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From: Tom Cooper, Chief, Vehicle Integrity Division

Subject: Safety Compliance Testing for FMVSS No. 214 "Side Impact Protection" for 1999 Dodge Caravan

Date: March 17, 2000

The attached document is a copy of Report Number "214-MGA-99-05," of NHTSA Test Number CX0305, dated January 8, 1999.

REPORT NO.: 214-MGA-99-05
SAFETY COMPLIANCE TESTING FOR FMVSS NO. 214
"SIDE IMPACT PROTECTION"

DaimlerChrysler Corporation
1999 Dodge Caravan 3 Door
NHTSA NO: CX0305

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: January 5, 1999

Report Date: January 8, 1999

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6115 (NSA-30)
WASHINGTON, D.C. 20590

This Final Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-97-C-11033.

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Prepared By: Dave Kosloske
Dave Kosloske, Project Engineer

Approved By: David Winkelbauer
David Winkelbauer, Deputy Facility Director

Approval Date: 1/27/99

FINAL REPORT ACCEPTED BY (OVSC):

Accepted By: _____
Contract Technical Manager

Acceptance Date: _____

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4. Title and Subtitle Final Report of FMVSS No.214 Compliance Side Impact Protection Testing of a 1999 Dodge Caravan 3 Door NHTSA No. CX0305		5. Report Date January 8, 1999 6. Performing Organization Code MGA
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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
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15. Supplementary Notes		

16. Abstract

A 48/24 kph 90° Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject 1999 Dodge Caravan 3 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 January 5, 1999.

The impact velocity of the Moving Deformable Barrier (MDB) was 52.6 kph, and the ambient temperature at the struck side of the target vehicle at the time of impact was 21.7°C. The target vehicle post test maximum crush was 369 mm between levels 1 and 2. The test vehicle's performance follows:

	DRIVER.	LEFT REAR PASS.
Left Upper Rib (LUR) Accel., g	36	32
Left Lower Rib (LLR) Accel., g	30	35
Lower Spine (T_{12}) Accel., g	49	51
Thoracic Trauma Index (TTI)	43	43
Pelvis (PEV) Accel., g	52	95

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

17. Key Words Compliance Testing Side Impact Protection FMVSS 214 Side Impact Dummy (SID)		18. Distribution Statement 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	
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY 99 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 1999/Dodge/Caravan/3 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.

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SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 1999 Dodge Caravan 3 Door was impacted on the left side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 52.6 kph (32.7 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on January 5, 1999. Pre- and post-test photographs of the test vehicle, the MDB and the side impact dummies (SIDs) are included in Appendix A.

Two Side Impact Dummies (SIDs) were placed in the left front and left rear designated seating positions according to instructions specified in the OVSC Side Impact Laboratory Test Procedure which is dated 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 (LUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T_{12}) uniaxial accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

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

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

Injury Criteria	Front SID	Rear SID
TTI (g)	43	43
Pelvis (g)	52	95

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

2. Post-test FMVSS 301 Static Rollover was not conducted due to fuel leakage immediately after impact.

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: 1999/Dodge/Caravan/3 Door

Vehicle NHTSA No.: CX0305 VIN: 2B4FP25B9XR221461

Vehicle Body Color: Cranberry Build Date: 11-98

Engine Data: 4 Cylinders; __ CID; 2.4 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 79 miles

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

__Cruise Control; __Tilt Wheel; __Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 35 Psi FRONT

35 Psi REAR

Recommended Tire Size: P205/75R14

Tires on Test Vehicle: P205/75R14 Manufacturer: Goodyear

Vehicle Capacity Data:

Number of Occupants: 2 Front; 2 Rear; 3 3rd Seat 7 Total

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

Type of Front Seat Back: __ Fixed; X Adjustable with X Lever _Knob __Powe

Vehicle Maximum Capacity Loading	=	521.6 kg	(A)
No. of Occupants x 68.04 kg.	=	476.3 kg	(B)
Cargo Capacity (A-B)	=	45.3 kg	

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	= 478.5 kg	Right Rear	= 344.8 kg
Left Front	= 496.7 kg	Left Rear	= 348.8 kg
TOTAL FRONT	= 975.2 kg	TOTAL REAR	= 693.6 kg
% of Total Weight	= 58.4 %;	% of Total Weight	= 41.6 %

TOTAL WEIGHT = 1668.8 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1999 Dodge Caravan 3 Door

Vehicle NHTSA No.: CX0305 Test Date: January 5, 1999

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	= 1668.8	kg
Cargo Carrying Capacity of Test Vehicle	= 45.3	kg
Weight of 2 Side Impact Dummies (2 x 80.7 kg.)	= 161.4	kg
TEST VEHICLE TARGET WEIGHT	= 1875.5	kg

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

Right Front	= 481.7 kg	Right Rear	= 402.3 kg
Left Front	= 565.6 kg	Left Rear	= 425.9 kg
TOTAL FRONT	= 1047.3 kg	TOTAL REAR	= 828.2 kg
% of Total Weight	= 55.8 %	% of Total Weight	= 44.2 %
TOTAL WEIGHT	= 1875.5 kg		

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 756 mm Left Front 758 mm Right Rear 764 mm Left Rear 752 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 751 mm Left Front 742 mm Right Rear 742 mm Left Rear 718 mm

TEST ATTITUDE:

Right Front 746 mm Left Front 743 mm Right Rear 743 mm Left Rear 722 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2887 mm

C.G. As Tested = 1245 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4316 mm

Centerline = 4687 mm

Left Side = 4316 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1999/Dodge/Caravan/3 Door

Vehicle NHTSA No.: CX0305 Test Date: January 5, 1999

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 223 mm

Test Position: 12th detent rearward of 23 total

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 4° rearward of full up

REAR POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: non-adjustable

Seat Back Adjustment Position: non-adjustable

ADJUSTABLE STEERING COLUMN POSITION: non-adjustable

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 = 75.7 liters

Test Volume: 69.8 liters 92% of capacity

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

Wheelbase: = 2887 mm

Impact Point is 504 mm rearward of front axle centerline

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1999/Dodge/Caravan/3 Door

Vehicle NHTSA No.: CX0305 Test Date: January 5, 1999

Overall Length = 4687 mm; Overall Width = 1928 mm

TEST WEIGHT:

Right Front = 499.4 kg Right Rear = 395.1 kg

Left Front = 563.8 kg Left Rear = 411.4 kg

TOTAL FRONT = 1063.2 kg TOTAL REAR = 806.5 kg

% of Total Weight = 56.9 % % of Total Weight = 43.1 %

TOTAL VEHICLE WEIGHT = 1869.7 kg

Wheelbase = 2887 mm

Longitudinal C.G. from Center of Front Axle = 1245 mm

Impact Angle with Respect to Impactor = 90° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (254 mm above ground) = 207 mm
2. LEVEL 2 (690 mm above ground) = 345 mm
3. LEVEL 3 (755 mm above ground) = 359 mm
4. LEVEL 4 (985 mm above ground) = 262 mm
5. LEVEL 5 (1575 mm above ground) = 23 mm

Maximum Post-Test Intrusion = 369 mm

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

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)

INSTRUMENTATION:

Number of Vehicle Data Channels:		=	21
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: 1999/Dodge/Caravan/3 Door

Vehicle NHTSA No.: CX0305 Test Date: January 5, 1999

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	= 1098 mm
C.G. Location From Center Line	= -15 mm
C.G. Location Above Ground Level	= 485 mm

MDB WEIGHT:

Left Front	= 457.7 kg	Left Rear	= 235.1 kg
Right Front	= 328.1 kg	Right Rear	= 342.6 kg
TOTAL FRONT	= 785.8 kg	TOTAL REAR	= 577.7 kg

TOTAL MDB WEIGHT = 1363.5 kg

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

Impact Speed = Primary: 32.7 mph (52.6 kph) Secondary: 32.8 mph (52.7 kph)

CRASH TEST SUMMARY FOR SIDE IMPACTOR (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Top of Stack (813 mm) = 116 mm
2. Row B Mid Stack (686 mm) = 53 mm
3. Row C Top of Bumper (533 mm) = 22 mm
4. Row D Center of Bumper (432 mm) = 48 mm

INSTRUMENTATION:

Number of MDB Data Channels = 7

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1999/Dodge/Caravan/3 Door

Vehicle NHTSA No.: CX0305 Test Date: January 5, 1999

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	LEFT REAR SID
Head	to none	to headrest
Arm	to top of door panel and armrest	to door panel
Pelvis	to door panel	to door panel
Left Knee	to door panel	to door panel
Right Knee	to left knee	to left knee

DOOR OPENING:

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

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 15 mm rearward Vertical: 13 mm low

ARM REST LOCATIONS:

Front: 125 mm from bottom of window

Rear: 135 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 38 mm Front Seat Cushion: 23 mm

Left Rear Seat Back: 30 mm Rear Seat Cushion: 15 mm

GLAZING DAMAGE:

Windshield cracked

PILLAR PERFORMANCE:

None noted

SILL SEPARATION:

None noted

FRONTAL AIRBAGS:

Driver Deployed: No Passenger Deployed: No

OTHER NOTABLE IMPACT EFFECTS:

The filler neck separated from the fuel tank during impact allowing approximately 11 gallons of Stoddard solvent to leak.

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA

Year/Make/Model/Body Style: 1999 Dodge Caravan 3 Door

Vehicle NHTSA No.: CX0305 Test Date: January 5, 1999

	Front SID ID #036				Rear SID ID #037			
	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	36.0	58	-10.2	97	32.4	49	-6.0	39
Left Lower Rib (LLR) Y	30.3	58	-5.4	98	34.8	45	-10.8	112
SPINE ACCELERATIONS								
Lower Lateral Y	49.0	46	-6.2	68	51.1	58	-6.6	79
PELVIS ACCELERATIONS								
Lateral Y	51.9	46	-11.9	63	94.6	53	-8.2	68

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

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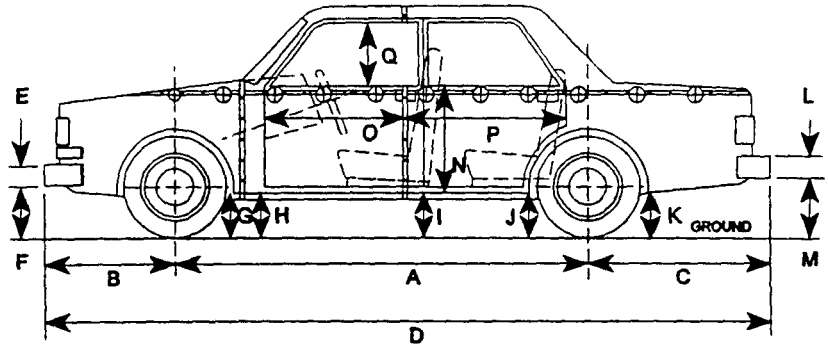
DATA SHEET NO. 6
VEHICLE PRE AND POST-TEST MEASUREMENTS



LEFT SIDE VIEW

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

ALL MEASUREMENTS IN (mm)

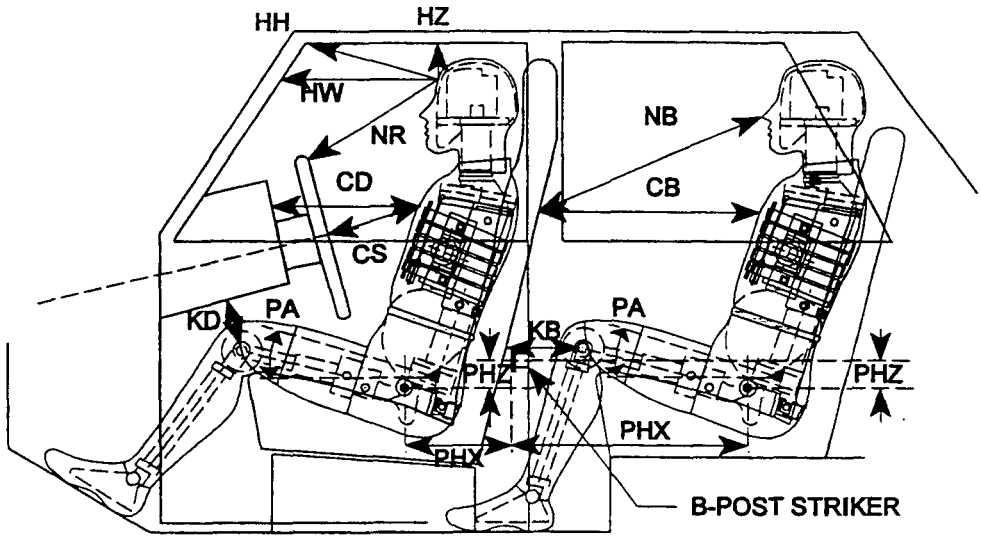
	PRE-TEST	POST-TEST	Δ CHANGE
A	2887	2880	-7
B	924	924	0
C	876	876	0
D	4687	4680	-7
E	130	130	0
F	441	480	39
G	200	198	-2
H	197	203	6
I	197	225	28
J1/J2	206/204	242/251	36/47
K	258	263	5
L	165	165	0
M	307	301	-6
N	770	690	-80
O	895	862	-33
P	172	172	0
Q	607	610	3
R	4316	4350	34
S	4316	4273	-43
T	1928	1559	-369

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1999 Dodge Caravan 3 Door

NHTSA NO.: CX0305 Test Date: January 5, 1999



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

	DRIVER ID #036
HH	377
HW	649
HZ	191
NR	442
CD	564
CS	314
KDL (KDA°)	183 (0.0°)
KDR (KDA°)	224 (0.0°)
PA°	24.3°
PHX	245
PHZ	5

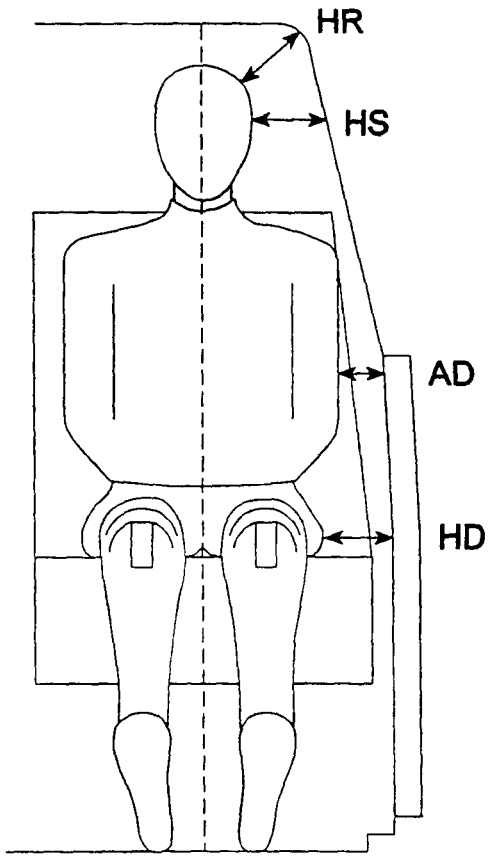
	REAR PASSENGER SID ID #037
HZ	190
NB	624
CB	565
KBL (KBA)	198 (0.0°)
KBR (KBA)	205 (0.0°)
PA°	23.3°
PHX	592
PHZ	48

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: 1999 Dodge Caravan 3 Door

NHTSA NO.: CX0305 Test Date: January 5, 1999



NOTE: All dimensions are in mm

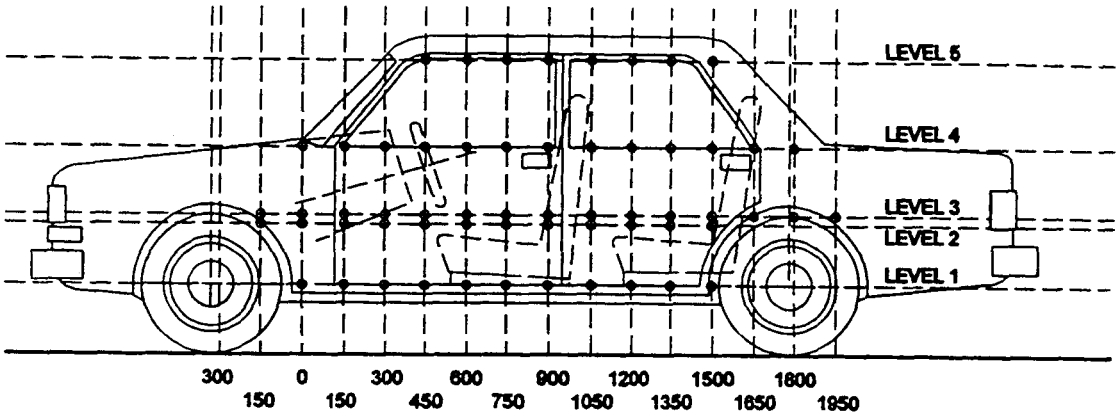
	DRIVER ID #036	REAR PASSENGER ID #037
HR	221	233
HS	348	379
AD	147	180
HD	157	138

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1999 Dodge Caravan 3 Door

NHTSA NO.: CX0305 Test Date: January 5, 1999



LEFT SIDE VIEW

NOTE: All measurements are in millimeters (mm)

LEVEL 5 - WINDOW TOP
LEVEL 4 - WINDOW SILL
LEVEL 3 - OCCUPANT H-POINT
LEVEL 2 - MID DOOR
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)	= 254	mm
Level 2 @ Mid Door	= 690	mm
Level 3 @ Occupant H-Point	= 755	mm
Level 4 @ Window Sill	= 985	mm
Level 5 @ Window Top	= 1575	mm

DATA SHEET NO. 10

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)	727	770	43
150	719	794	75
300	714	812	98
450	709	842	133
600	709	865	156
750	704	892	188
900	705	907	202
1050	703	910	207
1200	703	906	203
1350	700	900	200
1500	700	895	195
1650	700	892	192
1800	700	889	189
1950	702	917	215
2100			
2250			
2400			

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

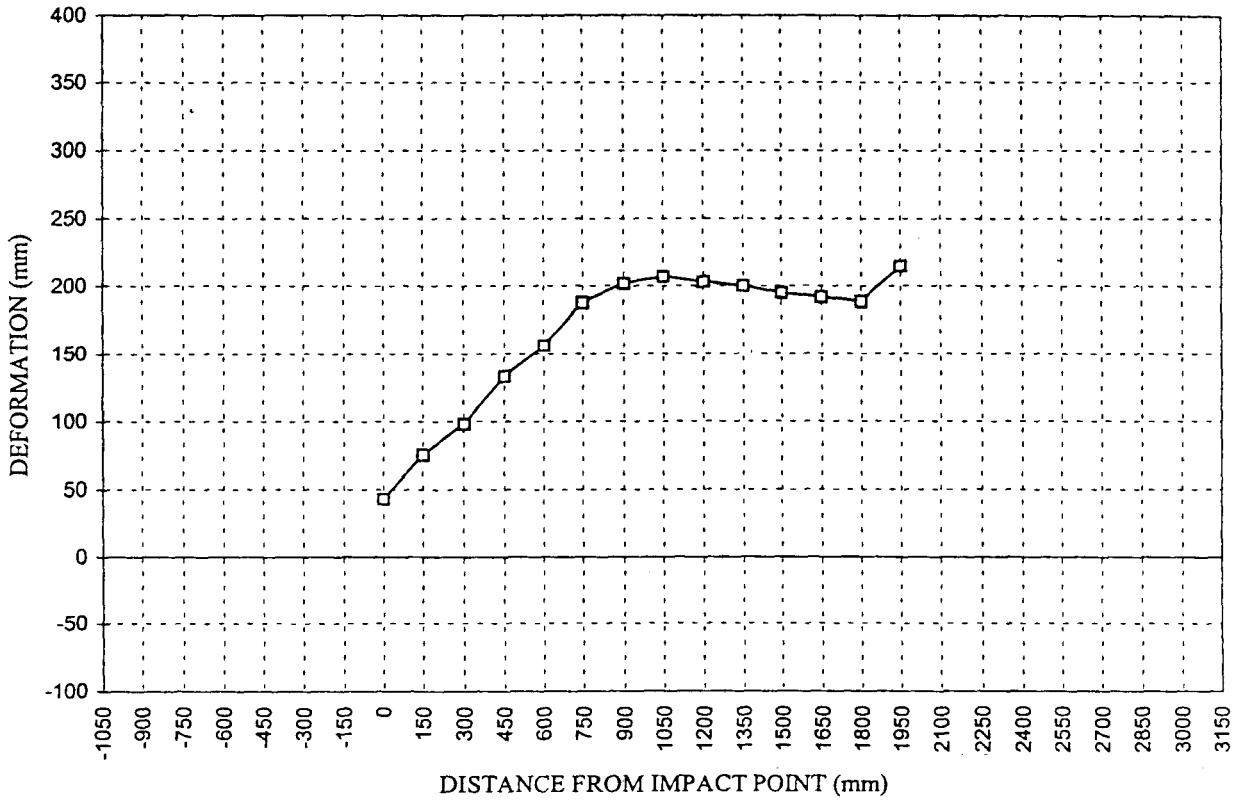
DATA SHEET NO. 10 (Cont'd)

VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 - Axle Centerline		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
2550			
2700			
2850			
3000			
3150			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



LEVEL 1 - AXLE CENTERLINE

DATA SHEET NO. 10 (Cont'd)

VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 - Mid Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150	608	642	34
0 (impact point)	604	710	106
150	603	810	207
300	600	841	241
450	599	865	266
600	598	875	277
750	596	891	295
900	595	911	316
1050	594	923	329
1200	593	934	341
1350	592	937	345
1500	591	921	330
1650	589	918	329
1800	585	911	326
1950	583	857	274
2100	582	800	218
2250			
2400			

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

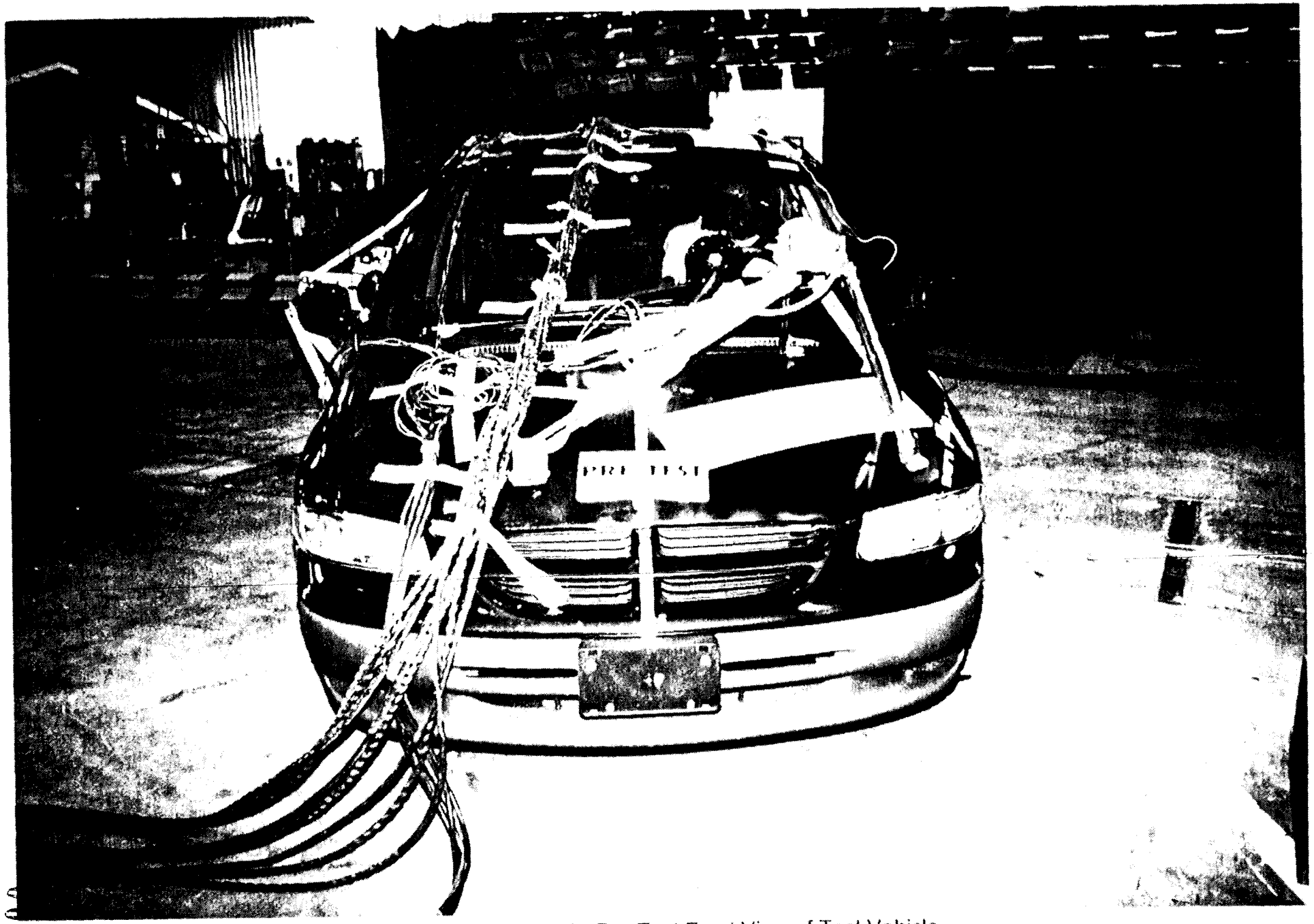


Photo No. A-1 - Pre-Test Front View of Test Vehicle

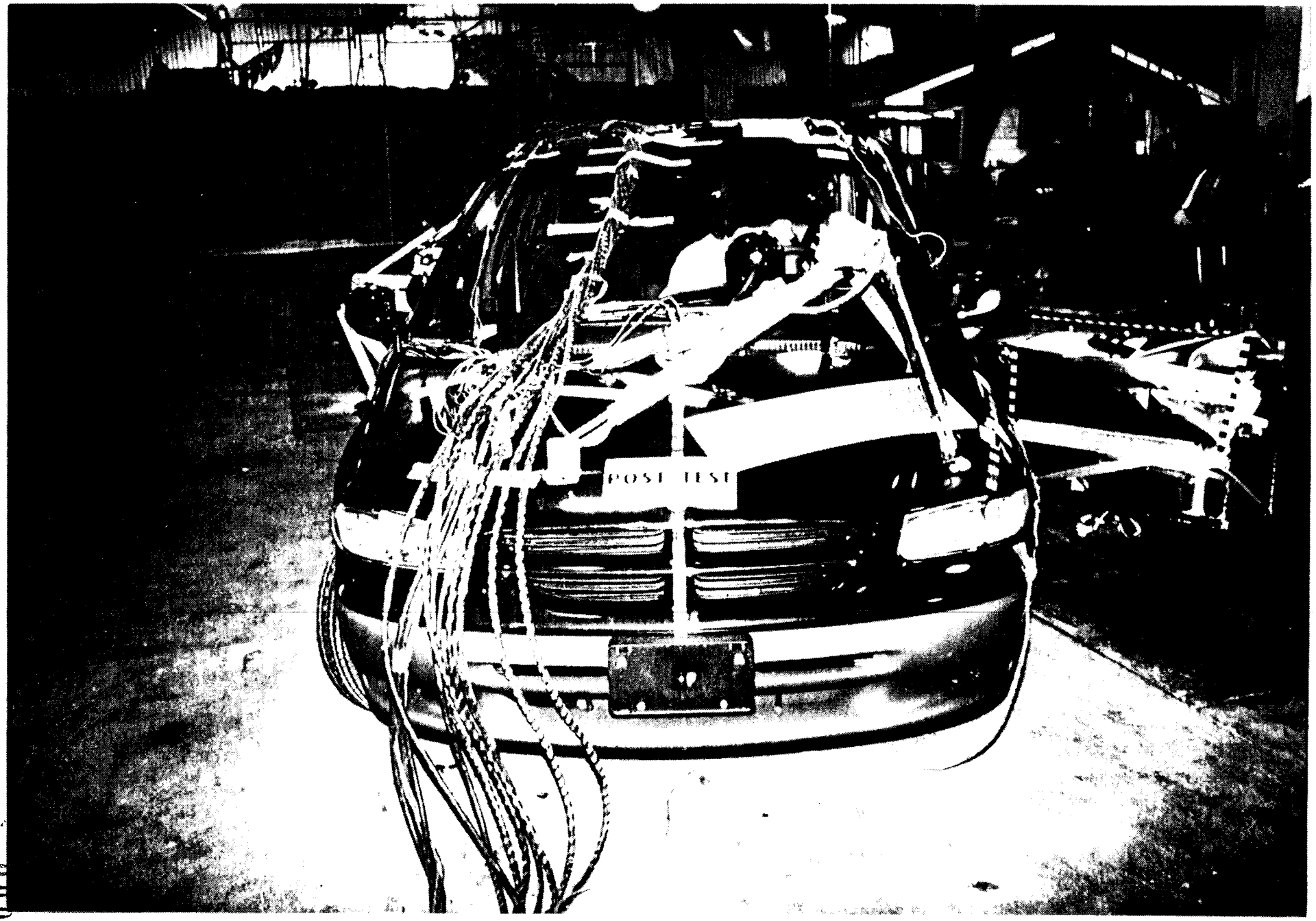


Photo No. A-2 - Post-Test Front View of Test Vehicle

000430

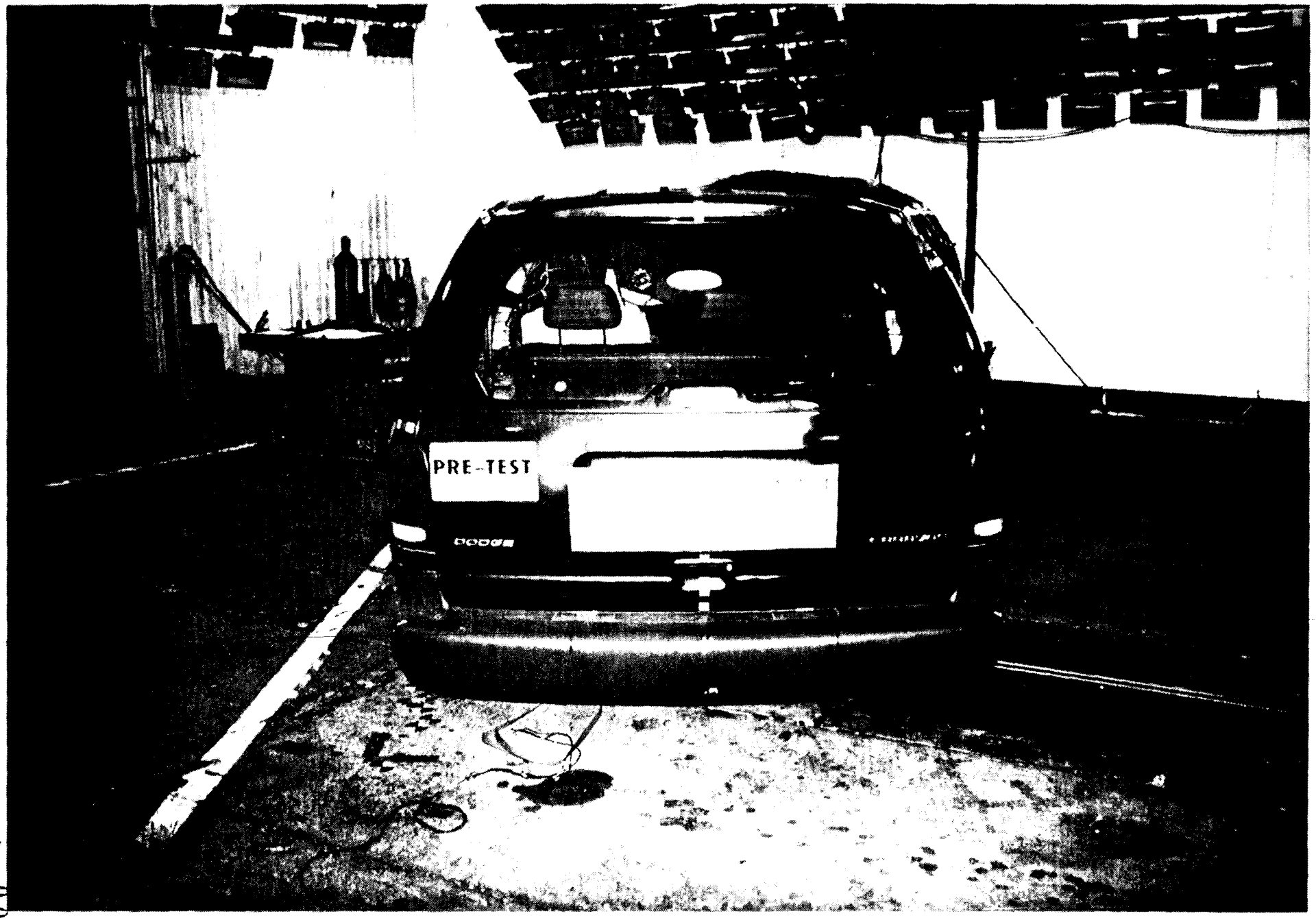


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

0000481

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

00004382

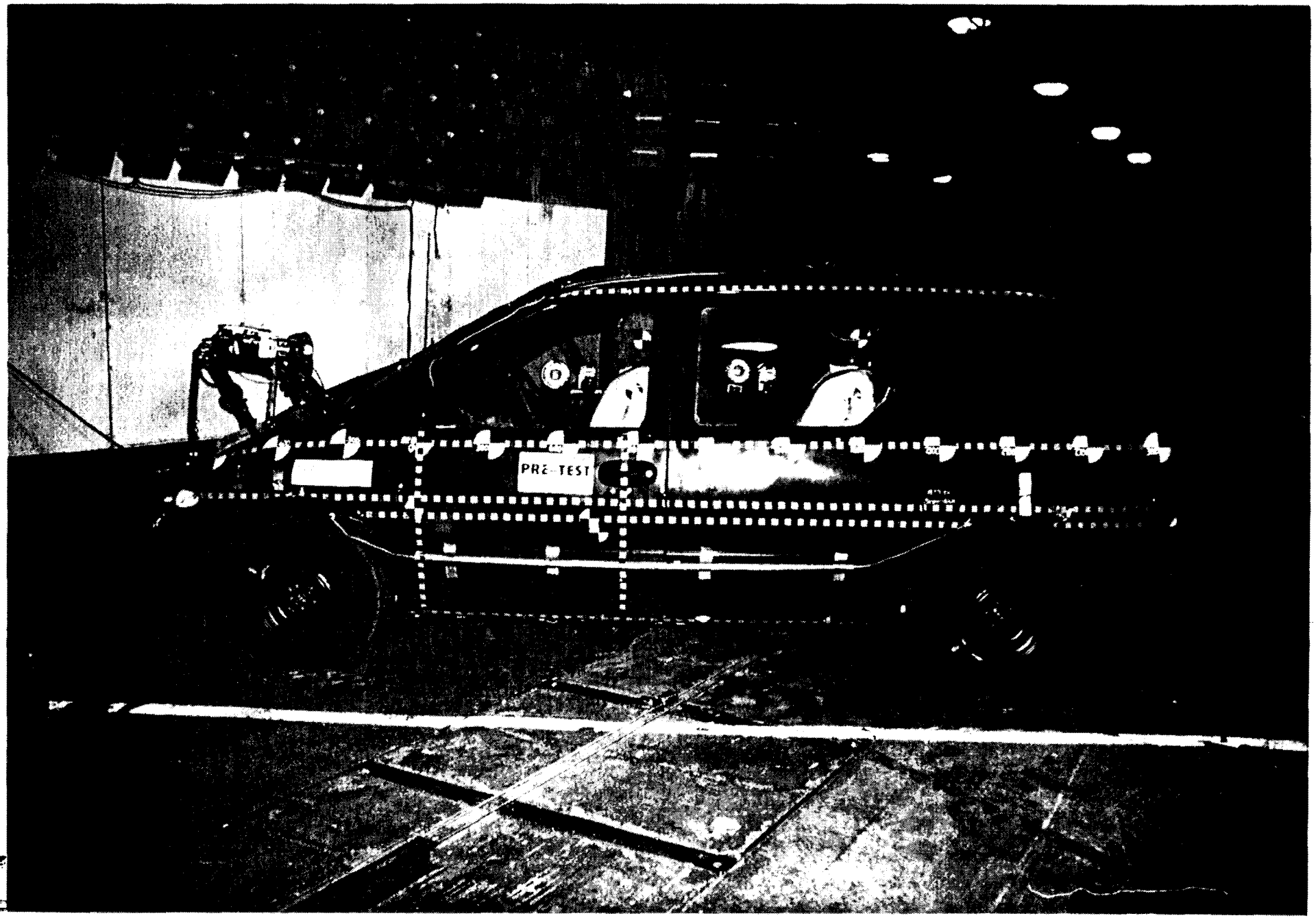


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

0000483

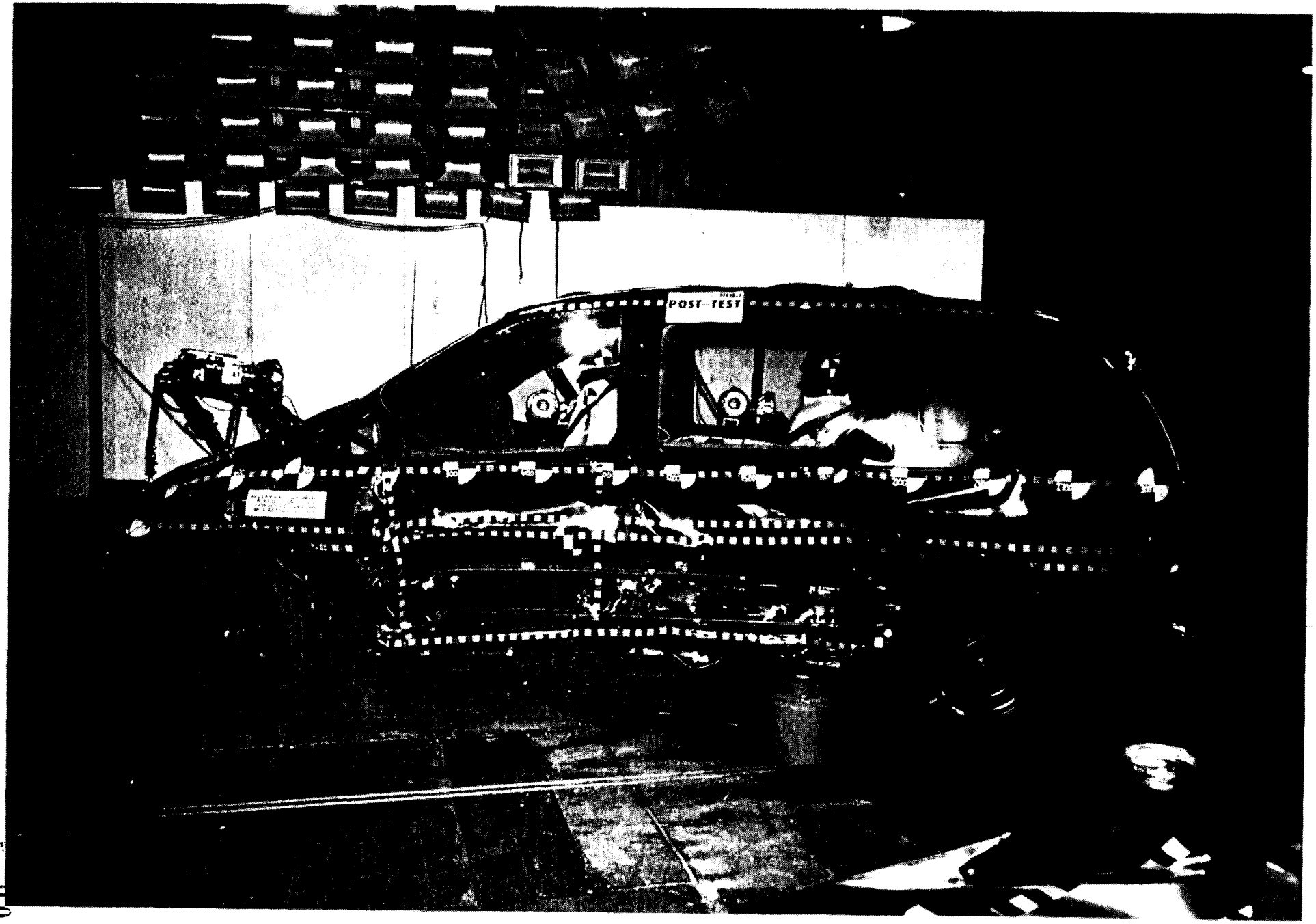


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

000434

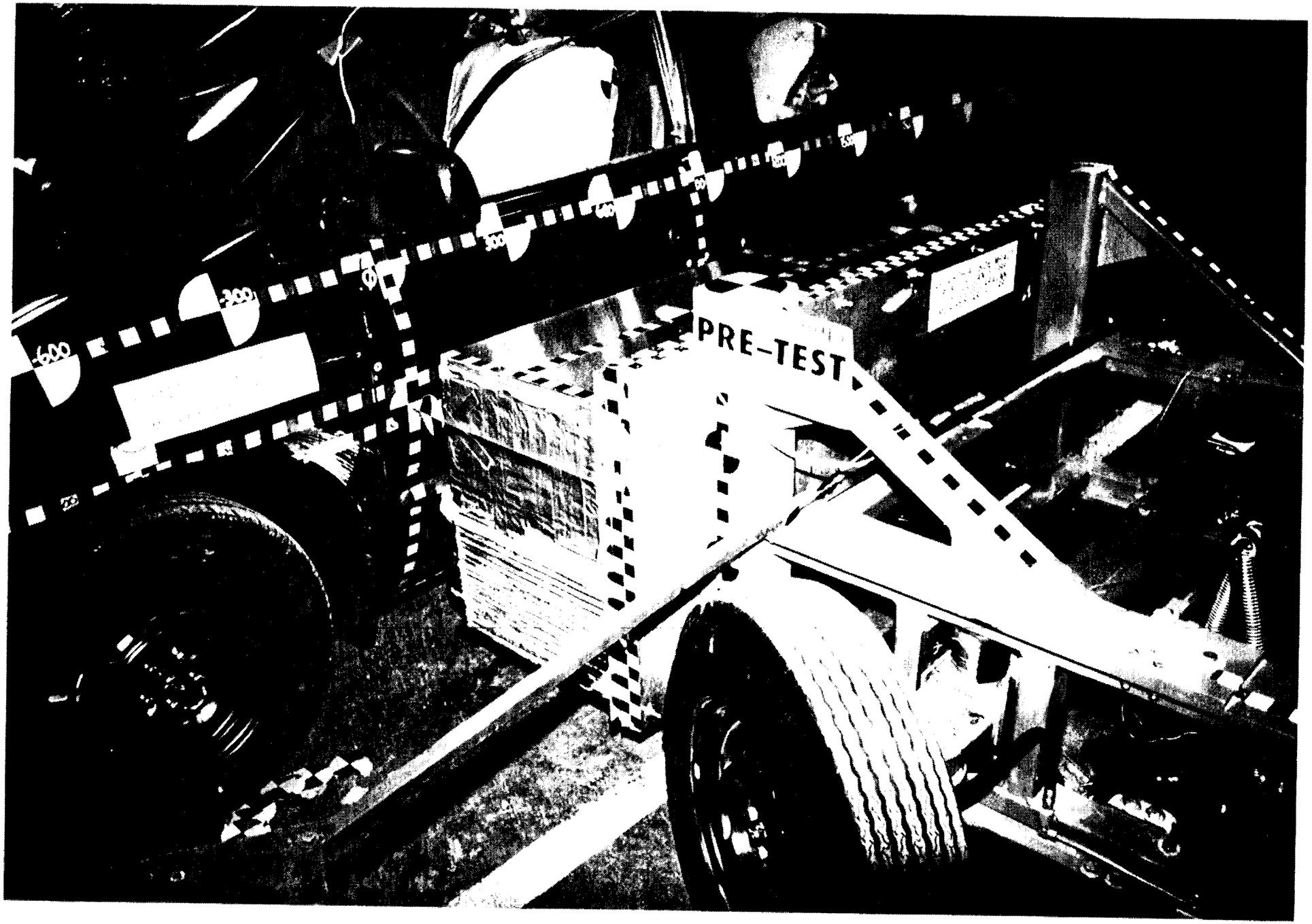


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

0004435

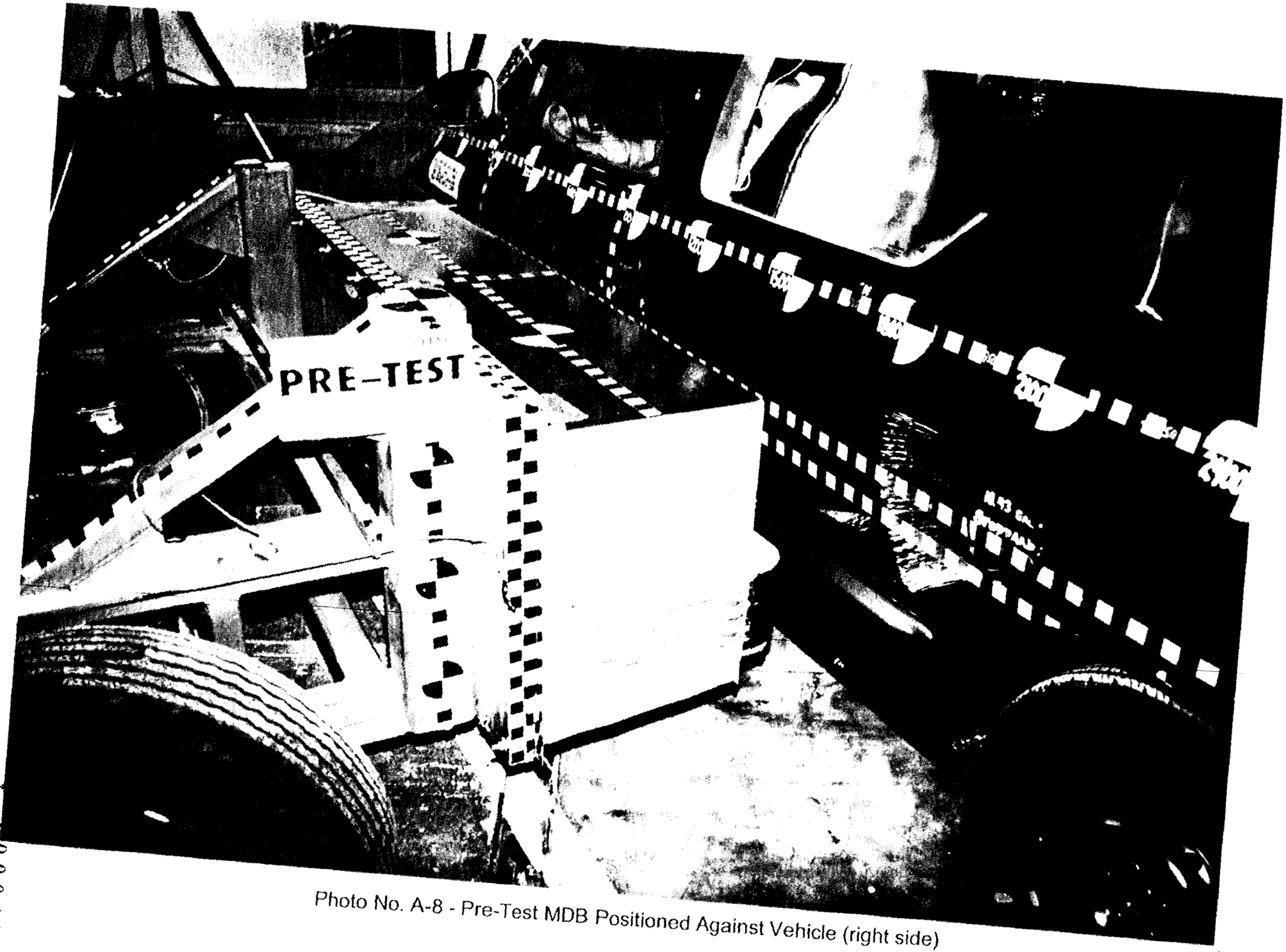


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

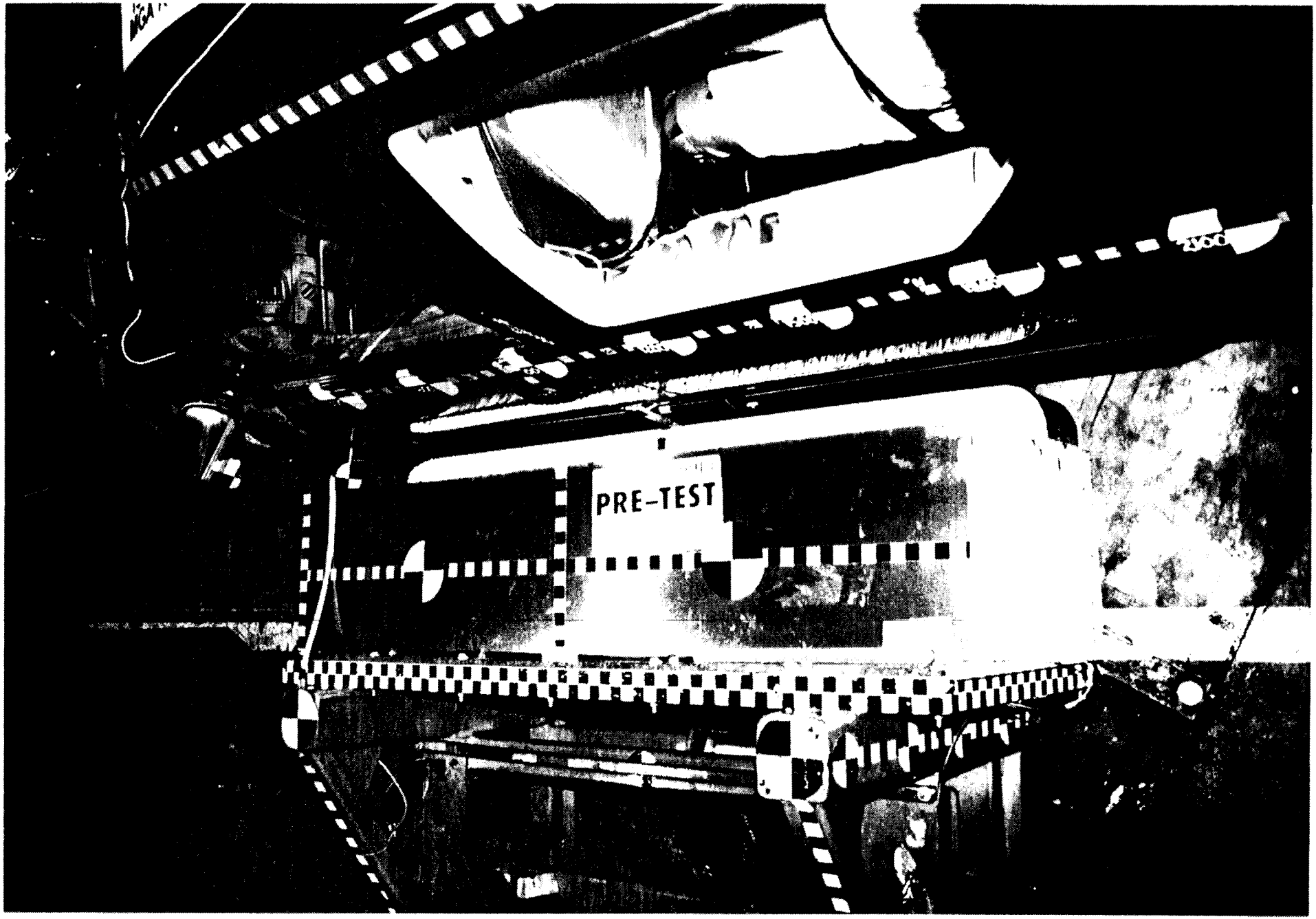


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

0004437

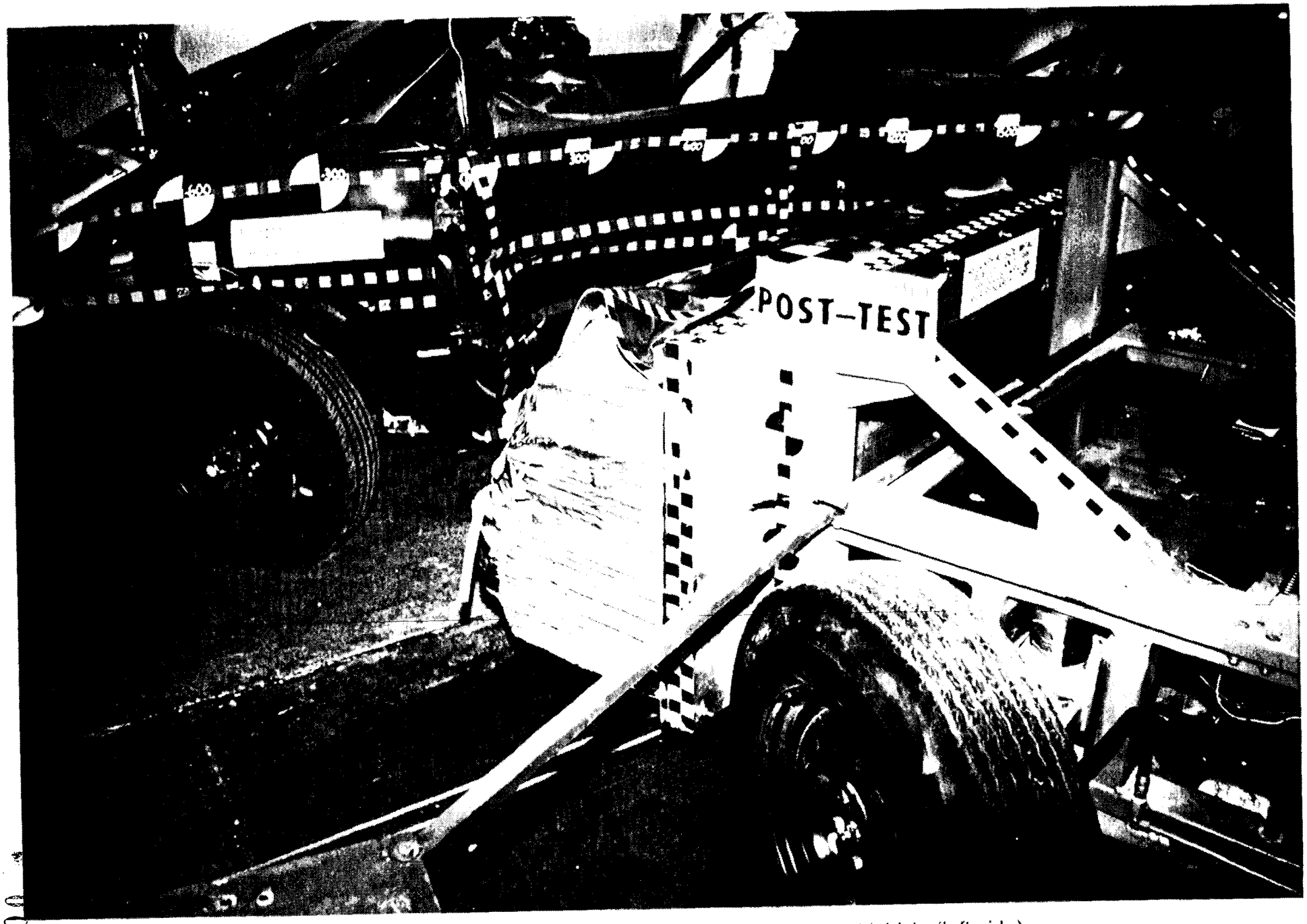


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)

0004488

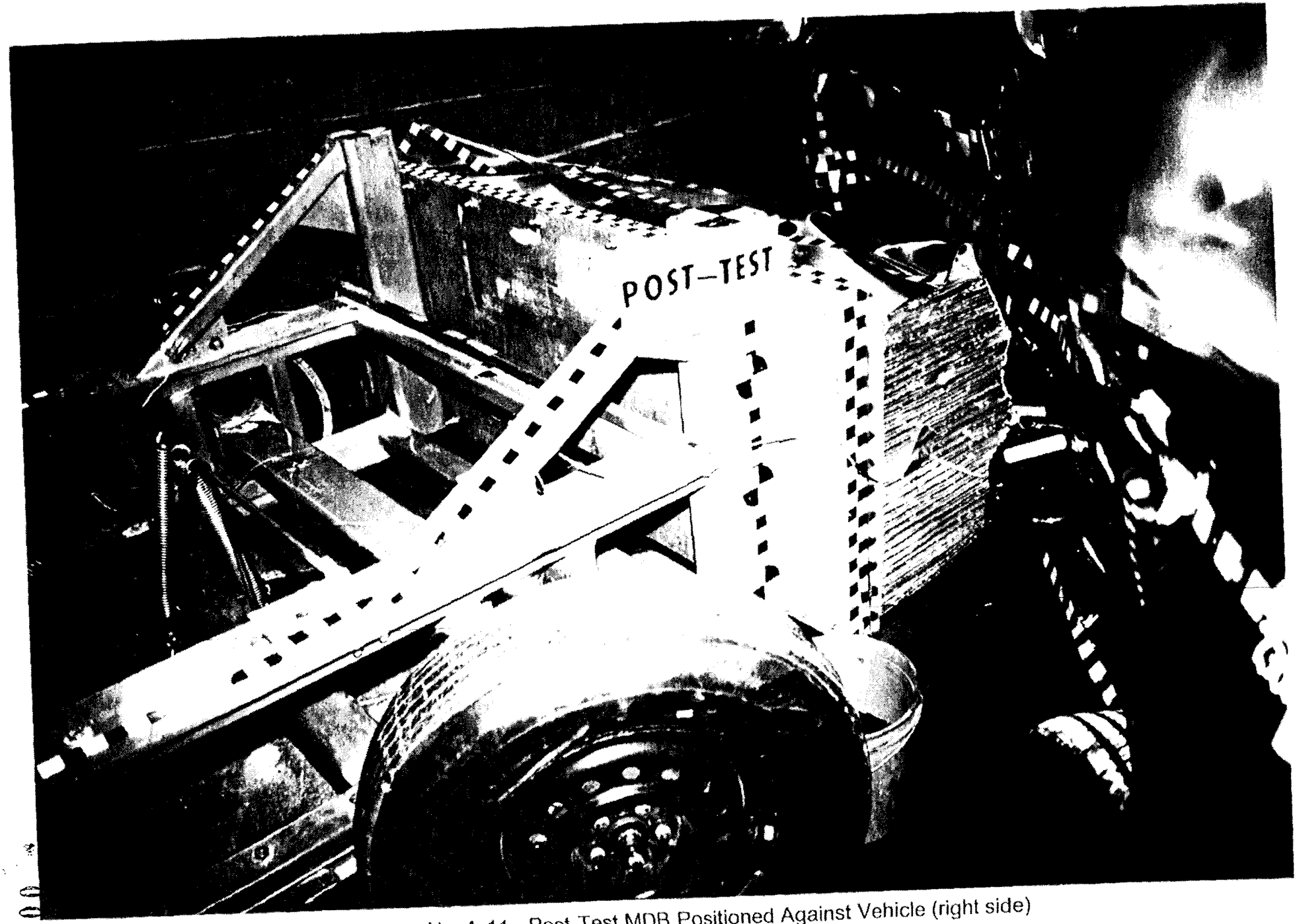


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (right side)

