V2713

REPORT NO. MGA-98-N02

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

1998 JEEP GRAND CHEROKEE LAREDO 4 DOOR 4WD
NHTSA NO. MW0307

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: November 3, 1997

Report Date: November 24, 1997

FINAL REPORT

Prepared For:

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15. Supplementary Notes

16. Abstract

A 56 kph (35 mph) frontal barrier impact using a rigid barrier was conducted on a 1998 Jeep Grand Cherokee 4 Door in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure No. TP-NCAP090196 for the determination of vehicle crashworthiness on November 3, 1997.

The barrier impact velocity was 56.5 kph (35.1 mph), and the ambient temperature at the time of impact was 20.6 °C. The post-test maximum static crush was 620 mm.

The test vehicle appeared to comply with the requirements of the following Federal Motor Vehicle Safety Standards:

1. FMVSS 212, "Windshield Mounting"
2. FMVSS 219 (partial), "Windshield Zone Intrusion"
3. FMVSS 301, "Fuel System Integrity"

With regard to "Occupant Crash Protection" injury criteria, the driver's HIC was 947.5 and the 3 msec. Clip (Chest g's) was 56.2 g's. The left and right femur loads for the driver were 6688 and 7183 Newtons, respectively. The passenger's HIC was 545.6 and the 3 msec Clip was 57.6 g's. The left and right femur maximum loads were 6657 and 6567 Newtons respectively.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (partial) Indicant Testing FMVSS 301 Indicant Testing	Copies of this report are available from: Technical Ref. Division, NHTSA, NASSIF Building, Room 5108 400 Seventh Street, S.W. Washington, D.C. 20590

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Date of Report Acceptance

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE NO.
1	Purpose and Summary of NCAP Test	1-1
2	Occupant and Vehicle Information/Data Sheets	2-1
3	Summary of Results For FMVSS 212, 219 and 301-75	3-1
4	OMI Final Data	4-1
APPENDIX A	Photographs	
APPENDIX B	Vehicle and Dummy Response Data	
APPENDIX C	Dummy Configuration and Performance Verification Data	
APPENDIX D	Test Equipment and Instrumentation Calibration	
APPENDIX E	Vehicle Owner's Occupant Restraint System Instructions	

DATA SHEET LISTING

DATA SHEET NO.	DESCRIPTION	PAGE NO.
1	Crash Test Summary	2-1
2	General Test and Vehicle Parameter Data	2-2
3	Post Impact Data	2-5
4	Test Vehicle Information	2-6
5	Summary of FMVSS 212 Data	3-2
6	Windshield Zone Intrusion FMVSS 219 Data	3-3
7	FMVSS 301 Fuel System Integrity Data	3-4
8	FMVSS 301 Rollover Data	3-5
9	Dummy Injury Criteria Values	4-2
10	Dummy Positioning in Vehicle	4-4
11	Seat Belt Positioning Data	4-7
12	Seat Belt Performance Data	4-8
13	Camera Data	4-9
14	Vehicle Target Locations	4-11
15	Vehicle Accelerometer Location and Data Summary	4-12
16	Post Test Air Bag Data	4-13
17	Test Vehicle Measurements	4-14
18	Accident Investigation Division Data	4-21

SECTION 1

PURPOSE AND SUMMARY OF NCAP TEST

This 35 mph frontal barrier impact test is part of the Composite FY'98 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-96-D-12020. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48 kph (30 mph) FMVSS 208/212/219/301-75 requirements.

The 56 kph (35 mph) frontal barrier impact test was conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Indicant Test Procedure for New Car Assessment Program (NCAP) dated January 1, 1990. Data for FMVSS No. 212, "Windshield Mounting", FMVSS No. 219 (Partial), "Windshield Zone Intrusion", FMVSS No. 301-75, "Fuel System Integrity," as well as occupant performance data are provided herein.

A rigid barrier was impacted by a 1998 Jeep Grand Cherokee Laredo 4 Door 4WD at a velocity of 56.5 kph (35.1 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on November 3, 1997. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 15 high speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest primary and redundant triaxial accelerometers, pelvis triaxial accelerometers, a chest displacement transducer, a six axis neck

load cell, right/left femur load cells, right/left lower leg sensors, and right/left feet accelerometers. Seat belt load cells were also on the driver and passenger shoulder and lap belts to measure dummy torso and pelvic section loading. Calibrated ATDs, driver (Serial No. 066), and the right front passenger (Serial No. 065), were used for this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 111 channels of data were recorded on 10 computers. Appendix B contains the vehicle, and dummy response data traces.

The driver's head struck the inflated airbag. The driver HIC was 947.5 and the maximum chest (CLIP) deceleration over 3 milliseconds was 56.2 g's. The maximum chest compression was 36 mm. The left and right femur loads were 6688 and 7183 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 545.6 and maximum chest (CLIP) deceleration over 3 milliseconds was 57.6 g's. The maximum chest compression was 41 mm. The left and right femur loads were 6657 and 6567 Newtons respectively.

SECTION 2

OCCUPANT AND VEHICLE

INFORMATION/DATA SHEETS

DATA SHEET NO. 1

CRASH TEST SUMMARY

Vehicle Yr/Make/Model/Body Style: 1998/Jeep/Grand Cherokee Laredo/4 Door 4WD

NHTSA No.: MW0307 VIN.: 1J4G25856WCI65947

Vehicle Test Weight: 2035.3 kgs.

Impact Velocity: 56.5 kph Maximum Static Crush: 620 mm

Vehicle Rebound: 907 mm

DUMMIES:	DRIVER	PASSENGER
Serial Number:	066	065
Restraint System:	Type II belt with airbag	Type II belt with airbag
No. Data Channels:	34	34

Number of Cameras: 1 Real Time

15 High Speed

Door Opening Data: Yes LF Yes RF Yes LR Yes RR
(without use of tools)

FRONT SEAT(S) DATA	DRIVER	FRONT PASSENGER
Seat Shift:	5 mm rearward;	5 mm rearward
Seat Back Movement:	0	0

VISIBLE DUMMY

CONTACT POINTS:	DRIVER	PASSENGER
Head	to airbag	to airbag
Chest	to airbag	to airbag
Left Knee	to knee bolster	to glovebox
Right Knee	to knee bolster	to glovebox

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

Vehicle Yr/Make/Model/Body Style: 1998/Jeep/Grand Cherokee Laredo/4 Door 4WD

NHTSA No.: MW0307 VIN.: 1J4G25856WC165947

Body color: Black Date of Manufacture: 9-97

Engine: 6 Cylinders; ___ C.I.D.; 4 Liters;

X Gas; ___ Diesel; ___ Turbocharged

X Longitudinal; ___ Transverse

Transmission: 4 Speed; ___ Manual; X Automatic; X Overdrive

Final Drive: ___ Front Wheel; ___ Rear Wheel; X Four Wheel

Odometer Reading: 85 miles

Major Option:

X A/C; X P/S; X P/B; X P/wdo;

X P/locks; X Tilt Wheel; X Cruise Control; X ABS

Other: Rear window defroster, Next Generation airbags

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 248 kPa (36 Psi) Rear 248 kPa (36 Psi)

Recommended Tire Size: P215/75R15

Recommended Cold Tire Pressure: Front 248 kPa (36 Psi) Rear 248 kPa (36 Psi)

Tires on Vehicle: P225/75R15 Manufacturer: Good year

Number of Occupants: 2 Front; 3 Rear; ___ 3rd Seat; 5 TOTAL

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

Type of Front Seat Back: ___ Fixed; X Adj. With; ___ Power; X Lever

Vehicle Capacity Weight (VCW) = 521.6 kg. (A)

No. of Occupants x 68.0 kg. = 340.2 kg. (B)

Rated Cargo Weight (RCW) A-B = 181.4 kg.

GVWR 2404.1 kg. GAWR: Front 1247.4 kg.; Rear 1338.1 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW:

Right Front = 487.6 kg Right Rear = 384.7 kg

Left Front = 482.6 kg Left Rear = 400.5 kg

TOTAL FRONT WEIGHT = 970.2 kg (55.7 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 785.2 kg (44.7 % of Total Vehicle Weight)

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1755.4 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1755.4 kg

VCW = Vehicle Capacity Weight 521.6 kg

DSC = Designated Seating Capacity 5 RCW = VCW - 68 (DSC) = 136 kg*

Target Test Weight = UDW + RCW + (2 dummies x 78.0 kg/dummy)

Target Test Weight = 2047.4 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 534.8 kg Right Rear = 498.5 kg

Left Front = 513.5 kg Left Rear = 488.5 kg

TOTAL FRONT WEIGHT = 1048.3 kg (51.5 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 987.0 kg (48.5 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 2035.3 kg

Weight of ballast secured in vehicle trunk area = 45.3 kg

Vehicle components removed to meet target weight: Rear cargo area components

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude:	RF 812	LF 799	RR 820	LR 821
Test Attitude:	RF 790	LF 796	RR 776	LR 789
Post Test	RF 714	LF 788	RR 742	LR 874

Wheel Base: 2700 mm; C.G. = 1309 mm rearward of front wheel C/L

Remarks: _____

* light trucks and MPVs RCW is 136 kgs or manufacturer's value, whichever is less

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

Location of Vehicle's C.G. = _____ (if required)

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 85.2 liters

Usable Capacity Figure Furnished by COTR = 85.2 liters

Test Volume Range (92 to 94% of Usable Capacity) = 78.4 to 80.1 liters

ACTUAL TEST VOLUME = 79.5 liters

Test Fluid Type: Stoddard Solvent; Spec. Grav. = 0.77

Kinematic Viscosity = 1.788 centistrokes; Color = Purple

Type of Fuel Pump; Electric X; Mechanical _____

Does Electric Pump operate with ignition switch "ON" & engine "Off"?

Yes X No _____

DATA SHEET NO. 3

POST-IMPACT DATA

Vehicle Yr/Make/Model/Body Style: 1998/Jeep/Grand Cherokee Laredo/4 Door 4WD

NHTSA No.: MW0307 VIN.: IJ4G25856WCI65947

Type of Test: 35 mph Frontal Impact Impact Angle: 0°

Date of Test: November 3, 1997 Time of Test: 6:34 p.m.

Ambient Temperature: 20.6°C (69°F) (Spec. Range = 18.8 to 25.6°C)

Temperature in Occupant Compartment: 20.6° C

Windshield Molding Temperature: 20.6° C

Required Impact Velocity Range: 55.5 to 57.1 kph

Impact Velocity: primary = 56.5 kph; secondary = N/A kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 1430 mm

Exiting Speed Trap: 305 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length:	Pre-test	= Right 4362	C/L 4462	Left 4363
	Post-test	= Right 3815	C/L 3842	Left 3889
	Crush	= Right 547	C/L 620	Left 474

Distance from front of test vehicle to point of impact (rebound):

R 908 mm C_L 880 mm L 932 mm

Average = 907 mm

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

	Front		Rear	
Post-Test Door Opening	Left	Right	Left	Right
(without use of tools)	Yes	Yes	Yes	Yes

	Front		Rear	
Seat Movement	Left	Right	Left	Right
Seat Back Movement	0	0	0	0
Seat Shift (mm)	5 mm forward		5 mm forward	

Glazing Damage

Backlight/Windshield Cracked

Other Notable Impact Effects: None noted

SECTION 3

SUMMARY OF RESULTS FOR-------

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

DATA SHEET 5

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

Details of windshield mounting such as retention method, trim type, etc.:

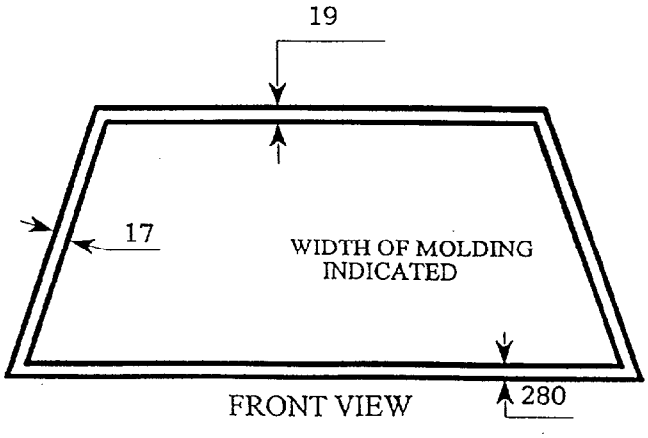
Windshield set in rubber molding with glue

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	2093	2093	100%
LEFT SIDE	2096	2096	100%
TOTAL	4189	4189	100%

AREA OF RETENTION FAILURE: None



FRONT VIEW

FAILURE DETAILS: None

DATA SHEET 6

FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the surface of the instrument panel, including padding, and drawing the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contact points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and ½" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:

A= 1265 mm

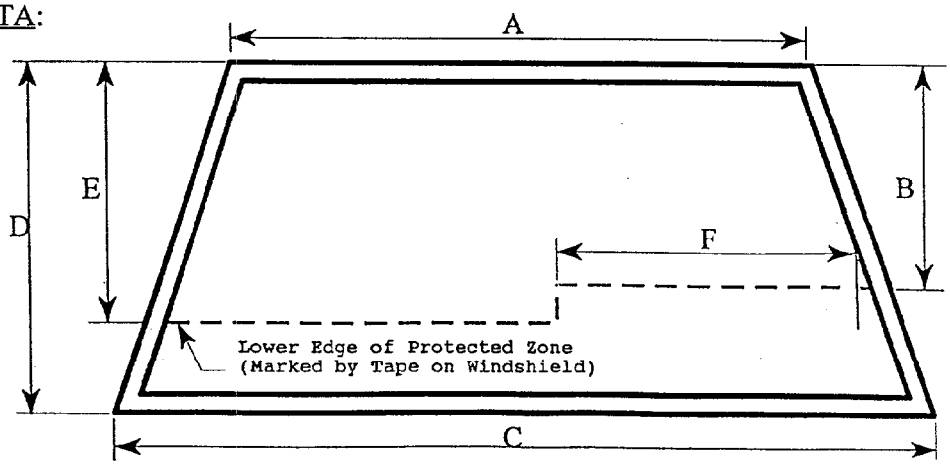
B= 341 mm

C= 1580 mm

D= 665 mm

E= 493 mm

F= 841 mm



FRONT VIEW

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

(Show location of penetration)

NONE

DATA SHEET 7

FMVSS NO. 301-75, FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: MW0307 Test Date: November 3, 1997

Vehicle Mfgr./Make/Model: Jeep/Grand Cherokee Laredo/4 Door 4WD

Usable Capacity of Vehicle's Fuel Tank: 85.2 Liters
(figure furnished by vehicle manufacturer)

TEST REQUIREMENTS:

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

AMOUNT OF STODDARD SOLVENT ADDED TO VEHICLE'S FUEL TANK:

79.5 Liters which is 93.3 % of the stated USABLE CAPACITY.

TEST VEHICLE IMPACT TYPE: X Frontal (35 mph)

___ Oblique (30 mph) with __° barrier face first contacting (driver/passenger) side

___ Rear Moving Barrier (30 mph)

___ Side Impact MDB (33.2 mph)

FUEL SPILLAGE MEASUREMENT:

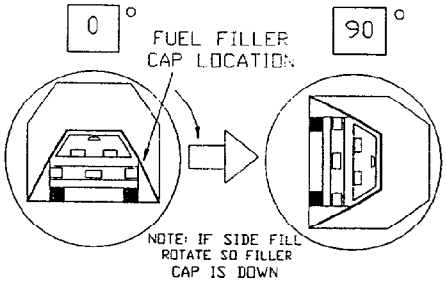
	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	1 OZ
2. For 5 minute period after vehicle motion ceases	0	5 OZ
3. For next 25 minutes	0	1 oz./1 MIN

SOLVENT SPILLAGE DETAILS: None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90° Vehicle NHTSA ID No.: MW0307



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 47 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 47 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

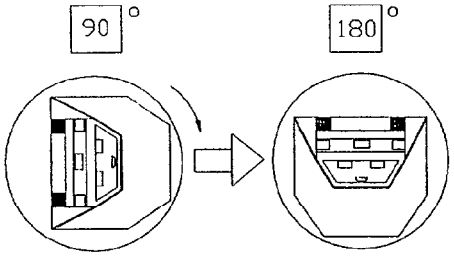
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 90° - 180° Vehicle NHTSA ID No.: MW0307



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 31 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 31 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

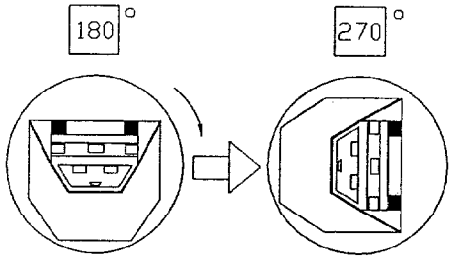
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 180° - 270° Vehicle NHTSA ID No.: MW0307



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 11 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 11 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

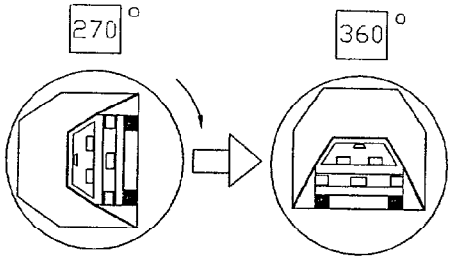
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 270° - 360° Vehicle NHTSA ID No.: MW0307



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 41 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 41 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

SECTION 4

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Camera Locations
6. Vehicle Target Locations

II. OVR DATA

1. Vehicle Accelerometer Data
2. Post-Test Airbag Data
3. Test Vehicle Measurements

III. AID DATA

1. Accident Investigation Damage Data Summary

DATA SHEET 9

DUMMY INJURY CRITERIA VALUES DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1998/Jeep/Grand Cherokee/Laredo/4 Door 4WD

VEH. NHTSA NO.: MW0307 TEST DATE: November 3, 1997

ACCELERATION VALUES: (g's)	DRIVER # 066		PASSENGER # 065	
	Min.	Max.	Min.	Max.
Head Channel X	-75.0 @ 67 msec.	36.3 @ 182 msec.	-53.4 @ 80 msec.	2.7 @ 184 msec.
Head Channel Y	-49.9 @ 181 msec.	19.2 @ 53 msec.	-5.6 @ 189 msec.	27.9 @ 88 msec.
Head Channel Z	-19.4 @ 65 msec.	19.8 @ 88 msec.	-32.0 @ 70 msec.	15.0 @ 113 msec.
HEAD RESULTANT	77.4 @ 67 msec.		58.0 @ 79 msec.	
Chest Channel X	-57.0 @ 72 msec.	4.3 @ 193 msec.	-58.0 @ 72 msec.	4.0 @ 151 msec.
Chest Channel Y	-14.3 @ 103 msec.	8.6 @ 51 msec.	-10.6 @ 80 msec.	3.9 @ 124 msec.
Chest Channel Z	-17.7 @ 66 msec.	11.9 @ 104 msec.	-19.1 @ 58 msec.	17.0 @ 114 msec.
CLIP	56.2		57.6	
TIME INTERVAL (msec) [3. msec. minimum]	$t_1 = 71.5$ $t_2 = 74.6$		$t_1 = 70.3$ $t_2 = 73.4$	

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	947.5	545.6
t_1 = (msec)	53.5	63.3
t_2 = (msec)	87.9	97.4
Avg. Accel. t_1 to t_2 (g's)	59.7	48.0

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

COMPRESSIVE FEMUR FORCES:

Left Side (N)	-258 @ 133 msec.	6688 @ 46 msec.	-249 @ 40 msec.	6657 @ 54 msec.
Right Side (N)	-244 @ 120 msec.	7183 @ 51 msec.	-172 @ 121 msec.	6567 @ 53 msec.

SEAT BELT FORCES:

Lap Belt (N)	2971 @ 59 msec.	4123 @ 56 msec.
Shoulder Belt (N)	6528 @ 74 msec.	6061 @ 75 msec.
Belt Spoolout	70 @ 92 msec.	91 @ 82 msec.

DATA SHEET 9

DUMMY INJURY CRITERIA VALUES DATA SHEET (Cont'd)

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

	DRIVER DUMMY #066		PASSENGER DUMMY #065	
	Min.	Max.	Min.	Max.
Neck Load X (N)	-456 @ 64 msec.	343 @ 118 msec.	-185 @ 40 msec.	774 @ 62 msec.
Neck Load Y (N)	-201 @ 74 msec.	217 @ 138 msec.	-324 @ 71 msec.	172 @ 150 msec.
Neck Load Z (N)	-3389 @ 65 msec.	641 @ 184 msec.	-1722 @ 76 msec.	698 @ 122 msec.
Neck Moment X (NM)	-21.6 @ 73 msec.	4.7 @ 178 msec.	-18.7 @ 63 msec.	15.3 @ 89 msec.
Neck Moment Y (NM)	-8.4 @ 170 msec.	48.8 @ 86 msec.	-66.6 @ 60 msec.	11.4 @ 40 msec.
Neck Moment Z (NM)	-12.7 @ 82 msec.	6.5 @ 139 msec.	-29.1 @ 103 msec.	13.0 @ 166 msec.
Chest Deflection X (mm)	36 @ 62 msec.		41 @ 79 msec.	
Pelvis X Acceleration (g's)	-69.9 @ 44 msec.	3.3 @ 154 msec.	-84.0 @ 53 msec.	5.4 @ 138 msec.
Pelvis Y Acceleration (g's)	-18.9 @ 44 msec.	9.3 @ 43 msec.	-10.4 @ 67 msec.	8.3 @ 58 msec.
Pelvis Z Acceleration (g's)	-19.2 @ 102 msec.	6.0 @ 185 msec.	-20.4 @ 105 msec.	5.7 @ 45 msec.
Pelvis Resultant (g's)	72.2 @ 44 msec.		84.1 @ 53 msec.	

DATA SHEET 10

DUMMY POSITIONING IN VEHICLE

Vehicle NHTSA No.: MW0307 Vehicle: 1998 Jeep Grand Cherokee Laredo

SEAT TYPE:	ADJUSTER TYPE:		BUCKET SEAT BACK TYPE:
____Bench	Driver:	_X_ Manual	____Fixed
_X_Bucket		___ Power	_X_Adjustable Reclining
____Split Bench			
	Passenger:	_X_ Manual	____Fixed
		___ Power	_X_Adjustable Reclining

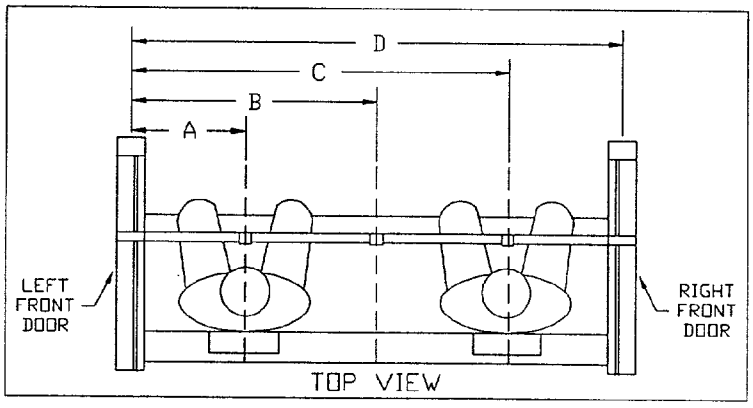
DRIVER SEAT POSITION
11th detent out of 20 detents

Seat back angle 8.1°

PASSENGER SEAT POSITION
11th detent of 20 detents

Seat back angle 8.3°

Steering column set to mid position. Steering column angle 24°



066 DUMMY ID 065

A = Left Door to Driver Centerline 384 mm

B = Left Door to Center Passenger Centerline 801 mm

C = Left Door to Right Passenger Centerline 1204 mm

D = Left Door to Right Door 1602 mm

DATA SHEET 10

DUMMY POSITIONING IN VEHICLE (Cont'd)

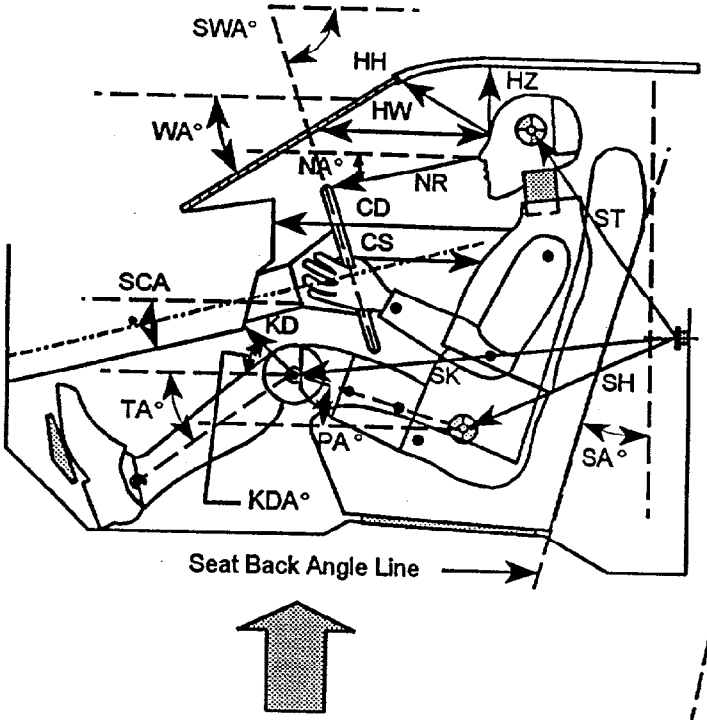
Units (mm)

	DRIVER (Serial #066)	PASSENGER (Serial #065)
WA°	33.2°	
SWA°	66°	N/A
SCA°	24°	N/A
SA°	24°	24°
HZ	176	162
HH	368	402
HW	536	540
HR	239	244
NR	380 Angle 17.6°	N/A
CD	524	609
CS	304	N/A
RA	158	N/A
KDL	155 Angle (KDA) 23.8°	169
KDR	152	174 Angle 20°
PA°	24.7°	22.0°
TA°	42.5°	41.0°
KK	303	250
ST*	598 Angle 6.8°	597 Angle 7.7°
SK*	609 Angle 86.2°	612 Angle 90.7°
SH*	226 Angle 104.8°	211 Angle 108.4°
SHY	208	202
HS	273	288
HD	136	134
AD	73	80

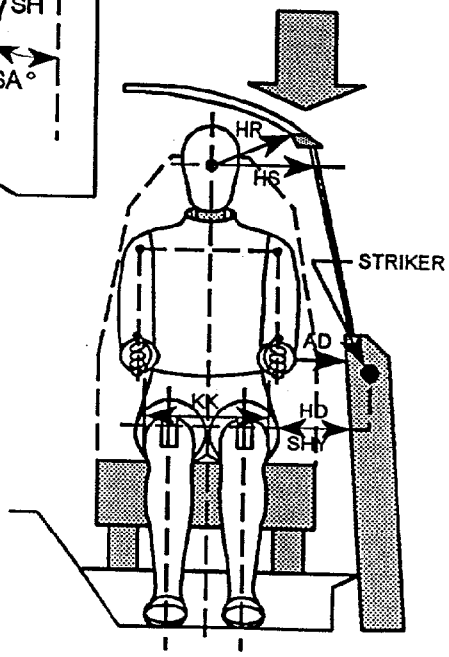
N/A = Not Applicable

* Angles measured from vertical

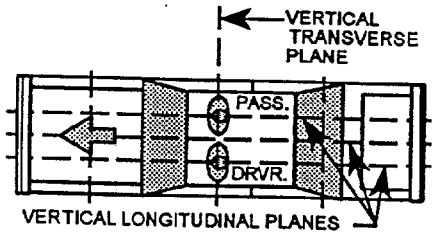
FRONT SEAT MEASUREMENTS



AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
SHY- Striker to H-Point (Y Direction)

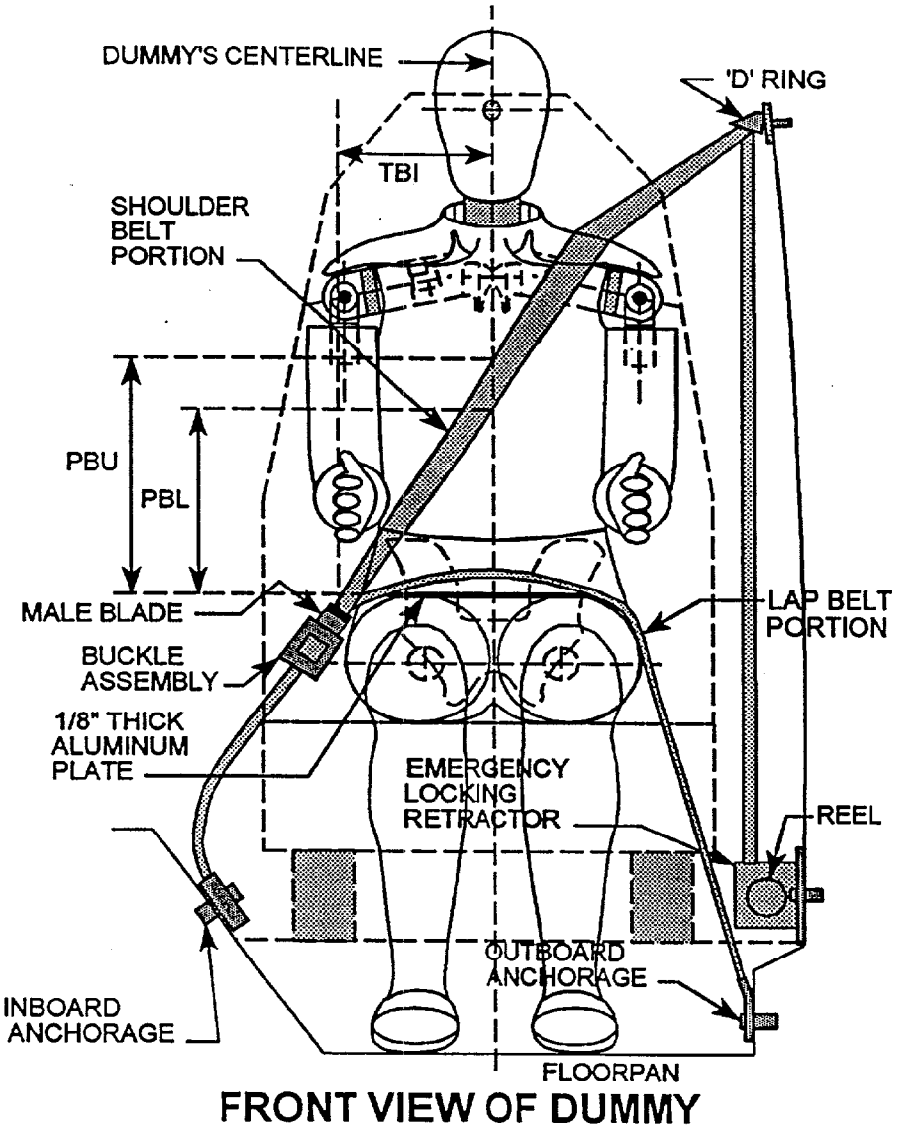


CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
KDA - Knee to Dash Angle
KDL - Left Knee to Dash
KDR - Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA - Steering Column Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
SWA - Steering Wheel Angle
TA - Tibial Angle
WA - Windshield Angle



DATA SHEET 11

SEAT BELT POSITIONING DATA



(illustration)

Dimension = mm

	DRIVER DUMMY	PASSENGER DUMMY
PBU -- Top surface of alum. plate to upper edge	362	364
PBL -- Top surface of alum. plate to belt lower edge	292	300

DATA SHEET 12

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Length from trim above retractor reel to "D" ring as measured on dummy.	212 mm	220 mm
Shoulder belt length as measured on Part 572 Dummy.	792 mm	790 mm
Lap belt length as measured on Part 572 Dummy.	842 mm	840 mm

SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis	92 mm	88 mm at shoulder
As measured electronically	70 mm	91 mm at retractor
As determined mechanically	118 mm	125 mm

BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	N/A	N/A
Measured mechanically	N/A	N/A

RETRACTOR LOCK-UP TIME:		
As determined by shoulder belt spool-off observed in on-board cameras	N/A	N/A

DATA SHEET 13

CAMERA LOCATIONS

VEH. NHTSA NO.: MW0307 ; TEST DATE: November 3, 1997

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1998/Jeep/Grand Cherokee Laredo/4 Door 4WD

CAMERA POSITION NO.	VIEW	CAMERA POSITIONS (mm.)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	-	-	-	-	-		
2	Left Front View	-660	-8100	1520	90	7605	25	545
3	Steering Column Top	-200	-8000	1560	90	7505	25	1005
4	Steering Column Bottom	-2000	-8000	1040	90	7505	25	1163
5	Driver Close-up	-1440	-10510	1520	90	10015	75	1081
6	Driver Angle	-5150	-5350	2040			50	980
7	Onboard Driver						35	990
8	Onboard Passenger						35	1010
9	Right Overall	-2470	8150	1430	90	7690	13	966
10	Right Passenger Half	-940	7880	1465	90	7420	25	995
11	Right Close-up	-1600	10390	1380	90	9930	75	1075
12	Right Angle	-5300	5570	1960			50	1124
13	Top Overall	390	0	2620			13	1064
14	Top Driver	-100	-460	1770			13	897
15	Top Passenger	-100	490	1770			13	699
16	Pit Front	-1230	0	-3165			13	1005
17	Pit Rear	-3070	0	-3175			13	922

* COORDINATES:

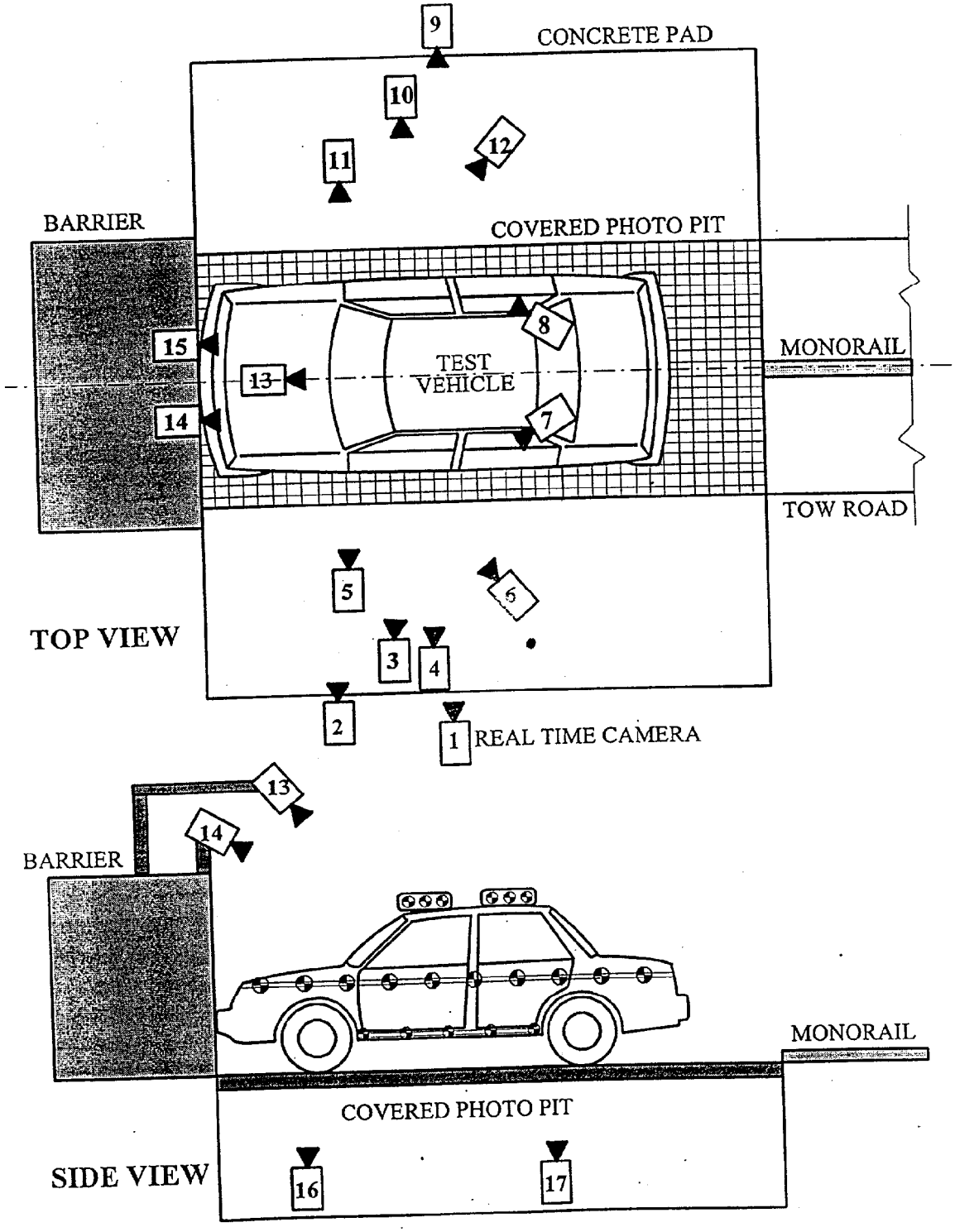
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

+Z = film plane to above ground level

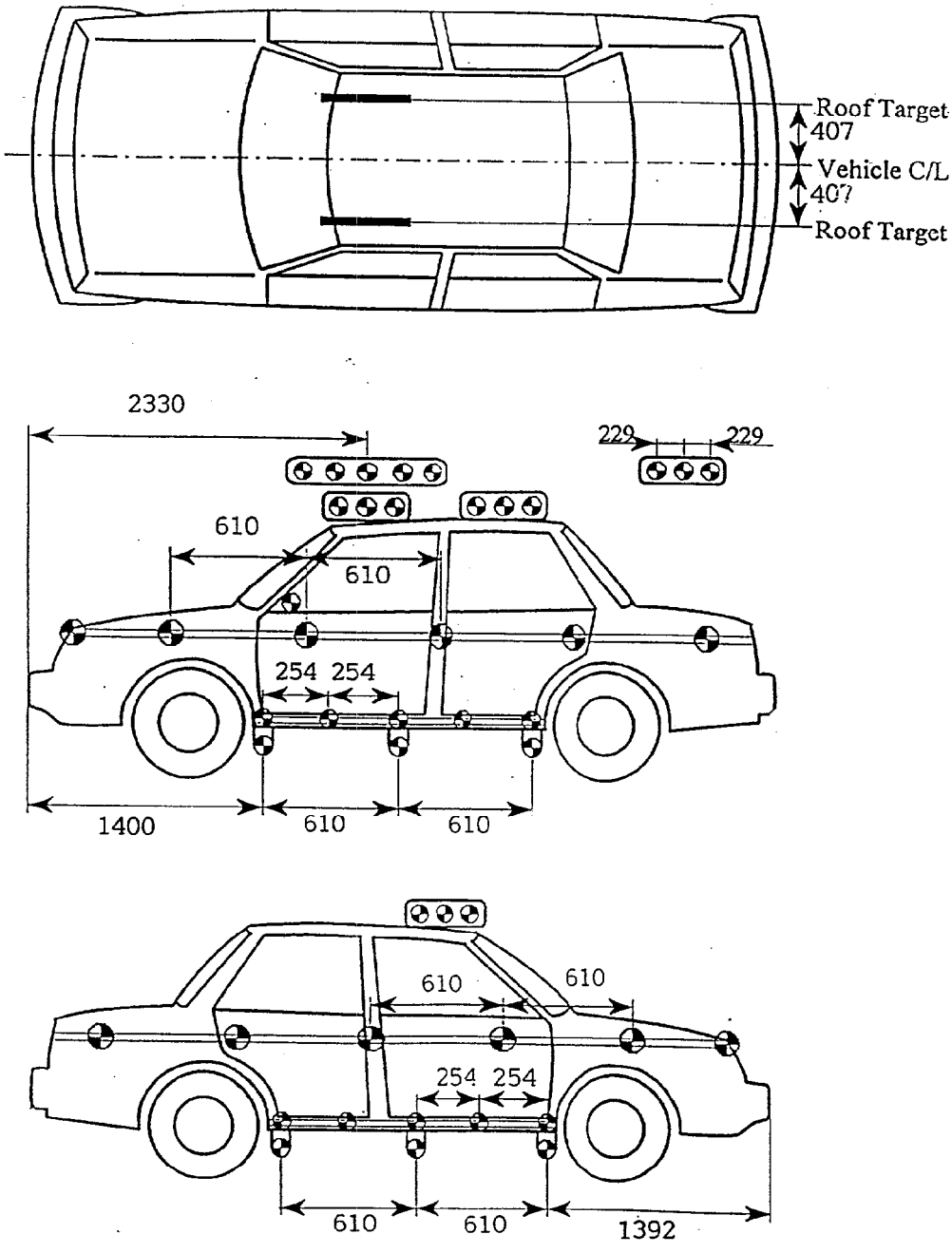
ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

CAMERA LOCATIONS (Cont'd)



DATA SHEET 14

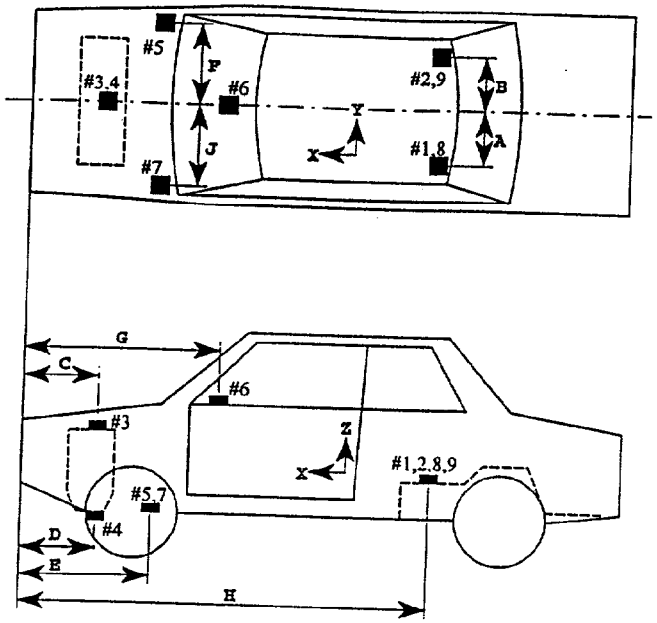
VEHICLE TARGET LOCATIONS



(DIMENSIONS IN MM)

DATA SHEET 15

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



Units: (mm)

Dimension	Length
A	504
B	504
C	3715
D	3402
E	1159
F	577
G	2924
H	2624
J	577

ACCEL. NO.	ACCELEROMETER	DIRECTION
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Side Brake Caliper	X

DATA SHEET 16

POST TEST AIRBAG DATA

A. Number of Vent Holes: Driver 0 ; Passenger 0

B. Size of Vent Holes: Driver ___ mm dia;. Passenger ___ mm dia;

C. Total Vent Area; Driver ____ cm^2 Passenger ____ cm^2

D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter

Driver; Length ____ mm, Width ____ mm, Diameter 550 mm

Passenger; Length 890 mm, Width 463 mm, Diameter ____ mm

E. Is the Airbag Tethered?

Driver; X Yes; __ No; If yes, record length of tether 230 mm

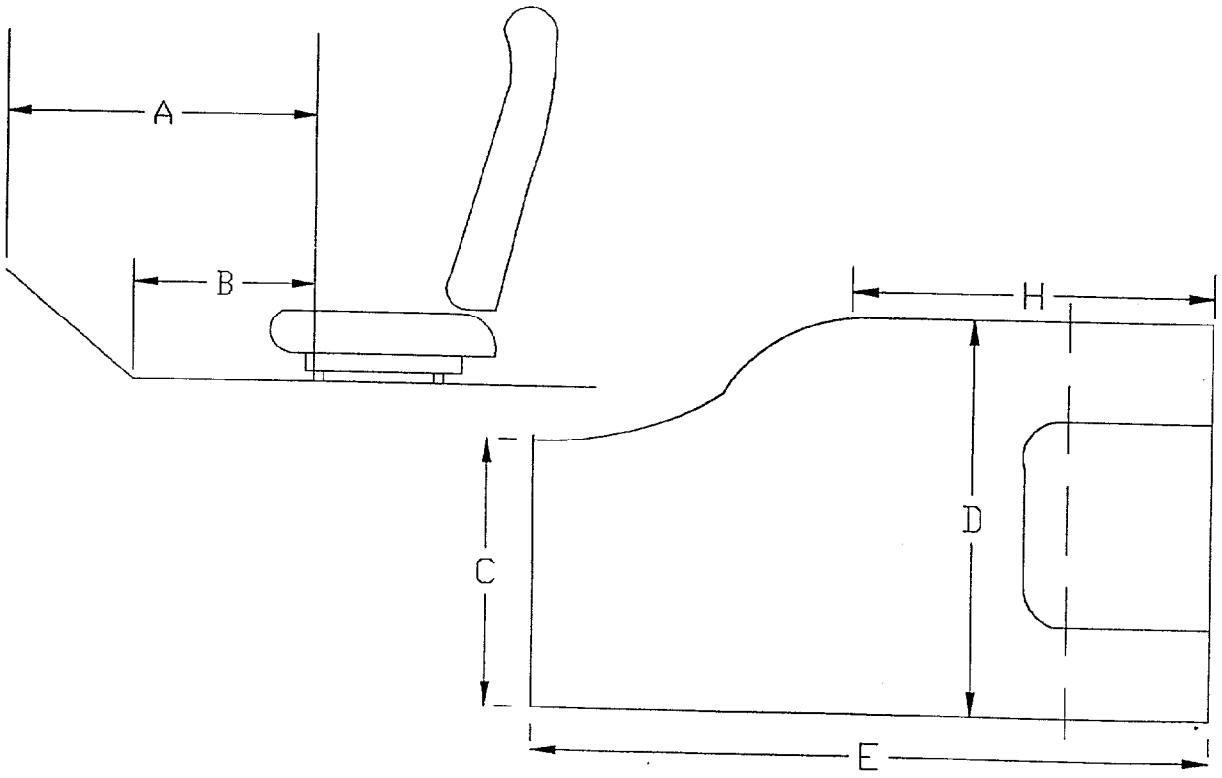
Passenger; __ Yes; X No, If yes, record length of tether ____ mm

DATA SHEET 17

TEST VEHICLE MEASUREMENTS

STATIC FOOTWELL DEFORMATION

Driver's Side



Units = mm

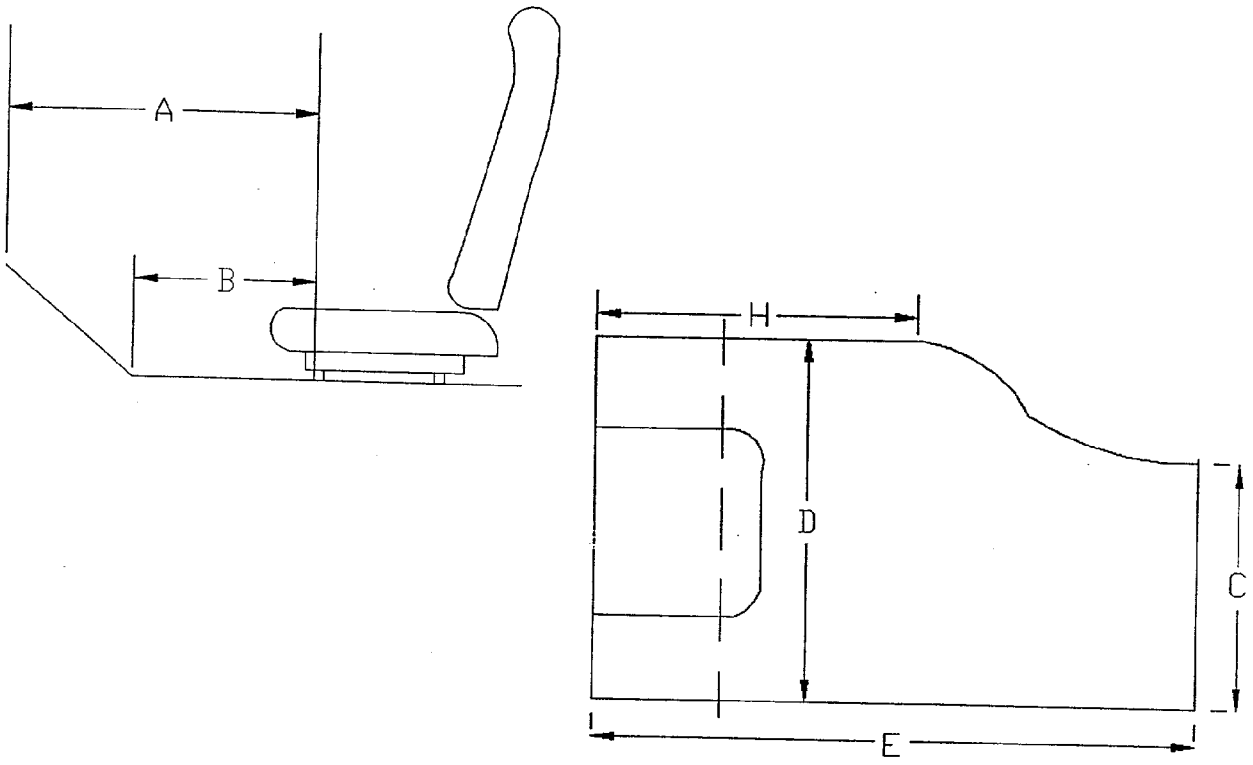
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	853	746	107
B	640	651	-11
C	295	358	-63
D	330	370	-40
E	1989	1915	74
H	1721	1649	72

DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC FOOTWELL DEFORMATION

Passenger's Side



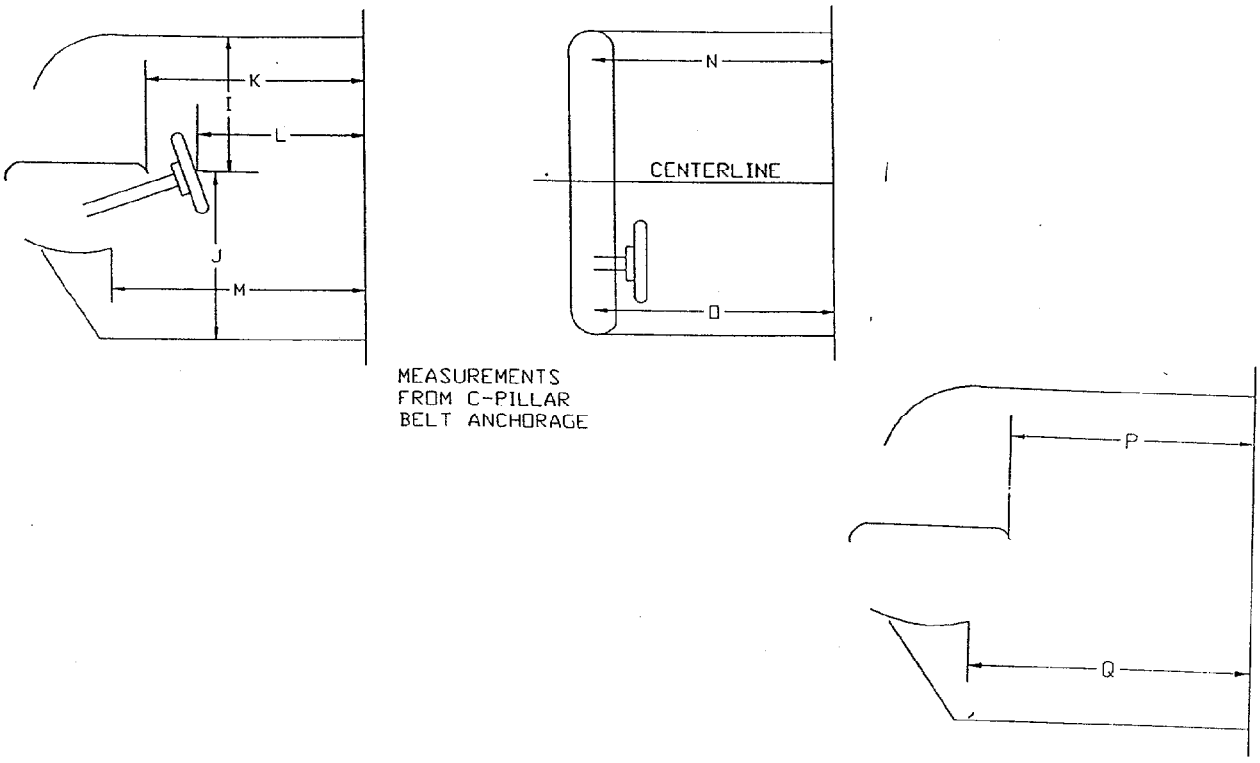
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	784	658	126
B	604	593	11
C	352	334	18
D	406	398	8
E	2001	1936	65
H	1861	1860	1

DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC PASSENGER COMPARTMENT INTRUSION



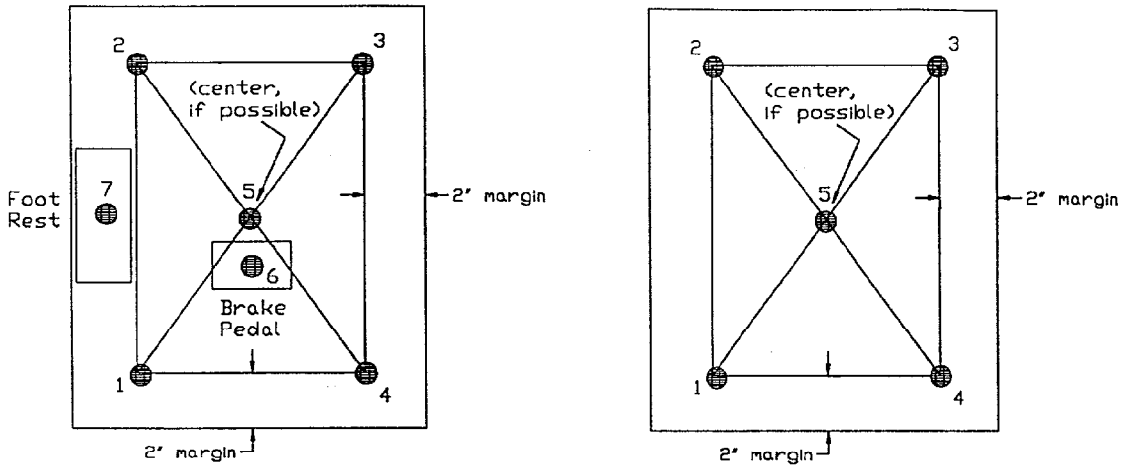
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	500	376	124
J	622	791	-169
K	1663	1627	36
L	1446	1430	16
M	1759	1674	85
N	1902	1880	22
O	1924	1848	76
P	1769	1710	59
Q	1786	1642	144

DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)

TOE PAN MEASUREMENTS



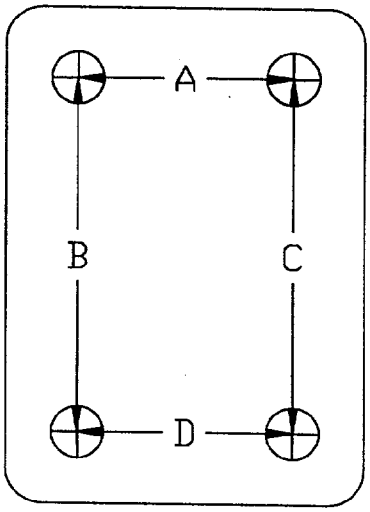
Location	X			Z		
Driver						
	Pre-Test	Post-Test	Def.	Pre-Test	Post-Test	Def.
1	678	701	-23	13	-10	23
2	810	792	18	208	204	4
3	804	691	113	175	158	17
4	688	666	22	29	-2	31
5	736	688	48	88	86	2
6	590	614	-24	153	126	27
7	668	681	-13	96	75	21
Passenger						
Location	X			Z		
	Pre-Test	Post-Test	Def.	Pre-Test	Post-Test	Def.
1	628	570	58	-10	-4	-6
2	761	638	123	158	163	-5
3	756	725	31	162	168	-5
4	651	636	15	50	-24	74
5	710	659	51	-14	68	-82

DATA SHEET 17

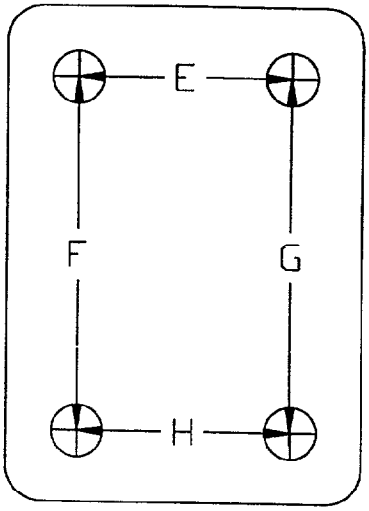
TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



PASSENGER'S SIDE



MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	261	261	0
B	263	263	0
C	248	252	-4
D	245	245	0
E	282	282	0
F	231	231	0
G	233	233	0
H	282	282	0

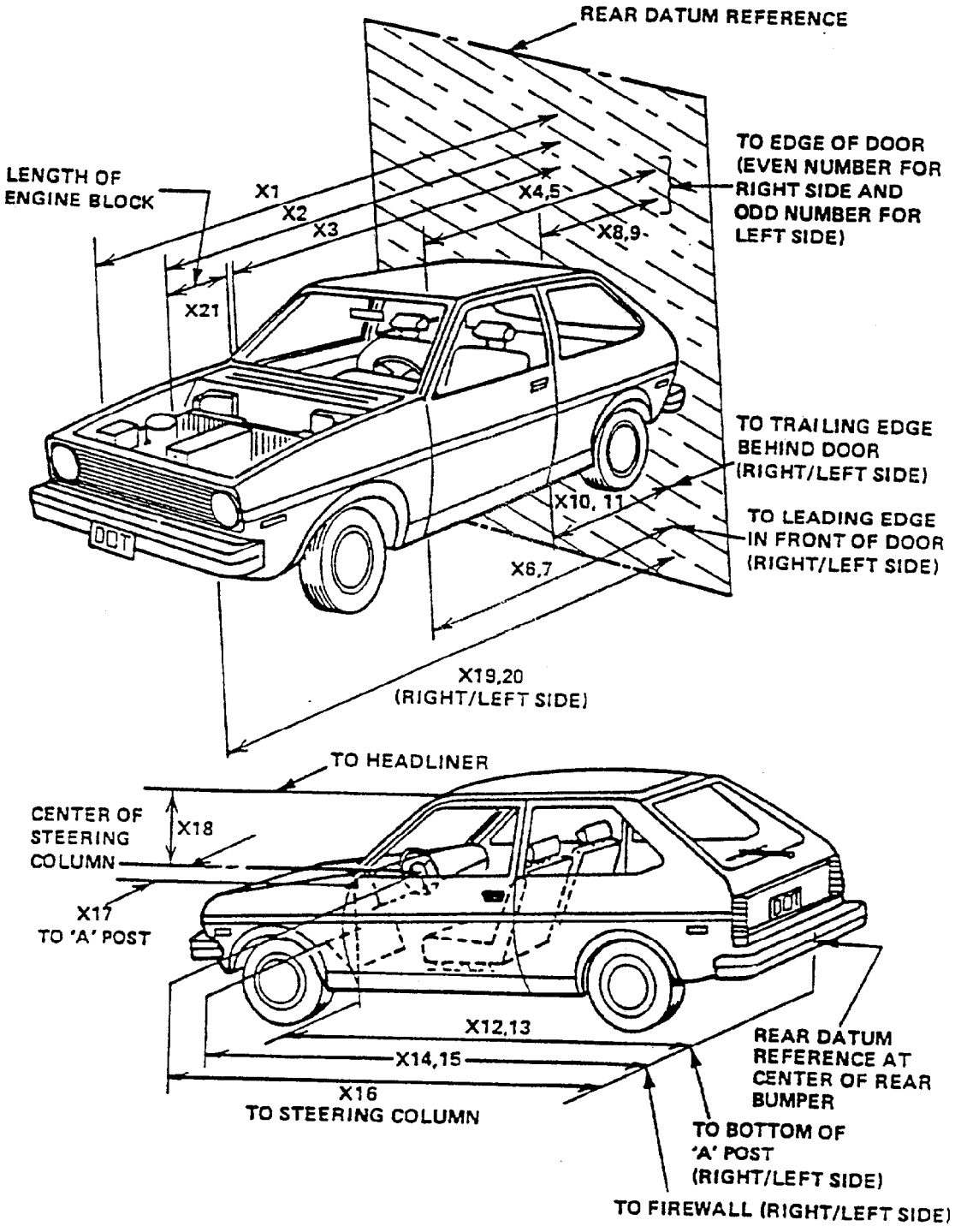
DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4462	3842	620
X2	Rear Surface of Vehicle to Front of Engine	3902	3766	136
X3	Rear Surface of Vehicle to Firewall	3382	3772	-390
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3082	3095	-13
X5	Rear Surface to Upr. Leading Edge of Left Door	3086	3090	-4
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3052	3044	8
X7	Rear Surface to Lwr. Leading Edge of Left Door	3054	3044	10
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2010	2035	-25
X9	Rear Surface to Upr. Trailing Edge of Left Door	2018	2037	-19
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	1994	1985	9
X11	Rear Surface to Lwr. Trailing Edge of Left Door	1998	1980	18
X12	Rear Surface to Bottom of A-Post on Rt. Side	3044	3035	9
X13	Rear Surface to Bottom of A-Post on Left Side	3055	3054	1
X14	Rear Surface to Firewall on Right Side	3392	3303	89
X15	Rear Surface to Firewall on Left Side	3404	3389	15
X16	Rear Surface to Steering Column	2551	2055	496
X17	Center of Steering Column to A-Post	444	329	115
X18	Center of Steering Column to Headlining	461	351	110
X19	Rear Surface to Right Side of Front Bumper	4362	3815	547
X20	Rear Surface to Left Side of Front Bumper	4363	3889	747
X21	Length of Engine Block	700	700	0

DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)



DATA SHEET 18

ACCIDENT INVESTIGATION DIVISION DATA

FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1998/Jeep Grand Cherokee Laredo/4 Door 4WD

VEH. NHTSA NO.: MW0307 ; VIN: 1J4G25856WCI65947

MODEL YEAR: 1998 ; BUILD DATE: 9-97 ; TEST DATE: November 3, 1997

VEH. SIZE CATEGORY: MPV ; TEST WEIGHT: 2035.3 kg

VEH. WHEELBASE: 2700 mm; FRONT OVERHANG: 825 mm; OVERALL WIDTH: 1640 mm

ACCELEROMETER DATA:

LOCATION: As per measurements on pages 4-13

CALIBRATION PROCEDURE: As per MGA Calibration Procedure

LINEARITY: >99.9% ; INTEGRATION ALGORITHM: Trapezoidal

VEH: IMPACT SPEED: 56.5 kph ; TIME OF SEPARATION: 180 msec

VELOCITY CHANGE: 66.4 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: F (Frontal)

CRUSH DEPTH C1 = 474 mm

DIMENSIONS: C2 = 575 mm

C3 = 629 mm

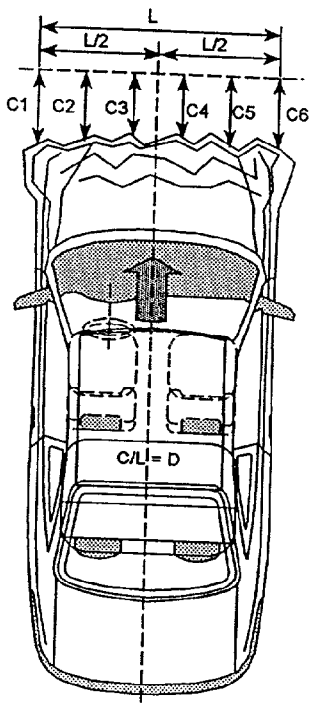
C4 = 644 mm

C5 = 614 mm

C6 = 547 mm

MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitude)

LENGTH OF DAMAGED REGION: L = 1550 mm



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

	Page No.
Photo No. A-1 - Pre-Test Front View of Test Vehicle	A-1
Photo No. A-2 - Post-Test Front View of Test Vehicle	A-2
Photo No. A-3 - Pre-Test Rear View of Test Vehicle	A-3
Photo No. A-4 - Pre-Test Left Side View of Test Vehicle	A-4
Photo No. A-5 - Post-Test Left Side View of Test Vehicle	A-5
Photo No. A-6 - Pre-Test Left Rear Three-Quarter View of Test Vehicle	A-6
Photo No. A-7 - Post-Test Left Rear Three-Quarter View of Test Vehicle	A-7
Photo No. A-8 - Pre-Test Right Side View of Test Vehicle	A-8
Photo No. A-9 - Post-Test Right Side View of Test Vehicle	A-9
Photo No. A-10 - Pre-Test Right Front Three-Quarter View of Test Vehicle	A-10
Photo No. A-11 - Post-Test Right Front Three-Quarter View of Test Vehicle	A-11
Photo No. A-12 - Pre-Test Fuel Filler Cap View	A-12
Photo No. A-13 - Pre-Test Engine Compartment View	A-13
Photo No. A-14 - Post-Test Engine Compartment View	A-14
Photo No. A-15 - Pre-Test Front Underbody View	A-15
Photo No. A-16 - Post-Test Front Underbody View	A-16
Photo No. A-17 - Pre-Test Rear Underbody View	A-17
Photo No. A-18 - Post-Test Rear Underbody View	A-18
Photo No. A-19 - Pre-Test Windshield View	A-19
Photo No. A-20 - Post-Test Windshield View	A-20
Photo No. A-21 - Pre-Test Driver Dummy Position Left Side View	A-21
Photo No. A-22 - Post-Test Driver Dummy Position Left Side View	A-22
Photo No. A-23 - Pre-Test Driver Dummy Position Left Side View (Door Open)	A-23
Photo No. A-24 - Post-Test Driver Dummy Position Left Side View (Door Open)	A-24
Photo No. A-25 - Pre-Test Driver Seat Position View	A-25
Photo No. A-26 - Post-Test Driver Seat Position View	A-26

TABLE OF PHOTOGRAPHS (Cont'd)

	Page No.
Photo No. A-27 - Pre-Test Driver Dummy Knee Position	A-27
Photo No. A-28 - Post-Test Driver Dummy Knee Position	A-28
Photo No. A-29 - Post-Test Driver Airbag Contact	A-29
Photo No. A-30 - Post-Test Driver Knee Contact View	A-30
Photo No. A-31 - Pre-Test Passenger Dummy Position Right Side View	A-31
Photo No. A-32 - Post-Test Passenger Dummy Position Right Side View	A-32
Photo No. A-33 - Pre-Test Passenger Dummy Position Right Side View (Door Open)	A-33
Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View (Door Open)	A-34
Photo No. A-35 - Pre-Test Passenger Seat Position View	A-35
Photo No. A-36 - Post-Test Passenger Seat Position View	A-36
Photo No. A-37 - Pre-Test Passenger Dummy Knee Position	A-37
Photo No. A-38 - Post-Test Passenger Dummy Knee Position	A-38
Photo No. A-39 - Post-Test Passenger Airbag Contact	A-39
Photo No. A-40 - Post-Test Passenger Knee Contact View	A-40
Photo No. A-41 - Vehicle Certification Label	A-41
Photo No. A-42 - Tire Placard	A-42
Photo No. A-43 - Vehicle Impact	A-43
Photo No. A-44 - Rollover 90°	A-44
Photo No. A-45 - Rollover 180°	A-45
Photo No. A-46 - Rollover 270°	A-46
Photo No. A-47 - Rollover 360°	A-47

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

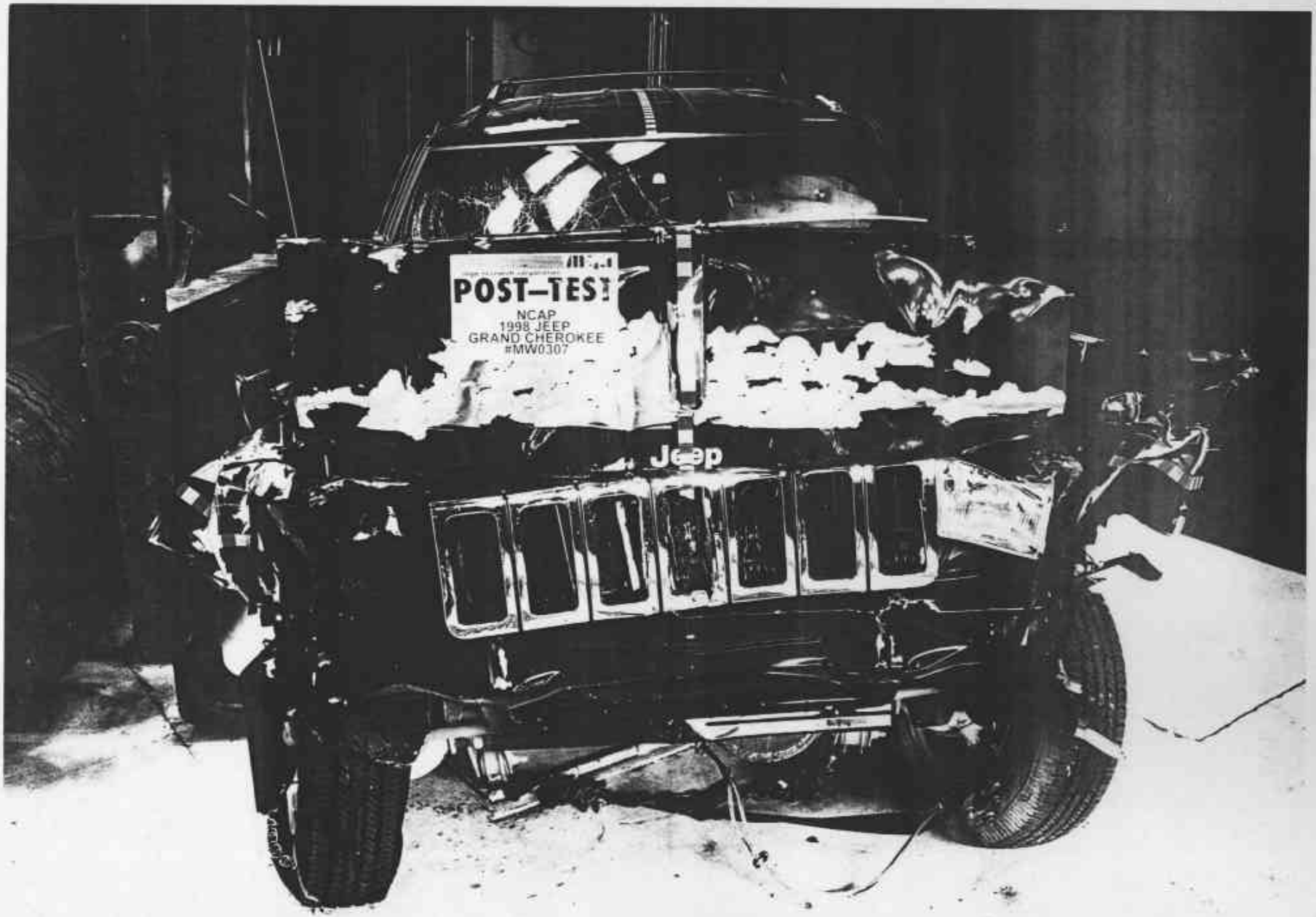


Photo No. A-2 - Post-Test Front View of Test Vehicle

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

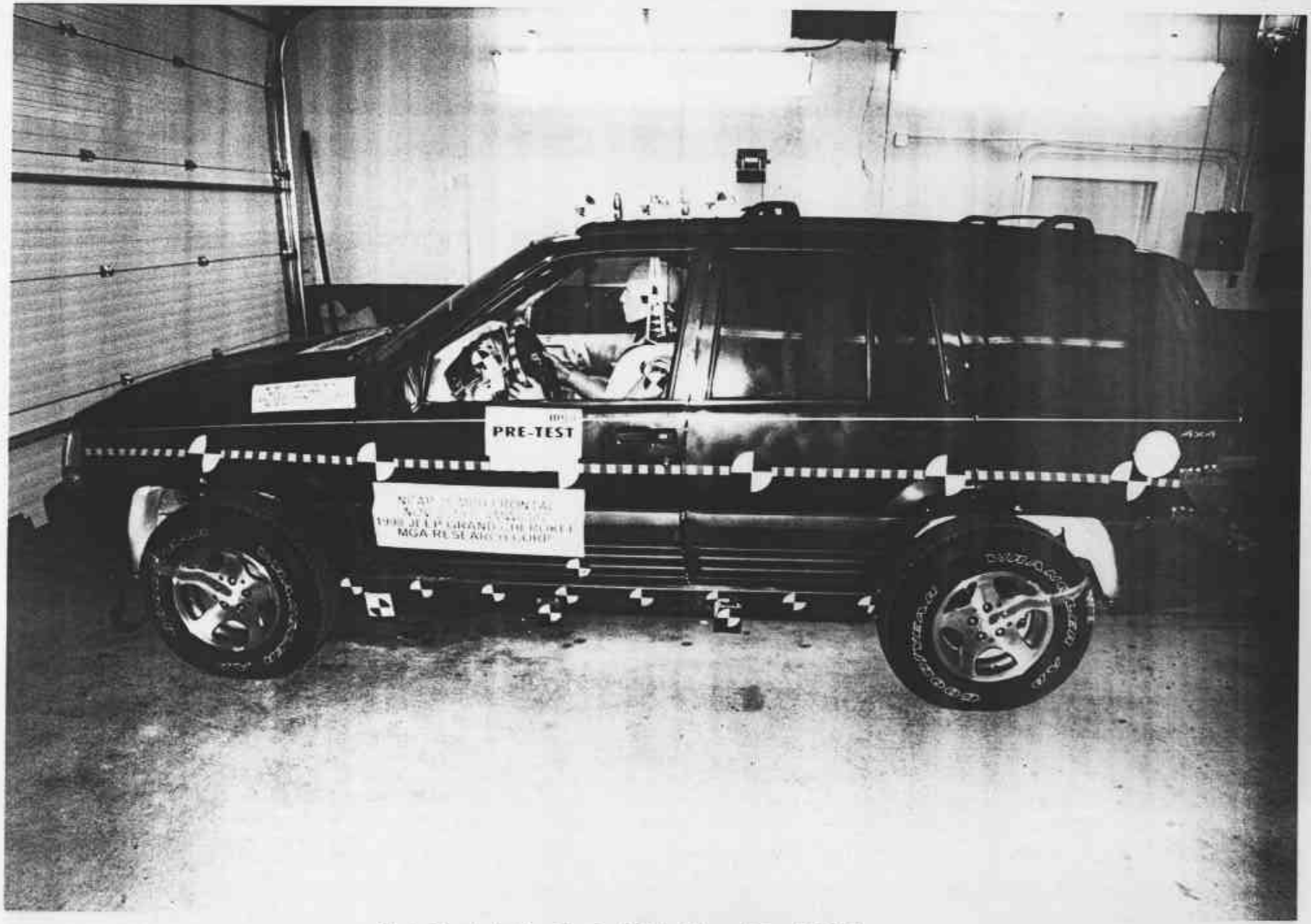


Photo No. A-4 - Pre-Test Left Side View of Test Vehicle

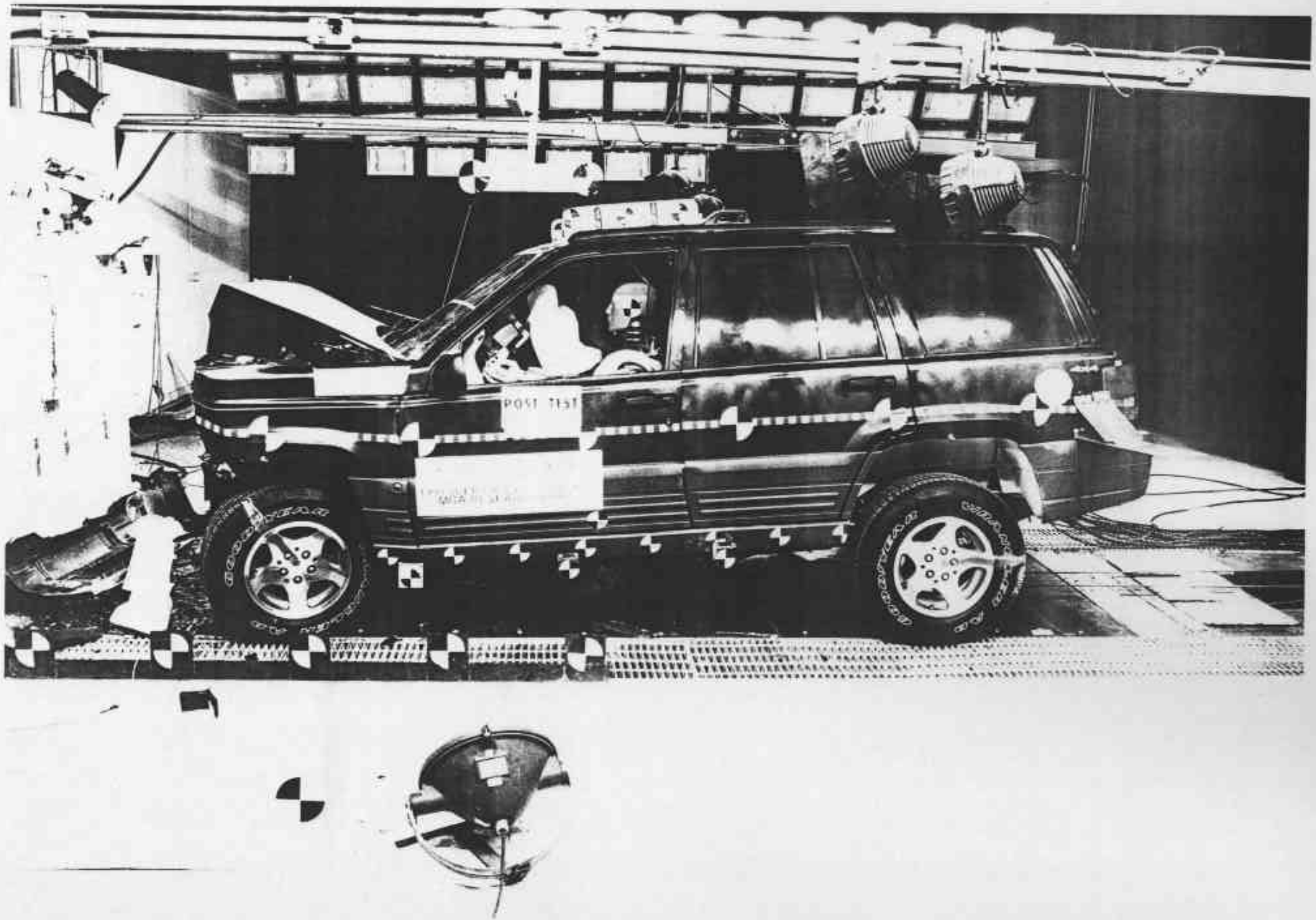


Photo No. A-5 - Post-Test Left Side View of Test Vehicle

Photo No. A-6 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

A-7

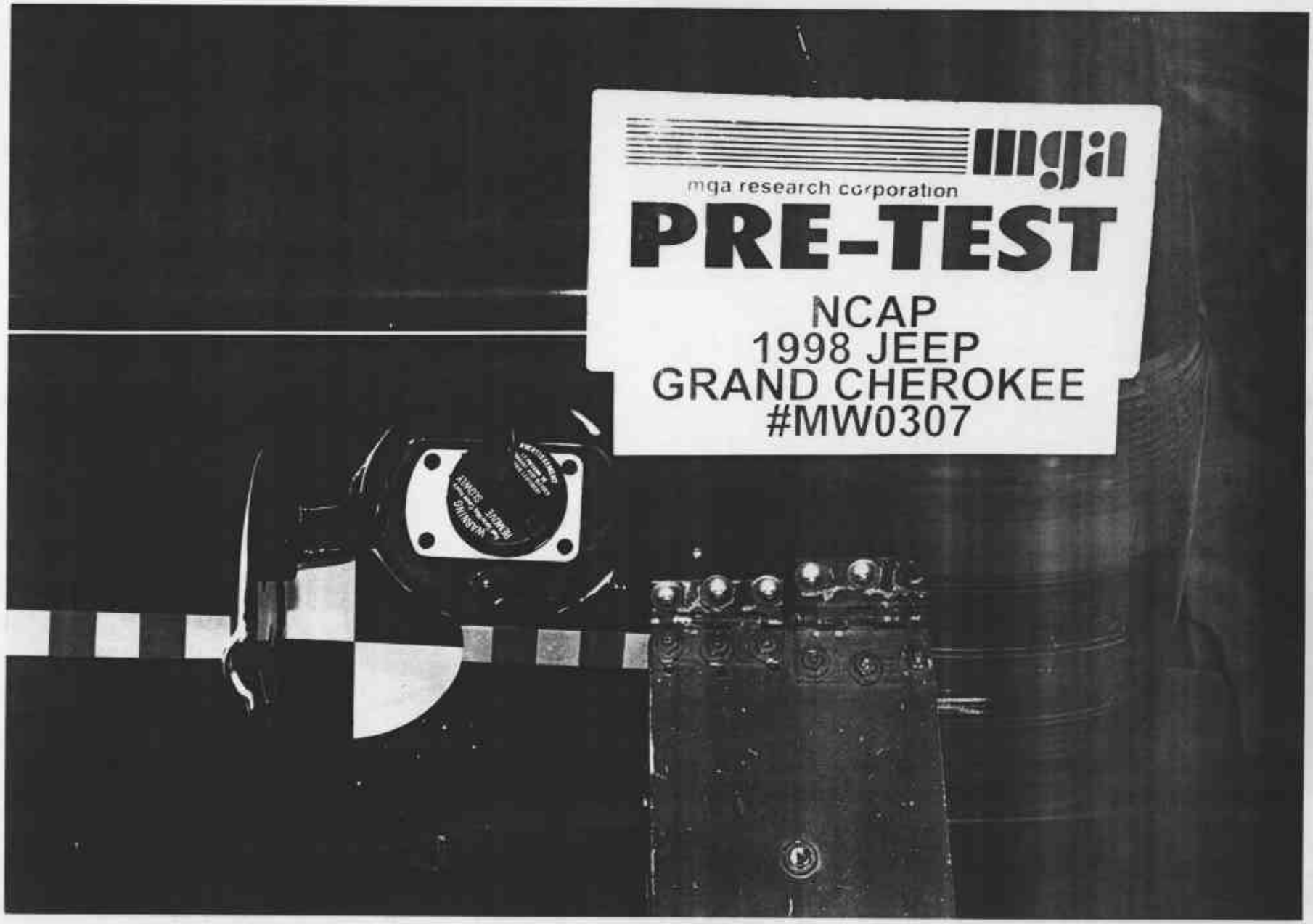
Photo No. A-7 - Post-Test Left Rear Three-Quarter View of Test Vehicle

