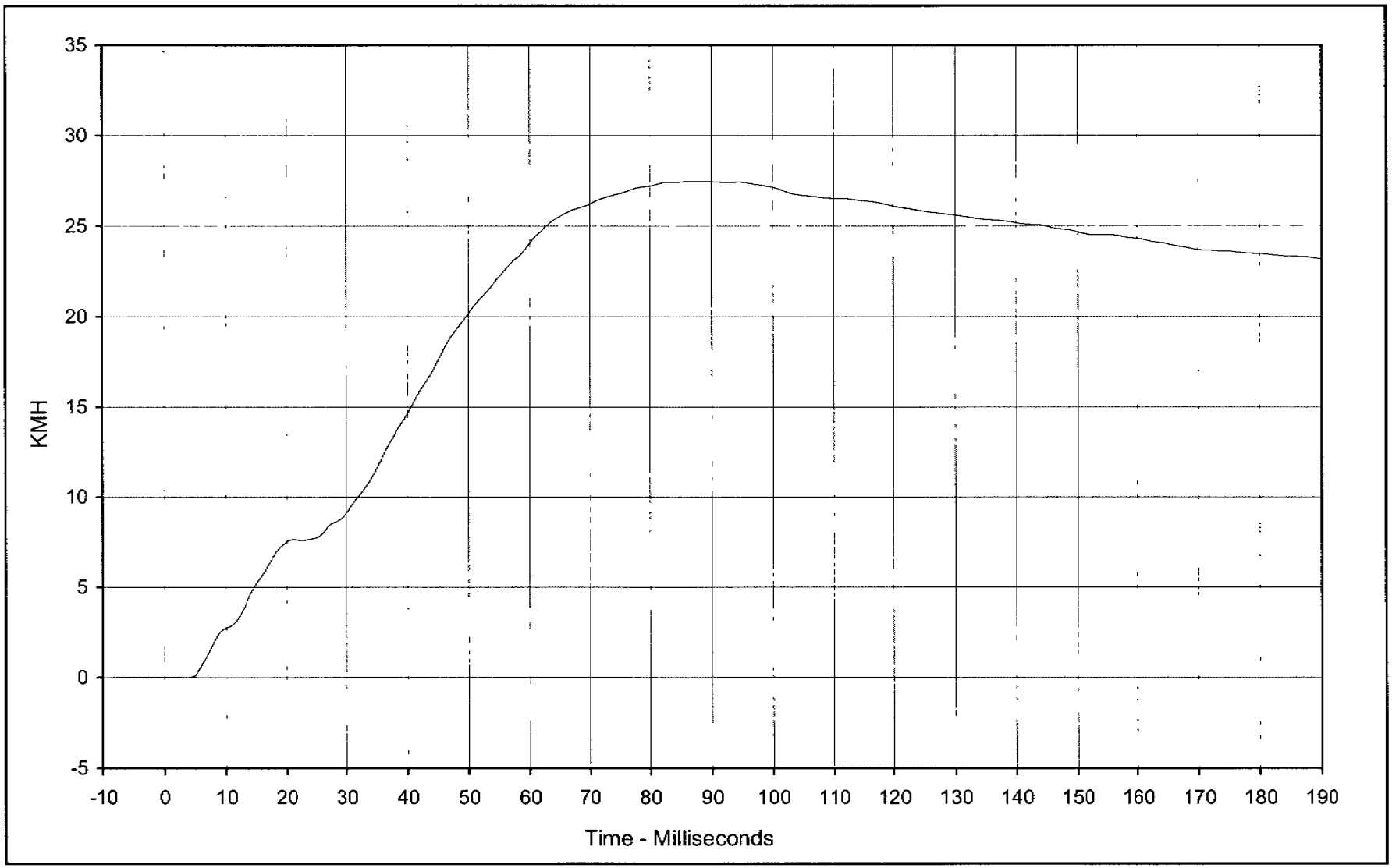
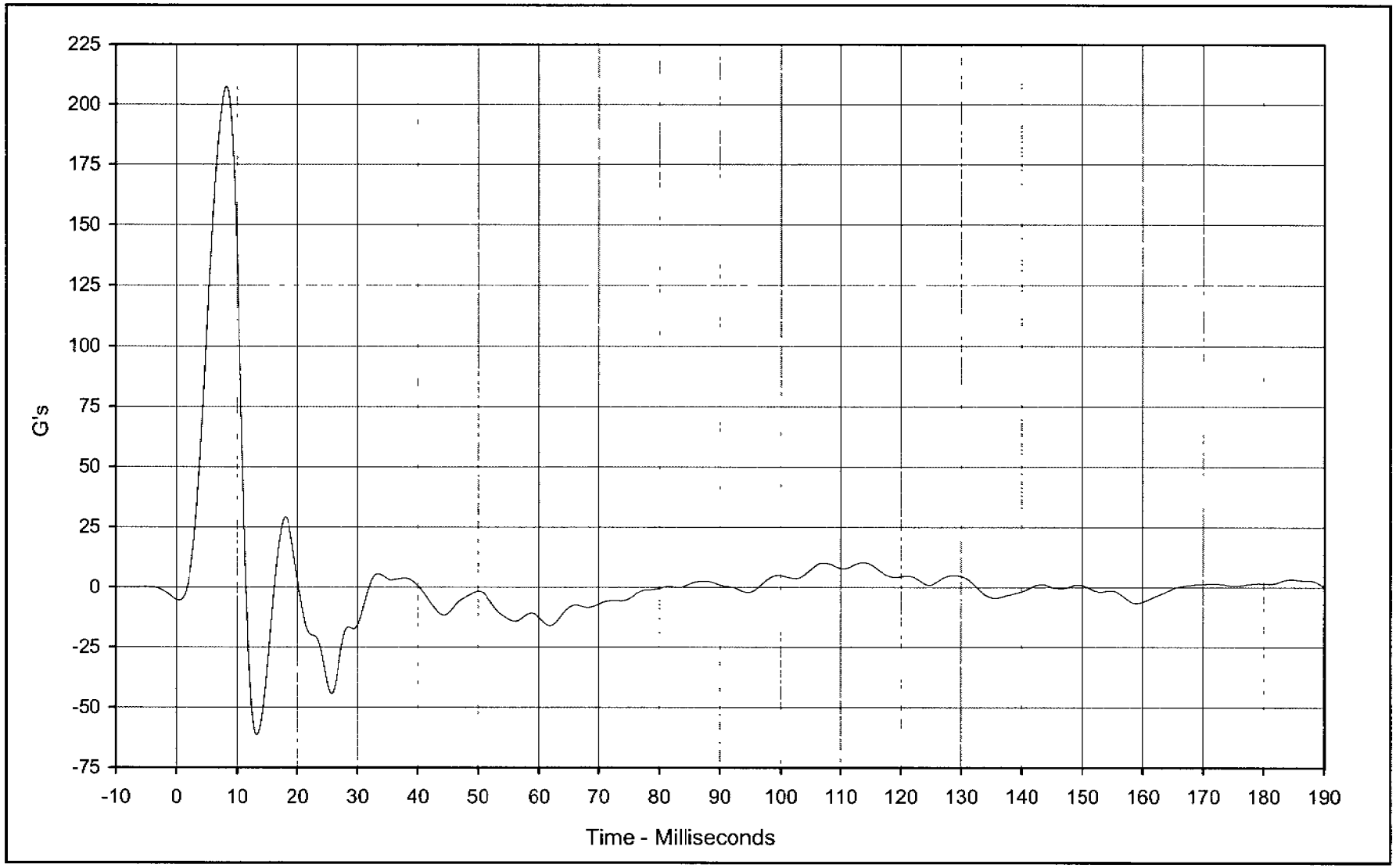
KAR20051-01



Curve Description:	Right Rear Occ. Comp. Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	27.5	at	86.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.0	at	3.5 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-039				

KARC Engineering



Curve Description:	Left Front Door Mid Rear Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	207.5	at	8.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-61.5	at	13.2 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-040				

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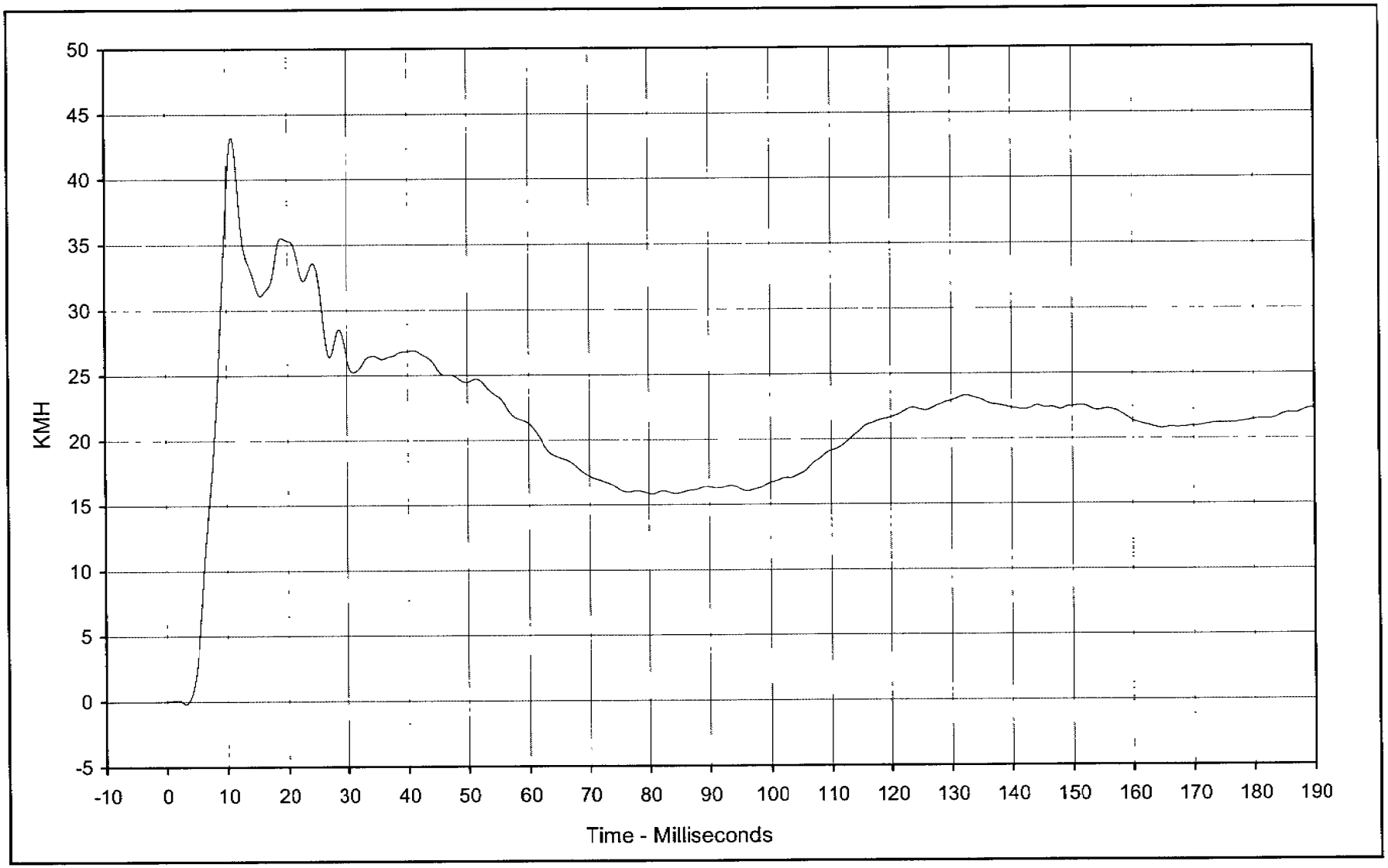


Curve Description: Left Front Door Mid-Rear Y Velocity

Maximum Value: 43.2 at 10.9 Milliseconds

Minimum Value: -0.2 at 3.0 Milliseconds

SAE Filter Class: 180

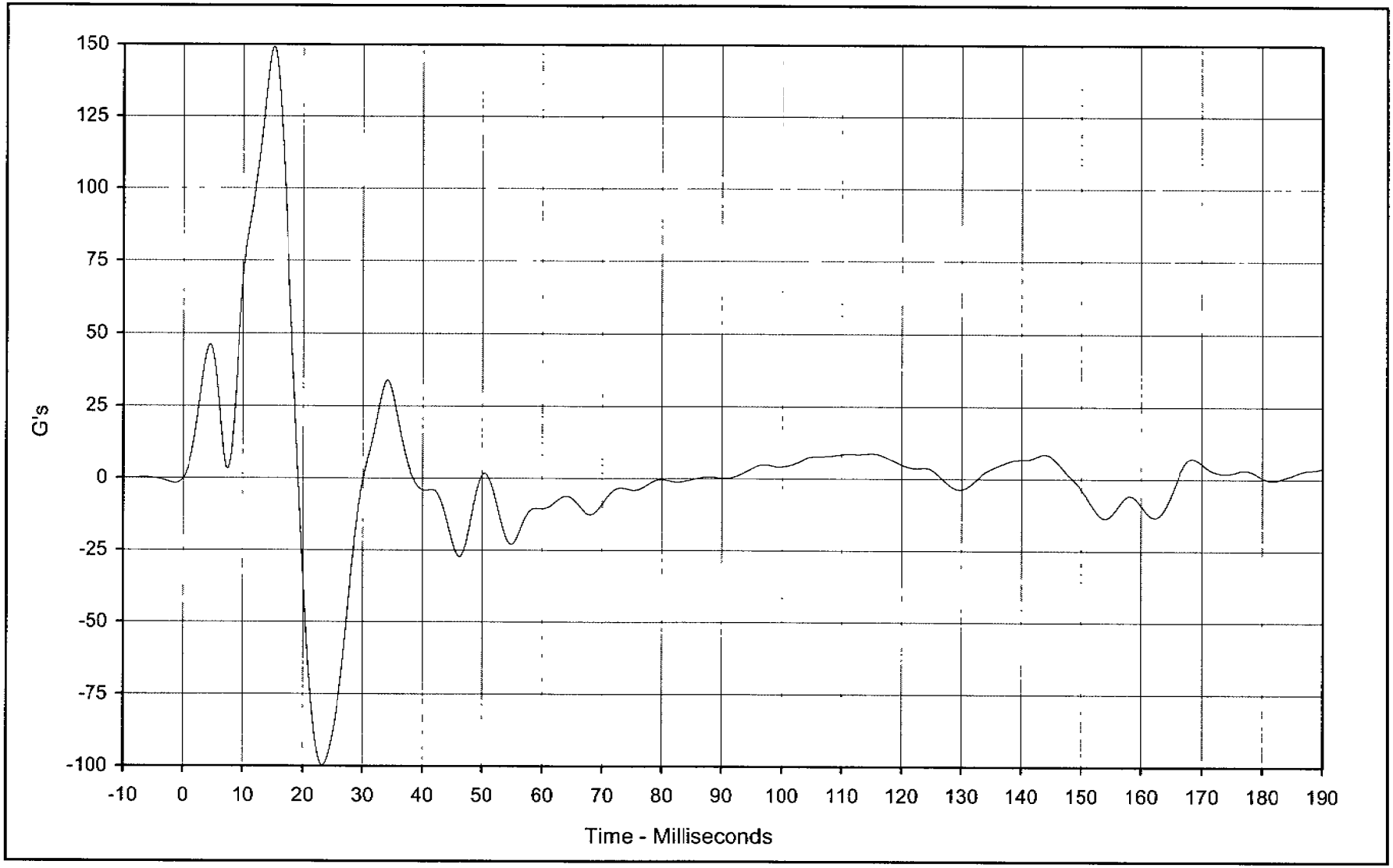
Date of Test: 07/12/00

Curve Number: IN1-040

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Left Front Door Upper CL Y

Maximum Value: 149.3 at 15.1 Milliseconds

Minimum Value: -99.7 at 23.2 Milliseconds

SAE Filter Class: 60

Date of Test: 07/12/00

Curve Number: FIL-041

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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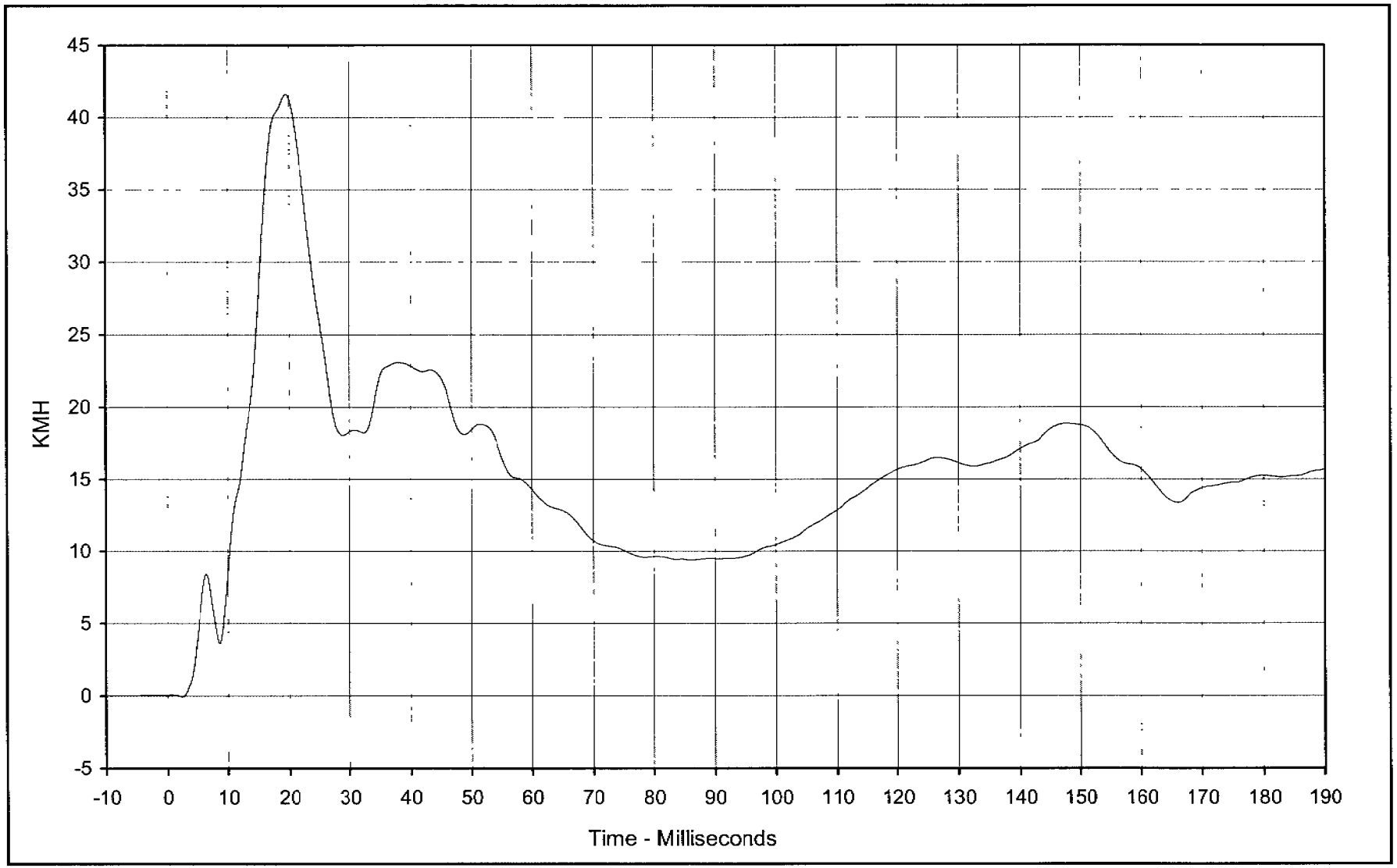
KAR20051-01



Curve Description: Left Front Door Upper CL Y Velocity

Maximum Value: 41.6 at 19.4 Milliseconds

Minimum Value: -0.1 at 2.3 Milliseconds

SAE Filter Class: 180

Date of Test: 07/12/00

Curve Number: IN1-041

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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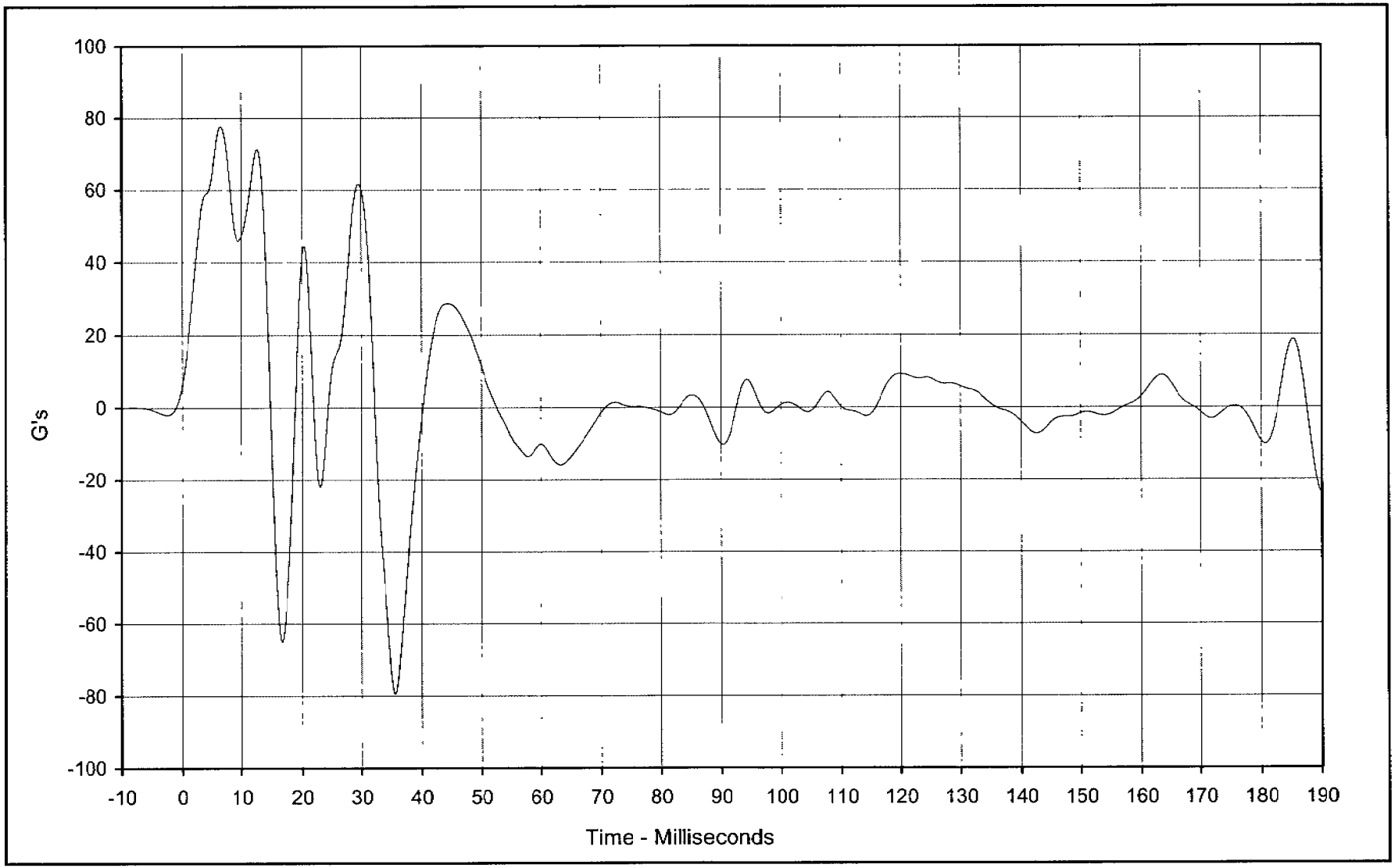
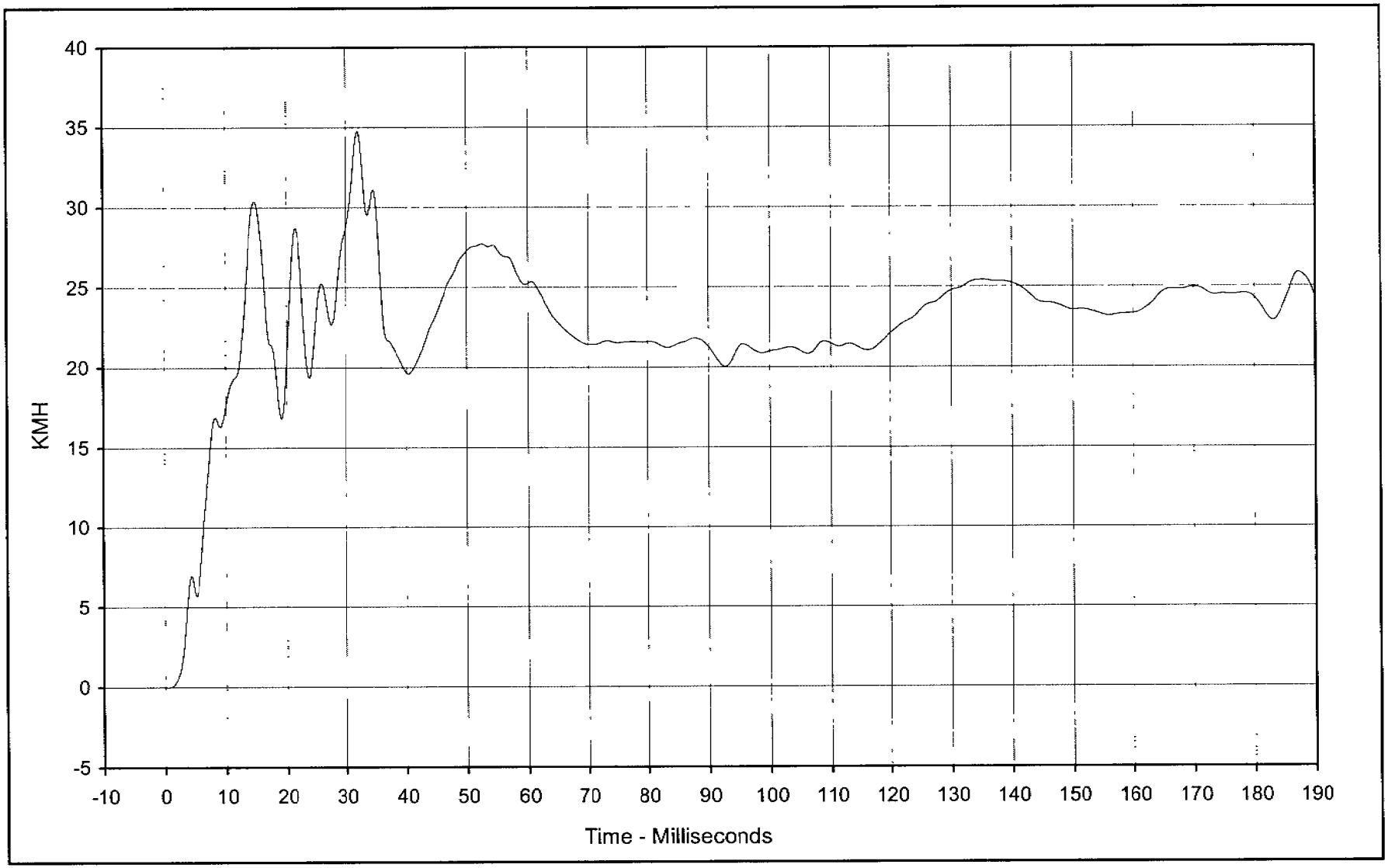


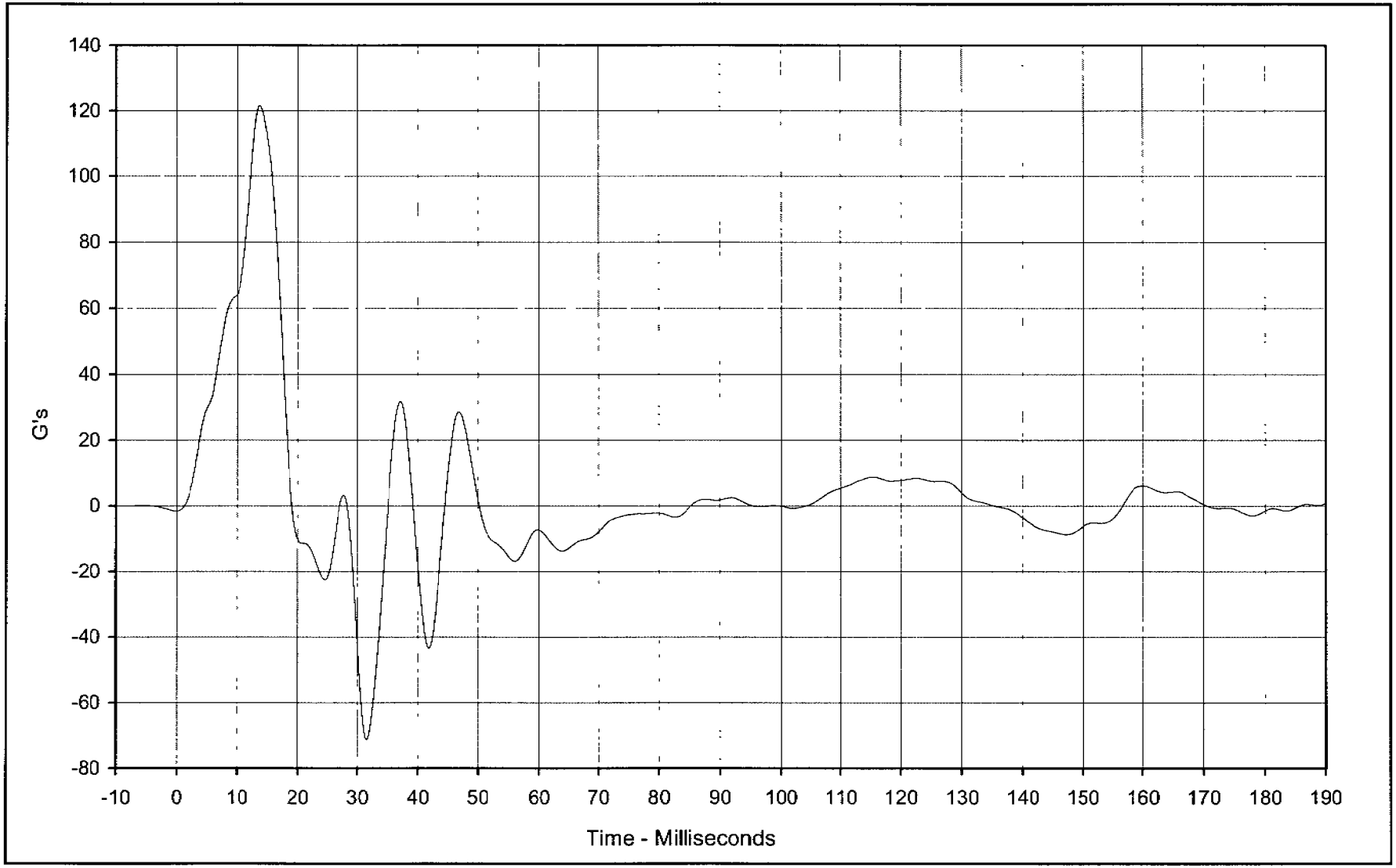
Curve Description:	Left Rear Door Mid Rear Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	77.7	at	6.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-79.4	at	35.6 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-042				

KARCO Engineering



Curve Description:	Left Rear Door Mid Rear Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	34.8	at	32.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.0	at	0.4 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-042				

KARCO Engineering



Curve Description:	Left Rear Door Upper CL Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	121.6	at	13.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-71.3	at	31.5 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-043				

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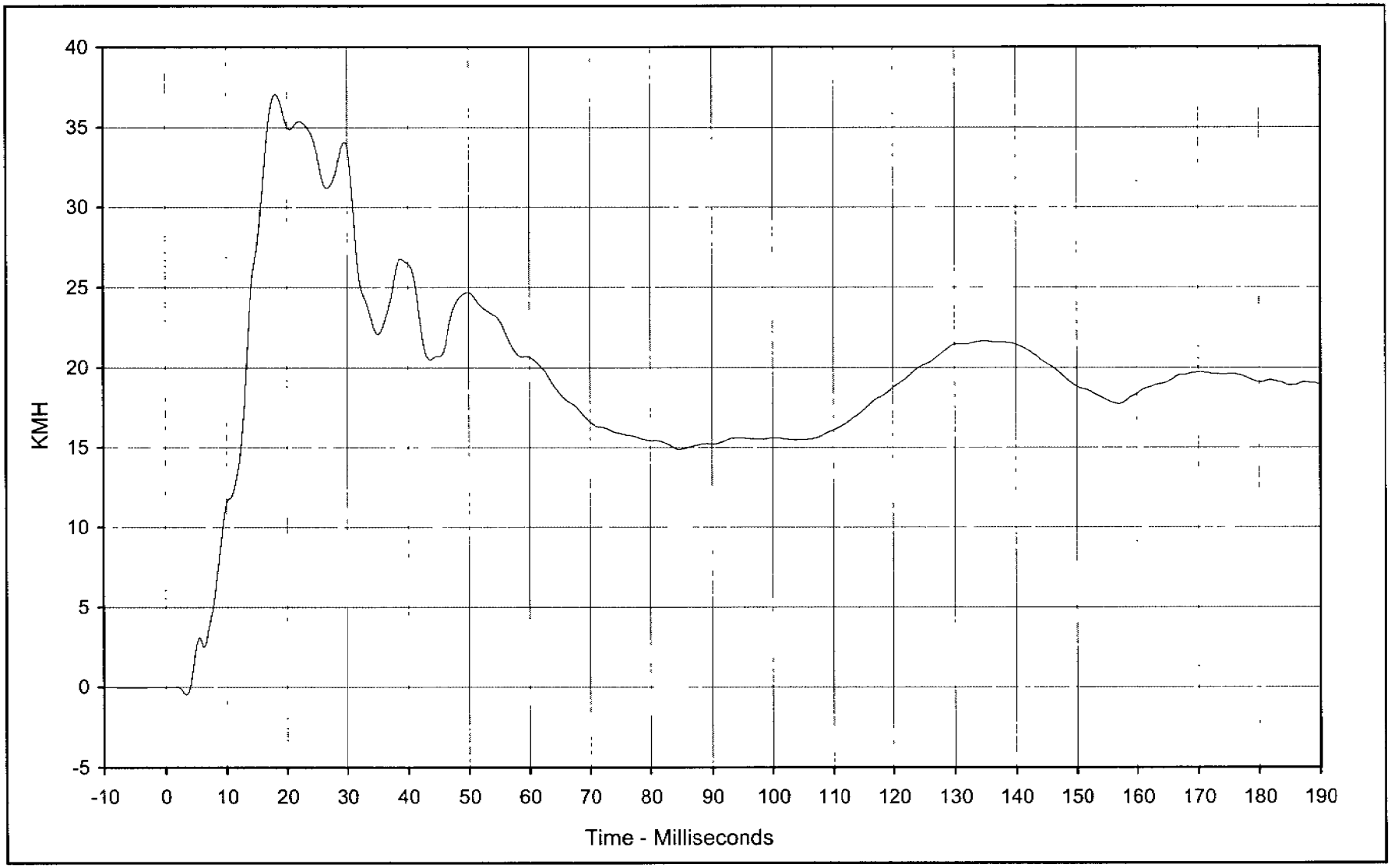
KAR20051-01



Curve Description:	Left Rear Door Upper CL Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	37.0	at	18.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.5	at	3.3 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-043				

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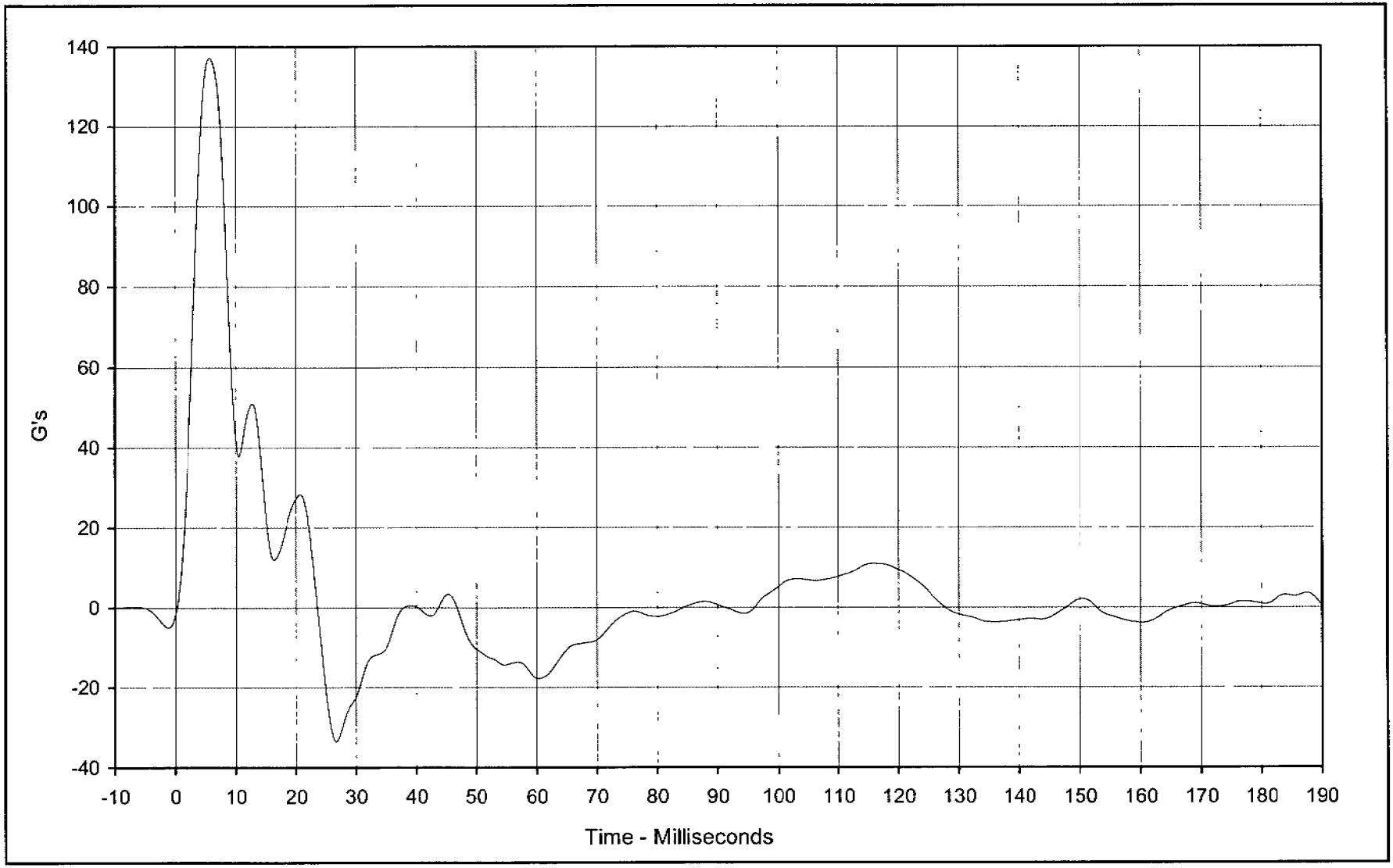
KAR20051-01



Curve Description:	Left B-Post Lower Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	137.2	at	5.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-33.6	at	26.6 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-044				

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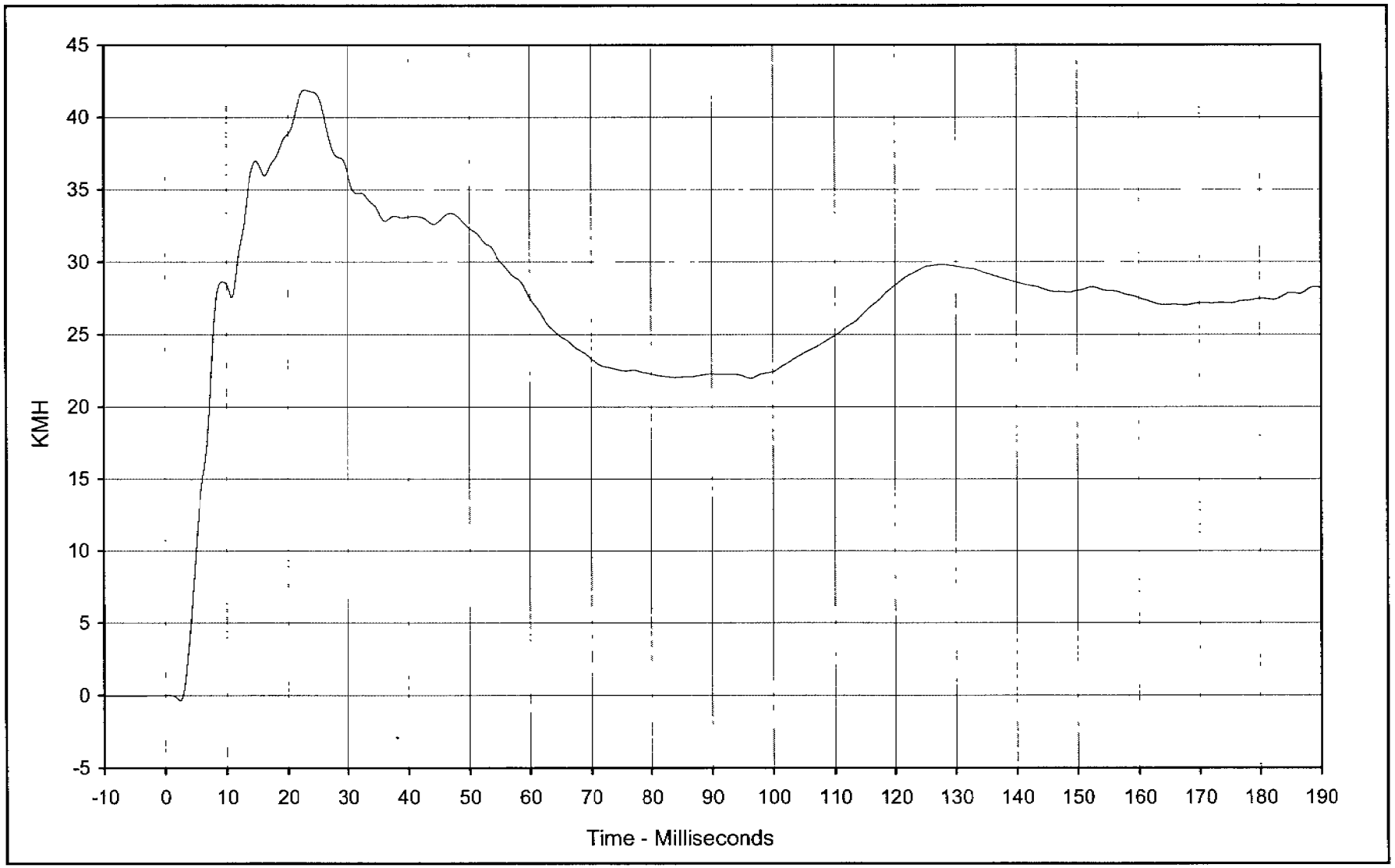

Curve Description:	Left B-Post Lower Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	41.9	at	22.9 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.3	at	2.3 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-044				

