V2683

REPORT NUMBER: CAL-98-02

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

CHRYSLER CORPORATION
1998 DODGE CARAVAN
MPV

NHTSA NUMBER: MW0302

CALSPAN TEST NUMBER: 8413-1

CALSPAN SRL CORPORATION
TRANSPORTATION SCIENCE CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225

October 2, 1997

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
Mail Code: NPS-10
400 Seventh Street, SW, Room No. 5313
Washington, DC 20590

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: _____

Patrick G. MacDiarmid, Jr., Project Engineer

Approved by: _____

David J. Travale, Program Manager
Transportation Research/
Physical Sciences Department

Approval Date: October 8, 1991

FINAL REPORT ACCEPTANCE BY OCS:

_____

Manager, New Car Assessment Program (NCAP)
NHTSA, Office of Crashworthiness Standards

_____

Date of Report Acceptance

_____

COTR, New Car Assessment Program (NCAP)
NHTSA, Office of Crashworthiness Standards

_____

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. *Report No.* CAL-98-02	2. *Government Accession No.*	3. *Recipient's Catalog No.*
4. *Title and Subtitle* Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Testing of a 1998 Dodge Caravan MPV NHTSA No. MW0302		5. *Report Date* October 2, 1997 6. *Performing Organization Code* CAL
7. *Author(s)* David J. Travale, Program Manager Patrick G. MacDiarmid, Jr., Project Engineer		8. *Performing Organization Report No.* 8413-1
9. *Performing Organization Name and Address* Calspan SRL Corporation 4455 Genesee Street Buffalo, New York 14225		10. *Work Unit No.* 11. *Contract or Grant No.* DTNH22-96-D-02010
12. *Sponsoring Agency Name and Address* U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworithness Standards Mail Code: NPS-10 400 Seventh , SW, Room 5313 Washington, D.C. 20590		13. *Type of Report and Period Covered* Final Report October 1997 14. *Sponsoring Agency Code* NPS-10
15. *Supplementary Notes*		

16. *Abstract*

A frontal load cell barrier test of a 1998 Dodge Caravan MPV was performed at Calspan SRL Corporation crash test facility in Buffalo, New York, on October 2, 1997.

The impact velocity was 56.6 kph and the temperature at the barrier face was 21°C. The maximum post-test vehicle crush was 520 mm. The test vehicle was equipped with a 3-point restraint system and supplemental airbags at each outboard seating position. The passenger side was equipped with a next generation type depowered airbag.

With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" the both the driver and passenger appear to comply with head, chest and femur requirements.

17. *Key Words* 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)	18. *Distribution Statement* Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5108 Washington, DC 20590		
19. *Security Classif. (of this report)* UNCLASSIFIED	20. *Security Classif. (of this page)* UNCLASSIFIED	21. *No. of Pages*	22. *Price*

Form DOT F1700.7 (8-69)

TABLE OF CONTENTS

Section 1

PURPOSE AND SUMMARY OF TEST MW0302

PURPOSE

This 56.6 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-96-D-02010. 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 48.3 kph requirements.

The 56.6 kph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

SUMMARY

A fixed-collision barrier was impacted by a 1998 Dodge Caravan MPV at a velocity of 56.6 kph. The test was performed at the Calspan SRL Corporation on October 2, 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 1 real-time camera and 16 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, chest, and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 245) and the right-front passenger (position 2) ATD (Serial No. 150) were used for one prior test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 97 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Load cell barrier data was not requested for this test.

The driver's HIC was 869.73. The maximum chest deceleration over 3 milliseconds was 52.796 g's and maximum chest deflection was -49.58 mm. Femur loads were -5318.4 Newtons on the left and -4290.2 Newtons on the right.

The right front passenger's HIC was 787.93. Maximum chest deceleration over 3 milliseconds was 52.976 g's and maximum chest deflection was -39.86 mm. Femur loads were -5983.4 Newtons on the left and -5974.9 Newtons on the right.

The vehicle's right side hood hinge broke upon impact. Windshield cracking was evident in the lower corners of the windshield due to contact with the hood. Some minor cracking occurred across the entire windshield as a result of the impact.

Passenger chest y did not record accurately. The data cable was damaged during the test so data is not available for this channel. As a result, the passenger chest resultant was calculated using the passenger redundant y chest accelerometer. Position 2 chest z redundant is not accurate after 40 milliseconds.

The vehicle top of engine block (#3), bottom of engine block (#4), and right side disc brake caliper accelerometer (#6) data is not accurate after 40 ms.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No. : MW0302 Test Mode : 56 kph Frontal Barrier

Test Date : October 2, 1997 Time: 13:00 Temperature : 11 °C

Vehicle Make/Model/Body Style : 1998 Dodge Caravan MPV

Vehicle Test Weight : 1936 kg

Vehicle/Barrier Impact Angle : 0 °

Impact Velocity : 56.6 kph

Maximum Static Crush : 520 mm

Vehicle Rebound : 410.3 mm

DUMMIES:	DRIVER	PASSENGER
Type :	572E	572E
Restraint System :	Airbag, Seatbelt, Knee Bolster	Next Generation Airbag, Seatbelt, Knee Bolster

Number of Data Channels : 97

Number of Cameras : 1 Real Time

16 High Speed

DOOR OPENING DATA : Closed/Operable - Left Front

Closed/Operable - Right Front

Front Seat(s) Data :	DRIVER	PASSENGER
Seat Track Failure :(mm of shift)	5 mm forward	0 mm
Seat Back Failure :	None	None

VISIBLE DUMMY CONTACT POINTS :	DRIVER	PASSENGER
Head :	Face to center of airbag. Back of head to inboard headrest	Face to center of airbag. Back of head to outboard side of headrest
Abdomen :	None	None
Chest	Airbag, Seatbelt	Airbag, Seatbelt
Knees	Knee Bolster	Glove box and lower airbag flap.

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1998 Dodge Caravan MPV

NHTSA No. : MW0302 ; VIN: 2B4-FP25B7WR-514130 ; Color : Green

Engine Data: 4 cylinders; - CID; 2.4 Liters; - cc

Placement : - Longitudinal or In-Line; X Transverse or Lateral

Transmission Data : 3 speeds; - Manual; X Automatic; - Overdrive

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

Major Options : X A/C; X Pwr.Strg.; X Pwr. Brakes

- Pwr. Windows; - Pwr. Door Locks; - Tilt Wheel

Date Received : 09/18/97 ; Odometer Reading 92 km

Selling Dealer : Transitowne Dodge

& Address: 7408 Transit Road Williamsville, NY 14221-6091

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : Chrysler Corporation

Date of Manufacture 08/97

GVWR : 2268 kg; GAWR: 1203 kg FRONT; 1180 kg REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 241 kpa FRONT

241 kpa REAR

Recommended Tire Size : P205/75R14

* Recommended Cold Tire Pressure : 241 kpa FRONT; 241 kpa REAR

Size of Tires on Test Vehicle: P205/75R14 ; Manufacturer:

Vehicle Capacity Data :

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

Number of Occupants: 2 Front; 5 Rear; 7 Total

Vehicle Capacity Weight (VCW) = 586 kg

No. of Occupants x 68 kg = 476 kg

Rated Cargo/Luggage Weight (RCLW) = 110 kg

*Tire pressure used for test

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front	=	470.5 kg	Right Rear	=	342.5 kg
Left Front	=	511.0 kg	Left Rear	=	358.0 kg
TOTAL FRONT	=	981.5 kg	TOTAL REAR	=	700.5 kg

TOTAL DELIVERED WEIGHT = 1,682.0 kg

% of Total Front of Vehicle Weight = 58.4 % of Total Rear Weight = 41.6 %

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

Total Delivered Weight (UDW)	=	1,682 kg
Rated Cargo/Luggage Weight (RCLW)	=	110 kg
Weight of 2 p.572 Dummies @ 76 each	=	152 kg
TARGET TEST WEIGHT	=	1,944 kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 102 KG OF CARGO WEIGHT:

Right Front	=	524.0 kg	Right Rear	=	421.5 kg
Left Front	=	552.5 kg	Left Rear	=	438.0 kg
TOTAL FRONT	=	1,076.5 kg	TOTAL REAR	=	859.5 kg

TOTAL TEST WEIGHT = 1,936.0 kg

% of Total Front Weight = 55.6 % % of Total Rear Weight = 44.4 %

Weight of Ballast Secured in Vehicle Trunk Area = 63.5 kg

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED :	RF	763	LF	765	RR	789	LR 782
FULLY LOADED :	RF	742	LF	743	RR	753	LR 747
AS TESTED :	RF	750	LF	753	RR	760	LR 748

Vehicle's Wheel Base : 2895 mm

Location of Vehicle's C.G. : 1,285.3 mm rearward of front wheel center.

FUEL SYSTEM DATA :

Fuel System Capacity From Owner's Manual = 75.7 liters

Usable Capacity Figure Furnished by COTR = 75.7 liters

Test Volume Range (92 to 94% of Usable Capacity) = 69.7 to 71.2 liters

ACTUAL TEST VOLUME= 70.0 liters (with entire fuel system filled)

Test Fluid Type: Stoddard Solution ; Spec. Grav. = 0.764

Kinematic Viscosity = 0.96 centistokes; Color = Orange

Type of Fuel Pump: Electric- X ; Mechanical- -

Does Electric Pump operate with ignition switch "ON" & engine "OFF" Yes- X No- -

Details of Fuel System Filler -Left side; Tank left-center, ahead of rear axle; Lines - left frame rail.

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test : Frontal Barrier Impact Angle : 0°

Test Date : October 2, 1997 Time: 13:00 Temperature: 11 °C

Vehicle NHTSA No. : MW0302

Required Impact Velocity Range : 55.7 to 57.1 kph

BARRIER IMPACT VELOCITY : (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 56.6 kph; Trap No. 2 = 56.6 kph

Distance from vehicle to barrier : (1) entering trap = 1321 mm

(2) exiting trap = 305 mm

VEHICLE STATIC CRUSH: (mm) (For frontal and rear impacts only.)

Vehicle Length:

Pre-Test	Right =	4570	; C/L =	4700	; Left =	4565
Post-Test	Right =	4065	; C/L =	4180	; Left =	4175
Crush	Right =	505.0	; C/L =	520.0	; Left =	390.0
AVERAGE	=	471.7	mm			

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point :

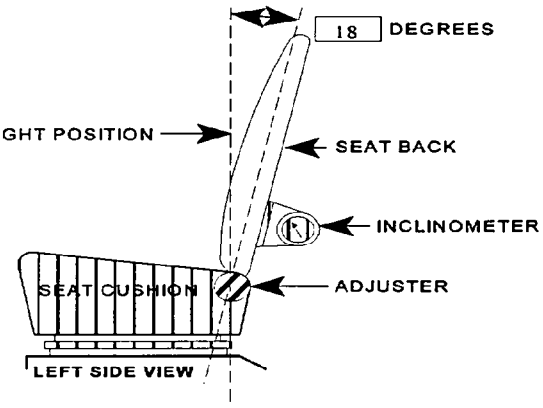
	Right =	459	; C/L =	408	; Left =	364
AVERAGE	=	410.3	mm			

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1998 Vehicle Model: Dodge Caravan Body Style : MPV

1. Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat : 18

Measurement instructions : Seatback in full upright position. Recline four degrees rearward.

Seat back angle for passenger's seat : 18

Measurement instructions : Same as driver.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Seat travel is 200 mm. Set seat track in mid-position, 100 mm forward of full-rear and 100 mm aft of full-forward position.

Positioning of the passenger's seat (if applicable) : Same as driver.

3. Fuel Tank Capacity Data

3.1

A. "Usable Capacity" of the standard equipment fuel tank is 75.7 liters

B. "Usable Capacity" of the optional equipment fuel tank is - liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 75.7 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 70.0 liters

3.3 Is vehicle equipped with electric fuel pump? Yes- X ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

Fuel pump activates when the vehicle's ignition system is activated.

4. STEERING COLUMN ADJUSTMENTS :

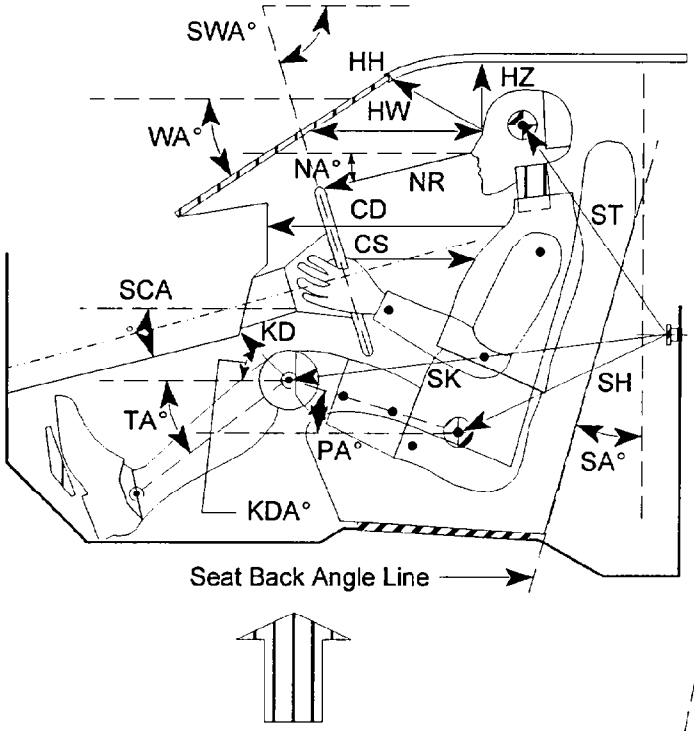
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: This vehicle was not equipped with a tilt steering column.

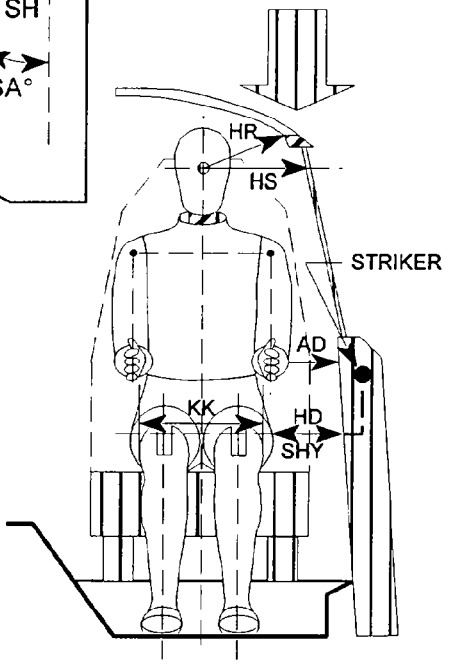
5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Place in uppermost position. Ensure mechanism is fully engaged. Lower two notches to achieve "design" position.

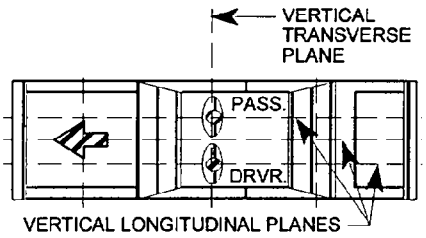
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



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



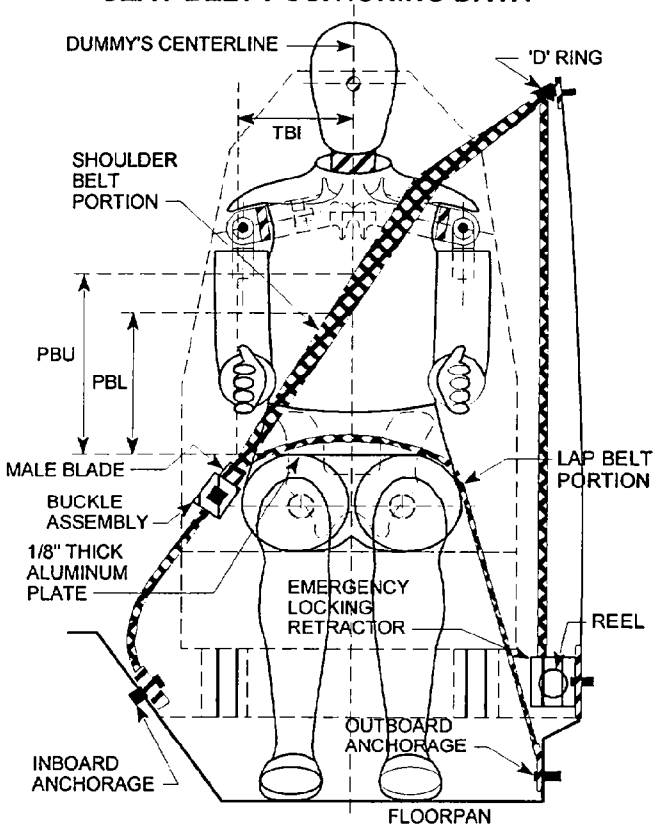
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

	DRIVER (Serial #245)			PASS. (Serial # 150)		
WA°	29 deg.			N/A		
SWA°	62 deg.			N/A		
SCA°	28 deg.			N/A		
SA°	18 deg.			18 deg.		
HZ	181			185		
HH	317			292		
HW	587			590		
HR	270			255		
NR	377	Angle	-18 deg.	N/A		
CD	543			543		
CS	262			N/A		
RA	167			N/A		
KDL	175	Angle (KDA)	25 deg.	167		
KDR	196			169	Angle (KDA)	25 deg.
PA°	22.5 deg.			23 deg.		
TA°	-52 deg.			-60 deg.		
KK	311			243		
ST	680	Angle	11 deg.	678	Angle	11 deg.
SK	647	Angle	81 deg.	635	Angle	80 deg.
SH	228	Angle	85 deg.	212	Angle	84 deg.
SHY	258			248		
HS	350			353		
HD	137			125		
AD	133			133		

Dimensions in millimeters

DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

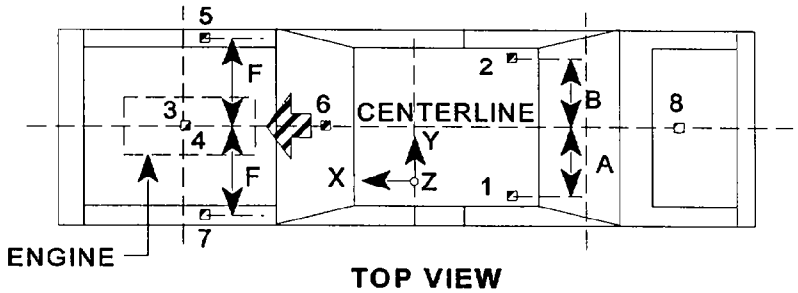
SEAT BELT POSITIONING DATA



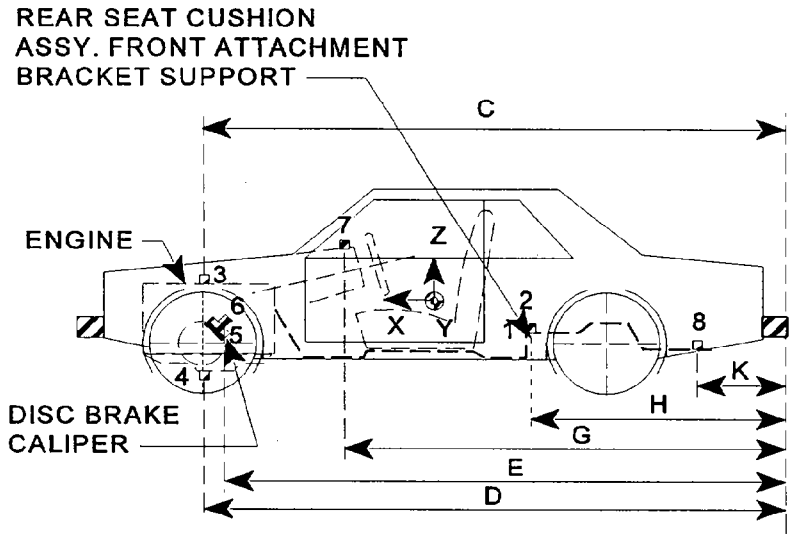
FRONT VIEW OF DUMMY

	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	345	338
PBL-- Top surface of alum. plate to belt lower edge	265	262
LAP BELT TENSION	10 Newtons	10 Newtons
SHOULDER BELT TENSION	Retractor	Retractor

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



TOP VIEW



LEFT SIDE VIEW

Note: Vehicle accelerometer location and data summary shown in DATA SHEET NO. 7

DATA SHEET NO. 7 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

DIMENSION	LENGTH (mm)
	PRE-TEST VALUES
A Left Rear Seat Crossmember Y	-677
B Right Rear Seat Crossmember Y	677
C Top of Engine X	3970
D Bottom of Engine X	3685
E Disc Brake Calipers X	3760
F Disc Brake Calipers Y	±780
G Instrument Panel X	3054
H Rear Seat Crossmembers X	2188

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Rear Seat X-Member @ Left Side	3.6	19.7	-41.7	33.2
2	Rear Seat X-Member @ Right Side	2.1	-31.6	-53.3	60.9
3	Top of Engine Block	126.3	47.3	-205.2	26.2
4	Bottom of Engine	36.4	53.2	-93.6	23.1
5	Disc Brake Caliper @ Left Side	38.3	59.5	-153.9	38.1
6	Disc Brake Caliper @ Right Side	73.3	51.2	-126.0	37.1
7	Instrument Panel	48.0	56.8	-74.0	63.9
8	Rear Seat X-Member @ Left-Redundant	3.0	181.1	-42.5	33.2
9	Rear Seat X-Member @ Right-Redundant	3.1	172.0	-42.2	33.4

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

NHTSA Test No.: MW0302 Vehicle: 1998 Dodge Caravan MPV

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec.	Neg.	msec.
Pos. 1 Head X	g's	11.6	185.6	-80.2	77.6
Pos. 1 Head Y	g's	3.7	123.0	-6.7	67.4
Pos. 1 Head Z	g's	6.5	113.7	-9.6	82.4
Pos. 1 Head Resultant	g's	80.4	77.6	.0	-23.6
Pos. 2 Head X	g's	29.7	186.8	-64.9	82.1
Pos. 2 Head Y	g's	7.8	188.7	-27.8	93.2
Pos. 2 Head Z	g's	26.5	76.6	-9.1	114.3
Pos. 2 Head Resultant	g's	70.1	84.6	.1	-32.5
Pos. 1 Chest X	g's	9.3	184.8	-53.3	72.1
Pos. 1 Chest Y	g's	2.5	194.2	-3.6	61.7
Pos. 1 Chest Z	g's	4.4	113.3	-8.1	83.9
Pos. 1 Chest Resultant	g's	53.5	72.1	.0	-31.0
Pos. 1 Chest Displacement	mm	.0	8.5	-49.6	77.7
Pos. 2 Chest X	g's	7.8	188.7	-55.5	75.9
Pos. 2 Chest Y	g's	*	*	*	*
Pos. 2 Chest Z	g's	7.5	66.9	-5.3	81.5
Pos. 2 Chest Resultant**	g's	55.5	75.9	.0	-31.6
Pos. 2 Chest Displacement	mm	.0	10.7	-39.9	88.7
Pos. 1 Left Femur	N	591.8	213.2	-5318.4	64.7
Pos. 1 Right Femur	N	733.1	42.7	-4290.2	61.5
Pos. 2 Left Femur	N	789.1	42.4	-5983.4	55.7
Pos. 2 Right Femur	N	738.8	45.9	-5974.9	56.7
Pos. 1 Left Belt Load	N	2466.4	65.6	-50.0	213.2
Pos. 1 Torso Belt Load	N	5691.8	71.5	-140.0	213.5
Pos. 2 Right Belt Load	N	2478.9	62.7	-68.7	213.2
Pos. 2 Torso Belt Load	N	7011.5	69.6	-228.9	213.2

* This Data is Not Accurate.

** Calculated using Redundant Chest Y Data

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

NHTSA Test No.: MW0302 Vehicle: 1998 Dodge Caravan MPV

	HEAD INJURY CRITERIA (HIC)			
	HIC**	t_1 (msec)	t_2 (msec)	Average Acceleration t_1 to t_2
Position #1 - Driver	869.73	61.6	90.6	61.77
Position #2 - Passenger	787.93	68.1	101.3	56.25

** HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

	CLIP SUMMARY*			
	CLIP (g's)	t_1 (msec)	t_2 (msec)	CSI
Position #1 - Driver	52.796	70.1664	73.1664	488.032
Position #2 - Passenger	52.976**	73.9572	76.9572	458.174

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

** Calculated using redundant chest y data.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
HYBRID III NECK AND PELVIC DATA SHEET

Vehicle Year/Make/Model/Body Style: 1998 Dodge Caravan MPV

NHTSA Test No.: MW0302 Test Date: October 2, 1997

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Upper Neck Fx	N	225.0	127.0	-351.9	60.9
Pos. 1 Upper Neck Fy	N	268.0	121.4	-506.3	54.6
Pos. 1 Upper Neck Fz	N	2610.6	73.2	-535.5	53.5
Pos. 1 Neck Force Result	N	2619.3	73.2	3.3	19.9
Pos. 1 Upper Neck Mx	N-m	15.0	126.7	-21.5	73.7
Pos. 1 Upper Neck My	N-m	2.9	25.5	-46.3	77.8
Pos. 1 Upper Neck Mz	N-m	1.5	253.1	-10.8	51.6
Pos. 1 Neck Moment Result	N-m	47.6	77.8	.1	-39.0
Pos. 2 Upper Neck Fx	N	672.3	82.3	-288.4	64.0
Pos. 2 Upper Neck Fy	N	204.0	71.1	-427.5	54.7
Pos. 2 Upper Neck Fz	N	1584.5	72.5	-821.5	53.6
Pos. 2 Neck Force Result	N	1599.4	72.3	3.0	23.0
Pos. 2 Upper Neck Mx	N-m	17.9	54.5	-25.7	72.9
Pos. 2 Upper Neck My	N-m	57.1	84.0	-17.6	246.1
Pos. 2 Upper Neck Mz	N-m	41.8	85.1	-12.0	52.2
Pos. 2 Neck Moment Result	N-m	71.1	85.1	.1	-34.9
Pos. 1 Pelvic (X)	g's	3.4	236.7	-59.7	60.6
Pos. 1 Pelvic (Y)	g's	6.8	49.4	-12.2	54.8
Pos. 1 Pelvic (Z)	g's	4.7	115.5	-24.6	74.3
Pos. 1 Pelvic (R)	g's	62.3	60.6	.1	-30.6
Pos. 2 Pelvic (X)	g's	3.0	271.1	-66.5	56.2
Pos. 2 Pelvic (Y)	g's	10.9	76.7	-10.1	57.0
Pos. 2 Pelvic (Z)	g's	3.0	255.9	-22.0	77.9
Pos. 2 Pelvic (R)	g's	67.1	56.2	.1	147.9

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
HYBRID III LOWER LEG DATA SHEET

Vehicle Year/Make/Model/Body Style: 1998 Dodge Caravan MPV

NHTSA Test No.: MW0302 Test Date: October 2, 1997

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
P1 Lt Upper Tibia Mx	N-m	61.1	49.3	-72.8	44.9
P1 Lt Upper Tibia My	N-m	38.0	52.2	-135.2	46.6
P1 Lt Lower Tibia Fx	N	71.3	184.7	-1969.1	69.7
P1 Lt Lower Tibia Fz	N	104.5	182.7	-4406.0	46.1
P1 Lt Lower Tibia My	N-m	334.8	58.9	-53.1	40.4
P1 Rt Upper Tibia Mx	N-m	47.9	60.2	-29.1	51.9
P1 Rt Upper Tibia My	N-m	128.3	46.3	-53.8	54.7
P1 Rt Lower Tibia Fx	N	99.3	177.4	-2651.0	53.0
P1 Rt Lower Tibia Fz	N	183.1	212.1	-5248.2	53.5
P1 Rt Lower Tibia My	N-m	394.8	55.1	-103.8	42.4
Pos. 2 Lt Upper Tibia Mx	N-m	11.5	48.4	-41.6	56.6
Pos. 2 Lt Upper Tibia My	N-m	63.8	55.7	-121.3	41.7
Pos. 2 Lt Lower Tibia Fx	N	57.4	243.3	-2193.7	53.1
Pos. 2 Lt Lower Tibia Fz	N	93.6	250.4	-2838.2	53.6
Pos. 2 Lt Lower Tibia My	N-m	272.0	53.7	-87.0	41.1
Pos. 2 Rt Upper Tibia Mx	N-m	34.9	85.3	-13.3	62.0
Pos. 2 Rt Upper Tibia My	N-m	68.7	55.4	-110.3	54.1
Pos. 2 Rt Lower Tibia Fx	N	4833.4	46.5	-6220.0	148.3
Pos. 2 Rt Lower Tibia Fz	N	155.4	148.3	-3301.1	54.6
Pos. 2 Rt Lower Tibia My	N-m	337.2	54.5	-47.4	44.6

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
HYBRID III ANKLE DATA SHEET

Vehicle Year/Make/Model/Body Style: 1998 Dodge Caravan MPV

NHTSA Test No.: MW0302 Test Date: October 2, 1997

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Left Ankle X	g's	76.7	45.0	-108.4	44.5
Pos. 1 Left Ankle Z	g's	198.1	44.8	-210.6	45.2
Pos. 1 Left Toe Z	g's	268.5	44.8	-270.0	45.4
Pos. 1 Right Ankle X	g's	73.9	56.0	-147.5	53.6
Pos. 1 Right Ankle Z	g's	79.1	52.7	-132.4	49.6
Pos. 1 Right Toe Z	g's	257.7	52.7	-281.0	40.6
Pos. 2 Left Ankle X	g's	94.7	58.9	-164.9	52.4
Pos. 2 Left Ankle Z	g's	115.8	53.0	-96.6	40.7
Pos. 2 Left Toe Z	g's	303.2	52.8	-216.1	40.5
Pos. 2 Right Ankle X	g's	64.6	56.2	-254.6	54.3
Pos. 2 Right Ankle Z	g's	146.5	53.7	-157.0	55.5
Pos. 2 Right Toe Z	g's	206.3	53.5	-215.0	55.5

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
REDUNDANT DUMMY DATA

NHTSA Test No.: MW0302 Vehicle: 1998 Dodge Caravan MPV

DESCRIPTION	UNIT	MAXIMUM VALUE			
		Pos.	msec	Neg.	msec
Pos. 1 Head X(R)	g's	12.8	185.8	-82.3	75.3
Pos. 1 Head Y(R)	g's	6.5	213.2	-6.7	69.8
Pos. 1 Head Z(R)	g's	12.2	48.0	-12.2	85.2
Pos. 1 Head Resultant(RR)	g's	82.4	75.3	.0	-26.2
Pos. 2 Head X(R)	g's	28.4	186.8	-71.8	80.1
Pos. 2 Head Y(R)	g's	84.7	213.2	-68.2	30.3
Pos. 2 Head Z(R)	g's	29.3	68.6	-6.5	114.4
Pos. 2 Head Resultant(RR)	g's	85.4	213.2	.0	9.6
Pos. 1 Chest X(R)	g's	8.4	185.1	-52.7	72.6
Pos. 1 Chest Y(R)	g's	5.8	54.1	-3.2	61.8
Pos. 1 Chest Z(R)	g's	5.8	177.8	-12.4	58.5
Pos. 1 Chest Resultant(RR)	g's	52.9	72.6	.0	-33.0
Pos. 2 Chest X(R)	g's	6.8	188.9	-56.8	75.1
Pos. 2 Chest Y(R)	g's	5.3	54.0	-2.7	63.0
Pos. 2 Chest Z(R)	g's	*	*	*	*
Pos. 2 Chest Resultant(RR)	g's	*	*	*	*

* This Data is Not Accurate.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
REDUNDANT DUMMY DATA

NHTSA Test No.: MW0302 Vehicle: 1998 Dodge Caravan MPV

	HEAD INJURY CRITERIA (HIC) **REDUNDANT**			
	HIC**	t_1 (msec)	t_2 (msec)	Average Acceleration t_1 to t_2
Position #1 - Driver	923.55	61.7	91.2	62.84
Position #2 - Passenger	880.76	67.6	100.2	59.25

** HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

	CLIP SUMMARY* **REDUNDANT**			
	CLIP (g's)	t_1 (msec)	t_2 (msec)	CSI
Position #1 - Driver	52.269	70.543	73.543	528.043
Position #2 - Passenger	Not Available	-	-	-

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	2634	2600
Shoulder belt length as measured on Part 572 Dummy.	900	895
Lap belt length as measured on Part 572 Dummy.	1000	970
SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis.	76	89
As determined mechanically.	67	89
As determined electronically.	78.2	108.5
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	43.5 mm/M	35.4 mm/M
Measured mechanically.	0 mm/M	0 mm/M

Dimensions in millimeters

DATA SHEET NO.10 SUMMARY OF FMVSS 212 DATA

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with 5.0 mm molding.

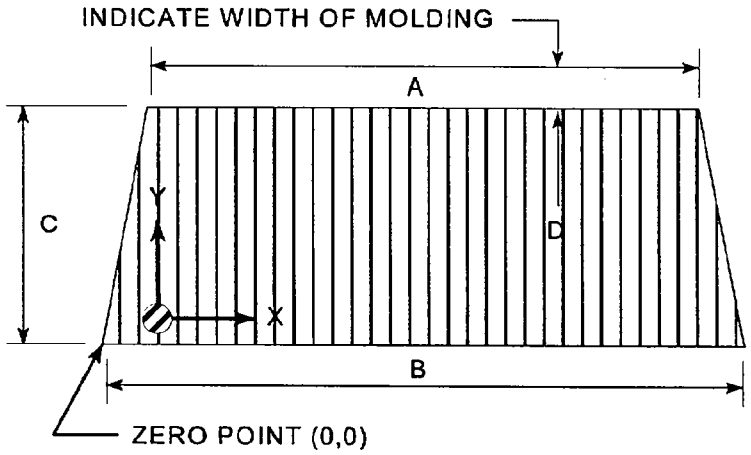
FMVSS 212 REQUIREMENTS:

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 the windshield for vehicles equipped with automatic restraint systems for front occupants,

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST(mm)	% OF RETENTION
RIGHT SIDE	2385	2385	100
LEFT SIDE	2385	2385	100
TOTAL	4,770	4,770	100

AREA OF RETENTION FAILURE:



FRONT VIEW OF WINDSHIELD

DIMENSIONS (mm)	
A	1220
B	1750
C	900
D	5.0

FAILURE DETAILS: None.

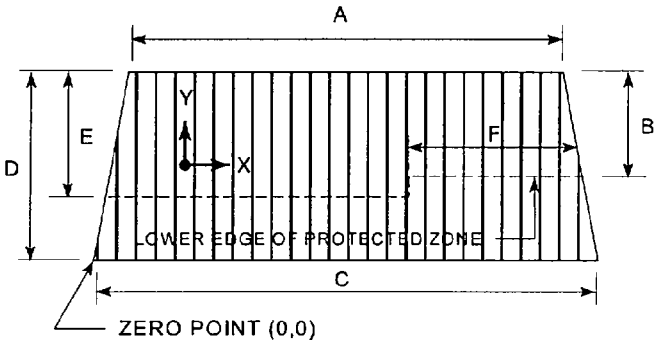
DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield, then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 TEST DATA:

(Dimensions in mm)



FRONT VIEW OF WINDSHIELD

DIMENSIONS	
A	1220
B	515
C	1750
D	900
E	609
F	590

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None.