Photo No. A-8 - Pre-Test Right Side View of Test Vehicle

Photo No. A-9 - Post-Test Right Side View of Test Vehicle

Photo No. A-10 - Pre-Test Right Front Three-Quarter View of Test Vehicle

Photo No. A-11 - Post-Test Right Front Three-Quarter View of Test Vehicle



A-12

Photo No. A-12 - Pre-Test Fuel Filler Cap View

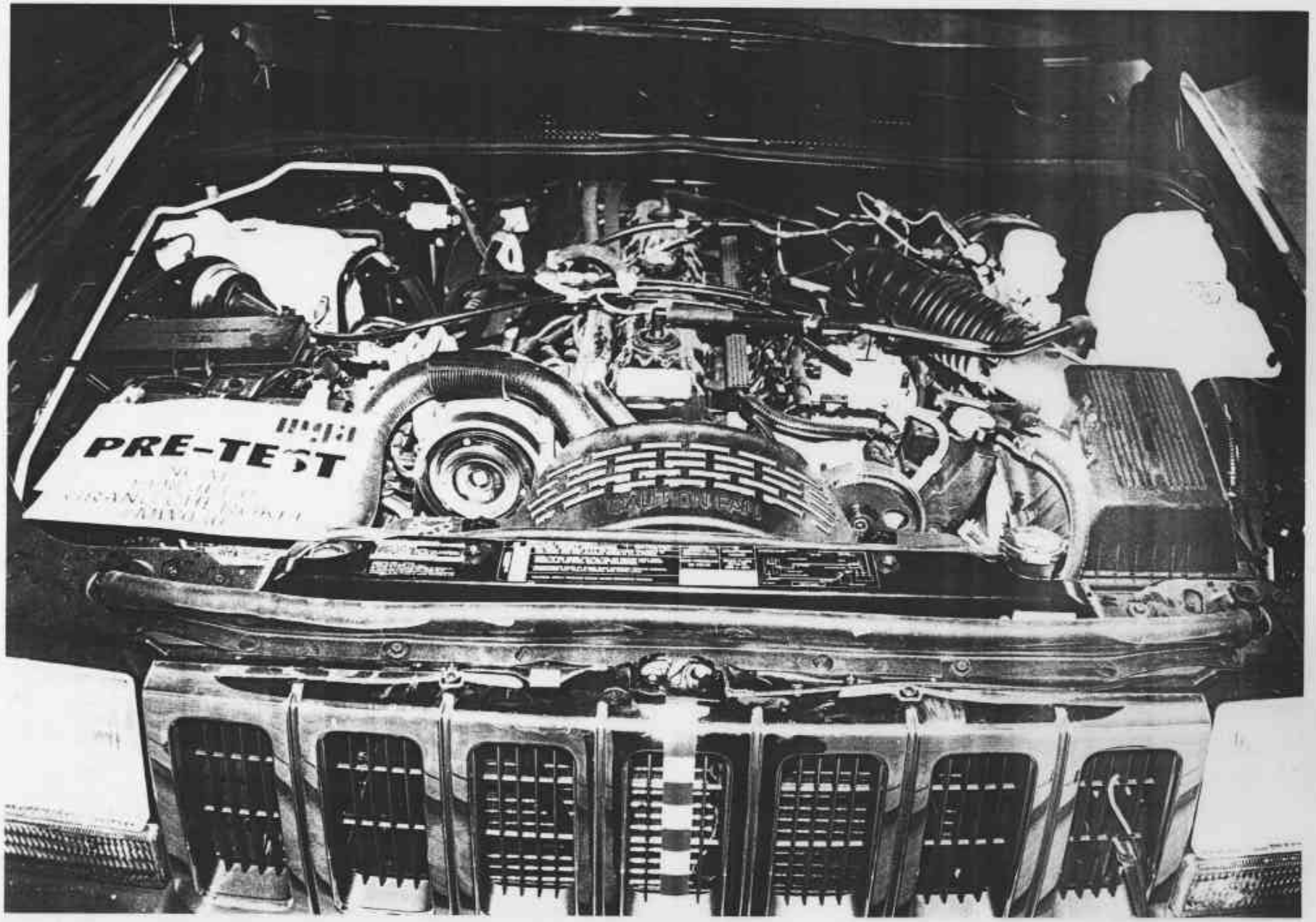


Photo No. A-13 - Pre-Test Engine Compartment View

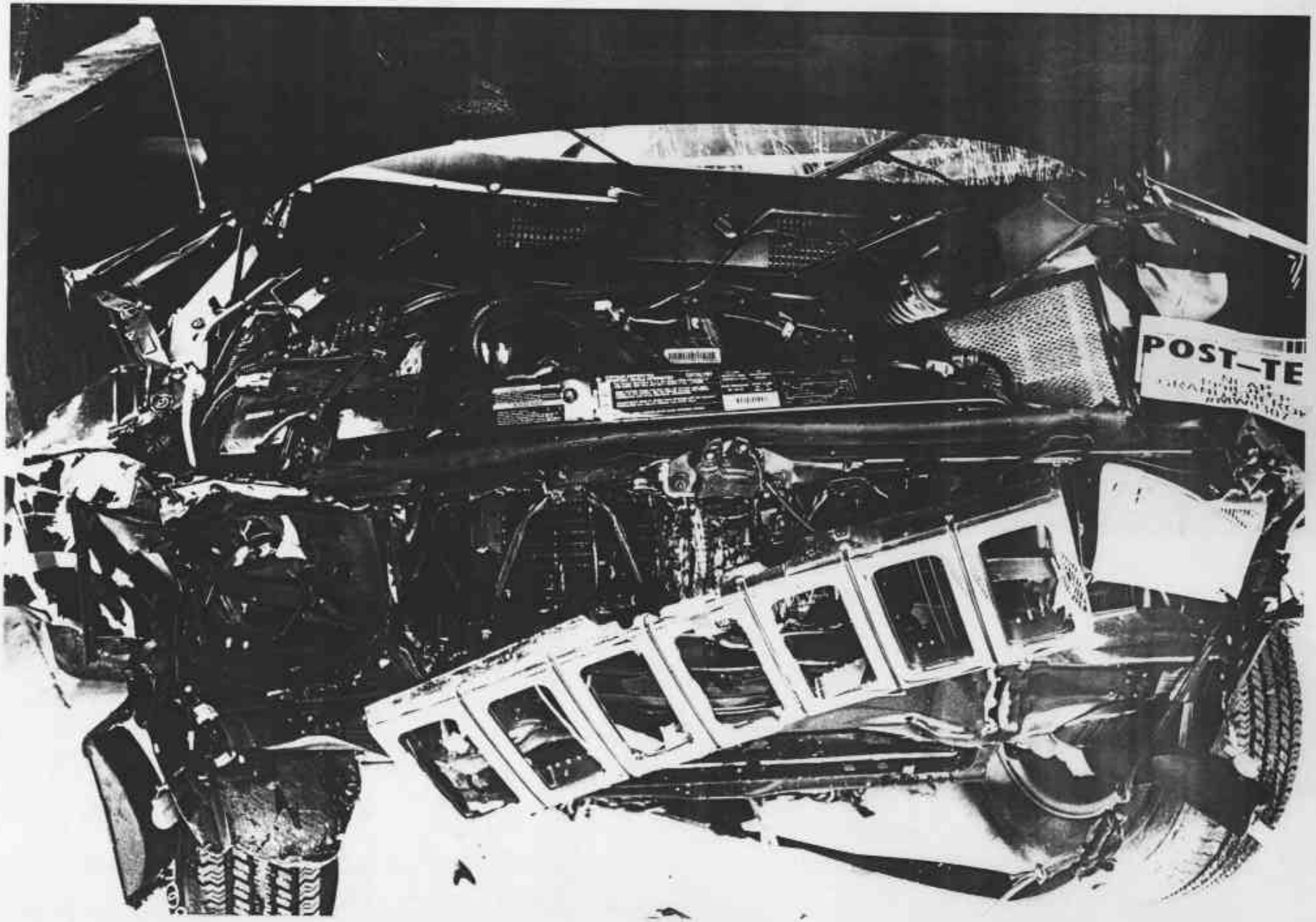


Photo No. A-14 - Post-Test Engine Compartment View

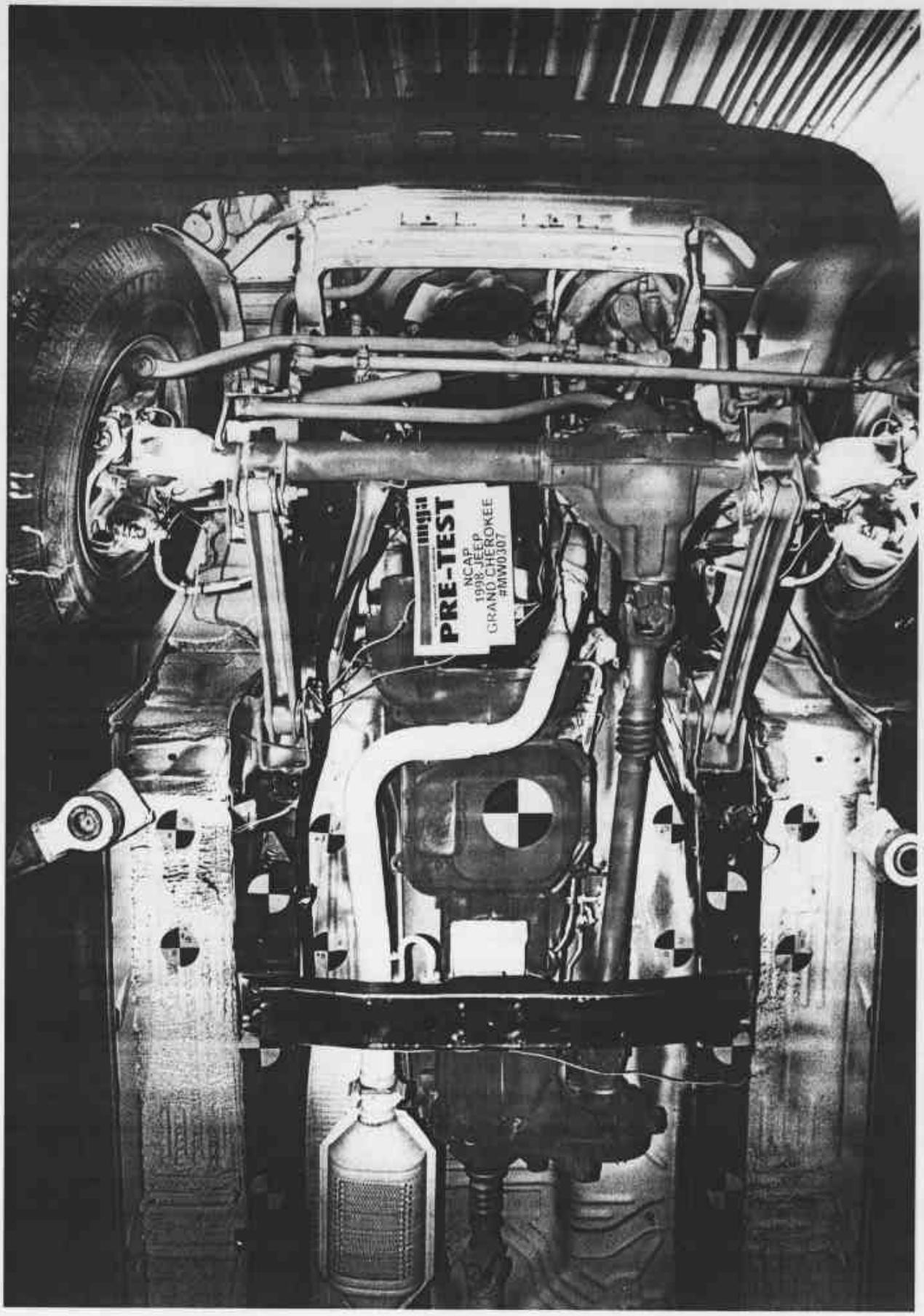


Photo No. A-15 - Pre-Test Front Underbody View

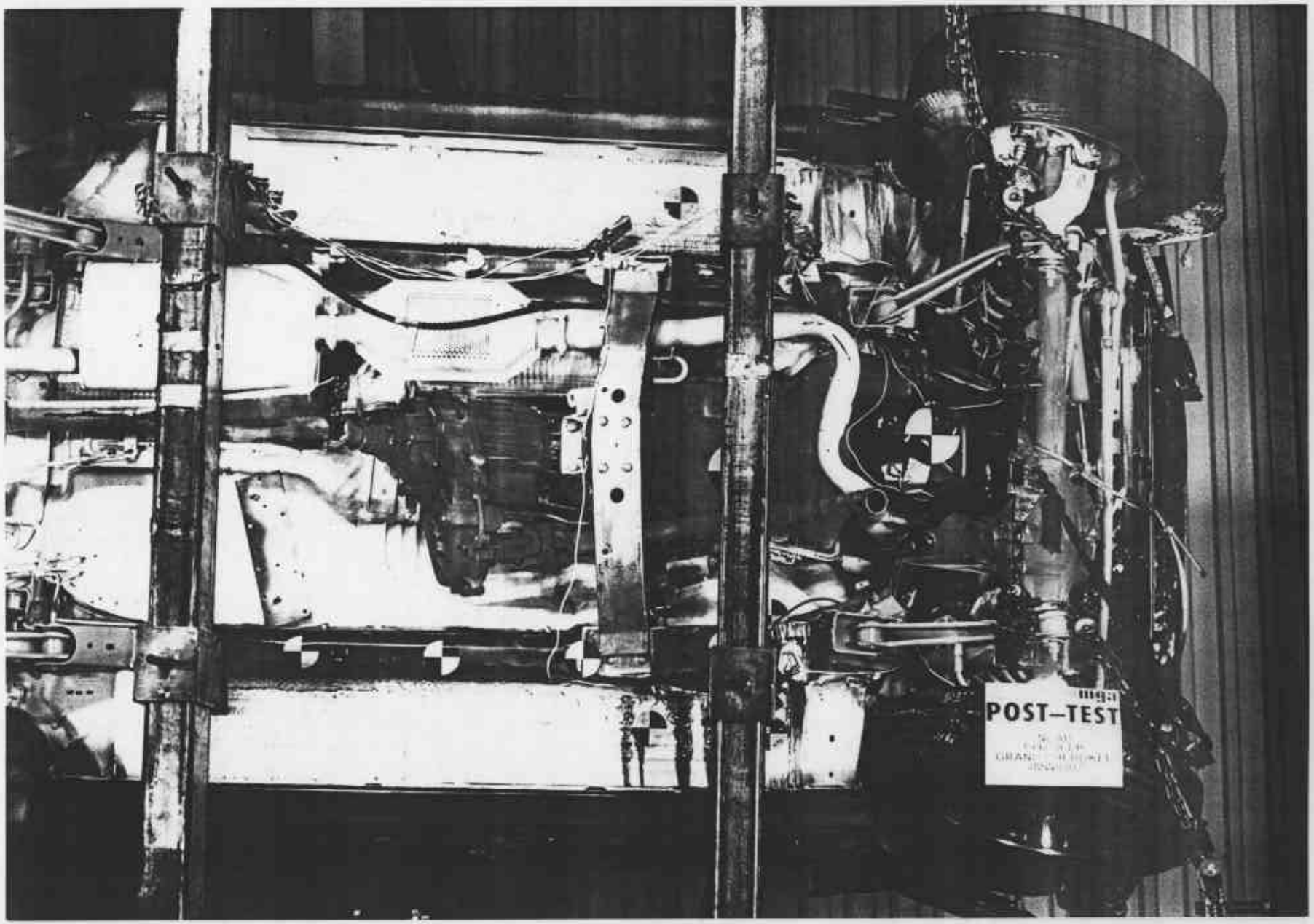


Photo No. A-16 - Post-Test Front Underbody View

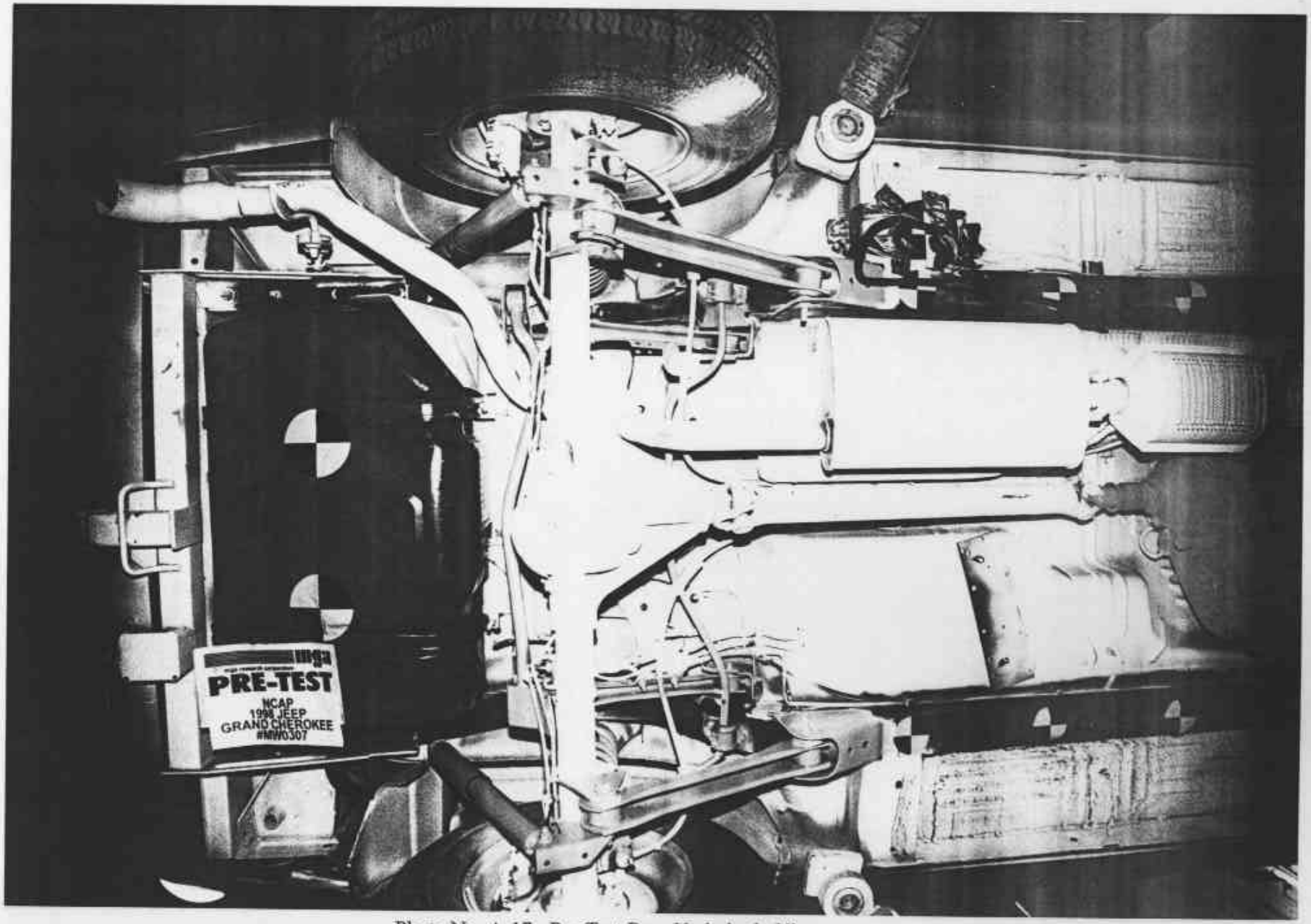


Photo No. A-17 - Pre-Test Rear Underbody View

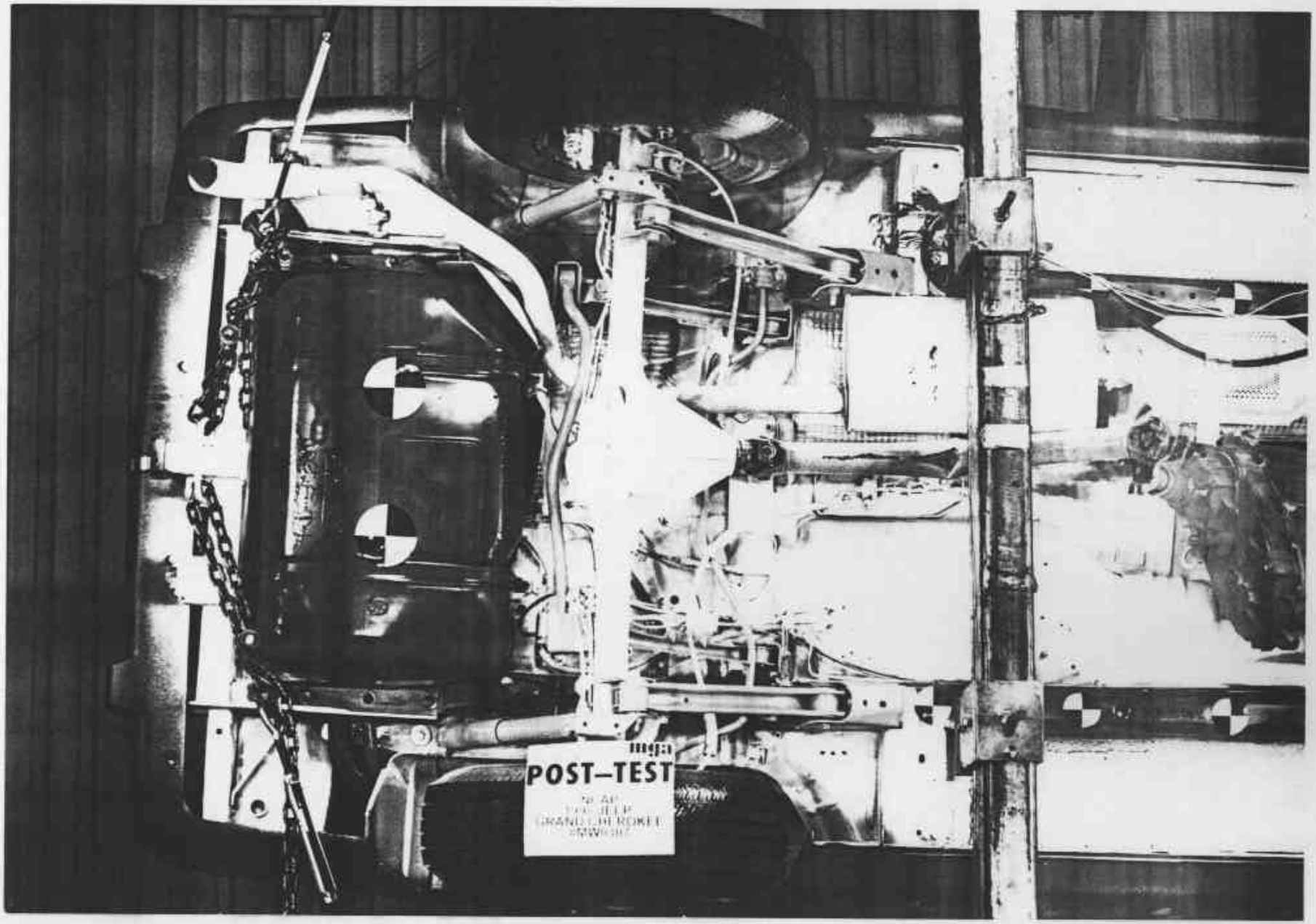


Photo No. A-18 - Post-Test Rear Underbody View

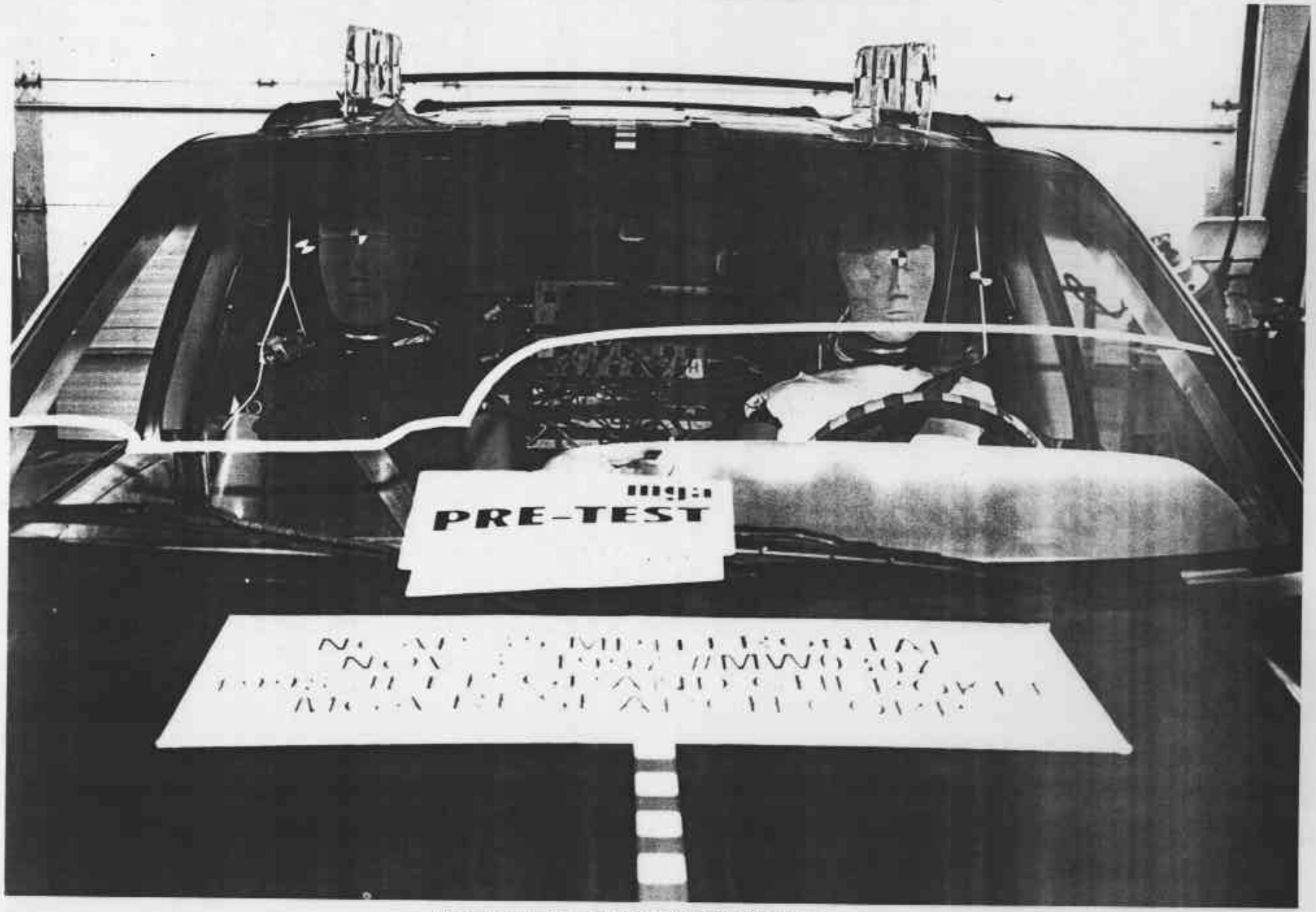


Photo No. A-19 - Pre-Test Windshield View

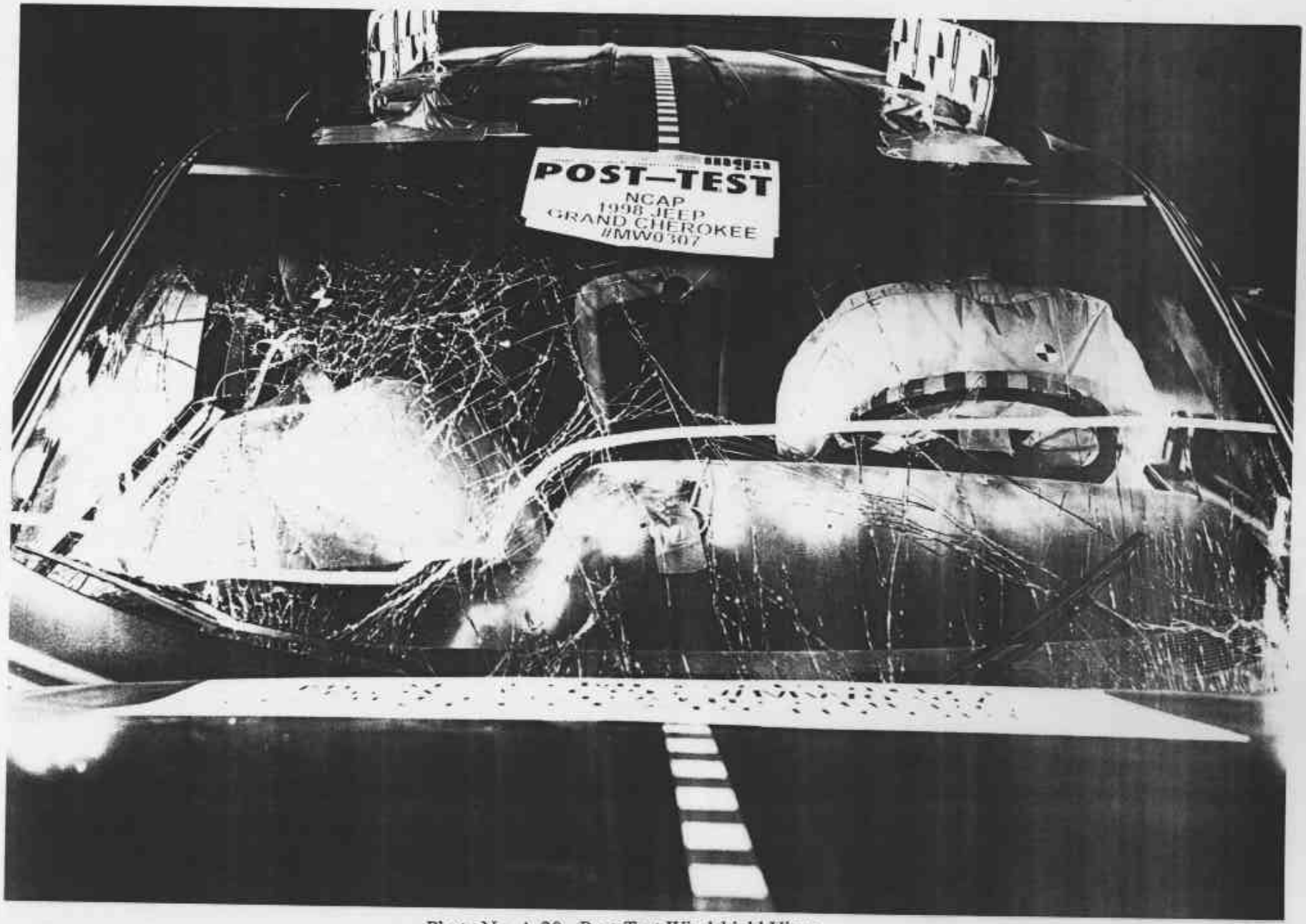


Photo No. A-20 - Post-Test Windshield View

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

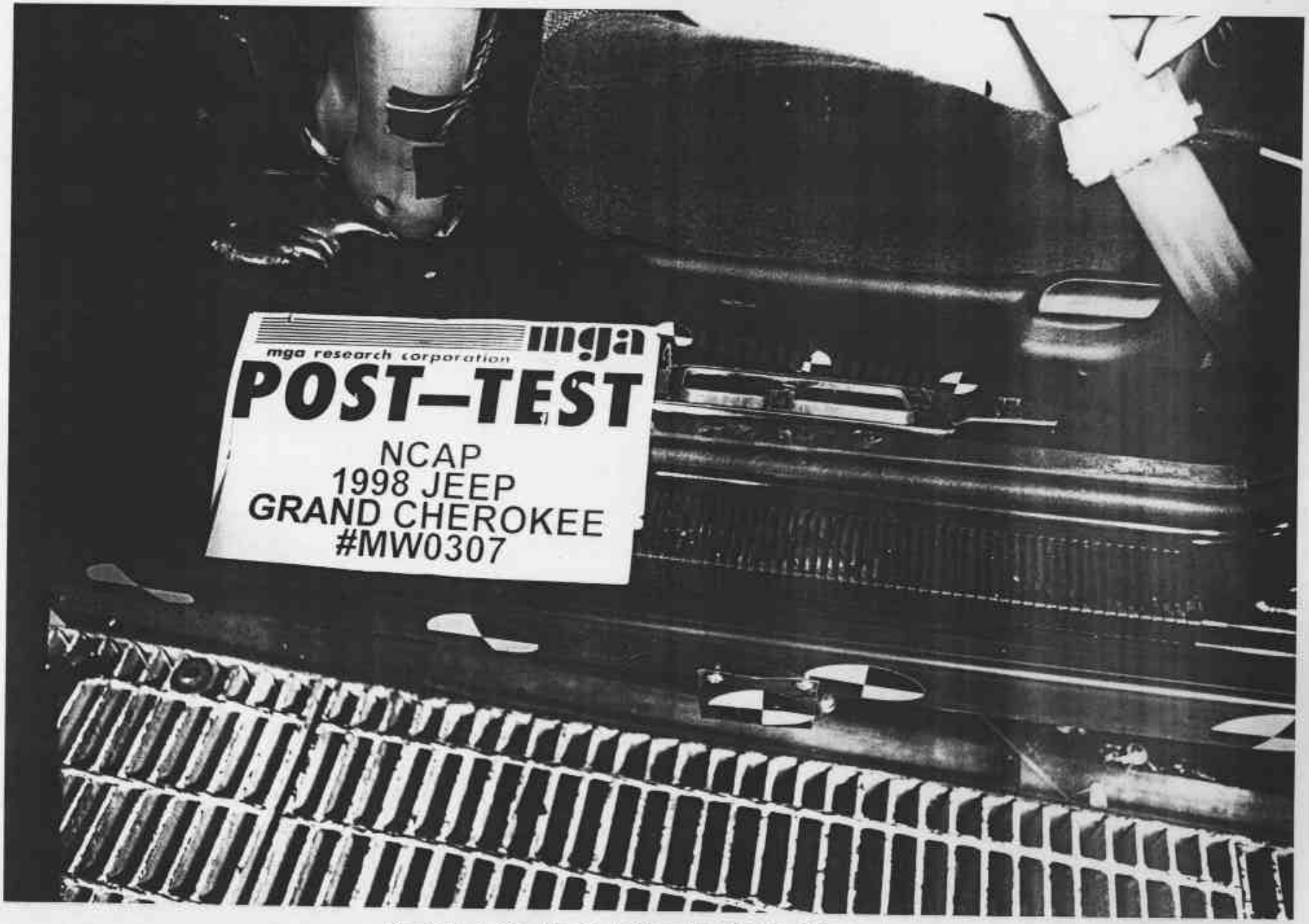
Photo No. A-22 - Post-Test Driver Dummy Position Left Side View

Photo No. A-23 - Pre-Test Driver Dummy Position Left Side View (Door Open)

A-24

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

Photo No. A-25 - Pre-Test Driver Seat Position View



A-26

Photo No. A-26 - Post-Test Driver Seat Position View

Photo No. A-27 - Pre-Test Driver Dummy Knee Position

Photo No. A-28 - Post-Test Driver Dummy Knee Position

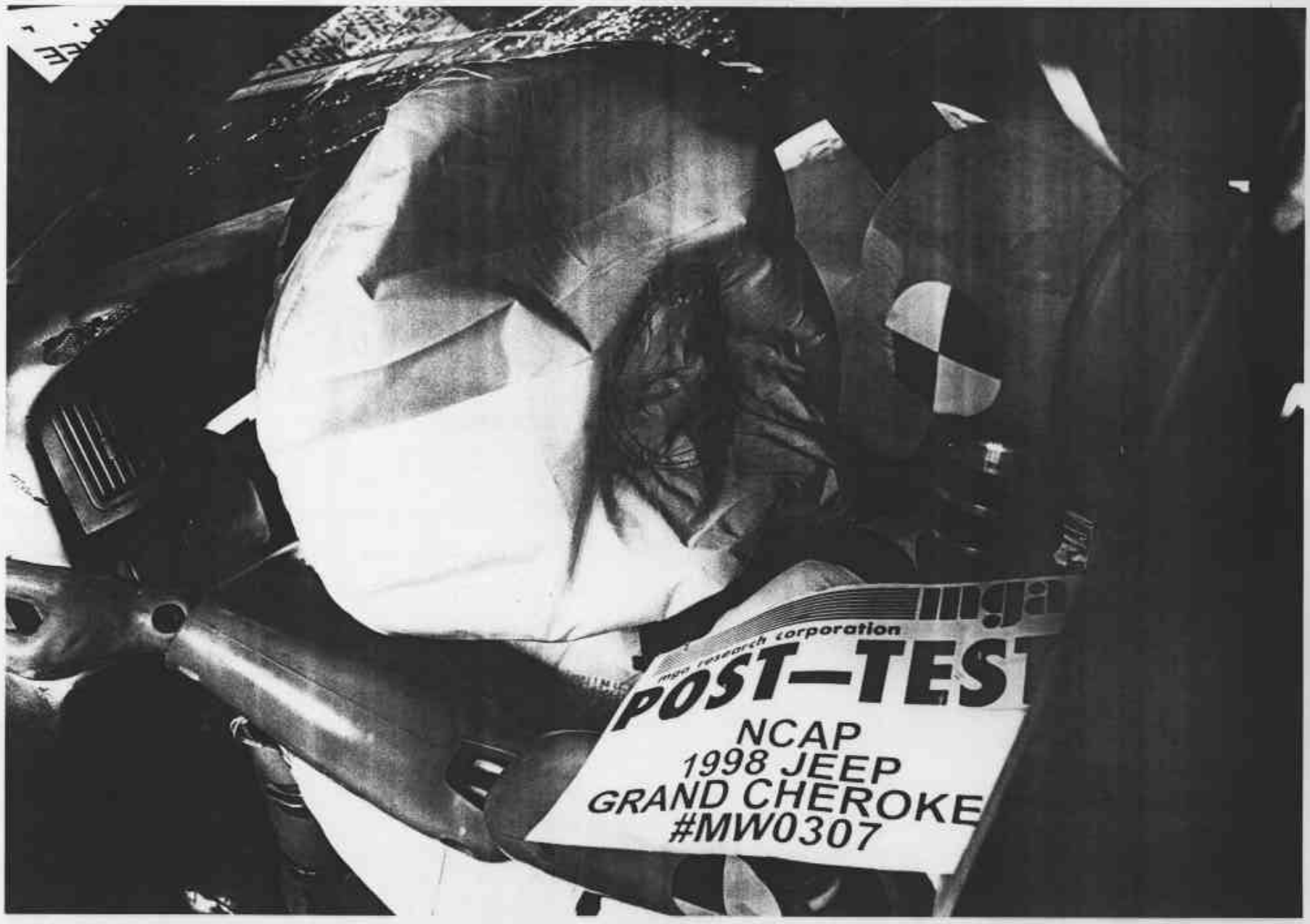


Photo No. A-29 - Post-Test Driver Airbag Contact

Photo No. A-30 - Post-Test Driver Knee Contact View

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

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

Photo No. A-33 - Pre-Test Passenger Dummy Position Right Side View (Door Open)

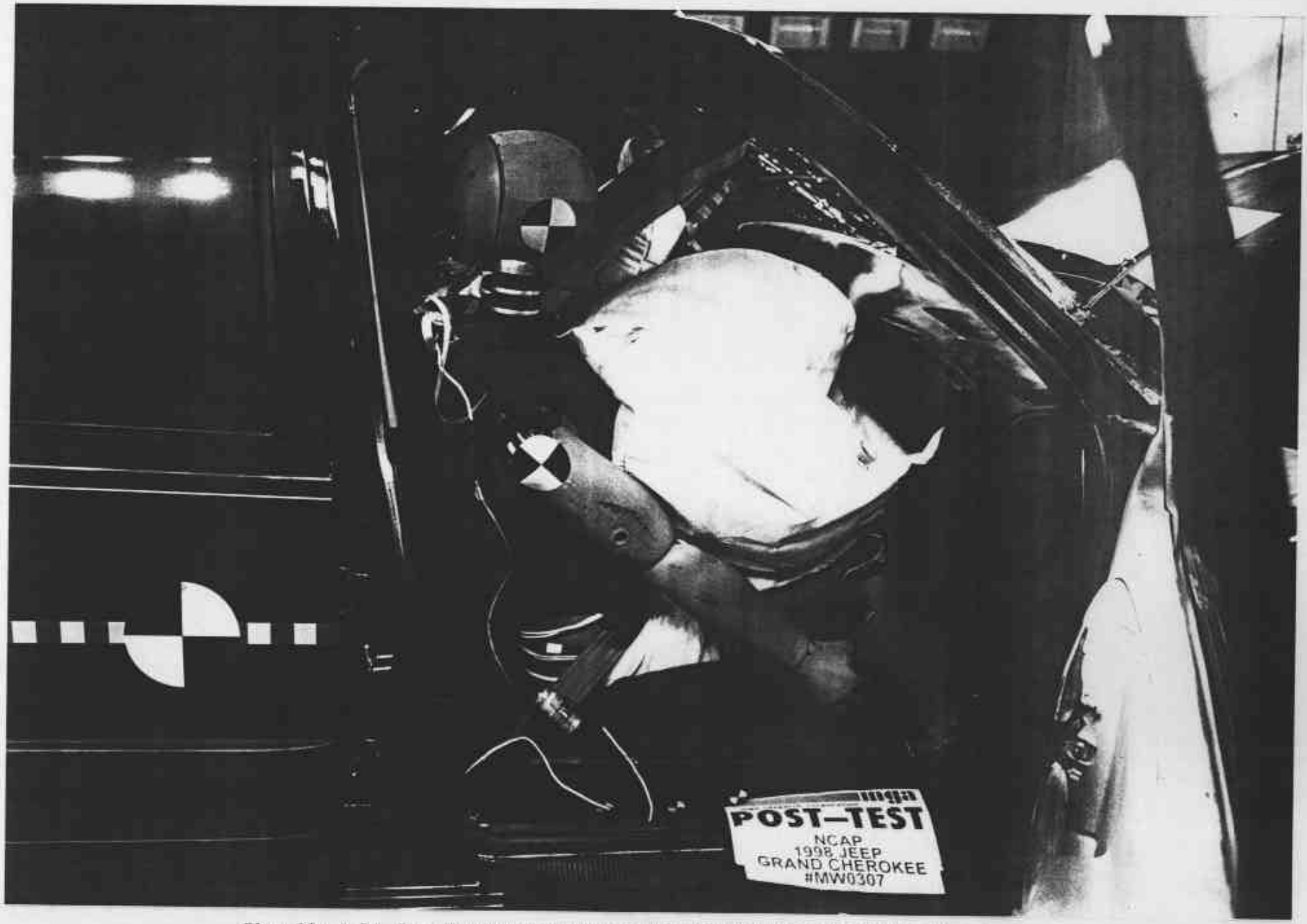


Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View (Door Open)

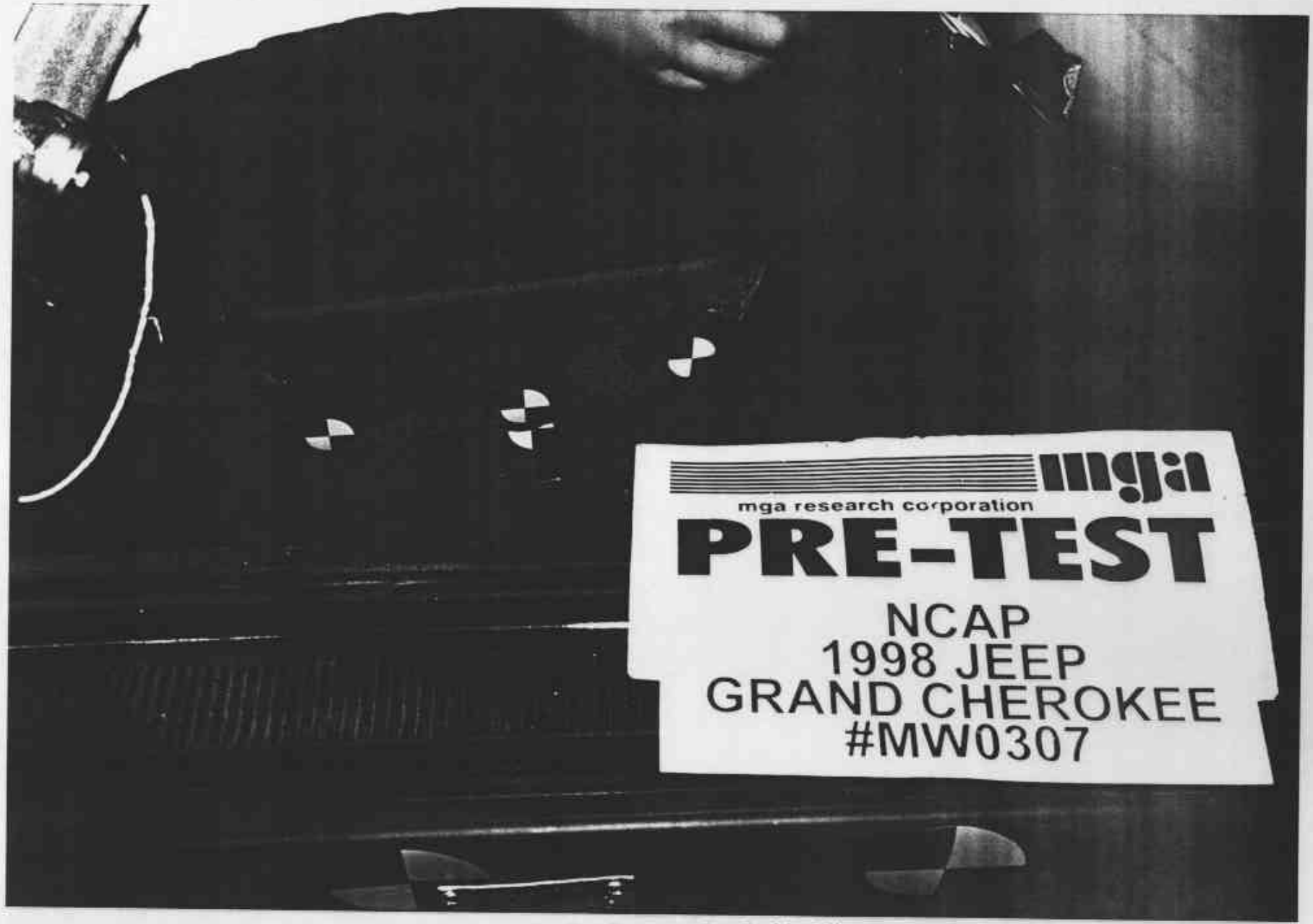


Photo No. A-35 - Pre-Test Passenger Seat Position View

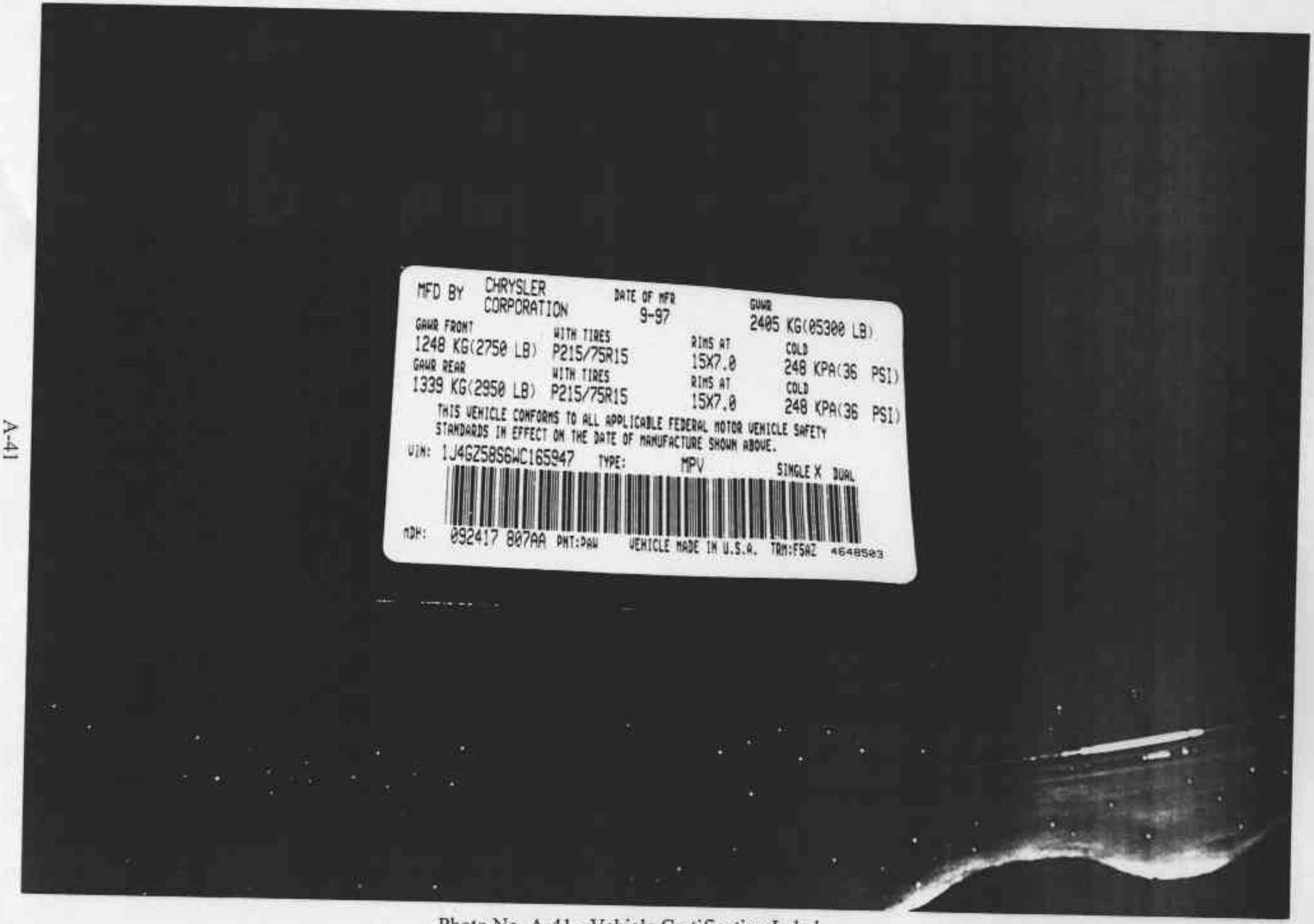
Photo No. A-36 - Post-Test Passenger Seat Position View

Photo No. A-37 - Pre-Test Passenger Dummy Knee Position

Photo No. A-38 - Post-Test Passenger Dummy Knee Position

Photo No. A-39 - Post-Test Passenger Airbag Contact

Photo No. A-40 - Post-Test Passenger Knee Contact View



A-41

Photo No. A-41 - Vehicle Certification Label

Photo No. A-42 - Tire Placard

Photo No. A-43 - Vehicle Impact

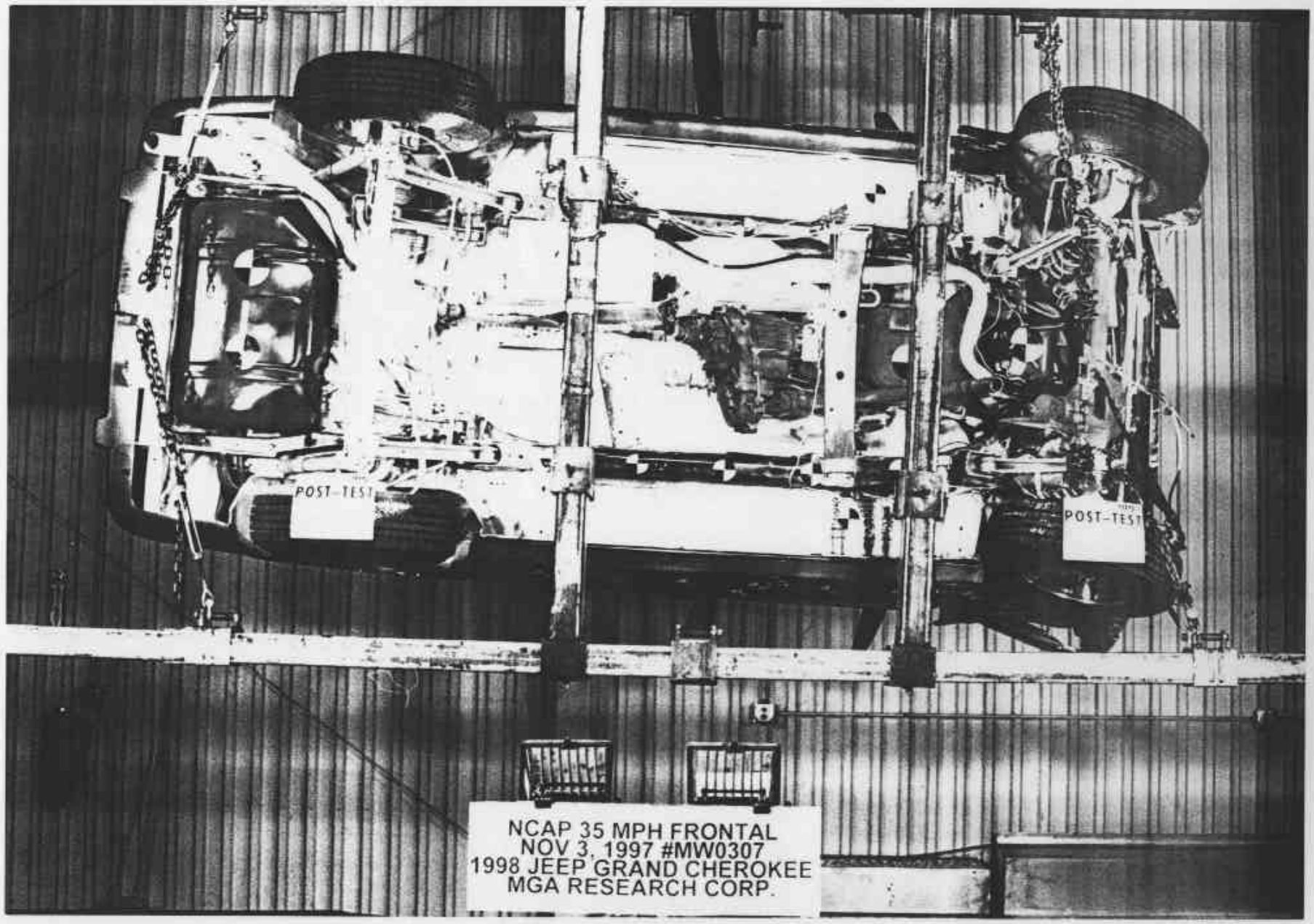


Photo No. A-44 - Rollover 90°

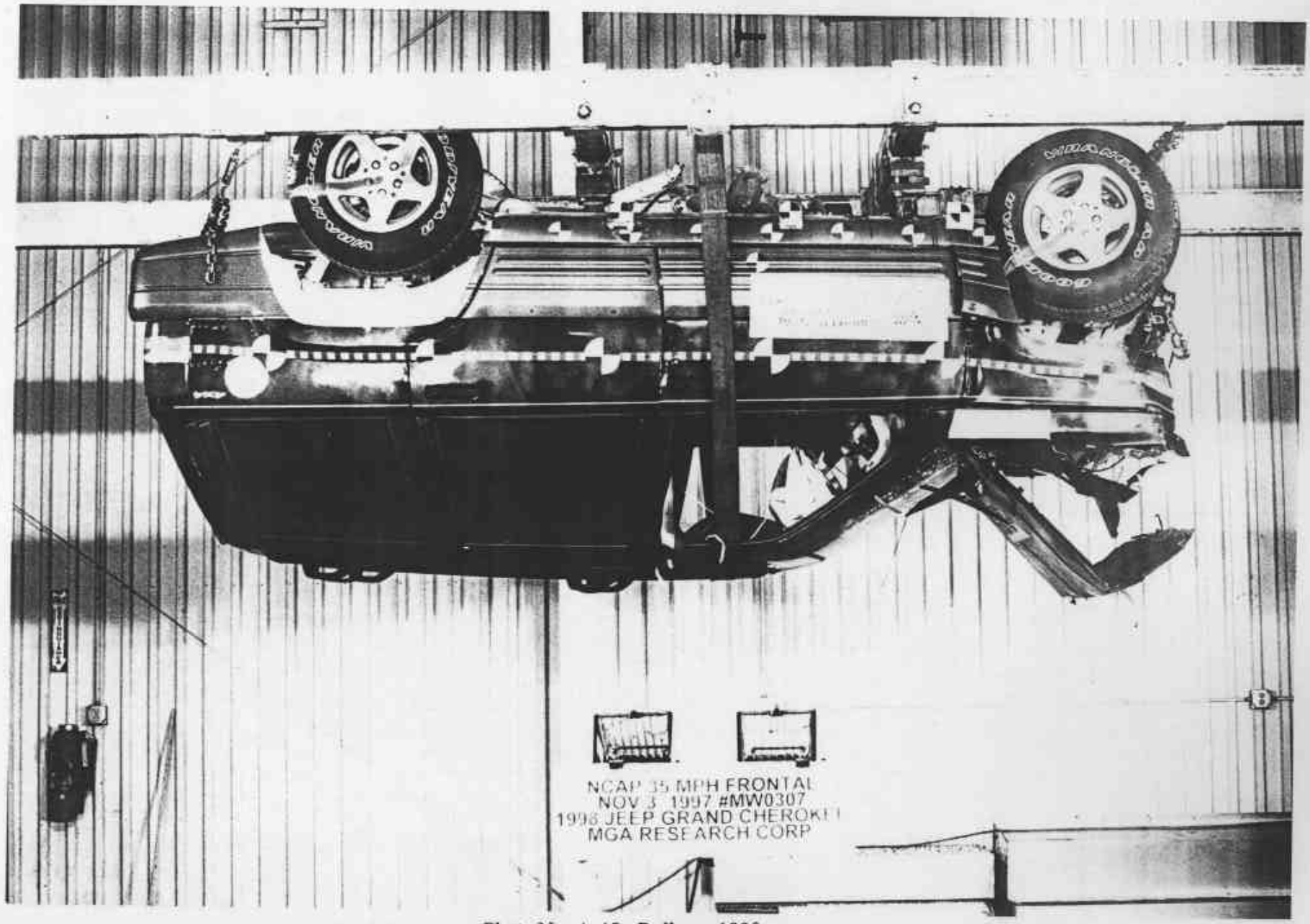


Photo No. A-45 - Rollover 180°

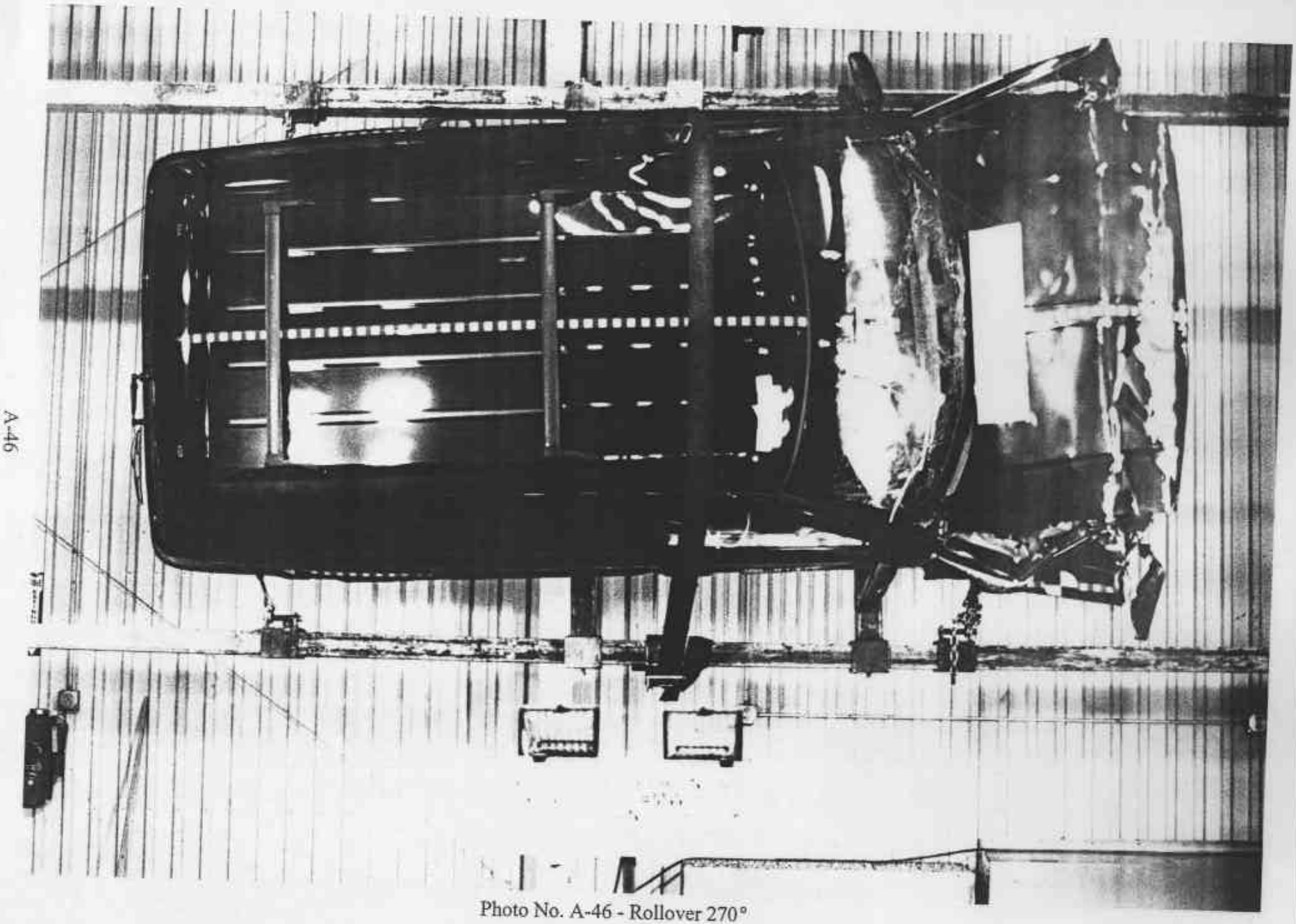


Photo No. A-46 - Rollover 270°

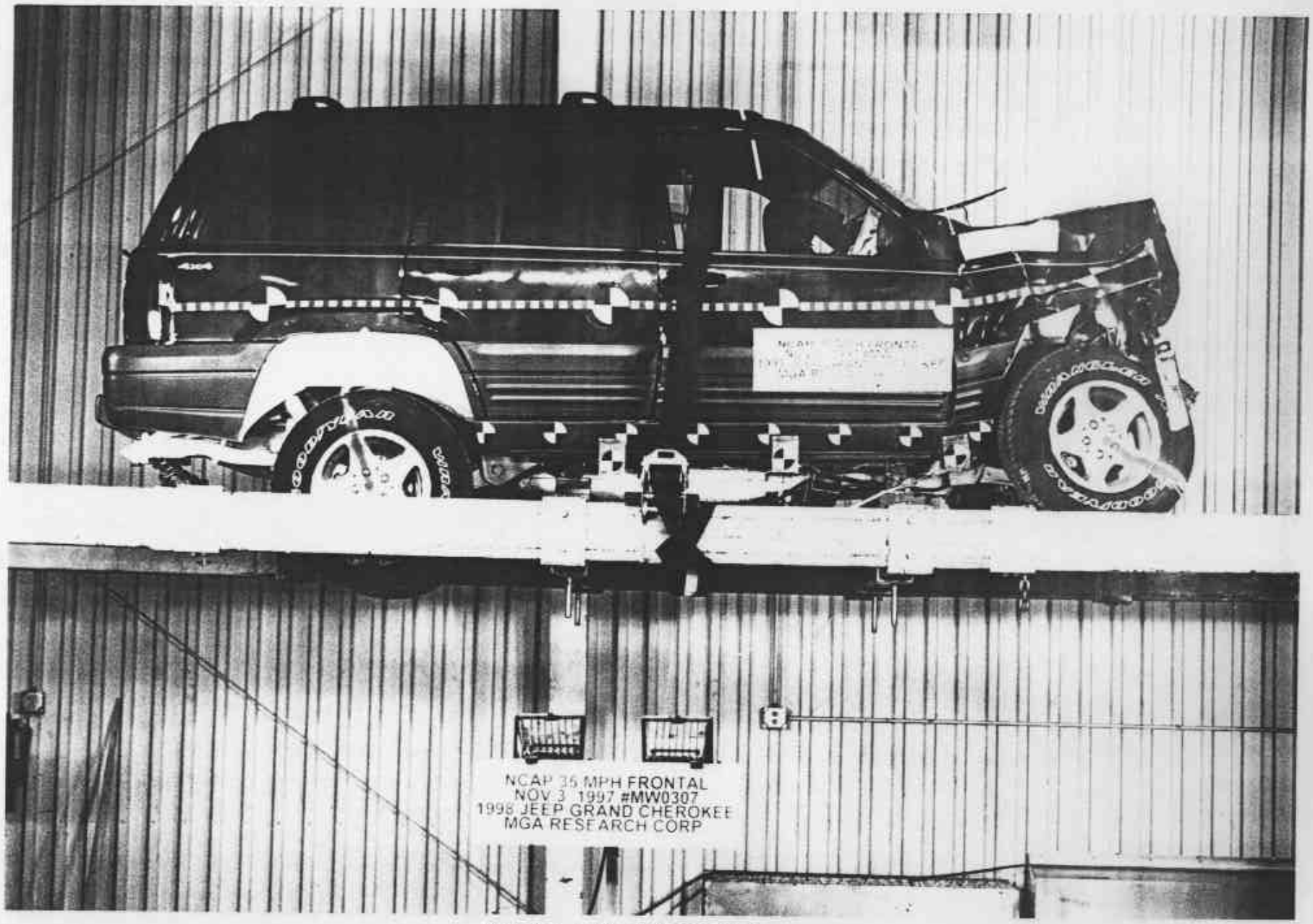


Photo No. A-47 - Rollover 360°

APPENDIX B

Vehicle and Dummy Response Data

1998 Jeep Grand Cherokee Laredo 4 Door 4WD

NHTSA NO.: MV0307

VEHICLE DATA FILTER CHANNEL CLASS

Head Accelerations 1000 (1650 Hz)

Chest Accelerations 180 (300 Hz)

Vehicle Accelerations 60 (100 Hz)

Barrier Load Cells 60 (100 Hz)

Femur Load Cells 600 (1000 Hz)

Lap and Torso Belts 60 (100 Hz)

Occupant Data	Page No.
Figure B-1 - Driver Head X Acceleration vs. Time	B-1
Figure B-2 - Driver Head Y Acceleration vs. Time	B-2
Figure B-3 - Driver Head Z Acceleration vs. Time	B-3
Figure B-4 - Driver Head Resultant Acceleration vs. Time	B-4
Figure B-5 - Driver Head X Velocity vs. Time	B-5
Figure B-6 - Driver Head Redundant X Acceleration vs. Time	B-6
Figure B-7 - Driver Head Redundant Y Acceleration vs. Time	B-7
Figure B-8 - Driver Head Redundant Z Acceleration vs. Time	B-8
Figure B-9 - Driver Head Redundant Resultant Acceleration vs. Time*	B-9
Figure B-10 - Driver Head Redundant X Velocity vs. Time	B-10
Figure B-11 - Driver Neck Force X vs. Time	B-11
Figure B-12 - Driver Neck Force Y vs. Time	B-12
Figure B-13 - Driver Neck Force Z vs. Time	B-13
Figure B-14 - Driver Neck Force Resultant vs. Time	B-14
Figure B-15 - Driver Neck Moment X vs. Time	B-15
Figure B-16 - Driver Neck Moment Y vs. Time	B-16
Figure B-17 - Driver Neck Moment Z vs. Time	B-17
Figure B-18 - Driver Neck Moment Resultant vs. Time	B-18
Figure B-19 - Driver Chest X Acceleration vs. Time	B-19

* Calculated using the driver head redundant X and Z accelerations and the driver head primary Y acceleration

Occupant Data: (Cont'd) Page No.

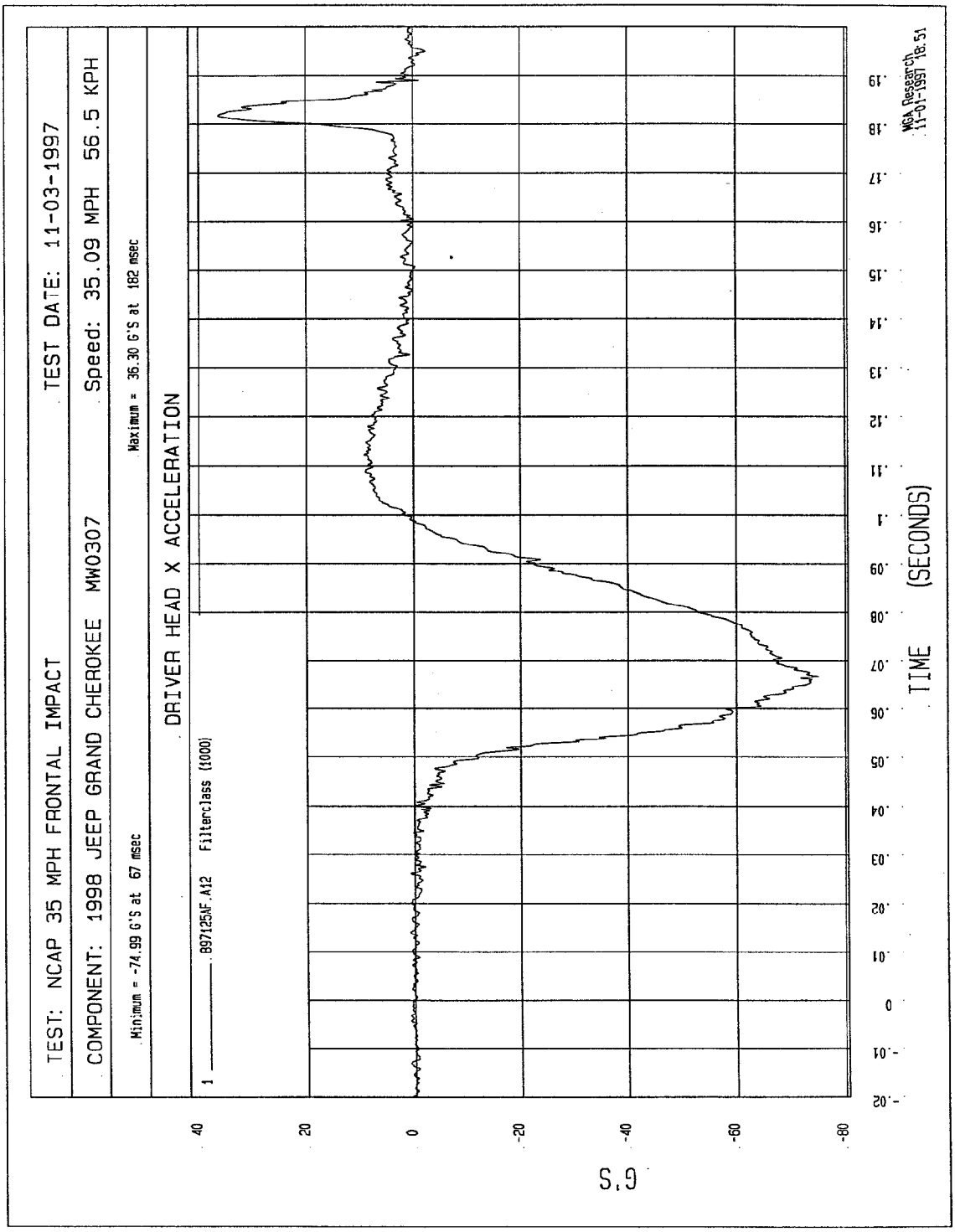
Figure B-20 - Driver Chest Y Acceleration vs. Time B-20
Figure B-21 - Driver Chest Z Acceleration vs. Time B-21
Figure B-22 - Driver Chest Resultant Acceleration vs. Time B-22
Figure B-23 - Driver Chest X Velocity vs. Time B-23
Figure B-24 - Driver Chest Redundant X Acceleration vs. Time B-24
Figure B-25 - Driver Chest Redundant Y Acceleration vs. Time B-25
Figure B-26 - Driver Chest Redundant Z Acceleration vs. Time B-26
Figure B-27 - Driver Chest Redundant Resultant Acceleration vs. Time B-27
Figure B-28 - Driver Chest Redundant X Velocity vs. Time B-28
Figure B-29 - Driver Chest Compression vs. Time B-29
Figure B-30 - Driver Pelvis X Acceleration vs. Time B-30
Figure B-31 - Driver Pelvis Y Acceleration vs. Time B-31
Figure B-32 - Driver Pelvis Z Acceleration vs. Time B-32
Figure B-33 - Driver Pelvis Resultant Acceleration vs. Time B-33
Figure B-34 - Driver Pelvis X Velocity vs. Time B-34
Figure B-35 - Driver Left Femur Force vs. Time B-35
Figure B-36 - Driver Right Femur Force vs. Time B-36
Figure B-37 - Driver Left Upper Tibia Moment X vs. Time B-37
Figure B-38 - Driver Left Upper Tibia Moment Y vs. Time B-38
Figure B-39 - Driver Left Lower Tibia Force X vs. Time B-39
Figure B-40 - Driver Left Lower Tibia Force Z vs. Time B-40
Figure B-41 - Driver Left Lower Tibia Moment Y vs. Time B-41
Figure B-42 - Driver Right Upper Tibia Moment X vs. Time B-42
Figure B-43 - Driver Right Upper Tibia Moment Y vs. Time B-43
Figure B-44 - Driver Right Lower Tibia Force X vs. Time B-44
Figure B-45 - Driver Right Lower Tibia Force Z vs. Time B-45
Figure B-46 - Driver Right Lower Tibia Moment Y vs. Time B-46
Figure B-47 - Driver Left Foot Ball Z Acceleration vs. Time B-47
Figure B-48 - Driver Left Foot Heel X Acceleration vs. Time B-48
Figure B-49 - Driver Left Foot Heel Z Acceleration vs. Time B-49
Figure B-50 - Driver Right Foot Ball Z Acceleration vs. Time B-50

Occupant Data: (Cont'd)	Page No.
Figure B-51 - Driver Right Foot Heel X Acceleration vs. Time	B-51
Figure B-52 - Driver Right Foot Heel Z Acceleration vs. Time	B-52
Figure B-53 - Driver Lap Belt Force vs. Time	B-53
Figure B-54 - Driver Shoulder Belt Force vs. Time	B-54
Figure B-55 - Driver Belt Spoolout vs. Time	B-55
Figure B-56 - Passenger Head X Acceleration vs. Time	B-56
Figure B-57 - Passenger Head Y Acceleration vs. Time	B-57
Figure B-58 - Passenger Head Z Acceleration vs. Time	B-58
Figure B-59 - Passenger Head Resultant Acceleration vs. Time	B-59
Figure B-60 - Passenger Head X Velocity vs. Time	B-60
Figure B-61 - Passenger Head Redundant X Acceleration vs. Time	B-61
Figure B-62 - Passenger Head Redundant Y Acceleration vs. Time	B-62
Figure B-63- Passenger Head Redundant Z Acceleration vs. Time	B-63
Figure B-64 - Passenger Head Redundant Resultant Acceleration vs. Time	B-64
Figure B-65 - Passenger Head Redundant X Velocity vs. Time	B-65
Figure B-66 - Passenger Neck Force X vs. Time	B-66
Figure B-67 - Passenger Neck Force Y vs. Time	B-67
Figure B-68 - Passenger Neck Force Z vs. Time	B-68
Figure B-69 - Passenger Neck Force Resultant vs. Time	B-69
Figure B-70 - Passenger Neck Moment X vs. Time	B-70
Figure B-71 - Passenger Neck Moment Y vs. Time	B-71
Figure B-72 - Passenger Neck Moment Z vs. Time	B-72
Figure B-73 - Passenger Neck Moment Resultant vs. Time	B-73
Figure B-74 - Passenger Chest X Acceleration vs. Time	B-74
Figure B-75 - Passenger Chest Y Acceleration vs. Time	B-75
Figure B-76 - Passenger Chest Z Acceleration vs. Time	B-76
Figure B-77 - Passenger Chest Resultant Acceleration vs. Time	B-77
Figure B-78 - Passenger Chest X Velocity vs. Time	B-78
Figure B-79 - Passenger Chest Redundant X Acceleration vs. Time	B-79
Figure B-80 - Passenger Chest Redundant Y Acceleration vs. Time	B-80
Figure B-81 - Passenger Chest Redundant Z Acceleration vs. Time	B-81

Occupant Data: (Cont'd) Page No.

Figure B-82 - Passenger Chest Redundant Resultant Acceleration vs. Time B-82
Figure B-83 - Passenger Chest Redundant X Velocity vs. Time B-83
Figure B-84 - Passenger Chest Compression vs. Time B-84
Figure B-85 - Passenger Pelvis X Acceleration vs. Time B-85
Figure B-86 - Passenger Pelvis Y Acceleration vs. Time B-86
Figure B-87 - Passenger Pelvis Z Acceleration vs. Time B-87
Figure B-88 - Passenger Pelvis Resultant Acceleration vs. Time B-88
Figure B-89 - Passenger Pelvis X Velocity vs. Time B-89
Figure B-90 - Passenger Left Femur Force vs. Time B-90
Figure B-91 - Passenger Right Femur Force vs. Time B-91
Figure B-92 - Passenger Left Upper Tibia Moment X vs. Time B-92
Figure B-93 - Passenger Left Upper Tibia Moment Y vs. Time B-93
Figure B-94 - Passenger Left Lower Tibia Force X vs. Time B-94
Figure B-95 - Passenger Left Lower Tibia Force Z vs. Time B-95
Figure B-96 - Passenger Left Lower Tibia Moment Y vs. Time B-96
Figure B-97 - Passenger Right Upper Tibia Moment X vs. Time B-97
Figure B-98 - Passenger Right Upper Tibia Moment Y vs. Time B-98
Figure B-99 - Passenger Right Lower Tibia Force X vs. Time B-99
Figure B-100 - Passenger Right Lower Tibia Force Z vs. Time B-100
Figure B-101 - Passenger Right Lower Tibia Moment Y vs. Time B-101
Figure B-102 - Passenger Left Foot Ball Z Acceleration vs. Time B-102
Figure B-103 - Passenger Left Foot Heel X Acceleration vs. Time B-103
Figure B-104 - Passenger Left Foot Heel Z Acceleration vs. Time B-104
Figure B-105 - Passenger Right Foot Ball Z Acceleration vs. Time B-104
Figure B-106 - Passenger Right Foot Heel X Acceleration vs. Time B-106
Figure B-107 - Passenger Right Foot Heel Z Acceleration vs. Time B-107
Figure B-108 - Passenger Lap Belt Force vs. Time B-108
Figure B-109 - Passenger Shoulder Belt Force vs. Time B-109
Figure B-110 - Passenger Belt Spoolout vs. Time B-110

Vehicle and Barrier Data:	Page No.
Figure B-111- Left Rear Seat Crossmember X Acceleration vs. Time	B-111
Figure B-112 - Left Rear Seat Crossmember X Velocity vs. Time	B-112
Figure B-113 - Left Rear Seat Crossmember X Displacement vs. Time	B-113
Figure B-114 - Right Rear Seat Crossmember X Acceleration vs. Time	B-114
Figure B-115- Right Rear Seat Crossmember X Velocity vs. Time	B-115
Figure B-116 - Right Rear Seat Crossmember X Displacement vs. Time	B-116
Figure B-117 - Top of Engine Block X Acceleration vs. Time	B-117
Figure B-118 - Top of Engine Block X Velocity vs. Time	B-118
Figure B-119 - Top of Engine Block X Displacement vs. Time	B-119
Figure B-120 - Bottom of Engine X Acceleration vs. Time	B-120
Figure B-121 - Bottom of Engine X Velocity vs. Time	B-121
Figure B-122 - Bottom of Engine X Displacement vs. Time	B-122
Figure B-123 - Left Front Brake Caliper X Acceleration vs. Time	B-123
Figure B-124 - Left Front Brake Caliper X Velocity vs. Time	B-124
Figure B-125 - Left Front Brake Caliper X Displacement vs. Time	B-125
Figure B-126 - Right Front Brake Caliper X Acceleration vs. Time	B-126
Figure B-127 - Right Front Brake Caliper X Velocity vs. Time	B-127
Figure B-128 - Right Front Brake Caliper X Displacement vs. Time	B-128
Figure B-129 - Instrument Panel X Acceleration vs. Time	B-129
Figure B-130 - Instrument Panel X Velocity vs. Time	B-130
Figure B-131 - Instrument Panel X Displacement vs. Time	B-131
Figure B-132 - Left Rear Seat Crossmember Redundant X Acceleration vs. Time	B-132
Figure B-133 - Left Rear Seat Crossmember Redundant X Velocity vs. Time	B-133
Figure B-134 - Left Rear Seat Crossmember Redundant X Displacement vs. Time	B-134
Figure B-135 - Right Rear Seat Crossmember Redundant X Acceleration vs. Time	B-135
Figure B-136 - Right Rear Seat Crossmember Redundant X Velocity vs.Time	B-136
Figure B-137 - Right Rear Seat Crossmember Redundant X Displacement vs. Time	B-137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TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -74.99 G'S at 67 msec
Maximum = 36.30 G'S at 182 msec
DRIVER HEAD X ACCELERATION
1 _____ .B97125NF.A12 Filterclass (1000)
40
20
0
-20
-40
-60
-80
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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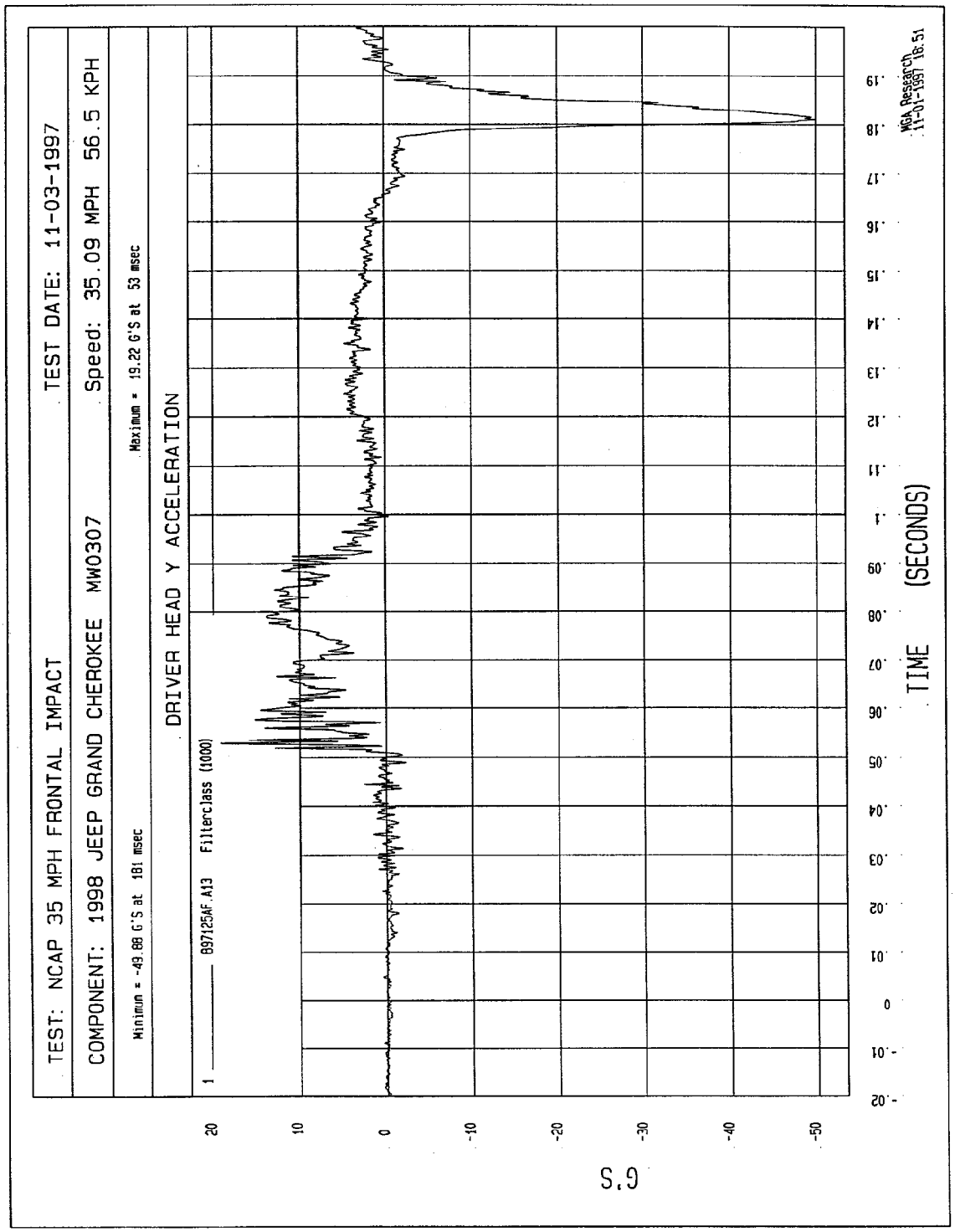
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COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -49.88 G'S at 181 msec
Maximum = 19.22 G'S at 53 msec
DRIVER HEAD Y ACCELERATION
1 ——— 897125AF.A13 Filterclass (1000)
20
10
0
-10
-20
-30
-40
-50
G'S
.02
.01
0
-.01
-.02
.07
.06
.05
.04
.03
.02
.01
0
.09
.08
.07
.06
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.03
.02
.01
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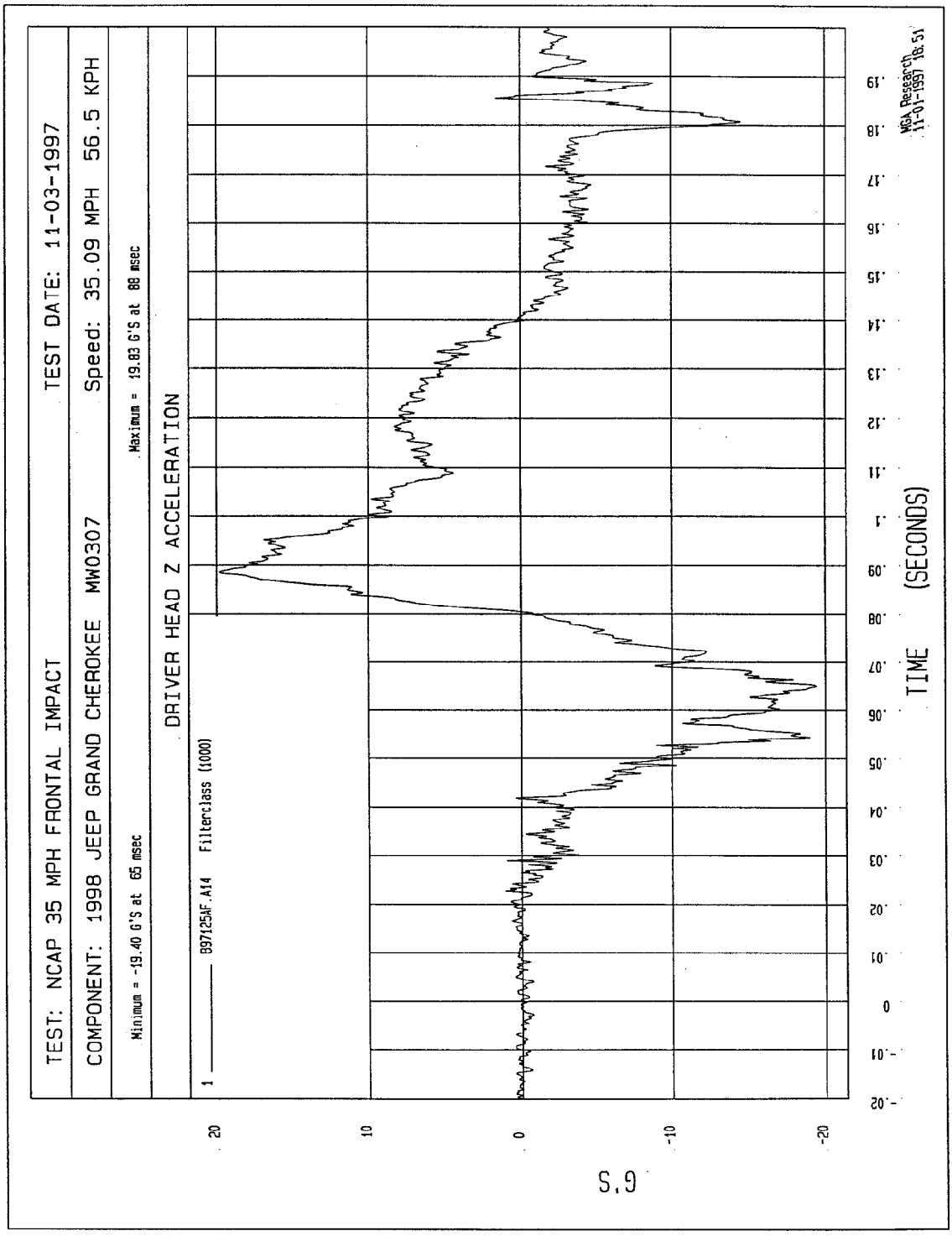
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TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -19.40 G'S at 65 msec
Maximum = 19.83 G'S at 88 msec
DRIVER HEAD Z ACCELERATION
1 B97125AF.A14 Filterclass (1000)
20
10
0
-10
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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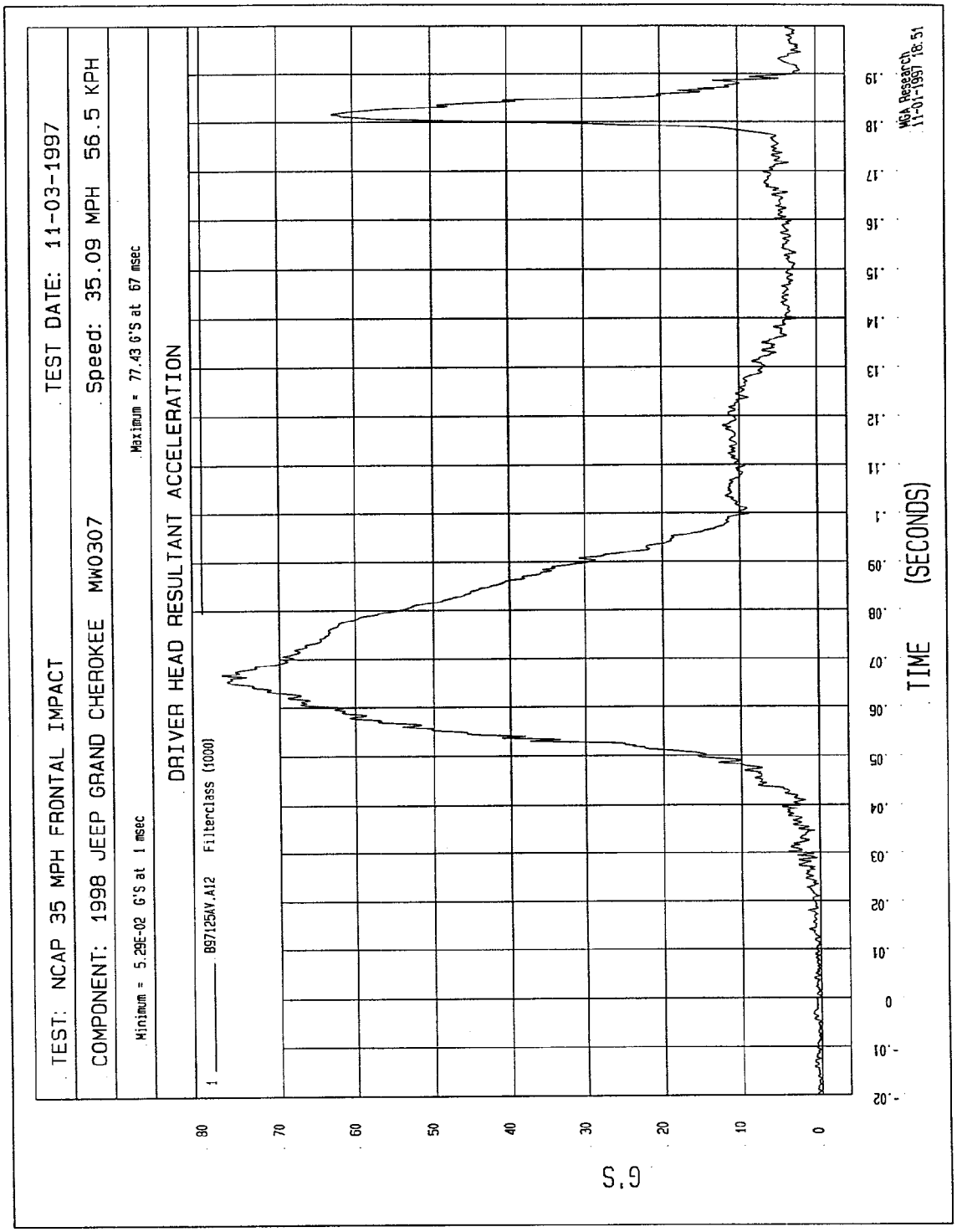
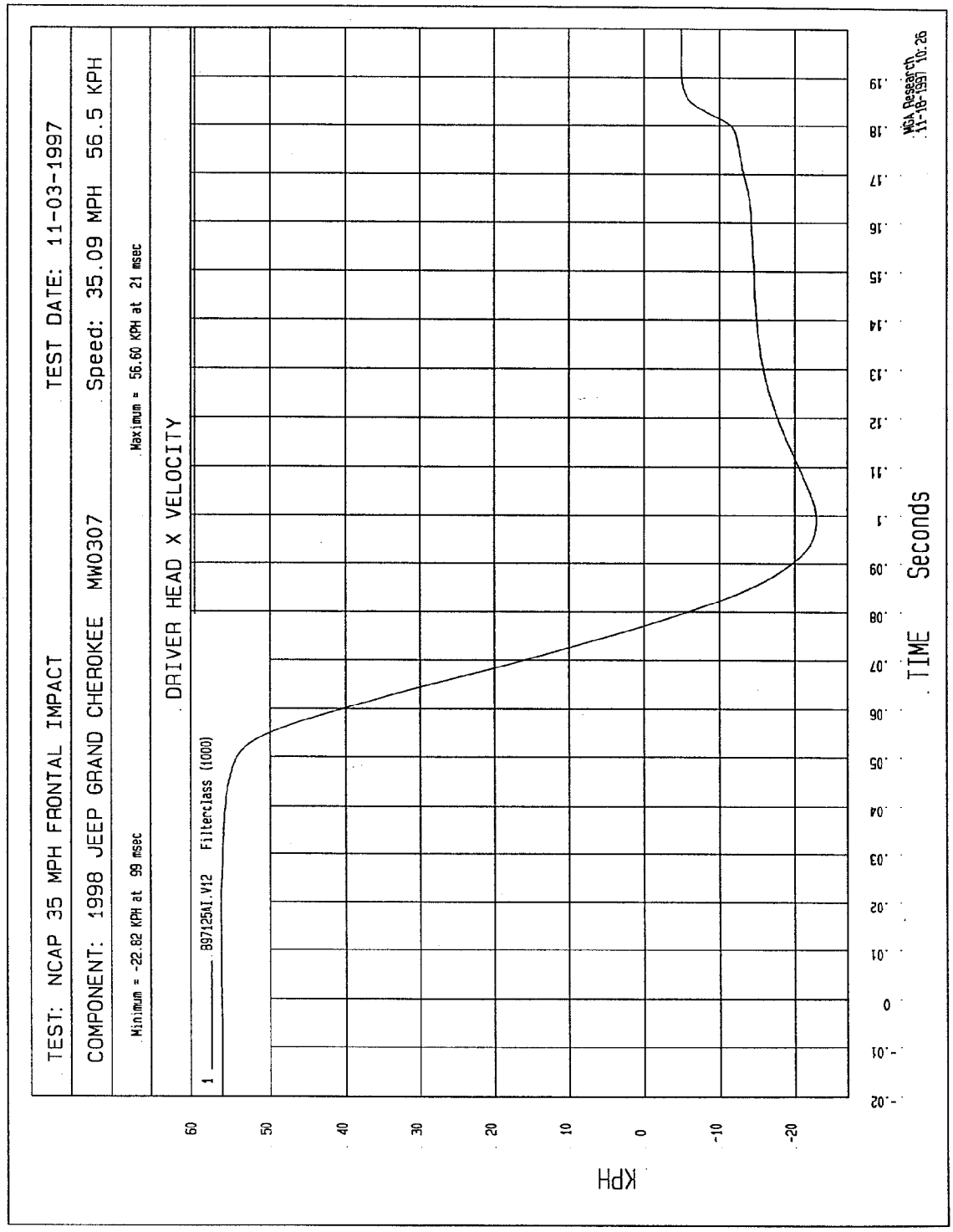
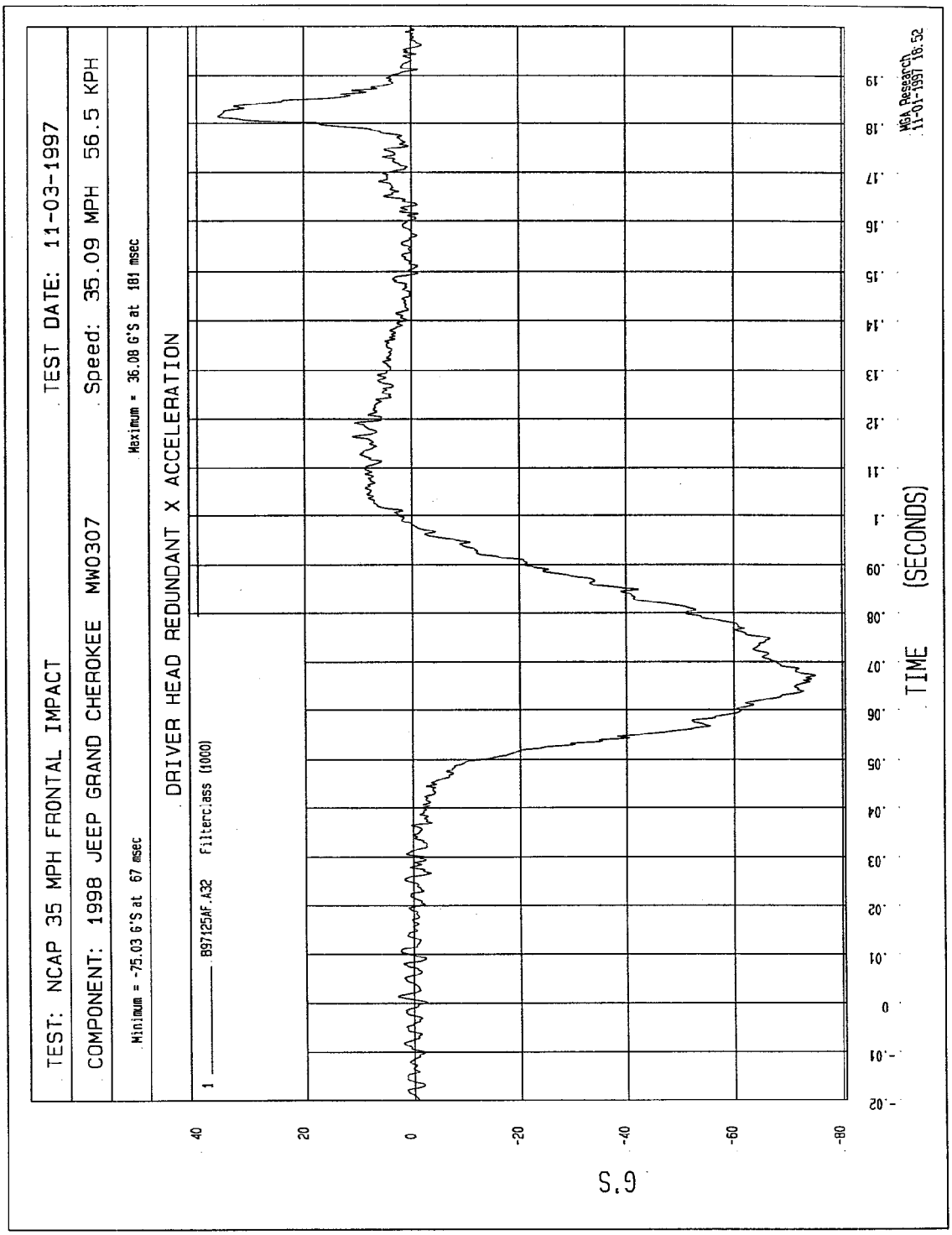
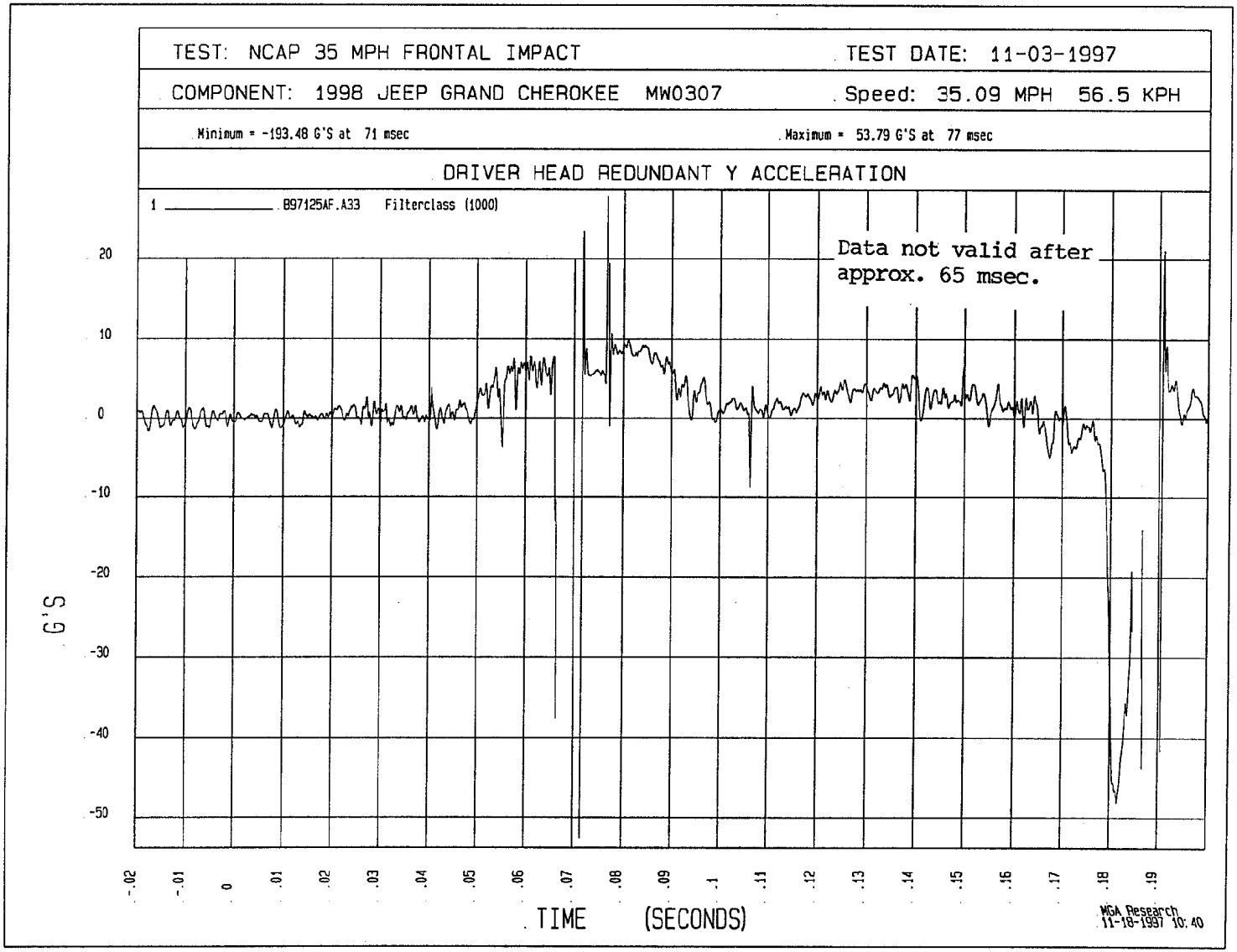
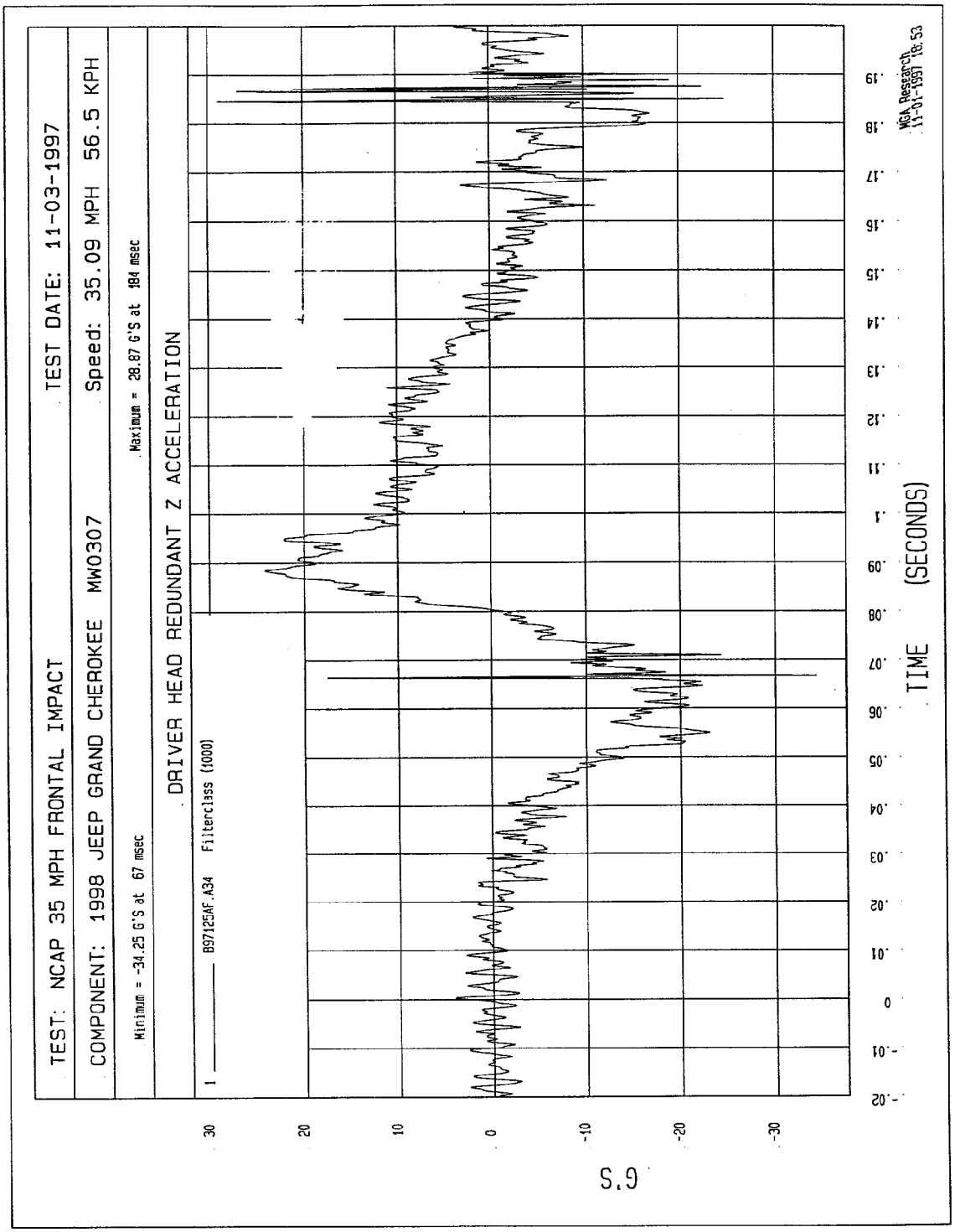
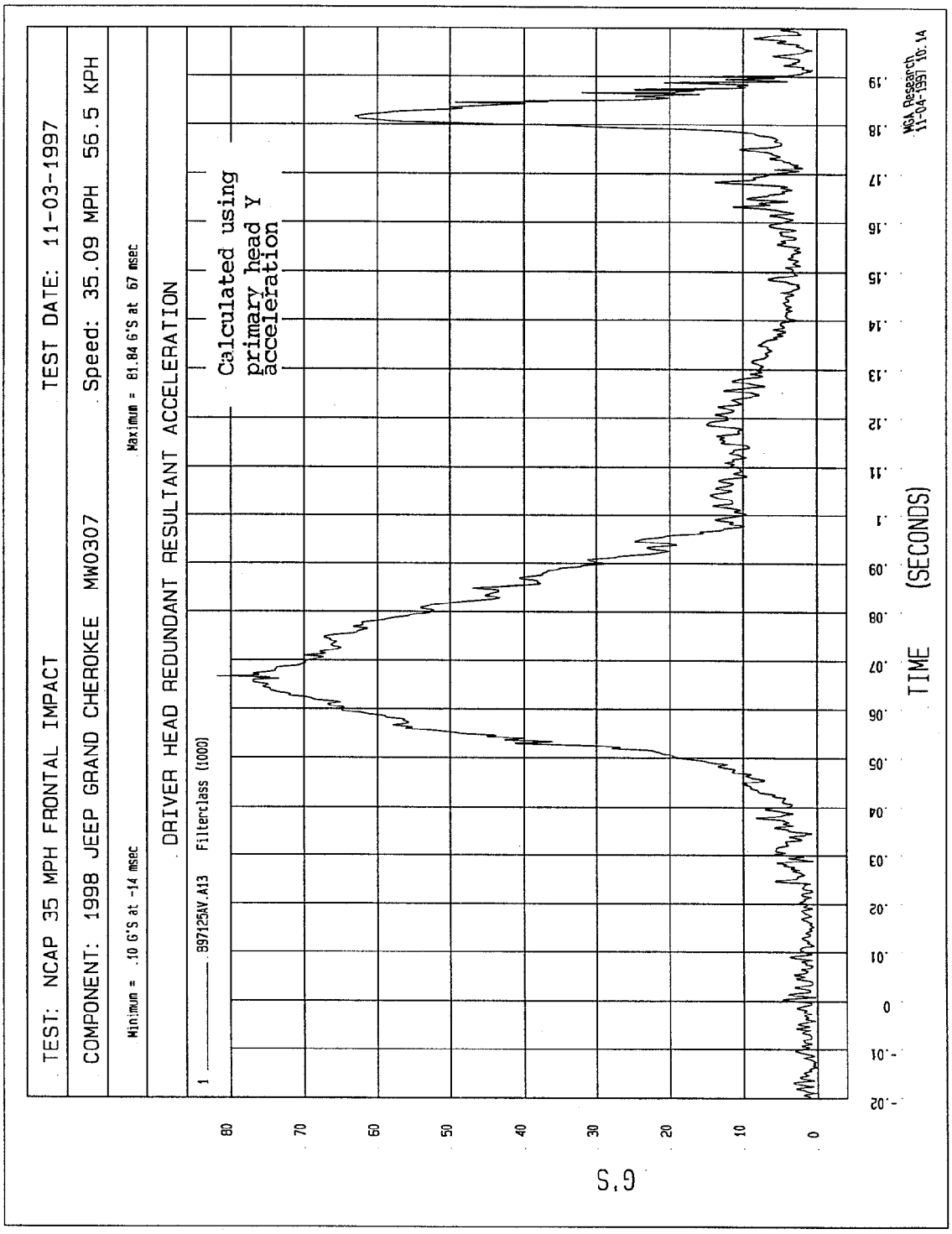