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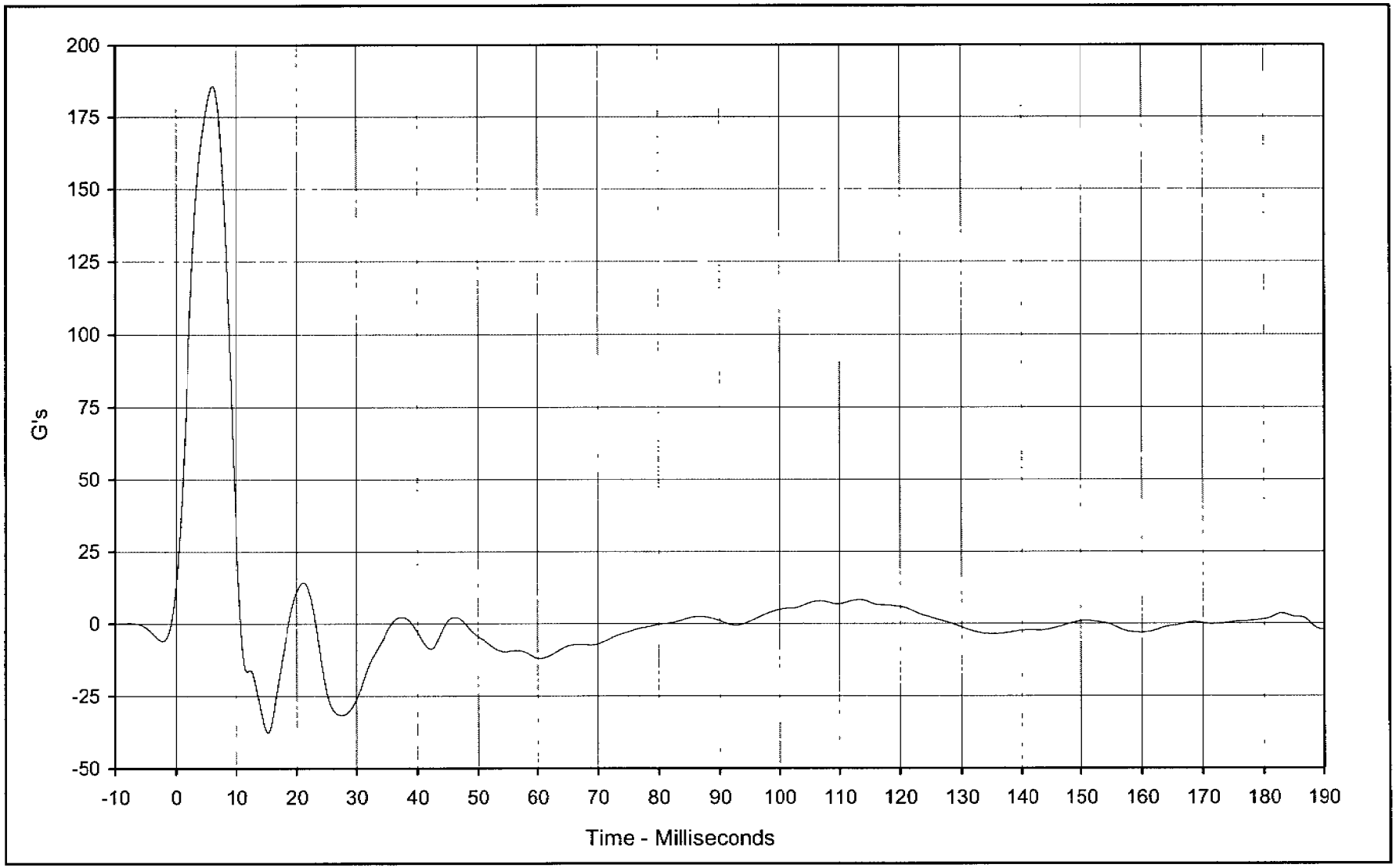
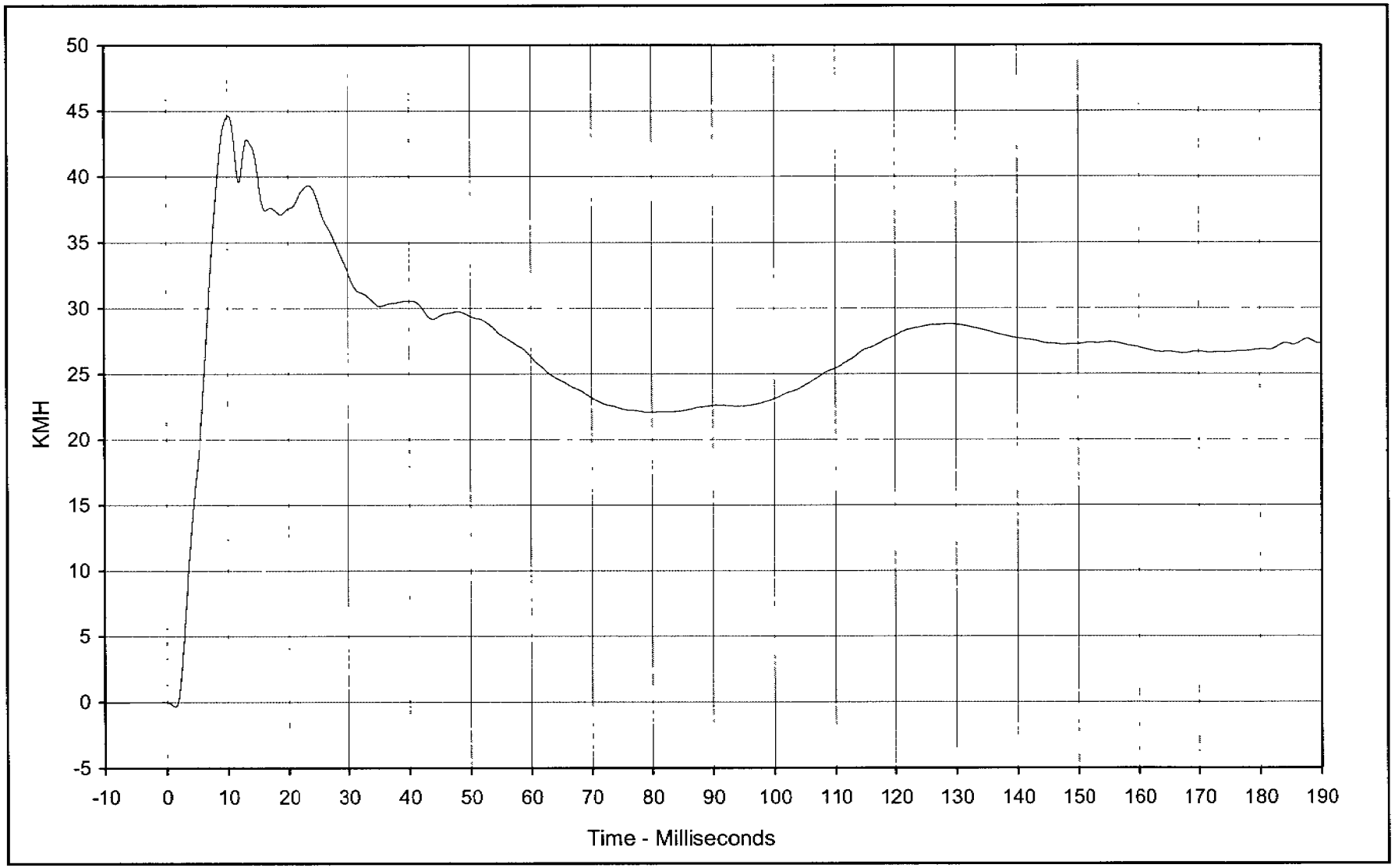


Curve Description:	Left B-Post Middle Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	185.8	at	6.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-37.7	at	15.1 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-045				

KARCO Engineering



Curve Description:	Left B-Post Middle Y Velocity				
Maximum Value:	44.6	at	10.2	Milliseconds	
Minimum Value:	-0.3	at	1.3	Milliseconds	
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-045				

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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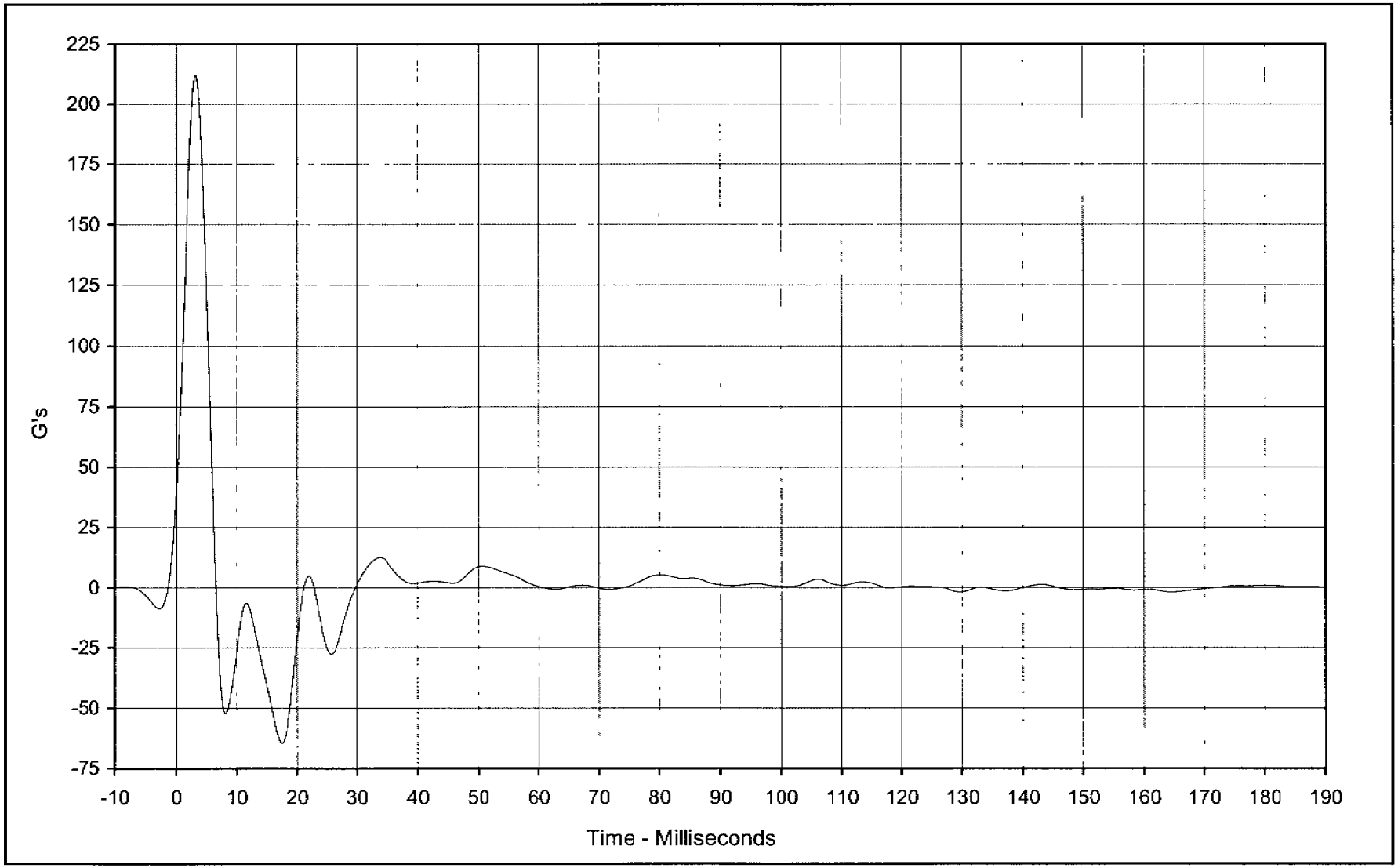

Curve Description:	Left A-Post Lower Y			
Maximum Value:	212.0	at	3.2	Milliseconds
Minimum Value:	-64.6	at	17.4	Milliseconds
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	FIL-046			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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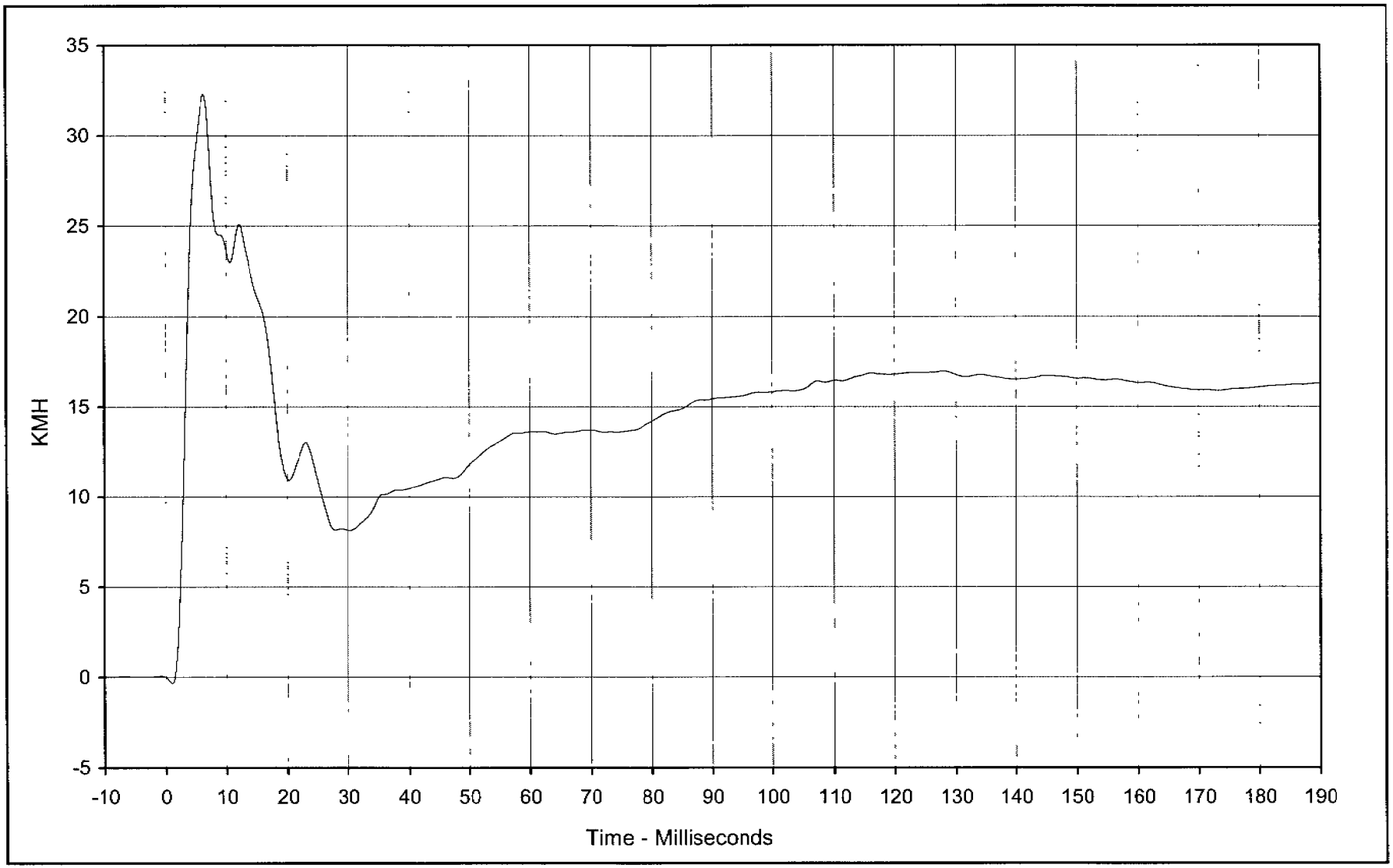
KAR20051-01



Curve Description:	Left A-Post Lower Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	32.3	at	6.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.4	at	1.0 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-046				

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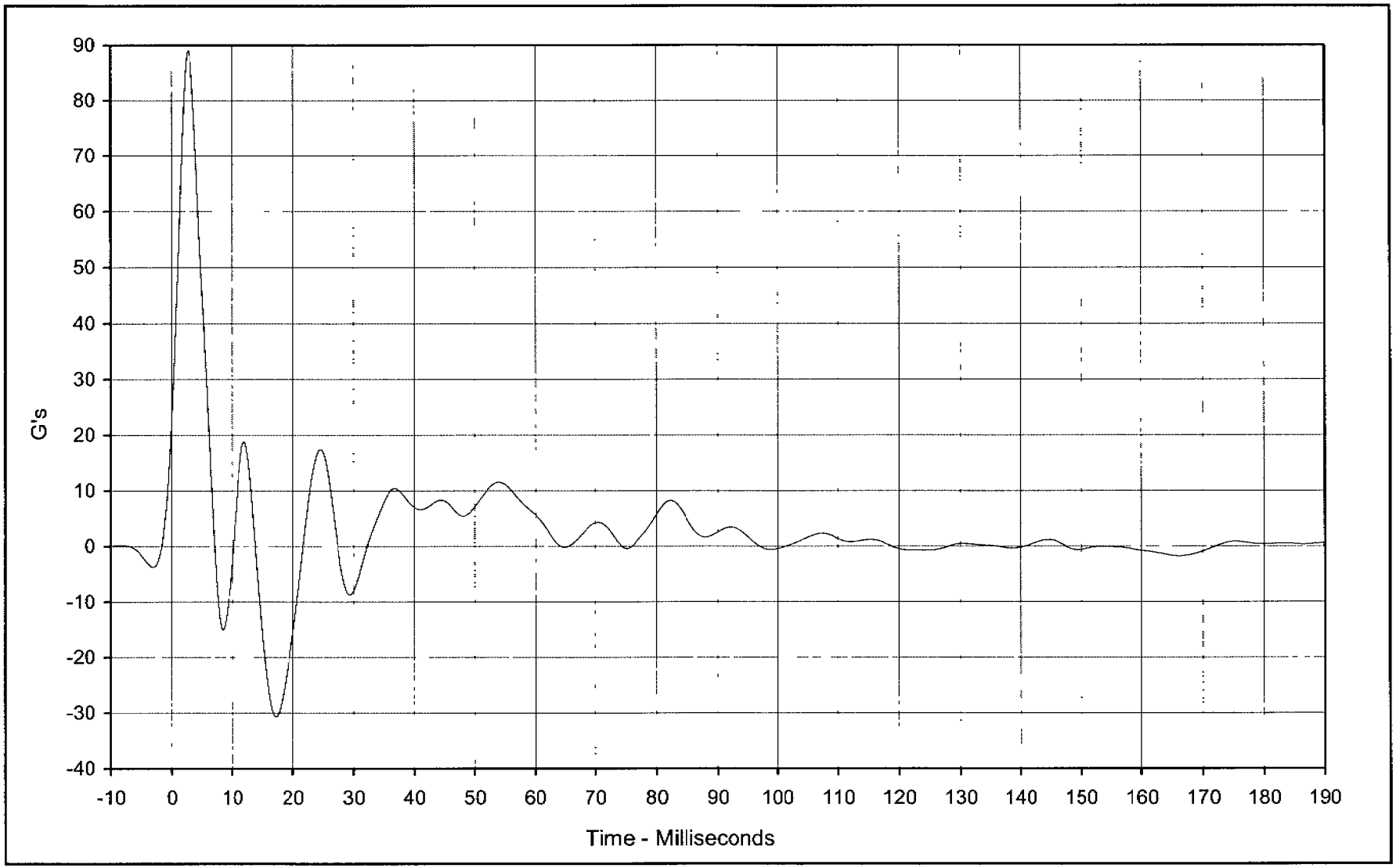
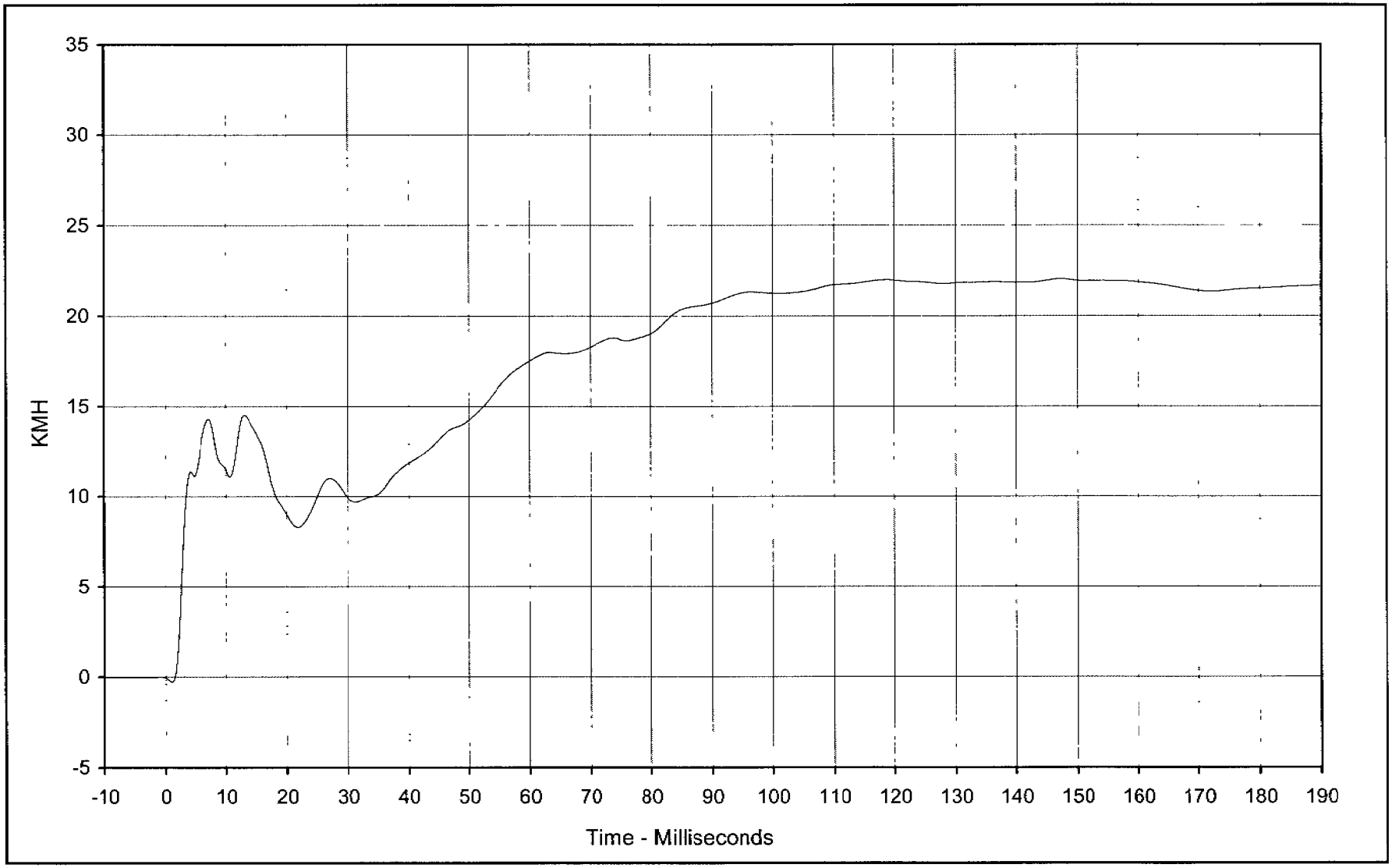


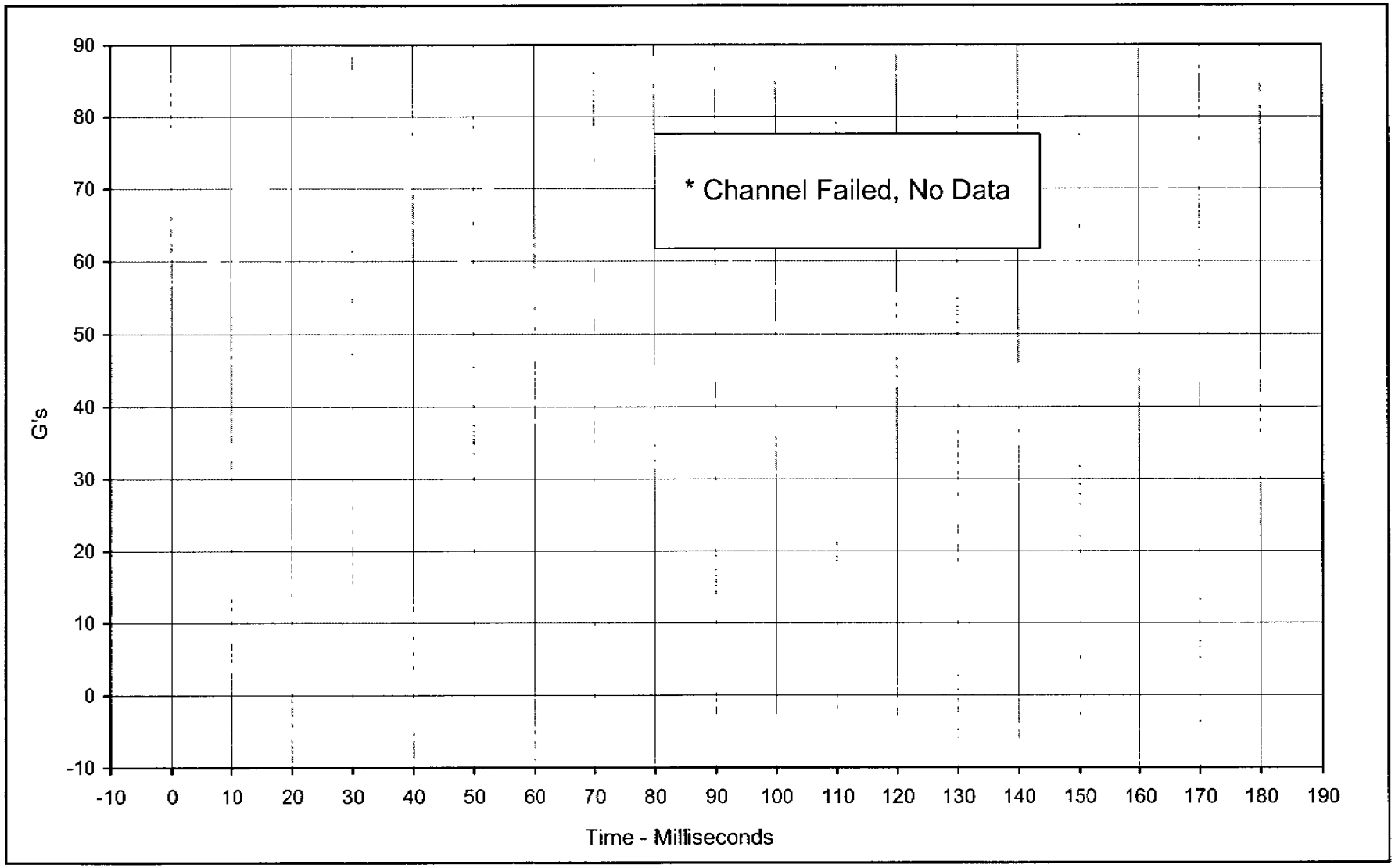
Curve Description:	Left A-Post Middle Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	89.1	at	2.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-30.7	at	17.2 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-047				

KARCO Engineering



Curve Description:	Left A-Post Middle Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	22.0	at	147.2 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-0.3	at	1.0 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-047				

KARC Engineering



Curve Description: Left Front Seat Track Y *

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 60

Date of Test: 07/12/00

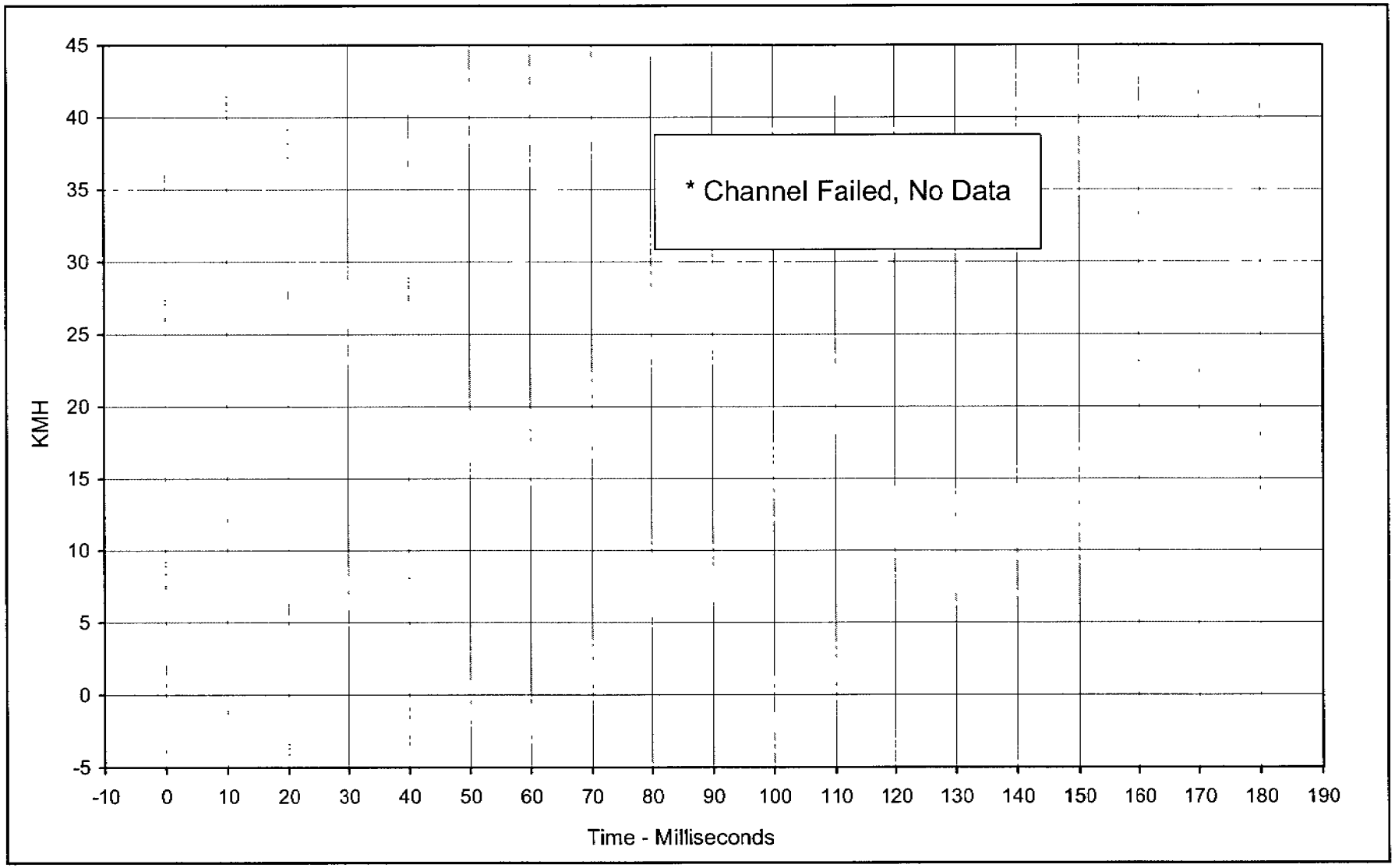
Curve Number: FIL-048

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

* Channel Failed, No Data

KARCO Engineering



Curve Description: Left Front Seat Track Y Velocity *

Maximum Value: 0.0 at 0.0 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 180

Date of Test: 07/12/00

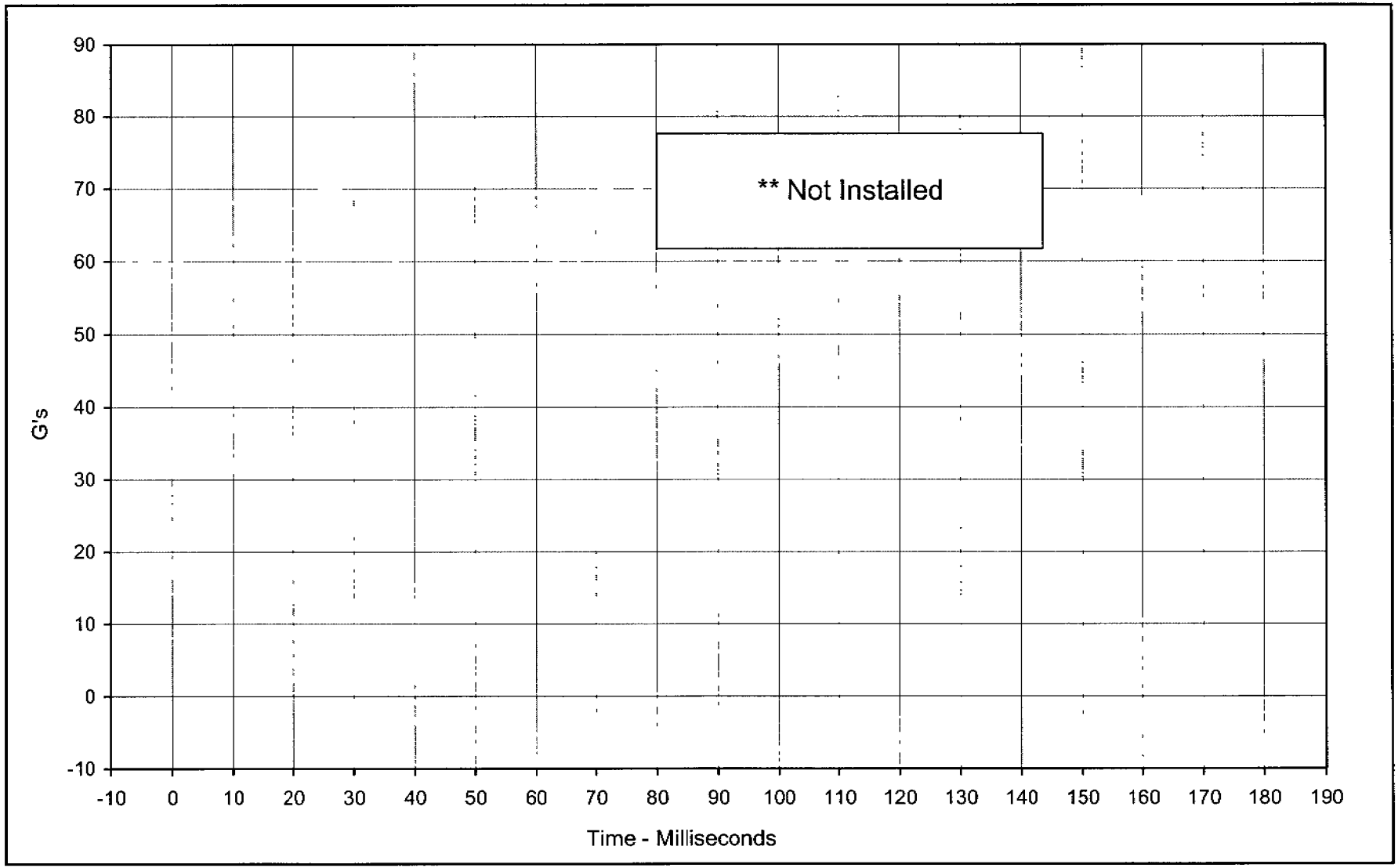
Curve Number: IN1-048

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

* Channel Failed, No Data

KARC Engineering



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: 07/12/00

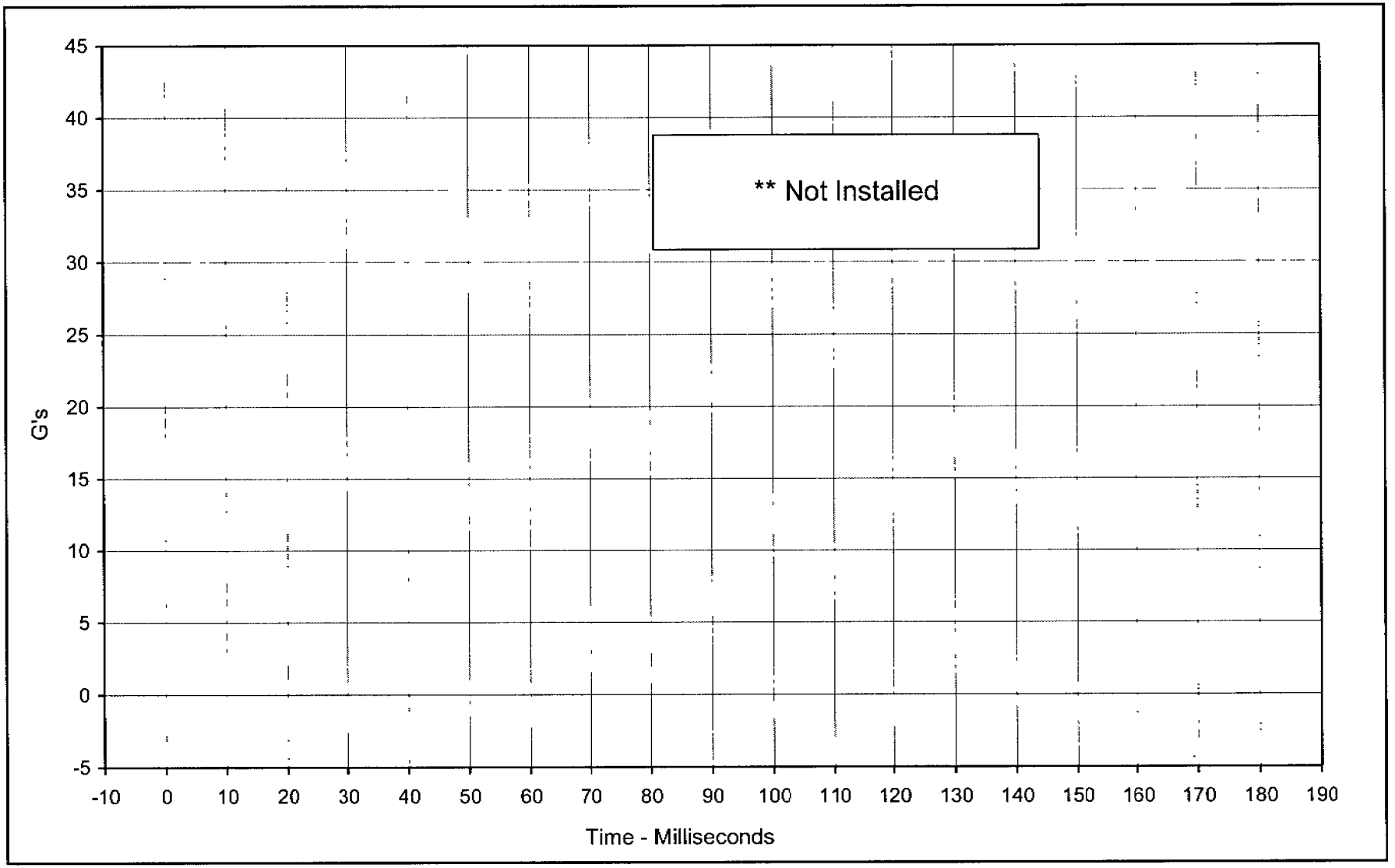
Curve Number: FIL-049

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

** Not Installed

KARC Engineering



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: 180

Date of Test: 07/12/00

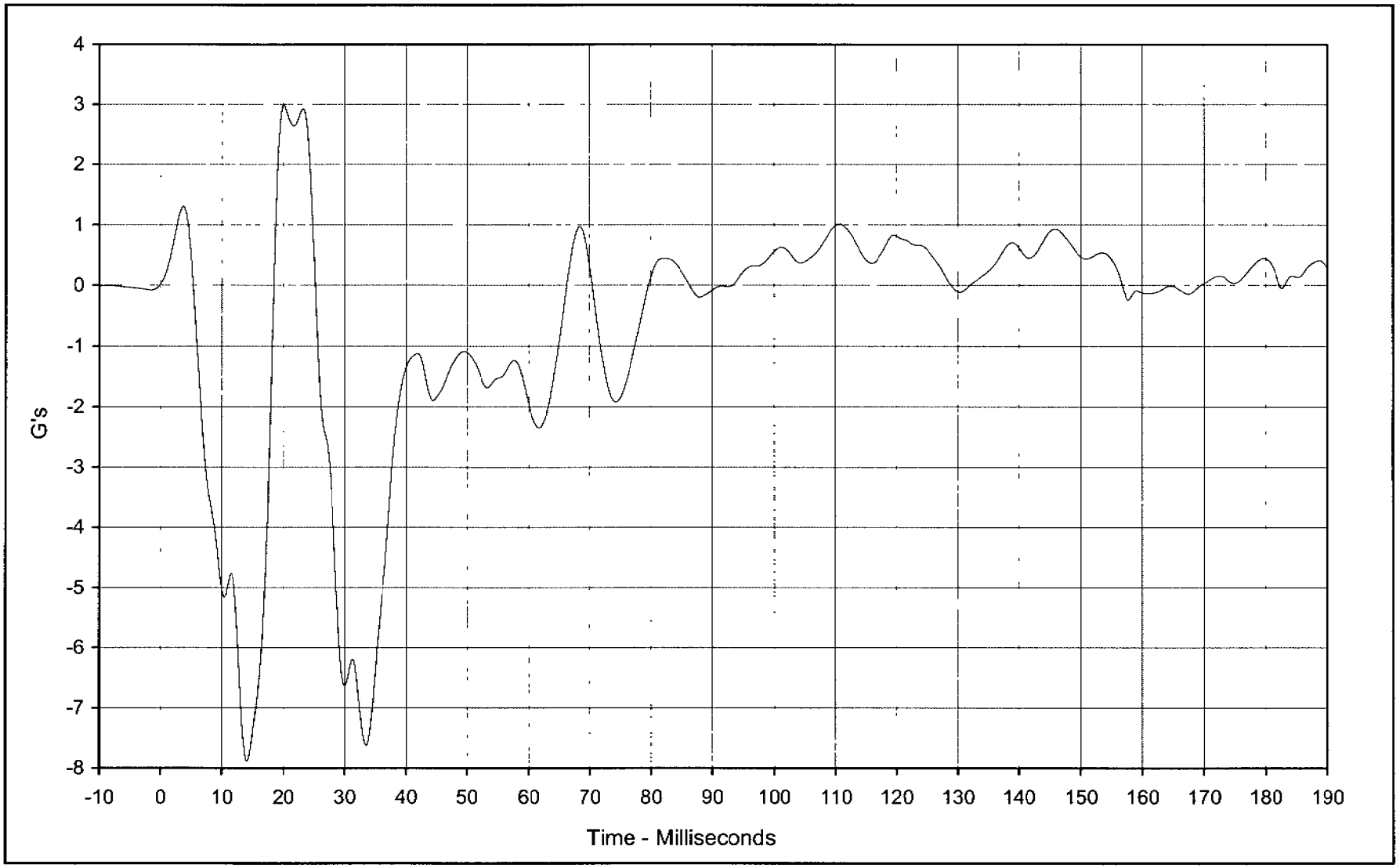
Curve Number: IN1-049

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

** Not Installed

KARCO Engineering



Curve Description:	Vehicle CG X				
Maximum Value:	3.0	at	20.0	Milliseconds	
Minimum Value:	-7.9	at	14.1	Milliseconds	
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-050				

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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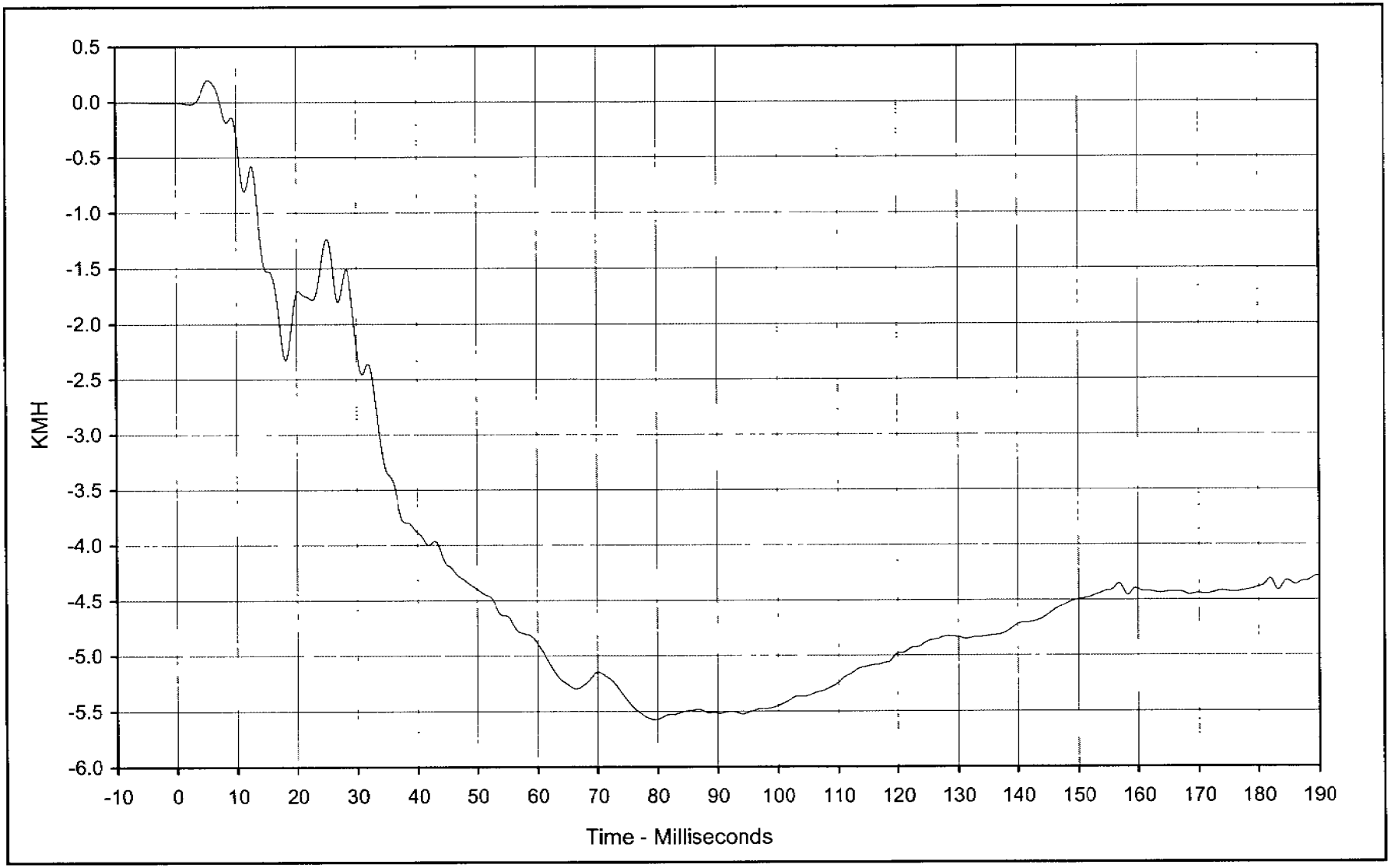

Curve Description:	Vehicle CG X Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	0.2	at	5.5 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-5.6	at	79.5 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-050				

