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REPORT NO.: 214-MGA-2000-011
SAFETY COMPLIANCE TESTING FOR FMVSS NO. 214
"SIDE IMPACT PROTECTION"

General Motors Corporation
2000 Saturn SL2 4-Door
NHTSA NO: CY0112

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: March 1, 2000

Report Date: March 2, 2000

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY ASSURANCE
OFFICE OF VEHICLE SAFETY COMPLIANCE
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This Final Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-97-C-11033.

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Acceptance Date: 4/12/2000

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 214-MGA-2000-011	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Final Report of FMVSS No.214 Compliance Side Impact Protection Testing of a 2000 Saturn SL2 4-Door NHTSA No. CY0112		5. Report Date March 2, 2000 6. Performing Organization Code MGA
7. Author(s) Gary Strassburg		8. Performing Organization Report No. MGA-DOT-214-011
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No. 11. Contract or Grant No. DTNH22-97-C-11033
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh St., S.W., Room 6115 Washington, D.C. 20590		13. Type of Report and Period Covered Final Test Report March 1, 2000 - March 2, 2000 14. Sponsoring Agency Code NSA-30
15. Supplementary Notes		

16. Abstract

A 48/24 kph 90° Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject 2000 Saturn SL2 4-Door in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP- 214D-05 for the determination of FMVSS No. 214 Side Impact Protection compliance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on March 1, 2000.

The impact velocity of the Moving Deformable Barrier (MDB) was 52.3 kph, and the ambient temperature at the struck side of the target vehicle at the time of impact was 22°C. The target vehicle post test maximum crush was 256 mm at level 2. The test vehicle's performance follows:

	DRIVER.	LEFT REAR PASS.
Left Upper Rib (LUR) Accel., g	52	65
Left Lower Rib (LLR) Accel., g	65	71
Lower Spine (T_{12}) Accel., g	73	67
Thoracic Trauma Index (TTI)	69	69
Pelvis (PEV) Accel., g	91	90

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words	18. Distribution Statement
Compliance Testing Side Impact Protection FMVSS 214 Side Impact Dummy (SID)	Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, Room 5108 (NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590 Telephone No. 202-366-4946

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	287	

Form DOT F 1700.7 (8-69)

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SECTION 1
PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY 2000 FMVSS 214 Side Impact Protection Compliance Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-97-C-11033. The purpose of this test was to evaluate side impact protection of a 2000 Saturn SL2 4-Door.

This side impact test was conducted in accordance with the Office of Vehicle Safety Compliance's FMVSS 214 test procedure (TP-214D-05, dated August 2, 1999).

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2
SUMMARY OF SIDE IMPACT TEST

A 2000 Saturn SL2 4-Door was impacted on the left 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 52.3 kph (32.5 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on March 1, 2000. Pre- and post-test photographs of the test vehicle, the MDB and the side impact dummies (SIDs) are included in Appendix A.

Two Side Impact Dummies (SIDs) were placed in the left front and left rear designated seating positions according to instructions specified in the OVSC Side Impact Laboratory Test Procedure which is dated August 2, 1999. The side impact event was documented by nine high speed cameras. Camera locations and other pertinent camera information can be found in this report.

The SIDs were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T_{12}) uniaxial accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

Appendix B contains the vehicle and dummy response data traces. A summary of the side impact dummy (SID) configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report.

The following table summarizes the results of the FMVSS 214 Left Side Impact test:

Injury Criteria	Front SID	Rear SID
TTI (g)	69	69
Pelvis (g)	91	90

TEST NOTES

1. The following accelerometers were not used for this test:

   Left Front Door on Centerline
   Midrear of Left Front Door
   Left Front Door Upper Centerline
   Midrear of Left Rear Door
   Left Rear Door Upper Centerline
   Left Mid B-Pillar
   Left Rear Seat Track

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

DATA SHEET NO. 1

GENERAL VEHICLE TEST PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 VIN: 1G8ZJ5270YZ106526

Vehicle Body Color: Blue Build Date: 8-99

Engine Data: 4 Cylinders; ___ CID; 1.9 Liter; ___cc

Placement __ Longitudinal; X Lateral

Transmission: 5 speed; X Manual; ___ Automatic; ___ Overdrive

Final Drive: ___ Rear Wheel Drive; X Frt. Wheel Drive; __ Four Wheel Drive

Odometer Reading 247 miles

Options: X A/C; X Pwr. Steering; X Pwr. Brakes; __ Pwr. Windows;

__Cruise Control; X Tilt Wheel; ___Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 Psi FRONT

26 Psi REAR

Recommended Tire Size: P185/65R15

Tires on Test Vehicle: P185/65R15 Manufacturer: Firestone

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; _ 3rd Seat 5 Total

Type of Front Seats: X Bucket; ___ Bench; ___ Split Bench

Type of Front Seat Back: __ Fixed; X Adjustable with X Lever __Knob __Power

Vehicle Maximum Capacity Loading = 384.6 kg (A)

No. of Occupants x 68.04 kg. = 340.2 kg (B)

Cargo Capacity (A-B) = 44.4 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front =	334.8	kg	Right Rear =	216.4	kg
Left Front =	328.0	kg	Left Rear =	219.5	kg
TOTAL FRONT =	662.8	kg	TOTAL REAR =	435.9	kg
% of Total Weight =	60.3	%	% of Total Weight =	39.7	%
TOTAL WEIGHT =	1098.7	kg			

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	= 1098.7	kg
Cargo Carrying Capacity of Test Vehicle*	= 44.4	kg
Weight of 2 Side Impact Dummies (2 x 80.7 kg.)	= 161.4	kg
TEST VEHICLE TARGET WEIGHT	= 1304.5	kg

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO: (FULLY LOADED)

Right Front =	339.3	kg	Right Rear =	274.0	kg
Left Front =	377.8	kg	Left Rear =	313.4	kg
TOTAL FRONT =	717.1	kg	TOTAL REAR =	587.4	kg
% of Total Weight =	55.0	%	% of Total Weight =	45.0	%
TOTAL WEIGHT =	1304.5	kg			

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 663 mm Left Front 667 mm Right Rear 671 mm Left Rear 662 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 660 mm Left Front 650 mm Right Rear 646 mm Left Rear 624 mm

TEST ATTITUDE:

Right Front 655 mm Left Front 651 mm Right Rear 646 mm Left Rear 629 mm

* light trucks and MPVs RCW is 136.1 kgs or manufacturer's value, whichever is less

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2604 mm

C.G. As Tested = 1135 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 3949 mm

Centerline = 4538 mm

Left Side = 3950 mm

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 210 mm

Test Position: 11 th position rearward of full forward

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 2nd position back from full forward

REAR POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: NA

Seat Back Adjustment Position: NA

ADJUSTABLE STEERING COLUMN POSITION: Mid

WINDOW POSITIONS: Left Front Closed Left Rear Closed

Right Front Open Right Rear Open

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel system usable capacity = 47.3 liters

Test Volume: 44.0 liters 93.0 % of capacity

LOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase: = 2604 mm

Impact Point is 362 mm rearward of front axle centerline

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

Overall Length = 4538 mm; Overall Width = 1677 mm

TEST WEIGHT:

Right Front =	349.7	kg	Right Rear =	267.6	kg
Left Front =	381.9	kg	Left Rear =	297.6	kg
TOTAL FRONT =	731.6	kg	TOTAL REAR =	565.2	kg
% of Total Weight =	56.4	%	% of Total Weight =	43.6	%
TOTAL WEIGHT =	1296.8	kg			

Wheelbase = 2604 mm

Longitudinal C.G. from Center of Front Axle = 1135 mm

Impact Angle with Respect to Impactor = 0 ° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (261 mm above ground) = 138 mm
2. LEVEL 2 (452 mm above ground) = 256 mm
3. LEVEL 3 (575 mm above ground) = 247 mm
4. LEVEL 4 (825 mm above ground) = 212 mm
5. LEVEL 5 (1265 mm above ground) = 45 mm

Maximum Post-Test Intrusion = 256 mm

OCCUPANTS:	Driver	Left Rear Passenger
Type of Dummy	SID	SID
Restraints Used	type II belt with frontal airbag	type II belt

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)

INSTRUMENTATION:

Number of Vehicle Data Channels:		= 19
Number of Cameras:	Onboard Vehicle	= 3
	Offboard Vehicle	= 4
	Deformable Barrier	= 2
	TOTAL	= 9

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	= 1252 mm
Overall Length of MDB (incl. honeycomb impact face)	= 4115 mm
Wheelbase of Framework Carriage	= 2591 mm
Tread of Framework Carriage (Front & Rear)	= 1880 mm
C.G. Location Rearward of Front Axle	= 1100 mm
C.G. Location From Center Line	= -10 mm
C.G. Location Above Ground Level	= 477 mm

MDB WEIGHT:

Left Front	= 458.8 kg	Left Rear	= 230.3 kg
Right Front	= 324.4 kg	Right Rear	= 350.6 kg
TOTAL FRONT = 783.2 kg		TOTAL REAR = 580.9 kg	

TOTAL MDB WEIGHT = 1364.1 kg

Impact Angle (MDB C/L to Target Vehicle C/L) = 90° degrees

Impact Speed = Primary: 32.54 mph (52.4 kph) Secondary: 32.44 mph (52.2 kph)

CRASH TEST SUMMARY FOR SIDE IMPACTOR (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Top of Stack (813 mm) = 100 mm
2. Row B Mid Stack (686 mm) = 56 mm
3. Row C Top of Bumper (533 mm) = 71 mm
4. Row D Center of Bumper (432 mm) = 72 mm

INSTRUMENTATION:

Number of MDB Data Channels = 7

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	LEFT REAR SID
Head	to shoulder & headrest	to C-Post
Arm	to door panel	to door panel
Pelvis	to arm rest	to arm rest
Left Knee	to door panel	to door panel
Right Knee	to left knee	to left knee

DOOR OPENING:

	LEFT SIDE	RIGHT SIDE
Front	Remained closed	Remained closed
Rear	Remained closed	Remained closed

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 6 mm rearward Vertical: 2 mm above

ARM REST LOCATIONS:

Front: 235 mm from bottom of window

Rear: 250 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 106 mm Front Seat Cushion: 123 mm

Left Rear Seat Back: 24 mm Rear Seat Cushion: 157 mm

GLAZING DAMAGE:

Left side windows broke, windshield cracked

PILLAR PERFORMANCE:

No failure

SILL SEPARATION:

None

FRONTAL AIRBAGS:

Driver Deployed: Yes Passenger Deployed: Yes

OTHER NOTABLE IMPACT EFFECTS:

None

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA

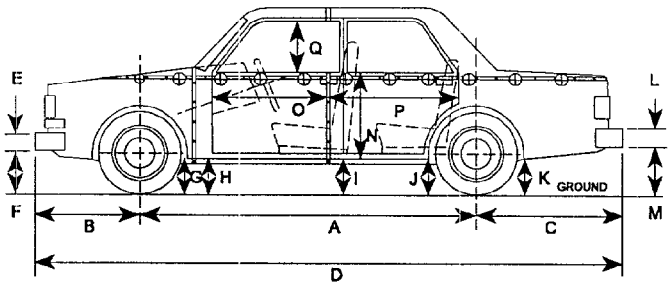
Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

	Driver SID ID #048				Left Passenger SID ID # 049			
	Pos. Direct.		Neg. Direct		Pos. Direct.		Neg. Direct	
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
RIB ACCELERATIONS								
Left Upper Rib Y	52.1	33	-15.0	75	65.3	41	-7.4	91
Left Upper Rib Redundant Y (R)	52.7	33	-14.3	76	64.7	41	-7.5	91
Left Lower Rib Y	64.9	33	-14.0	74	70.6	40	-22.6	68
Left Lower Rib Redundant Y (R)	65.5	32	-15.1	74	73.8	40	-20.2	68
SPINE ACCELERATIONS								
Lower Lateral Y	73.4	38	-24.6	64	67.1	42	-24.1	72
Lower Lateral Redundant Y (R)	74.1	38	-23.8	64	65.2	42	-23.8	72
PELVIS ACCELERATIONS								
Lateral Y	90.6	30	-11.8	55	90.0	35	-6.4	198
Lateral Redundant Y (R)	91.7	30	-11.3	78	91.3	35	-6.6	198

REFERENCE: Positive Direction- Longitudinal (X) = forward
Lateral (Y) = to right
Vertical (Z) = down

DATA SHEET NO. 6
VEHICLE PRE AND POST-TEST MEASUREMENTS



LEFT SIDE VIEW

D = Length at Centerline
R = Right Side Length
S = Left Side Length
T = Width at B Post
J1 = To Pinch Weld
J2 = To Sill

E & L = Bumper Thickness

ALL MEASUREMENTS IN (mm)

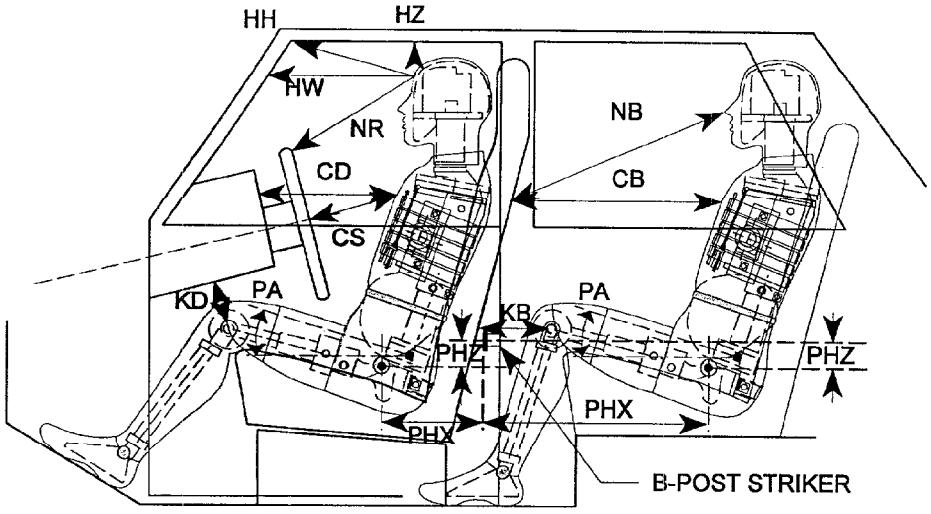
	PRE-TEST	POST-TEST	Δ CHANGE
A	2604	2586	18
B	1016	994	22
C	918	903	15
D	4538	4483	55
E	161	161	0
F	353	365	-12
G	181	204	-23
H	180	221	-41
I	167	196	-29
J1/J2	165/159	166/168	-1/-9
K	177	186	-9
L	170	170	0
M	370	371	-1
N	470	477	-7
O	712	717	-5
P	1107	1057	50
Q	463	450	13
R	3949	3940	9
S	3950	3906	44
T	1677	1447	230

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

NHTSA NO.: CY0112 Test Date: March 1, 2000



NOTE: All dimensions are in mm with tolerance of ± 3 mm

	DRIVER ID #048
HH	354
HW	642
HZ	192
NR	413
CD	489
CS	328
KDL (KDA°)	234 (0.0°)
KDR (KDA°)	214 (12.5°)
PA°	24.4°
PHX	166
PHZ	179

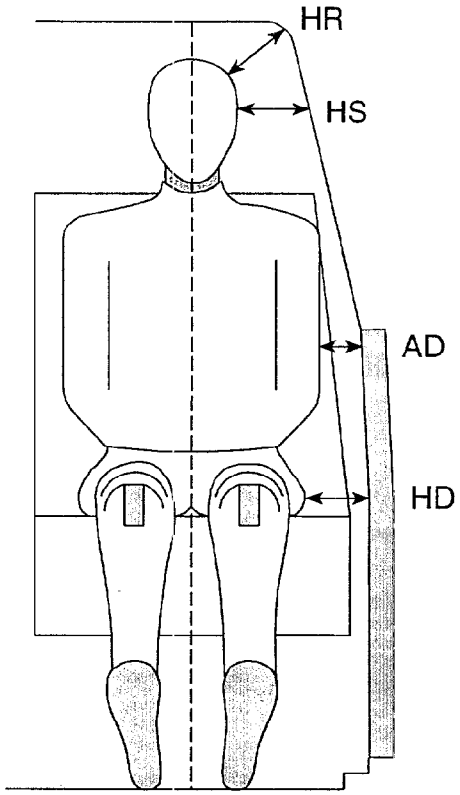
	REAR PASSENGER SID ID # 049
HZ	181
NB	550
CB	478
KBL (KBA)	175 (0.0°)
KBR (KBA)	168 (0.0°)
PA°	24.9°
PHX	278
PHZ	385

NOTE: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as reference point.

DATA SHEET NO. 8
SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

NHTSA NO.: CY0112 Test Date: March 1, 2000



NOTE: All dimensions are in mm

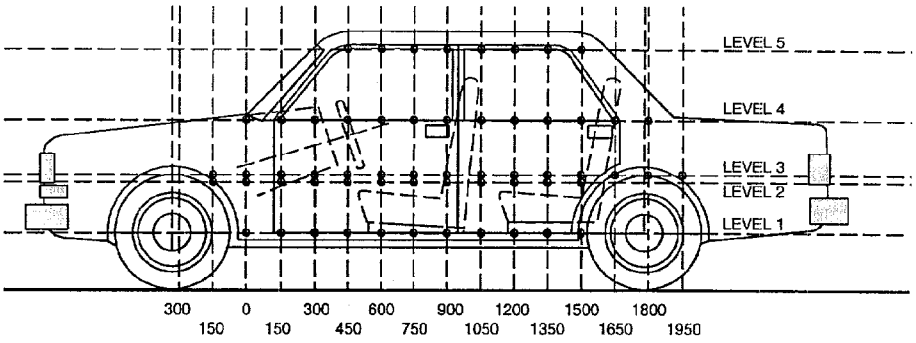
	DRIVER ID #048	REAR PASSENGER ID # 049
HR	190	204
HS	326	335
AD	83	109
HD	136	146

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

NHTSA NO.: CY0112 Test Date: March 1, 2000



LEFT SIDE VIEW

NOTE: All measurements are in millimeters (mm)

LEVEL 5 - WINDOW TOP
LEVEL 4 - WINDOW SILL
LEVEL 3 - MID-DOOR
LEVEL 2 - OCCUPANT H-POINT
LEVEL 1 - SILL TOP HEIGHT

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION

MEASUREMENTS ALONG THE VERTICAL 750 mm. LINE SHOWN ABOVE

Level 1 @ Sill Top Height	= 261	mm
Level 2 @ Occupant H-Point	= 452	mm
Level 3 @ Mid Door	= 575	mm
Level 4 @ Window Sill	= 825	mm
Level 5 @ Window Top	= 1265	mm

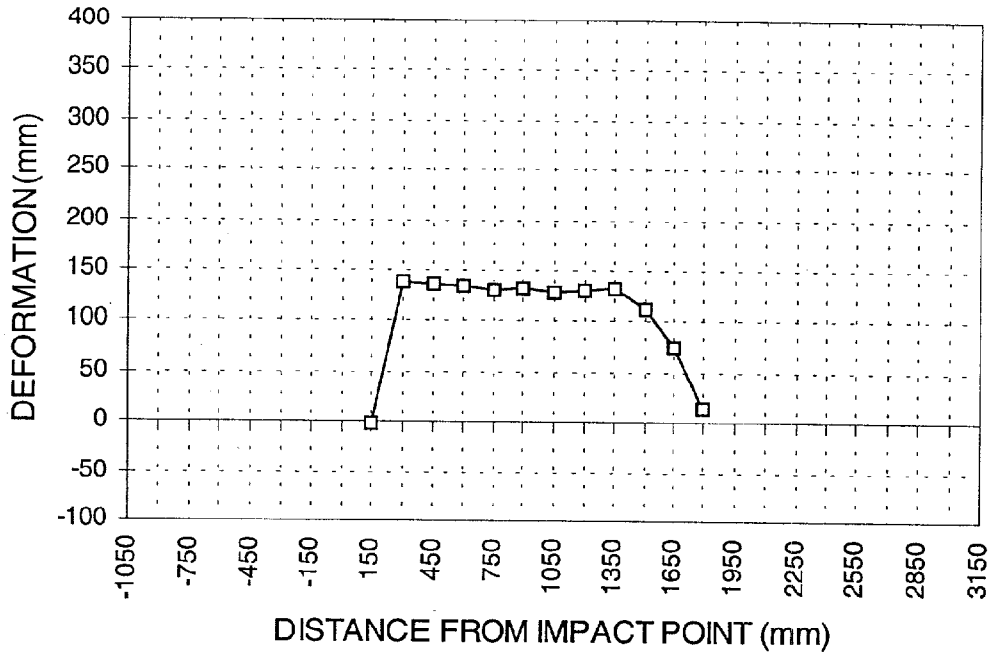
DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 - Sill Top Height		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150	686	684	-2
300	687	825	138
450	688	824	136
600	689	823	134
750	690	821	131
900	690	822	132
1050	690	818	128
1200	691	821	130
1350	691	824	133
1500	691	803	112
1650	690	765	75
1800	694	708	14
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



LEVEL 1 - SILL TOP HEIGHT

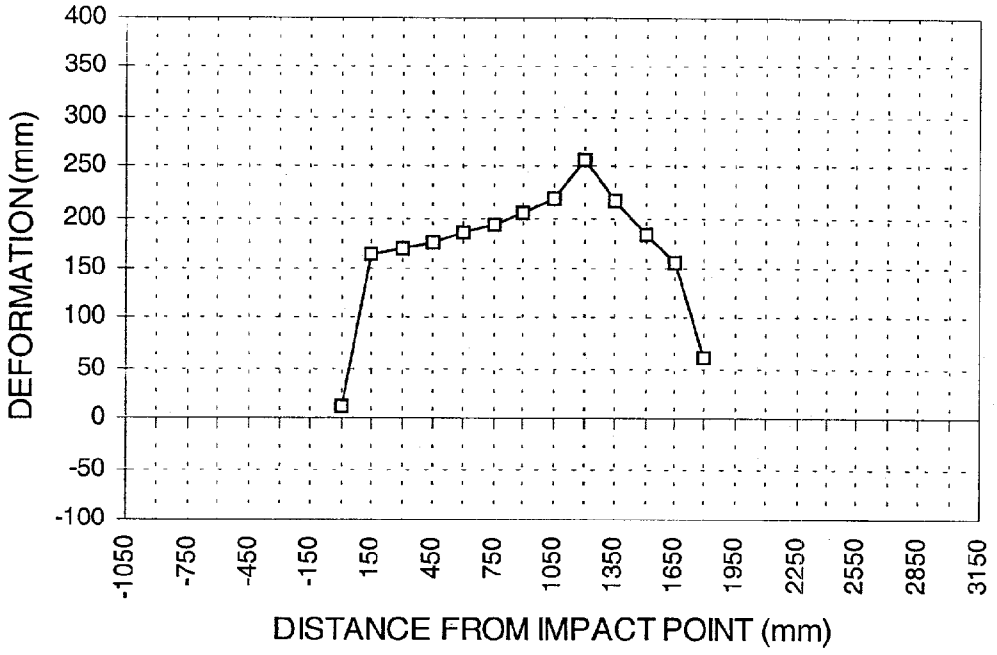
DATA SHEET NO. 10 (Cont'd)

VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 - Occupant H Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	634	647	13
150	634	798	164
300	632	802	170
450	631	807	176
600	630	815	185
750	629	823	194
900	629	834	205
1050	629	847	218
1200	631	887	256
1350	629	845	216
1500	628	812	184
1650	627	783	156
1800	627	689	62
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



LEVEL 2 - OCCUPANT H-POINT

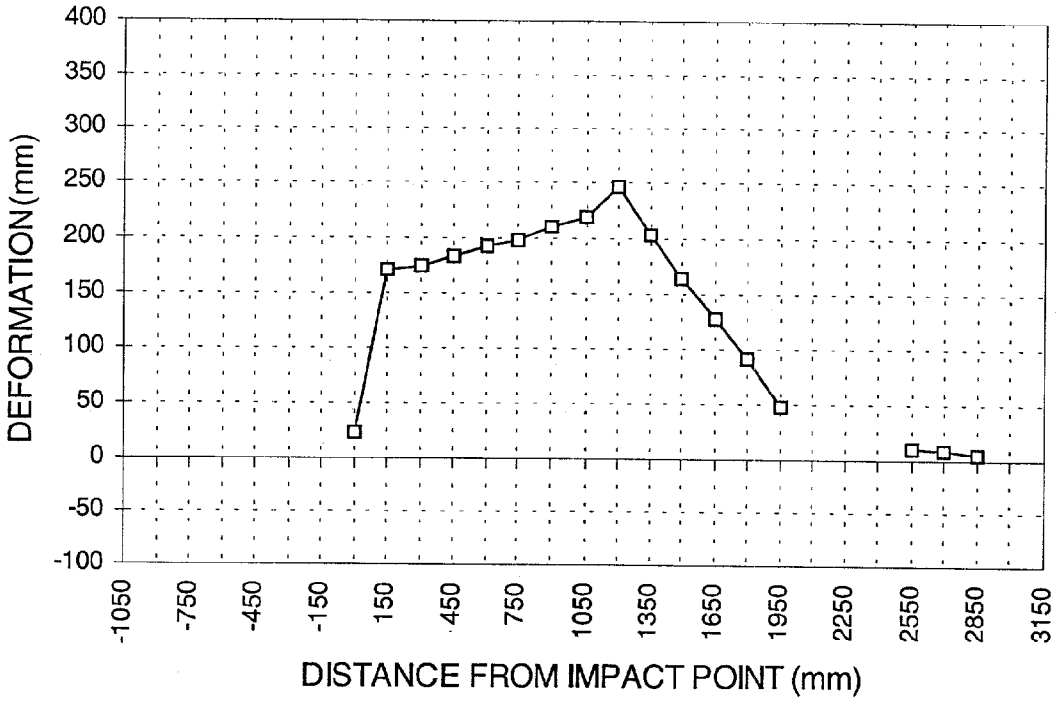
DATA SHEET NO. 10 (Cont'd)

VEHICLE EXTERIOR CRUSH PROFILES

	Level 3 - Mid Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	628	650	22
150	627	797	170
300	627	802	175
450	625	809	184
600	625	817	192
750	627	824	197
900	626	836	210
1050	628	848	220
1200	630	877	247
1350	630	833	203
1500	630	794	164
1650	629	757	128
1800	627	718	91
1950	626	674	48
2100			
2250			
2400			
2550	651	662	11
2700	668	677	9
2850	692	697	5
3000			

Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



LEVEL 3 - MID DOOR

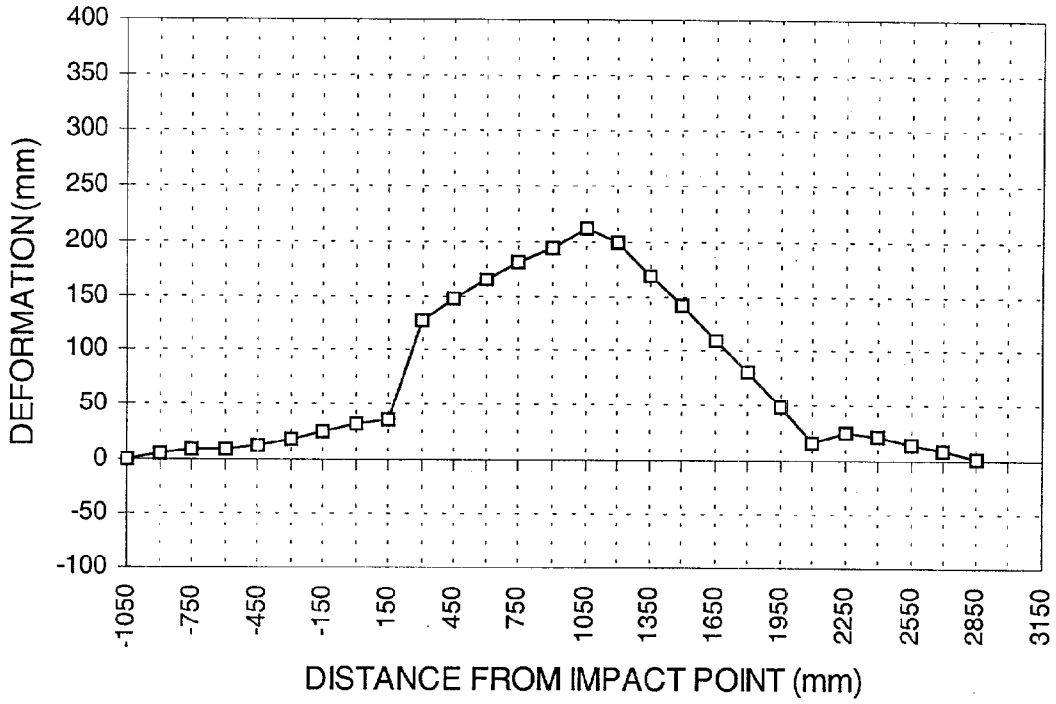
DATA SHEET NO. 10 (Cont'd)

VEHICLE EXTERIOR CRUSH PROFILES

	Level 4 - Window Sill		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050	784	784	0
-900	745	749	4
-750	720	728	8
-600	702	711	9
-450	686	698	12
-300	678	696	18
-150	672	697	25
0 (impact point)	668	700	32
150	668	703	35
300	665	793	128
450	663	810	147
600	664	830	166
750	665	847	182
900	668	862	194
1050	670	882	212
1200	670	870	200
1350	675	844	169
1500	676	817	141
1650	681	791	110
1800	685	765	80
1950	688	736	48
2100	691	707	16
2250	703	728	25
2400	713	734	21
2550	730	743	13
2700	750	758	8
2850	776	777	1
3000			

Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



LEVEL 4 - WINDOW SILL

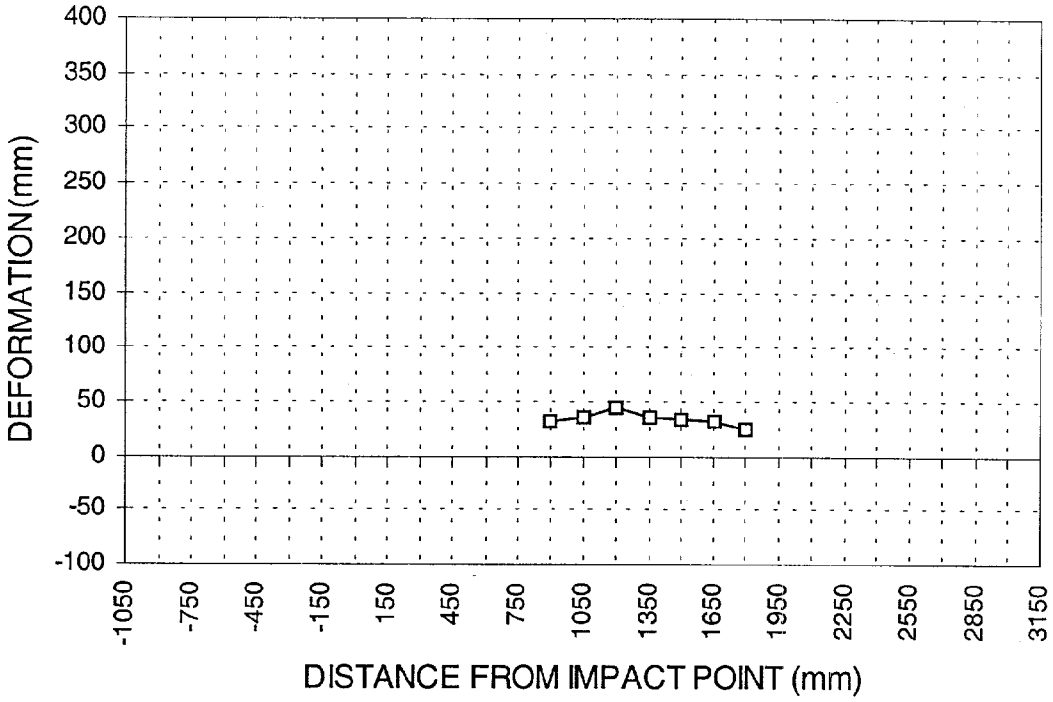
DATA SHEET NO. 10 (Cont'd)

VEHICLE EXTERIOR CRUSH PROFILES

	Level 5 - Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750			
900	919	951	32
1050	922	958	36
1200	924	969	45
1350	923	959	36
1500	922	955	33
1650	919	950	31
1800	921	946	25
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



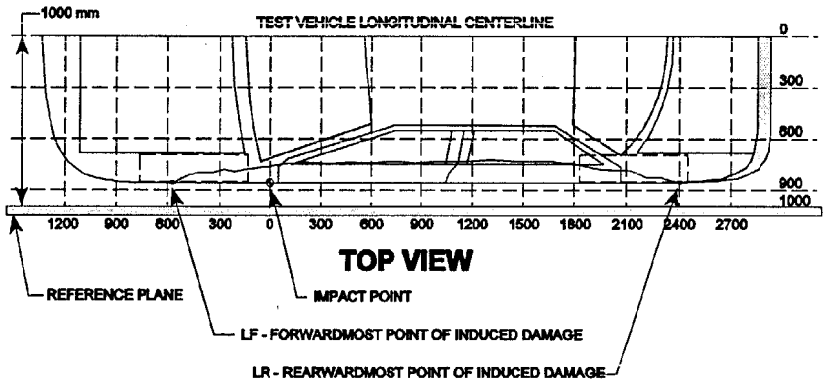
LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

NHTSA NO.: CY0112 Test Date: March 1, 2000



MEASUREMENT CONVENTIONS:

Forward of the impact point (towards front of vehicle) is considered negative (—).

Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1. (LR = 2850 mm)	777	776	1
2. 2062 mm	714	689	25
3. 1293 mm	863	630	233
4. 490 mm	824	688	136
5. -269 mm	698	677	21
6. (LF = -1050 mm)	784	784	0

DATA SHEET NO. 12

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

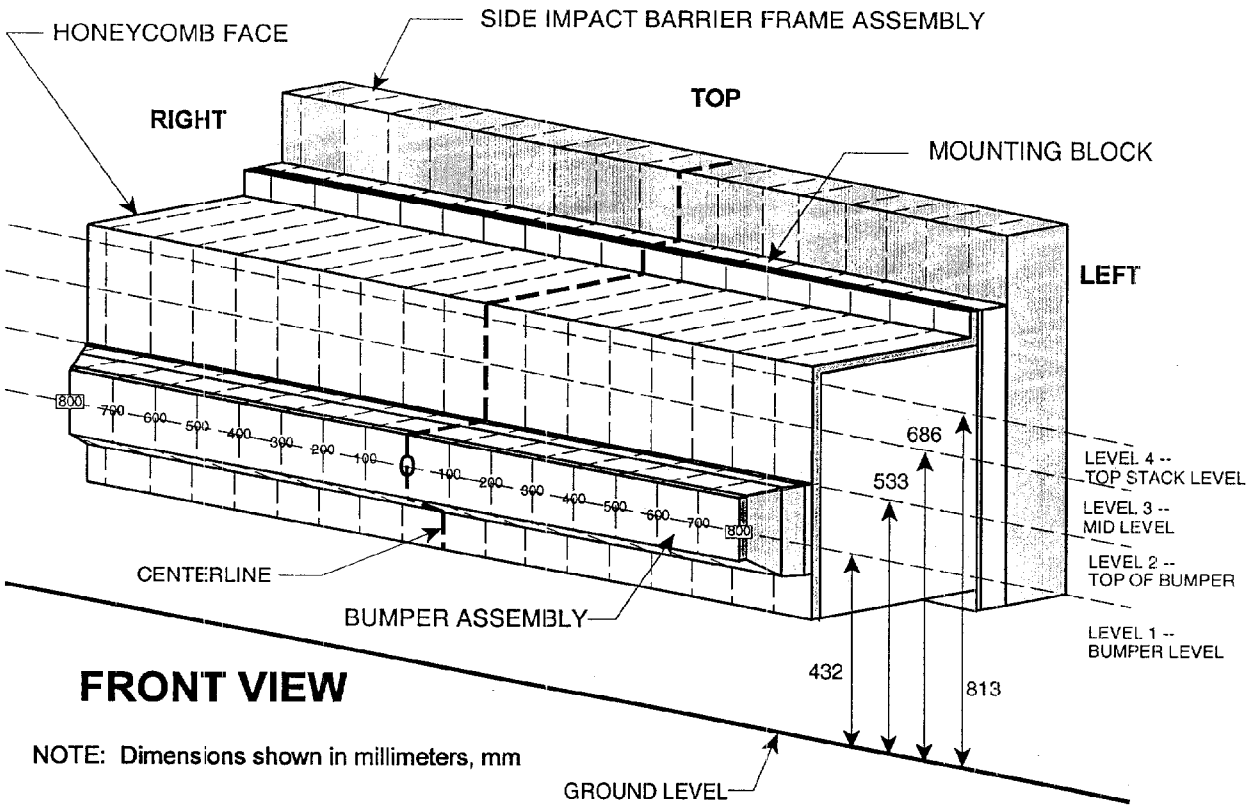
Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

		Distance Right of Center (mm)									Distance Left of Center (mm)							
Location	Height at CL*	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
Top Stack Level 4	813 mm	53	18	5	-1	1	1	3	3	4	6	7	6	8	15	37	71	100
Mid Level Level 3	686 mm	56	17	5	5	6	6	8	9	7	6	5	6	8	9	11	48	56
Top Bumper Level 2	533 mm	71	35	27	21	16	15	17	15	17	17	18	19	20	20	22	30	39
Mid Bumper Level 1	432 mm	72	57	44	34	30	33	27	26	25	26	26	27	28	29	34	56	65

* See next page for Barrier Face Graphic

DATA SHEET NO. 12 (Cont'd)



FRONT VIEW

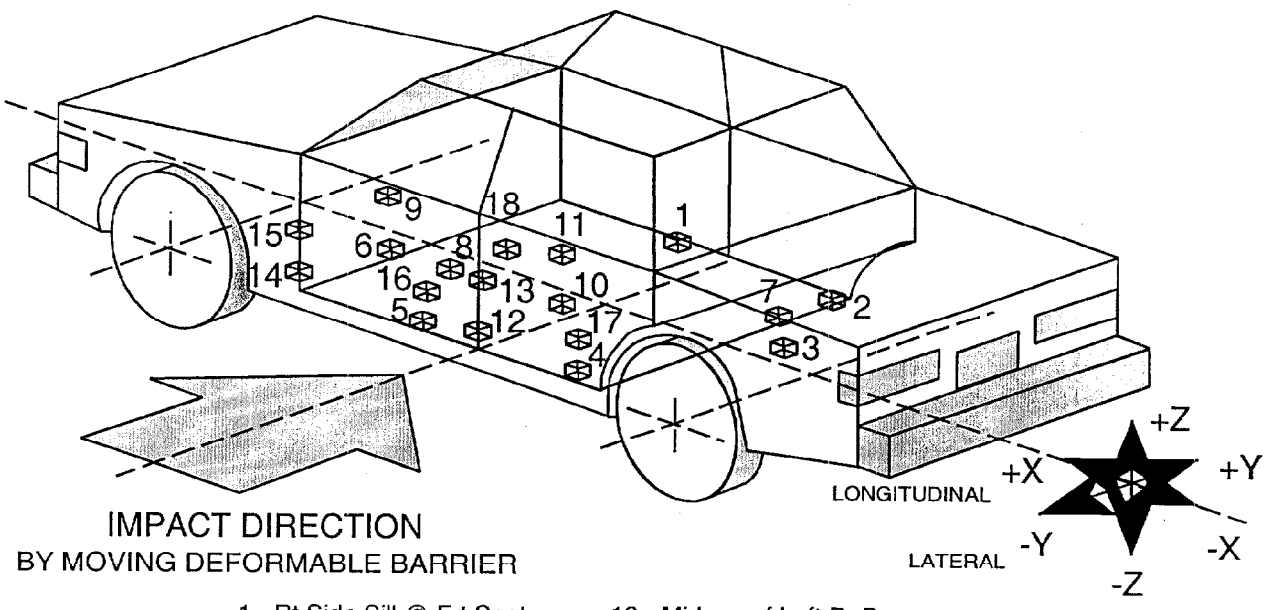
NOTE: Dimensions shown in millimeters, mm

DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000



1 - Rt Side Sill @ Frt Seat
2 - Rt Side Sill @ Rr Seat
3 - Rr Floorpan Above Axle
4 - Left Side Sill @ Rr Seat
5 - Left Side Sill @ Frt Seat
6 - Left Frt Door on Centerline
7 - Rt Rr Occ Compartment
8 - Midrear of Left Frt Door
9 - Left Frt Door Upr C/Line
10 - Midrear of Left Rr Door
11 - Left Rr Door Upr C/Line
12 - Left Lwr B-Post
13 - Left Middle B-Post
14 - Left Lwr A-Post
15 - Left Middle A-Post
16 - Frt Seat Track
17 - Rr Seat Track
18 - Vehicle C.G.

DATA SHEET NO. 13 (Cont'd)

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

Accel. No.	Description	Coordinates (mm)*			Long. (X) Maximums (g's)		Lat. (Y) Maximums (g's)		Vert. (Z) Maximums (g's)		Resultant (g's)
		X	Y	Z	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Max.
1	Right Side Sill @ Front Seat	2452	638	205	3.9	-7.7	27.1	-3.0	6.3	-8.3	28.2
2	Right Side Sill @ Rear Seat	1327	638	206	5.4	-8.5	23.8	-3.6	5.2	-9.7	25.9
3	Rear Floorpan Above Axle	962	0	425	2.0	-6.3	20.8	-2.5	8.3	-6.1	21.1
4	Left Side Sill @ Rear Seat	1356	-638	209	---	---	39.4	-7.1	---	---	---
5	Left Side Sill @ Front Seat	2475	-638	204	---	---	67.8	-24.1	---	---	---
7	Right Rear Occupant Compartment	1648	394	315	---	---	20.8	-2.9	---	---	---
12	Left Lower B-Post	1934	-645	212	---	---	68.0	-20.0	---	---	---
14	Left Lower A-Post	2990	-642	310	---	---	69.6	-17.9	---	---	---
15	Left Mid A-Post	3013	-710	870	---	---	55.7	-3.8	---	---	---
16	Driver Seat Track	2017	-616	223	---	---	69.0	-41.8	---	---	---
18	Vehicle CG	2403	0	394	3.6	-8.5	26.4	-3.1	10.9	-9.9	27.9

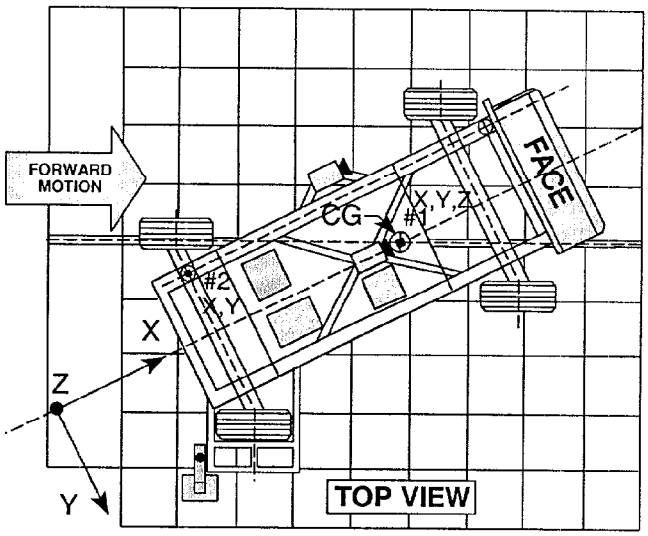
*Reference: X - Rear Bumper (+ Forward)
Y - Vehicle Centerline (+ To right)
Z - Ground Level (+ Up)

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000



Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.5	182	-17.4	38
	Lateral (Y)	---	---	---	2.6	58	-8.2	34
	Vertical (Z)	---	---	---	18.5	53	-21.4	27
	Resultant (R)	---	---	---	26.5	27	---	---
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X)	---	---	---	1.8	189	-21.2	31
	Lateral (Y)	---	---	---	5.4	34	-1.9	188

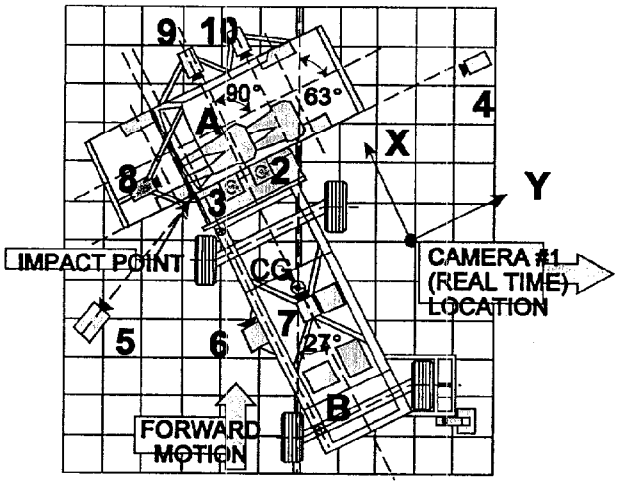
*Reference: X - Front Axle (+ Forward)
Y - Vehicle Centerline (+ To right)
Z - Ground Level (+ Up)

DATA SHEET NO. 15

HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000



Camera No.	View	Coordinates (mm)*			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Real Time				10	24
2	Top Overall	-170	1250	5000	8	1036
3	Top Impact	-250	90	5000	13	1000
4	Rear Impact	-17	-500	1850	25	1000
5	Left Impact	-1000	-2310	1750	13	1031
6	Cart Impact				13	1015
7	Cart Wide				35	1010
8	Hood				13	1005
9	Onboard Front Occupant				7.5	1000
10	Onboard Rear Occupant				13	1005

* Reference: (from impact point)
+X = Forward
+Y = To Right
+Z = Upward from floor level

DATA SHEET 16

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

TEST REQUIREMENTS:

Drain the test vehicle's fuel system and operate the engine until the fuel system is dry. Add Stoddard solvent, which has been dyed purple, until 92-94% of the stated usable capacity is reached. Operate the engine to assure the Stoddard solvent is present throughout the entire fuel system.

TEST VEHICLE IMPACT TYPE: X Left Side Impact MDB 32.5 mph (52.3 kph)

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0 oz	1 oz
2. For 5 minute period after vehicle motion ceases	0 oz	5 oz
3. For next 25 minutes	0 oz	1 oz./1 min

FUEL SPILLAGE LOCATION(S): None

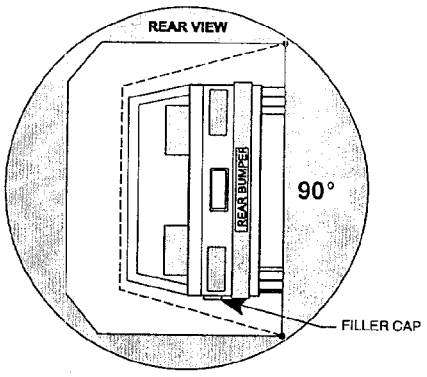
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 47 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 47 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

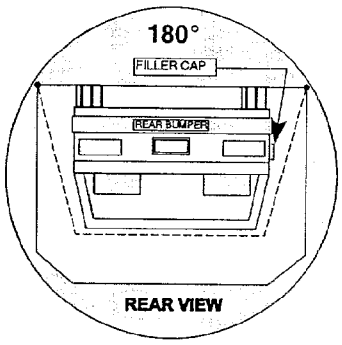
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 26 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 26 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

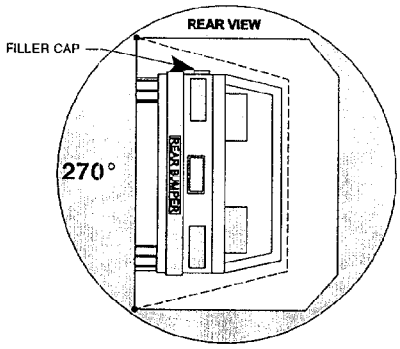
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 2000/Saturn/SL2/4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 23 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 23 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

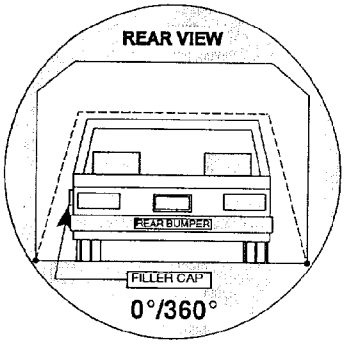
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 2000 Saturn SL2 4-Door

Vehicle NHTSA No.: CY0112 Test Date: March 1, 2000

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 36 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 36 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

APPENDIX A - PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

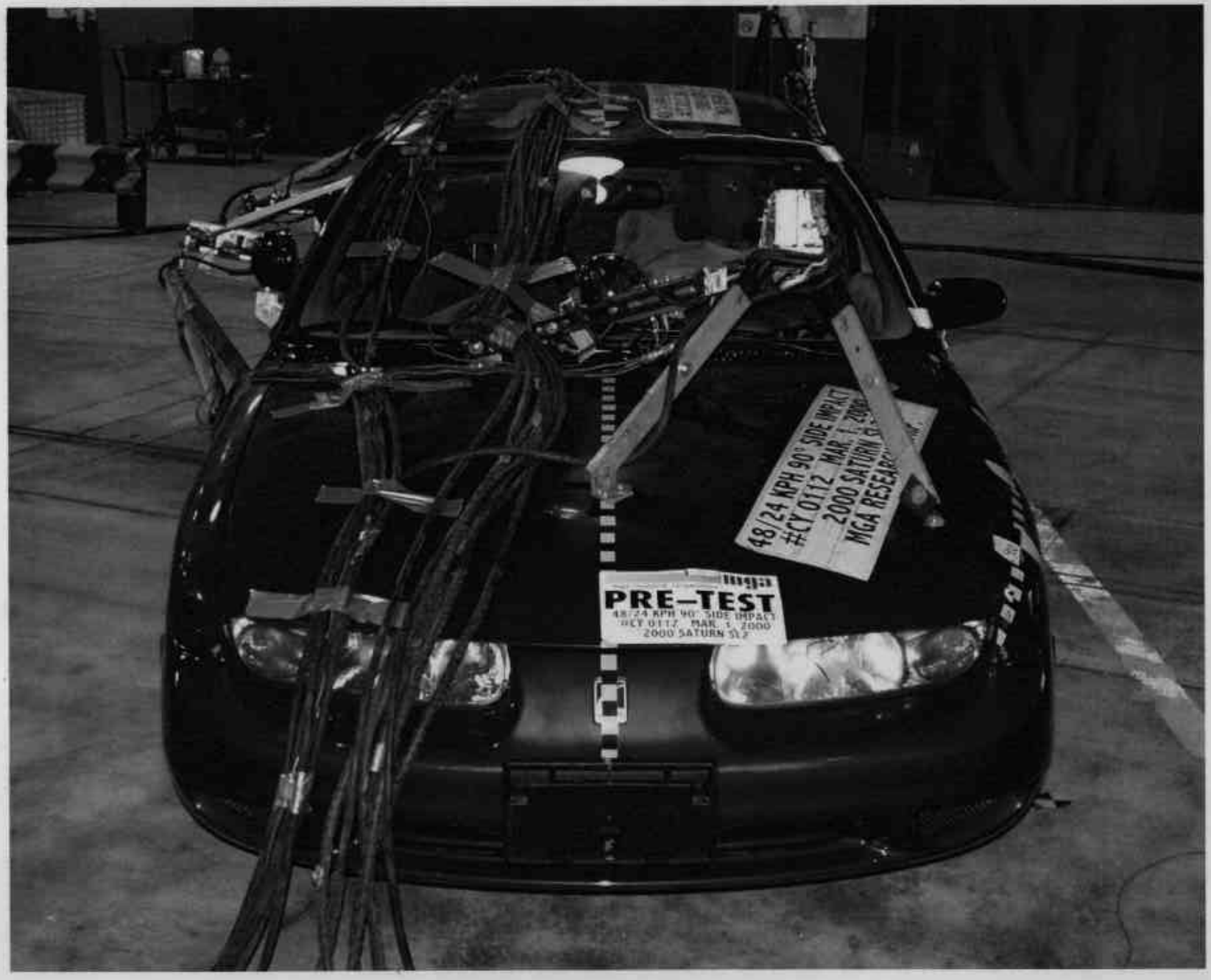


Photo No. A-1 - Pre-Test Front View of Test Vehicle

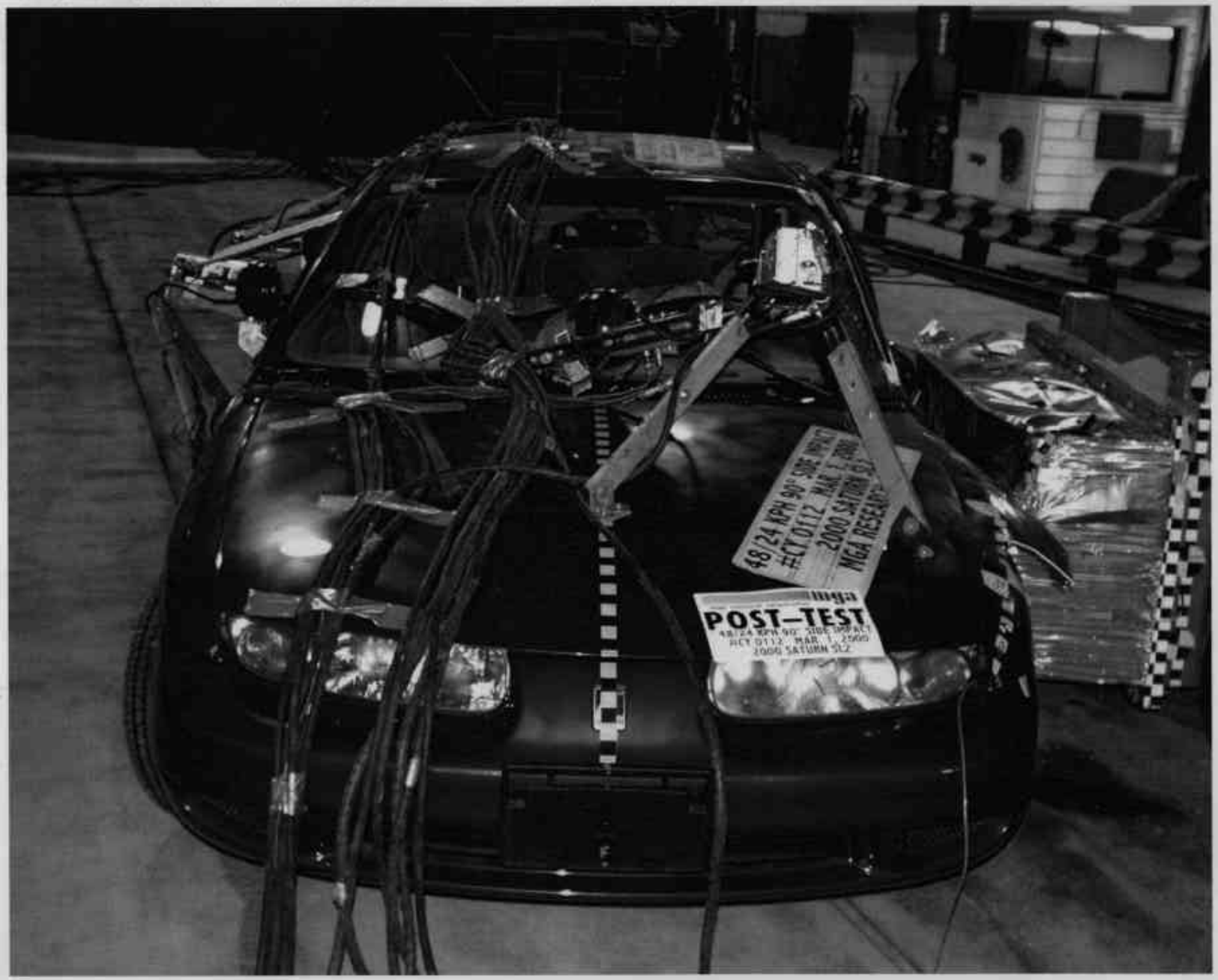


Photo No. A-2 - Post-Test Front View of Test Vehicle

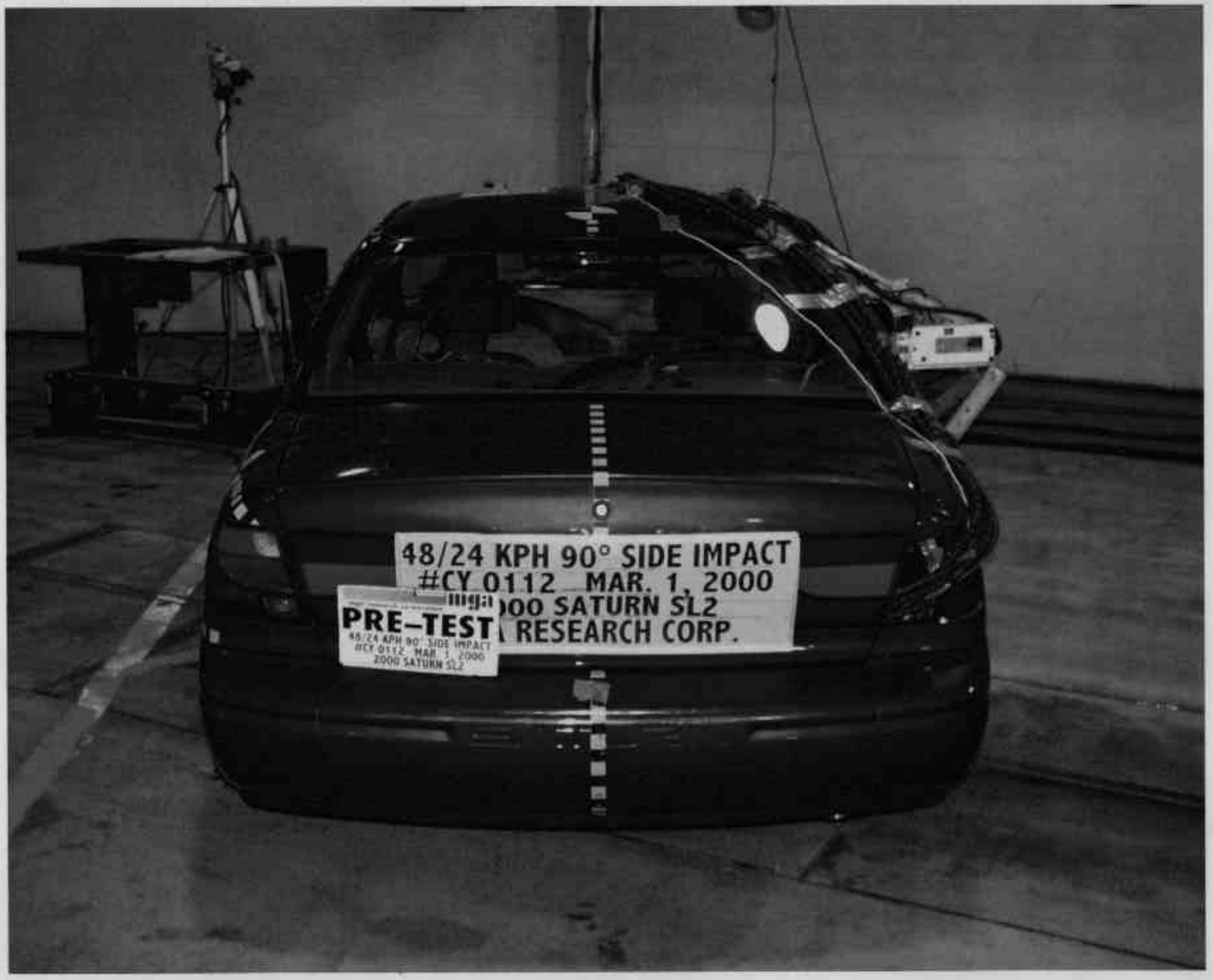


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

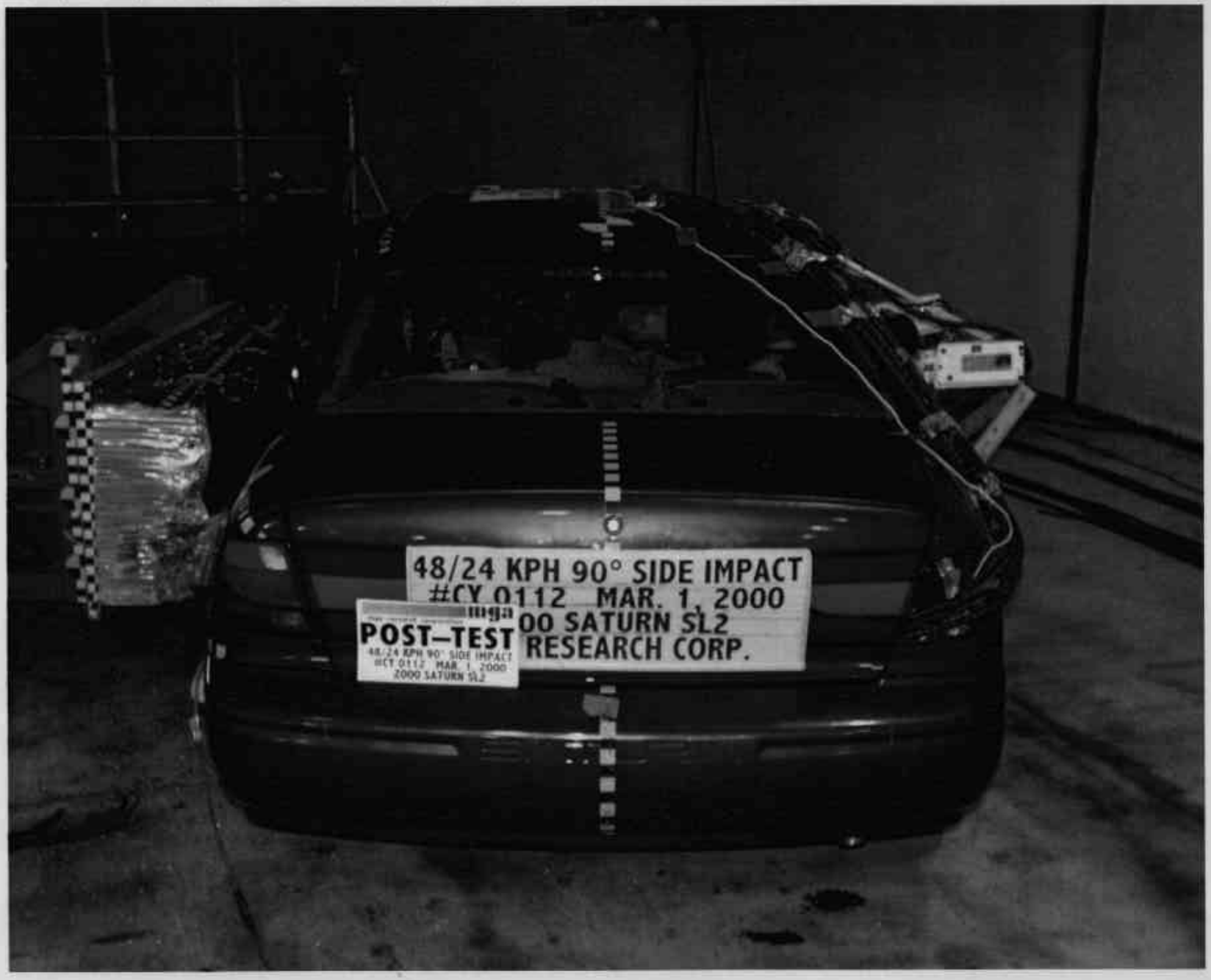


Photo No. A-4 - Post-Test Rear View of Test Vehicle

Photo No. A-5 - Post-Test Left Side View of Test Vehicle

Photo No. A-6 - Pre-Test MDB Positioned Against Vehicle (left side)

Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (right side)

Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle Overhead View

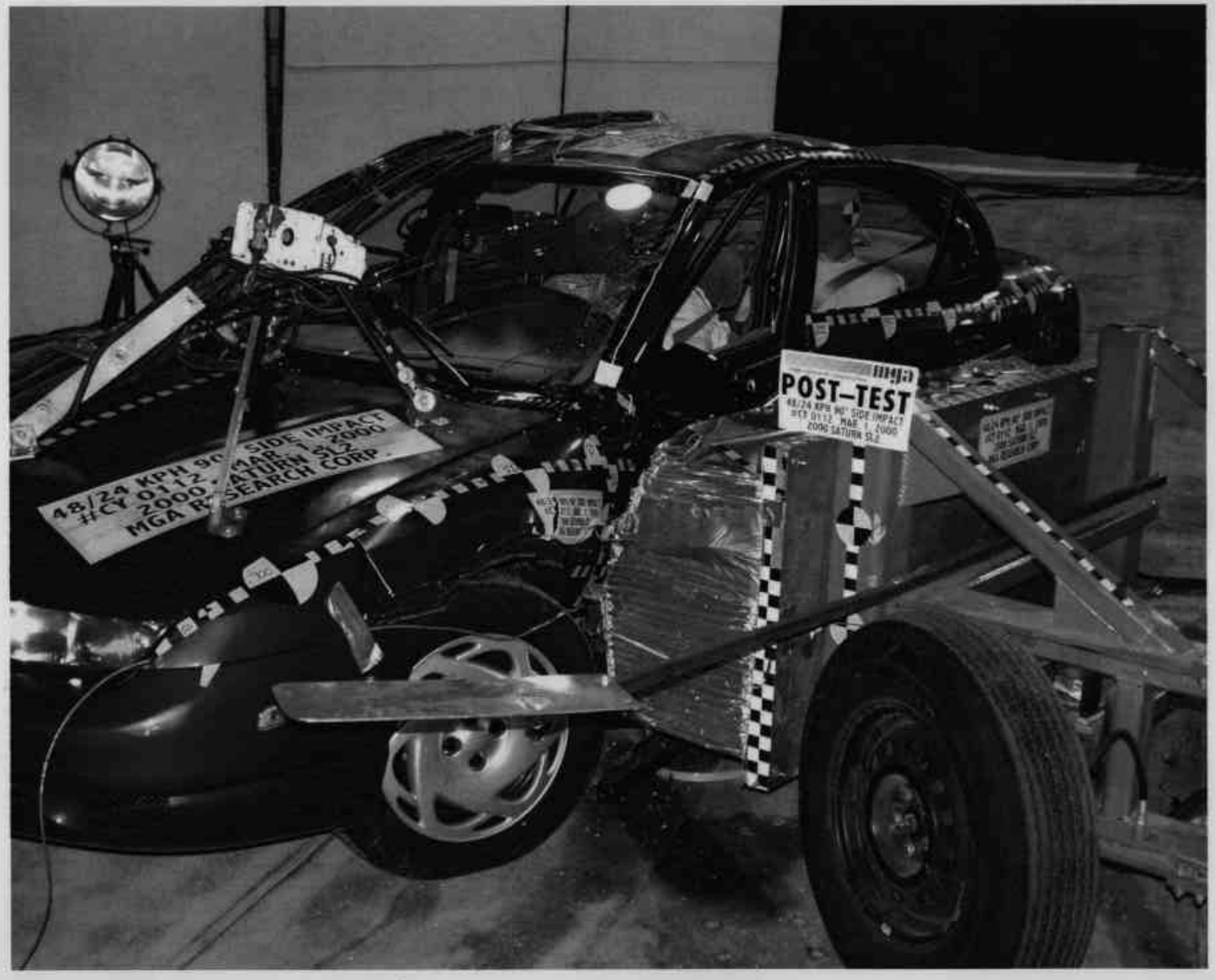


Photo No. A-9 - Post-Test MDB and Vehicle (left side)

Photo No. A-10 - Post-Test MDB and Vehicle (right side)

Photo No. A-11 - Post-Test MDB and Vehicle Overhead View

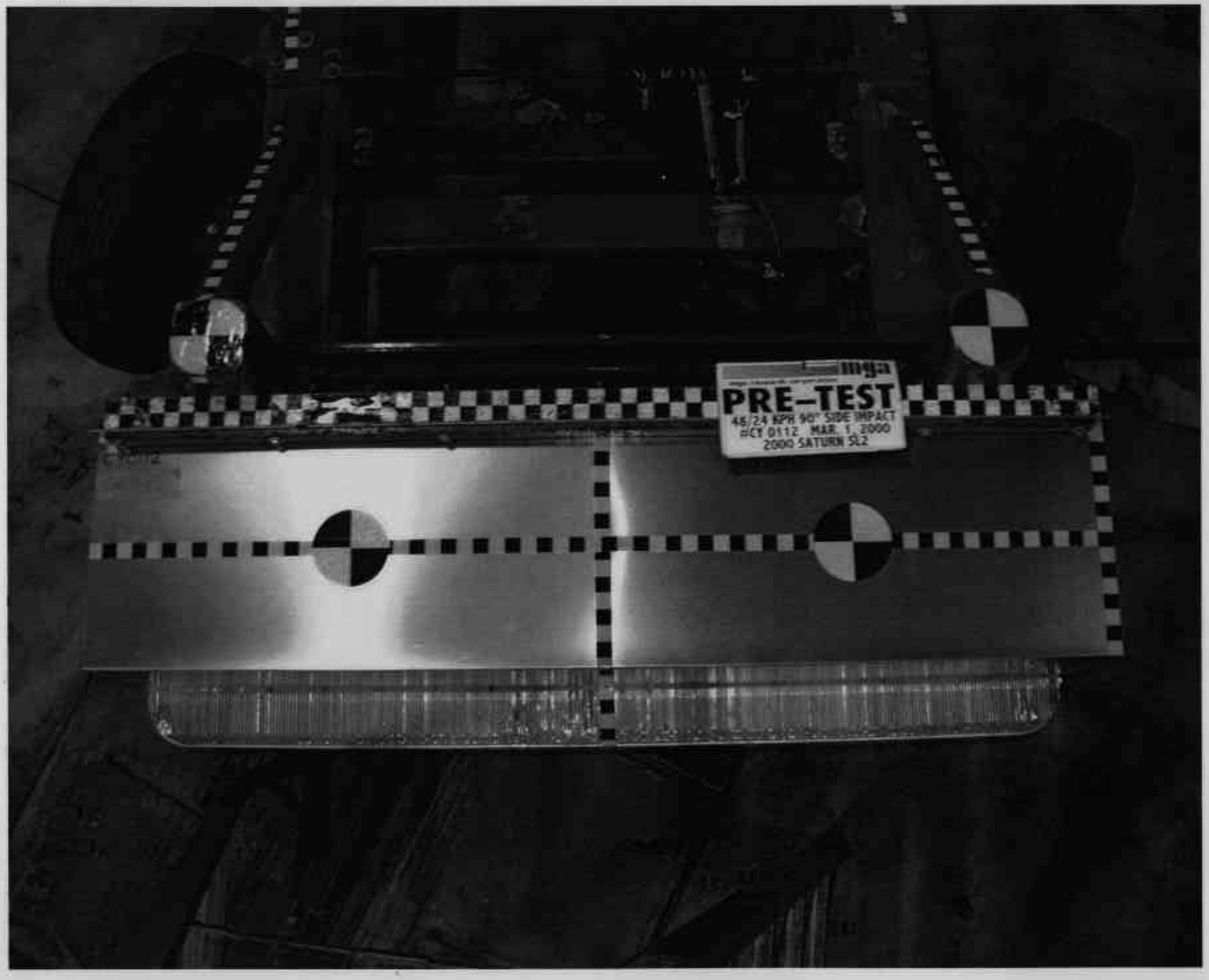


Photo No. A-12 - Pre-Test MDB Top View

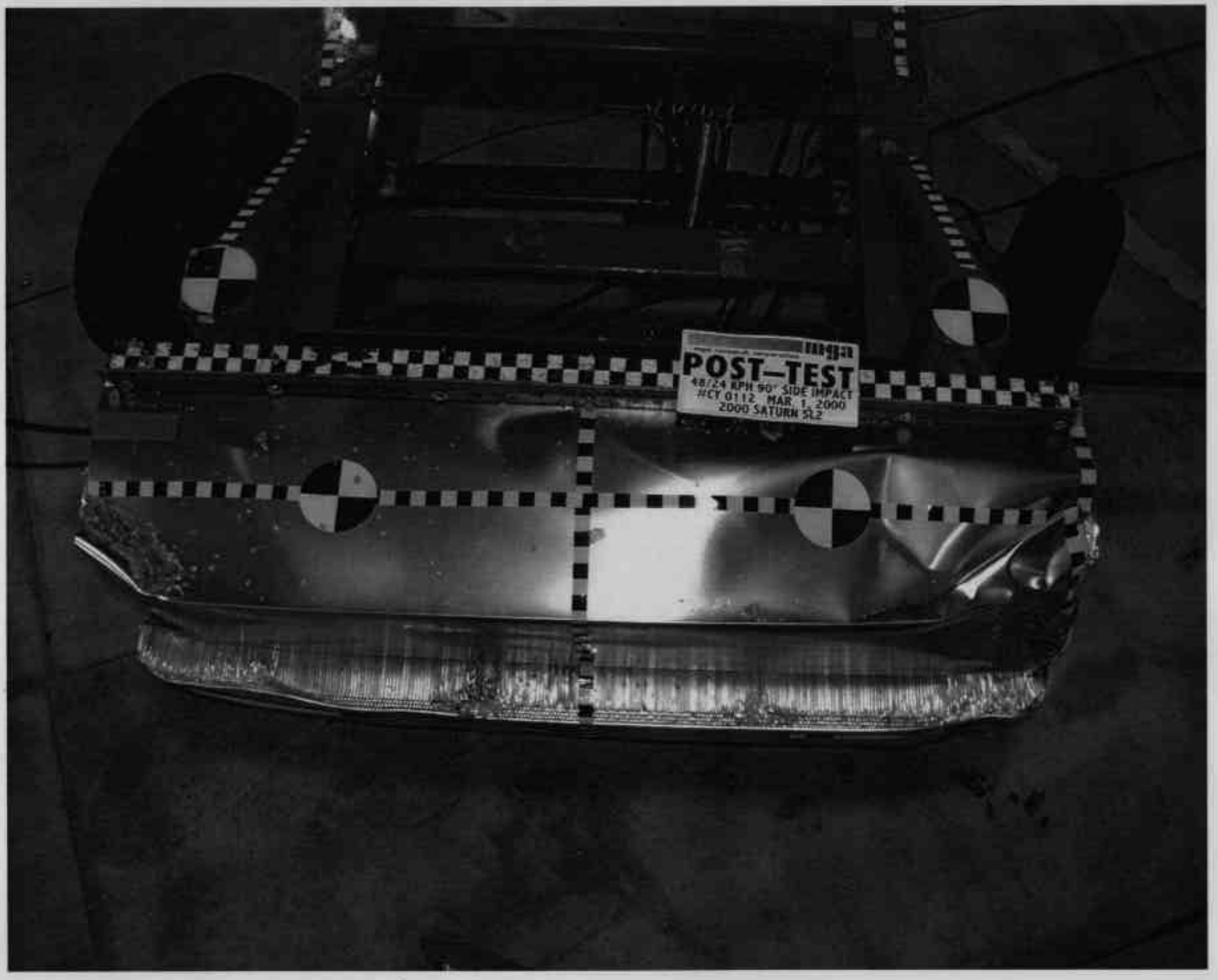


Photo No. A-13 - Post-Test MDB Top View

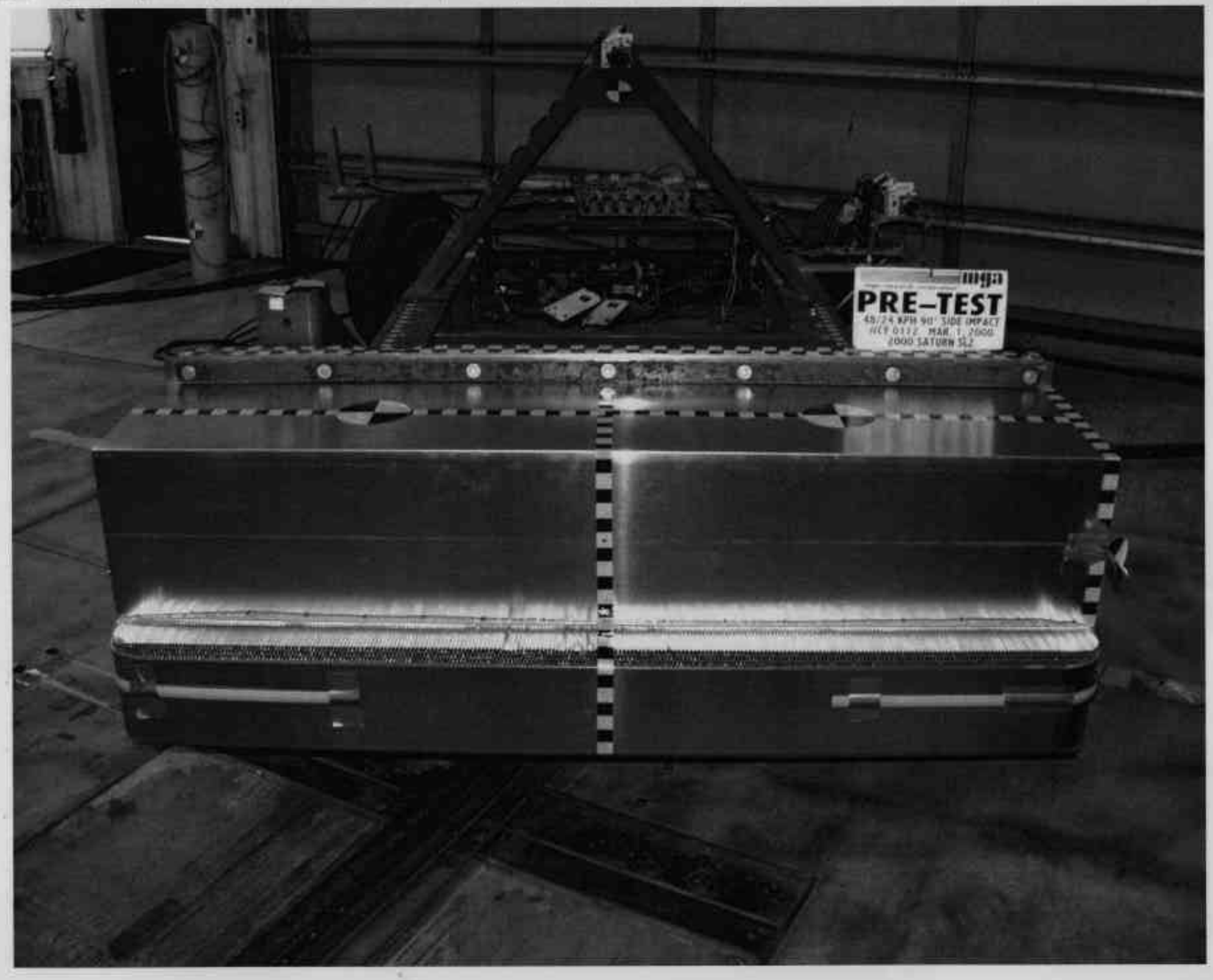


Photo No. A-14 - Pre-Test MDB Front View

Photo No. A-15 - Post-Test MDB Front View

Photo No. A-16 - Pre-Test MDB Left Side View

Photo No. A-17 - Post-Test MDB Left Side View

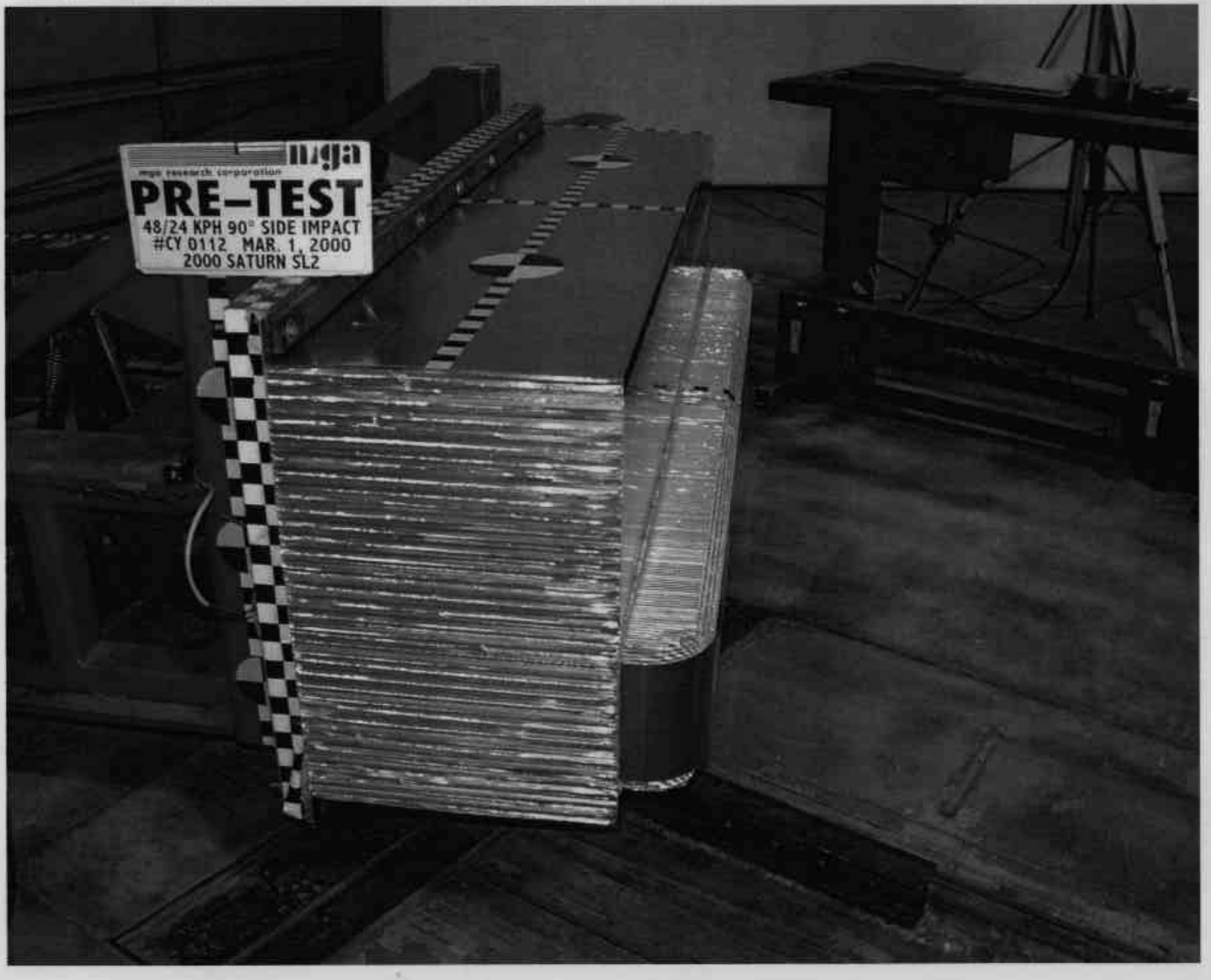


Photo No. A-18 - Pre-Test MDB Right Side View

Photo No. A-19 - Post-Test MDB Right Side View

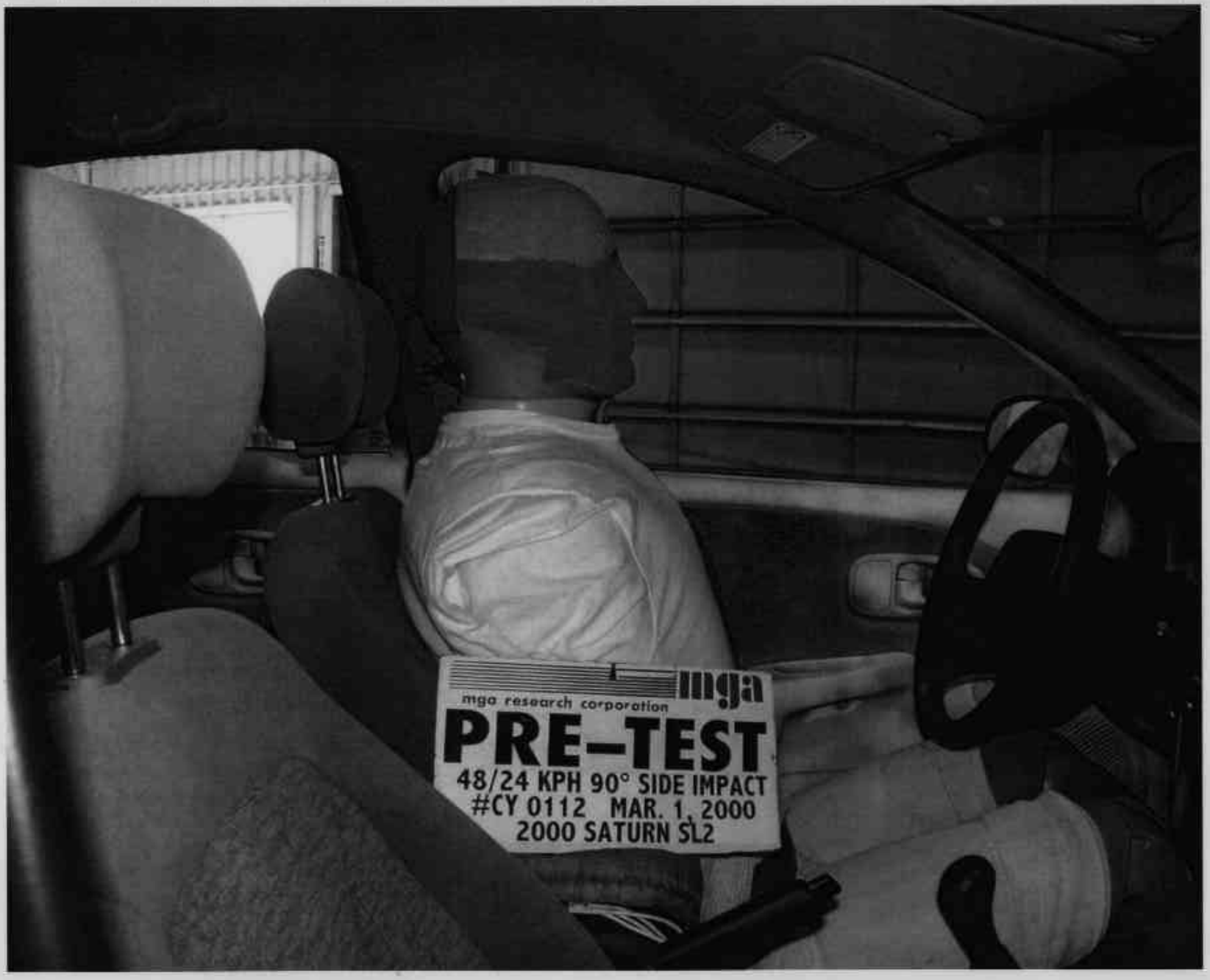


Photo No. A-20 - Pre-Test Driver Dummy Right Side View

Photo No. A-21 - Post-Test Driver Dummy Right Side View

A-21

Photo No. A-22 - Pre-Test Driver Dummy Left Side View

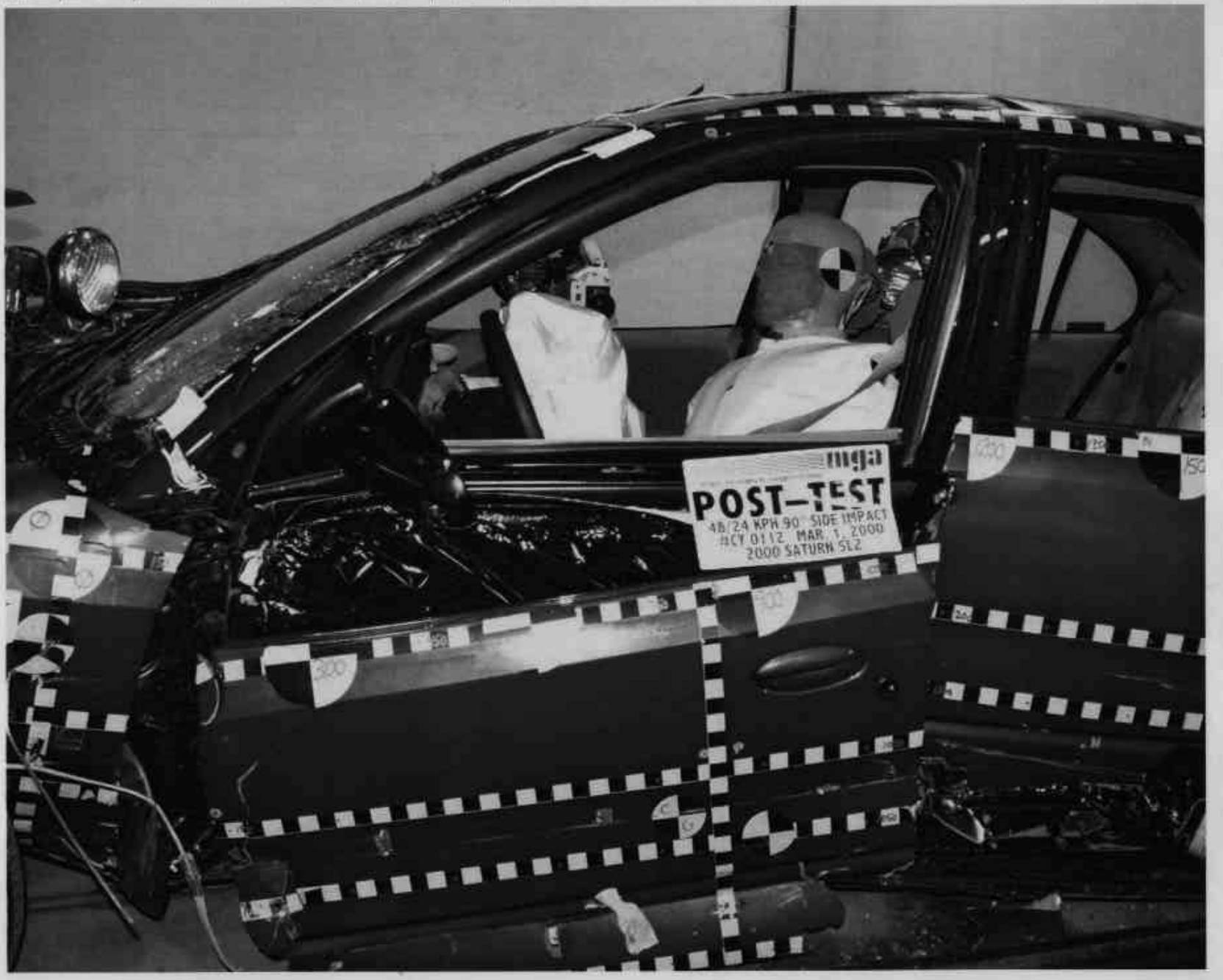


Photo No. A-23 - Post-Test Driver Dummy Left Side View

Photo No. A-24 - Pre-Test Driver Dummy Left Side View (Door Open)