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 5.29E-02 G'S at 1 msec
Maximum = 77.43 G'S at 67 msec
DRIVER HEAD RESULTANT ACCELERATION
1 B97125AV.A12 Filterclass (1000)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 18:51

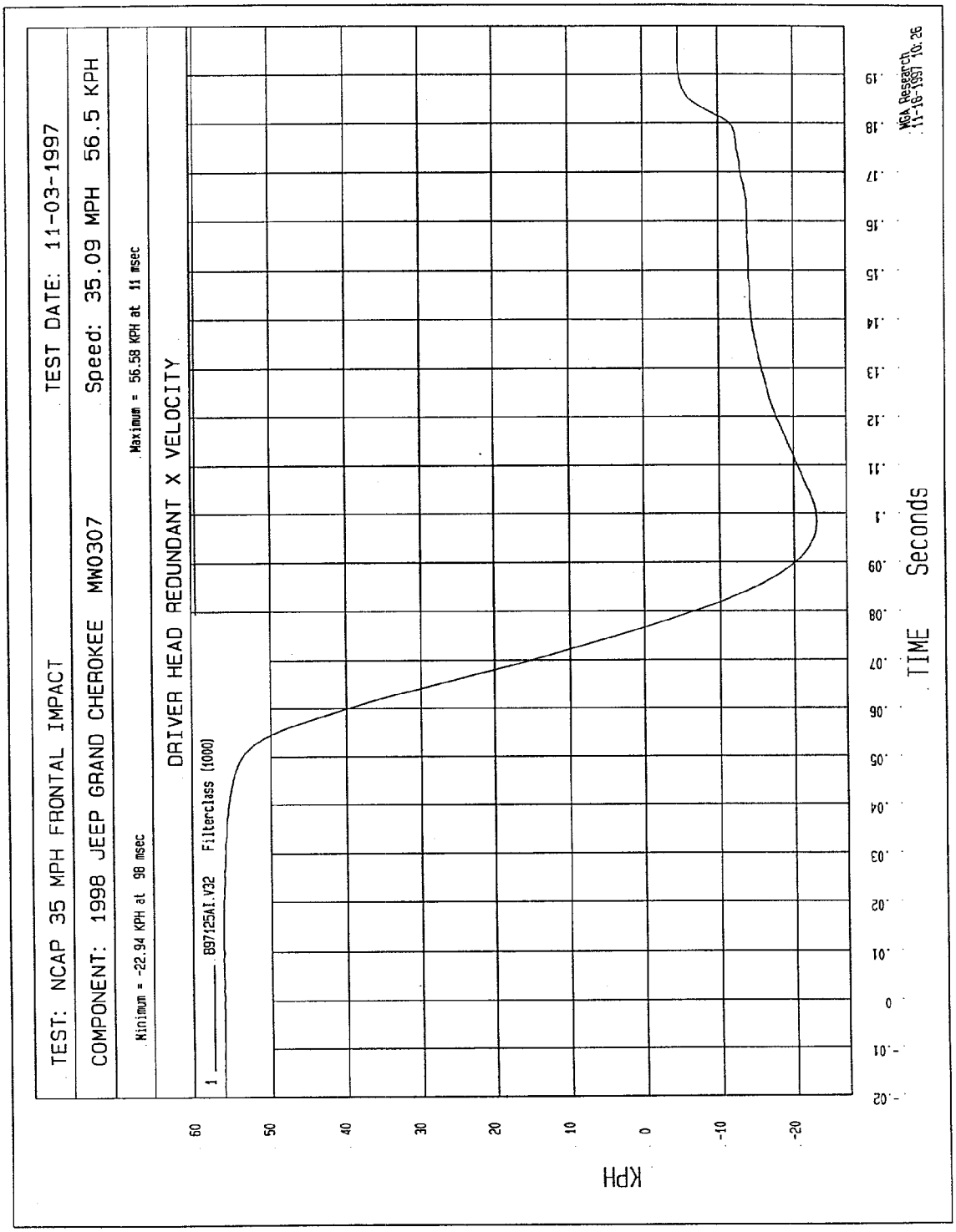

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -22.82 KPH at 99 msec
Maximum = 56.60 KPH at 21 msec
DRIVER HEAD X VELOCITY
1 B97125A1.V12 Filterclass (1000)
KPH
TIME Seconds
NGA Research
11-18-1997 10:26

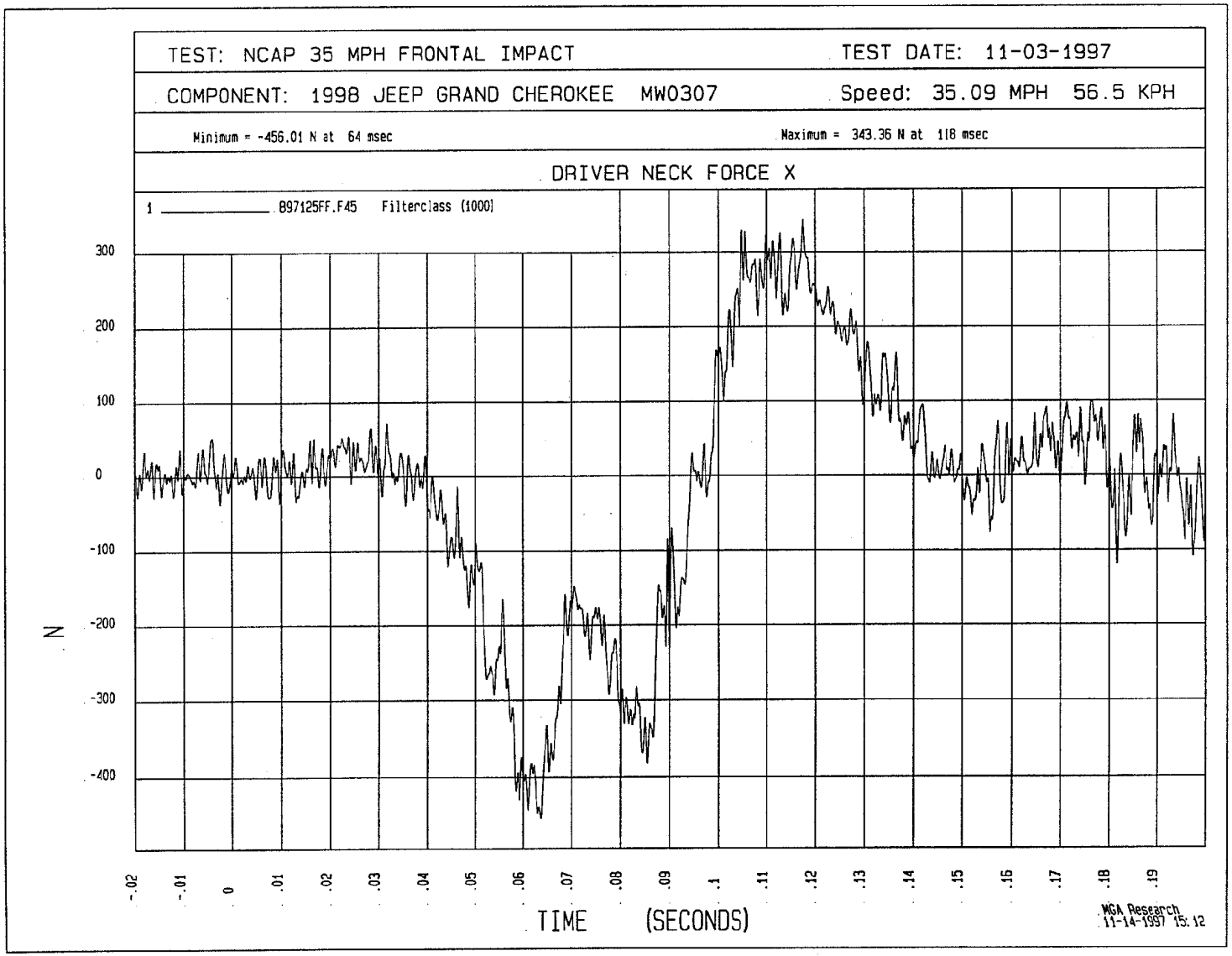

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -75.03 G'S at 67 msec
Maximum = 36.08 G'S at 181 msec
DRIVER HEAD REDUNDANT X ACCELERATION
1 B97125AF.A32 Filterclass (1000)
40
20
0
-20
-40
-60
-80
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-01-1997 16:52

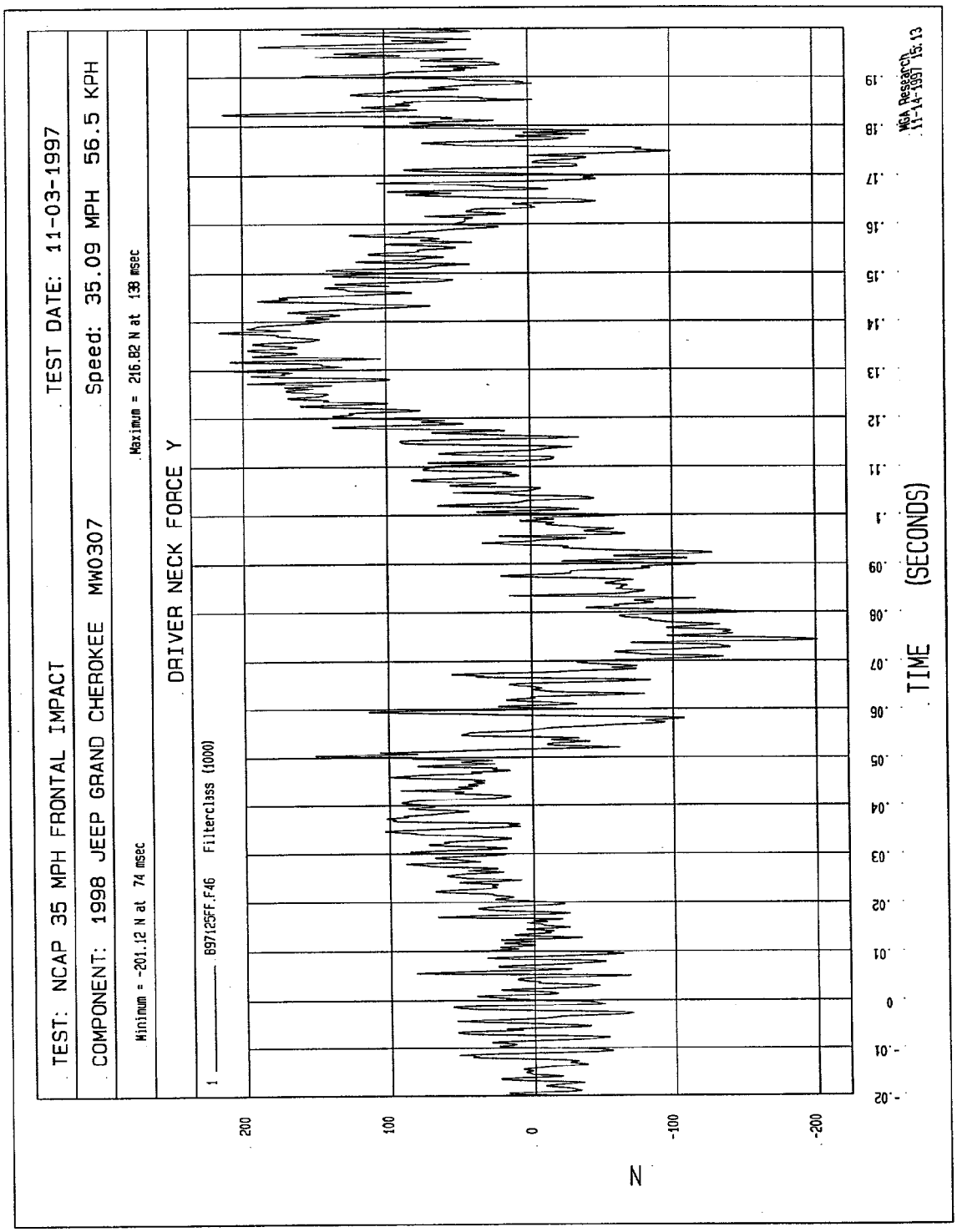

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -193.48 G'S at 71 msec
Maximum = 53.79 G'S at 77 msec
DRIVER HEAD REDUNDANT Y ACCELERATION
1 B97125AF.A33 Filterclass (1000)
Data not valid after approx. 65 msec.
20
10
0
-10
-20
-30
-40
-50
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
11-18-1997 10:40

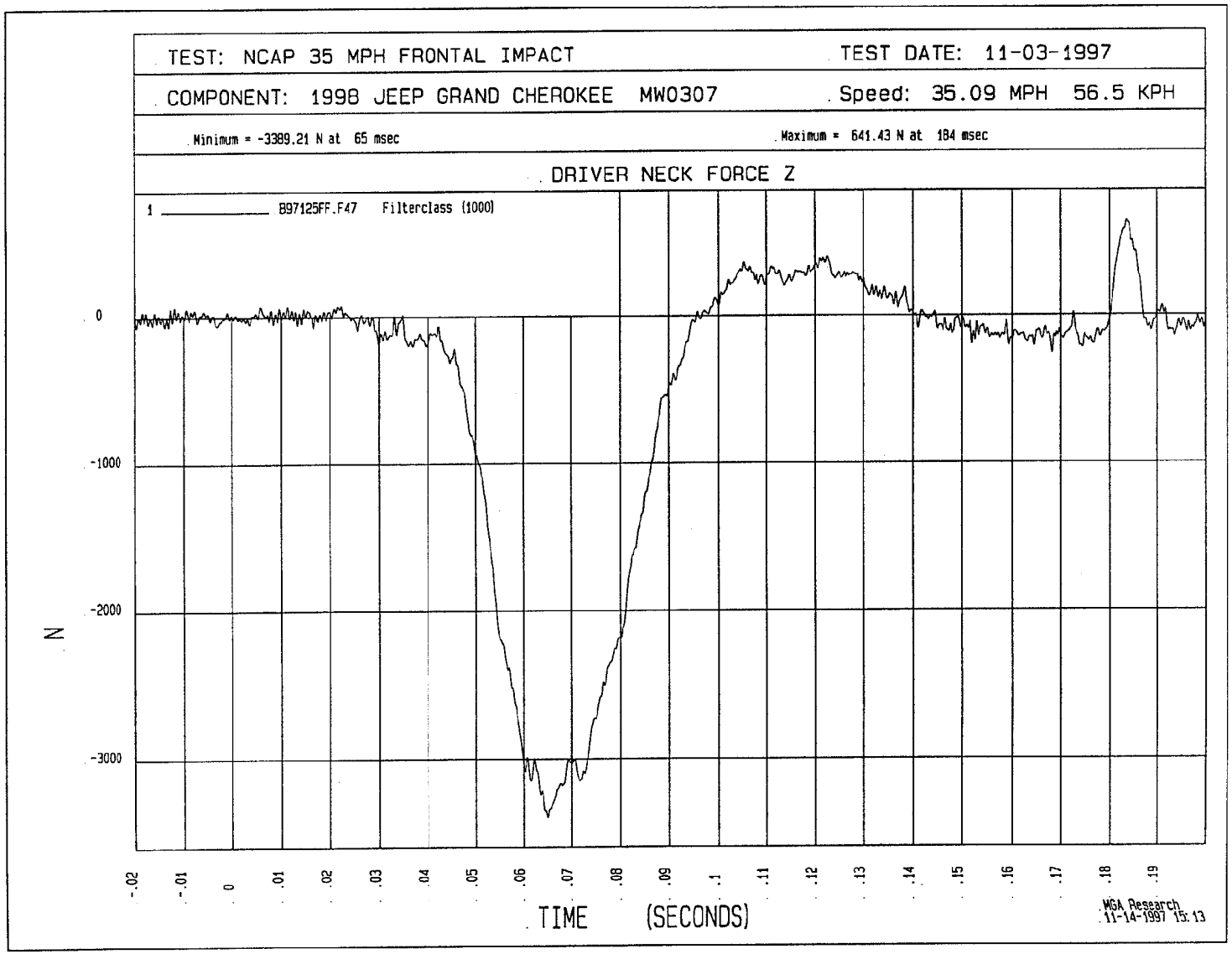

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -34.25 G'S at 67 msec
Maximum = 28.87 G'S at 184 msec
DRIVER HEAD REDUNDANT Z ACCELERATION
1 B97125AF.A34 Filterclass (1000)
30
20
10
0
-10
-20
-30
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-01-1997 16:53

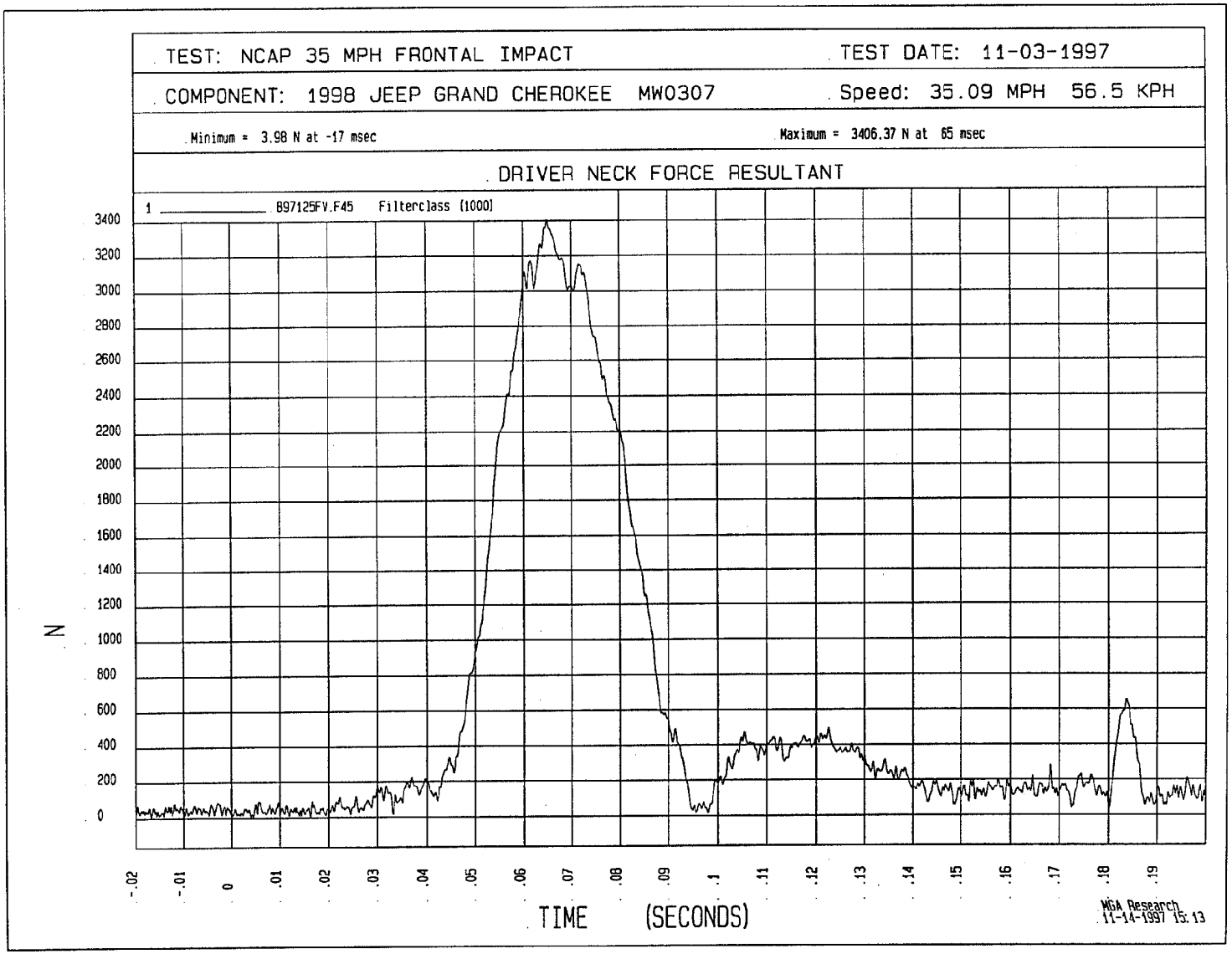

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = .10 G'S at -14 msec
Maximum = 81.84 G'S at 67 msec
DRIVER HEAD REDUNDANT RESULTANT ACCELERATION
1 _____ 397125AV.A13 Filterclass (1000)
Calculated using primary head Y acceleration
G'S
TIME (SECONDS)
MGA Research 11-04-1997 10:14

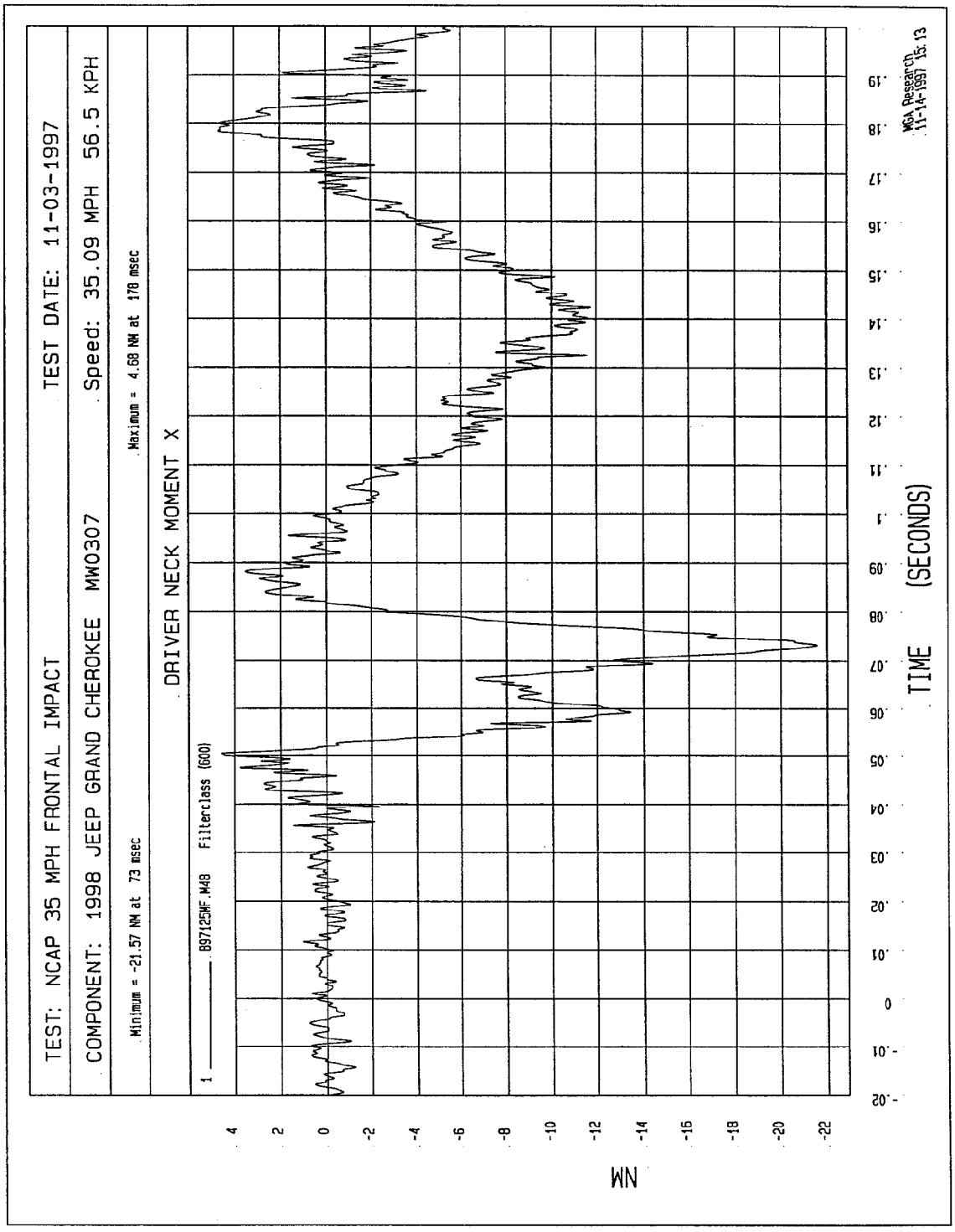

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -22.94 KPH at 98 msec
Maximum = 56.58 KPH at 11 msec
DRIVER HEAD REDUNDANT X VELOCITY
1 B97125AI.V32 Filterclass (1000)
KPH
TIME Seconds
WSA Research
11-18-1997 10:26

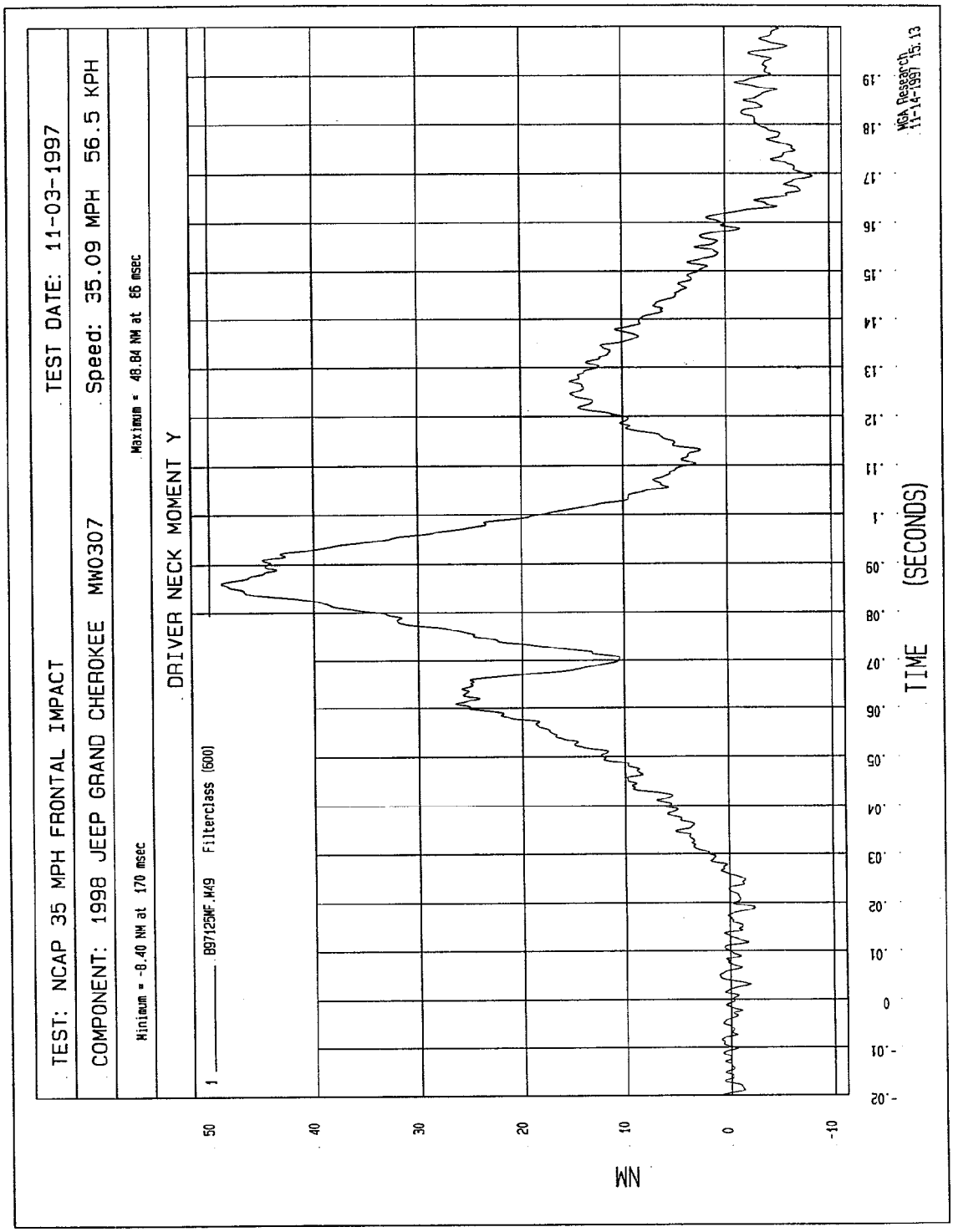

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -456.01 N at 64 msec
Maximum = 343.36 N at 118 msec
DRIVER NECK FORCE X
1 B97125FF.F45 Filterclass (1000)
300
200
100
0
-100
-200
-300
-400
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:12

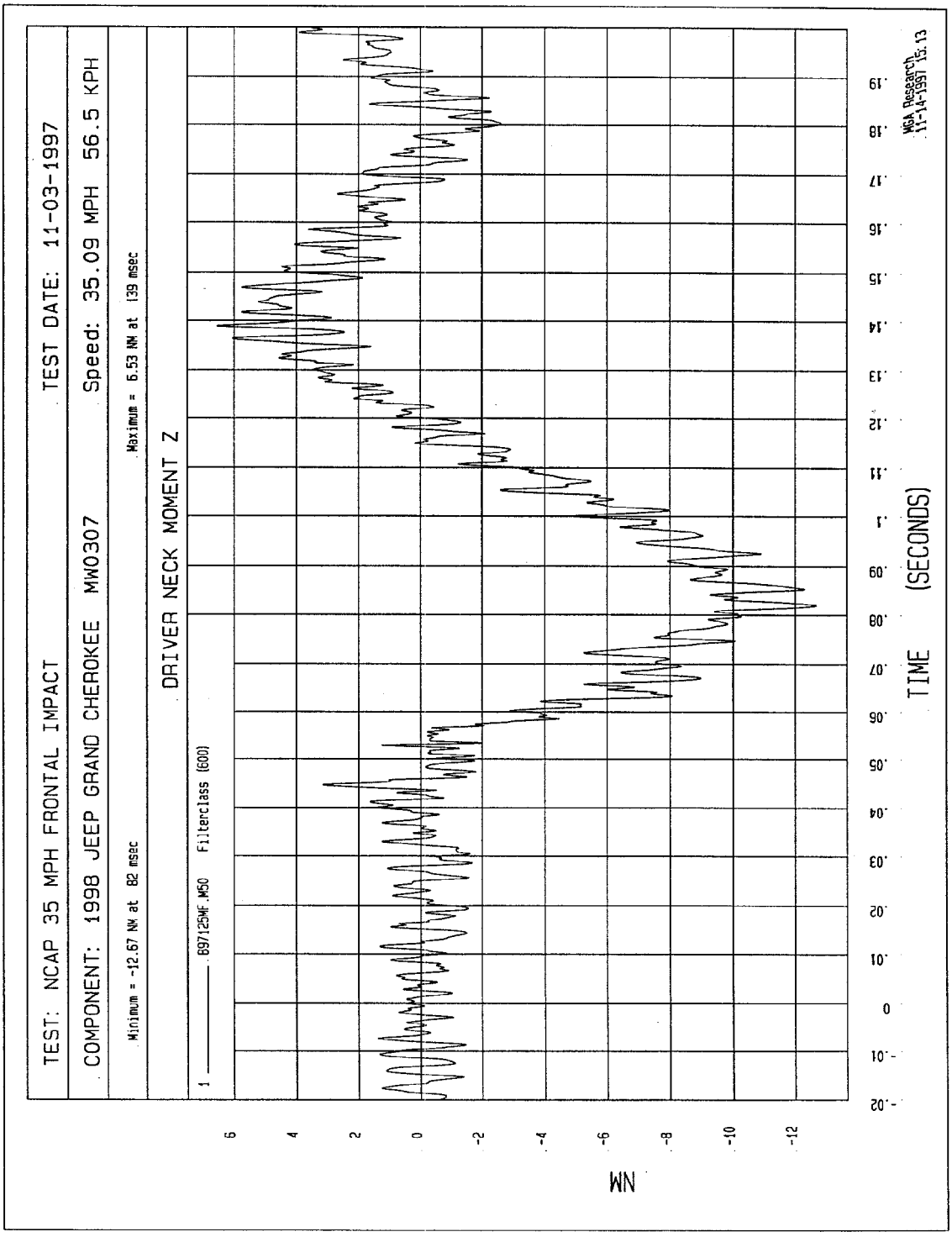

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -201.12 N at 74 msec
Maximum = 216.82 N at 138 msec
DRIVER NECK FORCE Y
1 B97125FF.F46 Filterclass (1000)
200
100
0
-100
-200
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:13

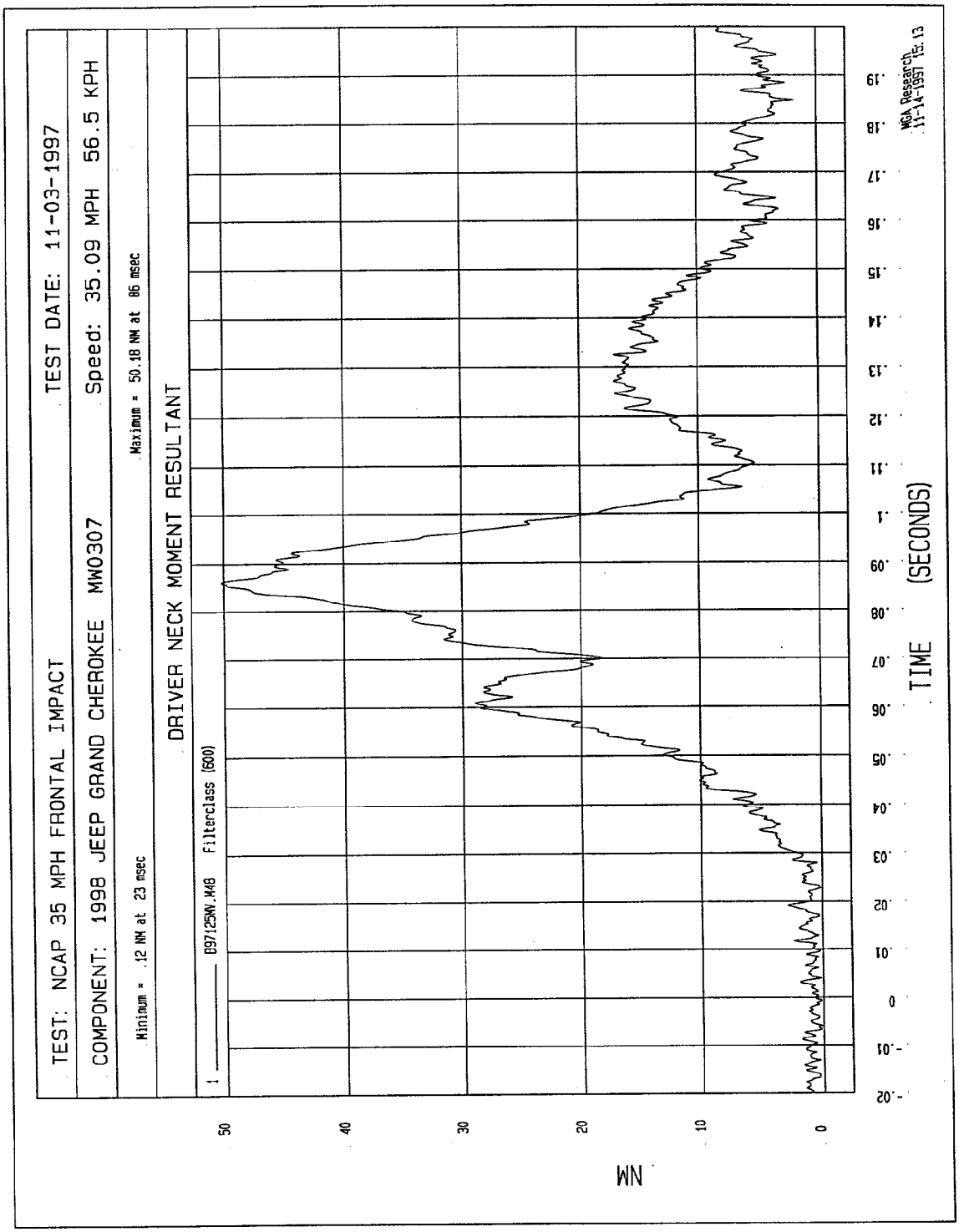

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -3389.21 N at 65 msec
Maximum = 641.43 N at 184 msec
DRIVER NECK FORCE Z
1 B97125FF.F47 Filterclass (1000)
0
-1000
-2000
-3000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:13

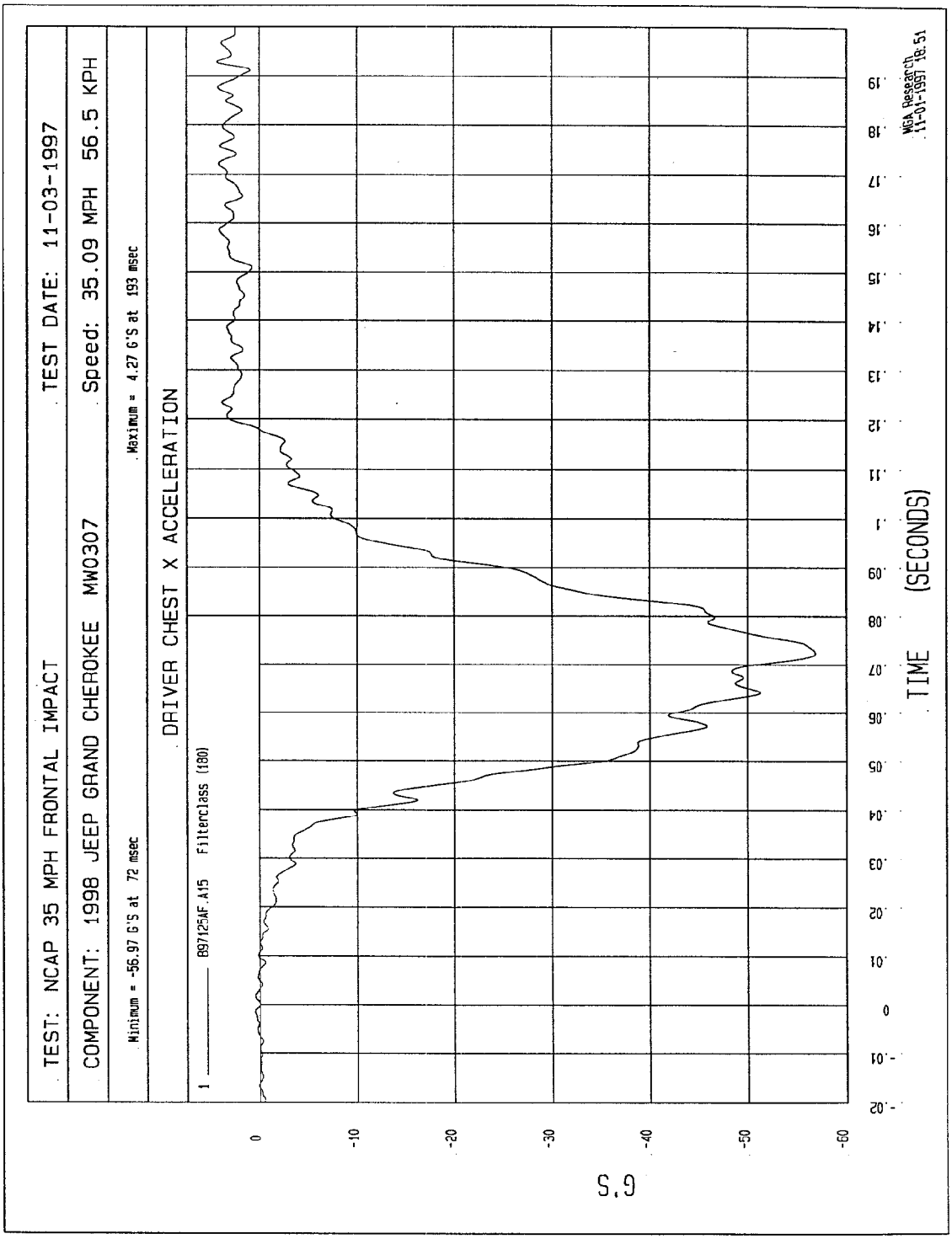

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 3.98 N at -17 msec
Maximum = 3406.37 N at 65 msec
DRIVER NECK FORCE RESULTANT
1 B97125FV.F45 Filterclass (1000)
N
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
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
11-14-1997 15:13

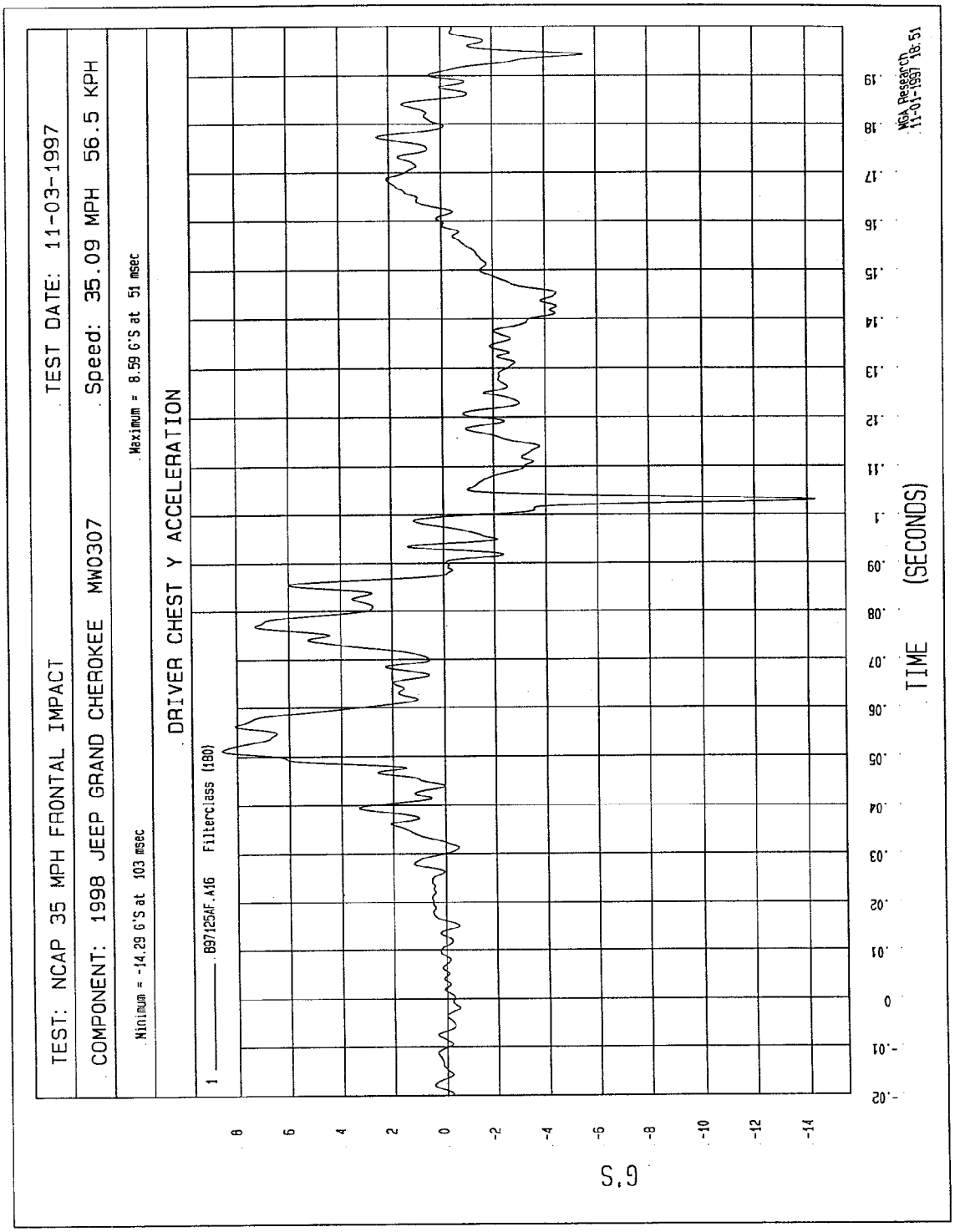

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -21.57 NM at 73 msec
Maximum = 4.68 NM at 178 msec
DRIVER NECK MOMENT X
1 _____ B97125MF.M48 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-14-1997 15:13

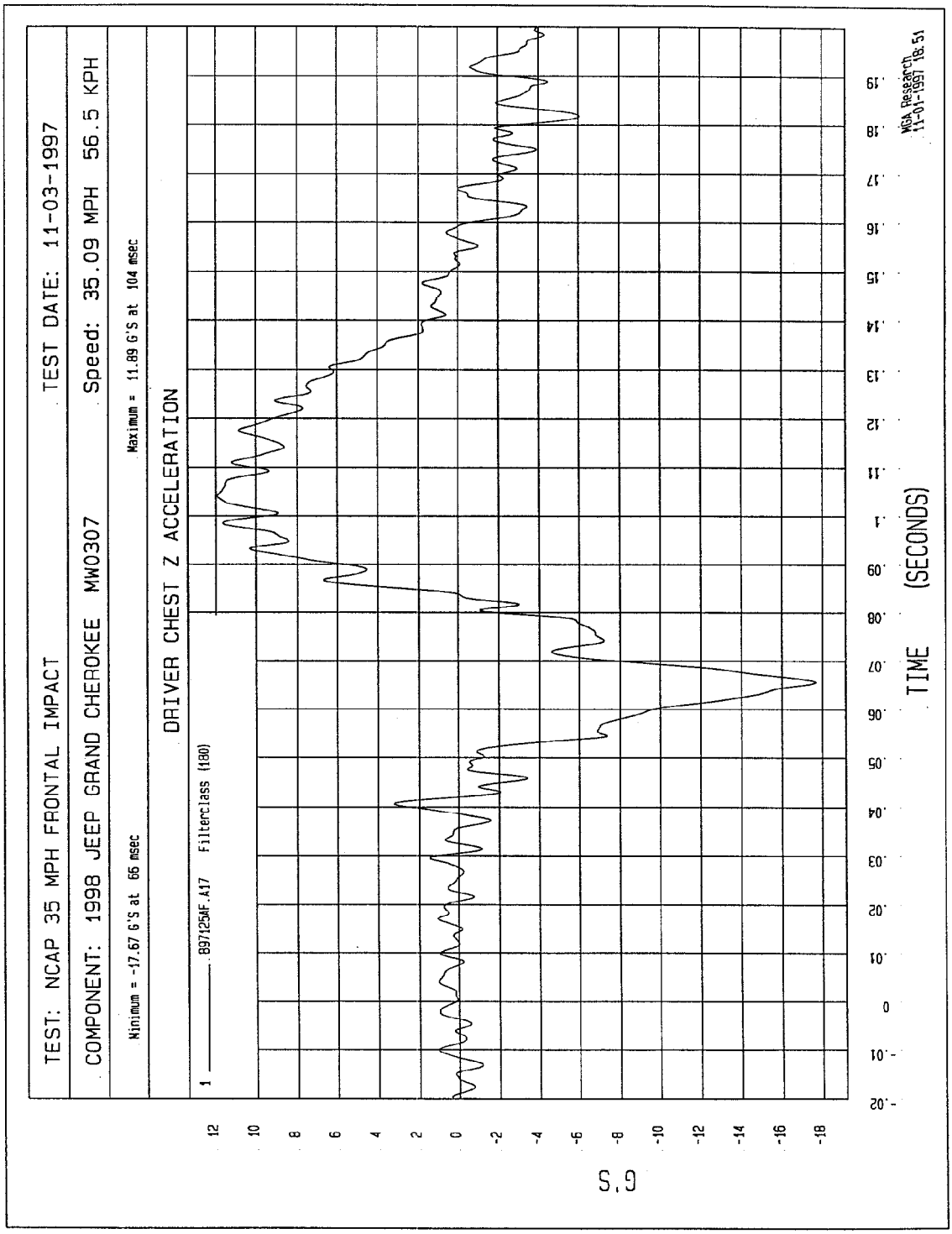

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -8.40 NM at 170 msec
Maximum = 48.84 NM at 66 msec
DRIVER NECK MOMENT Y
1 B97125NF.M49 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-14-1997 15:13

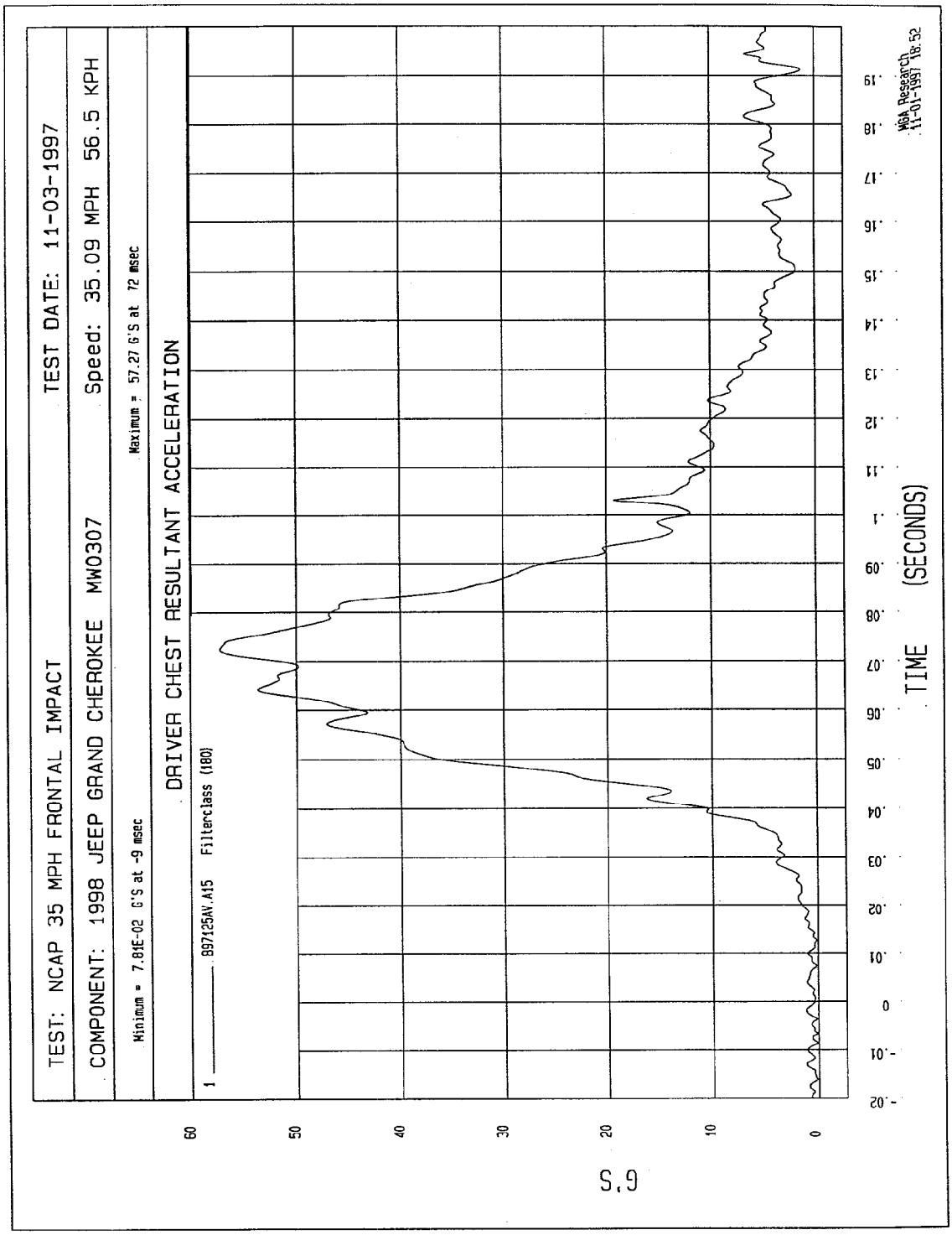

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -12.67 NM at 82 msec
Maximum = 6.53 NM at 139 msec
DRIVER NECK MOMENT Z
1 _____ 897125MF.M50 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-14-1997 15:13

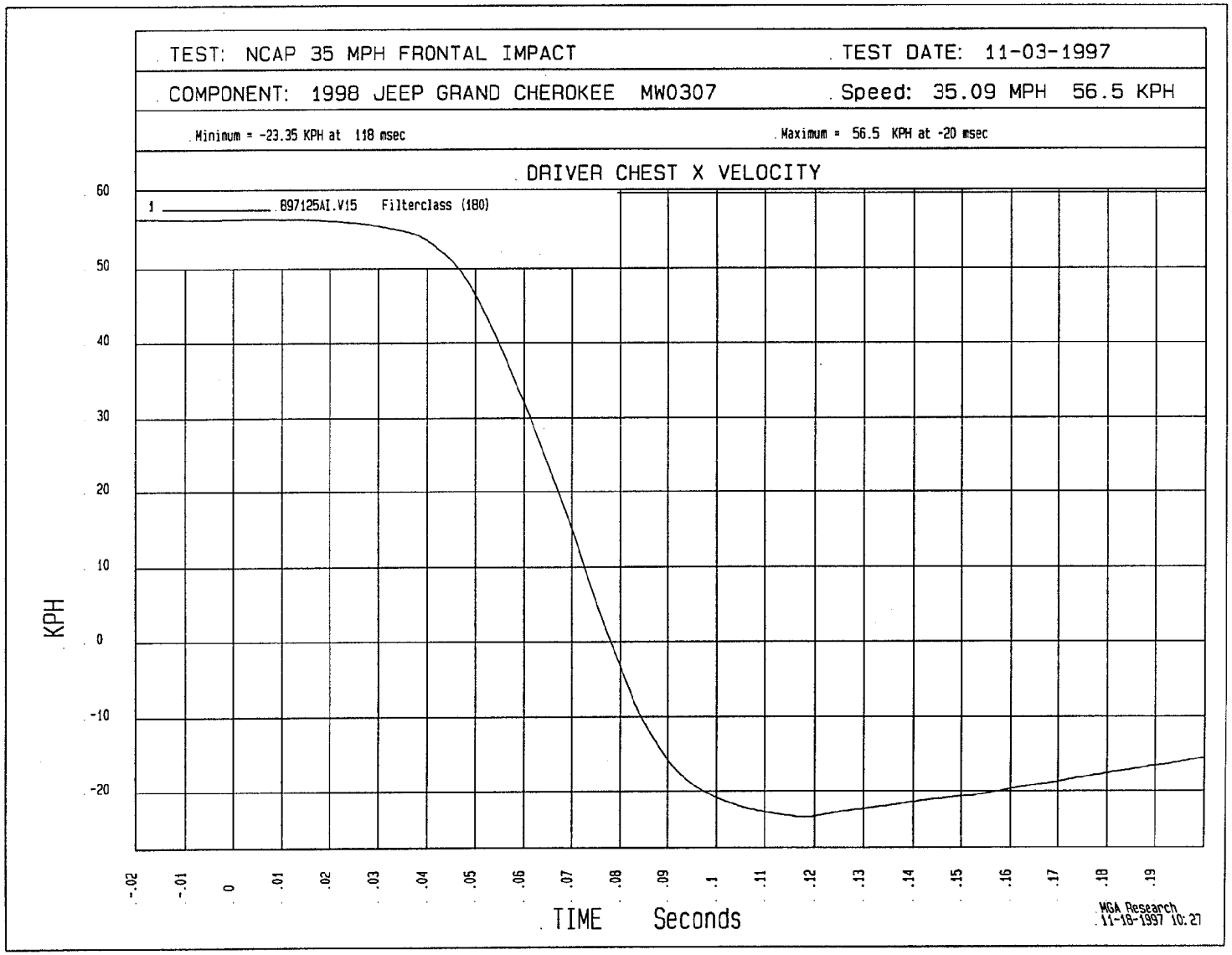

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = .12 NM at 23 msec
Maximum = 50.18 NM at 86 msec
DRIVER NECK MOMENT RESULTANT
1 _____ D97I25NW.M4B Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-14-1997 15: 13

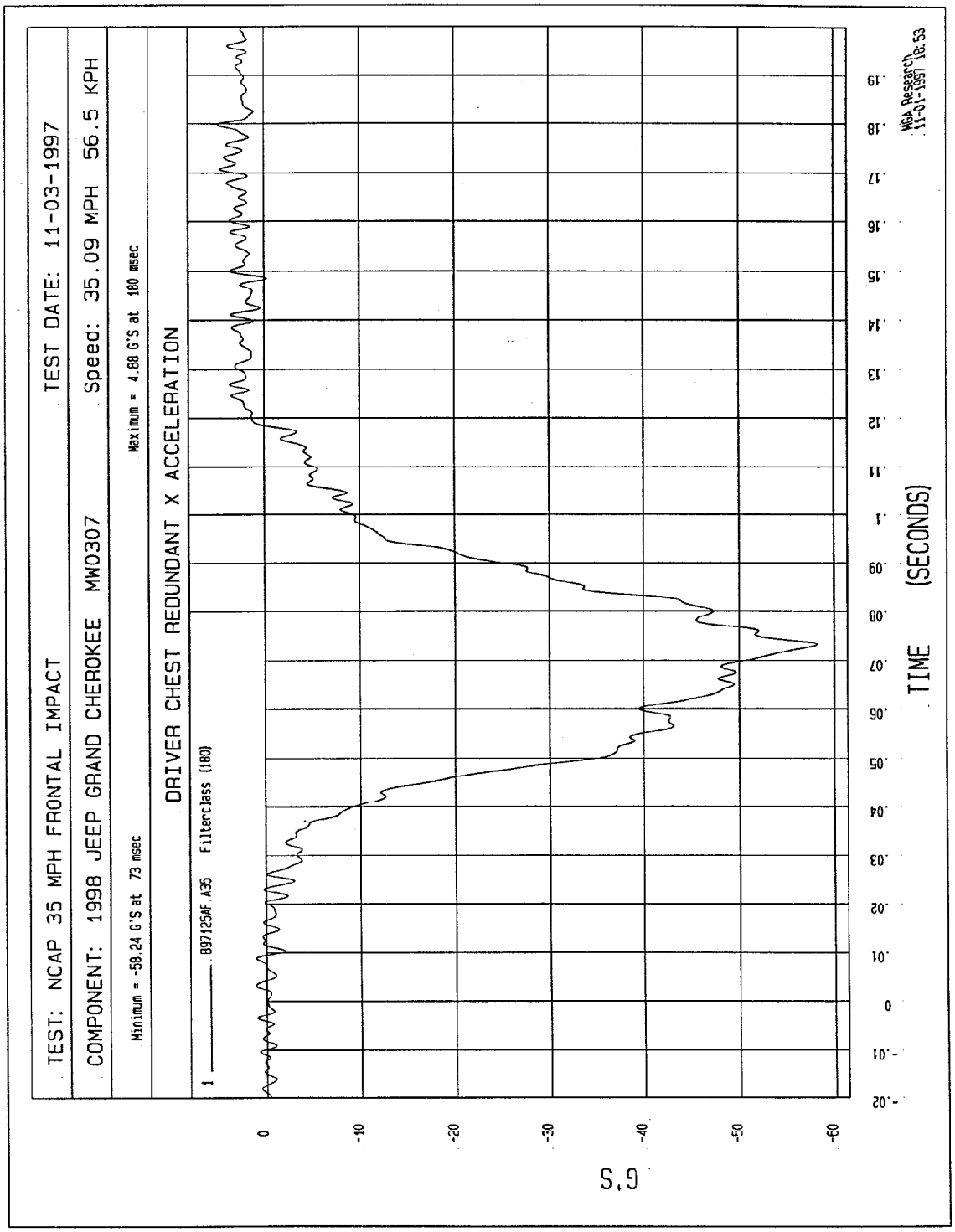

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -56.97 G'S at 72 msec
Maximum = 4.27 G'S at 193 msec
DRIVER CHEST X ACCELERATION
1 B97125AF.A15 Filterclass (180)
0
-10
-20
-30
-40
-50
-60
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-01-1997 18:51

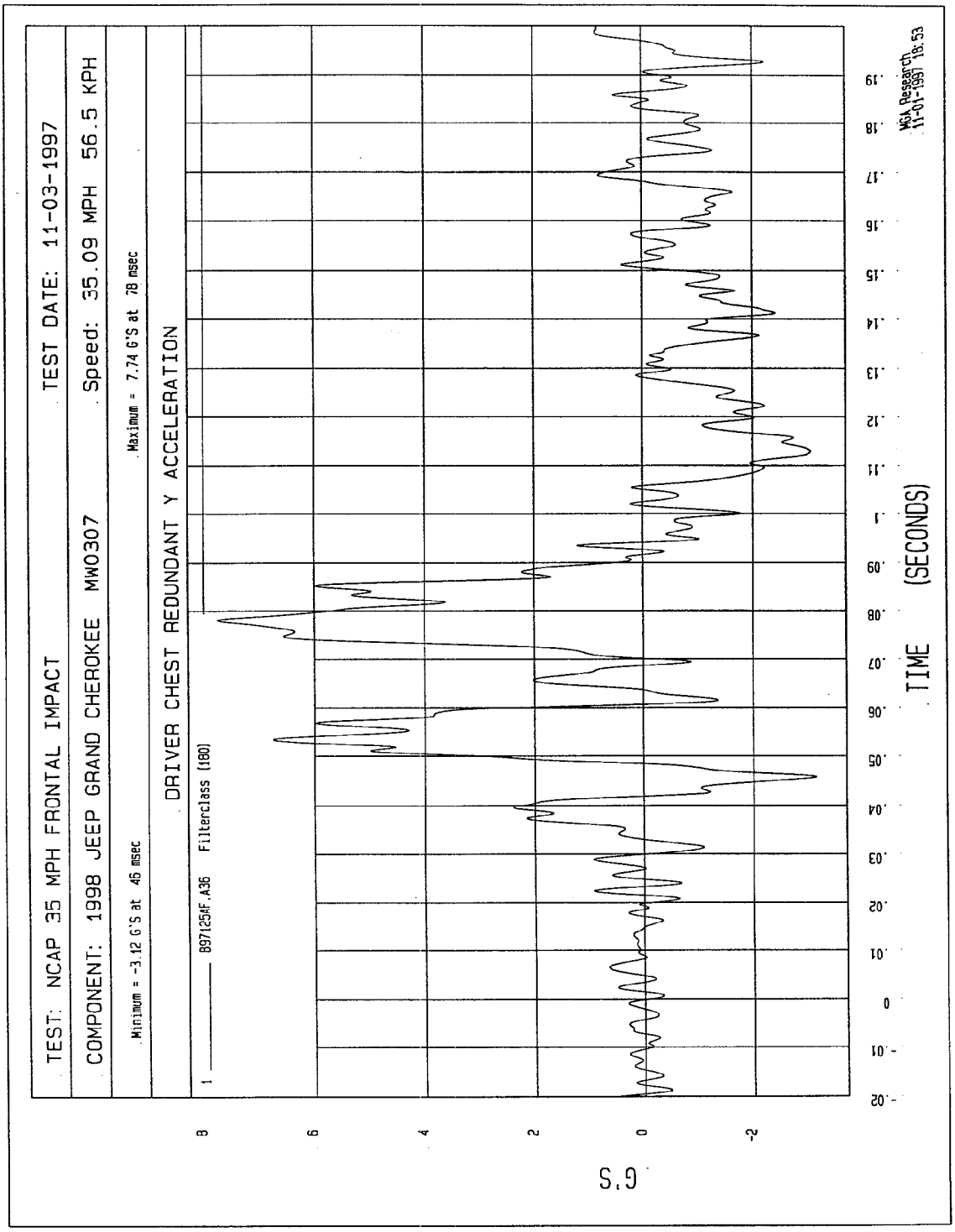

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -14.29 G'S at 103 msec
Maximum = 8.59 G'S at 51 msec
DRIVER CHEST Y ACCELERATION
1 B97125AF.A16 Filterclass (180)
G'S
TIME (SECONDS)
NGA Research 11-01-1997 18:51

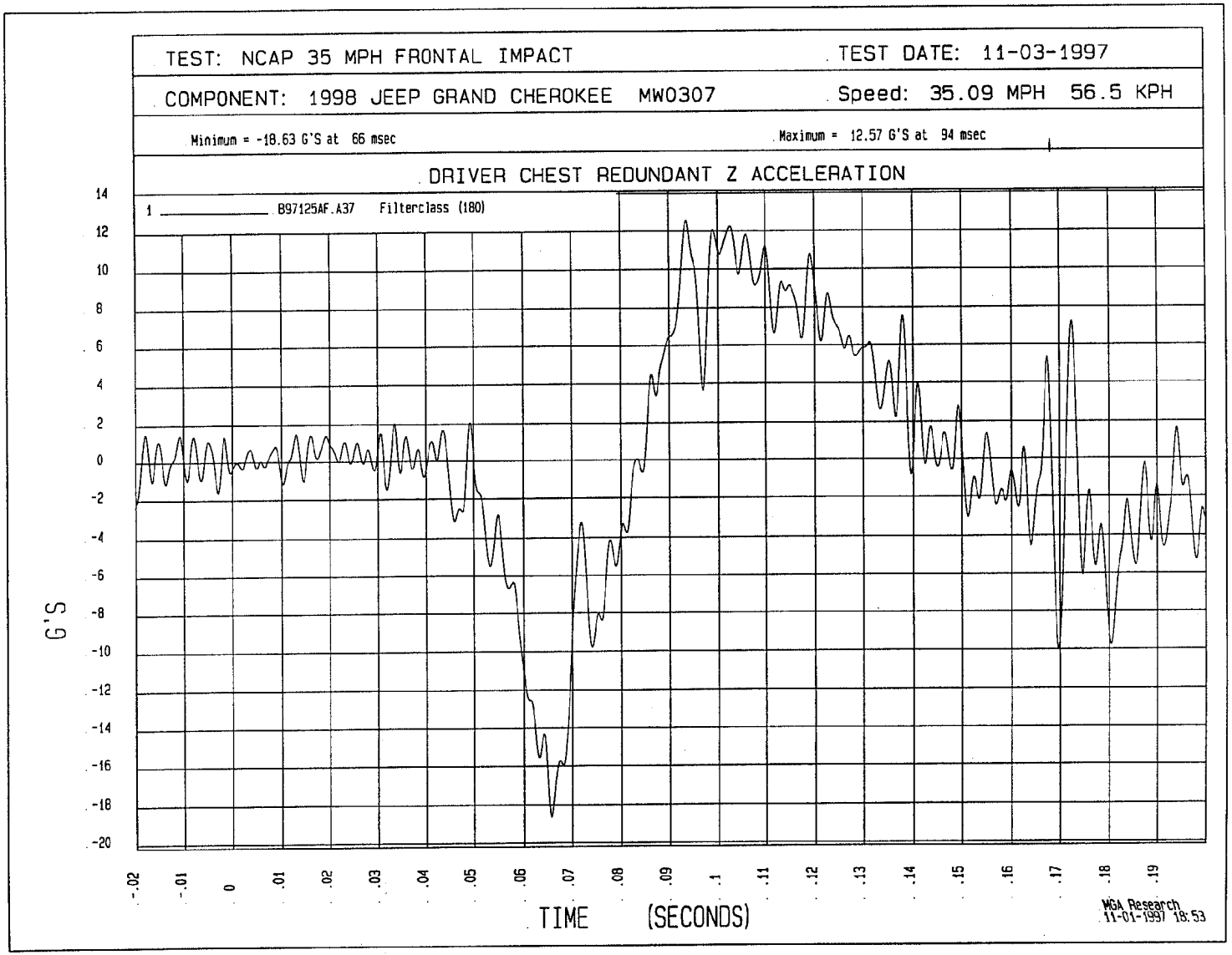

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -17.67 G'S at 66 msec
Maximum = 11.89 G'S at 104 msec
DRIVER CHEST Z ACCELERATION
1 _____ 897125MF.A17 Filterclass (180)
G'S
TIME (SECONDS)
WSTA Research
11-01-1997 18:51

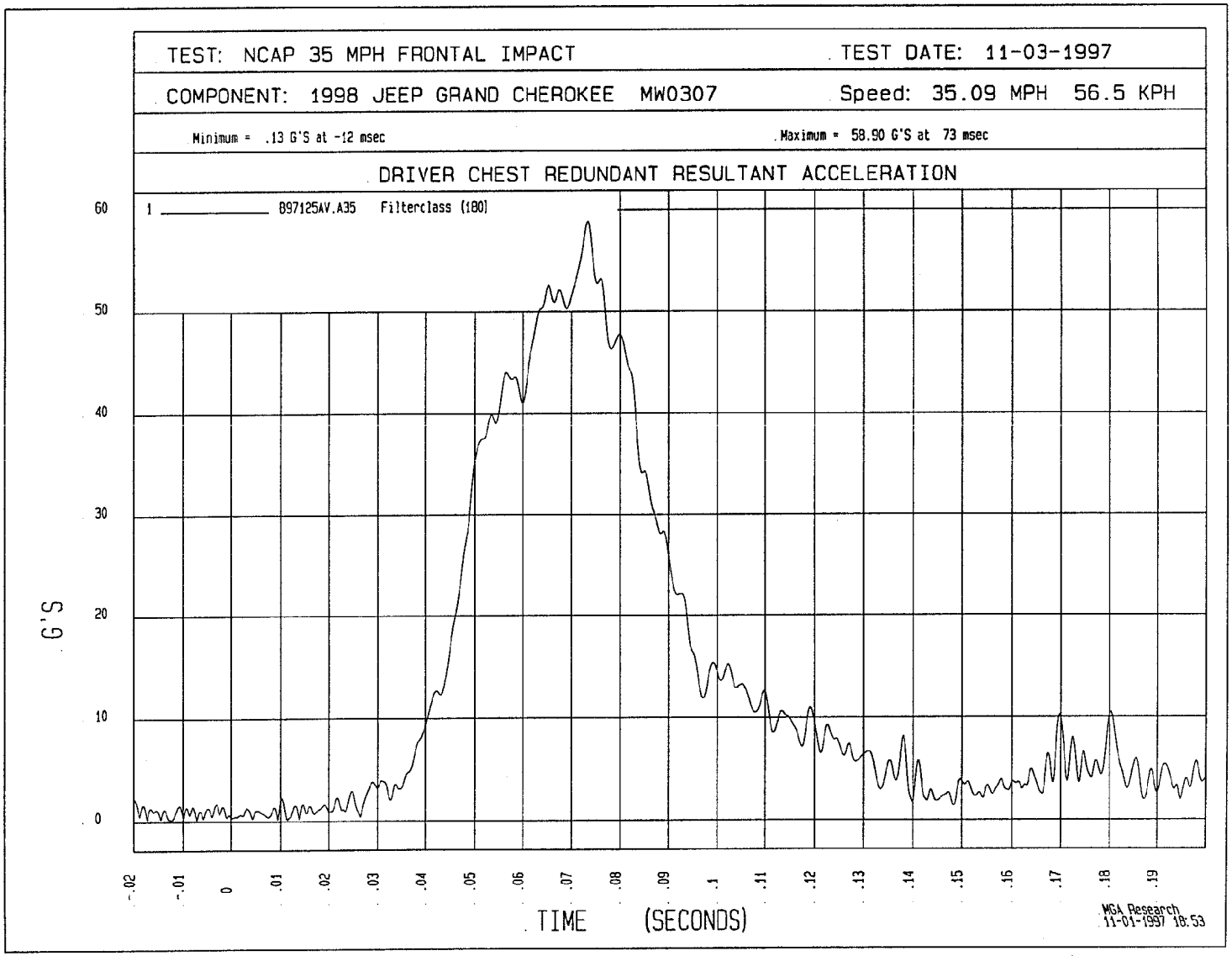

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 7.81E-02 G'S at -9 msec
Maximum = 57.27 G'S at 72 msec
DRIVER CHEST RESULTANT ACCELERATION
1 ——— 897125AV.A15 Filterclass (180)
60
50
40
30
20
10
0
G'S
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:52

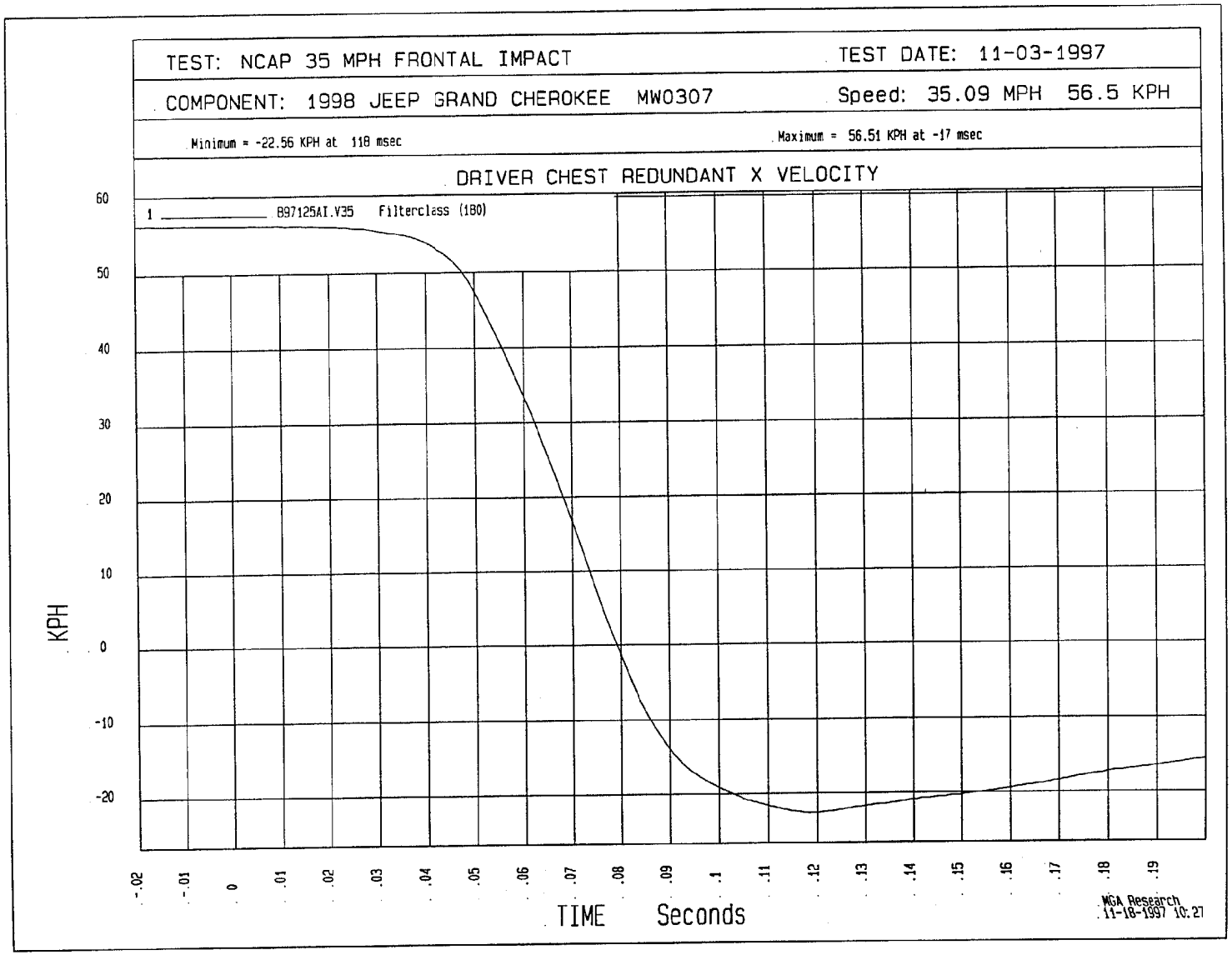

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -23.35 KPH at 118 msec
Maximum = 56.5 KPH at -20 msec
DRIVER CHEST X VELOCITY
1 897125AI.V15 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:27

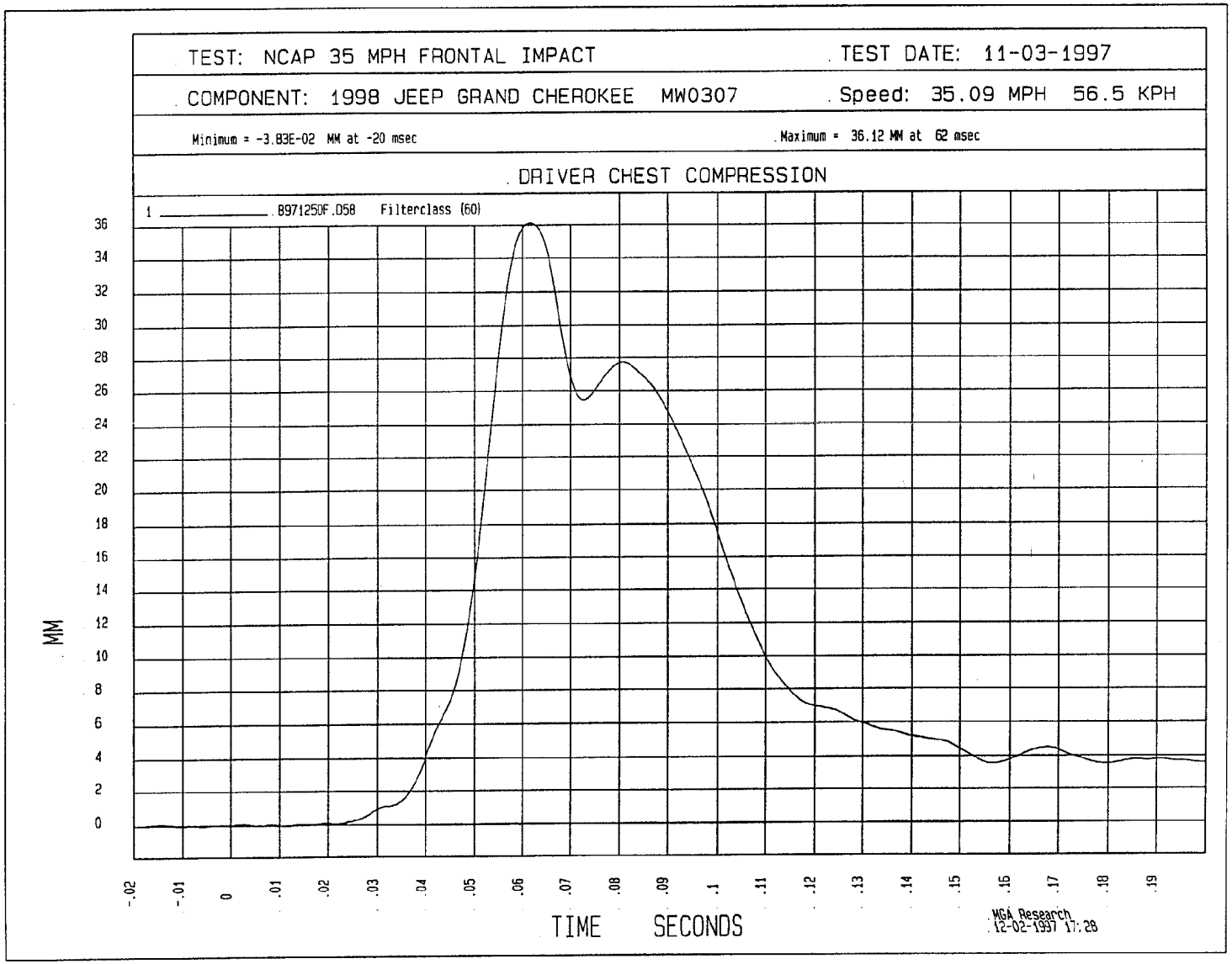

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -58.24 G'S at 73 msec
Maximum = 4.88 G'S at 180 msec
DRIVER CHEST REDUNDANT X ACCELERATION
1 ——— 097125AF.A35 Filterclass (180)
G's
TIME (SECONDS)
MGA Research
11-01-1997 18:53


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -3.12 G'S at 46 msec
Maximum = 7.74 G'S at 78 msec
DRIVER CHEST REDUNDANT Y ACCELERATION
1 ——— 897125AF.A36 Filterclass (180)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 18:53


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -18.63 G'S at 66 msec
Maximum = 12.57 G'S at 94 msec
DRIVER CHEST REDUNDANT Z ACCELERATION
1 B97125AF.A37 Filterclass (180)
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
G's
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 18:53


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = .13 G'S at -12 msec
Maximum = 58.90 G'S at 73 msec
DRIVER CHEST REDUNDANT RESULTANT ACCELERATION
1 B97125AV.A35 Filterclass (180)
60
50
40
30
20
10
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
11-01-1997 18:53


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -22.56 KPH at 118 msec
Maximum = 56.51 KPH at -17 msec
DRIVER CHEST REDUNDANT X VELOCITY
1 B97125AI.V35 Filterclass (180)
60
50
40
30
20
10
0
-10
-20
KPH
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:27