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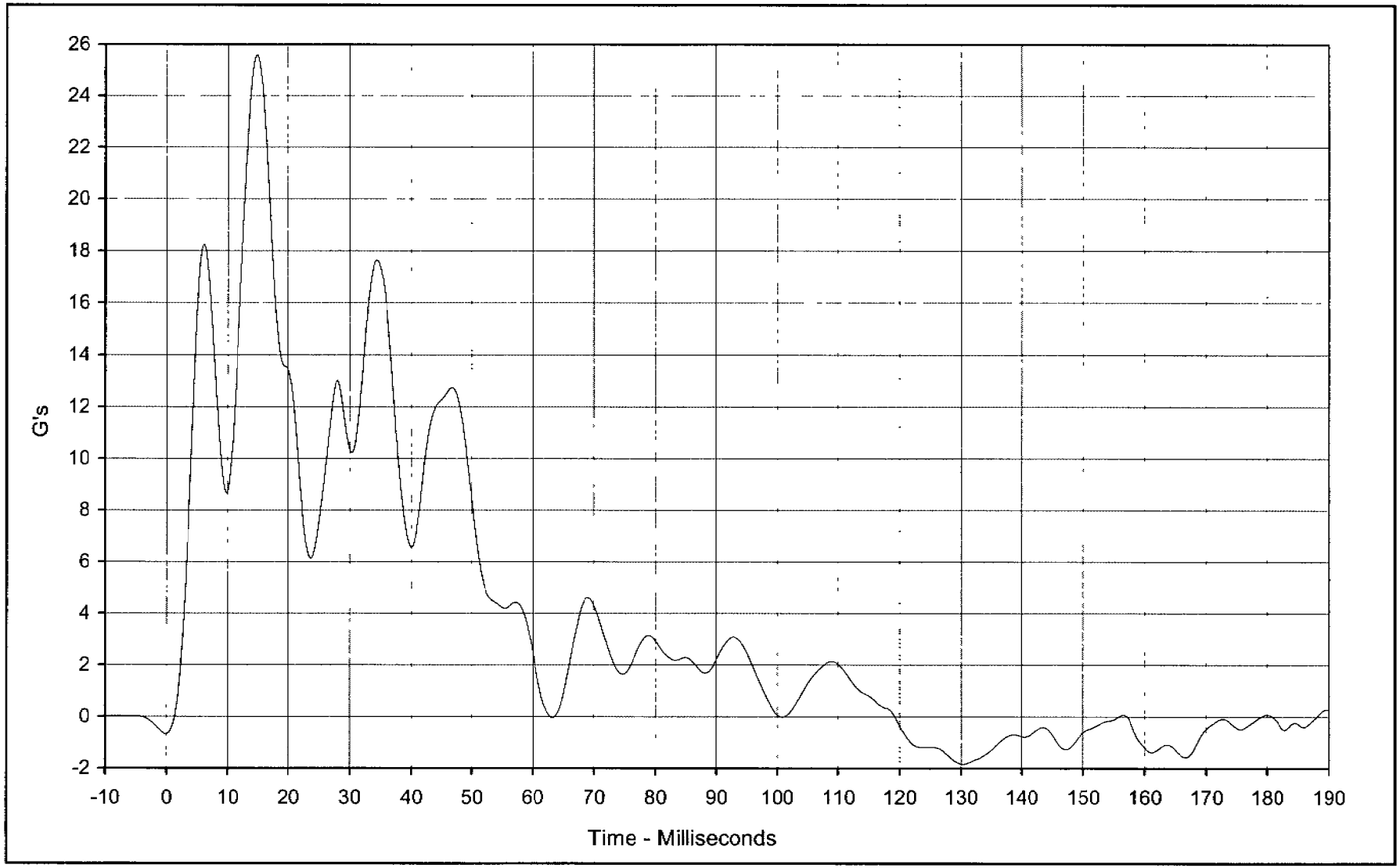
B-101

KAR20051-01



Curve Description:	Vehicle CG Y			
Maximum Value:	25.6	at	14.9	Milliseconds
Minimum Value:	-1.8	at	130.3	Milliseconds
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	FIL-051			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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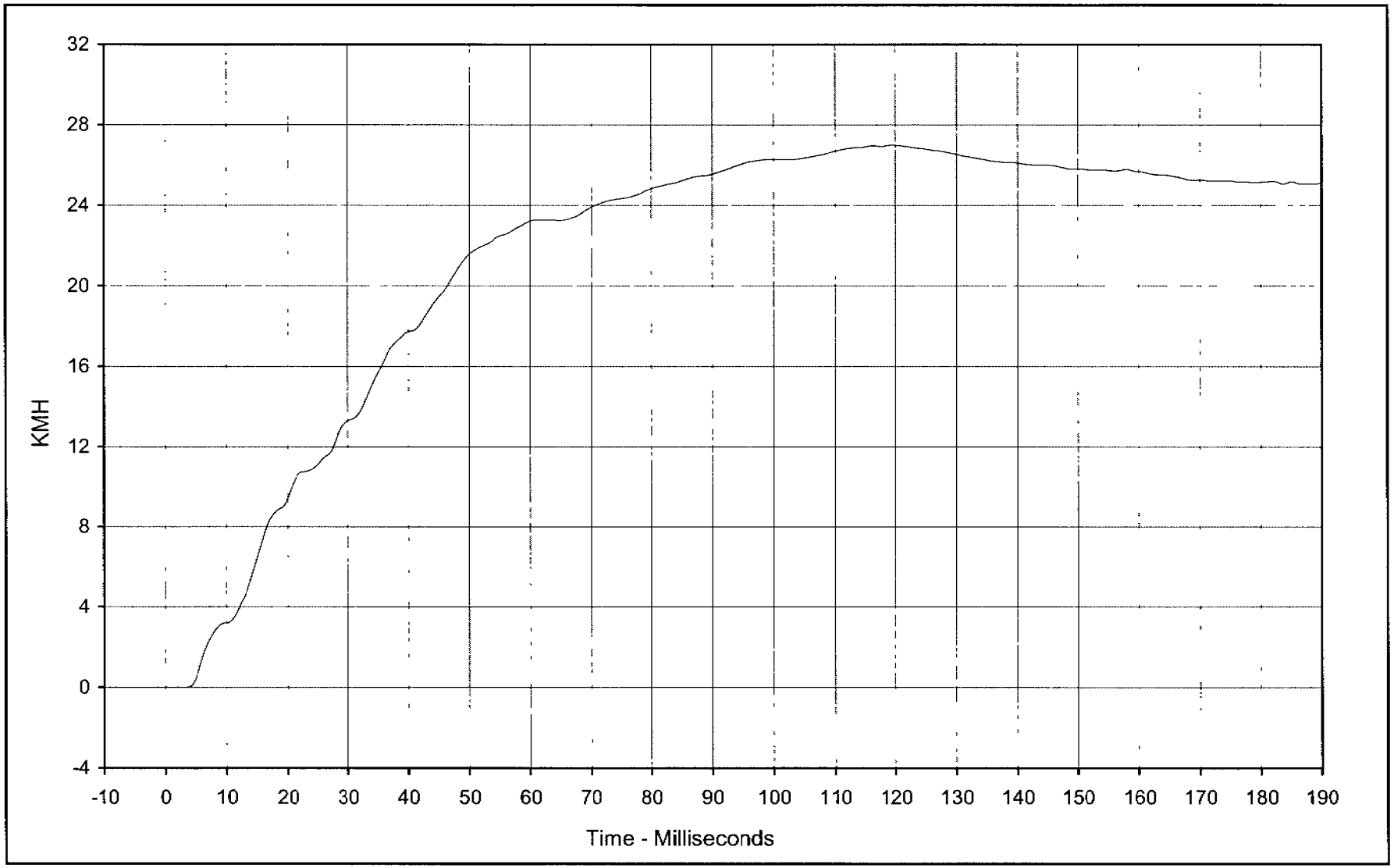

Curve Description:	Vehicle CG Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	27.0	at	119.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.0	at	3.1 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-051				

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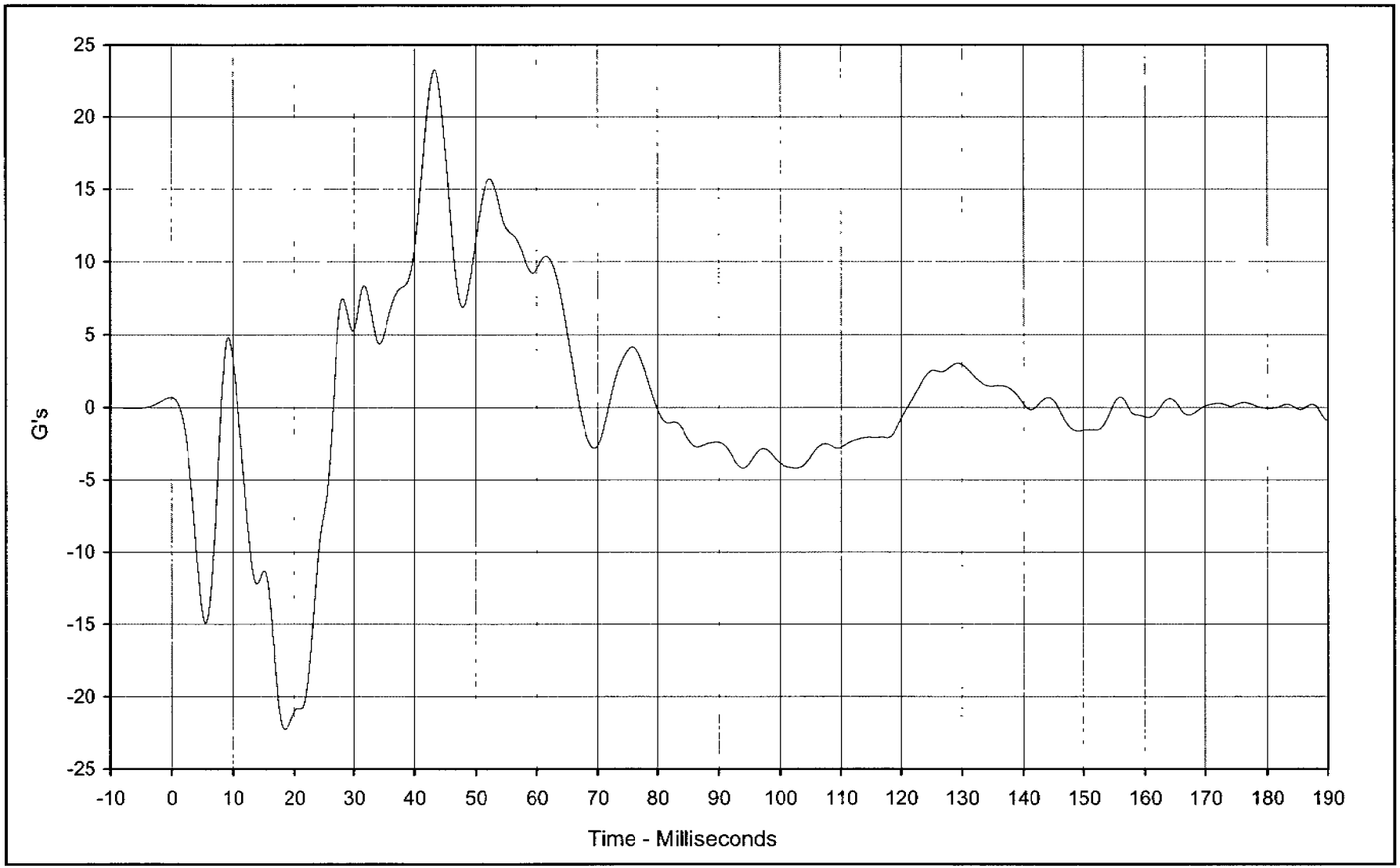

Curve Description:	Vehicle CG Z			
Maximum Value:	23.3	at 43.2	Milliseconds	
Minimum Value:	-22.3	at 18.4	Milliseconds	
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	FIL-052			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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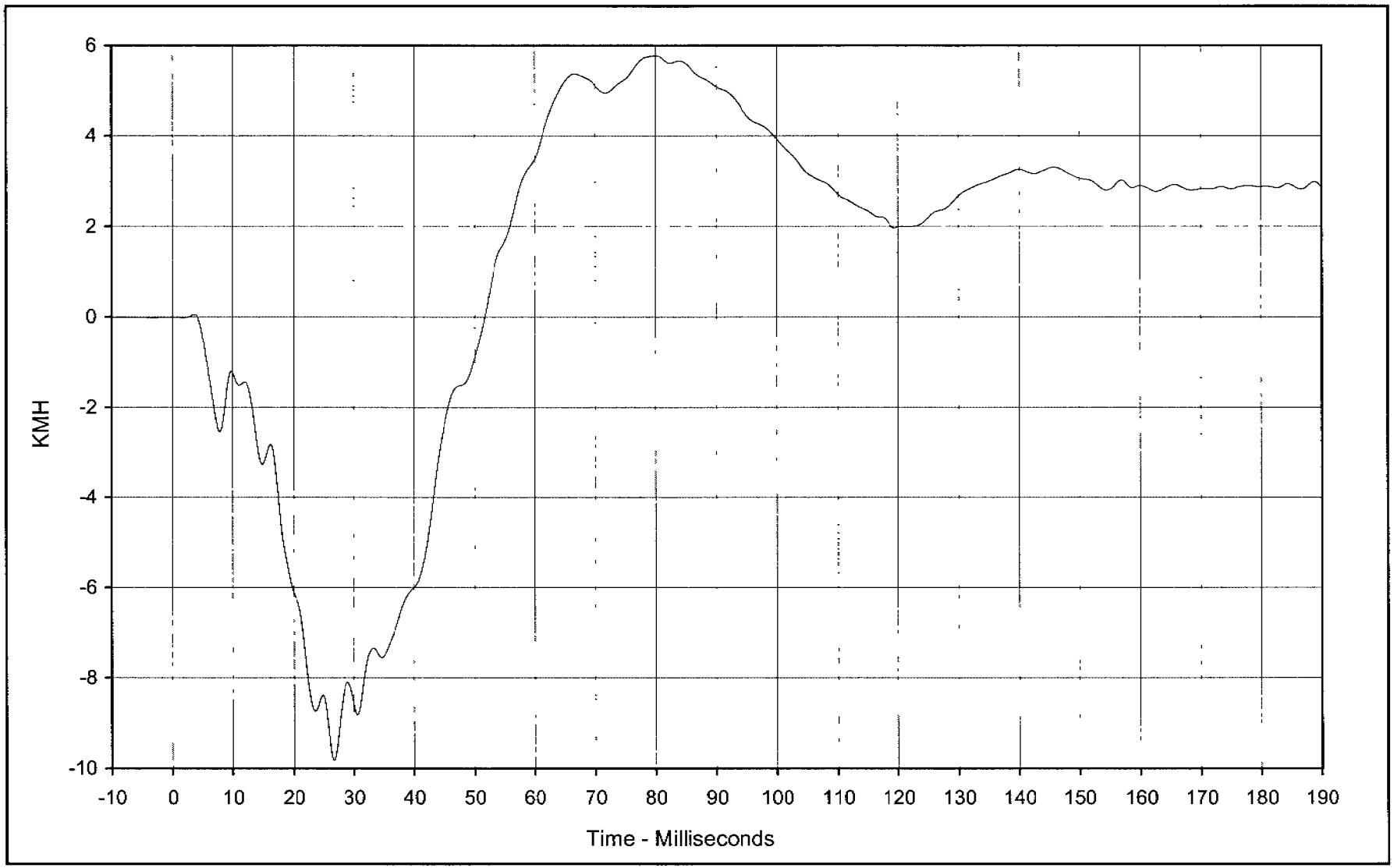

Curve Description:	Vehicle CG Z Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	5.8	at	80.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-9.8	at	26.6 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-052				

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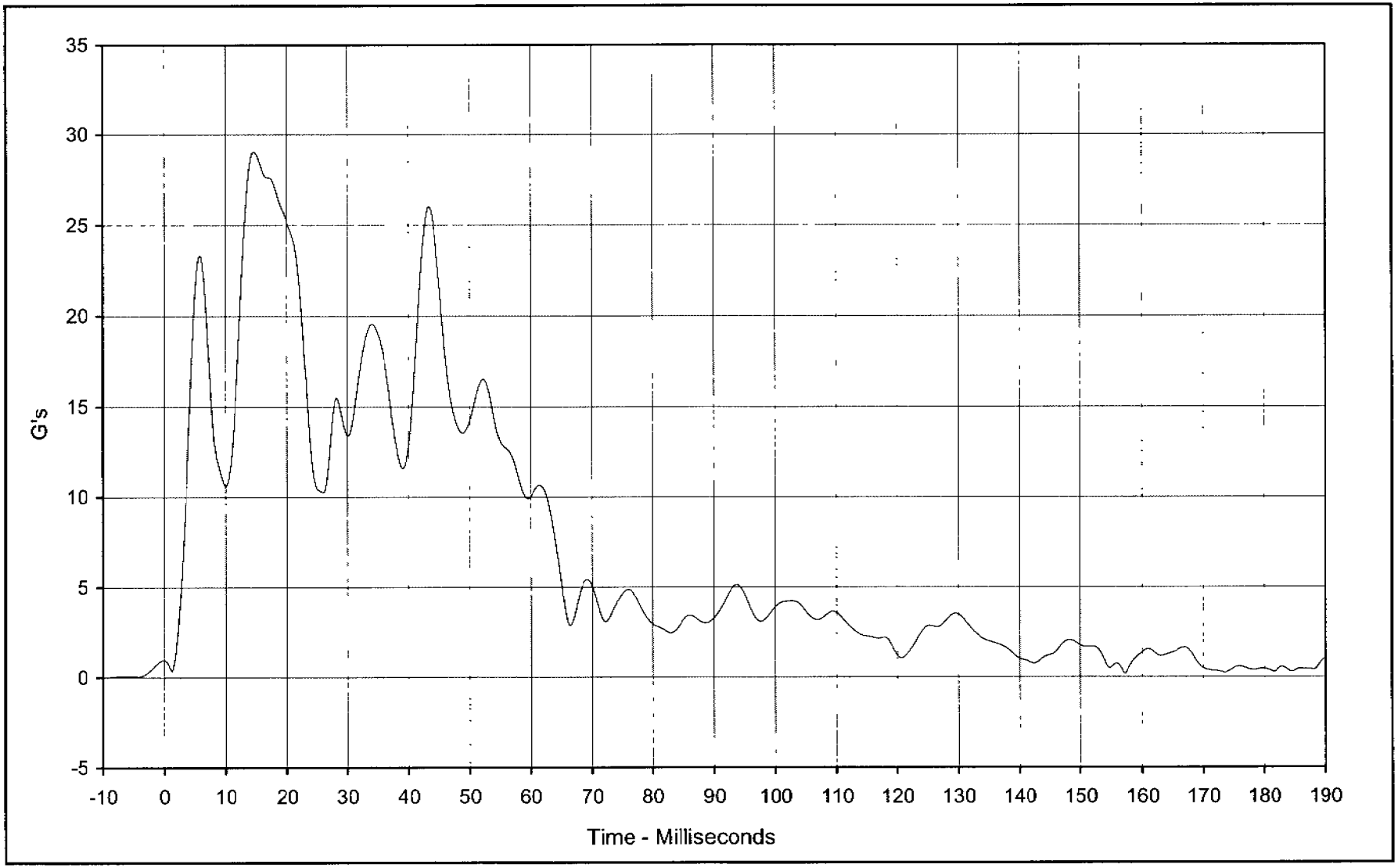
KAR20051-01



Curve Description:	Vehicle CG Resultant			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	29.1	at	14.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.2	at	157.1 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	RES-050				

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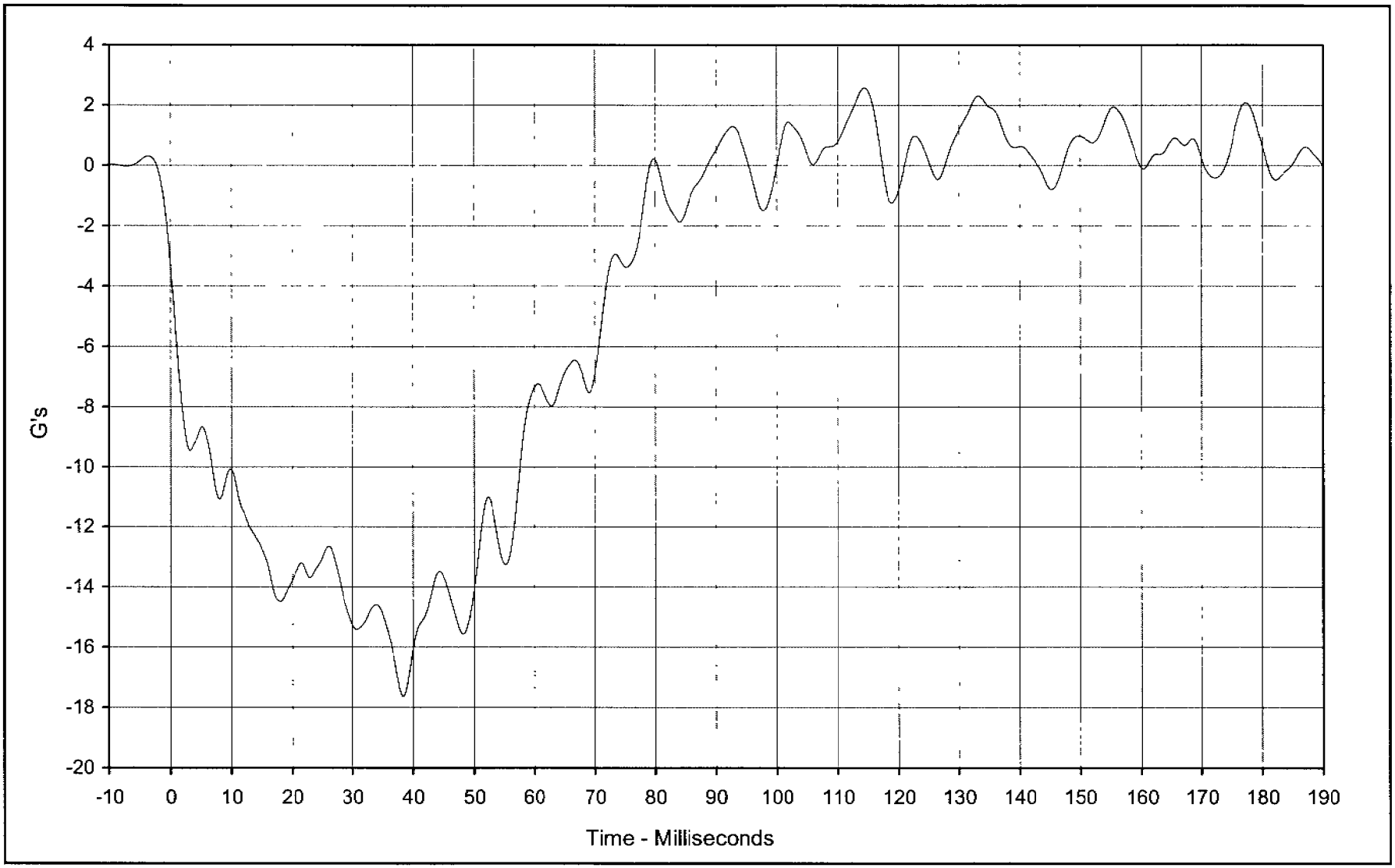

Curve Description:	MDB CG X			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	2.6	at	114.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-17.6	at	38.4 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-053				

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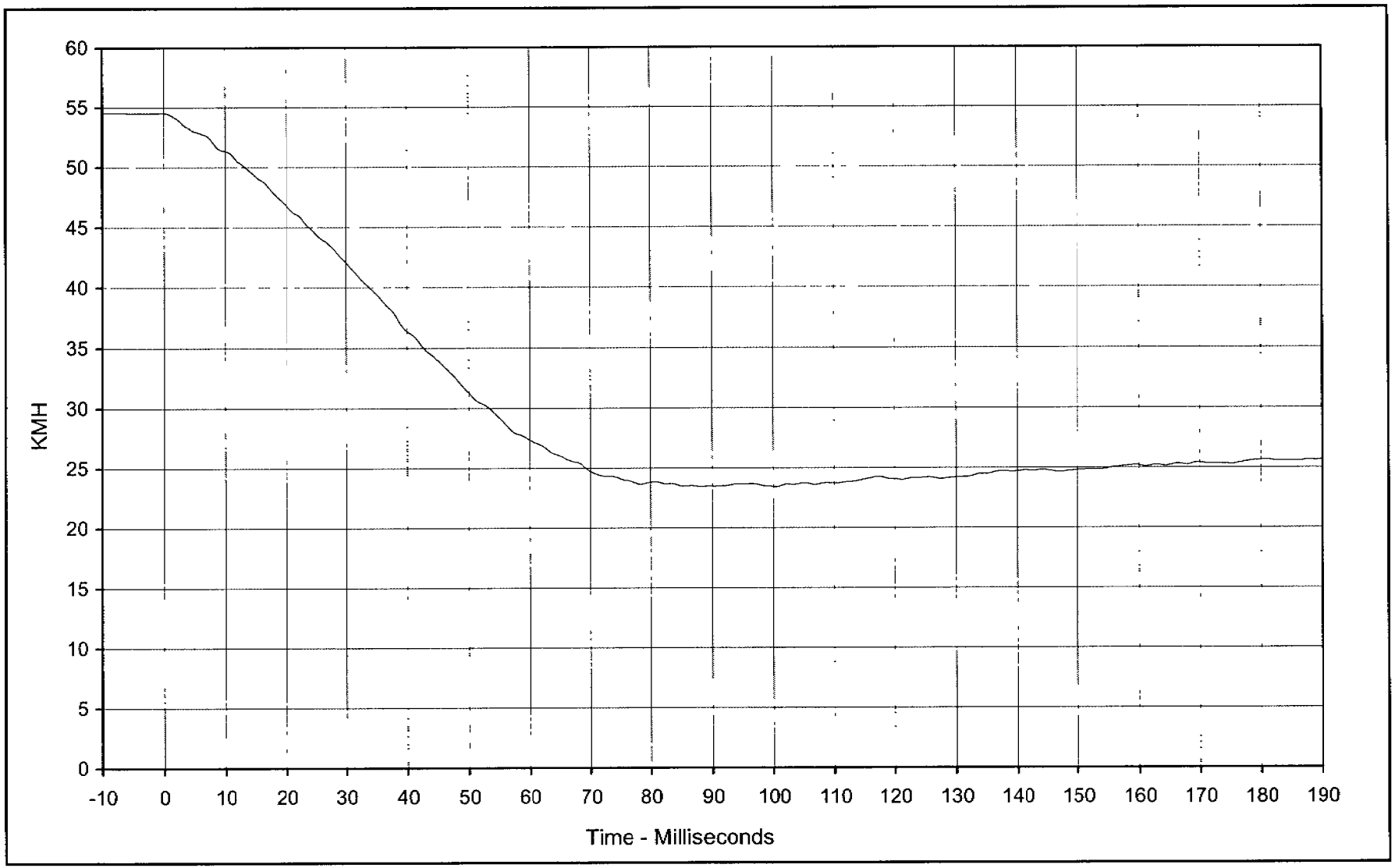

Curve Description:	MDB CG X Velocity			
Maximum Value:	54.5	at	0.0	Milliseconds
Minimum Value:	23.4	at	100.4	Milliseconds
SAE Filter Class:	180			
Date of Test:	07/12/00			
Curve Number:	IN1-053			

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

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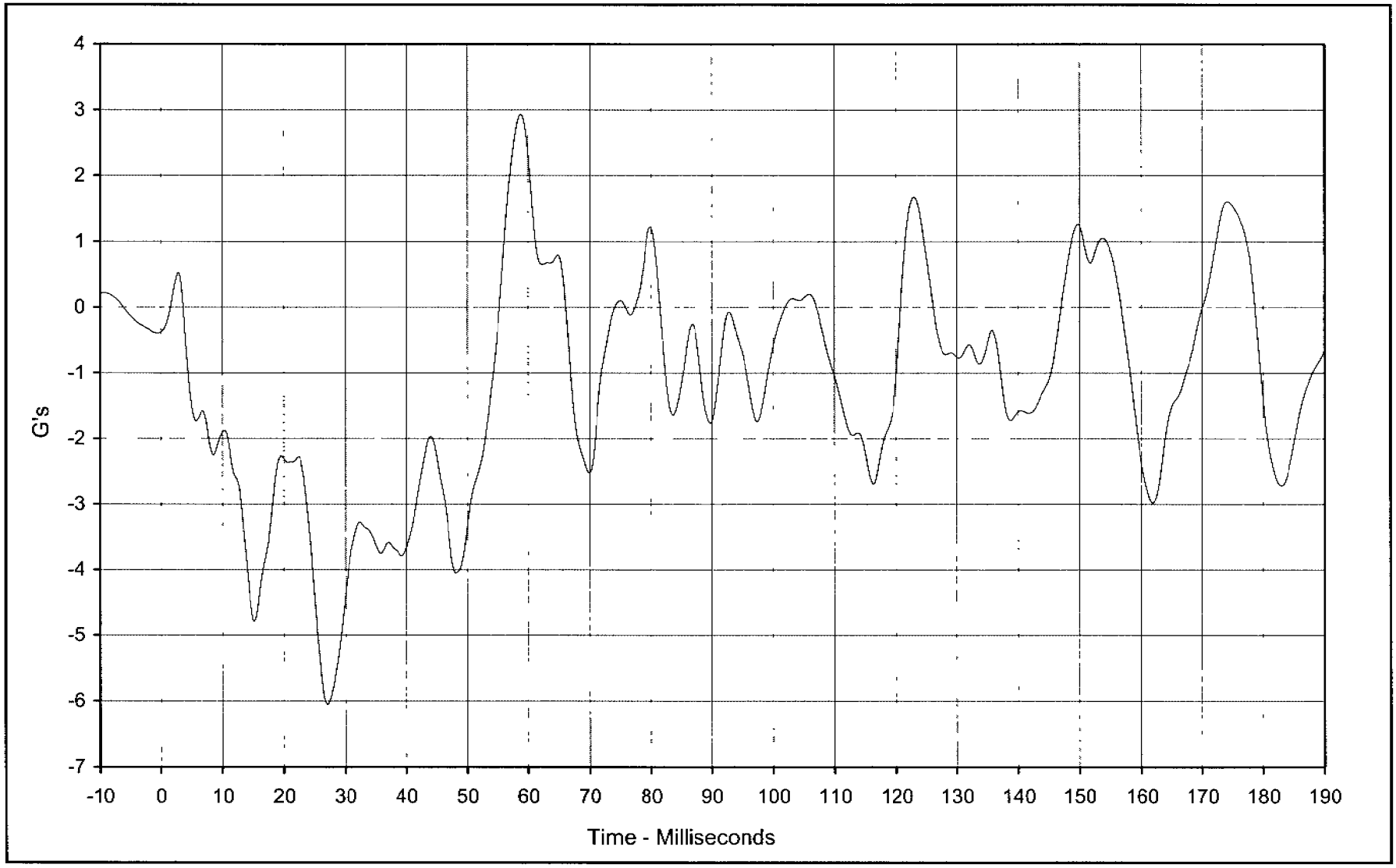
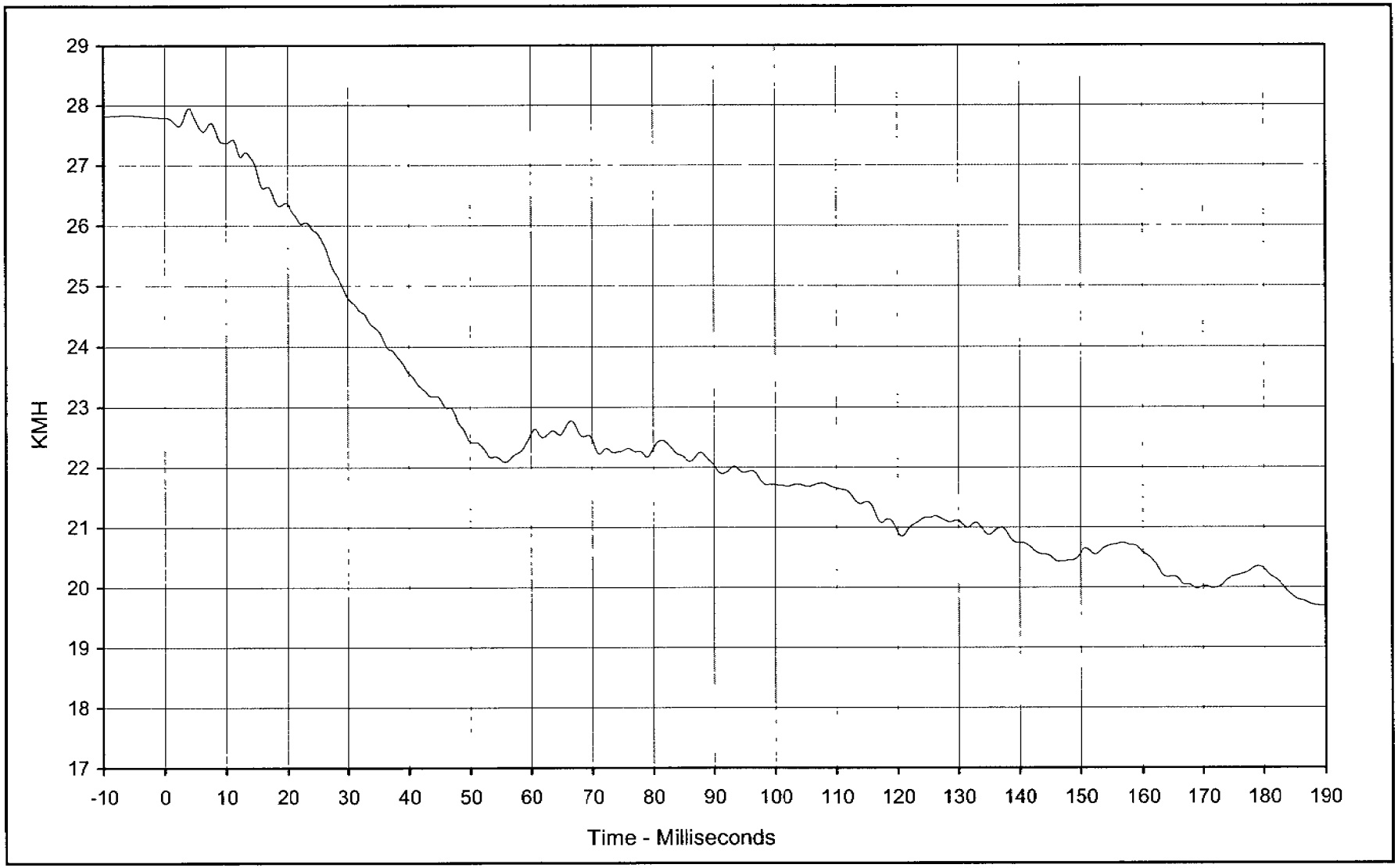


Curve Description:	MDB CG Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	2.9	at	58.8 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-6.1	at	27.0 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-054				

KARCO Engineering



Curve Description:	MDB CG Y Velocity			
Maximum Value:	28.0	at	3.8	Milliseconds
Minimum Value:	19.7	at	189.9	Milliseconds
SAE Filter Class:	180			
Date of Test:	07/12/00			
Curve Number:	IN1-054			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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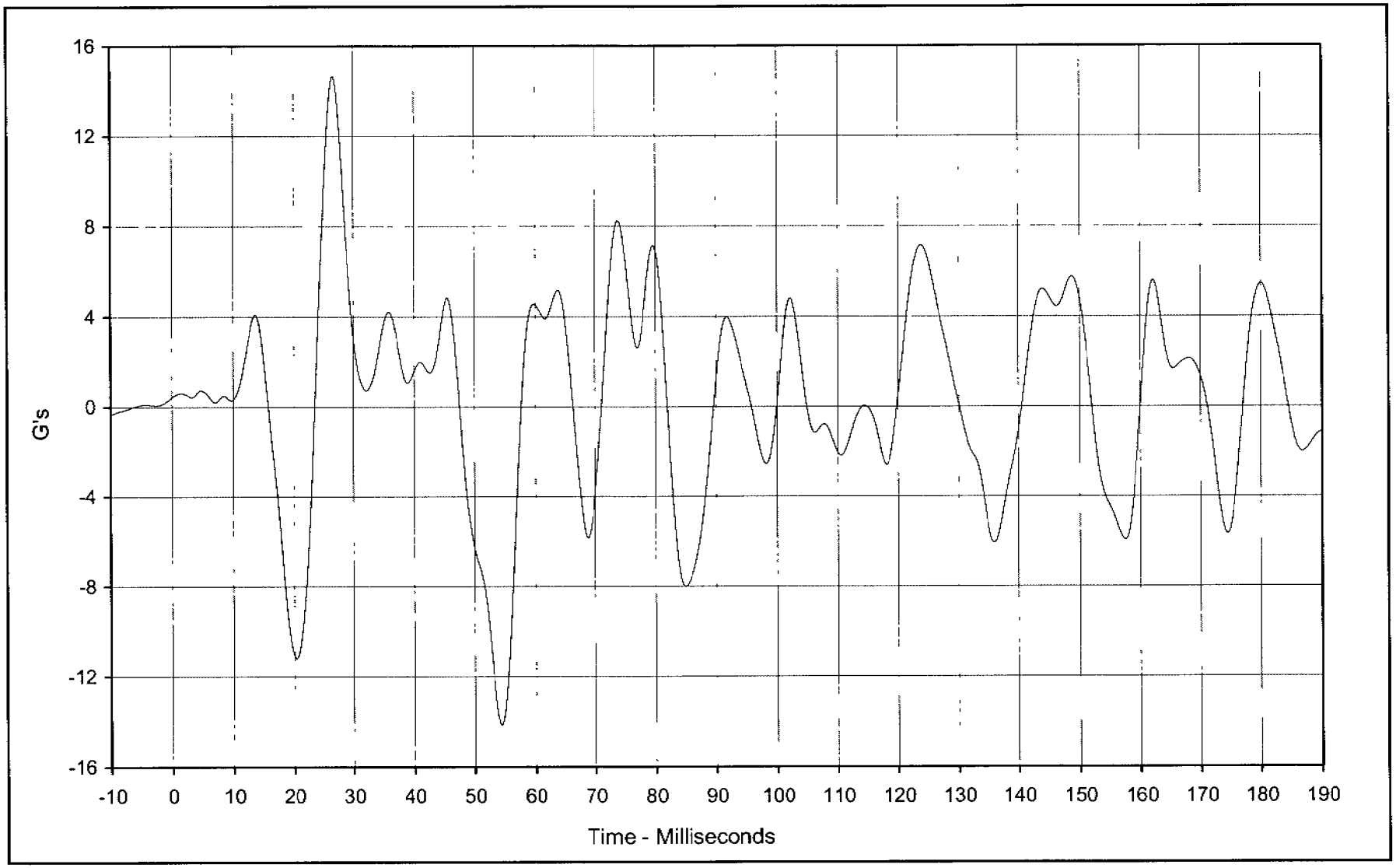

Curve Description:	MDB CG Z			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	14.7	at	26.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-14.2	at	54.5 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	FIL-055				

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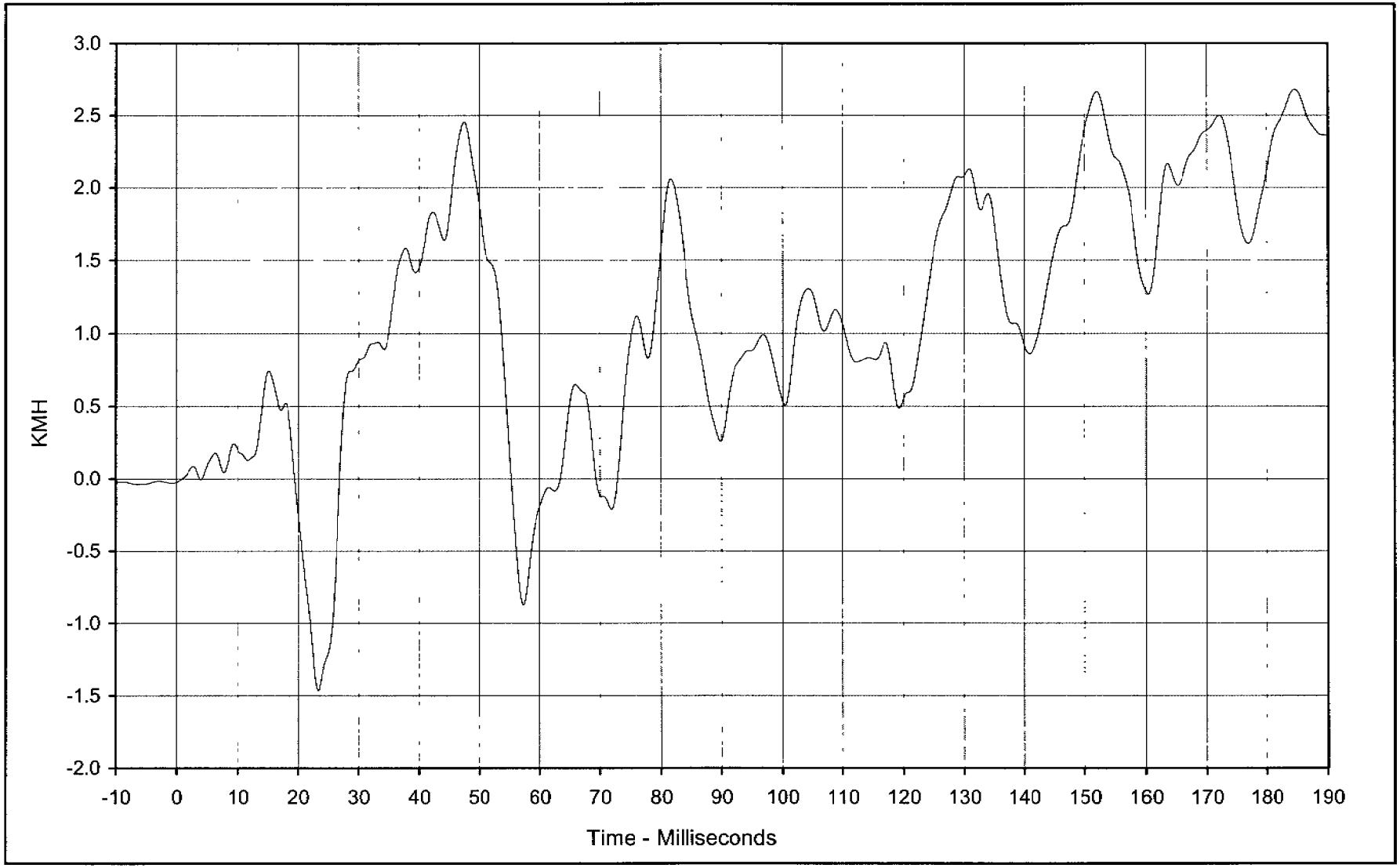

Curve Description:	MDB CG Z Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	2.7	at	184.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-1.5	at	23.3 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-055				

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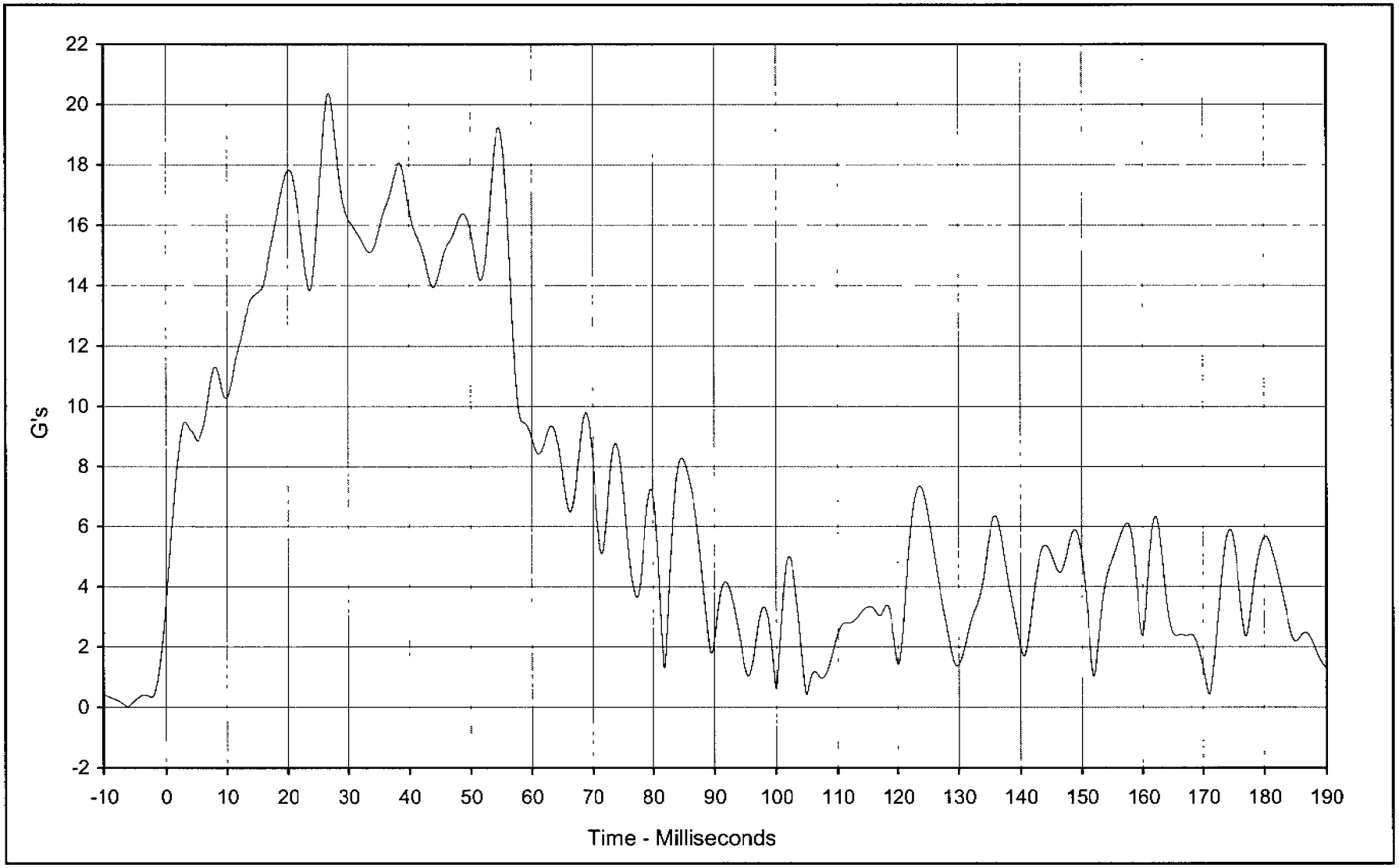

