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REPORT NO.: 214-MGA-98-02
SAFETY COMPLIANCE TESTING FOR FMVSS NO. 214
"SIDE IMPACT PROTECTION -
PASSENGER CARS"

GENERAL MOTORS CORPORATION
1998 SATURN SC2 2 DOOR
NHTSA NO: CW0103

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: September 10, 1997

Report Date: September 16, 1997

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
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4. Title and Subtitle	5. Report Date
Final Report of FMVSS No.214 Compliance Side Impact Protection Testing of a 1998 Saturn SC2 2 Door NHTSA No. CW0103	September 16, 1997
	6. Performing Organization Code MGA
7. Author(s) Hans Hauschild, Project Engineer	8. Performing Organization Report No. MGA-DOT-214-02
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 September 10, to September 16, 1997
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15. Supplementary Notes

16. Abstract

A 48/24 kph 90° Left Side Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject 1998 Saturn SC2 2 Door in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP- 214D-04 for the determination of FMVSS No. 214 Side Impact Protection compliance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on September 10, 1997.

The impact velocity of the Moving Deformable Barrier (MDB) was 53.0 kph, and the ambient temperature at the struck side of the target vehicle at the time of impact was 23°C. The target vehicle post test maximum crush was 326 mm at level 2. The test vehicle's performance follows:

	DRIVER.	LEFT REAR PASS.
Left Upper Rib (RUR) Accel., g	58	70
Left Lower Rib (RLR) Accel., g	62	75
Lower Spine (T_{12}) Accel., g	69	68
Thoracic Trauma Index (TTI)	66	72
Pelvis (PEV) Accel., g	102	90

The door on the struck side of the vehicle did not separate from the body at the hinges or latch and the opposite door 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 Attn: Robert Hornickle

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Approval Date: 9-24-97

FINAL REPORT ACCEPTED BY (OVSC):

Accepted By: _____
Contract Technical Manager

Acceptance Date: 10/28/97

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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY 98 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 1998 Saturn SC2 2 Door.

This side impact test was conducted in accordance with the Vehicle Safety Compliance's FMVSS 214 test procedure (TP-214D-04, dated September 1, 1995).

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

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 1998 Saturn SC2 2 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 33.0 mph (53.0 kph). 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 September 10, 1997. 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 right front and rear right designated seating positions according to instructions specified in the OVSC Side Impact Laboratory Test Procedure which is dated September 1, 1995. 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 (RUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (RLR) 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)	66	72
Pelvis (g)	102	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

   Mid B-Pillar

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: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 VIN: 1G8ZH1277WZ112826

Vehicle Body Color: Red Build Date: 7/97

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

Placement __ Longitudinal; X Lateral

Transmission: 3 speed; __ Manual; X Automatic; __ Overdrive

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

Odometer Reading 15 miles

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

__Cruise Control; X Tilt Wheel; X Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 Psi FRONT

26 Psi REAR

Recommended Tire Size: P195/60R15

Tires on Test Vehicle: P195/60R15 Manufacturer: Firestone

Vehicle Capacity Data:

Number of Occupants: 2 Front; 2 Rear; __ 3rd Seat 4 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 = 323.9 kg (A)

No. of Occupants x 68.04 kg. = 272.2 kg (B)

Cargo Capacity (A-B) = 51.7 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:(AS DELIVERED)

Right Front	= 332.9 kg	Right Rear	= 212.3 kg
Left Front	= 341.6 kg	Left Rear	= 211.4 kg
TOTAL FRONT =	674.5 kg	TOTAL REAR =	423.7 kg
% of Total Vehicle Weight =	61.4 %;	% of Total Weight =	38.6 %

TOTAL WEIGHT = 1098.2 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	= 1098.2 kg
Cargo Carrying Capacity of Test Vehicle	= 51.7 kg
Weight of 2 Side Impact Dummies (2 x 80.7 kg.)	= 161.4 kg
TEST VEHICLE TARGET WEIGHT	= 1311.3 kg

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

Right Front	= 338.8 kg	Right Rear	= 271.7 kg
Left Front	= 390.5 kg	Left Rear	= 304.8 kg
TOTAL FRONT	= 729.3 kg	TOTAL REAR	= 576.5 kg
% of Total Weight	= 55.9 %	% of Total Weight	= 44.1 %
TOTAL TEST WEIGHT	= 1305.8 kg		

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 675 mm Left Front 675 mm Right Rear 680 mm Left Rear 677 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 669 mm Left Front 657 mm Right Rear 653 mm Left Rear 638 mm

TEST ATTITUDE:

Right Front 660 mm Left Front 661 mm Right Rear 657 mm Left Rear 646 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2605 mm

C.G. As Tested = 1099 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4215 mm

Centerline = 4565 mm

Left Side = 4215 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

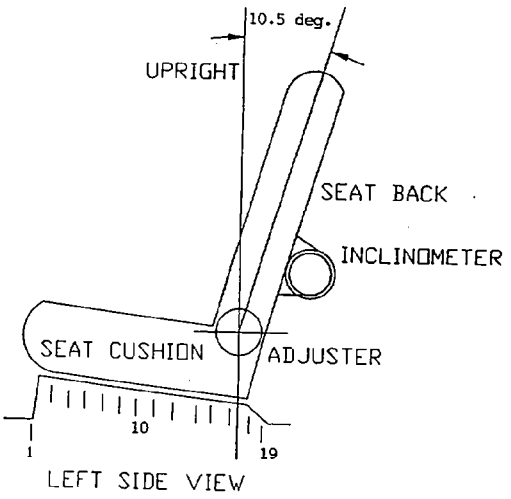
Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 194 mm

Test Position: 10th position rearward out of 19 total



FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 4th locking position from upright as 1

10.5° measured at headrest

REAR POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: Non-Adjustable

Seat Back Adjustment Position: Non-Adjustable

ADJUSTABLE STEERING COLUMN POSITION: Mid

WINDOW POSITIONS: Left Front Closed Left Rear Closed

Right Front Open Right Rear Removed

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel system usable capacity = 47.2 liters

Test Volume: 43.9 liters 93.0 % of capacity

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

Wheelbase: = 2605 mm

Impact Point is 363 mm rearward of front axle centerline

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

Overall Length = 4565 mm; Overall Width = 1702 mm

TEST WEIGHT:

Right Front = 362.0 kg Right Rear = 267.2 kg

Left Front = 391.5 kg Left Rear = 282.6 kg

TOTAL FRONT = 753.5 kg TOTAL REAR = 549.8 kg

% of Total Weight = 56.4 % % of Total Weight = 43.6 %

TOTAL VEHICLE WEIGHT = 1303.3 kg

Wheelbase = 2605 mm

Longitudinal C.G. from Center of Front Axle = 1099 mm

Impact Angle with Respect to Impactor = 27° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1* (225 mm above ground) = 106 mm
2. LEVEL 2 (455 mm above ground) = 326 mm
3. LEVEL 3 (555 mm above ground) = 298 mm
4. LEVEL 4 (850 mm above ground) = 185 mm
5. LEVEL 5 (1248 mm above ground) = 37 mm

Maximum Post-Test Intrusion = 326 mm

* Panel at Level 1 fell off during impact

OCCUPANTS:	Left Front Passenger	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: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

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	= 1105 mm
C.G. Location From Center Line	= -12 mm
C.G. Location Above Ground Level	= 484 mm

MDB WEIGHT:

Left Front	= 440.1 kg	Left Rear	= 246.6 kg
Right Front	= 338.2 kg	Right Rear	= 331.9 kg
TOTAL FRONT = 778.3 kg		TOTAL REAR = 578.5 kg	

TOTAL MDB WEIGHT = 1356.8 kg

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

Impact Speed = Primary: 33.0 mph (53.0 kph) Secondary: 32.9 mph (52.9 kph)

CRASH TEST SUMMARY FOR SIDE IMPACTOR (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Top of Stack (813 mm) = 105 mm
2. Row B Mid Stack (686 mm) = 96 mm
3. Row C Top of Bumper (533 mm) = 69 mm
4. Row D Center of Bumper (432 mm) = 105 mm

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

VISIBLE DUMMY CONTACT POINTS:

	LEFT FRONT SID	LEFT REAR SID
Head	to window sill & headrest	to C Post, side header, & third brake light cover
Arm	to door trim panel	to side trim panel
Pelvis	to armrest	to armrest
Left Knee	to middle door trim panel	to side trim panel under armrest
Right Knee	to left knee	to left knee

DOOR OPENING:

	LEFT SIDE	RIGHT SIDE
Front	remained closed	remained closed
Rear	N/A	N/A

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 2 mm rearward Vertical: 5 mm low

ARM REST LOCATIONS:

Front: 272 mm from bottom of window

Rear: 332 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 126 mm Front Seat Cushion: 124 mm

Left Rear Seat Back: 50 mm Rear Seat Cushion: 96 mm

GLAZING DAMAGE:

Left door glass, left rear quarter window, windshield

PILLAR PERFORMANCE:

None noted

SILL SEPARATION:

465 mm back from front hub centerline at bottom of A-Pillar, 34 mm long

OTHER NOTABLE IMPACT EFFECTS:

Driver and passenger airbags did not deploy

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5
SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

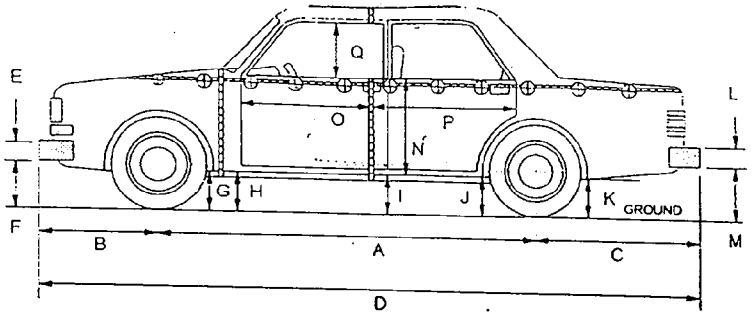
Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

	Front SID ID #049				Rear SID ID #048			
	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 (LUR) Y	57.6	36	-24.7	71	70.1	43	-13.1	68
Left Lower Rib (LLR) Y	61.7	38	-17.3	86	74.9	44	-18.6	68
SPINE ACCELERATIONS								
Lower Lateral Y	68.6	33	-29.8	65	68.2	46	-22.3	74
PELVIS ACCELERATIONS								
Lateral Y	102.2	27	-22.1	51	89.8	37	-10.3	59

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
E & L = Bumper Thickness

J1 = To Pinch Weld
J2 = To Sill

ALL MEASUREMENTS IN (mm)

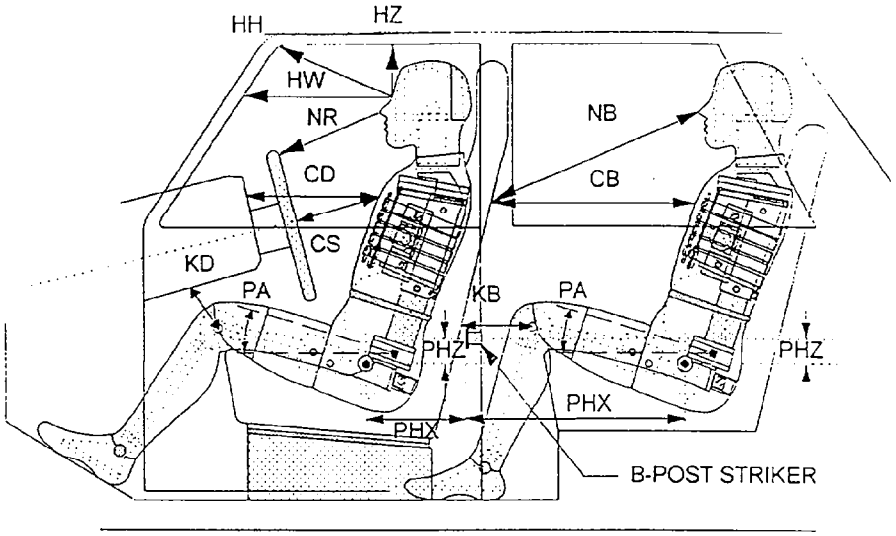
	PRE-TEST	POST-TEST	Δ CHANGE
A	2605	2596	9
B	1044	1036	8
C	916	923	-7
D	4565	4555	10
E	140	140	0
F	398	412	-14
G	175	195	-20
H	172	208	-36
I	158	200	-42
J1/J2	159/158	195/190	-36/-32
K	230	244	-14
L	225	225	0
M	360	378	-18
N	670	585	85
O	718	719	-1
P	584	581	3
Q	409	357	52
R	4215	4226	-11
S	4215	4190	25
T	1702	1398	304

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

NHTSA NO.: CW0103 Test Date: September 10, 1997



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

	FRONT PASSENGER ID #049
HH	381
HW	725
HZ	160
NR	462
CD	540
KDL(KDA°)	205 (28.0°)
KDR(KDA°)	210 (33.1°)
PA°	23.8°
PHX	424
PHZ	184

	REAR PASSENGER SID ID #048
HZ	120
NB	444
CB	390
KBL (KBA)	120 (0°)
KBR (KBA)	108 (0°)
PA°	24.7°
PHX	376
PHZ	190

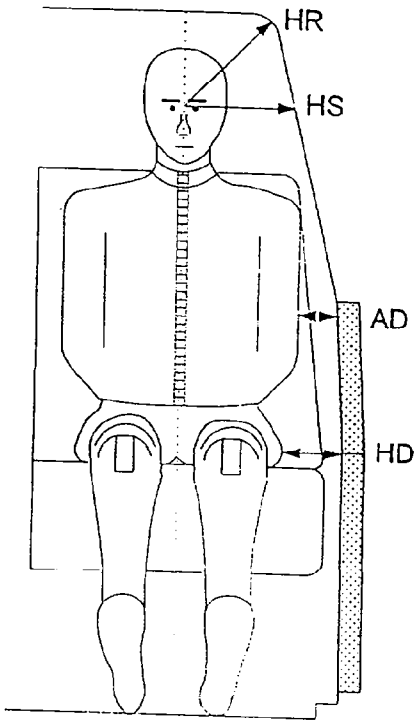
NOTE: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as reference point.

DATA SHEET NO. 8

SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

NHTSA NO.: CW0103 Test Date: September 10, 1997



NOTE: All dimensions are in mm

	FRONT PASSENGER ID #049	REAR PASSENGER ID #048
HR	184	192
HS	308	298
AD	105	101
HD	122	158

DATA SHEET NO. 9

DUMMY POSITIONING - DRIVER

Driver H-Point

HP to Floor Z = 85

HP to Hinge X = 850

HP to Sill Y = 128

HP to Striker X = 512

HP to Dash X = 697

HP to Header Z = 757

Driver Dummy Position

HP to Floor Z = 80

HP to Hinge X = 850

HP to Sill Y = 135

HP to Striker X = 513

HP to Dash X = 706

HP to Header Z = 761

Pelvis Angle = 23.8°

H-Point Machine

Left Knee = 135°

Right Knee = 135°

Left Foot = 98°

Right Foot = 94°

Left Leg = 95°

Right Leg = 95°

Hip Angle = 99°

Back Angle = 24°

DATA SHEET NO. 9 (Cont'd)

DUMMY POSITIONING - LEFT REAR PASSENGER

Driver H-Point

HP to Floor Z = N/A
HP to Hinge X = 1567
HP to Sill Y = 138
HP to Striker X = 434
HP to Dash X = 1416
HP to Header Z = 748

Driver Dummy Position

HP to Floor Z = N/A
HP to Hinge X = 1577
HP to Sill Y = 148
HP to Striker X = 444
HP to Dash X = 1423
HP to Header Z = 760
Pelvis Angle = 24.7°

H-Point Machine

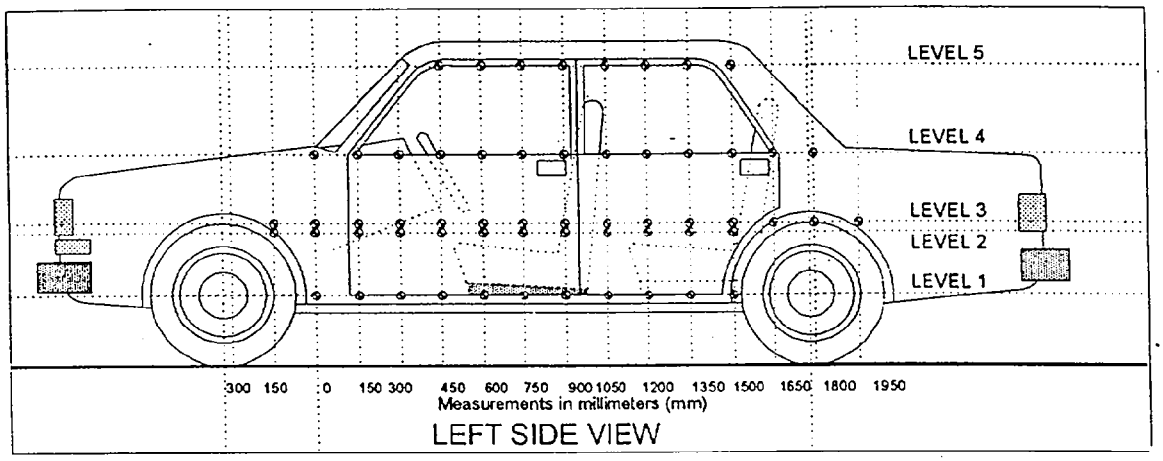
Left Knee = 90°
Right Knee = 90°
Left Foot = 121°
Right Foot = 121°
Left Leg = 105°
Right Leg = 70°
Hip Angle = 81°
Back Angle = 23°

DATA SHEET NO. 10

VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

NHTSA NO.: CW0103 Test Date: September 10, 1997



LEVEL 5 - WINDOW TOP
LEVEL 4 - WINDOW SILL
LEVEL 3 - MID-DOOR
LEVEL 2 - OCCUPANT H-POINT
LEVEL 1 - AXLE CENTERLINE HEIGHT or 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 @ Axle Centerline Height (or Sill Top Height)	= 225 mm
Level 2 @ Occupant H-Point	= 455 mm
Level 3 @ Mid Door	= 555 mm
Level 4 @ Window Sill	= 850 mm
Level 5 @ Window Top	= 1248 mm

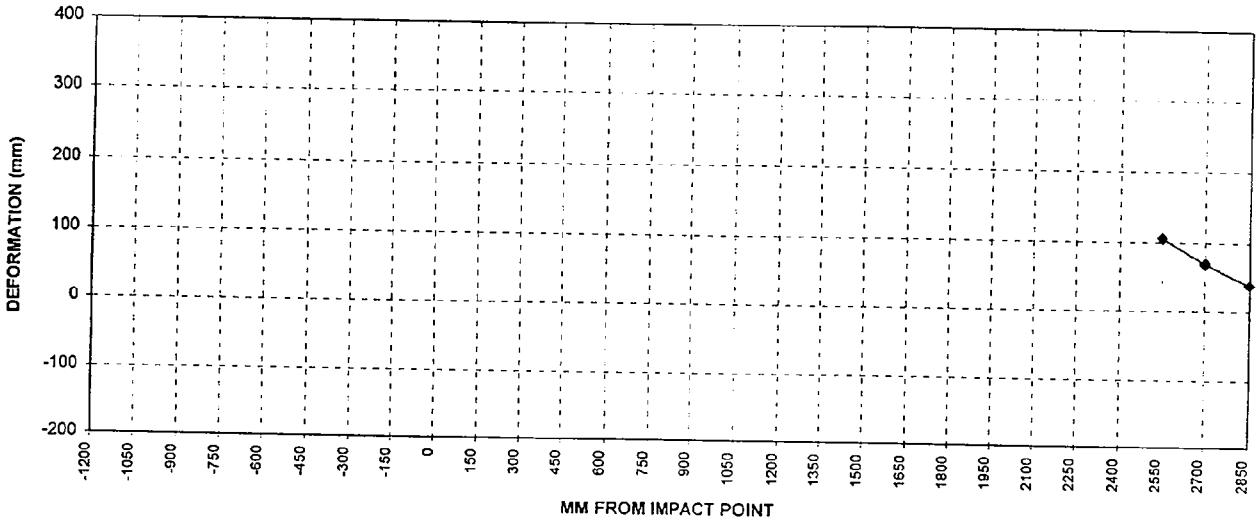
DATA SHEET NO. 11
VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 - Axle Centerline		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150	598	N/A*	N/A*
300	599	N/A*	N/A*
450	599	N/A*	N/A*
600	599	N/A*	N/A*
750	598	N/A*	N/A*
900	597	N/A*	N/A*
1050	597	N/A*	N/A*
1200	597	N/A*	N/A*
1350	597	N/A*	N/A*
1500	597	703	106
1650	597	667	70
1800	597	636	39
1950			
2100			
2250			
2400			
2550			
2700			
2850			

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

NA* Panel broken off vehicle

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



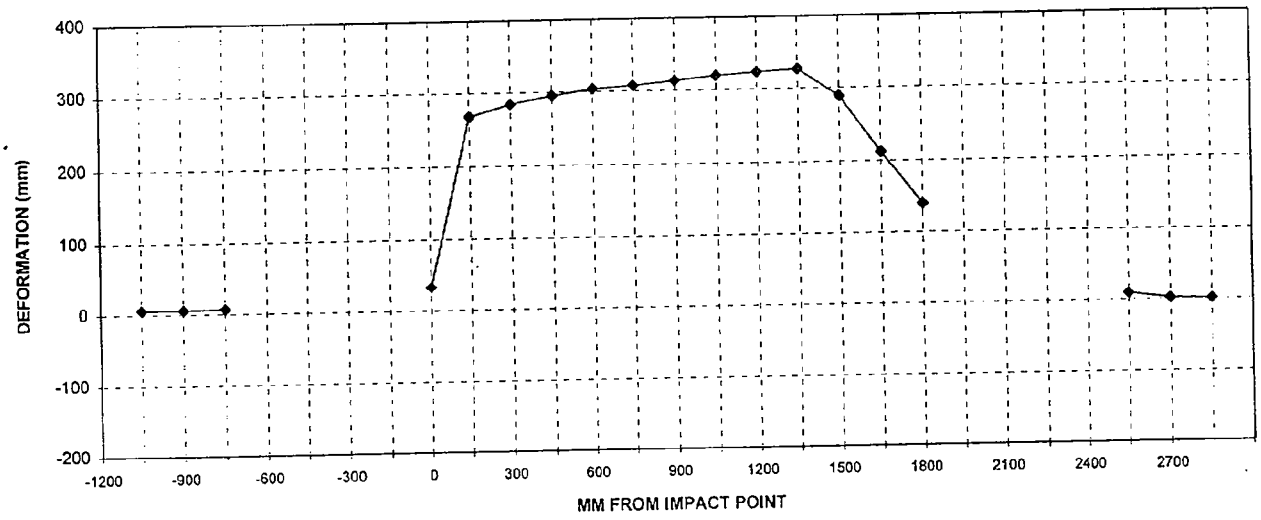
LEVEL 1 - AXLE CENTERLINE

DATA SHEET NO. 11 (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	667	673	6
-900	619	625	6
-750	584	591	7
-600			
-450			
-300			
-150			
0 (impact point)	557	590	33
150	562	830	268
300	558	842	284
450	557	852	295
600	557	860	303
750	557	864	307
900	558	871	313
1050	558	877	319
1200	560	883	323
1350	561	887	326
1500	559	848	289
1650	557	769	212
1800	558	697	139
1950			
2100			
2250			
2400			
2550	572	581	9
2700	595	597	2
2850	620	621	1

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



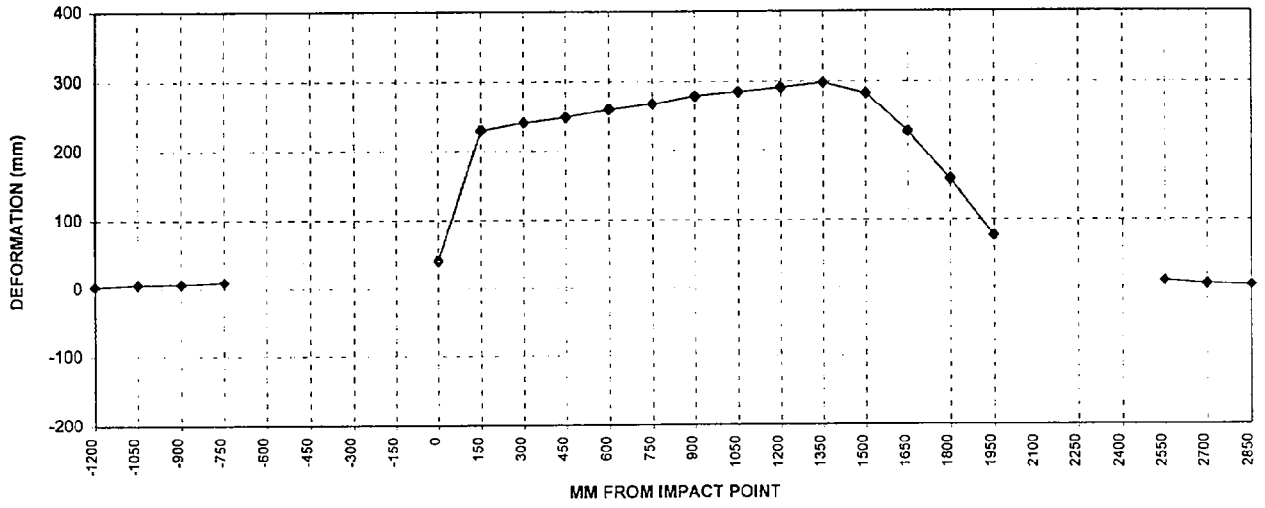
LEVEL 2 - OCCUPANT H-POINT

DATA SHEET NO. 11 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

	Level 3 - Mid Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200	748	751	3
-1050	675	681	6
-900	625	632	7
-750	585	594	9
-600			
-450			
-300			
-150			
0 (impact point)	547	588	41
150	550	780	230
300	552	793	241
450	555	804	249
600	557	817	260
750	560	828	268
900	564	843	279
1050	567	852	285
1200	571	862	291
1350	572	870	298
1500	570	853	283
1650	564	791	227
1800	557	715	158
1950	551	627	76
2100			
2250			
2400			
2550	580	590	10
2700	607	612	5
2850	652	655	3

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



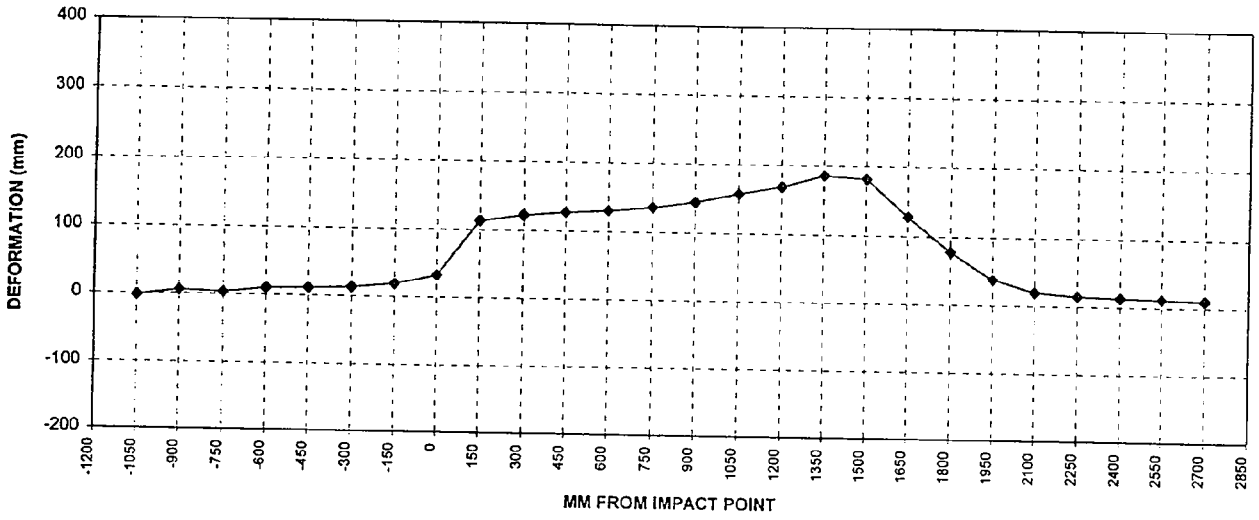
LEVEL 3 - MID DOOR

DATA SHEET NO. 11 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

	Level 4 - Window Sill		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050	760	758	-2
-900	708	714	6
-750	672	675	3
-600	643	653	10
-450	623	634	11
-300	614	627	13
-150	607	626	19
0 (impact point)	604	637	33
150	601	714	113
300	605	727	122
450	603	730	127
600	607	737	130
750	607	743	136
900	609	753	144
1050	611	768	157
1200	615	783	168
1350	617	802	185
1500	622	803	181
1650	625	753	128
1800	627	705	78
1950	630	668	38
2100	638	658	20
2250	647	662	15
2400	658	671	13
2550	671	683	12
2700	697	707	10
2850			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



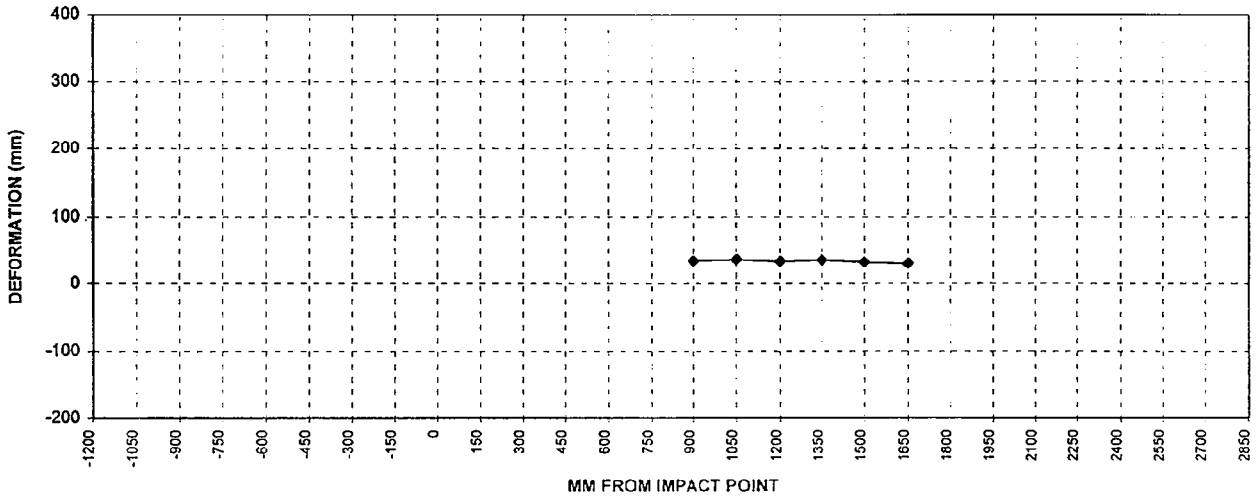
LEVEL 4 - WINDOW SILL

DATA SHEET NO. 11 (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	867	902	35
1050	868	905	37
1200	871	905	34
1350	870	906	36
1500	871	904	33
1650	873	904	31
1800			
1950			
2100			
2250			
2400			
2550			
2700			
2850			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



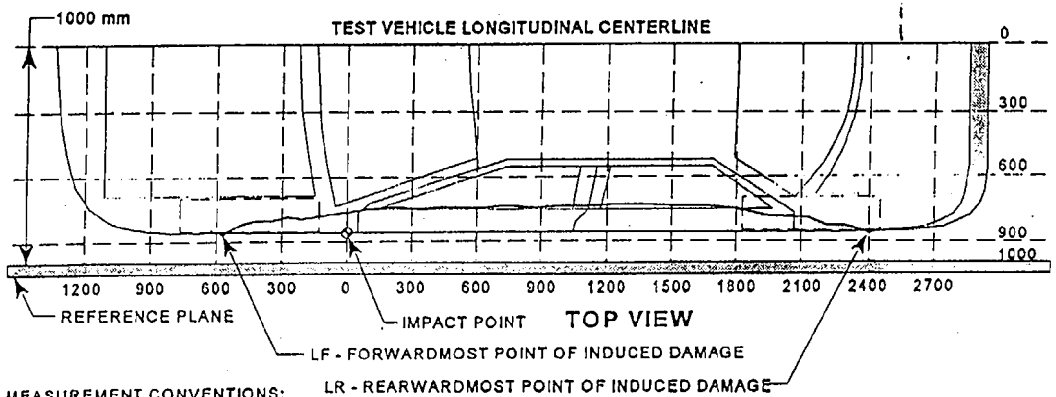
LEVEL 5 - WINDOW TOP

DATA SHEET NO. 12
VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

NHTSA NO.: CW0103 Test Date: September 10, 1997

NOTE: All measurements are in millimeters (mm) and should be accurate to ± 3mm.



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. (LF = ___ mm)	NR	NR	NR
2. mm	NR	NR	NR
3. mm	NR	NR	NR
4. mm	NR	NR	NR
5. mm	NR	NR	NR
6. (LR = ____mm)	NR	NR	NR

* Vehicle damage profiles not required due to use of plastic body panels.

NR = Not Required

DATA SHEET NO. 13

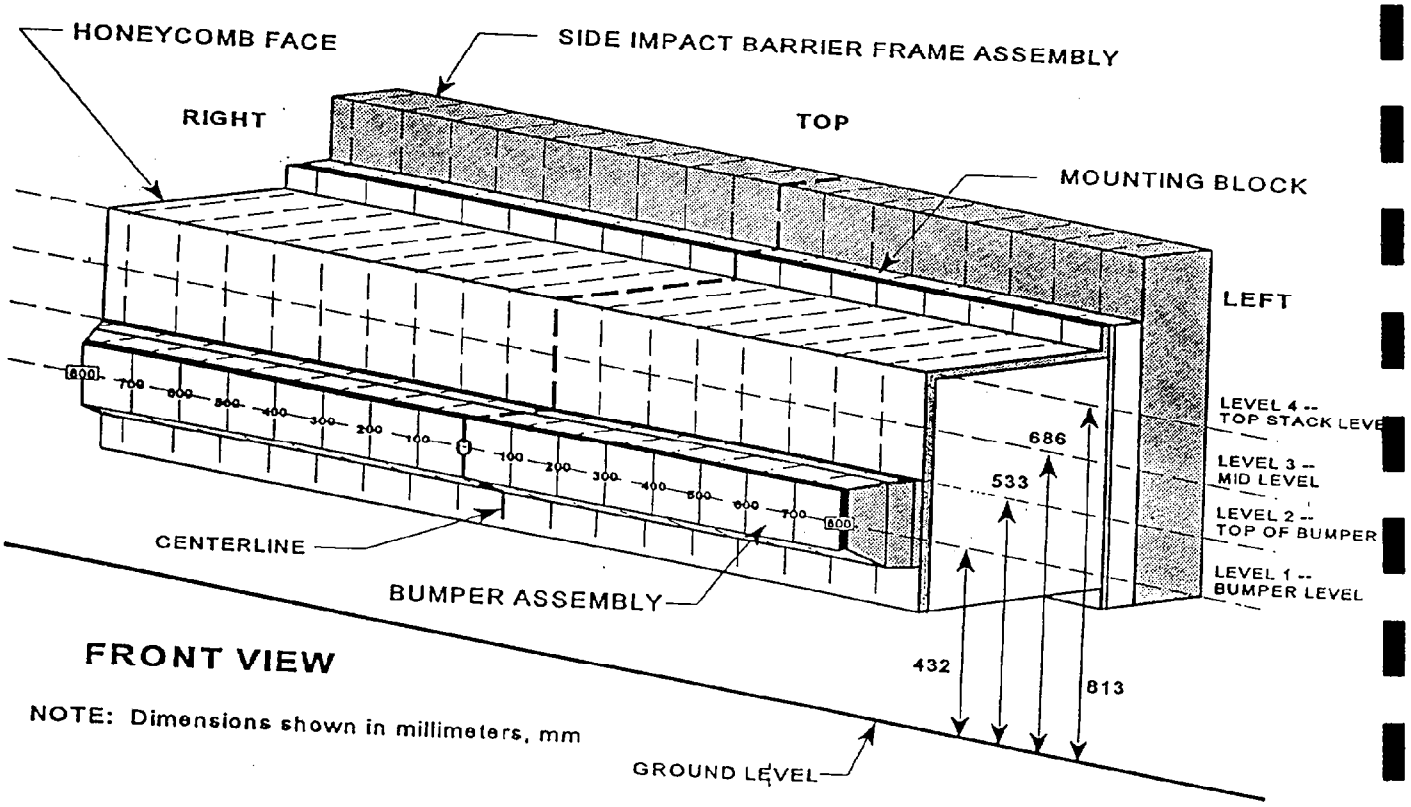
EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

		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	68	34	-1	0	0	1	1	2	2	3	4	5	6	17	39	69	105
Mid Level Level 3	686 mm	25	8	3	5	5	3	4	4	5	4	4	5	6	7	11	44	96
Top Bumper Level 2	533 mm	69	56	33	16	13	13	12	12	12	14	14	14	15	16	21	29	45
Mid Bumper Level 1	432 mm	105	100	76	45	31	29	28	26	25	25	25	25	25	27	35	60	63

See next page for Barrier Face Graphic

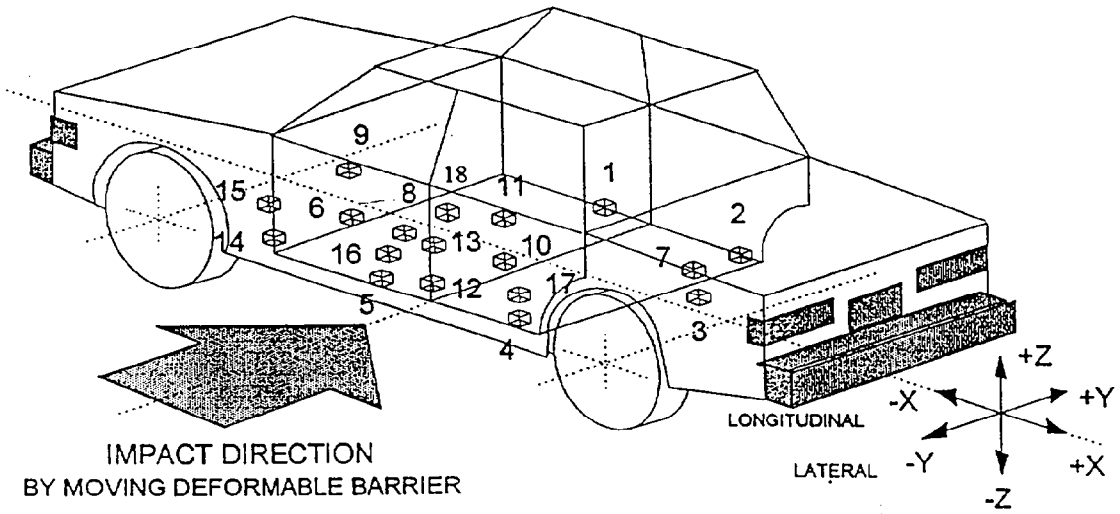

HONEYCOMB FACE
SIDE IMPACT BARRIER FRAME ASSEMBLY
RIGHT
TOP
MOUNTING BLOCK
LEFT
LEVEL 4 -- TOP STACK LEVEL
LEVEL 3 -- MID LEVEL
LEVEL 2 -- TOP OF BUMPER
LEVEL 1 -- BUMPER LEVEL
686
533
432
813
CENTERLINE
BUMPER ASSEMBLY
GROUND LEVEL
FRONT VIEW
NOTE: Dimensions shown in millimeters, mm

DATA SHEET 14

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997



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 Upper Ctrline
10-Midrear of Left Rear Door
11-Left Rear Door Upper Ctrline
12-Left Lower B-Post
13-Left Middle B-Post
14-Left Lower A-Post
15-Left Middle A-Post
16-Front Seat Track
17-Rear Seat Track
18-Vehicle C.G.

DATA SHEET NO. 14 (Cont'd)

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

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	2585	637	206	3.0	-10.1	23.9	-5.0	6.5	-4.8	26.0
2	Right Side Sill @ Rear Seat	1658	633	207	5.1	-8.8	20.2	-2.9	80.9*	-3.7*	82.9
3	Rear Floorpan Above Axle	975	0	447	2.6	-9.8	22.8	-3.4	8.1	-7.1	24.7
4	Left Side Sill @ Rear Seat	1662	-633	205			53.1	-8.2			
5	Left Side Sill @ Front Seat	2590	-637	202			47.5	-22.4			
7	Right Rear Occupant Compartment	1732	346	277			19.3	-3.1			
12	Left Lower B-Post	1743	-645	274			56.4**	-50.2**			
14	Left Lower A-Post	2968	-648	262			91.2	-19.1			
15	Left Mid A-Post	2985	-722	898			52.8	-17.9			
16	Driver Seat Track	2063	-554	209			76.0***	-60.9***			
18	Vehicle CG	2532	-10	397	3.3	-7.0	22.9	-1.6	8.9	-15.2	23.4

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

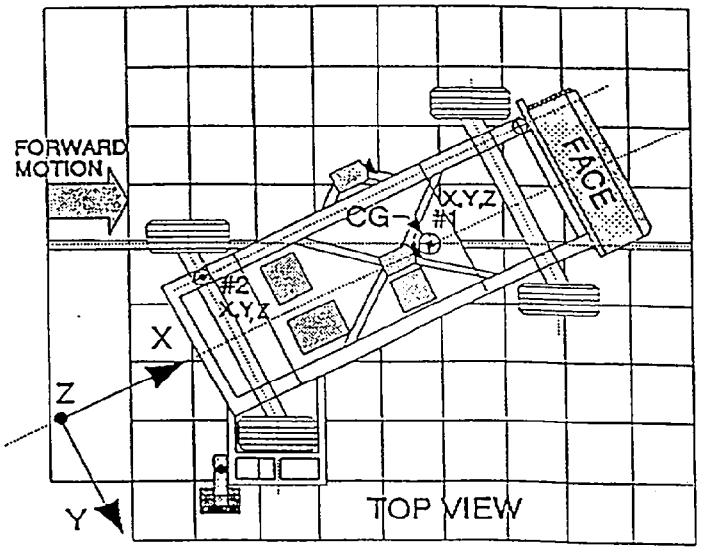
* Data is questionable
** Data valid until approximately 80 msec.
*** Data valid until approximately 79 msec.

DATA SHEET NO. 15

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997



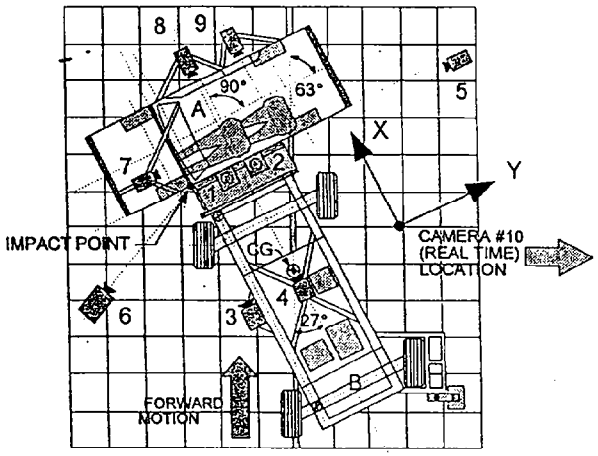
		Coordinates (mm)*			(+) Positive		(-) Negative	
Accel. No.	Description	X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	1105	-12	484				
	Longitudinal (X)	---	---	---	1.1	116	-16.5	35
	Lateral (Y)	---	---	---	3.3	60	-5.0	48
	Vertical (Z)	---	---	---	25.5	56	-21.6	67
	Resultant (R)	---	---	---	27.5	56	---	---
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X)	---	---	---	1.6	183	-20.6	34
	Lateral (Y)	---	---	---	3.0	30	-1.7	182

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

DATA SHEET NO. 16
HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997



Camera No.	View	Coordinates (mm)*			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
	Real Time					13	24
6	Left Impact	-720	-2390	1640		13	1010
7	Onboard Hood					13	1015
8	Onboard Front Occupant					8	930
9	Onboard Rear Occupant					8	1058
5	Right Impact	-390	10470	1650		25	1026
2	Top Overall	20	1320	5000		8	1036
1	Top Impact	-300	0	5000		13	1036
4	Cart Overall					13	885
3	Cart Impact					35	1010

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

DATA SHEET 17

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

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 33.0 mph (53.0 kph)

FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATION(S): None

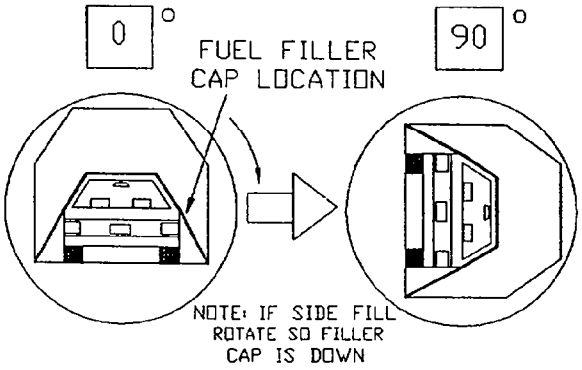
DATA SHEET 17

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 56 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 56 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

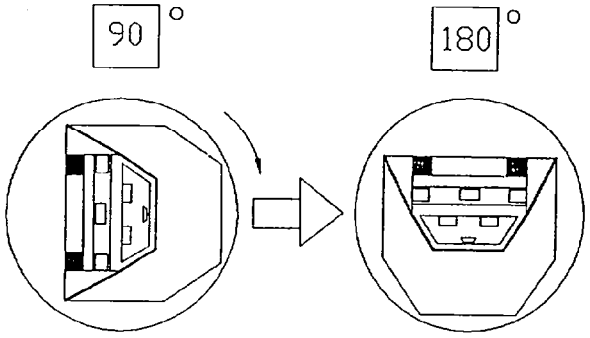
DATA SHEET 17

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 32 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 32 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

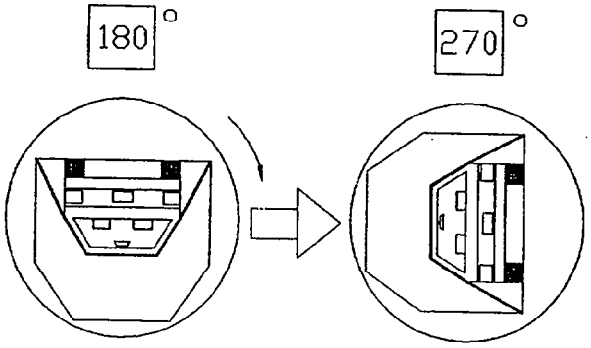
DATA SHEET 17

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 16 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 16 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

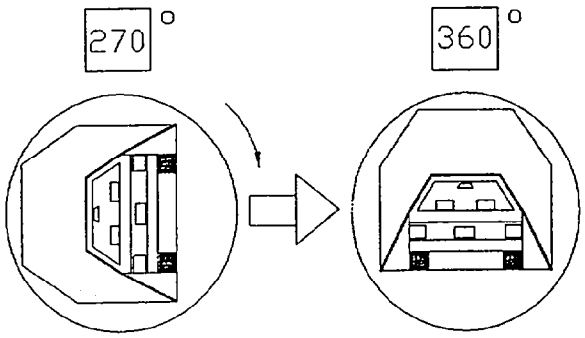
DATA SHEET 17

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Saturn/SC2/2 Door

Vehicle NHTSA No.: CW0103 Test Date: September 10, 1997

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 39 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 39 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

TABLE OF PHOTOGRAPHS

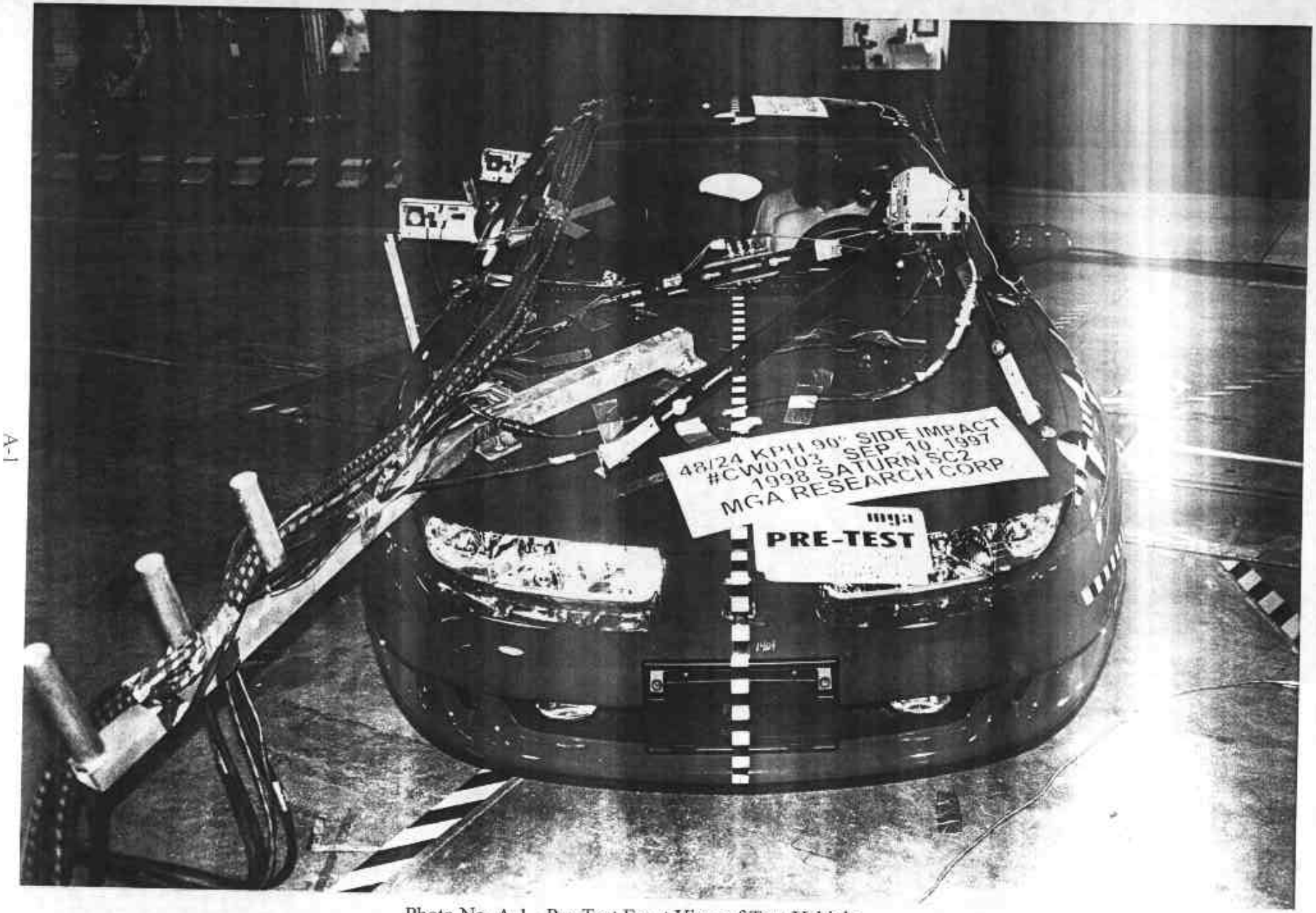


Photo No. A-1 - Pre-Test Front View of Test Vehicle

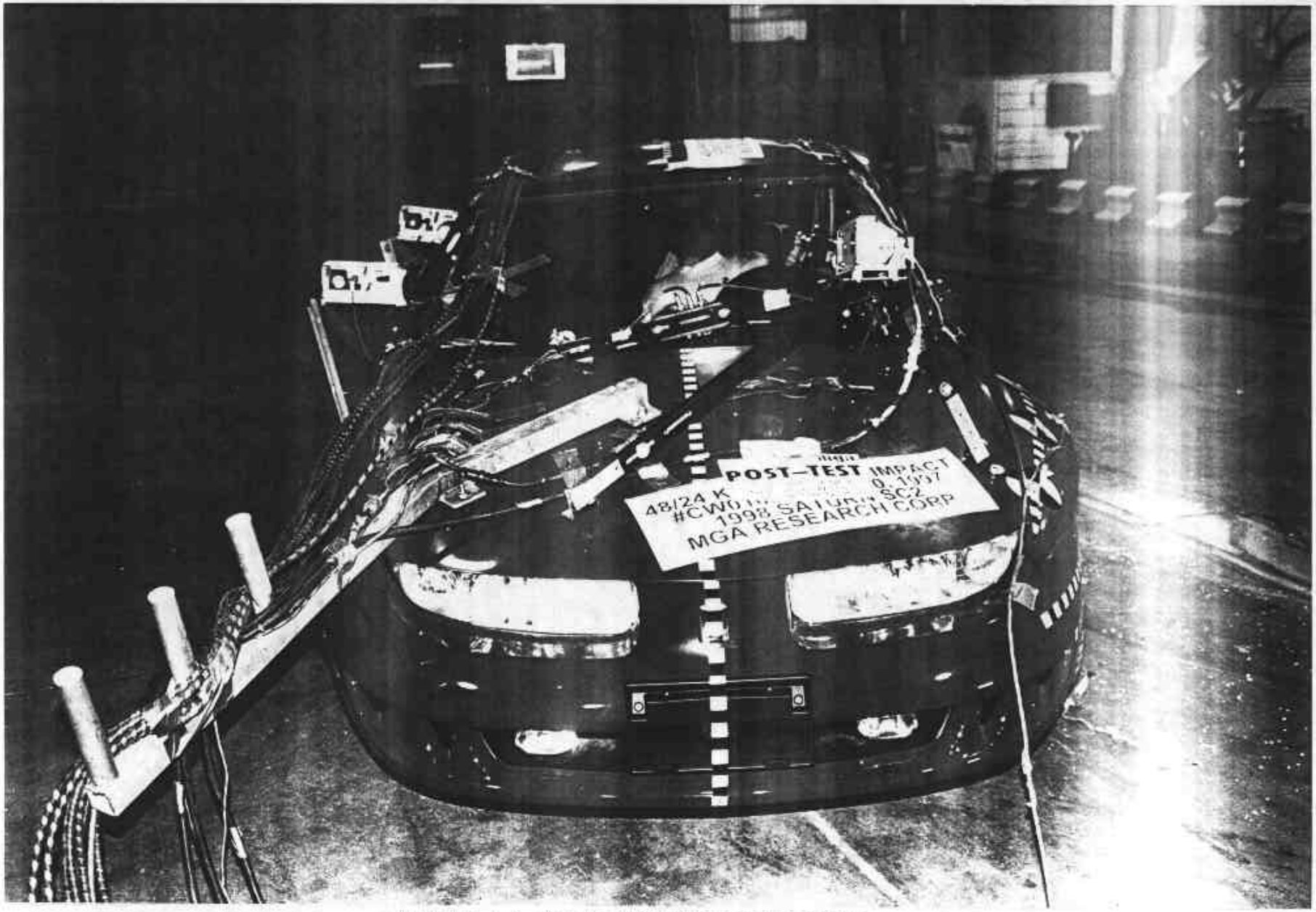
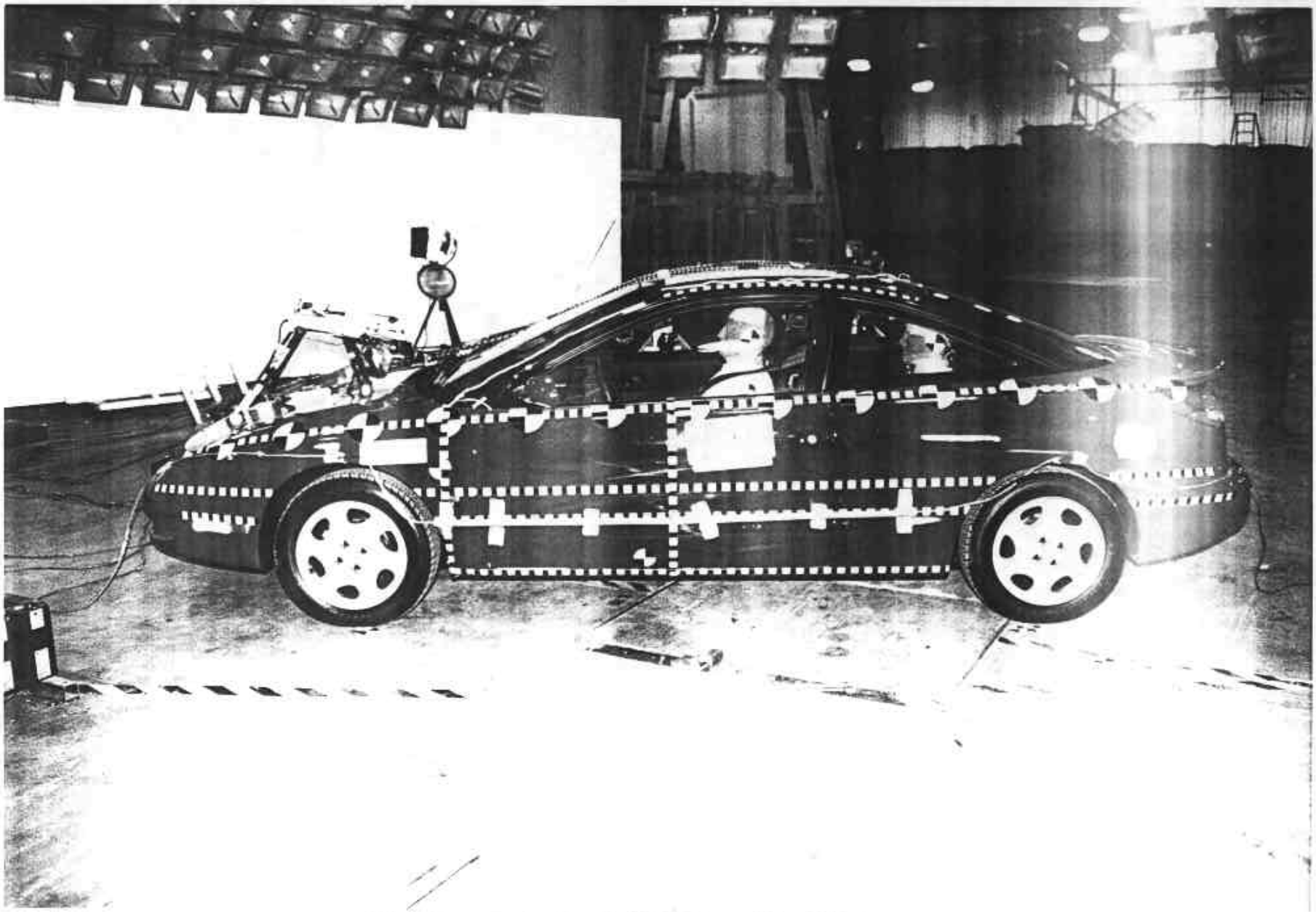


Photo No. A-2 - Post-Test Front View of Test Vehicle

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

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



A-5

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

Photo No. A-6 - Post-Test Left Side View of Test Vehicle

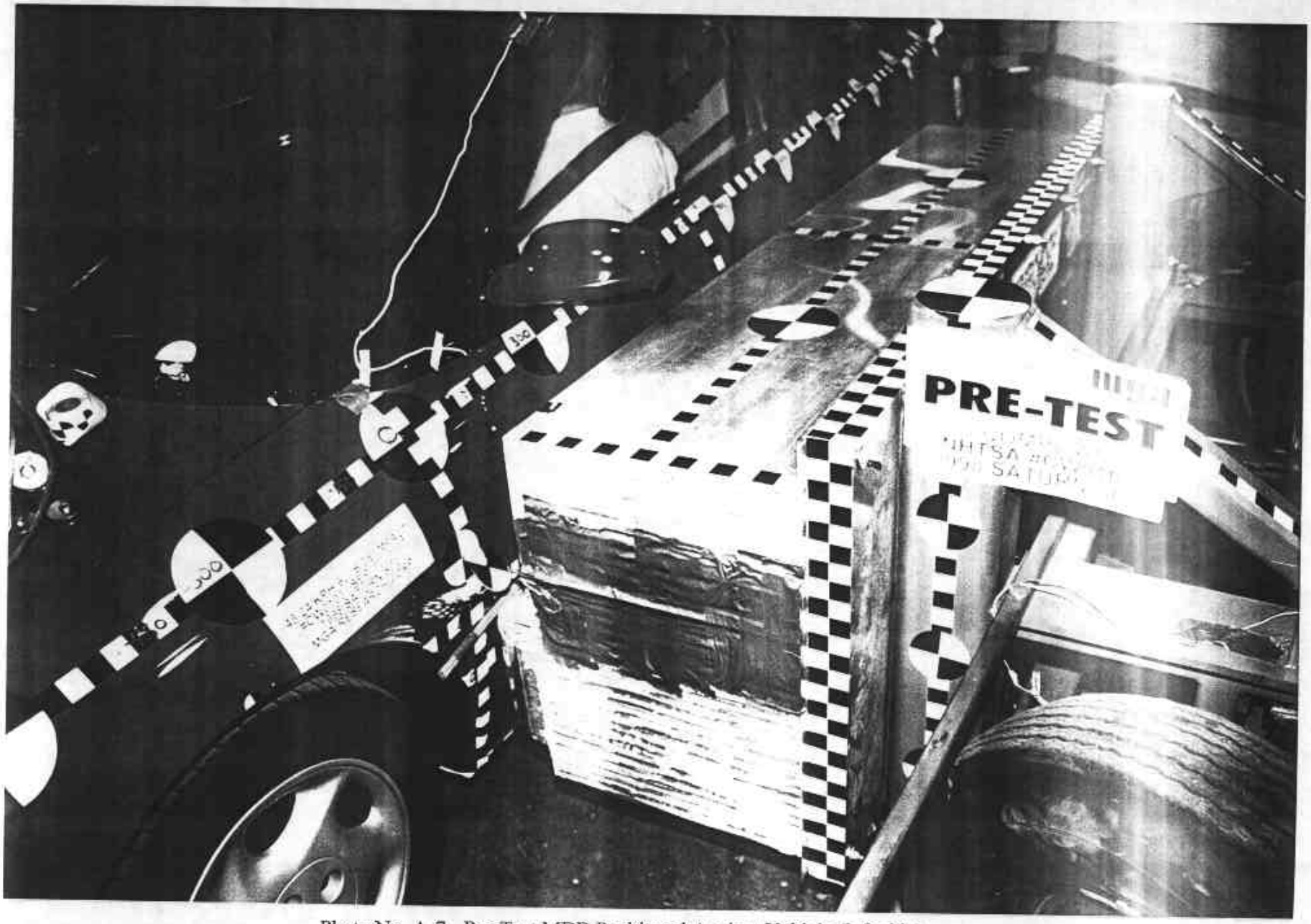


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

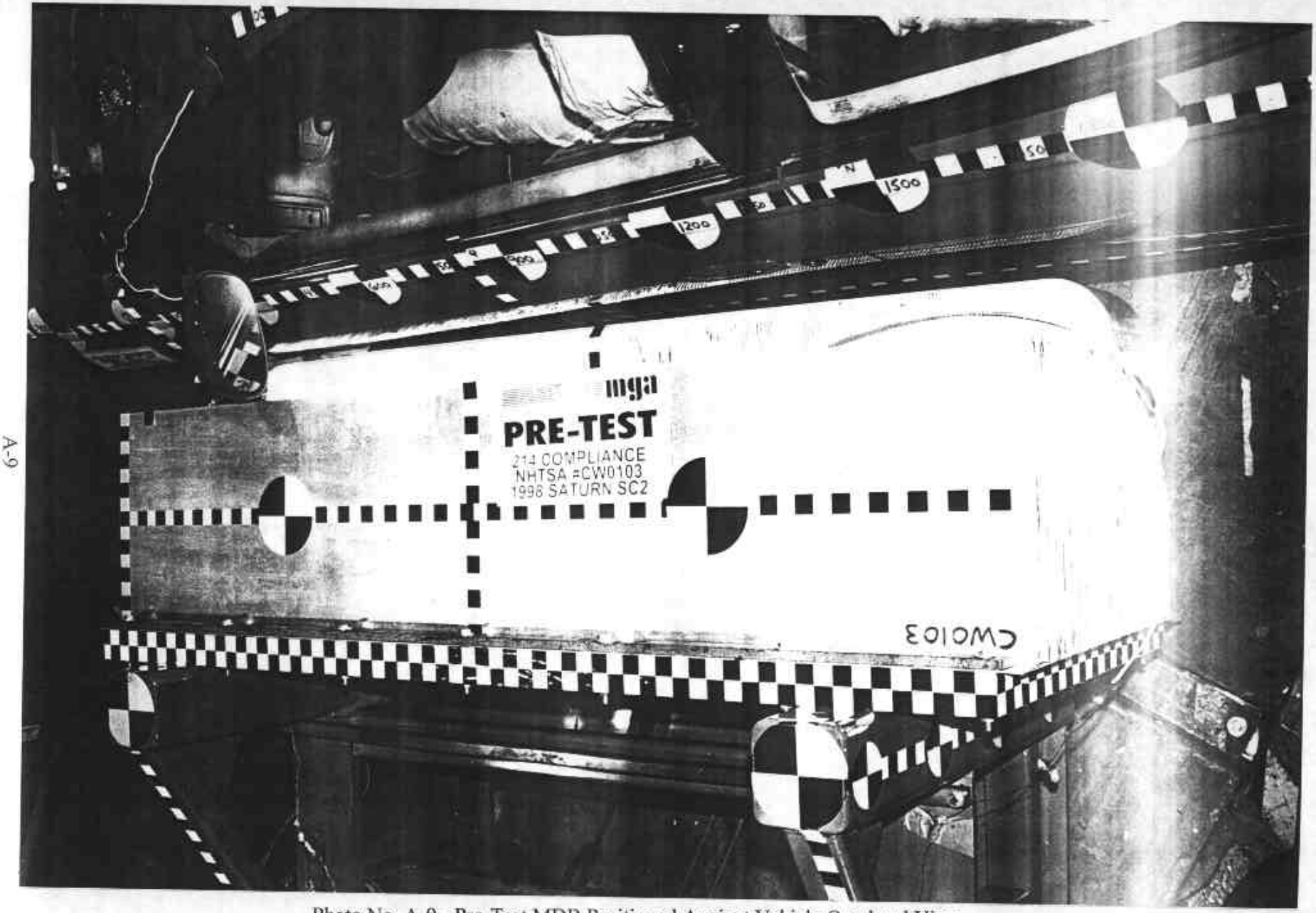


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

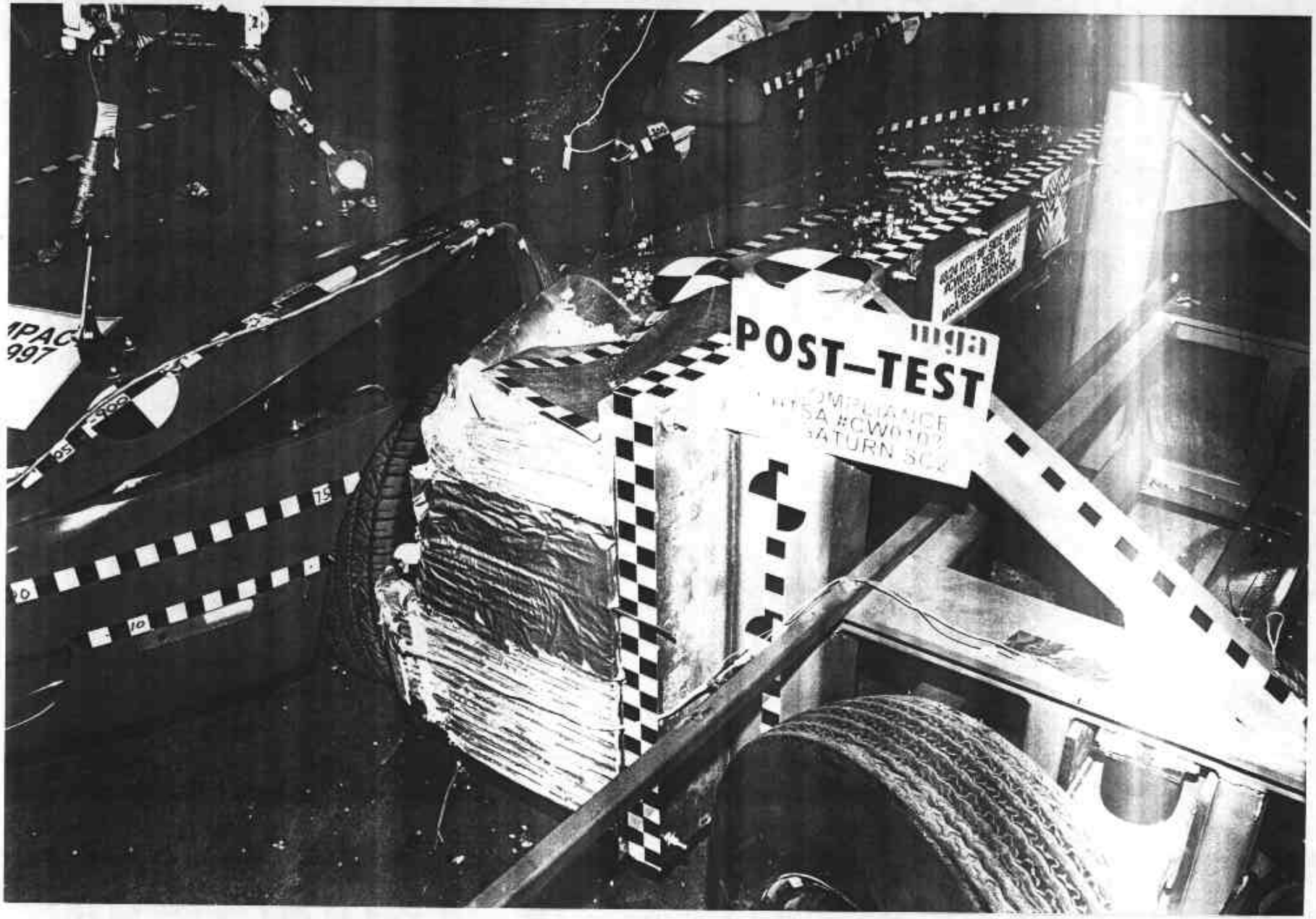


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)

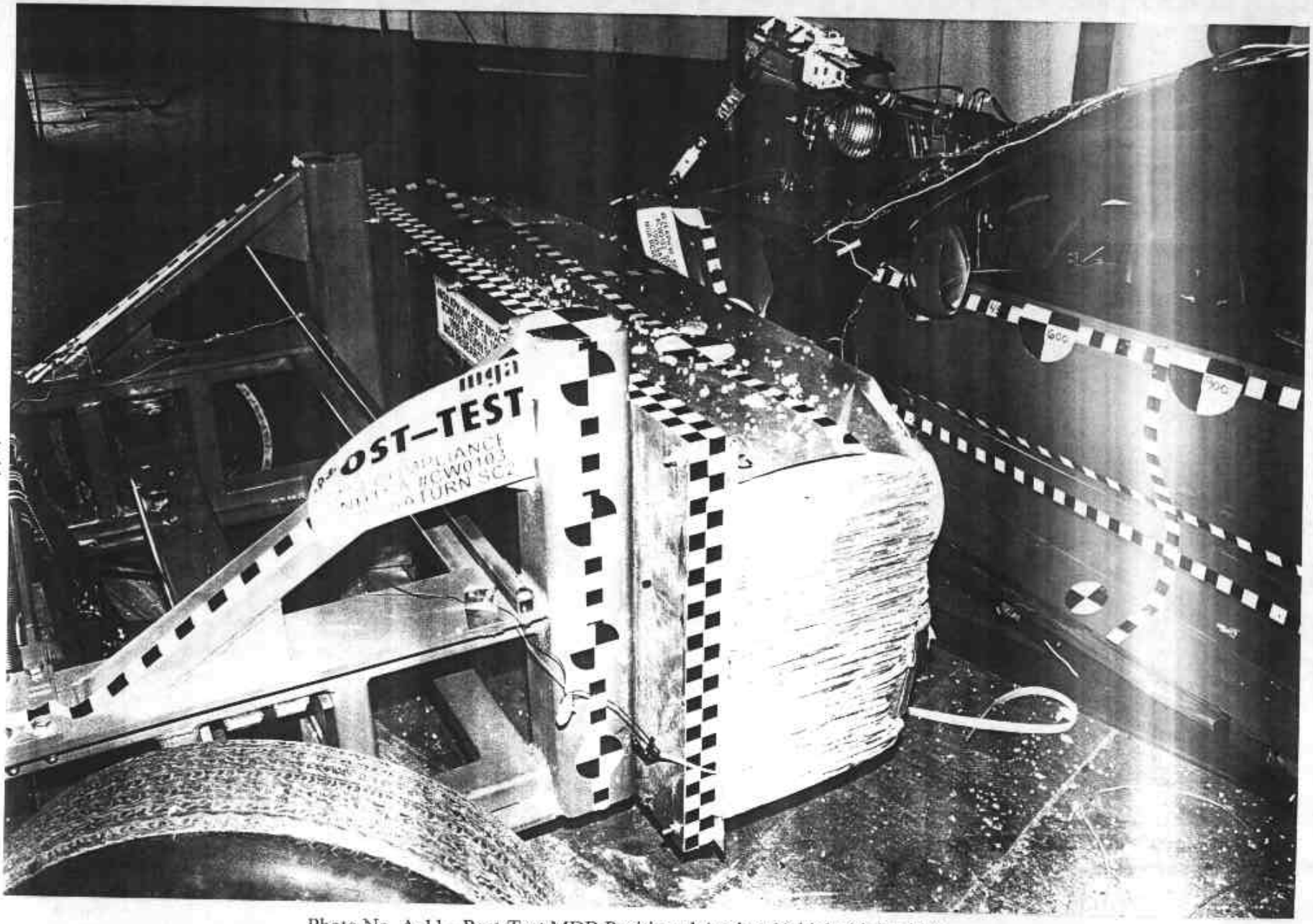


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (right side)