(Show location of penetration on the above sketch)

	COORDINATES	
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

DATA SHEET NO. 12 FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

NHTSA TEST No.: MW0302 TEST DATE: October 2, 1997

VEHICLE MAKE/MODEL: 1998 Dodge Caravan

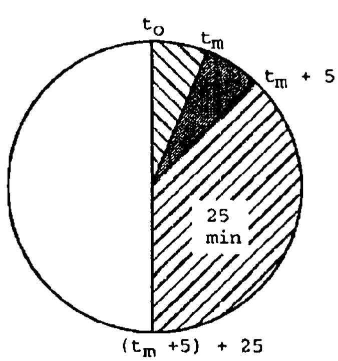
The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

= =

TEST VEHICLE IMPACT TYPE:

X	Frontal (56 kph)
-	Oblique (48 kph) with ________ deg. barrier face first contacting ______________________ (driver/passenger) side
-	Rear Moving Barrier (48 kph)
-	Lateral Moving Barrier (32 kph)

FUEL SPILLAGE MEASUREMENT:



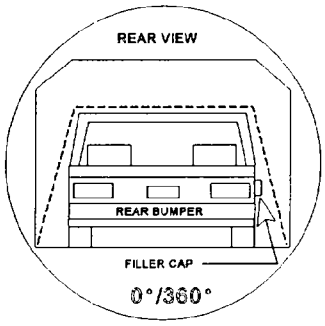
	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	28 g
2. For 5 minute period after vehicle motion ceases	0	141 g
3. For next 25 minutes	0	28 g/min.

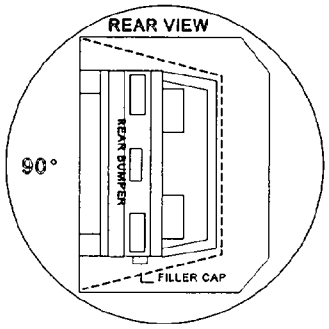
SOLVENT SPILLAGE DETAILS: None.

DATA SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE:
0-90 deg.

NHTSA Test No.:
MW0302





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	13	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	13	seconds
Next whole minute interval	7	minutes	00	seconds

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

141 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	N/A

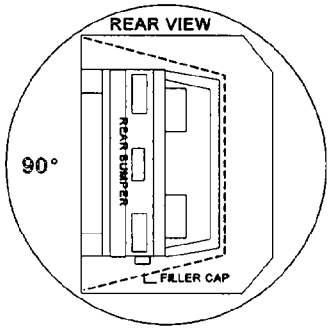
Note: Record spillage for whole minute intervals only as determined above.

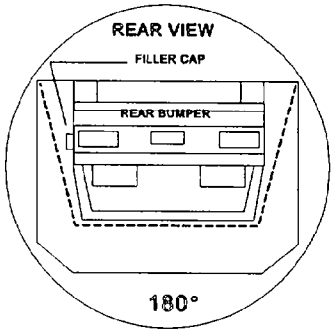
IV. SOLVENT SPILLAGE LOCATION(S): None

TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:
90-180 deg

NHTSA Test No.:
MW0302





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	06	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	6	seconds
Next whole minute interval	7	minutes	00	seconds

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

141 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	N/A

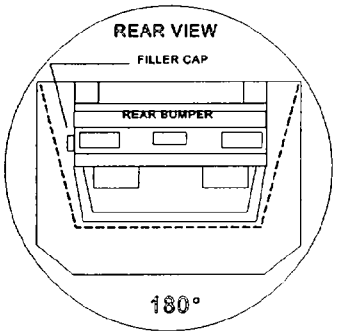
Note: Record spillage for whole minute intervals only as determined above.

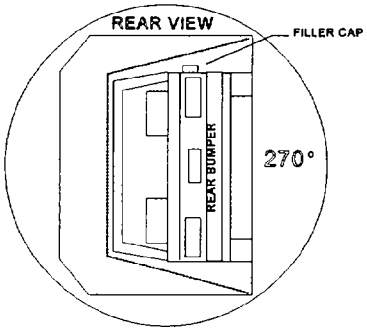
IV. SOLVENT SPILLAGE LOCATION(S): None.

TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:
180-270 deg.

NHTSA Test No.:
MW0302





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	07	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	7	seconds
Next whole minute interval	7	minutes	00	seconds

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

141 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	N/A

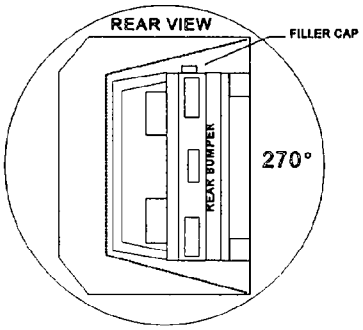
Note: Record spillage for whole minute intervals only as determined above.

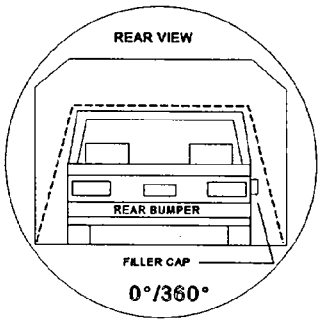
IV. SOLVENT SPILLAGE LOCATION(S): None.

TEST SHEET NO. 13 FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE:
270-360 deg.

NHTSA Test No.:
MW0302





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	08	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	8	seconds
Next whole minute interval	7	minutes	00	seconds

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

141 g	28 g	28 g	28 g

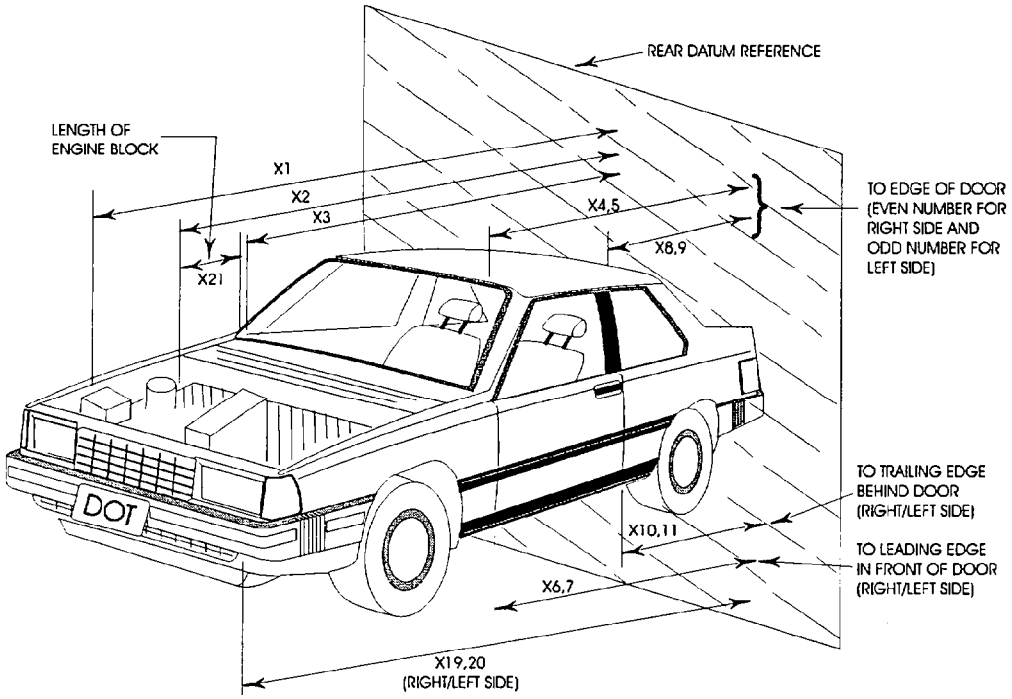
III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

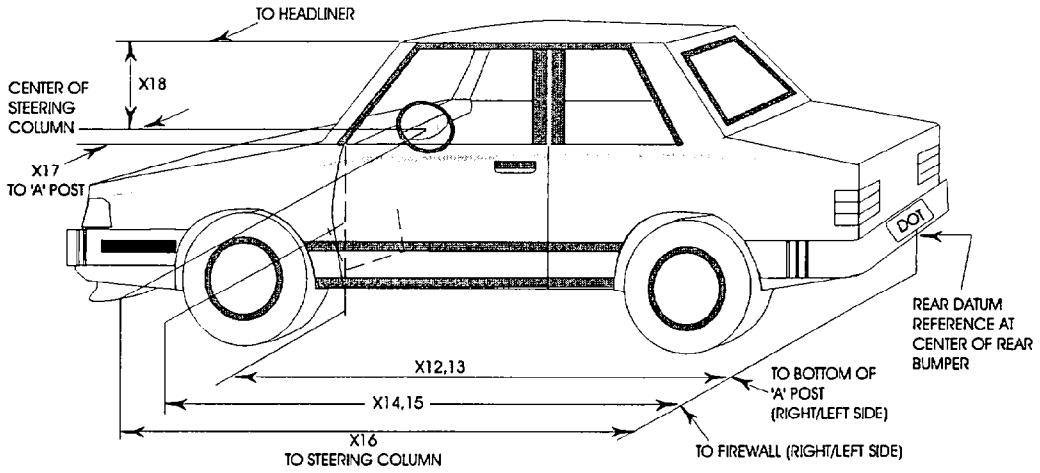
0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S): None.

TEST VEHICLE MEASUREMENTS





DATA SHEET NO.14 VEHICLE MEASUREMENTS

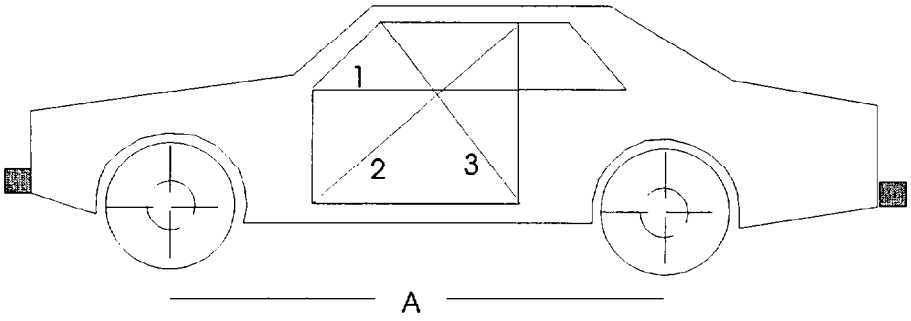
		All Dimensions in mm		
No.		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	4700	4180	520
X2	Rear Surface of Vehicle to Front of Engine	4045	3735	310
X3	Rear Surface of Vehicle to Firewall	3620*	3555*	65
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3365	3366	-1
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3362	3350	12
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3297	3296	1
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3292	3284	8
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2300	2301	-1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2296	2285	11
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2300	2299	1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2294	2285	9
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3247	3250	-3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3243	3246	-3
X14	Rear Surface of Vehicle to Firewall, Right Side	3685*	3655*	30
X15	Rear Surface of Vehicle to Firewall, Left Side	3615*	3655*	-40
X16	Rear Surface of Vehicle to Steering Column	2890	2895	-5
X17	Center of Steering Column to "A" Post	475	485	-10
X18	Center of Steering Column to Headliner	450	400	50
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4570	4065	505
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4565	4175	390
X21	Length of Engine Block	440	440	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3125	3125	0
CD	Rear Surface of Vehicle to Center of Dash Panel	3120	3115	5
LD	Rear Surface of Vehicle to Left Side of Dash Panel	3115	3110	5

* Estimated

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

VEHICLE INTRUSION MEASUREMENTS

DOOR OPENING WIDTH



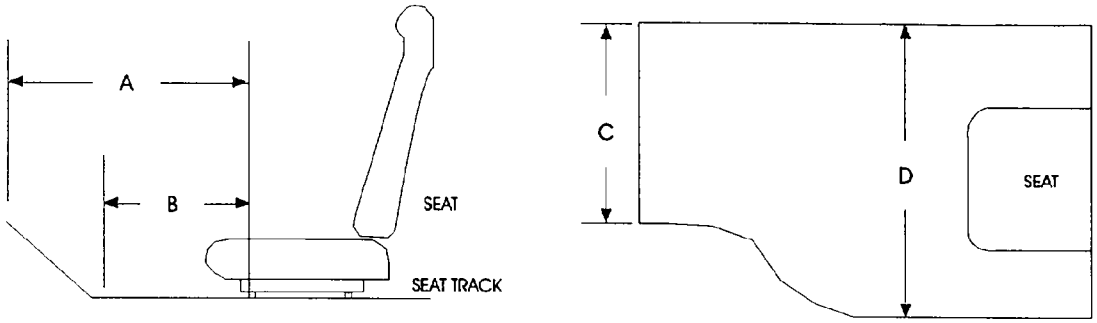
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	985	1555	1200	985	1565	1180
AFTER TEST	970	1560	1195	980	1570	1185
DIFFERENCE	15	-5	5	5	-5	-5

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2895	2895
AFTER TEST	2745	2745
DIFFERENCE	150	150

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

VEHICLE INTRUSION MEASUREMENTS

STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	555	510	45
B	540	510	30
C	530	470	60
D	605	600	5

PASSENGER

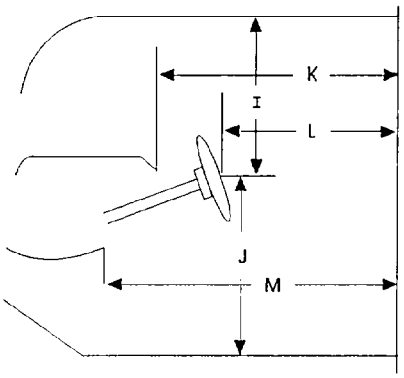
Measurement	Pre-Test	Post-Test	Difference
A	545	500	45
B	510	480	30
C	365	340	25
D	585	580	5

Units = mm

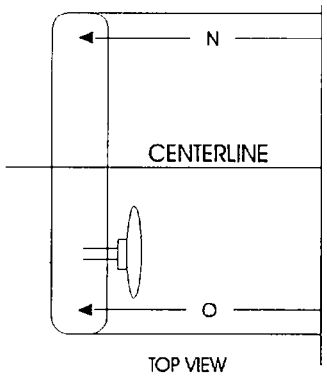
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

VEHICLE INTRUSION MEASUREMENTS

STATIC PASSENGER COMPARTMENT INTRUSION

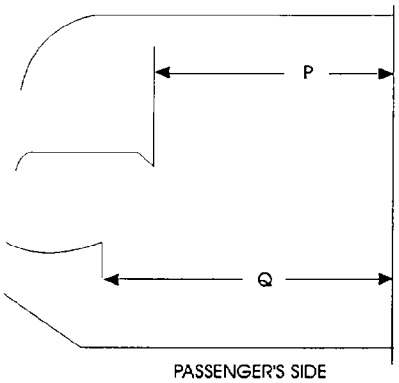


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS FROM C-PILLAR BELT ANCHORAGE



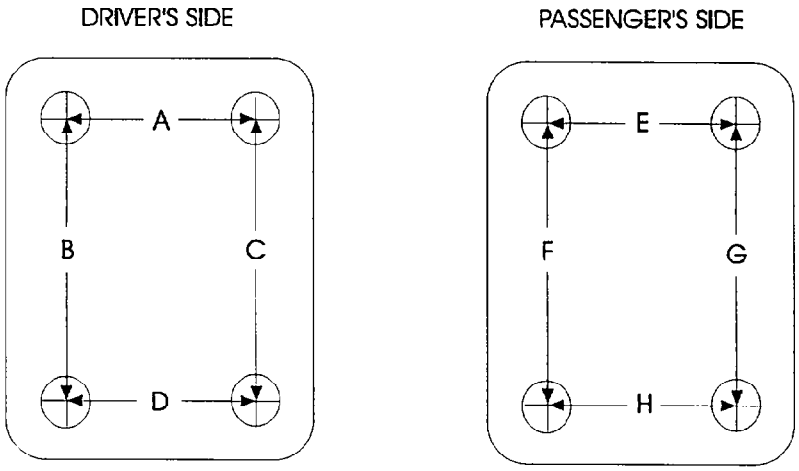
PASSENGER'S SIDE

Measurement	Pre-Test	Post-Test	Difference
I	440	390	50
J	755	805	-50
K	770	760	10
L	515	520	-5
M	780	770	10
N	740	750	-10
O	750	735	15
P = K (PASS.)	860	860	0
Q = M (PASS.)	780	780	0

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

FLOORBOARD DEFORMATION



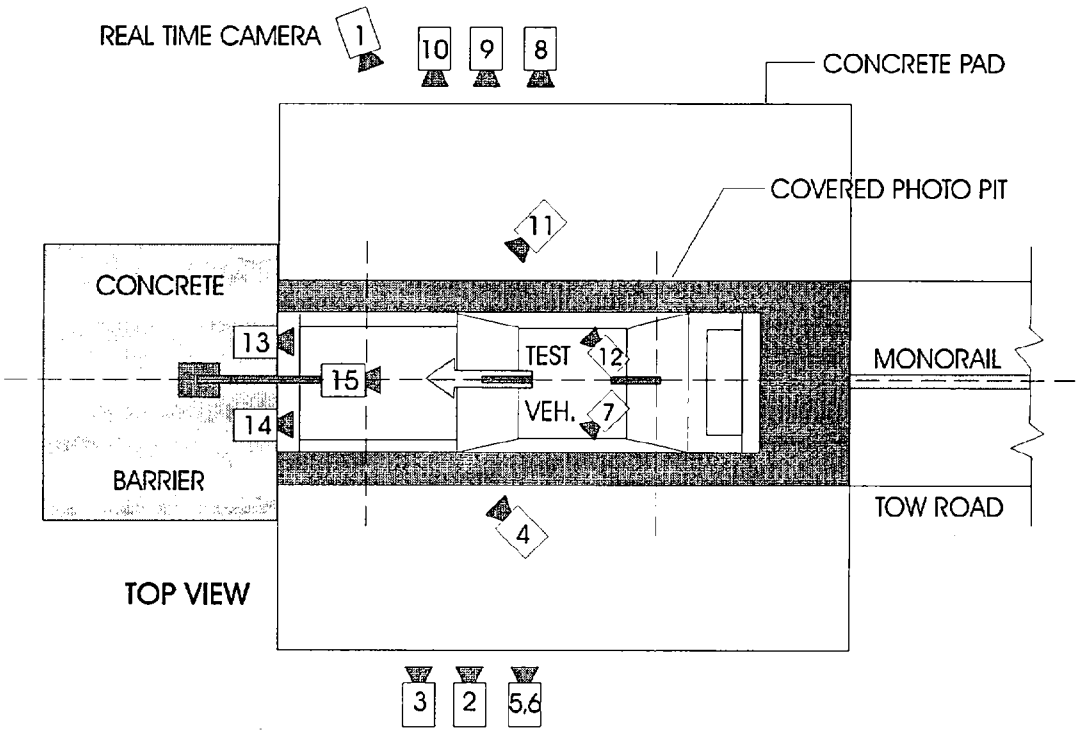
TOP VIEW THROUGH FLOOR PAN

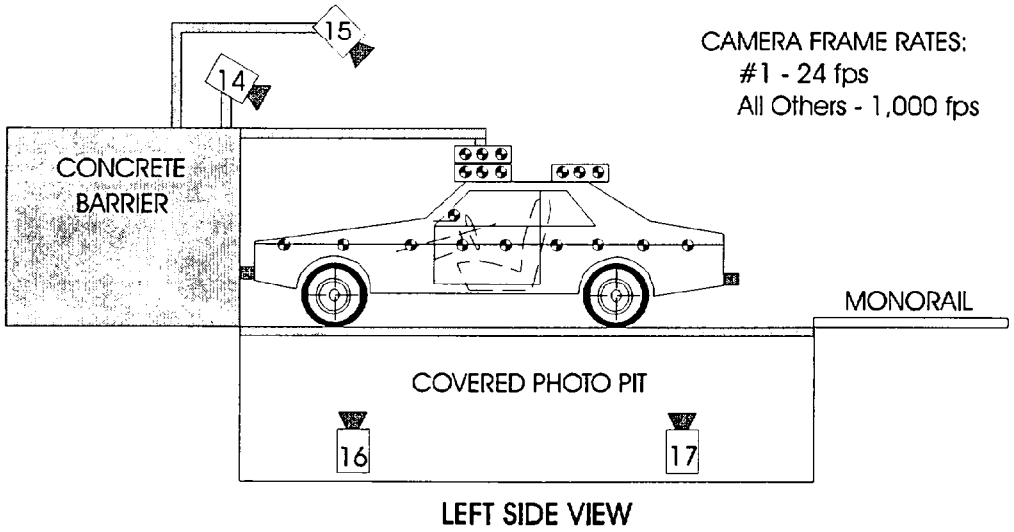
Measurement	Pre-Test	Post-Test	Difference
A	310	375	-65
B	500	505	-5
C	500	475	25
D	300	305	-5
E	250	290	-40
F	400	410	-10
G	400	410	-10
H	300	305	-5

Units = mm

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera information shown in DATA SHEET NO. 15.





DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

NHTSA Test No.: MW0302 Vehicle: 1998 Dodge Caravan MPV

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	6680	1660	1090	-5	6211	12.5	1000
3	Left Side View	8050	1060	1090	-3	7581	25	1000
4	Driver and Interior View	5150	3000	1930	-10	-	25	1000
5	Steering Column (Bottom)	7790	1980	1165	-3	7321	25	1000
6	Steering Column (Top)	7790	1980	1785	-9	7321	25	1000
7	Left Belt	-	-	-	-	-	8	950
8	Overall Right Side	6620	2280	1080	-3	7089	13	1000
9	Right Side View	8070	1695	1145	-2	8539	25	1010
10	Right Passenger View	7905	2180	1405	-2	8374	35	1000
11	Passenger and Interior View	5070	3370	1905	-11	-	25	1000
12	Right Belt	-	-	-	-	-	8	1000
13	Passenger Front View	627	-60	1830	-47	-	8	1000
14	Driver Front View	627	-60	1830	-40	-	8	1000
15	Windshield View	0	0	3374	-57	-	13	1000
16	Pit View of Engine	0	960	-3048	90	-	13	1000
17	Pit View of Fuel Tank	0	2305	-3048	90	-	13	980

*X = film plane to monorail centerline

Y = film plane to impact location

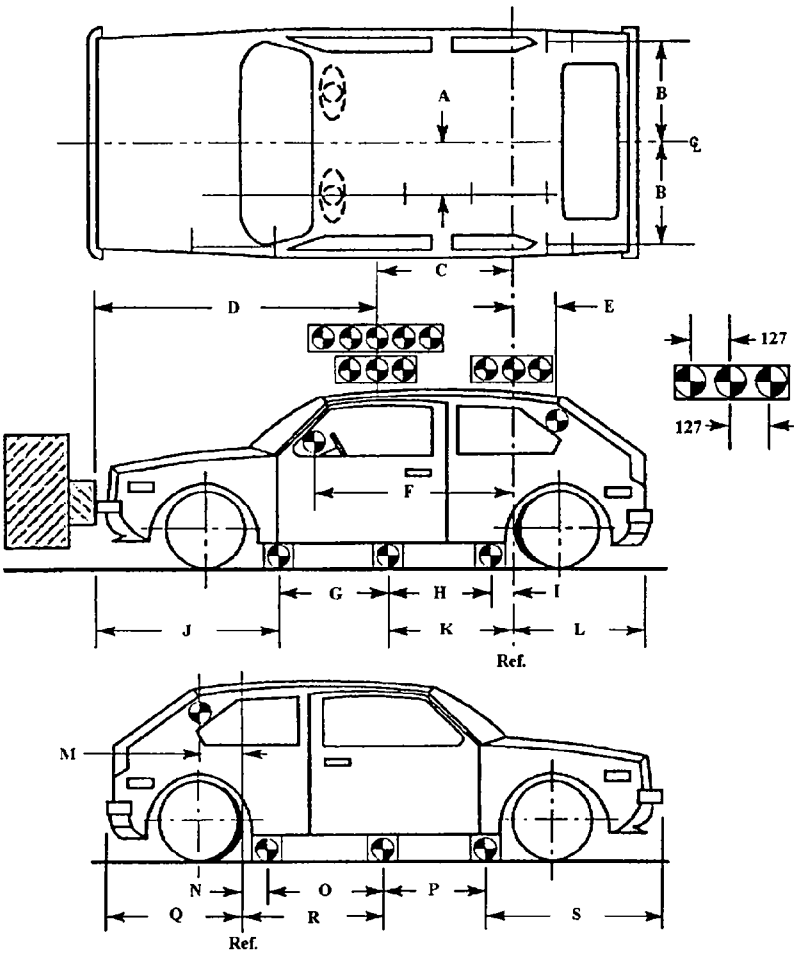
Z = film plane to ground

** = referenced to horizontal plane

N.T. indicates No Timing

(Dimensions in millimeters)

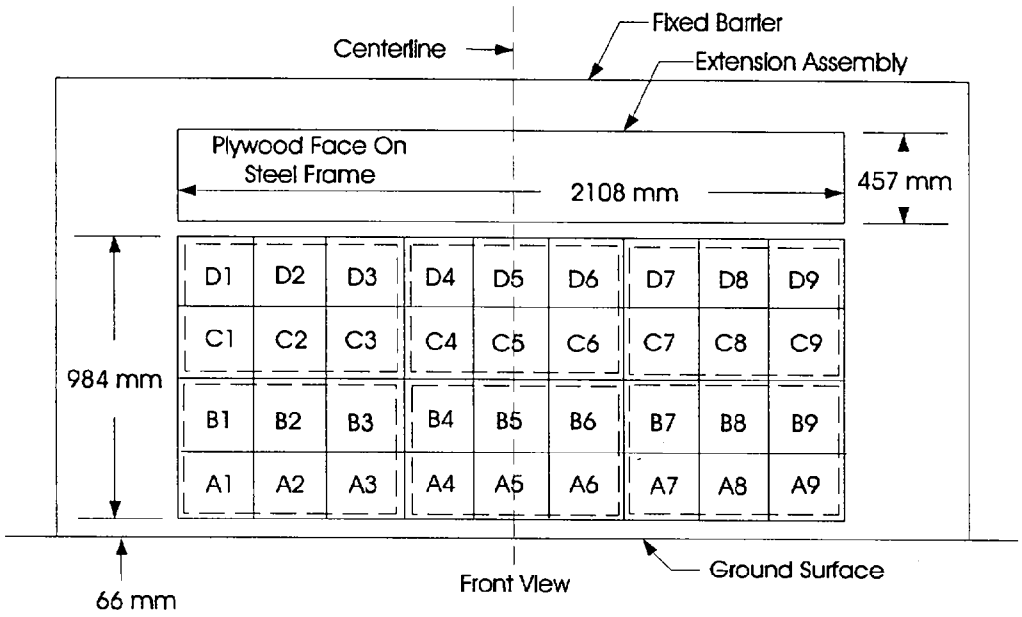
A	393
B	600
C	1214
D	2296
E	363
F	1853
G	950
H	950
I	203
J	1407
K	1153
L	1190
M	363
N	203
O	950
P	950
Q	1190
R	1153
S	1407



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

Load Cell Barrier Data was not requested for this test

36 Load Cells
4 Rows
9 Columns
6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

(1)Data from 36 individual load cells
(2)Total or Sum of 36 individual load cells
(3)Data from 6 Groupings shown above (6 cells/group)

DATA SHEET NO. 18 POST TEST AIR BAG DATA

NHTSA No. : MW0302; Test Date: October 2, 1997; Technician: P. MacDiarmid

Vehicle Model Year/Make/Model: 1998 Dodge Caravan

A. No. of vent holes: 0 -Driver 0 -Passenger

B. Size of vent holes: (mm^2) - -Driver - -Passenger

C. Total vent area: (mm^2) - -Driver - -Passenger

D. Deflated air bag length and width dimensions or, if round,diameter. (mm)

Driver: 557 -Length; 665 -Width; 318 -Depth

Passenger: 714 -Height; 853 -Width; 875 -Depth

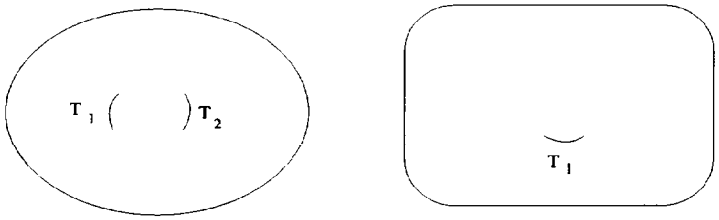
E. Is the air bag tethered?

Driver: X -Yes; - -No; If yes, record length of tether- 274

Passenger: X -Yes; - -No; If yes, record length of tether- 232

Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.
(Note: Not to scale; V_n = Vent hole$_n$, T_n = Tether$_n$).

Driver **Passenger**



F. Record part numbers and manufacturer name of the air bag and gas generator.

Driver: Air bag: P120235-62C TMH2248D0737

Generator: TTCDM2257M0699 POG43SJK CTCH8D5MASD CBLH853UCLS

Passenger: Air bag: -

Generator: TCJPB230730523 0468490AC 73427C C/L: A

DATA SHEET NO.19 ACCIDENT INVESTIGATION DIVISION DATA

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Dodge Caravan MPV

NHTSA Test No.: MW0302 VIN: 2B4-FP25B7WR-514130

Model Year: 1998 Build Date: 08/97 Test Date: October 2, 1997

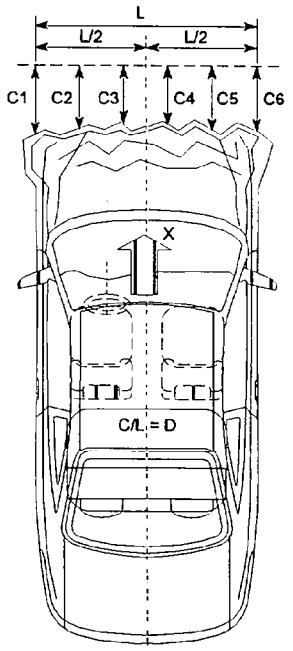
Vehicle Size Category: Minivan Test Weight: 1936 kg

Vehicle Wheelbase: 2895 mm; Front Overhang: 1407 mm; Overall Width: 1950 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions:

	PRE	POST	DIFF	
C1 =	4465	4110	-355	mm
C2 =	4650	4205	-445	mm
C3 =	4700	4190	-510	mm
C4 =	4700	4155	-545	mm
C5 =	4650	4060	-590	mm
C6 =	4475	4035	-440	mm



Midpoint of Damage: D = Vehicle Centerline (Longitud.)