Curve Description:	MDB CG Resultant			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	20.4	at	26.7 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	0.4	at	105.0 Milliseconds		
SAE Filter Class:	60				
Date of Test:	07/12/00				
Curve Number:	RES-053				

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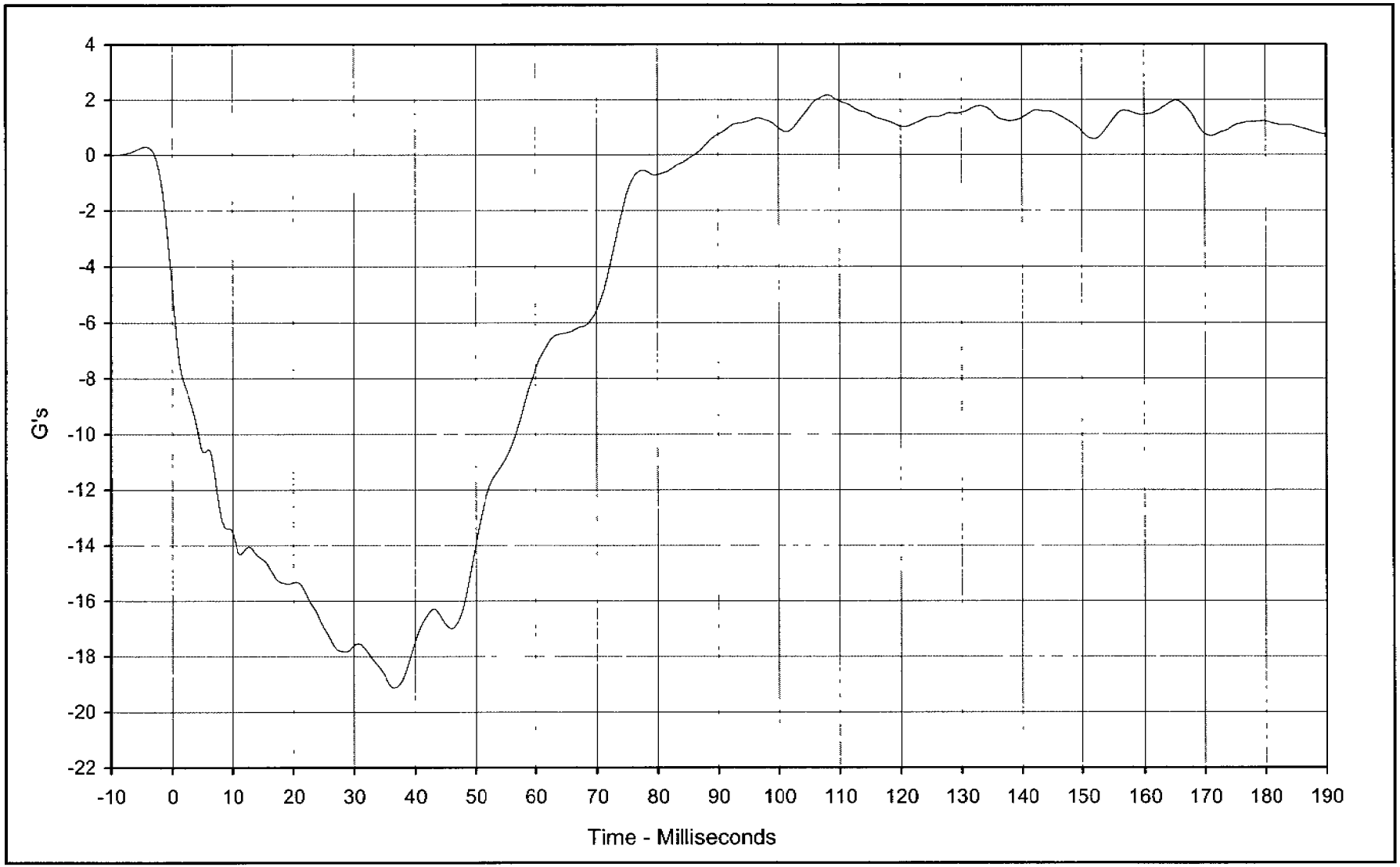
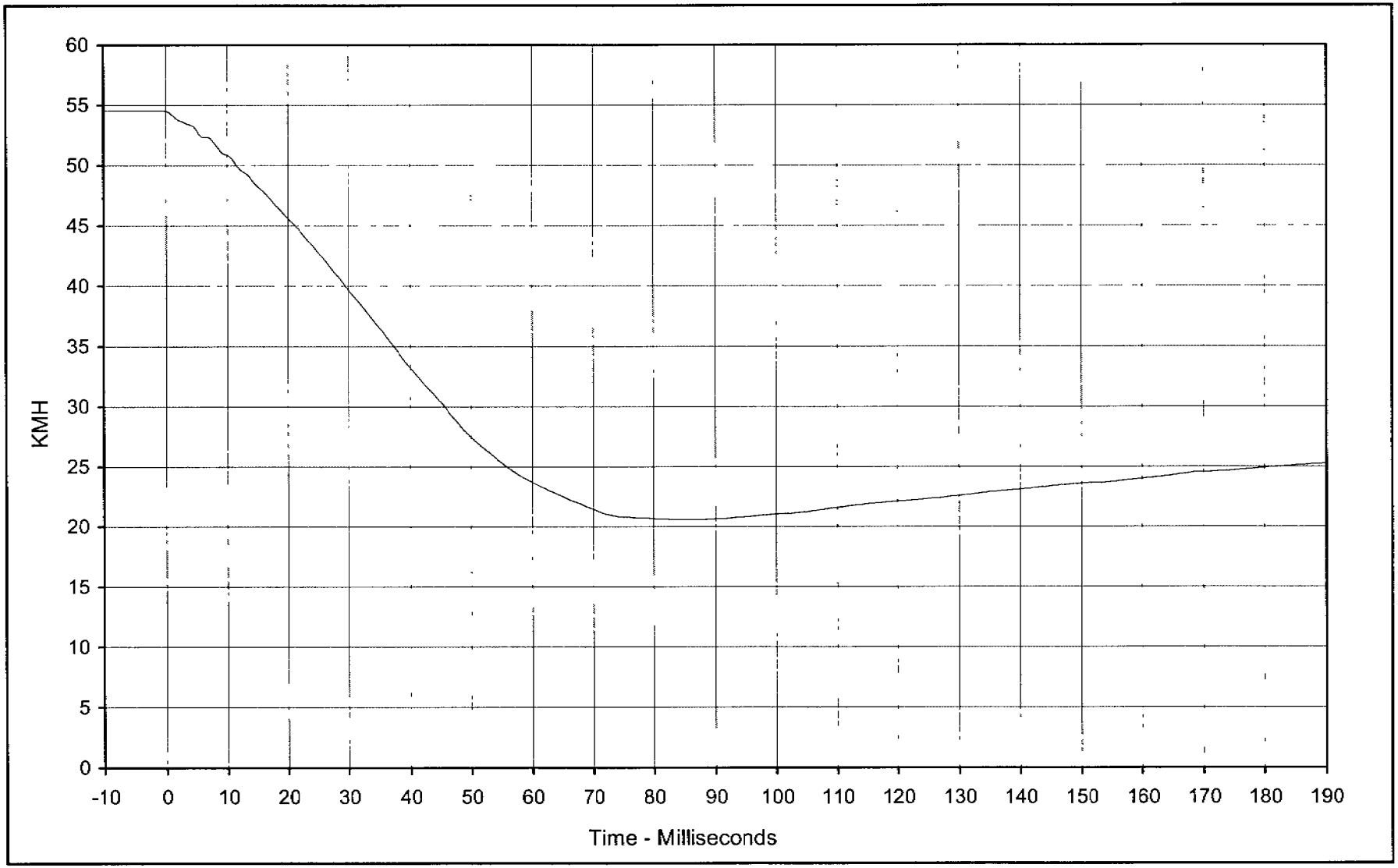


Curve Description:	MDB Rear X			
Maximum Value:	2.2	at	108.0	Milliseconds
Minimum Value:	-19.1	at	36.5	Milliseconds
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	FIL-056			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	MDB Rear X Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	54.5	at	0.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	20.6	at	85.2 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-056				

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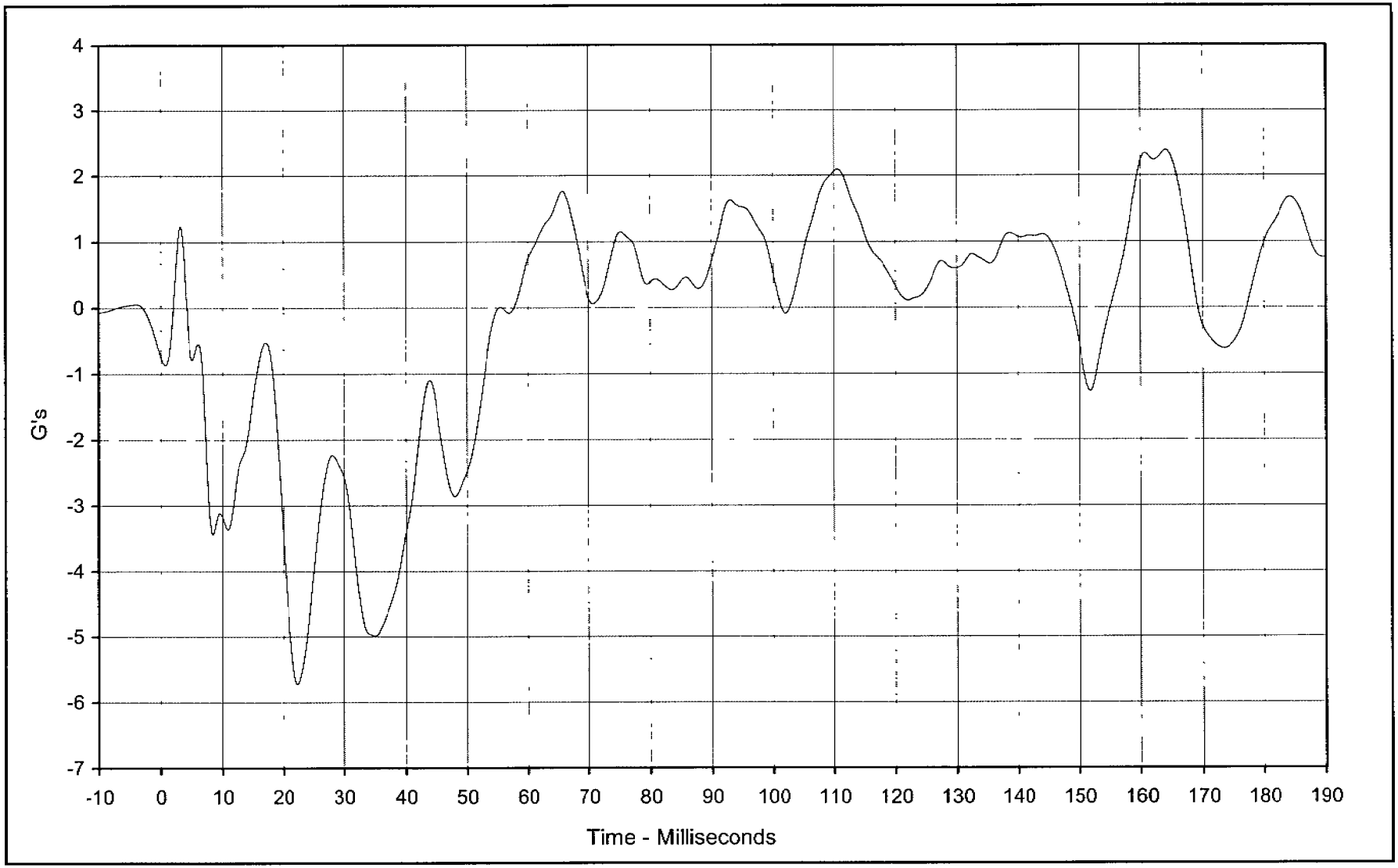

Curve Description:	MDB Rear Y			
Maximum Value:	2.4	at	164.0	Milliseconds
Minimum Value:	-5.7	at	22.3	Milliseconds
SAE Filter Class:	60			
Date of Test:	07/12/00			
Curve Number:	FIL-057			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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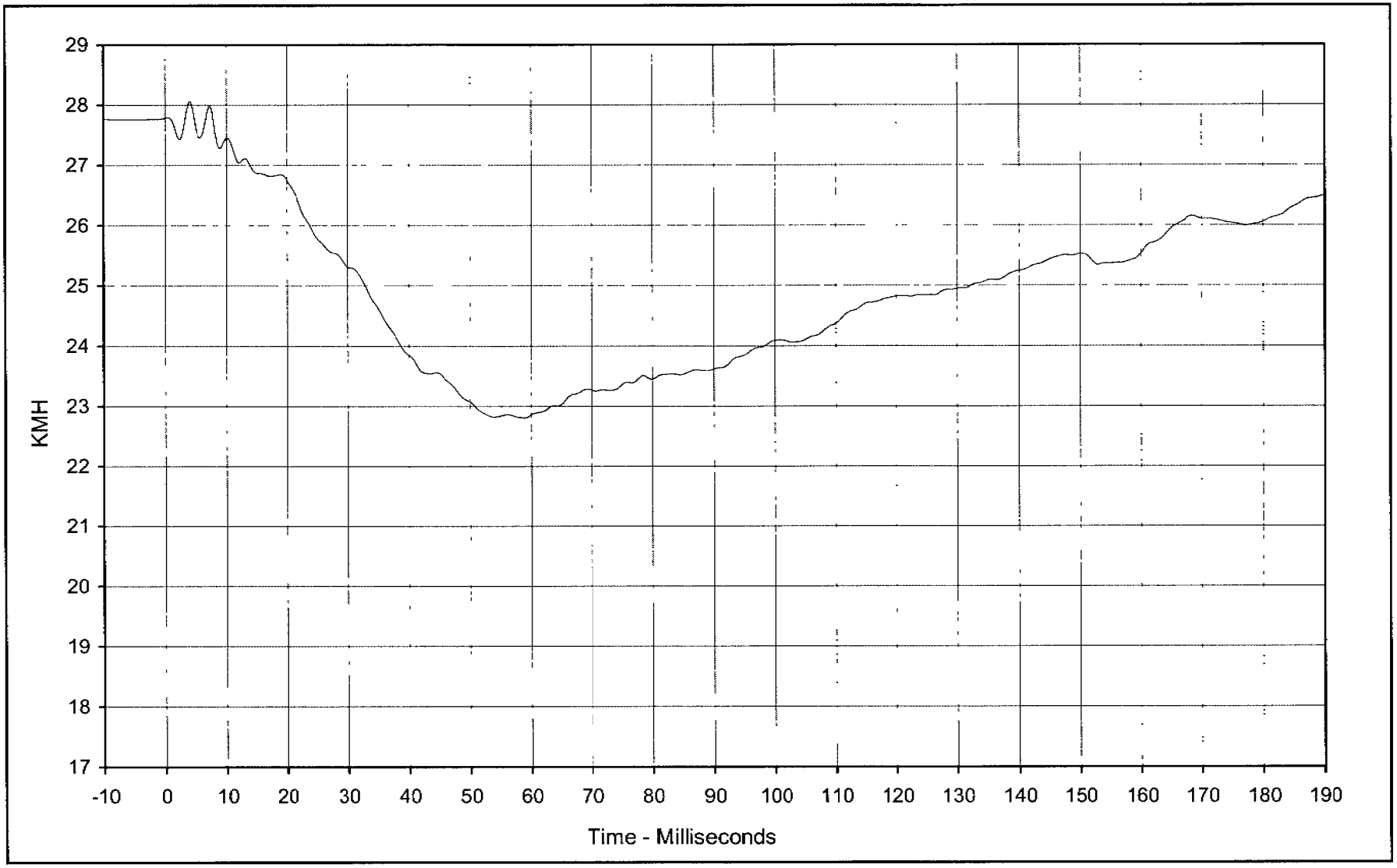
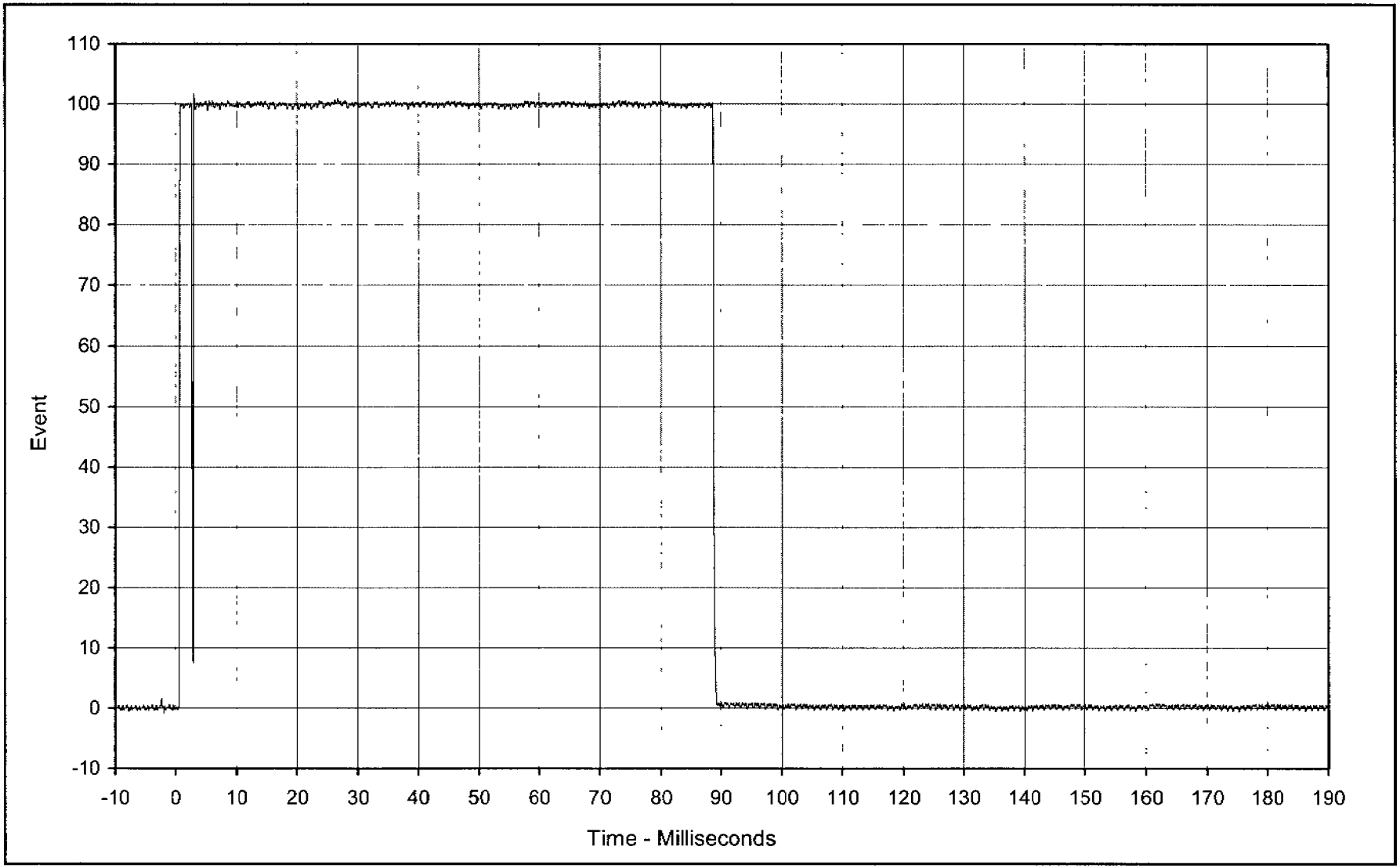


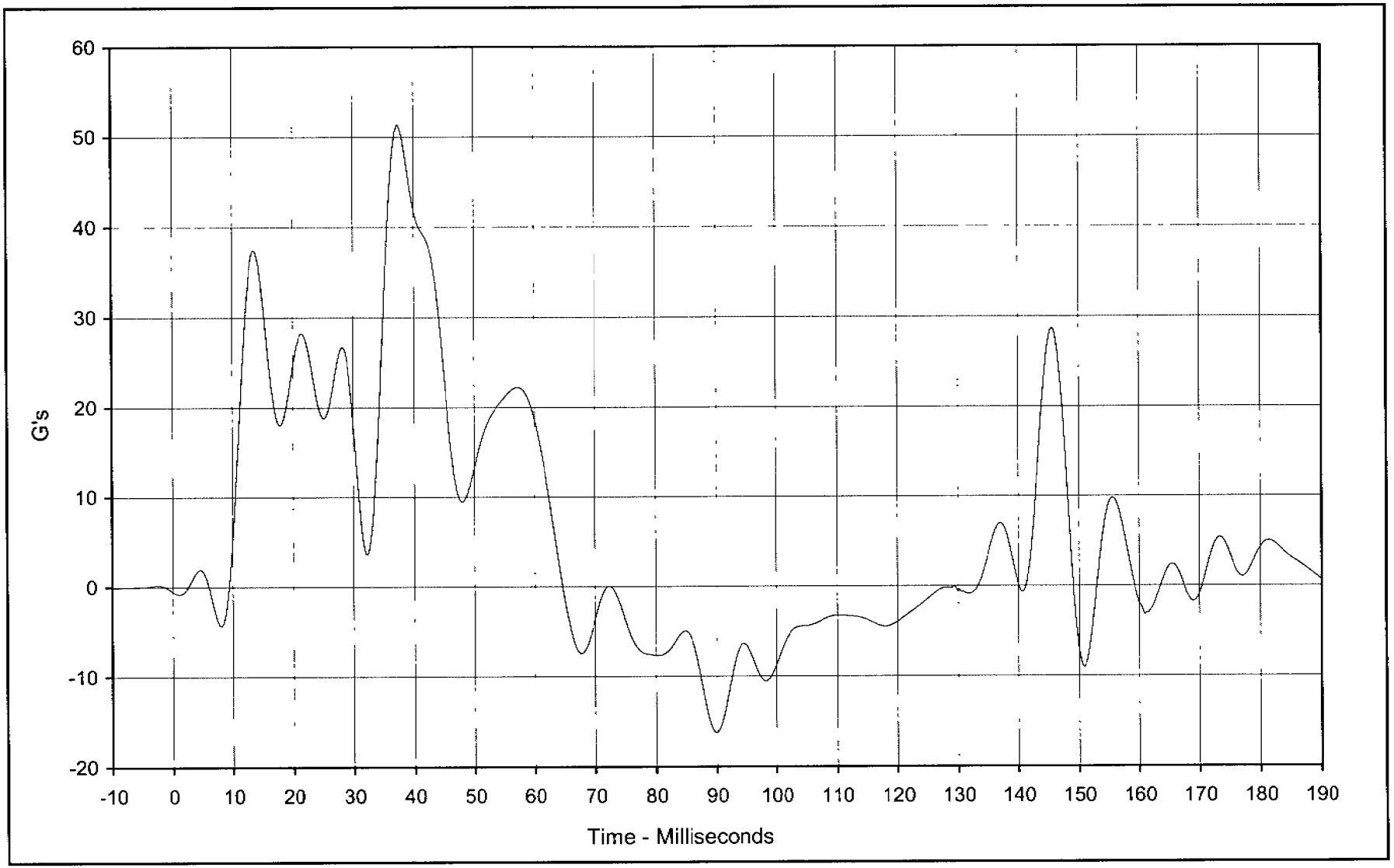
Curve Description:	MDB Rear Y Velocity			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	28.1	at	4.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	22.8	at	58.9 Milliseconds		
SAE Filter Class:	180				
Date of Test:	07/12/00				
Curve Number:	IN1-057				

KARCO Engineering



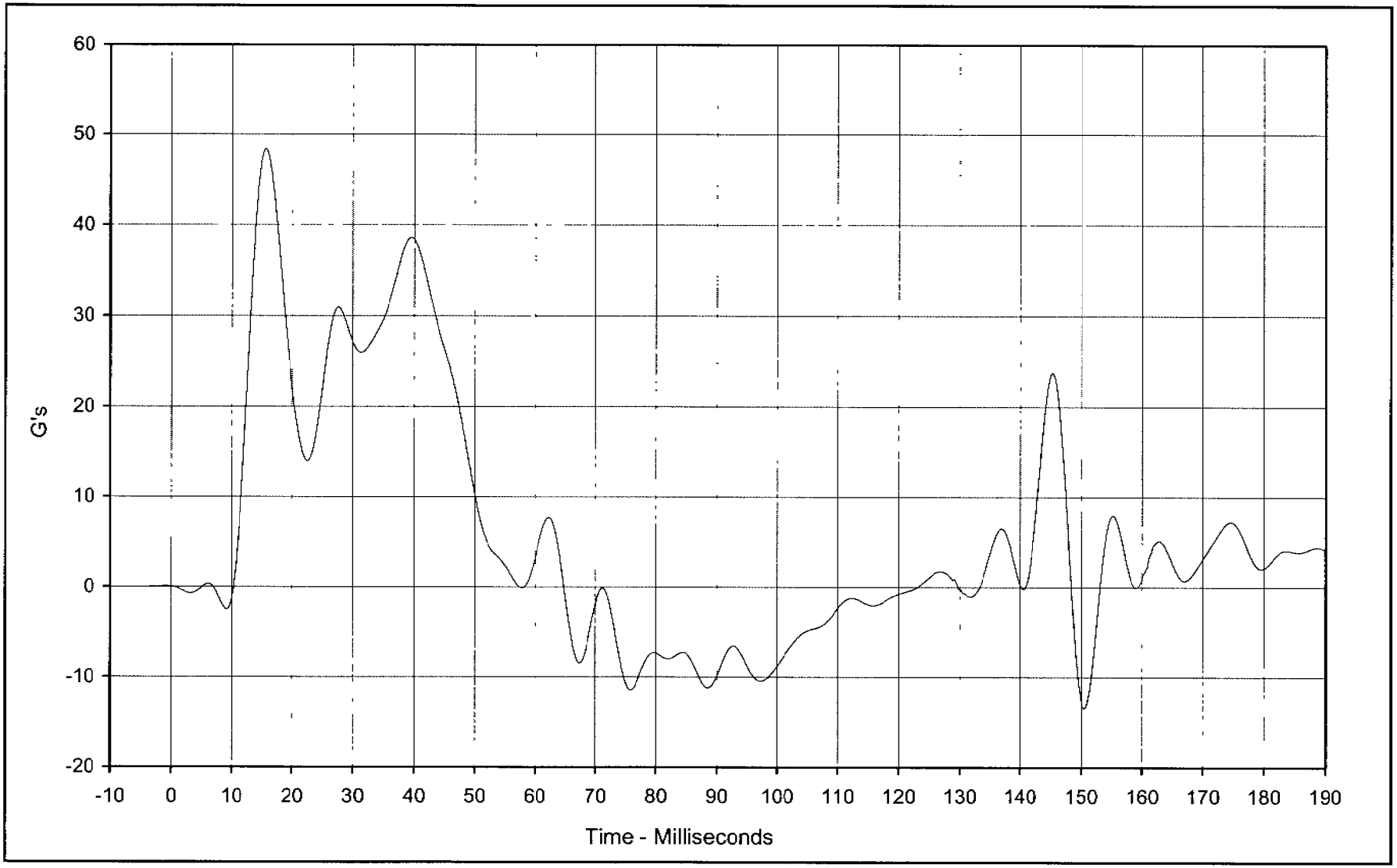
Curve Description:	MDB Right Bumper Contact			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	101.5	at	3.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Crossing Point:	50%	at	0.7 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	07/12/00				
Curve Number:	FIL-058				

KARC Engineering



Curve Description:	Driver Upper Rib Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	51.4	at	37.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-16.2	at	89.8 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-004				

KARC Engineering



Curve Description: Driver Lower Rib Primary Y

Maximum Value: 48.4 at 15.6 Milliseconds

Minimum Value: -13.4 at 150.5 Milliseconds

SAE Filter Class: FIR 100

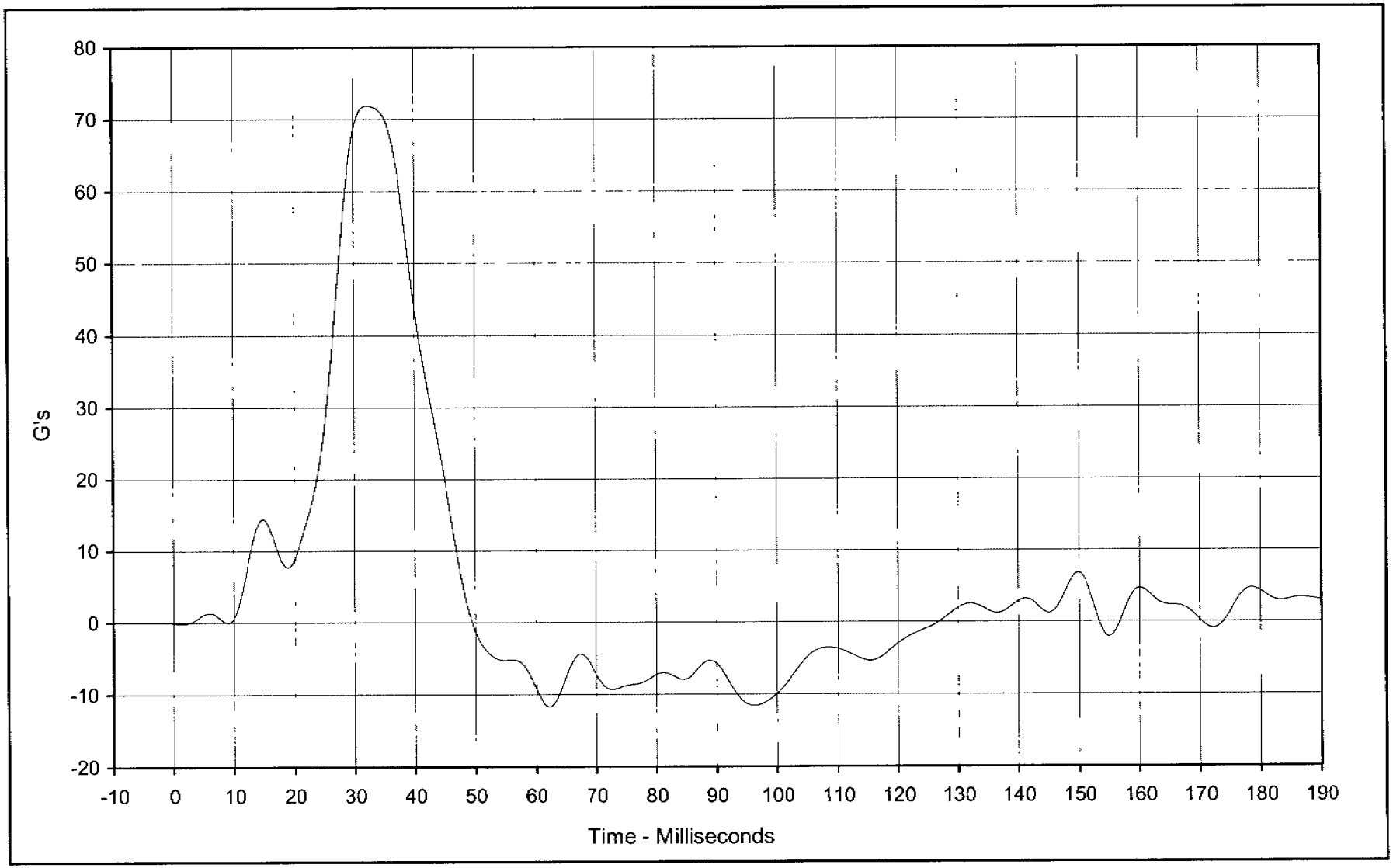
Date of Test: 07/12/00

Curve Number: FIR-005

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

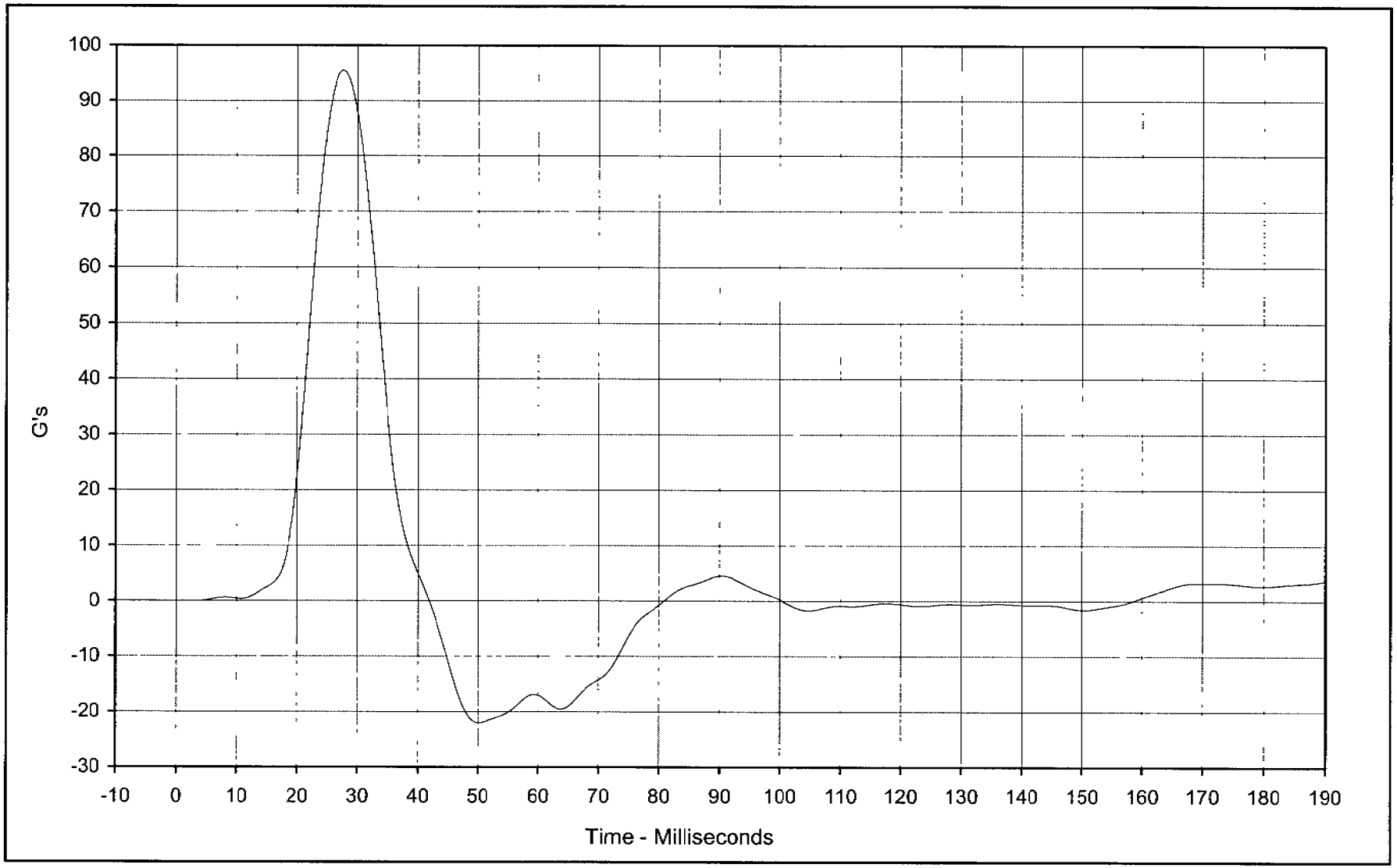
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



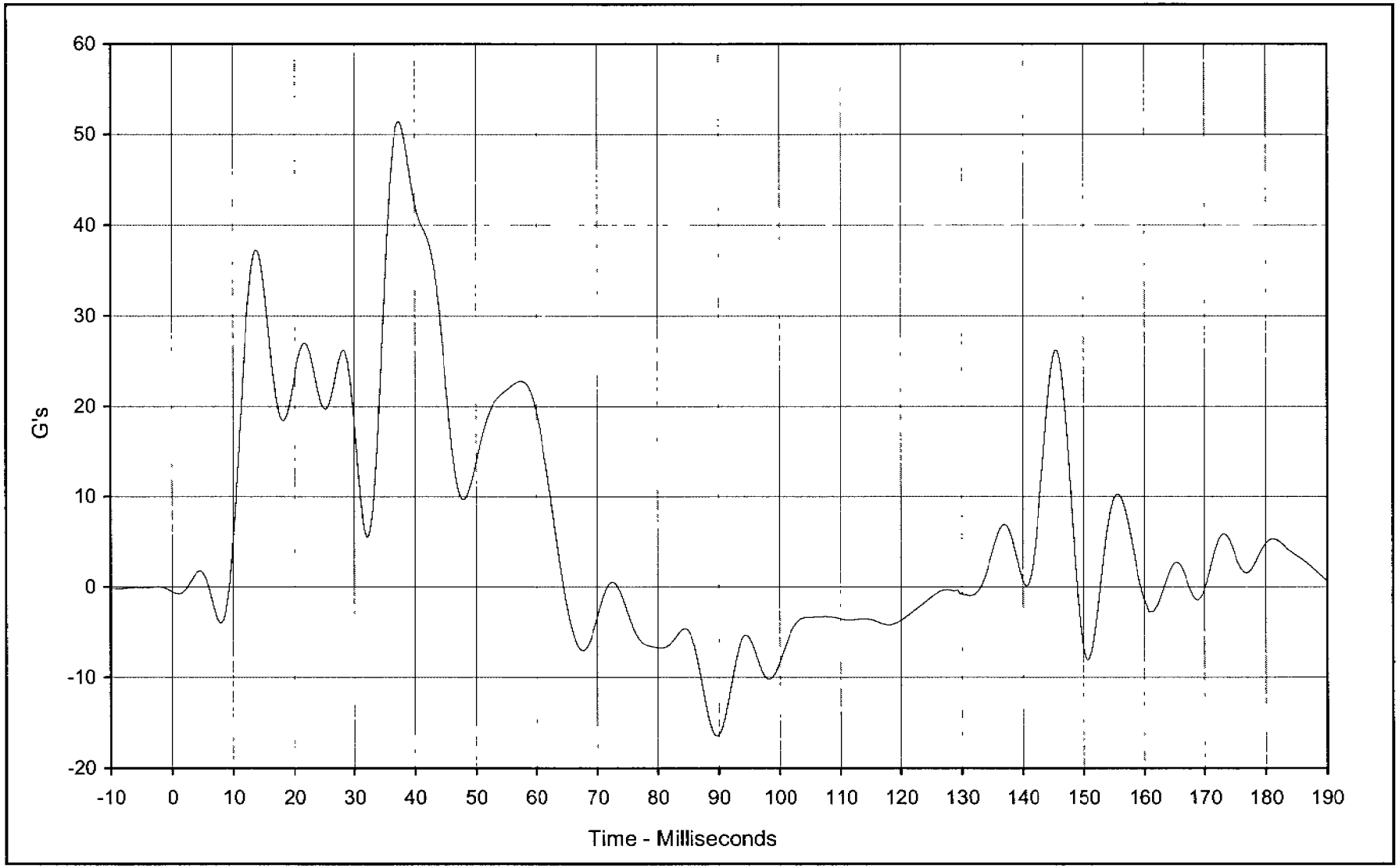
Curve Description:	Driver Lower Spine Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	71.8	at	32.3 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-11.7	at	62.1 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-006				

KARC Engineering



Curve Description:	Driver Pelvis Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	95.5	at	27.6 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-22.1	at	50.1 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-007				

KARCO Engineering



Curve Description: Driver Upper Rib Redundant Y

Maximum Value: 51.4 at 37.3 Milliseconds

Minimum Value: -16.5 at 89.6 Milliseconds

SAE Filter Class: FIR 100

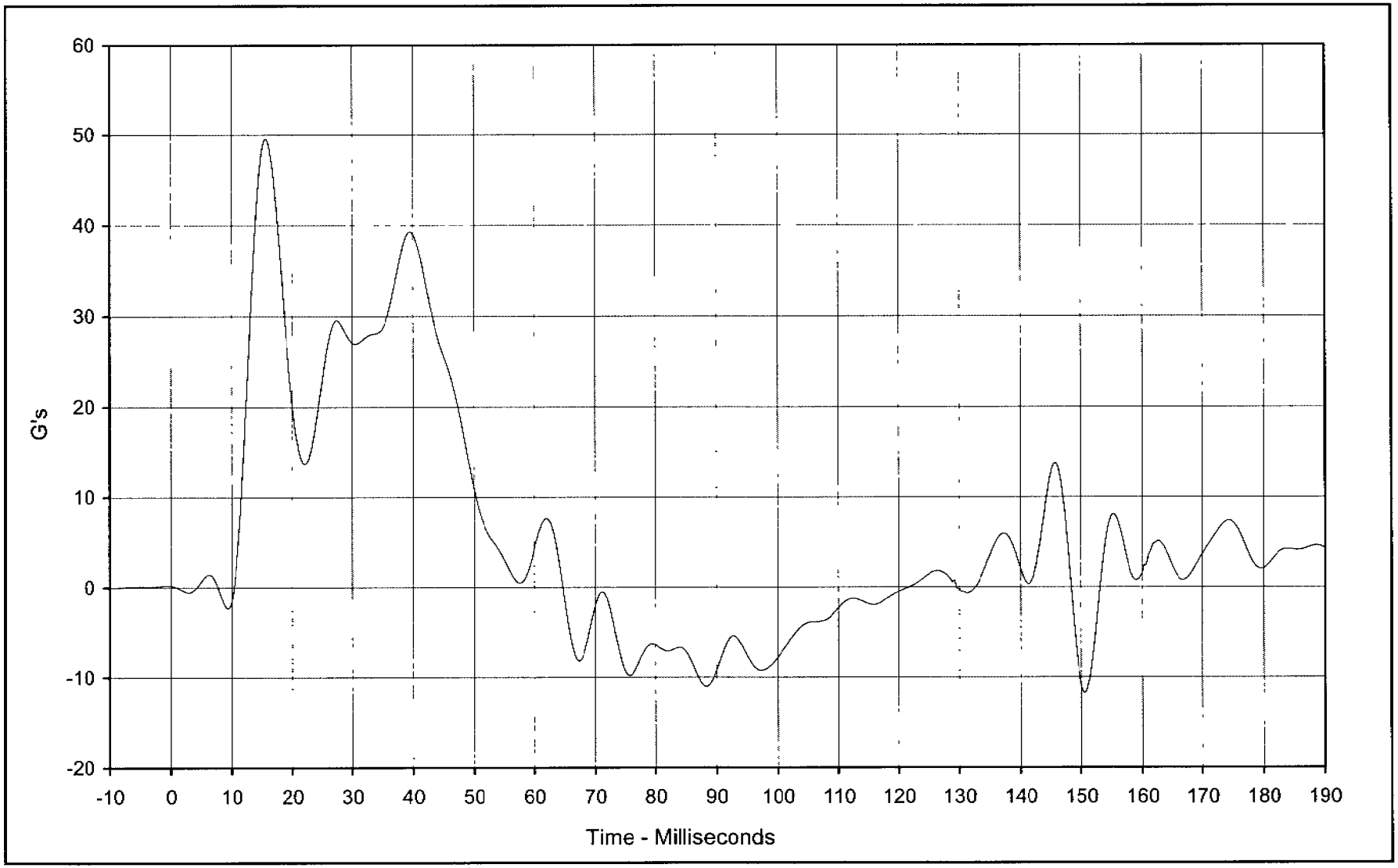
Date of Test: 07/12/00

Curve Number: FIR-008

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Driver Lower Rib Redundant Y