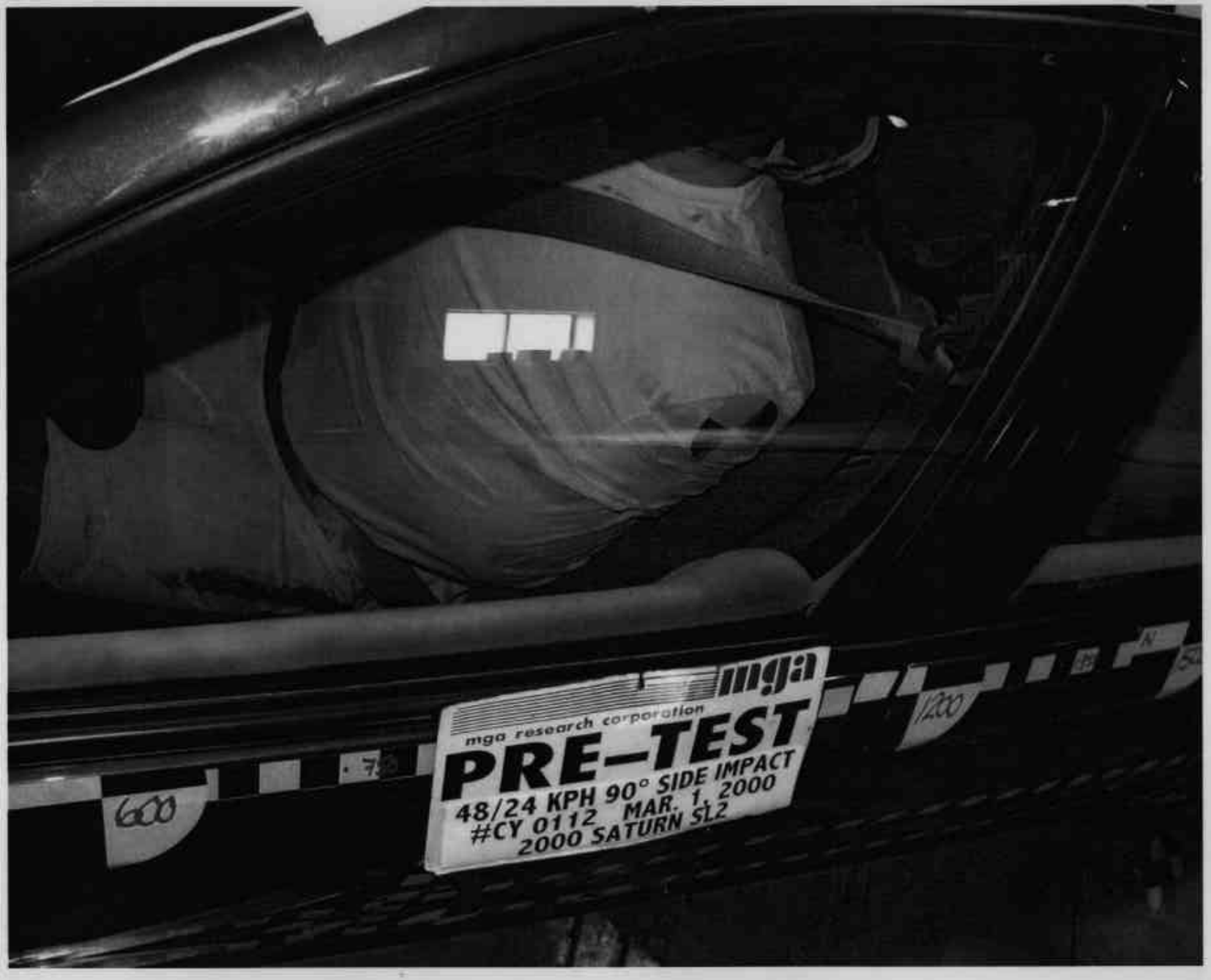


Photo No. A-25 - Pre-Test Driver Shoulder and Door Top View

Photo No. A-26 - Post-Test Driver Shoulder and Door Top View

Photo No. A-27 - Post-Test Driver Dummy Contact

Photo No. A-28 - Post-Test Driver Dummy Head Contact

Photo No. A-29 - Pre-Test Rear Passenger Dummy Right Side View

Photo No. A-30 - Post-Test Rear Passenger Dummy Right Side View

Photo No. A-31 - Pre-Test Rear Passenger Dummy Left Side View

Photo No. A-32 - Post-Test Rear Passenger Dummy Left Side View

Photo No. A-33 - Post-Test Rear Passenger Dummy Left Side View (Door Open)

Photo No. A-34 - Pre-Test Rear Passenger Dummy Shoulder View

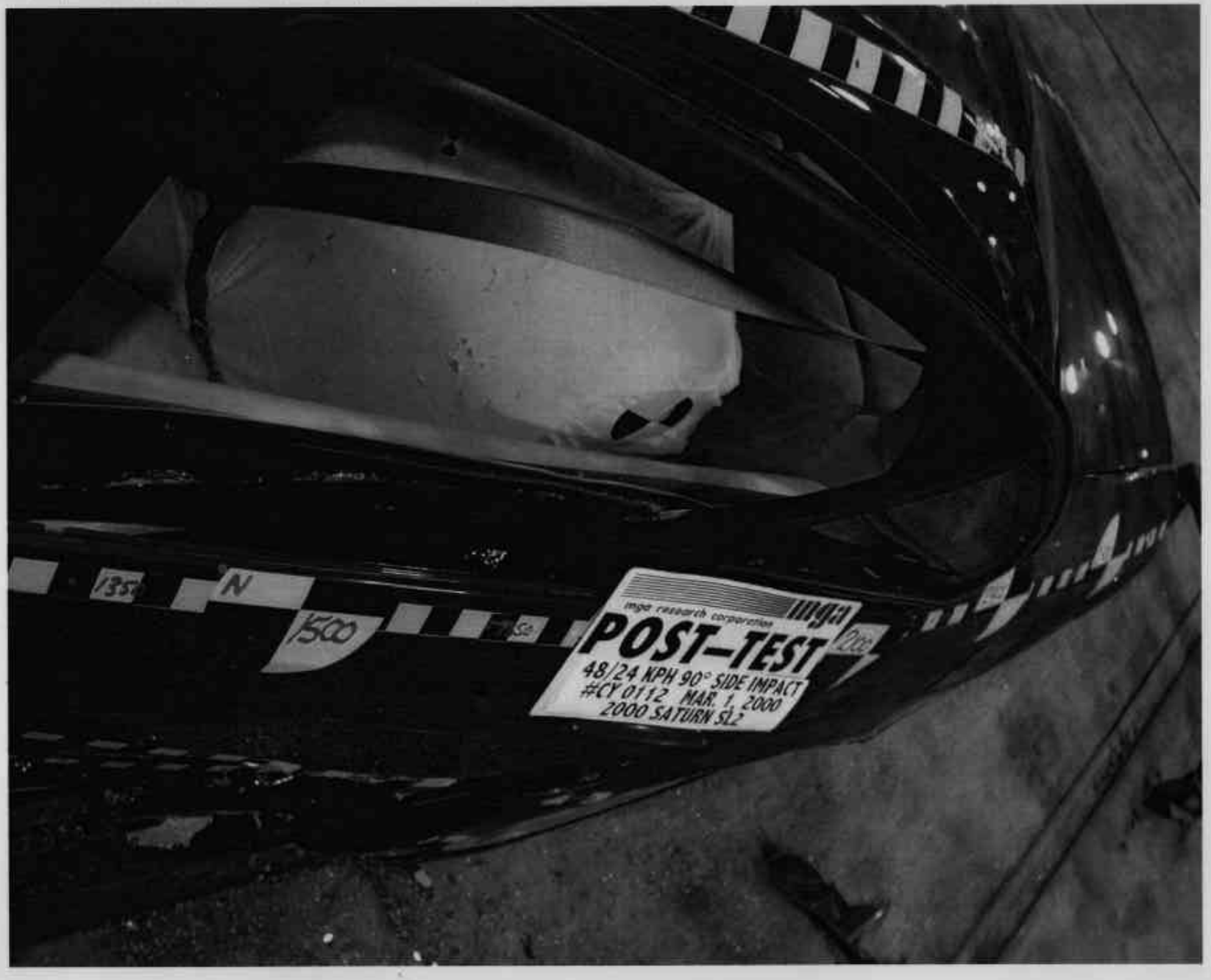


Photo No. A-35 - Post-Test Rear Passenger Dummy Shoulder View

Photo No. A-36 - Post-Test Rear Passenger Dummy Contact

Photo No. A-37 - Post-Test Rear Passenger Dummy Head Contact

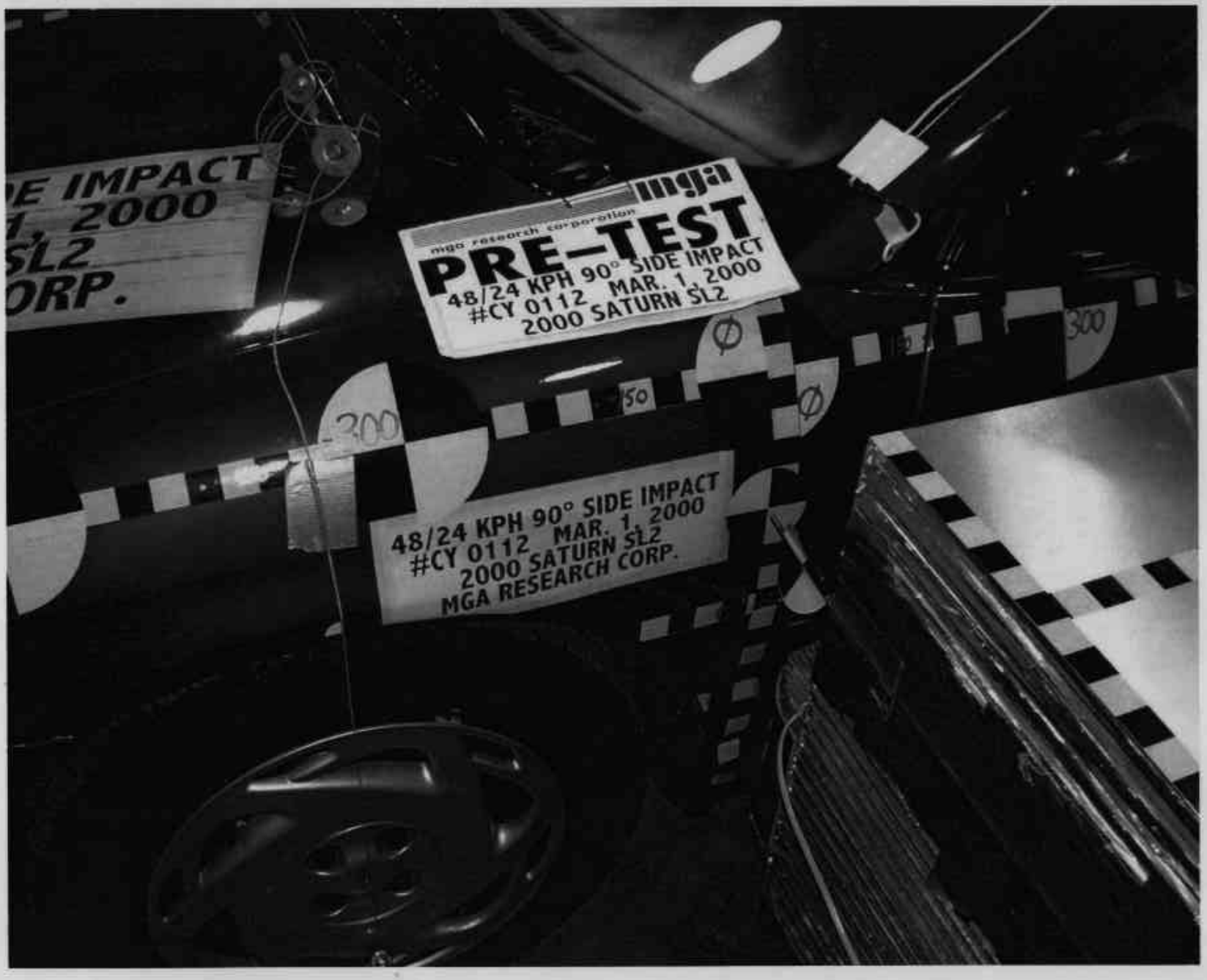


Photo No. A-38 - Pre-Test Right Front Impact Point on Vehicle

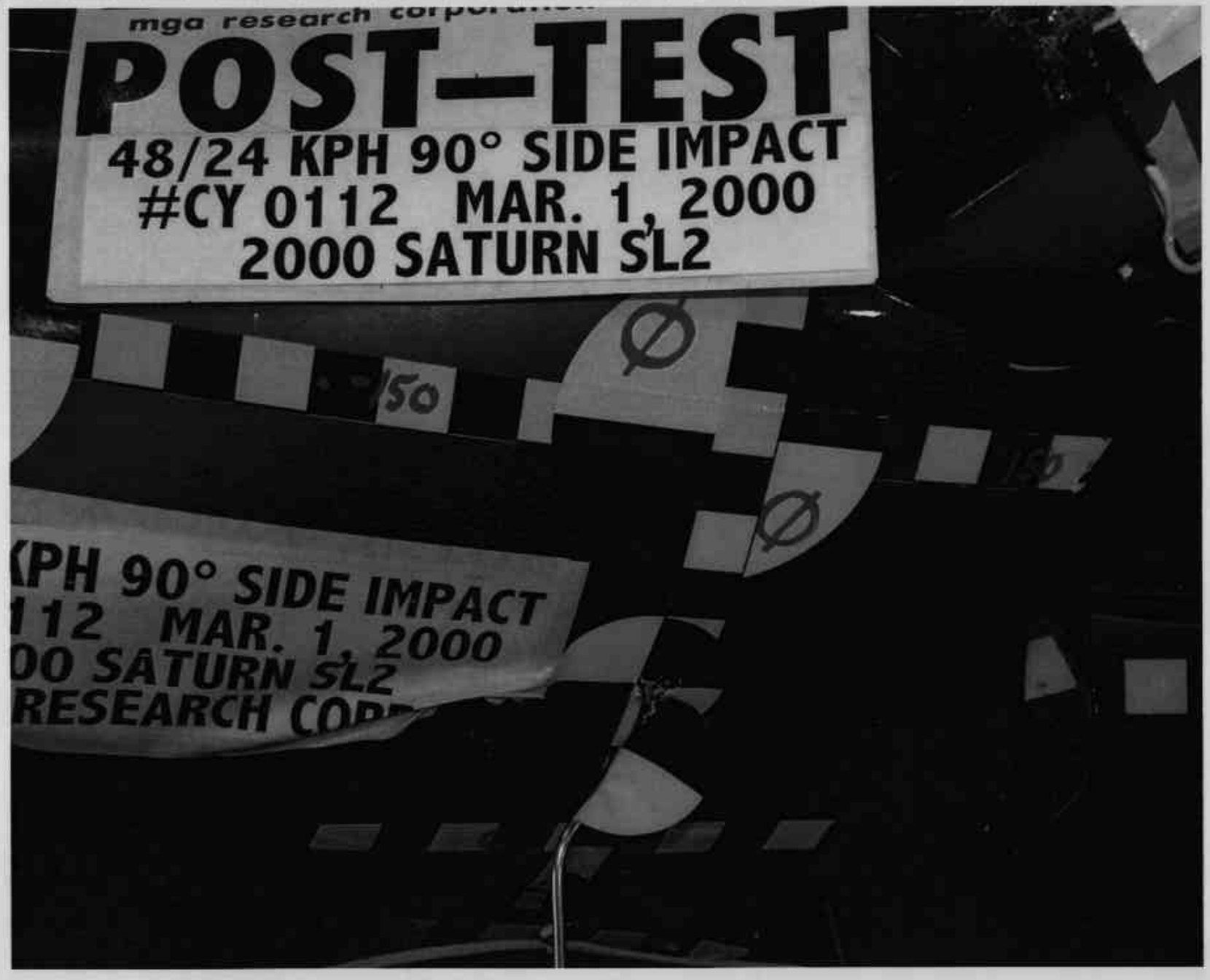


Photo No. A-39 - Post-Test Right Front Impact Point on Vehicle

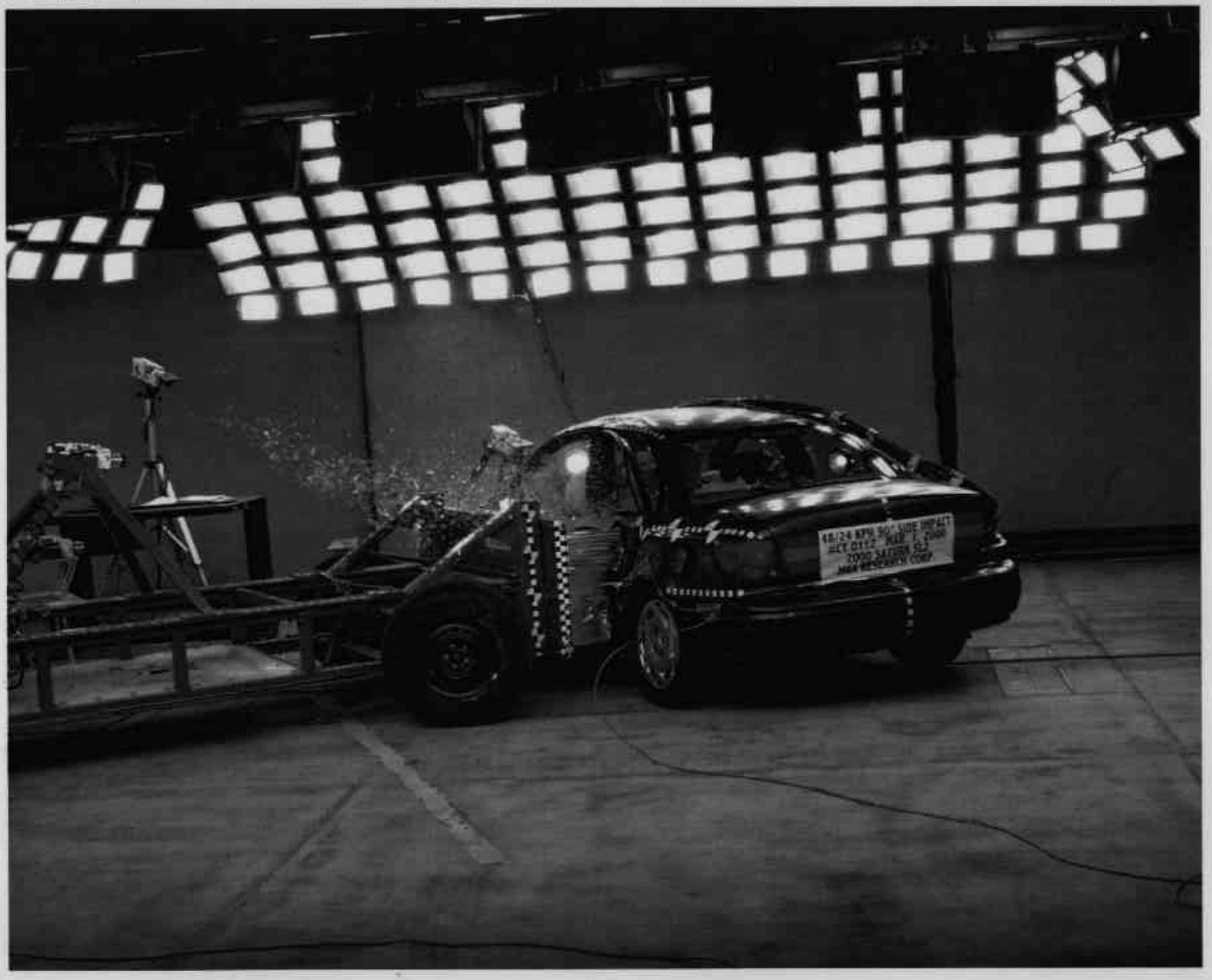


Photo No. A-40 – Impact

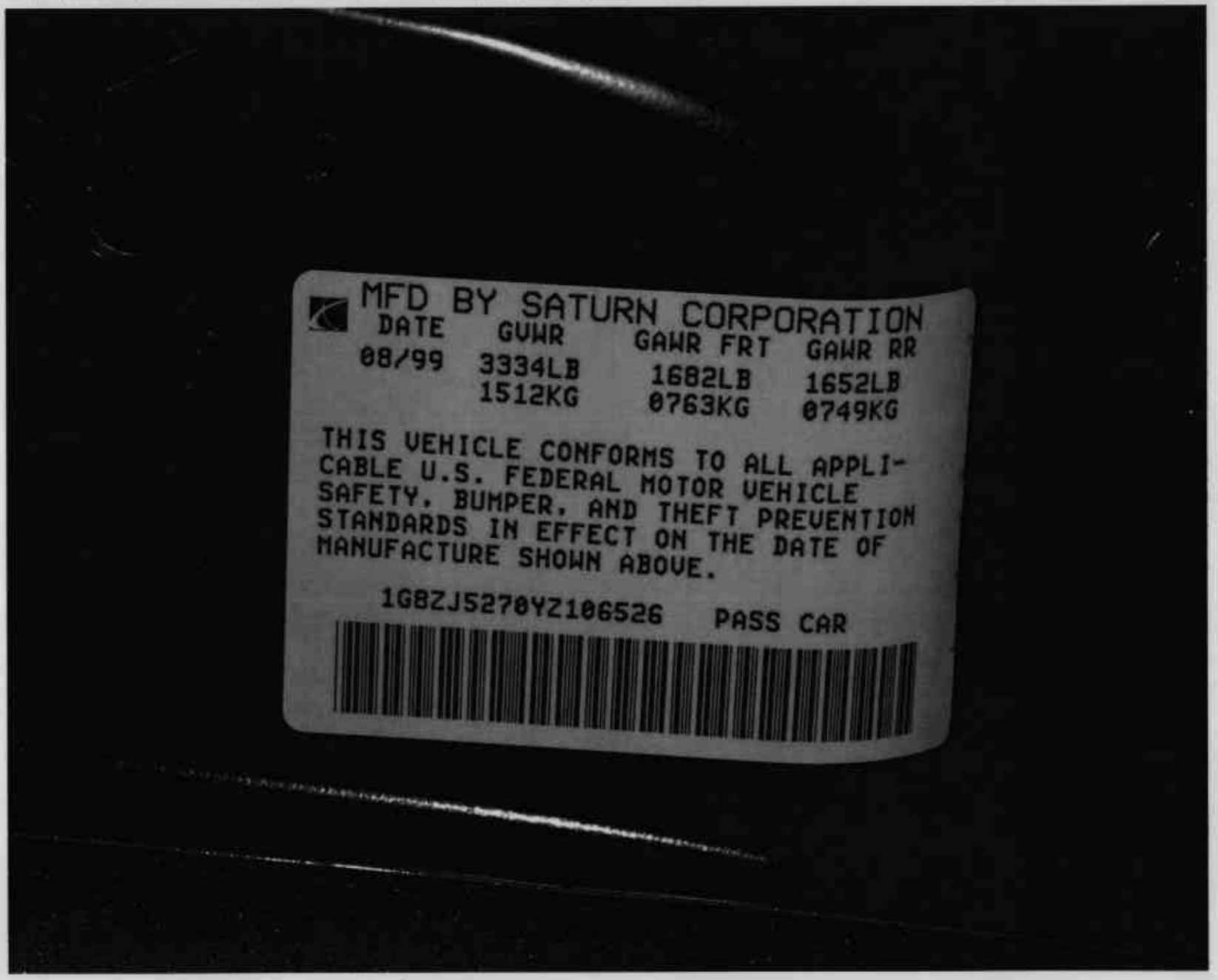


Photo No. A-41 - Vehicle Certification Label

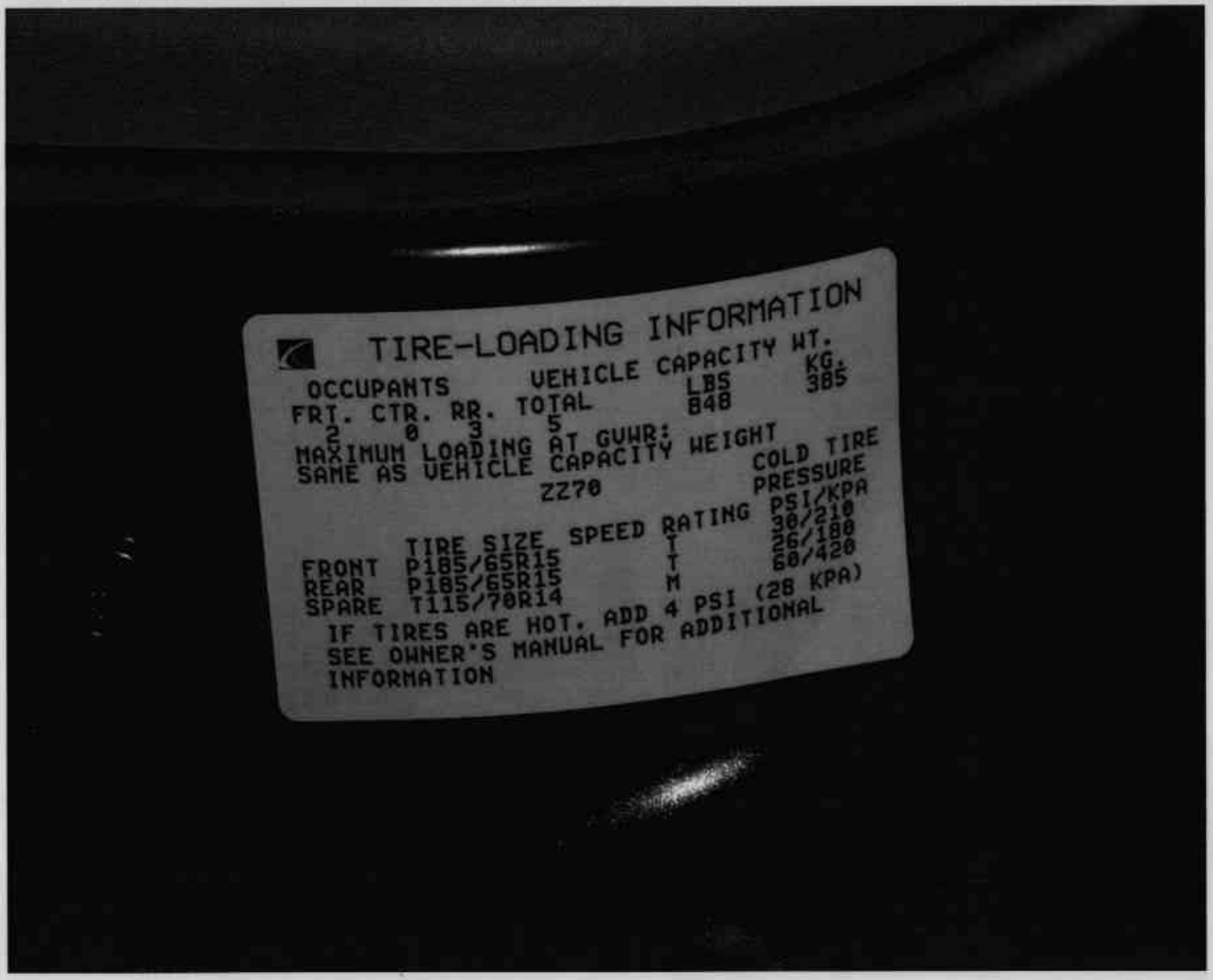


Photo No. A-42 - Tire Placard

Photo No. A-43 - Rollover 90°

Photo No. A-44 - Rollover 180°

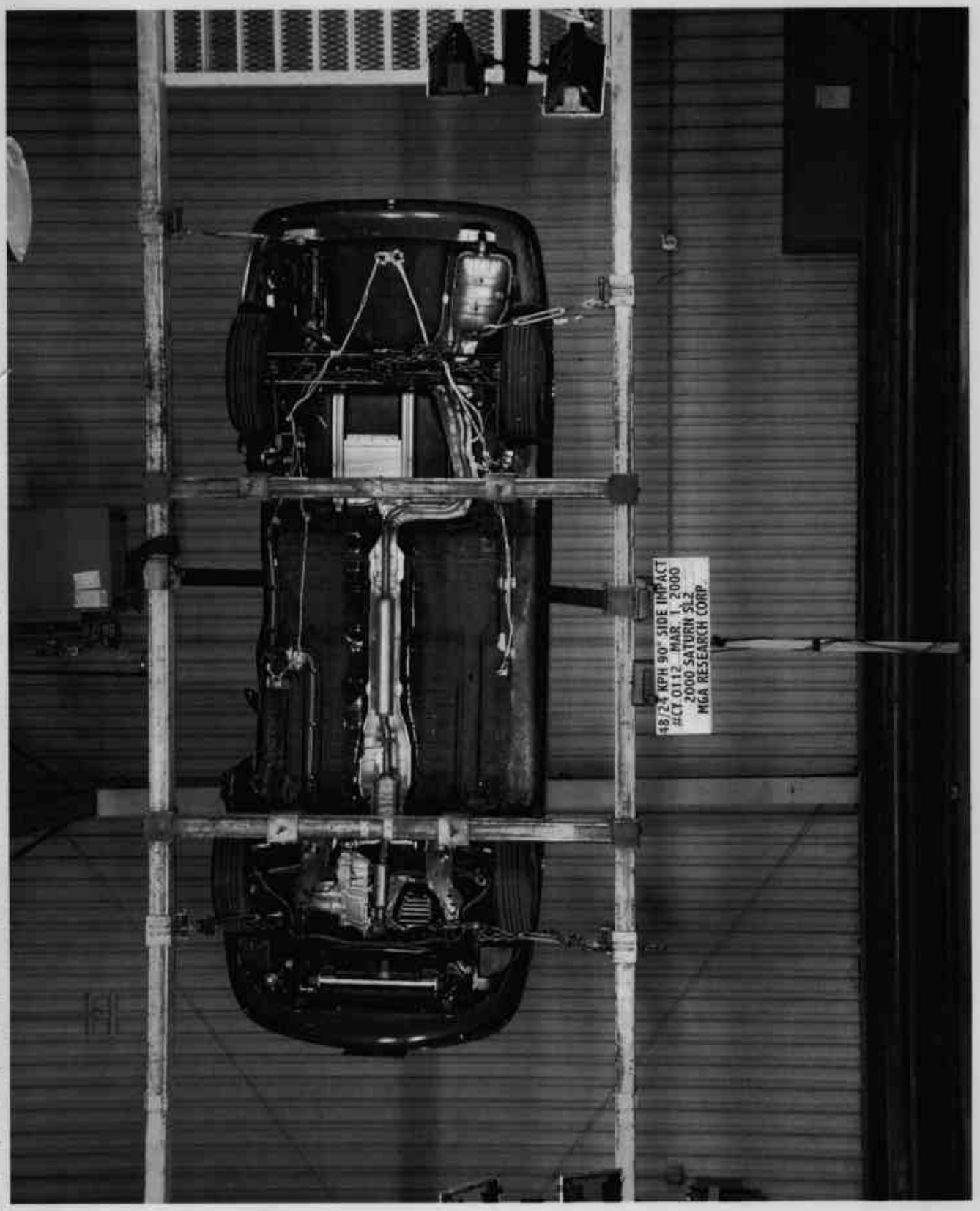


Photo No. A-45 - Rollover 270°

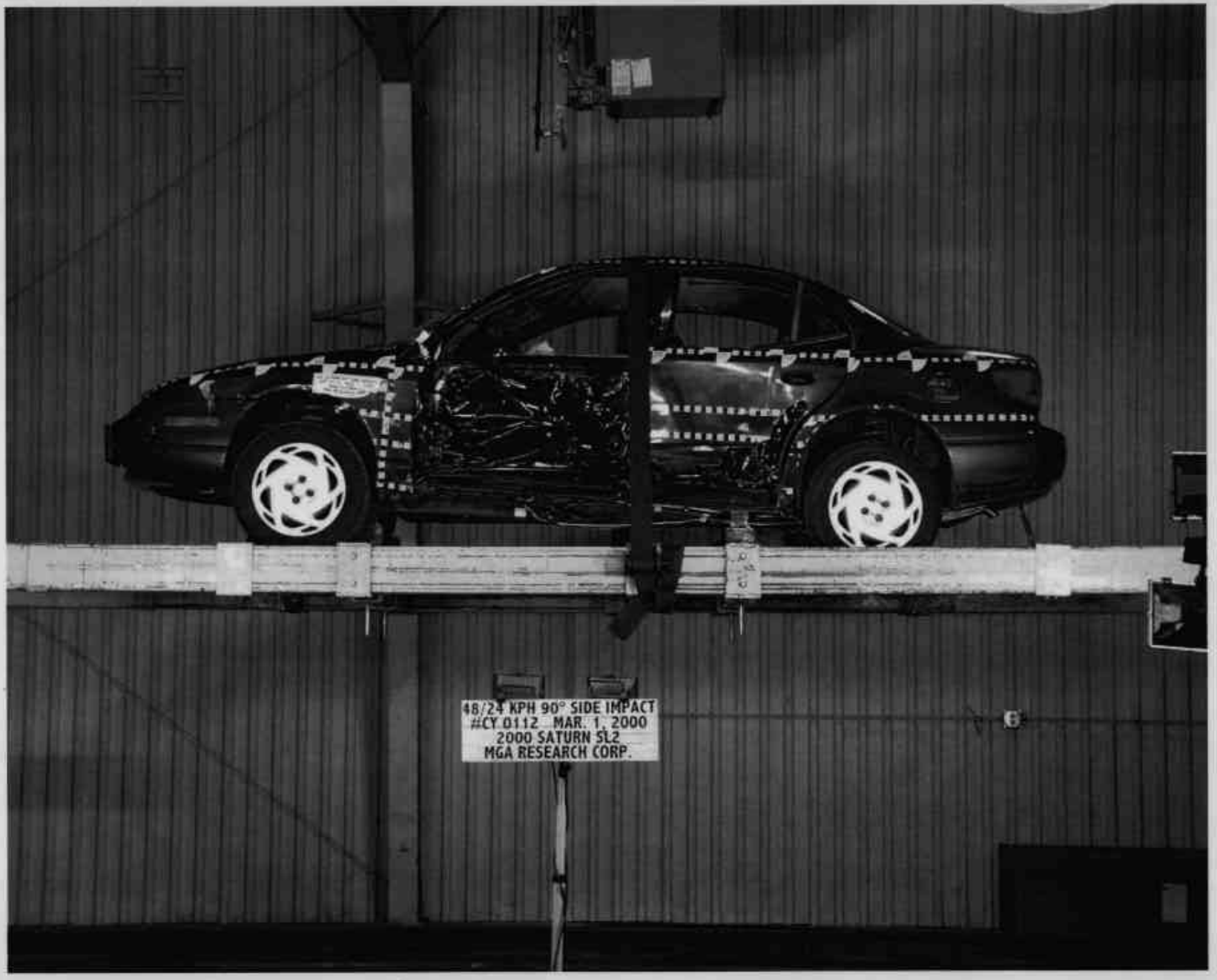


Photo No. A-46 - Rollover 360°

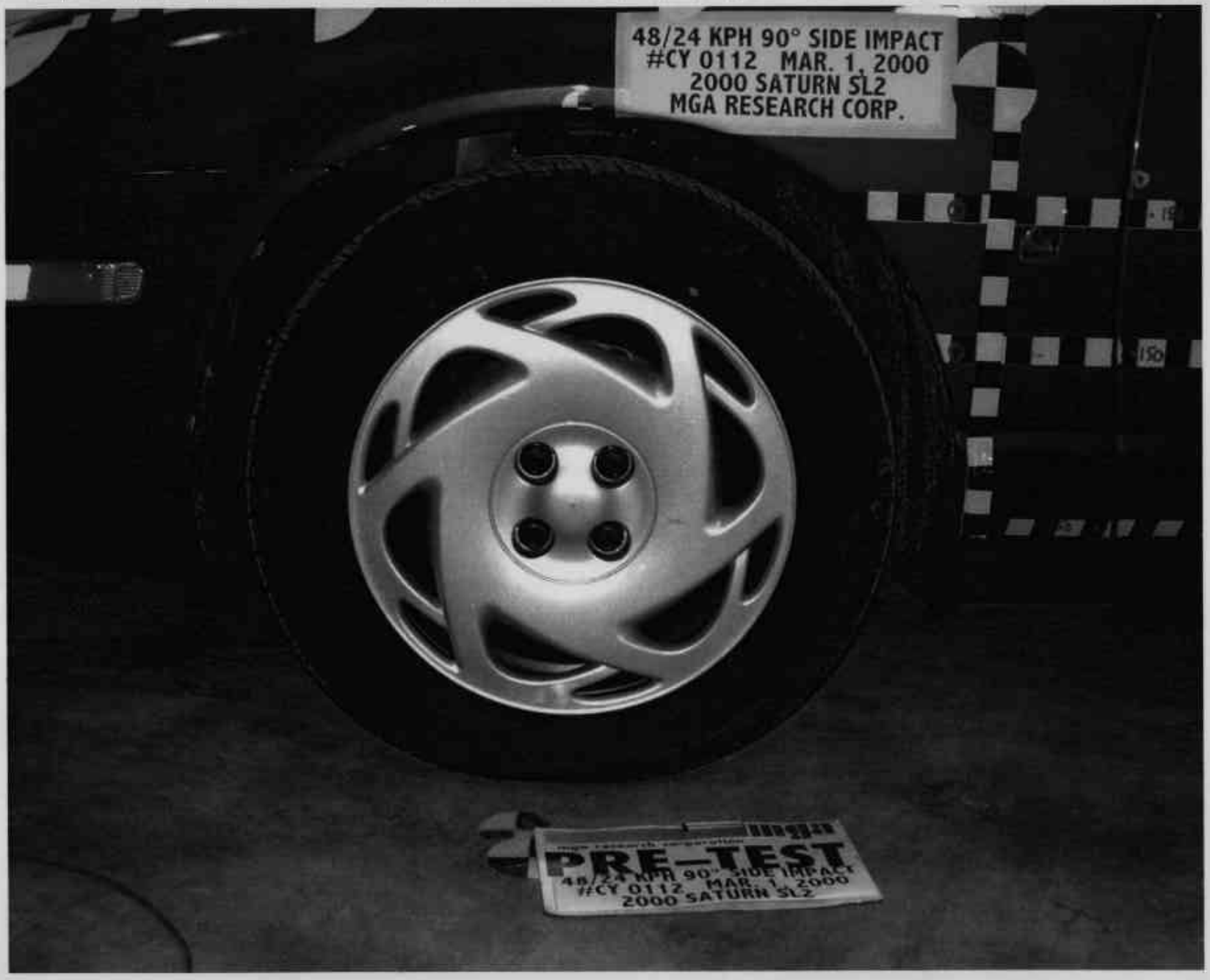


Photo No. A-47 - Left Front Attitude Point

Photo No. A-48 - Right Front Attitude Point

Photo No. A-49 - Left Rear Attitude Point

Photo No. A-50 - Right Rear Attitude Point

A-50

APPENDIX B - VEHICLE AND SID RESPONSE DATA

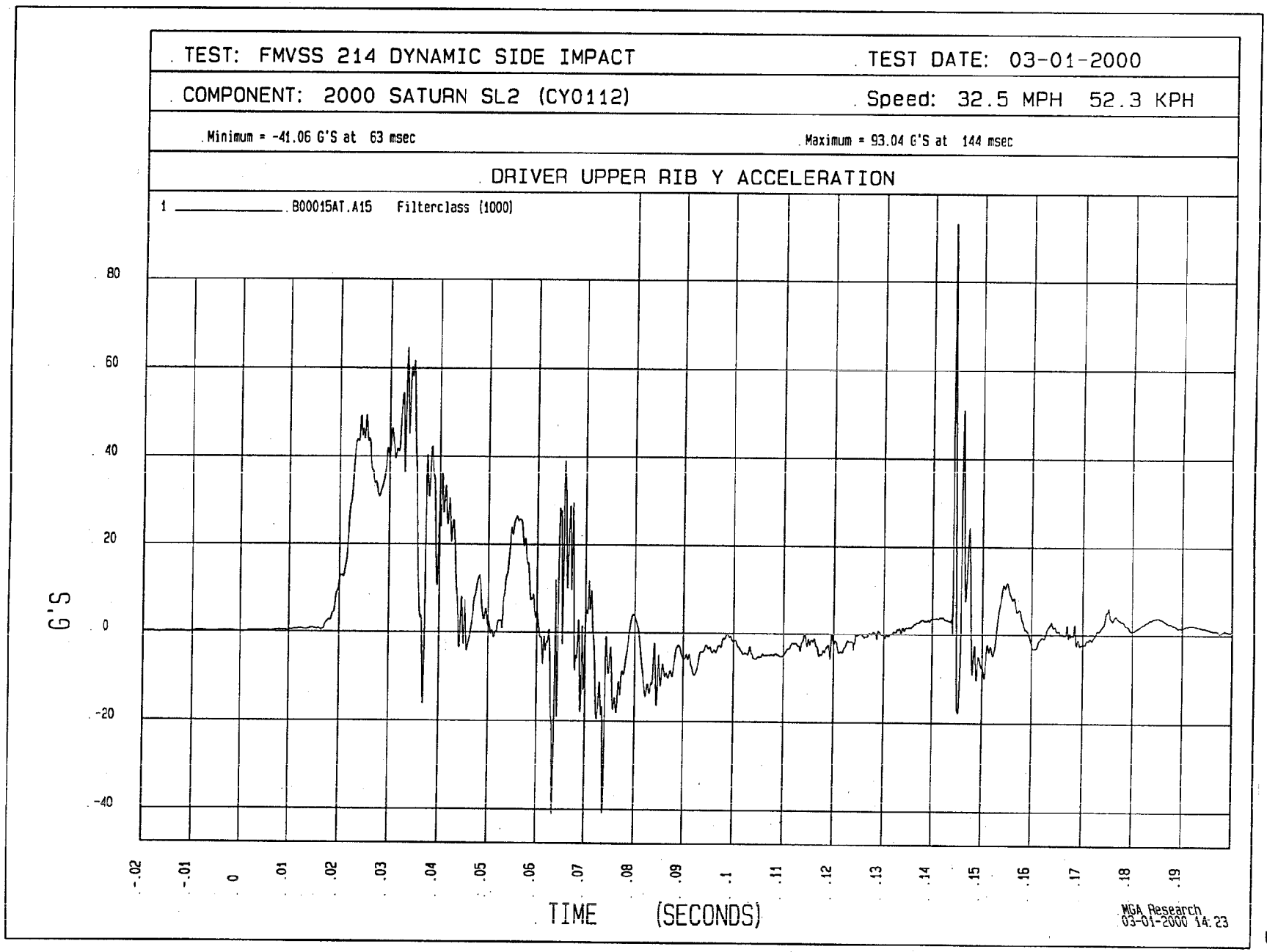
Table of Data Plots

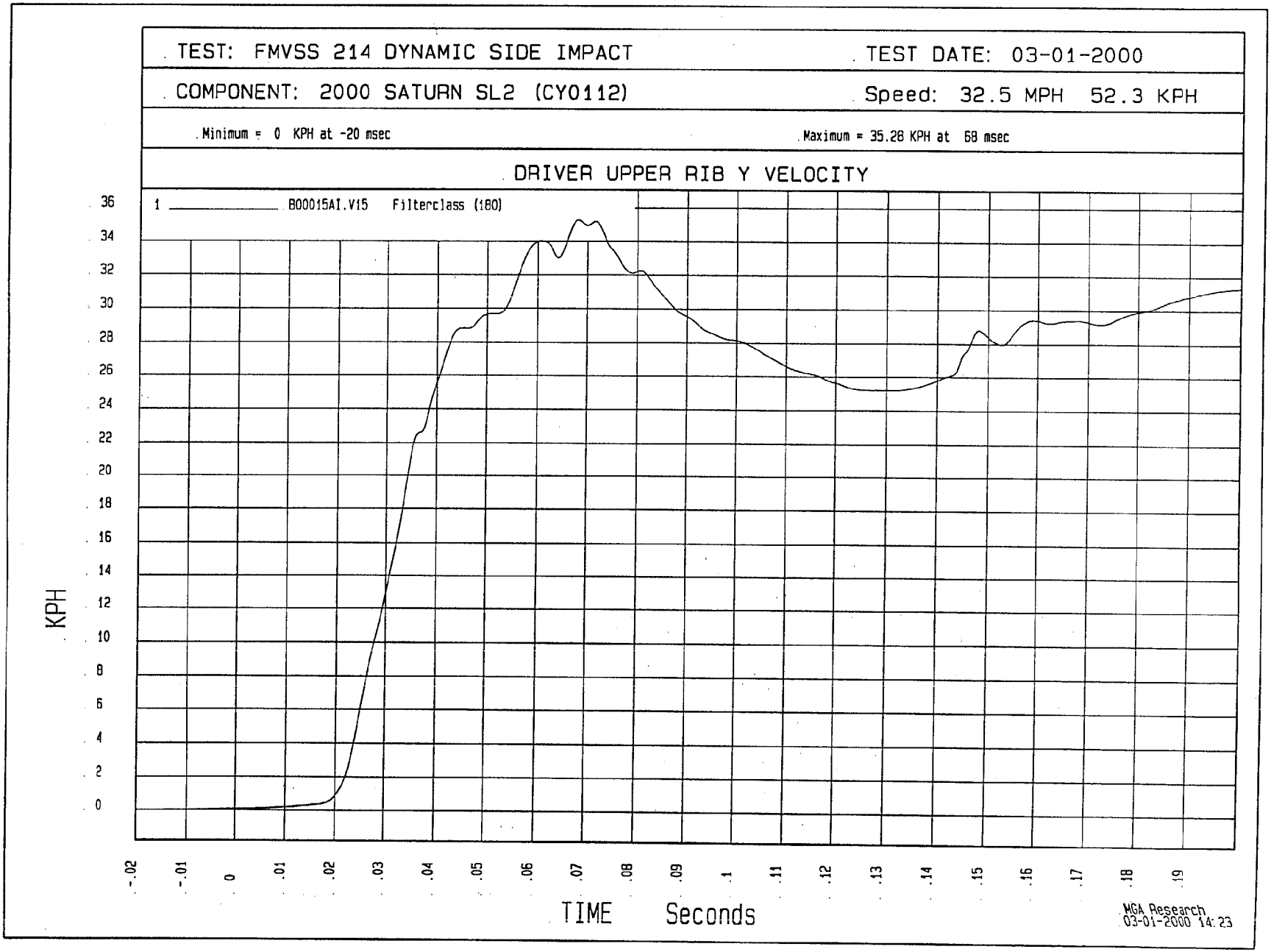
Table of Data Plots

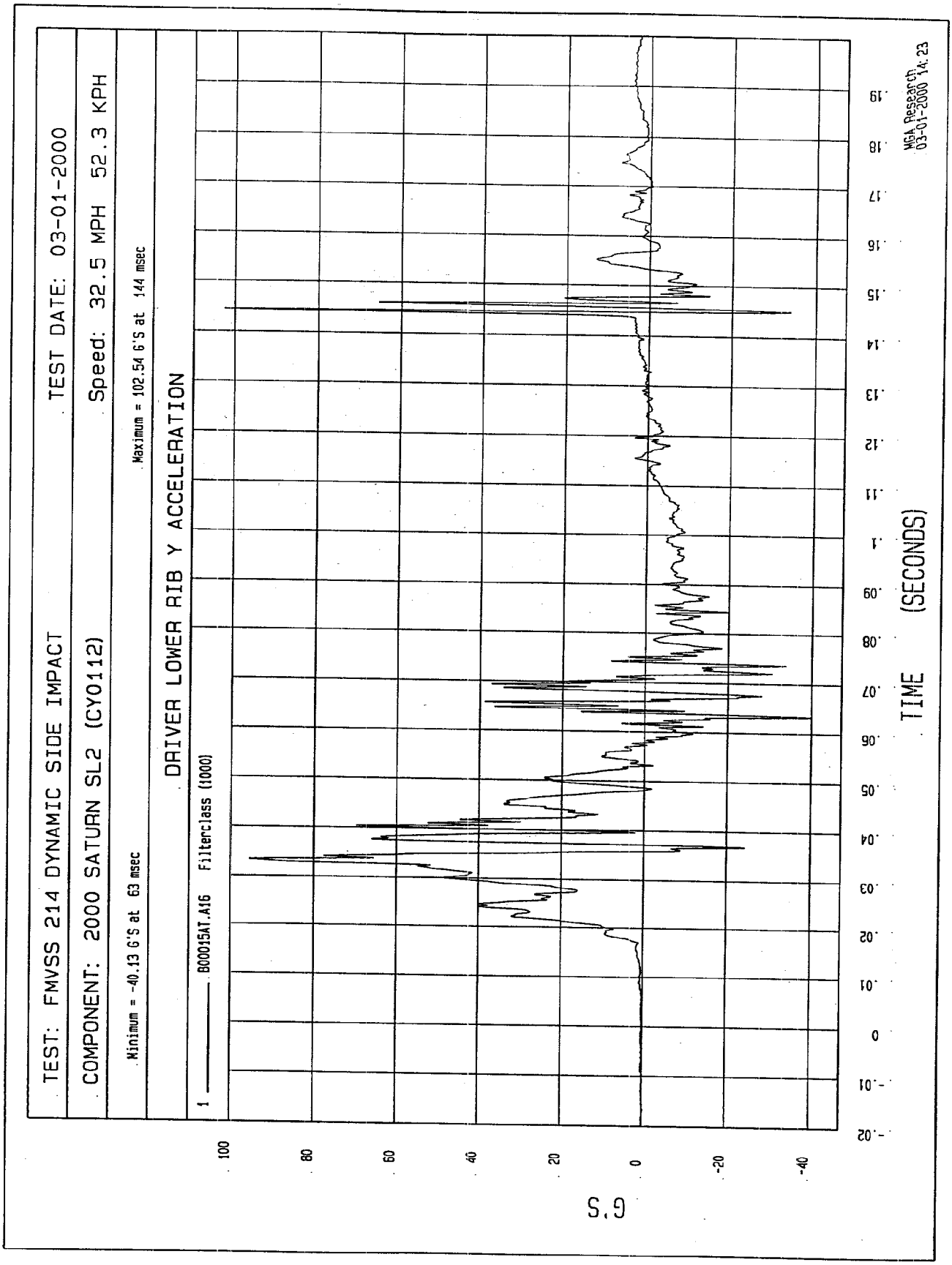
Table of Data Plots

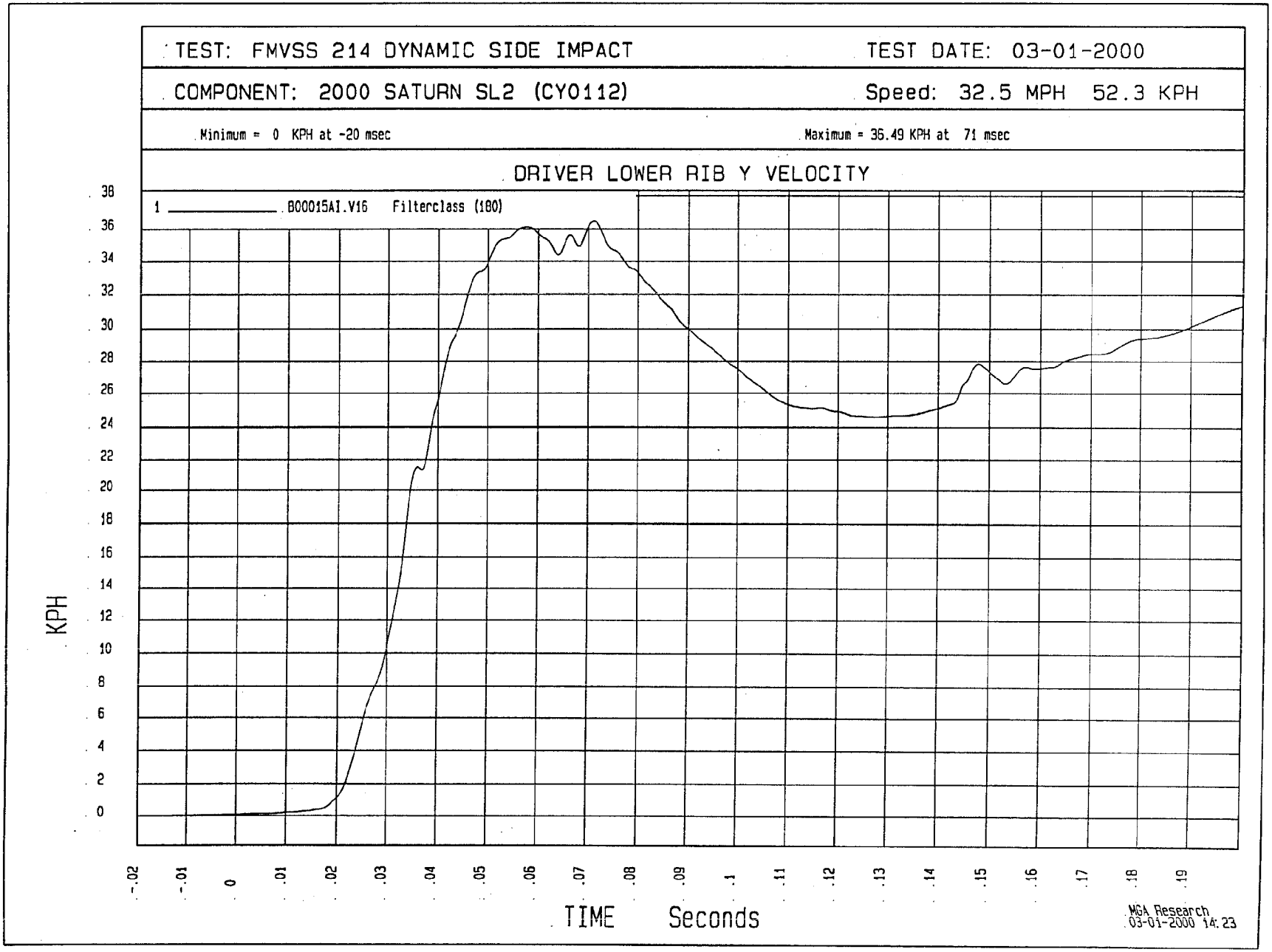
Table of Data Plots

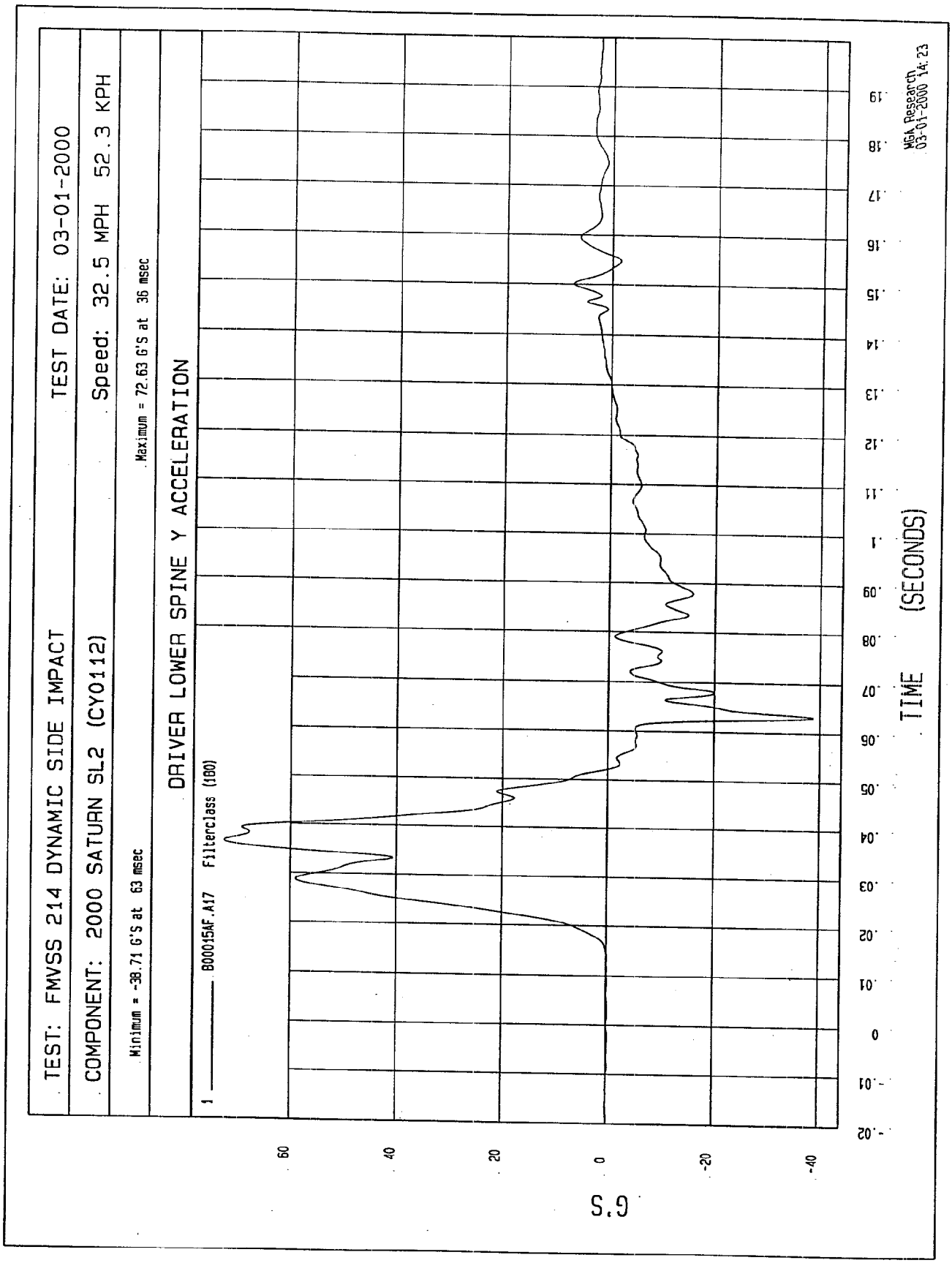
Table of Data Plots

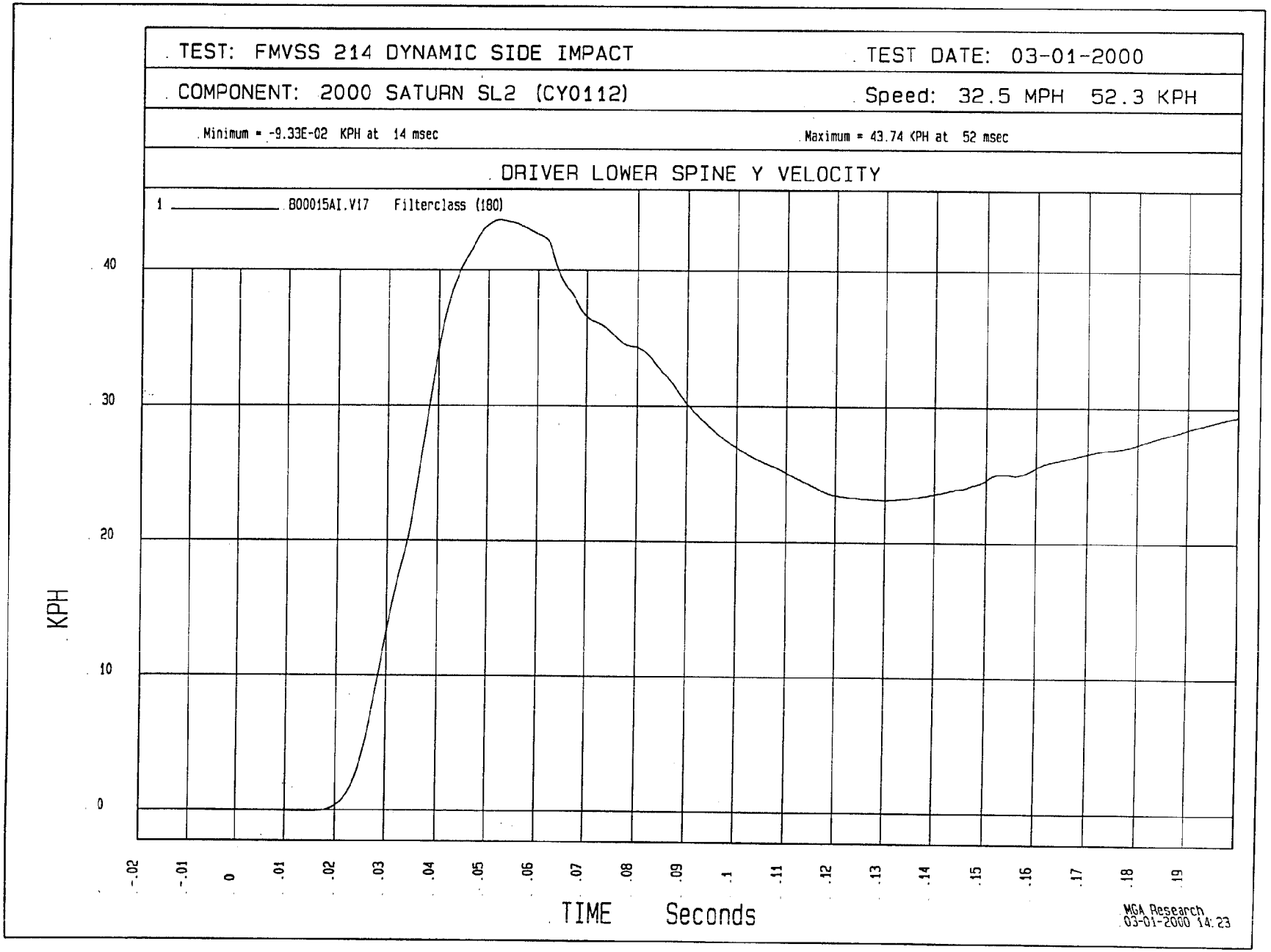

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -41.06 G'S at 63 msec
Maximum = 93.04 G'S at 144 msec
DRIVER UPPER RIB Y ACCELERATION
1 B00015AT.A15 Filterclass (1000)
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

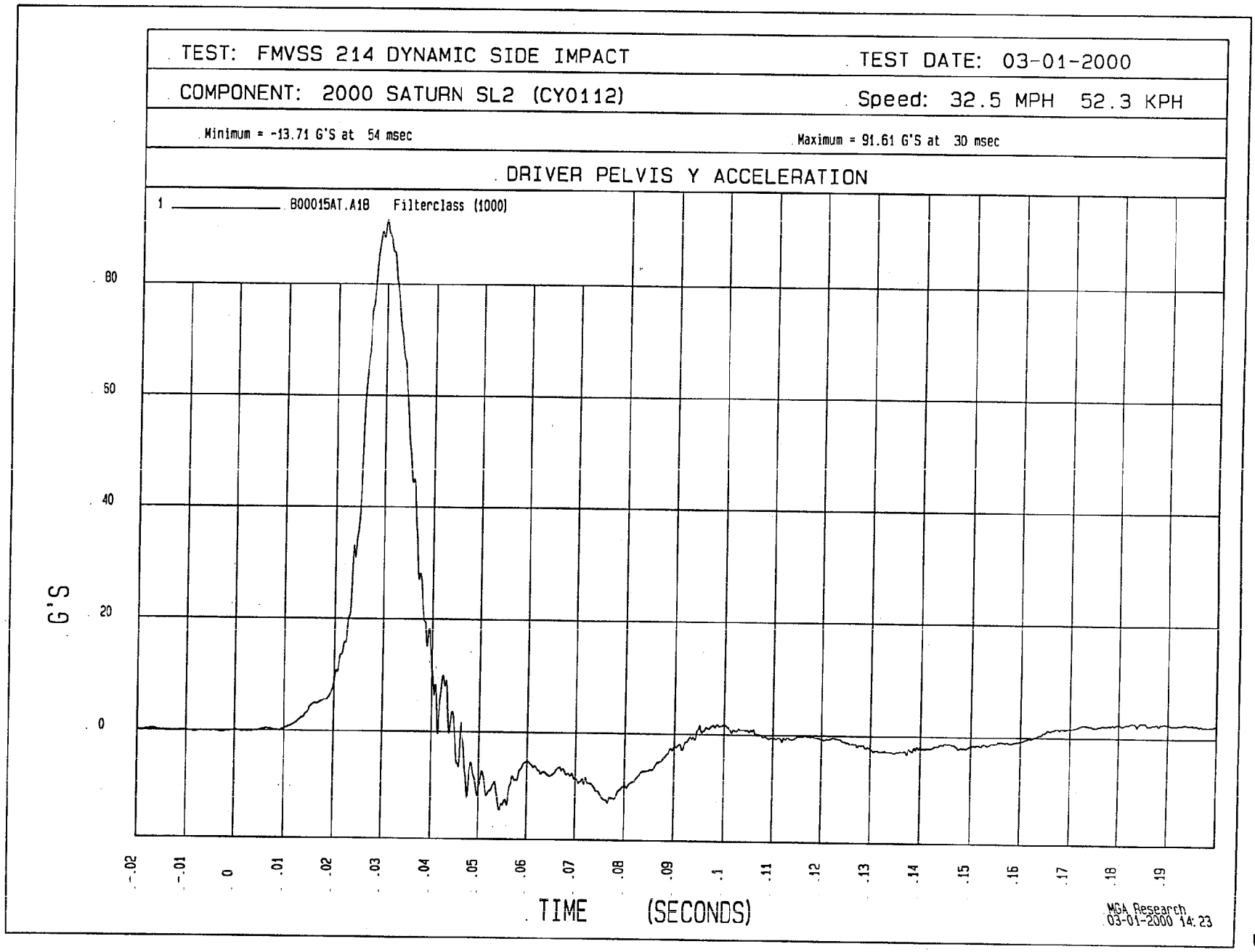

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 0 KPH at -20 msec
Maximum = 35.28 KPH at 68 msec
DRIVER UPPER RIB Y VELOCITY
1 B00015AI.Vi5 Filterclass (180)
KPH
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:23

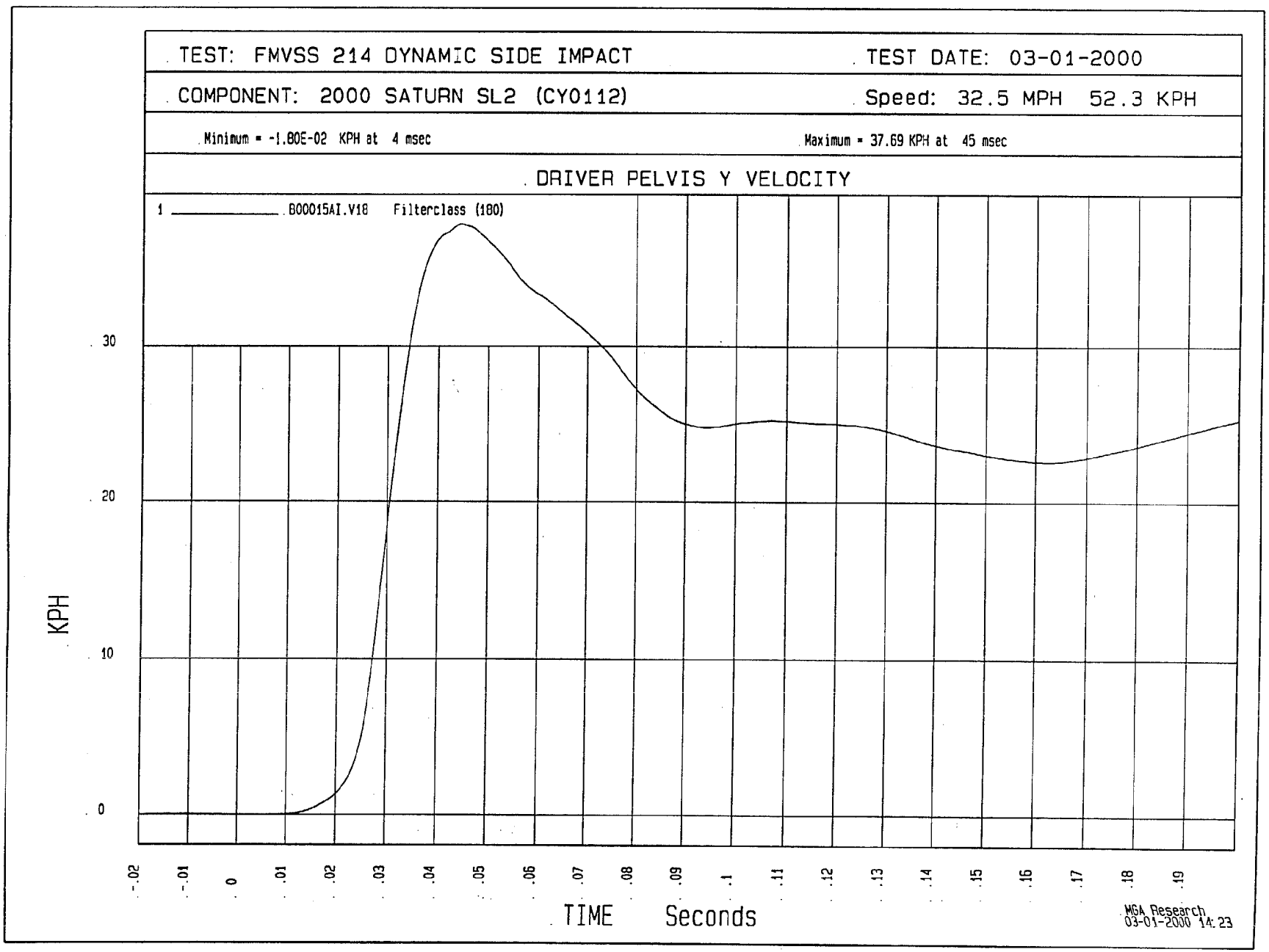

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -40.13 G'S at 63 msec
Maximum = 102.54 G'S at 144 msec
DRIVER LOWER RIB Y ACCELERATION
1 B00015AT.A16 Filterclass (1000)
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
11
12
13
14
15
16
17
18
19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

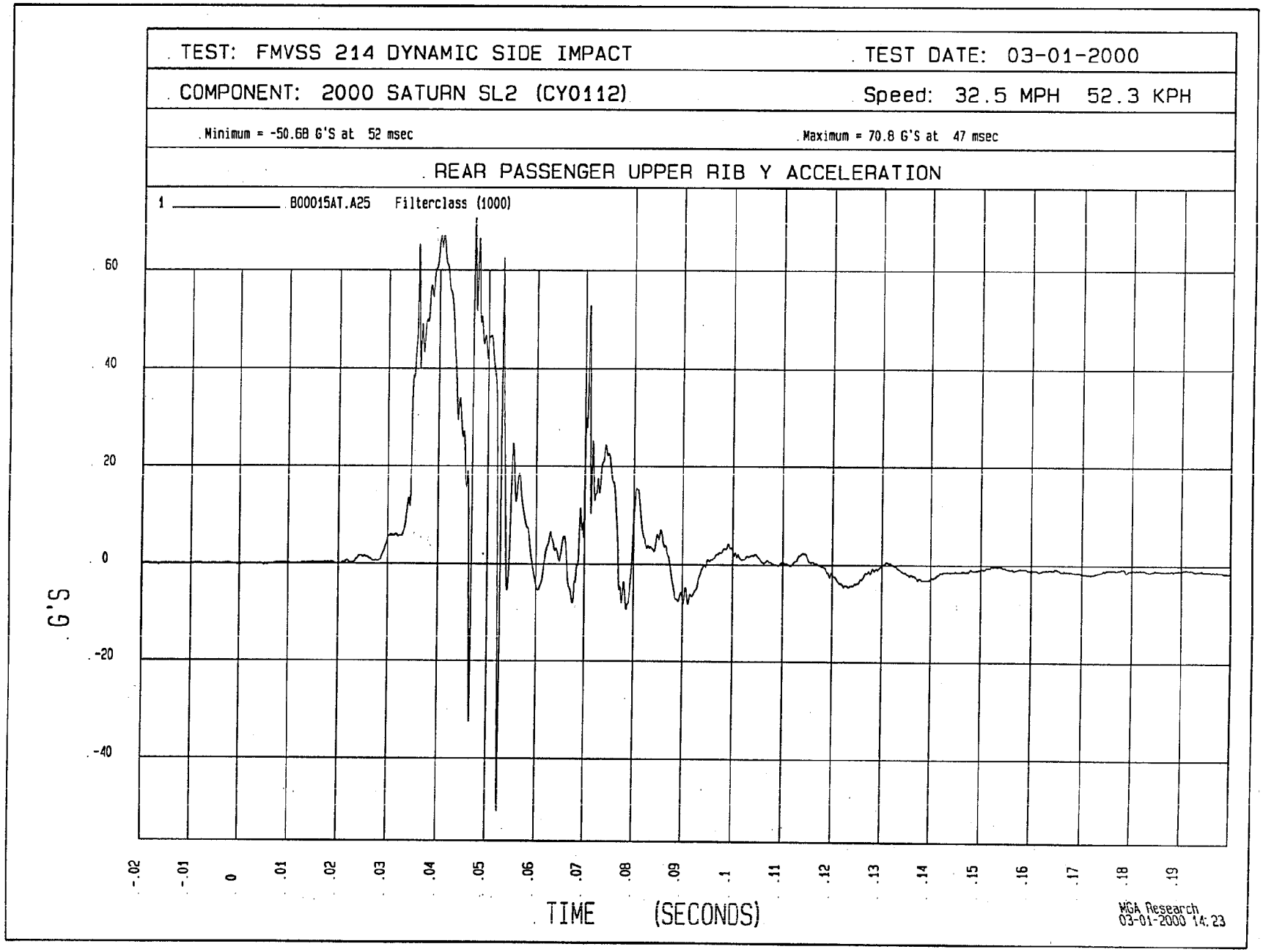

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 0 KPH at -20 msec
Maximum = 36.49 KPH at 71 msec
DRIVER LOWER RIB Y VELOCITY
1 B00015AI.V16 Filterclass (180)
KPH
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:23

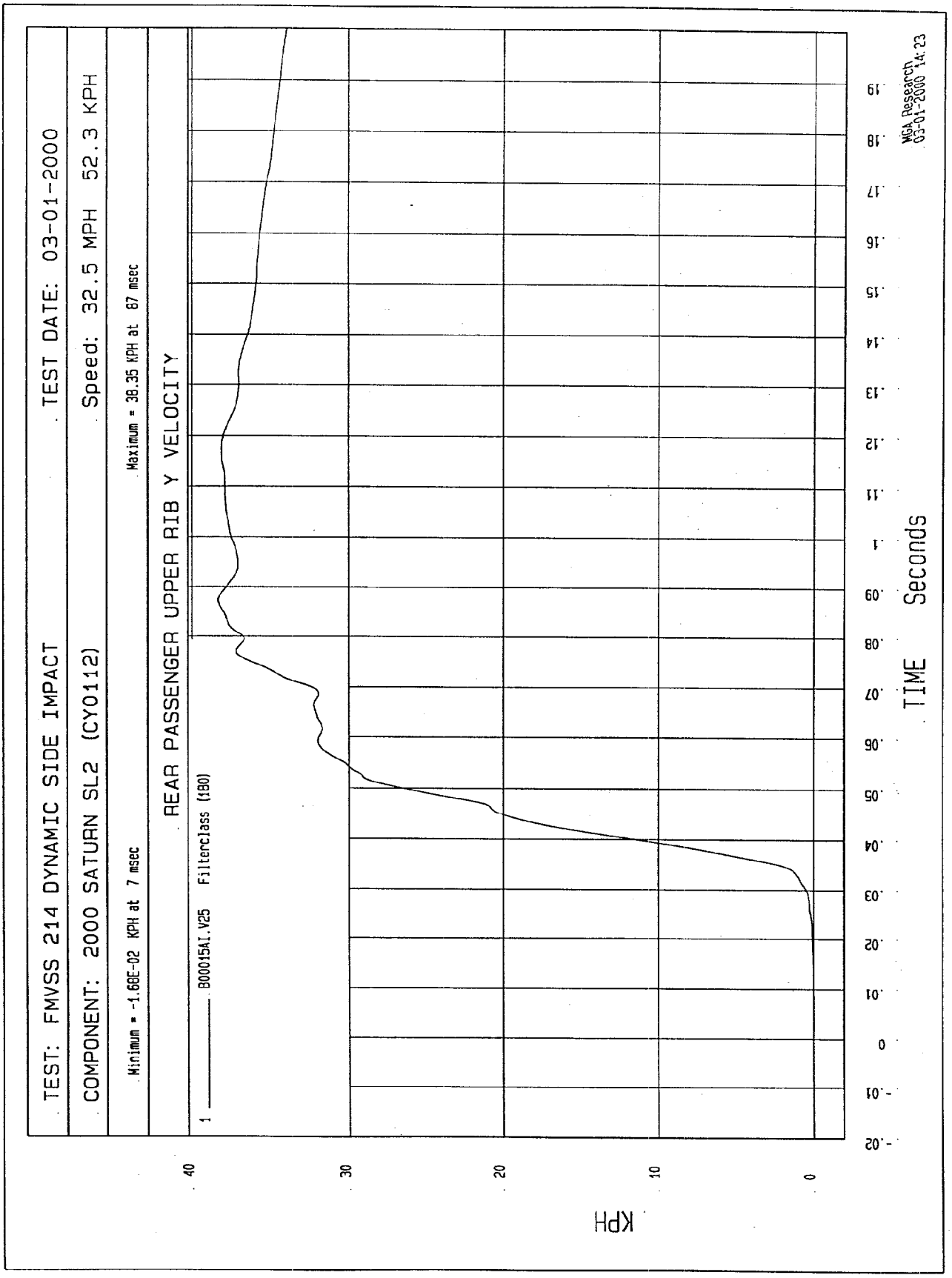

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -38.71 G'S at 63 msec
Maximum = 72.63 G'S at 36 msec
DRIVER LOWER SPINE Y ACCELERATION
1 B00015AF.A17 Filterclass (180)
60
40
20
0
-20
-40
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

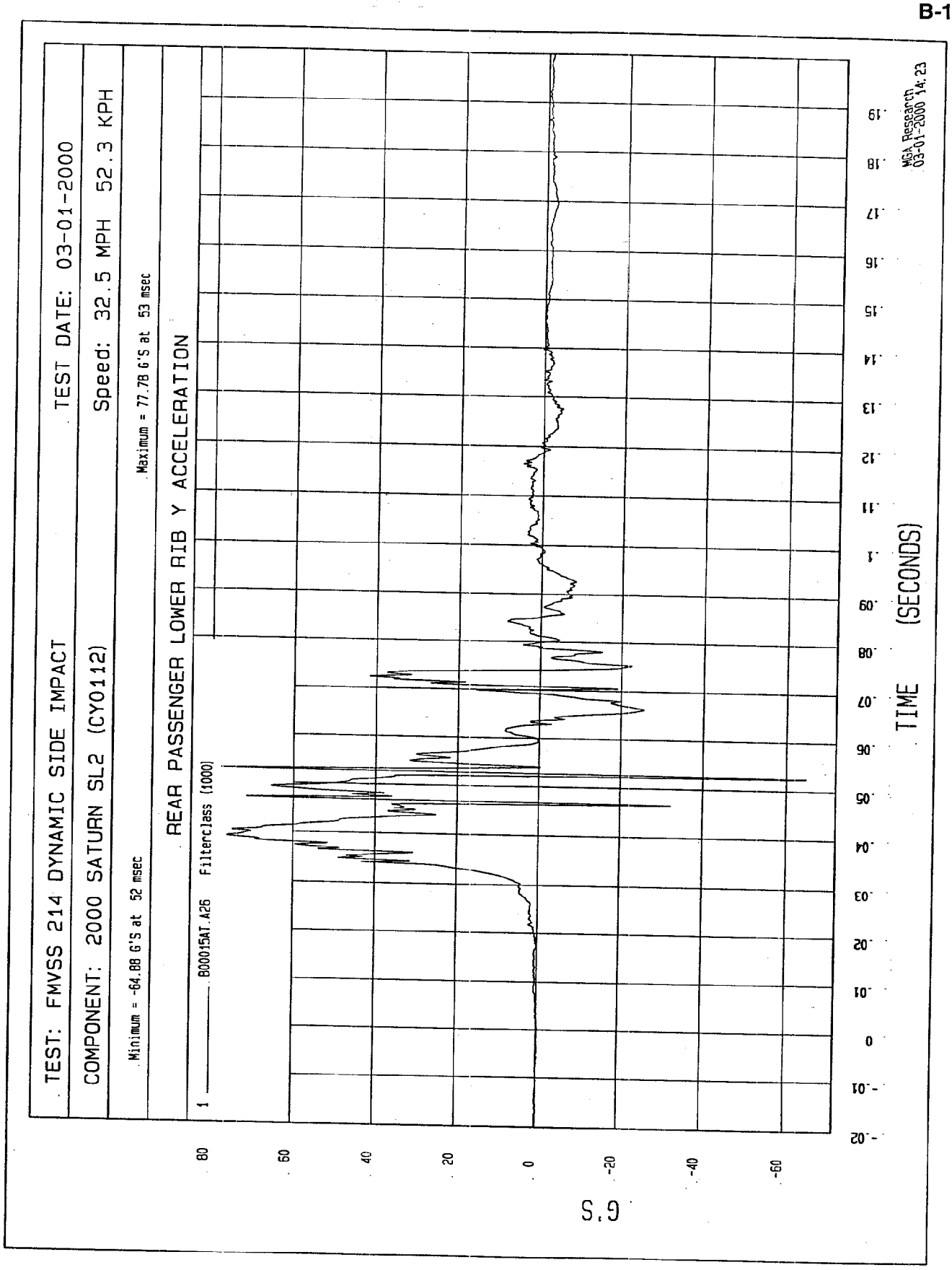

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -9.33E-02 KPH at 14 msec
Maximum = 43.74 KPH at 52 msec
DRIVER LOWER SPINE Y VELOCITY
1 B00015AI.V17 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:23

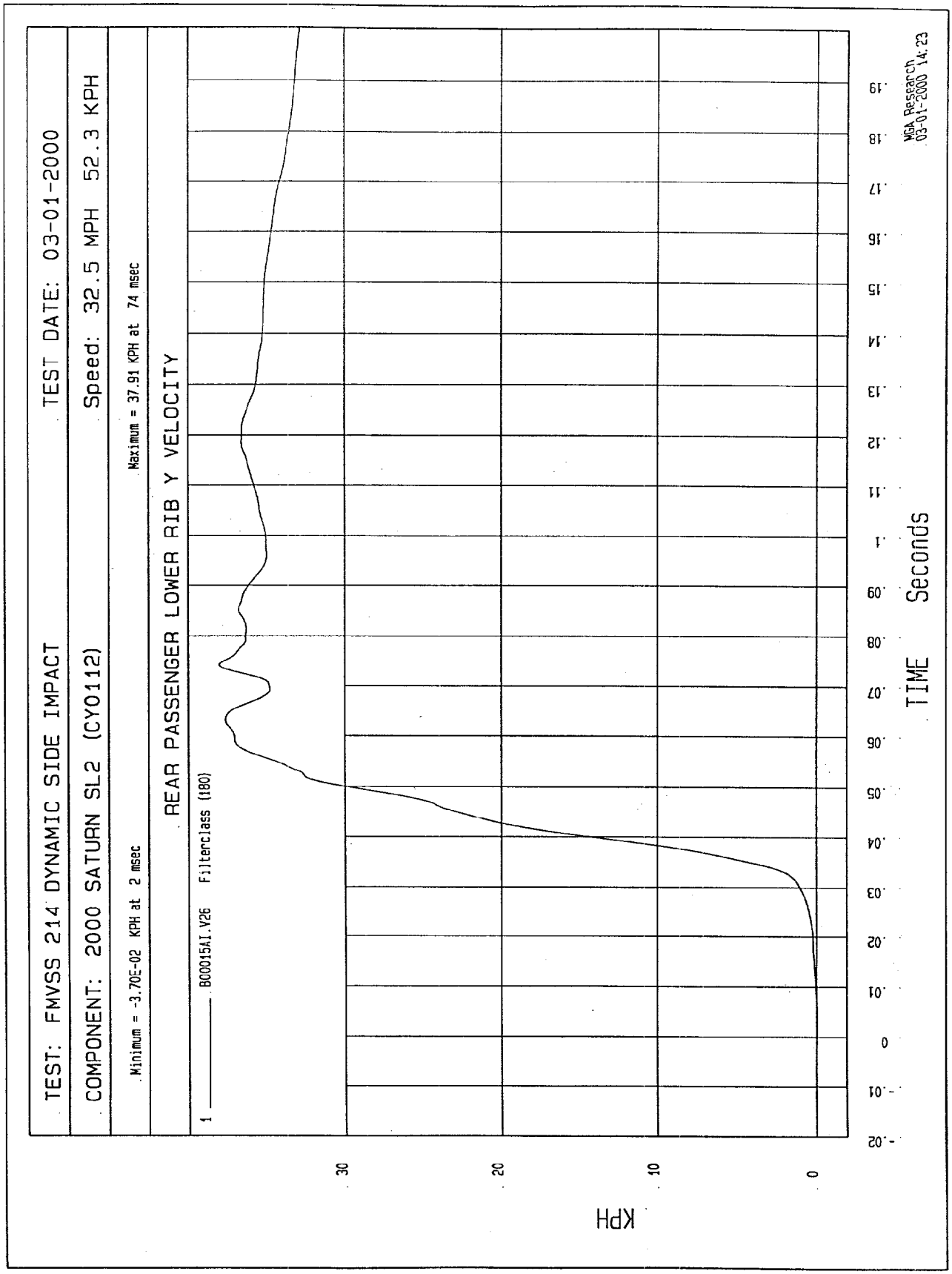

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -13.71 G'S at 54 msec
Maximum = 91.61 G'S at 30 msec
DRIVER PELVIS Y ACCELERATION
1 B00015AT.A1B Filterclass (1000)
80
60
40
20
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

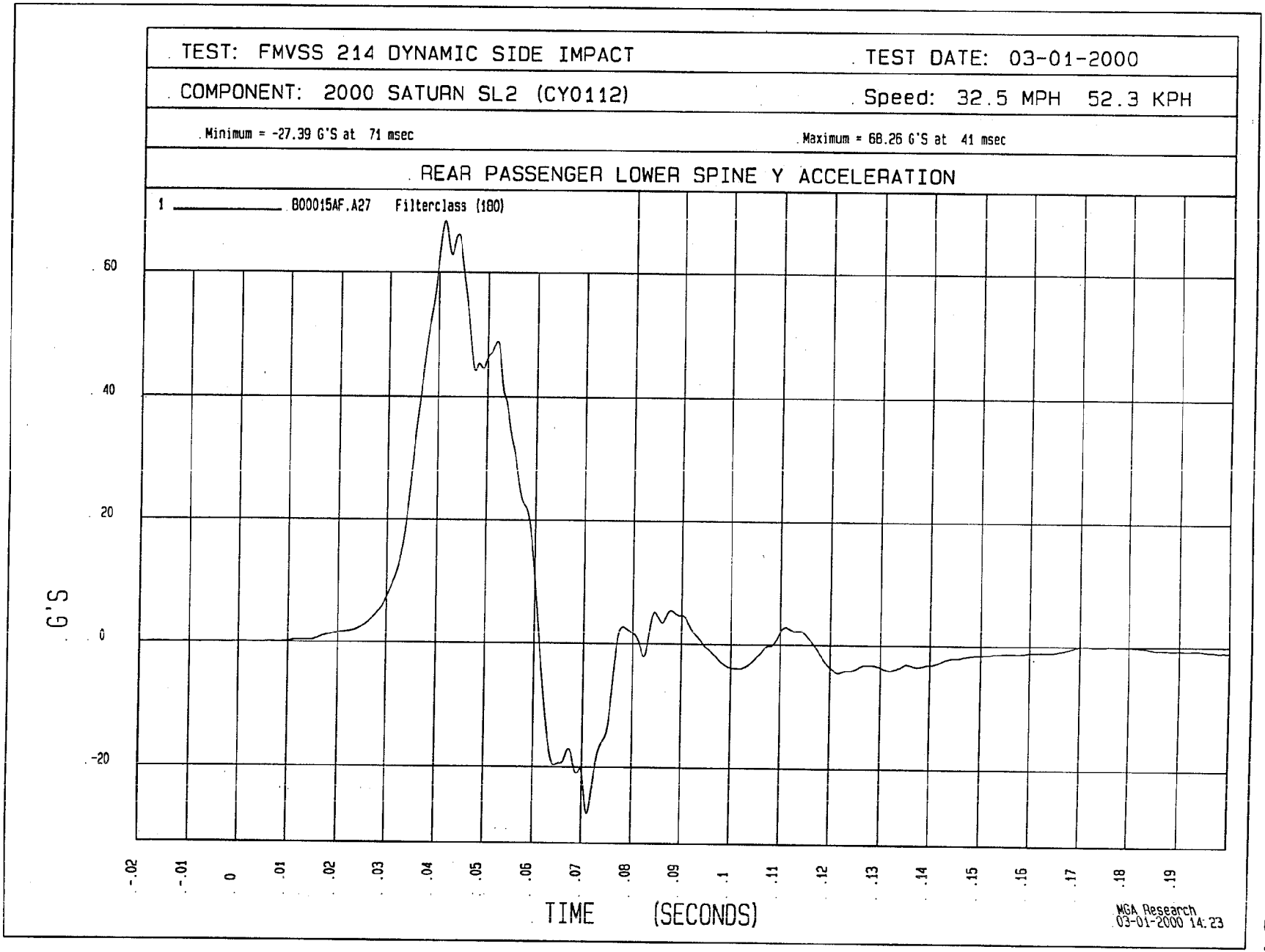

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.80E-02 KPH at 4 msec
Maximum = 37.69 KPH at 45 msec
DRIVER PELVIS Y VELOCITY
1 B00015AI.V18 Filterclass (180)
KPH
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:23