000043

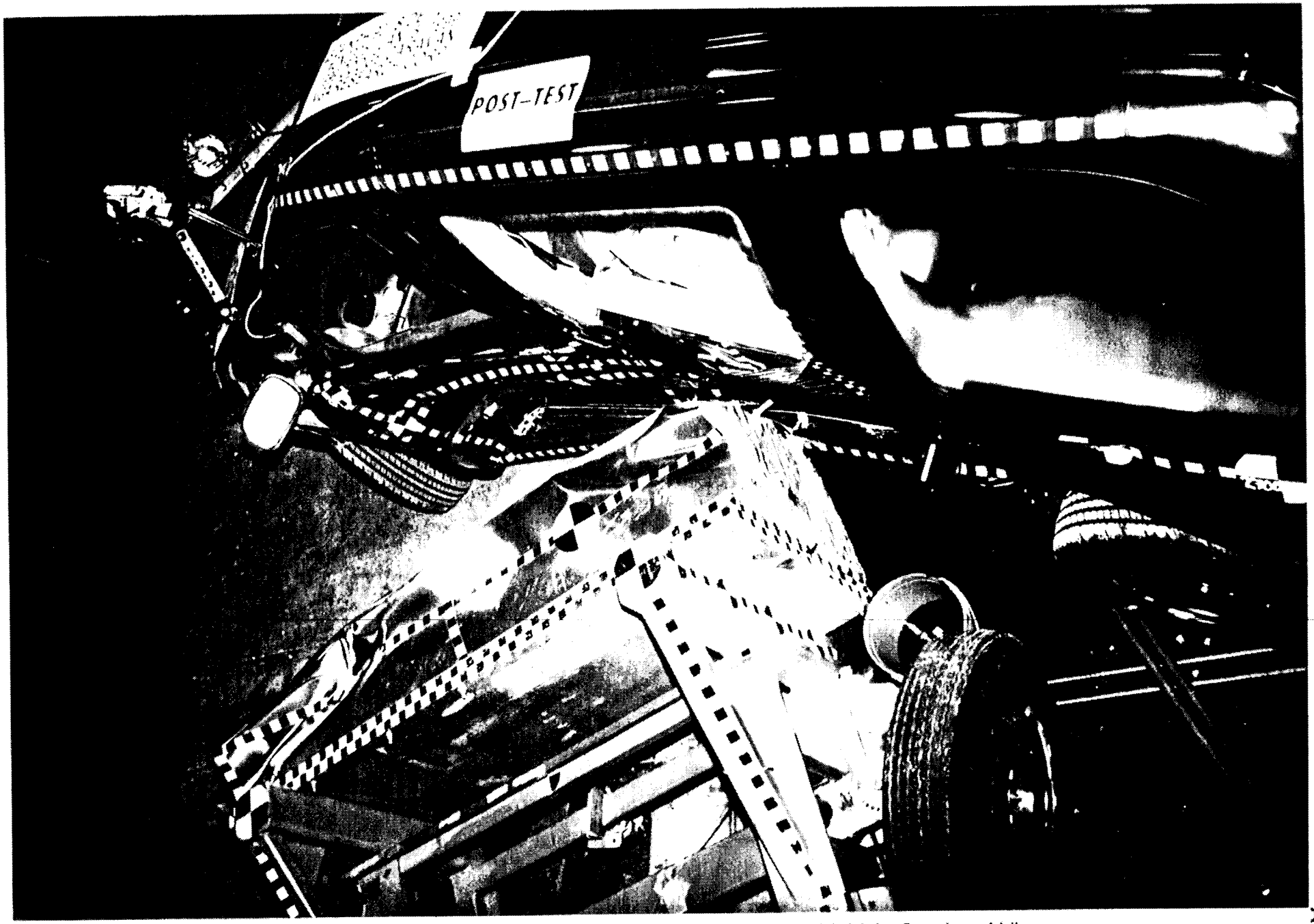


Photo No. A-12 - Post-Test MDB Positioned Against Vehicle Overhead View

0000490

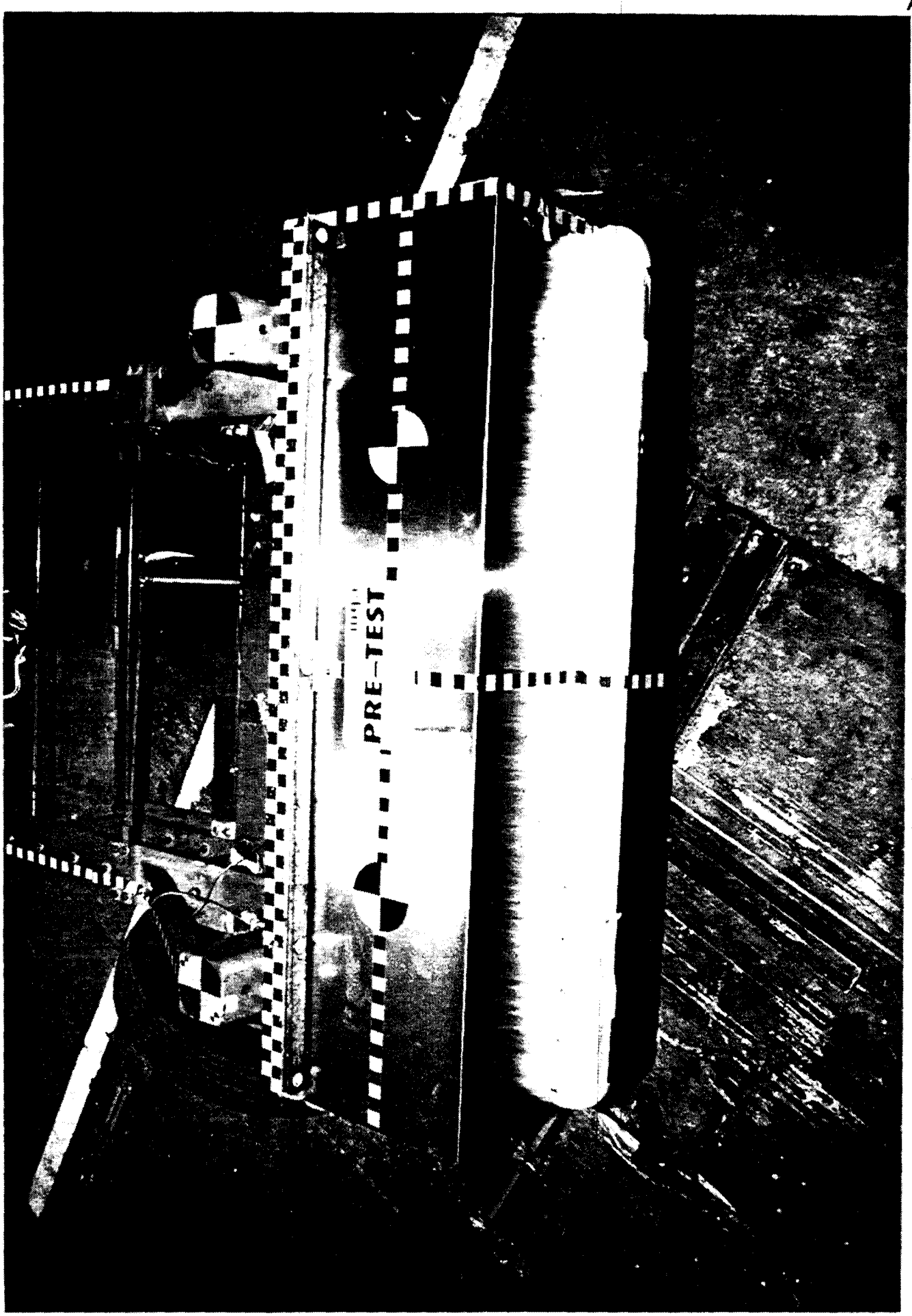


Photo No. A-13 - Pre-Test MDB Top View

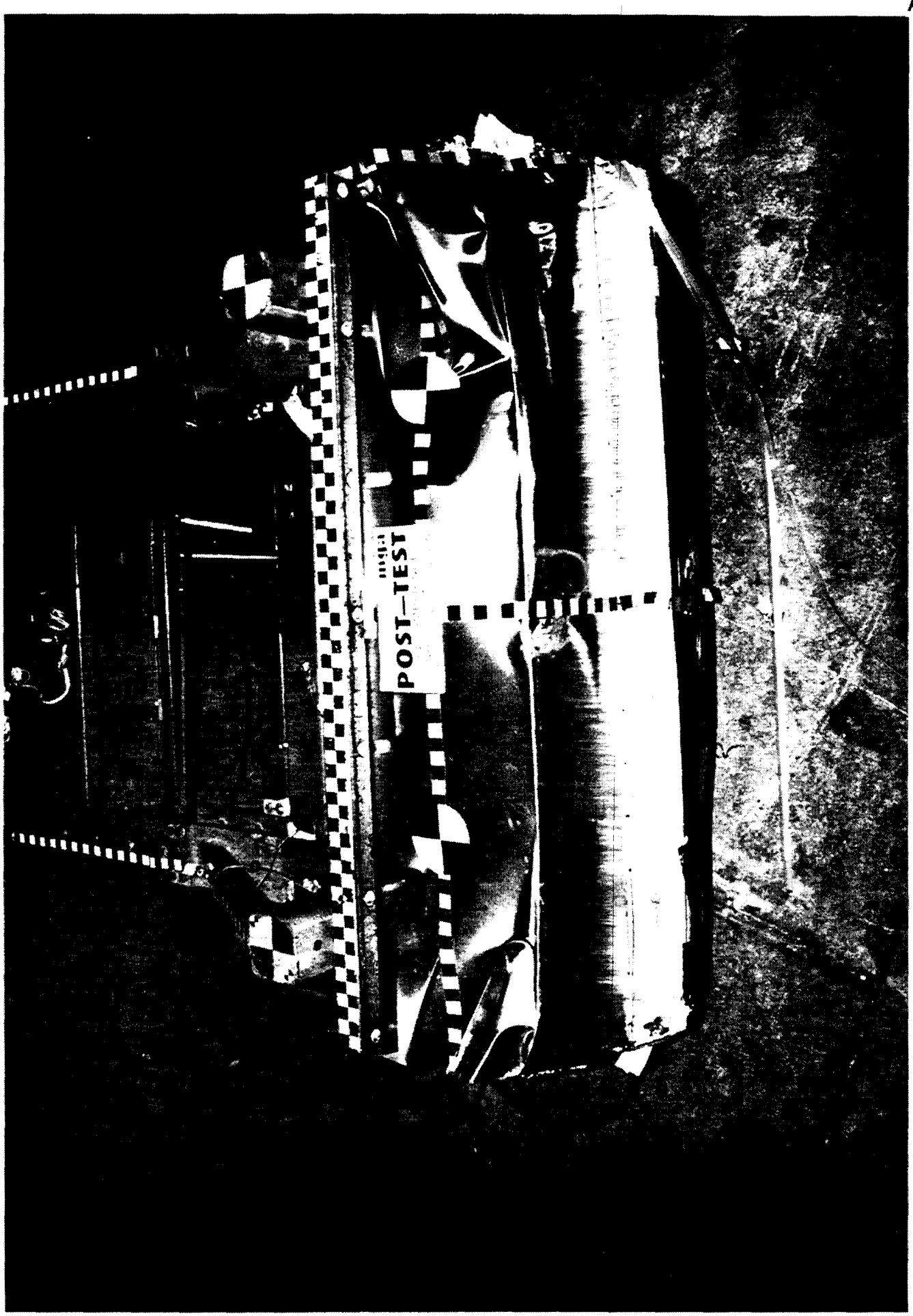


Photo No. A-14 - Post-Test MDB Top View

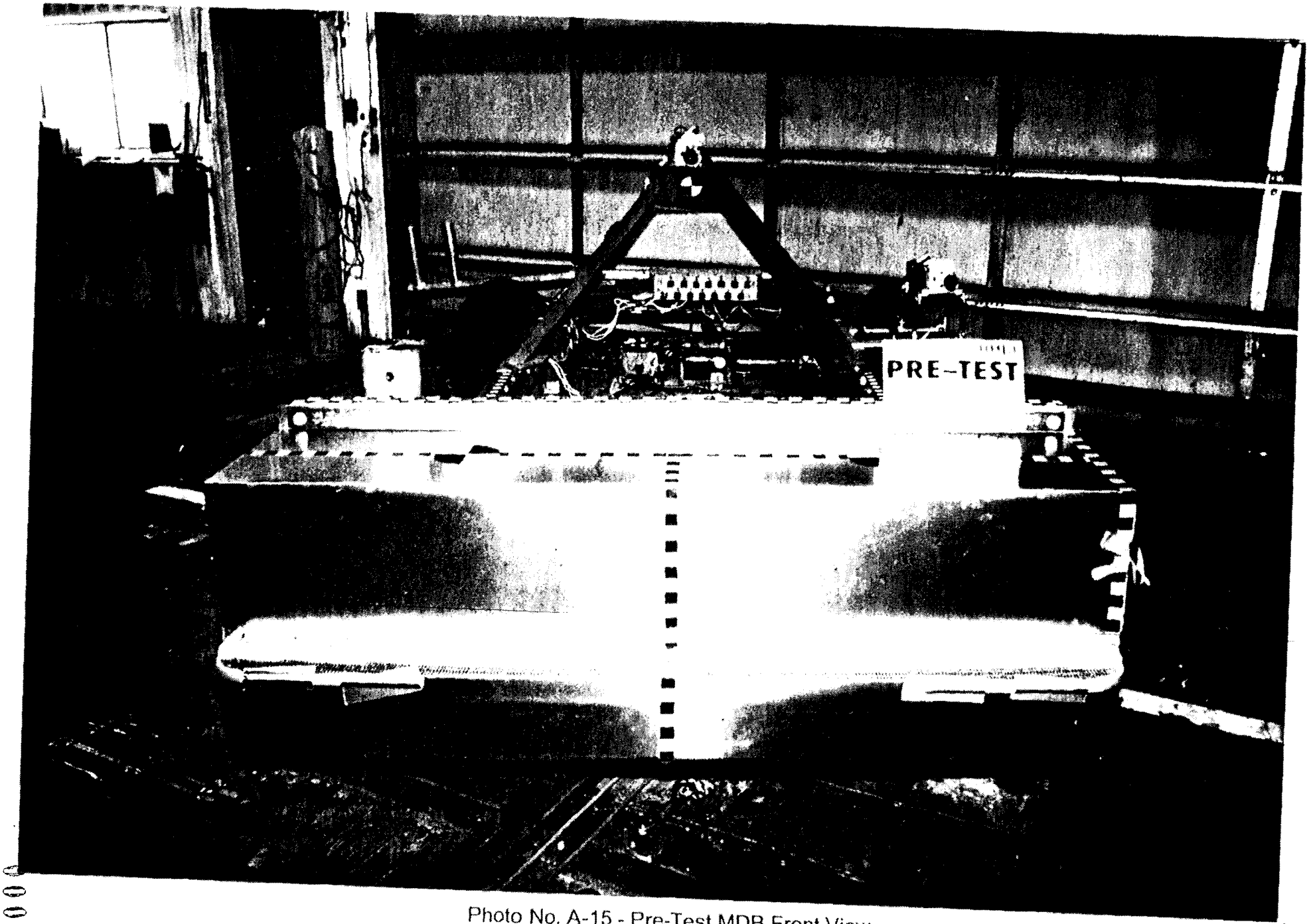


Photo No. A-15 - Pre-Test MDB Front View

000483

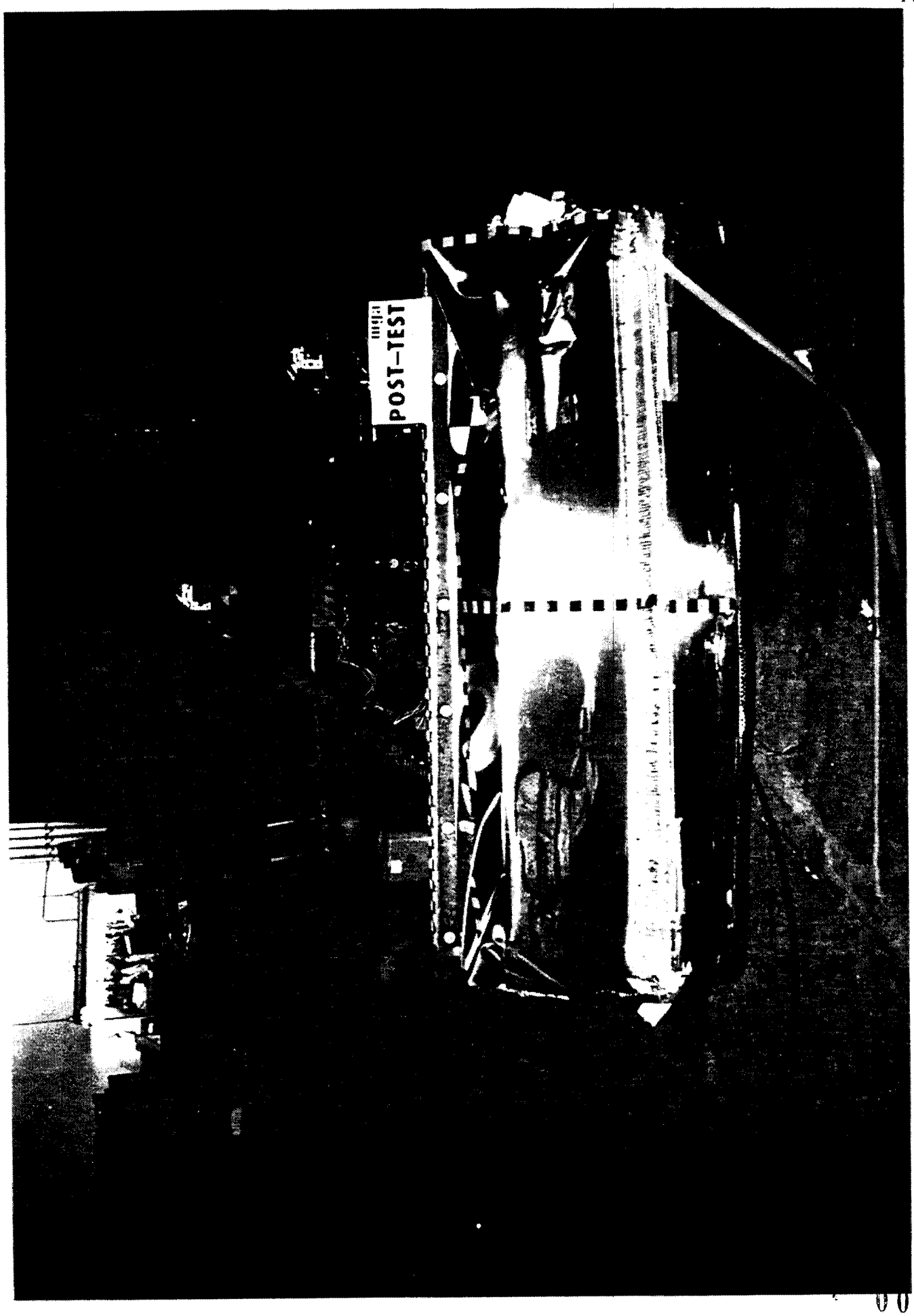


Photo No. A-16 - Post-Test MDB Front View

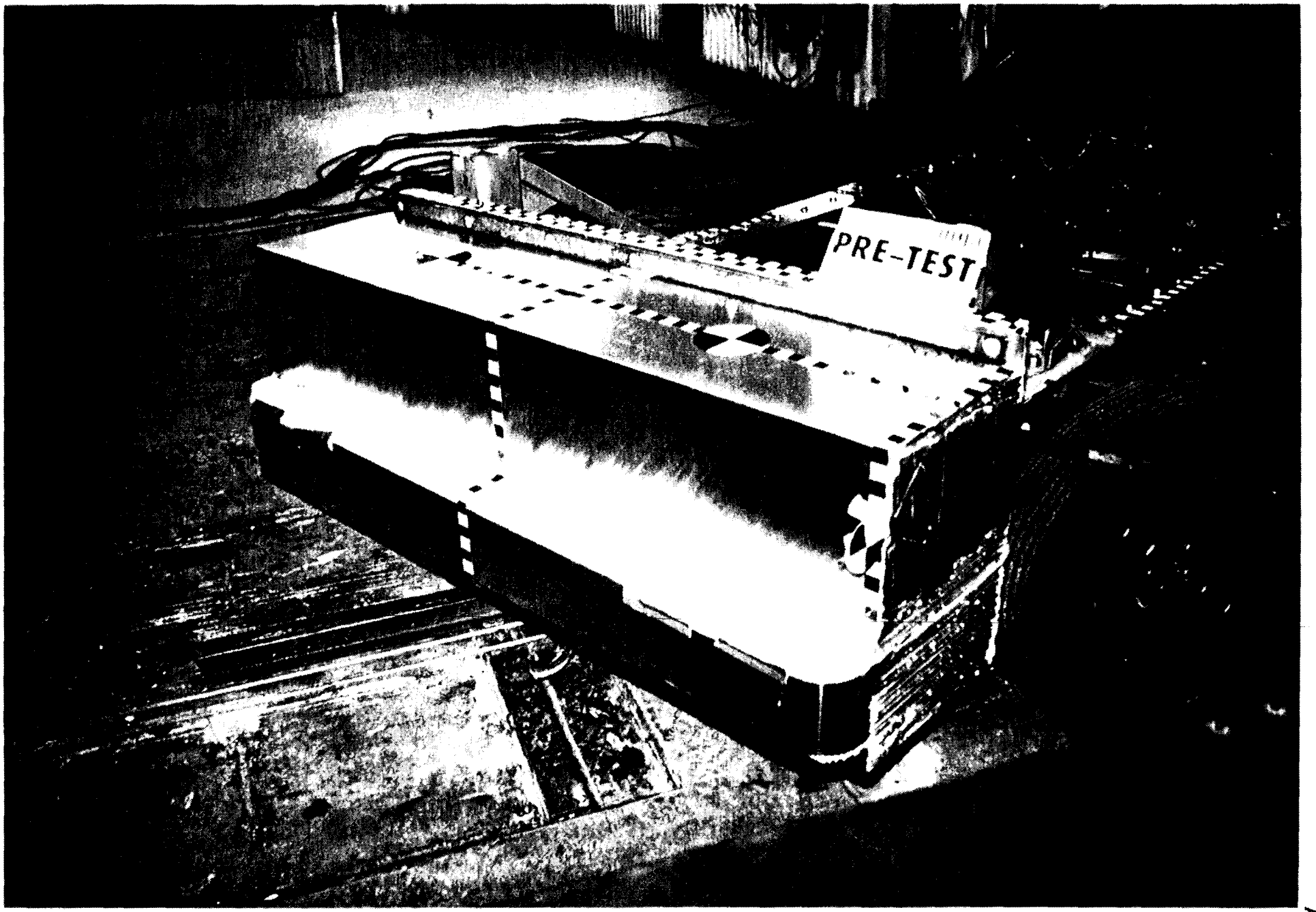


Photo No. A-17 - Pre-Test MDB Left Side View

000435

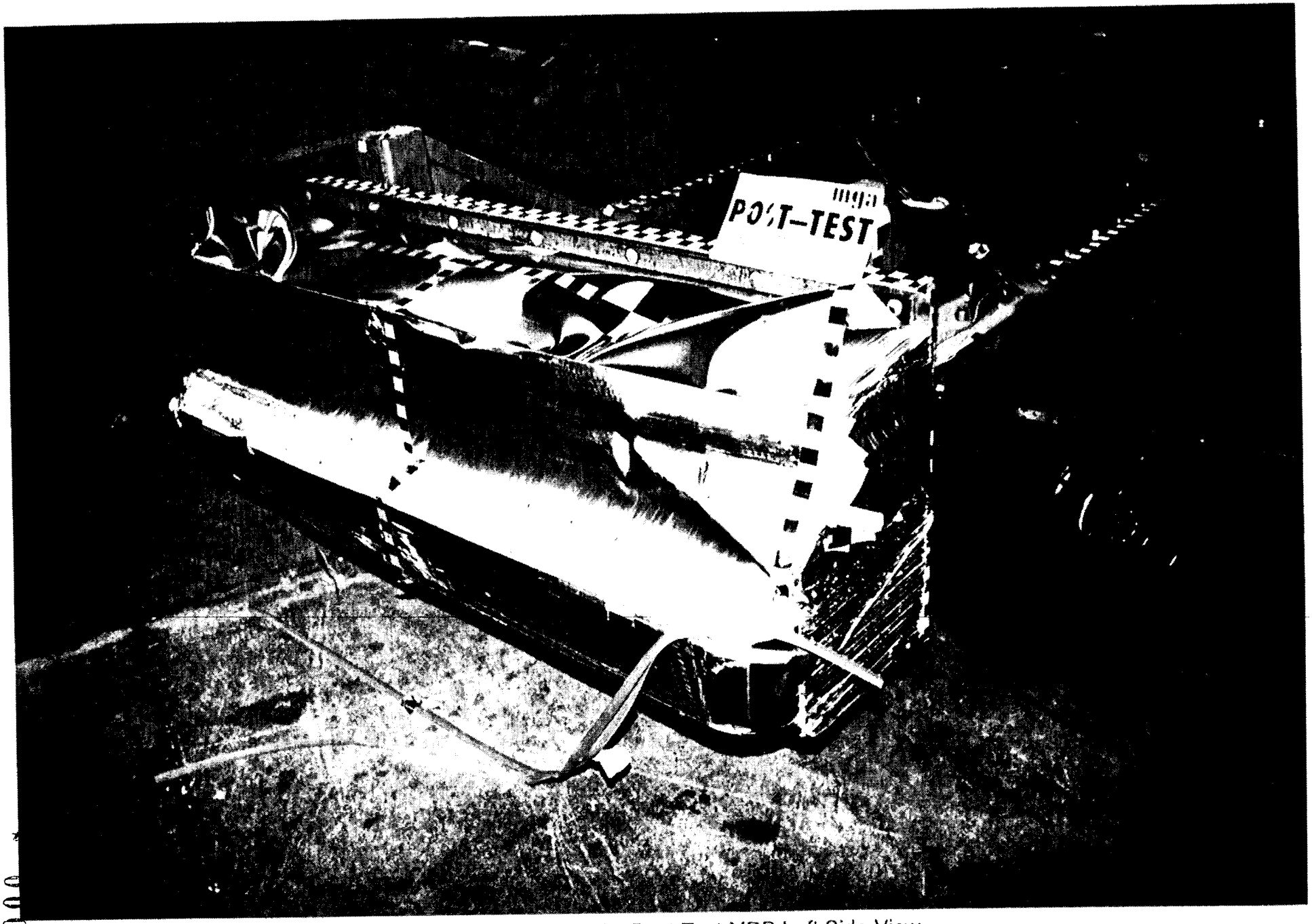


Photo No. A-18 - Post-Test MDB Left Side View

000436

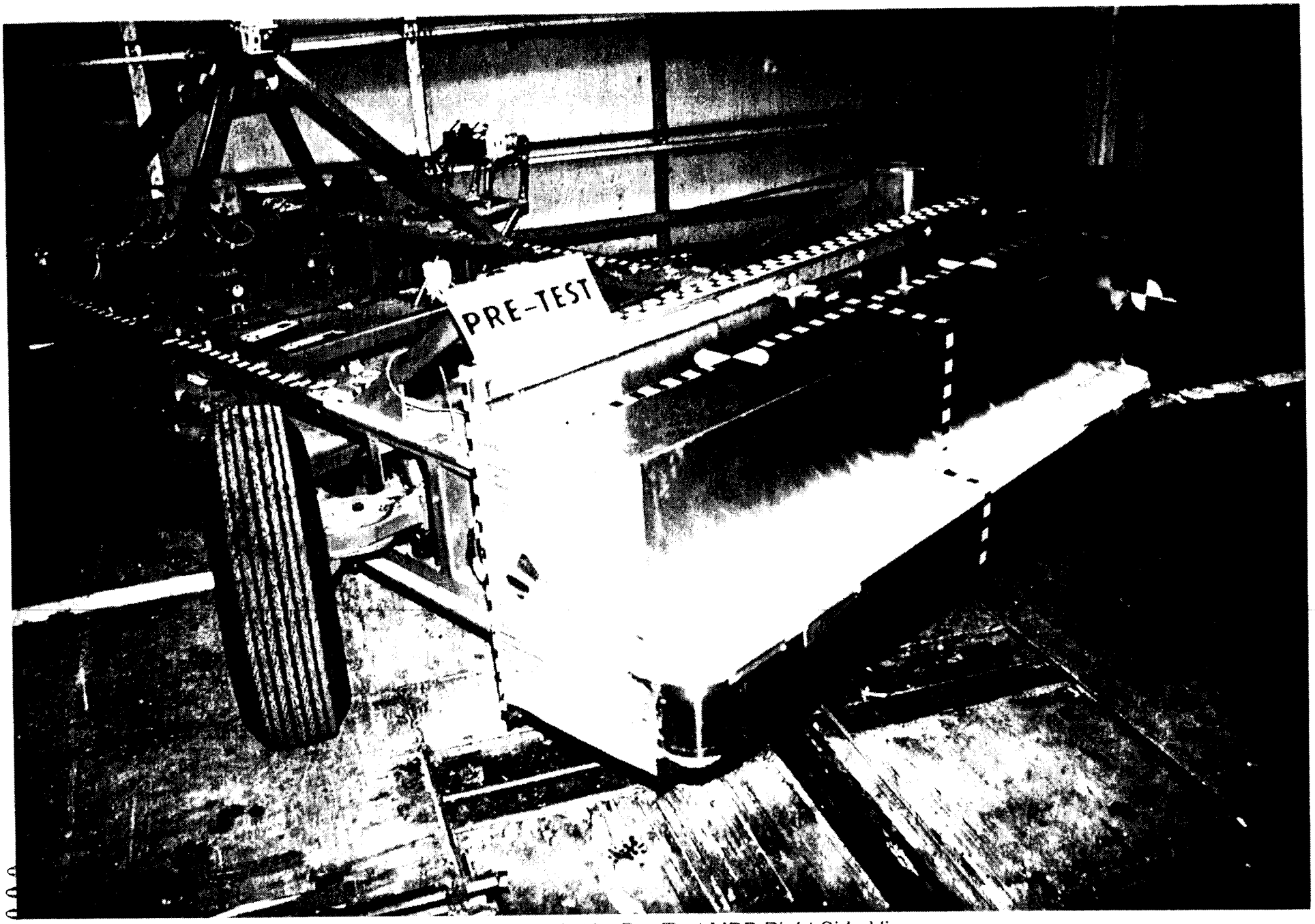


Photo No. A-19 - Pre-Test MDB Right Side View

000 0437

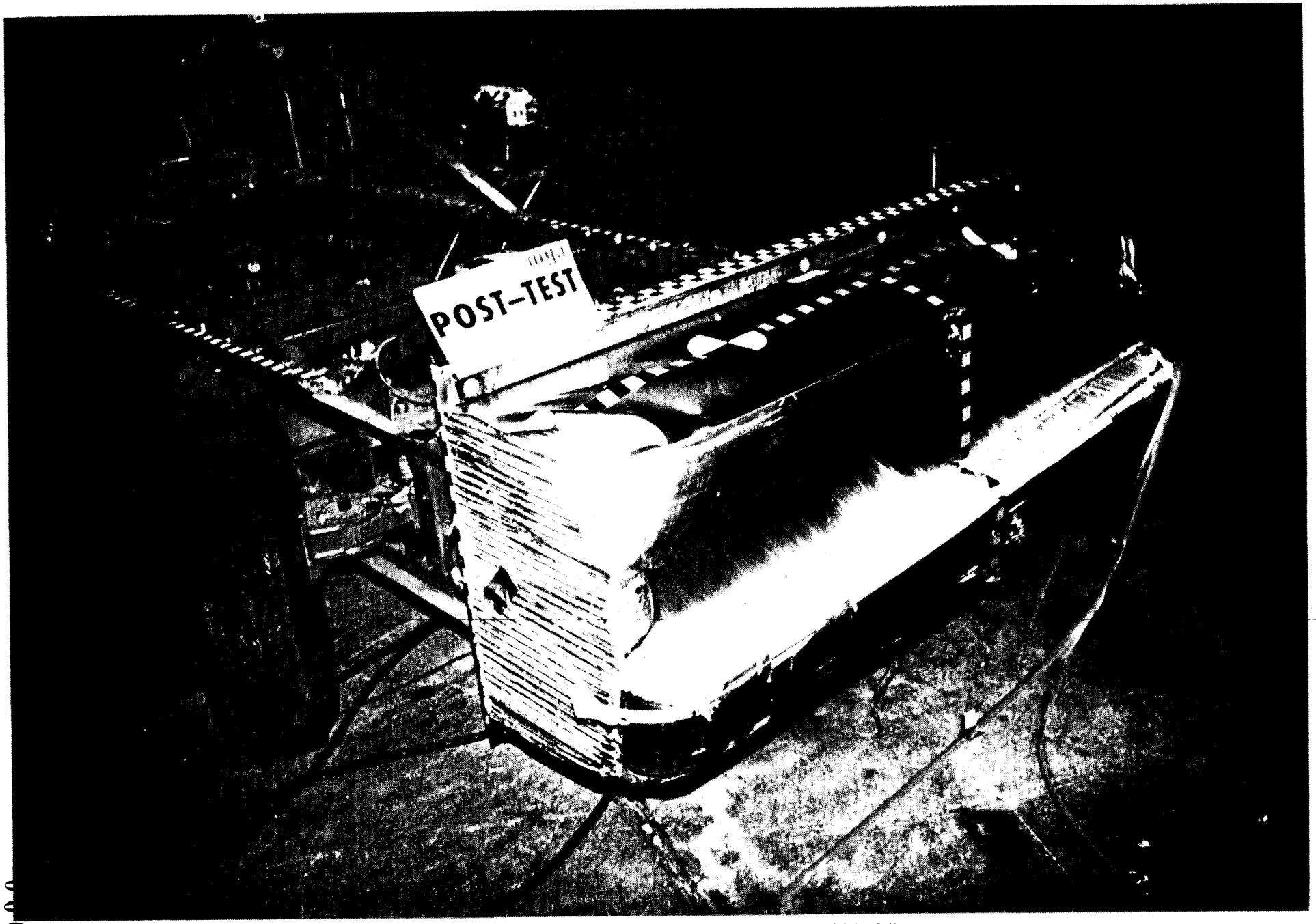


Photo No. A-20 - Post-Test MDB Right Side View

000438

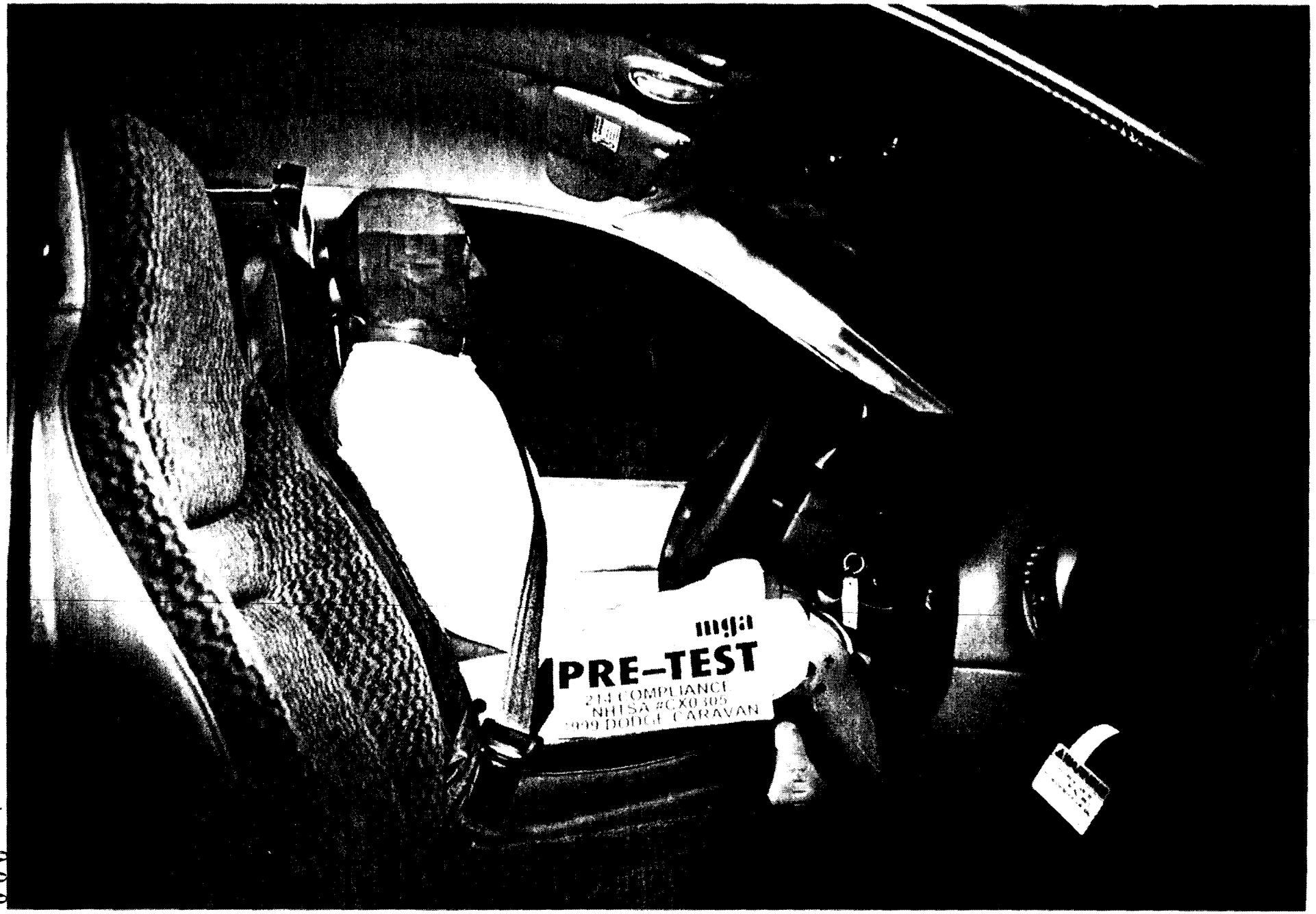


Photo No. A-21 - Pre-Test Driver Dummy Right Side View

000499

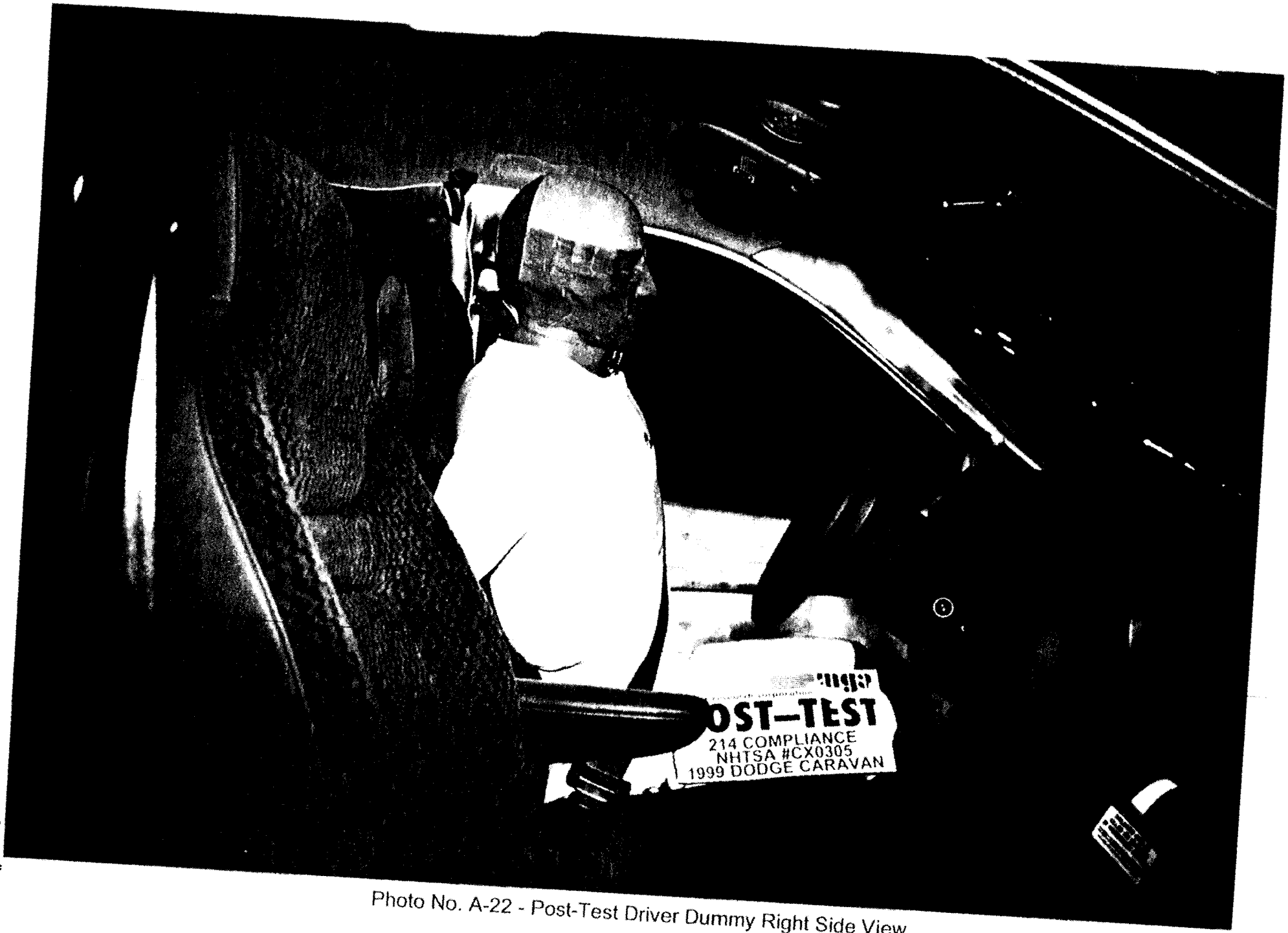


Photo No. A-22 - Post-Test Driver Dummy Right Side View

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

* 0000501

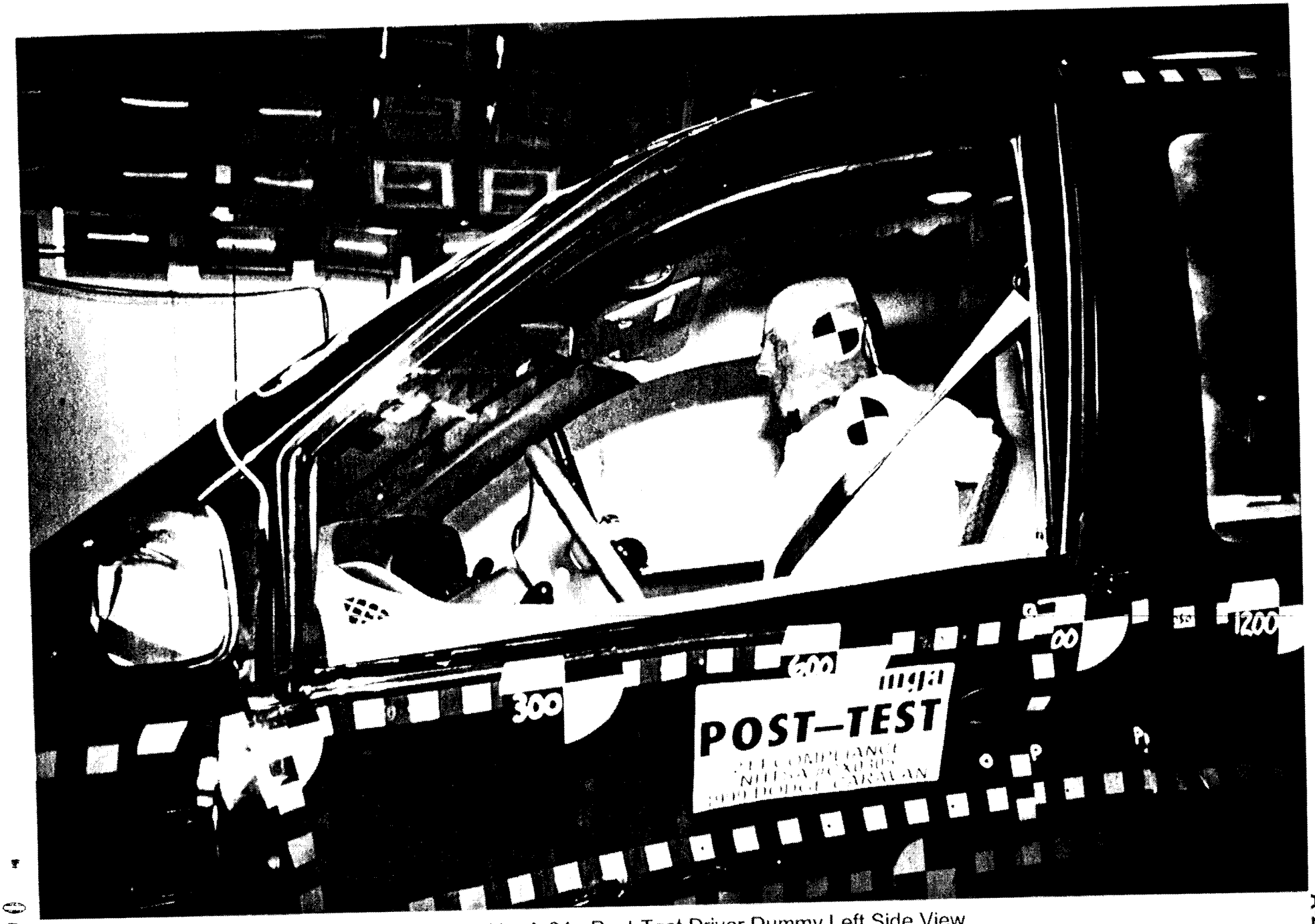


Photo No. A-24 - Post-Test Driver Dummy Left Side View

0000502

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

000503

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

000054

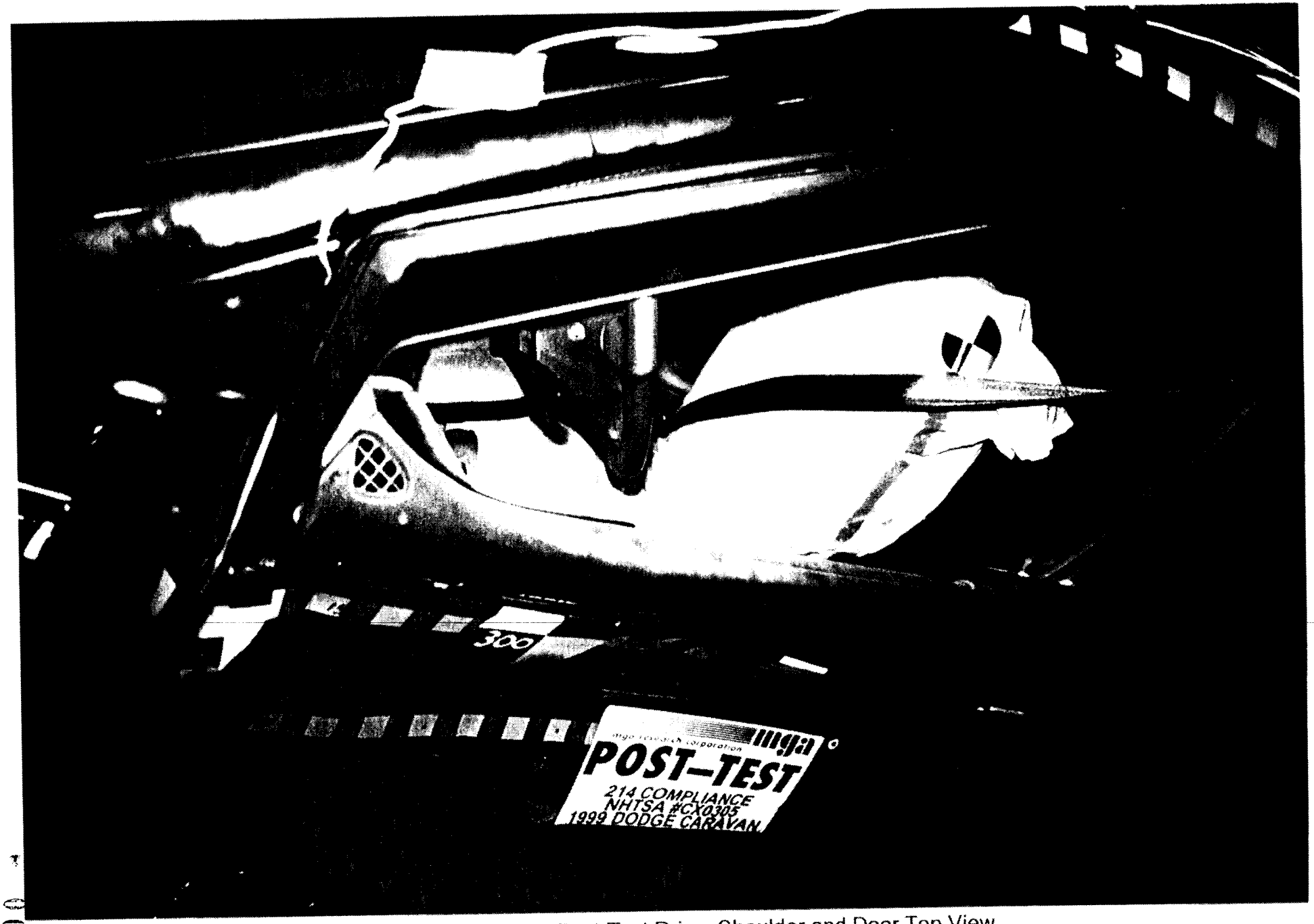


Photo No. A-27 - Post-Test Driver Shoulder and Door Top View

000505

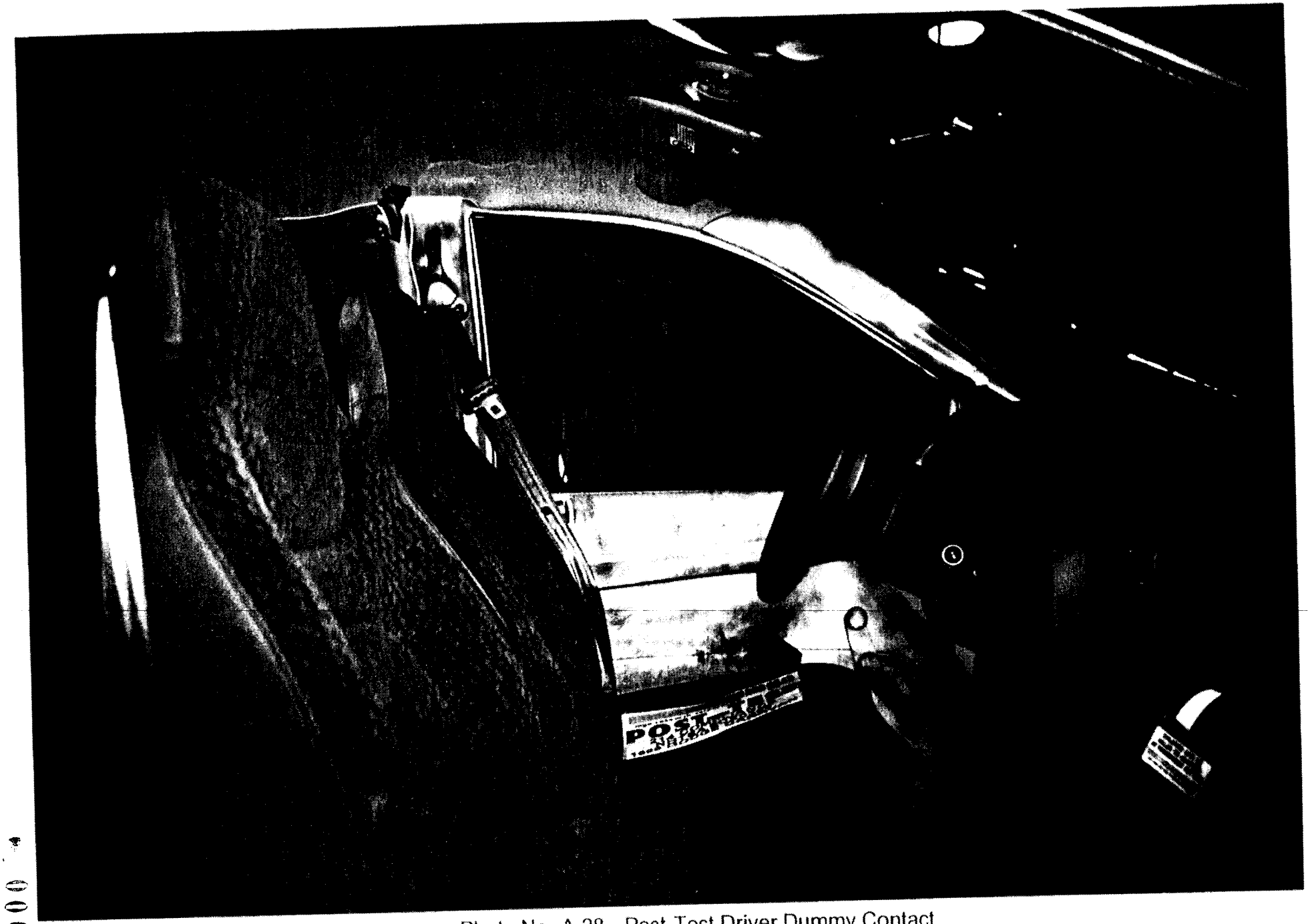


Photo No. A-28 - Post-Test Driver Dummy Contact

0000506

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

0000507

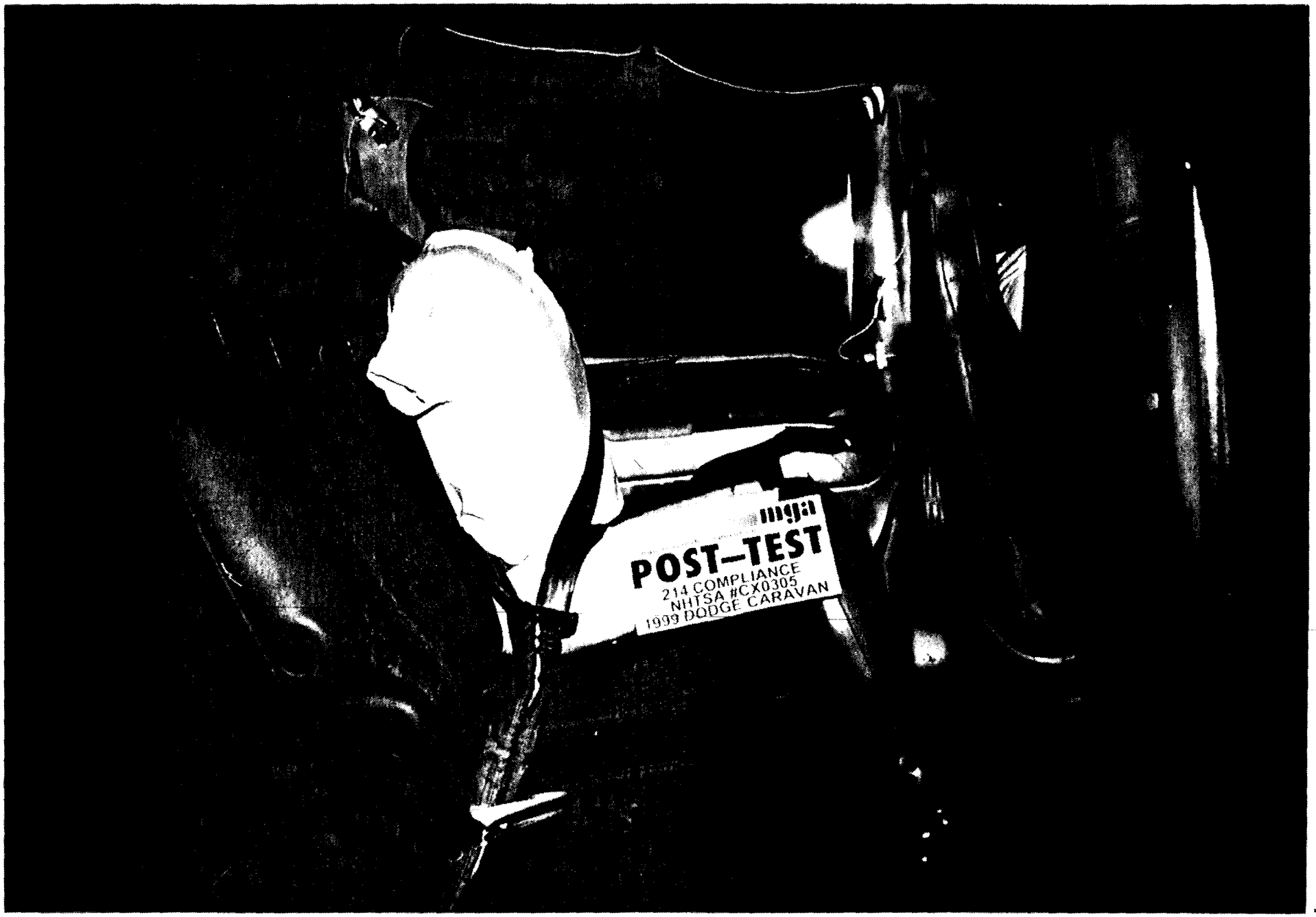


Photo No. A-31 - Post-Test Rear Passenger Dummy Right Side View

000509

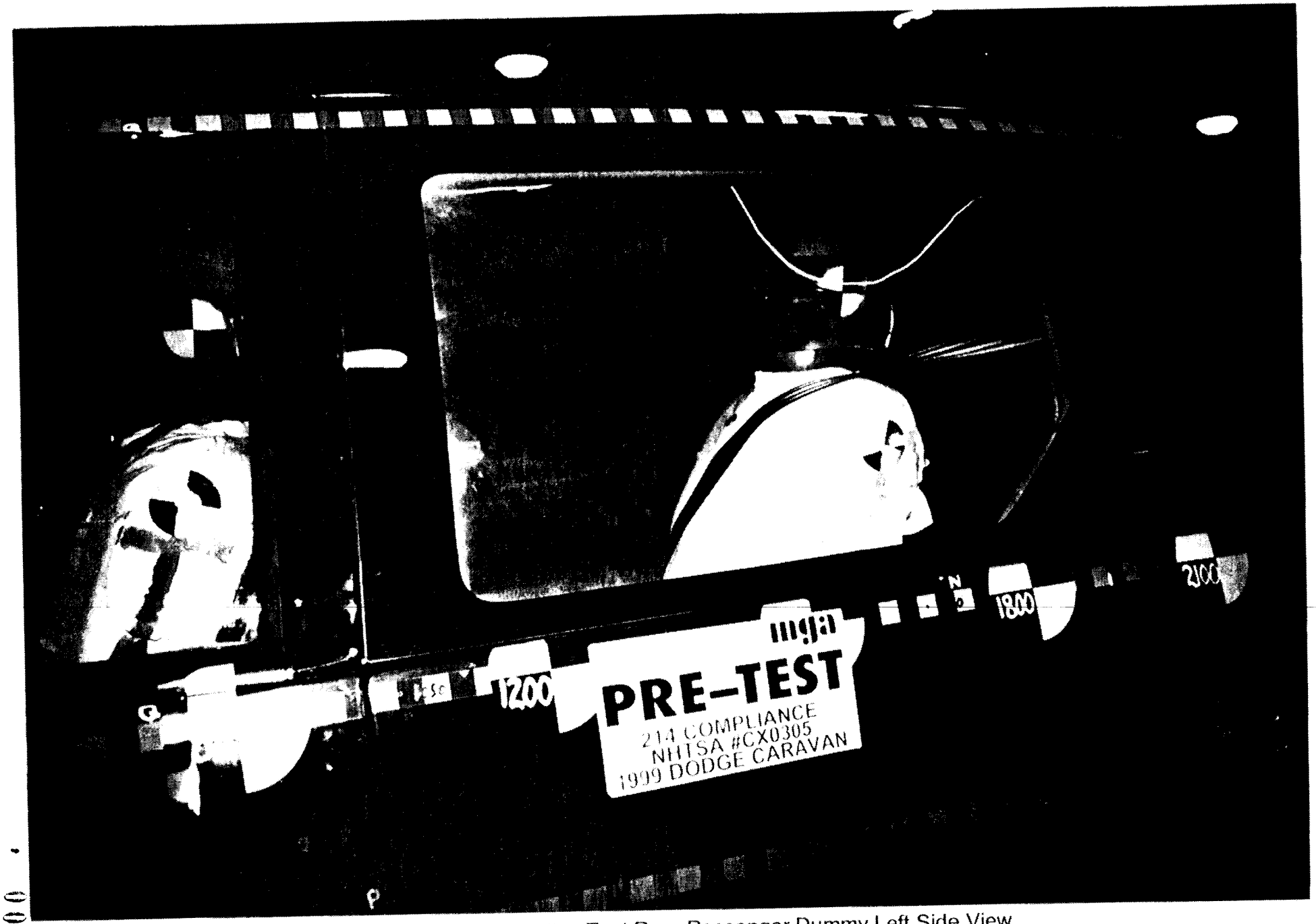


Photo No. A-32 - Pre-Test Rear Passenger Dummy Left Side View

000510

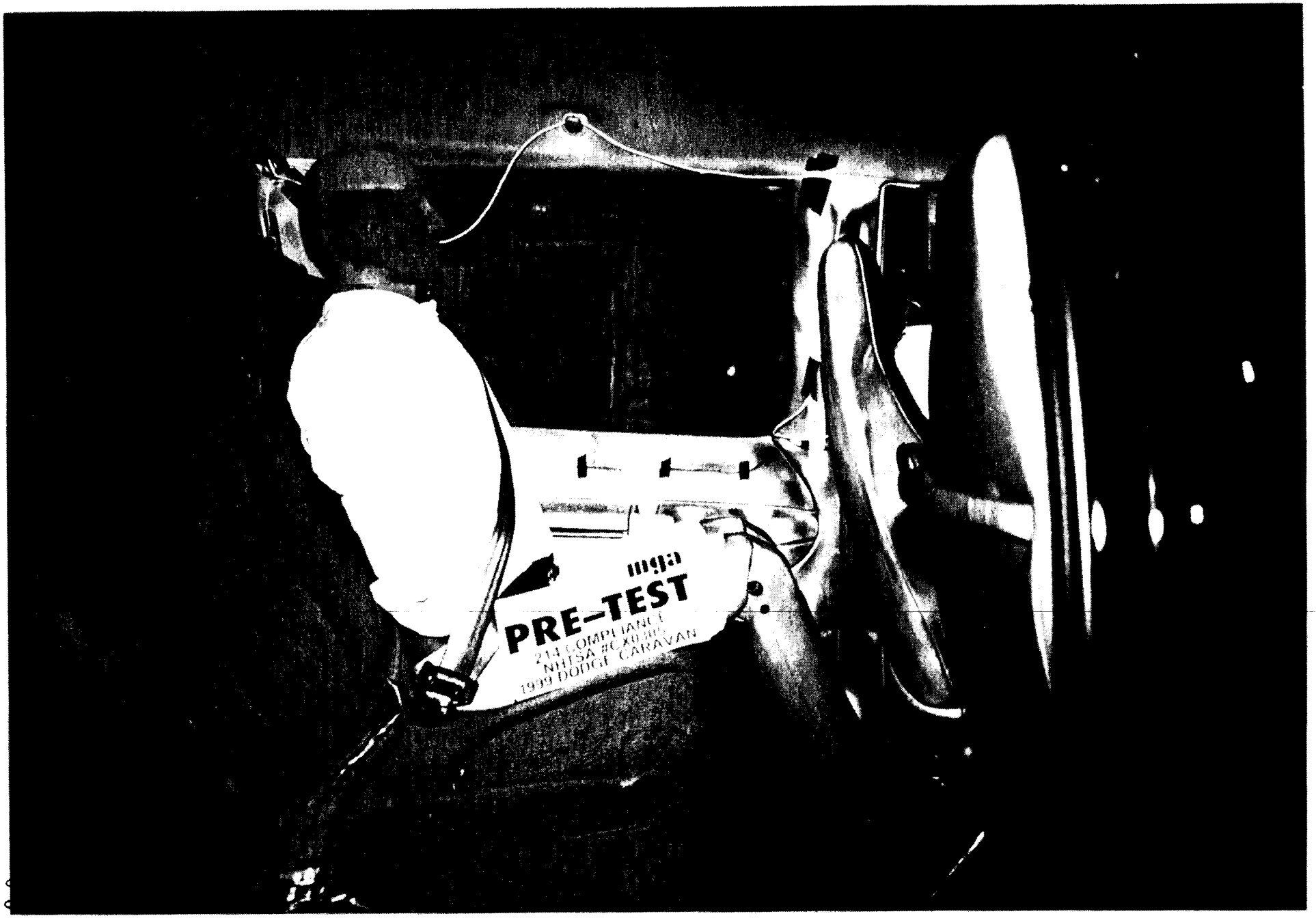


Photo No. A-30 - Pre-Test Rear Passenger Dummy Right Side View

00508

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

0000511

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

000051 2

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

0000513

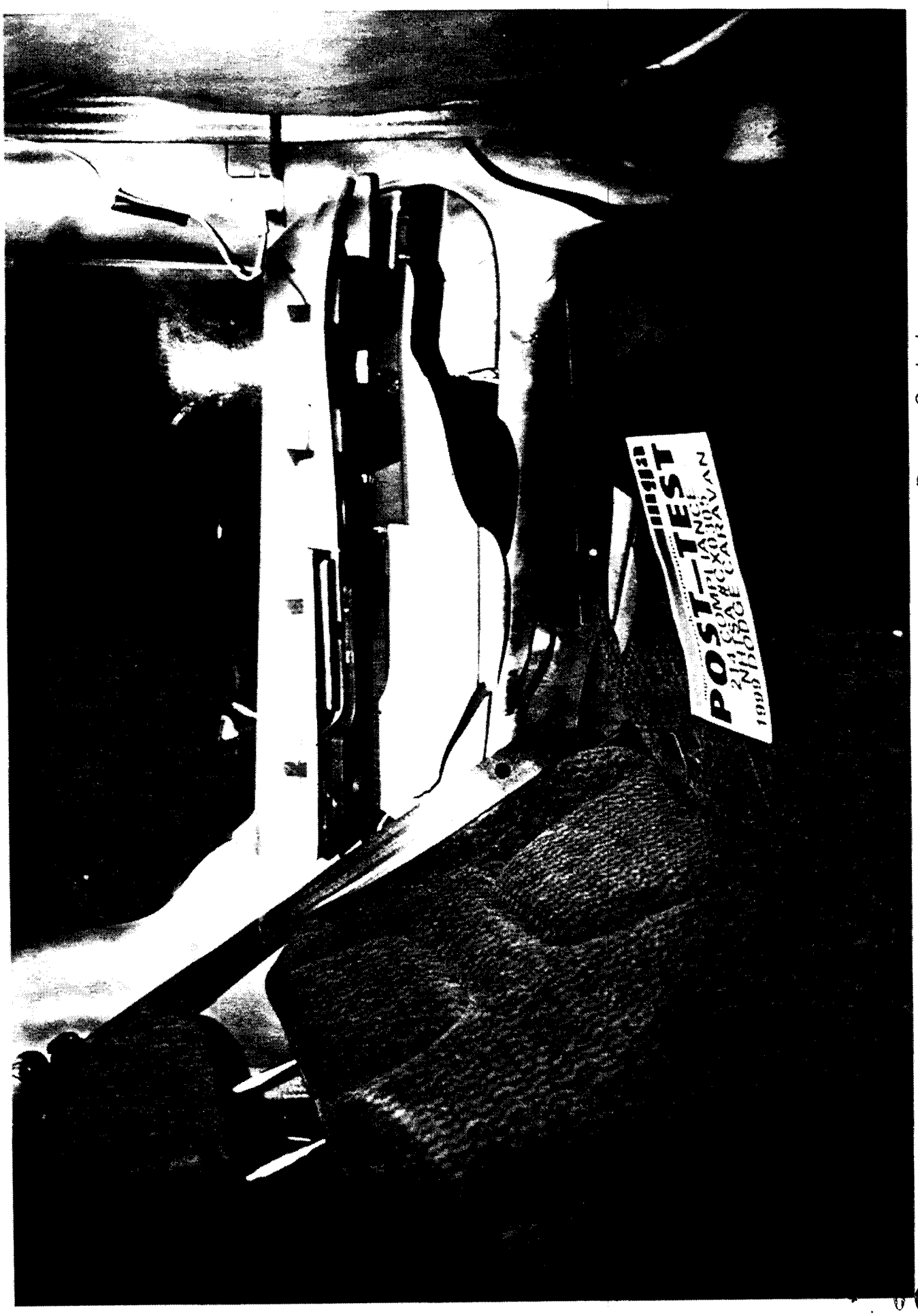


Photo No. A-36 - Post-Test Rear Passenger Dummy Contact

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

000515

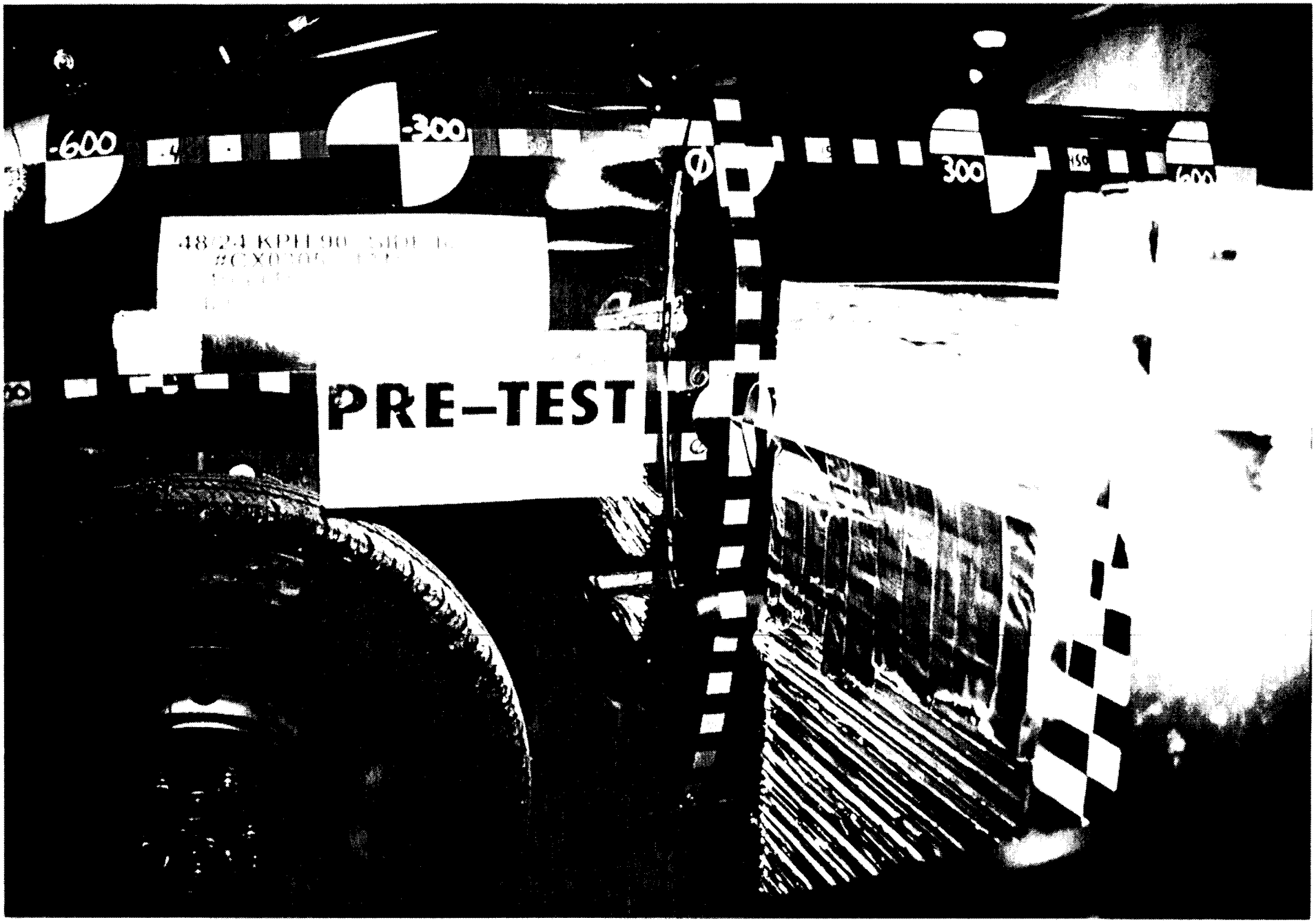


Photo No. A-38 - Pre-Test Left Front Impact Point on Vehicle

00005516

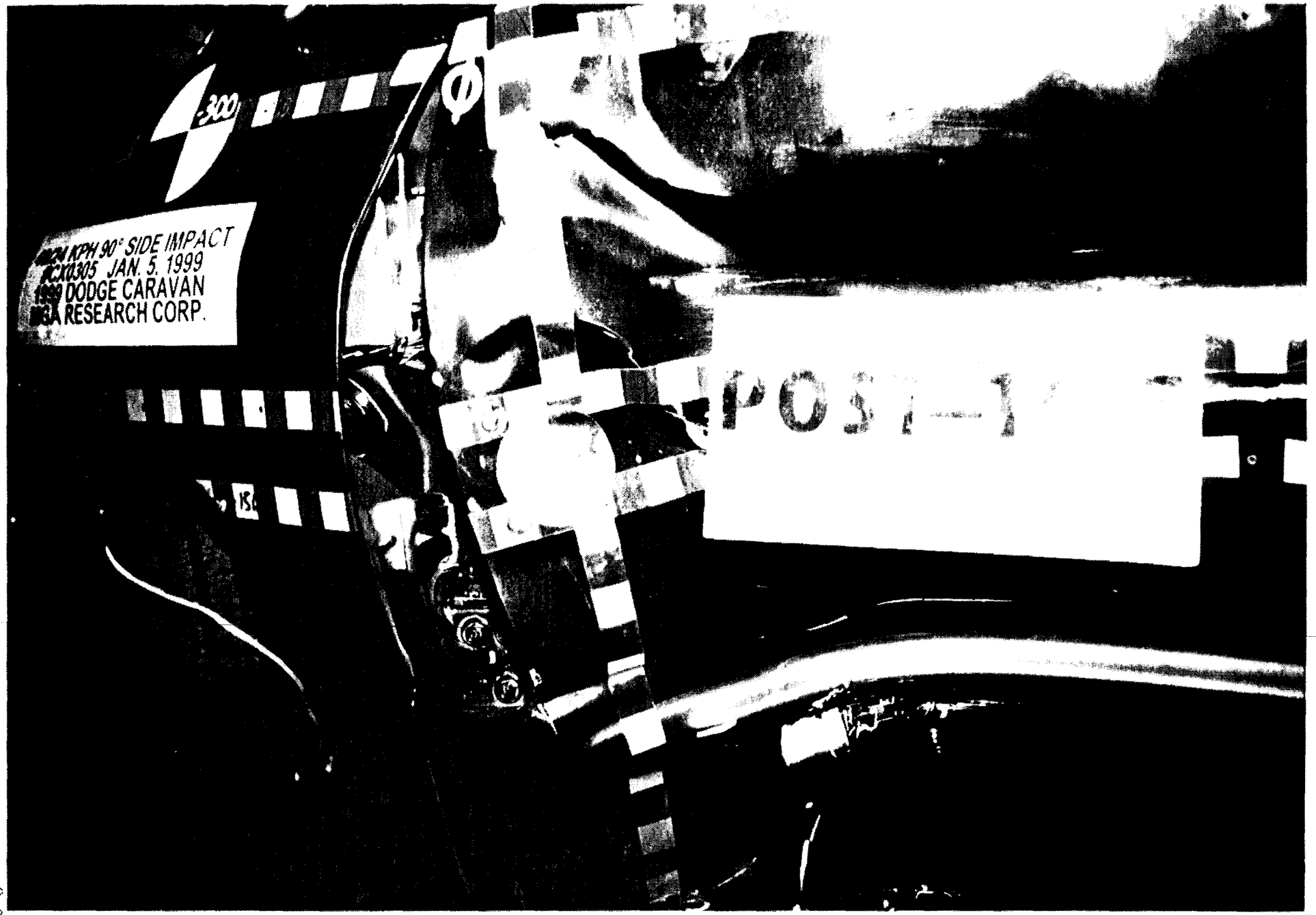


Photo No. A-39 - Post-Test Left Front Impact Point on Vehicle

000051 7

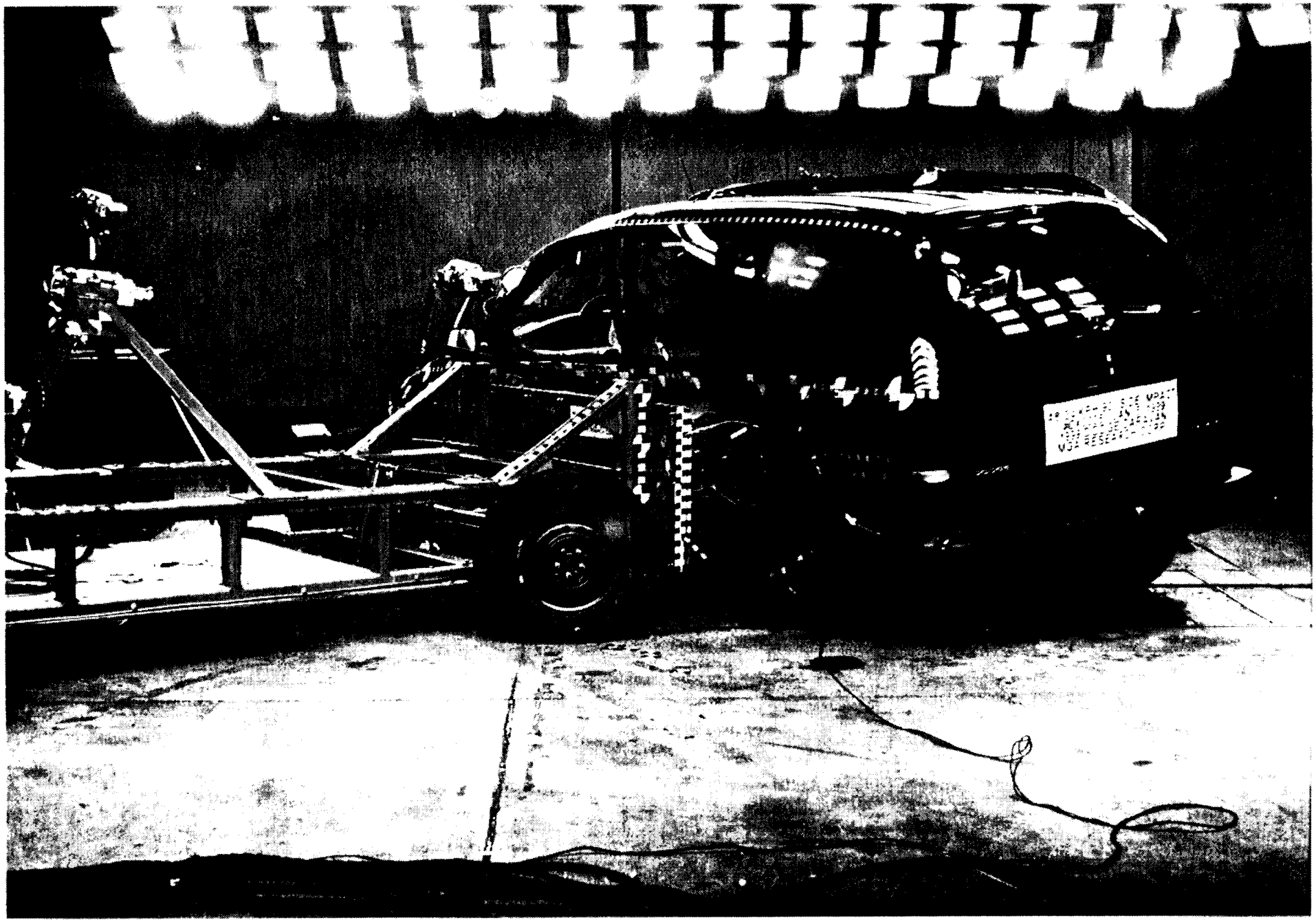


Photo No. A-40 - Impact

000510

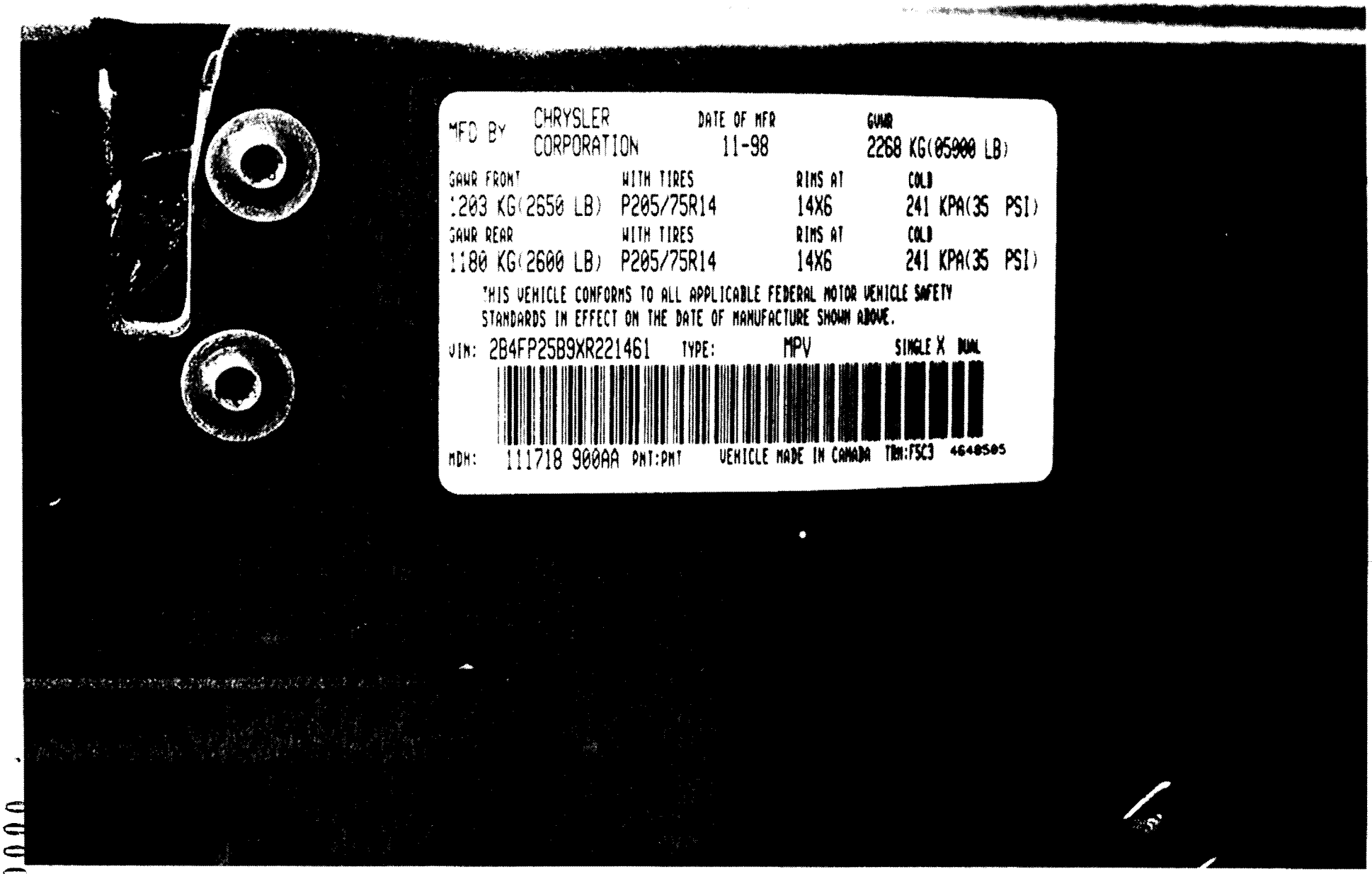


Photo No. A-41 - Vehicle Certification Label and Tire Placard

000519

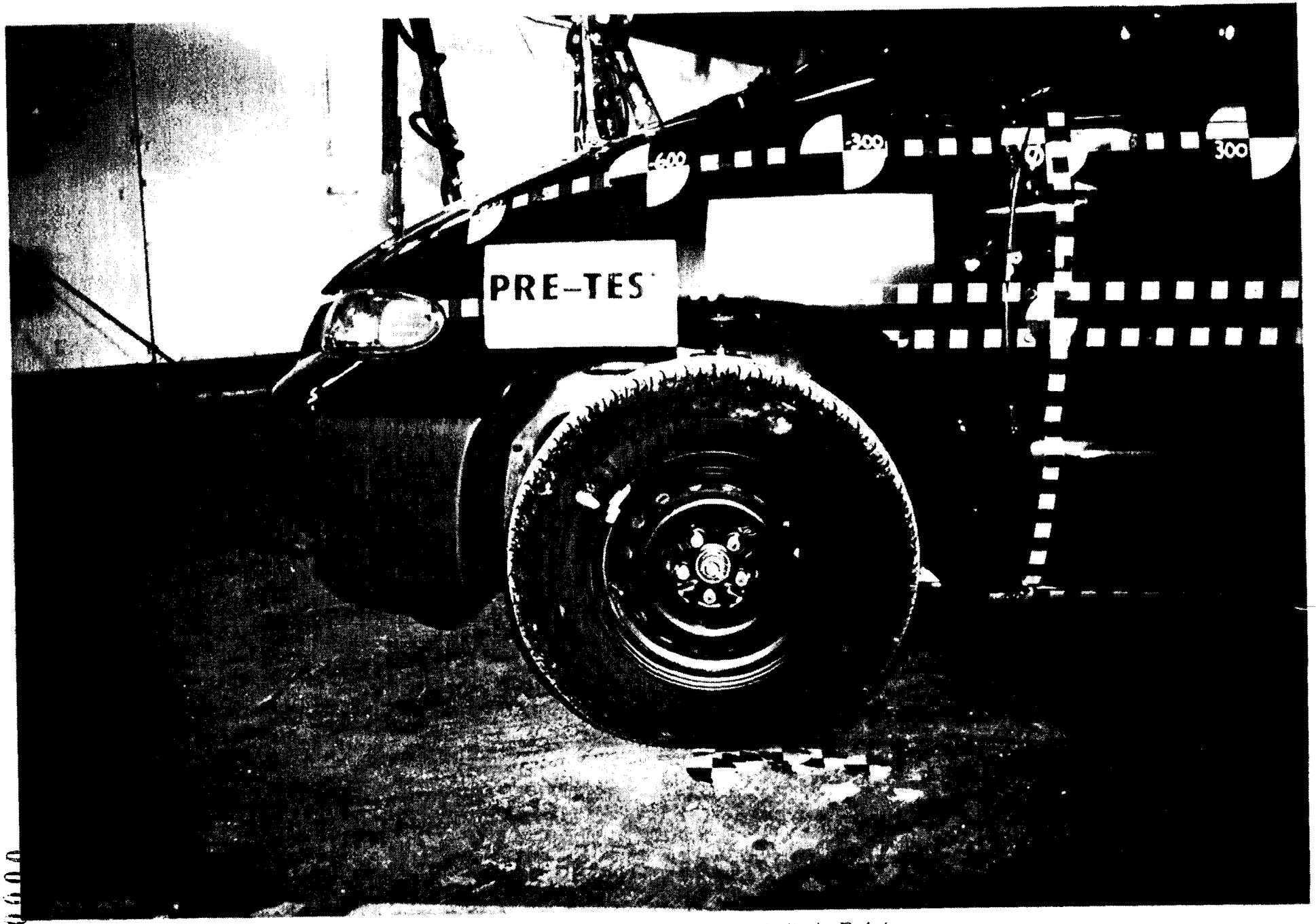


Photo No. A-42 - Left Front Attitude Point

0090520

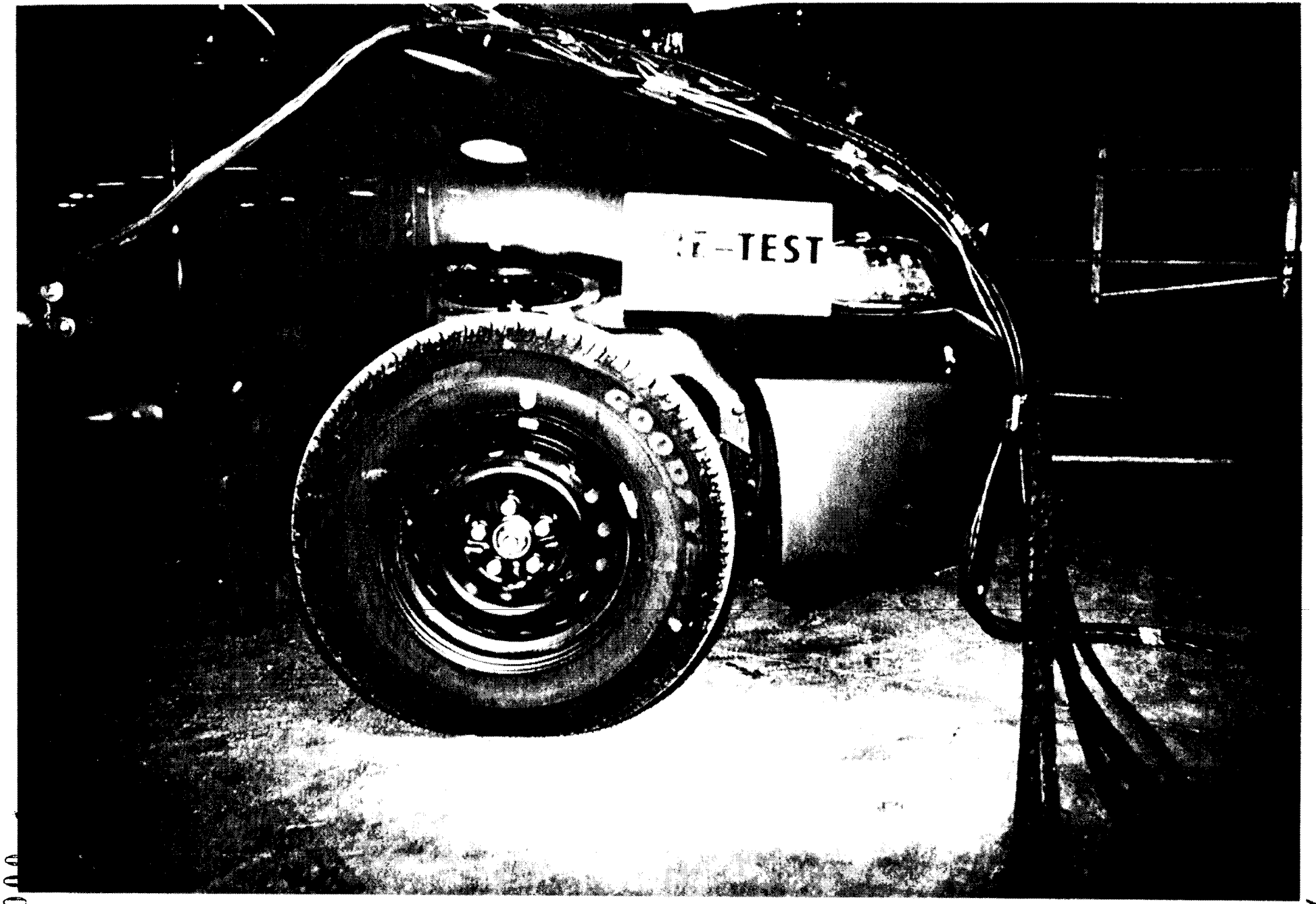


Photo No. A-43 - Right Front Attitude Point

00005521

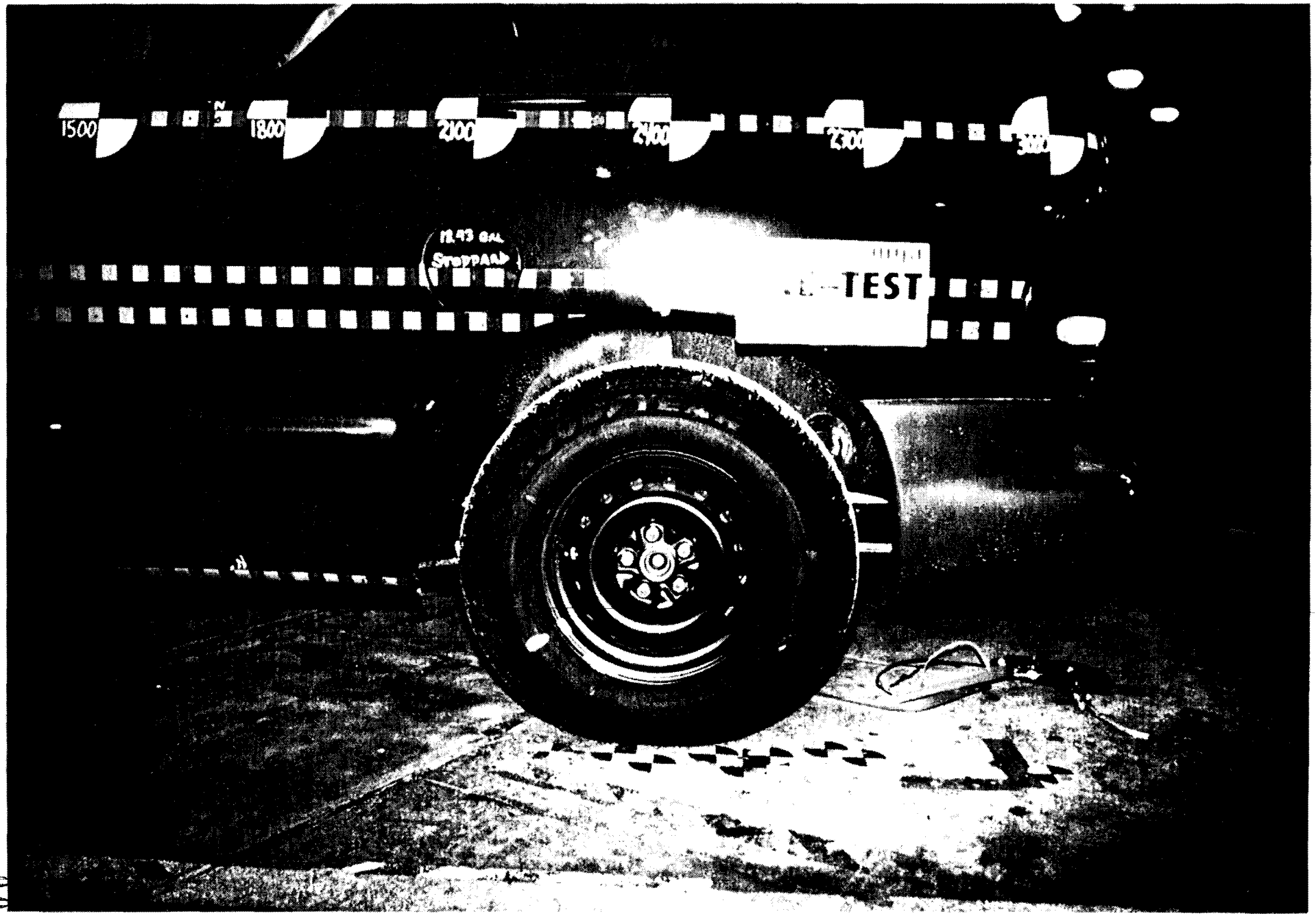


Photo No. A-44 - Left Rear Attitude Point

000522

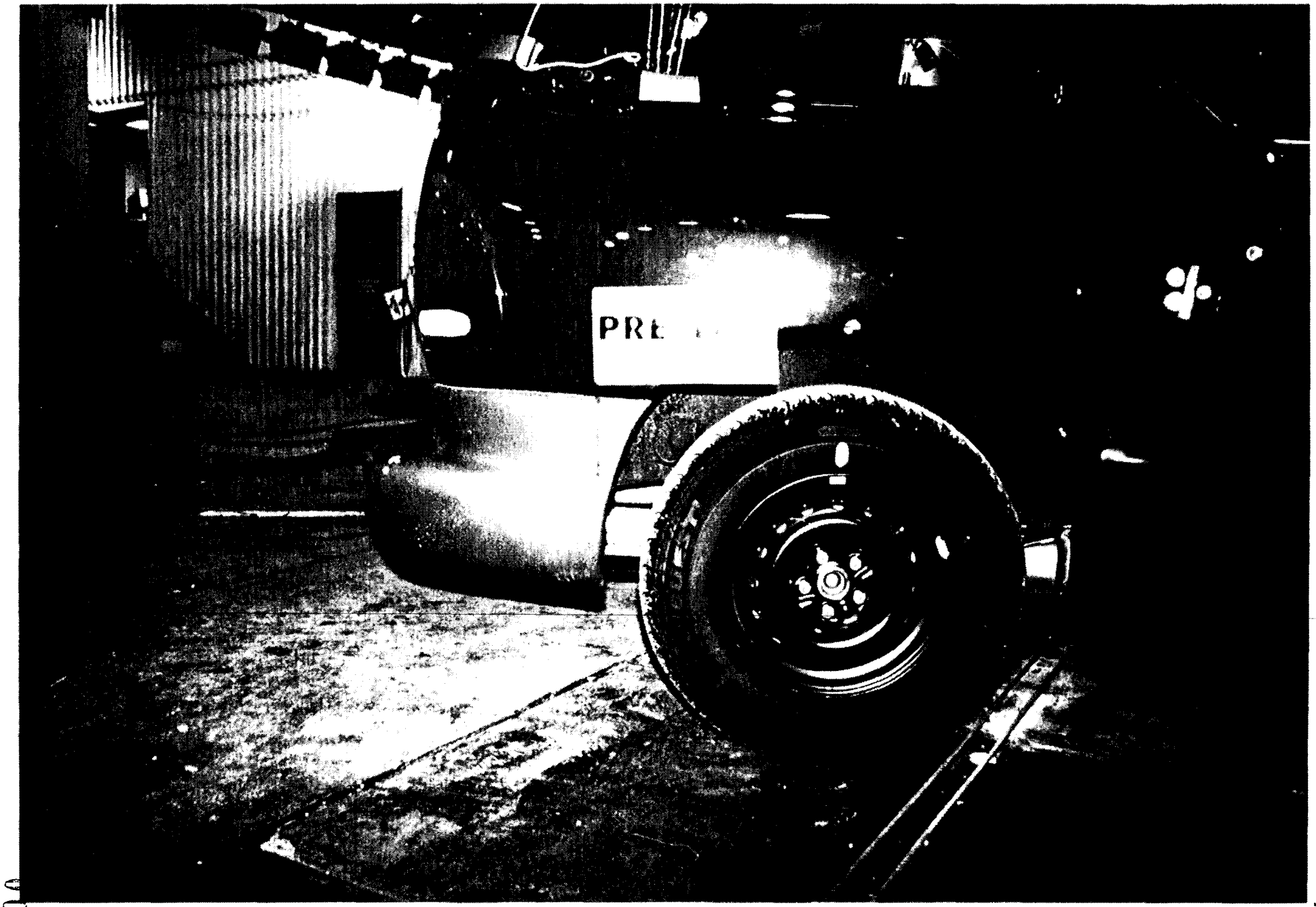


Photo No. A-45 - Right Rear Attitude Point

000523

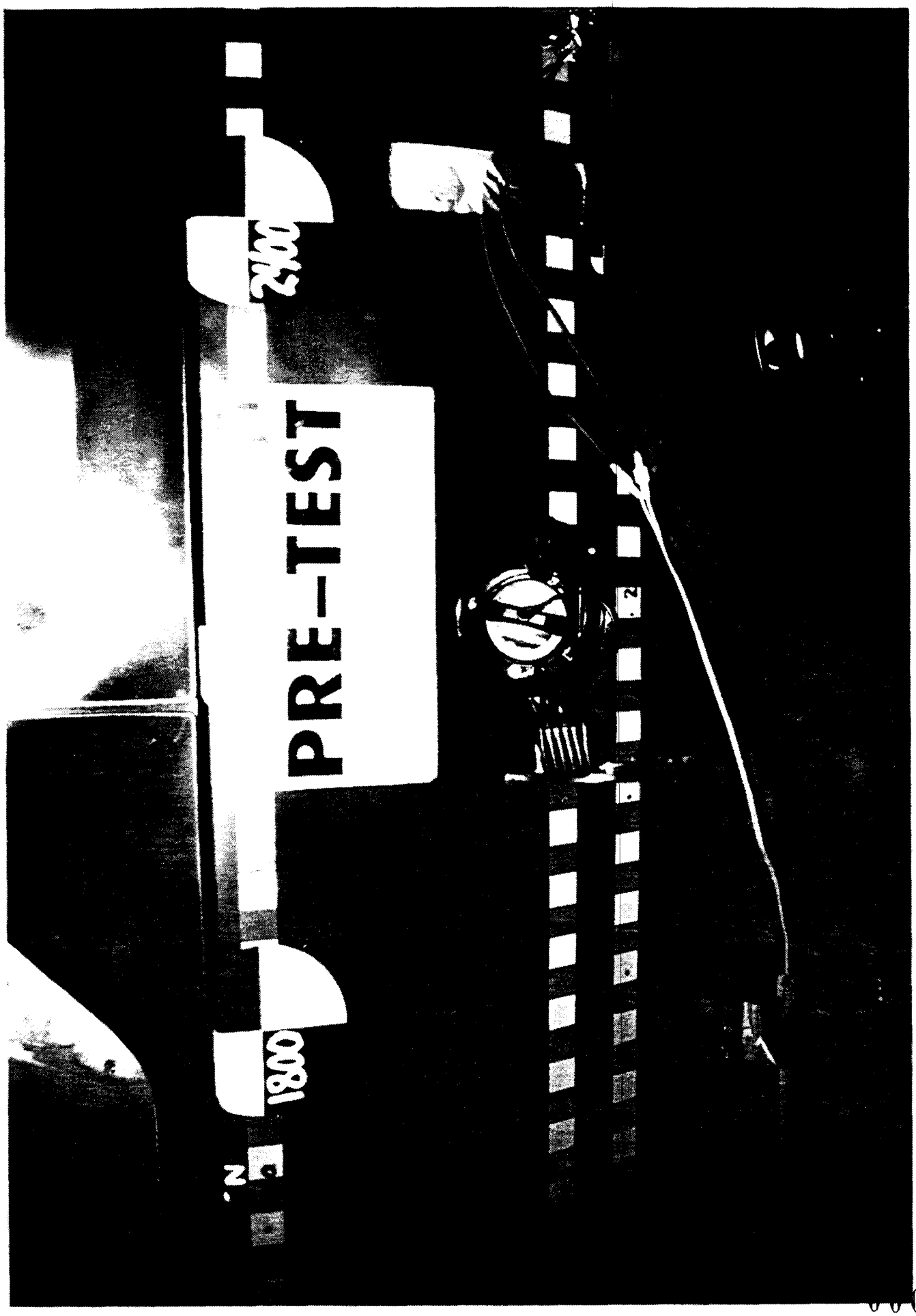


Photo No. A-46 - Pre-Test Fuel Filler Cap

Photo No. A-47 - Post-Test Fuel Leakage Point

000525

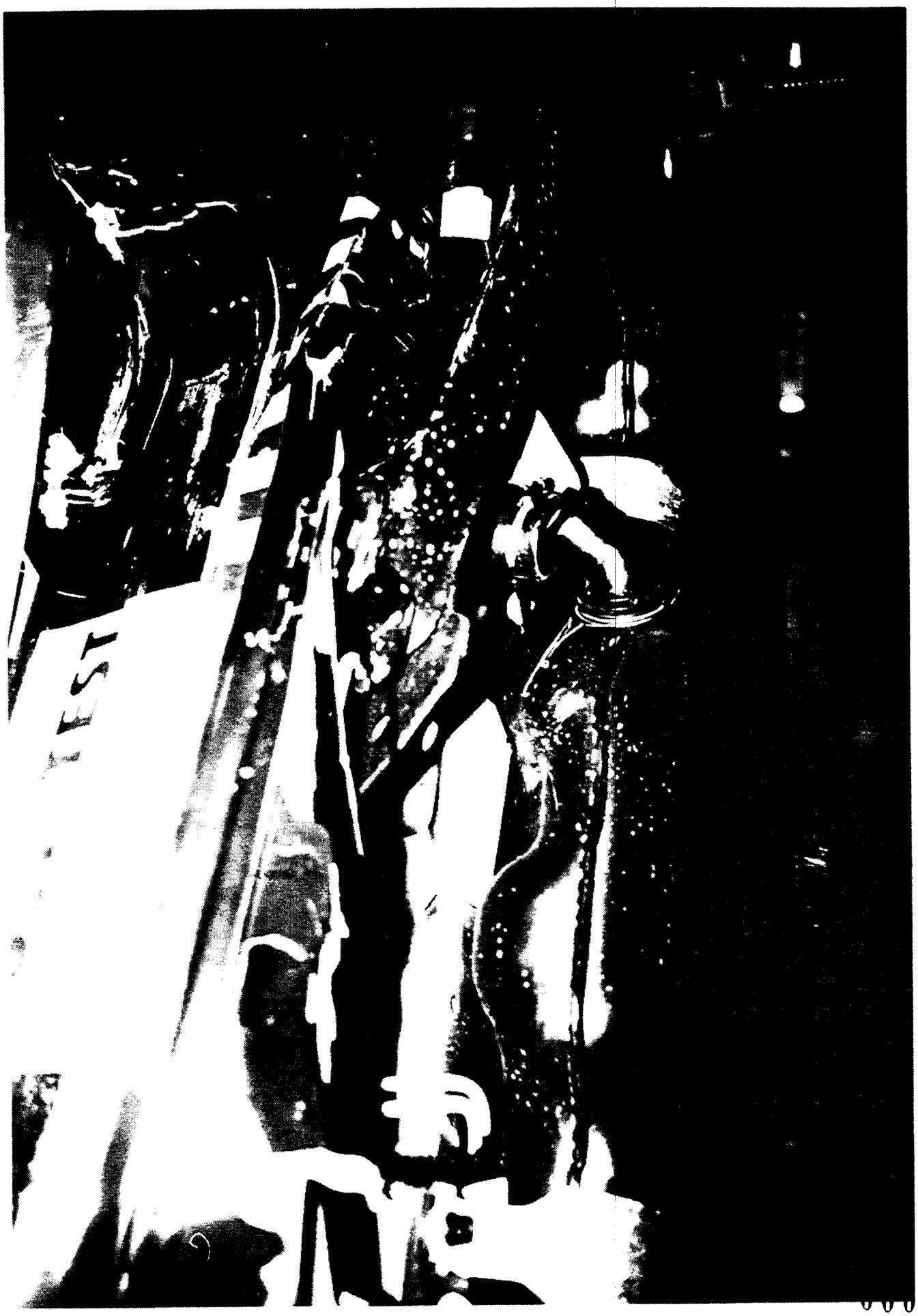


Photo No. A-48 - Post-Test Fuel Leakage Point

Photo No. A-49 - Post-Test Fuel Leakage Point

0000527

Photo No. A-50 - Pre-Test Driver Interior Door View

000528

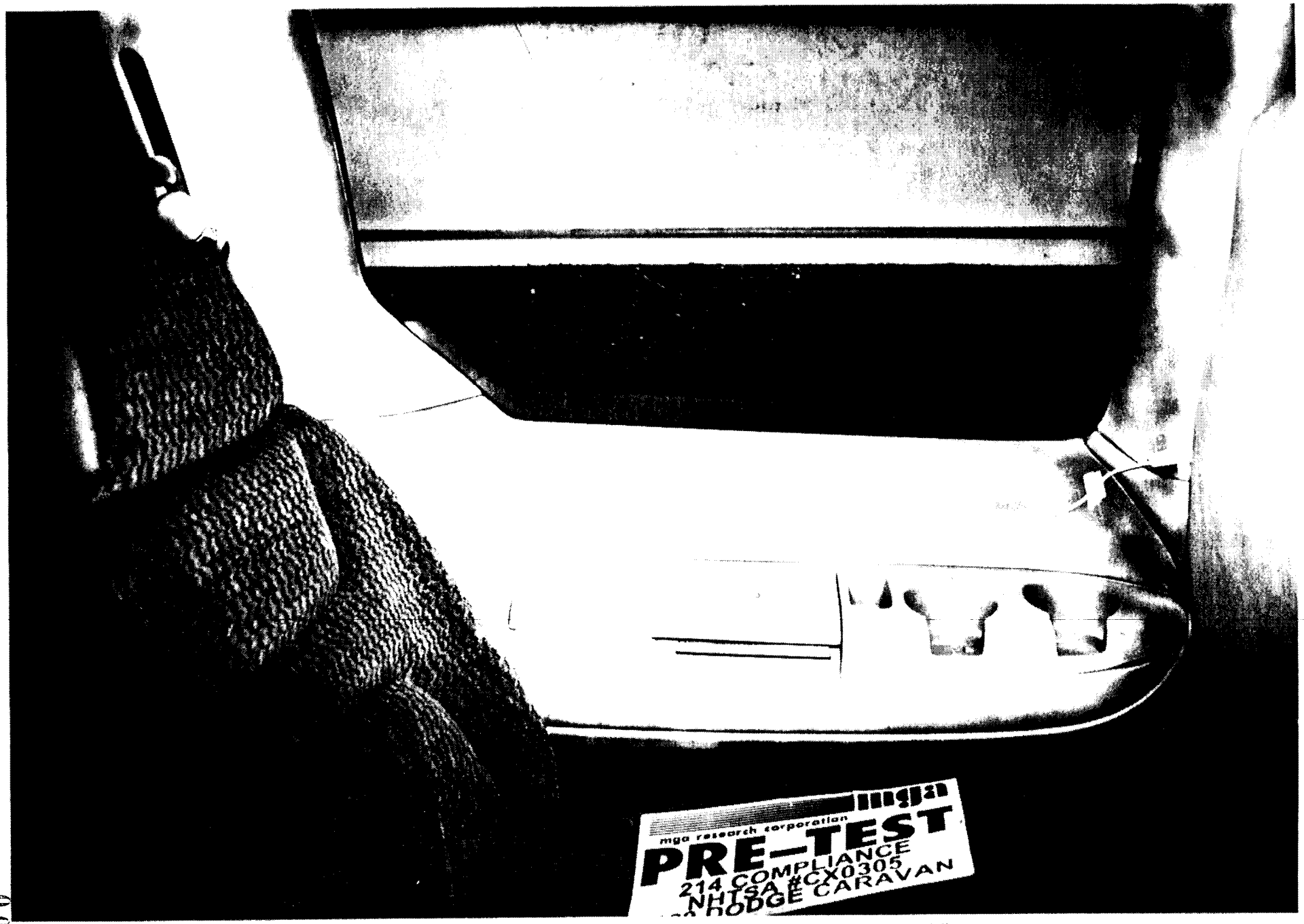


Photo No. A-51 - Pre-Test Rear Passenger Interior Door View

000529

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* Mounting cube broke loose during impact

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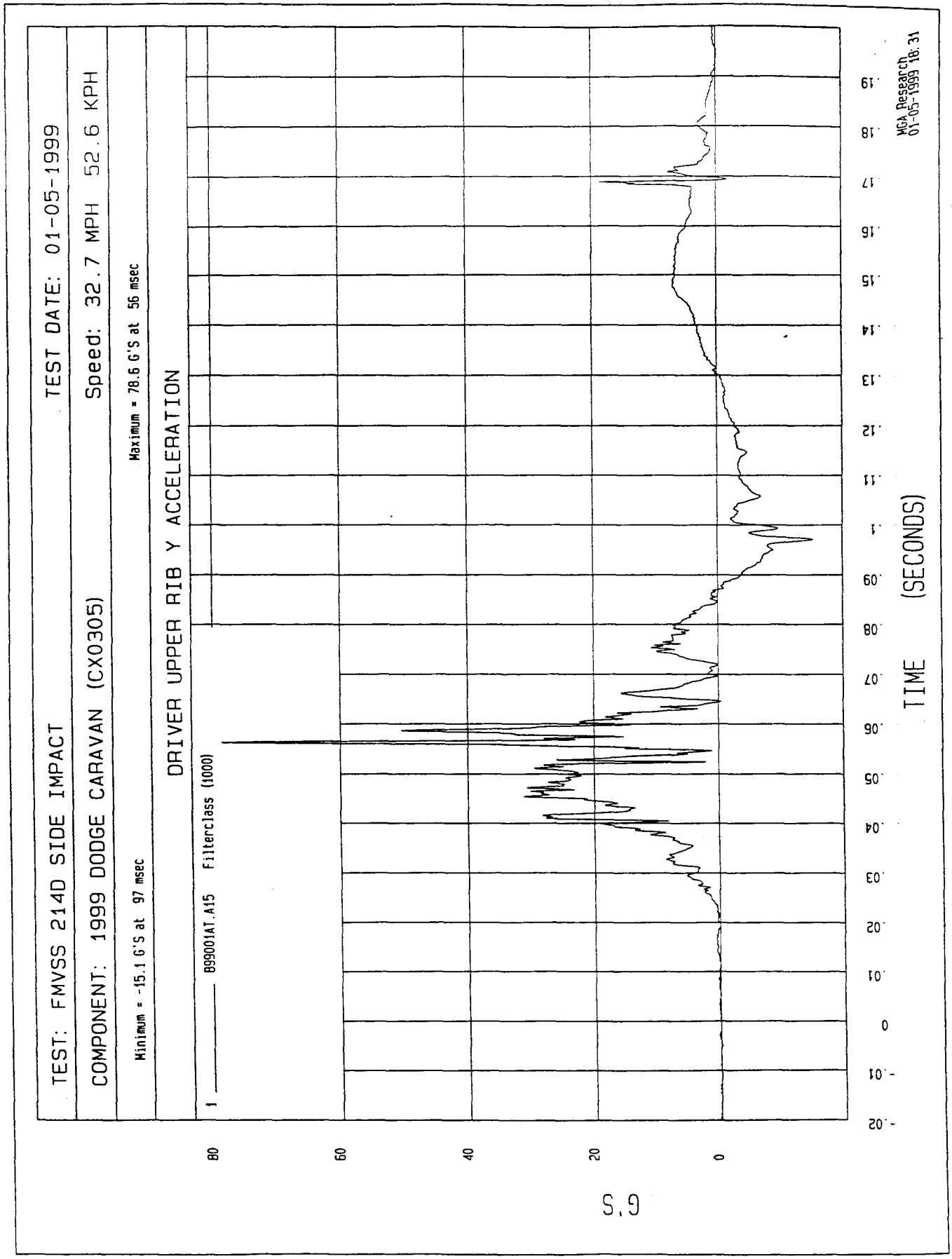

TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -15.1 G'S at 97 msec
Maximum = 78.6 G'S at 56 msec
DRIVER UPPER RIB Y ACCELERATION
1 B99001AT.A15 Filterclass (1000)
80
60
40
20
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:31

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

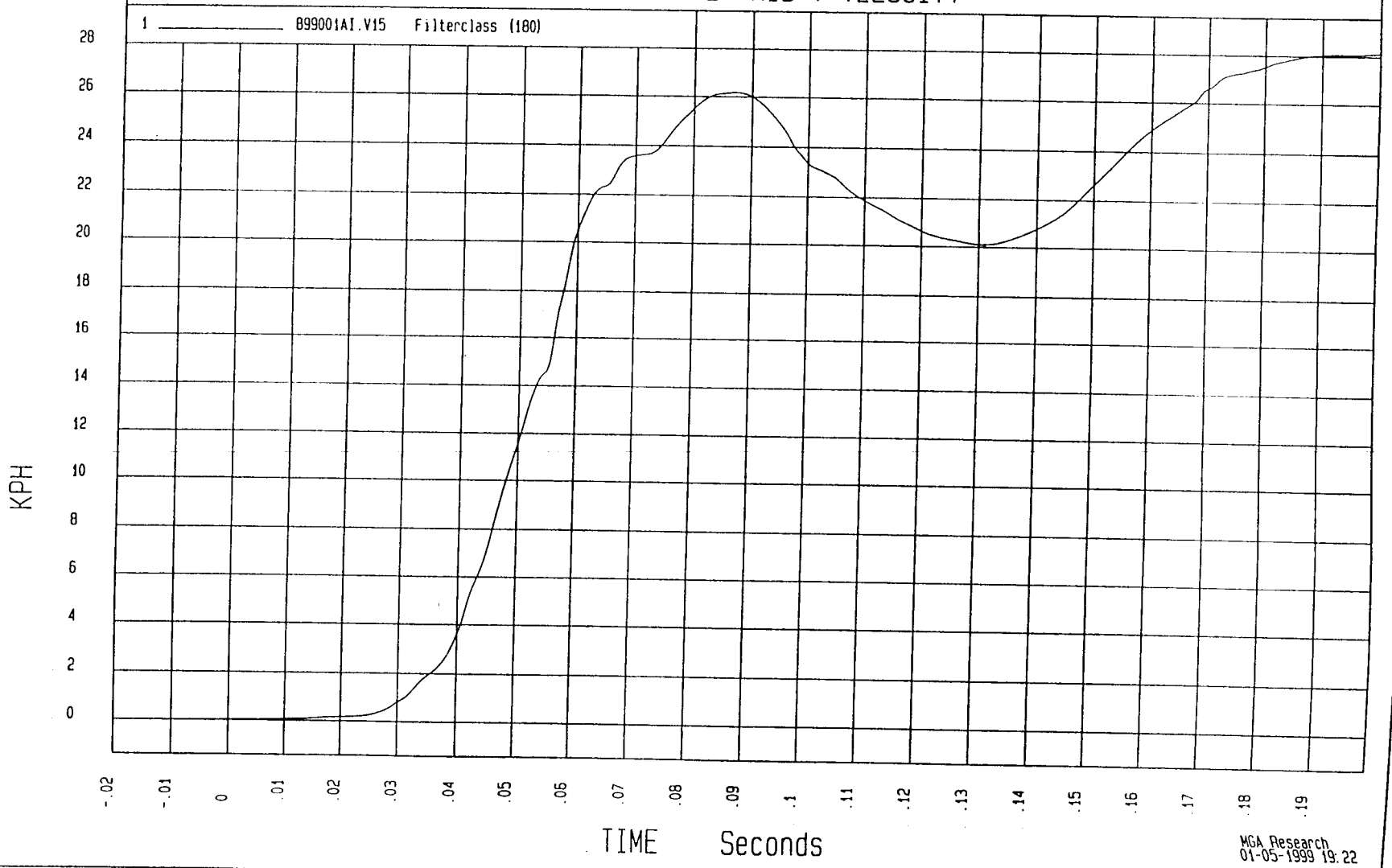
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = 0 KPH at -20 msec

Maximum = 28.13 KPH at 200 msec

DRIVER UPPER RIB Y VELOCITY



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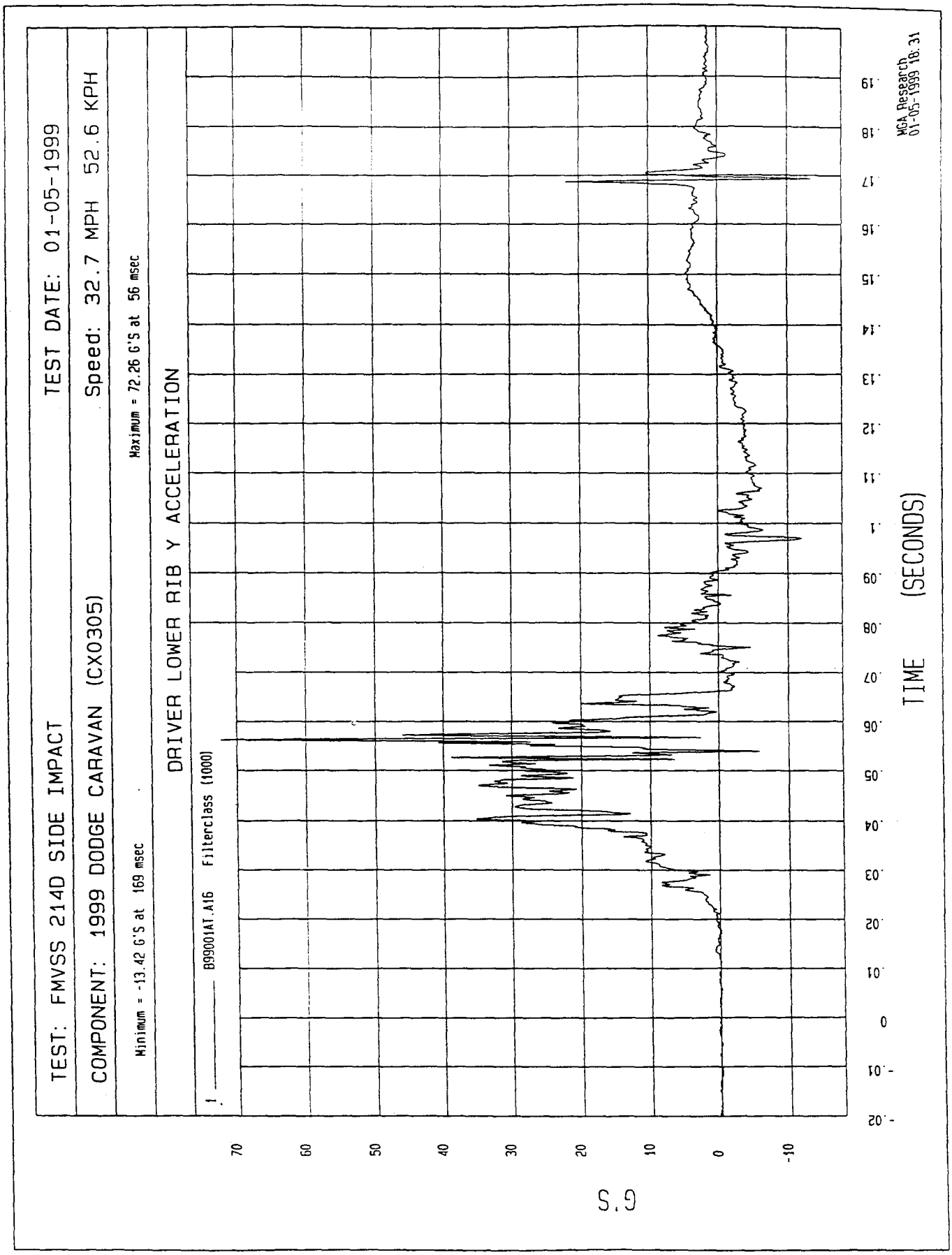
01-05-1999 19:22

0000537


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -13.42 G'S at 169 msec
Maximum = 72.26 G'S at 56 msec
DRIVER LOWER RIB Y ACCELERATION
B99001AT.A16 Filterclass (1000)
G'S
70
60
50
40
30
20
10
0
-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
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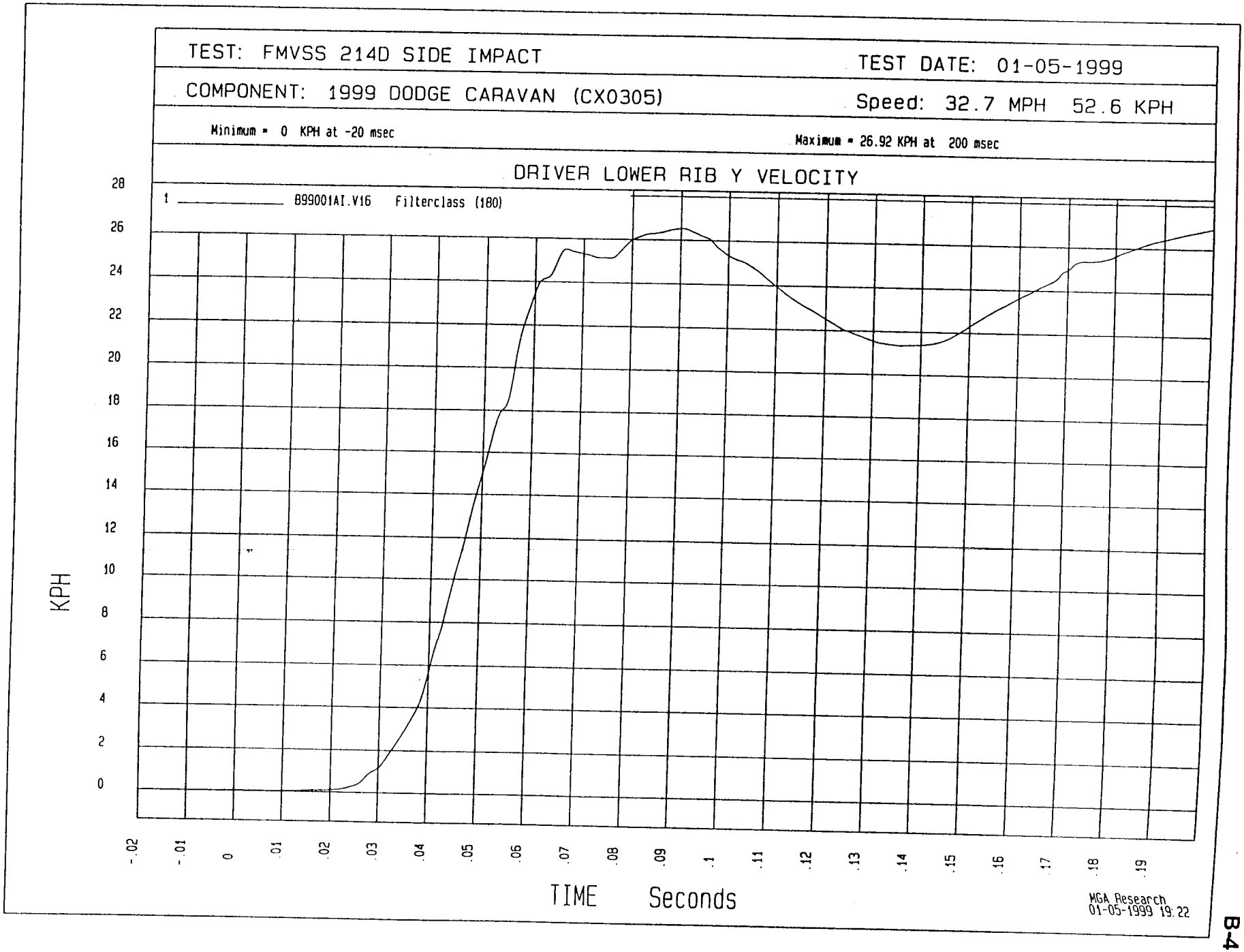
TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = 0 KPH at -20 msec
Maximum = 26.92 KPH at 200 msec
DRIVER LOWER RIB Y VELOCITY
1 B99001AI.V16 Filterclass (180)
KPH
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
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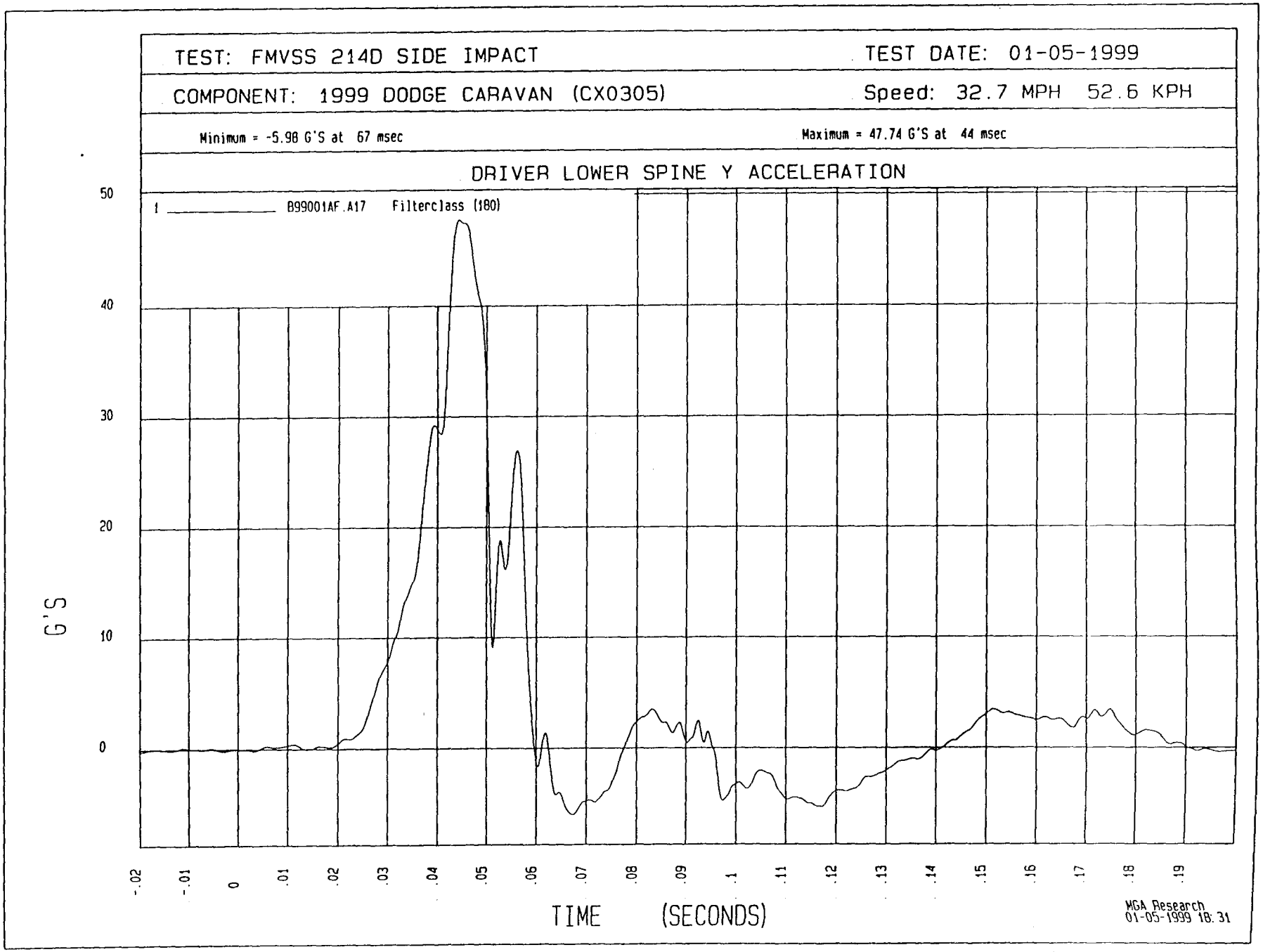
000539