Maximum Value: 49.5 at 15.6 Milliseconds

Minimum Value: -11.7 at 150.6 Milliseconds

SAE Filter Class: FIR 100

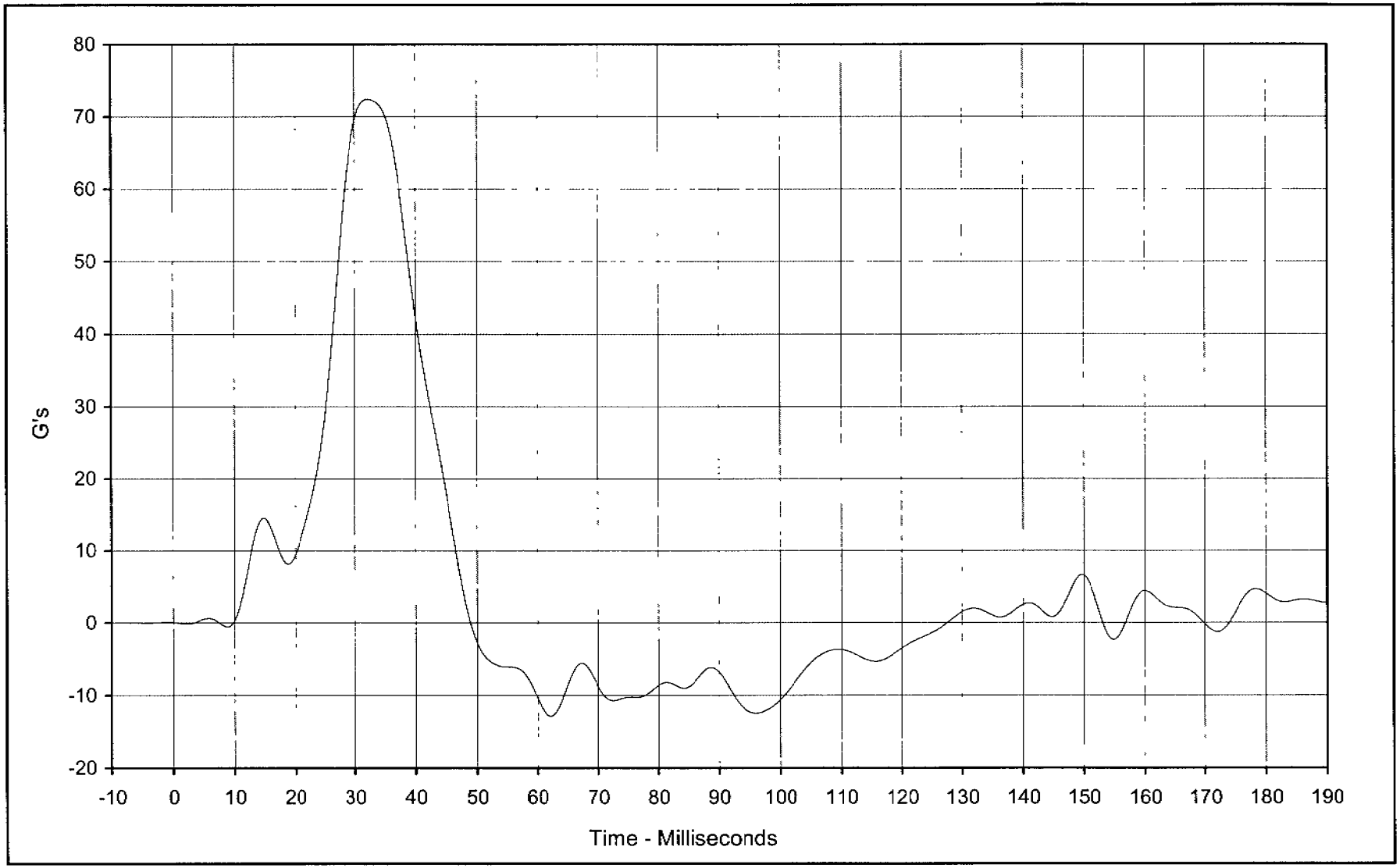
Date of Test: 07/12/00

Curve Number: FIR-009

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

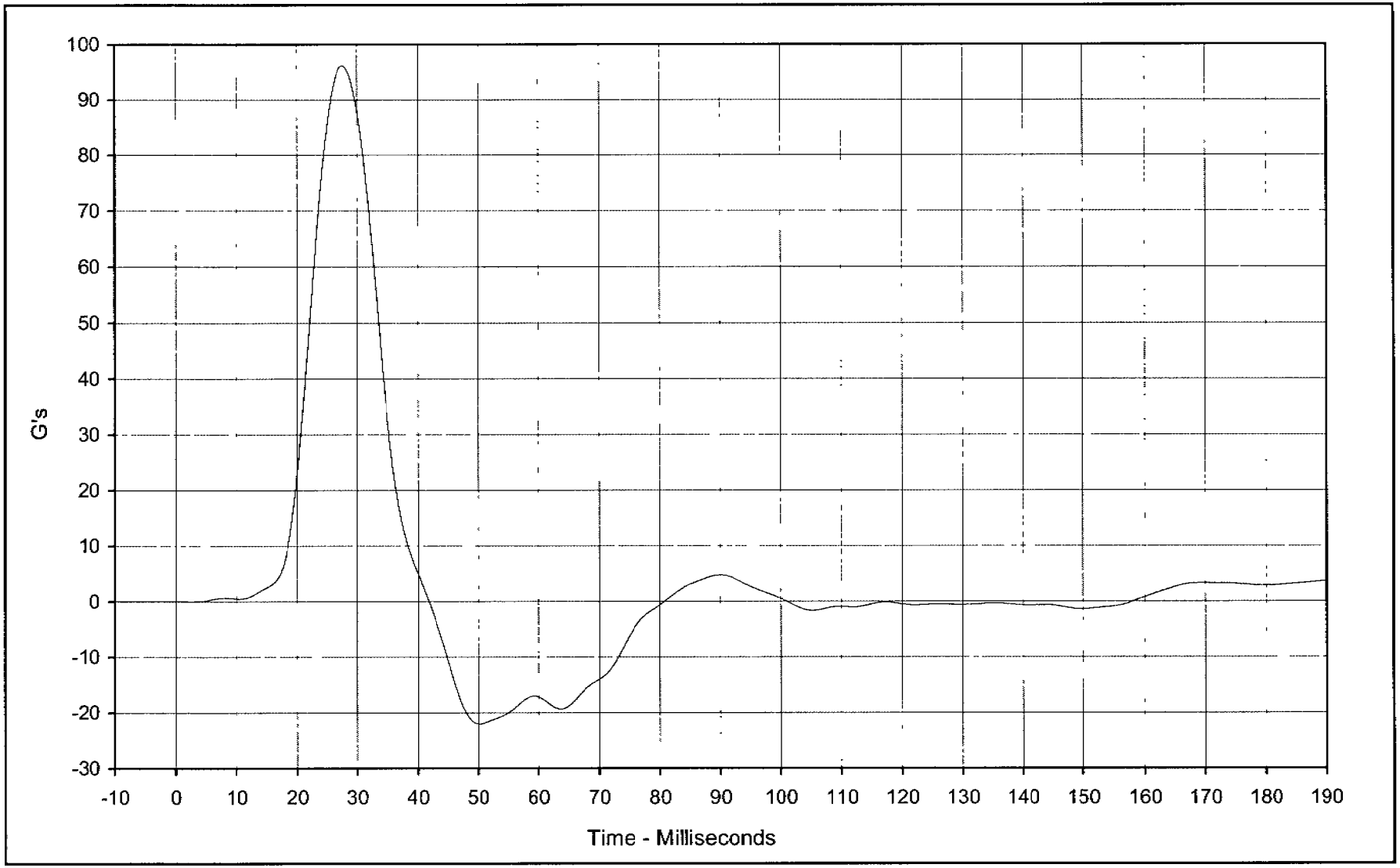
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



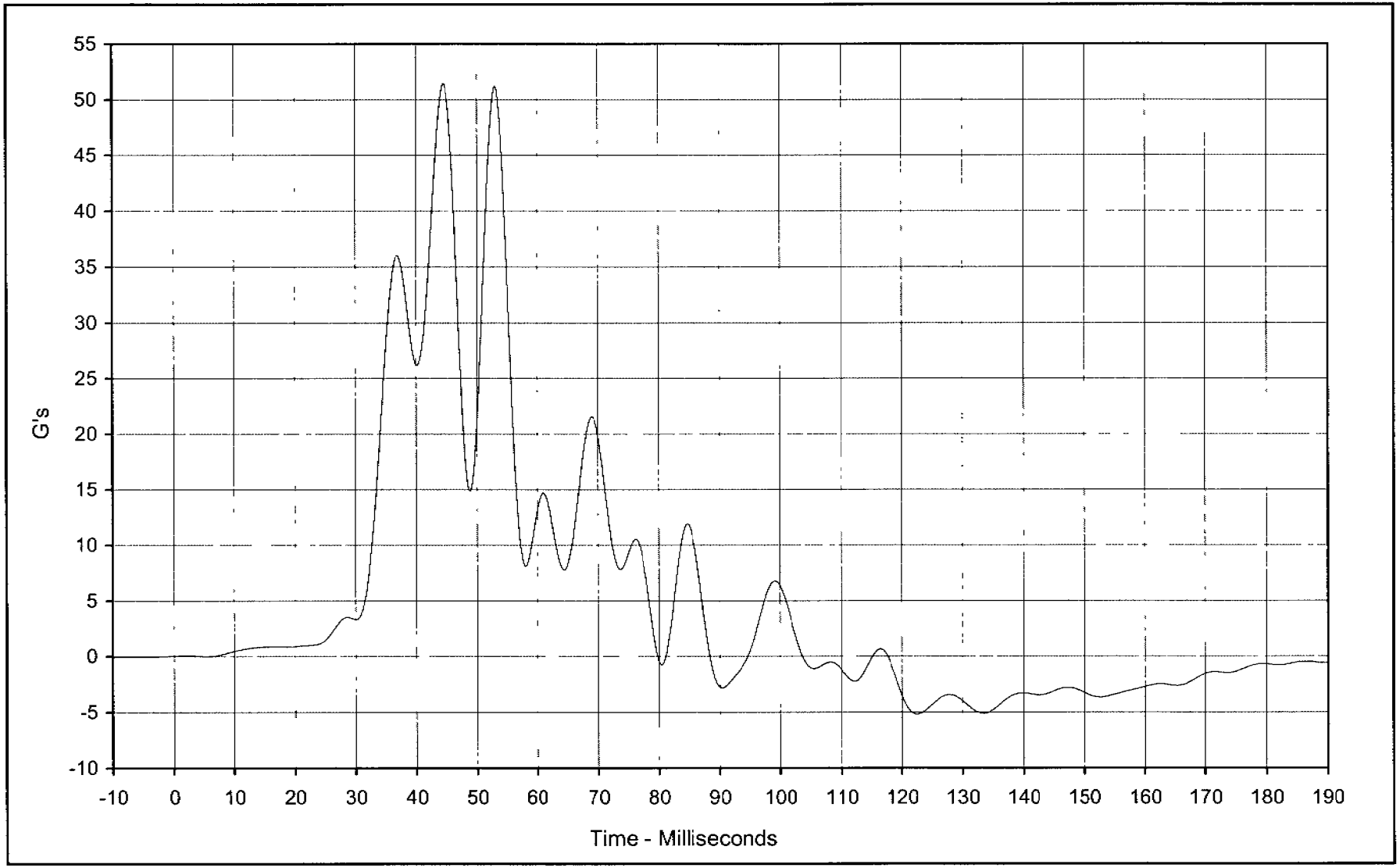
Curve Description:	Driver Lower Spine Redundant Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	72.4	at	32.1 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-12.9	at	62.1 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-010				

KARCO Engineering



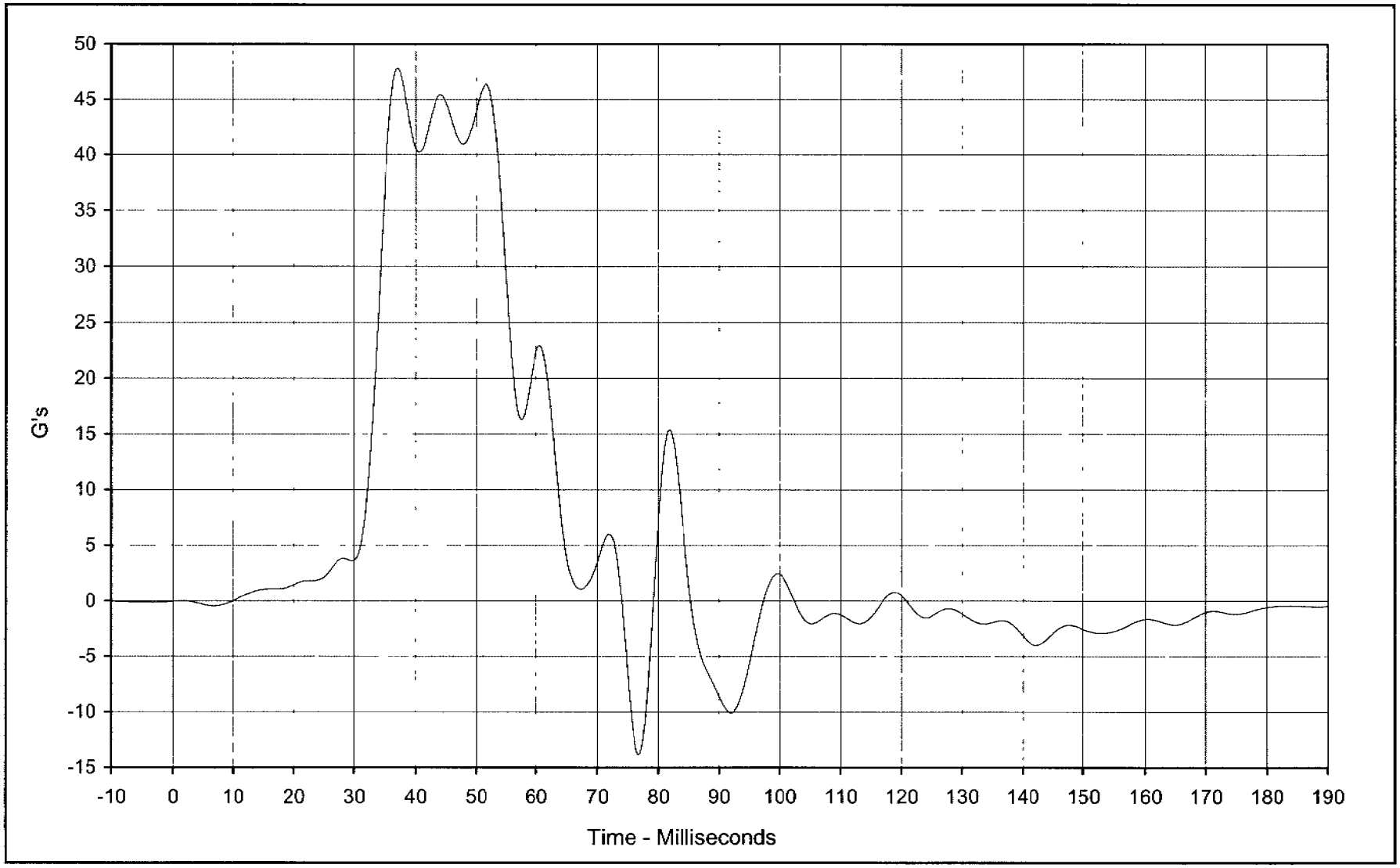
Curve Description:	Driver Pelvis Redundant Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	96.1	at	27.5 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-22.0	at	50.1 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-011				

KARCO Engineering



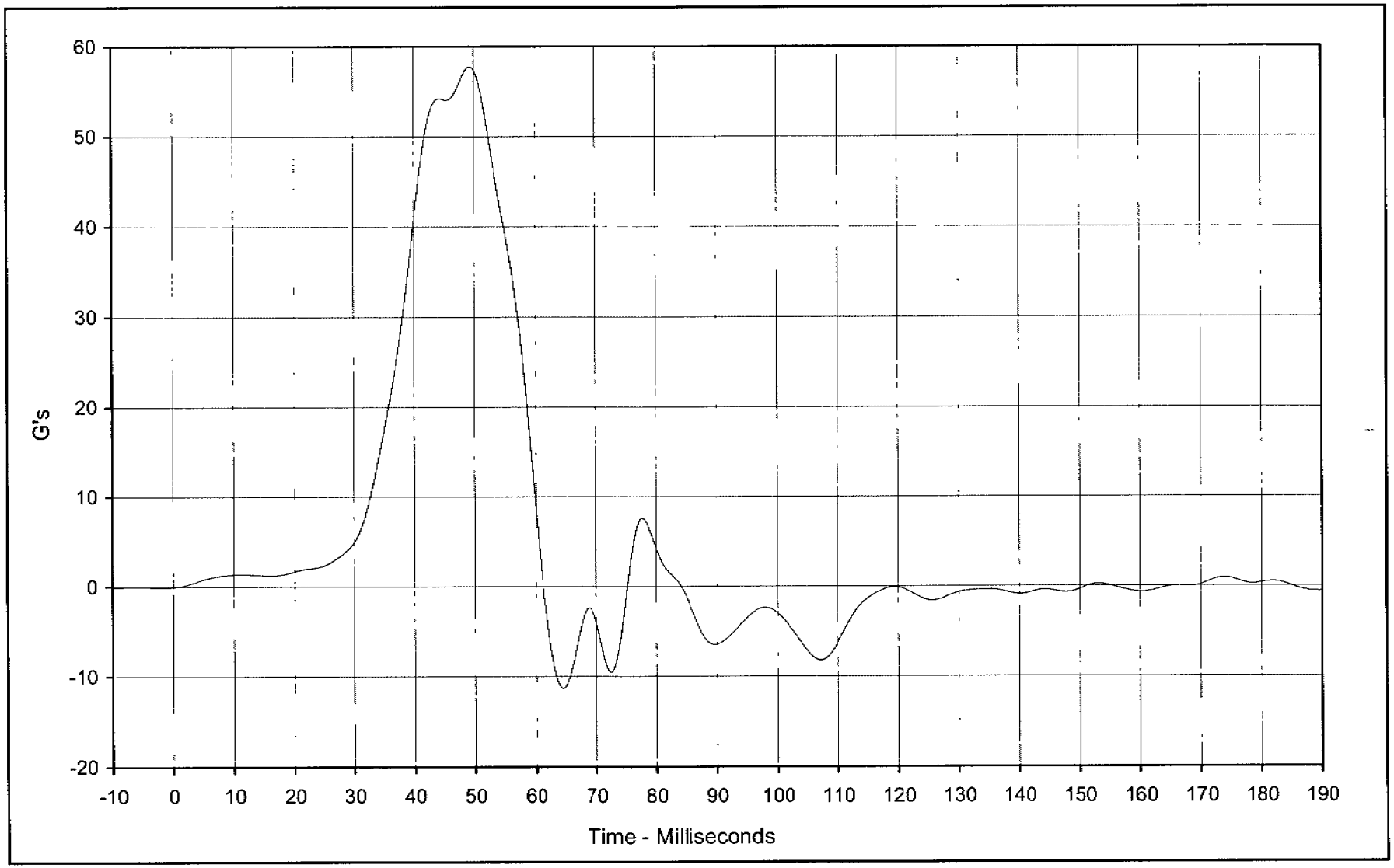
Curve Description:	Pass. Upper Rib Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	51.4	at	44.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-5.2	at	122.5 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-017				

KARCO Engineering



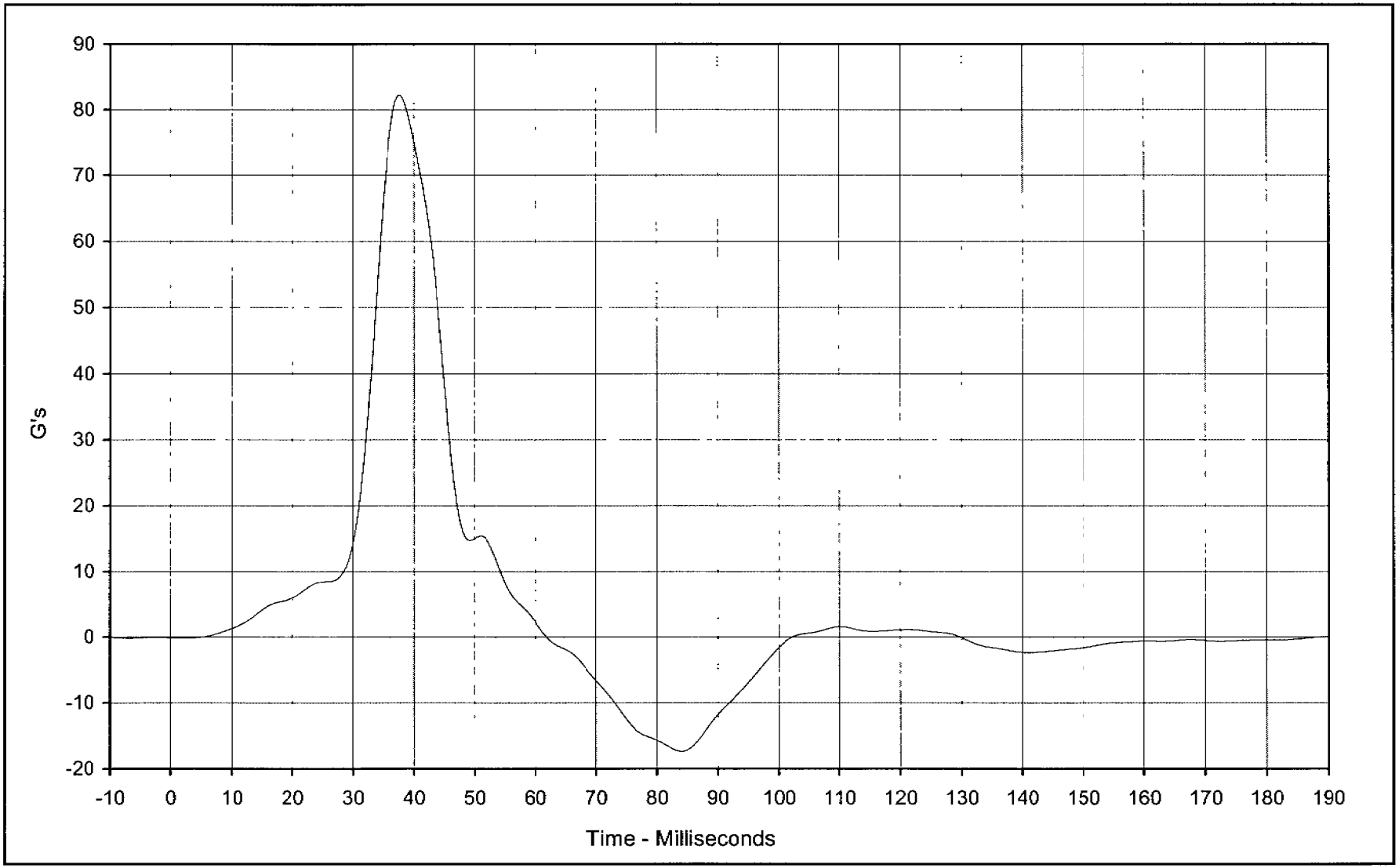
Curve Description:	Pass. Lower Rib Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	47.8	at	37.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-13.8	at	76.7 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-018				

KARCO Engineering



Curve Description:	Pass. Lower Spine Primary Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	57.8	at	49.4 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-11.3	at	64.5 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-019				

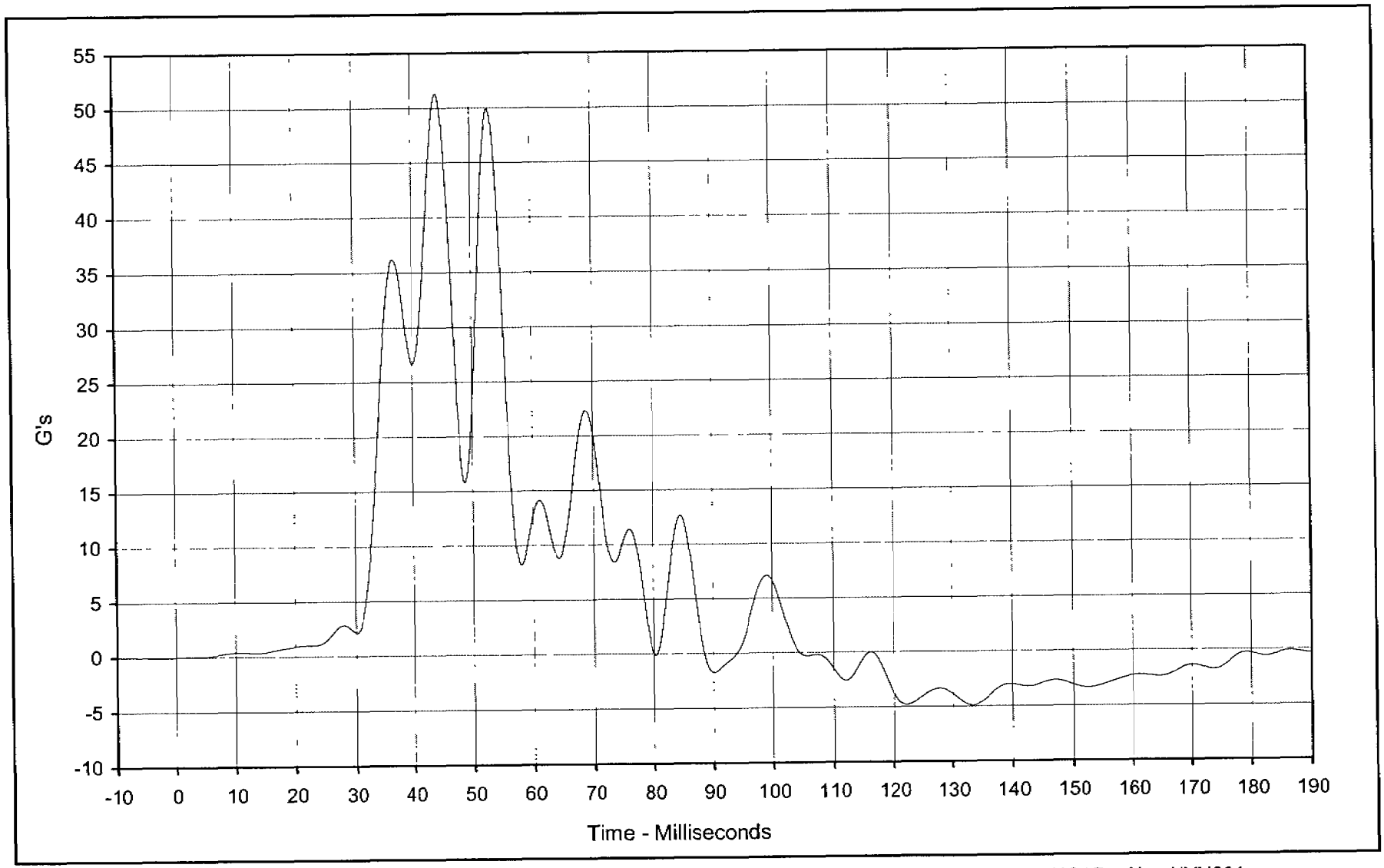
KARC Engineering



Curve Description:	Pass. Pelvis Primary Y			
Maximum Value:	82.2	at	37.6	Milliseconds
Minimum Value:	-17.4	at	84.0	Milliseconds
SAE Filter Class:	FIR 100			
Date of Test:	07/12/00			
Curve Number:	FIR-020			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description: Pass. Upper Rib Redundant Y

Maximum Value: 51.3 at 44.3 Milliseconds

Minimum Value: -4.9 at 133.4 Milliseconds

SAE Filter Class: FIR 100

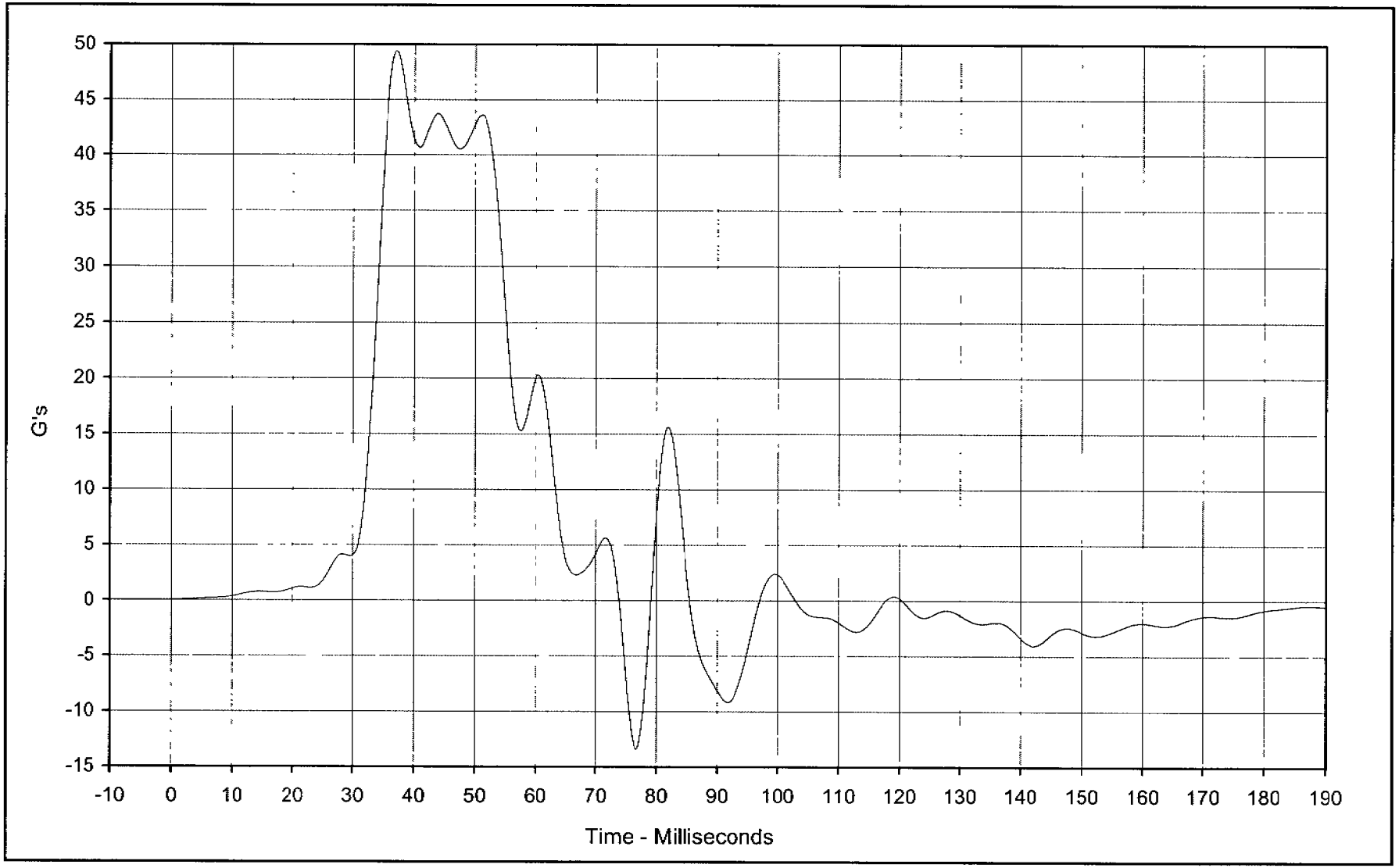
Date of Test: 07/12/00

Curve Number: FIR-021

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

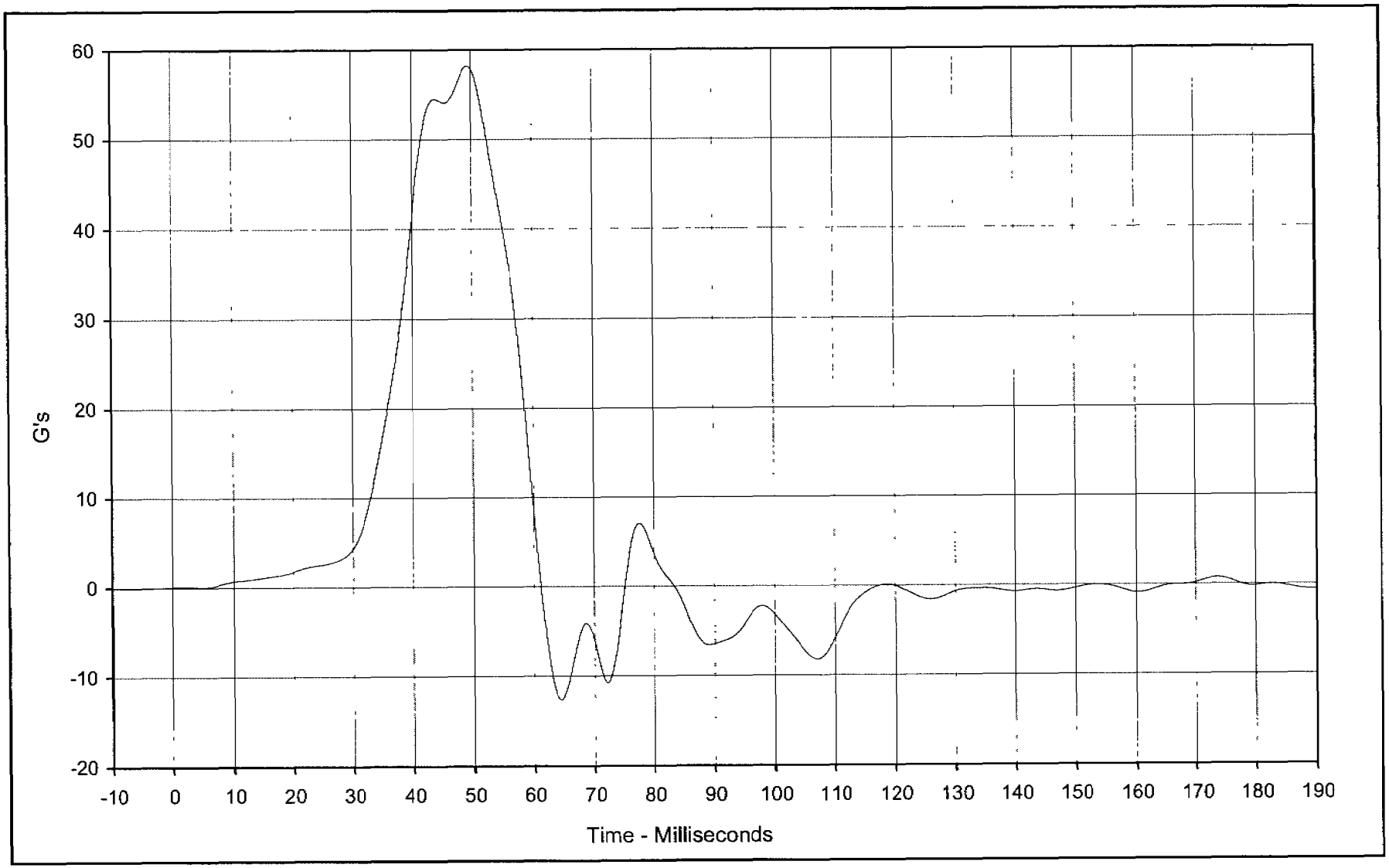
Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Pass. Lower Rib Redundant Y			Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Maximum Value:	49.4	at	37.0 Milliseconds	Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan
Minimum Value:	-13.4	at	76.7 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	07/12/00				
Curve Number:	FIR-022				

KARCO Engineering



Curve Description: Pass. Lower Spine Redundant Y

Maximum Value: 58.2 at 49.4 Milliseconds

Minimum Value: -12.6 at 64.4 Milliseconds

SAE Filter Class: FIR 100

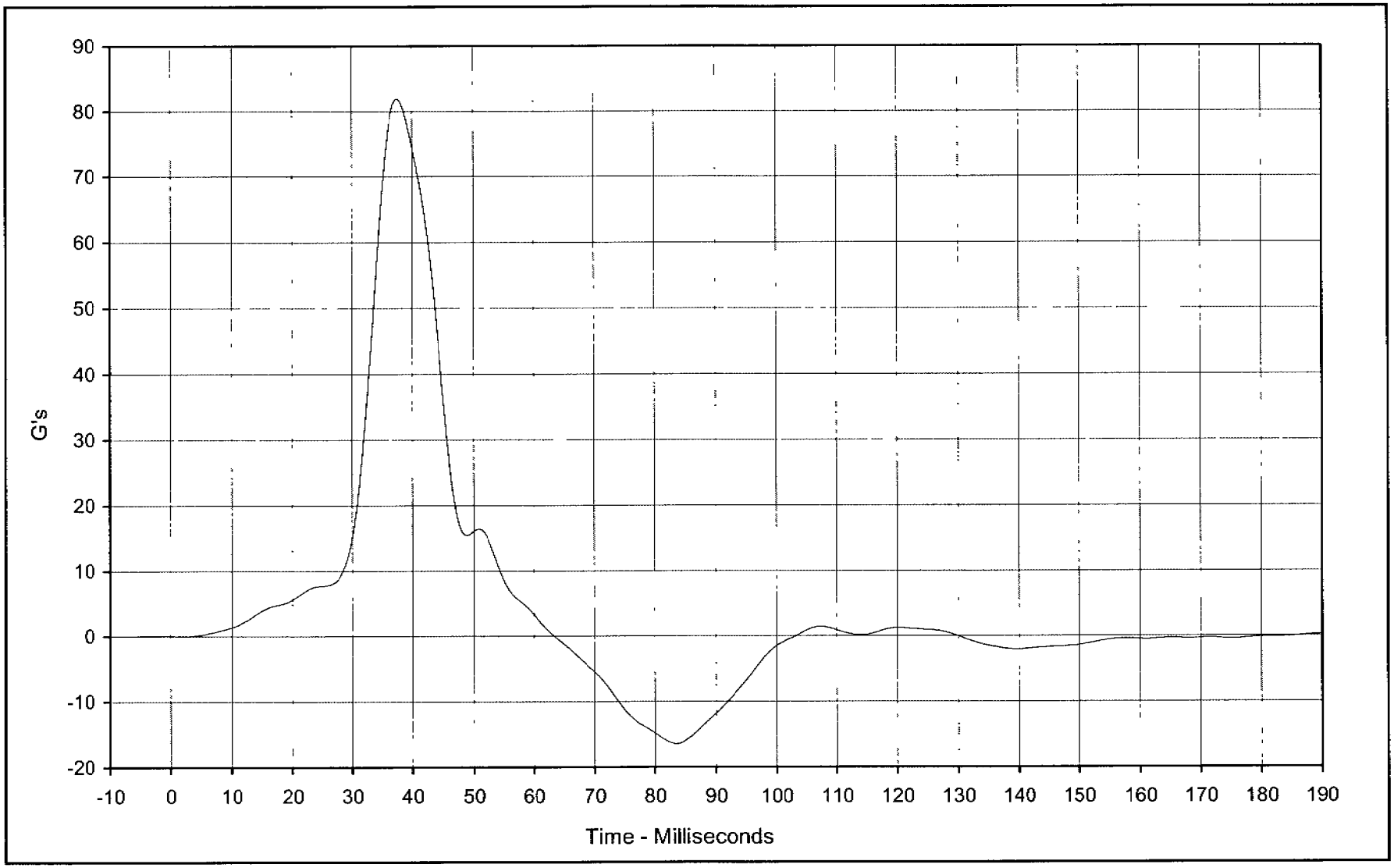
Date of Test: 07/12/00

Curve Number: FIR-023

Test Program: 55/28 km/h Side Impact NCAP No.: HYU001

Test Vehicle: 2000 Hyundai Sonata GLS 4 Door Sedan

KARCO Engineering



Curve Description:	Pass. Pelvis Redundant Y			
Maximum Value:	81.9	at	37.5	Milliseconds
Minimum Value:	-16.5	at	83.5	Milliseconds
SAE Filter Class:	FIR 100			
Date of Test:	07/12/00			
Curve Number:	FIR-024			

Test Program:	55/28 km/h Side Impact NCAP No.: HYU001
Test Vehicle:	2000 Hyundai Sonata GLS 4 Door Sedan

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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.: 056 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	20.6	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	900	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	511	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	521	Pass
KV- Knee Pivot From Floor	mm	490 to 505	501	Pass
HW- Hip Width	mm	356 to 391	363	Pass
		Overall Test Results		Pass

Laboratory Technician

July 10, 2000
Test Date

James E. Kotts
Approved By

7/10/2000
Date

KARCO Engineering

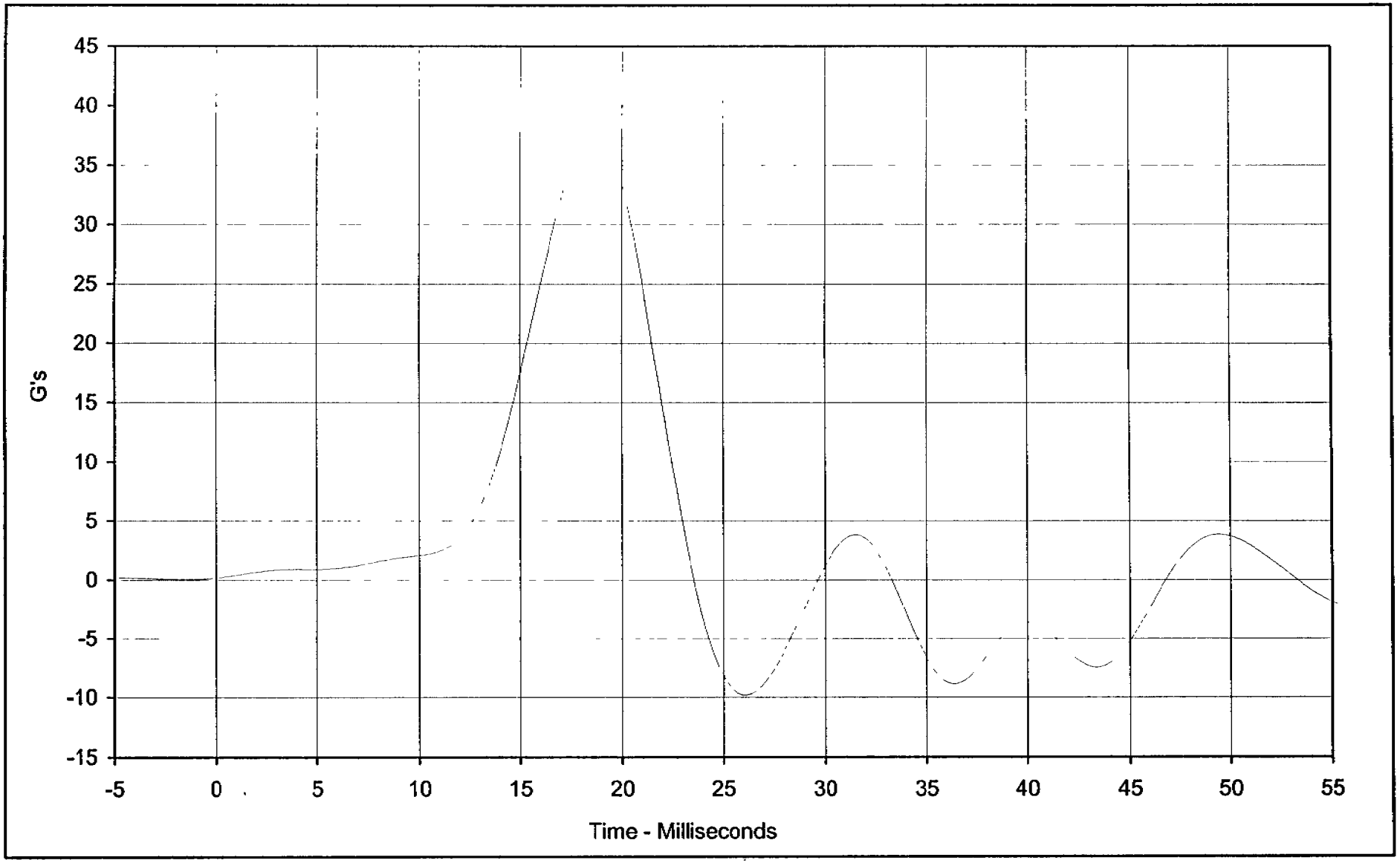
Performance Verification Data
Side Impact Dummy (SID)
Thorax Lateral Impact

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: TI03A

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	4.30	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	37.7	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	37.9	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.9	Pass
		Overall Test Results		Pass

Laboratory Technician — July 6, 2000 (Test Date)

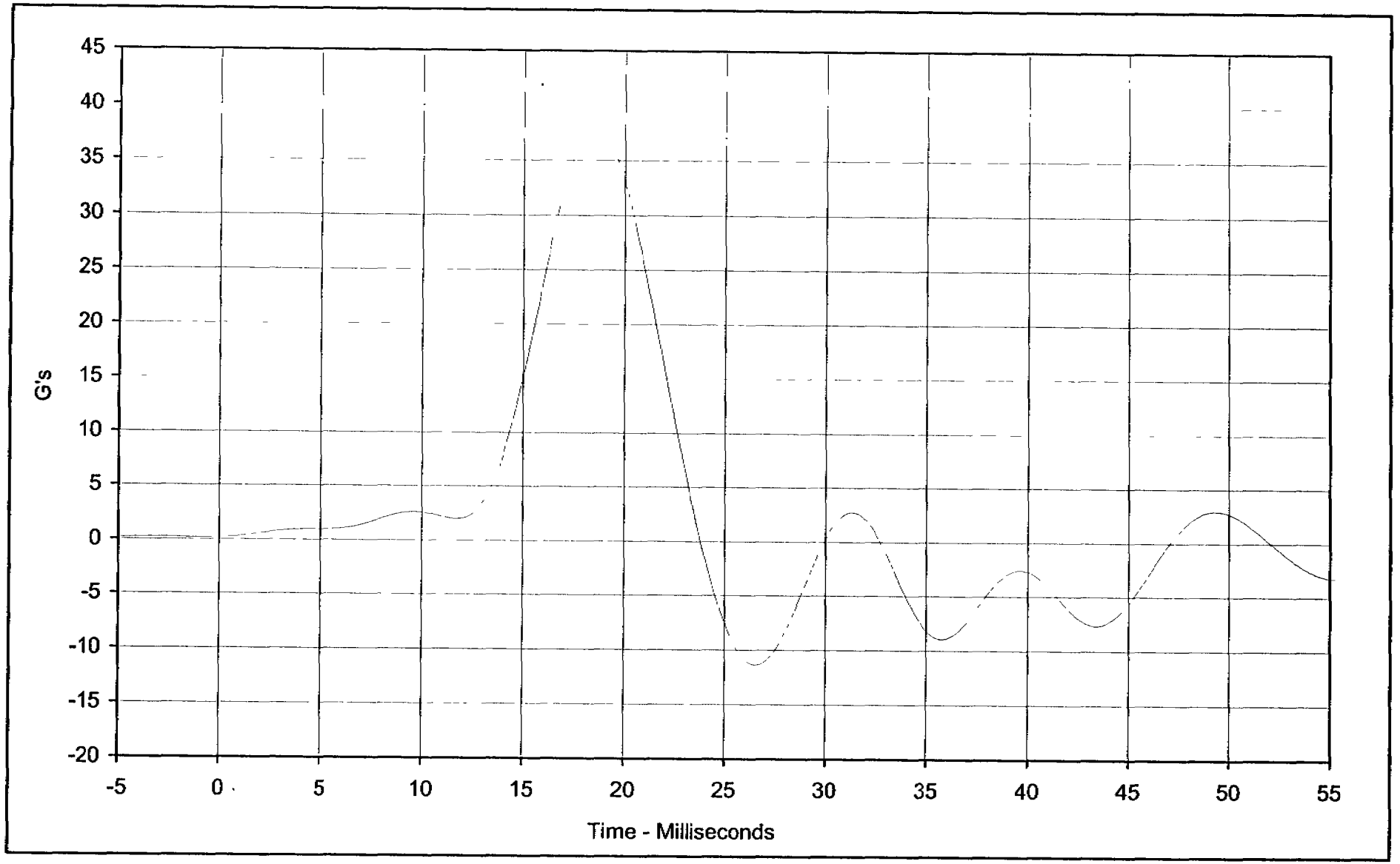
James E. Scott — 7/6/2000 (Date)
Approved By