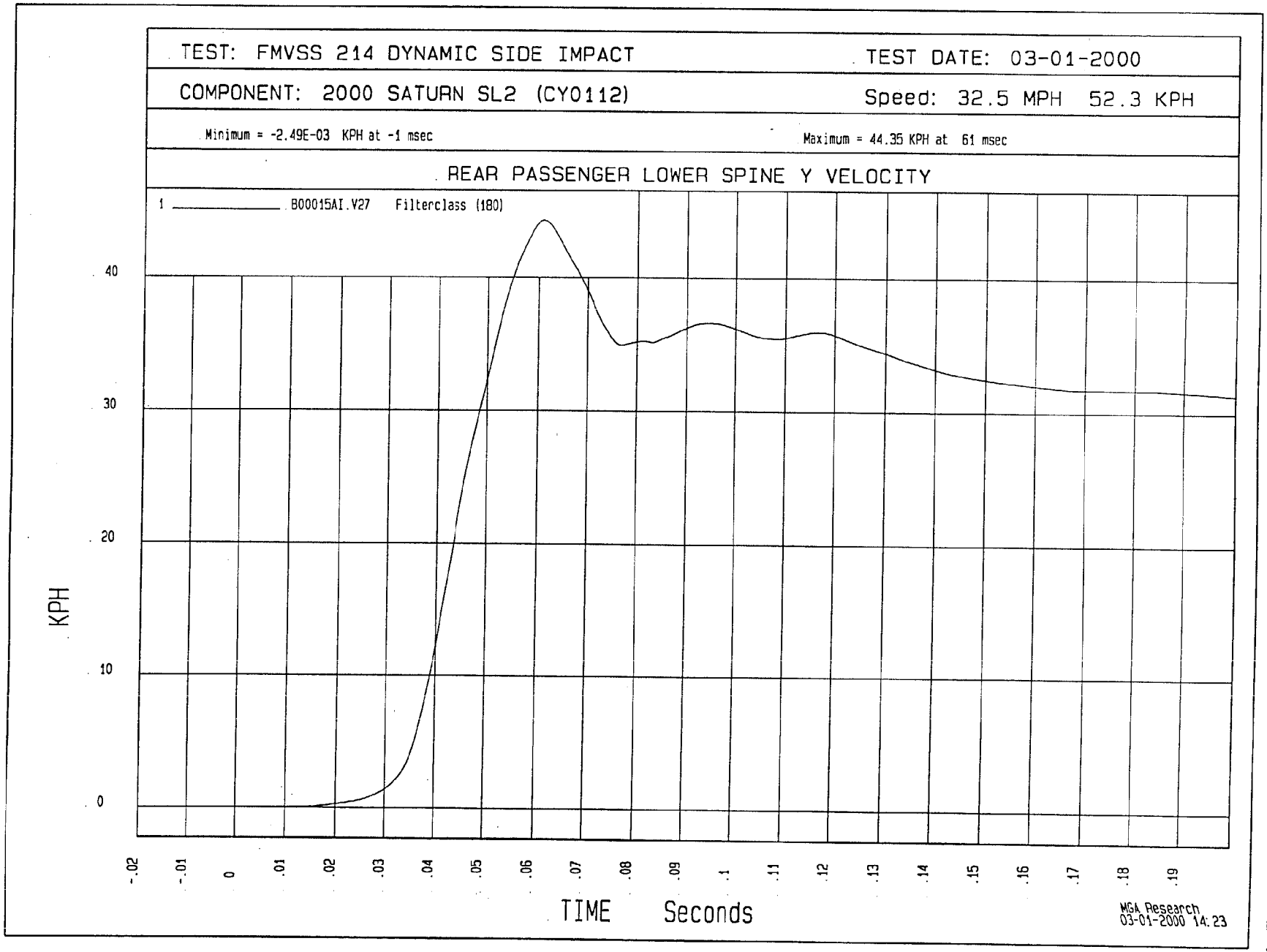

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -50.68 G'S at 52 msec
Maximum = 70.8 G'S at 47 msec
REAR PASSENGER UPPER RIB Y ACCELERATION
1 B00015AT.A25 Filterclass (1000)
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

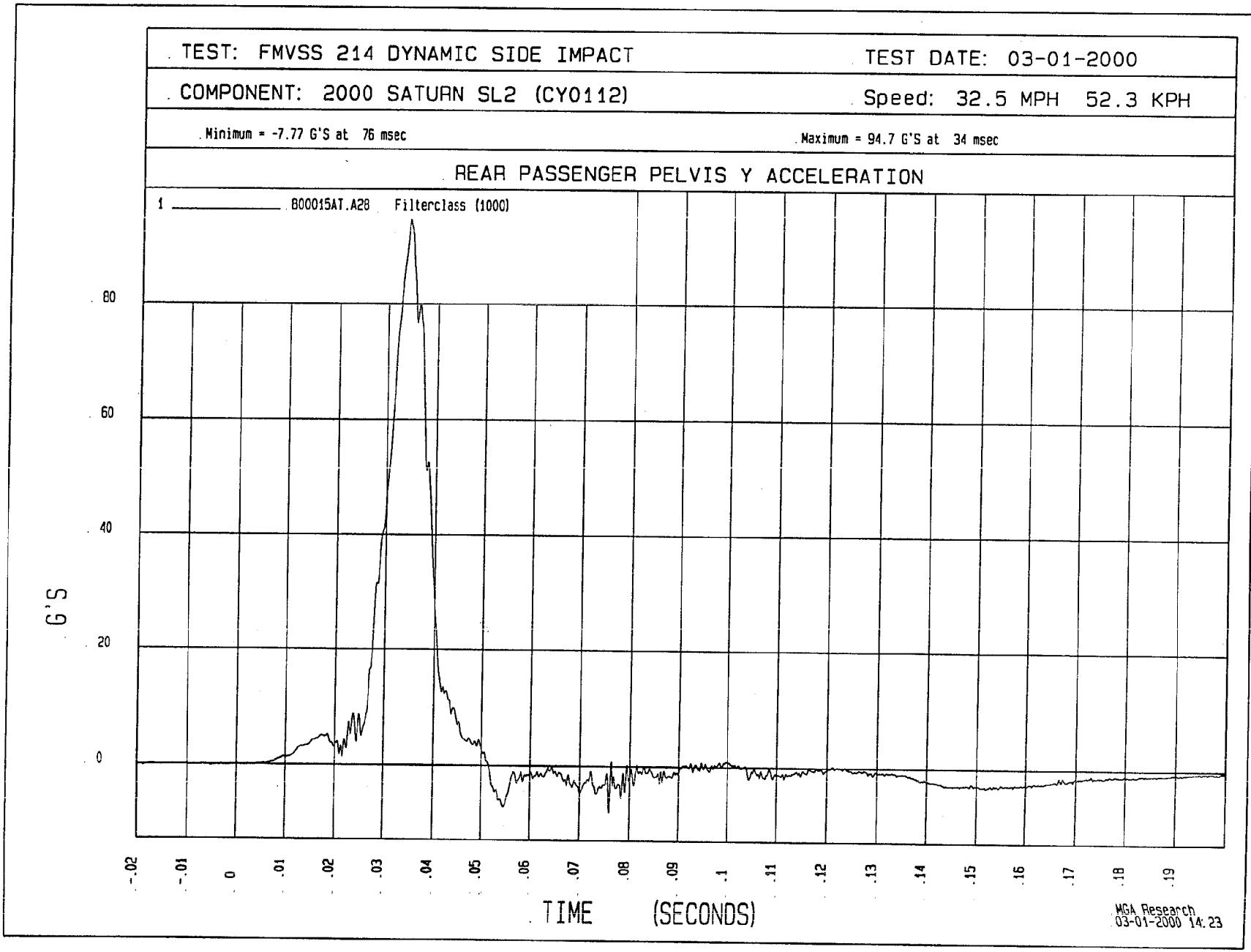

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.66E-02 KPH at 7 msec
Maximum = 38.35 KPH at 87 msec
REAR PASSENGER UPPER RIB Y VELOCITY
1 B00015AI.V25 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:23

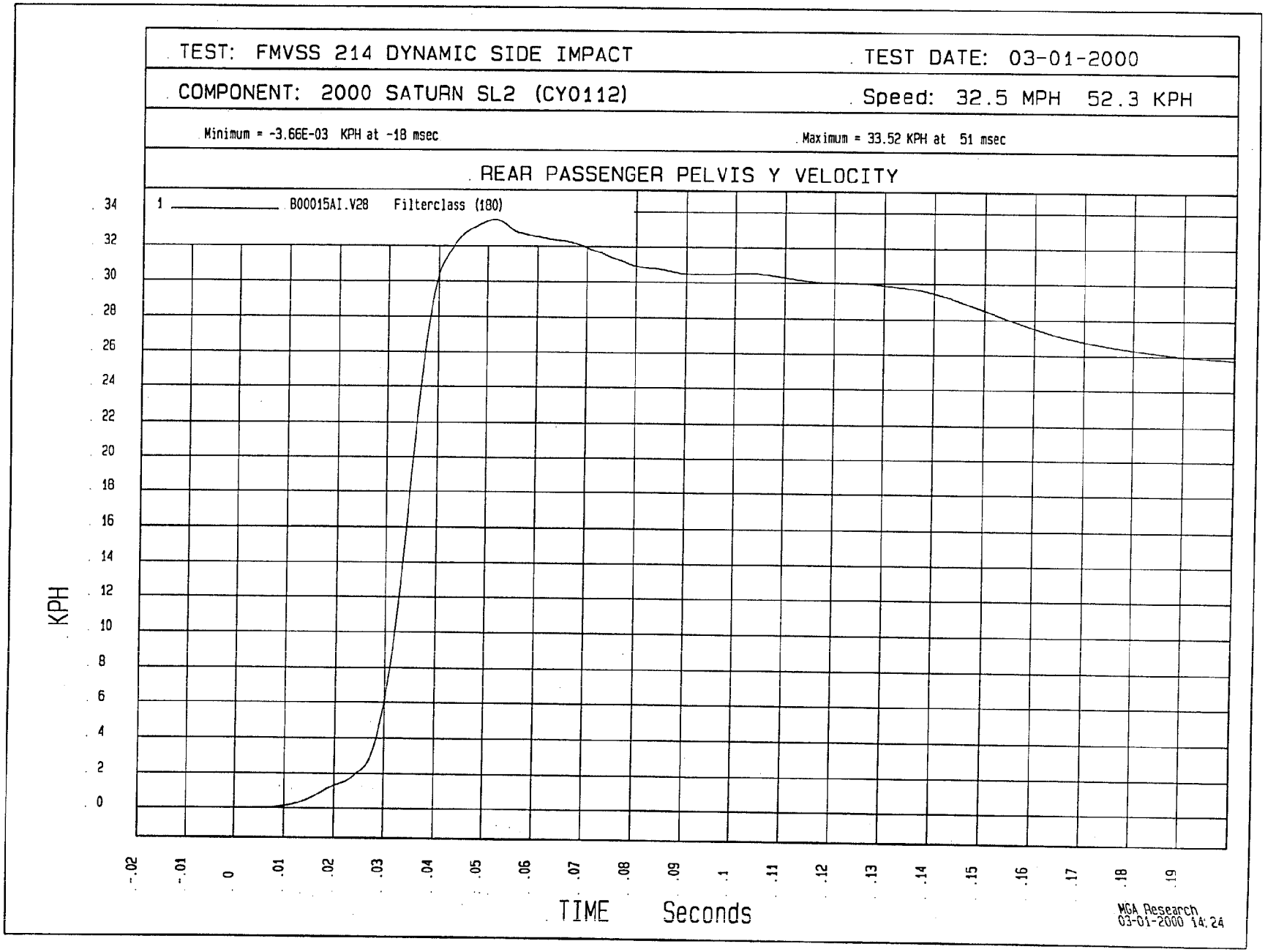

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -64.88 G'S at 52 msec
Maximum = 77.78 G'S at 53 msec
REAR PASSENGER LOWER RIB Y ACCELERATION
1 B00015AT.A26 Filterclass (1000)
80
60
40
20
0
-20
-40
-60
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

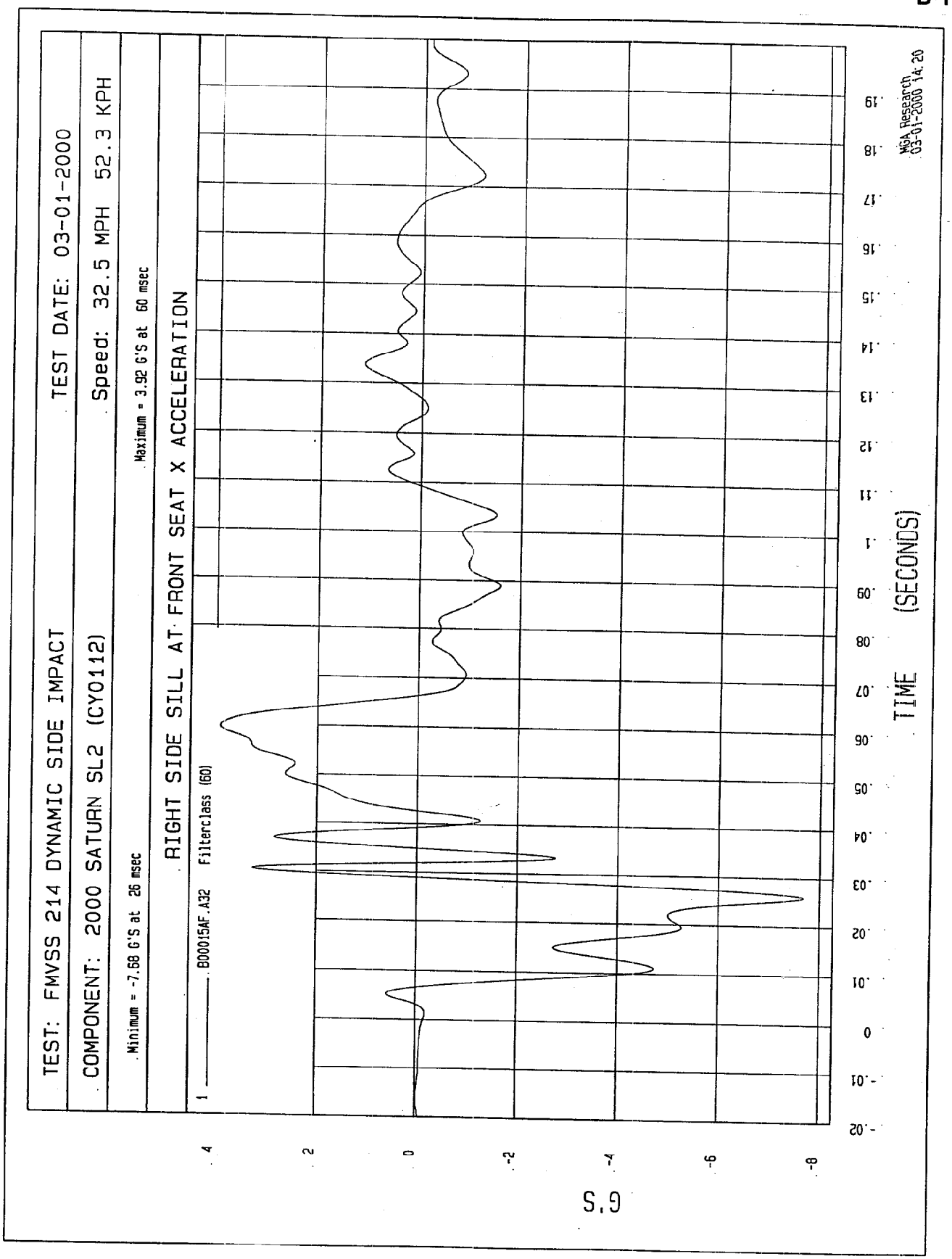

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.70E-02 KPH at 2 msec
Maximum = 37.91 KPH at 74 msec
REAR PASSENGER LOWER RIB Y VELOCITY
1 B00015AI.V26 Filterclass (180)
KPH
30
20
10
0
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
03-01-2000 14:23

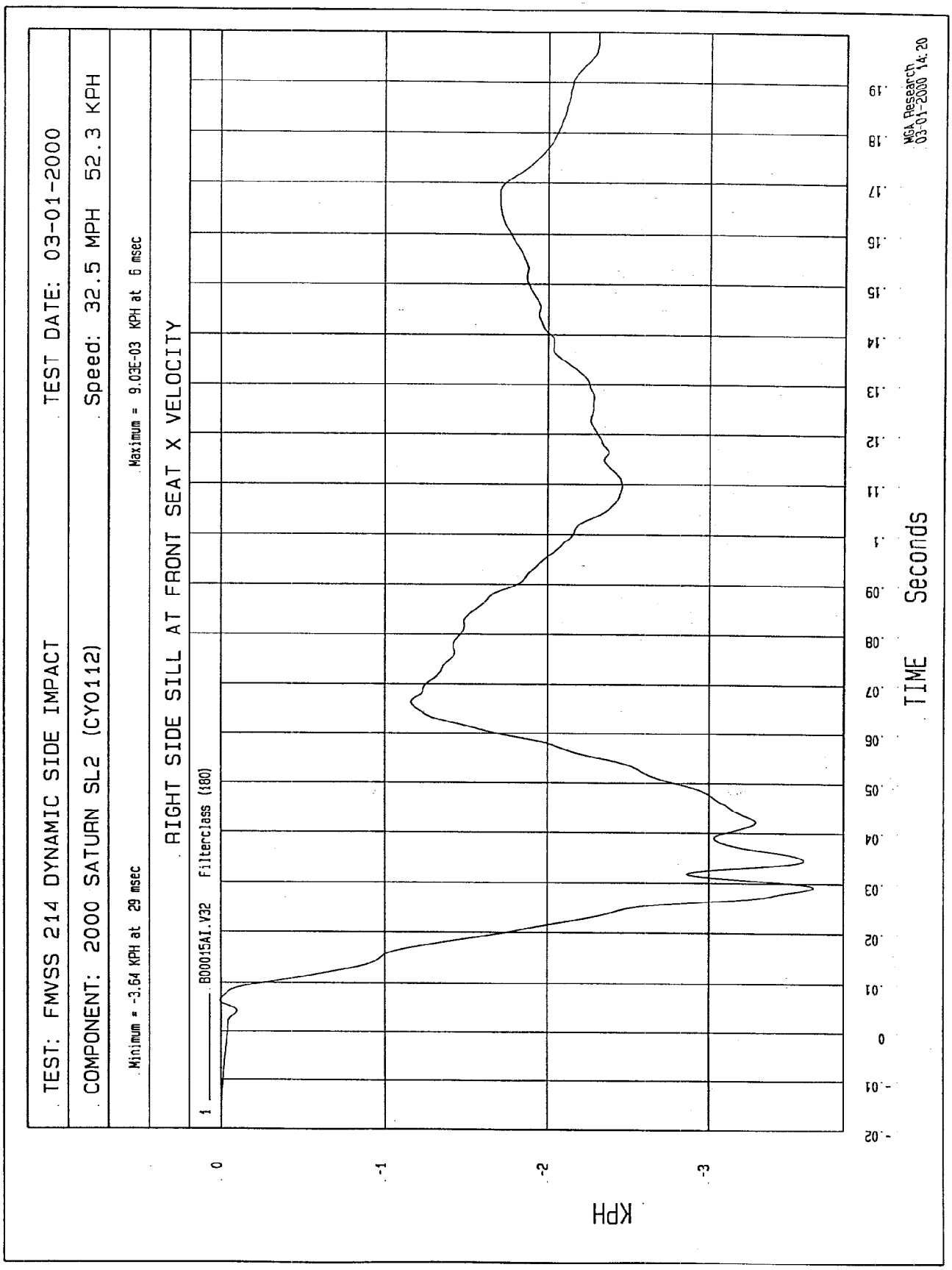

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -27.39 G'S at 71 msec
Maximum = 68.26 G'S at 41 msec
REAR PASSENGER LOWER SPINE Y ACCELERATION
1 B00015AF.A27 Filterclass (180)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

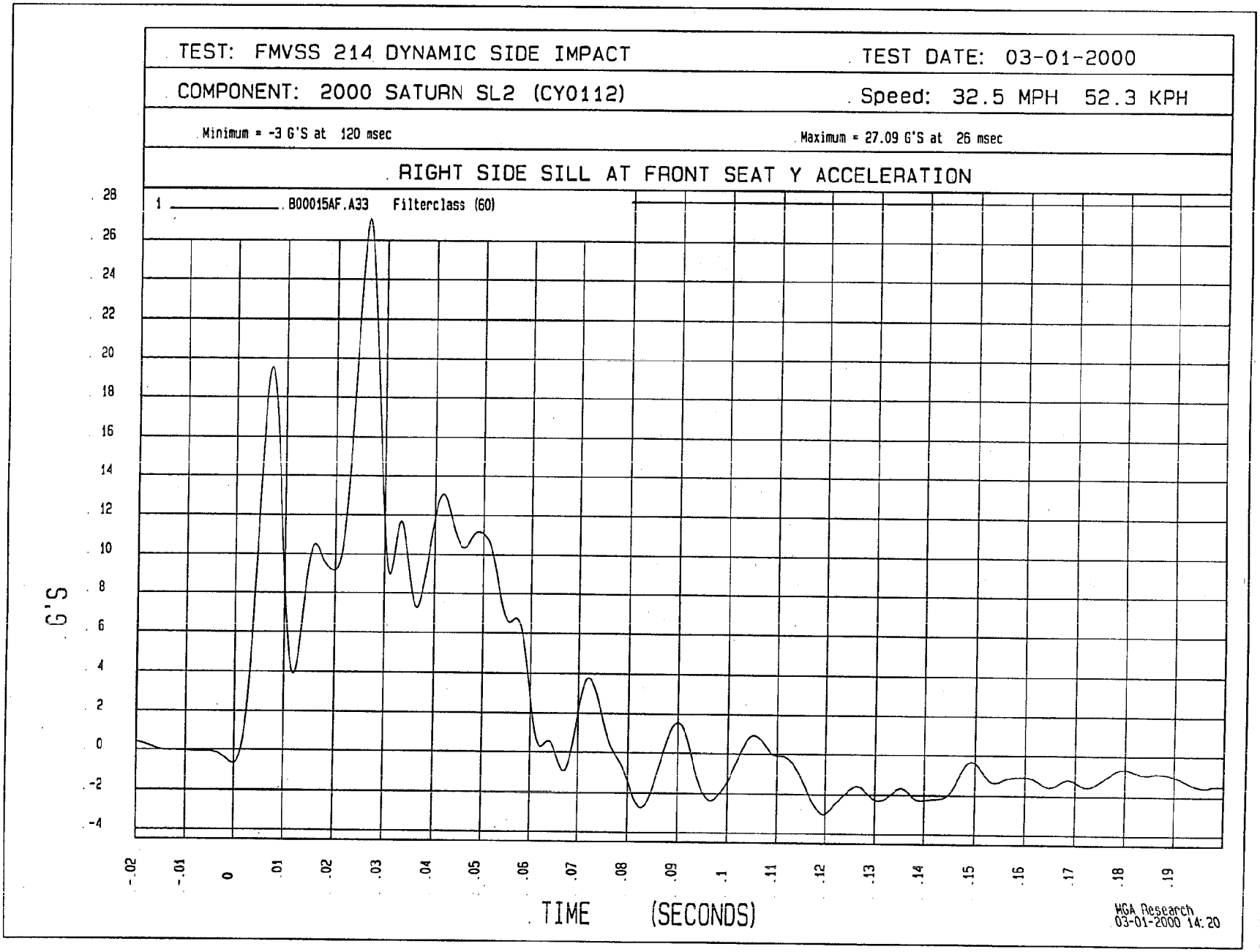

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.49E-03 KPH at -1 msec
Maximum = 44.35 KPH at 61 msec
REAR PASSENGER LOWER SPINE Y VELOCITY
1 B00015AI.V27 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:23

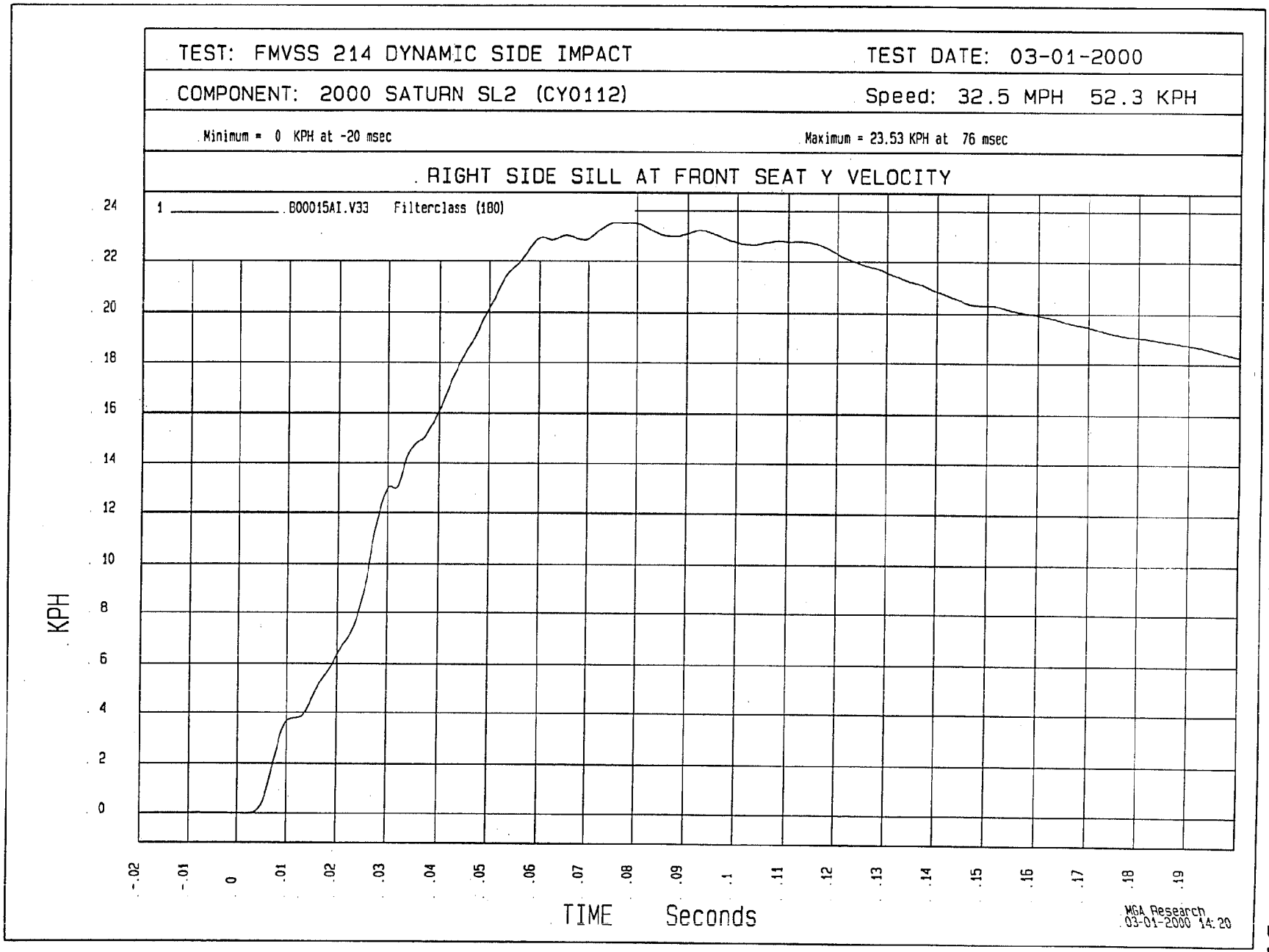

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -7.77 G'S at 76 msec
Maximum = 94.7 G'S at 34 msec
REAR PASSENGER PELVIS Y ACCELERATION
1 B00015AT.A28 Filterclass (1000)
G'S
80
60
40
20
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:23

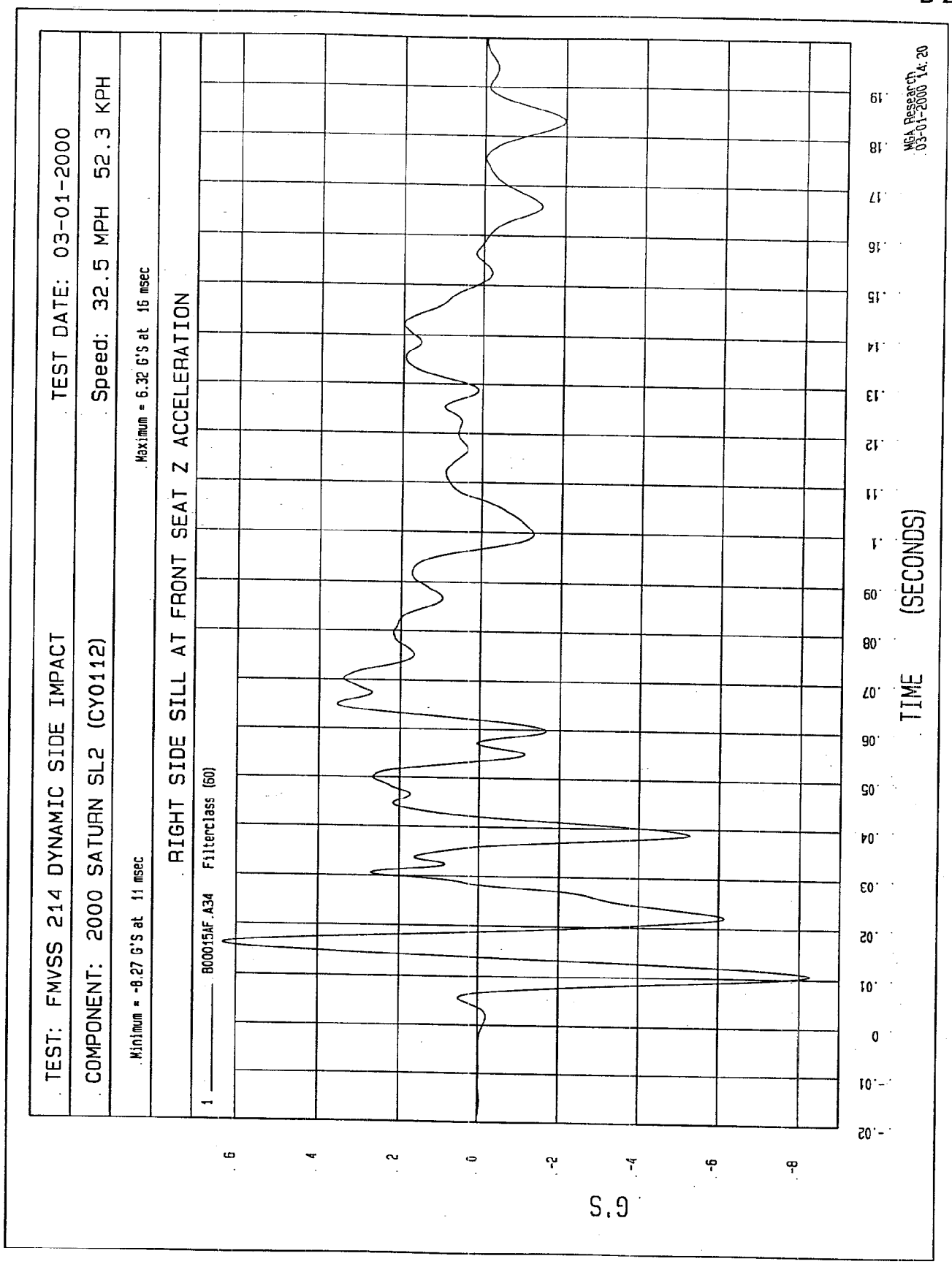

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.66E-03 KPH at -18 msec
Maximum = 33.52 KPH at 51 msec
REAR PASSENGER PELVIS Y VELOCITY
1 B00015AI.V28 Filterclass (180)
KPH
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -7.68 G'S at 26 msec
Maximum = 3.92 G'S at 60 msec
RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION
1 B00015AF.A32 Filterclass (60)
4
2
0
-2
-4
-6
-8
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.64 KPH at 29 msec
Maximum = 9.03E-03 KPH at 6 msec
RIGHT SIDE SILL AT FRONT SEAT X VELOCITY
1 B0001SAI.V32 Filterclass (180)
KPH
0
-1
-2
-3
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3 G'S at 120 msec
Maximum = 27.09 G'S at 26 msec
RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION
1 B00015AF.A33 Filterclass (60)
G'S
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 0 KPH at -20 msec
Maximum = 23.53 KPH at 76 msec
RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY
1 B00015AI.V33 Filterclass (180)
KPH
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -8.27 G'S at 11 msec
Maximum = 6.32 G'S at 16 msec
RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION
1 B00015AF.A34 Filterclass (60)
MGA Research
03-01-2000 14:20
6
4
2
0
-2
-4
-6
-8
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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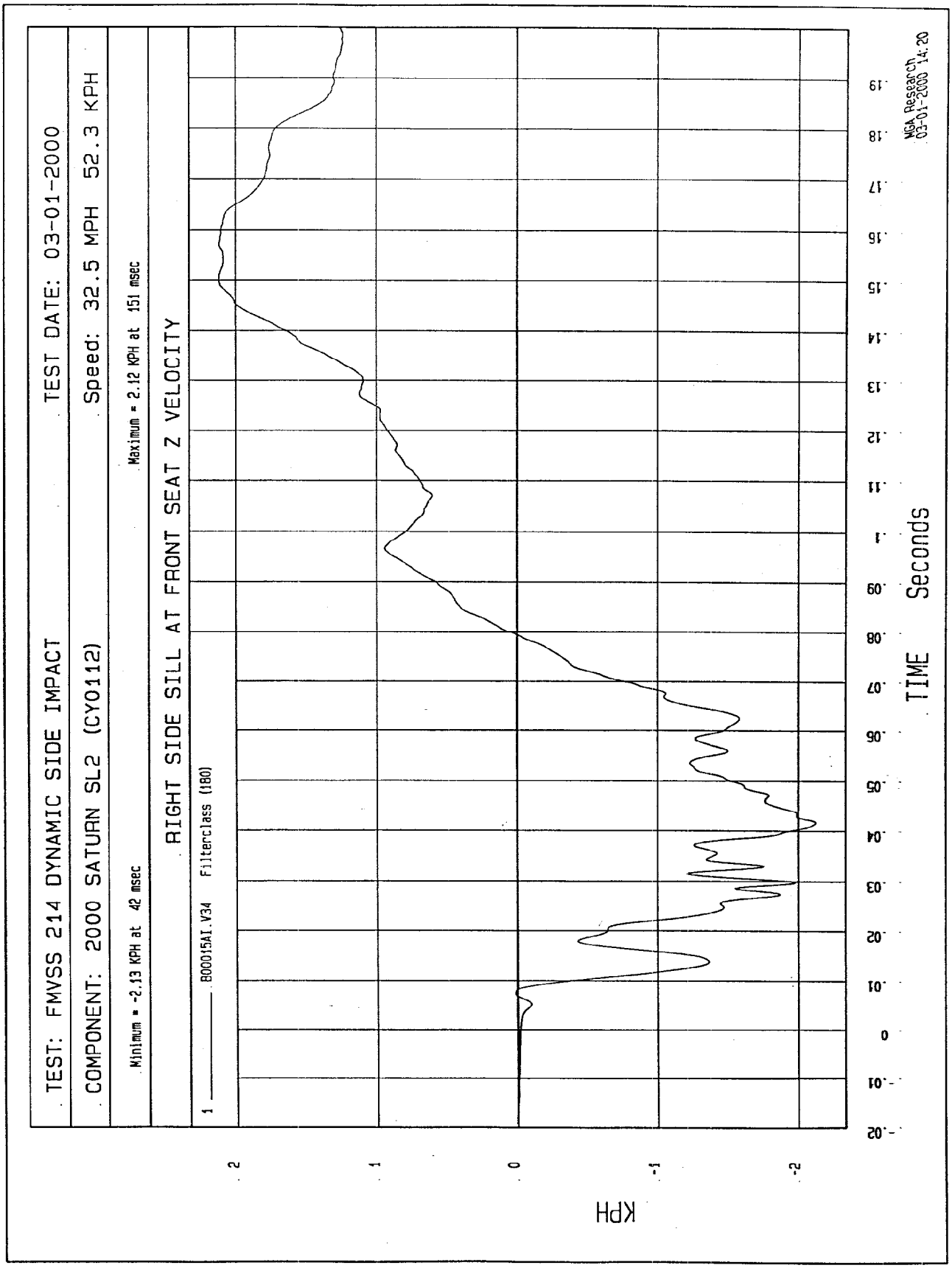
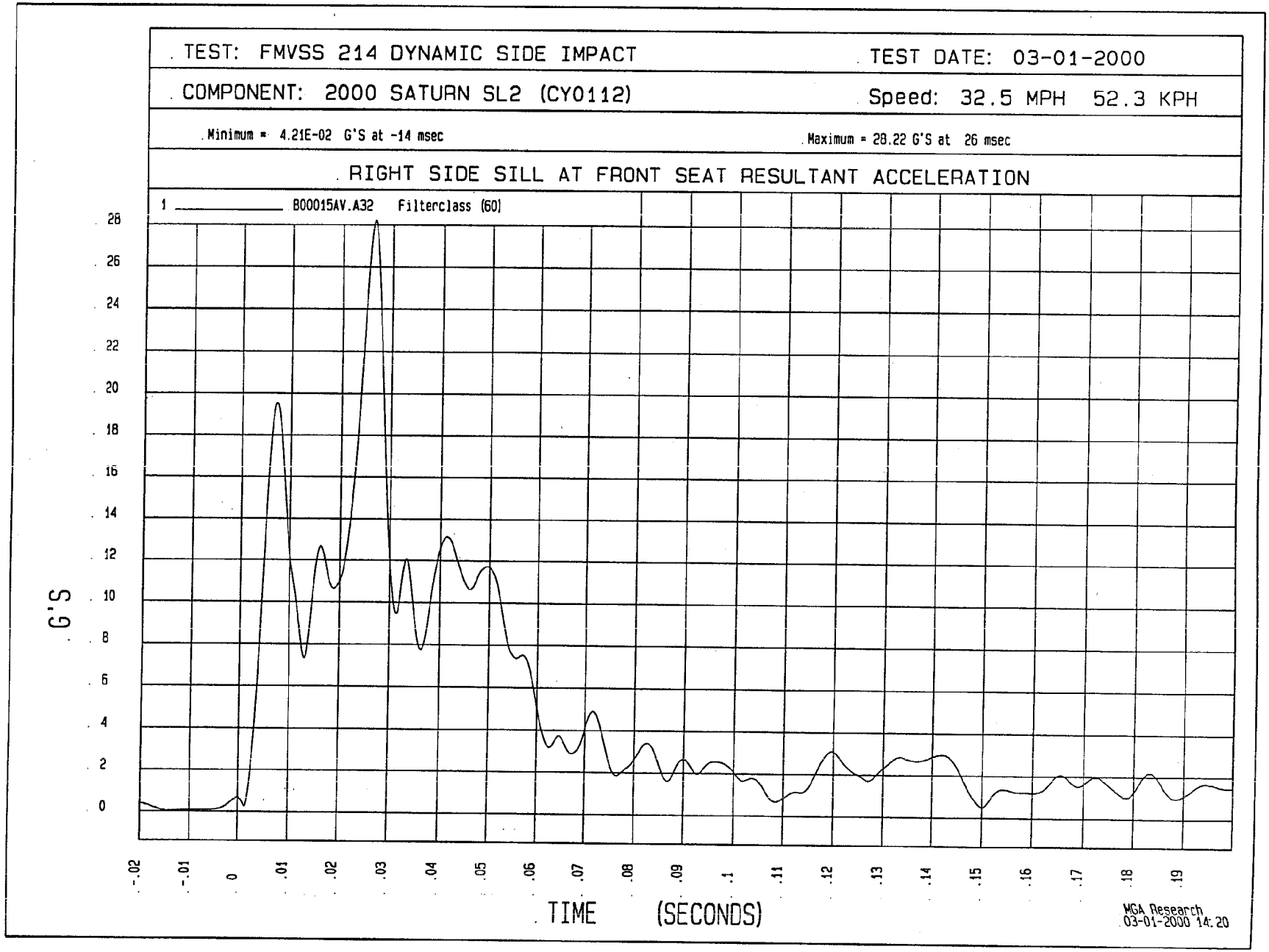
.17
.18
.19
TIME (SECONDS)
G's


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.13 KPH at 42 msec
Maximum = 2.12 KPH at 151 msec
RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY
1 B00015AI.V34 Filterclass (180)
KPH
TIME Seconds
NGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 4.21E-02 G'S at -14 msec
Maximum = 28.22 G'S at 26 msec
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION
1 B00015AV.A32 Filterclass (60)
G'S
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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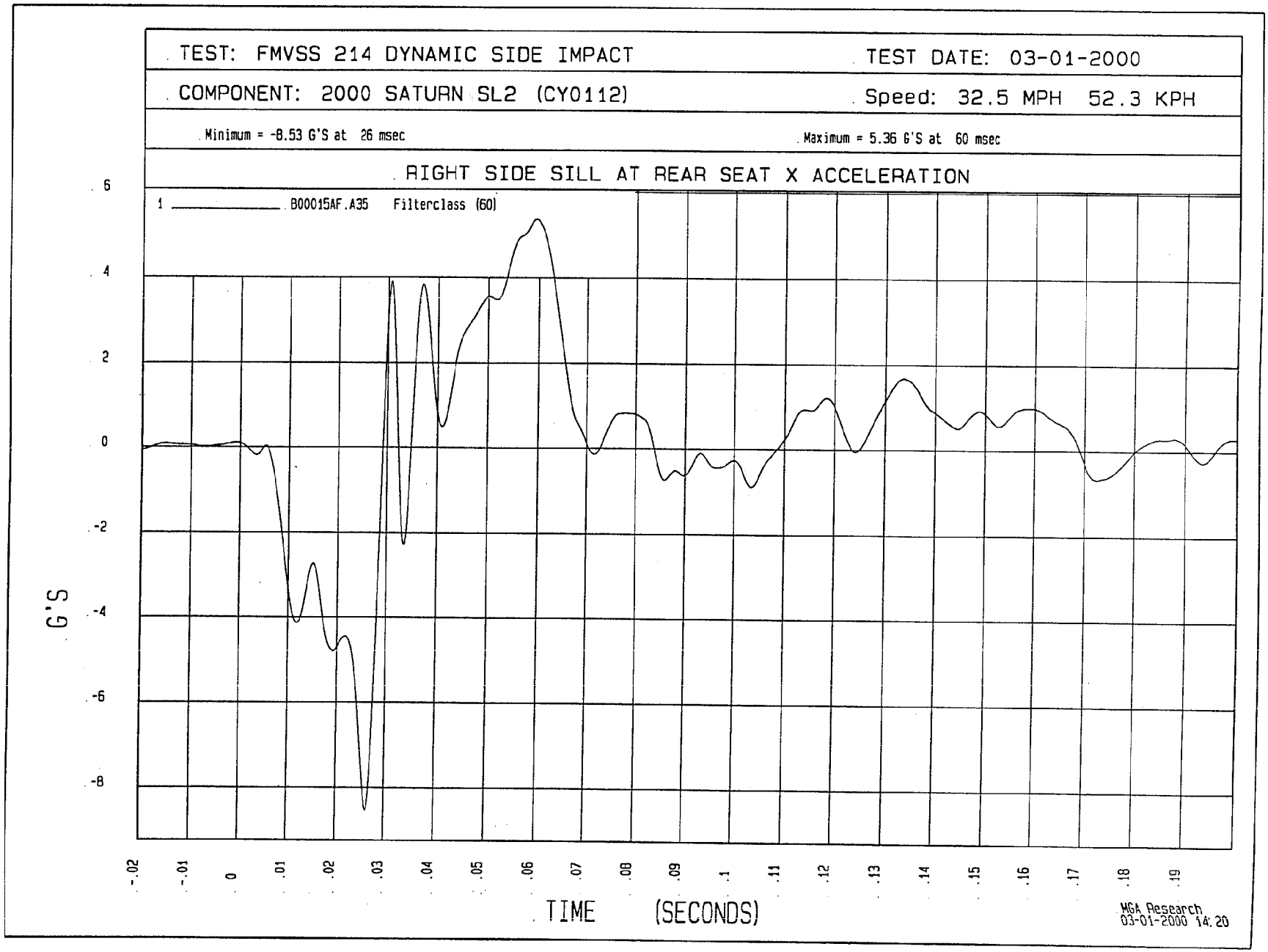
TIME (SECONDS)
MGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -8.53 G'S at 26 msec
Maximum = 5.36 G'S at 60 msec
RIGHT SIDE SILL AT REAR SEAT X ACCELERATION
1 B00015AF.A35 Filterclass (60)
6
4
2
0
-2
-4
-6
-8
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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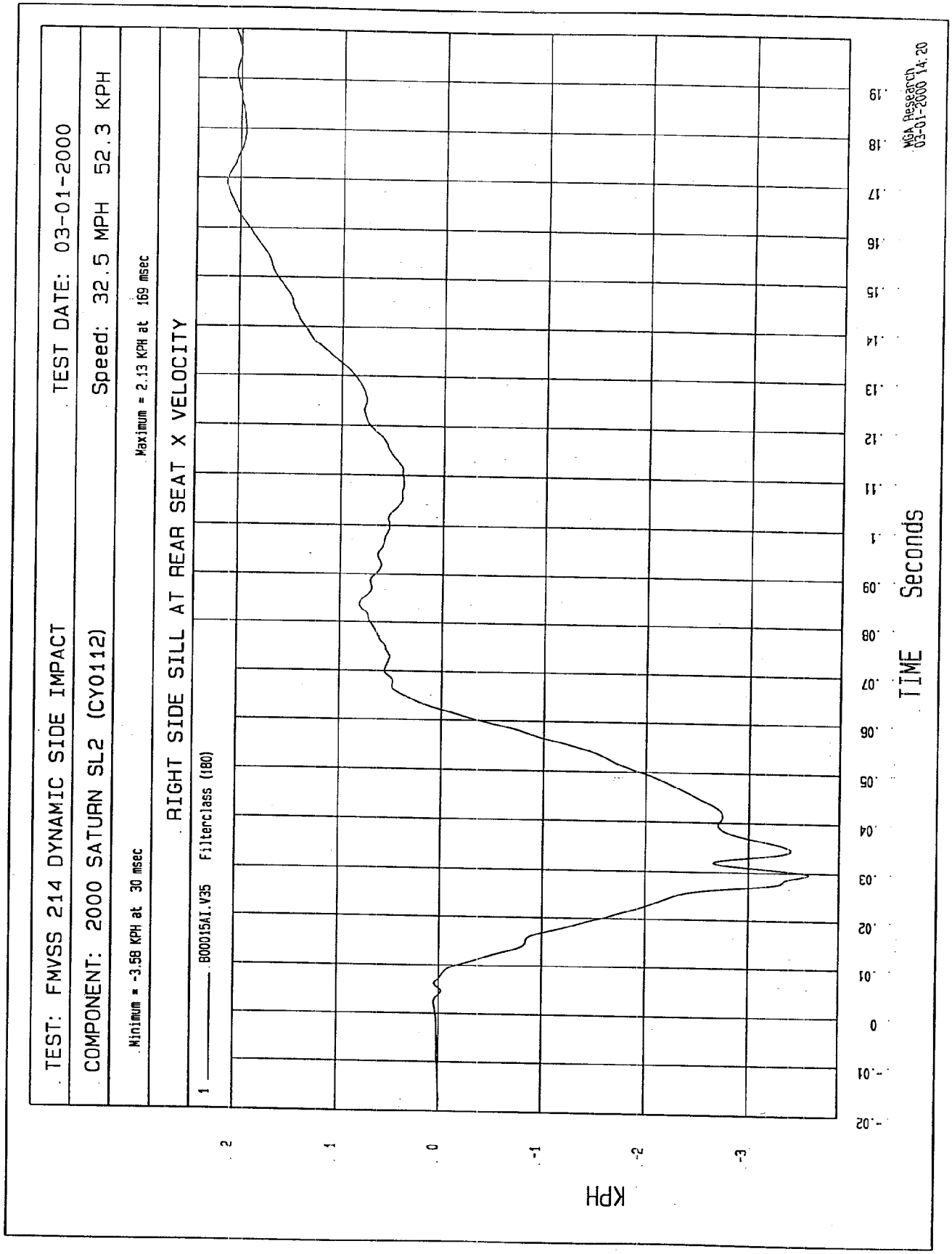
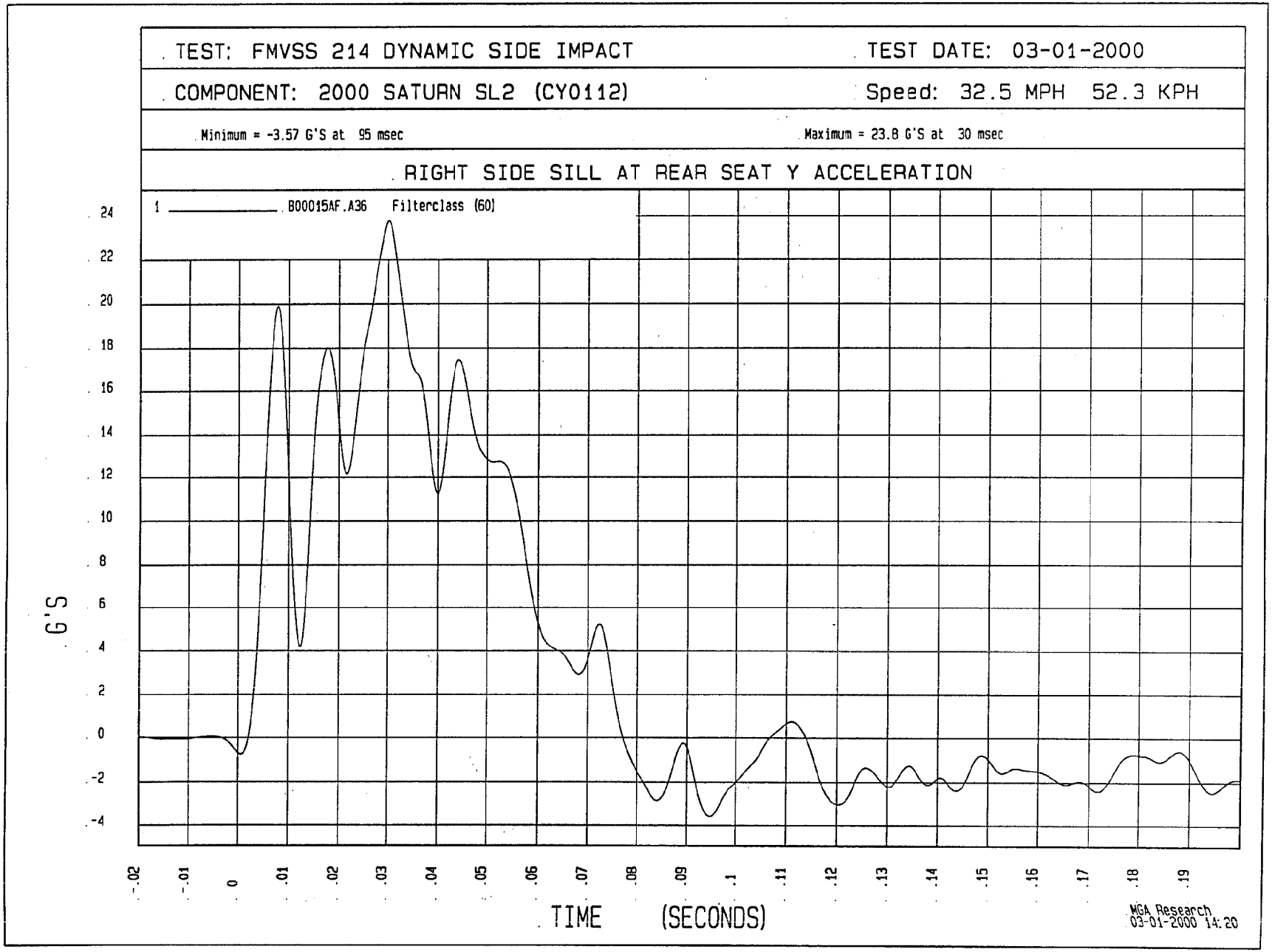
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.58 KPH at 30 msec
Maximum = 2.13 KPH at 169 msec
RIGHT SIDE SILL AT REAR SEAT X VELOCITY
1 B00015AI.V35 Filterclass (180)
KPH
TIME Seconds
NGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.57 G'S at 95 msec
Maximum = 23.8 G'S at 30 msec
RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION
1 B00015AF.A36 Filterclass (60)
G'S
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.13
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.18
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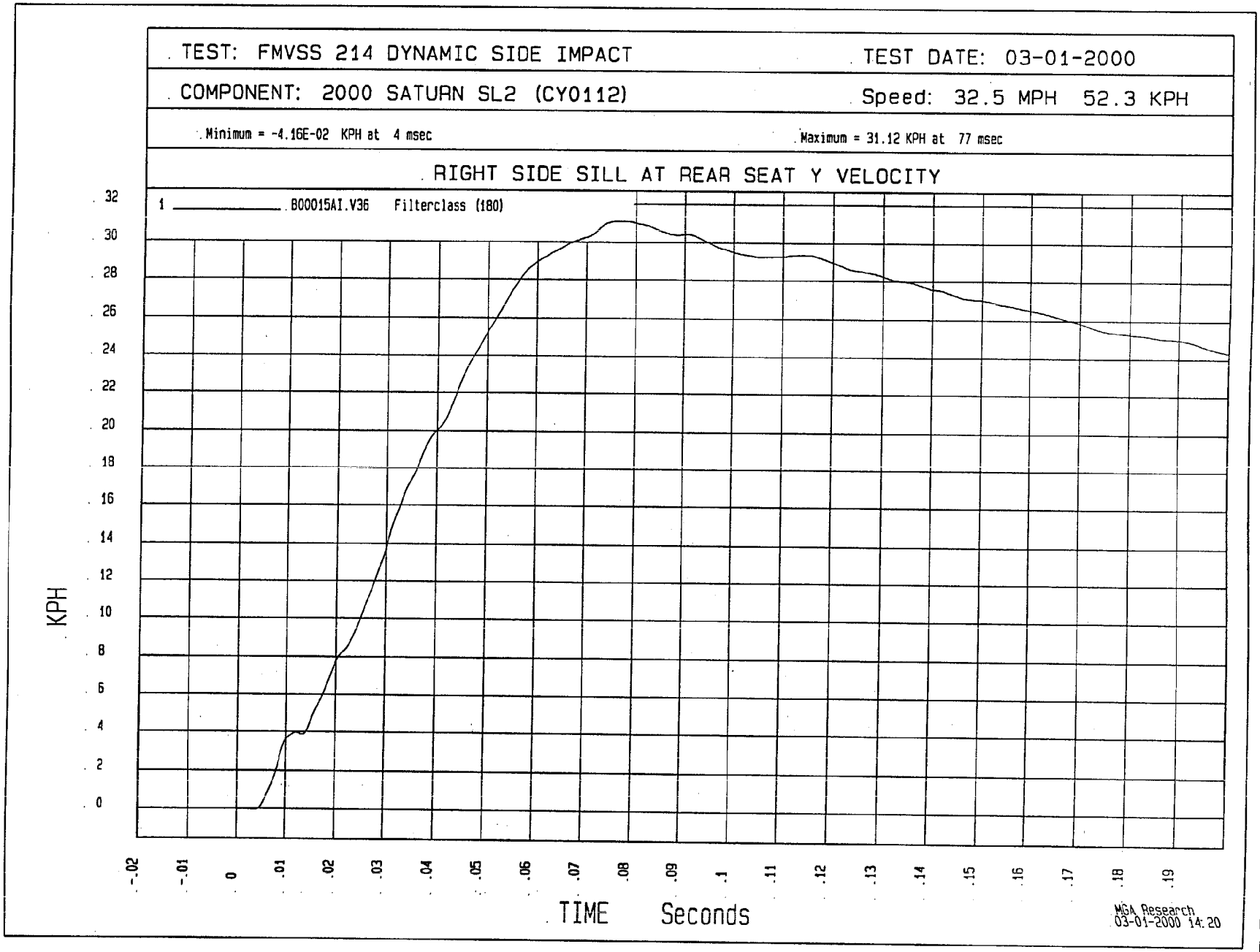
TIME (SECONDS)
MGA Research
03-01-2000 14:20


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -4.16E-02 KPH at 4 msec
Maximum = 31.12 KPH at 77 msec
RIGHT SIDE SILL AT REAR SEAT Y VELOCITY
1 B00015AI.V36 Filterclass (180)
KPH
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.11
.12
.13
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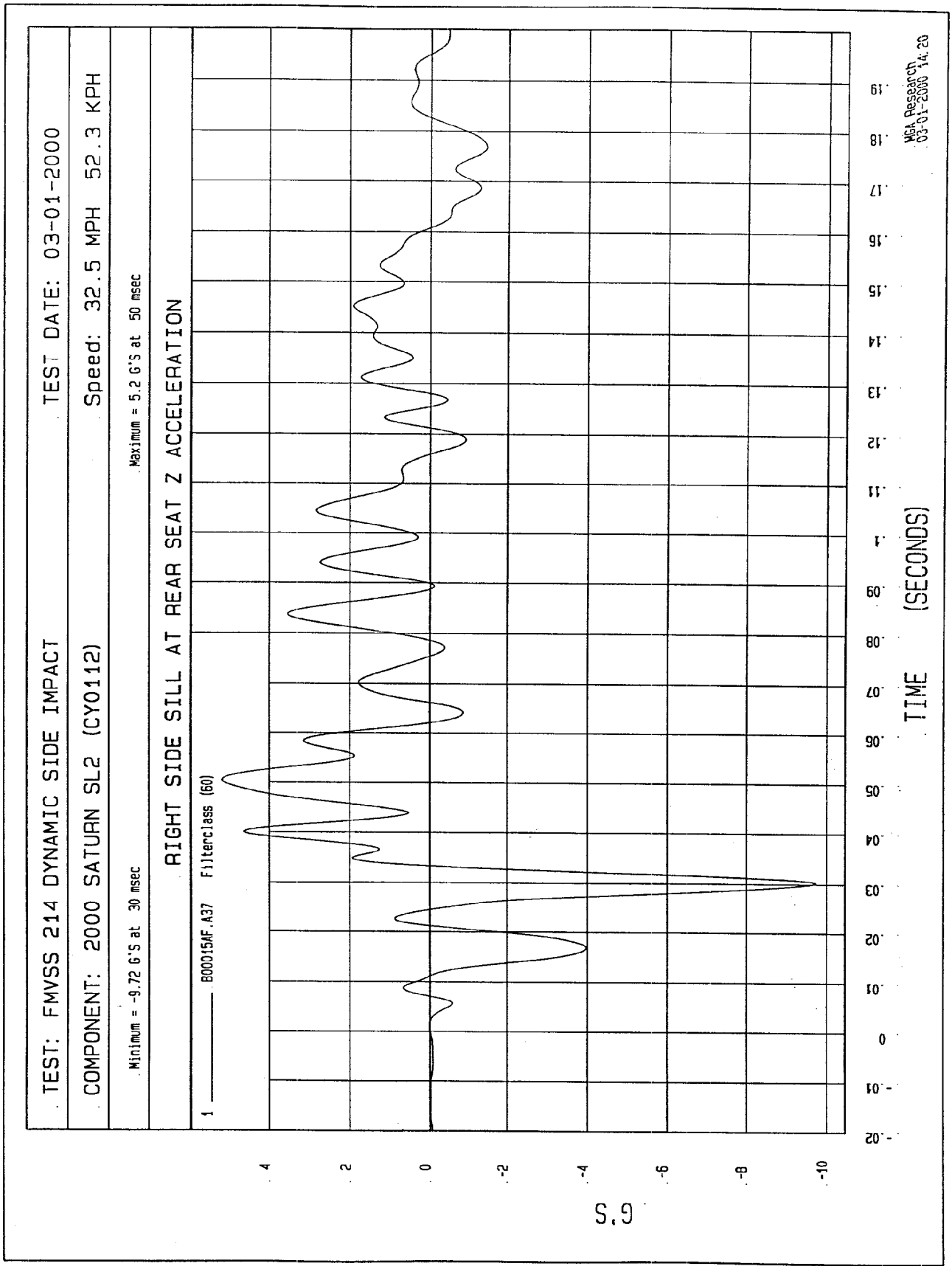
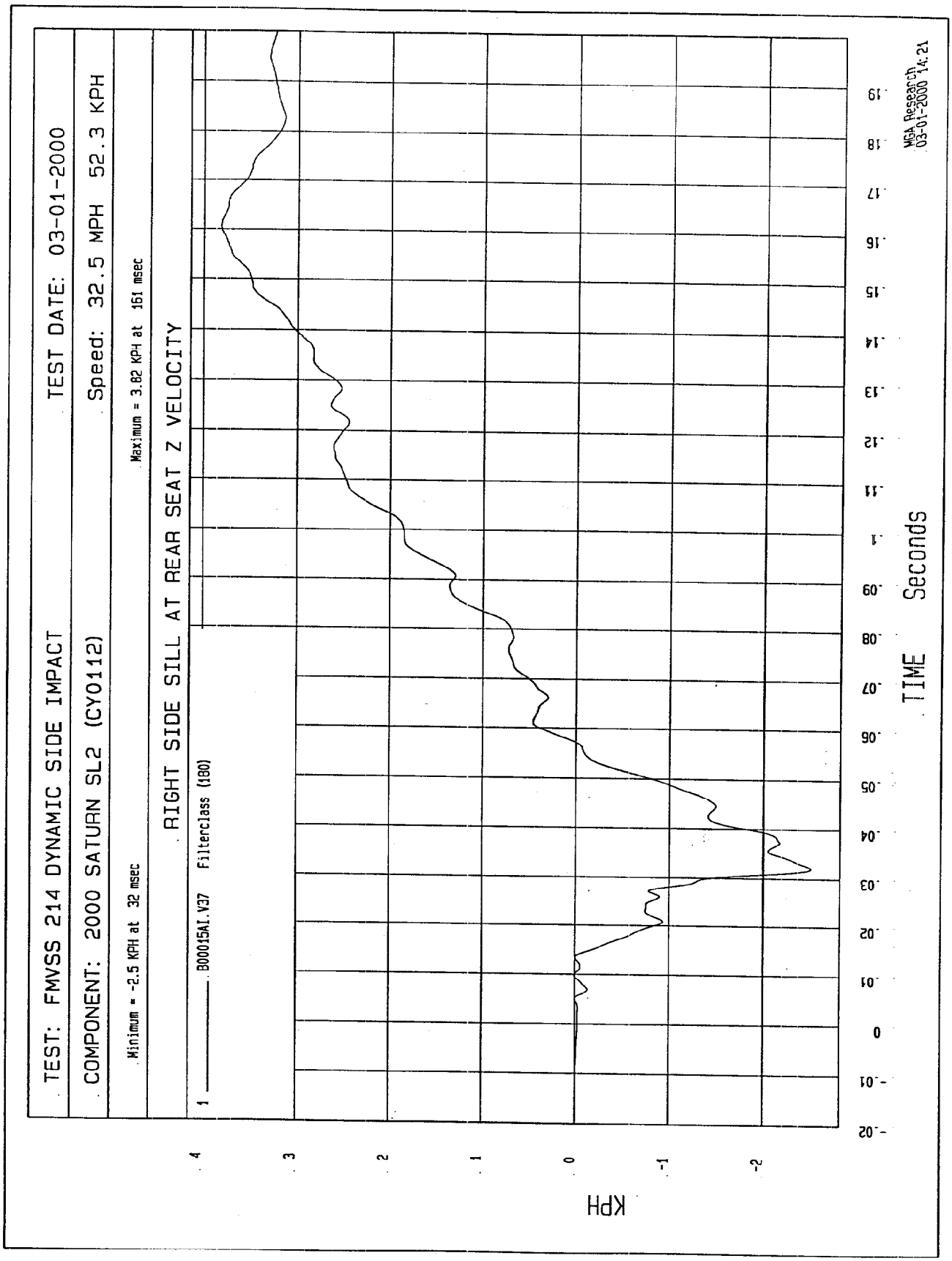
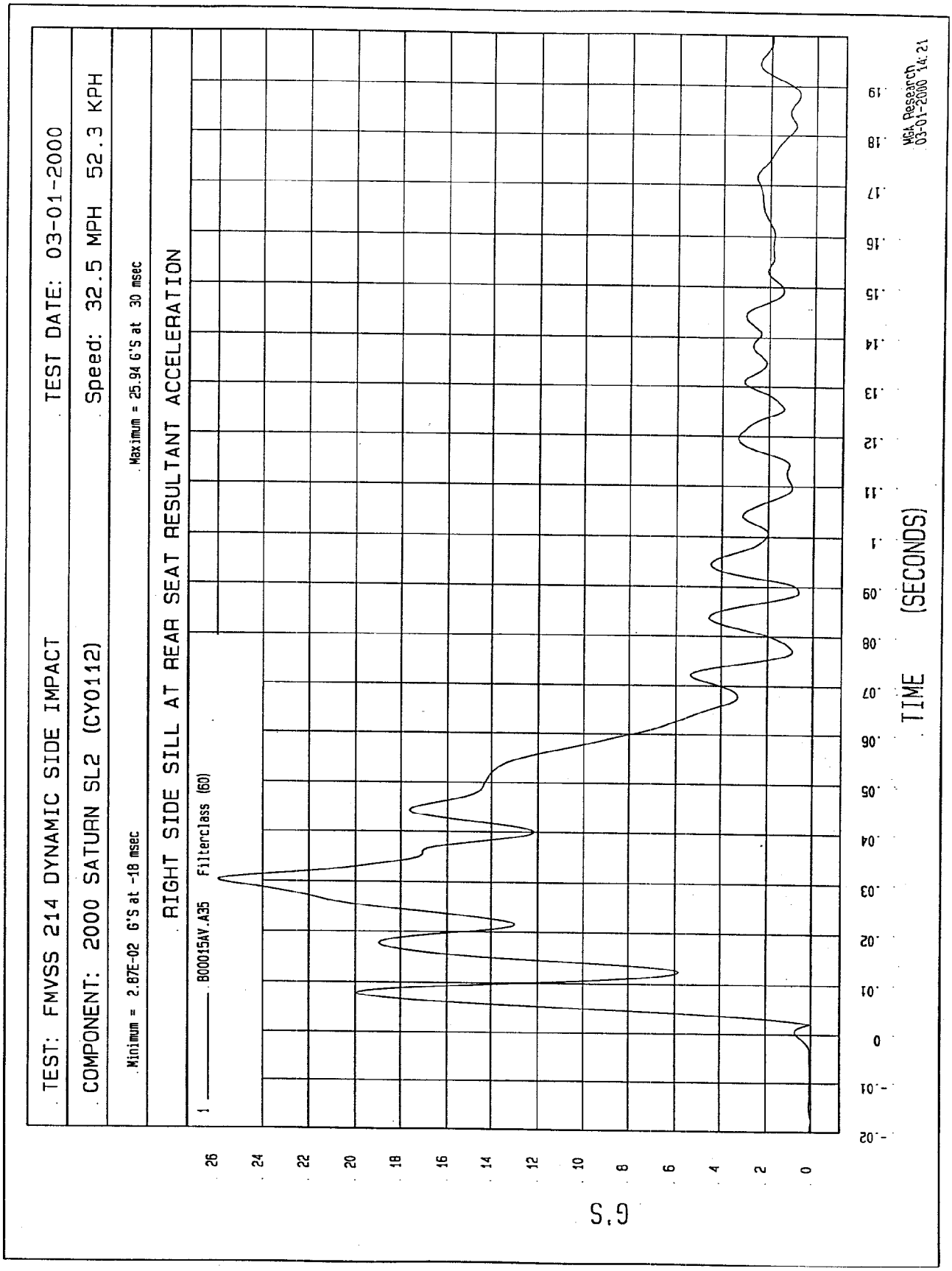
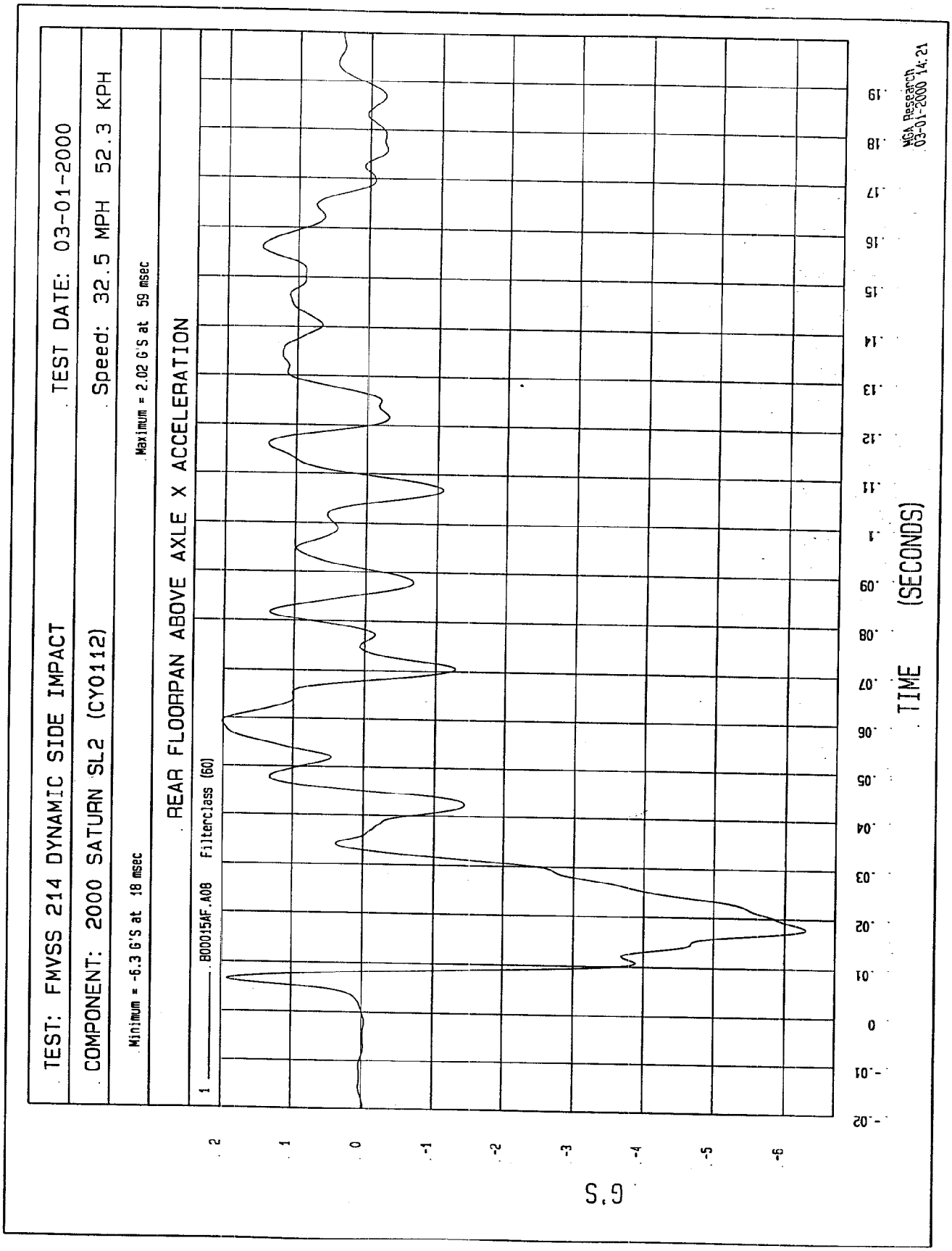
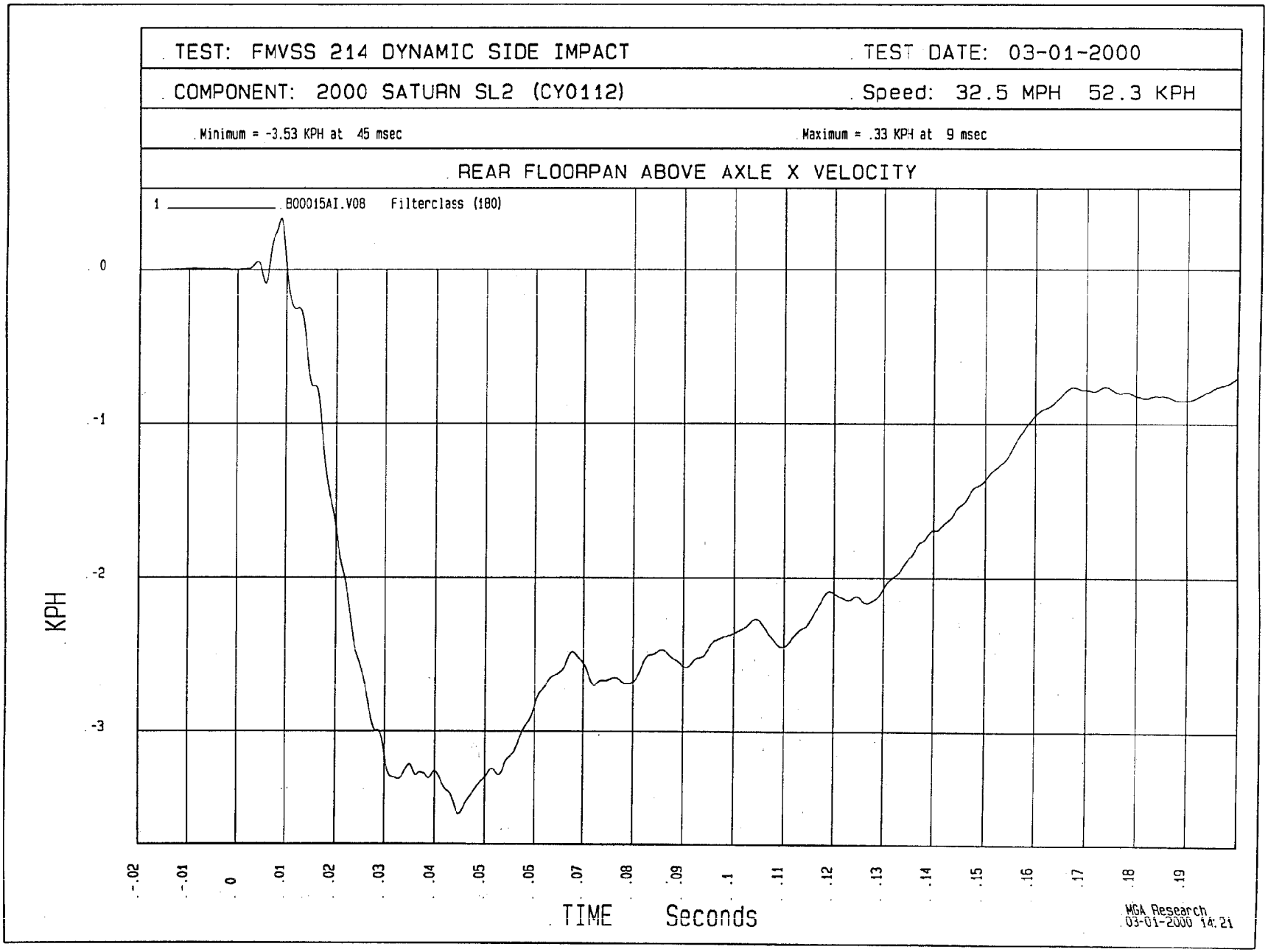
TIME Seconds
MGA Research
03-01-2000 14:20

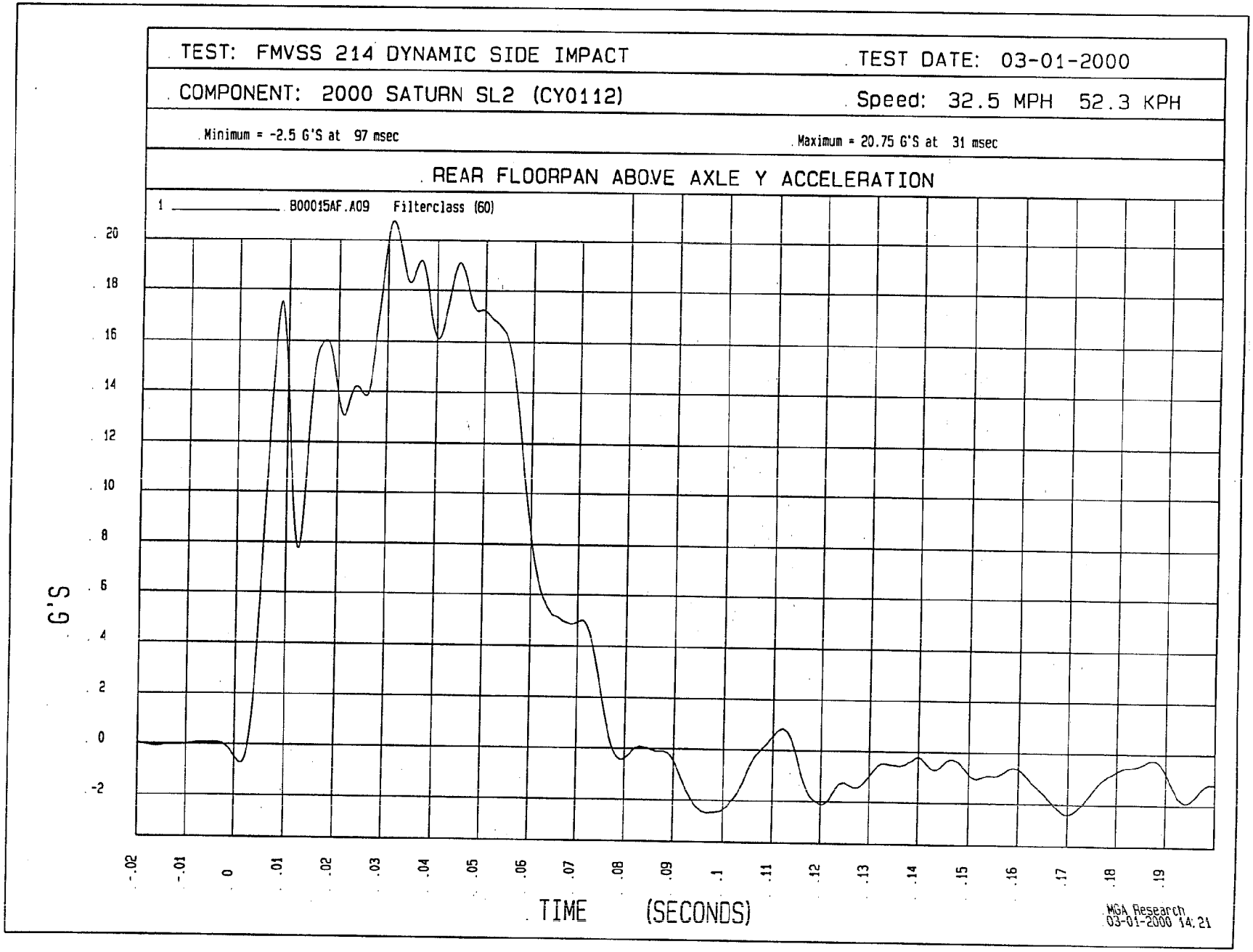

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -9.72 G'S at 30 msec
Maximum = 5.2 G'S at 50 msec
RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION
1 B00015AF.A37 Filterclass (60)
MGA Research
03-01-2000 14:28
G'S
TIME (SECONDS)