Longitude Length of Damaged Region:

L1 = 1720 mm

L2 = 860 mm

L3 = 344 mm

Appendix A

PHOTOGRAPHS

PHOTOGRAPHS

PHOTOGRAPHS (continued)

PHOTOGRAPH NOT AVAILABLE

Figure A-1 LOAD CELL LOCATIONS

8413-1

Figure A-2 PRE-TEST FRONT VIEW

Figure A-3 POST-TEST FRONT VIEW

Figure A-4 PRE-TEST LEFT SIDE VIEW

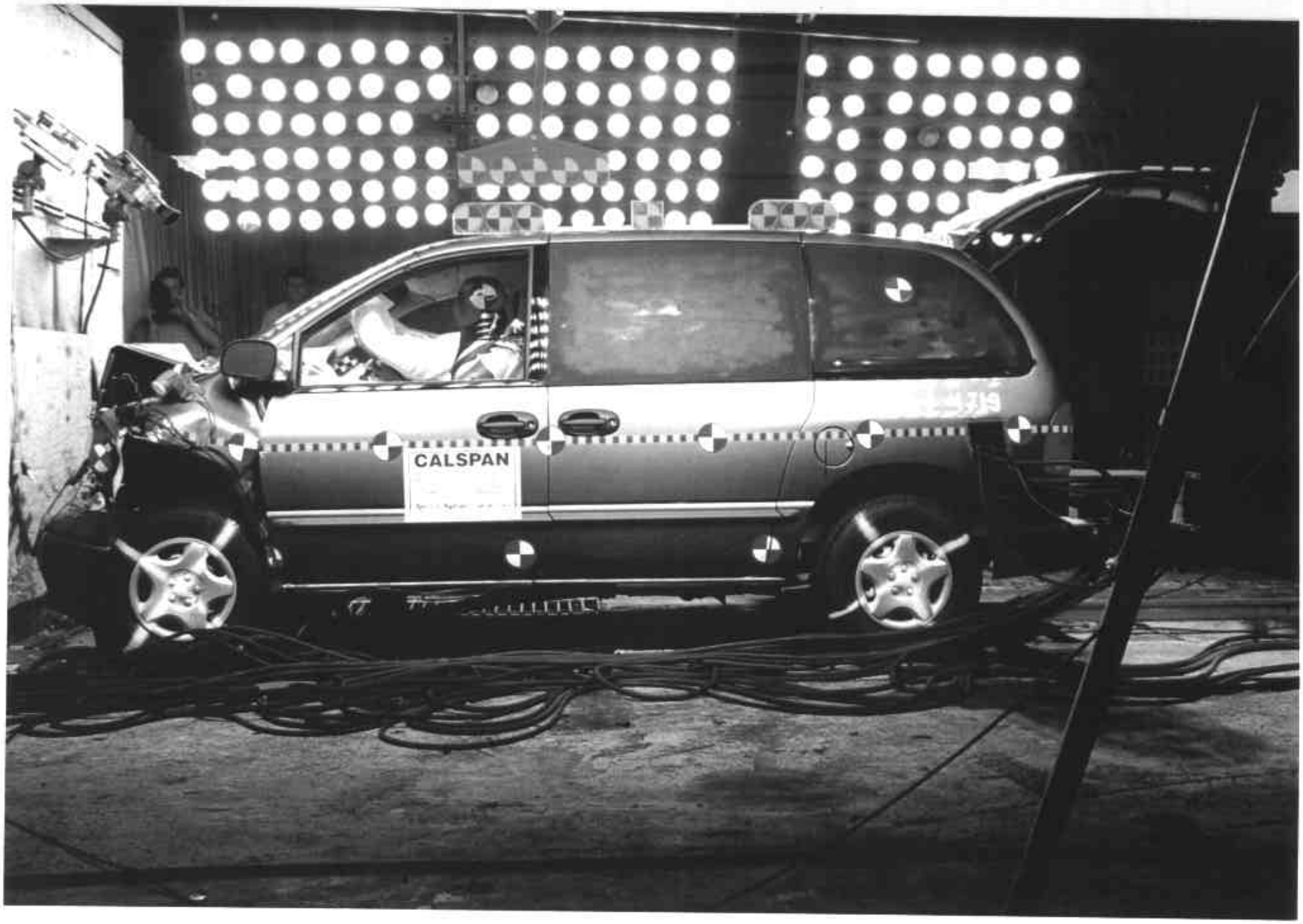


Figure A-5 POST-TEST LEFT SIDE VIEW

Figure A-6 PRE-TEST RIGHT SIDE VIEW

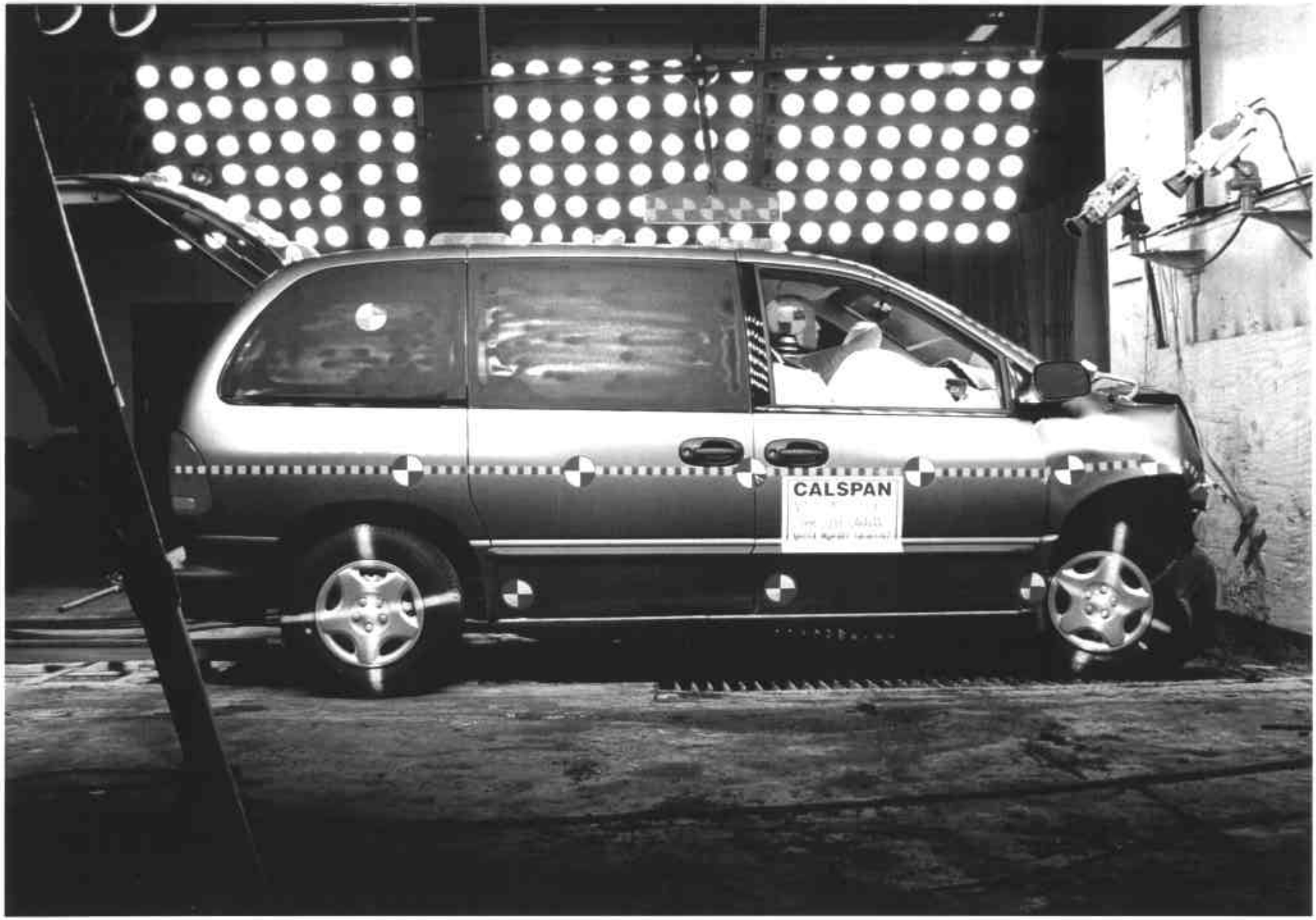


Figure A-7 POST-TEST RIGHT SIDE VIEW

Figure A-8 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

Figure A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

8413-1

Figure A-10 PRE-TEST LEFT REAR THREE-QUARTER VIEW

Figure A-11 POST-TEST LEFT REAR THREE-QUARTER VIEW

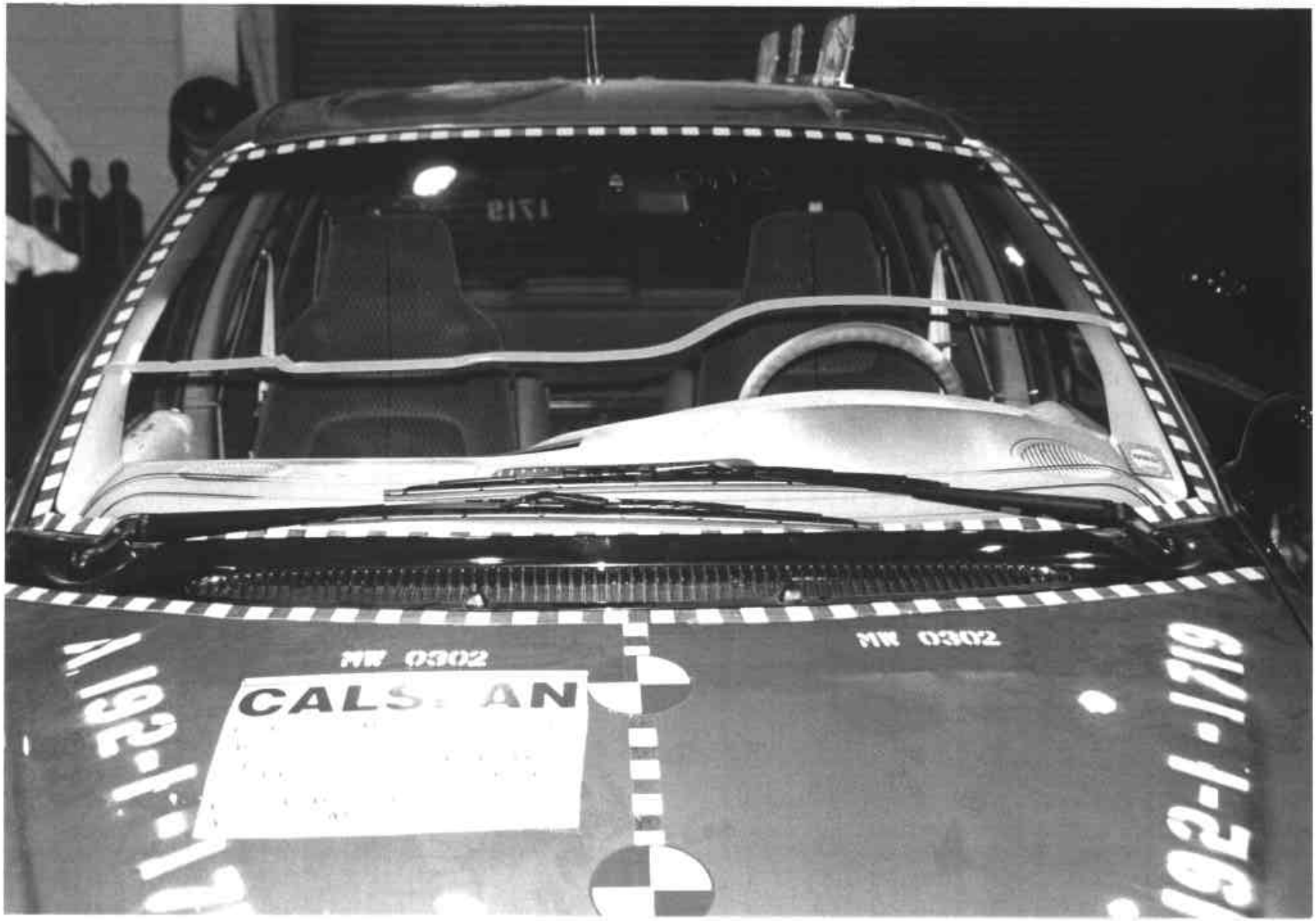


Figure A-12 PRE-TEST WINDSHIELD VIEW

Figure A-13 POST-TEST WINDSHIELD VIEW

Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

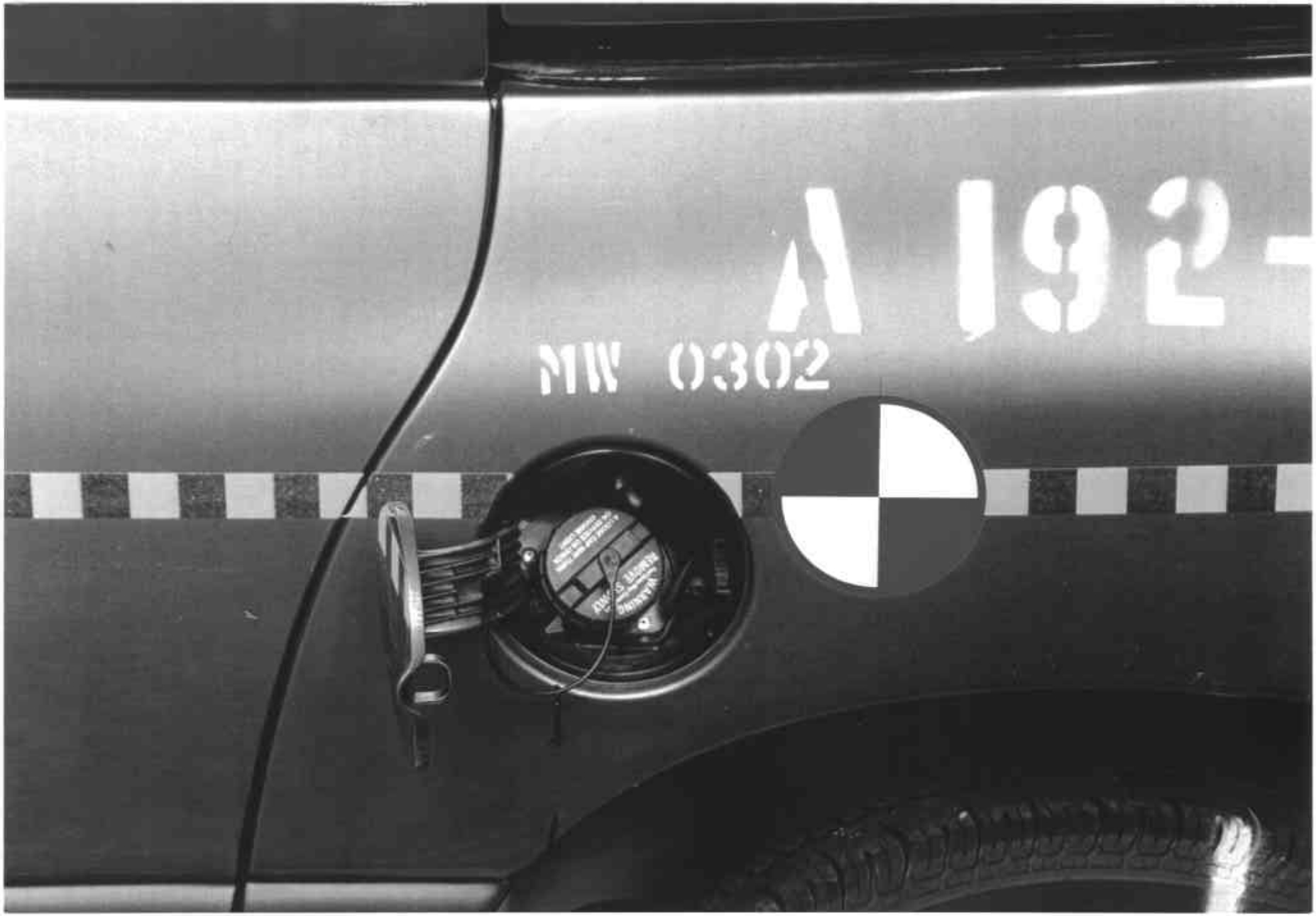


Figure A-15 FUEL CAP VIEW

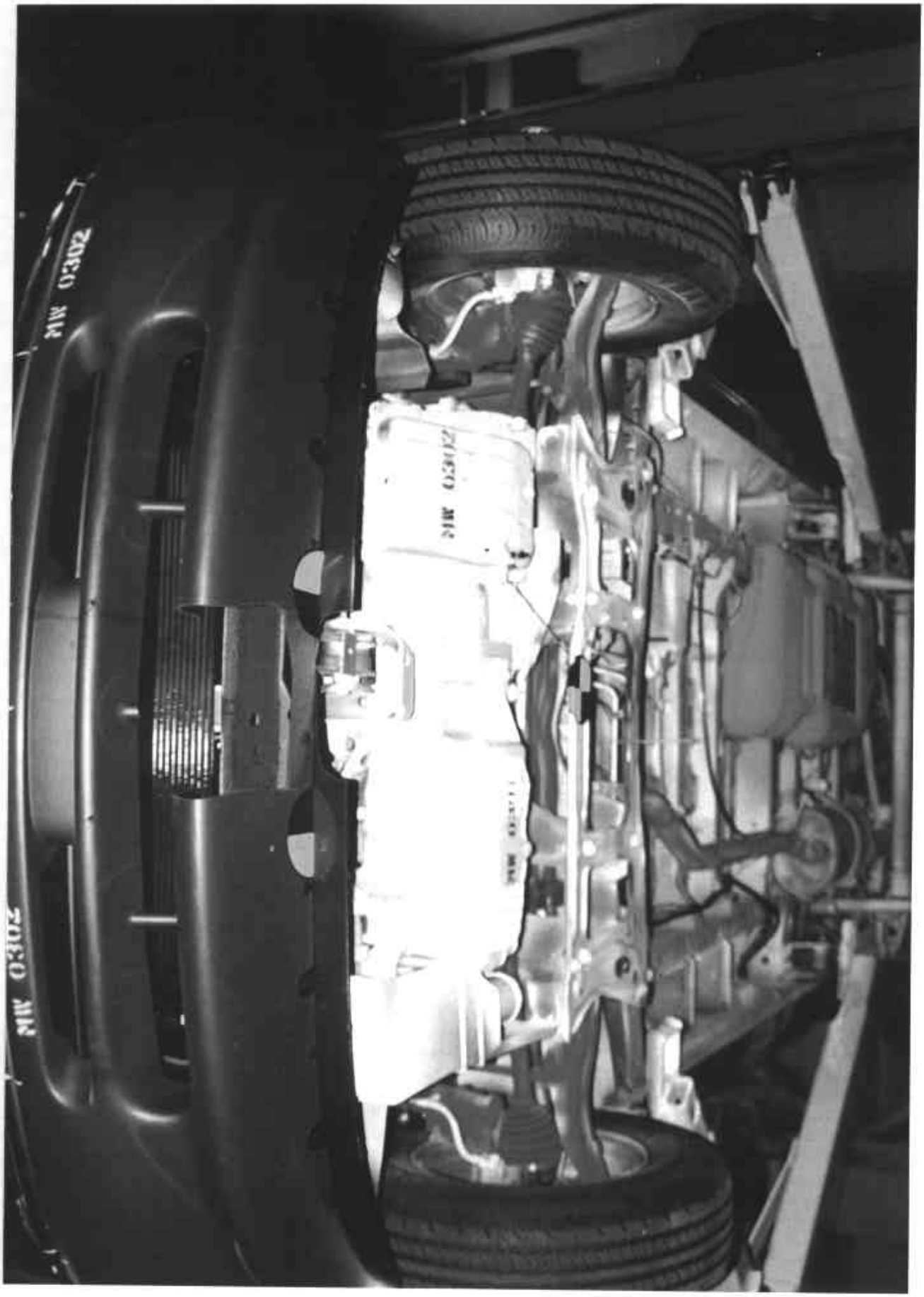


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

Figure A-17 POST-TEST FRONT UNDERBODY VIEW

Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

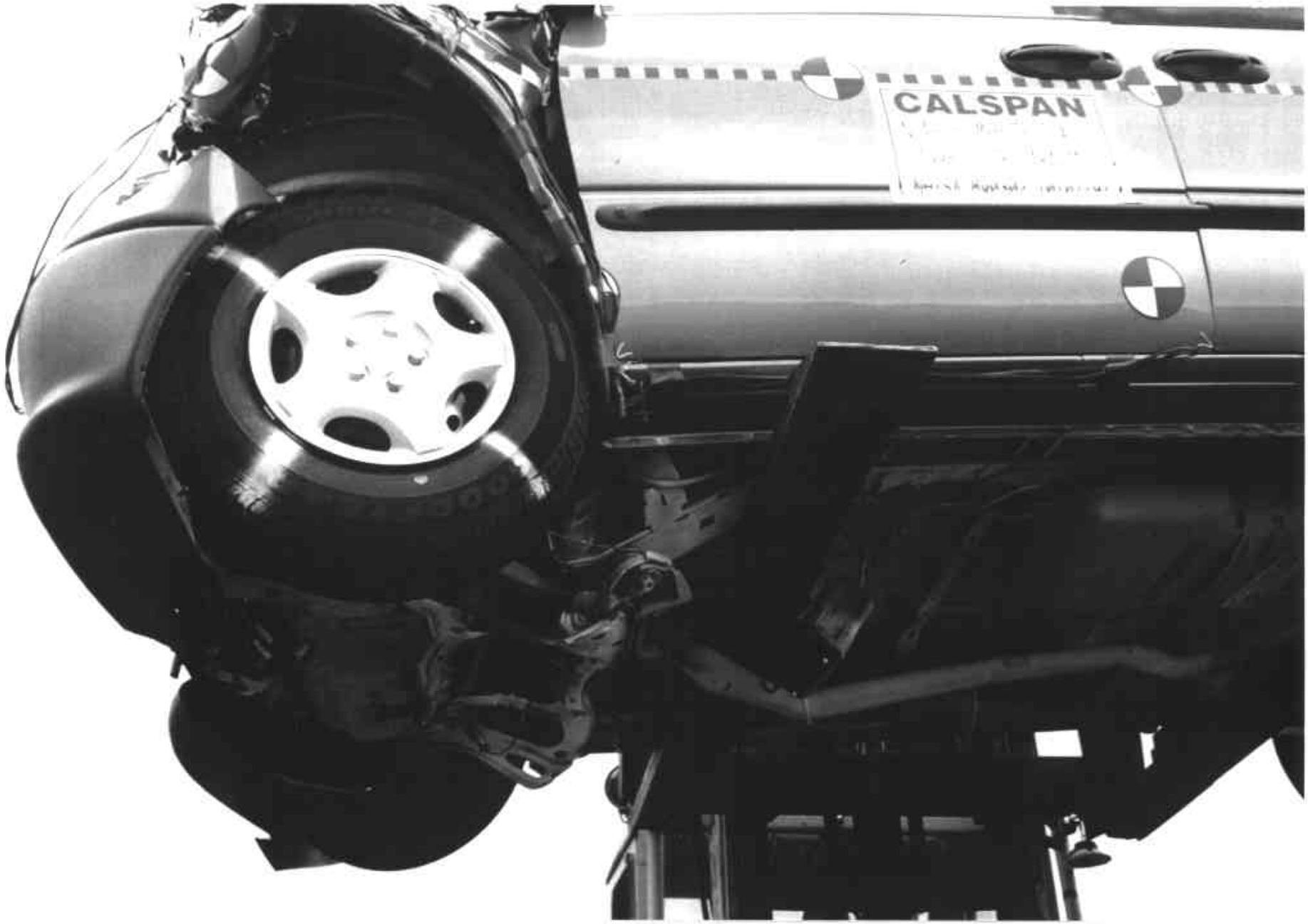


Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW

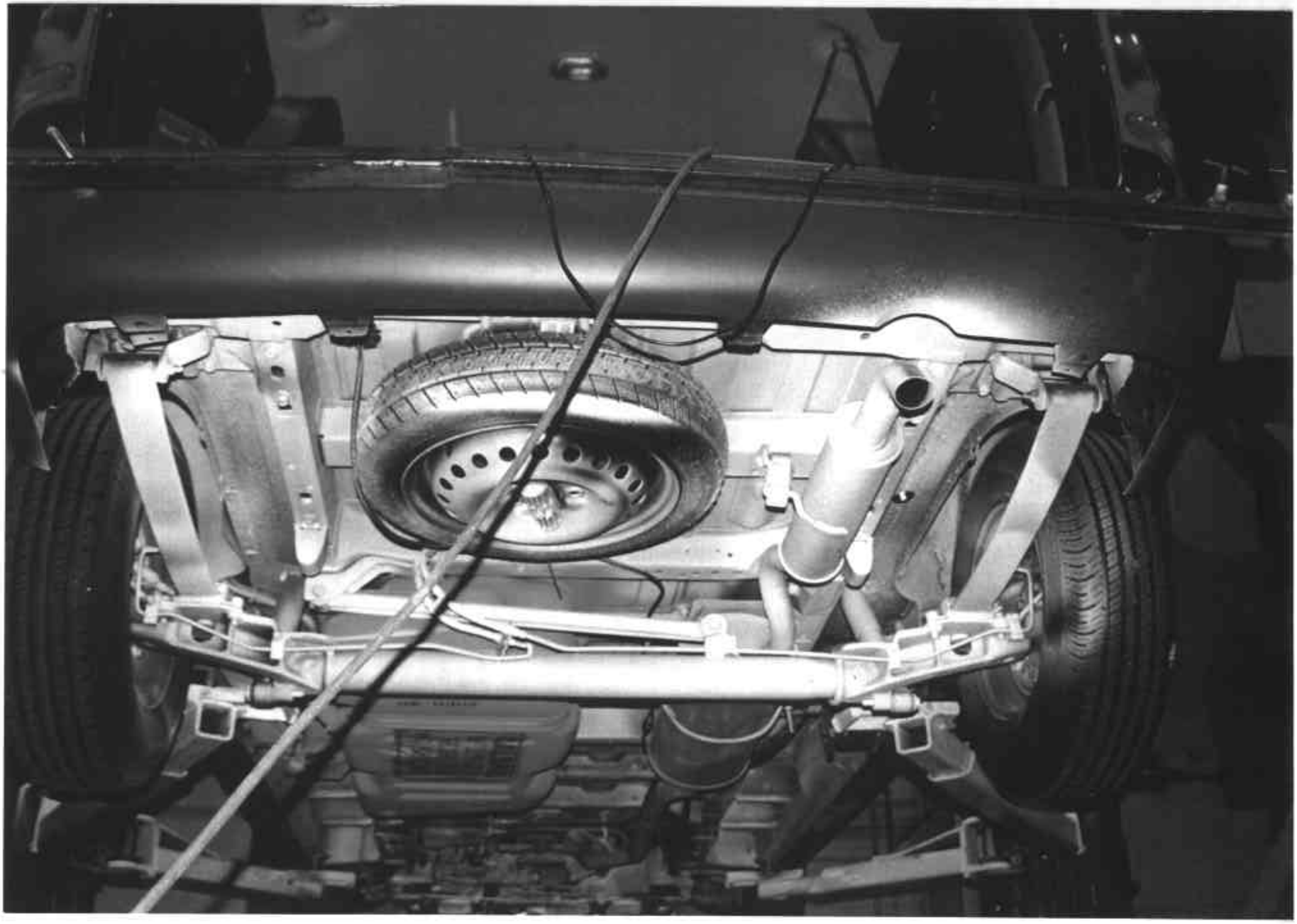


Figure A-20 PRE-TEST REAR UNDERBODY VIEW

Figure A-21 POST-TEST REAR UNDERBODY VIEW

Figure A-22 PRE-TEST DRIVER POSITION VIEW

Figure A-23 POST-TEST DRIVER POSITION VIEW

Figure A-24 PRE-TEST PASSENGER POSITION VIEW

Figure A-25 POST-TEST PASSENGER POSITION VIEW

Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW

Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW

Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

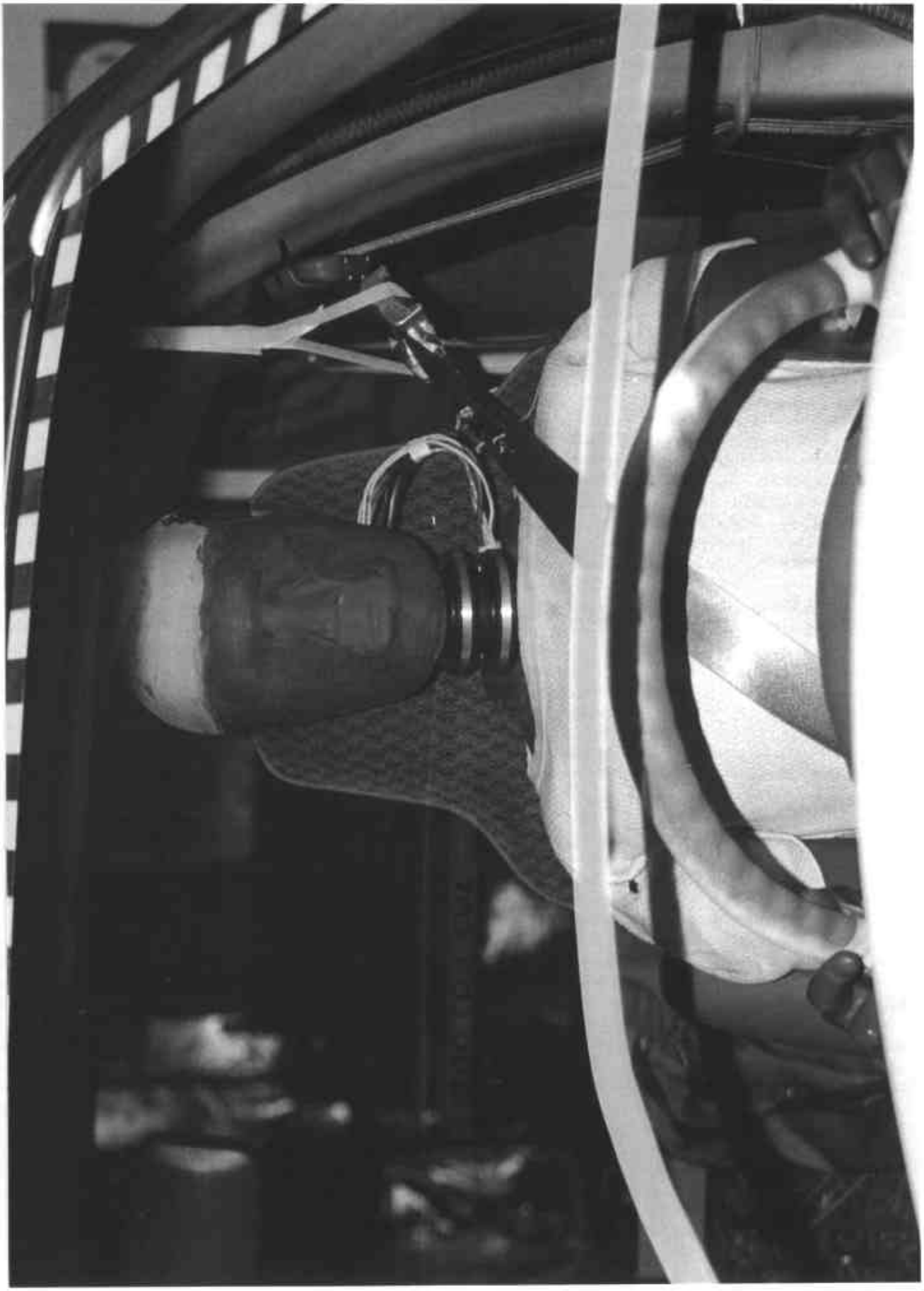


Figure A-30 PRE-TEST DRIVER HEAD LOCATION

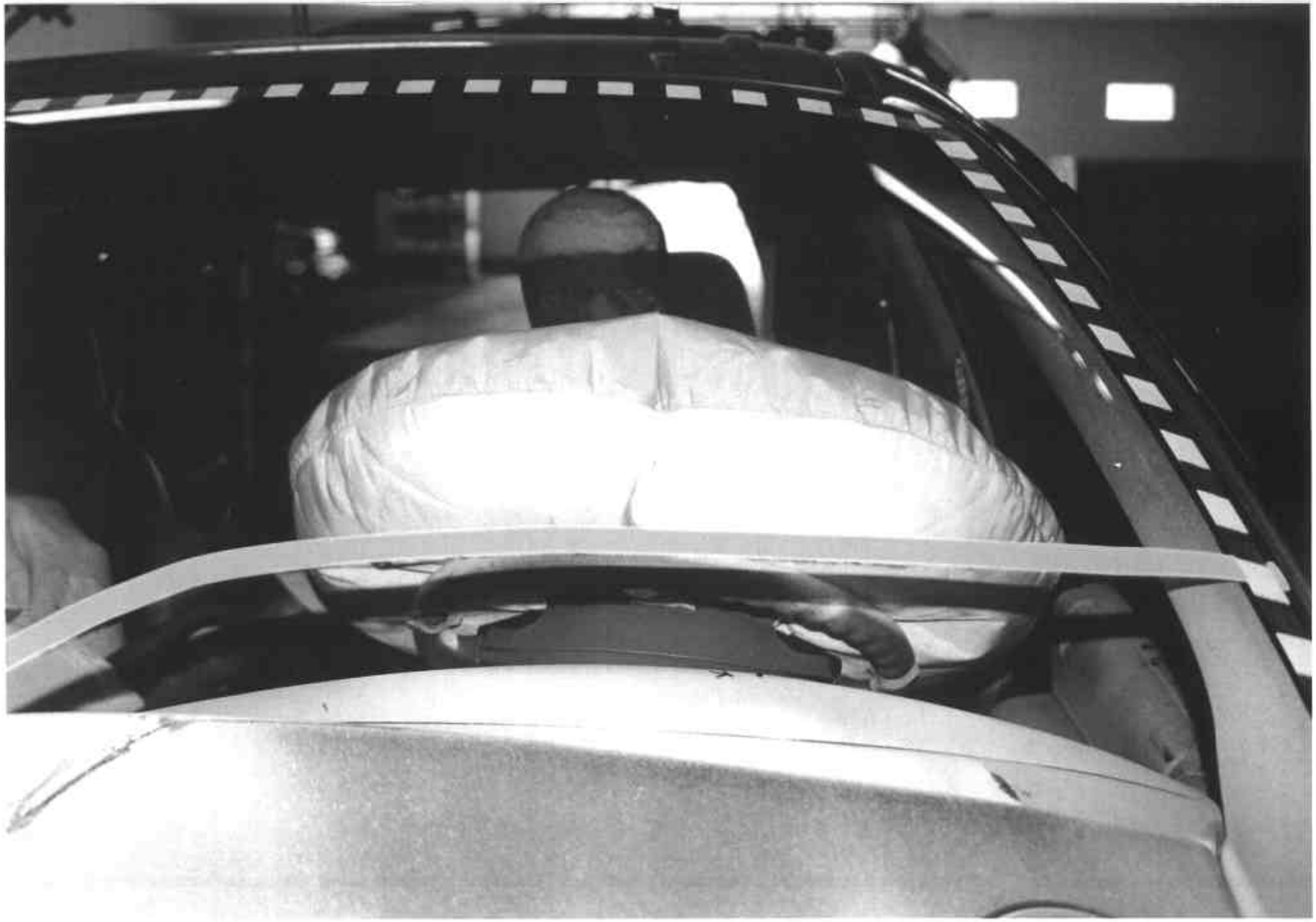


Figure A-31 POST-TEST DRIVER HEAD LOCATION

Figure A-32 PRE-TEST PASSENGER HEAD LOCATION

Figure A-33 POST-TEST PASSENGER HEAD LOCATION

Figure A-34 PRE-TEST DRIVER FLOOR PAN VIEW

Figure A-35 POST-TEST DRIVER FLOOR PAN VIEW

Figure A-36 PRE-TEST PASSENGER FLOOR PAN VIEW

Figure A-37 POST-TEST PASSENGER FLOOR PAN VIEW

Figure A-38 ROLLOVER VIEW

Figure A-39 IMPACT VIEW

Appendix B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers

Transducer	DOT/NHTSA Sign Convention (positive unless noted)
Upper Neck Load Cell	Fx Head forward Fy Head left Fz Neck in tension Mx Right ear to right shoulder My Chin to chest (flexion) Mz Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative
Pelvic Load Cell (Lower Lumbar)	Fx Chest forward Fy Chest left Fz Spine in tension
Femur Load Cell	Compression is negative
Upper Tibia Load Cell (right and left leg)	Mx Support tibia, load right side center My Support tibia, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fy Foot right w/r to left Fz Tibia in tension Mx Support tibia, press right side center

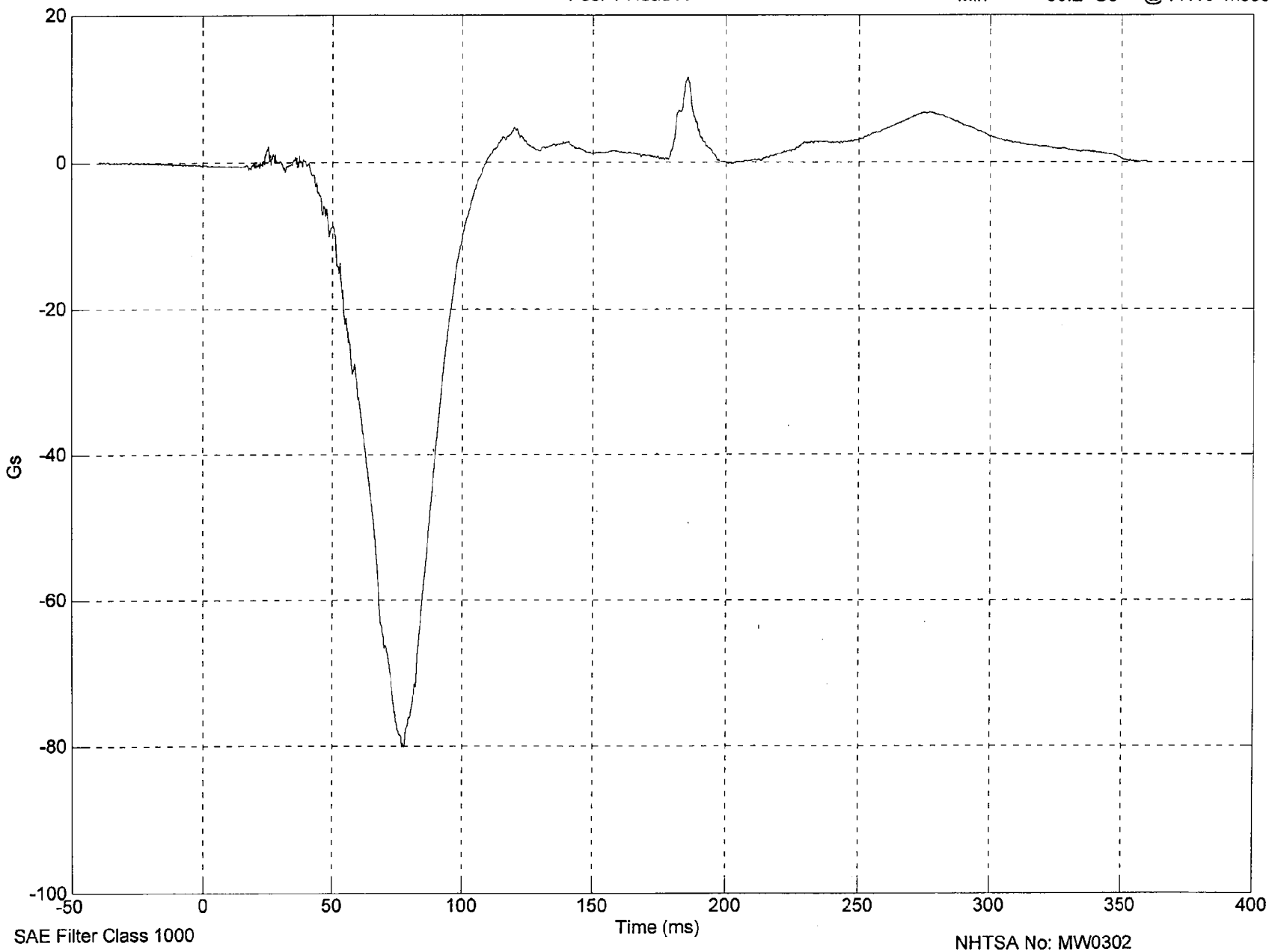
NHTSA TEST NO. MW0302

DUMMY DATA

CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Chest Displacements	60
Femur Forces	600
Belt Loads	60
Belt Displacements	180
Neck Forces	1000
Neck Moments	600