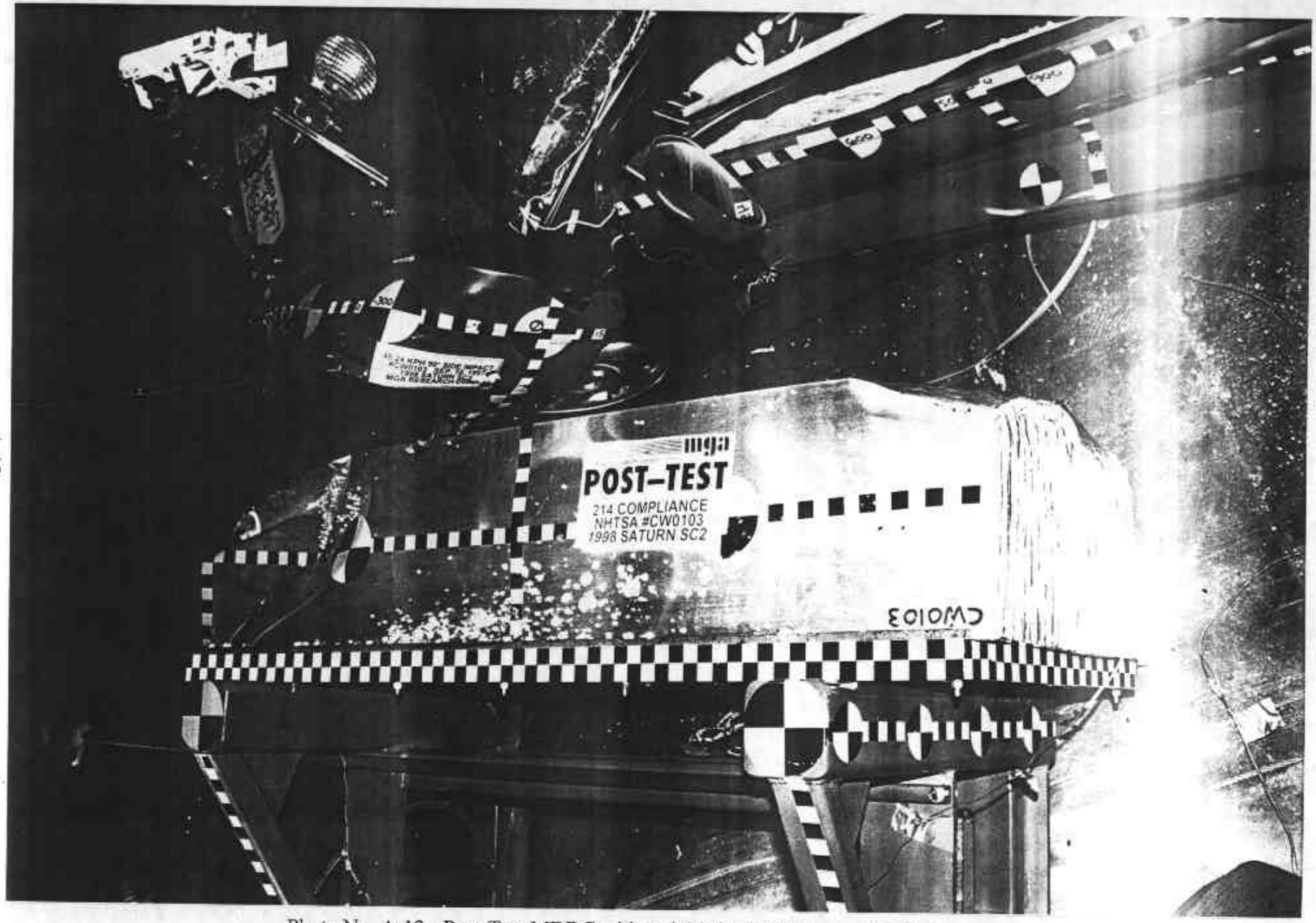


Photo No. A-12 - Post-Test MDB Positioned Against Vehicle Overhead View

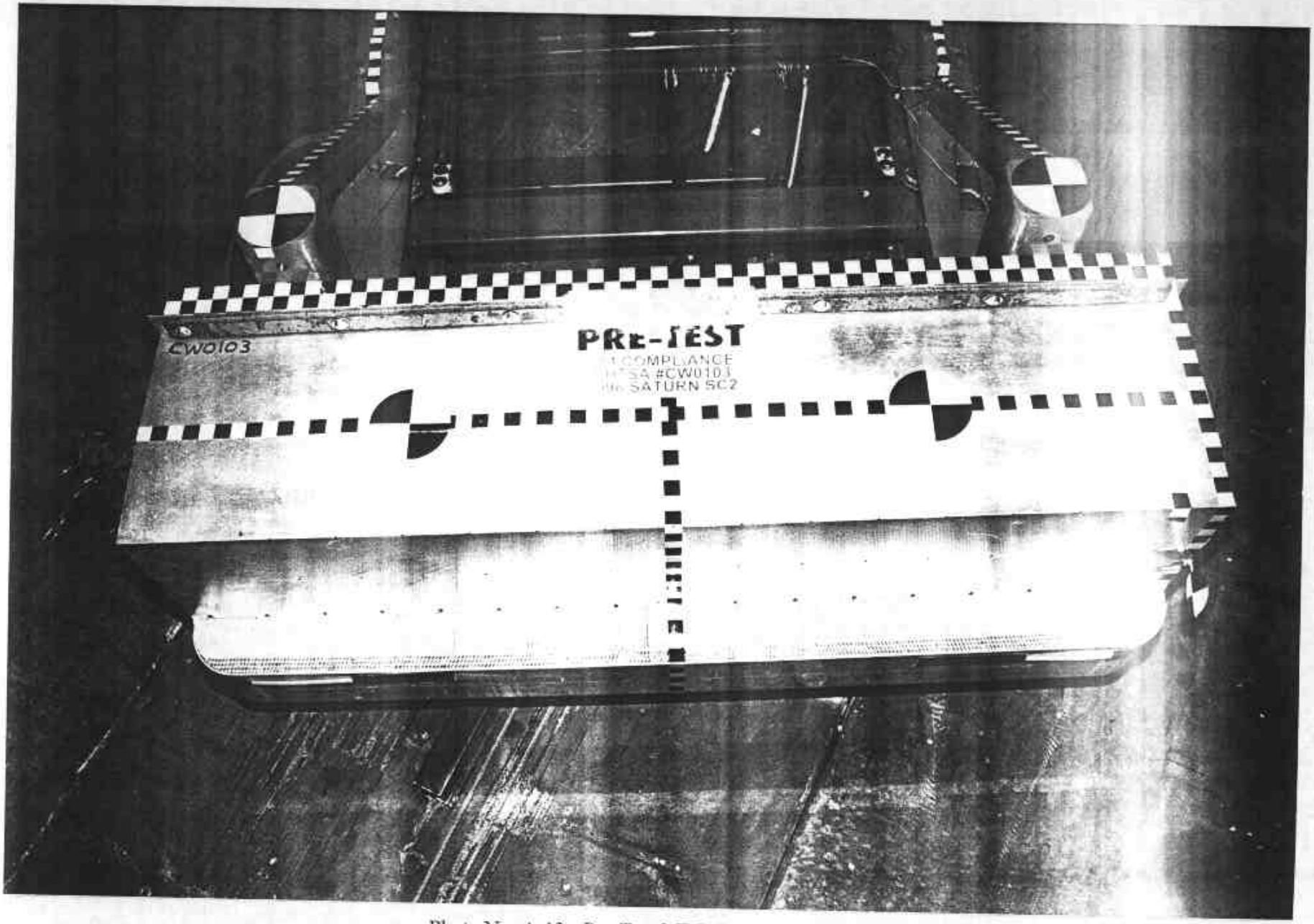


Photo No. A-13 - Pre-Test MDB Top View

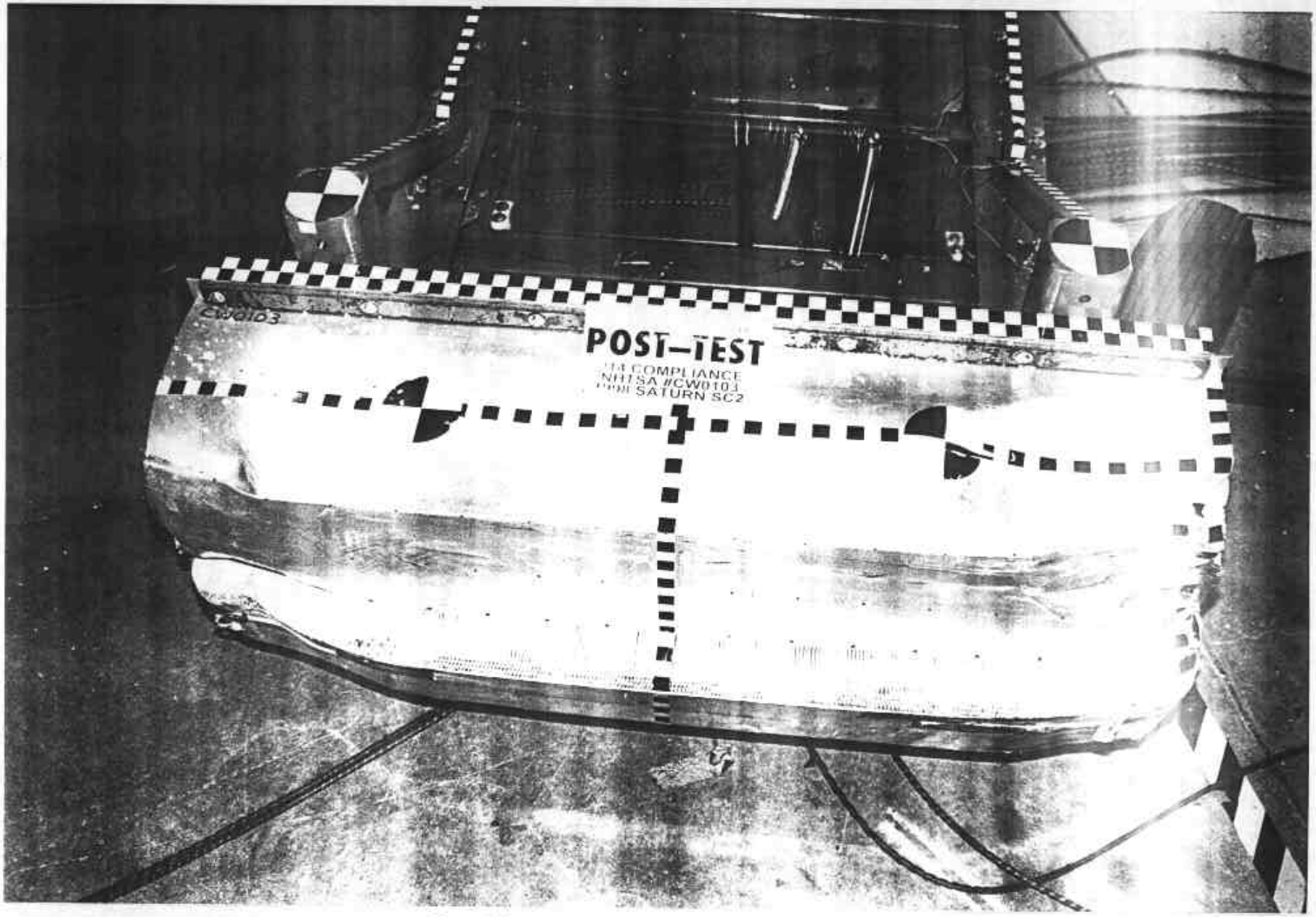


Photo No. A-14 - Post-Test MDB Top View

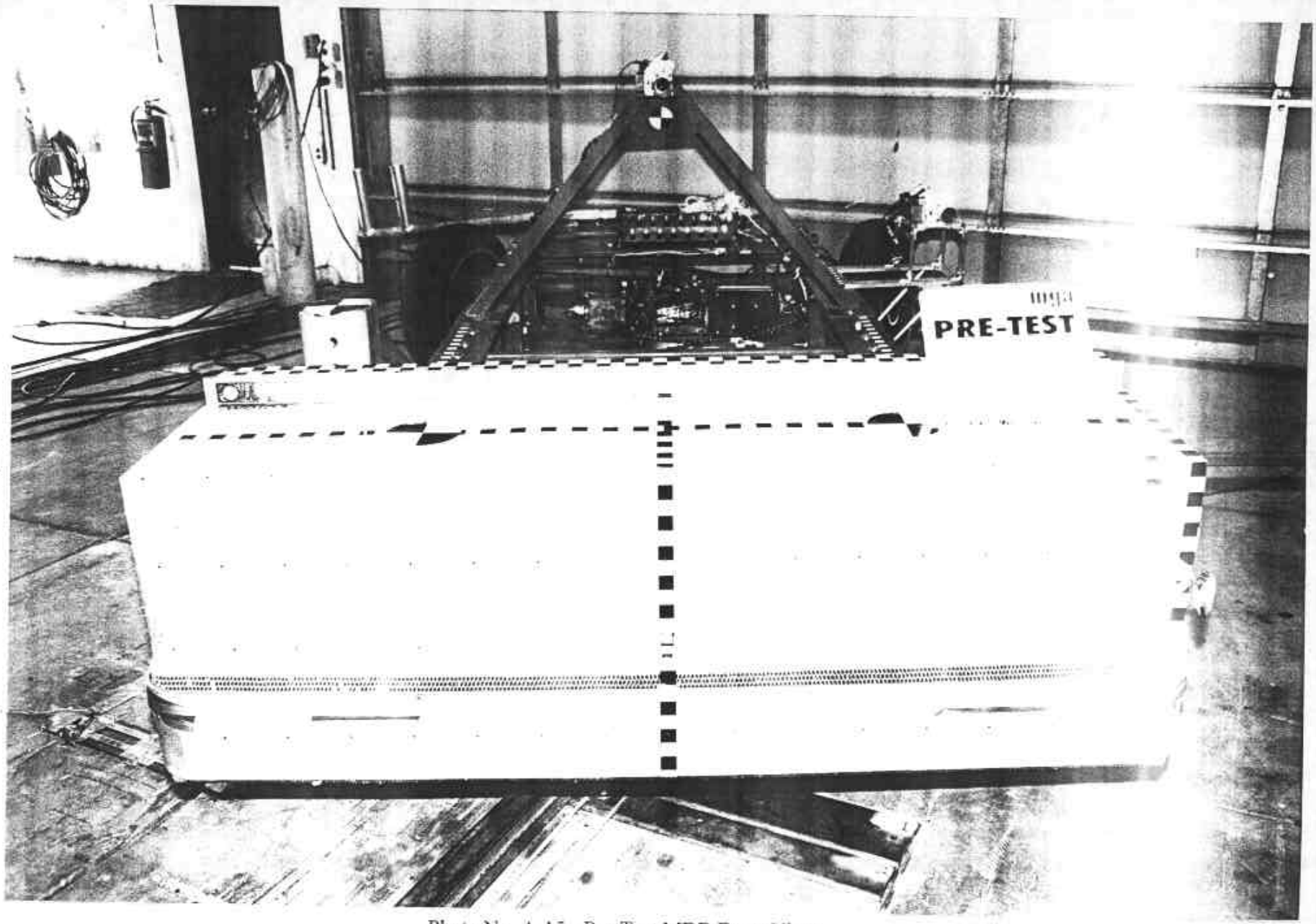


Photo No. A-15 - Pre-Test MDB Front View

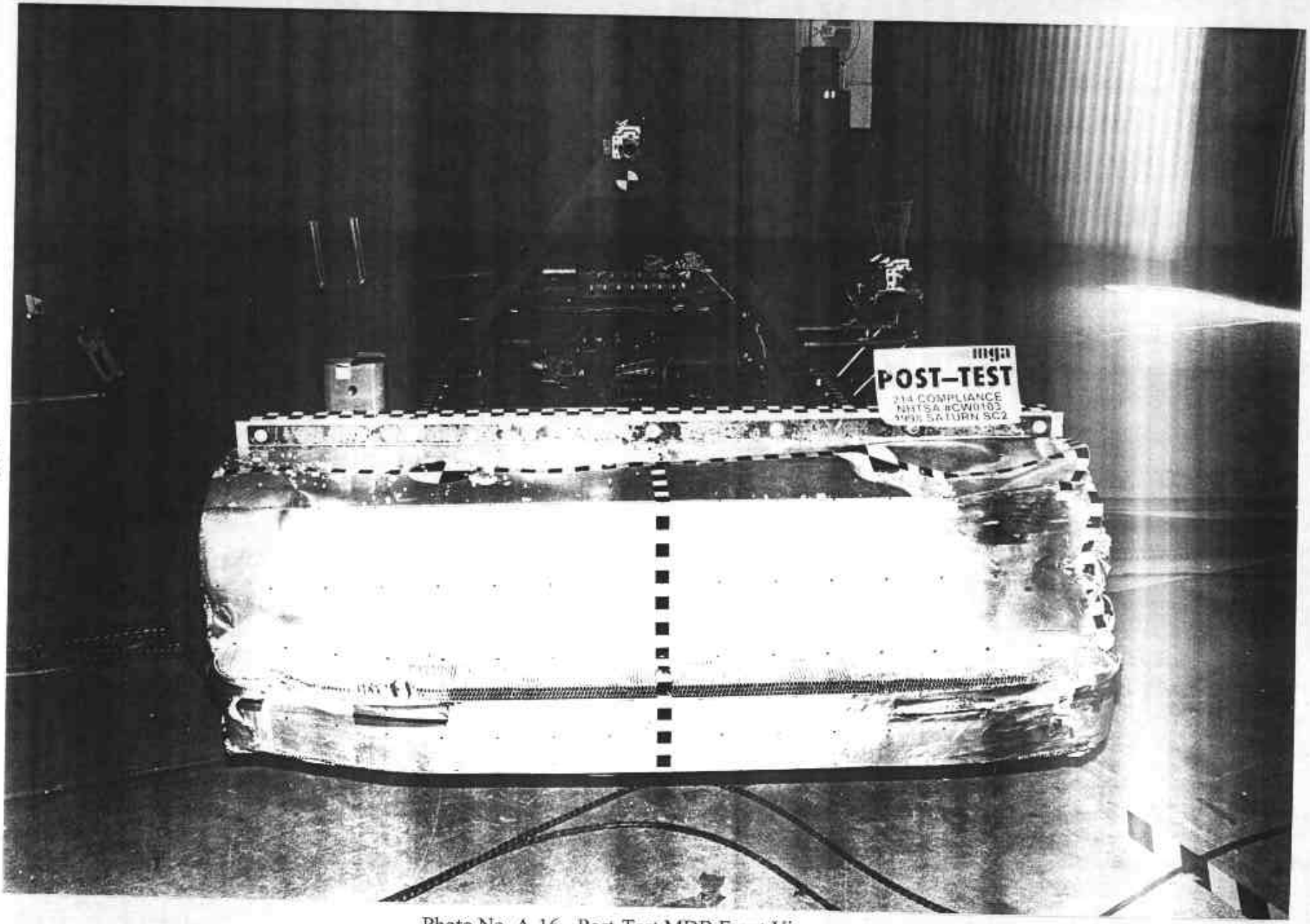


Photo No. A-16 - Post-Test MDB Front View

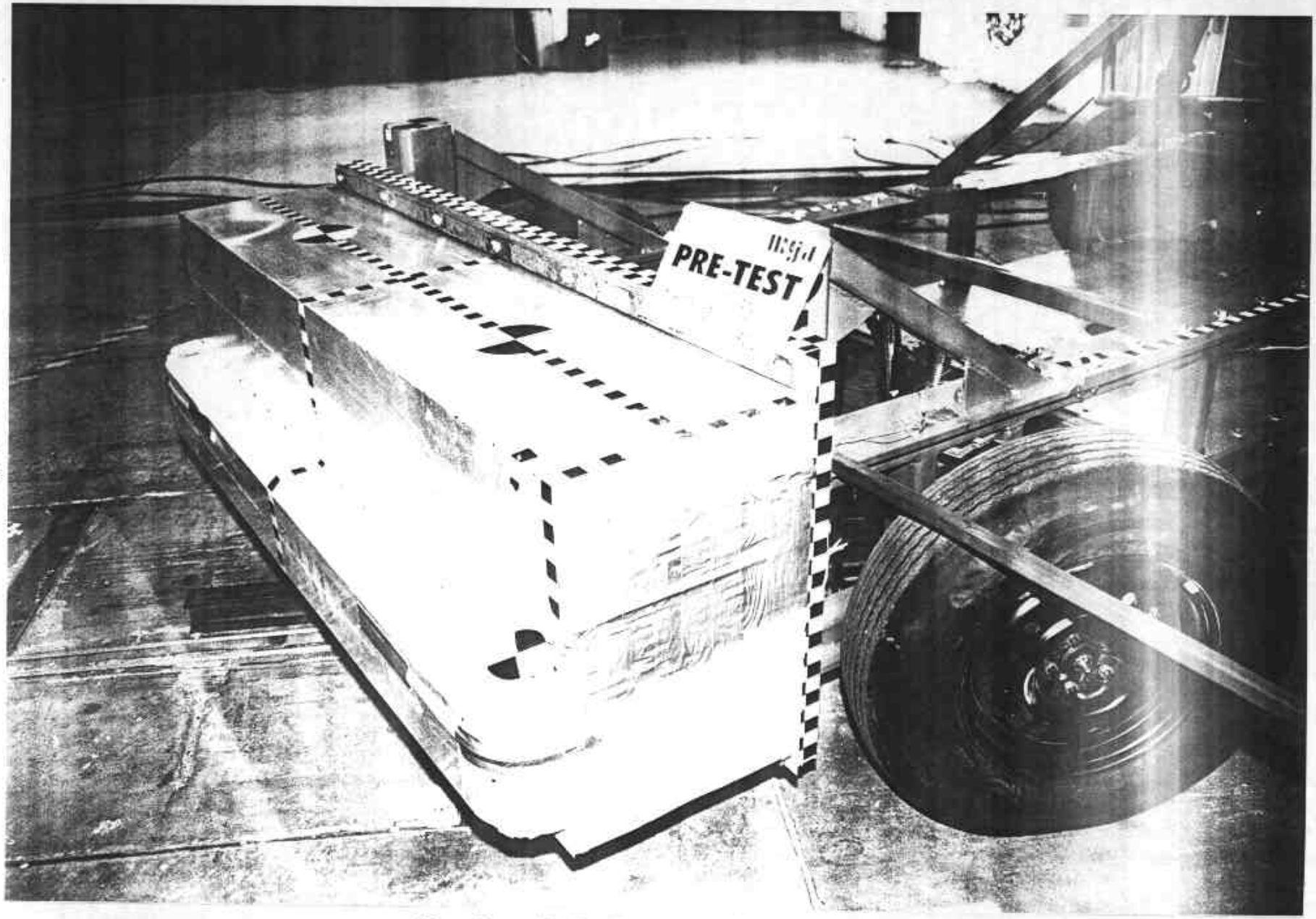


Photo No. A-17 - Pre-Test MDB Left Side View

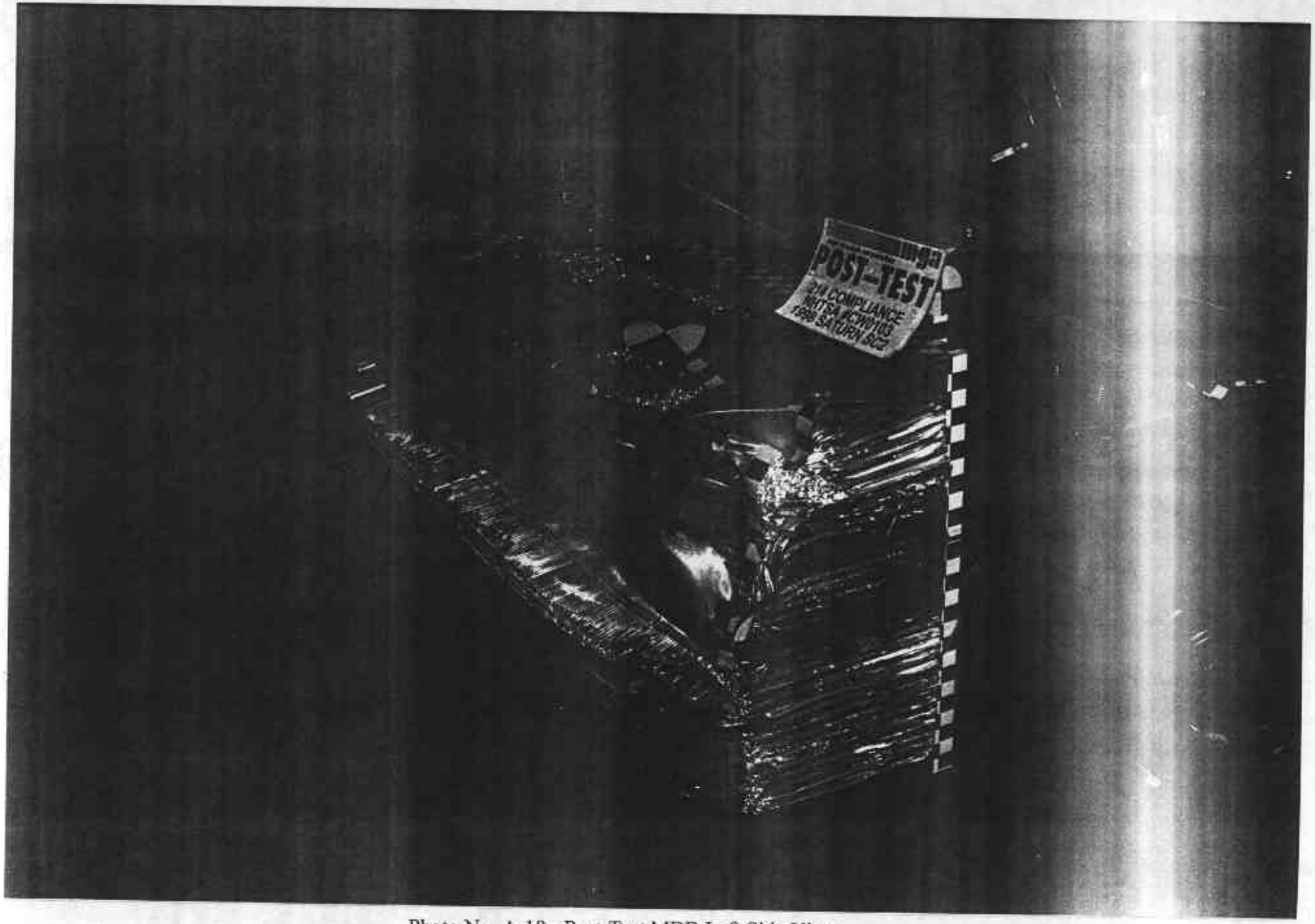


Photo No. A-18 - Post-Test MDB Left Side View

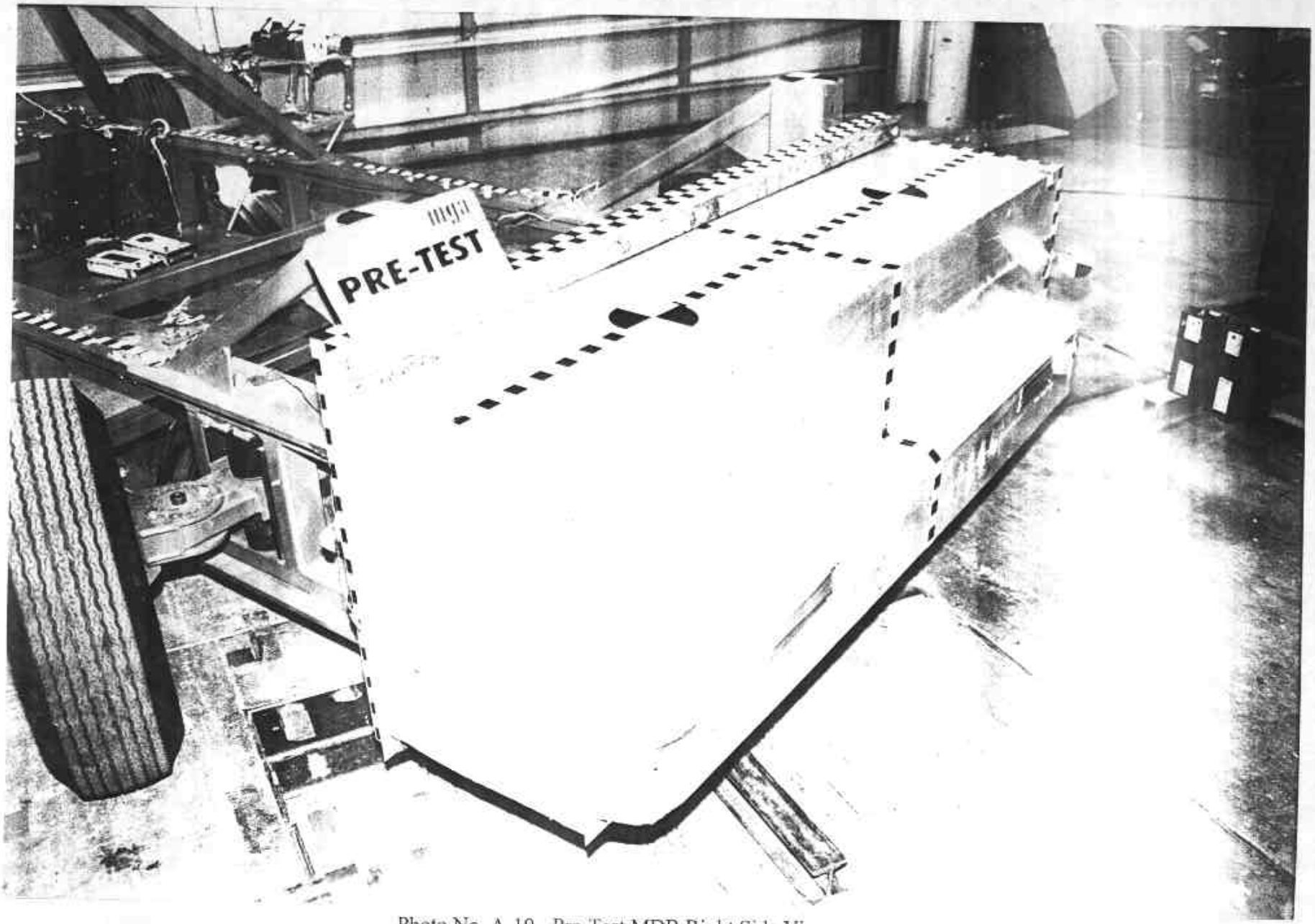


Photo No. A-19 - Pre-Test MDB Right Side View

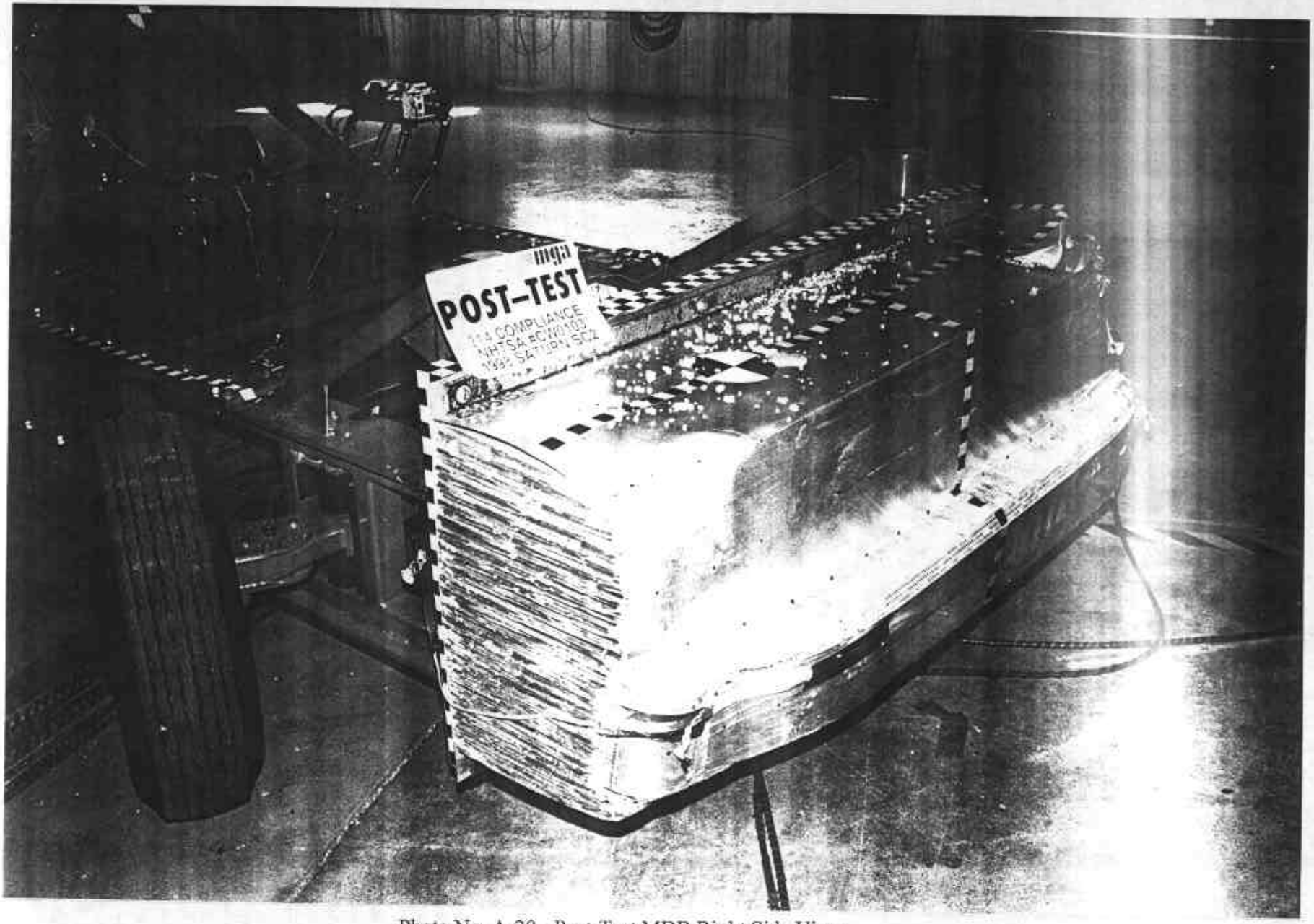


Photo No. A-20 - Post-Test MDB Right Side View

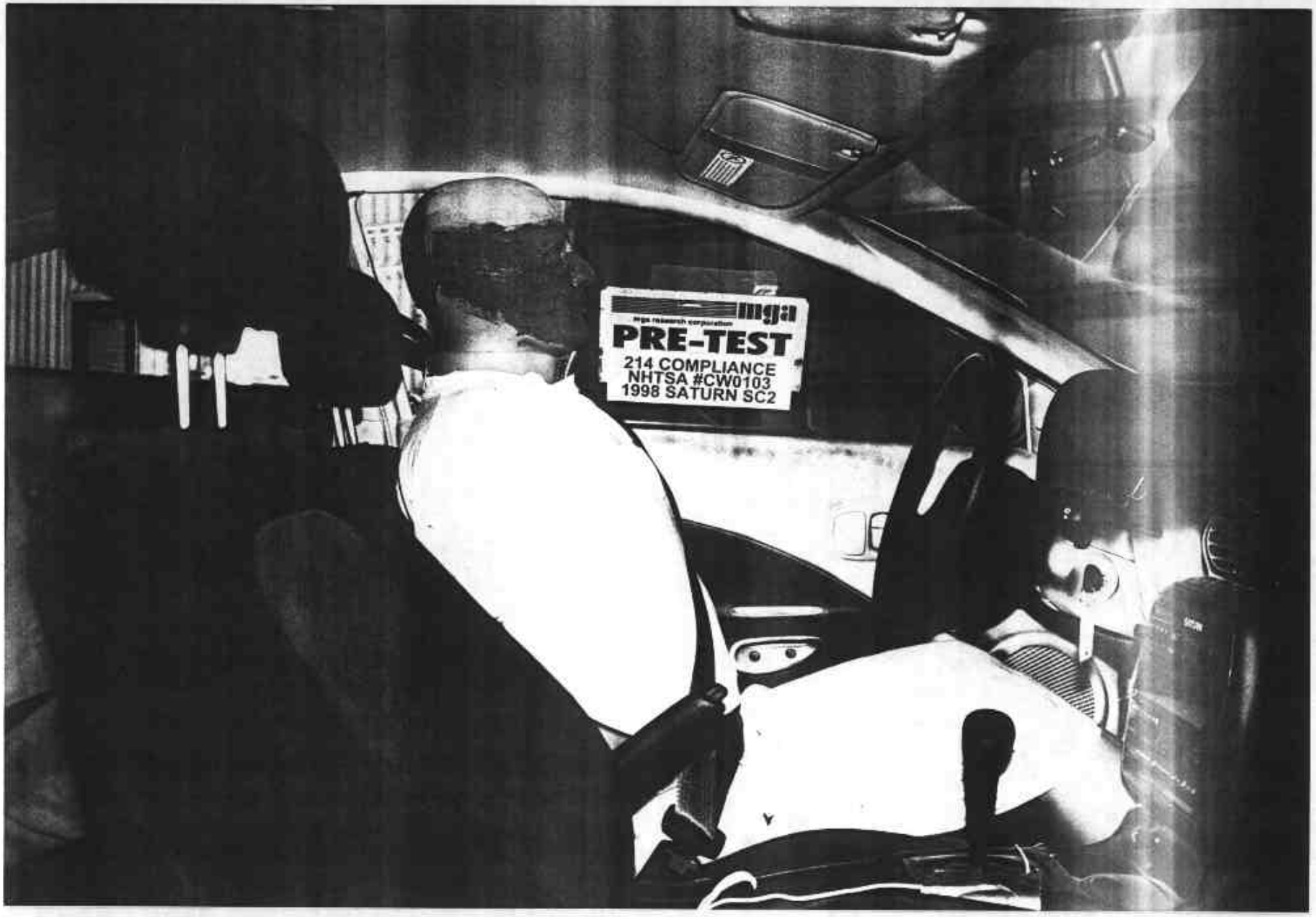


Photo No. A-21 - Pre-Test Driver Dummy Right Side View

Photo No. A-22 - Post-Test Driver Dummy Right Side View

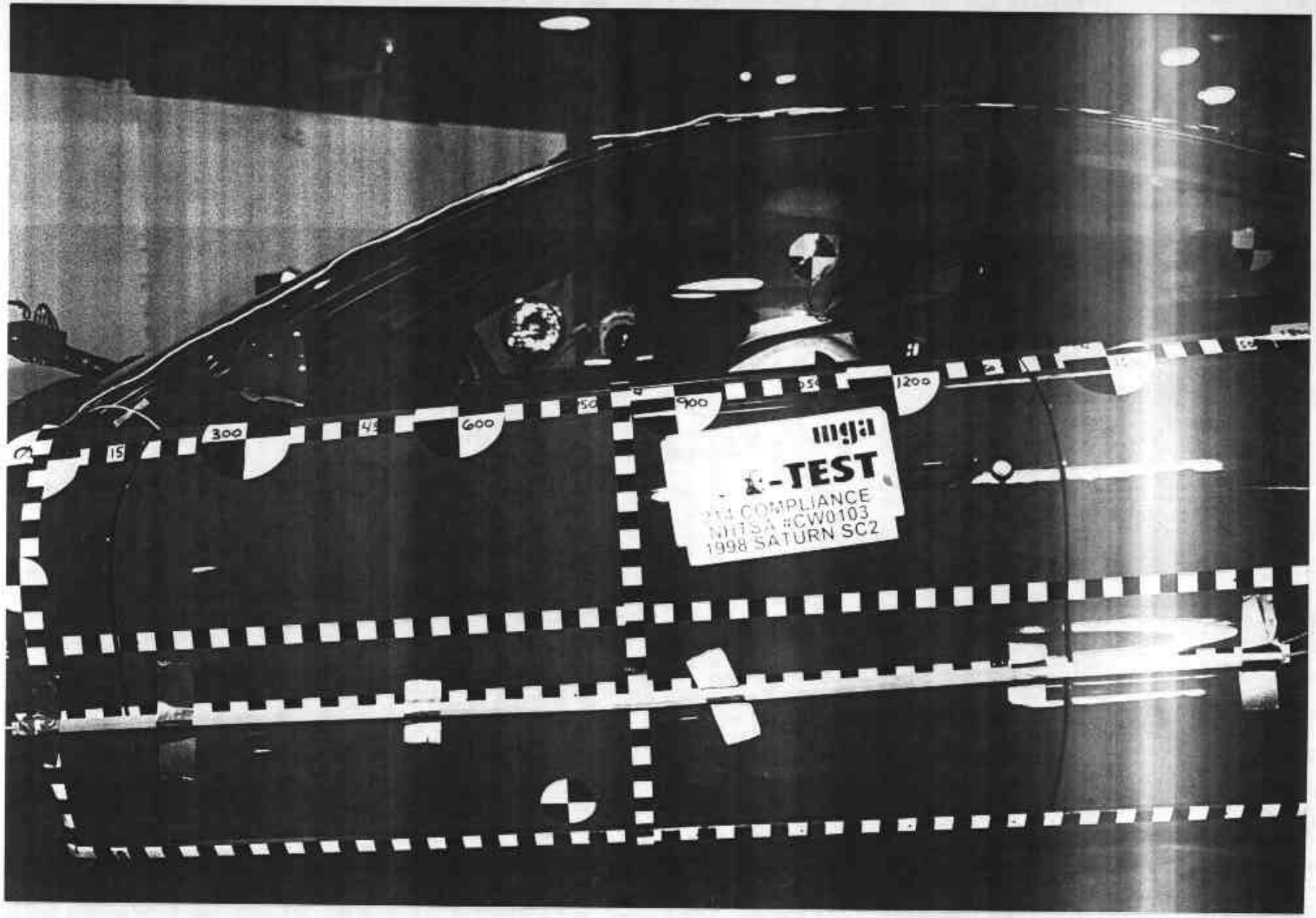


Photo No. A-23 - Pre-Test Driver Dummy Left Side View

A-24

Photo No. A-24 - Post-Test Driver Dummy Left Side View

Photo No. A-25 - Pre-Test Driver Dummy Left Side View (Door Open)

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

Photo No. A-27 - Post-Test Driver Shoulder and Door Top View

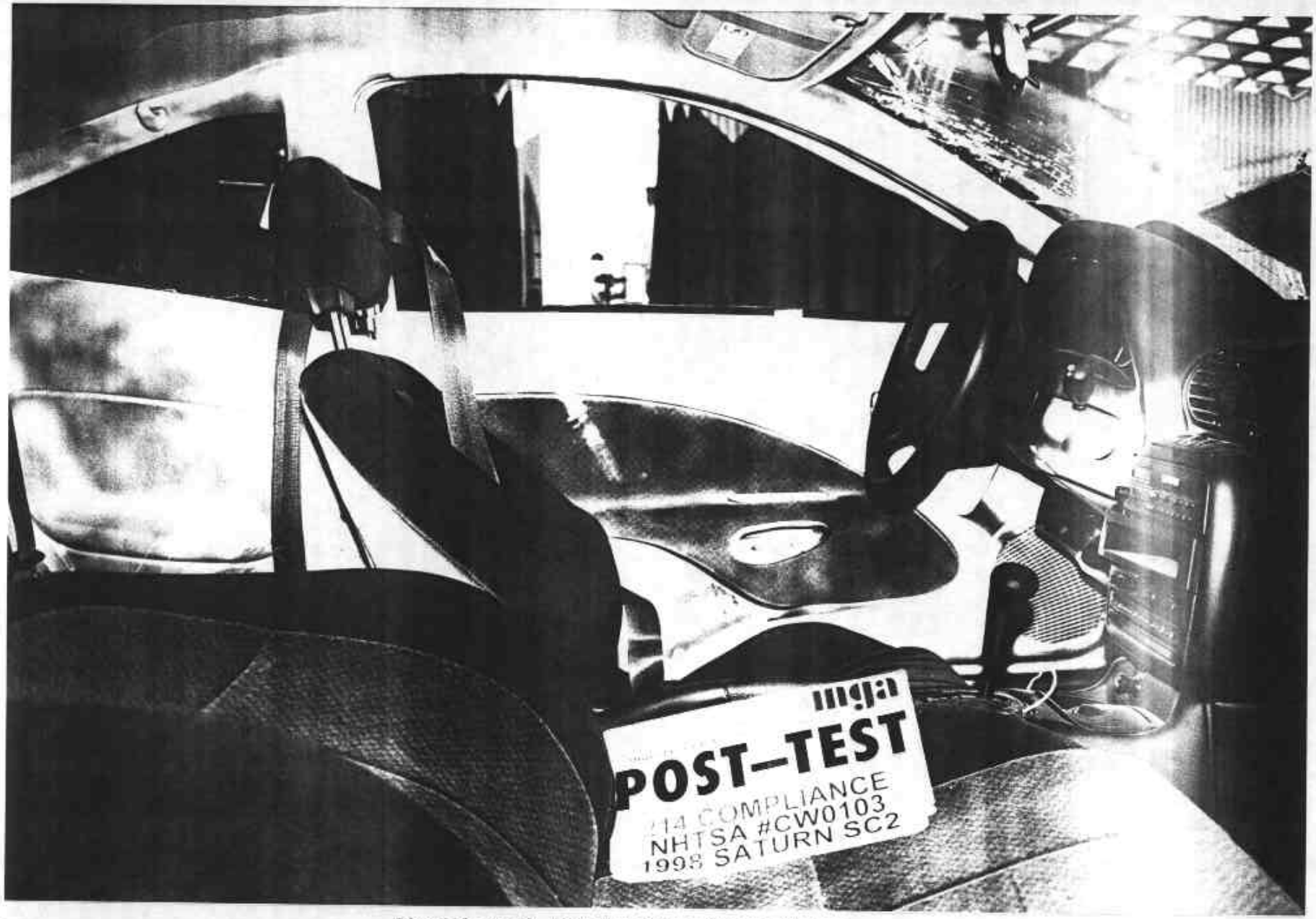


Photo No. A-28 - Post-Test Driver Dummy Contact

Photo No. A-29 - Post-Test Driver Dummy Head Contact

Photo No. A-30 - Post-Test Driver Dummy Head Contact

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

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

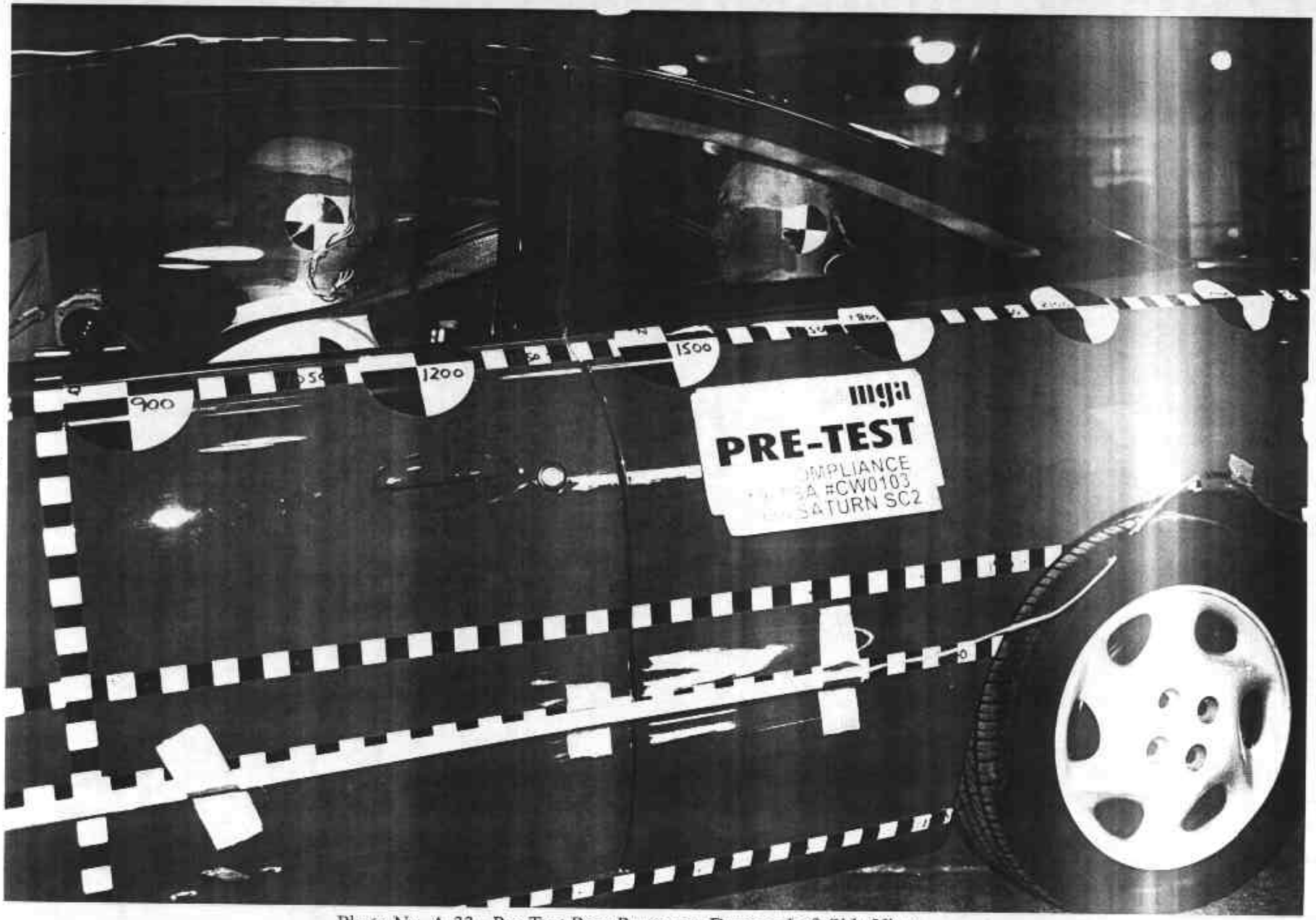


Photo No. A-33 - Pre-Test Rear Passenger Dummy Left Side View

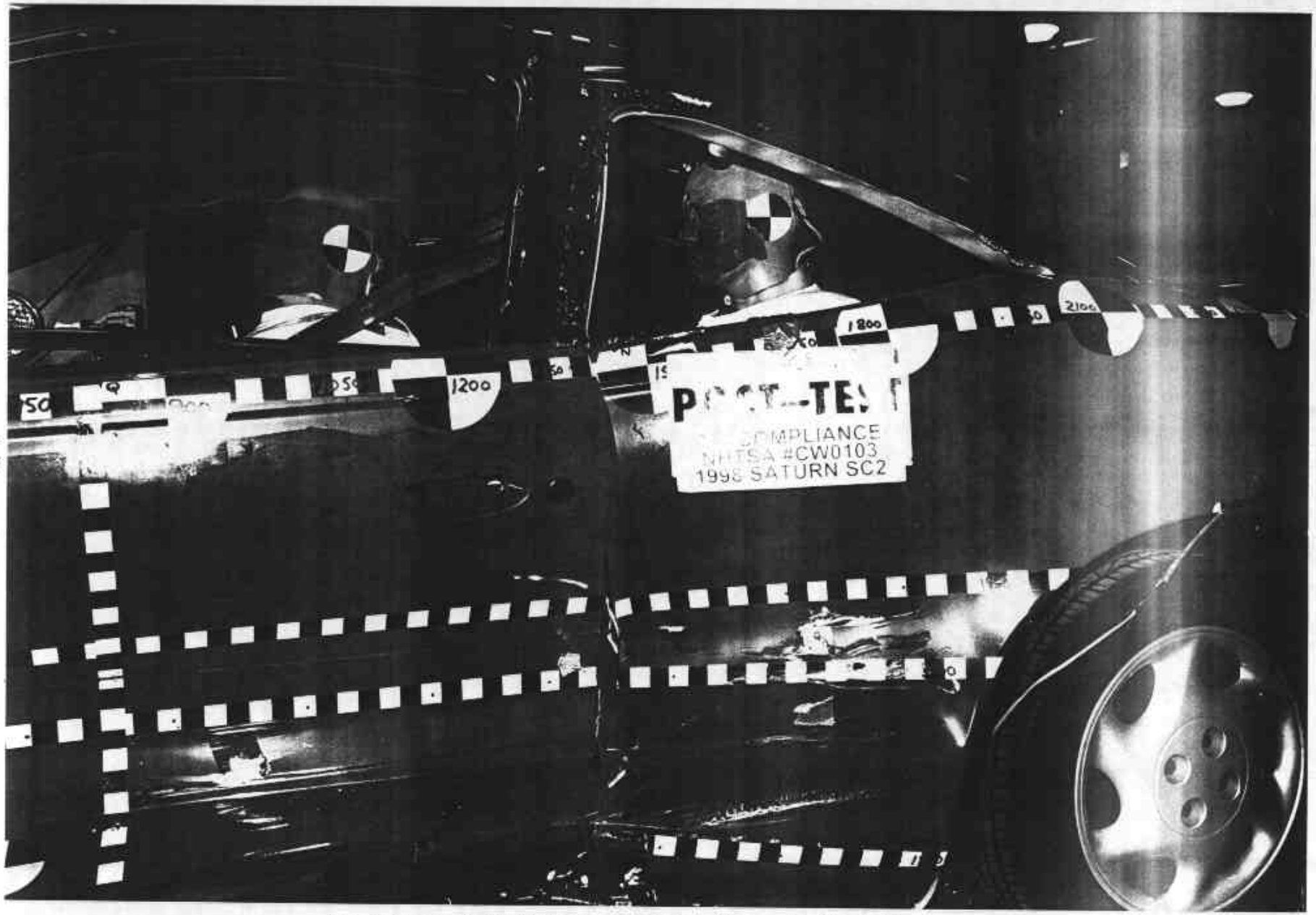


Photo No. A-34 - Post-Test Rear Passenger Dummy Left Side View

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

Photo No. A-36 - Post-Test Rear Passenger Dummy Shoulder View

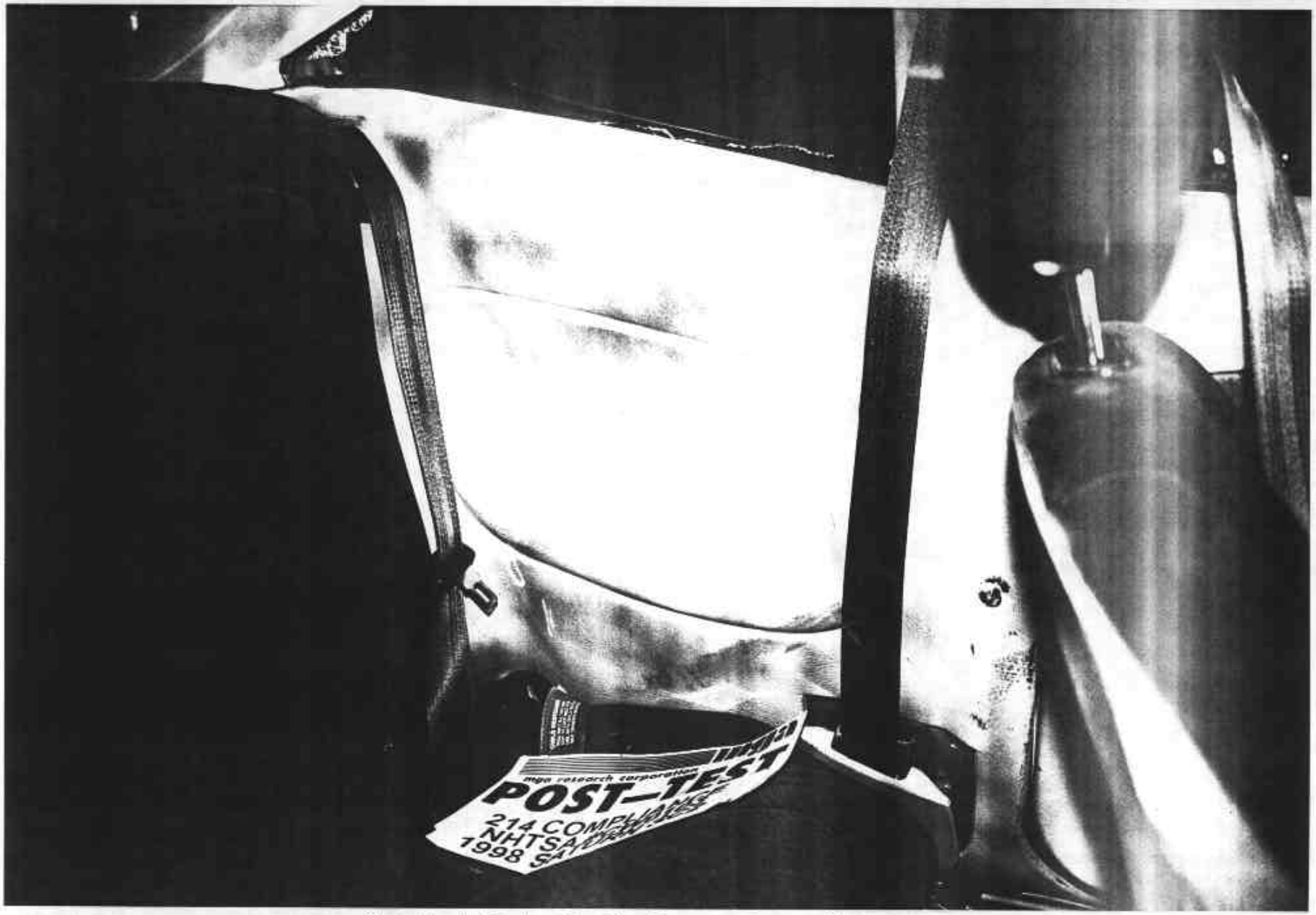


Photo No. A-37 - Post-Test Rear Passenger Dummy Contact

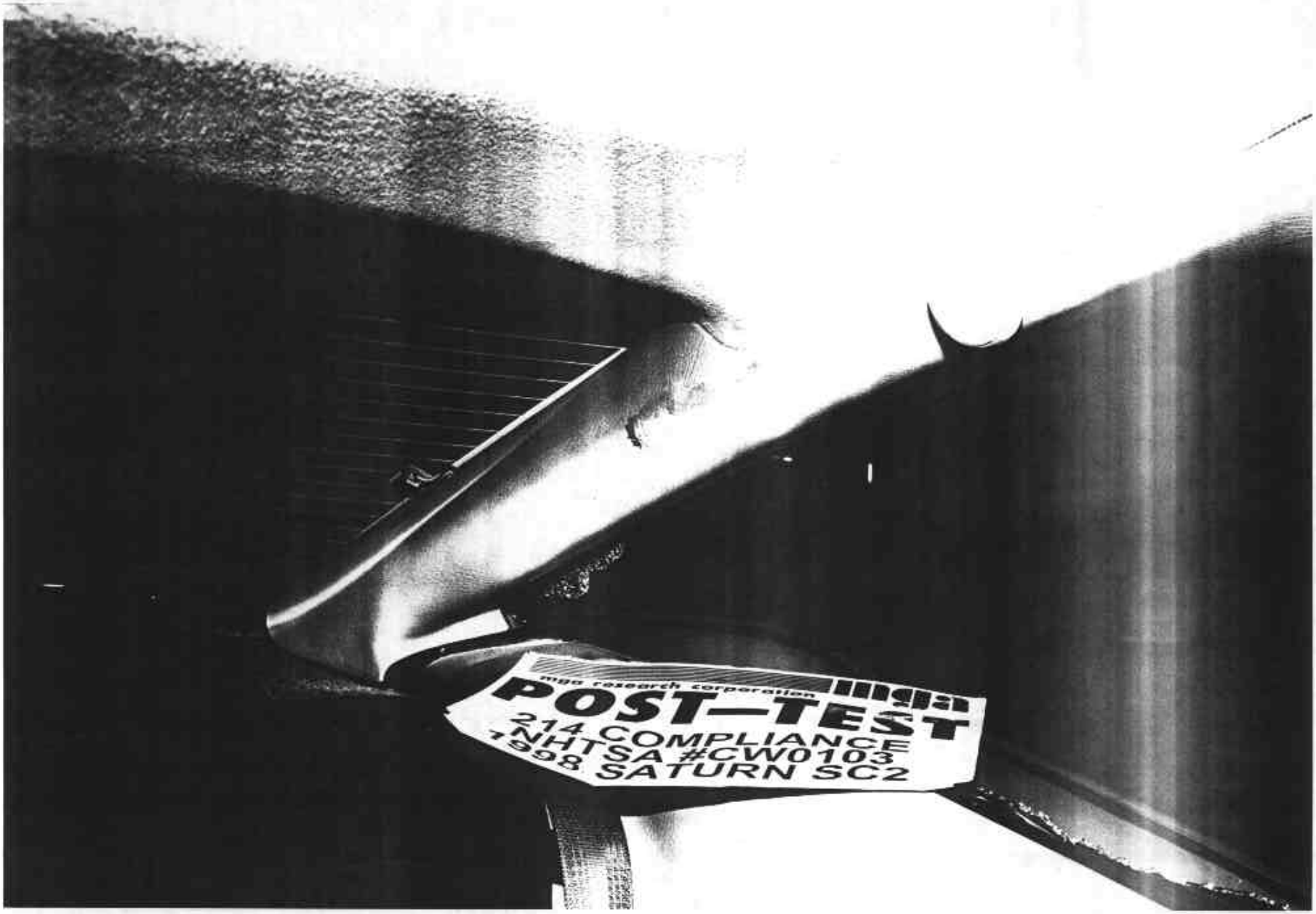
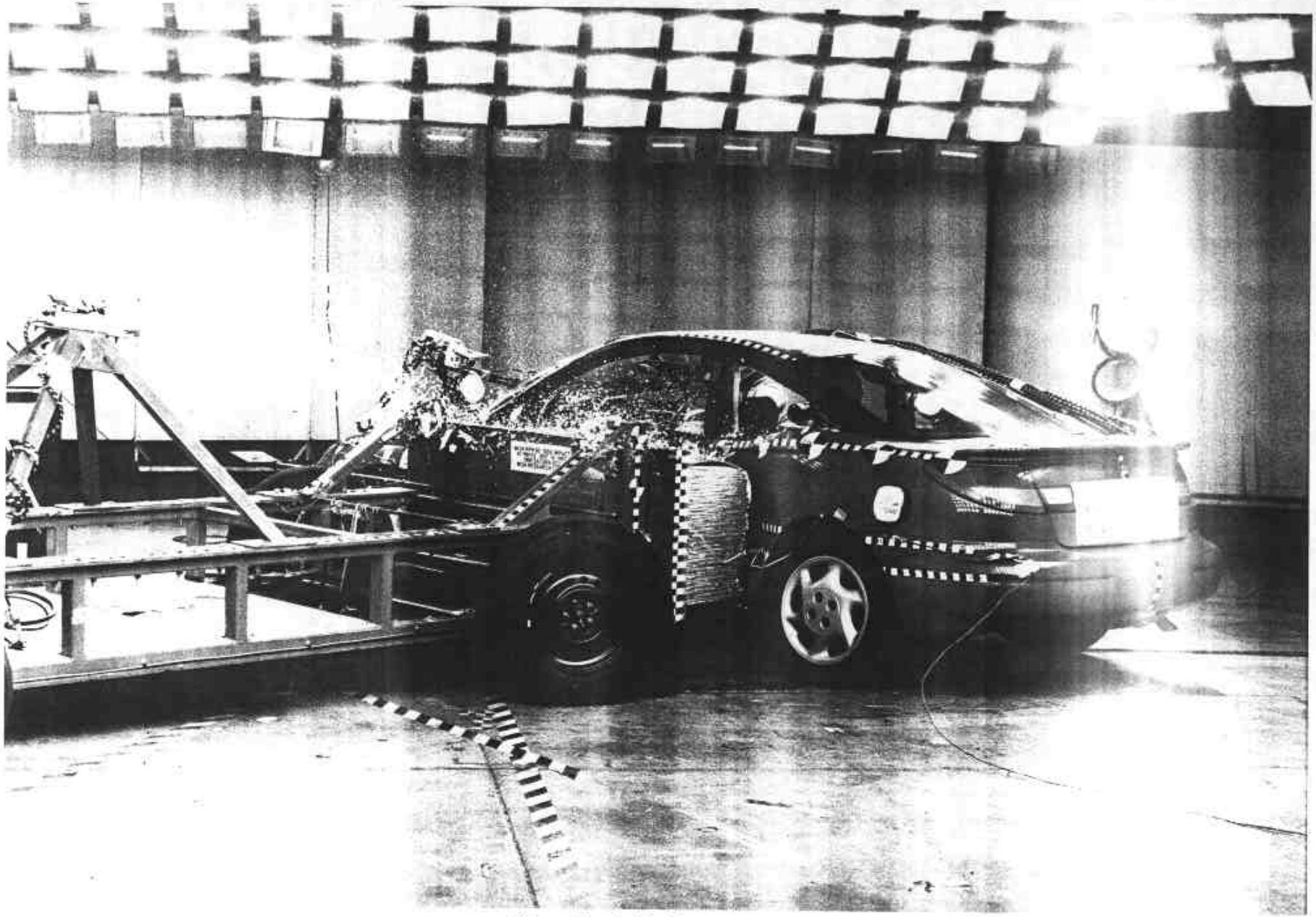


Photo No. A-38 - Post-Test Rear Passenger Dummy Head Contact

Photo No. A-39 - Pre-Test Left Front Impact Point on Vehicle

Photo No. A-40 - Post-Test Left Front Impact Point on Vehicle



A41

Photo No. A-41 - Impact

Photo No. A-42 - Vehicle Certification Label

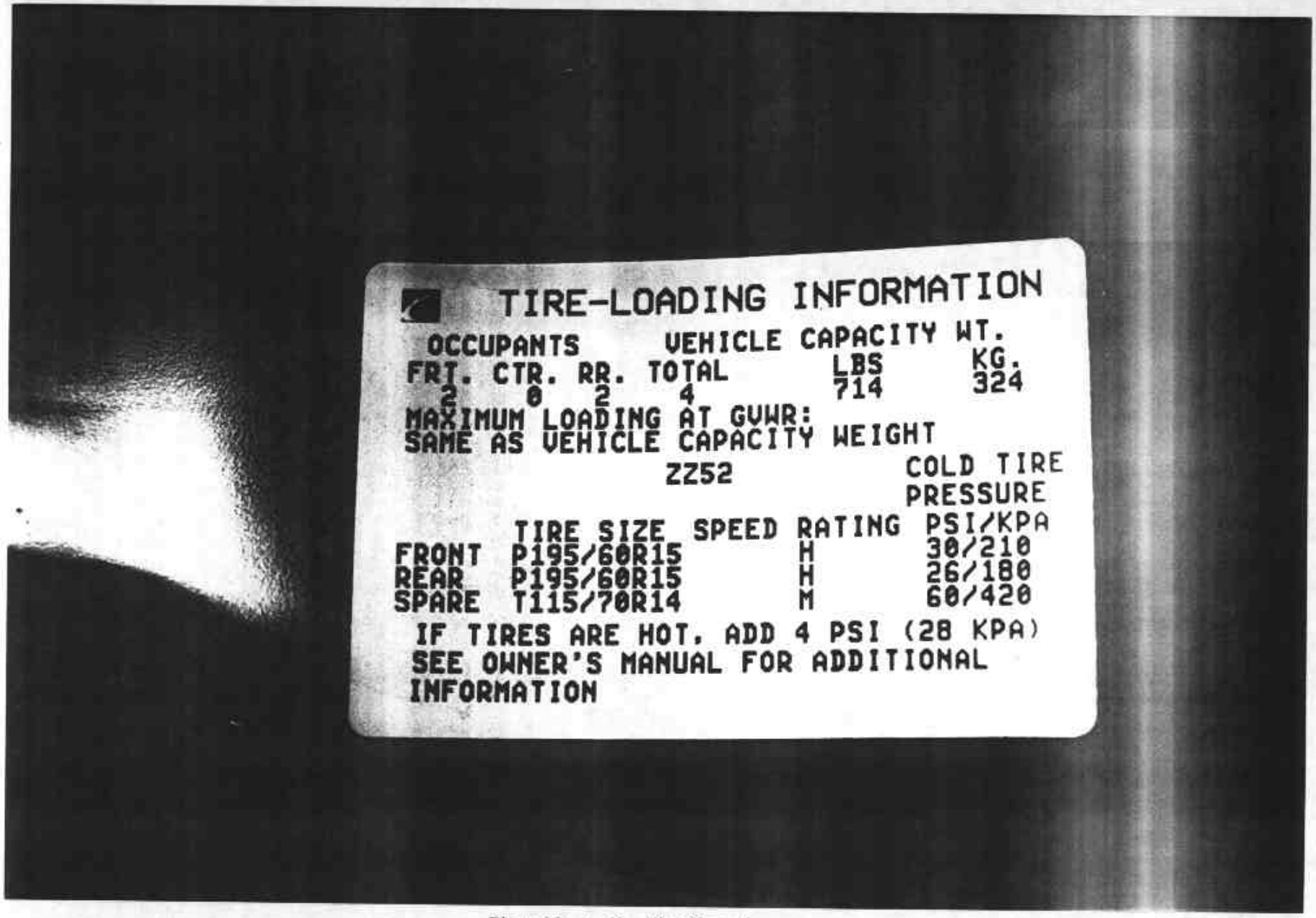


Photo No. A-43 - Tire Placard

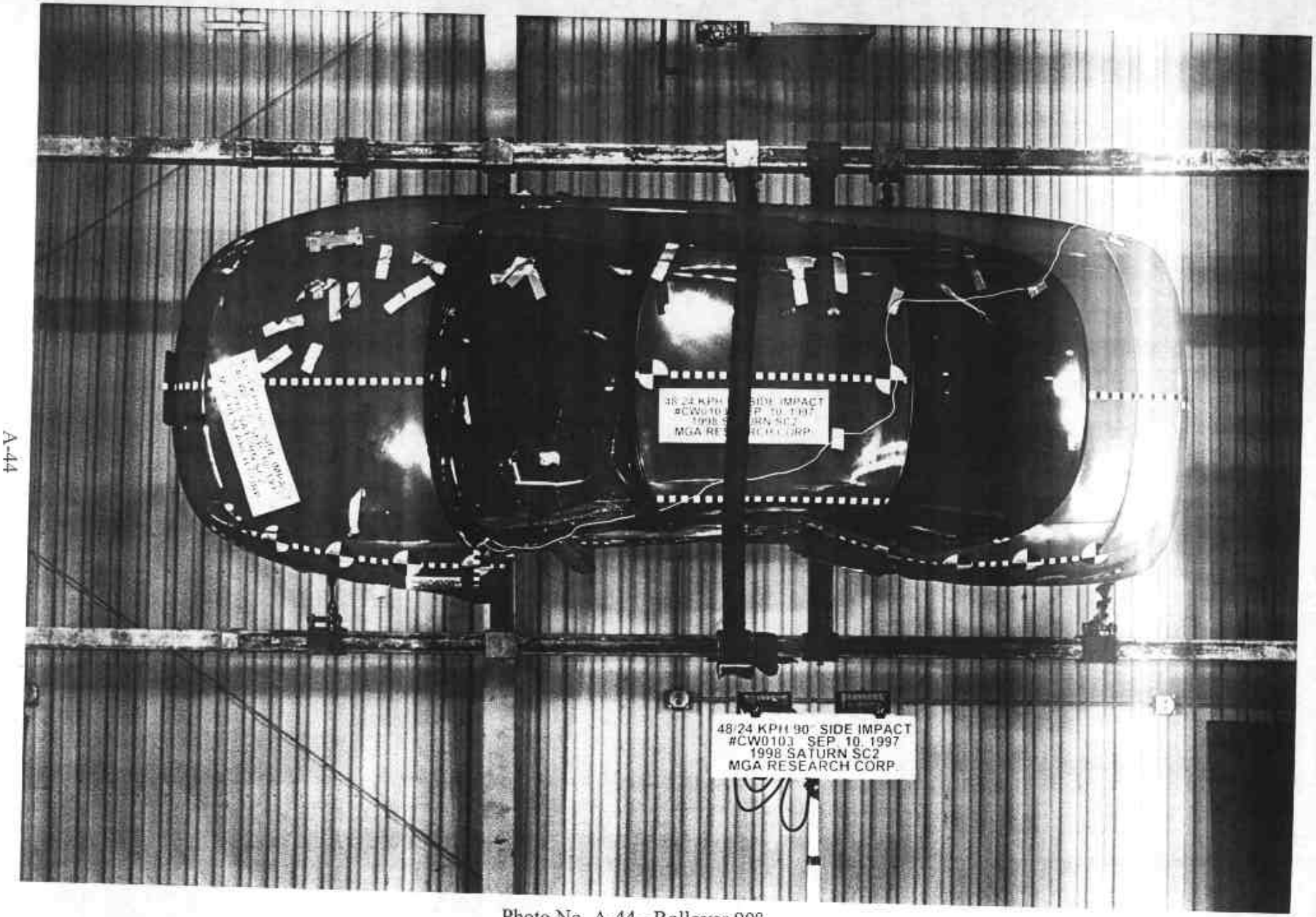


Photo No. A-44 - Rollover 90°

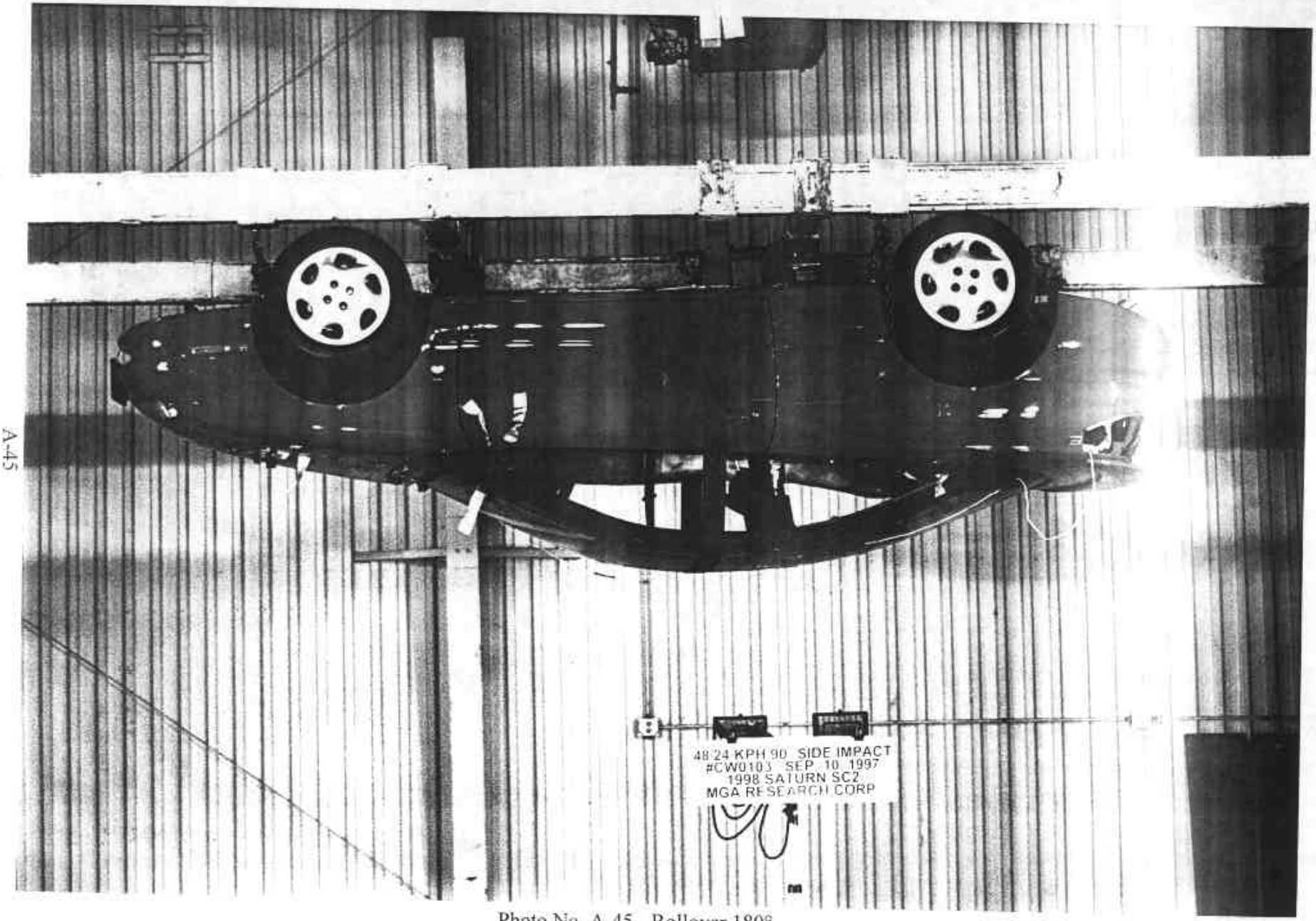


Photo No. A-45 - Rollover 180°

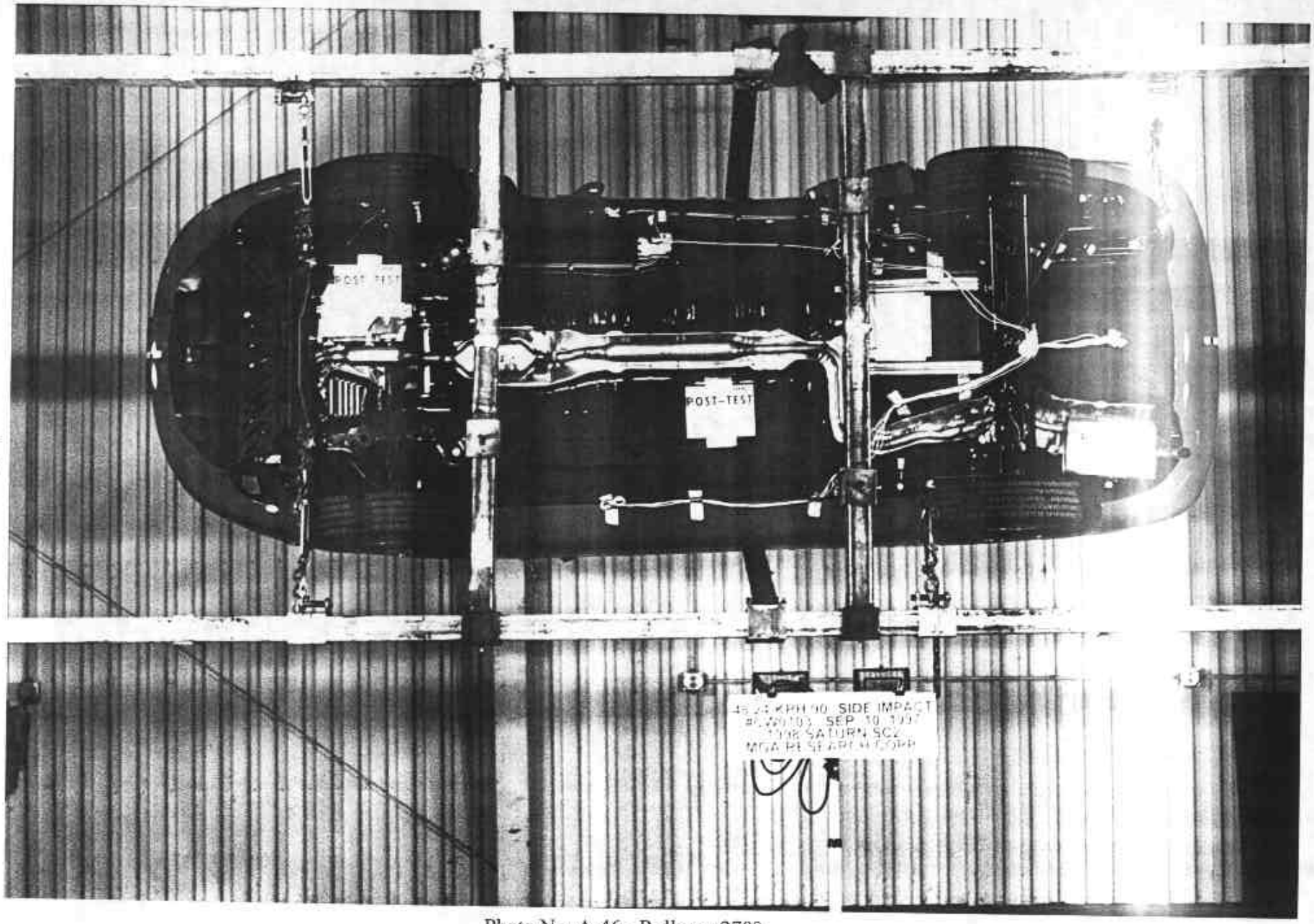


Photo No. A-46 - Rollover 270°

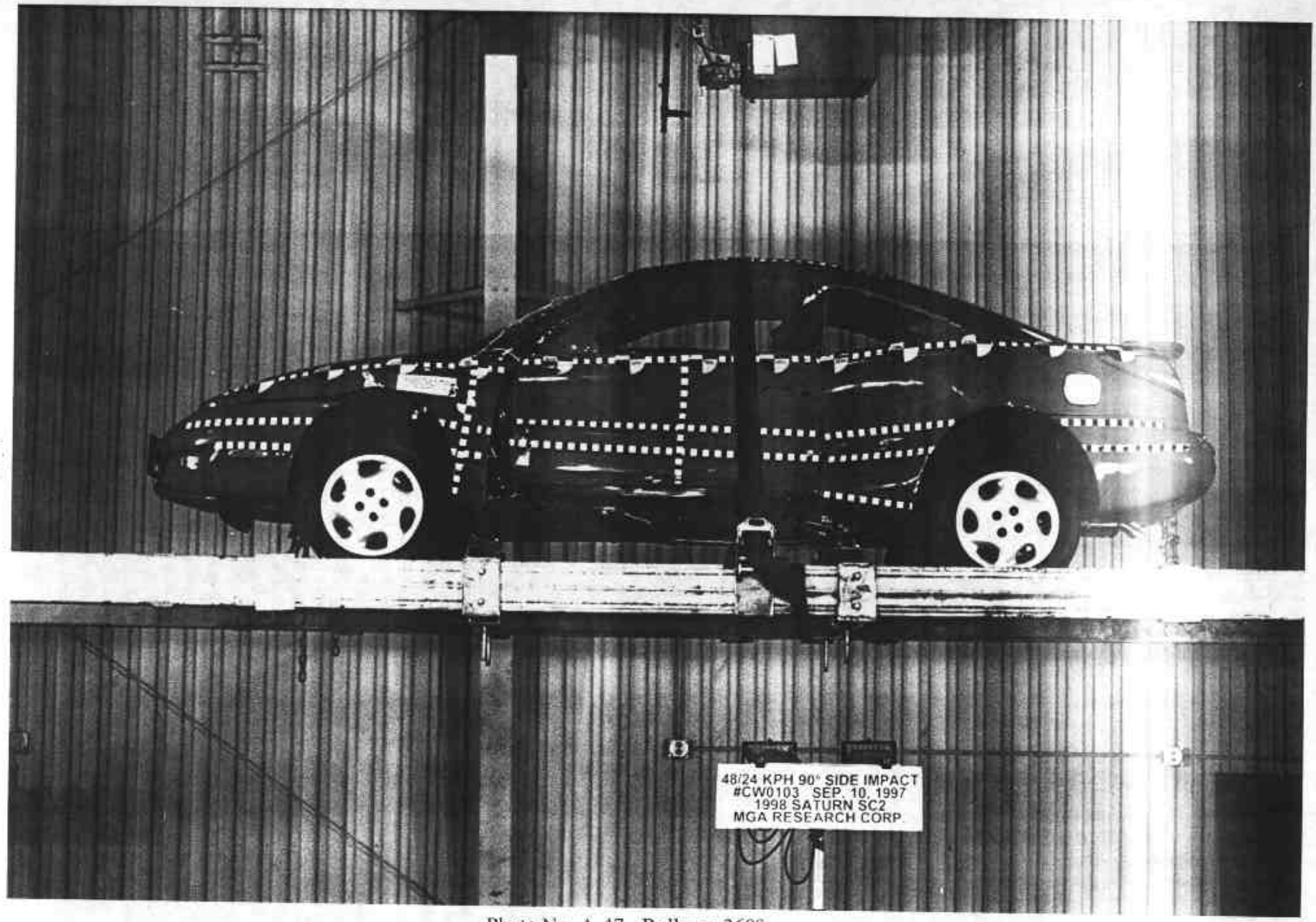


Photo No. A-47 - Rollover 360°

Photo No. A-48 - Left Front Attitude Point

Photo No. A-49 - Right Front Attitude Point

A-50

Photo No. A-50 - Left Rear Attitude Point

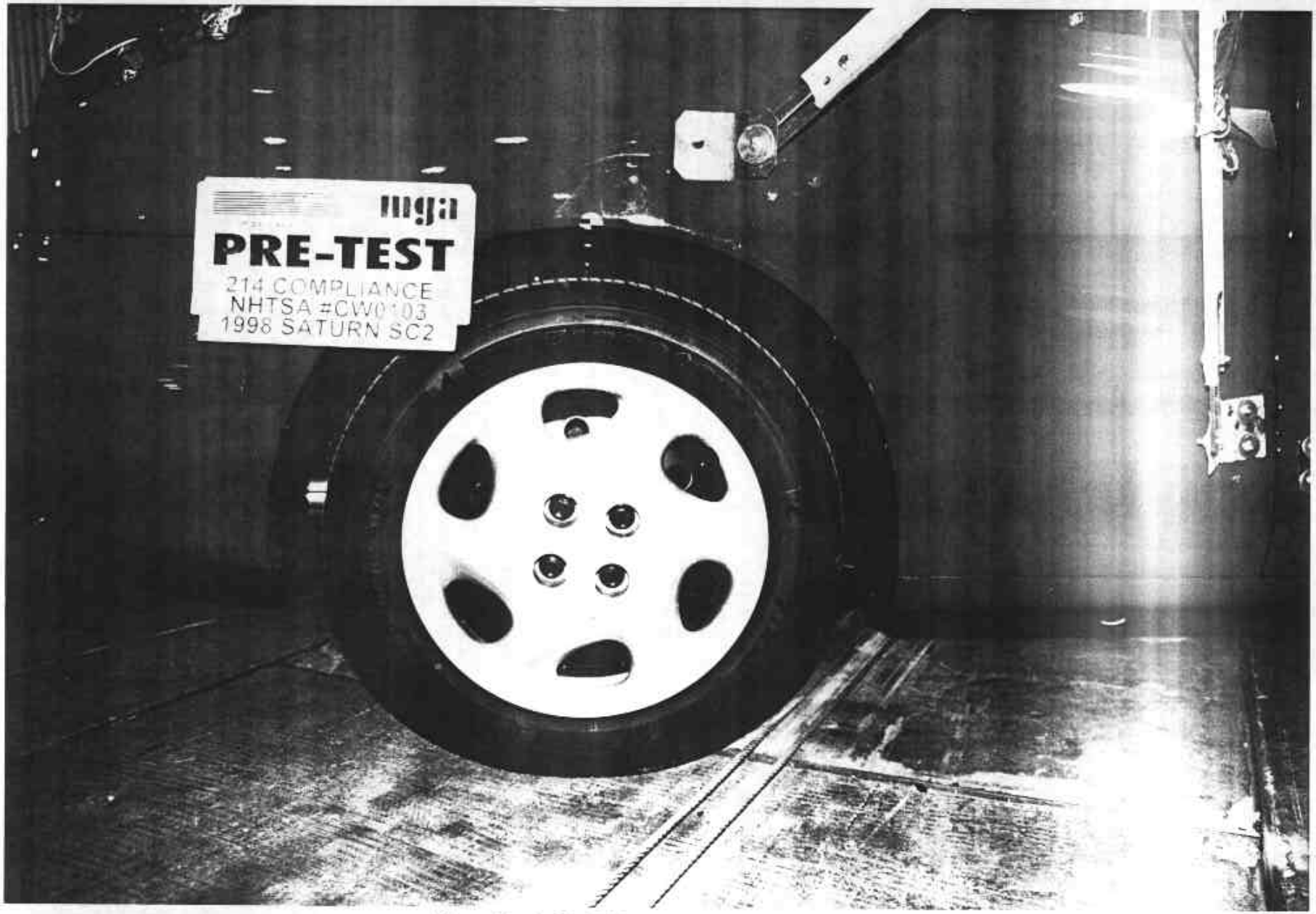
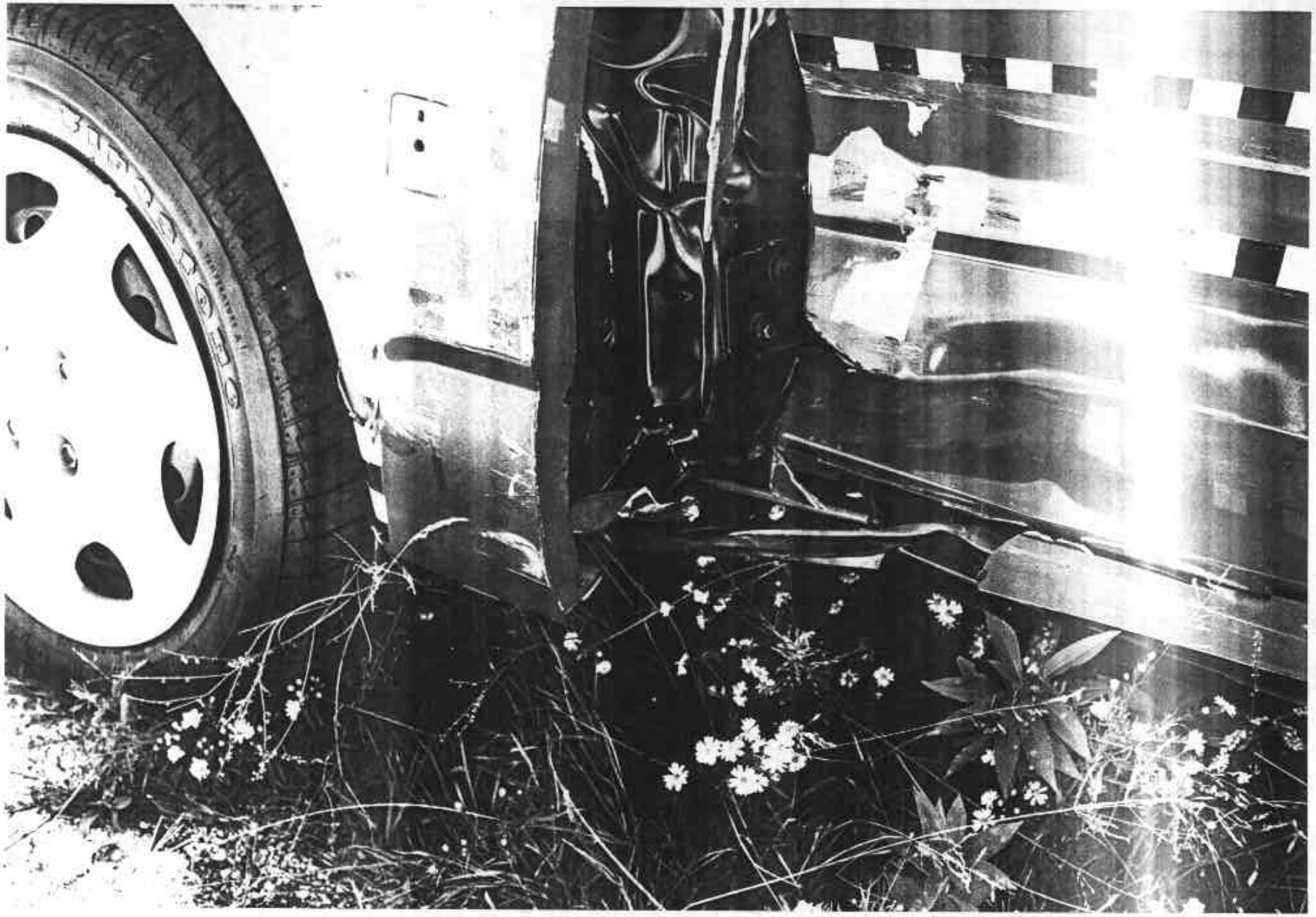


Photo No. A-51 - Right Rear Attitude Point



A-52

Photo No. A-52 - Sill Seperation at A-Pillar

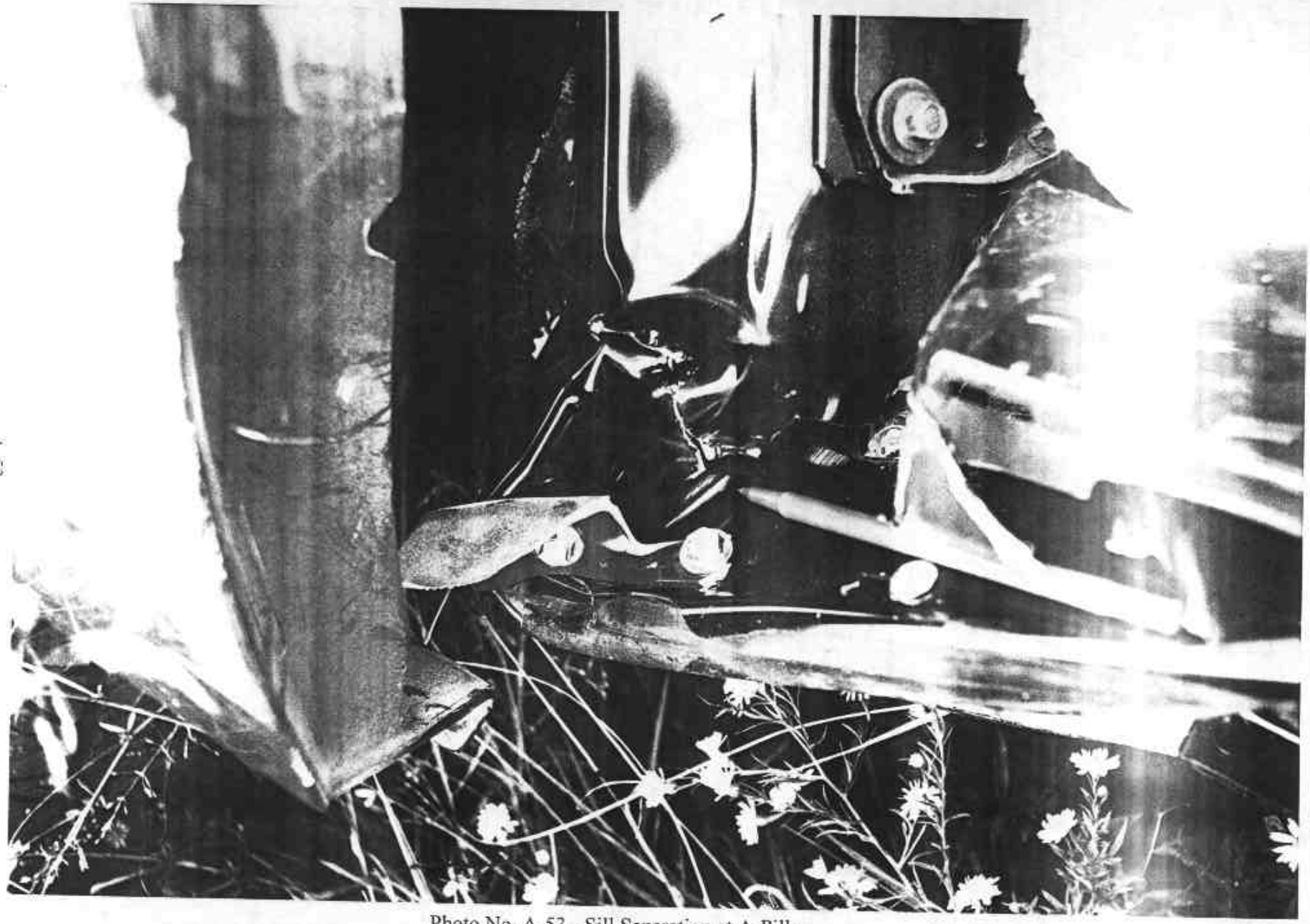


Photo No. A-53 - Sill Seperation at A-Pillar

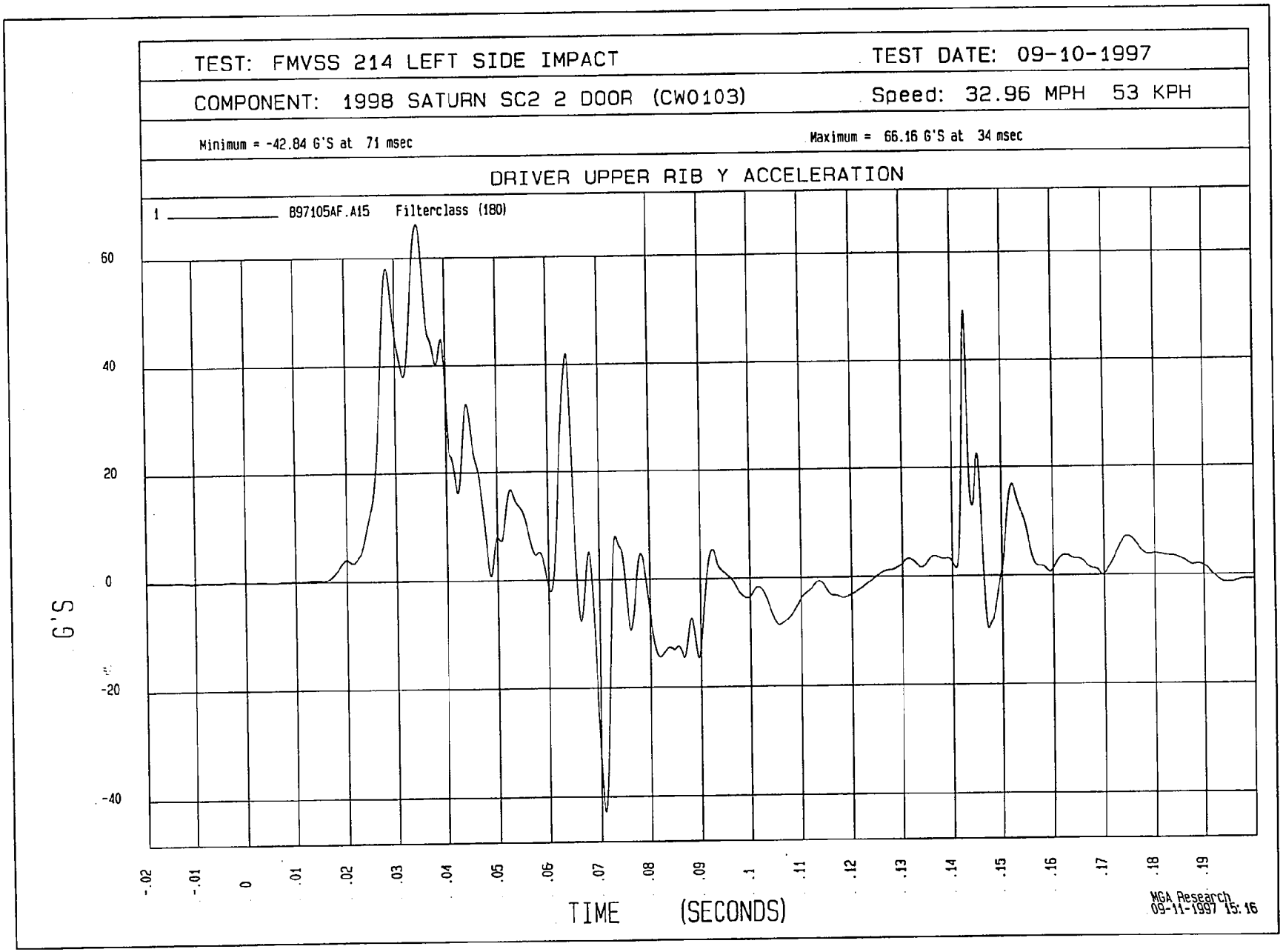
APPENDIX B - VEHICLE AND SID RESPONSE DATA