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -5.98 G'S at 67 msec
Maximum = 47.74 G'S at 44 msec
DRIVER LOWER SPINE Y ACCELERATION
1 B99001AF.A17 Filterclass (180)
G'S
50
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
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TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

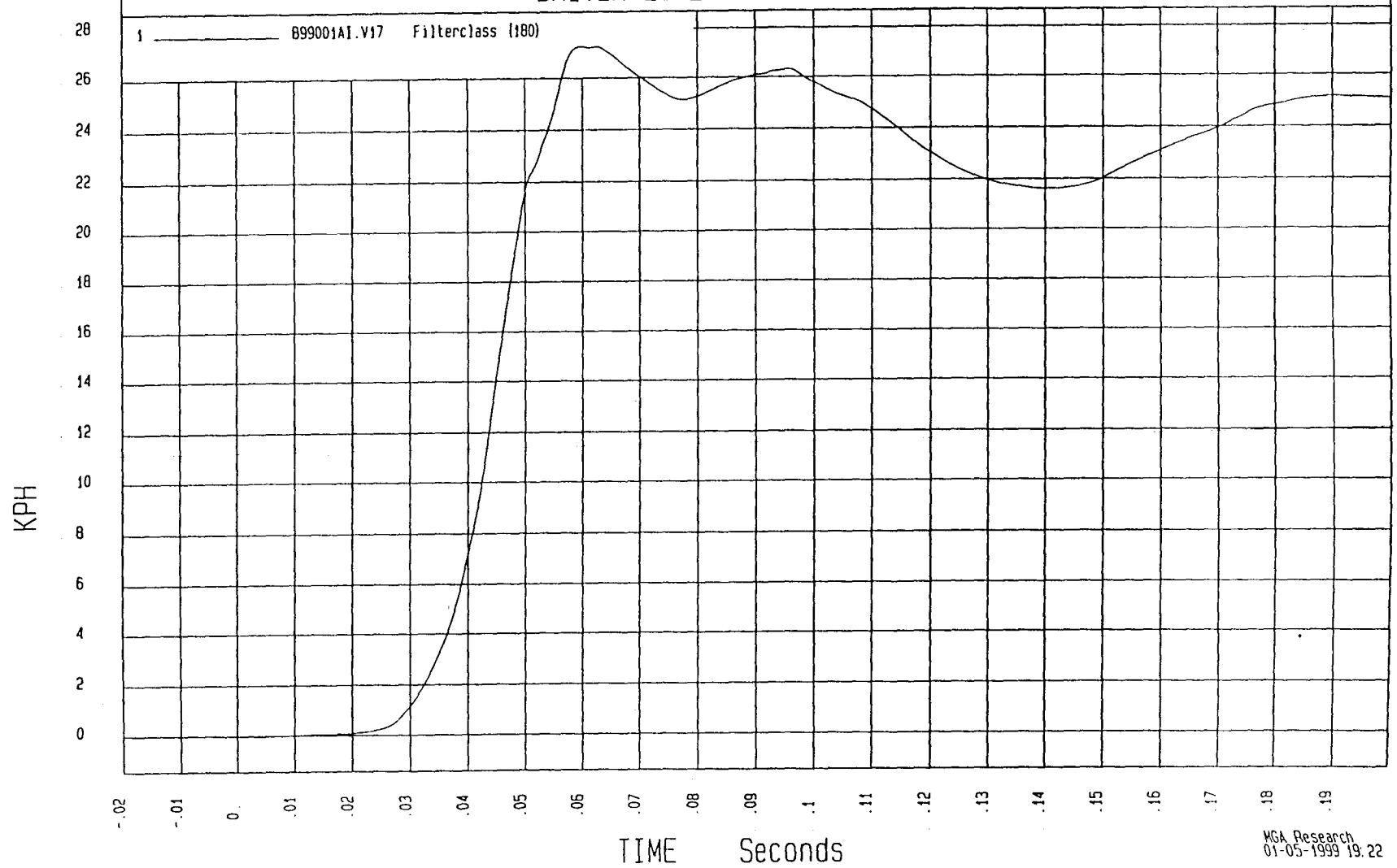
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -3.28E-02 KPH at 4 msec

Maximum = 27.29 KPH at 60 msec

DRIVER LOWER SPINE Y VELOCITY



MGA Research
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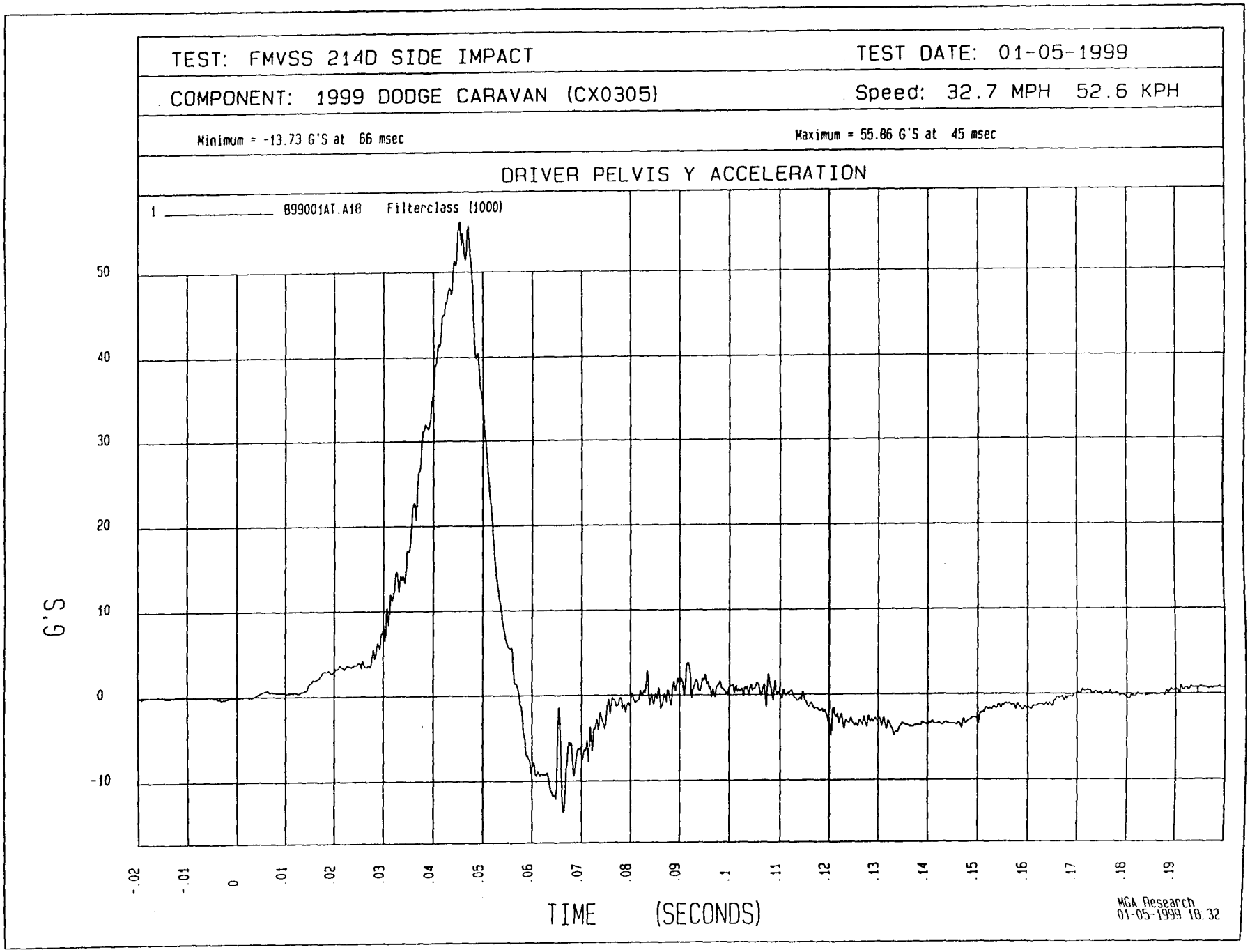
000541


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -13.73 G'S at 66 msec
Maximum = 55.86 G'S at 45 msec
DRIVER PELVIS Y ACCELERATION
1 899001AT.A18 Filterclass (1000)
G'S
50
40
30
20
10
0
-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
01-05-1999 18:32

000054

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

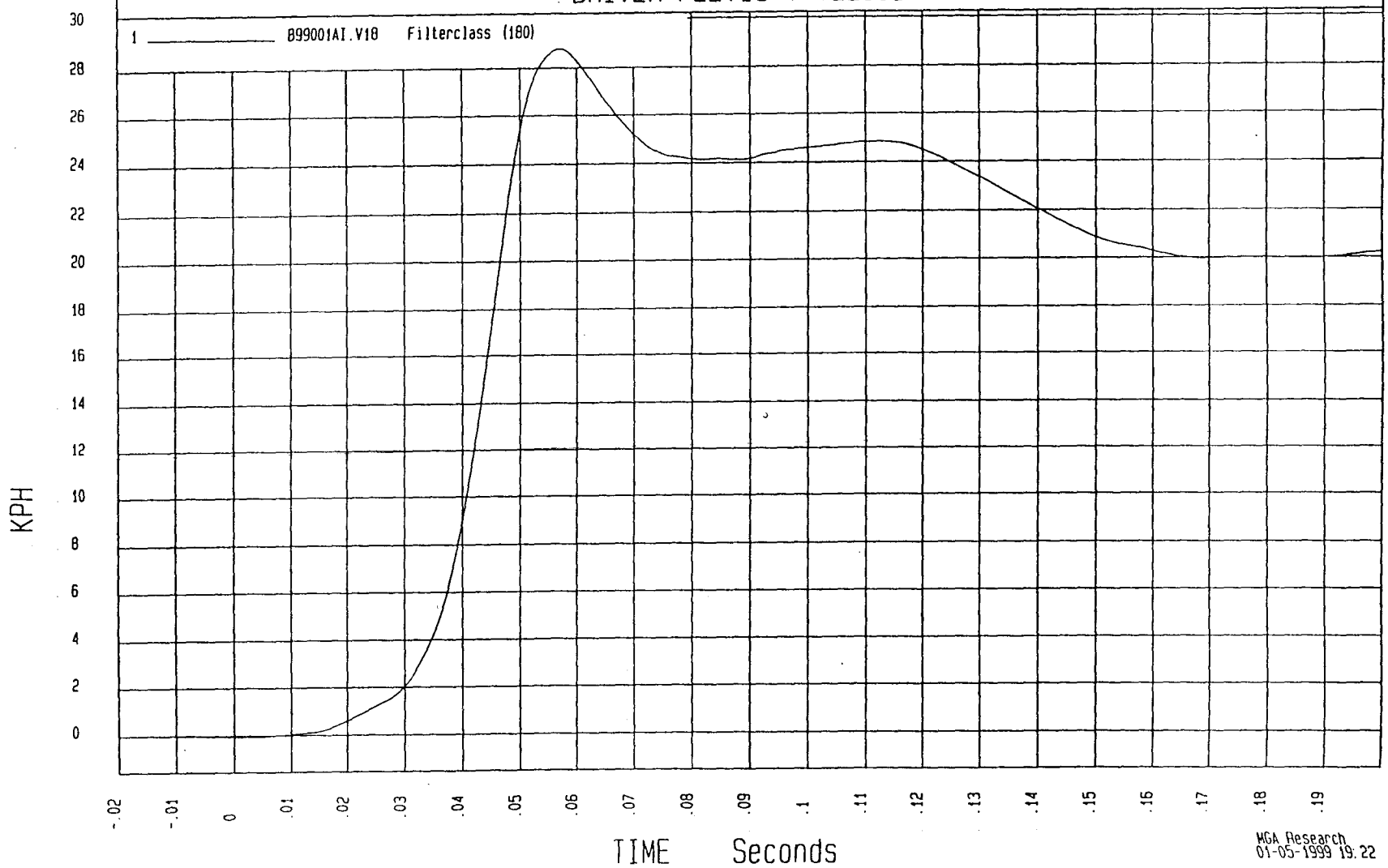
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -5.65E-02 KPH at 4 msec

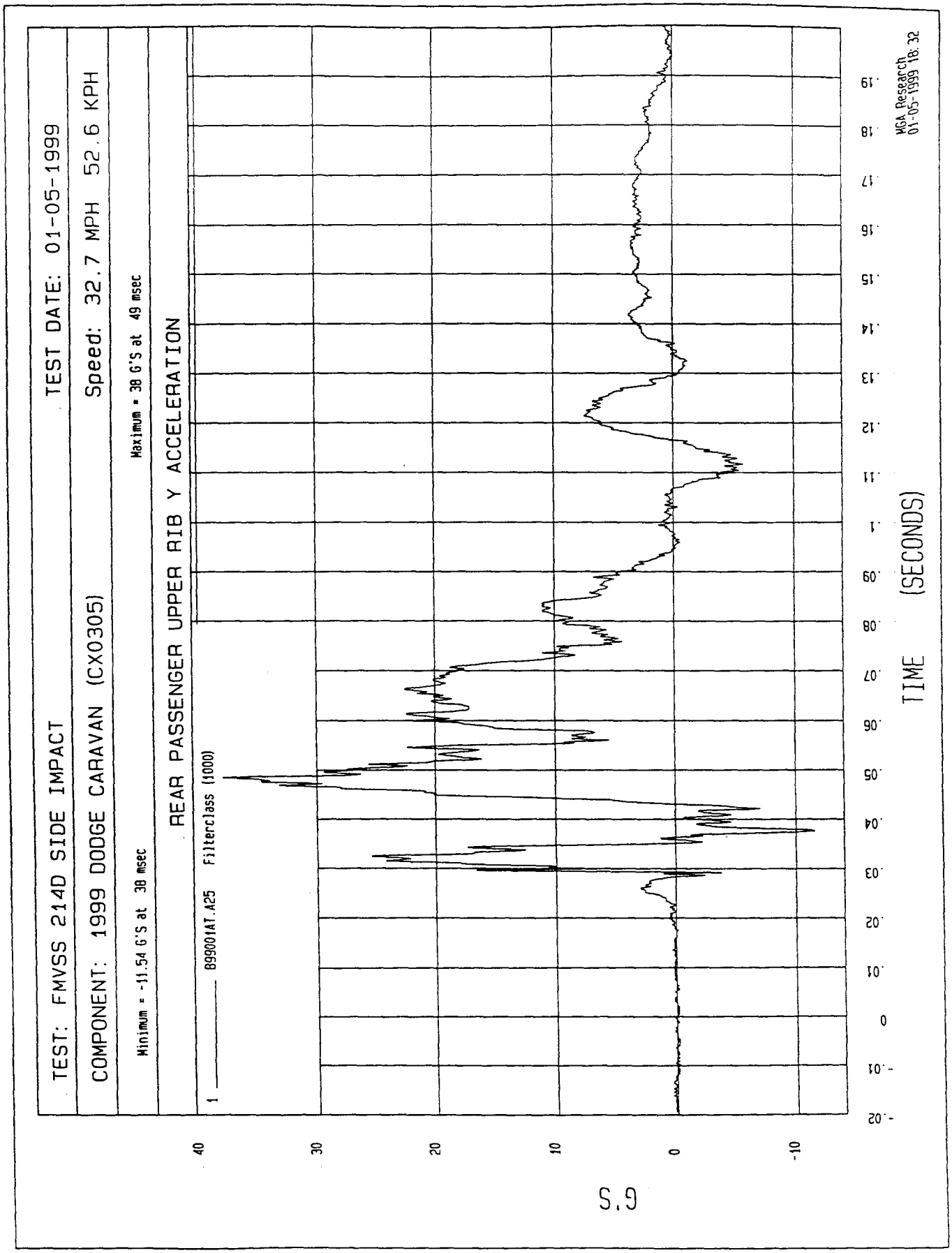
Maximum = 28.77 KPH at 57 msec

DRIVER PELVIS Y VELOCITY



MGA Research
01-05-1999 19:22

0000543

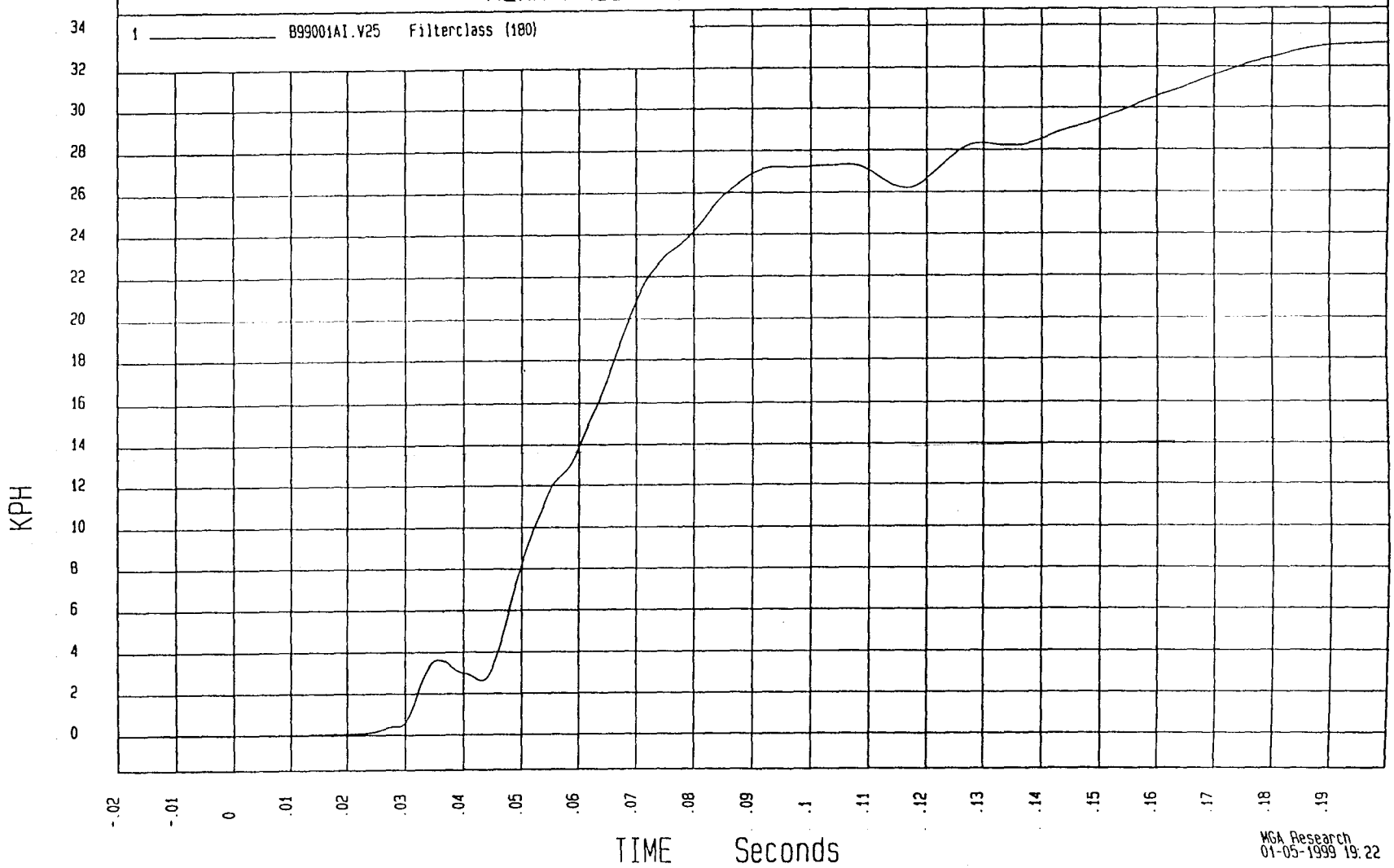

TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -11.54 G'S at 38 msec
Maximum = 38 G'S at 49 msec
REAR PASSENGER UPPER RIB Y ACCELERATION
1 B99001AT.A25 Filterclass (1000)
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:32

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

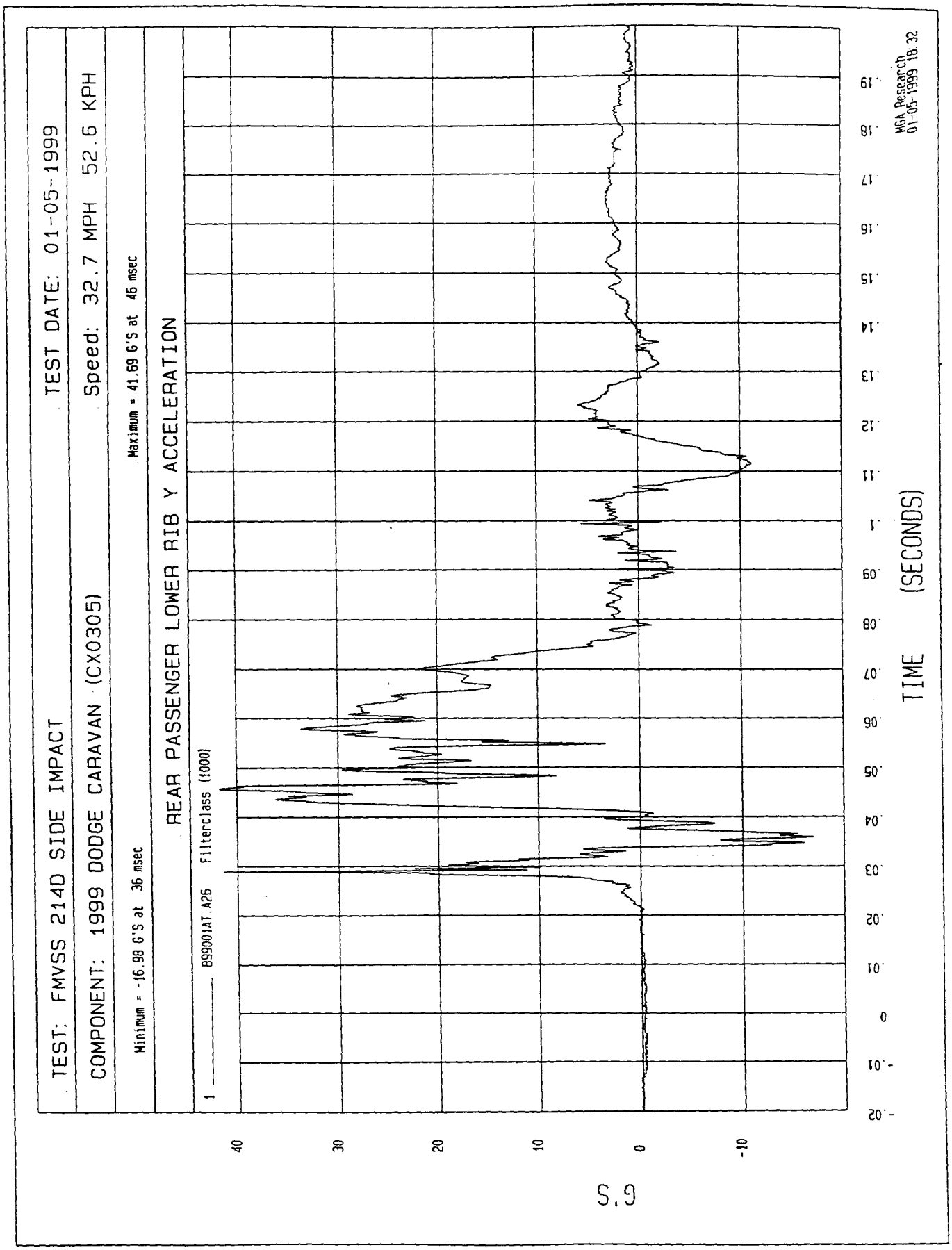
Minimum = -2.87E-07 KPH at -20 msec | Maximum = 33.13 KPH at 200 msec

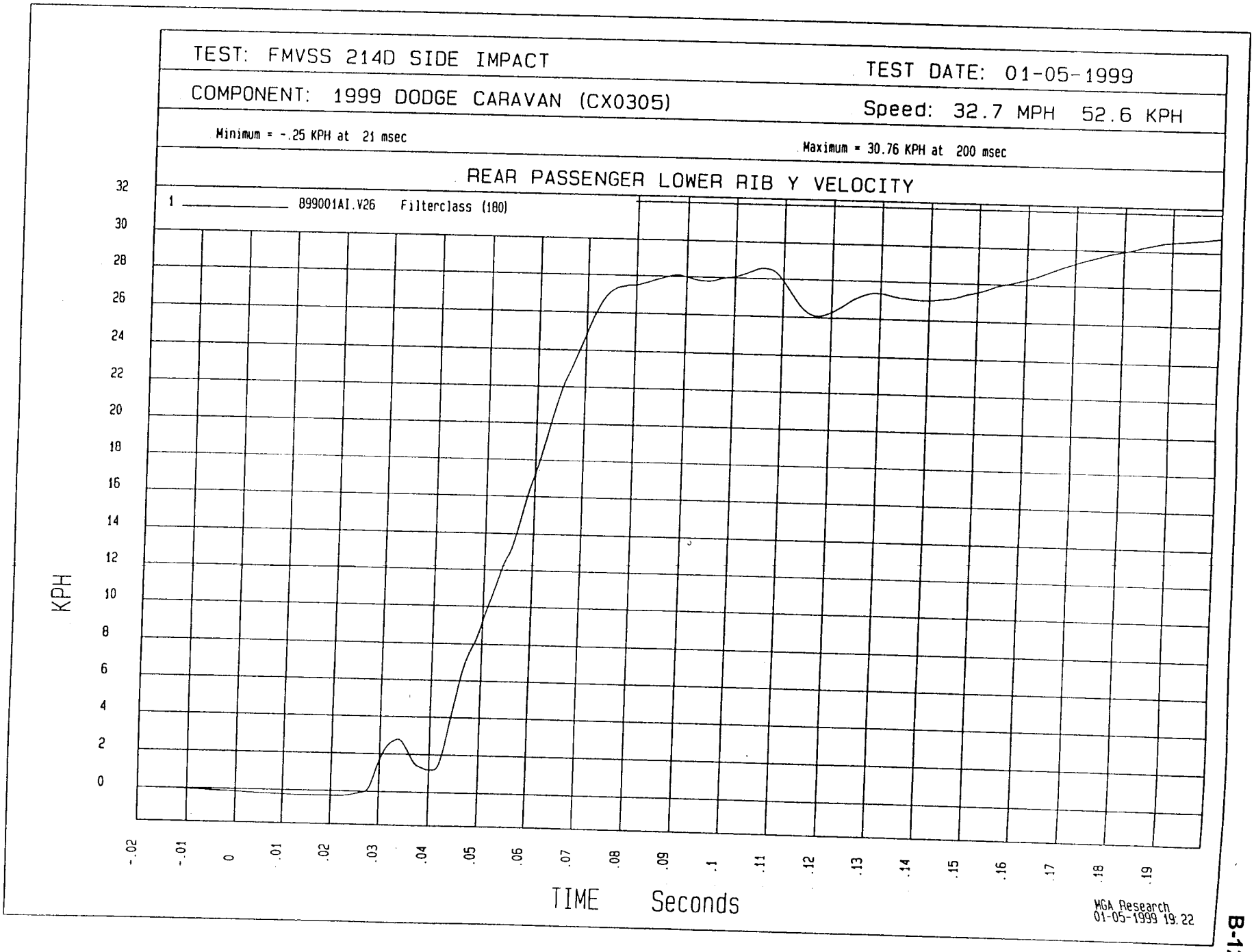
REAR PASSENGER UPPER RIB Y VELOCITY



MGA Research
01-05-1999 19:22

0000545


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -16.98 G'S at 36 msec
Maximum = 41.69 G'S at 46 msec
REAR PASSENGER LOWER RIB Y ACCELERATION
1 899001AT.A26 Filterclass (1000)
MGA Research
01-05-1999 18:32
G'S
40
30
20
10
0
-10
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -.25 KPH at 21 msec
Maximum = 30.76 KPH at 200 msec
REAR PASSENGER LOWER RIB Y VELOCITY
1 B99001AI.V26 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
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
01-05-1999 19:22

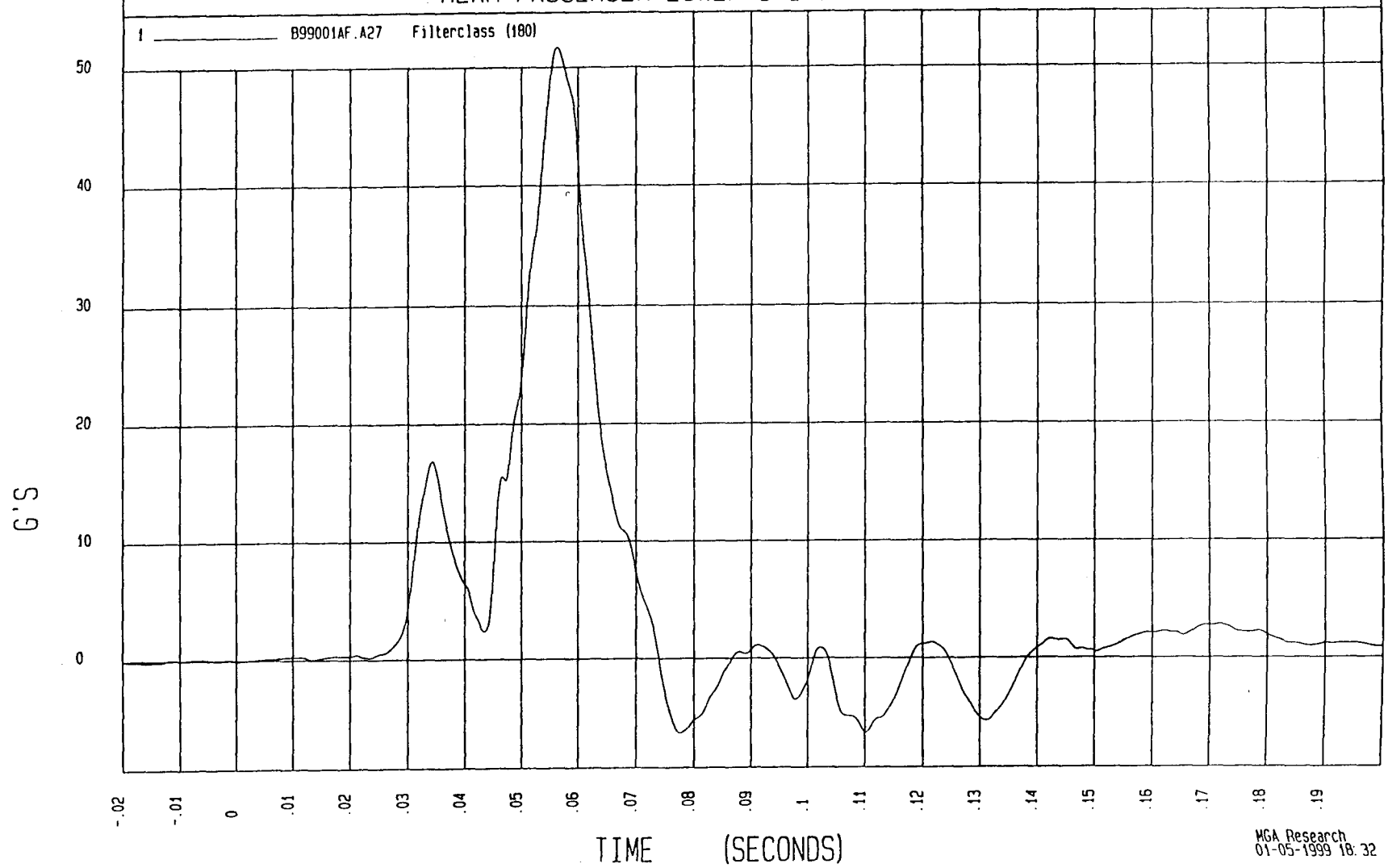
0000547

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = -6.39 G'S at 78 msec Maximum = 51.68 G'S at 56 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION



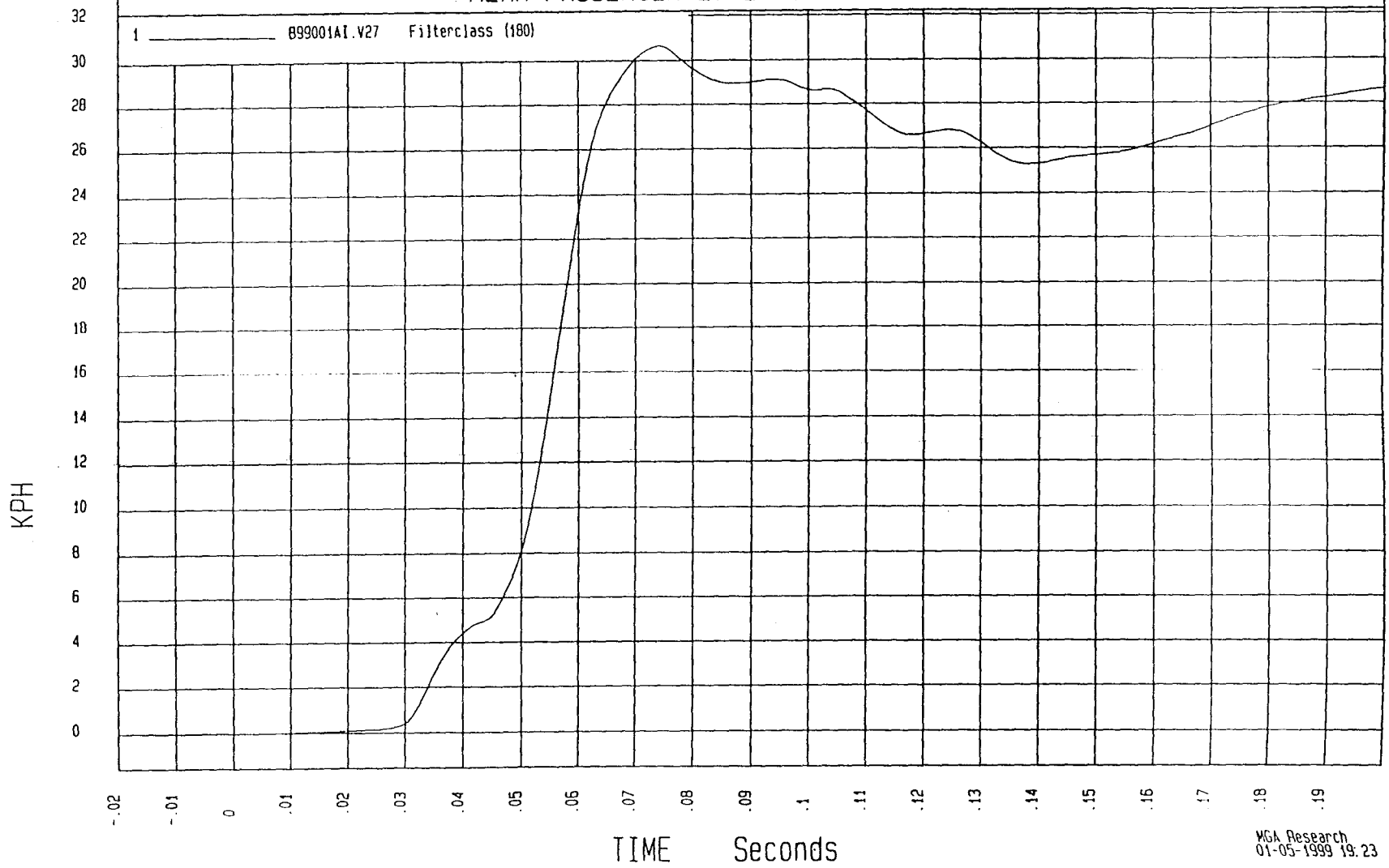
000548

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

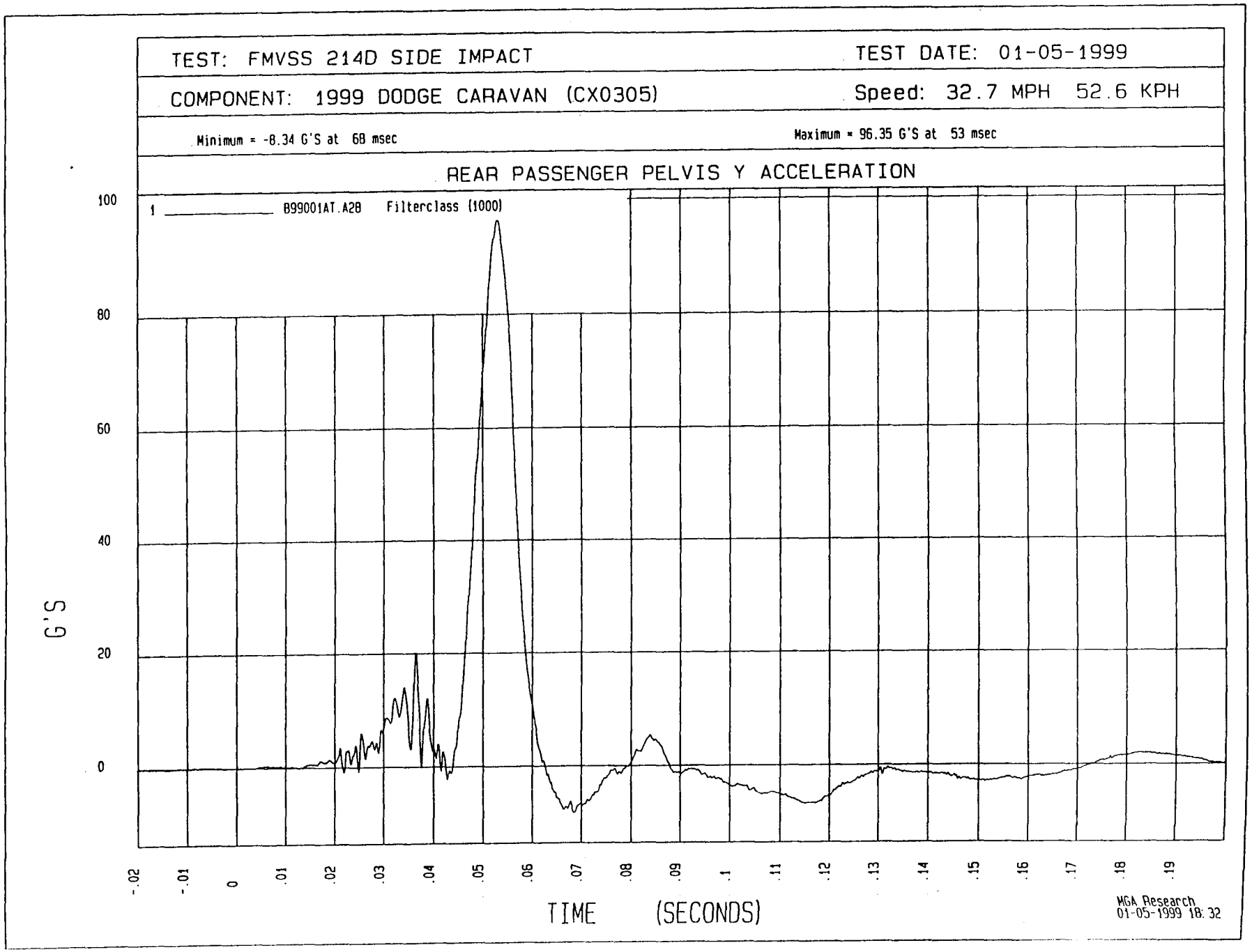
Minimum = -3.00E-02 KPH at -12 msec — Maximum = 30.65 KPH at 74 msec

REAR PASSENGER LOWER SPINE Y VELOCITY



MGA Research
01-05-1999 19:23

000549


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -8.34 G'S at 68 msec
Maximum = 96.35 G'S at 53 msec
REAR PASSENGER PELVIS Y ACCELERATION
1 B99001AT.A28 Filterclass (1000)
G'S
100
80
60
40
20
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:32

000053 0

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

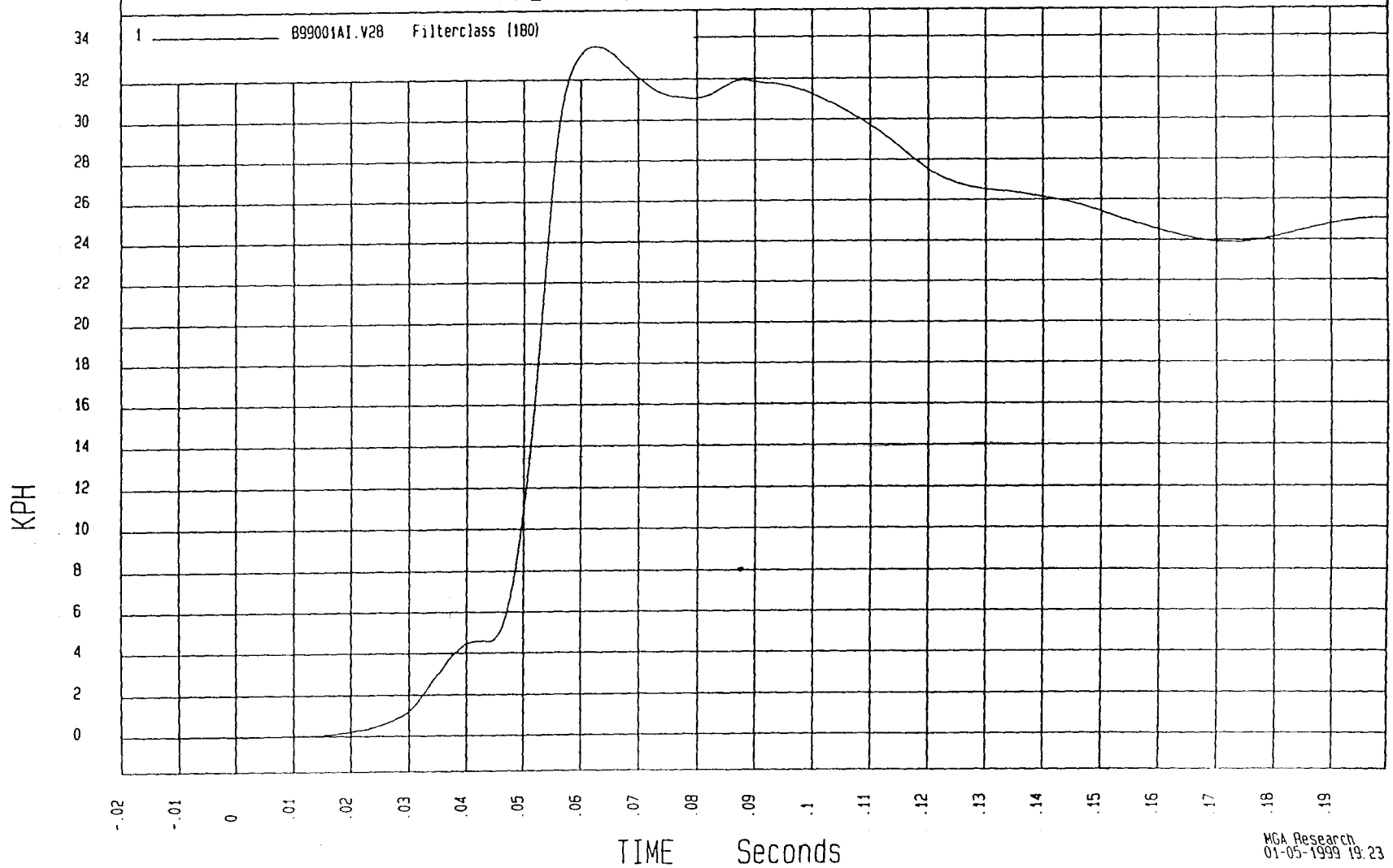
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -2.55E-02 KPH at -12 msec

Maximum = 33.58 KPH at 62 msec

REAR PASSENGER PELVIS Y VELOCITY



MGA Research
01-05-1999 19:23

0000521

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

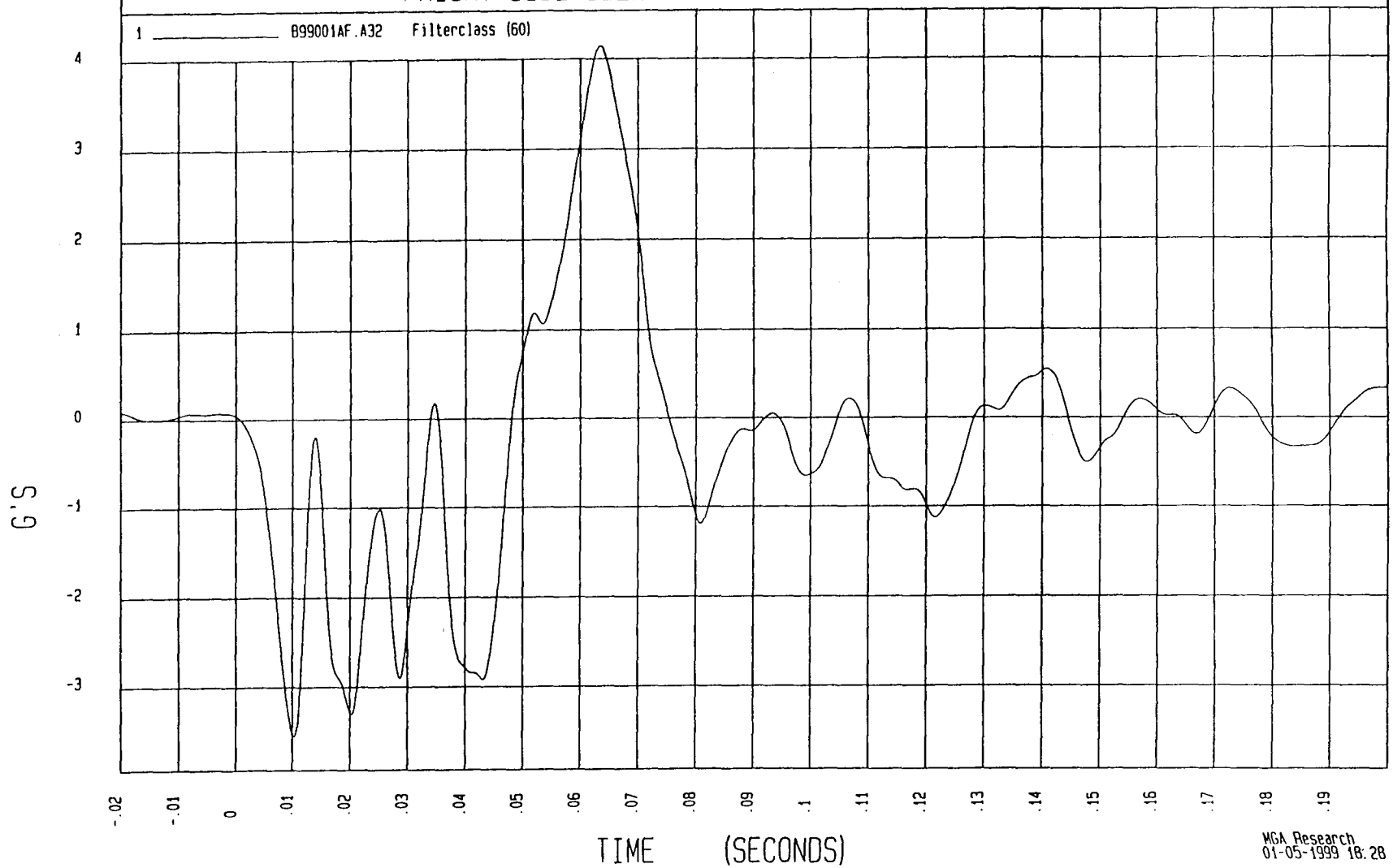
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -3.54 G'S at 10 msec

Maximum = 4.14 G'S at 64 msec

RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION



MGA Research
01-05-1999 18:28

0000552

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

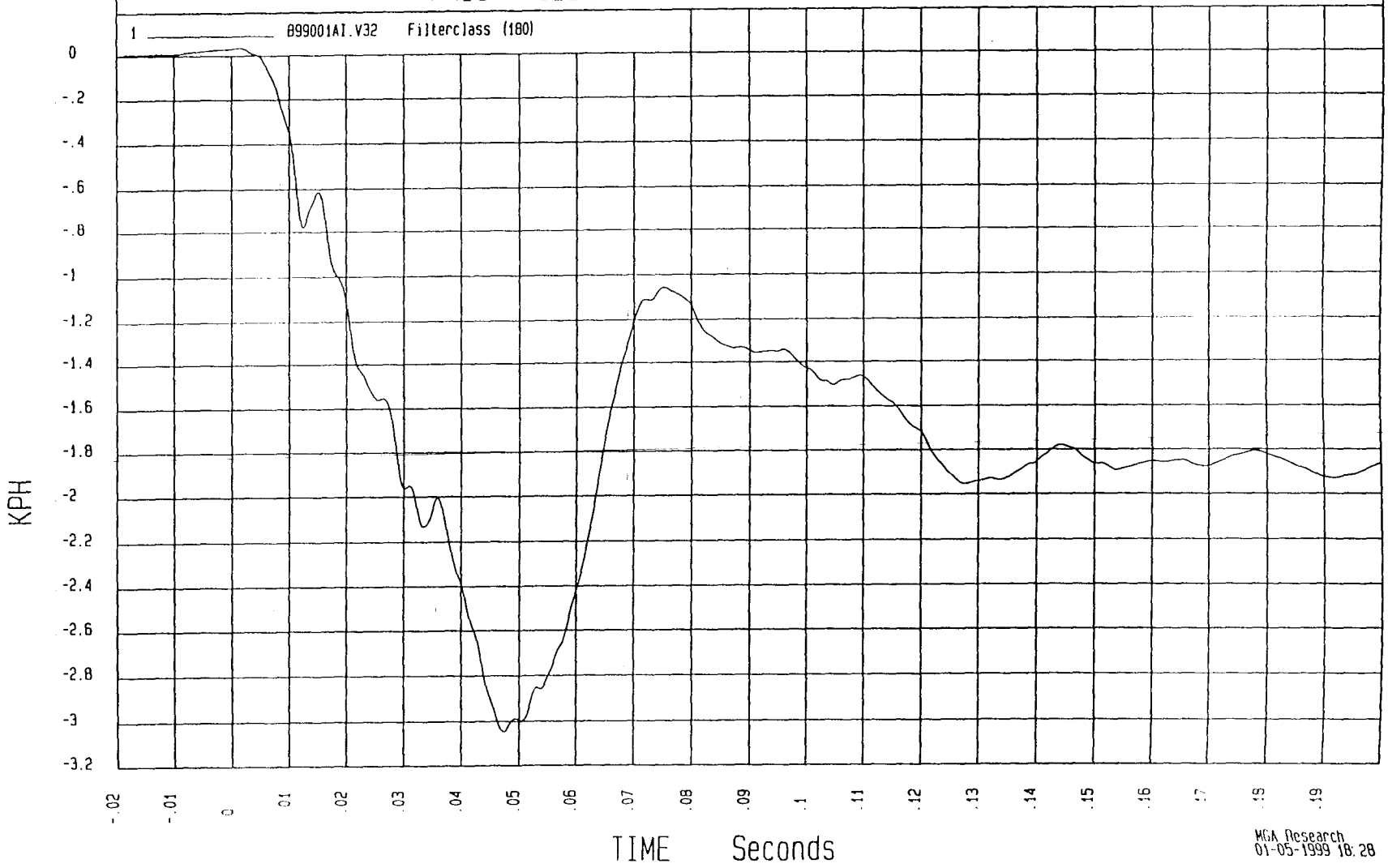
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -3.05 KPH at 48 msec

Maximum = 3.37E-02 KPH at 1 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY



MGA Research
01-05-1999 18:28

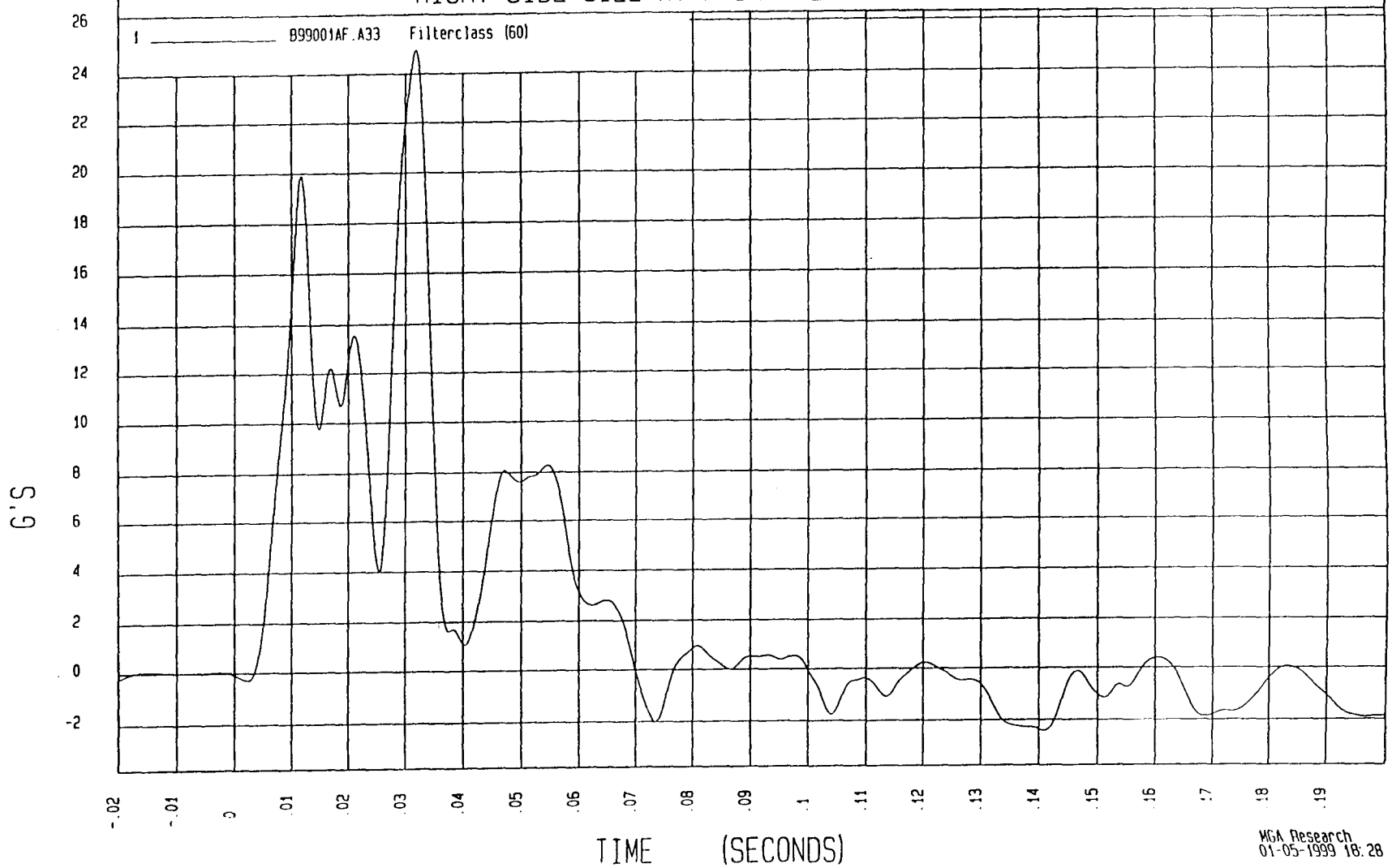
000053

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -2.42 G'S at 141 msec — Maximum = 24.91 G'S at 32 msec

RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION



MGA Research
01-05-1999 18:28

000054

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

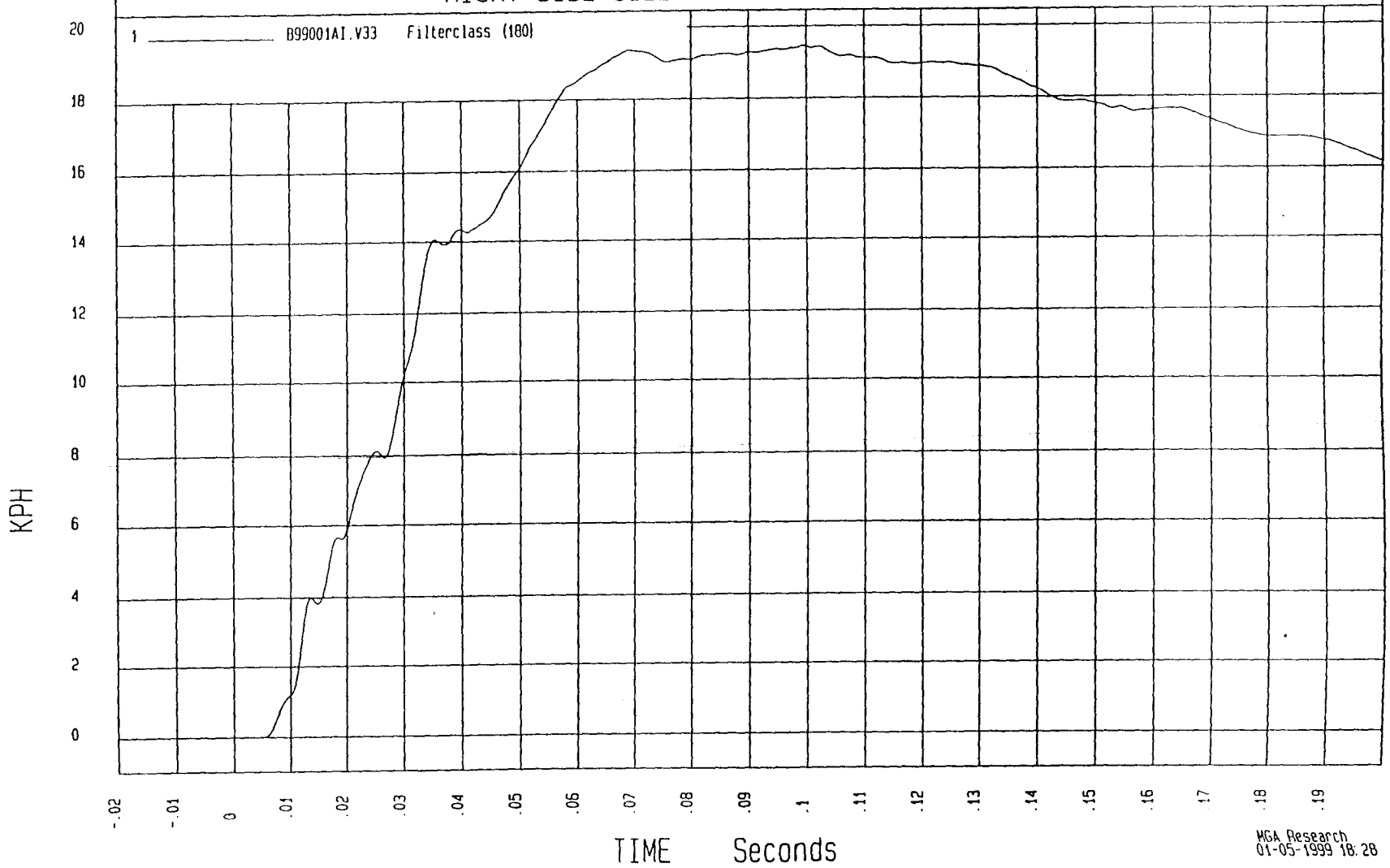
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -5.79E-03 KPH at -16 msec

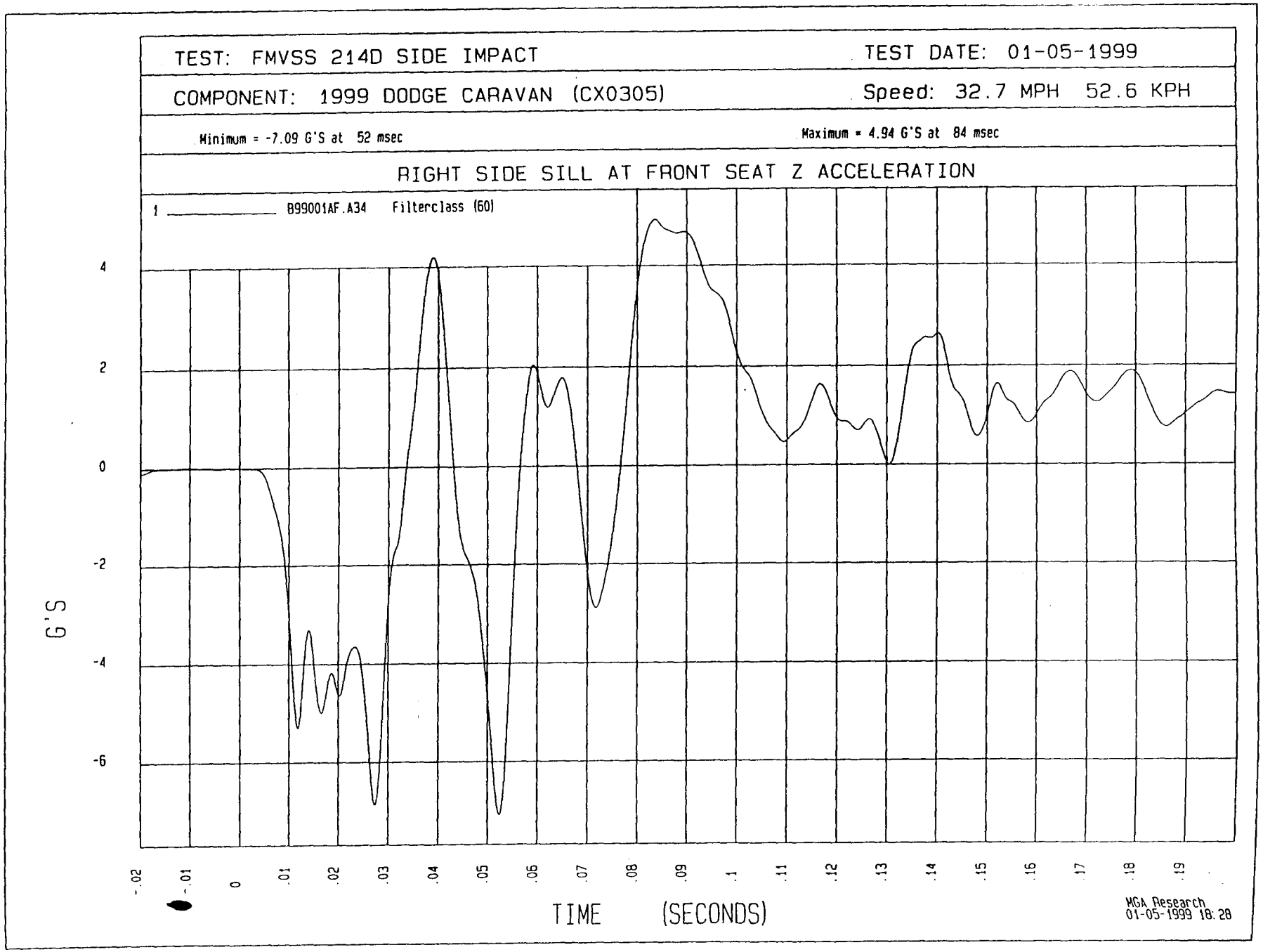
Maximum = 19.46 KPH at 100 msec

RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY



MGA Research
01-05-1999 18:28

000055


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -7.09 G'S at 52 msec
Maximum = 4.94 G'S at 84 msec
RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION
1 B99001AF.A34 Filterclass (60)
G'S
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
01-05-1999 18:28

000056

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

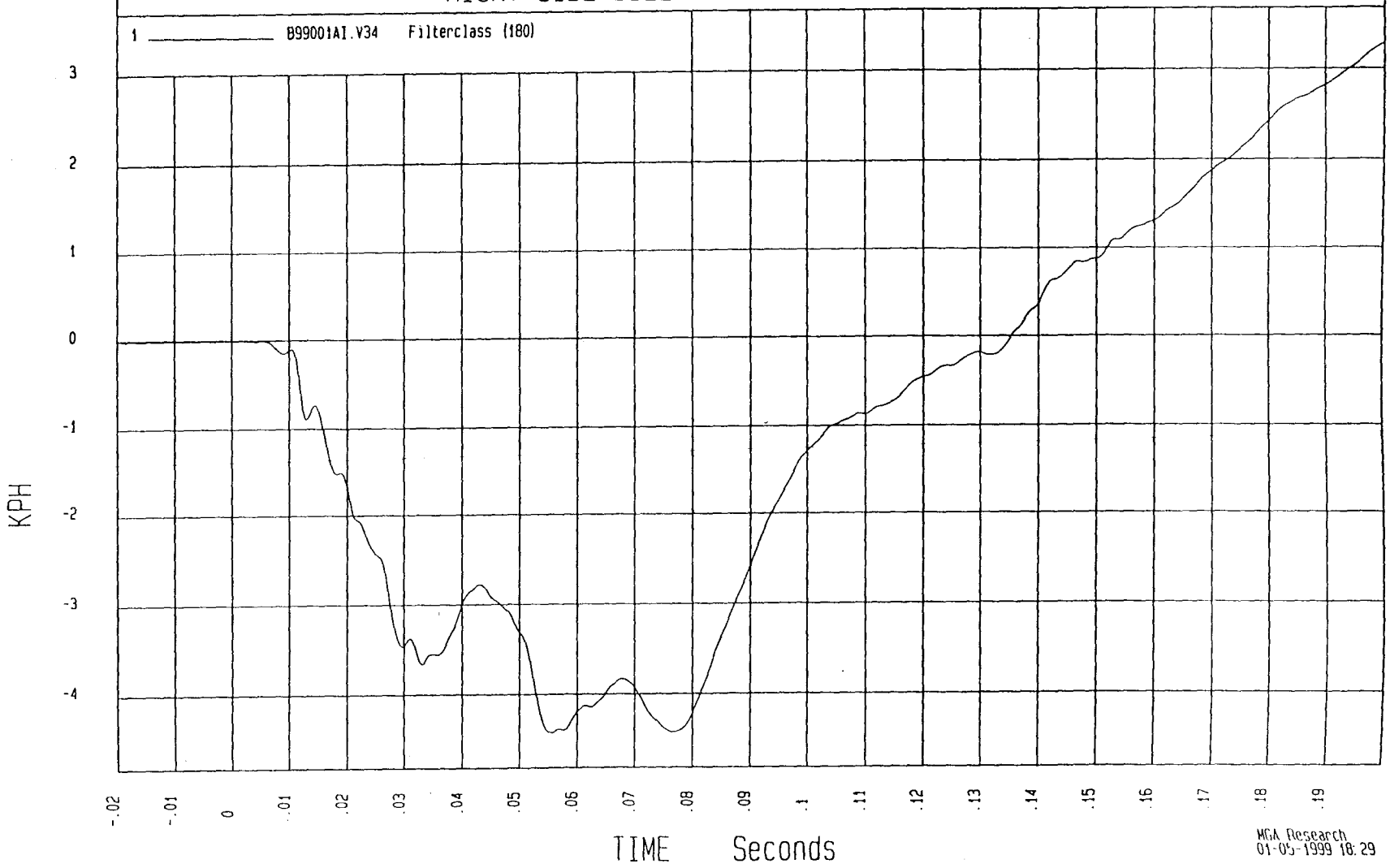
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -4.43 KPH at 56 msec

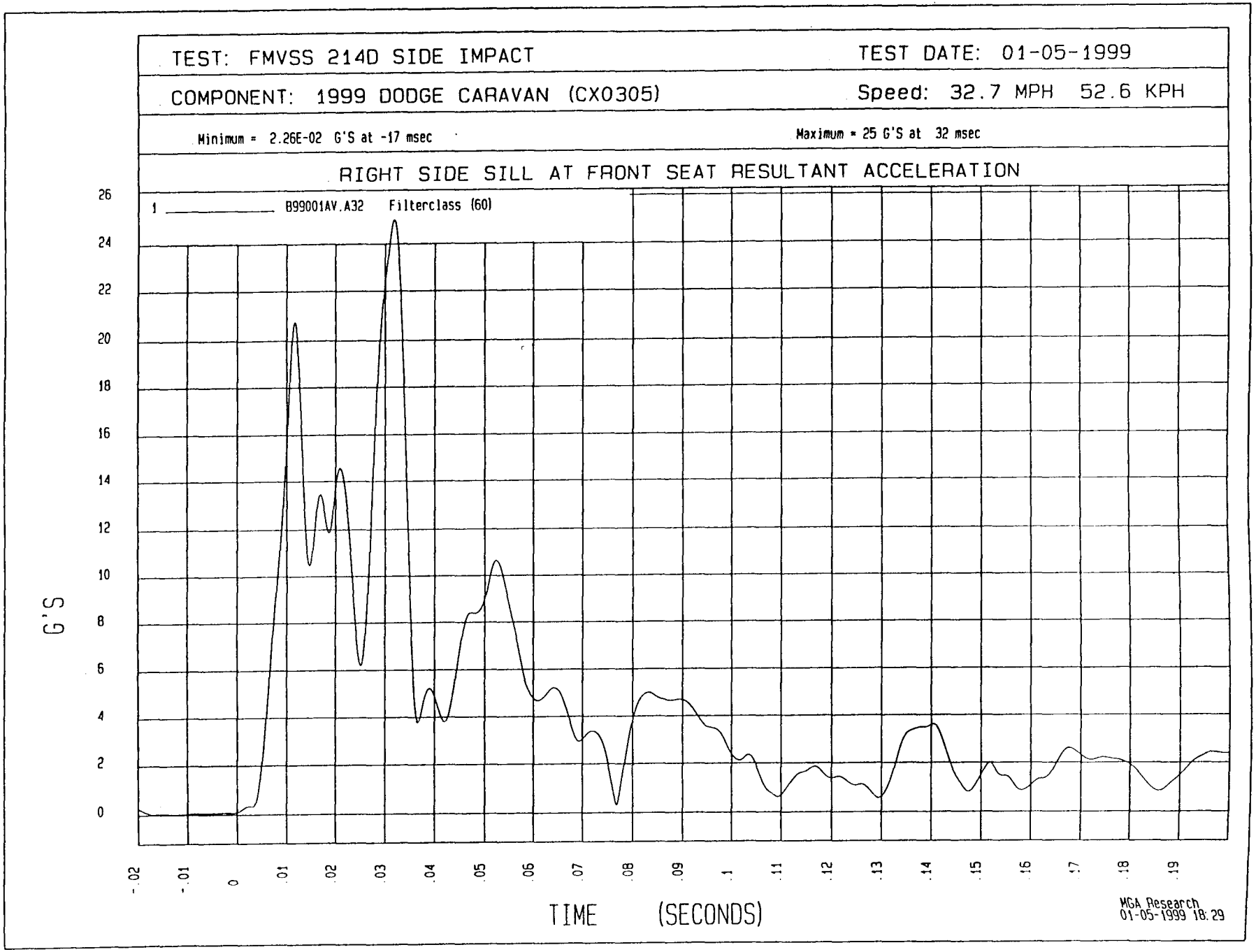
Maximum = 3.28 KPH at 200 msec

RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY



MGA Research
01-05-1999 18:29

000057


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = 2.26E-02 G'S at -17 msec
Maximum = 25 G'S at 32 msec
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION
1 B99001AV.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
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:29

000058

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

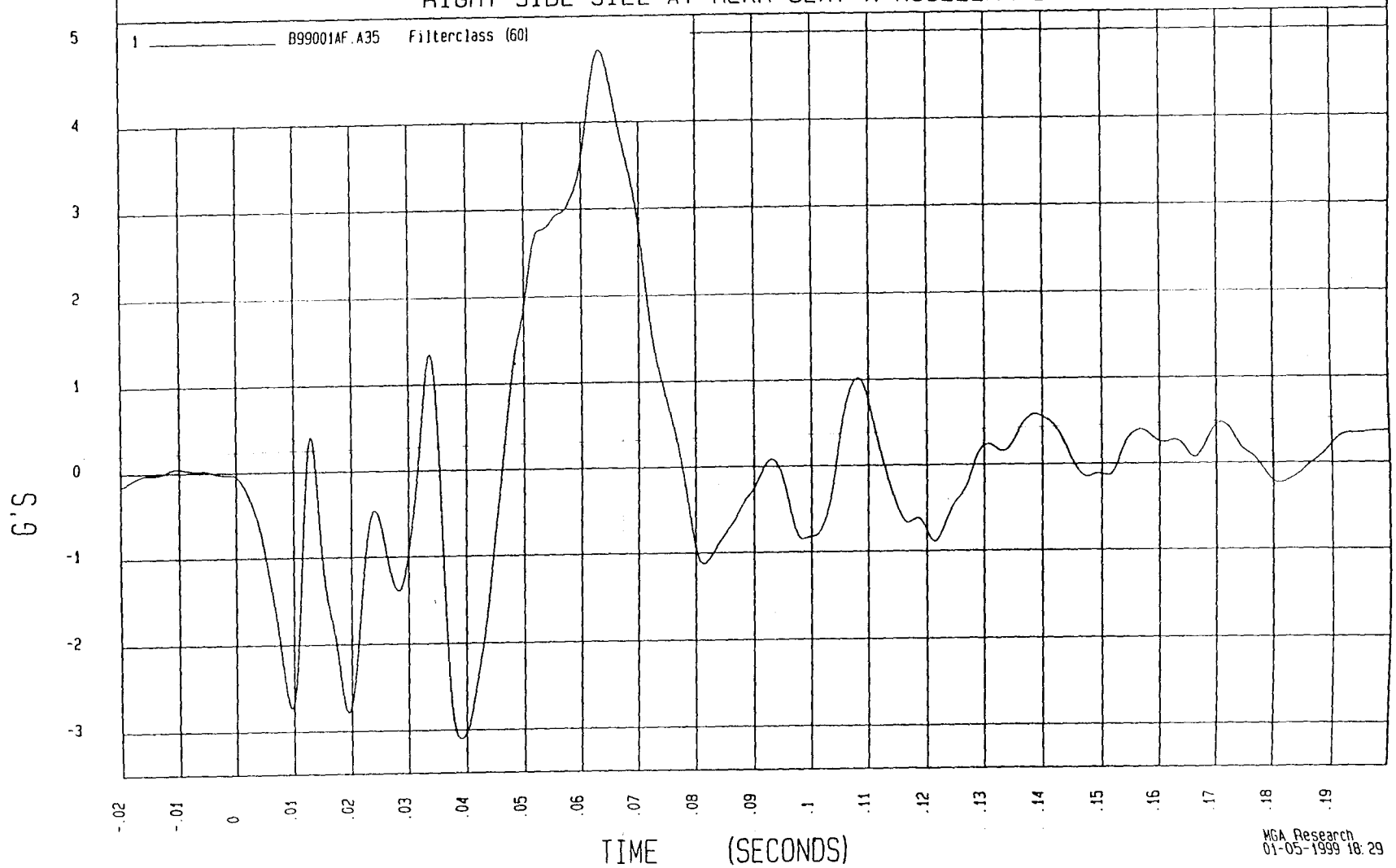
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -3.1 G'S at 39 msec

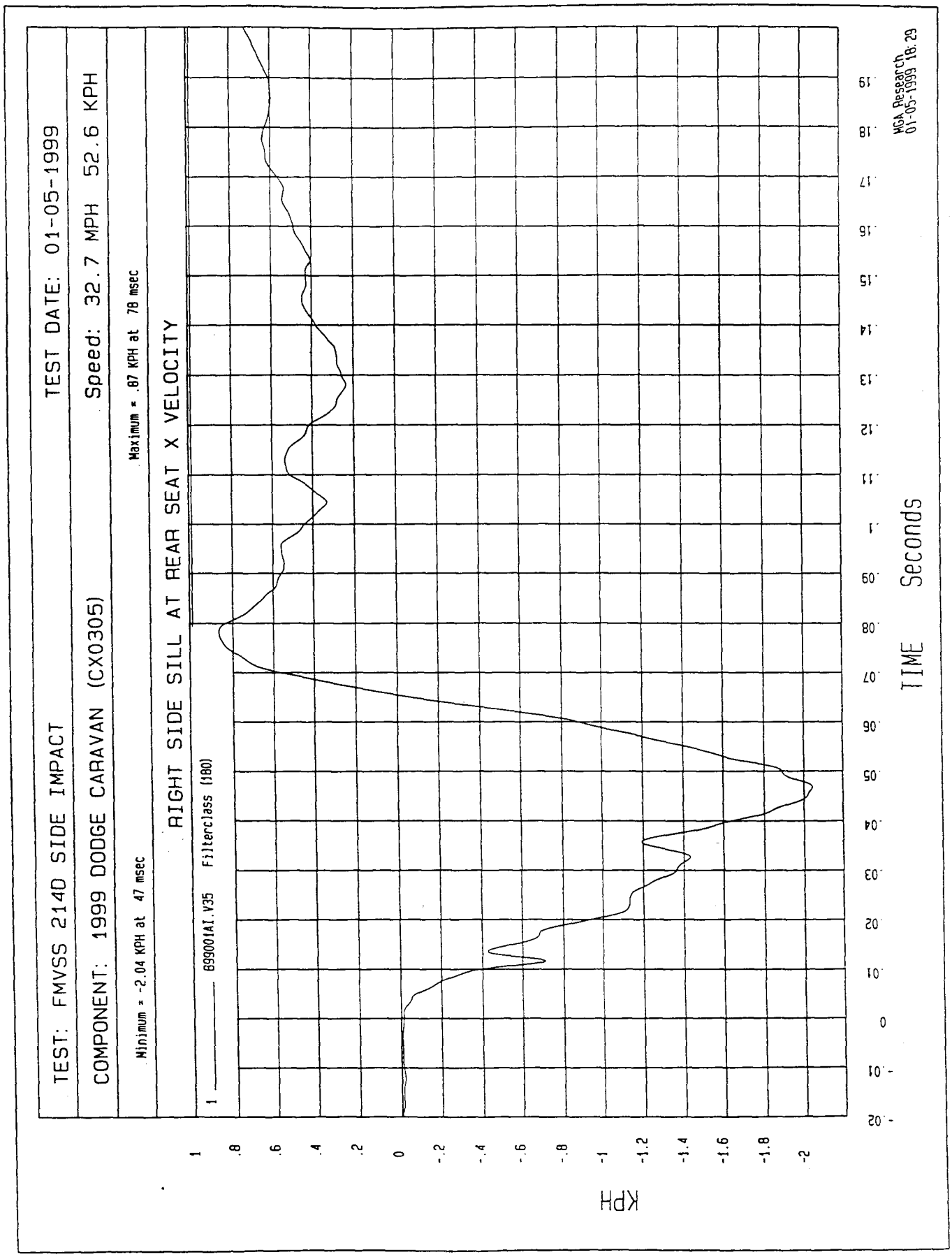
Maximum = 4.81 G'S at 63 msec

RIGHT SIDE SILL AT REAR SEAT X ACCELERATION



MGA Research
01-05-1999 18:29

0000539


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -2.04 KPH at 47 msec
Maximum = .87 KPH at 78 msec
RIGHT SIDE SILL AT REAR SEAT X VELOCITY
1 _____ 699001AI.V35 Filterclass (180)
KPH
1
.8
.6
.4
.2
0
-.2
-.4
-.6
-.8
-1
-1.2
-1.4
-1.6
-1.8
-2
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
01-05-1999 18:29

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

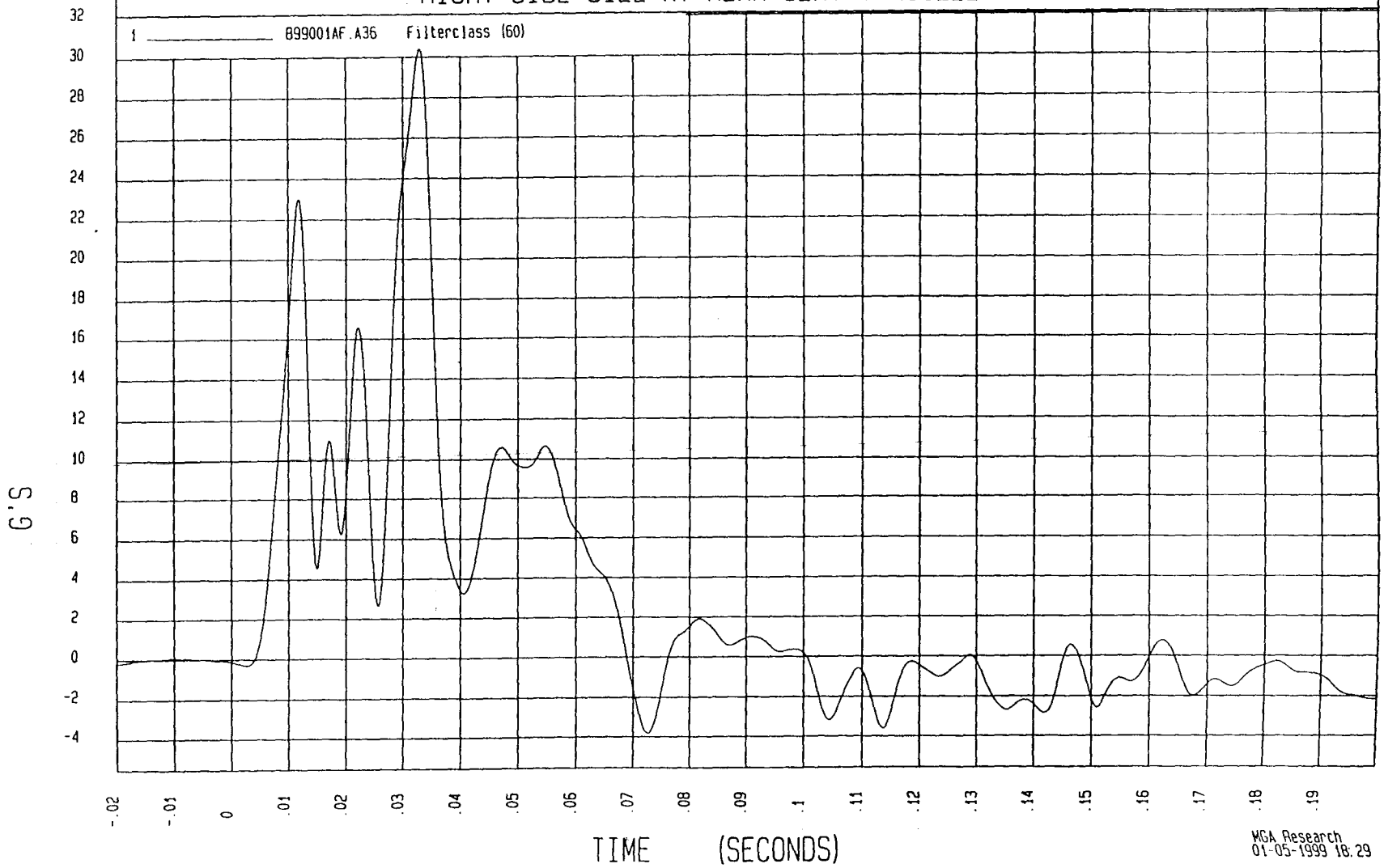
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -3.82 G'S at 73 msec

Maximum = 30.4 G'S at 33 msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION



MGA Research
01-05-1999 18:29

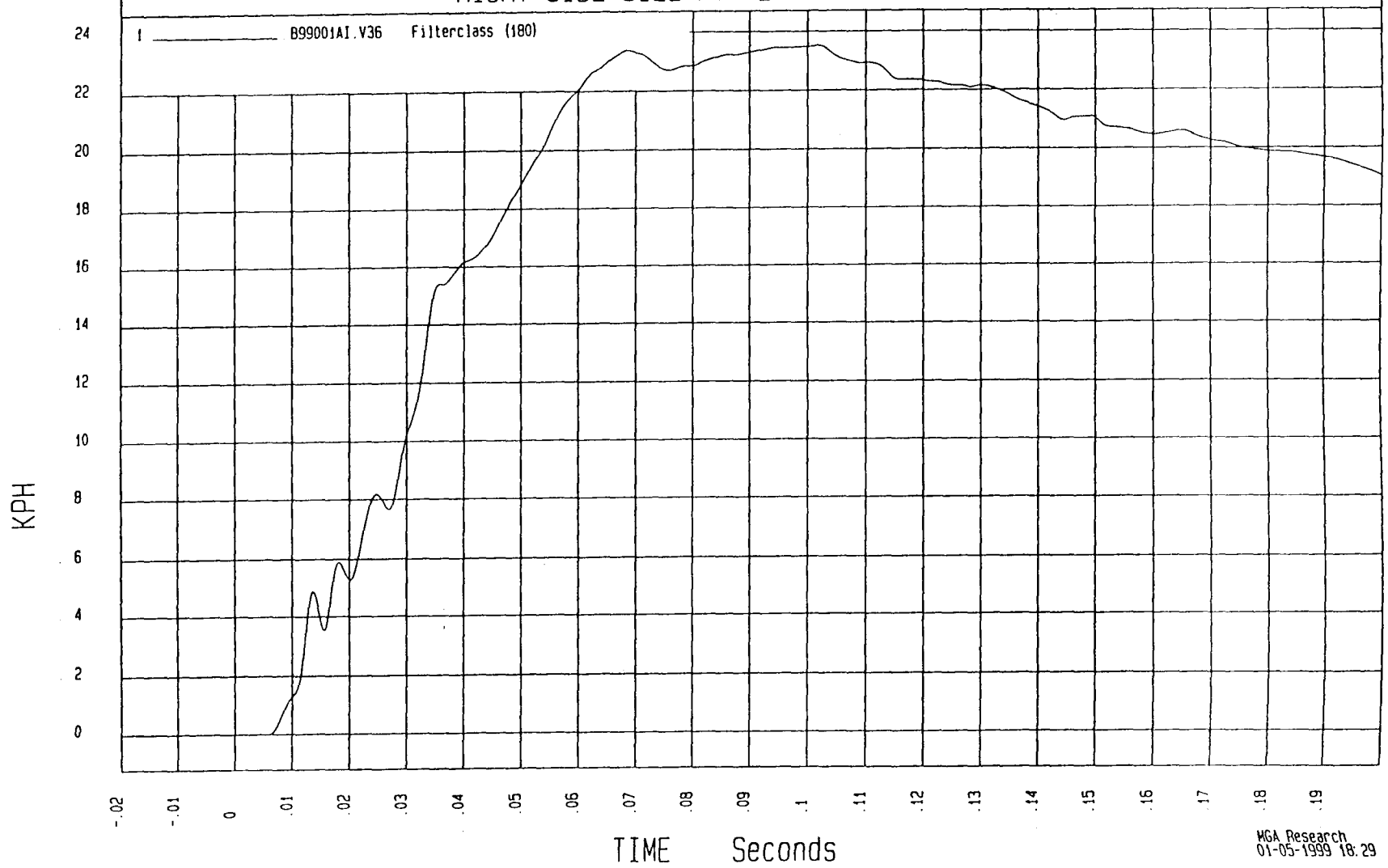
000061

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

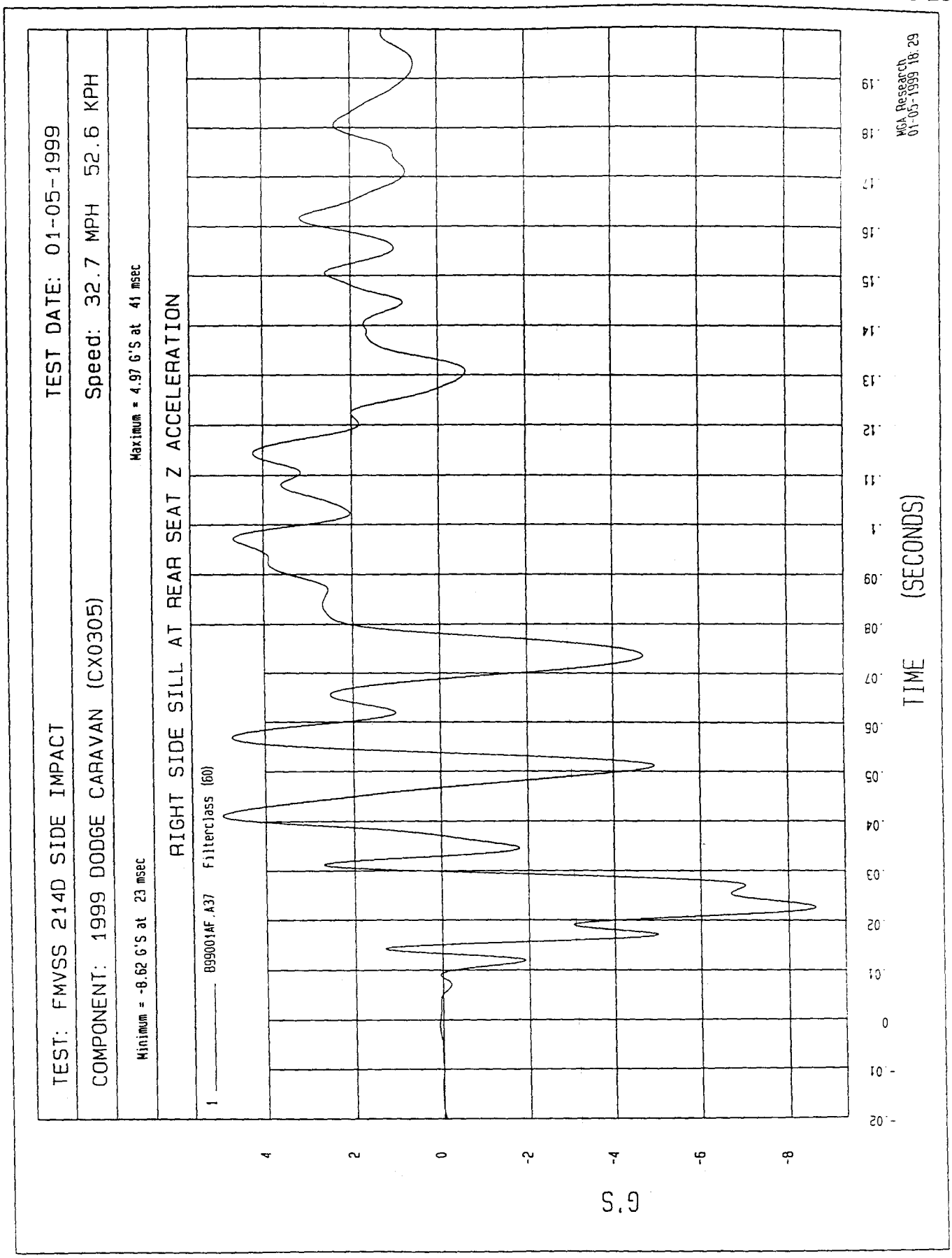
Minimum = -2.09E-02 KPH at 6 msec Maximum = 23.53 KPH at 102 msec

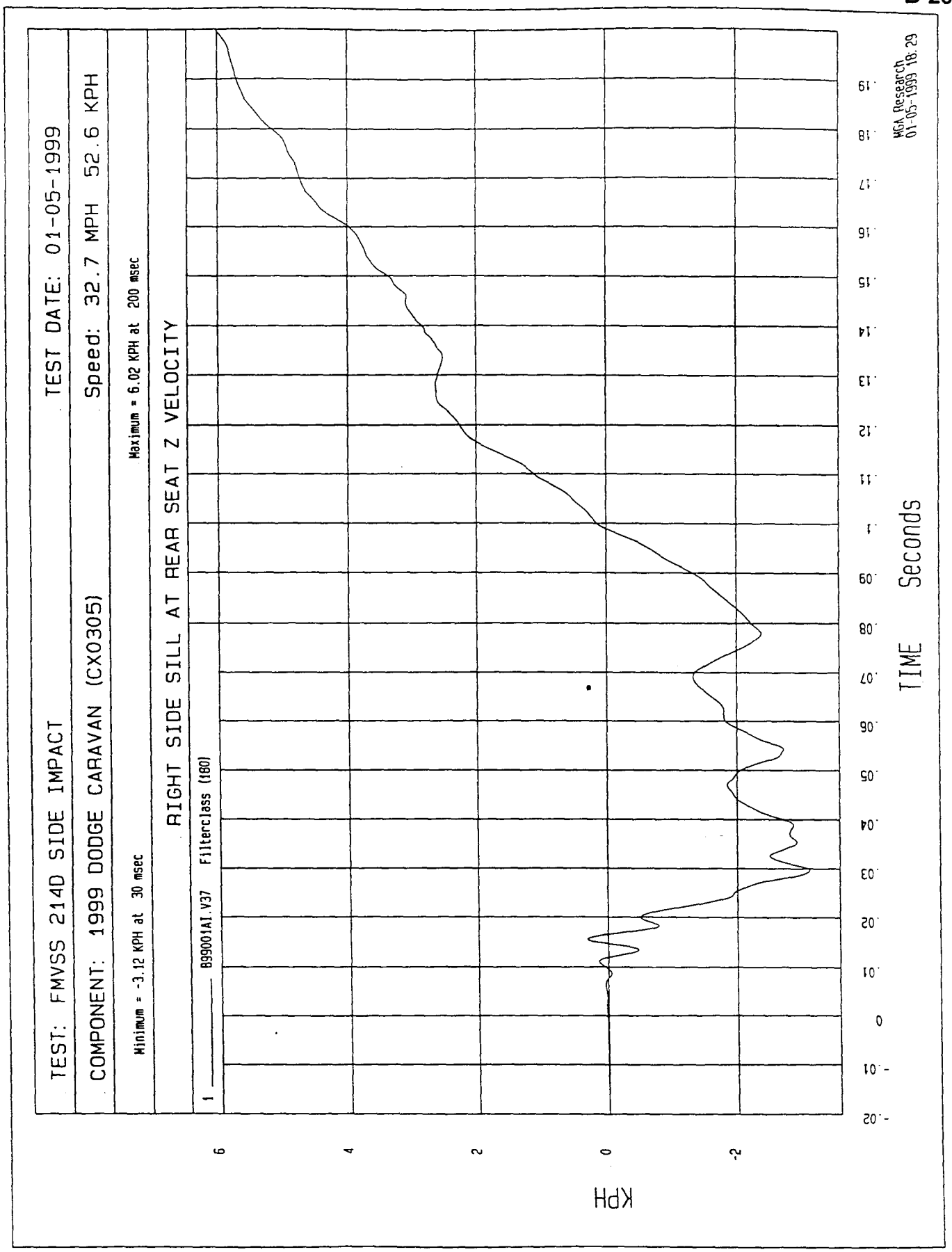
RIGHT SIDE SILL AT REAR SEAT Y VELOCITY



MGA Research
01-05-1999 18:29

000056 2


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -8.62 G'S at 23 msec
Maximum = 4.97 G'S at 41 msec
RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION
1 B99001AF.A37 Filterclass (60)
G'S
4
2
0
-2
-4
-6
-8
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
01-05-1999 18:29