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 11.6 Gs @ 185.70 msec
Min = -80.2 Gs @ 77.10 msec



SAE Filter Class 1000

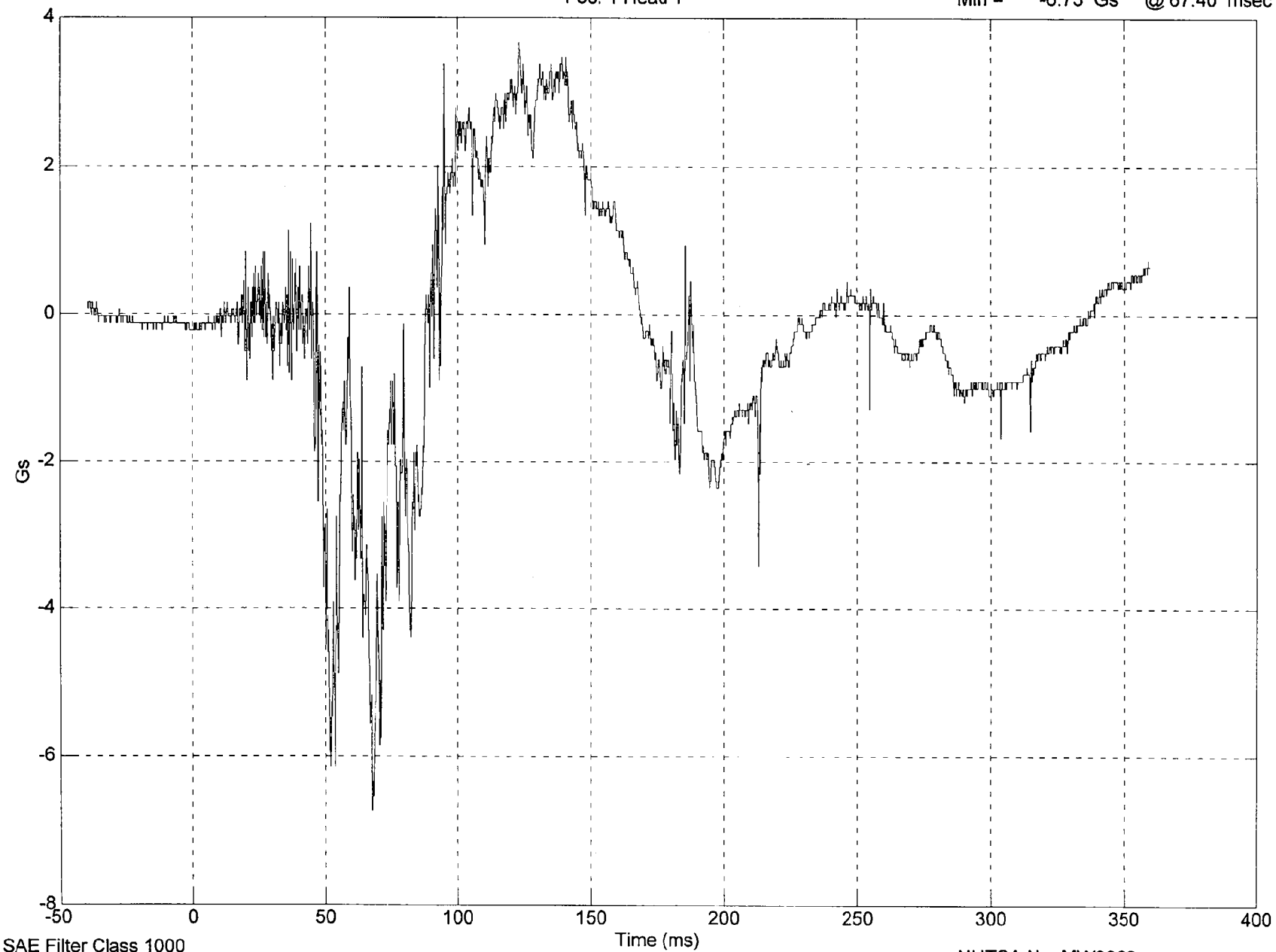
NHTSA No: MW0302
Date: 02 Oct 1997

B-4

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 3.67 Gs @ 123.10 msec
Min = -6.73 Gs @ 67.40 msec



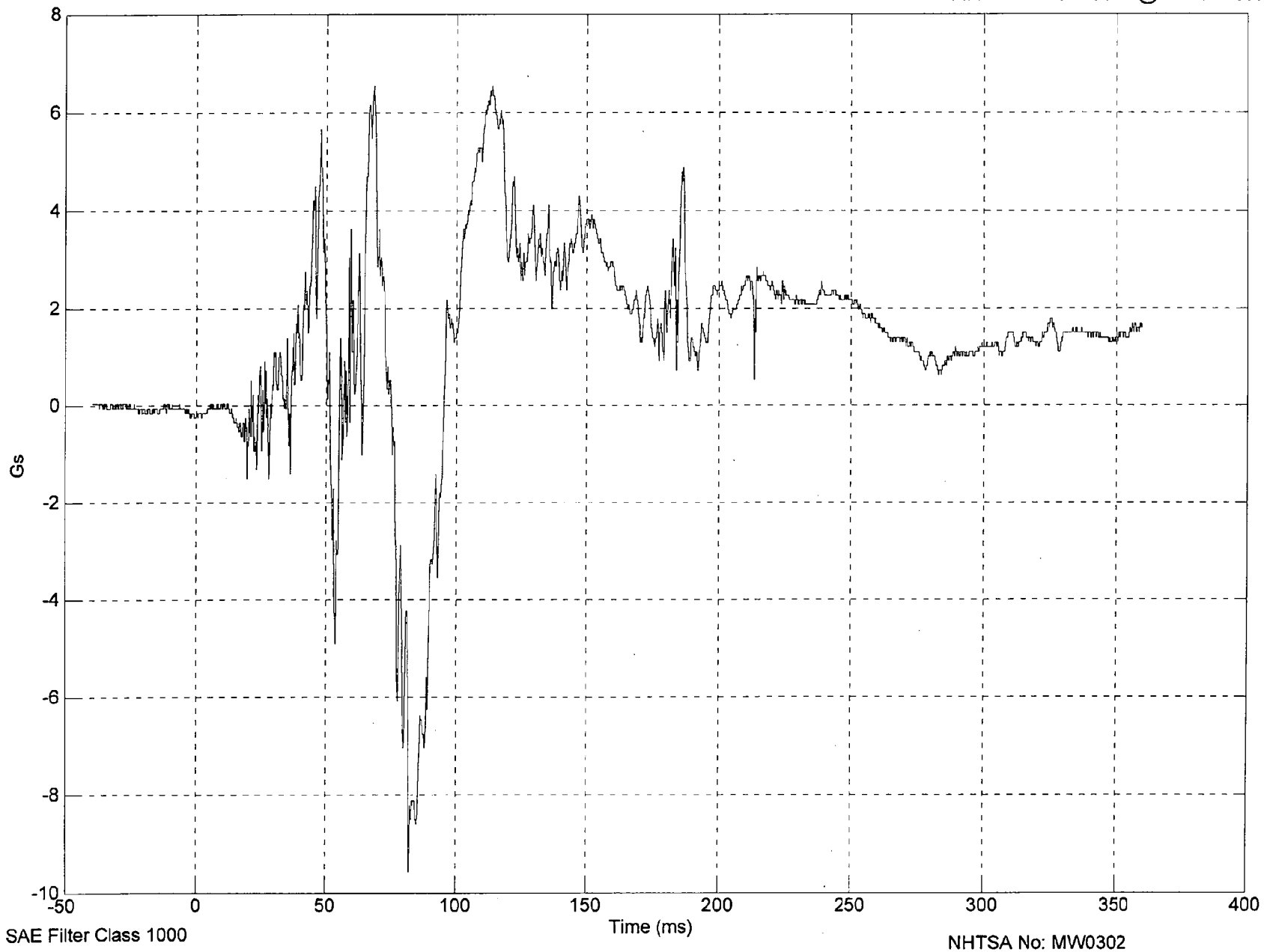
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 6.54 Gs @ 68.30 msec
Min = -9.57 Gs @ 82.40 msec

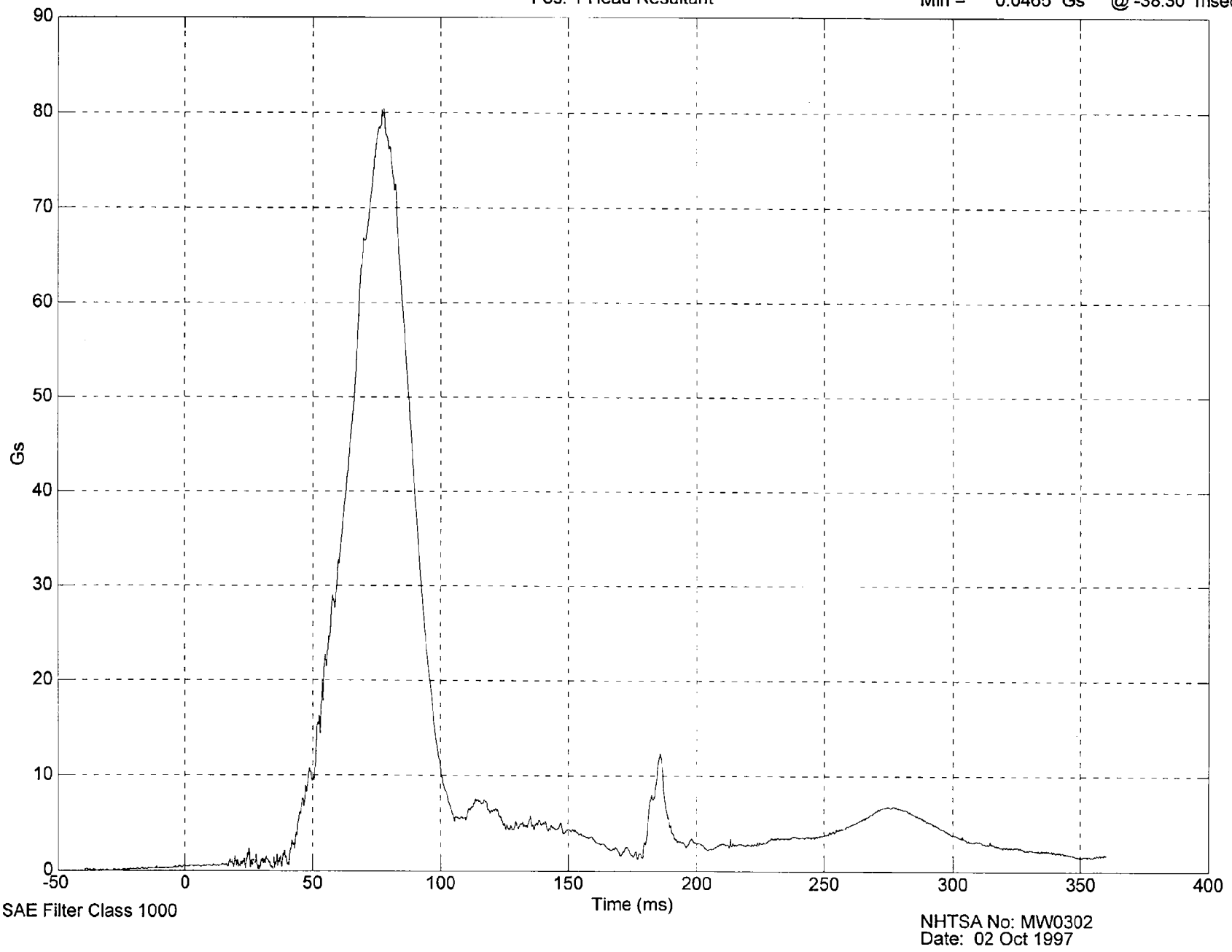


SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 80.4 Gs @ 77.70 msec
Min = 0.0465 Gs @ -38.30 msec



SAE Filter Class 1000

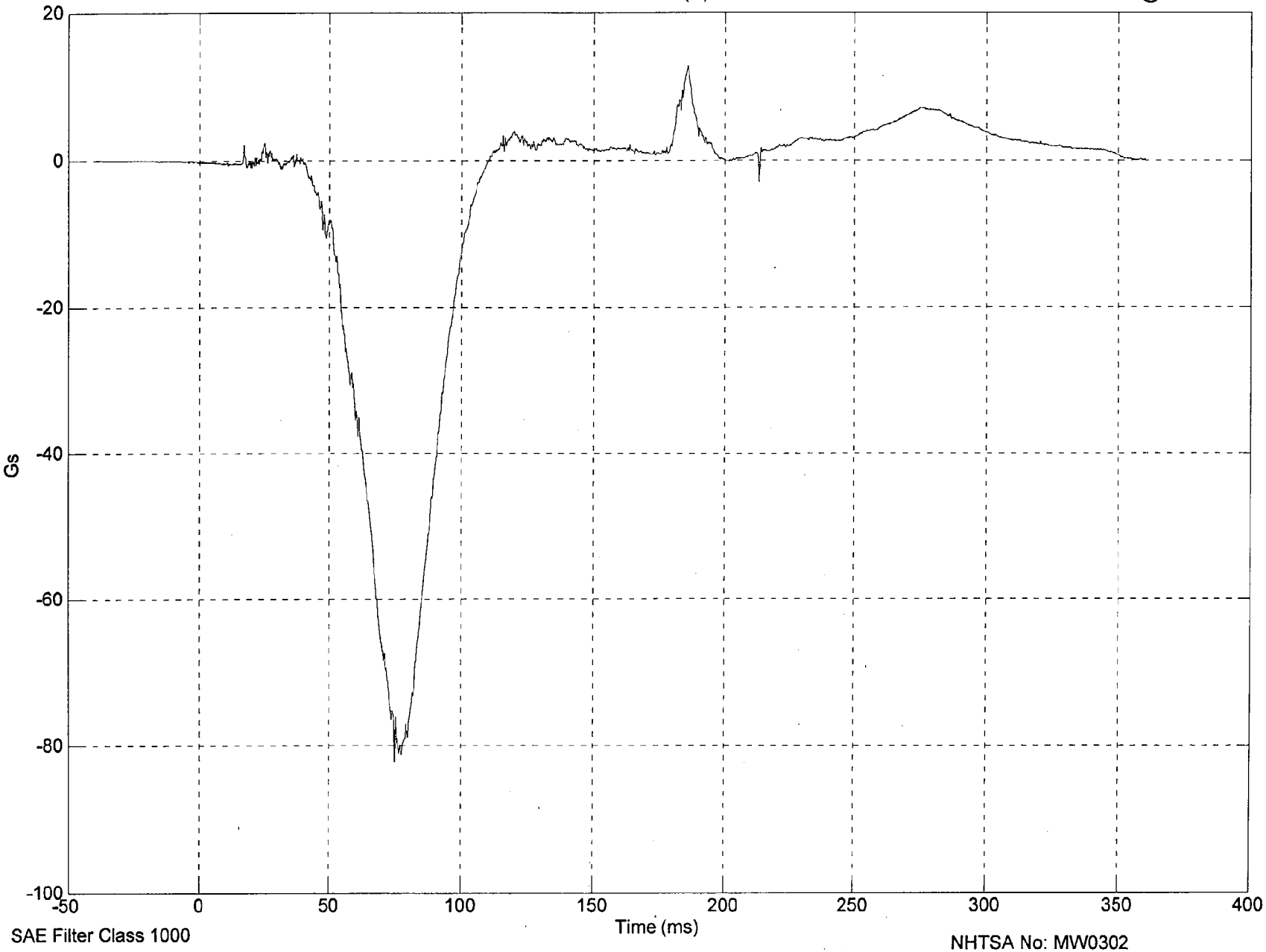
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Head X(R)

Max = 12.8 Gs @ 185.80 msec
Min = -82.3 Gs @ 75.40 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

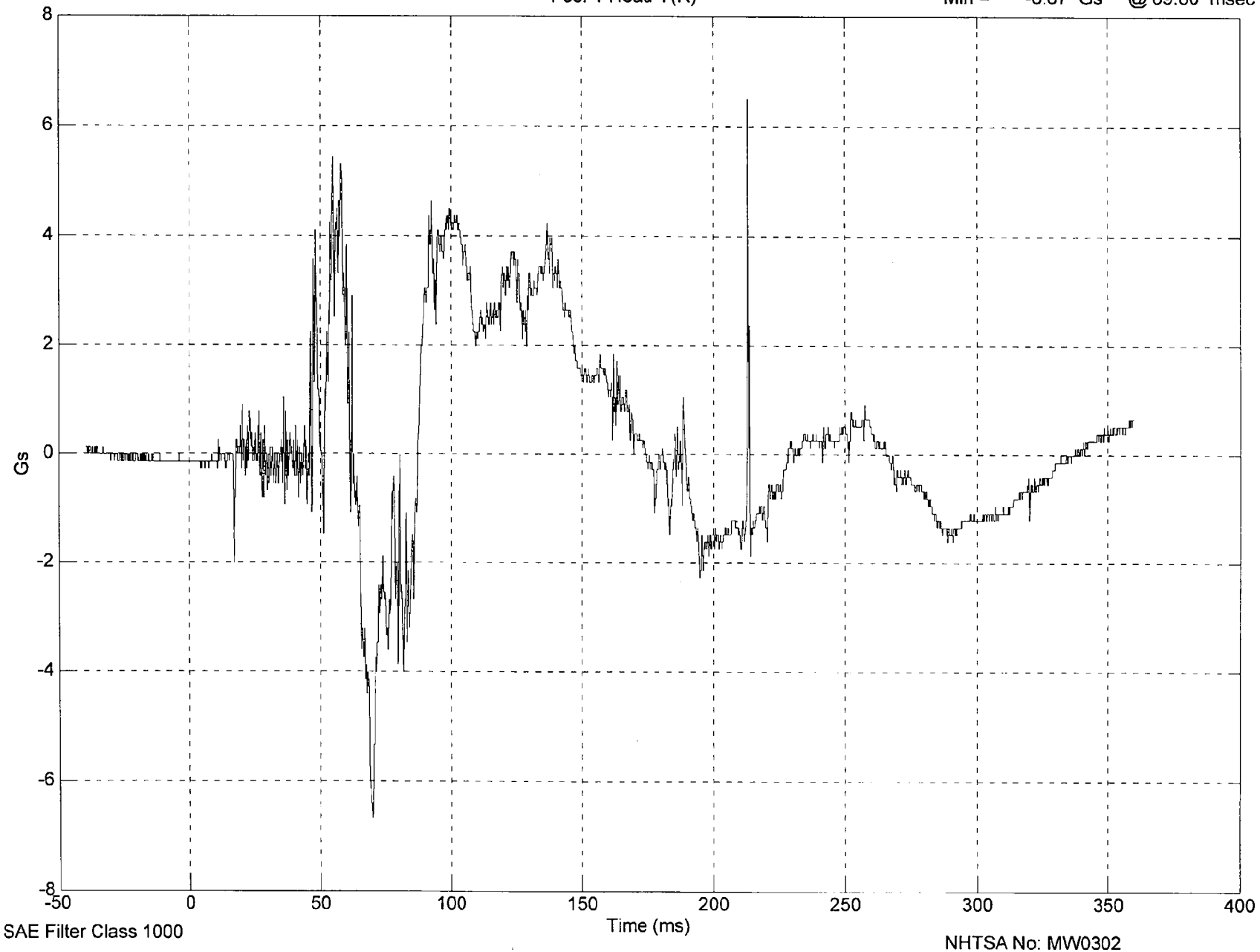
B-8

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Head Y(R)

Max = 6.51 Gs @ 213.30 msec
Min = -6.67 Gs @ 69.80 msec



SAE Filter Class 1000

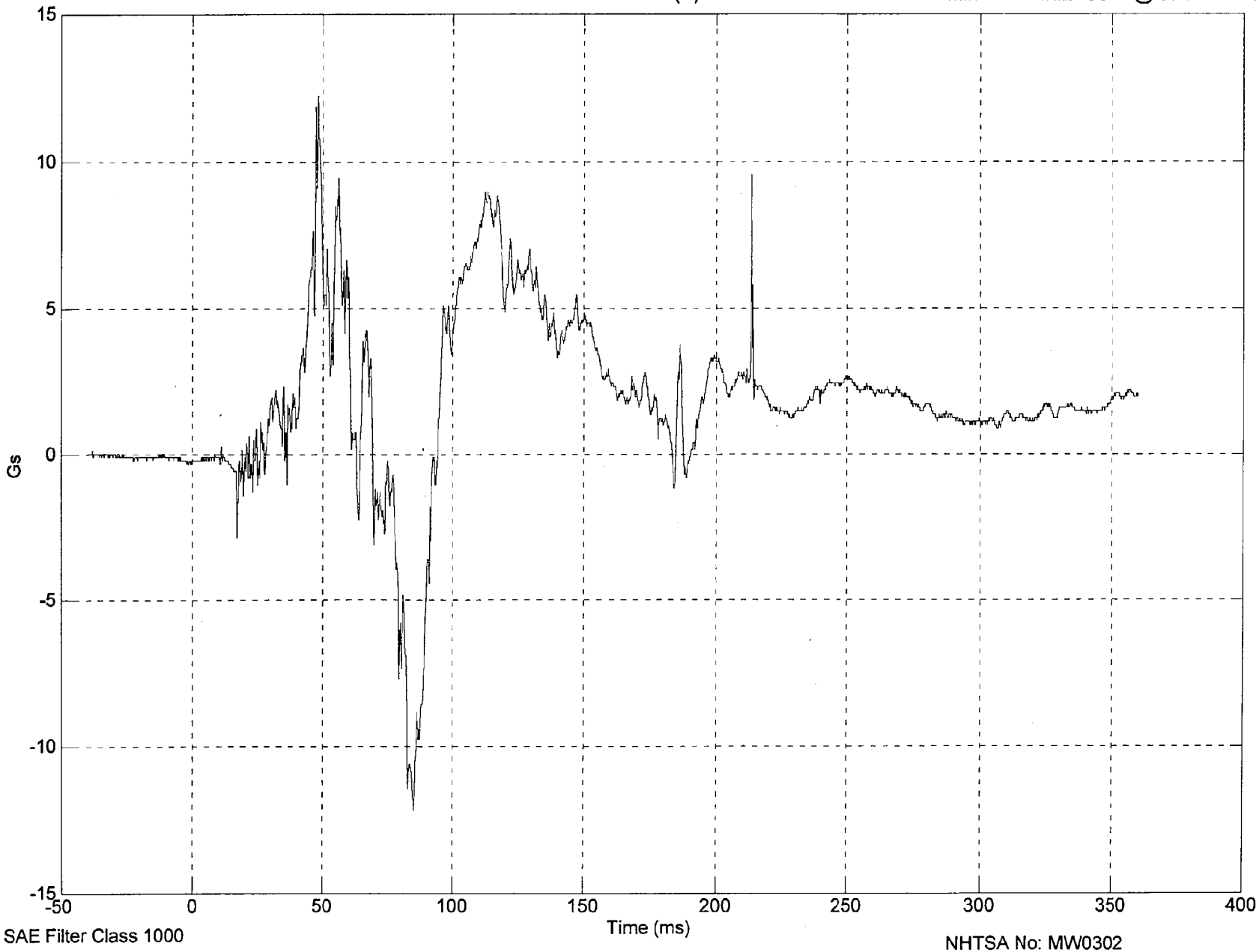
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Head Z(R)

Max = 12.2 Gs @ 48.10 msec
Min = -12.2 Gs @ 85.30 msec



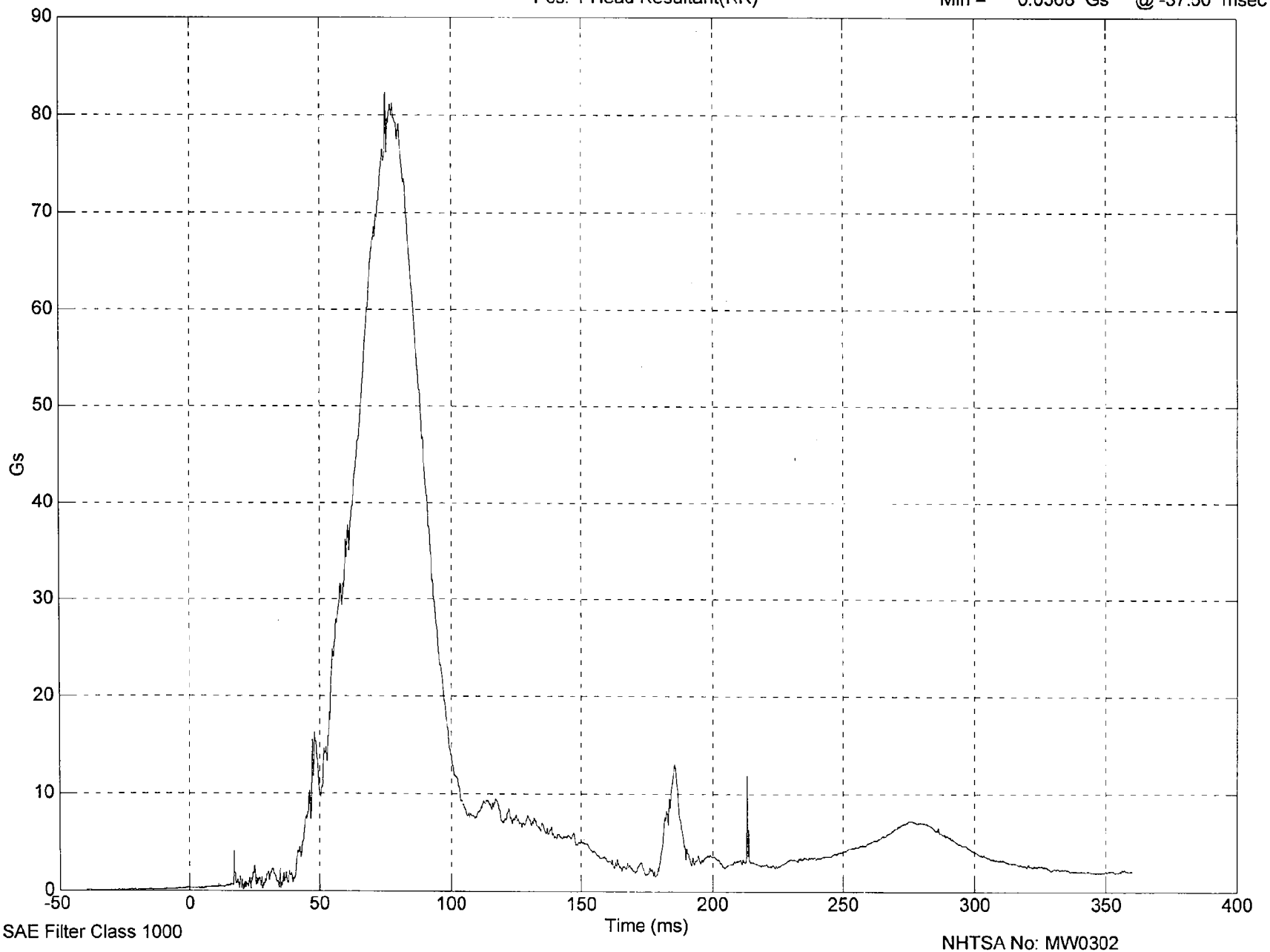
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 82.4 Gs @ 75.40 msec
Min = 0.0368 Gs @ -37.50 msec



SAE Filter Class 1000

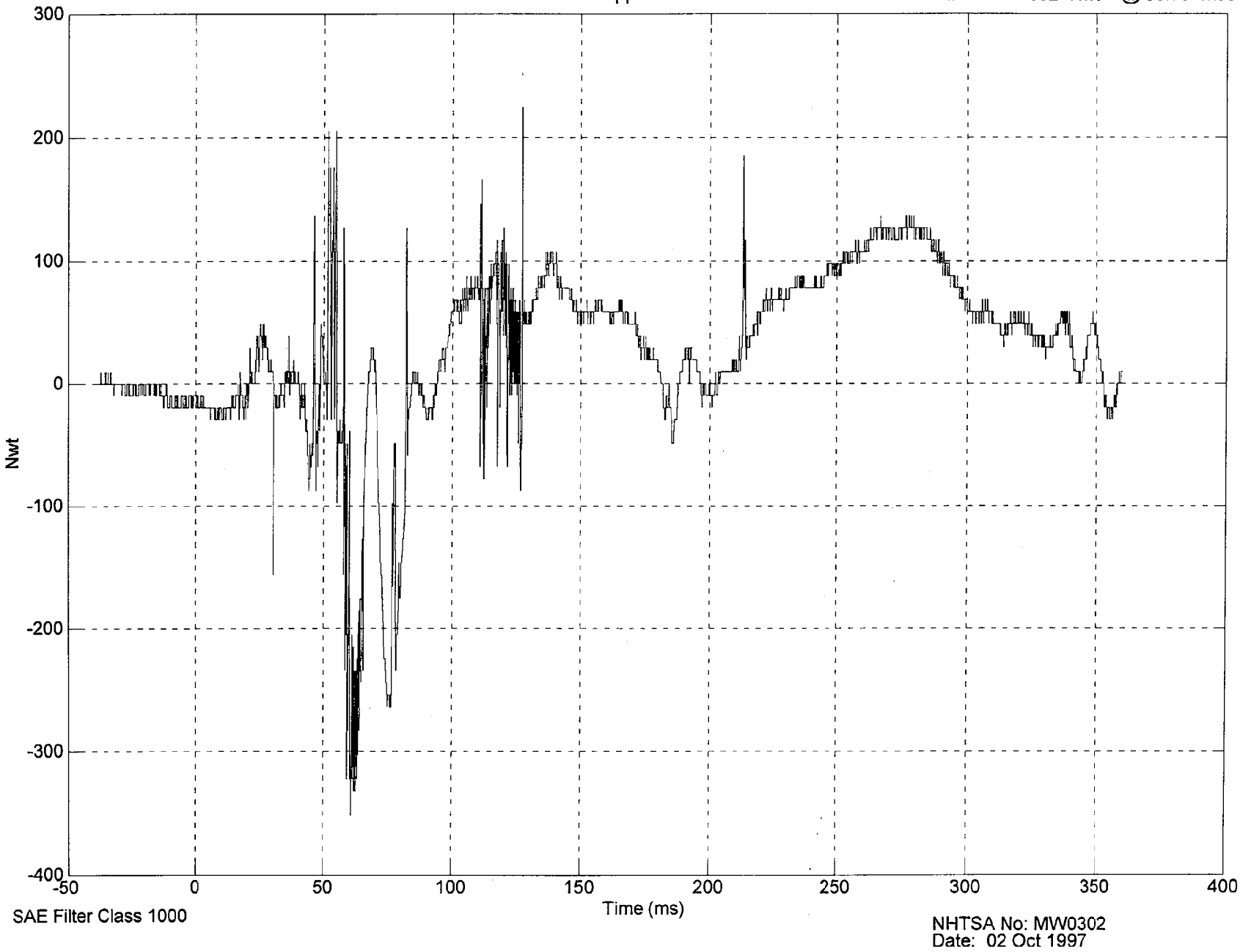
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Upper Neck Fx

Max = 225 Nwt @ 127.10 msec
Min = -352 Nwt @ 60.70 msec



SAE Filter Class 1000

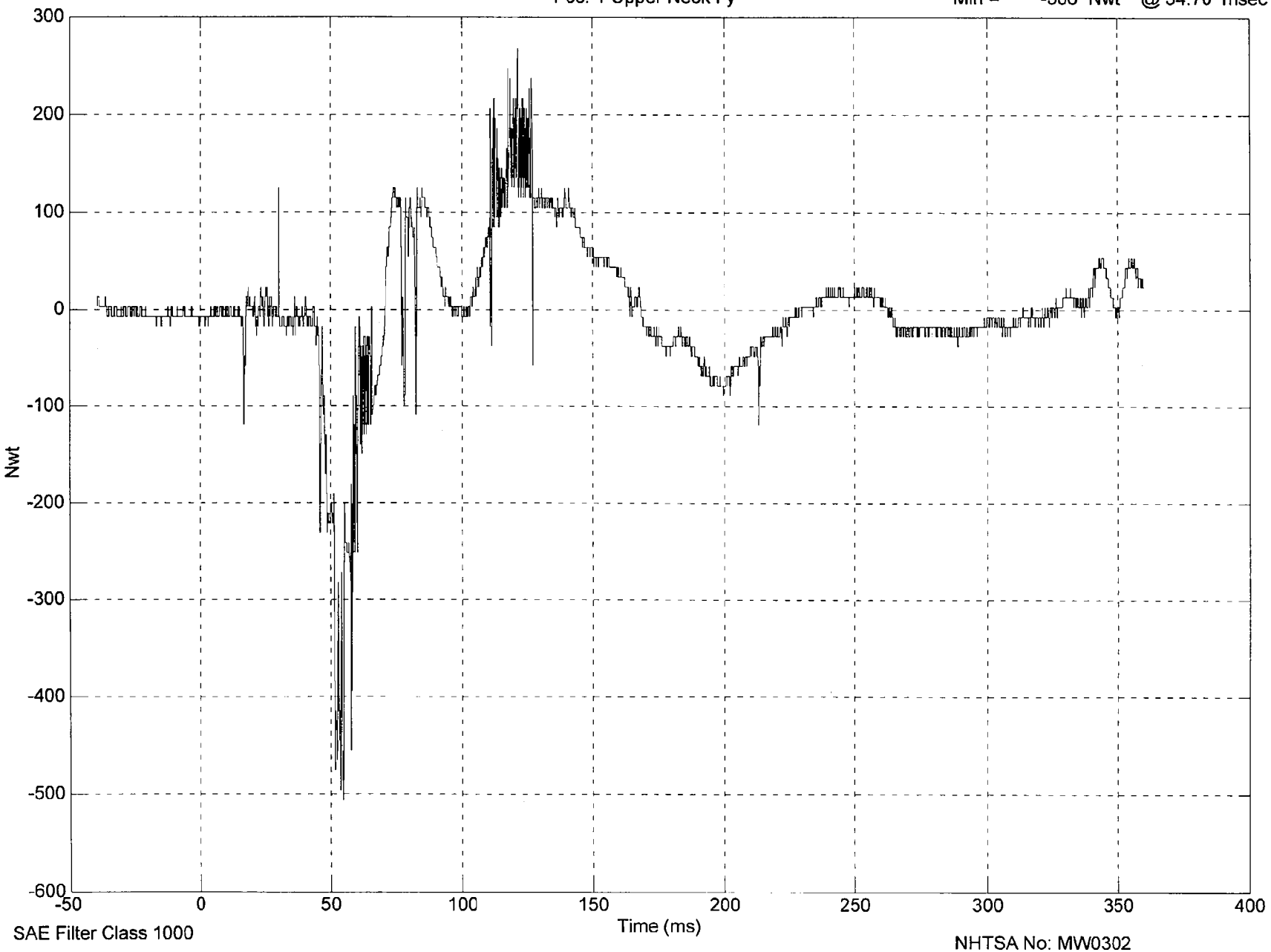
NHTSA No: MW0302
Date: 02 Oct 1997

B-12

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 268 Nwt @ 121.50 msec
Min = -506 Nwt @ 54.70 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