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -3.83E-02 MM at -20 msec
Maximum = 36.12 MM at 62 msec
DRIVER CHEST COMPRESSION
1 _____ 8971250F.D58 Filterclass (60)
MM
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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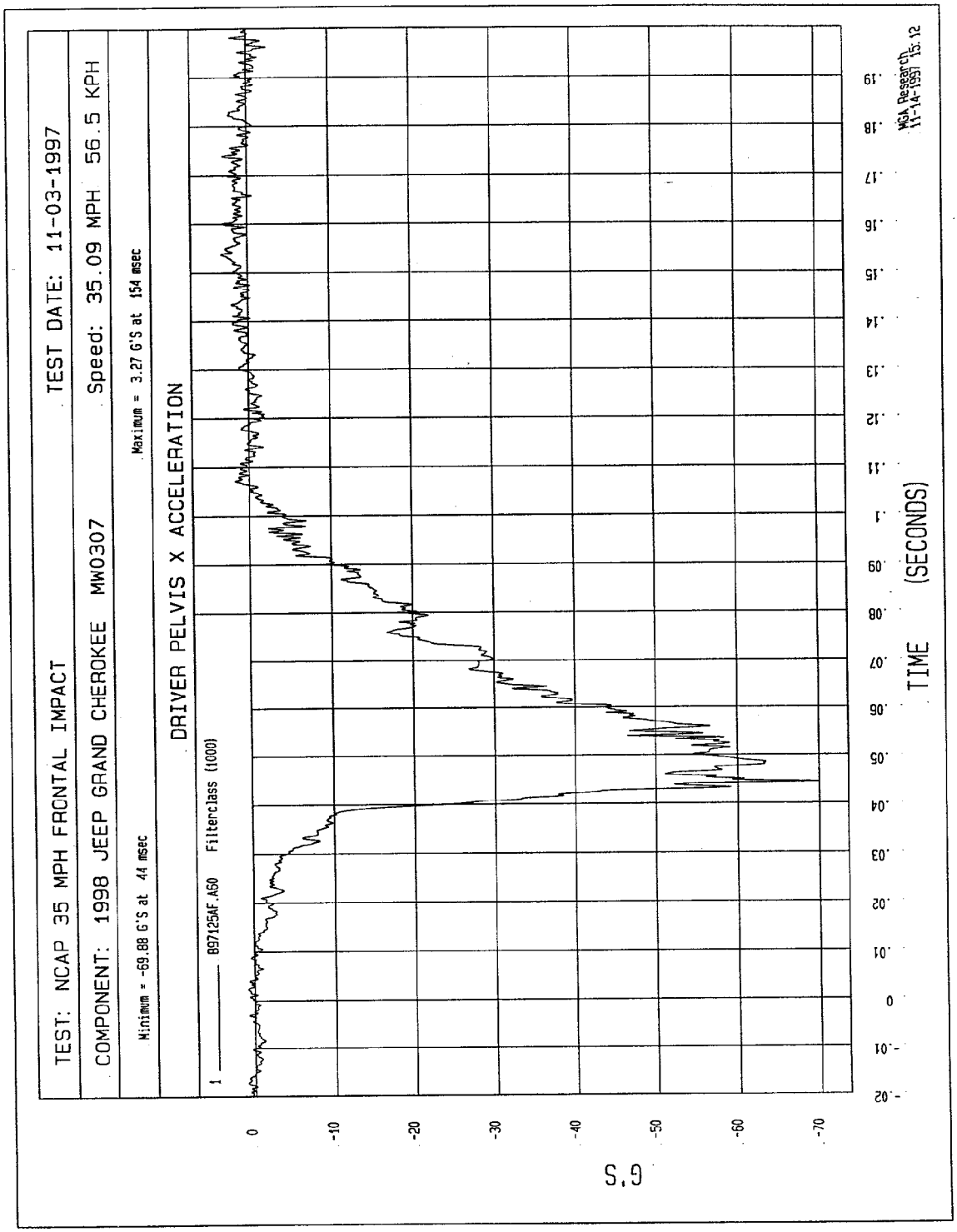
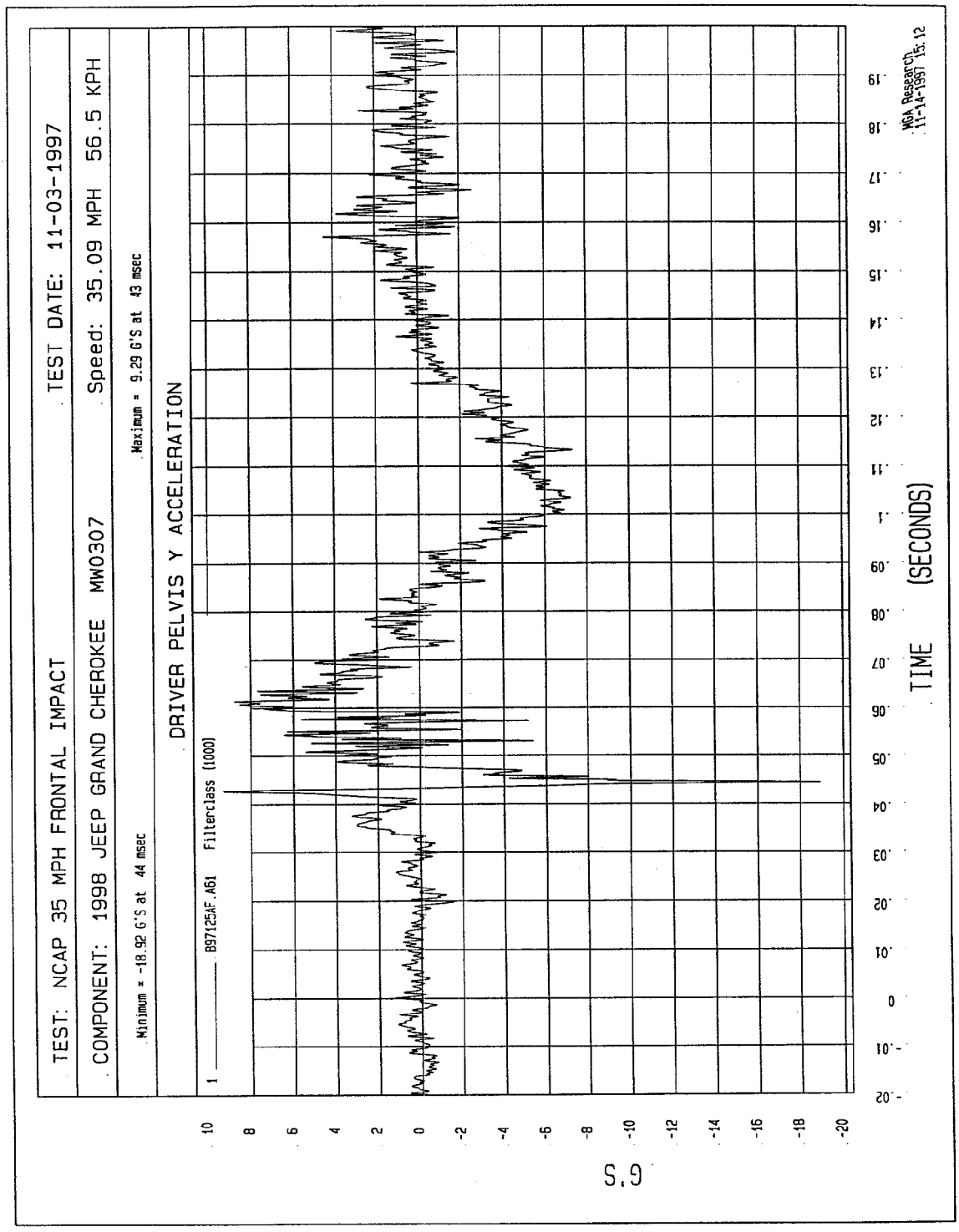
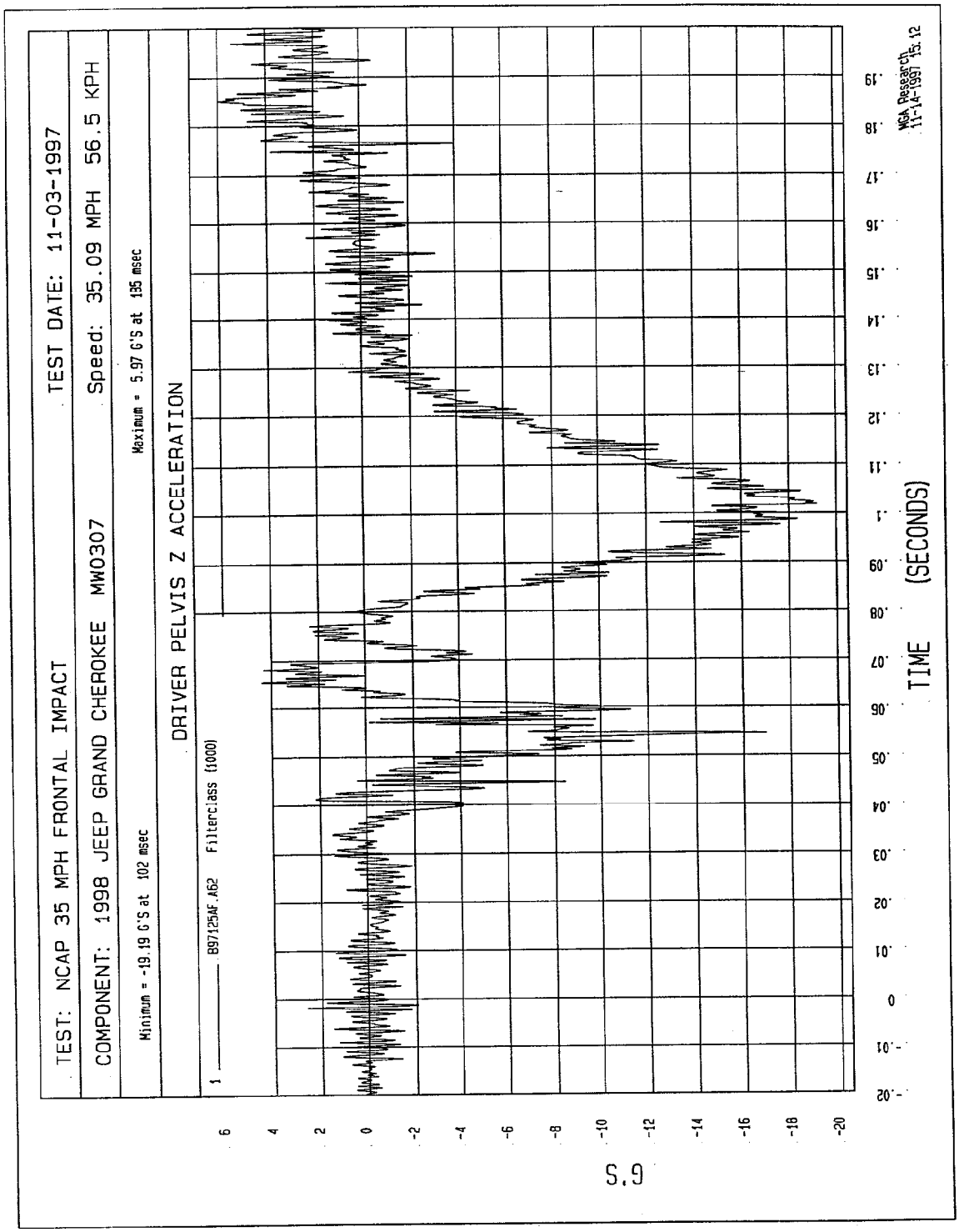
.16
.17
.18
.19
TIME SECONDS
MGA Research
12-02-1997 17:28


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -69.88 G'S at 44 msec
Maximum = 3.27 G'S at 154 msec
DRIVER PELVIS X ACCELERATION
1 _____ 897125AF.A50 Filterclass (1000)
0
-10
-20
-30
-40
-50
-60
-70
G's
TIME (SECONDS)
MGA Research
11-14-1997 15:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -18.92 G'S at 44 msec
Maximum = 9.29 G'S at 43 msec
DRIVER PELVIS Y ACCELERATION
1 B97125AF.A61 Filterclass (1000)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Maximum = 5.97 G'S at 135 msec
Minimum = -19.19 G'S at 102 msec
DRIVER PELVIS Z ACCELERATION
1 B97125AF.A62 FilterClass (1000)
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
G'S
.02
.01
0
-.01
-.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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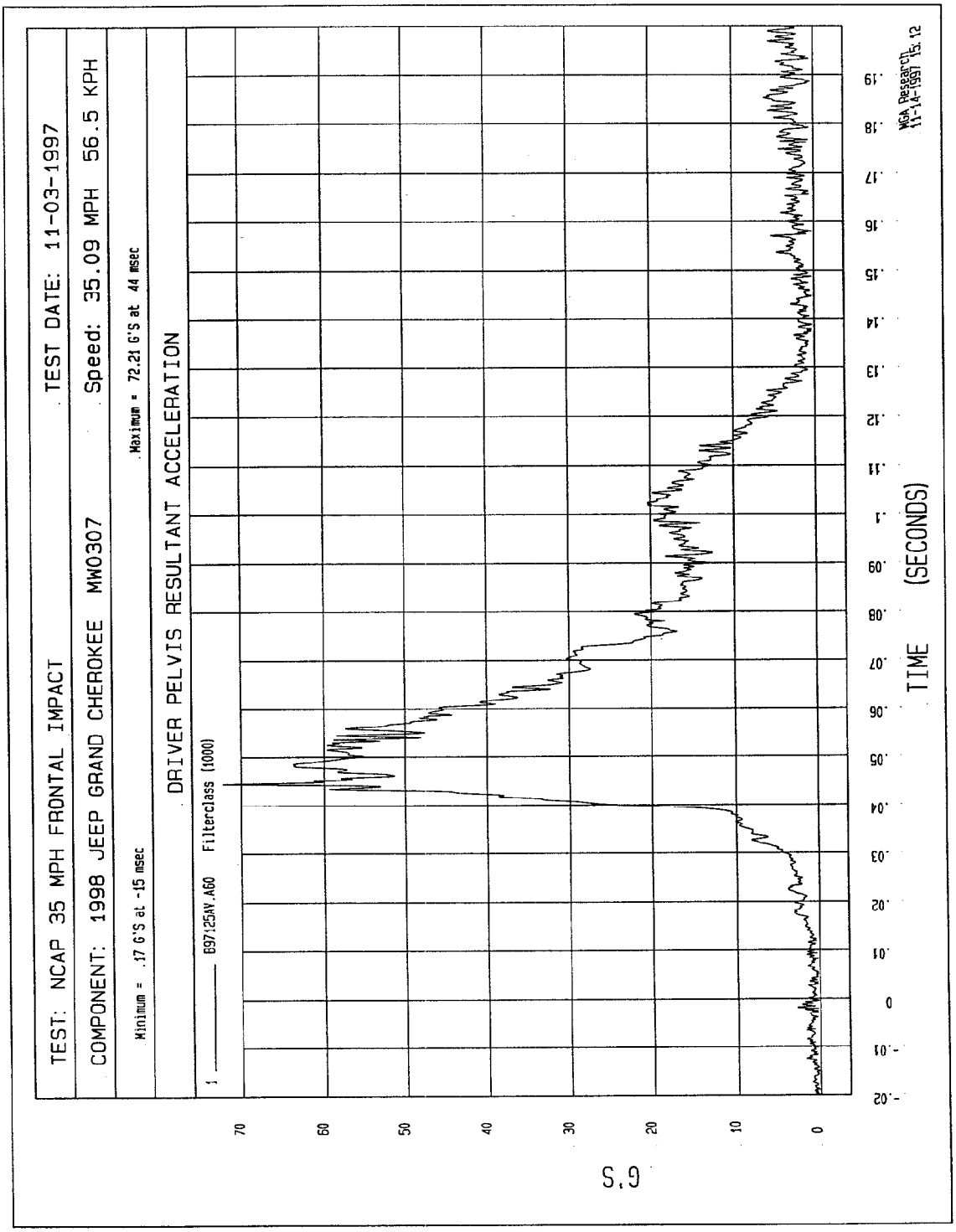
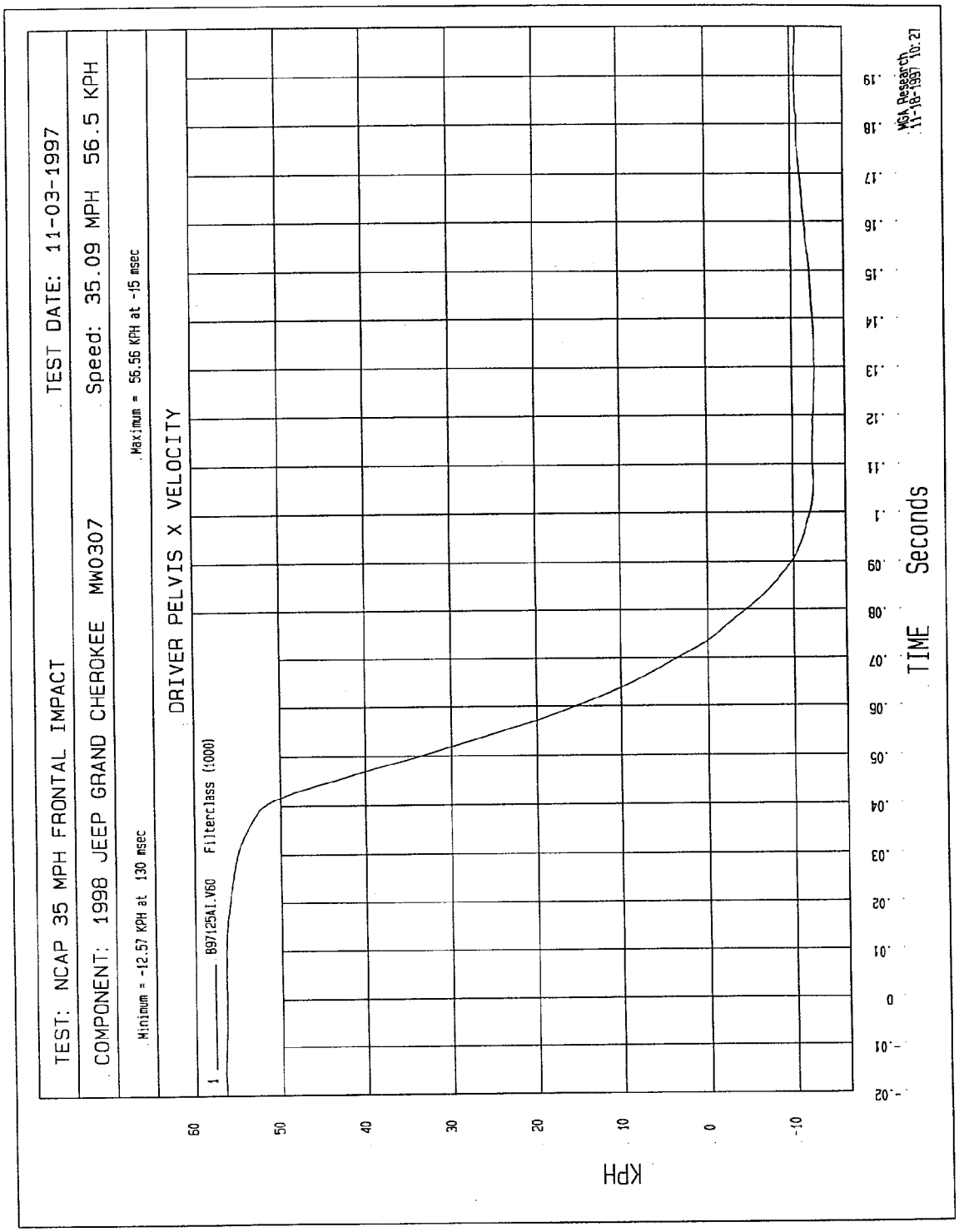
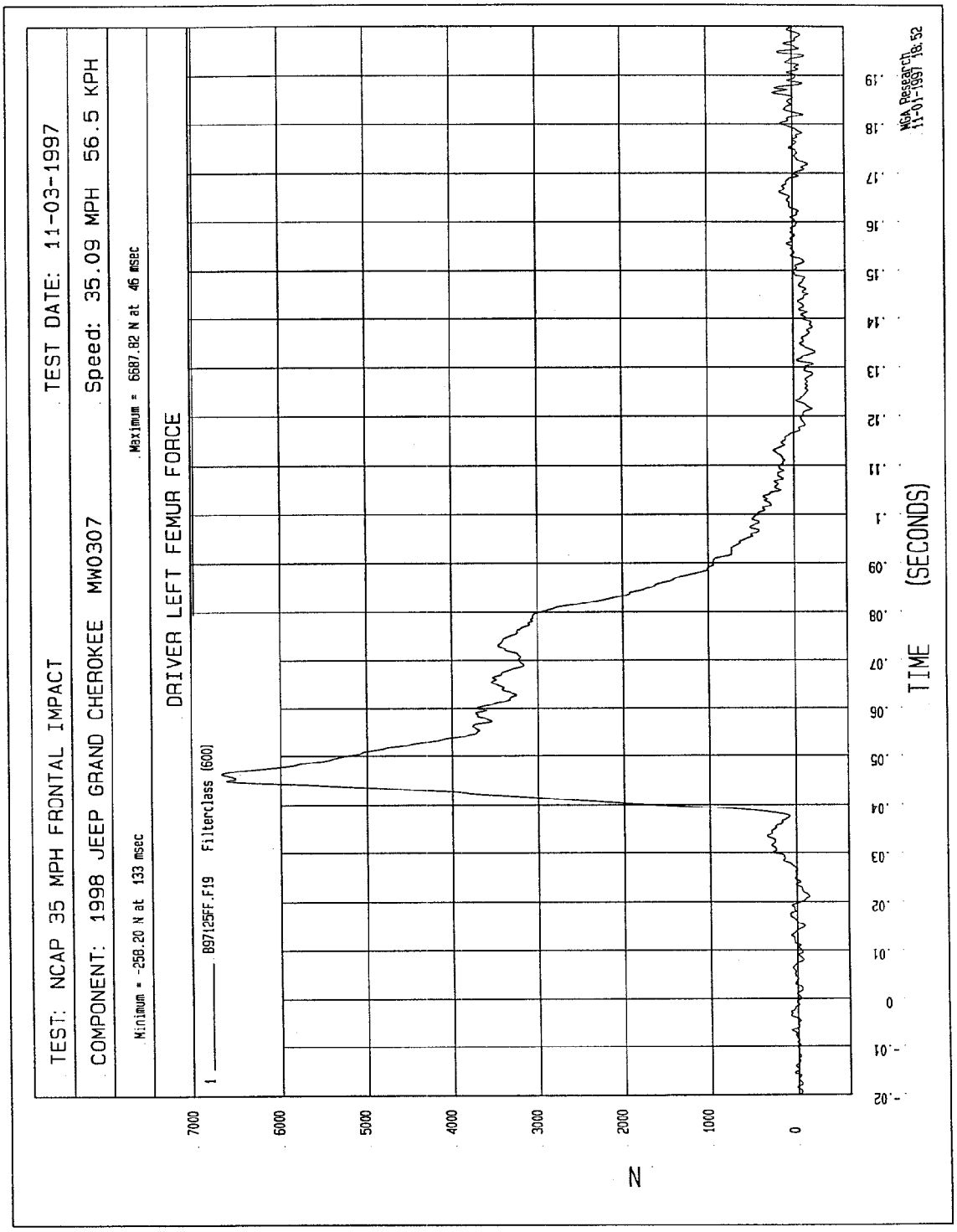
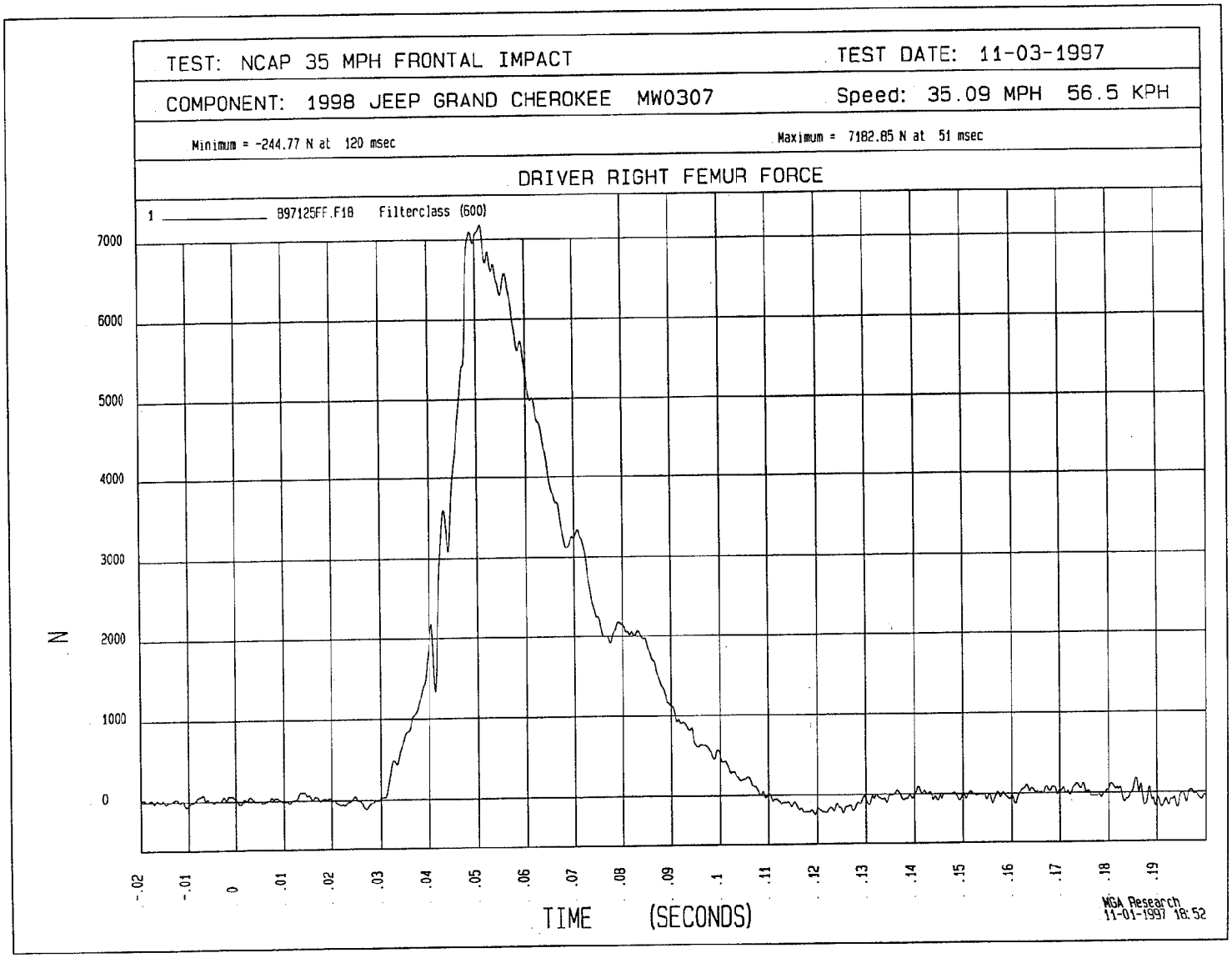
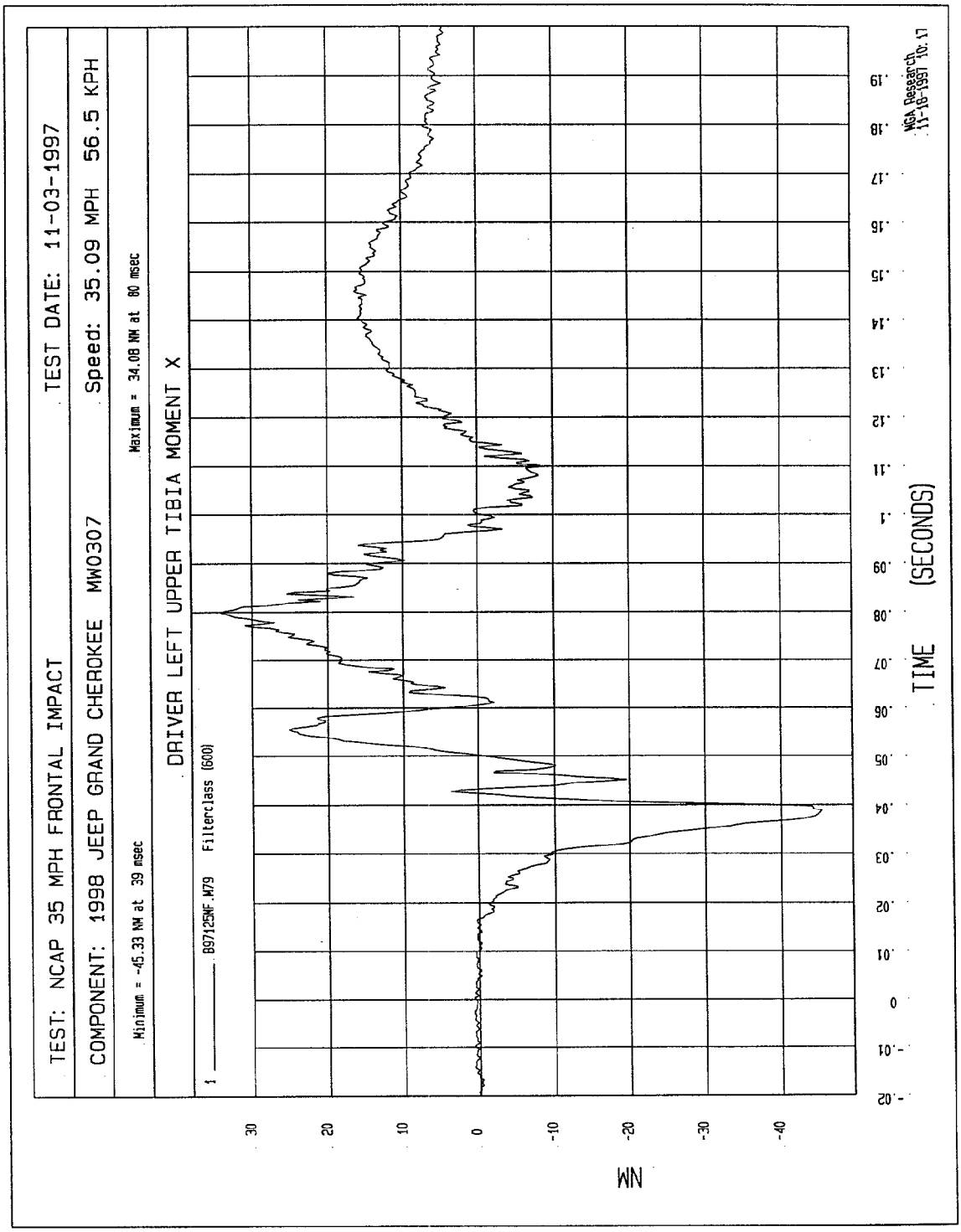
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:12

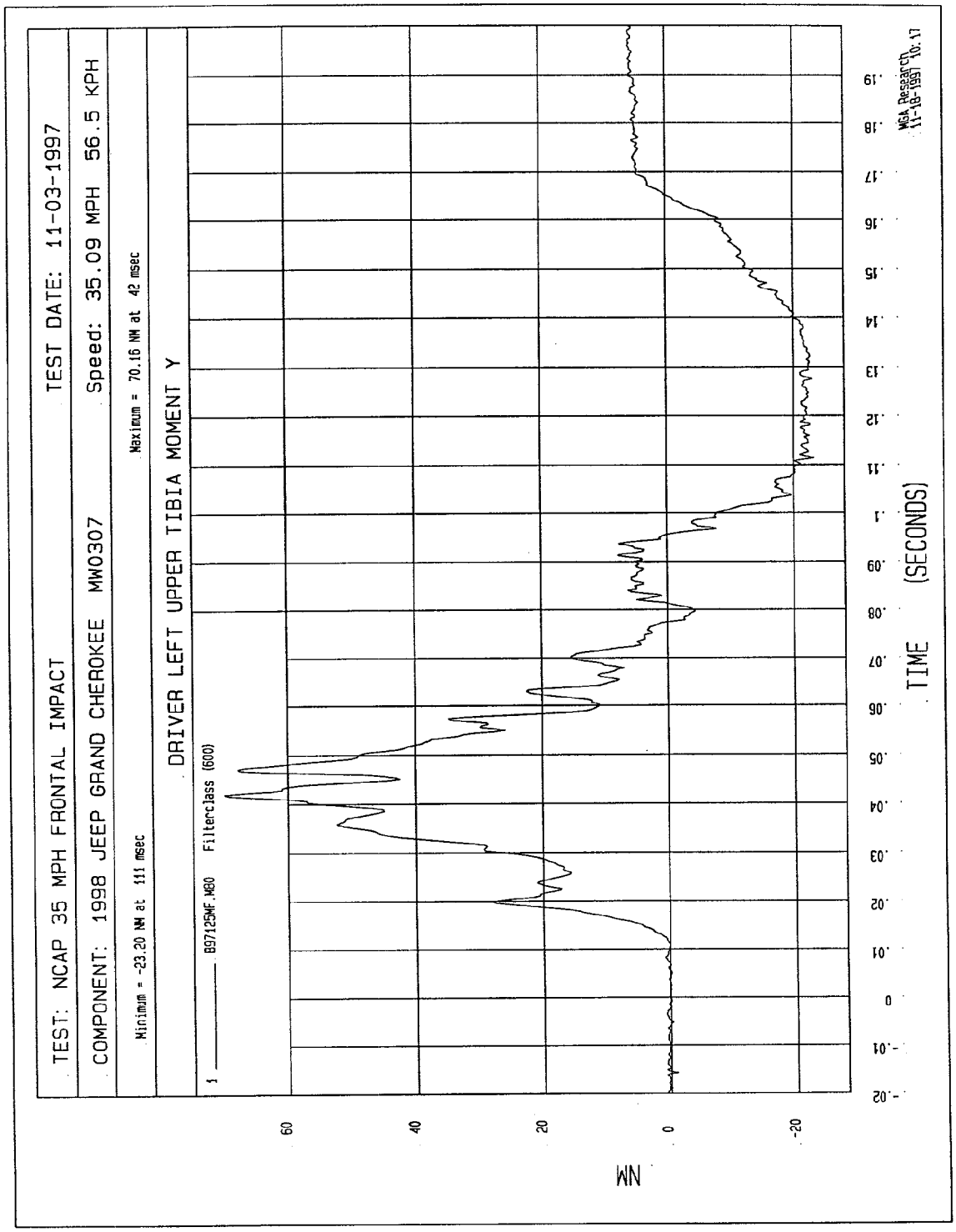

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = .17 G'S at -15 msec
Maximum = 72.21 G'S at 44 msec
DRIVER PELVIS RESULTANT ACCELERATION
1 B97I25AV.A60 Filterclass (1000)
70
60
50
40
30
20
10
0
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-14-1997 15:12

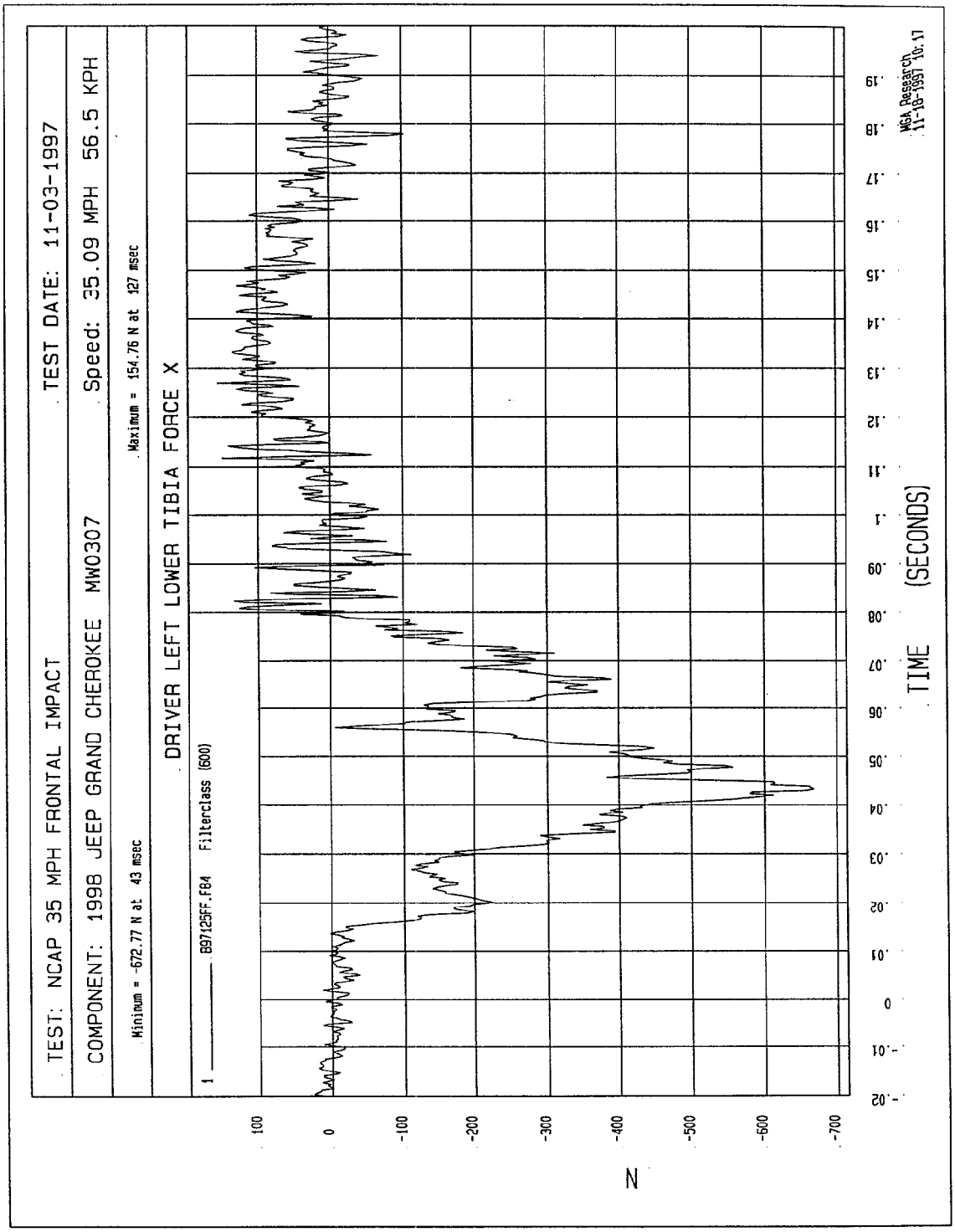

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -12.57 KPH at 130 msec
Maximum = 56.56 KPH at -15 msec
DRIVER PELVIS X VELOCITY
1 B97125A1.V60 Filterclass (1000)
KPH
TIME Seconds
MGA Research
11-18-1997 10:27

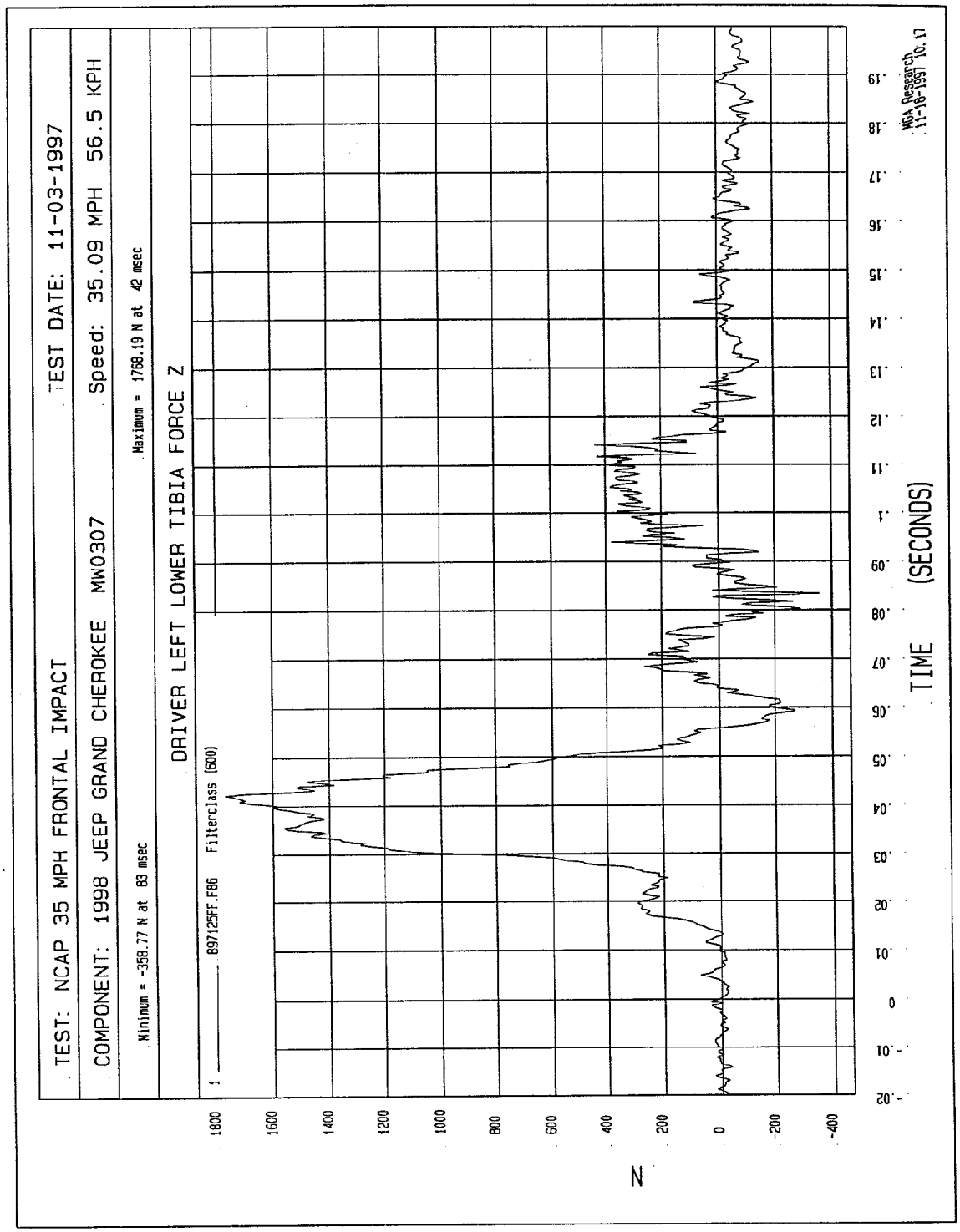

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -258.20 N at 133 msec
Maximum = 6687.82 N at 46 msec
DRIVER LEFT FEMUR FORCE
1 B97125FF.F19 Filterclass (600)
N
TIME (SECONDS)
NGA Research
11-01-1997 18:52

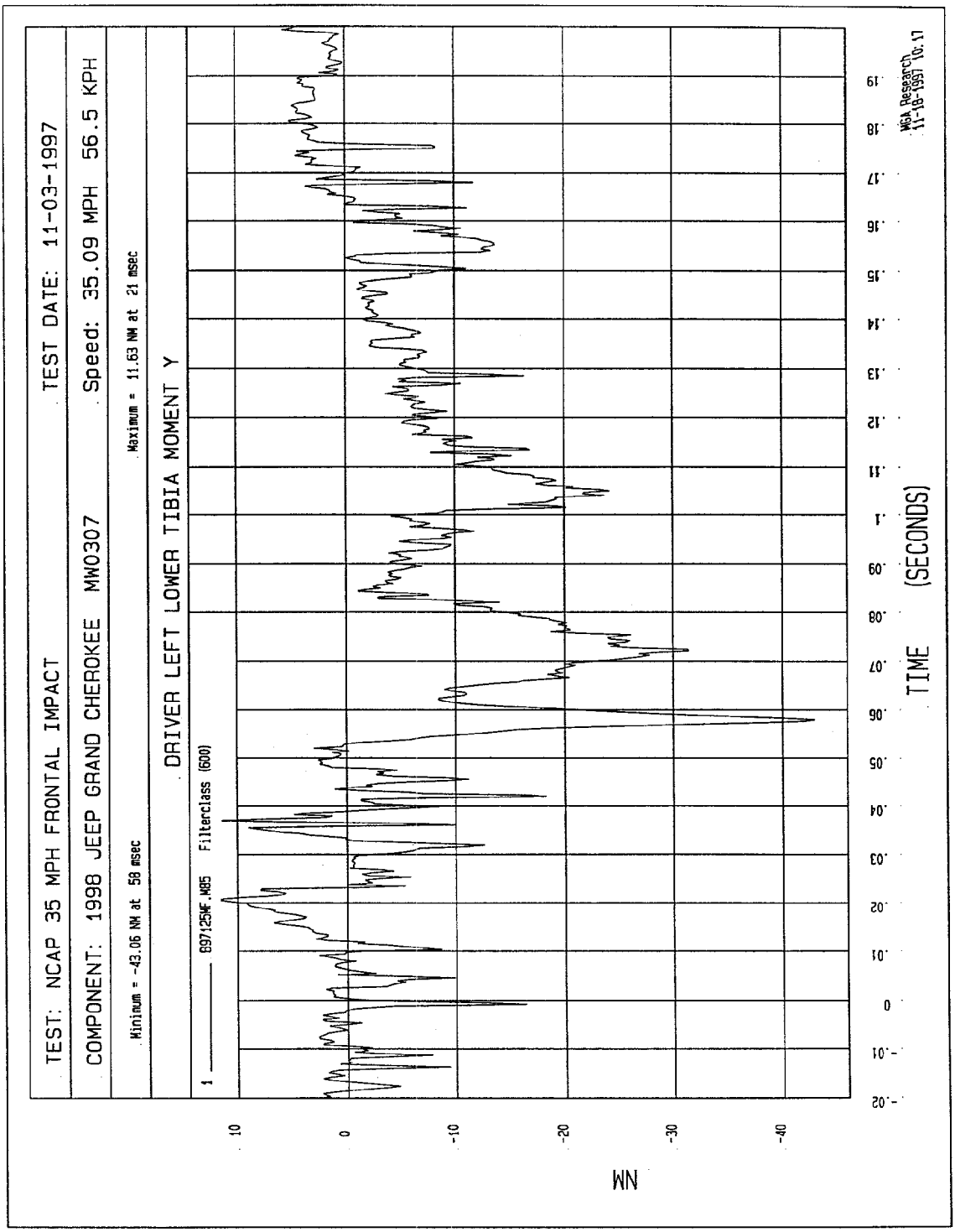

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -244.77 N at 120 msec
Maximum = 7182.85 N at 51 msec
DRIVER RIGHT FEMUR FORCE
1 B97125FF.F18 Filterclass (600)
7000
6000
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 18:52

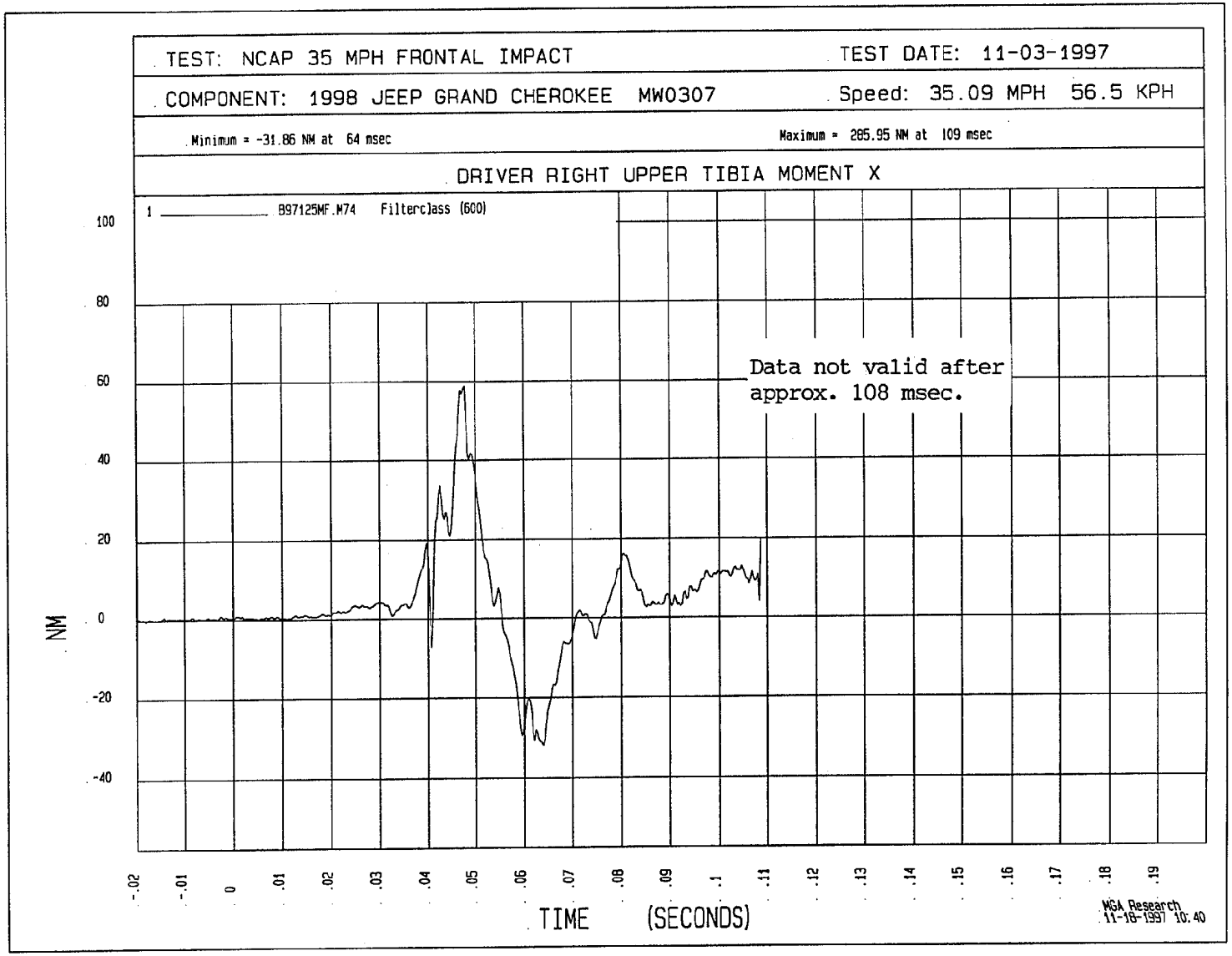

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -45.33 NM at 39 msec
Maximum = 34.08 NM at 80 msec
DRIVER LEFT UPPER TIBIA MOMENT X
1 B97125NF.M79 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-18-1997 10:17

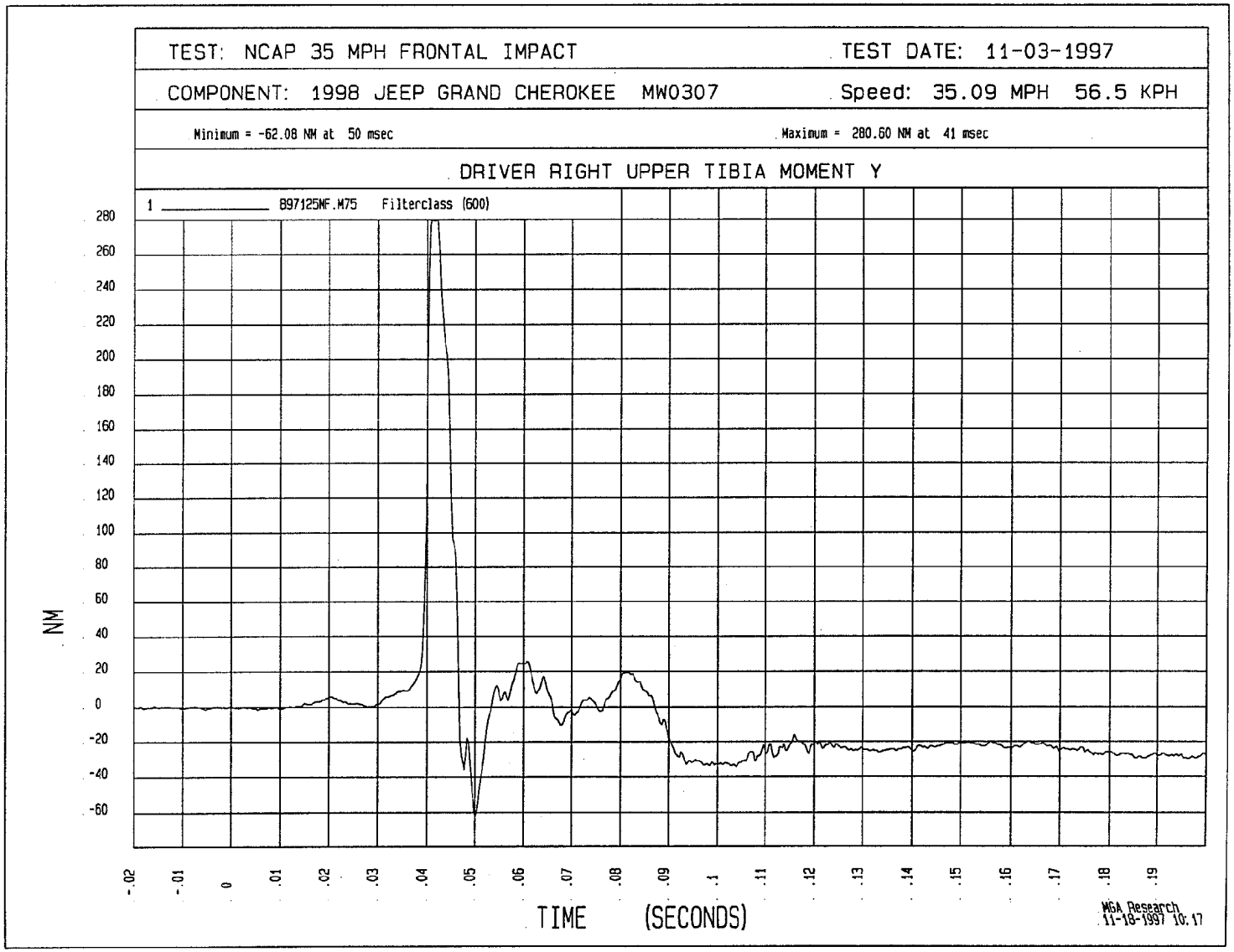

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -23.20 NM at 111 msec
Maximum = 70.16 NM at 42 msec
DRIVER LEFT UPPER TIBIA MOMENT Y
1 B97125MF.M80 FilterClass (600)
NM
60
40
20
0
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:17

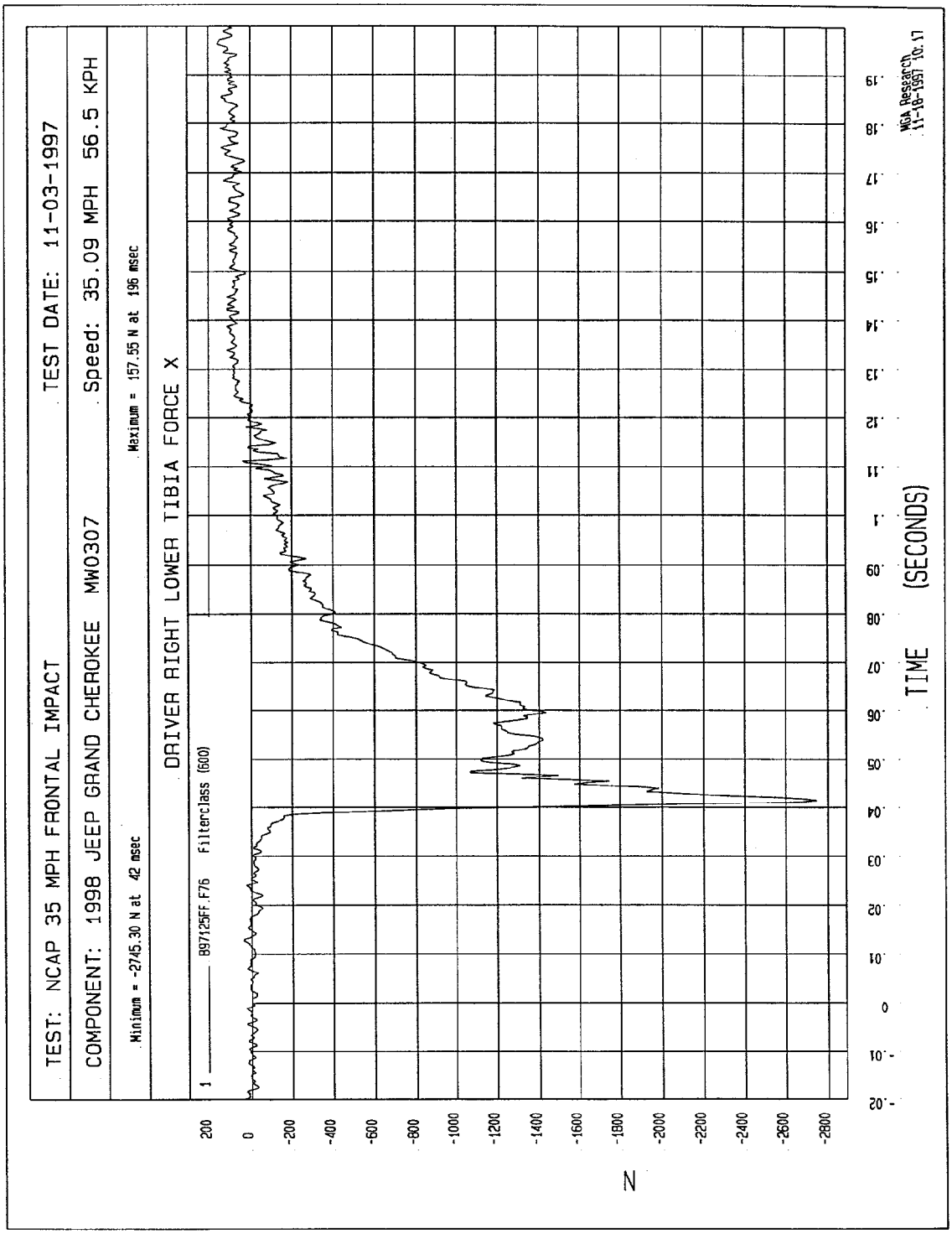

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -672.77 N at 43 msec
Maximum = 154.76 N at 127 msec
DRIVER LEFT LOWER TIBIA FORCE X
1 B97125FF.F84 Filterclass (600)
100
0
-100
-200
-300
-400
-500
-600
-700
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:17

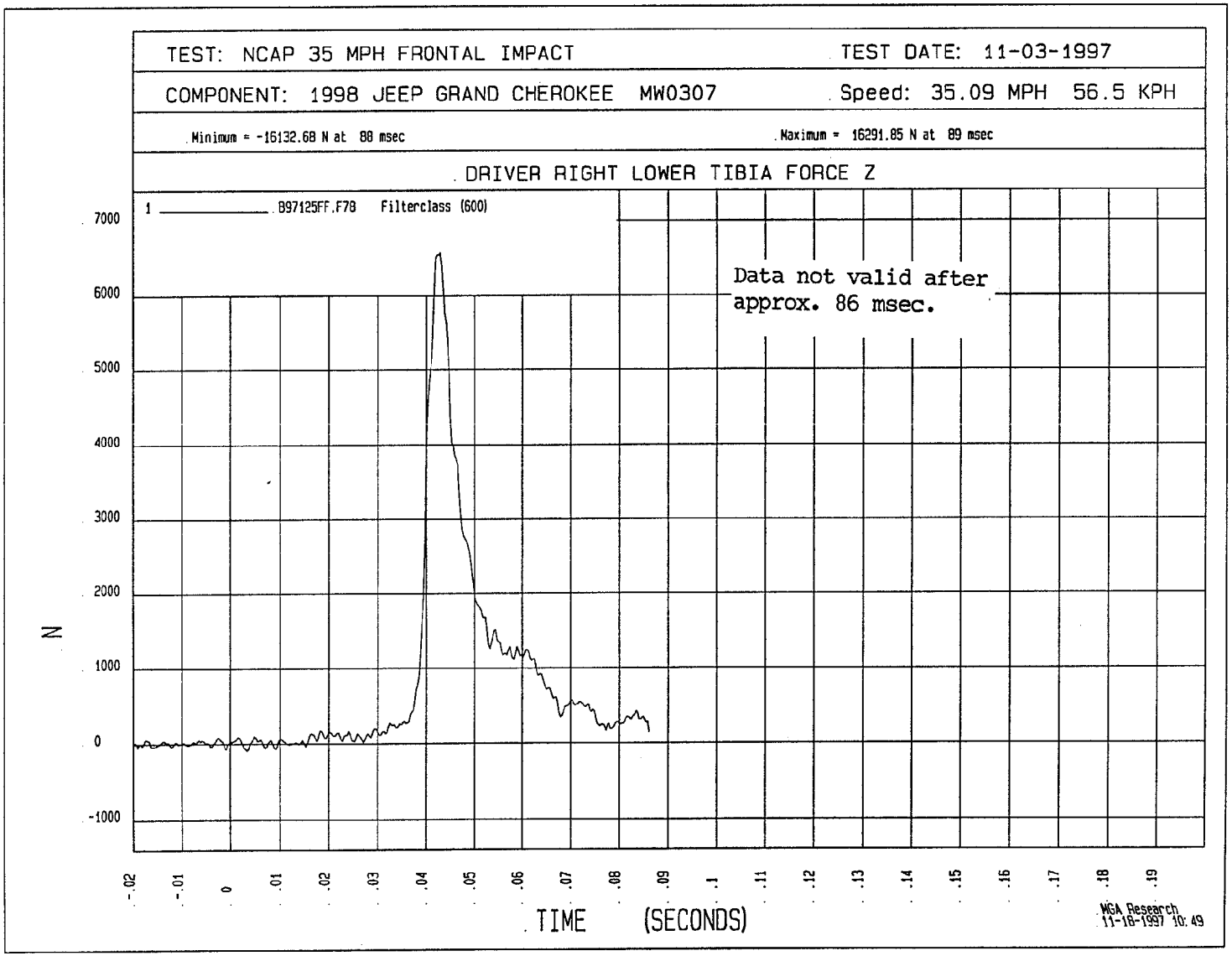

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -358.77 N at 83 msec
Maximum = 1768.19 N at 42 msec
DRIVER LEFT LOWER TIBIA FORCE Z
1 _____ 897125FF.F86 Filterclass (600)
N
TIME (SECONDS)
NGA Research
11-18-1997 10:17

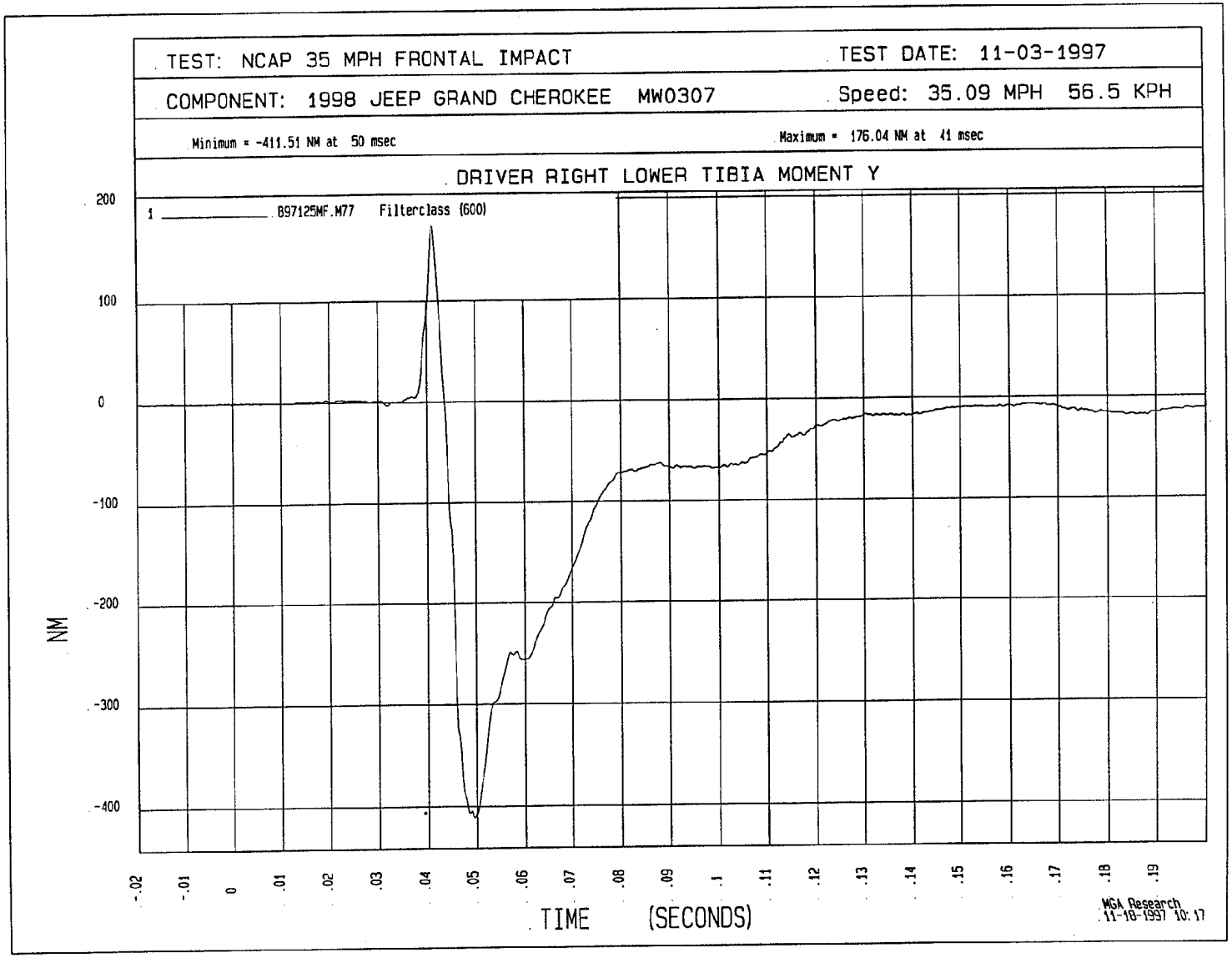

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -43.06 NM at 59 msec
Maximum = 11.63 NM at 21 msec
DRIVER LEFT LOWER TIBIA MOMENT Y
1 _____ 897:25MF.M85 Filterclass (600)
NM
10
0
-10
-20
-30
-40
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-18-1997 10:17

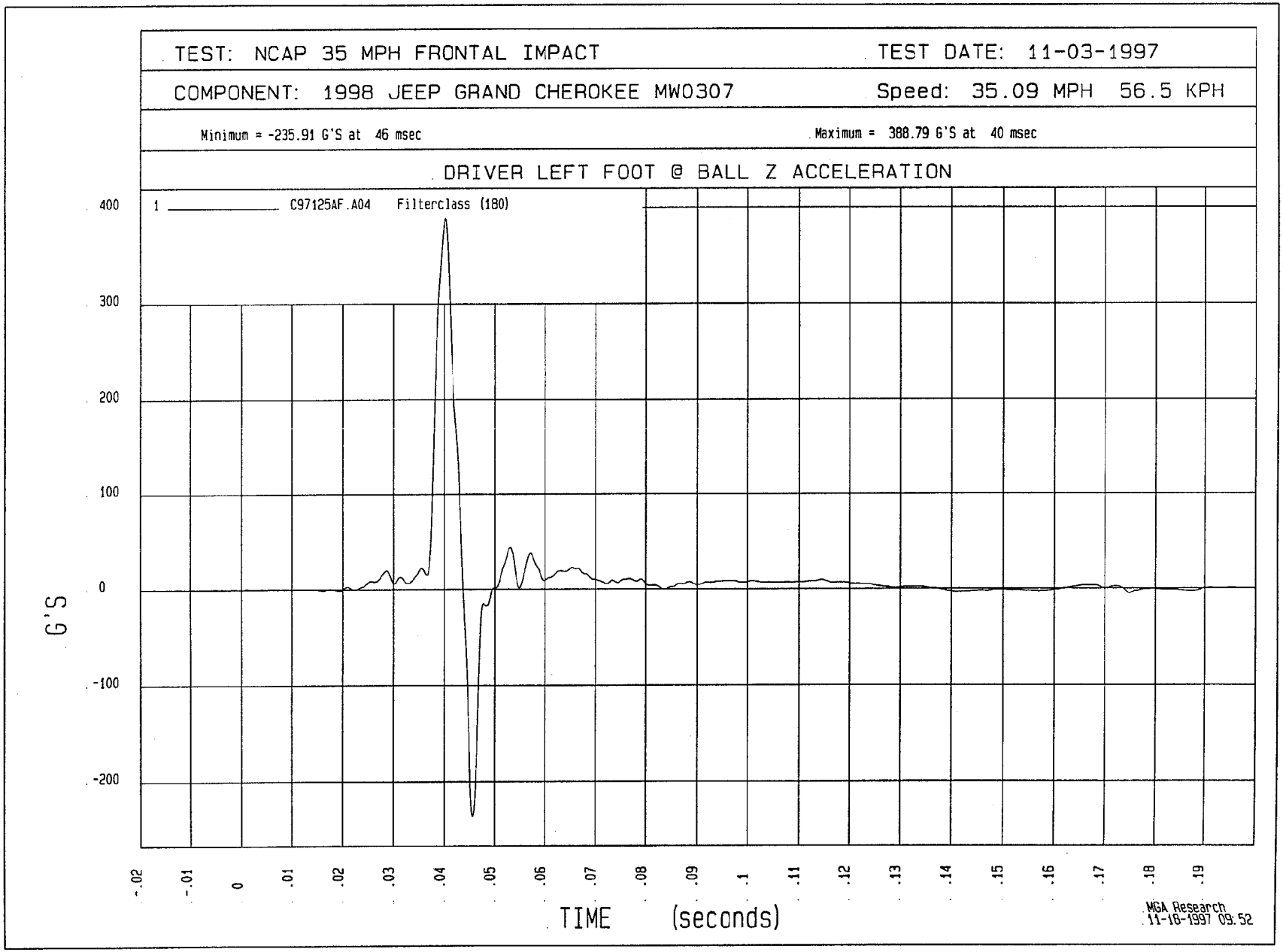

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -31.86 NM at 64 msec
Maximum = 285.95 NM at 109 msec
DRIVER RIGHT UPPER TIBIA MOMENT X
1 B97125MF.M74 Filterclass (600)
Data not valid after approx. 108 msec.
NM
100
80
60
40
20
0
-20
-40
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:40

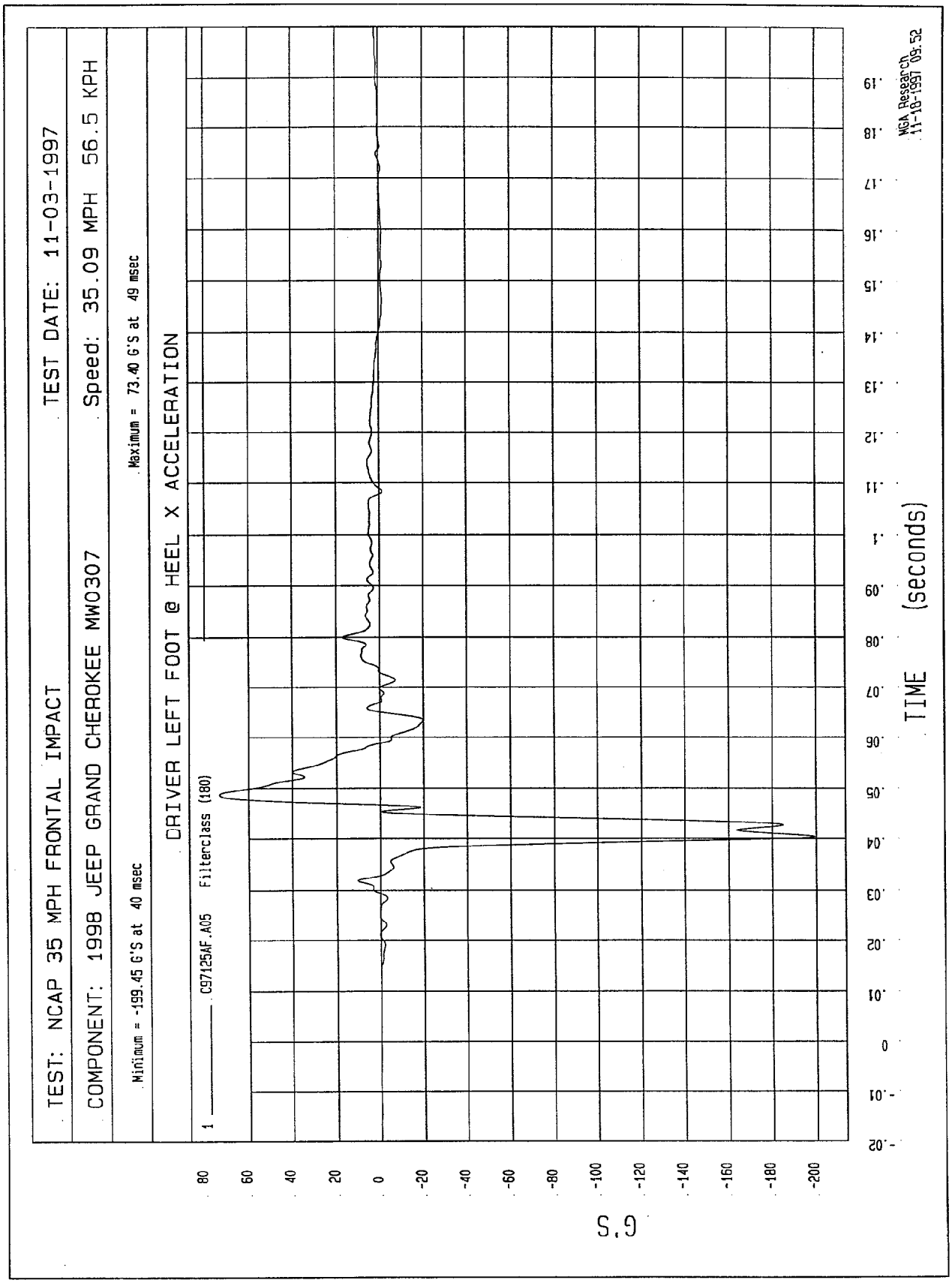

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -62.08 NM at 50 msec
Maximum = 280.60 NM at 41 msec
DRIVER RIGHT UPPER TIBIA MOMENT Y
1 B97125MF.M75 Filterclass (600)
NM
280
260
240
220
200
180
160
140
120
100
80
60
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
11-18-1997 10:17

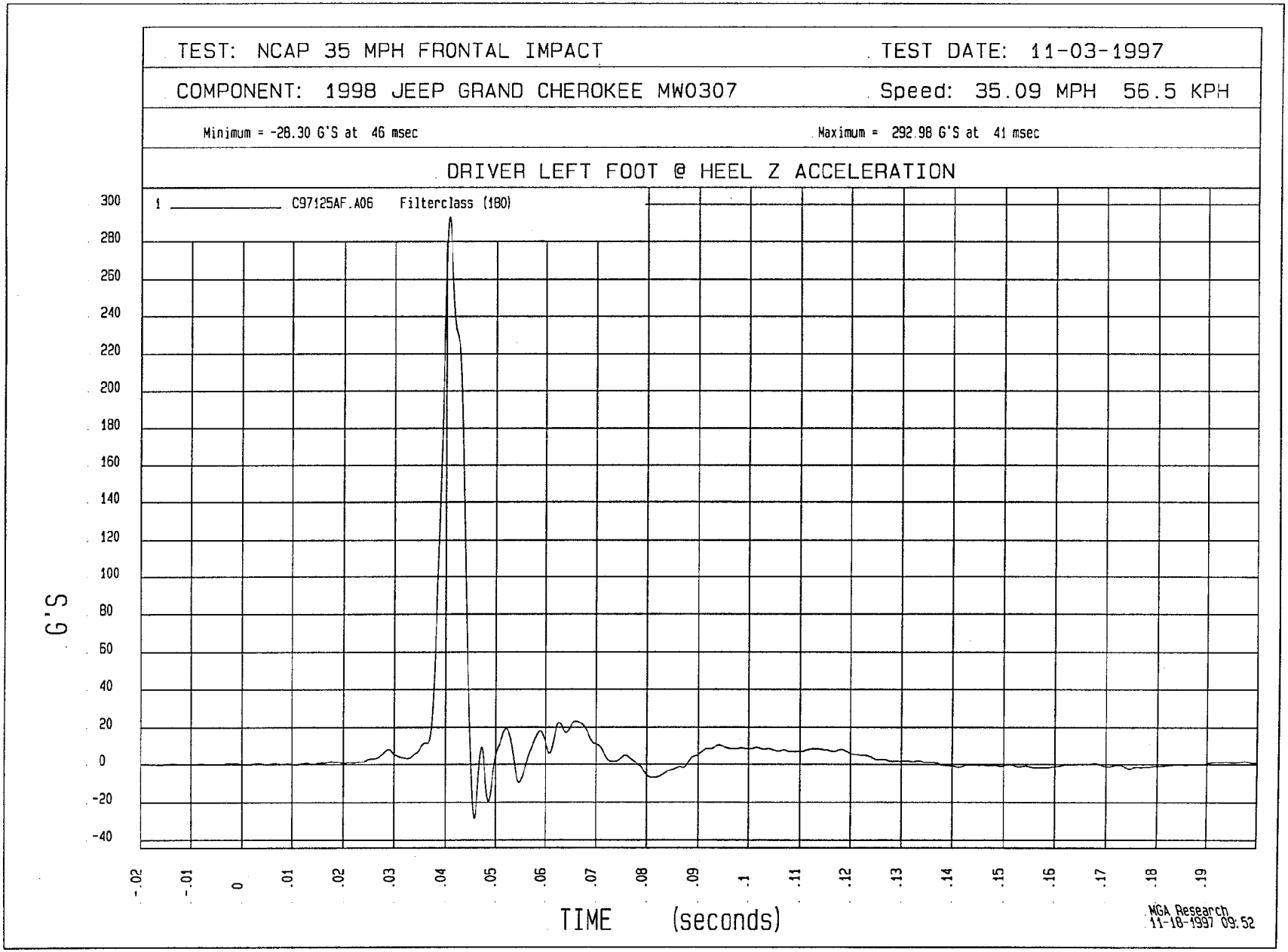

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -2745.30 N at 42 msec
Maximum = 157.55 N at 196 msec
DRIVER RIGHT LOWER TIBIA FORCE X
1 B97125FF.F76 Filterclass (600)
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
-2200
-2400
-2600
-2800
N
TIME (SECONDS)
MGA Research
11-18-1997 Ver. 17

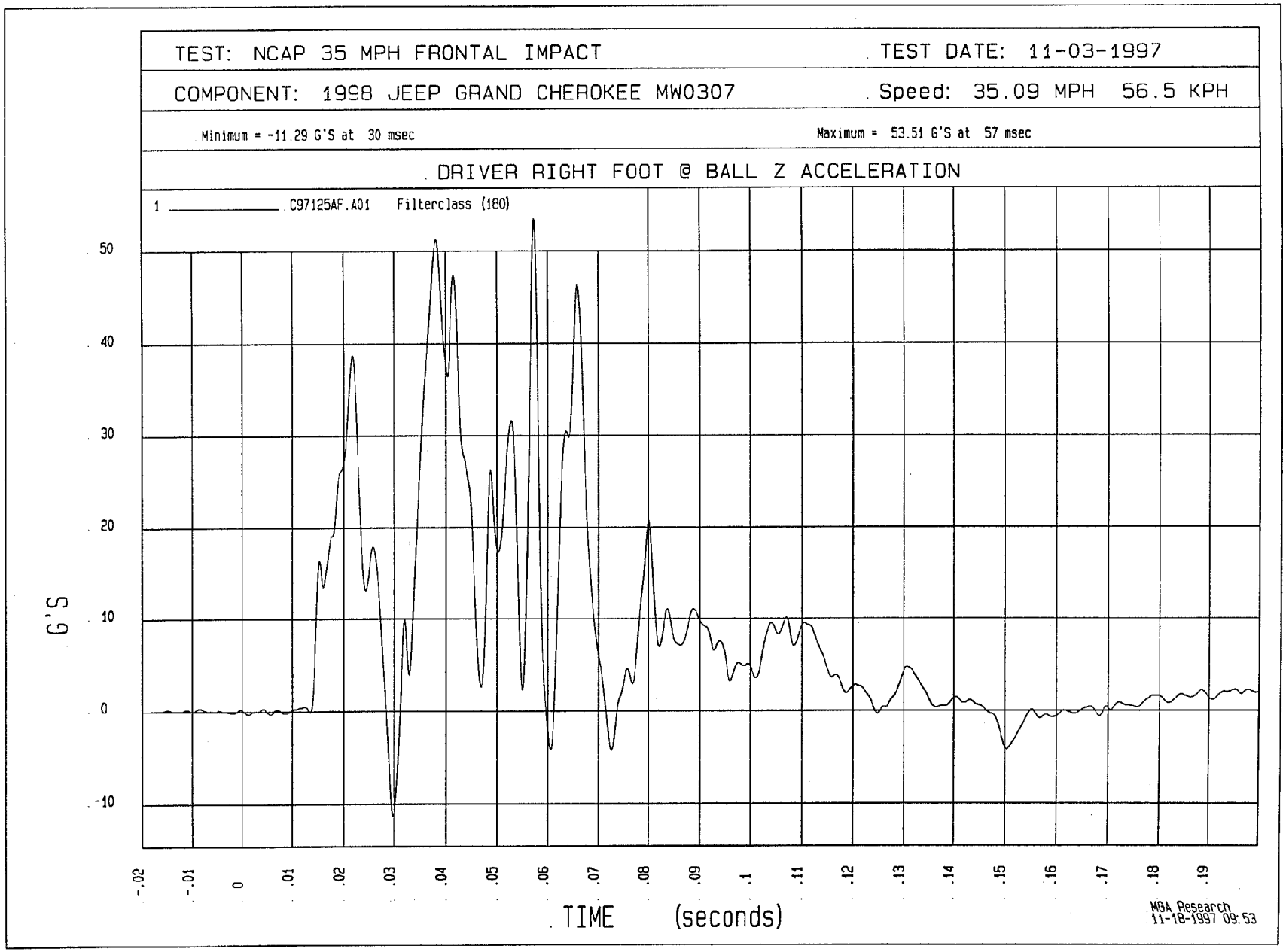

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -16132.68 N at 88 msec
Maximum = 16291.85 N at 89 msec
DRIVER RIGHT LOWER TIBIA FORCE Z
1 B97125FF.F78 Filterclass (600)
Data not valid after approx. 86 msec.
7000
6000
5000
4000
3000
2000
1000
0
-1000
N
-.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
11-18-1997 10:49

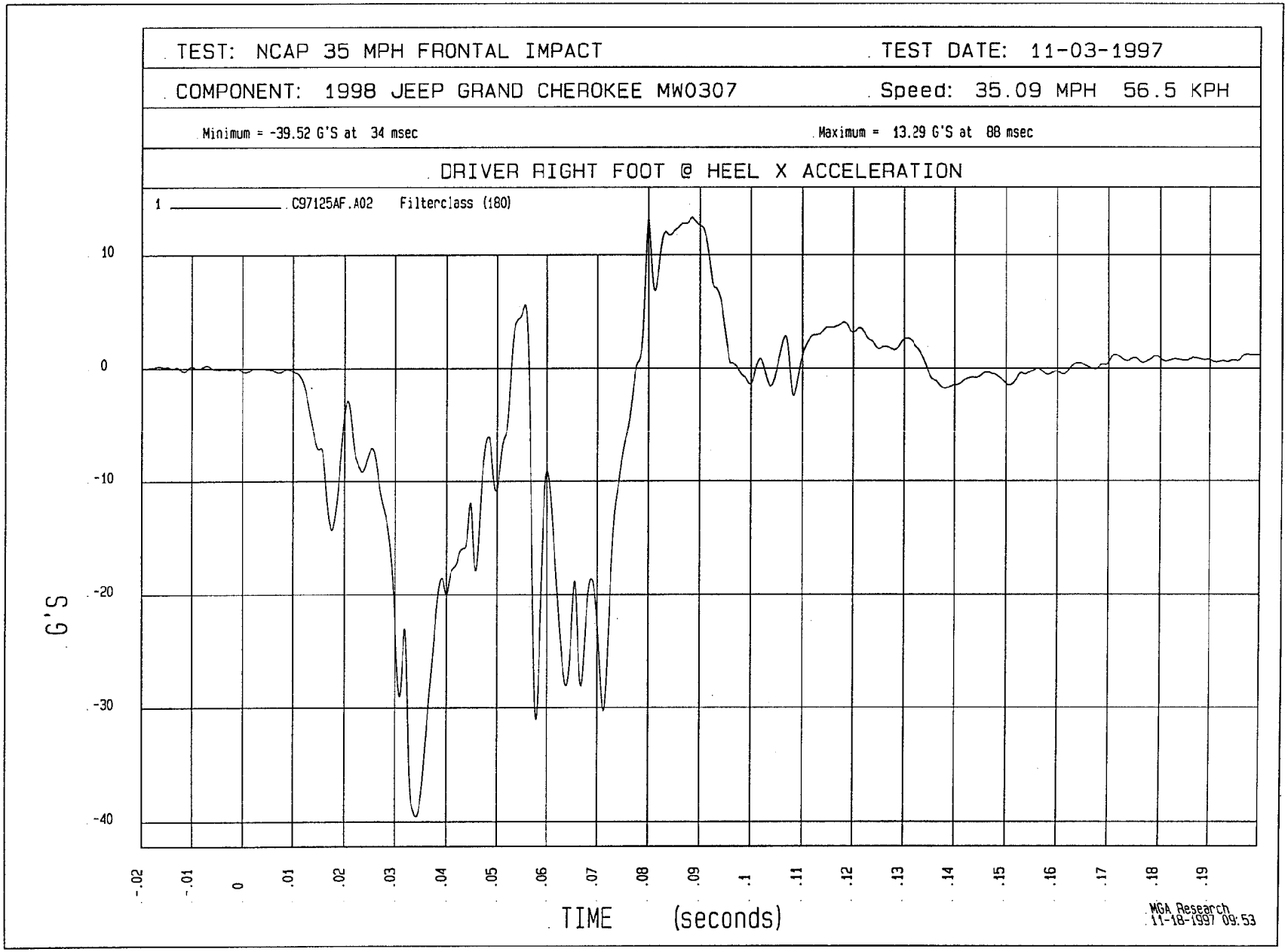

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -411.51 NM at 50 msec
Maximum = 176.04 NM at 41 msec
DRIVER RIGHT LOWER TIBIA MOMENT Y
1 897125MF.M77 Filterclass (600)
200
100
0
-100
-200
-300
-400
NM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:17

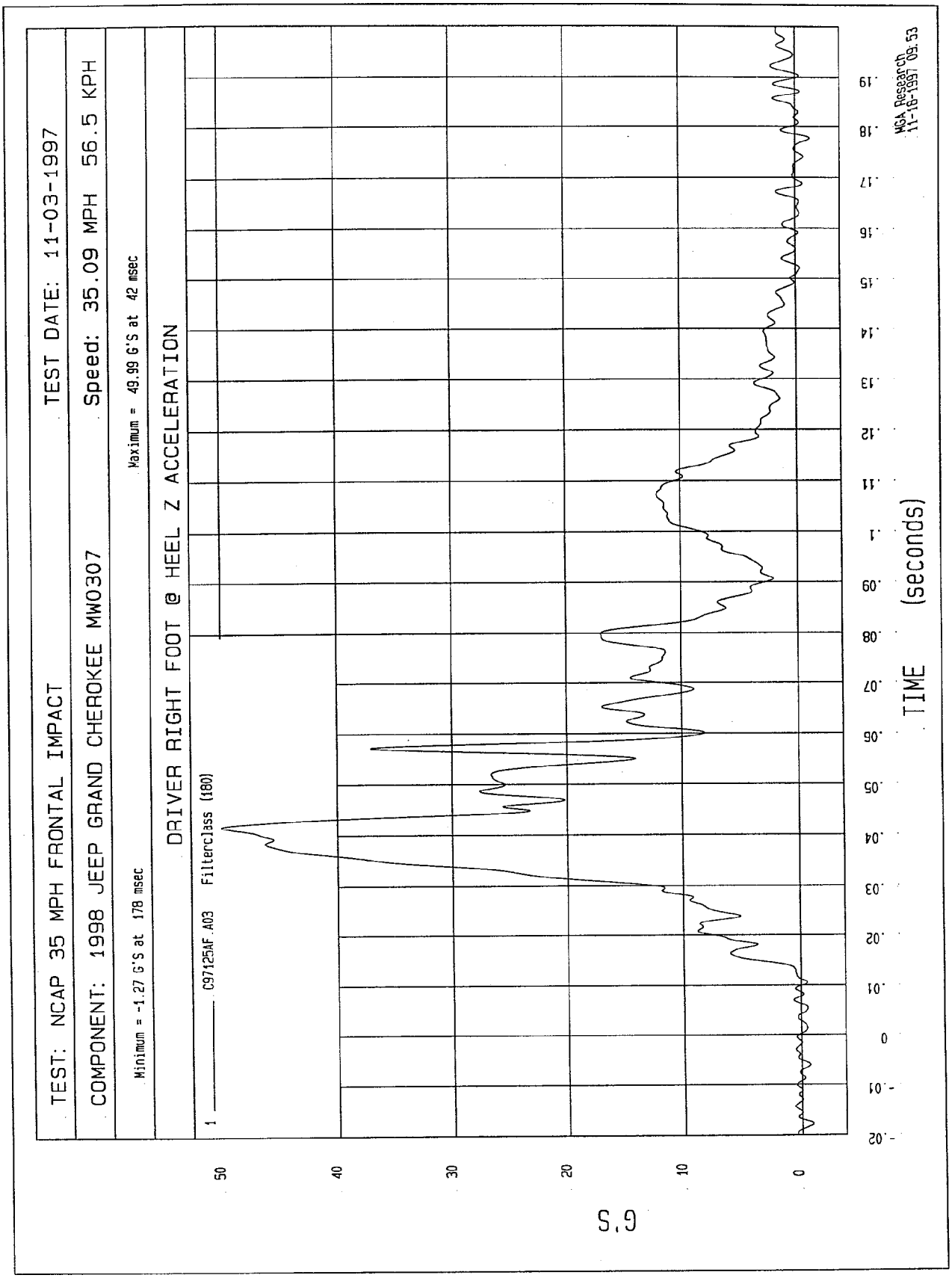

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -235.91 G'S at 46 msec
Maximum = 388.79 G'S at 40 msec
DRIVER LEFT FOOT @ BALL Z ACCELERATION
1 C97125AF.A04 Filterclass (180)
400
300
200
100
0
-100
-200
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-18-1997 09:52

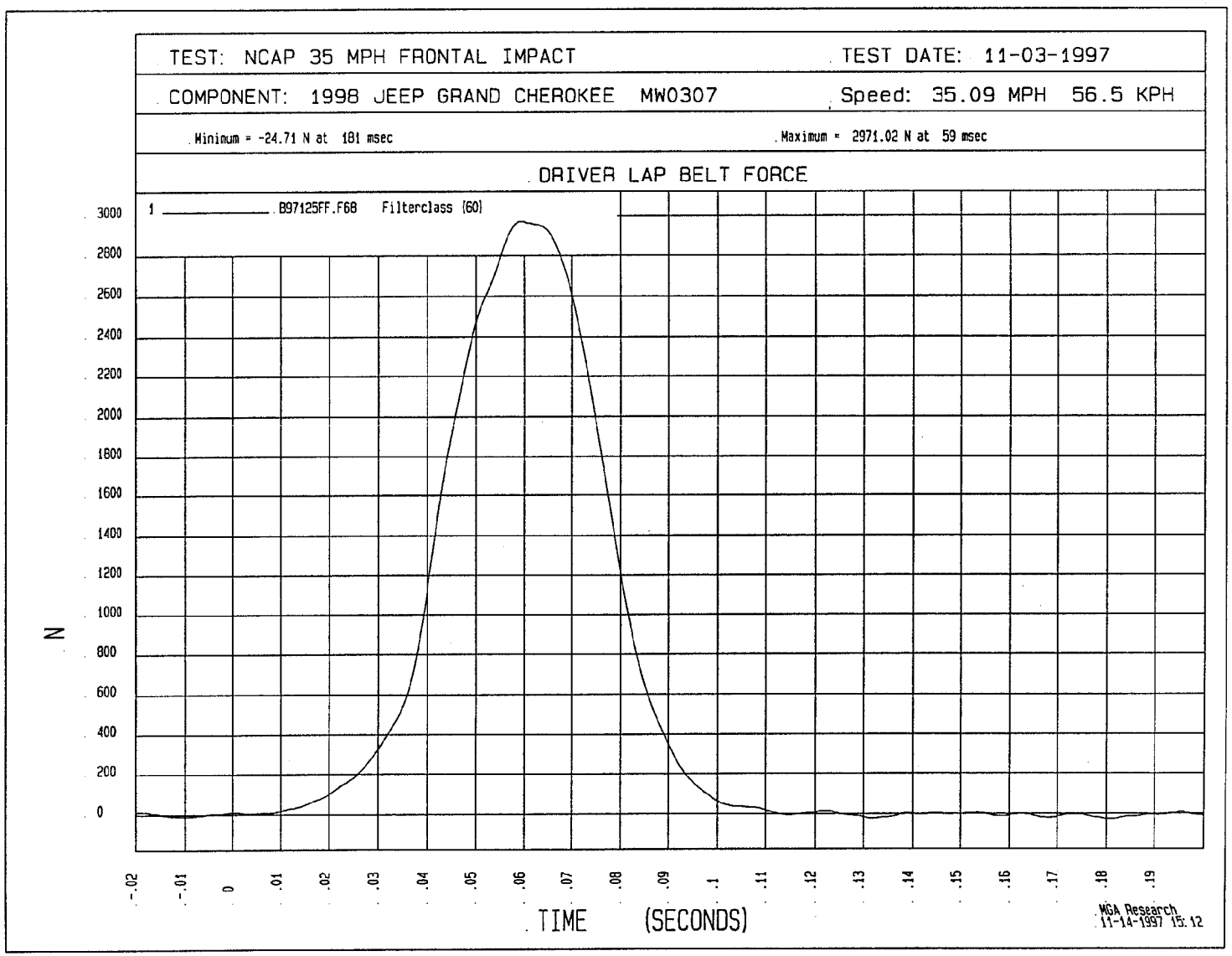

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -199.45 G'S at 40 msec
Maximum = 73.40 G'S at 49 msec
DRIVER LEFT FOOT @ HEEL X ACCELERATION
1 C97125AF.A05 Filterclass (180)
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
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
11-18-1997 09:52