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -3.12 KPH at 30 msec
Maximum = 6.02 KPH at 200 msec
RIGHT SIDE SILL AT REAR SEAT Z VELOCITY
1 _____ 899001AI.V37 Filterclass (180)
KPH
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
01-05-1999 18:29

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

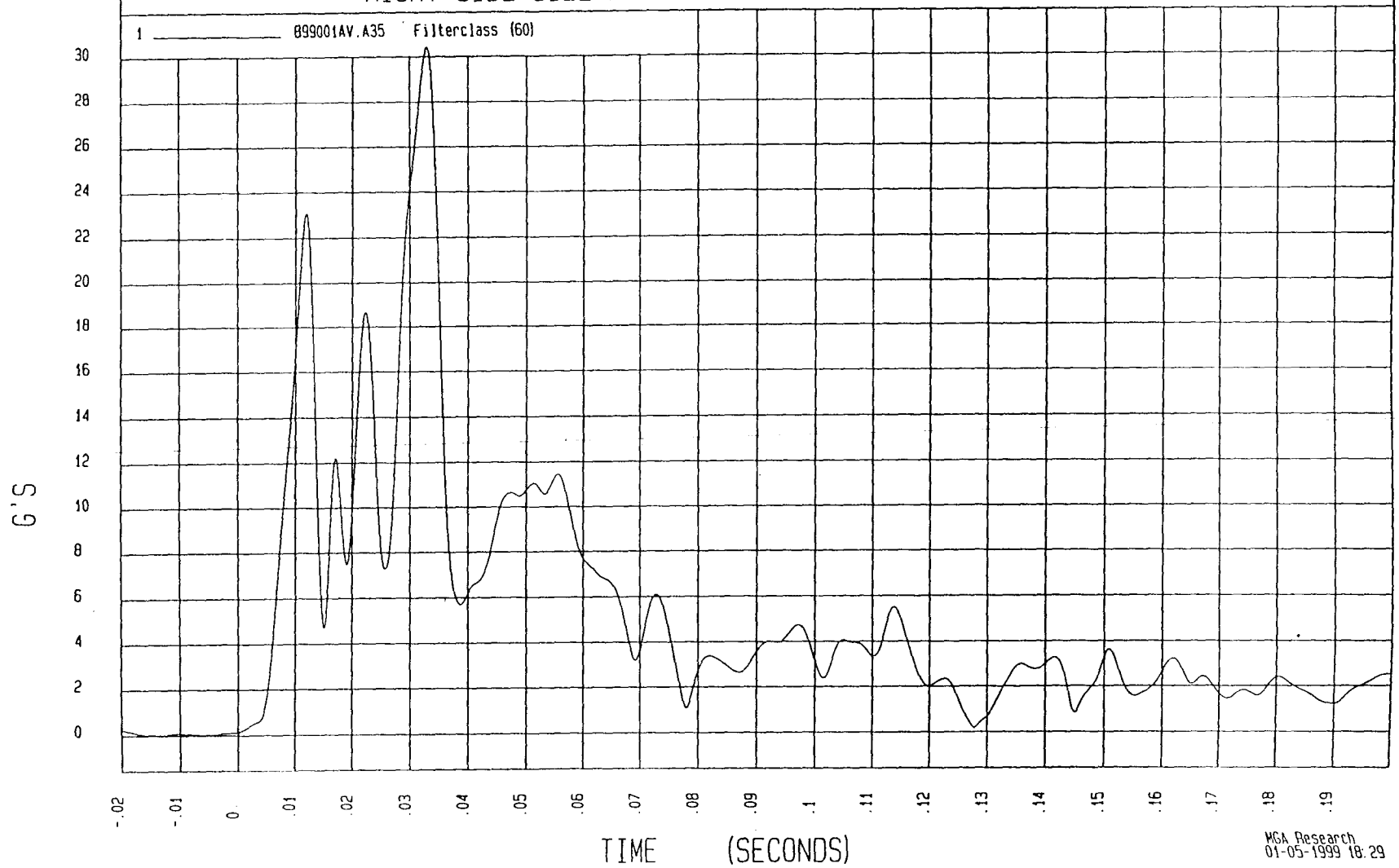
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = 2.47E-02 G'S at -5 msec

Maximum = 30.41 G'S at 33 msec

RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION



MGA Research
01-05-1999 18:29

0000565

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

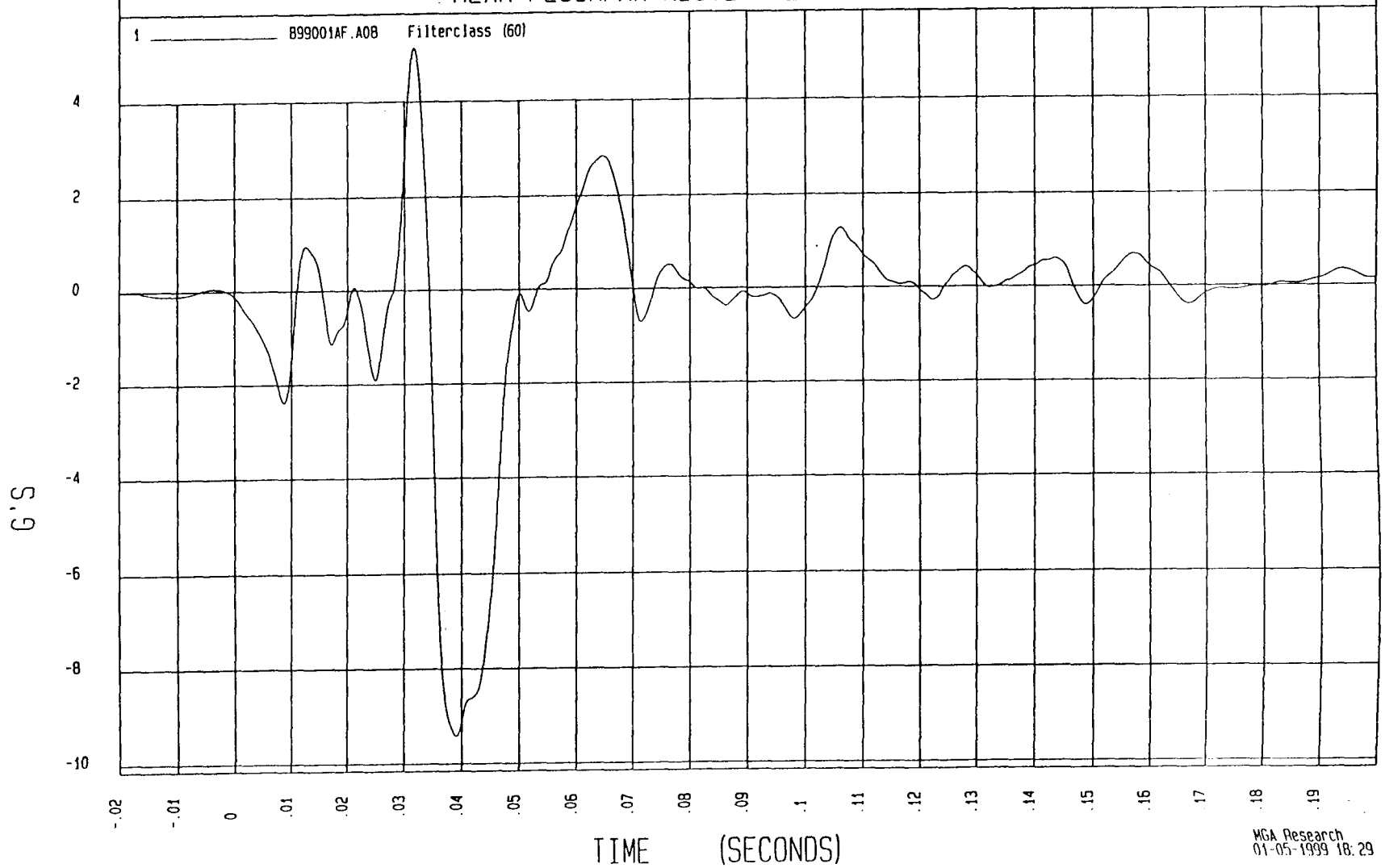
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -9.42 G'S at 39 msec

Maximum = 5.11 G'S at 32 msec

REAR FLOORPAN ABOVE AXLE X ACCELERATION



MGA Research
01-05-1999 18:29

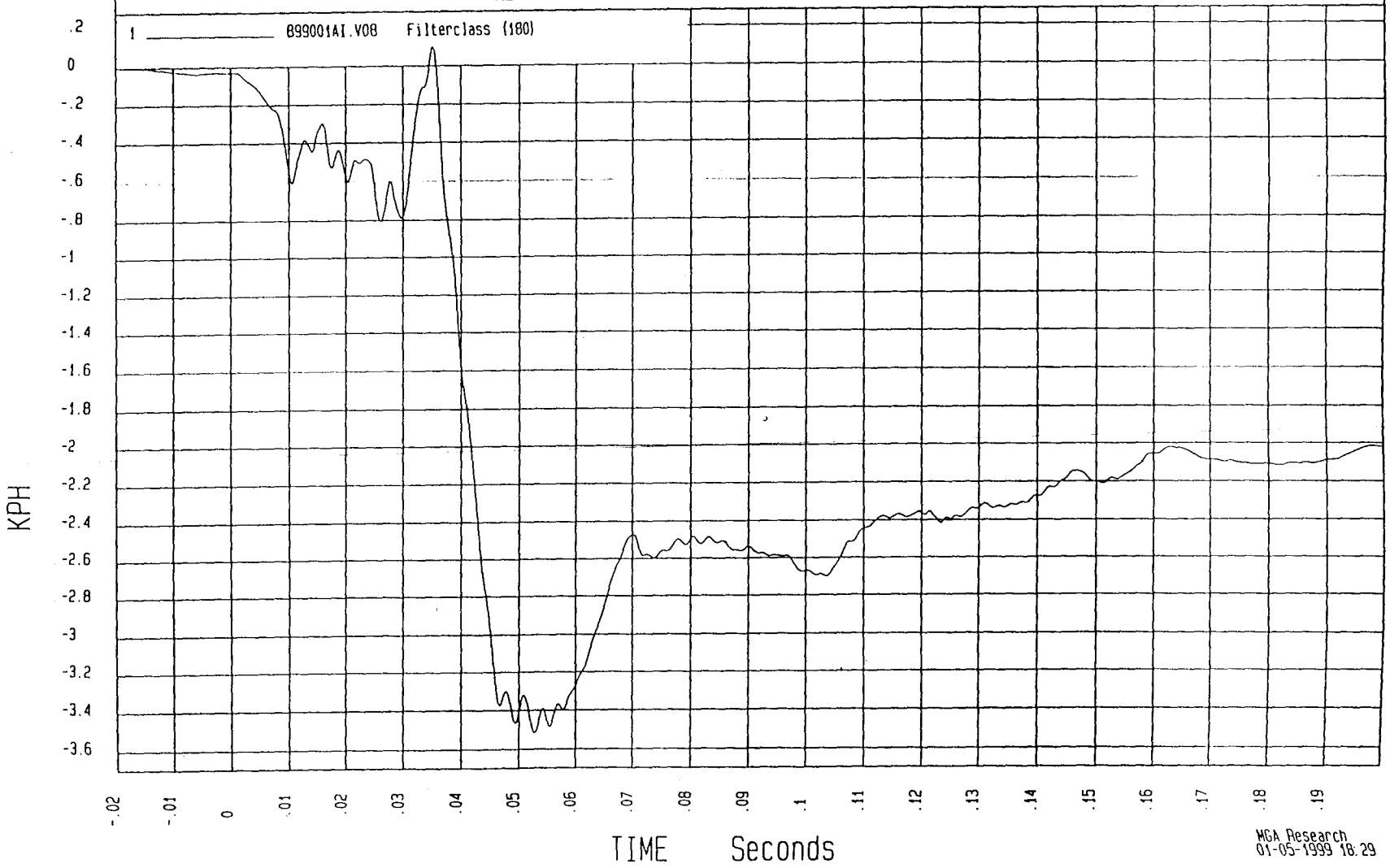
0000566

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -3.52 KPH at 53 msec — Maximum = 9.97E-02 KPH at 35 msec

REAR FLOORPAN ABOVE AXLE X VELOCITY



MGA Research
01-05-1999 18:29

0000567

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

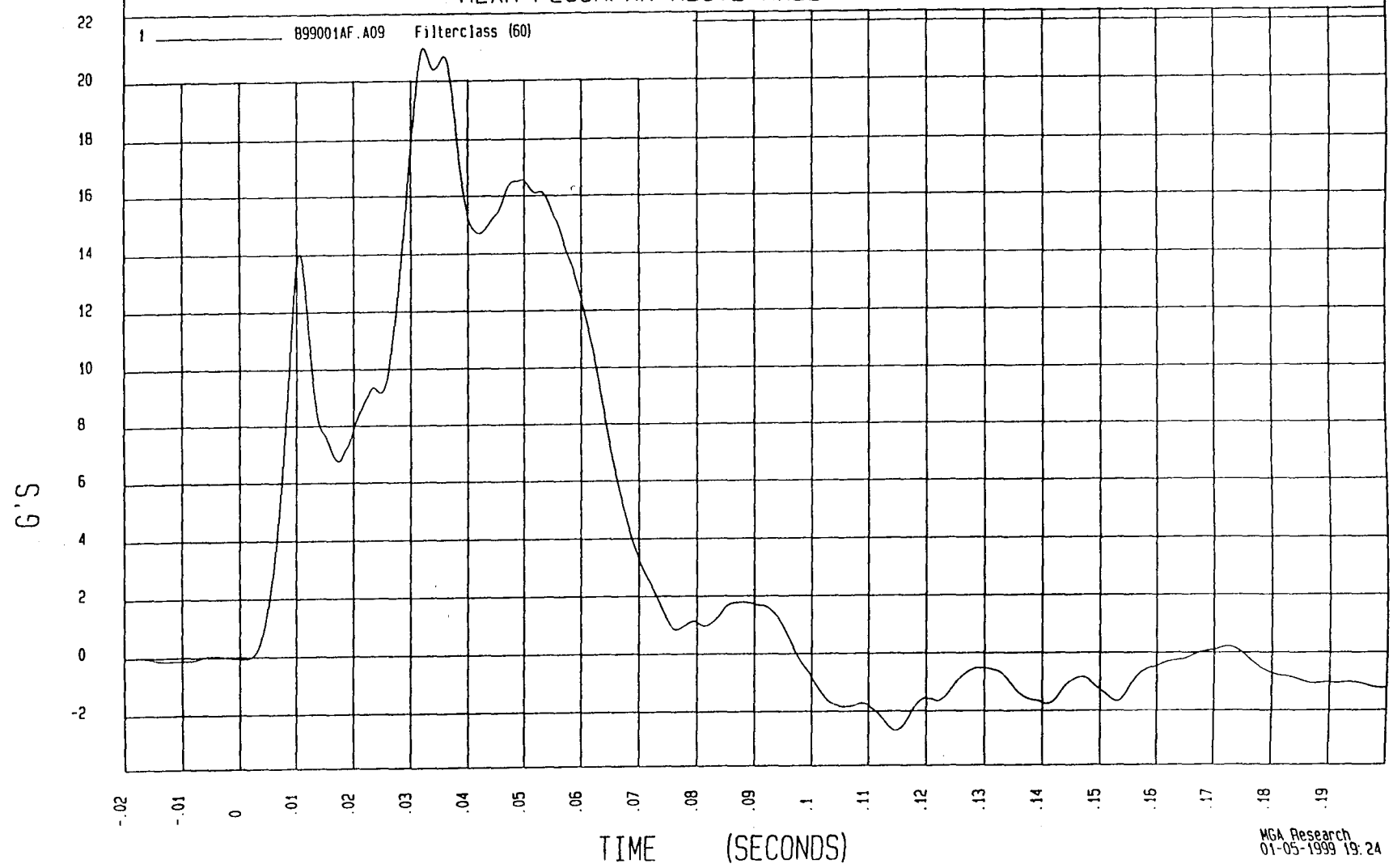
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -2.67 G'S at 115 msec

Maximum = 21.13 G'S at 32 msec

REAR FLOORPAN ABOVE AXLE Y ACCELERATION



MGA Research
01-05-1999 19:24

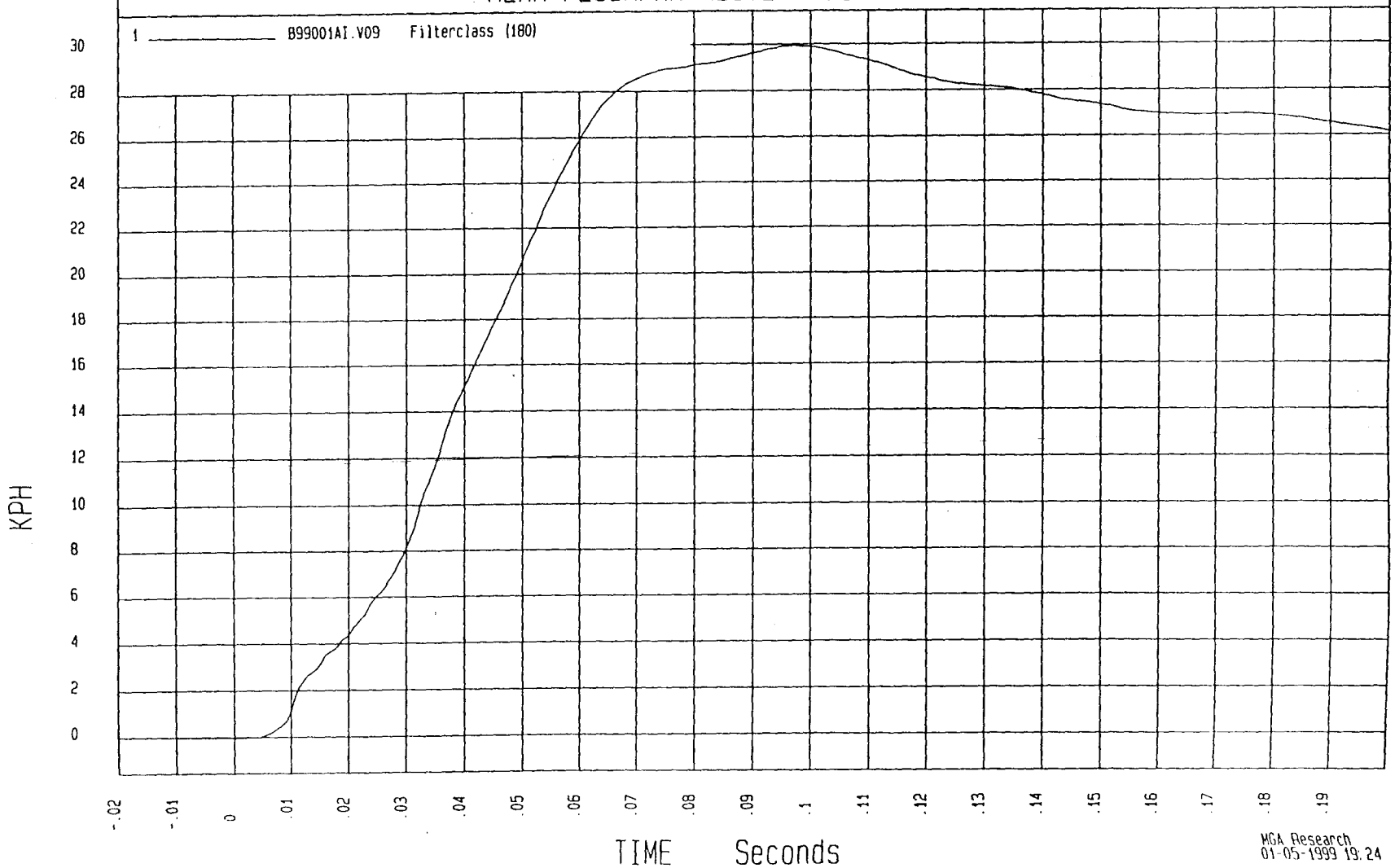
0000568

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -.04 KPH at -6 msec — Maximum = 29.94 KPH at 97 msec

REAR FLOORPAN ABOVE AXLE Y VELOCITY



MGA Research
01-05-1999 19:24

000569

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

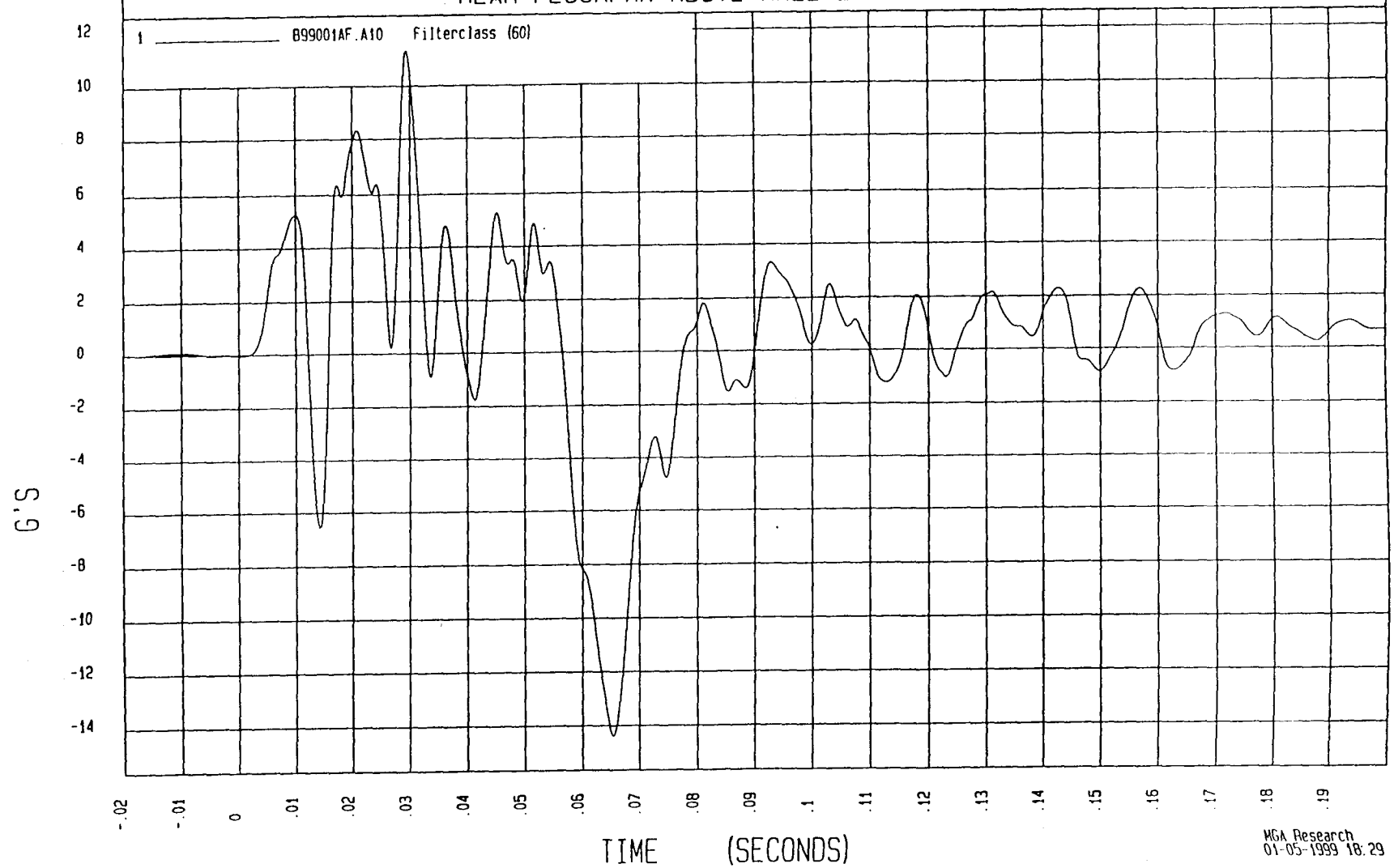
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -14.38 G'S at 65 msec

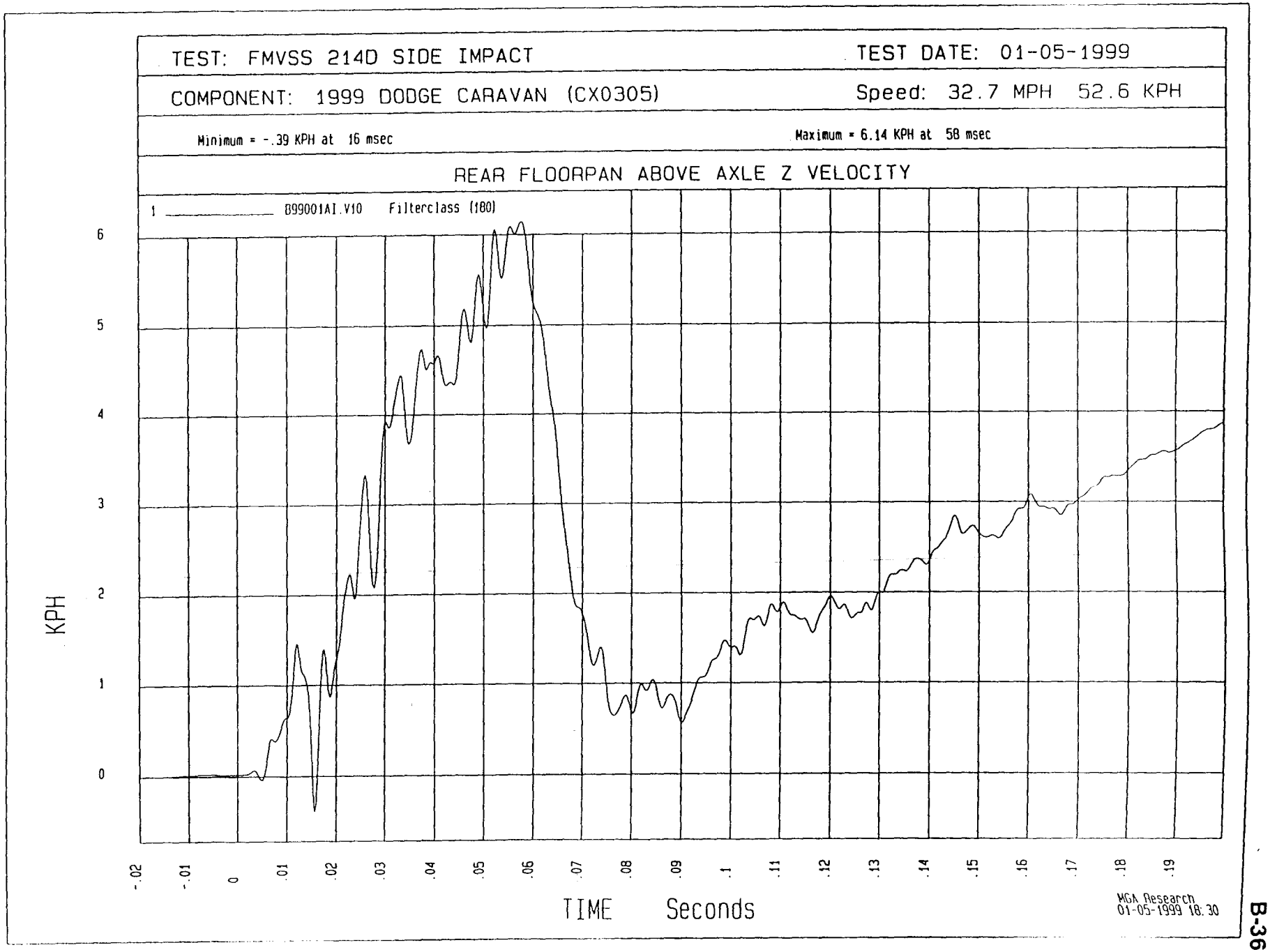
Maximum = 11.31 G'S at 29 msec

REAR FLOORPAN ABOVE AXLE Z ACCELERATION



MGA Research
01-05-1999 18:29

000057 0


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -.39 KPH at 16 msec
Maximum = 6.14 KPH at 58 msec
REAR FLOORPAN ABOVE AXLE Z VELOCITY
1 _____ 899001AI.V10 Filterclass (180)
KPH
6
5
4
3
2
1
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
01-05-1999 18:30

0000571

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

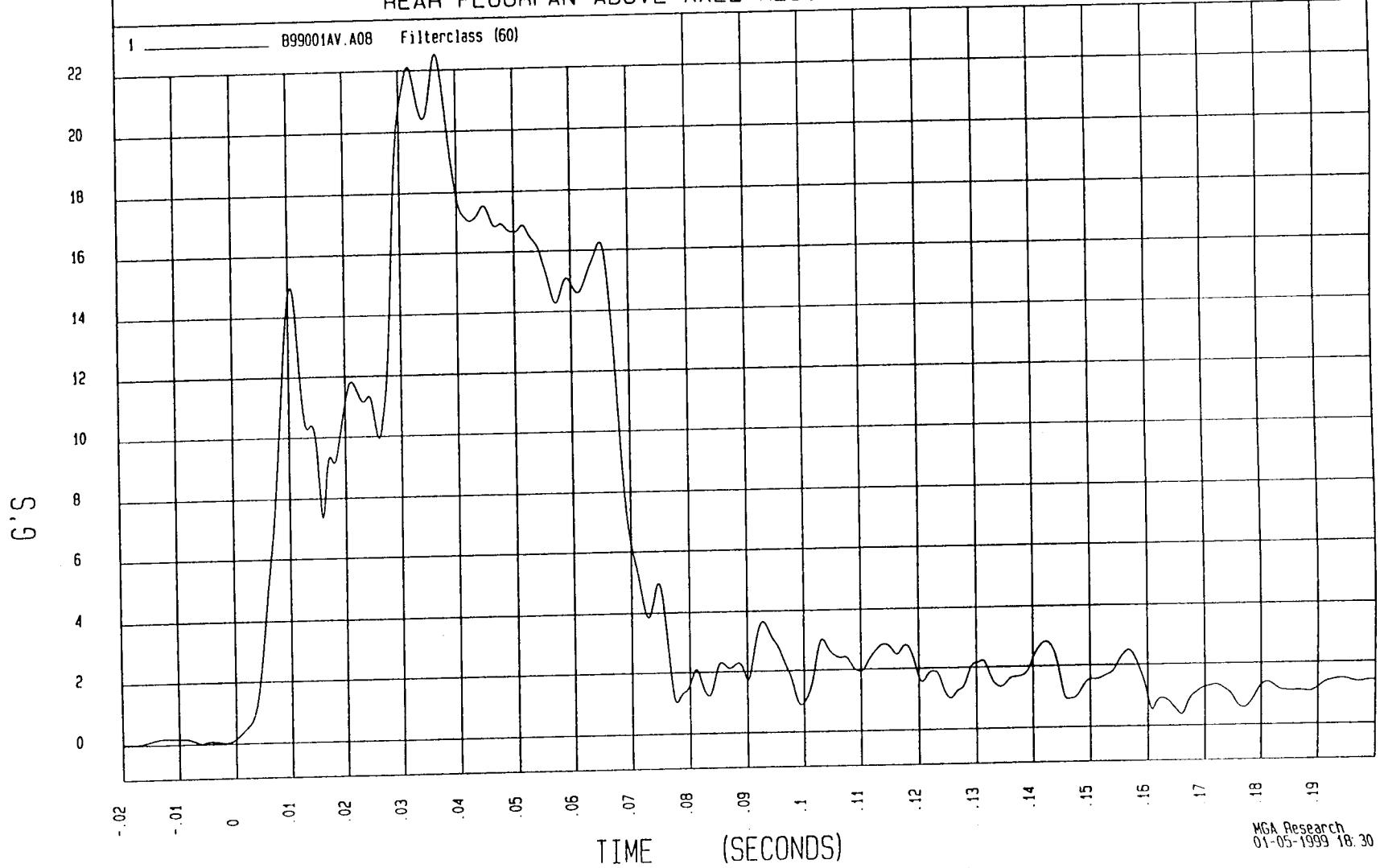
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = 5.93E-03 G'S at -6 msec

Maximum = 22.5 G'S at 36 msec

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION



MGA Research
01-05-1999 18:30

0000572

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

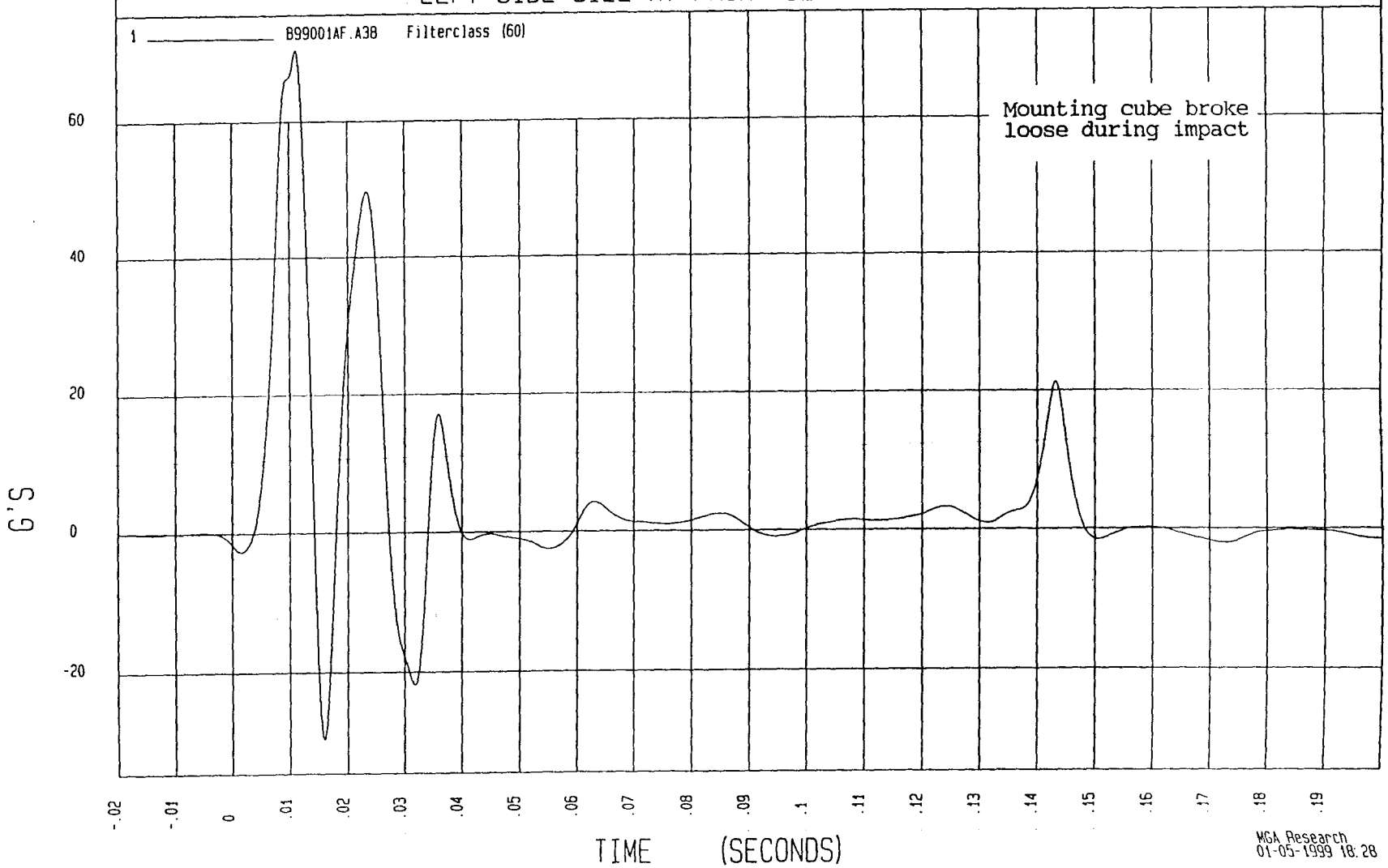
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -29.81 G'S at 16 msec

Maximum = 70.36 G'S at 11 msec

LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION



MGA Research
01-05-1999 18:28

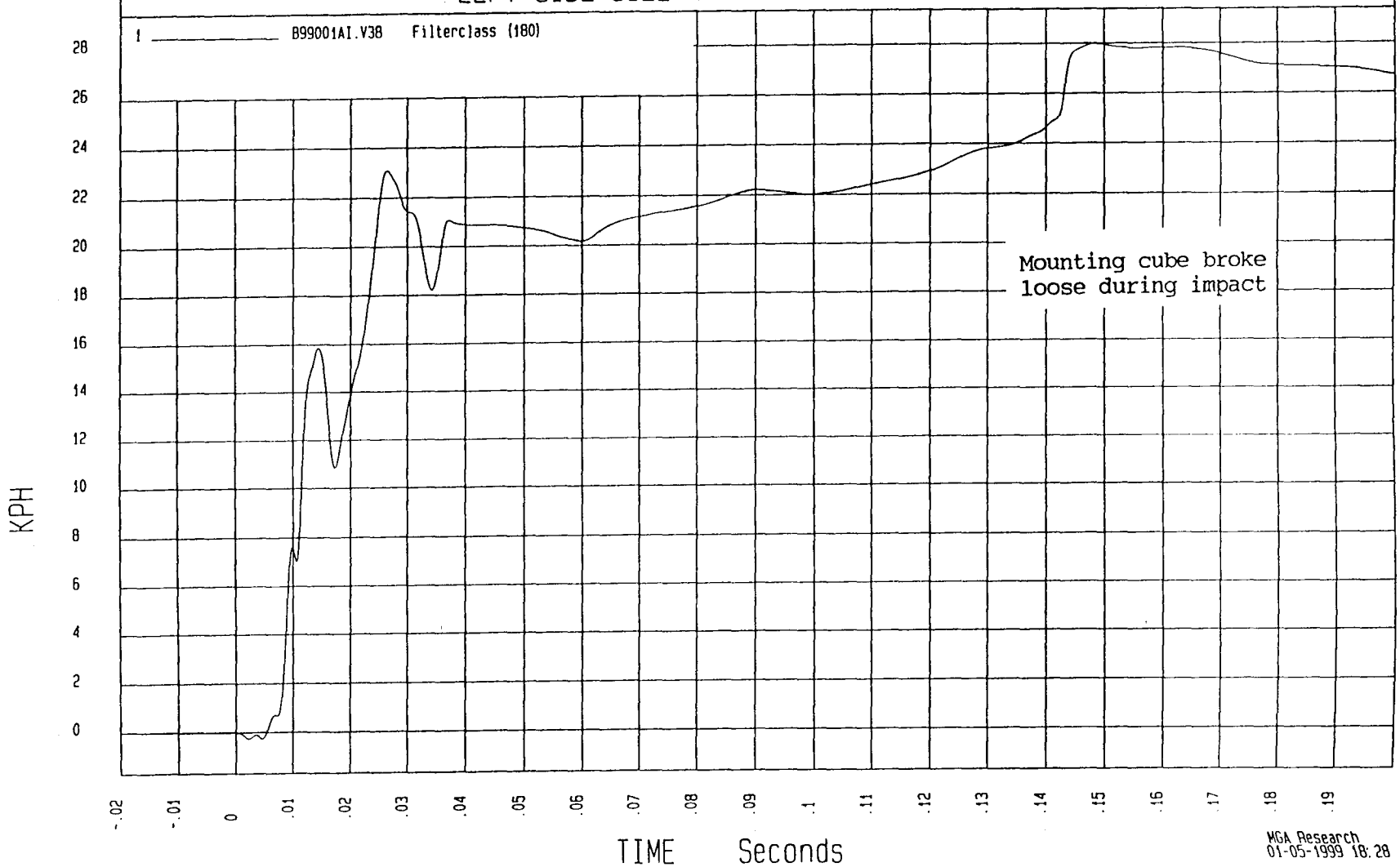
000573

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -.27 KPH at 5 msec — Maximum = 28 KPH at 149 msec

LEFT SIDE SILL AT FRONT SEAT Y VELOCITY



MGA Research
01-05-1999 18:28

00005774

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

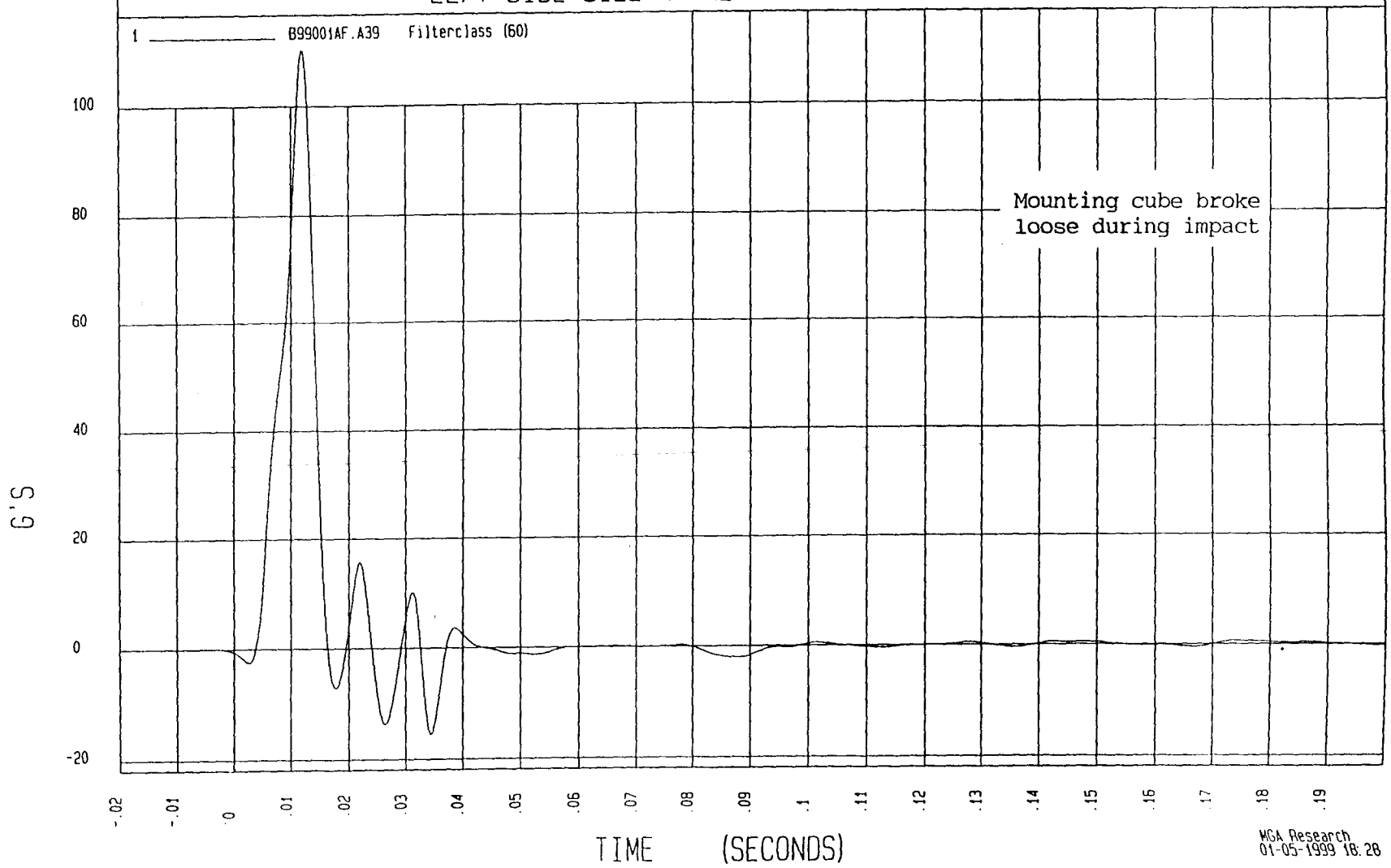
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -15.6 G'S at 34 msec

Maximum = 109.83 G'S at 12 msec

LEFT SIDE SILL AT REAR SEAT Y ACCELERATION



MGA Research
01-05-1999 18:28

000057 3

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

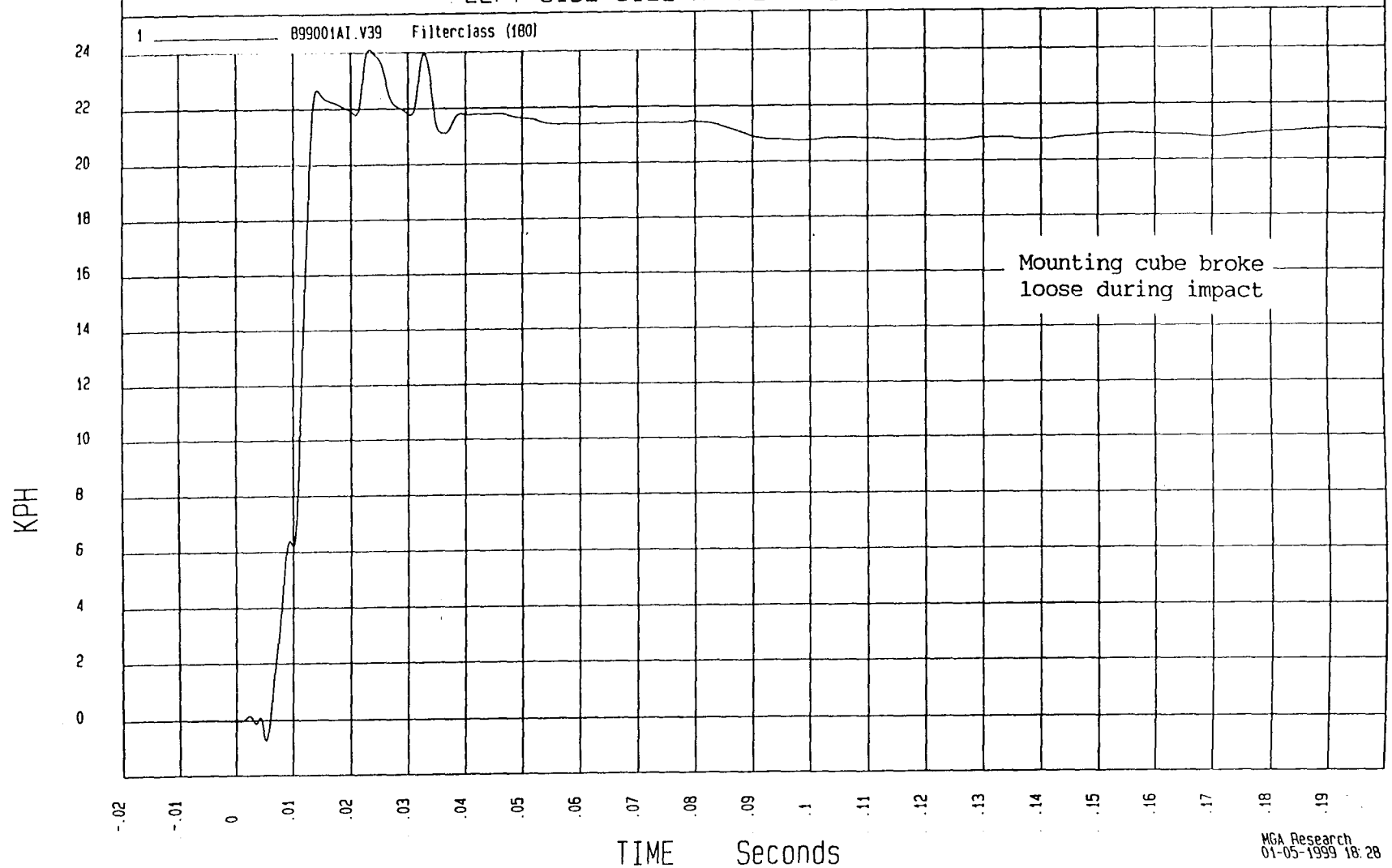
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -.75 KPH at 5 msec

Maximum = 24.12 KPH at 23 msec

LEFT SIDE SILL AT REAR SEAT Y VELOCITY



MGA Research
01-05-1999 18:28

0000576

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

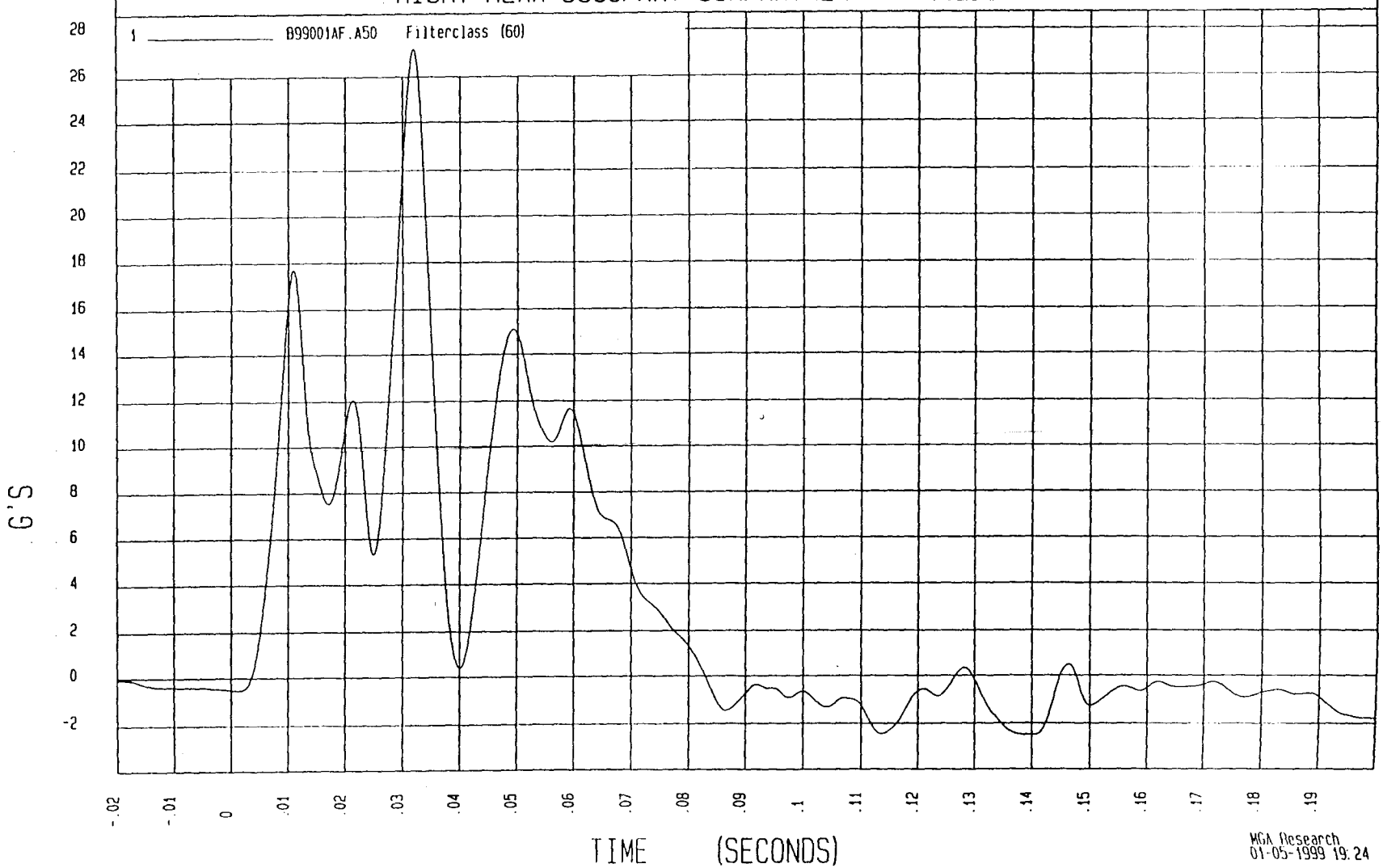
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

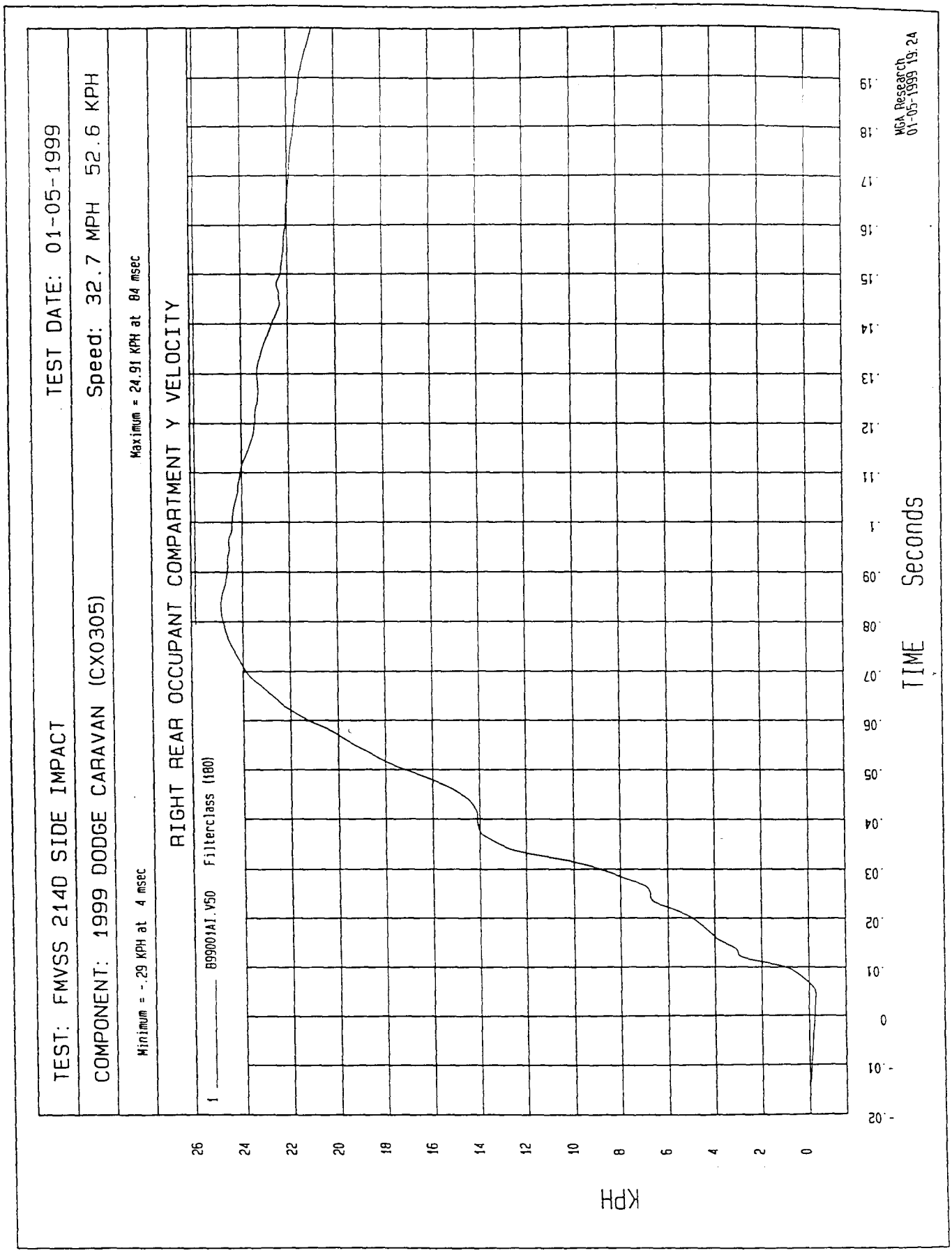
Minimum = -2.47 G'S at 140 msec

Maximum = 27.21 G'S at 32 msec

RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION



000057 7


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -.29 KPH at 4 msec
Maximum = 24.91 KPH at 84 msec
RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY
1 B99001A1.V50 Filterclass (180)
KPH
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
01-05-1999 19:24

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

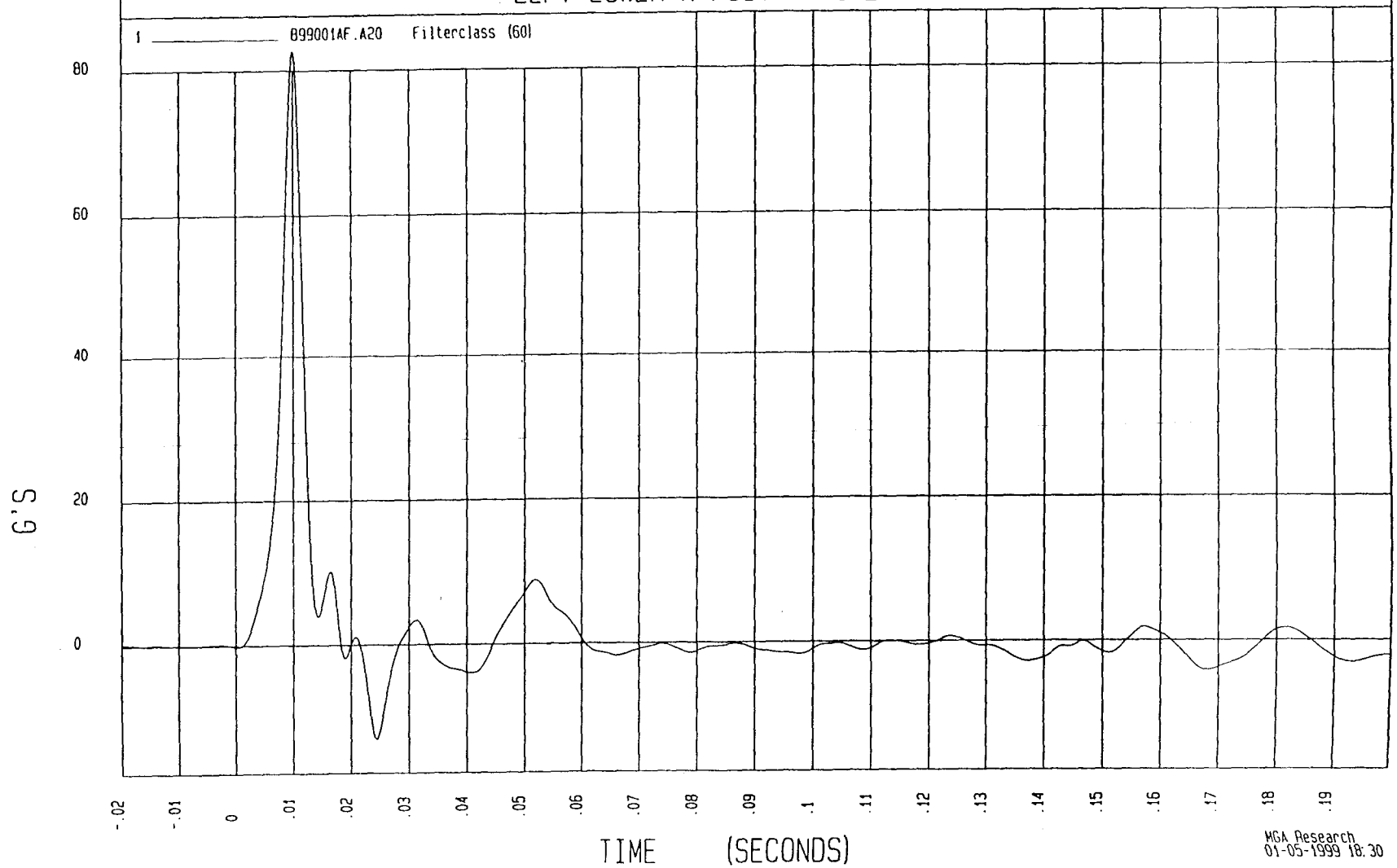
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -13.21 G'S at 24 msec

Maximum = 82.6 G'S at 10 msec

LEFT LOWER A-POST Y ACCELERATION



MGA Research
01-05-1999 18:30

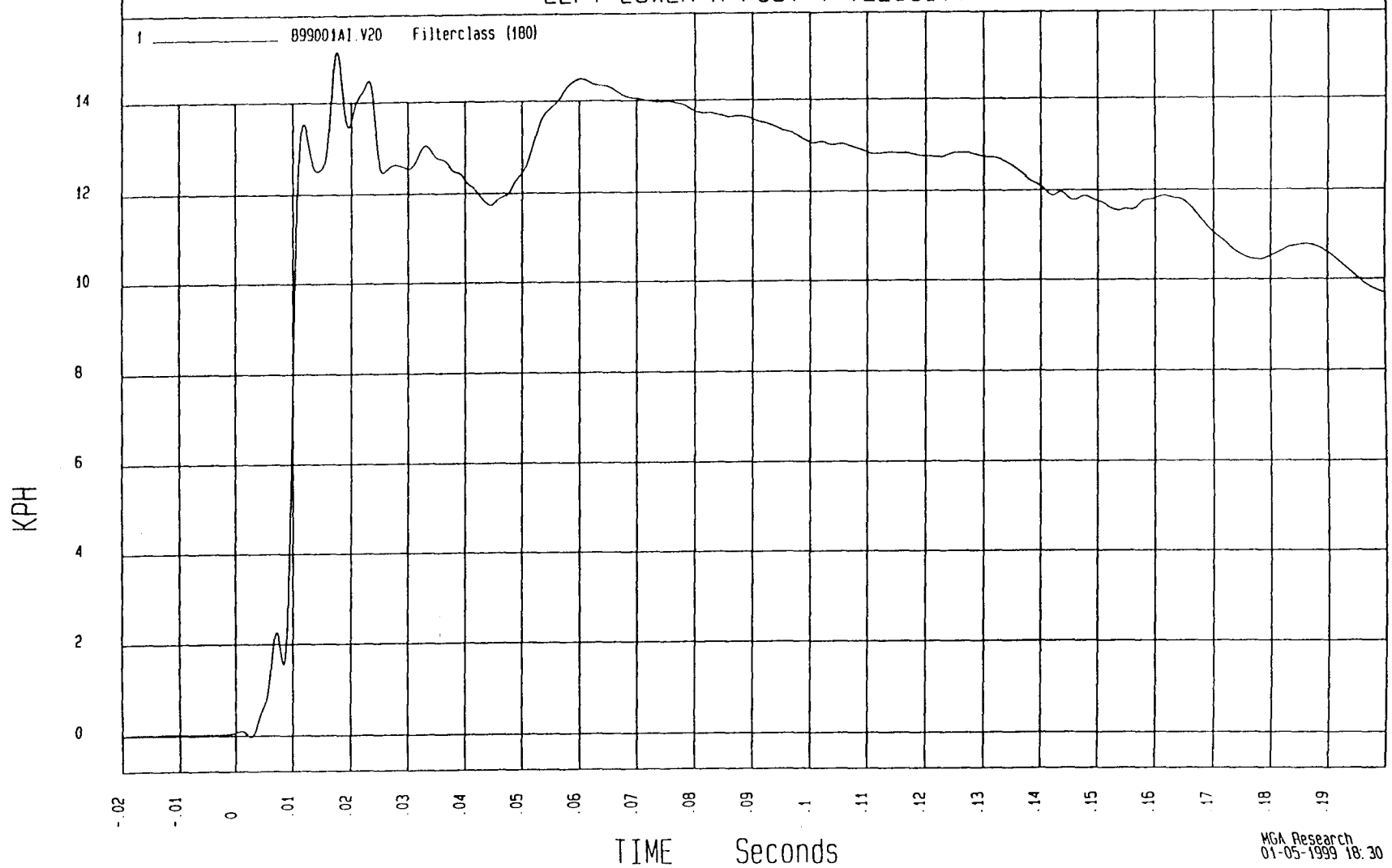
0000579

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -.02 KPH at 3 msec | Maximum = 15.12 KPH at 18 msec

LEFT LOWER A-POST Y VELOCITY



MGA Research
01-05-1999 18:30

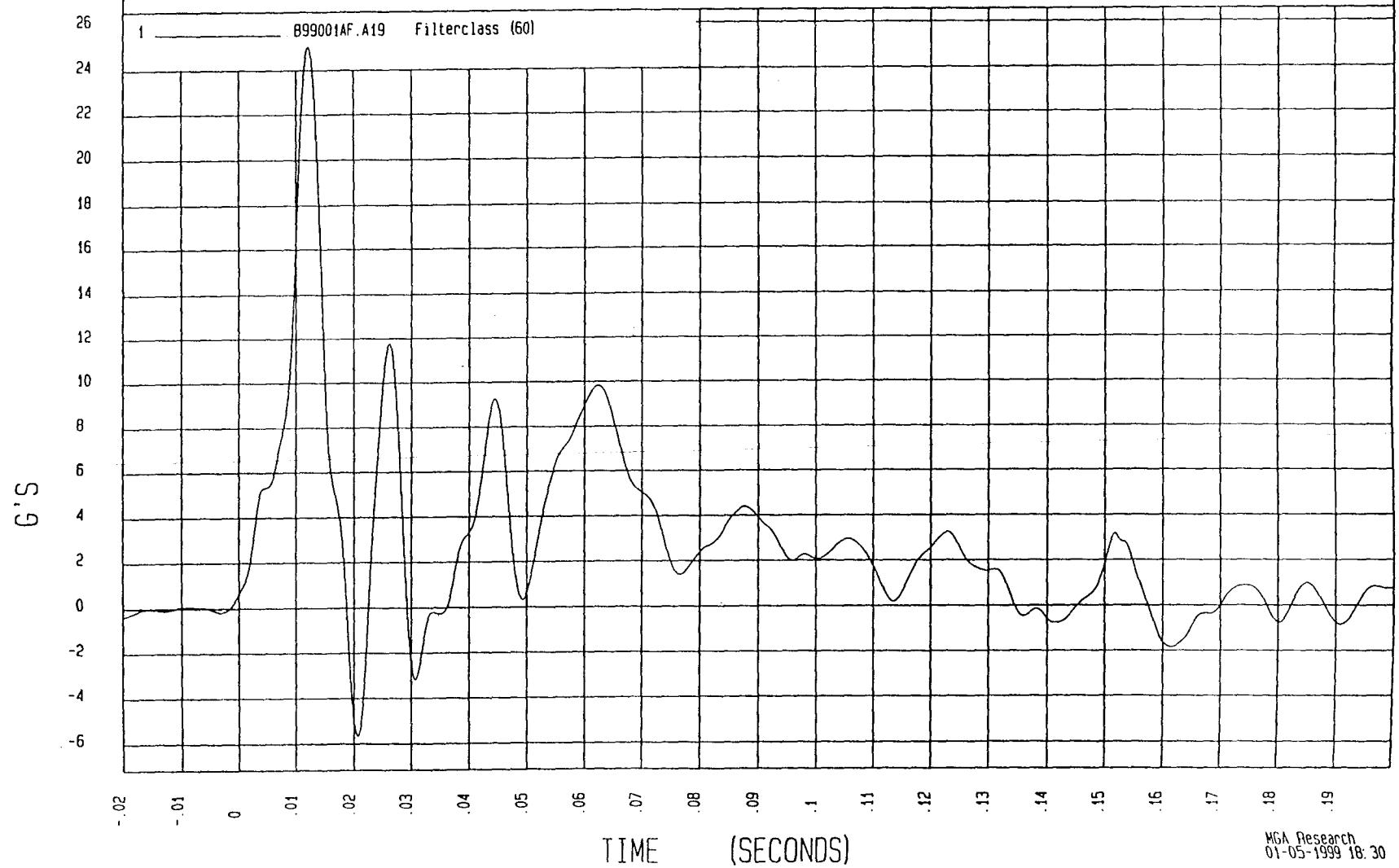
0 0 0 0 5 0

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

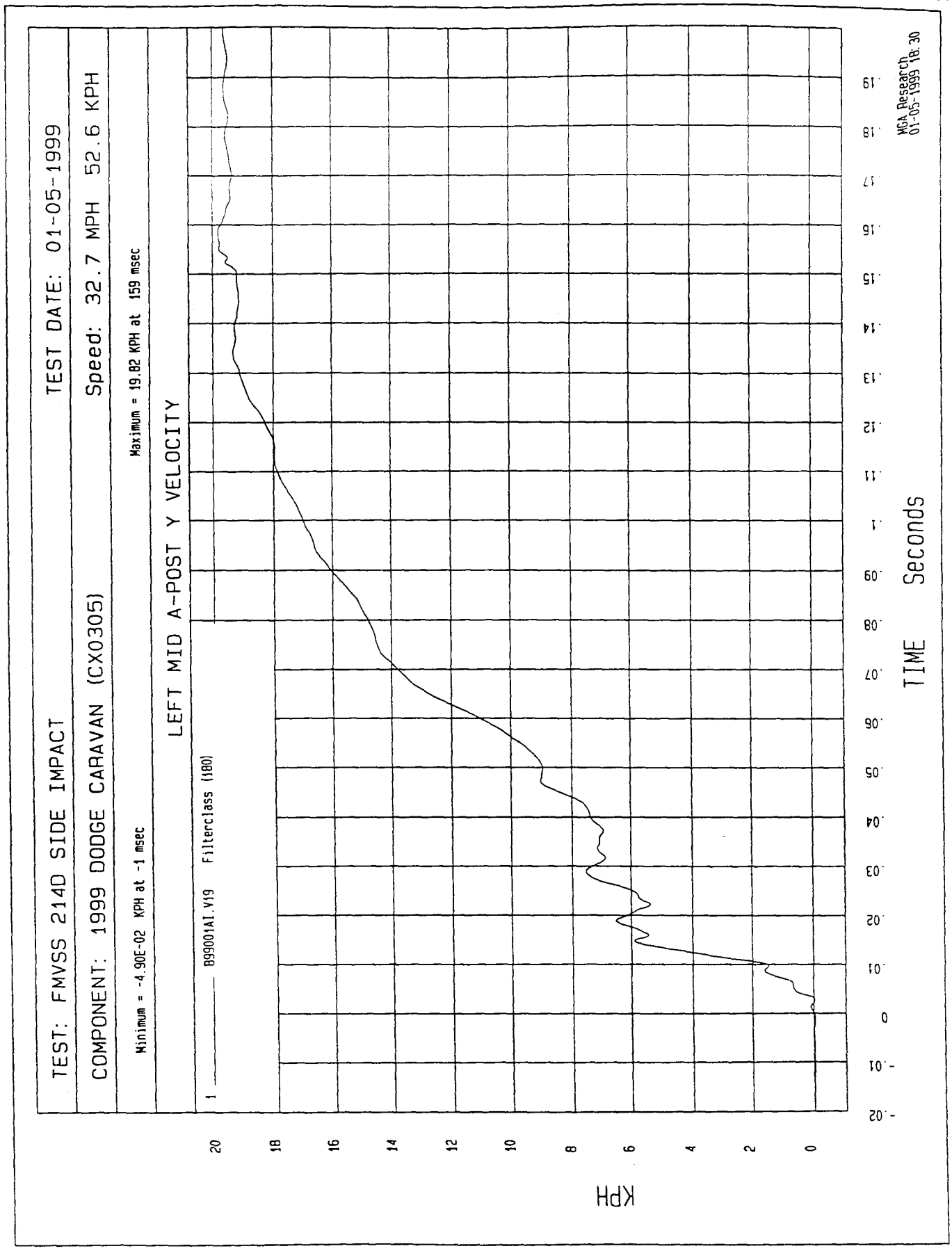
Minimum = -5.63 G'S at 21 msec Maximum = 25.04 G'S at 12 msec

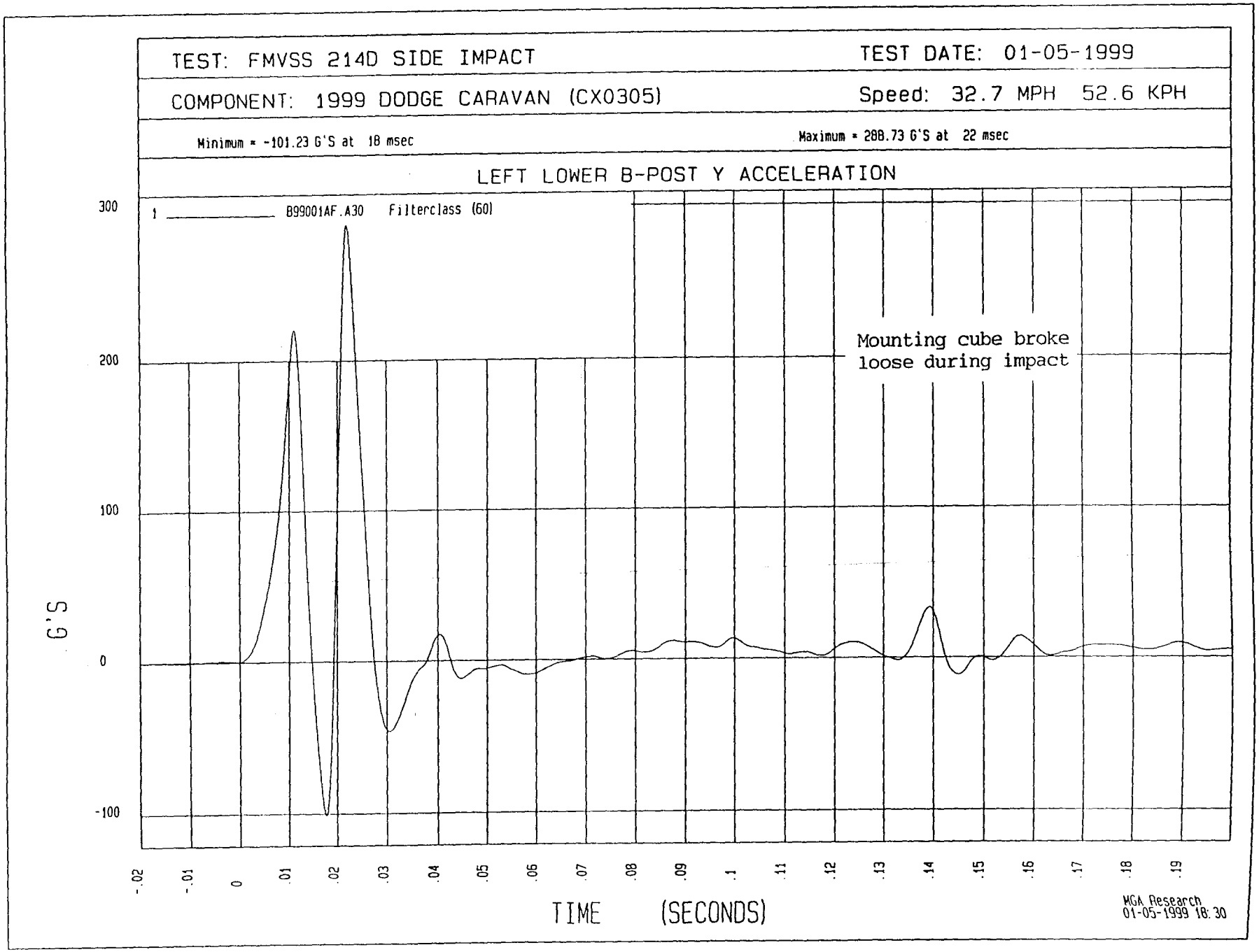
LEFT MID A-POST Y ACCELERATION



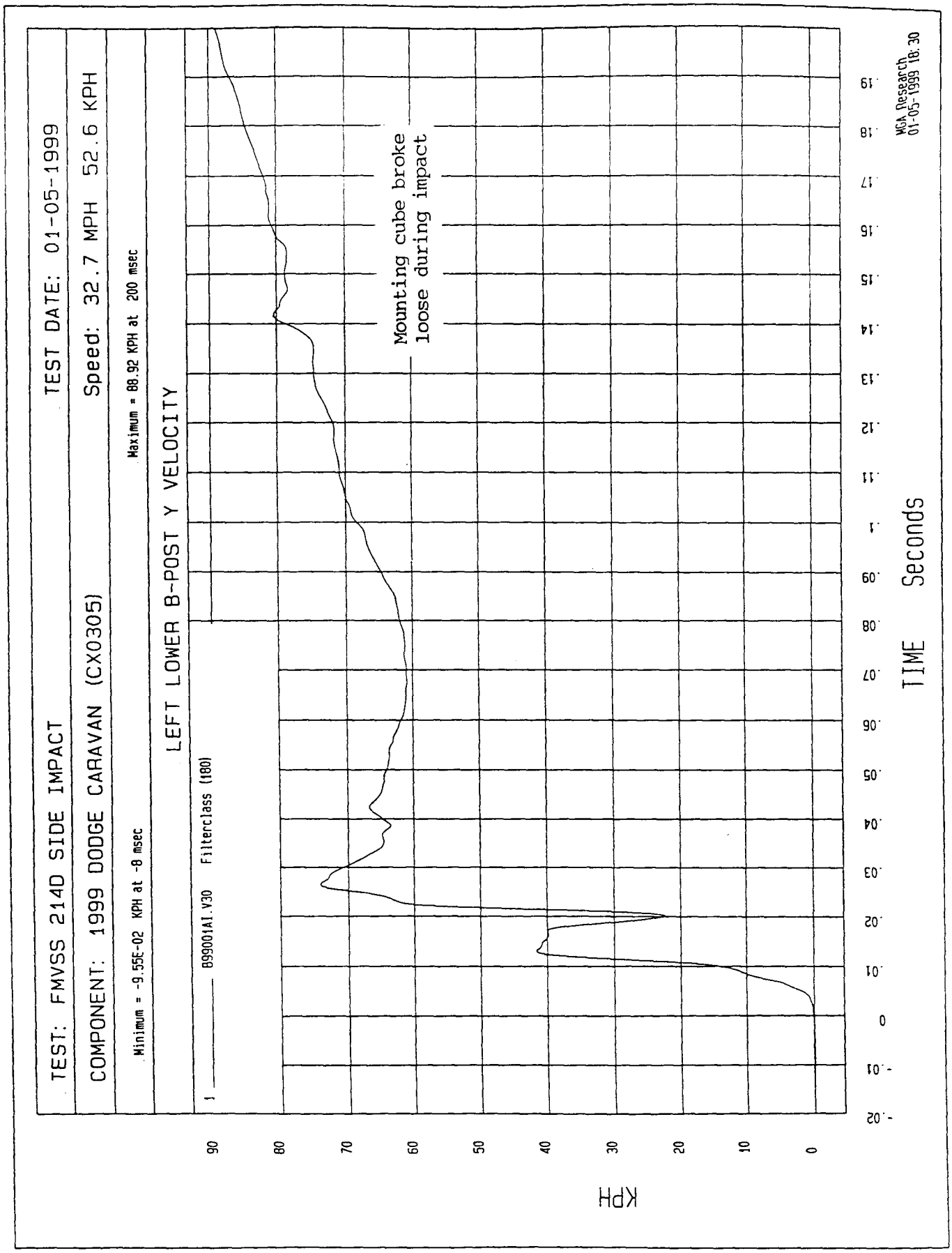
MGA Research
01-05-1999 18:30

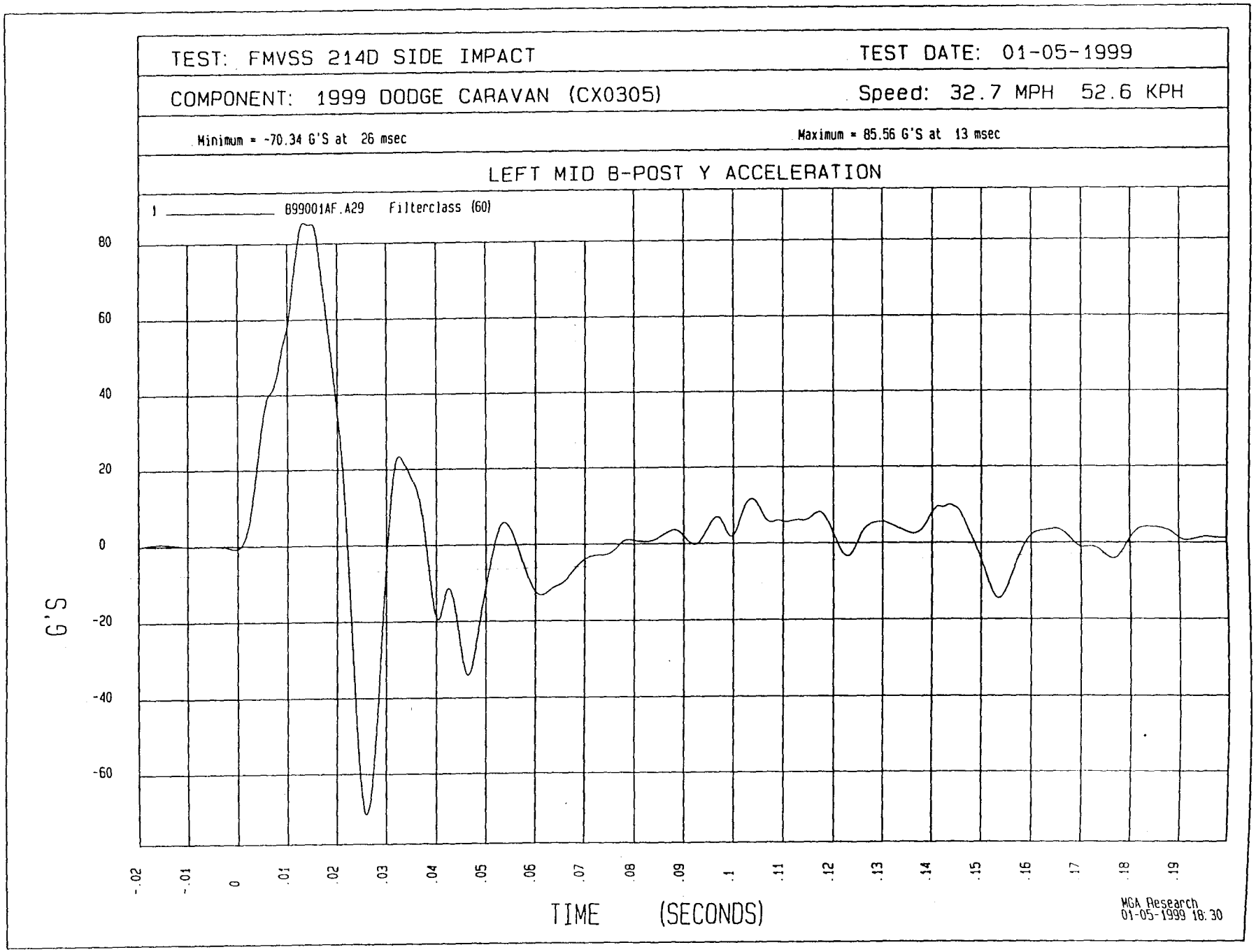
0000581


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -4.90E-02 KPH at -1 msec
Maximum = 19.82 KPH at 159 msec
LEFT MID A-POST Y VELOCITY
1 B99001AI.V19 Filterclass (180)
KPH
20
18
16
14
12
10
8
6
4
2
0
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
01-05-1999 18:30

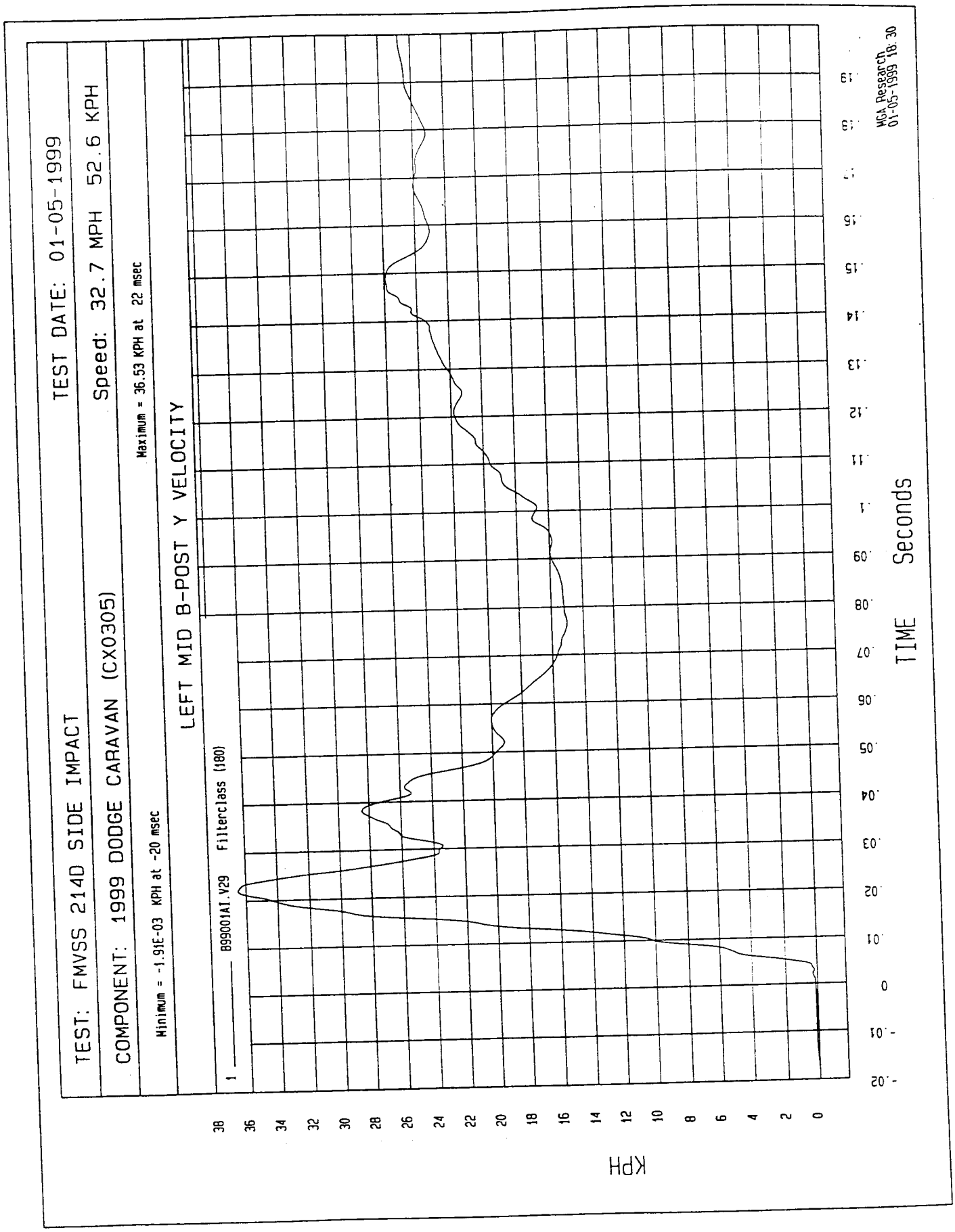

TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -101.23 G'S at 18 msec
Maximum = 288.73 G'S at 22 msec
LEFT LOWER B-POST Y ACCELERATION
1 B99001AF.A30 Filterclass (60)
Mounting cube broke loose during impact
G'S
300
200
100
0
-100
-.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
01-05-1999 18:30

0000533


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -9.55E-02 KPH at -8 msec
Maximum = 88.92 KPH at 200 msec
LEFT LOWER B-POST Y VELOCITY
1 B99001A1.V30 Filterclass (180)
Mounting cube broke loose during impact
KPH
90
80
70
60
50
40
30
20
10
0
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research 01-05-1999 18:30


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -70.34 G'S at 26 msec
Maximum = 85.56 G'S at 13 msec
LEFT MID B-POST Y ACCELERATION
1 B99001AF.A29 Filterclass (60)
G'S
80
60
40
20
0
-20
-40
-60
-.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
01-05-1999 18:30

000583


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -1.91E-03 KPH at -20 msec
Maximum = 36.53 KPH at 22 msec
LEFT MID B-POST Y VELOCITY
1 B99001AI.V29 Filterclass (180)
KPH
TIME Seconds
MGA Research
01-05-1999 18:30

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

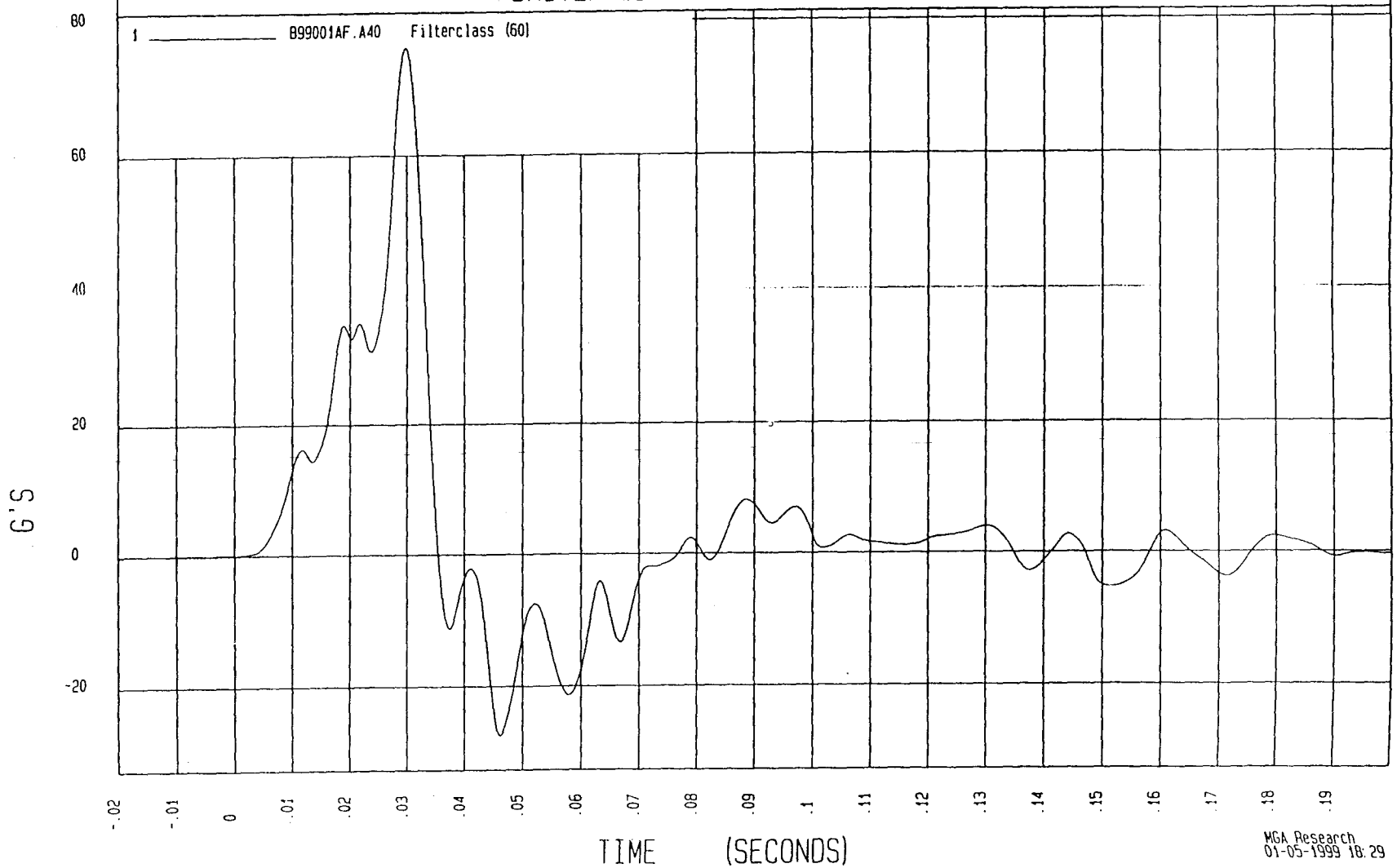
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -27.46 G'S at 46 msec

Maximum = 76.09 G'S at 30 msec

DRIVER SEAT TRACK Y ACCELERATION



0000587

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

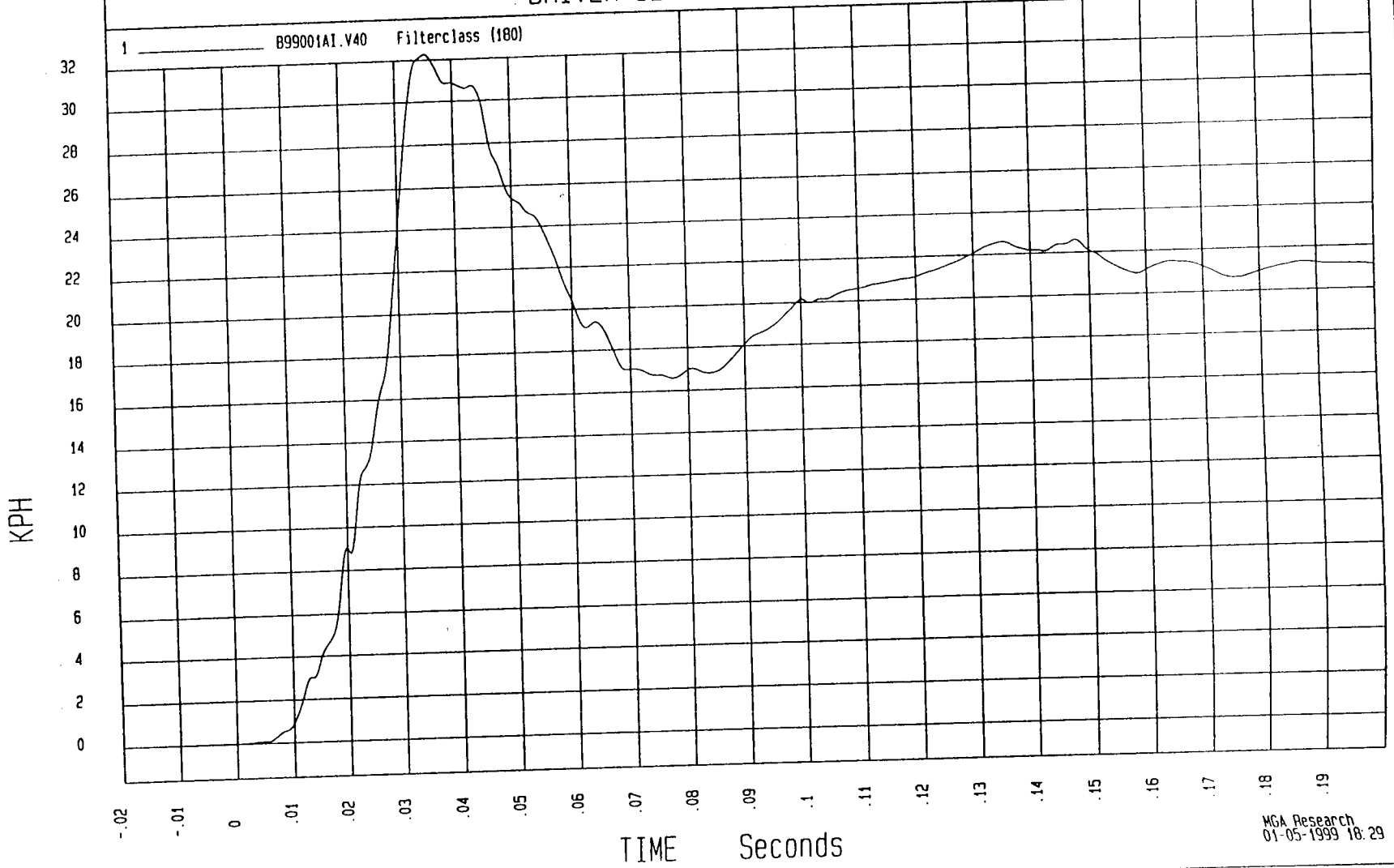
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -4.20E-03 KPH at -4 msec