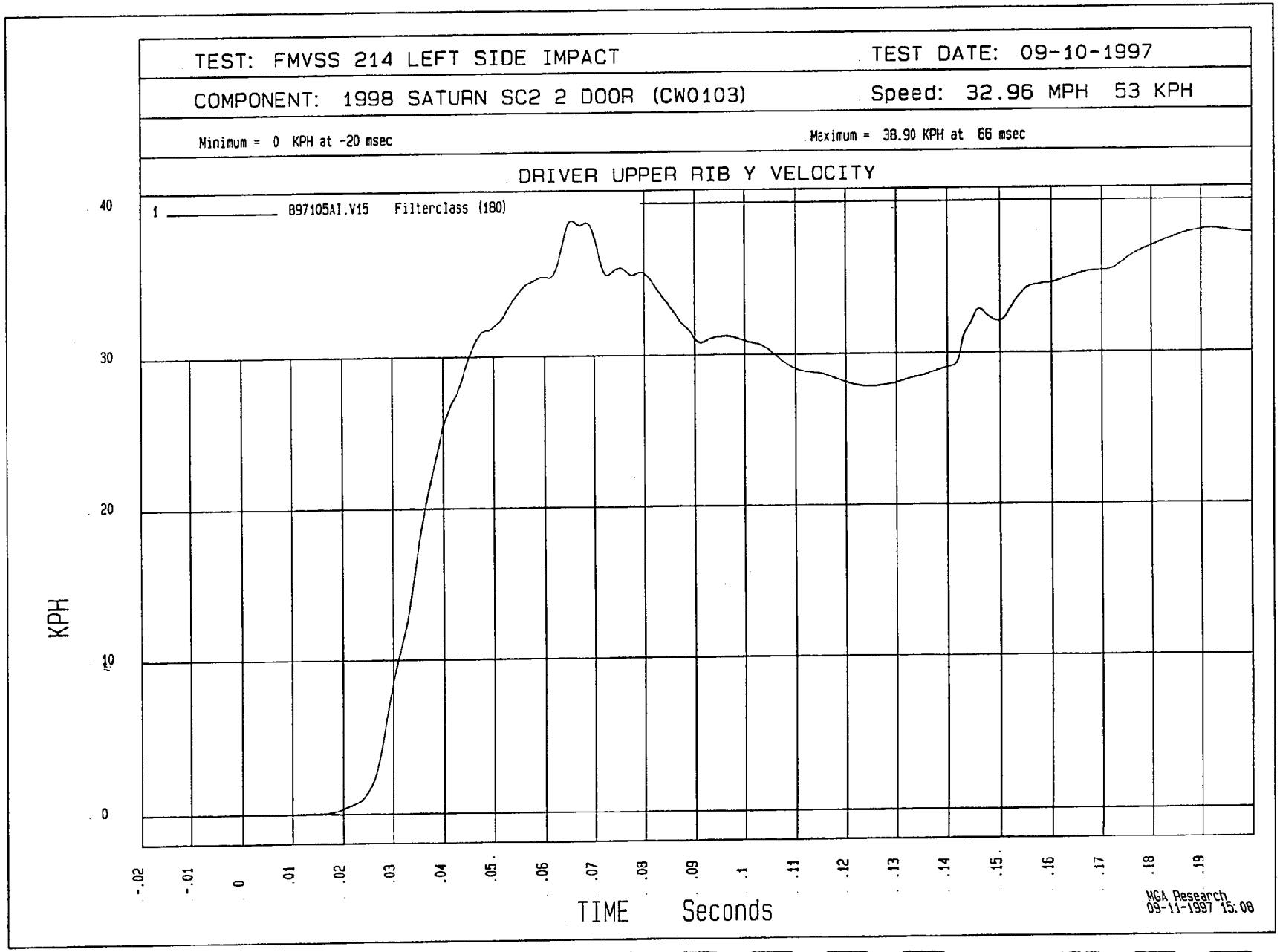
Table of Data Plots

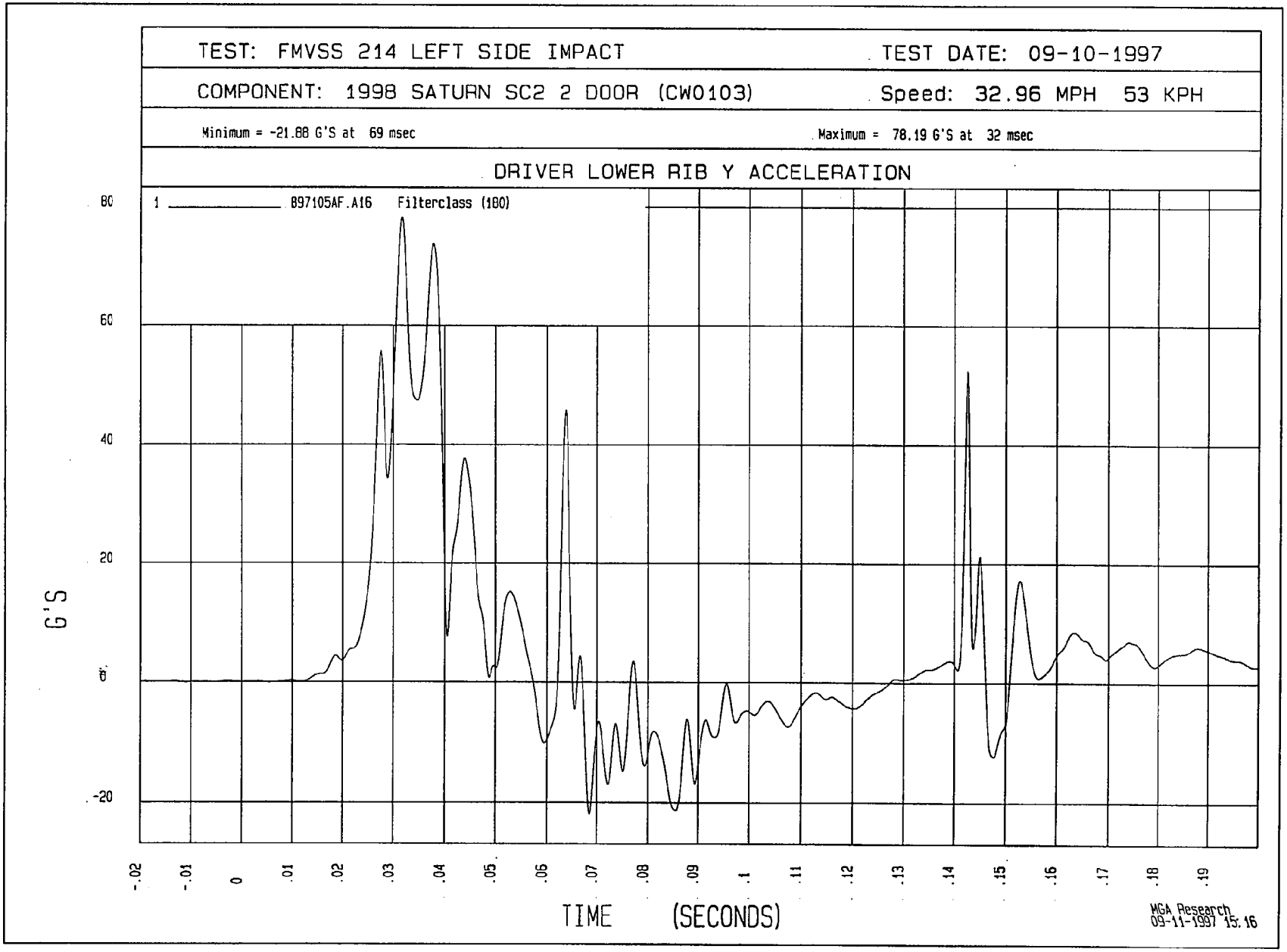
Table of Data Plots

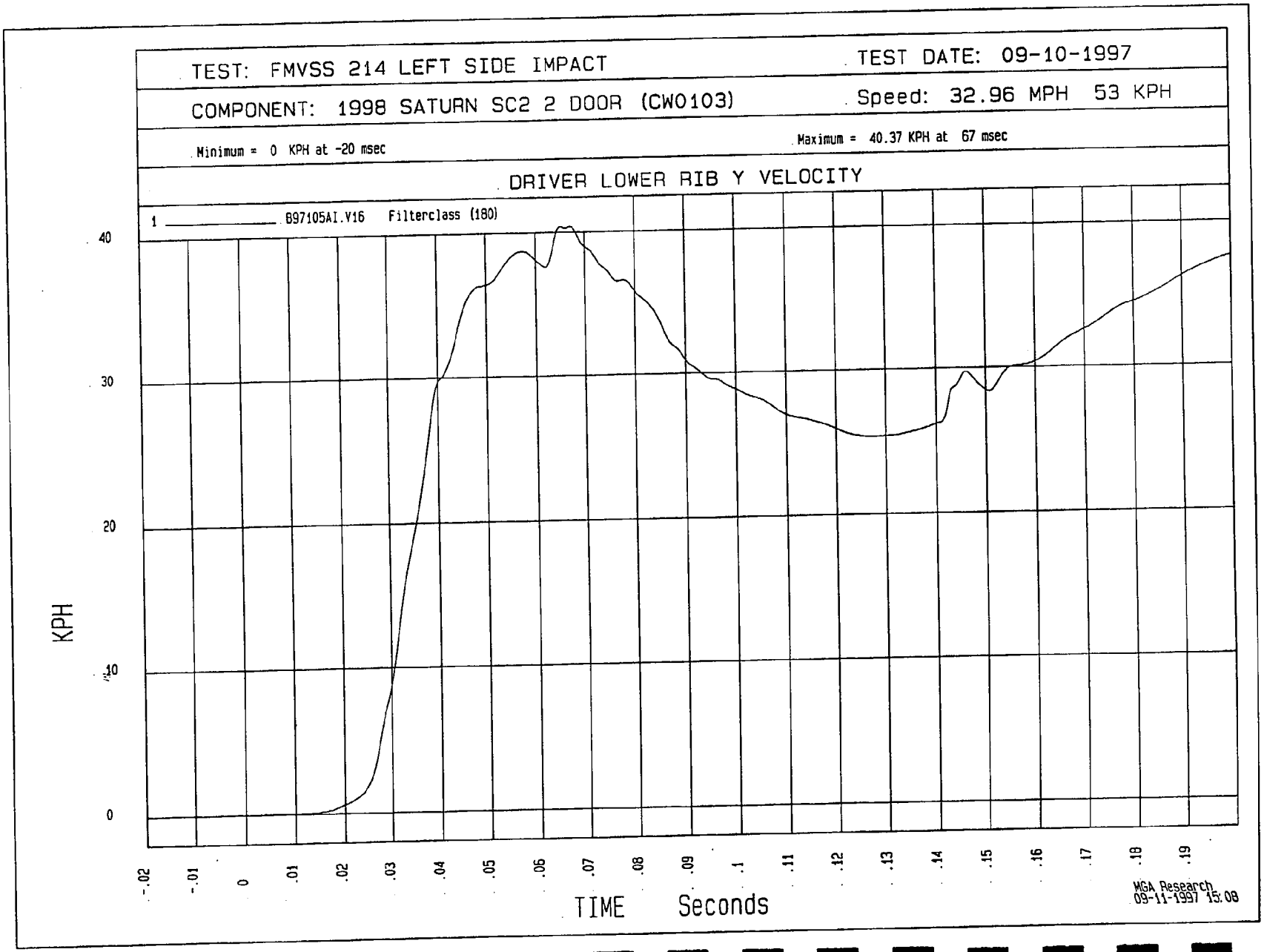
Table of Data Plots

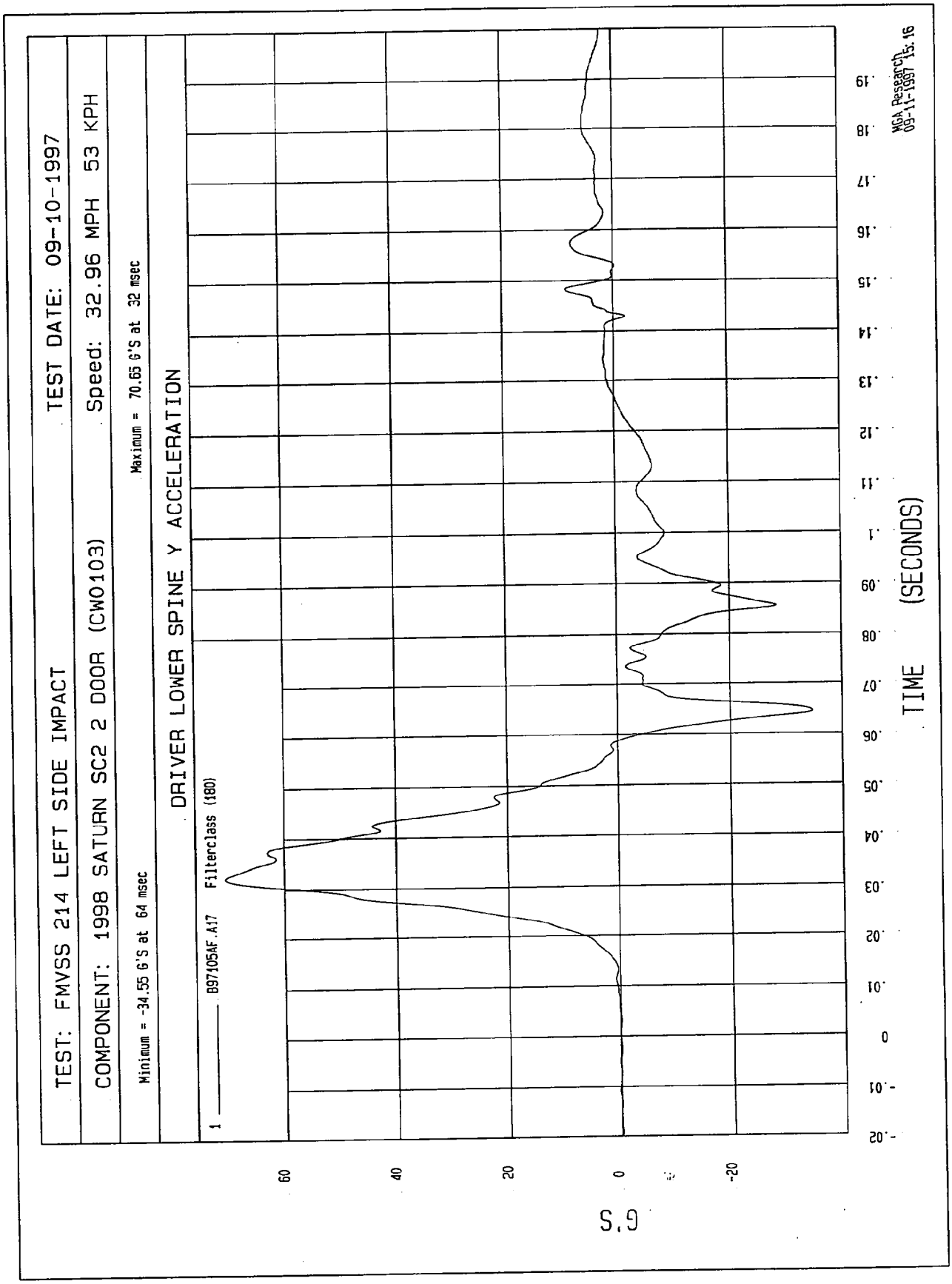
Table of Data Plots

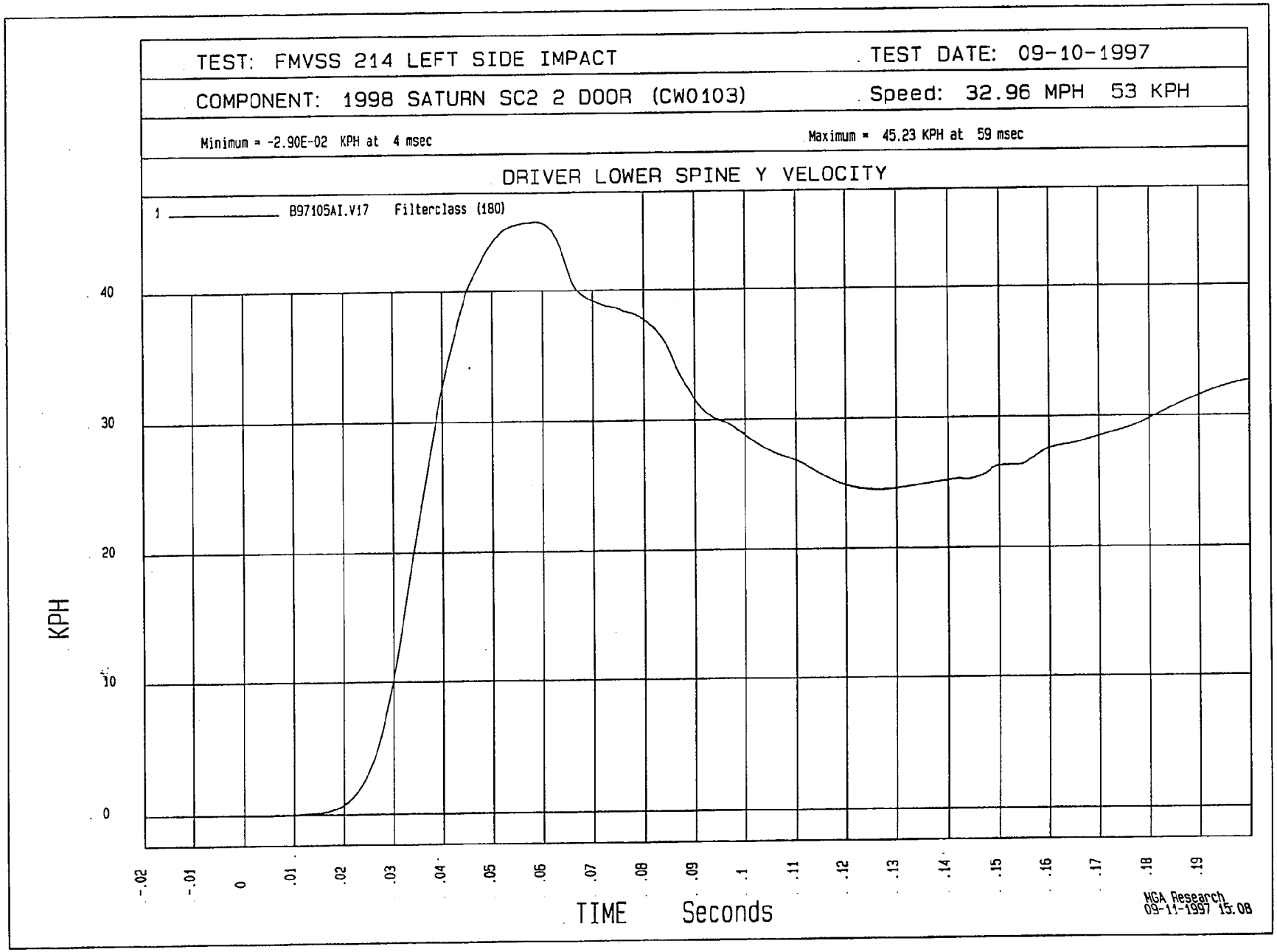

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -42.84 G'S at 71 msec
Maximum = 66.16 G'S at 34 msec
DRIVER UPPER RIB Y ACCELERATION
1 B97105AF.A15 Filterclass (180)
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:16

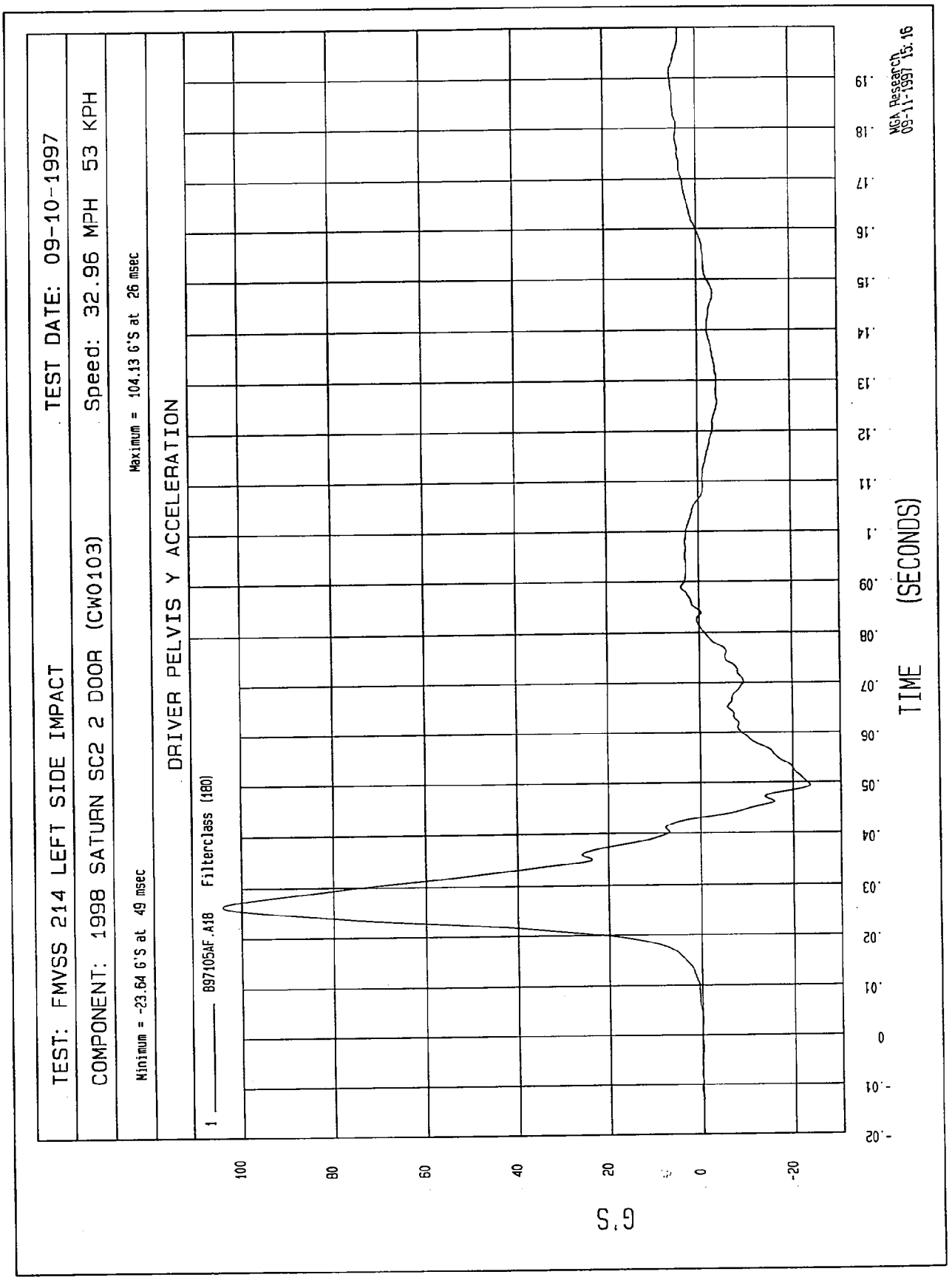

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 0 KPH at -20 msec
Maximum = 38.90 KPH at 66 msec
DRIVER UPPER RIB Y VELOCITY
1 897105AI.V15 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:08

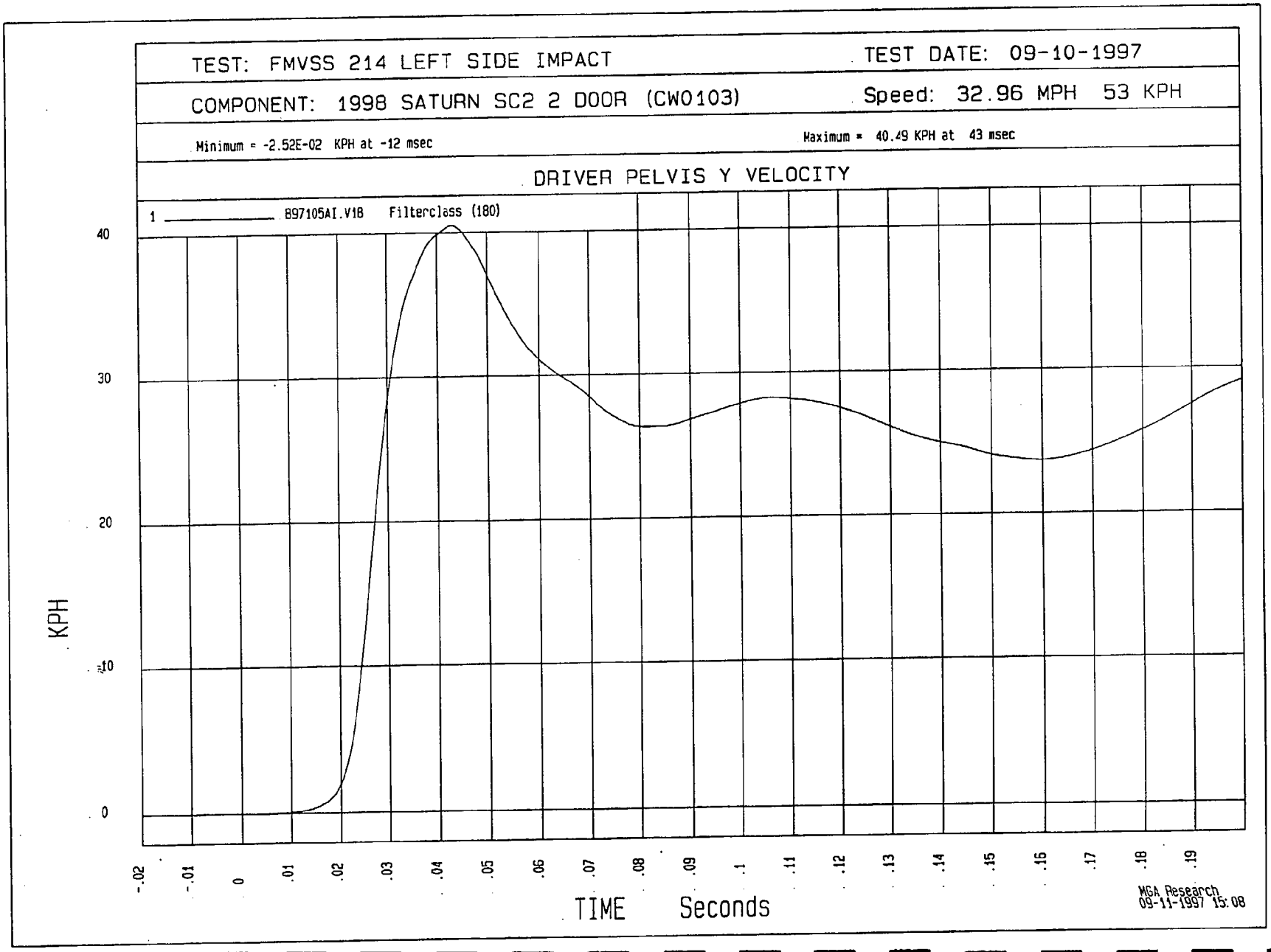

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -21.88 G'S at 69 msec
Maximum = 78.19 G'S at 32 msec
DRIVER LOWER RIB Y ACCELERATION
1 897105AF.A16 Filterclass (180)
80
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:16

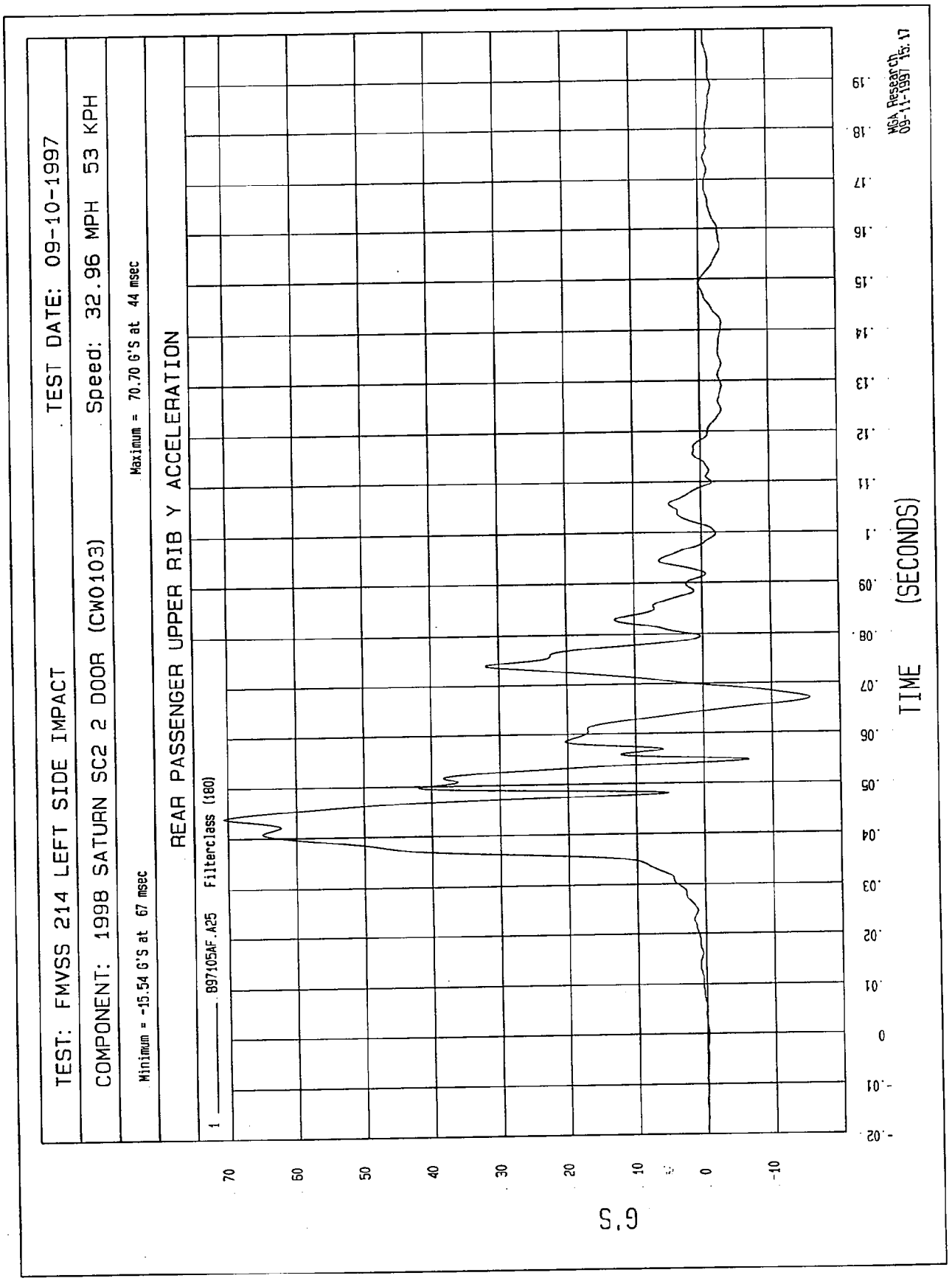

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 0 KPH at -20 msec
Maximum = 40.37 KPH at 67 msec
DRIVER LOWER RIB Y VELOCITY
1 B97105AI.V16 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:08

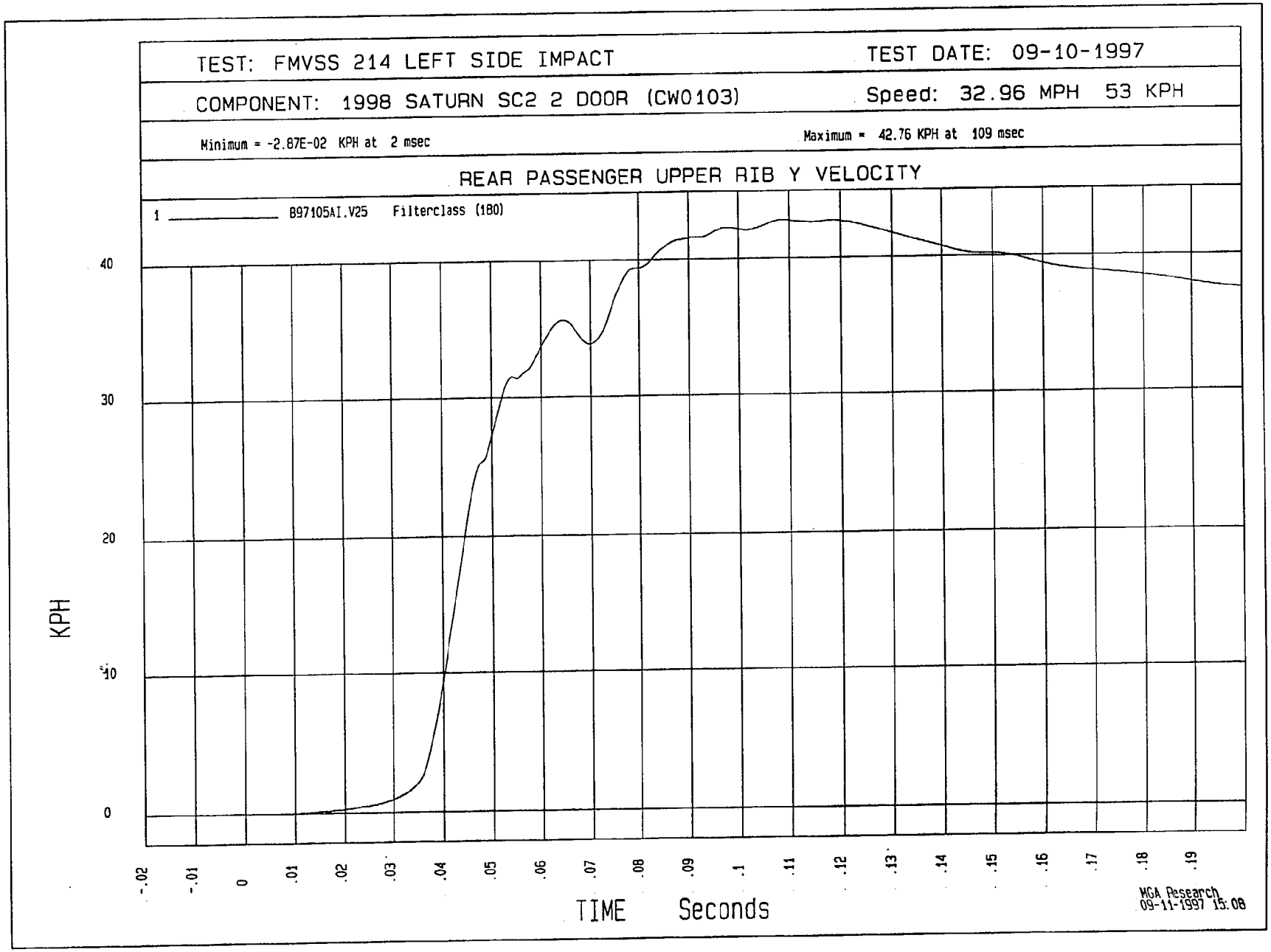

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -34.55 G'S at 64 msec
Maximum = 70.65 G'S at 32 msec
DRIVER LOWER SPINE Y ACCELERATION
1 B97105AF.A17 Filterclass (180)
MGA Research 09-11-1997 15:16
TIME (SECONDS)
G'S

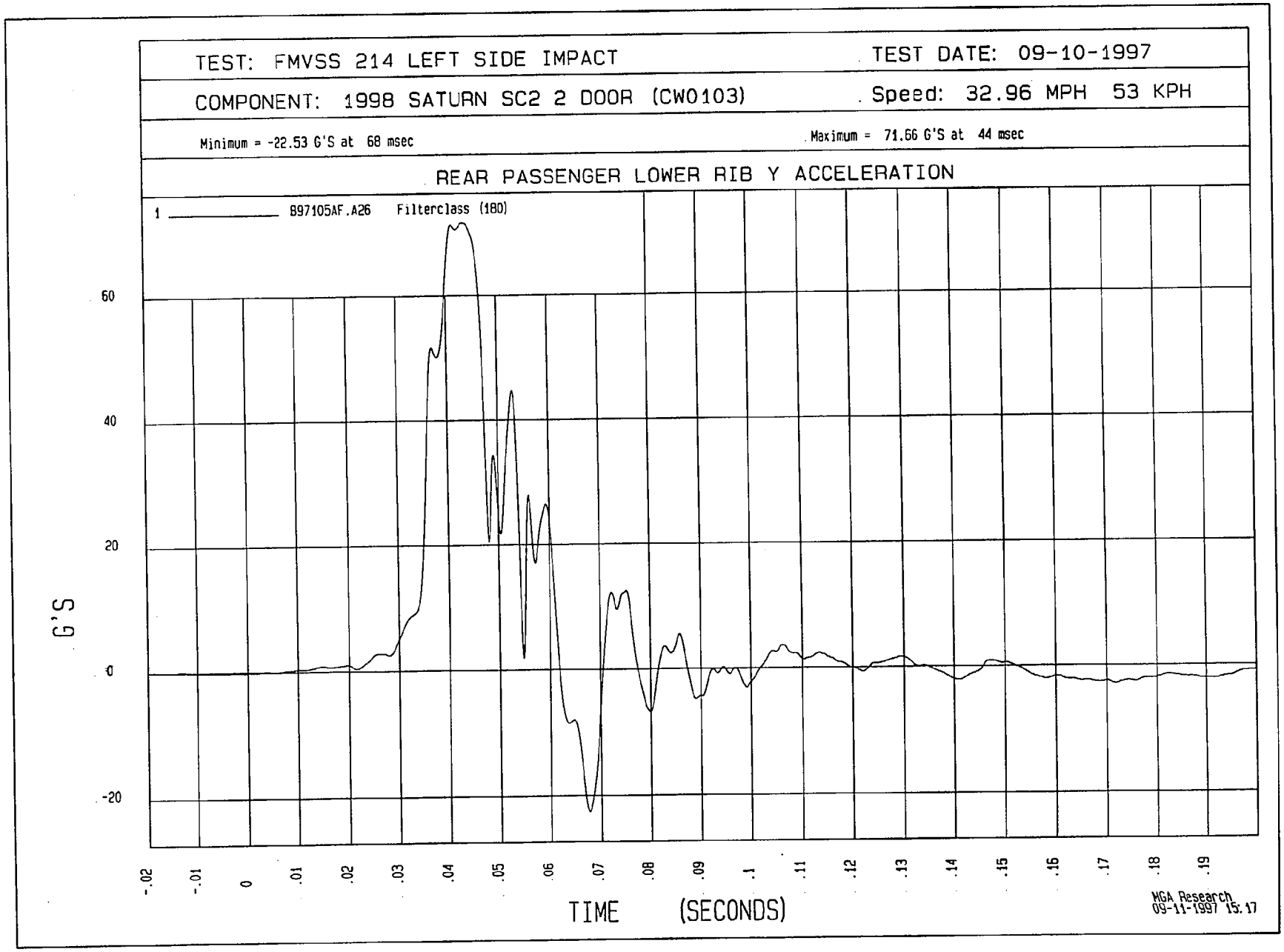

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -2.90E-02 KPH at 4 msec
Maximum = 45.23 KPH at 59 msec
DRIVER LOWER SPINE Y VELOCITY
1 B97105AI.V17 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:08

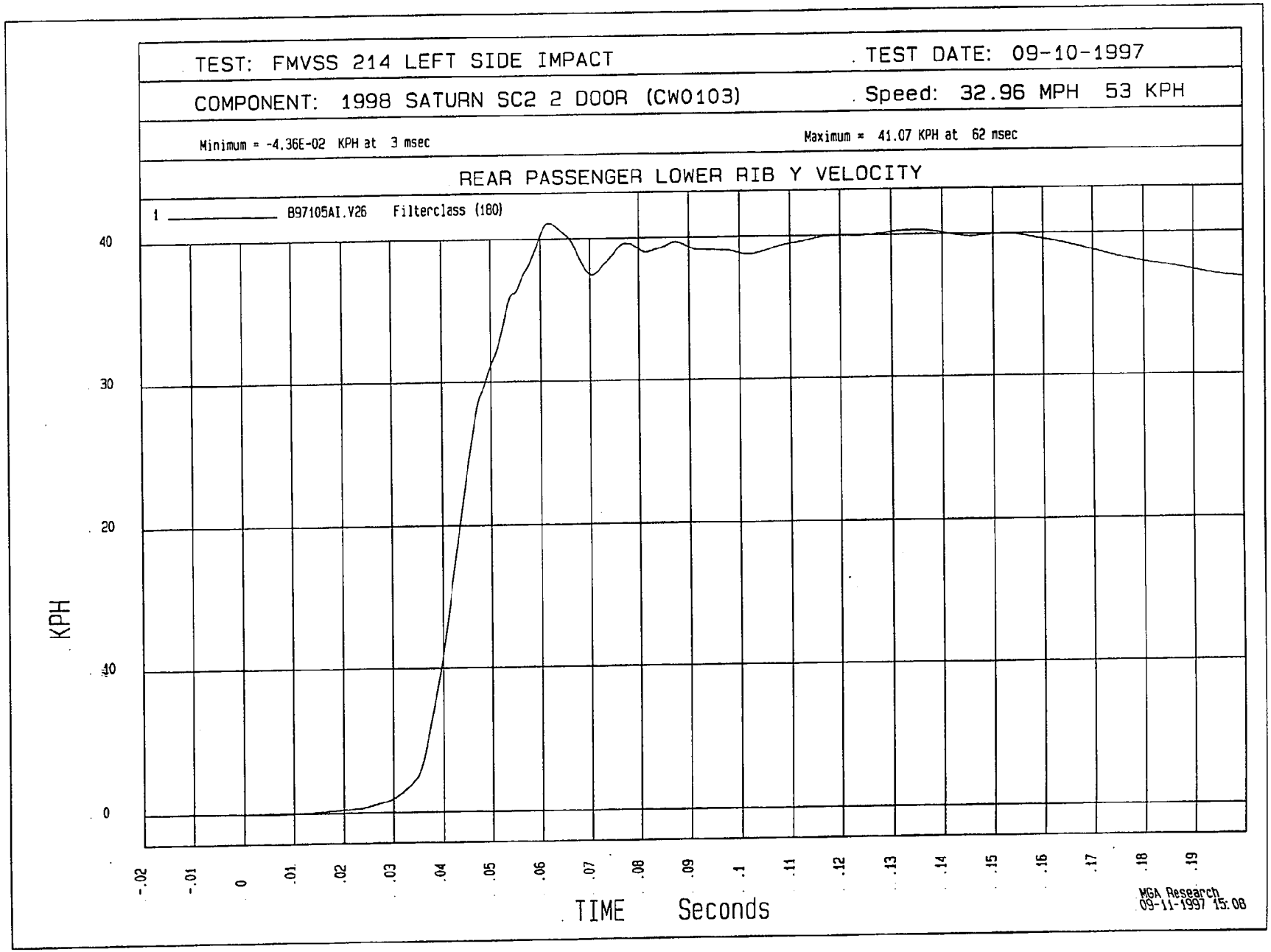

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -23.64 G'S at 49 msec
Maximum = 104.13 G'S at 26 msec
DRIVER PELVIS Y ACCELERATION
1 B97105AF.A1B Filterclass (180)
100
80
60
40
20
0
-20
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
09-11-1997 15:16

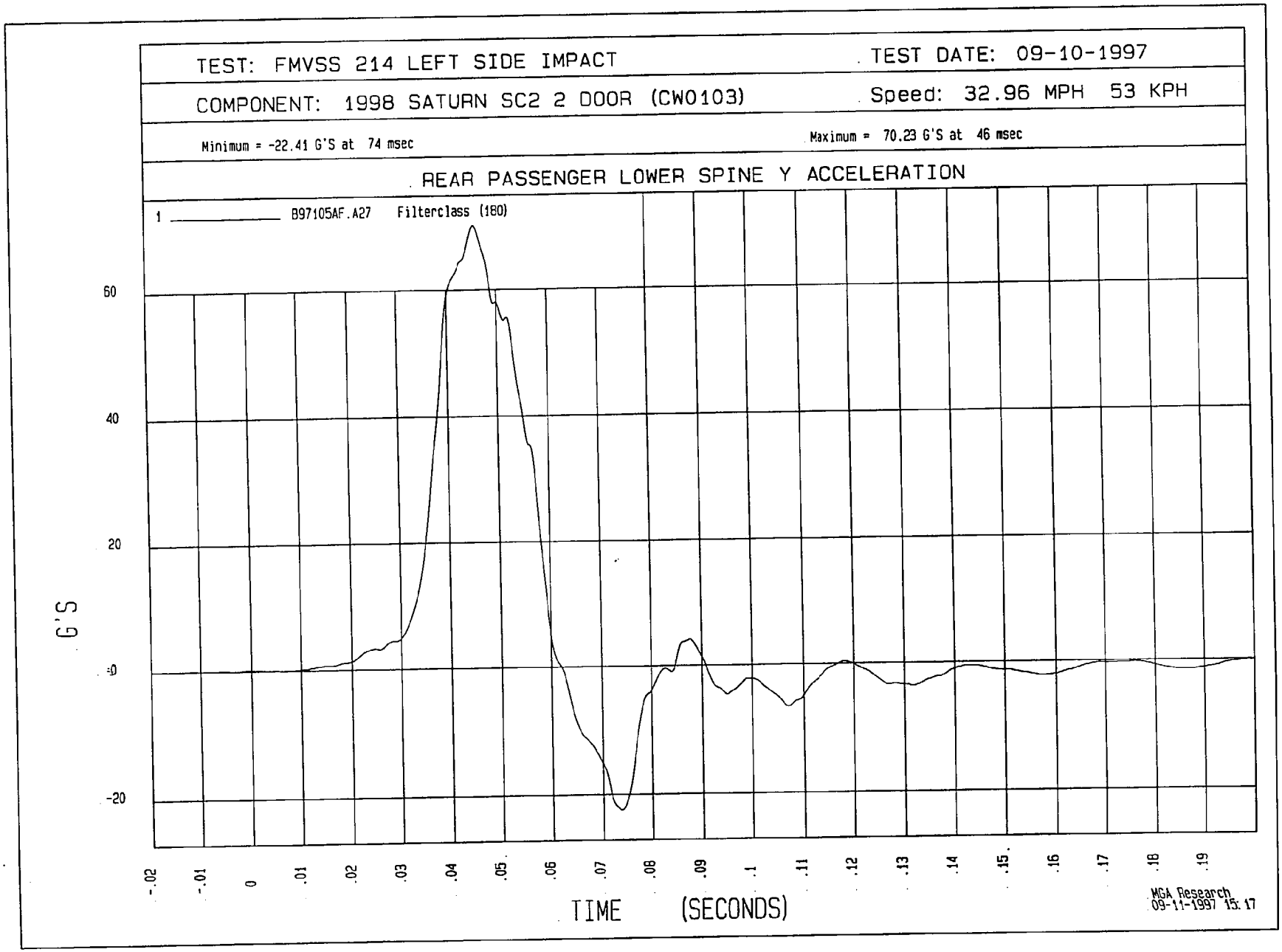

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -2.52E-02 KPH at -12 msec
Maximum = 40.49 KPH at 43 msec
DRIVER PELVIS Y VELOCITY
1 897105AI.V18 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:08

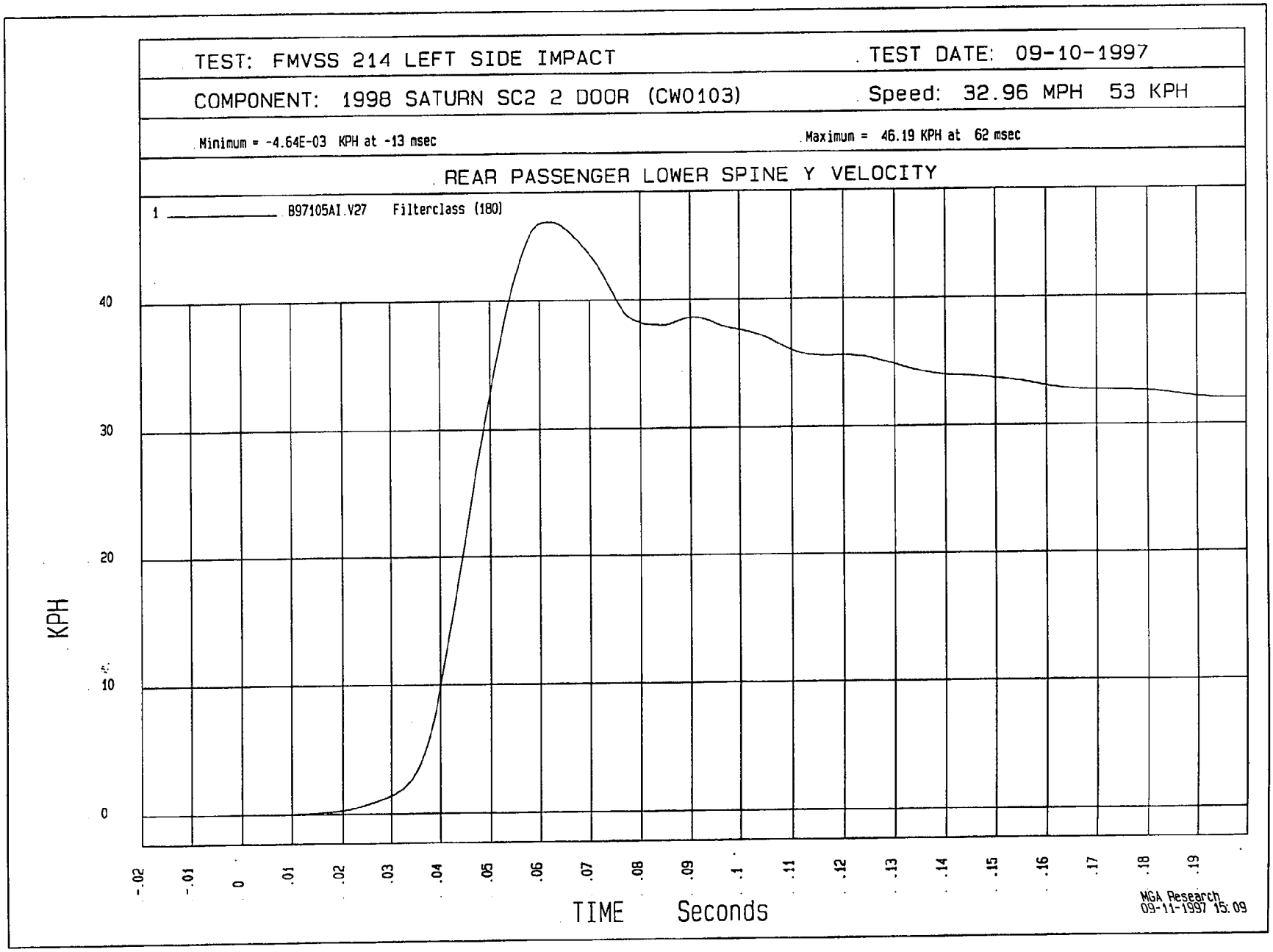

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -15.54 G'S at 67 msec
Maximum = 70.70 G'S at 44 msec
REAR PASSENGER UPPER RIB Y ACCELERATION
1 _____ 897105AF.A25 Filterclass (180)
70
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:17


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -2.87E-02 KPH at 2 msec
Maximum = 42.76 KPH at 109 msec
REAR PASSENGER UPPER RIB Y VELOCITY
1 B97105AI.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
09-11-1997 15:08


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -22.53 G'S at 68 msec
Maximum = 71.66 G'S at 44 msec
REAR PASSENGER LOWER RIB Y ACCELERATION
1 B97105AF.A26 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
09-11-1997 15:17


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.36E-02 KPH at 3 msec
Maximum = 41.07 KPH at 62 msec
REAR PASSENGER LOWER RIB Y VELOCITY
1 B97105AI.V26 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
09-11-1997 15:08


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -22.41 G'S at 74 msec
Maximum = 70.23 G'S at 46 msec
REAR PASSENGER LOWER SPINE Y ACCELERATION
1 B97105AF.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
09-11-1997 15:17


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.64E-03 KPH at -13 msec
Maximum = 46.19 KPH at 62 msec
REAR PASSENGER LOWER SPINE Y VELOCITY
1 B97105AI.V27 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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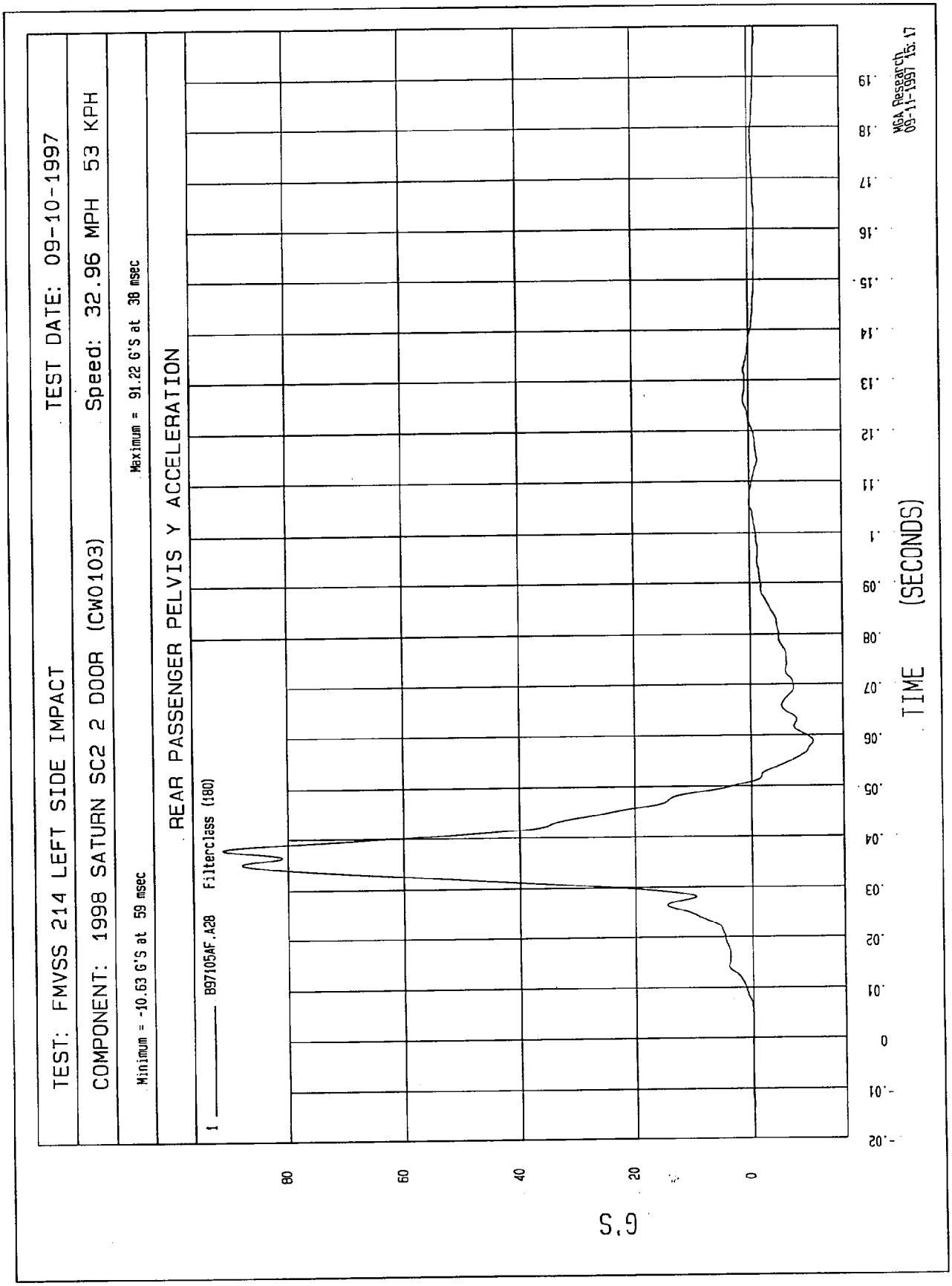
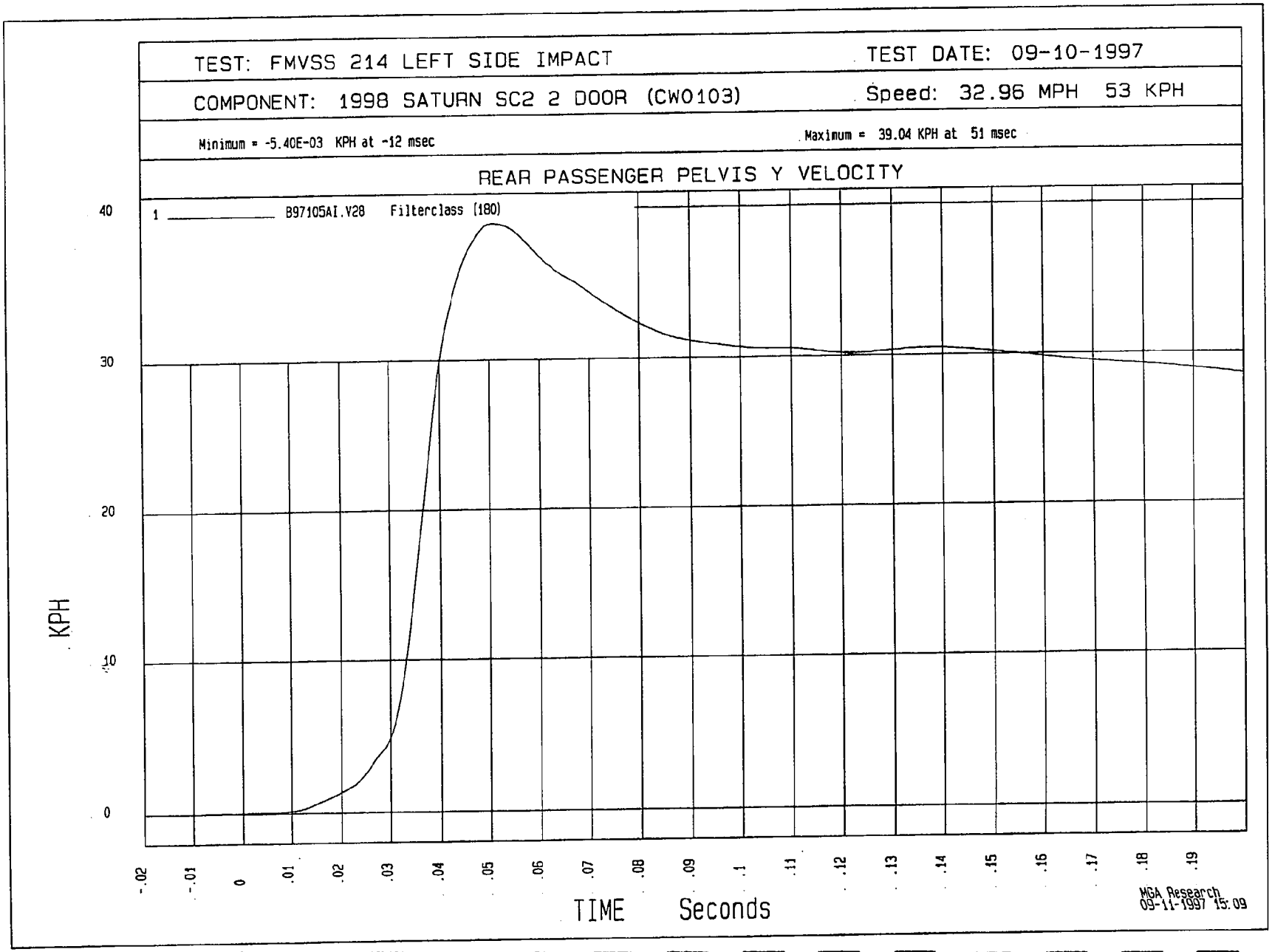
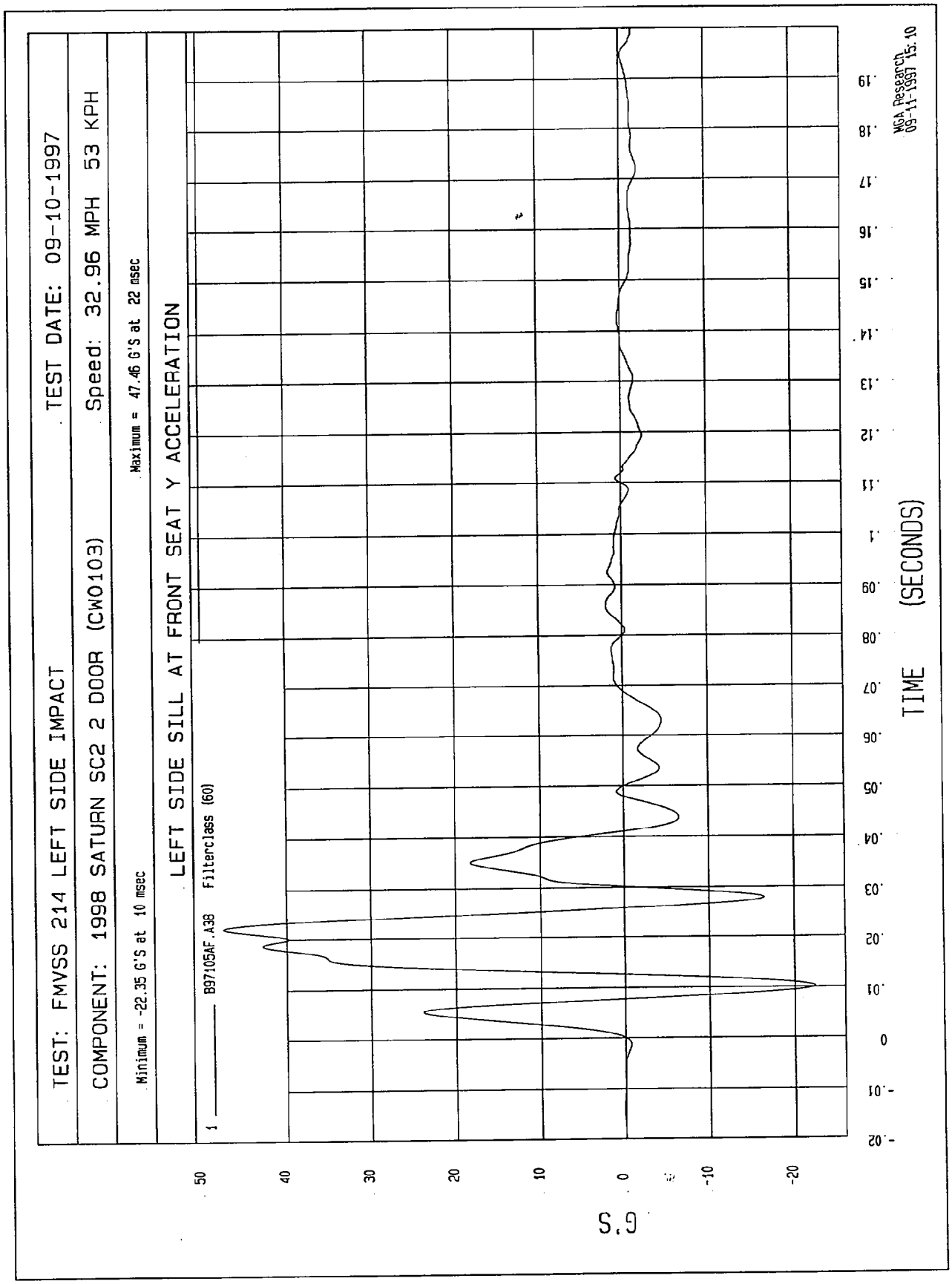
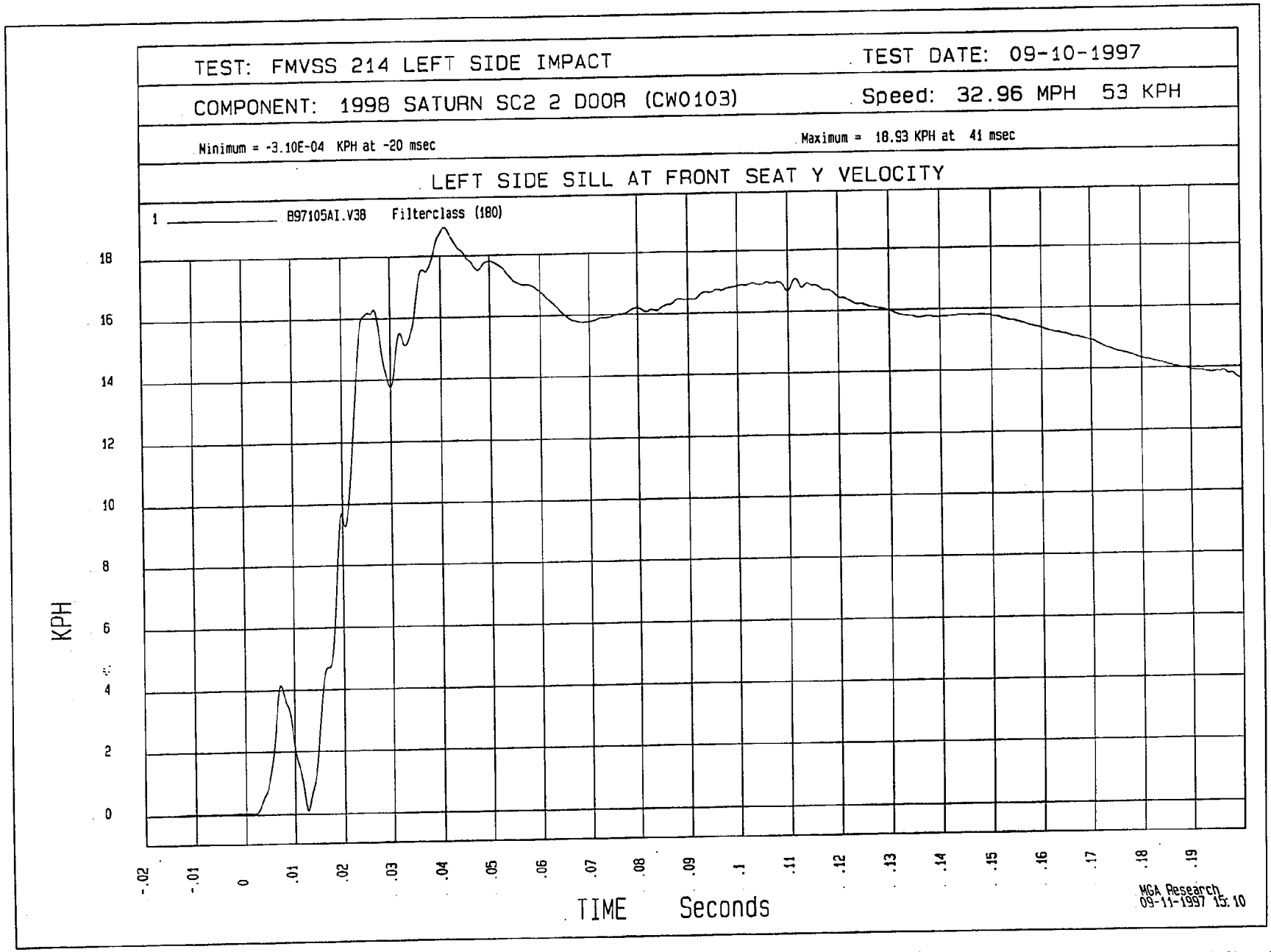
TIME Seconds
MGA Research
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -10.63 G'S at 59 msec
Maximum = 91.22 G'S at 38 msec
REAR PASSENGER PELVIS Y ACCELERATION
1 B97105AF.A28 Filterclass (180)
MGA Research 09-11-1997 15:17
TIME (SECONDS)
G'S


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -5.40E-03 KPH at -12 msec
Maximum = 39.04 KPH at 51 msec
REAR PASSENGER PELVIS Y VELOCITY
1 B97105AI.V28 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
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -22.35 G'S at 10 msec
Maximum = 47.46 G'S at 22 msec
LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION
1 B97105AF.A3B Filterclass (60)
MGA Research 09-11-1997 15:10
G'S
TIME (SECONDS)


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.10E-04 KPH at -20 msec
Maximum = 18.93 KPH at 41 msec
LEFT SIDE SILL AT FRONT SEAT Y VELOCITY
1 B97105AI.V38 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
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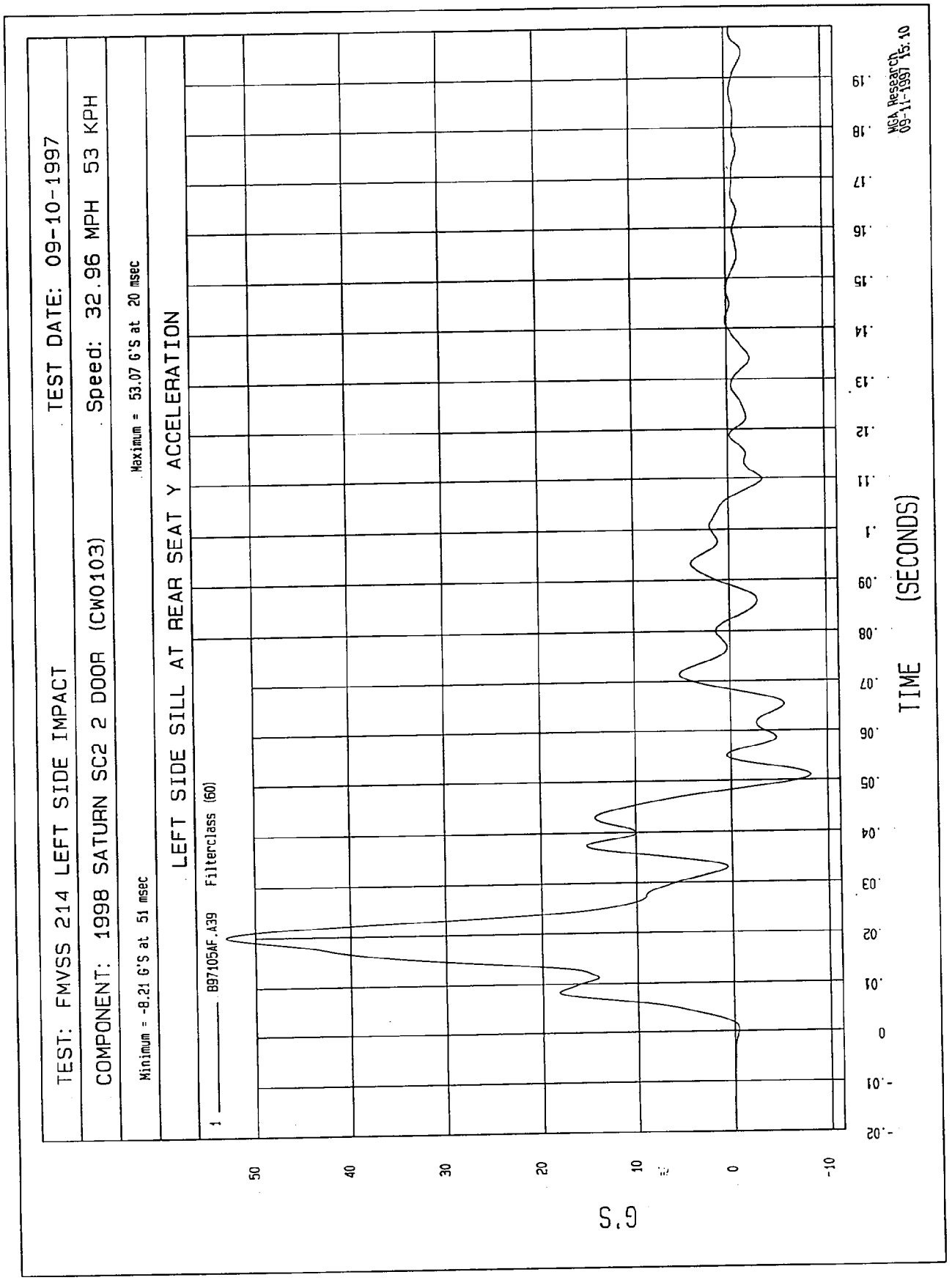
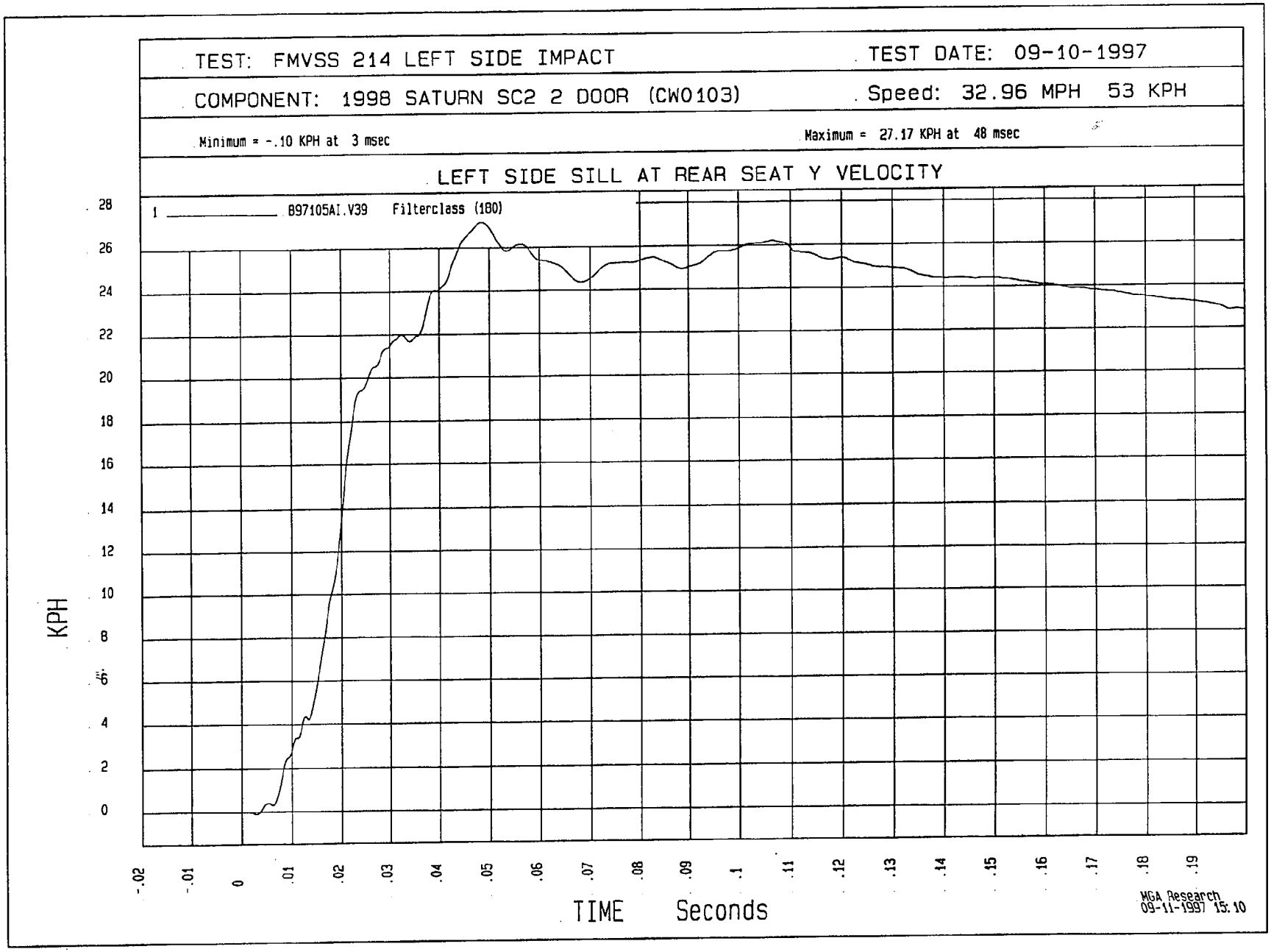
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:10


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Maximum = 53.07 G'S at 20 msec
Minimum = -8.21 G'S at 51 msec
LEFT SIDE SILL AT REAR SEAT Y ACCELERATION
1 B97105AF.A39 Filterclass (60)
MGA Research 09-11-1997 15:10
50
40
30
20
10
0
-10
.19
.18
.17
.16
.15
.14
.13
.12
.11
1.
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
G's


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -.10 KPH at 3 msec
Maximum = 27.17 KPH at 48 msec
LEFT SIDE SILL AT REAR SEAT Y VELOCITY
1 B97105AI.V39 Filterclass (180)
KPH
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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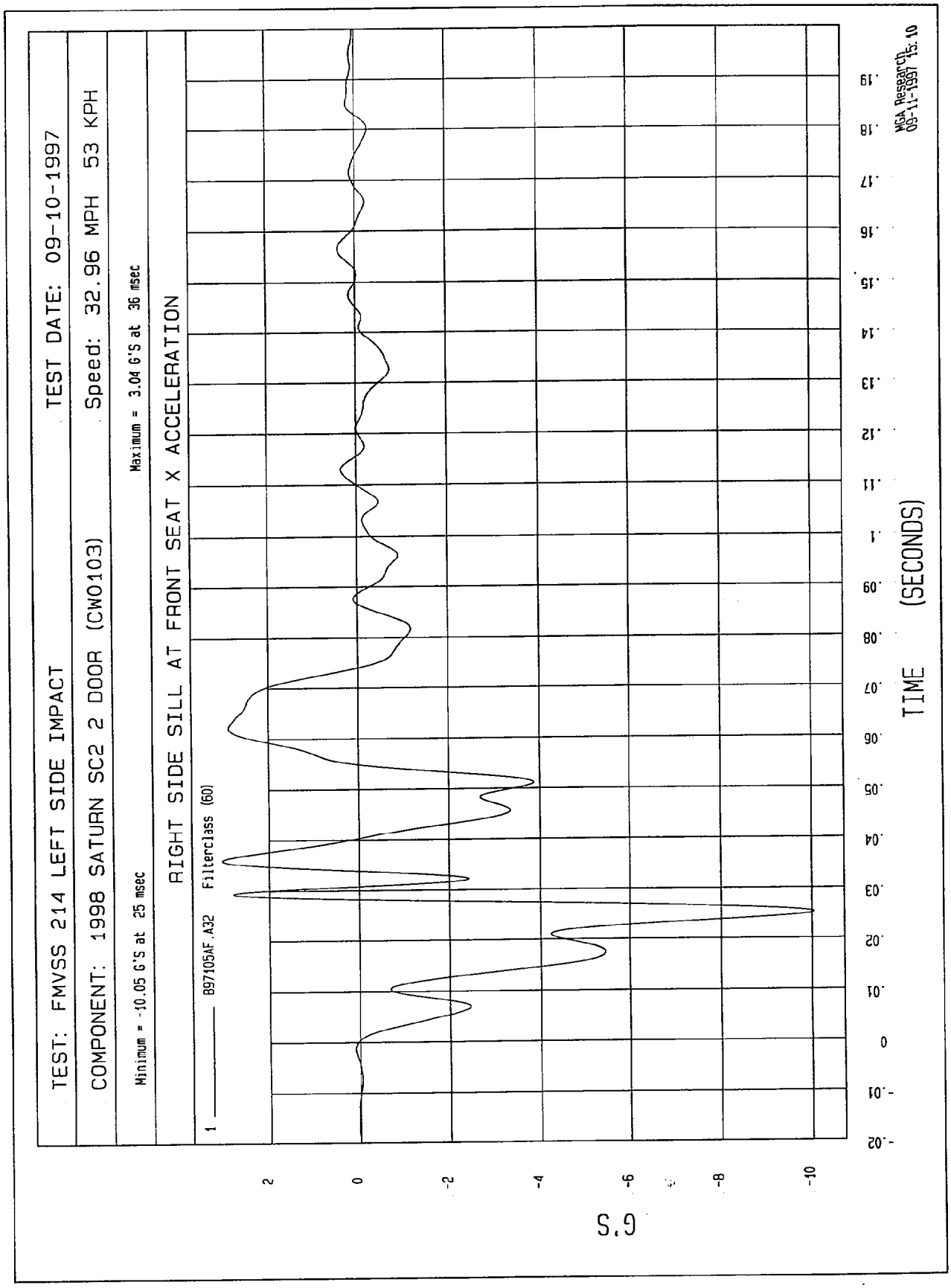
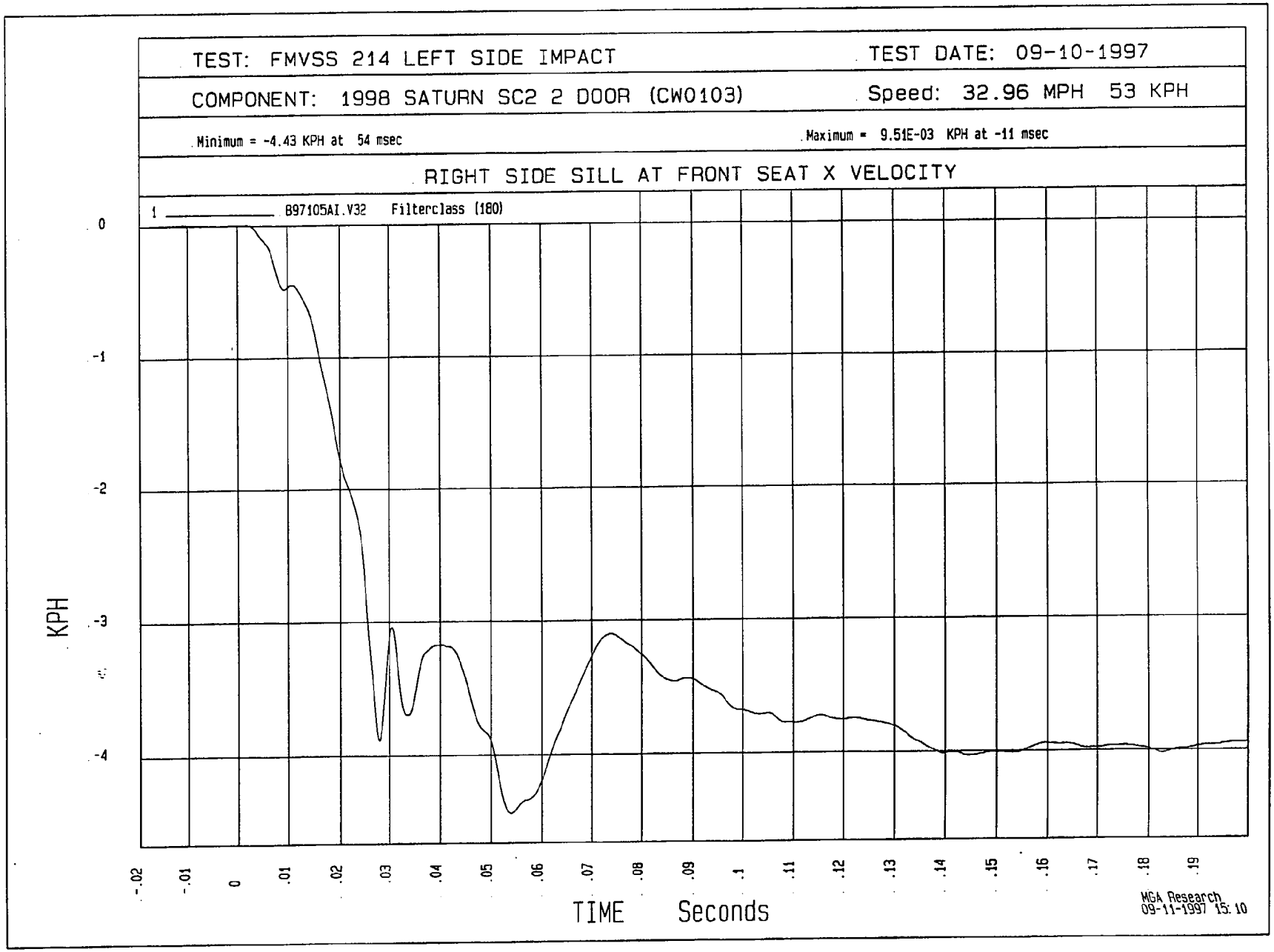
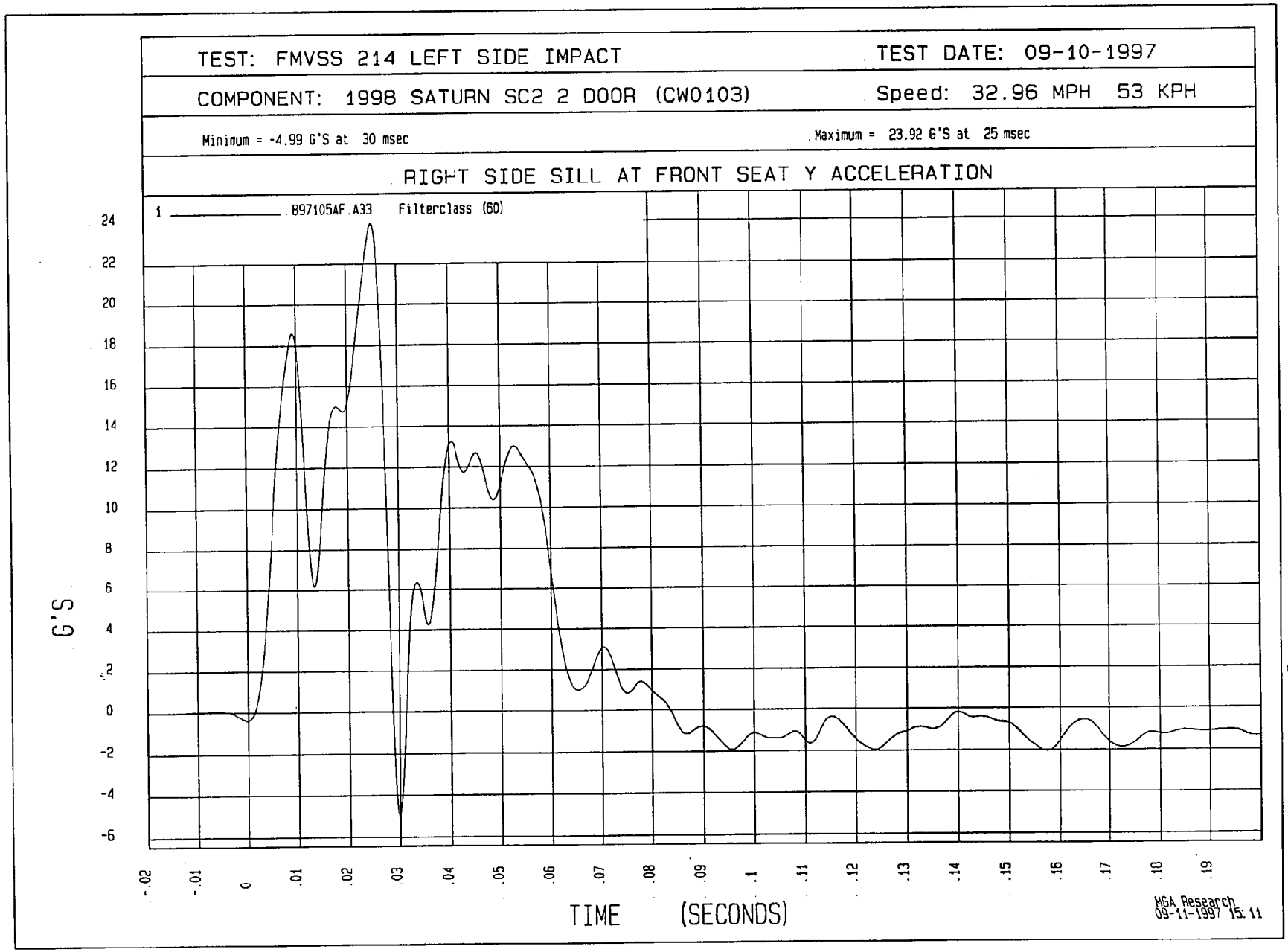
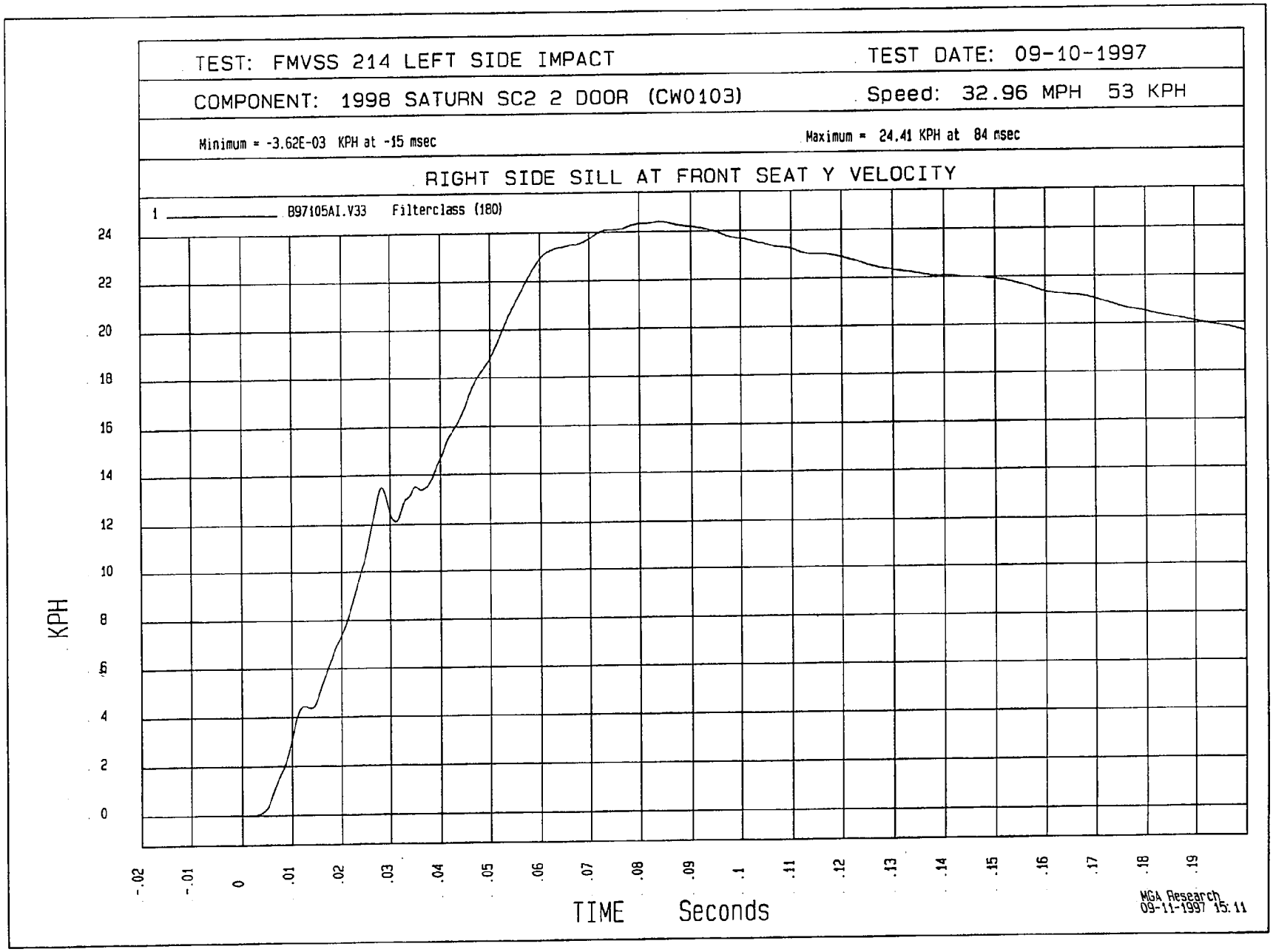
TIME Seconds
MGA Research
09-11-1997 15:10