Curve Description:	Left Upper Rib Y Acceleration			Test Program:	SID Thorax Lateral Impact Test
Maximum Value:	37.7	at	18.6 Milliseconds	Test Information:	SID S/N: 056 Test I.D.: TI03A
Minimum Value:	-9.8	at	26.1 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	7/6/00				

KARCO Engineering

KAR20051-01



Curve Description: Left Lower Rib Y Acceleration

Maximum Value: 37.9 at 18.5 Milliseconds

Minimum Value: -11.4 at 26.6 Milliseconds

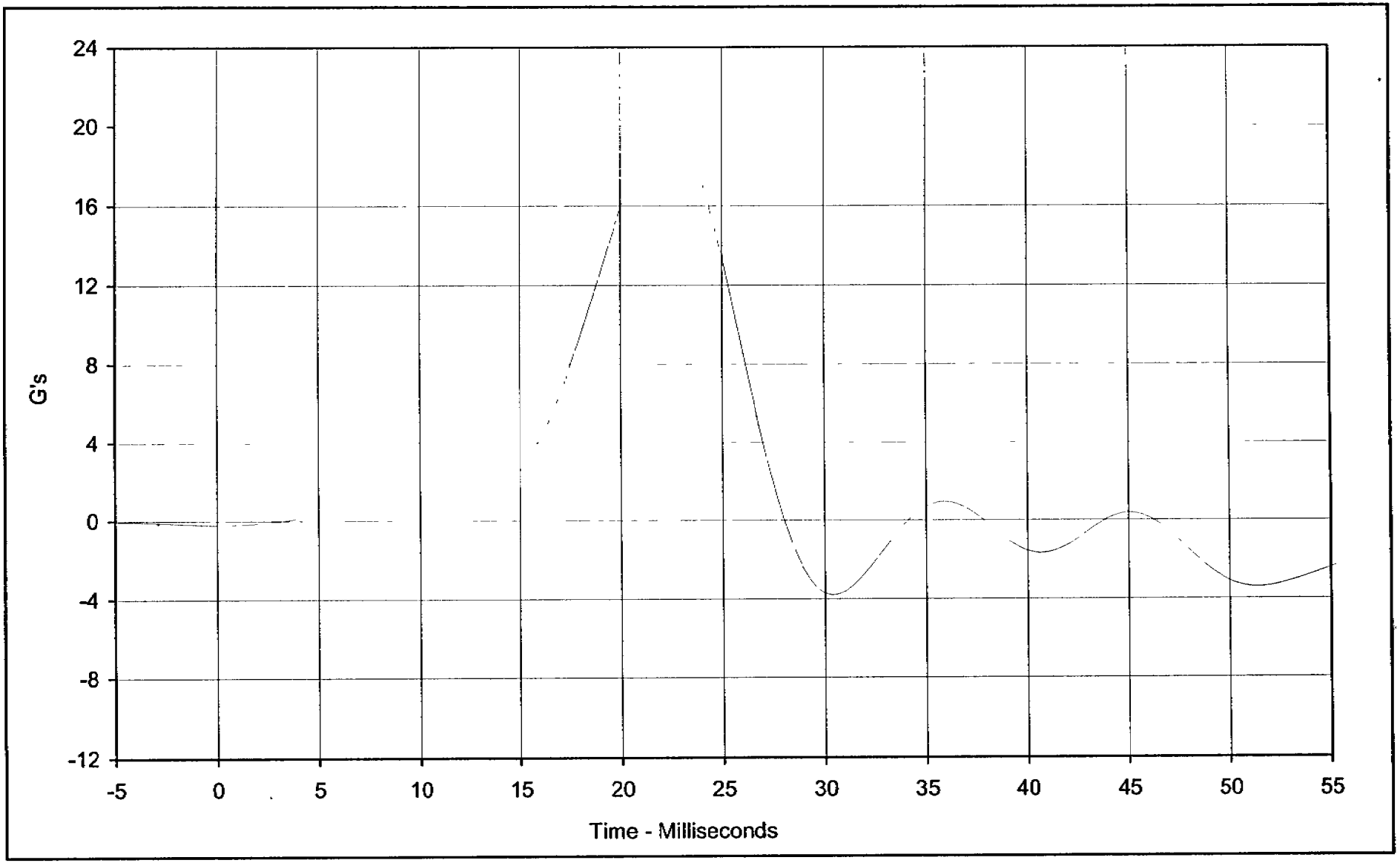
SAE Filter Class: FIR 100

Date of Test: 7/6/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 056 Test I.D.: TI03A

KARCO Engineering



Curve Description: Lower Spine Y Acceleration

Maximum Value: 19.9 at 22.3 Milliseconds

Minimum Value: -3.8 at 30.4 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 7/6/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 056 Test I.D.: TI03A

KARCO Engineering

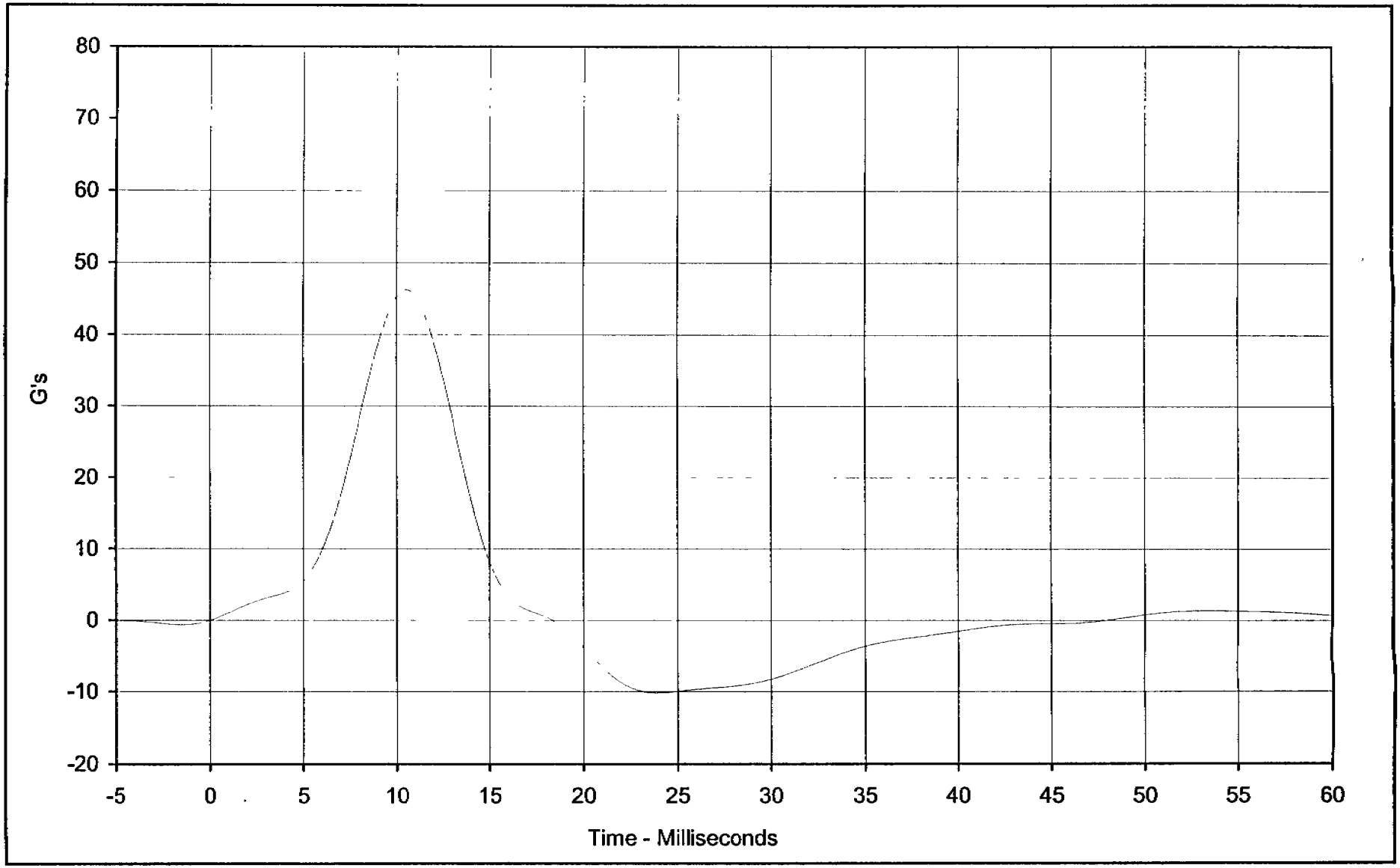
Performance Verification Data
Side Impact Dummy (SID)
Left Side Pelvis Lateral Impact

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: PI03A

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	46.3	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	6.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician — July 7, 2000 (Test Date)

James E. Loth — Approved By — 7/7/2000 (Date)



Curve Description: Pelvis Y Axis Acceleration

Maximum Value: 46.3 at 10.5 Milliseconds

Minimum Value: -10.2 at 23.9 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 7/7/00

Test Program: Left Side Pelvis Lateral Impact

Test Information: SID S/N: 056 Test I.D.: PI03A

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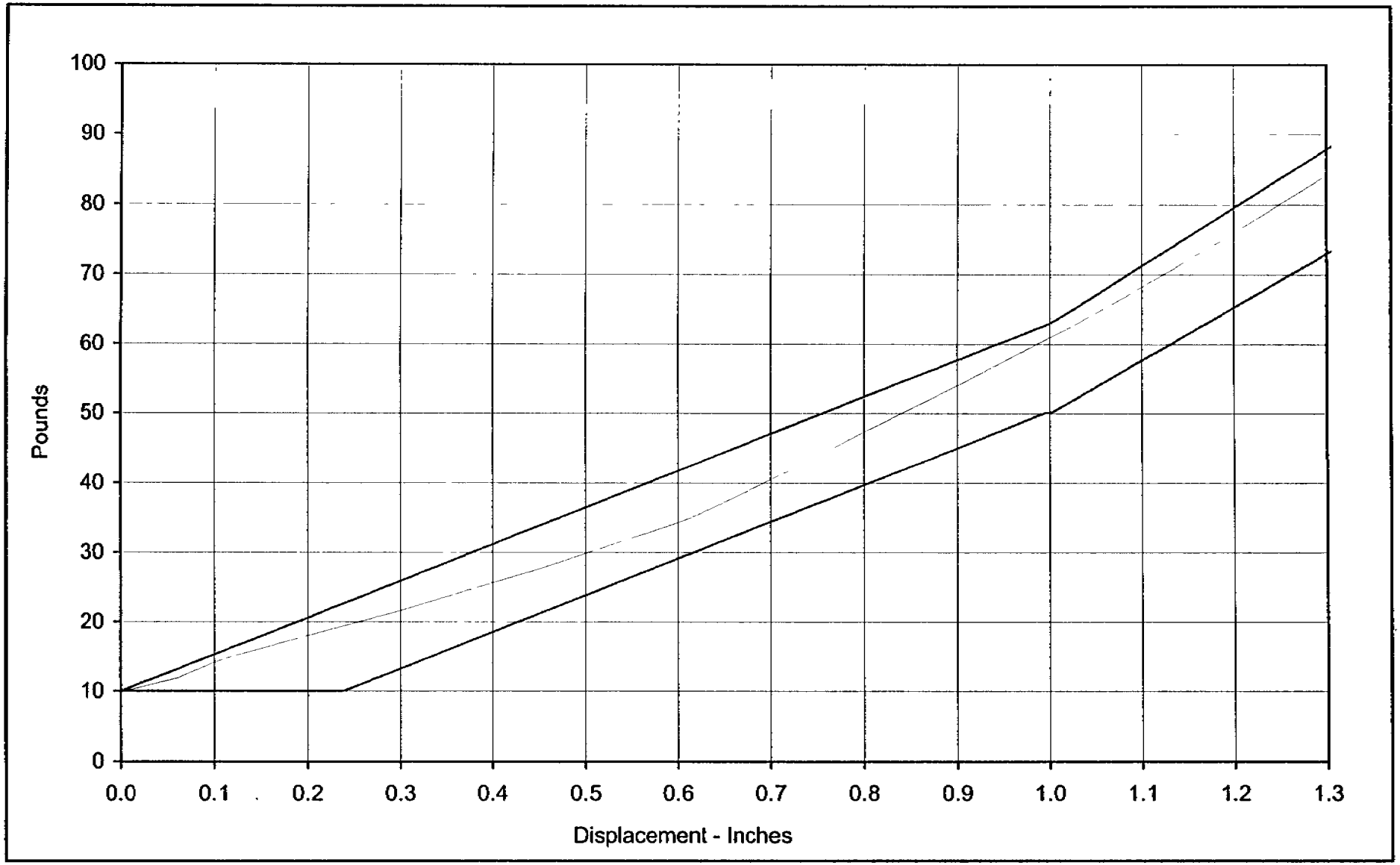
Performance Verification Data
Side Impact Dummy (SID)
Abdominal Compression Test

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: AB06A

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	29.8	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	43.8	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	60.6	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	84.2	Pass
		Overall Test Results		Pass

Laboratory Technician — July 10, 2000 (Test Date)

James E. Hatch — Approved By — 7/10/2000 (Date)



Curve Description:	Abdomen Force vs. Displacement	Test Program:	Hybrid II Abdominal Compression
Force at 0.5 In.:	29.8 Pounds	Test Information:	SID S/N: 056 Test I.D.: AB06A
Force at 0.75 In.:	43.8 Pounds		
Force at 1.0 In.:	60.6 Pounds		
Force at 1.3 In.:	84.2 Pounds		
Date of Test:	7/10/00		

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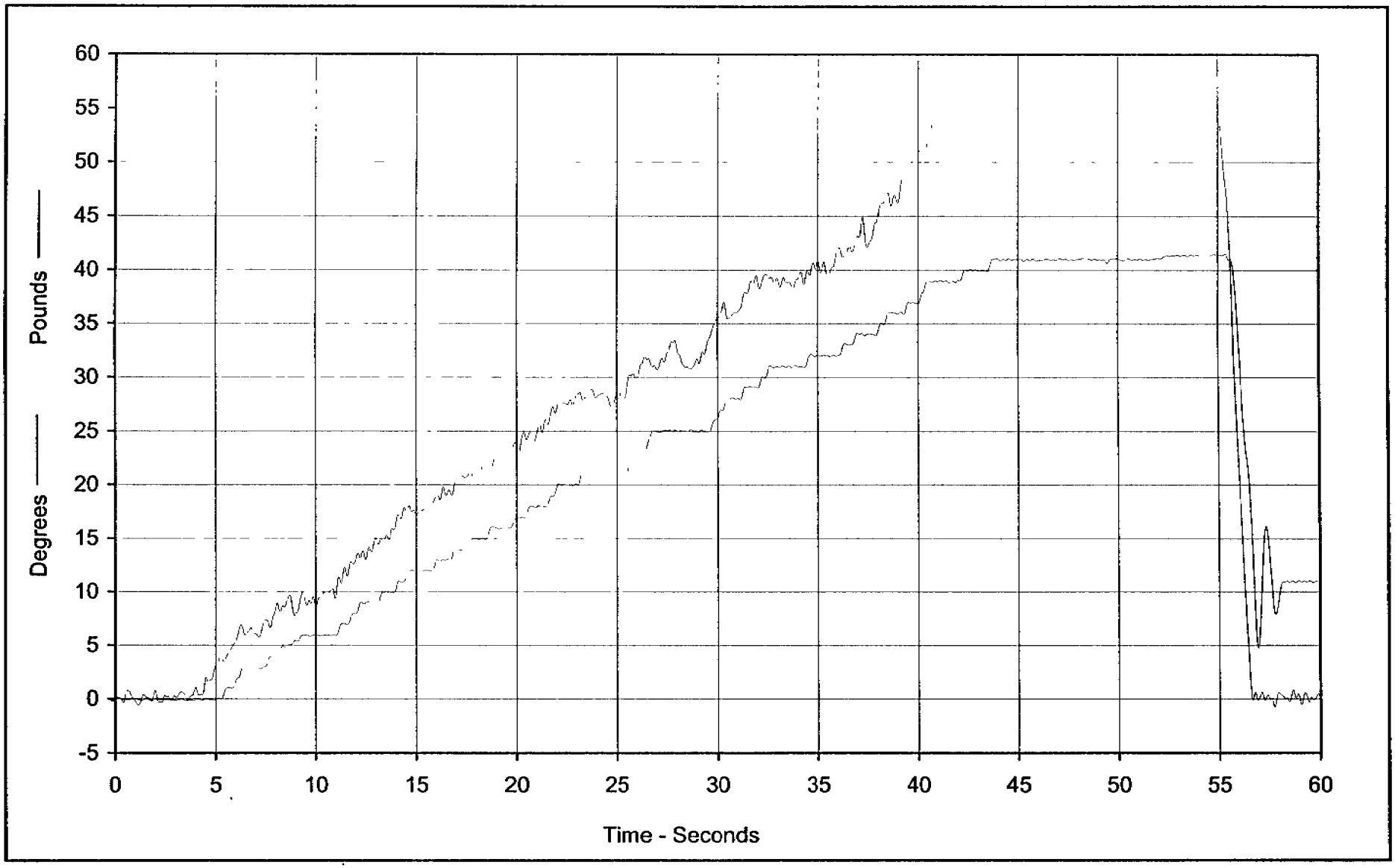
Performance Verification Data
Side Impact Dummy (SID)
Lumbar Flexion Test

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: LF06A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Applied Force at 0° of Flexion	Pounds	0.0	0.0	Pass
Applied Force at 20° of Flexion	Pounds	22.0 to 34.0	27.5	Pass
Applied Force at 30° of Flexion	Pounds	34.0 to 46.0	38.8	Pass
Applied Force at 40° of Flexion	Pounds	46.0 to 58.0	54.5	Pass
Return Angle 3 Minutes After Release	Degrees	≤12.0	6.8	Pass
		Overall Test Results		Pass

Laboratory Technician — July 8, 2000 (Test Date)

James E. Hooth — Approved By — 7/8/2000 (Date)



Curve Description:	Applied Lumbar Force And Angle		Test Program:	Hybrid II Lumbar Flexion
Force at 20°:	27.5	Pounds	Test Information:	SID S/N: 056 Test I.D.: LF06A
Force at 30°:	38.8	Pounds		
Force at 40°:	54.5	Pounds		
Return Angle:	6.8	Degrees		
Test Date:	7/8/00			

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

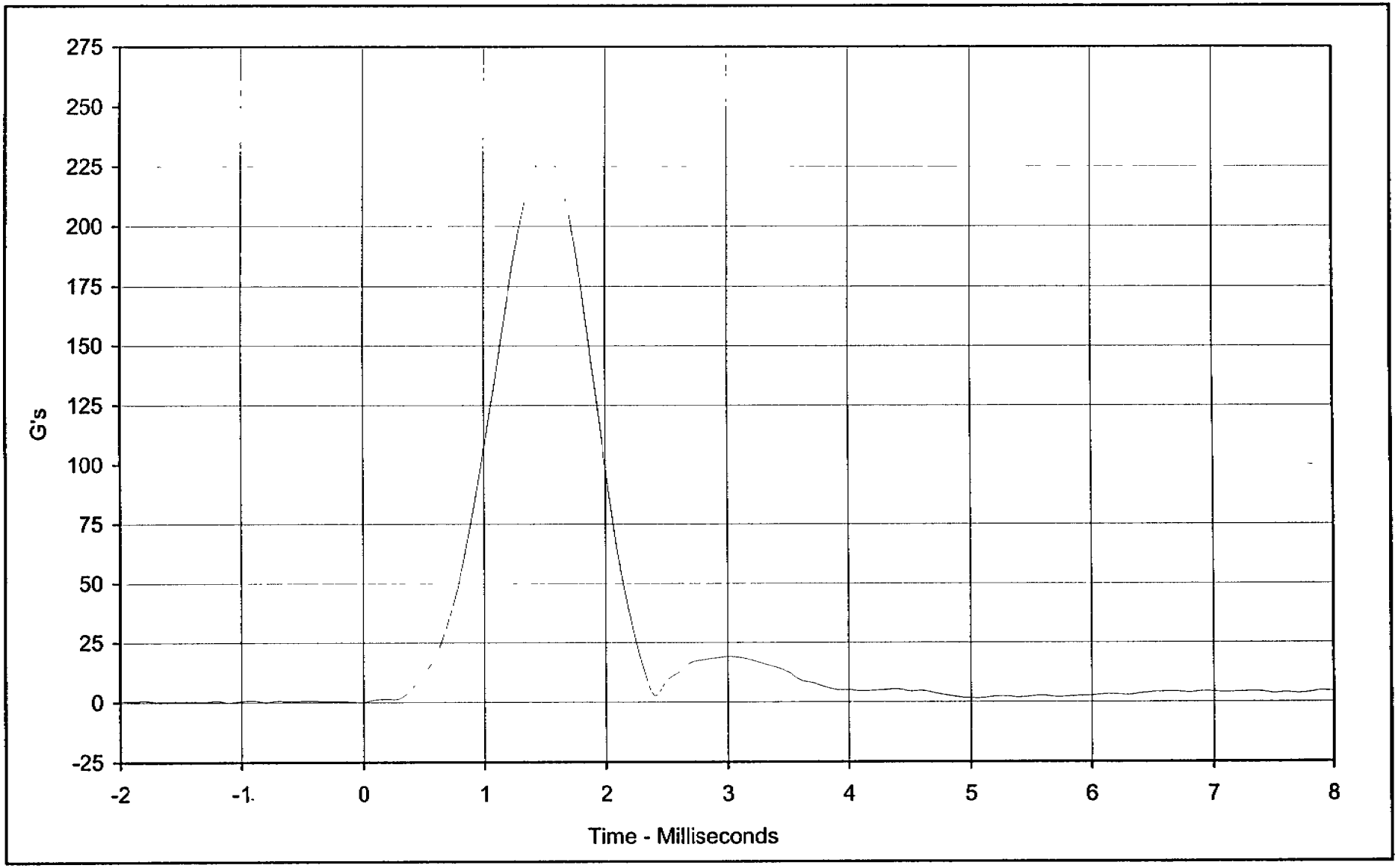
ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: SH06A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	69	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	230.2	Pass
Peak Lateral Acceleration	G's	≤10.0	7.2	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 — July 9, 2000 (Test Date)

James E. Scott — 7/9/2000 (Date)

Approved By



Curve Description: Head Resultant Acceleration

Maximum Value: 230.2 at 1.5 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 7/9/00

Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 056 Test I.D.: SH06A

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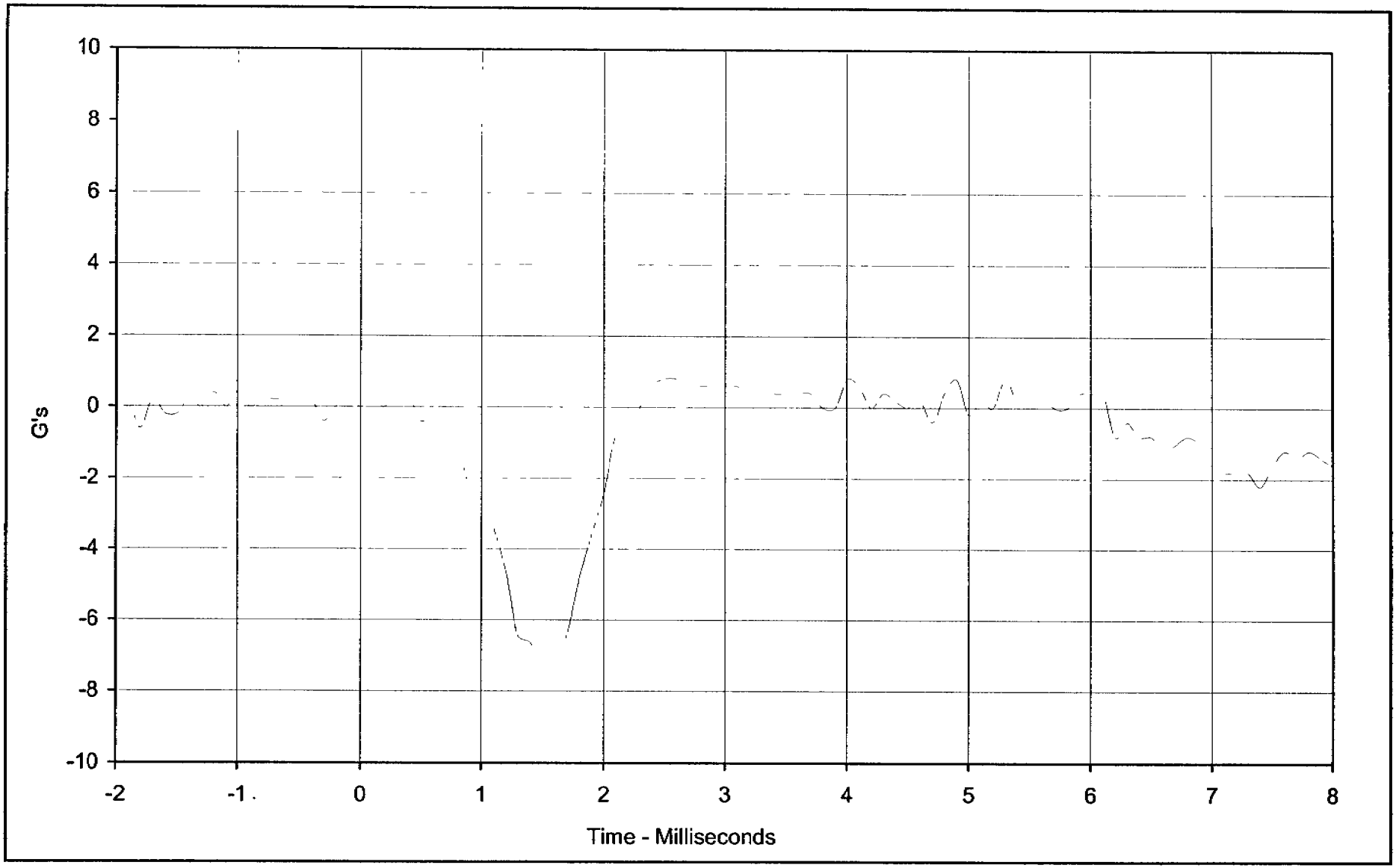
C-13

KAR20051-01



Curve Description:	Head Y Axis Acceleration			Test Program:	Hybrid II Head Drop Calibration
Maximum Value:	0.8	at	2.5 Milliseconds	Test Information:	SID S/N: 056 Test I.D.: SH06A
Minimum Value:	-7.2	at	1.5 Milliseconds		
SAE Filter Class:	1000				
Date of Test:	7/9/00				

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Performance Verification Data
Side Impact Dummy (SID)
External Dimensions

ATD Serial No.: 057 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	20.6	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	507	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	498	Pass
HW- Hip Width	mm	356 to 391	375	Pass
		Overall Test Results		Pass

Laboratory Technician — July 10, 2000 (Test Date)

James E. Hartt — Approved By — 7/10/2000 (Date)

KARCO Engineering

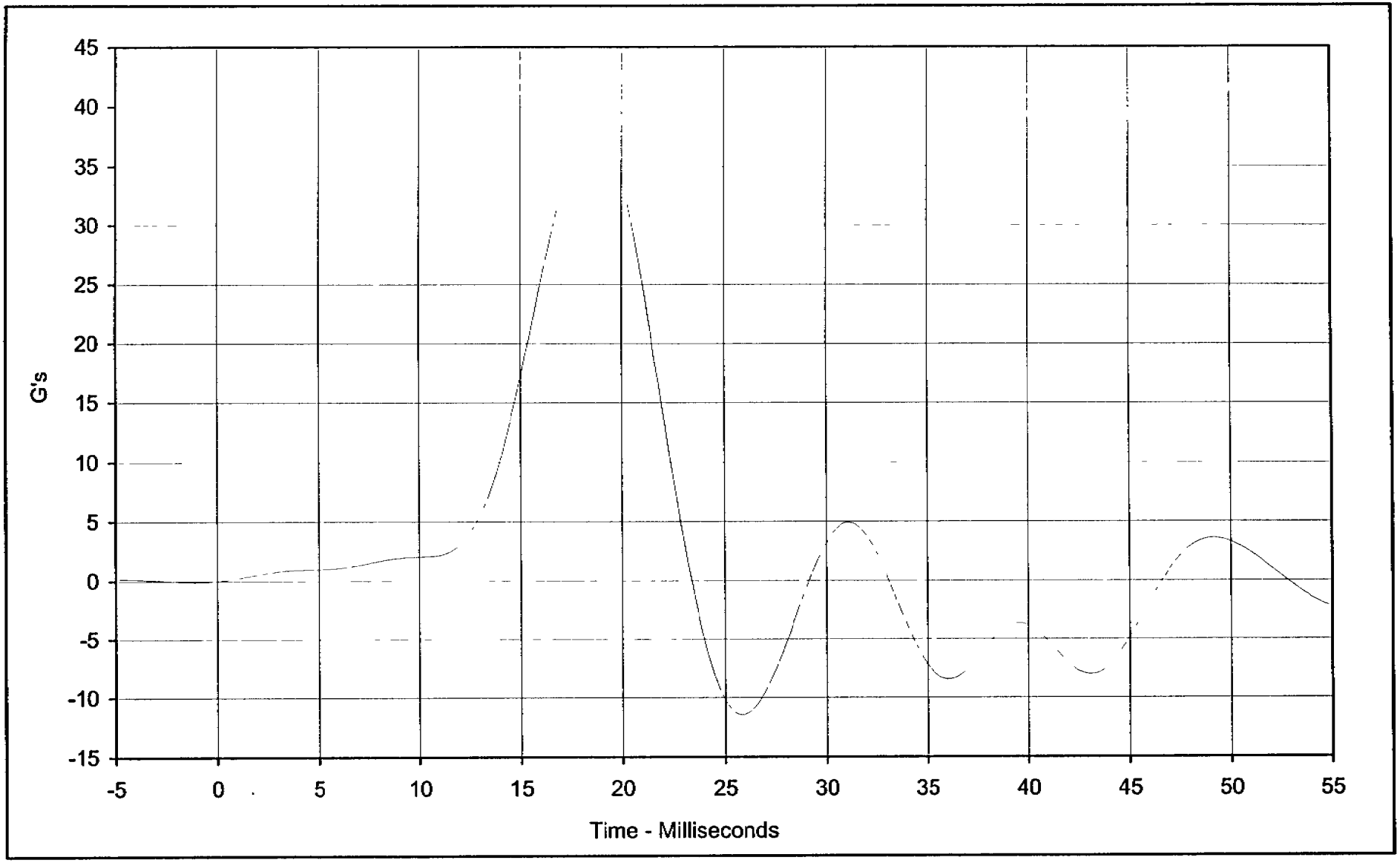
Performance Verification Data
Side Impact Dummy (SID)
Thorax Lateral Impact

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: TI03B

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	4.31	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	38.7	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	39.0	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	21.5	Pass
		Overall Test Results		Pass

Laboratory Technician — July 6, 2000 (Test Date)

James E. Hoth — Approved By — 7/6/2000 (Date)



Curve Description: Left Upper Rib Y Acceleration

Maximum Value: 38.7 at 18.6 Milliseconds

Minimum Value: -11.4 at 25.8 Milliseconds

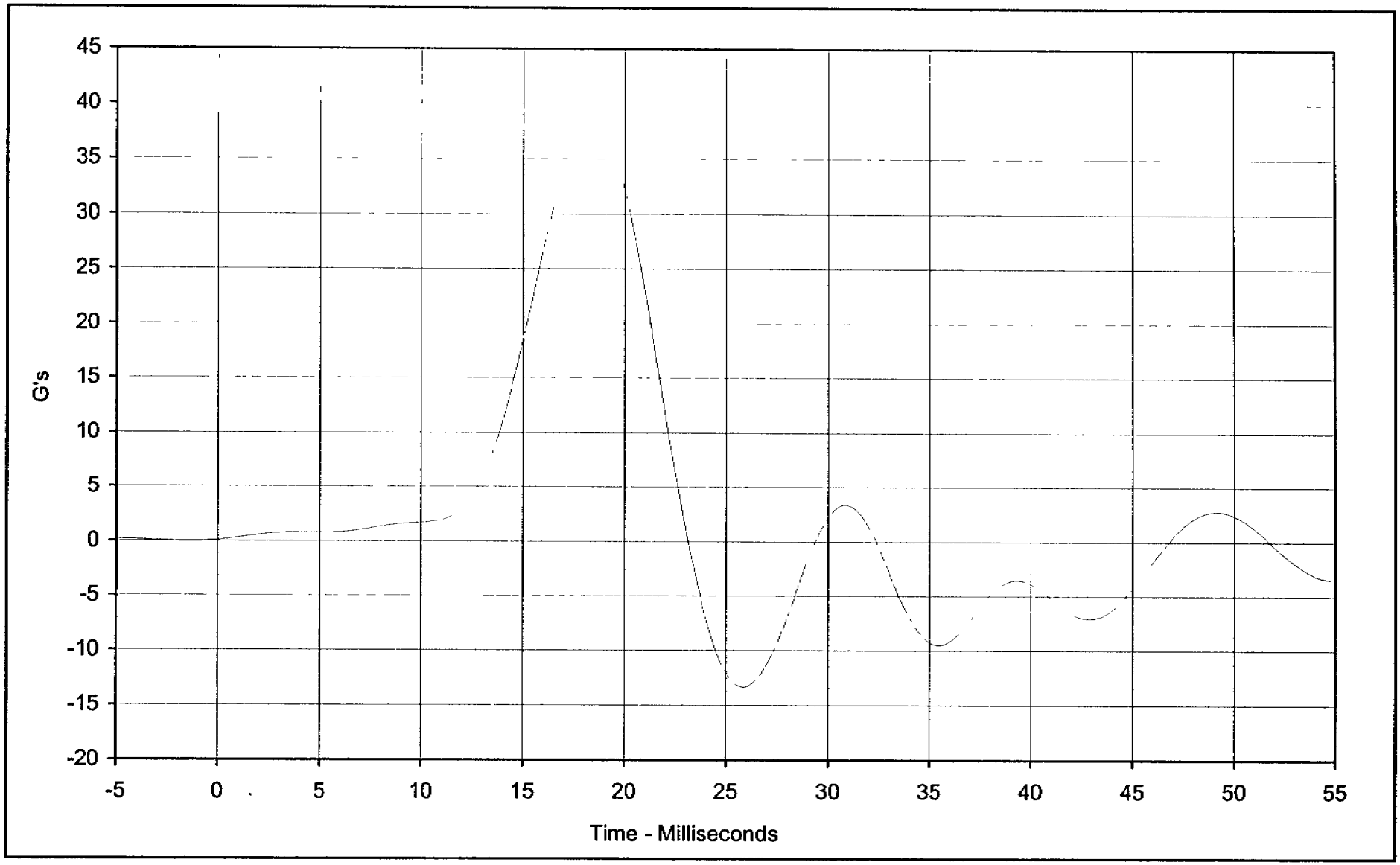
SAE Filter Class: FIR 100

Date of Test: 7/6/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 057 Test I.D.: TI03B

KARCO Engineering



Curve Description: Left Lower Rib Y Acceleration

Maximum Value: 39.0 at 18.4 Milliseconds

Minimum Value: -13.3 at 25.8 Milliseconds

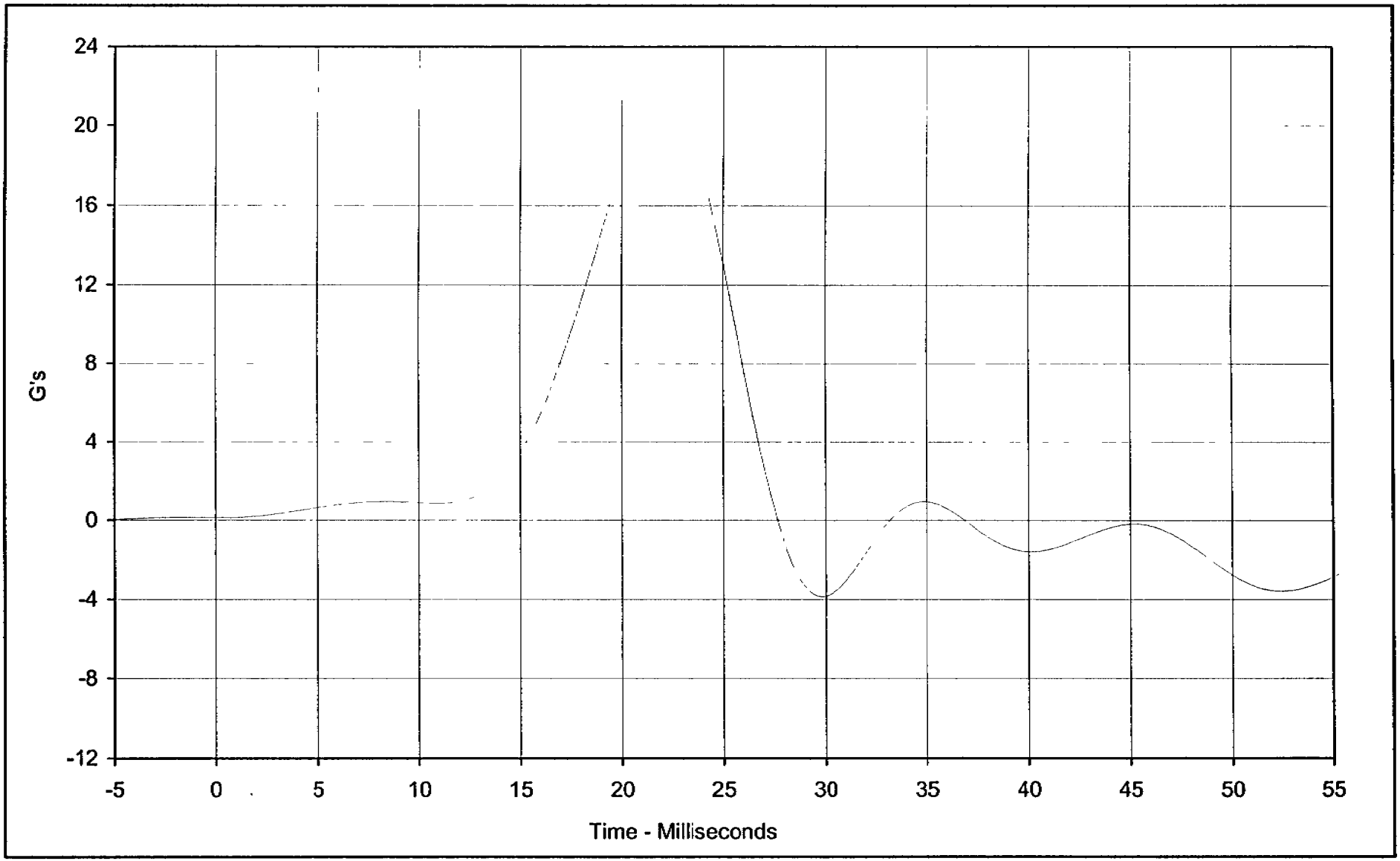
SAE Filter Class: FIR 100

Date of Test: 7/6/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 057 Test I.D.: TI03B

KARCO Engineering



Curve Description: Lower Spine Y Acceleration

Maximum Value: 21.5 at 22.1 Milliseconds

Minimum Value: -3.9 at 29.8 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 7/6/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 057 Test I.D.: TI03B

KARCO Engineering

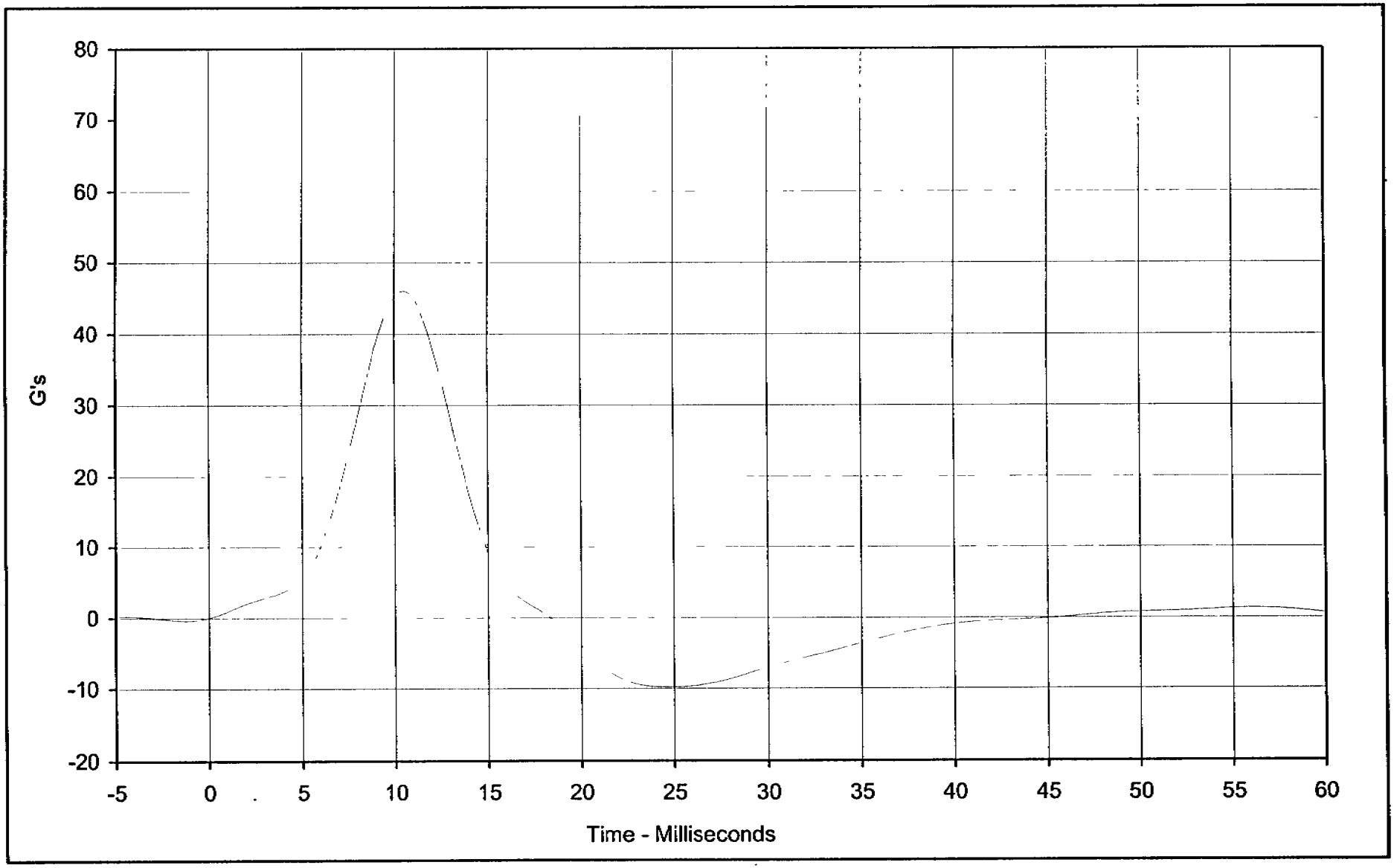
Performance Verification Data
Side Impact Dummy (SID)
Left Side Pelvis Lateral Impact

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: PI03B

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	46.0	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	6.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician — July 7, 2000 (Test Date)

Approved By — 7/7/2000 (Date)



Curve Description: Pelvis Y Axis Acceleration

Maximum Value: 46.0 at 10.5 Milliseconds

Minimum Value: -9.8 at 24.6 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 7/7/00