Maximum = 32.25 KPH at 35 msec

DRIVER SEAT TRACK Y VELOCITY



MGA Research
01-05-1999 18:29

000588

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

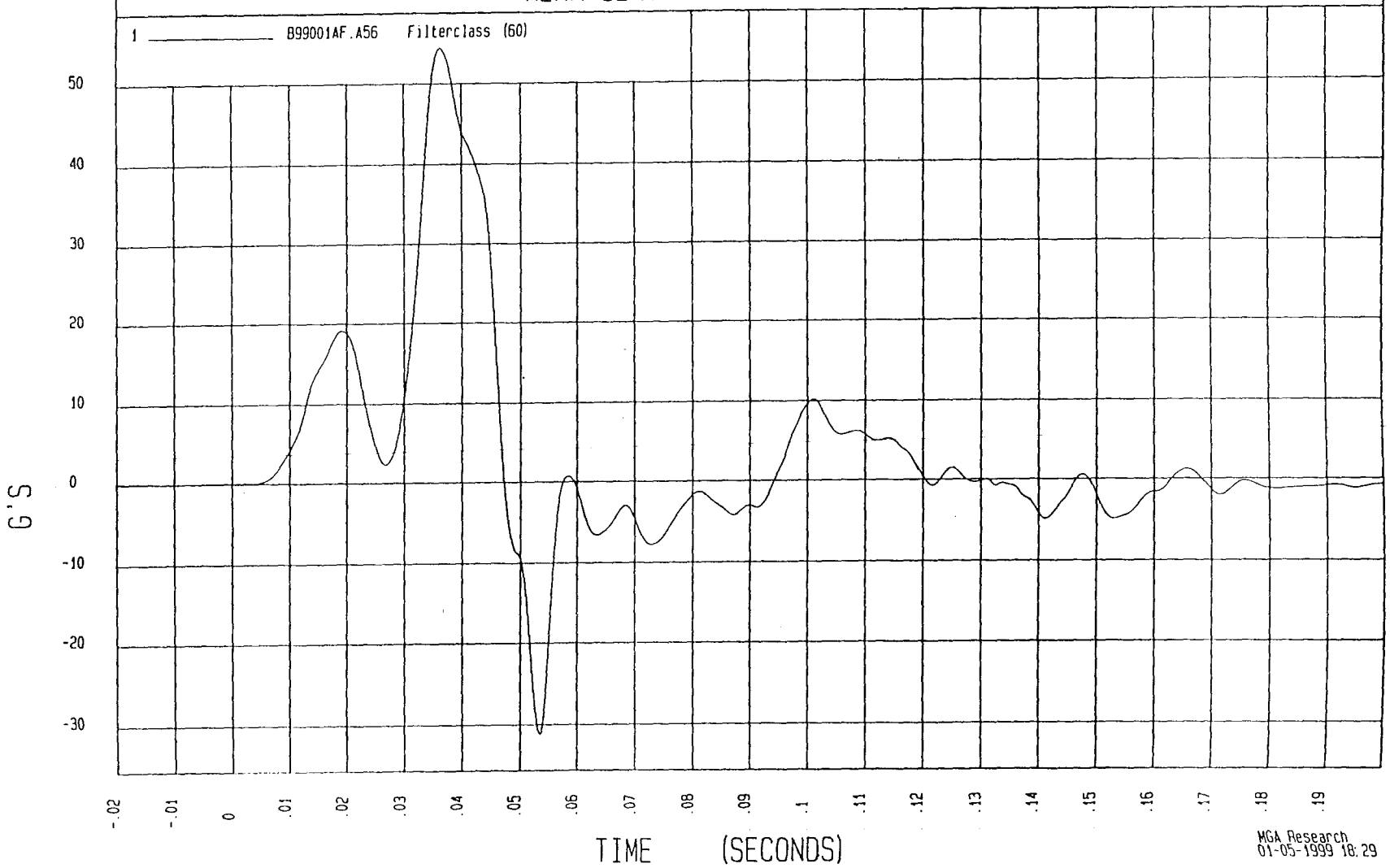
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -31.17 G'S at 53 msec

Maximum = 54.35 G'S at 36 msec

REAR SEAT TRACK Y ACCELERATION



0000589

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

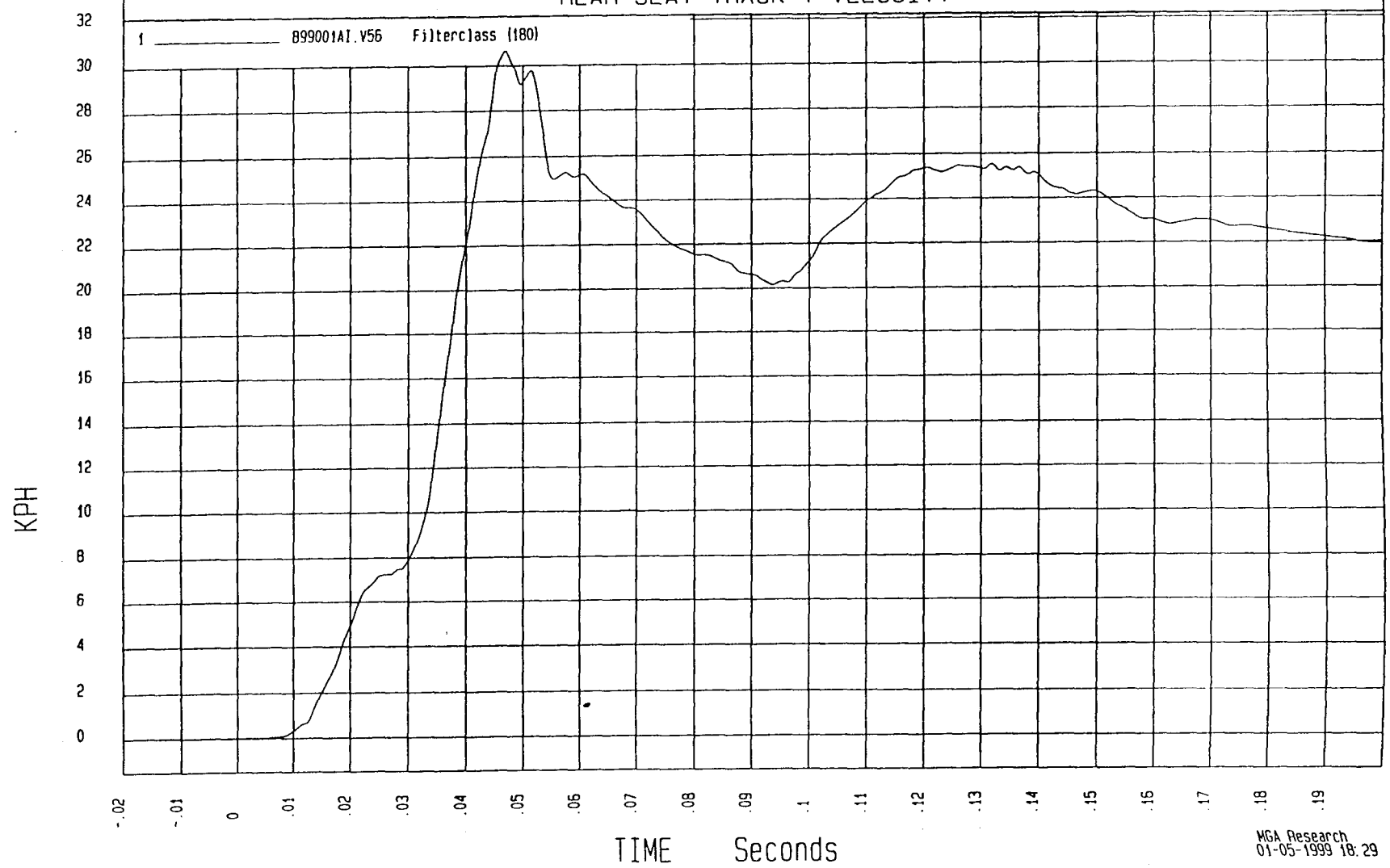
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = 0 KPH at -20 msec

Maximum = 30.65 KPH at 47 msec

REAR SEAT TRACK Y VELOCITY



MGA Research
01-05-1999 18:29

000050

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

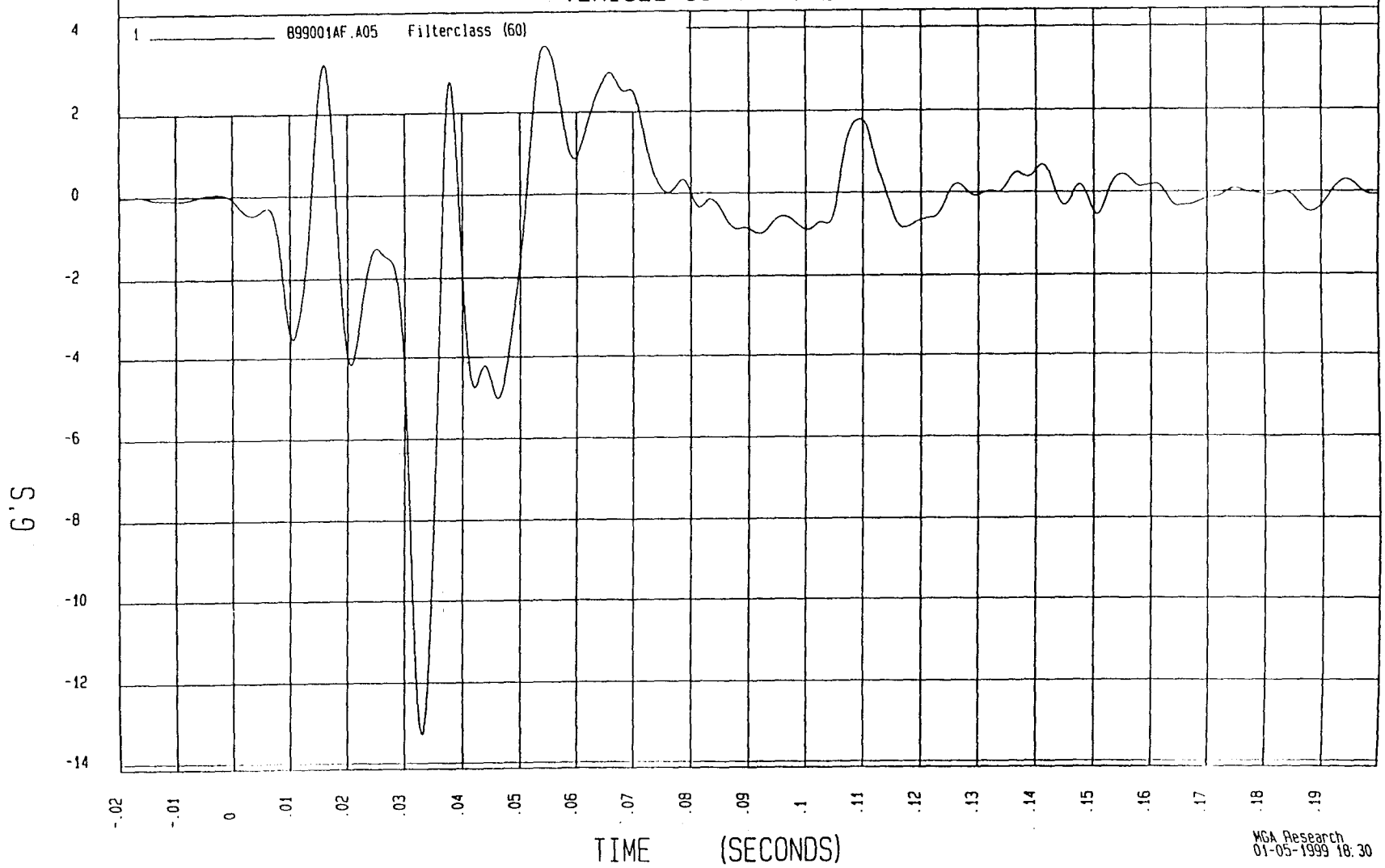
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -13.29 G'S at 33 msec

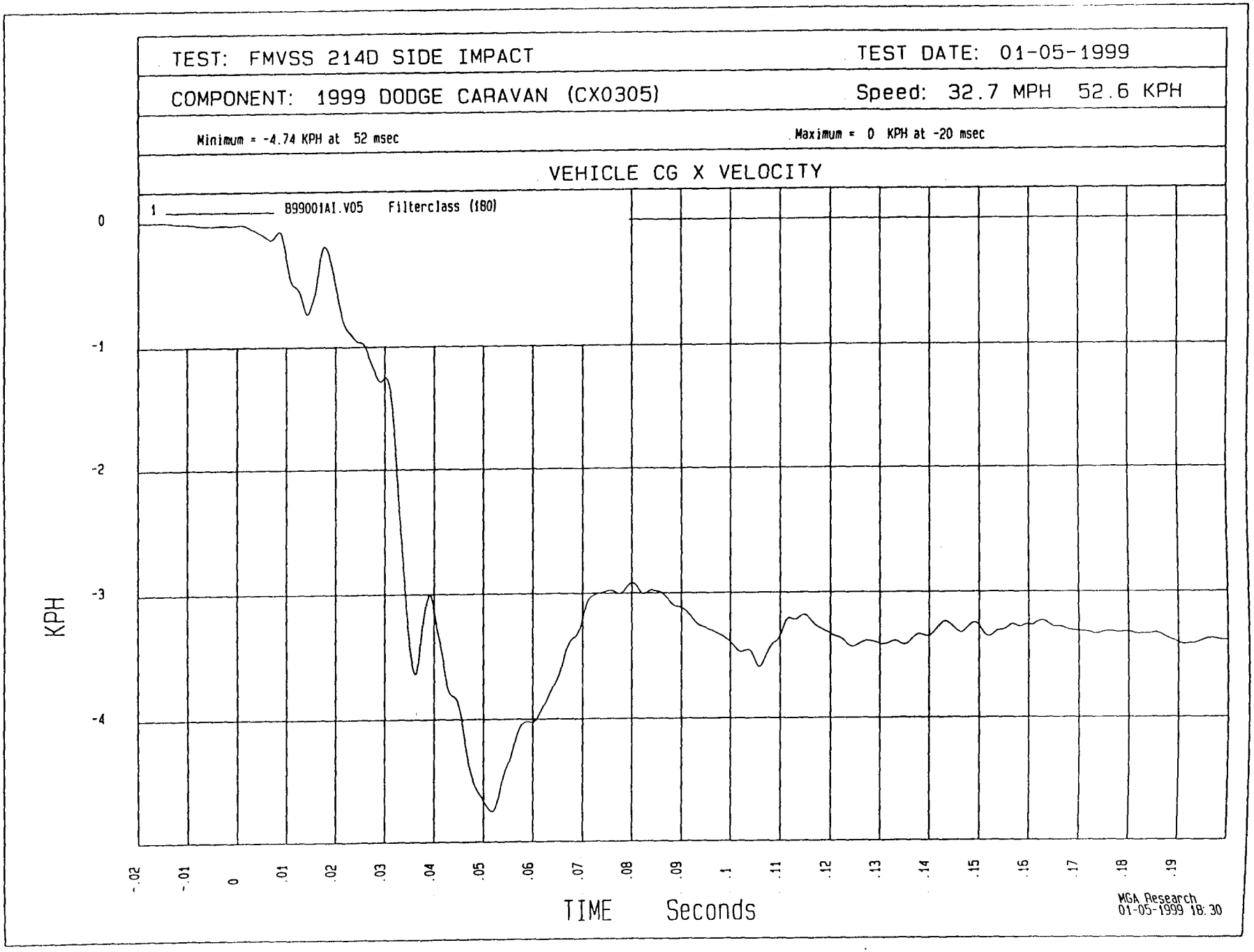
Maximum = 3.58 G'S at 54 msec

VEHICLE CG X ACCELERATION



MGA Research
01-05-1999 18:30

0000591


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -4.74 KPH at 52 msec
Maximum = 0 KPH at -20 msec
VEHICLE CG X VELOCITY
1 B99001AI.V05 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
01-05-1999 18:30

0000592

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

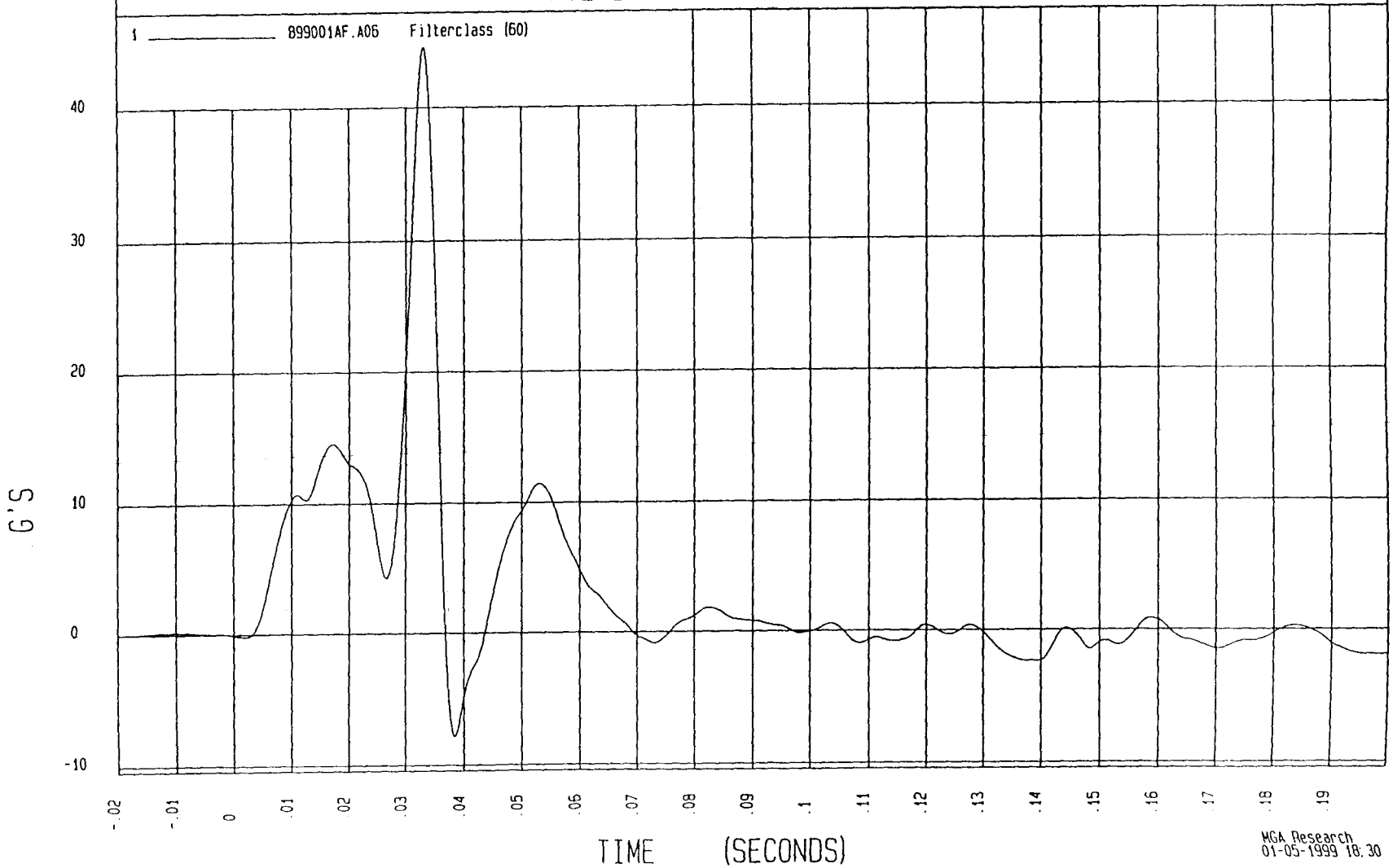
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -7.81 G'S at 38 msec

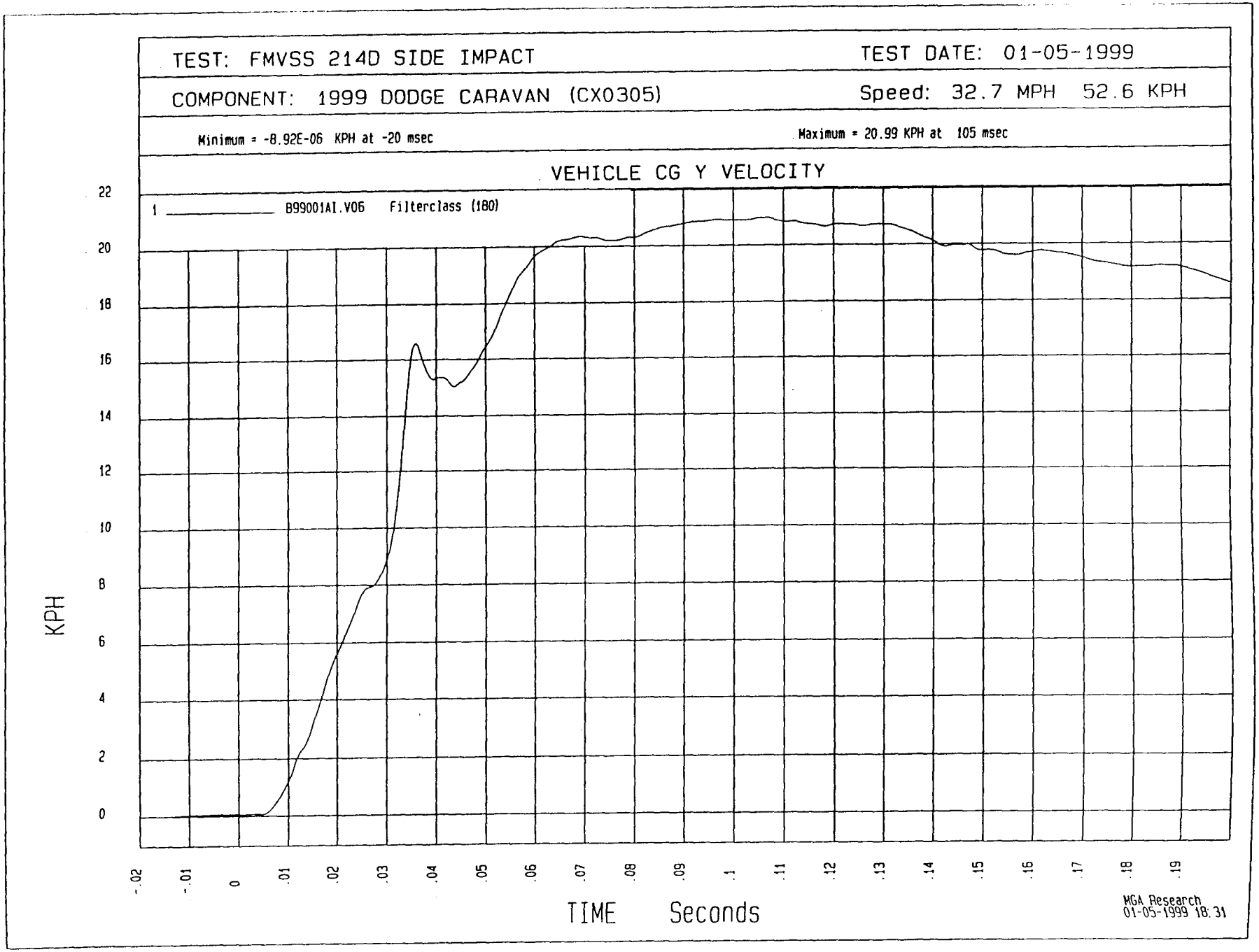
Maximum = 44.47 G'S at 33 msec

VEHICLE CG Y ACCELERATION



MGA Research
01-05-1999 18:30

00005933


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -8.92E-06 KPH at -20 msec
Maximum = 20.99 KPH at 105 msec
VEHICLE CG Y VELOCITY
1 B99001AI.V06 Filterclass (180)
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
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
01-05-1999 18:31

0000594

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

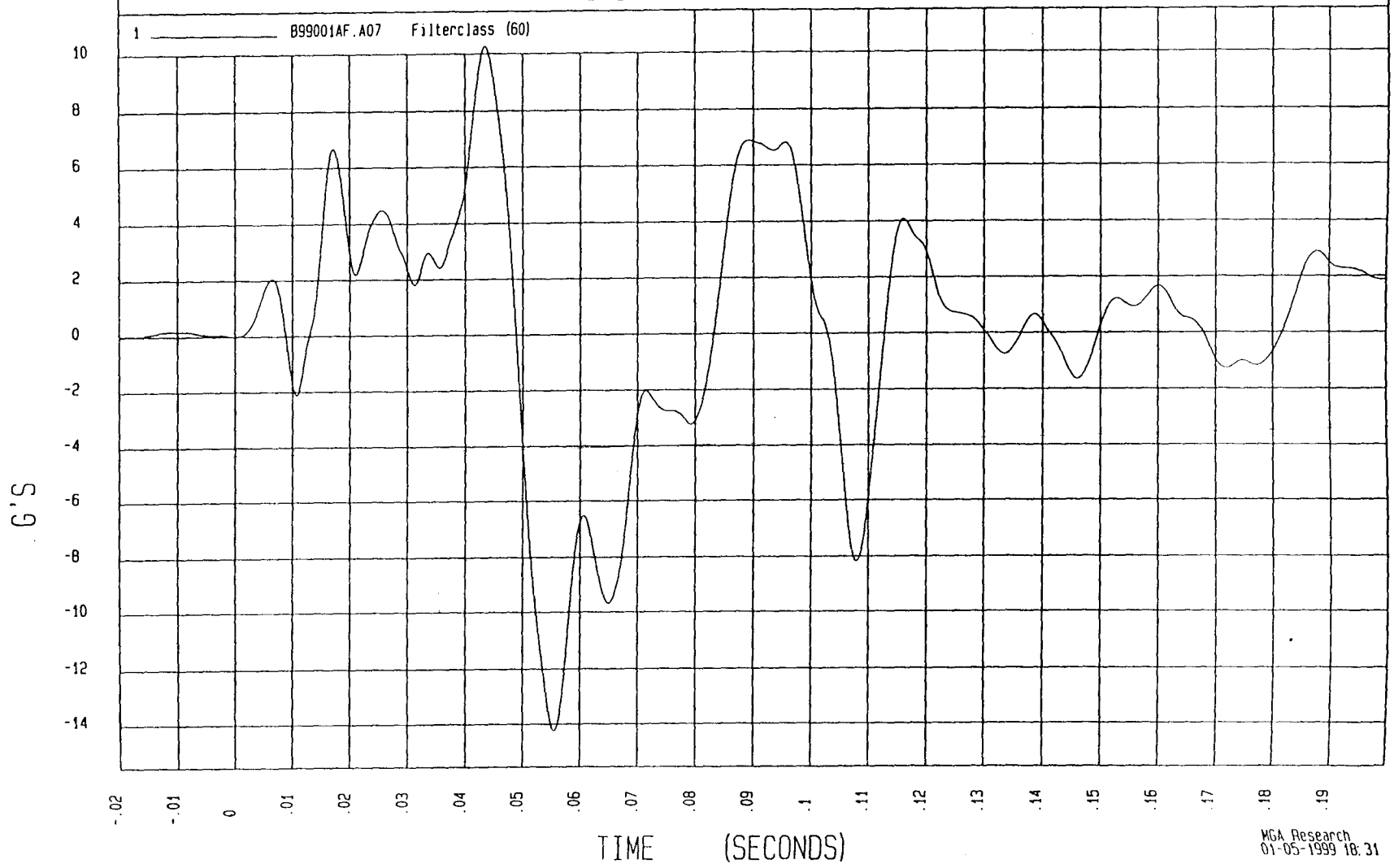
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -14.24 G'S at 56 msec

Maximum = 10.27 G'S at 44 msec

VEHICLE CG Z ACCELERATION



MGA Research
01-05-1999 18:31

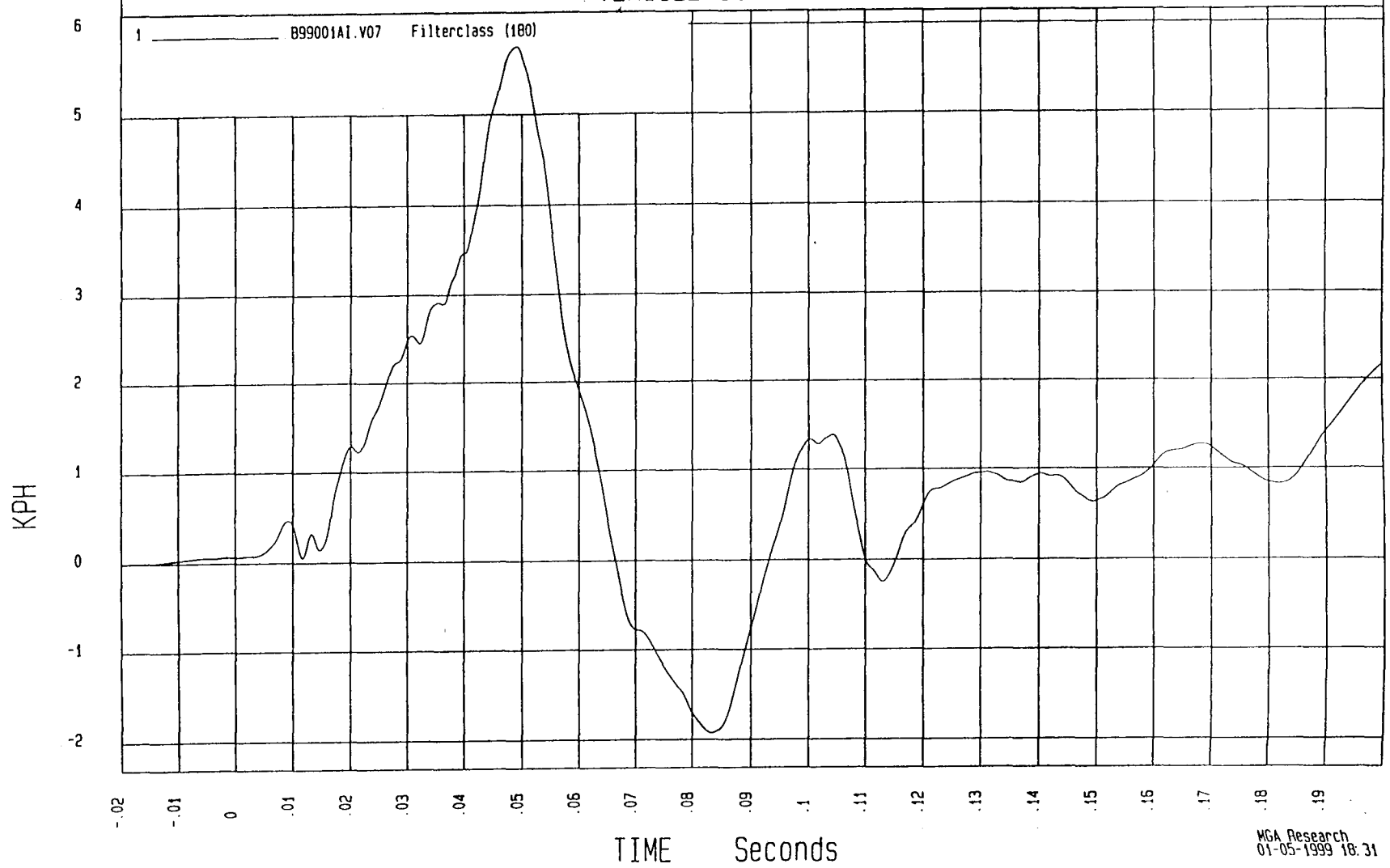
0000593

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

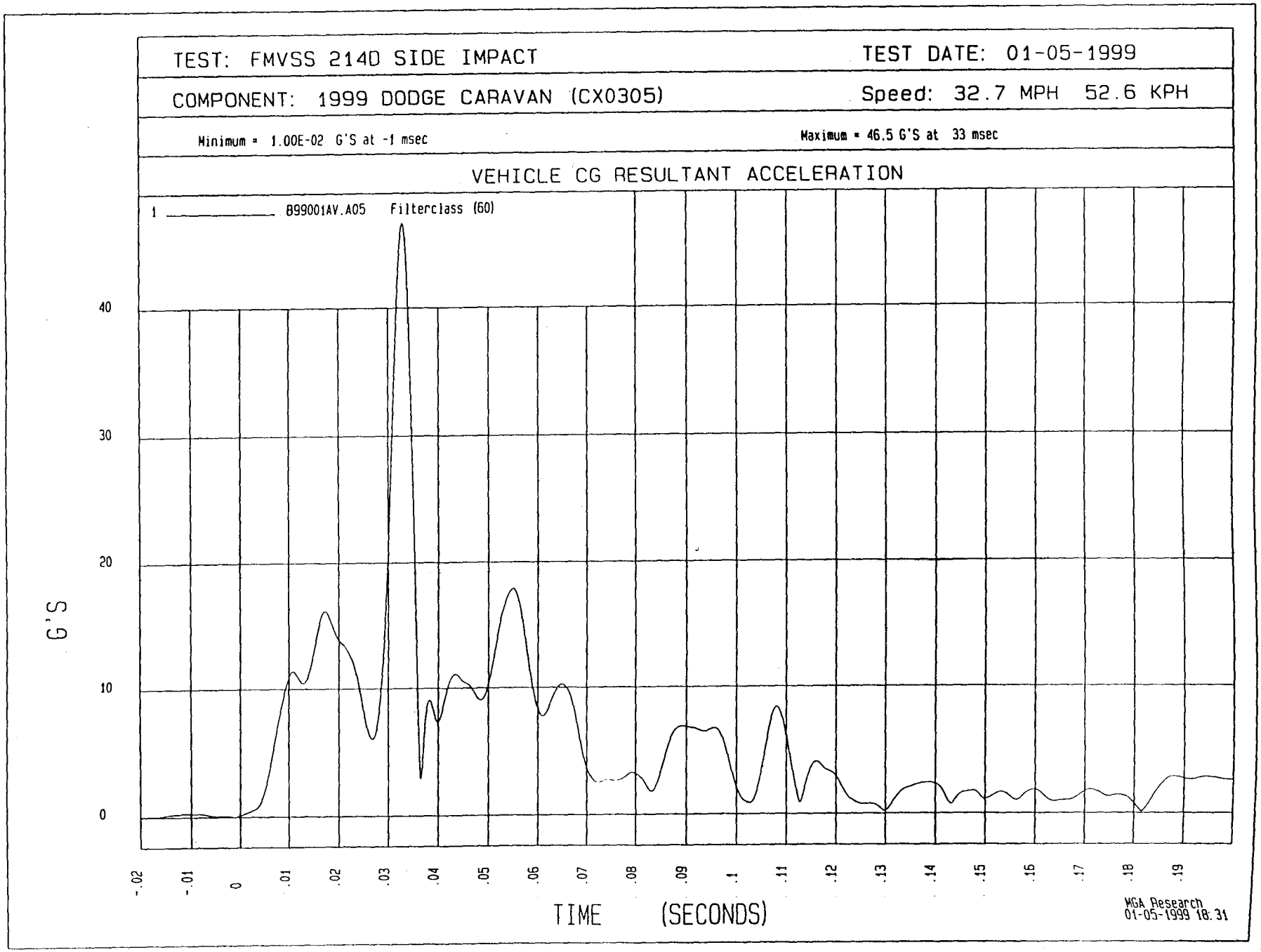
Minimum = -1.93 KPH at 83 msec Maximum = 5.76 KPH at 49 msec

VEHICLE CG Z VELOCITY



MGA Research
01-05-1999 18:31

000536


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = 1.00E-02 G'S at -1 msec
Maximum = 46.5 G'S at 33 msec
VEHICLE CG RESULTANT ACCELERATION
1 B99001AV.A05 Filterclass (60)
G'S
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
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.16
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.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:31

0000537

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

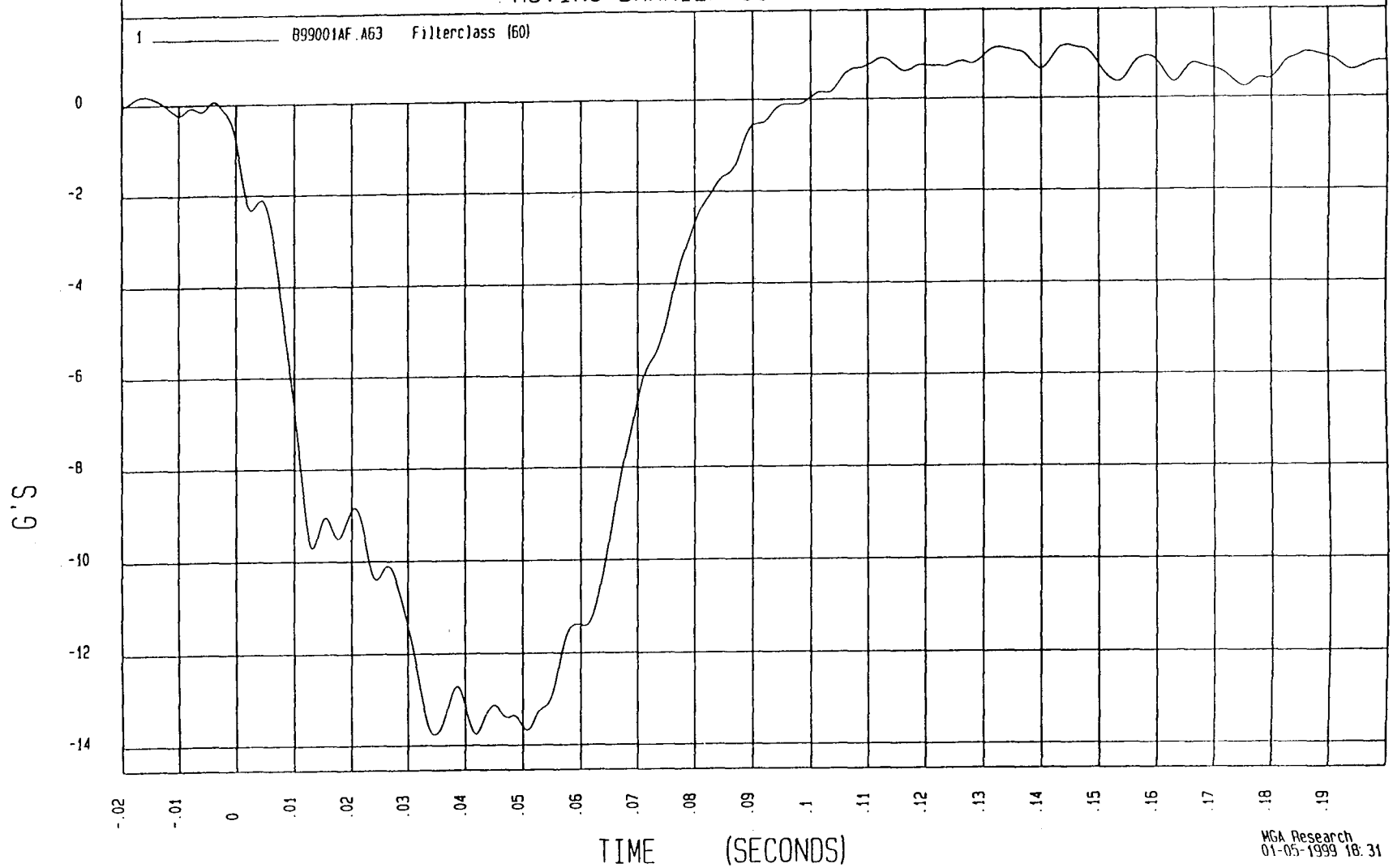
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -13.76 G'S at 35 msec

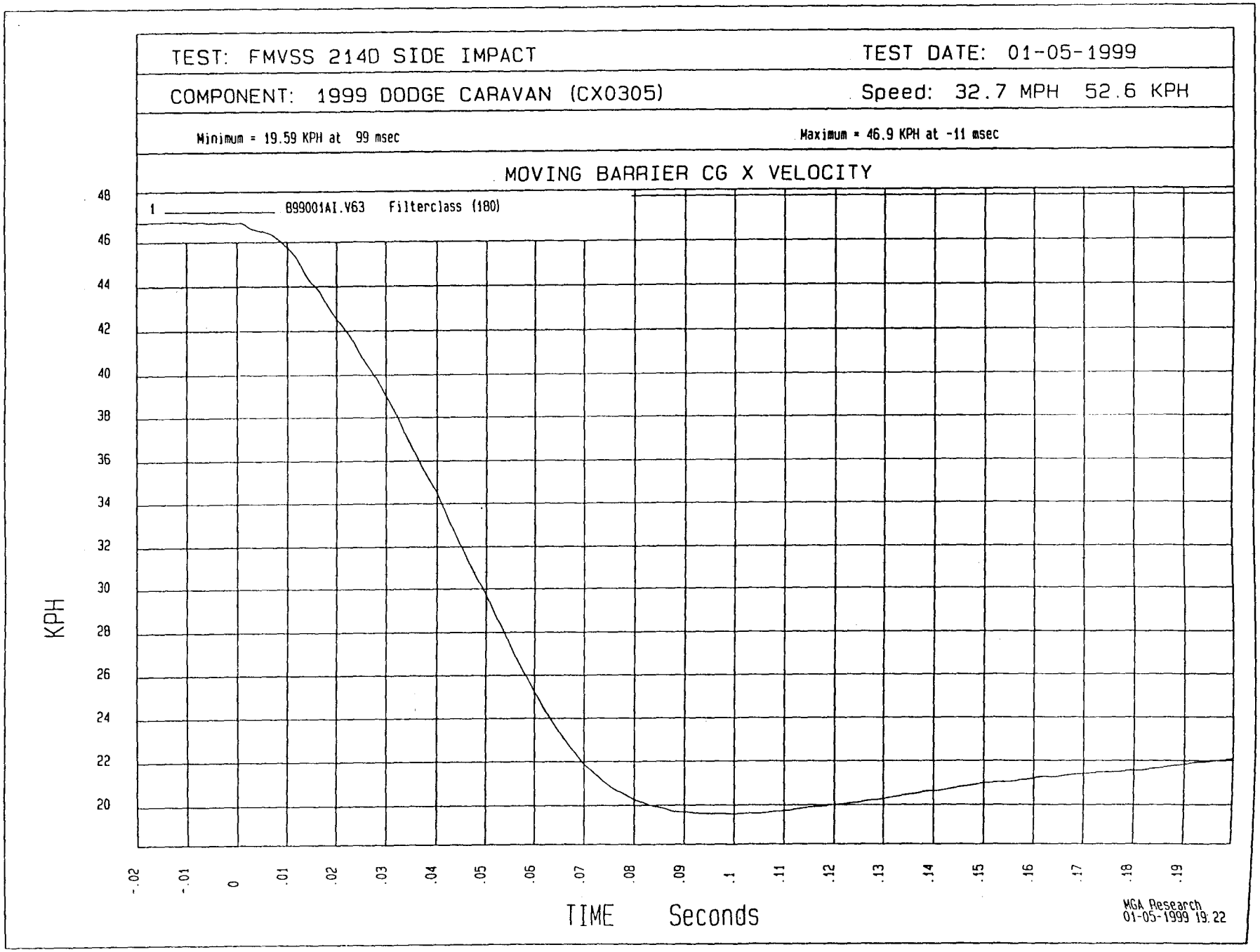
Maximum = 1.14 G'S at 144 msec

MOVING BARRIER CG X ACCELERATION



MGA Research
01-05-1999 18:31

000053 8


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = 19.59 KPH at 99 msec
Maximum = 46.9 KPH at -11 msec
MOVING BARRIER CG X VELOCITY
1 899001AI.V63 Filterclass (180)
KPH
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.09
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.12
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.14
.15
.16
.17
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.19
TIME Seconds
MGA Research
01-05-1999 19:22

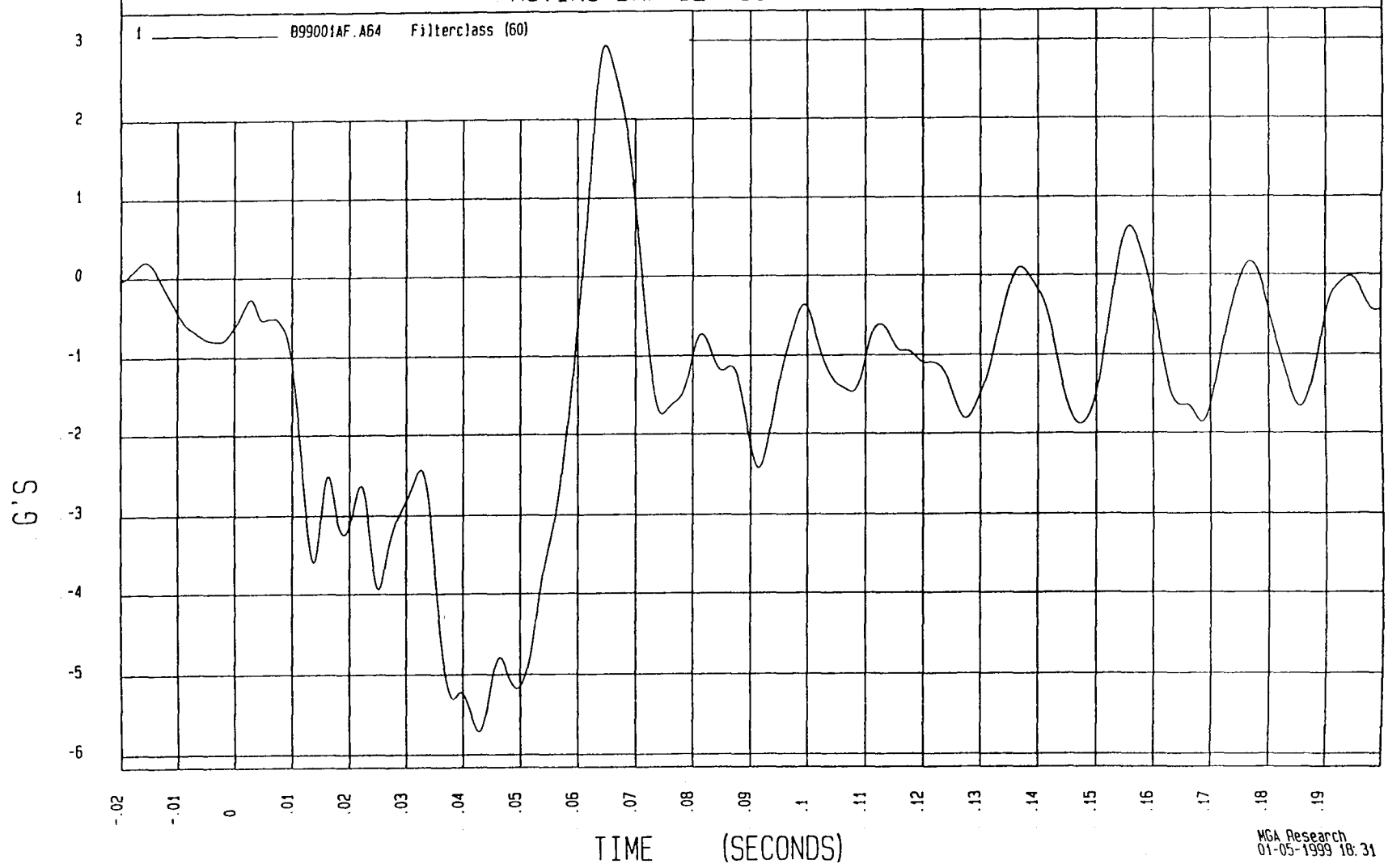
000059

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

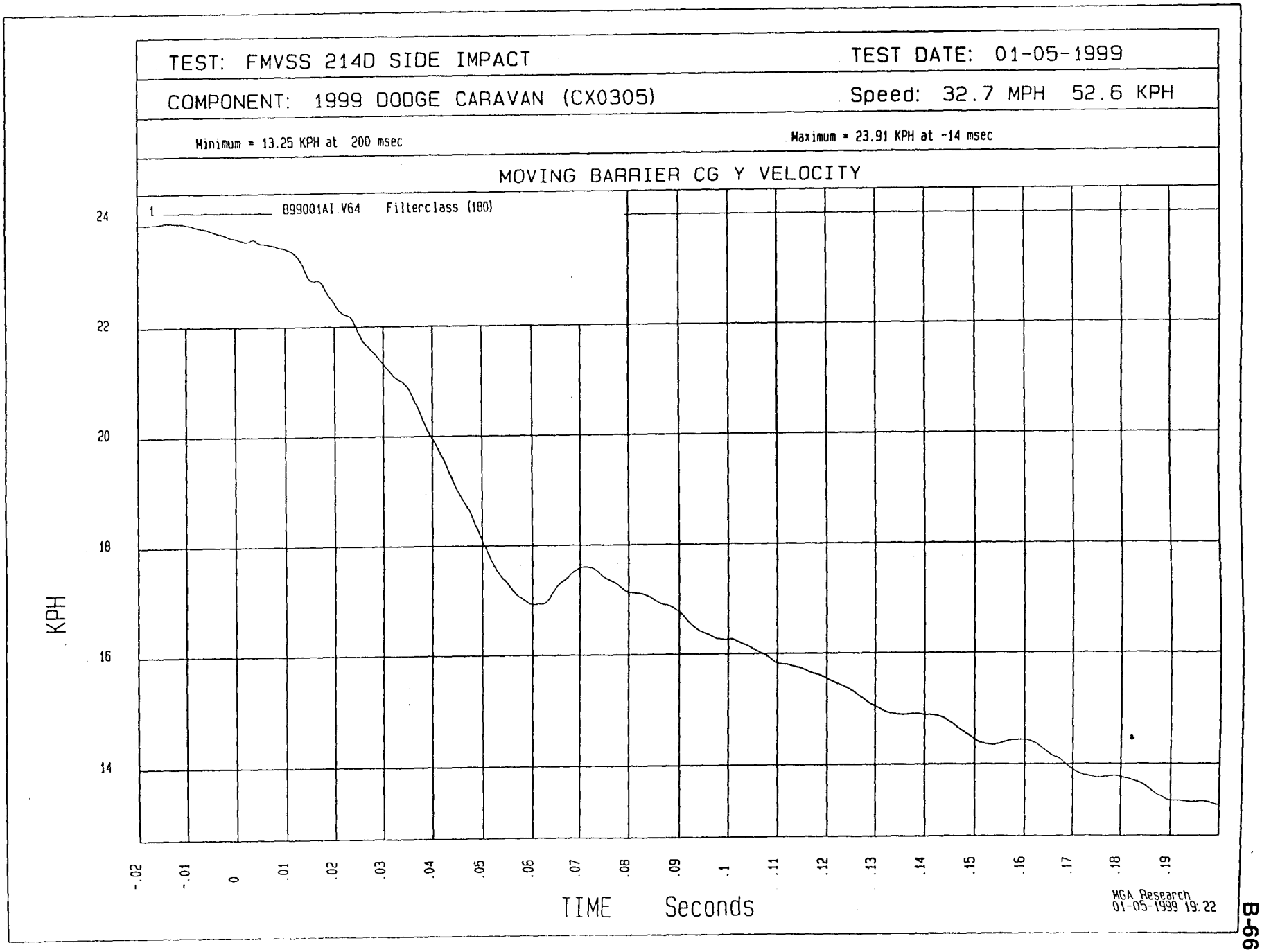
COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = -5.72 G'S at 43 msec Maximum = 2.94 G'S at 65 msec

MOVING BARRIER CG Y ACCELERATION



0000000


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = 13.25 KPH at 200 msec
Maximum = 23.91 KPH at -14 msec
MOVING BARRIER CG Y VELOCITY
1 899001AI.V64 Filterclass (180)
KPH
24
22
20
18
16
14
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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.12
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.19
TIME Seconds
MGA Research
01-05-1999 19:22

0000601

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

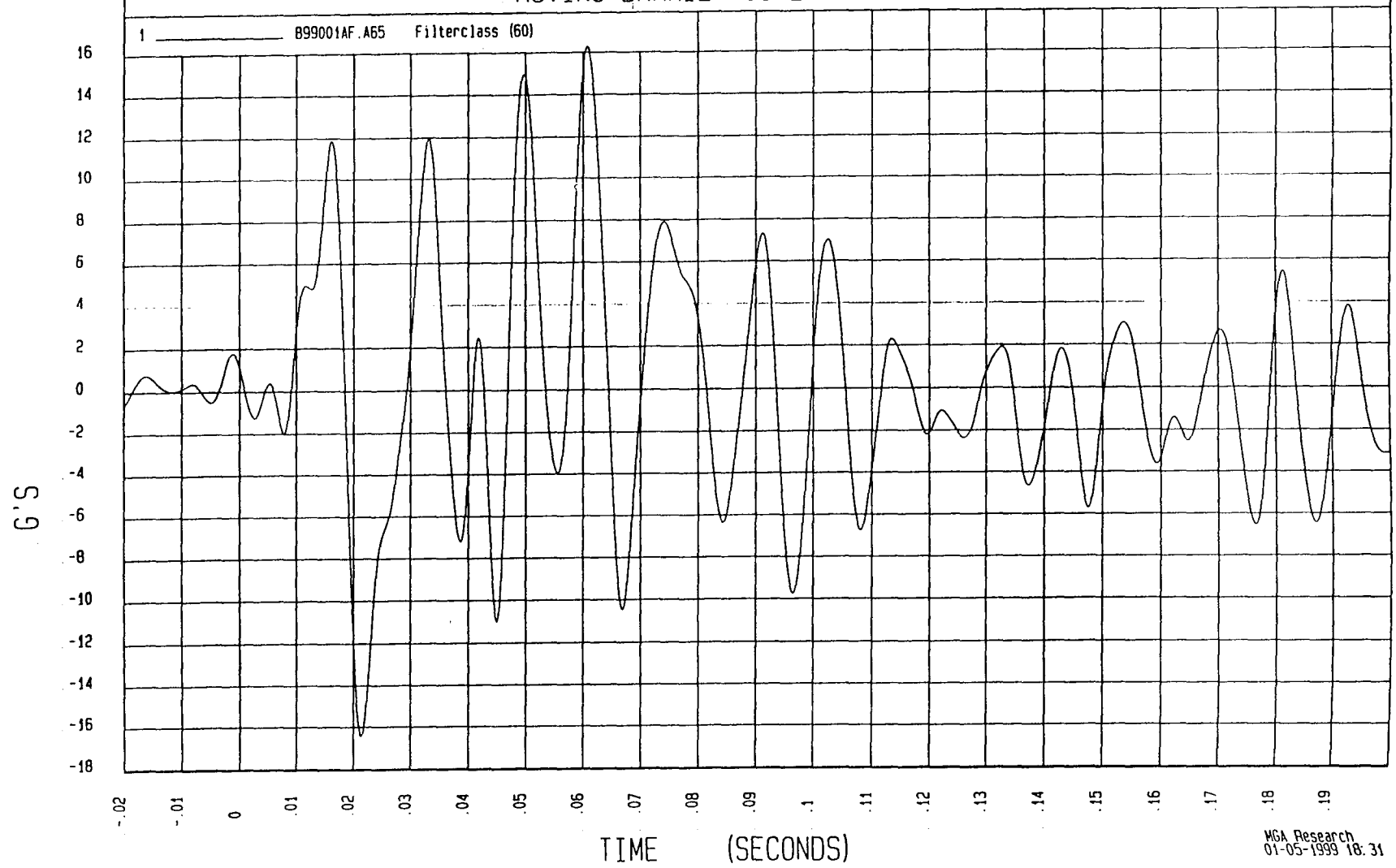
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -16.43 G'S at 21 msec

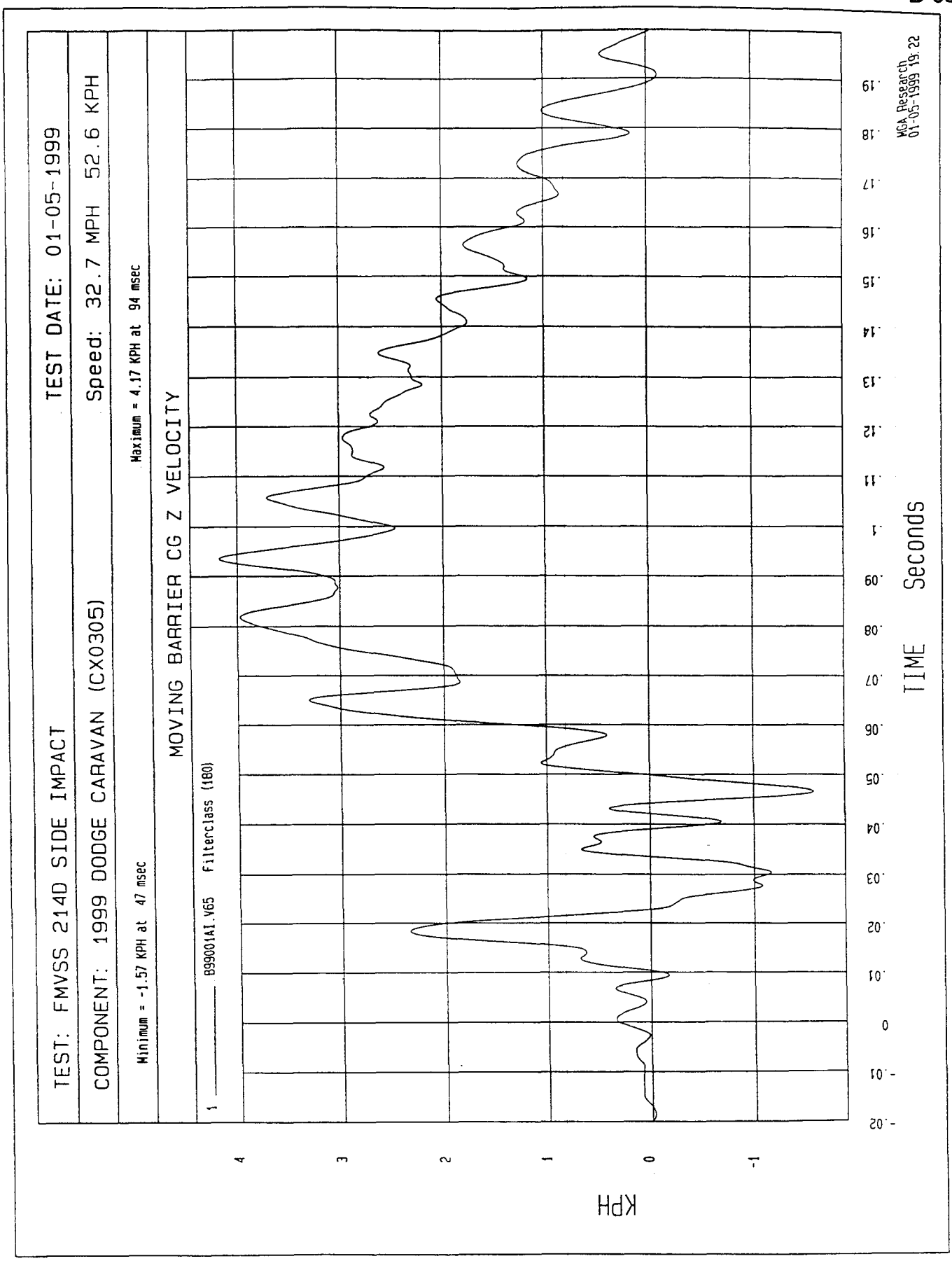
Maximum = 16.27 G'S at 61 msec

MOVING BARRIER CG Z ACCELERATION



MGA Research
01-05-1999 18:31

00060 2


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -1.57 KPH at 47 msec
Maximum = 4.17 KPH at 94 msec
MOVING BARRIER CG Z VELOCITY
1 B99001A1.V65 Filterclass (180)
KPH
4
3
2
1
0
-1
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
01-05-1999 19:22

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

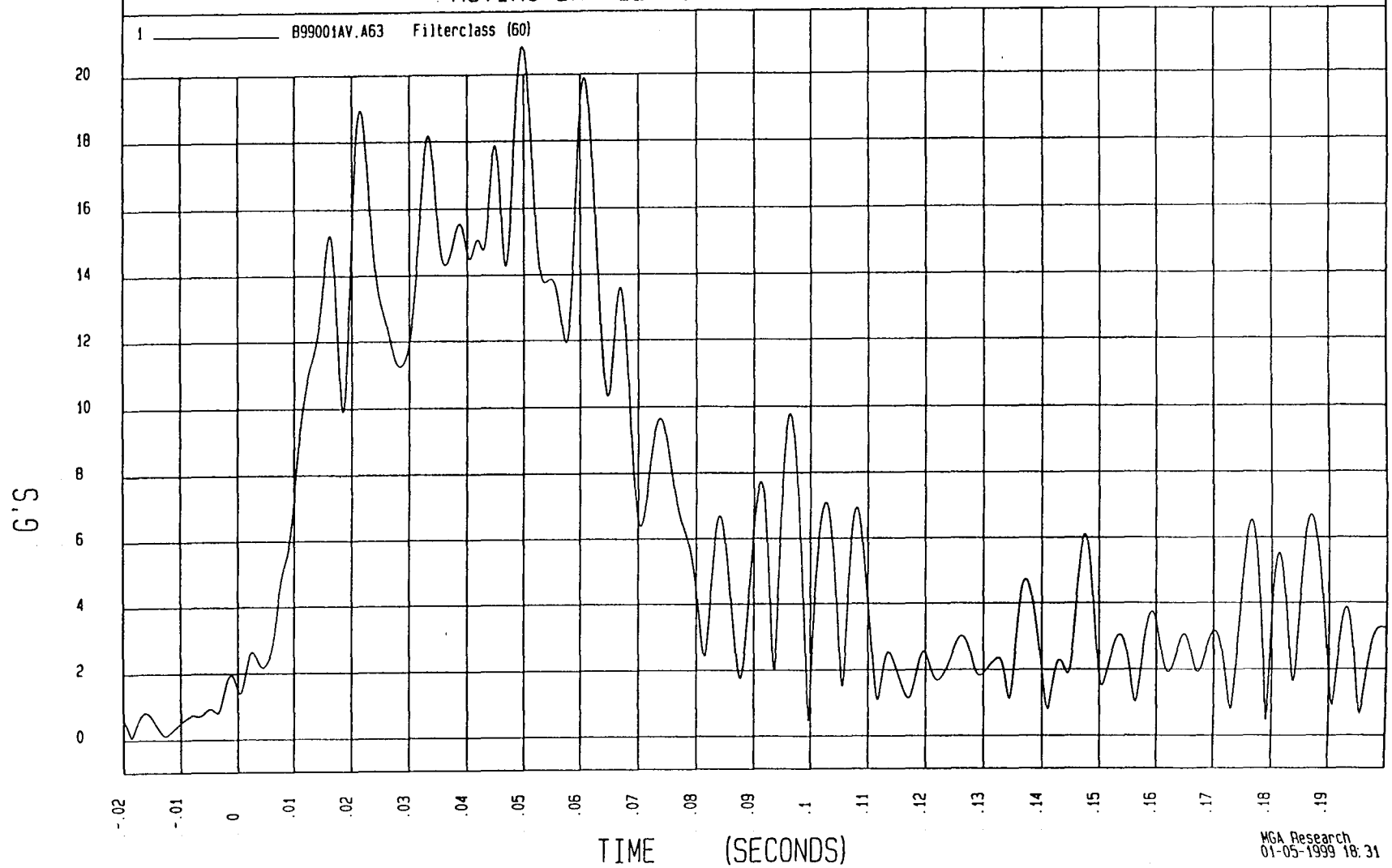
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = .07 G'S at -19 msec

Maximum = 20.84 G'S at 50 msec

MOVING BARRIER CG RESULTANT ACCELERATION



000604

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

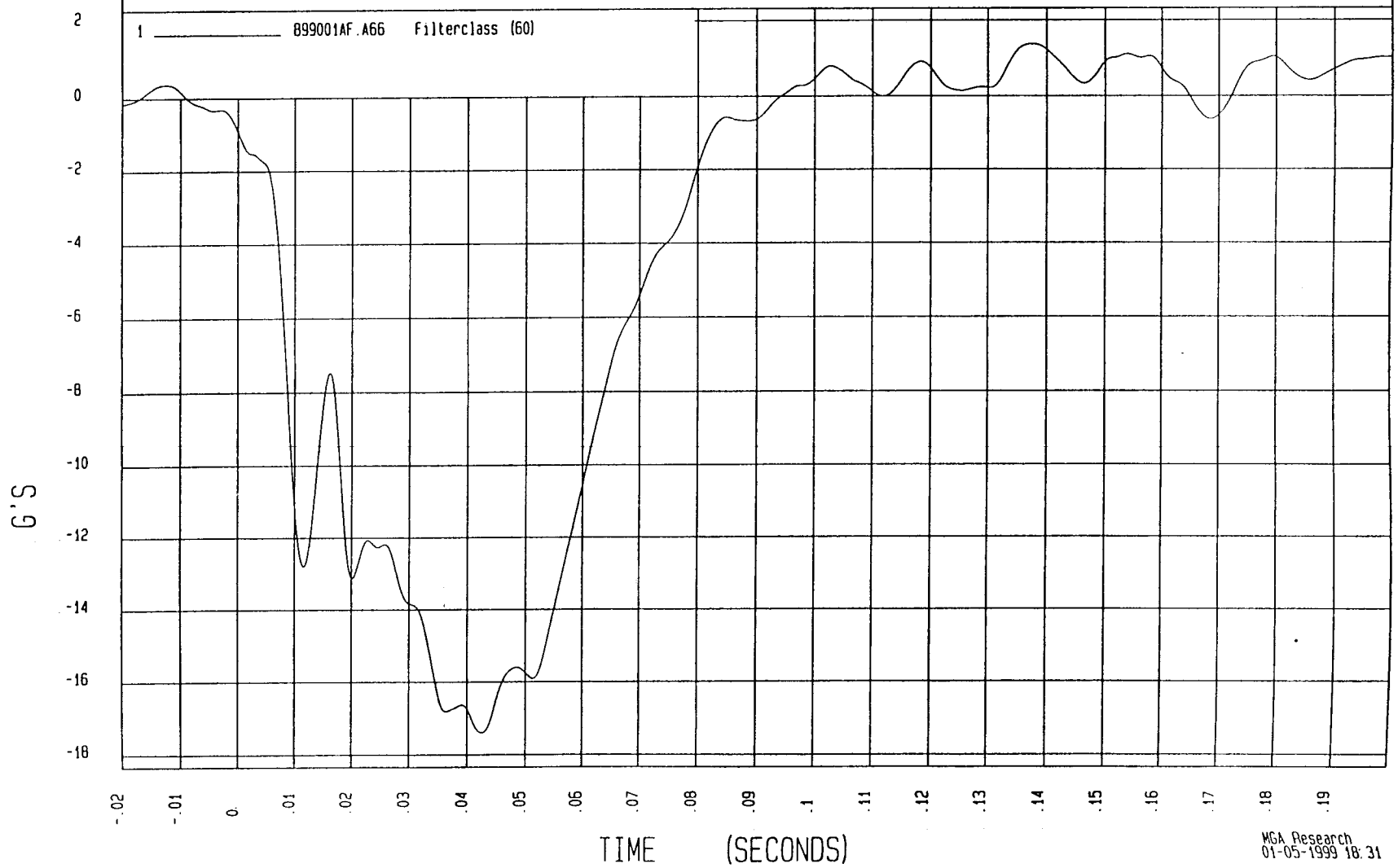
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -17.39 G'S at 43 msec

Maximum = 1.38 G'S at 138 msec

MOVING BARRIER REAR AXLE X ACCELERATION



MGA Research
01-05-1999 18:31

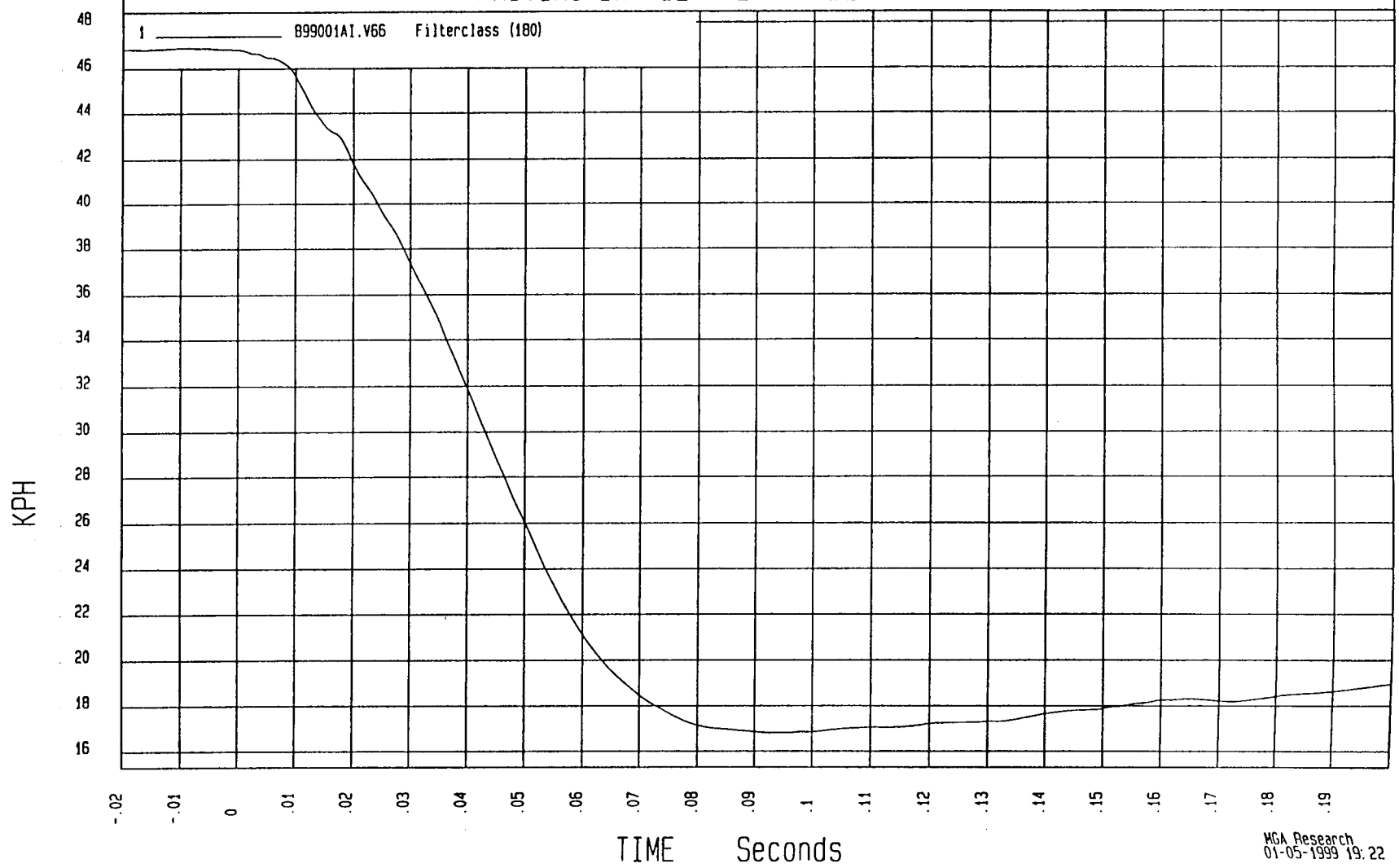
000065

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = 16.8 KPH at 96 msec Maximum = 46.93 KPH at -10 msec

MOVING BARRIER REAR AXLE X VELOCITY



MGA Research
01-05-1999 19:22

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

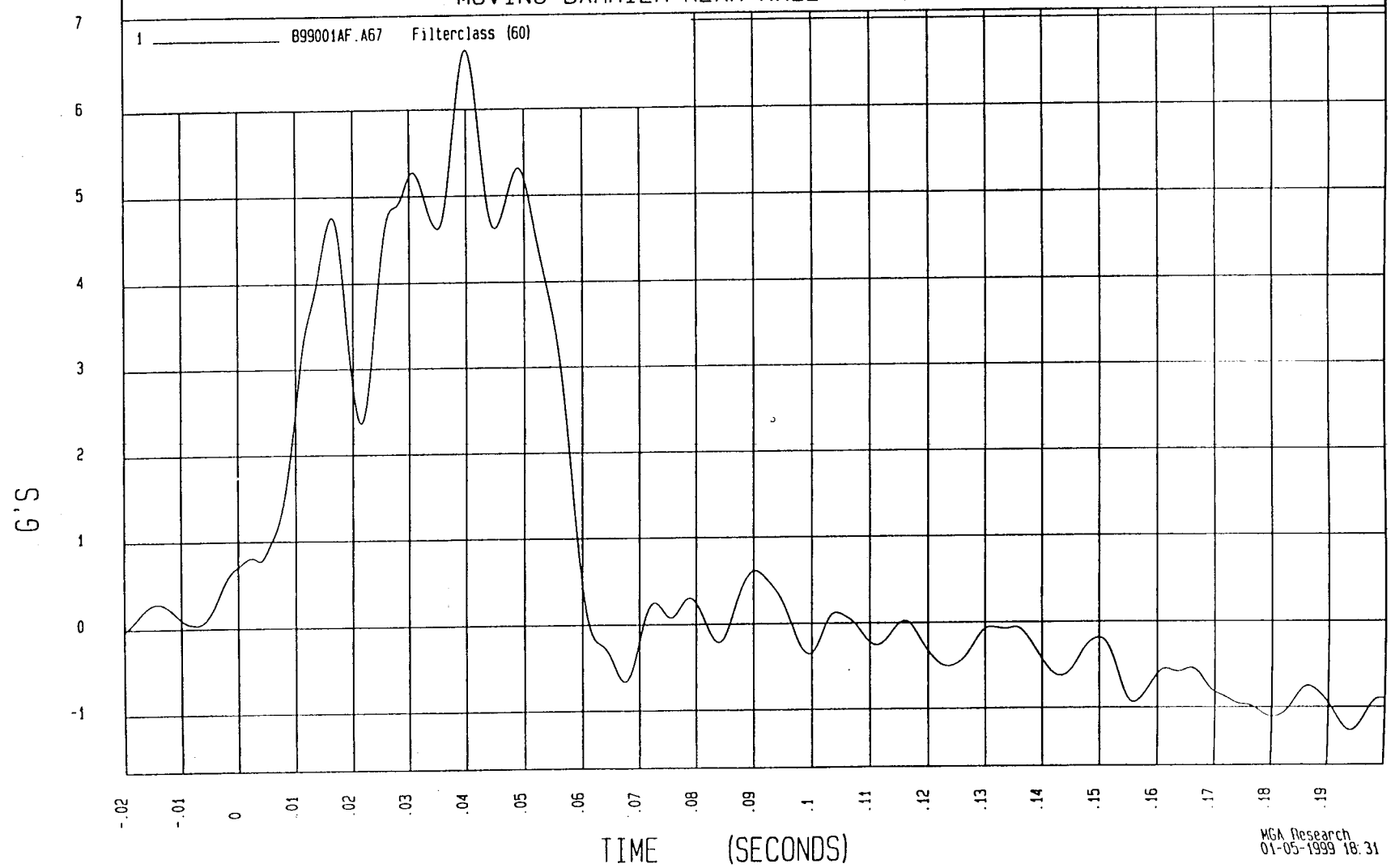
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -1.25 G'S at 194 msec

Maximum = 6.68 G'S at 40 msec

MOVING BARRIER REAR AXLE Y ACCELERATION



MGA Research
01-05-1999 18:31

0000607

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

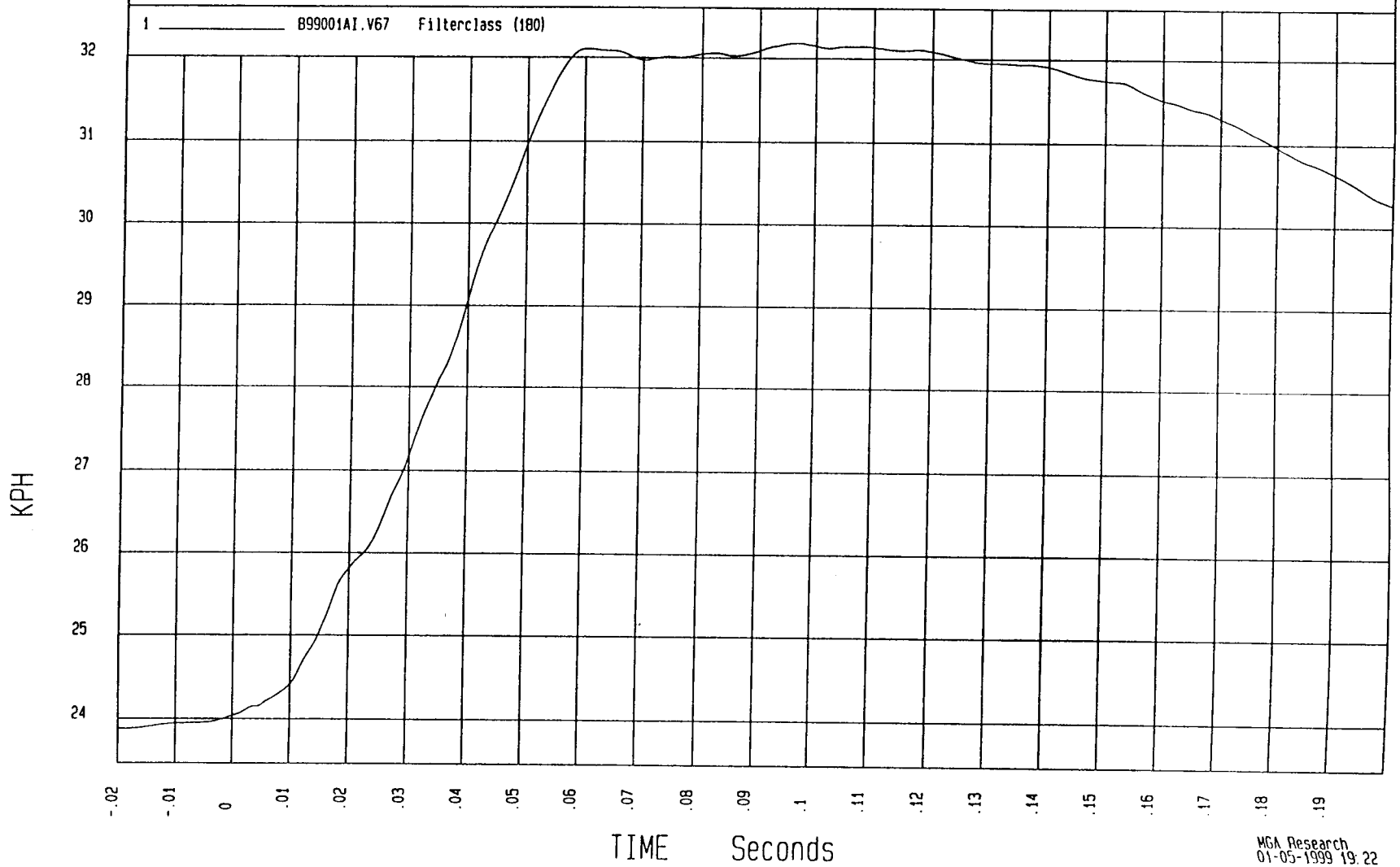
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = 23.88 KPH at -20 msec

Maximum = 32.18 KPH at 97 msec

MOVING BARRIER REAR AXLE Y VELOCITY



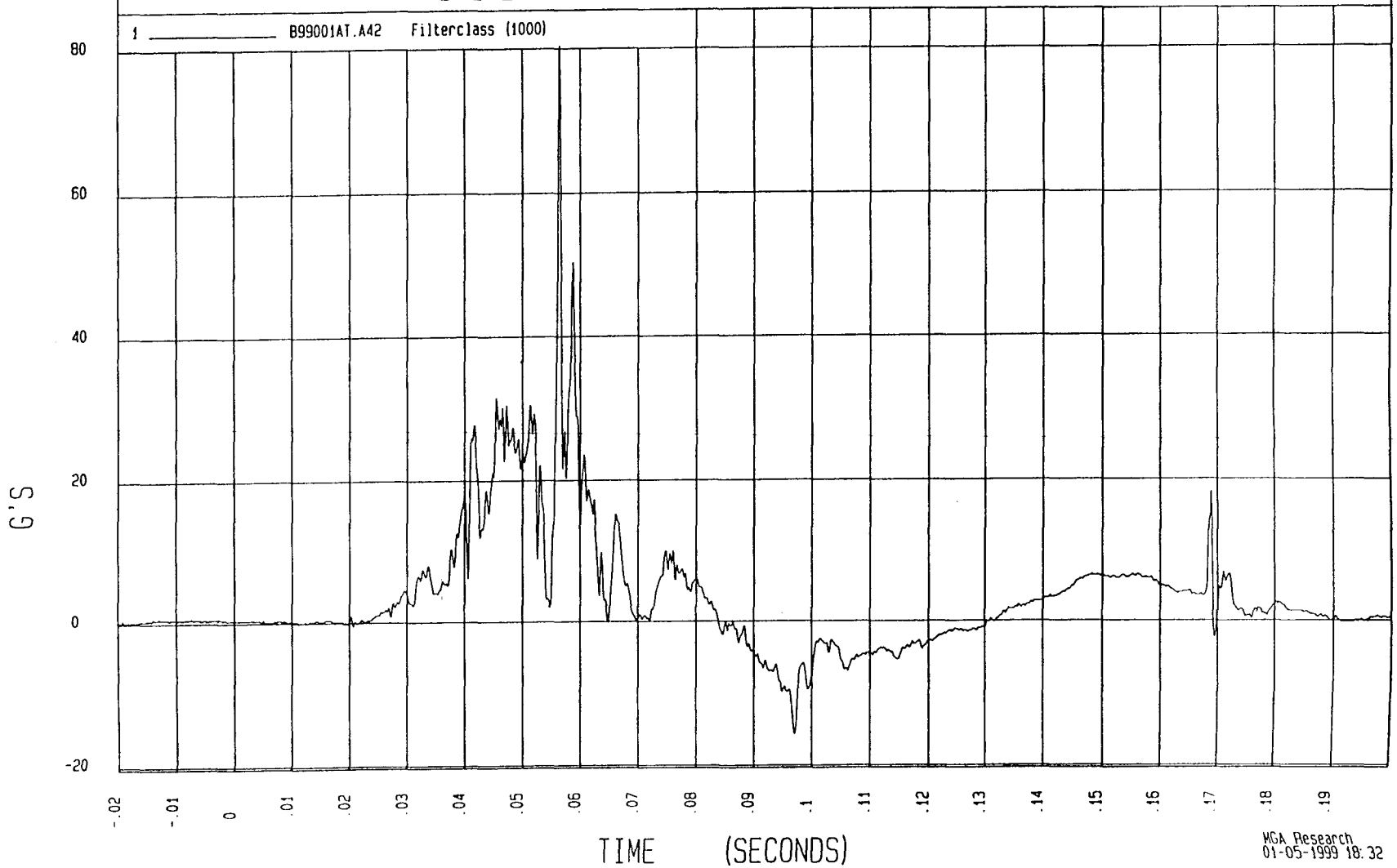
000608

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -15.53 G'S at 97 msec — Maximum = 80.46 G'S at 56 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION



000060 9

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

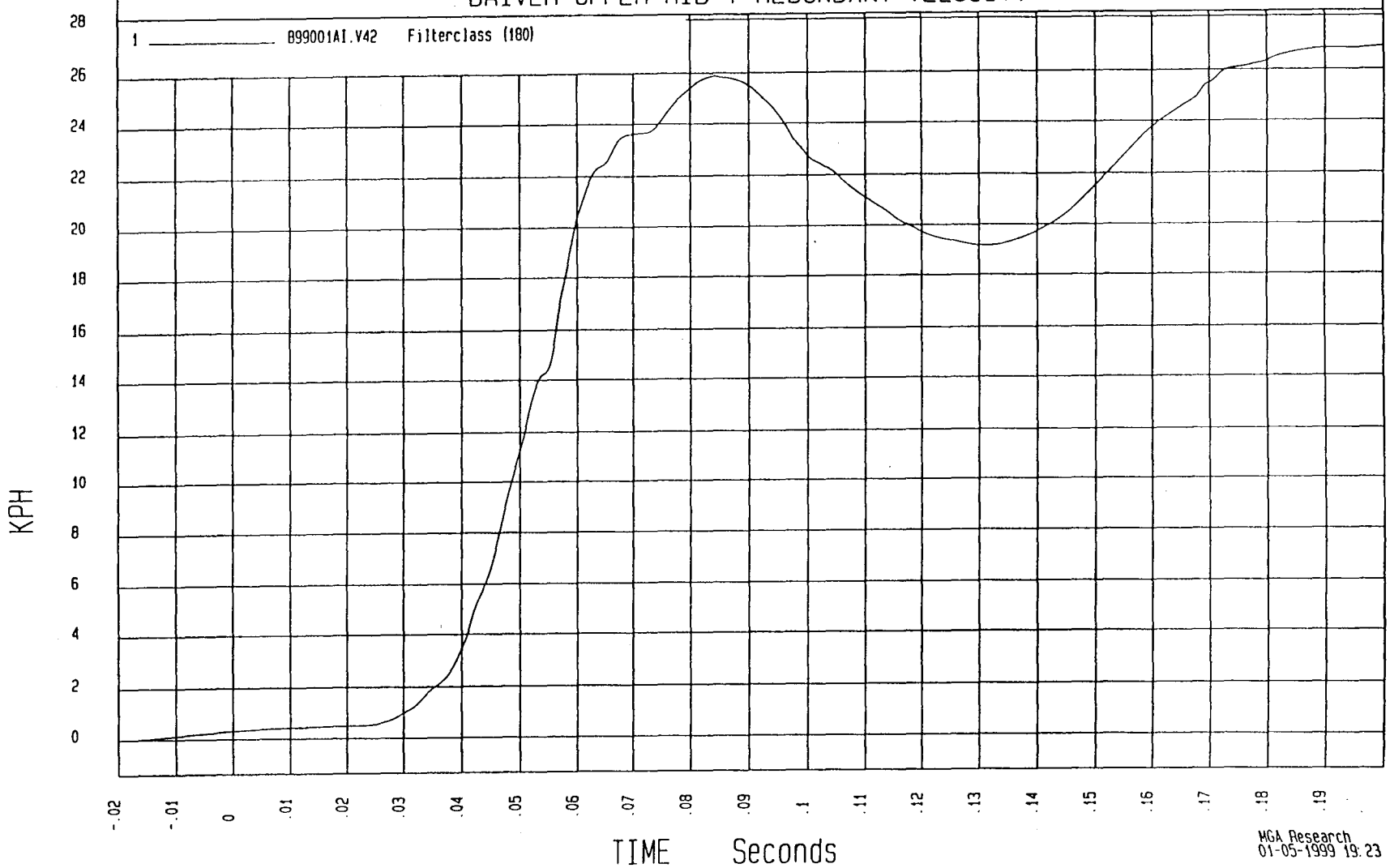
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = 0 KPH at -20 msec

Maximum = 26.85 KPH at 200 msec

DRIVER UPPER RIB Y REDUNDANT VELOCITY



MGA Research
01-05-1999 19:23

000010

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

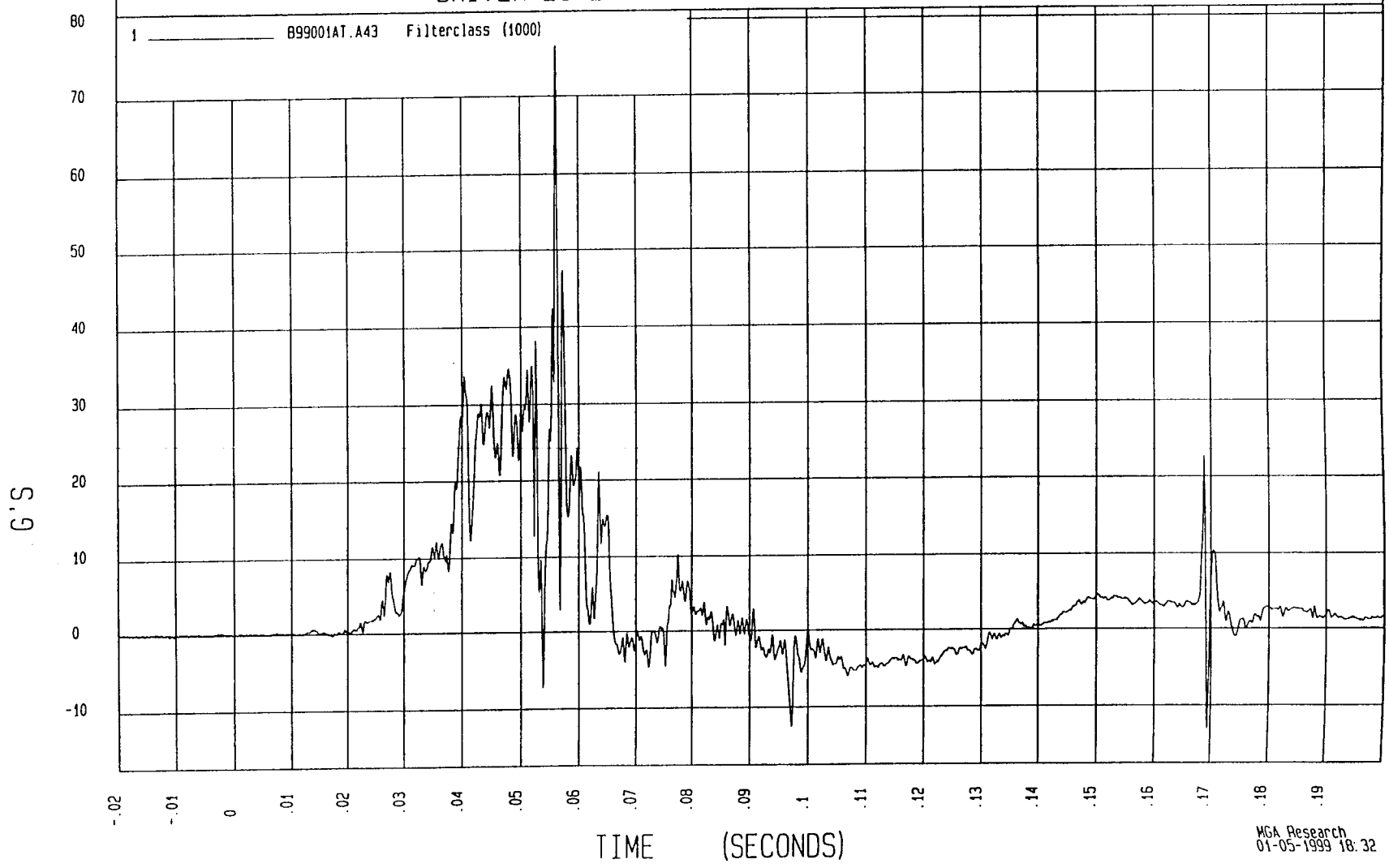
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -13.07 G'S at 169 msec

Maximum = 76.62 G'S at 56 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION