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -10.05 G'S at 25 msec
Maximum = 3.04 G'S at 36 msec
RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION
1 B97105AF.A32 Filterclass (60)
MGA Research
09-11-1997 15:10
G'S
TIME (SECONDS)


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.43 KPH at 54 msec
Maximum = 9.51E-03 KPH at -11 msec
RIGHT SIDE SILL AT FRONT SEAT X VELOCITY
1 B97105AI.V32 Filterclass (180)
KPH
0
-1
-2
-3
-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
09-11-1997 15:10


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.99 G'S at 30 msec
Maximum = 23.92 G'S at 25 msec
RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION
1 B97105AF.A33 Filterclass (60)
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
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
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.62E-03 KPH at -15 msec
Maximum = 24.41 KPH at 84 msec
RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY
1 B97105AI.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
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.09
.1
.11
.12
.13
.14
.15
.16
.17
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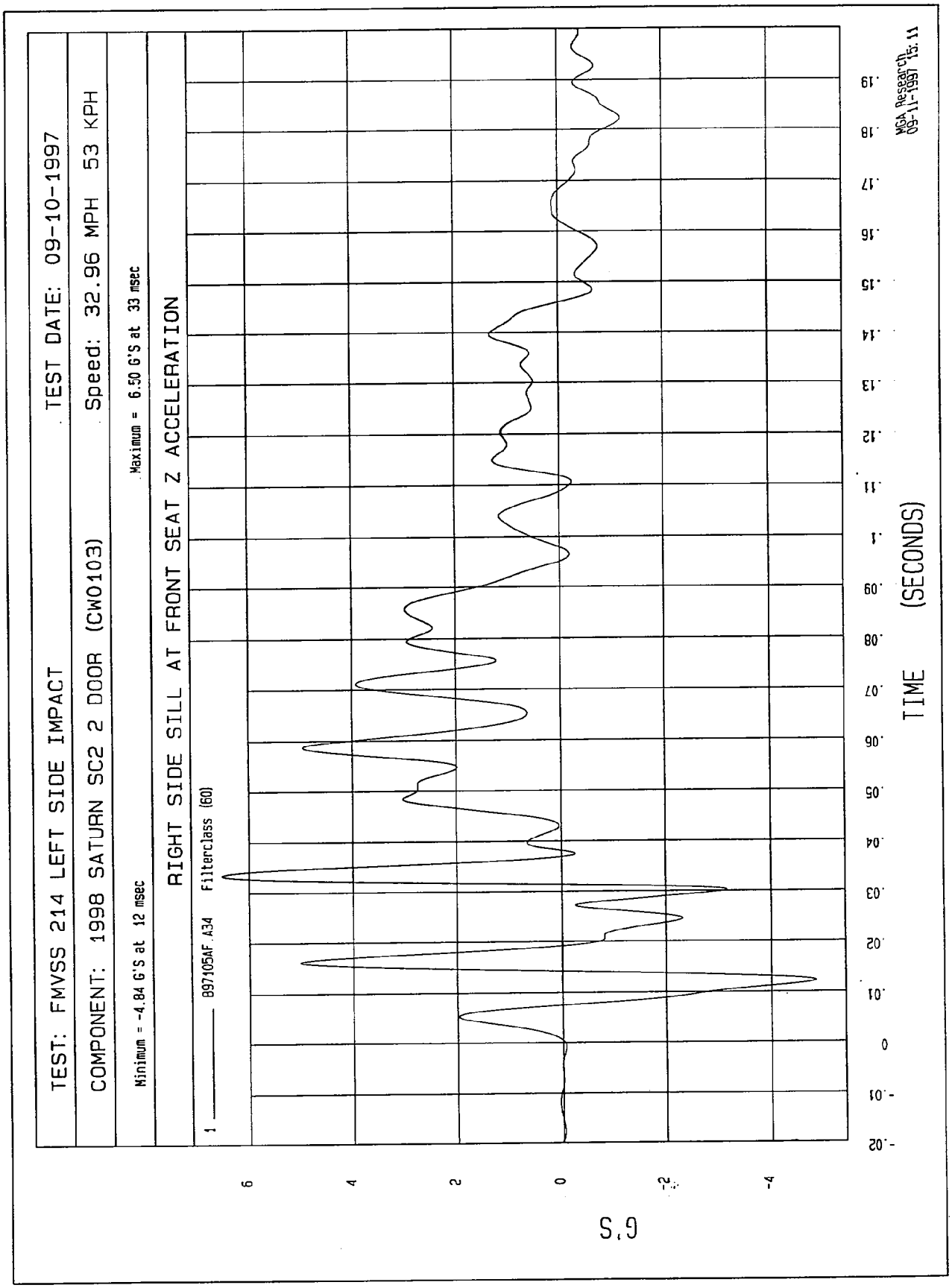
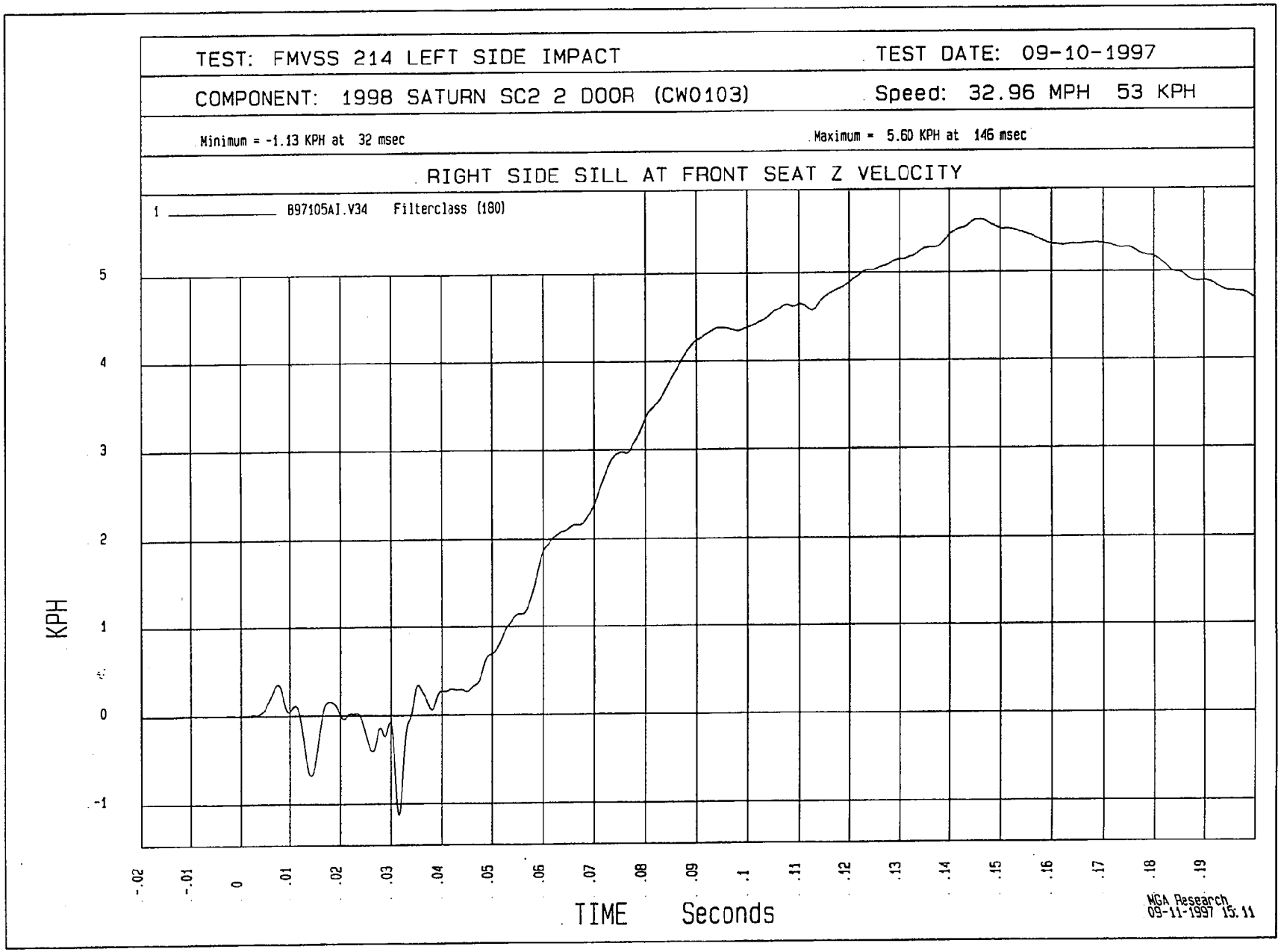
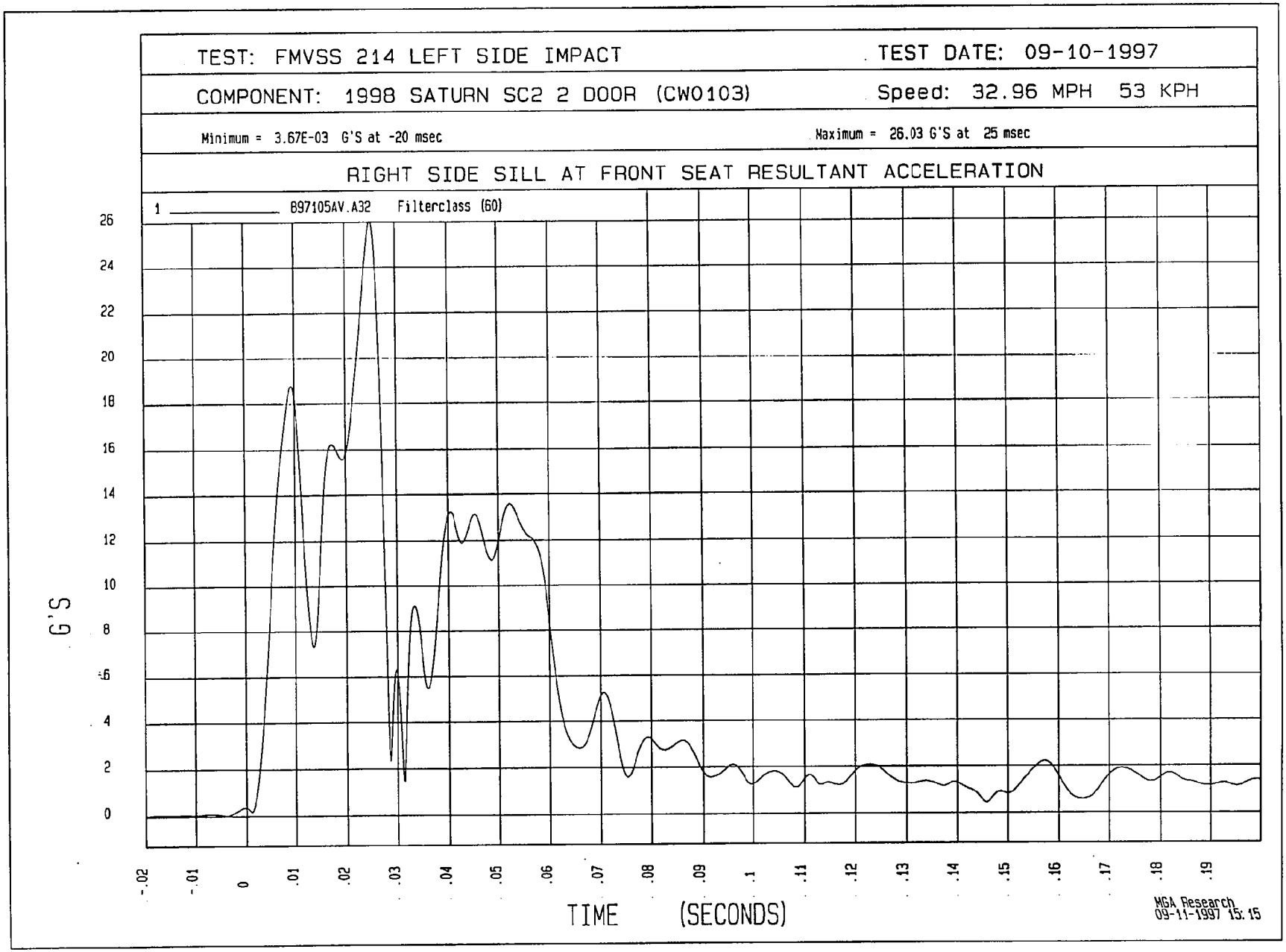
.19
TIME Seconds
MGA Research
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.84 G'S at 12 msec
Maximum = 6.50 G'S at 33 msec
RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION
1 B97105AF A34 Filterclass (60)
6
4
2
0
-2
-4
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
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -1.13 KPH at 32 msec
Maximum = 5.60 KPH at 146 msec
RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY
1 B97105AI.V34 Filterclass (180)
KPH
5
4
3
2
1
0
-1
-.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
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 3.67E-03 G'S at -20 msec
Maximum = 26.03 G'S at 25 msec
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION
1 B97105AV.A32 Filterclass (60)
G'S
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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.1
.11
.12
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.14
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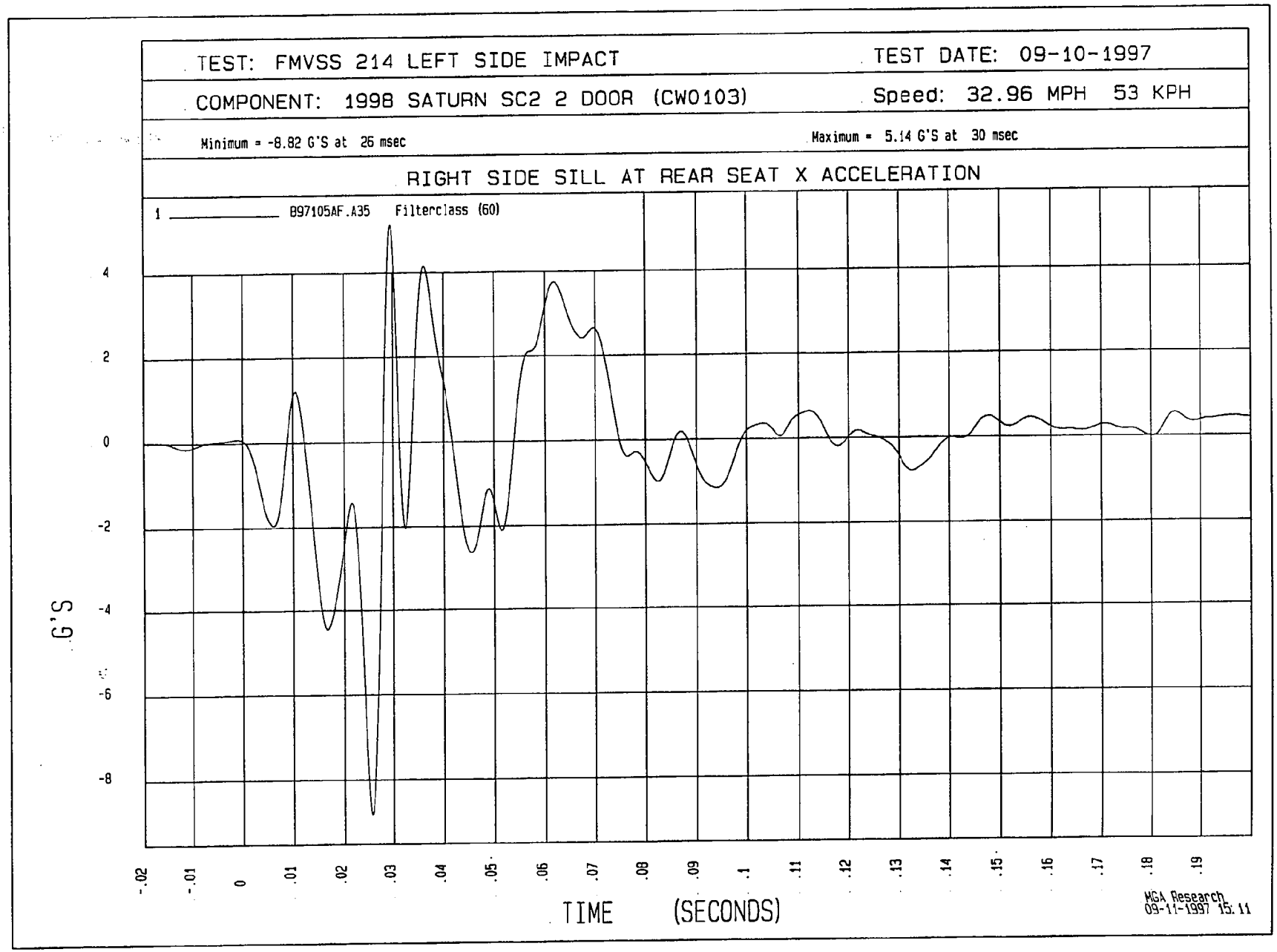
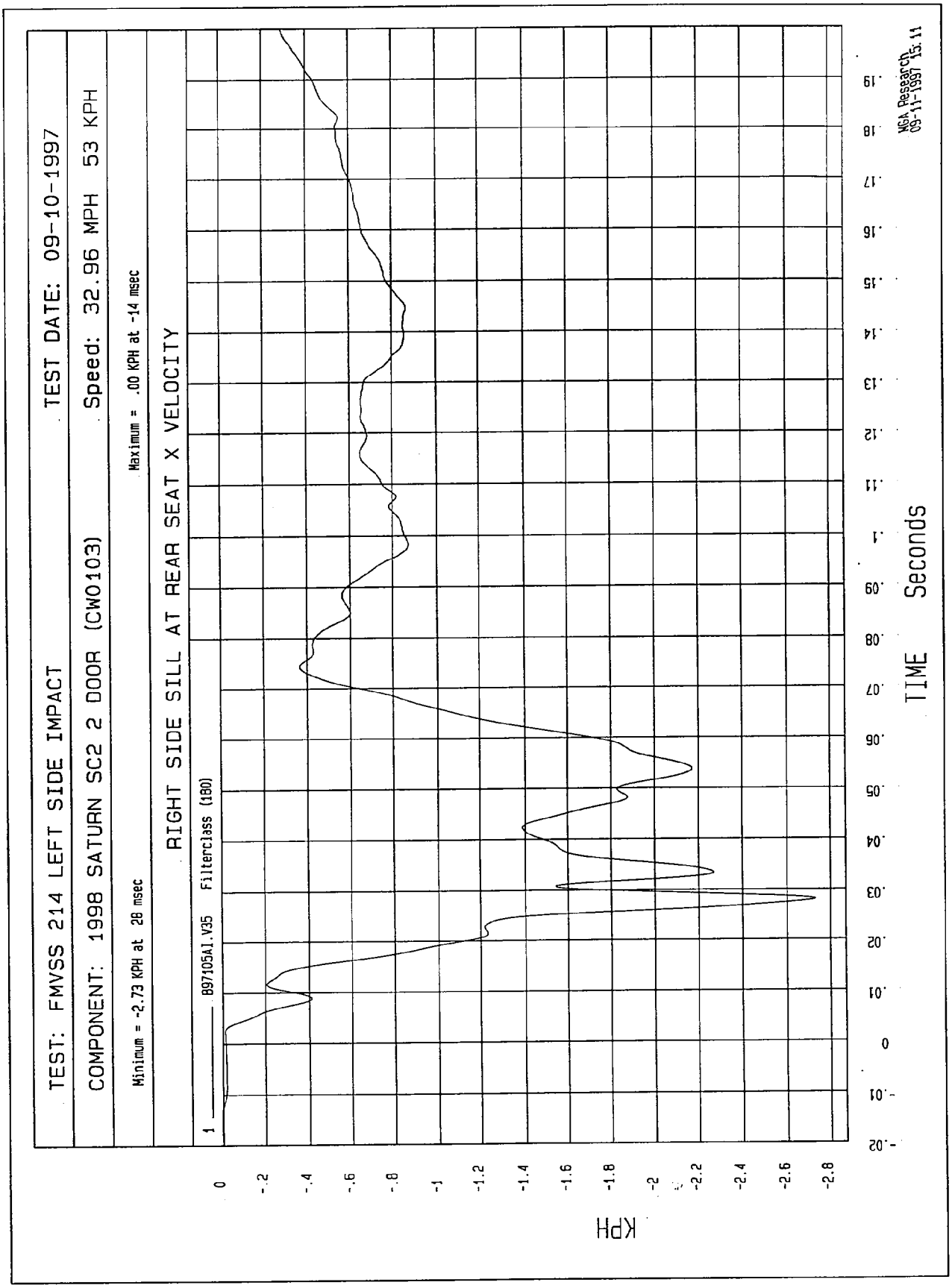
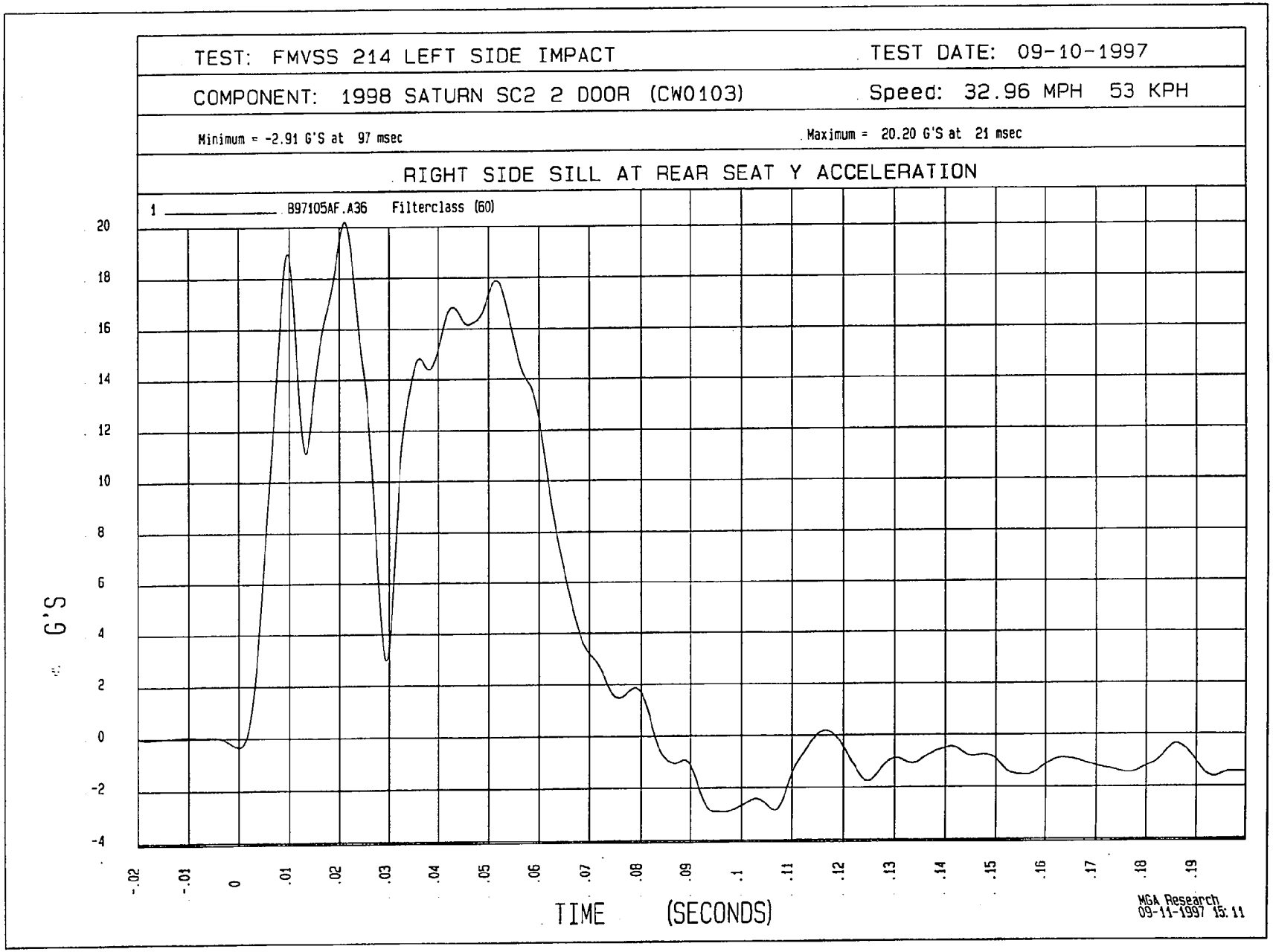
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:15


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -8.82 G'S at 26 msec
Maximum = 5.14 G'S at 30 msec
RIGHT SIDE SILL AT REAR SEAT X ACCELERATION
1 B97105AF.A35 Filterclass (60)
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
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -2.73 KPH at 28 msec
Maximum = .00 KPH at -14 msec
RIGHT SIDE SILL AT REAR SEAT X VELOCITY
1 B97105A1.V35 Filterclass (180)
KPH
TIME Seconds
NGA Research
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -2.91 G'S at 97 msec
Maximum = 20.20 G'S at 21 msec
RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION
1 B97105AF.A36 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
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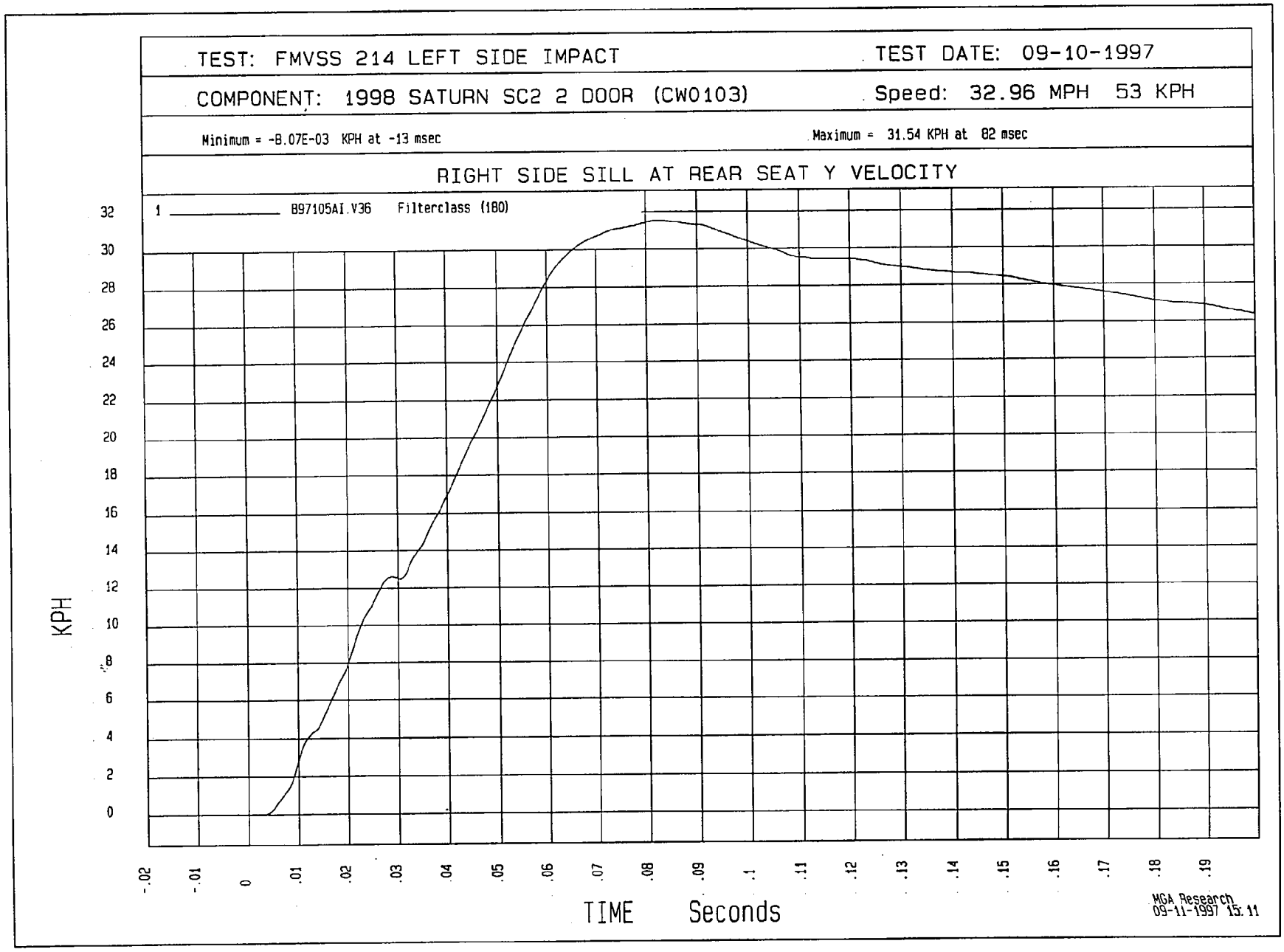
TIME (SECONDS)
MGA Research
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -8.07E-03 KPH at -13 msec
Maximum = 31.54 KPH at 82 msec
RIGHT SIDE SILL AT REAR SEAT Y VELOCITY
1 B97105AI.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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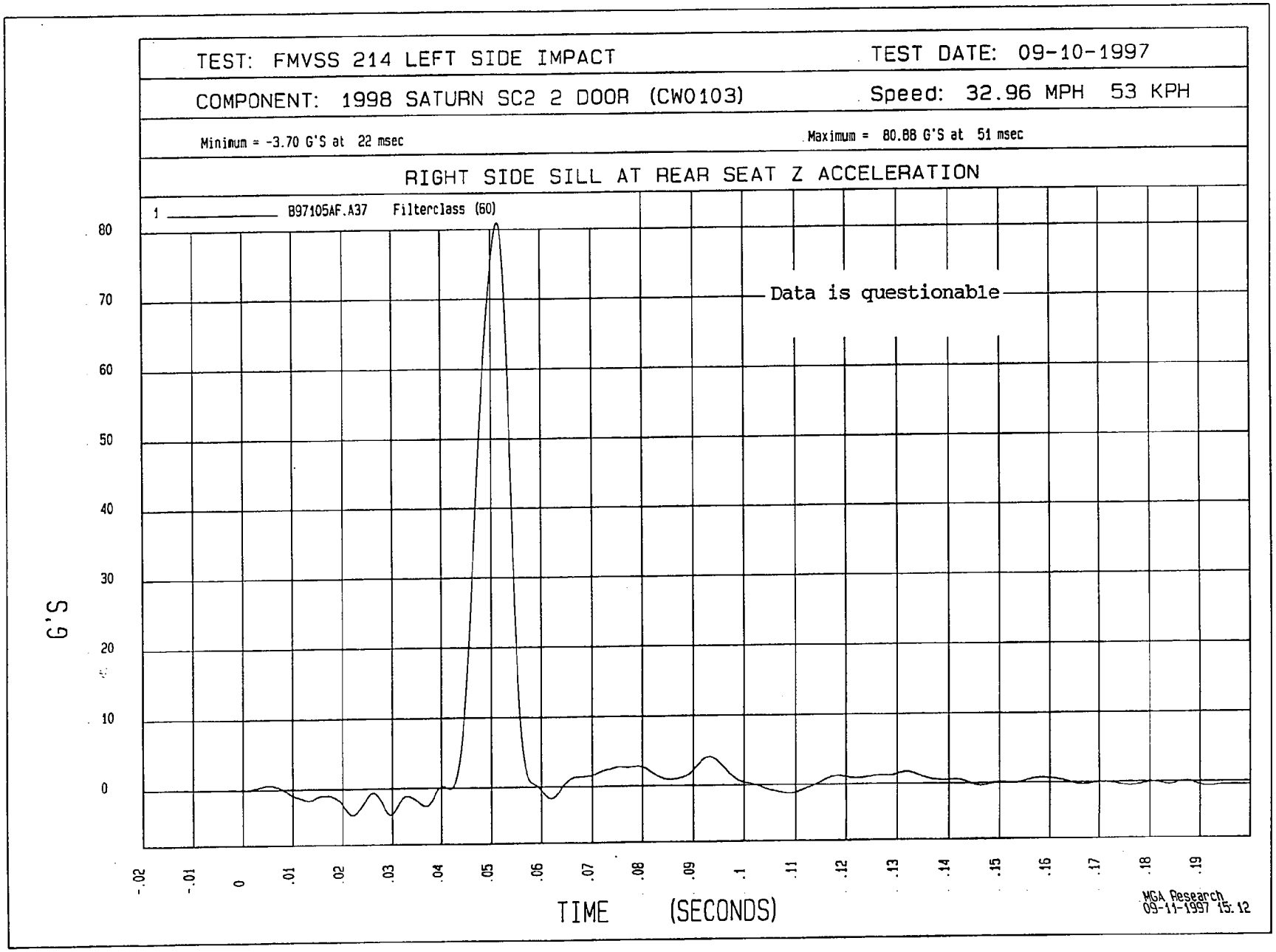
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:11


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.70 G'S at 22 msec
Maximum = 80.88 G'S at 51 msec
RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION
1 B97105AF.A37 Filterclass (60)
Data is questionable
G'S
80
70
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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.18
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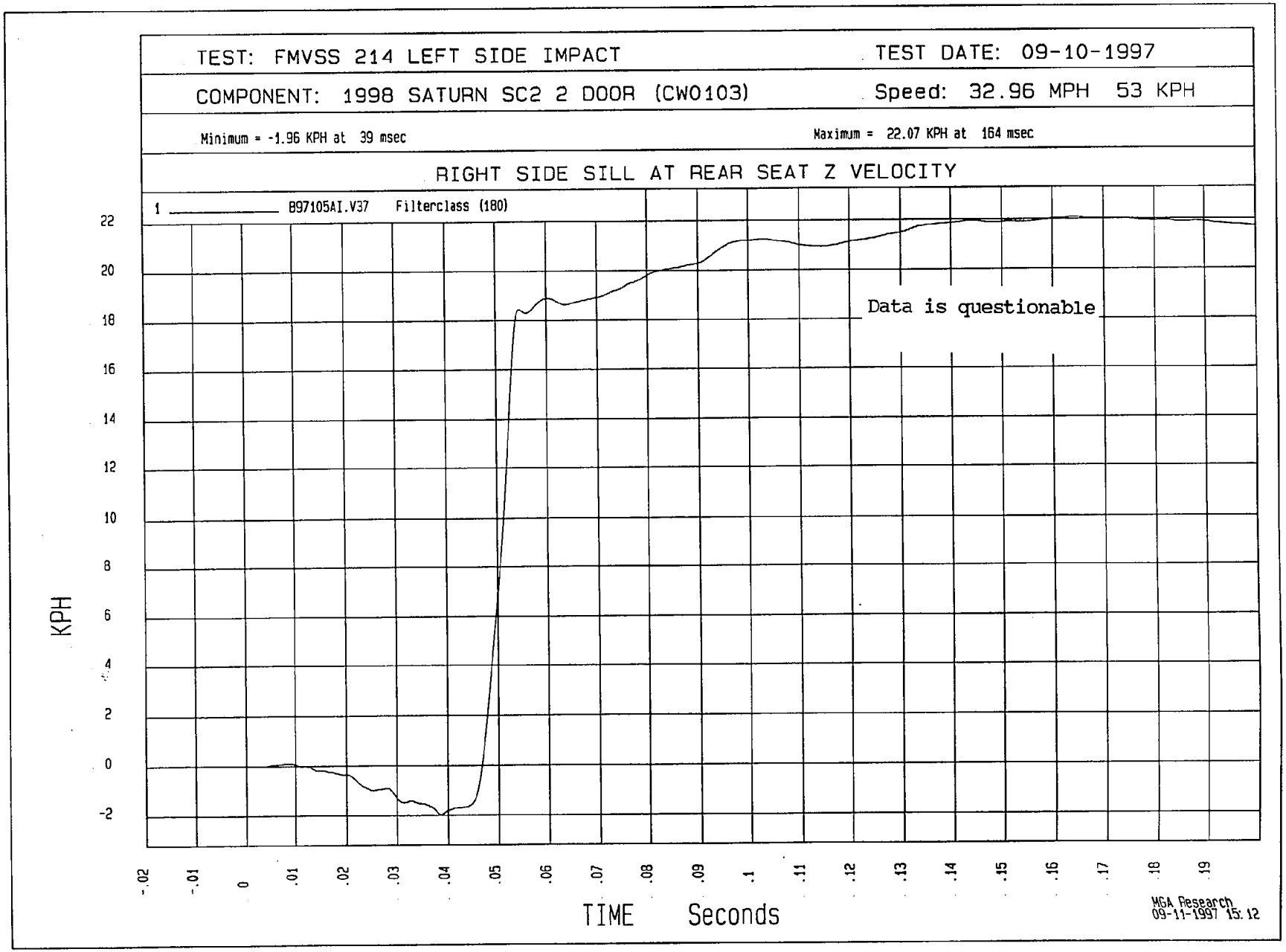
TIME (SECONDS)
MGA Research
09-11-1997 15:12


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -1.96 KPH at 39 msec
Maximum = 22.07 KPH at 164 msec
RIGHT SIDE SILL AT REAR SEAT Z VELOCITY
1 B97105AI.V37 Filterclass (180)
Data is questionable
KPH
22
20
18
16
14
12
10
8
6
4
2
0
-2
-.02
-.01
0
.01
.02
.03
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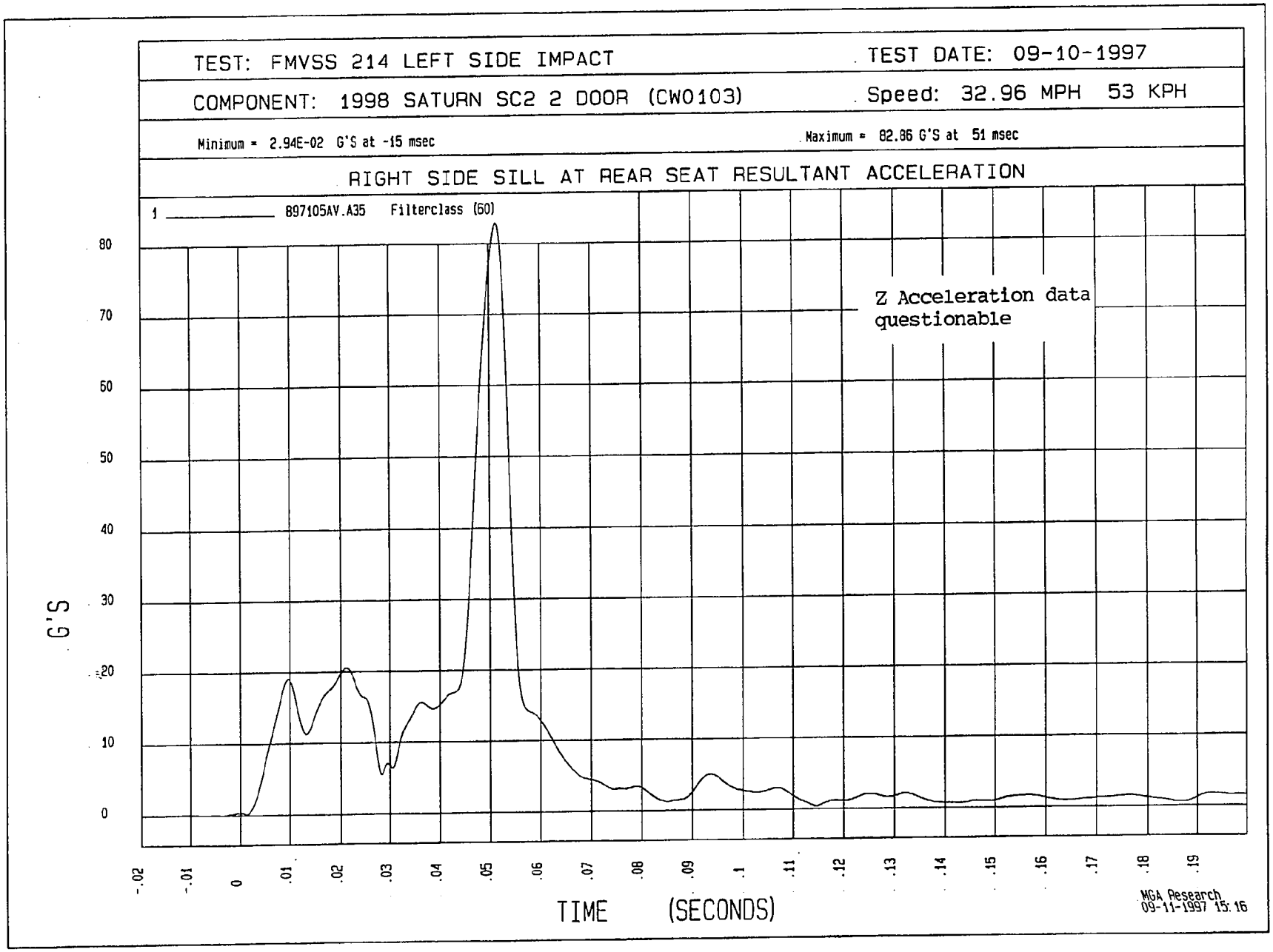
TIME Seconds
MGA Research
09-11-1997 15:12


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 2.94E-02 G'S at -15 msec
Maximum = 82.86 G'S at 51 msec
RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION
1 897105AV.A35 Filterclass (60)
Z Acceleration data questionable
G'S
80
70
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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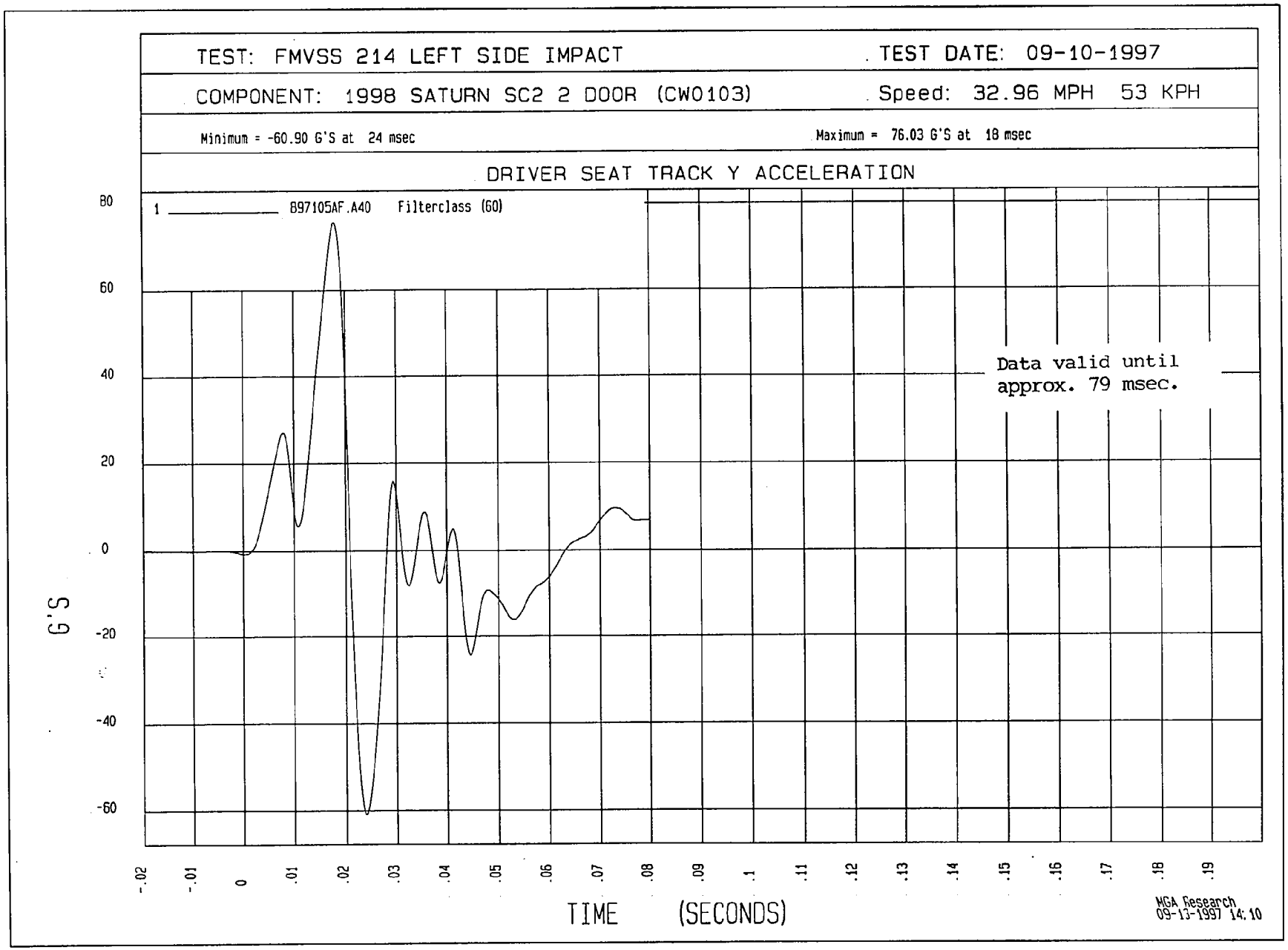
TIME (SECONDS)
MGA Research
09-11-1997 15:16


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -60.90 G'S at 24 msec
Maximum = 76.03 G'S at 18 msec
DRIVER SEAT TRACK Y ACCELERATION
1 B97105AF.A40 Filterclass (60)
Data valid until approx. 79 msec.
80
60
40
20
0
-20
-40
-60
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.16
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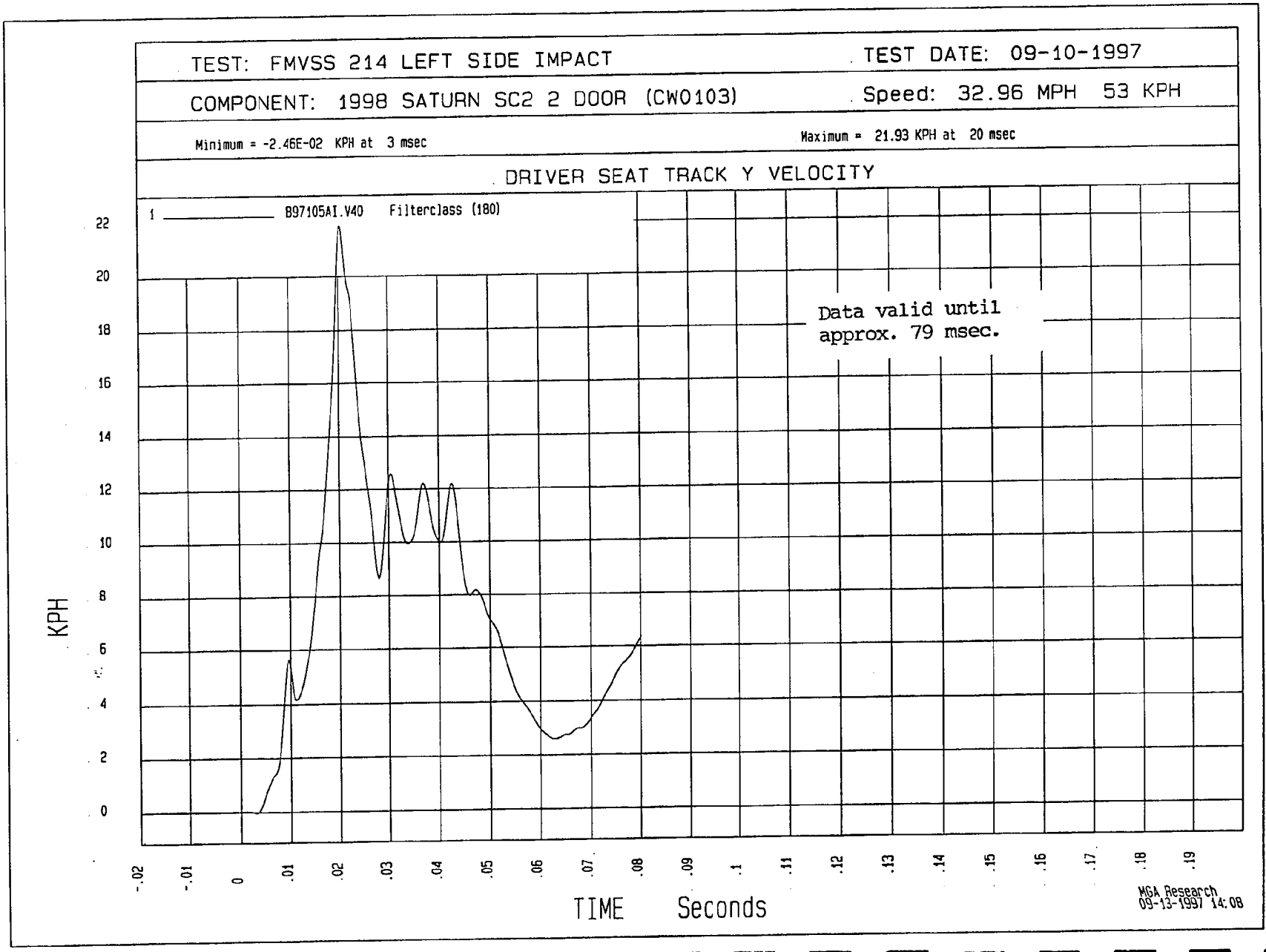
TIME (SECONDS)
MGA Research
09-13-1997 14:10


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -2.46E-02 KPH at 3 msec
Maximum = 21.93 KPH at 20 msec
DRIVER SEAT TRACK Y VELOCITY
1 B97105AI.V40 Filterclass (180)
Data valid until approx. 79 msec.
KPH
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
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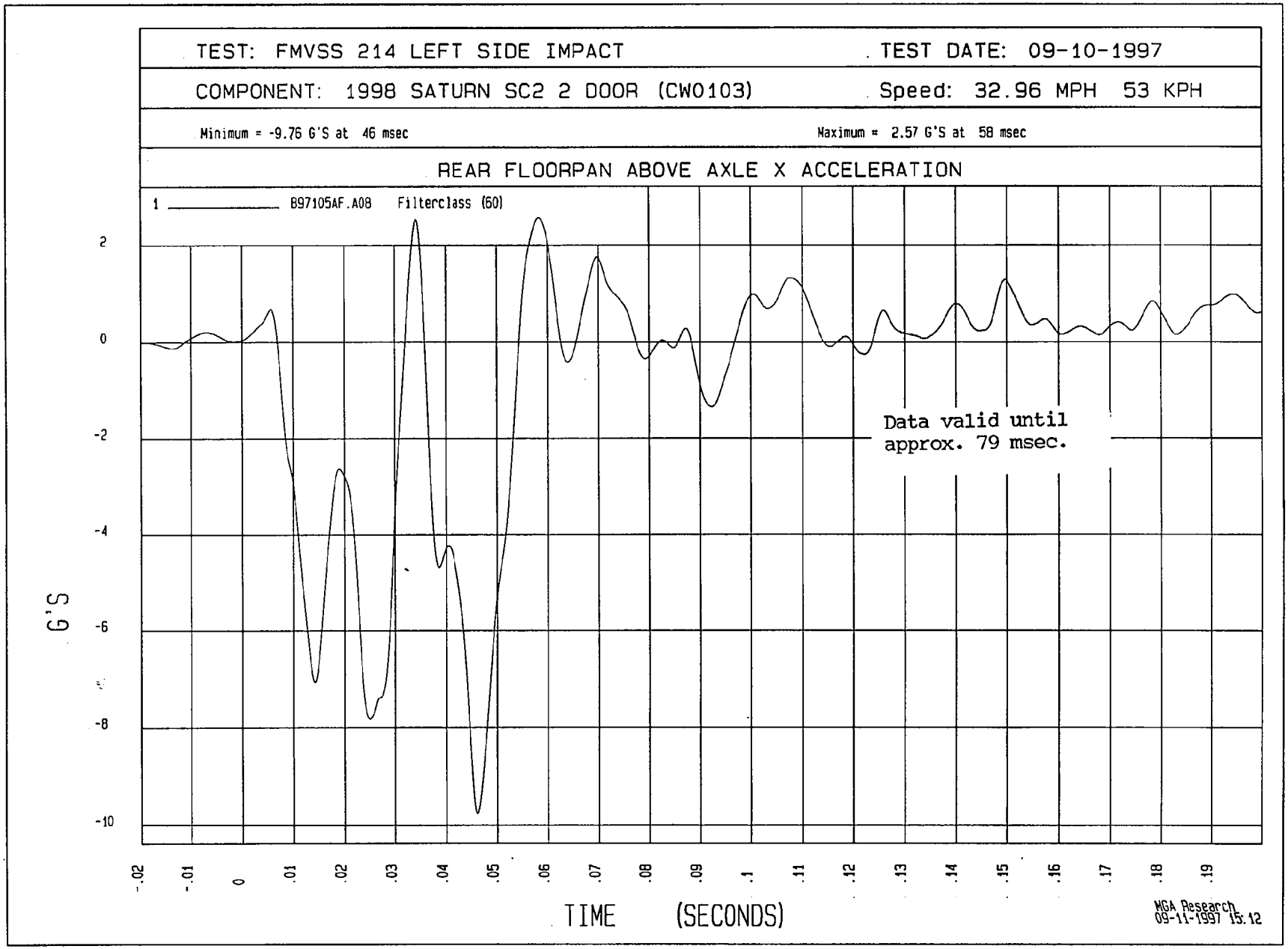
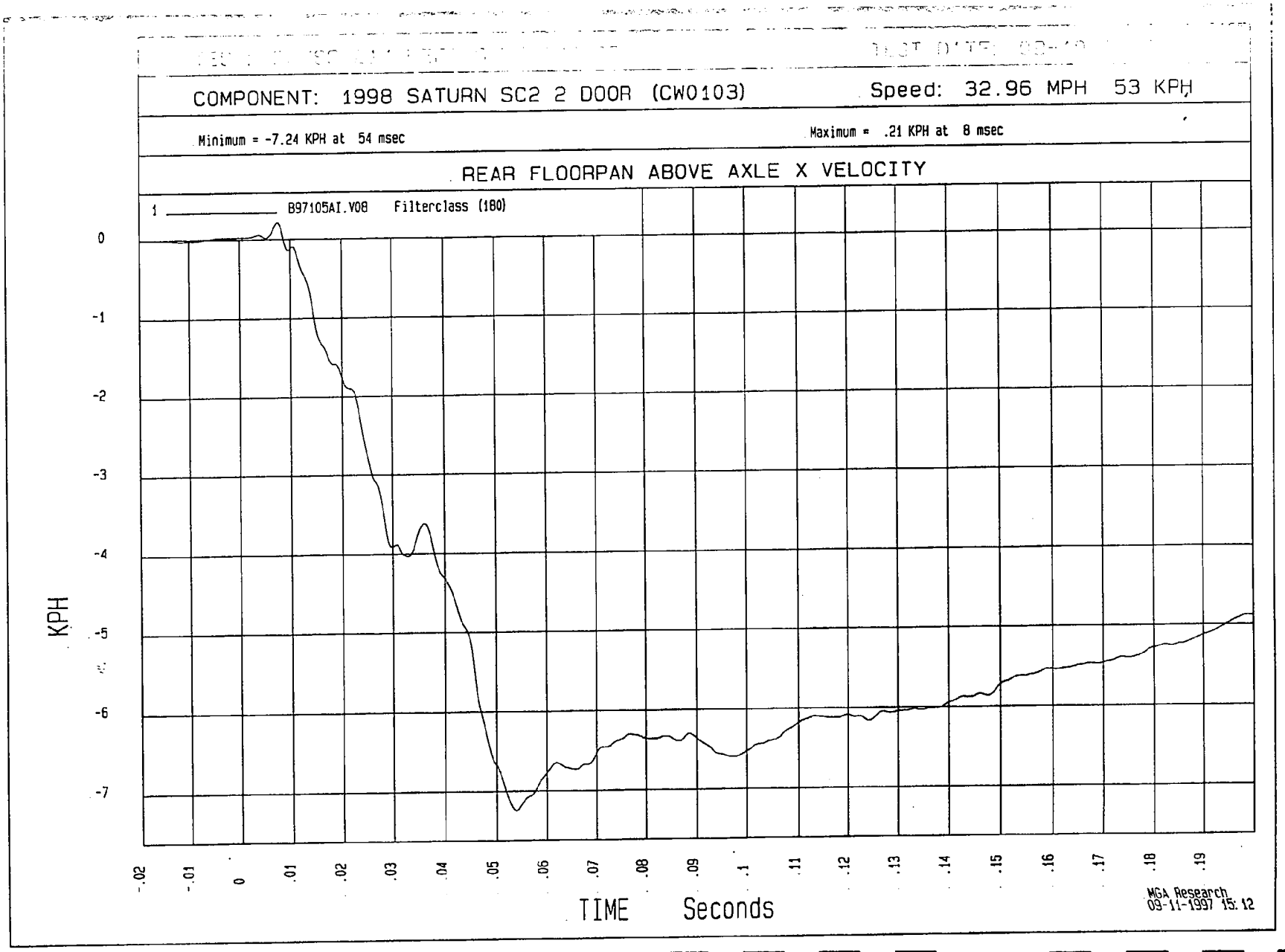
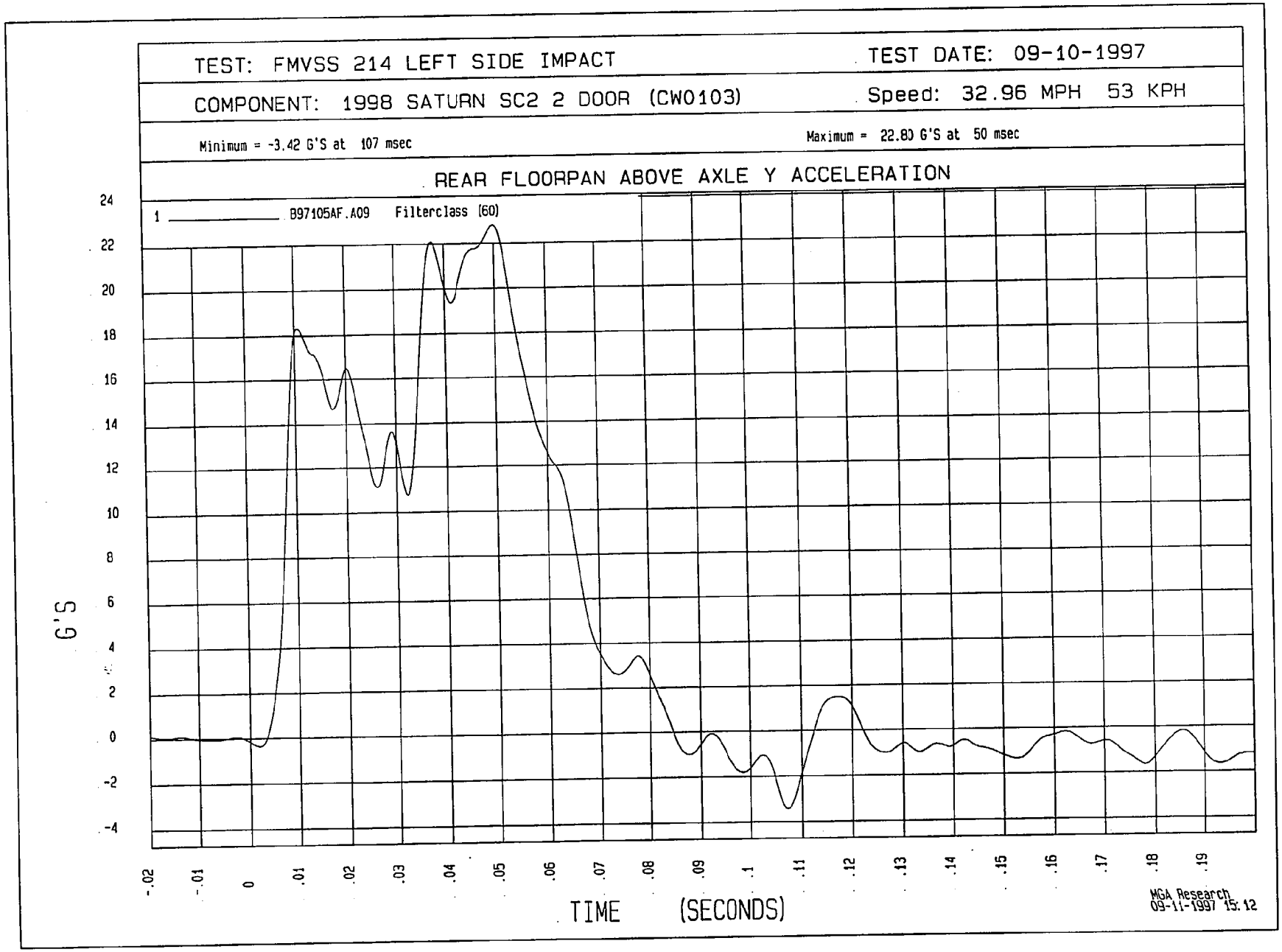
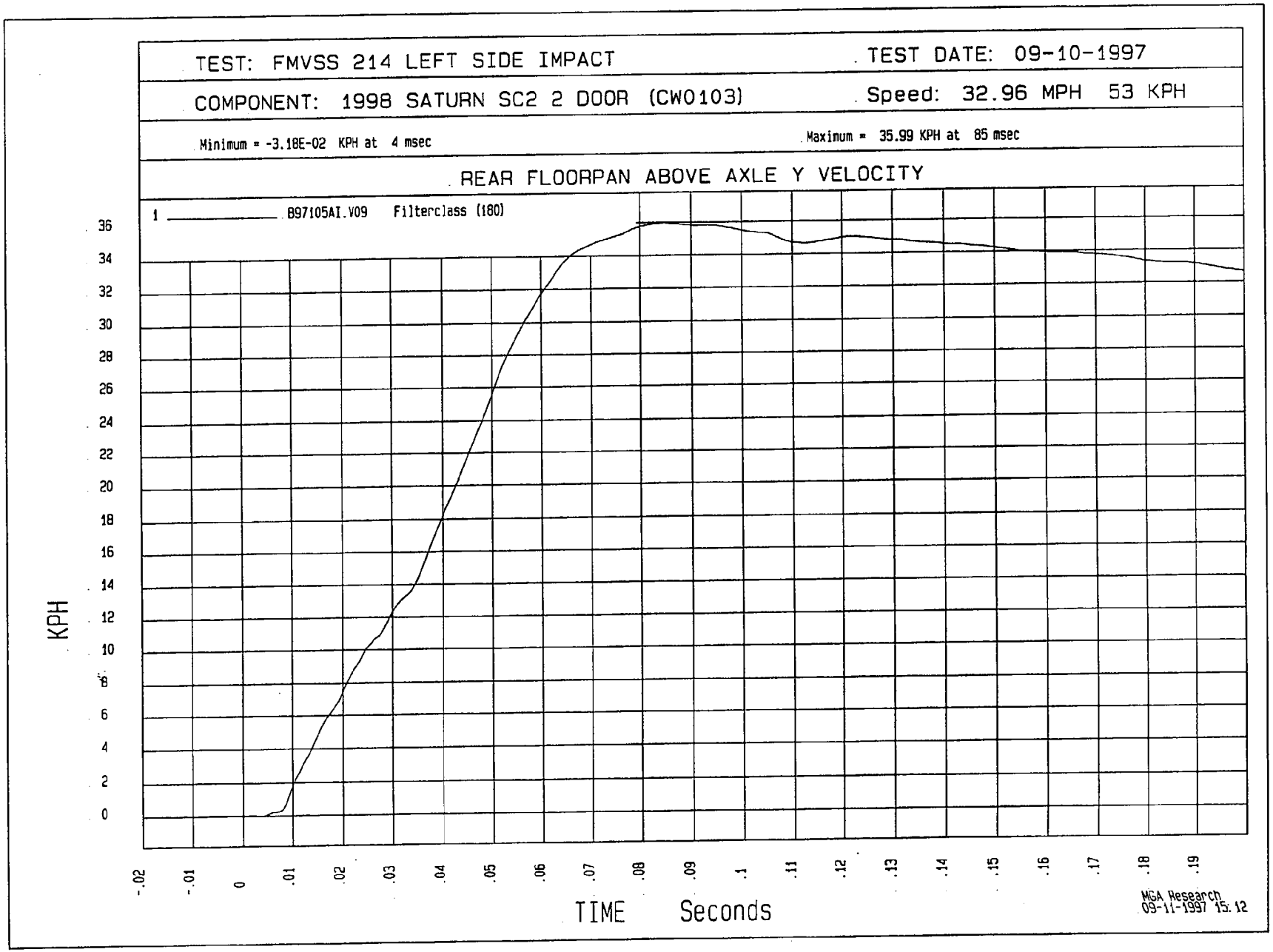
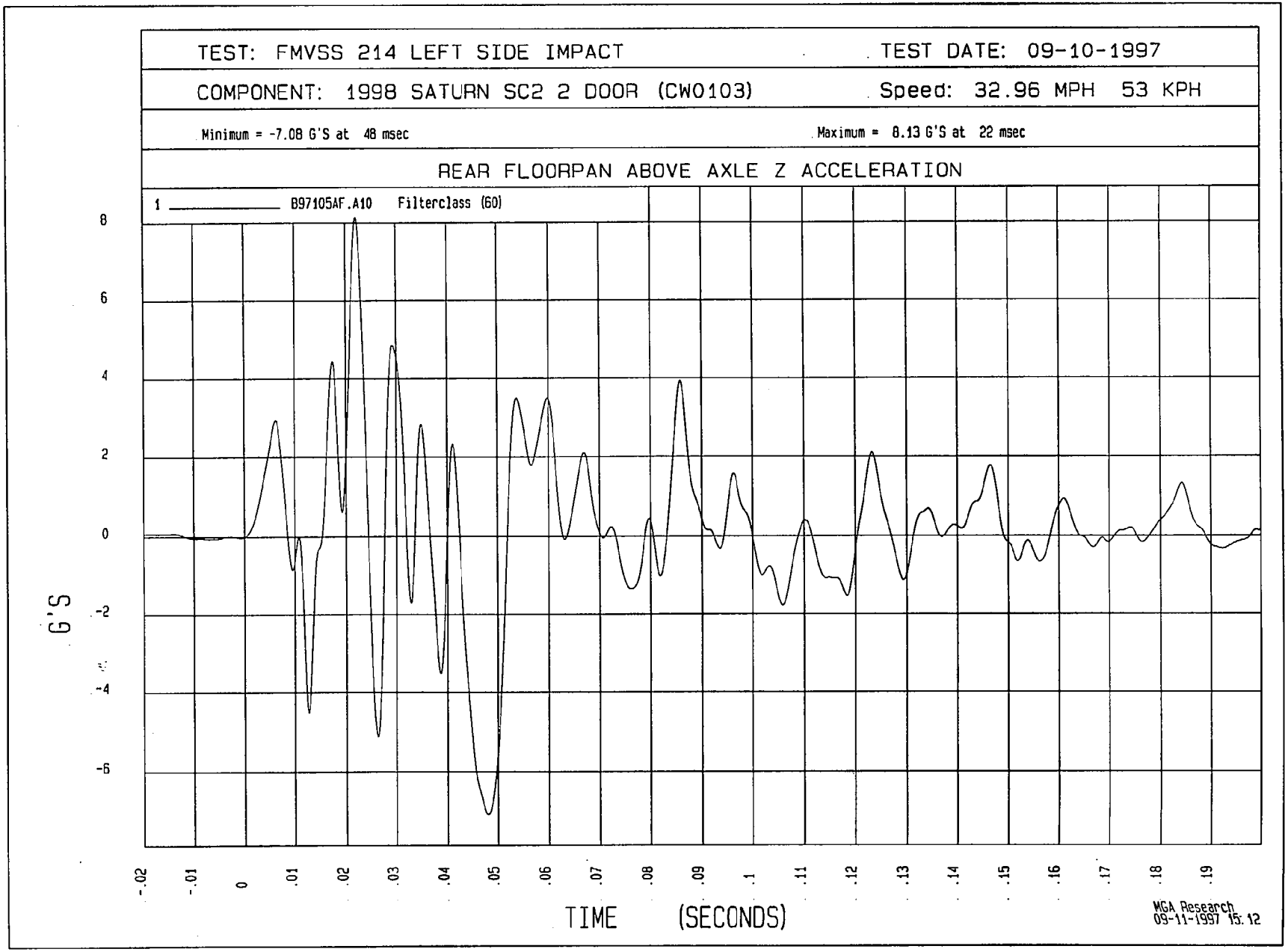
.18
.19
TIME Seconds
MGA Research
09-13-1997 14:08

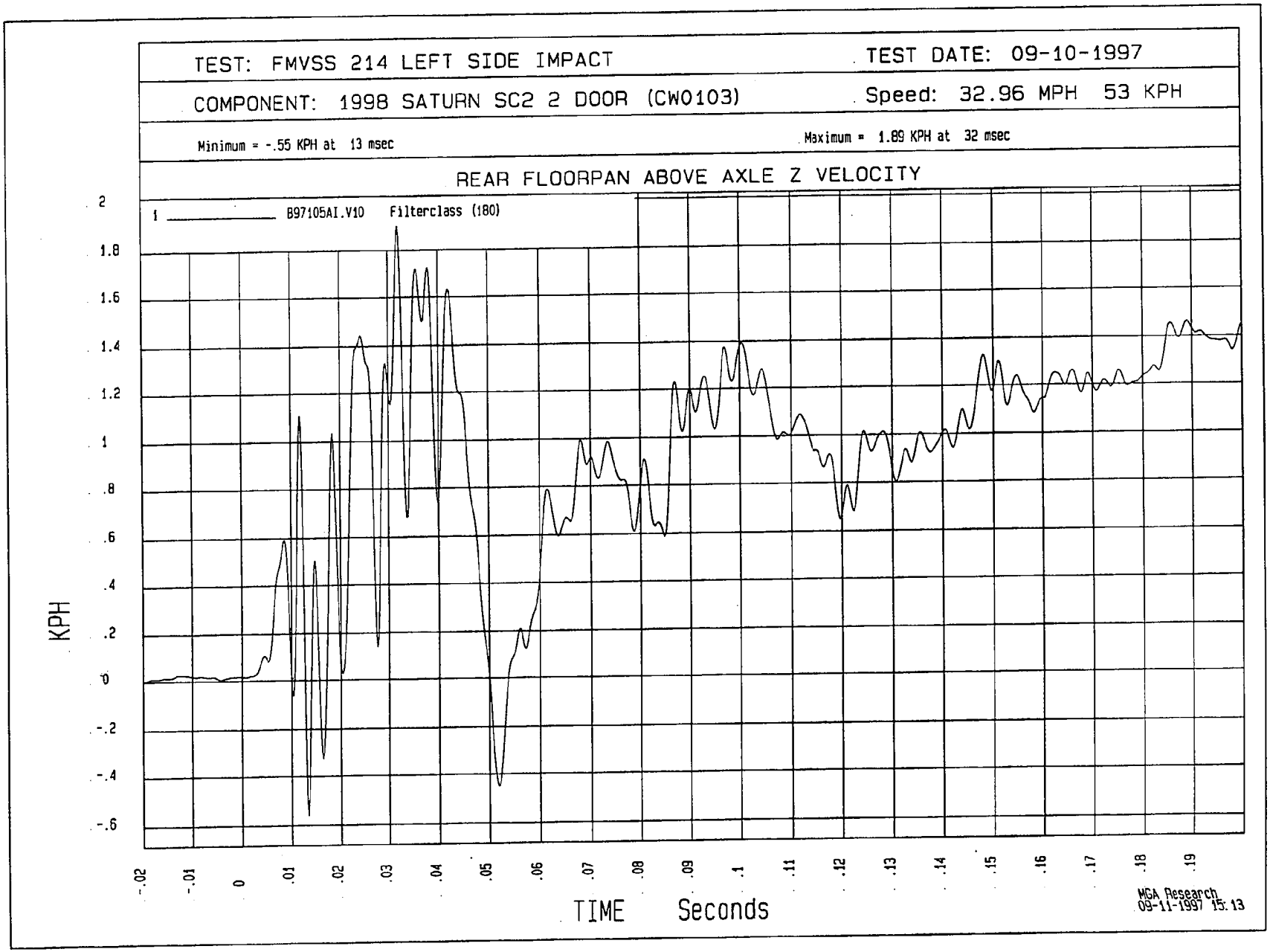

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -9.76 G'S at 46 msec
Maximum = 2.57 G'S at 58 msec
REAR FLOORPAN ABOVE AXLE X ACCELERATION
1 B97105AF.A08 Filterclass (60)
Data valid until approx. 79 msec.
G'S
2
0
-2
-4
-6
-8
-10
-.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 09-11-1997 15:12

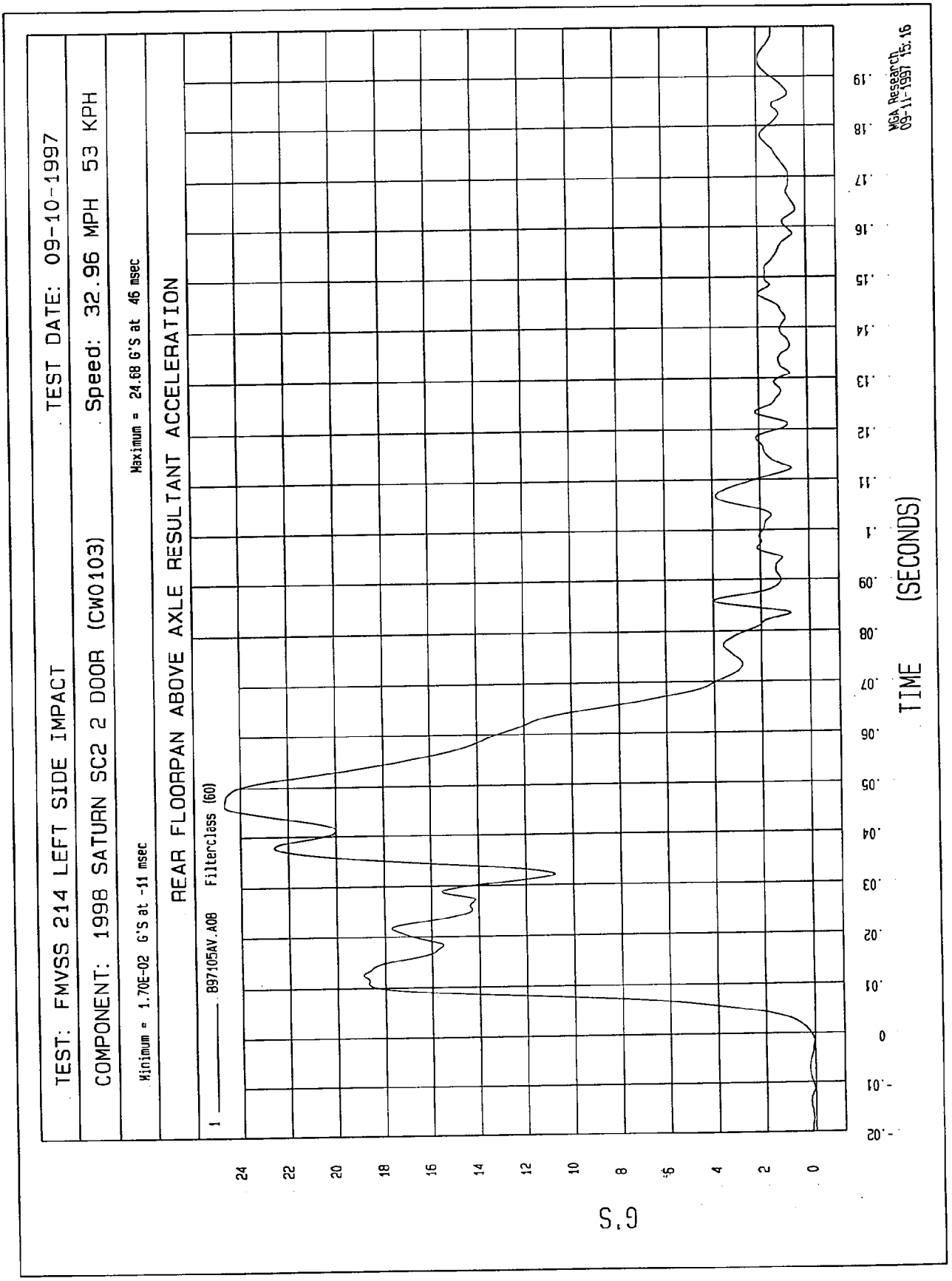

COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -7.24 KPH at 54 msec
Maximum = .21 KPH at 8 msec
REAR FLOORPAN ABOVE AXLE X VELOCITY
1 B97105AI.V08 Filterclass (180)
KPH
0
-1
-2
-3
-4
-5
-6
-7
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:12

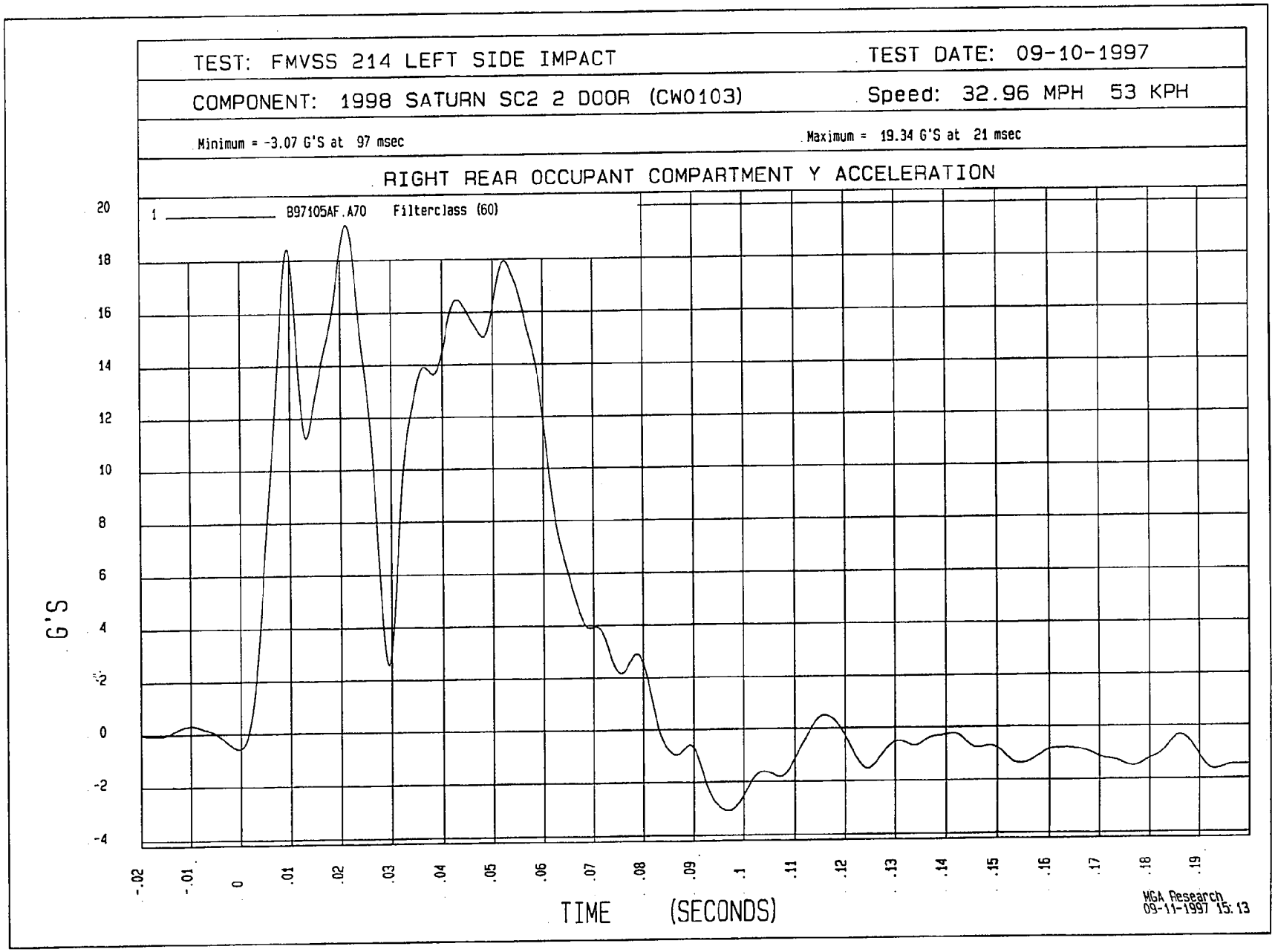

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.42 G'S at 107 msec
Maximum = 22.80 G'S at 50 msec
REAR FLOORPAN ABOVE AXLE Y ACCELERATION
1 B97105AF.A09 Filterclass (60)
G'S
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:12

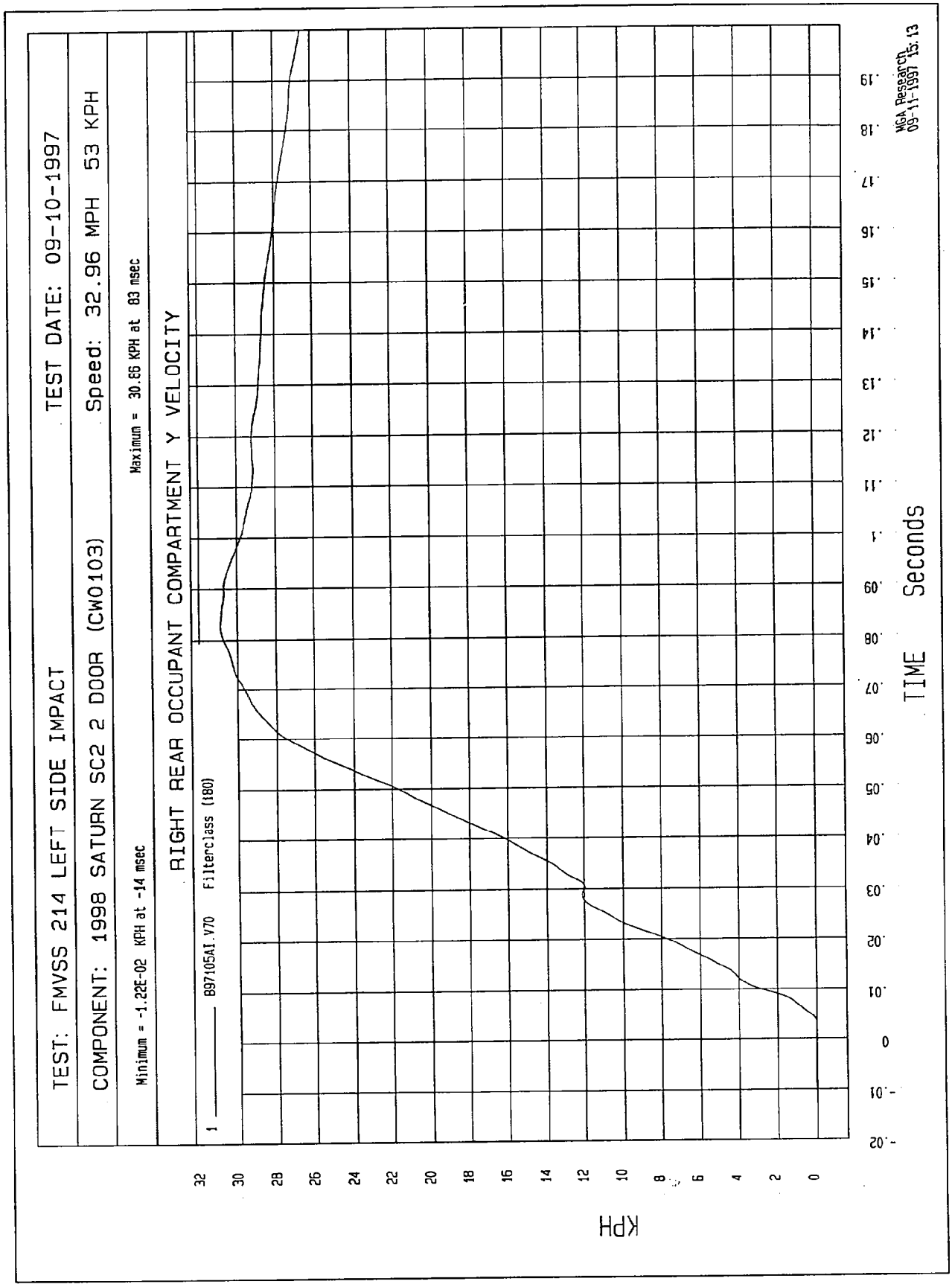

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.18E-02 KPH at 4 msec
Maximum = 35.99 KPH at 85 msec
REAR FLOORPAN ABOVE AXLE Y VELOCITY
1 B97105AI.V09 Filterclass (180)
KPH
36
34
32
30
28
26
24
22
20
18
16
14
12
10
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
09-11-1997 15:12