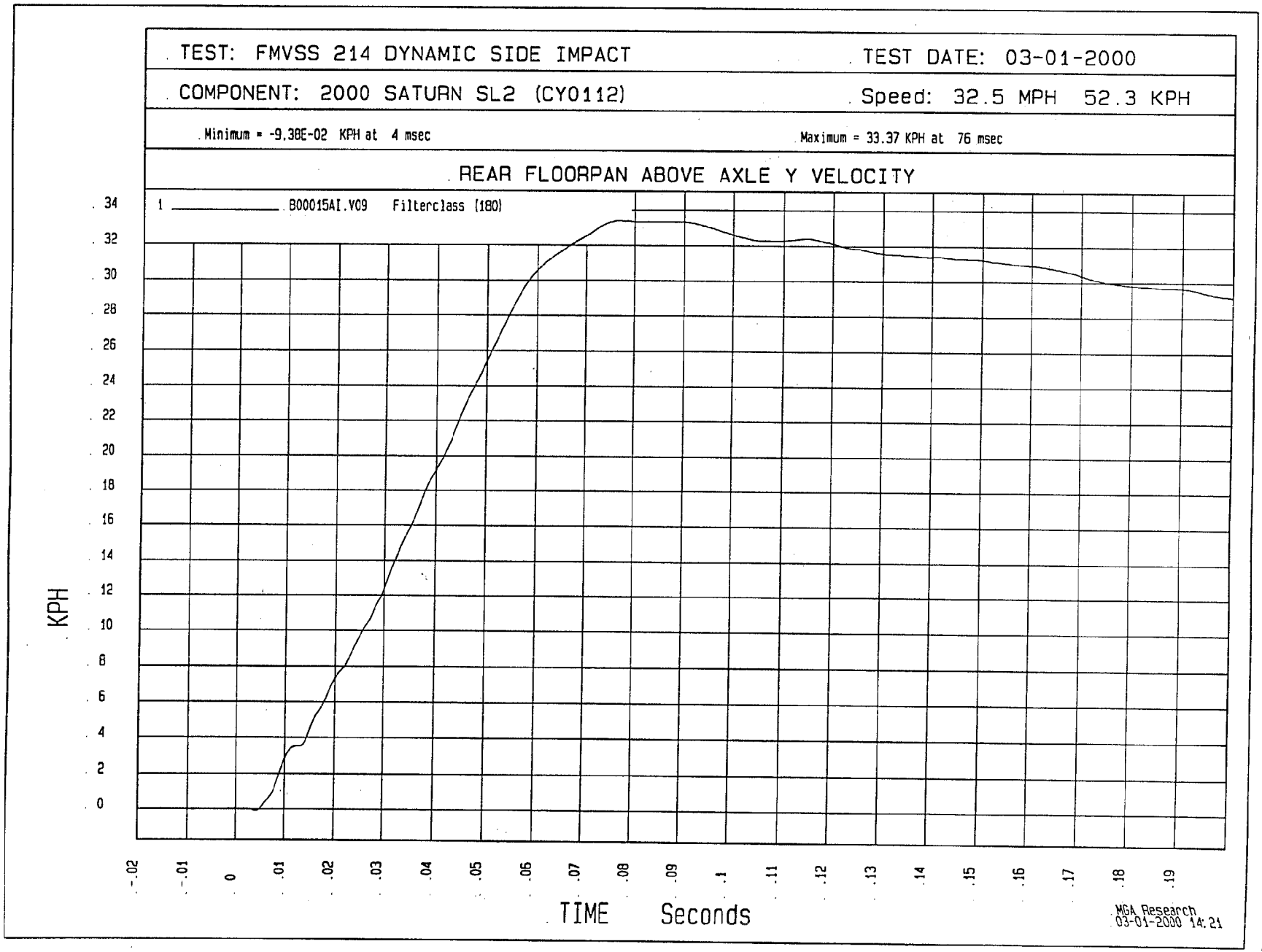

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.5 KPH at 32 msec
Maximum = 3.82 KPH at 161 msec
RIGHT SIDE SILL AT REAR SEAT Z VELOCITY
1 B00015AI.V37 Filterclass (180)
KPH
TIME Seconds
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 2.87E-02 G'S at -18 msec
Maximum = 25.94 G'S at 30 msec
RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION
1 B00015AV.A35 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -6.3 G'S at 18 msec
Maximum = 2.02 G'S at 59 msec
REAR FLOORPAN ABOVE AXLE X ACCELERATION
1 B00015AF.A08 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.53 KPH at 45 msec
Maximum = .33 KPH at 9 msec
REAR FLOORPAN ABOVE AXLE X VELOCITY
1 B00015AI.V08 Filterclass (180)
0
-1
-2
-3
KPH
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.5 G'S at 97 msec
Maximum = 20.75 G'S at 31 msec
REAR FLOORPAN ABOVE AXLE Y ACCELERATION
1 B00015AF.A09 Filterclass (60)
G'S
20
18
16
14
12
10
8
6
4
2
0
-2
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -9.38E-02 KPH at 4 msec
Maximum = 33.37 KPH at 76 msec
REAR FLOORPAN ABOVE AXLE Y VELOCITY
1 B00015AI.V09 Filterclass (180)
KPH
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
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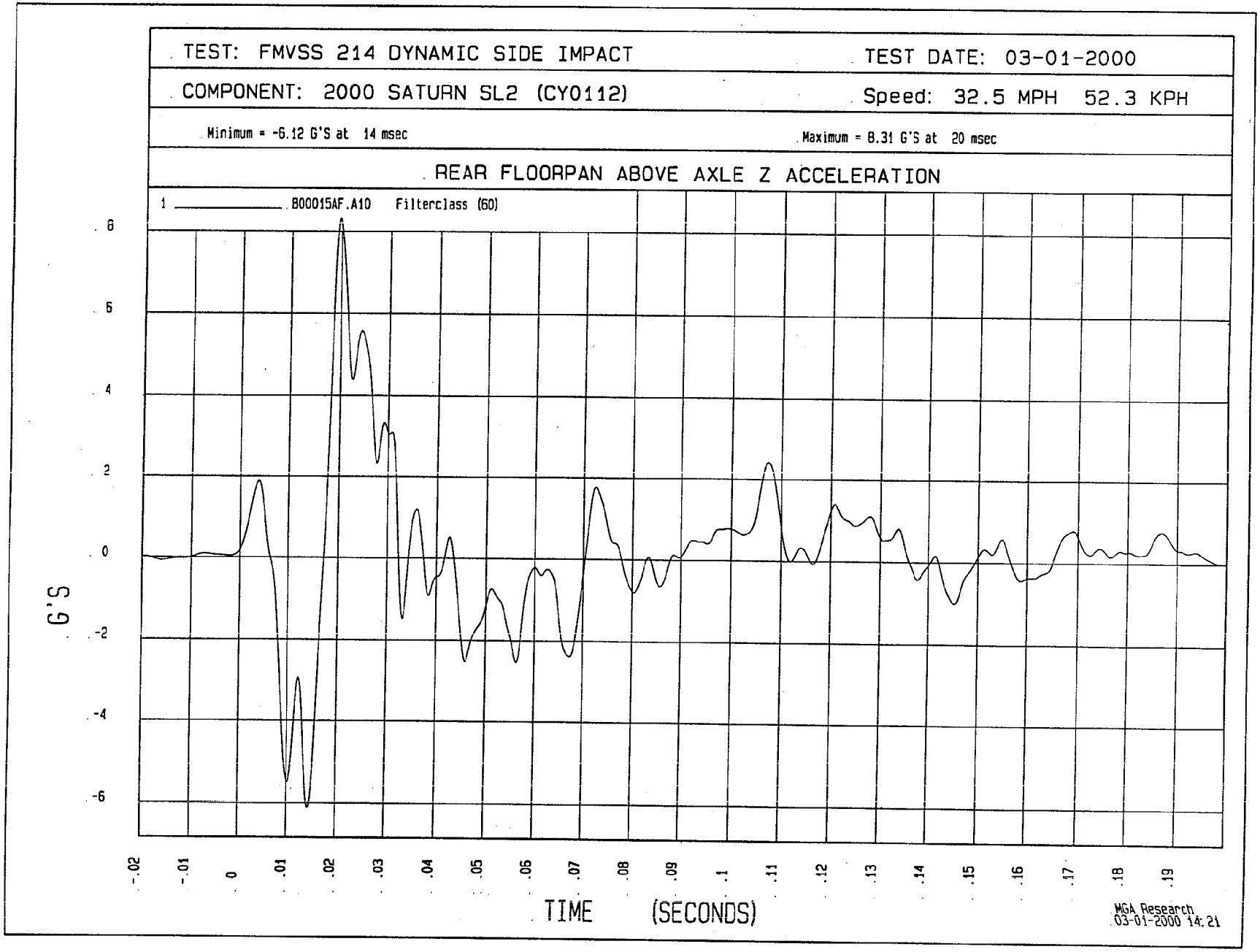
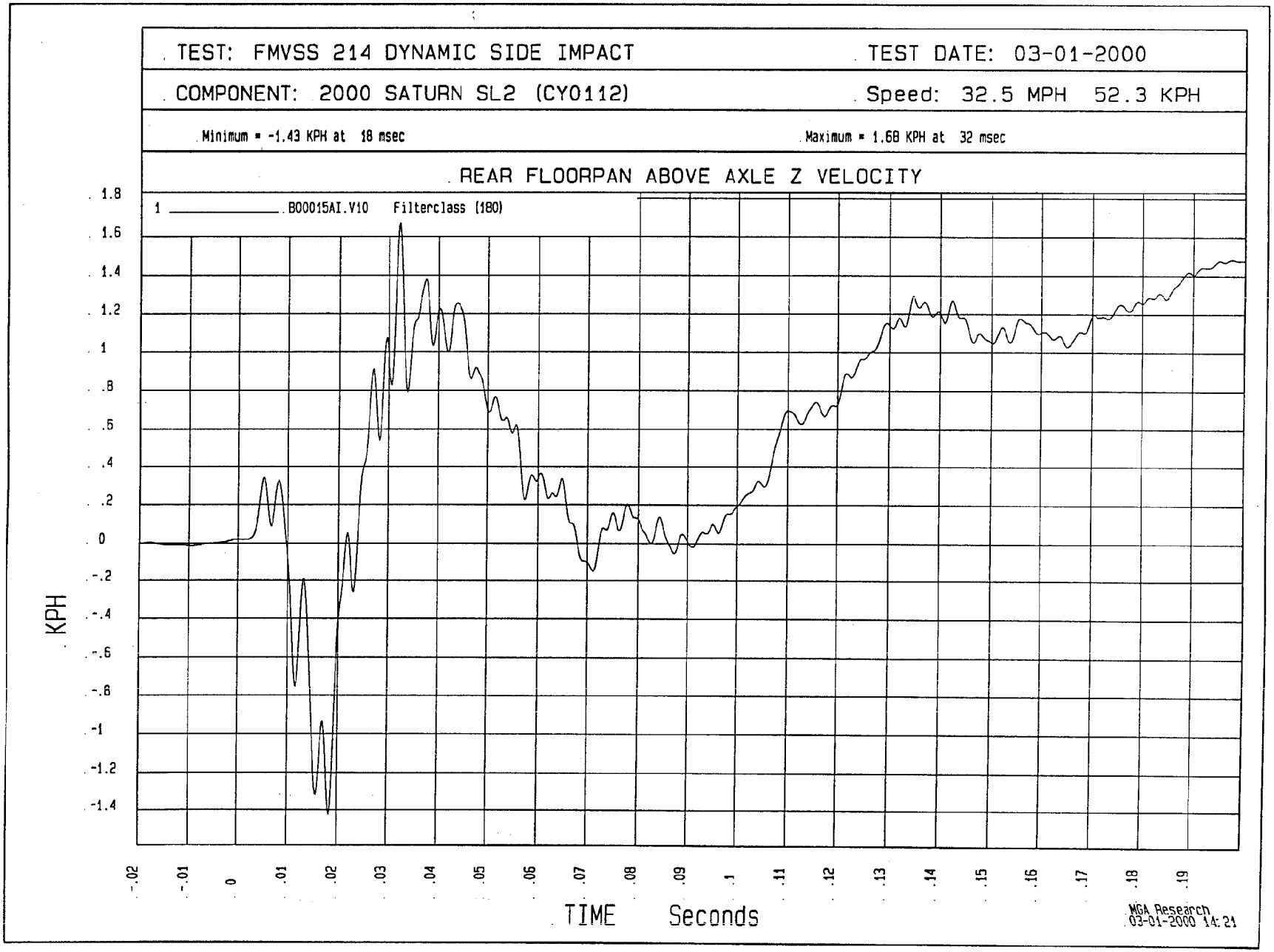
.19
TIME Seconds
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -6.12 G'S at 14 msec
Maximum = 8.31 G'S at 20 msec
REAR FLOORPAN ABOVE AXLE Z ACCELERATION
1 B00015AF.A10 Filterclass (60)
G'S
8
6
4
2
0
-2
-4
-6
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.43 KPH at 18 msec
Maximum = 1.68 KPH at 32 msec
REAR FLOORPAN ABOVE AXLE Z VELOCITY
1 B00015AI.V10 Filterclass (180)
KPH
1.8
1.6
1.4
1.2
1
.8
.6
.4
.2
0
-.2
-.4
-.6
-.8
-1
-1.2
-1.4
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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.14
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.16
.17
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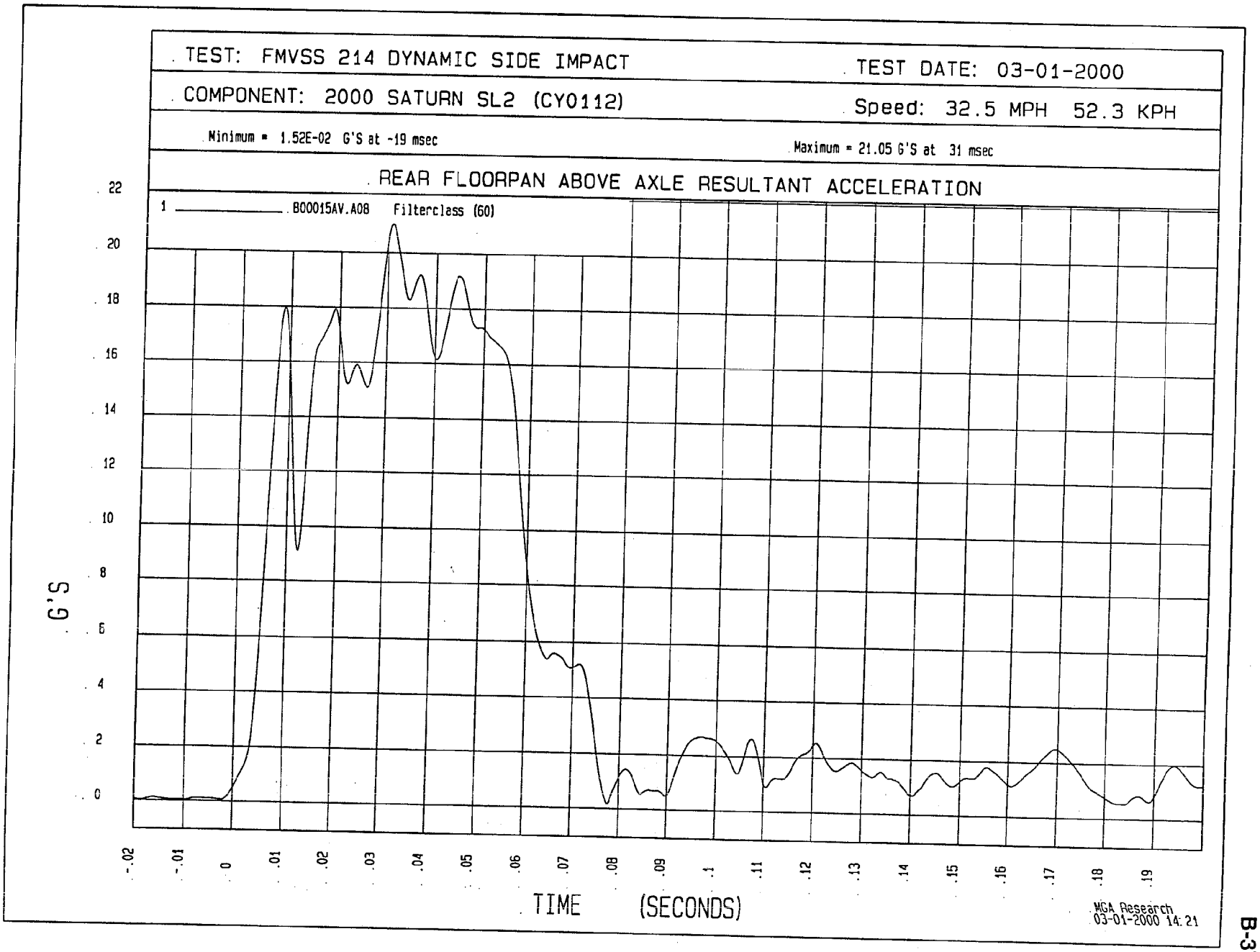
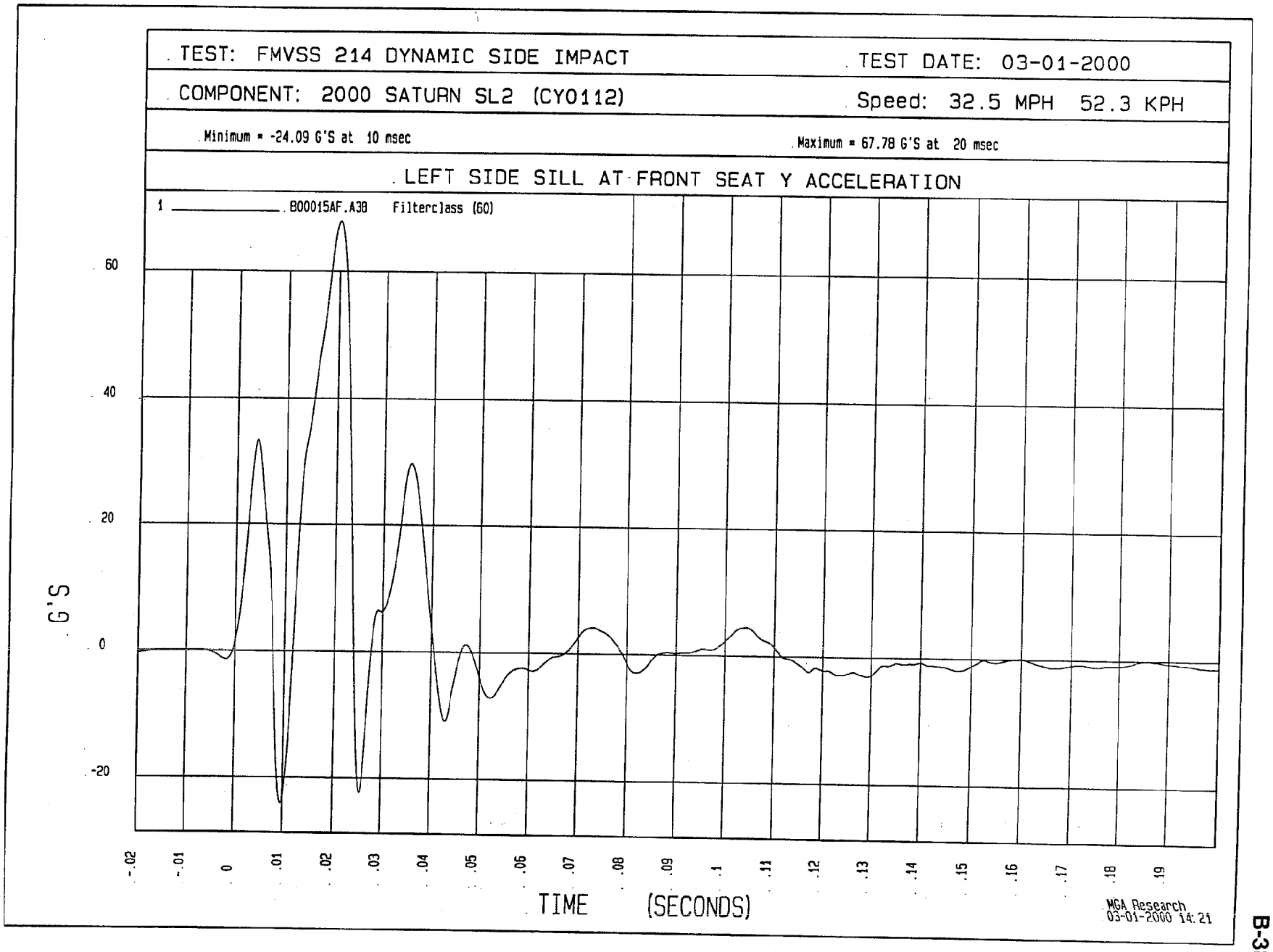
.19
TIME Seconds
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 1.52E-02 G'S at -19 msec
Maximum = 21.05 G'S at 31 msec
REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION
1 B00015AV.A08 Filterclass (60)
G'S
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -24.09 G'S at 10 msec
Maximum = 67.78 G'S at 20 msec
LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION
1 B00015AF.A38 Filterclass (60)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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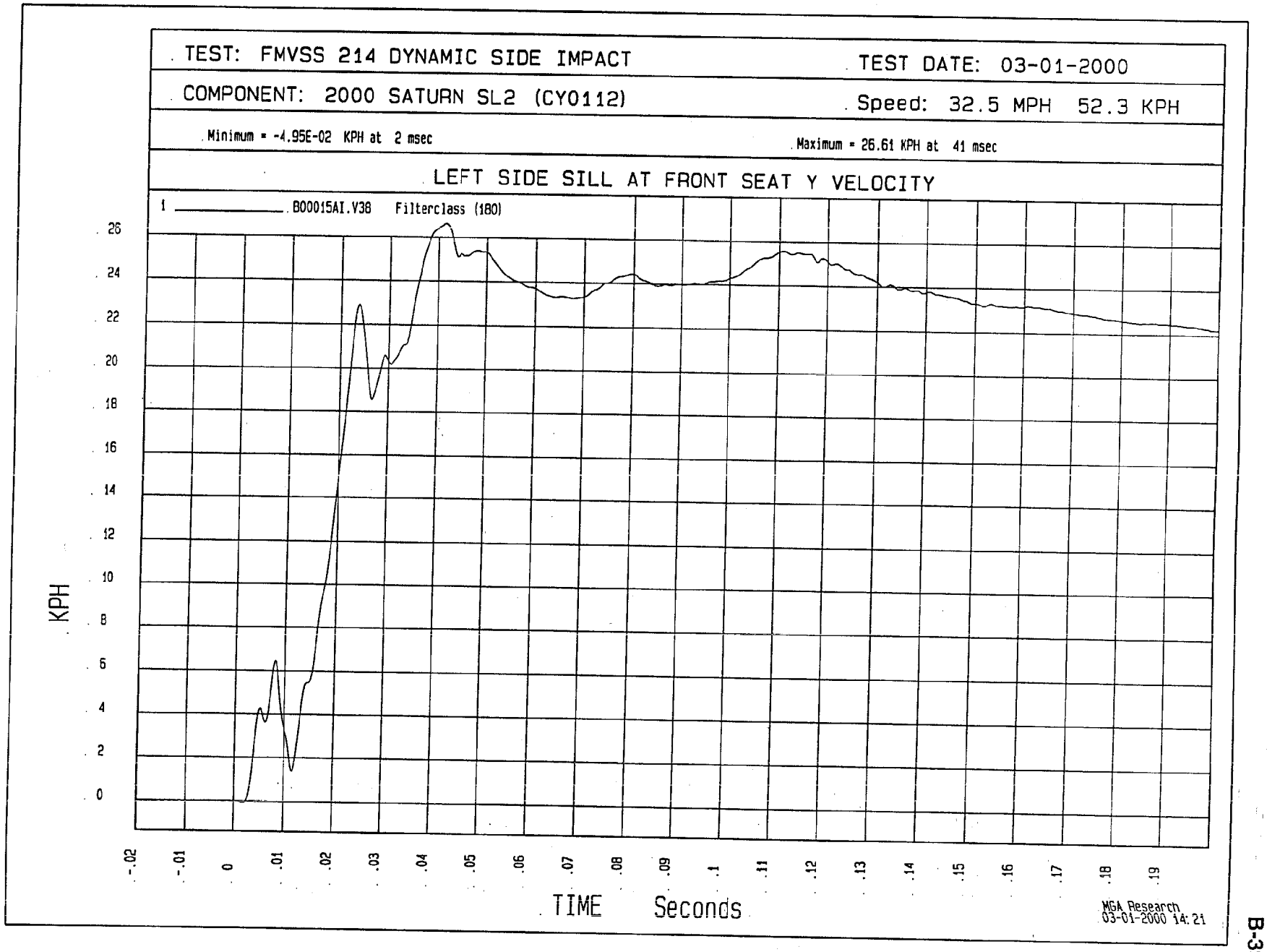
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -4.95E-02 KPH at 2 msec
Maximum = 26.61 KPH at 41 msec
LEFT SIDE SILL AT FRONT SEAT Y VELOCITY
1 B00015AI.V38 Filterclass (180)
KPH
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
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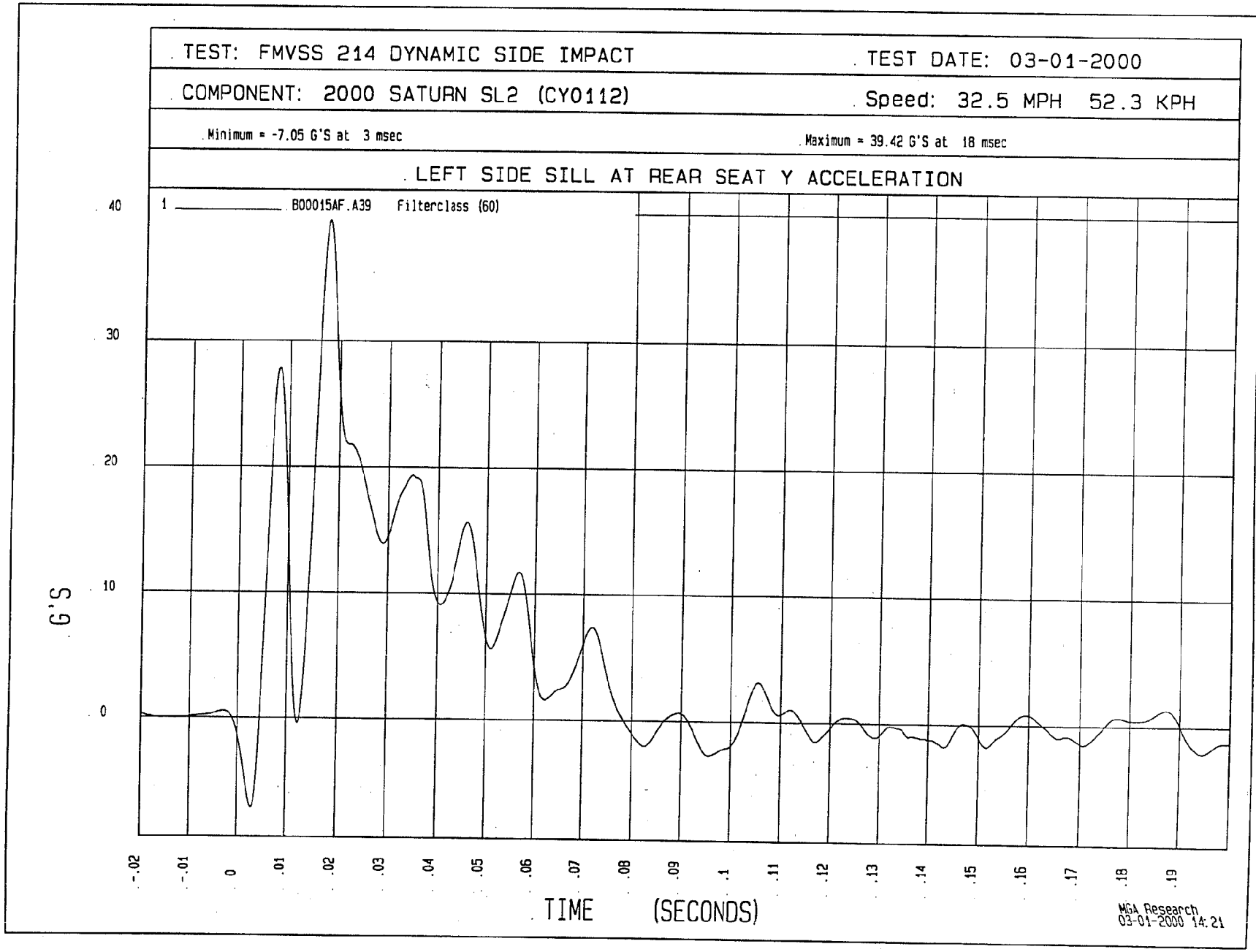
TIME Seconds
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -7.05 G'S at 3 msec
Maximum = 39.42 G'S at 18 msec
LEFT SIDE SILL AT REAR SEAT Y ACCELERATION
1 B00015AF.A39 Filterclass (60)
G'S
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
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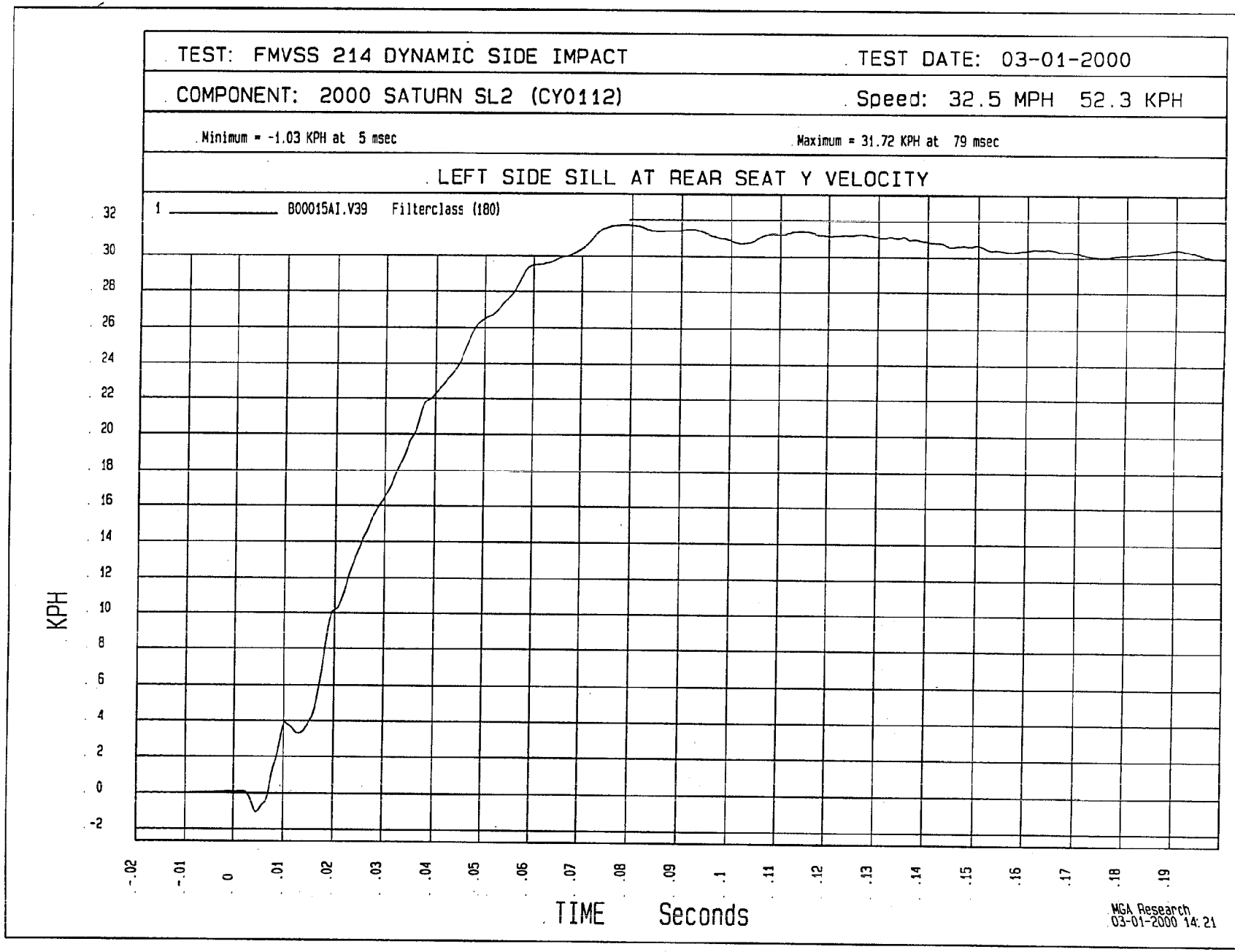
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:21


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.03 KPH at 5 msec
Maximum = 31.72 KPH at 79 msec
LEFT SIDE SILL AT REAR SEAT Y VELOCITY
1 B00015AI.V39 Filterclass (180)
KPH
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-.02
-.01
0
.01
.02
.03
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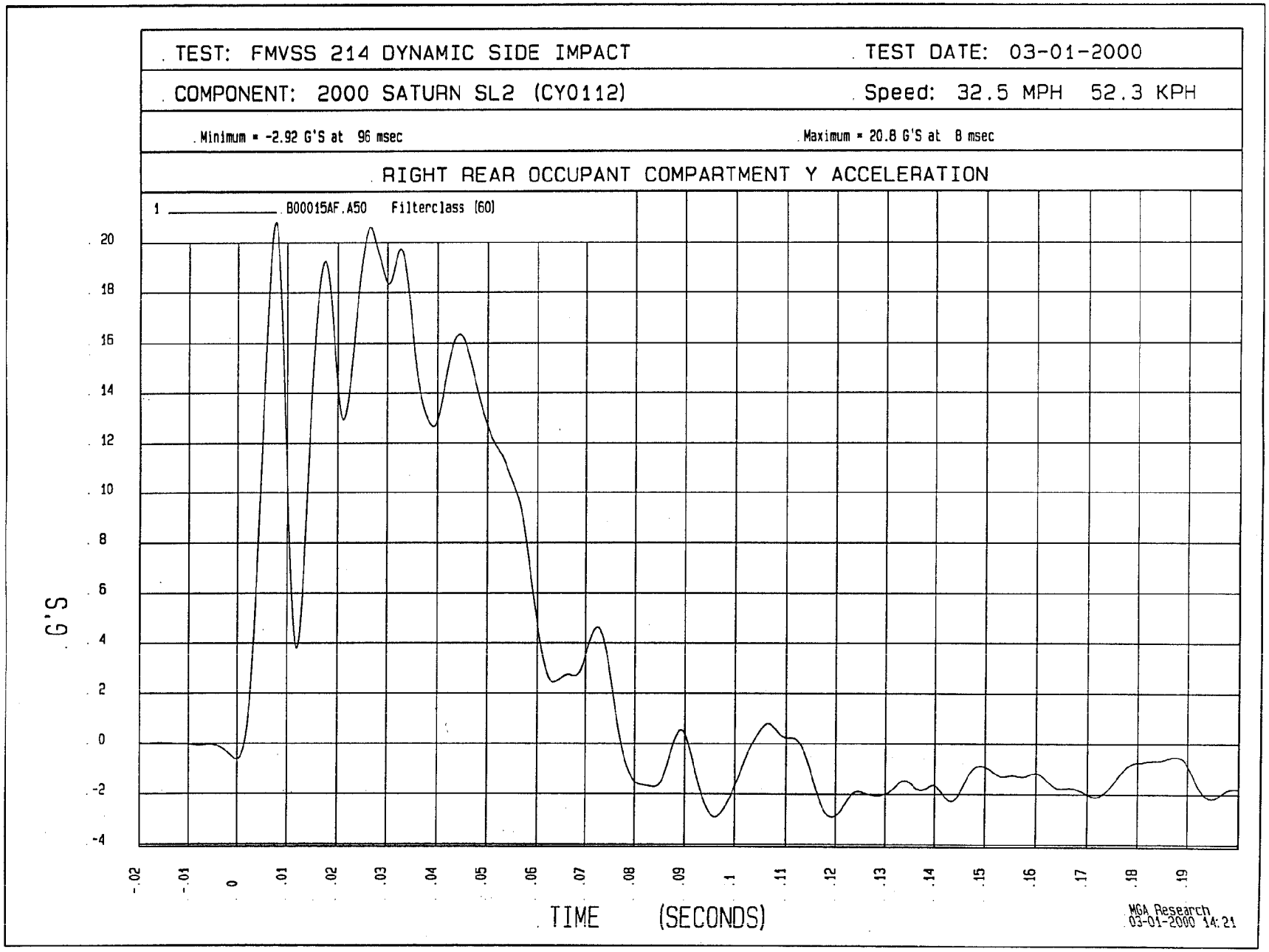
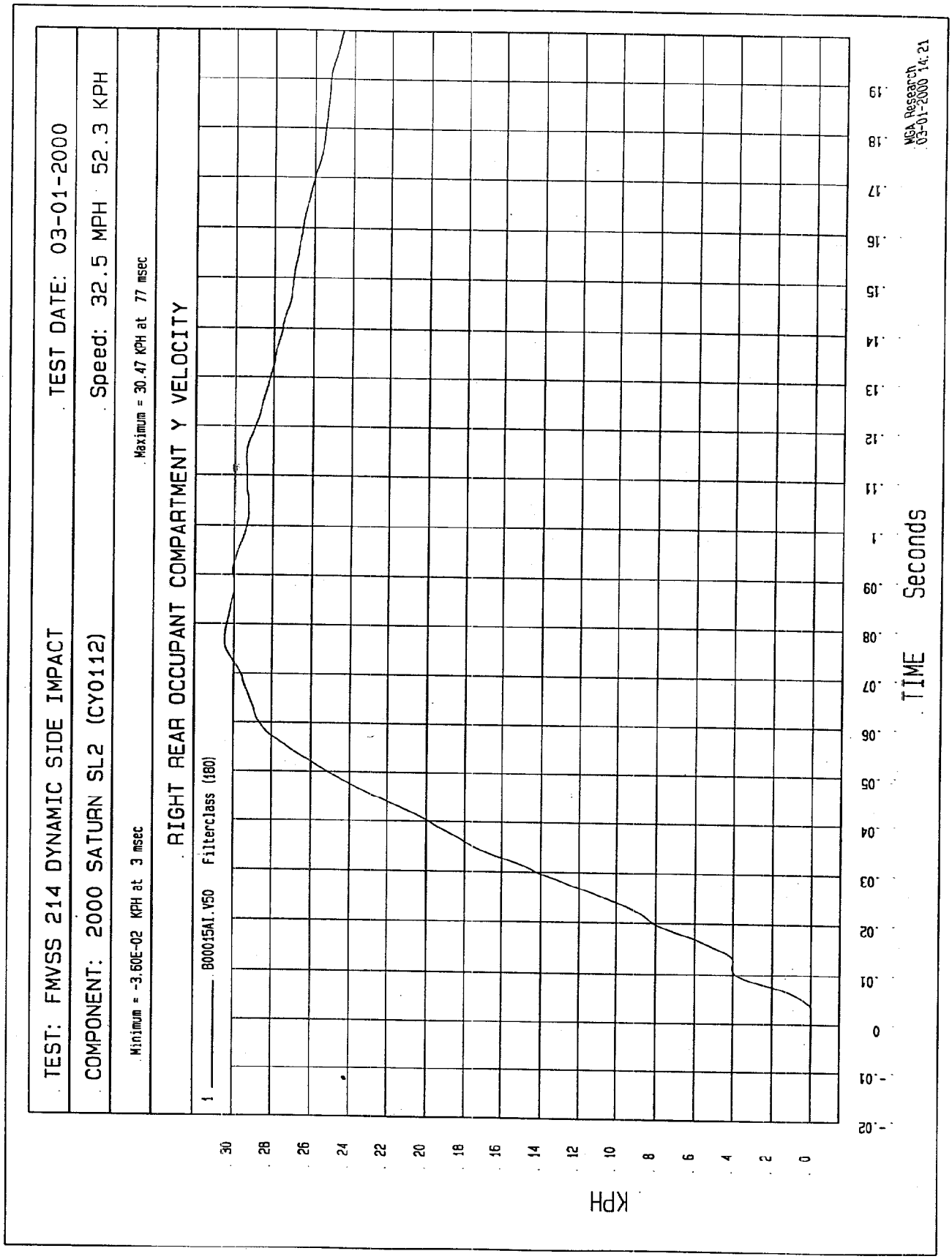
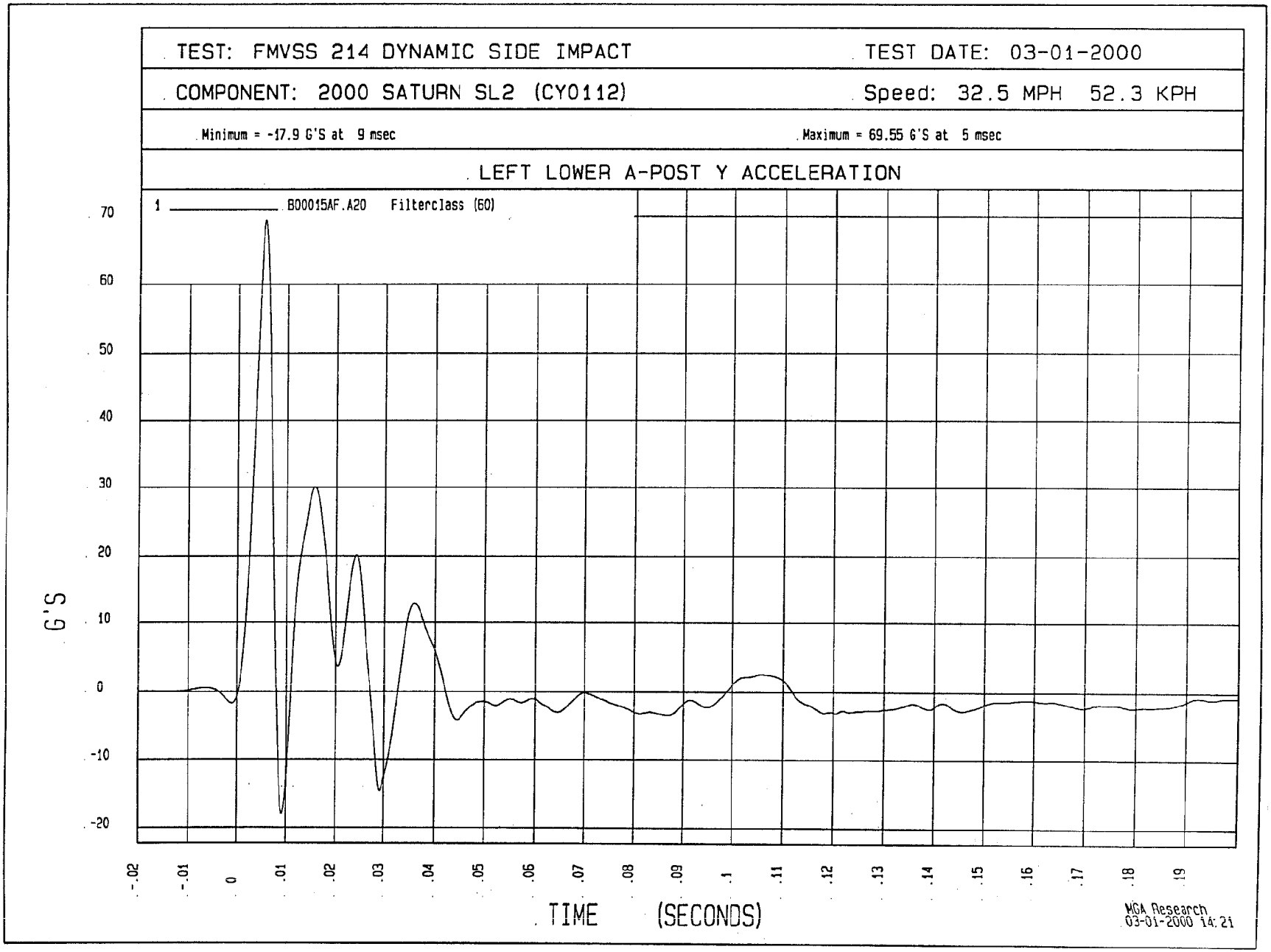
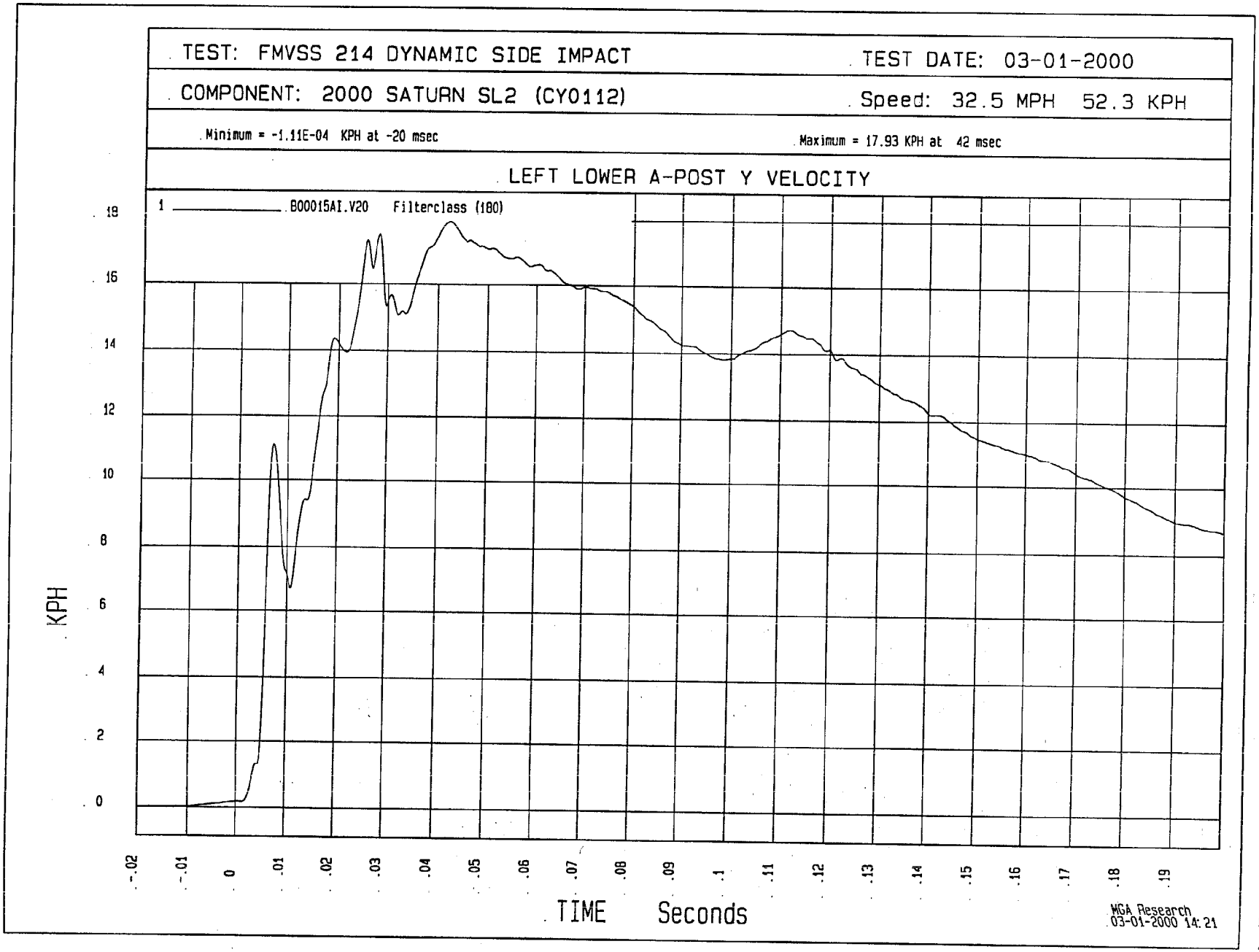
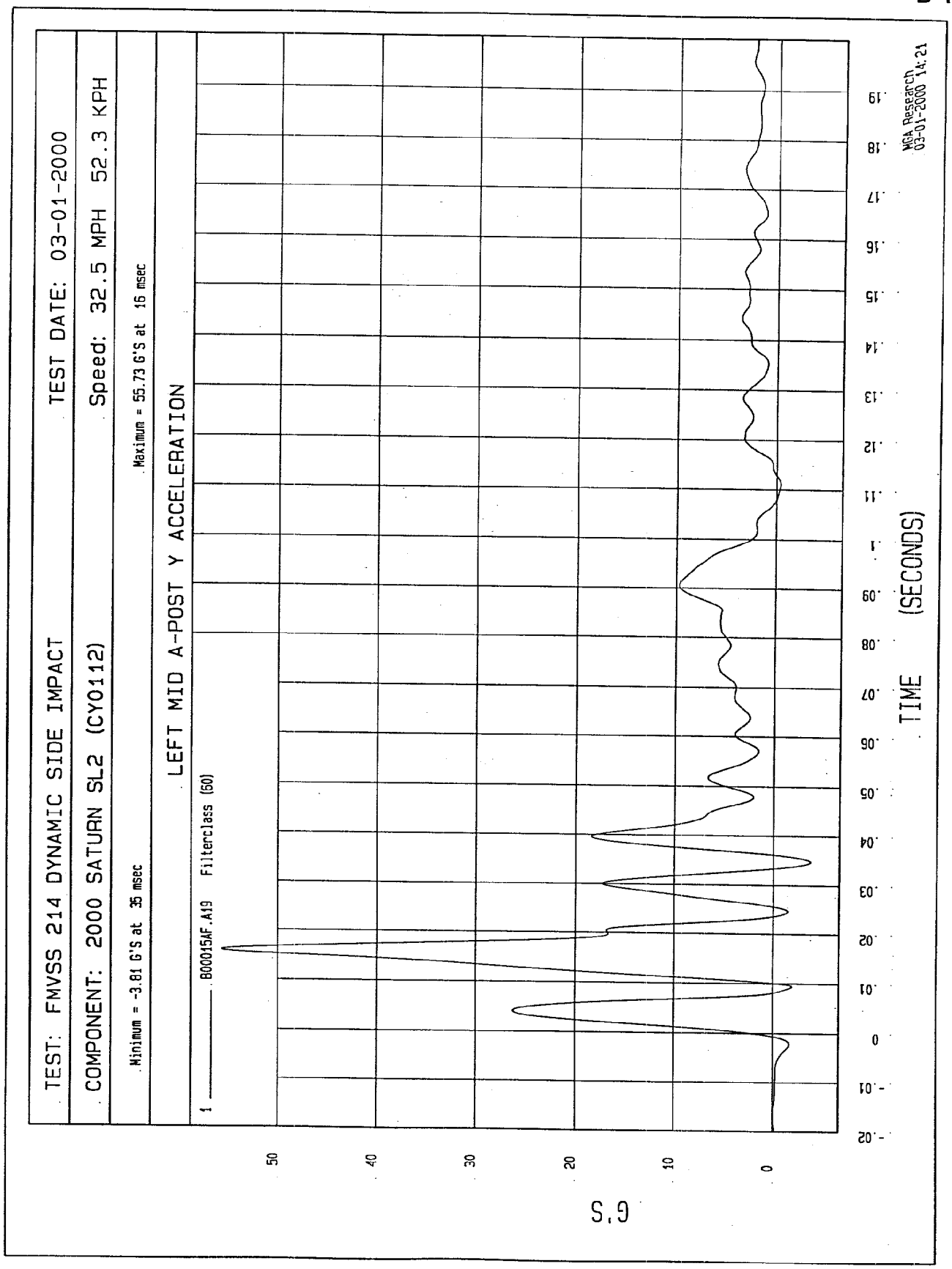
TIME Seconds
MGA Research
03-01-2000 14:21

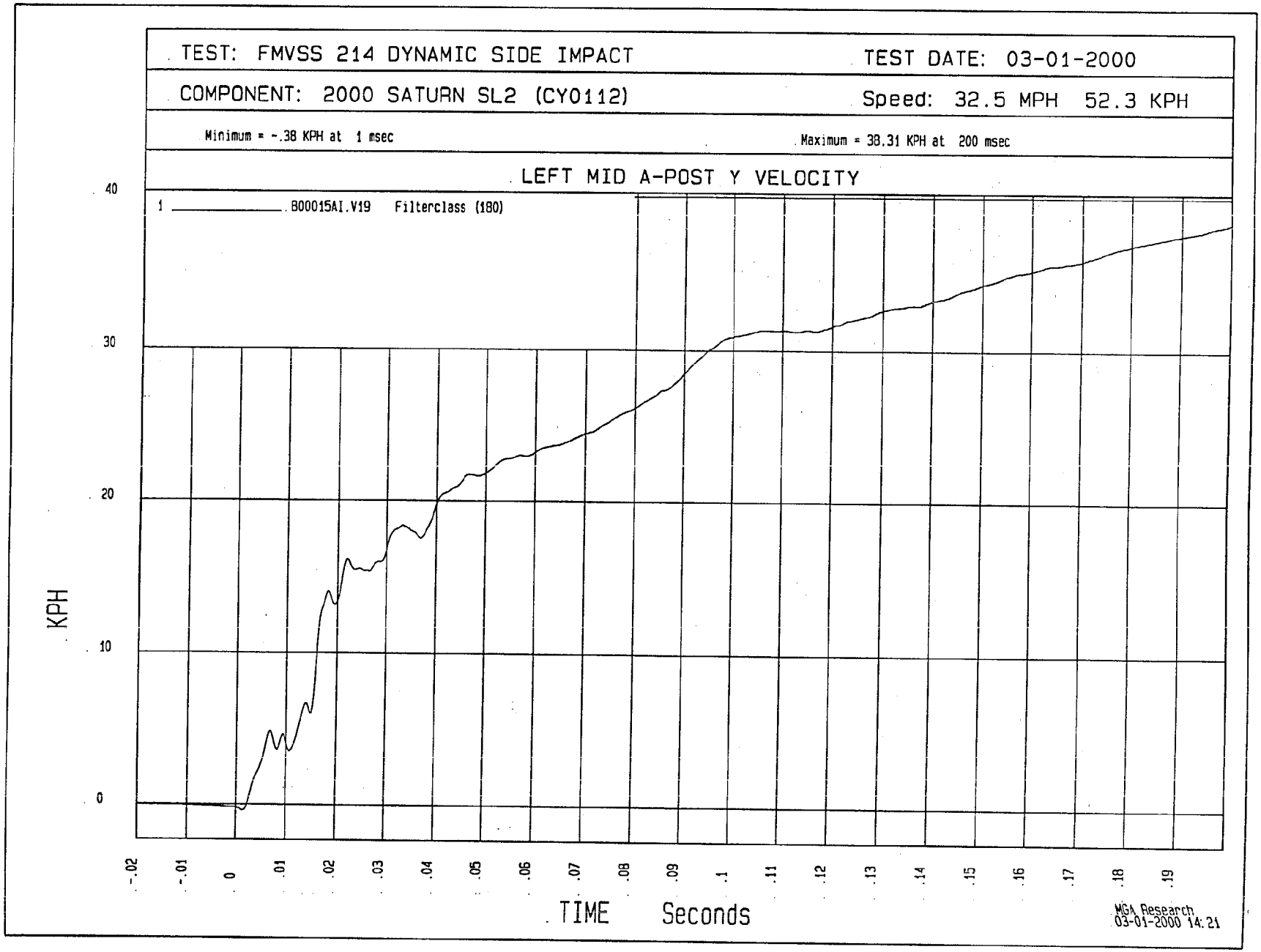

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.92 G'S at 96 msec
Maximum = 20.8 G'S at 8 msec
RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION
1 B00015AF.A50 Filterclass (60)
G'S
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:21

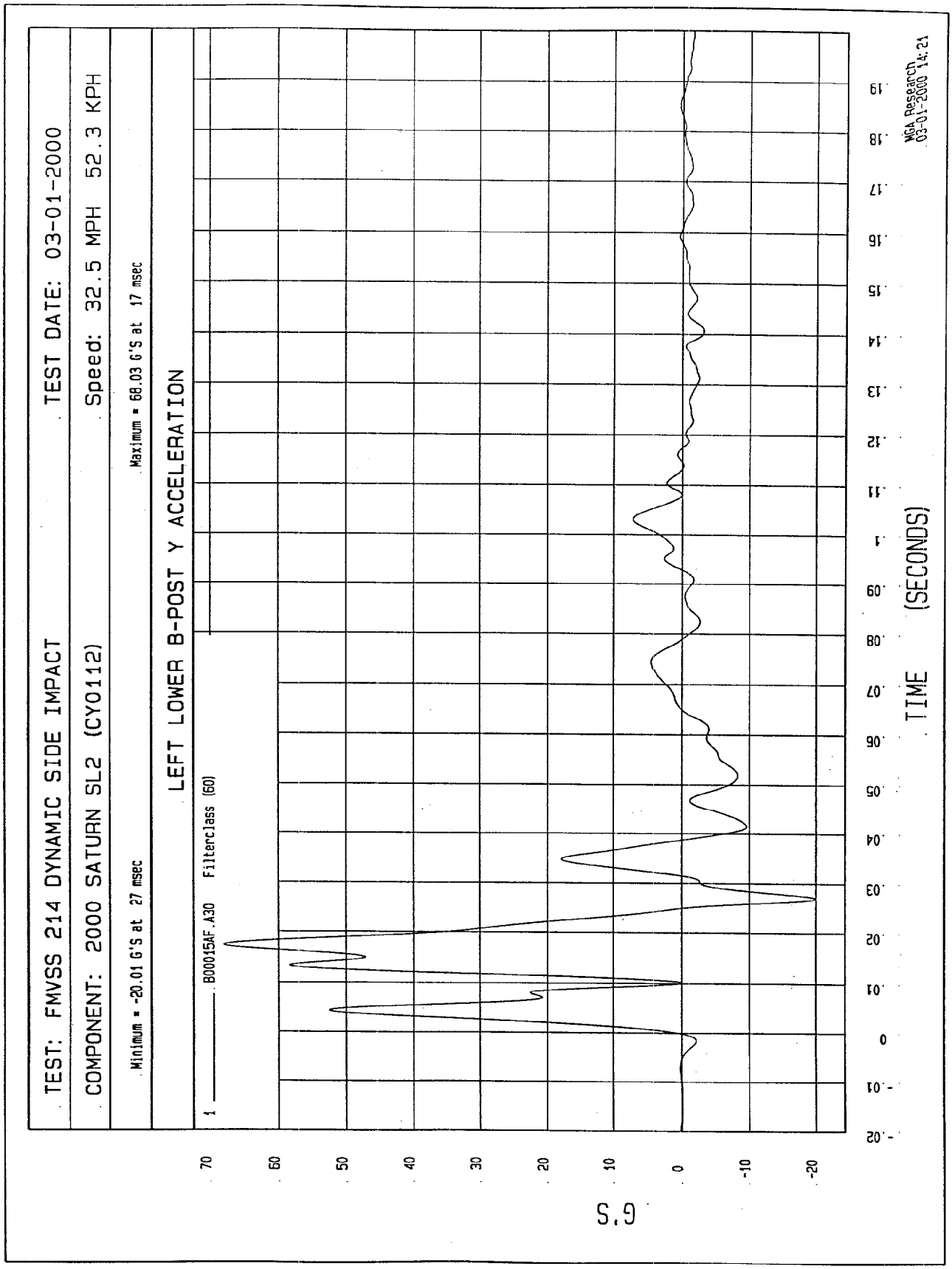

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.60E-02 KPH at 3 msec
Maximum = 30.47 KPH at 77 msec
RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY
1 B00015AI.V50 Filterclass (180)
KPH
TIME Seconds
MGA Research
03-01-2000 14:21

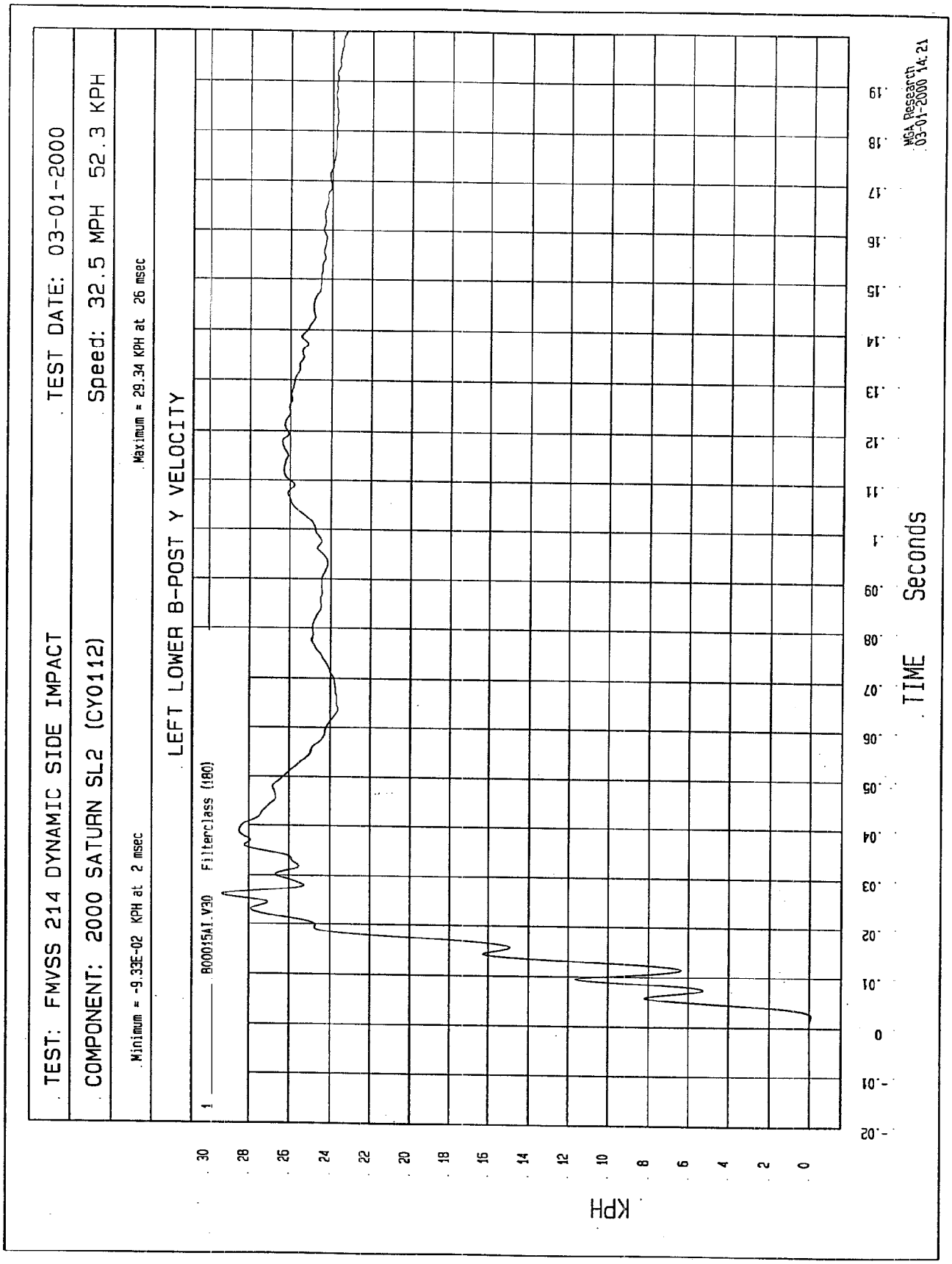

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -17.9 G'S at 9 msec
Maximum = 69.55 G'S at 5 msec
LEFT LOWER A-POST Y ACCELERATION
1 B00015AF.A20 Filterclass (60)
70
60
50
40
30
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:21

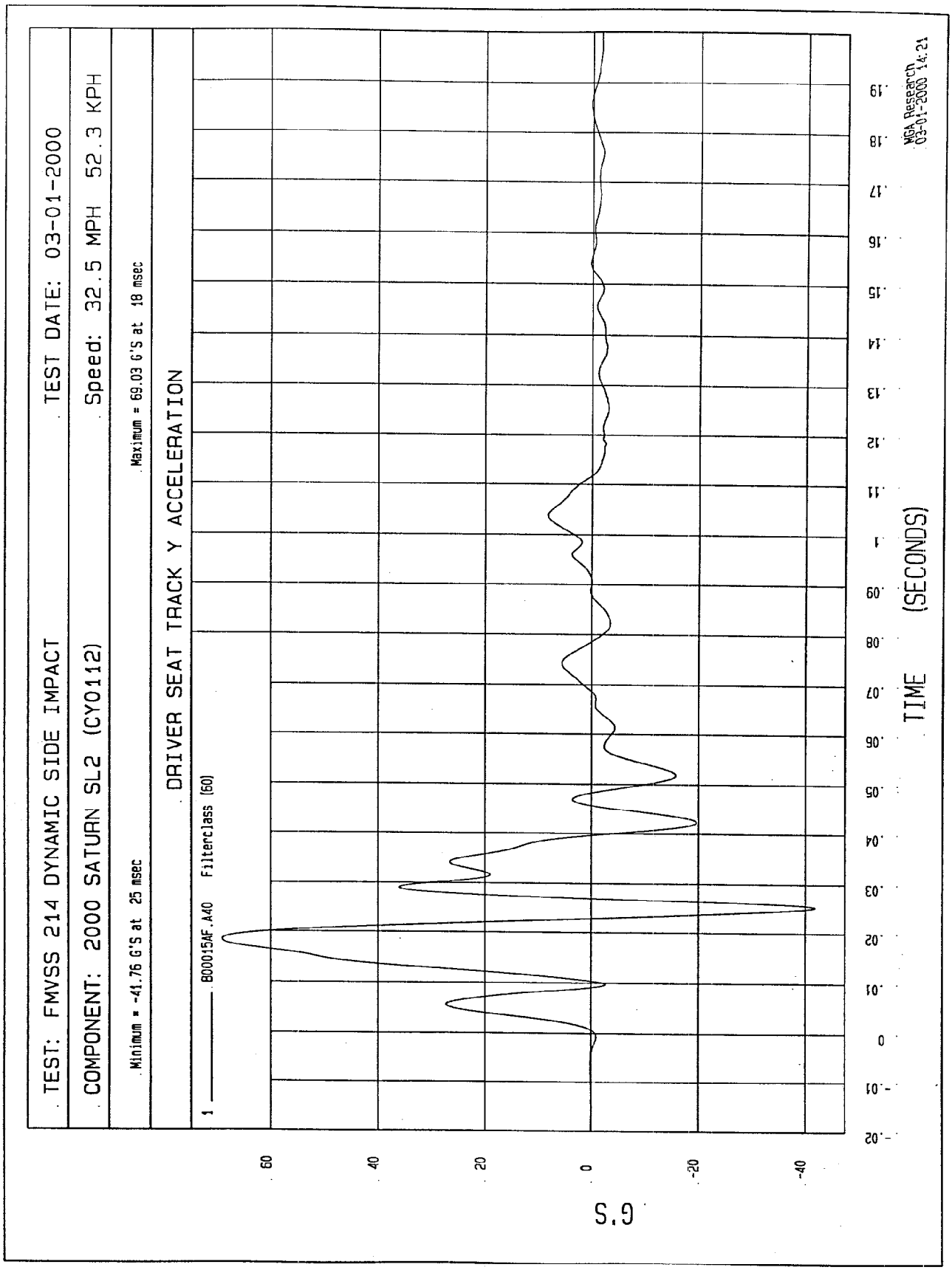

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.11E-04 KPH at -20 msec
Maximum = 17.93 KPH at 42 msec
LEFT LOWER A-POST Y VELOCITY
1 B00015AI.V20 Filterclass (180)
KPH
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:21

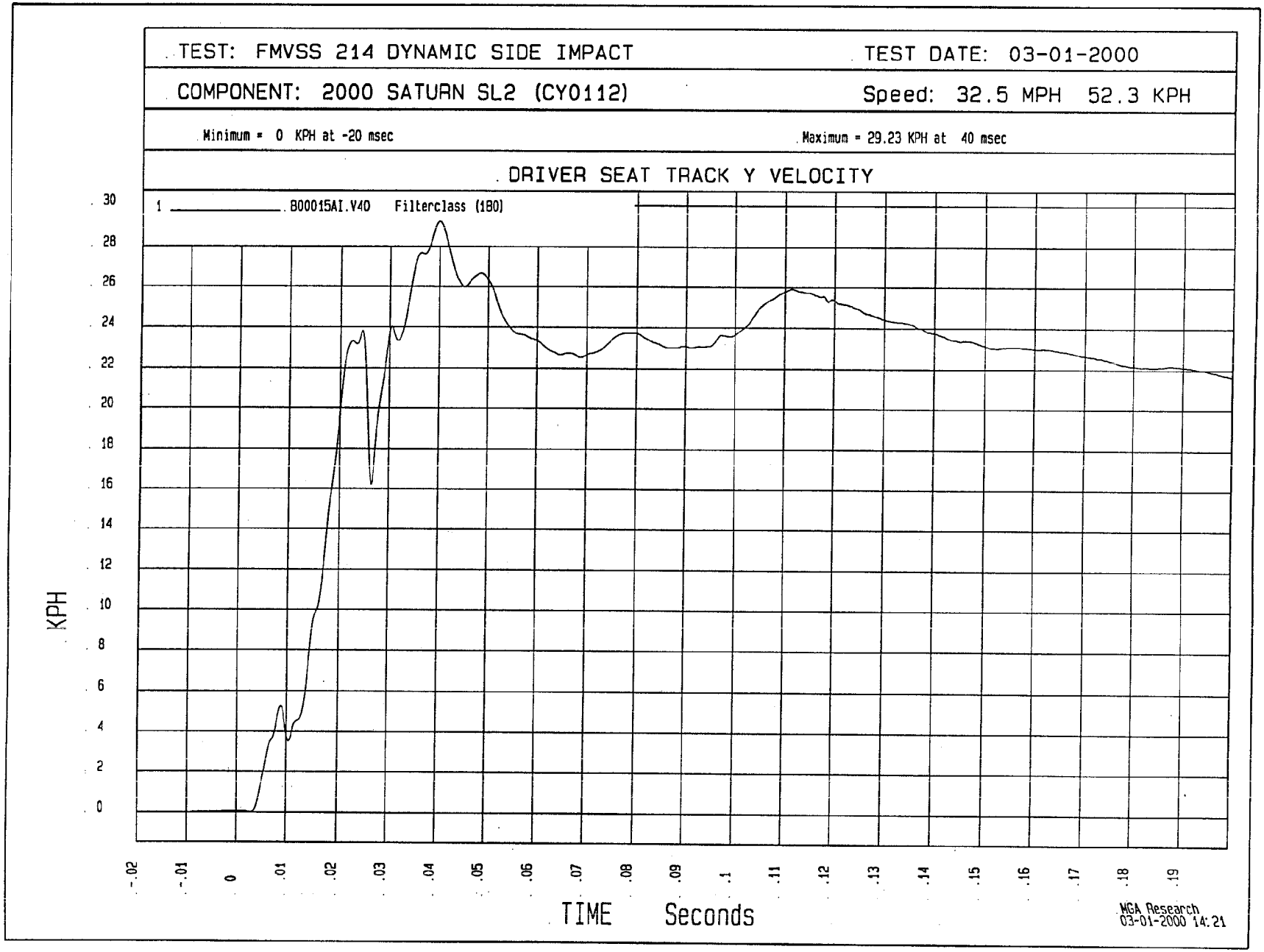

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.81 G'S at 35 msec
Maximum = 55.73 G'S at 16 msec
LEFT MID A-POST Y ACCELERATION
1 B00015AF.A19 Filterclass (60)
MGA Research
03-01-2000 14:21
G'S
TIME (SECONDS)

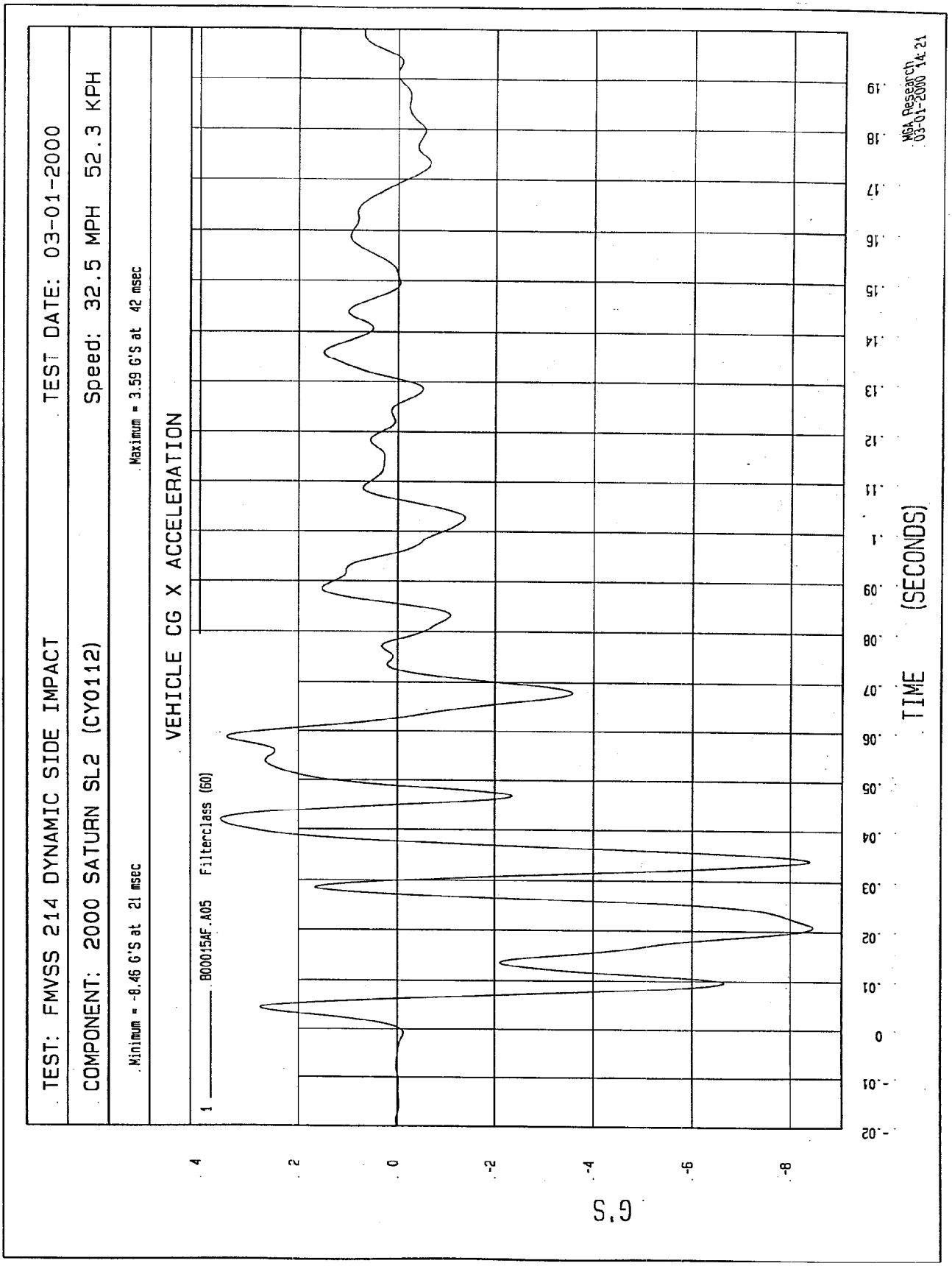

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -.38 KPH at 1 msec
Maximum = 38.31 KPH at 200 msec
LEFT MID A-POST Y VELOCITY
1 B00015AI.V19 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:21

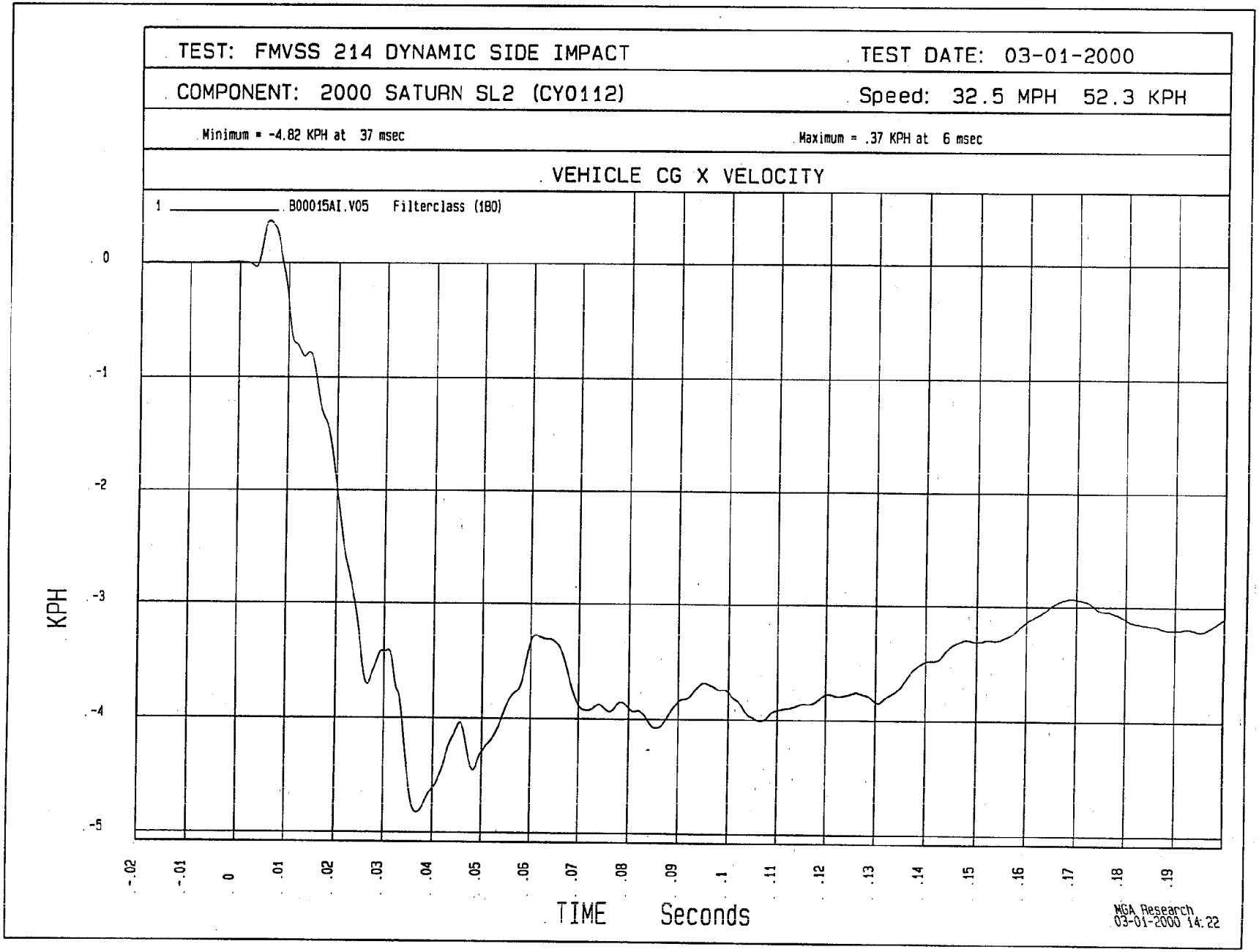

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -20.01 G'S at 27 msec
Maximum = 68.03 G'S at 17 msec
LEFT LOWER B-POST Y ACCELERATION
1 B00015AF.A30 Filterclass (60)
70
60
50
40
30
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
WGA Research
03-01-2000 14:21

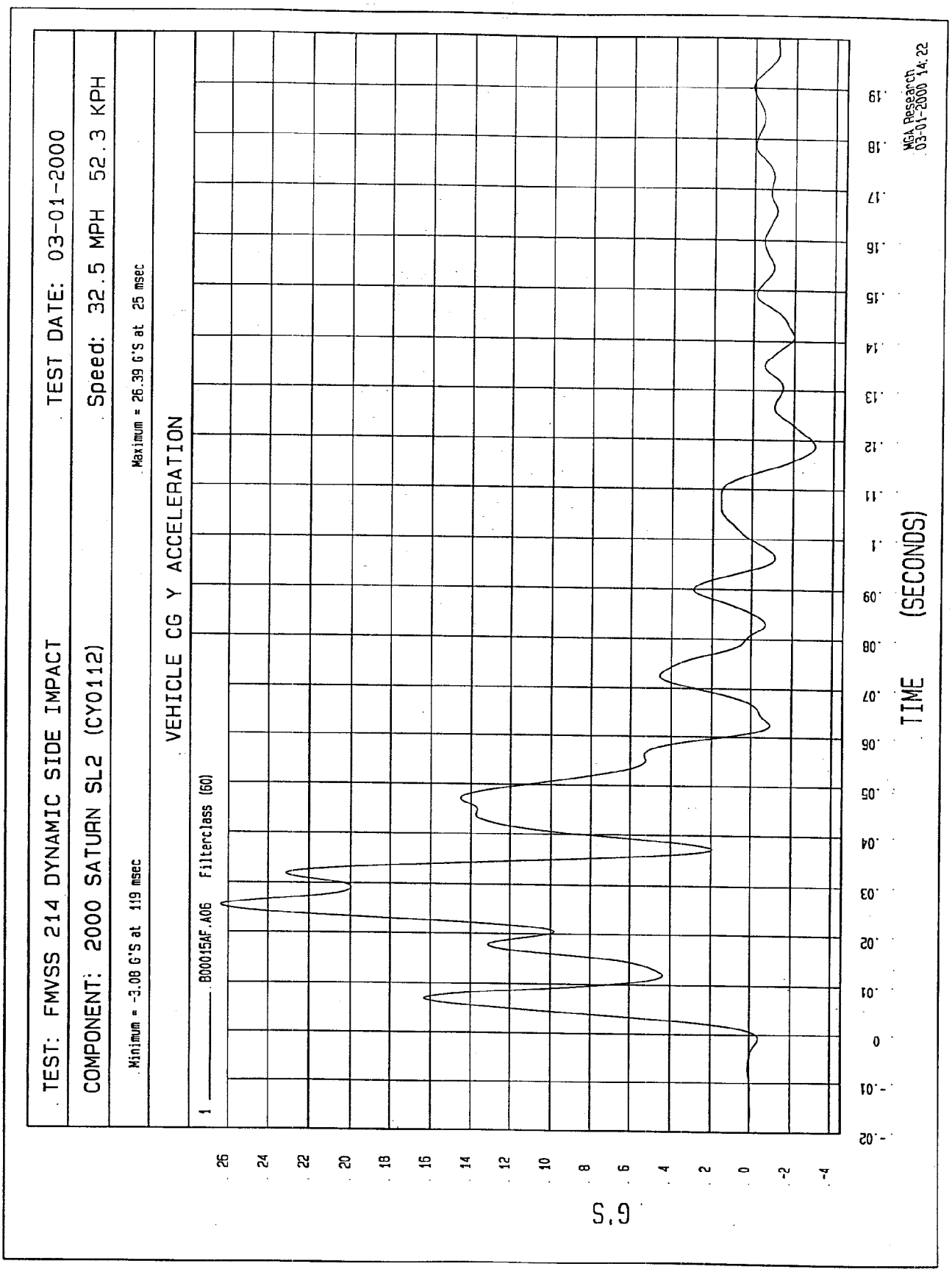

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -9.33E-02 KPH at 2 msec
Maximum = 29.34 KPH at 26 msec
LEFT LOWER B-POST Y VELOCITY
1 R00015AI.V30 Filterclass (180)
KPH
TIME Seconds
MGA Research
03-01-2000 14:21

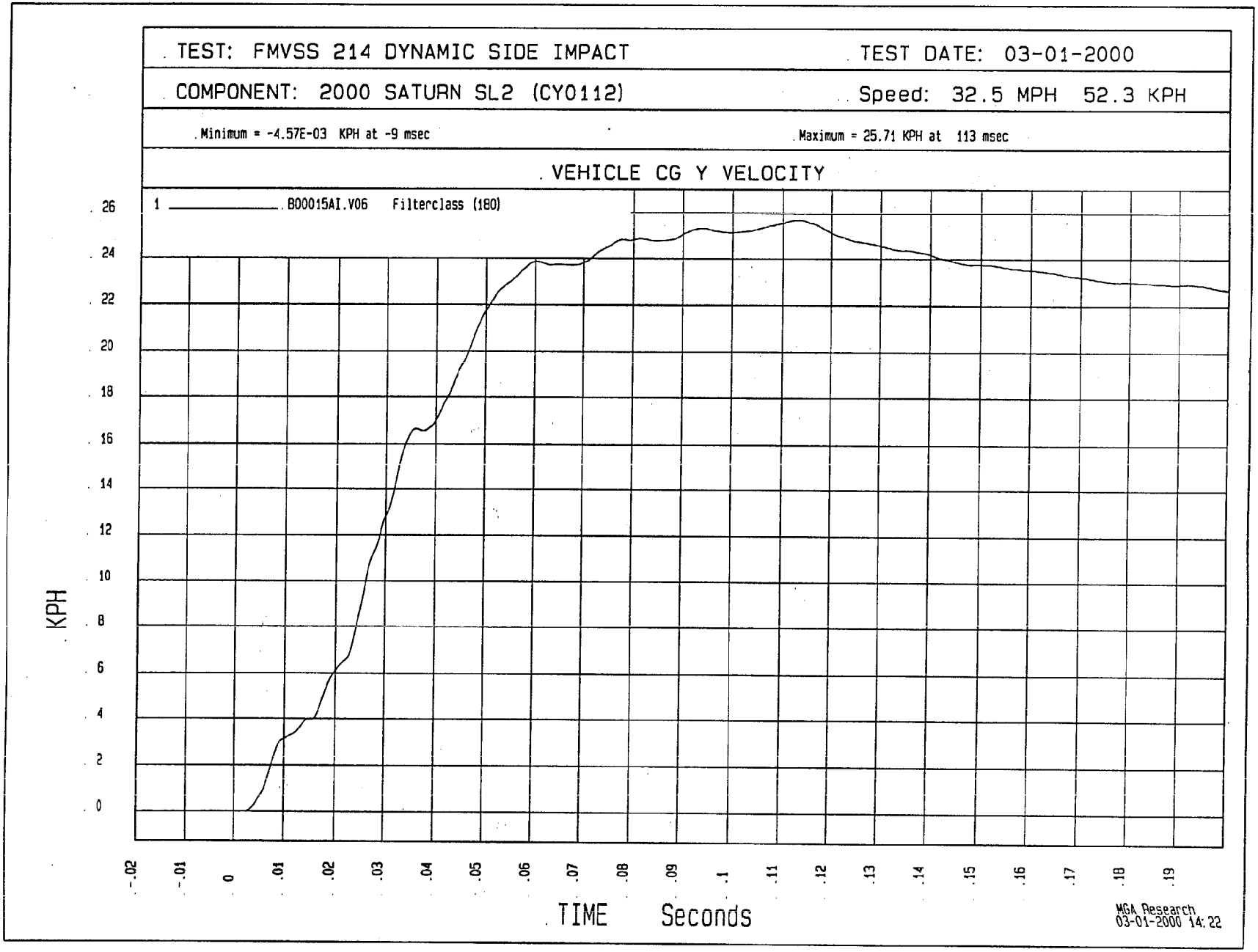

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -41.76 G'S at 25 msec
Maximum = 69.03 G'S at 18 msec
DRIVER SEAT TRACK Y ACCELERATION
1 B00015AF.A40 Filterclass (60)
60
40
20
0
-20
-40
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
03-01-2000 14:21

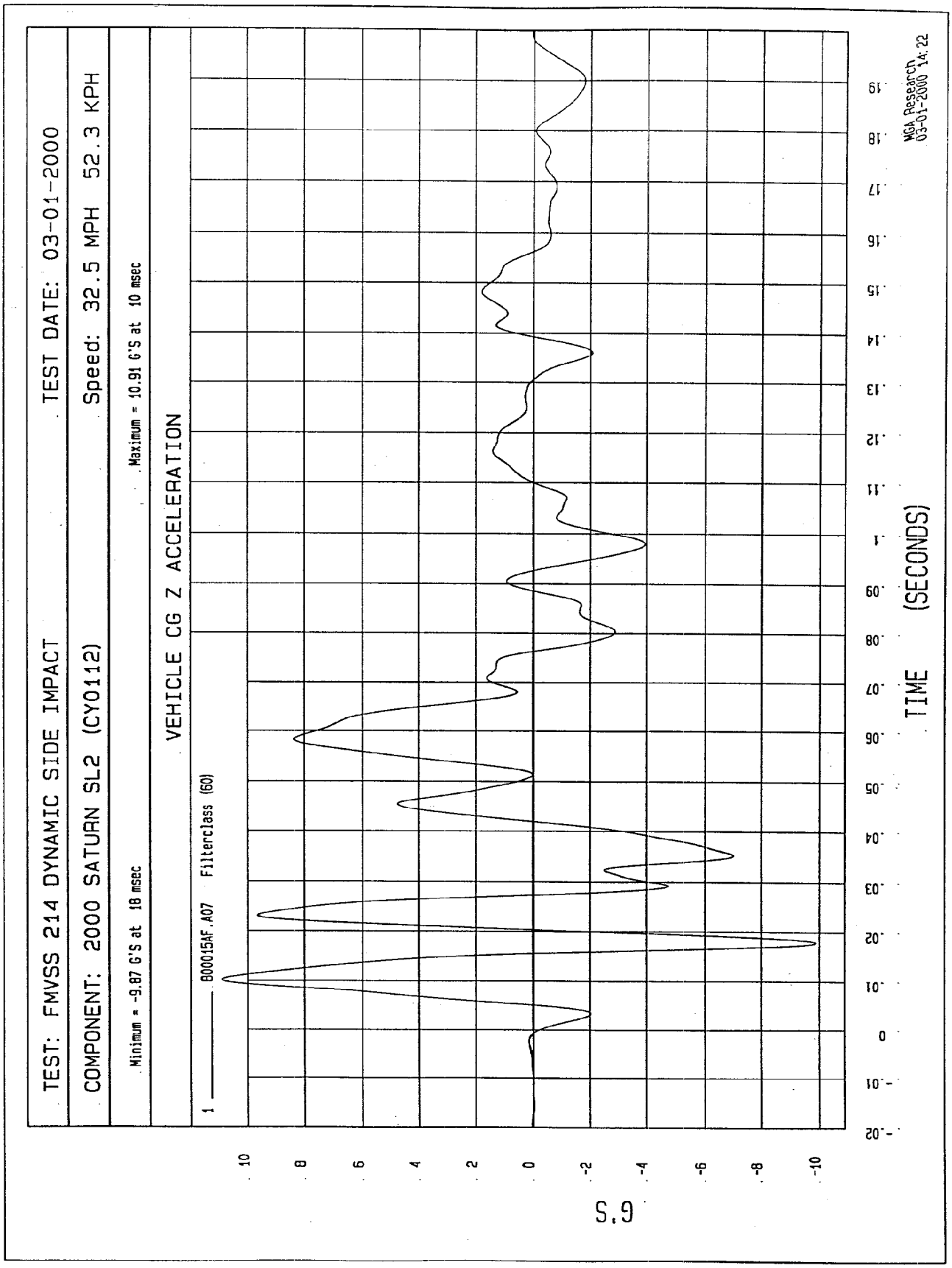

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 0 KPH at -20 msec
Maximum = 29.23 KPH at 40 msec
DRIVER SEAT TRACK Y VELOCITY
1 B00015AI.V40 Filterclass (180)
KPH
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:21

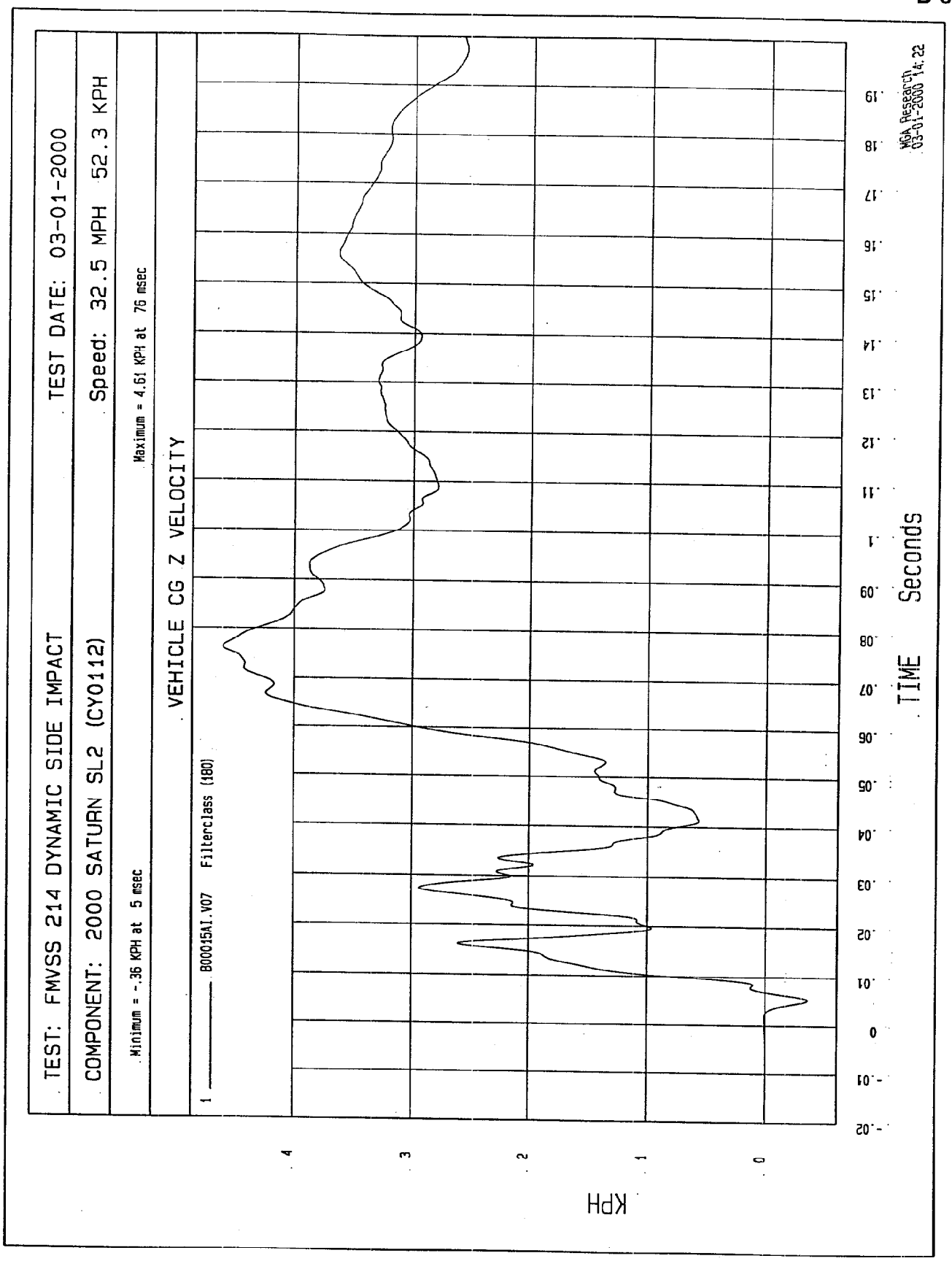

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -8.46 G'S at 21 msec
Maximum = 3.59 G'S at 42 msec
VEHICLE CG X ACCELERATION
1 B00015AF.A05 Filterclass (60)
MGA Research
03-01-2000 14:21
G'S
TIME (SECONDS)

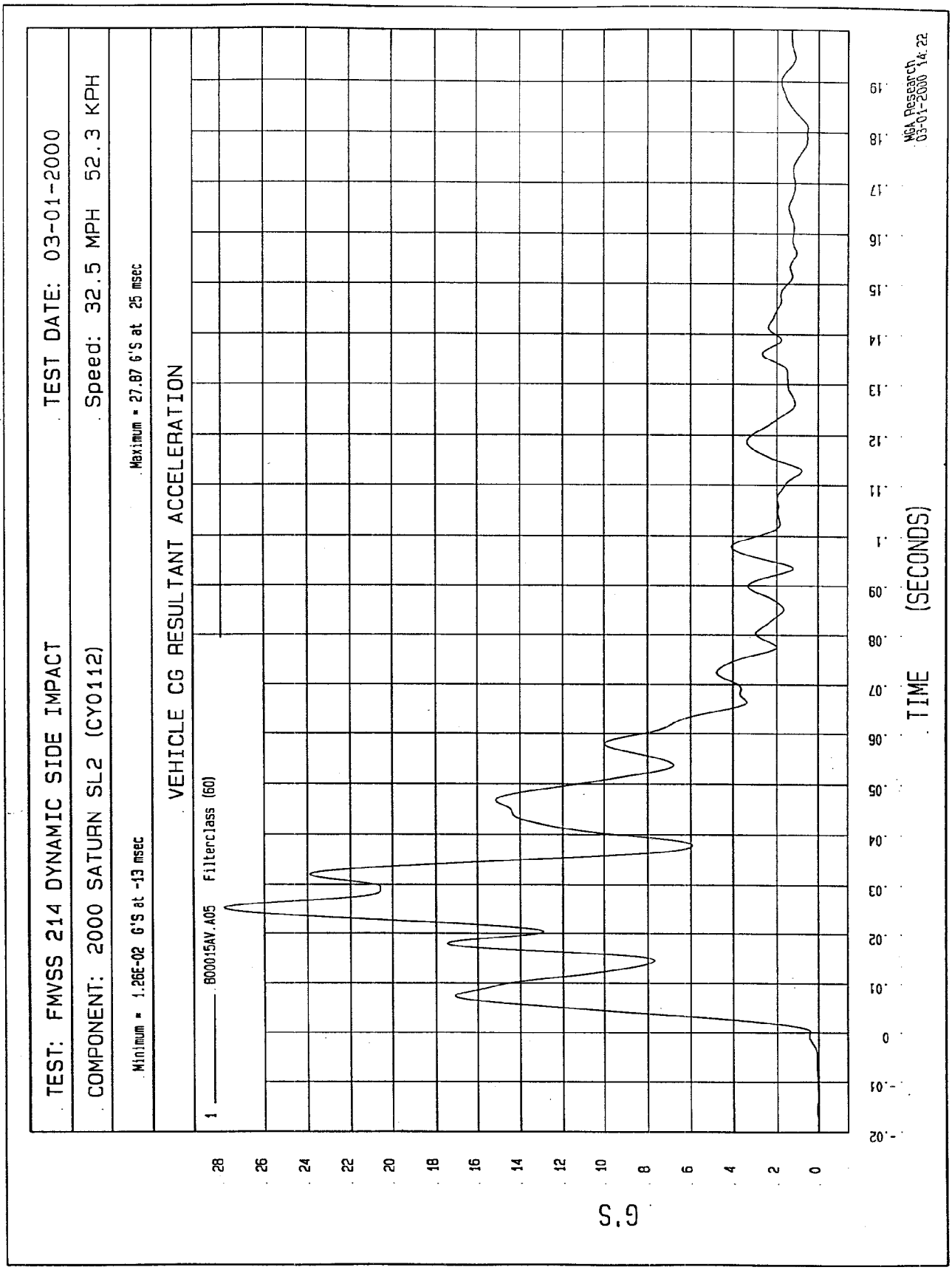

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -4.82 KPH at 37 msec
Maximum = .37 KPH at 6 msec
VEHICLE CG X VELOCITY
1 B00015AI.V05 Filterclass (180)
KPH
0
-1
-2
-3
-4
-5
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:22