MGA Research
01-05-1999 18:32

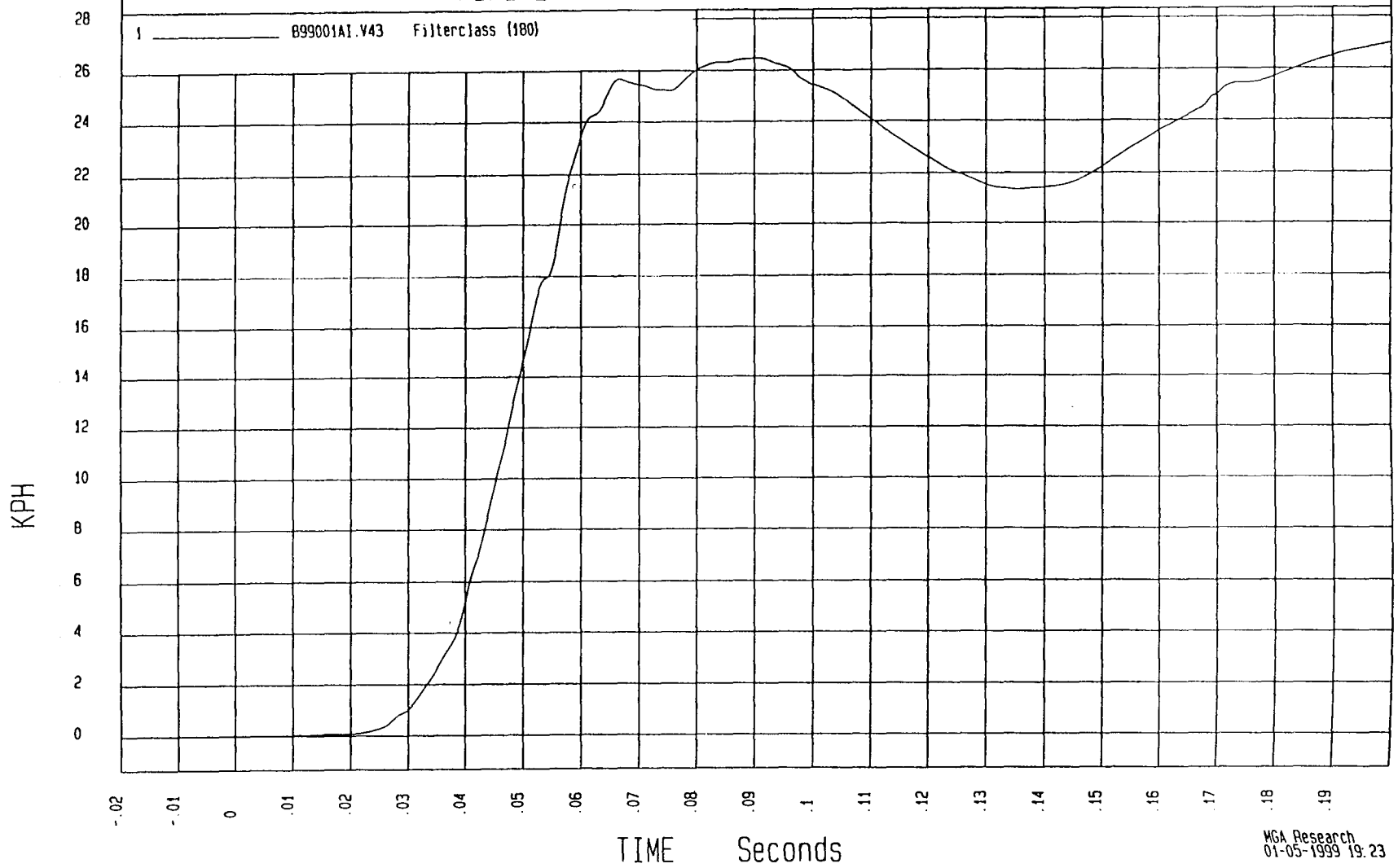
1190000

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

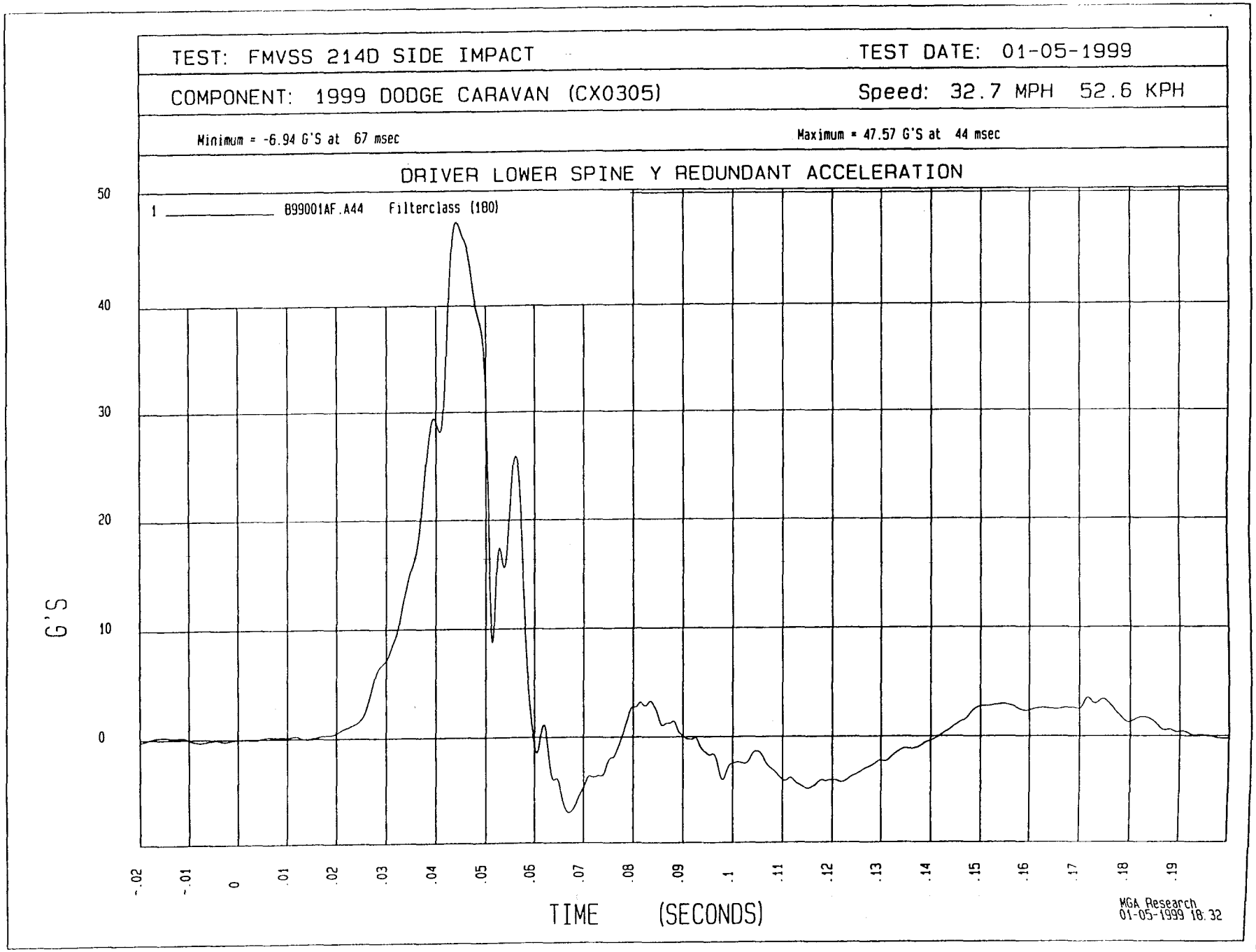
Minimum = 0 KPH at -20 msec | Maximum = 26.98 KPH at 200 msec

DRIVER LOWER RIB Y REDUNDANT VELOCITY



MGA Research
01-05-1999 19:23

0000612


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -6.94 G'S at 67 msec
Maximum = 47.57 G'S at 44 msec
DRIVER LOWER SPINE Y REDUNDANT ACCELERATION
1 B99001AF.A44 Filterclass (180)
G'S
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.13
.14
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.16
.17
.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:32

000061 3

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

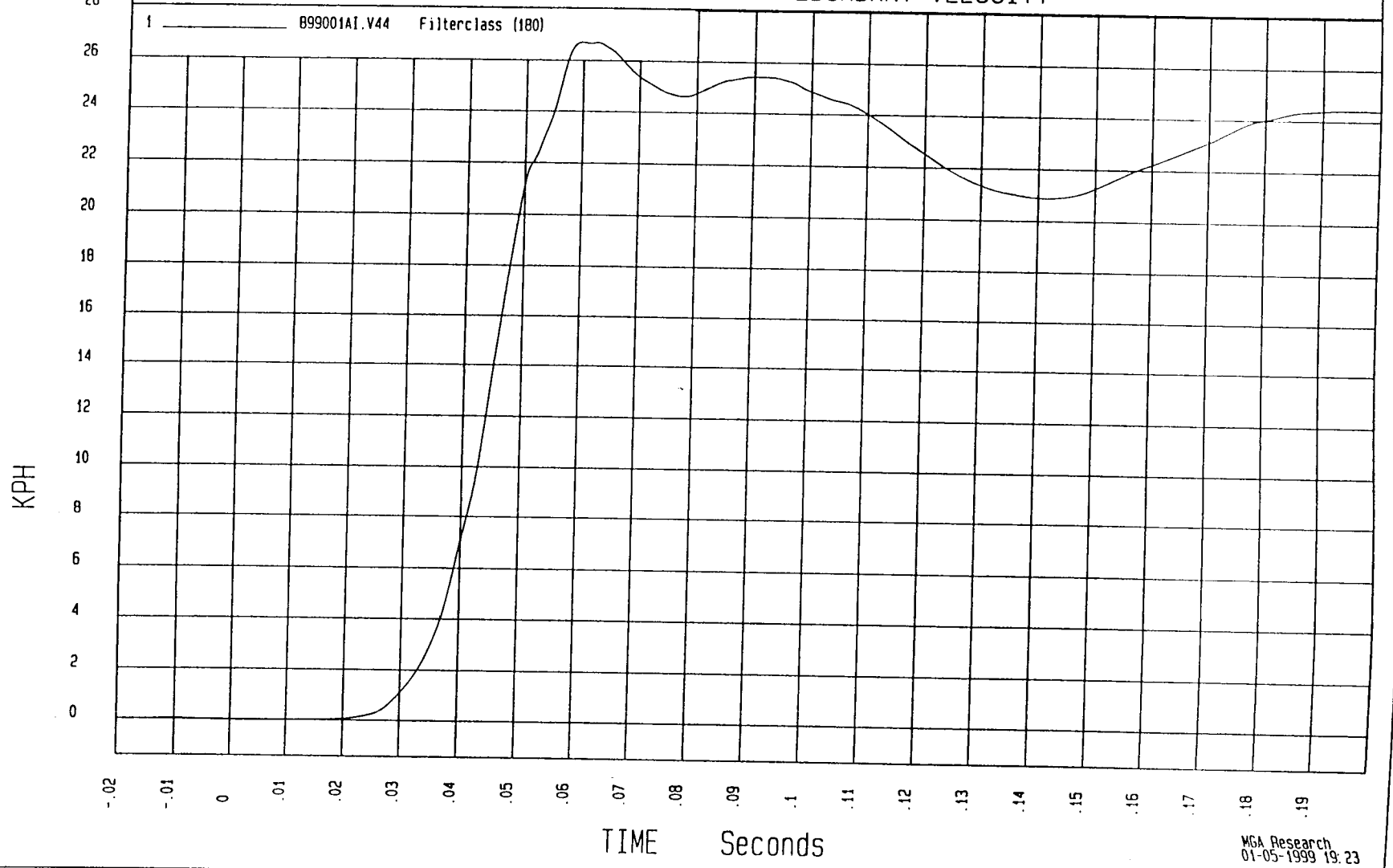
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -3.12E-02 KPH at 4 msec

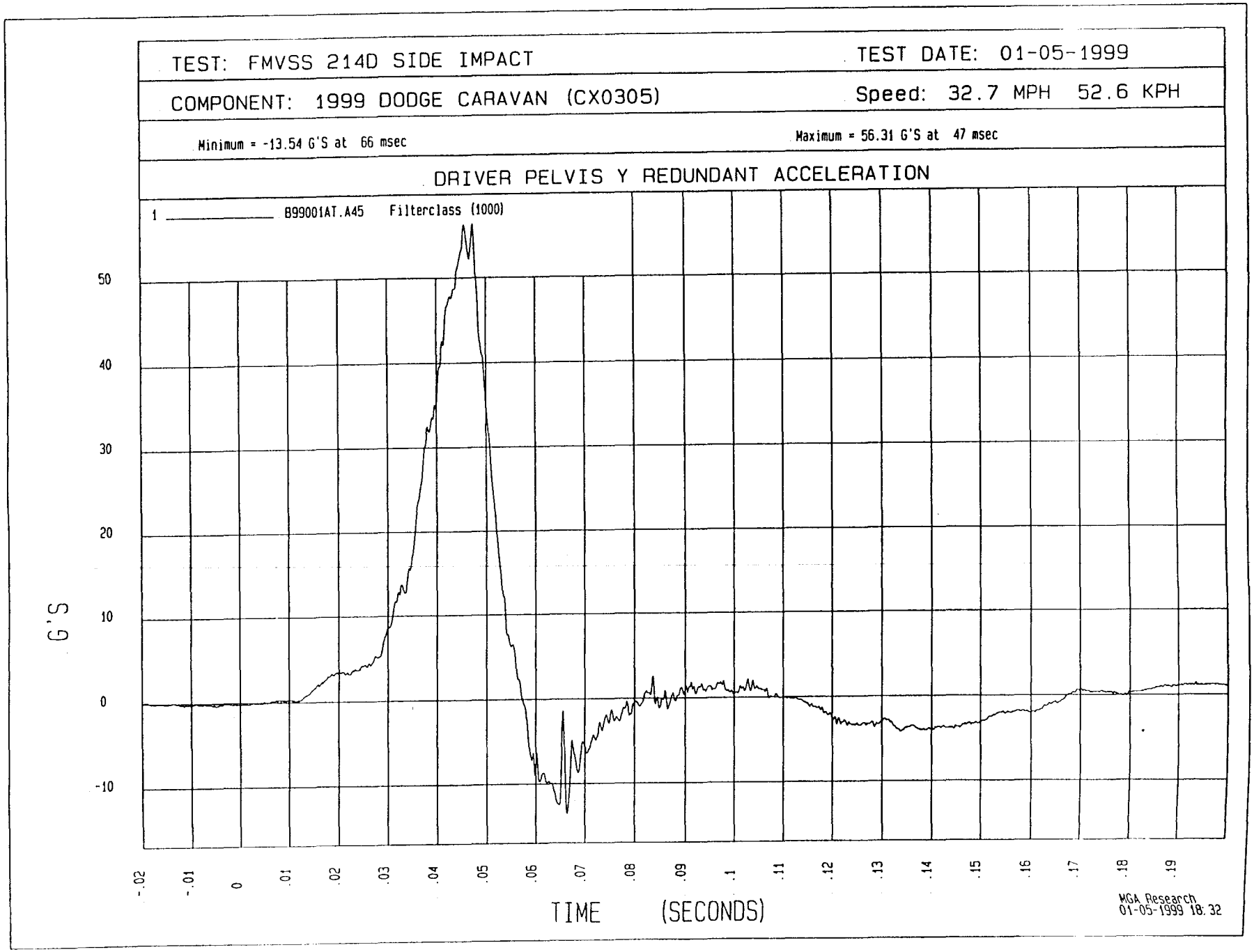
Maximum = 26.72 KPH at 60 msec

DRIVER LOWER SPINE Y REDUNDANT VELOCITY



MGA Research
01-05-1999 19:23

0000614


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -13.54 G'S at 66 msec
Maximum = 56.31 G'S at 47 msec
DRIVER PELVIS Y REDUNDANT ACCELERATION
1 B99001AT.A45 Filterclass (1000)
G'S
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
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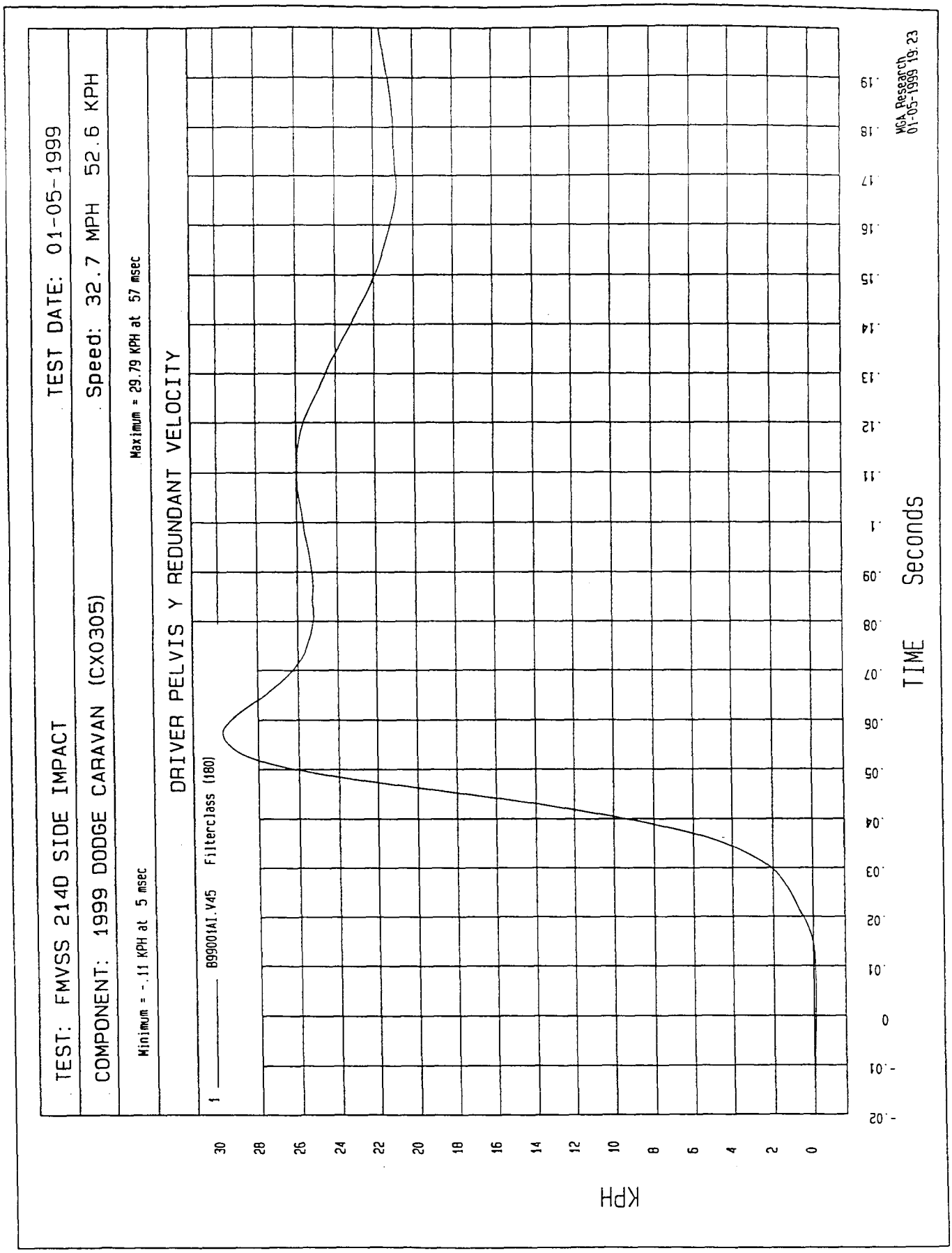
.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:32

0000615


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -.11 KPH at 5 msec
Maximum = 29.79 KPH at 57 msec
DRIVER PELVIS Y REDUNDANT VELOCITY
1 B99001AI.V45 Filterclass (180)
KPH
30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0
TIME Seconds
-.02 -.01 0 .01 .02 .03 .04 .05 .06 .07 .08 .09 .1 .11 .12 .13 .14 .15 .16 .17 .18 .19
MGA Research
01-05-1999 19:23

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

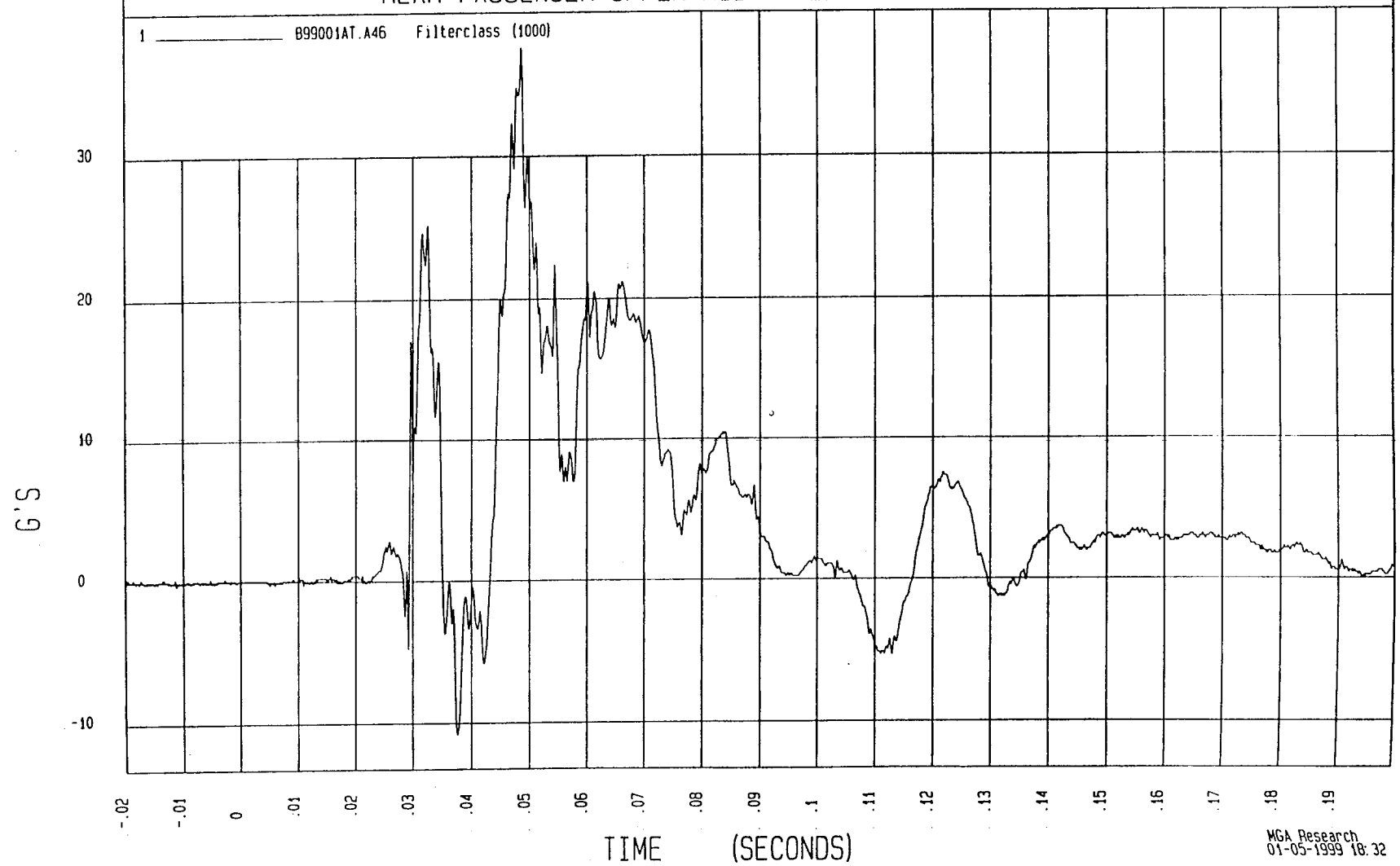
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -10.82 G'S at 38 msec

Maximum = 37.45 G'S at 49 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION



000017

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

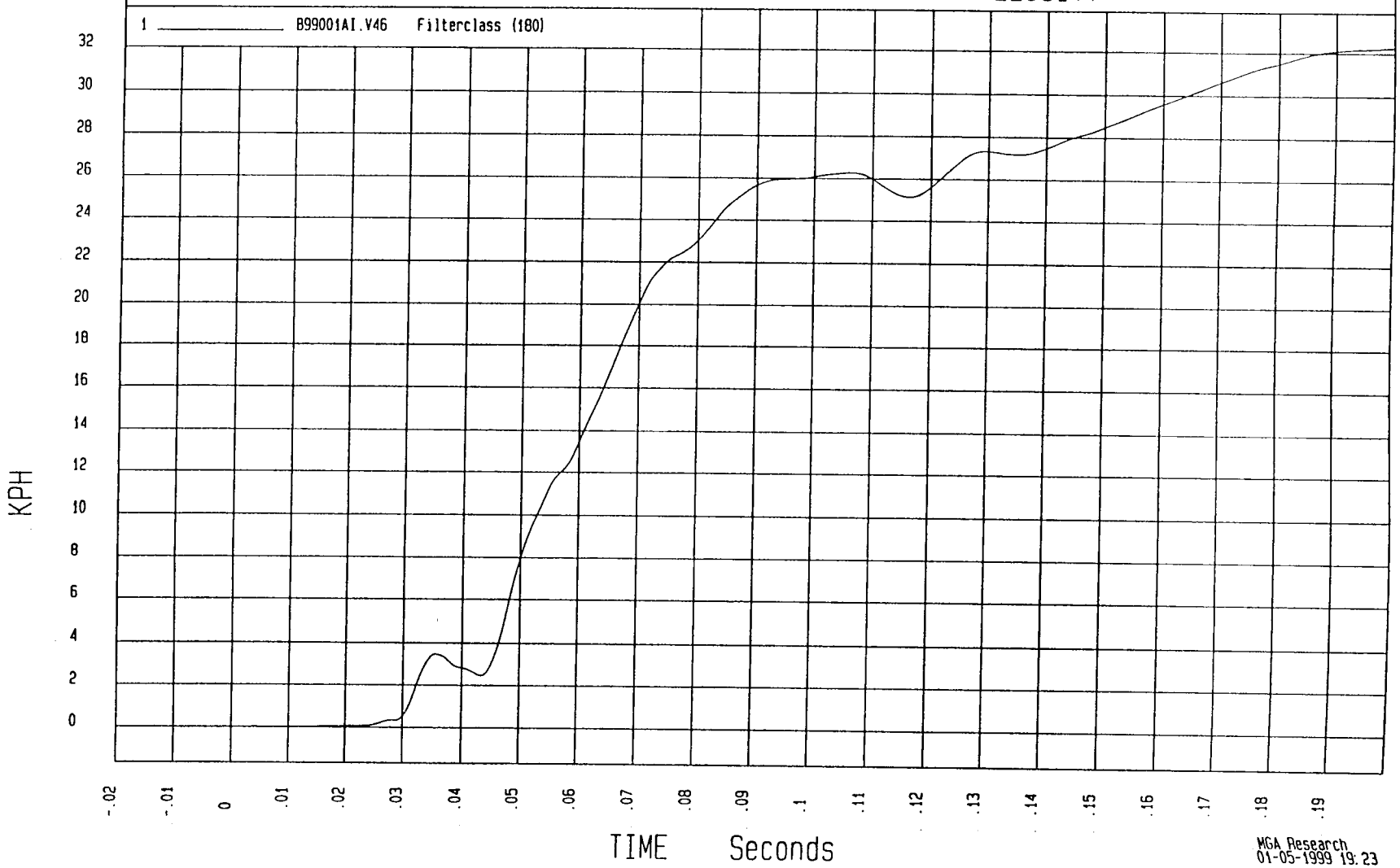
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = 0 KPH at -20 msec

Maximum = 32.26 KPH at 200 msec

REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY



MGA Research
01-05-1999 19:23

000061 8

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

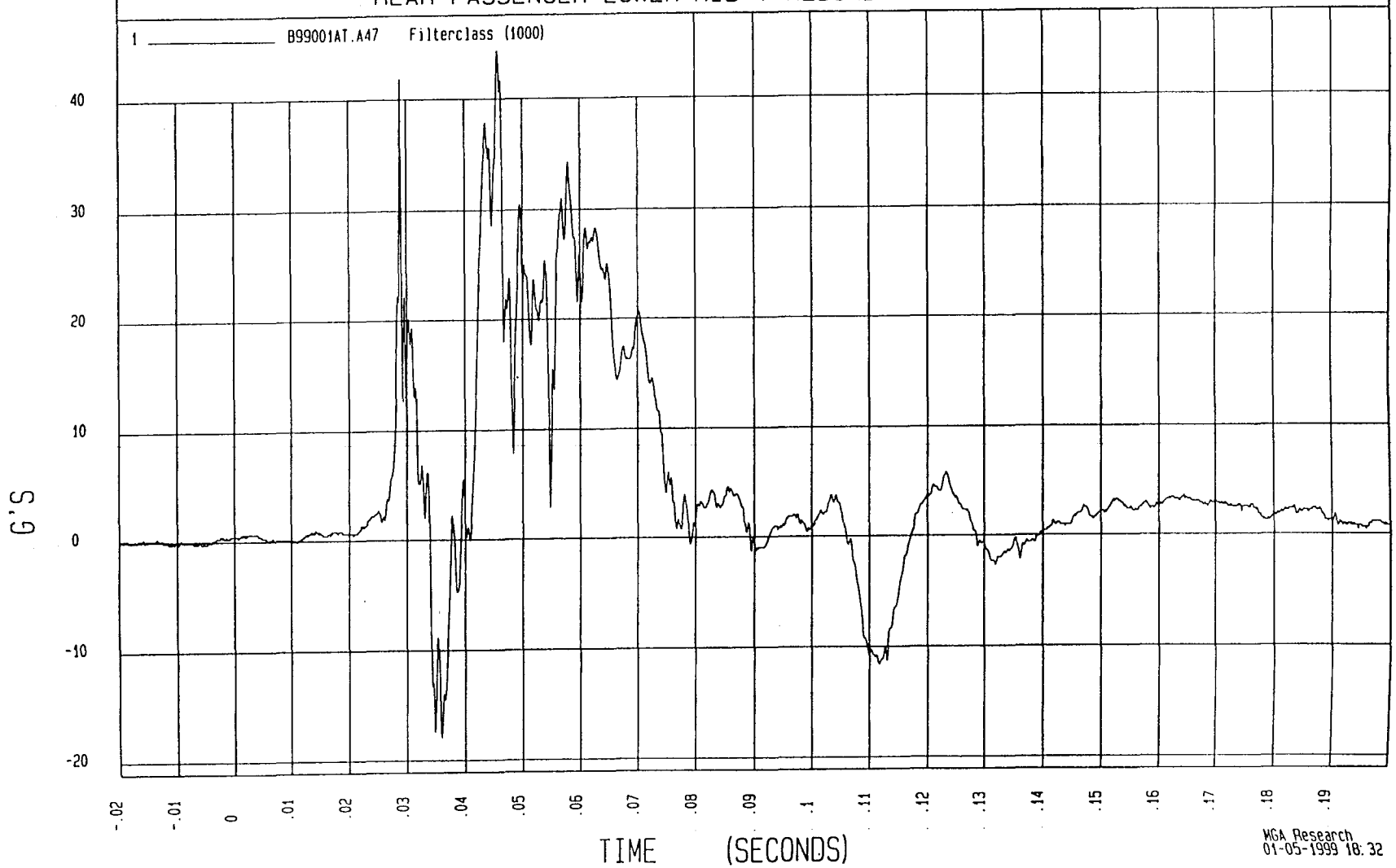
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -17.95 G'S at 36 msec

Maximum = 44.22 G'S at 46 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION



MGA Research
01-05-1999 18:32

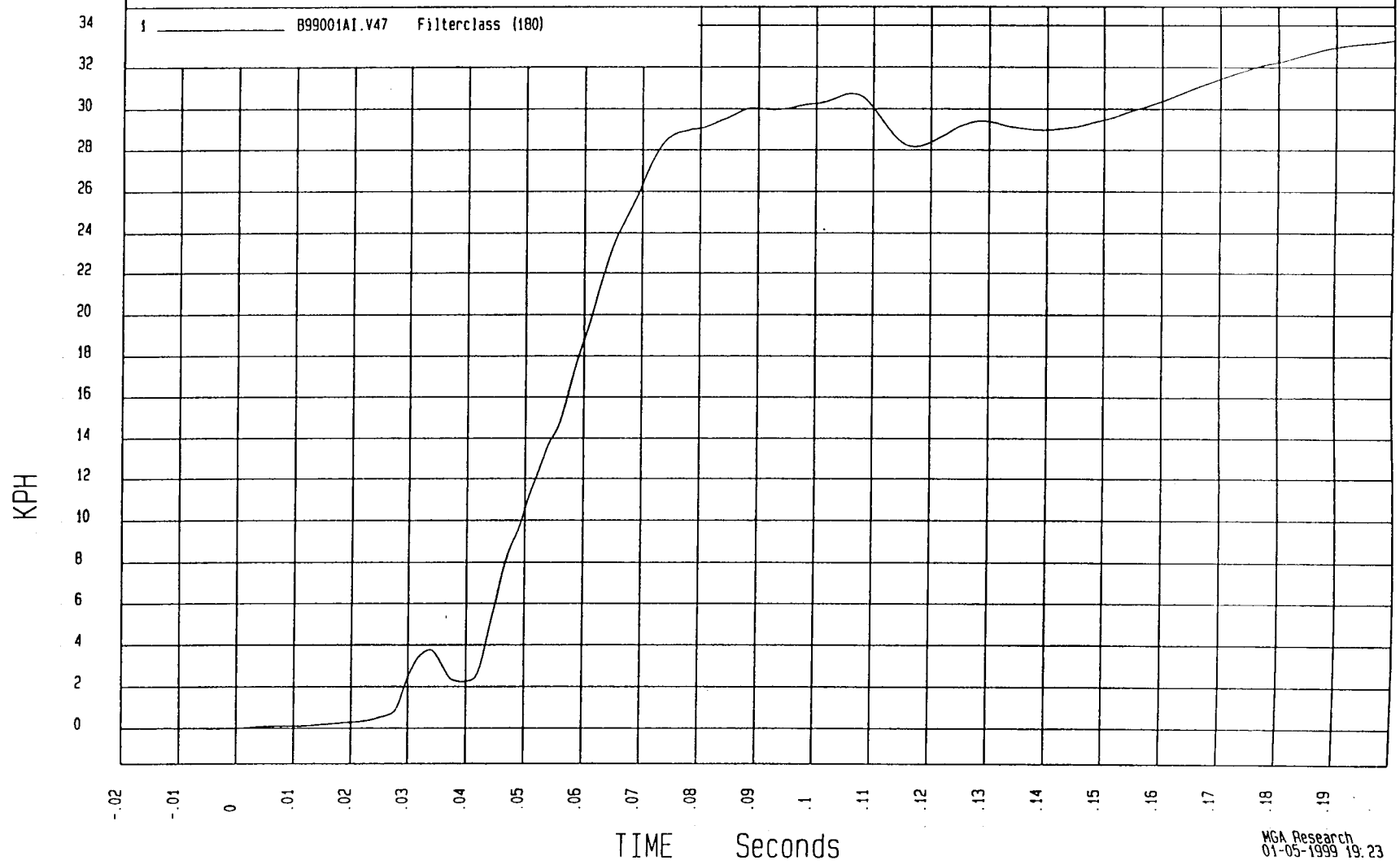
000061 9

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -2.78E-02 KPH at -4 msec — Maximum = 33.25 KPH at 200 msec

REAR PASSENGER LOWER RIB Y REDUNDANT VELOCITY



000620

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

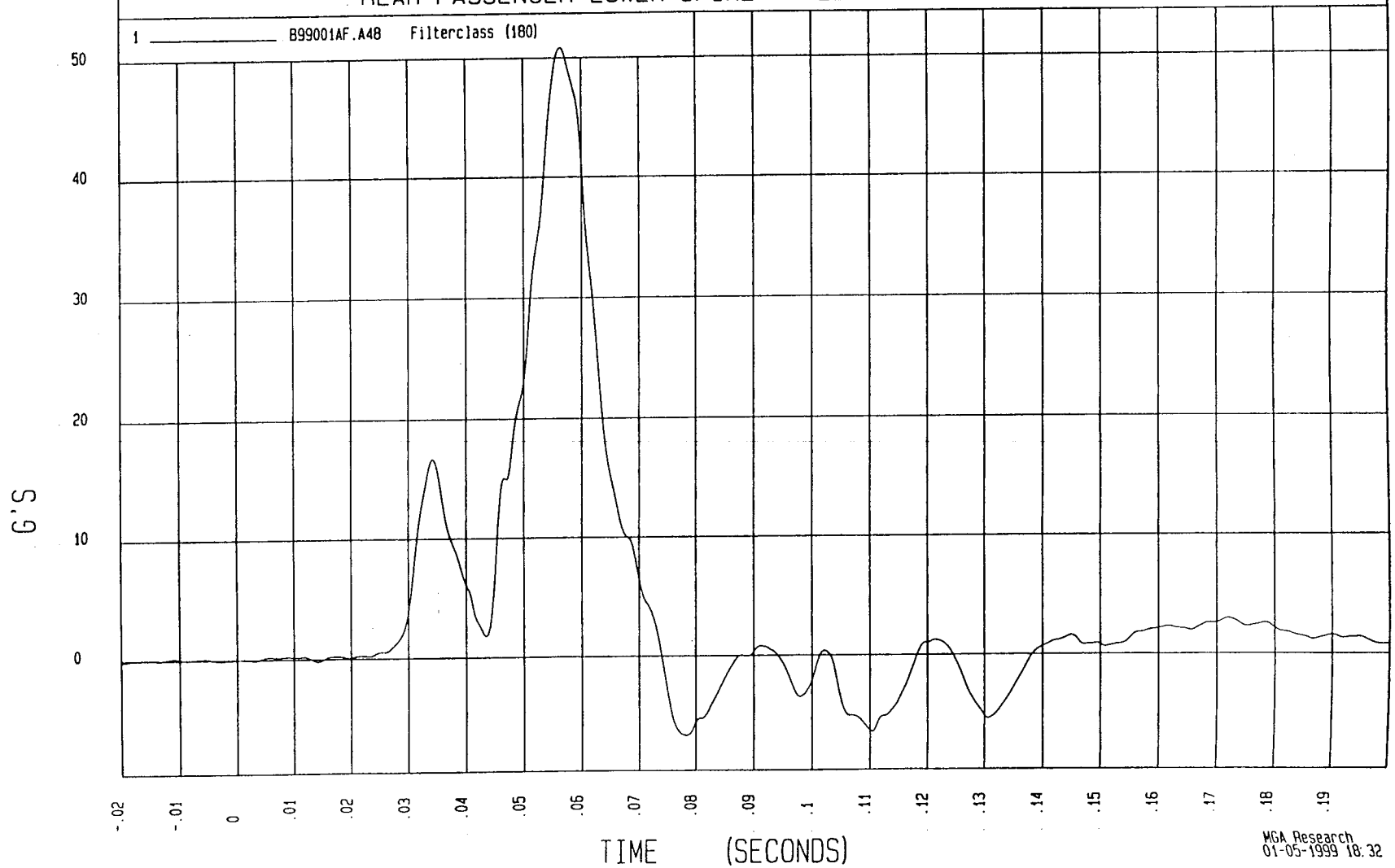
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -6.59 G'S at 78 msec

Maximum = 50.84 G'S at 56 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION



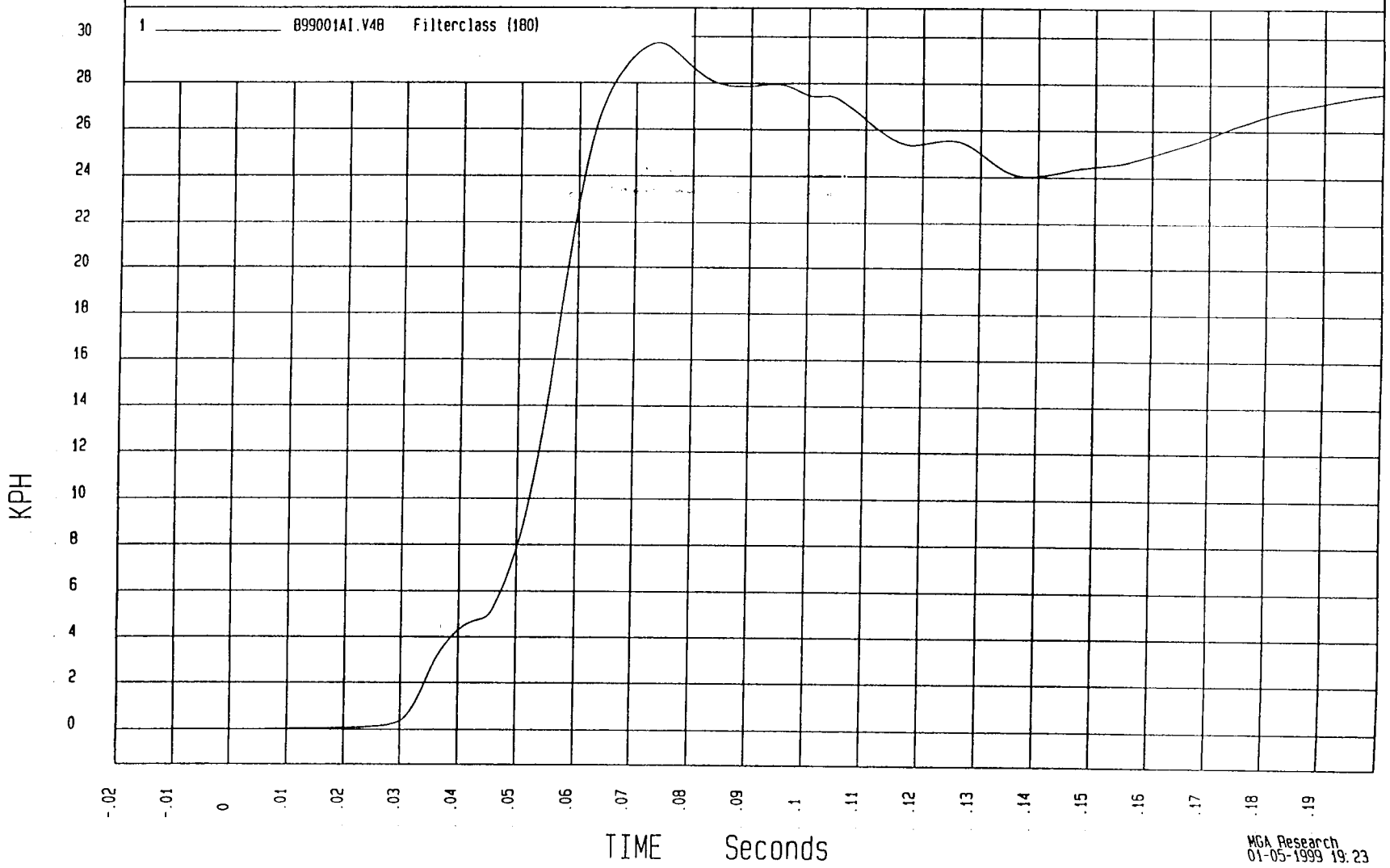
00006221

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = -5.89E-03 KPH at -17 msec Maximum = 29.74 KPH at 74 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY



MGA Research
01-05-1999 19:23

0000622

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

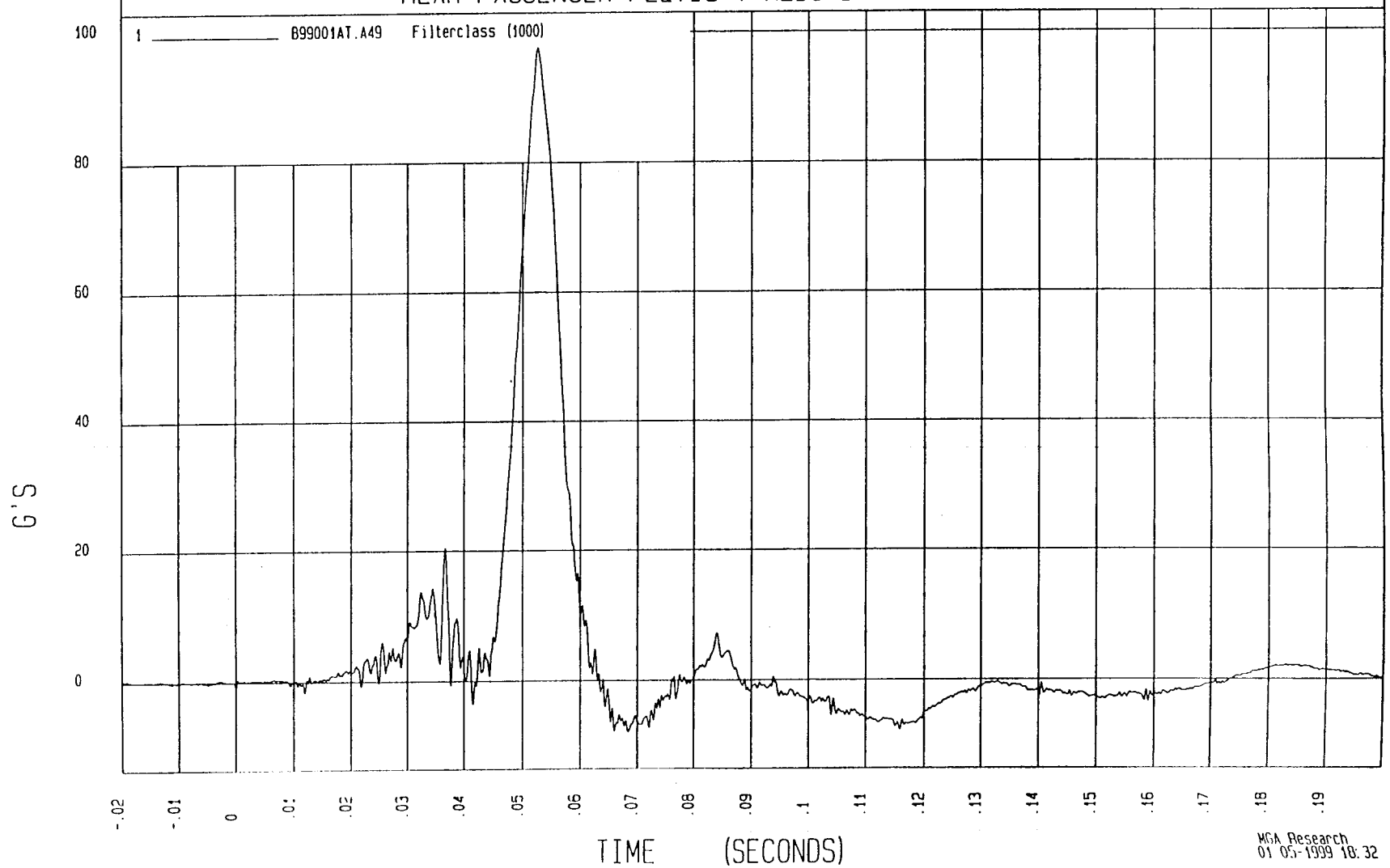
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -7.87 G'S at 68 msec

Maximum = 97.72 G'S at 53 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION



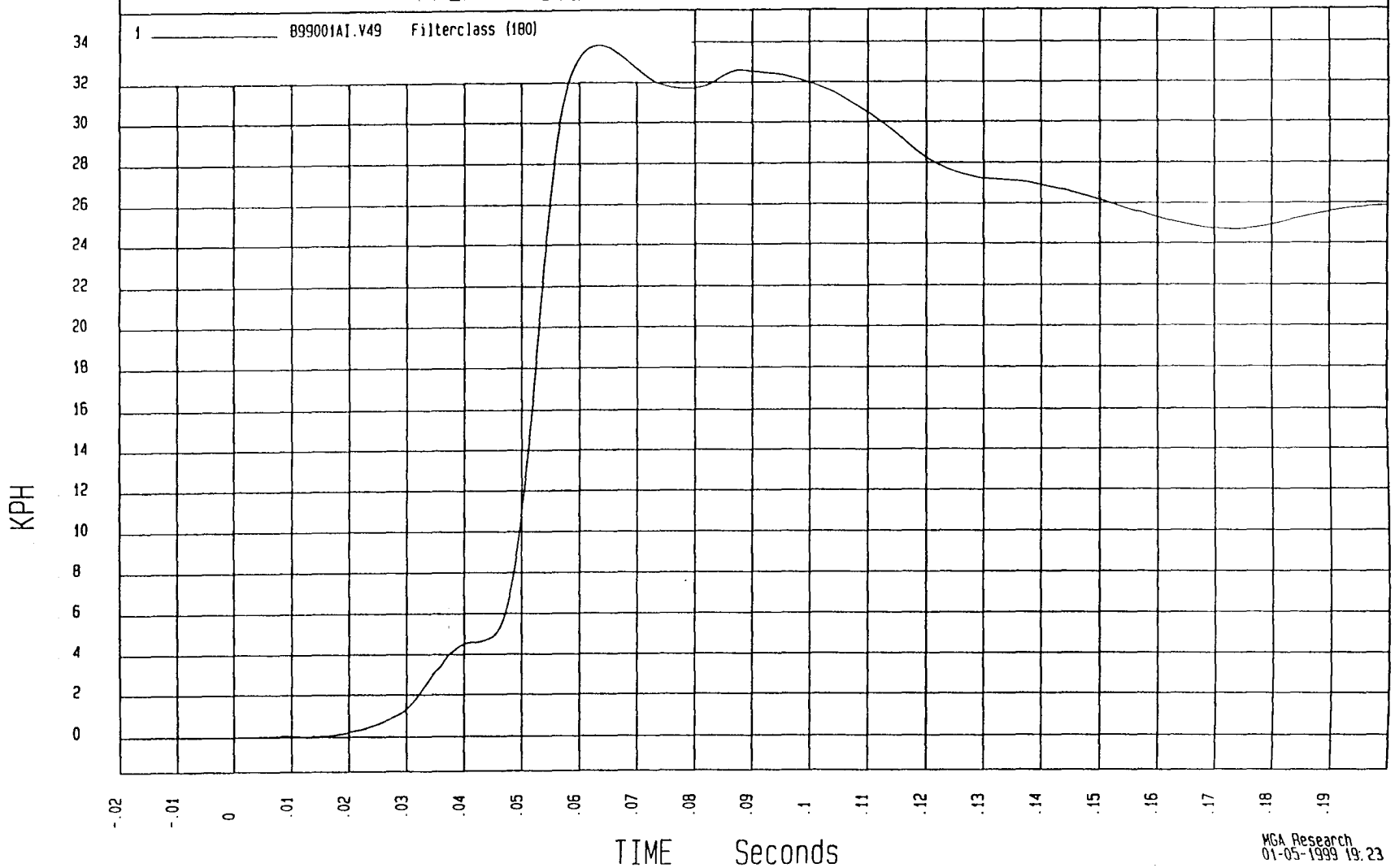
MGA Research
01-05-1999 18:32

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = -5.48E-03 KPH at -4 msec Maximum = 33.87 KPH at 64 msec

REAR PASSENGER PELVIS Y REDUNDANT VELOCITY



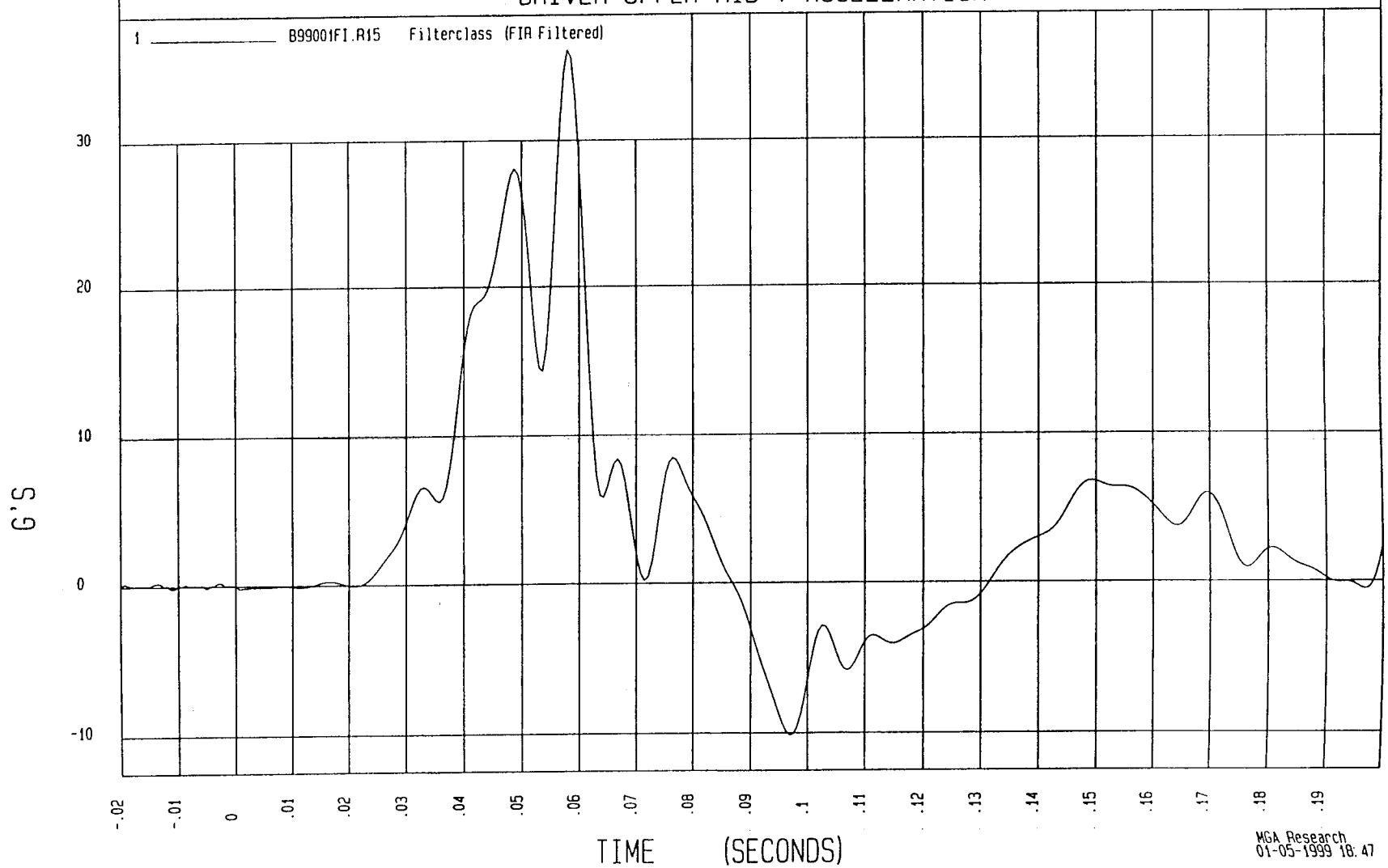
MGA Research
01-05-1999 19:23

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -10.15 G'S at 97 msec — Maximum = 36.02 G'S at 58 msec

DRIVER UPPER RIB Y ACCELERATION



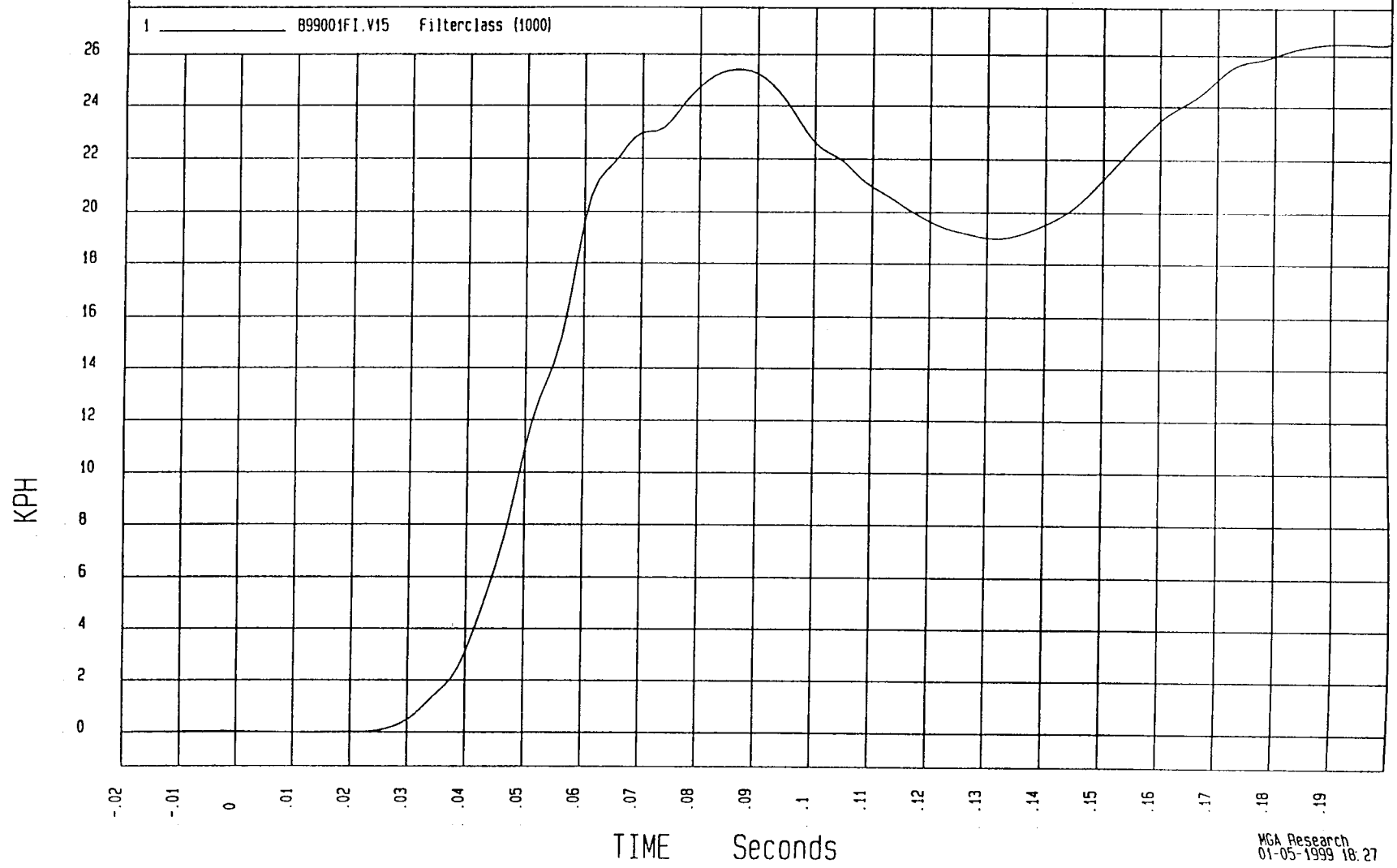
000625

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -1.17E-02 KPH at 13 msec — Maximum = 26.44 KPH at 200 msec

DRIVER UPPER RIB Y VELOCITY



MGA Research
01-05-1999 18:27

0000626

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

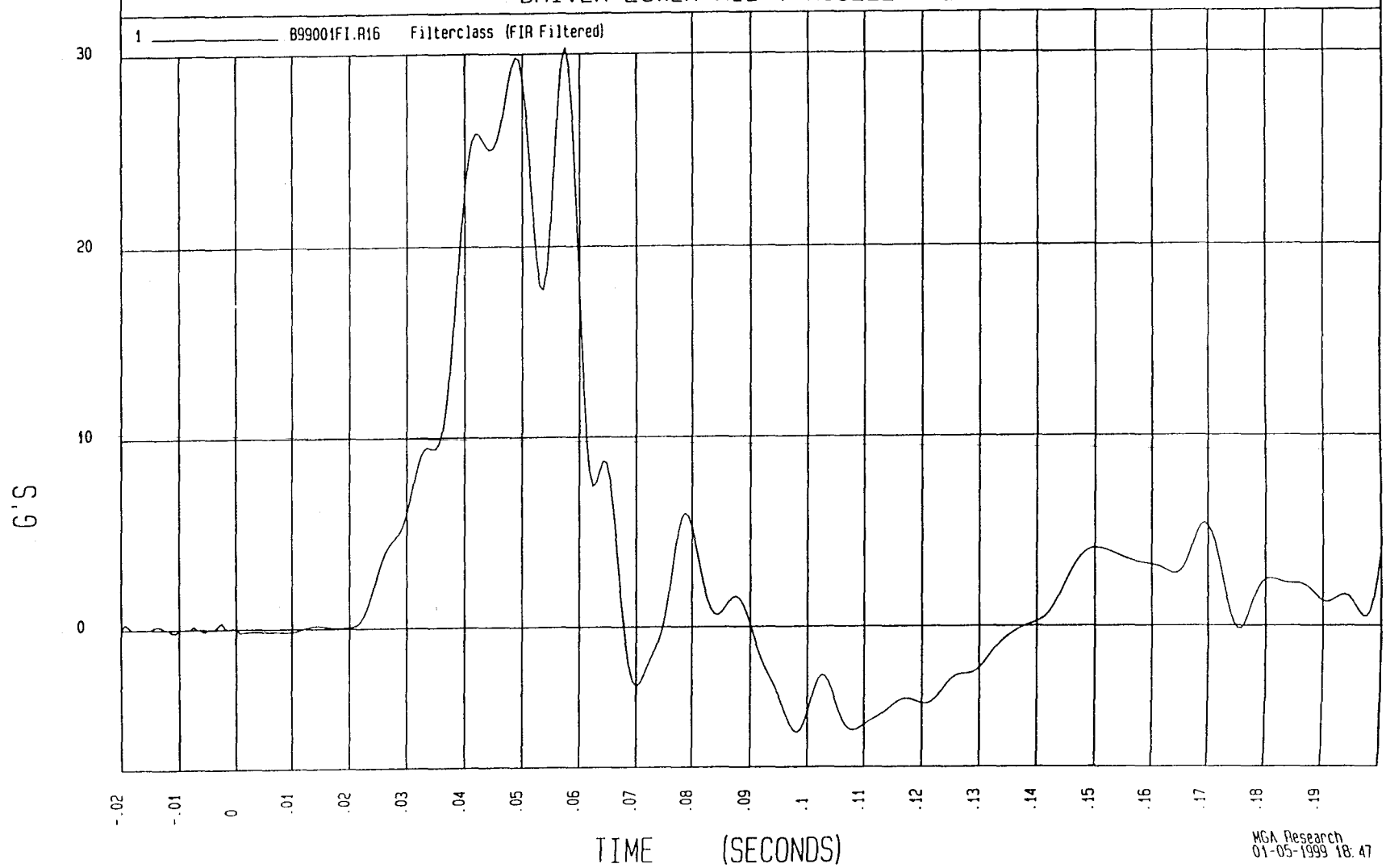
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -5.44 G'S at 98 msec

Maximum = 30.31 G'S at 58 msec

DRIVER LOWER RIB Y ACCELERATION



0000627

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

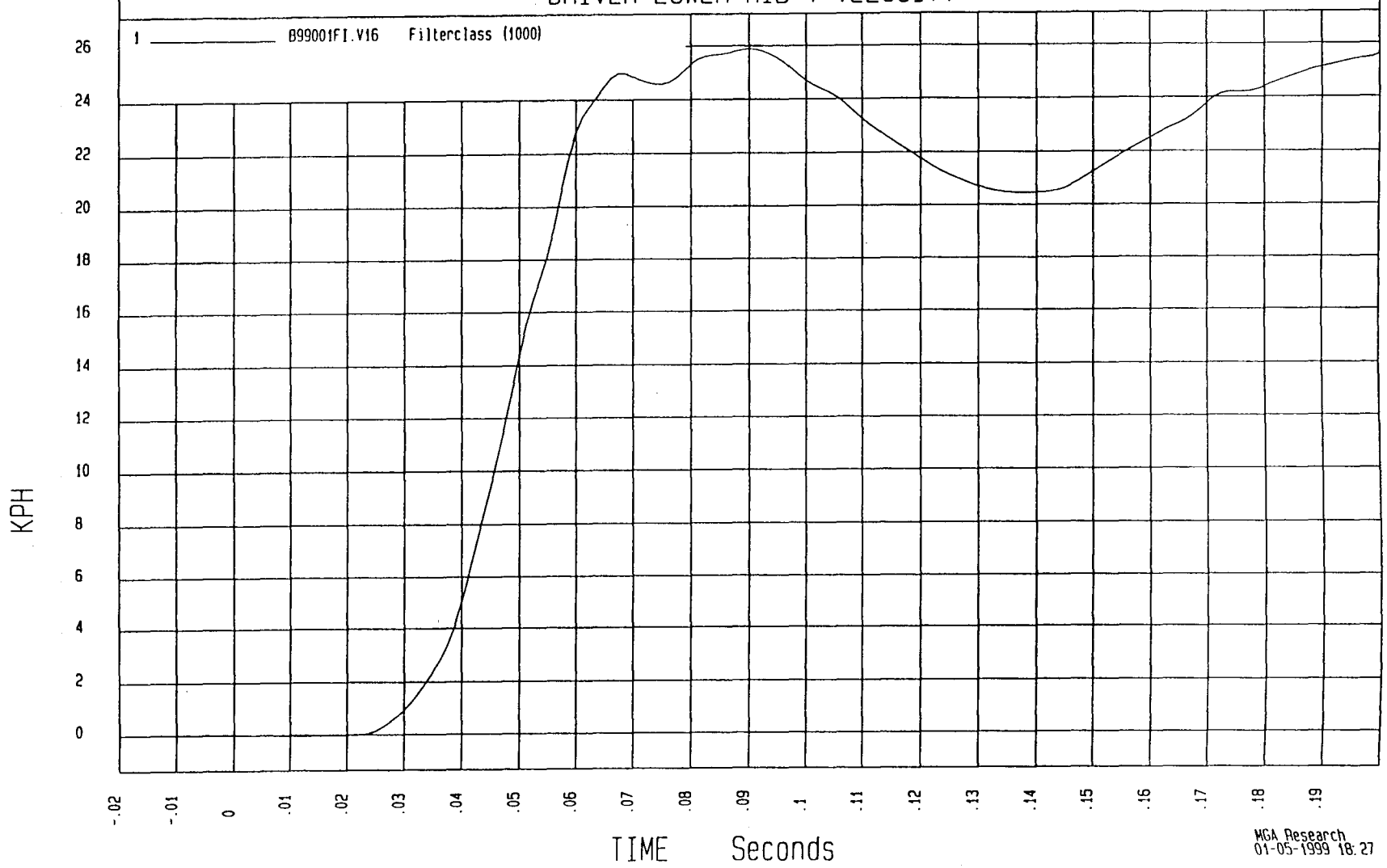
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -4.02E-02 KPH at 12 msec

Maximum = 25.89 KPH at 90 msec

DRIVER LOWER RIB Y VELOCITY



MGA Research
01-05-1999 18:27

0000628

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

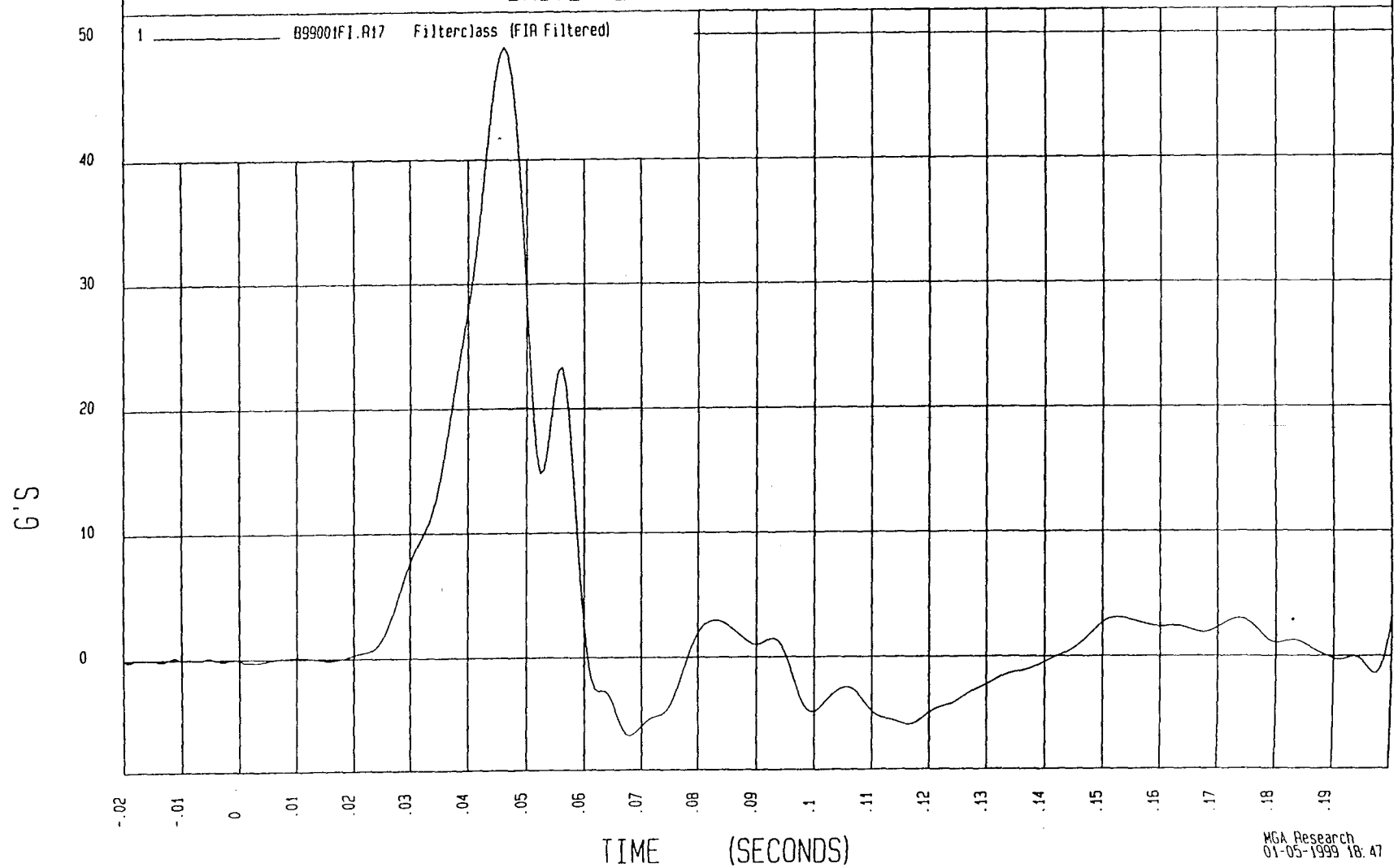
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -6.17 G'S at 68 msec

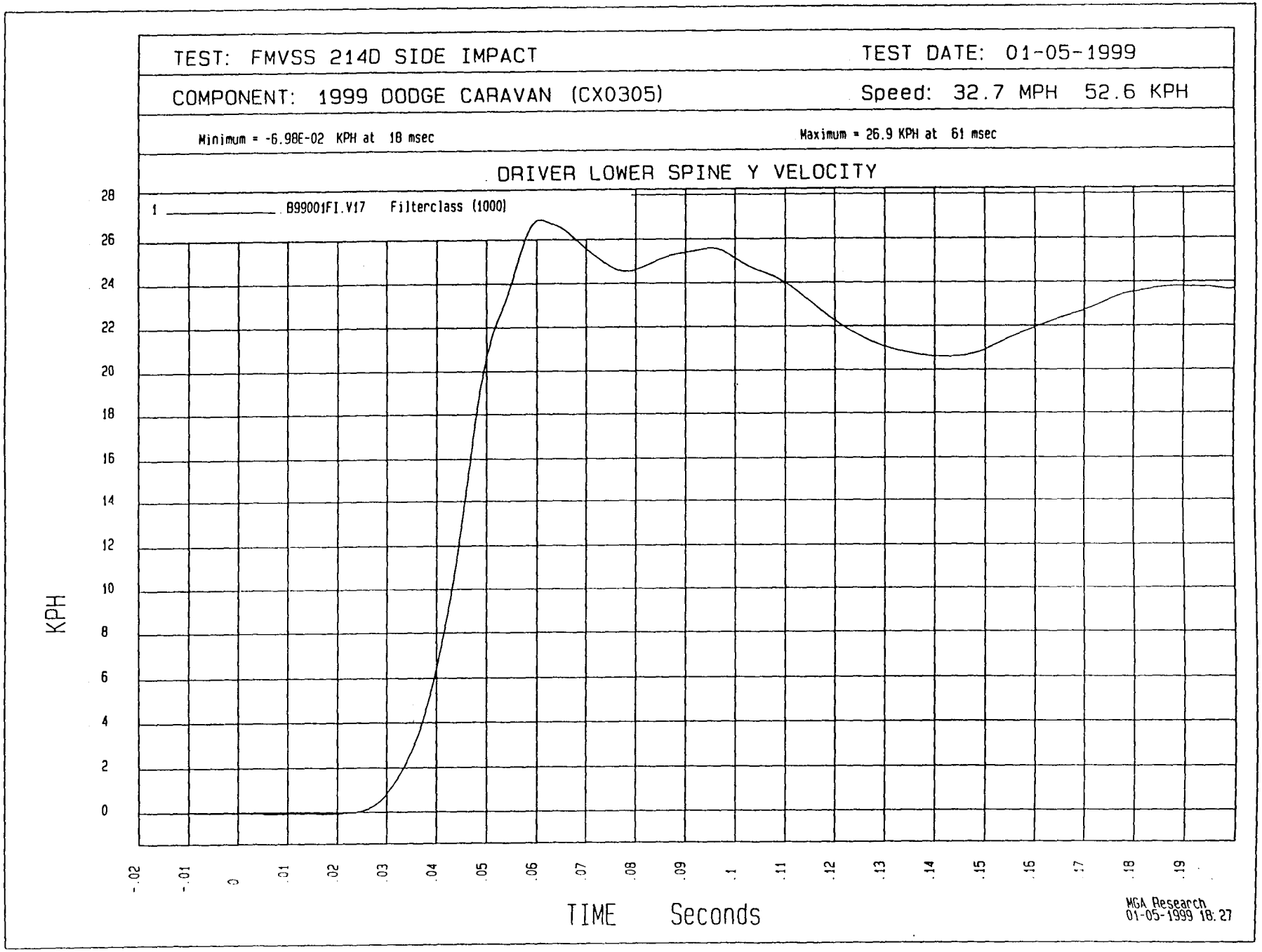
Maximum = 49.03 G'S at 46 msec

DRIVER LOWER SPINE Y ACCELERATION



MGA Research
01-05-1999 18:47

000629


TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -6.98E-02 KPH at 18 msec
Maximum = 26.9 KPH at 61 msec
DRIVER LOWER SPINE Y VELOCITY
1 B99001FI.V17 Filterclass (1000)
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
01-05-1999 18:27

0000630

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

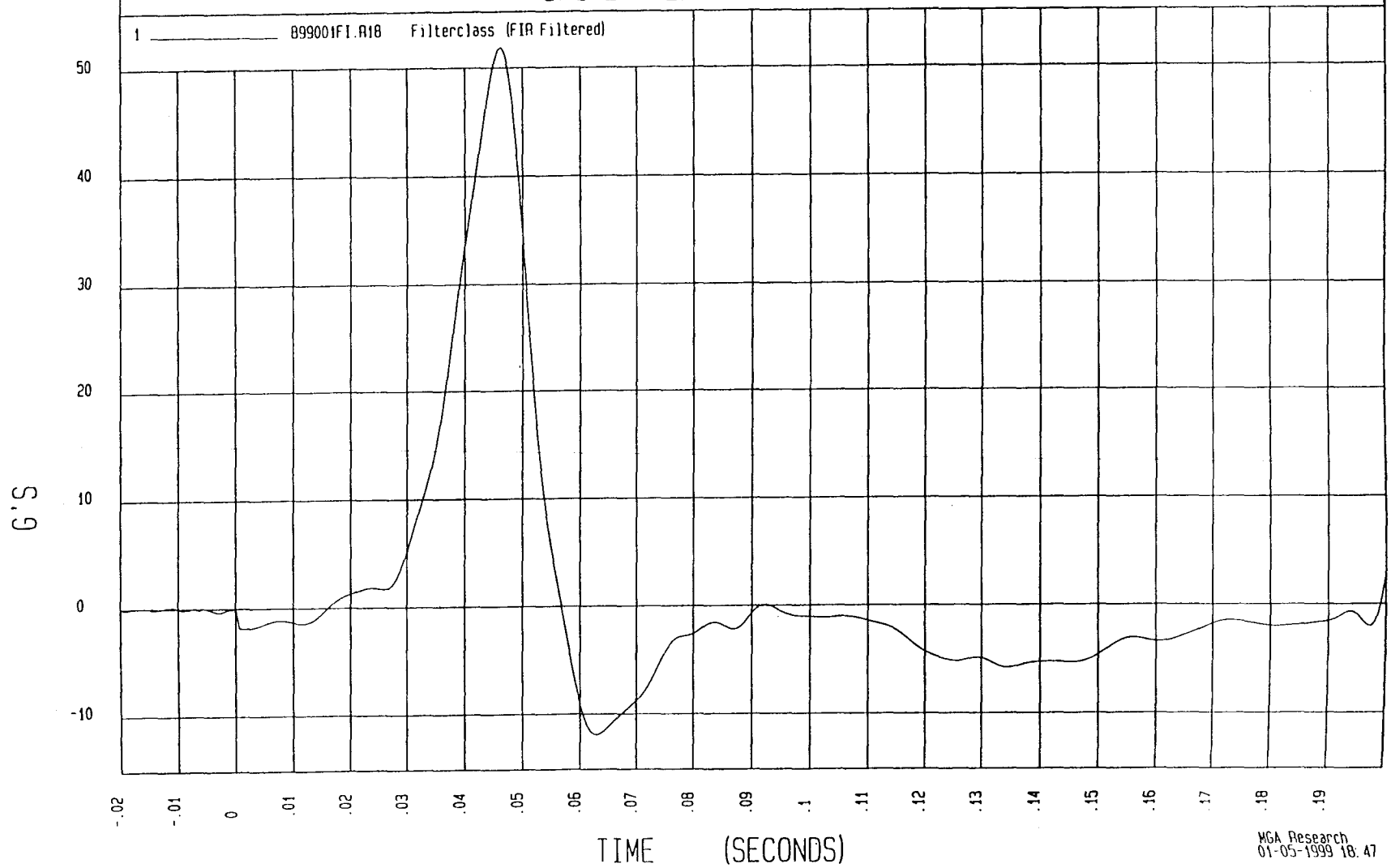
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -11.88 G'S at 63 msec

Maximum = 51.86 G'S at 46 msec

DRIVER PELVIS Y ACCELERATION



MGA Research
01-05-1999 18:47

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

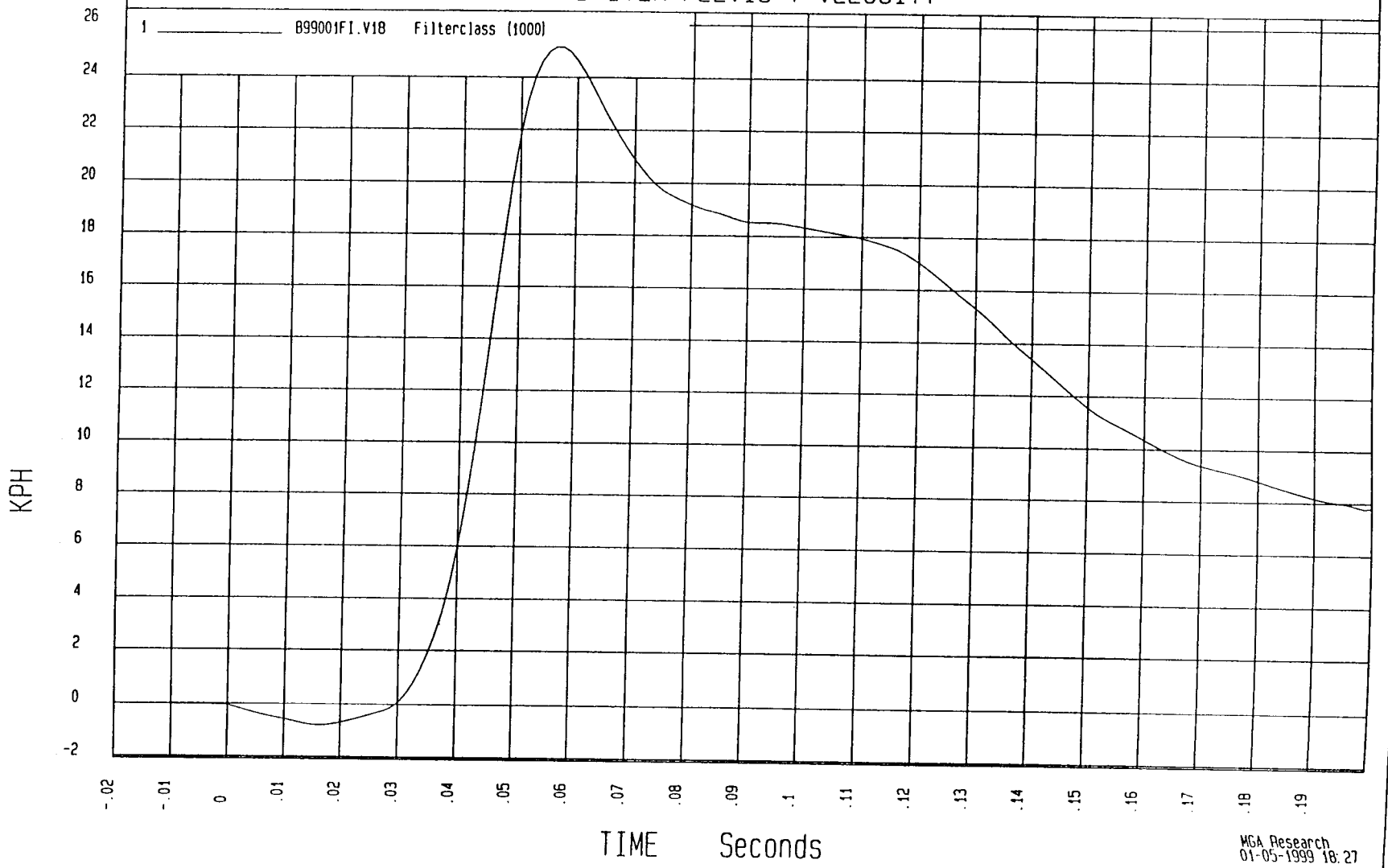
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -.78 KPH at 16 msec

Maximum = 25.17 KPH at 57 msec

DRIVER PELVIS Y VELOCITY



MGA Research
01-05-1999 18:27

000633

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

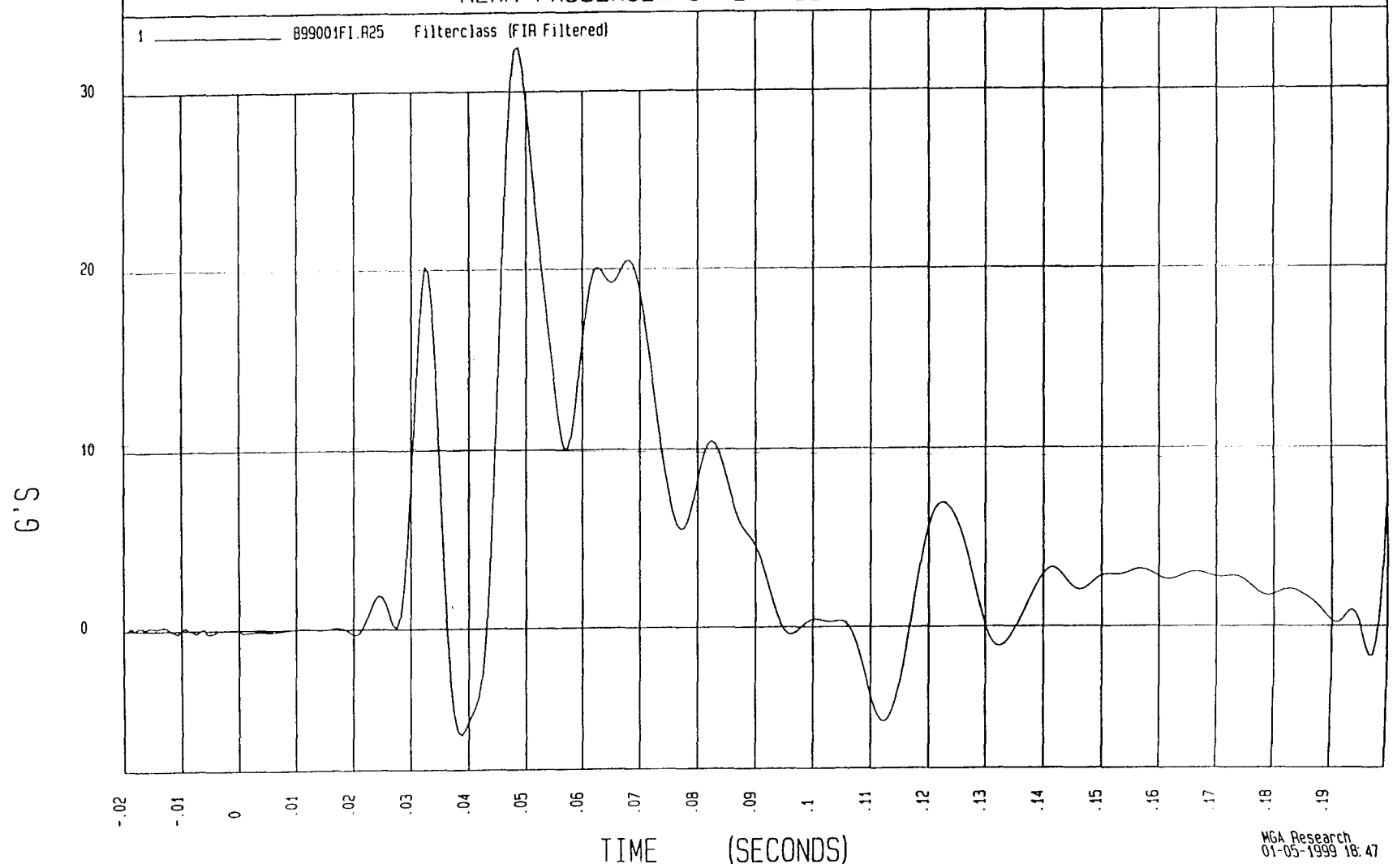
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -6.04 G'S at 39 msec

Maximum = 32.42 G'S at 49 msec

REAR PASSENGER UPPER RIB Y ACCELERATION



MGA Research
01-05-1999 18:47

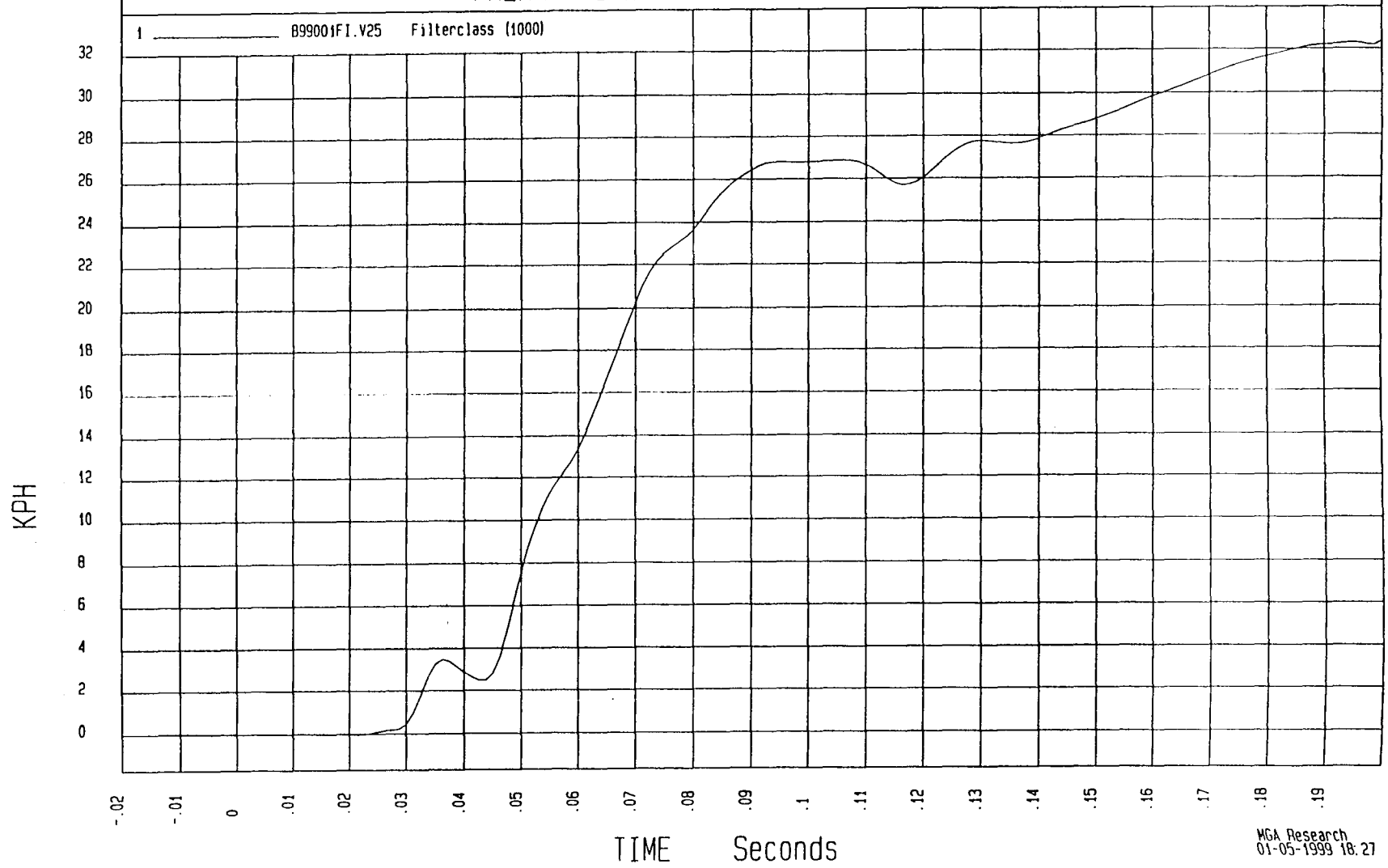
000634

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

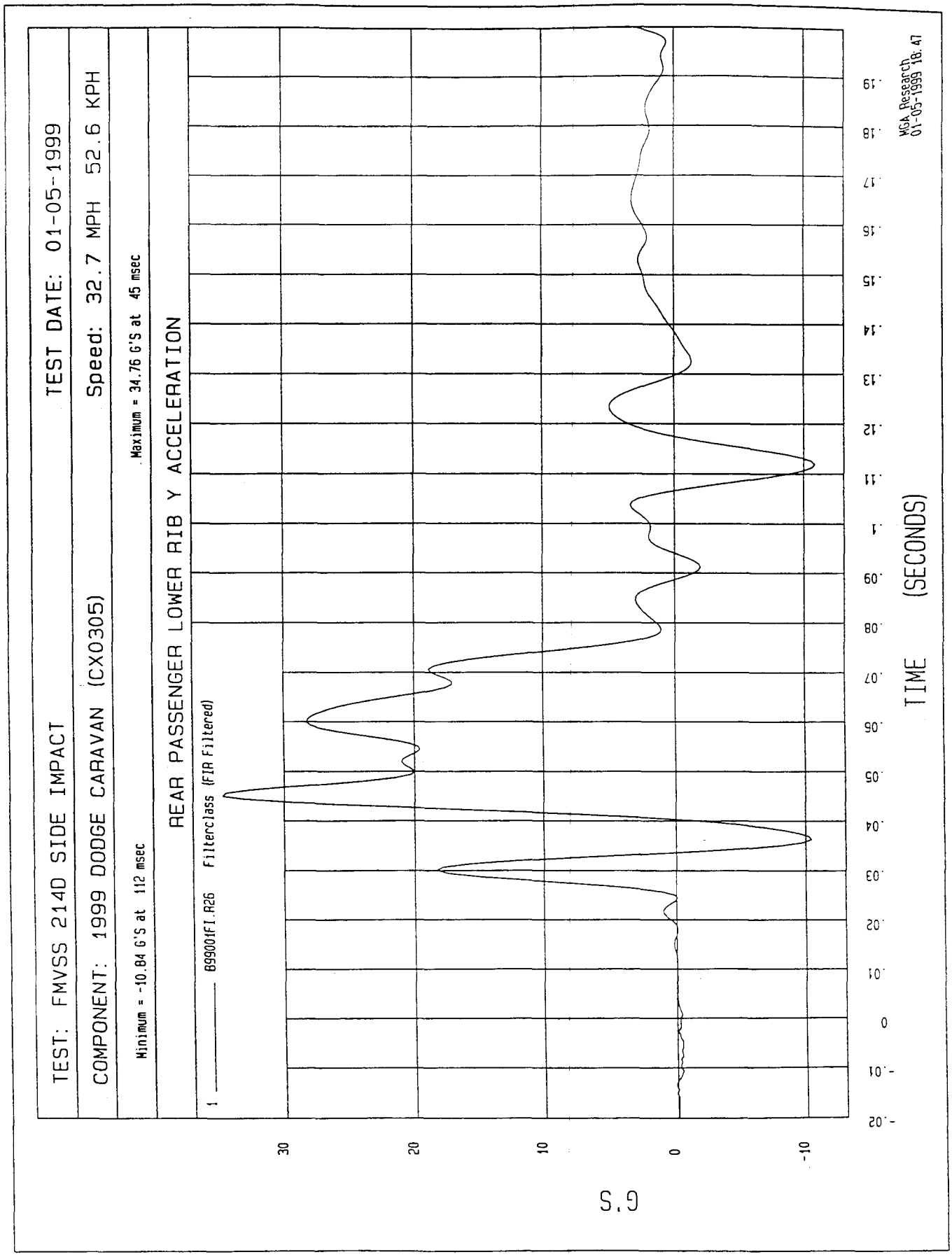
COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -3.52E-02 KPH at 21 msec | Maximum = 32.35 KPH at 200 msec

REAR PASSENGER UPPER RIB Y VELOCITY



MGA Research
01-05-1999 18:27

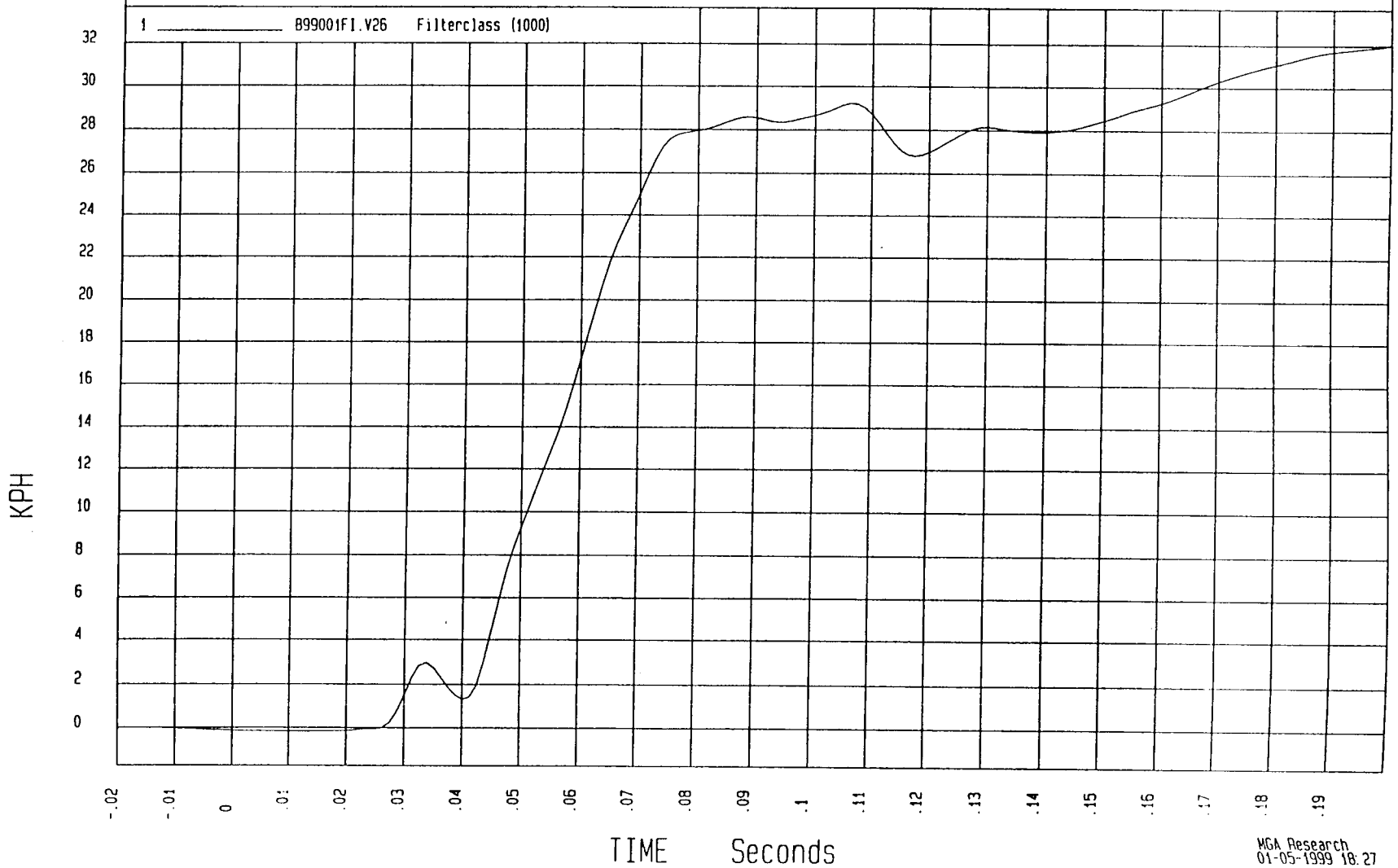

TEST: FMVSS 214D SIDE IMPACT
TEST DATE: 01-05-1999
COMPONENT: 1999 DODGE CARAVAN (CX0305)
Speed: 32.7 MPH 52.6 KPH
Minimum = -10.84 G'S at 112 msec
Maximum = 34.76 G'S at 45 msec
REAR PASSENGER LOWER RIB Y ACCELERATION
1 _____ 699001F1.R26 Filterclass (FIR Filtered)
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
01-05-1999 18:47