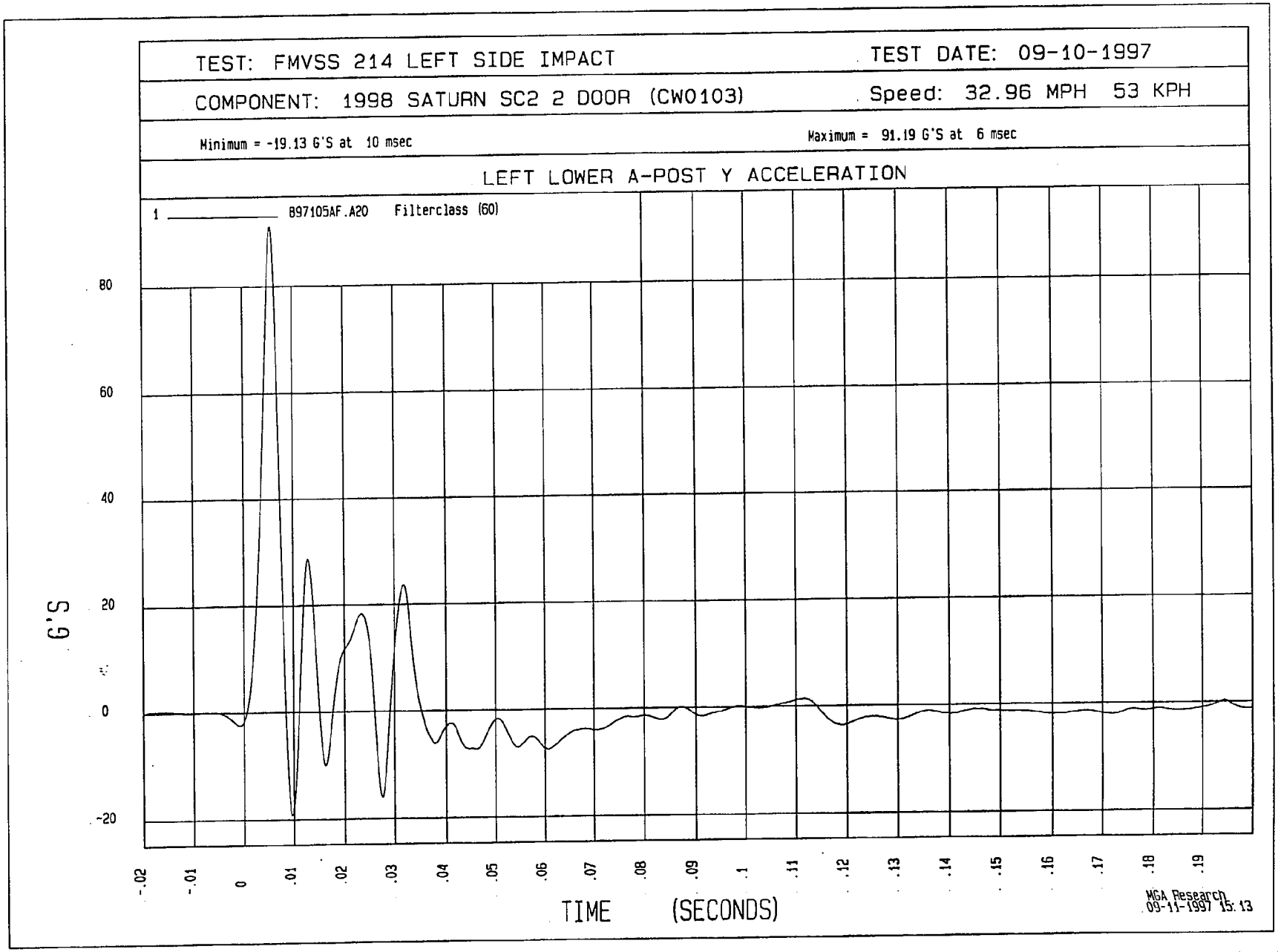

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -7.08 G'S at 48 msec
Maximum = 8.13 G'S at 22 msec
REAR FLOORPAN ABOVE AXLE Z ACCELERATION
1 B97105AF.A10 Filterclass (60)
8
6
4
2
0
-2
-4
-6
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:12

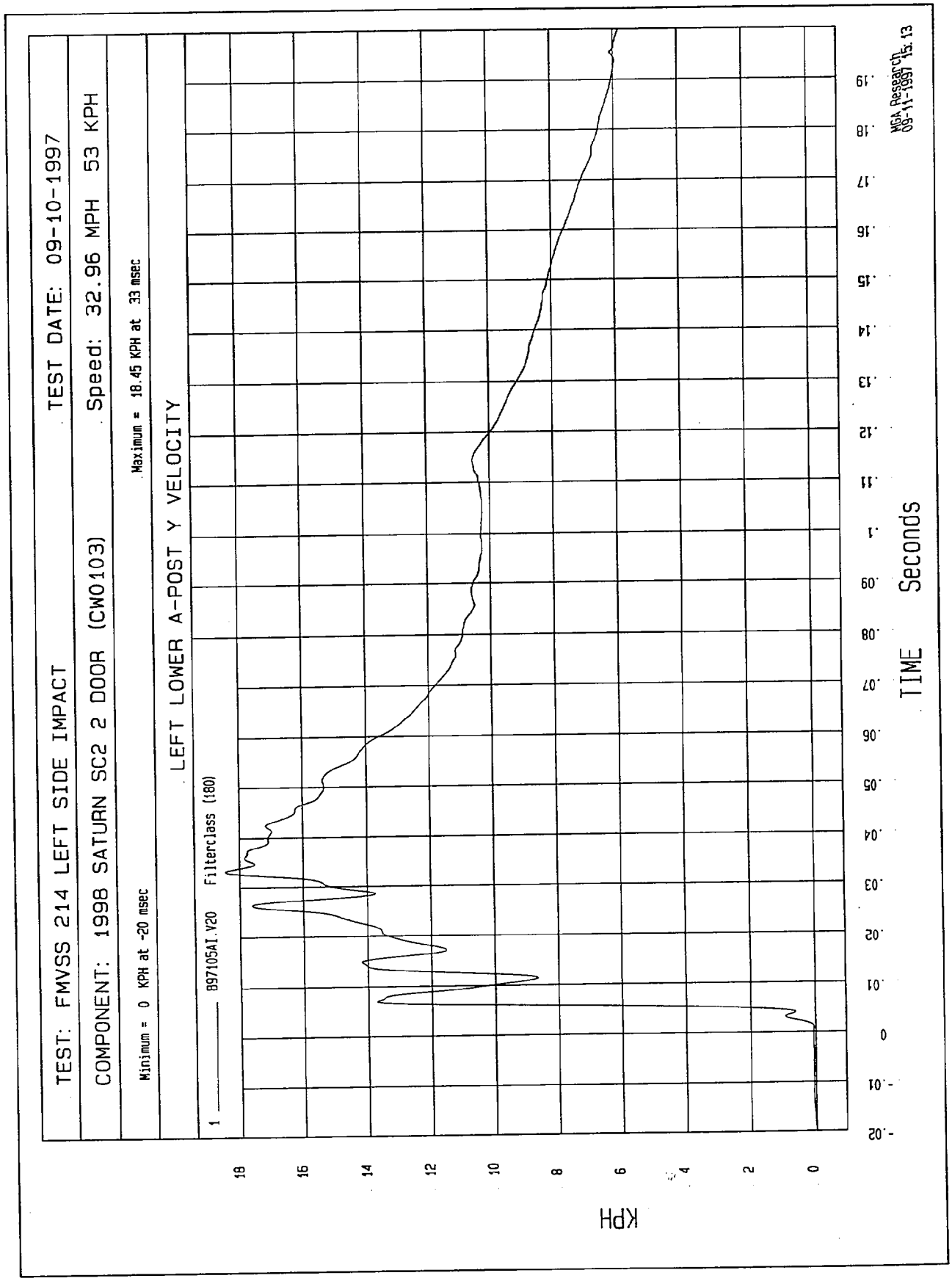

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -.55 KPH at 13 msec
Maximum = 1.89 KPH at 32 msec
REAR FLOORPAN ABOVE AXLE Z VELOCITY
1 B97105AI.V10 Filterclass (180)
KPH
2
1.8
1.6
1.4
1.2
1
.8
.6
.4
.2
0
-.2
-.4
-.6
-.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
09-11-1997 15:13

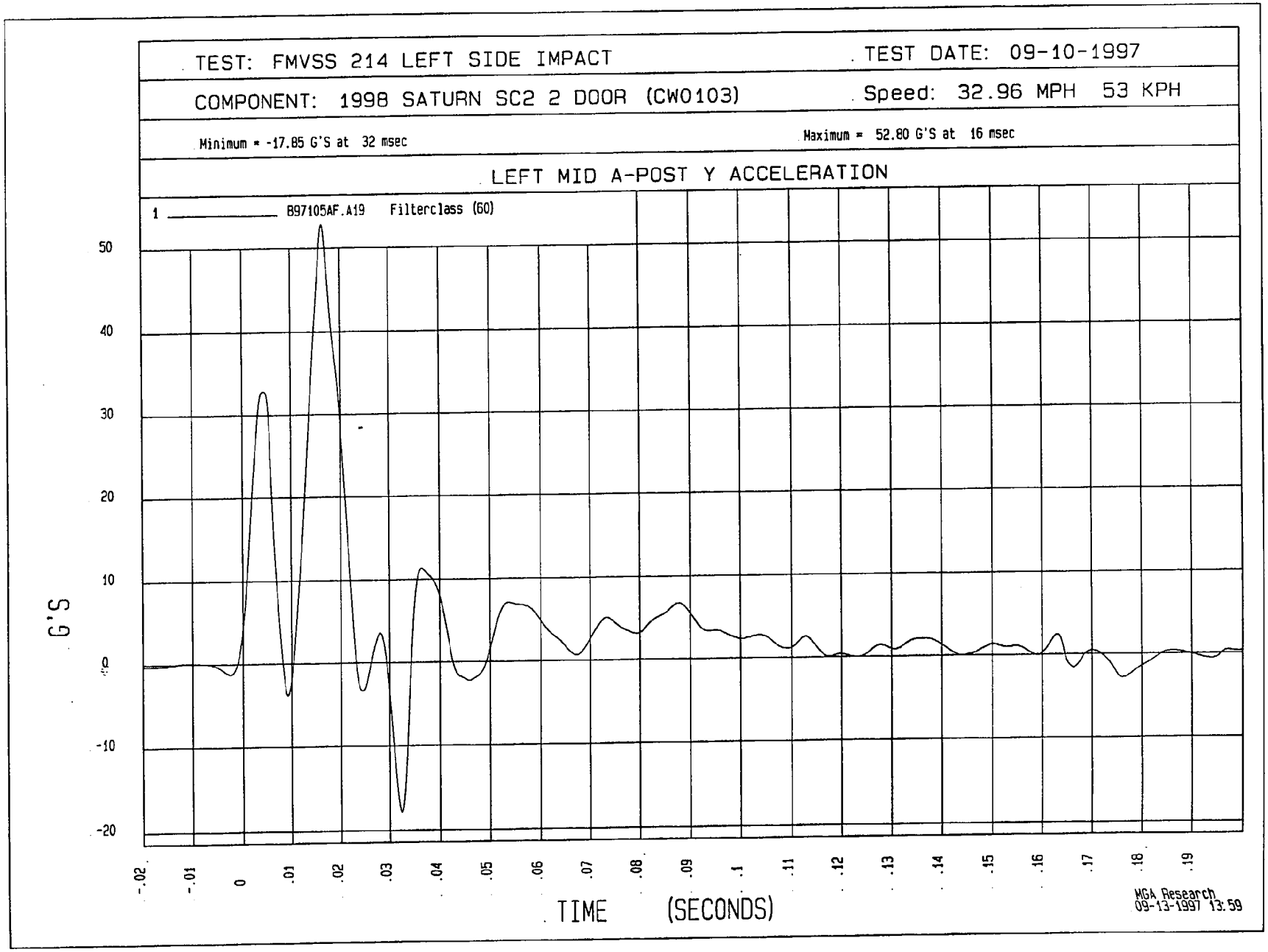

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 1.70E-02 G'S at -11 msec
Maximum = 24.68 G'S at 46 msec
REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION
1 B97105AV.A08 Filterclass (60)
MGA Research
09-11-1997 15:16
G'S
TIME (SECONDS)

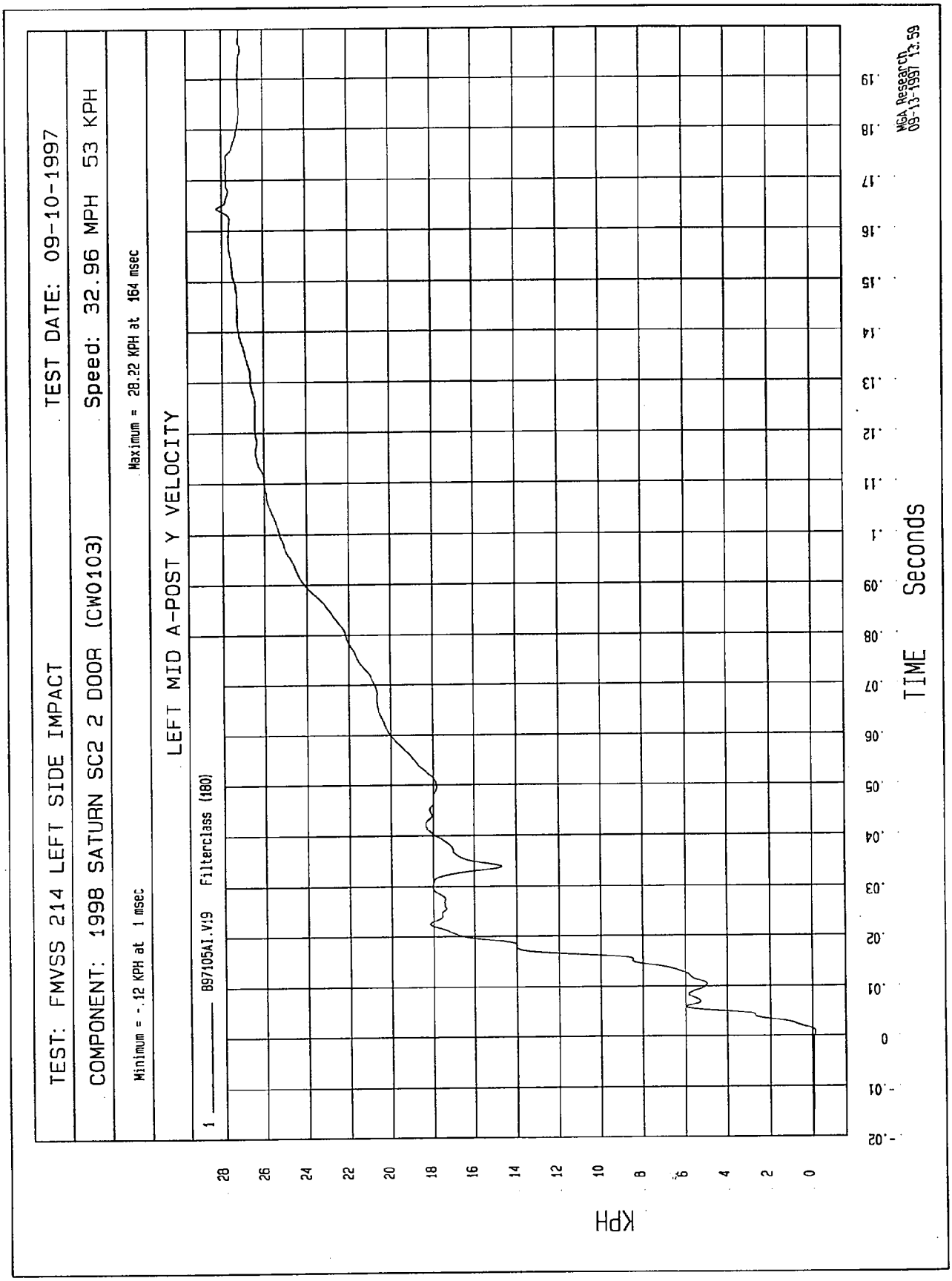

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.07 G'S at 97 msec
Maximum = 19.34 G'S at 21 msec
RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION
1 B97105AF.A70 Filterclass (60)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
G'S
-.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
09-11-1997 15:13

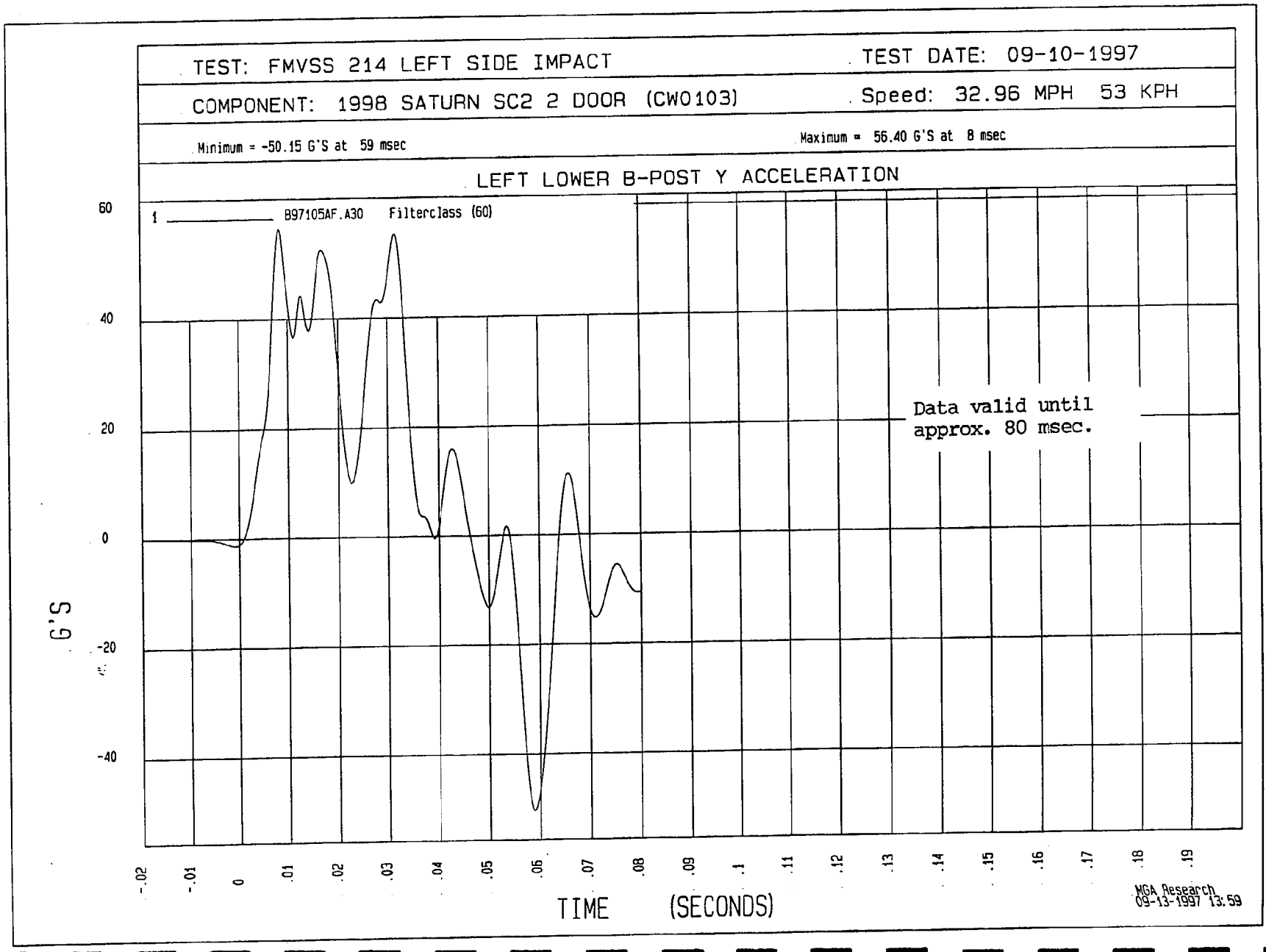

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -1.22E-02 KPH at -14 msec
Maximum = 30.66 KPH at 83 msec
RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY
1 B97105A1.V70 Filterclass (180)
KPH
TIME Seconds
MGA Research
09-11-1997 15:13

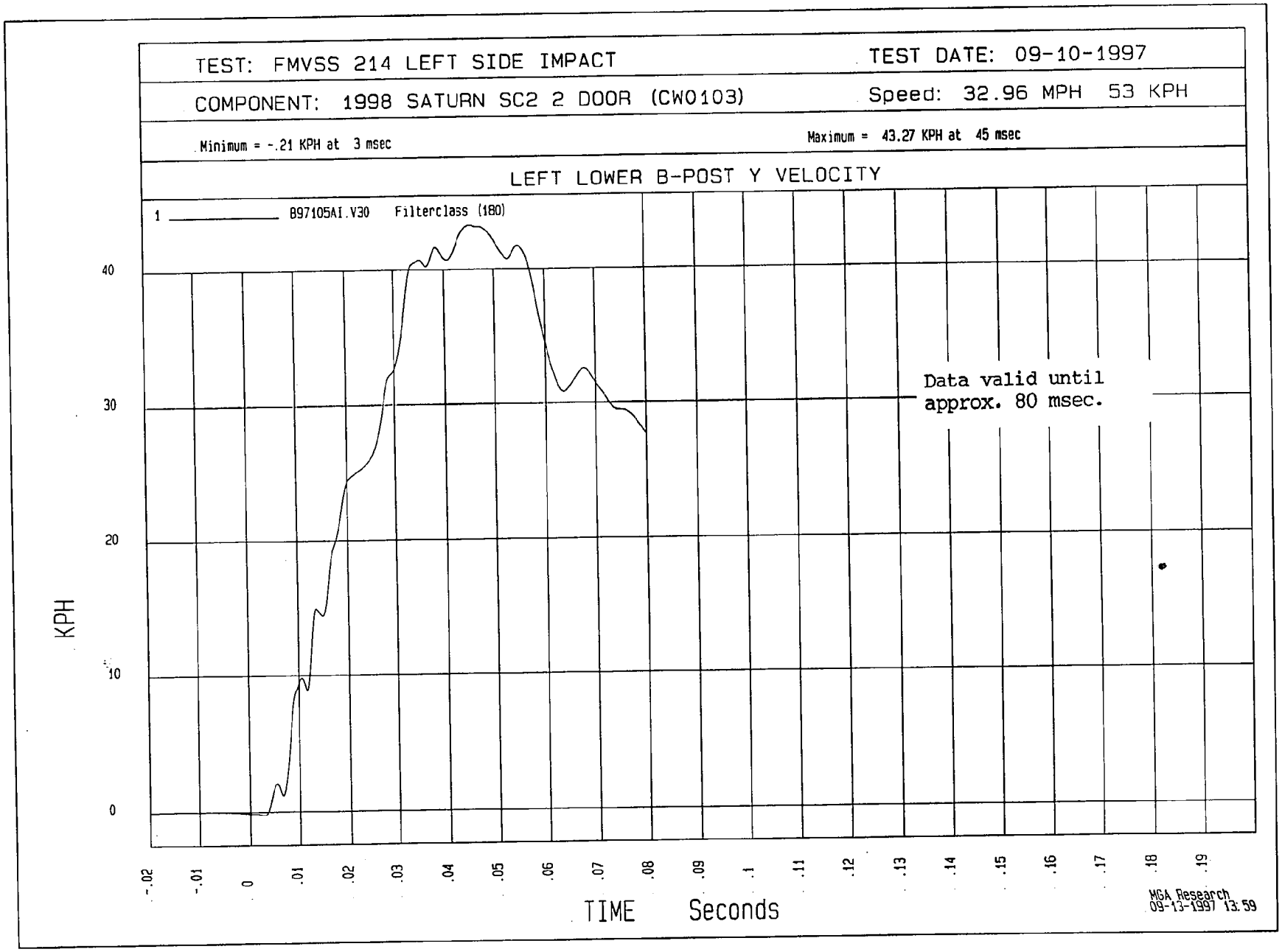

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -19.13 G'S at 10 msec
Maximum = 91.19 G'S at 6 msec
LEFT LOWER A-POST Y ACCELERATION
1 897105AF.A20 Filterclass (60)
80
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:13

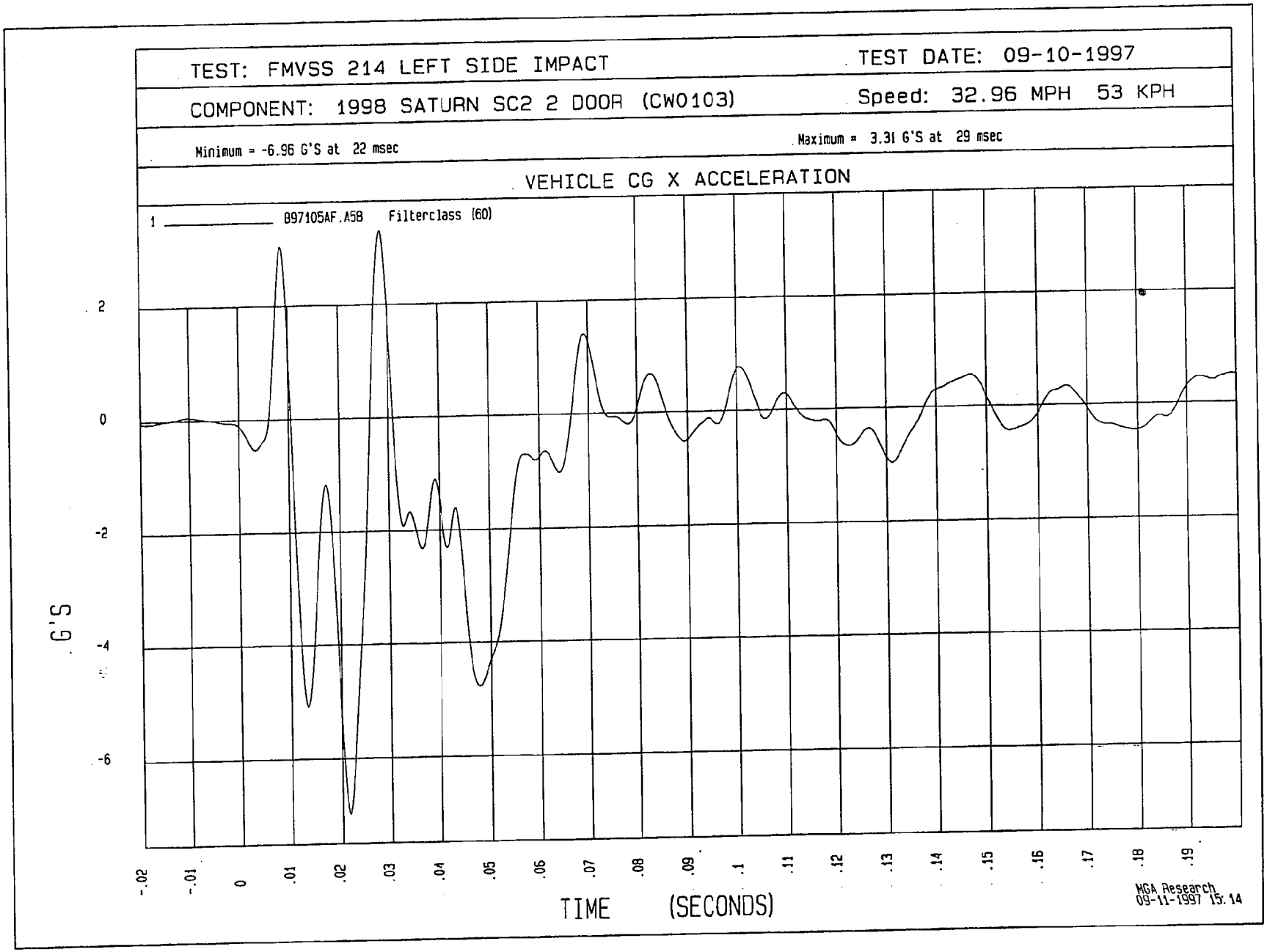

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 0 KPH at -20 msec
Maximum = 18.45 KPH at 33 msec
LEFT LOWER A-POST Y VELOCITY
1 B9710SAI.V20 Filterclass (180)
KPH
TIME Seconds
MGA Research 09-11-1997 15:13

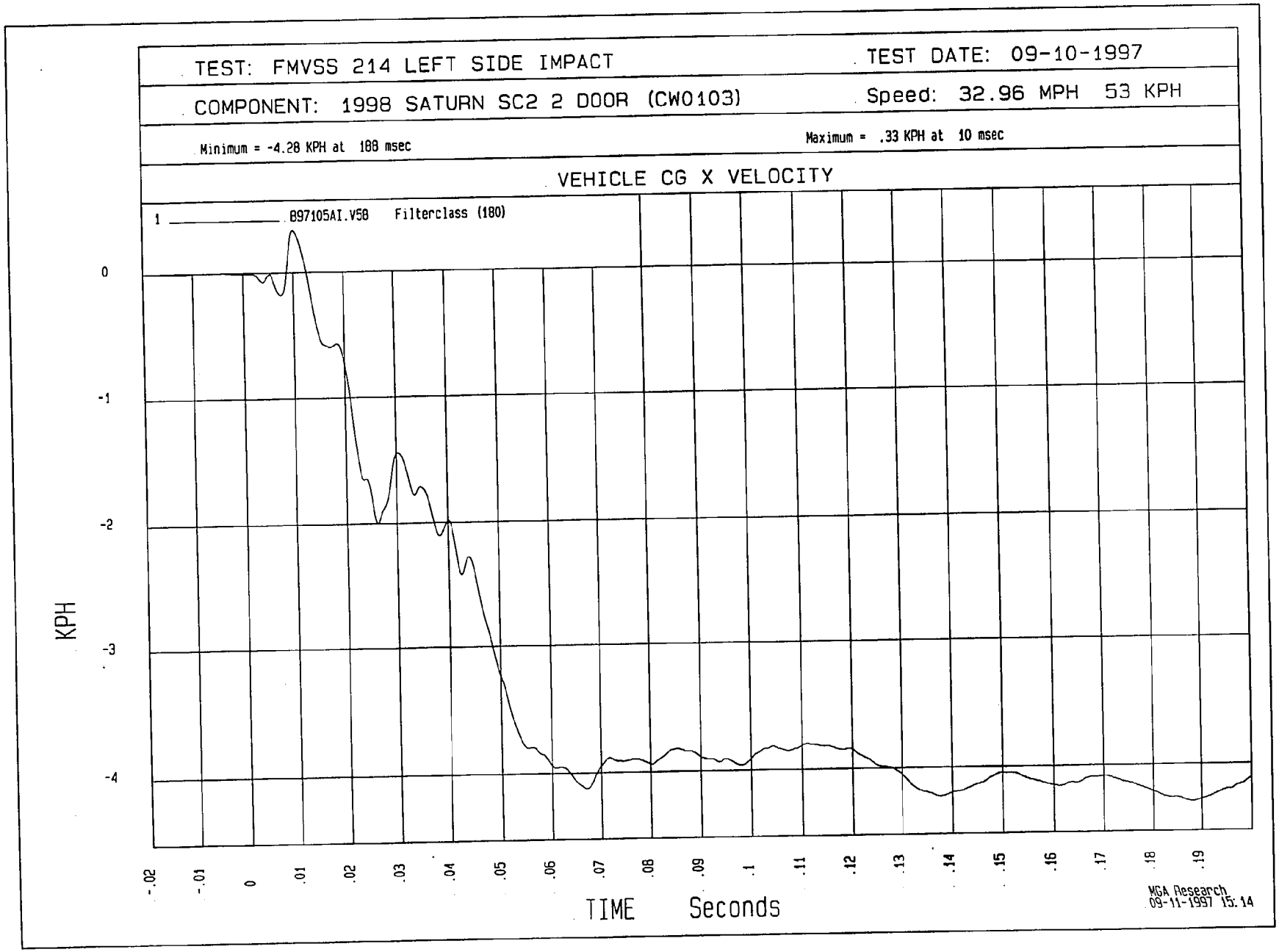

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -17.85 G'S at 32 msec
Maximum = 52.80 G'S at 16 msec
LEFT MID A-POST Y ACCELERATION
1 B97105AF.A19 Filterclass (60)
50
40
30
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-13-1997 13:59

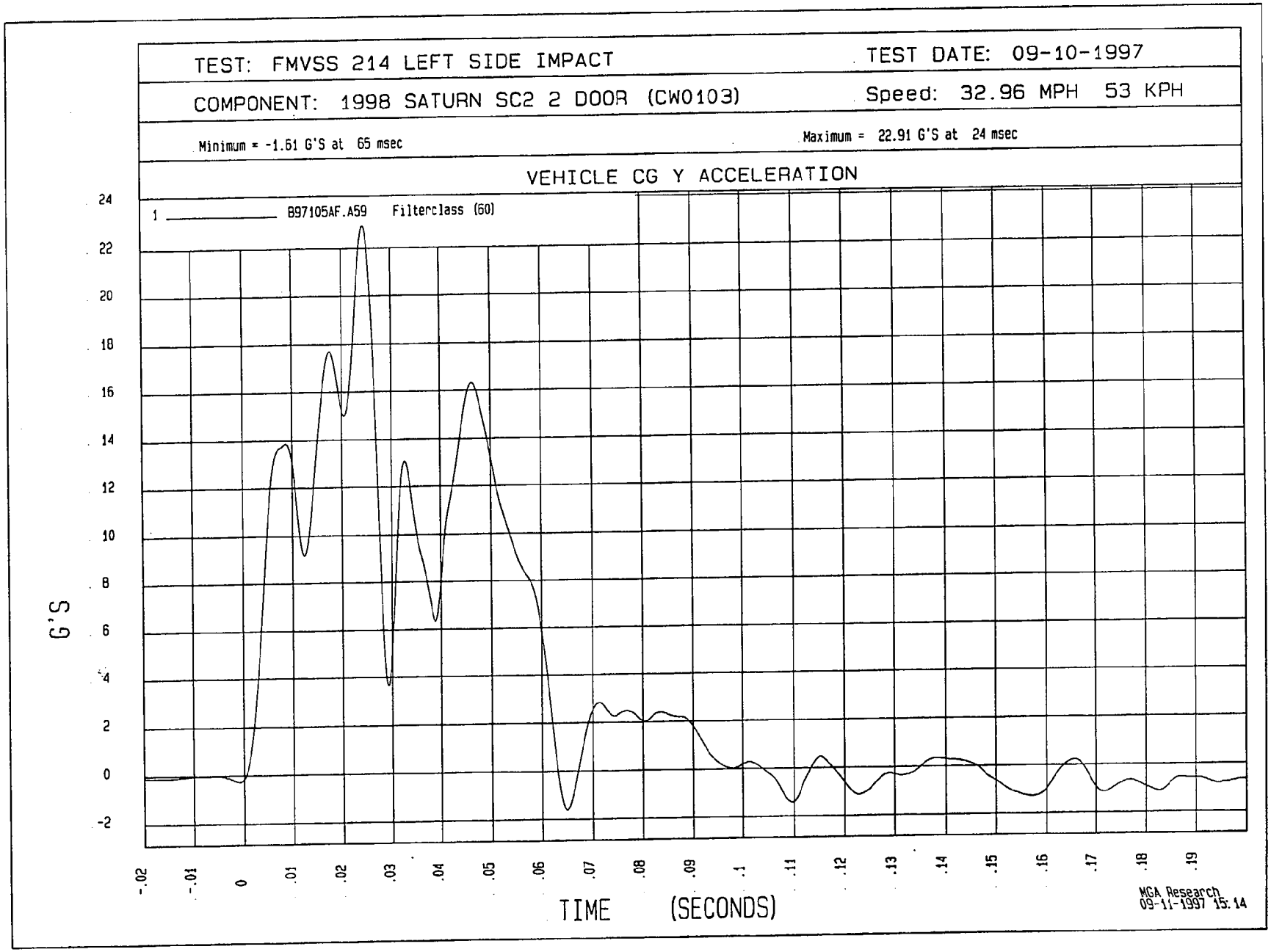

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -.12 KPH at 1 msec
Maximum = 28.22 KPH at 164 msec
LEFT MID A-POST Y VELOCITY
1 B97105AI.V19 Filterclass (180)
KPH
TIME Seconds
MGA Research
09-13-1997 13:59

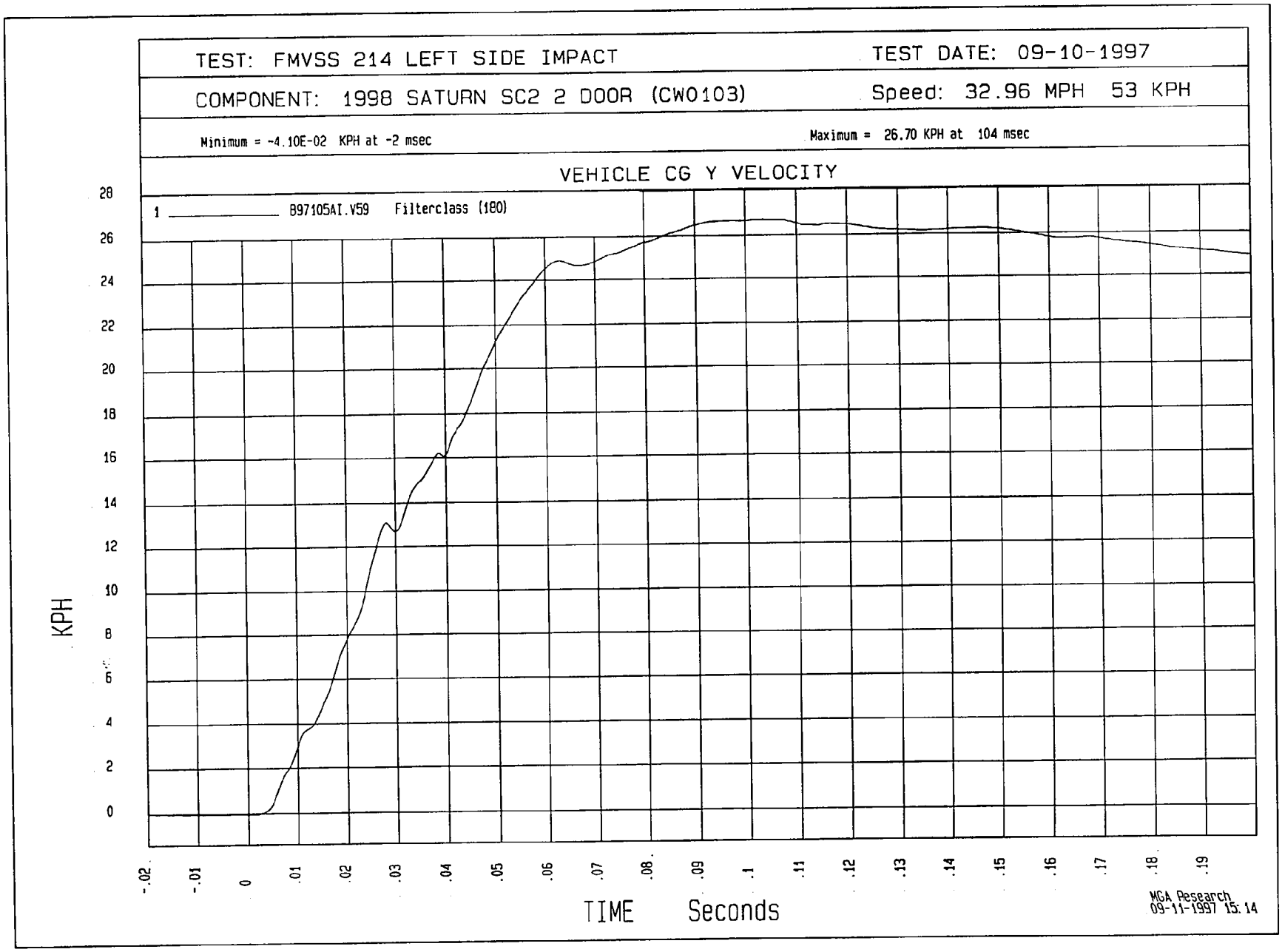

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -50.15 G'S at 59 msec
Maximum = 56.40 G'S at 8 msec
LEFT LOWER B-POST Y ACCELERATION
1 B97105AF.A30 Filterclass (60)
Data valid until approx. 80 msec.
G'S
60
40
20
0
-20
-40
-.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
09-13-1997 13:59

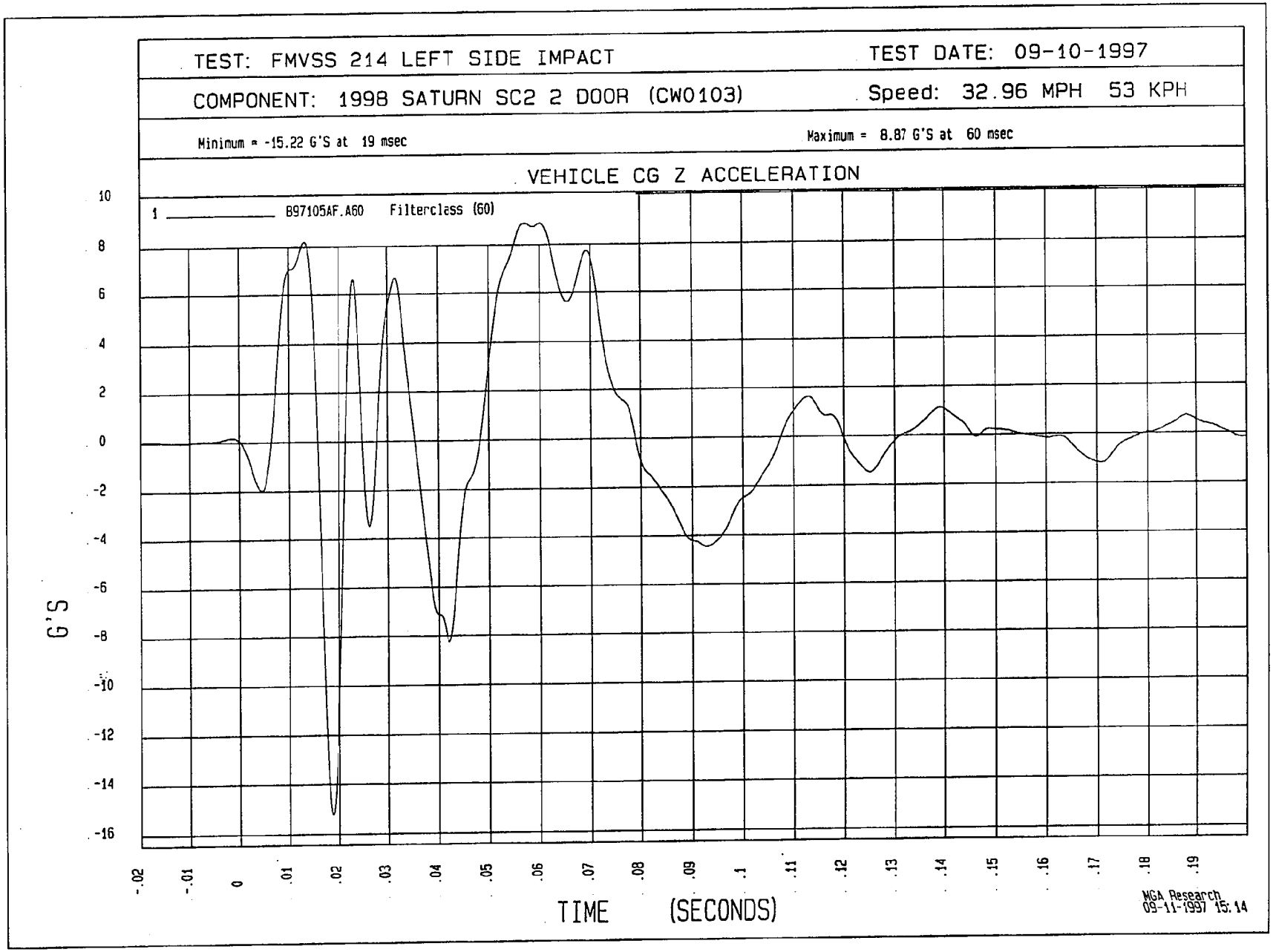

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -.21 KPH at 3 msec
Maximum = 43.27 KPH at 45 msec
LEFT LOWER B-POST Y VELOCITY
1 B97105AI.V30 Filterclass (180)
Data valid until approx. 80 msec.
KPH
40
30
20
10
0
-.02
-.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
09-13-1997 13:59


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -6.96 G'S at 22 msec
Maximum = 3.31 G'S at 29 msec
VEHICLE CG X ACCELERATION
1 B97105AF.A58 Filterclass (60)
2
0
-2
-4
-6
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
09-11-1997 15:14


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.28 KPH at 188 msec
Maximum = .33 KPH at 10 msec
VEHICLE CG X VELOCITY
1 B97105AI.V58 Filterclass (180)
KPH
0
-1
-2
-3
-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
09-11-1997 15:14


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -1.61 G'S at 65 msec
Maximum = 22.91 G'S at 24 msec
VEHICLE CG Y ACCELERATION
1 B97105AF.A59 Filterclass (60)
G'S
24
22
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
09-11-1997 15:14


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.10E-02 KPH at -2 msec
Maximum = 26.70 KPH at 104 msec
VEHICLE CG Y VELOCITY
1 B97105AI.V59 Filterclass (180)
KPH
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
09-11-1997 15:14


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -15.22 G'S at 19 msec
Maximum = 8.87 G'S at 60 msec
VEHICLE CG Z ACCELERATION
1 B97105AF.A60 Filterclass (60)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
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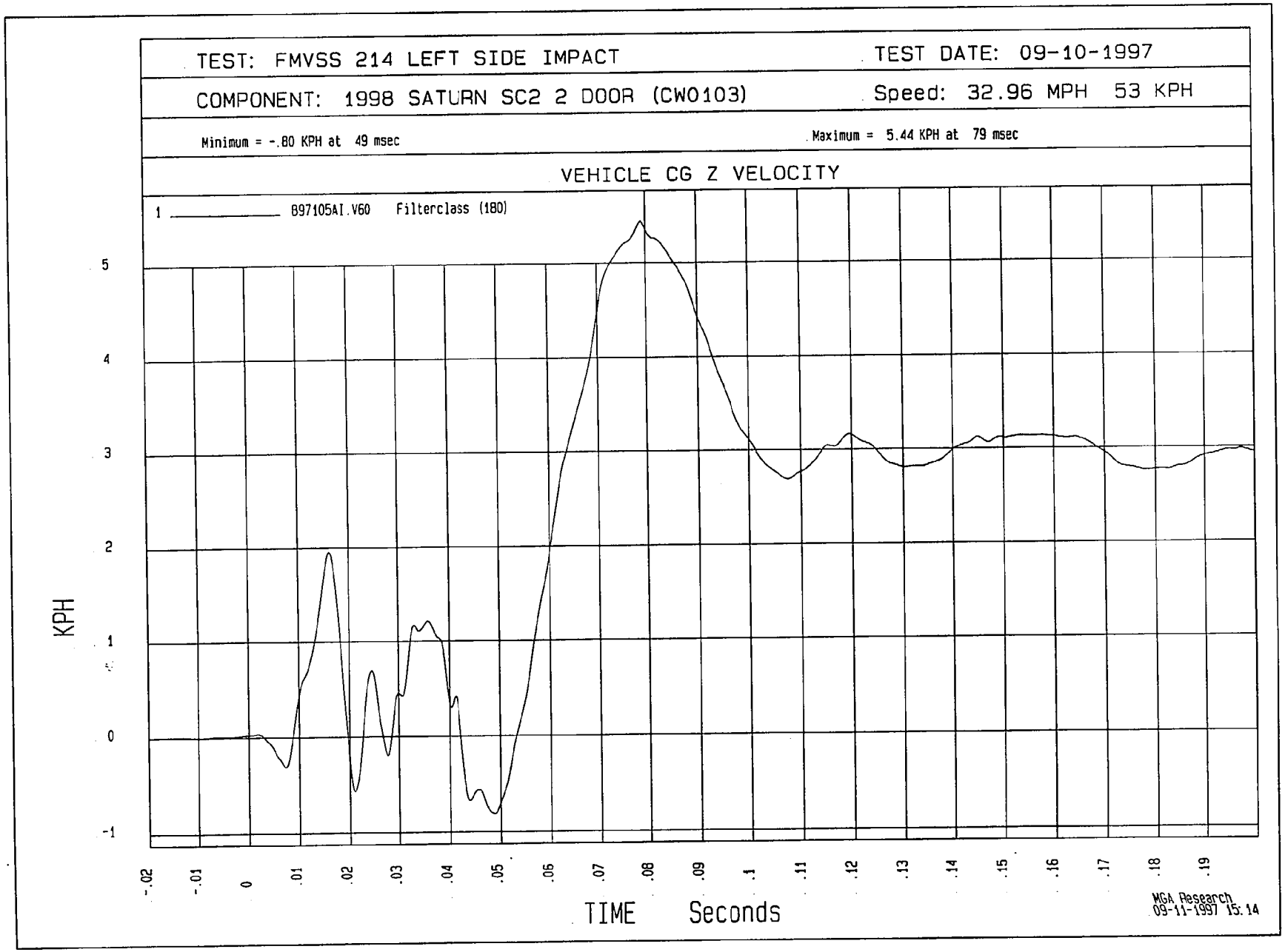
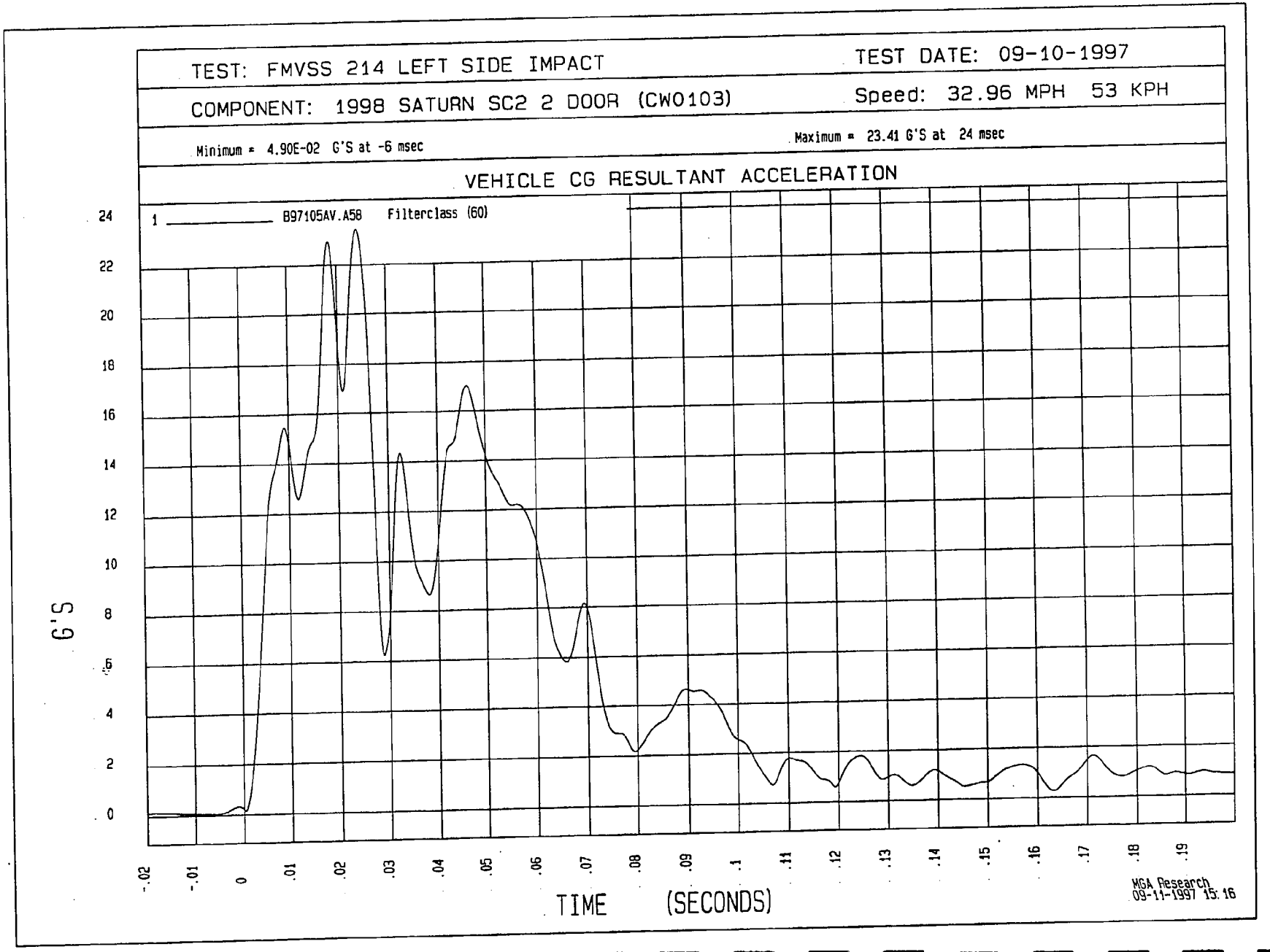
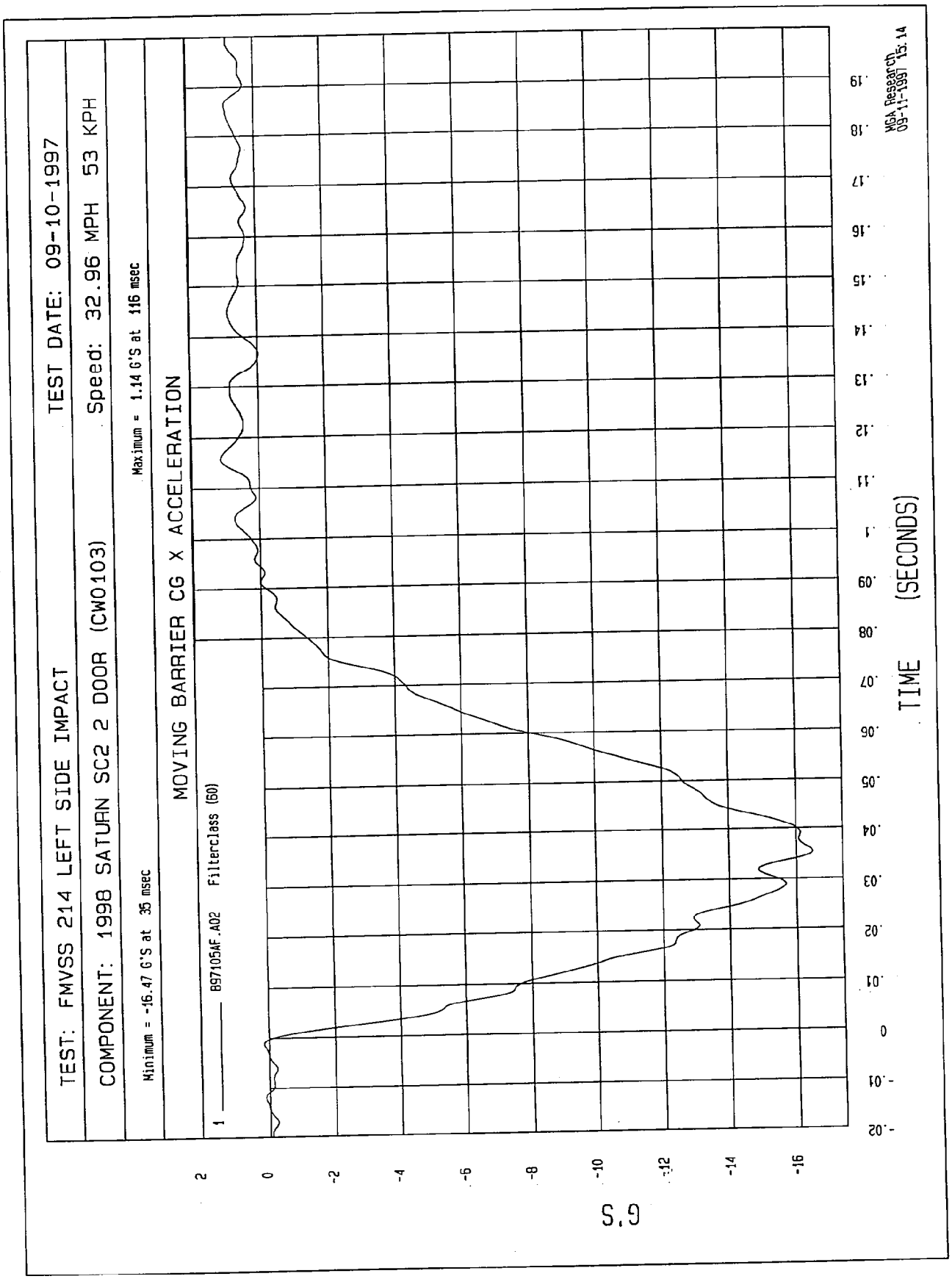
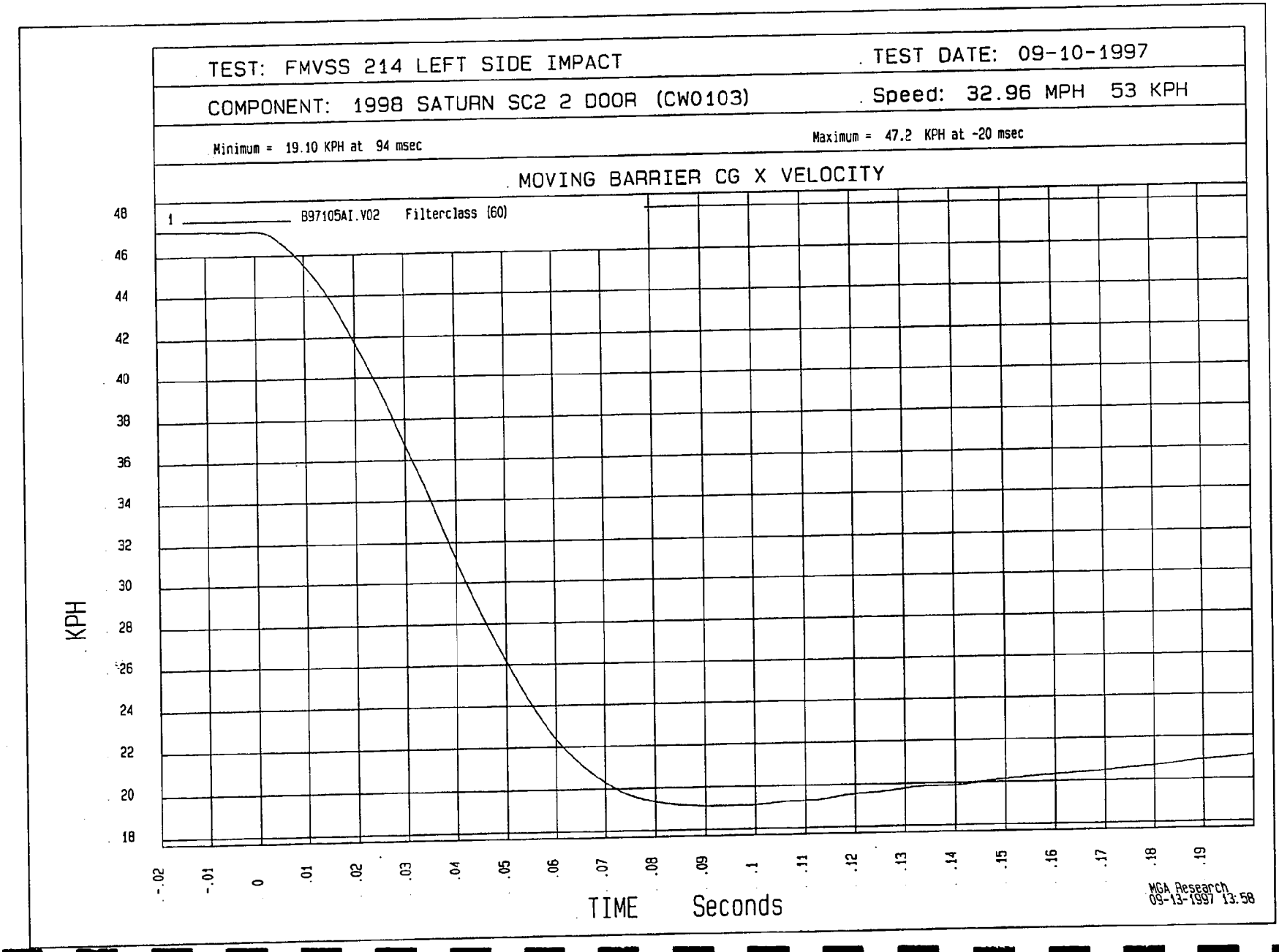
TIME (SECONDS)
MGA Research
09-11-1997 15:14


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -.80 KPH at 49 msec
Maximum = 5.44 KPH at 79 msec
VEHICLE CG Z VELOCITY
1 B97105AI.V60 Filterclass (180)
KPH
5
4
3
2
1
0
-1
-.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
09-11-1997 15:14


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 4.90E-02 G'S at -6 msec
Maximum = 23.41 G'S at 24 msec
VEHICLE CG RESULTANT ACCELERATION
1 B97105AV.A58 Filterclass (60)
G'S
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
09-11-1997 15:16


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -16.47 G'S at 35 msec
Maximum = 1.14 G'S at 116 msec
MOVING BARRIER CG X ACCELERATION
1 B97105AF.A02 Filterclass (60)
MGA Research 09-11-1997 15:14
2
0
-2
-4
-6
-8
-10
-12
-14
-16
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 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 19.10 KPH at 94 msec
Maximum = 47.2 KPH at -20 msec
MOVING BARRIER CG X VELOCITY
1 B97105AI.V02 Filterclass (60)
KPH
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.09
.1
.11
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.13
.14
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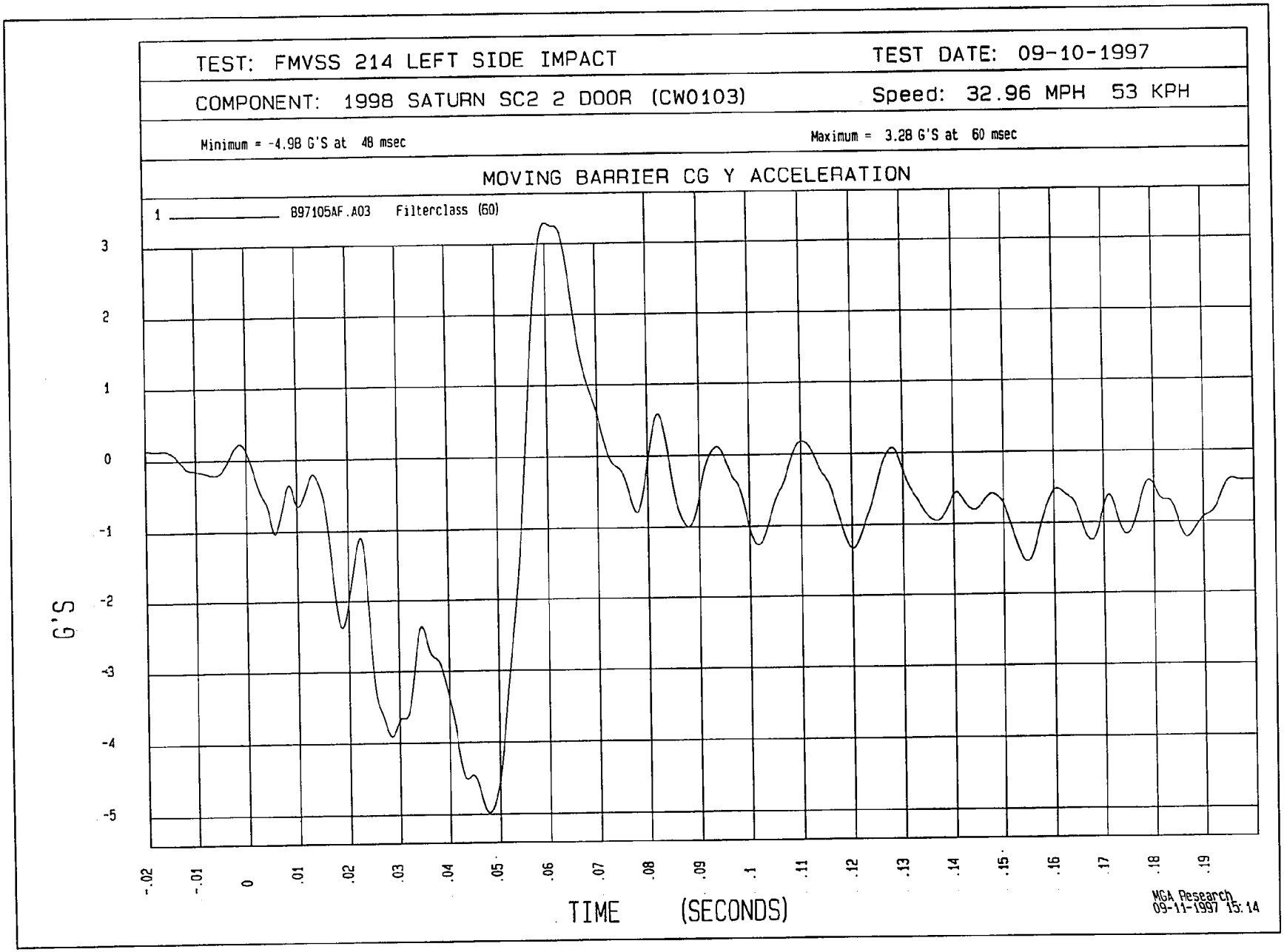
.16
.17
.18
.19
TIME Seconds
MGA Research
09-13-1997 13:58


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -4.98 G'S at 48 msec
Maximum = 3.28 G'S at 60 msec
MOVING BARRIER CG Y ACCELERATION
1 B97105AF.A03 Filterclass (60)
G'S
3
2
1
0
-1
-2
-3
-4
-5
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.13
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.16
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.18
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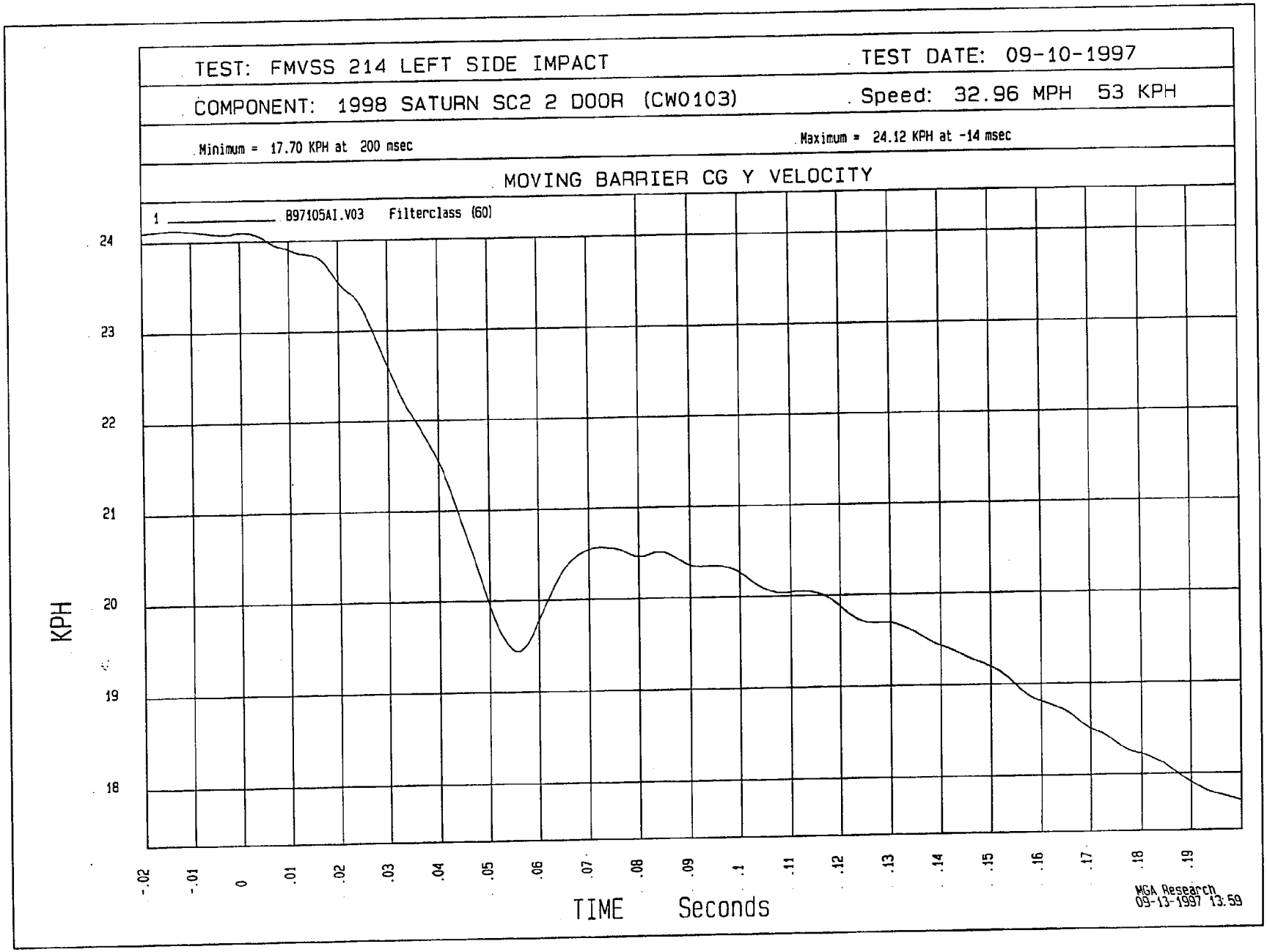
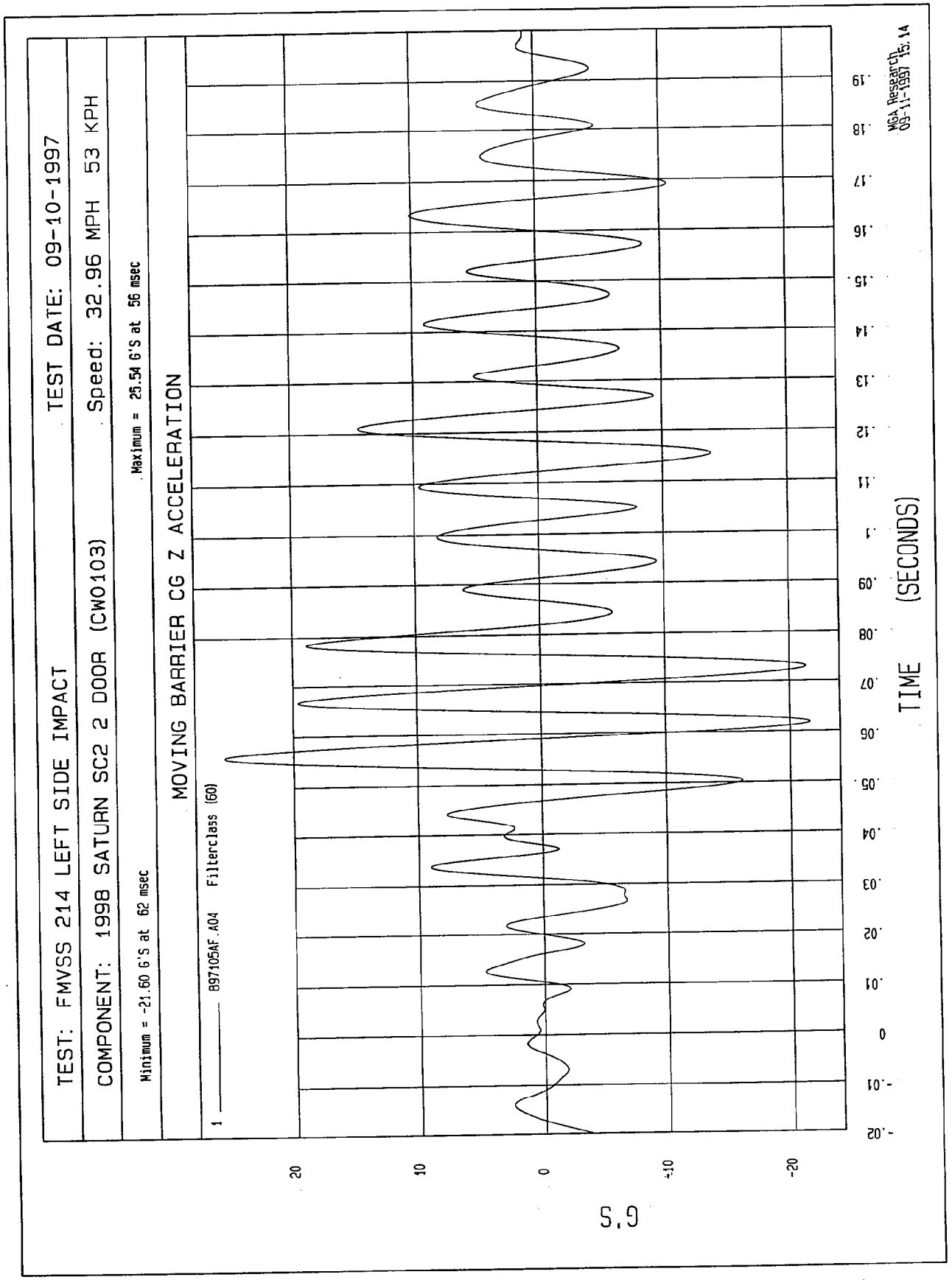
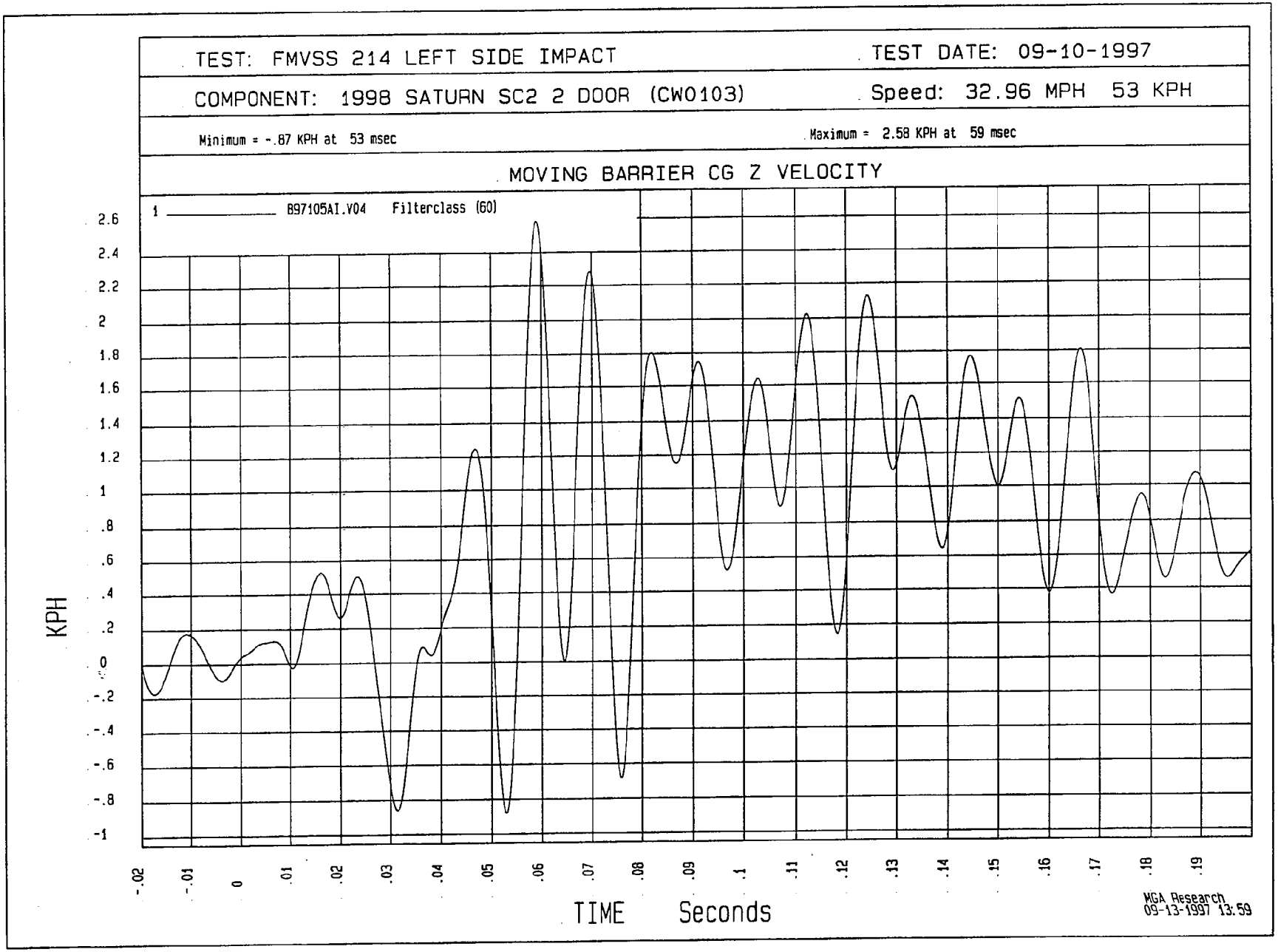
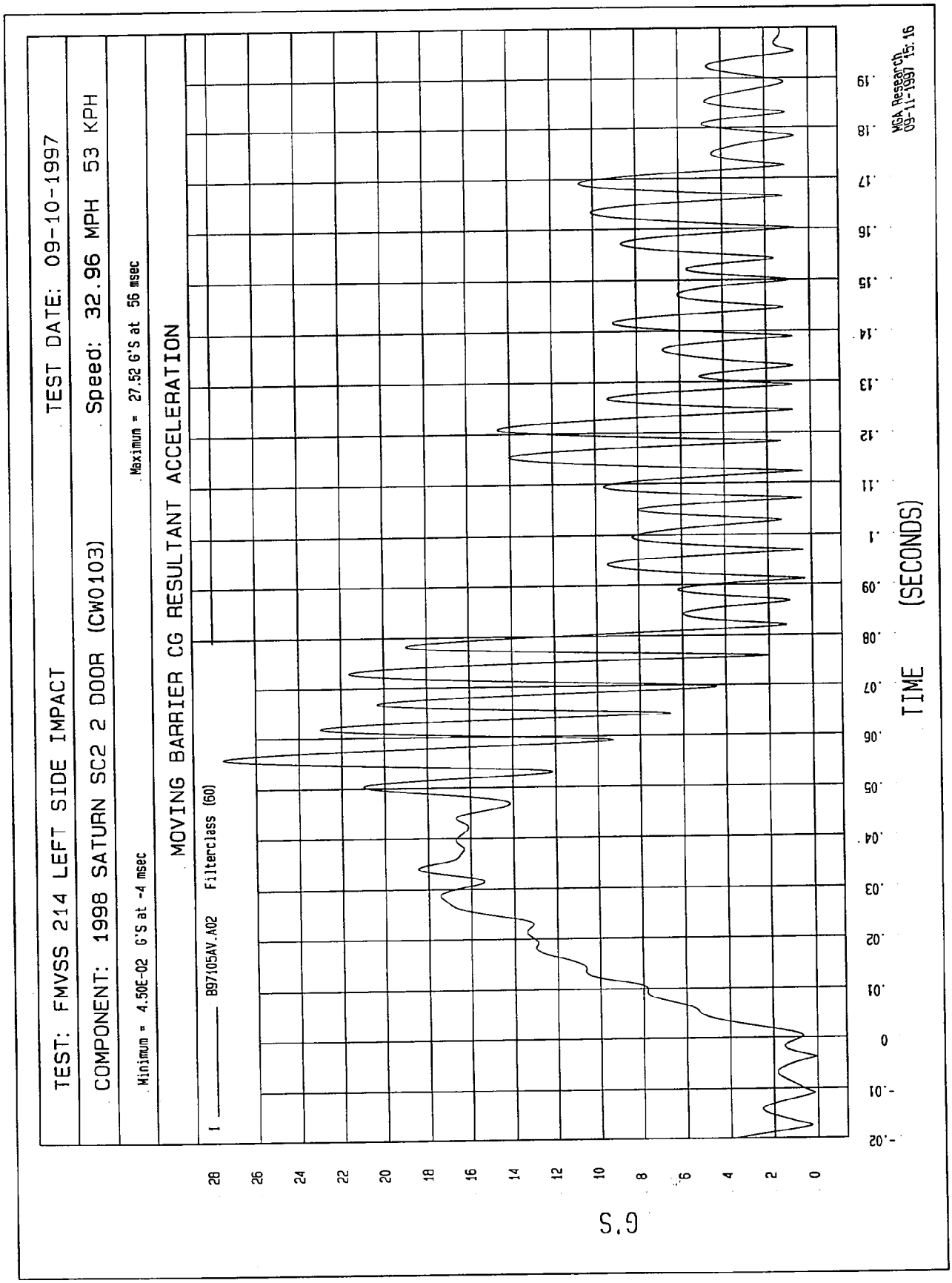
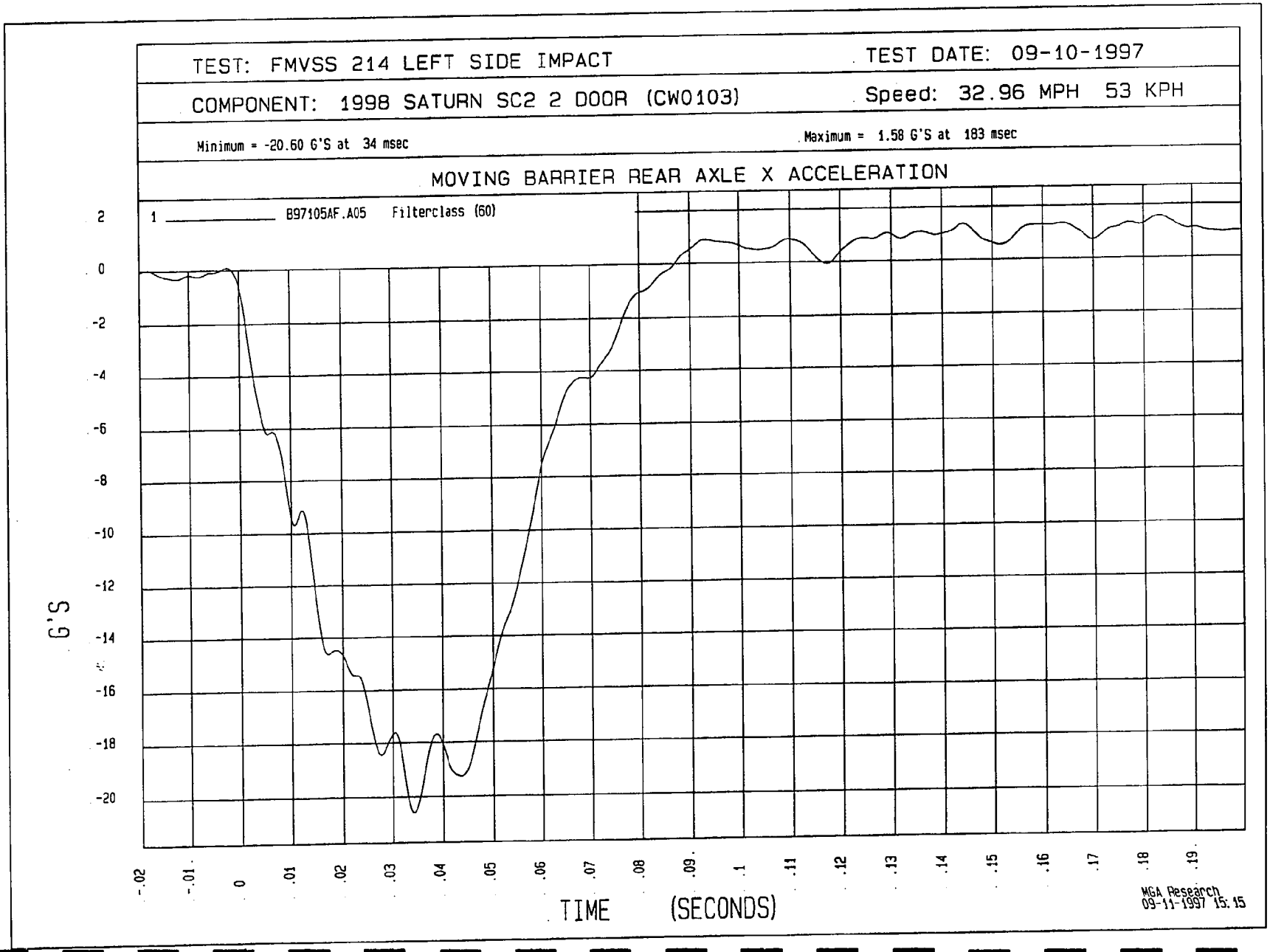
TIME (SECONDS)
MGA Research
09-11-1997 15:14