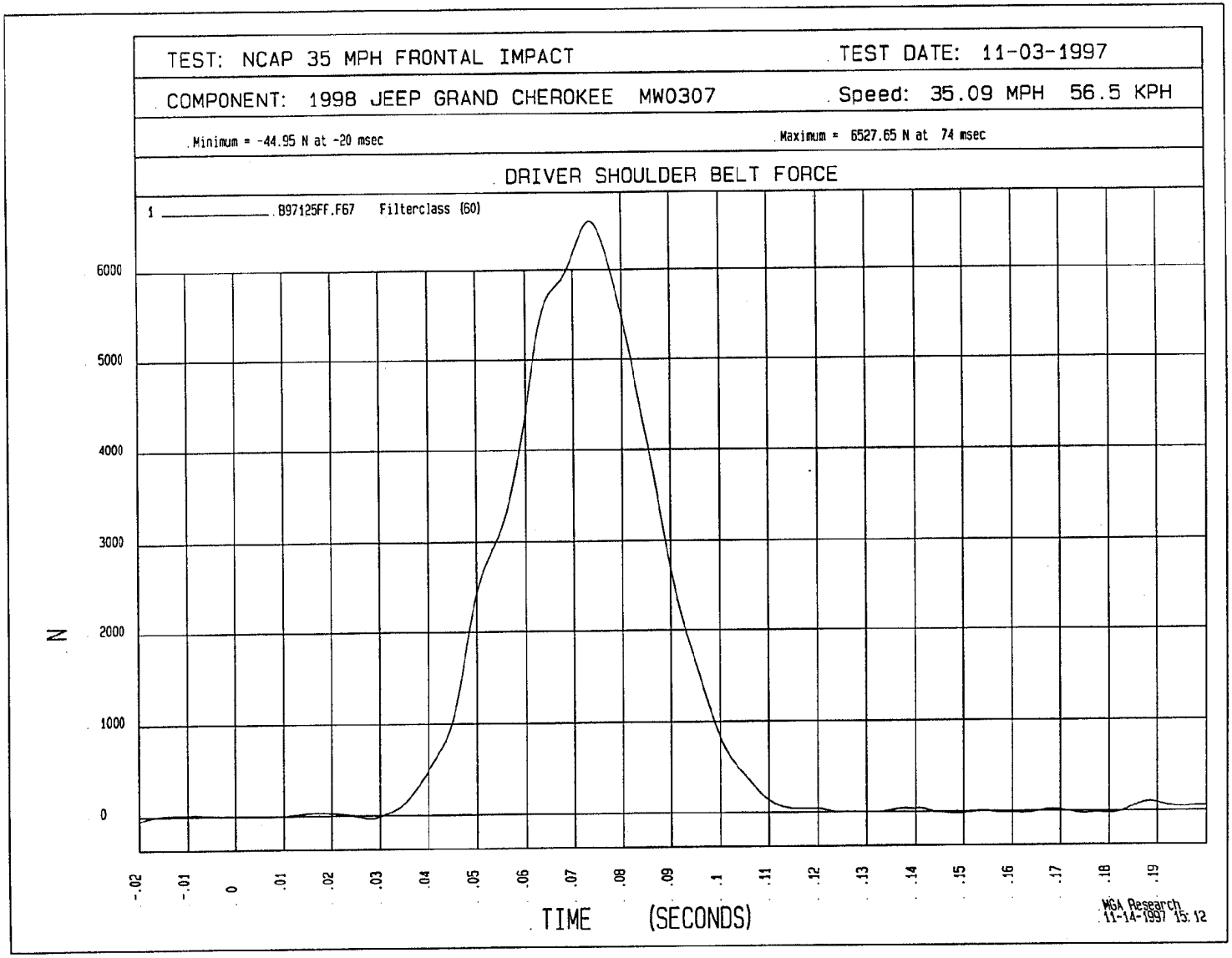

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -28.30 G'S at 46 msec
Maximum = 292.98 G'S at 41 msec
DRIVER LEFT FOOT @ HEEL Z ACCELERATION
1 C97125AF.A06 Filterclass (180)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-18-1997 09:52

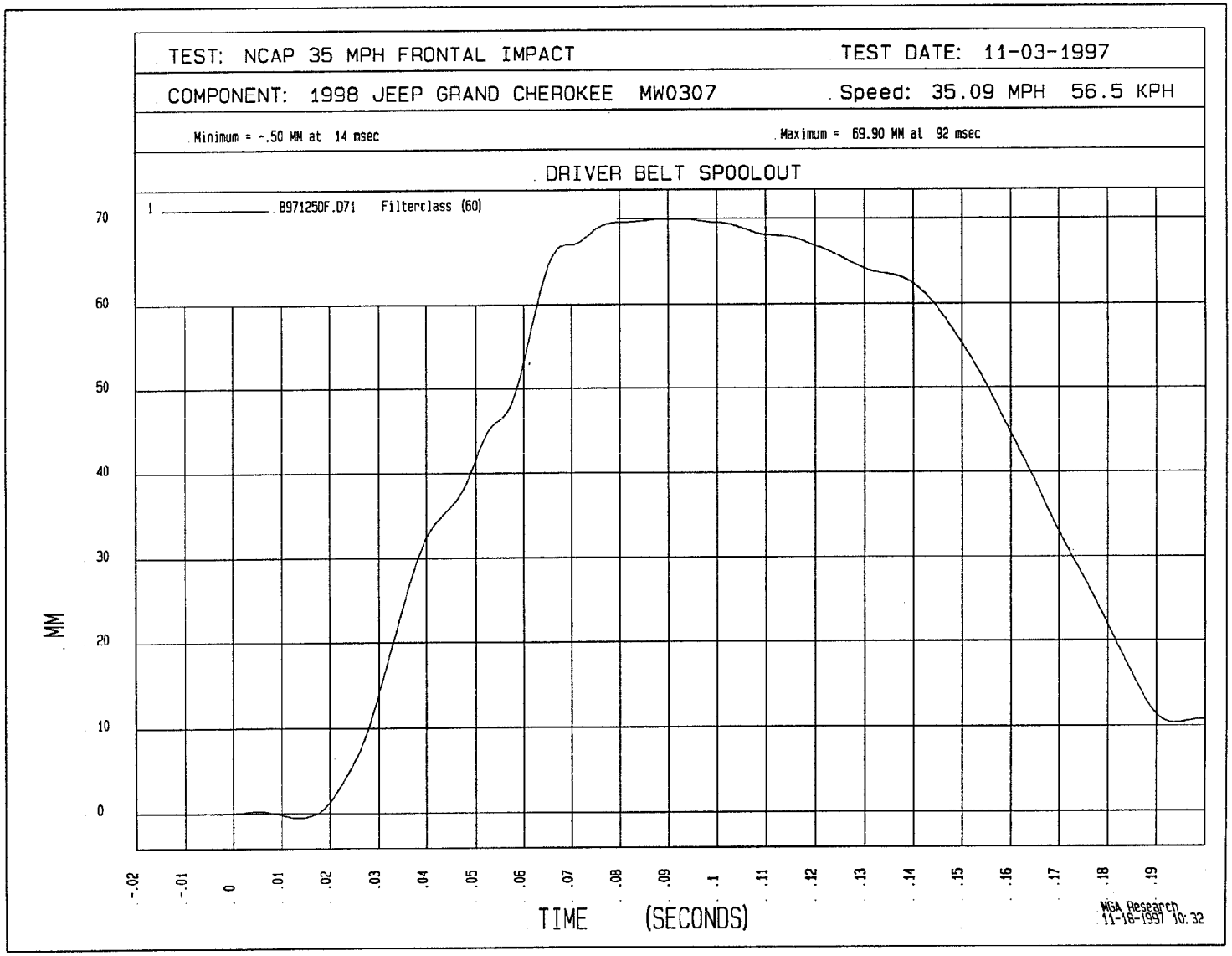

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -11.29 G'S at 30 msec
Maximum = 53.51 G'S at 57 msec
DRIVER RIGHT FOOT @ BALL Z ACCELERATION
1 C97125AF.A01 Filterclass (180)
G'S
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-18-1997 09:53

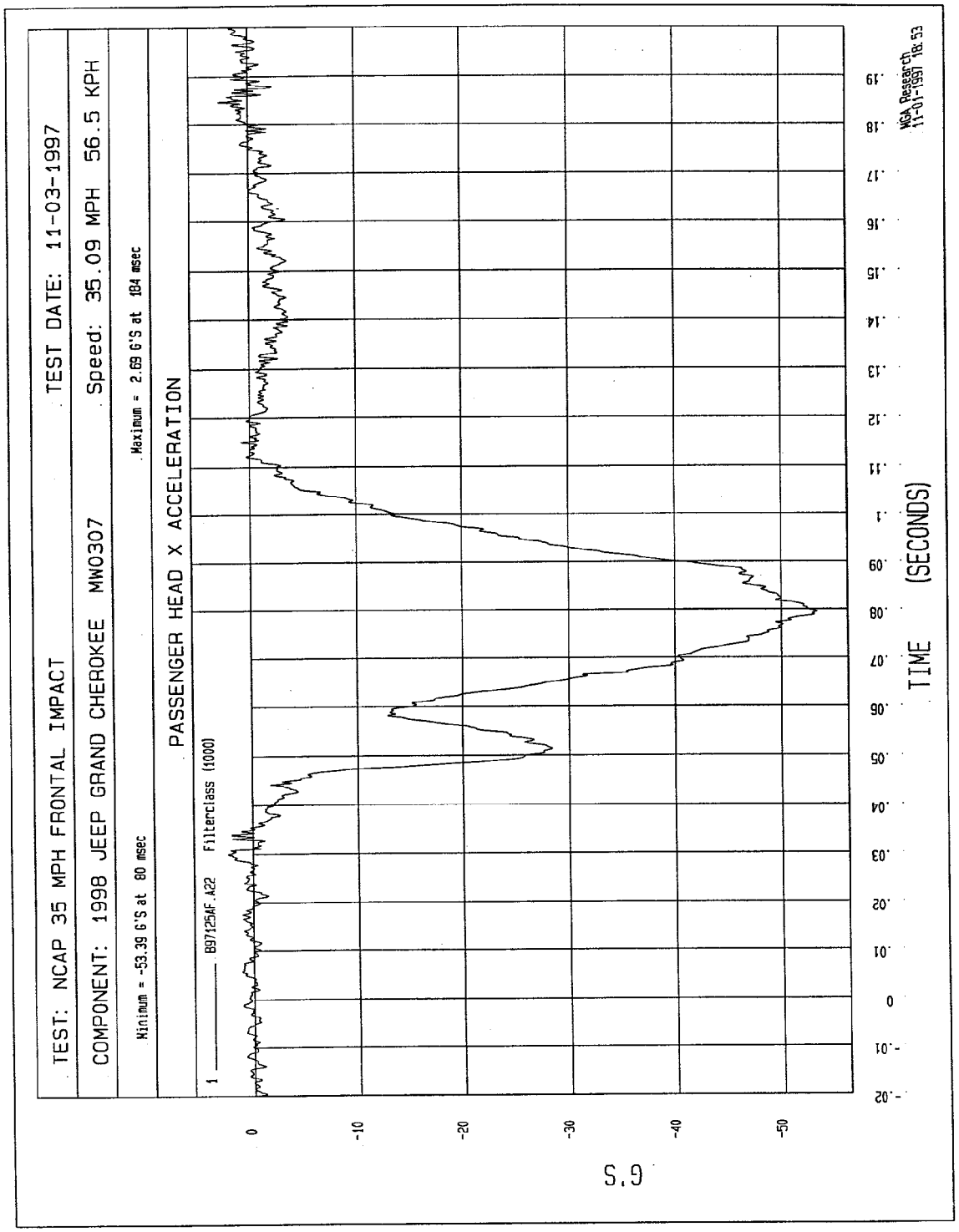

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -39.52 G'S at 34 msec
Maximum = 13.29 G'S at 88 msec
DRIVER RIGHT FOOT @ HEEL X ACCELERATION
1 C97125AF.A02 Filterclass (180)
10
0
-10
-20
-30
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-18-1997 09:53

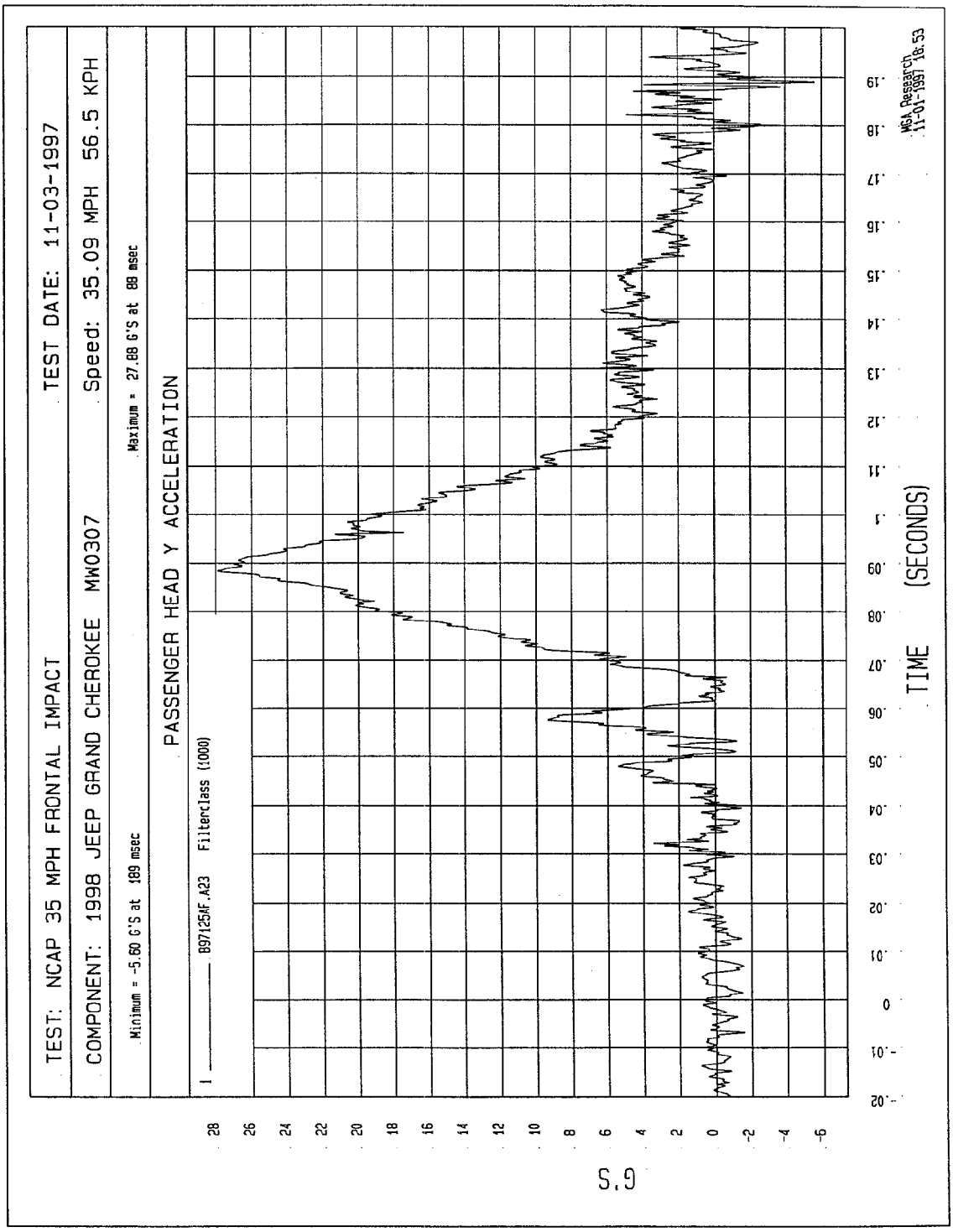

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -1.27 G'S at 178 msec
Maximum = 49.99 G'S at 42 msec
DRIVER RIGHT FOOT @ HEEL Z ACCELERATION
1 C97125AF.A03 Filterclass (180)
G'S
TIME (seconds)
MGA Research
11-18-1997 09:53

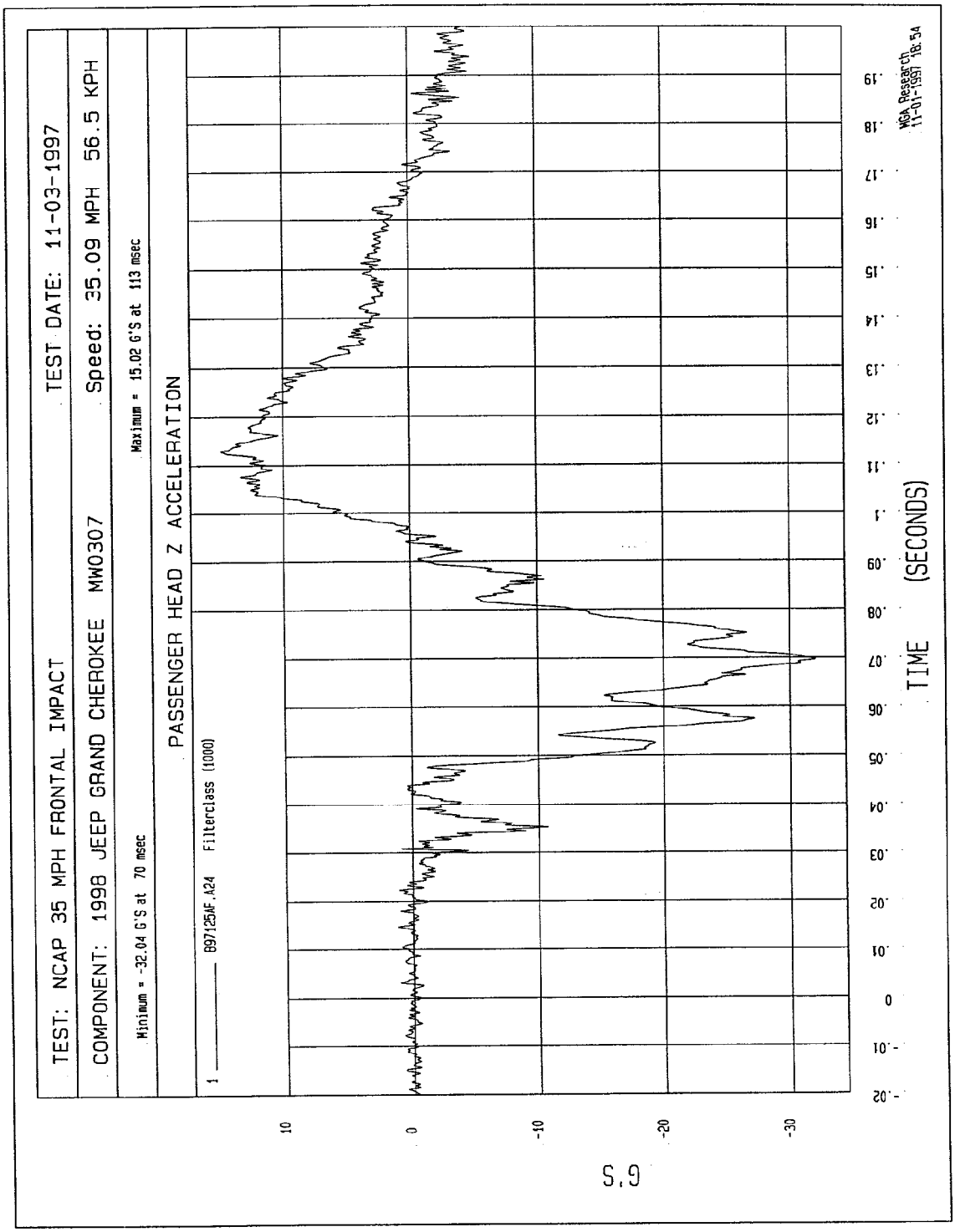

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -24.71 N at 181 msec
Maximum = 2971.02 N at 59 msec
DRIVER LAP BELT FORCE
1 B97125FF.F68 Filterclass (60)
N
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
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
11-14-1997 15:12

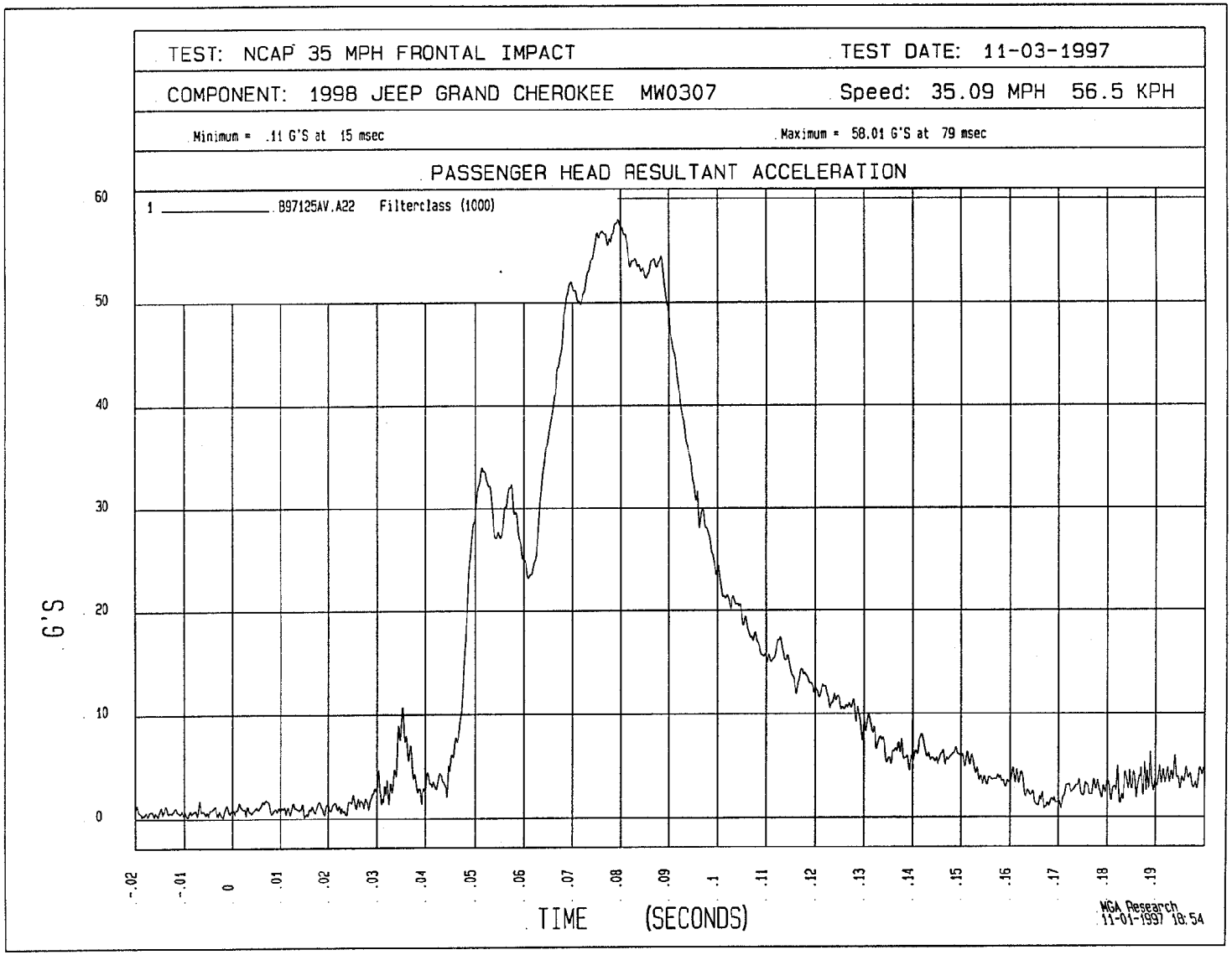

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -44.95 N at -20 msec
Maximum = 6527.65 N at 74 msec
DRIVER SHOULDER BELT FORCE
1 B97125FF.F67 Filterclass (60)
6000
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:12

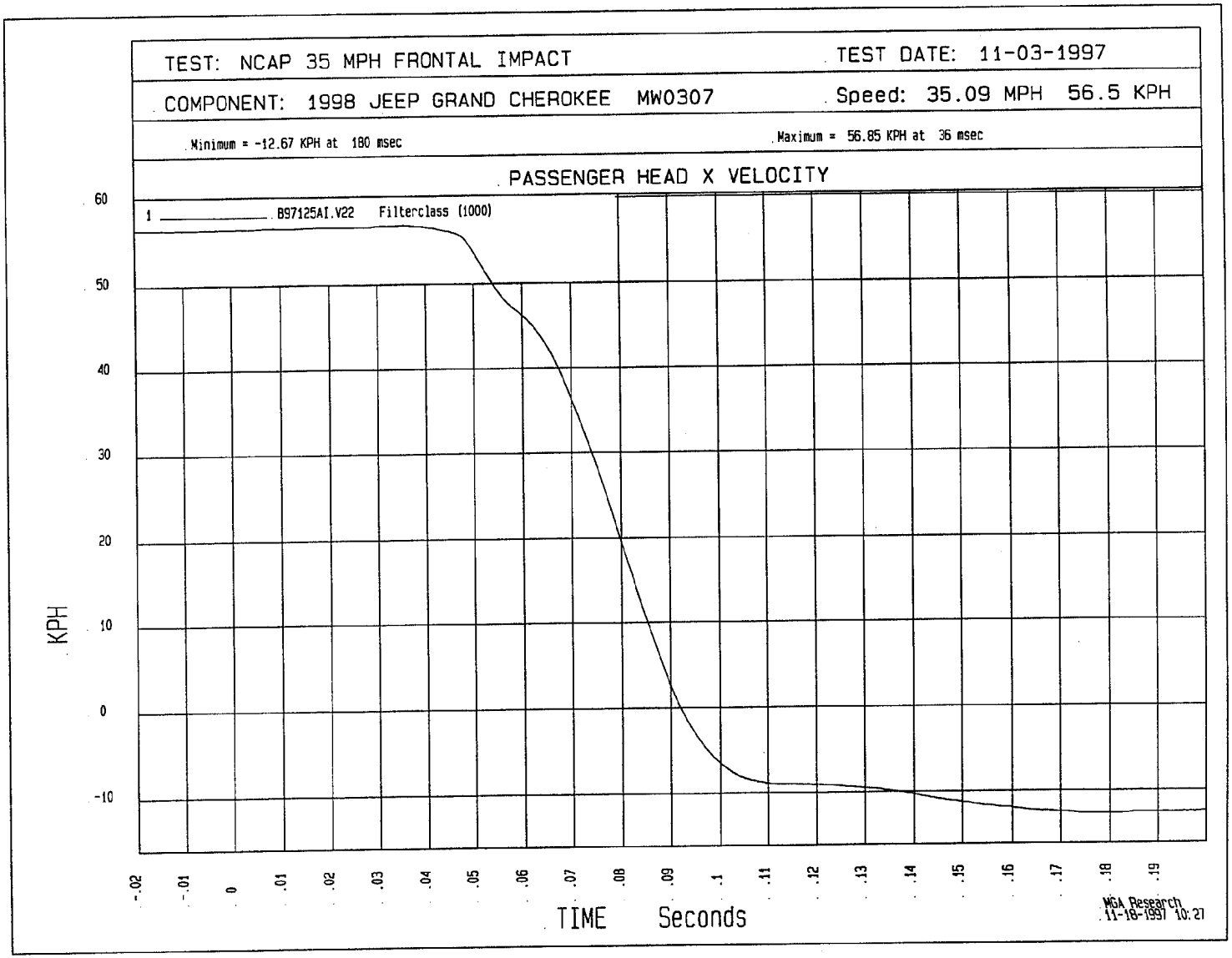

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -.50 MM at 14 msec
Maximum = 69.90 MM at 92 msec
DRIVER BELT SPOOLOUT
1 B971250F.D71 Filterclass (60)
MM
70
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:32

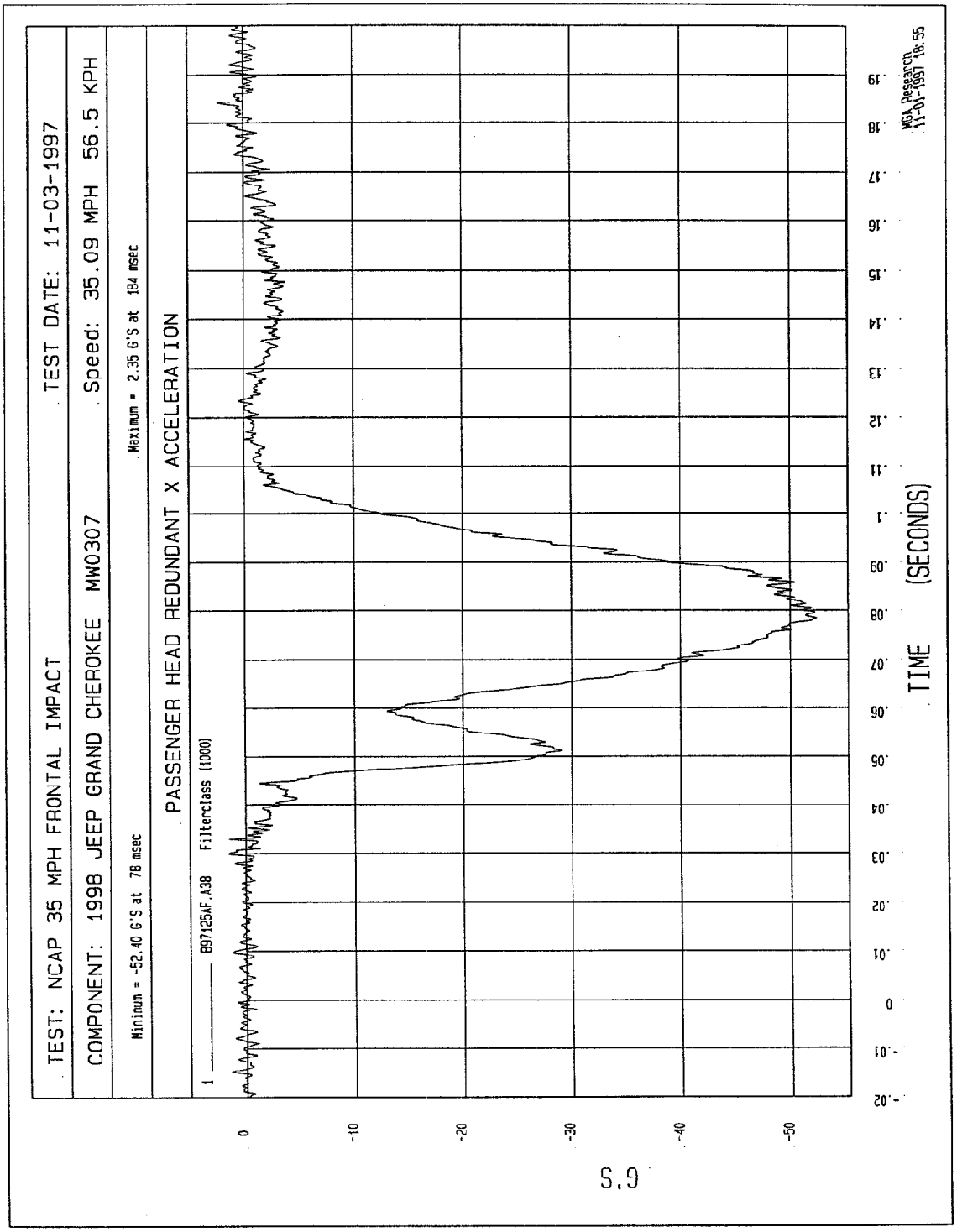

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -53.39 G'S at 80 msec
Maximum = 2.69 G'S at 184 msec
PASSENGER HEAD X ACCELERATION
1 B97125AF.A22 Filterclass (1000)
0
-10
-20
-30
-40
-50
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-01-1997 18:53

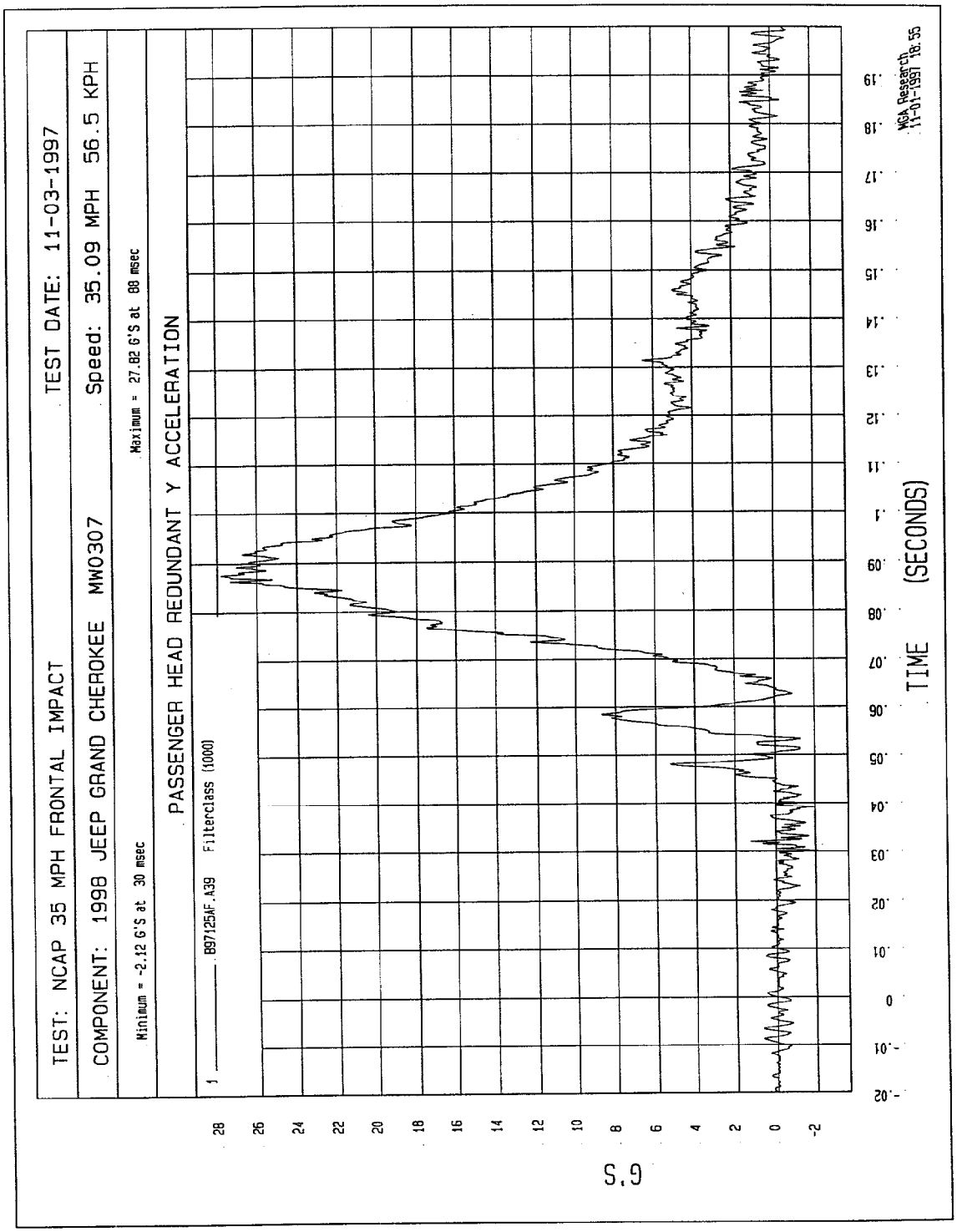

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -5.60 G'S at 189 msec
Maximum = 27.88 G'S at 88 msec
PASSENGER HEAD Y ACCELERATION
B97125NF.A23 FilterClass (1000)
G's
TIME (SECONDS)
MGA Research
11-01-1997 16:53

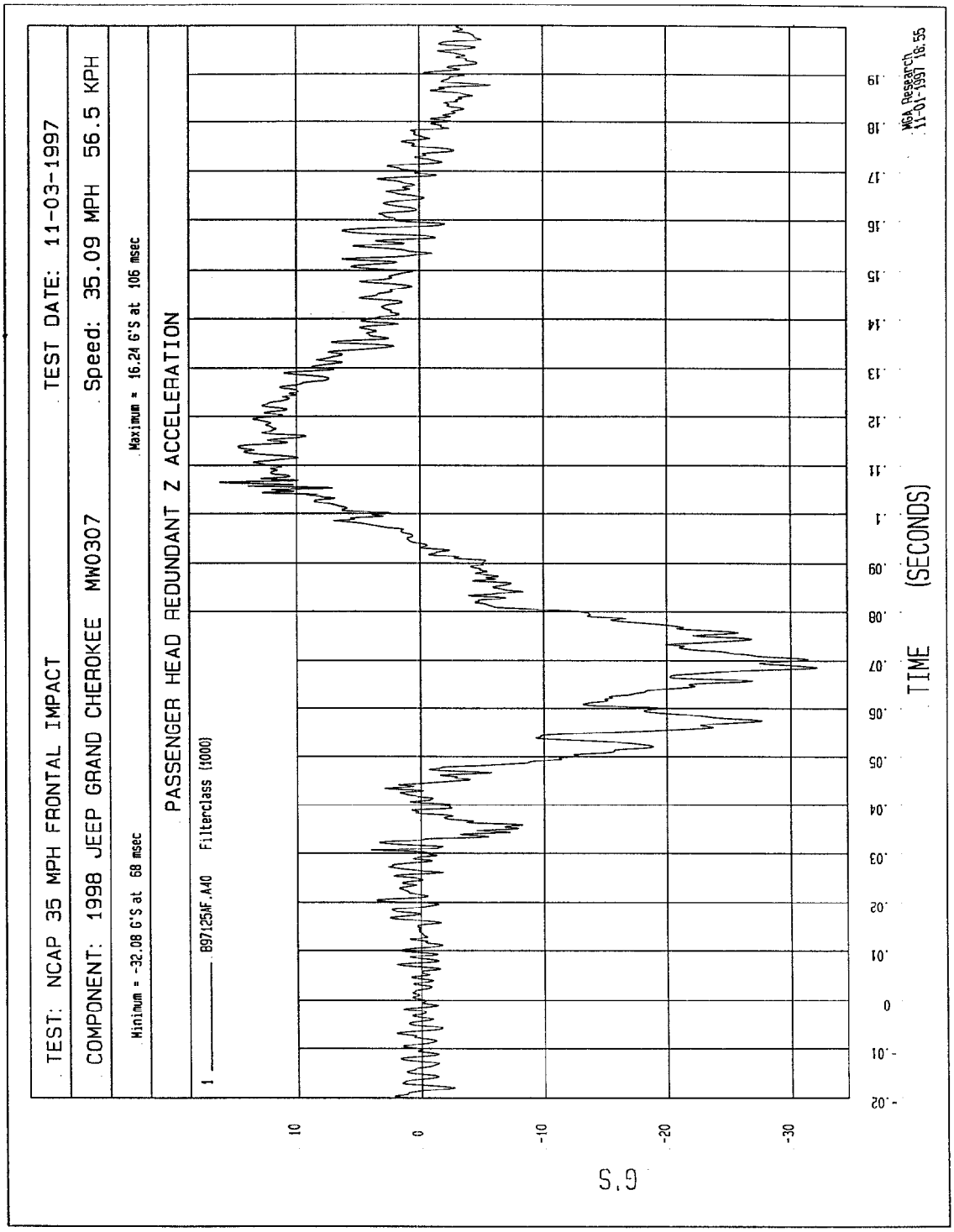

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -32.04 G'S at 70 msec
Maximum = 15.02 G'S at 113 msec
PASSENGER HEAD Z ACCELERATION
1 _____ 897125AF.A24 Filterclass (1000)
10
0
-10
-20
-30
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
NGA Research
11-01-1998 18:54
6.5

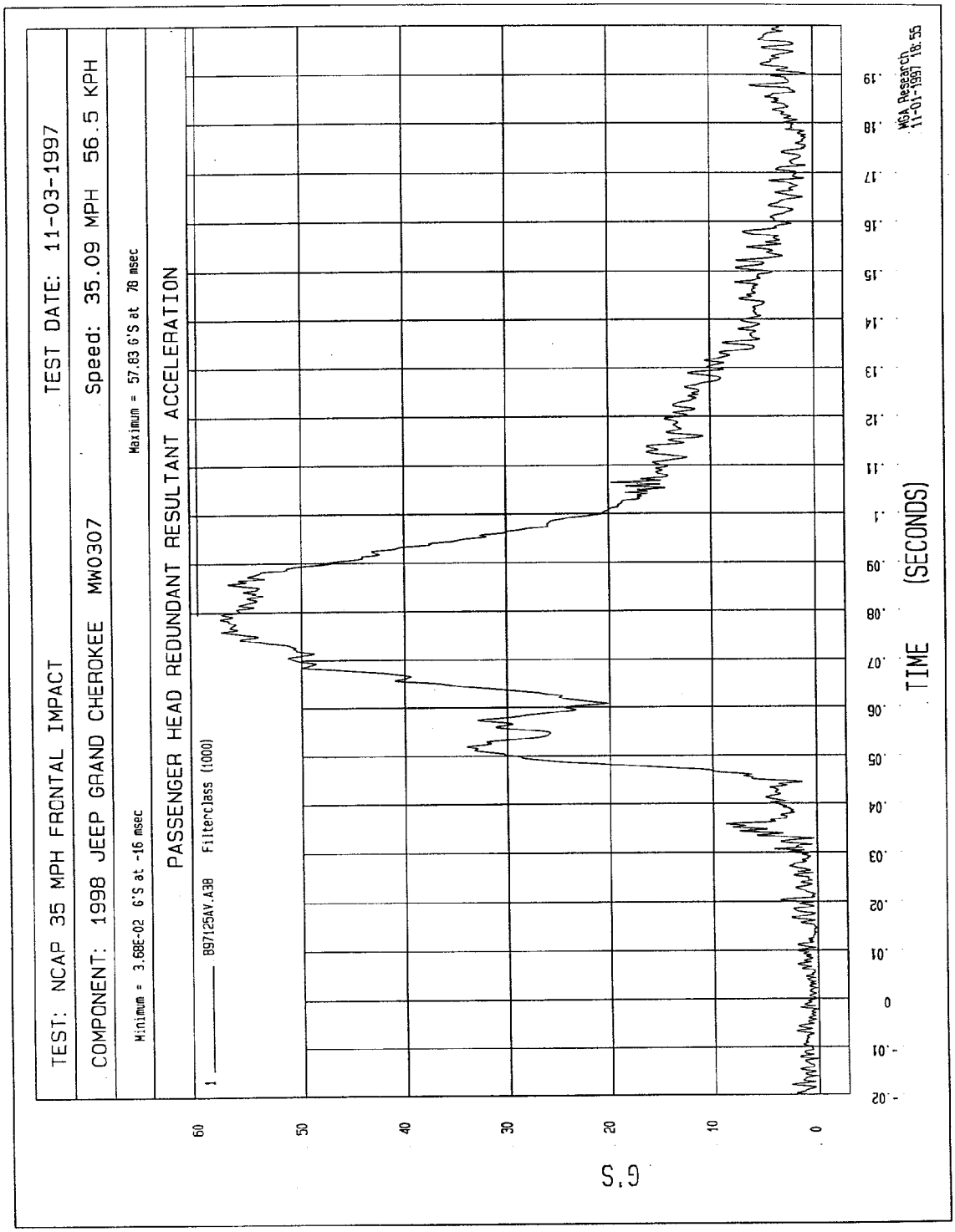

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = .11 G'S at 15 msec
Maximum = 58.01 G'S at 79 msec
PASSENGER HEAD RESULTANT ACCELERATION
1 B97125AV.A22 Filterclass (1000)
G'S
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
NGA Research
11-01-1997 18:54

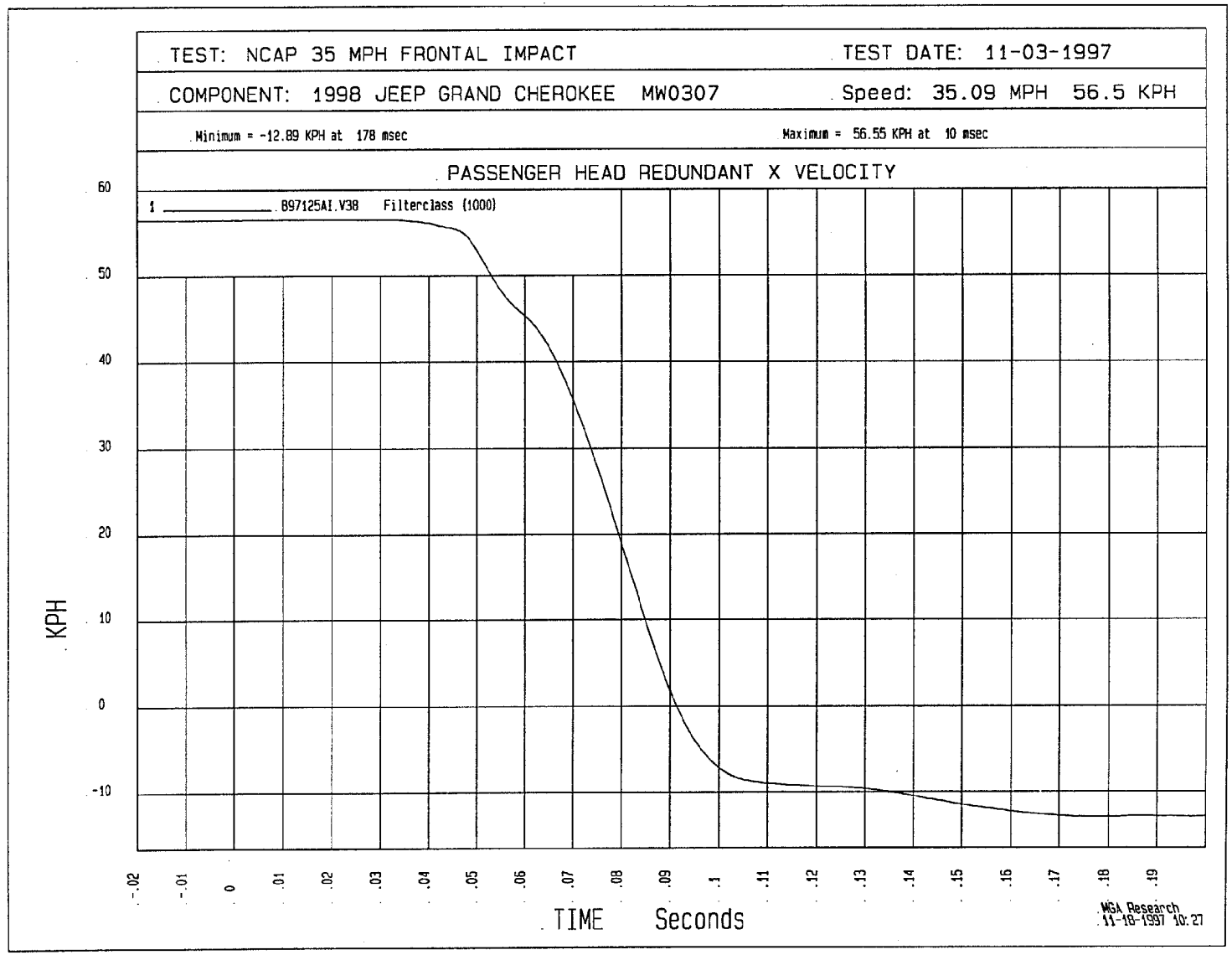

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -12.67 KPH at 180 msec
Maximum = 56.85 KPH at 36 msec
PASSENGER HEAD X VELOCITY
1 B97125AI.V22 Filterclass (1000)
KPH
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:27

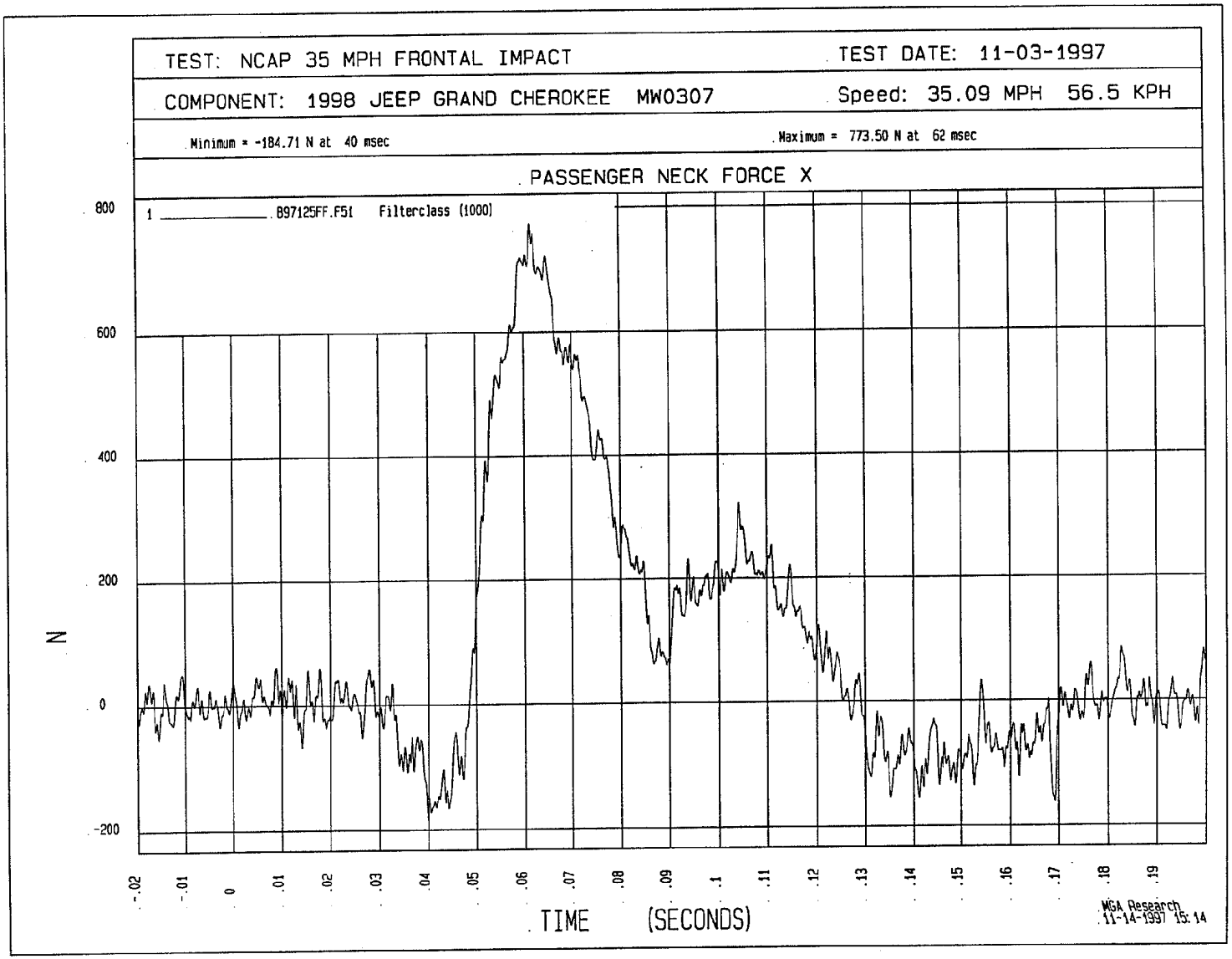

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -52.40 G'S at 78 msec
Maximum = 2.35 G'S at 134 msec
PASSENGER HEAD REDUNDANT X ACCELERATION
1 _____ B97125AF.A38 Filterclass (1000)
0
-10
-20
-30
-40
-50
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:55

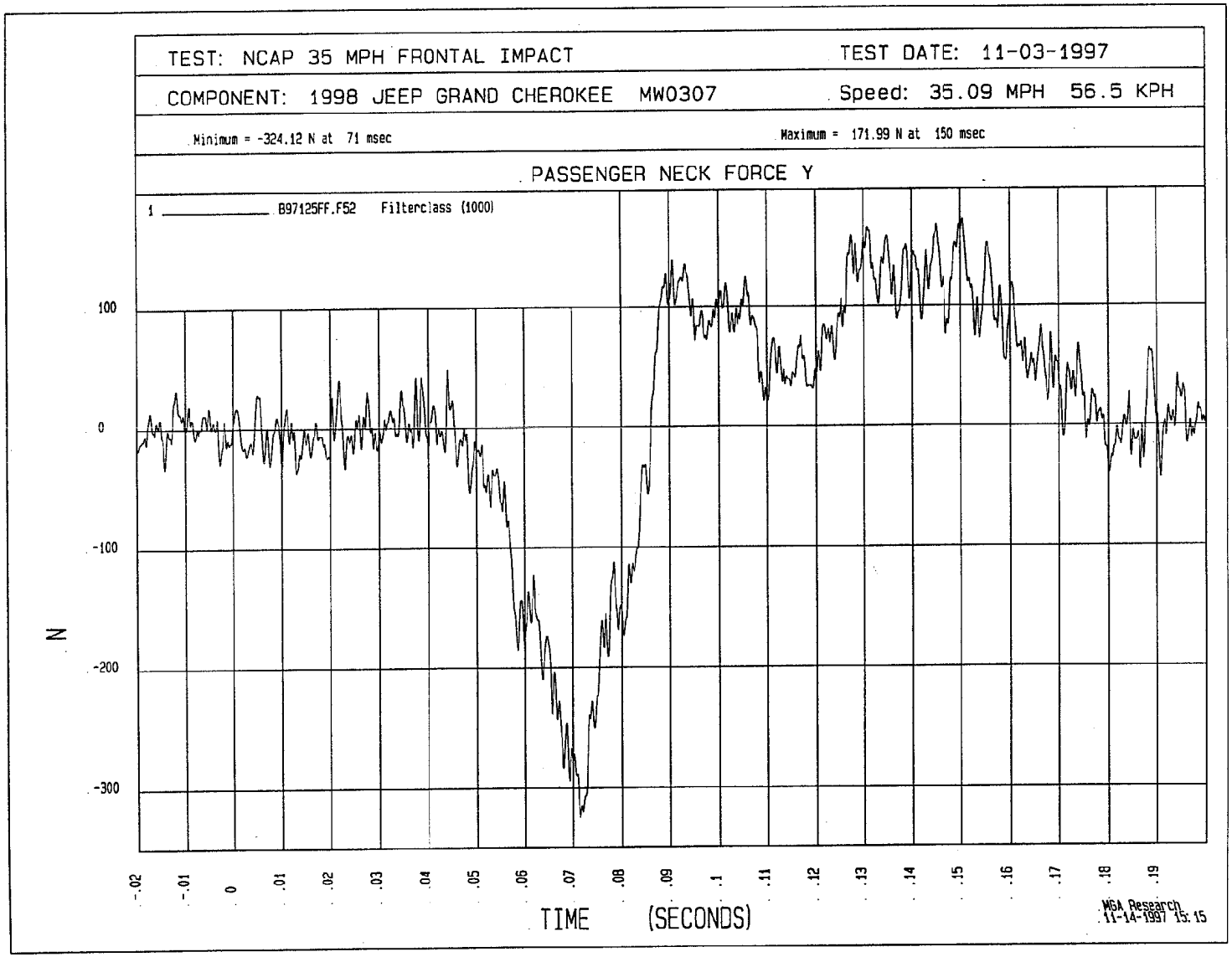

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -2.12 G'S at 30 msec
Maximum = 27.82 G'S at 88 msec
PASSENGER HEAD REDUNDANT Y ACCELERATION
1 B97125AF.A39 Filterclass (1000)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 18:55

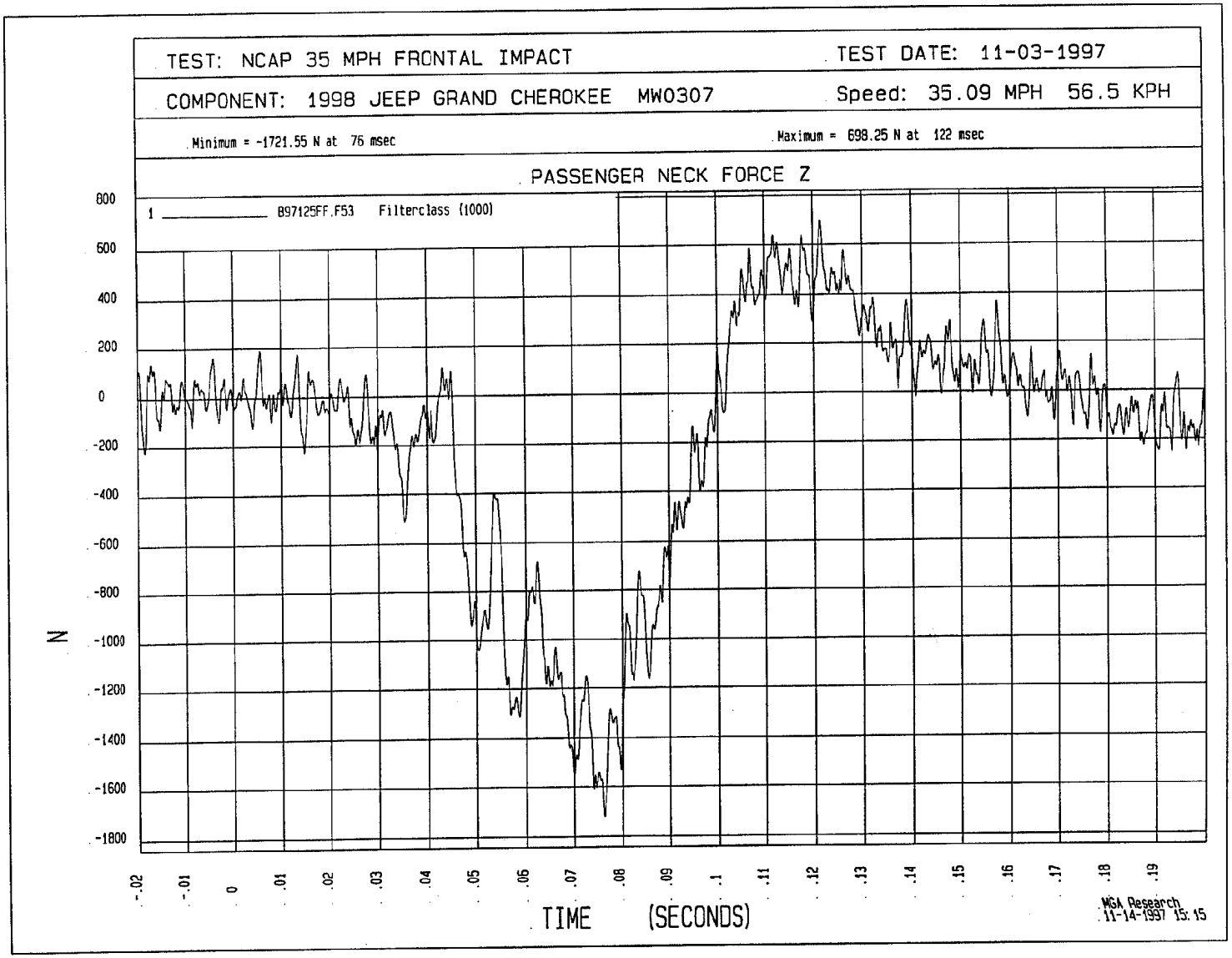

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -32.08 G'S at 68 msec
Maximum = 16.24 G'S at 106 msec
PASSENGER HEAD REDUNDANT Z ACCELERATION
1 897:25NF.A40 Filterclass (1000)
10
0
-10
-20
-30
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-03-1997 16:55

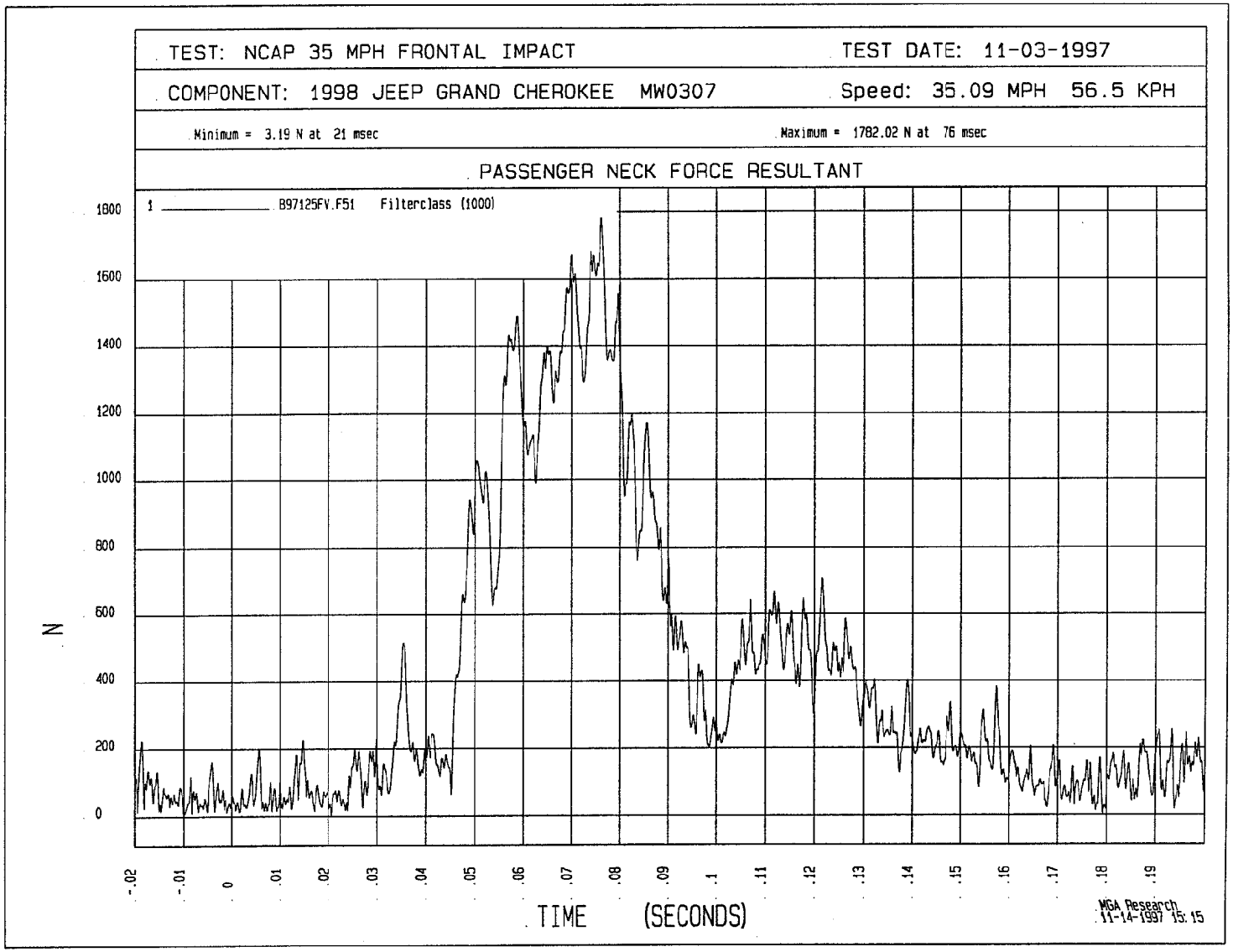

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 3.68E-02 G'S at -16 msec
Maximum = 57.83 G'S at 78 msec
PASSENGER HEAD REDUNDANT RESULTANT ACCELERATION
1 B97125AY.A3B Filterclass (1000)
G's
TIME (SECONDS)
MGA Research
11-01-1997 18:55

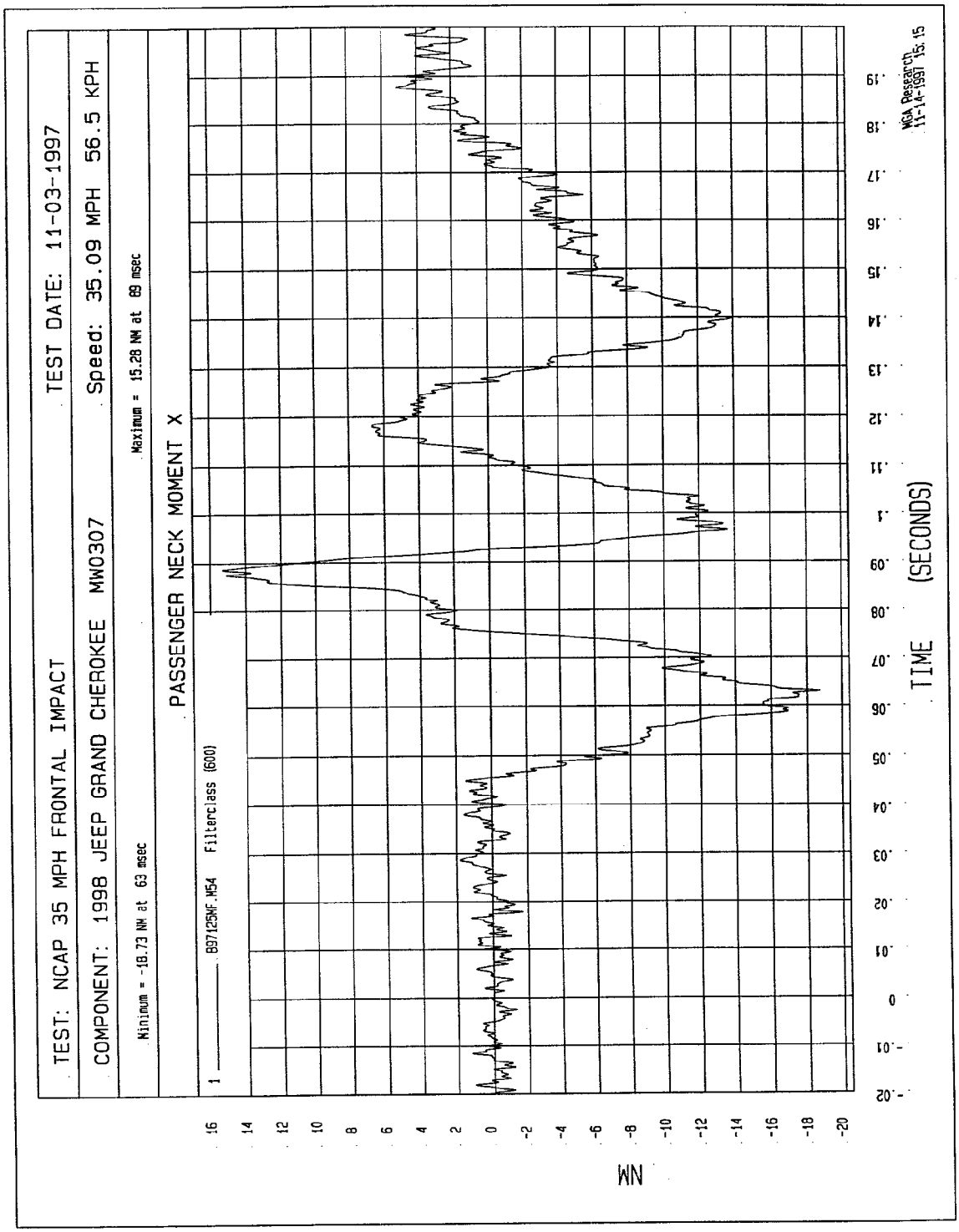

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -12.89 KPH at 178 msec
Maximum = 56.55 KPH at 10 msec
PASSENGER HEAD REDUNDANT X VELOCITY
1 B97125AI.V38 Filterclass (1000)
KPH
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:27

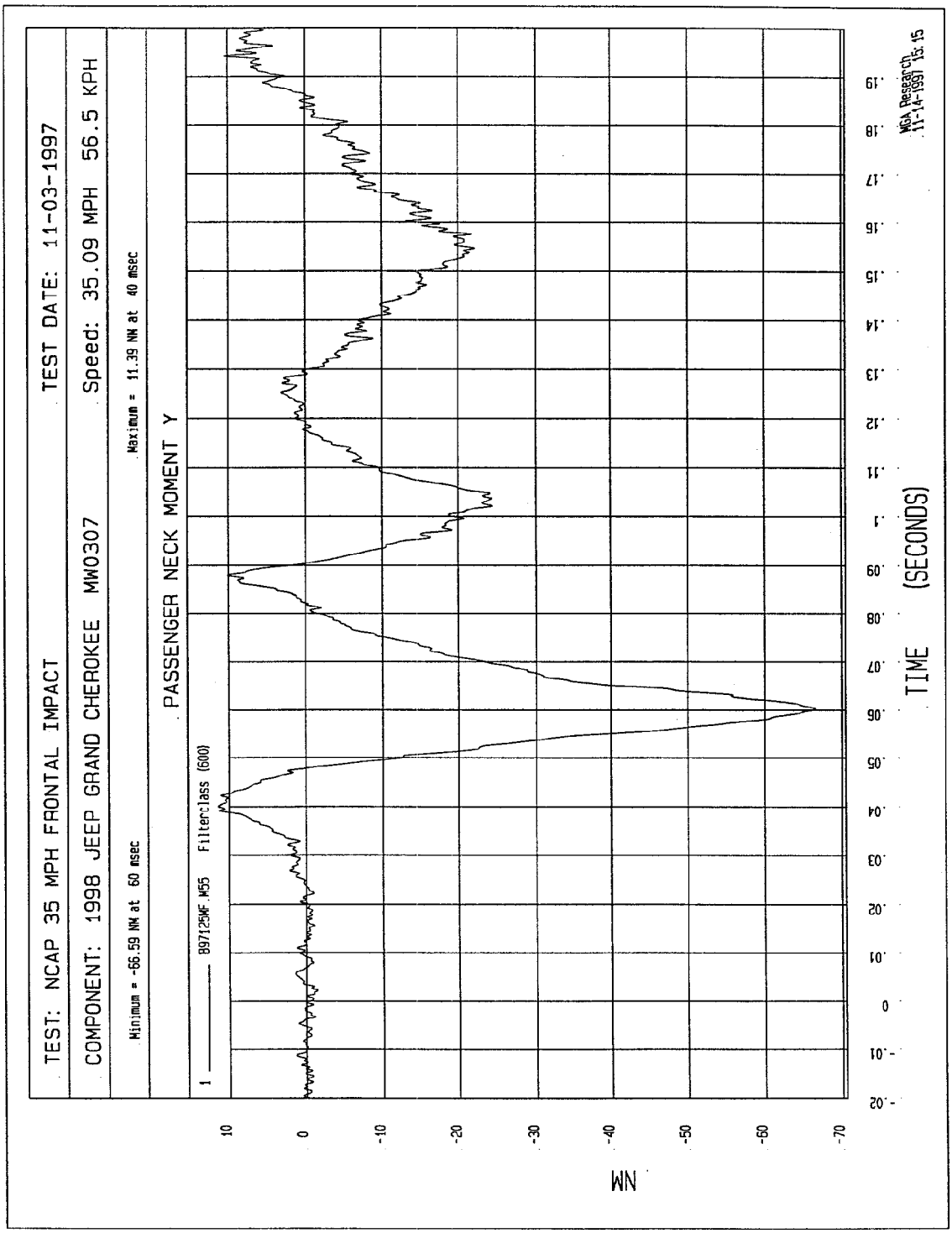

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -184.71 N at 40 msec
Maximum = 773.50 N at 62 msec
PASSENGER NECK FORCE X
1 897125FF.F51 Filterclass (1000)
800
600
400
200
0
-200
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:14

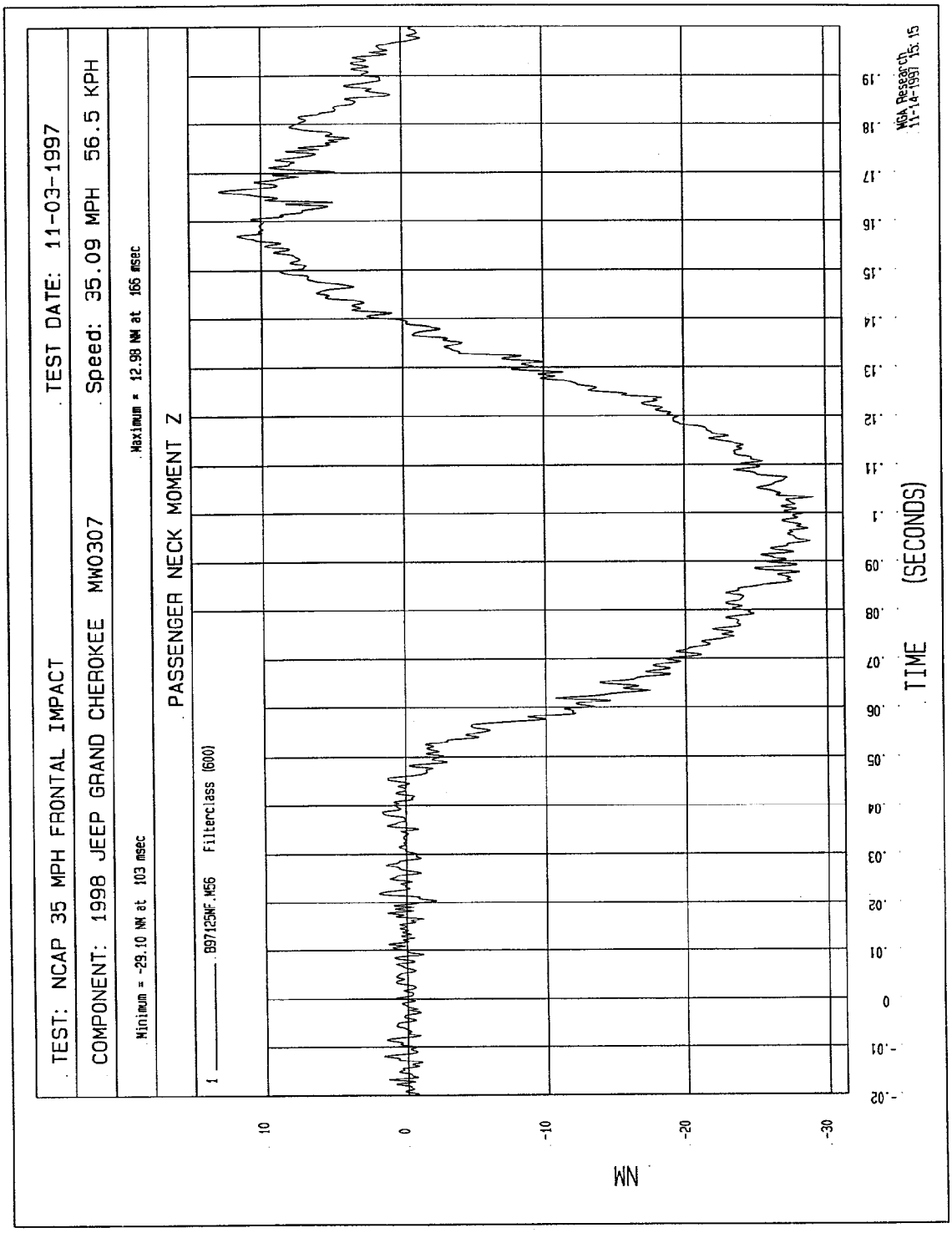

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -324.12 N at 71 msec
Maximum = 171.99 N at 150 msec
PASSENGER NECK FORCE Y
1 B97125FF.F52 Filterclass (1000)
100
0
-100
-200
-300
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:15


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -1721.55 N at 76 msec
Maximum = 698.25 N at 122 msec
PASSENGER NECK FORCE Z
1 B97125FF.F53 Filterclass (1000)
800
600
400
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
N
-.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
11-14-1997 15:15


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 3.19 N at 21 msec
Maximum = 1782.02 N at 76 msec
PASSENGER NECK FORCE RESULTANT
1 B97125FV.F51 Filterclass (1000)
1800
1600
1400
1200
1000
800
600
400
200
0
N
-.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
11-14-1997 15:15


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -18.73 NM at 63 msec
Maximum = 15.28 NM at 89 msec
PASSENGER NECK MOMENT X
1 B97125NF.M54 Filterclass (600)
NM
TIME (SECONDS)
MGA Research 11-14-1997 15:15


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -66.59 NM at 60 msec
Maximum = 11.39 NM at 40 msec
PASSENGER NECK MOMENT Y
1 B97125MF.M55 Filter:lass (600)
NM
TIME (SECONDS)
MGA Research
11-14-1997 15:15


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -29.10 NM at 103 msec
Maximum = 12.98 NM at 166 msec
PASSENGER NECK MOMENT Z
1 B97125NF.M56 Filterclass (600)
NM
10
0
-10
-20
-30
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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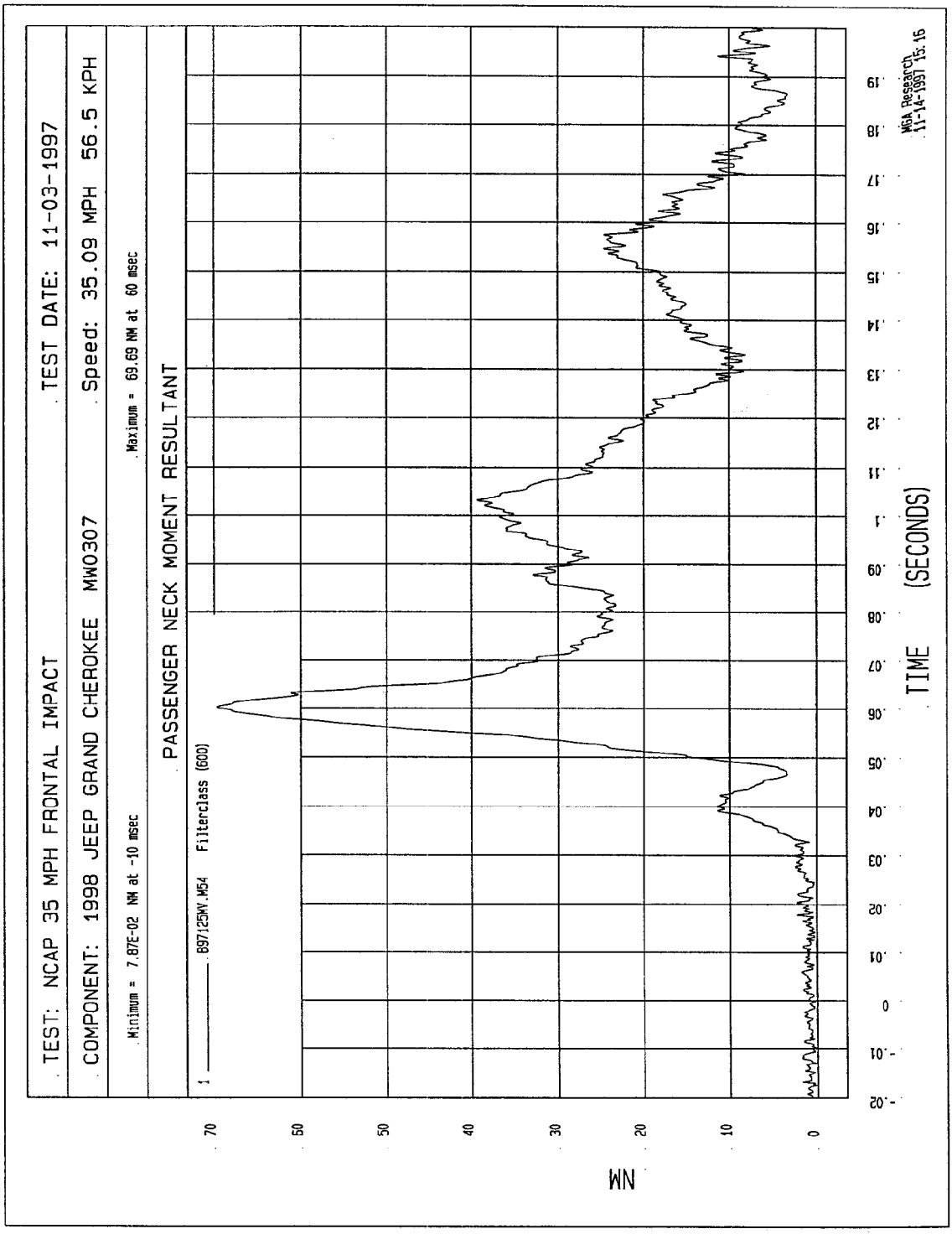
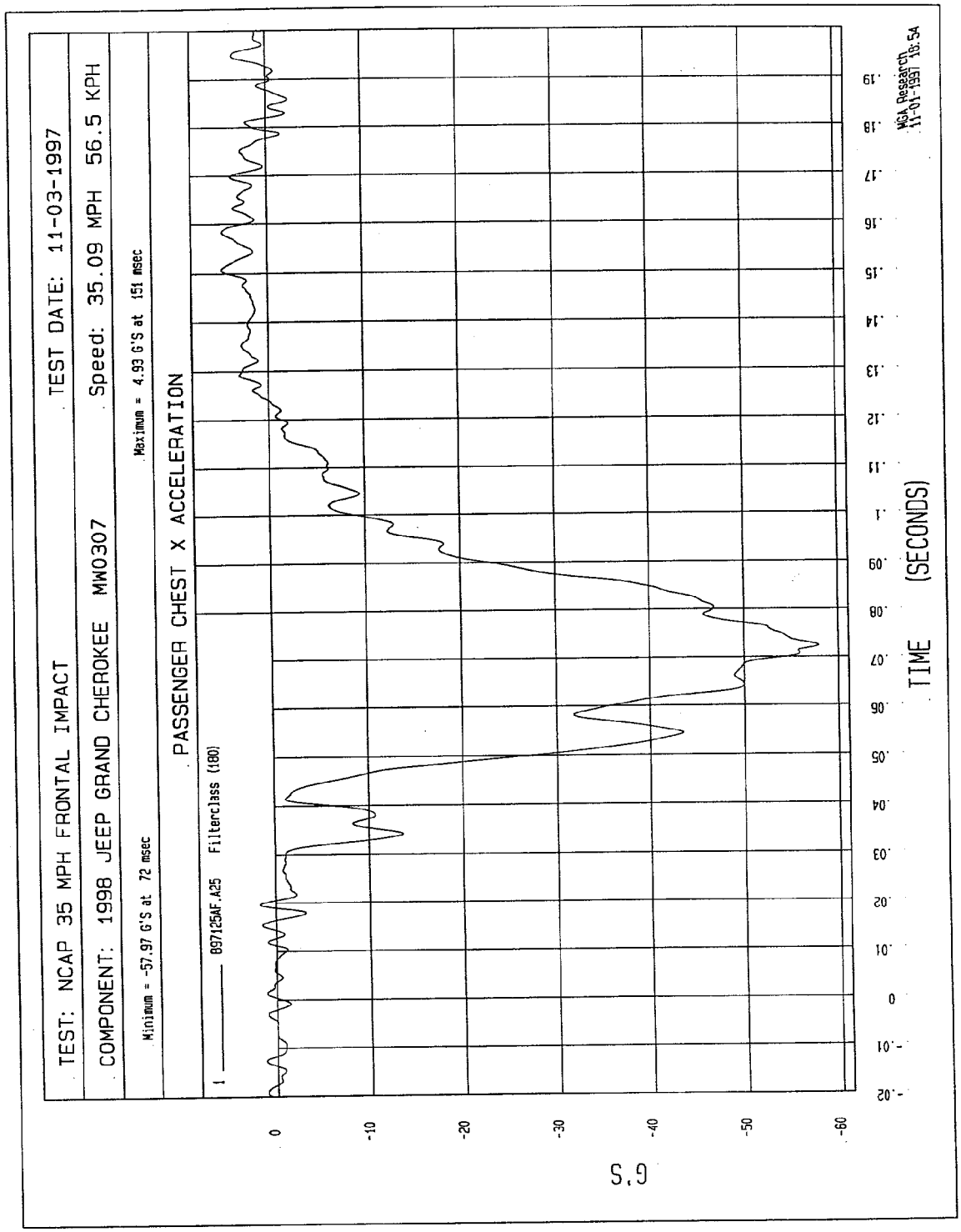
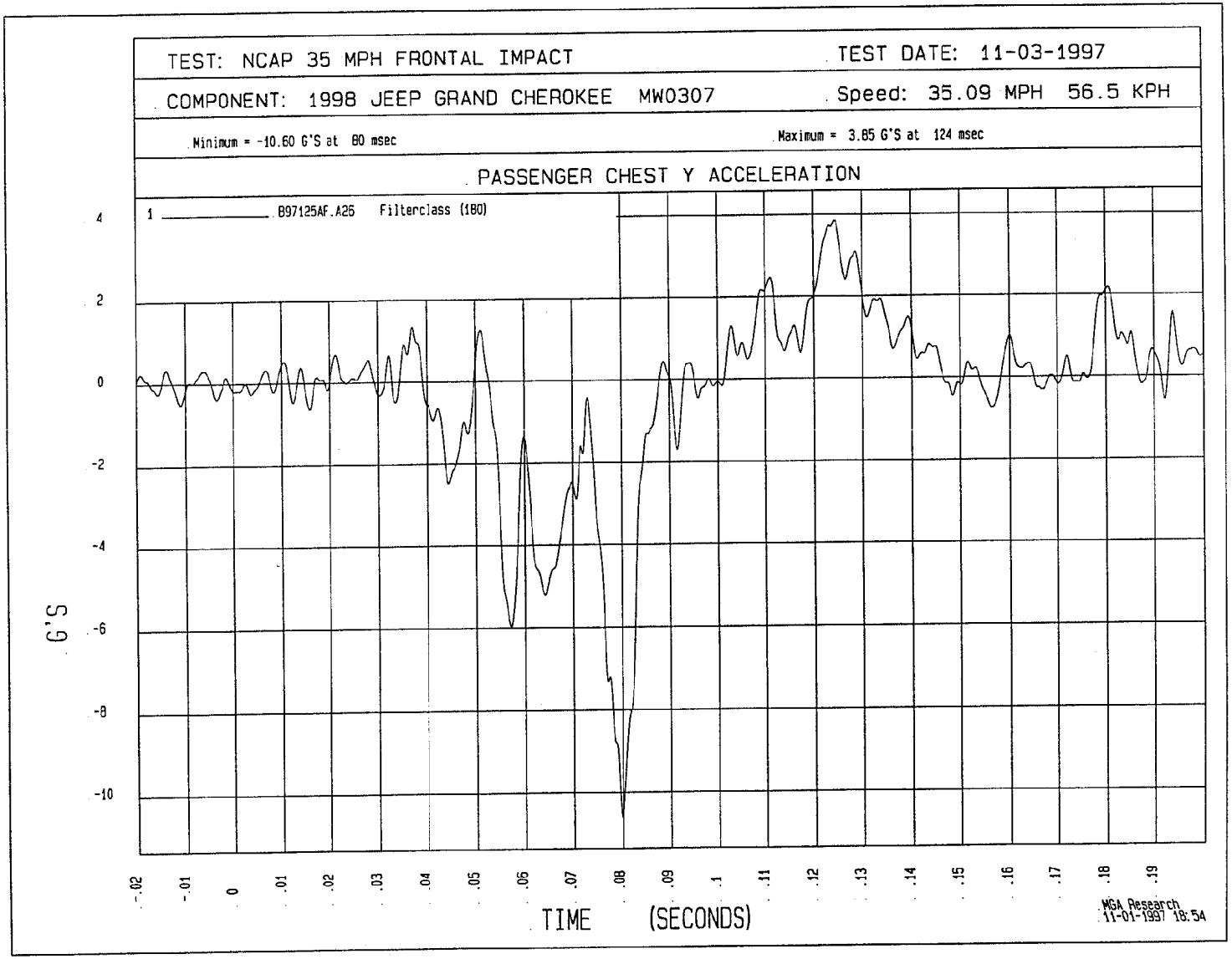
MGA Research
11-14-1997 15:15


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 7.87E-02 NM at -10 msec
Maximum = 69.69 NM at 60 msec
PASSENGER NECK MOMENT RESULTANT
1 ——— 897125NV.MS4 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-14-1997 15:16


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Maximum = 4.93 G'S at 151 msec
Minimum = -57.97 G'S at 72 msec
PASSENGER CHEST X ACCELERATION
1 _____ 897125AF.A25 Filterclass (180)
0
-10
-20
-30
-40
-50
-60
G's
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 18:54


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -10.60 G'S at 80 msec
Maximum = 3.85 G'S at 124 msec
PASSENGER CHEST Y ACCELERATION
1 B97125AF.A25 Filterclass (180)
4
2
0
-2
-4
-6
-8
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.14
.15
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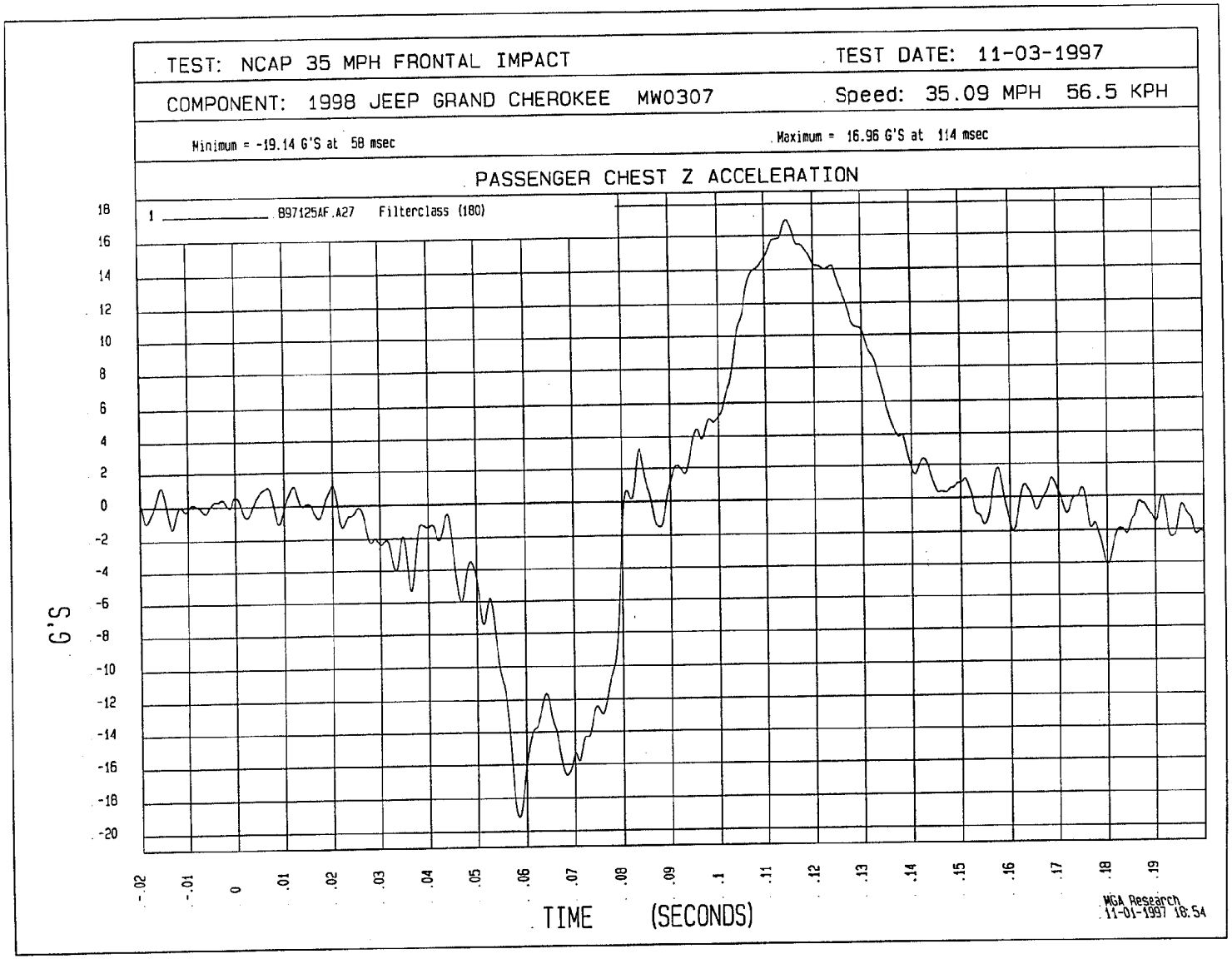
.19
TIME (SECONDS)
MGA Research
11-01-1997 18:54