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = -.17 KPH at 12 msec Maximum = 32.05 KPH at 200 msec

REAR PASSENGER LOWER RIB Y VELOCITY



MGA Research
01-05-1999 18:27

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

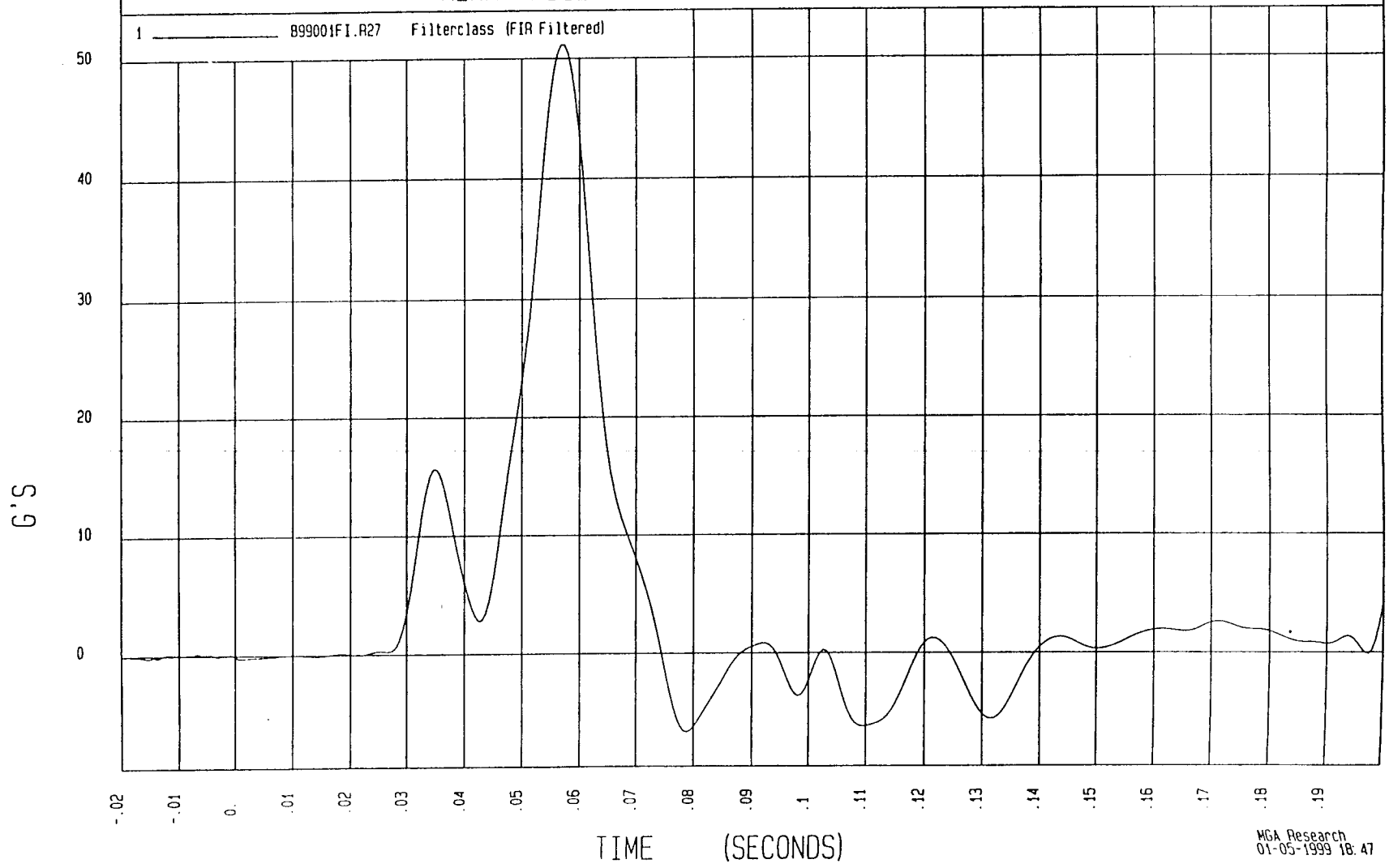
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -6.57 G'S at 79 msec

Maximum = 51.14 G'S at 58 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION



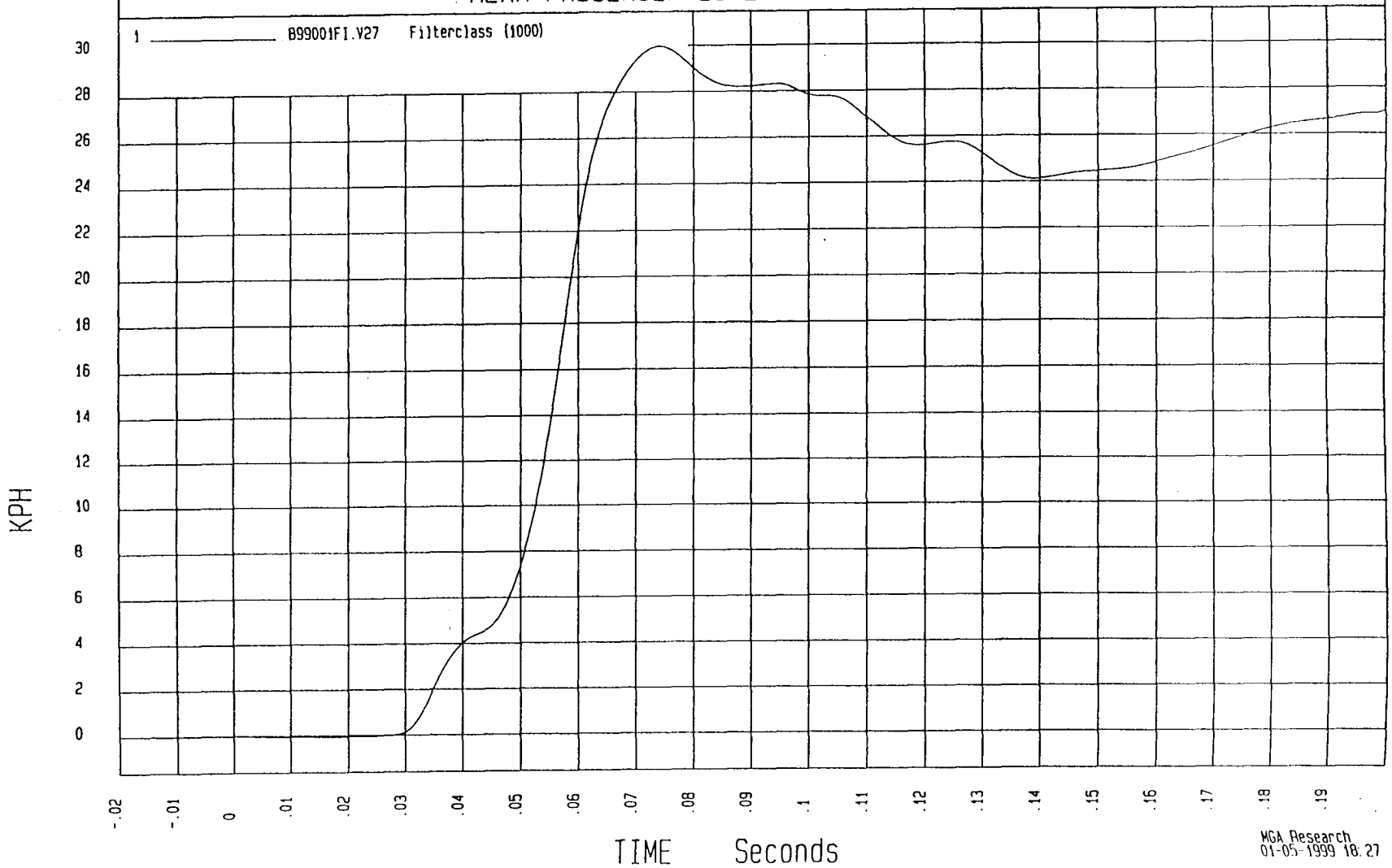
0000638

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -6.24E-02 KPH at 16 msec | Maximum = 29.98 KPH at 74 msec

REAR PASSENGER LOWER SPINE Y VELOCITY



MGA Research
01-05-1999 18:27

0000639

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

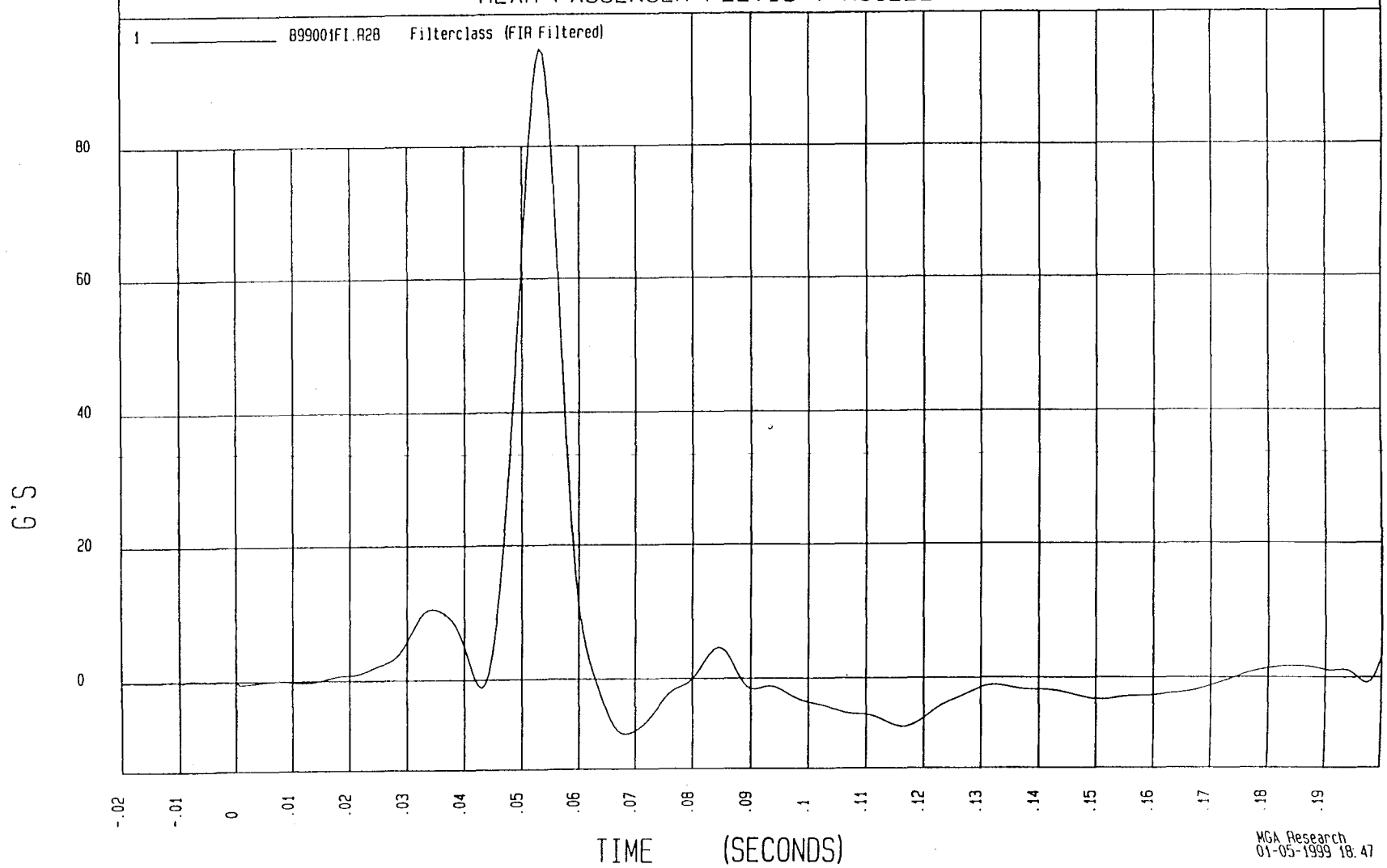
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -8.15 G'S at 68 msec

Maximum = 94.6 G'S at 53 msec

REAR PASSENGER PELVIS Y ACCELERATION



MGA Research
01-05-1999 18:47

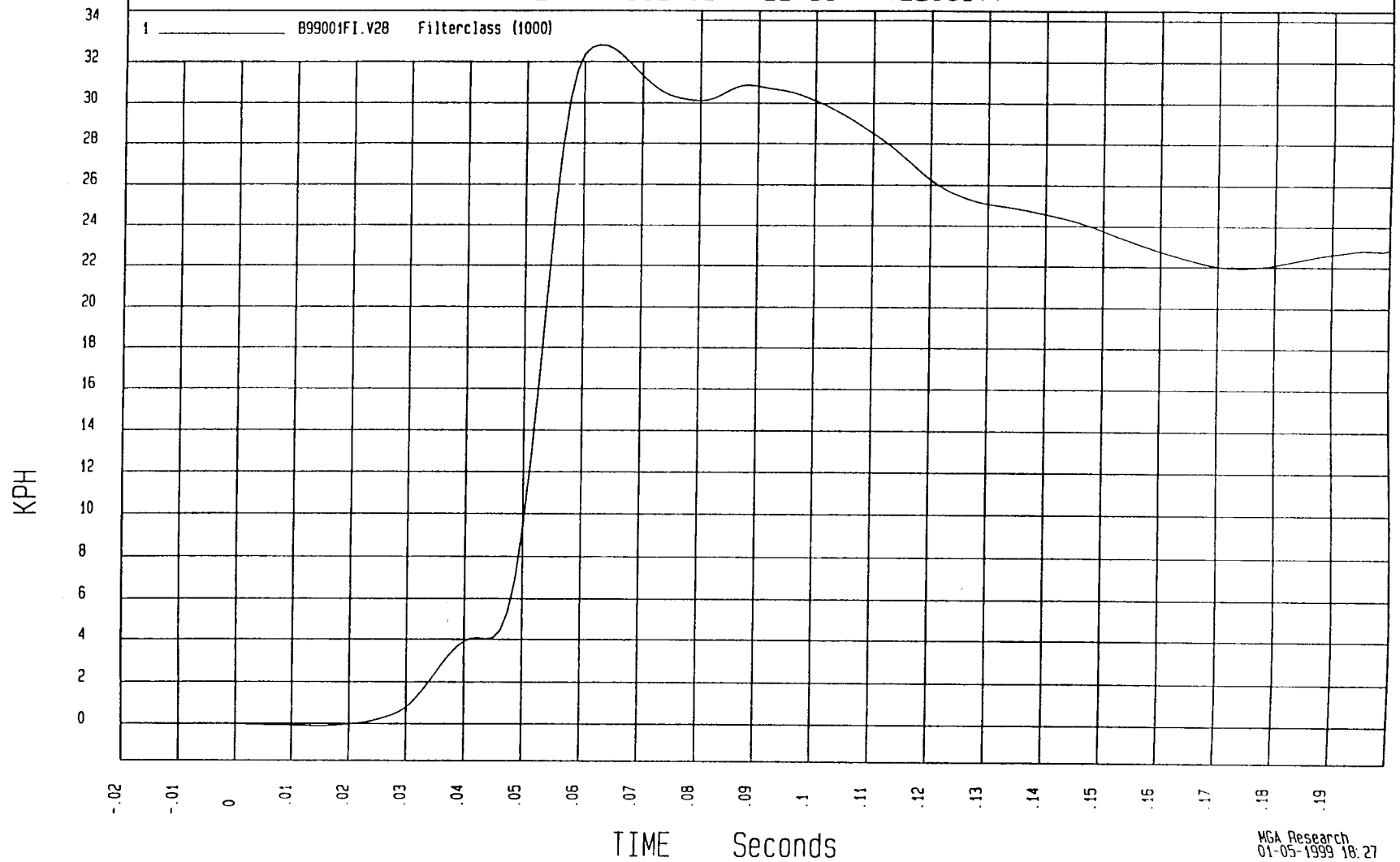
0000640

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -.11 KPH at 15 msec | Maximum = 32.81 KPH at 63 msec

REAR PASSENGER PELVIS Y VELOCITY



MGA Research
01-05-1999 18:27

0000641

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

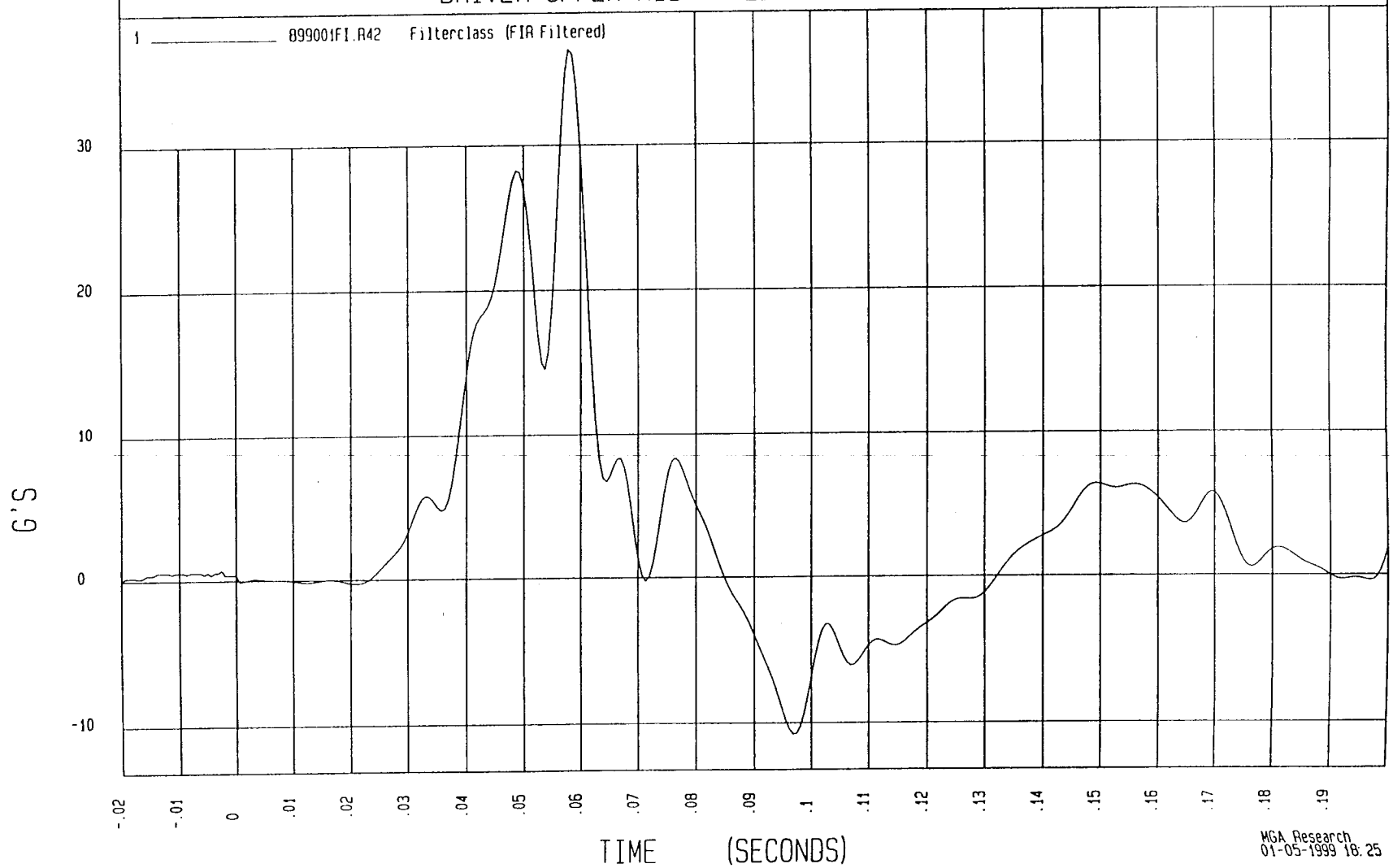
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -10.74 G'S at 97 msec

Maximum = 36.53 G'S at 58 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION



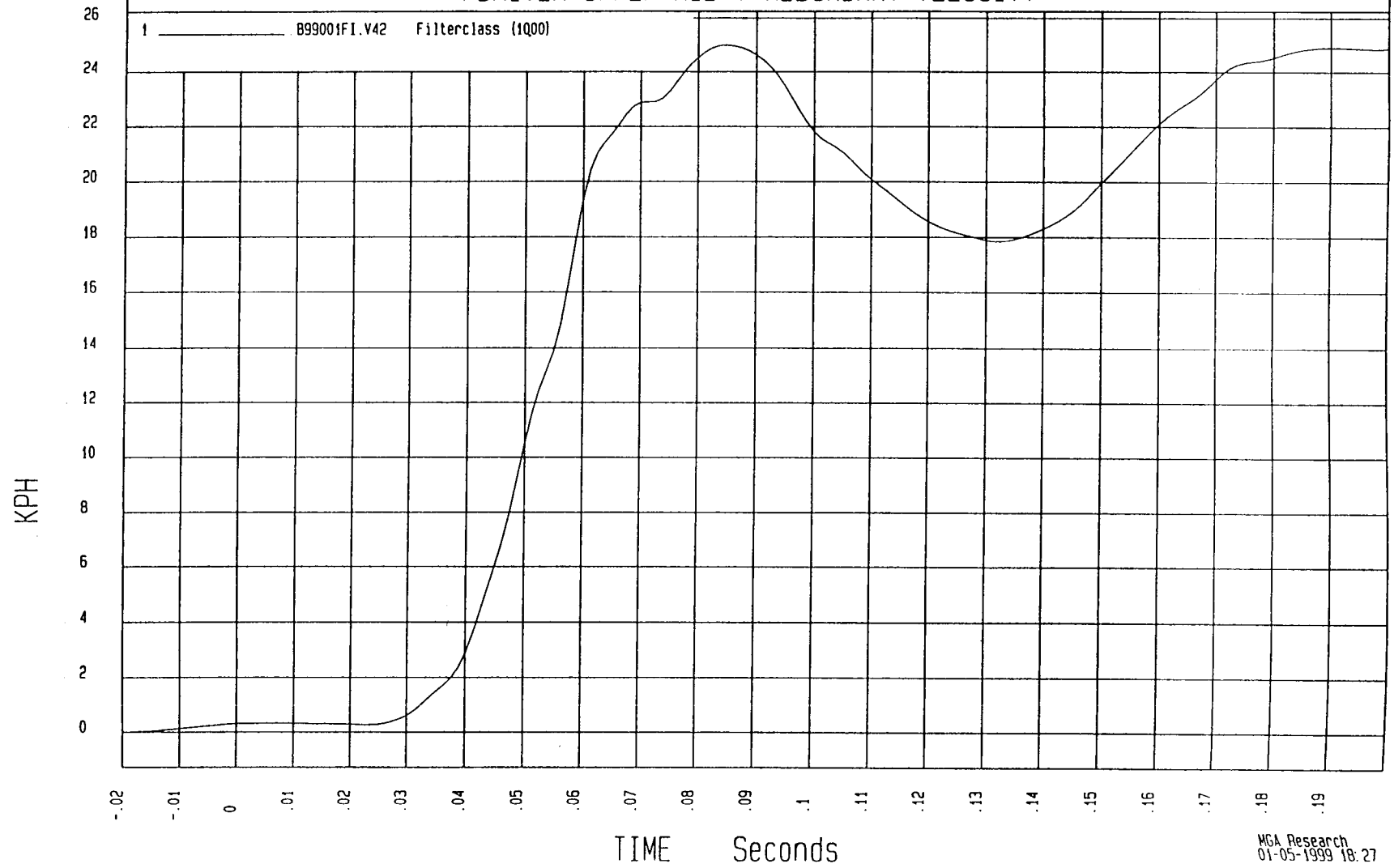
0000642

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = 0 KPH at -20 msec Maximum = 24.99 KPH at 85 msec

DRIVER UPPER RIB Y REDUNDANT VELOCITY



MGA Research
01-05-1999 18:27

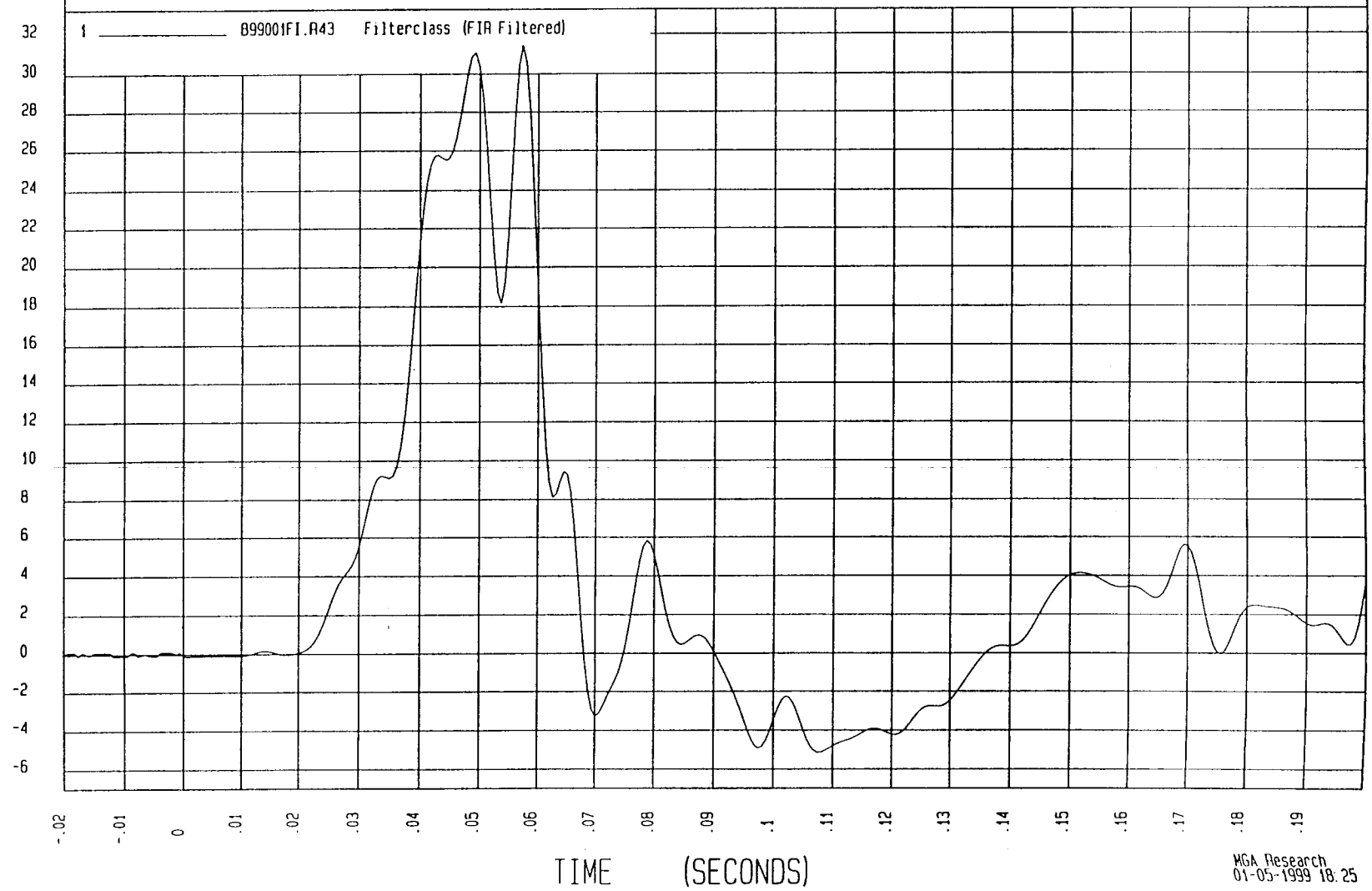
0000643

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -5.15 G'S at 108 msec | Maximum = 31.43 G'S at 58 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION



MGA Research
01-05-1999 18:25

0000644

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

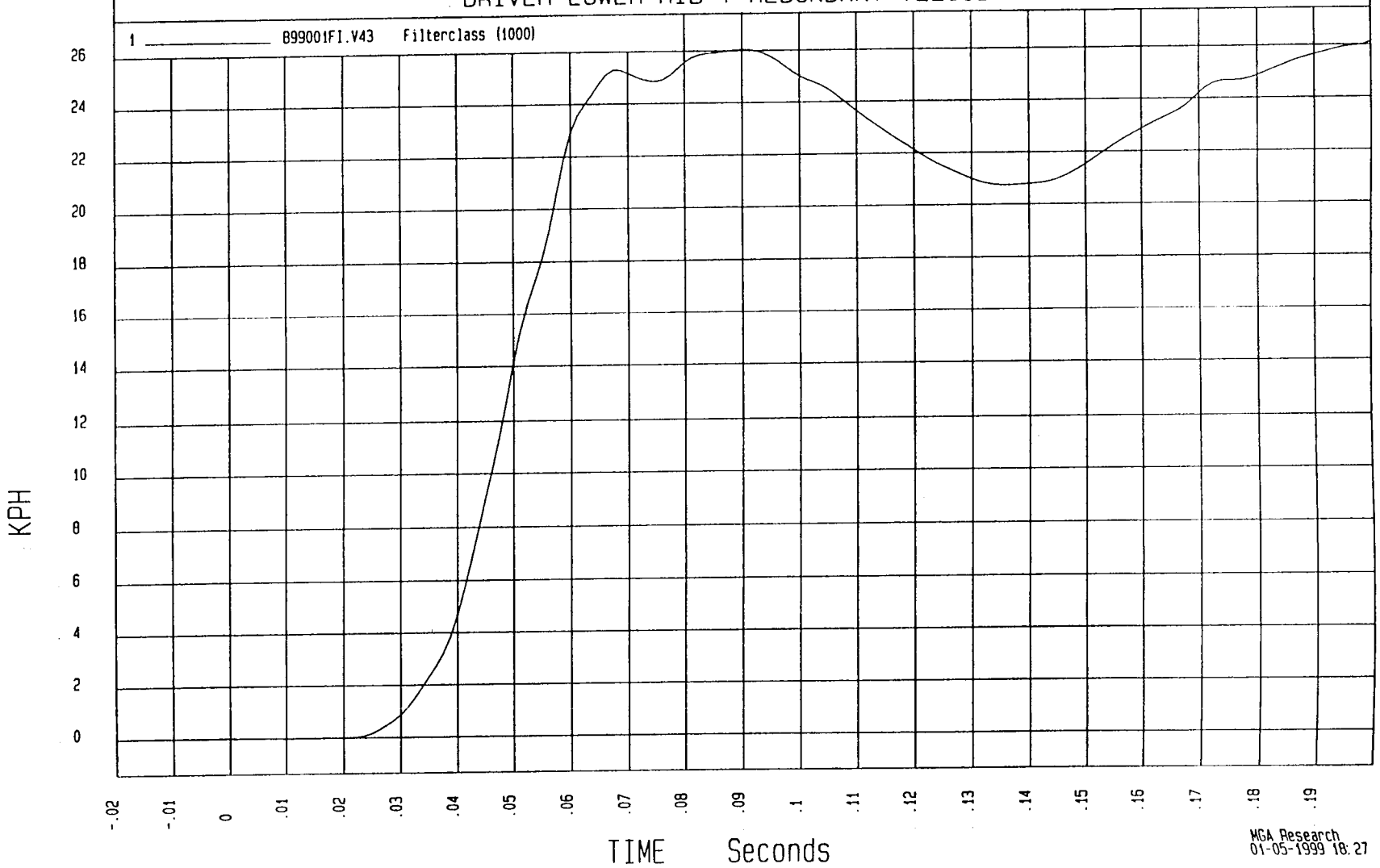
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -1.52E-02 KPH at 11 msec

Maximum = 26.12 KPH at 200 msec

DRIVER LOWER RIB Y REDUNDANT VELOCITY



MGA Research
01-05-1999 18:27

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

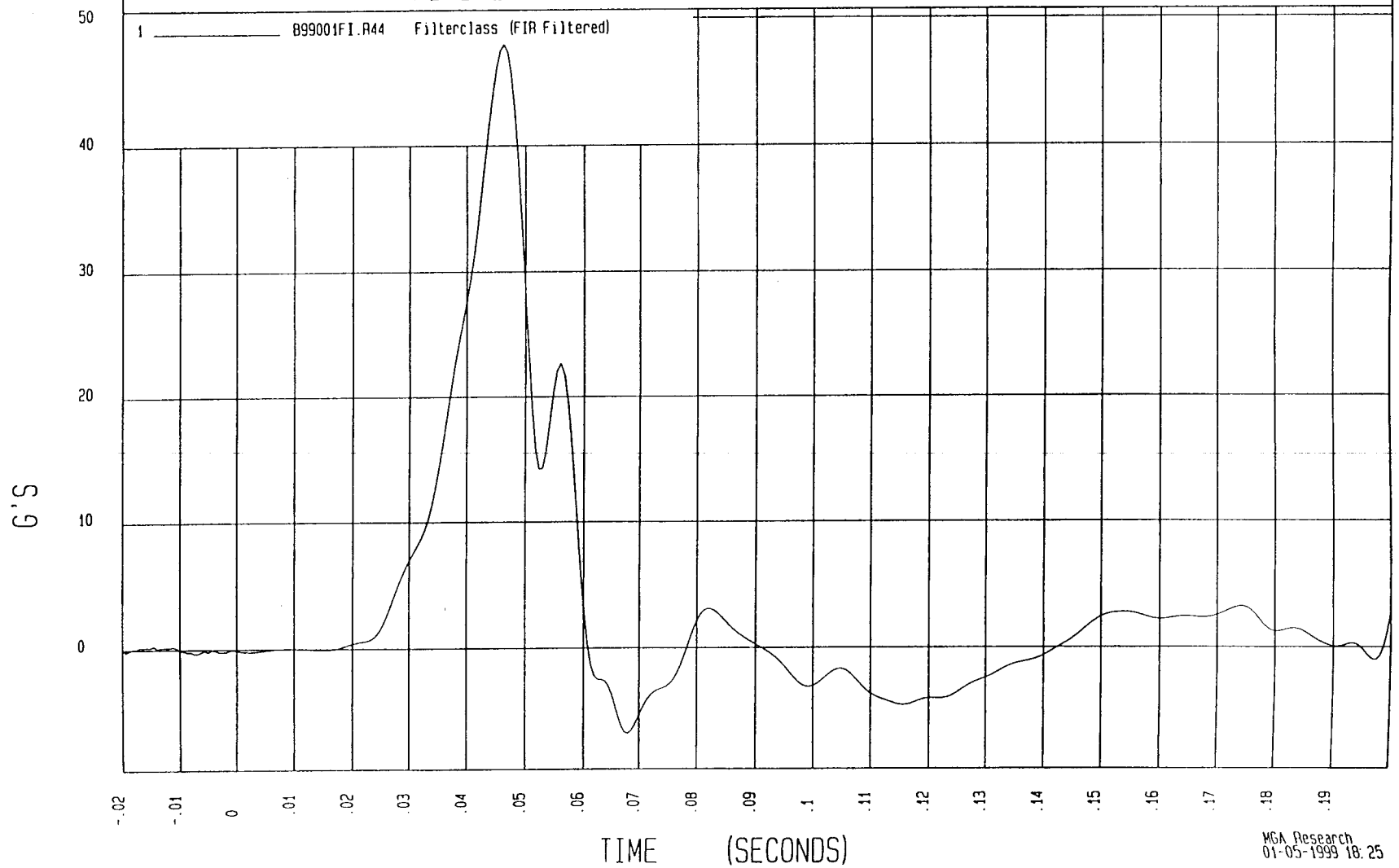
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -6.9 G'S at 68 msec

Maximum = 47.93 G'S at 46 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION



MGA Research
01-05-1999 18:25

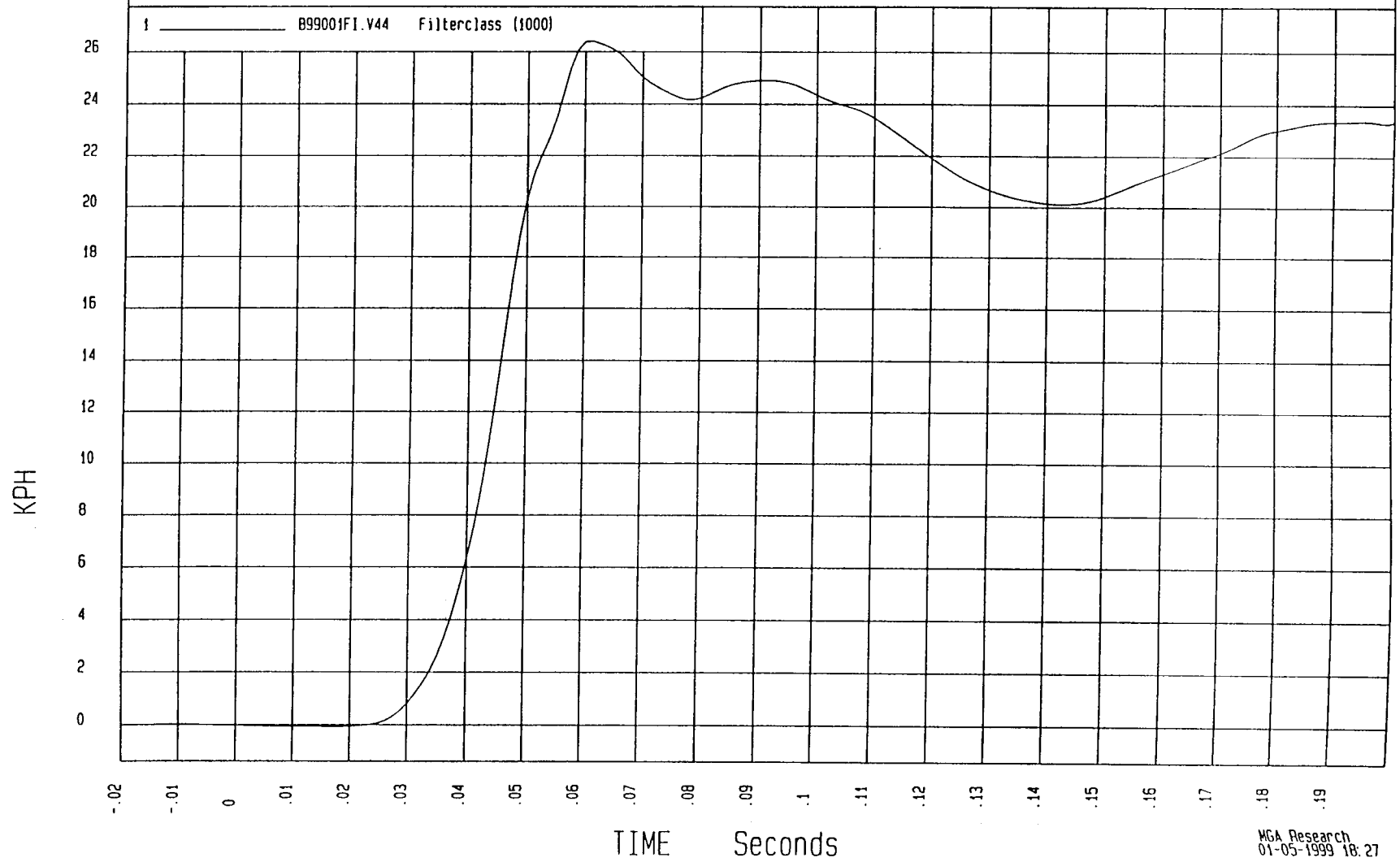
0000646

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -.07 KPH at 18 msec | Maximum = 26.42 KPH at 61 msec

DRIVER LOWER SPINE Y REDUNDANT VELOCITY



000047

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

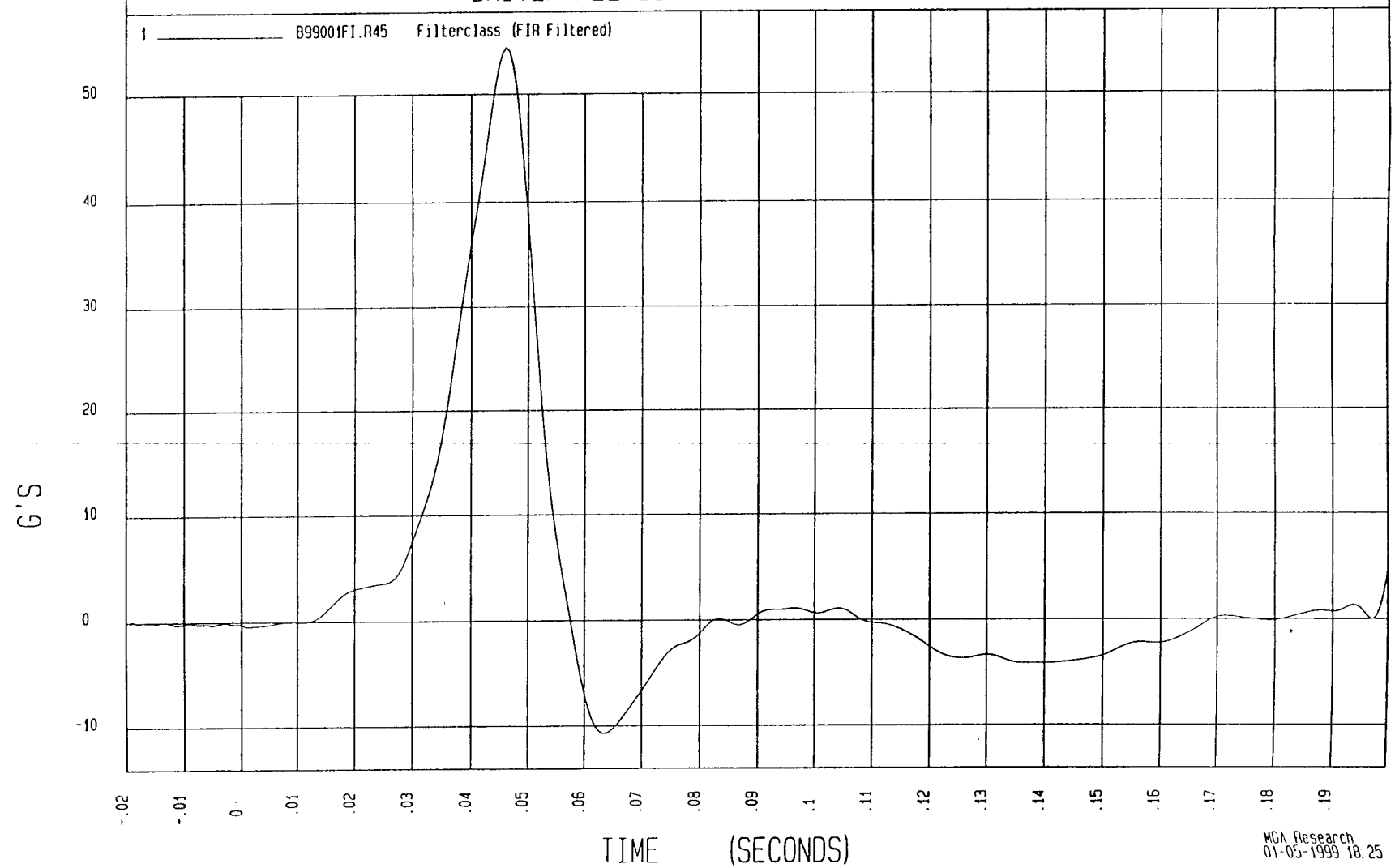
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -10.68 G'S at 63 msec

Maximum = 54.34 G'S at 46 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION



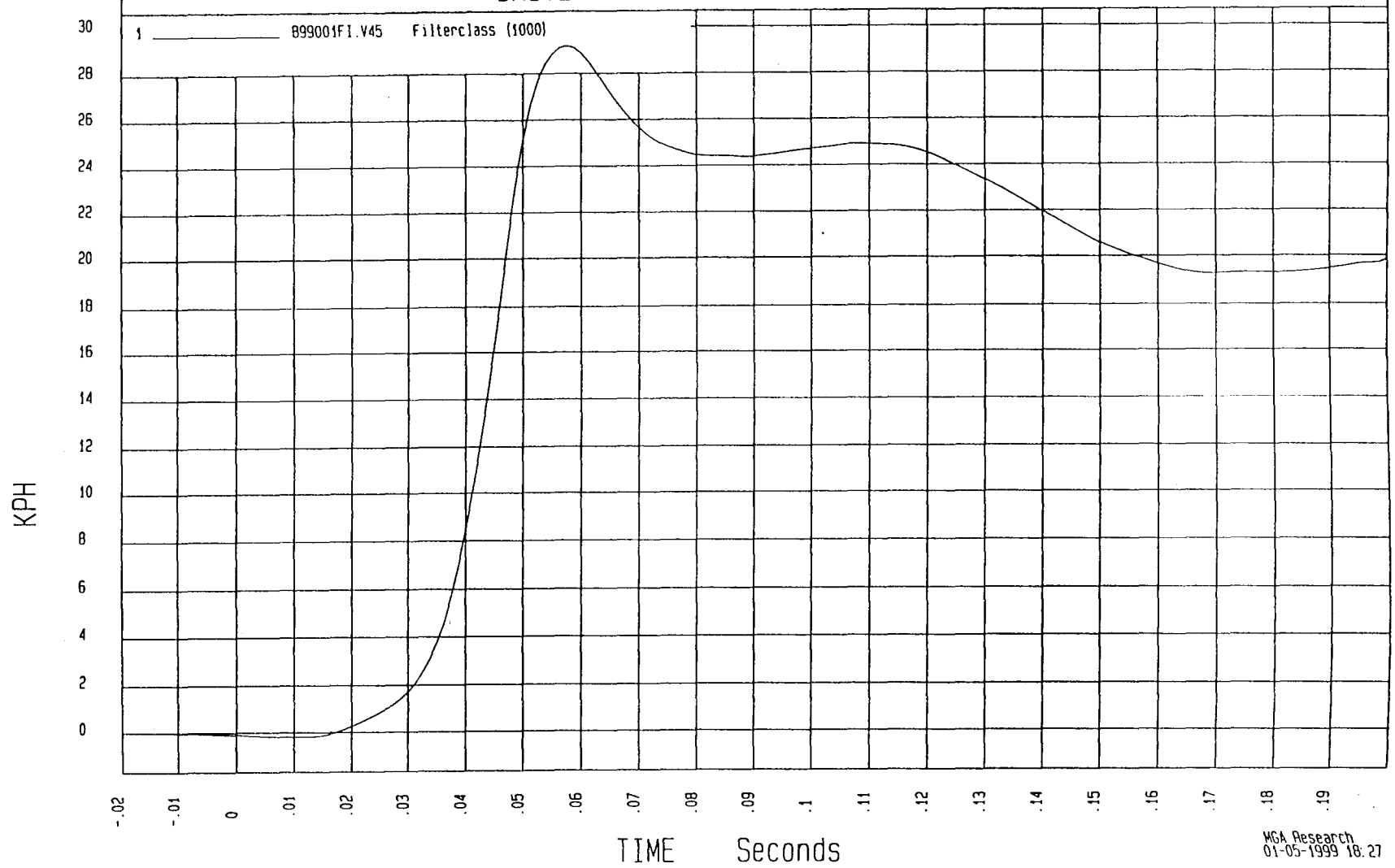
MGA Research
01-05-1999 18:25

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -.19 KPH at 12 msec | Maximum = 29.2 KPH at 58 msec

DRIVER PELVIS Y REDUNDANT VELOCITY



MGA Research
01-05-1999 18:27

0000649

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

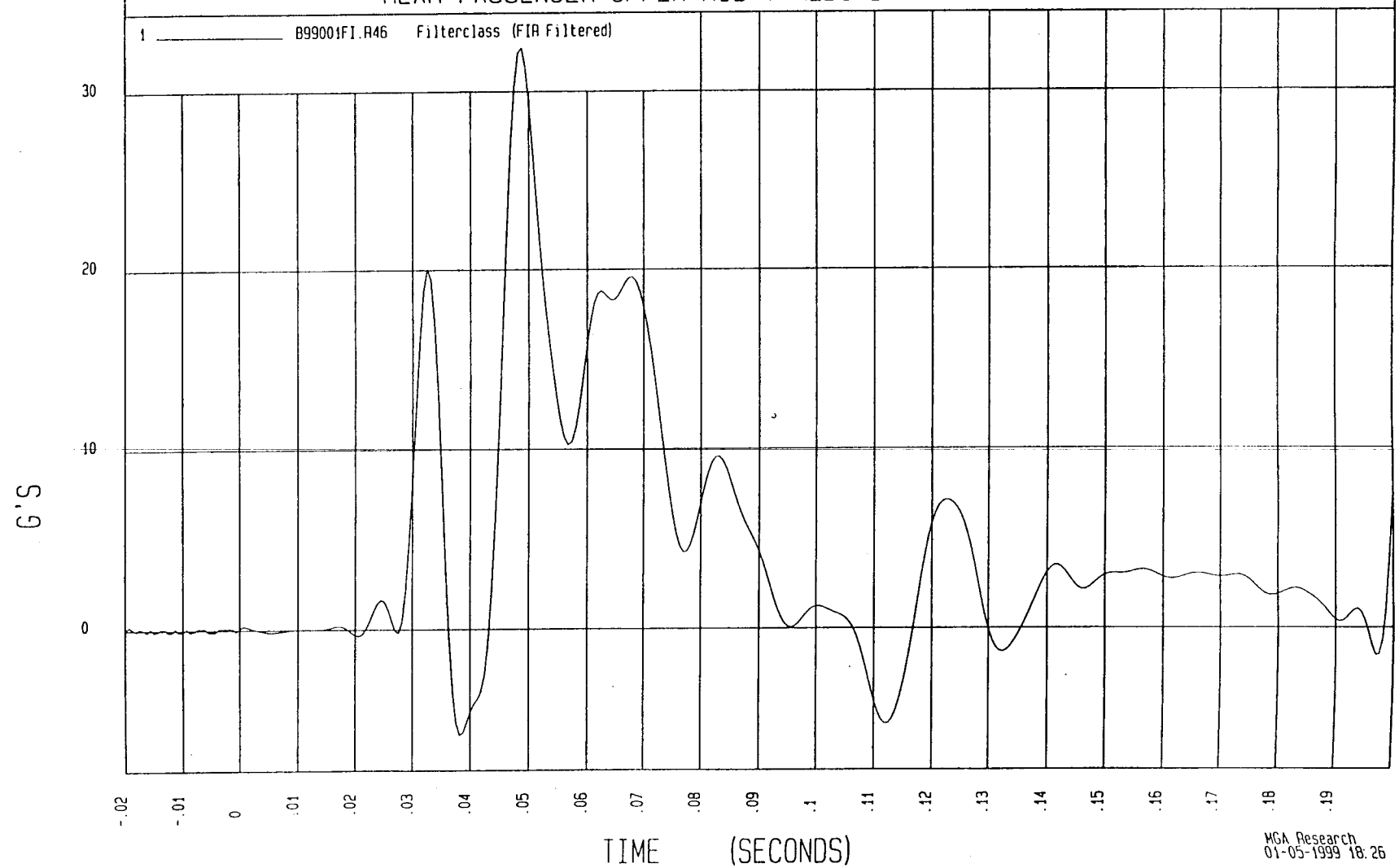
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -5.84 G'S at 38 msec

Maximum = 32.4 G'S at 49 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION



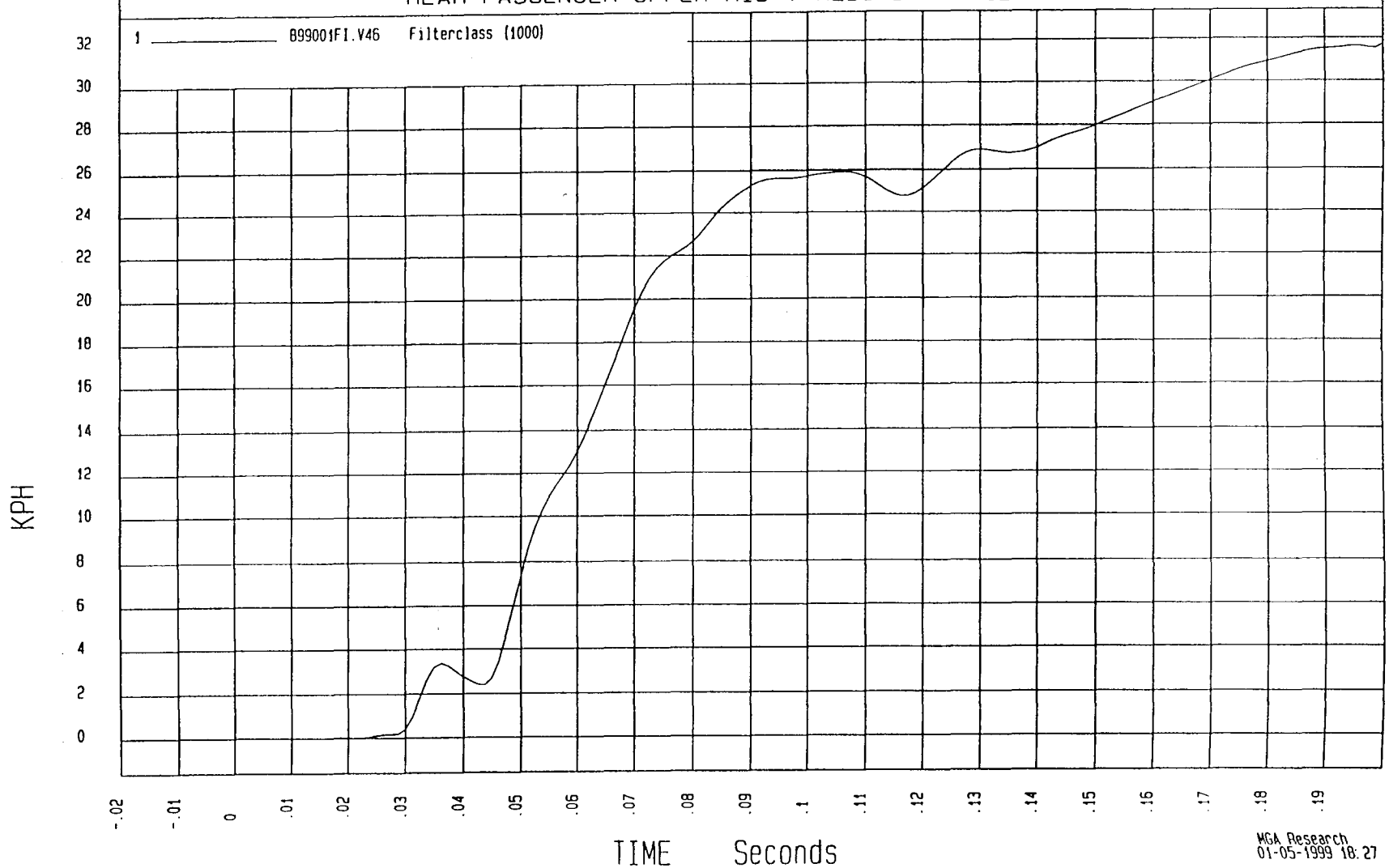
000063

TEST: FMVSS 214D SIDE IMPACT — TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) — Speed: 32.7 MPH 52.6 KPH

Minimum = -6.48E-03 KPH at 22 msec — Maximum = 31.72 KPH at 200 msec

REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY



MGA Research
01-05-1999 18:27

TEST: FMVSS 214D SIDE IMPACT

TEST DATE: 01-05-1999

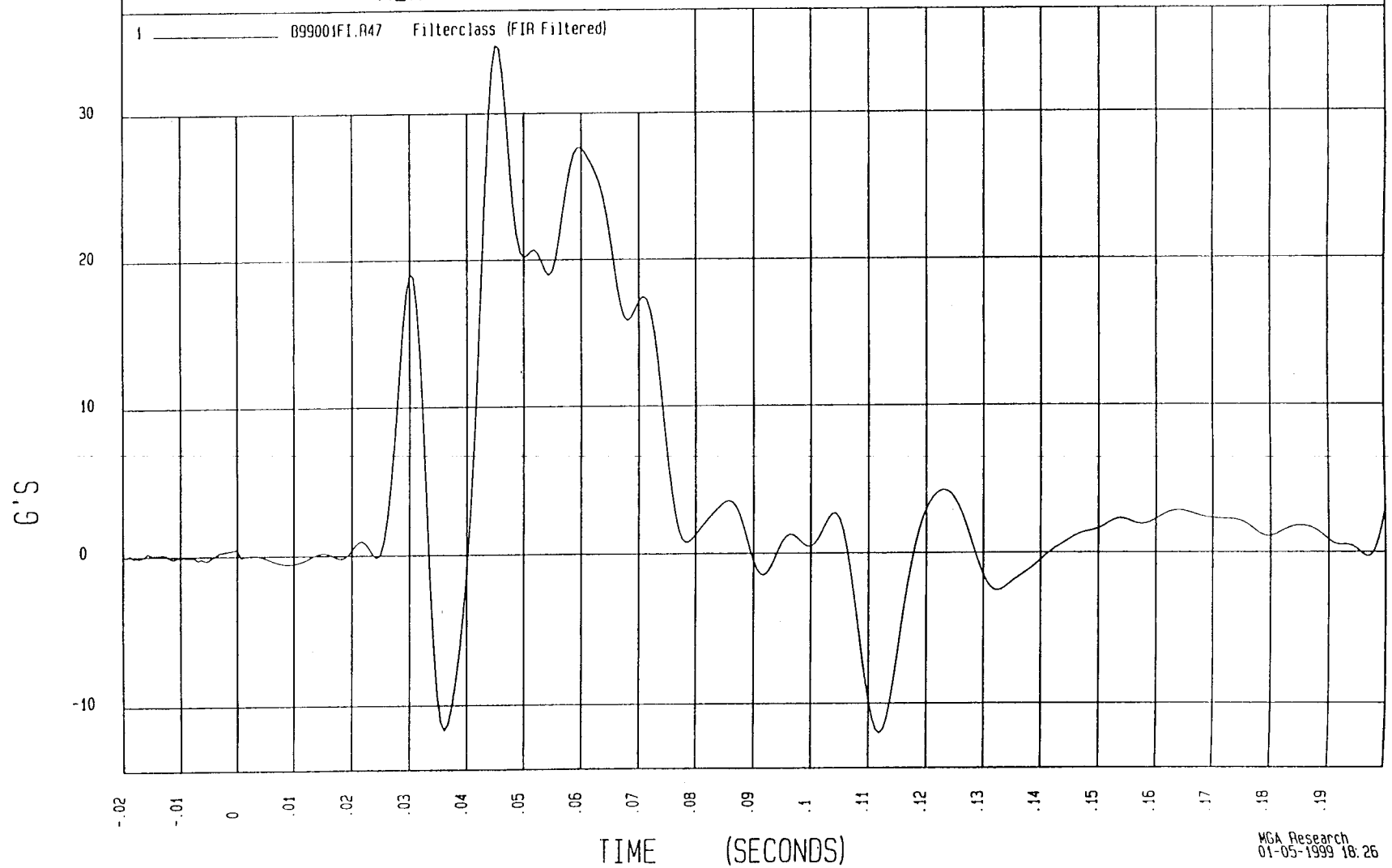
COMPONENT: 1999 DODGE CARAVAN (CX0305)

Speed: 32.7 MPH 52.6 KPH

Minimum = -11.98 G'S at 112 msec

Maximum = 34.68 G'S at 45 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION



MGA Research
01-05-1999 18:26

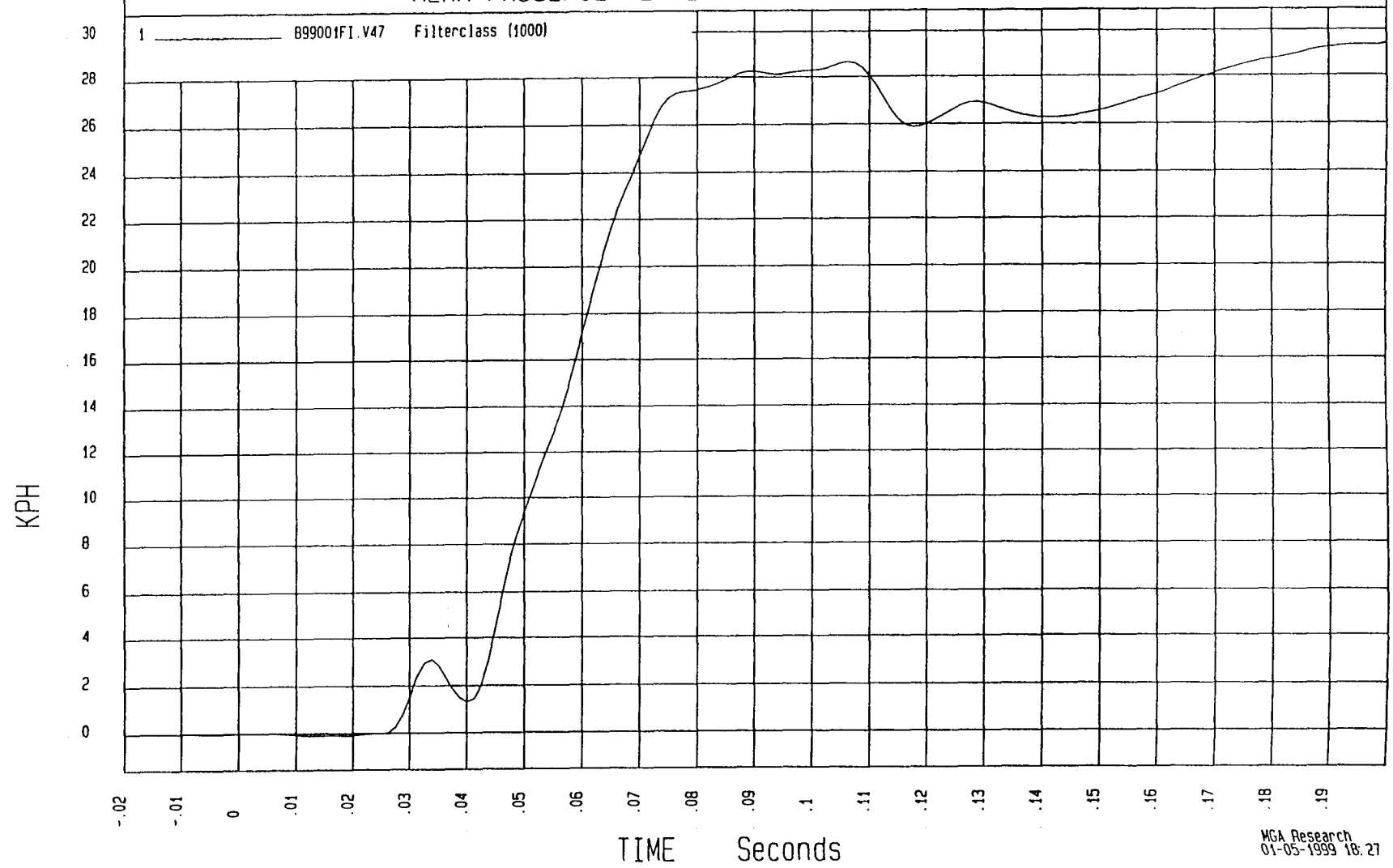
000063 2

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -.1 KPH at 14 msec | Maximum = 29.41 KPH at 200 msec

REAR PASSENGER LOWER RIB Y REDUNDANT VELOCITY



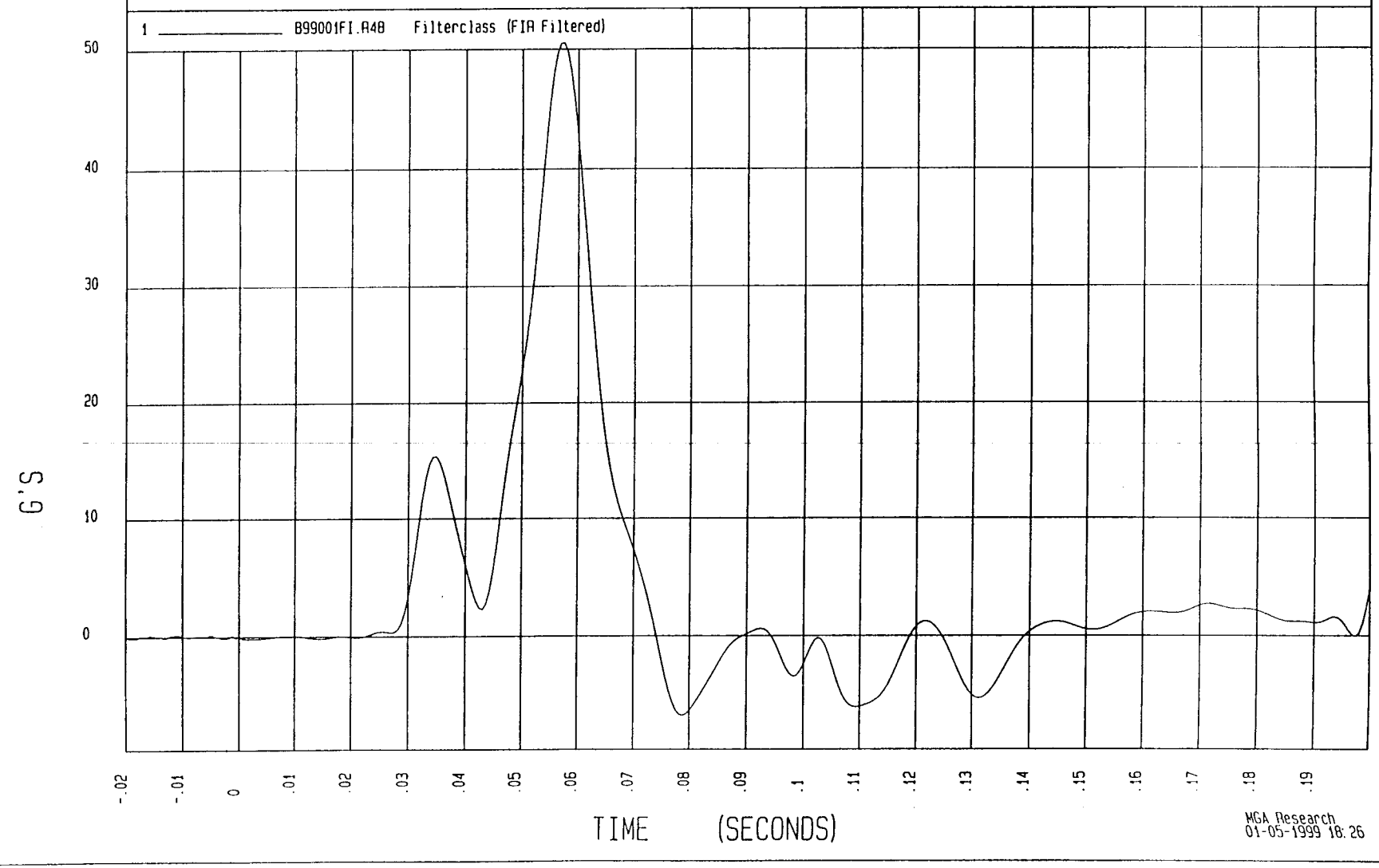
000633

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -6.83 G'S at 79 msec | Maximum = 50.53 G'S at 58 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION



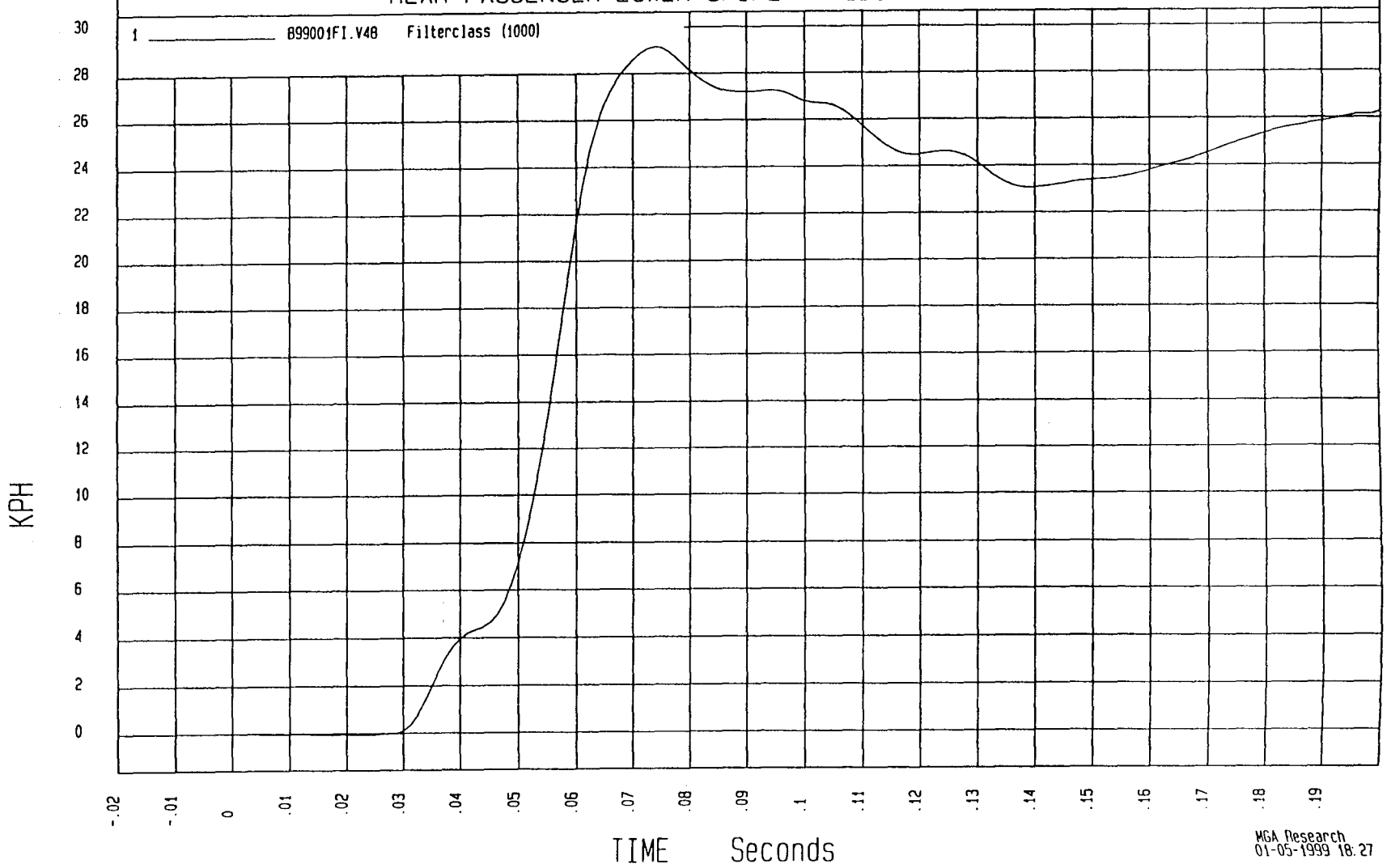
000063 4

TEST: FMVSS 214D SIDE IMPACT TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) Speed: 32.7 MPH 52.6 KPH

Minimum = -6.34E-02 KPH at 22 msec Maximum = 29.17 KPH at 74 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY



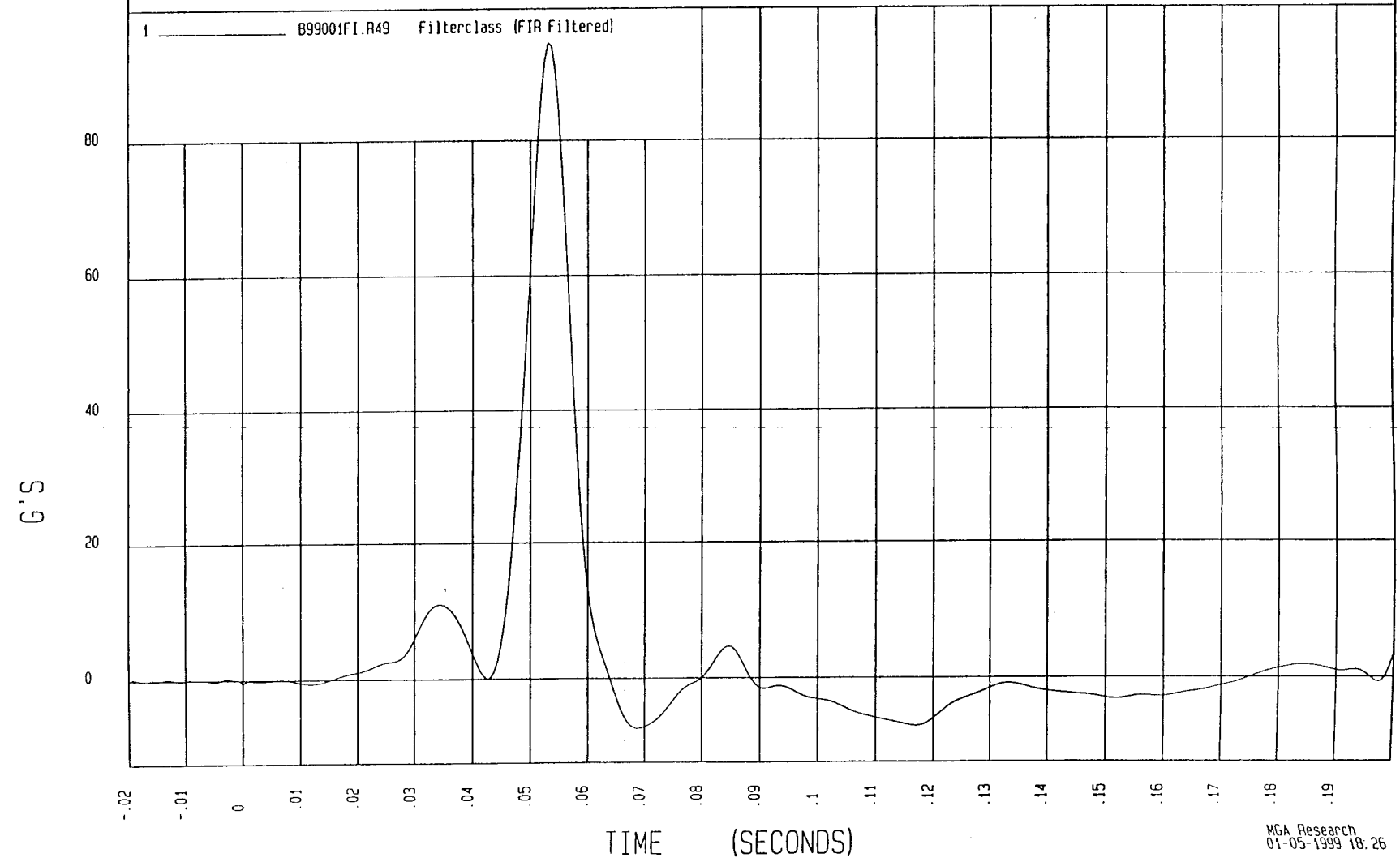
000063

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -7.42 G'S at 69 msec | Maximum = 94.21 G'S at 53 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION



MGA Research
01-05-1999 18:26

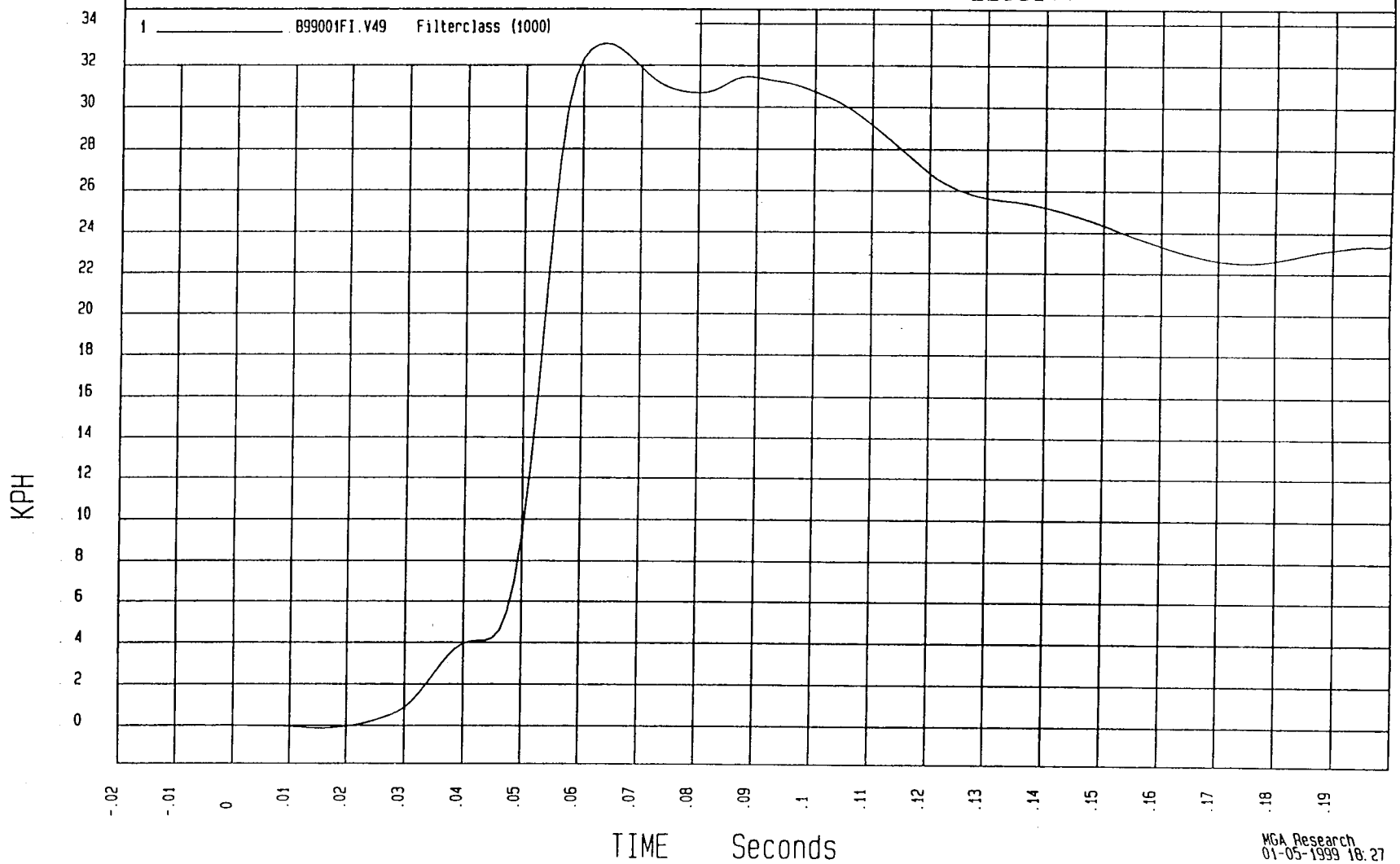
000636

TEST: FMVSS 214D SIDE IMPACT | TEST DATE: 01-05-1999

COMPONENT: 1999 DODGE CARAVAN (CX0305) | Speed: 32.7 MPH 52.6 KPH

Minimum = -.13 KPH at 15 msec | Maximum = 33.04 KPH at 64 msec

REAR PASSENGER PELVIS Y REDUNDANT VELOCITY



MGA Research
01-05-1999 18:27

000067

APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION

SUMMARY

SIDE PRE & POST-TEST CALIBRATION

CONFIGURED TO LEFT SIDE IMPACT

Report Date: January 5, 1999 Technician: Tim Michnay

Test Date: January 8, 1998

Test Parameter	Specification	Dummy Serial No: 036		Dummy Serial No: 037	
		Pre-Test	Post-Test	Pre-Test	Post-Test
SH-Seated Height (mm)	889 - 909	904	904	902	902
RH-Rib Height (mm)	501 - 521	508	508	507	507
HP-Hip Pivot Height (mm)	99 ref.	99	99	99	99
RD-Rib from Back Line (mm)	229 - 241	233	233	235	235
KV-Knee Pivot from Back Line (mm)	511 - 526	521	521	523	523
SW-Knee Pivot to Floor (mm)	490 - 505	494	494	493	493
HW-Hip Width (mm)	356 - 391	370	370	378	378
Thorax Impacts					
Temperature (°C)	18.9 - 25.5	21.0	21.0	21.0	21.0
Relative Humidity (%)	10 - 70	14	44	15	44
Probe Speed (m/s)	4.27 - 4.33	4.30	4.29	4.28	4.28
Upper Rib (g's)	37 - 46	45	42	43	37
Lower Rib (g's)	37 - 46	39	45	45	41
Lower Spine (g's)	15 - 22	18	19	20	21
Pelvis Impact					
Temperature (°C)	18.9 - 25.5	21.0	21.0	21.0	21.0
Relative Humidity (%)	10 - 70	14	44	15	44
Probe Speed (m/s)	4.27 - 4.33	4.29	4.28	4.31	4.29
Pelvis ('gs)	40 - 60	45	46	51	47

REMARKS:

PRE-TEST CERTIFICATION DATA

Dummy Serial Number: 036

Calibration Test Results Summary

Dummy Serial Number: 036

Pre-Test Calibration

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

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 036 DATE OF VERIFICATION: January 4, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	904
RH - Rib Height (mm)	501 - 521	508
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	233
KV - Knee Pivot From Back Line (mm)	511 - 526	521
SW - Knee Pivot to Floor (mm)	490 - 505	494
HW - Hip Width (mm)	356 - 391	370

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99002

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
PROBE SPEED (m/s)	4.27 - 4.33	4.30
UPPER RIB (g's)	37 - 46 g's	45
LOWER RIB (g's)	37 - 46 g's	39
LOWER SPINE (g's)	15 - 22 g's	18

TEST MEETS SPECIFICATIONS

TECHNICIAN

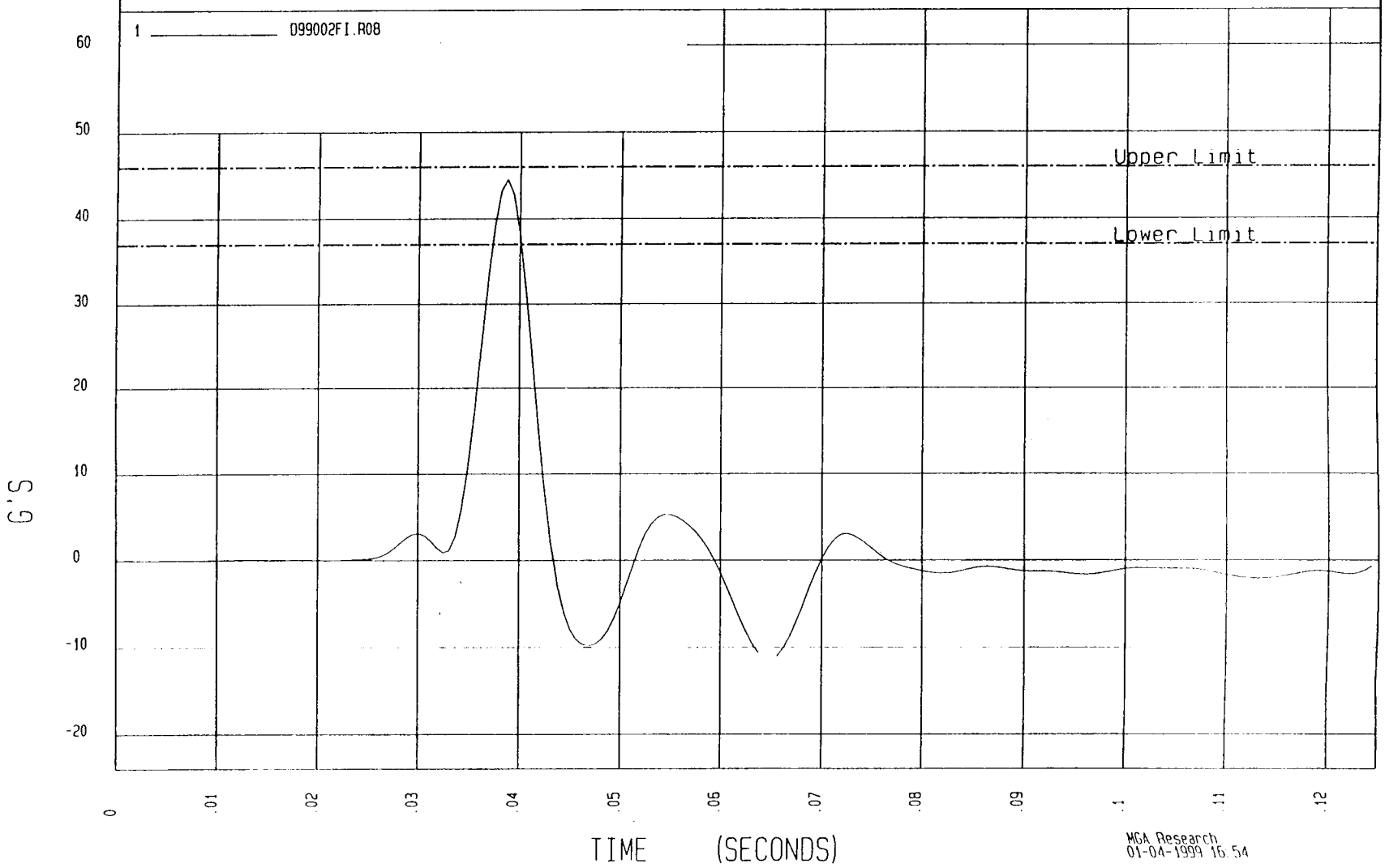
APPROVED BY

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-04-1999 - 16:48

COMPONENT: DUMMY # 036 Velocity: 14.096 FT/SEC 4.3 M/SEC

Minimum = -11.30 G'S at 65 msec Maximum = 44.54 G'S at 38.7 msec

UPPER RIB ACCELERATION



MGA Research
01-04-1999 16:54

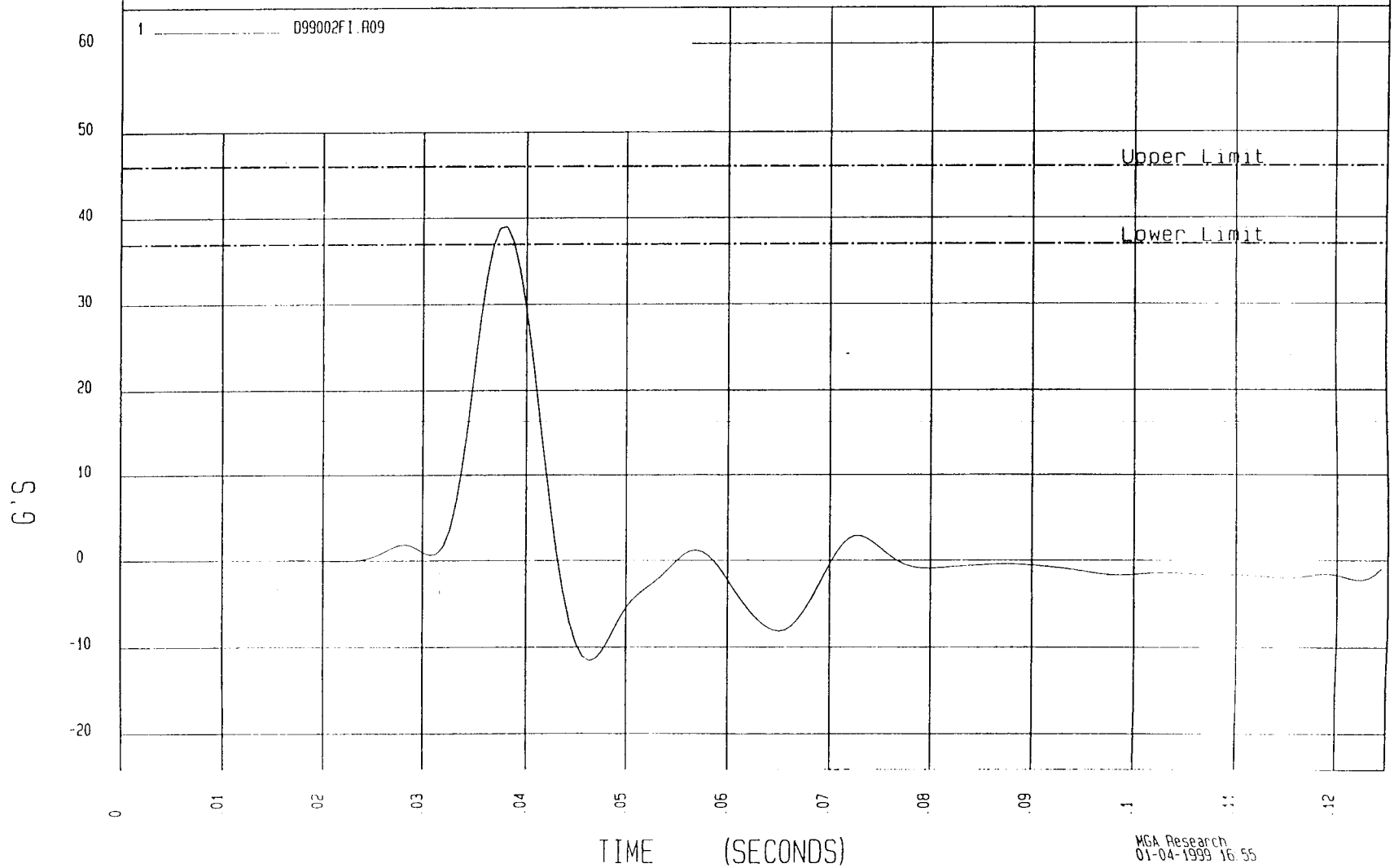
0000634

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-04-1999 - 16:48

COMPONENT: DUMMY # 036 Velocity: 14.096 FT/SEC 4.3 M/SEC

Minimum = -11.51 G'S at 46.2 msec Maximum = 39.03 G'S at 38.1 msec

LOWER RIB ACCELERATION



MGA Research
01-04-1999 16:55

TEST: DUMMY CALIBRATION - THORAX IMPACT

TEST DATE: 01-04-1999 - 16:48

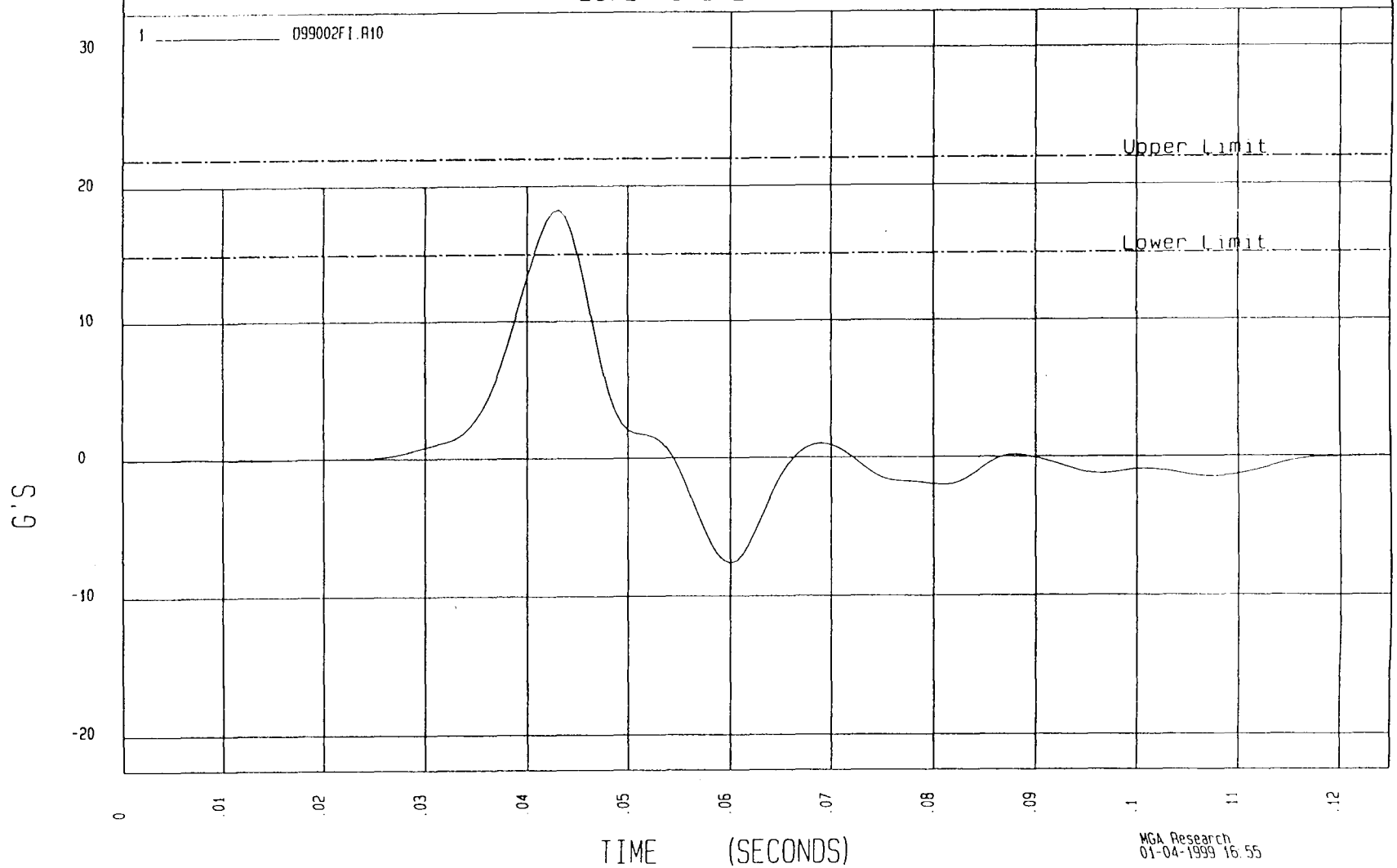
COMPONENT: DUMMY # 036

Velocity: 14.096 FT/SEC 4.3 M/SEC

Minimum = -7.57 G'S at 60 msec

Maximum = 18.28 G'S at 43.1 msec

LOWER SPINE ACCELERATION



0000636

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99003

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
PROBE SPEED (m/s)	4.27 - 4.33	4.29
PELVIS ACCELERATION (g's)	40 - 60	45