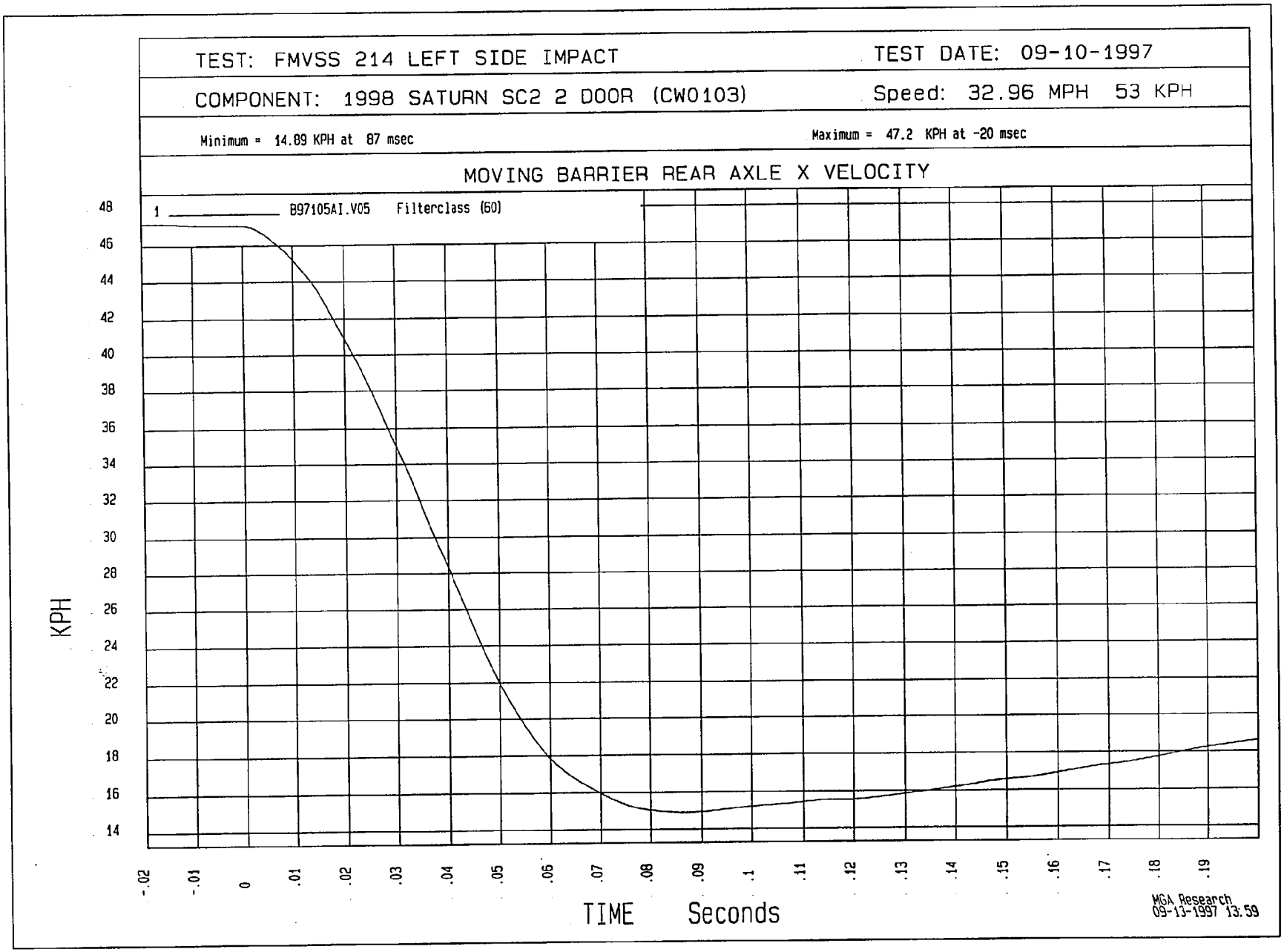

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 17.70 KPH at 200 msec
Maximum = 24.12 KPH at -14 msec
MOVING BARRIER CG Y VELOCITY
1 B97105AI.V03 Filterclass (60)
KPH
24
23
22
21
20
19
18
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-13-1997 13:59


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -21.60 G'S at 62 msec
Maximum = 25.54 G'S at 56 msec
MOVING BARRIER CG Z ACCELERATION
1 B97105AF.A04 Filterclass (60)
MGA Research 09-11-1997 15:14
20
10
0
-10
-20
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
5.9


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -.87 KPH at 53 msec
Maximum = 2.58 KPH at 59 msec
MOVING BARRIER CG Z VELOCITY
1 B97105AI.V04 Filterclass (60)
KPH
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
.8
.6
.4
.2
0
-.2
-.4
-.6
-.8
-1
-.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
09-13-1997 13:59


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 4.50E-02 G'S at -4 msec
Maximum = 27.52 G'S at 56 msec
MOVING BARRIER CG RESULTANT ACCELERATION
1 B97105AV.A02 Filterclass (60)
MGA Research
09-11-1997 15:16
TIME (SECONDS)
G'S


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -20.60 G'S at 34 msec
Maximum = 1.58 G'S at 183 msec
MOVING BARRIER REAR AXLE X ACCELERATION
1 B97105AF.A05 Filterclass (60)
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-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
09-11-1997 15:15


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 14.89 KPH at 87 msec
Maximum = 47.2 KPH at -20 msec
MOVING BARRIER REAR AXLE X VELOCITY
1 B97105AI.V05 Filterclass (60)
KPH
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
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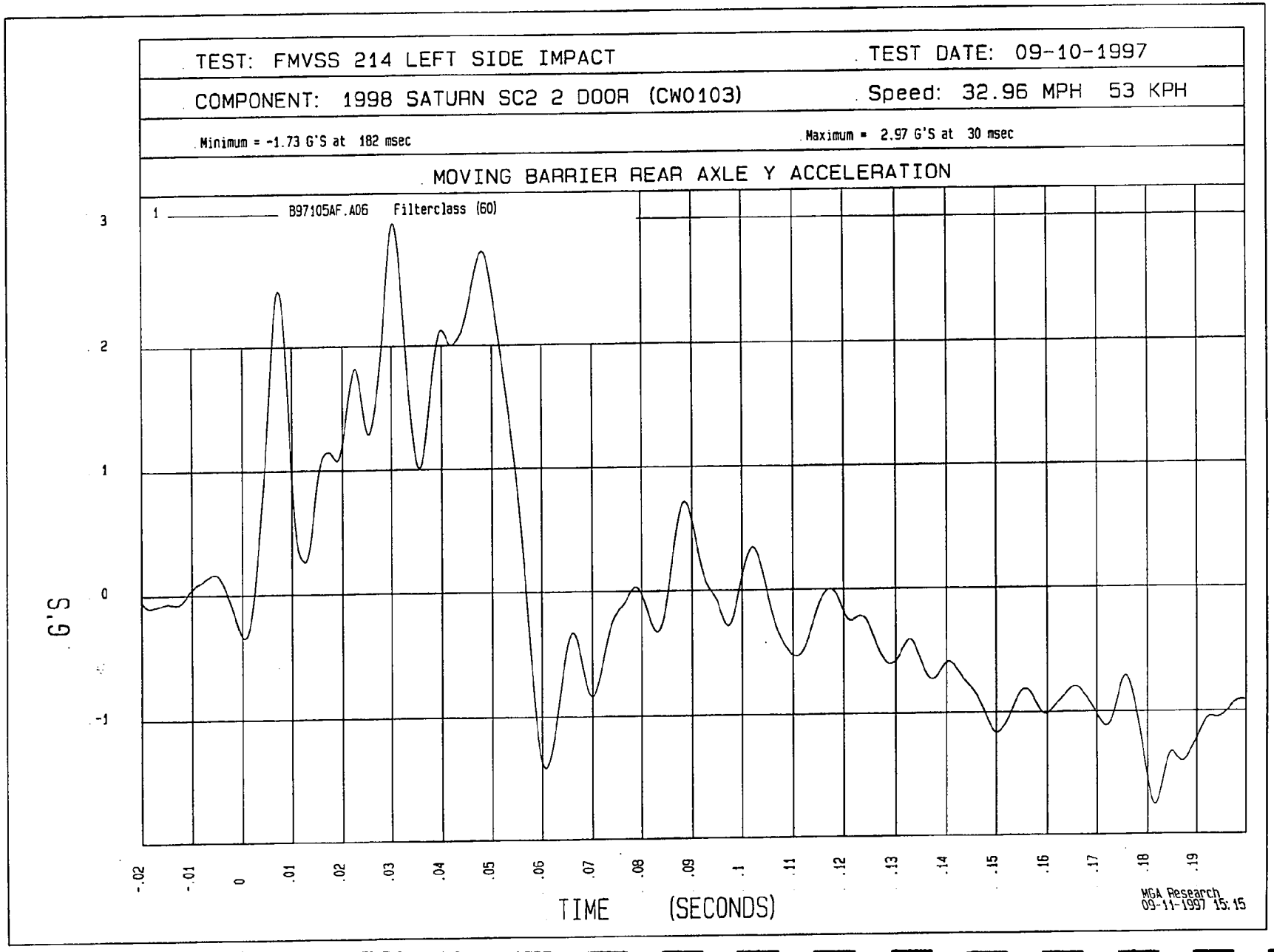
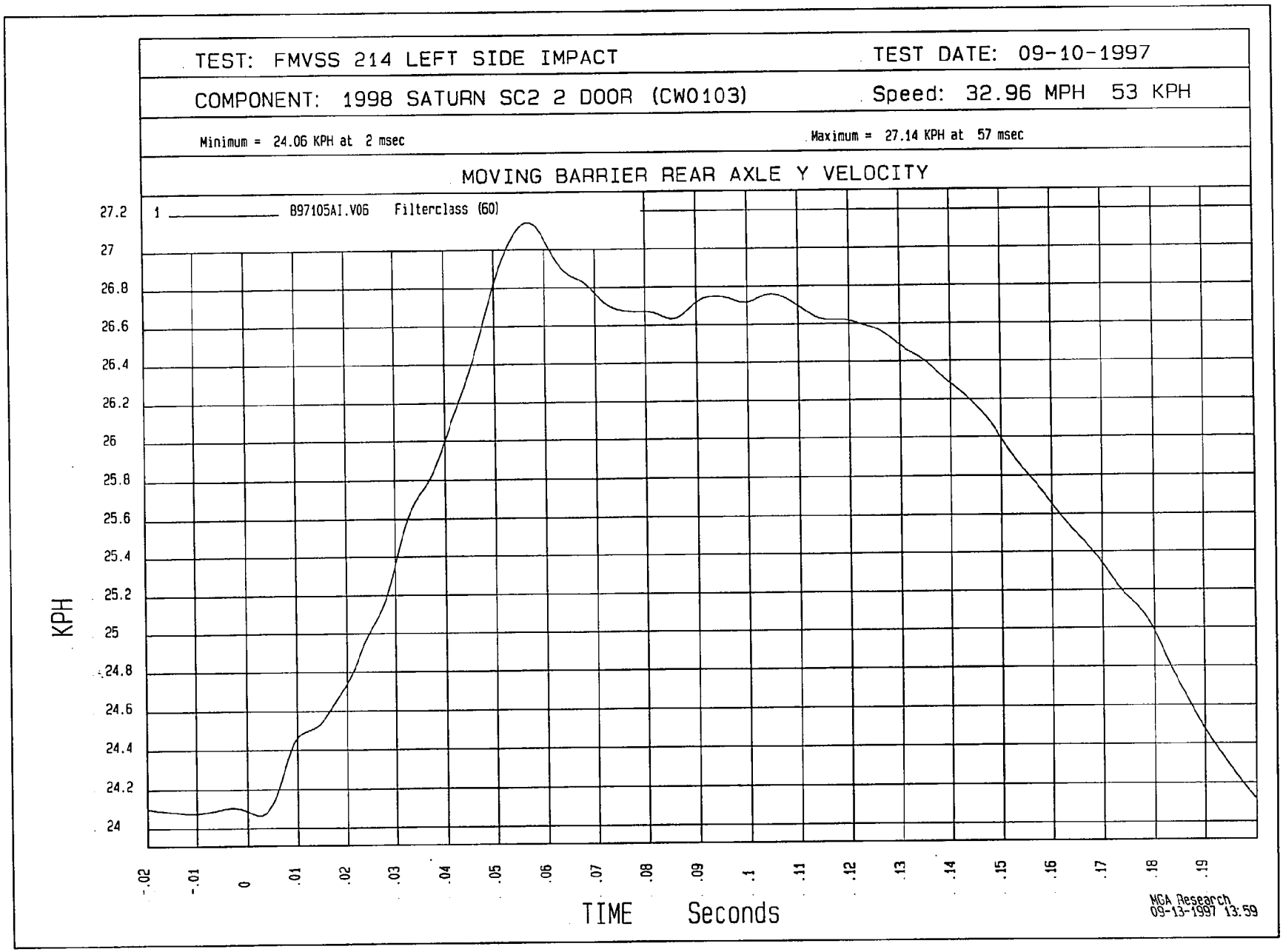
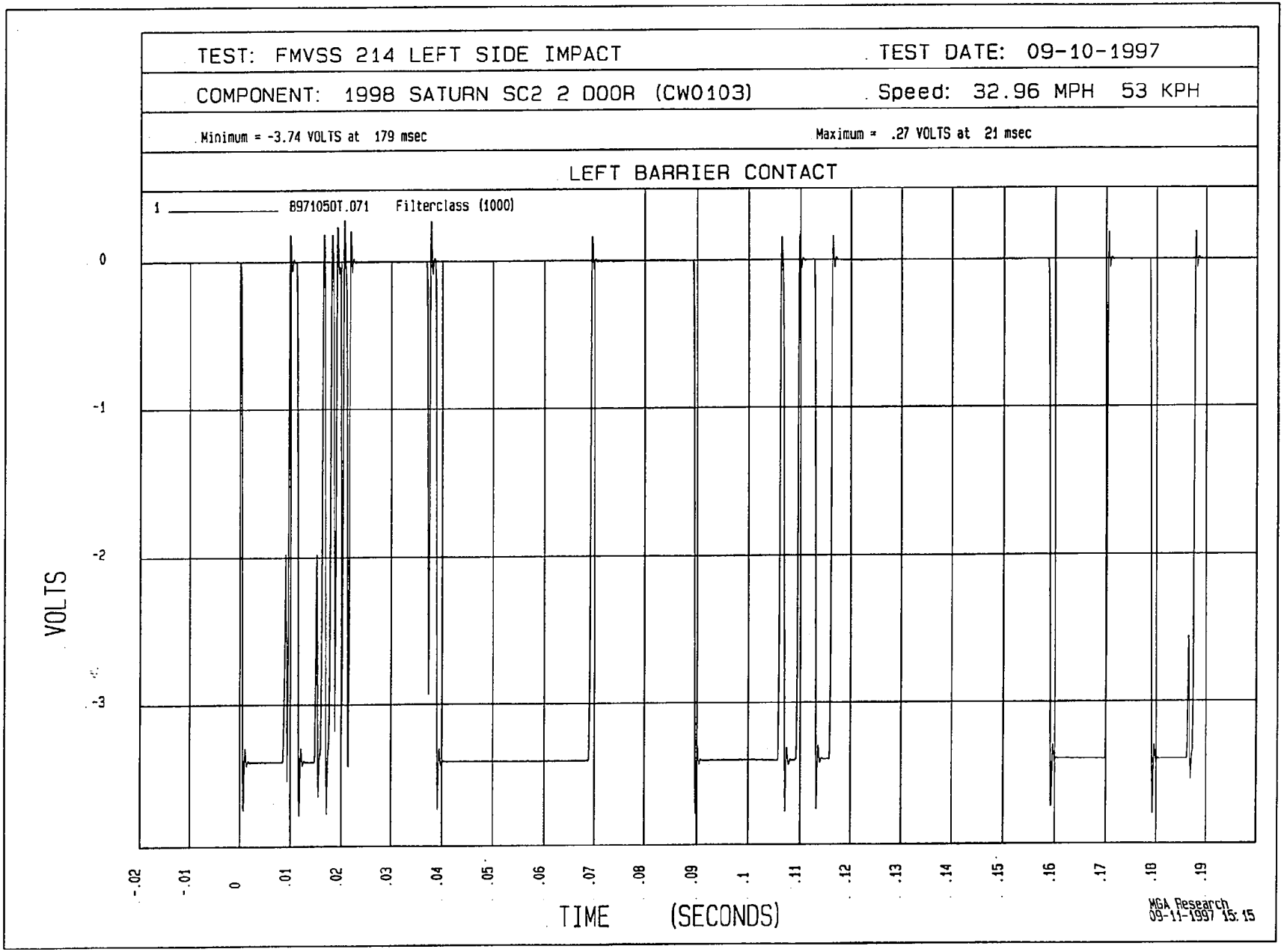
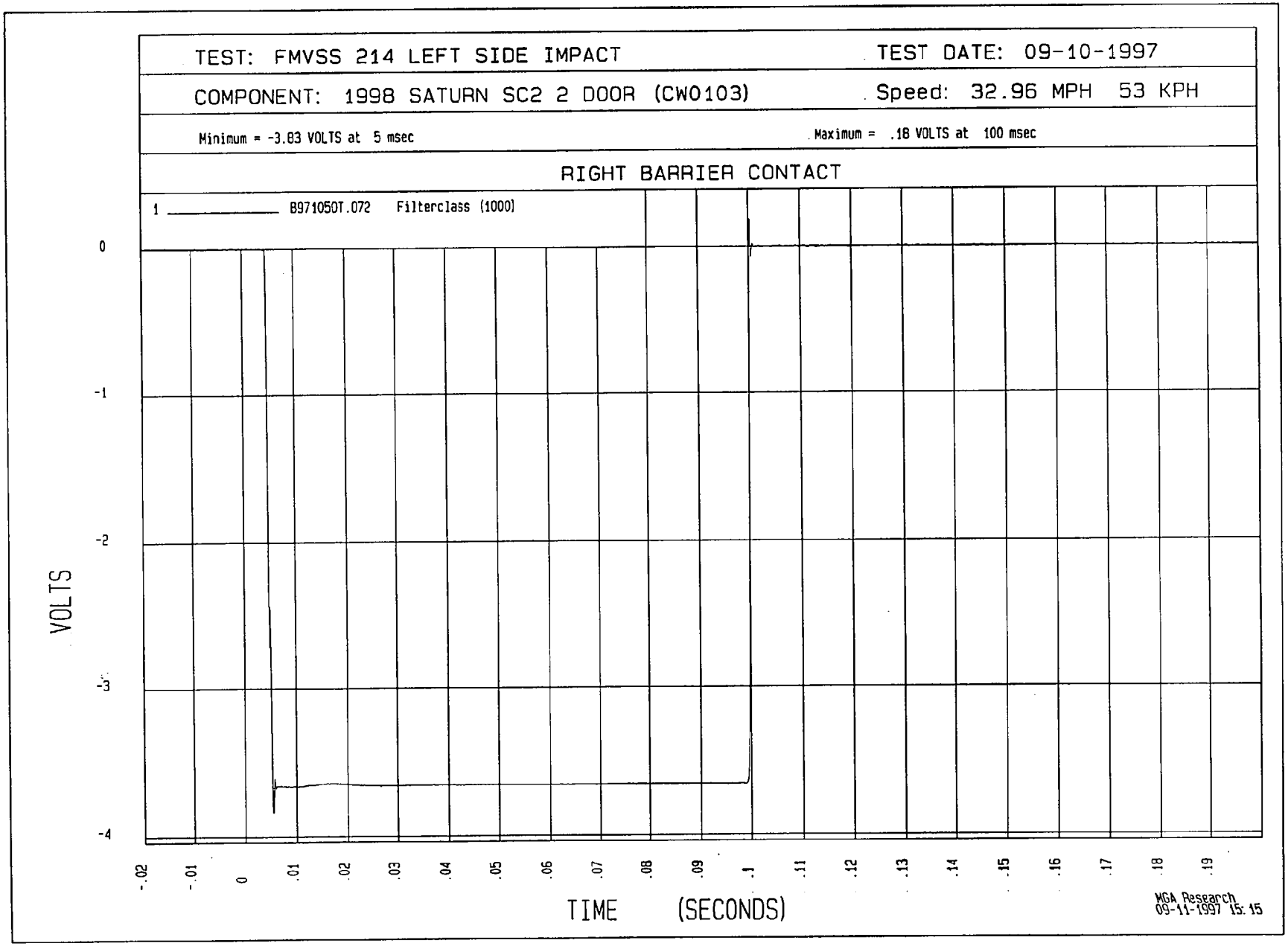
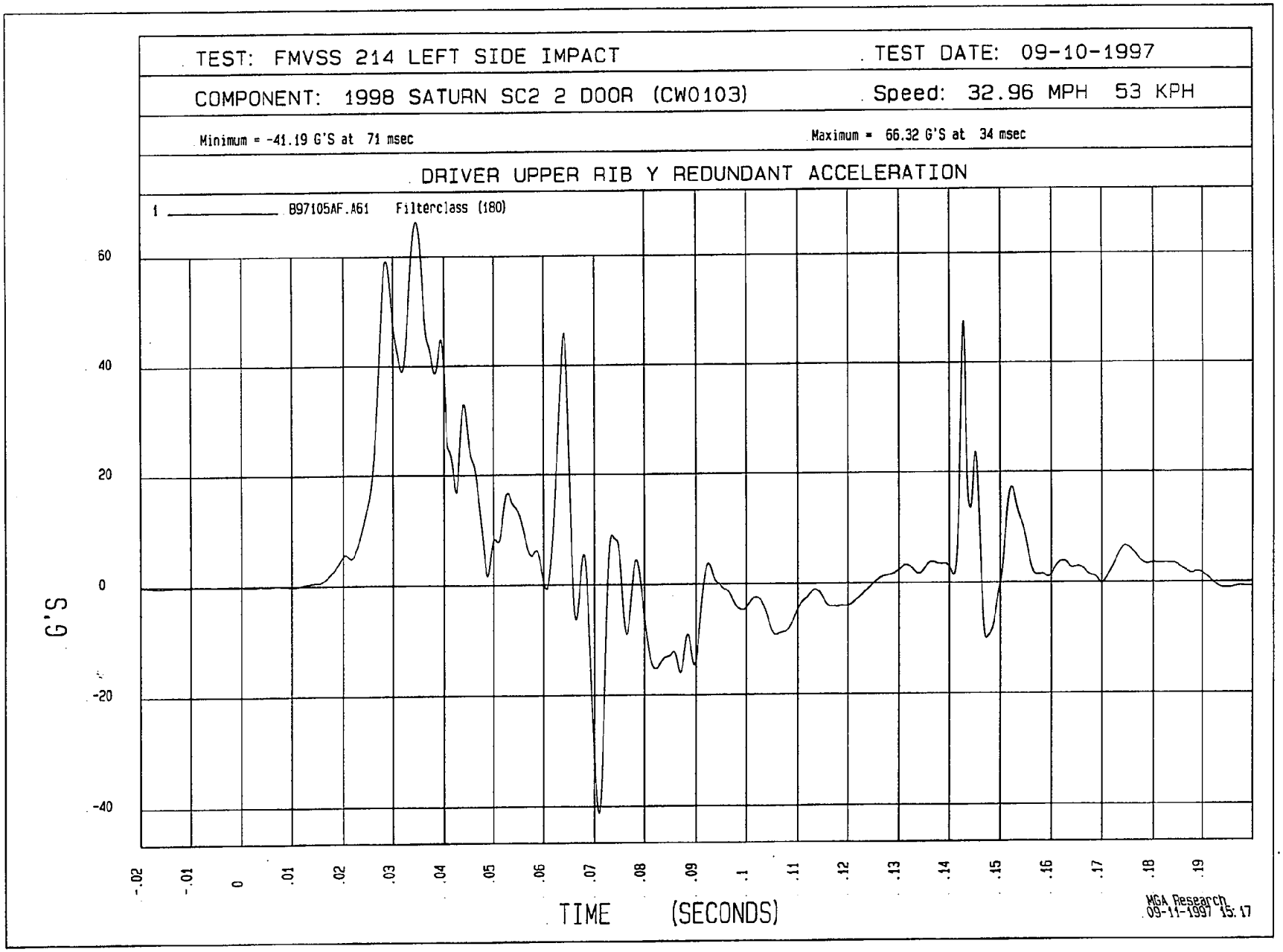
TIME Seconds
MGA Research
09-13-1997 13:59

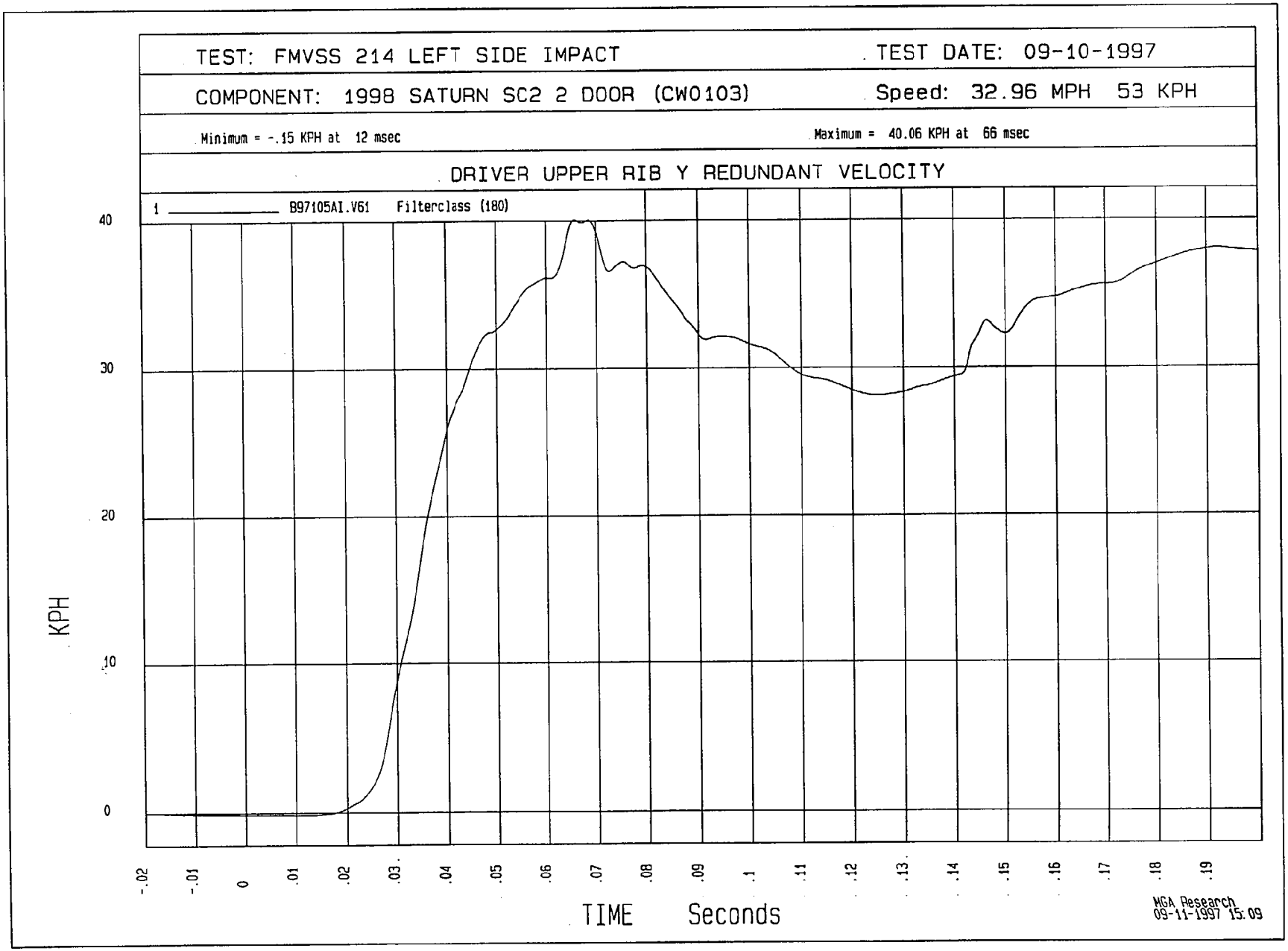

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -1.73 G'S at 182 msec
Maximum = 2.97 G'S at 30 msec
MOVING BARRIER REAR AXLE Y ACCELERATION
1 B97105AF.A06 Filterclass (60)
G'S
3
2
1
0
-1
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:15

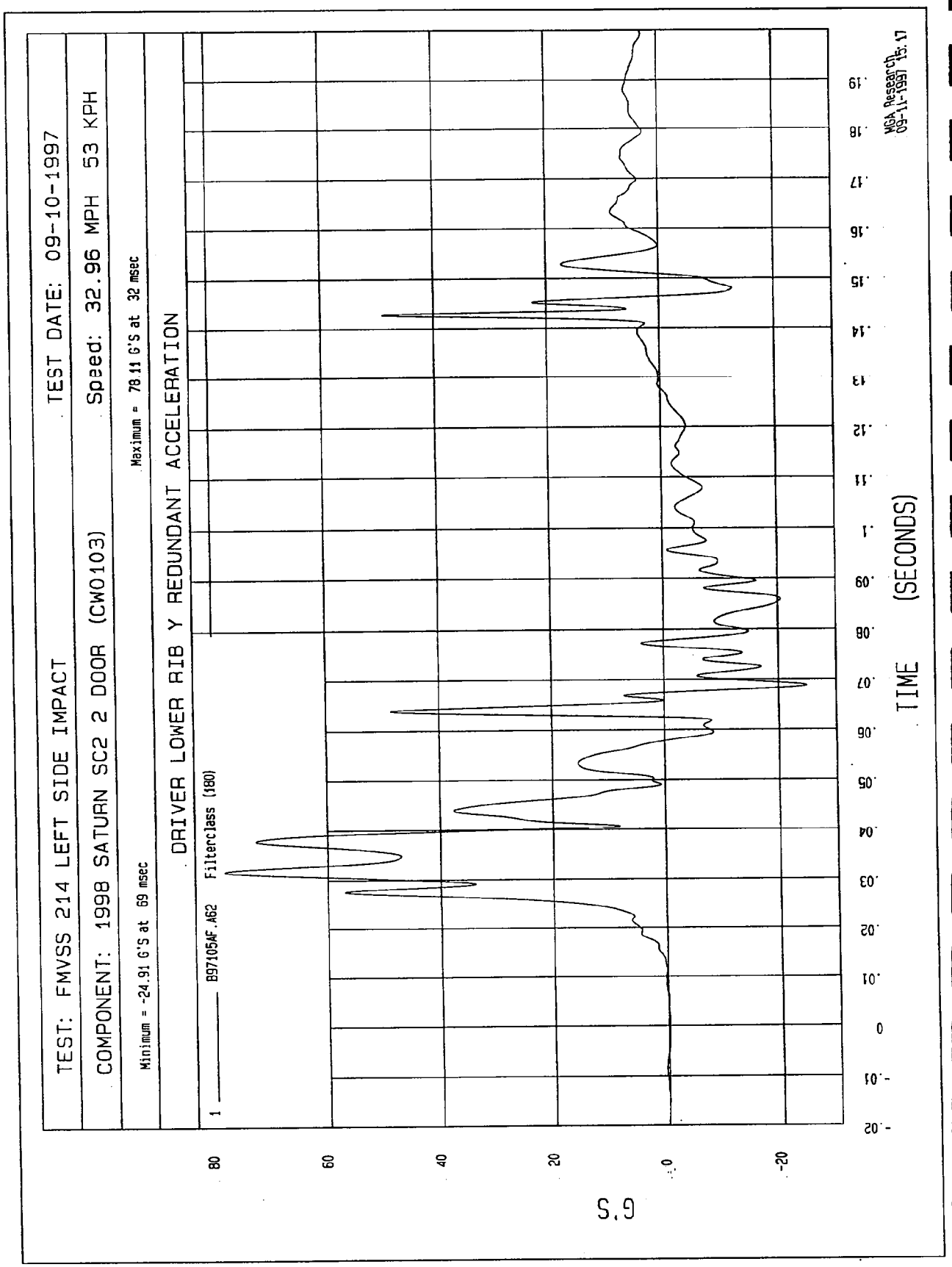

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = 24.06 KPH at 2 msec
Maximum = 27.14 KPH at 57 msec
MOVING BARRIER REAR AXLE Y VELOCITY
1 B97105AI.V06 Filterclass (60)
KPH
27.2
27
26.8
26.6
26.4
26.2
26
25.8
25.6
25.4
25.2
25
24.8
24.6
24.4
24.2
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
09-13-1997 13:59

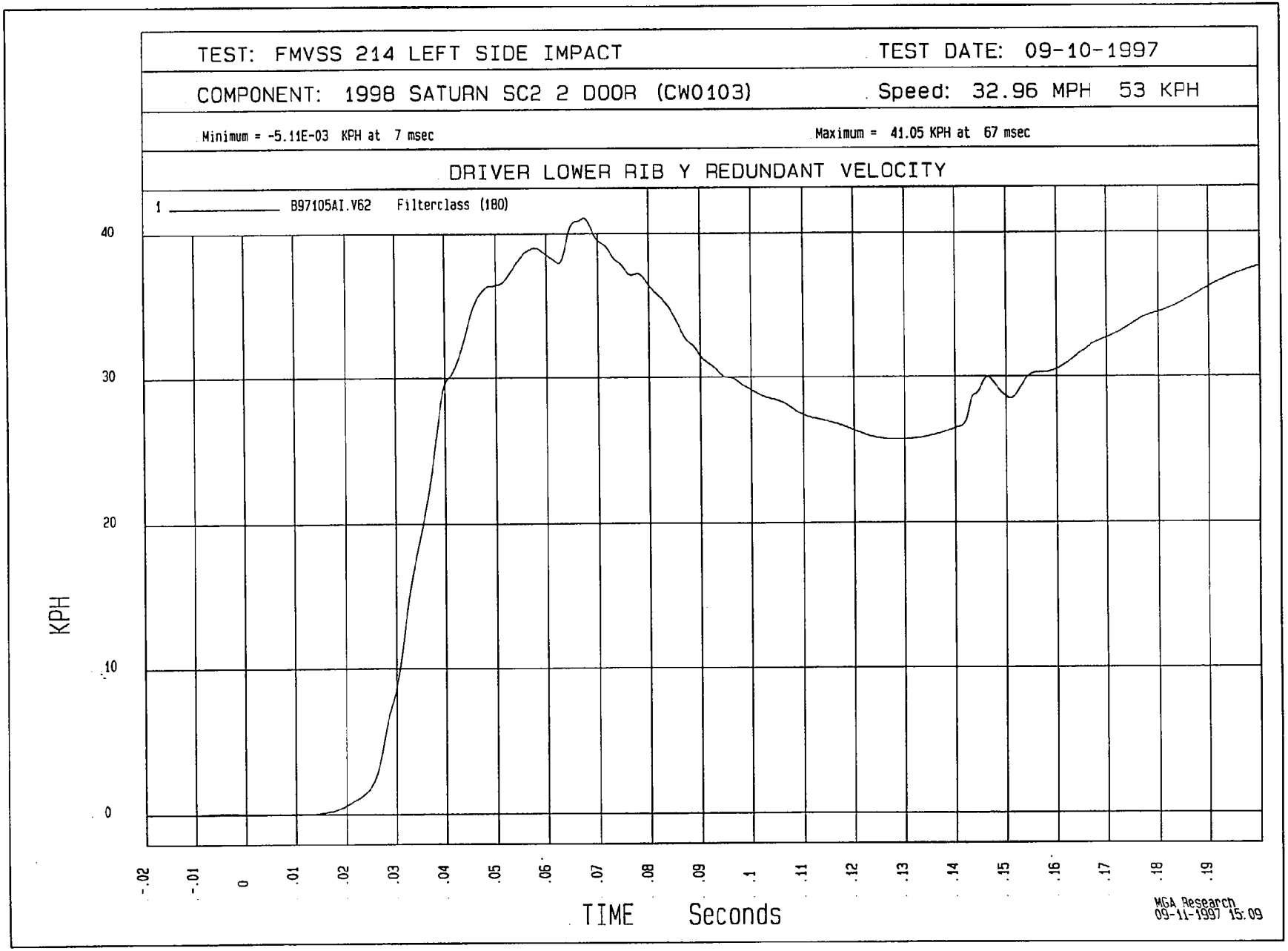

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.74 VOLTS at 179 msec
Maximum = .27 VOLTS at 21 msec
LEFT BARRIER CONTACT
1 8971050T.071 Filterclass (1000)
VOLTS
0
-1
-2
-3
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:15

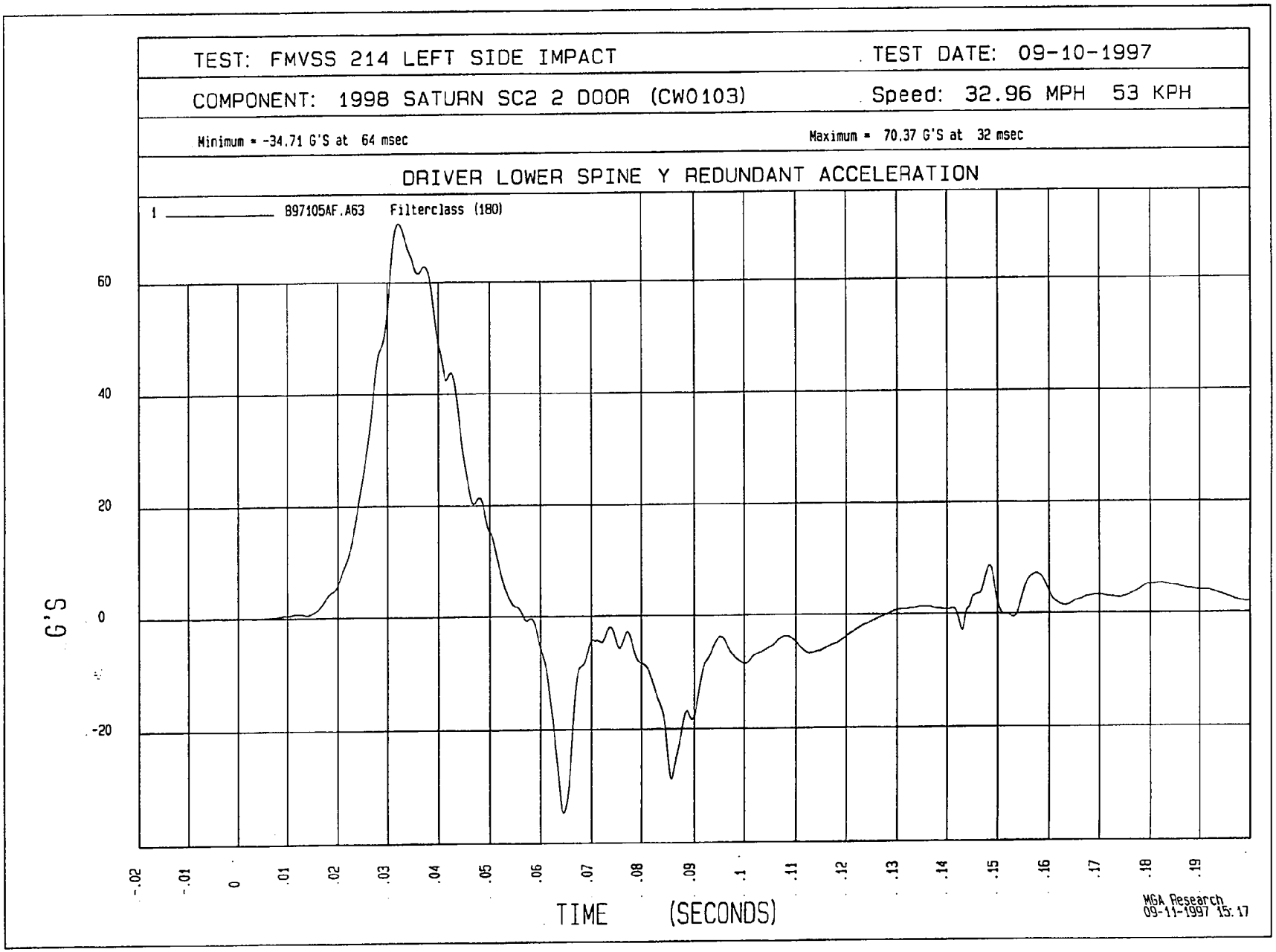

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.83 VOLTS at 5 msec
Maximum = .18 VOLTS at 100 msec
RIGHT BARRIER CONTACT
1 B9710501.072 Filterclass (1000)
VOLTS
0
-1
-2
-3
-4
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:15

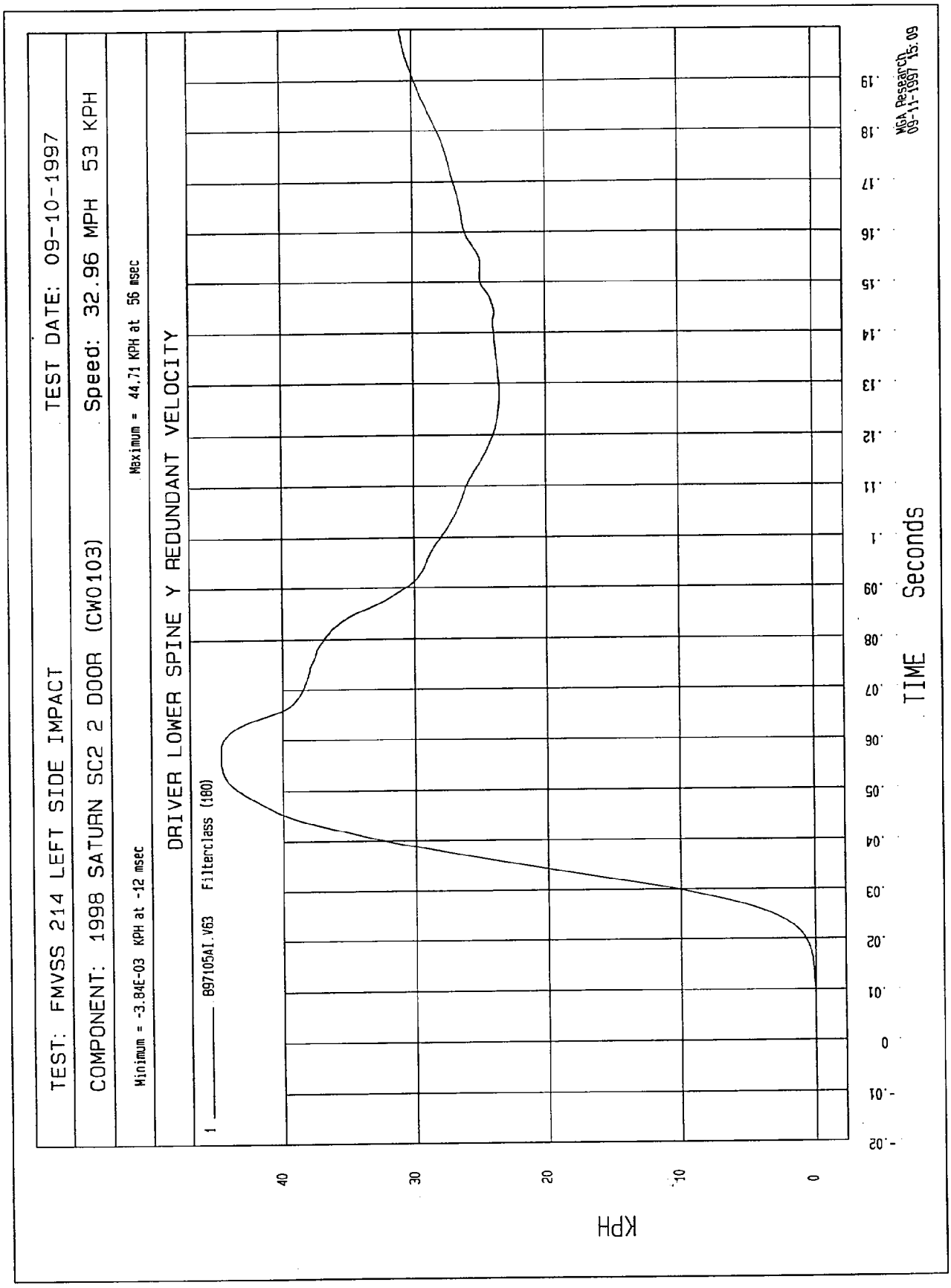

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -41.19 G'S at 71 msec
Maximum = 66.32 G'S at 34 msec
DRIVER UPPER RIB Y REDUNDANT ACCELERATION
1 B97105AF.A61 Filterclass (180)
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
09-11-1997 15:17

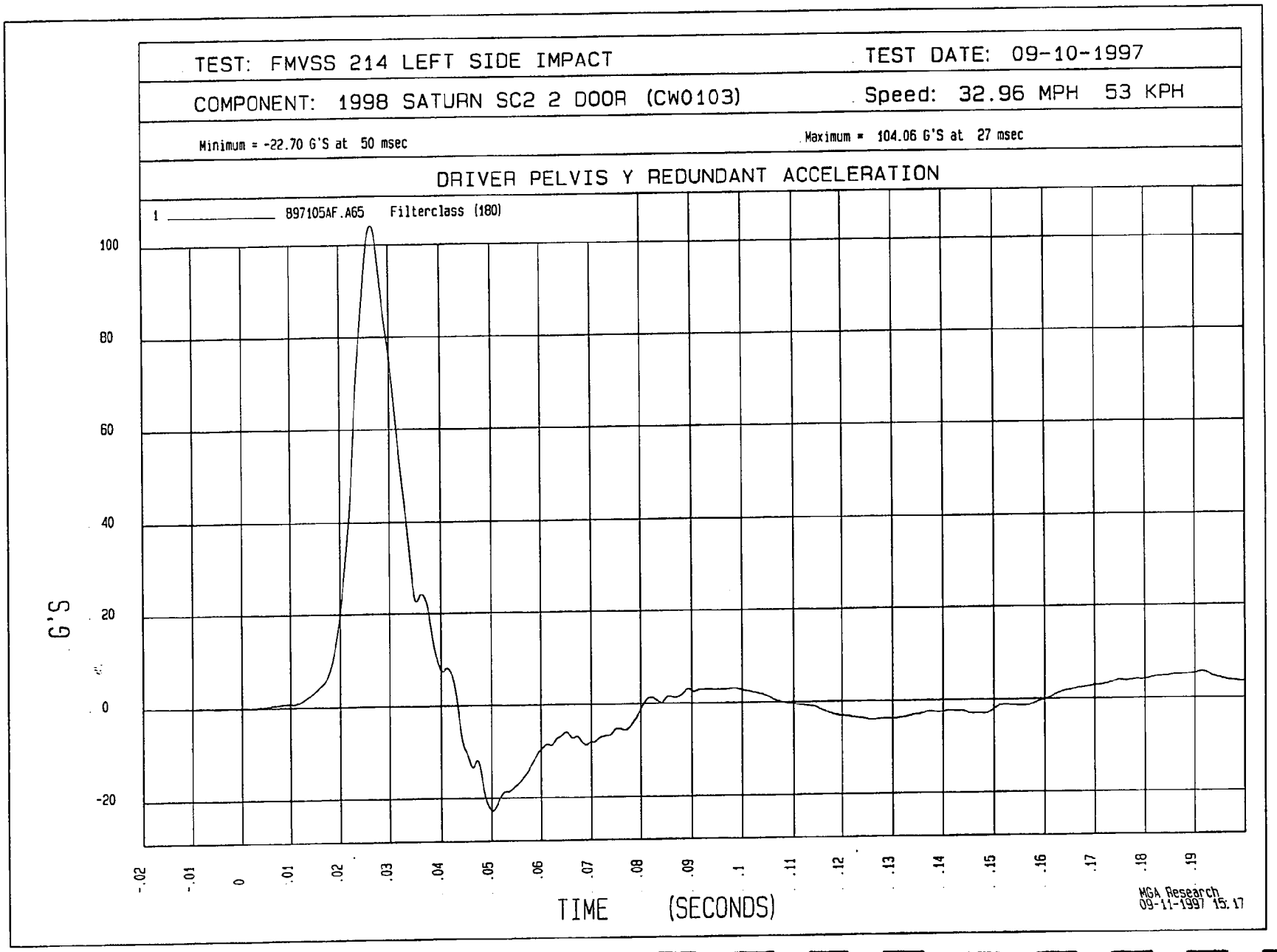

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -.15 KPH at 12 msec
Maximum = 40.06 KPH at 66 msec
DRIVER UPPER RIB Y REDUNDANT VELOCITY
1 B97105AI.V61 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:09

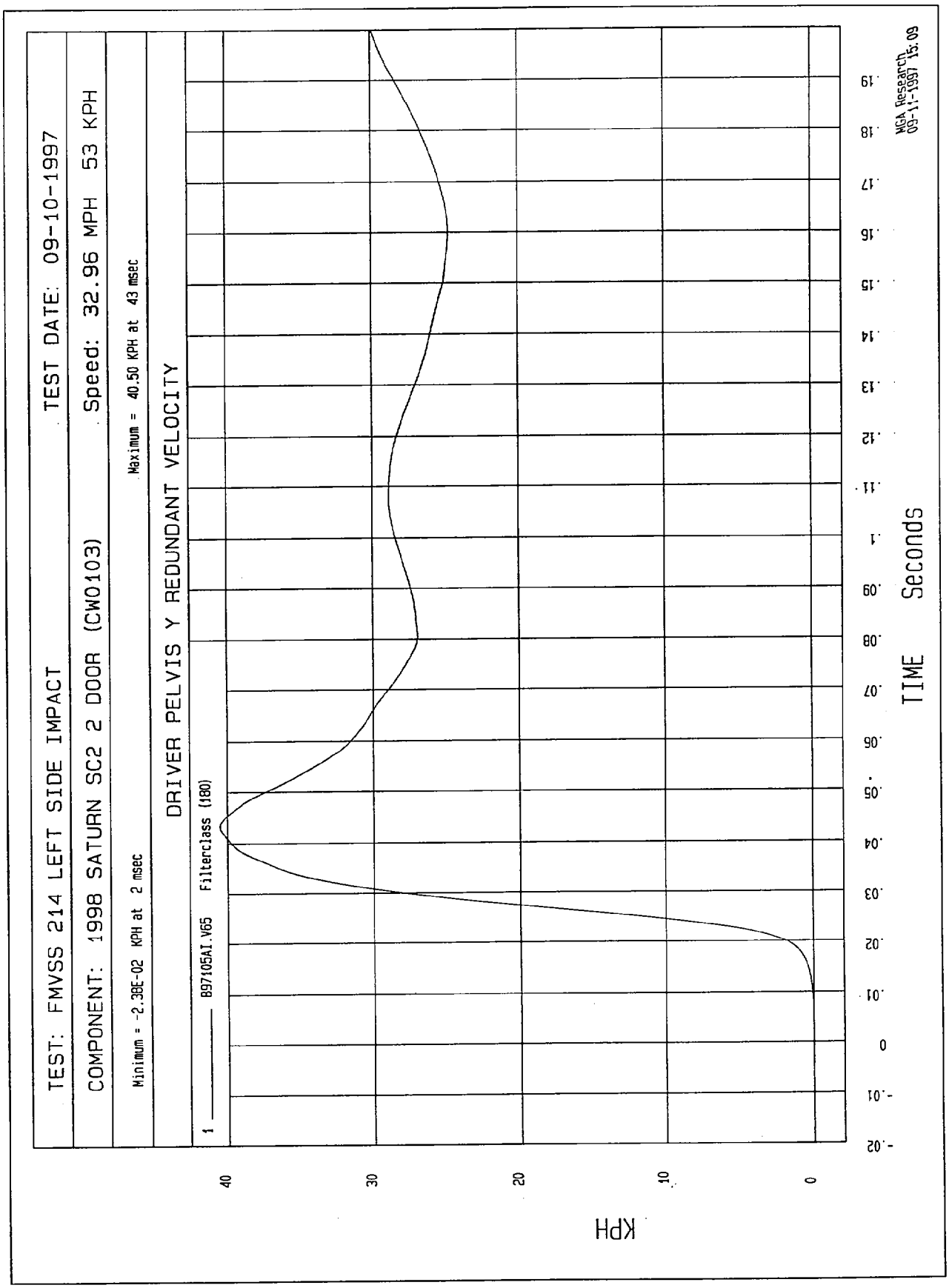

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Maximum = 78.11 G'S at 32 msec
Minimum = -24.91 G'S at 69 msec
DRIVER LOWER RIB Y REDUNDANT ACCELERATION
1 B97105AF.A62 Filterclass (180)
MGA Research 09-11-1997 15:17
80
60
40
20
0
-20
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)

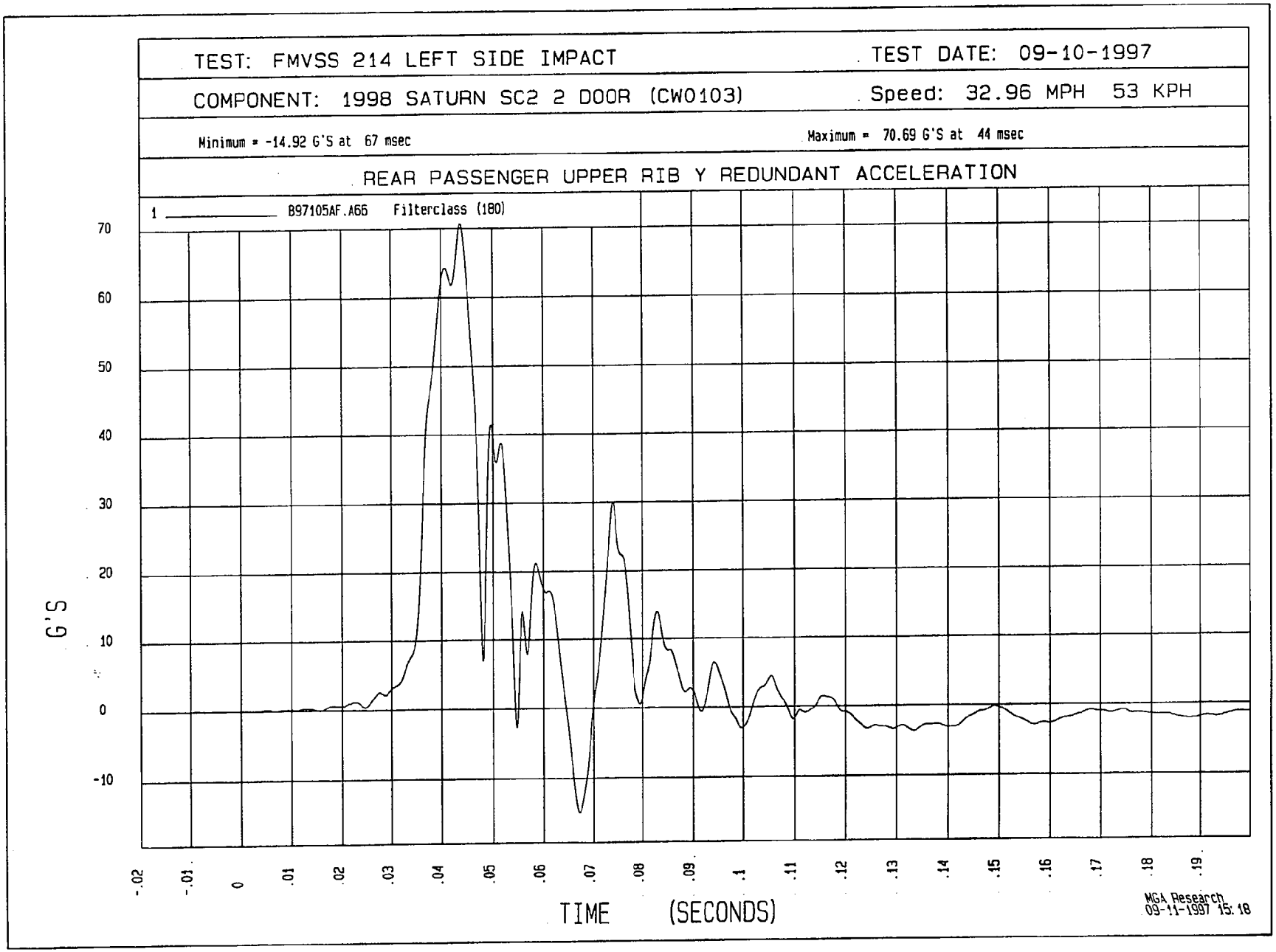

TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -5.11E-03 KPH at 7 msec
Maximum = 41.05 KPH at 67 msec
DRIVER LOWER RIB Y REDUNDANT VELOCITY
1 B97105AI.V62 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -34.71 G'S at 64 msec
Maximum = 70.37 G'S at 32 msec
DRIVER LOWER SPINE Y REDUNDANT ACCELERATION
1 B97105AF.A63 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
09-11-1997 15:17


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -3.84E-03 KPH at -12 msec
Maximum = 44.71 KPH at 56 msec
DRIVER LOWER SPINE Y REDUNDANT VELOCITY
1 B97105A1.V63 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
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -22.70 G'S at 50 msec
Maximum = 104.06 G'S at 27 msec
DRIVER PELVIS Y REDUNDANT ACCELERATION
1 B97105AF.A65 Filterclass (180)
100
80
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
09-11-1997 15:17


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -2.38E-02 KPH at 2 msec
Maximum = 40.50 KPH at 43 msec
DRIVER PELVIS Y REDUNDANT VELOCITY
1 B97105AI.V65 Filterclass (180)
KPH
TIME Seconds
MGA Research
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -14.92 G'S at 67 msec
Maximum = 70.69 G'S at 44 msec
REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION
1 B97105AF.A66 Filterclass (180)
70
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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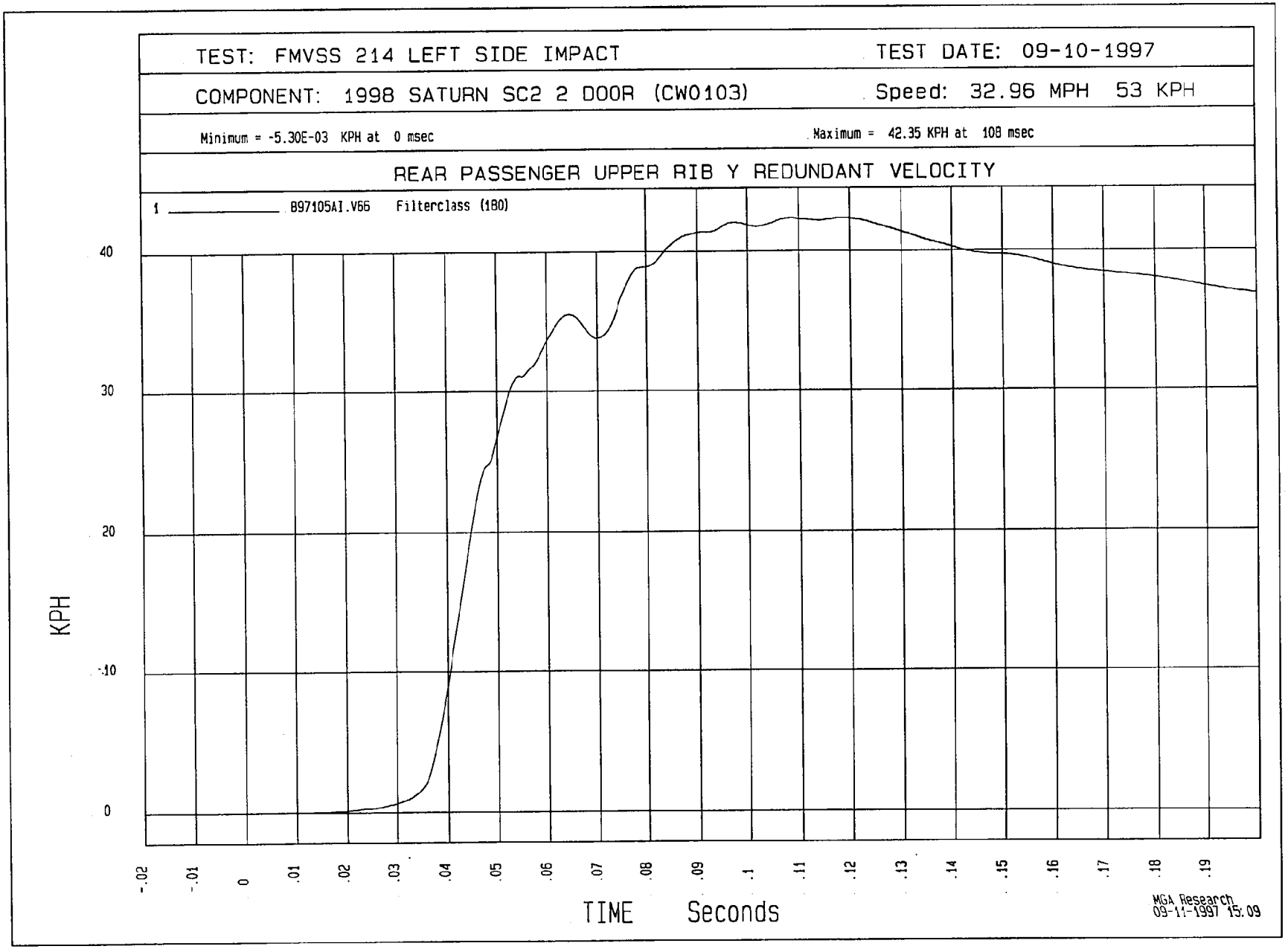
TIME (SECONDS)
MGA Research
09-11-1997 15:18


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -5.30E-03 KPH at 0 msec
Maximum = 42.35 KPH at 108 msec
REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY
1 B97105AI.V66 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
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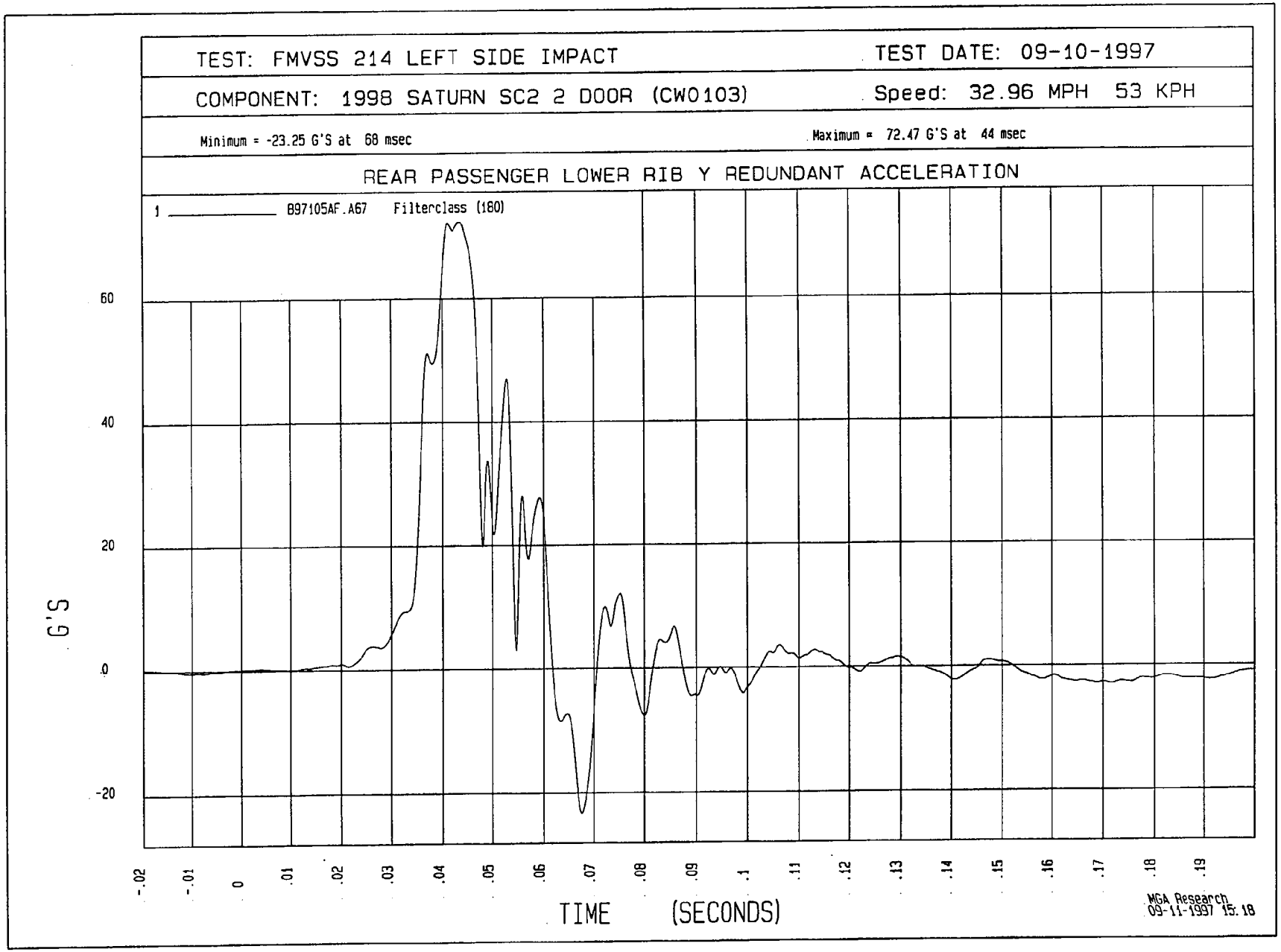
TIME Seconds
MGA Research
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -23.25 G'S at 68 msec
Maximum = 72.47 G'S at 44 msec
REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION
1 B97105AF.A67 Filterclass (180)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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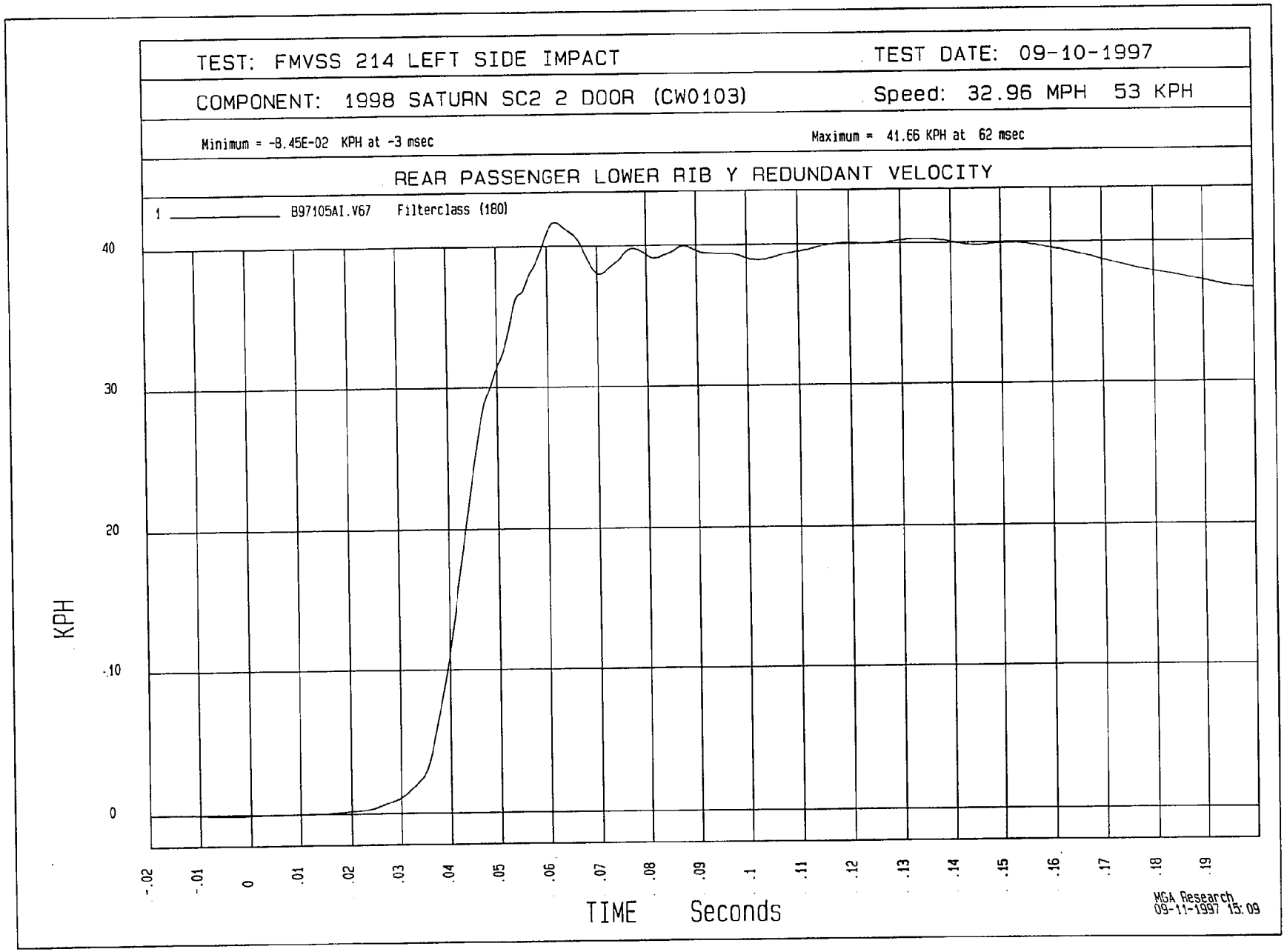
TIME (SECONDS)
MGA Research
09-11-1997 15:18


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -8.45E-02 KPH at -3 msec
Maximum = 41.66 KPH at 62 msec
REAR PASSENGER LOWER RIB Y REDUNDANT VELOCITY
1 B97105AI.V67 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
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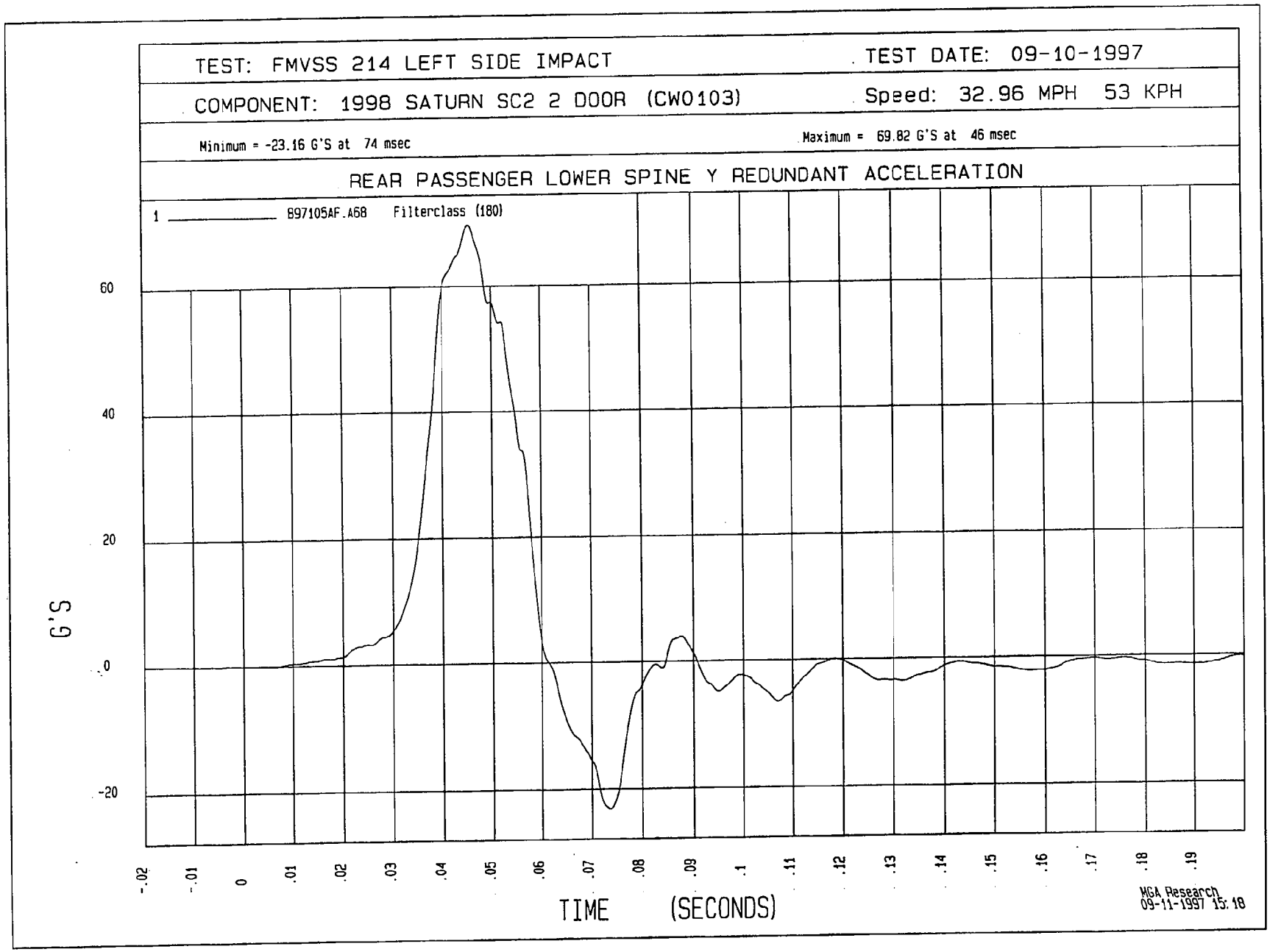
TIME Seconds
MGA Research
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -23.16 G'S at 74 msec
Maximum = 69.82 G'S at 46 msec
REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION
1 B97105AF.A68 Filterclass (180)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
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.08
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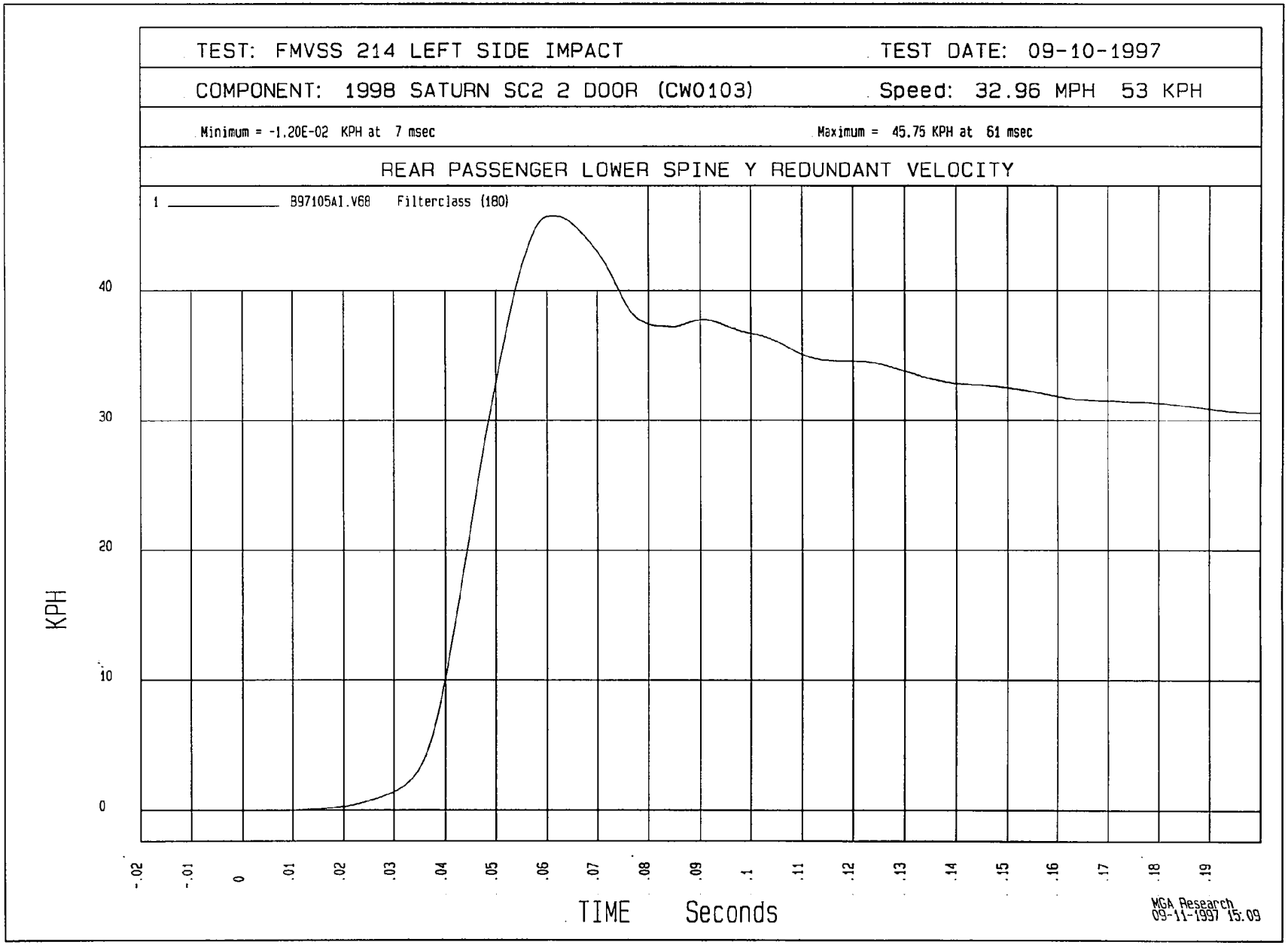
TIME (SECONDS)
MGA Research
09-11-1997 15:18


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -1.20E-02 KPH at 7 msec
Maximum = 45.75 KPH at 61 msec
REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY
1 B97105A1.V68 Filterclass (180)
KPH
0
10
20
30
40
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.1
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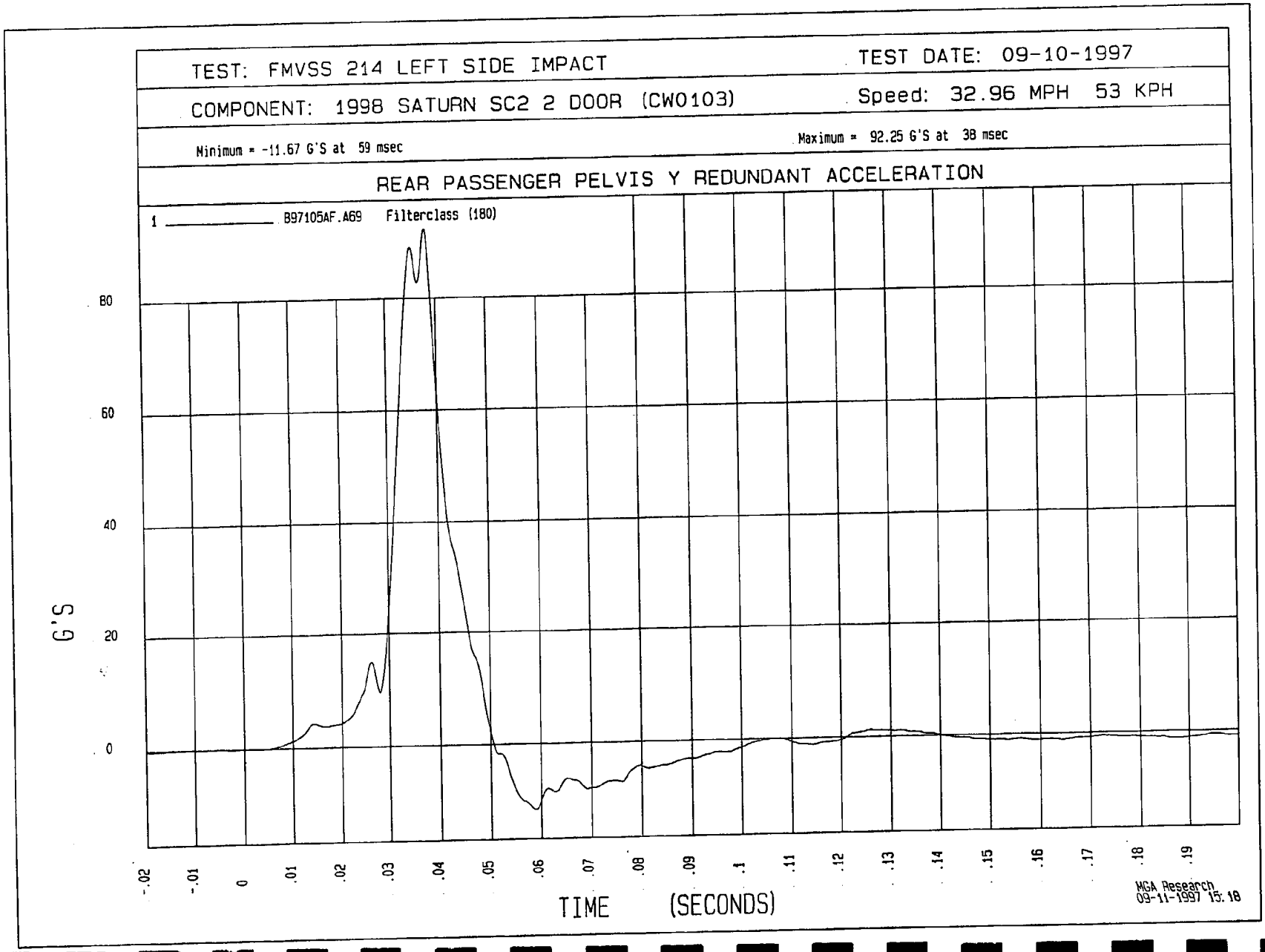
TIME Seconds
MGA Research
09-11-1997 15:09


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -11.67 G'S at 59 msec
Maximum = 92.25 G'S at 38 msec
REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION
1 B97105AF.A69 Filterclass (180)
80
60
40
20
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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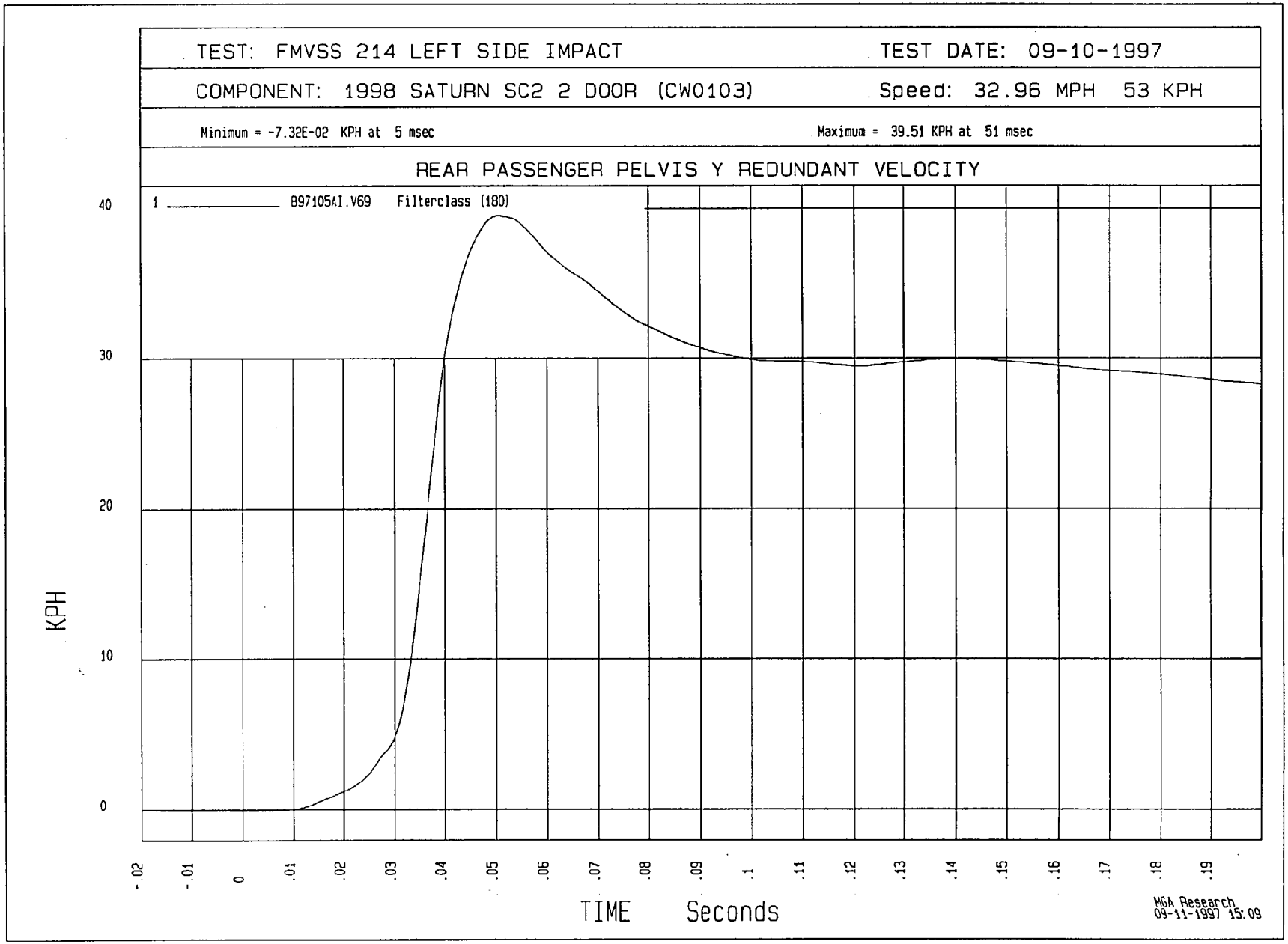
TIME (SECONDS)
MGA Research
09-11-1997 15:18