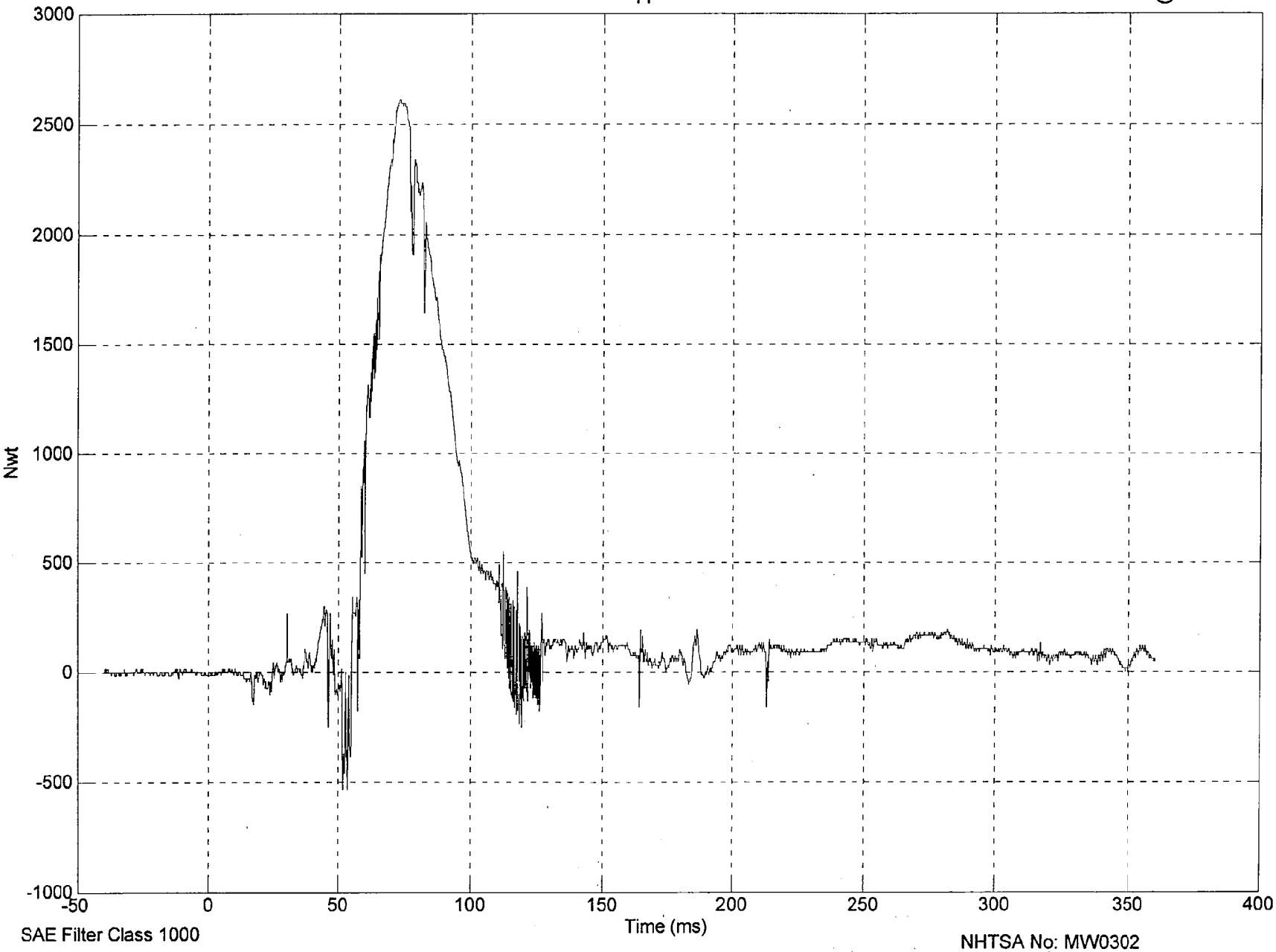
B-13

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Upper Neck Fz

Max = 2.61e+003 Nwt @ 72.70 msec
Min = -536 Nwt @ 51.60 msec



B-14

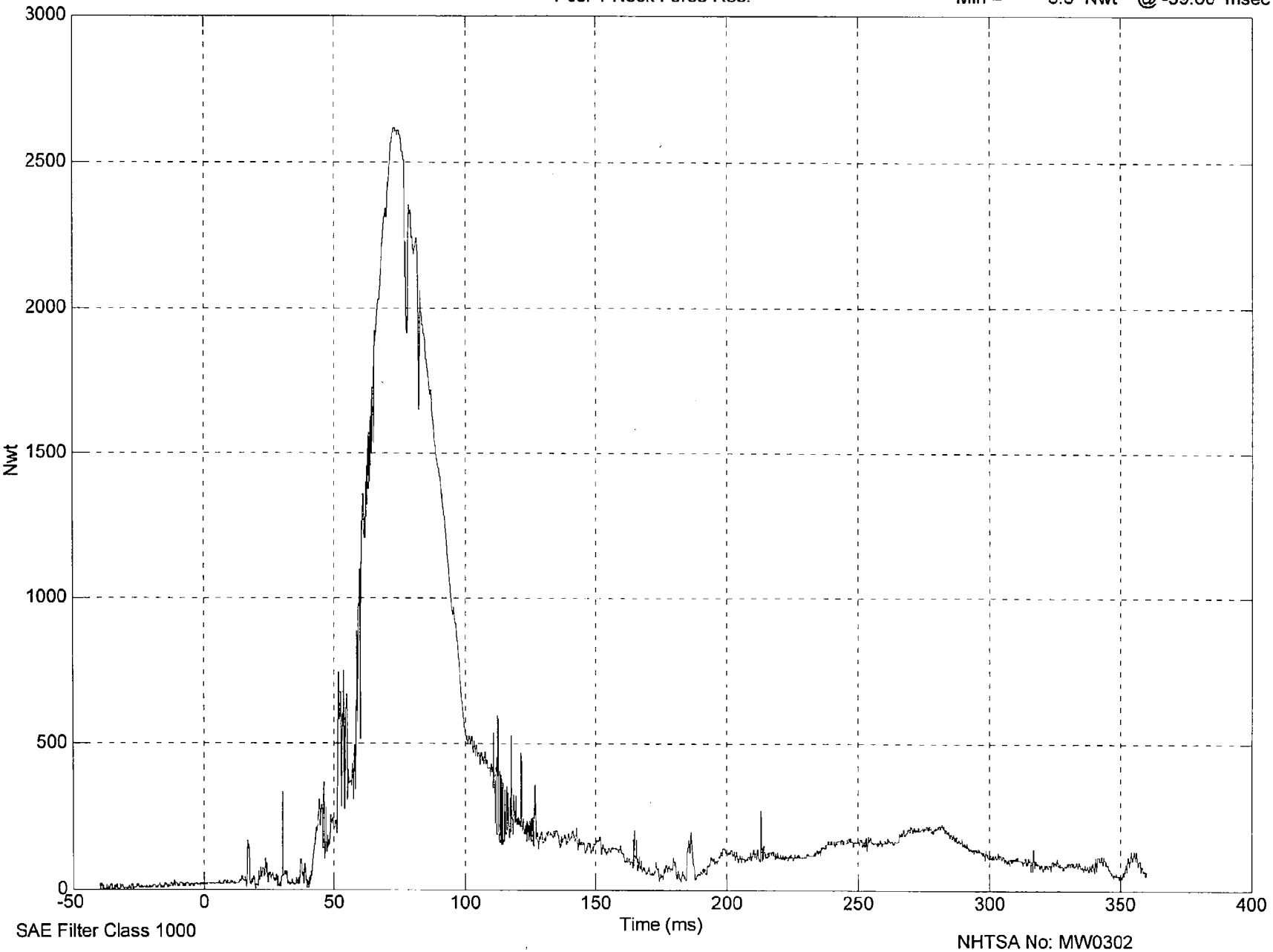
8413-1

SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 2.62e+003 Nwt @ 73.30 msec
Min = 3.3 Nwt @ -39.60 msec



B-15

8413-1

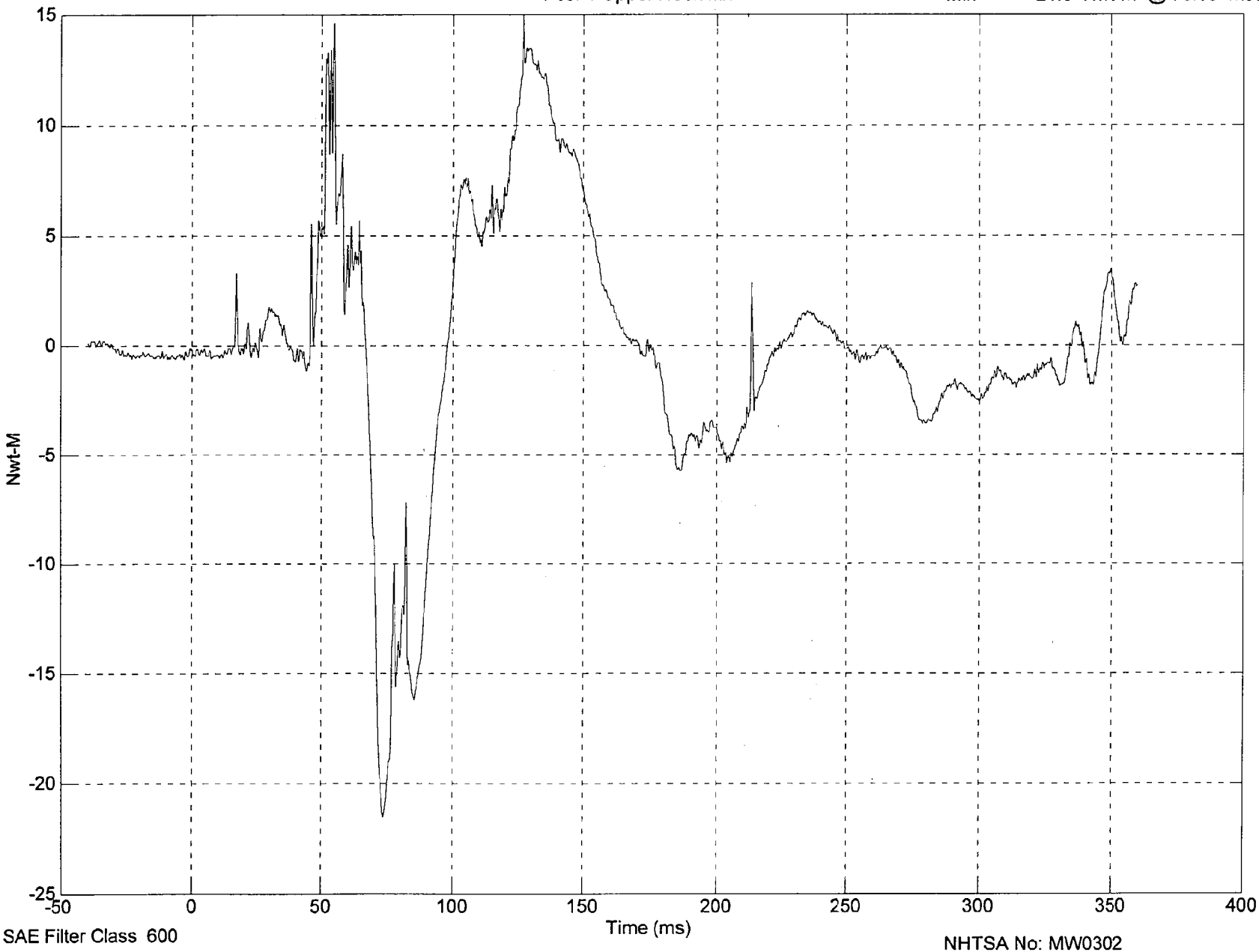
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Upper Neck Mx

Max = 15 Nwt-M @ 126.80 msec
Min = -21.5 Nwt-M @ 73.80 msec



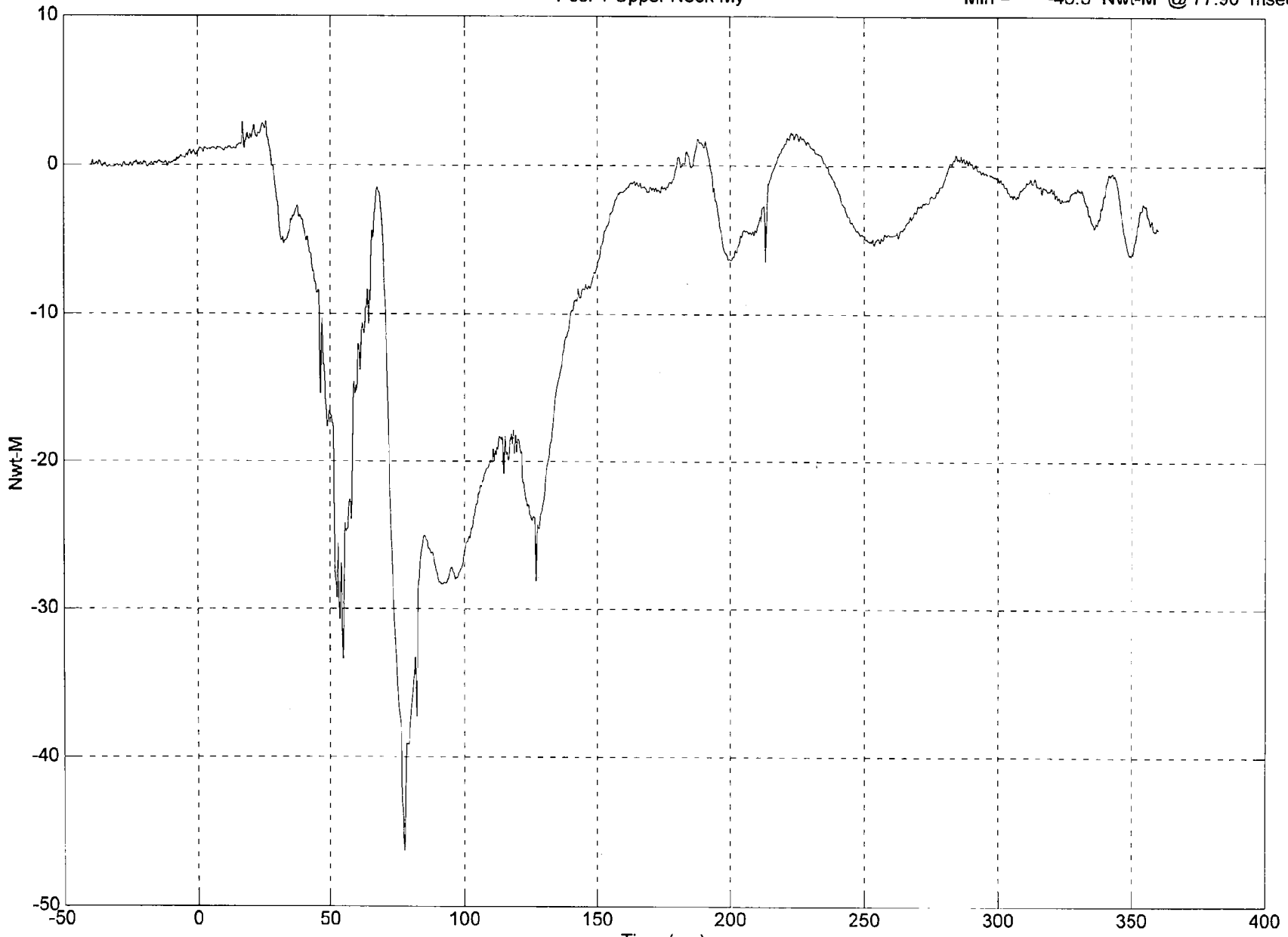
SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Upper Neck My

Max = 2.94 Nwt-M @ 25.60 msec
Min = -46.3 Nwt-M @ 77.90 msec



SAE Filter Class 600

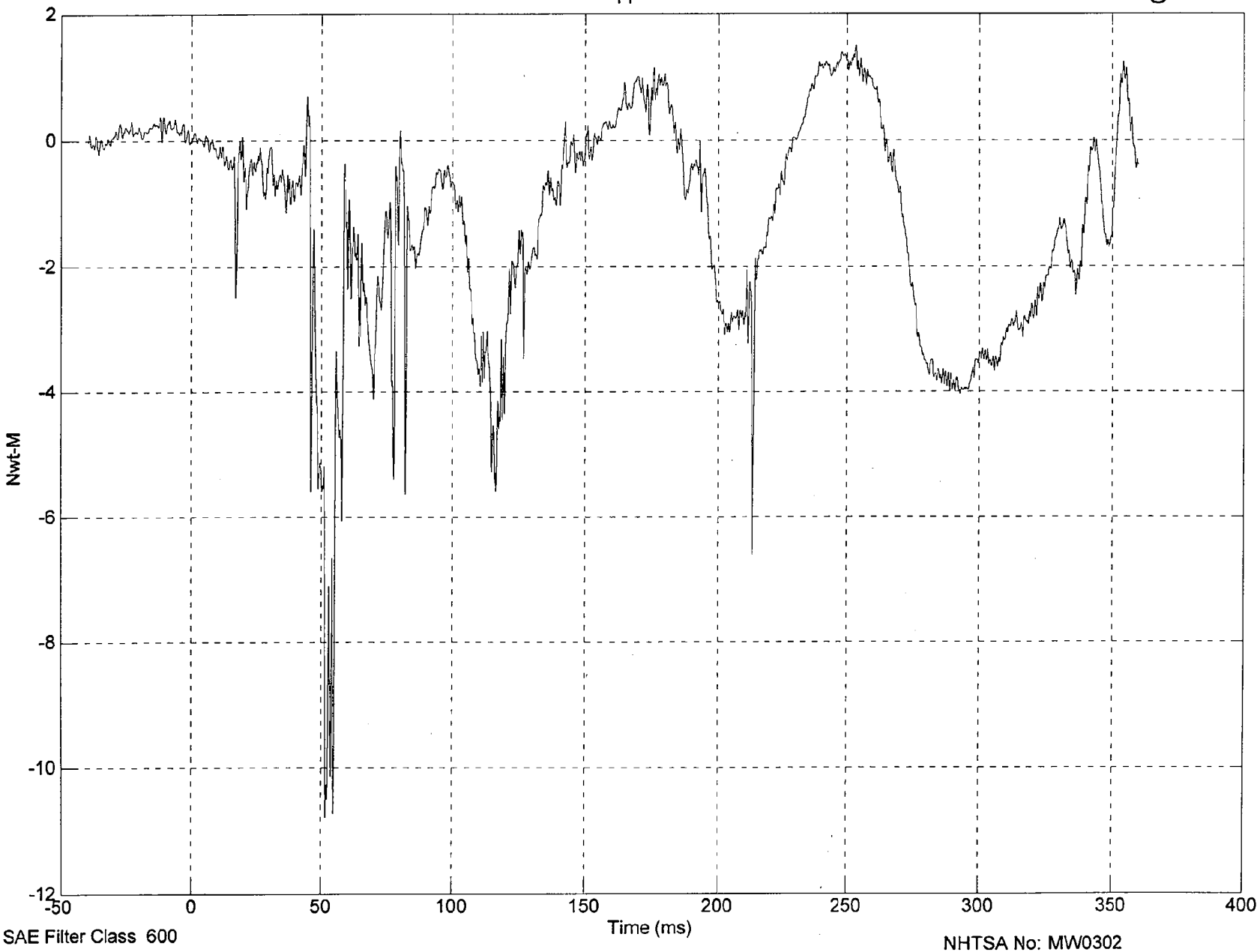
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Upper Neck Mz

Max = 1.5 Nwt-M @ 253.20 msec
Min = -10.8 Nwt-M @ 51.70 msec

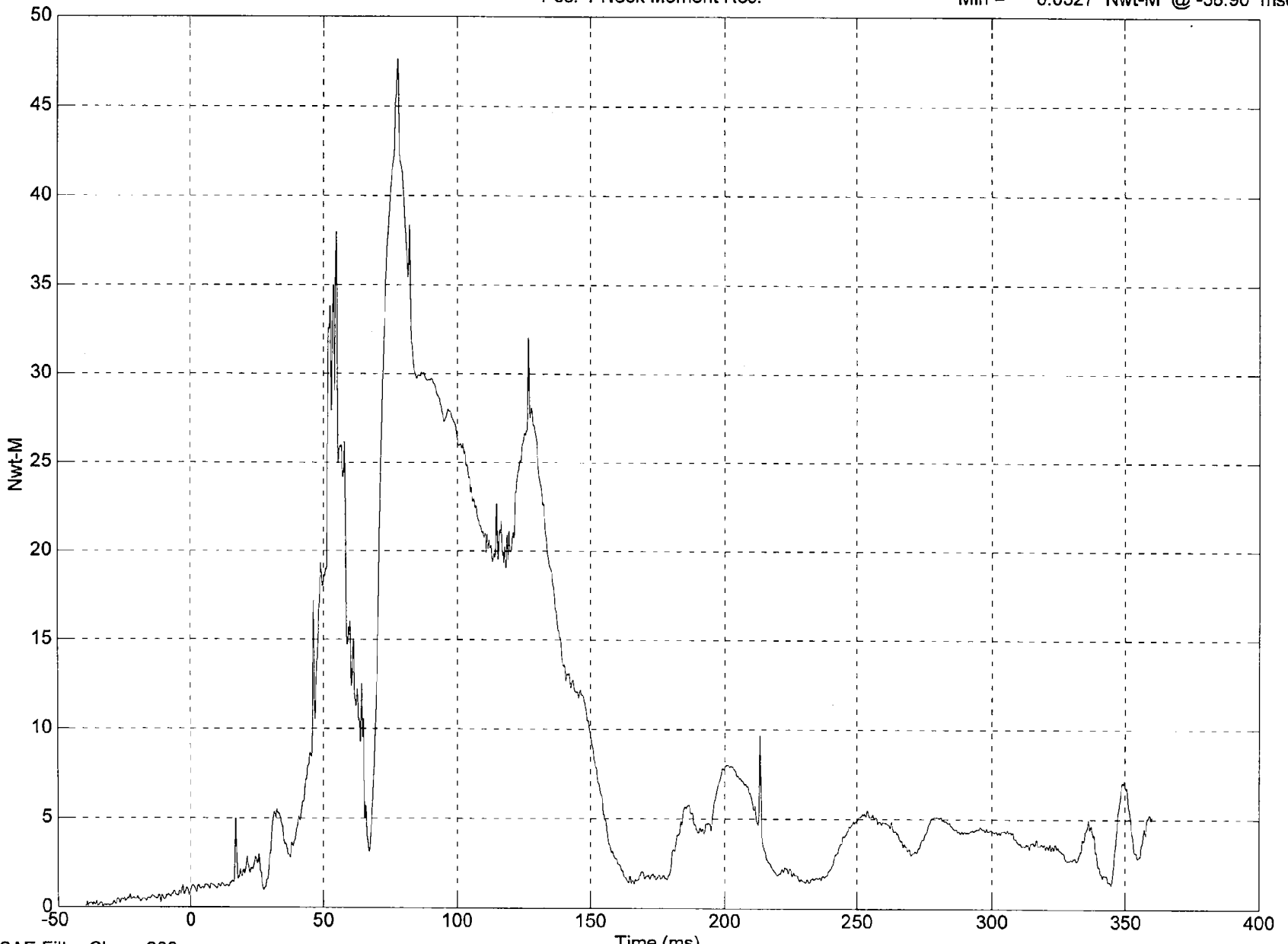


SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 47.6 Nwt-M @ 77.90 msec
Min = 0.0527 Nwt-M @ -38.90 msec



SAE Filter Class 600

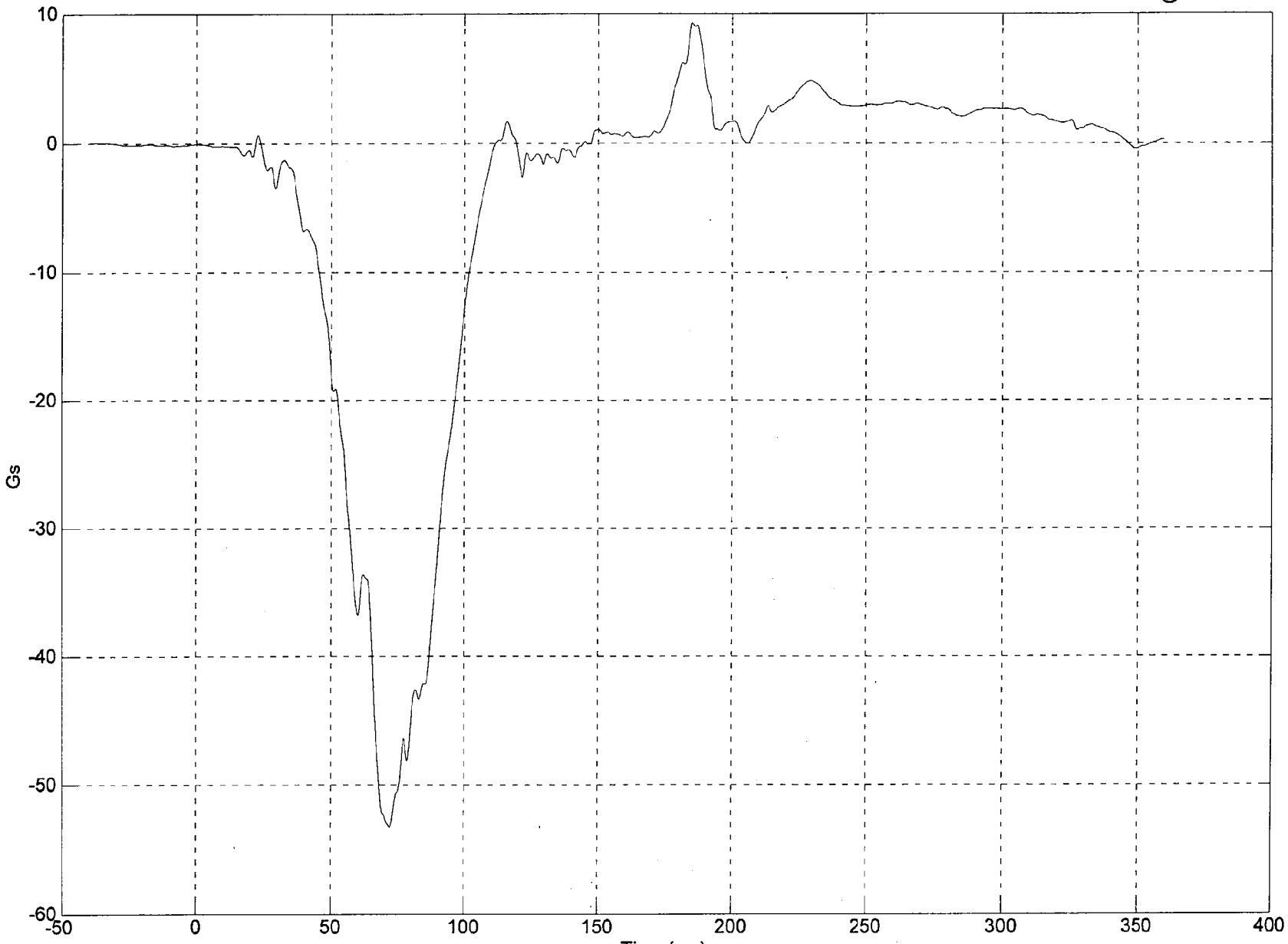
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Chest X

Max = 9.3 Gs @ 184.90 msec
Min = -53.3 Gs @ 72.20 msec



SAE Filter Class 180

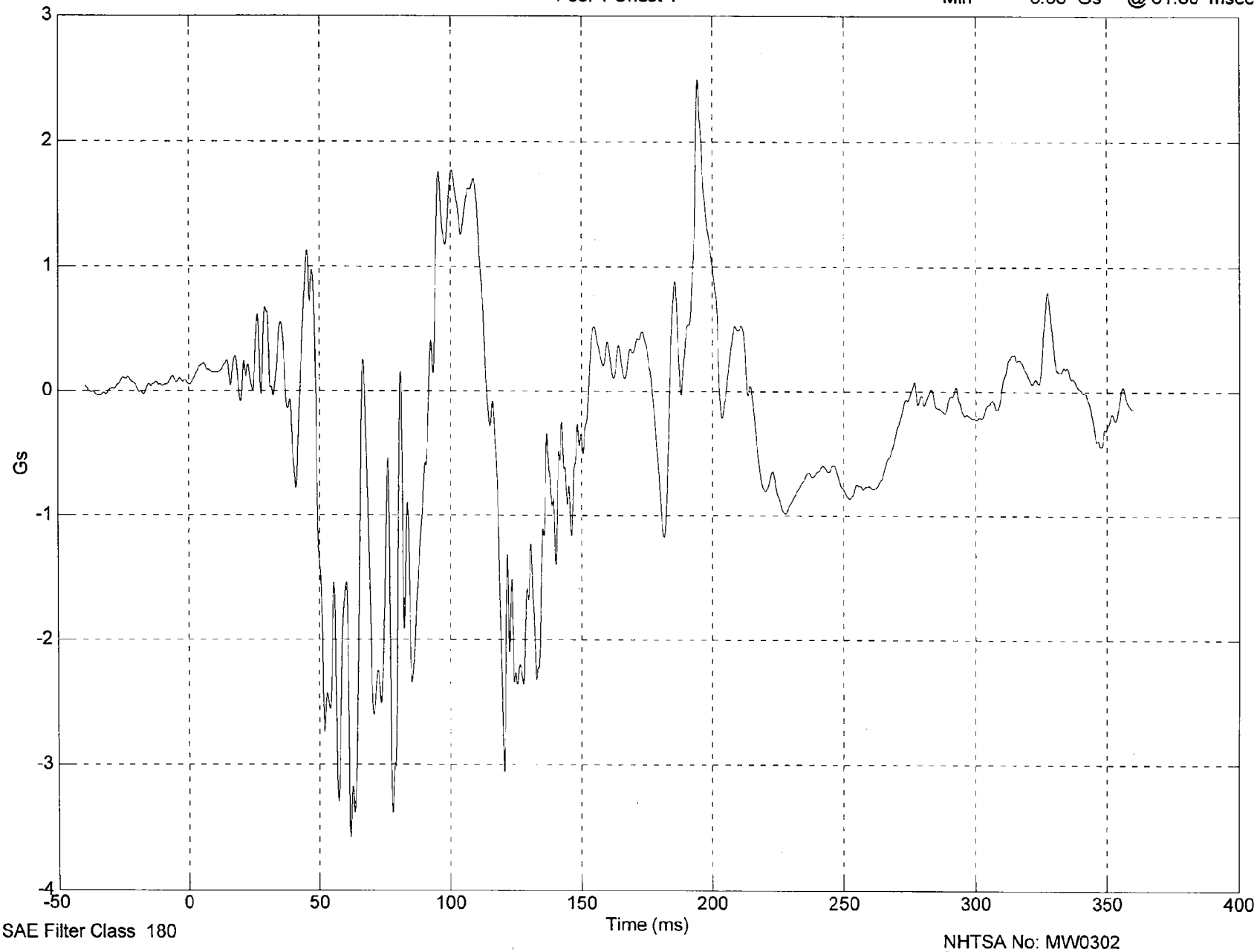
NHTSA No: MW0302
Date: 02 Oct 1997

B-20

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 2.49 Gs @ 194.30 msec
Min = -3.58 Gs @ 61.80 msec



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

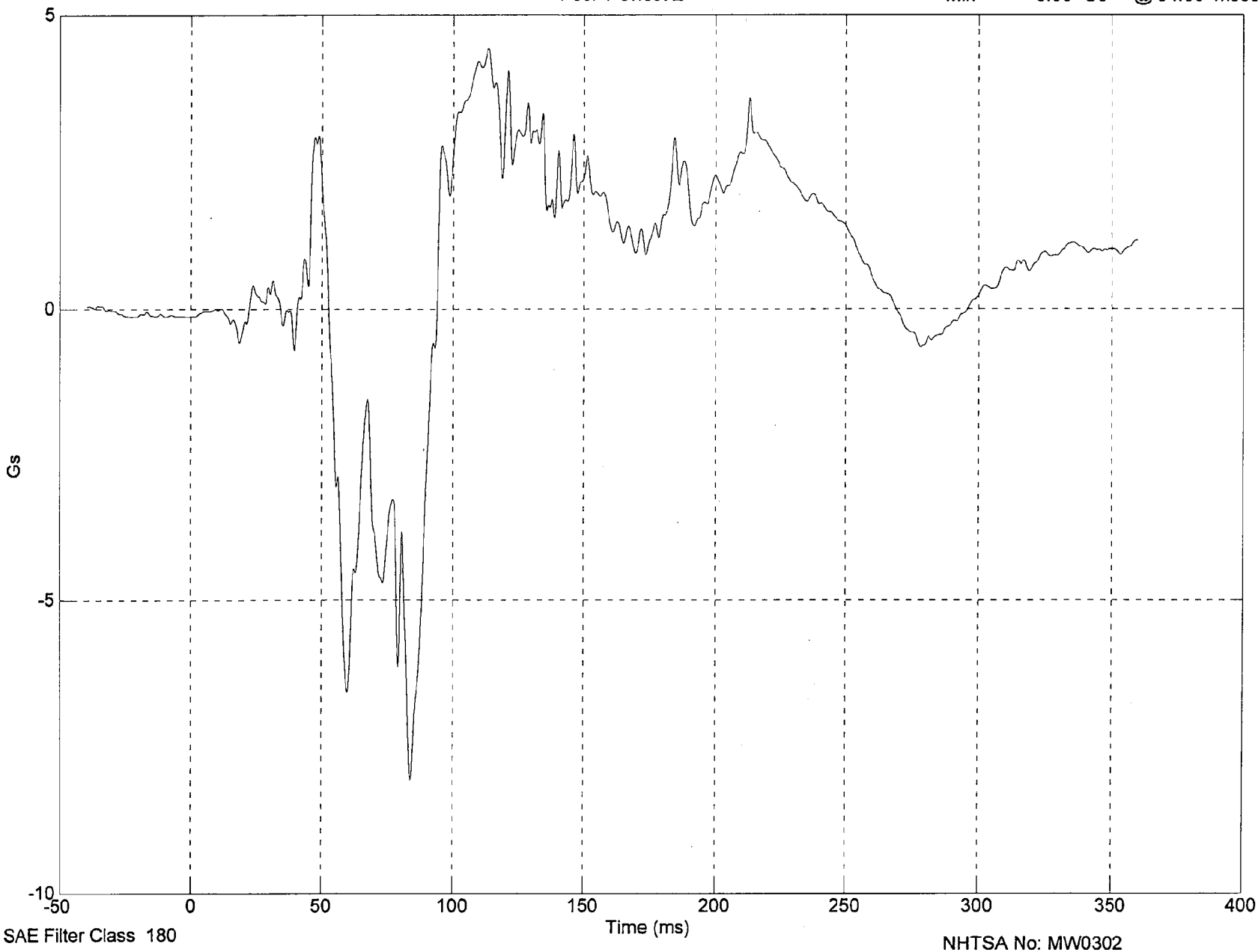
B-21

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Chest Z

Max = 4.43 Gs @ 113.40 msec
Min = -8.08 Gs @ 84.00 msec



SAE Filter Class 180

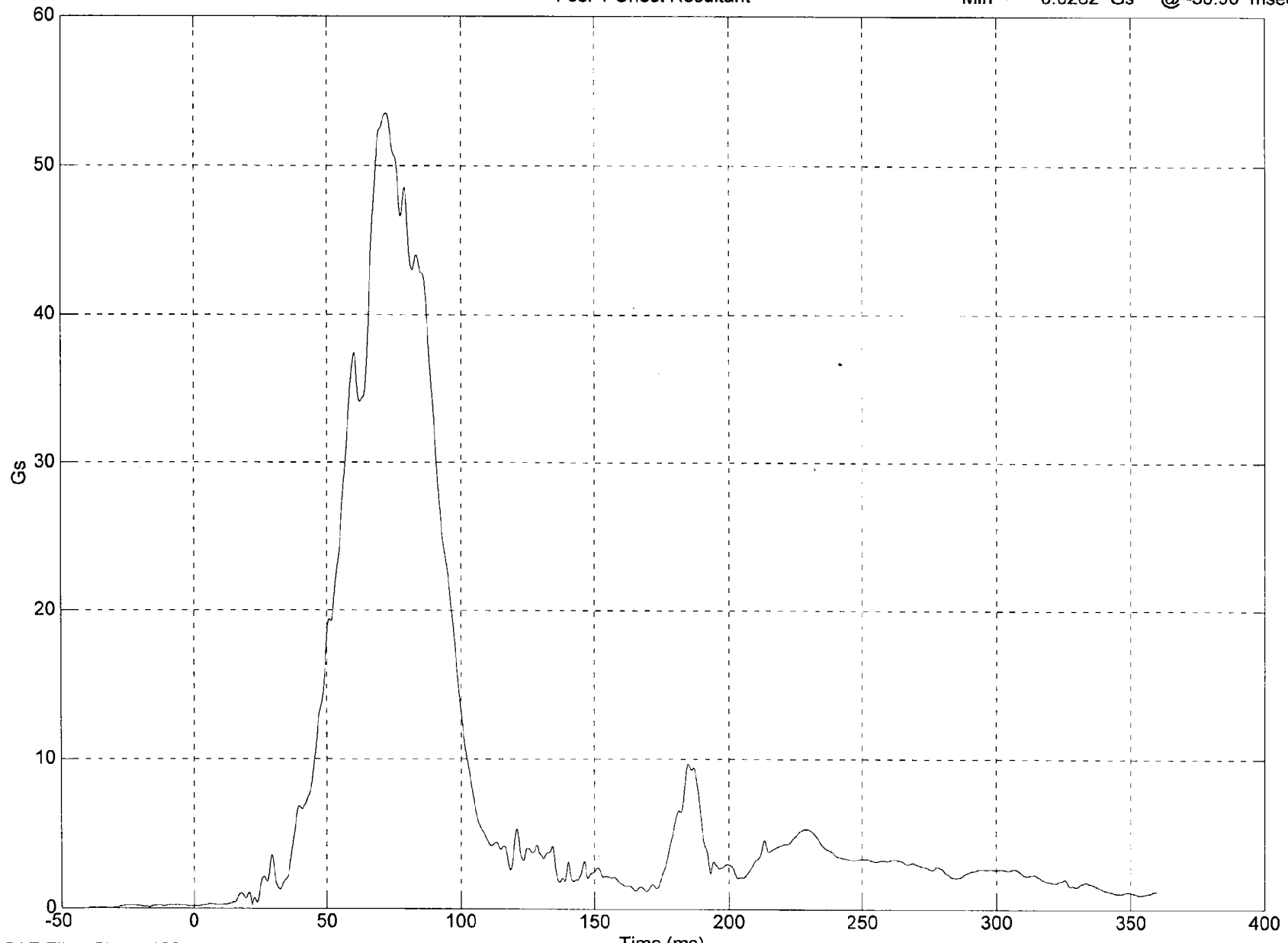
NHTSA No: MW0302
Date: 02 Oct 1997

B-22

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 53.5 Gs @ 72.20 msec
Min = 0.0262 Gs @ -30.90 msec