TEST MEETS SPECIFICATIONS

TECHNICIAN

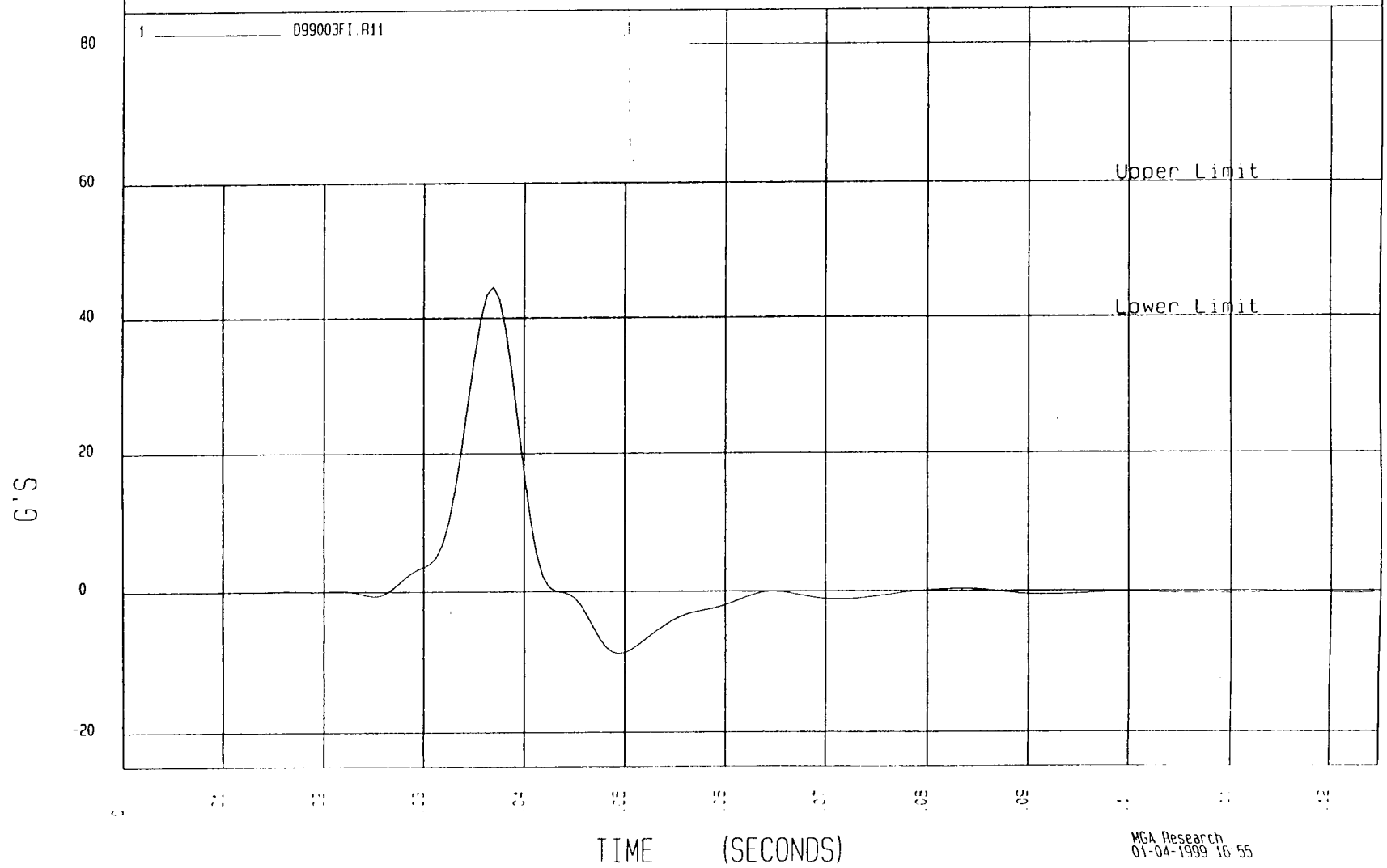
APPROVED BY

TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-04-1999 - 16:53

COMPONENT: DUMMY # 036 Velocity: 14.079 FT/SEC 4.29 M/SEC

Minimum = -8.82 G'S at 49.3 msec Maximum = 44.55 G'S at 36.8 msec

PELVIS ACCLERATION



000068

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST

(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

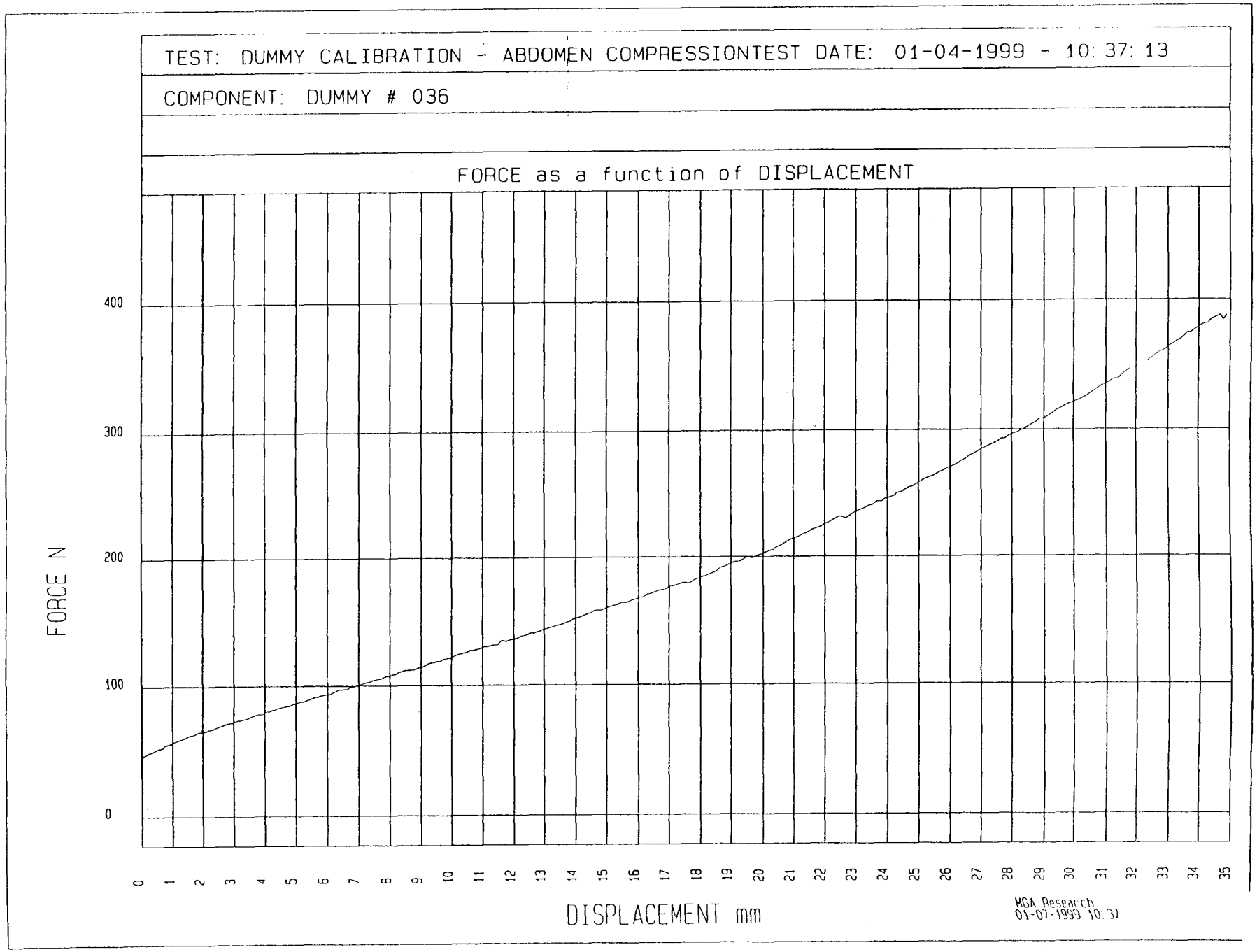
DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99004

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
FORCE @ 12.7 mm	104 - 162	141
FORCE @ 19.0 mm	163 - 222	196
FORCE @ 25.4 mm	222 - 280	263
FORCE @ 33 mm	325 - 391	365

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 01-04-1999 - 10:37:13
COMPONENT: DUMMY # 036
FORCE as a function of DISPLACEMENT
FORCE N
400
300
200
100
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
DISPLACEMENT mm
MGA Research
01-07-1999 10:37

0000670

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99005

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	15
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	99.5
FORCE @ 30°	151.2 - 204.6	155.7
FORCE @ 40°	204.6 - 258.0	223.9
RETURN ANGLE	12° maximum	5

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY

TEST: DUMMY CALIBRATION - LUMBAR FLEXION
TEST DATE: 01-04-1999 - 15:58:52
COMPONENT: DUMMY # 036
FORCE as a function of TORSO ROTATION
FORCE N
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
TORSO ROTATION DEGREES
0
10
20
30
40
MGA Research
01-04-1999 16:22

PRE-TEST CERTIFICATION DATA

Dummy Serial Number: 037

Calibration Test Results Summary

Dummy Serial Number: 037

Pre-Test Calibration

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

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 037 DATE OF VERIFICATION: January 4, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	902
RH - Rib Height (mm)	501 - 521	507
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	235
KV - Knee Pivot From Back Line (mm)	511 - 526	523
SW - Knee Pivot to Floor (mm)	490 - 505	493
HW - Hip Width (mm)	356 - 391	378

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

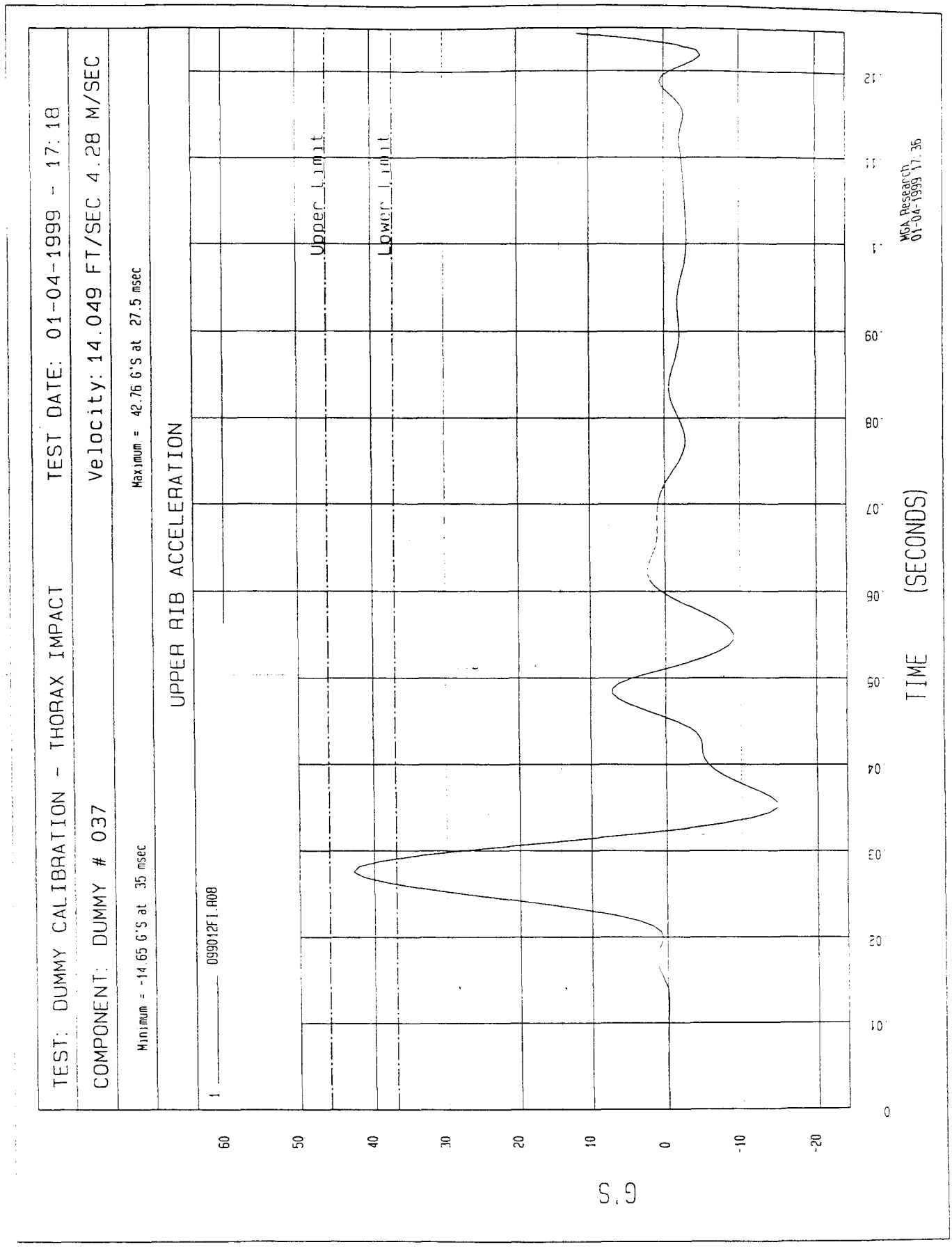
DUMMY SERIAL NUMBER: 037 TEST NUMBER: D99012

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	15
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46	43
LOWER RIB (g's)	37 - 46	45
LOWER SPINE (g's)	15 - 22	20

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY

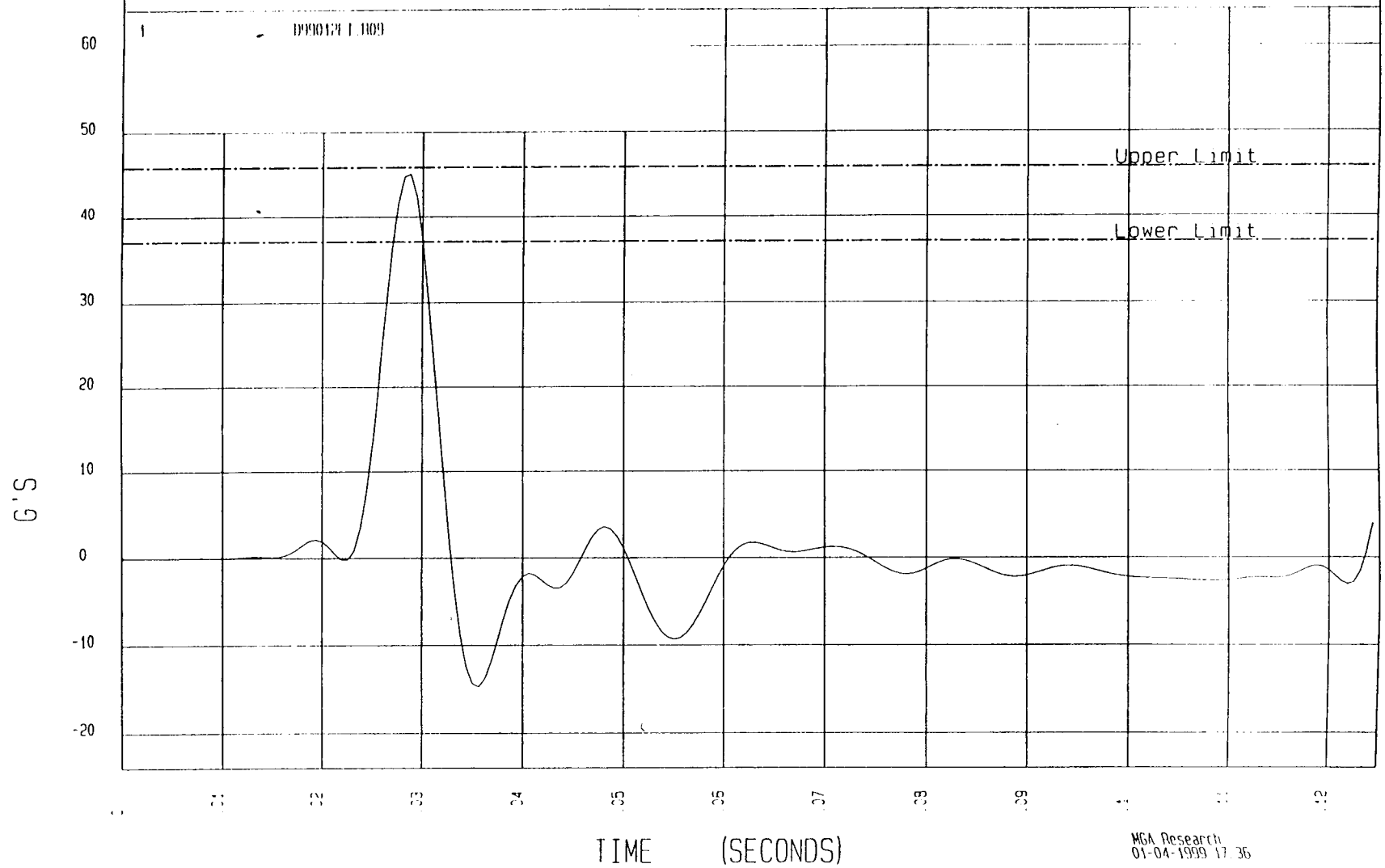

TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 01-04-1999 - 17:18
COMPONENT: DUMMY # 037
Velocity: 14.049 FT/SEC 4.28 M/SEC
Minimum = -14.65 G'S at 35 msec
Maximum = 42.76 G'S at 27.5 msec
UPPER RIB ACCELERATION
099012F1.A08
Upper Limit
Lower Limit
G'S
60
50
40
30
20
10
0
-10
-20
TIME (SECONDS)
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
MGA Research
01-04-1999 17:36

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-04-1999 - 17: 18

COMPONENT: DUMMY # 037 Velocity: 14.049 FT/SEC 4.28 M/SEC

Minimum = -14.67 G'S at 35.6 msec Maximum = 45.19 G'S at 28.7 msec

LOWER RIB ACCELERATION



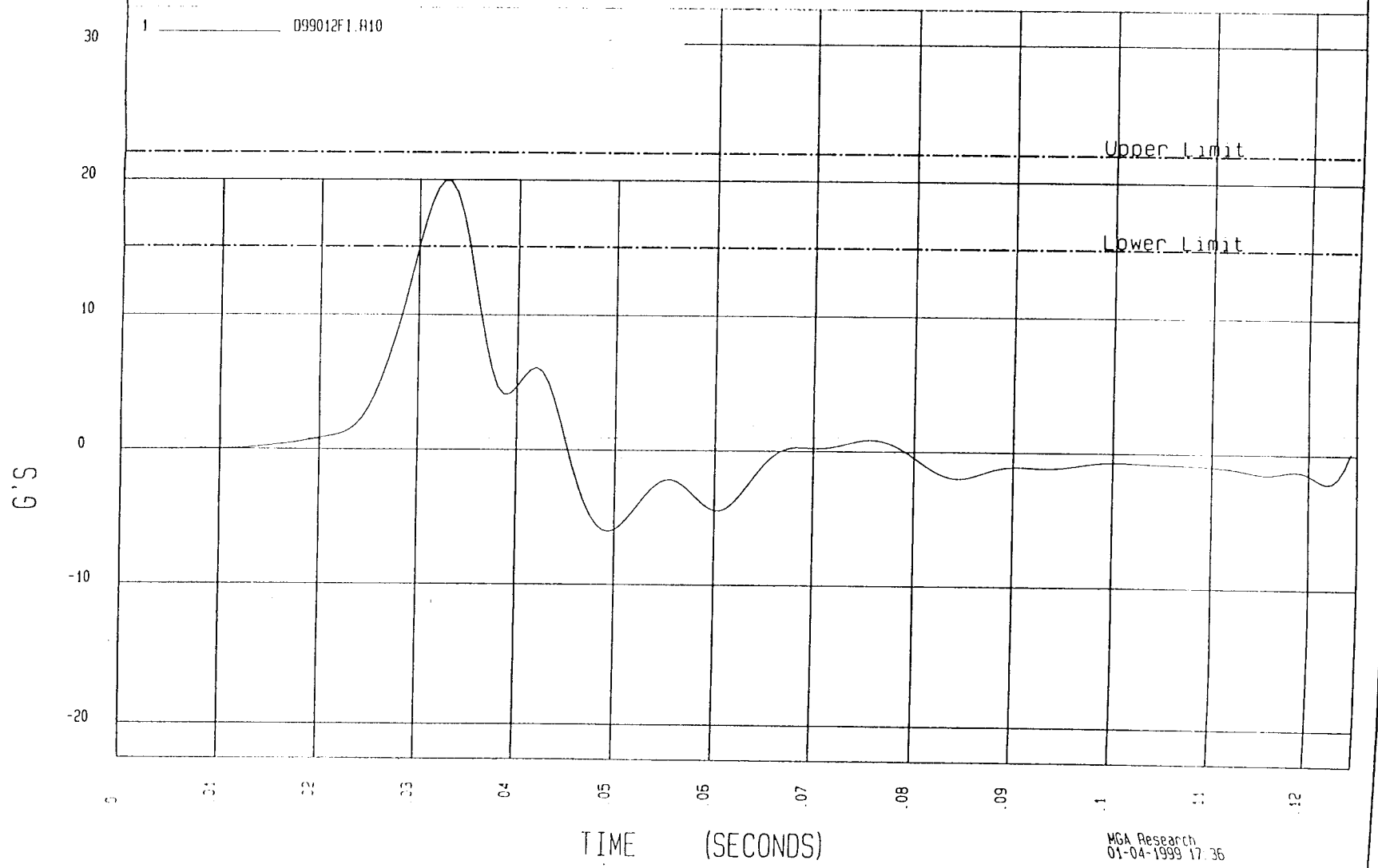
0000678

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-04-1999 - 17:18

COMPONENT: DUMMY # 037 Velocity: 14.049 FT/SEC 4.28 M/SEC

Minimum = -6.09 G'S at 49.3 msec Maximum = 19.94 G'S at 32.5 msec

LOWER SPINE ACCELERATION



0000679

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

DUMMY SERIAL NUMBER: 037 TEST NUMBER: D99013

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	15
PROBE SPEED (m/s)	4.27 - 4.33	4.31
PELVIS ACCELERATION (g's)	40 - 60	51

TEST MEETS SPECIFICATIONS

TECHNICIAN

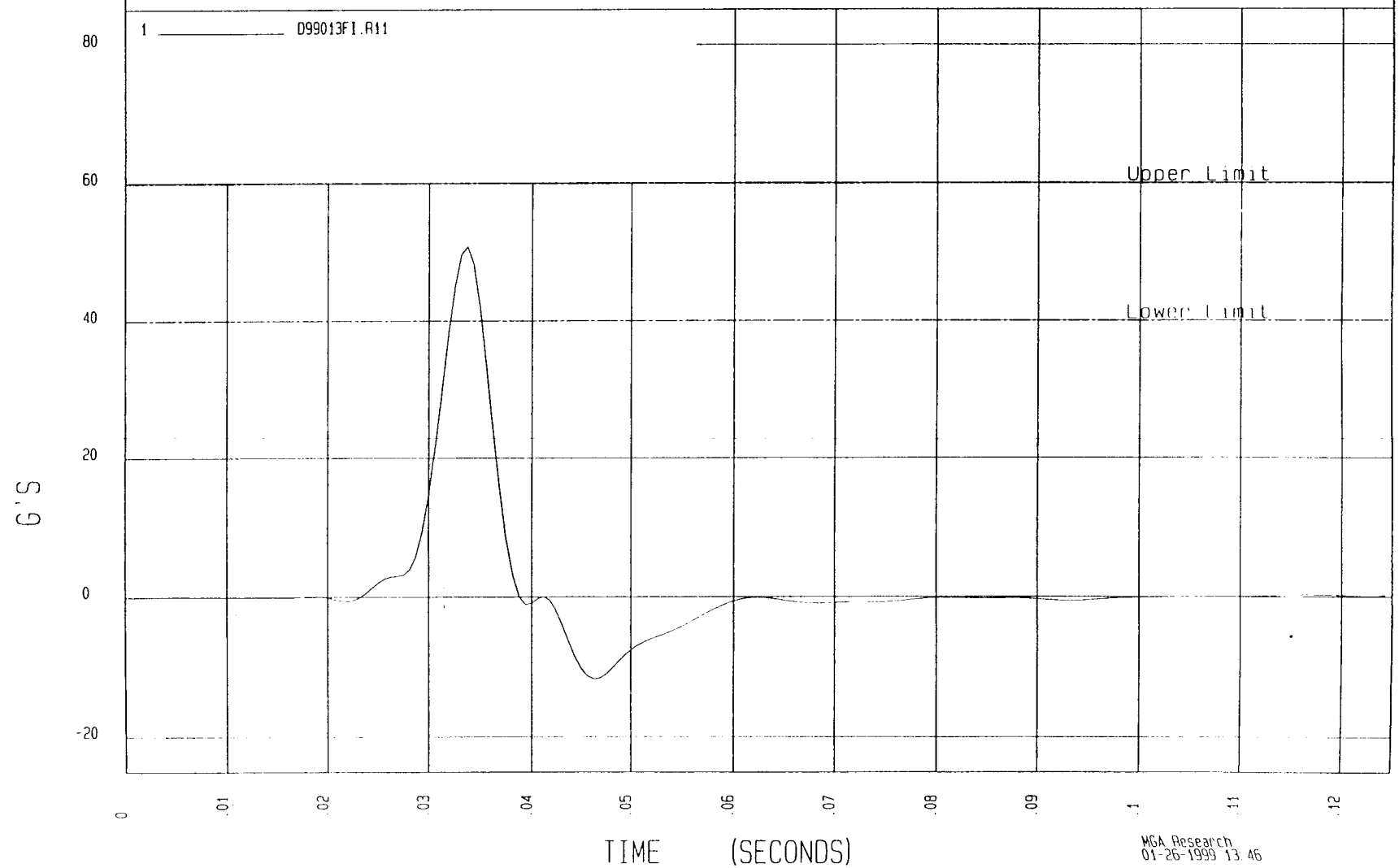
APPROVED BY

TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-04-1999 - 17:33

COMPONENT: DUMMY # 037 Velocity: 14.152 FT/SEC 4.31 M/SEC

Minimum = -11.73 G'S at 46.2 msec Maximum = 50.78 G'S at 33.7 msec

PELVIS ACCLERATION



0000681

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST

(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

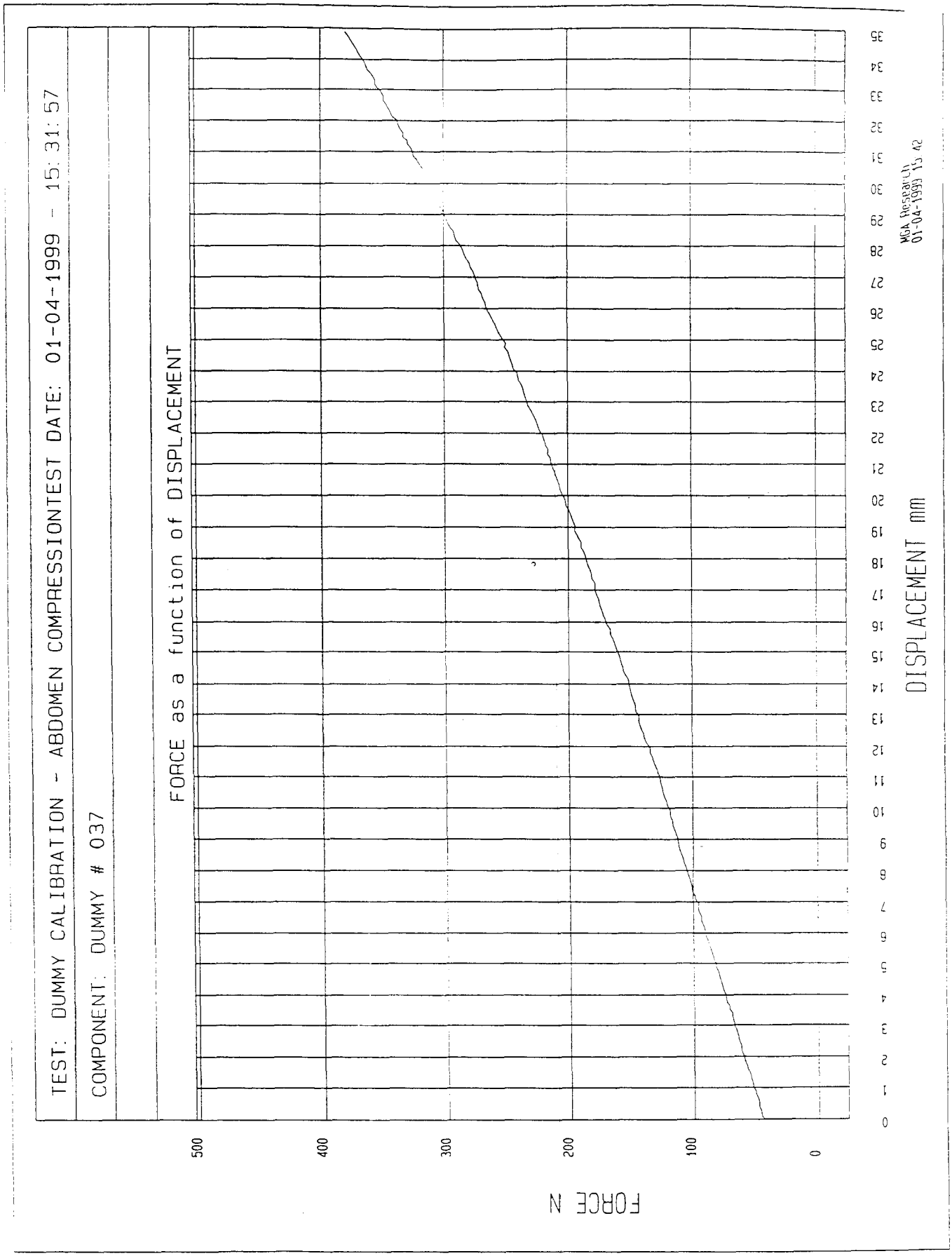
DUMMY SERIAL NUMBER: 037 TEST NUMBER: D99014

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
FORCE @ 12.7 mm	104 - 162	144
FORCE @ 19.0 mm	163 - 222	196
FORCE @ 25.4 mm	222 - 280	259
FORCE @ 33 mm	325 - 391	354

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 01-04-1999 - 15:31:57
COMPONENT: DUMMY # 037
FORCE as a function of DISPLACEMENT
FORCE N
500
400
300
200
100
0
DISPLACEMENT mm
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
MGA Research
01-04-1999 15:42

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 4, 1999

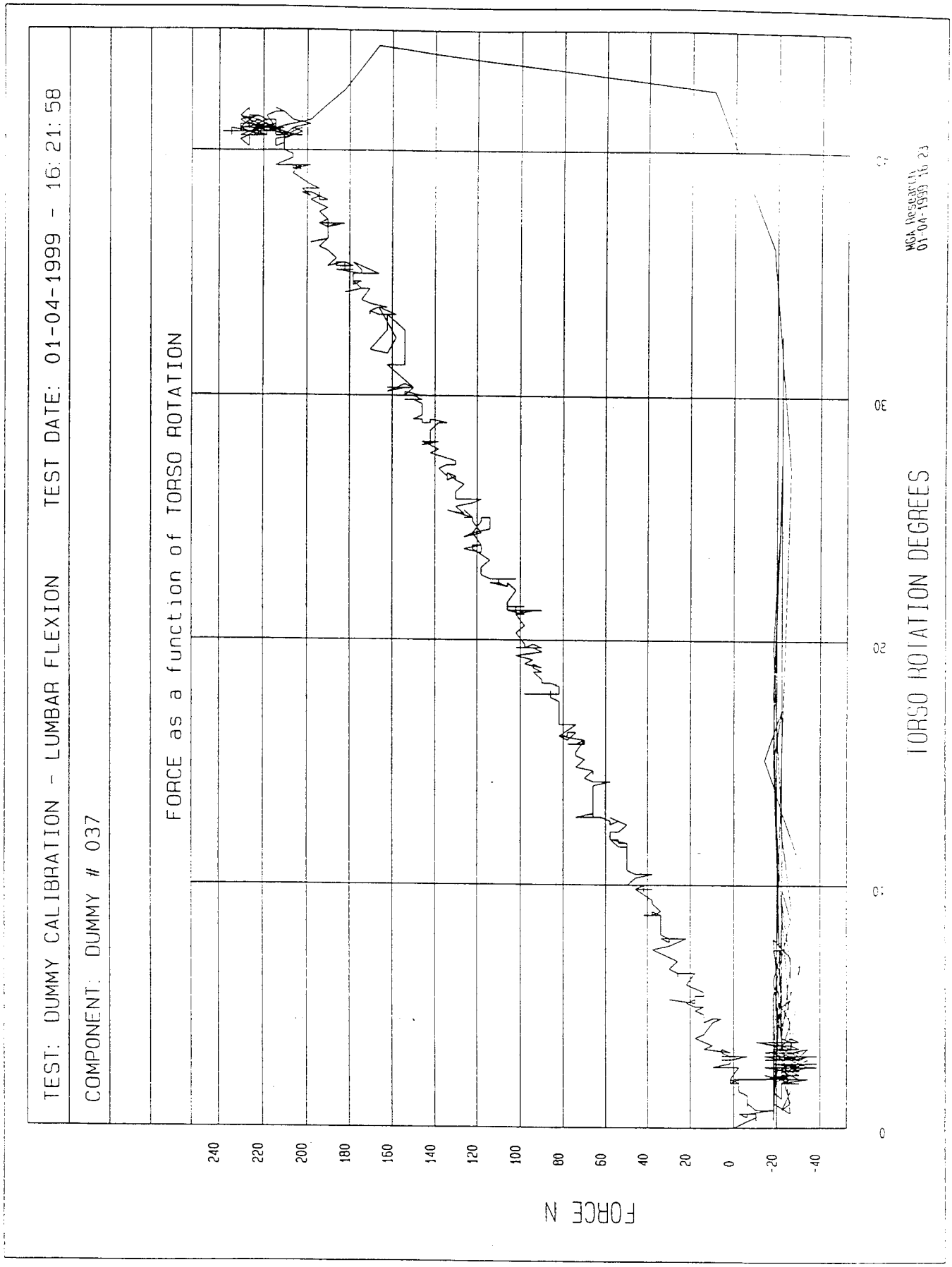
DUMMY SERIAL NUMBER:_ TEST NUMBER: D99015

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	15
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	102.1
FORCE @ 30°	151.2 - 204.6	154.3
FORCE @ 40°	204.6 - 258.0	210.5
RETURN ANGLE	12° maximum	2

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - LUMBAR FLEXION
TEST DATE: 01-04-1999 - 16:21:58
COMPONENT: DUMMY # 037
FORCE as a function of TORSO ROTATION
FORCE N
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
TORSO ROTATION DEGREES
0
10
20
30
40
MGA Research
01-04-1999 16:23

POST-TEST CERTIFICATION DATA

Dummy Serial Number: 036

Calibration Test Results Summary

Dummy Serial Number: 036

Post-Test Calibration

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

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 036 DATE OF VERIFICATION: January 21, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	904
RH - Rib Height (mm)	501 - 521	508
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	233
KV - Knee Pivot From Back Line (mm)	511 - 526	521
SW - Knee Pivot to Floor (mm)	490 - 505	494
HW - Hip Width (mm)	356 - 391	370

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 21, 1999

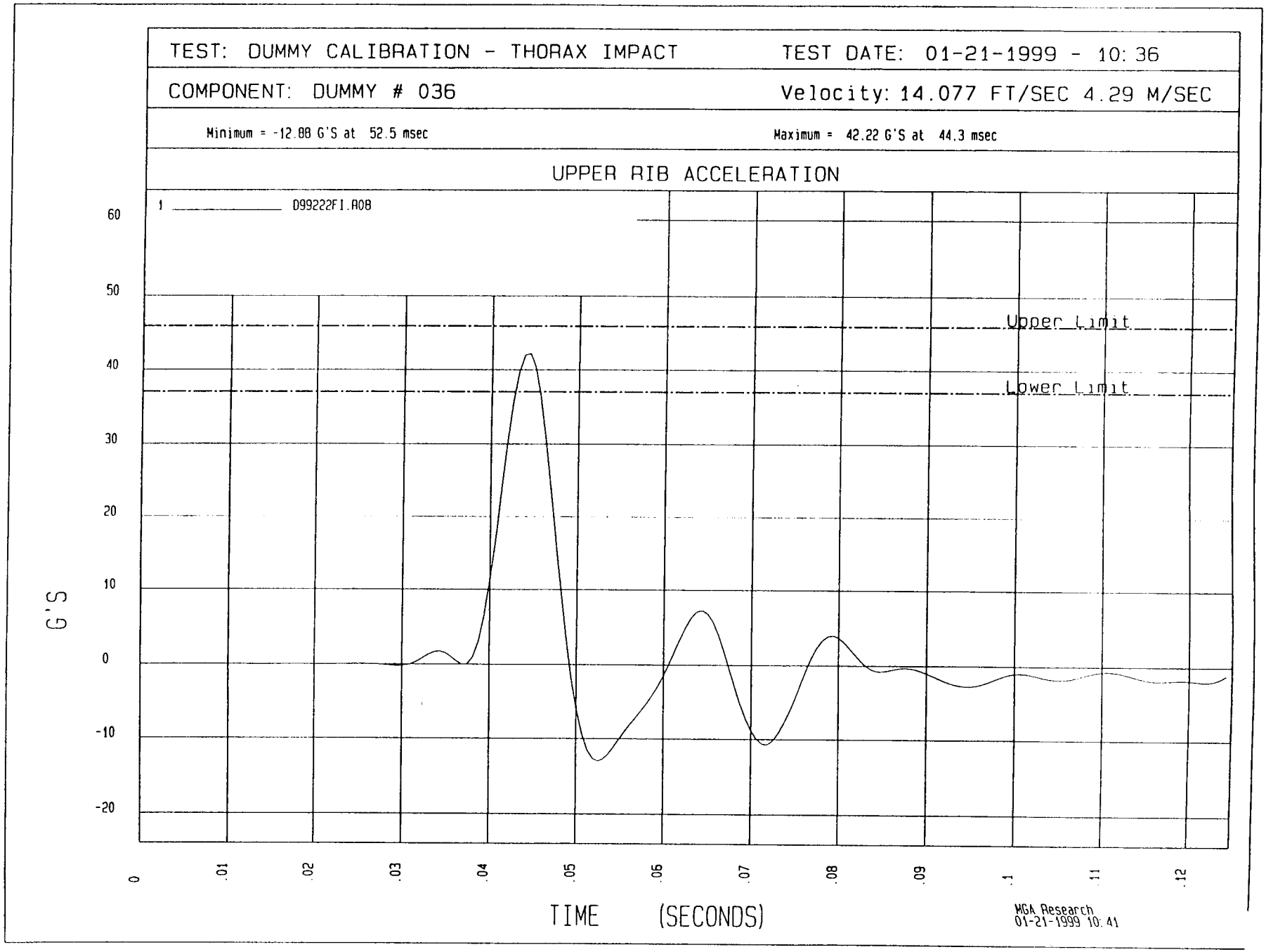
DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99222

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	44
PROBE SPEED (m/s)	4.27 - 4.33 fps	4.29
UPPER RIB (g's)	37 - 46 g's	42
LOWER RIB (g's)	37 - 46 g's	45
LOWER SPINE (g's)	15 - 22 g's	19

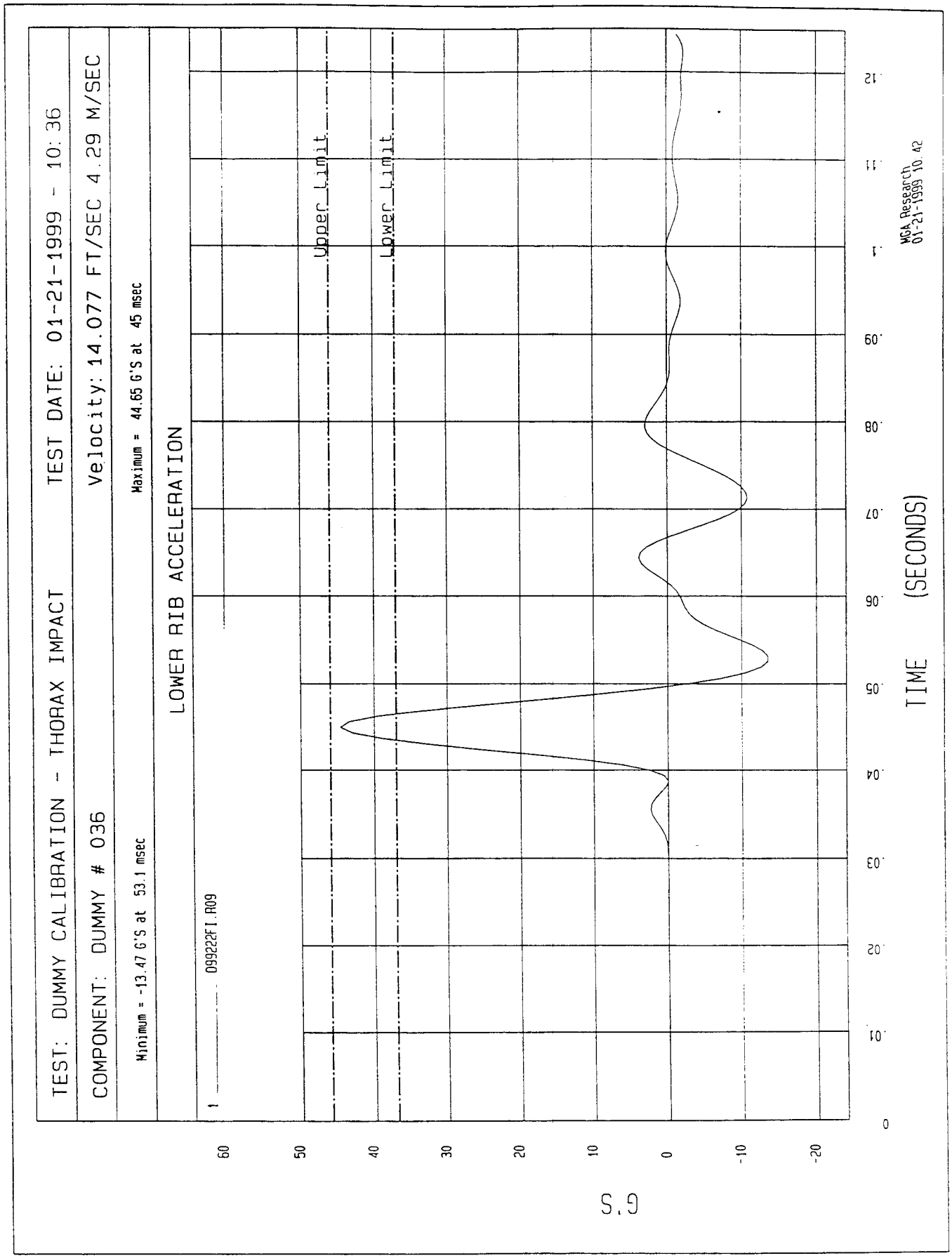
TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 01-21-1999 - 10:36
COMPONENT: DUMMY # 036
Velocity: 14.077 FT/SEC 4.29 M/SEC
Minimum = -12.88 G'S at 52.5 msec
Maximum = 42.22 G'S at 44.3 msec
UPPER RIB ACCELERATION
1 D99222FI.A08
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
01-21-1999 10:41

000090


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 01-21-1999 - 10:36
COMPONENT: DUMMY # 036
Velocity: 14.077 FT/SEC 4.29 M/SEC
Minimum = -13.47 G'S at 53.1 msec
Maximum = 44.65 G'S at 45 msec
LOWER RIB ACCELERATION
1 099222FI.R09
Upper Limit
Lower Limit
G'S
60
50
40
30
20
10
0
-10
-20
TIME (SECONDS)
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
MGA Research
01-21-1999 10:42

TEST: DUMMY CALIBRATION - THORAX IMPACT

TEST DATE: 01-21-1999 - 10:36

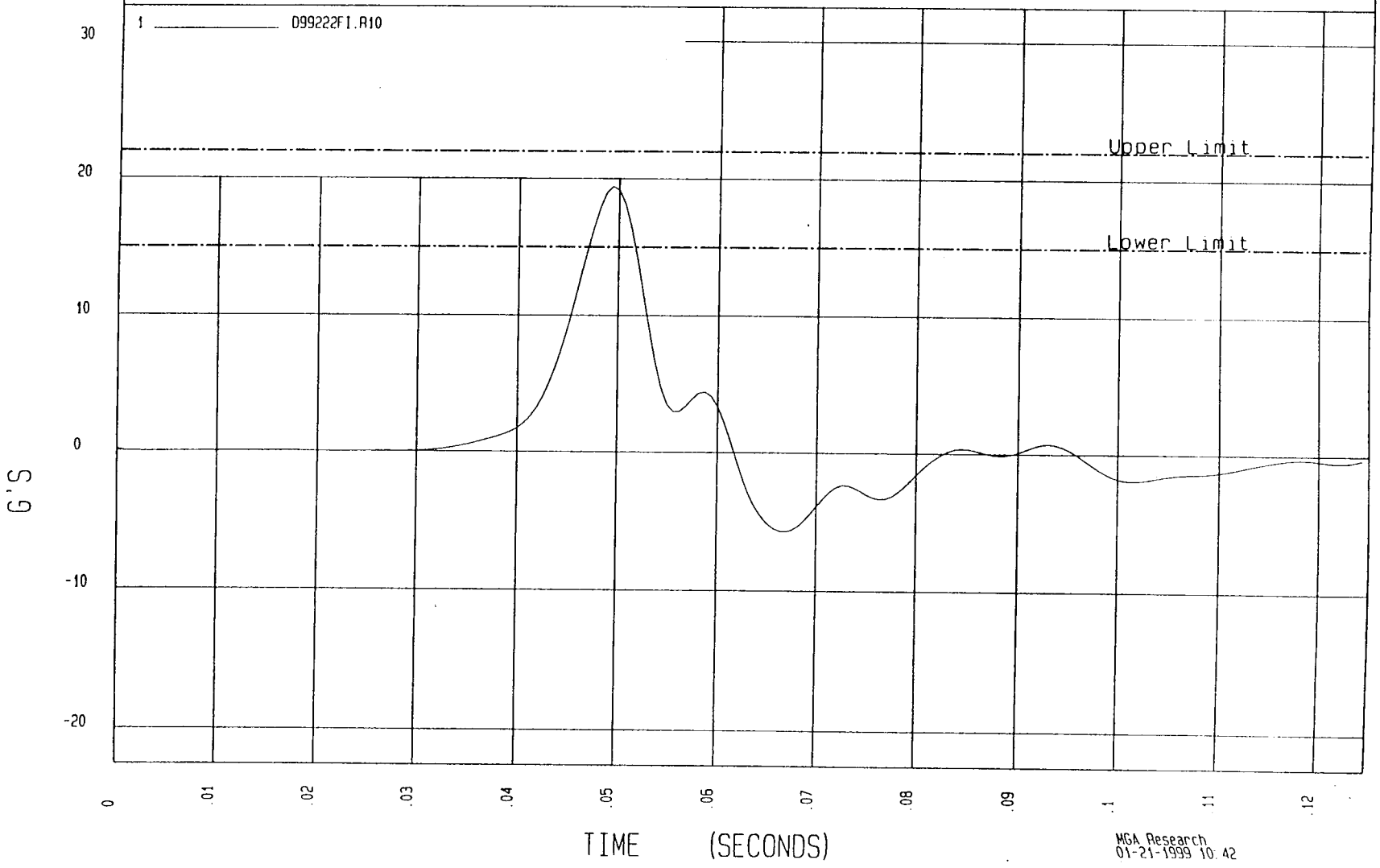
COMPONENT: DUMMY # 036

Velocity: 14.077 FT/SEC 4.29 M/SEC

Minimum = -5.72 G'S at 66.8 msec

Maximum = 19.43 G'S at 49.3 msec

LOWER SPINE ACCELERATION



0000692

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 21, 1999

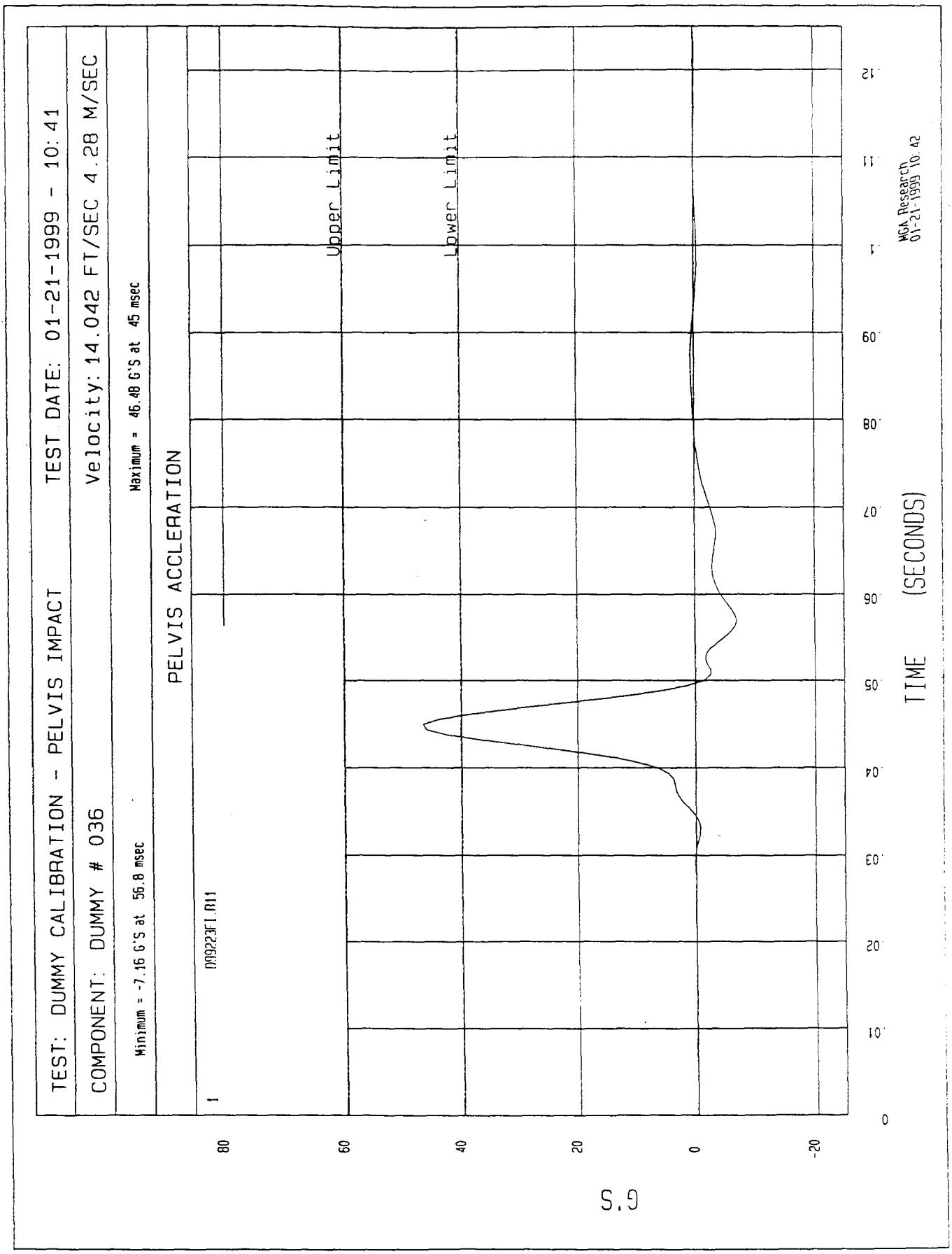
DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99223

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5° F	21.0
RELATIVE HUMIDITY (%)	10 - 70%	44
PROBE SPEED (m/s)	4.27 - 4.33 f/s	4.28
PELVIS ACCELERATION (g's)	40 - 60 g's	46

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - PELVIS IMPACT
TEST DATE: 01-21-1999 - 10:41
COMPONENT: DUMMY # 036
Velocity: 14.042 FT/SEC 4.28 M/SEC
Minimum = -7.16 G'S at 56.8 msec
Maximum = 46.48 G'S at 45 msec
PELVIS ACCLERATION
D99223F1.A11
Upper Limit
Lower Limit
G'S
80
60
40
20
0
-20
TIME (SECONDS)
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
MGA Research
01-21-1999 10:42

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST

(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 20, 1999

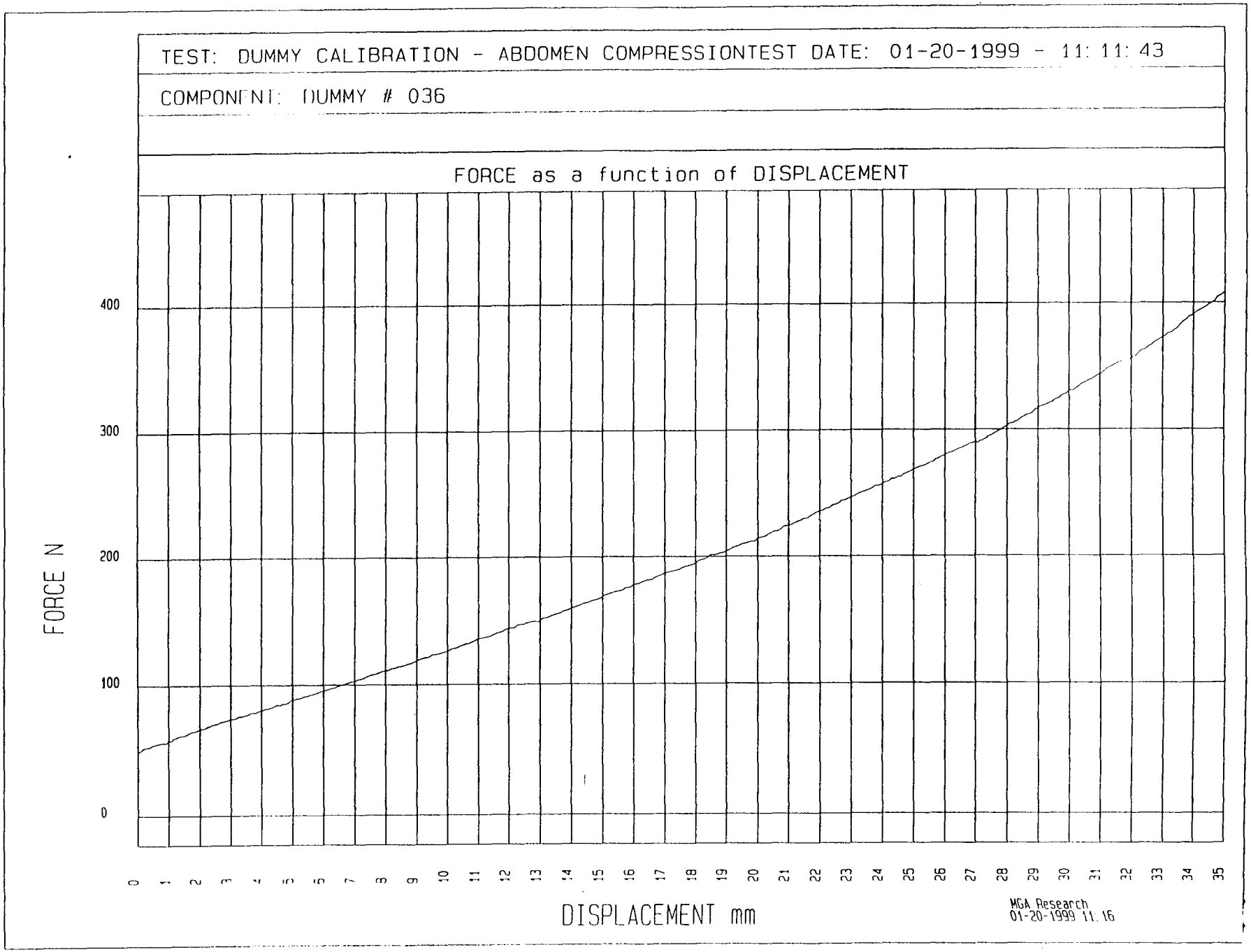
DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99224

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
FORCE @ 12.7 mm	104 - 162	149
FORCE @ 19.0 mm	163 - 222	206
FORCE @ 25.4 mm	222 - 280	273
FORCE @ 33 mm	325 - 391	374

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 01-20-1999 - 11:11:43
COMPONENT: DUMMY # 036
FORCE as a function of DISPLACEMENT
FORCE N
400
300
200
100
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
DISPLACEMENT mm
MGA Research
01-20-1999 11:16

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 20, 1999

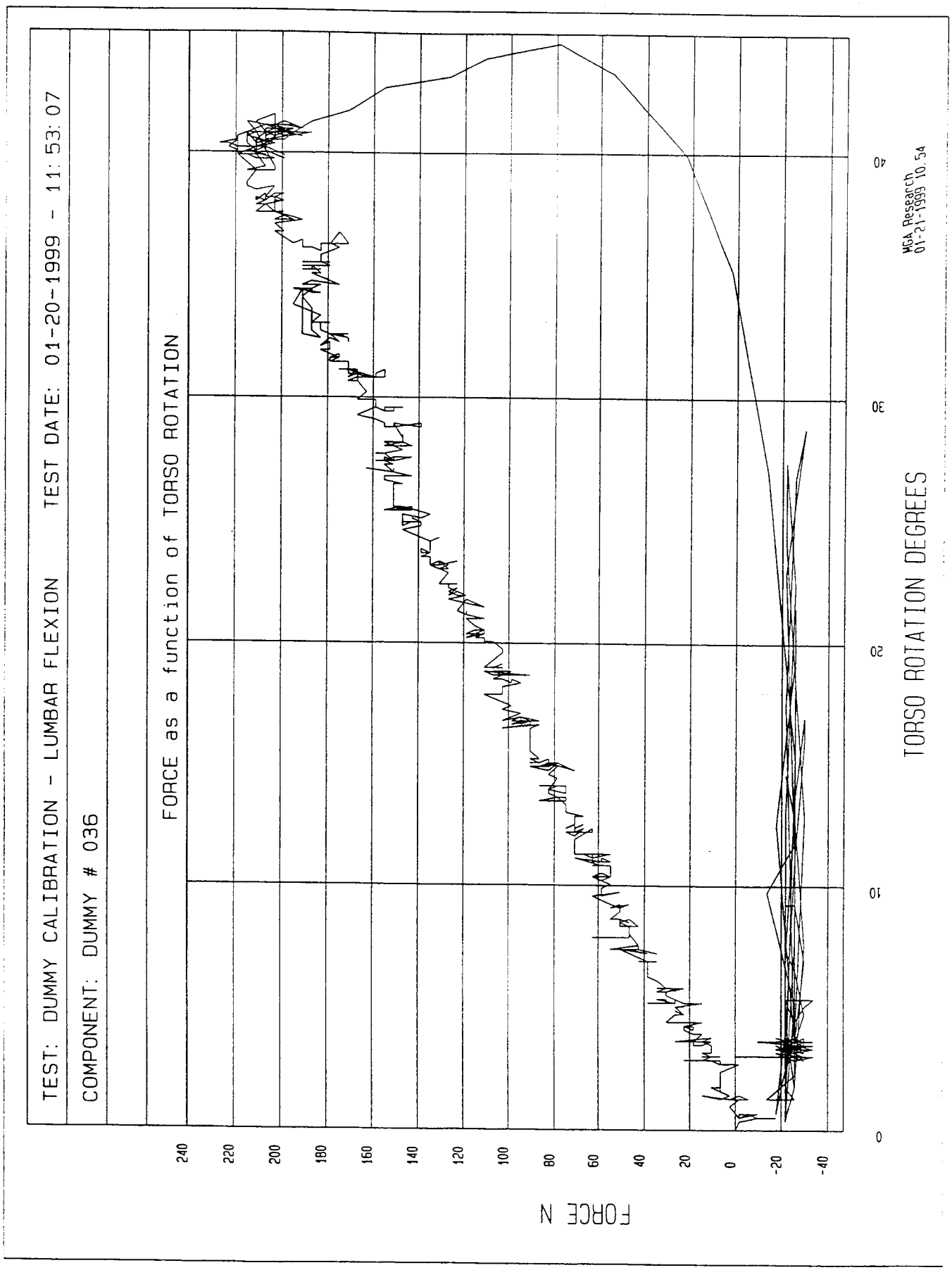
DUMMY SERIAL NUMBER: 036 TEST NUMBER: D99225

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	106.8
FORCE @ 30°	151.2 - 204.6	163.0
FORCE @ 40°	204.6 - 258.0	219.2
RETURN ANGLE	12° maximum	3

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY


TEST: DUMMY CALIBRATION - LUMBAR FLEXION
TEST DATE: 01-20-1999 - 11:53:07
COMPONENT: DUMMY # 036
FORCE as a function of TORSO ROTATION
FORCE N
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
TORSO ROTATION DEGREES
0
10
20
30
40
MGA Research
01-21-1999 10:54

POST-TEST CERTIFICATION DATA

Dummy Serial Number: 037

Calibration Test Results Summary

Dummy Serial Number: 037

Post-Test Calibration

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

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY SERIAL NO.: 037 DATE OF VERIFICATION: January 21, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	902
RH - Rib Height (mm)	501 - 521	507
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	235
KV - Knee Pivot From Back Line (mm)	511 - 526	523
SW - Knee Pivot to Floor (mm)	490 - 505	493
HW - Hip Width (mm)	356 - 391	378

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 21, 1999

DUMMY SERIAL NUMBER: 037 TEST NUMBER: D99232

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	44
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46 g's	37
LOWER RIB (g's)	37 - 46 g's	41
LOWER SPINE (g's)	15 - 22 g's	21

TECHNICIAN

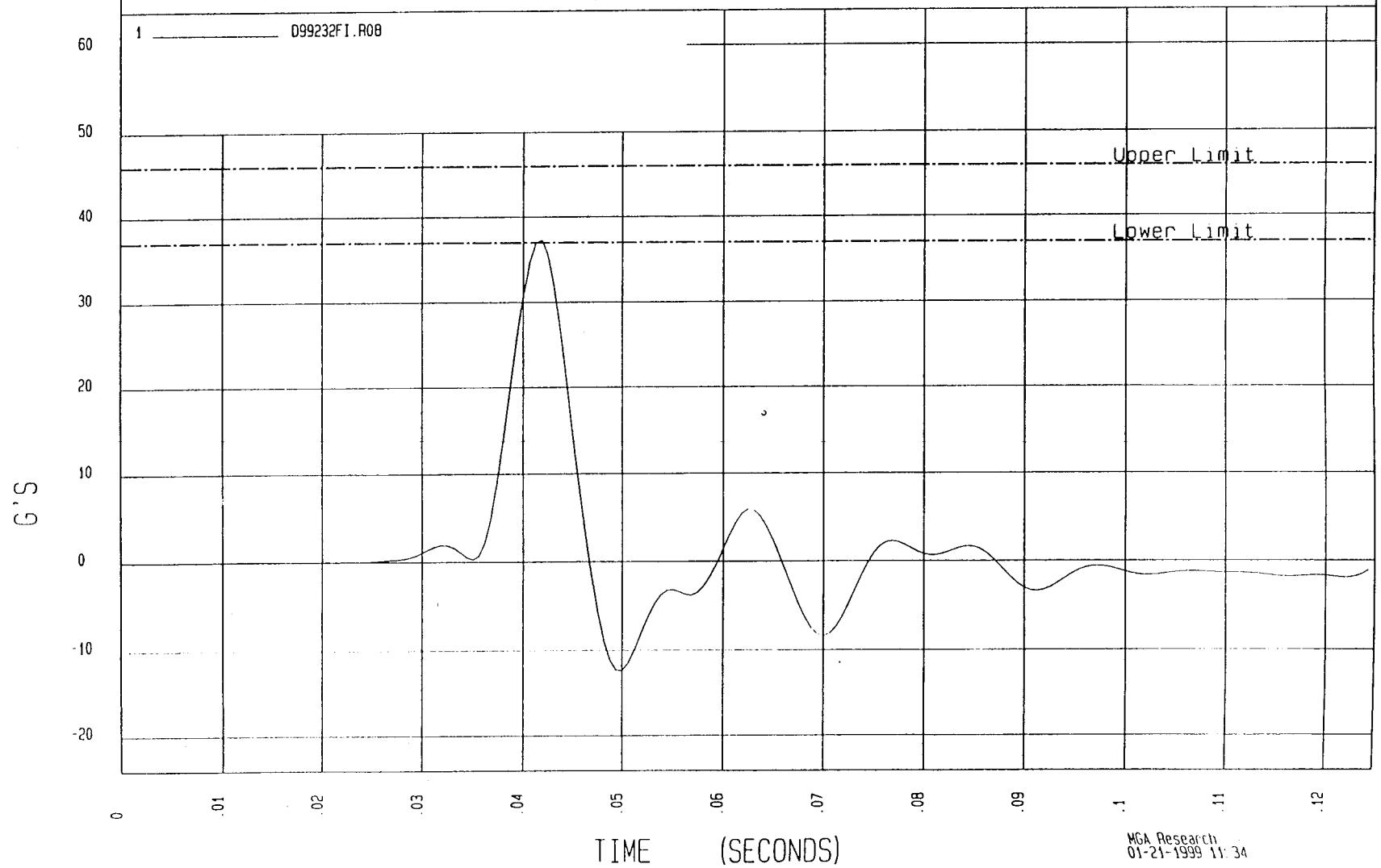
APPROVED BY

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-21-1999 - 11:13

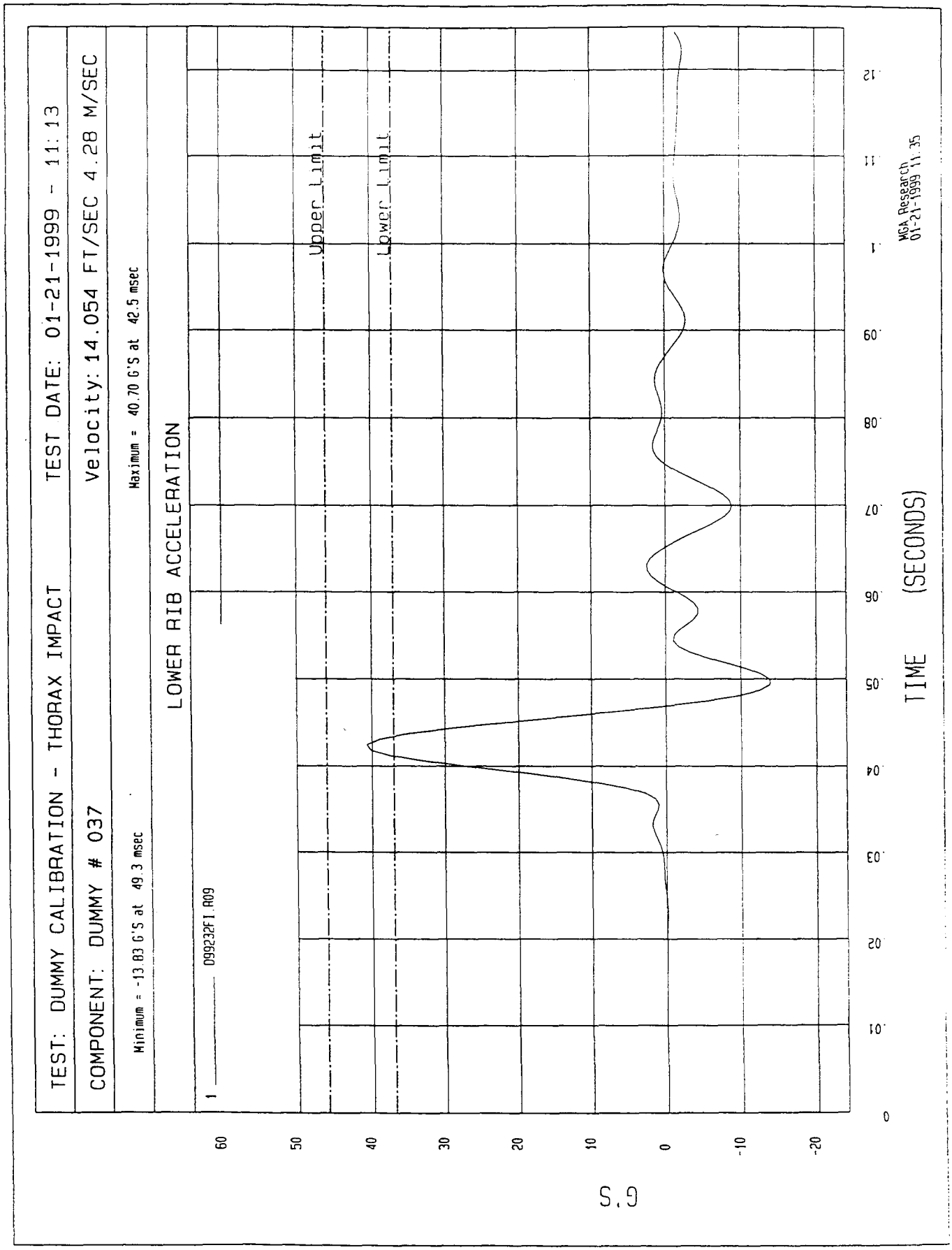
COMPONENT: DUMMY # 037 Velocity: 14.054 FT/SEC 4.28 M/SEC

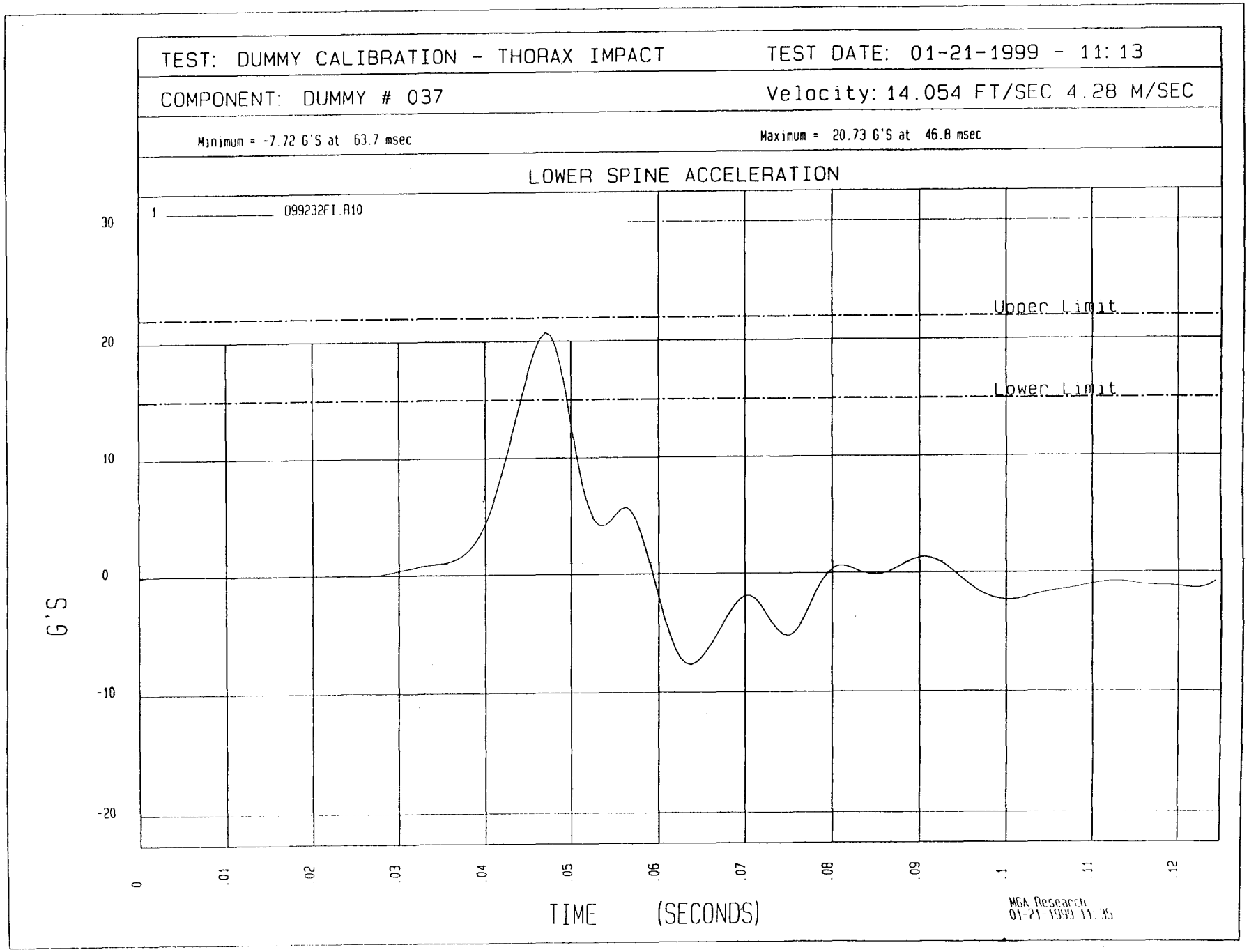
Minimum = -12.33 G'S at 50 msec Maximum = 37.30 G'S at 41.8 msec

UPPER RIB ACCELERATION



000073


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 01-21-1999 - 11:13
COMPONENT: DUMMY # 037
Velocity: 14.054 FT/SEC 4.28 M/SEC
Minimum = -13.83 G'S at 49.3 msec
Maximum = 40.70 G'S at 42.5 msec
LOWER RIB ACCELERATION
1
D99232F1.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
01-21-1999 11:35


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 01-21-1999 - 11:13
COMPONENT: DUMMY # 037
Velocity: 14.054 FT/SEC 4.28 M/SEC
Minimum = -7.72 G'S at 63.7 msec
Maximum = 20.73 G'S at 46.8 msec
LOWER SPINE ACCELERATION
1 099232FI.R10
Upper Limit
Lower Limit
G'S
30
20
10
0
-10
-20
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
TIME (SECONDS)
MGA Research
01-21-1999 11:36

0000703

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 21, 1999

DUMMY SERIAL NUMBER: 037 TEST NUMBER: D99233

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	44
PROBE SPEED (m/s)	4.27 - 4.33	4.29
PELVIS ACCELERATION (g's)	40 - 60	47

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY

TEST: DUMMY CALIBRATION - PELVIS IMPACT

TEST DATE: 01-21-1999 - 11:33:57

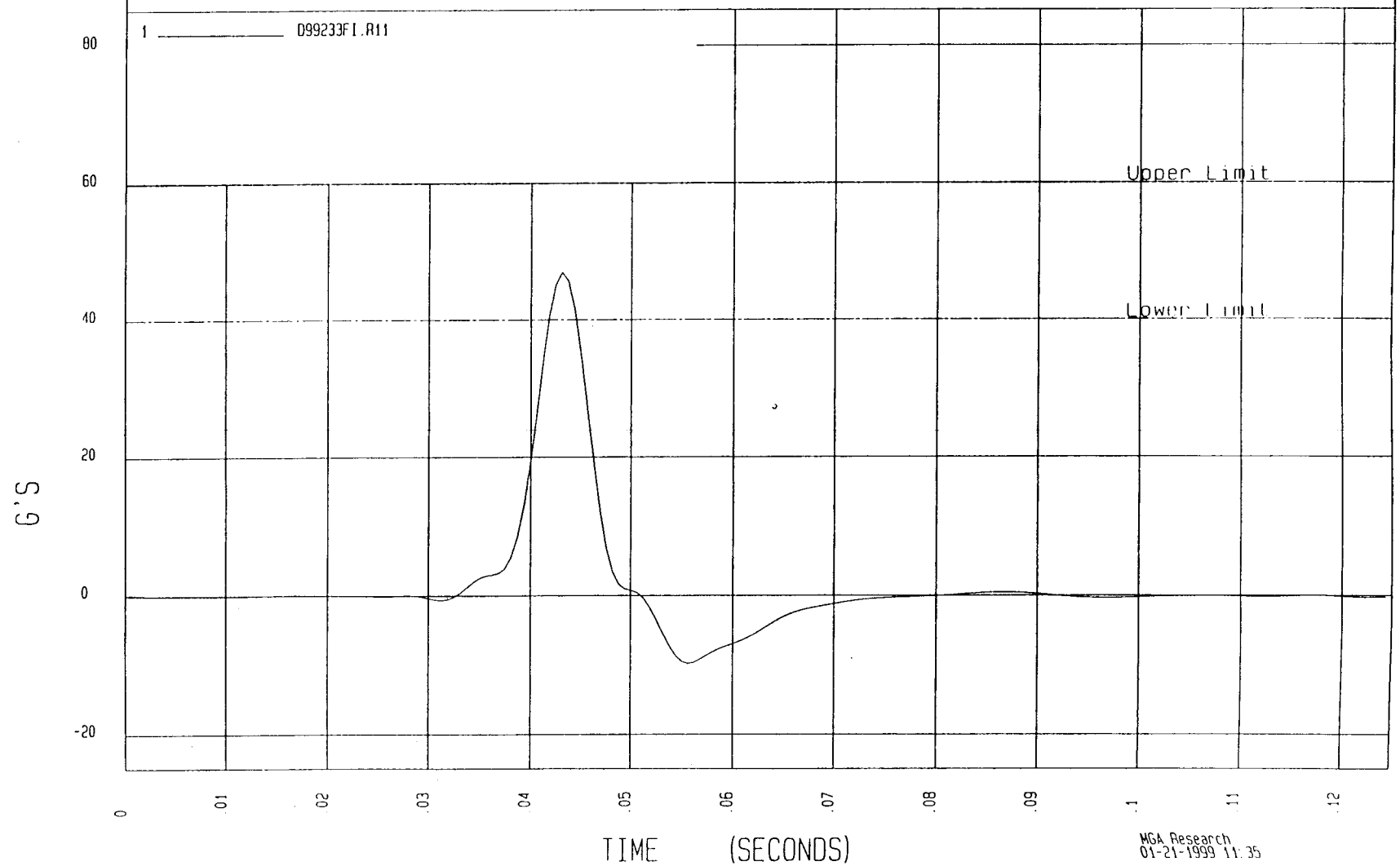
COMPONENT: DUMMY # 037

Velocity: 14.08 FT/SEC 4.29 M/SEC

Minimum = -9.80 G'S at 55.6 msec

Maximum = 47.07 G'S at 43.1 msec

PELVIS ACCLERATION



0000207

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST

(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 20, 1999

DUMMY SERIAL NUMBER: 037 TEST NUMBER: D99234

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
FORCE @ 12.7 mm	104 - 162	141
FORCE @ 19.0 mm	163 - 222	192
FORCE @ 25.4 mm	222 - 280	256
FORCE @ 33 mm	325 - 391	352

TEST MEETS SPECIFICATIONS

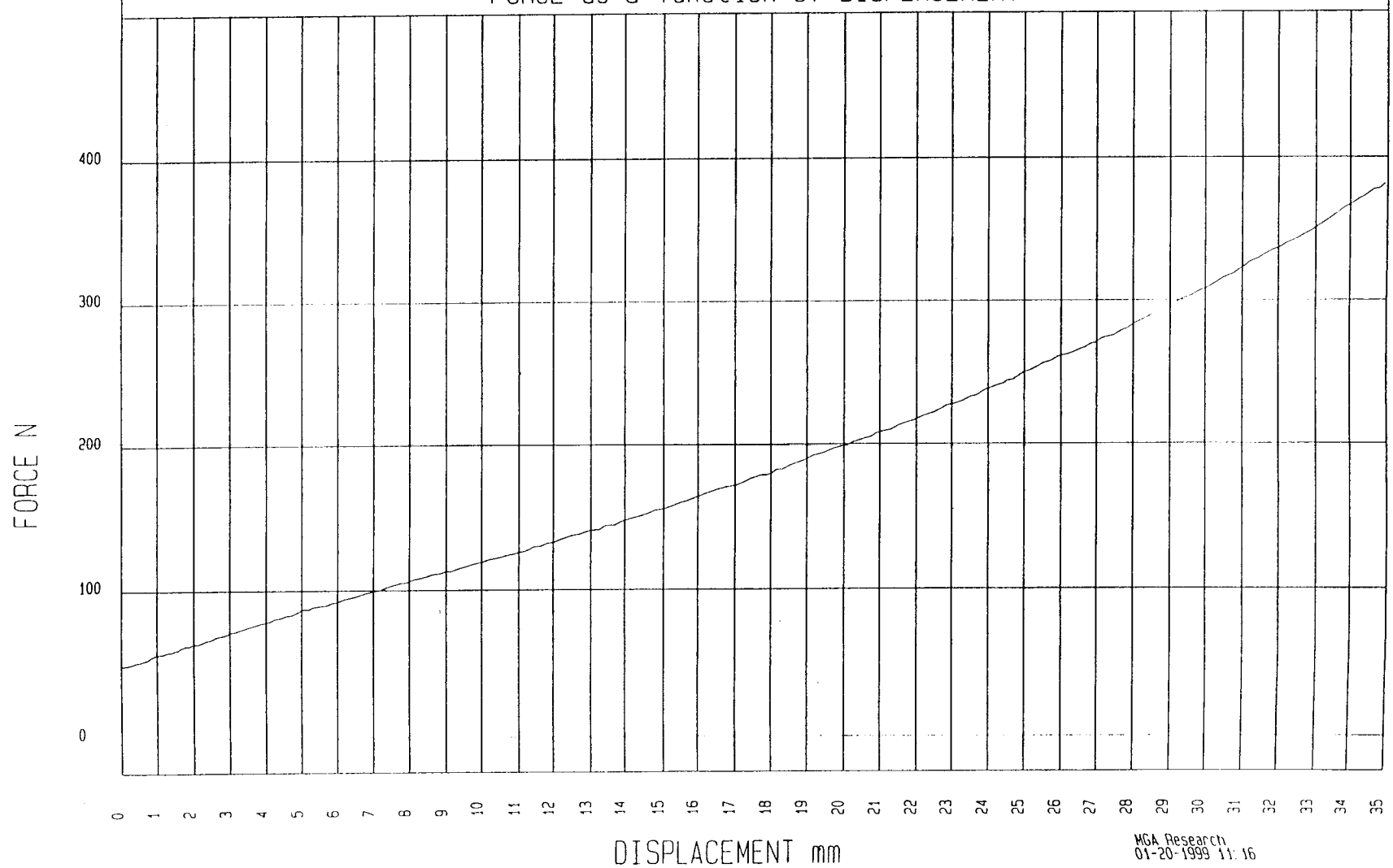
TECHNICIAN

APPROVED BY

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 01-20-1999 - 11: 15: 47

COMPONENT: DUMMY # 037

FORCE as a function of DISPLACEMENT



60200000

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 20, 1999

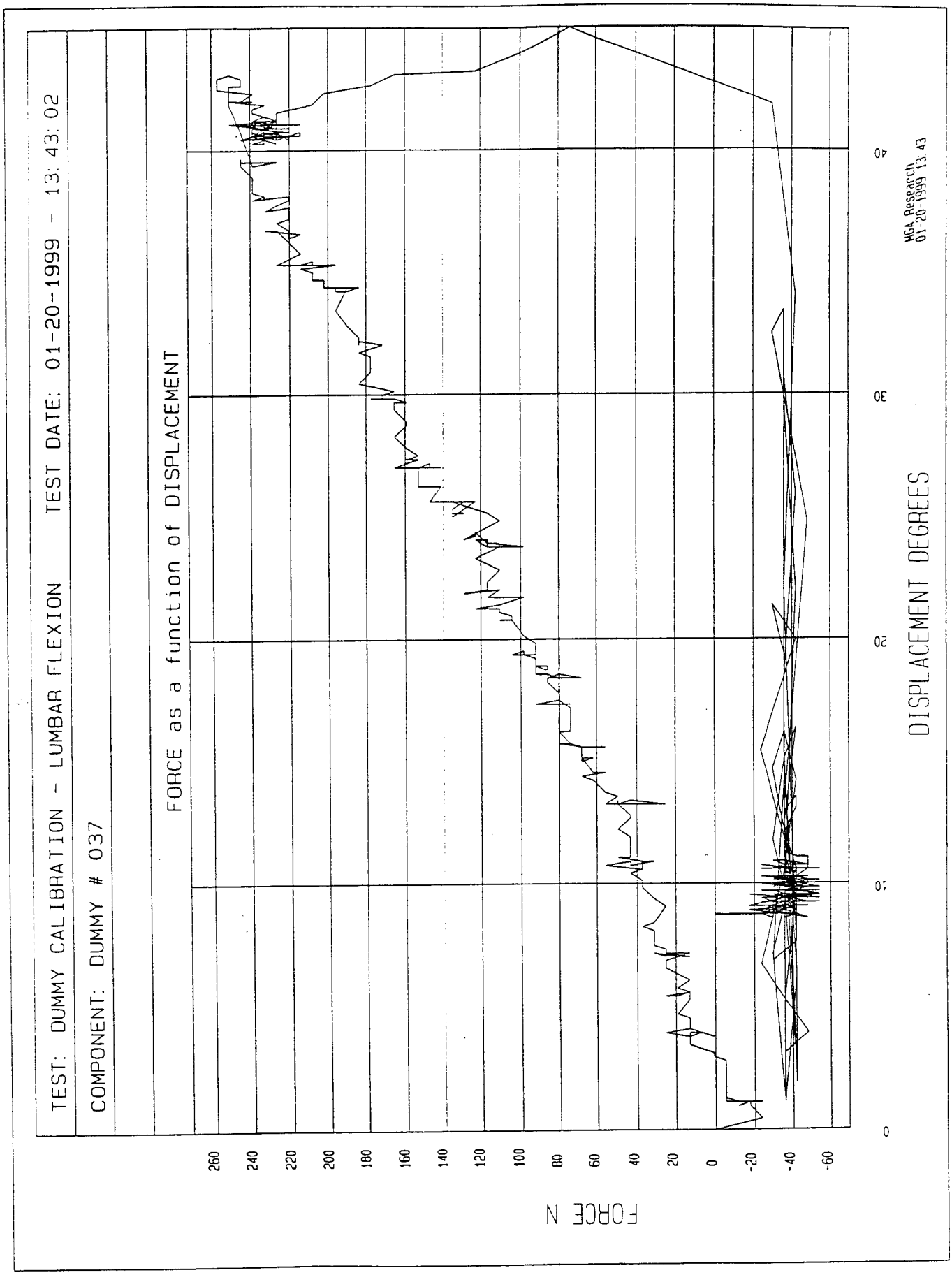
DUMMY SERIAL NUMBER: 037 TEST NUMBER: D99235

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0
RELATIVE HUMIDITY (%)	10 - 70	14
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	98.4
FORCE @ 30°	151.2 - 204.6	165.5
FORCE @ 40°	204.6 - 258.0	244.8
RETURN ANGLE	12° maximum	9

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____


TEST: DUMMY CALIBRATION - LUMBAR FLEXION
TEST DATE: 01-20-1999 - 13: 43: 02
COMPONENT: DUMMY # 037
FORCE as a function of DISPLACEMENT
FORCE N
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
DISPLACEMENT DEGREES
0
10
20
30
40
MGA Research
01-20-1999 13:43

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Dummy Serial Number: 036

Inspected By: Tim Michnay

Date: January 21, 1999

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

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

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Dummy Serial Number: 037

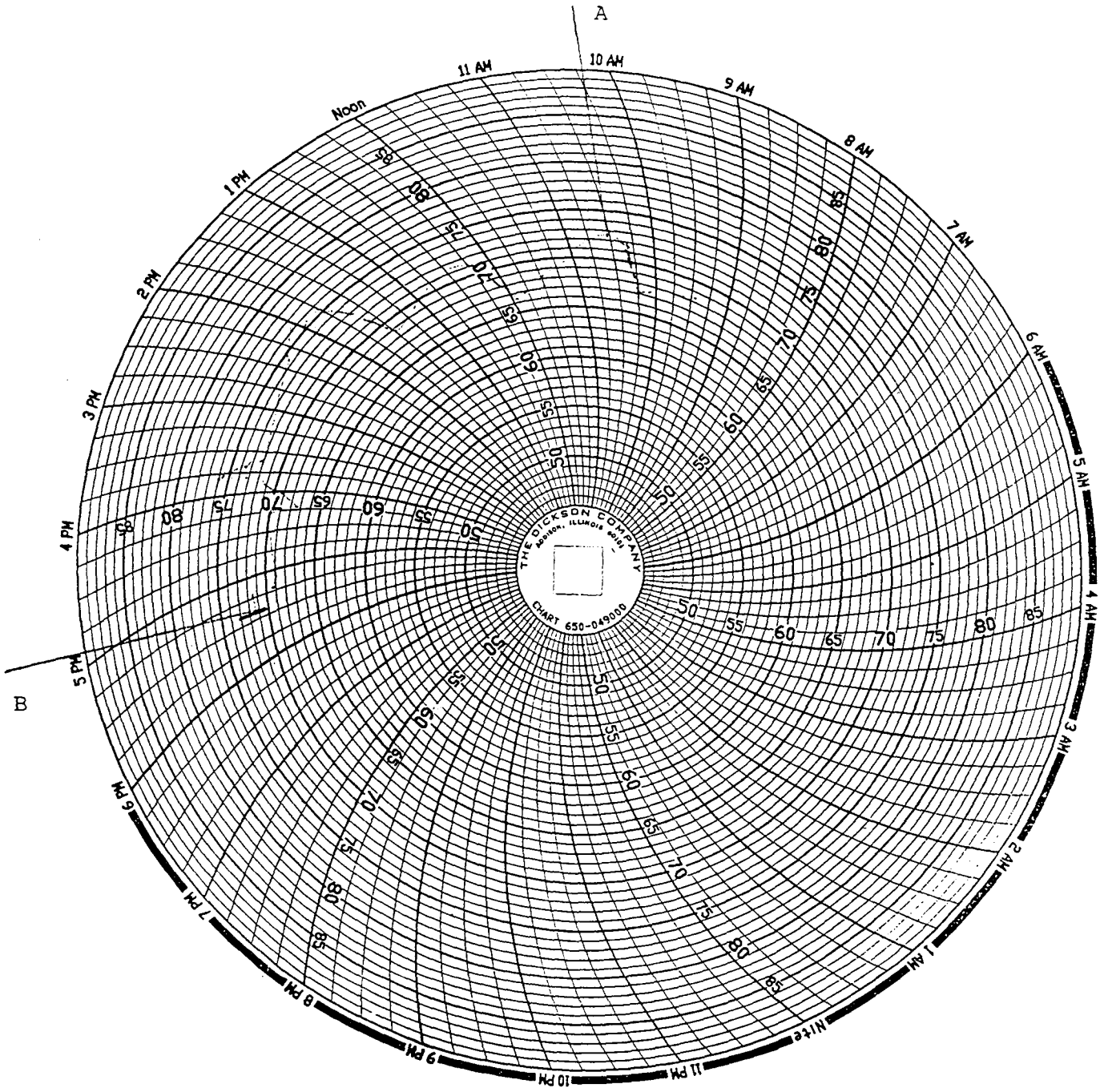
Inspected By: Tim Michnay

Date: January 21, 1999

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. 036

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	J10195	Endevco	December 14, 1998
Lower Rib Y	AMTA3	Endevco	December 14, 1998
Lower Spine Y	AP1Y8	Endevco	December 14, 1998
Pelvis Y	AJ8T5	Endevco	December 14, 1998
Upper Rib Redundant Y	J13942	Endevco	December 14, 1998
Lower Rib Redundant Y	AJ420	Endevco	December 14, 1998
Lower Spine Redundant Y	AMT78	Endevco	December 14, 1998
Pelvis Redundant Y	AGP28	Endevco	December 14, 1998

INSTRUMENTS FOR LEFT REAR PASSENGER DUMMY NO. 037

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AHTT2	Endevco	December 11, 1998
Lower Rib Y	AJ411	Endevco	December 11, 1998
Lower Spine Y	AP2D7	Endevco	December 11, 1998
Pelvis Y	J18620	Endevco	December 11, 1998
Upper Rib Redundant Y	AJ9C2	Endevco	December 11, 1998
Lower Rib Redundant Y	AGTM8	Endevco	December 11, 1998
Lower Spine Redundant Y	AP1T8	Endevco	December 11, 1998
Pelvis Redundant Y	AKAH1	Endevco	December 11, 1998

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	K19-A11	Entran	August 27, 1998
Moving Barrier CG Y	K19-A15	Entran	August 27, 1998
Moving Barrier CG Z	K11-J17	Entran	August 28, 1998
Moving Barrier Rear Axle X	H02-J02	Entran	December 15, 1998
Moving Barrier Rear Axle Y	J04-F16	Entran	December 15, 1998
Left Mid A-Post Y	F18-G06	Entran	December 16, 1998
Left Lower A-Post Y	G01-J09	Entran	December 21, 1998
Left Mid B-Post Y	I25-J06	Entran	September 24, 1998
Left Lower B-Post Y	I25-J18	Entran	December 8, 1998
Rear Floorpan Above Axle X	B14-R14	Entran	August 26, 1998
Rear Floorpan Above Axle Y	K16-X06	Entran	September 15, 1998
Rear Floorpan Above Axle Z	D05-R13	Entran	December 15, 1998
Driver Seat Track Y	F20-G07	Entran	September 24, 1998
Rear Seat Track Y	I18-E15	Entran	September 16, 1998
Right Side Sill at Front Seat X	D05-R20	Entran	December 8, 1998
Right Side Sill at Front Seat Y	H02-J05	Entran	December 8, 1998
Right Side Sill at Front Seat Z	D05-R09	Entran	December 8, 1998
Right Side Sill at Rear Seat X	F18-G07	Entran	September 15, 1998
Right Side Sill at Rear Seat Y	F18-G13	Entran	September 15, 1998
Right Side Sill at Rear Seat Z	F20-G10	Entran	December 15, 1998

00007218

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Front Seat Y	F07-A24	Entran	December 15, 1998
Left Side Sill at Rear Seat Y	I25-J19	Entran	September 24, 1998
Rear Occupant Compartment Y	C25-A17	Entran	December 21, 1998
Vehicle CG X	J04-F14	Entran	December 21, 1998
Vehicle CG Y	E23-R06	Entran	December 21, 1998
Vehicle CG Z	F12-G01	Entran	December 21, 1998

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

0000719