Test Program: Left Side Pelvis Lateral Impact

Test Information: SID S/N: 057 Test I.D.: PI03B

KARCO Engineering

KAR20051-01

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

KARCO Engineering

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: AB06C

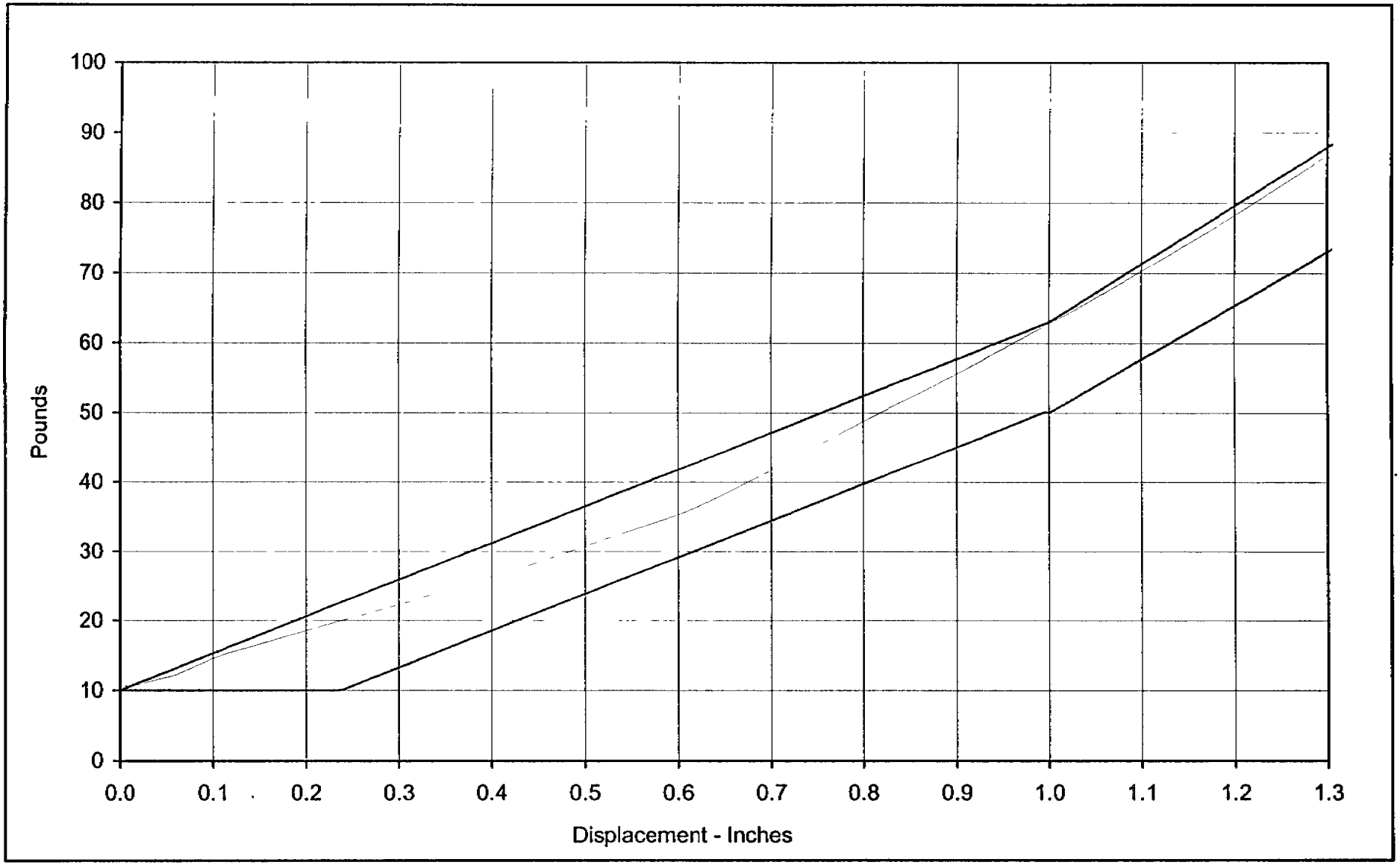
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force at 0.5 Inches of Displacement	Pounds	23.0 to 36.0	30.6	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	45.1	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	62.4	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	86.6	Pass
		Overall Test Results		Pass

[signature]
Laboratory Technician

July 10, 2000
Test Date

James E. Hoth
Approved By

7/10/2000
Date



Curve Description:	Abdomen Force vs. Displacement		Test Program:	Hybrid II Abdominal Compression
Force at 0.5 In.:	30.6	Pounds	Test Information:	SID S/N: 057 Test I.D.: AB06C
Force at 0.75 In.:	45.1	Pounds		
Force at 1.0 In.:	62.4	Pounds		
Force at 1.3 In.:	86.6	Pounds		
Date of Test:	7/10/00			

KARCO Engineering

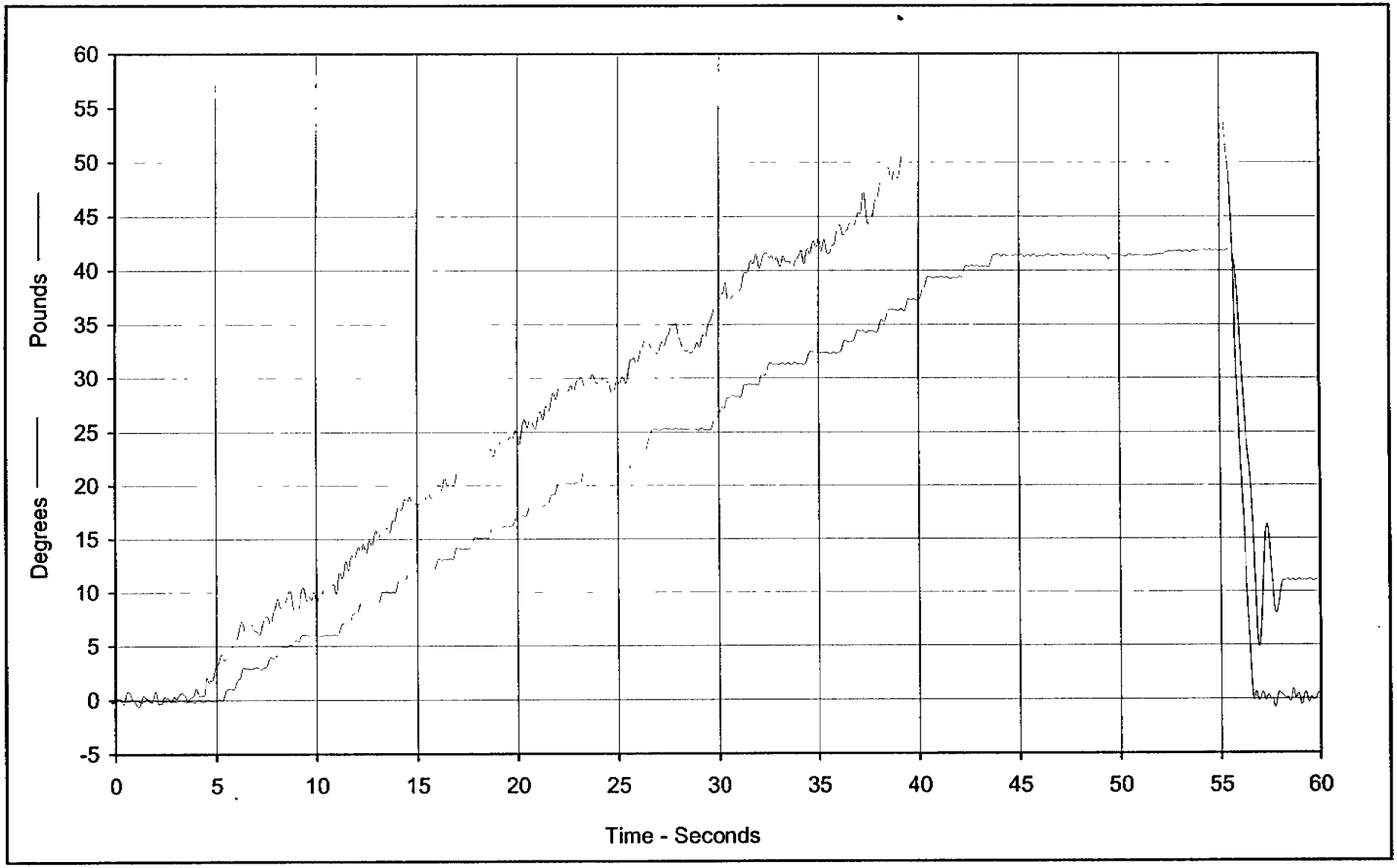
Performanc Verification Data
Side Impact Dummy (SID)
Lumbar Flexion Test

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: LF06B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Applied Force at 0° of Flexion	Pounds	0.0	0.0	Pass
Applied Force at 20° of Flexion	Pounds	22.0 to 34.0	28.4	Pass
Applied Force at 30° of Flexion	Pounds	34.0 to 46.0	40.4	Pass
Applied Force at 40° of Flexion	Pounds	46.0 to 58.0	56.0	Pass
Return Angle 3 Minutes After Release	Degrees	≤12.0	6.9	Pass
		Overall Test Results		Pass

Laboratory Technician — July 8, 2000 — Test Date

James E. Hoath — Approved By — 7/8/2000 — Date



Curve Description: Applied Lumbar Force And Angle

Force at 20°: 28.4 Pounds

Force at 30°: 40.4 Pounds

Force at 40°: 56.0 Pounds

Return Angle: 6.9 Degrees

Test Date: 7/8/00

Test Program: Hybrid II Lumbar Flexion

Test Information: SID S/N: 057 Test I.D.: LF06B

KARCO Engineering

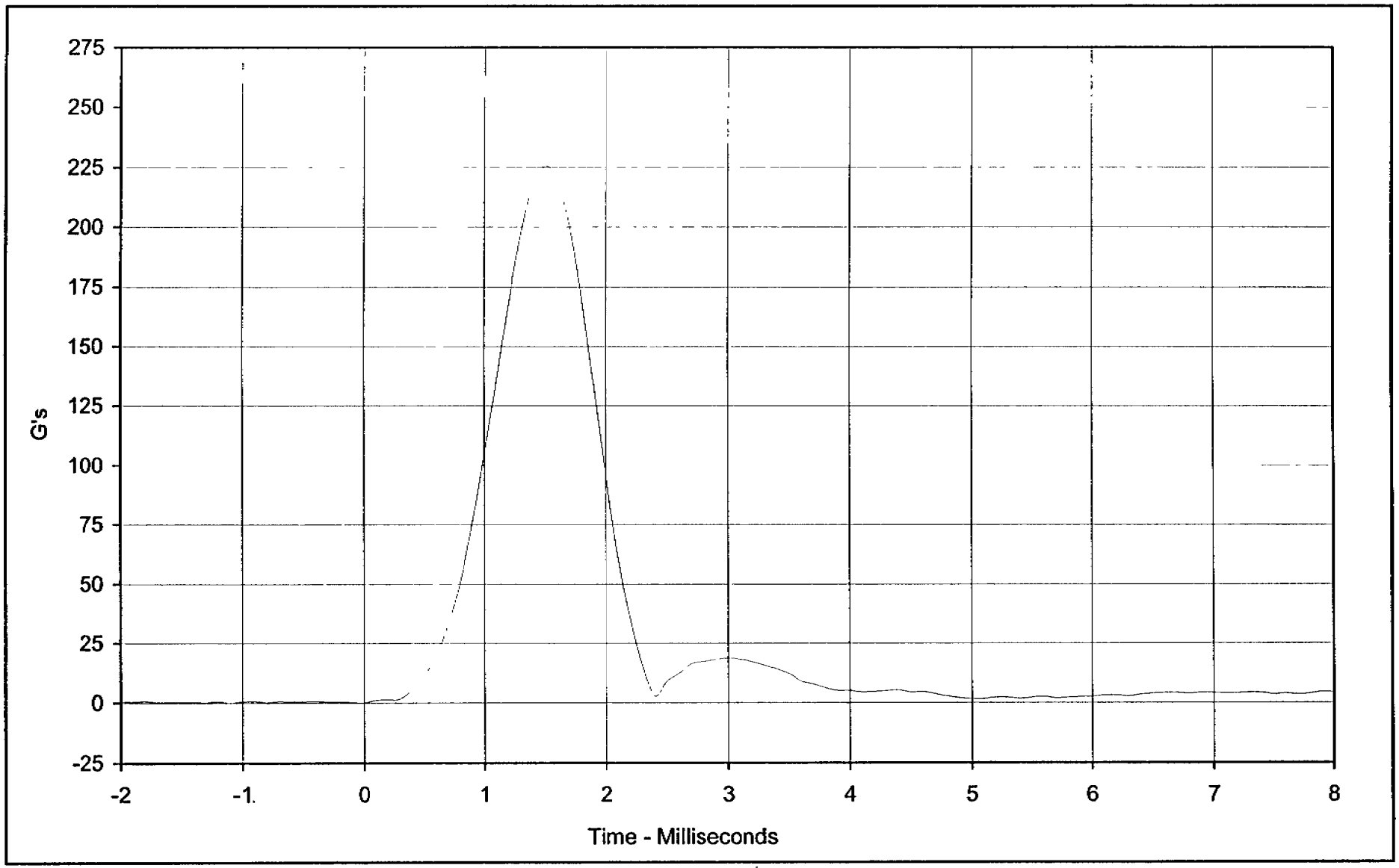
Performance Verification Data
Side Impact Dummy (SID)
Head Drop Calibration

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: SH06B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	69	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	225.6	Pass
Peak Lateral Acceleration	G's	≤10.0	7.1	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 — July 9, 2000 (Test Date)

James E. Scott — Approved By — 7/9/2000 (Date)



Curve Description: Head Resultant Acceleration

Maximum Value: 225.6 at 1.5 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

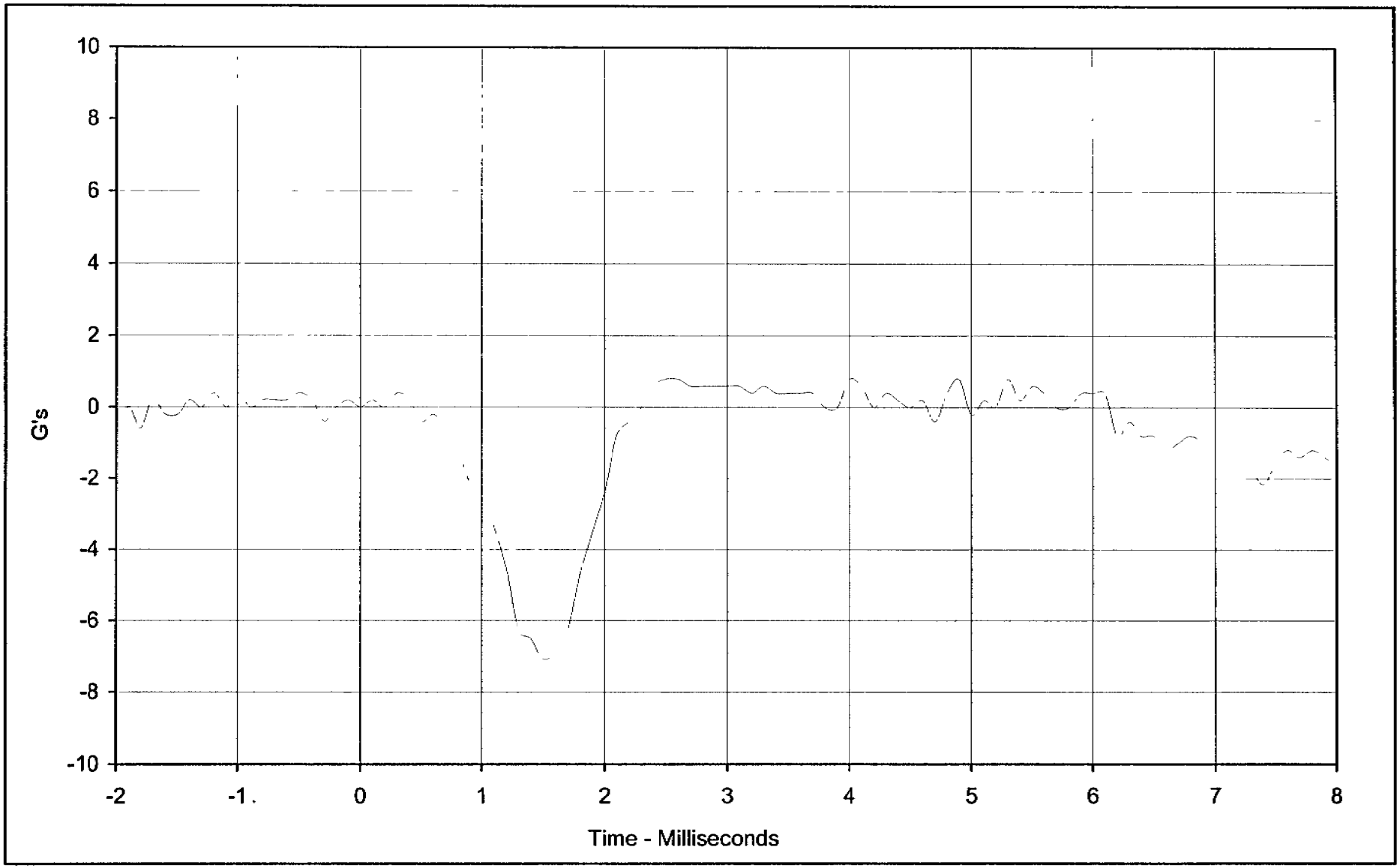
SAE Filter Class: 1000

Date of Test: 7/9/00

Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 057 Test I.D.: SH06B

KARCO Engineering



Curve Description:	Head Y Axis Acceleration			
Maximum Value:	0.8	at	2.5	Milliseconds
Minimum Value:	-7.1	at	1.5	Milliseconds
SAE Filter Class:	1000			
Date of Test:	7/9/00			

Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 057 Test I.D.: SH06B

KARCO Engineering

KAR20051-01

APPENDIX C

POST-TEST SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Performance Verification Data
Side Impact Dummy (SID)
External Dimensions

ATD Serial No.: 056 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	20.6	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	900	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	511	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	522	Pass
KV- Knee Pivot From Floor	mm	490 to 505	501	Pass
HW- Hip Width	mm	356 to 391	363	Pass
		Overall Test Results		Pass

Laboratory Technician — July 16, 2000 Test Date

James E. Hoth — 7/16/2000

Approved By — Date

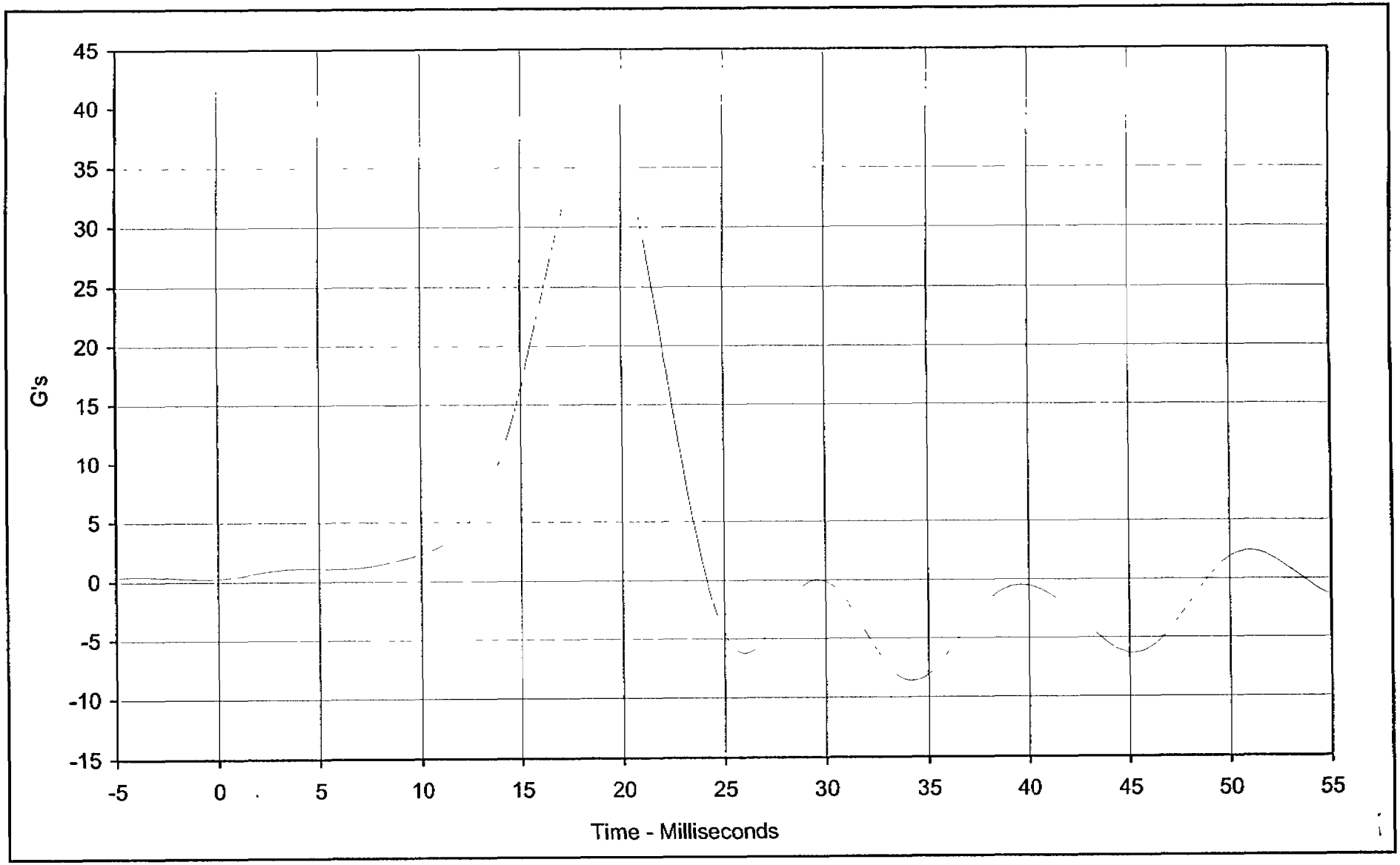
Performance Verification Data
Side Impact Dummy (SID)
Thorax Lateral Impact

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: TI03D

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	4.31	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	38.7	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	38.5	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.2	Pass
		Overall Test Results		Pass

Laboratory Technician — July 12, 2000 (Test Date)

James E Scott — 7/12/2000 (Date)
Approved By



Curve Description: Left Upper Rib Y Acceleration

Maximum Value: 38.7 at 19.0 Milliseconds

Minimum Value: -8.6 at 34.2 Milliseconds

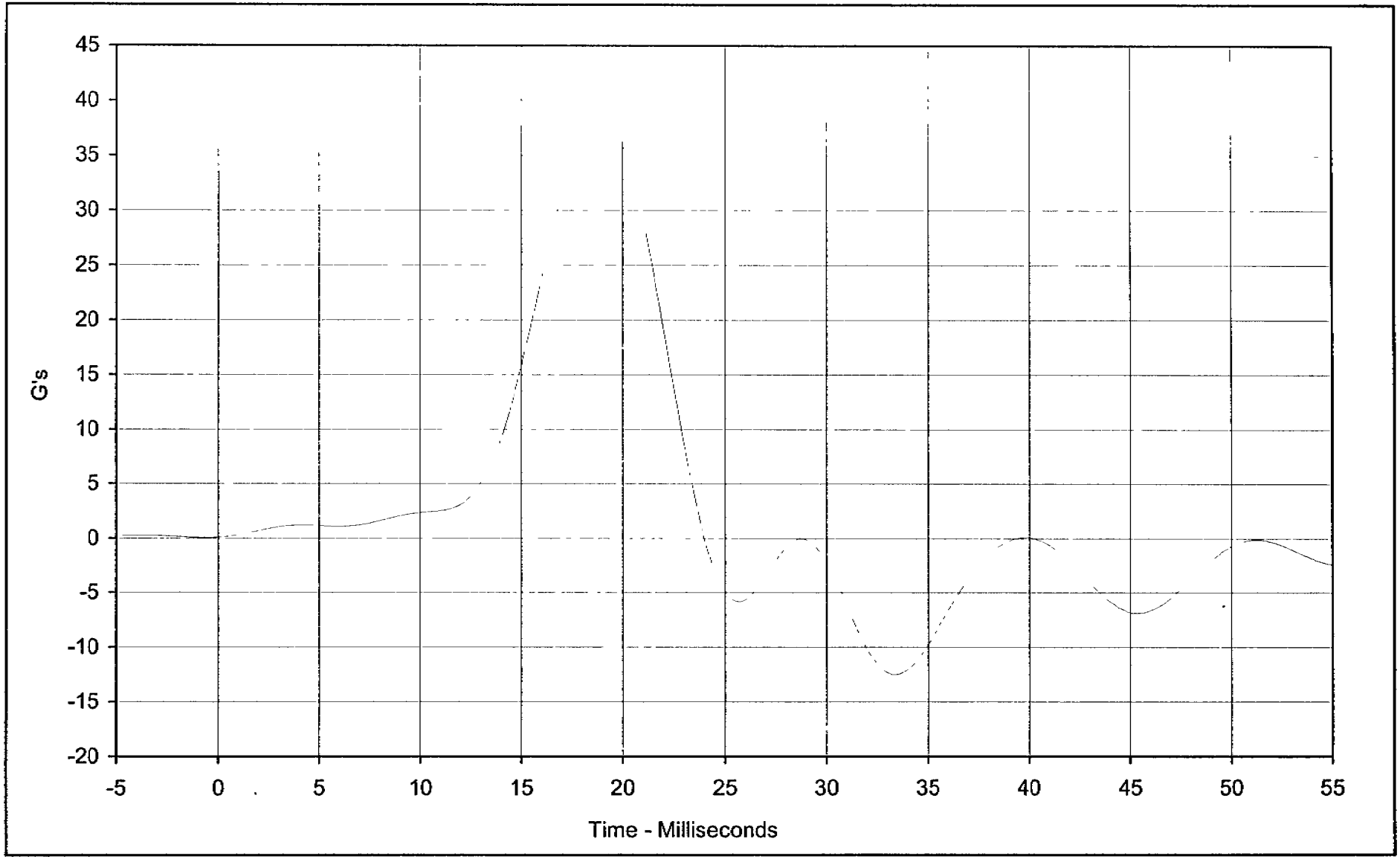
SAE Filter Class: FIR 100

Date of Test: 7/12/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 056 Test I.D.: TI03D

KARCO Engineering



Curve Description: Left Lower Rib Y Acceleration

Maximum Value: 38.5 at 18.9 Milliseconds

Minimum Value: -12.5 at 33.3 Milliseconds

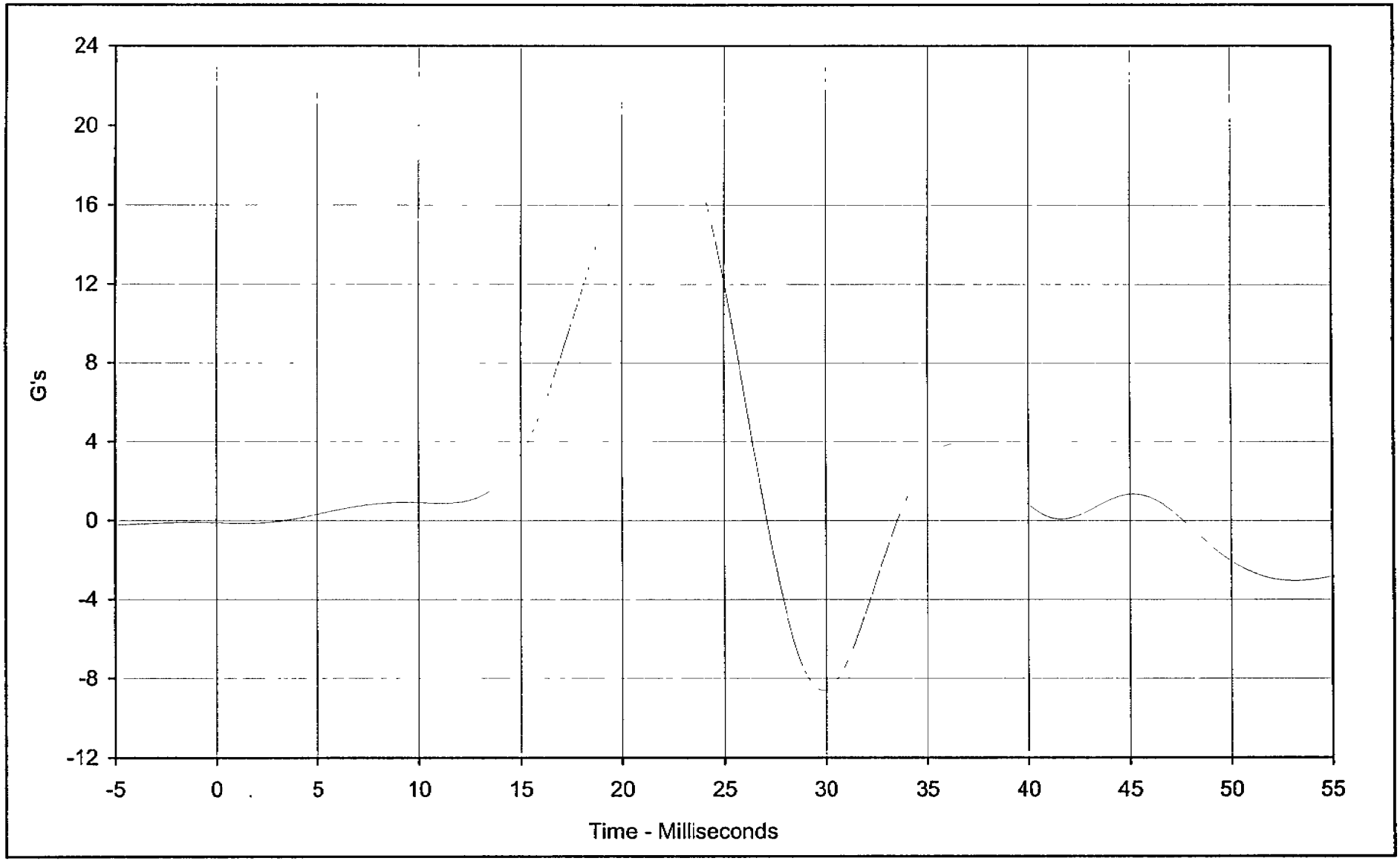
SAE Filter Class: FIR 100

Date of Test: 7/12/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 056 Test I.D.: TI03D

KARCO Engineering



Curve Description: Lower Spine Y Acceleration

Maximum Value: 20.2 at 21.9 Milliseconds

Minimum Value: -8.6 at 29.8 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 7/12/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 056 Test I.D.: TI03D

KARCO Engineering

C-33

KAR20051-01

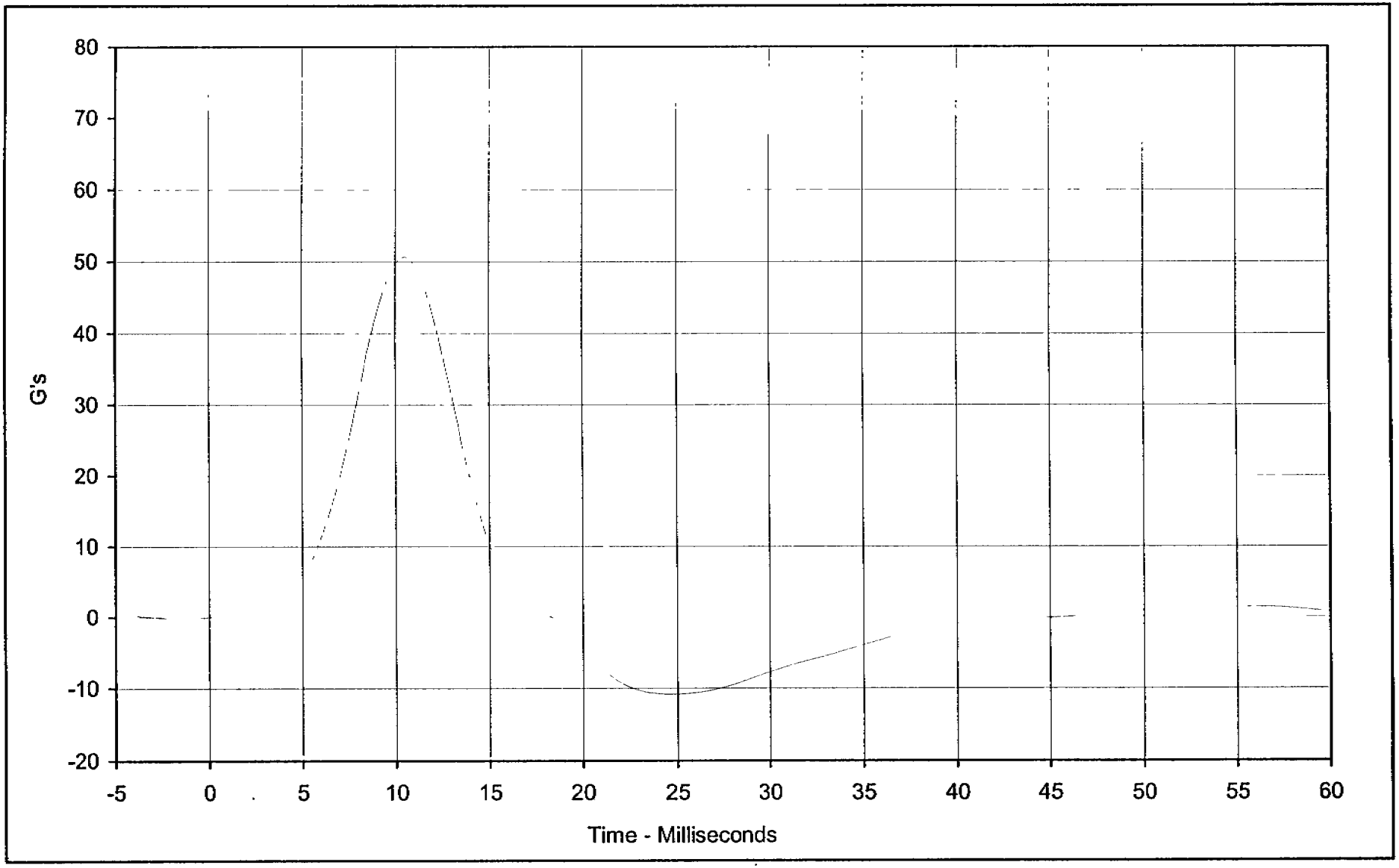
Performance Verification Data
Side Impact Dummy (SID)
Left Side Pelvis Lateral Impact

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: PI03D

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	50.6	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	6.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician — July 13, 2000 (Test Date)

James E. Foth — 7/13/2000 (Date)
Approved By



Curve Description: Pelvis Y Axis Acceleration

Maximum Value: 50.6 at 10.5 Milliseconds

Minimum Value: -10.8 at 24.6 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 7/13/00

Test Program: Left Side Pelvis Lateral Impact

Test Information: SID S/N: 056 Test I.D.: PI03D

KARCO Engineering

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

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: AB06D

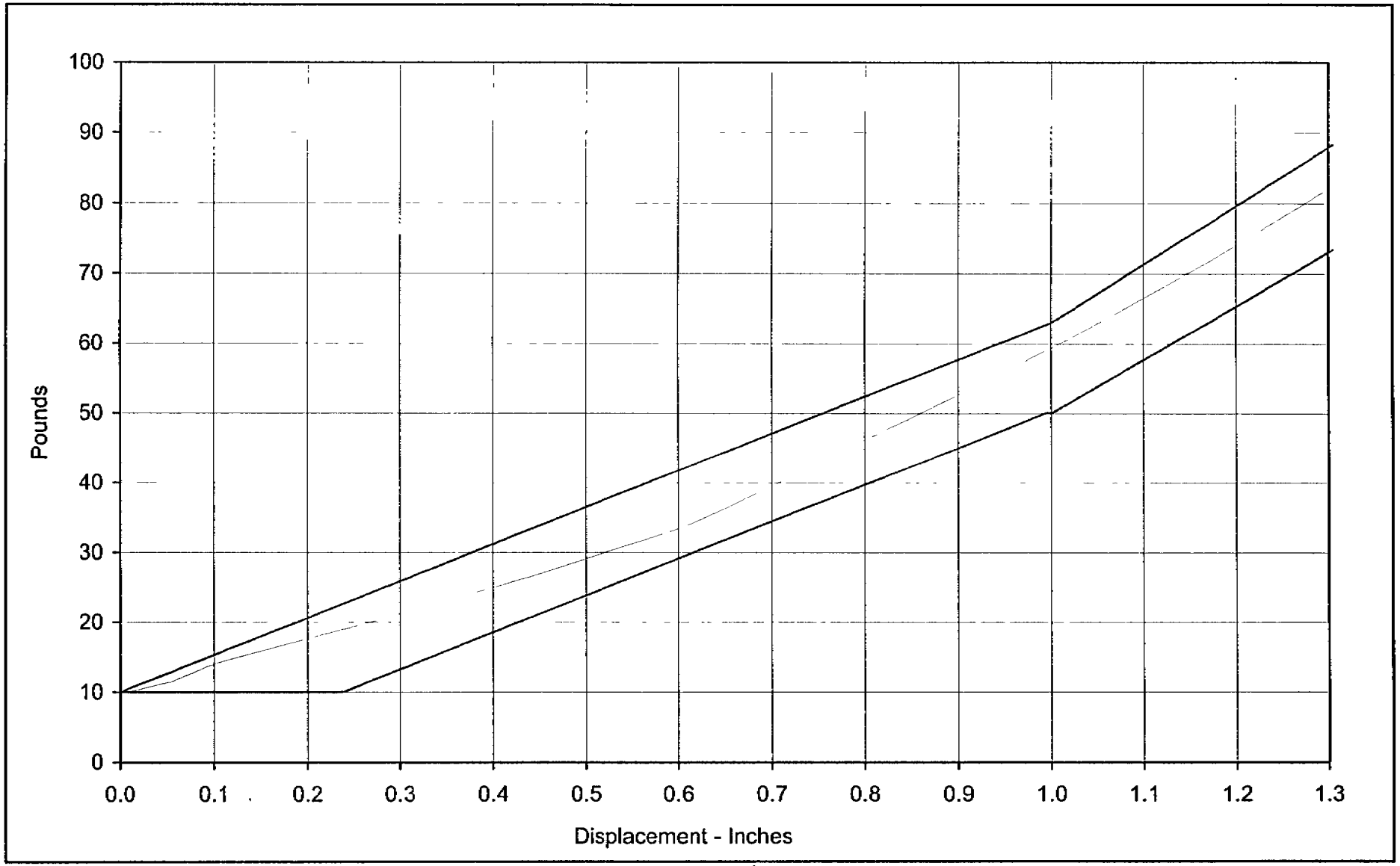
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force at 0.5 Inches of Displacement	Pounds	23.0 to 36.0	29.0	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	42.7	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	59.1	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	82.0	Pass
		Overall Test Results		Pass

Laboratory Technician

July 15, 2000
Test Date

James E. Holtb
Approved By

7/15/2000
Date



Curve Description:	Abdomen Force vs. Displacement	Test Program:	Hybrid II Abdominal Compression
Force at 0.5 In.:	29.0 Pounds	Test Information:	SID S/N: 056 Test I.D.: AB06D
Force at 0.75 In.:	42.7 Pounds		
Force at 1.0 In.:	59.1 Pounds		
Force at 1.3 In.:	82.0 Pounds		
Date of Test:	7/15/00		

KARCO Engineering

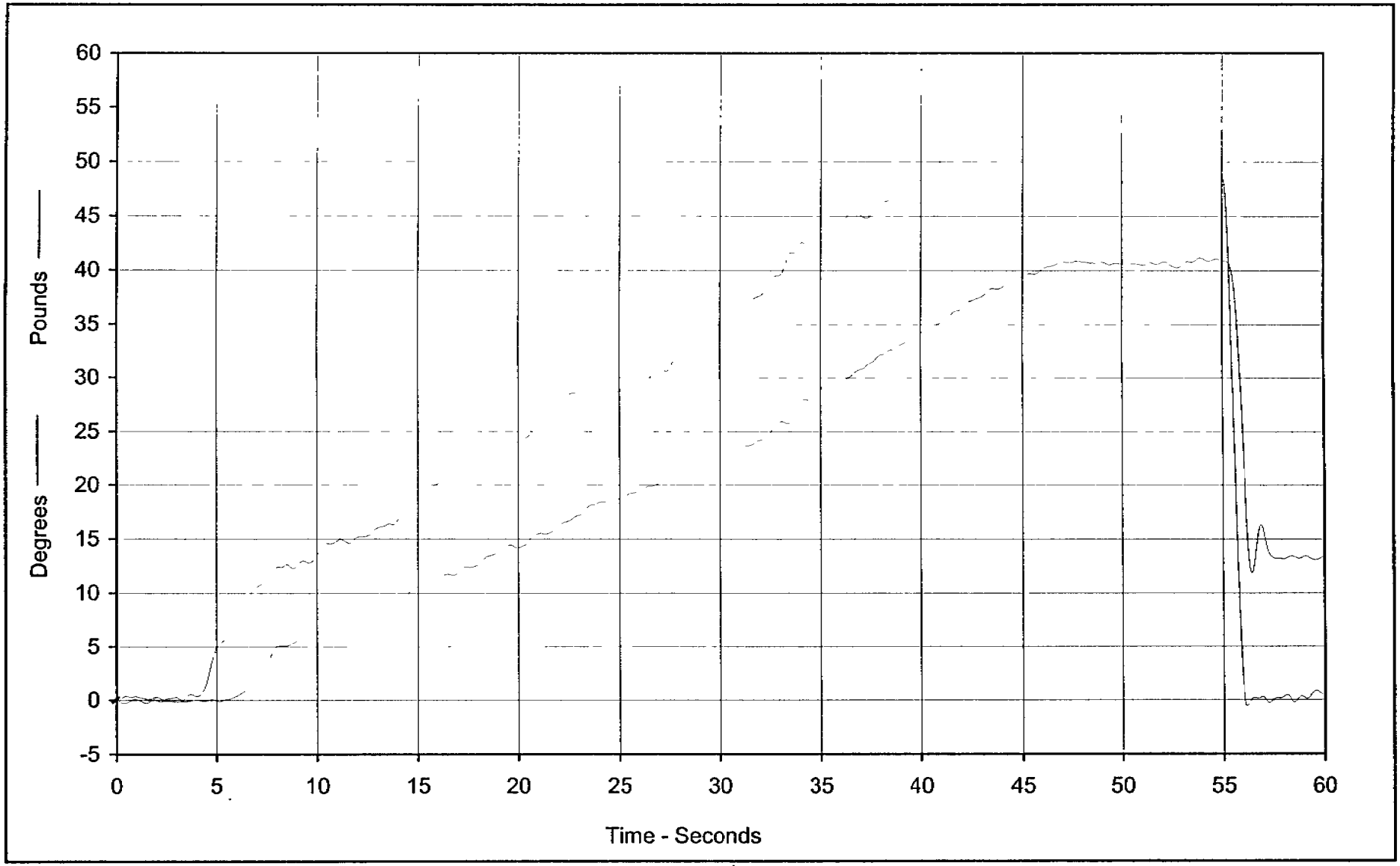
Performance Verification Data
Side Impact Dummy (SID)
Lumbar Flexion Test

ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: LF06C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Applied Force at 0° of Flexion	Pounds	0.0	0.0	Pass
Applied Force at 20° of Flexion	Pounds	22.0 to 34.0	30.5	Pass
Applied Force at 30° of Flexion	Pounds	34.0 to 46.0	45.2	Pass
Applied Force at 40° of Flexion	Pounds	46.0 to 58.0	51.8	Pass
Return Angle 3 Minutes After Release	Degrees	≤12.0	7.1	Pass
		Overall Test Results		Pass

Laboratory Technician — July 14, 2000 (Test Date)

James E. Kath — Approved By — 7/14/2000 (Date)