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

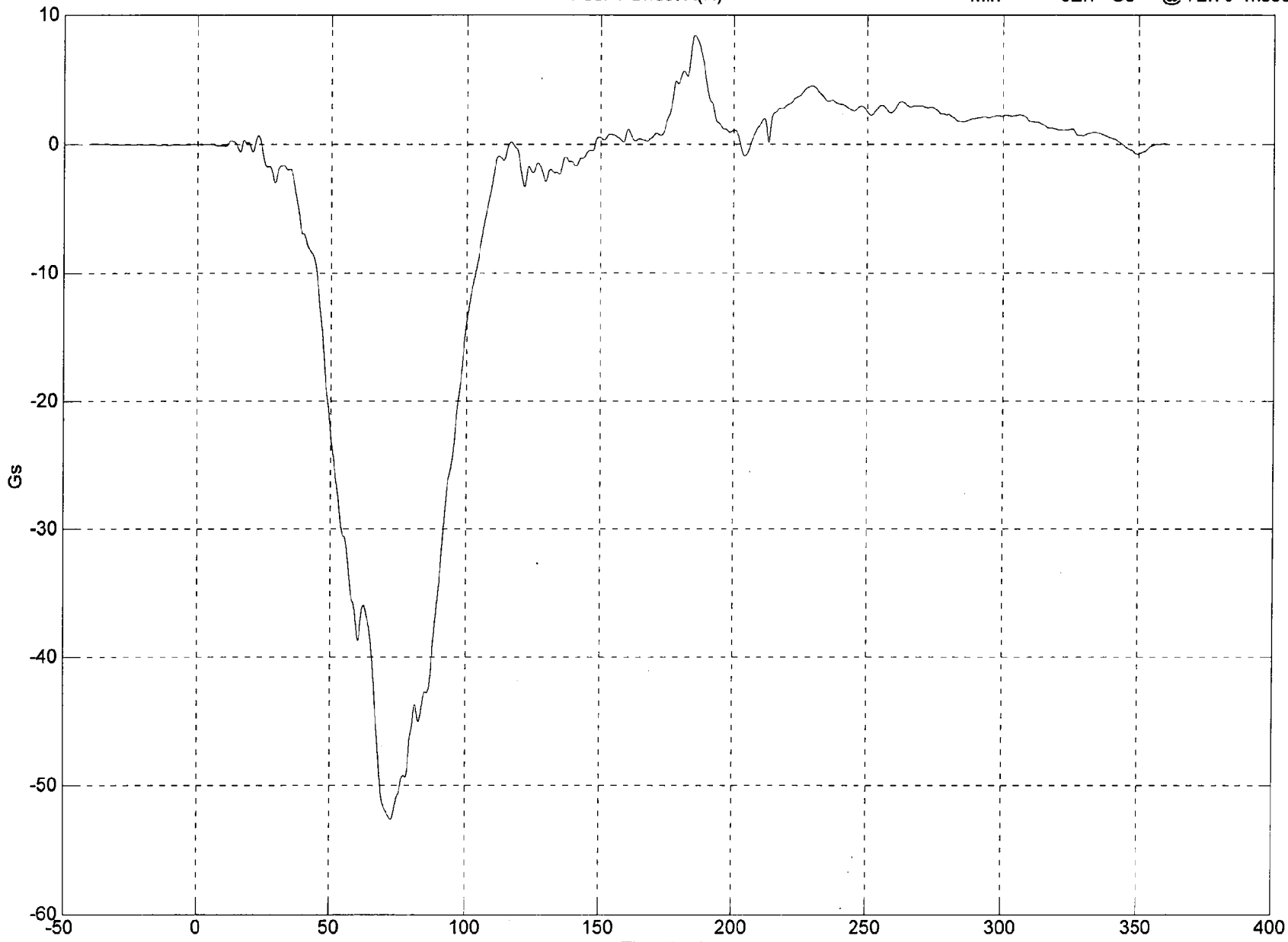
B-23

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Chest X(R)

Max = 8.43 Gs @ 185.20 msec
Min = -52.7 Gs @ 72.70 msec



SAE Filter Class 180

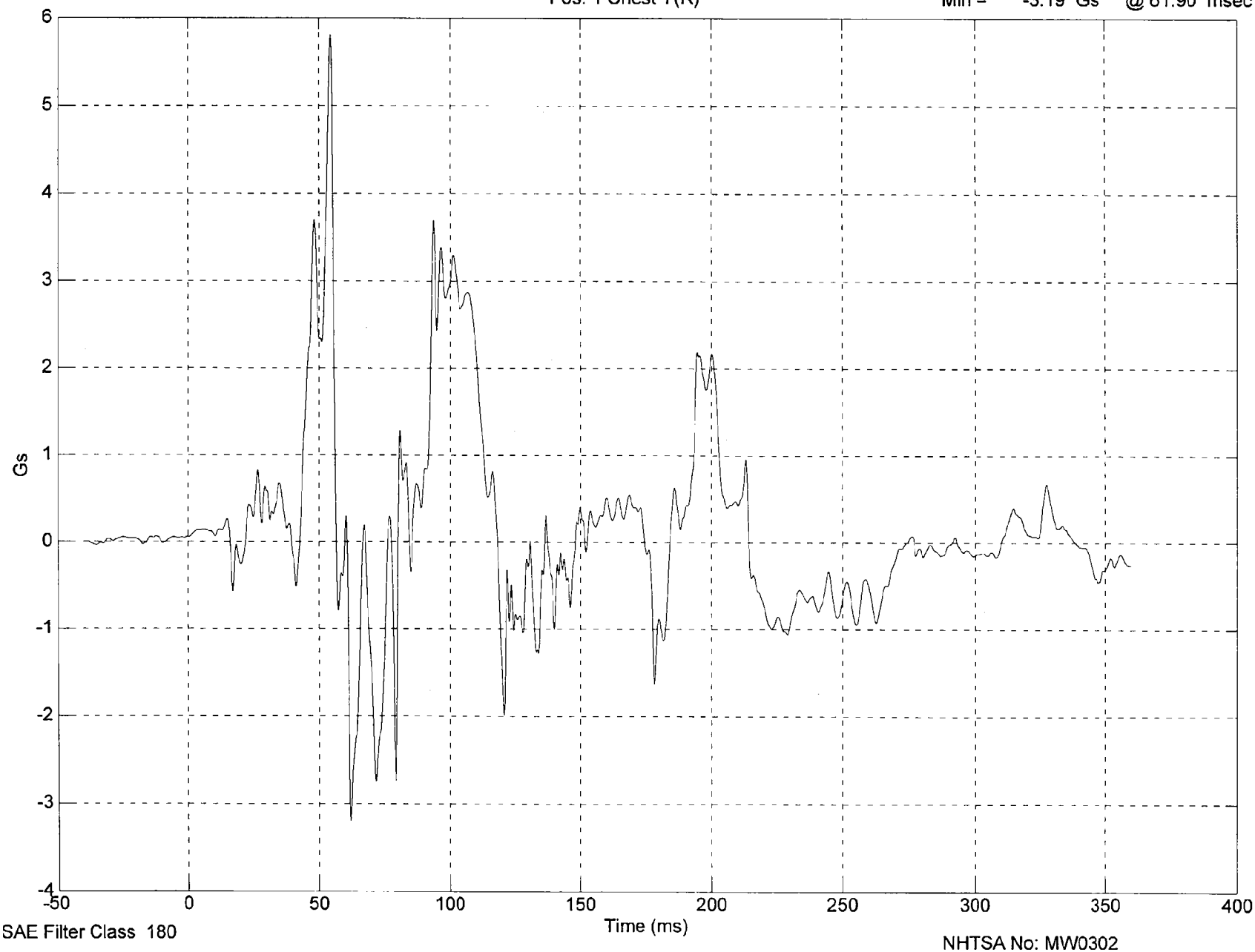
NHTSA No: MW0302
Date: 02 Oct 1997

B-24

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 5.81 Gs @ 54.20 msec
Min = -3.19 Gs @ 61.90 msec



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

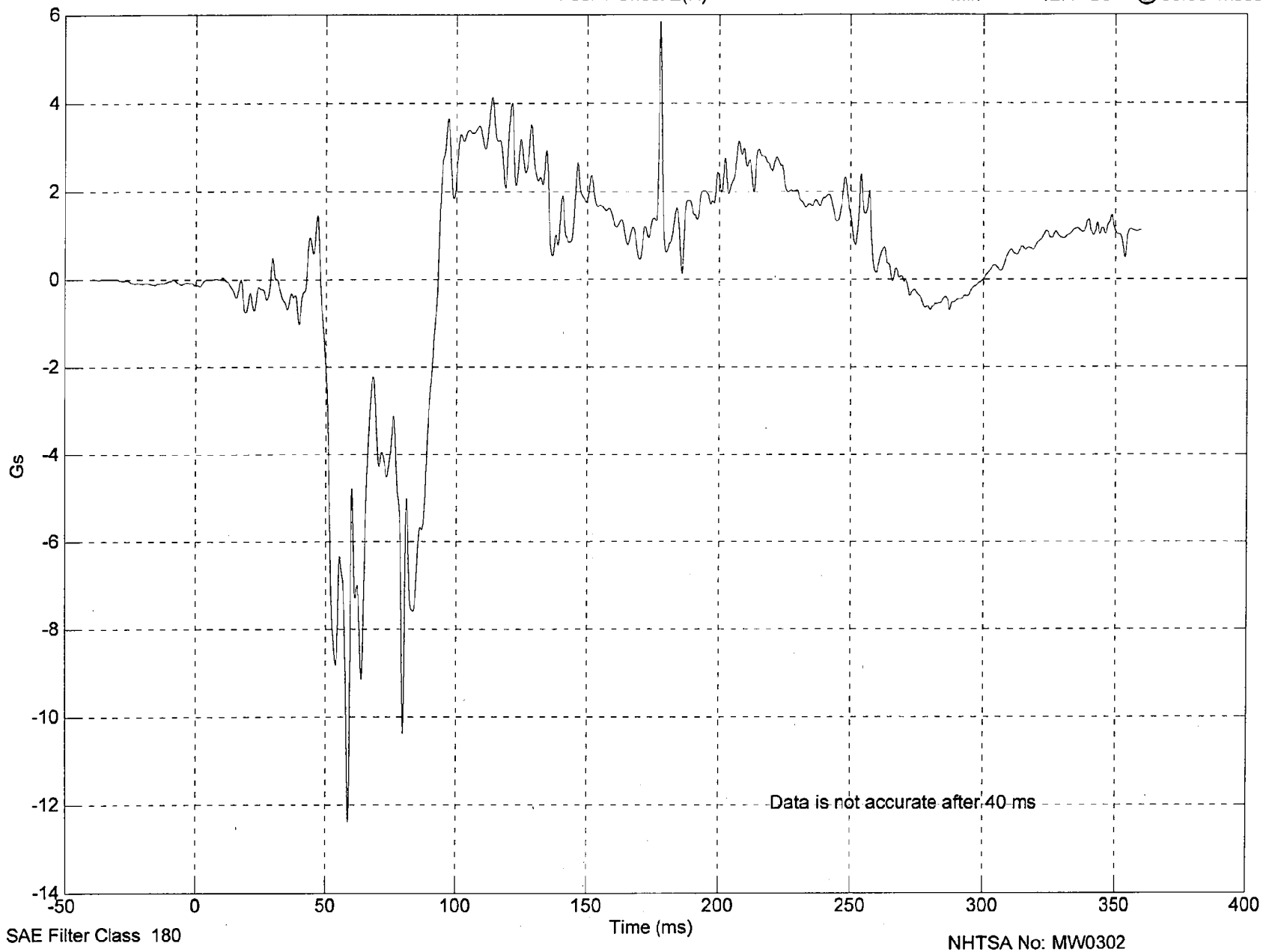
B-25

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Chest Z(R)

Max = 5.84 Gs @ 177.90 msec
Min = -12.4 Gs @ 58.60 msec



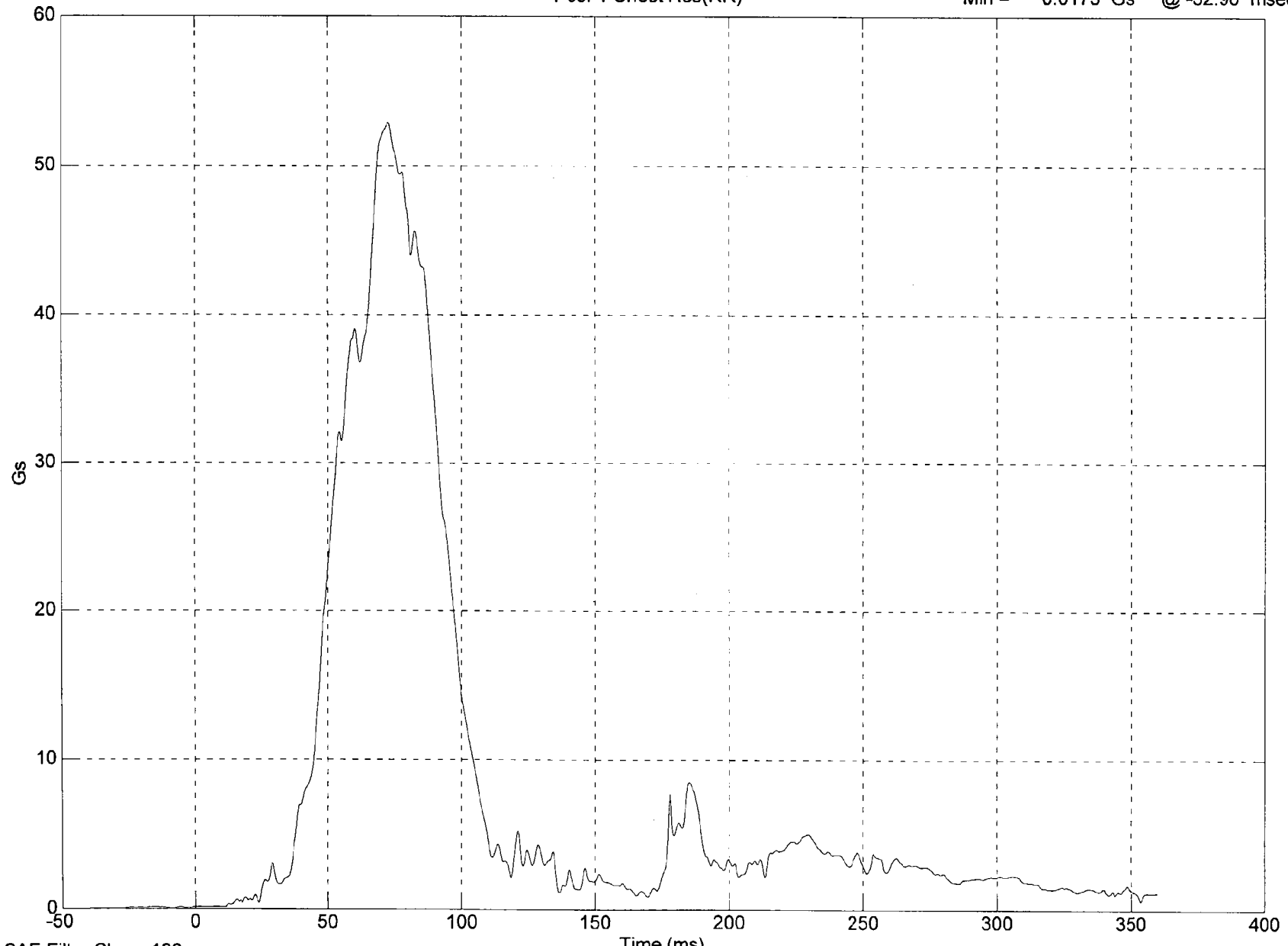
SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 52.9 Gs @ 72.70 msec
Min = 0.0173 Gs @ -32.90 msec



SAE Filter Class 180

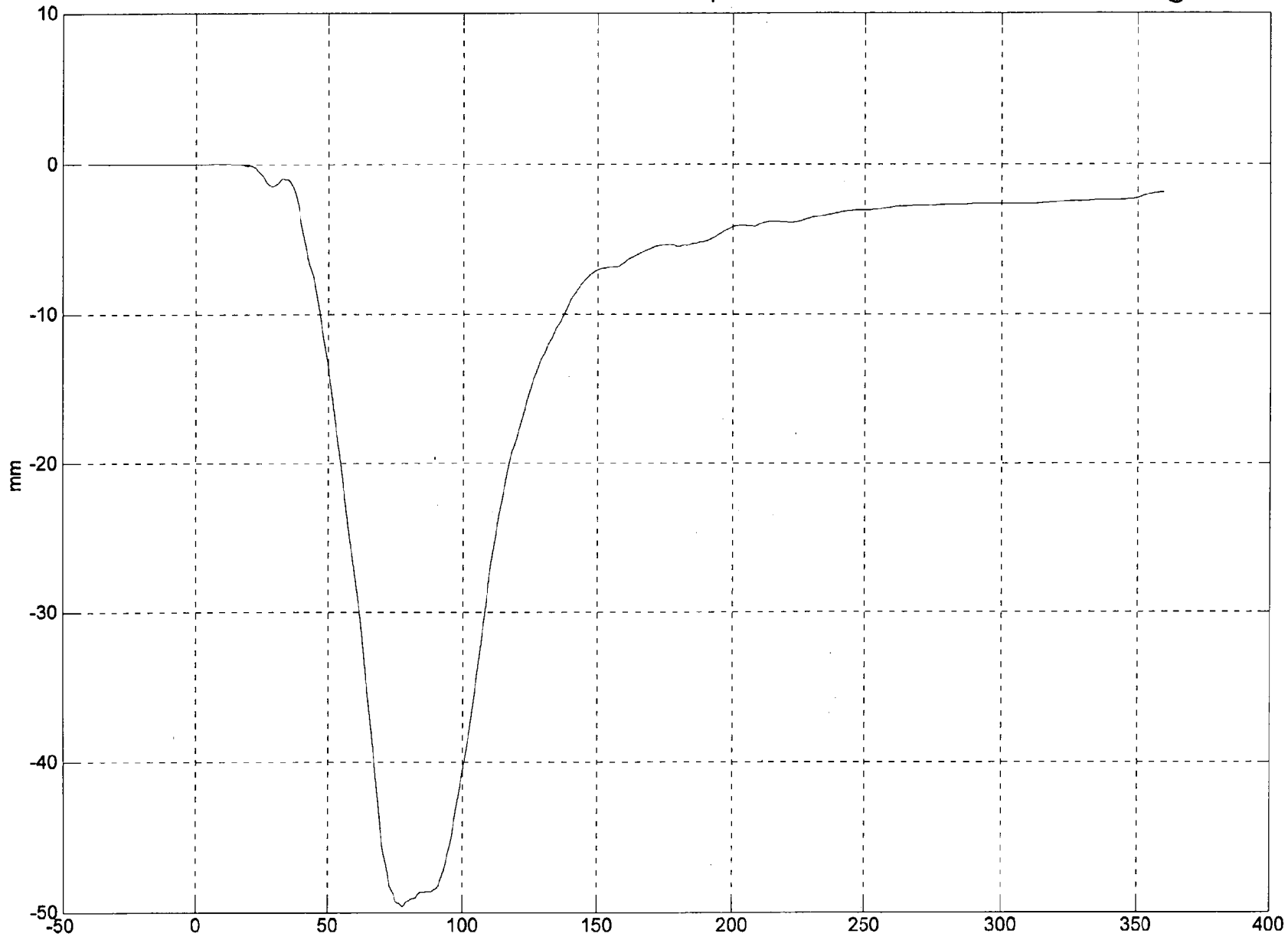
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Chest Disp.

Max = 0.0358 mm @ 8.60 msec
Min = -49.6 mm @ 77.80 msec



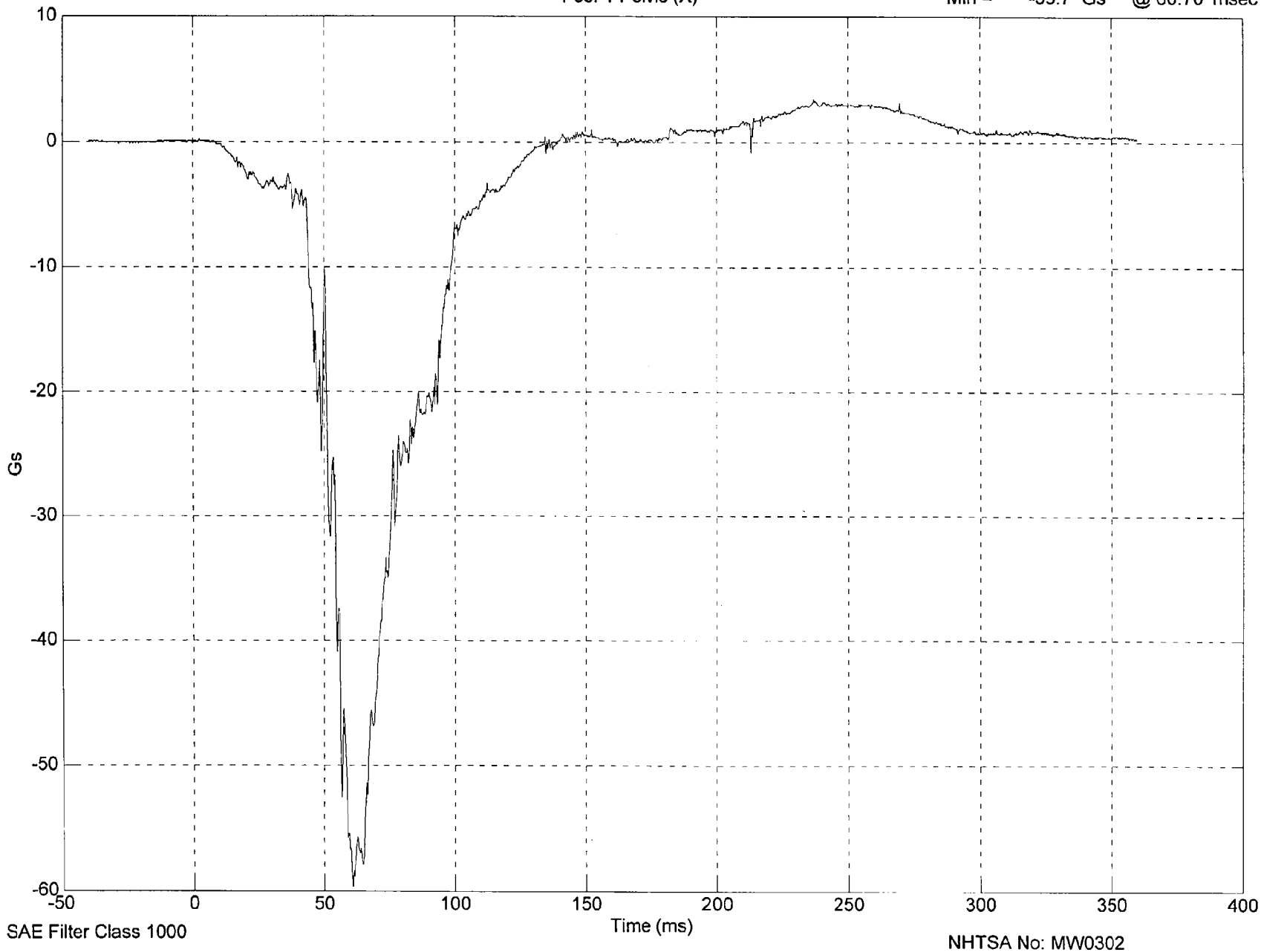
SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 3.41 Gs @ 236.80 msec
Min = -59.7 Gs @ 60.70 msec



SAE Filter Class 1000

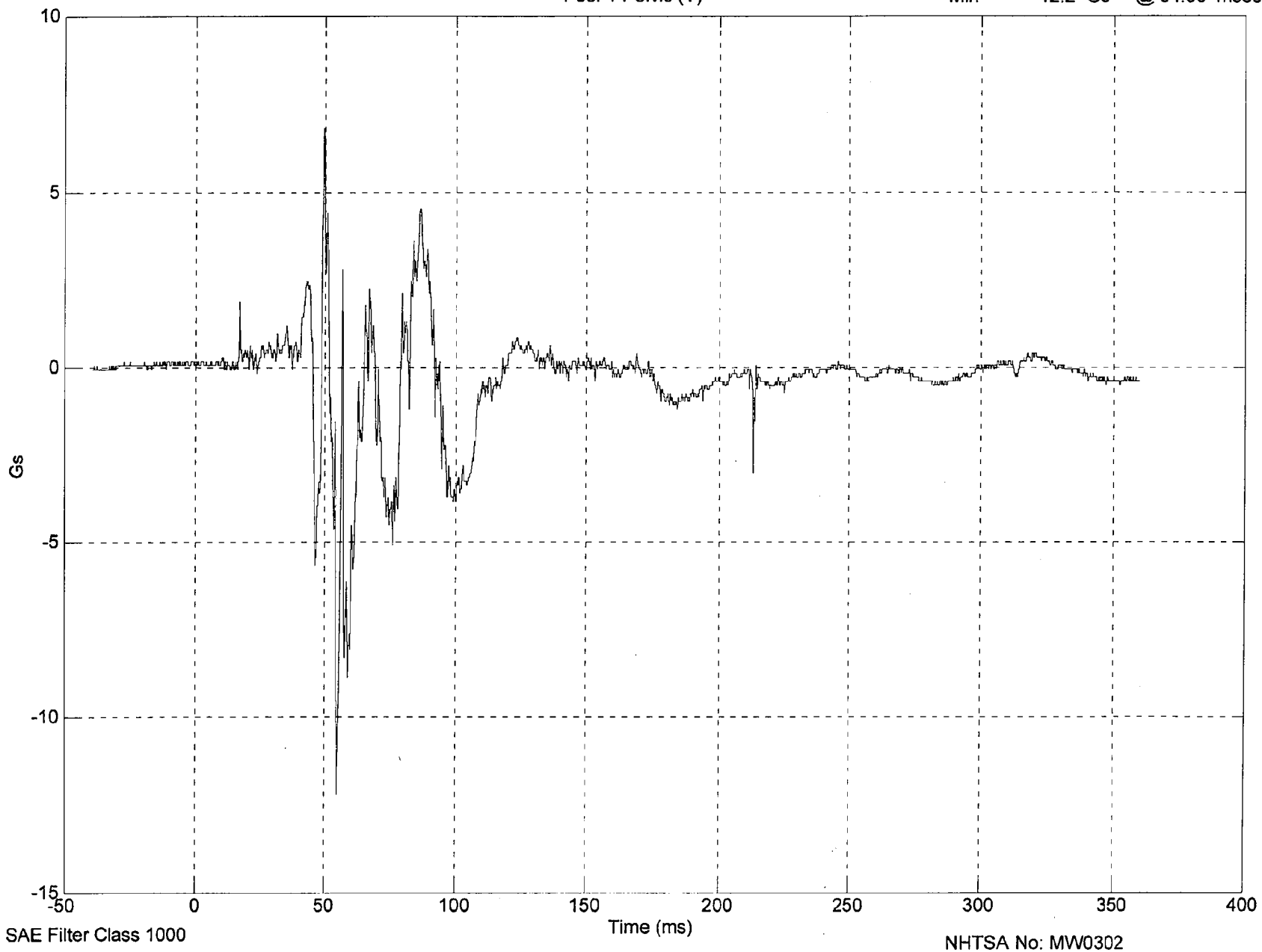
NHTSA No: MW0302
Date: 02 Oct 1997

B-29

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 6.84 Gs @ 49.50 msec
Min = -12.2 Gs @ 54.90 msec



SAE Filter Class 1000

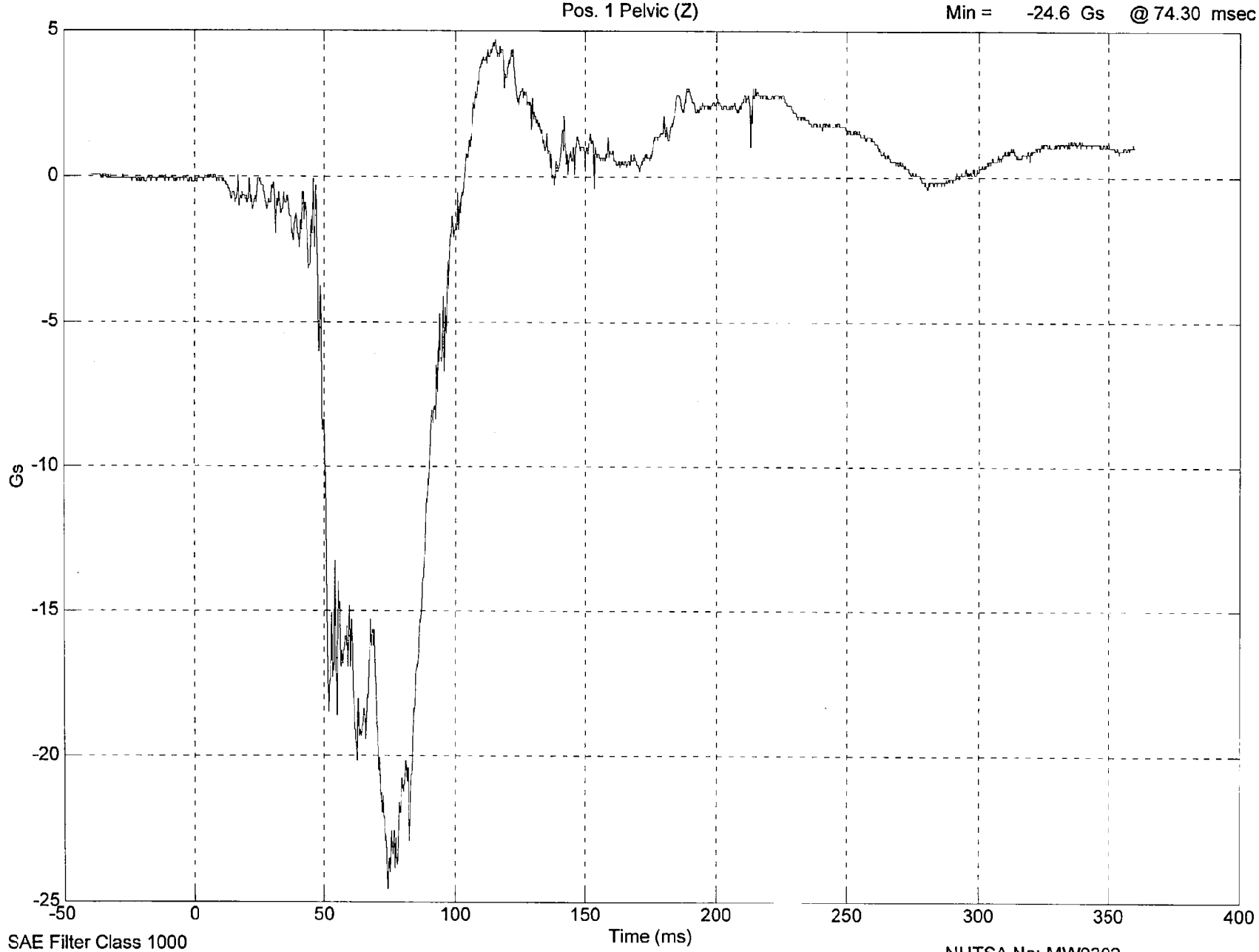
NHTSA No: MW0302
Date: 02 Oct 1997

B-30

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 4.71 Gs @ 115.50 msec
Min = -24.6 Gs @ 74.30 msec