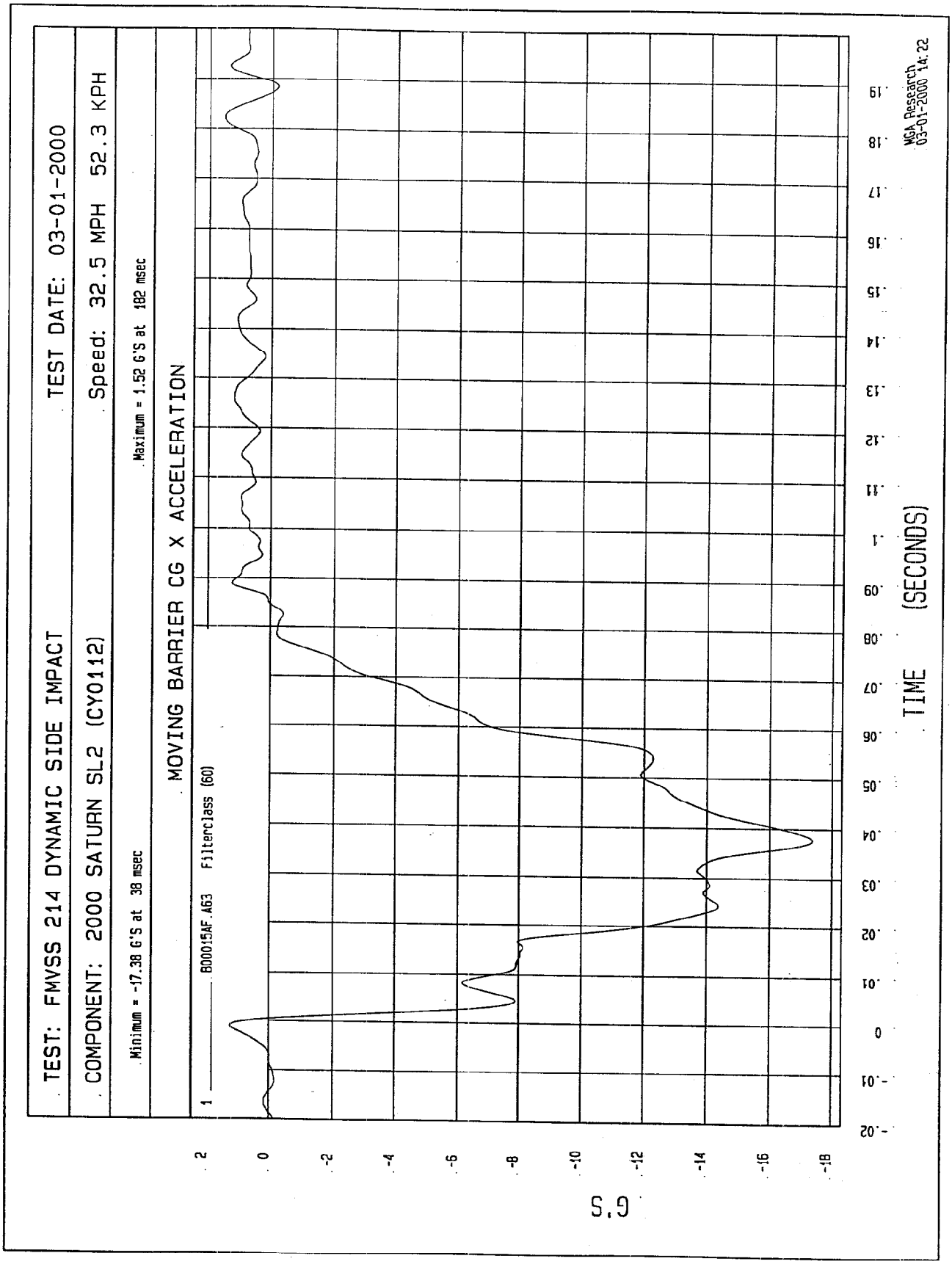

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.08 G'S at 119 msec
Maximum = 26.39 G'S at 25 msec
VEHICLE CG Y ACCELERATION
1 B00015AF.A06 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
03-01-2000 14:22

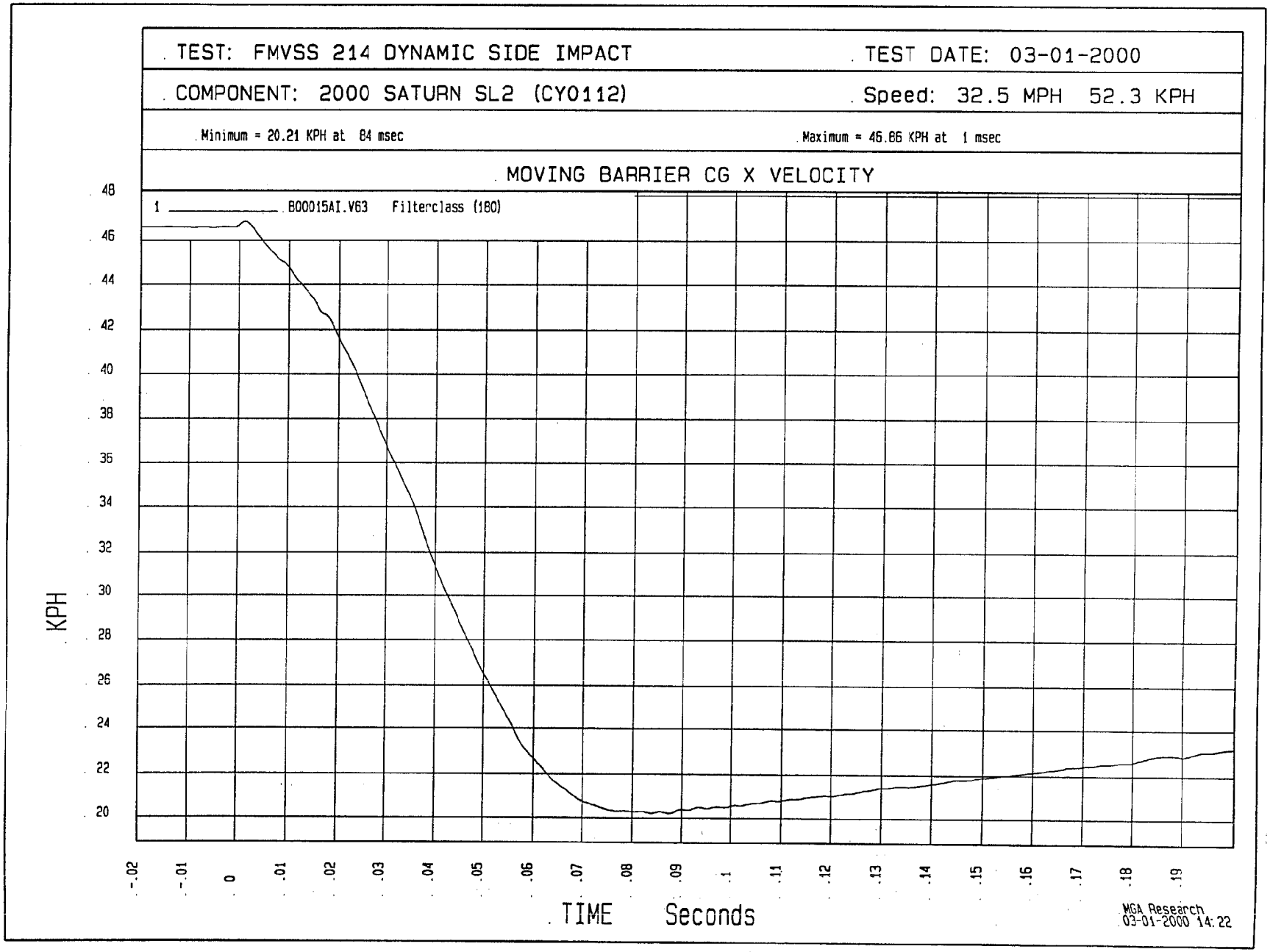

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -4.57E-03 KPH at -9 msec
Maximum = 25.71 KPH at 113 msec
VEHICLE CG Y VELOCITY
1 B00015AI.V06 Filterclass (180)
KPH
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:22

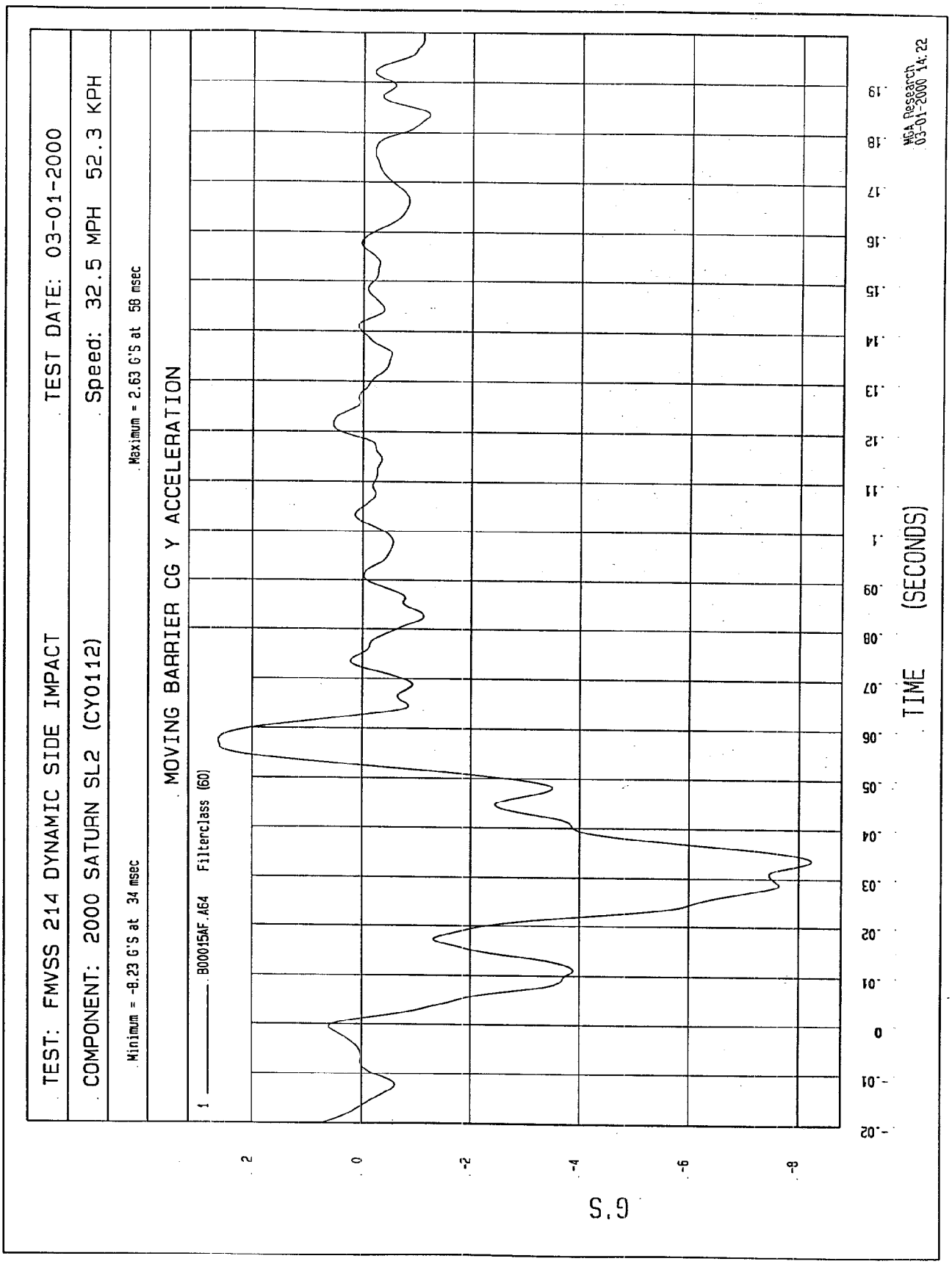

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -9.87 G'S at 18 msec
Maximum = 10.91 G'S at 10 msec
VEHICLE CG Z ACCELERATION
1 B00015AF.A07 Filterclass (60)
10
8
6
4
2
0
-2
-4
-6
-8
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:22

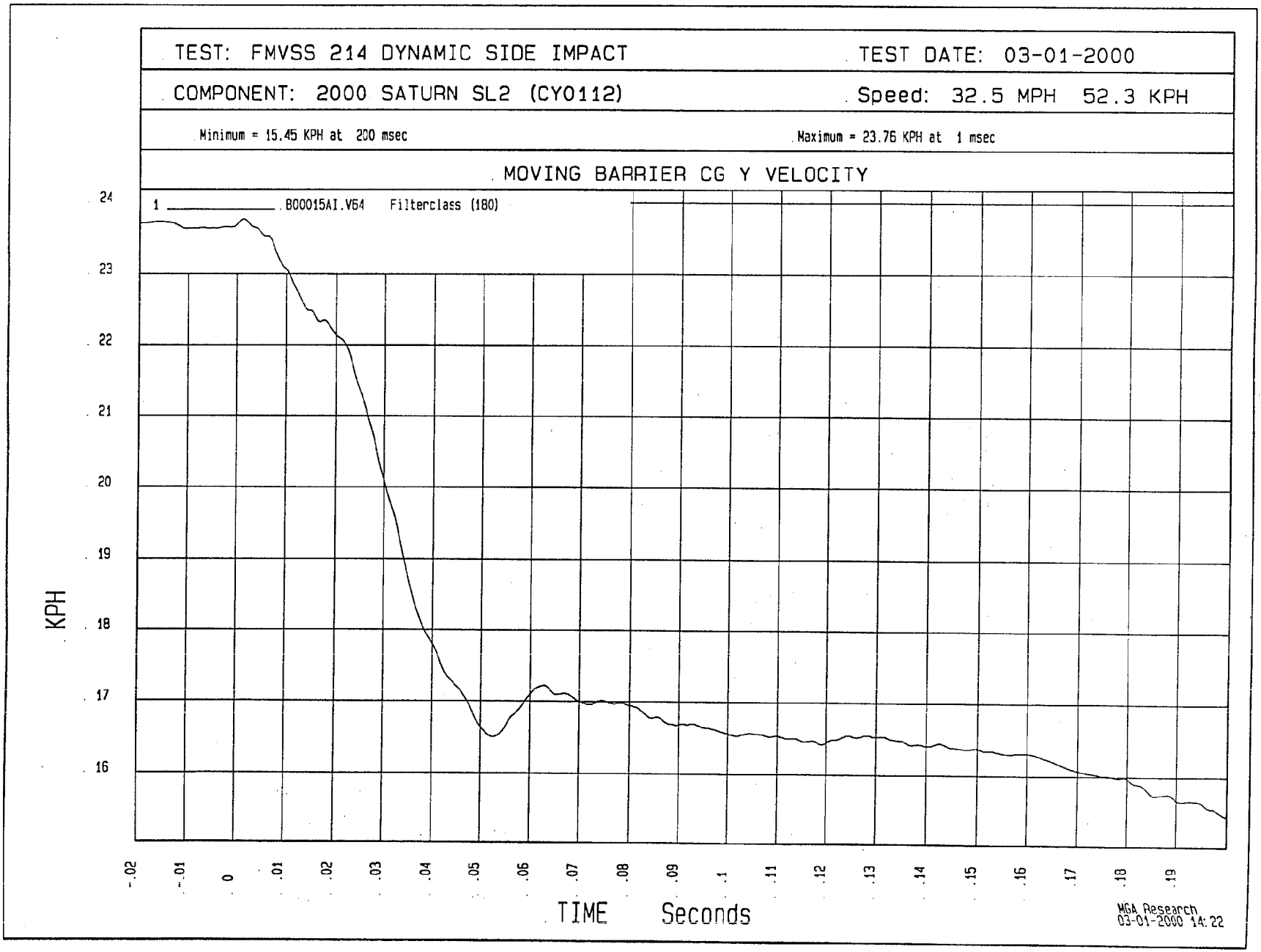

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -.36 KPH at 5 msec
Maximum = 4.61 KPH at 76 msec
VEHICLE CG Z VELOCITY
1 B00015A1.V07 Filterclass (180)
KPH
TIME Seconds
MGA Research
03-01-2000 14:22

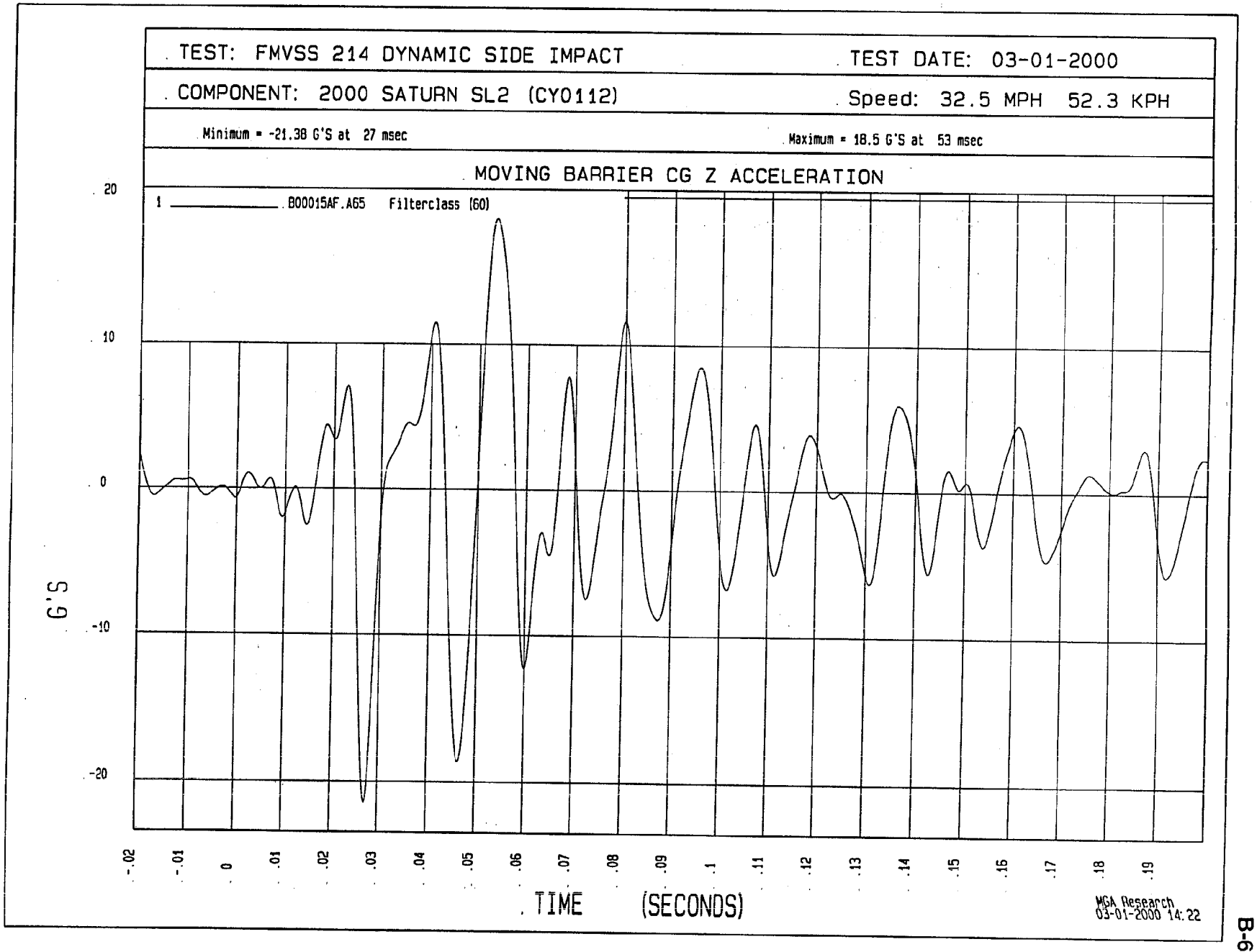

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 1.26E-02 G'S at -13 msec
Maximum = 27.87 G'S at 25 msec
VEHICLE CG RESULTANT ACCELERATION
1 B00015AV.A05 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
03-01-2000 14:22

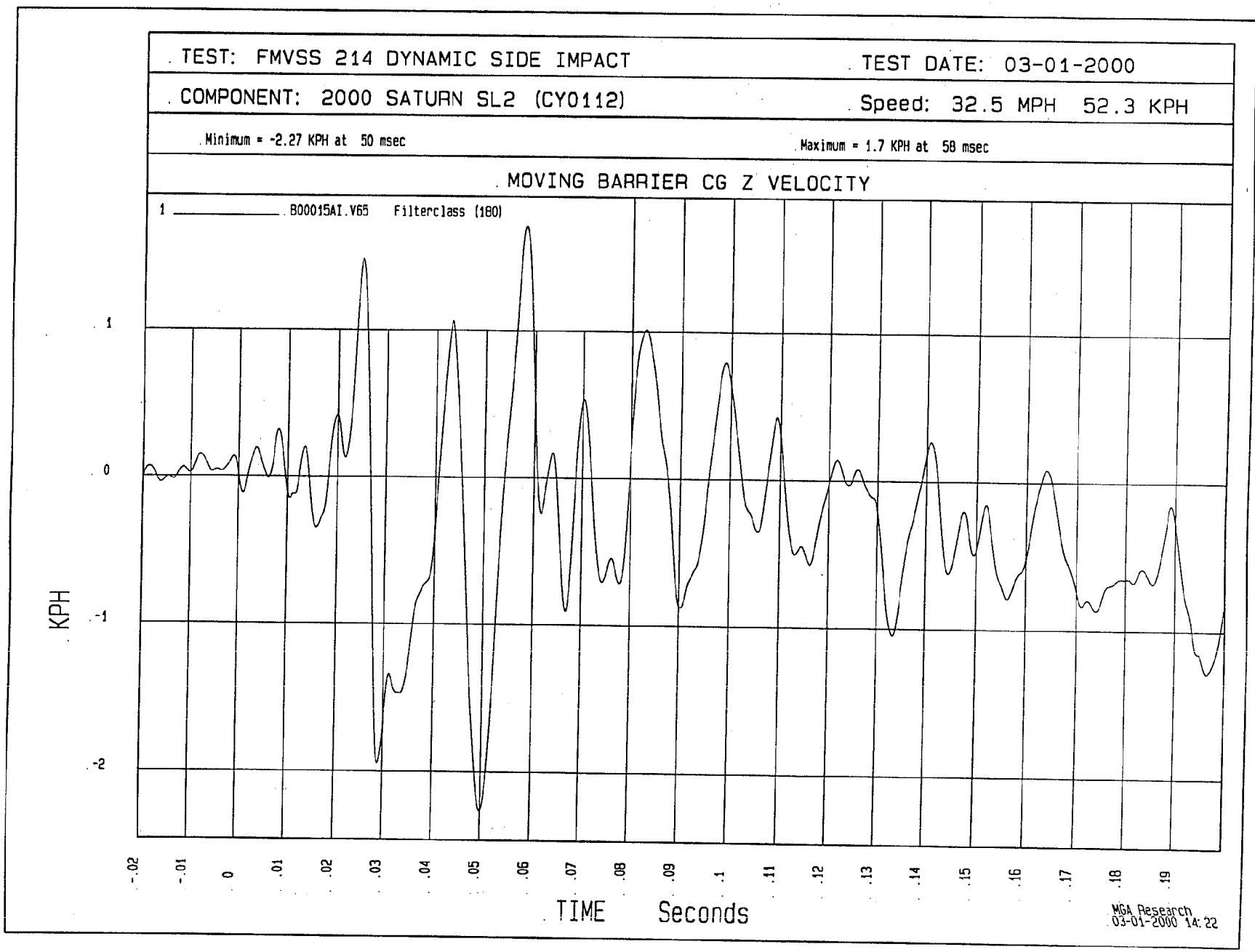

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -17.38 G'S at 38 msec
Maximum = 1.52 G'S at 182 msec
MOVING BARRIER CG X ACCELERATION
1 B00015AF.A63 Filterclass (60)
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
GS
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 20.21 KPH at 84 msec
Maximum = 46.86 KPH at 1 msec
MOVING BARRIER CG X VELOCITY
1 B00015AI.V63 Filterclass (180)
KPH
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -8.23 G'S at 34 msec
Maximum = 2.63 G'S at 58 msec
MOVING BARRIER CG Y ACCELERATION
1 B00015AF.AG4 Filterclass (60)
G'S
2
0
-2
-4
-6
-8
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 15.45 KPH at 200 msec
Maximum = 23.76 KPH at 1 msec
MOVING BARRIER CG Y VELOCITY
1 B00015AI.V64 Filterclass (180)
KPH
24
23
22
21
20
19
18
17
16
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -21.38 G'S at 27 msec
Maximum = 18.5 G'S at 53 msec
MOVING BARRIER CG Z ACCELERATION
1 B00015AF.A65 Filterclass (60)
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.27 KPH at 50 msec
Maximum = 1.7 KPH at 58 msec
MOVING BARRIER CG Z VELOCITY
1 B00015AI.V65 Filterclass (180)
KPH
1
0
-1
-2
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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.16
.17
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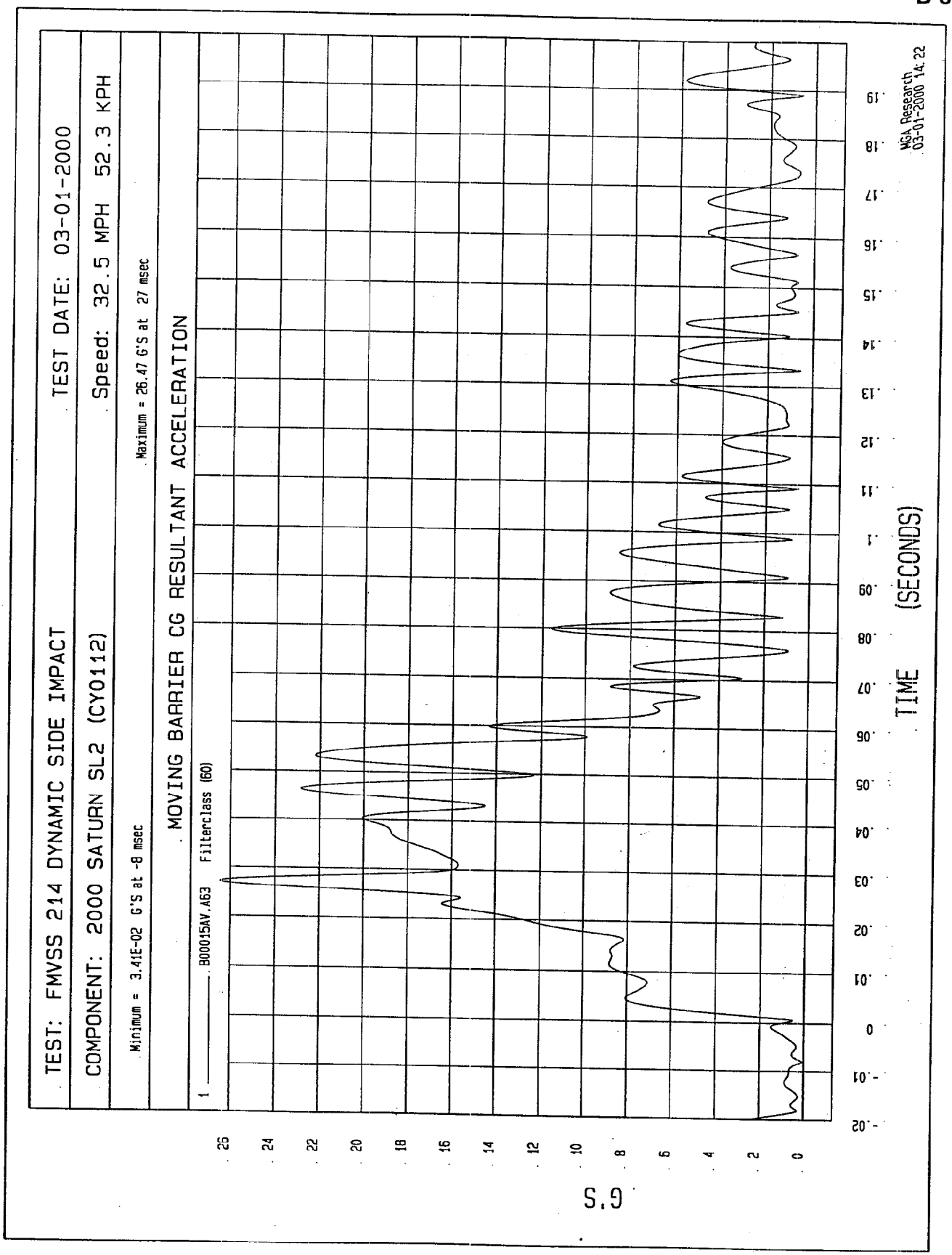
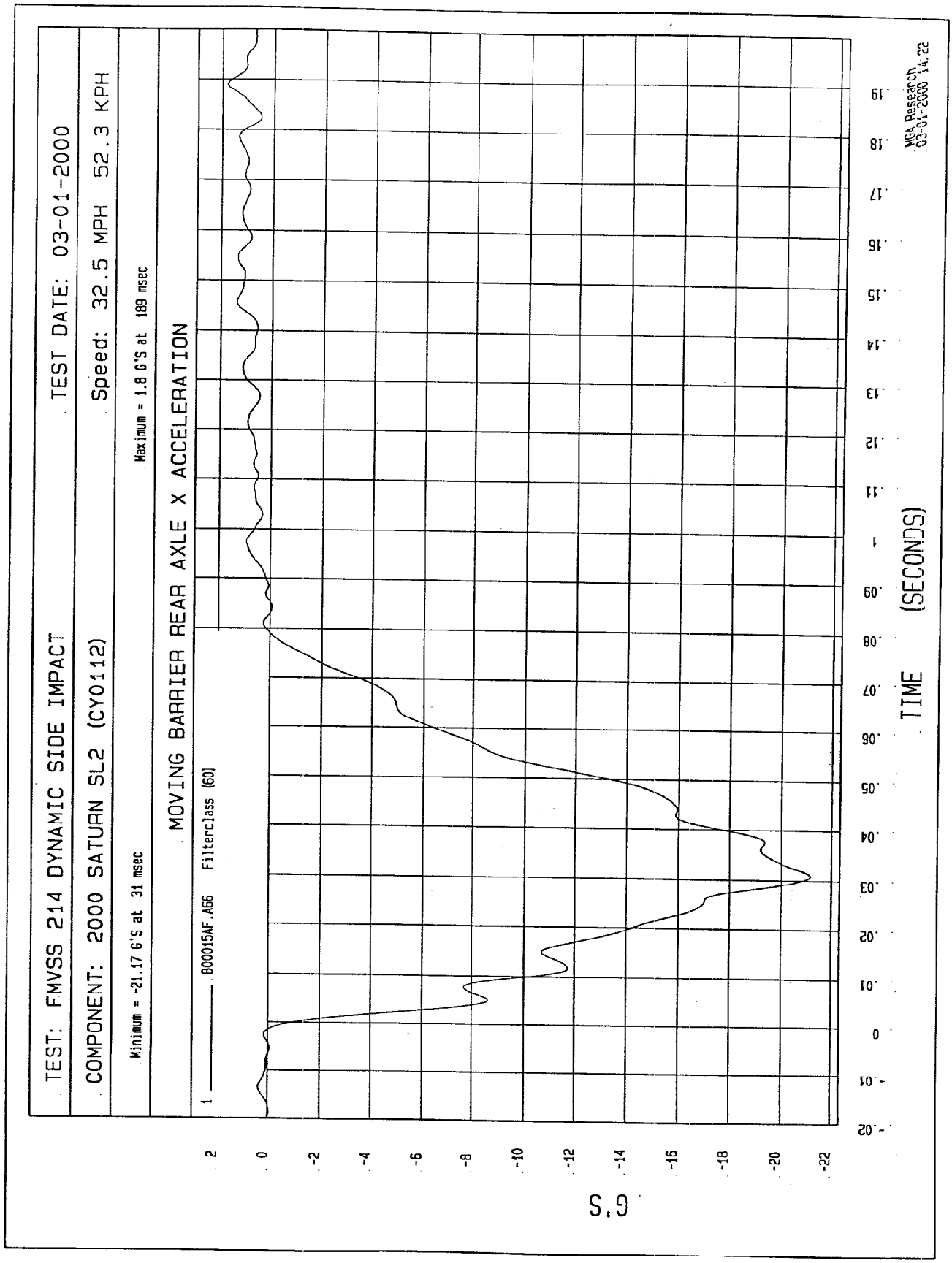
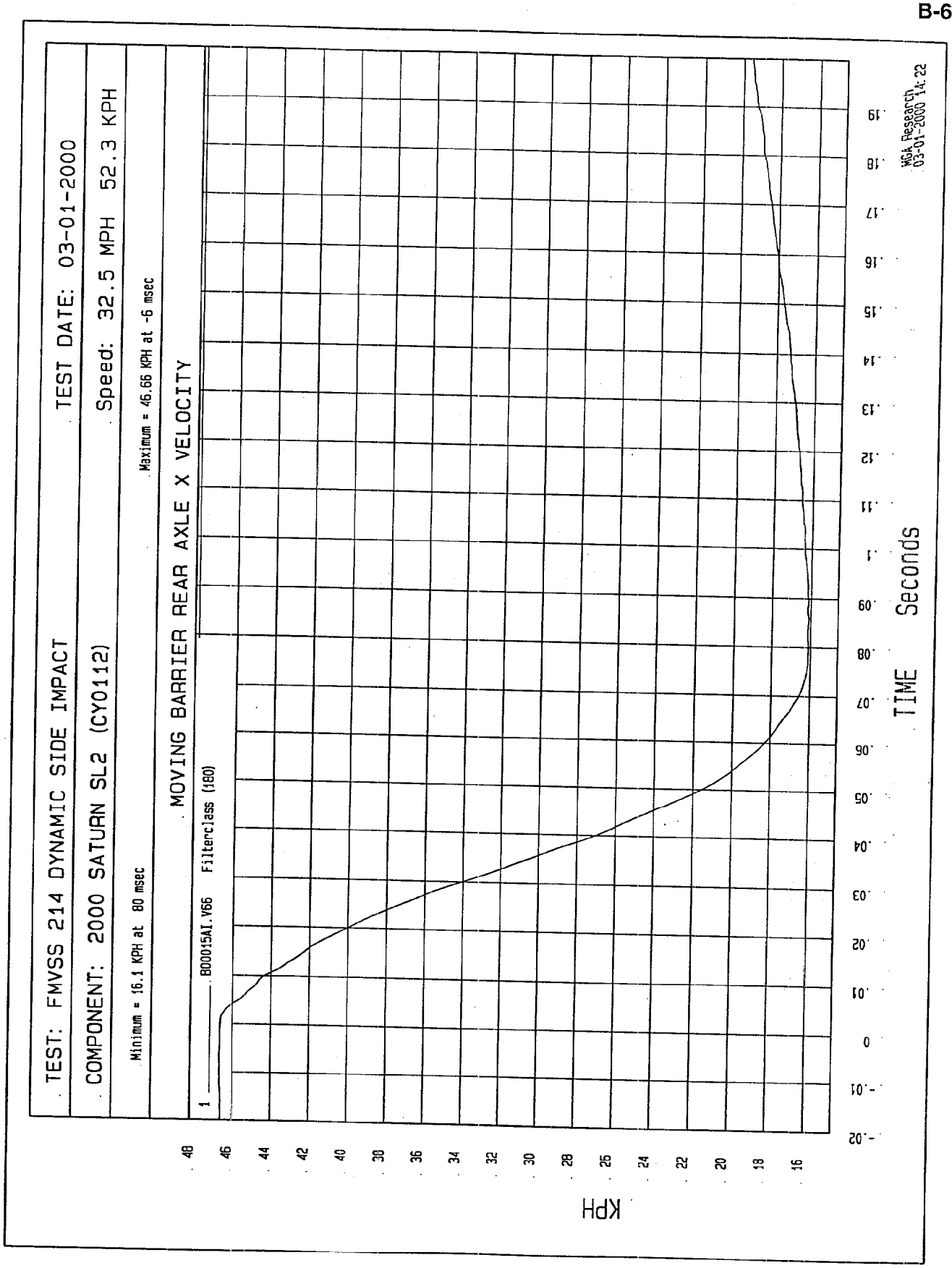
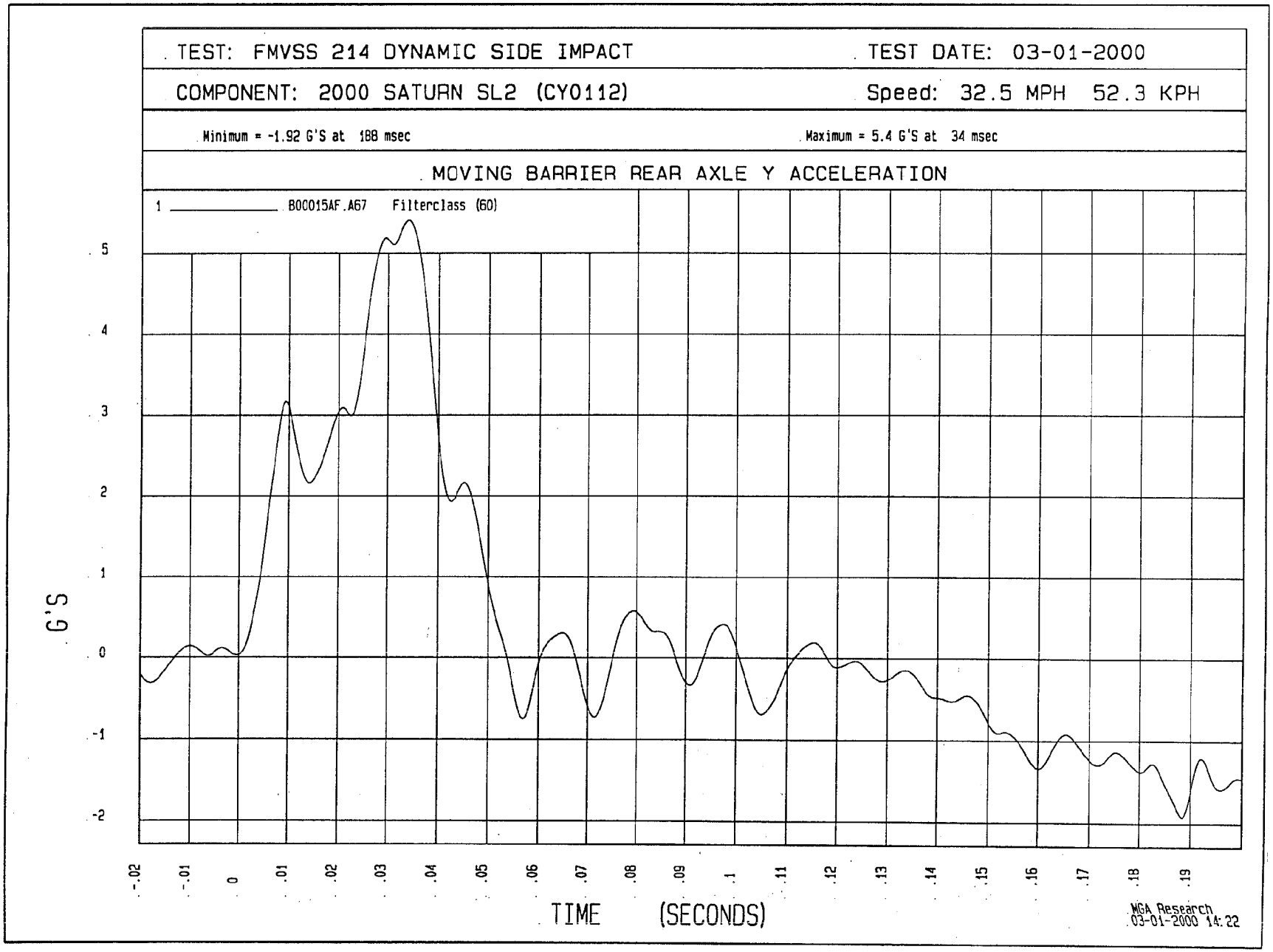
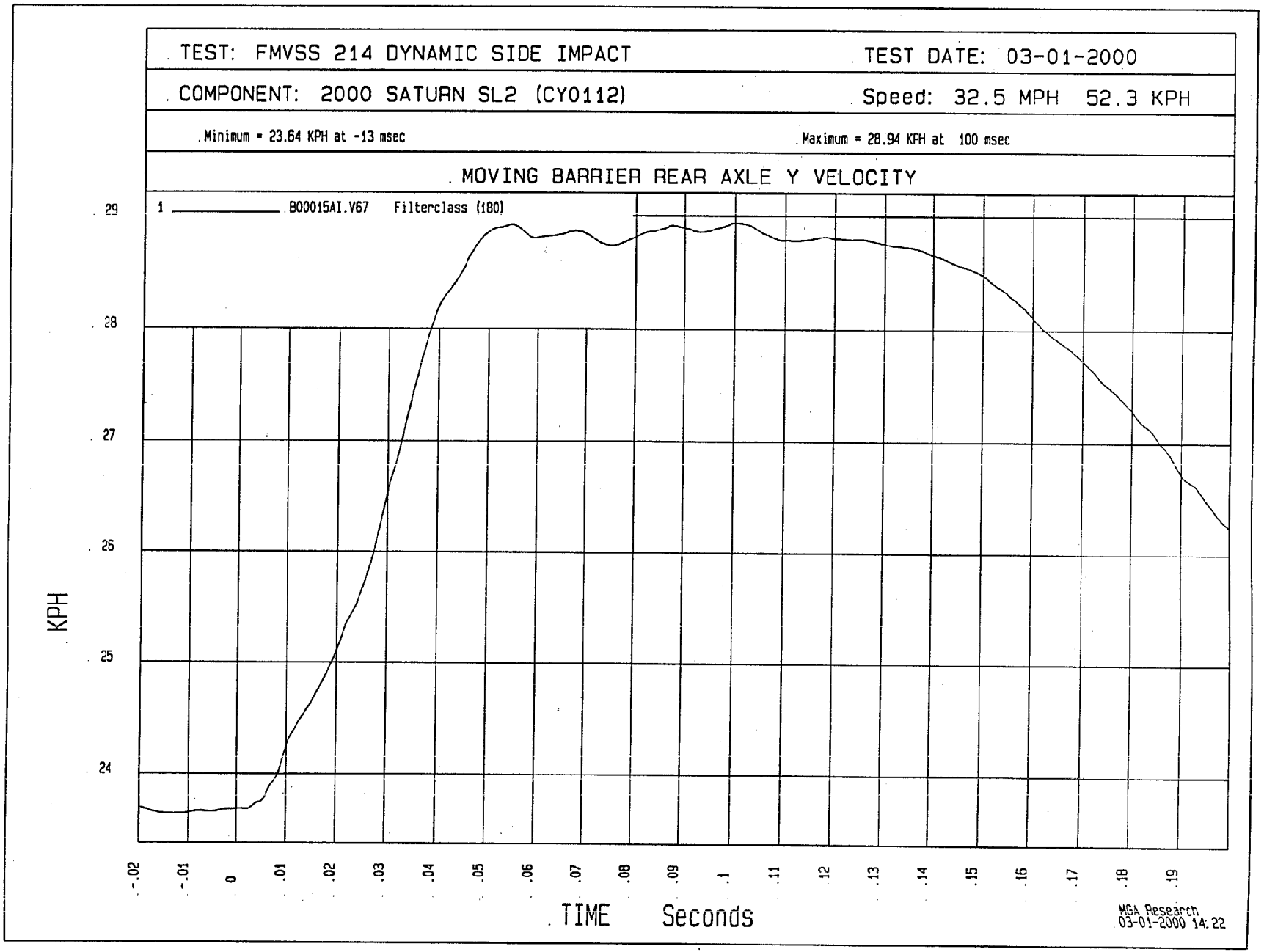
.19
TIME Seconds
MGA Research
03-01-2000 14:22

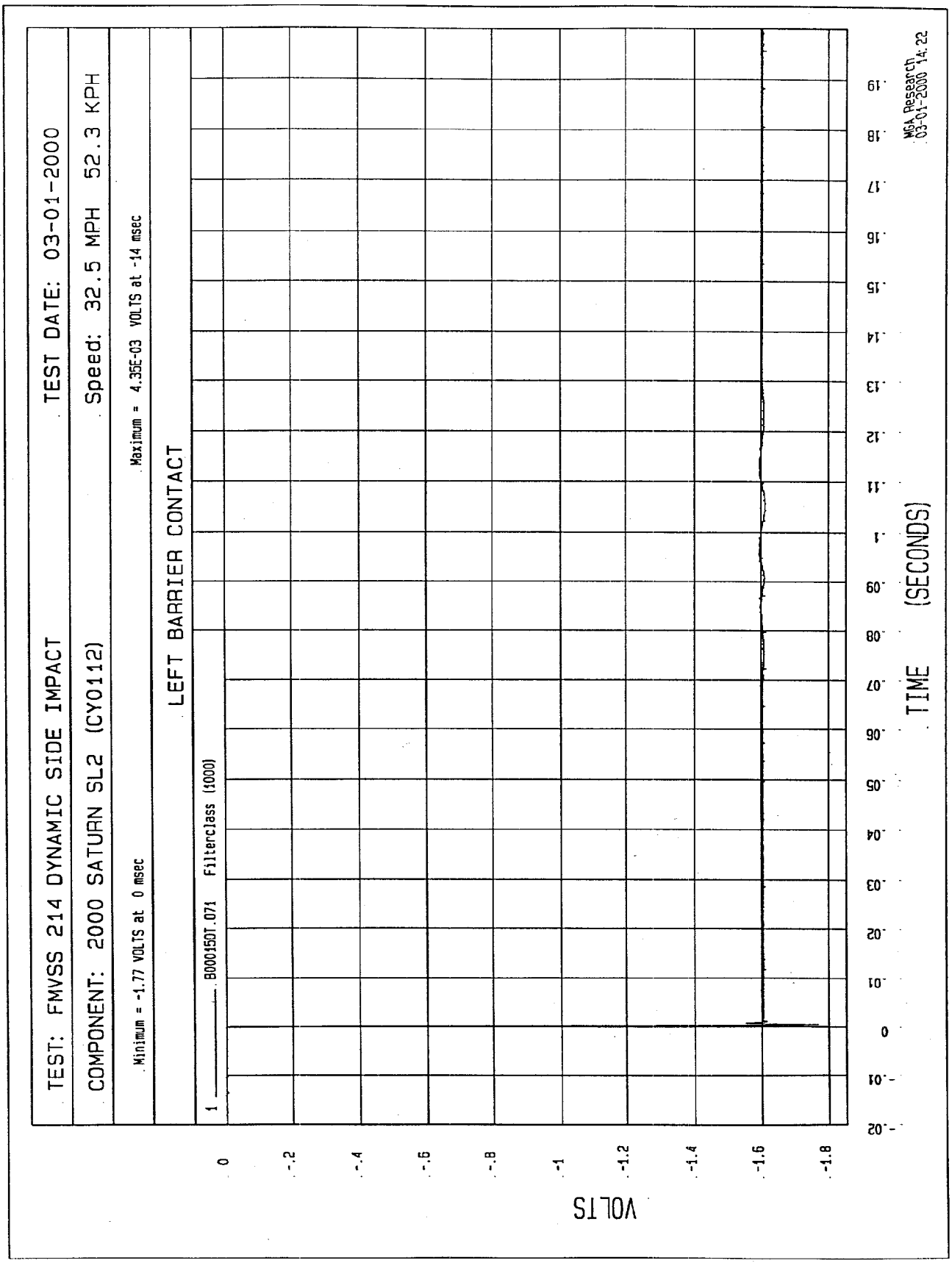

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 3.41E-02 G'S at -8 msec
Maximum = 26.47 G'S at 27 msec
MOVING BARRIER CG RESULTANT ACCELERATION
1 B00015AV.A63 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
03-01-2000 14:22

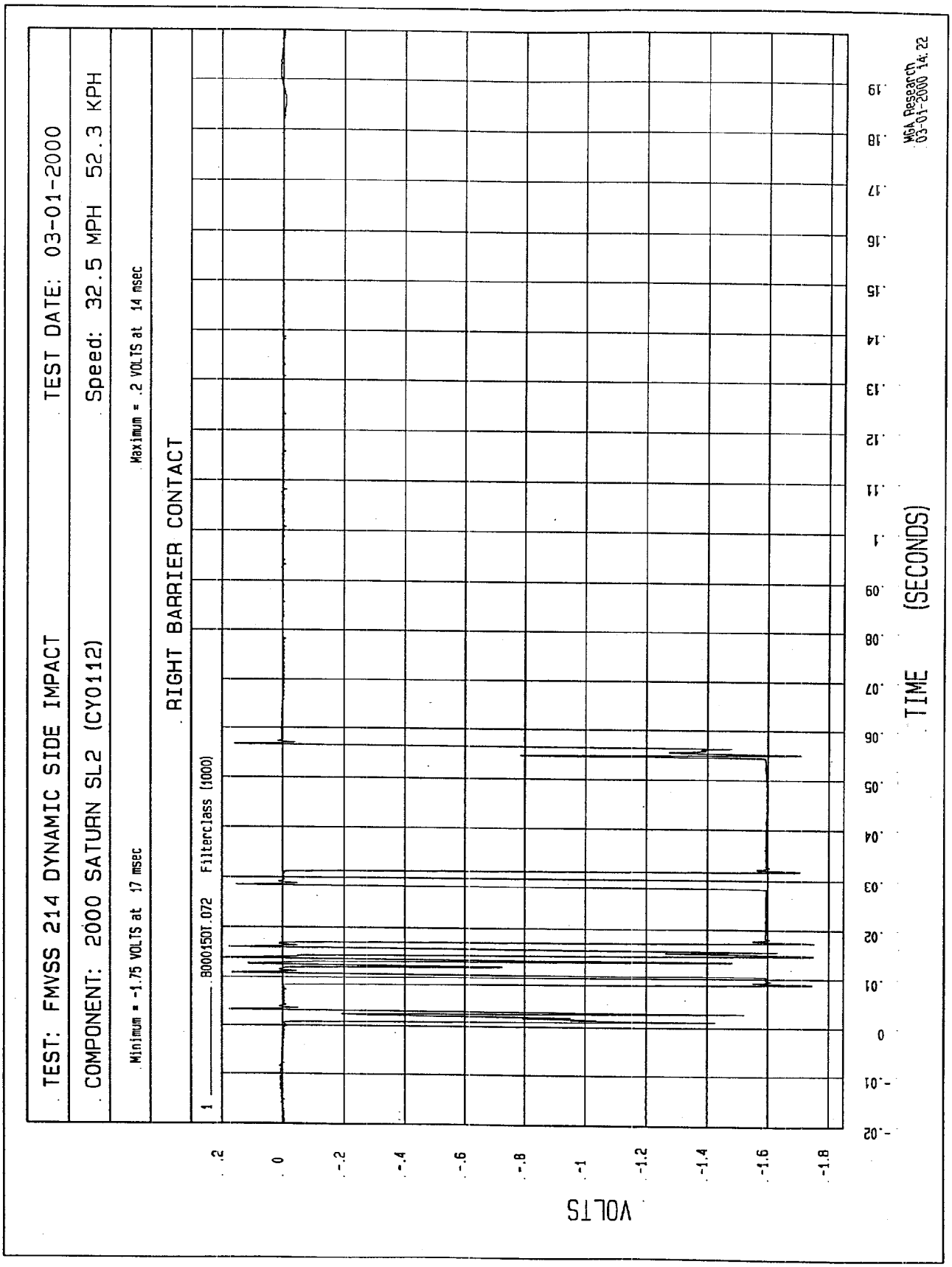

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -21.17 G'S at 31 msec
Maximum = 1.8 G'S at 189 msec
MOVING BARRIER REAR AXLE X ACCELERATION
1 B00015AF.A66 Filterclass (60)
G's
TIME (SECONDS)
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 16.1 KPH at 80 msec
Maximum = 46.66 KPH at -6 msec
MOVING BARRIER REAR AXLE X VELOCITY
1 B00015AI.V66 Filterclass (180)
KPH
TIME Seconds
NGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.92 G'S at 188 msec
Maximum = 5.4 G'S at 34 msec
MOVING BARRIER REAR AXLE Y ACCELERATION
1 B0C015AF.A67 Filterclass (60)
G'S
5
4
3
2
1
0
-1
-2
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 23.64 KPH at -13 msec
Maximum = 28.94 KPH at 100 msec
MOVING BARRIER REAR AXLE Y VELOCITY
1 B00015AI.V67 Filterclass (180)
KPH
29
28
27
26
25
24
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.77 VOLTS at 0 msec
Maximum = 4.35E-03 VOLTS at -14 msec
LEFT BARRIER CONTACT
1 B0001501.071 Filterclass (1000)
VOLTS
0
-.2
-.4
-.6
-.8
-1
-1.2
-1.4
-1.6
-1.8
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:22


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.75 VOLTS at 17 msec
Maximum = .2 VOLTS at 14 msec
RIGHT BARRIER CONTACT
1 _____ 8000150T.072 Filterclass (1000)
VOLTS
.2
0
-.2
-.4
-.6
-.8
-1
-1.2
-1.4
-1.6
-1.8
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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.17
.18
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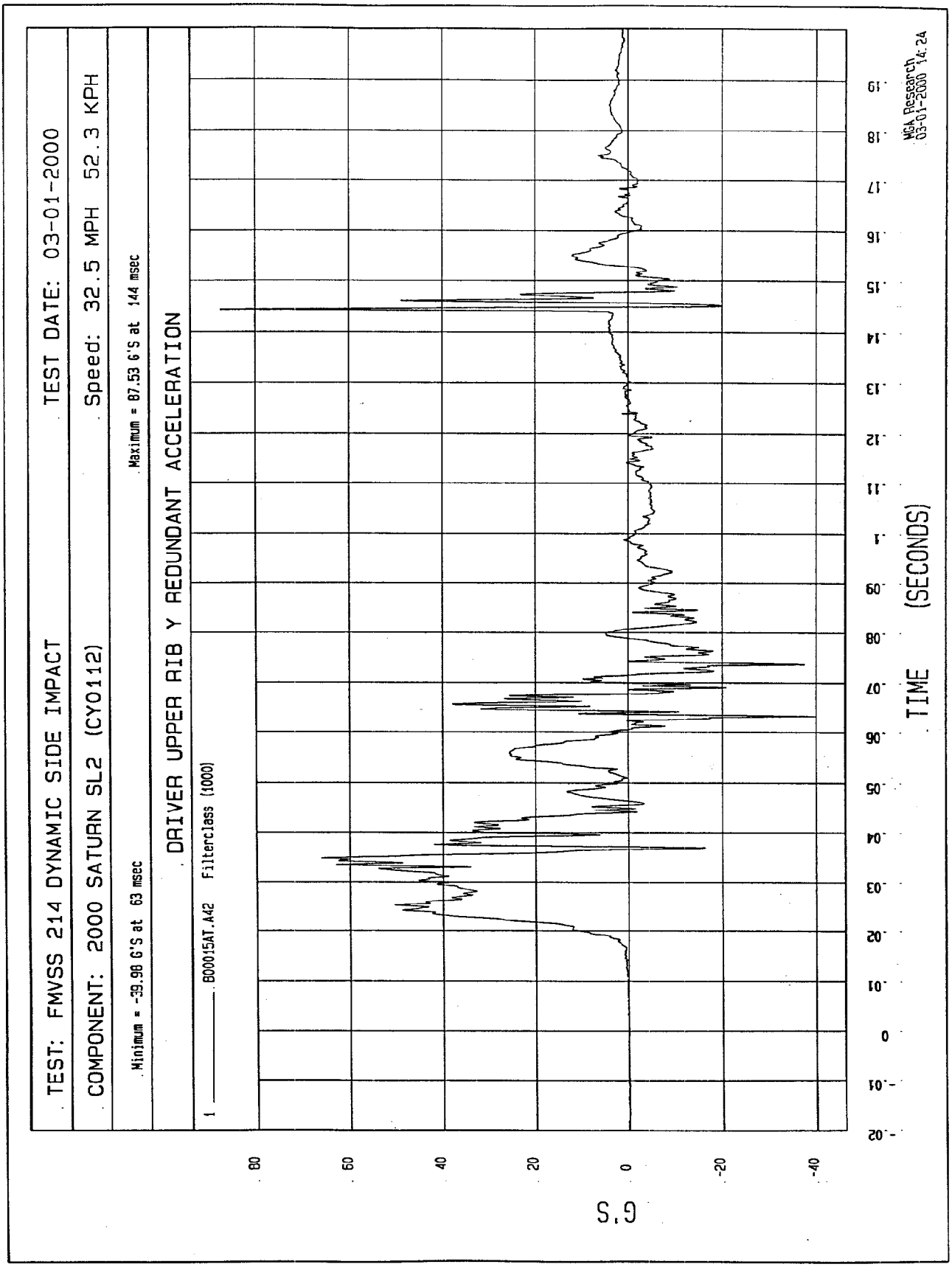
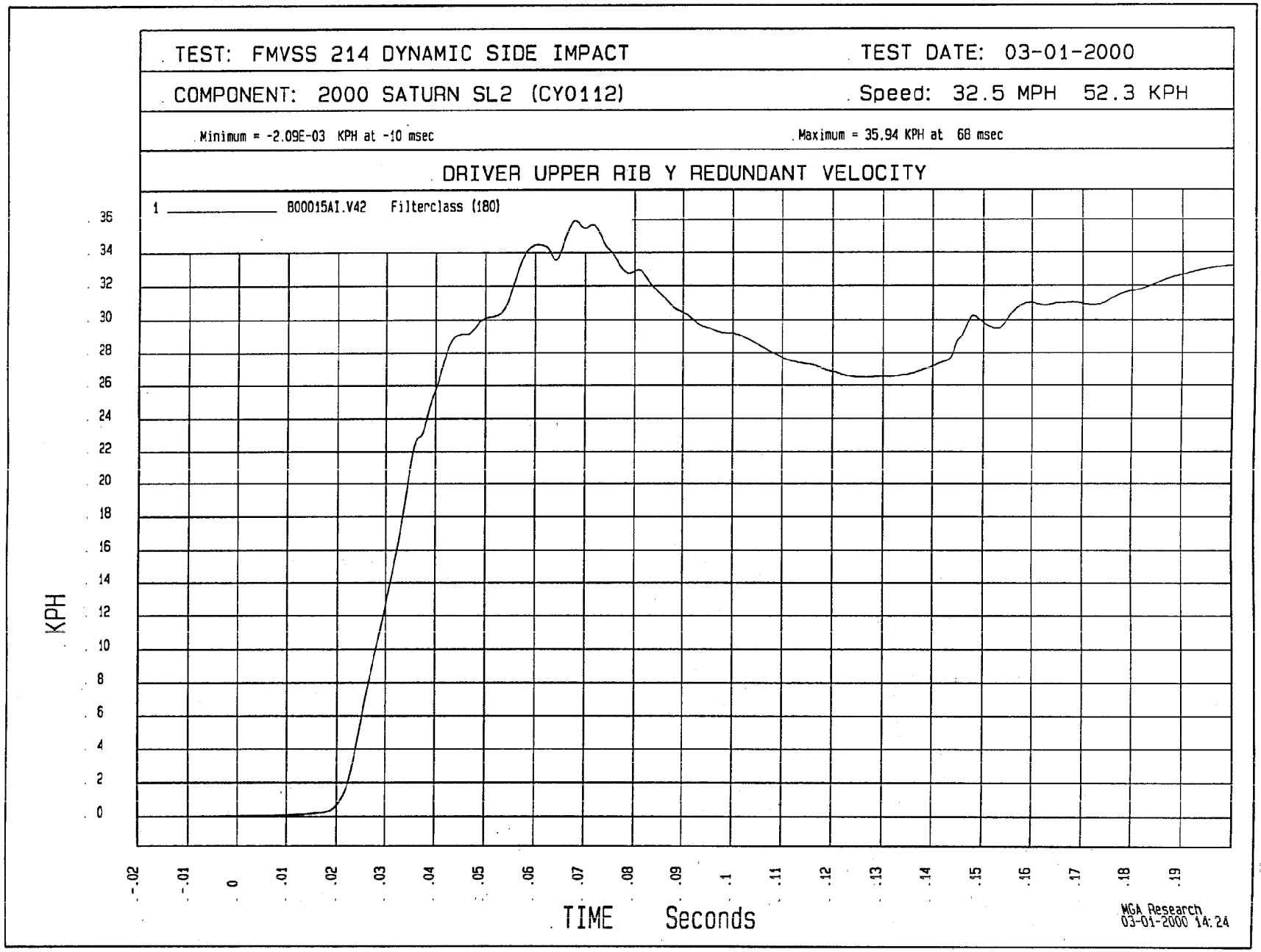
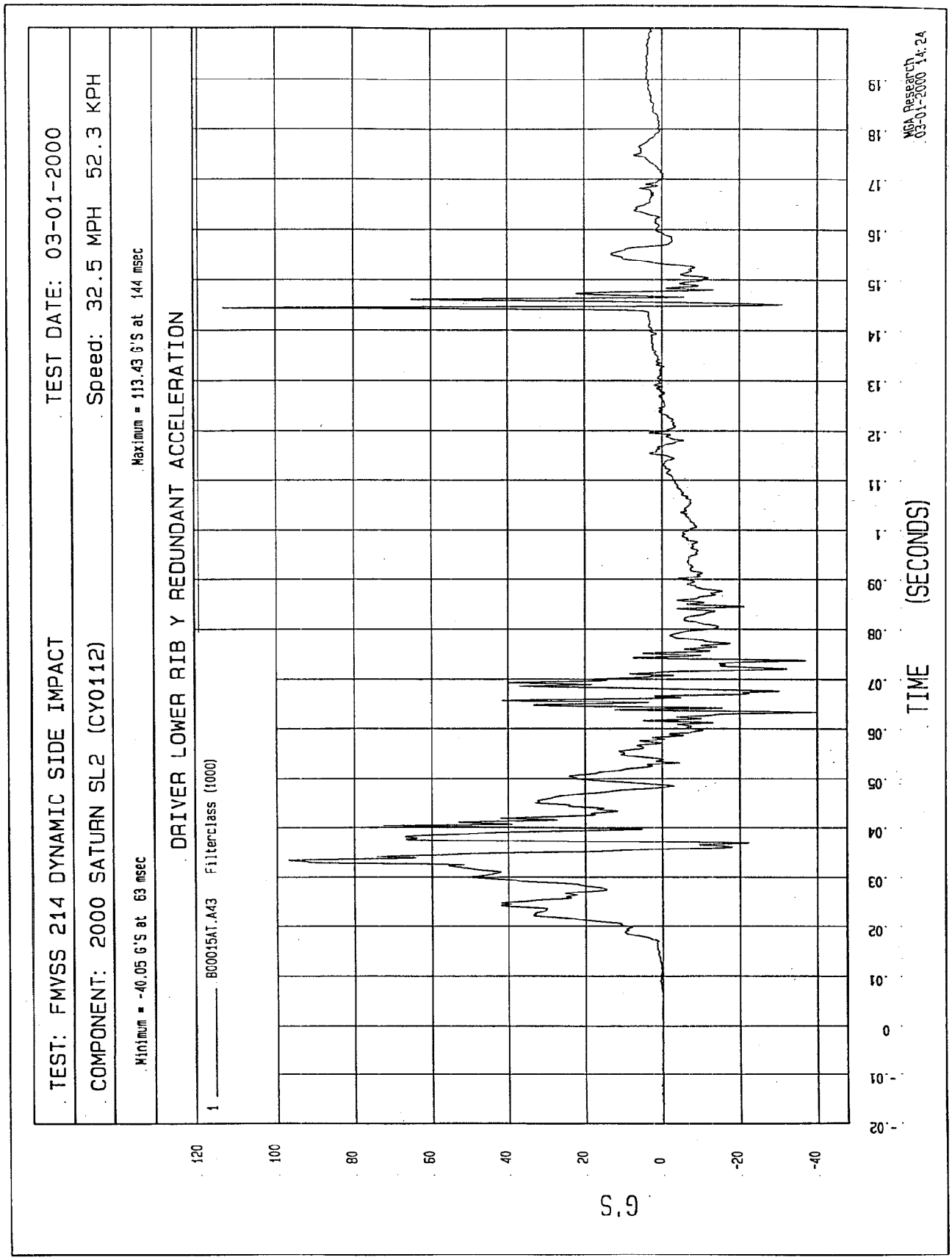
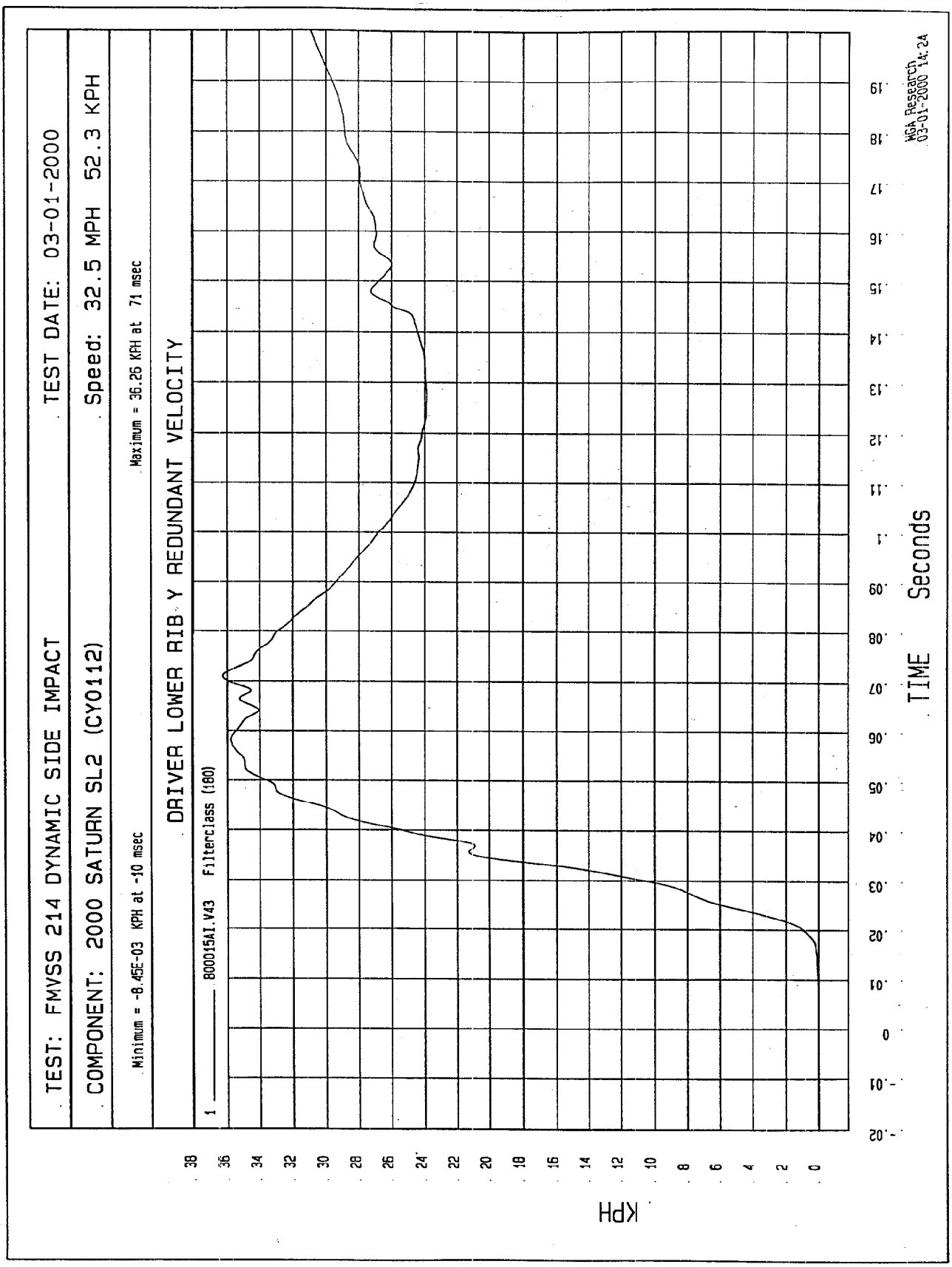
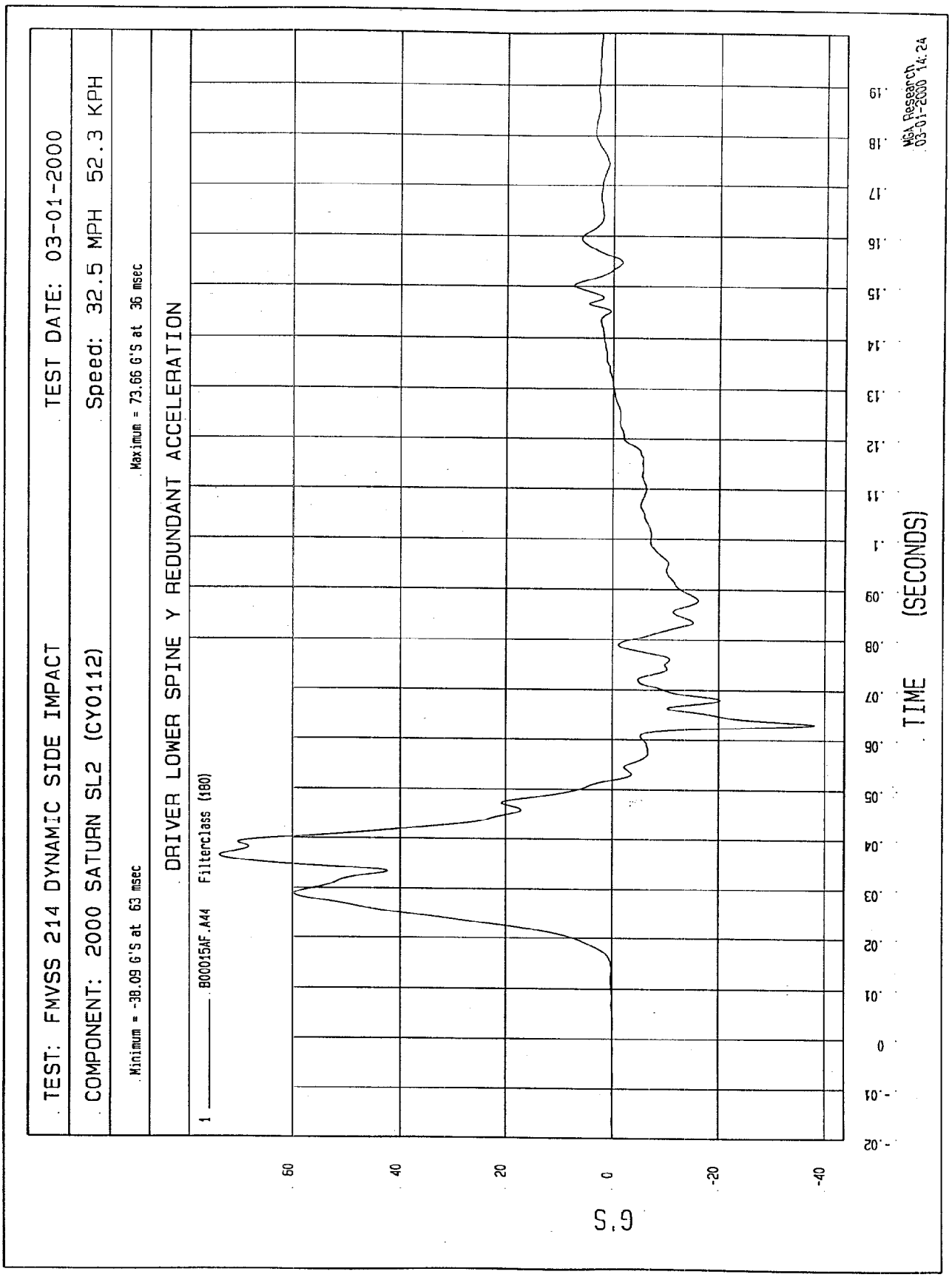
TIME (SECONDS)
MGA Research
03-01-2000 14:22

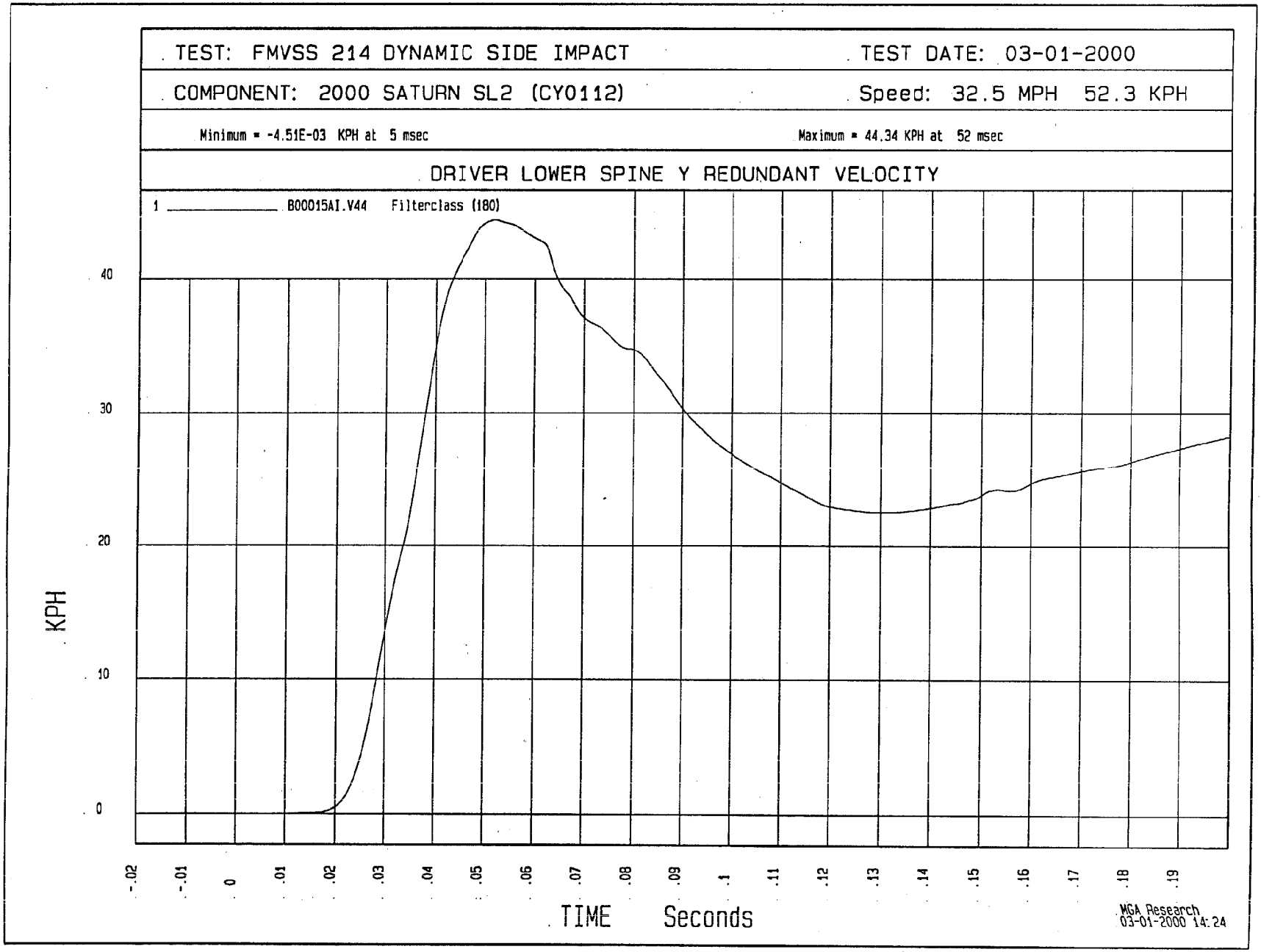

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -39.98 G'S at 63 msec
Maximum = 87.53 G'S at 144 msec
DRIVER UPPER RIB Y REDUNDANT ACCELERATION
1 B00015AT.A42 Filterclass (1000)
80
60
40
20
0
-20
-40
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.09E-03 KPH at -10 msec
Maximum = 35.94 KPH at 68 msec
DRIVER UPPER RIB Y REDUNDANT VELOCITY
1 B00015AI.V42 Filterclass (180)
KPH
35
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -40.05 G'S at 63 msec
Maximum = 113.43 G'S at 144 msec
DRIVER LOWER RIB Y REDUNDANT ACCELERATION
1 B00015AT.A43 Filterclass (1000)
120
100
80
60
40
20
0
-20
-40
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -8.45E-03 KPH at -10 msec
Maximum = 36.26 KPH at 71 msec
DRIVER LOWER RIB Y REDUNDANT VELOCITY
1 800015AI.V43 Filterclass (180)
KPH
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -38.09 G'S at 63 msec
Maximum = 73.66 G'S at 36 msec
DRIVER LOWER SPINE Y REDUNDANT ACCELERATION
1 B00015AF.A44 Filterclass (180)
60
40
20
0
-20
-40
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -4.51E-03 KPH at 5 msec
Maximum = 44.34 KPH at 52 msec
DRIVER LOWER SPINE Y REDUNDANT VELOCITY
1 B00015AI.V44 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.13
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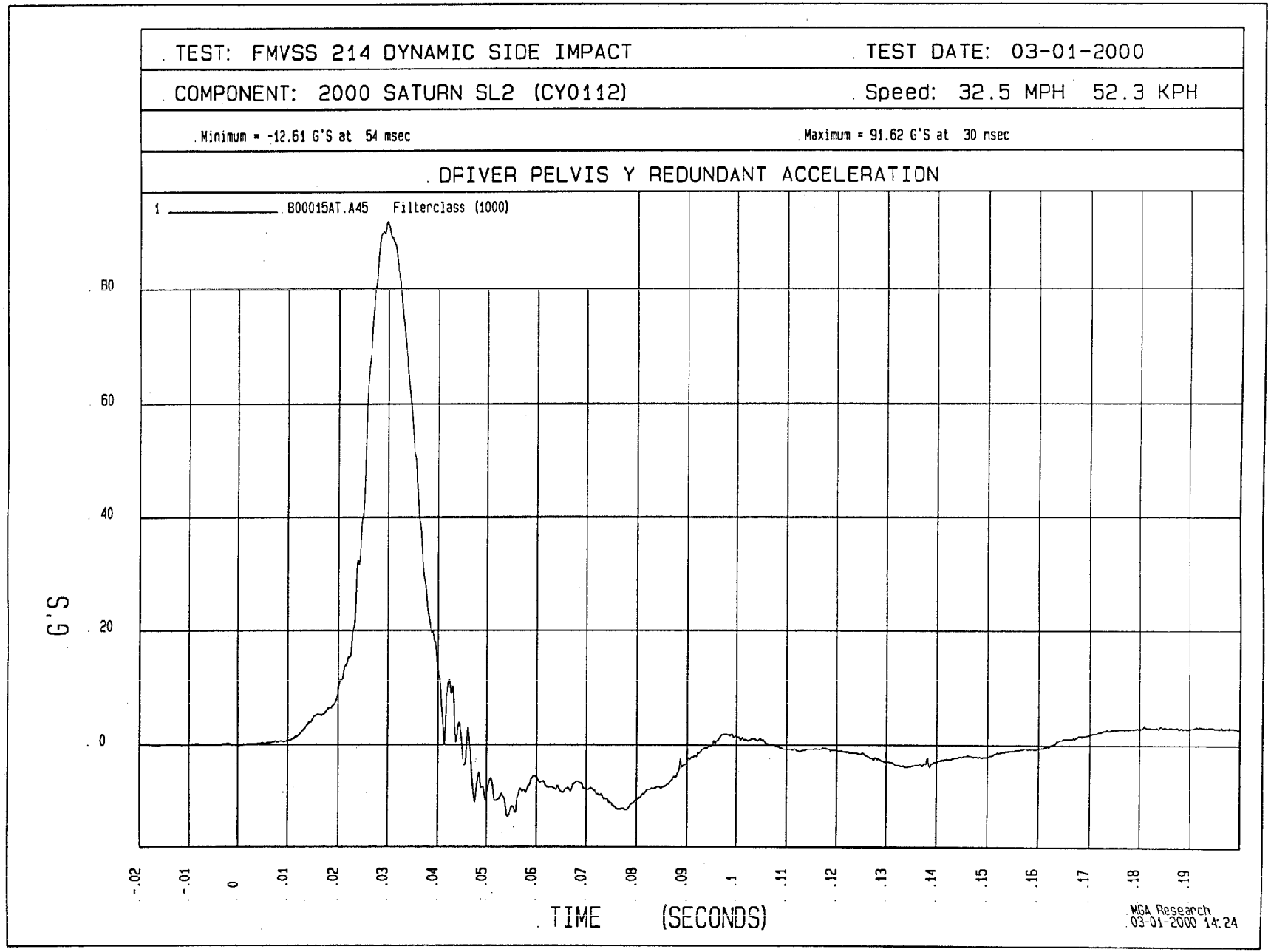
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -12.61 G'S at 54 msec
Maximum = 91.62 G'S at 30 msec
DRIVER PELVIS Y REDUNDANT ACCELERATION
1 B00015AT.A45 Filterclass (1000)
80
60
40
20
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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.14
.15
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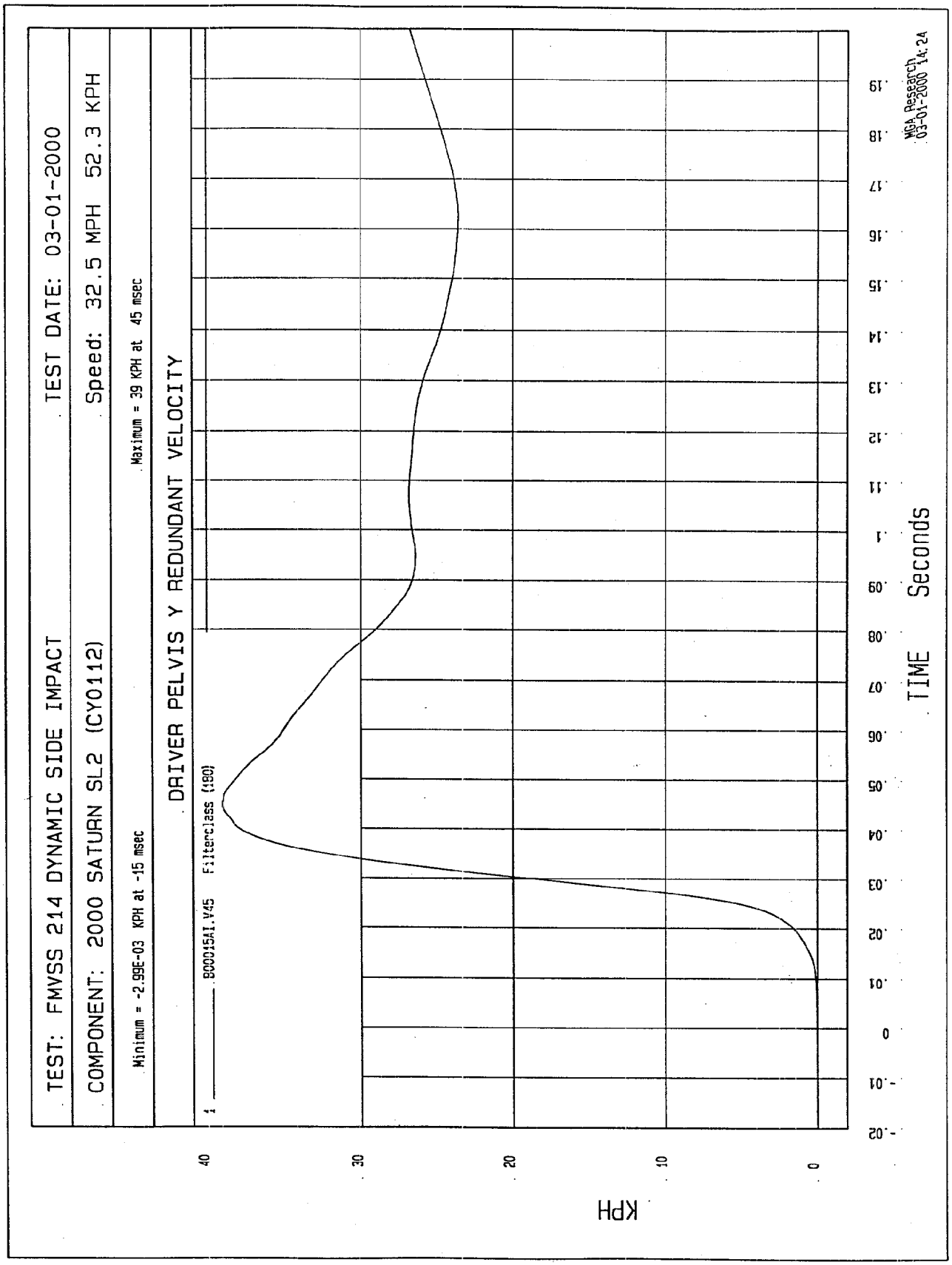
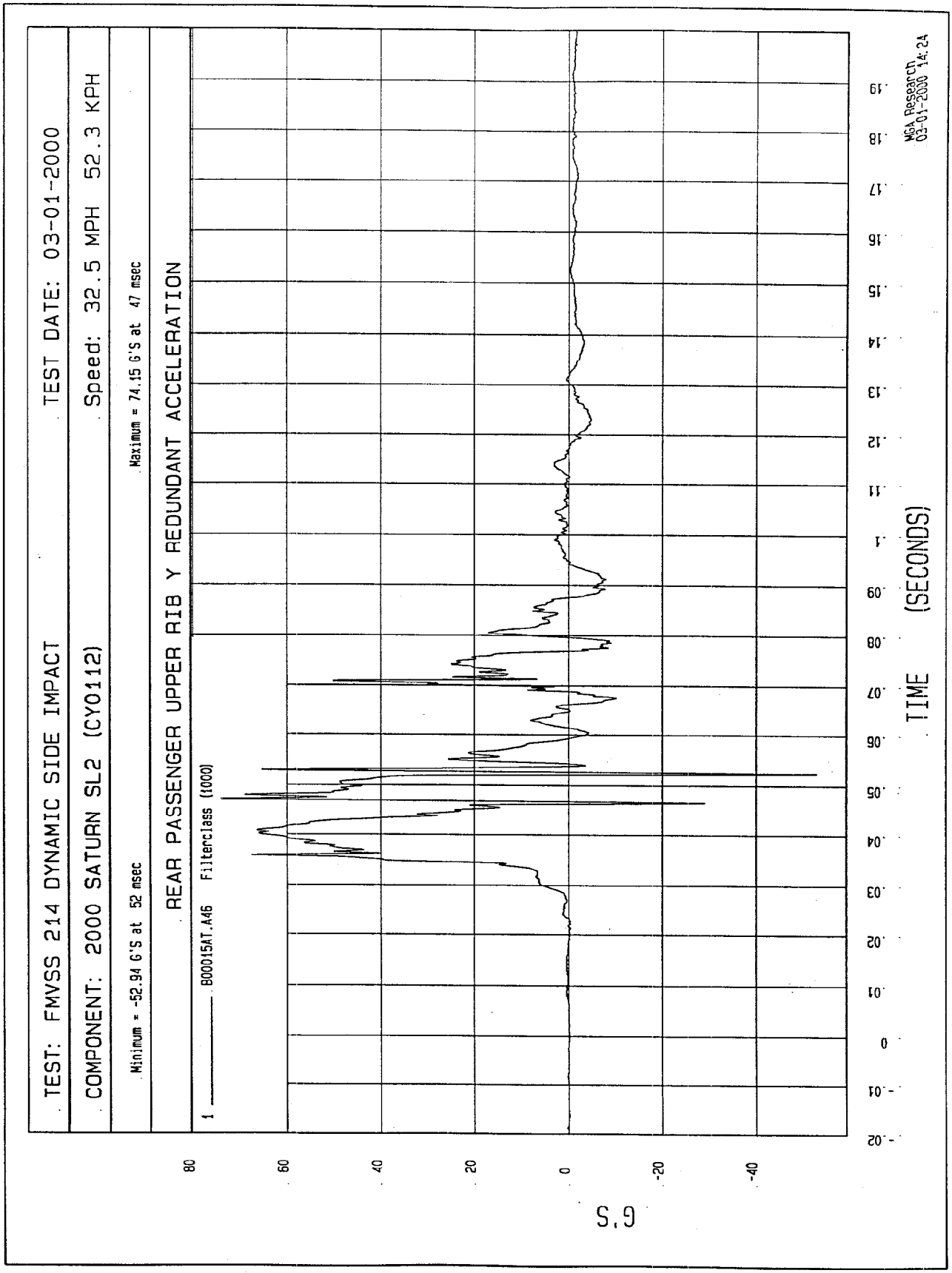
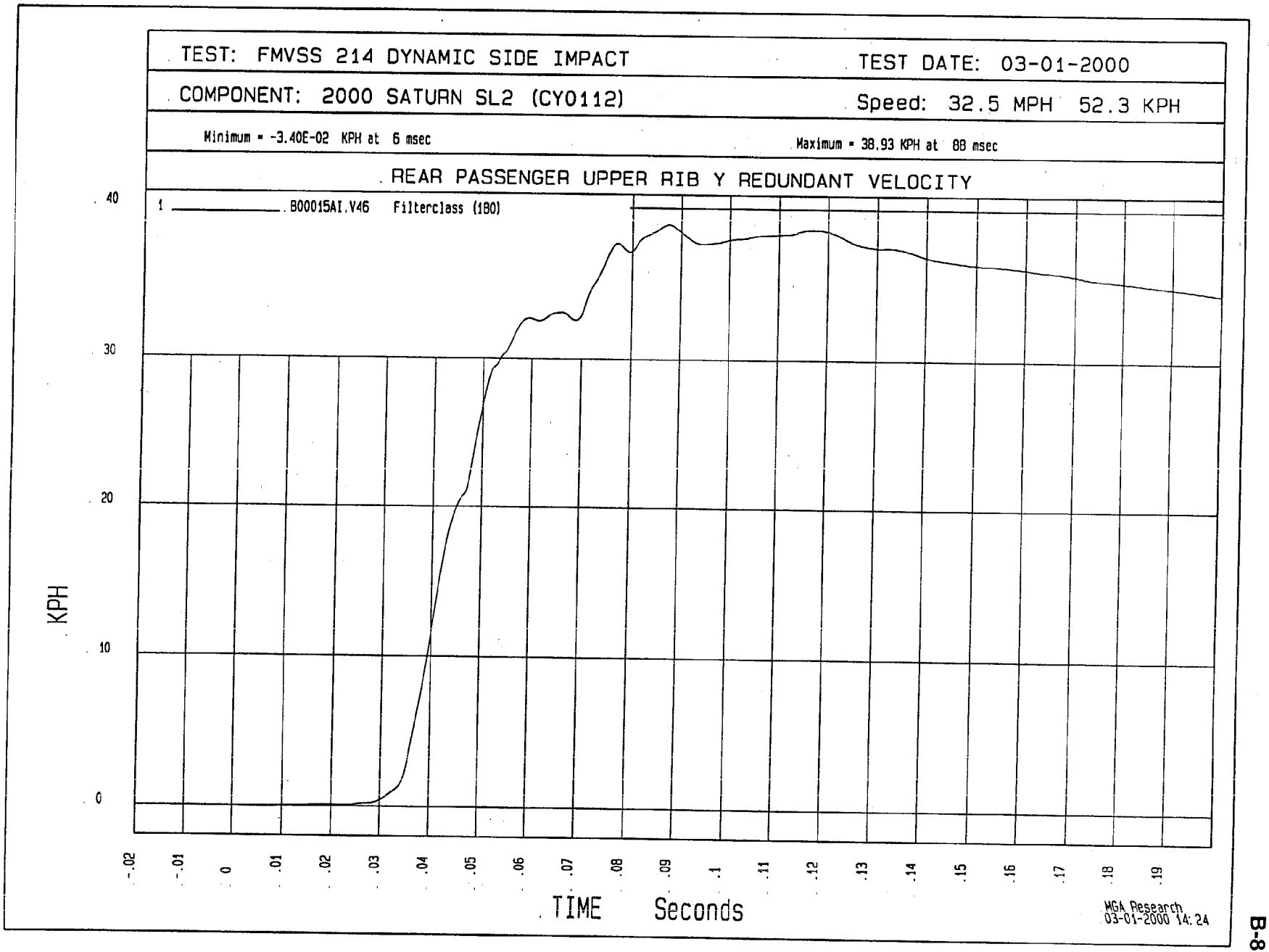
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.99E-03 KPH at -15 msec
Maximum = 39 KPH at 45 msec
DRIVER PELVIS Y REDUNDANT VELOCITY
1 B00015AI.V45 Filterclass (180)
KPH
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -52.94 G'S at 52 msec
Maximum = 74.15 G'S at 47 msec
REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION
1 B00015AT.A46 Filterclass (1000)
MGA Research
03-01-2000 14:24
80
60
40
20
0
-20
-40
G'S
-02
-01
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
TIME (SECONDS)