Curve Description: Applied Lumbar Force And Angle

Force at 20°: 30.5 Pounds

Force at 30°: 45.2 Pounds

Force at 40°: 51.8 Pounds

Return Angle: 7.1 Degrees

Test Date: 7/14/00

Test Program: Hybrid II Lumbar Flexion

Test Information: SID S/N: 056 Test I.D.: LF06C

KARC Engineering

KARCO Engineering

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

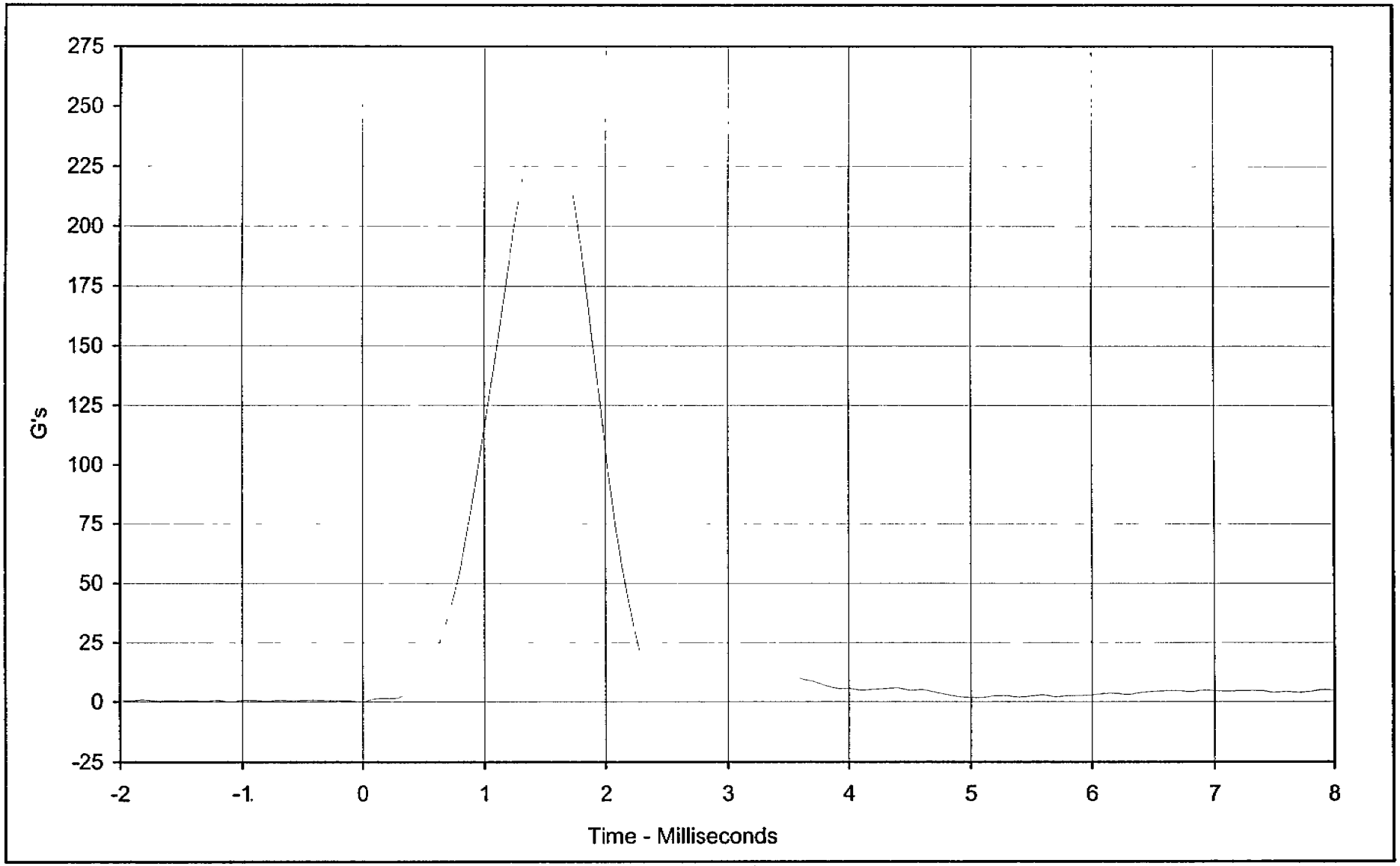
ATD Serial No.: 056 Part Serial No.: N/A Test I.D.: SH06C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	69	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	248.1	Pass
Peak Lateral Acceleration	G's	≤10.0	7.8	Pass
Time Above 100 G's	Msec.	0.9 to 1.5	1.1	Pass
Is Resultant Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician — July 16, 2000 Test Date

James E. Hall — 7/16/2000

Approved By — Date



Curve Description: Head Resultant Acceleration

Maximum Value: 248.1 at 1.5 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 1000

Date of Test: 7/16/00

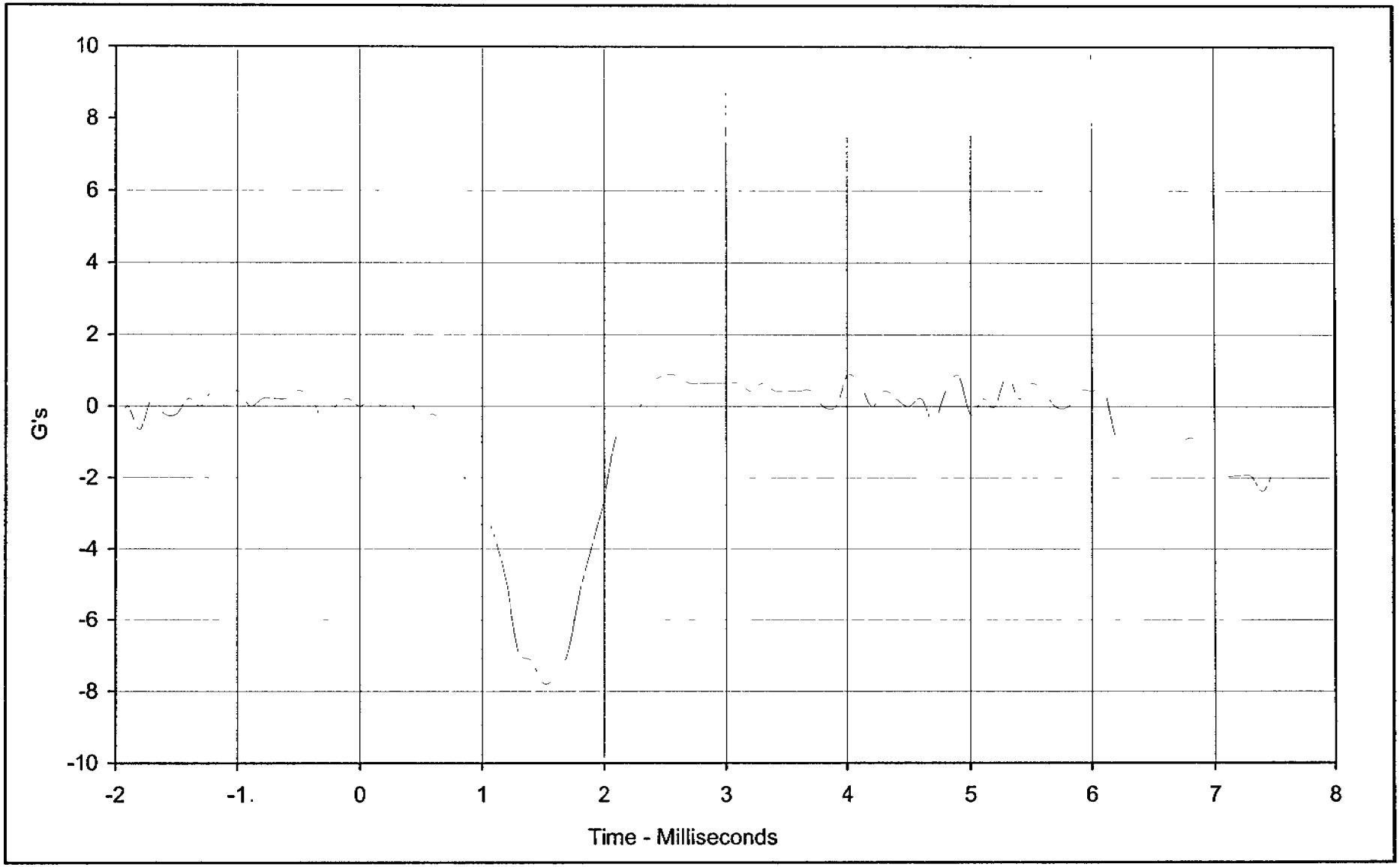
Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 056 Test I.D.: SH06C

KARCO Engineering

C-41

KAR20051-01



Curve Description: Head Y Axis Acceleration

Maximum Value: 0.9 at 2.5 Milliseconds

Minimum Value: -7.8 at 1.5 Milliseconds

SAE Filter Class: 1000

Date of Test: 7/16/00

Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 056 Test I.D.: SH06C

KARCO Engineering

KAR20051-01

Performance Verification Data
Side Impact Dummy (SID)
External Dimensions

ATD Serial No.: 057 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	20.6	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	507	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	521	Pass
KV- Knee Pivot From Floor	mm	490 to 505	498	Pass
HW- Hip Width	mm	356 to 391	375	Pass
		Overall Test Results		Pass

Laboratory Technician

July 16, 2000
Test Date

James E Hatt
Approved By

7/16/2000
Date

KARCO Engineering

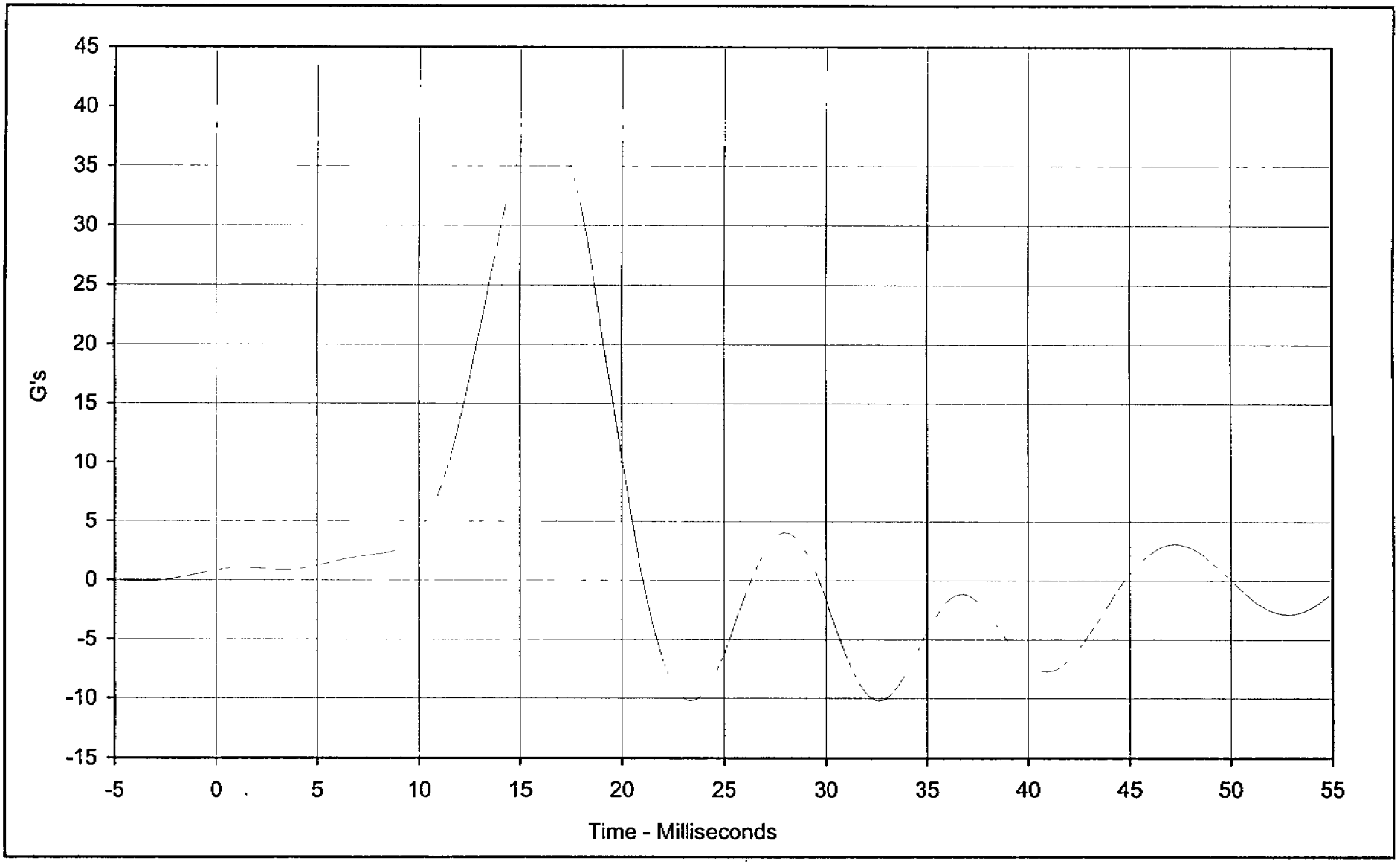
Performance Verification Data
Side Impact Dummy (SID)
Thorax Lateral Impact

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: TI03C

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	4.31	Pass
Left Upper Rib Acceleration	G's	37.0 to 46.0	39.3	Pass
Left Lower Rib Acceleration	G's	37.0 to 46.0	39.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	21.6	Pass
		Overall Test Results		Pass

Laboratory Technician — July 12, 2000 (Test Date)

James E. Hoett — Approved By — 7/12/2000 (Date)

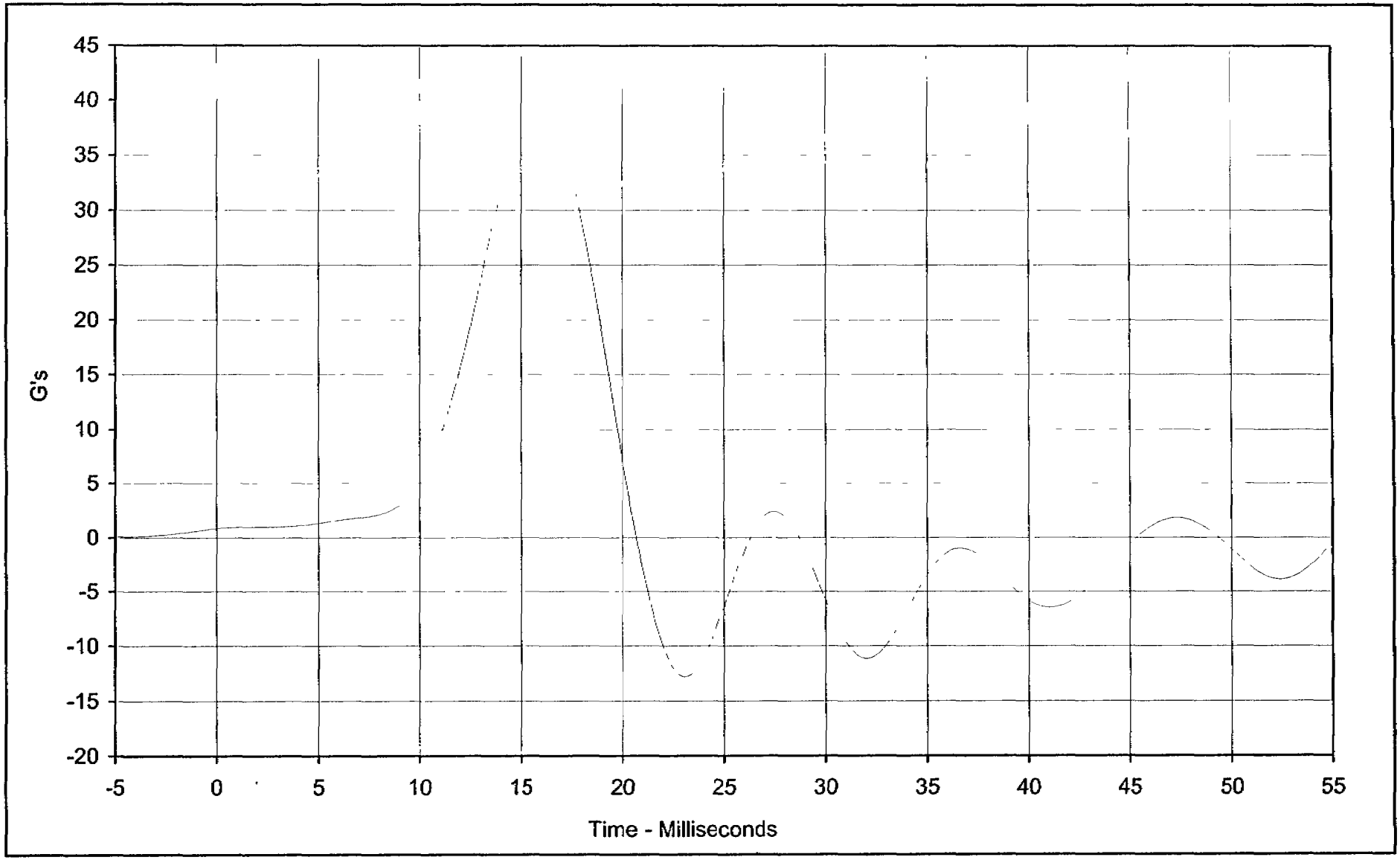


Curve Description:	Left Upper Rib Y Acceleration			
Maximum Value:	39.3	at	16.2	Milliseconds
Minimum Value:	-10.2	at	23.4	Milliseconds
SAE Filter Class:	FIR 100			
Date of Test:	7/12/00			

Test Program:	SID Thorax Lateral Impact Test
Test Information:	SID S/N: 057 Test I.D.: TI03C

KARCO Engineering

KAR20051-01



Curve Description: Left Lower Rib Y Acceleration

Maximum Value: 39.4 at 15.9 Milliseconds

Minimum Value: -12.8 at 23.1 Milliseconds

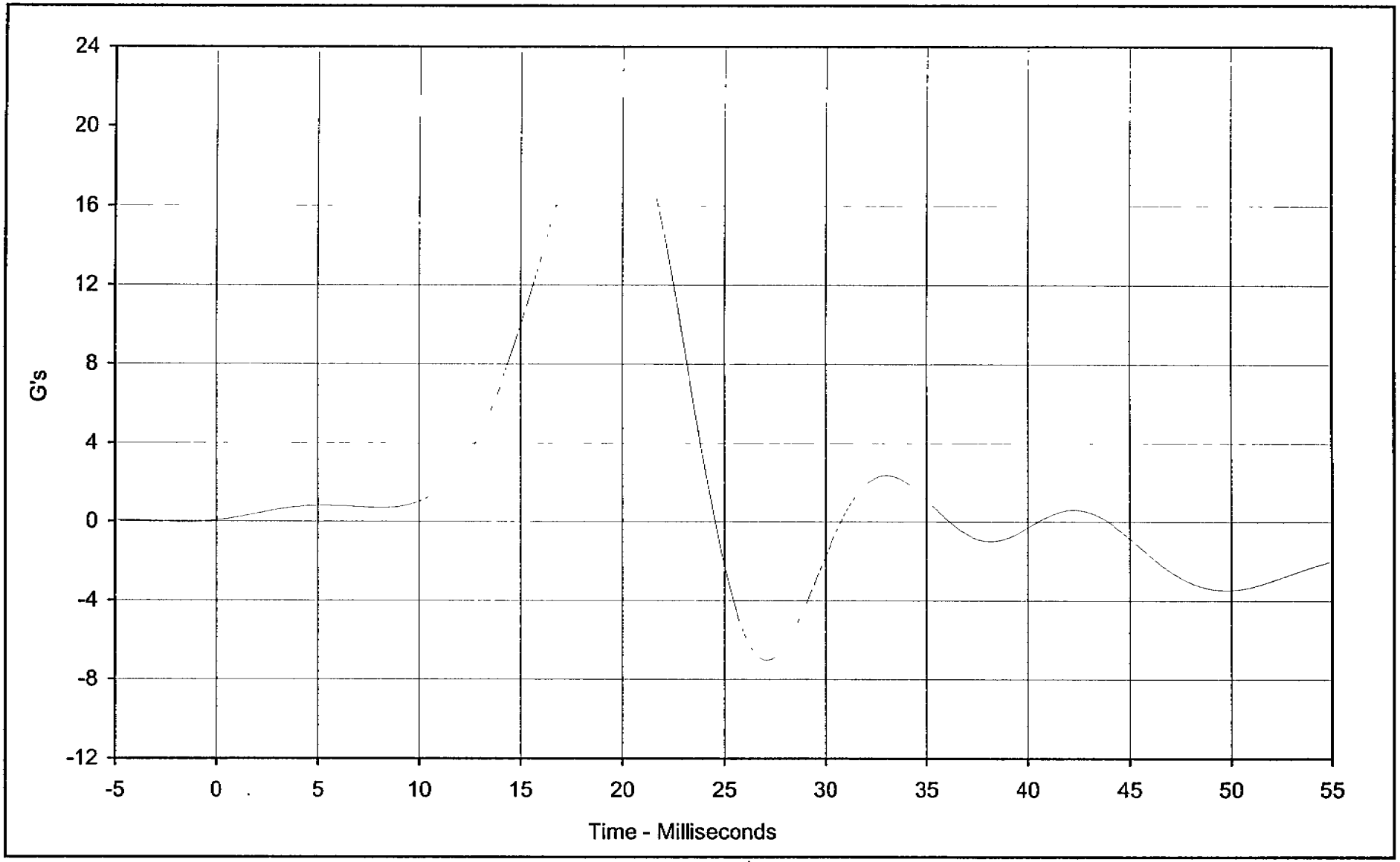
SAE Filter Class: FIR 100

Date of Test: 7/12/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 057 Test I.D.: TI03C

KARCO Engineering



Curve Description: Lower Spine Y Acceleration

Maximum Value: 21.6 at 19.5 Milliseconds

Minimum Value: -7.0 at 27.1 Milliseconds

SAE Filter Class: FIR 100

Date of Test: 7/12/00

Test Program: SID Thorax Lateral Impact Test

Test Information: SID S/N: 057 Test I.D.: TI03C

KARCO Engineering

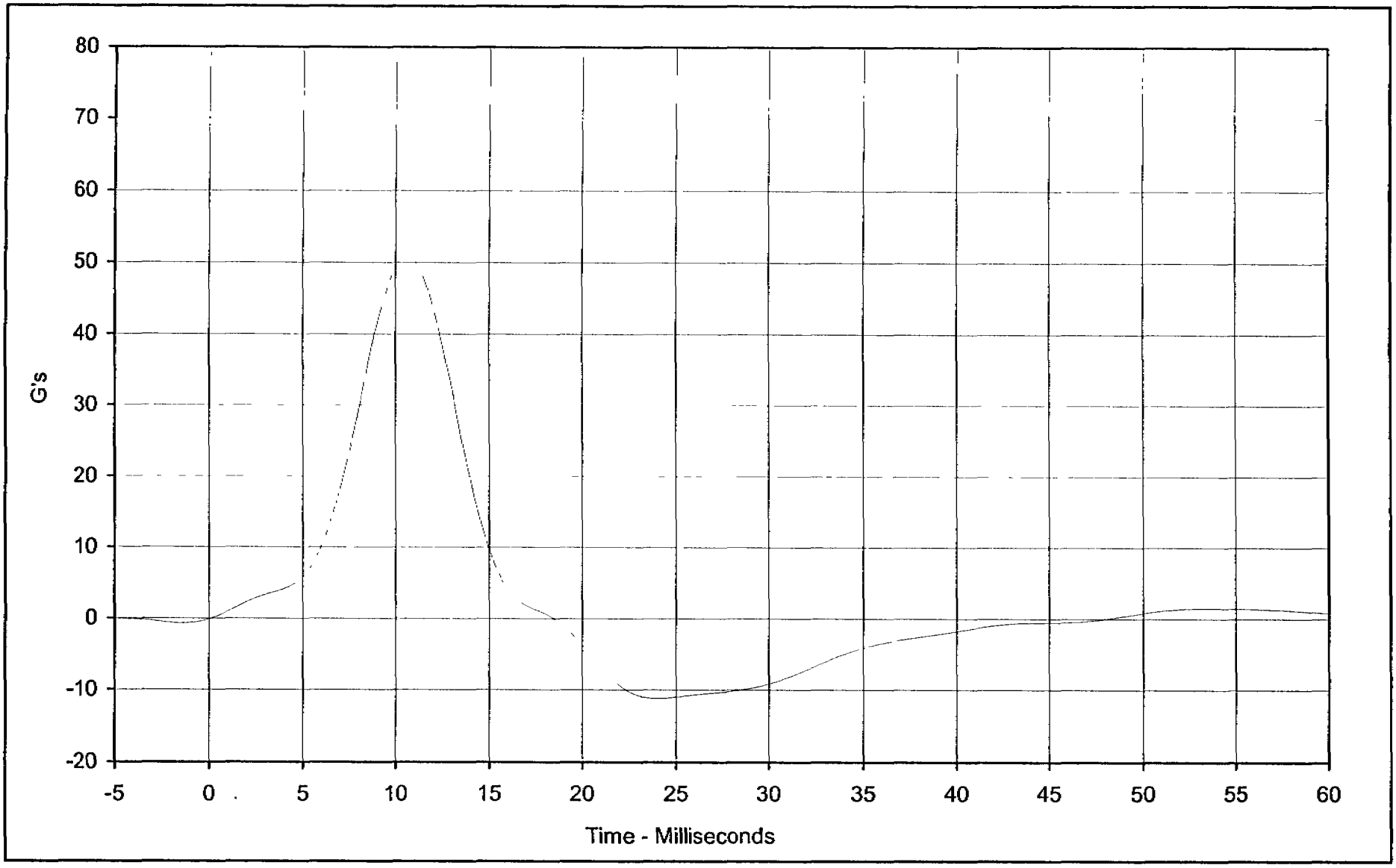
Performance Verification Data
Side Impact Dummy (SID)
Left Side Pelvis Lateral Impact

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: PI03C

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	50.9	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0 Msec.	6.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician — July 13, 2000 (Test Date)

James E. Hoth — 7/13/2000 (Approved By / Date)



Curve Description:	Pelvis Y Axis Acceleration			Test Program:	Left Side Pelvis Lateral Impact
Maximum Value:	50.9	at	10.6 Milliseconds	Test Information:	SID S/N: 057 Test I.D.: PI03C
Minimum Value:	-11.2	at	24.0 Milliseconds		
SAE Filter Class:	FIR 100				
Date of Test:	7/13/00				

KARCO Engineering

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

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: AB06C

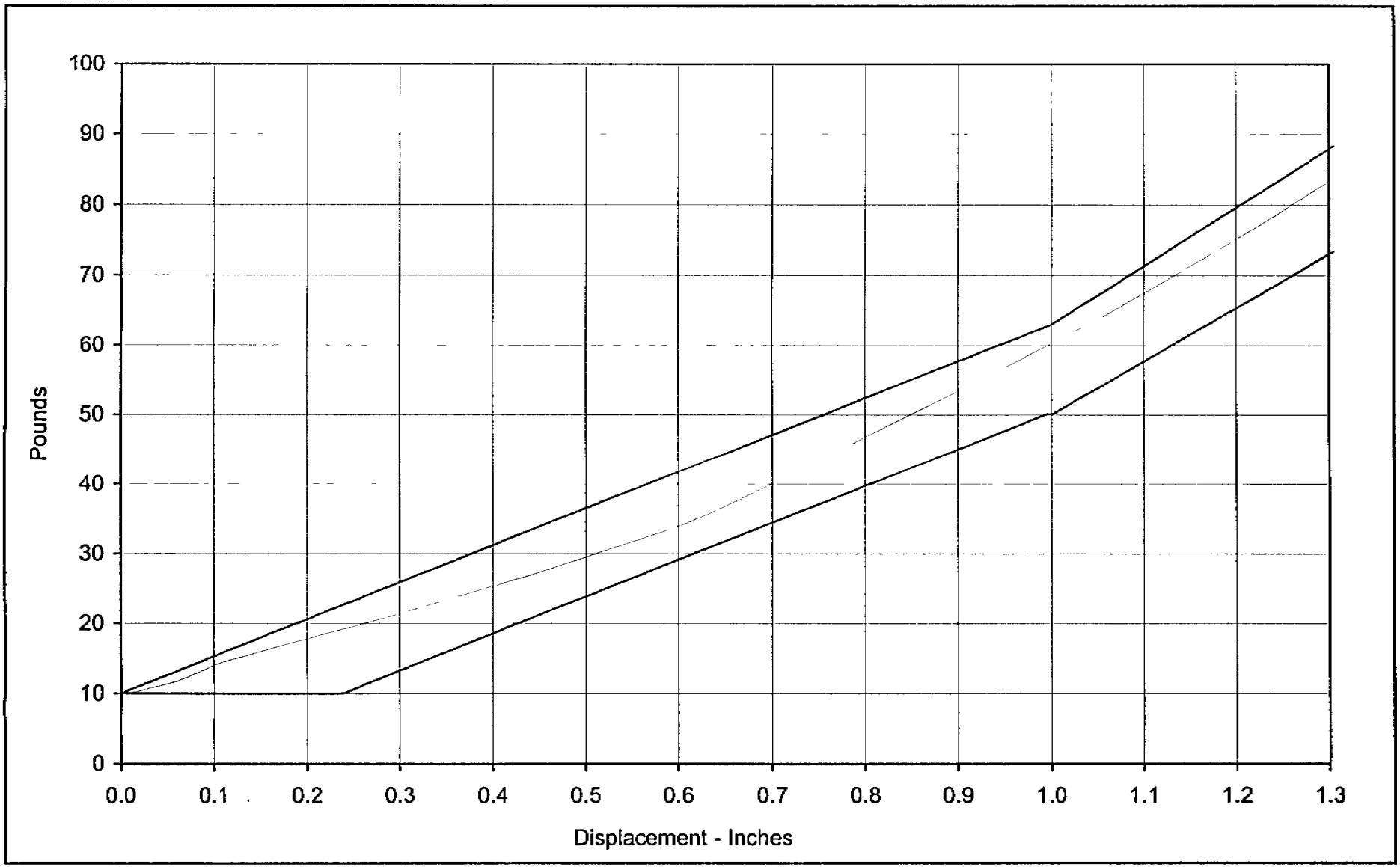
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force at 0.5 Inches of Displacement	Pounds	23.0 to 36.0	29.4	Pass
Force at 0.75 Inches of Displacement	Pounds	36.0 to 50.0	43.3	Pass
Force at 1.0 Inches of Displacement	Pounds	50.0 to 63.0	59.9	Pass
Force at 1.3 Inches of Displacement	Pounds	73.0 to 88.0	83.2	Pass
		Overall Test Results		Pass

Laboratory Technician

July 15, 2000
Test Date

James E. Hatt
Approved By

7/15/2000
Date



Curve Description: Abdomen Force vs. Displacement

Force at 0.5 In.: 29.4 Pounds

Force at 0.75 In.: 43.3 Pounds

Force at 1.0 In.: 59.9 Pounds

Force at 1.3 In.: 83.2 Pounds

Date of Test: 7/15/00

Test Program: Hybrid II Abdominal Compression

Test Information: SID S/N: 057 Test I.D.: AB06C

KARCO Engineering

KARCO Engineering

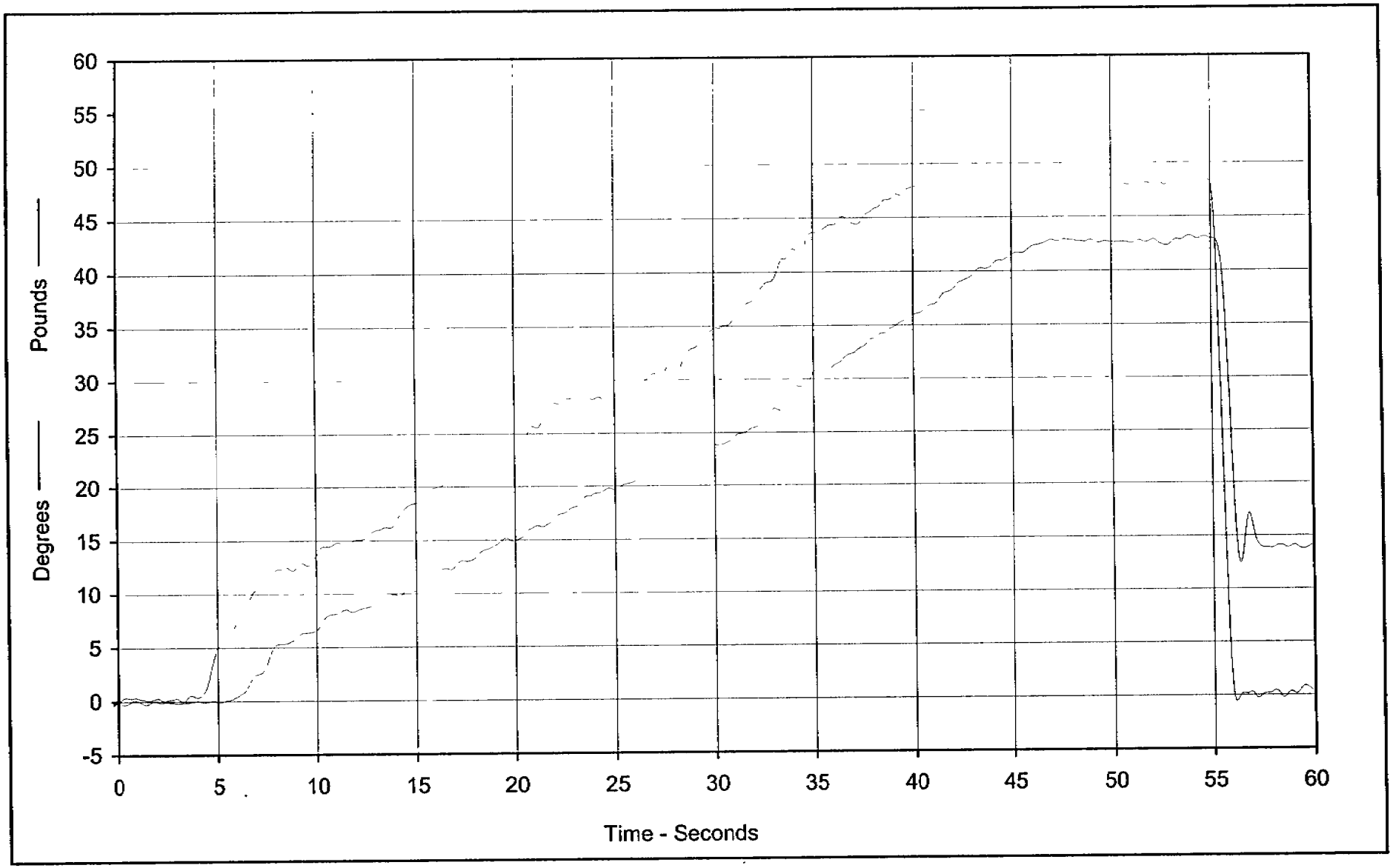
Performance Verification Data
Side Impact Dummy (SID)
Lumbar Flexion Test

ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: LF06D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	70	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Applied Force at 0° of Flexion	Pounds	0.0	0.0	Pass
Applied Force at 20° of Flexion	Pounds	22.0 to 34.0	28.7	Pass
Applied Force at 30° of Flexion	Pounds	34.0 to 46.0	43.5	Pass
Applied Force at 40° of Flexion	Pounds	46.0 to 58.0	52.4	Pass
Return Angle 3 Minutes After Release	Degrees	≤12.0	7.5	Pass
		Overall Test Results		Pass

Laboratory Technician — July 14, 2000 (Test Date)

James E. Scott — Approved By — 7/14/2000 (Date)



Curve Description: Applied Lumbar Force And Angle

Force at 20°: 28.7 Pounds

Force at 30°: 43.5 Pounds

Force at 40°: 52.4 Pounds

Return Angle: 7.5 Degrees

Test Date: 7/14/00

Test Program: Hybrid II Lumbar Flexion

Test Information: SID S/N: 057 Test I.D.: LF06D

KARCO Engineering

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

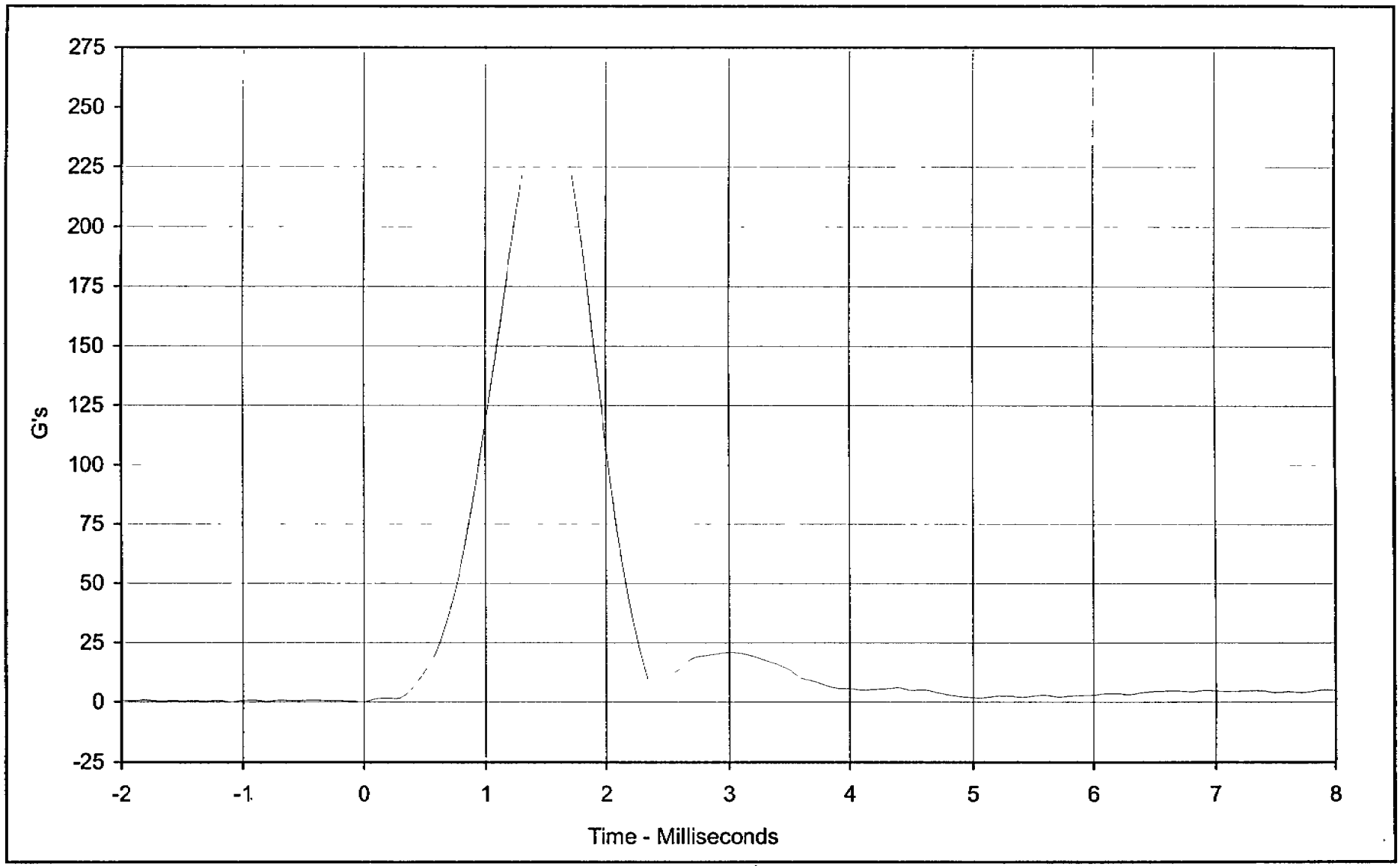
ATD Serial No.: 057 Part Serial No.: N/A Test I.D.: SH06D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°F	66 to 78	69	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	210.0 to 260.0	253.1	Pass
Peak Lateral Acceleration	G's	≤10.0	7.9	Pass
Time Above 100 G's	Msec.	0.9 to 1.5	1.1	Pass
Is Resultant Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician — July 16, 2000 Test Date

James E. Kath — 7/16/2000

Approved By — Date



Curve Description: Head Resultant Acceleration

Maximum Value: 253.1 at 1.5 Milliseconds

Minimum Value: 0.0 at 0.0 Milliseconds

SAE Filter Class: 1000

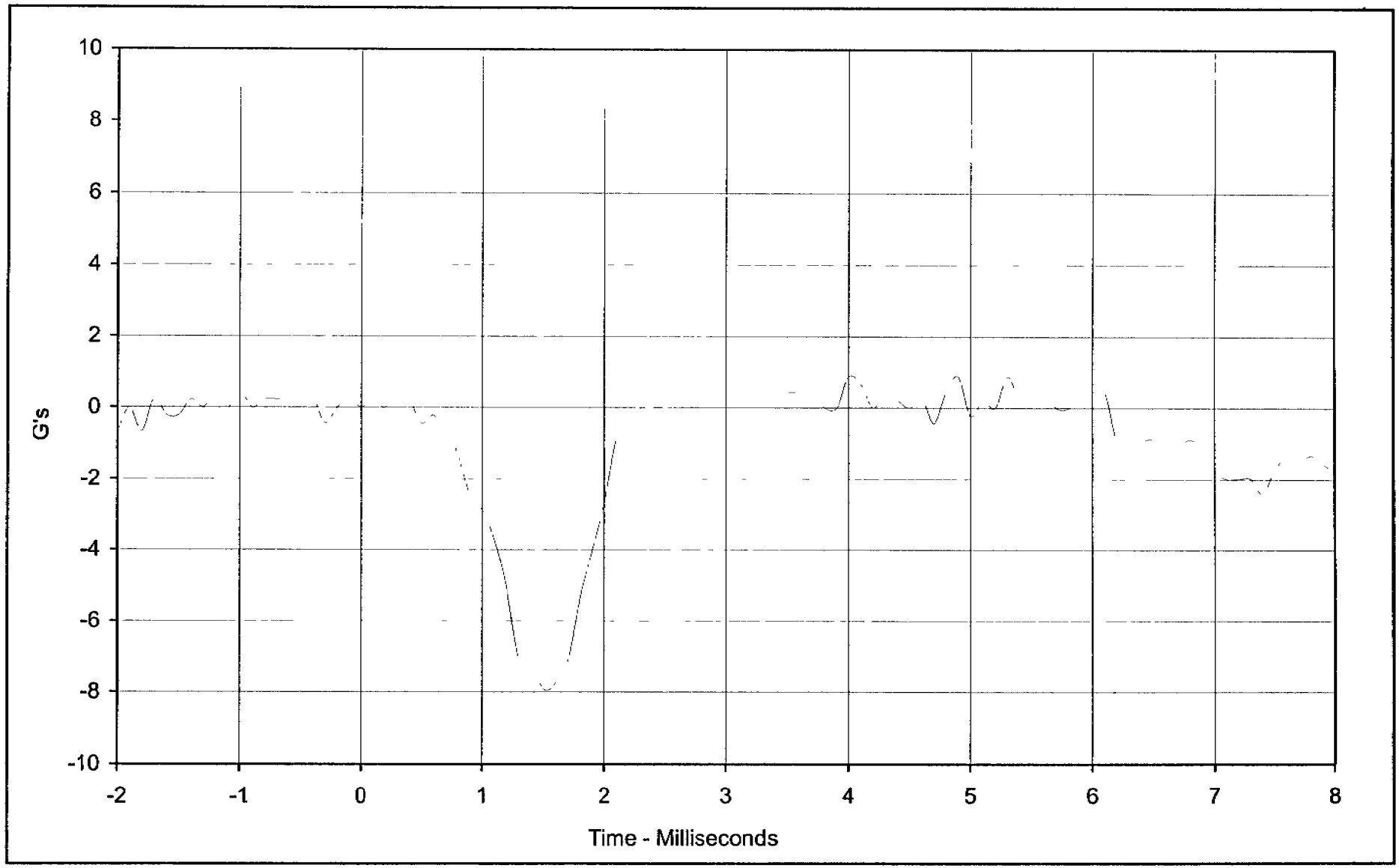
Date of Test: 7/16/00

Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 057 Test I.D.: SH06D

KARCO Engineering

KAR20051-01



Curve Description: Head Y Axis Acceleration

Maximum Value: 0.9 at 2.5 Milliseconds

Minimum Value: -7.9 at 1.5 Milliseconds

SAE Filter Class: 1000

Date of Test: 7/16/00

Test Program: Hybrid II Head Drop Calibration

Test Information: SID S/N: 057 Test I.D.: SH06D

KARCO Engineering

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 056
7/11/00
2000 Hyundai Sonata GLS 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	Head CG	X	KEAC070	Accel.,1/2 bridge	Endevco	7264-2000X	G
2	Head CG	Y	KEAC071	Accel.,1/2 bridge	Endevco	7264-2000Y	G
3	Head CG	Z	KEAC072	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. Grey	%
13	Pelvis Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Grey	%

55/28 km/h Sid Impact NCAP
Instrumentation Data Channel Assignm nts
Driver S.I.D. Serial Number 057
7/11/00
2000 Hyundai Sonata GLS 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
14	Head CG	X	KEAC039	Accel.,1/2 bridge	Endevco	7264-2000	G
15	Head CG	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
16	Head CG	Z	KEAC027	Accel.,1/2 bridge	Endevco	7264-2000	G
17	Upper Rib Primary	Y	KEAC031	Accel.,1/2 bridge	Endevco	7264-2000	G
18	Lower Rib, Primary	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
19	Lower Spine, Primary	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
20	Pelvis, Primary	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
21	Upper Rib Redundant	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
22	Lower Rib, Redundant	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
23	Lower Spine, Redundant	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
24	Pelvis, Redundant	Y	KEAC038	Accel.,1/2 bridge	Endevco	7264-2000	G
25	Thorax Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Grey	%
26	Pelvis Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Grey	%

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Vehicle Accelerometers
7/11/00
2000 Hyundai Sonata GLS 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	KEVA007	Accel., Vehicle block	I.C. Sensor	3031-500	G
37	Left Sill at Front Door	Y	KEVA005	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 Ocupant 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	3031-500	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 Strutcure	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 Sid Impact NCAP
Instrumentation Data Channel Assignments
Moving Deformable Barrier
7/11/00
2000 Hyundai Sonata GLS 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
53	MDB CG	X	ICST001X	Accel., Triax	I.C. Sensor	3031-500	G
54	MDB CG	Y	ICST001Y	Accel., Triax	I.C. Sensor	3031-500	G
55	MDB CG	Z	ICST001Z	Accel., Triax	I.C. Sensor	3031-500	G
56	MDB Rear Centerline	X	ICST002X	Accel., Triax	I.C. Sensor	3031-50	G
57	MDB Rear Centerline	Y	ICST002Y	Accel., Triax	I.C. Sensor	3031-50	G
58	Right Bumper Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Grey	%