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -19.14 G'S at 58 msec
Maximum = 16.96 G'S at 114 msec
PASSENGER CHEST Z ACCELERATION
1 897125AF.A27 Filterclass (180)
G'S
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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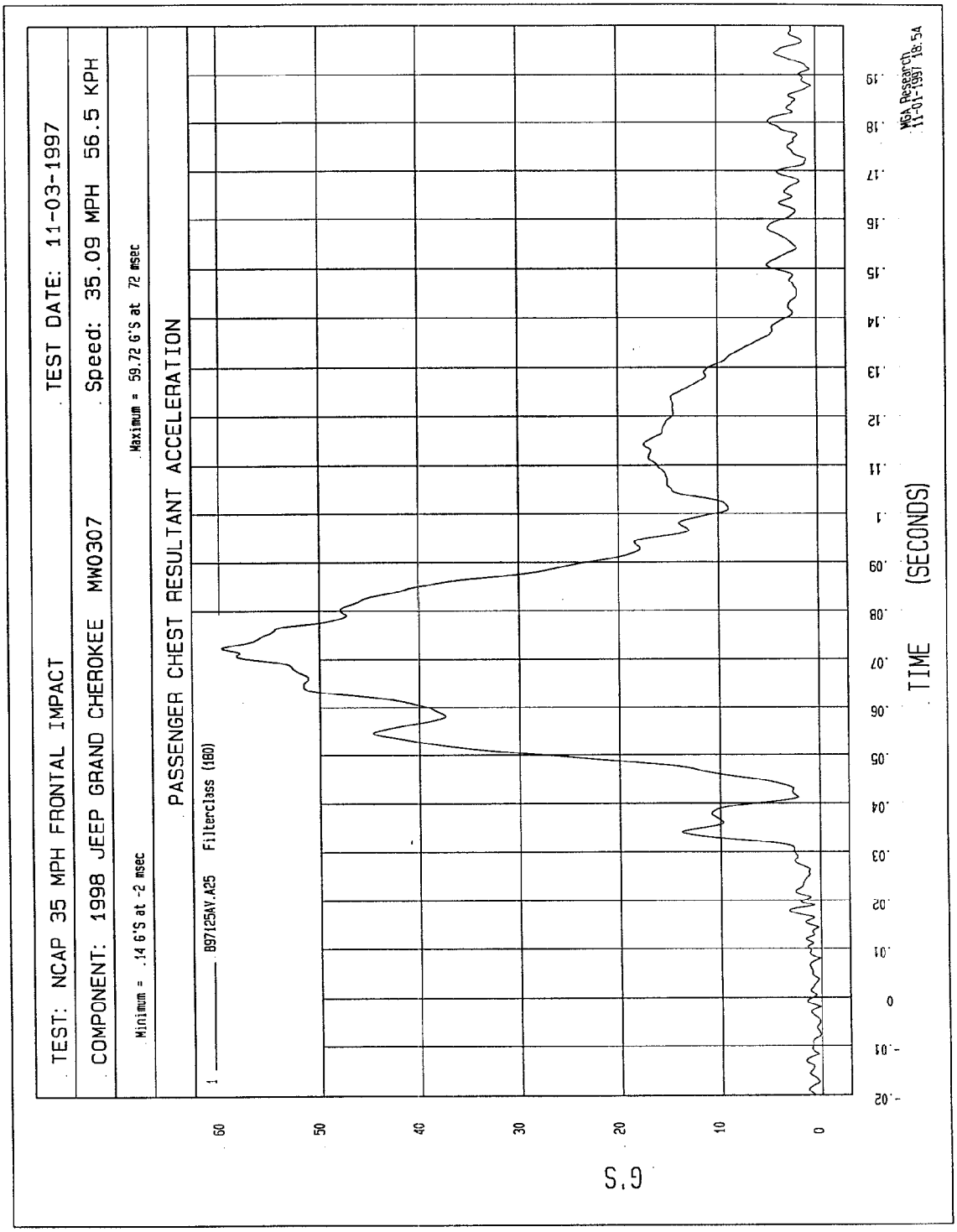
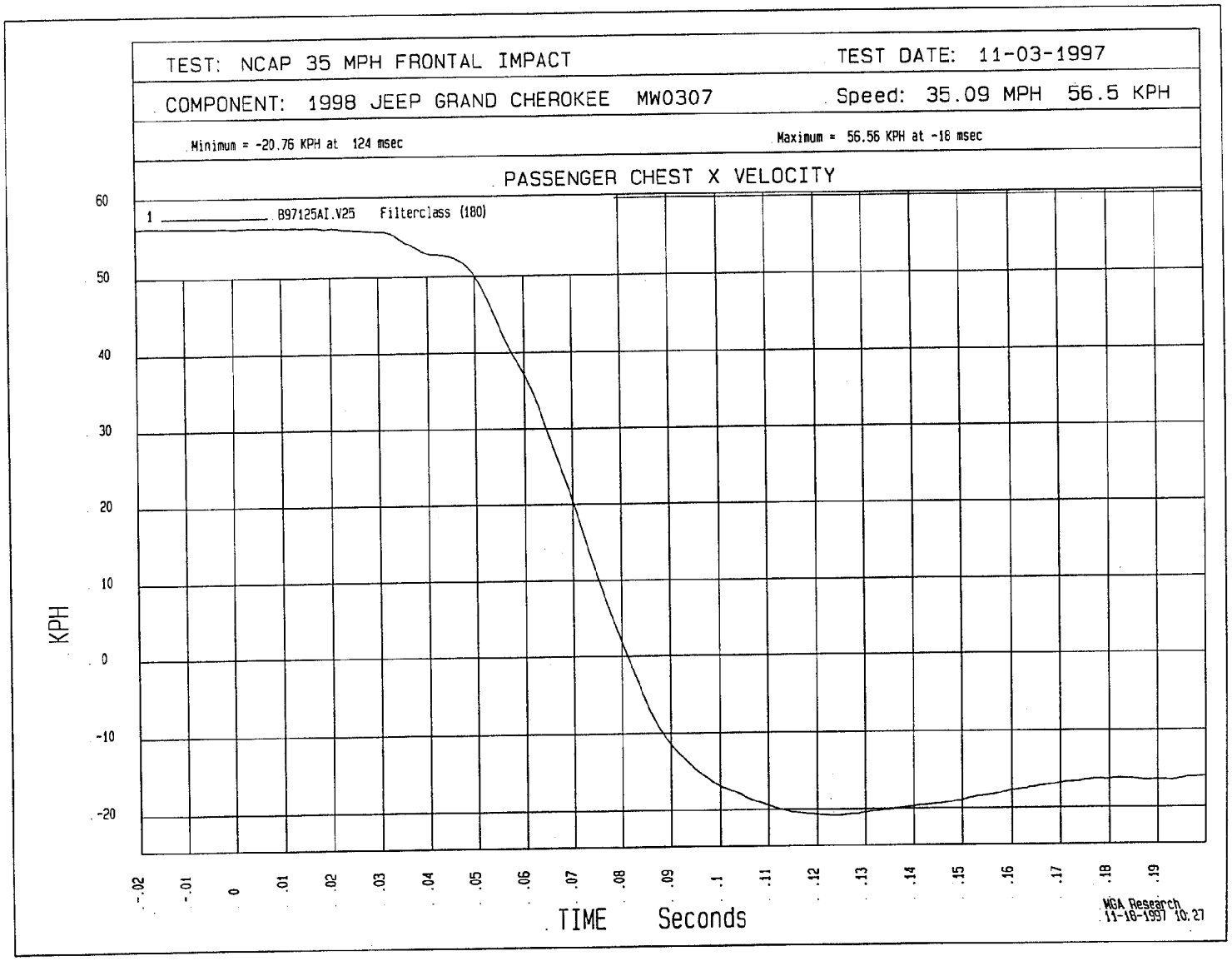
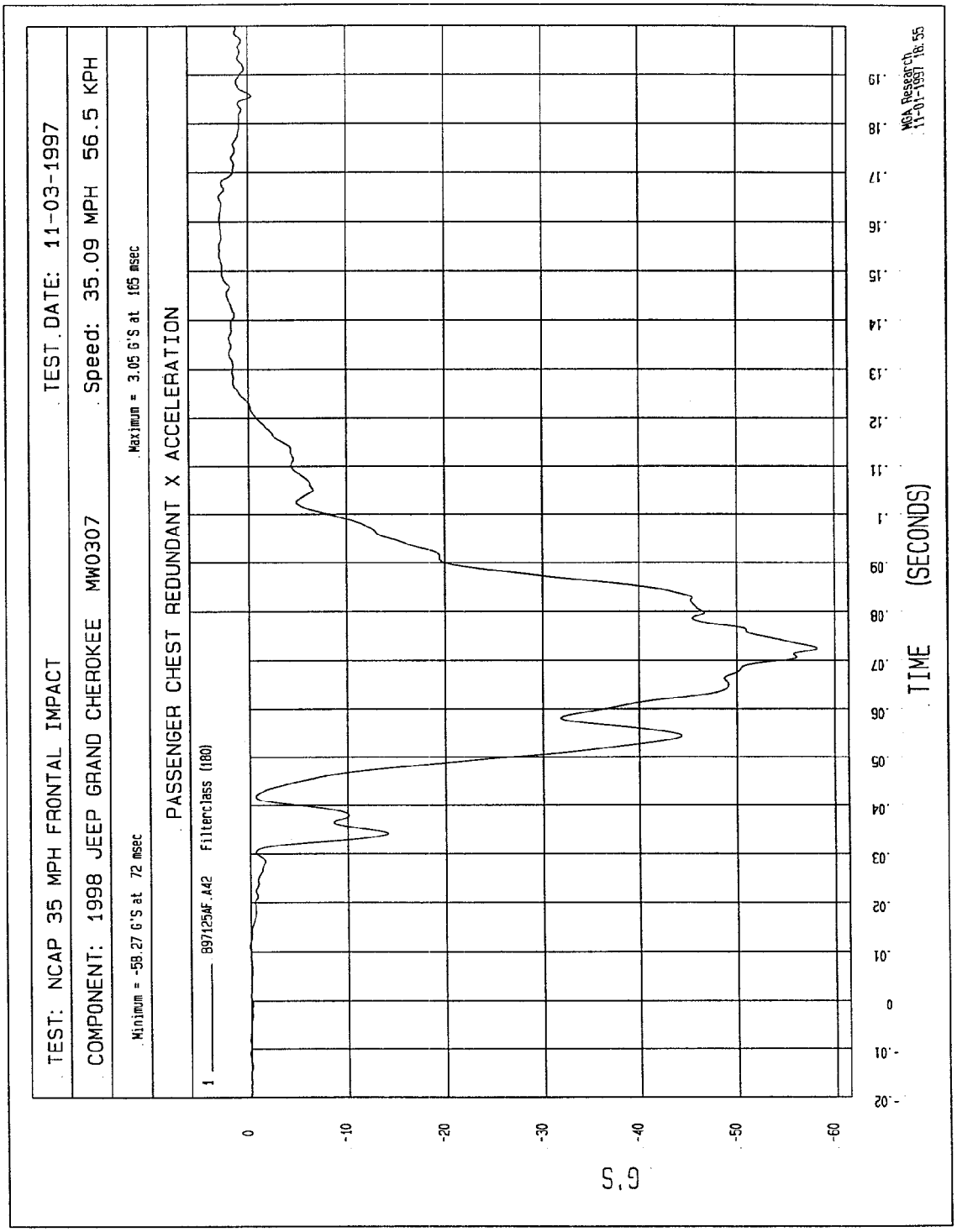
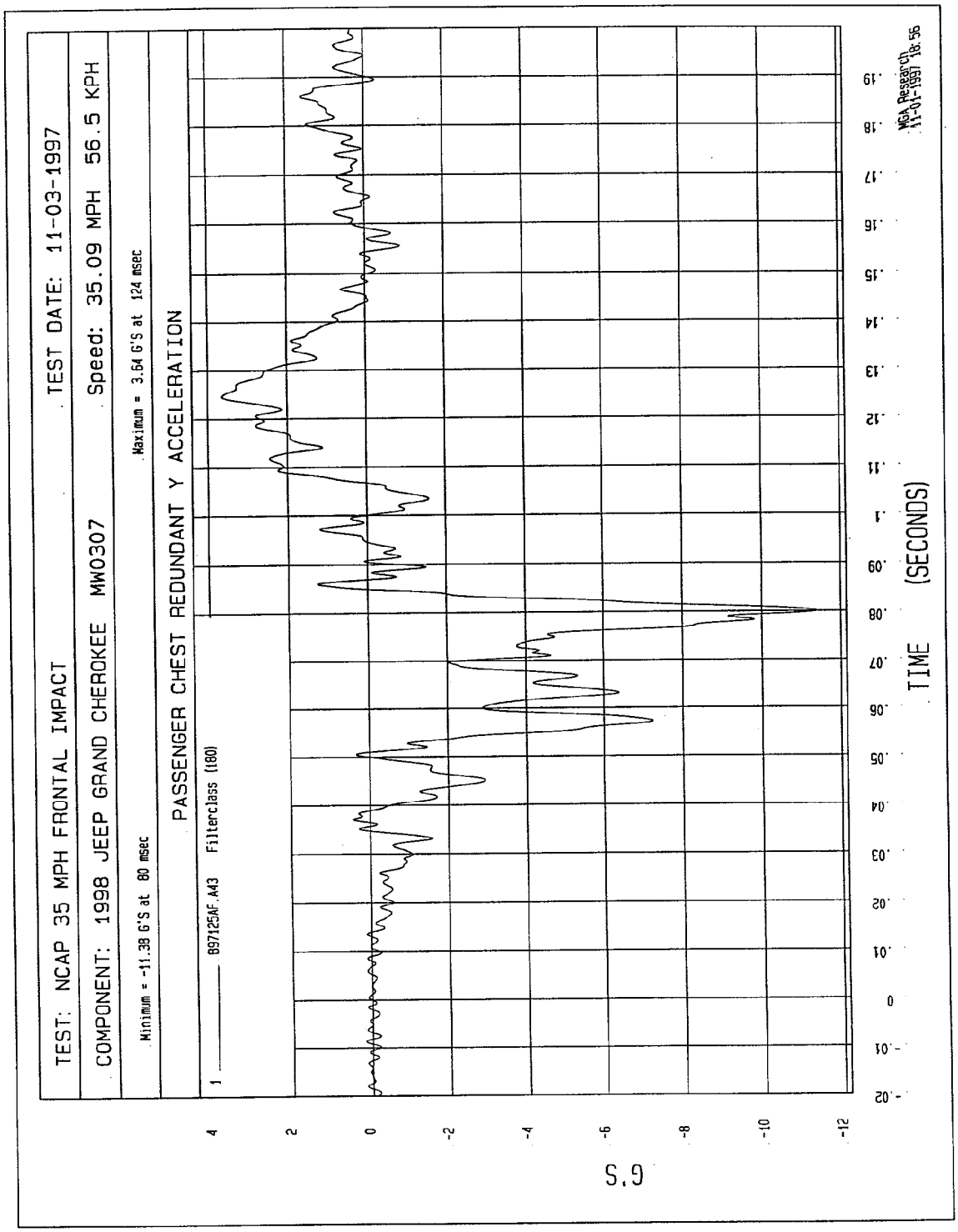
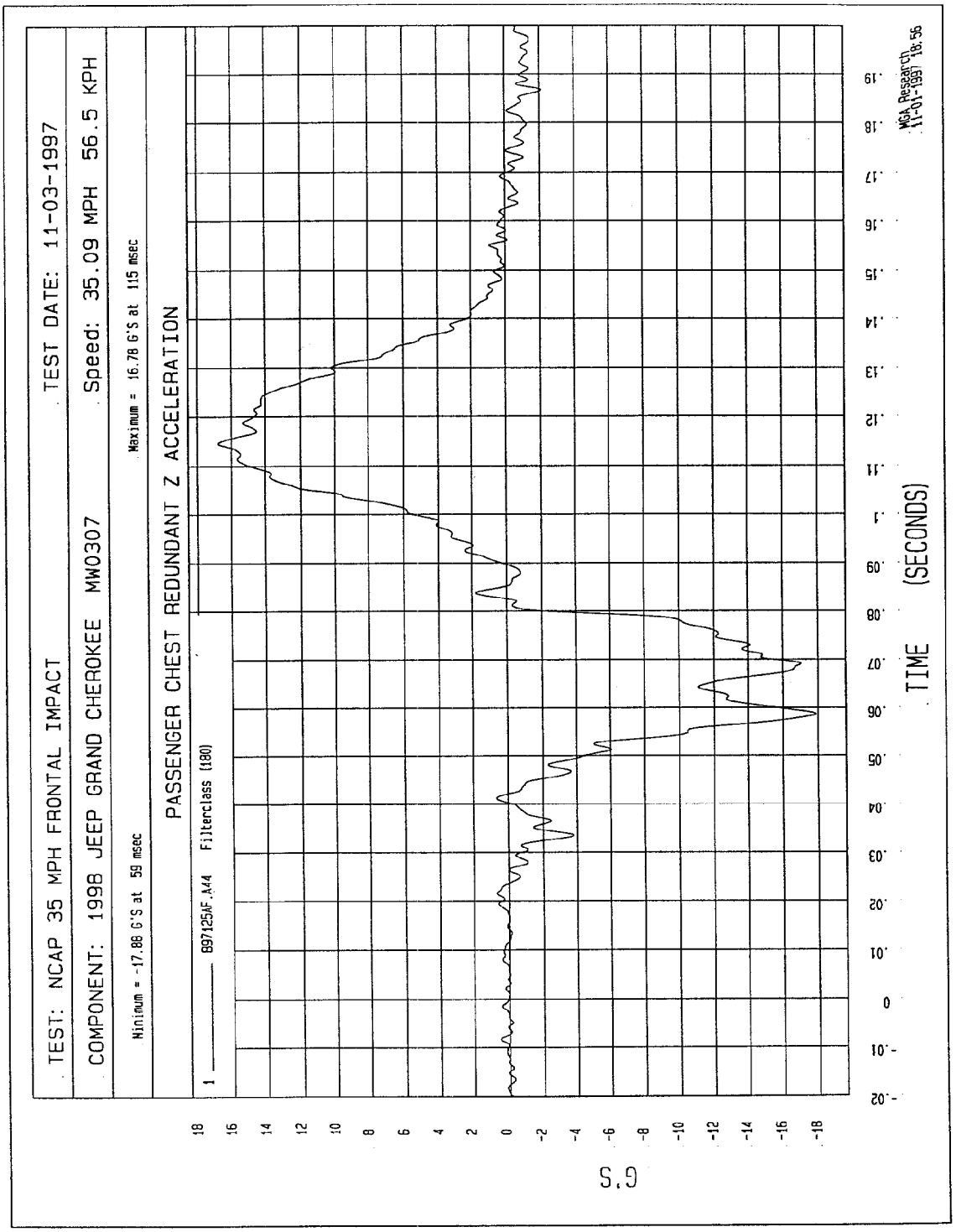
.16
.17
.18
.19
TIME (SECONDS)
NGA Research
11-01-1997 16:54

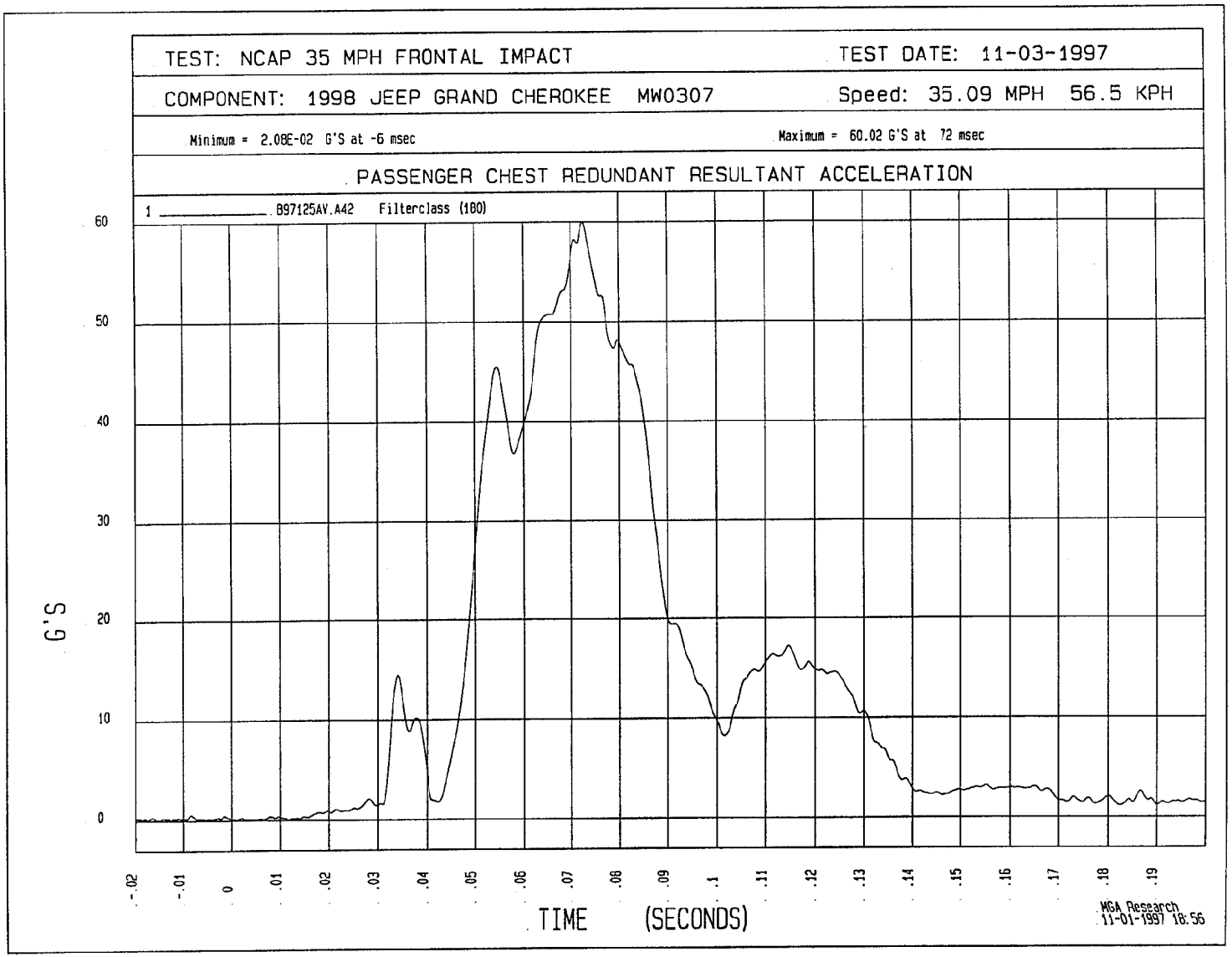

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = .14 G'S at -2 msec
Maximum = 59.72 G'S at 72 msec
PASSENGER CHEST RESULTANT ACCELERATION
1 B97I25AY.A25 Filterclass (180)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 18:54

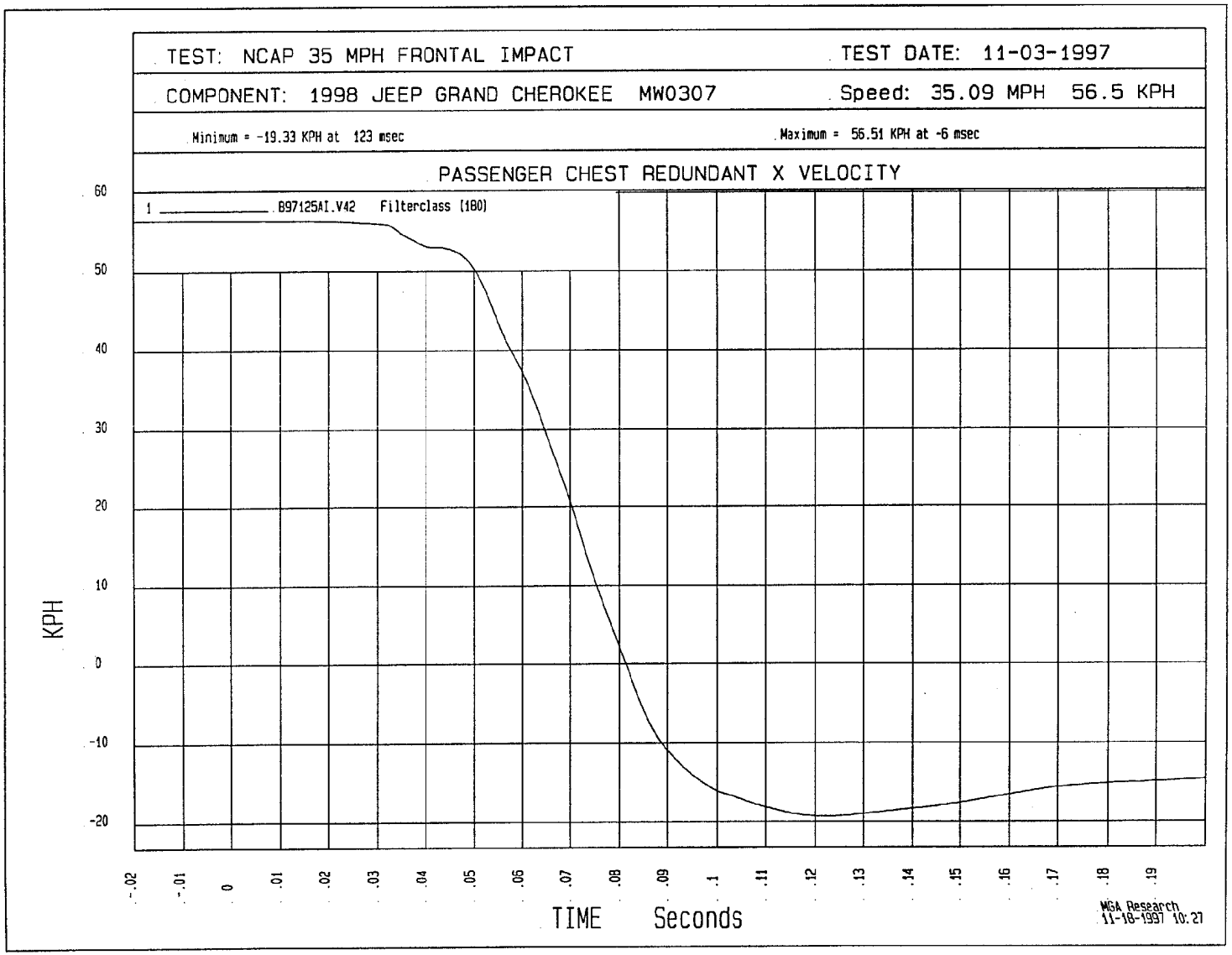

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -20.76 KPH at 124 msec
Maximum = 56.56 KPH at -18 msec
PASSENGER CHEST X VELOCITY
1 B97125AI.V25 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:27

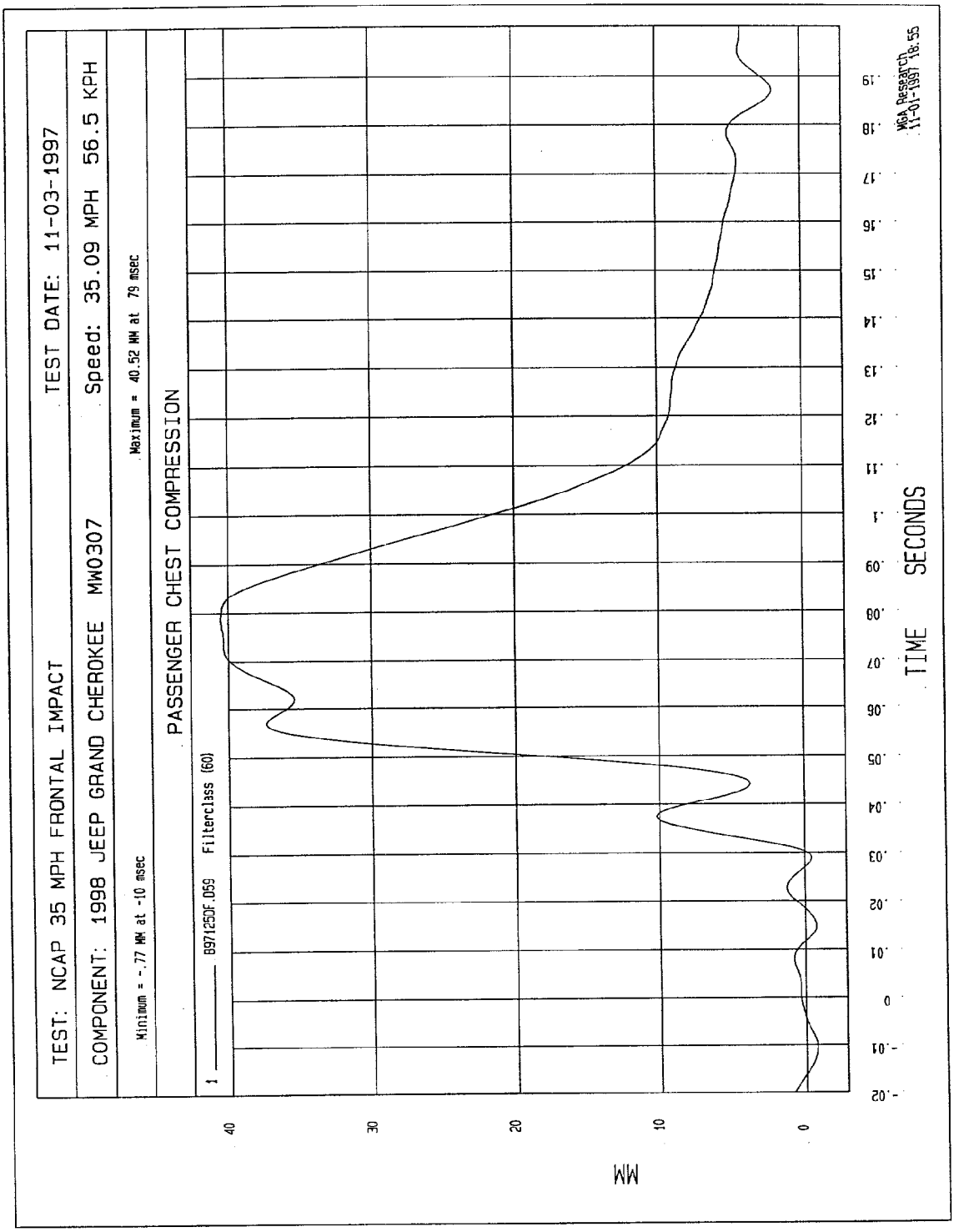

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -58.27 G'S at 72 msec
Maximum = 3.05 G'S at 165 msec
PASSENGER CHEST REDUNDANT X ACCELERATION
1 B971254F.A42 Filterclass (180)
0
-10
-20
-30
-40
-50
-60
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-01-1997 18:55

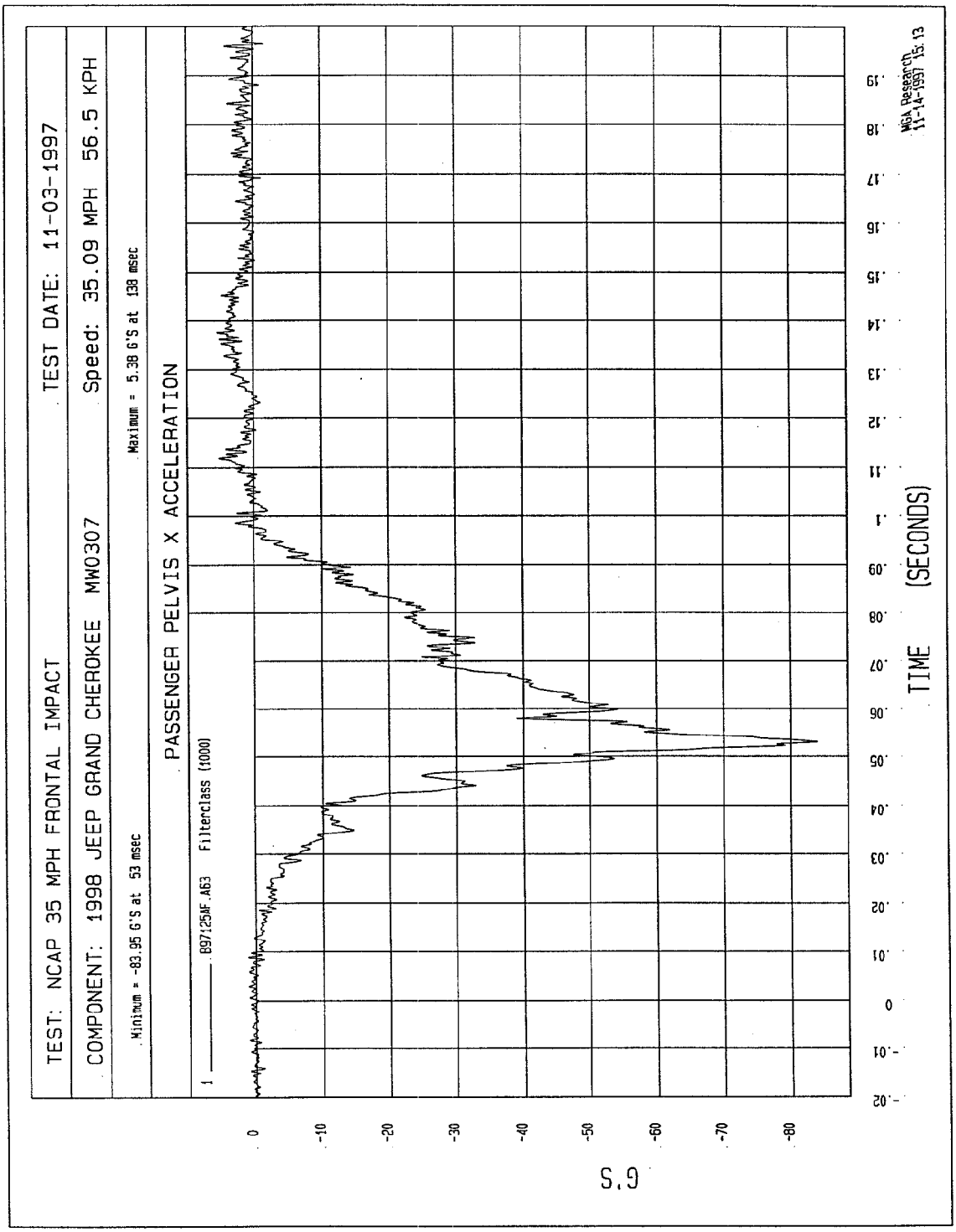

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -11.38 G'S at 80 msec
Maximum = 3.64 G'S at 124 msec
PASSENGER CHEST REDUNDANT Y ACCELERATION
1 _____ 897125AF.A43 Filterclass (180)
4
2
0
-2
-4
-6
-8
-10
-12
G'S
.02
-.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
11-01-1997 18:56

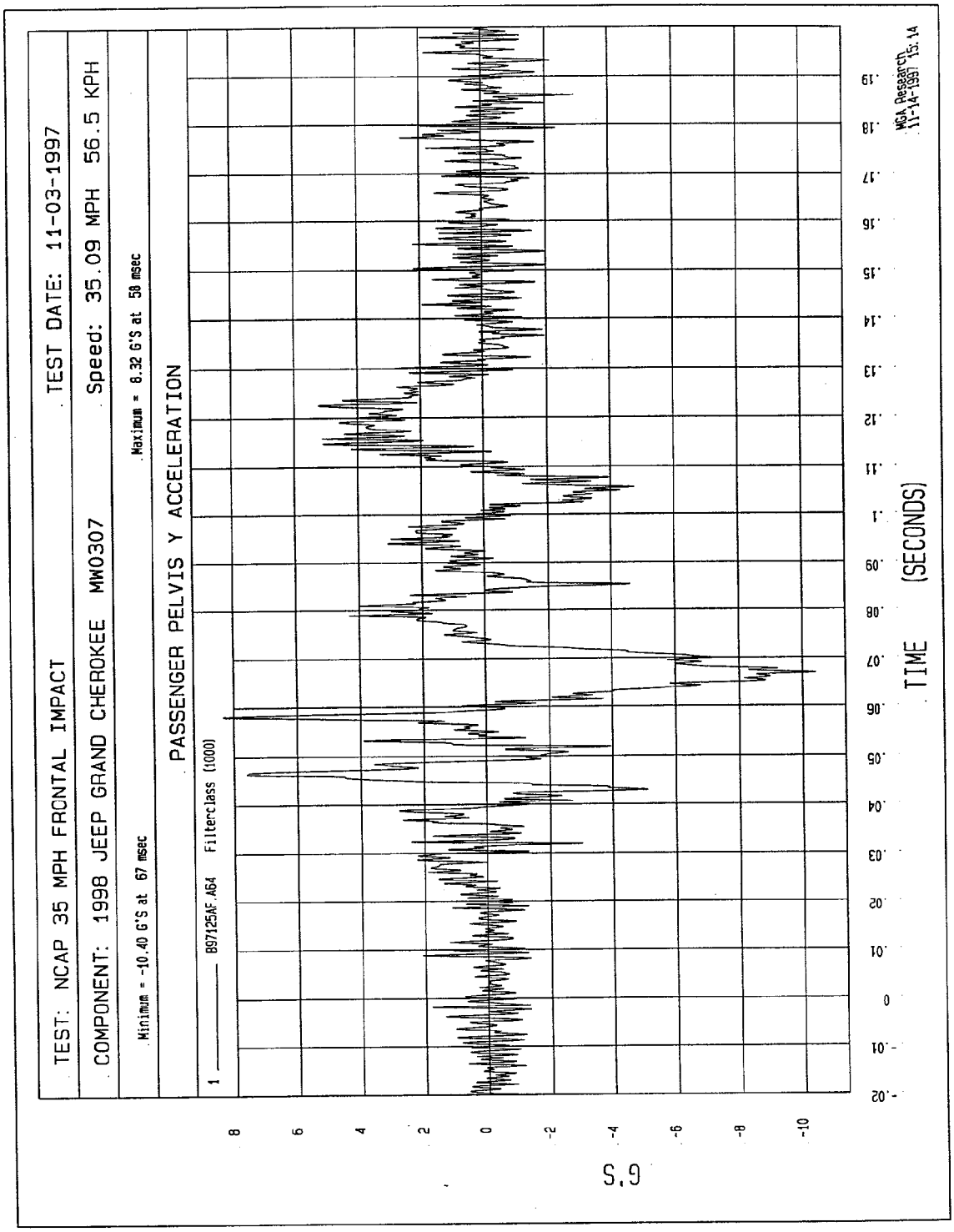

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -17.88 G'S at 59 msec
Maximum = 16.78 G'S at 115 msec
PASSENGER CHEST REDUNDANT Z ACCELERATION
1 B97125AF.A44 Filterclass (180)
G's
TIME (SECONDS)
MGA Research
11-01-1997 18:56

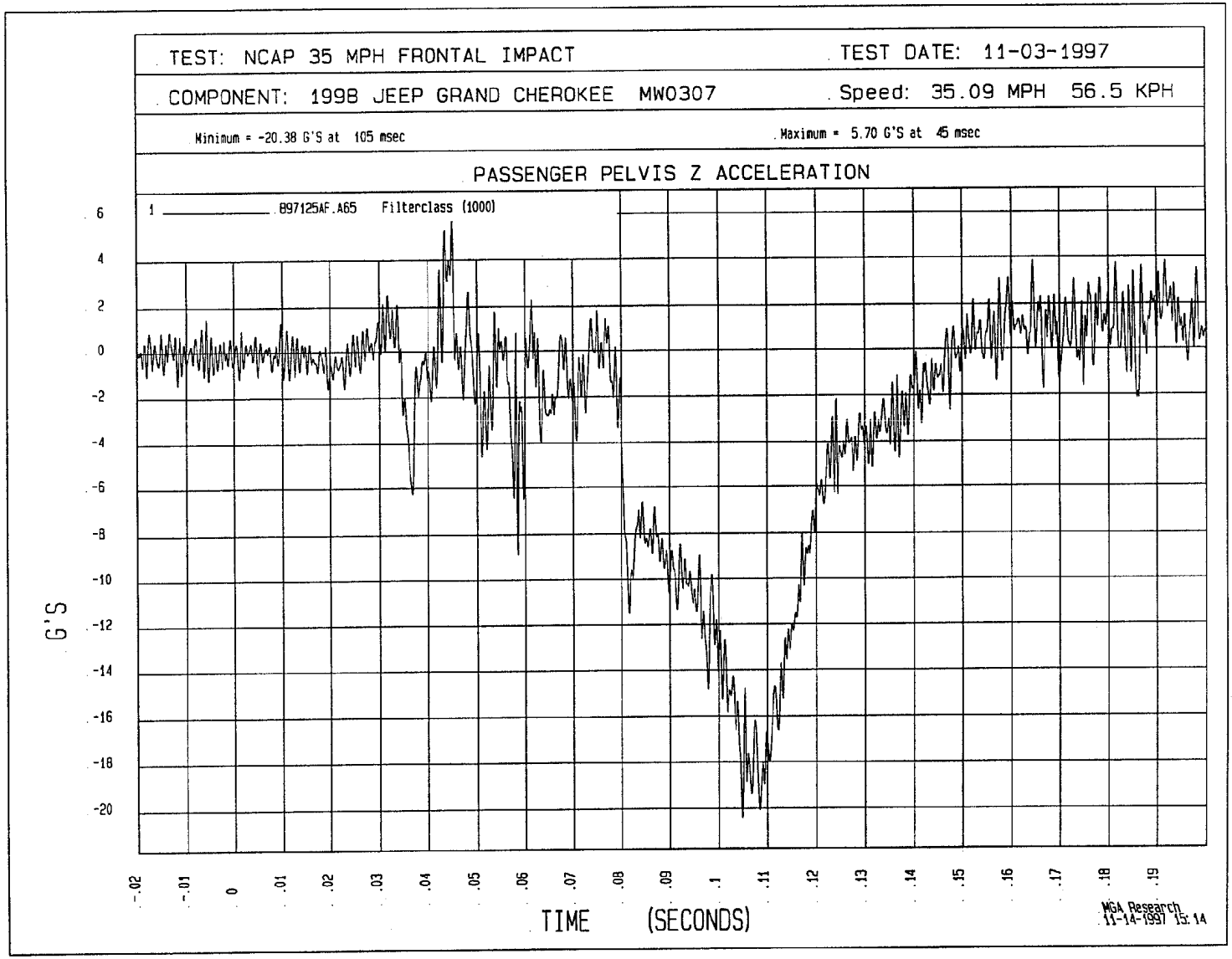

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 2.08E-02 G'S at -6 msec
Maximum = 60.02 G'S at 72 msec
PASSENGER CHEST REDUNDANT RESULTANT ACCELERATION
1 B97125AV.A42 Filterclass (180)
G'S
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:56

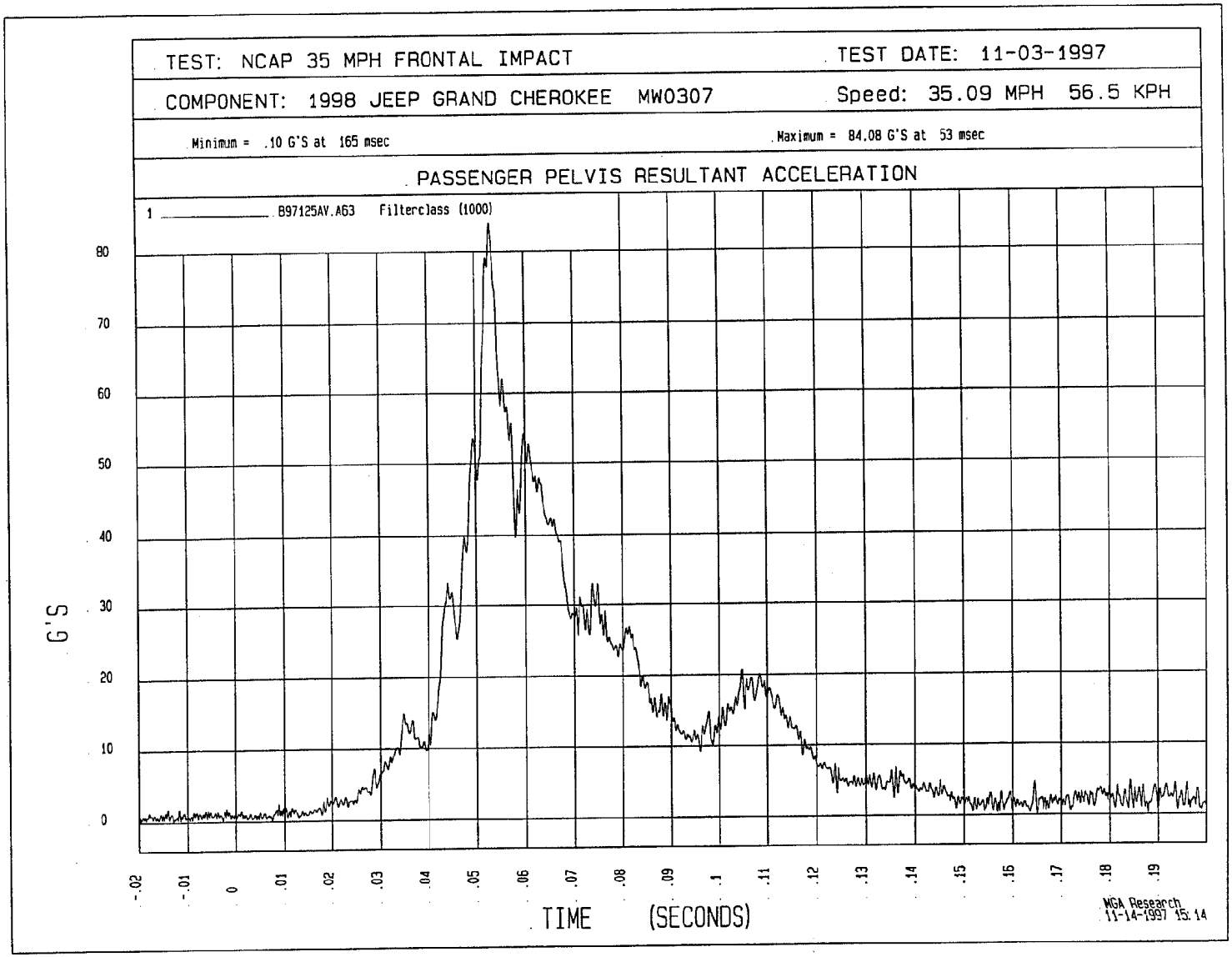

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -19.33 KPH at 123 msec
Maximum = 56.51 KPH at -6 msec
PASSENGER CHEST REDUNDANT X VELOCITY
1 B97125AI.V42 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:27

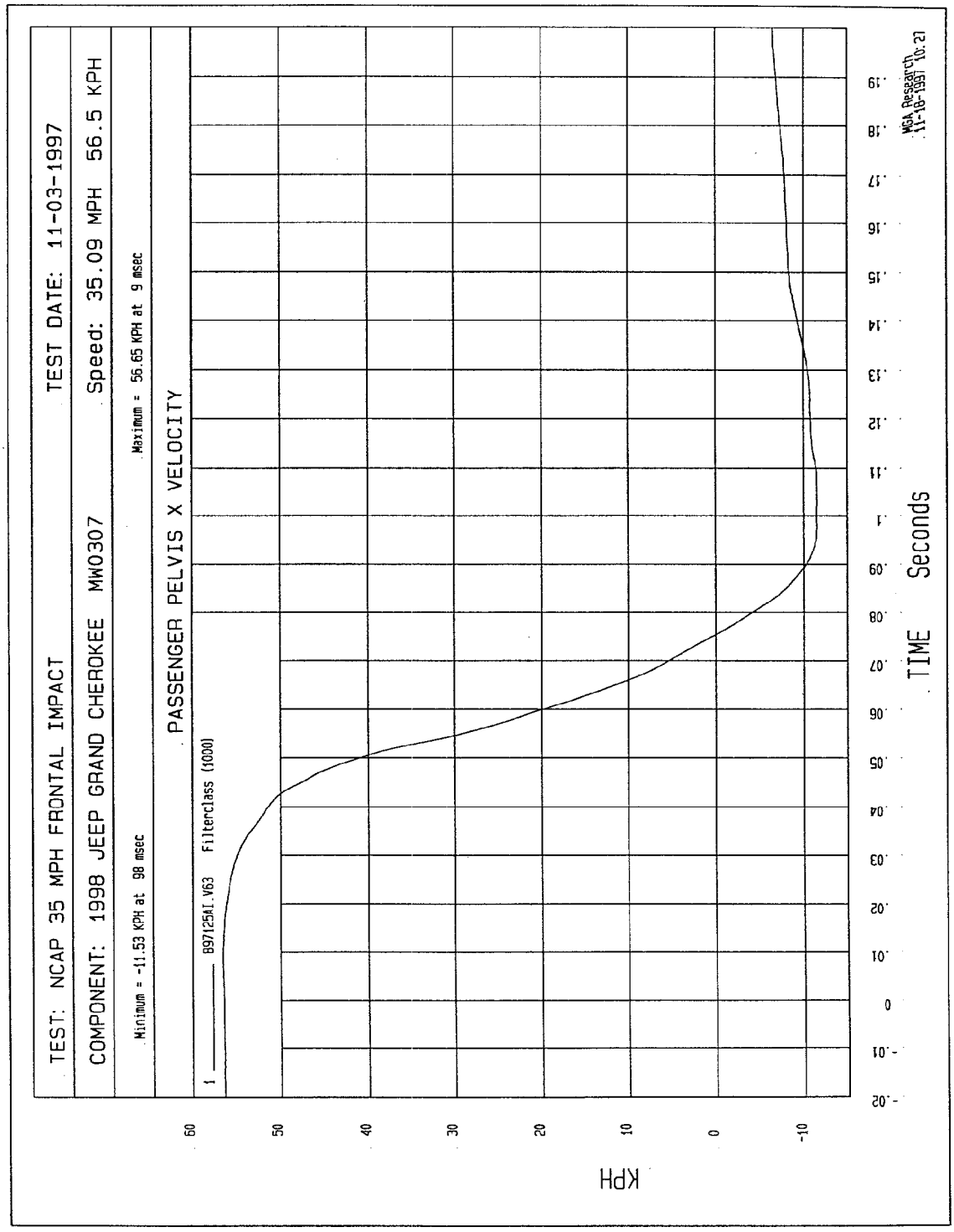

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -.77 MM at -10 msec
Maximum = 40.52 MM at 79 msec
PASSENGER CHEST COMPRESSION
1 B971250F.059 Filterclass (60)
MM
TIME SECONDS
MGA Research
11-03-1997 18:55

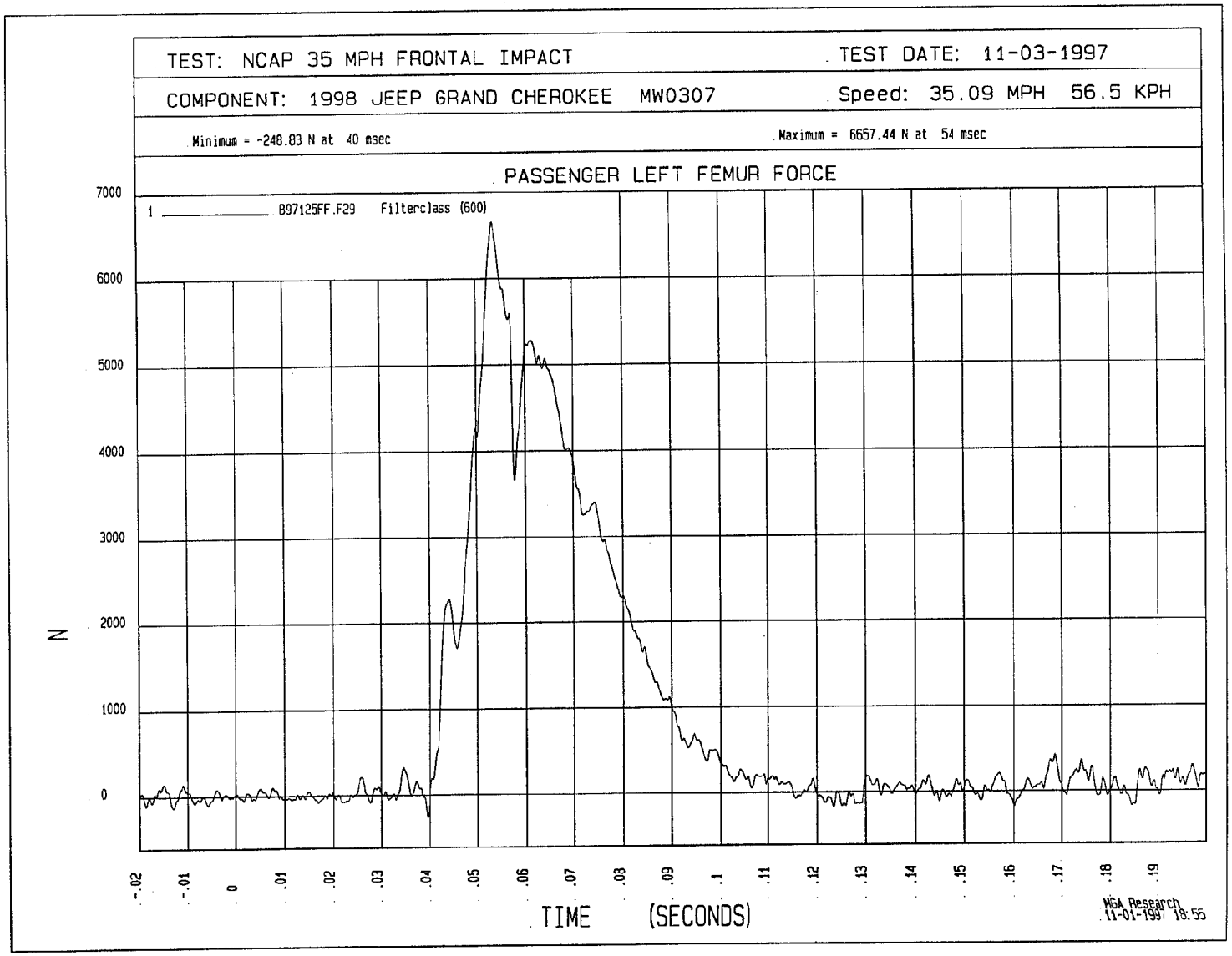

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -83.95 G'S at 53 msec
Maximum = 5.38 G'S at 138 msec
PASSENGER PELVIS X ACCELERATION
1 B97125AF.A63 Filterclass (1000)
0
-10
-20
-30
-40
-50
-60
-70
-80
G'S
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:13

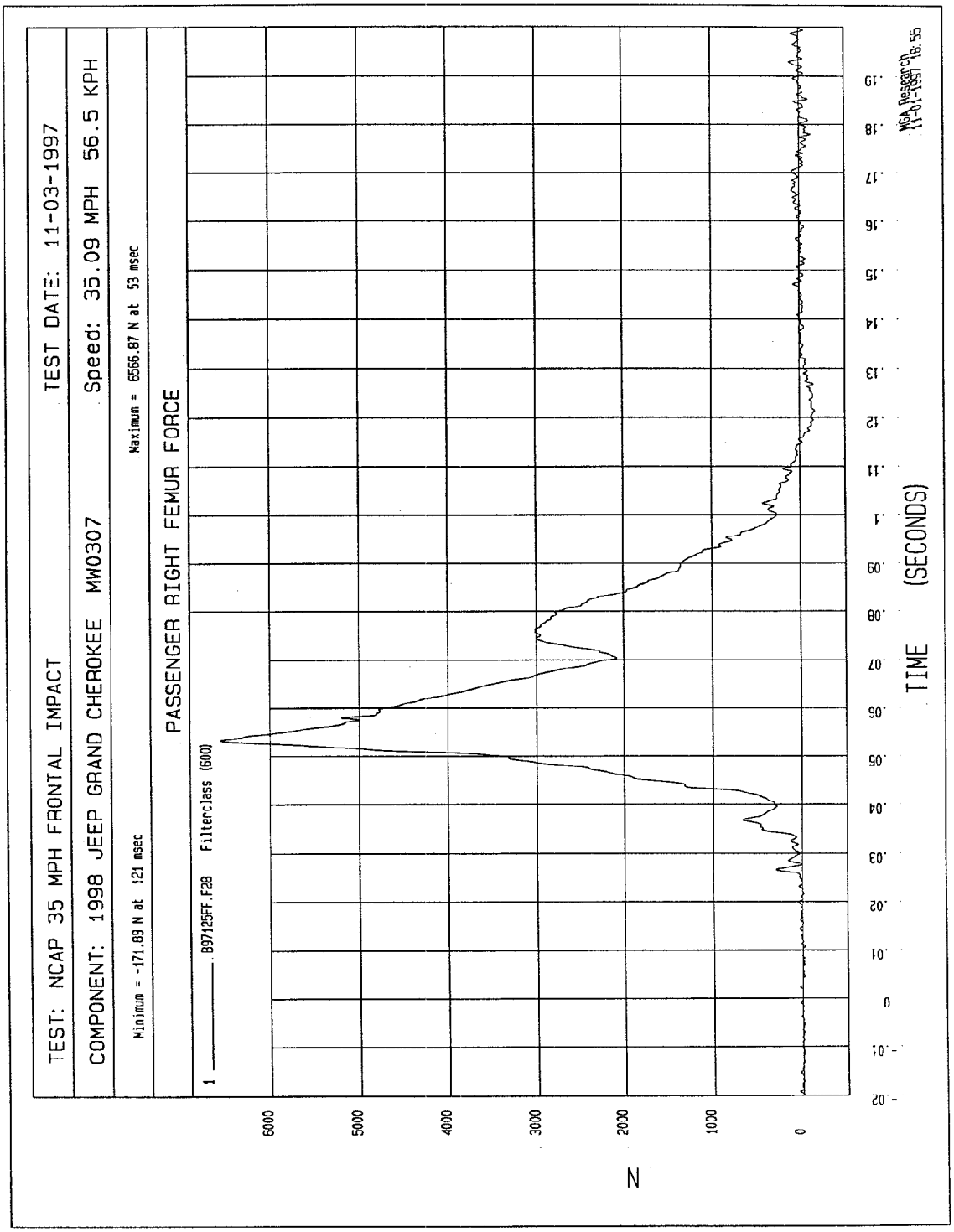

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -10.40 G'S at 67 msec
Maximum = 8.32 G'S at 58 msec
PASSENGER PELVIS Y ACCELERATION
1 B97125AF.A64 Filterclass (1000)
G'S
TIME (SECONDS)
MGA Research
11-14-1997 15:14

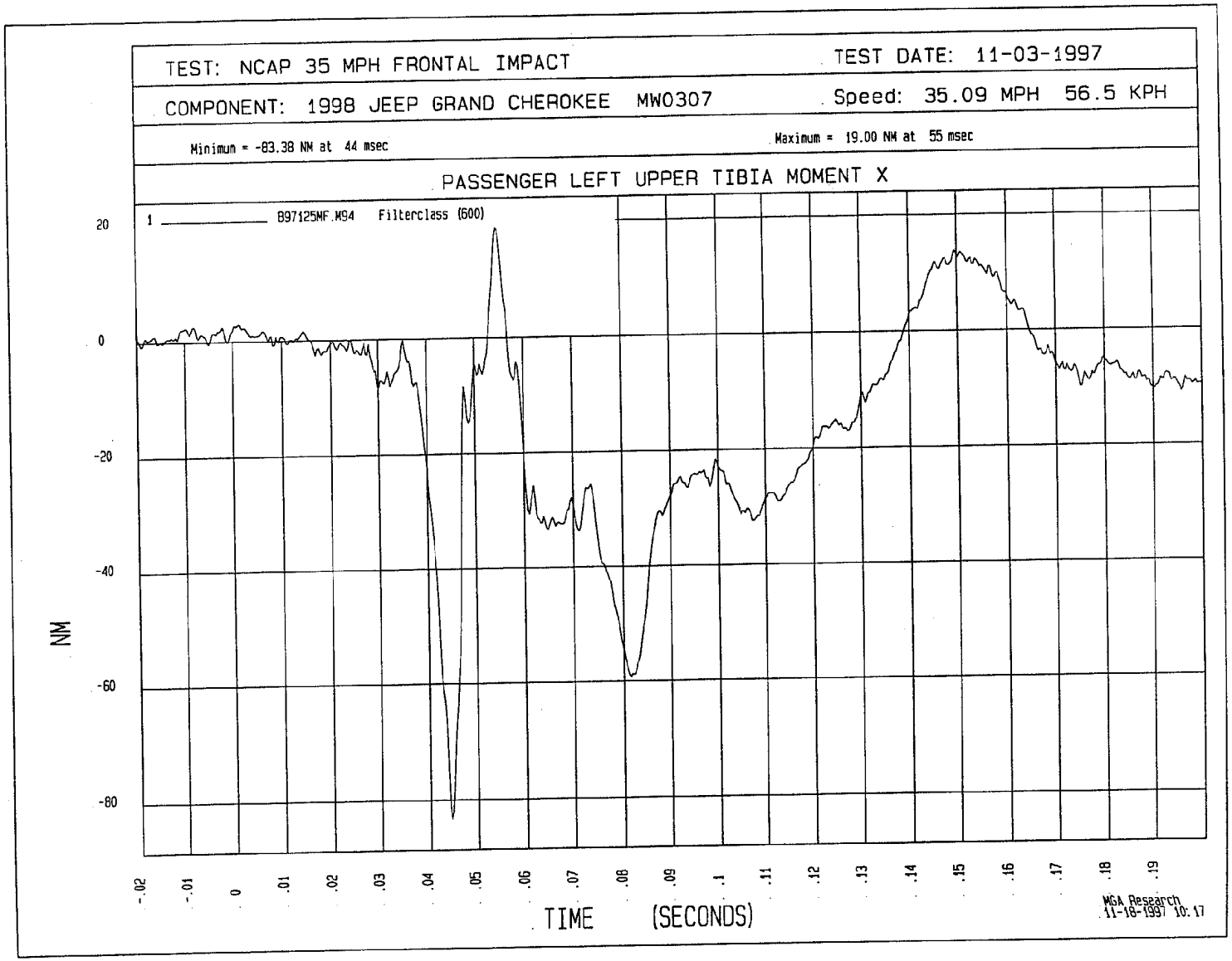

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -20.38 G'S at 105 msec
Maximum = 5.70 G'S at 45 msec
PASSENGER PELVIS Z ACCELERATION
1 897125AF.A65 Filterclass (1000)
G'S
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:14

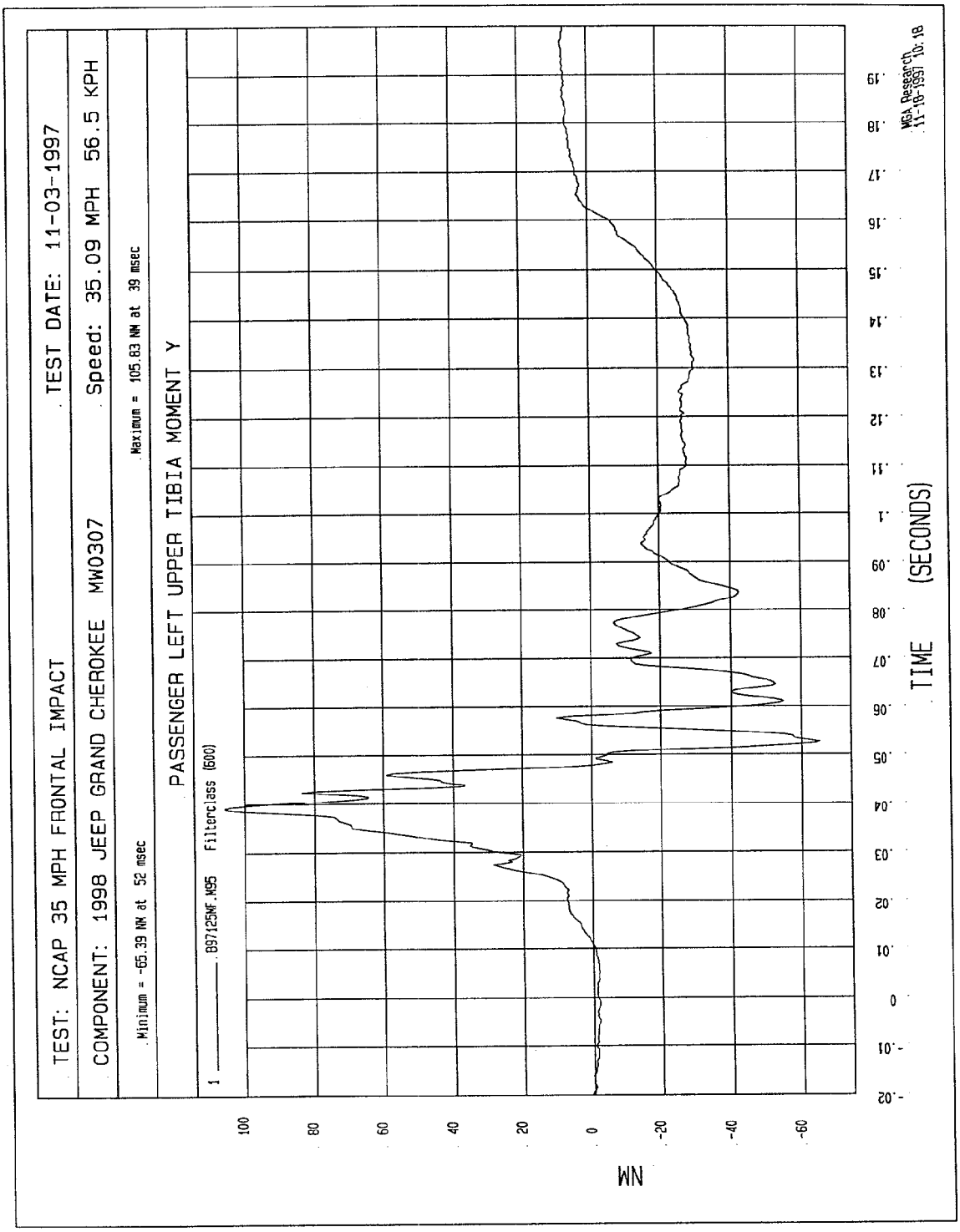

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = .10 G'S at 165 msec
Maximum = 84.08 G'S at 53 msec
PASSENGER PELVIS RESULTANT ACCELERATION
1 B97125AV.A63 Filterclass (1000)
G'S
80
70
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:14

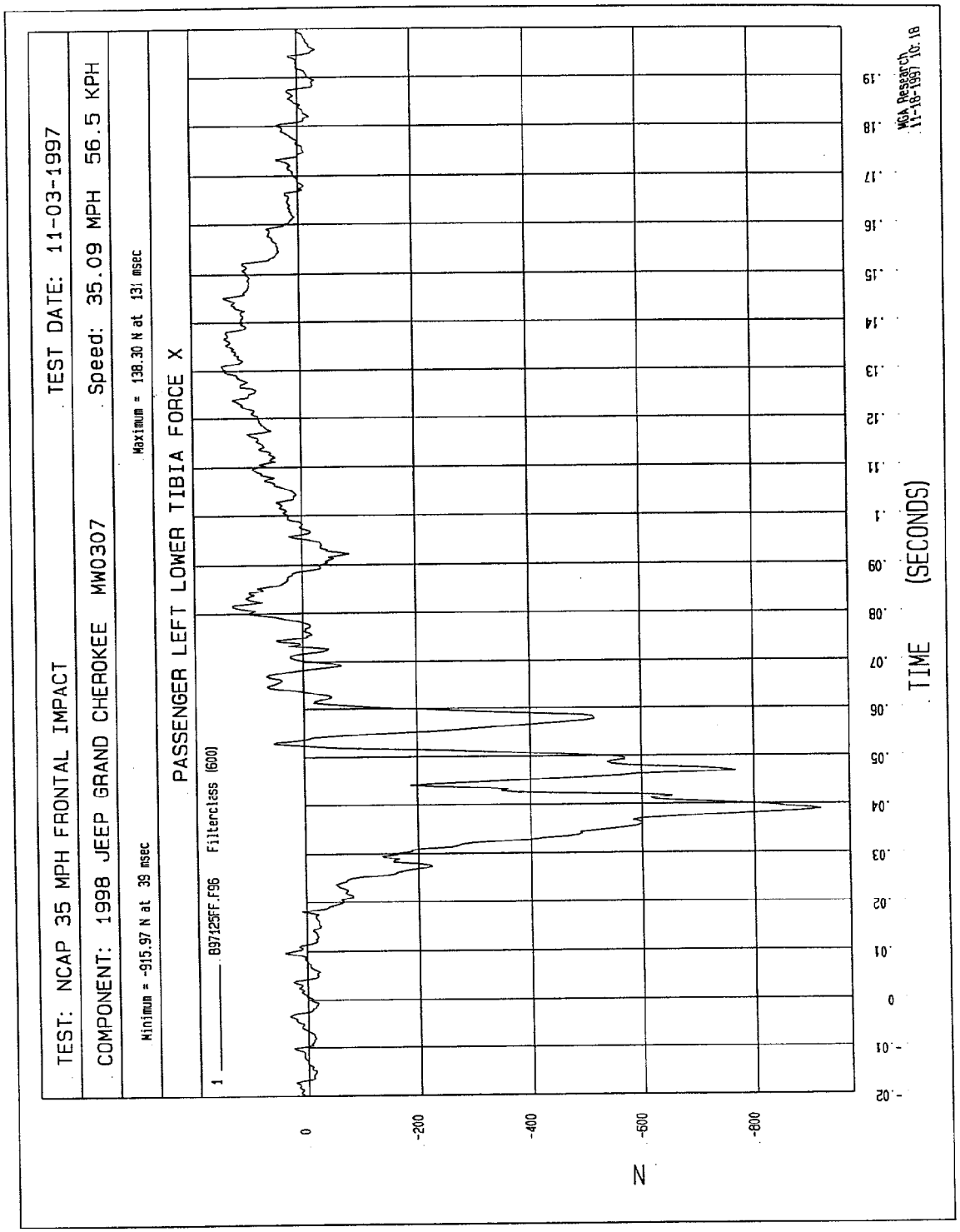

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -11.53 KPH at 98 msec
Maximum = 56.65 KPH at 9 msec
PASSENGER PELVIS X VELOCITY
1 B97125AI.V63 Filterclass (1000)
KPH
60
50
40
30
20
10
0
-10
-20
-10
0
10
20
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
TIME Seconds
MGA Research
11-18-1997 10:21

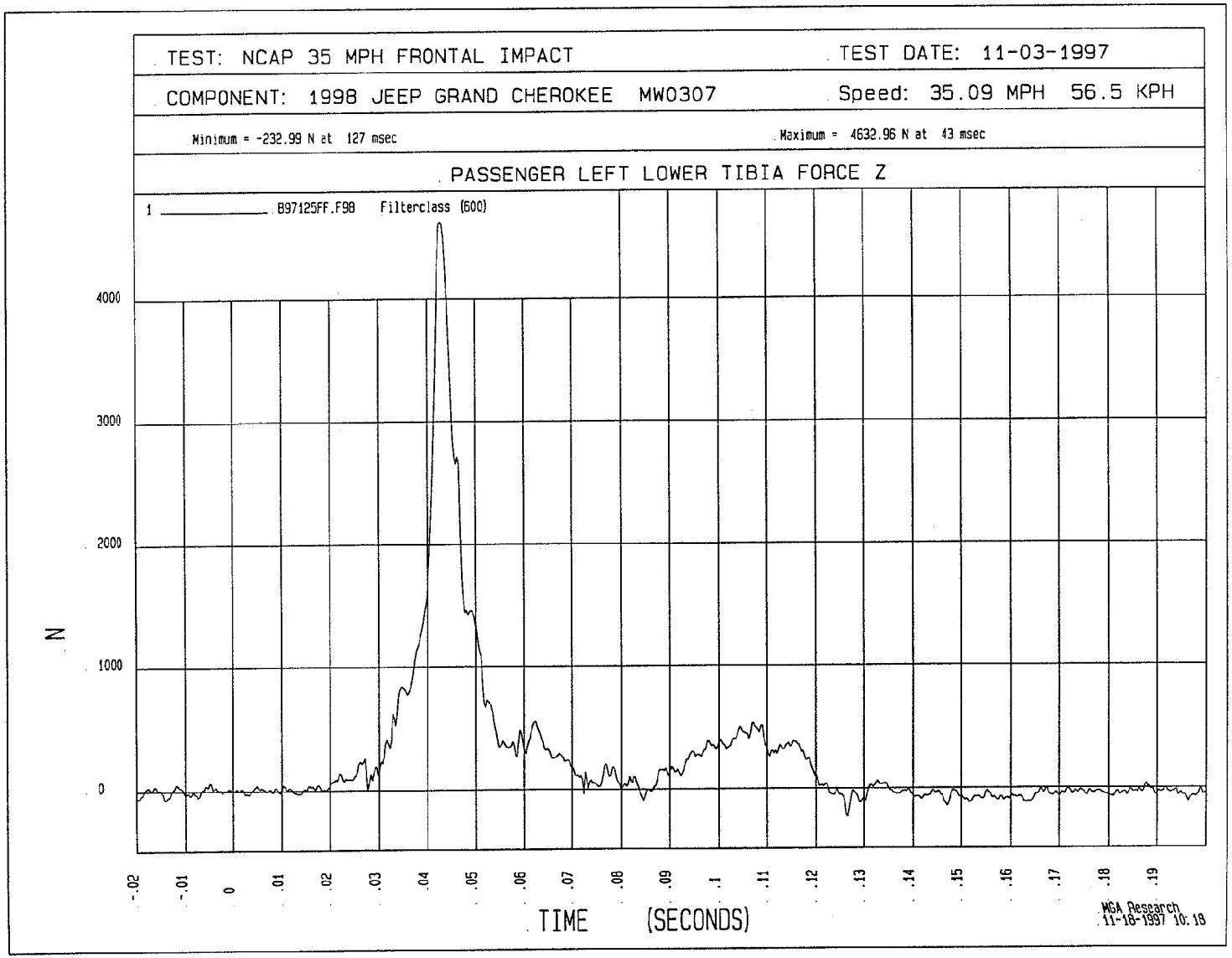

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -248.83 N at 40 msec
Maximum = 6657.44 N at 54 msec
PASSENGER LEFT FEMUR FORCE
1 B97125FF.F29 Filterclass (600)
7000
6000
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 18:55


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -171.89 N at 121 msec
Maximum = 6566.87 N at 53 msec
PASSENGER RIGHT FEMUR FORCE
1 B97125FF.F28 Filterclass (600)
N
TIME (SECONDS)
MGA Research
11-01-1997 16:55


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -83.38 NM at 44 msec
Maximum = 19.00 NM at 55 msec
PASSENGER LEFT UPPER TIBIA MOMENT X
1 897125MF.M94 Filterclass (600)
20
0
-20
-40
-60
-80
NM
-.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
11-18-1997 10:17


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -65.39 NM at 52 msec
Maximum = 105.83 NM at 39 msec
PASSENGER LEFT UPPER TIBIA MOMENT Y
1 B97125MF.M95 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-10-1997 10:18


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Maximum = 138.30 N at 131 msec
Minimum = -915.97 N at 39 msec
PASSENGER LEFT LOWER TIBIA FORCE X
1 B9712SFF.F96 Filterclass (600)
0
-200
-400
-600
-800
N
-.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
11-18-1997 10: 18


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -232.99 N at 127 msec
Maximum = 4632.96 N at 43 msec
PASSENGER LEFT LOWER TIBIA FORCE Z
1 B97125FF.F98 Filterclass (600)
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.09
.1
.11
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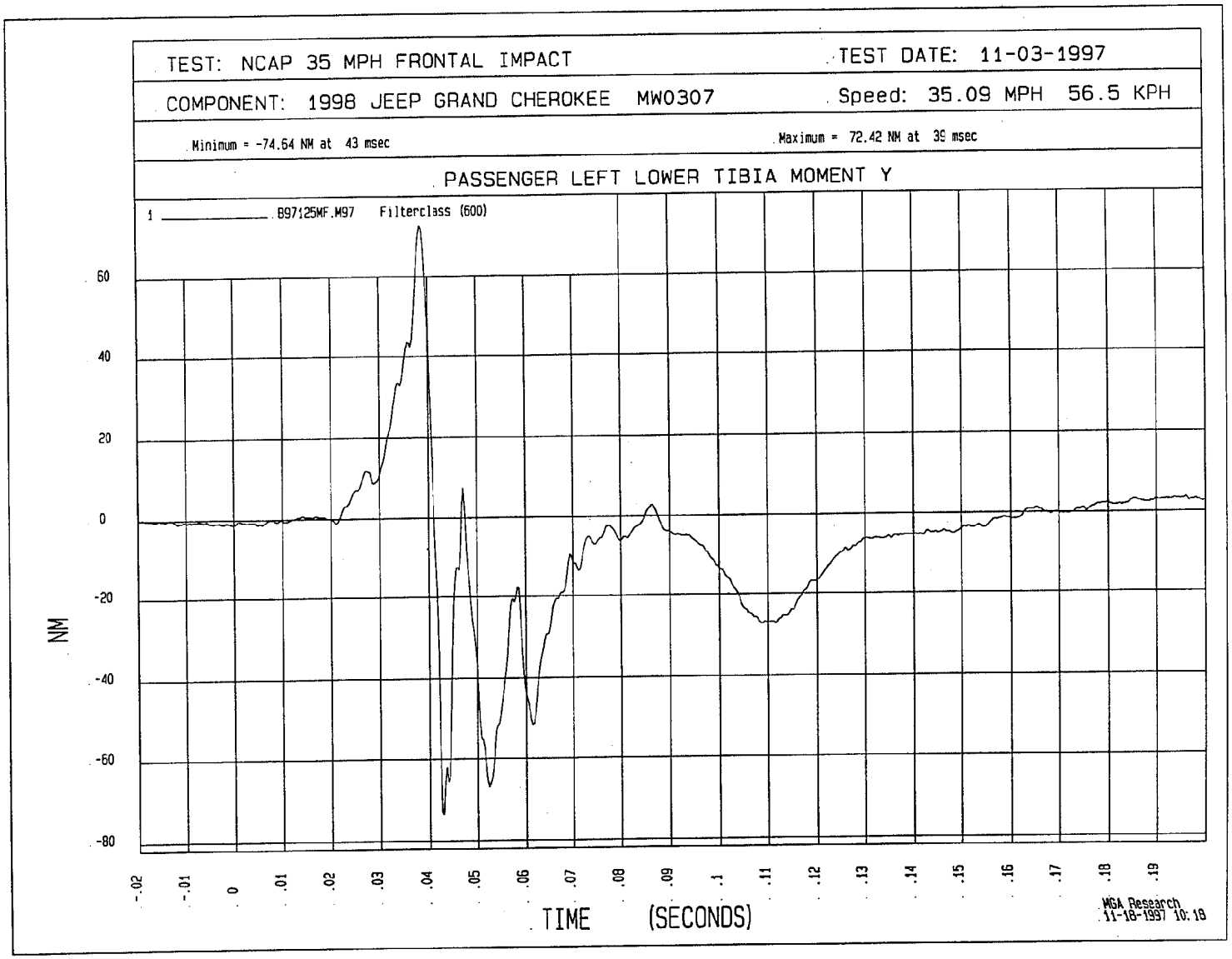
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:18


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -74.64 NM at 43 msec
Maximum = 72.42 NM at 39 msec
PASSENGER LEFT LOWER TIBIA MOMENT Y
1 B97125MF.M97 Filterclass (600)
NM
60
40
20
0
-20
-40
-60
-80
-.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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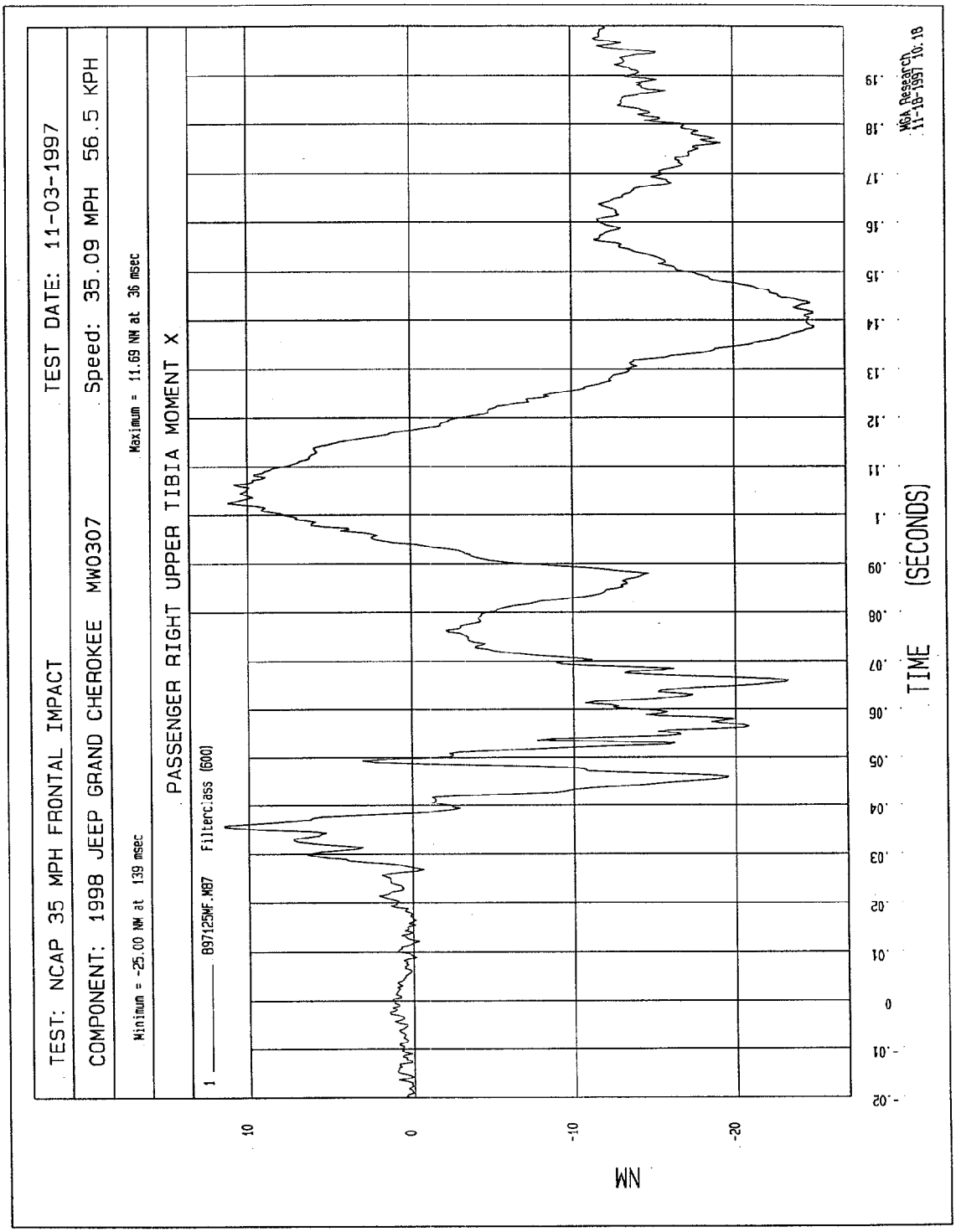
TIME (SECONDS)
MGA Research
11-18-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -25.00 NM at 139 msec
Maximum = 11.69 NM at 36 msec
PASSENGER RIGHT UPPER TIBIA MOMENT X
1 B97125MF.M07 Filterclass (600)
NM
10
0
-10
-20
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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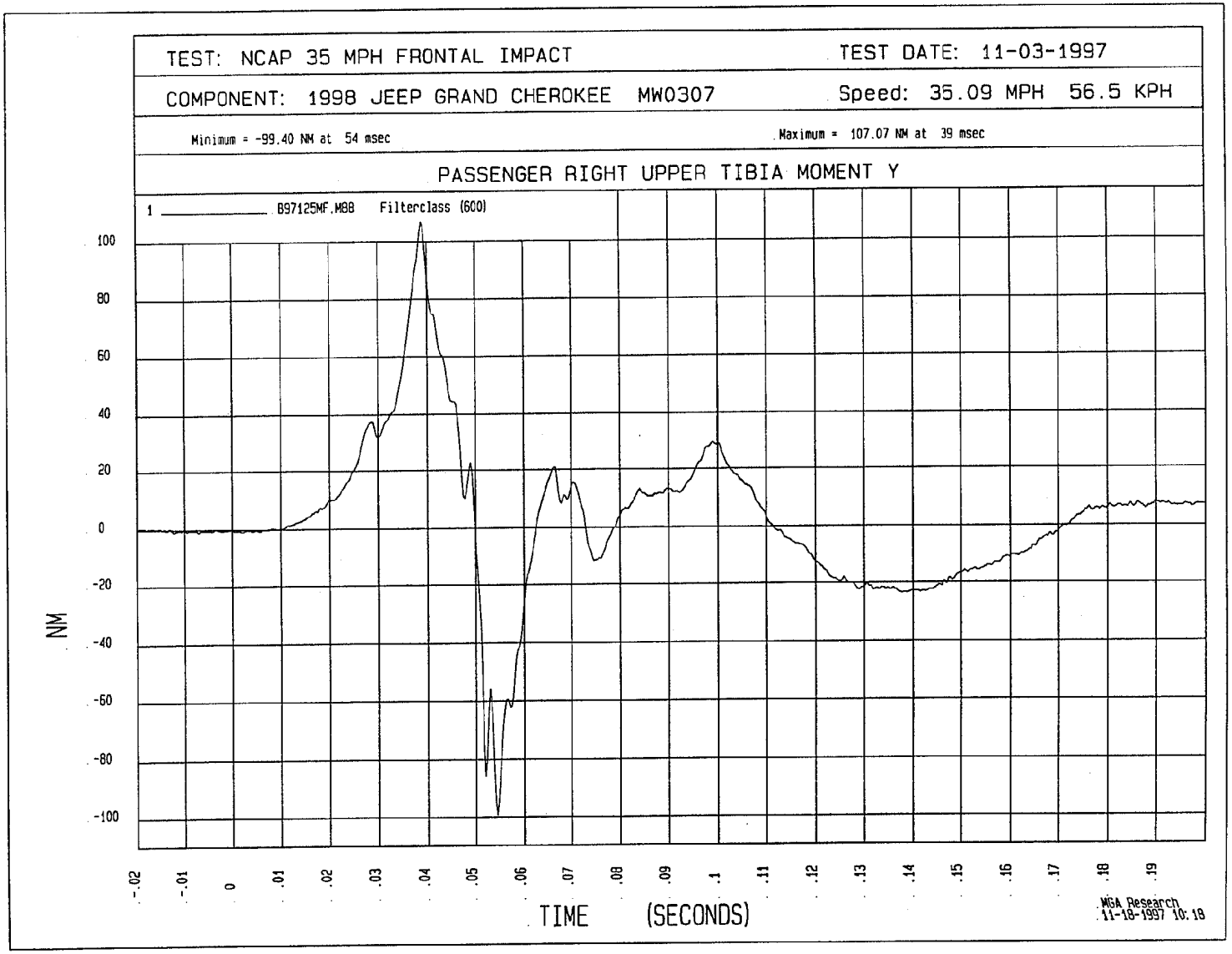
MGA Research
11-18-1997 10:18