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.40E-02 KPH at 6 msec
Maximum = 38.93 KPH at 88 msec
REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY
1 B00015AI.V46 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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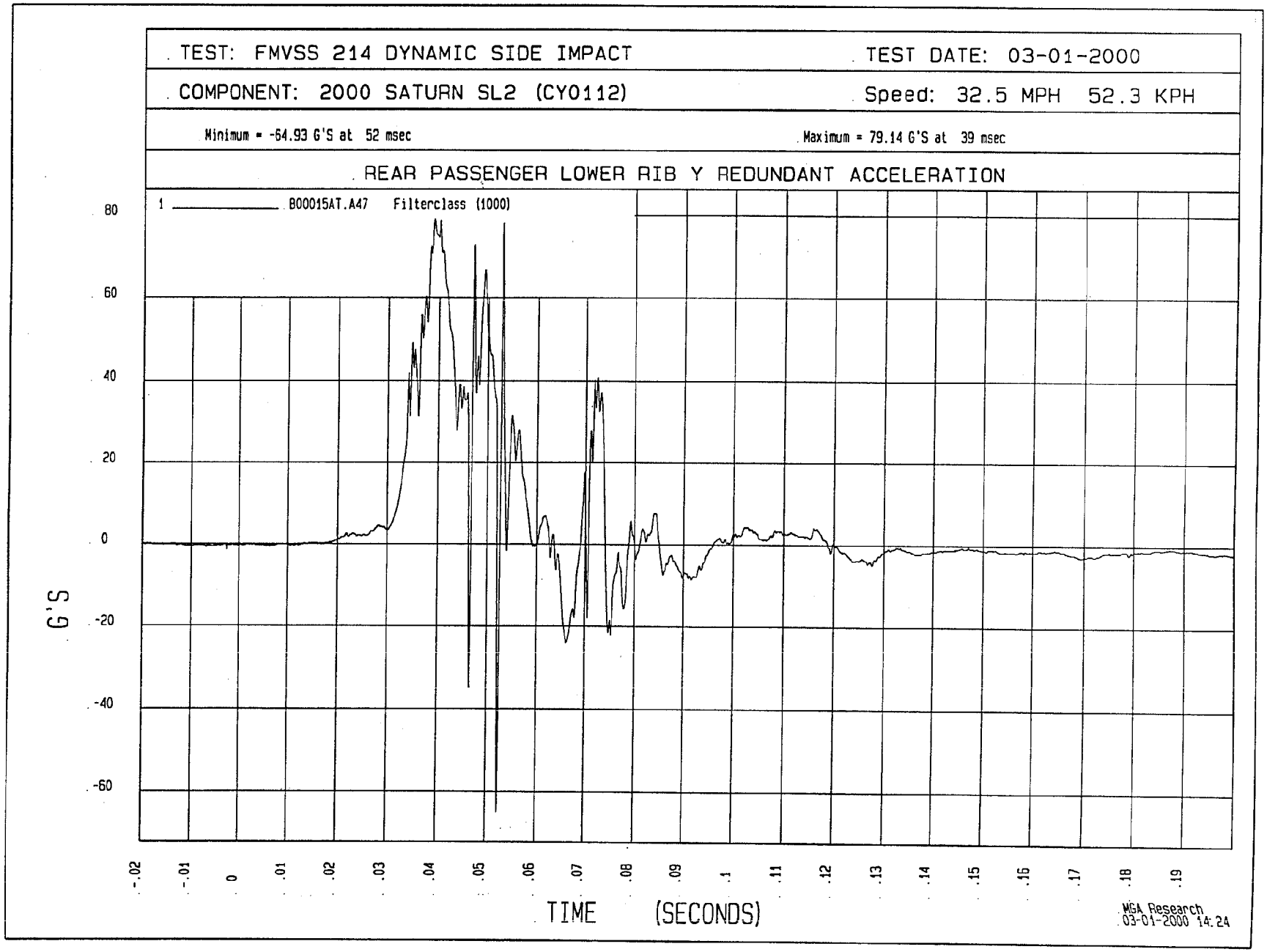
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -64.93 G'S at 52 msec
Maximum = 79.14 G'S at 39 msec
REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION
1 B00015AT.A47 Filterclass (1000)
80
60
40
20
0
-20
-40
-60
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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.18
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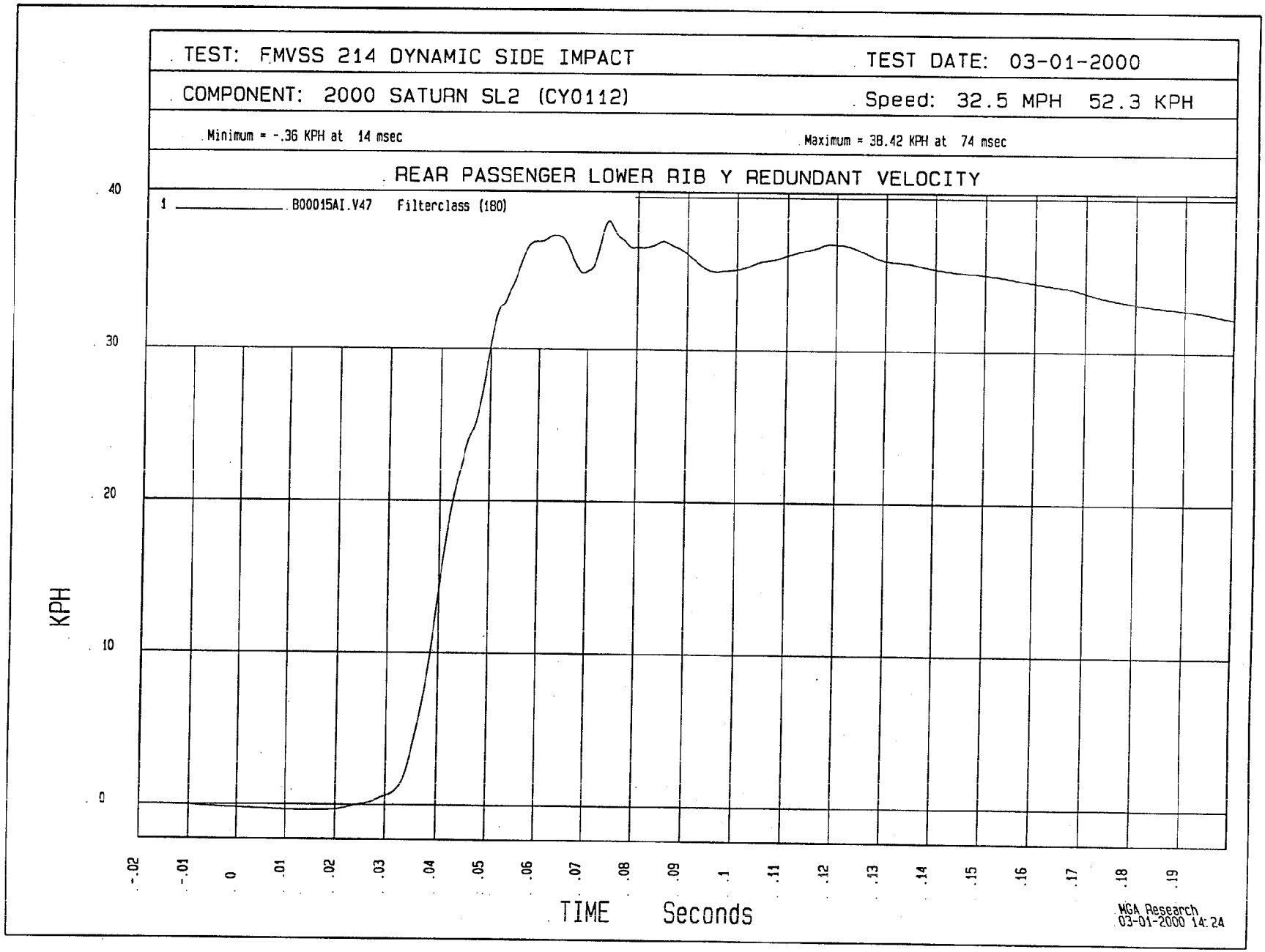
TIME (SECONDS)
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -.36 KPH at 14 msec
Maximum = 38.42 KPH at 74 msec
REAR PASSENGER LOWER RIB Y REDUNDANT VELOCITY
1 B00015AI.V47 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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.14
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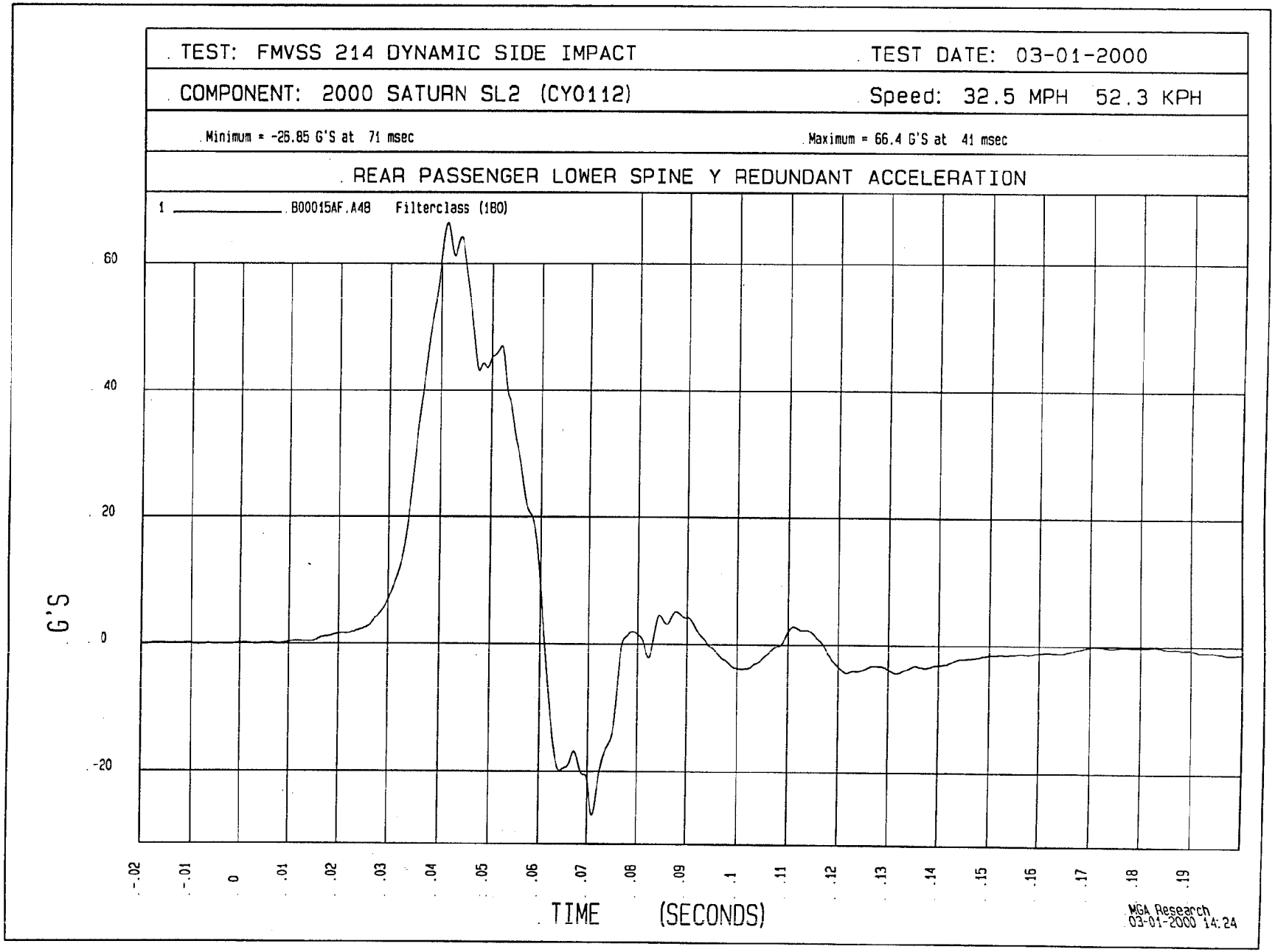
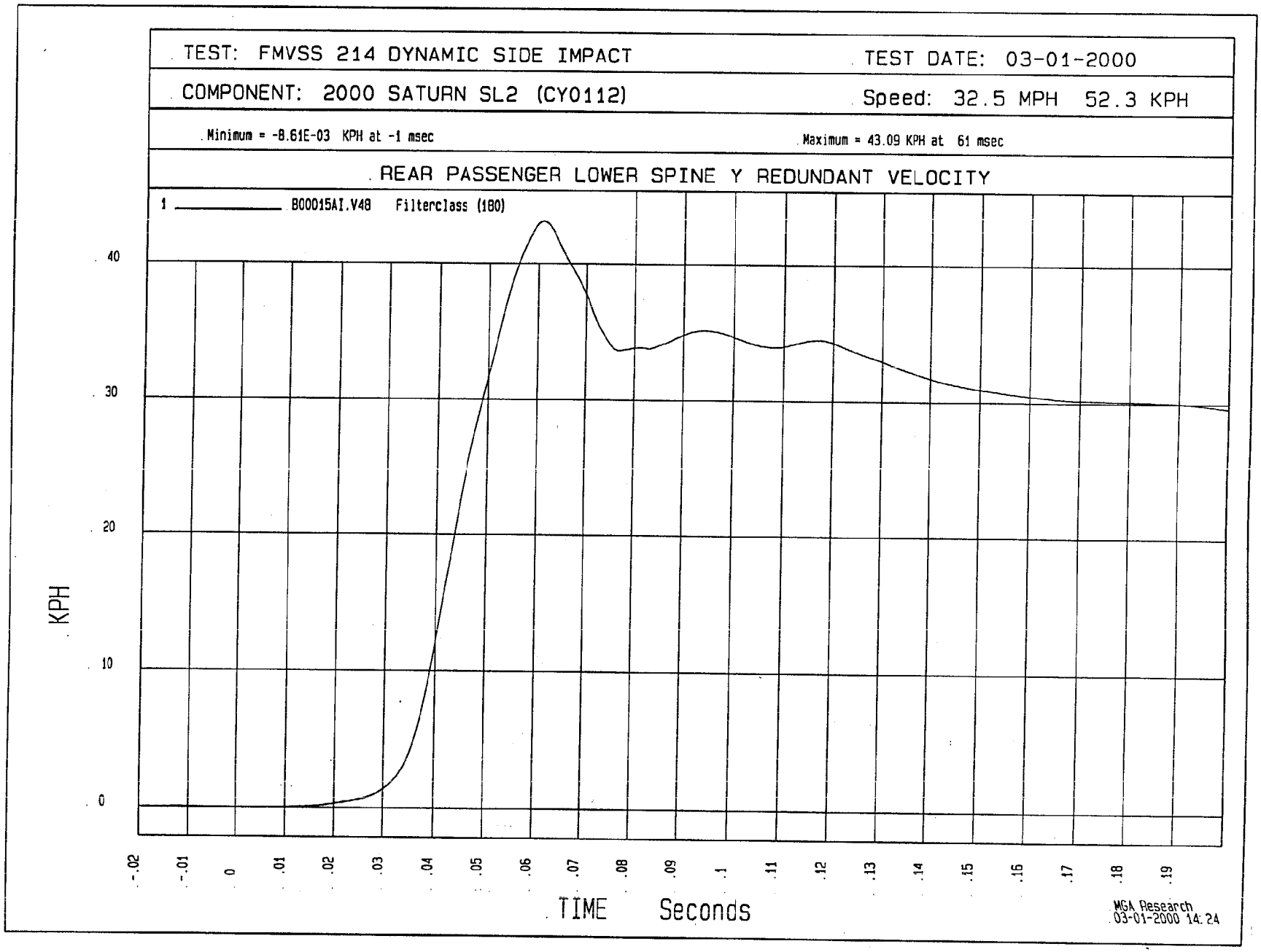
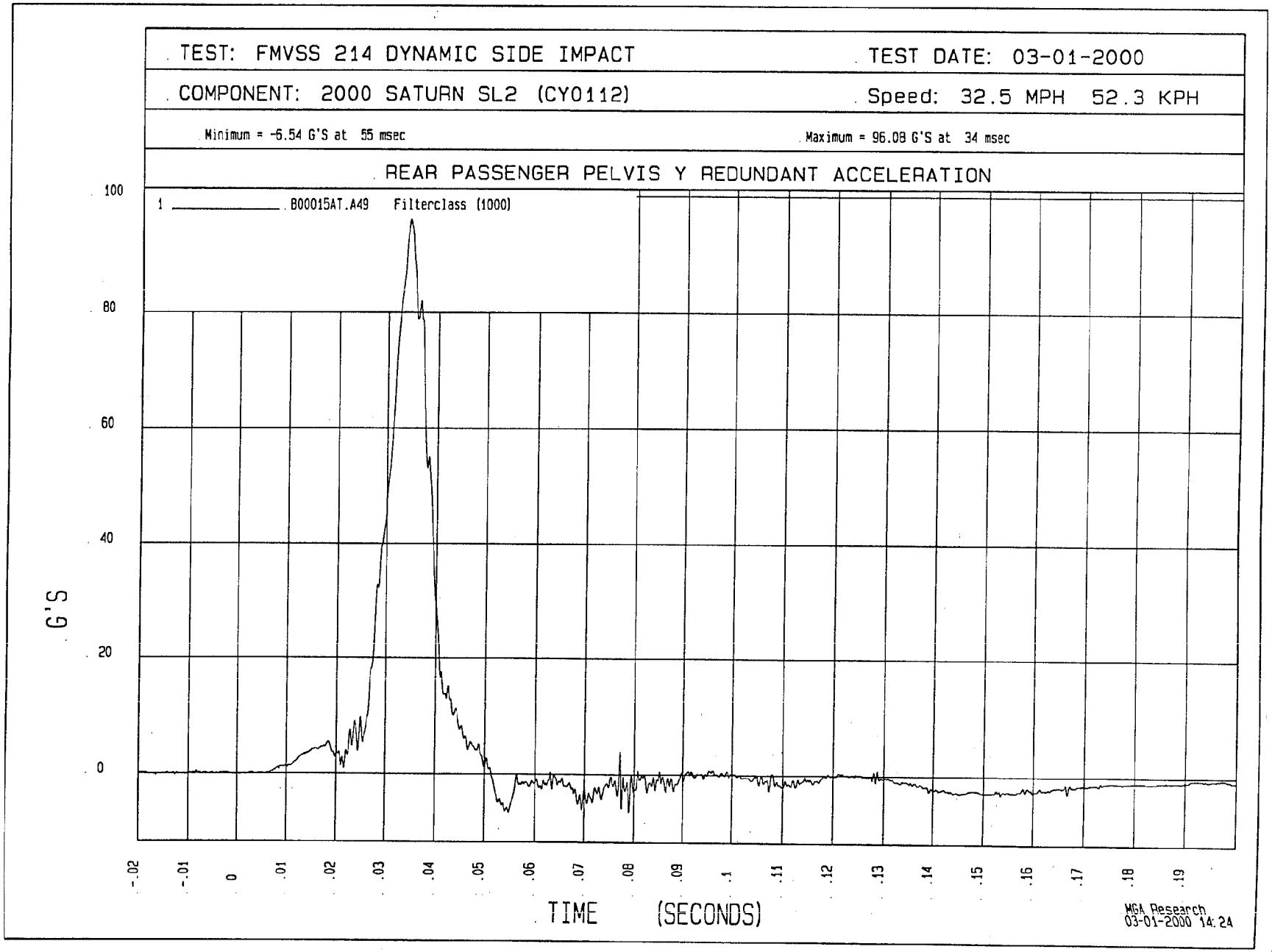
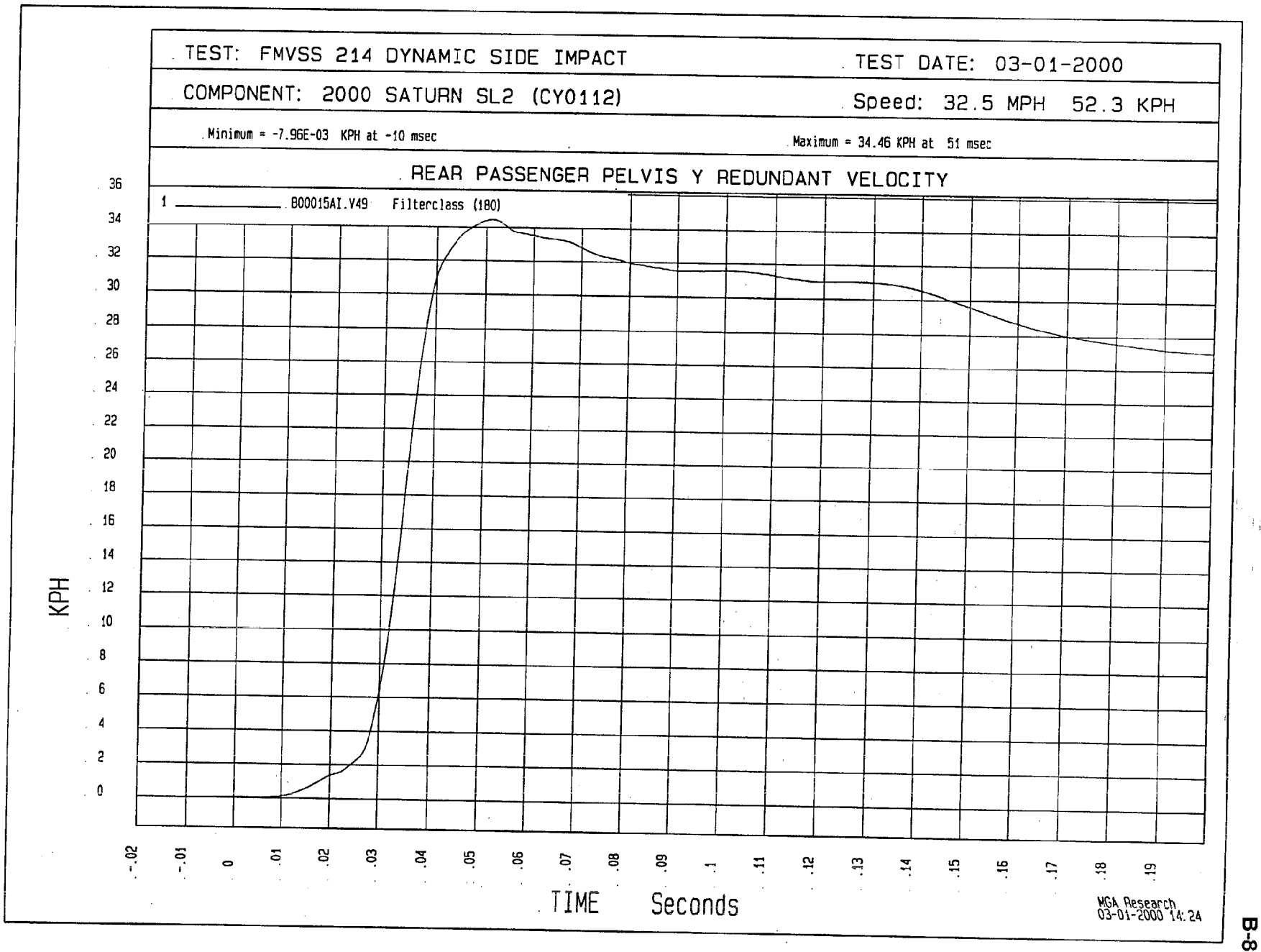
.19
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -26.85 G'S at 71 msec
Maximum = 66.4 G'S at 41 msec
REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION
1 B00015AF.A48 Filterclass (180)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -8.61E-03 KPH at -1 msec
Maximum = 43.09 KPH at 61 msec
REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY
1 B00015AI.V48 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -6.54 G'S at 55 msec
Maximum = 96.08 G'S at 34 msec
REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION
1 B00015AT.A49 Filterclass (1000)
G'S
100
80
60
40
20
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:24


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -7.96E-03 KPH at -10 msec
Maximum = 34.46 KPH at 51 msec
REAR PASSENGER PELVIS Y REDUNDANT VELOCITY
1 B00015AI.V49 Filterclass (180)
KPH
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
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.12
.13
.14
.15
.16
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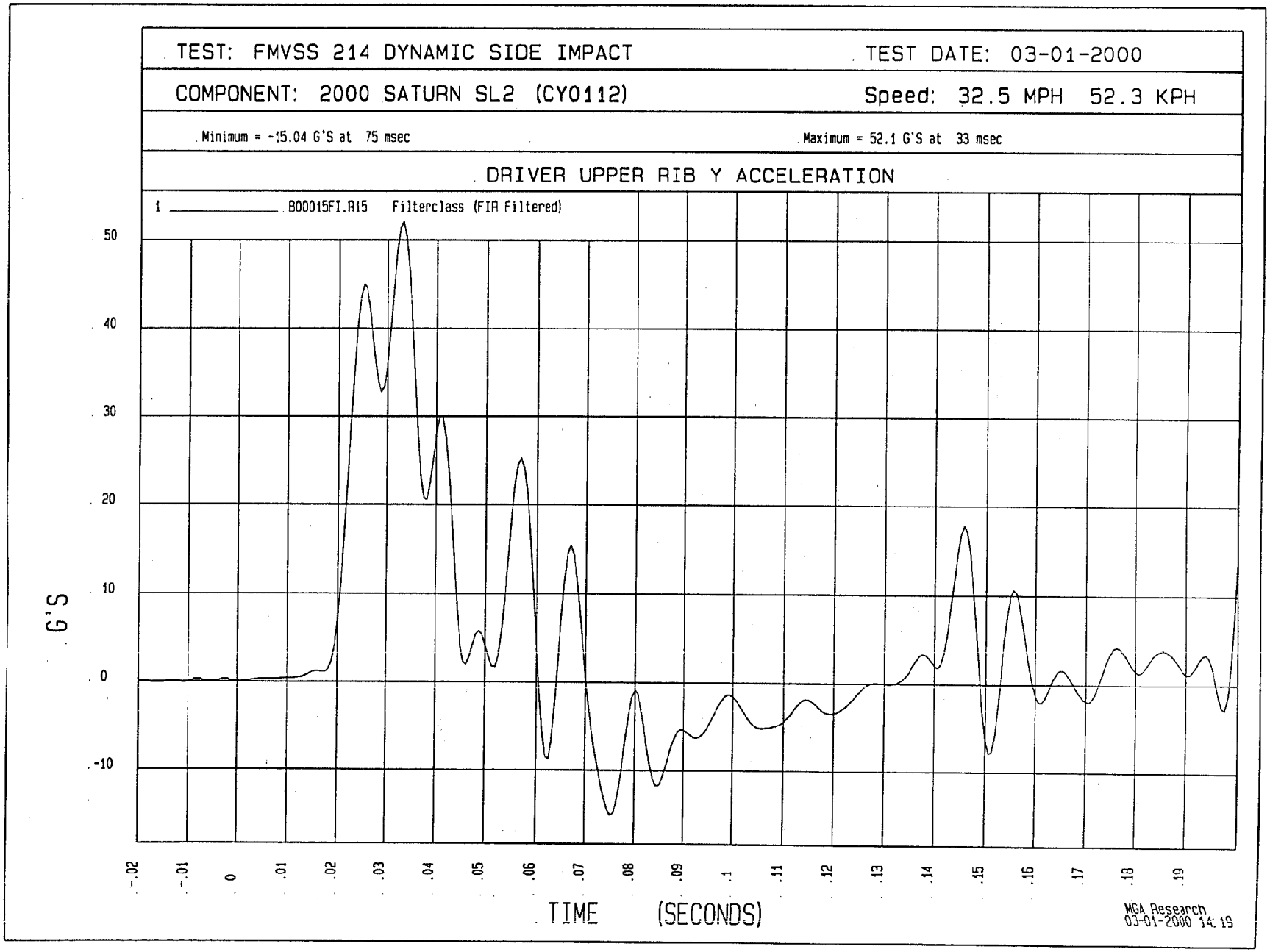
.19
TIME Seconds
MGA Research
03-01-2000 14:24

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -15.04 G'S at 75 msec
Maximum = 52.1 G'S at 33 msec
DRIVER UPPER RIB Y ACCELERATION
1 B00015FI.R15 Filterclass (FIR Filtered)
G'S
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
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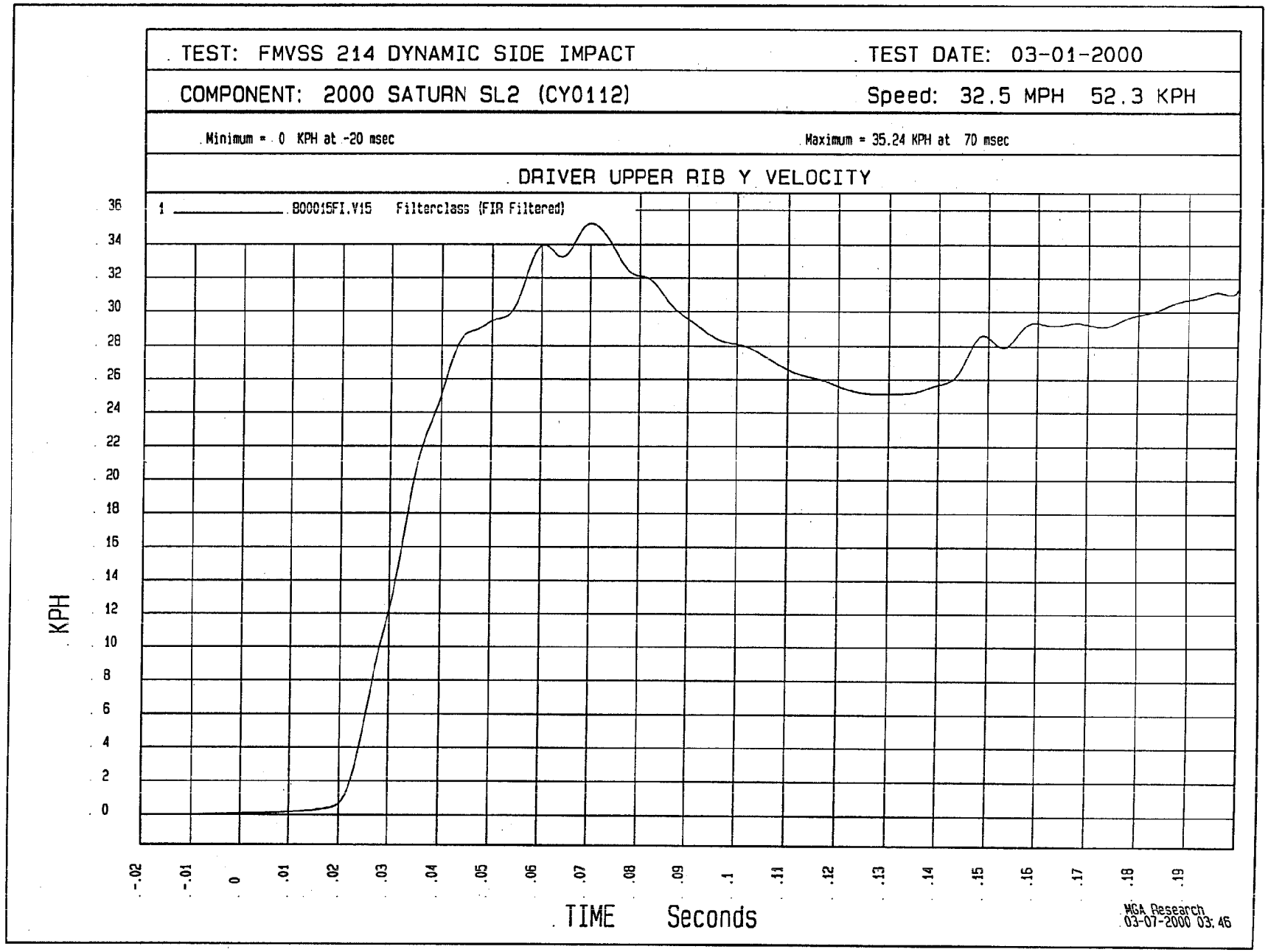
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 0 KPH at -20 msec
Maximum = 35.24 KPH at 70 msec
DRIVER UPPER RIB Y VELOCITY
1 B00015FI.V15 Filterclass (FIR Filtered)
KPH
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
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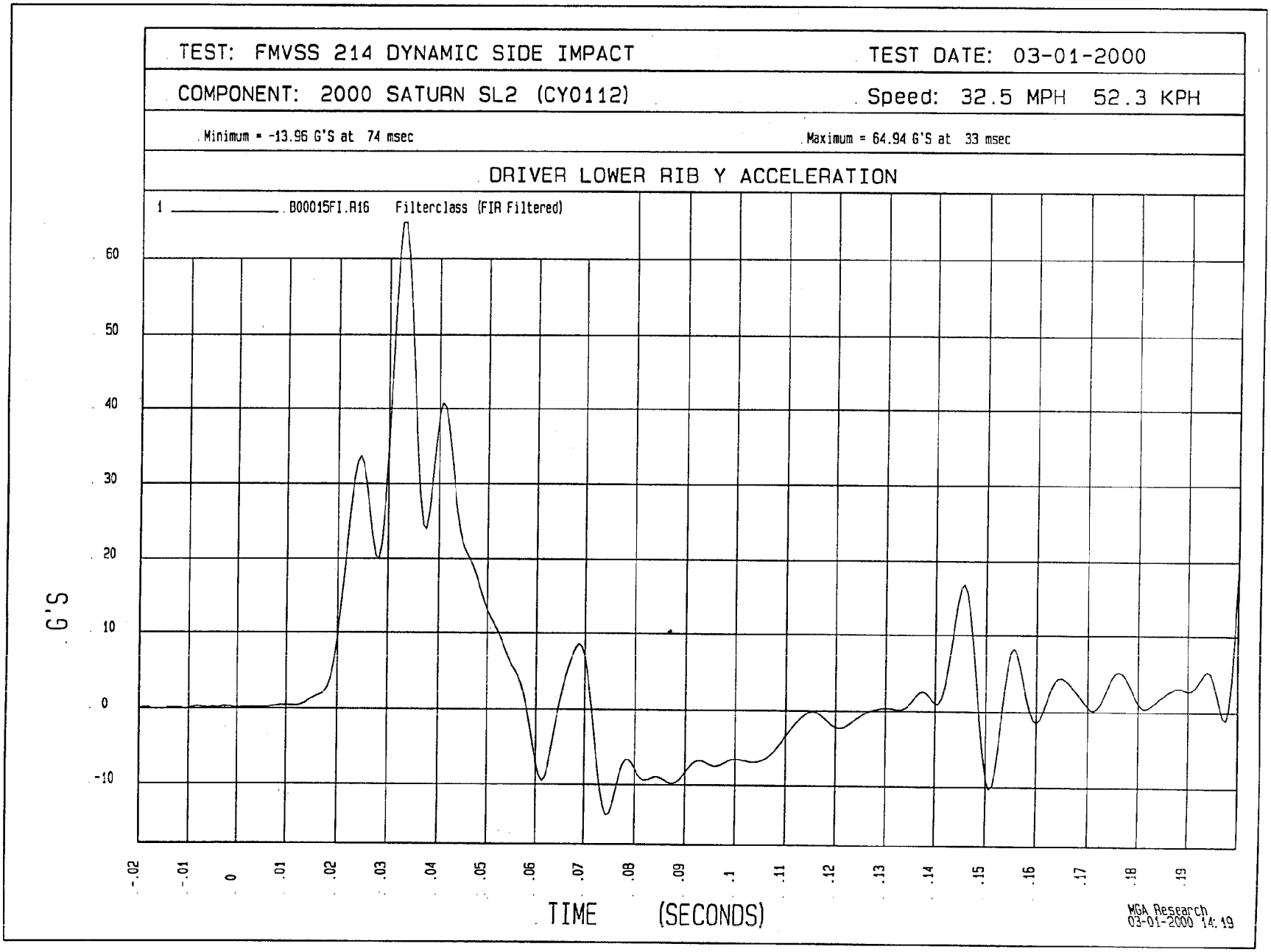
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -13.96 G'S at 74 msec
Maximum = 64.94 G'S at 33 msec
DRIVER LOWER RIB Y ACCELERATION
1 B00015FI.A16 Filterclass (FIR Filtered)
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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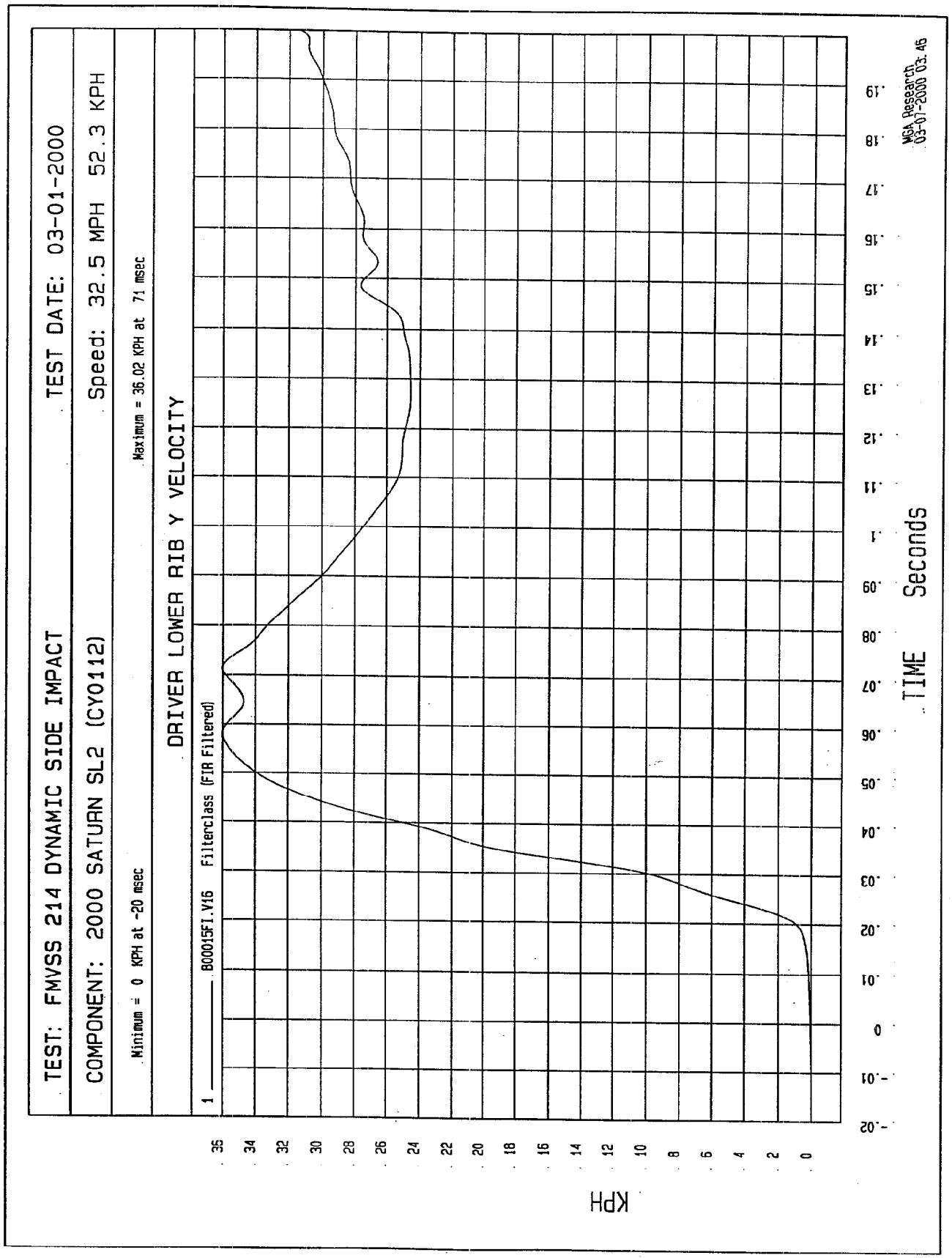
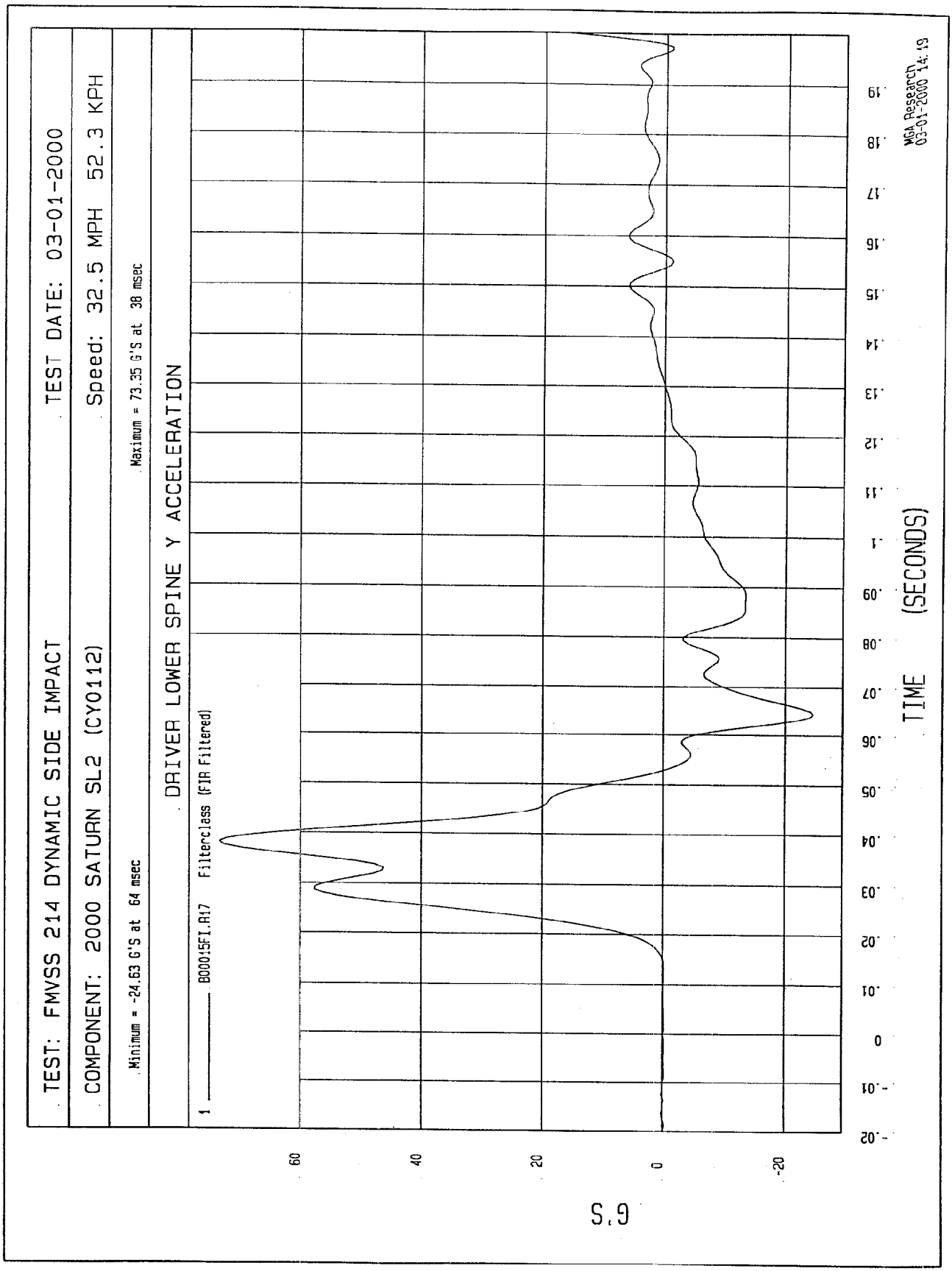
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 0 KPH at -20 msec
Maximum = 36.02 KPH at 71 msec
DRIVER LOWER RIB Y VELOCITY
1 B00015FI.V16 Filterclass (FIR Filtered)
KPH
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -24.63 G'S at 64 msec
Maximum = 73.35 G'S at 38 msec
DRIVER LOWER SPINE Y ACCELERATION
1 B00015FI.A17 Filterclass (FIR Filtered)
MGA Research
03-01-2000 14:19
60
40
20
0
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
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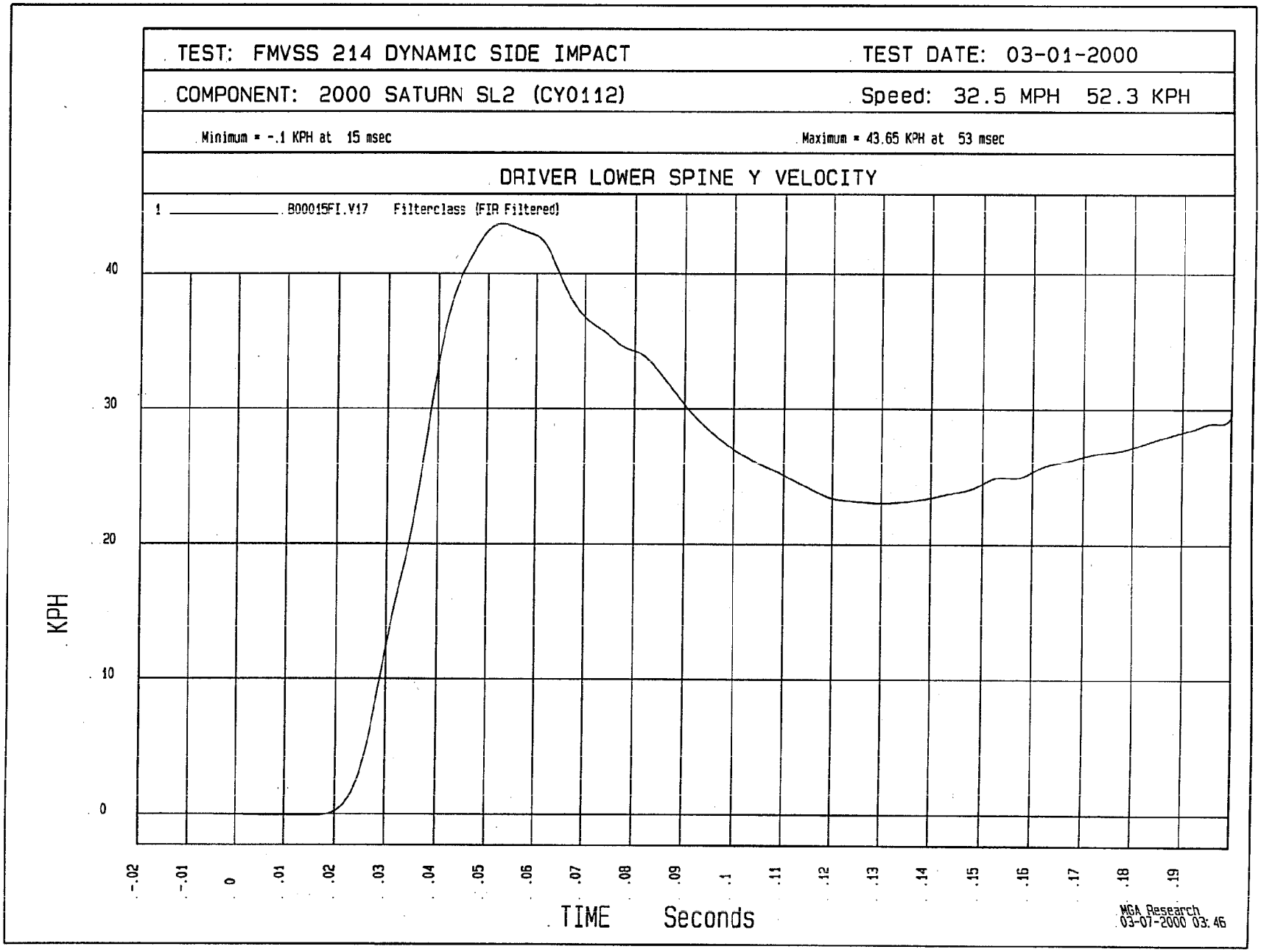
TIME (SECONDS)
G's


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -.1 KPH at 15 msec
Maximum = 43.65 KPH at 53 msec
DRIVER LOWER SPINE Y VELOCITY
1 B00015FI.V17 Filterclass (FIR Filtered)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
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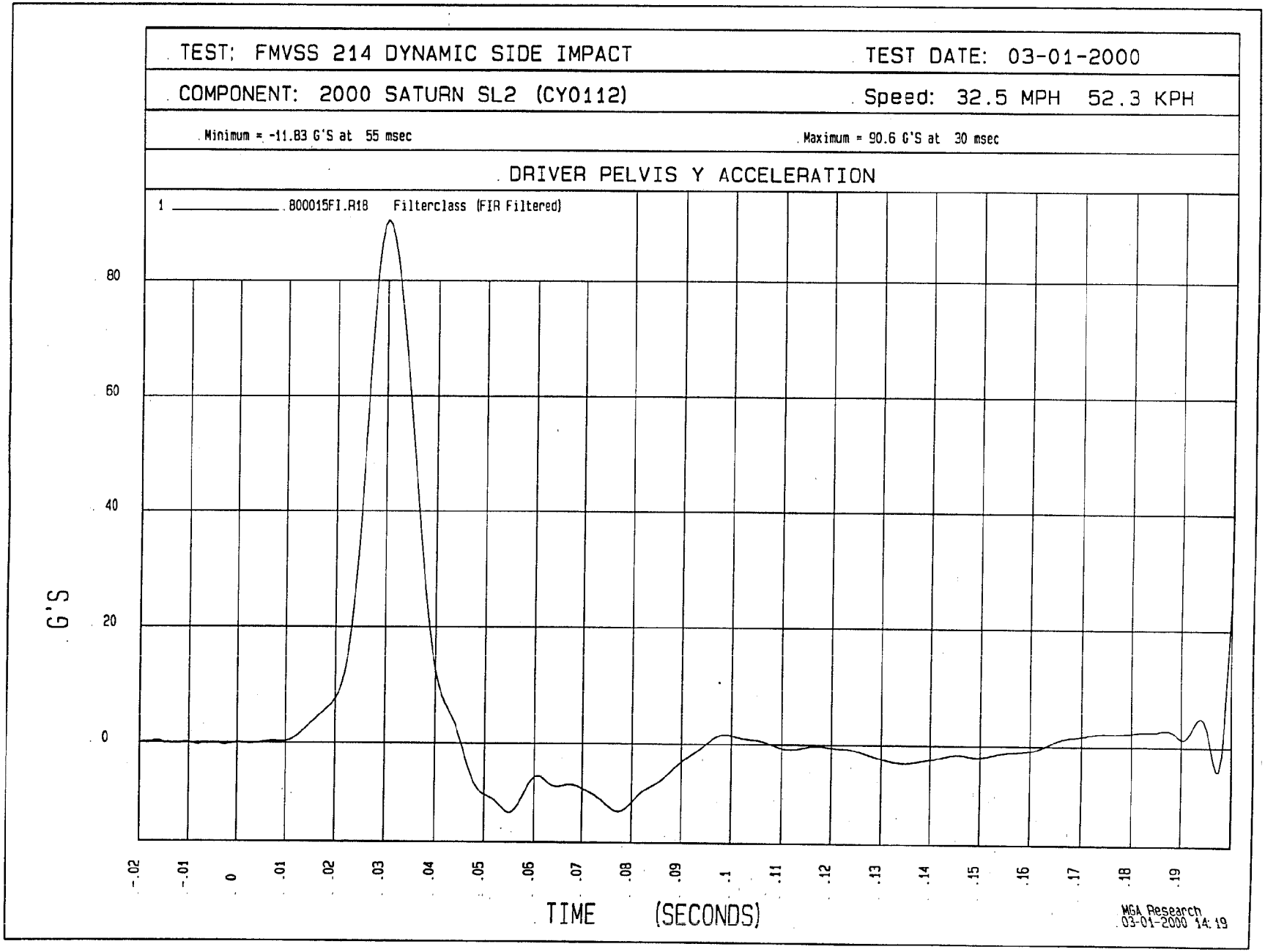
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -11.83 G'S at 55 msec
Maximum = 90.6 G'S at 30 msec
DRIVER PELVIS Y ACCELERATION
1 800015FI.A18 Filterclass (FIR Filtered)
80
60
40
20
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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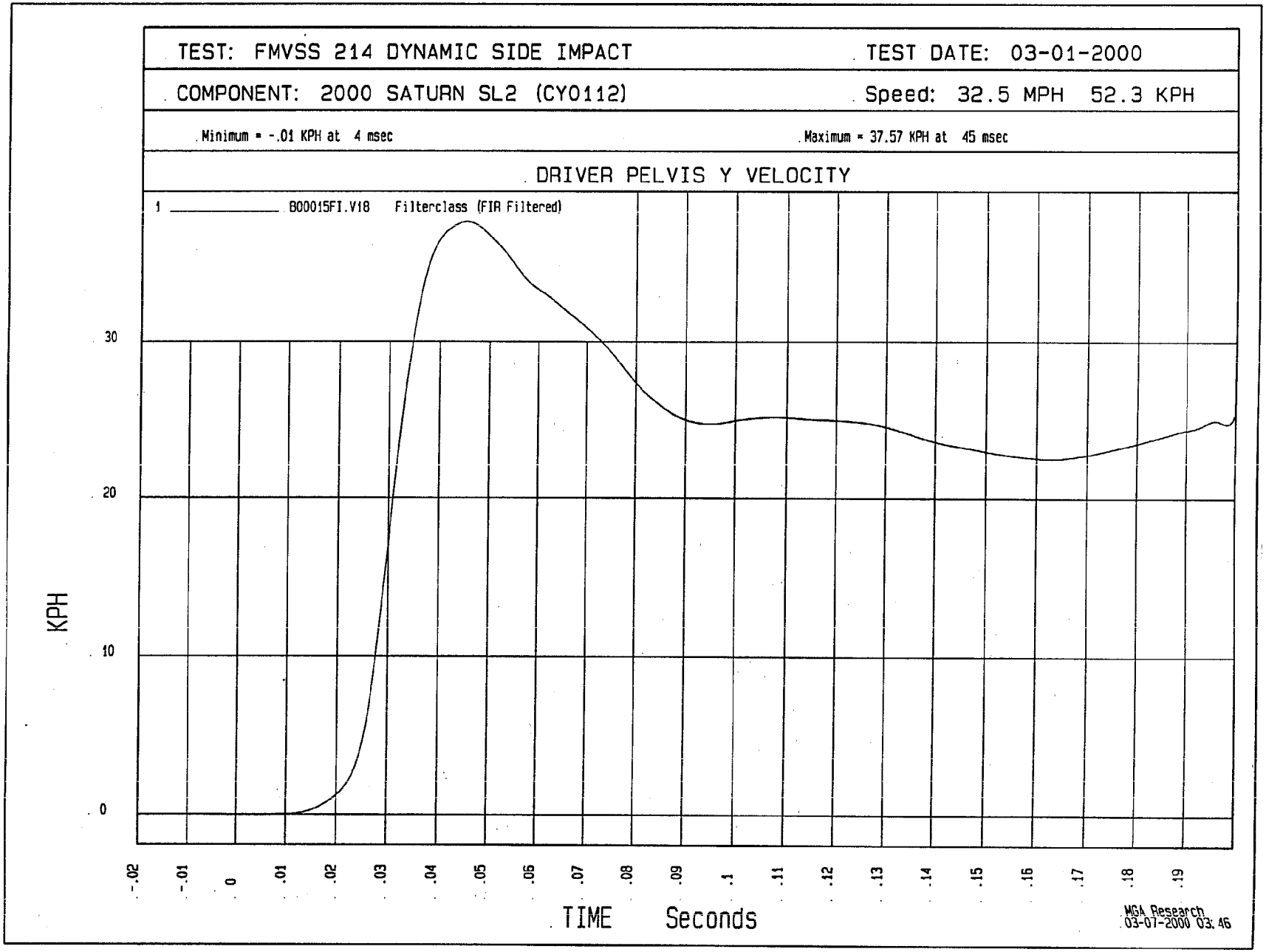
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -.01 KPH at 4 msec
Maximum = 37.57 KPH at 45 msec
DRIVER PELVIS Y VELOCITY
1 B00015FI.V18 Filterclass (FIR Filtered)
KPH
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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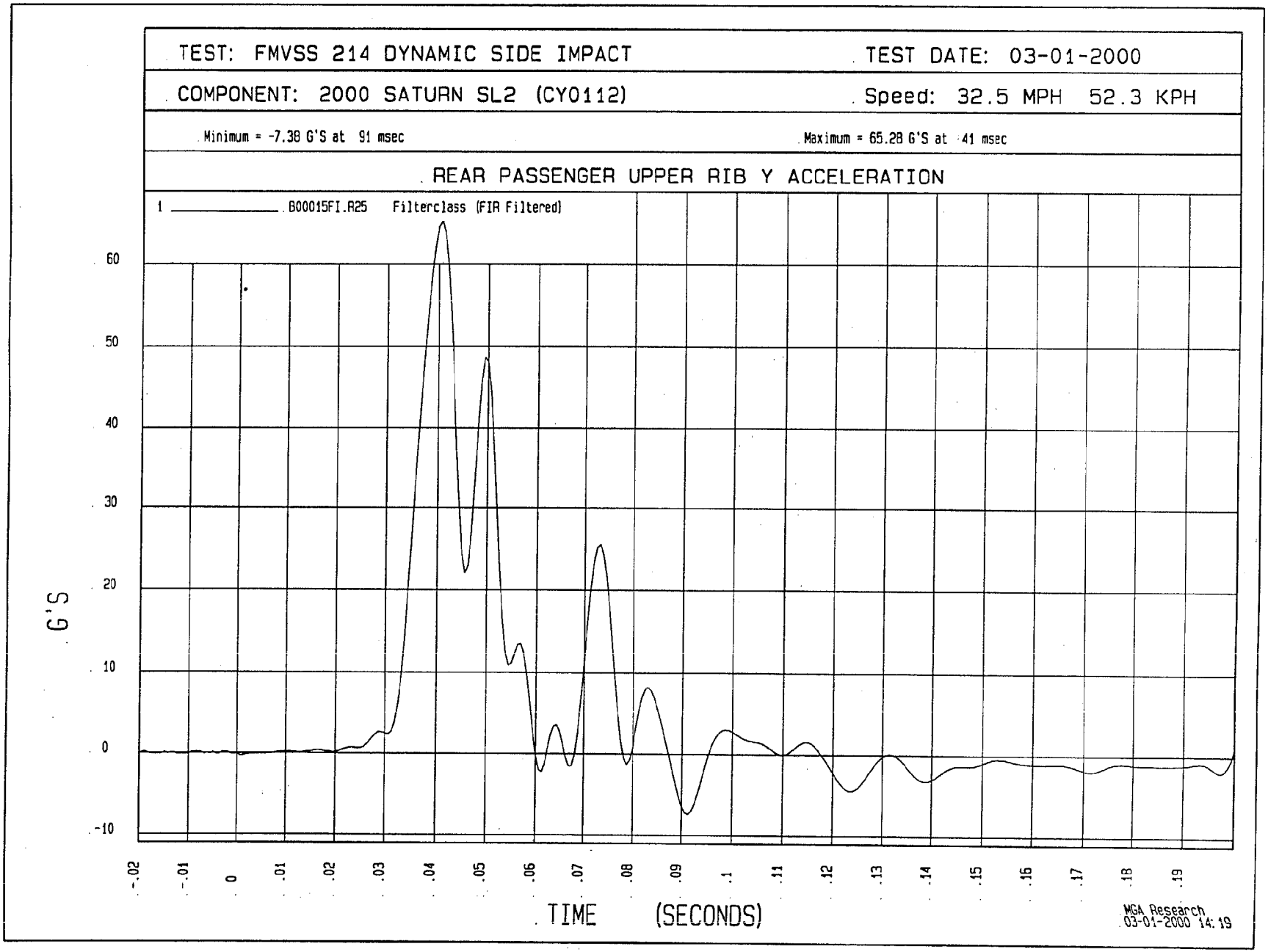
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -7.38 G'S at 91 msec
Maximum = 65.28 G'S at 41 msec
REAR PASSENGER UPPER RIB Y ACCELERATION
1 B00015FI.A25 Filterclass (FIR Filtered)
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.1
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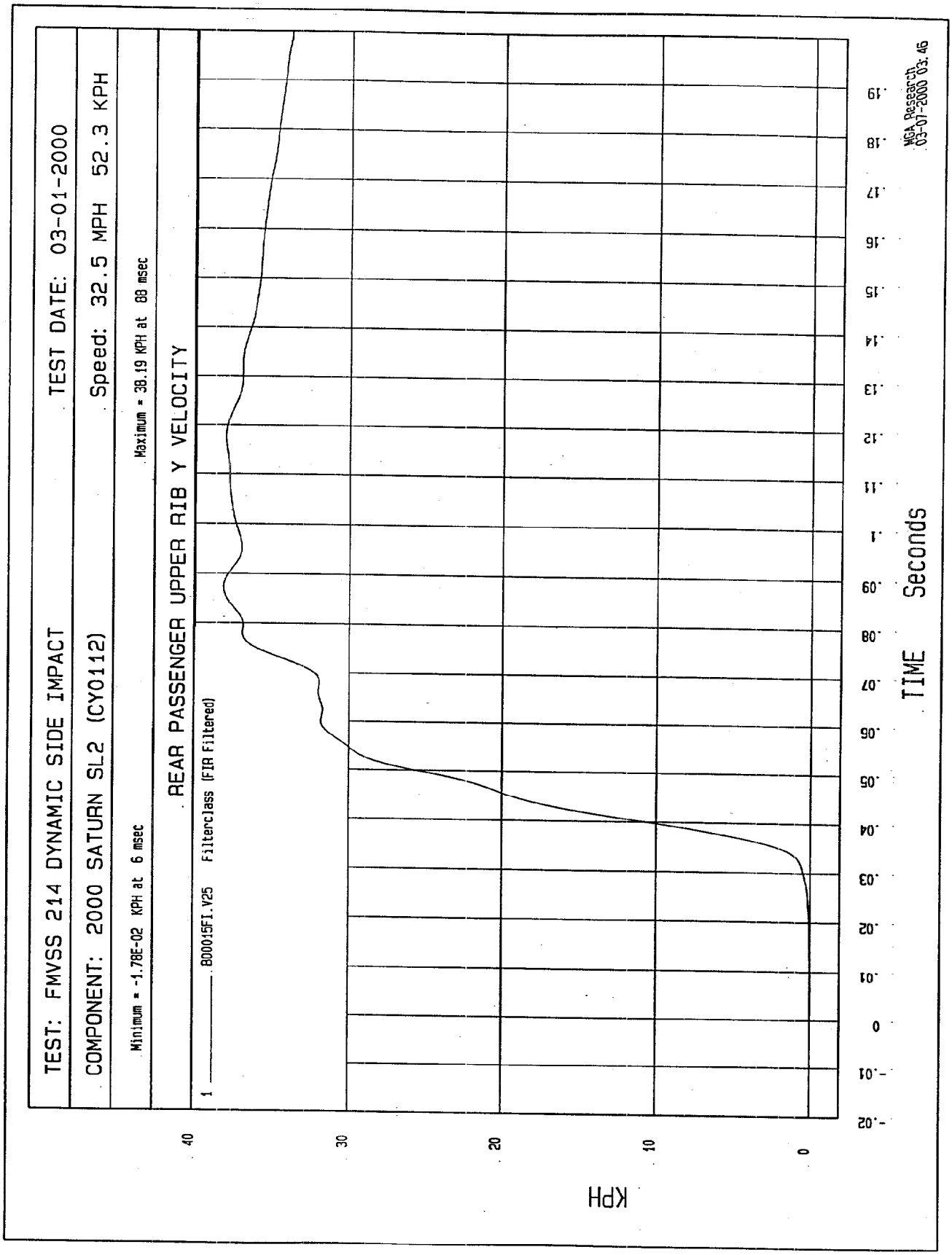
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.78E-02 KPH at 6 msec
Maximum = 38.19 KPH at 88 msec
REAR PASSENGER UPPER RIB Y VELOCITY
1 B00015FI.Y25 Filterclass (FIR Filtered)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
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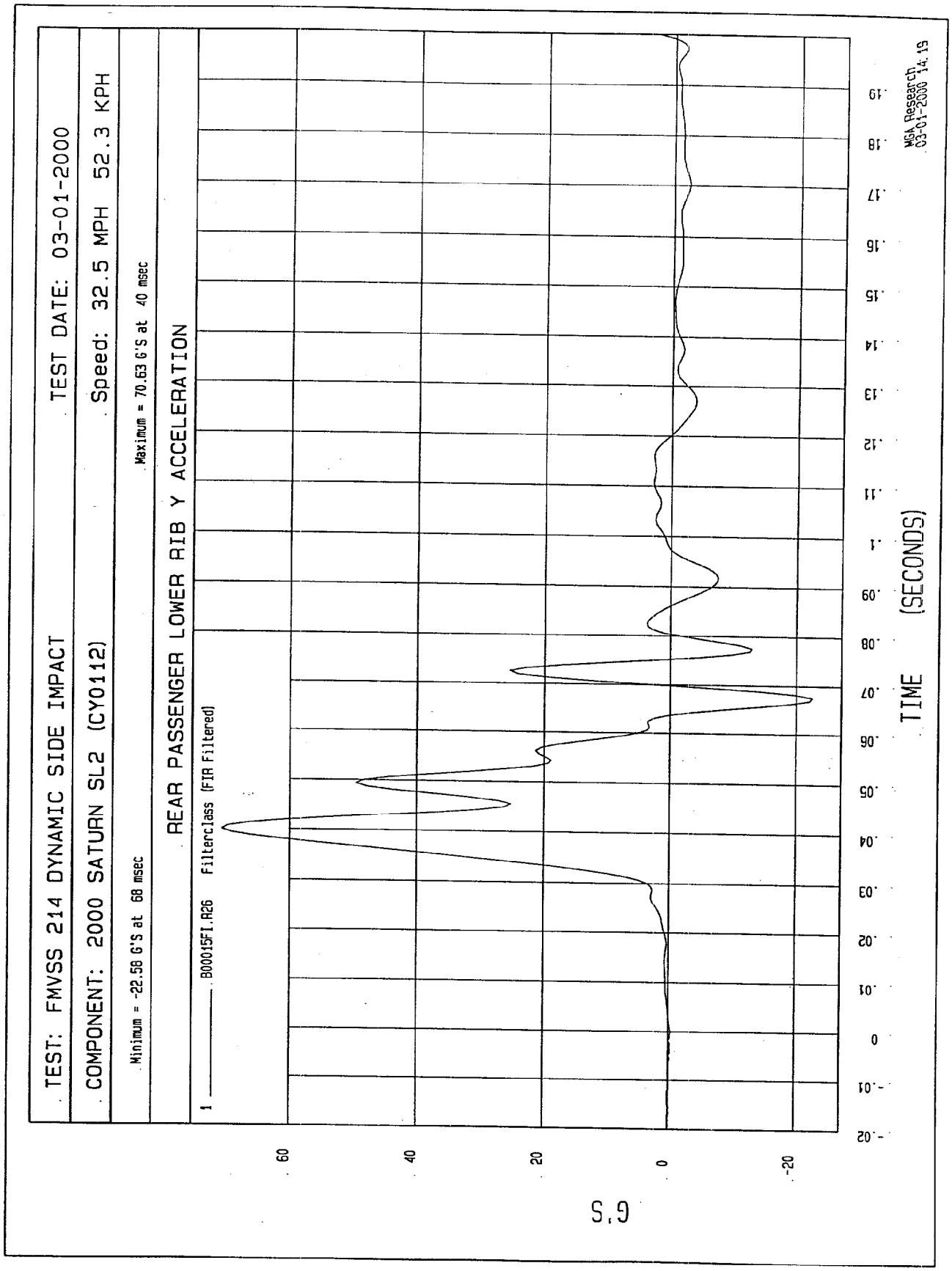
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -22.58 G'S at 68 msec
Maximum = 70.63 G'S at 40 msec
REAR PASSENGER LOWER RIB Y ACCELERATION
1 B00015FI.R26 FilterClass (FIR Filtered)
MGA Research
03-01-2000 14:19
60
40
20
0
-20
G'S
-.02
-.01
0
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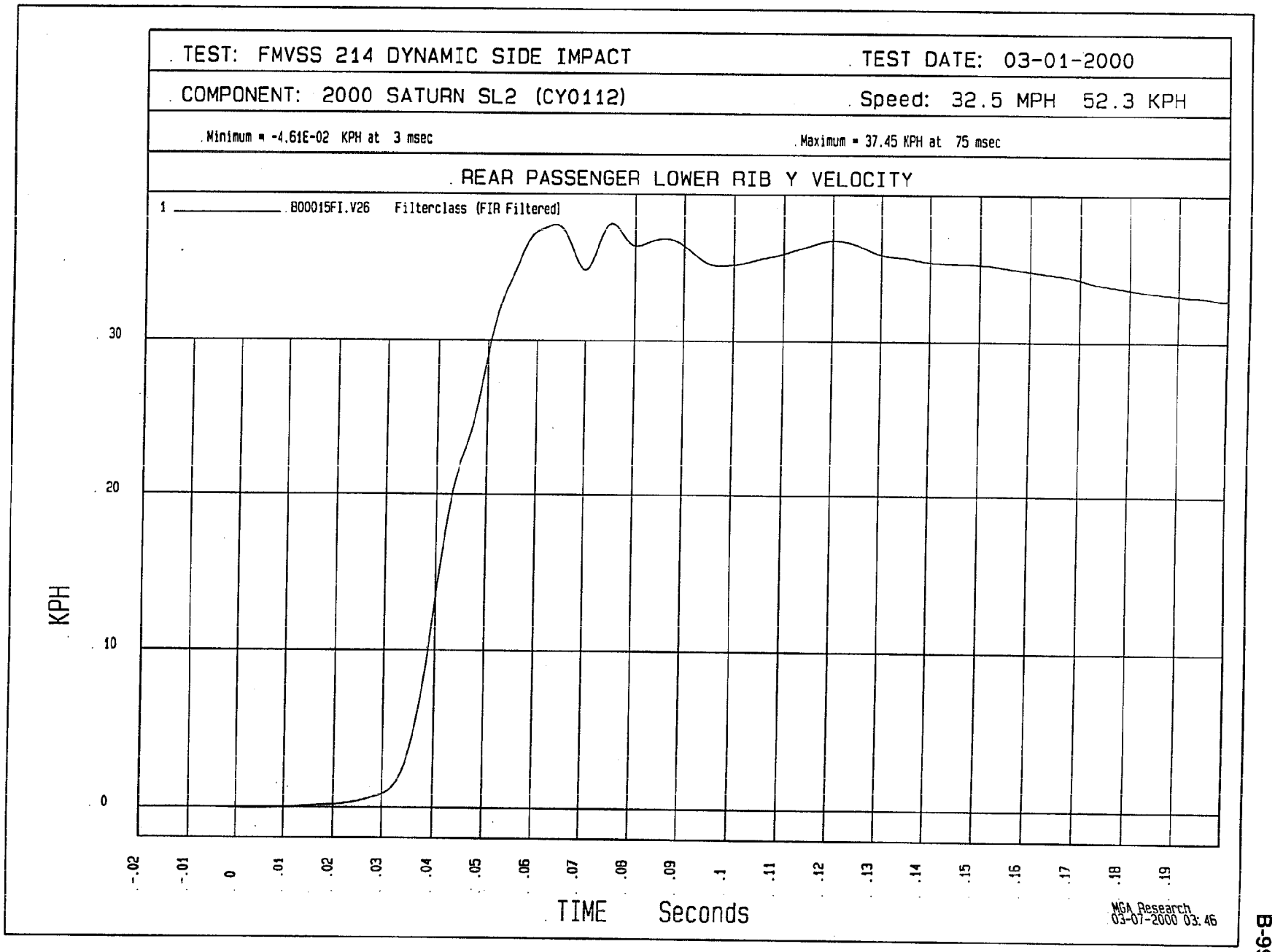
TIME (SECONDS)