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -7.32E-02 KPH at 5 msec
Maximum = 39.51 KPH at 51 msec
REAR PASSENGER PELVIS Y REDUNDANT VELOCITY
1 B97105AI.V69 Filterclass (180)
KPH
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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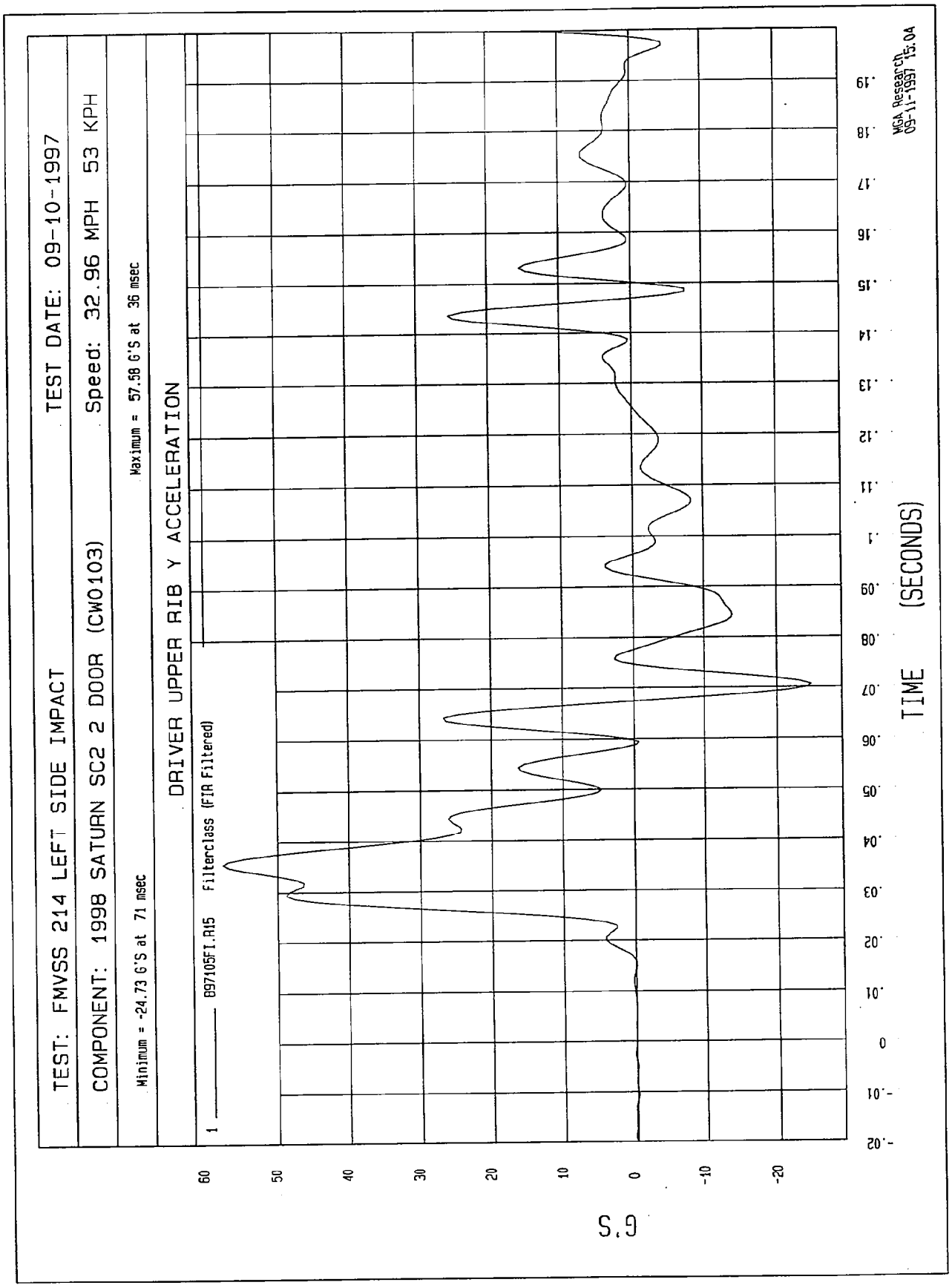
TIME Seconds
MGA Research
09-11-1997 15:09

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -24.73 G'S at 71 msec
Maximum = 57.58 G'S at 36 msec
DRIVER UPPER RIB Y ACCELERATION
1 B97105FI.R15 Filterclass (FIR Filtered)
MGA Research
09-11-1997 15:04
G'S
TIME (SECONDS)
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
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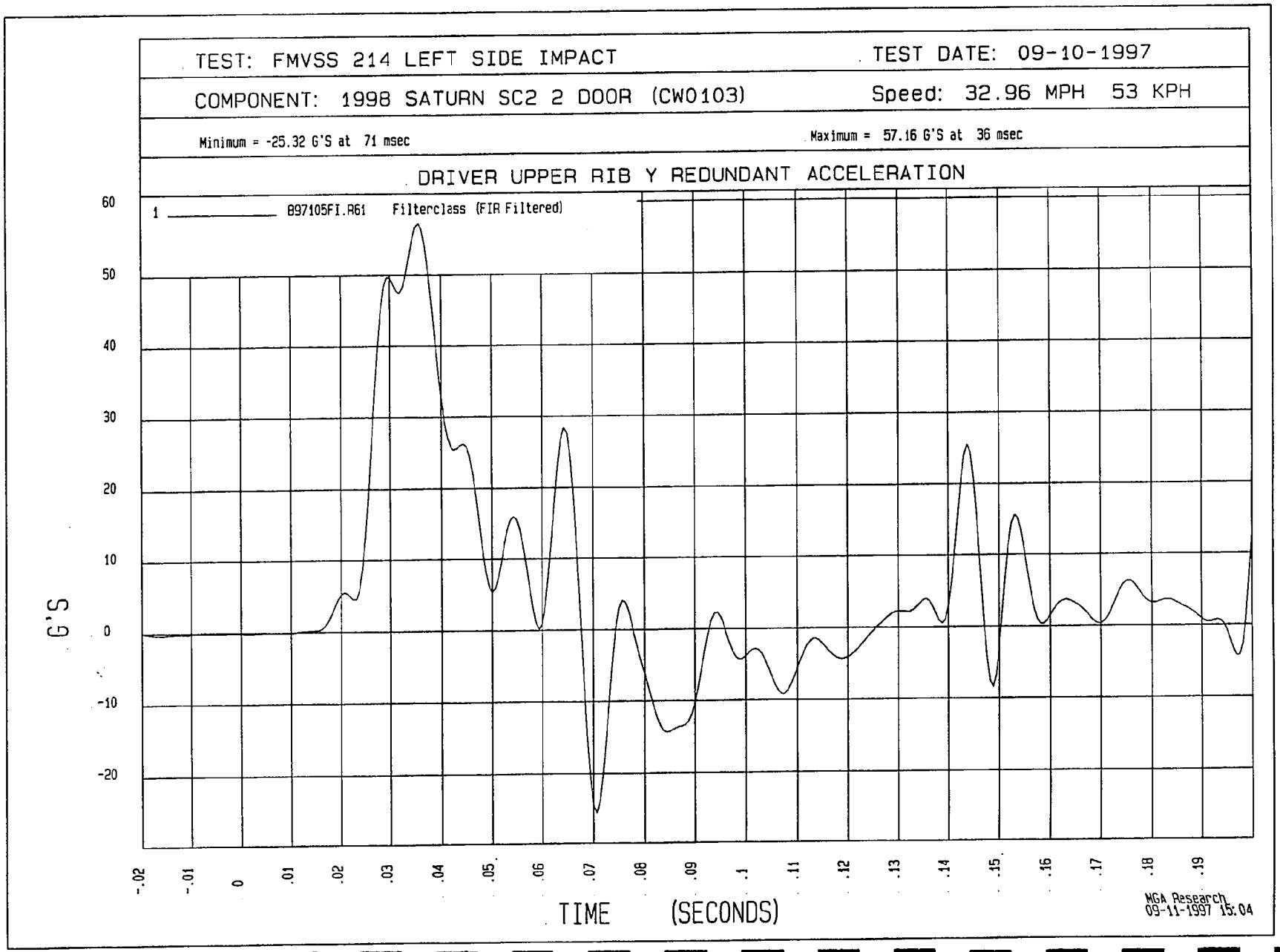
TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -25.32 G'S at 71 msec
Maximum = 57.16 G'S at 36 msec
DRIVER UPPER RIB Y REDUNDANT ACCELERATION
1 B97105FI.R61 Filterclass (FIR Filtered)
60
50
40
30
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
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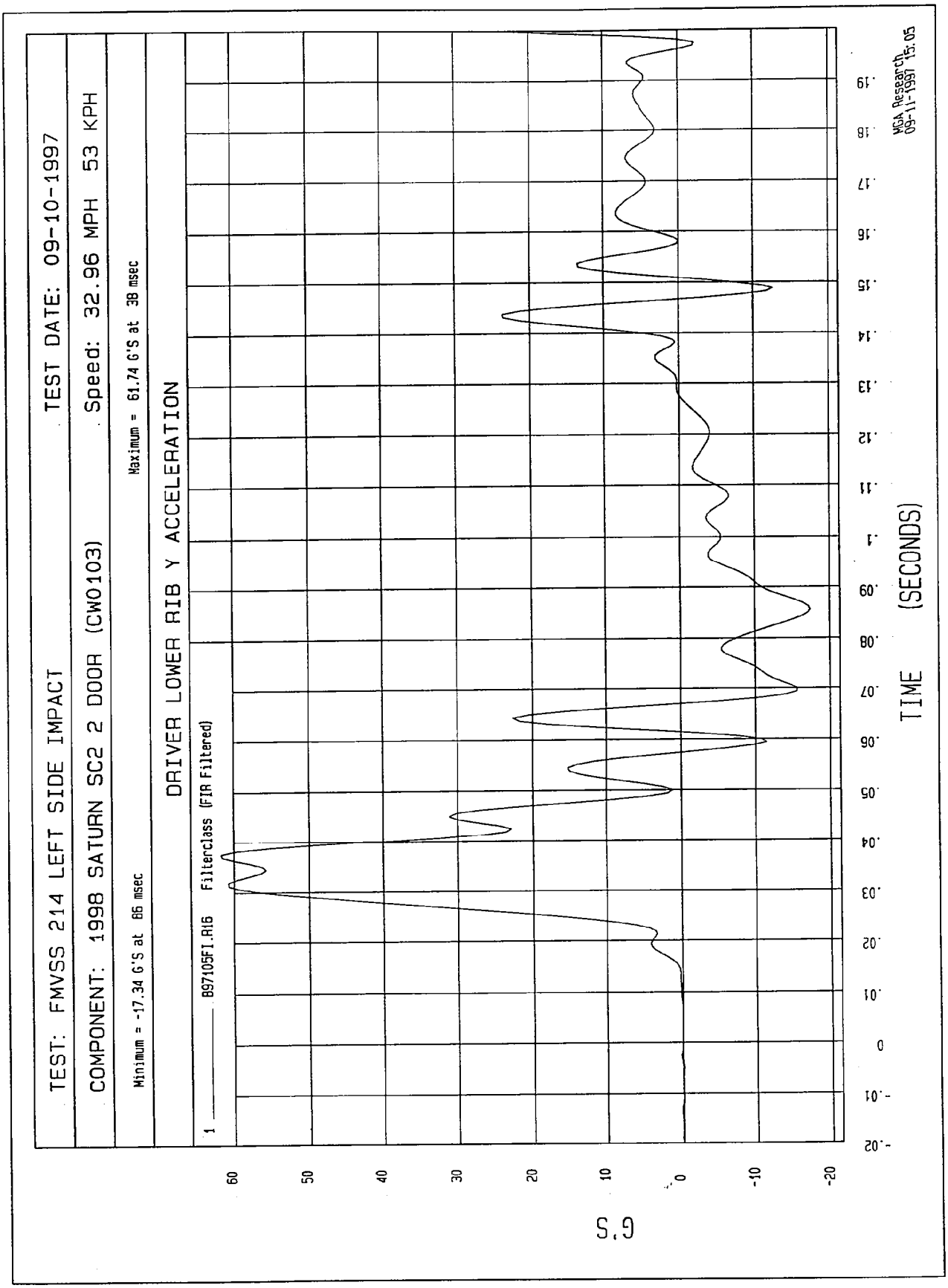
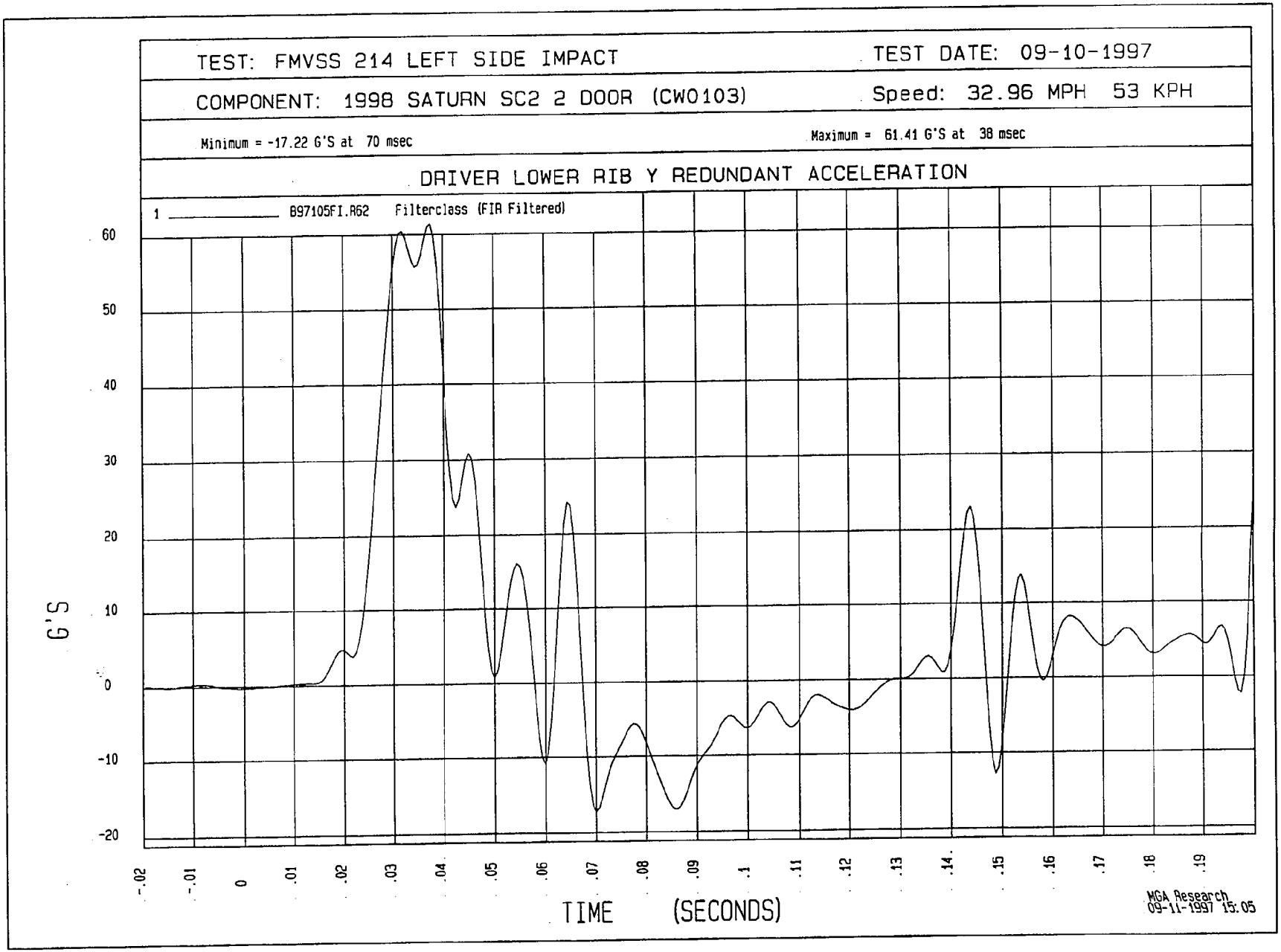
TIME (SECONDS)
MGA Research
09-11-1997 15:04


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -17.34 G'S at 86 msec
Maximum = 61.74 G'S at 38 msec
DRIVER LOWER RIB Y ACCELERATION
1 B97105FI.A16 Filterclass (FIR Filtered)
MGA Research
09-11-1997 15:05
G'S
TIME (SECONDS)


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -17.22 G'S at 70 msec
Maximum = 61.41 G'S at 38 msec
DRIVER LOWER RIB Y REDUNDANT ACCELERATION
1 B97105FI.A62 Filterclass (FIR Filtered)
60
50
40
30
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
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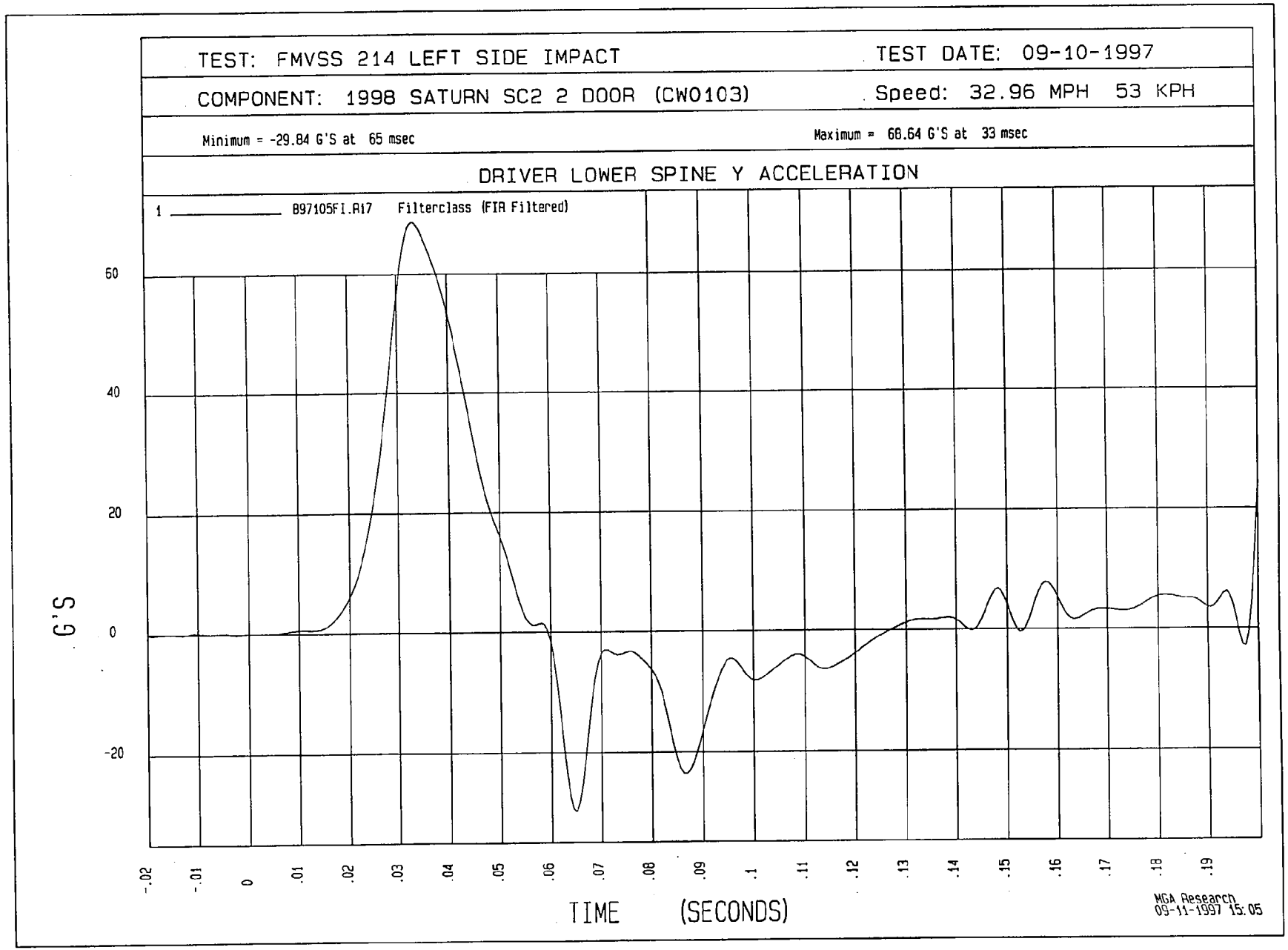
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -29.84 G'S at 65 msec
Maximum = 68.64 G'S at 33 msec
DRIVER LOWER SPINE Y ACCELERATION
1 B97105FI.A17 Filterclass (FIR Filtered)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
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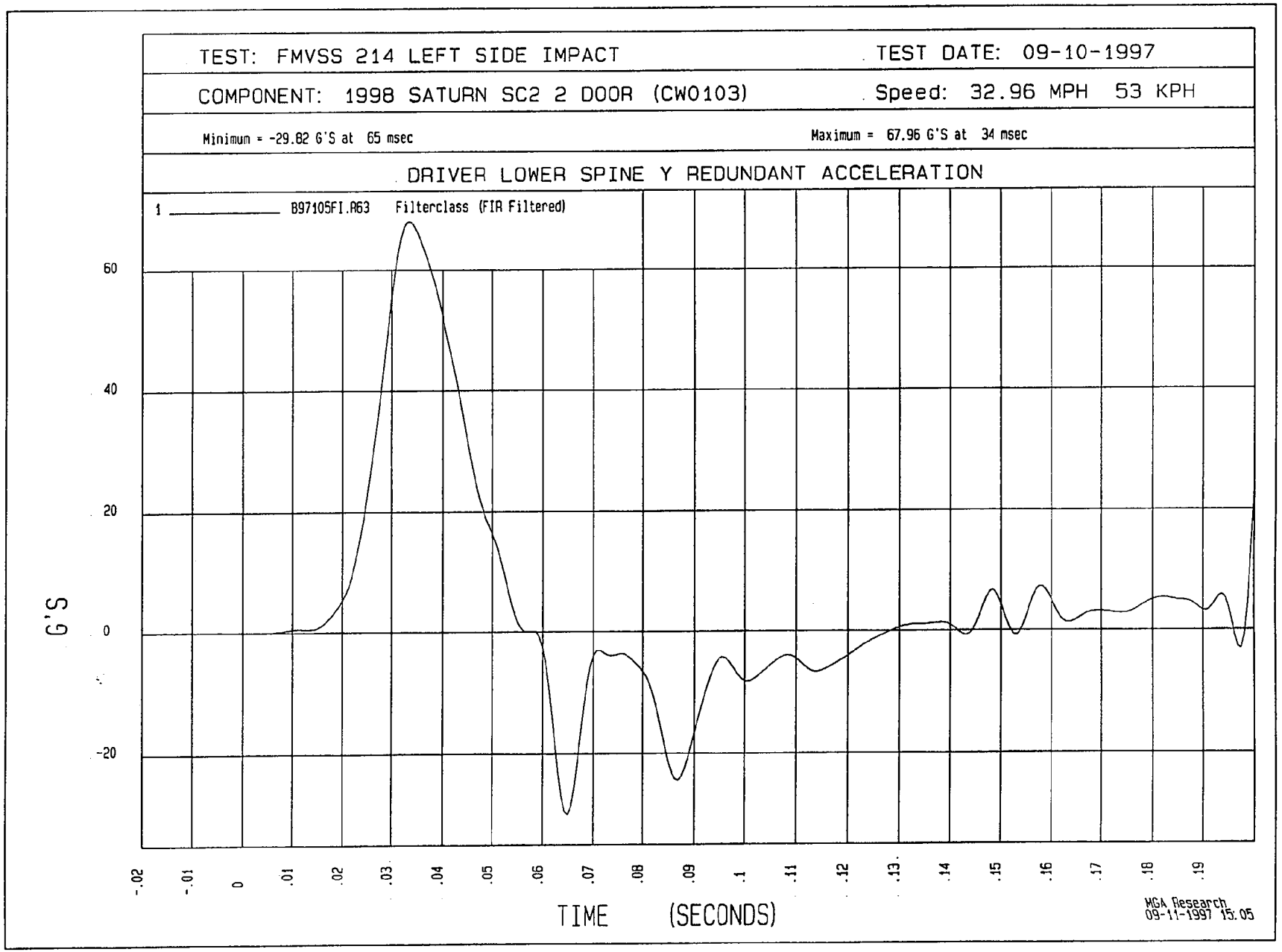
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -29.82 G'S at 65 msec
Maximum = 67.96 G'S at 34 msec
DRIVER LOWER SPINE Y REDUNDANT ACCELERATION
1 B97105FI.R63 Filterclass (FIR Filtered)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
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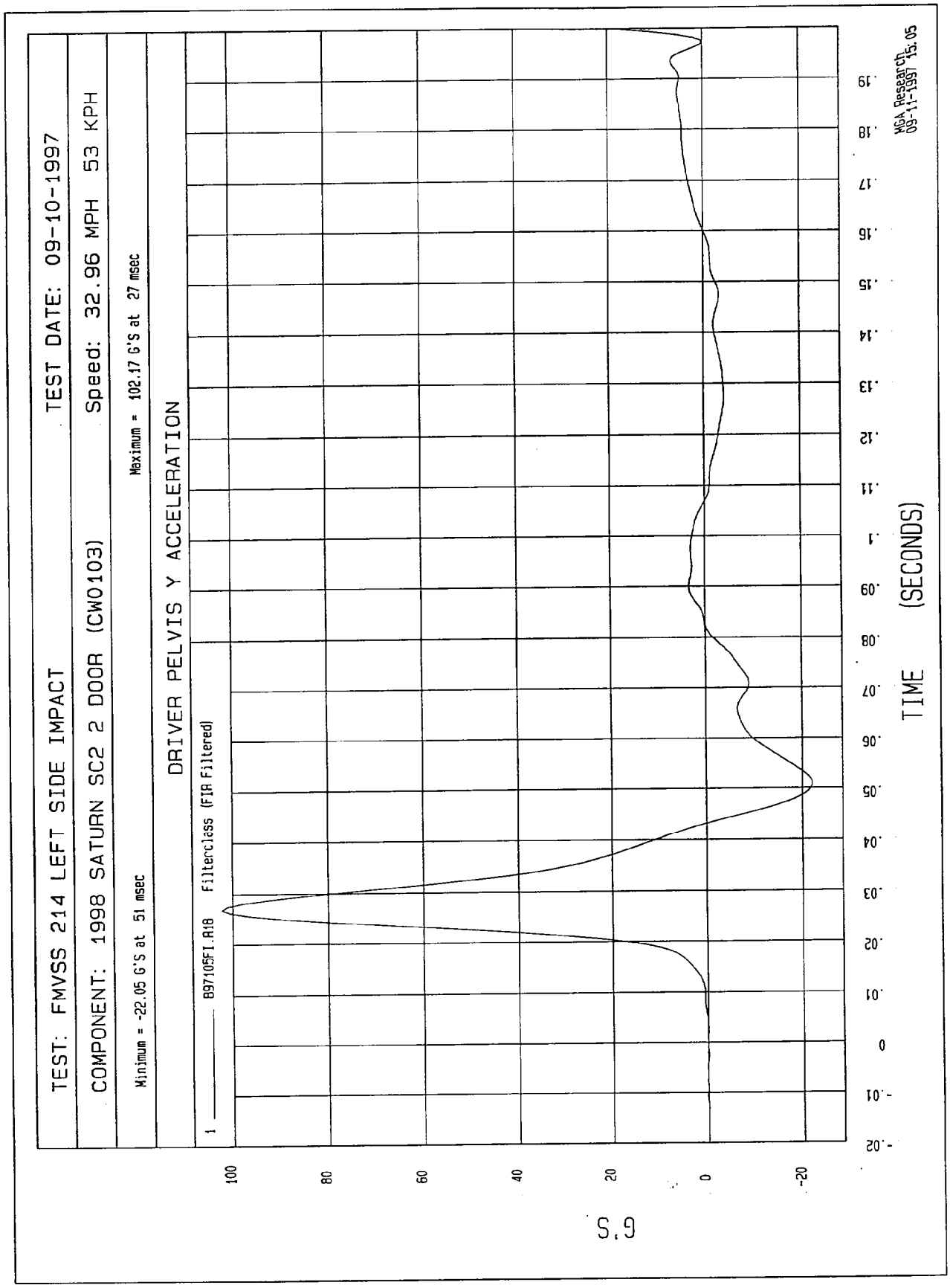
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -22.05 G'S at 51 msec
Maximum = 102.17 G'S at 27 msec
DRIVER PELVIS Y ACCELERATION
1 B97105F1.A18 Filterclass (FIR Filtered)
100
80
60
40
20
0
-20
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
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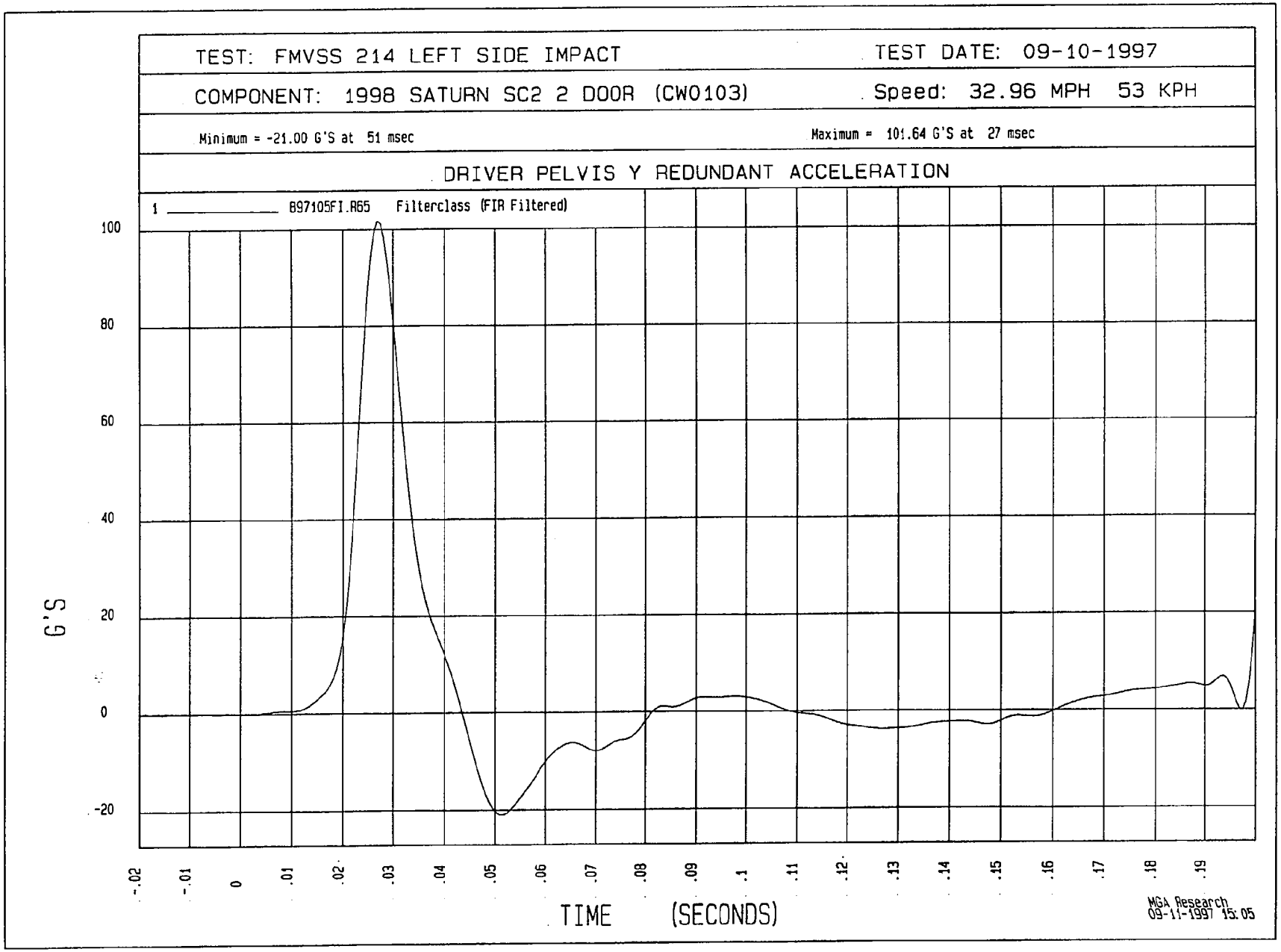
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
09-11-1997 15:05
S.9


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -21.00 G'S at 51 msec
Maximum = 101.64 G'S at 27 msec
DRIVER PELVIS Y REDUNDANT ACCELERATION
1 B97105FI.R65 Filterclass (FIR Filtered)
100
80
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
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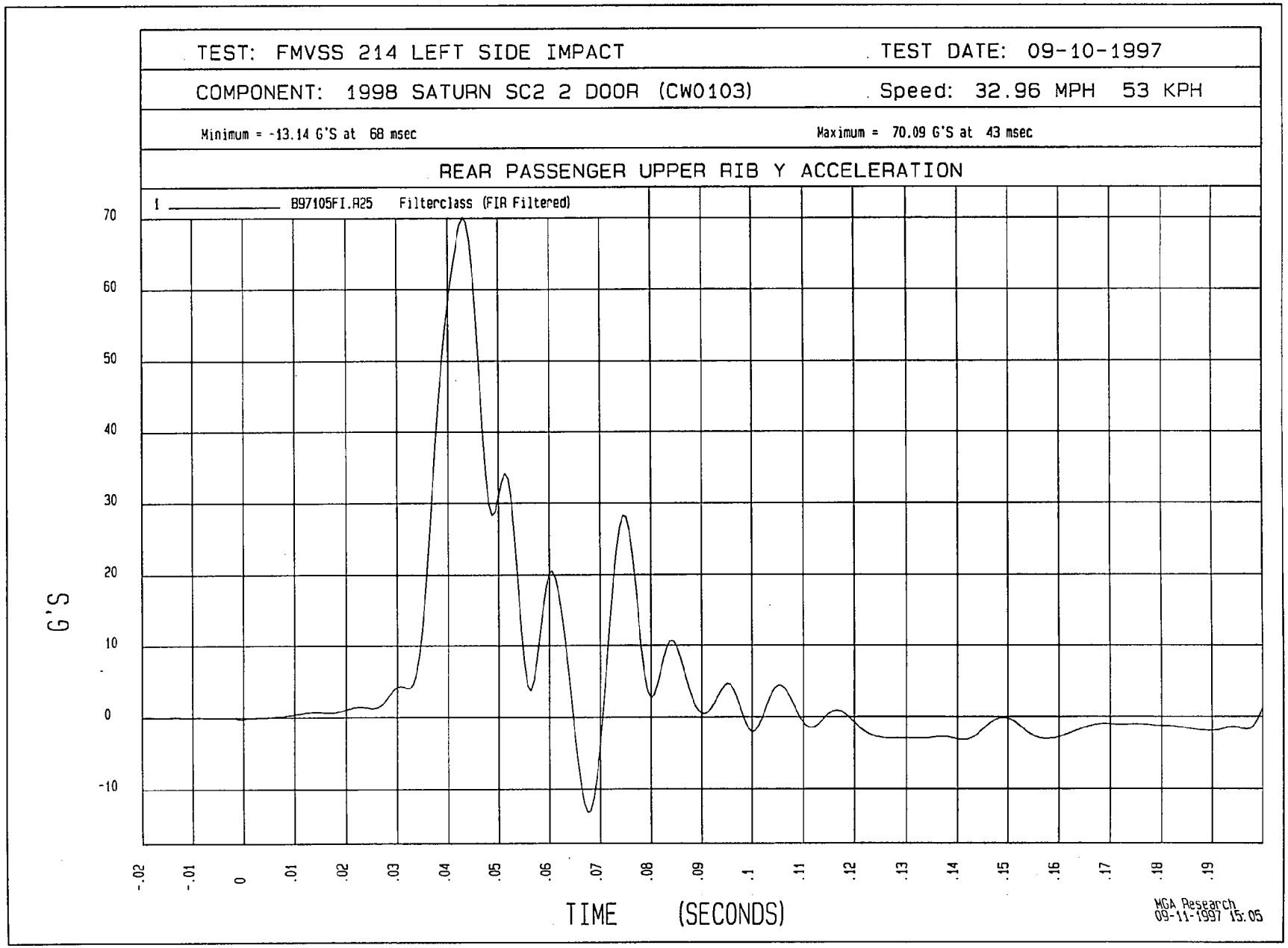
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -13.14 G'S at 68 msec
Maximum = 70.09 G'S at 43 msec
REAR PASSENGER UPPER RIB Y ACCELERATION
1 B97105FI.R25 Filterclass (FIR Filtered)
70
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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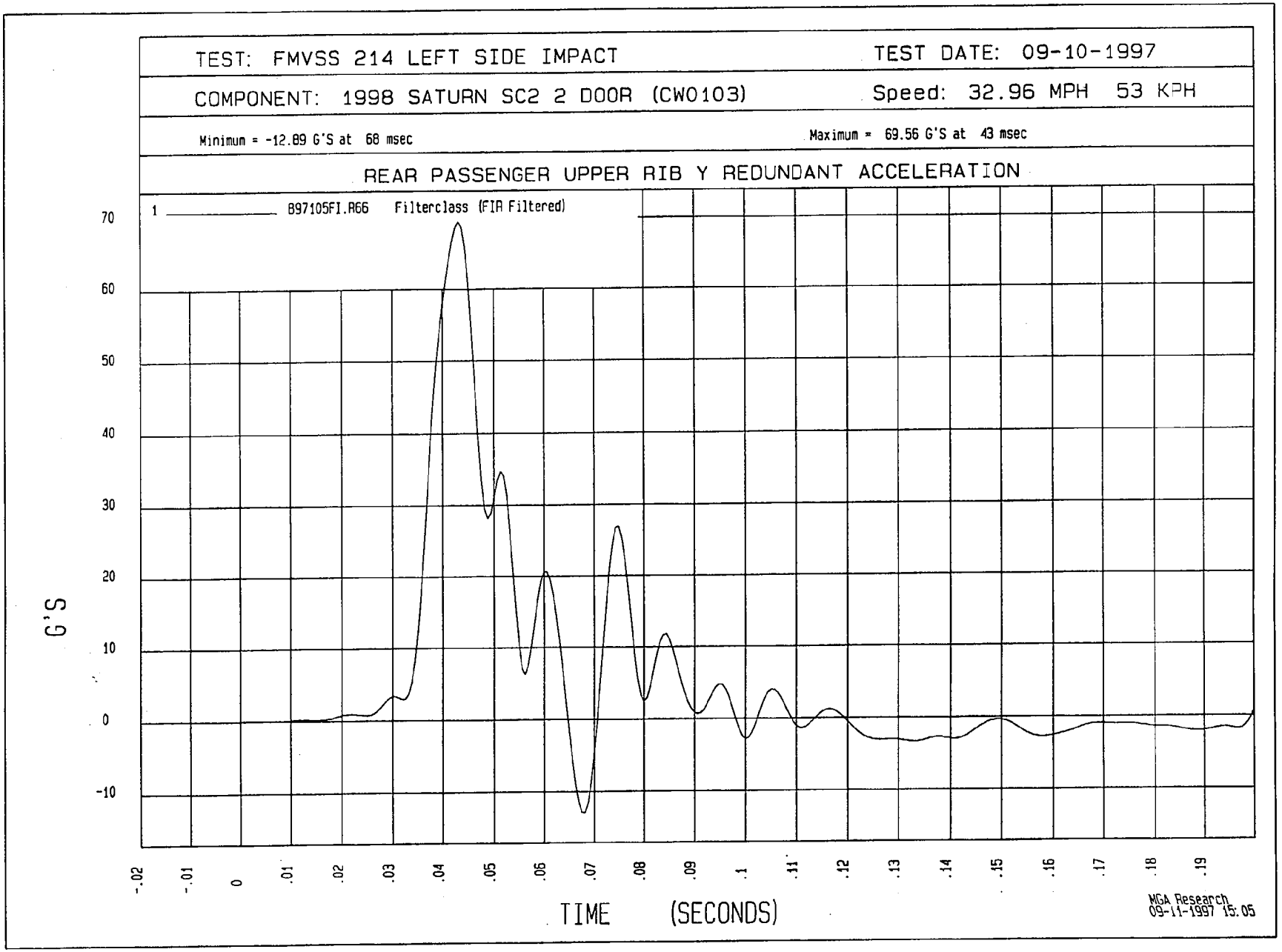
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -12.89 G'S at 68 msec
Maximum = 69.56 G'S at 43 msec
REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION
1 B97105FI.R66 Filterclass (FIR Filtered)
70
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
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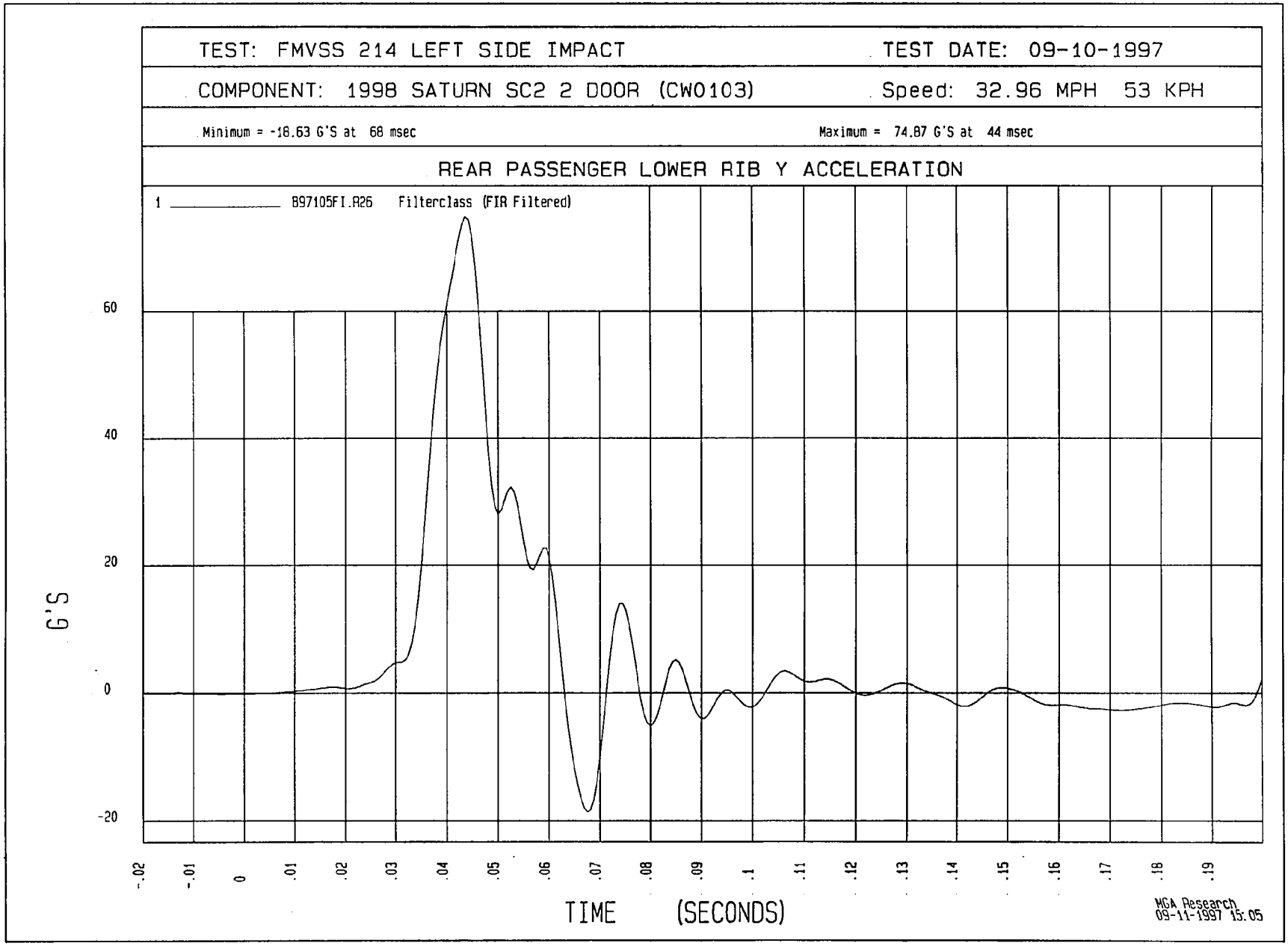
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -18.63 G'S at 68 msec
Maximum = 74.87 G'S at 44 msec
REAR PASSENGER LOWER RIB Y ACCELERATION
1 B97105FI.R26 Filterclass (FIR Filtered)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
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.07
.08
.09
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.14
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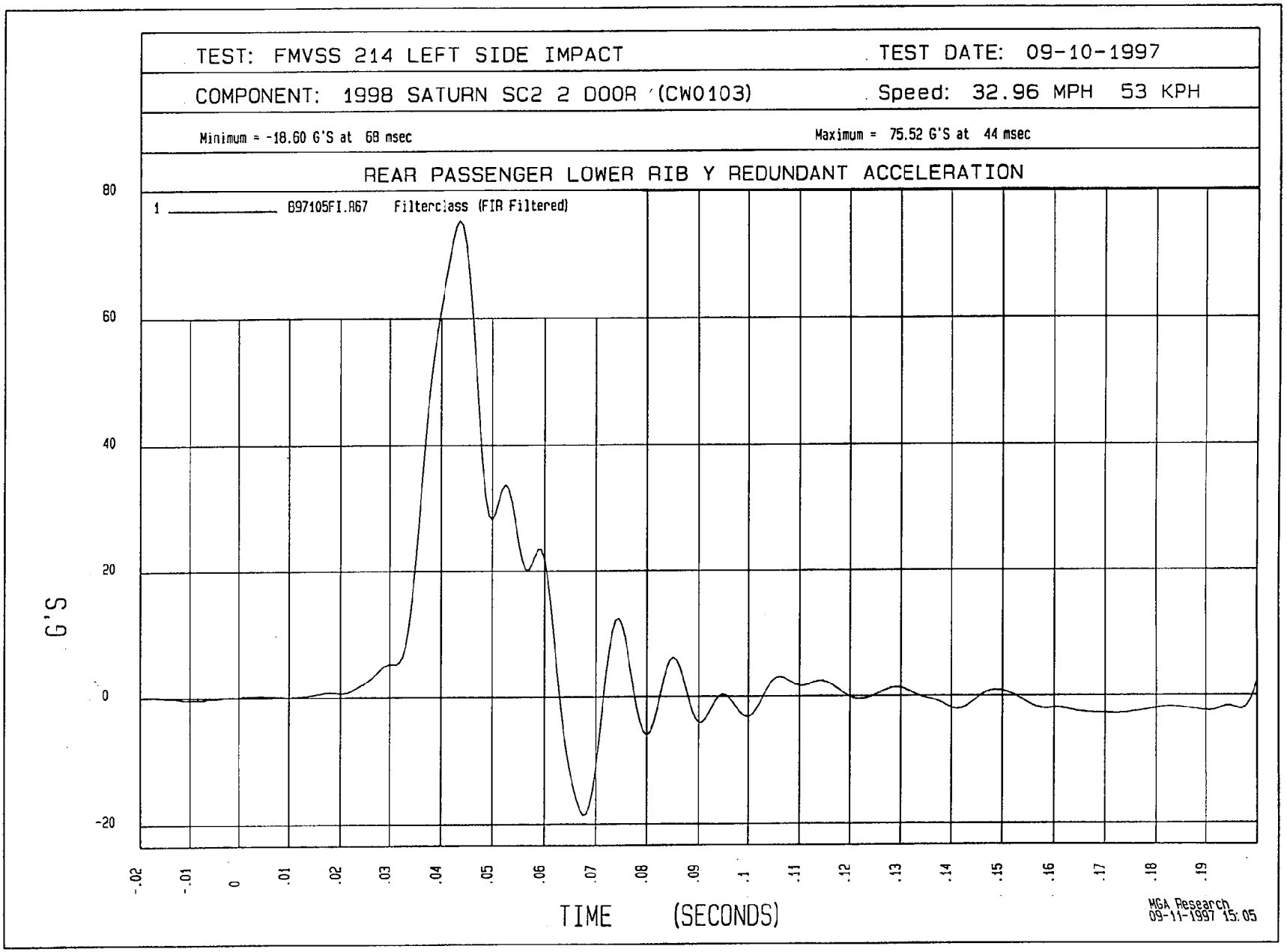
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -18.60 G'S at 68 msec
Maximum = 75.52 G'S at 44 msec
REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION
1 B97105FI.A67 Filterclass (FIR Filtered)
80
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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.14
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.18
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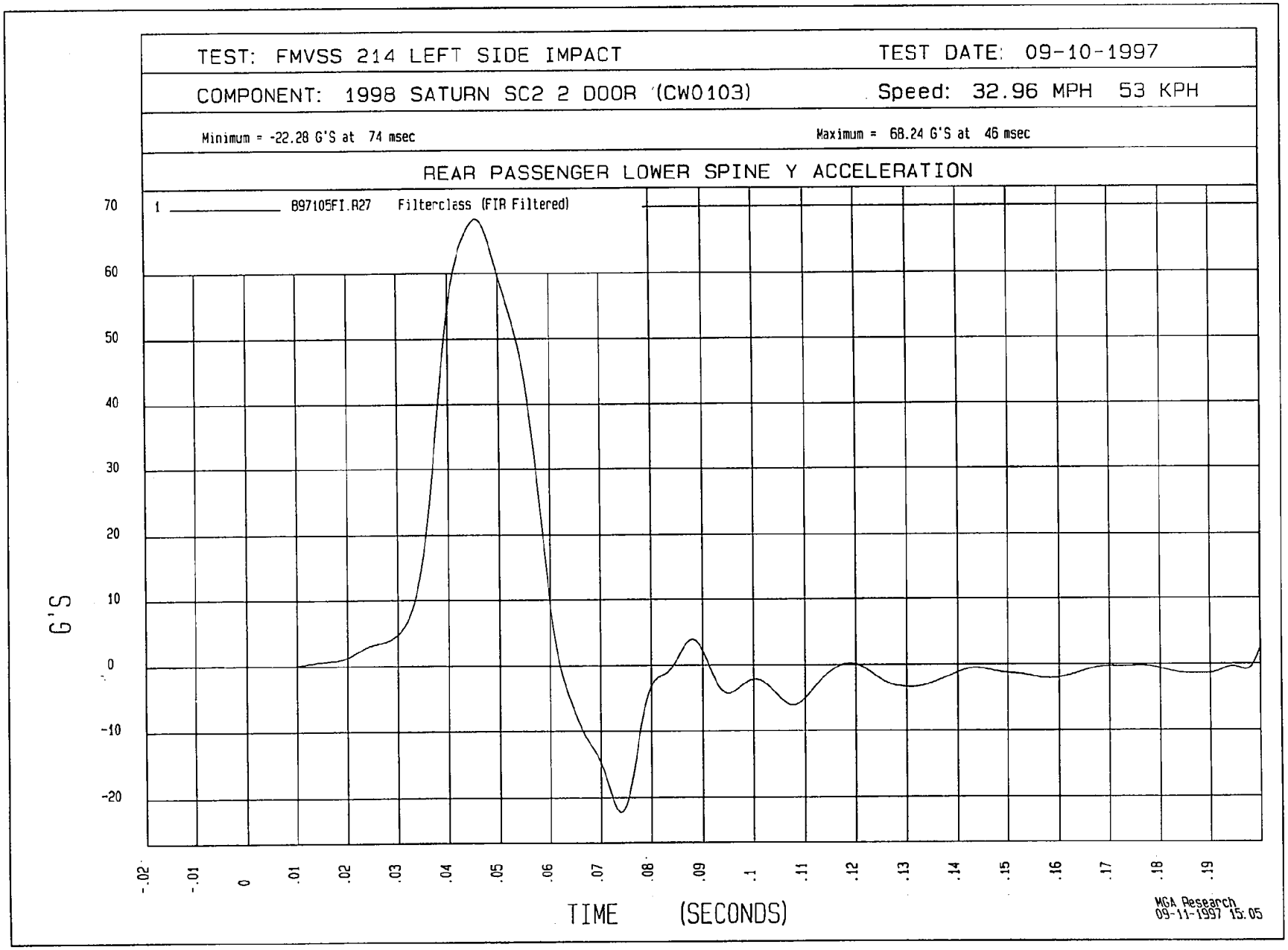
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -22.28 G'S at 74 msec
Maximum = 68.24 G'S at 46 msec
REAR PASSENGER LOWER SPINE Y ACCELERATION
1 B97105FI.R27 Filterclass (FIR Filtered)
70
60
50
40
30
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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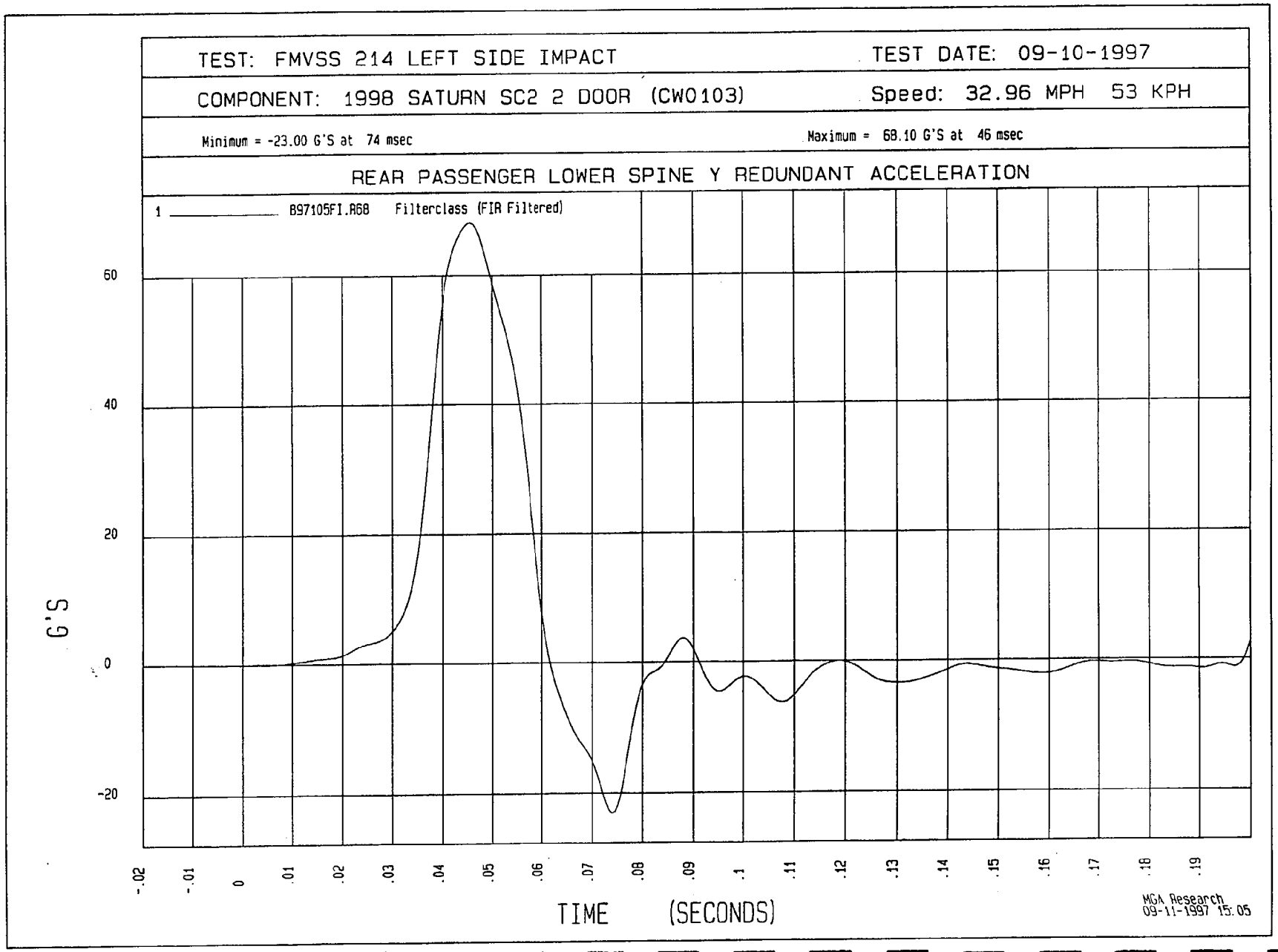
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -23.00 G'S at 74 msec
Maximum = 68.10 G'S at 46 msec
REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION
1 B97105FI.A68 Filterclass (FIR Filtered)
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
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.09
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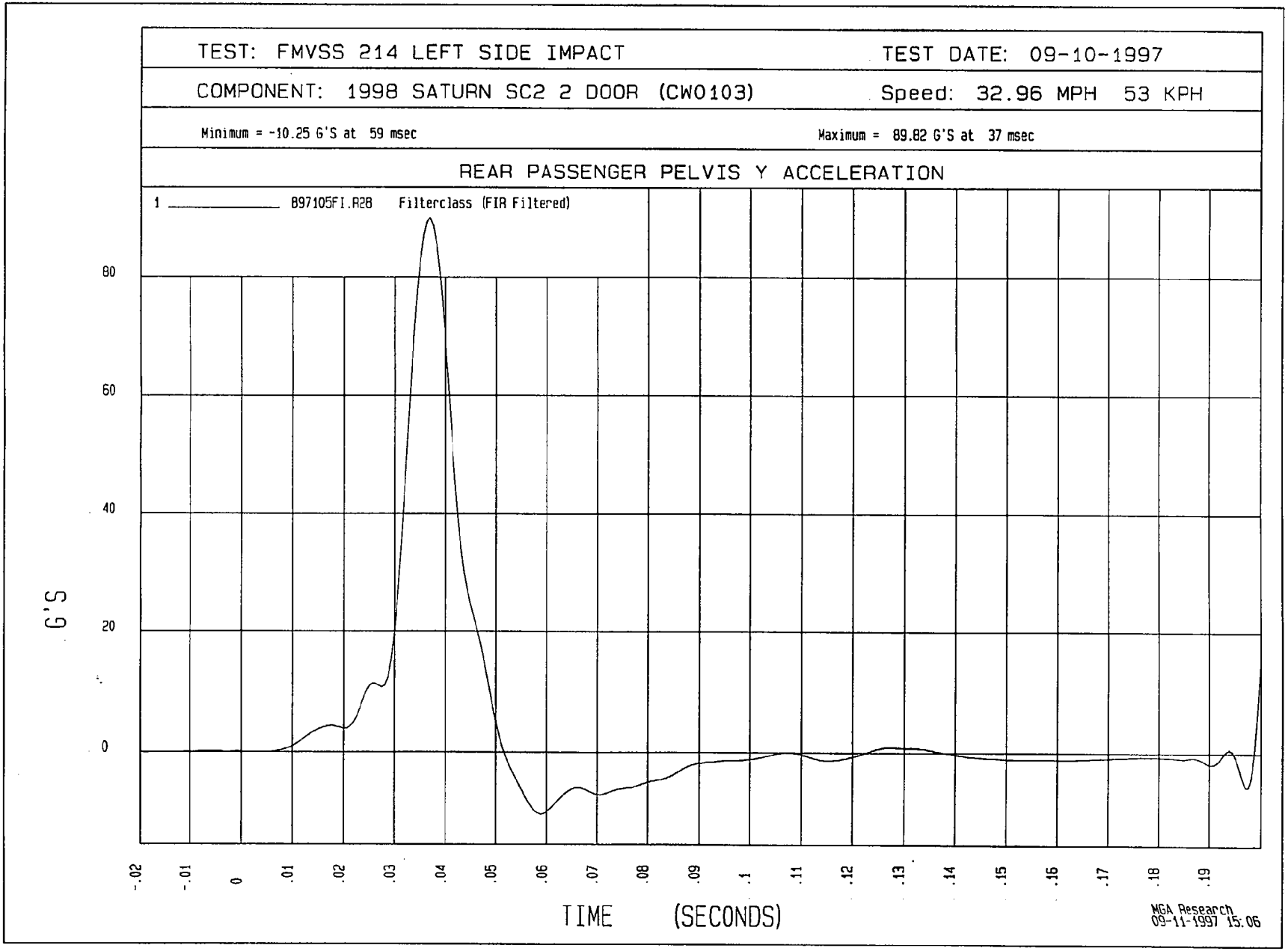
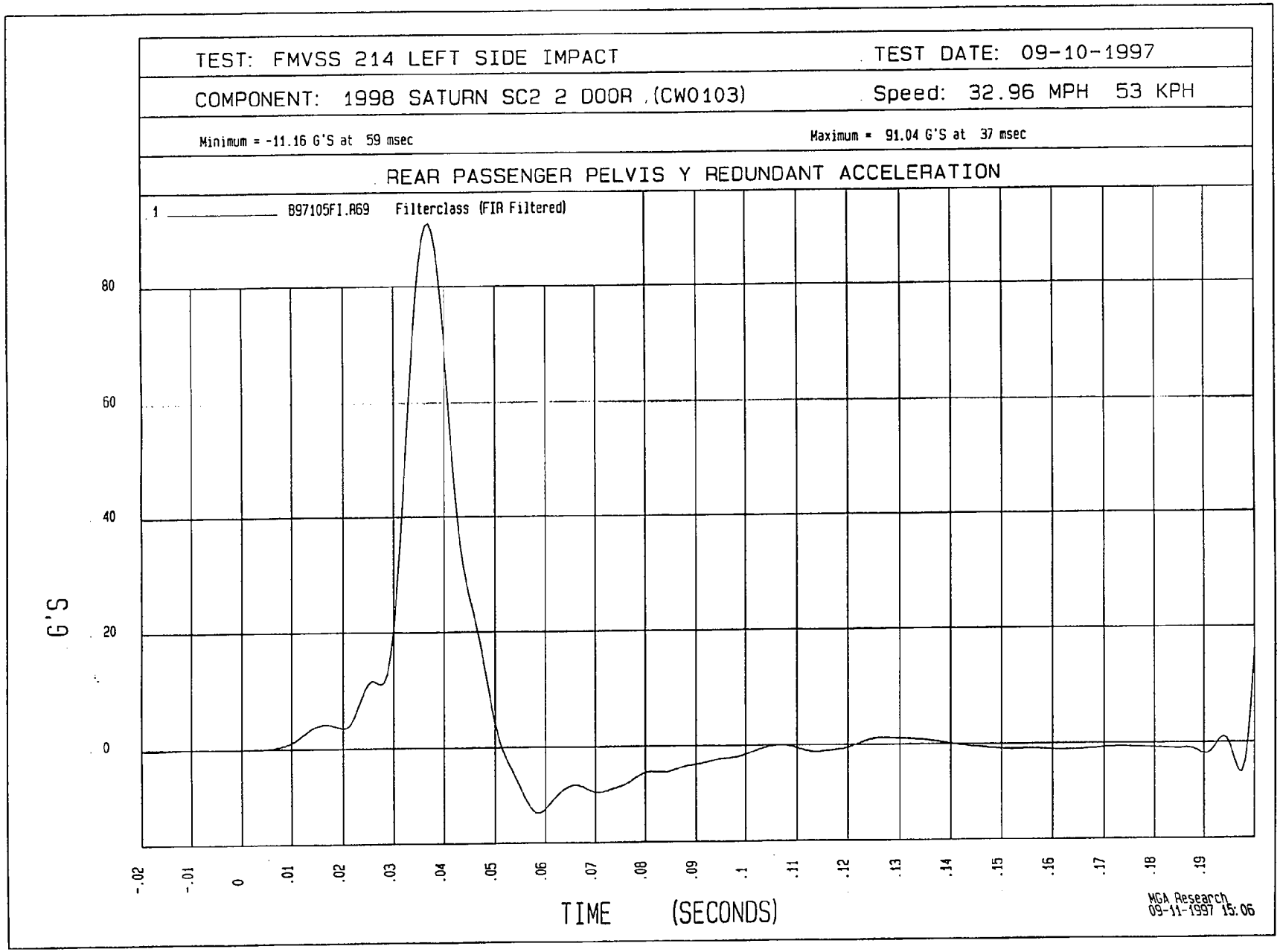
TIME (SECONDS)
MGA Research
09-11-1997 15:05


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -10.25 G'S at 59 msec
Maximum = 89.82 G'S at 37 msec
REAR PASSENGER PELVIS Y ACCELERATION
1 B97105FI.R28 Filterclass (FIR Filtered)
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
09-11-1997 15:06


TEST: FMVSS 214 LEFT SIDE IMPACT
TEST DATE: 09-10-1997
COMPONENT: 1998 SATURN SC2 2 DOOR (CW0103)
Speed: 32.96 MPH 53 KPH
Minimum = -11.16 G'S at 59 msec
Maximum = 91.04 G'S at 37 msec
REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION
1 B97105F1.A69 Filterclass (FIR Filtered)
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
09-11-1997 15:06

APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-98-DC02

DUMMY PERFORMANCE CALIBRATIONS

FMVSS 214 - SIDE IMPACT TEST

GENERAL MOTORS CORPORATION
1998 SATURN SC2 2 DOOR
NHTSA NO. CW0103

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: September 10, 1997

Report Date: September 16, 1997

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NEF-30
400 SEVENTH STREET, S.W., ROOM 6115
Washington, D.C. 20590

TABLE OF CONTENTS

PRE-TEST CERTIFICATION DATA

Front 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 NO.: 049 DATE OF VERIFICATION: September 5, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.00
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.5
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.7

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

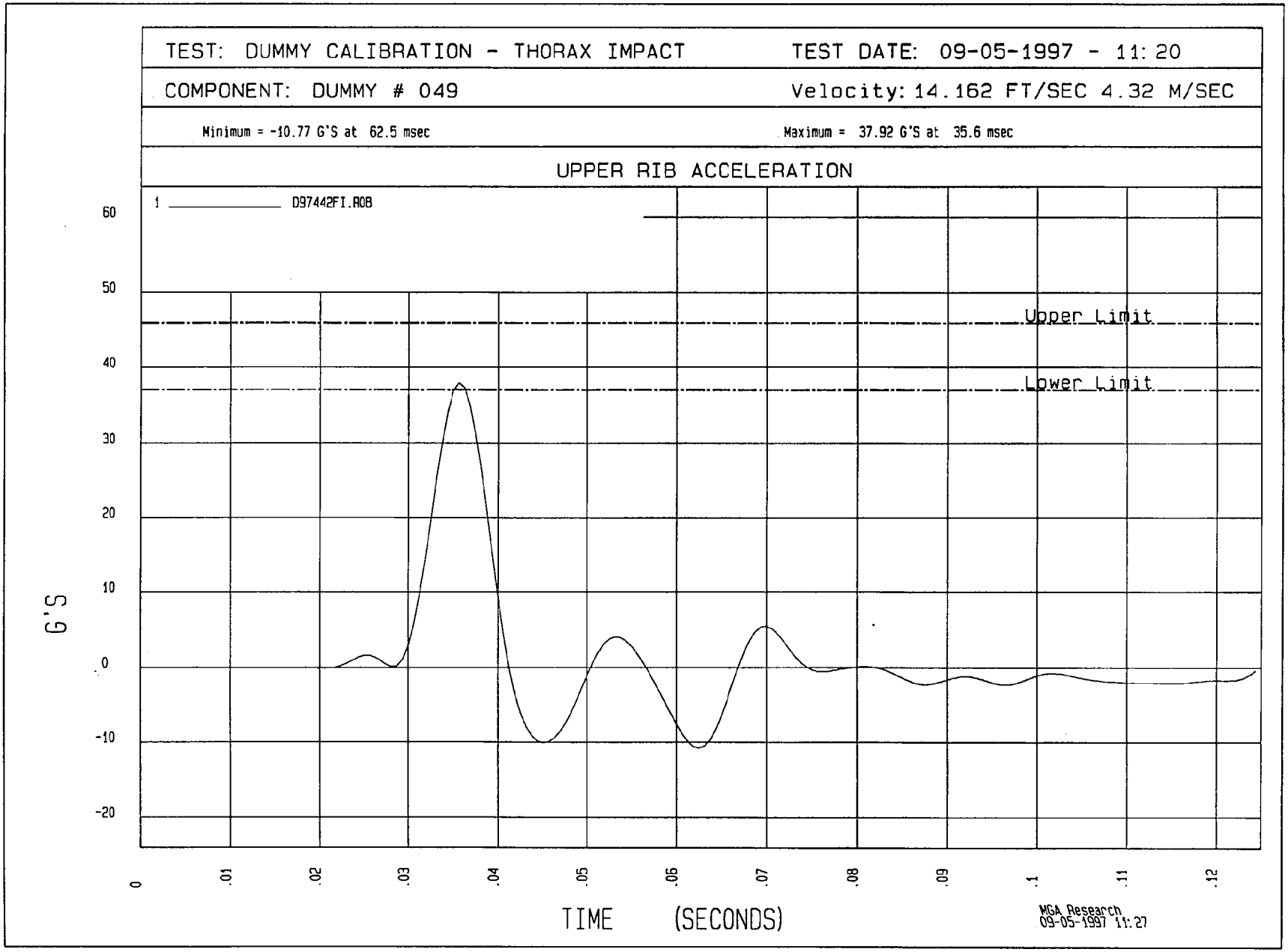
DUMMY NUMBER: 049 TEST NUMBER: D971442

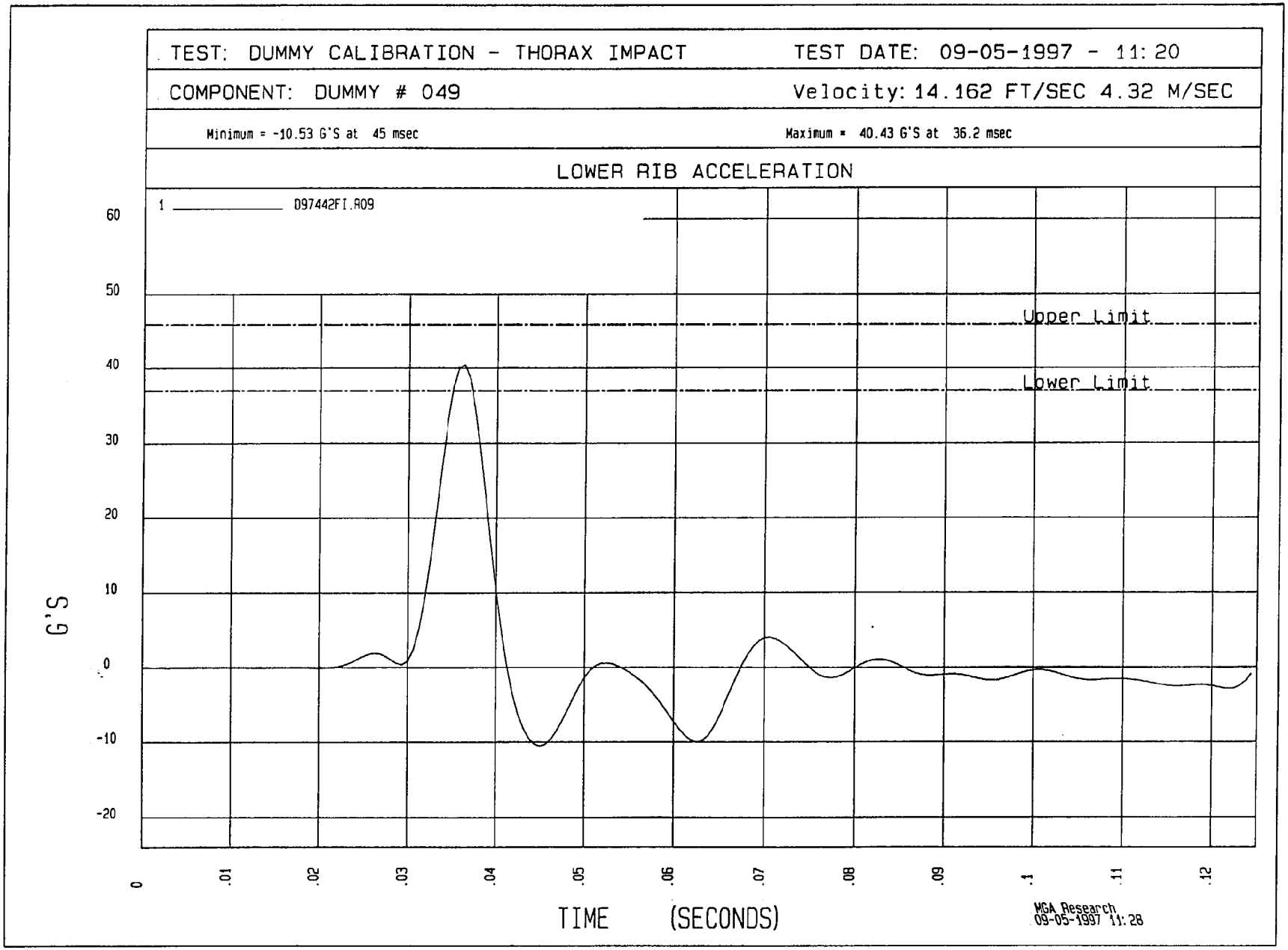
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
PROBE SPEED	14.0 - 14.2 fps	14.2
UPPER RIB	37 - 46 g's	38
LOWER RIB	37 - 46 g's	40
LOWER SPINE	15 - 22 g's	21

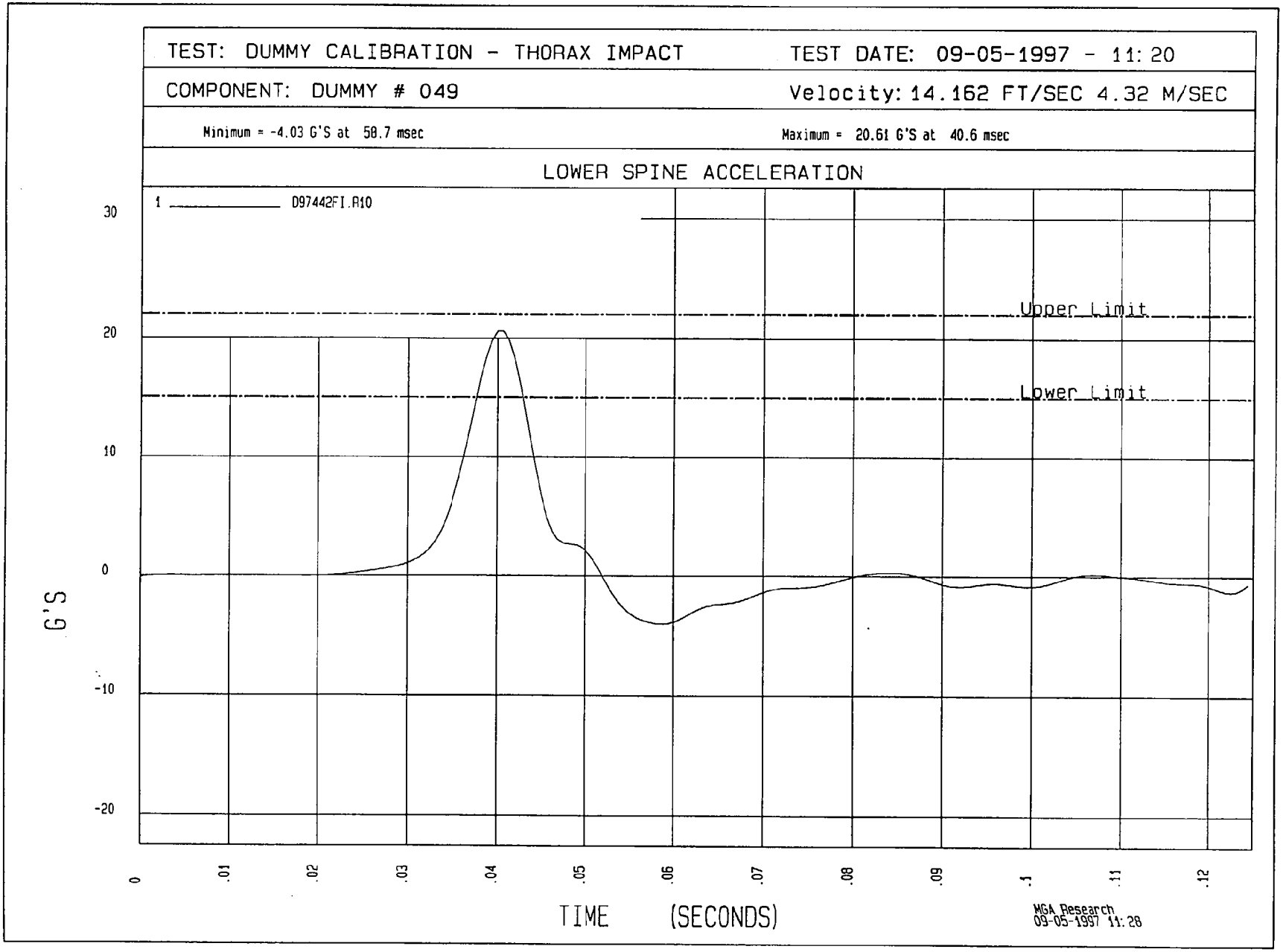
TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-05-1997 - 11:20
COMPONENT: DUMMY # 049
Velocity: 14.162 FT/SEC 4.32 M/SEC
Minimum = -10.77 G'S at 62.5 msec
Maximum = 37.92 G'S at 35.6 msec
UPPER RIB ACCELERATION
1 D97442FI.R0B
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 (SECONDS)
MGA Research
09-05-1997 11:27


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-05-1997 - 11:20
COMPONENT: DUMMY # 049
Velocity: 14.162 FT/SEC 4.32 M/SEC
Minimum = -10.53 G'S at 45 msec
Maximum = 40.43 G'S at 36.2 msec
LOWER RIB ACCELERATION
1 D97442FI.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 (SECONDS)
MGA Research
09-05-1997 11:28


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-05-1997 - 11:20
COMPONENT: DUMMY # 049
Velocity: 14.162 FT/SEC 4.32 M/SEC
Minimum = -4.03 G'S at 58.7 msec
Maximum = 20.61 G'S at 40.6 msec
LOWER SPINE ACCELERATION
1 D97442FI.A10
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 (SECONDS)
MGA Research
09-05-1997 11:28

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

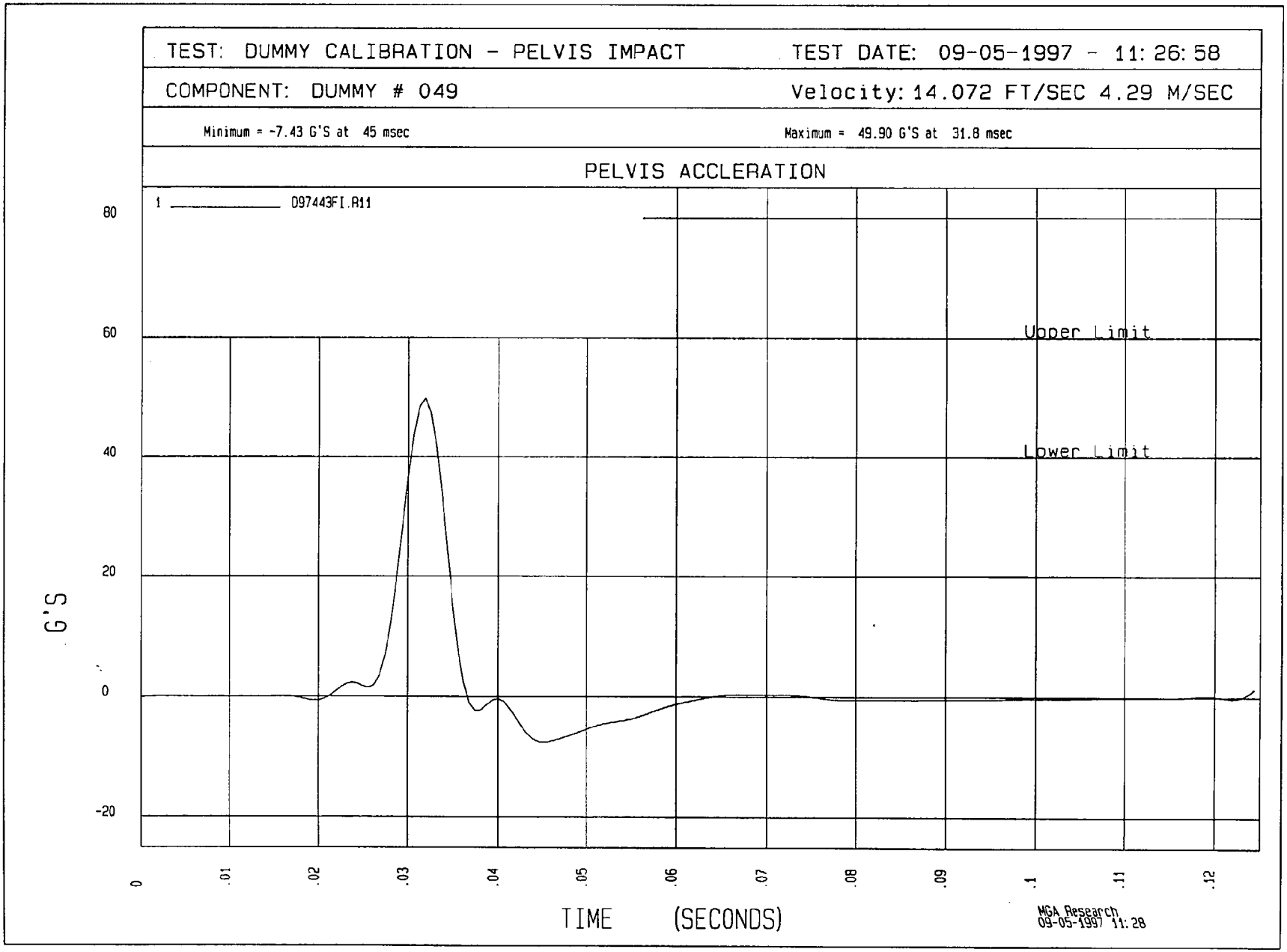
DUMMY NUMBER: 049 TEST NUMBER: D971443

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	50

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - PELVIS IMPACT
TEST DATE: 09-05-1997 - 11:26:58
COMPONENT: DUMMY # 049
Velocity: 14.072 FT/SEC 4.29 M/SEC
Minimum = -7.43 G'S at 45 msec
Maximum = 49.90 G'S at 31.8 msec
PELVIS ACCLERATION
1 097443FI.A11
Upper Limit
Lower Limit
80
60
40
20
0
-20
G'S
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (SECONDS)
MGA Research
09-05-1997 11:28

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

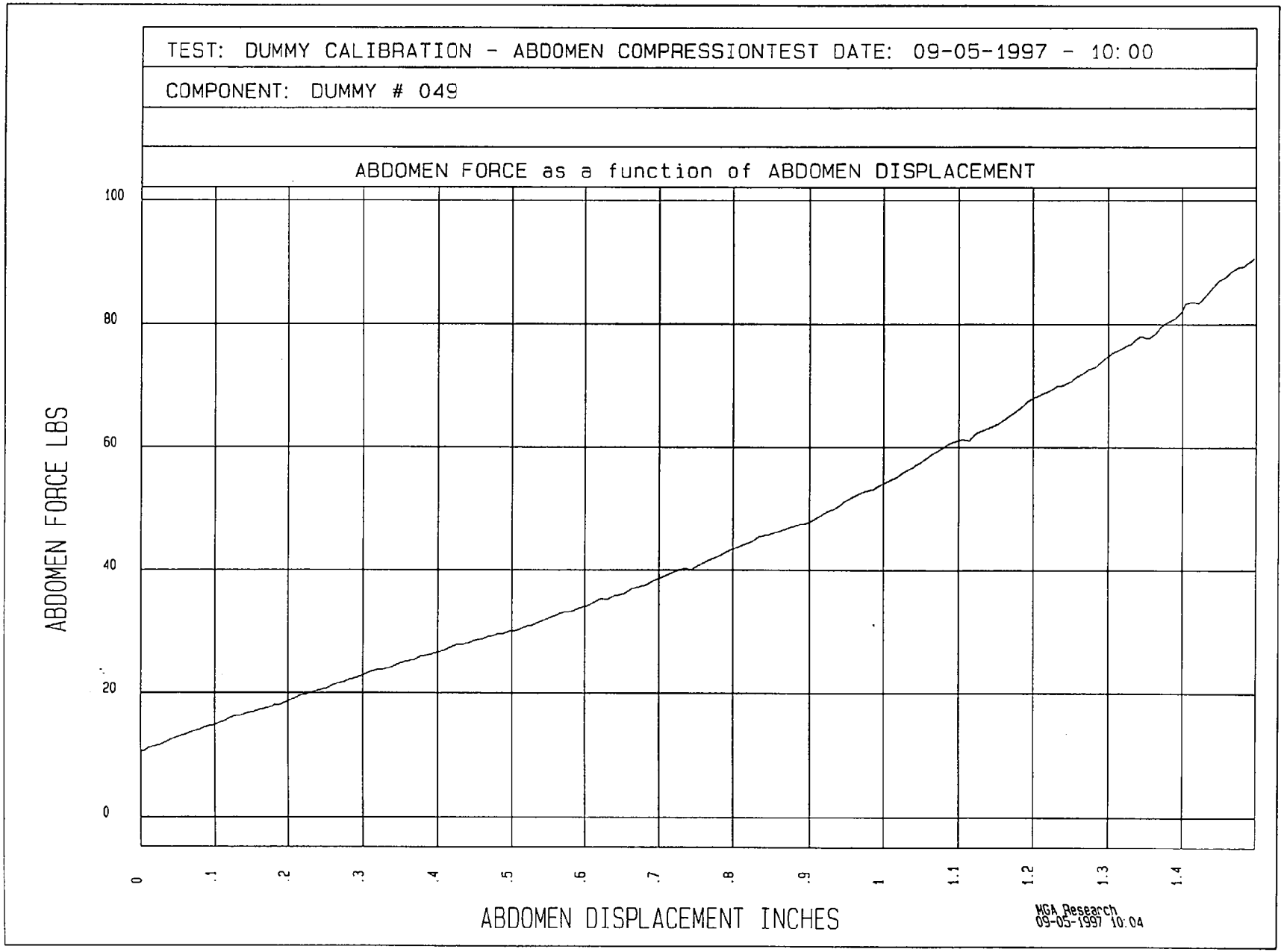
DUMMY NUMBER: 049 TEST NUMBER: D971444

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
FORCE @ 0.5 in	23.3 - 36.5 lbs	30.1
FORCE @ 0.75 in	36.7 - 49.8 lbs	40.9
FORCE @ 1.0 in	50 - 63 lbs	55
FORCE @ 1.3 in	73 - 88 lbs	75

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 09-05-1997 - 10:00
COMPONENT: DUMMY # 049
ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT
ABDOMEN FORCE LBS
100
80
60
40
20
0
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
1.1
1.2
1.3
1.4
ABDOMEN DISPLACEMENT INCHES
MGA Research
09-05-1997 10:04