SAE Filter Class 1000

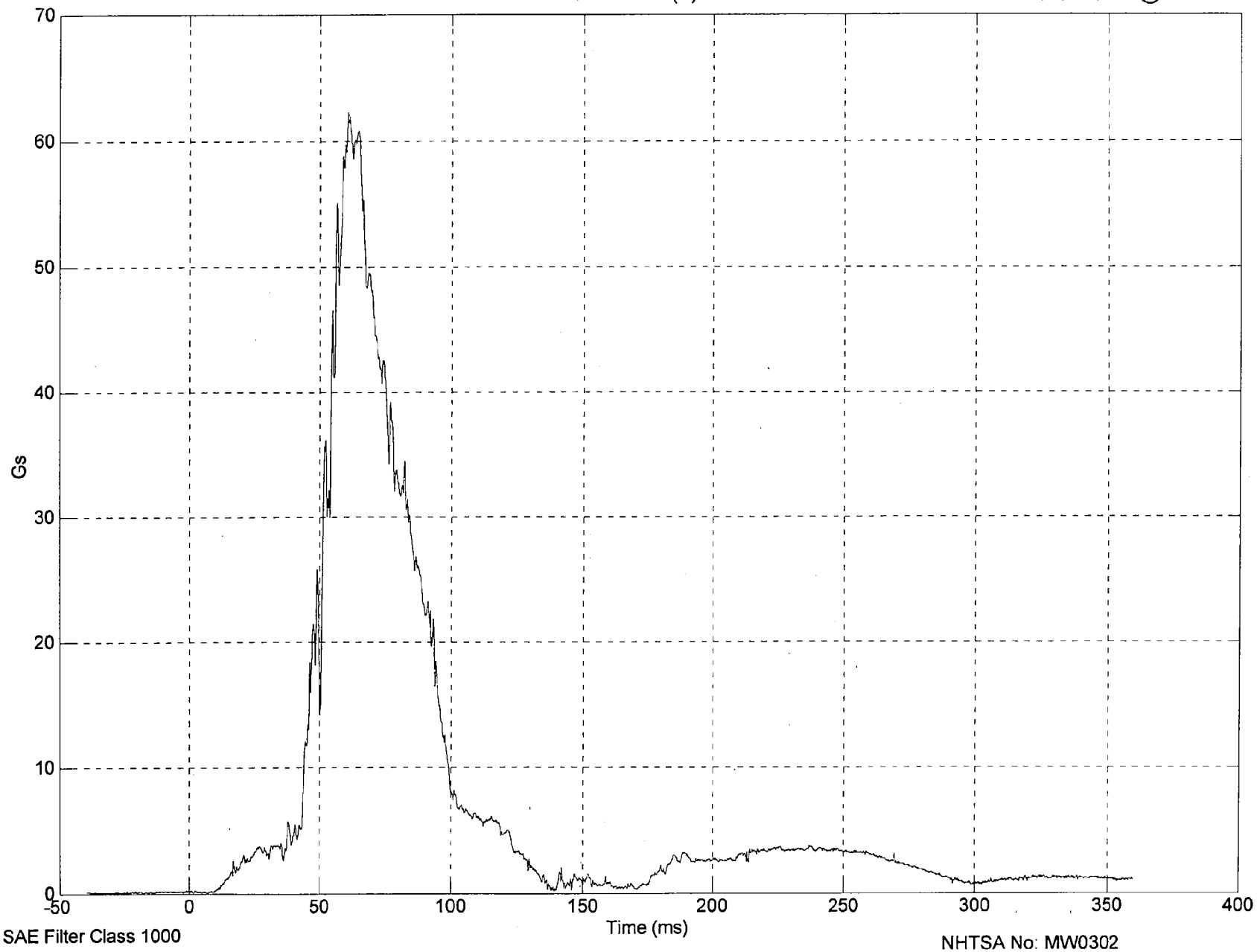
NHTSA No: MW0302
Date: 02 Oct 1997

B-31

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 62.3 Gs @ 60.70 msec
Min = 0.0752 Gs @ -36.00 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

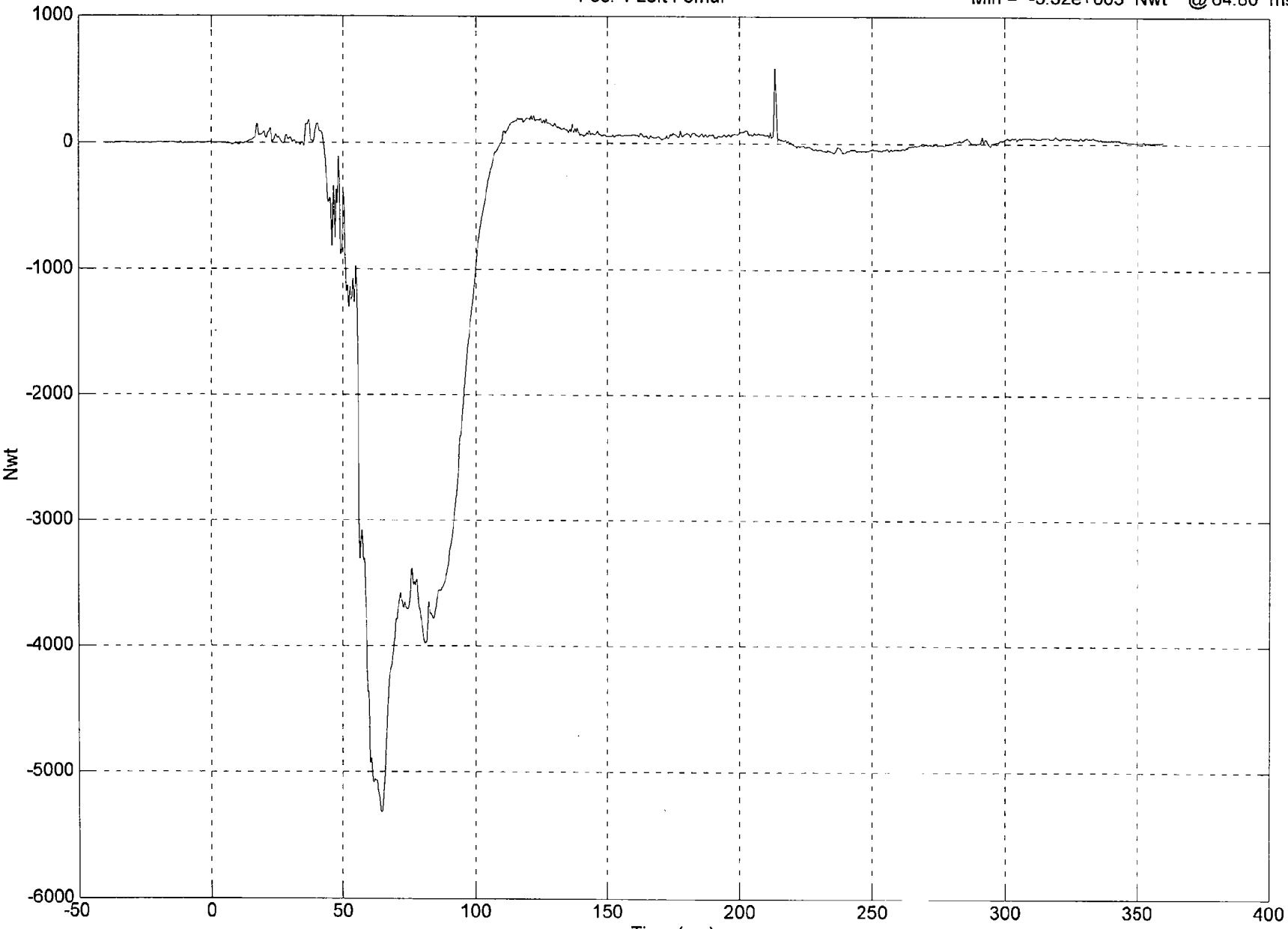
B-32

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Left Femur

Max = 592 Nwt @ 213.30 msec
Min = -5.32e+003 Nwt @ 64.80 msec



B-33

8413-1

SAE Filter Class 600

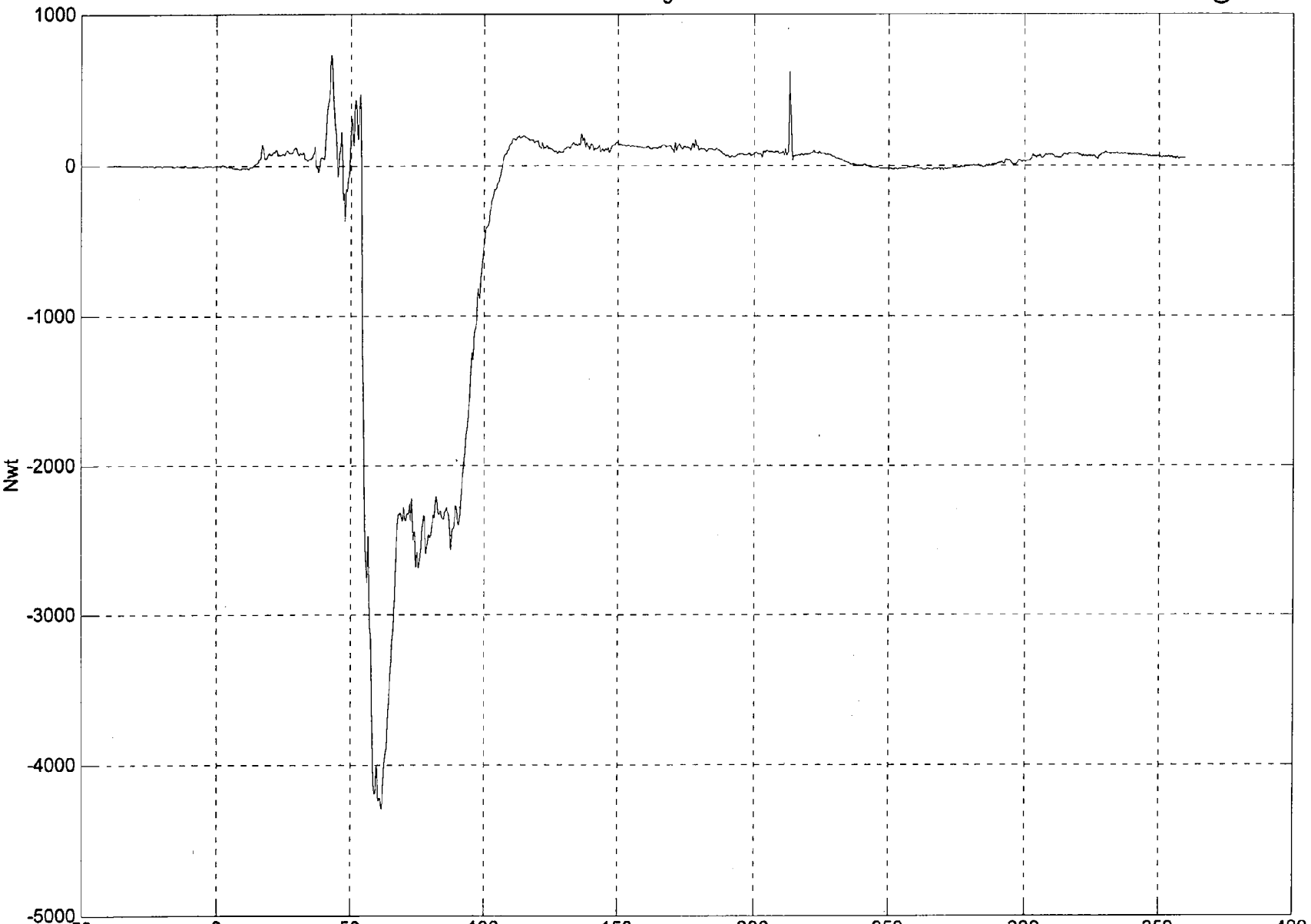
NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 733 Nwt @ 42.80 msec

Pos. 1 Right Femur

Min = -4.29e+003 Nwt @ 61.60 msec



B-34

8413-1

SAE Filter Class 600

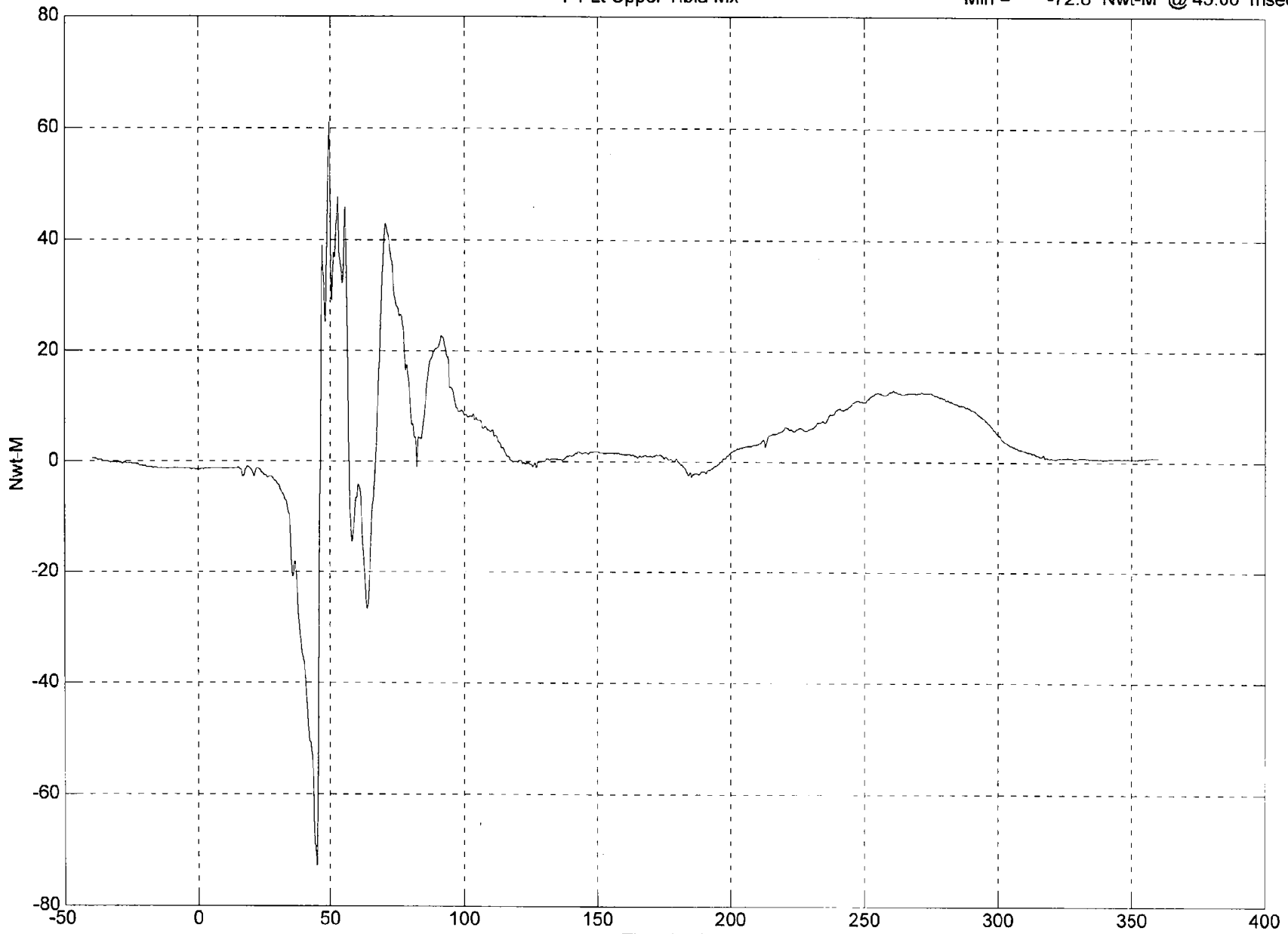
NHTSA No: MW0302

Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

P1 Lt Upper Tibia Mx

Max = 61.2 Nwt-M @ 49.40 msec
Min = -72.8 Nwt-M @ 45.00 msec



SAE Filter Class 600

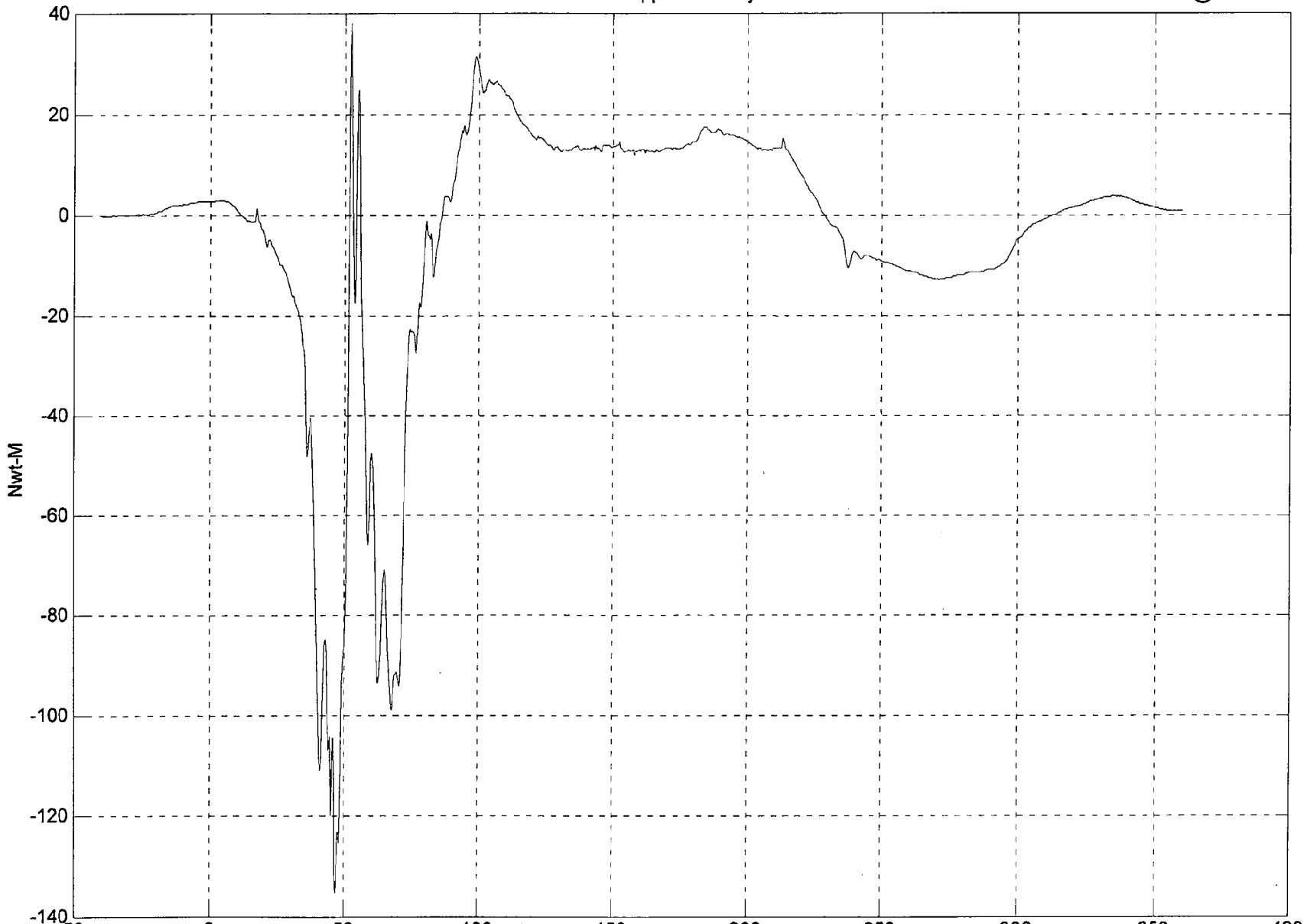
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

P1 Lt Upper Tibia My

Max = 38 Nwt-M @ 52.30 msec
Min = -135 Nwt-M @ 46.70 msec

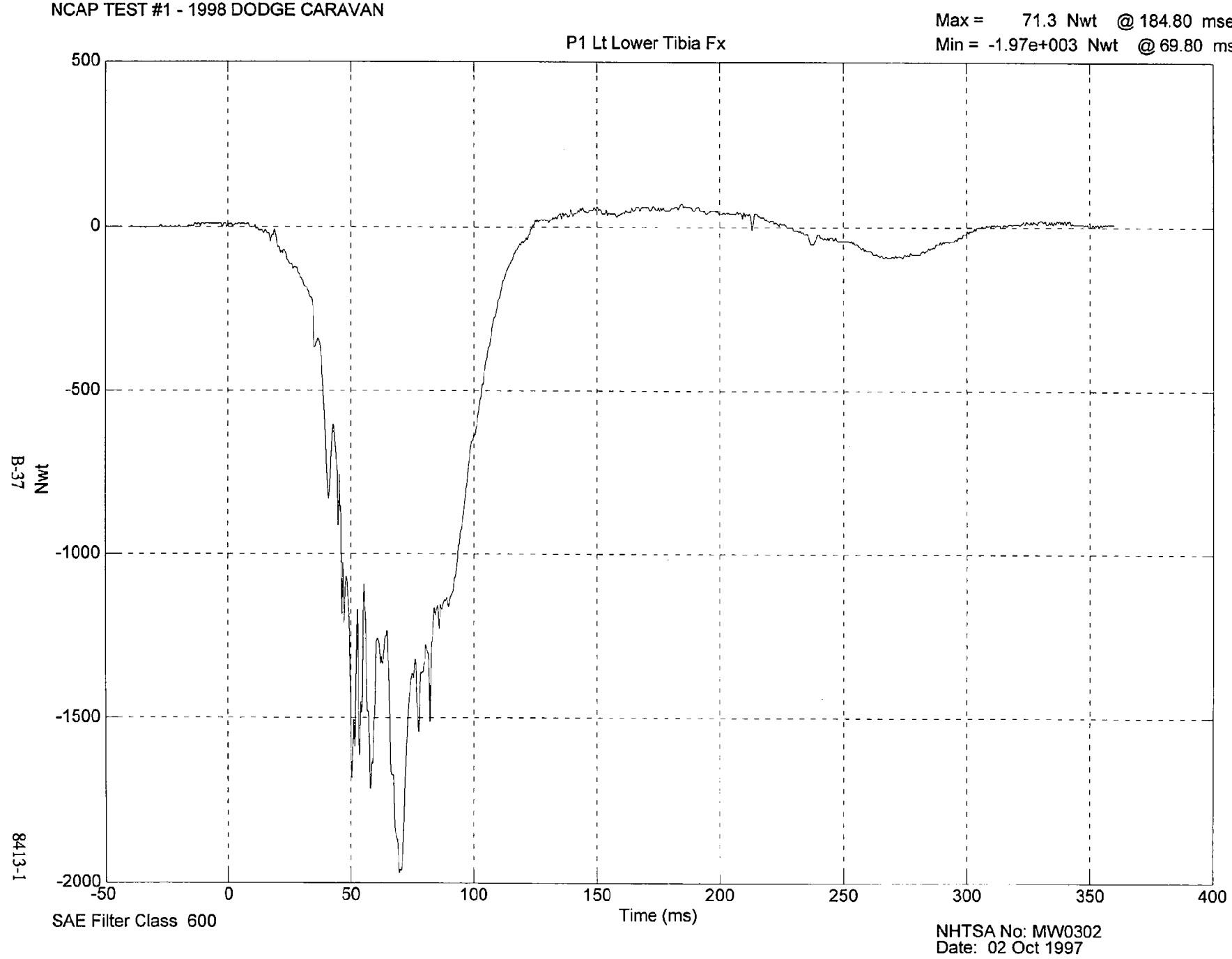


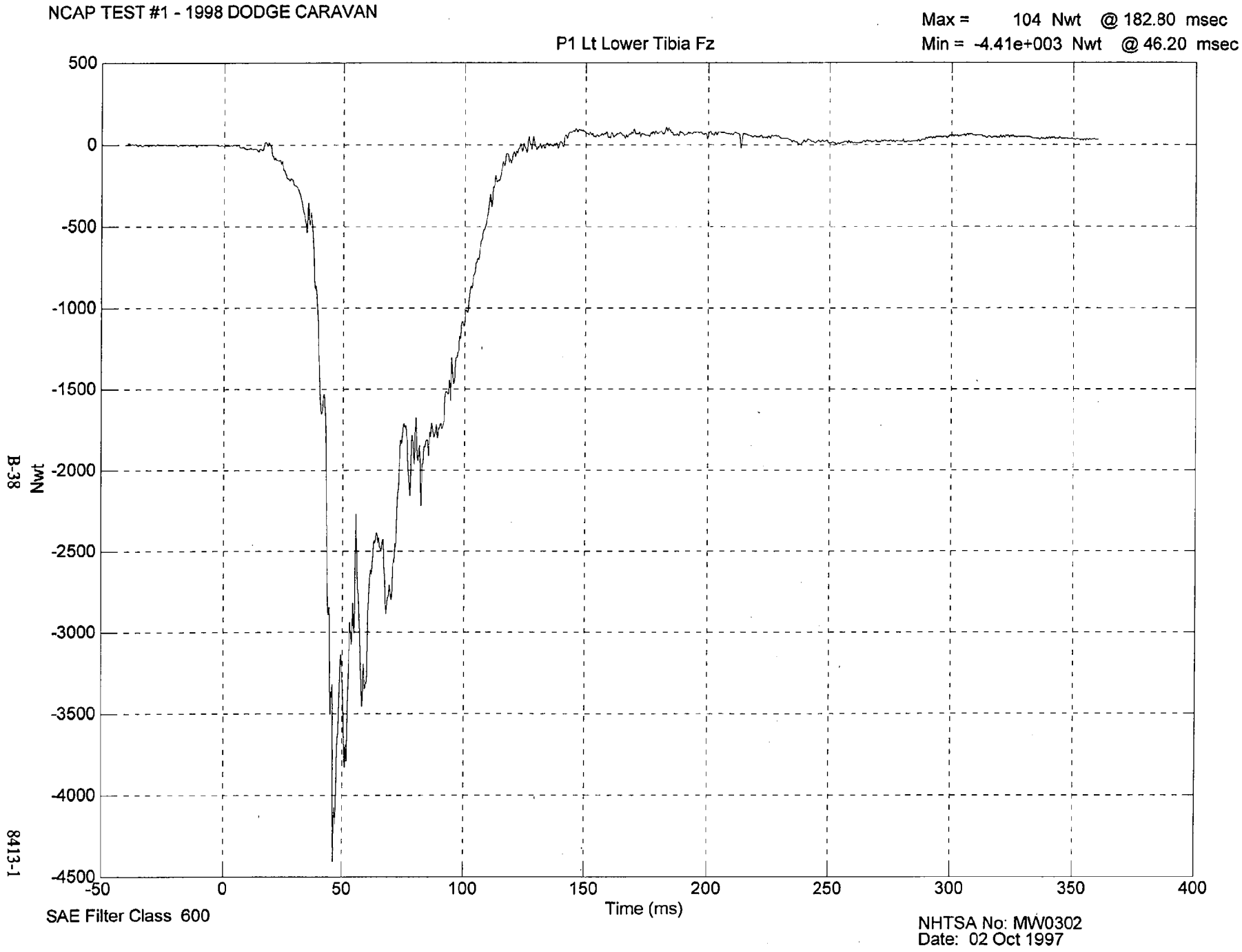
SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

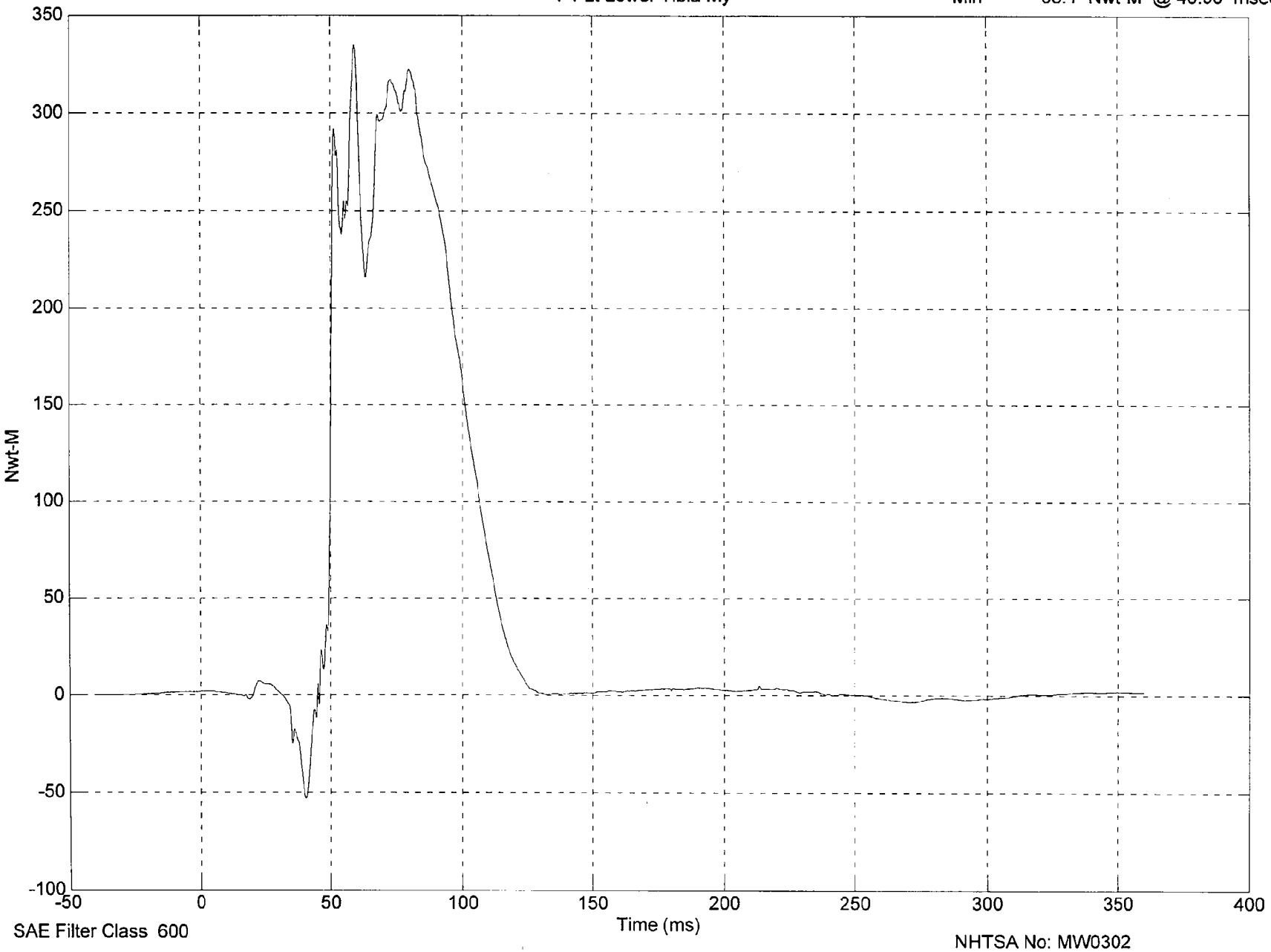



NCAP TEST #1 - 1998 DODGE CARAVAN
P1 Lt Lower Tibia Fz
Max = 104 Nwt @ 182.80 msec
Min = -4.41e+003 Nwt @ 46.20 msec
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-4000
-4500
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 600
NHTSA No: MW0302
Date: 02 Oct 1997
B-38
8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 335 Nwt-M @ 59.00 msec
Min = -53.1 Nwt-M @ 40.50 msec

P1 Lt Lower Tibia My



SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

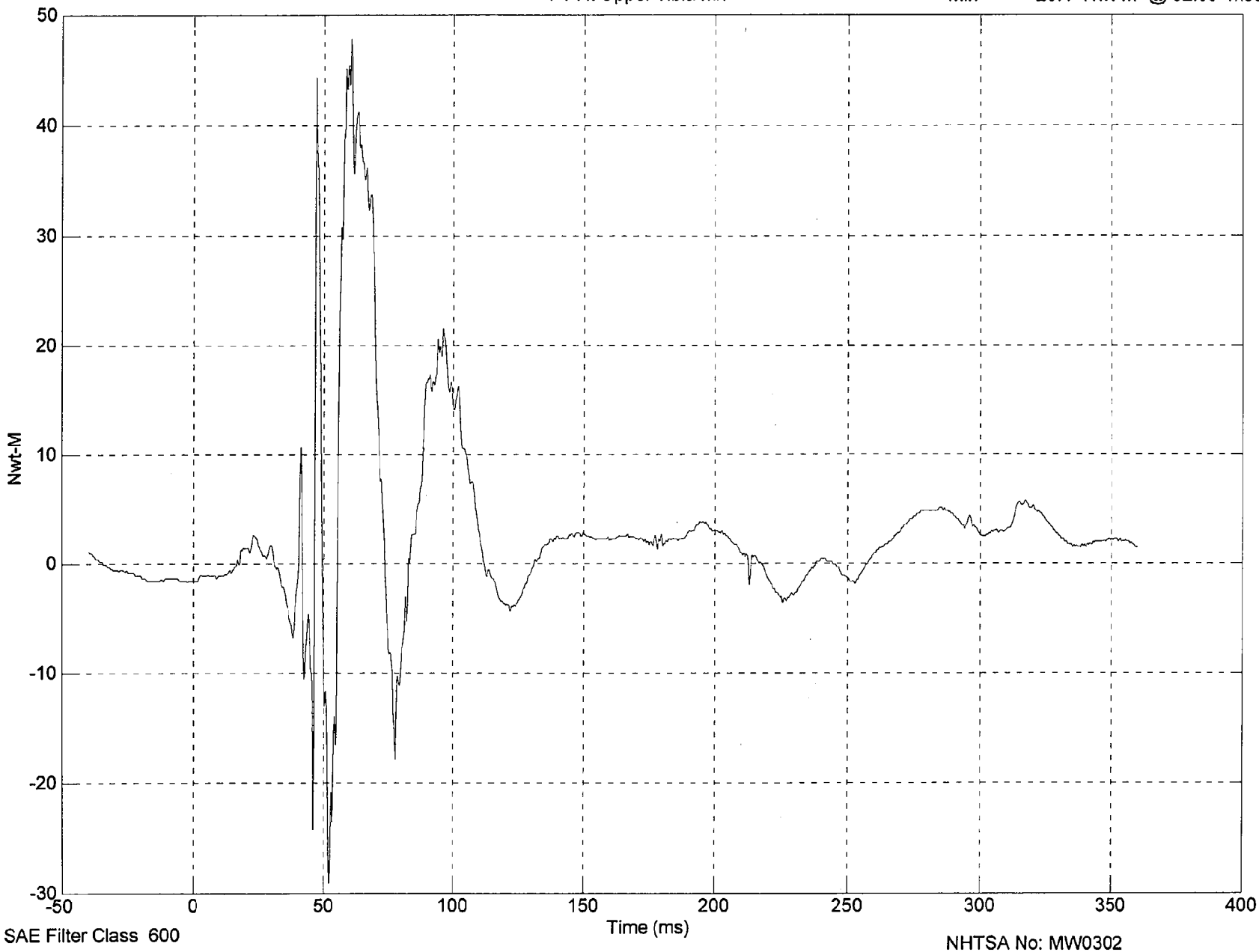
B-39

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

P1 Rt Upper Tibia Mx

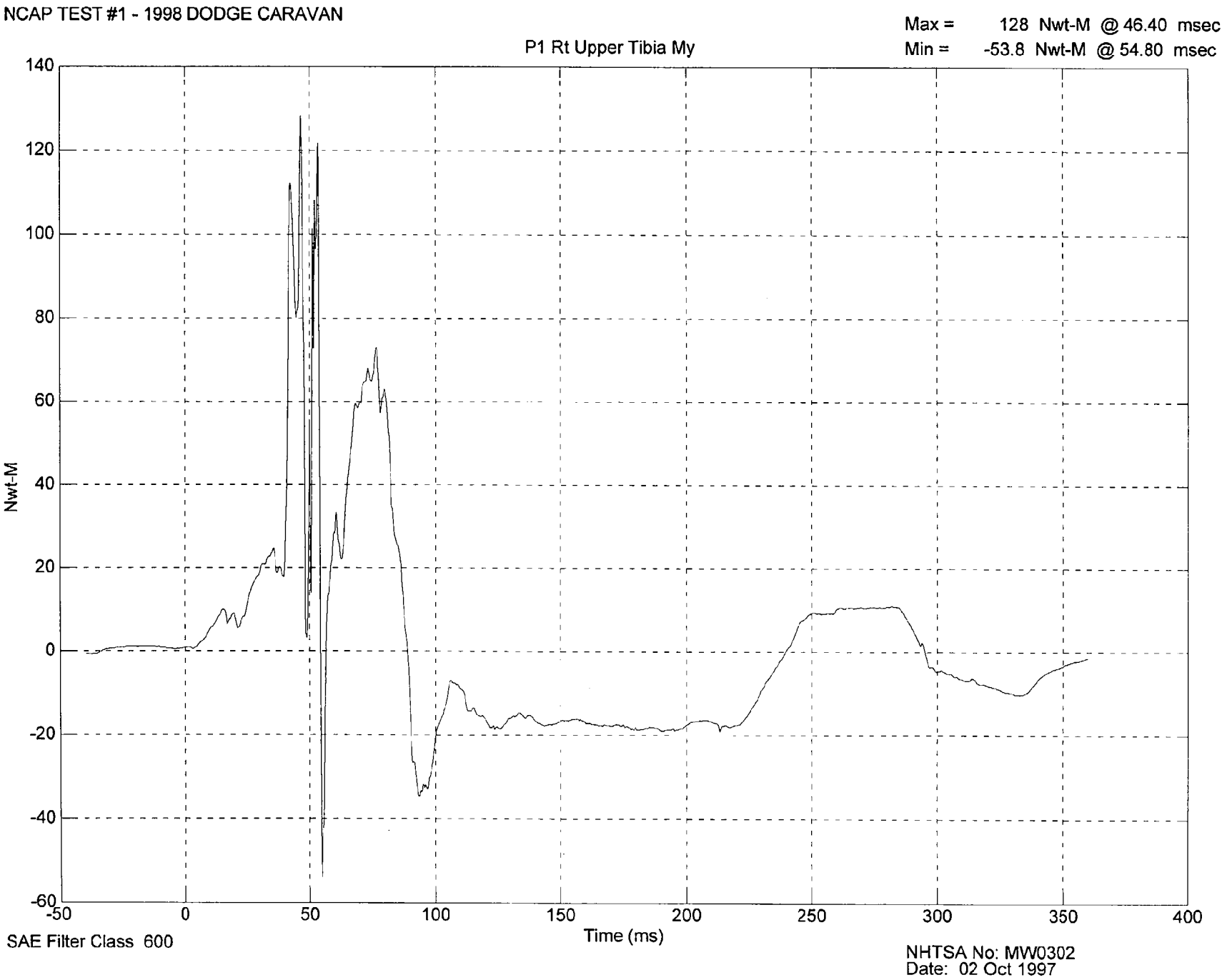
Max = 47.9 Nwt-M @ 60.30 msec
Min = -29.1 Nwt-M @ 52.00 msec