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -4.61E-02 KPH at 3 msec
Maximum = 37.45 KPH at 75 msec
REAR PASSENGER LOWER RIB Y VELOCITY
1 B00015FI.V26 Filterclass (FIR Filtered)
KPH
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
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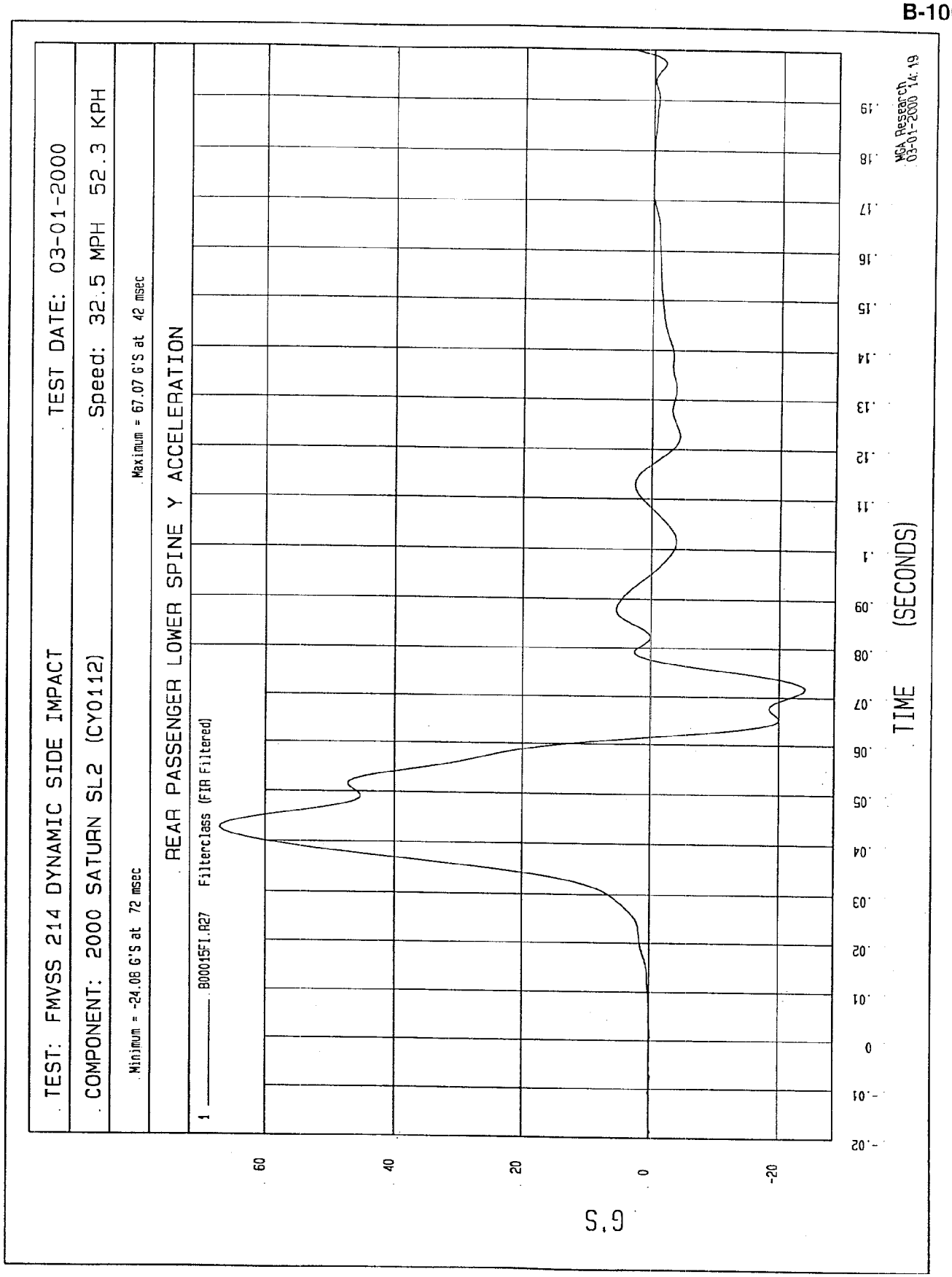
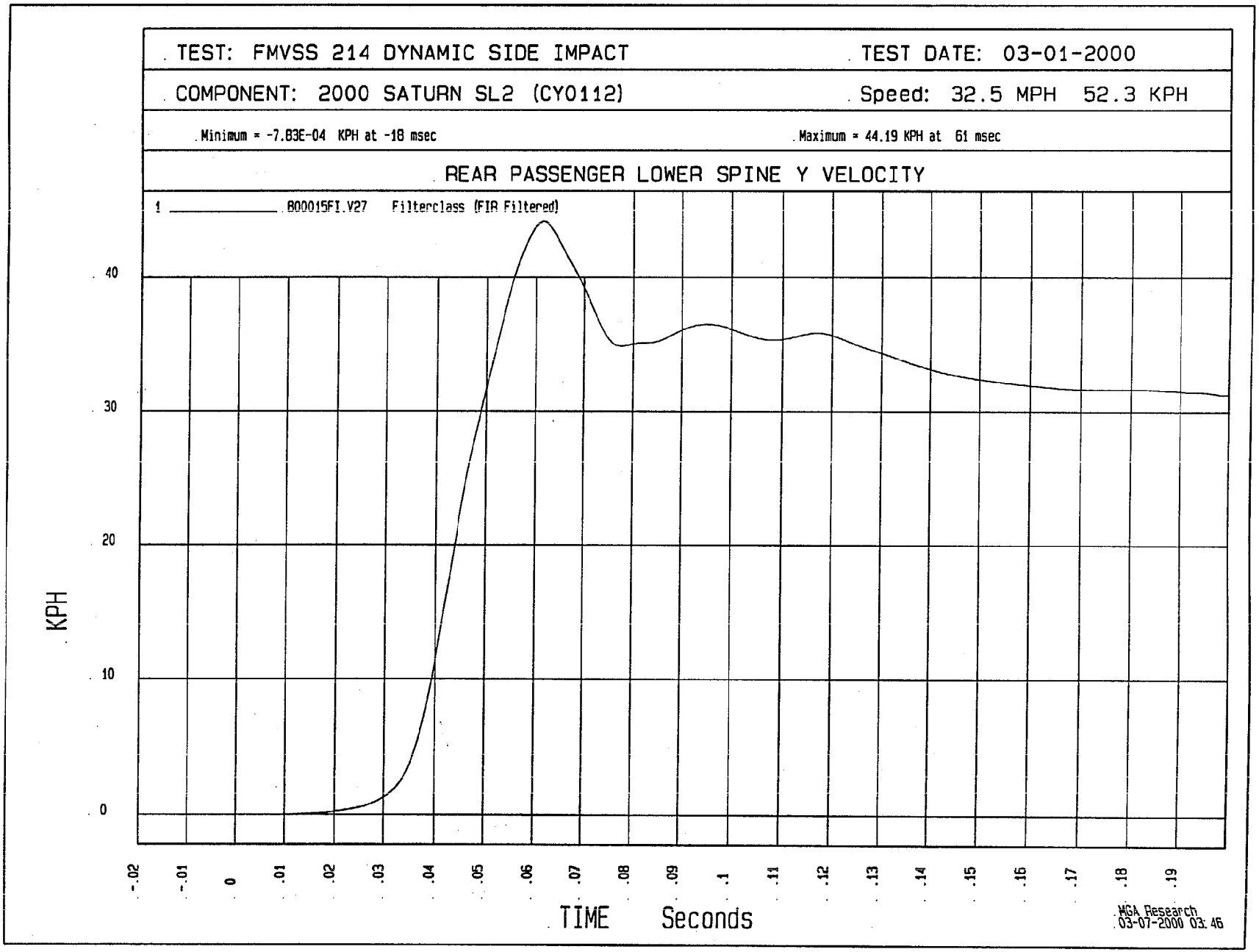
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -24.08 G'S at 72 msec
Maximum = 67.07 G'S at 42 msec
REAR PASSENGER LOWER SPINE Y ACCELERATION
1 B00015FI.R27 Filterclass (FIR Filtered)
60
40
20
0
-20
G'S
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -7.83E-04 KPH at -18 msec
Maximum = 44.19 KPH at 61 msec
REAR PASSENGER LOWER SPINE Y VELOCITY
1 B00015FI.V27 Filterclass (FIR Filtered)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
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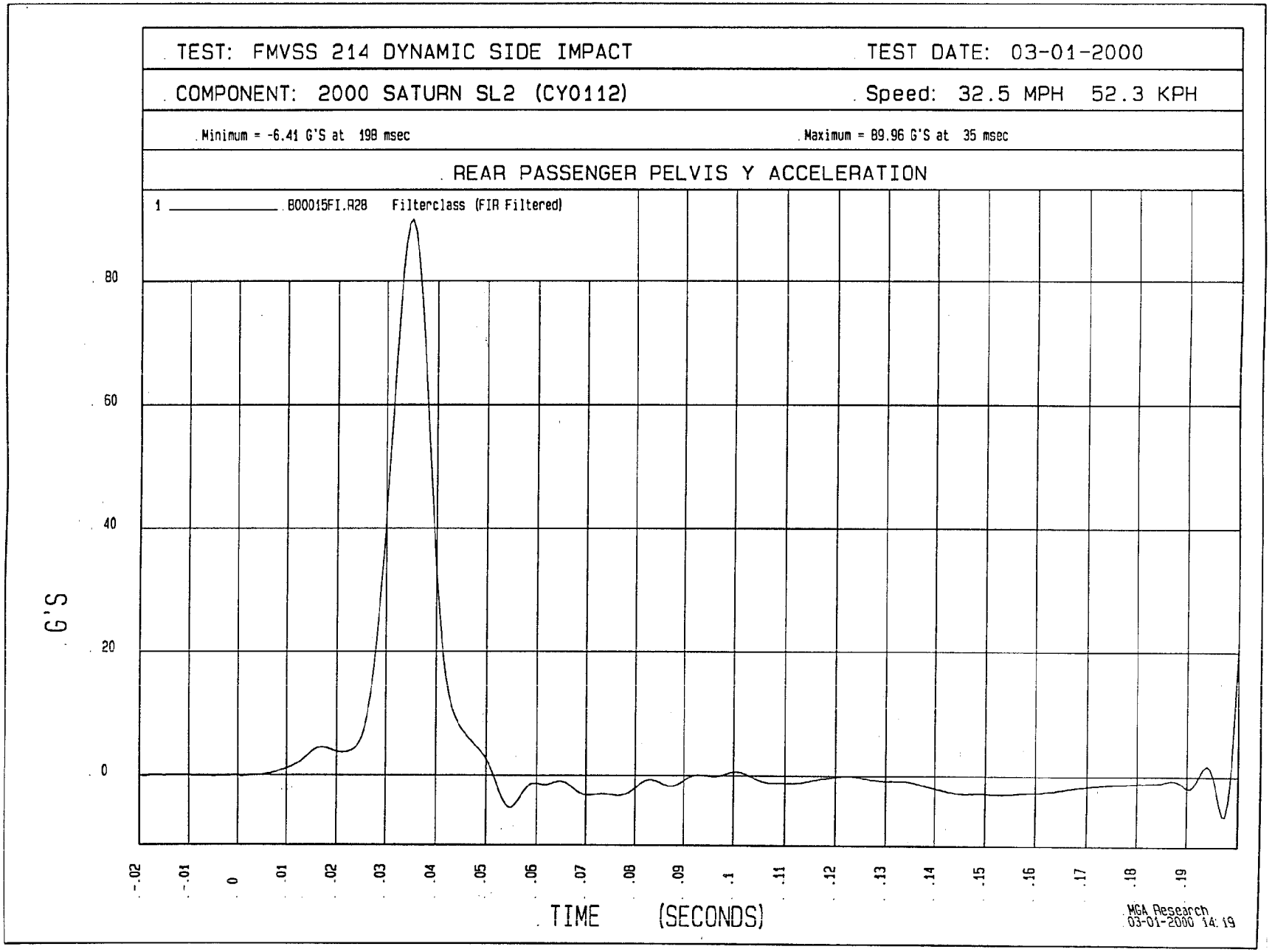
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -6.41 G'S at 198 msec
Maximum = 89.96 G'S at 35 msec
REAR PASSENGER PELVIS Y ACCELERATION
1 B00015FI.A28 Filterclass (FIR Filtered)
80
60
40
20
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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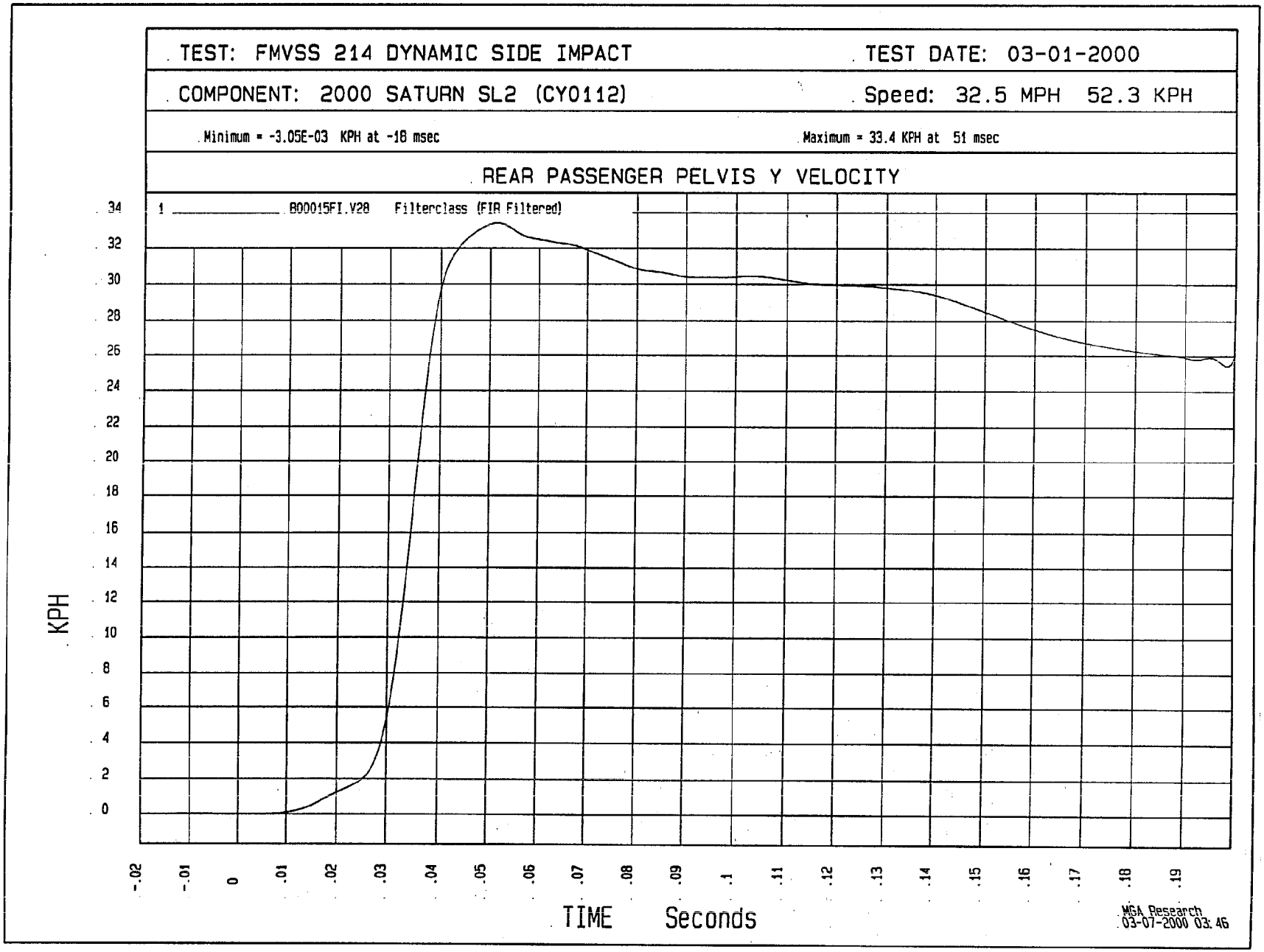
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.05E-03 KPH at -18 msec
Maximum = 33.4 KPH at 51 msec
REAR PASSENGER PELVIS Y VELOCITY
1 B00015FI.V28 Filterclass (FIR Filtered)
KPH
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
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0
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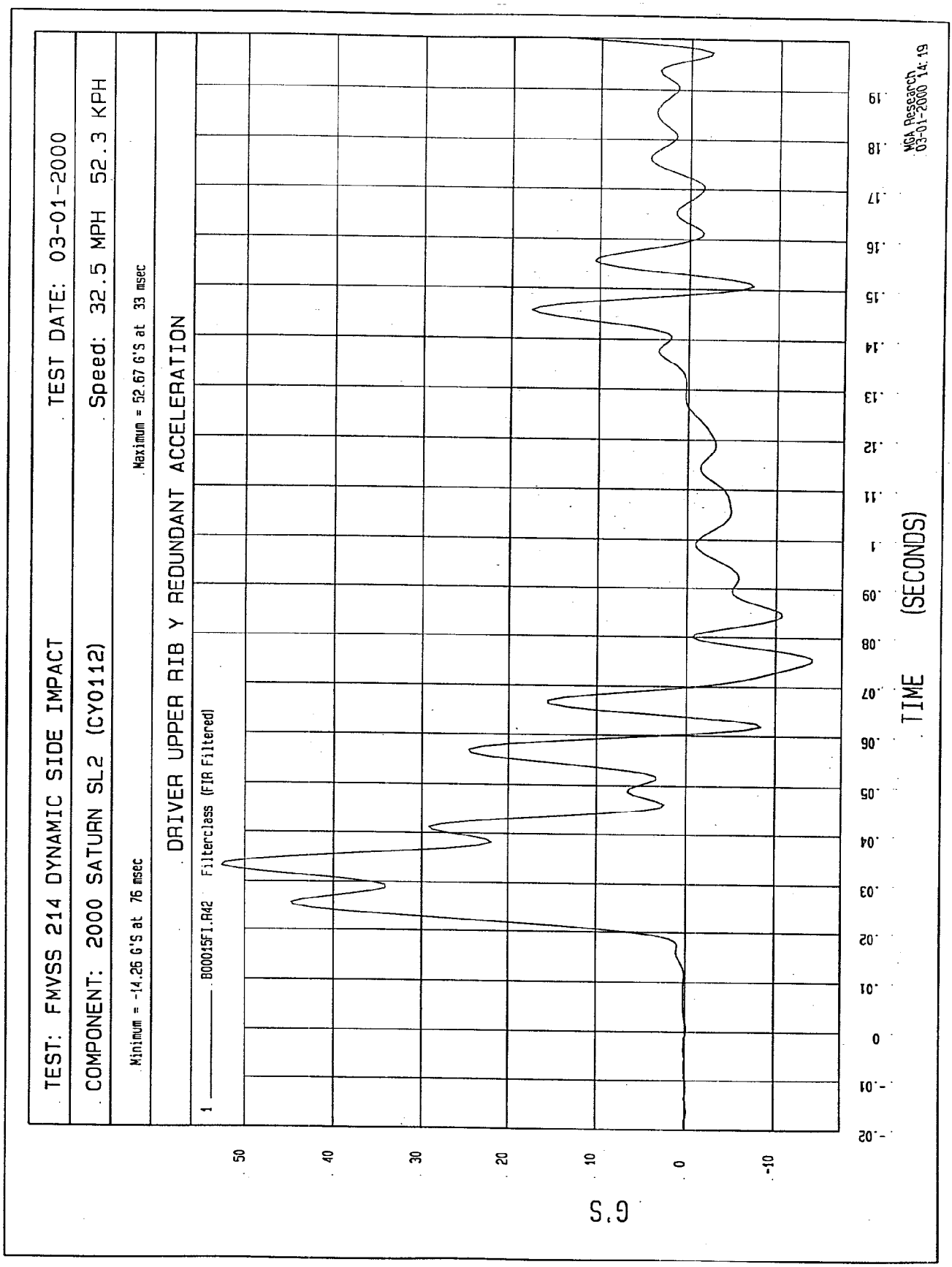
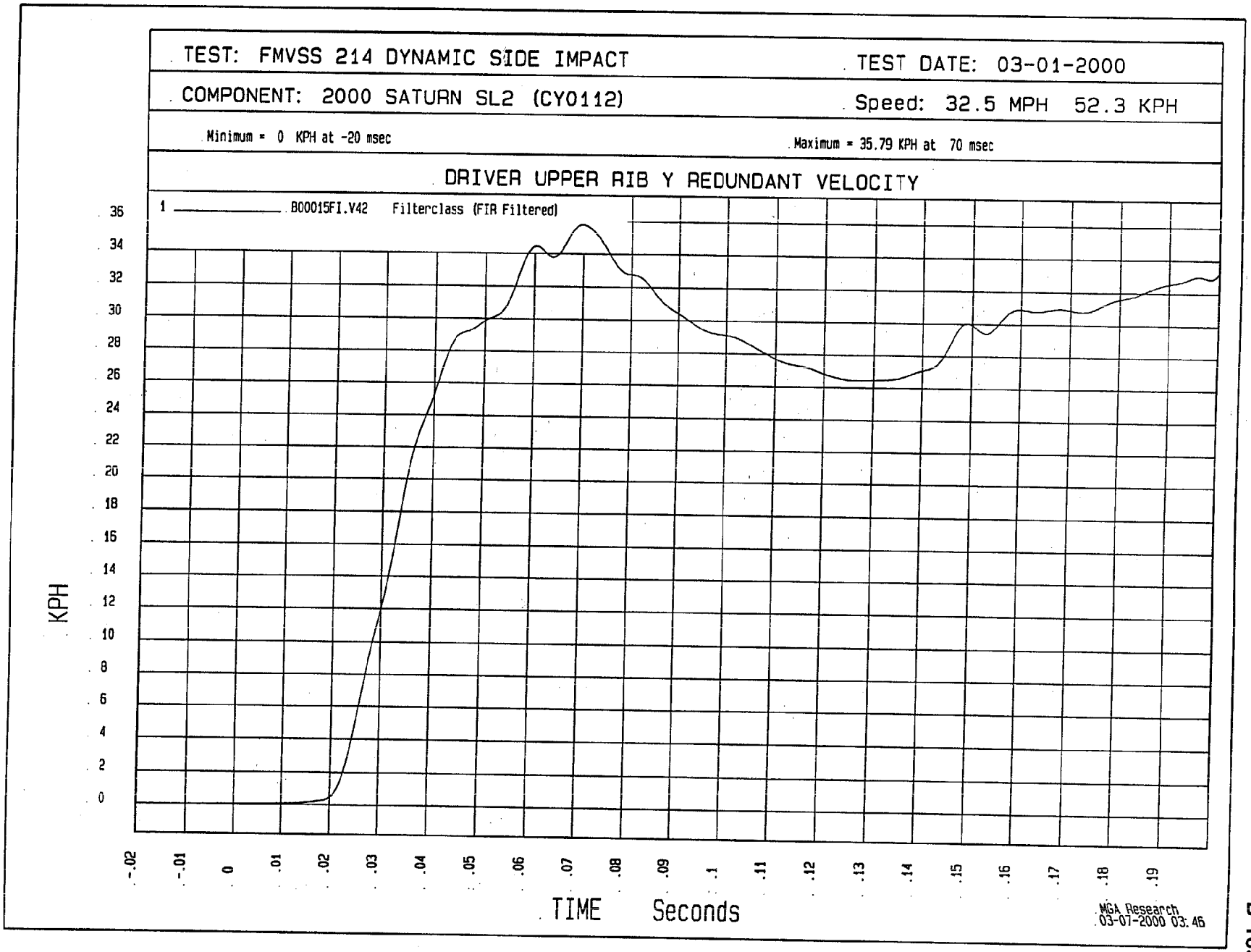
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -14.26 G'S at 76 msec
Maximum = 52.67 G'S at 33 msec
DRIVER UPPER RIB Y REDUNDANT ACCELERATION
1 B00015FI.R42 Filterclass (FIR Filtered)
50
40
30
20
10
0
-10
G'S
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = 0 KPH at -20 msec
Maximum = 35.79 KPH at 70 msec
DRIVER UPPER RIB Y REDUNDANT VELOCITY
1 B00015FI.V42 Filterclass (FIR Filtered)
KPH
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
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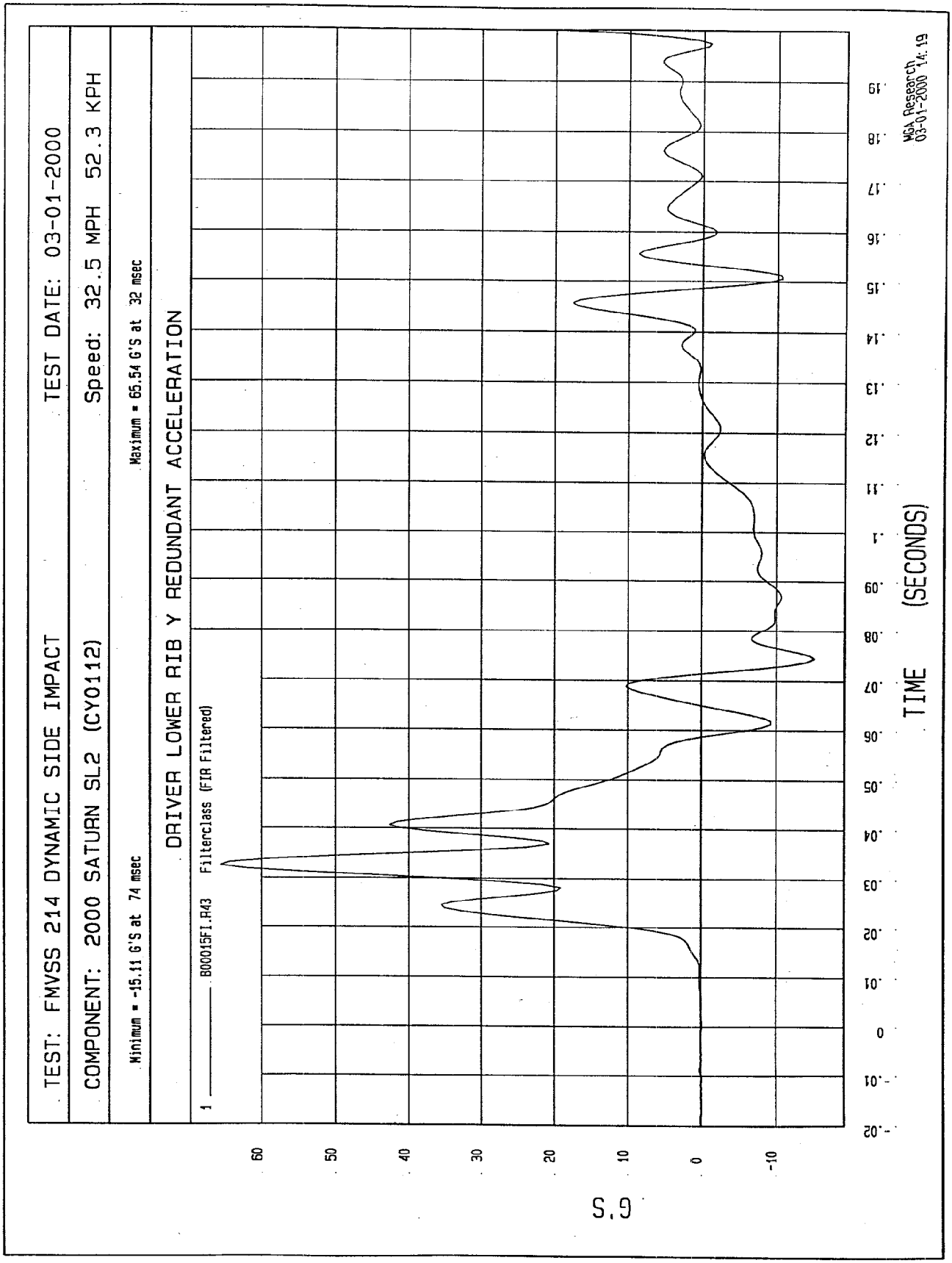
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -15.11 G'S at 74 msec
Maximum = 65.54 G'S at 32 msec
DRIVER LOWER RIB Y REDUNDANT ACCELERATION
1 B00015FI.R43 Filterclass (FIR Filtered)
MGA Research
03-01-2000 14:19
60
50
40
30
20
10
0
-10
G'S
.19
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.17
.16
.15
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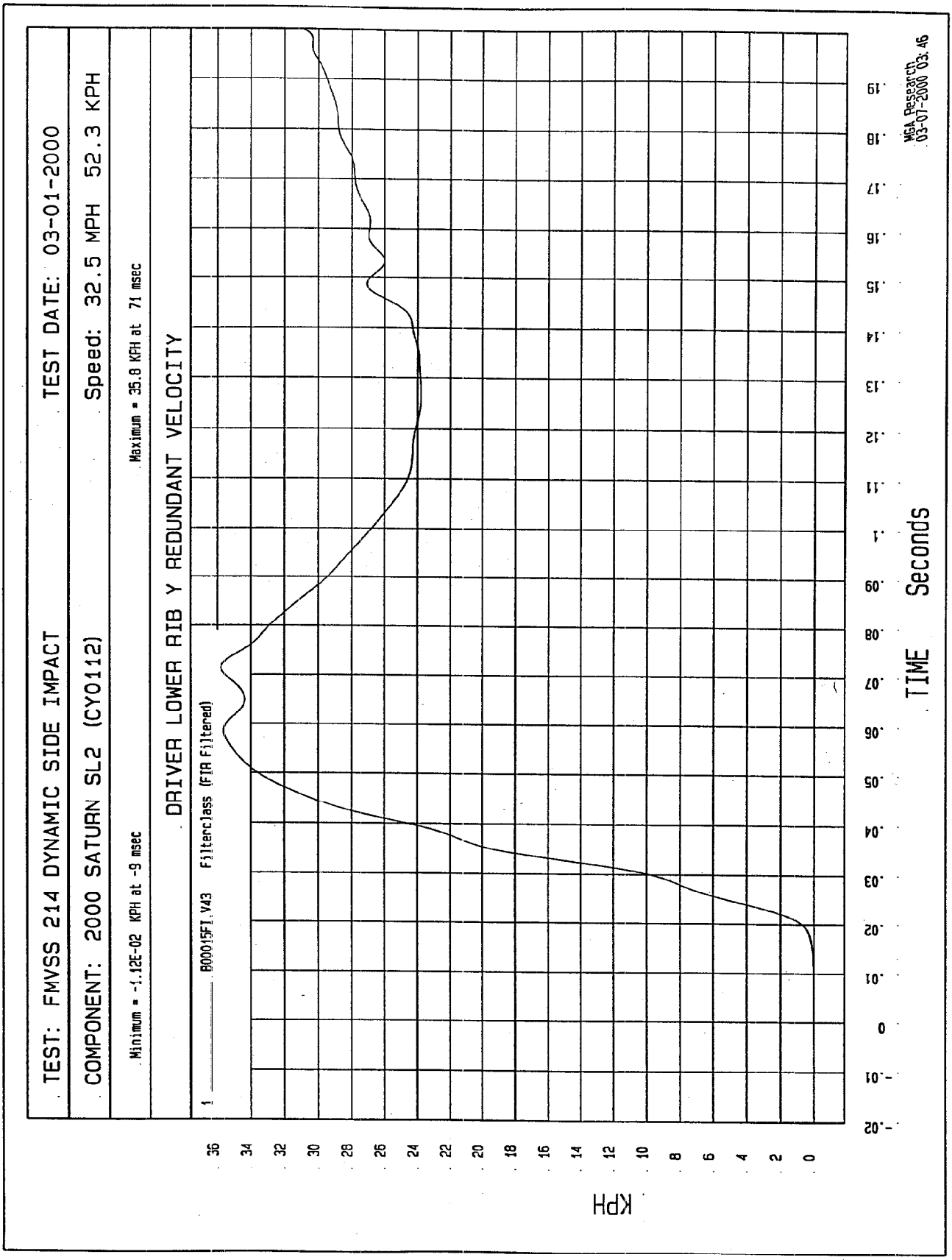
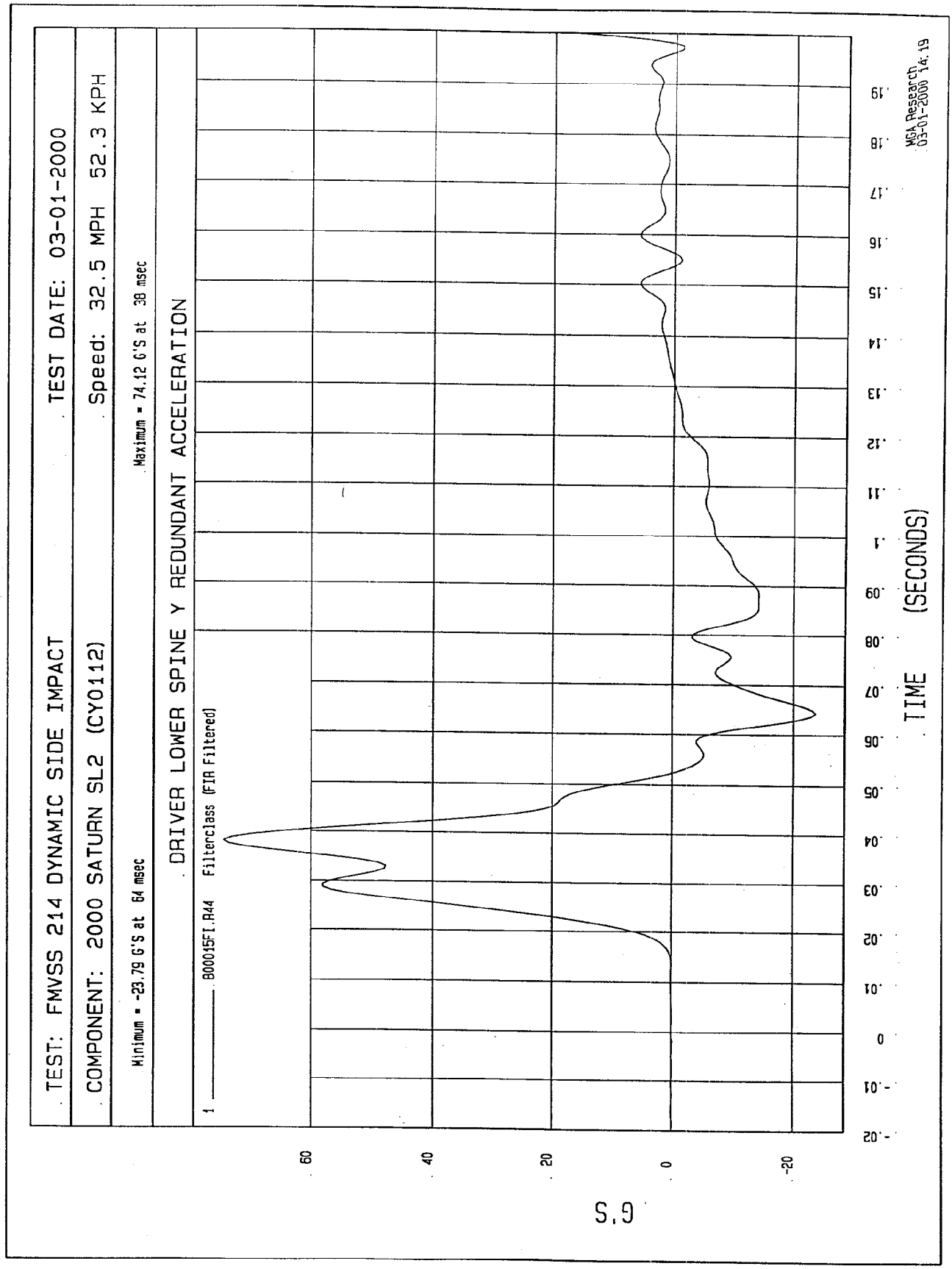
.01
0
-.01
-.02
TIME (SECONDS)


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.12E-02 KPH at -9 msec
Maximum = 35.8 KPH at 71 msec
DRIVER LOWER RIB Y REDUNDANT VELOCITY
1 B00015FI.V43 Filterclass (FIR Filtered)
KPH
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -23.79 G'S at 64 msec
Maximum = 74.12 G'S at 38 msec
DRIVER LOWER SPINE Y REDUNDANT ACCELERATION
1 B00015FI.A44 Filterclass (FIR Filtered)
MGA Research
03-01-2000 14:19
60
40
20
0
-20
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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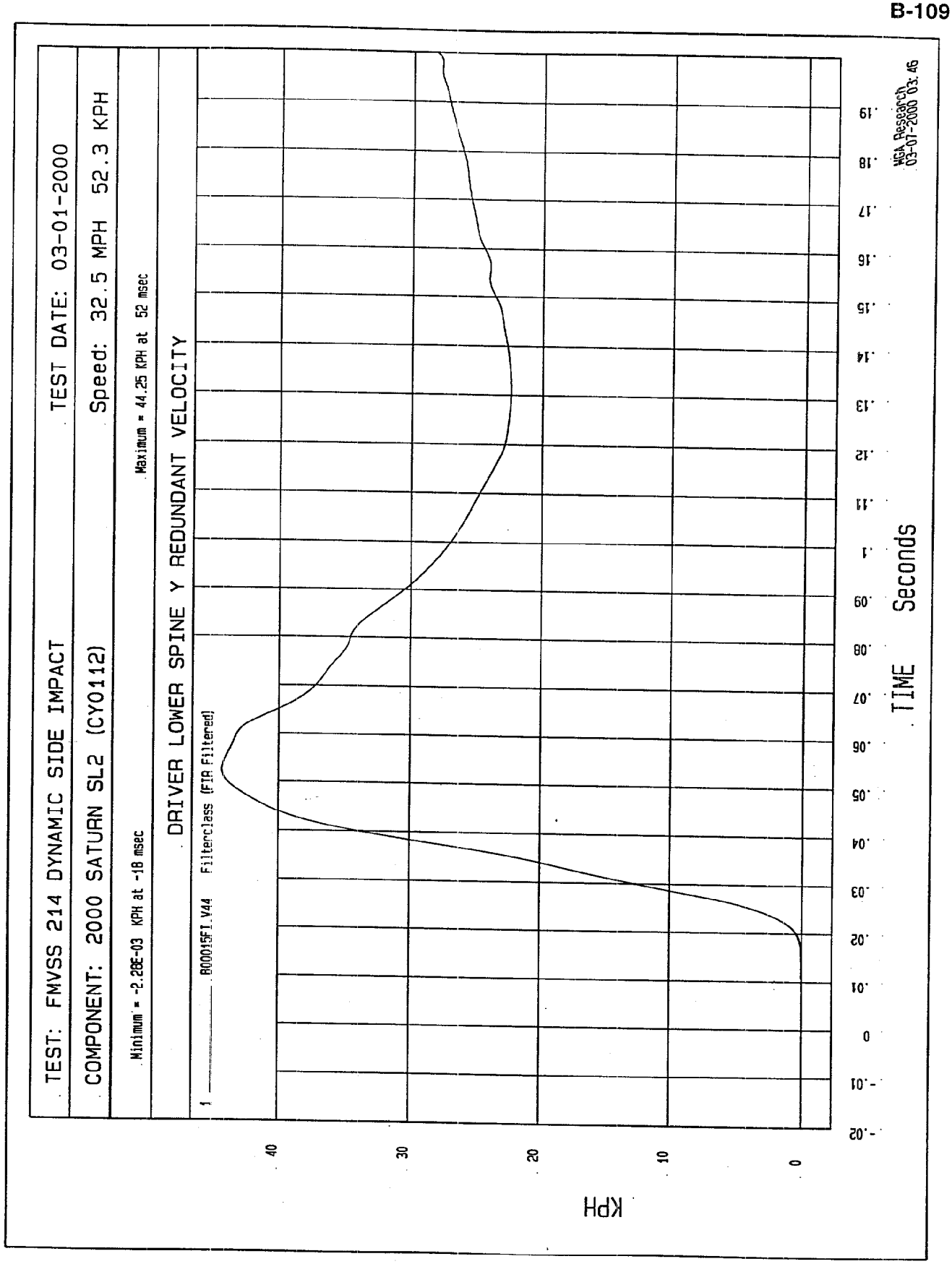
TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.28E-03 KPH at -18 msec
Maximum = 44.25 KPH at 52 msec
DRIVER LOWER SPINE Y REDUNDANT VELOCITY
1 B00015FI.V44 Filterclass (FIR Filtered)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
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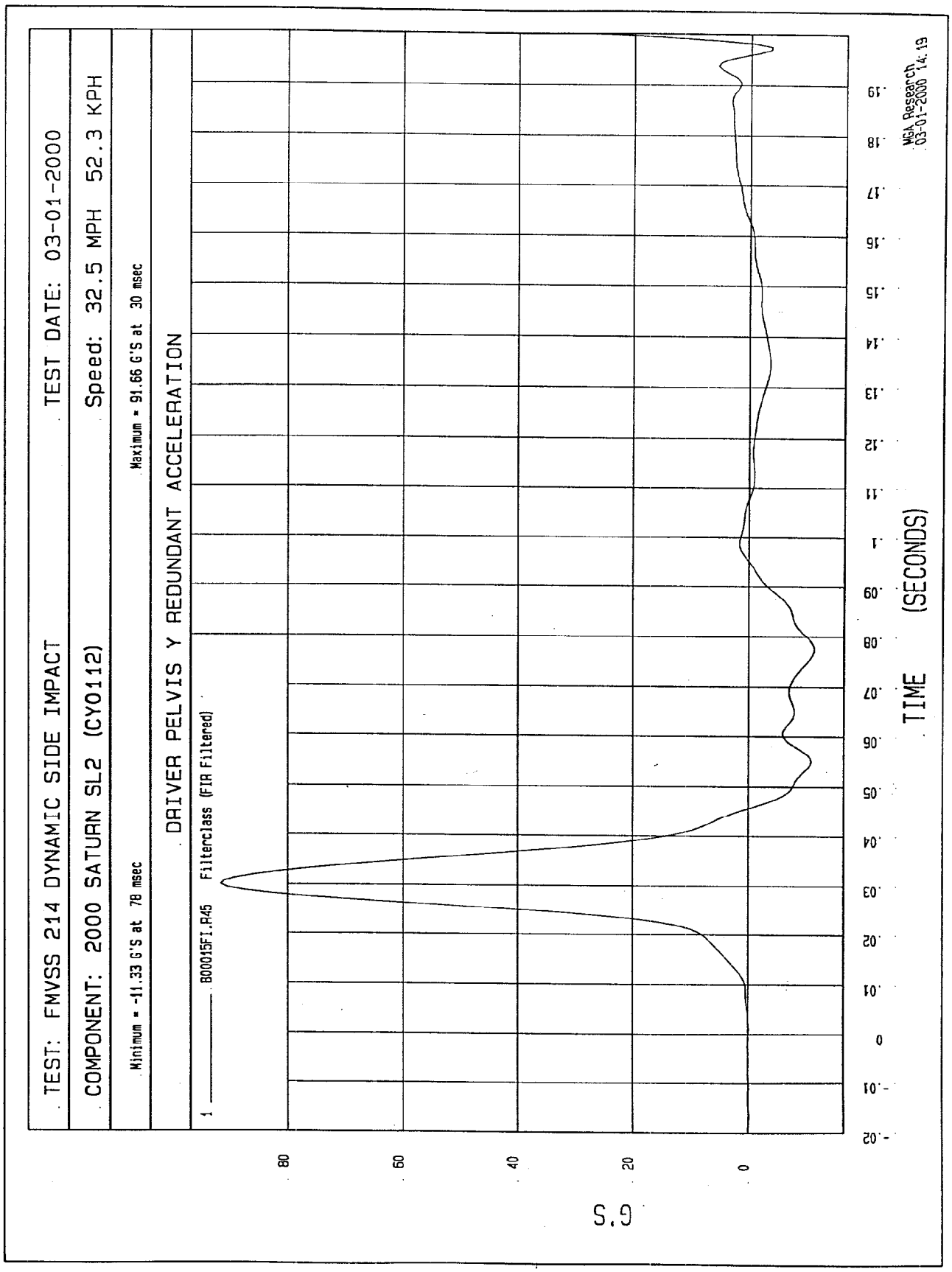
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -11.33 G'S at 78 msec
Maximum = 91.66 G'S at 30 msec
DRIVER PELVIS Y REDUNDANT ACCELERATION
1 B00015FI.R45 Filterclass (FIR Filtered)
80
60
40
20
0
-.02
-.01
0
.01
.02
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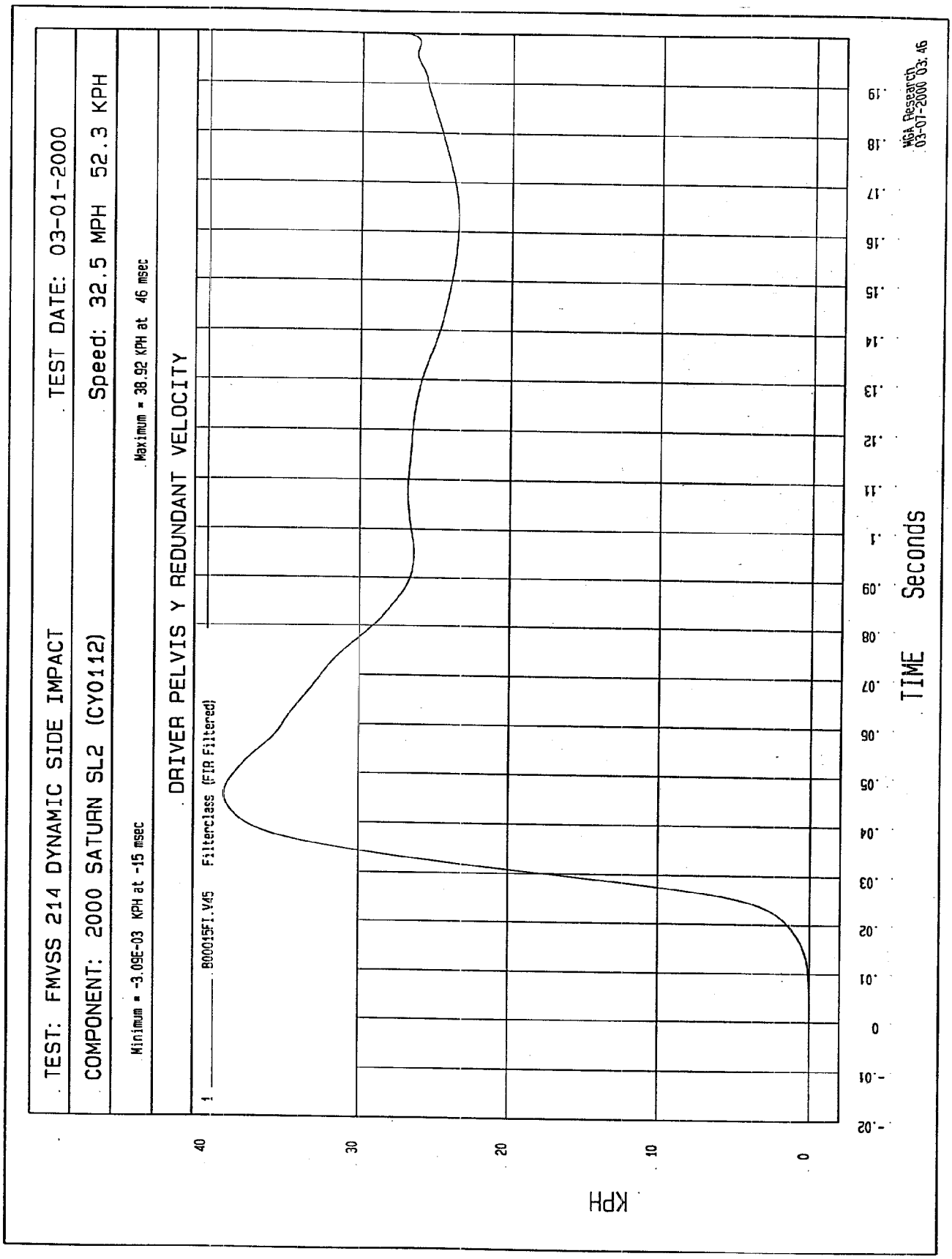
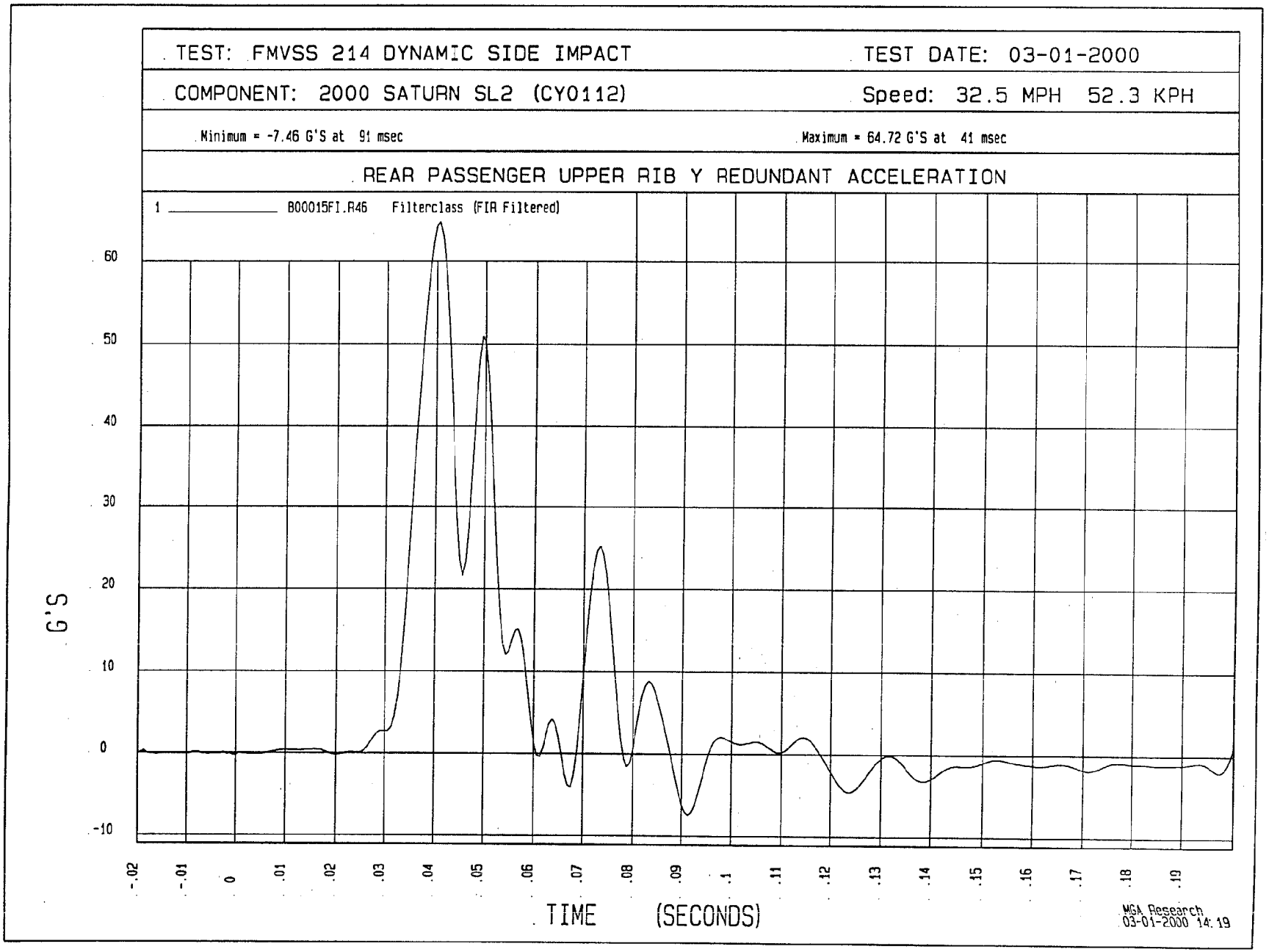
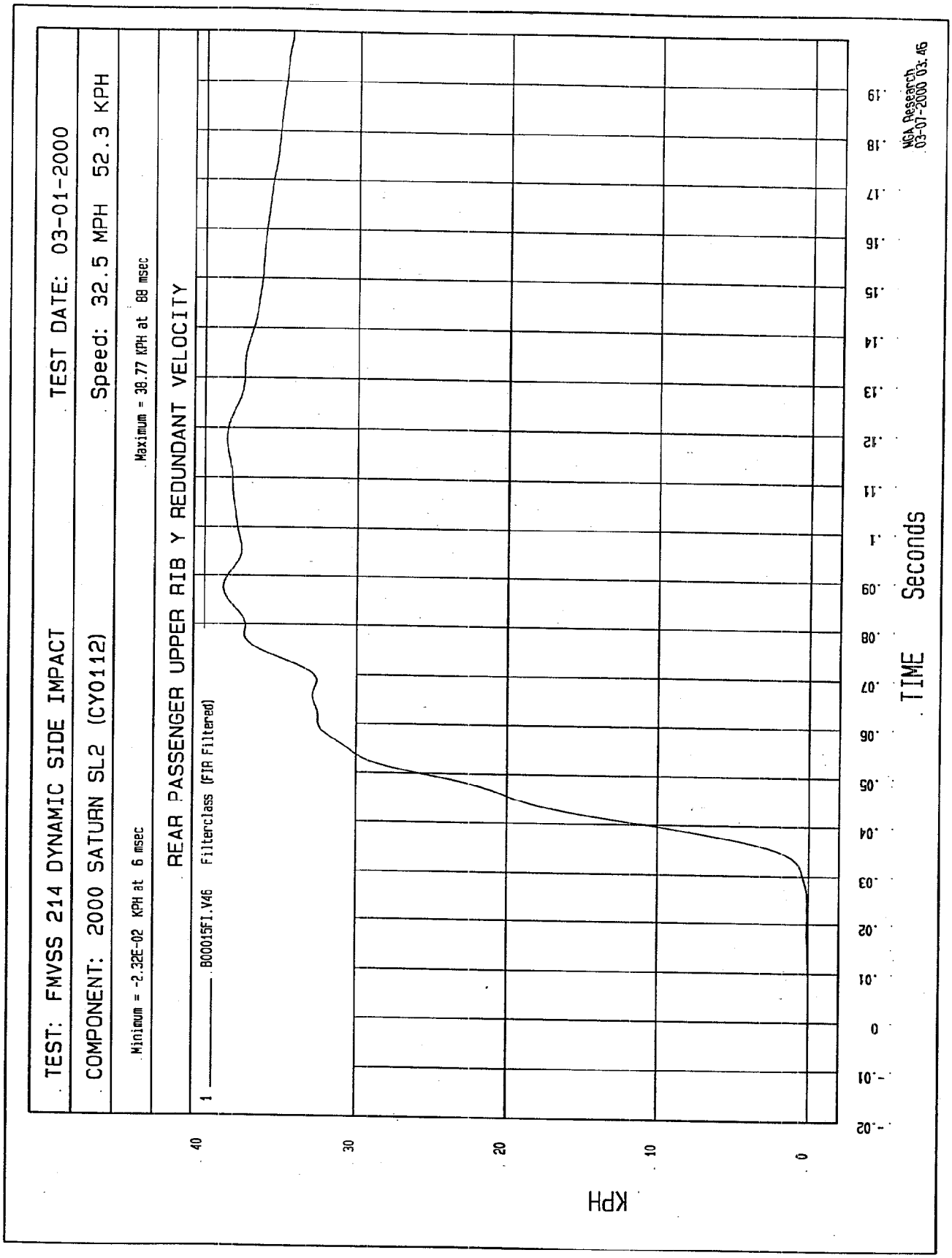
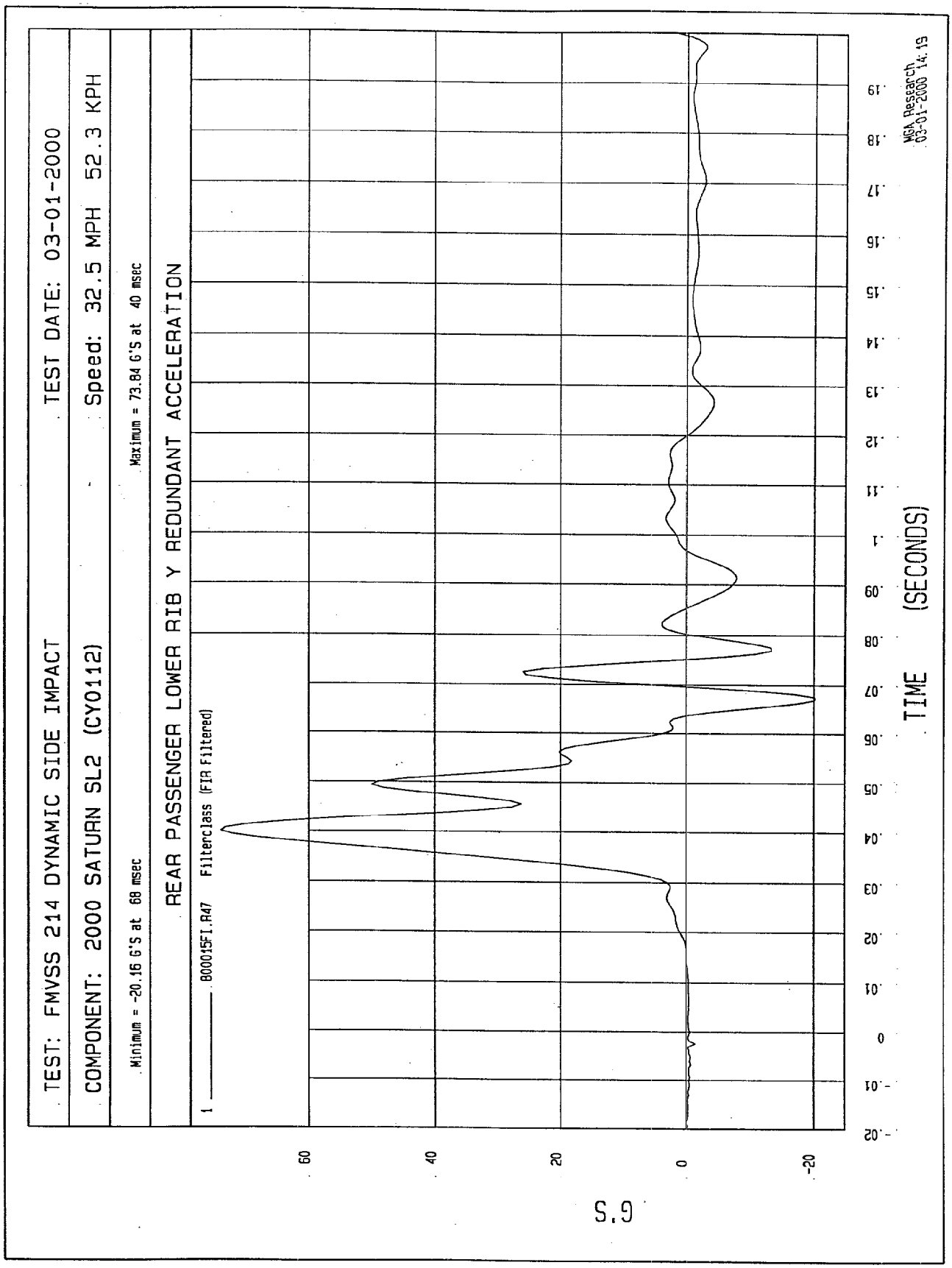
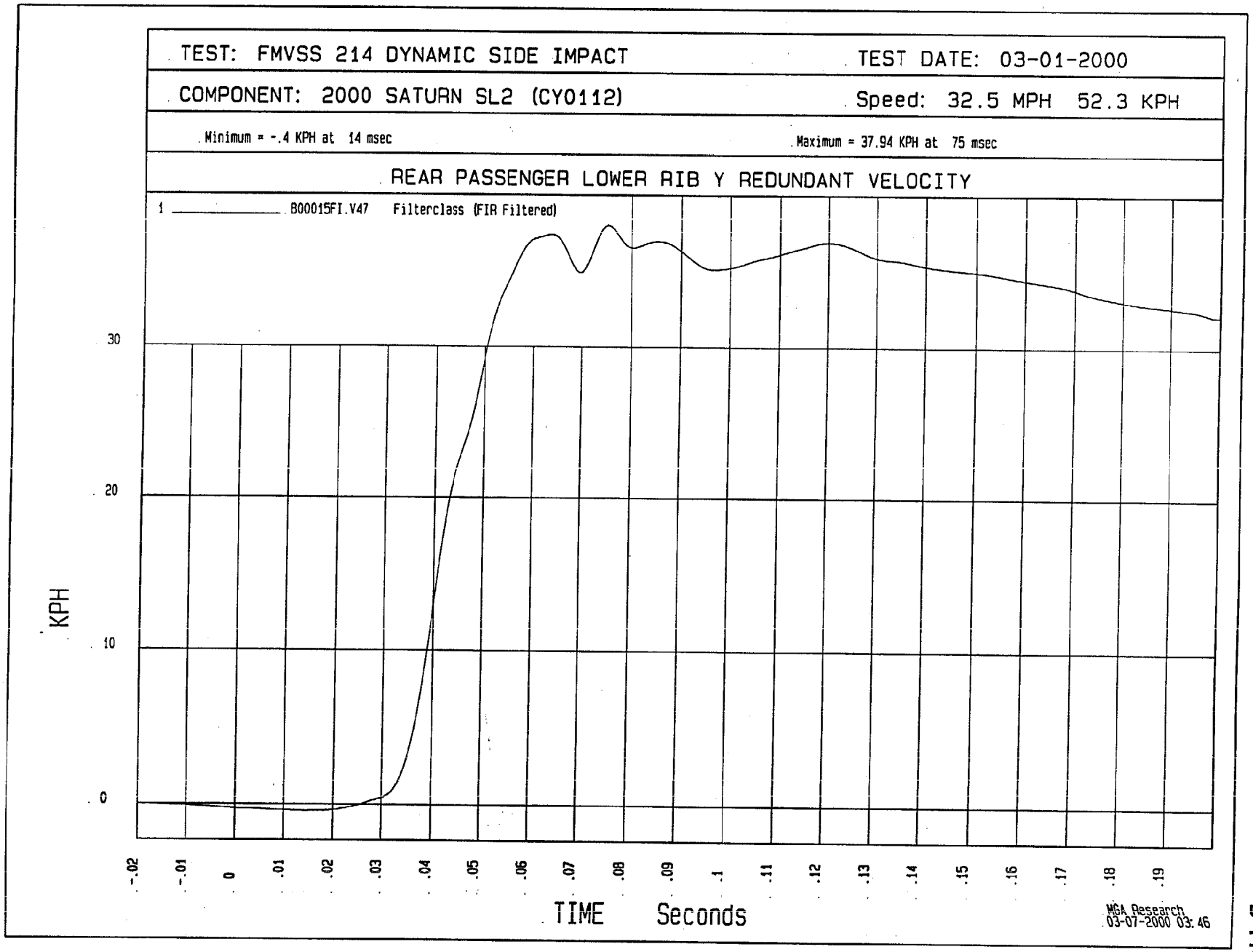
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
G's
MGA Research
03-01-2000 14:19

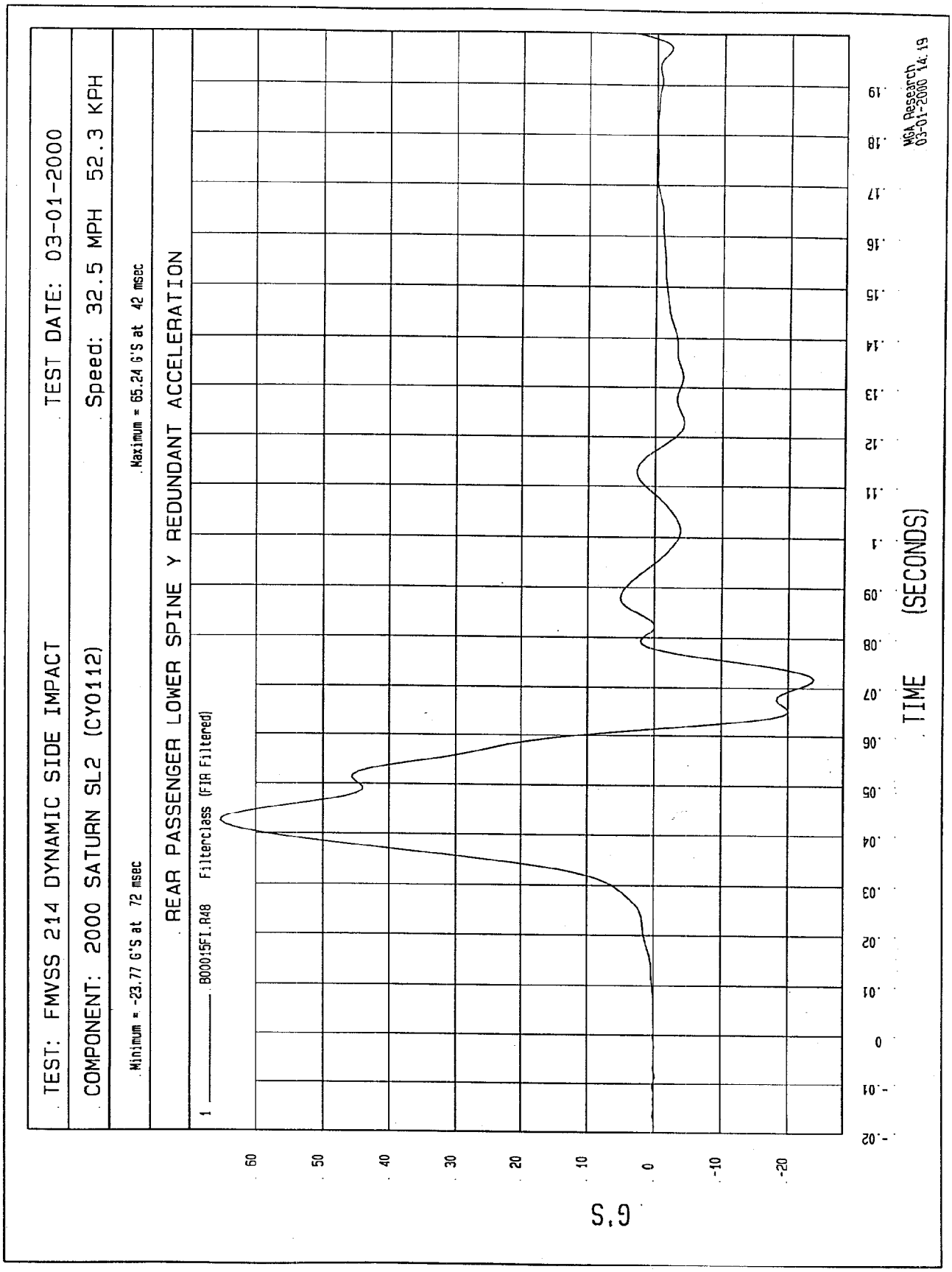

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -3.09E-03 KPH at -15 msec
Maximum = 38.92 KPH at 46 msec
DRIVER PELVIS Y REDUNDANT VELOCITY
1 B00015FI.V45 Filterclass (FIR Filtered)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-07-2000 03:46

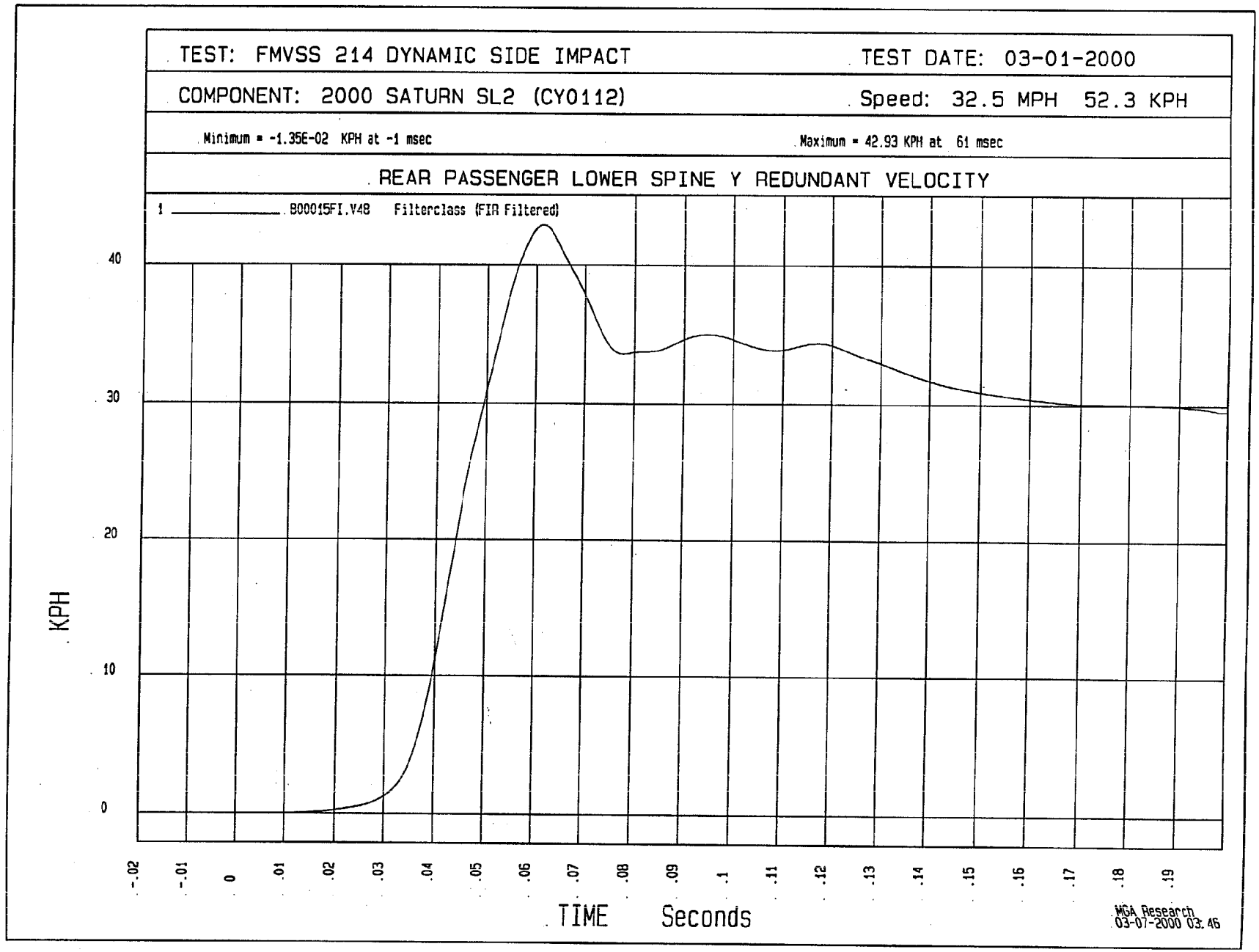

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -7.46 G'S at 91 msec
Maximum = 64.72 G'S at 41 msec
REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION
1 B00015FI.R46 Filterclass (FIR Filtered)
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:19

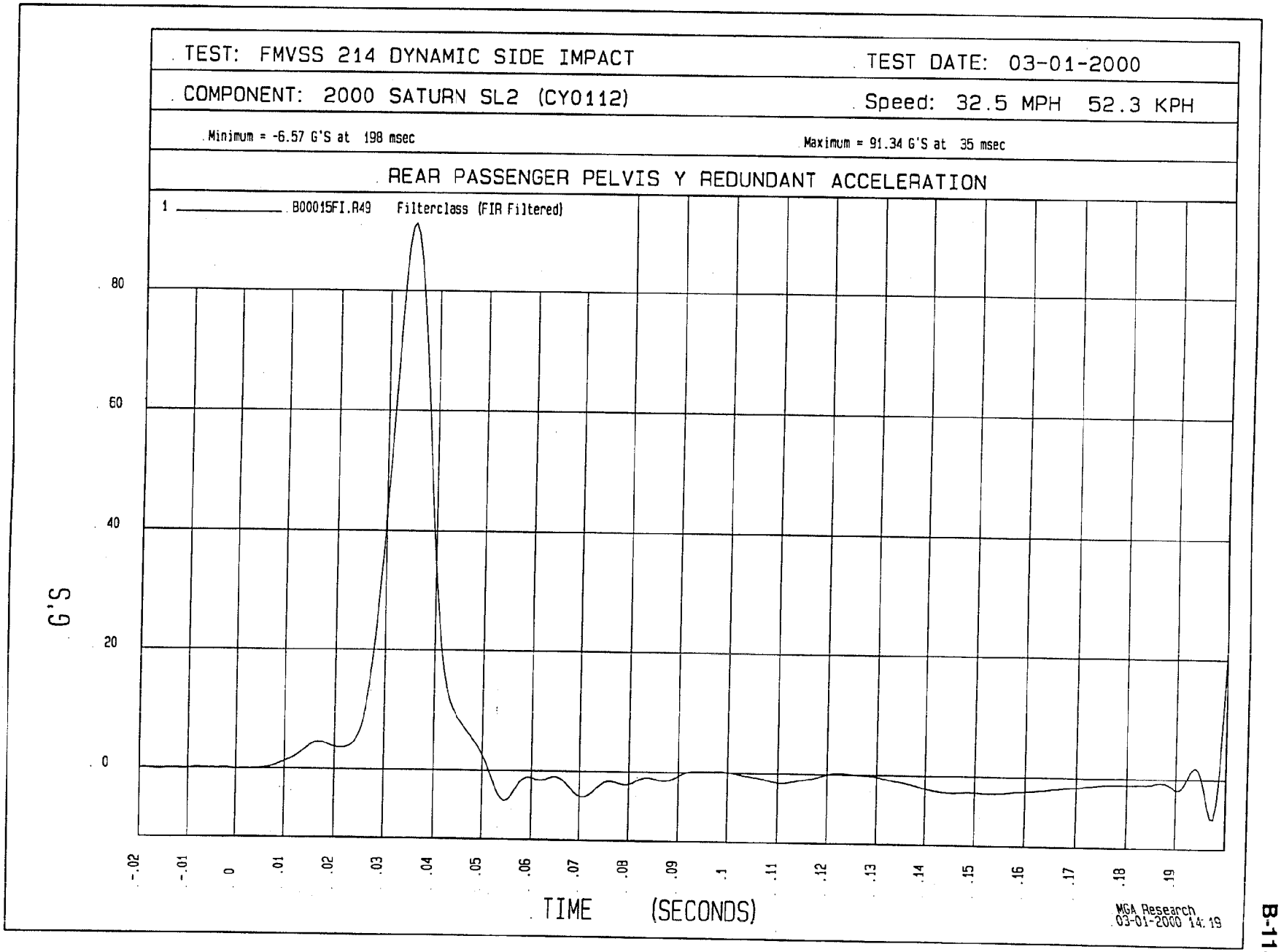

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -2.32E-02 KPH at 6 msec
Maximum = 38.77 KPH at 88 msec
REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY
1 B00015FI.V46 Filterclass (FIR Filtered)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
NGA Research
03-07-2000 03:46

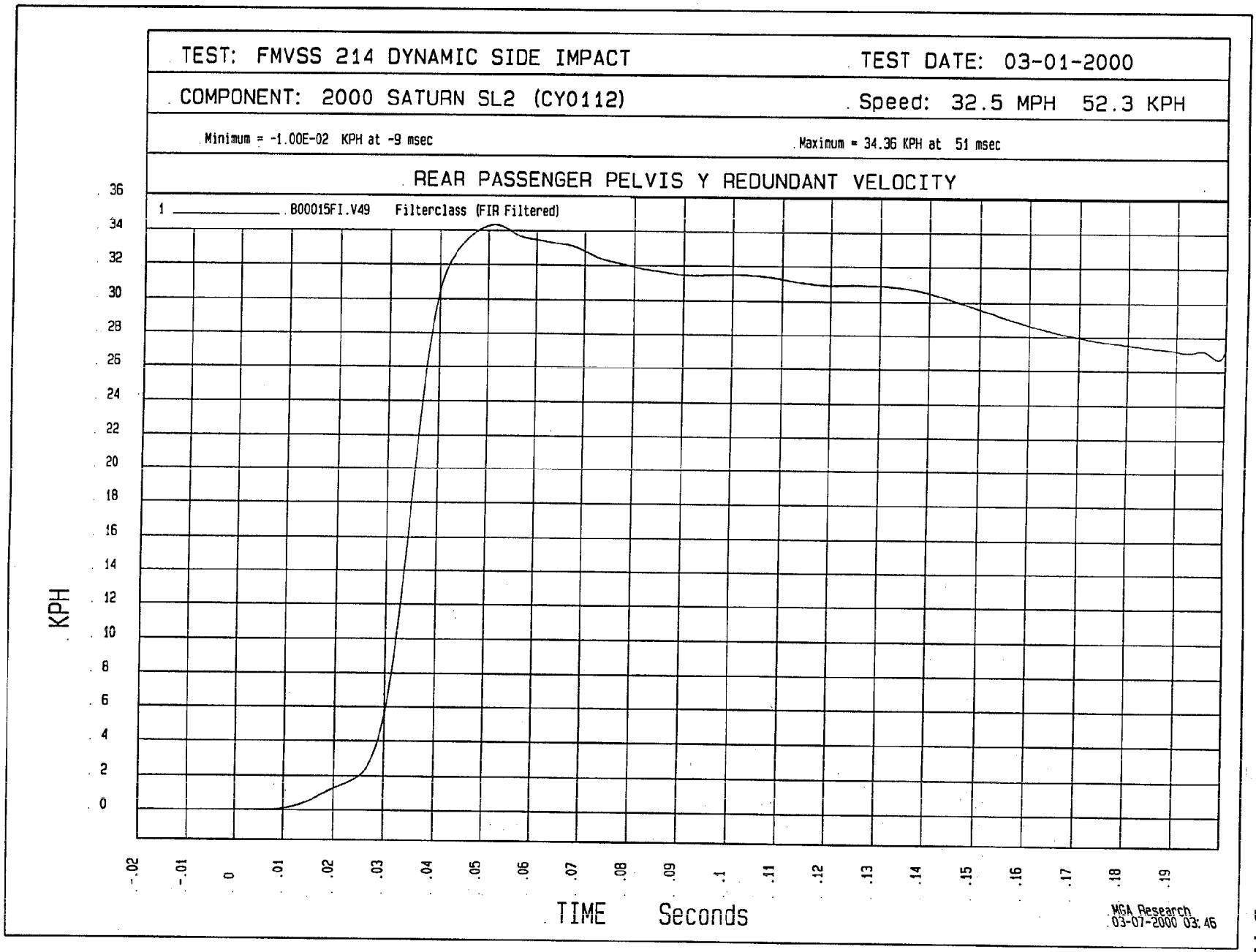

TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -20.16 G'S at 68 msec
Maximum = 73.84 G'S at 40 msec
REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION
1 B00015FI.A47 Filterclass (FIA Filtered)
60
40
20
0
-20
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -.4 KPH at 14 msec
Maximum = 37.94 KPH at 75 msec
REAR PASSENGER LOWER RIB Y REDUNDANT VELOCITY
1 B00015FI.V47 Filterclass (FIR Filtered)
KPH
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -23.77 G'S at 72 msec
Maximum = 65.24 G'S at 42 msec
REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION
1 B00015FI.R48 Filterclass (FIR Filtered)
60
50
40
30
20
10
0
-10
-20
G's
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.35E-02 KPH at -1 msec
Maximum = 42.93 KPH at 61 msec
REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY
1 B00015FI.V48 Filterclass (FIR Filtered)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-07-2000 03:46


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -6.57 G'S at 198 msec
Maximum = 91.34 G'S at 35 msec
REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION
1 B00015FI.R49 Filterclass (FIR Filtered)
G'S
80
60
40
20
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
03-01-2000 14:19


TEST: FMVSS 214 DYNAMIC SIDE IMPACT
TEST DATE: 03-01-2000
COMPONENT: 2000 SATURN SL2 (CY0112)
Speed: 32.5 MPH 52.3 KPH
Minimum = -1.00E-02 KPH at -9 msec
Maximum = 34.36 KPH at 51 msec
REAR PASSENGER PELVIS Y REDUNDANT VELOCITY
1 B00015FI.V49 Filterclass (FIR Filtered)
KPH
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
03-07-2000 03:46

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

SUMMARY

SIDE PRE & POST-TEST CALIBRATION

CONFIGURED TO LEFT SIDE IMPACT

Report Date: March 2, 2000 Technician: Tim Michnay

Test Date: March 1, 2000

Test Parameter	Specification	Dummy Serial No: 048		Dummy Serial No: 049	
		Pre-Test	Post-Test	Pre-Test	Post-Test
SH-Seated Height (mm)	889 - 909	905	905	902	902
RH-Rib Height (mm)	501 - 521	518	518	516	516
HP-Hip Pivot Height (mm)	99 ref.	99	99	99	99
RD-Rib from Back Line (mm)	229 - 241	236	236	233	233
KV-Knee Pivot from Back Line (mm)	511 - 526	521	521	523	523
SW-Knee Pivot to Floor (mm)	490 - 505	493	493	493	493
HW-Hip Width (mm)	356 - 391	368	368	371	371
Thorax Impacts					
Temperature (°C)	18.9 - 25.5	21.0	21.0	21.0	21.0
Relative Humidity (%)	10 - 70	39	24	21	24
Probe Speed (m/s)	4.27 - 4.33	4.27	4.29	4.28	4.28
Upper Rib (g's)	37 - 46	41	39	37	40
Lower Rib (g's)	37 - 46	38	41	41	40
Lower Spine (g's)	15 - 22	21	22	21	21
Pelvis Impact					
Temperature (°C)	18.9 - 25.5	21.0	21.0	21.0	21.0
Relative Humidity (%)	10 - 70	39	24	21	24
Probe Speed (m/s)	4.27 - 4.33	4.27	4.29	4.30	4.27
Pelvis ('gs)	40 - 60	47	50	54	52

REMARKS:

PRE-TEST CERTIFICATION DATA

Dummy Serial Number: 048

Calibration Test Results Summary

Dummy Serial Number: 048

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 048 DATE OF VERIFICATION: February 25, 2000

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	905
RH - Rib Height (mm)	501 - 521	518
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	236
KV - Knee Pivot From Back Line (mm)	511 - 526	521
SW - Knee Pivot to Floor (mm)	490 - 505	493
HW - Hip Width (mm)	356 - 391	368

TECHNICIAN: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: February 24, 2000

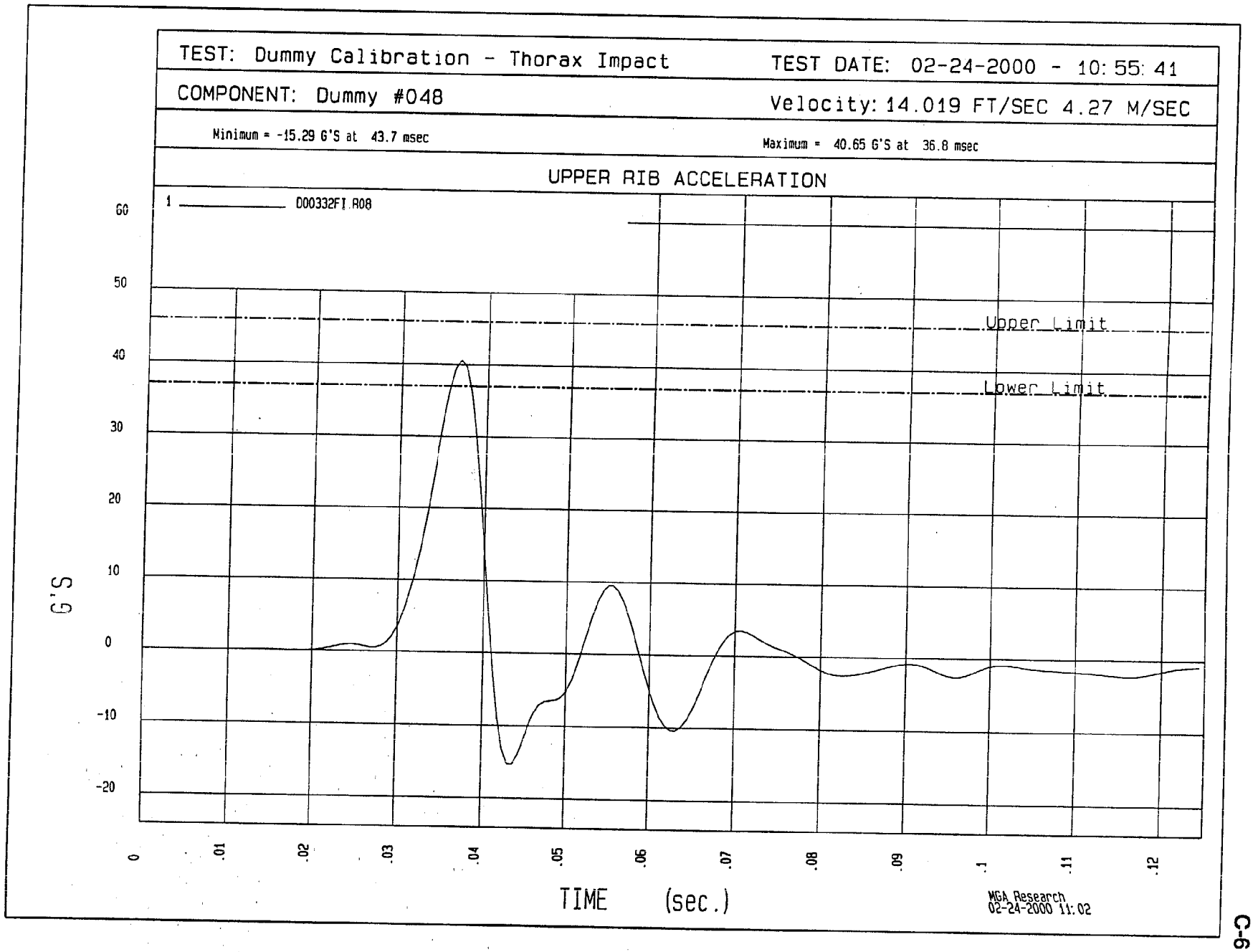
DUMMY SERIAL NUMBER: 048 TEST NUMBER: D00332

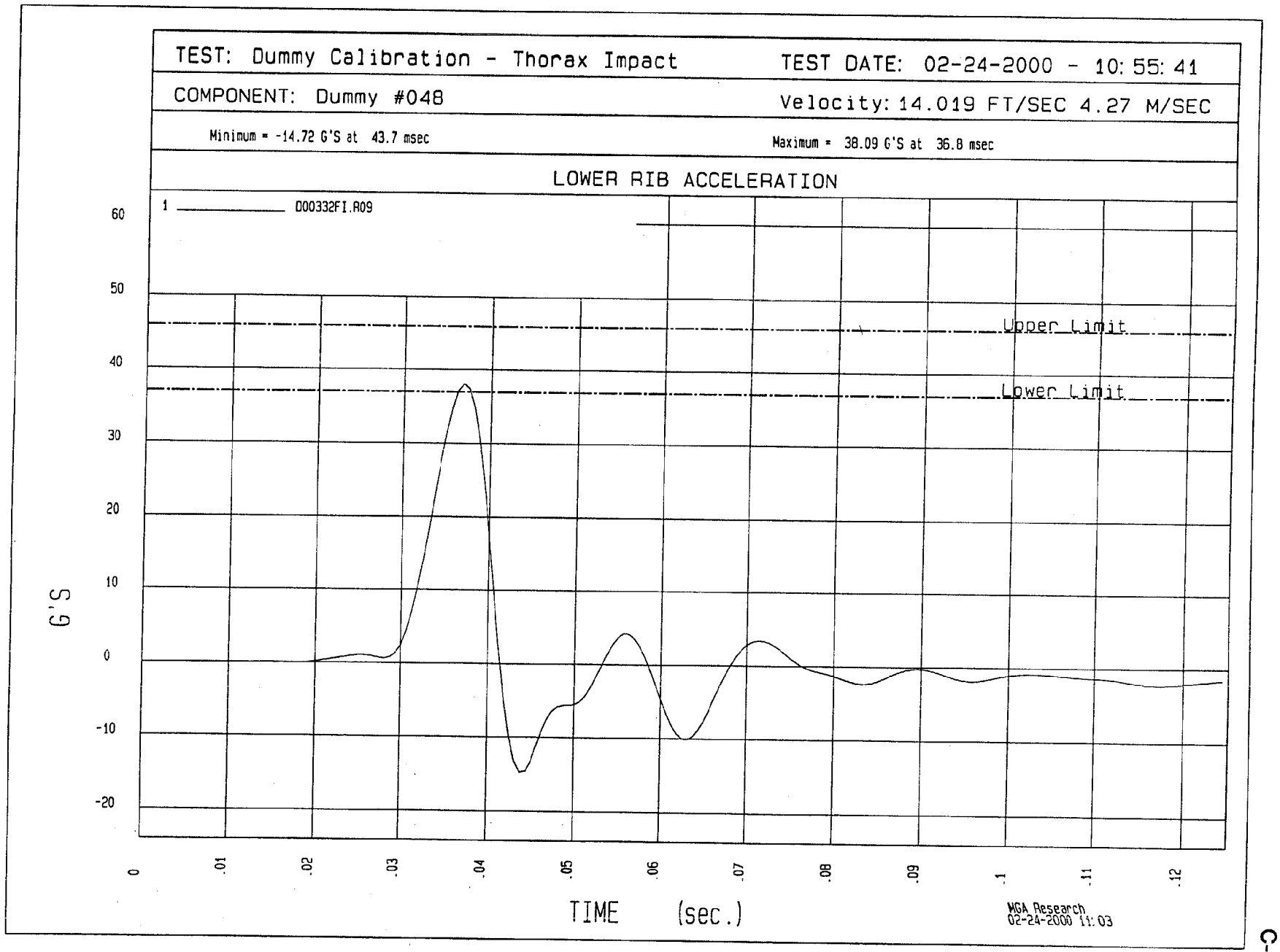
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	39
PROBE SPEED (m/s)	4.27 - 4.33	4.27
UPPER RIB (g's)	37 - 46 g's	41
LOWER RIB (g's)	37 - 46 g's	38
LOWER SPINE (g's)	15 - 22 g's	21

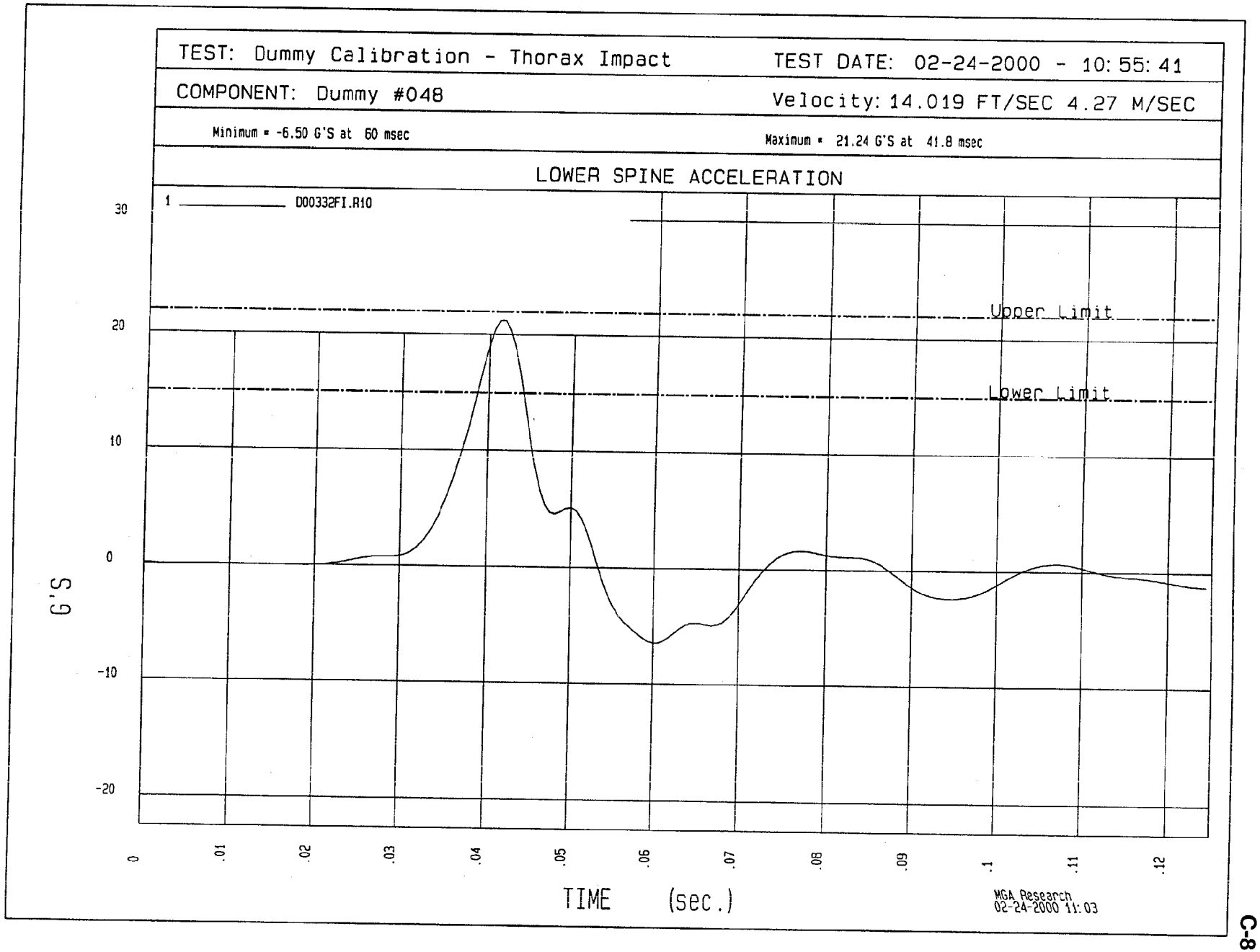
TEST MEETS SPECIFICATIONS

TECHNICIAN: _____

APPROVED BY: David Winkelbauer


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 02-24-2000 - 10:55:41
COMPONENT: Dummy #048
Velocity: 14.019 FT/SEC 4.27 M/SEC
Minimum = -15.29 G'S at 43.7 msec
Maximum = 40.65 G'S at 36.8 msec
UPPER RIB ACCELERATION
1 D00332FI.R08
Upper Limit
Lower Limit
G'S
60
50
40
30
20
10
0
-10
-20
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
02-24-2000 11:02


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 02-24-2000 - 10:55:41
COMPONENT: Dummy #048
Velocity: 14.019 FT/SEC 4.27 M/SEC
Minimum = -14.72 G'S at 43.7 msec
Maximum = 38.09 G'S at 36.8 msec
LOWER RIB ACCELERATION
1 D00332FI.R09
Upper Limit
Lower Limit
60
50
40
30
20
10
0
-10
-20
G'S
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
02-24-2000 11:03


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 02-24-2000 - 10:55:41
COMPONENT: Dummy #048
Velocity: 14.019 FT/SEC 4.27 M/SEC
Minimum = -6.50 G'S at 60 msec
Maximum = 21.24 G'S at 41.8 msec
LOWER SPINE ACCELERATION
1 D00332FI.R10
Upper Limit
Lower Limit
30
20
10
0
-10
-20
G'S
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
02-24-2000 11:03

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

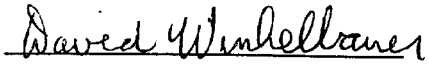
DATE: February 24, 2000

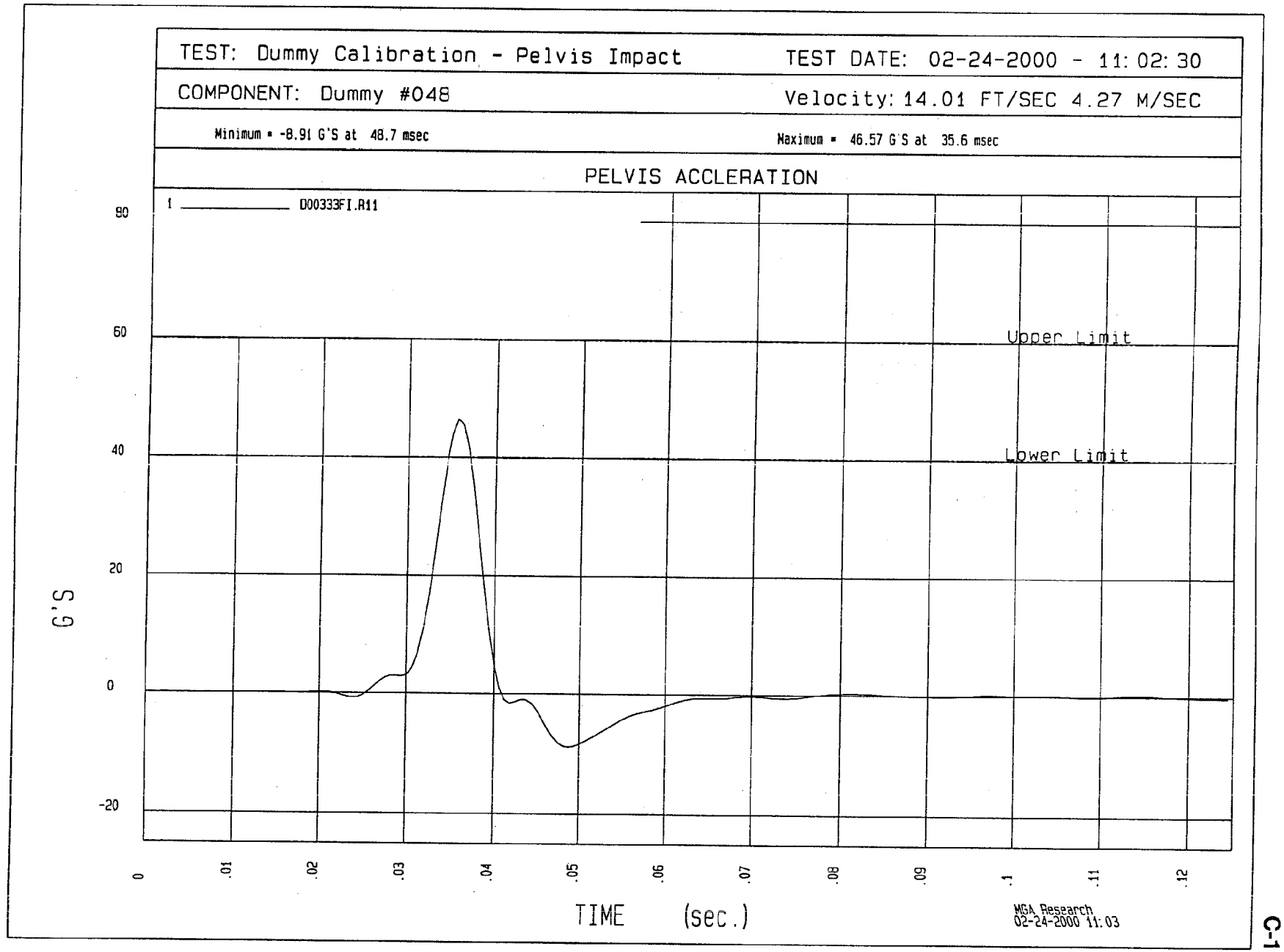
DUMMY SERIAL NUMBER: 048 TEST NUMBER: D00333

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	39
PROBE SPEED (m/s)	4.27 - 4.33	4.27
PELVIS ACCELERATION (g's)	40 - 60	47

TEST MEETS SPECIFICATIONS

TECHNICIAN: 

APPROVED BY: 


TEST: Dummy Calibration - Pelvis Impact
TEST DATE: 02-24-2000 - 11:02:30
COMPONENT: Dummy #048
Velocity: 14.01 FT/SEC 4.27 M/SEC
Minimum = -8.91 G'S at 48.7 msec
Maximum = 46.57 G'S at 35.6 msec
PELVIS ACCLERATION
1 D00333FI.R11
Upper Limit
Lower Limit
G'S
80
60
40
20
0
-20
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
02-24-2000 11:03

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: February 24, 2000

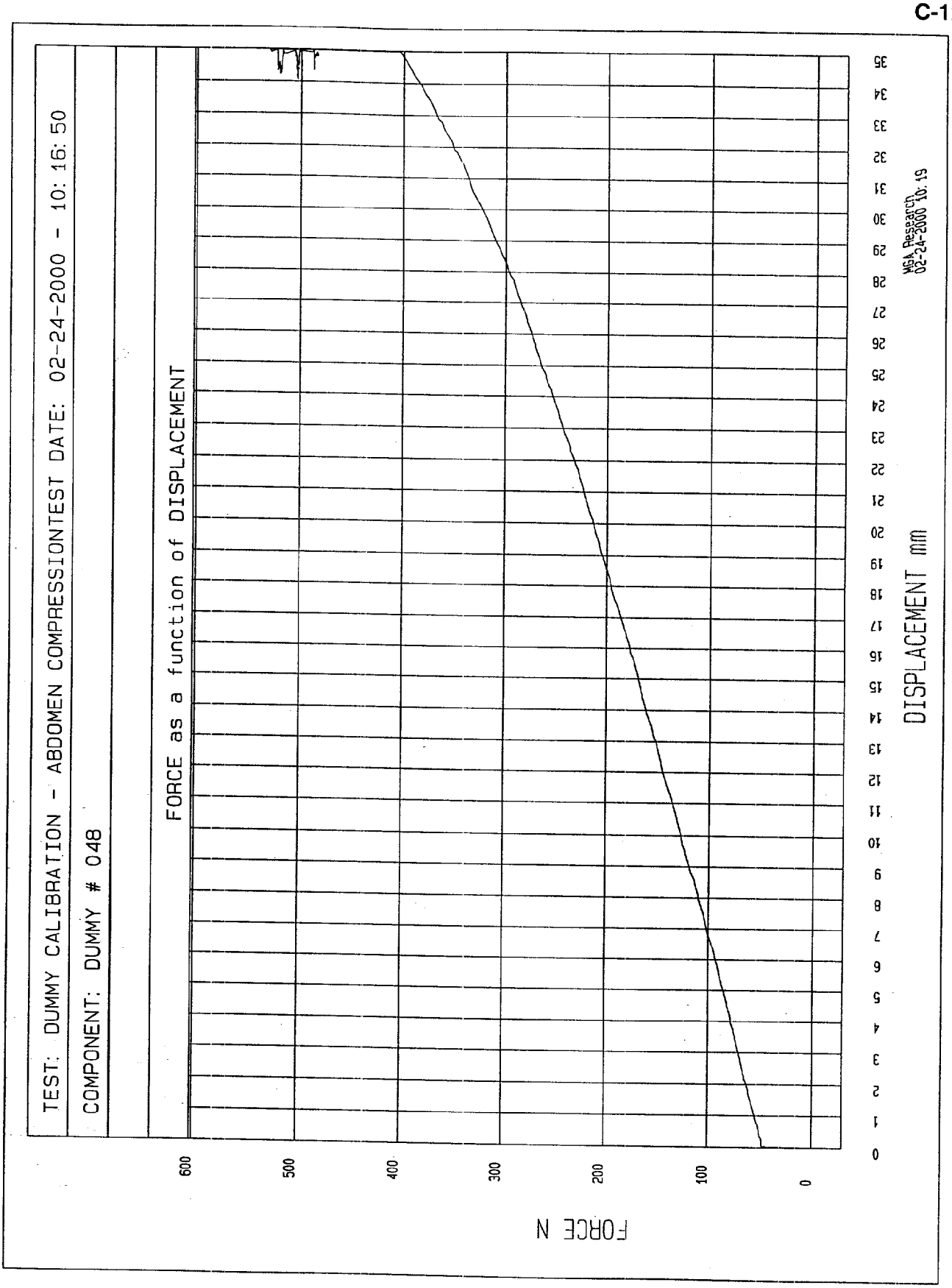
DUMMY SERIAL NUMBER: 048 TEST NUMBER: D00334

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	39
FORCE @ 12.7 mm	104 - 162	149
FORCE @ 19.0 mm	163 - 222	206
FORCE @ 25.4 mm	222 - 280	270
FORCE @ 33 mm	325 - 391	370

TEST MEETS SPECIFICATIONS

TECHNICIAN: _____

APPROVED BY: David Weihelbauer


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 02-24-2000 - 10: 16: 50
COMPONENT: DUMMY # 048
FORCE as a function of DISPLACEMENT
FORCE N
600
500
400
300
200
100
0
DISPLACEMENT mm
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
MGA Research
02-24-2000 10: 19

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: February 24, 2000

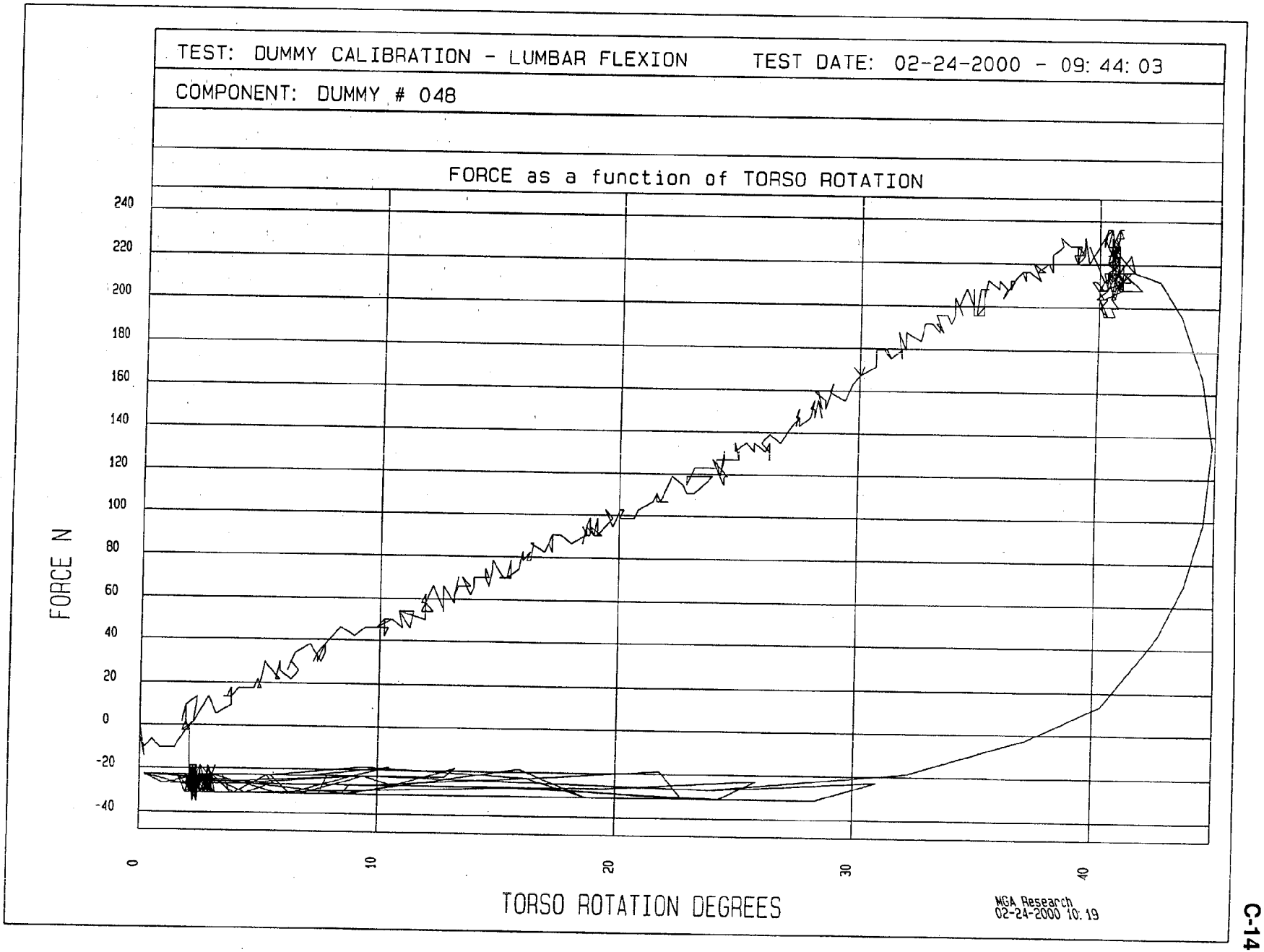
DUMMY SERIAL NUMBER: 048 TEST NUMBER: D00335