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

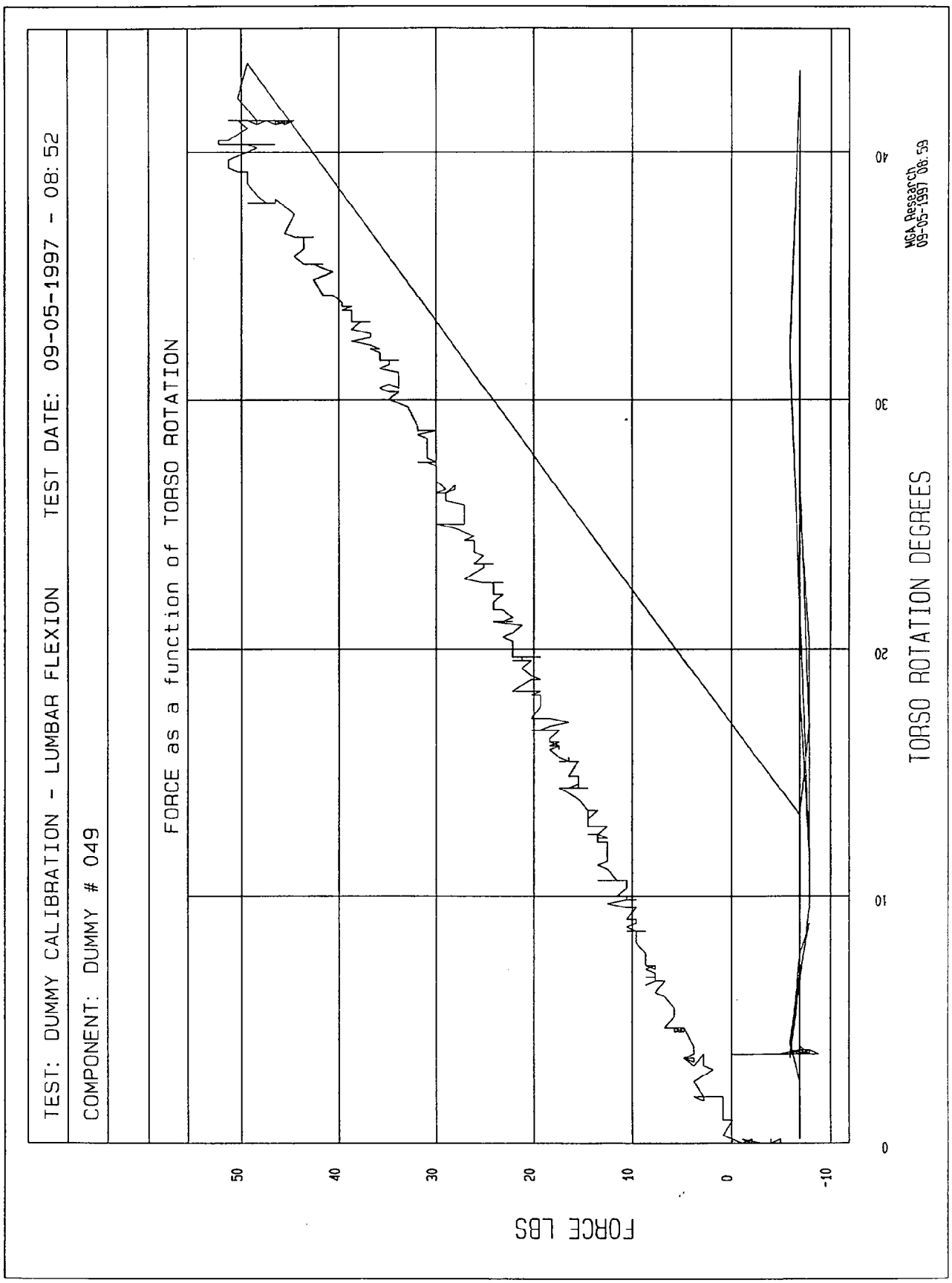
DUMMY NUMBER: 049 TEST NUMBER: D971445

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	38%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	22
FORCE @ 30°	34 - 46 lbs	35
FORCE @ 40°	46 - 58 lbs	48
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 09-05-1997 - 08:52
COMPONENT: DUMMY # 049
FORCE as a function of TORSO ROTATION
FORCE LBS
50
40
30
20
10
0
-10
0
10
20
30
40
TORSO ROTATION DEGREES
MGA Research
09-05-1997 08:59

PRE-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 048

Calibration Test Results Summary

Passenger 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 NO.: 048

DATE OF VERIFICATION: September 5, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.3
RH - Rib Height	19.75" - 20.50"	19.90
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.2
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	14.8

MEASUREMENTS BY:

APPROVED BY:

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

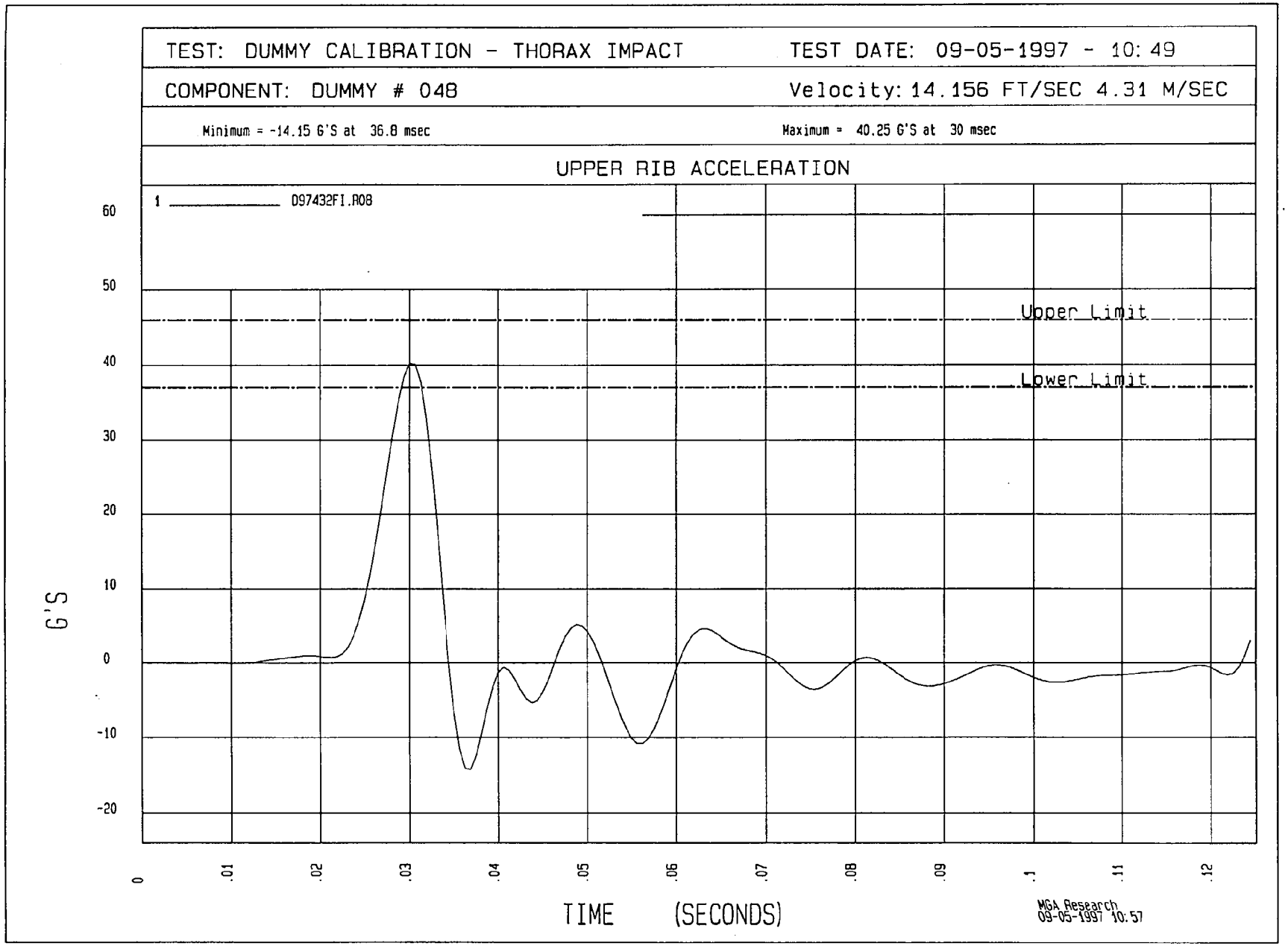
DUMMY NUMBER: 048 TEST NUMBER: D971432

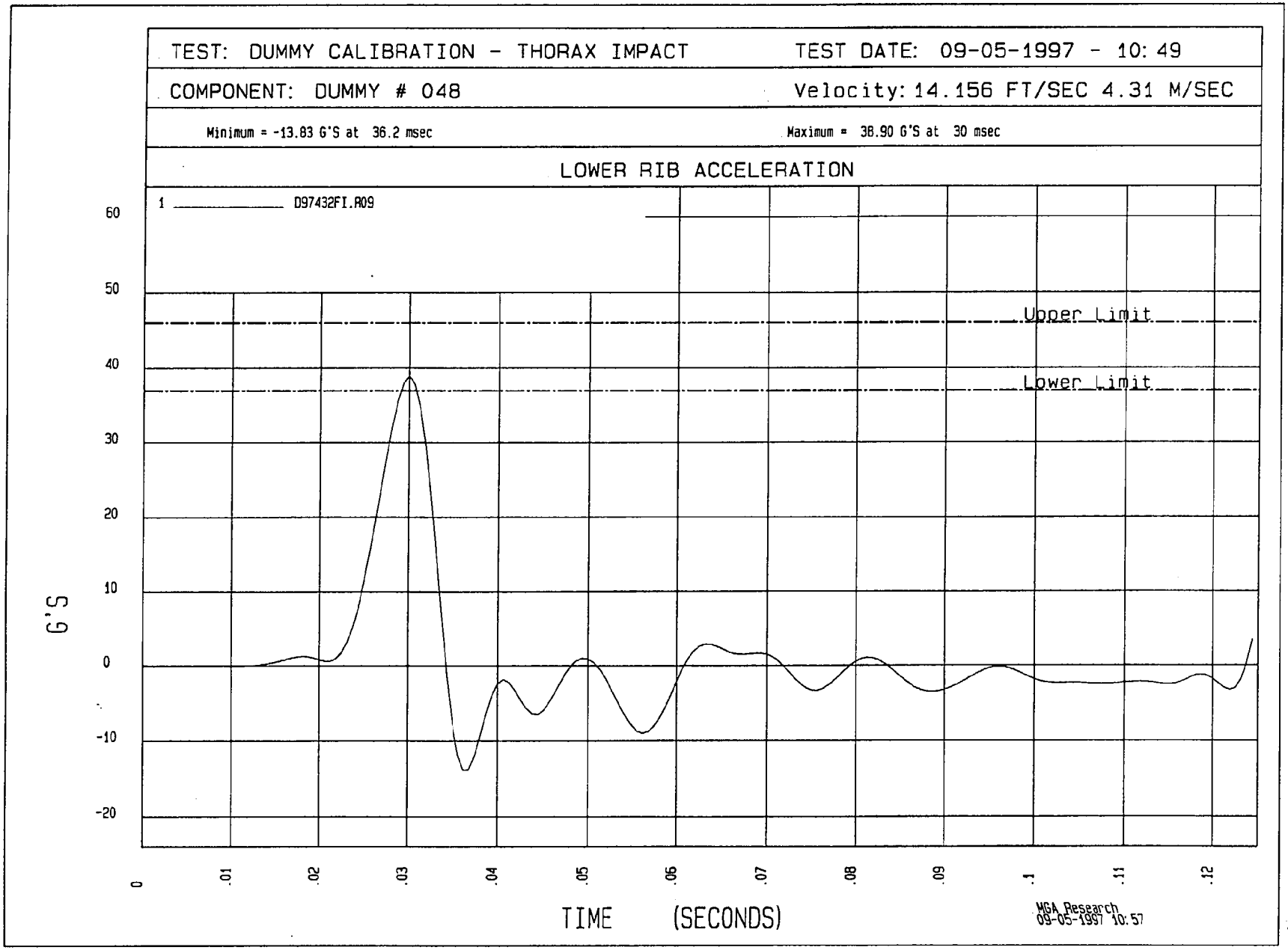
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
PROBE SPEED	14.0 - 14.2 fps	14.2
UPPER RIB	37 - 46 g's	40
LOWER RIB	37 - 46 g's	39
LOWER SPINE	15 - 22 g's	20

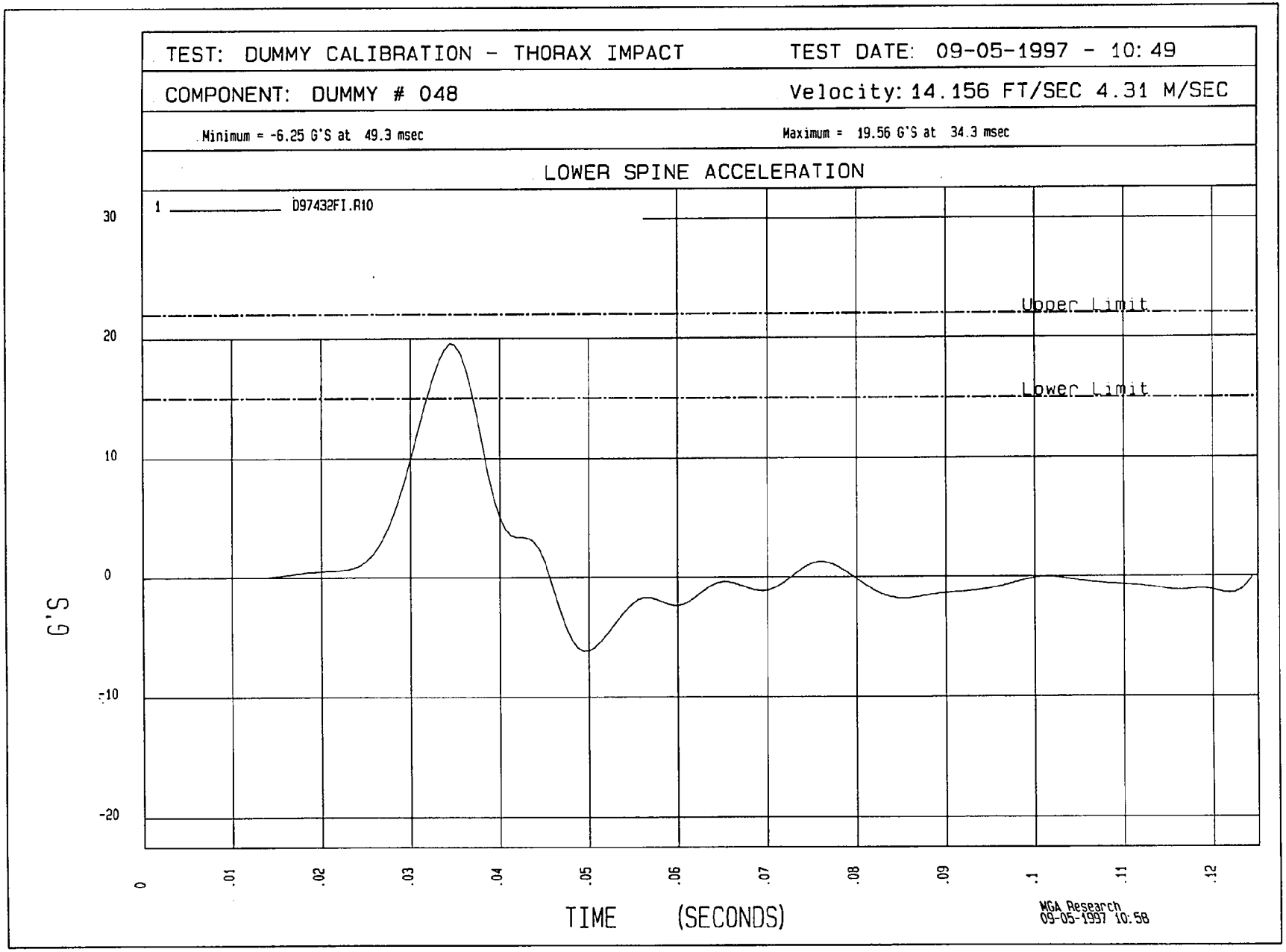
TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-05-1997 - 10:49
COMPONENT: DUMMY # 048
Velocity: 14.156 FT/SEC 4.31 M/SEC
Minimum = -14.15 G'S at 36.8 msec
Maximum = 40.25 G'S at 30 msec
UPPER RIB ACCELERATION
1 D97432FI.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 (SECONDS)
MGA Research
09-05-1997 10:57


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-05-1997 - 10:49
COMPONENT: DUMMY # 048
Velocity: 14.156 FT/SEC 4.31 M/SEC
Minimum = -13.83 G'S at 36.2 msec
Maximum = 38.90 G'S at 30 msec
LOWER RIB ACCELERATION
1 D97432FI.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 (SECONDS)
MGA Research
09-05-1997 10:57


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-05-1997 - 10:49
COMPONENT: DUMMY # 048
Velocity: 14.156 FT/SEC 4.31 M/SEC
Minimum = -6.25 G'S at 49.3 msec
Maximum = 19.56 G'S at 34.3 msec
LOWER SPINE ACCELERATION
1 D97432FI.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 (SECONDS)
MGA Research
09-05-1997 10:58

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

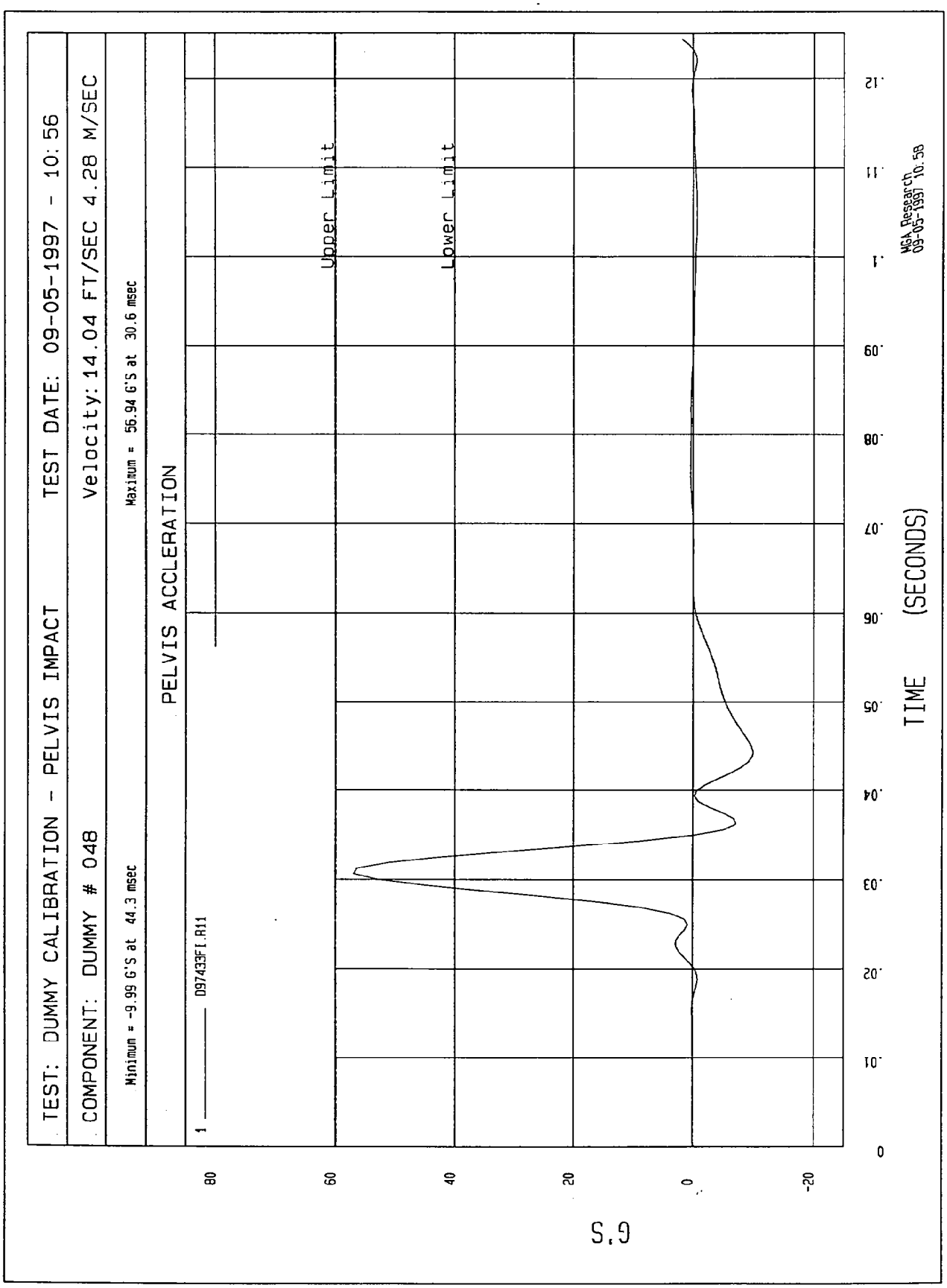
DUMMY NUMBER: 048 TEST NUMBER: D971433

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
PROBE SPEED	14.0 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	57

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - PELVIS IMPACT
TEST DATE: 09-05-1997 - 10:56
COMPONENT: DUMMY # 048
Velocity: 14.04 FT/SEC 4.28 M/SEC
Minimum = -9.99 G'S at 44.3 msec
Maximum = 56.94 G'S at 30.6 msec
PELVIS ACCLERATION
1 D97433FI.R11
Upper Limit
Lower Limit
80
60
40
20
0
-20
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (SECONDS)
MGA Research
09-05-1997 10:56
6'S

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

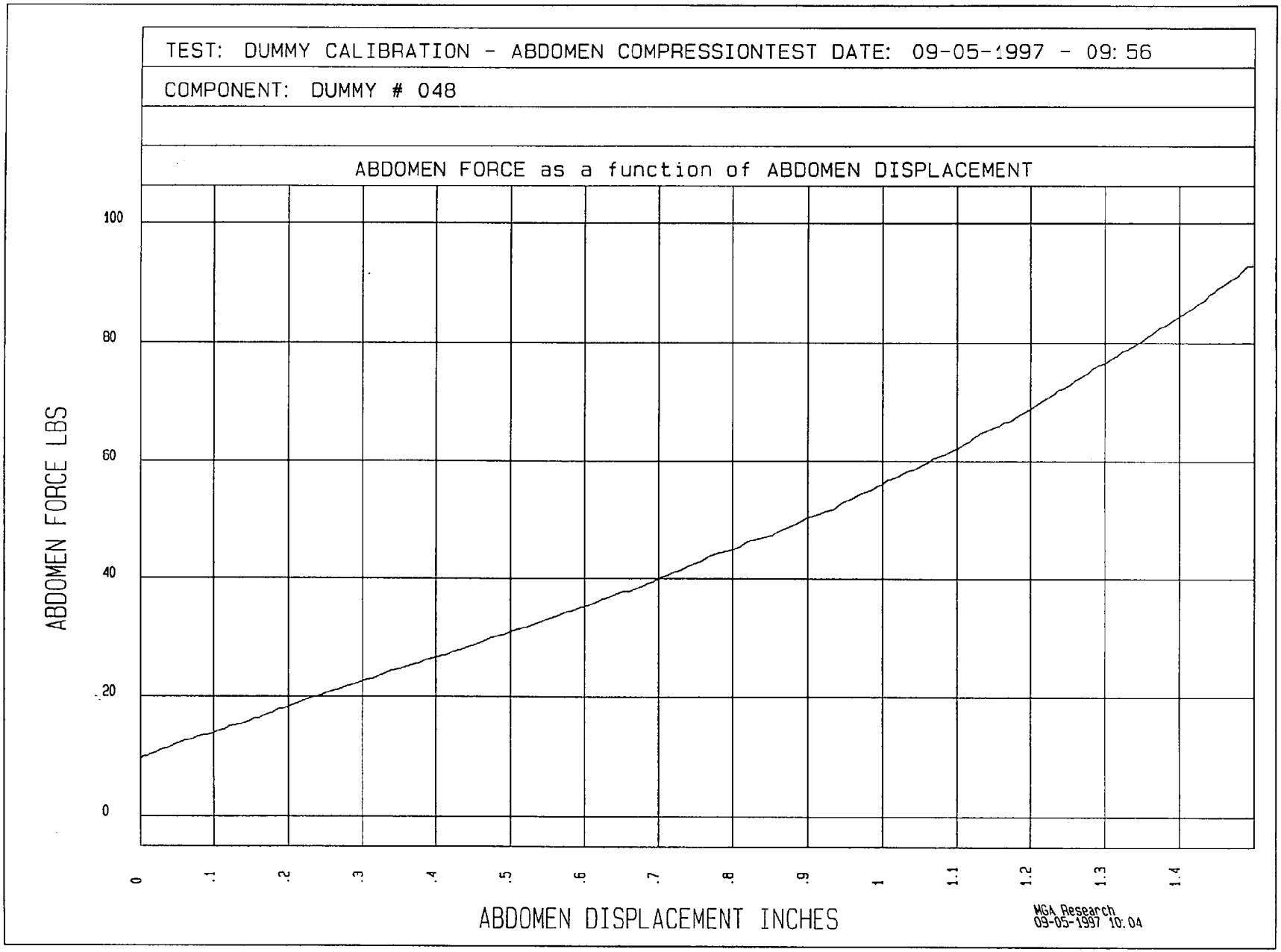
DUMMY NUMBER: 048 TEST NUMBER: D971434

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.1
FORCE @ 0.75 in	36.7 - 49.8 lbs	43.0
FORCE @ 1.0 in	50 - 63 lbs	57
FORCE @ 1.3 in	73 - 88 lbs	77

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 09-05-1997 - 09:56
COMPONENT: DUMMY # 048
ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT
ABDOMEN FORCE LBS
100
80
60
40
20
0
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
1.1
1.2
1.3
1.4
ABDOMEN DISPLACEMENT INCHES
MGA Research
09-05-1997 10:04

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: September 5, 1997

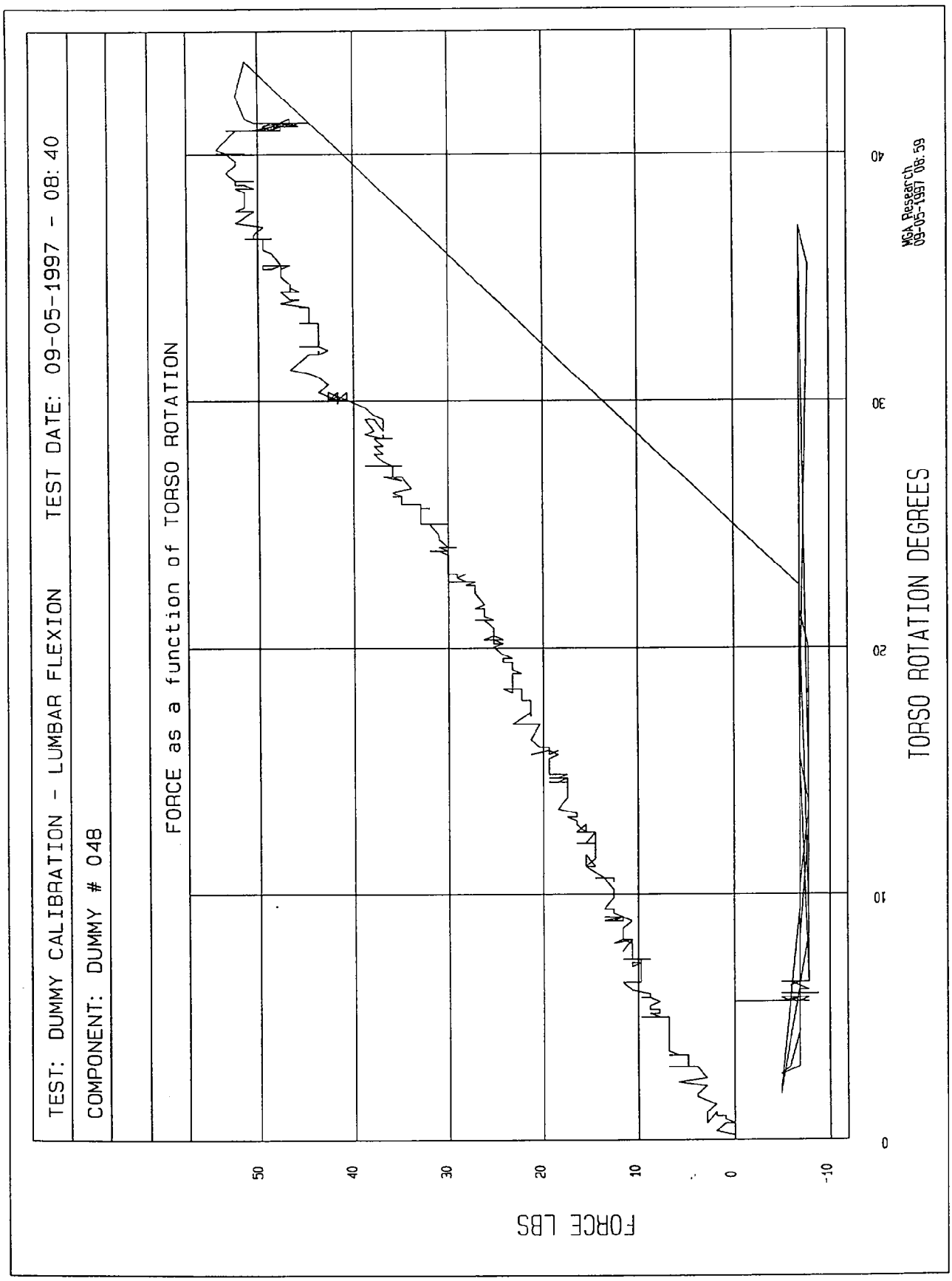
DUMMY NUMBER: 048 TEST NUMBER: D971435

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	38%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	42
FORCE @ 40°	46 - 58 lbs	53
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 09-05-1997 - 08:40
COMPONENT: DUMMY # 048
FORCE as a function of TORSO ROTATION
FORCE LBS
50
40
30
20
10
0
-10
0
10
20
30
40
TORSO ROTATION DEGREES
MGA Research
09-05-1997 08:59

POST-TEST CERTIFICATION DATA

Front 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 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 NO.: 049

DATE OF VERIFICATION: September 14, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.00
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.5
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.7

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 14, 1997

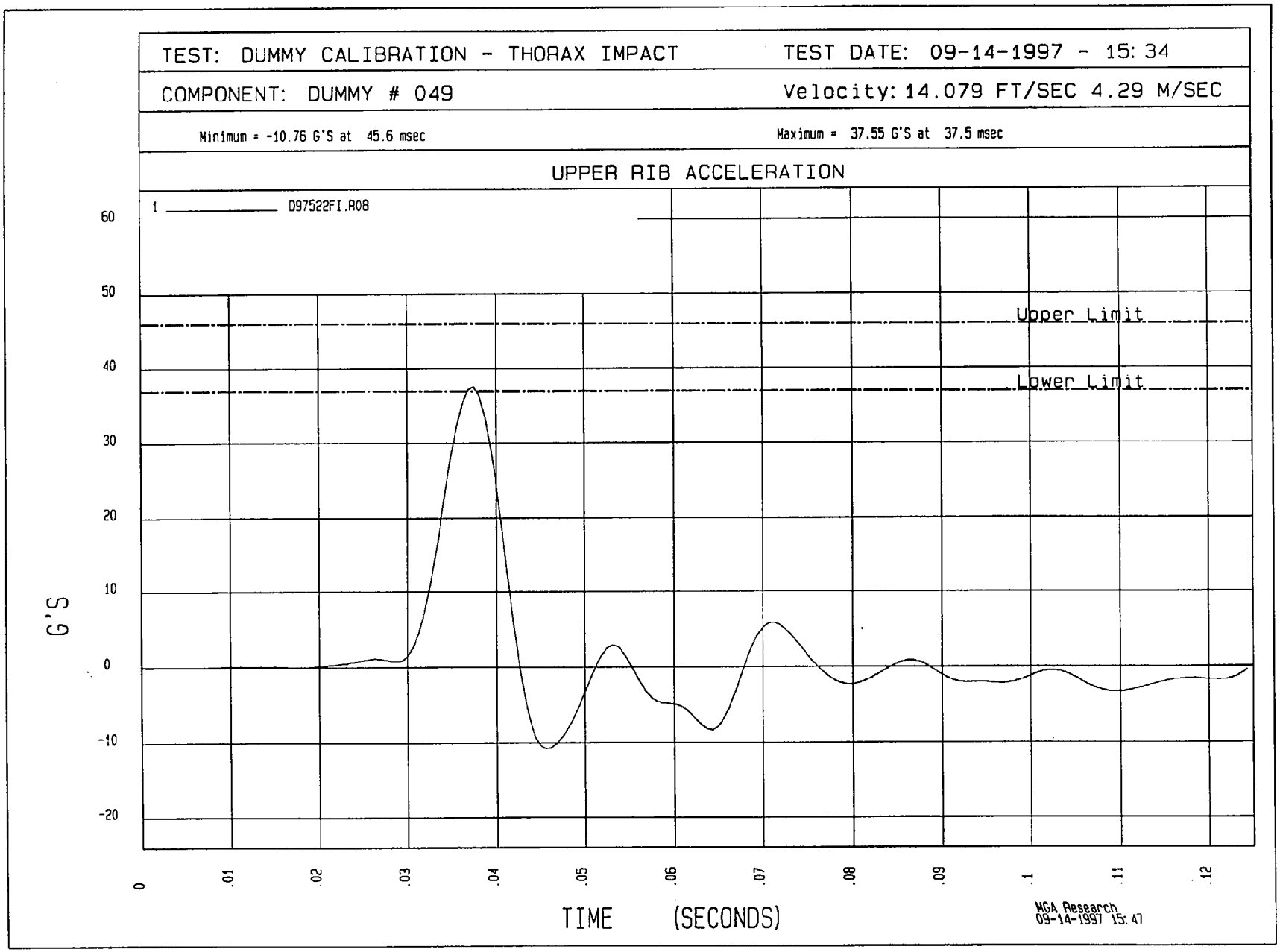
DUMMY NUMBER: 049 TEST NUMBER: D971522

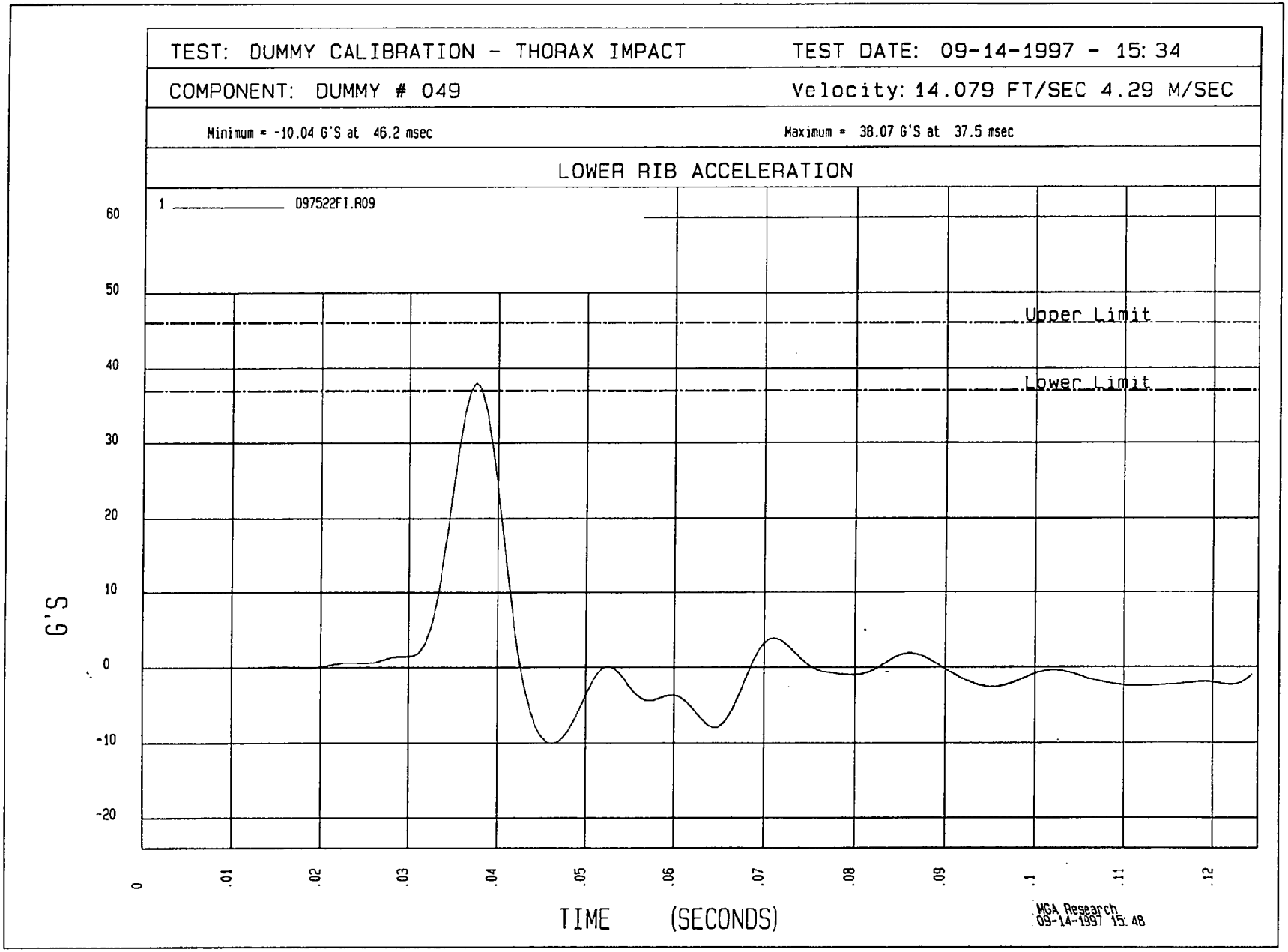
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	55%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	38
LOWER RIB	37 - 46 g's	38
LOWER SPINE	15 - 22 g's	21

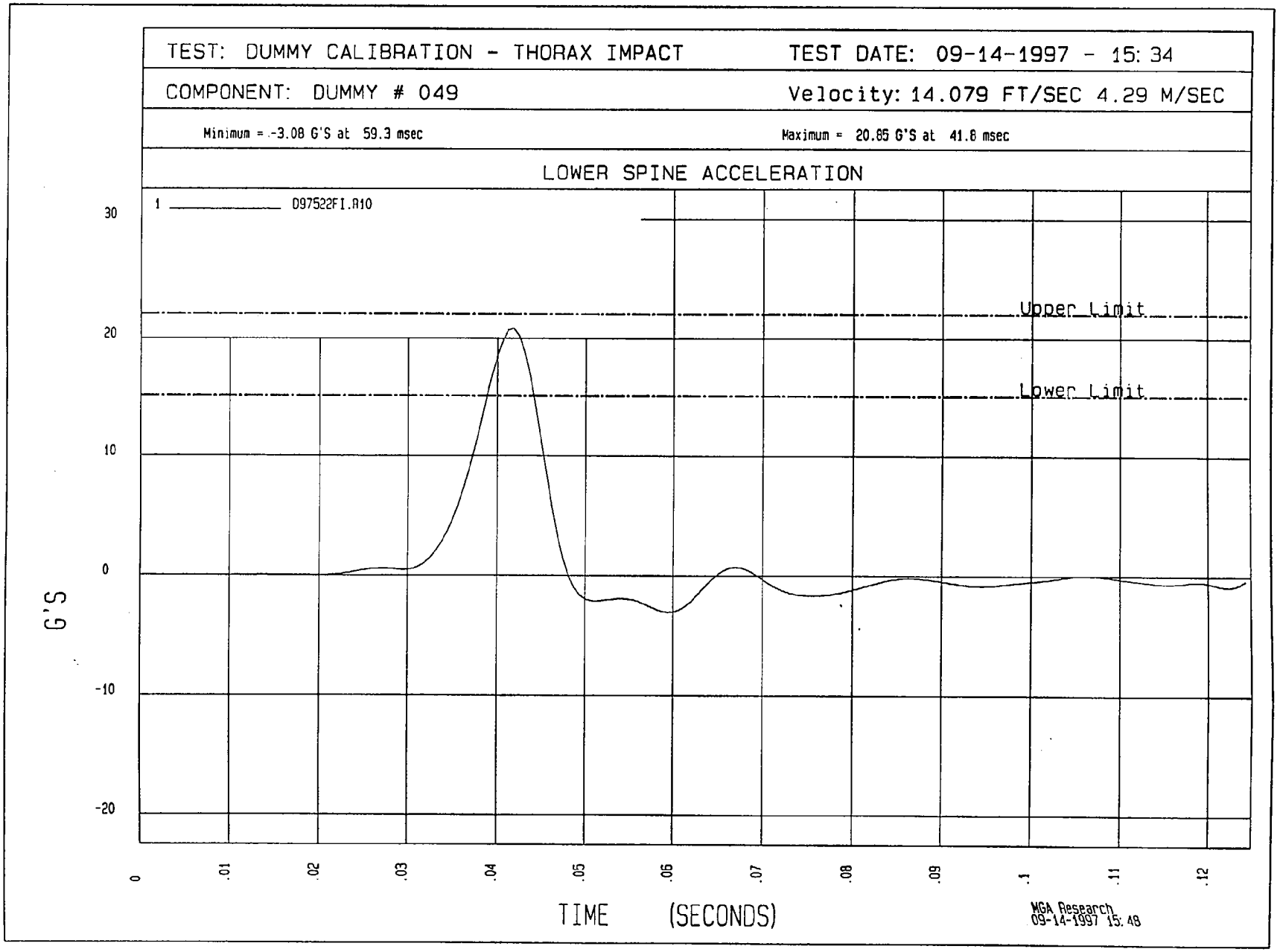
TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-14-1997 - 15:34
COMPONENT: DUMMY # 049
Velocity: 14.079 FT/SEC 4.29 M/SEC
Minimum = -10.76 G'S at 45.6 msec
Maximum = 37.55 G'S at 37.5 msec
UPPER RIB ACCELERATION
1 D97522FI.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 (SECONDS)
MGA Research
09-14-1997 15:47


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-14-1997 - 15:34
COMPONENT: DUMMY # 049
Velocity: 14.079 FT/SEC 4.29 M/SEC
Minimum = -10.04 G'S at 46.2 msec
Maximum = 38.07 G'S at 37.5 msec
LOWER RIB ACCELERATION
1 D97522FI.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 (SECONDS)
MGA Research
09-14-1997 15:48


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-14-1997 - 15:34
COMPONENT: DUMMY # 049
Velocity: 14.079 FT/SEC 4.29 M/SEC
Minimum = -3.08 G'S at 59.3 msec
Maximum = 20.85 G'S at 41.8 msec
LOWER SPINE ACCELERATION
1 D97522FI.A10
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 (SECONDS)
MGA Research
09-14-1997 15:48

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 14, 1997

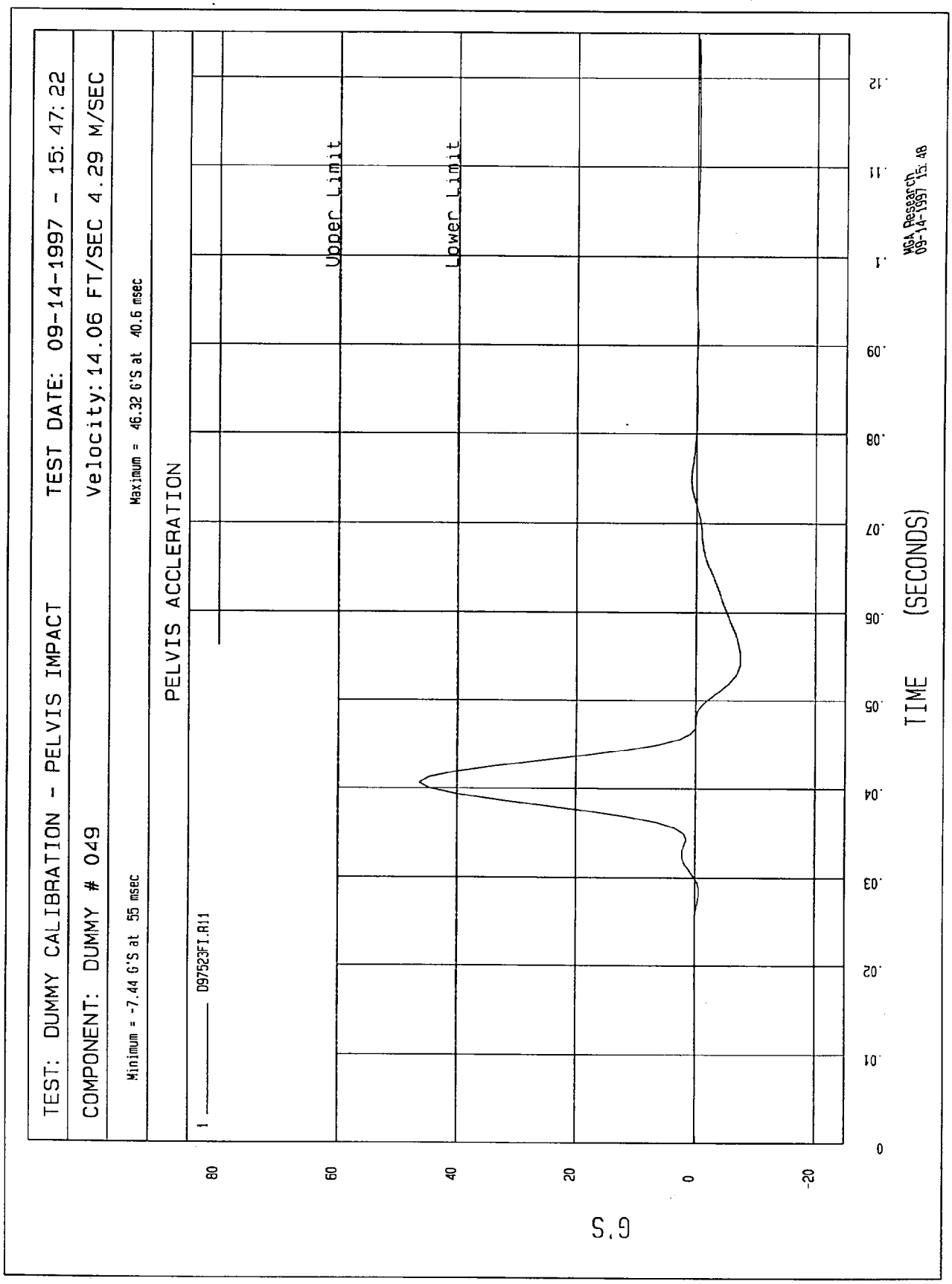
DUMMY NUMBER: 048 TEST NUMBER: D971453

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	55%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	46

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - PELVIS IMPACT
TEST DATE: 09-14-1997 - 15:47:22
COMPONENT: DUMMY # 049
Velocity: 14.06 FT/SEC 4.29 M/SEC
Minimum = -7.44 G'S at 55 msec
Maximum = 46.32 G'S at 40.6 msec
PELVIS ACCLERATION
1 D97523FI.R11
Upper Limit
Lower Limit
80
60
40
20
0
-20
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (SECONDS)
MGA Research
09-14-1997 15:48
G's

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: September 14, 1997

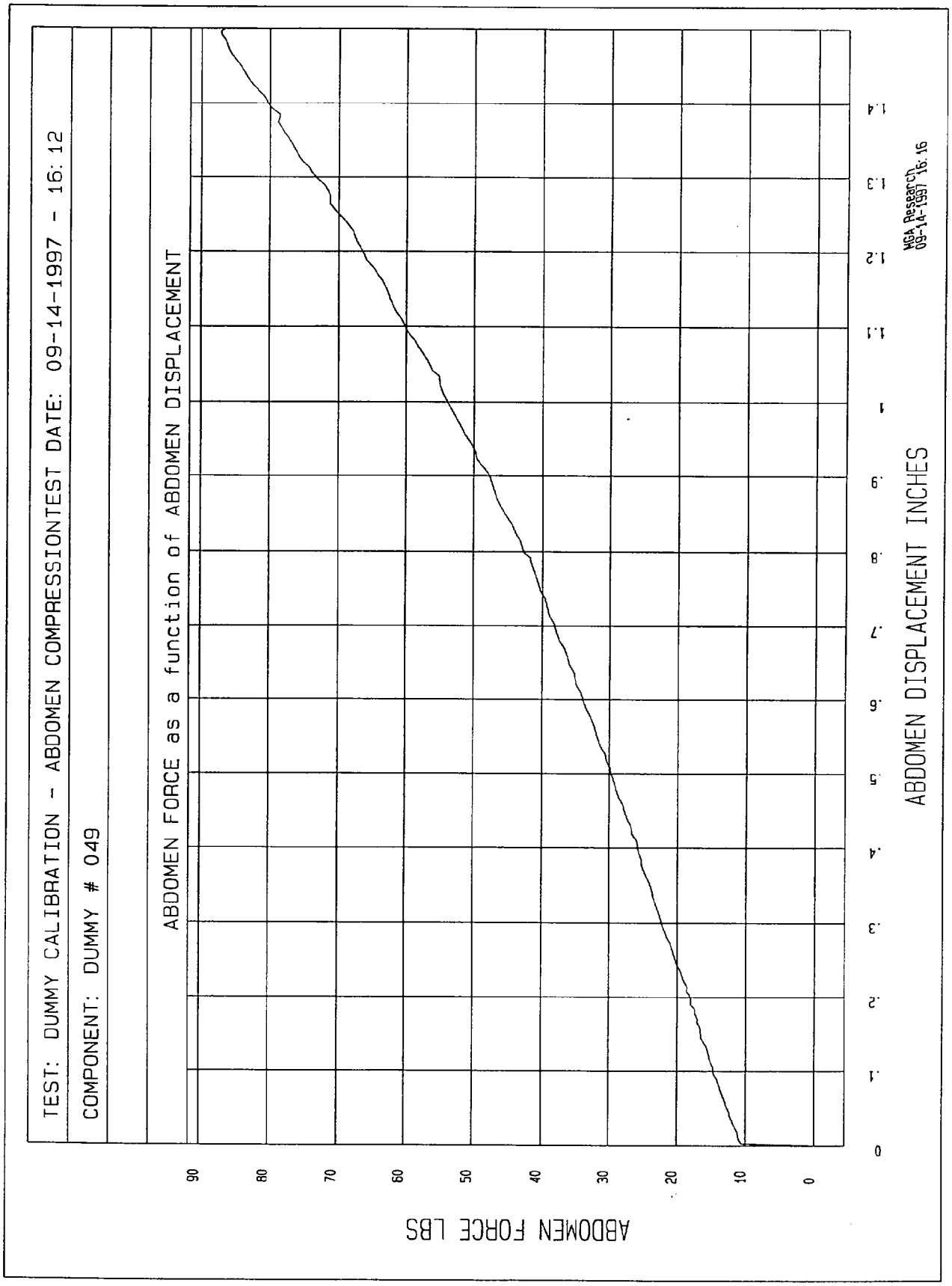
DUMMY NUMBER: 049 TEST NUMBER: D971524

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	55%
FORCE @ 0.5 in	23.3 - 36.5 lbs	29.9
FORCE @ 0.75 in	36.7 - 49.8 lbs	40.6
FORCE @ 1.0 in	50 - 63 lbs	55
FORCE @ 1.3 in	73 - 88 lbs	74

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 09-14-1997 - 16:12
COMPONENT: DUMMY # 049
ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT
ABDOMEN FORCE LBS
0
10
20
30
40
50
60
70
80
90
ABDOMEN DISPLACEMENT INCHES
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
1.1
1.2
1.3
1.4
MGA Research
09-14-1997 16:16

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: September 14, 1997

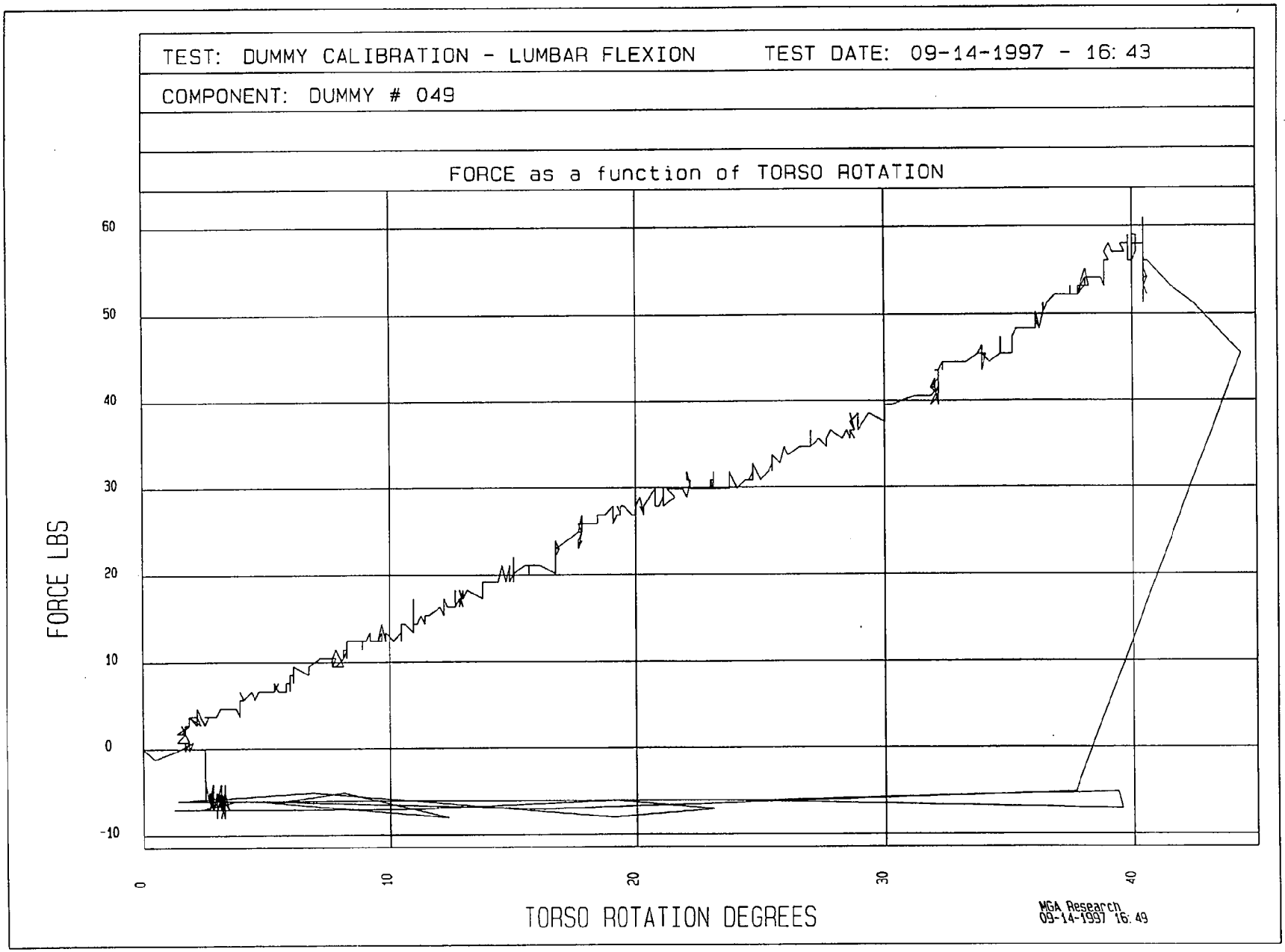
DUMMY NUMBER: 049 TEST NUMBER: D971525

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	55%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	27
FORCE @ 30°	34 - 46 lbs	38
FORCE @ 40°	46 - 58 lbs	56
RETURN ANGLE	12° maximum	2°

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - LUMBAR FLEXION
TEST DATE: 09-14-1997 - 16: 43
COMPONENT: DUMMY # 049
FORCE as a function of TORSO ROTATION
FORCE LBS
60
50
40
30
20
10
0
-10
0
10
20
30
40
TORSO ROTATION DEGREES
MGA Research
09-14-1997 16: 49

POST-TEST CERTIFICATION DATA

Rear 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 NO.: 048

DATE OF VERIFICATION: September 14, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.3
RH - Rib Height	19.75" - 20.50"	19.90
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.2
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	14.8

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 12, 1997

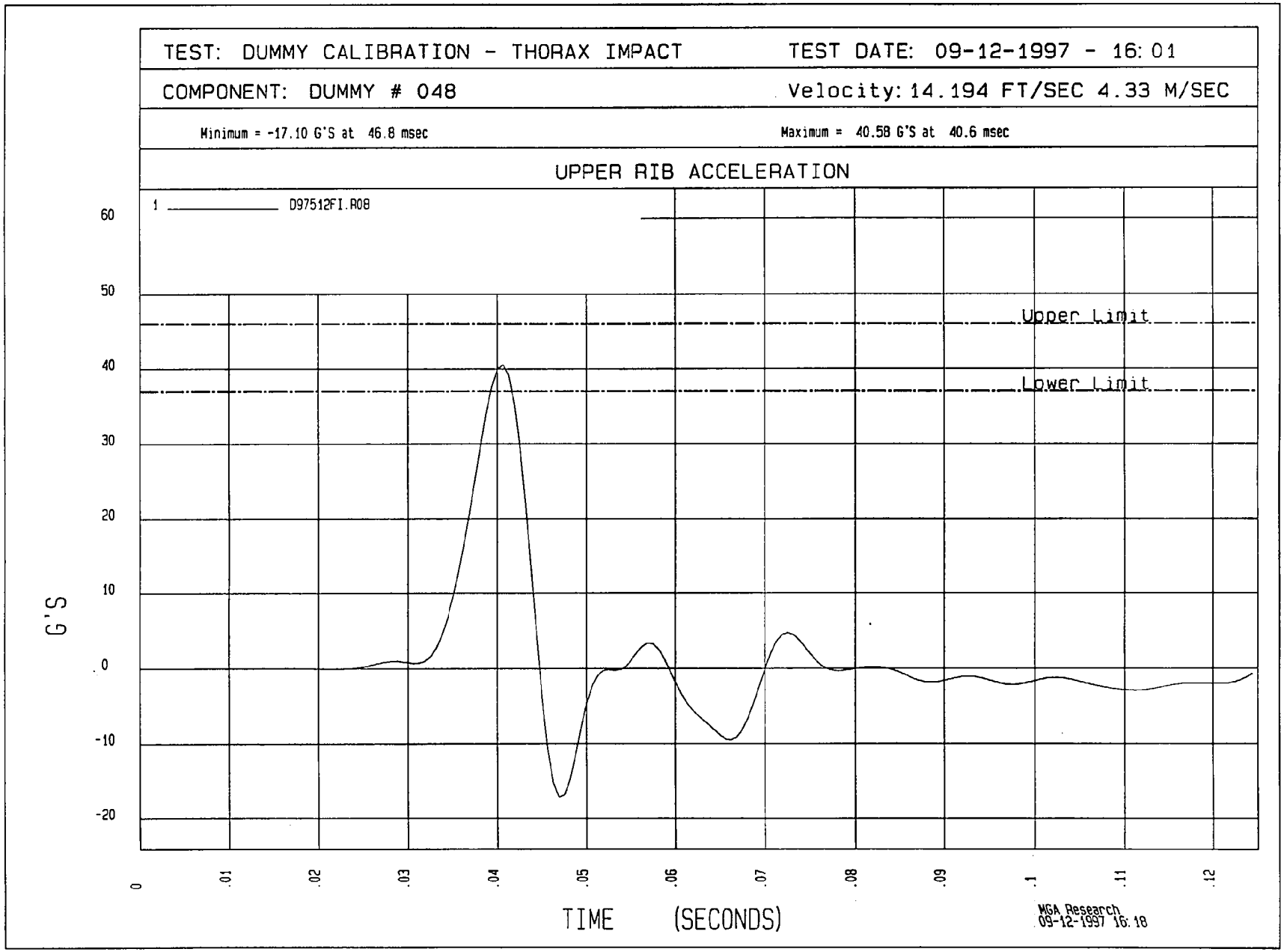
DUMMY NUMBER: 048 TEST NUMBER: D971512

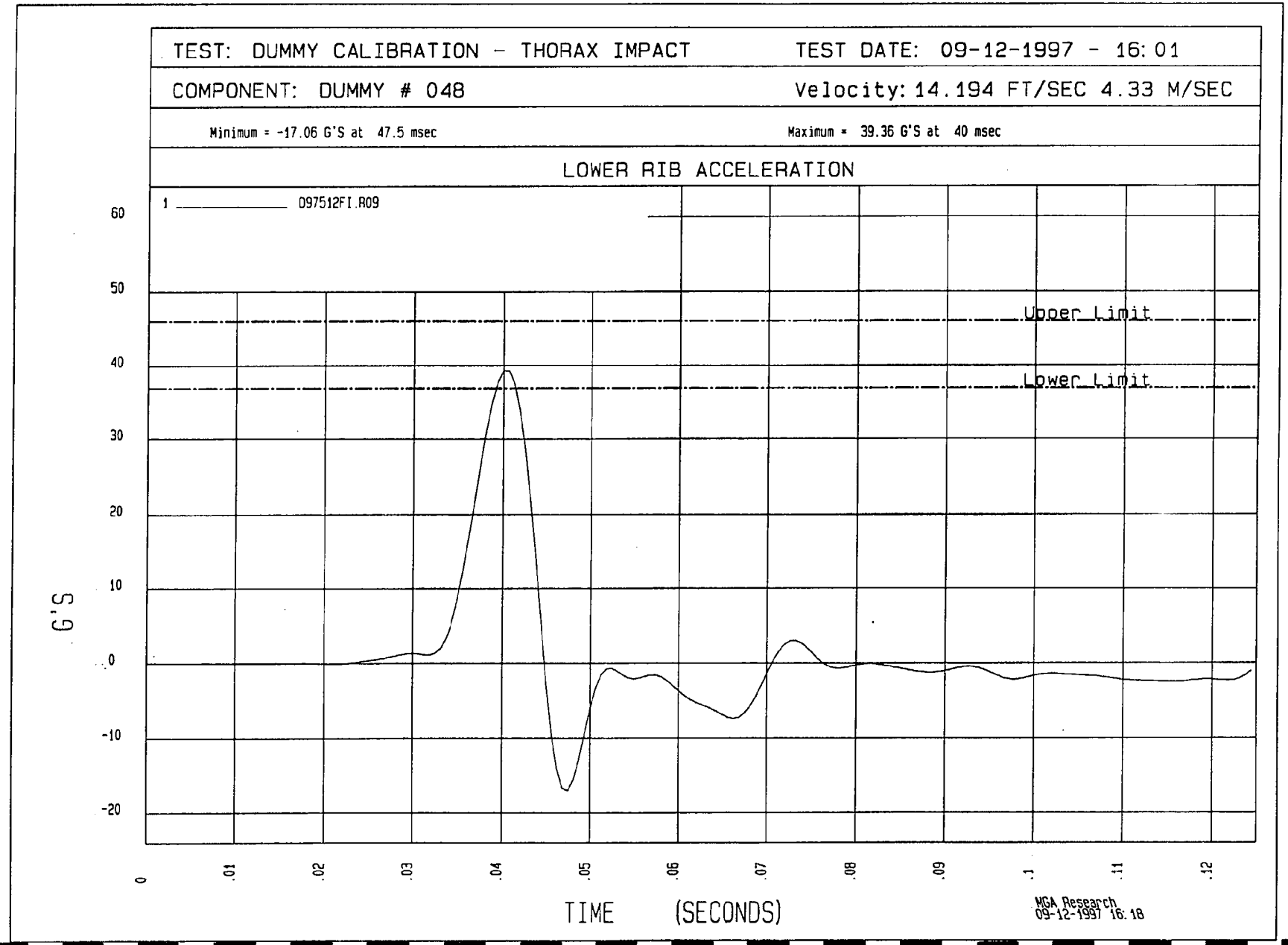
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
PROBE SPEED	14.0 - 14.2 fps	14.2
UPPER RIB	37 - 46 g's	41
LOWER RIB	37 - 46 g's	39
LOWER SPINE	15 - 22 g's	22

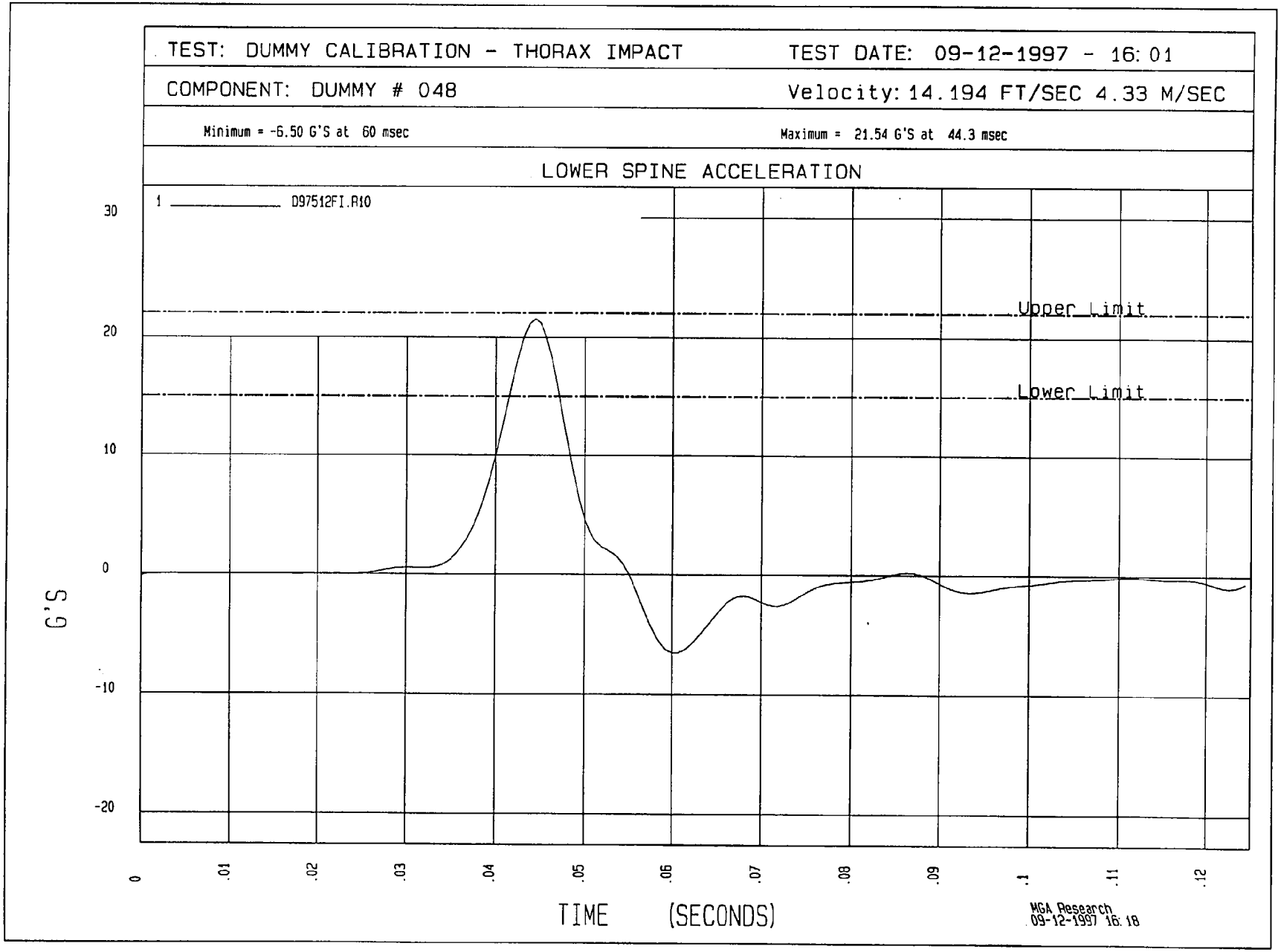
TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-12-1997 - 16:01
COMPONENT: DUMMY # 048
Velocity: 14.194 FT/SEC 4.33 M/SEC
Minimum = -17.10 G'S at 46.8 msec
Maximum = 40.58 G'S at 40.6 msec
UPPER RIB ACCELERATION
1 D97512FI.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 (SECONDS)
MGA Research
09-12-1997 16:18


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-12-1997 - 16:01
COMPONENT: DUMMY # 048
Velocity: 14.194 FT/SEC 4.33 M/SEC
Minimum = -17.06 G'S at 47.5 msec
Maximum = 39.36 G'S at 40 msec
LOWER RIB ACCELERATION
1 D97512FI.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 (SECONDS)
MGA Research
09-12-1997 16:18


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 09-12-1997 - 16:01
COMPONENT: DUMMY # 048
Velocity: 14.194 FT/SEC 4.33 M/SEC
Minimum = -6.50 G'S at 60 msec
Maximum = 21.54 G'S at 44.3 msec
LOWER SPINE ACCELERATION
1 D97512FI.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 (SECONDS)
MGA Research
09-12-1997 16:18

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: September 12, 1997

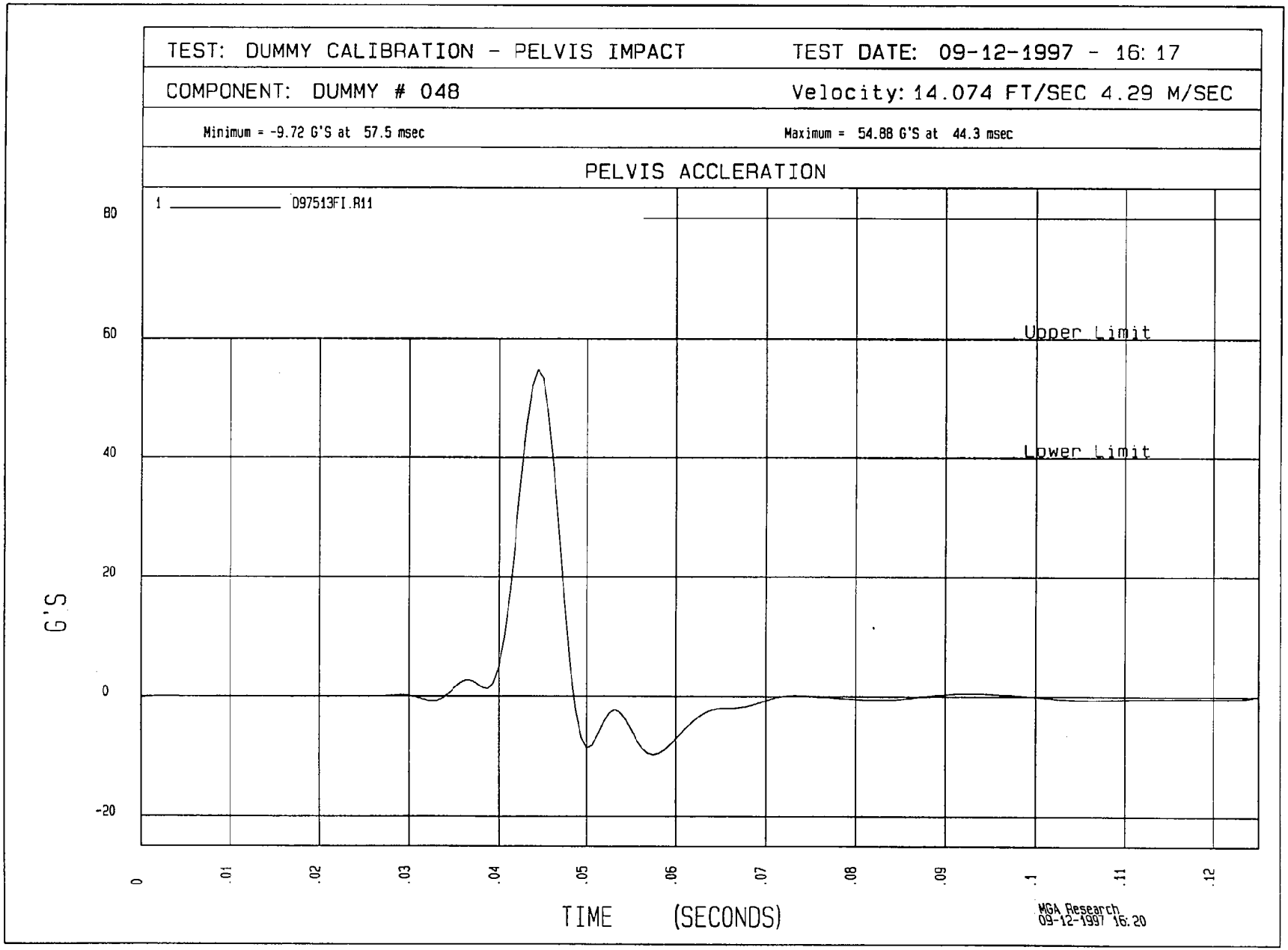
DUMMY NUMBER: 048 TEST NUMBER: D971513

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	55

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - PELVIS IMPACT
TEST DATE: 09-12-1997 - 16:17
COMPONENT: DUMMY # 048
Velocity: 14.074 FT/SEC 4.29 M/SEC
Minimum = -9.72 G'S at 57.5 msec
Maximum = 54.88 G'S at 44.3 msec
PELVIS ACCLERATION
1 D97513FI.A11
Upper Limit
Lower Limit
80
60
40
20
0
-20
G'S
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (SECONDS)
MGA Research
09-12-1997 16:20

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: September 14, 1997

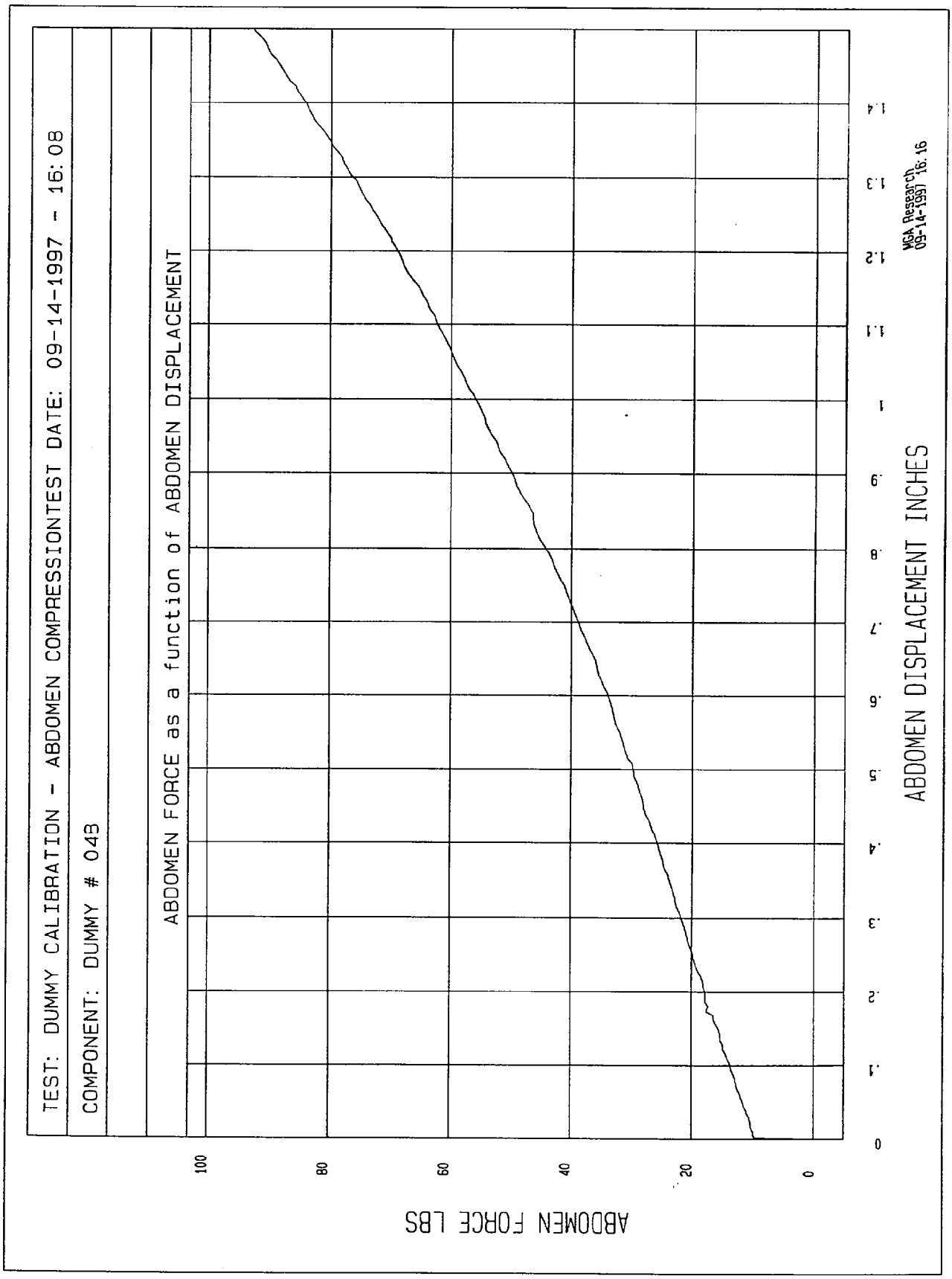
DUMMY NUMBER: 048 TEST NUMBER: D971514

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	55%
FORCE @ 0.5 in	23.3 - 36.5 lbs	29.8
FORCE @ 0.75 in	36.7 - 49.8 lbs	41.9
FORCE @ 1.0 in	50 - 63 lbs	56
FORCE @ 1.3 in	73 - 88 lbs	77

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 09-14-1997 - 16:08
COMPONENT: DUMMY # 043
ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT
ABDOMEN FORCE LBS
100
80
60
40
20
0
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
1.1
1.2
1.3
1.4
ABDOMEN DISPLACEMENT INCHES
MGA Research
09-14-1997 16:16

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: September 14, 1997

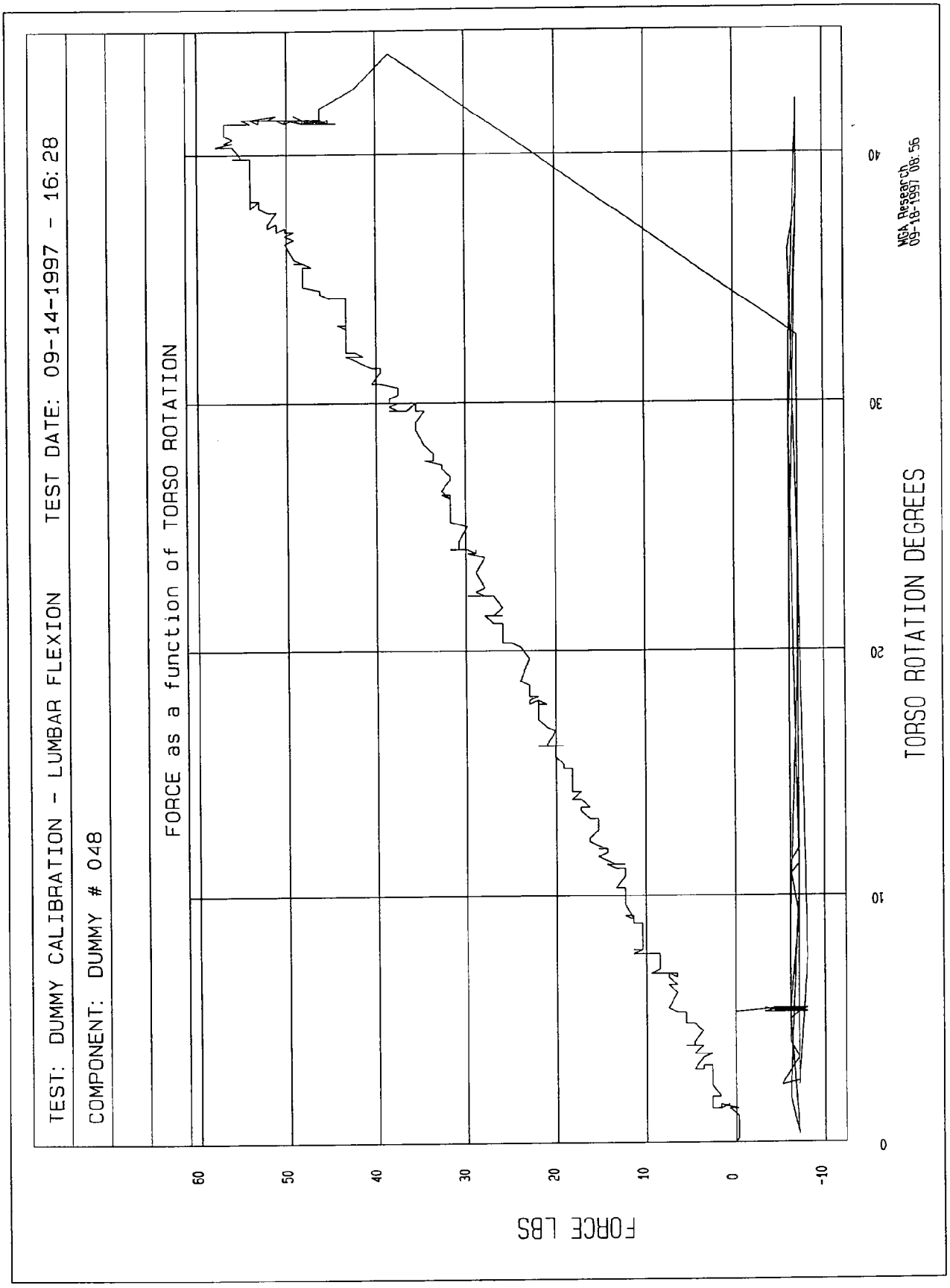
DUMMY NUMBER: 048 TEST NUMBER: D971515

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	55%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	24
FORCE @ 30°	34 - 46 lbs	39
FORCE @ 40°	46 - 58 lbs	56
RETURN ANGLE	12° maximum	5°

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 09-14-1997 - 16:28
COMPONENT: DUMMY # 048
FORCE as a function of TORSO ROTATION
FORCE LBS
60
50
40
30
20
10
0
-10
0
10
20
30
40
TORSO ROTATION DEGREES
MGA Research
09-18-1997 08:56

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 049

Inspected By: Tim Michnay

Date: September 14, 1997

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

Serial Number: 048

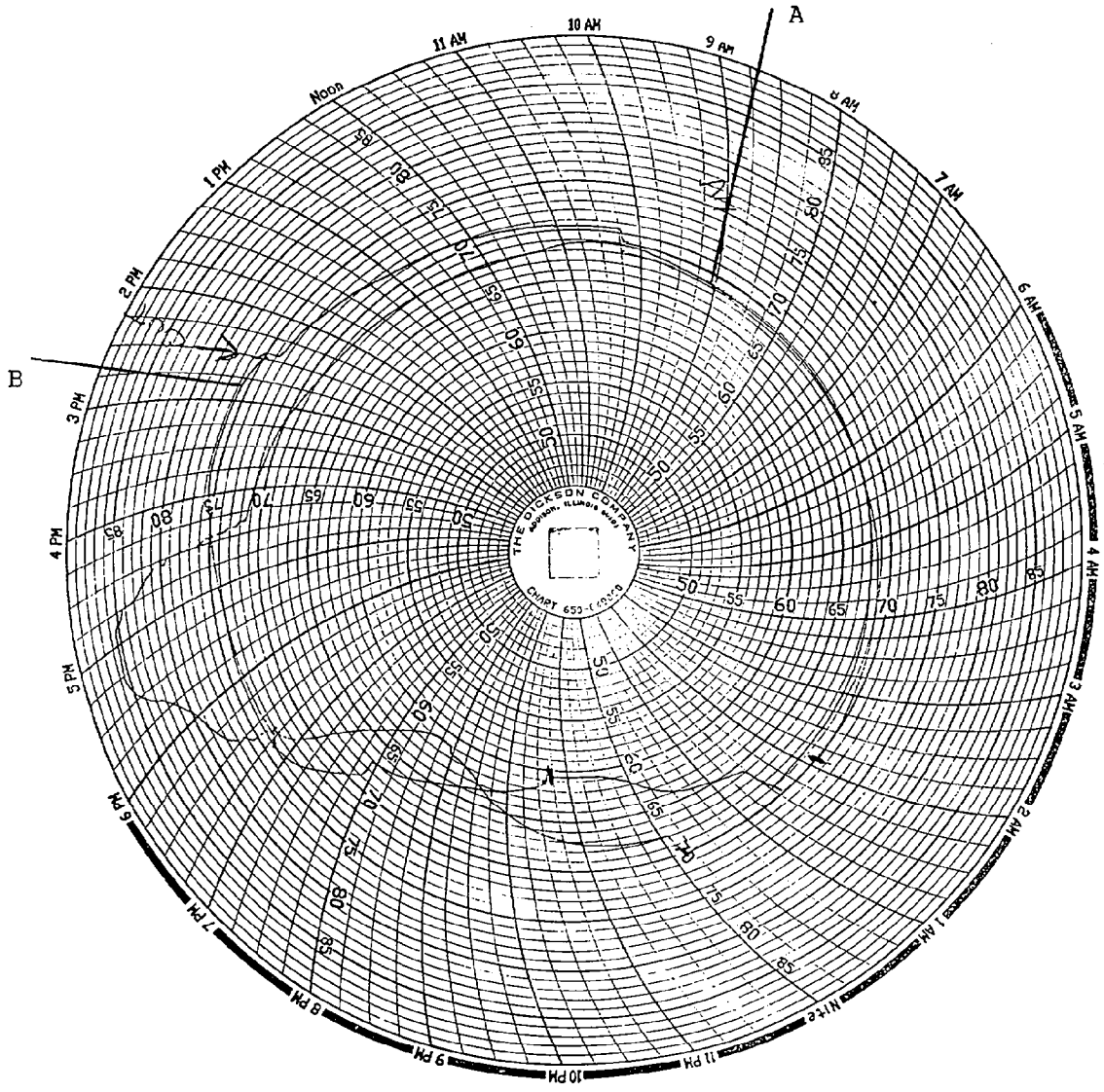
Inspected By: Tim Michnay

Date: September 14, 1997

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. 049

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AHRP6	Endevco	August 18, 1997
Lower Rib Y	J11630	Endevco	August 18, 1997
Lower Spine Y	AHT20	Endevco	August 18, 1997
Pelvis Y	AJ417	Endevco	August 18, 1997
Upper Rib Redundant Y	AJ412	Endevco	August 18, 1997
Lower Rib Redundant Y	J11166	Endevco	August 18, 1997
Lower Spine Redundant Y	AH0N9	Endevco	August 18, 1997
Pelvis Redundant Y	AGP20	Endevco	August 18, 1997

INSTRUMENTS FOR LEFT REAR PASSENGER DUMMY NO. 048

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AN8L6	Endevco	August 18, 1997
Lower Rib Y	J12465	Endevco	August 18, 1997
Lower Spine Y	J12450	Endevco	August 18, 1997
Pelvis Y	AGTP7	Endevco	August 18, 1997
Upper Rib Redundant Y	APY13	Endevco	August 18, 1997
Lower Rib Redundant Y	J11361	Endevco	August 18, 1997
Lower Spine Redundant Y	J12461	Endevco	August 18, 1997
Pelvis Redundant Y	AGT04	Endevco	August 18, 1997

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	J04-F10	Entran	August 7, 1997
Moving Barrier CG Y	F11-G04	Entran	August 7, 1997
Moving Barrier CG Z	J04-F12	Entran	August 7, 1997
Moving Barrier Rear Axle X	G13-B07	Entran	August 6, 1997
Moving Barrier Rear Axle Y	L14-D04	Entran	August 4, 1997
Left Mid A-Post Y	B14-R14	Entran	June 12, 1997
Left Lower A-Post Y	E10-F18	Entran	August 6, 1997
Left Lower B-Post Y	D05-R19	Entran	June 7, 1997
Rear Floorpan Above Axle X	E23-R07	Entran	August 7, 1997
Rear Floorpan Above Axle Y	F20-G02	Entran	August 7, 1997
Rear Floorpan Above Axle Z	F20-G06	Entran	August 7, 1997
Driver Seat Track Y	F10-D02	Entran	July 14, 1997
Right Side Sill at Front Seat X	G01-J06	Entran	August 5, 1997
Right Side Sill at Front Seat Y	C14-Z05	Entran	August 1, 1997
Right Side Sill at Front Seat Z	F20-G03	Entran	August 7, 1997
Right Side Sill at Rear Seat X	L14-D16	Entran	July 7, 1997
Right Side Sill at Rear Seat Y	C14-Z10	Entran	August 4, 1997
Right Side Sill at Rear Seat Z	C05-Z13	Entran	July 2, 1997
Right Side Sill at Front Seat Y	D05-R08	Entran	August 1, 1997

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Rear Seat Y	F07-A19	Entran	August 1, 1997
Rear Occupant Compartment Y	B14-R11	Entran	August 1, 1997
Vehicle CG X	F20-G01	Entran	August 7, 1997
Vehicle CG Y	E23-R06	Entran	August 5, 1997
Vehicle CG Z	B14-R15	Entran	July 14, 1997

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