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -99.40 NM at 54 msec
Maximum = 107.07 NM at 39 msec
PASSENGER RIGHT UPPER TIBIA MOMENT Y
1 B97125MF.M88 Filterclass (600)
NM
100
80
60
40
20
0
-20
-40
-60
-80
-100
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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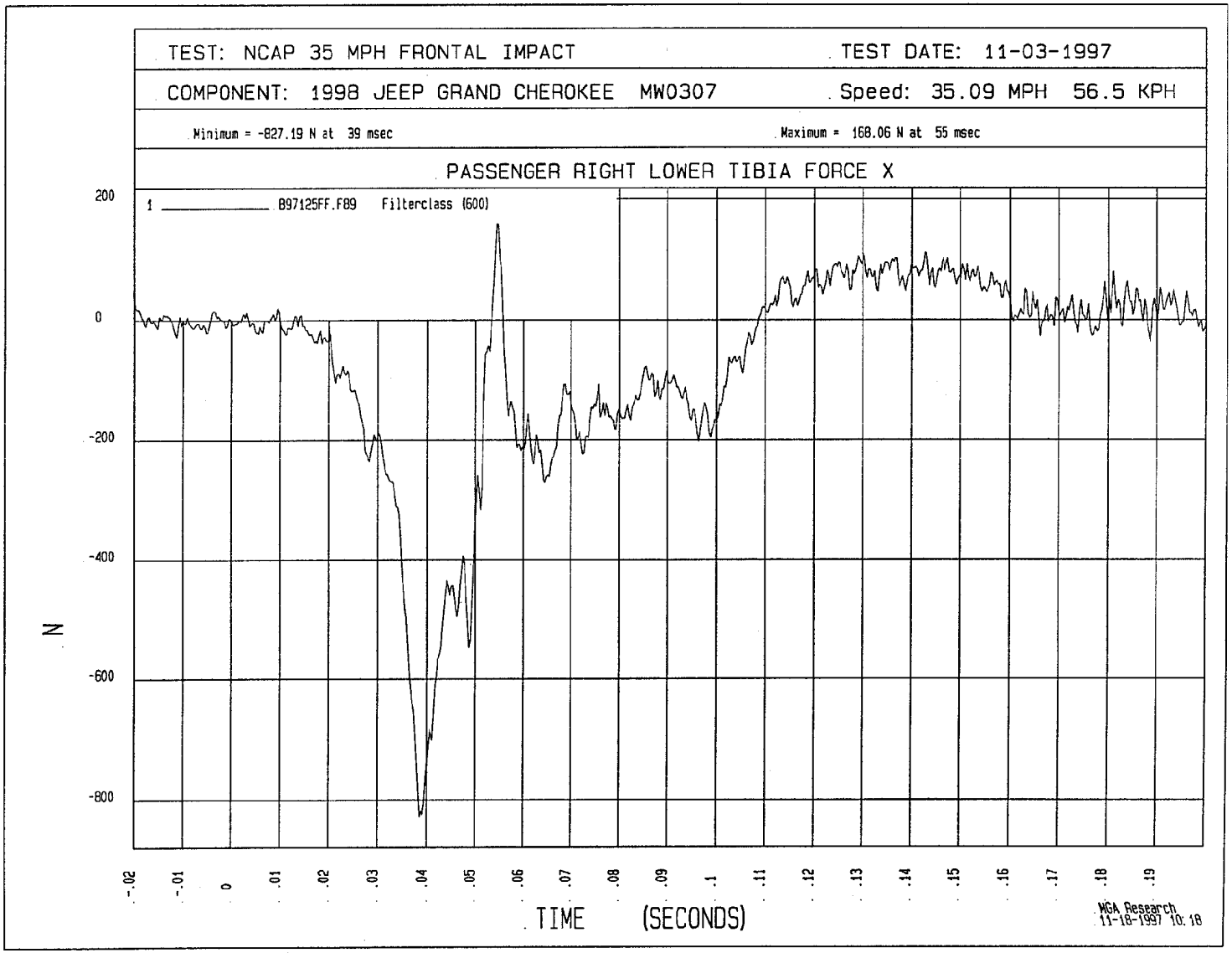
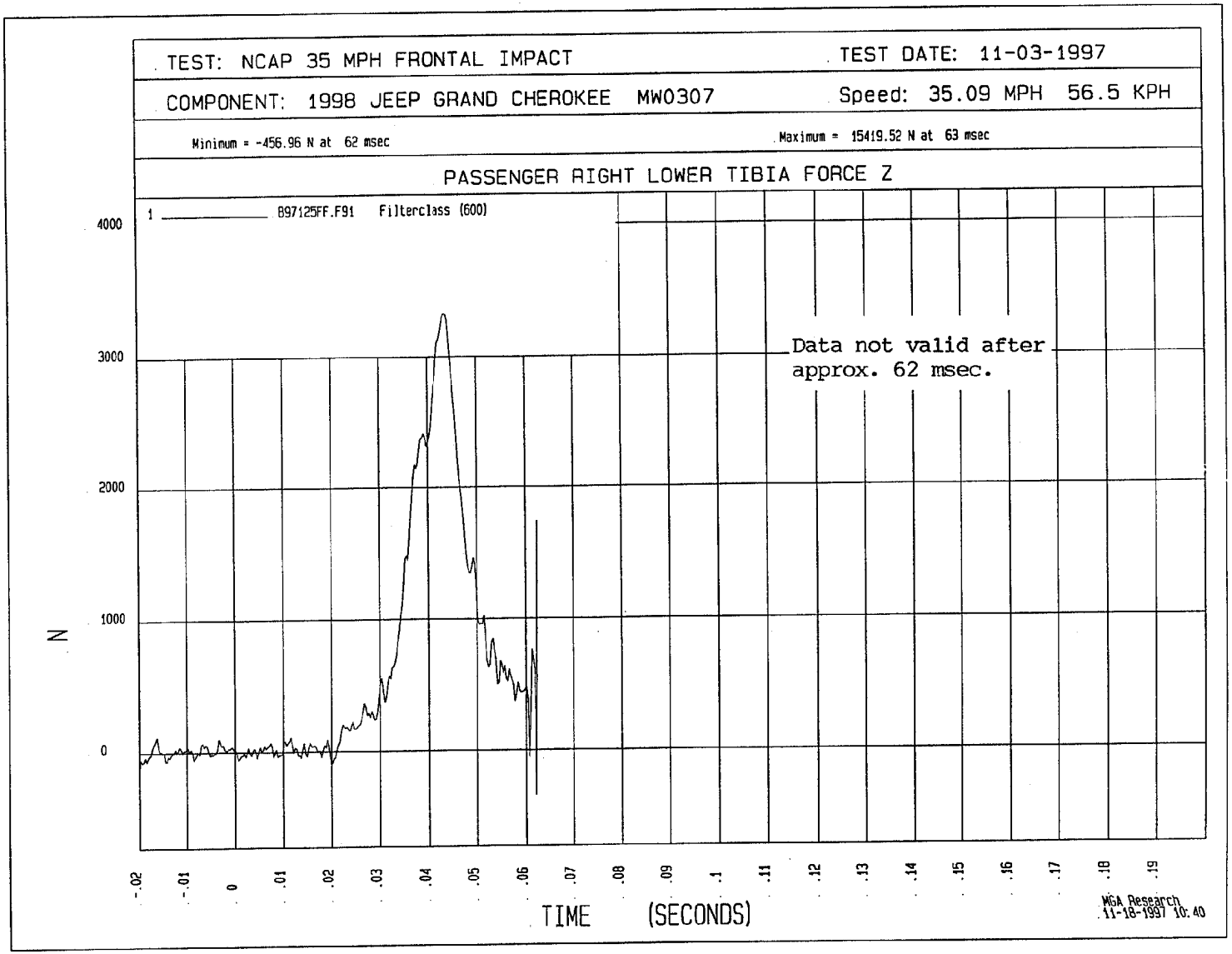
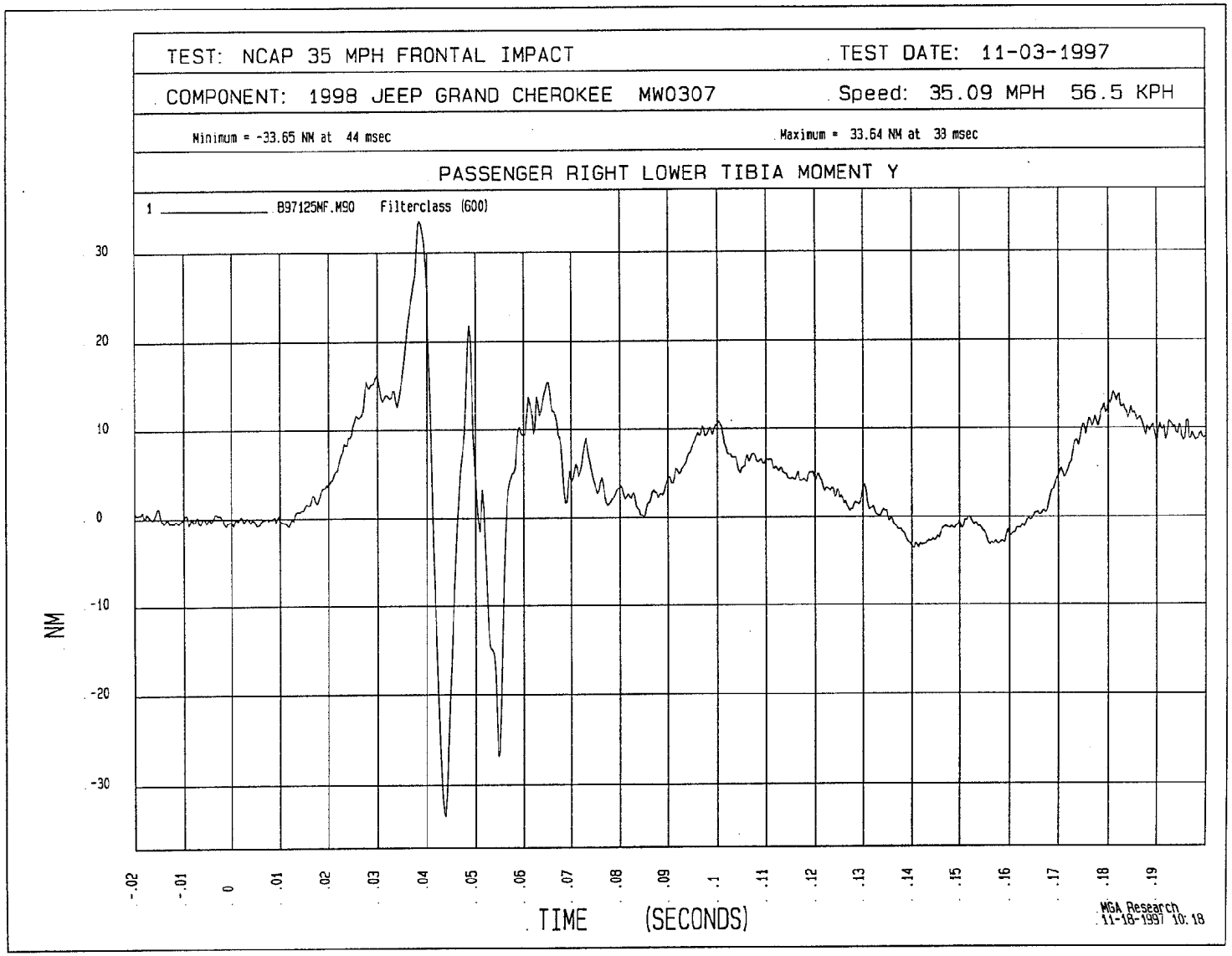
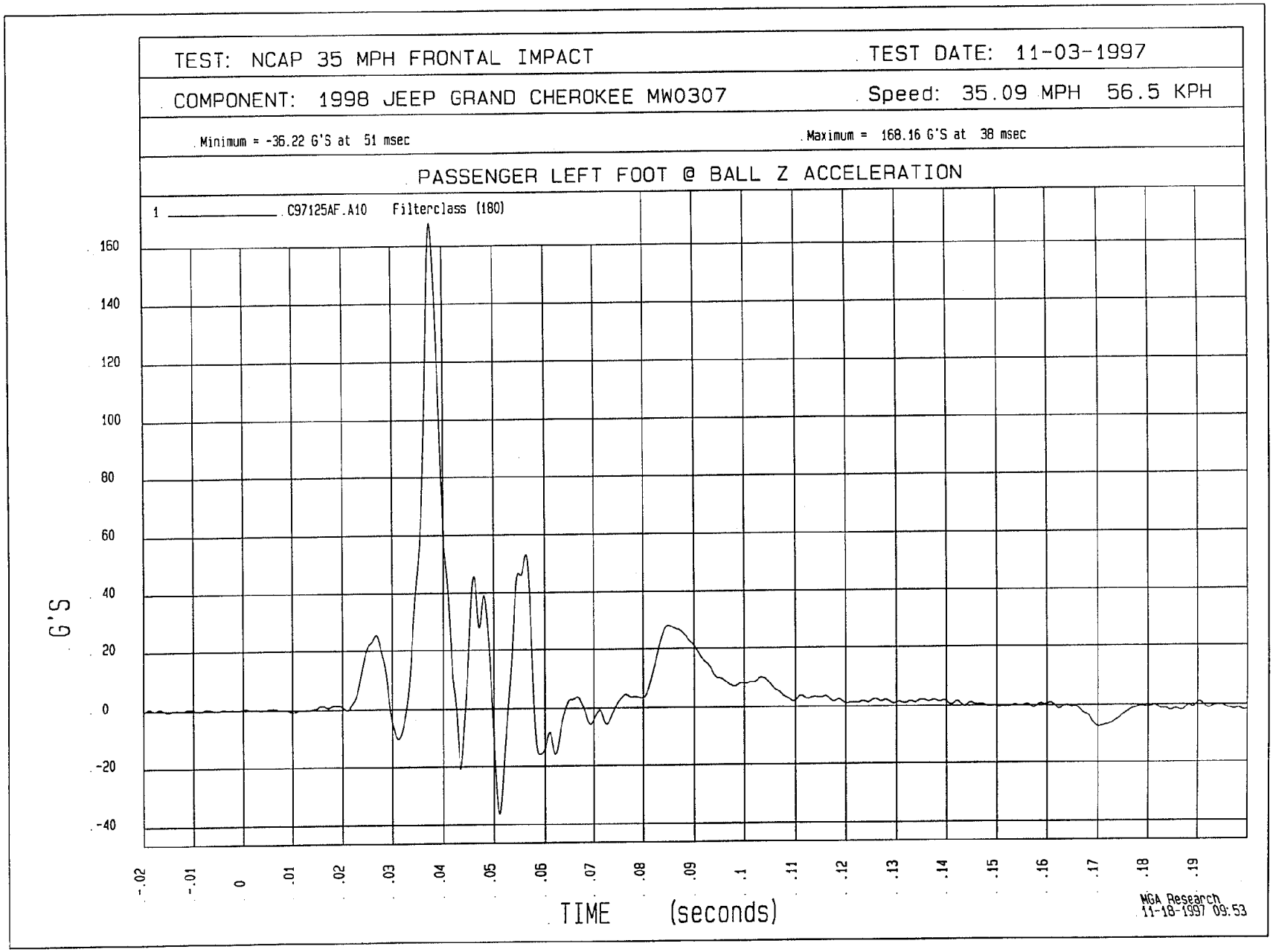
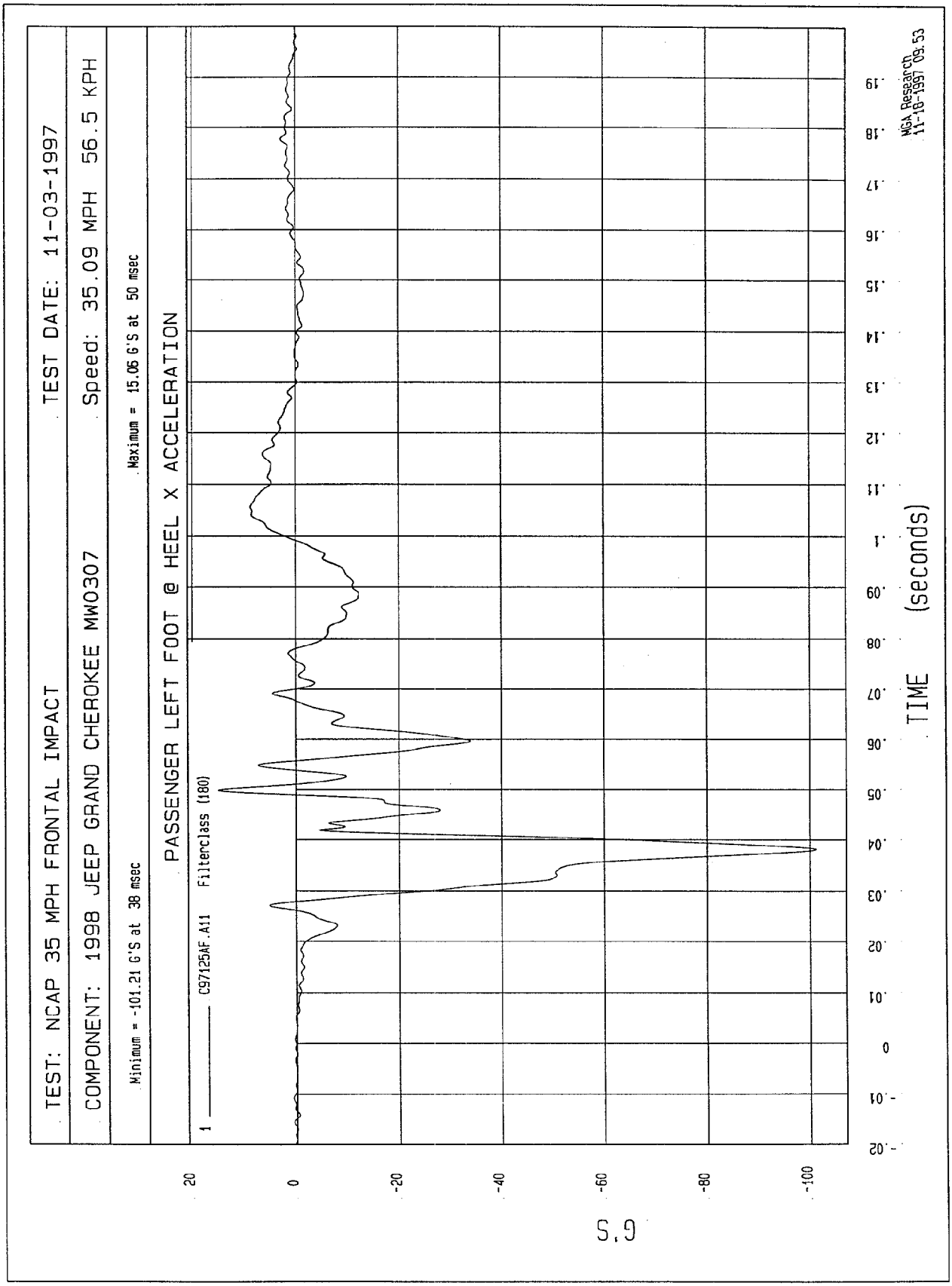
TIME (SECONDS)
MGA Research
11-18-1997 10:18

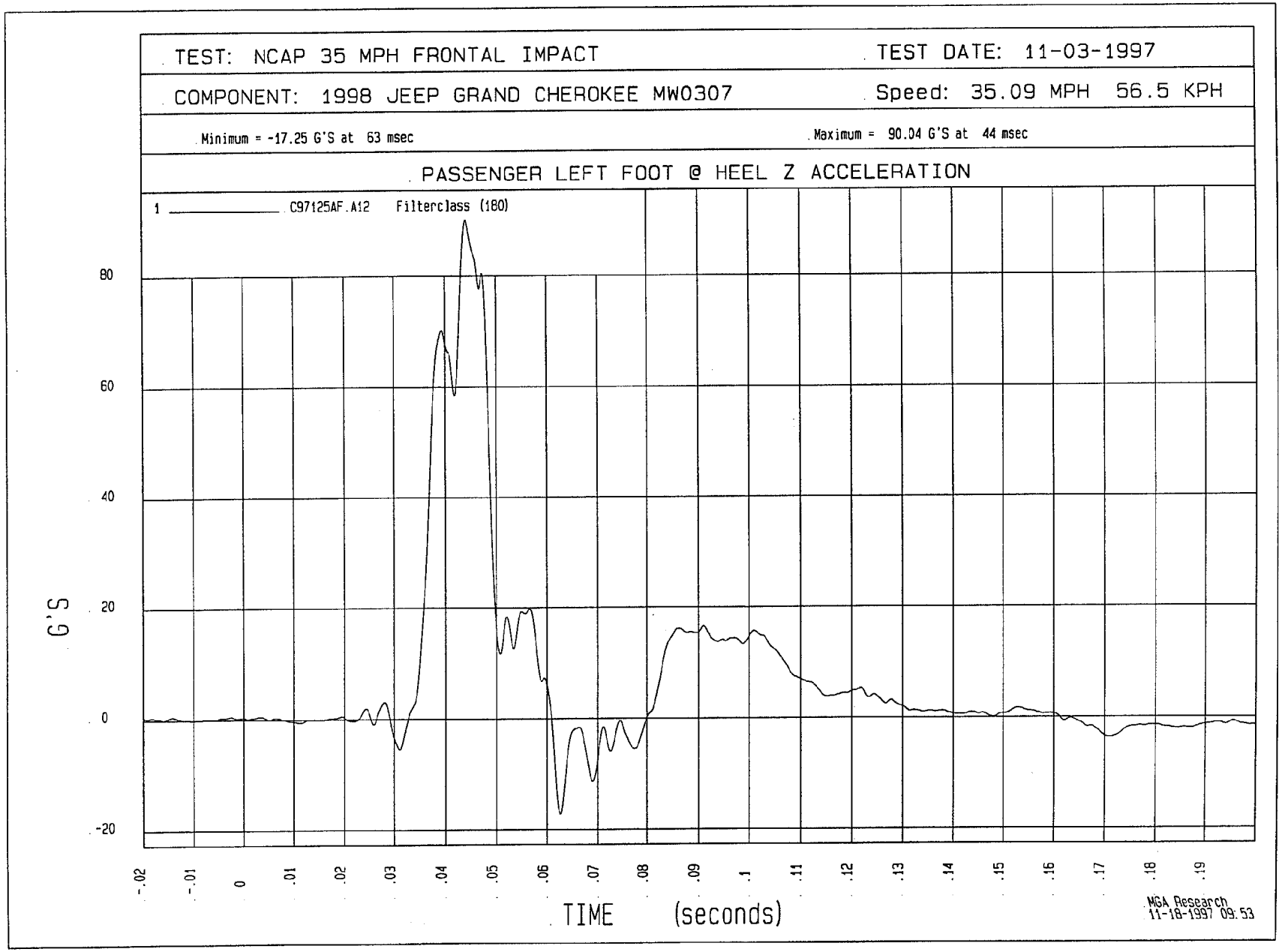

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -827.19 N at 39 msec
Maximum = 168.06 N at 55 msec
PASSENGER RIGHT LOWER TIBIA FORCE X
1 B97125FF.F89 Filterclass (600)
200
0
-200
-400
-600
-800
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:18

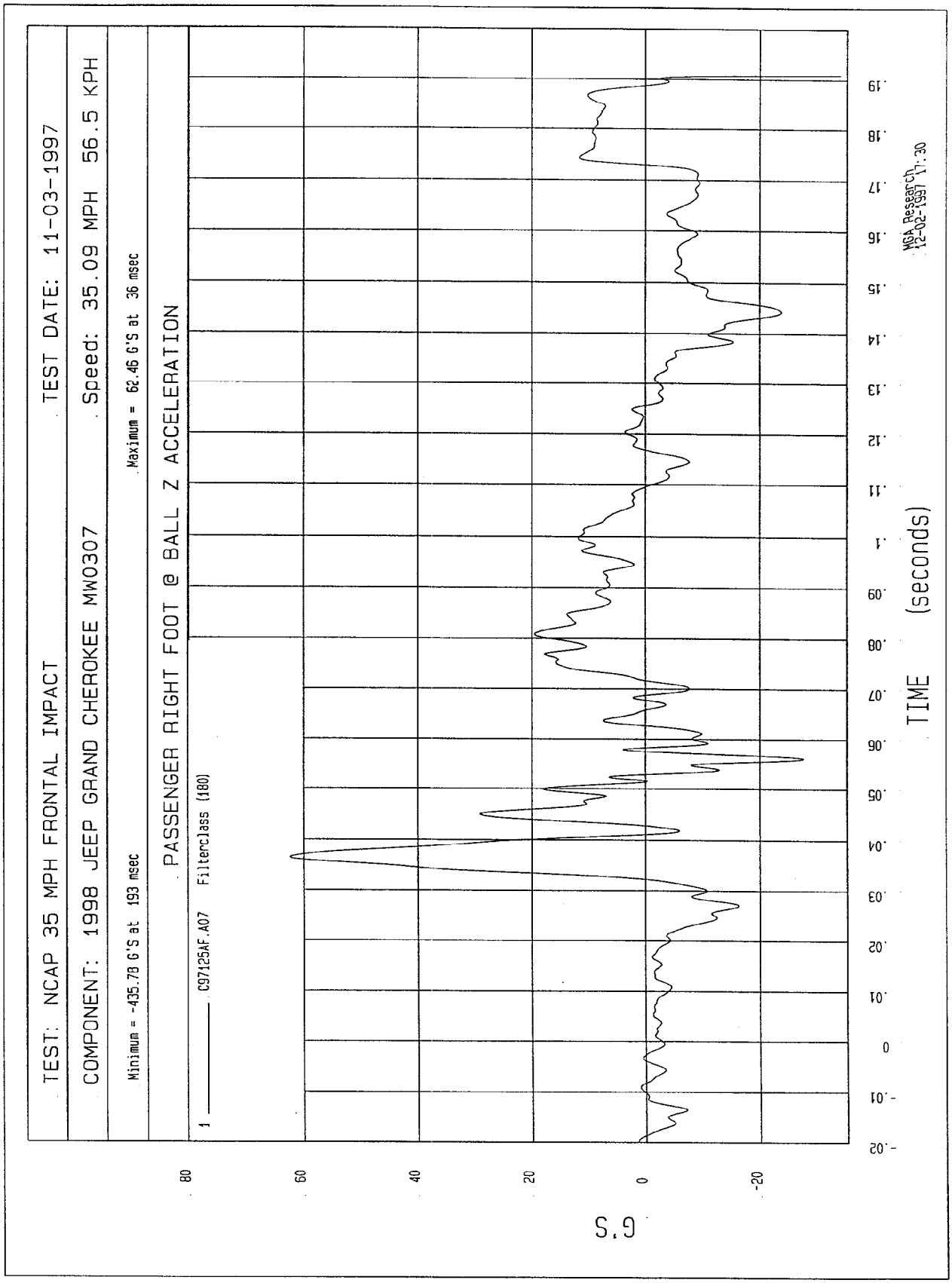

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -456.96 N at 62 msec
Maximum = 15419.52 N at 63 msec
PASSENGER RIGHT LOWER TIBIA FORCE Z
1 B97125FF.F91 Filterclass (600)
Data not valid after approx. 62 msec.
N
4000
3000
2000
1000
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
11-18-1997 10:40

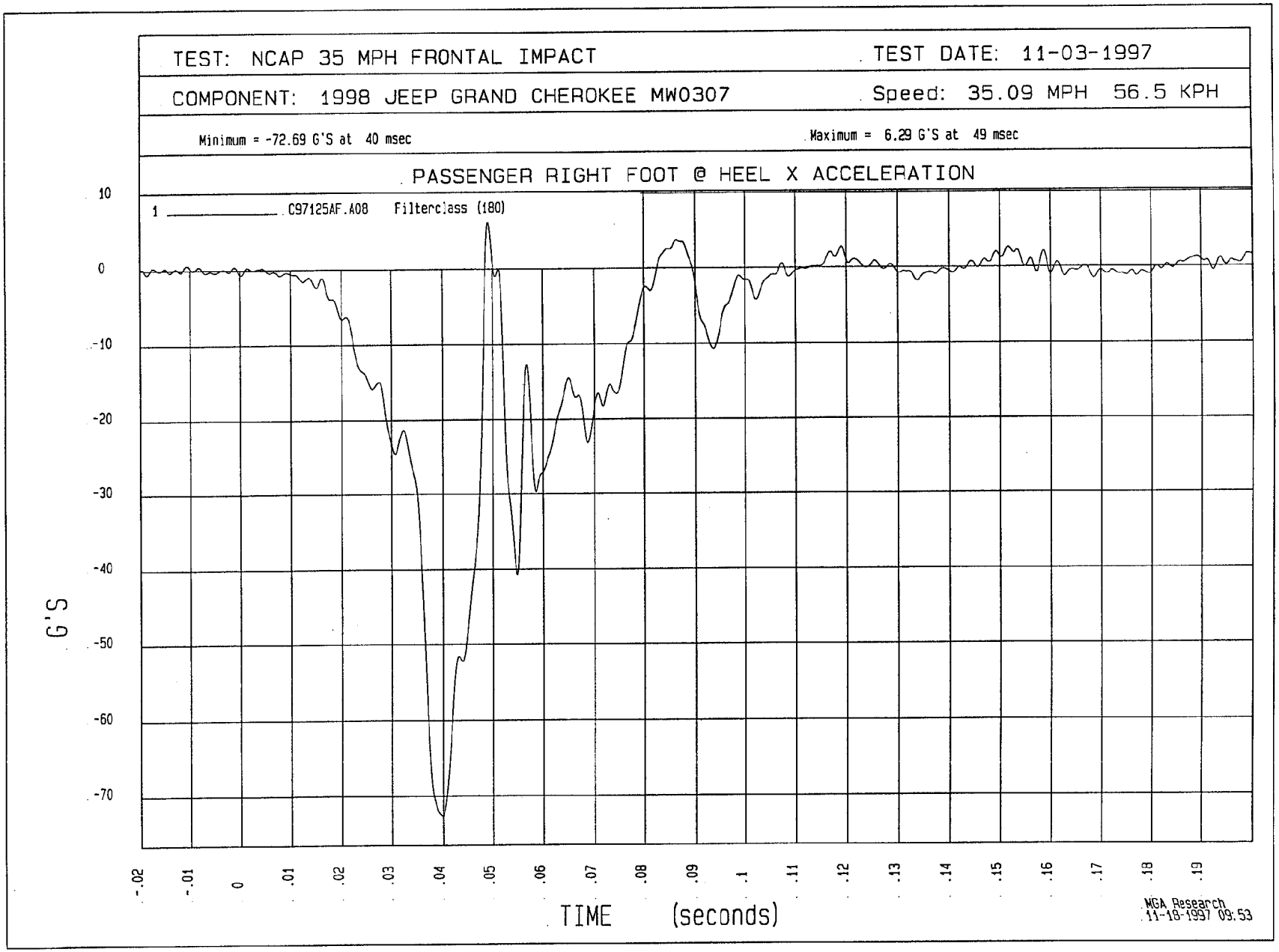

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -33.65 NM at 44 msec
Maximum = 33.64 NM at 33 msec
PASSENGER RIGHT LOWER TIBIA MOMENT Y
1 B97125MF.M90 Filterclass (600)
NM
30
20
10
0
-10
-20
-30
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:18

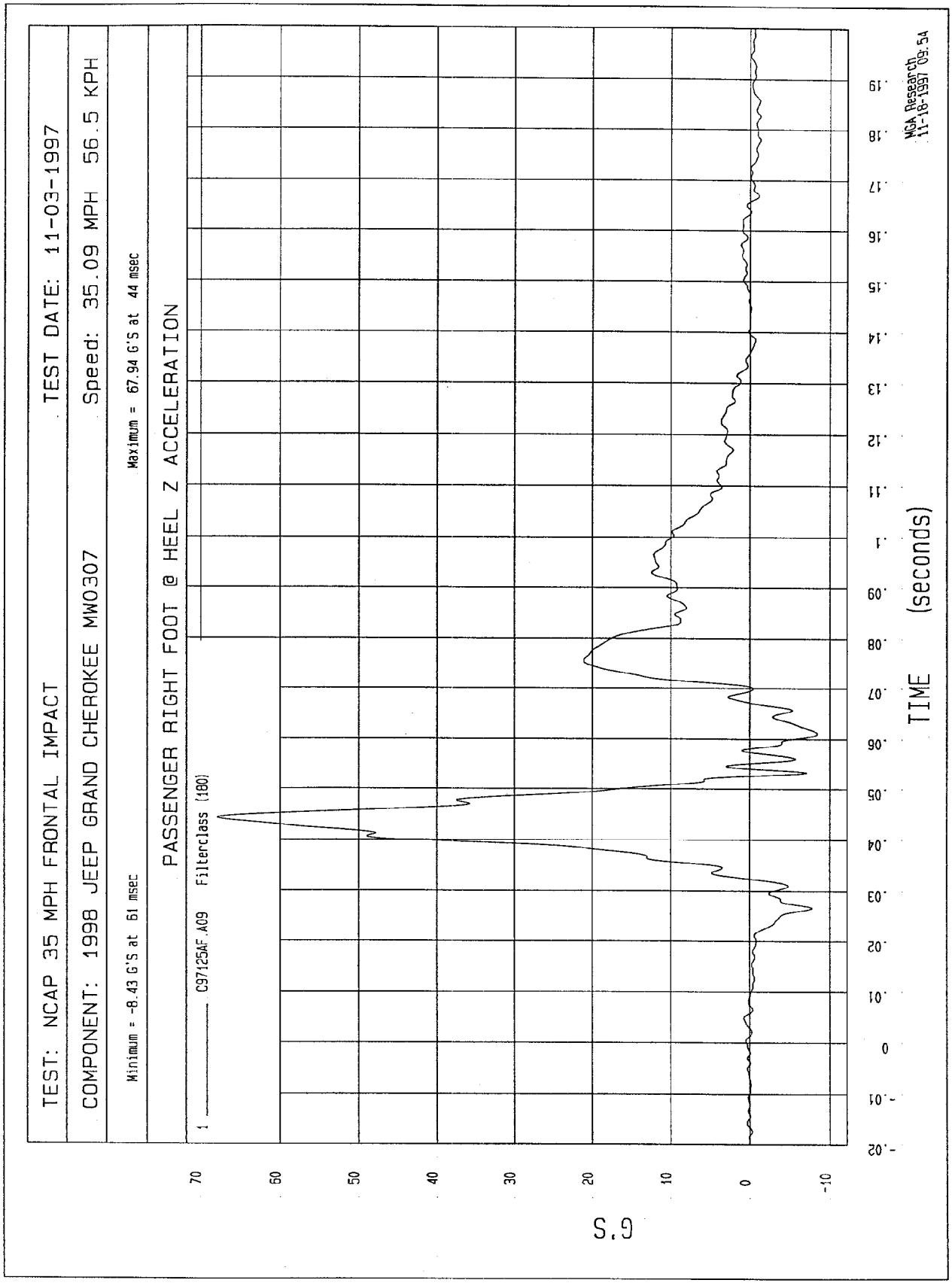

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -36.22 G'S at 51 msec
Maximum = 168.16 G'S at 38 msec
PASSENGER LEFT FOOT @ BALL Z ACCELERATION
1 C97125AF.A10 Filterclass (180)
160
140
120
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-18-1997 09:53

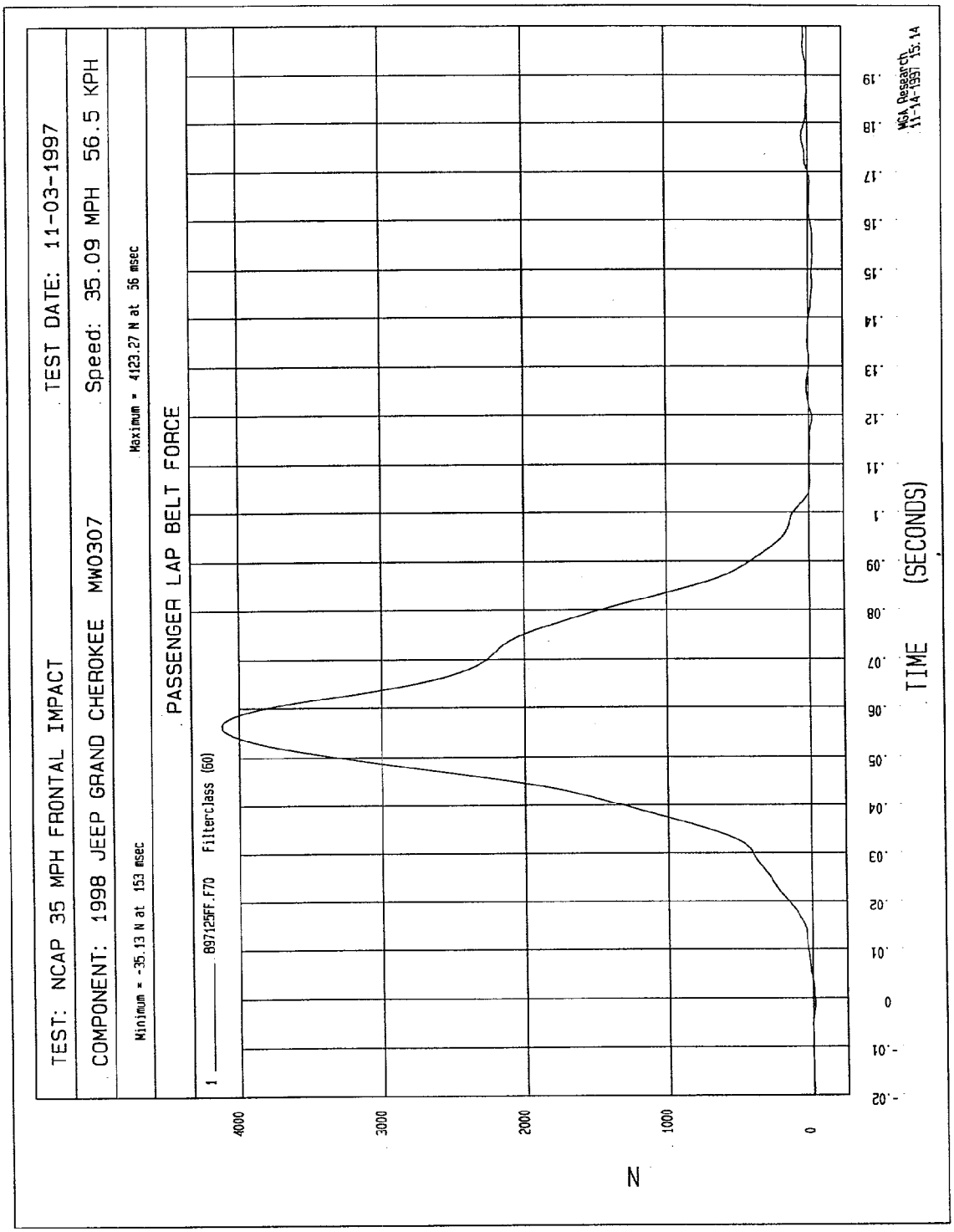

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -101.21 G'S at 38 msec
Maximum = 15.06 G'S at 50 msec
PASSENGER LEFT FOOT @ HEEL X ACCELERATION
1 C97125AF.A11 Filterclass (180)
20
0
-20
-40
-60
-80
-100
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-18-1997 09:53
G's

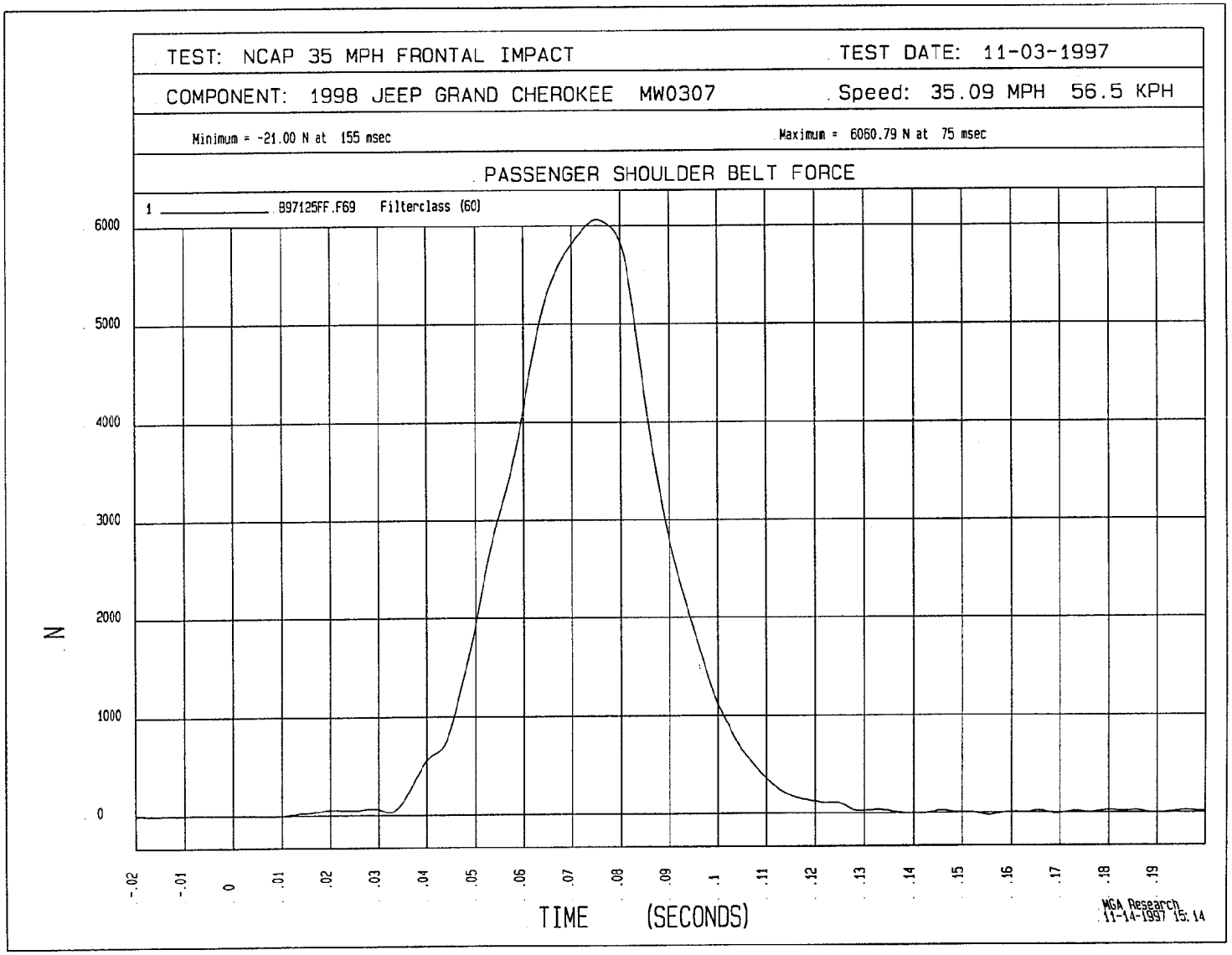

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -17.25 G'S at 63 msec
Maximum = 90.04 G'S at 44 msec
PASSENGER LEFT FOOT @ HEEL Z ACCELERATION
1 C97125AF.A12 Filterclass (180)
80
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-18-1997 09:53

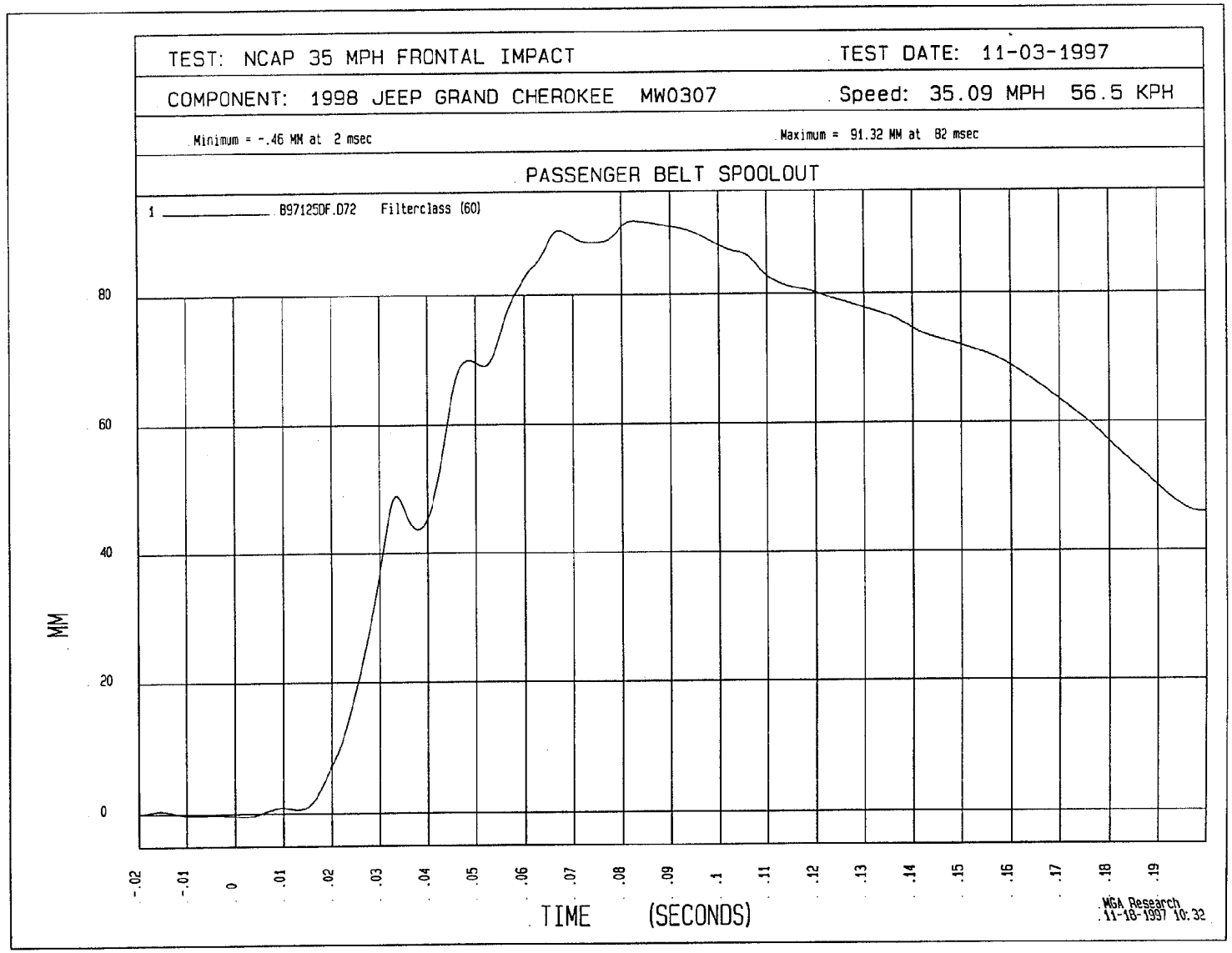

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -435.78 G'S at 193 msec
Maximum = 62.46 G'S at 36 msec
PASSENGER RIGHT FOOT @ BALL Z ACCELERATION
1 C97125AF.A07 Filterclass (180)
MGA Research
12-02-1997 11:30
TIME (seconds)
G'S

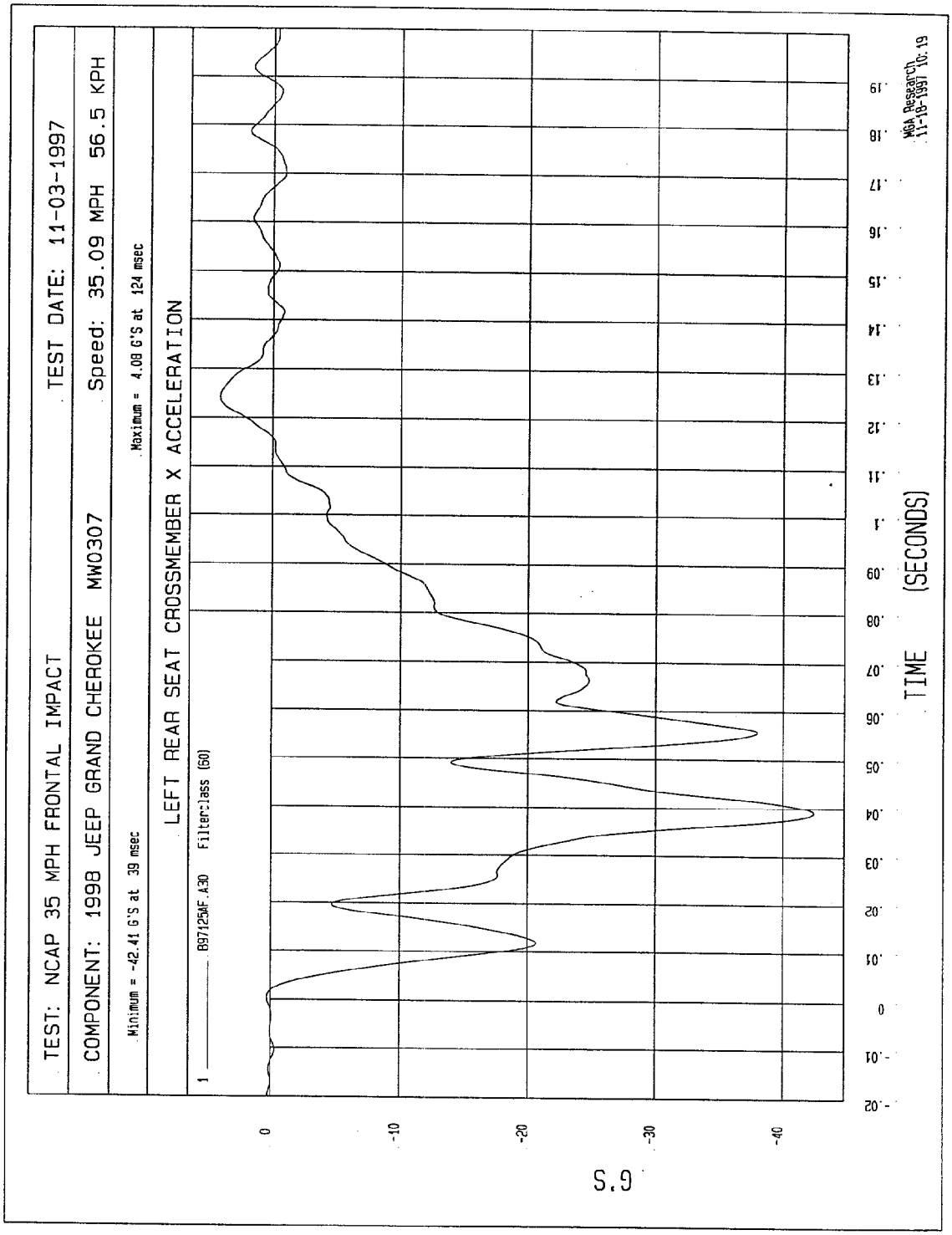

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -72.69 G'S at 40 msec
Maximum = 6.29 G'S at 49 msec
PASSENGER RIGHT FOOT @ HEEL X ACCELERATION
1 C97125AF.A08 Filterclass (180)
10
0
-10
-20
-30
-40
-50
-60
-70
G'S
-.02
-.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
11-18-1997 09:53

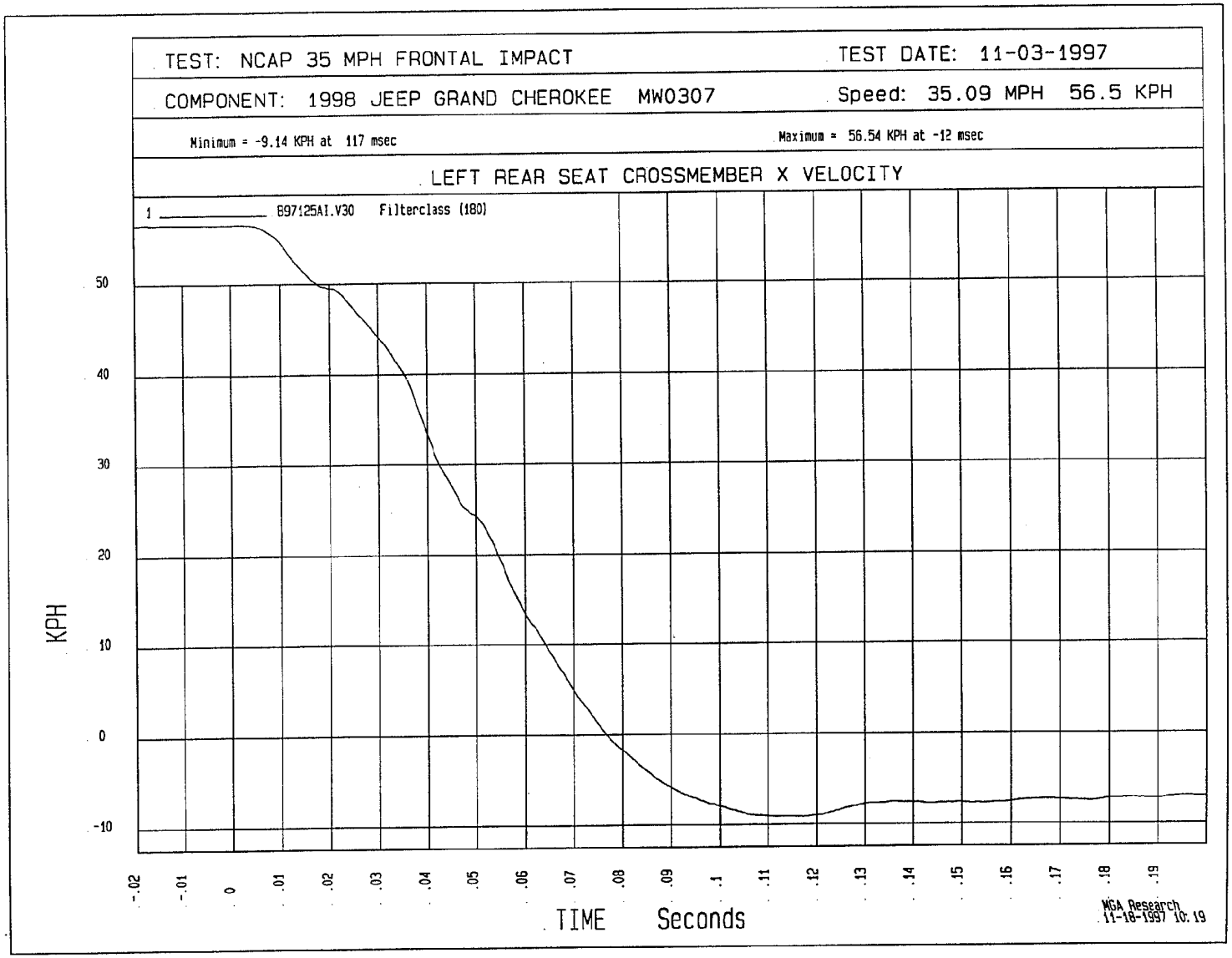

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -8.43 G'S at 61 msec
Maximum = 67.94 G'S at 44 msec
PASSENGER RIGHT FOOT @ HEEL Z ACCELERATION
1 C97125AF.A09 Filterclass (180)
MGA Research
11-18-1997 09:54
G's
TIME (seconds)

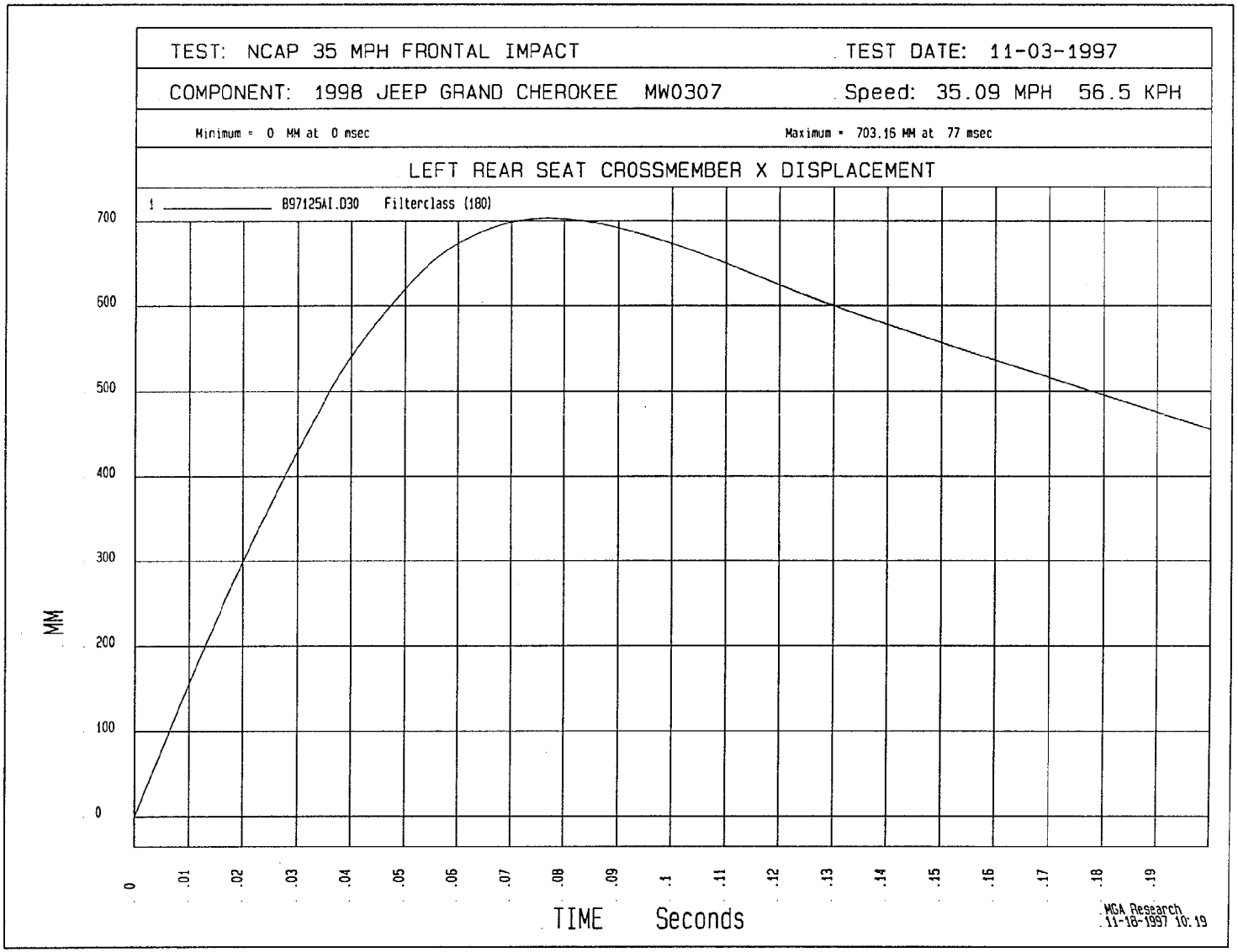

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -35.13 N at 153 msec
Maximum = 4123.27 N at 56 msec
PASSENGER LAP BELT FORCE
1 _____ 897125FF.F70 Filterclass (60)
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:14

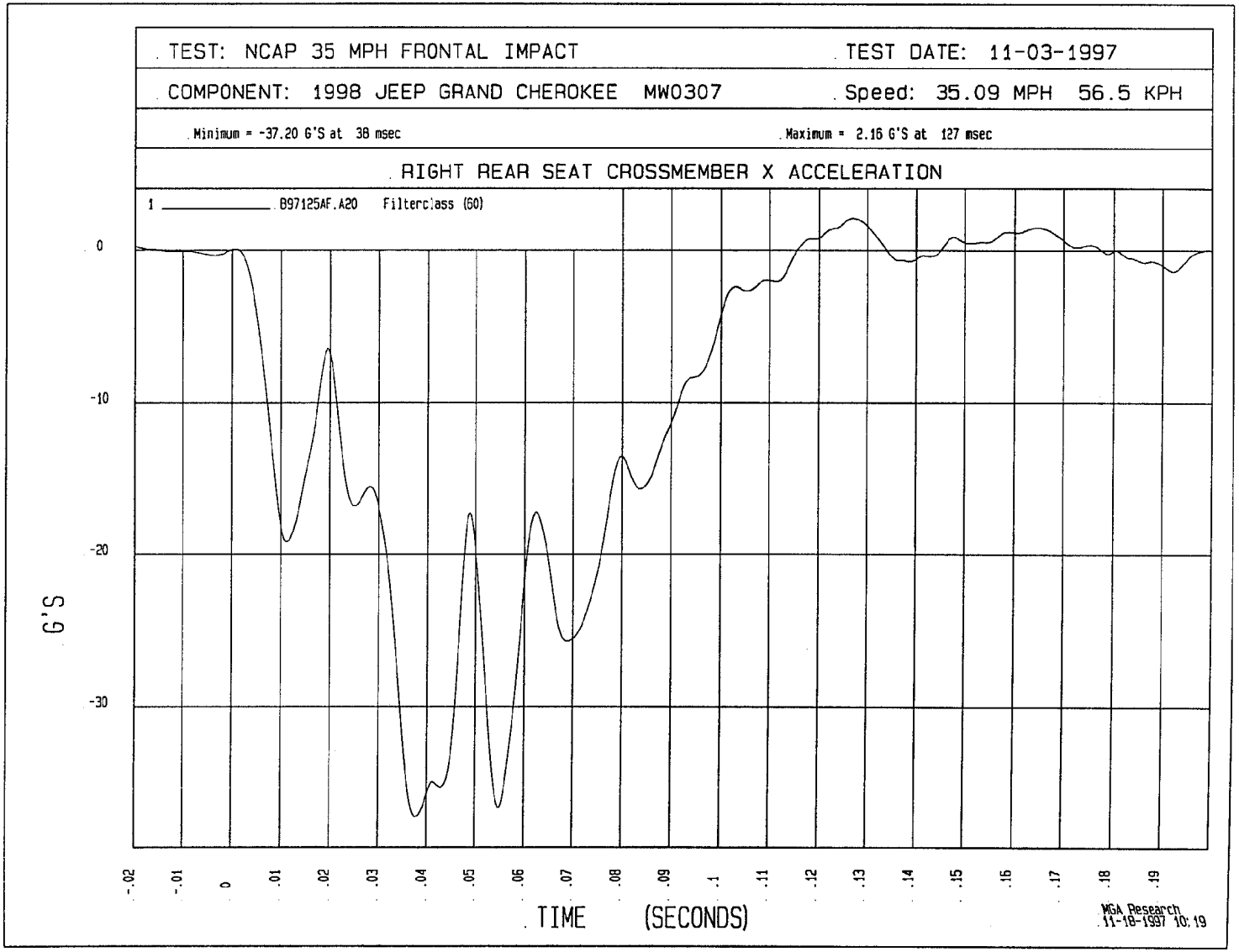

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -21.00 N at 155 msec
Maximum = 6060.79 N at 75 msec
PASSENGER SHOULDER BELT FORCE
1 B97125FF.F69 Filterclass (60)
6000
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-14-1997 15:14

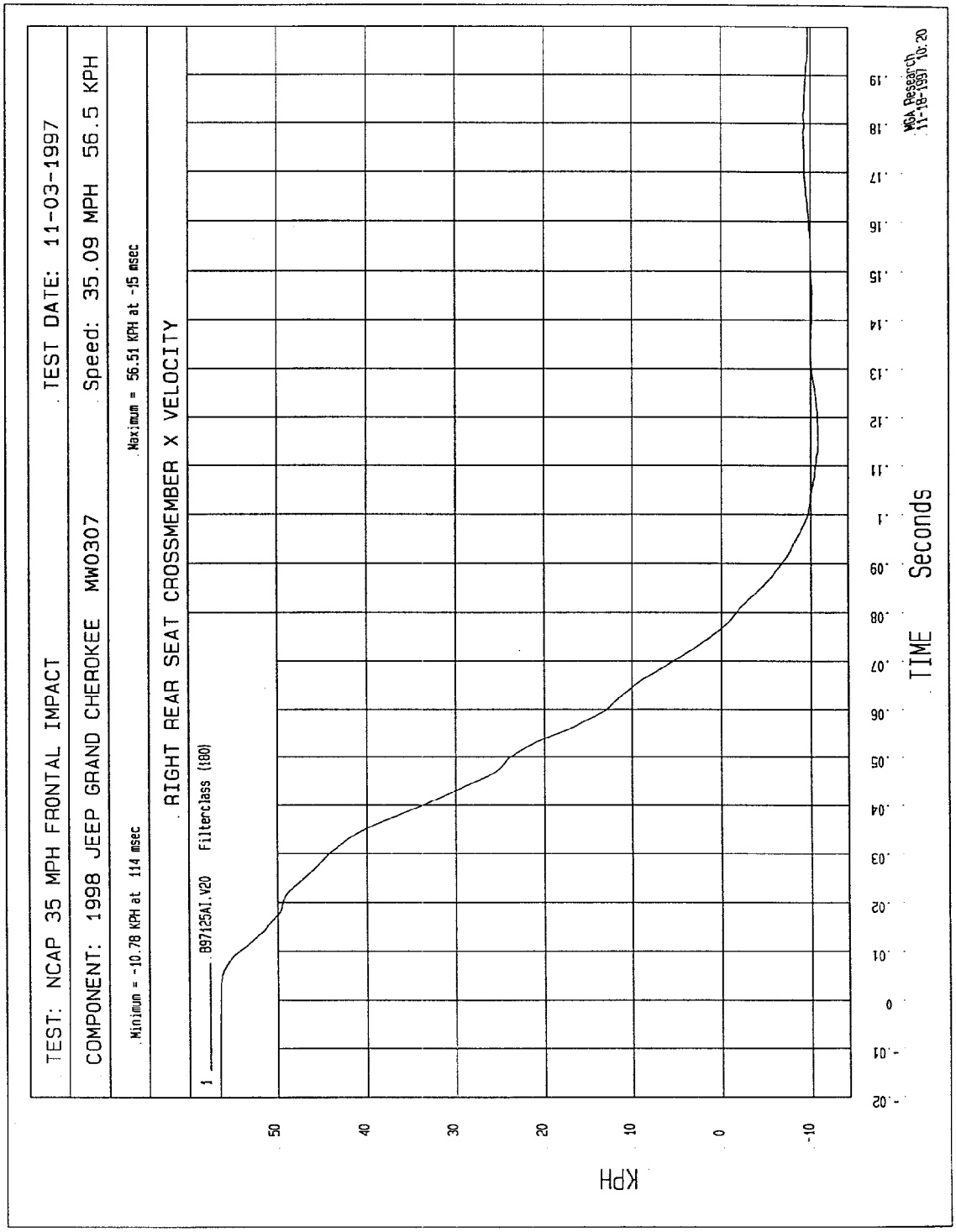

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -.46 MM at 2 msec
Maximum = 91.32 MM at 82 msec
PASSENGER BELT SPOOLOUT
1 B97125DF.D72 Filterclass (60)
MM
80
60
40
20
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-18-1997 10:32


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -42.41 G'S at 39 msec
Maximum = 4.08 G'S at 124 msec
LEFT REAR SEAT CROSSMEMBER X ACCELERATION
1 B971254F.A30 Filterclass (60)
0
-10
-20
-30
-40
S.9
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
11-18-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -9.14 KPH at 117 msec
Maximum = 56.54 KPH at -12 msec
LEFT REAR SEAT CROSSMEMBER X VELOCITY
1 ____ 897125AI.V30 Filterclass (180)
KPH
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
11-18-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 703.16 MM at 77 msec
LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT
1 B97125AI.D30 Filterclass (180)
MM
700
600
500
400
300
200
100
0
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -37.20 G'S at 38 msec
Maximum = 2.16 G'S at 127 msec
RIGHT REAR SEAT CROSSMEMBER X ACCELERATION
1 B97125AF.A20 Filterclass (60)
0
-10
-20
-30
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
11-18-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -10.78 KPH at 114 msec
Maximum = 56.51 KPH at -15 msec
RIGHT REAR SEAT CROSSMEMBER X VELOCITY
1 ____ 897125A1.V20 Filterclass (180)
KPH
50
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
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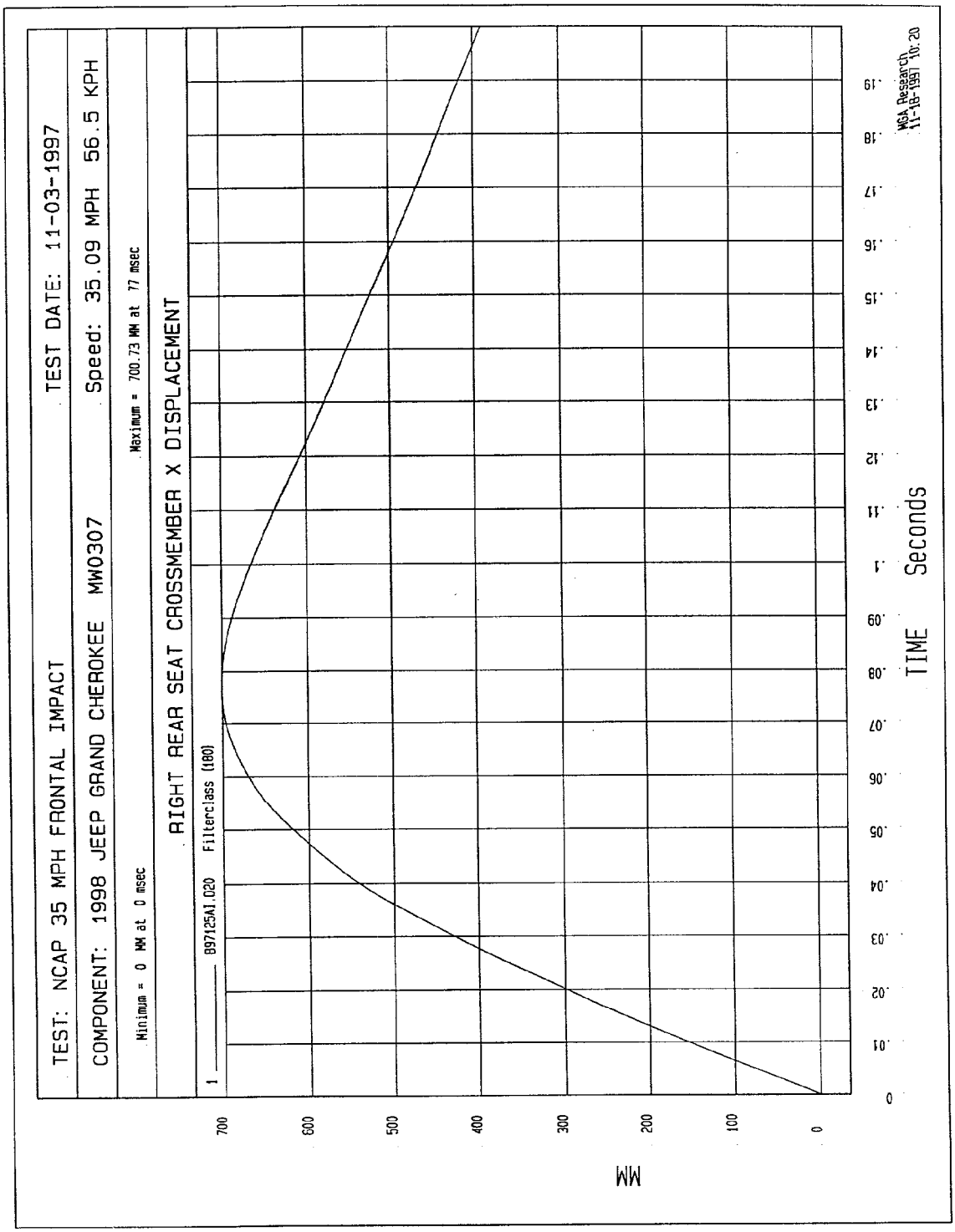
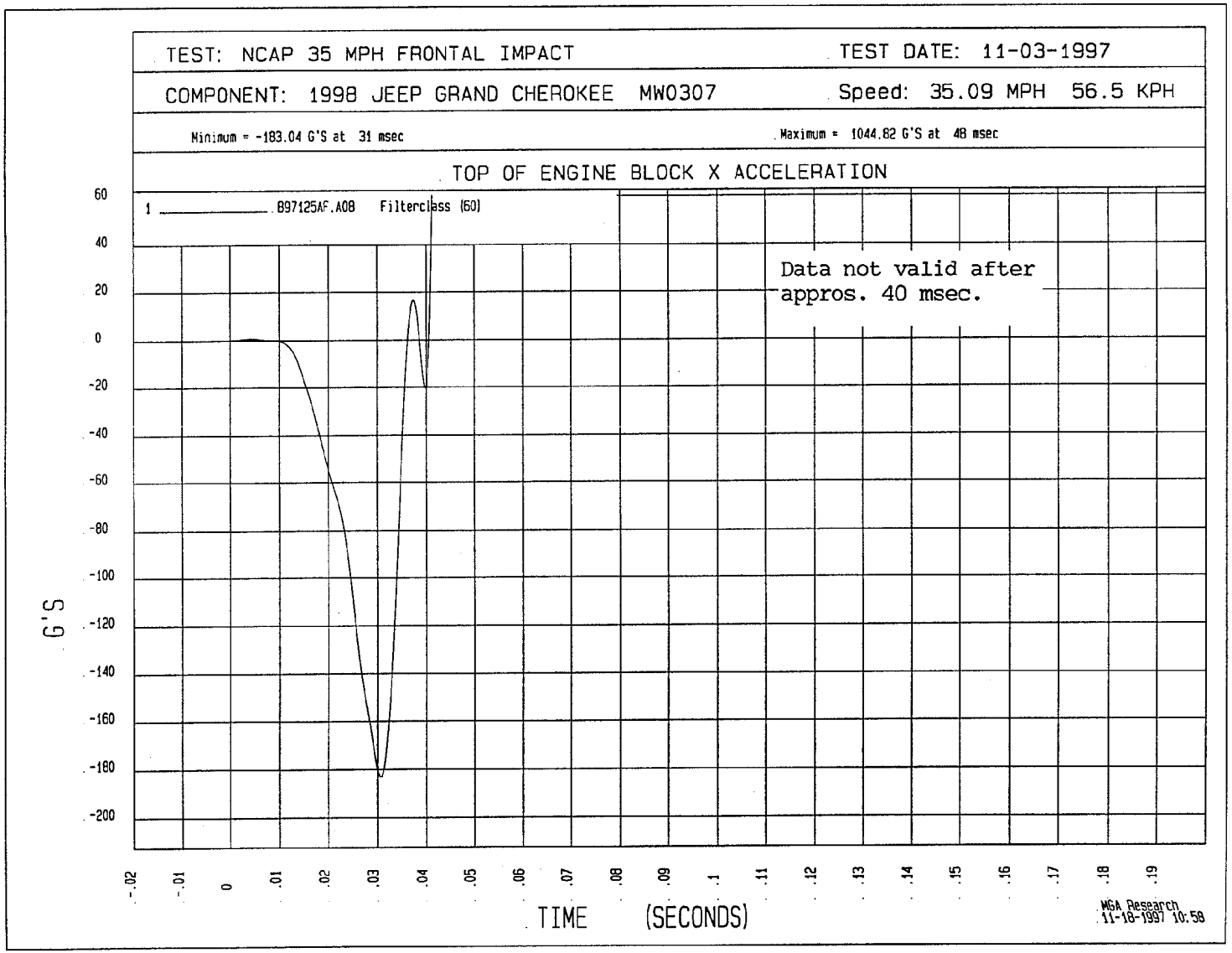
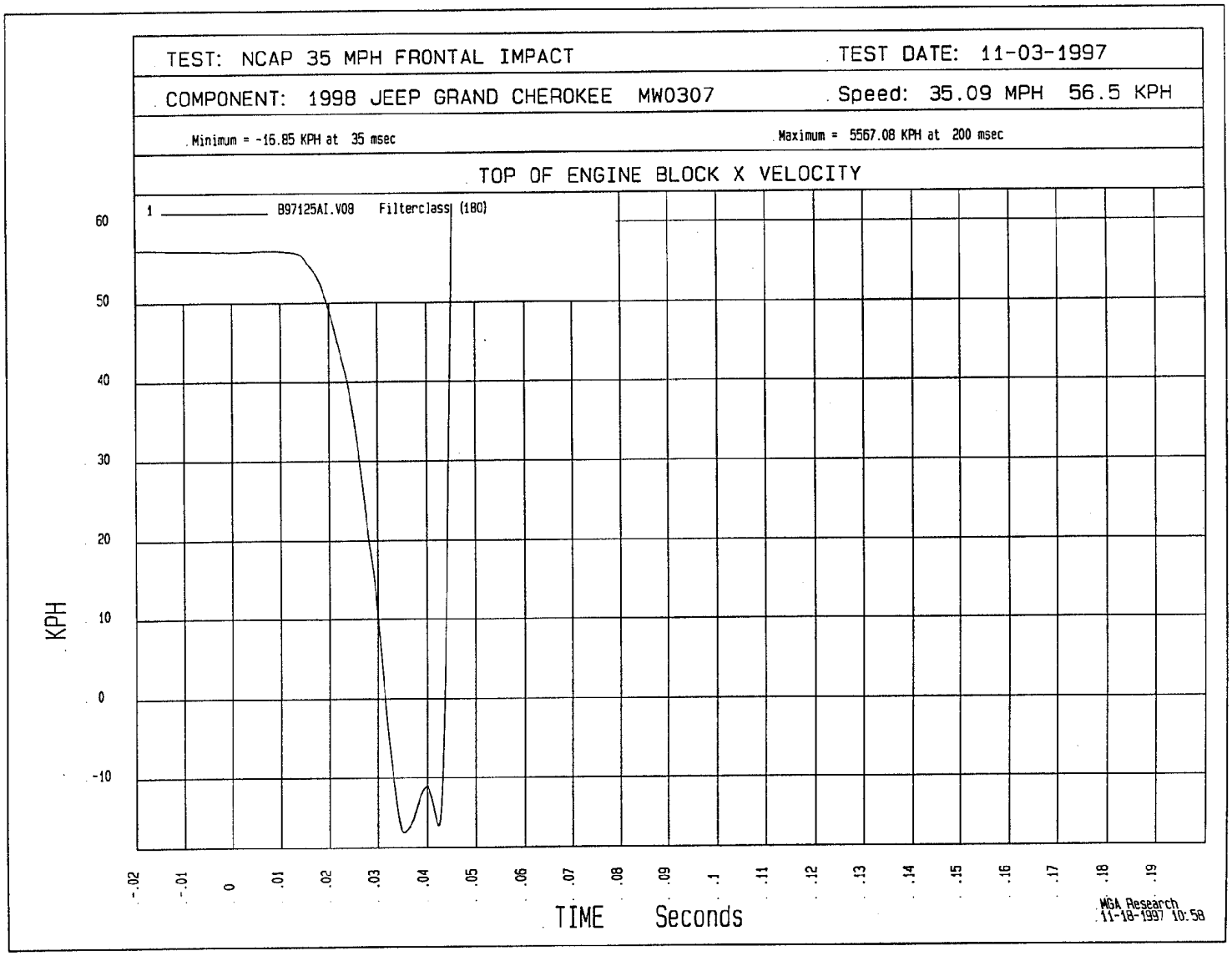
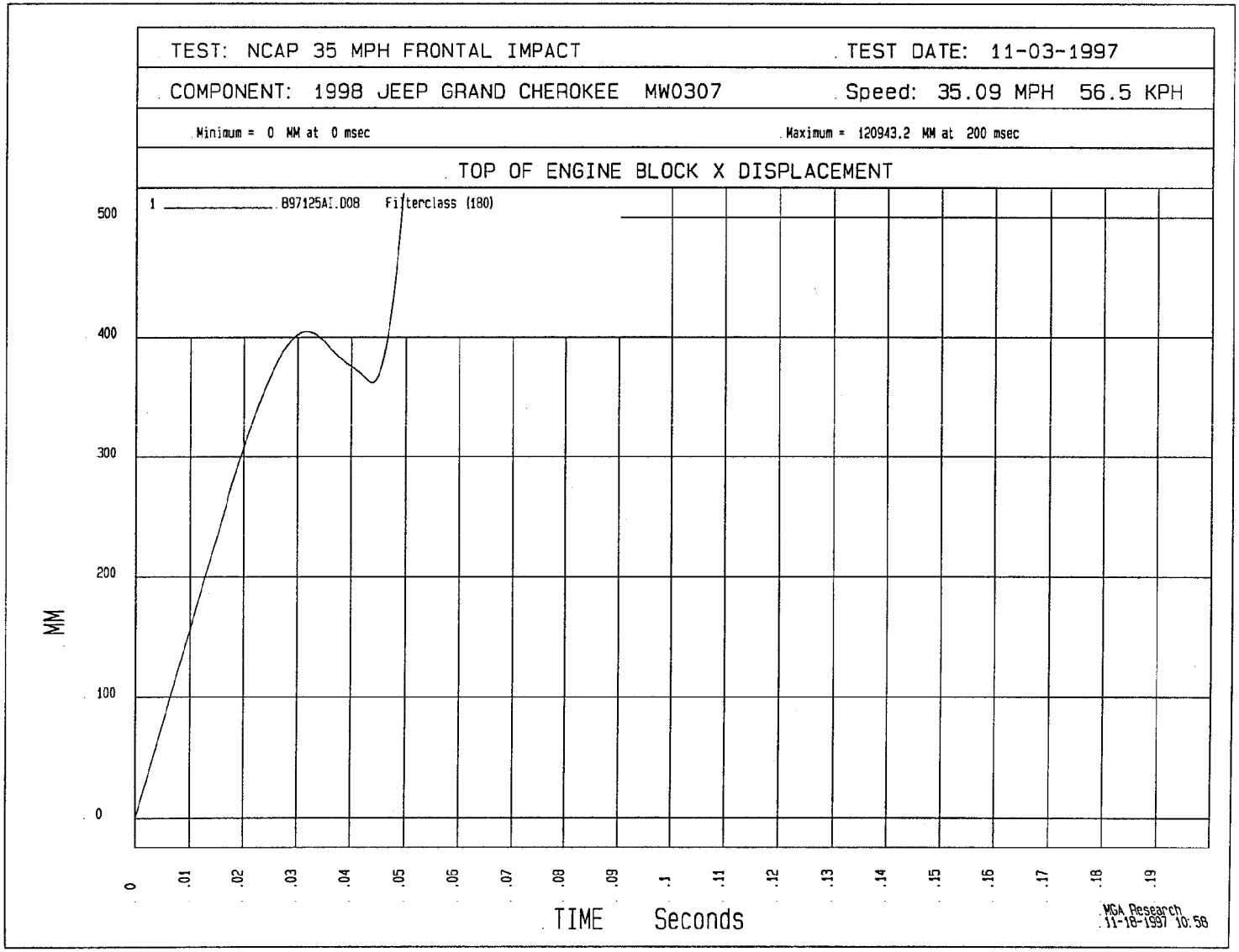
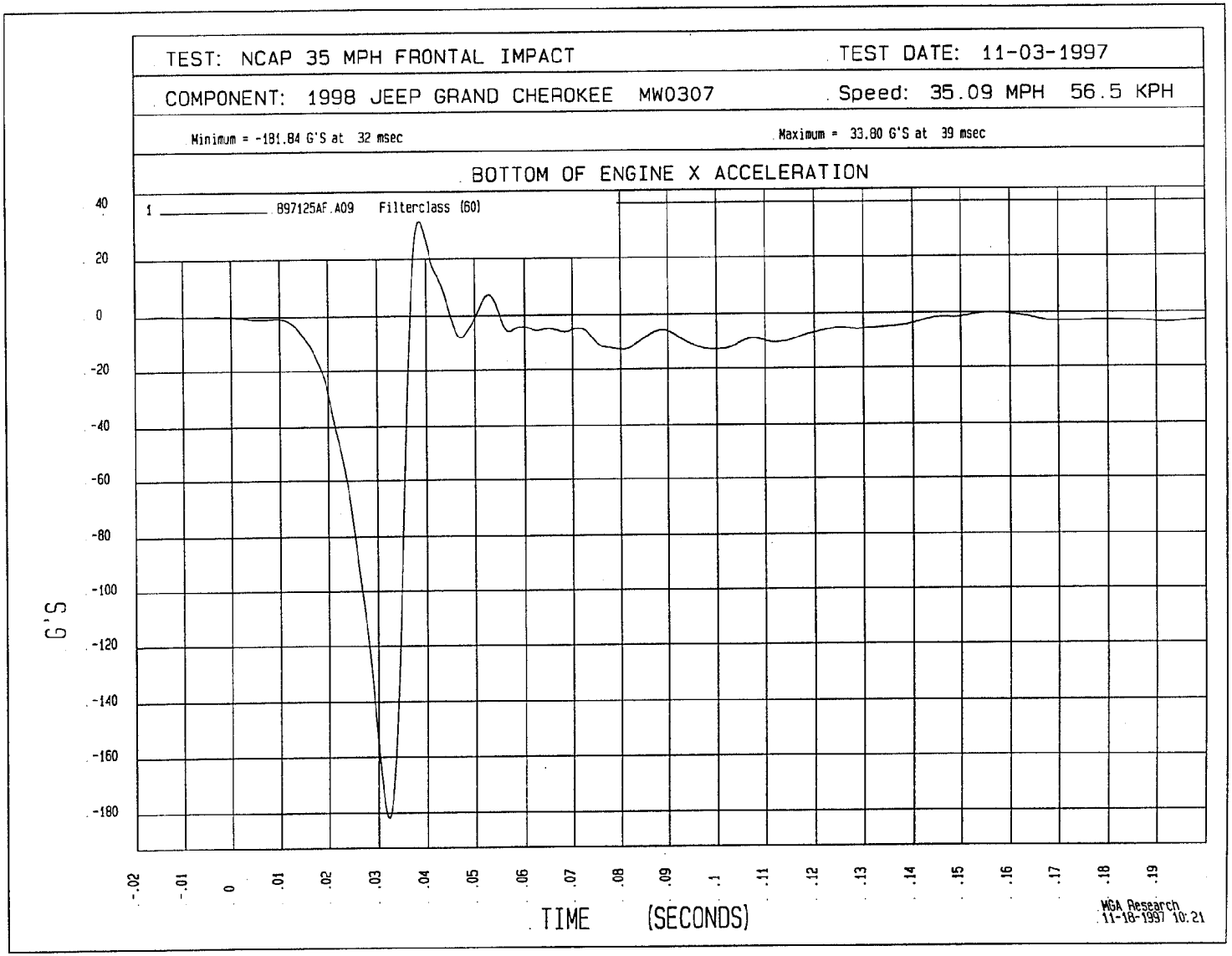
.16
.17
.18
.19
MGA Research
11-18-1997 10:20

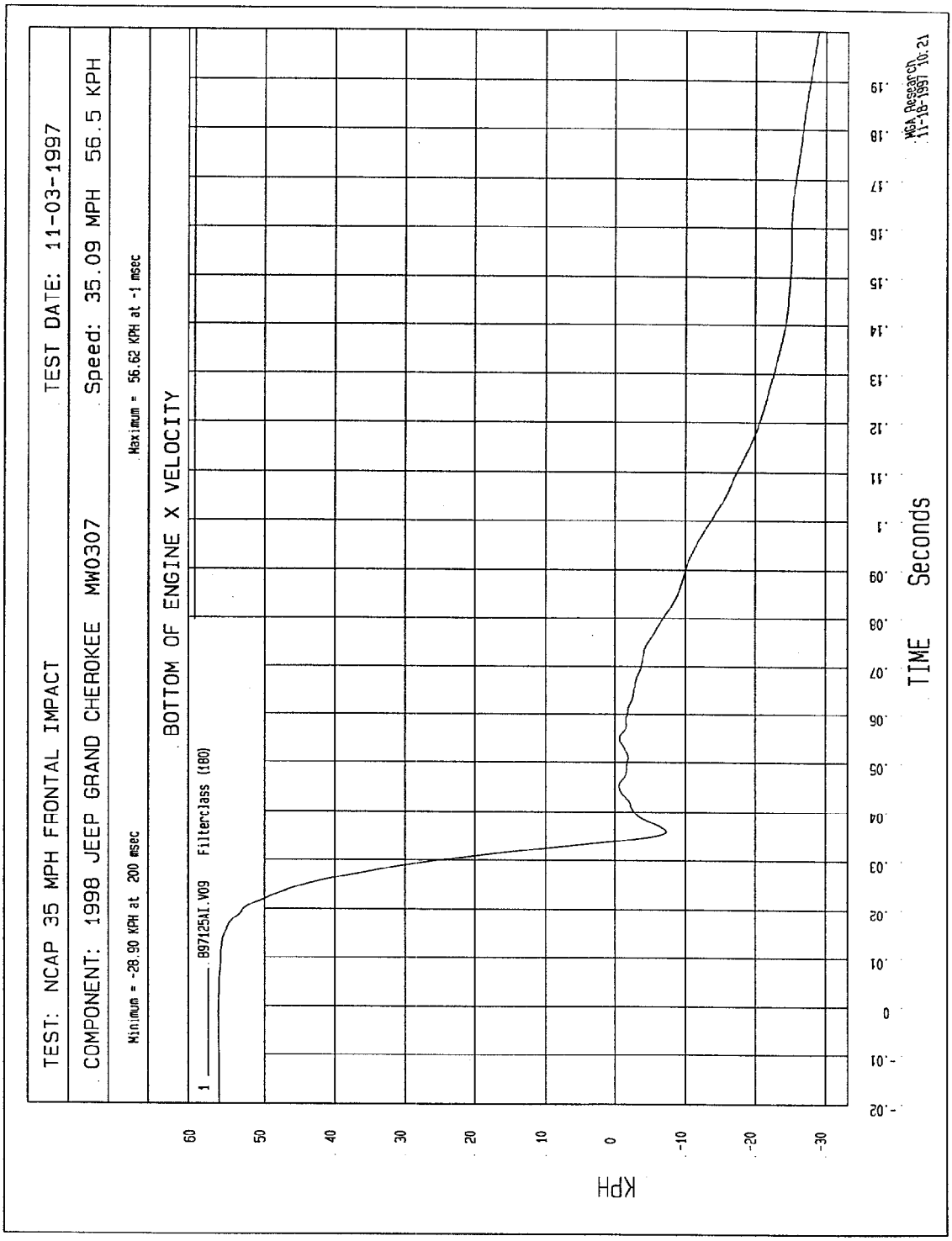

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 700.73 MM at 77 msec
RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT
1 _____ B97125A1.020 Filterclass (180)
MM
TIME Seconds
NGA Research
11-18-1997 10:20

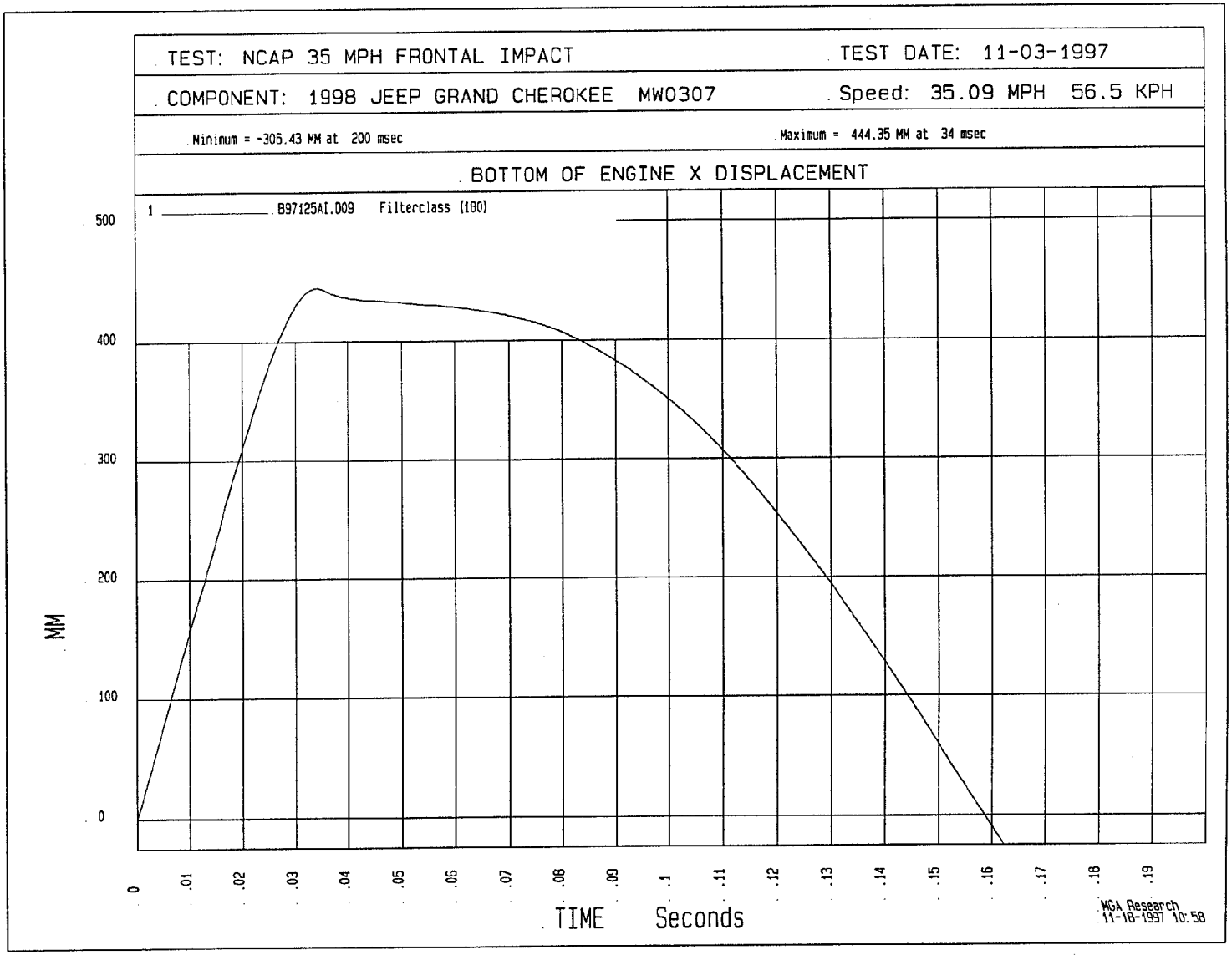

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -183.04 G'S at 31 msec
Maximum = 1044.82 G'S at 48 msec
TOP OF ENGINE BLOCK X ACCELERATION
1 B97125AF.A08 Filterclass (60)
Data not valid after appros. 40 msec.
G'S
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-.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
11-18-1997 10:58