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	39
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	102.7
FORCE @ 30°	151.2 - 204.6	167.5
FORCE @ 40°	204.6 - 258.0	232.3
RETURN ANGLE	12° maximum	2°

TEST MEETS SPECIFICATIONS

TECHNICIAN: _____

APPROVED BY: David Winkelbauer


TEST: DUMMY CALIBRATION - LUMBAR FLEXION
TEST DATE: 02-24-2000 - 09: 44: 03
COMPONENT: DUMMY # 048
FORCE as a function of TORSO ROTATION
FORCE N
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
0
10
20
30
40
TORSO ROTATION DEGREES
MGA Research
02-24-2000 10: 19

PRE-TEST CERTIFICATION DATA

Dummy Serial Number: 049

Calibration Test Results Summary

Dummy Serial Number: 049

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 049 DATE OF VERIFICATION: January 24, 2000

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	902
RH - Rib Height (mm)	501 - 521	516
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	233
KV - Knee Pivot From Back Line (mm)	511 - 526	523
SW - Knee Pivot to Floor (mm)	490 - 505	493
HW - Hip Width (mm)	356 - 391	371

TECHNICIAN: _____

APPROVED BY: David Winkelbauer

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

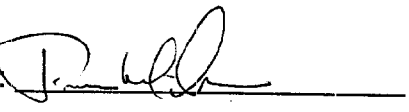
SIDE IMPACT DUMMY (SID)

DATE: January 24, 2000

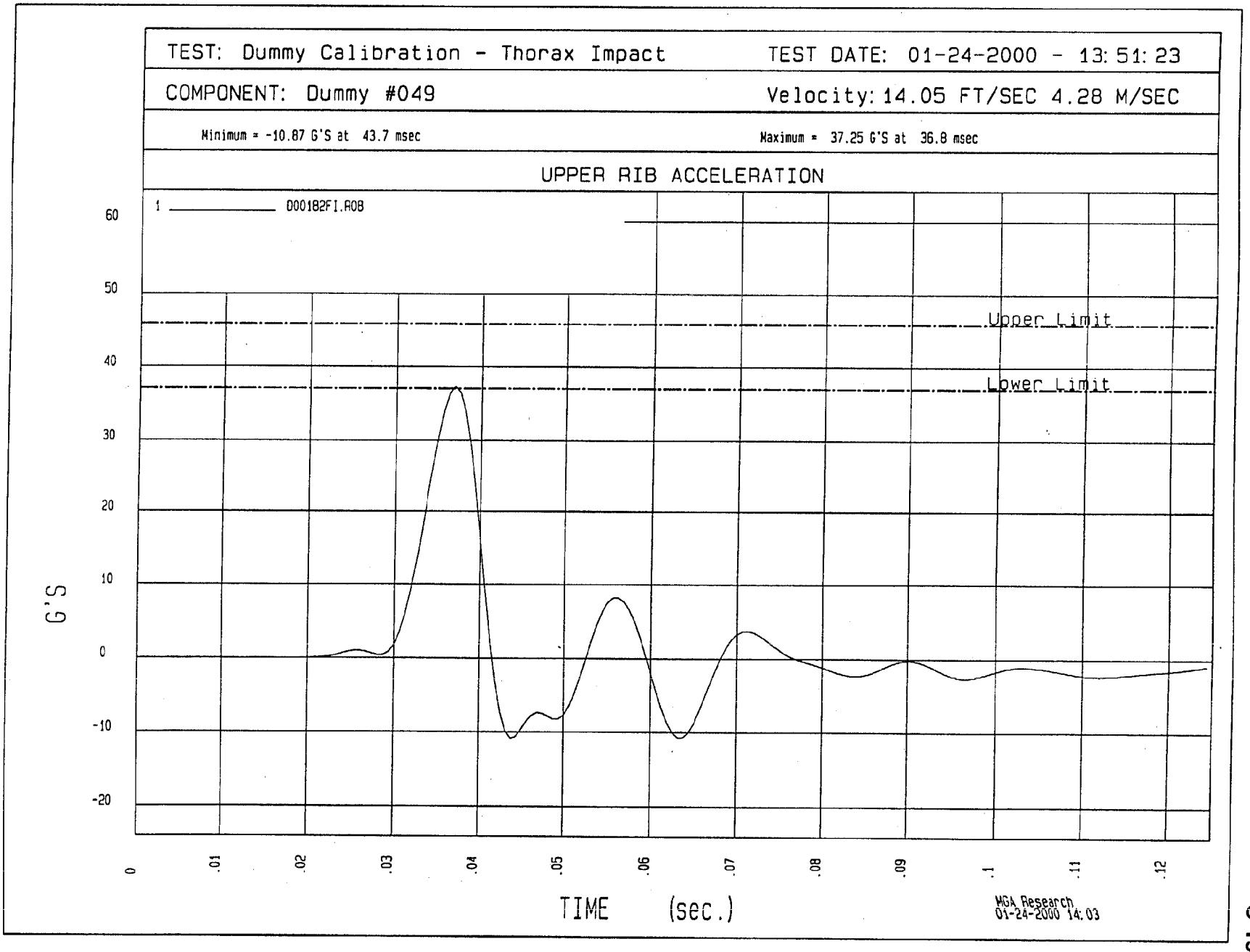
DUMMY SERIAL NUMBER: 049 TEST NUMBER: D00182

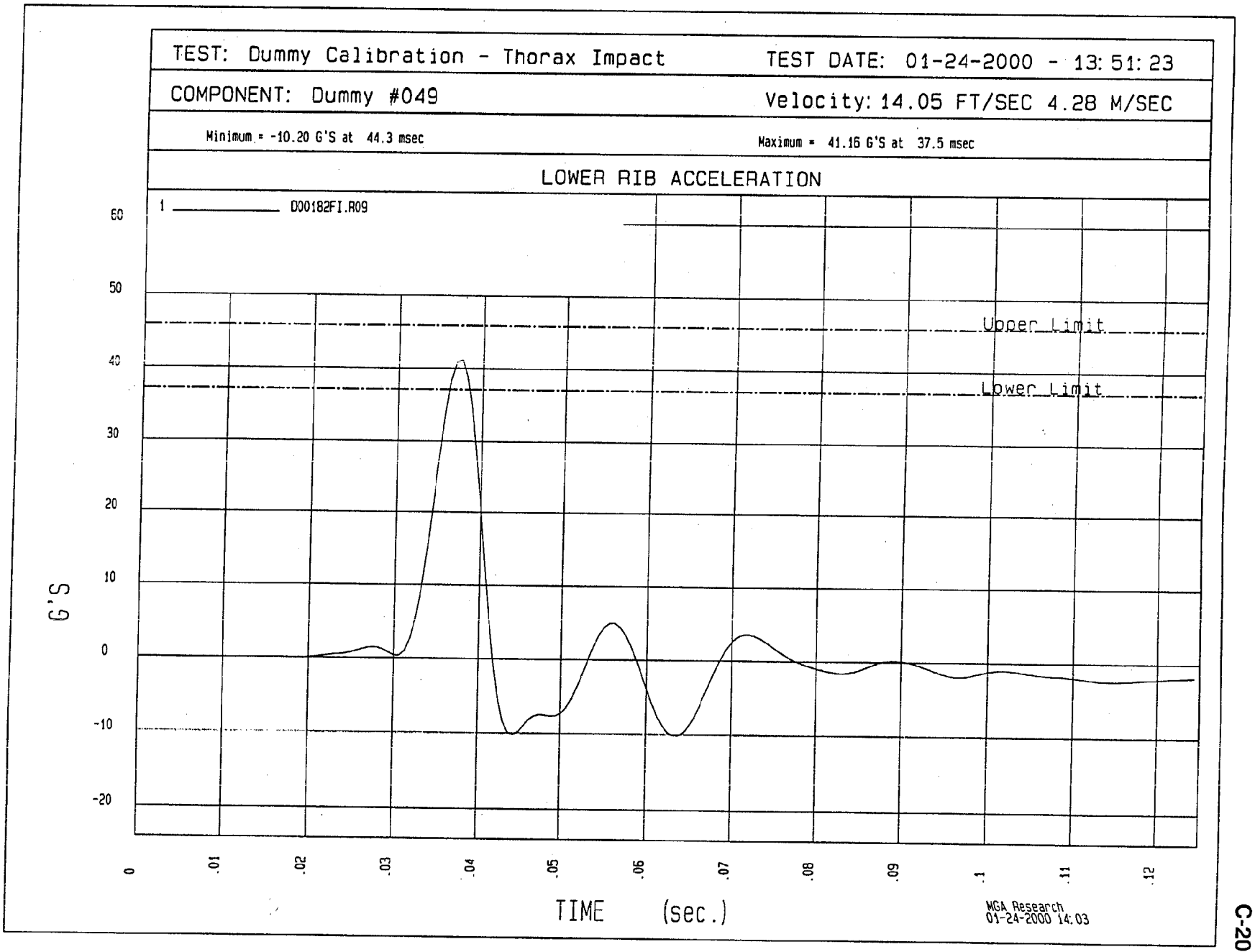
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	21
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46	37
LOWER RIB (g's)	37 - 46	41
LOWER SPINE (g's)	15 - 22	21

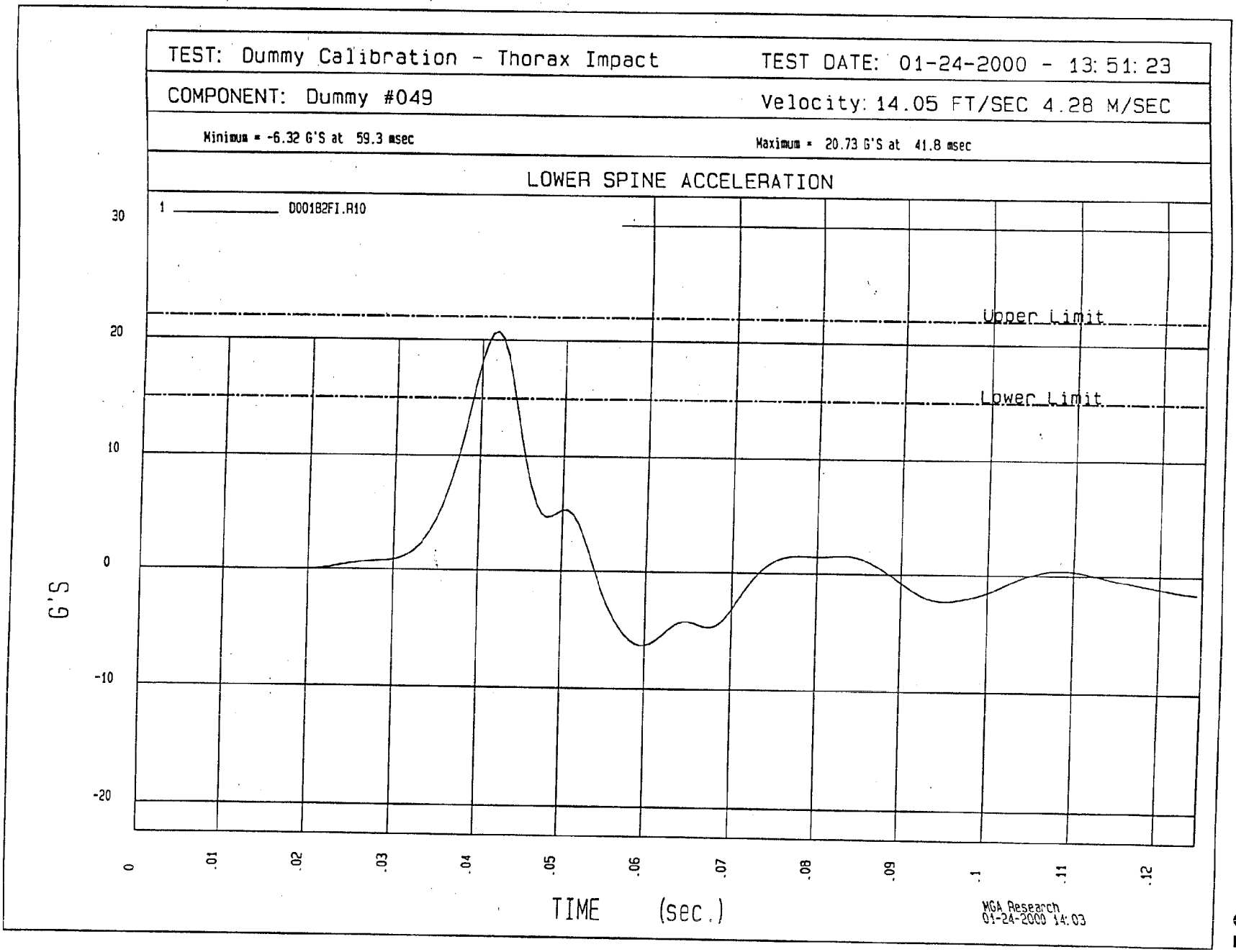
TEST MEETS SPECIFICATIONS

TECHNICIAN: 

APPROVED BY: David Winkellaar


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 01-24-2000 - 13:51:23
COMPONENT: Dummy #049
Velocity: 14.05 FT/SEC 4.28 M/SEC
Minimum = -10.87 G'S at 43.7 msec
Maximum = 37.25 G'S at 36.8 msec
UPPER RIB ACCELERATION
1 D00182FI.A0B
Upper Limit
Lower Limit
60
50
40
30
20
10
0
-10
-20
G'S
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
01-24-2000 14:03


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 01-24-2000 - 13:51:23
COMPONENT: Dummy #049
Velocity: 14.05 FT/SEC 4.28 M/SEC
Minimum = -10.20 G'S at 44.3 msec
Maximum = 41.16 G'S at 37.5 msec
LOWER RIB ACCELERATION
1 D00182FI.R09
Upper Limit
Lower Limit
G'S
60
50
40
30
20
10
0
-10
-20
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
01-24-2000 14:03


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 01-24-2000 - 13:51:23
COMPONENT: Dummy #049
Velocity: 14.05 FT/SEC 4.28 M/SEC
Minimum = -6.32 G'S at 59.3 msec
Maximum = 20.73 G'S at 41.8 msec
LOWER SPINE ACCELERATION
1 D00182FI.R10
Upper Limit
Lower Limit
30
20
10
0
-10
-20
G'S
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
01-24-2000 14:03

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 24, 2000

DUMMY SERIAL NUMBER: 049

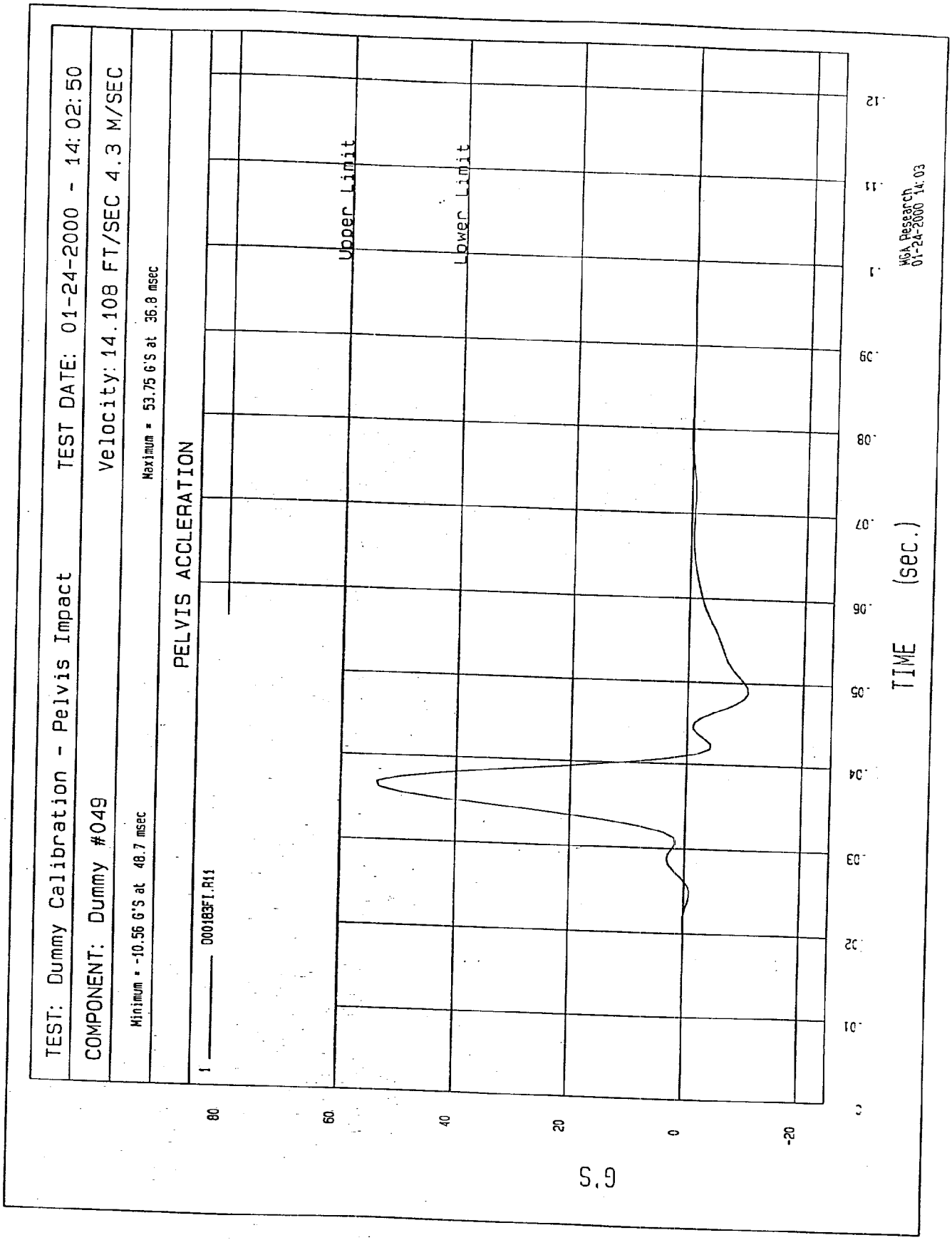
TEST NUMBER: D00183

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	21
PROBE SPEED (m/s)	4.27 - 4.33	4.30
PELVIS ACCELERATION (g's)	40 - 60	54

TEST MEETS SPECIFICATIONS

TECHNICIAN: 

APPROVED BY: David Winkelbauer


TEST: Dummy Calibration - Pelvis Impact
TEST DATE: 01-24-2000 - 14:02:50
COMPONENT: Dummy #049
Velocity: 14.108 FT/SEC 4.3 M/SEC
Minimum = -10.56 G'S at 48.7 msec
Maximum = 53.75 G'S at 36.8 msec
PELVIS ACCLERATION
1 D00183FI.R11
Upper Limit
Lower Limit
80
60
40
20
0
-20
G'S
TIME (sec.)
MGA Research
01-24-2000 14:03

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

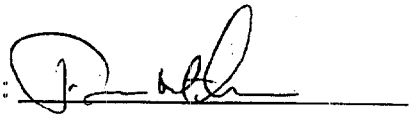
SIDE IMPACT DUMMY (SID)

DATE: January 24, 2000

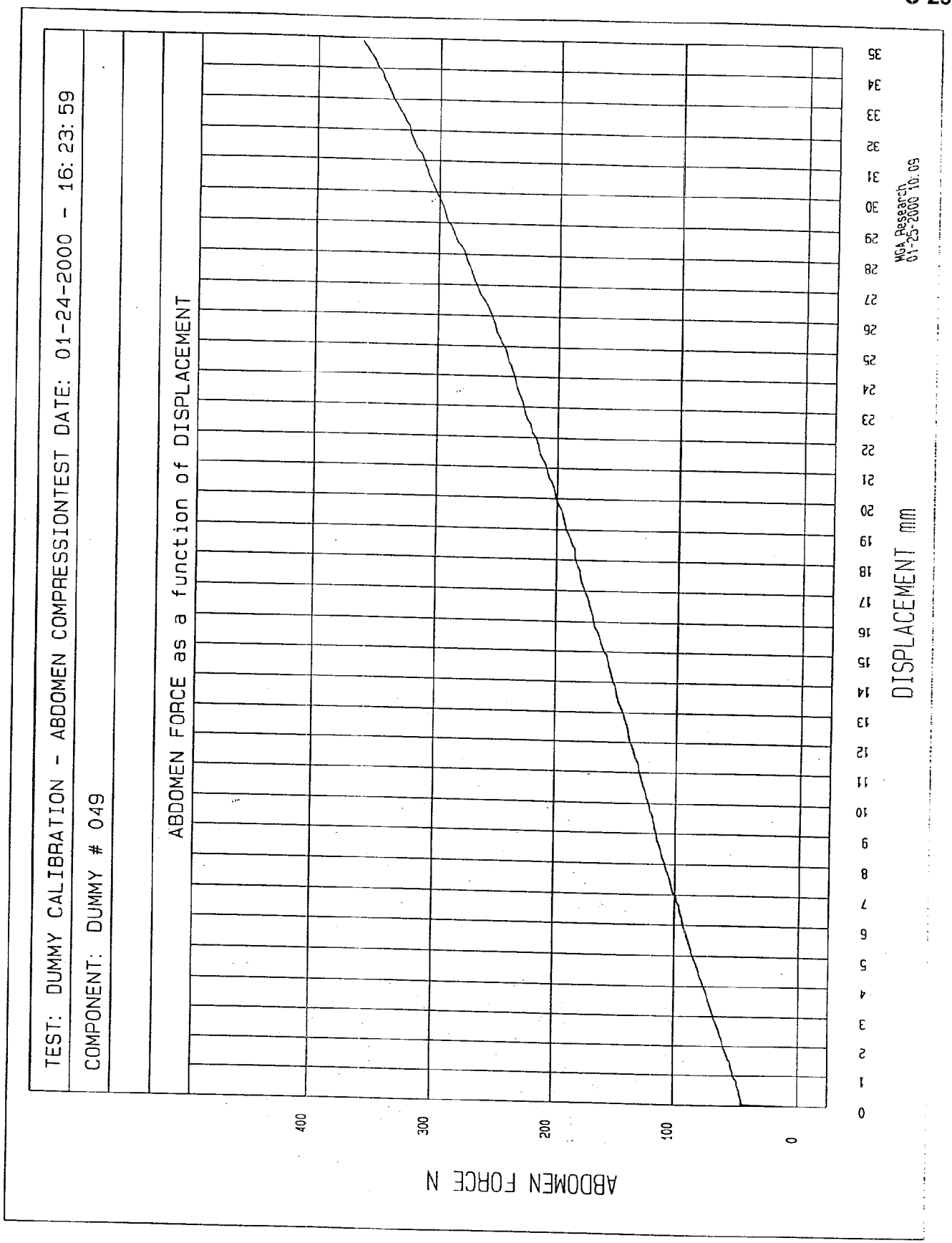
DUMMY SERIAL NUMBER: 049 TEST NUMBER: D00184

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	25
FORCE @ 12.7 mm	104 - 162	142
FORCE @ 19.0 mm	163 - 222	194
FORCE @ 25.4 mm	222 - 280	251
FORCE @ 33 mm	325 - 391	341

TEST MEETS SPECIFICATIONS

TECHNICIAN: 

APPROVED BY: David Winkelbauer


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 01-24-2000 - 16:23:59
COMPONENT: DUMMY # 049
ABDOMEN FORCE as a function of DISPLACEMENT
ABDOMEN FORCE N
0
100
200
300
400
DISPLACEMENT mm
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
MGA Research
01-25-2000 10:09

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 24, 2000

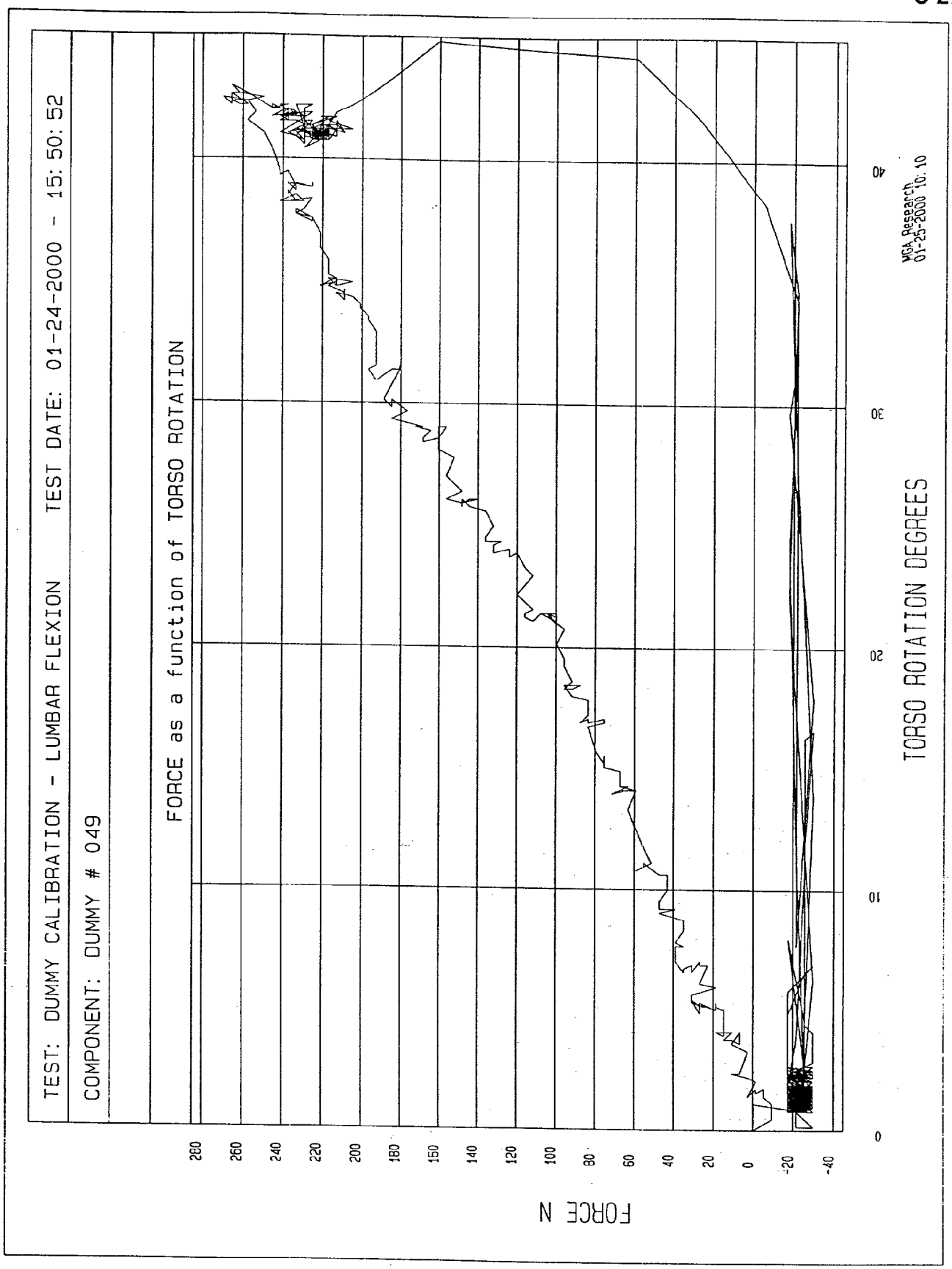
DUMMY SERIAL NUMBER: 049 TEST NUMBER: D00185

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	24
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	99.7
FORCE @ 30°	151.2 - 204.6	184.7
FORCE @ 40°	204.6 - 258.0	245.5
RETURN ANGLE	12° maximum	1

TEST MEETS SPECIFICATIONS

TECHNICIAN: 

APPROVED BY: David Winkelbauer


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-24-2000 - 15:50:52
COMPONENT: DUMMY # 049
FORCE as a function of TORSO ROTATION
FORCE N
280
260
240
220
200
180
150
140
120
100
80
60
40
20
0
-20
-40
0
10
20
30
40
TORSO ROTATION DEGREES
MGA Research
01-25-2000 10:10

POST-TEST CERTIFICATION DATA

Dummy Serial Number: 048

Calibration Test Results Summary

Dummy Serial Number: 048

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 048 DATE OF VERIFICATION: March 13, 2000

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	905
RH - Rib Height (mm)	501 - 521	518
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	236
KV - Knee Pivot From Back Line (mm)	511 - 526	521
SW - Knee Pivot to Floor (mm)	490 - 505	493
HW - Hip Width (mm)	356 - 391	368

TECHNICIAN: _____

APPROVED BY: David Winkelbauer

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: March 10, 2000

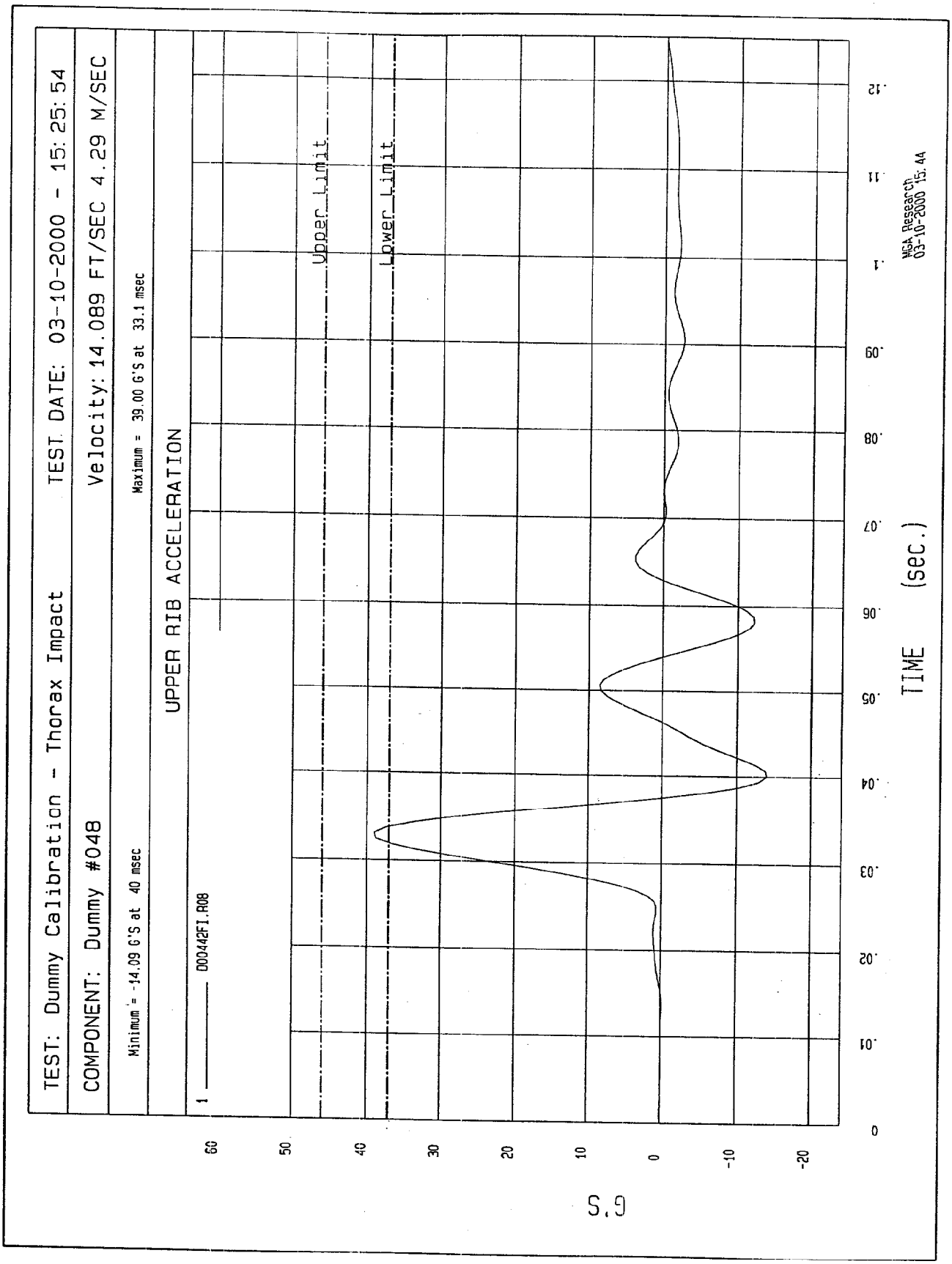
DUMMY SERIAL NUMBER: 048 TEST NUMBER: D00442

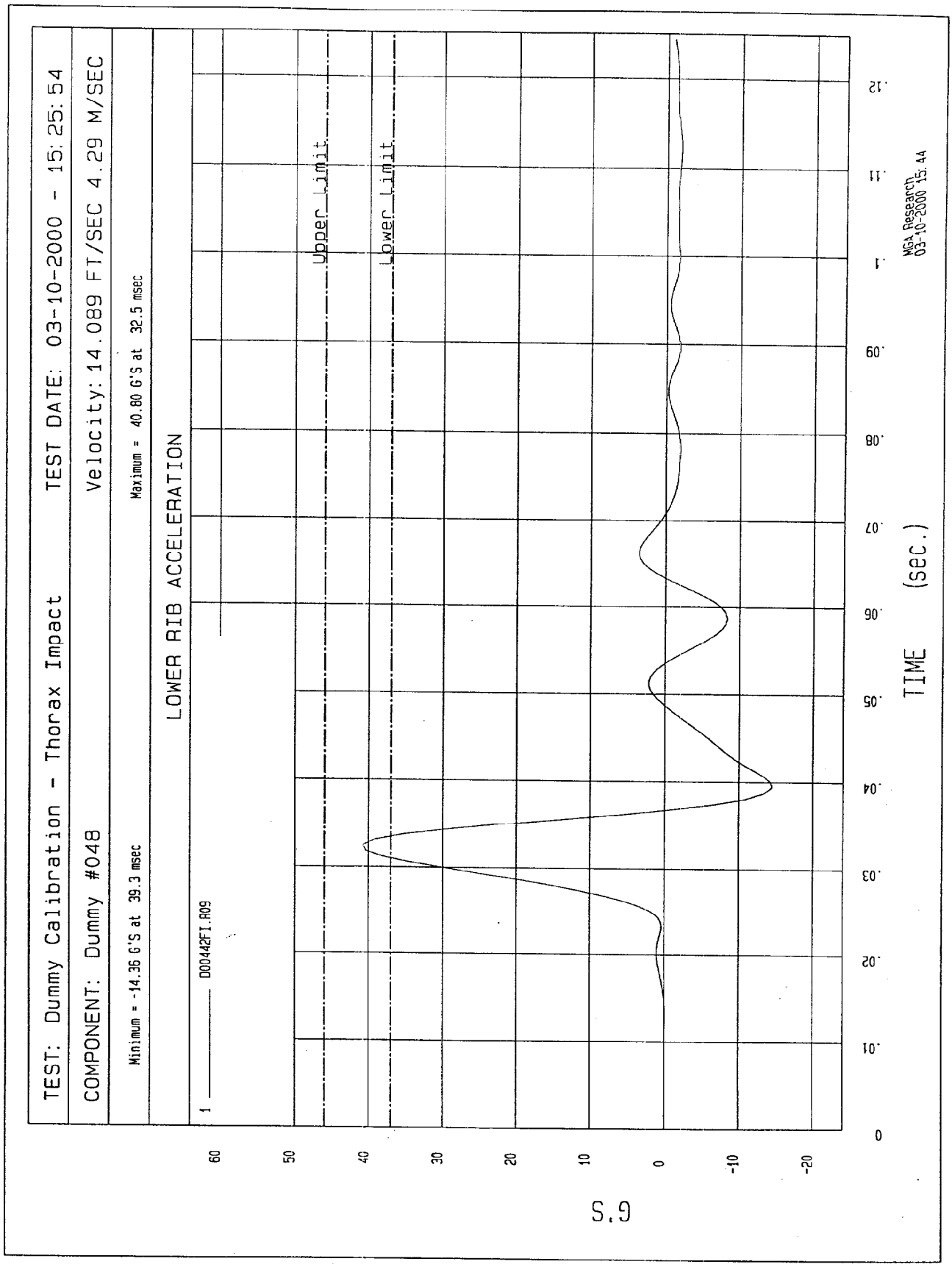
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	24
PROBE SPEED (m/s)	4.27 - 4.33	4.29
UPPER RIB (g's)	37 - 46	39
LOWER RIB (g's)	37 - 46	41
LOWER SPINE (g's)	15 - 22	22

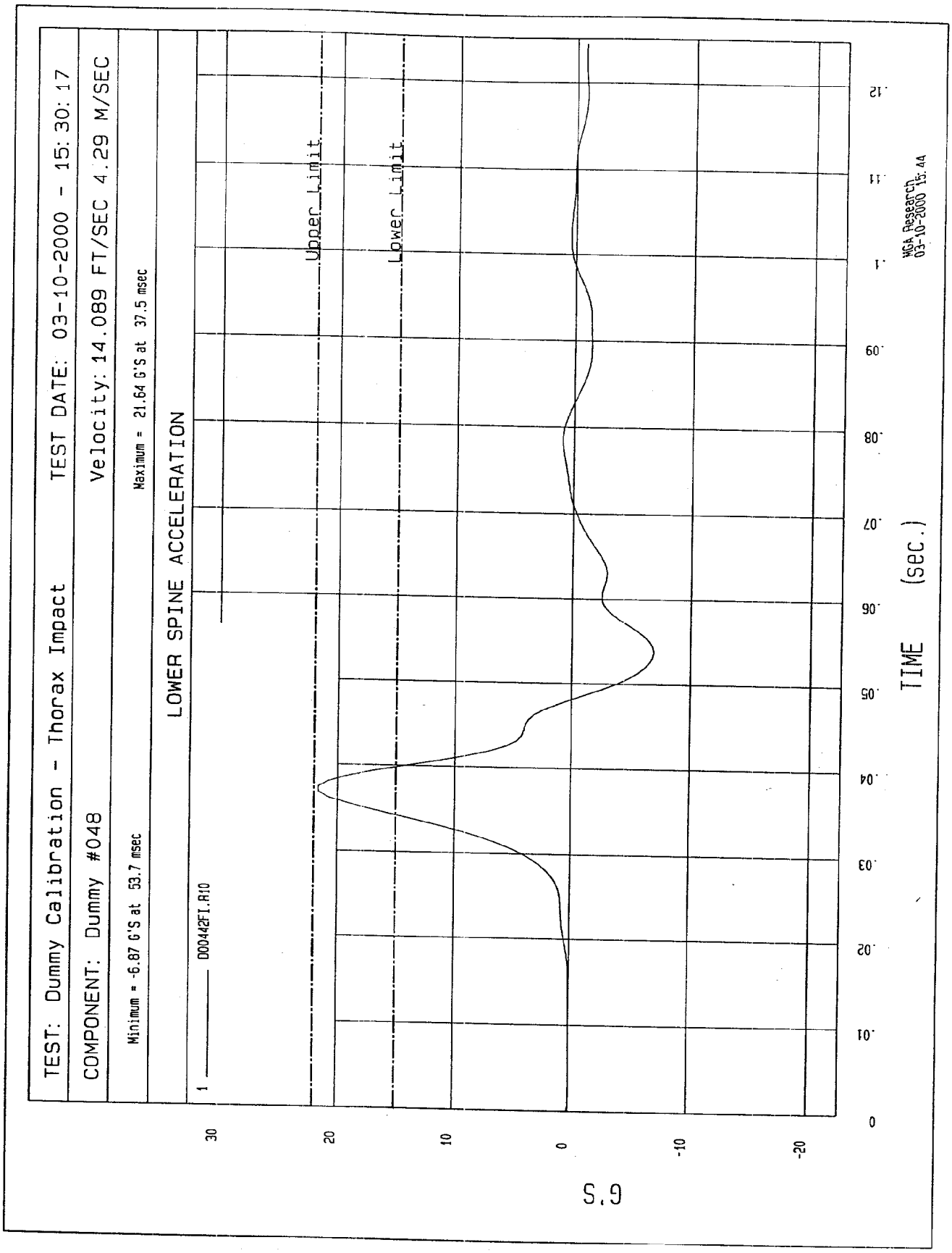
TEST MEETS SPECIFICATIONS

TECHNICIAN: _____

APPROVED BY: David Winkelbauer


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 03-10-2000 - 15:25:54
COMPONENT: Dummy #048
Velocity: 14.089 FT/SEC 4.29 M/SEC
Minimum = -14.09 G'S at 40 msec
Maximum = 39.00 G'S at 33.1 msec
UPPER RIB ACCELERATION
1 D00442FI.R08
Upper Limit
Lower Limit
60
50
40
30
20
10
0
-10
-20
G'S
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
03-10-2000 15:44


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 03-10-2000 - 15:25:54
COMPONENT: Dummy #048
Velocity: 14.089 FT/SEC 4.29 M/SEC
Minimum = -14.36 G'S at 39.3 msec
Maximum = 40.80 G'S at 32.5 msec
LOWER RIB ACCELERATION
1 D00442FI.R09
Upper Limit
Lower Limit
60
50
40
30
20
10
0
-10
-20
G'S
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
03-10-2000 15:44


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 03-10-2000 - 15:30:17
COMPONENT: Dummy #048
Velocity: 14.089 FT/SEC 4.29 M/SEC
Minimum = -6.87 G'S at 53.7 msec
Maximum = 21.64 G'S at 37.5 msec
LOWER SPINE ACCELERATION
1 D00442FI.R10
Upper Limit
Lower Limit
30
20
10
0
-10
-20
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
03-10-2000 15:44
S.G

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: March 10, 2000

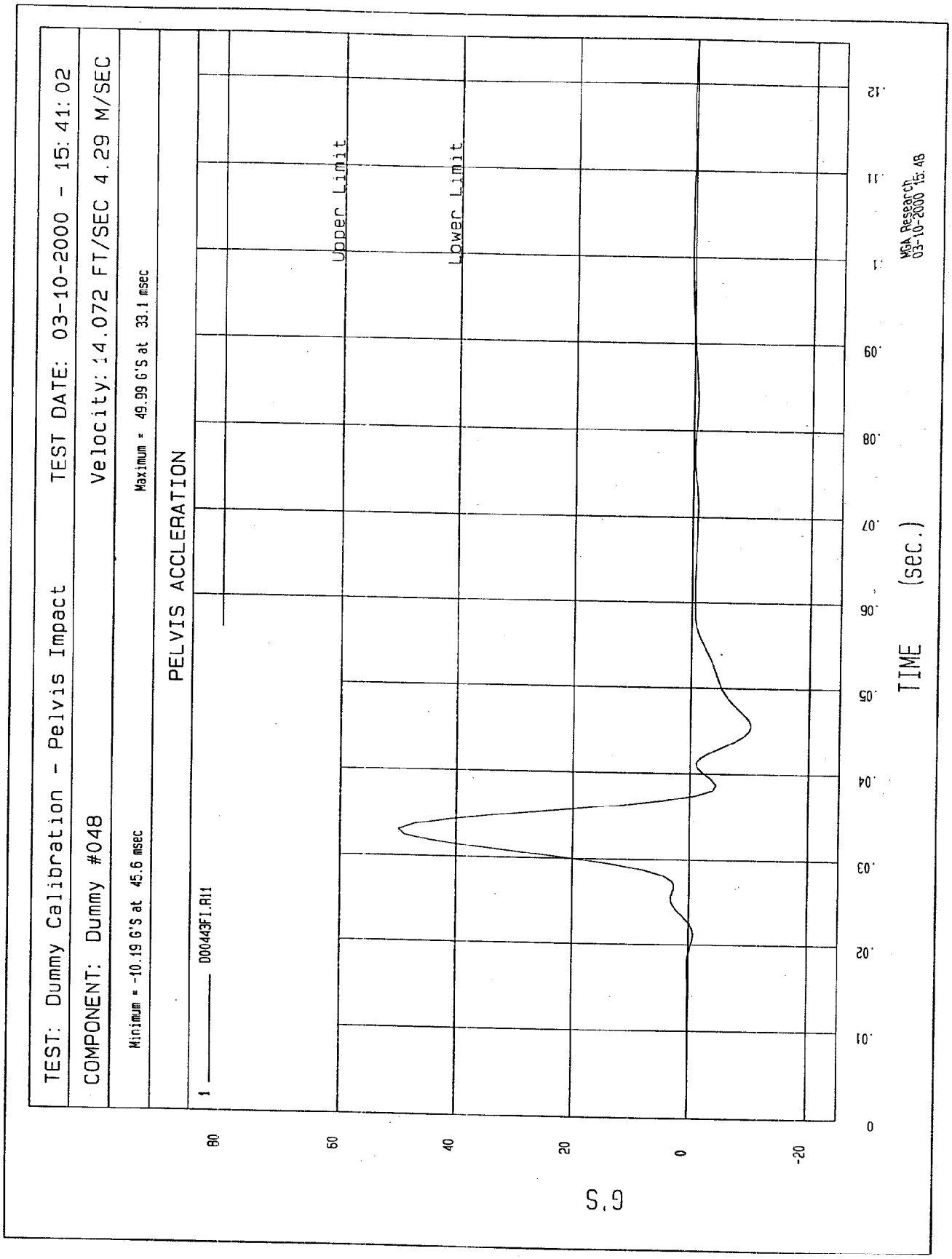
DUMMY SERIAL NUMBER: 048 TEST NUMBER: D00443

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70%	24
PROBE SPEED (m/s)	4.27 - 4.33	4.29
PELVIS ACCELERATION (g's)	40 - 60	50

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY David Winkelbauer


TEST: Dummy Calibration - Pelvis Impact
TEST DATE: 03-10-2000 - 15:41:02
COMPONENT: Dummy #048
Velocity: 14.072 FT/SEC 4.29 M/SEC
Minimum = -10.19 G'S at 45.6 msec
Maximum = 49.99 G'S at 33.1 msec
PELVIS ACCLERATION
1 D00443FI.A11
Upper Limit
Lower Limit
MGA Research
03-10-2000 15:48
G'S
TIME (sec.)
80
60
40
20
0
-20
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: March 13, 2000

DUMMY SERIAL NUMBER: 048

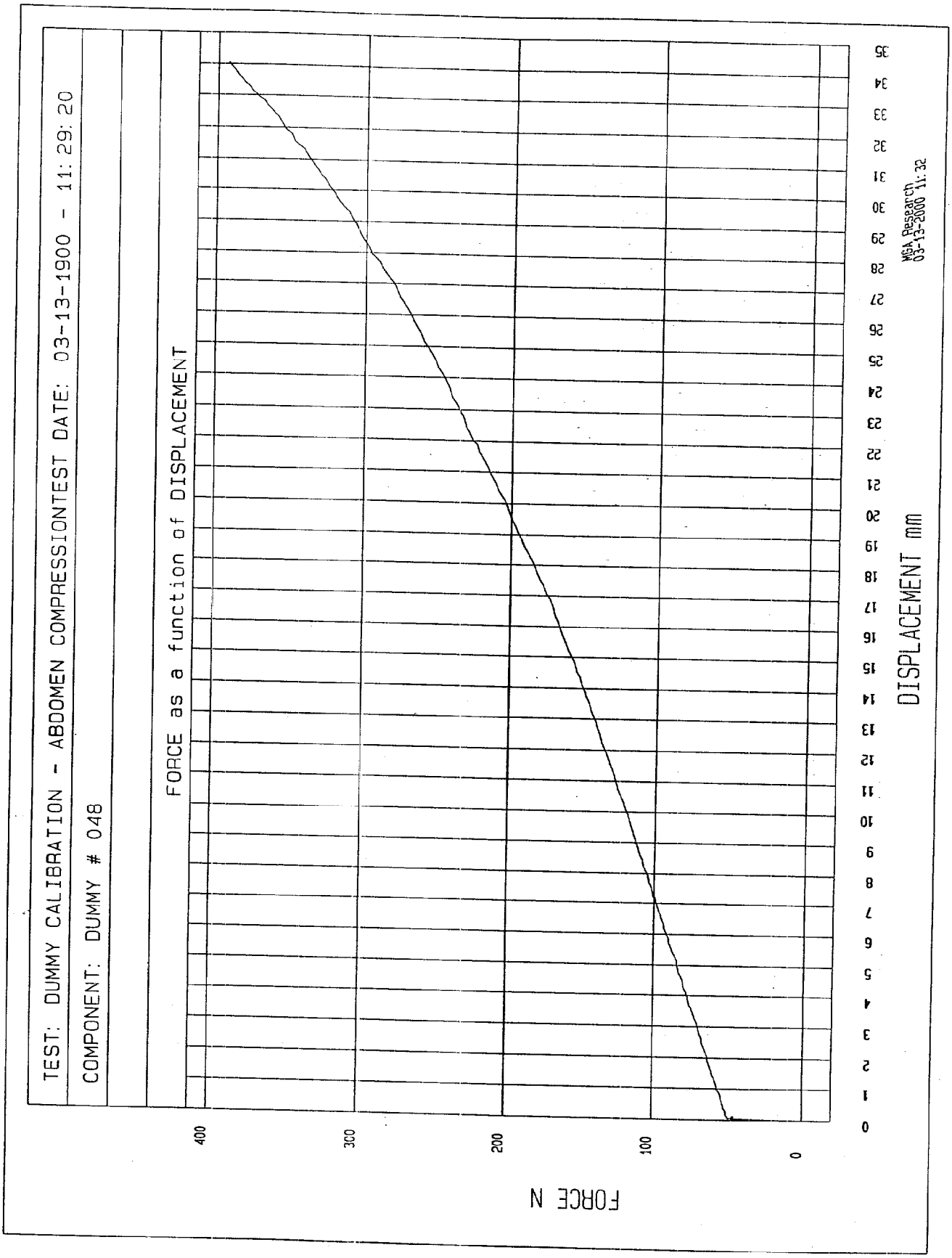
TEST NUMBER: D00444

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	25
FORCE @ 12.7 mm	104 - 162	140
FORCE @ 19.0 mm	163 - 222	196
FORCE @ 25.4 mm	222 - 280	265
FORCE @ 33 mm	325 - 391	377

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY David Winkelbauer


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 03-13-1900 - 11:29:20
COMPONENT: DUMMY # 048
FORCE as a function of DISPLACEMENT
FORCE N
400
300
200
100
0
DISPLACEMENT mm
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
MGA Research
03-13-2000 11:32

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: March 13, 2000

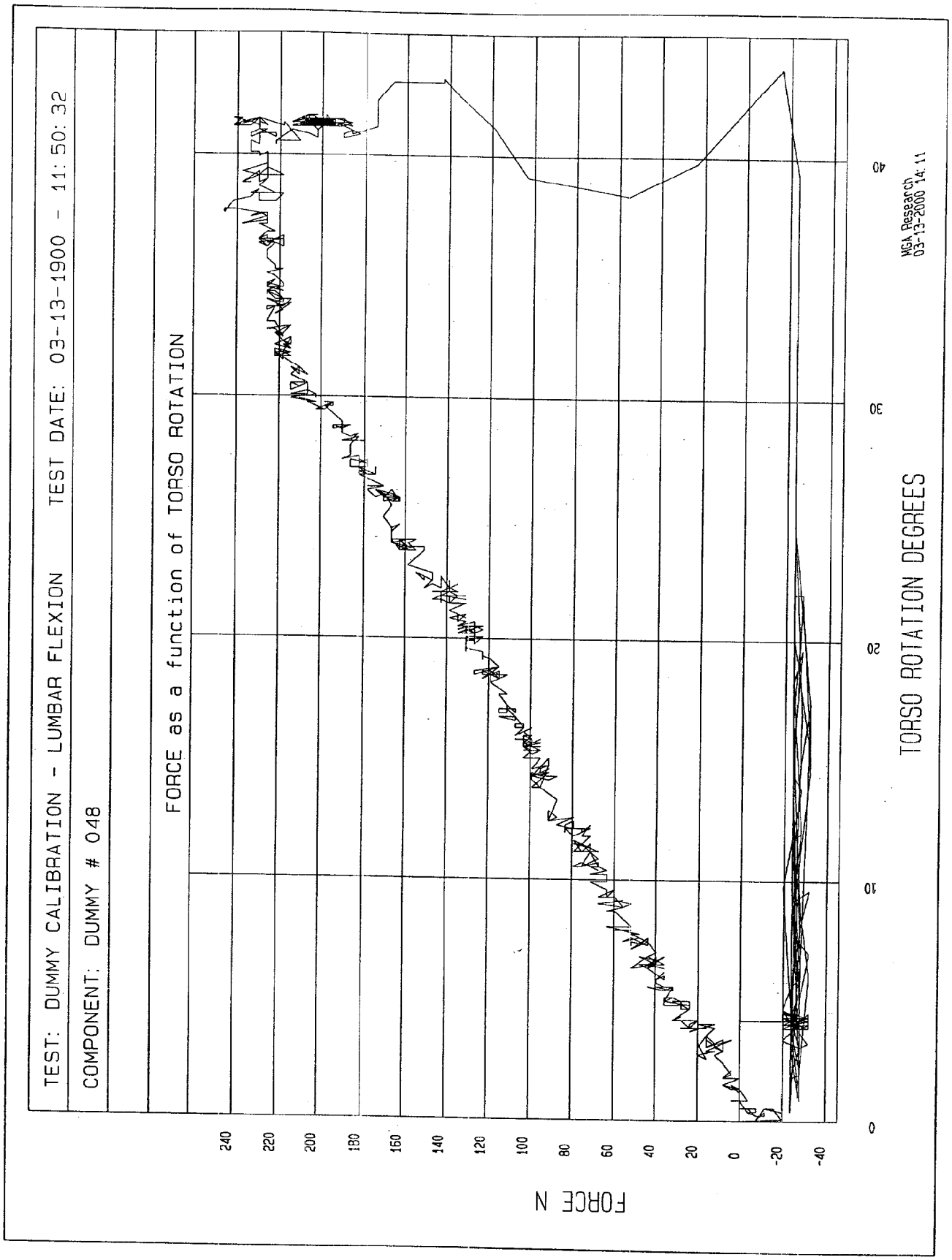
DUMMY SERIAL NUMBER: 048 TEST NUMBER: D00445

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	25
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	130.9
FORCE @ 30°	151.2 - 204.6	202.3
FORCE @ 40°	204.6 - 258.0	226.1
RETURN ANGLE	12° maximum	4

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY David Winkelbauer


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 03-13-1900 - 11:50:32
COMPONENT: DUMMY # 048
FORCE as a function of TORSO ROTATION
FORCE N
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
0
10
20
30
40
TORSO ROTATION DEGREES
MGA Research
03-13-2000 14:11

POST-TEST CERTIFICATION DATA

Dummy Serial Number: 049

Calibration Test Results Summary

Dummy Serial Number: 049

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax did passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 049 DATE OF VERIFICATION: March 13, 2000

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	902
RH - Rib Height (mm)	501 - 521	516
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	233
KV - Knee Pivot From Back Line (mm)	511 - 526	523
SW - Knee Pivot to Floor (mm)	490 - 505	493
HW - Hip Width (mm)	356 - 391	371

MEASUREMENTS BY: _____

APPROVED BY: David Winhellbauer

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: March 10, 2000

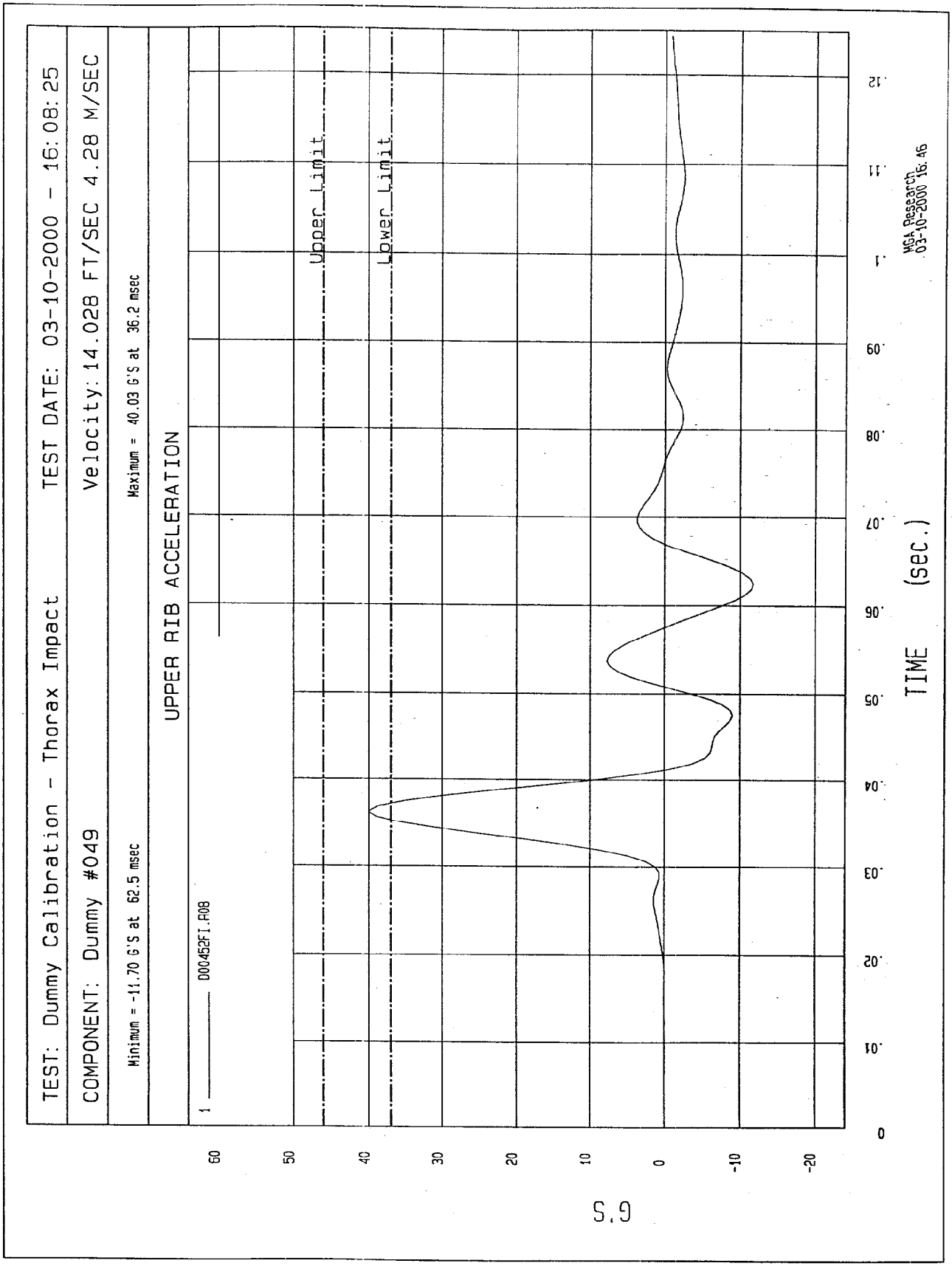
DUMMY SERIAL NUMBER: 049 TEST NUMBER: D00452

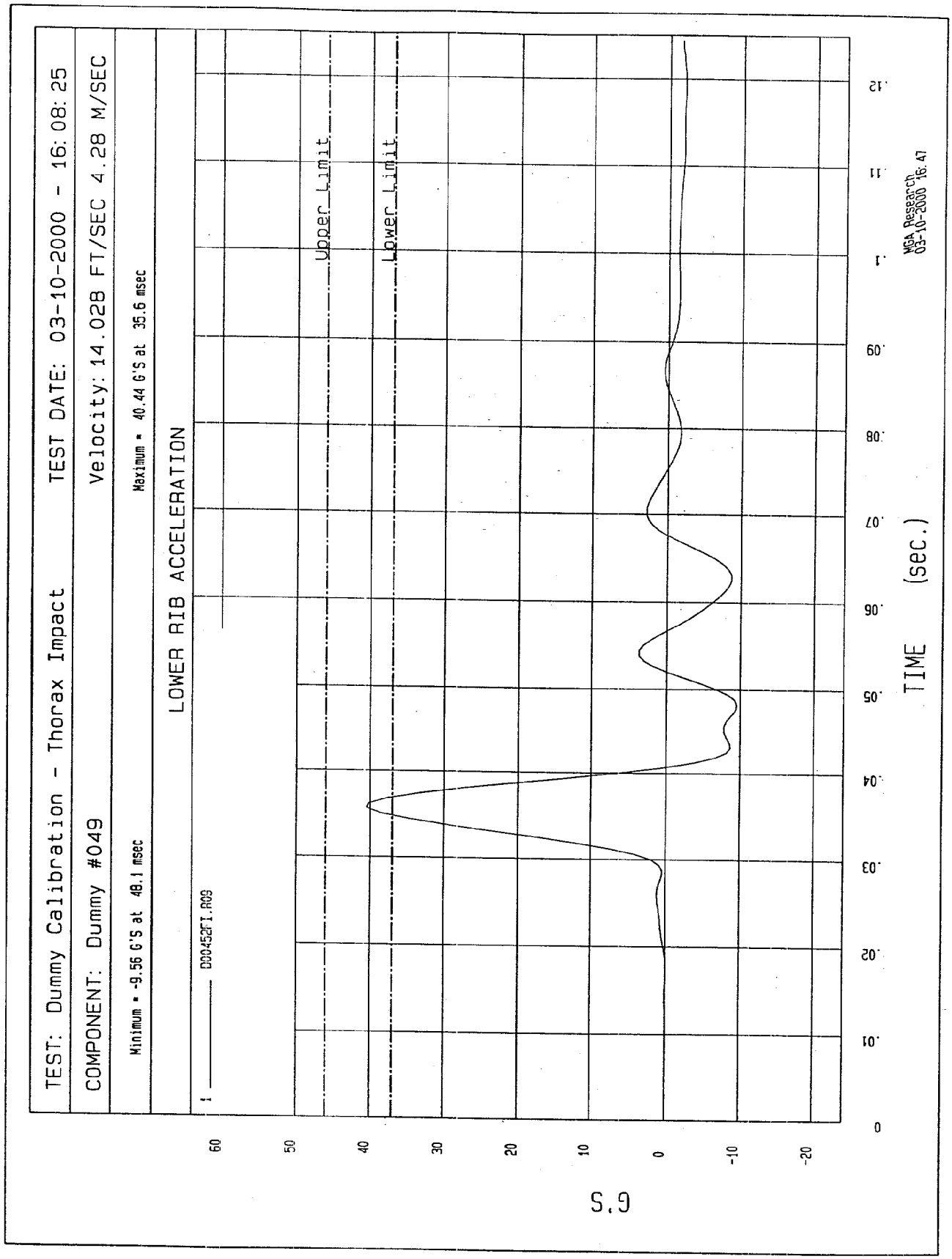
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	24
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46	40
LOWER RIB (g's)	37 - 46	40
LOWER SPINE (g's)	15 - 22	21

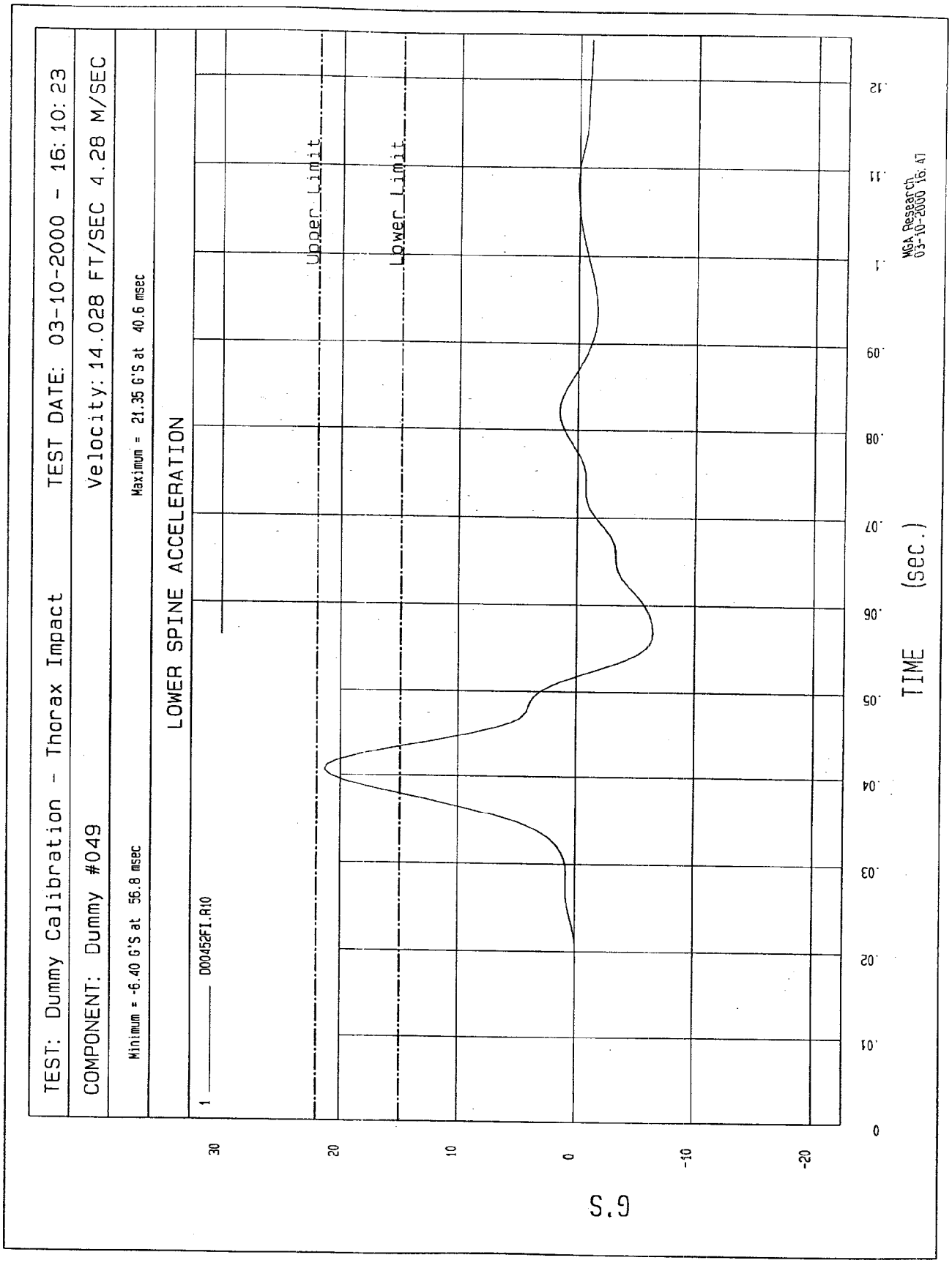
TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY David Winhellbauer


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 03-10-2000 - 16:08:25
COMPONENT: Dummy #049
Velocity: 14.028 FT/SEC 4.28 M/SEC
Minimum = -11.70 G'S at 62.5 msec
Maximum = 40.03 G'S at 36.2 msec
UPPER RIB ACCELERATION
1 D00452FI.A0B
Upper Limit
Lower Limit
60
50
40
30
20
10
0
-10
-20
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
03-10-2000 16:46
G's


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 03-10-2000 - 16:08:25
COMPONENT: Dummy #049
Velocity: 14.028 FT/SEC 4.28 M/SEC
Minimum = -9.56 G'S at 48.1 msec
Maximum = 40.44 G'S at 35.6 msec
LOWER RIB ACCELERATION
1 D00452F1.A09
Upper Limit
Lower Limit
60
50
40
30
20
10
0
-10
-20
G'S
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
03-10-2000 16:47


TEST: Dummy Calibration - Thorax Impact
TEST DATE: 03-10-2000 - 16:10:23
COMPONENT: Dummy #049
Velocity: 14.028 FT/SEC 4.28 M/SEC
Minimum = -6.40 G'S at 56.8 msec
Maximum = 21.35 G'S at 40.6 msec
LOWER SPINE ACCELERATION
1 D0045ZF1.A10
Upper Limit
Lower Limit
30
20
10
0
-10
-20
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (sec.)
MGA Research
03-10-2000 16:47
6.5

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: March 10, 2000

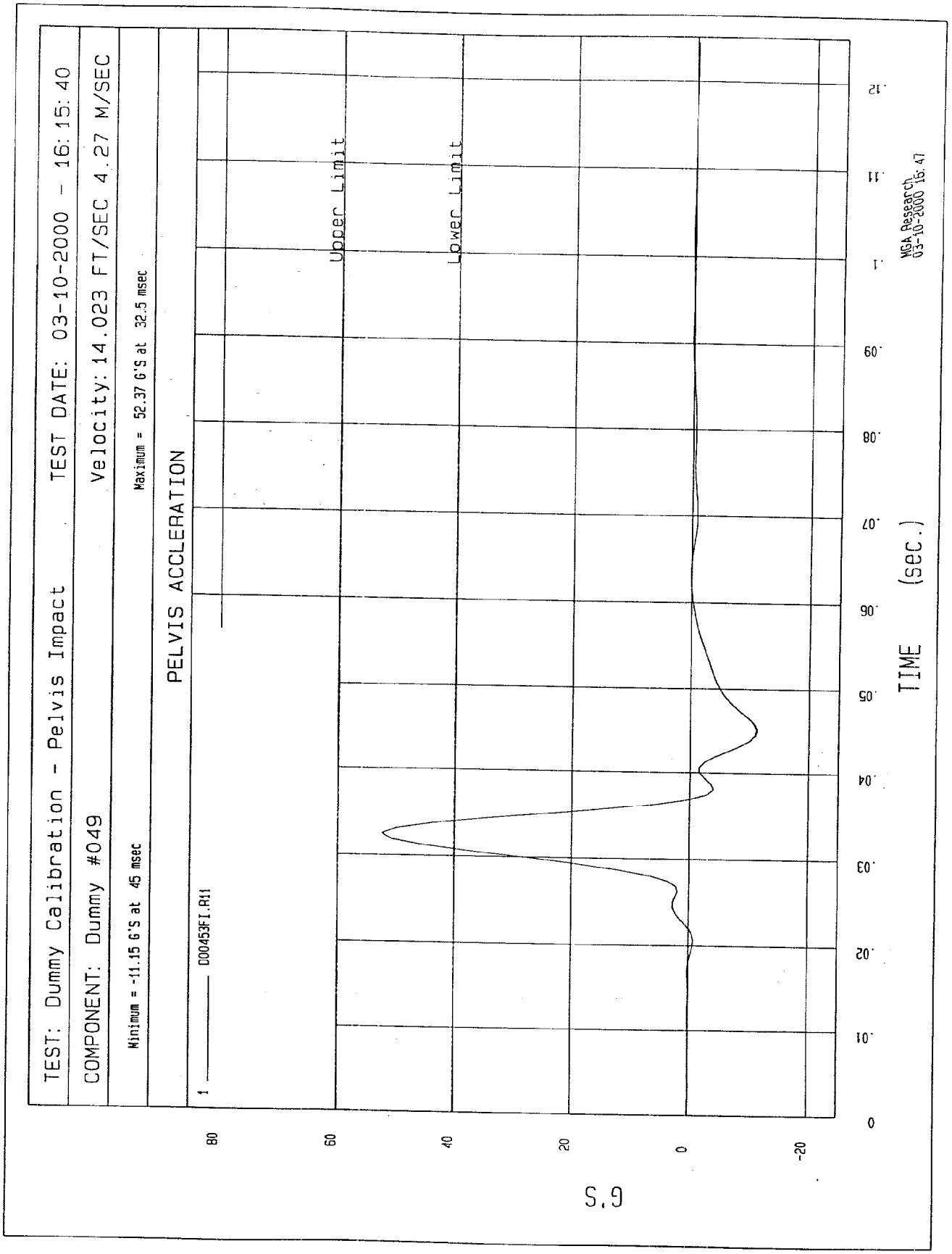
DUMMY SERIAL NUMBER: 049 TEST NUMBER: D00453

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	24
PROBE SPEED (m/s)	4.27 - 4.33	4.27
PELVIS ACCELERATION (g's)	40 - 60	52

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY David Winkelbauer


TEST: Dummy Calibration - Pelvis Impact
TEST DATE: 03-10-2000 - 16:15:40
COMPONENT: Dummy #049
Velocity: 14.023 FT/SEC 4.27 M/SEC
Minimum = -11.15 G'S at 45 msec
Maximum = 52.37 G'S at 32.5 msec
PELVIS ACCLERATION
1 D00453FI.R11
Upper Limit
Lower Limit
G'S
TIME (sec.)
MGA Research
03-10-2000 16:47

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: March 13, 2000

DUMMY SERIAL NUMBER: 049

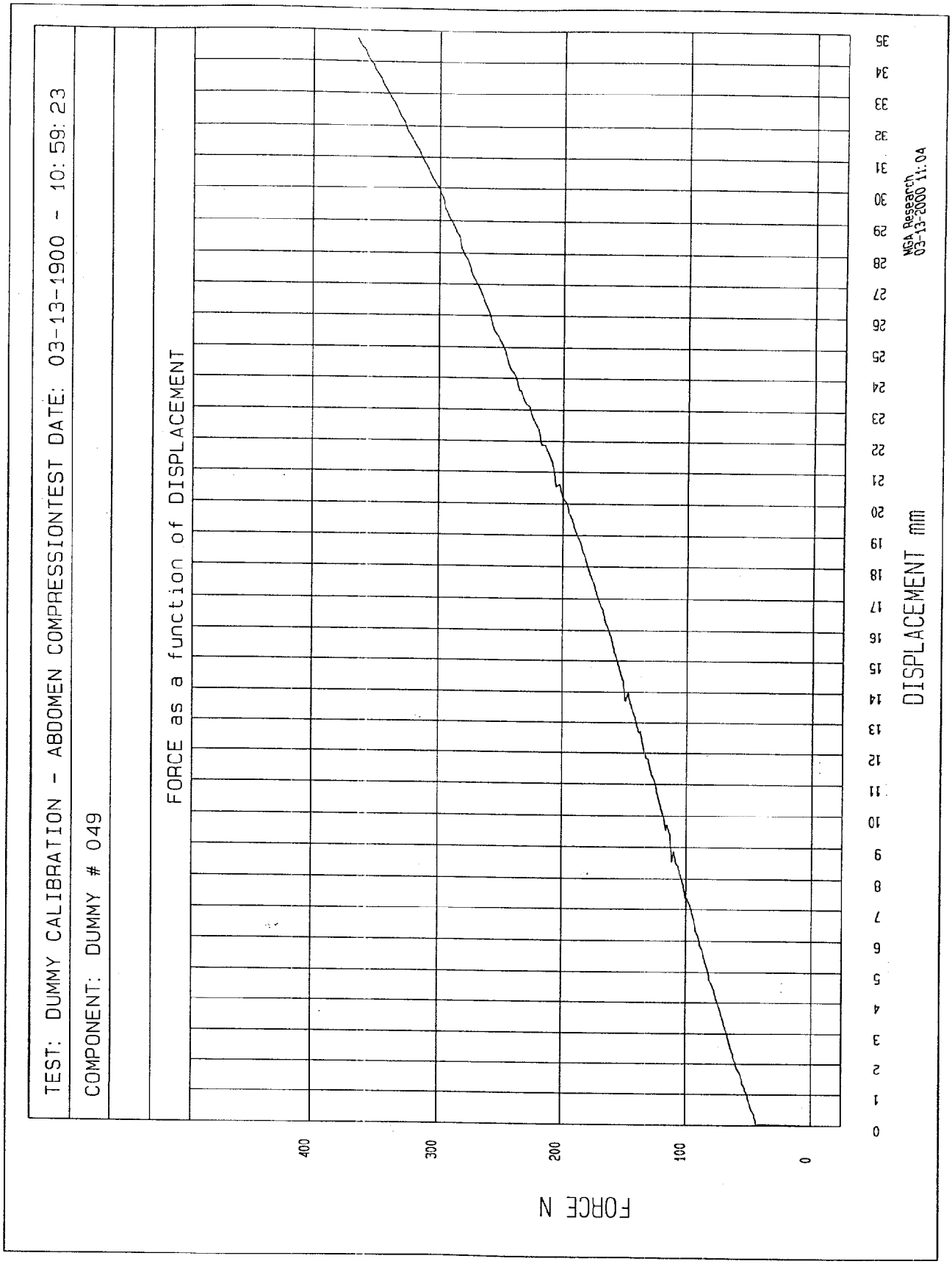
TEST NUMBER: D00444

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	25
FORCE @ 12.7 mm	104 - 162	141
FORCE @ 19.0 mm	163 - 222	190
FORCE @ 25.4 mm	222 - 280	255
FORCE @ 33 mm	325 - 391	341

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 03-13-1900 - 10:59:23
COMPONENT: DUMMY # 049
FORCE as a function of DISPLACEMENT
FORCE N
0
100
200
300
400
DISPLACEMENT mm
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
MGA Research
03-13-2000 11:04

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: March 13, 2000

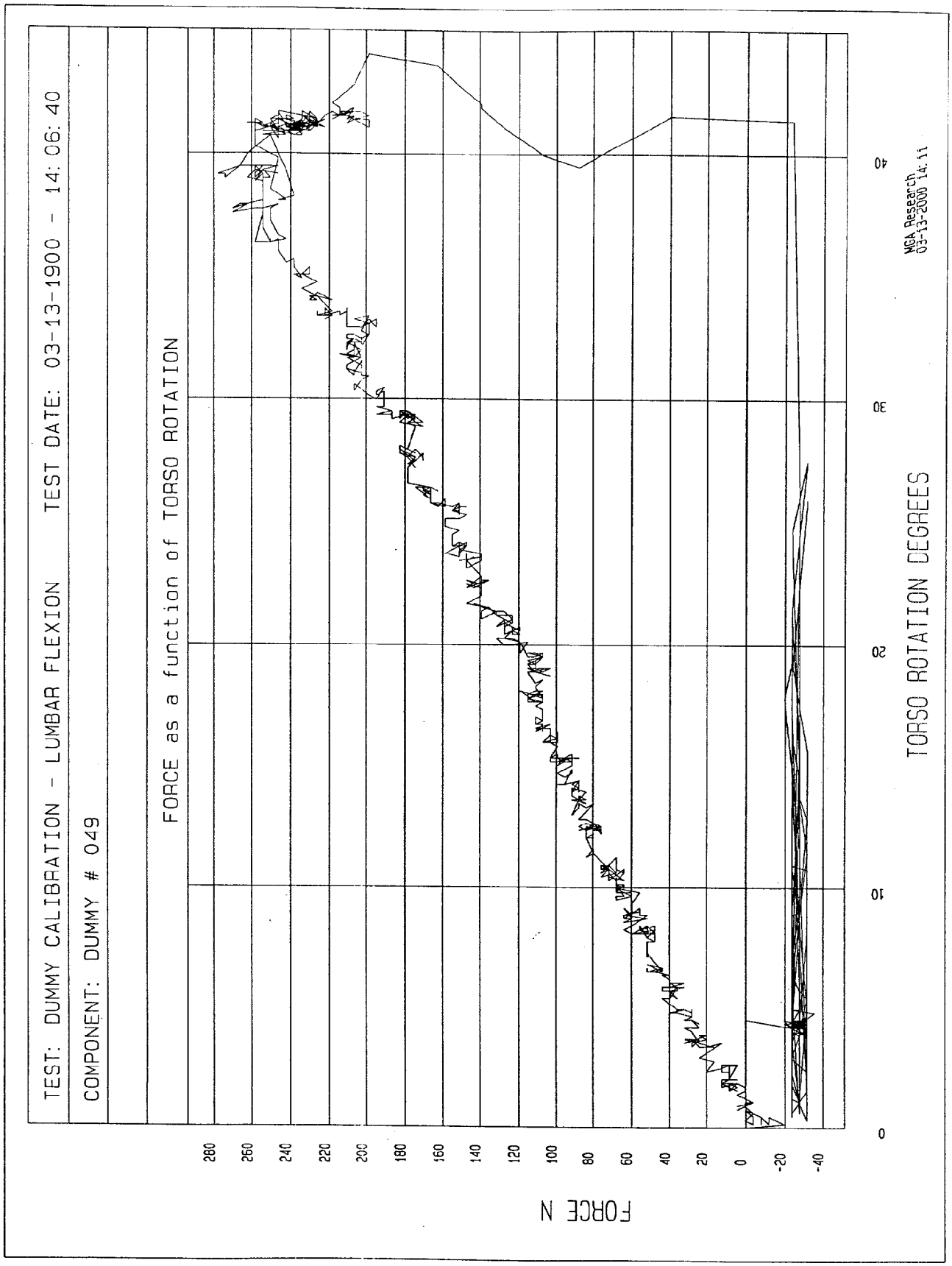
DUMMY SERIAL NUMBER: 049 TEST NUMBER: D00455

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	25
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	119.2
FORCE @ 30°	151.2 - 204.6	190.6
FORCE @ 40°	204.6 - 258.0	250.1
RETURN ANGLE	12° maximum	4

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY David Winkelbauer


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 03-13-1900 - 14: 06: 40
COMPONENT: DUMMY # 049
FORCE as a function of TORSO ROTATION
FORCE N
TORSO ROTATION DEGREES
MGA Research
03-13-2000 14: 11
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
0
10
20
30
40

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Dummy Serial Number: 048

Inspected By: Tim Michnay

Date: March 13, 2000

Part	Items Checked	Comments
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

NOTES: (include component/problem/action/reason):

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Dummy Serial Number: 049

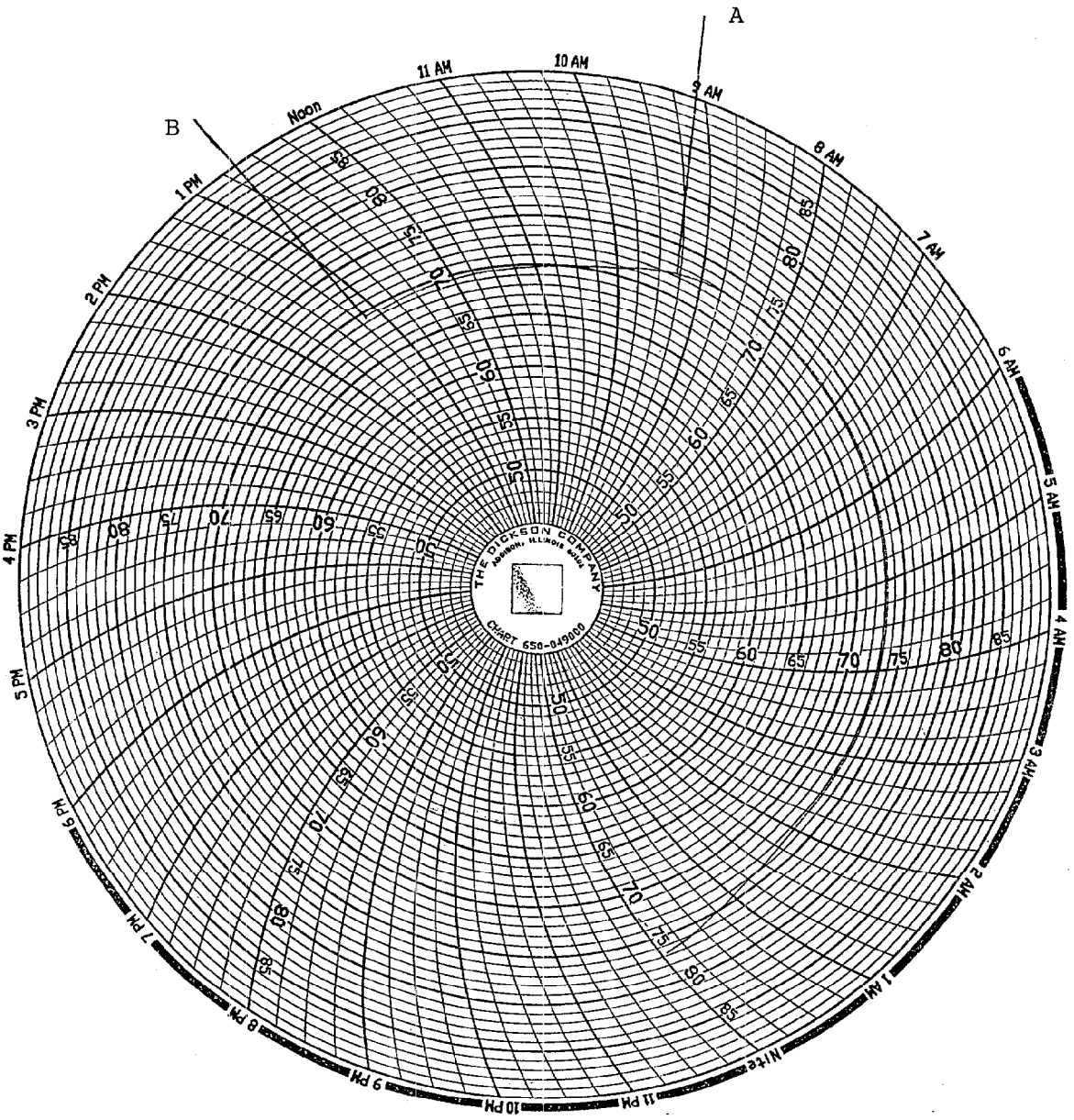
Inspected By: Tim Michnay

Date: March 13, 2000

Part	Items Checked	Comments
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

NOTES: (include component/problem/action/reason):

VEHICLE AND DUMMY TEMPERATURE



A = Dummies installed in vehicle
B = Test conducted

APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA
INSTRUMENTS FOR DRIVER DUMMY NO. 048

	LEFT FRONT PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	ANBP7	Endevco	February 10, 2000
Lower Rib Y	J14120	Endevco	February 10, 2000
Lower Spine Y	J10431	Endevco	February 10, 2000
Pelvis Y	AJ417	Endevco	February 10, 2000
Upper Rib Redundant Y	AP1C6	Endevco	February 10, 2000
Lower Rib Redundant Y	APY16	Endevco	February 10, 2000
Lower Spine Redundant Y	AN9E3	Endevco	February 10, 2000
Pelvis Redundant Y	AGP20	Endevco	February 10, 2000

INSTRUMENTS FOR LEFT REAR PASSENGER DUMMY NO. 049

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AN8L6	Endevco	February 10, 2000
Lower Rib Y	ALEC1	Endevco	February 10, 2000
Lower Spine Y	ALEC1	Endevco	February 10, 2000
Pelvis Y	AGM32	Endevco	February 10, 2000
Upper Rib Redundant Y	APY13	Endevco	February 10, 2000
Lower Rib Redundant Y	J10411	Endevco	February 10, 2000
Lower Spine Redundant Y	AKAD6	Endevco	February 10, 2000
Pelvis Redundant Y	AKAH3	Endevco	February 10, 2000

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	F20-G11	Entran	January 20, 2000
Moving Barrier CG Y	F11-G09	Entran	January 21, 2000
Moving Barrier CG Z	G01-J05	Entran	January 21, 2000
Moving Barrier Rear Axle X	I25-J02	Entran	January 20, 2000
Moving Barrier Rear Axle Y	G13-B14	Entran	January 20, 2000
Left Mid A-Post Y	B12-G06	Entran	January 20, 2000
Left Lower A-Post Y	F18-G13	Entran	January 20, 2000
Left Lower B-Post Y	H02-J15	Entran	January 21, 2000
Rear Floorpan Above Axle X	C18-G12	Entran	February 11, 2000
Rear Floorpan Above Axle Y	F07-A13	Entran	January 12, 2000
Rear Floorpan Above Axle Z	G01-J18	Entran	November 22, 1999
Driver Seat Track Y	A09-G02	Entran	February 11, 2000
Right Side Sill at Front Seat X	F11-G07	Entran	November 22, 1999
Right Side Sill at Front Seat Y	E23-R06	Entran	February 11, 2000
Right Side Sill at Front Seat Z	F11-G02	Entran	November 22, 1999
Right Side Sill at Rear Seat X	MGA-095	Entran	November 22, 1999
Right Side Sill at Rear Seat Y	F12-G07	Entran	February 11, 2000
Right Side Sill at Rear Seat Z	I14-D13	Entran	February 11, 2000
Left Side Sill at Front Seat Y	E10-F20	Entran	September 24, 1999

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Rear Seat Y	F18-G07	Entran	November 5, 1999
Rear Occupant Compartment Y	I14-D18	Entran	January 21, 2000
Vehicle CG X	J10-E18	Entran	February 11, 2000
Vehicle CG Y	J06-D19	Entran	February 11, 2000
Vehicle CG Z	E10-F03	Entran	February 11, 2000

Note: All Endevco accelerometers are Model No. 7264-2000. All Entran accelerometers are Model No. EGE-72