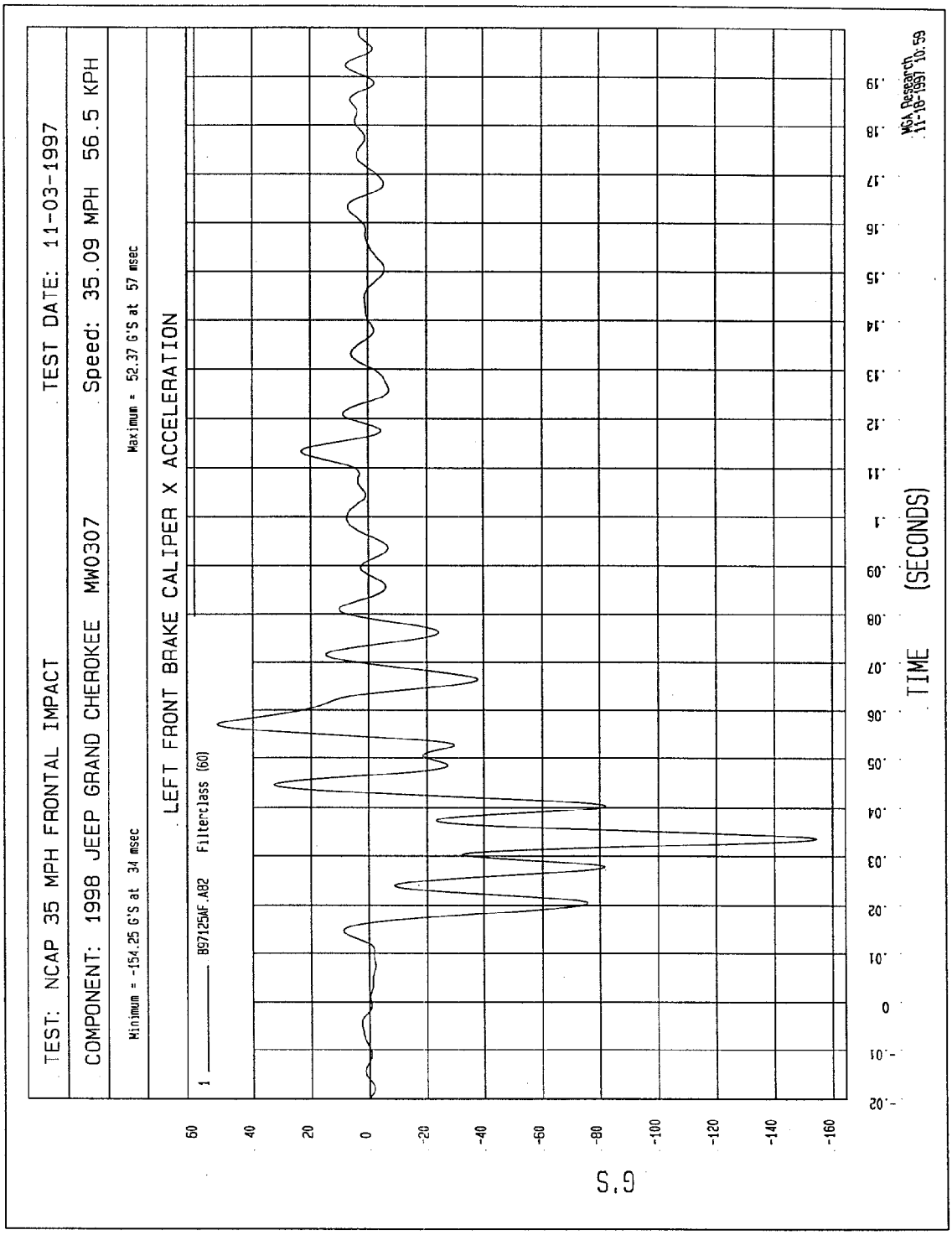

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -16.85 KPH at 35 msec
Maximum = 5567.08 KPH at 200 msec
TOP OF ENGINE BLOCK X VELOCITY
1 B97125AI.V08 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:58

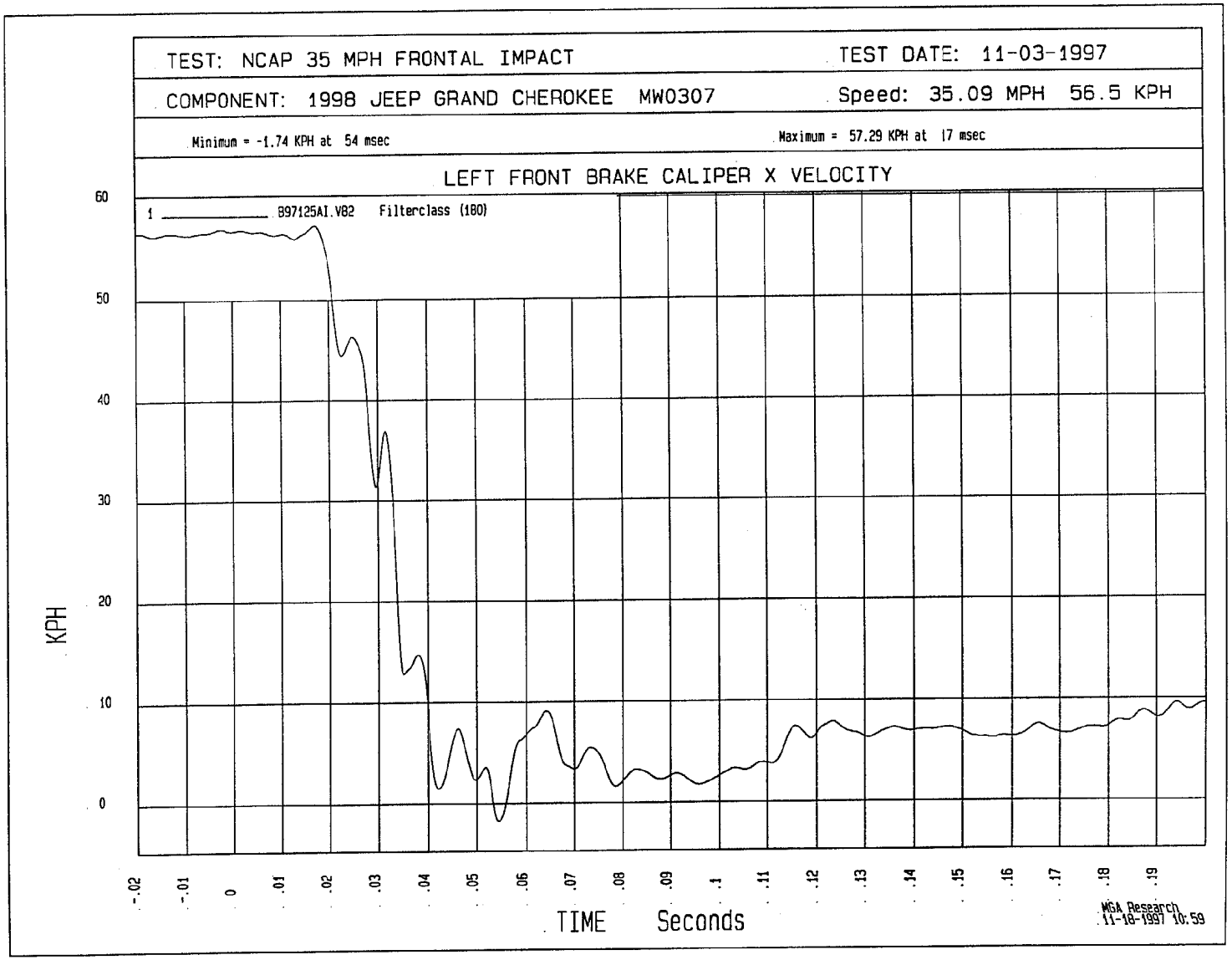

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 120943.2 MM at 200 msec
TOP OF ENGINE BLOCK X DISPLACEMENT
1 B97125AI.DO8 Filterclass (180)
MM
500
400
300
200
100
0
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:58

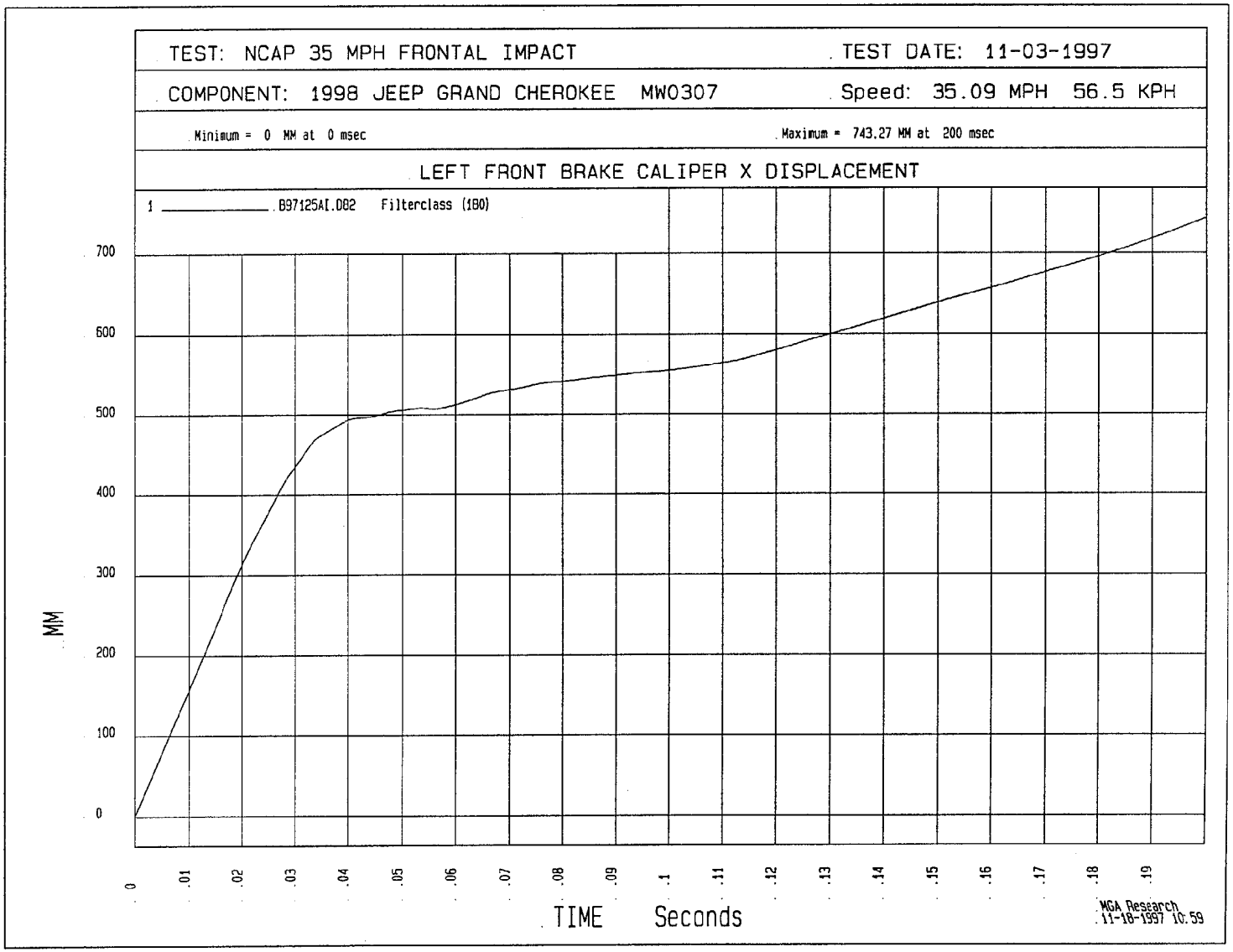

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -181.84 G'S at 32 msec
Maximum = 33.80 G'S at 39 msec
BOTTOM OF ENGINE X ACCELERATION
1 B97125AF.A09 Filterclass (60)
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
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
11-18-1997 10:21

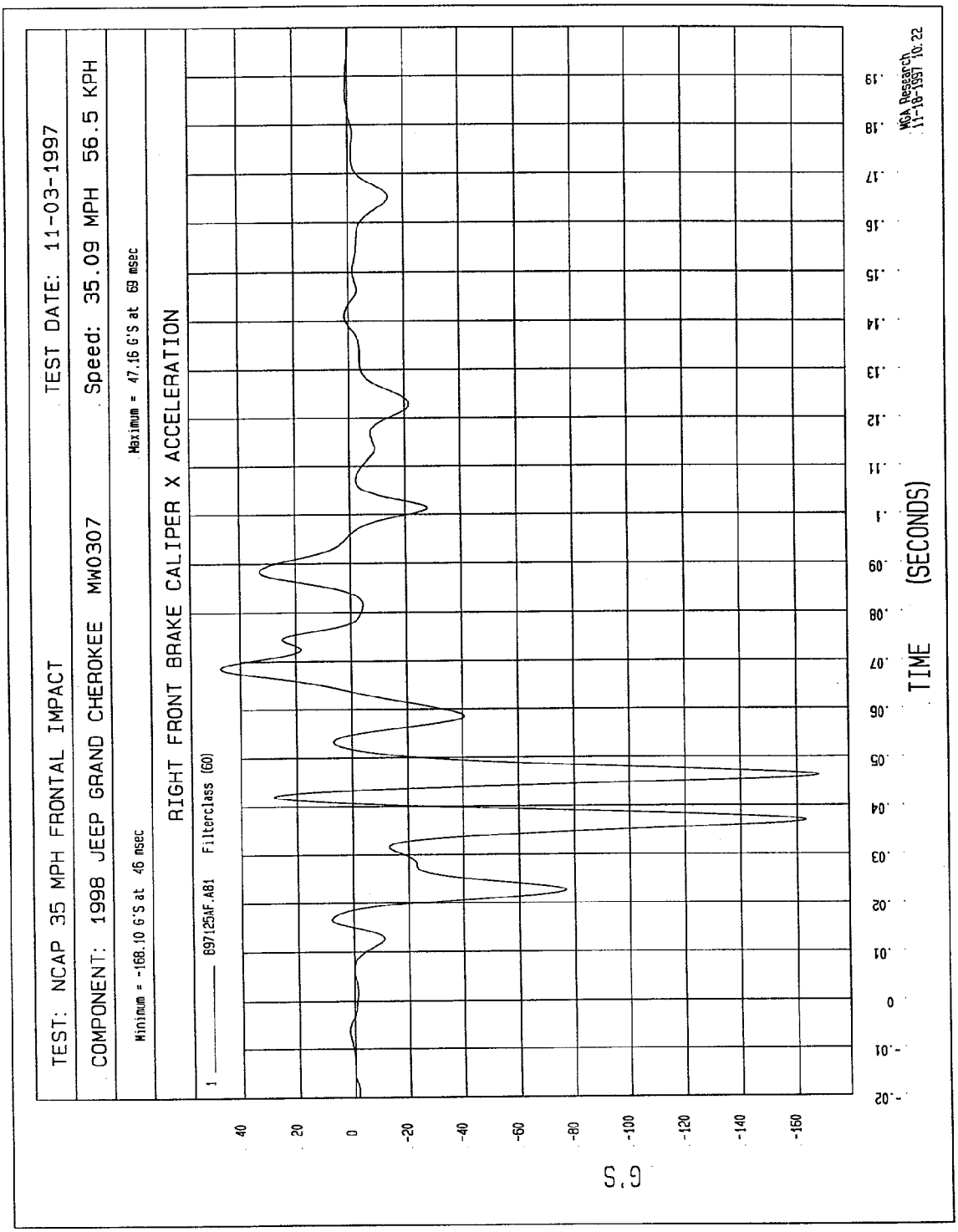

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -28.90 KPH at 200 msec
Maximum = 56.62 KPH at -1 msec
BOTTOM OF ENGINE X VELOCITY
1 B97125AI.V09 Filterclass (180)
KPH
TIME Seconds
MGA Research
11-18-1997 10:21

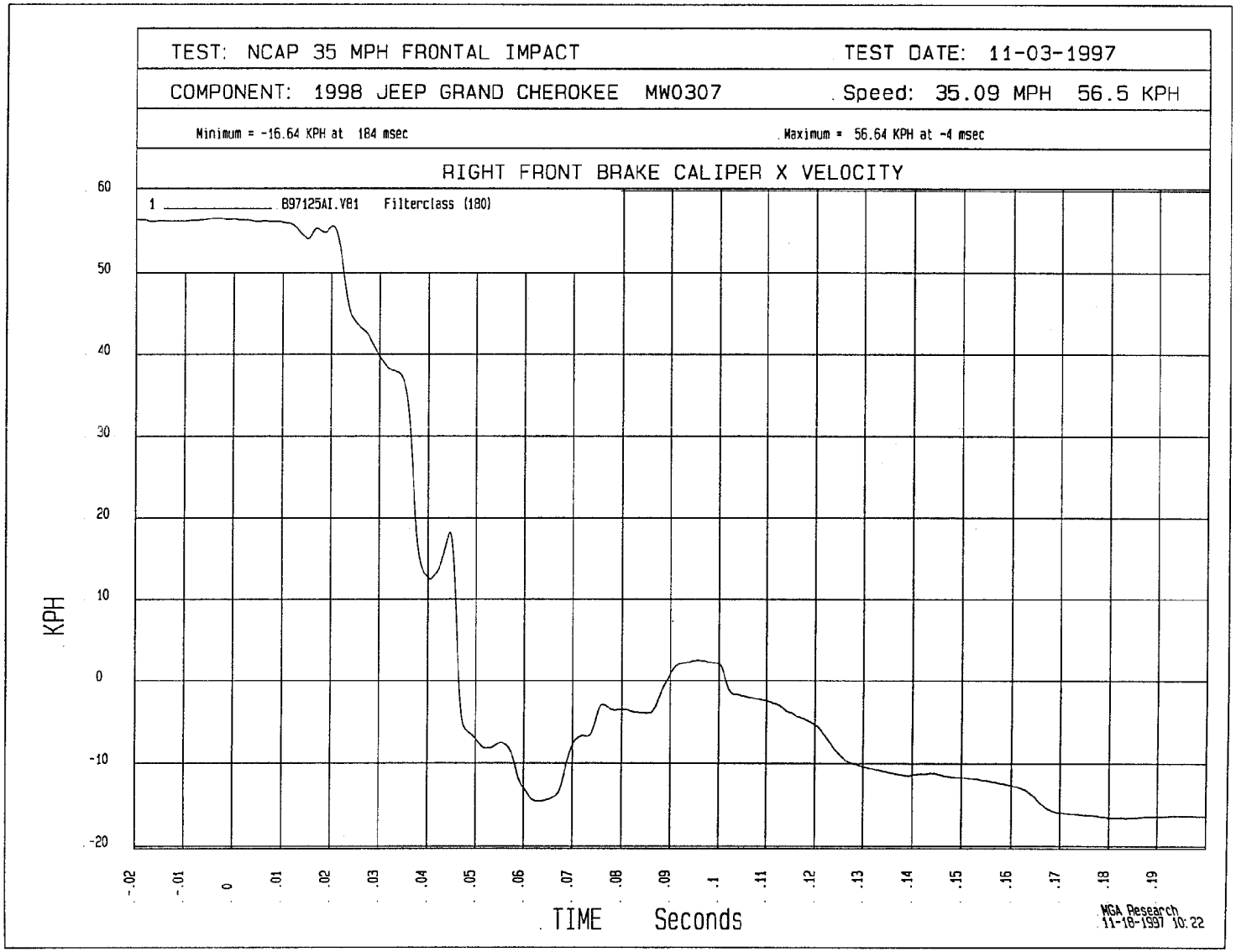

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -306.43 MM at 200 msec
Maximum = 444.35 MM at 34 msec
BOTTOM OF ENGINE X DISPLACEMENT
1 B97125AI.D09 Filterclass (180)
MM
500
400
300
200
100
0
0 .01 .02 .03 .04 .05 .06 .07 .08 .09 .1 .11 .12 .13 .14 .15 .16 .17 .18 .19
TIME Seconds
MGA Research
11-18-1997 10:58

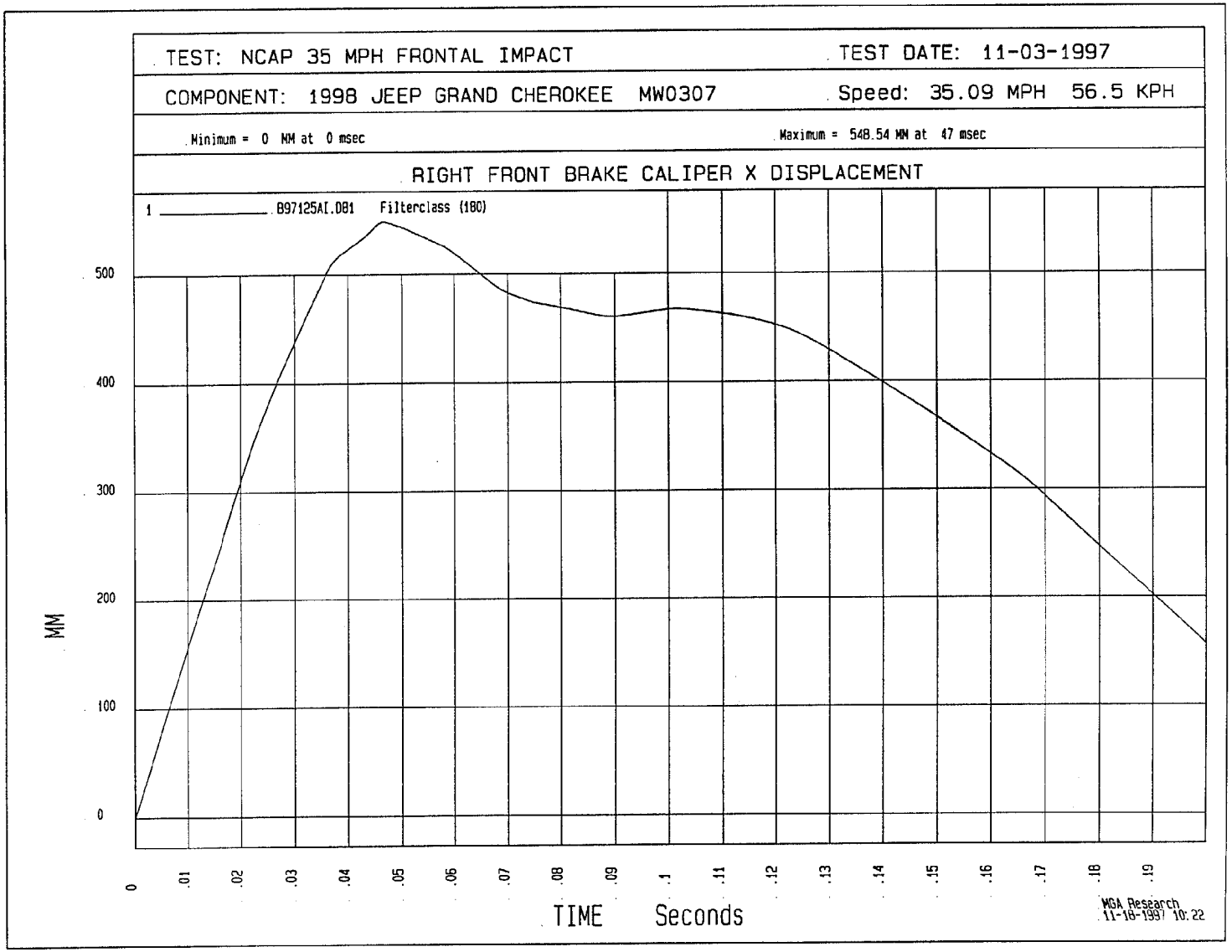

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -154.25 G'S at 34 msec
Maximum = 52.37 G'S at 57 msec
LEFT FRONT BRAKE CALIPER X ACCELERATION
1 B97125AF.A02 Filterclass (60)
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
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
11-18-1997 10:59

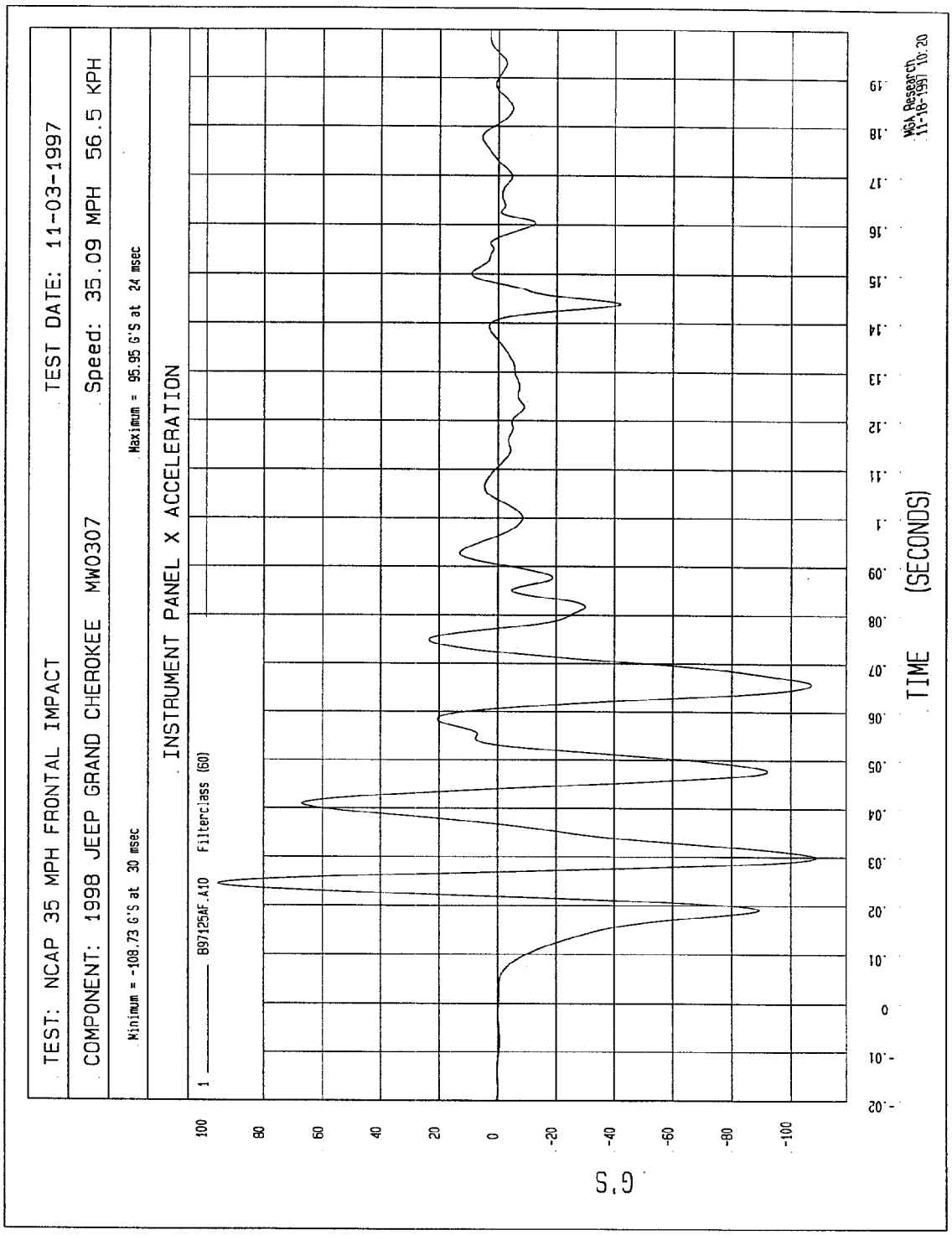

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -1.74 KPH at 54 msec
Maximum = 57.29 KPH at 17 msec
LEFT FRONT BRAKE CALIPER X VELOCITY
1 B97125AI.V82 Filterclass (180)
KPH
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:59

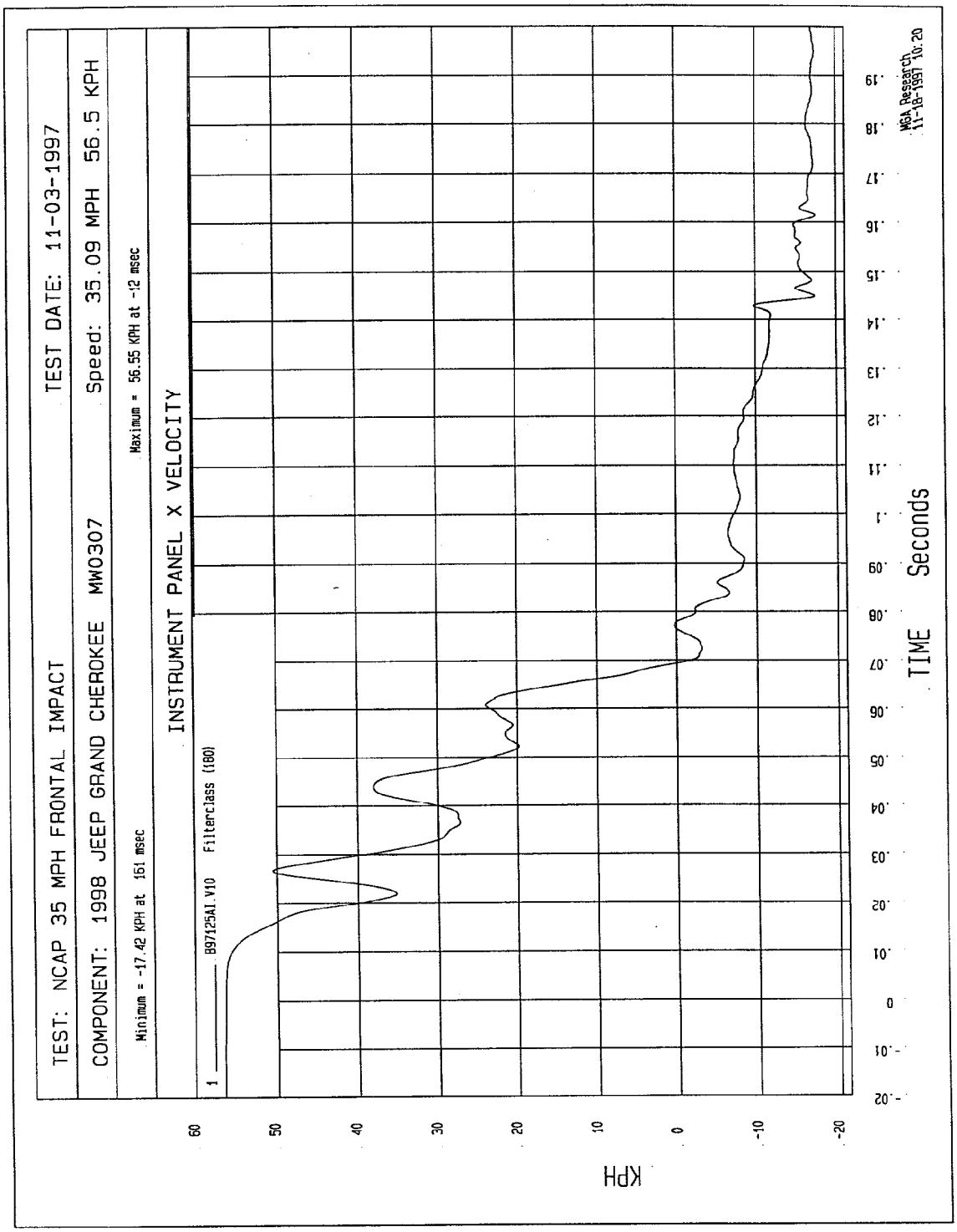

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 743.27 MM at 200 msec
LEFT FRONT BRAKE CALIPER X DISPLACEMENT
1 B97125AI.DB2 Filterclass (180)
MM
700
600
500
400
300
200
100
0
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:59

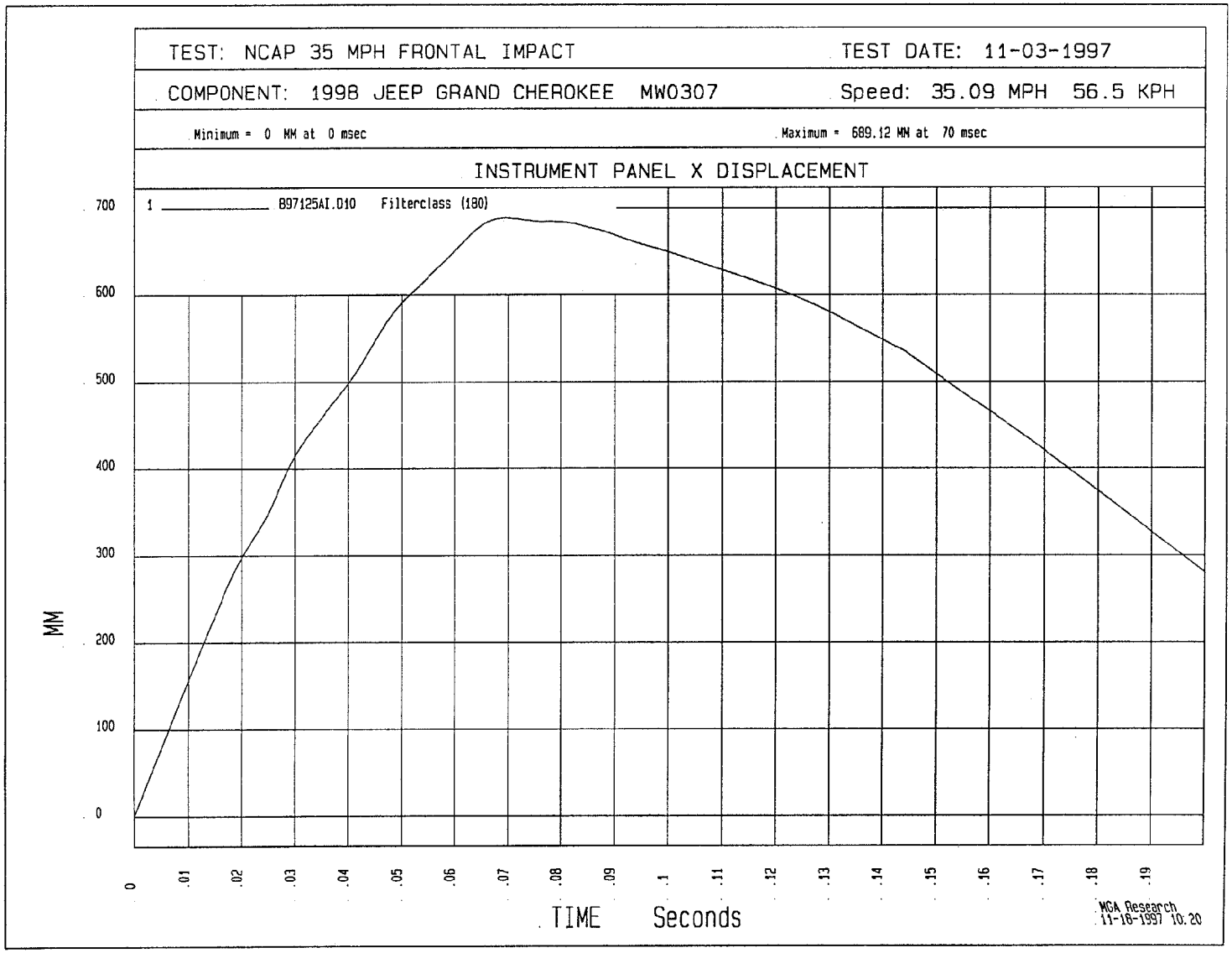

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -168.10 G'S at 46 msec
Maximum = 47.16 G'S at 69 msec
RIGHT FRONT BRAKE CALIPER X ACCELERATION
1 ——— 897125AF.A81 Filterclass (60)
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
GS
-.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
11-18-1997 10:22

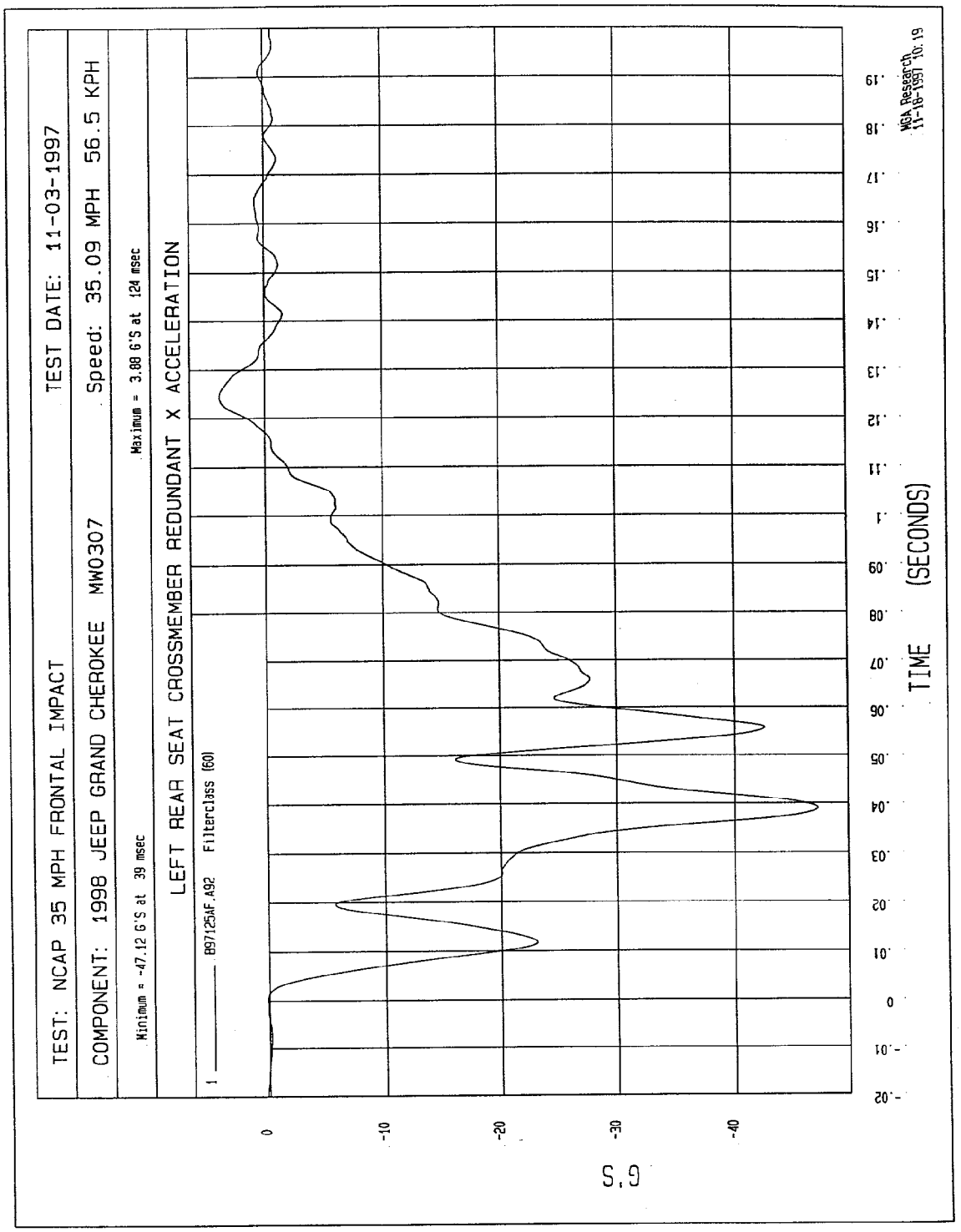

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -16.64 KPH at 184 msec
Maximum = 56.64 KPH at -4 msec
RIGHT FRONT BRAKE CALIPER X VELOCITY
1 B97125AI.V81 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:22

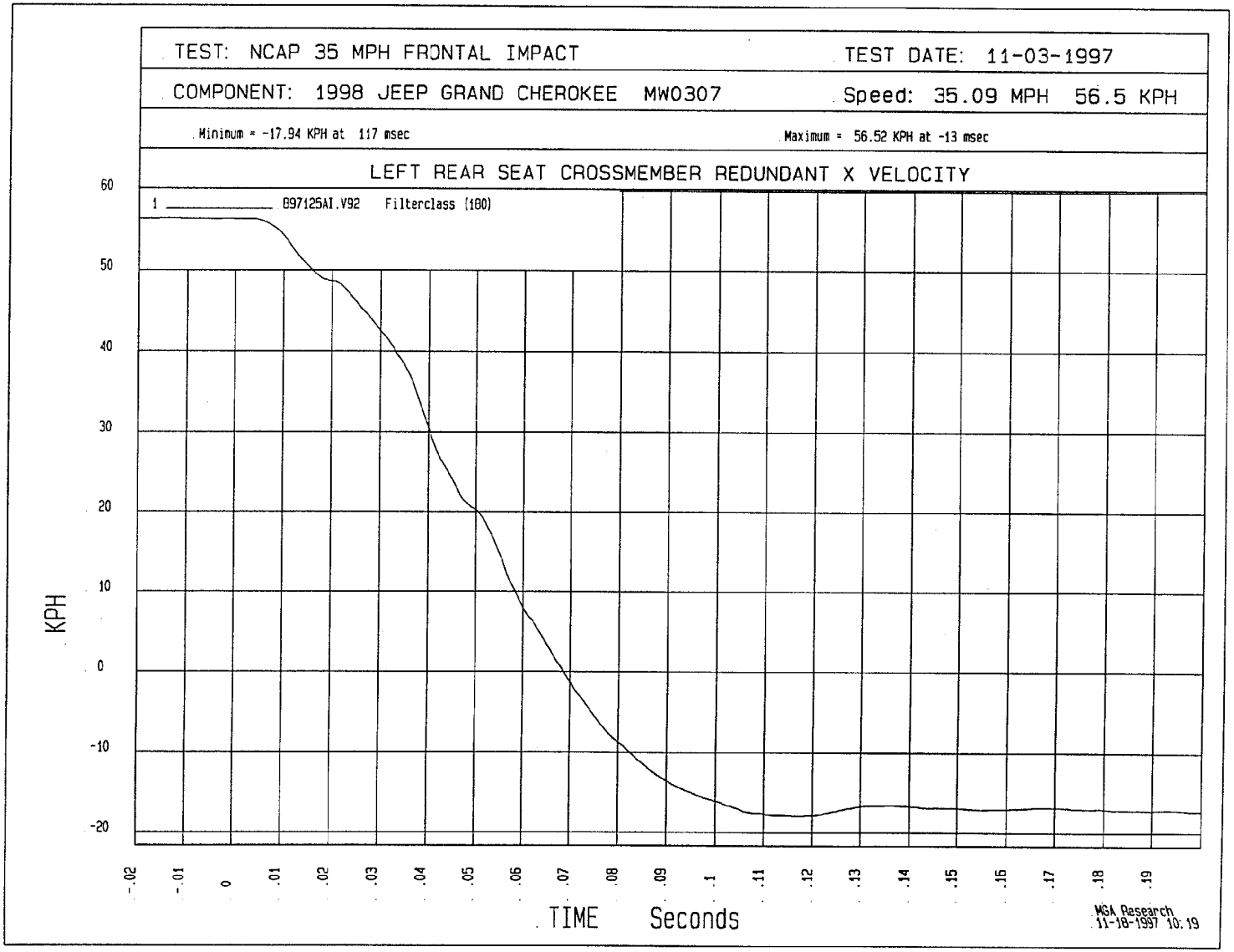

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 548.54 MM at 47 msec
RIGHT FRONT BRAKE CALIPER X DISPLACEMENT
1 B97125AI.001 Filterclass (180)
MM
500
400
300
200
100
0
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:22

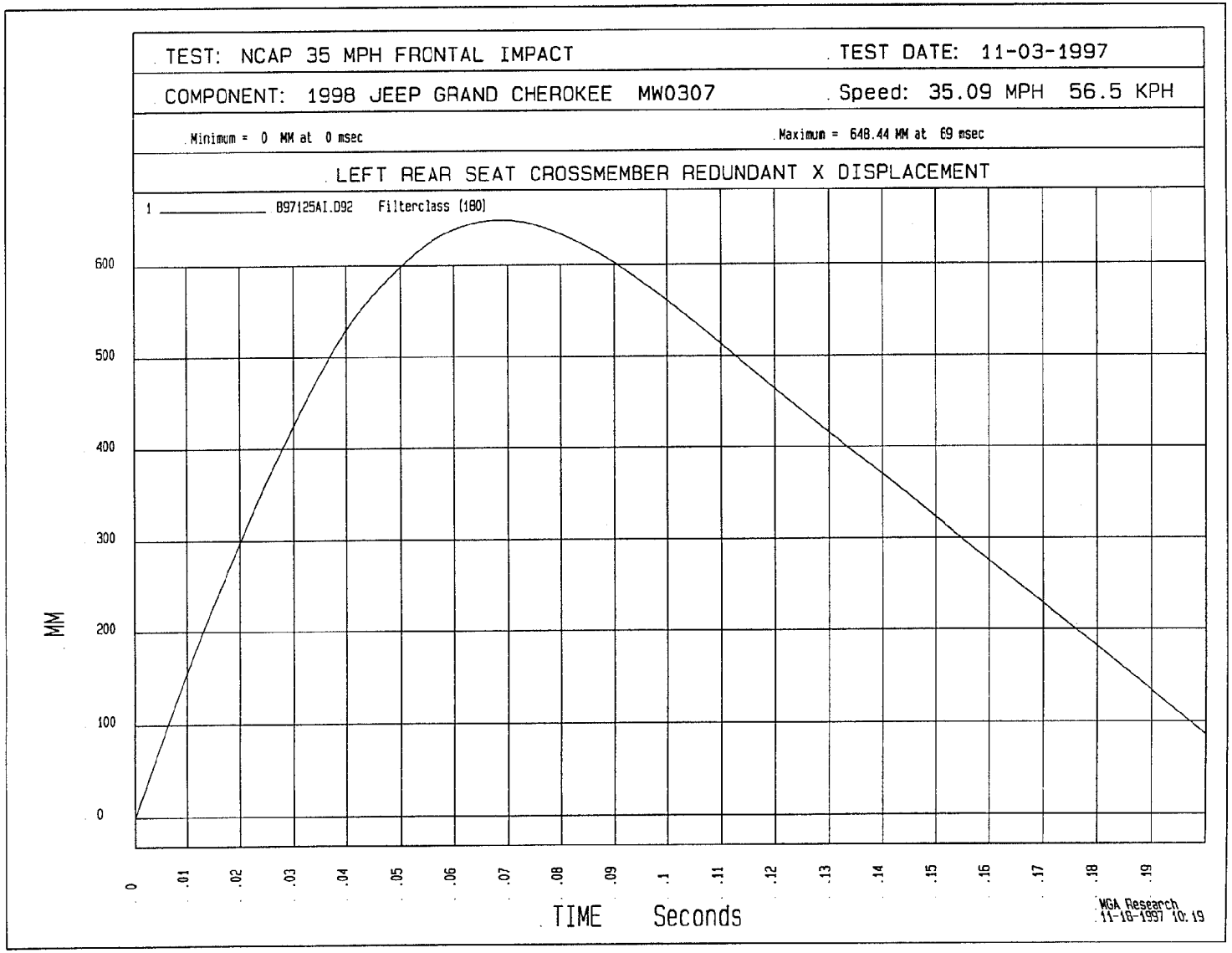

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -108.73 G'S at 30 msec
Maximum = 95.95 G'S at 24 msec
INSTRUMENT PANEL X ACCELERATION
1 B97125AF.A10 Filterclass (60)
100
80
60
40
20
0
-20
-40
-60
-80
-100
G's
TIME (SECONDS)
-02
-01
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
MGA Research
11-18-1997 10:20

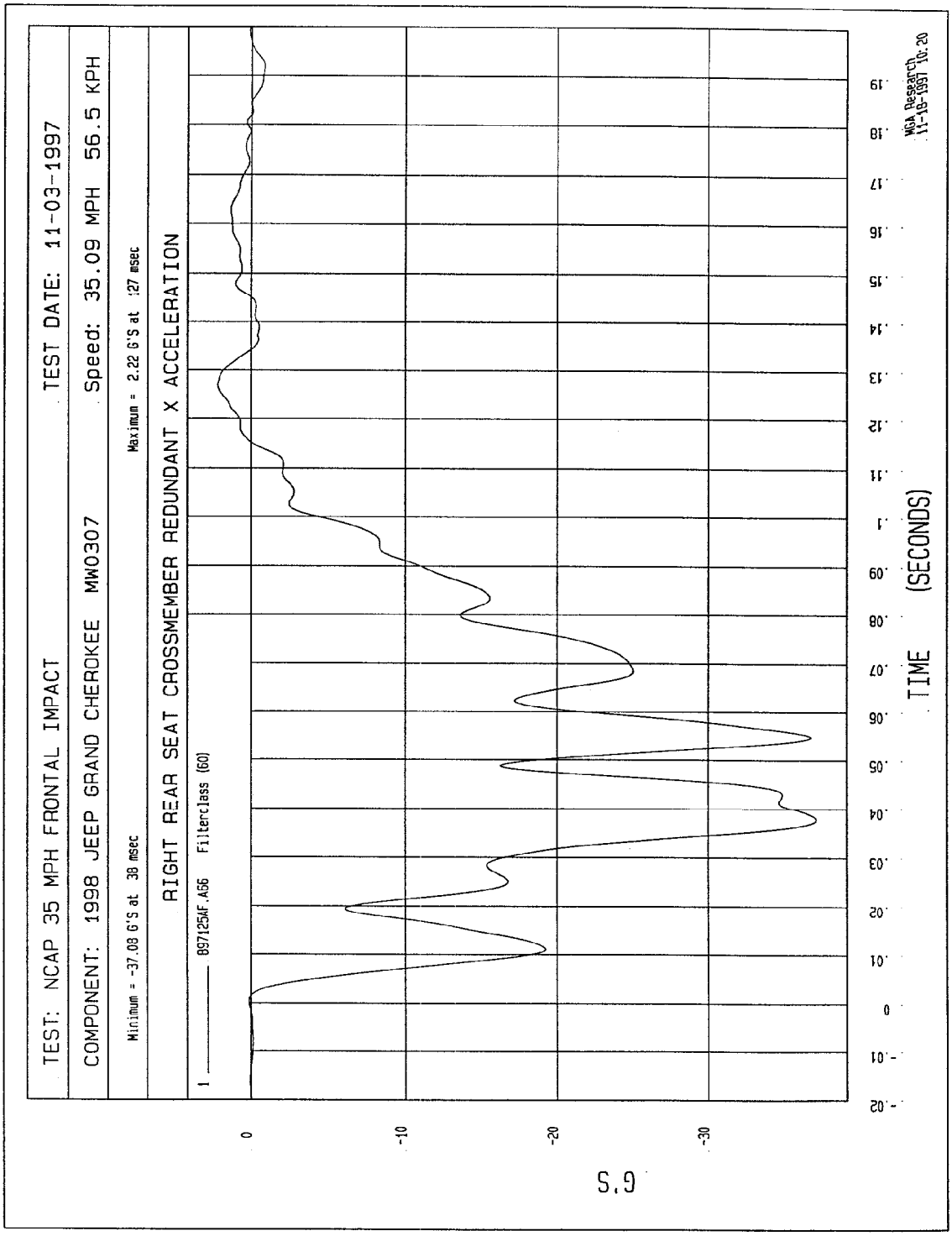

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -17.42 KPH at 161 msec
Maximum = 56.55 KPH at -12 msec
INSTRUMENT PANEL X VELOCITY
1 B97125AI.V10 Filterclass (180)
KPH
TIME Seconds
MGA Research
11-18-1997 10:20

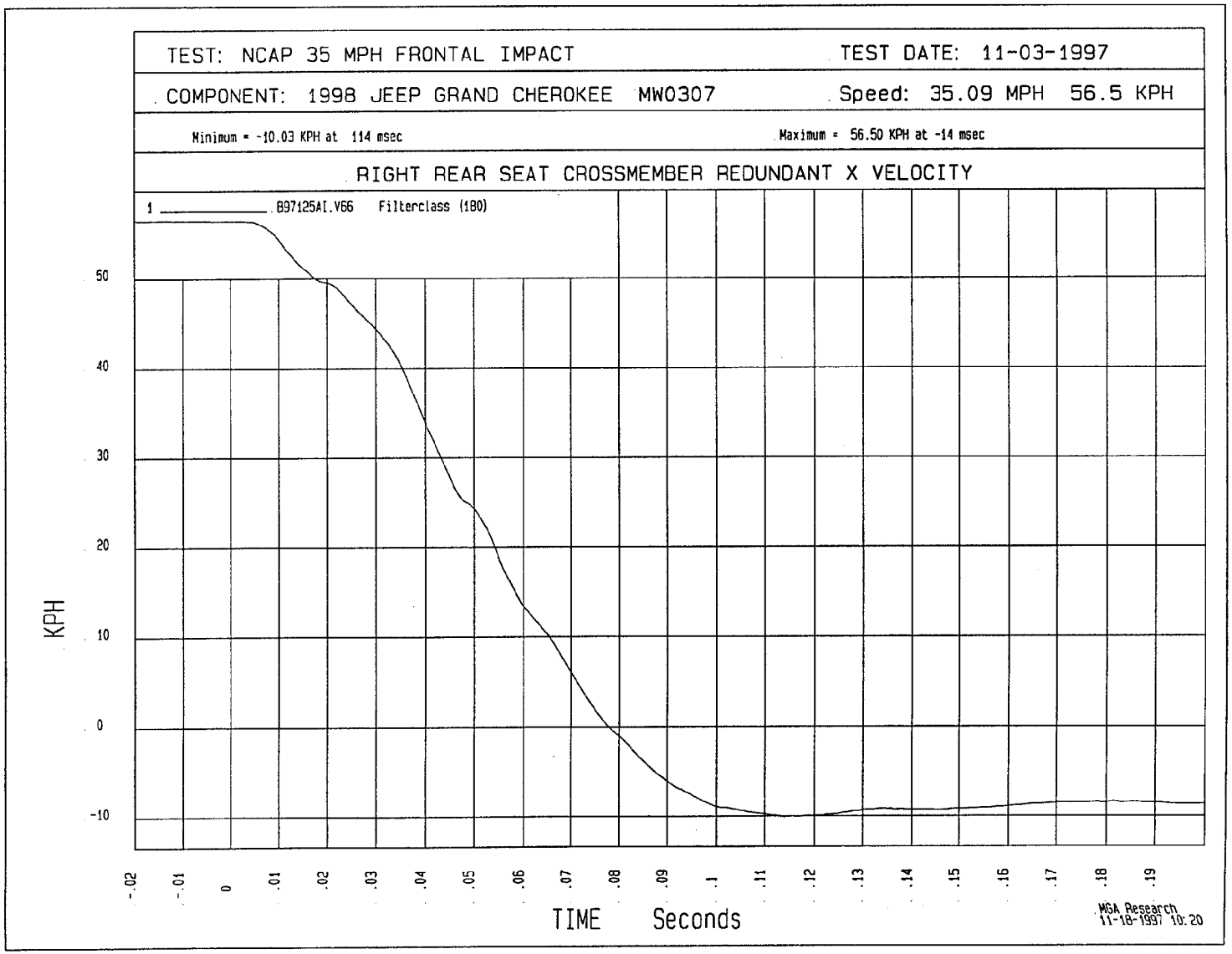

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 689.12 MM at 70 msec
INSTRUMENT PANEL X DISPLACEMENT
1 B97125AI.D10 Filterclass (180)
MM
700
600
500
400
300
200
100
0
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:20

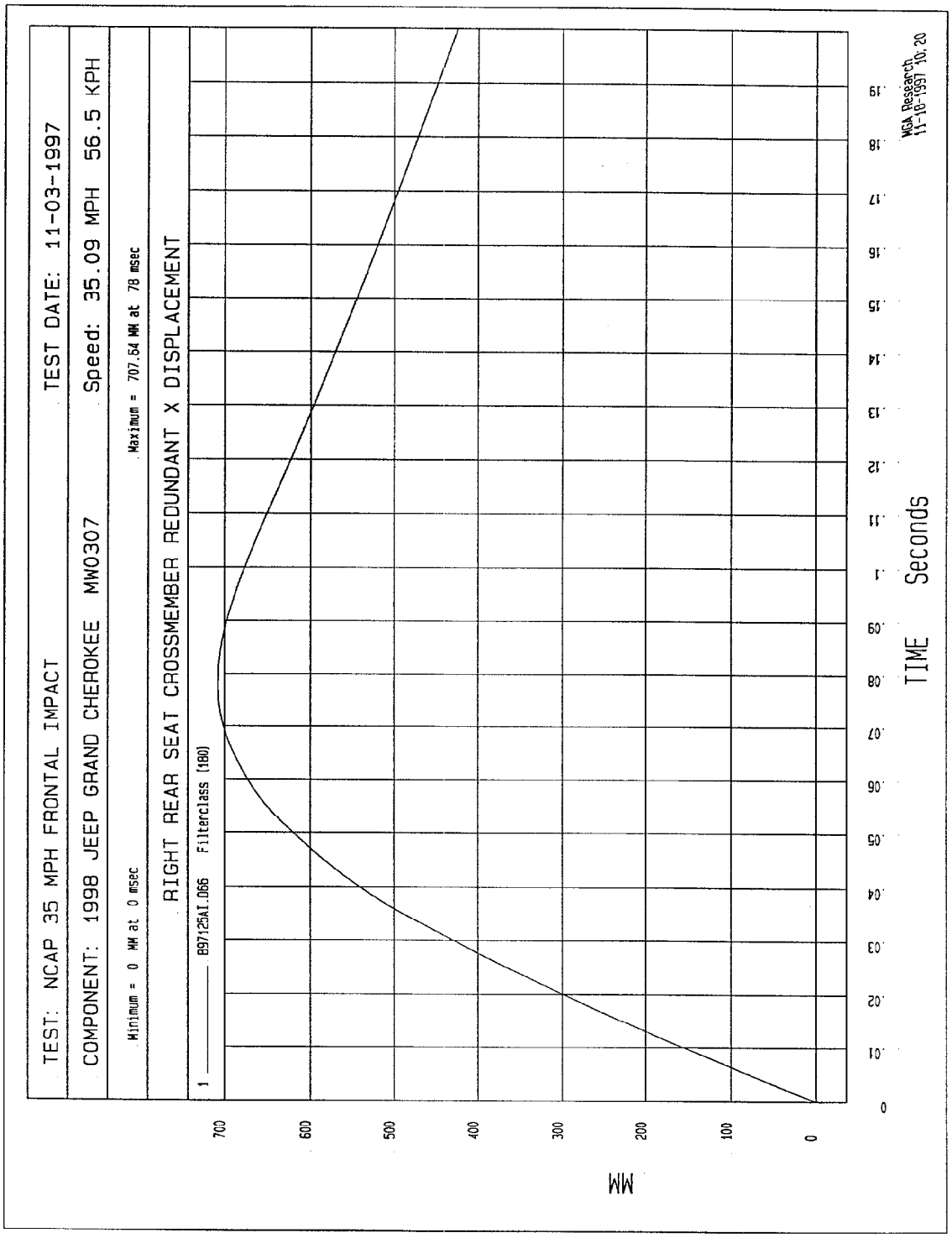

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -47.12 G'S at 39 msec
Maximum = 3.88 G'S at 124 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION
1 B97125AF.A92 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
11-18-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -17.94 KPH at 117 msec
Maximum = 56.52 KPH at -13 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY
1 B97125AI.V92 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-18-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 648.44 MM at 69 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT
1 B97125AI.D92 Filterclass (180)
MM
600
500
400
300
200
100
0
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-16-1997 10:19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -37.08 G'S at 38 msec
Maximum = 2.22 G'S at .127 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION
1 _____ 897125NF.A56 Filterclass (60)
0
-10
-20
-30
G'S
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
11-16-1997 10:20


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = -10.03 KPH at 114 msec
Maximum = 56.50 KPH at -14 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY
1 B97125AI.V66 Filterclass (180)
KPH
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
11-18-1997 10:20


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 11-03-1997
COMPONENT: 1998 JEEP GRAND CHEROKEE MW0307
Speed: 35.09 MPH 56.5 KPH
Minimum = 0 MM at 0 msec
Maximum = 707.54 MM at 78 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT
1 B97125AI.066 Filterclass (180)
MM
TIME Seconds
MGA Research
11-10-1997 10:20

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Tim Michnay

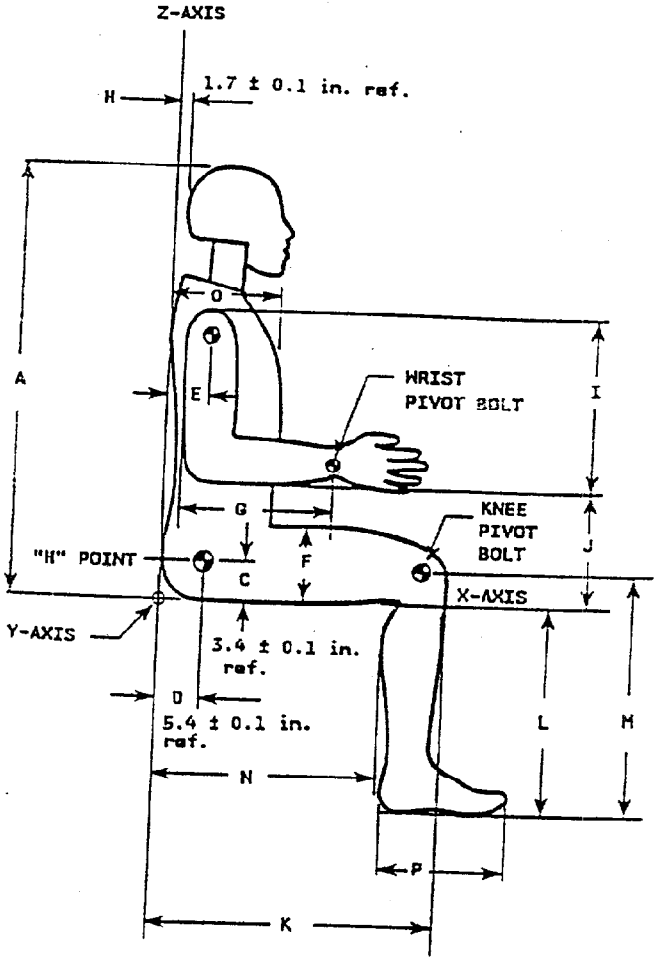
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: November 2, 1997

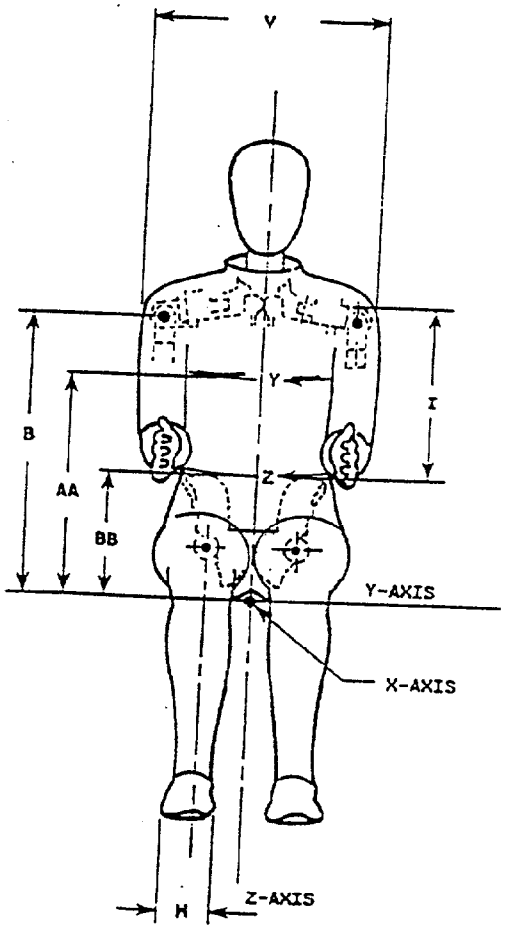
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



SIDE VIEW



FRONT VIEW

Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 066 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: November 2, 1997

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Peak Resultant Acceleration	225 - 275 G	260.5
Peak Lateral Acceleration	15 G. MAX	-6
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	26%
Pendulum Speed		22.6 - 23.4 FT/SEC	22.9
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.44
	20 MS	17.60 - 22.60 G	20.06
	30 MS	12.50 - 18.50 G	13.12
Max. Pendulum G Above 30 MS		29.0 G MAX	13.4
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	75
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	116
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	70
	TIME	47 - 58 MS	53
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	105

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	26%
Pendulum Speed		19.50 - 20.30 F/S	20.68
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.69
	20 MS	14.00 - 19.00 G	17.05
	30 MS	11.00 - 16.00 G	12.01
Max. Pendulum G Above 30 MS		22 G Max	13.0
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	41
D Plane Rotation	MAX	81 - 106 DEG.	101
	TIME	72 - 82 MS	73
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	155
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-51.4
	TIME	65 - 79 MS	70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	138

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	24%
Probe Speed	21.6 to 22.4 F/S	22.0
Peak Deflection	2.50 to 2.86 IN.	2.55
Peak Resistive Force	1160 to 1325 LBS.	1240
Internal Hysteresis	69 to 85%	71%

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1182

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1262

6.0 HIP JOINT-FEMUR FLEXION TEST

LEFT KNEE	SPECIFICATION	MEASUREMENT	
		LEFT	RIGHT
Relative Humidity	10 - 70%	27%	
Rotation Rate	5-10 DEG/SEC.	Yes	Yes
70 FT-LBF	30 DEGREE MAX. ROTATION	44	44
150 FT-LBF	40-50 DEGREE MAX. ROTATION	44	44

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Tim Michnay

I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: November 2, 1997

DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See page C-2 for external dimensions)

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 065 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: November 2, 1997

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Peak Resultant Acceleration	225 - 275 G	260
Peak Lateral Acceleration	15 G. MAX	-5
Is Acceleration Curve Unimodel	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	26%
Pendulum Speed		22.6 - 23.4 FT/SEC	22.9
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.5
	20 MS	17.60 - 22.60 G	21.03
	30 MS	12.50 - 18.50 G	15.16
Max. Pendulum G Above 30 MS		29.0 G MAX	15.1
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	37
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	115
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	71
	TIME	47 - 58 MS	50
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	104

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	26%
Pendulum Speed		19.50 - 20.30 F/S	20.04
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.38
	20 MS	14.00 - 19.00 G	17.23
	30 MS	11.00 - 16.00 G	12.74
Max. Pendulum G Above 30 MS		22 G Max	13.00
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	40
D Plane Rotation	MAX	81 - 106 DEG.	100
	TIME	72 - 82 MS	77
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	155
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-53
	TIME	65 - 79 MS	71
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	140

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	24%
Probe Speed	21.6 to 22.4 F/S	22.0
Peak Deflection	2.50 to 2.86 IN.	2.65
Peak Resistive Force	1160 to 1325 LBS.	1269
Internal Hysteresis	69 to 85%	70%

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1194

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1125

6.0 HIP JOINT-FEMUR FLEXION TEST

LEFT KNEE	SPECIFICATION	MEASUREMENT	
		LEFT	RIGHT
Relative Humidity	10 - 70%	27%	
Rotation Rate	5-10 DEG/SEC.	Yes	Yes
70 FT-LBF	30 DEGREE MAX. ROTATION	52	50
150 FT-LBF	40-50 DEGREE MAX. ROTATION	44	42

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	October 28, 1997
Head Y	ACCH1	Endevco	October 28, 1997
Head Z	AAMW5	Endevco	October 28, 1997
Head X Redundant	AJ9D2	Endevco	October 28, 1997
Head Y Redundant	AH1E2	Endevco	October 28, 1997
Head Z Redundant	AJ7K3	Endevco	October 28, 1997
Neck Load Cell X	443	Endevco	September 22, 1997
Neck Load Cell Y	443	Endevco	September 22, 1997
Neck Load Cell Z	443	Endevco	September 22, 1997
Neck Moment X	443	Endevco	September 22, 1997
Neck Moment Y	443	Endevco	September 22, 1997
Neck Moment Z	443	Endevco	September 22, 1997
Chest X	ACCY1	Denton	October 29, 1997
Chest Y	ACCC8	Denton	October 29, 1997
Chest Z	ACCT7	Endevco	October 29, 1997
Chest X Redundant	AJ9D4	Endevco	October 29, 1997
Chest Y Redundant	AJ9F3	Endevco	October 29, 1997
Chest Z Redundant	AJ9D9	Endevco	October 29, 1997
Chest Displacement	066	Servo	October 30, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Pelvis X	ALDY8	Denton	October 28, 1997
Pelvis Y	ALEK9	Denton	October 28, 1997
Pelvis Z	ALE80	Denton	October 28, 1997
Right Femur Load Cell	261	Denton	October 31, 1997
Left Femur Load Cell	262	Denton	October 31, 1997
Lap Belt Load Cell	212	GSE	June 12, 1997
Torso Belt Load Cell	657	GSE	June 12, 1997
Spool Out	2LPDZ	GSE	October 1, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	040	Denton	September 23, 1997
Upper Right Tibia Moment Y	040	Denton	September 23, 1997
Lower Right Tibia Moment Y	034	Denton	September 26, 1997
Lower Right Tibia Force X	034	Denton	September 26, 1997
Lower Right Tibia Force Z	034	Denton	September 26, 1997
Upper Left Tibia Moment X	023	Denton	September 23, 1997
Upper Left Tibia Moment Y	023	Denton	September 23, 1997
Lower Left Tibia Moment Y	019	Denton	September 26, 1997
Lower Left Tibia Force X	019	Denton	September 26, 1997
Lower Left Tibia Force Z	019	Denton	September 26, 1997
Right Foot Ball Z	J13628	Endevco	October 30, 1997
Right Foot Heel X	J14006	Endevco	October 30, 1997
Right Toe Z	J13652	Endevco	October 30, 1997
Left Foot Ball Z	J13424	Endevco	October 30, 1997
Left Foot Heel X	J14007	Endevco	October 30, 1997
Left Toe Z	J13650	Endevco	October 30, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	October 28, 1997
Head Y	ACC61	Endevco	October 28, 1997
Head Z	ACCW9	Endevco	October 28, 1997
Head X Redundant	AJ621	Endevco	October 28, 1997
Head Y Redundant	AJ619	Endevco	October 28, 1997
Head Z Redundant	AHY54	Endevco	October 28, 1997
Neck Load Cell X	442	Endevco	September 22, 1997
Neck Load Cell Y	442	Endevco	September 22, 1997
Neck Load Cell Z	442	Endevco	September 22, 1997
Neck Moment X	442	Endevco	September 22, 1997
Neck Moment Y	442	Endevco	September 22, 1997
Neck Moment Z	442	Endevco	September 22, 1997
Chest X	ACC78	Denton	October 29, 1997
Chest Y	ACCE6	Denton	October 29, 1997
Chest Z	ACCY3	Endevco	October 29, 1997
Chest X Redundant	AJ7A2	Endevco	October 29, 1997
Chest Y Redundant	AJ819	Endevco	October 29, 1997
Chest Z Redundant	AJ9J7	Endevco	October 29, 1997
Chest Displacement	065	Servo	October 30, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Pelvis X	ALB87	Denton	October 28, 1997
Pelvis Y	AHRP5	Denton	October 28, 1997
Pelvis Z	AJ9T6	Denton	October 28, 1997
Right Femur Load Cell	259	Denton	October 31, 1997
Left Femur Load Cell	260	Denton	October 31, 1997
Lap Belt Load Cell	211	GSE	June 12, 1997
Torso Belt Load Cell	624	GSE	June 12, 1997
Spool Out	1LPDX	GSE	October 1, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	036	Denton	September 23, 1997
Upper Right Tibia Moment Y	036	Denton	September 23, 1997
Lower Right Tibia Moment Y	040	Denton	September 26, 1997
Lower Right Tibia Force X	040	Denton	September 26, 1997
Lower Right Tibia Force Z	040	Denton	September 26, 1997
Upper Left Tibia Moment X	039	Denton	September 23, 1997
Upper Left Tibia Moment Y	039	Denton	September 23, 1997
Lower Left Tibia Moment Y	033	Denton	September 26, 1997
Lower Left Tibia Force X	033	Denton	September 26, 1997
Lower Left Tibia Force Z	033	Denton	September 26, 1997
Right Foot Ball Z	J10730	Endevco	October 28, 1997
Right Foot Heel X	J11014	Endevco	October 28, 1997
Right Toe Z	J11625	Endevco	October 28, 1997
Left Foot Ball Z	J11046	Endevco	October 28, 1997
Left Foot Heel X	J11047	Endevco	October 28, 1997
Left Toe Z	J11784	Endevco	October 28, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	L22-G05	Entran	August 5, 1997
Right Rear Seat Crossmember X	B14-R15	Entran	July 14, 1997
Top of Engine Block X	I25-J10	Entran	August 7, 1997
Bottom of Engine X	G08-B07	Entran	July 11, 1997
Left Brake Caliper X	I25-J1	Entran	July 7, 1997
Right Brake Caliper X	A09-G03	Entran	July 7, 1997
Instrument Panel X	F12-G04	Entran	July 14, 1997
Redundant Left Rear Seat Crossmember X	B14-Z05	Entran	August 1, 1997
Redundant Right Rear Seat Crossmember X	C06-G12	Entran	April 23, 1997

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	C12871	Endevco	October 27, 1997
Neck Bending Head Rotary Potentiometer	018	Spectrol	August 7, 1997
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	August 7, 1997
Chest Probe Accelerometer	J13780	Endevco	September 15, 1997
Knee Impact Accelerometer	J18530	Endevco	June 4, 1997

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

OCCUPANT RESTRAINTS

One of the most important safety features in your vehicle is the restraint system. This system includes the front and rear seat belts, and airbags for the driver and right front passenger. Your seat belts can also be used to hold infant and child restraint systems if you will be carrying children too small for adult-size belts.

Please pay careful attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

Seat Belt Warning Light

A warning chime and an indicator light will alert you to buckle the seat belts when you first start your vehicle.

WARNING!

In a collision, you and your passengers can suffer much greater injuries if you are not properly buckled up. You can strike parts of the inside of your vehicle or other passengers, or you can be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.

Buckle up even though you are an excellent driver, even on short trips. Someone on the road may be a poor driver and cause a collision which includes you. This can happen far away from home or on your own street.

Research has shown that seat belts save lives. And they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts provide protection against that, and they reduce the risk of injury caused by striking the inside of the vehicle. **Everyone** in a motor vehicle needs to be buckled up **all the time.**

Unibelts

The seats next to the front and rear doors of your vehicle are equipped with UNIBELTS.

Each unibelt is a combined lap/shoulder belt system. The belt webbing retractor will lock only during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under normal conditions. But in a collision, the belt will lock and reduce the risk of you striking the inside of the vehicle or being thrown out.

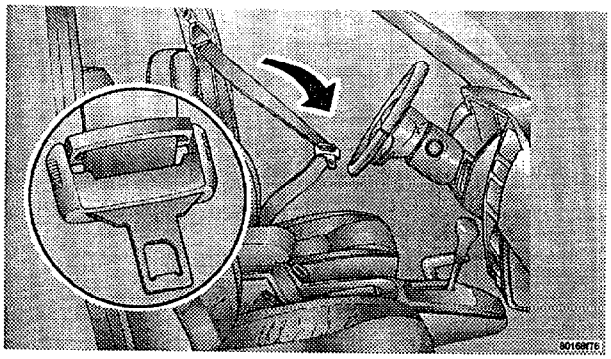
WARNING!

- **Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision the best. Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.**
- **Belting two people into one seat belt can lead to greater injury. People belted together can crash into one another in an accident, hurting one another badly. Never use a unibelt or a lap belt for more than one person, no matter what their size.**

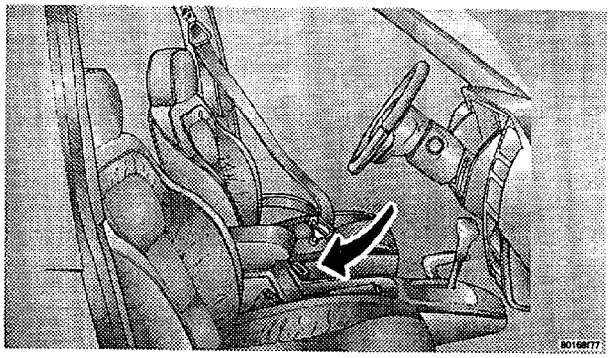
Unibelt Operating Instructions

1. Enter the vehicle and close the door. Sit back and adjust the seat.

2. The seat belt latch plate is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.



3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click".



WARNING!

A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.

A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.

A belt that is worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a collision, increasing head and neck injury. And a belt worn under the arm can cause internal injuries.

Wear the belt over your shoulder so that your strongest bones will take the force in a collision.

4. Position the lap belt across your thighs, below your abdomen. To remove slack in the lap portion, pull up a bit on the shoulder belt. To loosen the lap belt if it is too tight, tilt the latch plate and pull on the lap belt. A snug belt reduces the risk of sliding under the belt in a collision.

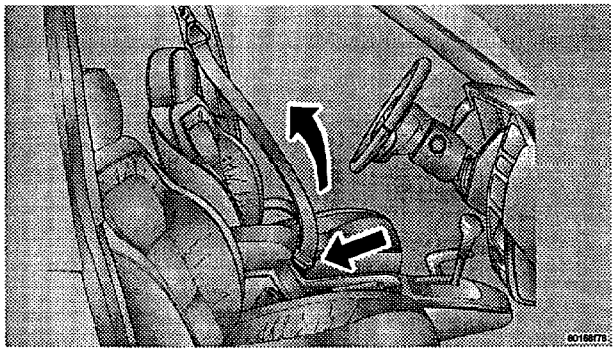
WARNING!

A lap belt worn too high can increase the risk of injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap part of your seat belt as low as possible and keep it snug.

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.

WARNING!

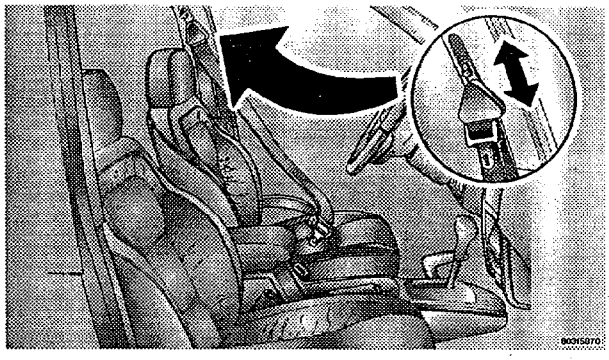
A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure the belt is straight. If you can't straighten a belt in your vehicle, take it to your dealer and have it fixed.



6. To release the belt, push the red button marked PRESS on the buckle. The belt will automatically retract to its stowed position. If necessary, slide the latch plate down the webbing to allow it to retract fully.

Adjustable Upper Shoulder Belt Anchorage

In the front seat and the outboard rear seating positions, the shoulder belt can be adjusted upward or downward to position the belt away from your neck. Push on the release lever to release the anchorage, and then move it up or down to the position that serves you best.



As a guide, if you are shorter than average, you will prefer a lower position, and if you are taller than average, you'll prefer a higher position. When you release the anchorage, try to move it up or down to make sure that it is locked in position.

Seat Belts and Pregnant Women

We recommend that pregnant women use seat belts throughout their pregnancy. Keeping the mother safe is the best way to keep the baby safe.

Pregnant women should wear the lap part of the belt across the thighs and as snug across the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

Rear Center Lap Belt

The rear center seating position has a lap belt only. To fasten a lap belt, slip the latch plate into the buckle.

To lengthen the lap belt, tilt the latch plate and pull. To remove slack, pull the loose end of the webbing. Wear the belt snug against the hips. Sit back and erect in the seat, then adjust the belt as tightly as is comfortable.

WARNING!

A lap belt worn too loose or too high is dangerous. A belt worn too loose can allow you to slip down and under the belt in a collision. A belt that is too high will apply crash forces to the abdomen, not to the stronger hip bones. In either case, the risk of internal injuries is greater. Wear a lap belt low and snug.

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after an accident if they have been damaged (bent retractor, torn webbing, etc.).

Seat Belt Extender

If a seat belt is too short, even when fully extended, your dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough. When it is not required, remove the extender and stow it.

WARNING!

Using a seat belt extender when not needed can increase the risk of injury in a collision. Only use when the lap belt is not long enough when it is worn low and snug, and in the recommended seating positions. Remove and stow when not needed.

Child Restraint

Everyone in your vehicle needs to be buckled up all the time, babies and children, too.

WARNING!

In a collision, an unrestrained child, even a tiny baby, can become a missile inside the vehicle. The force required to hold even an infant on your lap could become so great that you could not hold the child, no matter how strong you are. The child and others could be badly injured. Any child riding in your vehicle should be in a proper restraint for the child's size.

All states and Canadian provinces require small children to ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.

Infants and Small Children

There are different sizes and types of restraints for children from newborn size to the bigger child almost large enough for an adult safety belt. Use the restraint that is correct for your child.

Two different child restraint systems are generally available.

- The infant carrier for babies weighing up to 20 lbs. (9 kg.)
- The child seat for small children over 20 lbs.

In addition, some manufacturers make systems that can be used first as an infant carrier, and then converted to a child seat as the child grows.

Here are some tips on getting the most out of your child restraint:

- Before buying any restraint system, make sure that it has a label certifying that it meets Motor Vehicle Safety Standard 213. Chrysler also recommends that before you buy a child restraint, you try it in the vehicle seats where you will use it.
- The restraint must be appropriate for your child's weight and height. Check the label on the restraint for this too.
- If possible, install the restraint in the rear seat. According to accident statistics, children are safer when properly restrained in the rear seats than in the front.
- Carefully follow the instructions that come with the restraint. If you install the restraint improperly, it may not work when you need it.

WARNING!

- **A rearward facing infant restraint should only be used in a rear seat. A rearward facing infant restraint in the front seat may be struck by a deploying passenger airbag which may cause severe or fatal injury to the infant.**
- **Improper installation can lead to failure of an infant or child restraint. It could come loose in a collision. The child could be badly injured or killed. Follow the manufacturer's directions exactly when installing an infant or child restraint.**

- Infant and child restraints are secured in the vehicle seats by the lap belt or the lap part of the lap/shoulder belt. In the rear seats, you may have trouble tightening the belt on the child restraint because the buckle or latch plate interferes with the belt path opening on the restraint. Disconnect the latch plate from the buckle and twist the short buckle-end belt several turns to shorten it. Reassemble the latch plate to the buckle with the release button facing out.

In the front seat, move the seat forward to reposition the buckle against the side of the child restraint.

In the center rear seat if the belt can't be tightened, or if by pulling and pushing on the restraint loosens the belt, you may need to do something more. Disconnect the latch plate from the buckle, turn it over, and reconnect it to the buckle. If you still can't make the child restraint secure, try a different seating position.

- Some child seat manufacturers recommend the use of a top anchorage (tether) strap in addition to the lap belt. Your vehicle has tether strap anchorages behind the rear seating positions for use with these child seats. Your dealer can provide you with anchorage hardware and installation instructions.

WARNING!

An incorrectly anchored tether strap could lead to seat failure and injury to the child. In a collision, the seat could come loose and allow the child to crash into the inside of the vehicle or other passengers, or even be thrown from the vehicle. Use only the specified anchor positions to secure a child restraint requiring top tether strap(s).

- Buckle the child into the seat exactly as the seat manufacturer's directions tell you. The cinching latch plate will keep the belt tight.
- When your infant carrier or child seat is not in use, secure it with the seat belt or remove it from the vehicle. Don't leave it loose in the vehicle. In a sudden stop or collision, it could strike occupants and injure them.

Children Too Large For Child Seats

Children who are too large for child seats and who can sit upright by themselves should use the available lap/shoulder belts for best protection.

- Make sure that the child is seated upright in the seat.
- The lap belt should be fastened low on the hips and as snug as possible.
- Check belt fit periodically. A child's squirming or slouching can move the belt out of position.

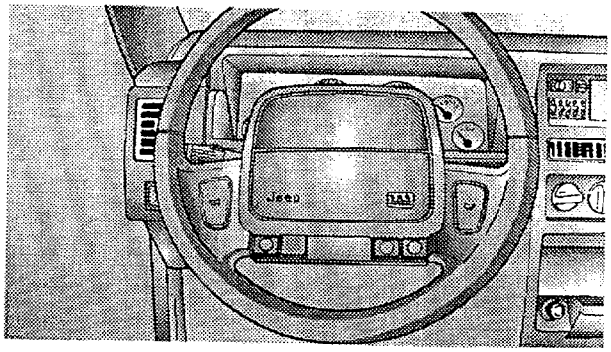
If the shoulder belt contacts the face or neck, move the child closer to the middle of the vehicle. If this doesn't solve the problem, move the child to the center rear seating position and use the lap belt.

Booster seats that may help overcome this problem are also available for use with lap/shoulder belts. Before buying a booster seat, make sure that it has a label certifying that it meets applicable Motor Vehicle Safety Standards. Make sure it is satisfactory for use in this vehicle.

Driver And Right Front Passenger Supplemental Restraint System (SRS) — AIRBAG

This airbag is certified to the new Federal regulations that allow less forceful airbags.

This vehicle has airbags for the driver and right front passenger as a supplement to the seat belt restraint system. The driver's airbag is mounted in the steering wheel. The passenger side airbag is mounted in the instrument panel, above the glove compartment. These airbags inflate in higher speed impacts. They work with the instrument panel knee bolsters and the seat belts to provide improved protection for the driver and right front passenger.



WARNING!

- **Relying on the airbags alone could lead to more severe injuries. Wear your seat belt even though you have an airbag.**
- **Being too close to the steering wheel or instrument panel during airbag deployment could cause serious injury. Airbags need room to inflate. Sit back, comfortably extending your arms to reach the steering wheel or instrument panel.**

The seat belt is designed to protect you in many types of collisions. The airbag deploys only in frontal collisions. And it will not deploy in collisions at slow speed. But even in collisions where the airbag does work, you need the seat belt to keep you in the right position for the airbag to protect you properly.

WARNING!

Ignoring the AIRBAG light in your instrument panel could mean you won't have the airbag to protect you in a collision. If the light does not come on for 6 to 8 seconds after the ignition is turned on, stays on after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

Here are four simple steps you can take to minimize the risk of harm from a deploying airbag.

1. Infants in a rear facing child safety seats designed for children up to one year or 20 pounds (9 kg) should NEVER ride in the front seat of a vehicle with a passenger side airbag unless the Airbag Switch is turned OFF. See the paragraph on Passenger Side Airbag Shut Off Switch.

Children up to 60 pounds (27 kg) should be secured in child seats or booster seats. Older children who do not use child safety seats or booster seats should ride properly buckled up.

Never allow children to slide the shoulder belt behind them or under the arm.

2. All occupants should wear their lap and shoulder belts properly.

3. The driver and front seat passenger seats should be moved as far back as practical to allow the airbags room to inflate.

4. You should read the instructions provided with your child safety seat or booster seat to make sure that you are using it properly.

The airbag system consists of the following:

- Airbag Control Module (ACM)
- AIRBAG Light
- Airbag/Inflator Unit
- Unique Steering Wheel and Column
- Interconnecting Wiring
- Knee Impact Bolster

How The Airbag System Works

- The **Airbag Control Module (ACM)** will not detect side, rollover, or rear impacts.
- The ACM monitors the readiness of the electronic parts of the system whenever the ignition switch is in the START or ON position. These include all of the items listed above except the steering wheel and column and the knee bolsters. It also software to determine if a frontal impact is severe enough to require the airbag.

  The ACM also turns on the AIRBAG light in the instrument panel for 6 to 8 seconds when the ignition is first turned on, then turns the light off. If it detects a malfunction in any part of the system, it turns on the light either momentarily or continuously. If the instrument cluster detects an airbag lamp failure it turns on the seat belt light either momentarily or continuously.
- The **Airbag/Inflator Units** are located in the center of the steering wheel for the driver and in the upper right side of the instrument panel for the front seat passenger. When the ACM detects an impact requiring the airbags, it signals the inflator units. A large quantity of

non-toxic nitrogen and/or argon gas is generated to inflate the airbag. The steering wheel hub trim cover and the upper right side of the instrument panel separate and fold out of the way as the bags inflate to their full size. The bags fully inflate in about 50–70 milliseconds. This is about half of the time it takes to blink your eyes. The bags then quickly deflate by venting the gas through holes and/or pores in the airbag fabric toward the instrument panel. In this way the bags do not interfere with your control of the vehicle.

If A Deployment Occurs

The airbag system is designed to deploy the airbags when the impact sensors detect a moderate-to-severe frontal collision, and then immediately deflate.

NOTE: A frontal collision that is not severe enough to need airbag protection will not activate the system. This does not mean something is wrong with the airbag system.

If you do have a collision which deploys the airbags, any or all of the following may occur:

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the occupants as the airbag deploys and unfolds itself from the steering wheel and the upper right side of the instrument panel.

  The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.

- As the airbags deflate you may see some smoke-like particles. The particles are a normal by-product of the process that generates the non-toxic gas used for airbag inflation. These airborne particles may irritate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose or throat irritation, move to fresh air. If the irritation continues, see your doctor.

  If these particles settle on your clothing, follow the garment manufacturer's instructions for cleaning.

- Your vehicle may be driveable after the airbags deploy. If so, you can tuck the deployed driver side airbag inside the opening in the steering wheel hub trim cover to make driving somewhat easier. You may tuck the passenger side airbag under the trim cover in the right side of the instrument panel.

WARNING!

Deployed airbags can't protect you in another collision. Have the airbags replaced by an authorized dealer as soon as possible.

Maintaining Your Airbag System

WARNING!

- **Modifications to any part of the airbag system could cause it to fail when you need it. You could be injured if the airbag system is not there to protect you. Do not modify the components or wiring, including adding any kind of badges or stickers to the steering wheel hub trim cover or the upper right side of the instrument panel. Do not modify the front bumper or vehicle body structure.**
- **You need proper knee impact protection in a collision. Do not mount or locate any aftermarket equipment on or behind the knee bolsters.**
- **It is dangerous to try to repair any part of the airbag system yourself. Don't try to repair the airbag system. Be sure to tell anyone who works on your vehicle that it has an airbag system.**

Airbag Light

You will want to have the airbag system ready to inflate for your protection in an impact. The airbag system is designed to be maintenance free. If any of the following occurs, have an authorized dealer service the system promptly:

- The AIRBAG light does not come on or flickers during the 6 to 8 seconds when the ignition switch is first turned on.
- The light remains on or flickers after the 6 to 8 second interval.
- The light flickers or comes on and remains on while driving.
- The seat belt light remains on or flickers after the 6 to 8 second interval after the vehicle has been started or comes on while driving. The seat belt light is used in place of the airbag light when there is an airbag lamp malfunction.

NEW VEHICLE BREAK-IN RECOMMENDATIONS

Your new Jeep engine is ready for the road. To provide the longest engine life, follow these guidelines for the first few hundred miles (or kilometers).

- Check the fluid and engine oil levels regularly and be alert for indications of overheating in any component of the vehicle. Engines tend to use more fuel and oil until they are broken in, so don't expect top economy for the first 1,200 miles (1 900 km).
- After starting a cold engine, let it warm up for 15 seconds or so before shifting into gear.
- Drive at varying speeds below 50 mph (80 km/h) for first 100 miles (160 km) and below 55 mph (88 km/h) for first 500 miles (800 km). Avoid driving at full throttle or top speeds, steady speeds, or excessive idling during this period. Avoid fast starts and quick stops.
- A break-in oil is not used. The original engine oil is the same type specified for regular oil changes. There is no need to have it changed or the oil filter replaced until the first scheduled maintenance interval except in heavy-duty operation. Don't add anti-friction compounds or special break-in oils during the first few thousand miles (or kilometers) of operation, since these additives might interfere with proper piston ring seating.

NOTE: Maintaining proper fluid levels is particularly important during the break-in period. Refer to the **Service and Maintenance** section for checking fluid levels.

CHECKING YOUR VEHICLE FOR SAFETY

Exhaust Gas

WARNING!

Exhaust gases can injure or kill. They contain carbon monoxide (CO) which is colorless and odorless. Breathing it can make you unconscious and can eventually poison you. To avoid breathing (CO) follow the safety tips below.

- Do not run the engine in a closed garage or in confined areas any longer than needed to move your vehicle in or out of the area.
- If it is necessary to sit in a parked vehicle with the engine running, adjust your heating or cooling controls to force outside air into the vehicle. Set the blower at high speed.
- Do not inhale exhaust gases. They contain carbon monoxide, a colorless and odorless gas which can kill. Never run the engine in a closed area, such as a garage, and never sit in a parked vehicle with the

engine running for an extended period. If the vehicle is stopped in an open area with the engine running for more than a short period, adjust the ventilation system to force fresh, outside air into the vehicle.

- Guard against carbon monoxide with proper maintenance. Have the exhaust system inspected every time the vehicle is raised. Have any abnormal conditions repaired promptly. Until repaired, drive with all side windows fully open.
- Keep the liftgate closed when driving your vehicle to prevent carbon monoxide and other poisonous exhaust gases from entering the vehicle.

WARNING!

If you are required to drive with the liftgate open, make sure that all windows are closed, and the climate control blower switch is set at high speed. Do NOT use the recirculation mode.

Safety Checks You Should Make Inside the Vehicle

Seat Belts

Inspect the belt system periodically, checking for cuts, frays and loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system.

Seat belt assemblies must be replaced after an accident if they have been damaged (bent retractor, torn webbing, etc.). If there is any question regarding belt or retractor condition, replace the belt.

Defrosters

Check operation by selecting the defrost mode and place the blower control on high speed. You should feel the air directed against the windshield.

Safety Checks You Should Make Outside the Vehicle

Tires

Examine tires for excessive tread wear or uneven wear patterns. Check for stones, nails, glass, or other objects lodged in the tread. Inspect for tread cuts or side wall cracks. Check wheel nuts for tightness and tires (including spare) for proper pressure.

Lights

Have someone observe the operation of all exterior lights while you work the controls. Check turn signal and high beam indicator lights on the instrument panel.

Fluid Leaks

Check area under vehicle after overnight parking for fuel, water, oil or other fluid leaks. Also, if gasoline fumes are detected, the cause should be located and corrected immediately.