SAE Filter Class 600

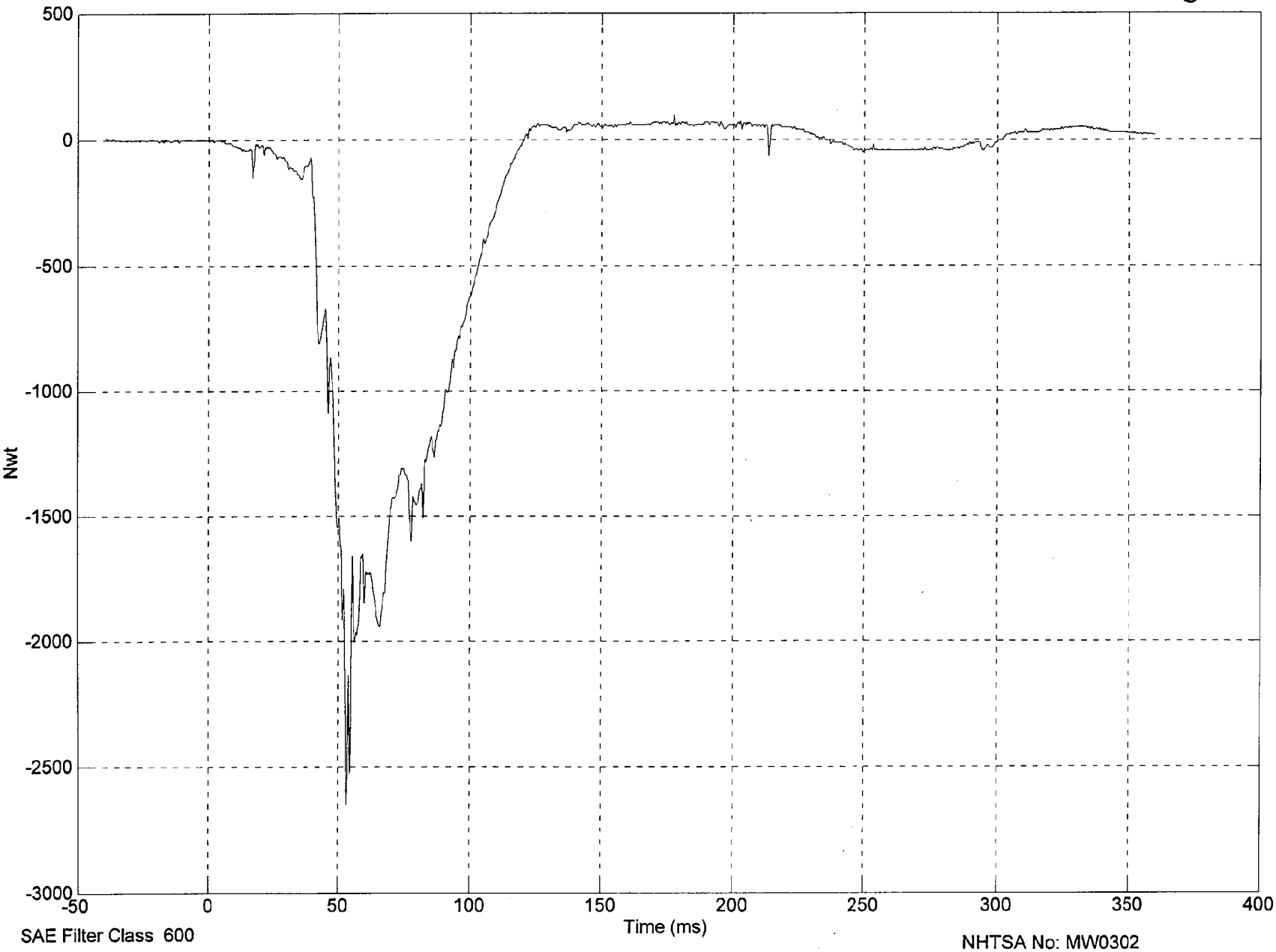
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1


NCAP TEST #1 - 1998 DODGE CARAVAN
P1 Rt Upper Tibia My
Max = 128 Nwt-M @ 46.40 msec
Min = -53.8 Nwt-M @ 54.80 msec
Nwt-M
Time (ms)
SAE Filter Class 600
NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 99.3 Nwt @ 177.50 msec
Min = -2.65e+003 Nwt @ 53.10 msec

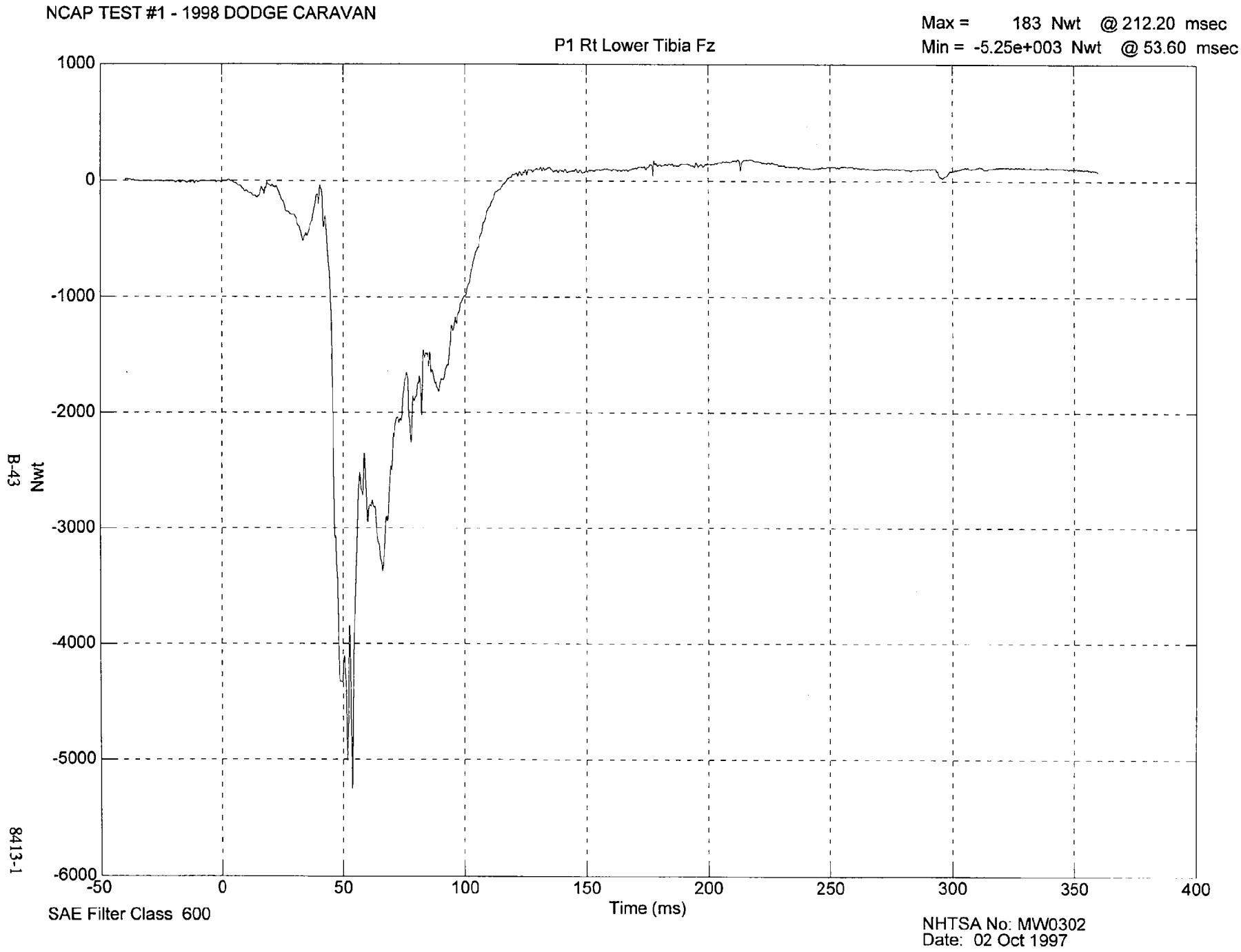


B-42

8413-1

SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

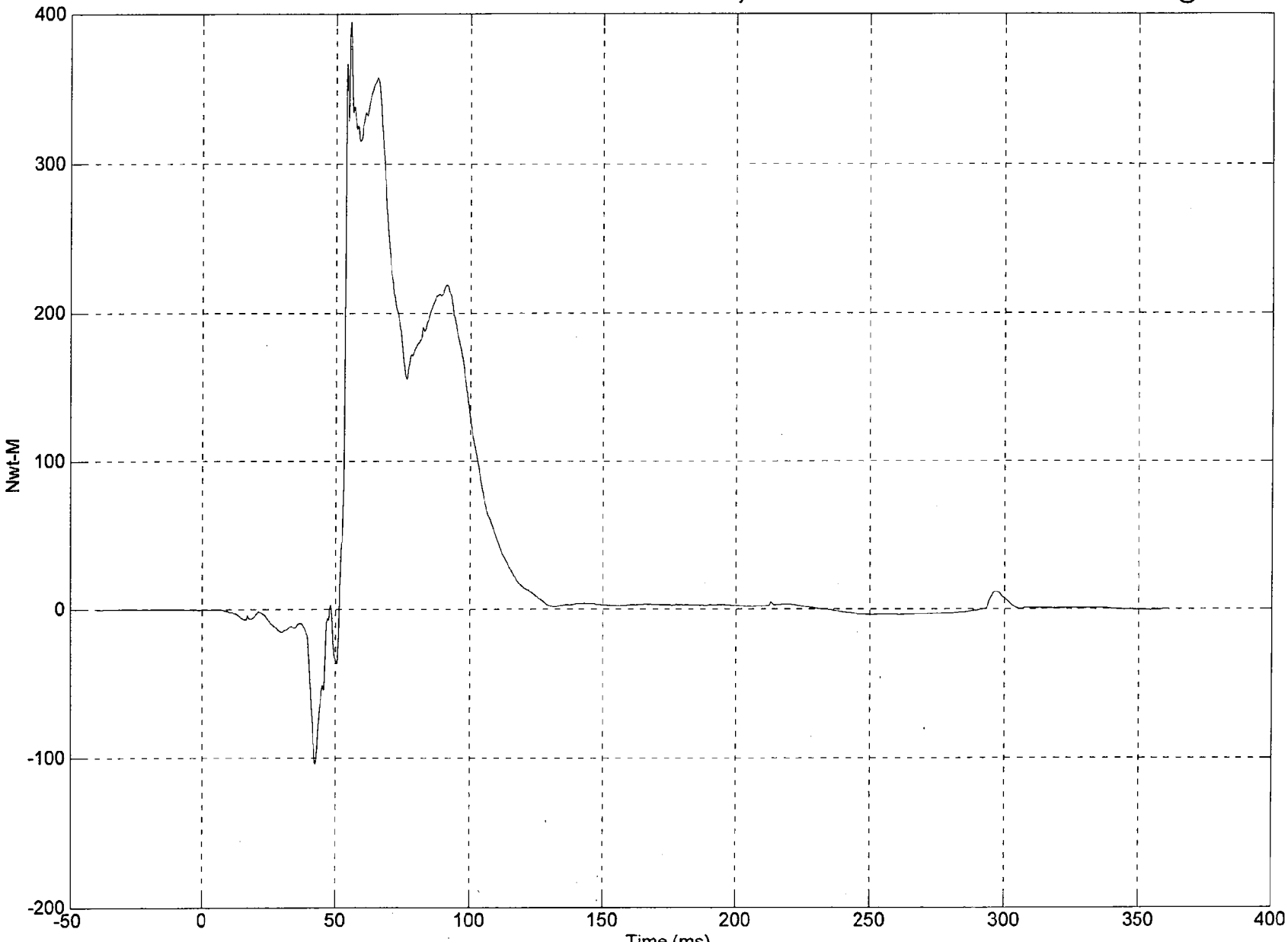

NCAP TEST #1 - 1998 DODGE CARAVAN
P1 Rt Lower Tibia Fz
Max = 183 Nwt @ 212.20 msec
Min = -5.25e+003 Nwt @ 53.60 msec
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
NWt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 600
NHTSA No: MW0302
Date: 02 Oct 1997
B-43
8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

P1 Rt Lower Tibia My

Max = 395 Nwt-M @ 55.20 msec

Min = -104 Nwt-M @ 42.50 msec



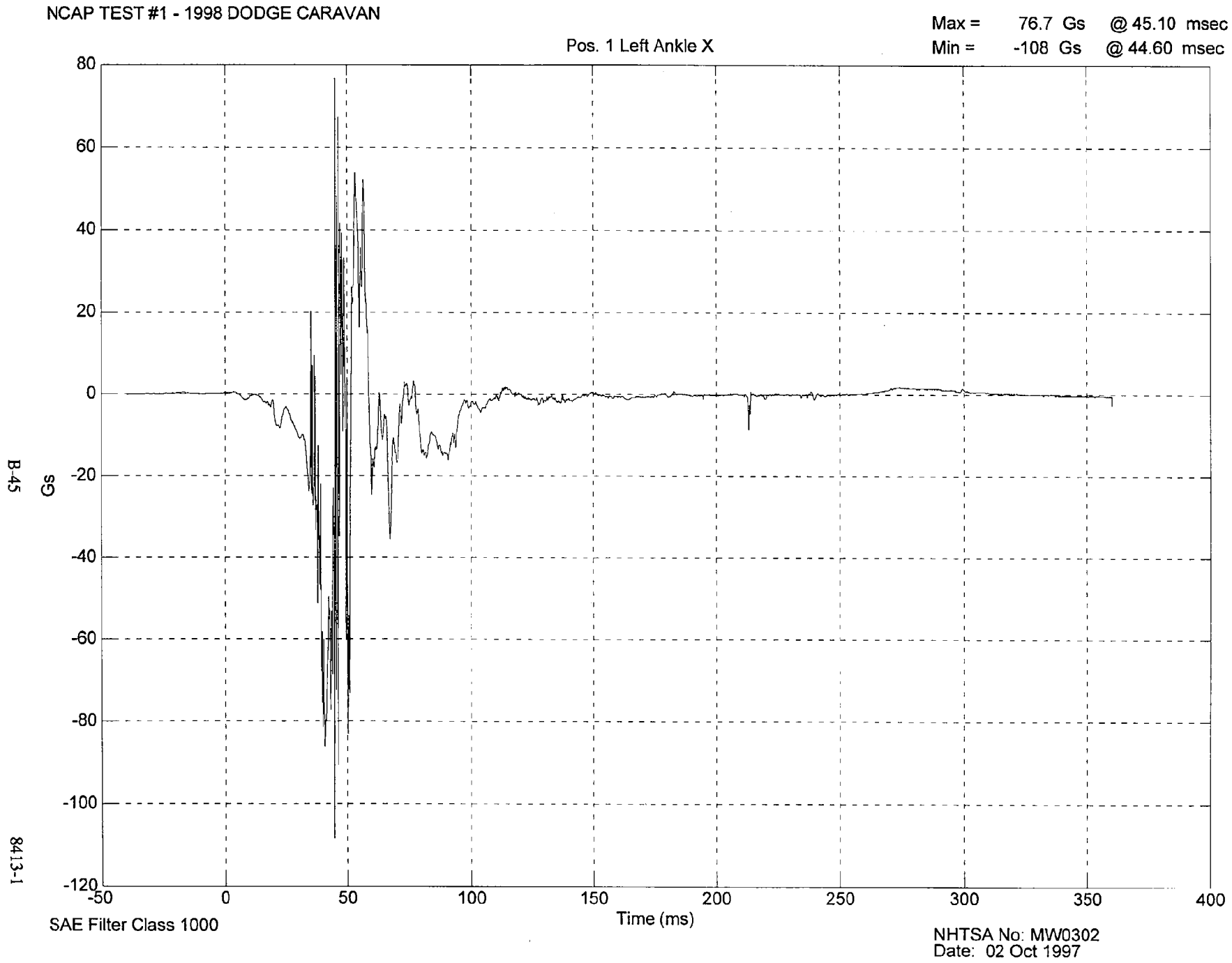
SAE Filter Class 600

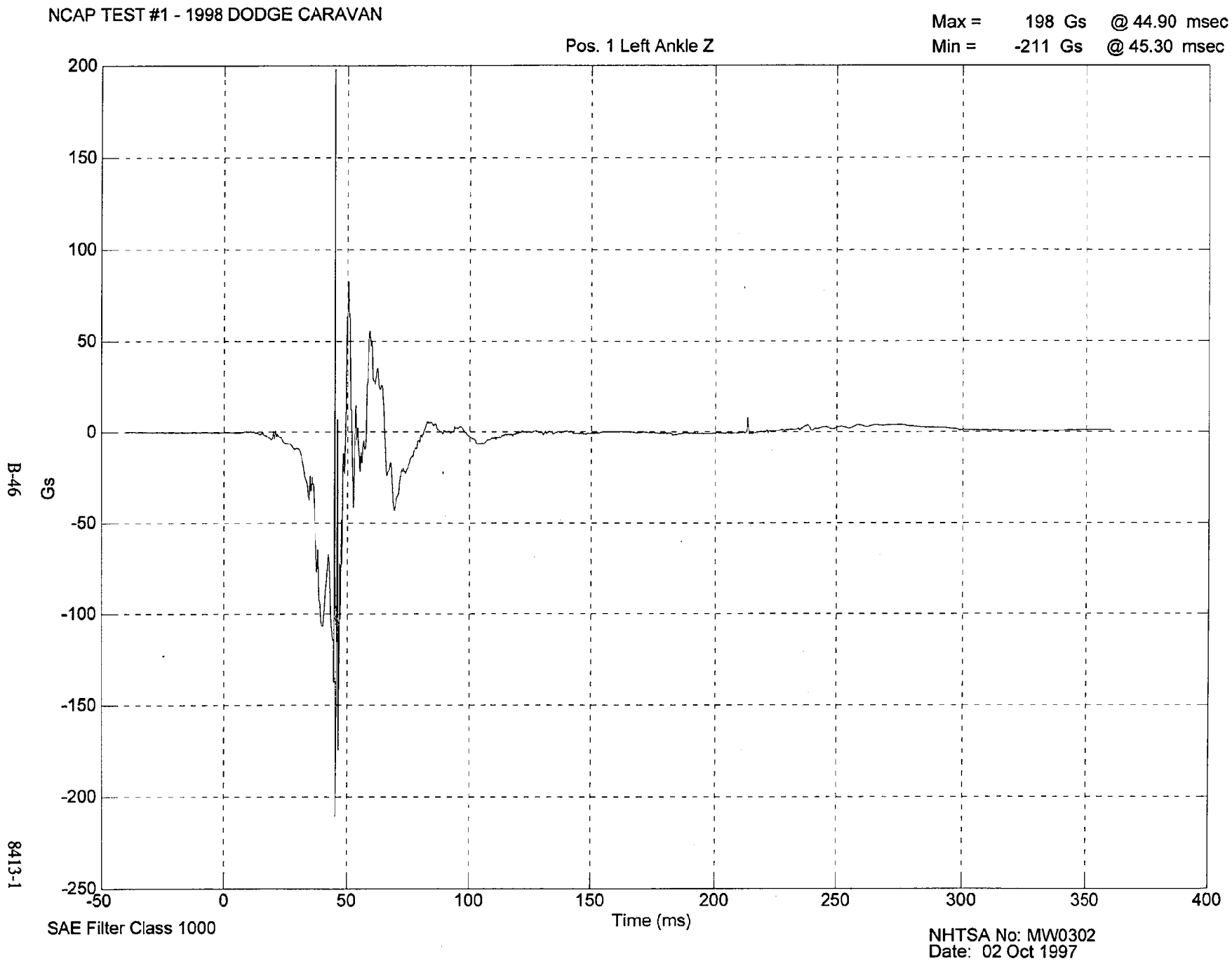
NHTSA No: MW0302

Date: 02 Oct 1997

B-44

8413-1


NCAP TEST #1 - 1998 DODGE CARAVAN
Pos. 1 Left Ankle X
Max = 76.7 Gs @ 45.10 msec
Min = -108 Gs @ 44.60 msec
80
60
40
20
0
-20
-40
-60
-80
-100
-120
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
NHTSA No: MW0302
Date: 02 Oct 1997
B-45
8413-1

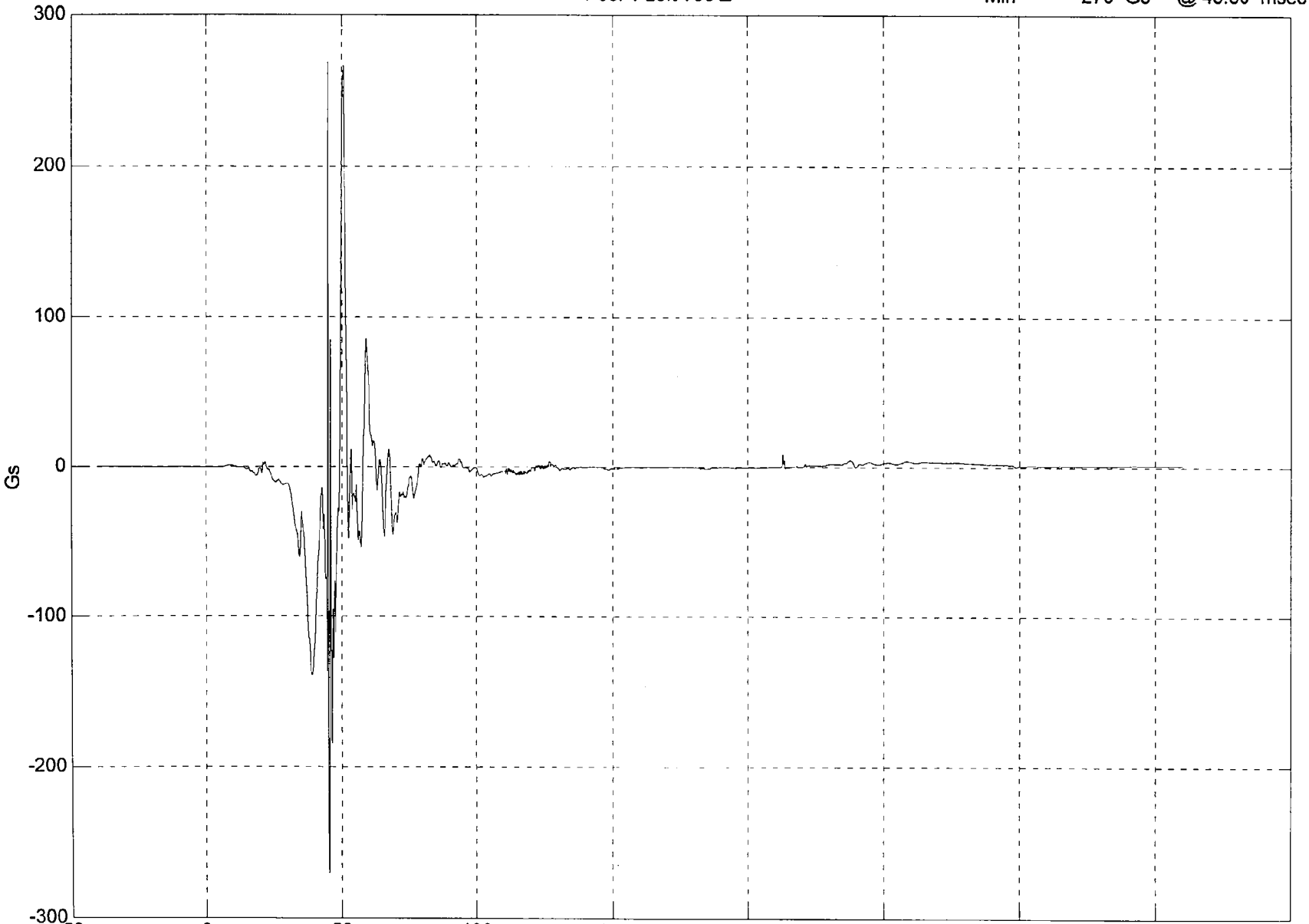

NCAP TEST #1 - 1998 DODGE CARAVAN
Pos. 1 Left Ankle Z
Max = 198 Gs @ 44.90 msec
Min = -211 Gs @ 45.30 msec
200
150
100
50
0
-50
-100
-150
-200
-250
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Left Toe Z

Max = 269 Gs @ 44.90 msec
Min = -270 Gs @ 45.50 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

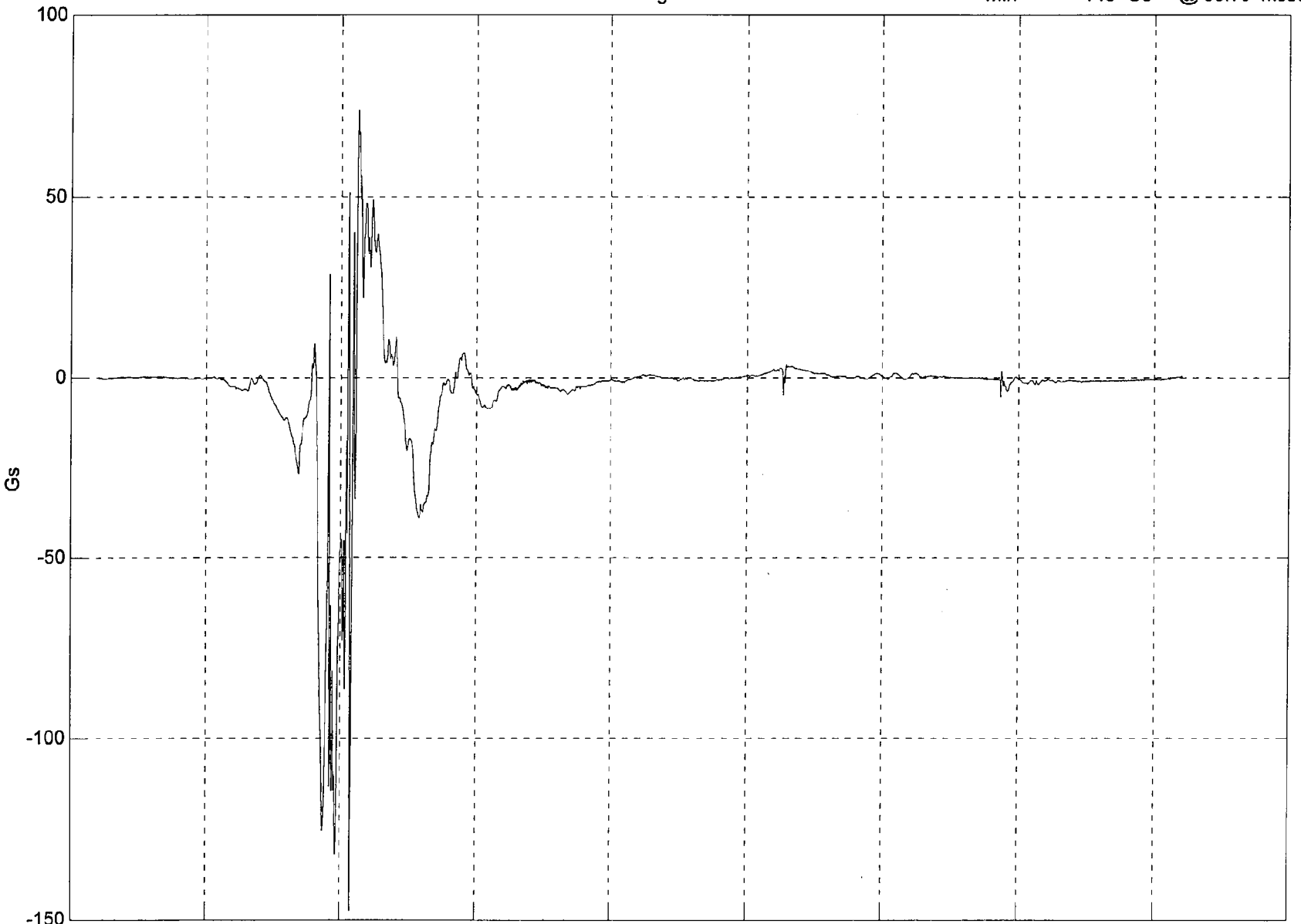
B-47

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Right Ankle X

Max = 73.9 Gs @ 56.10 msec
Min = -148 Gs @ 53.70 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

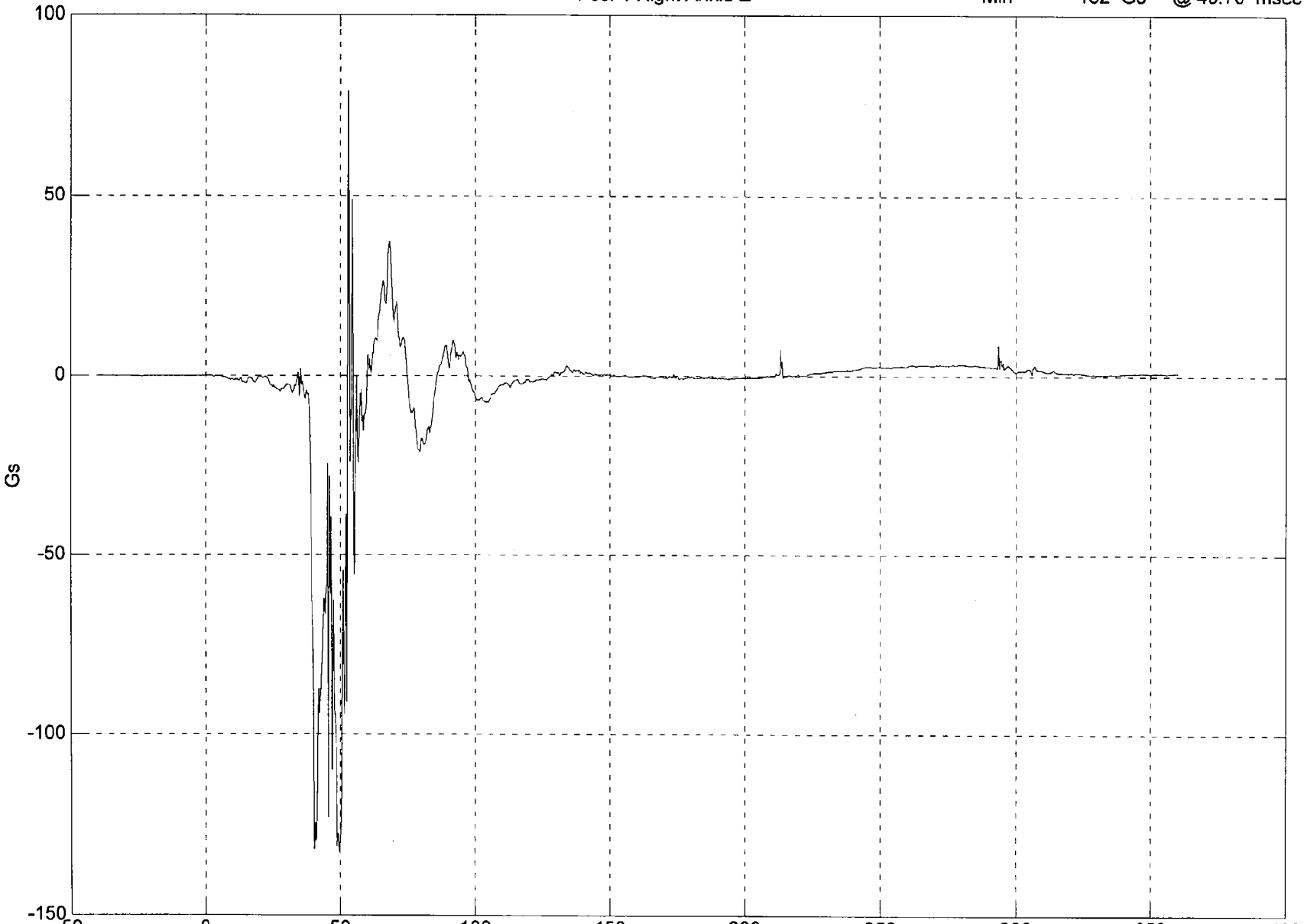
B-48

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Right Ankle Z

Max = 79.1 Gs @ 52.80 msec
Min = -132 Gs @ 49.70 msec



B-49

8413-1

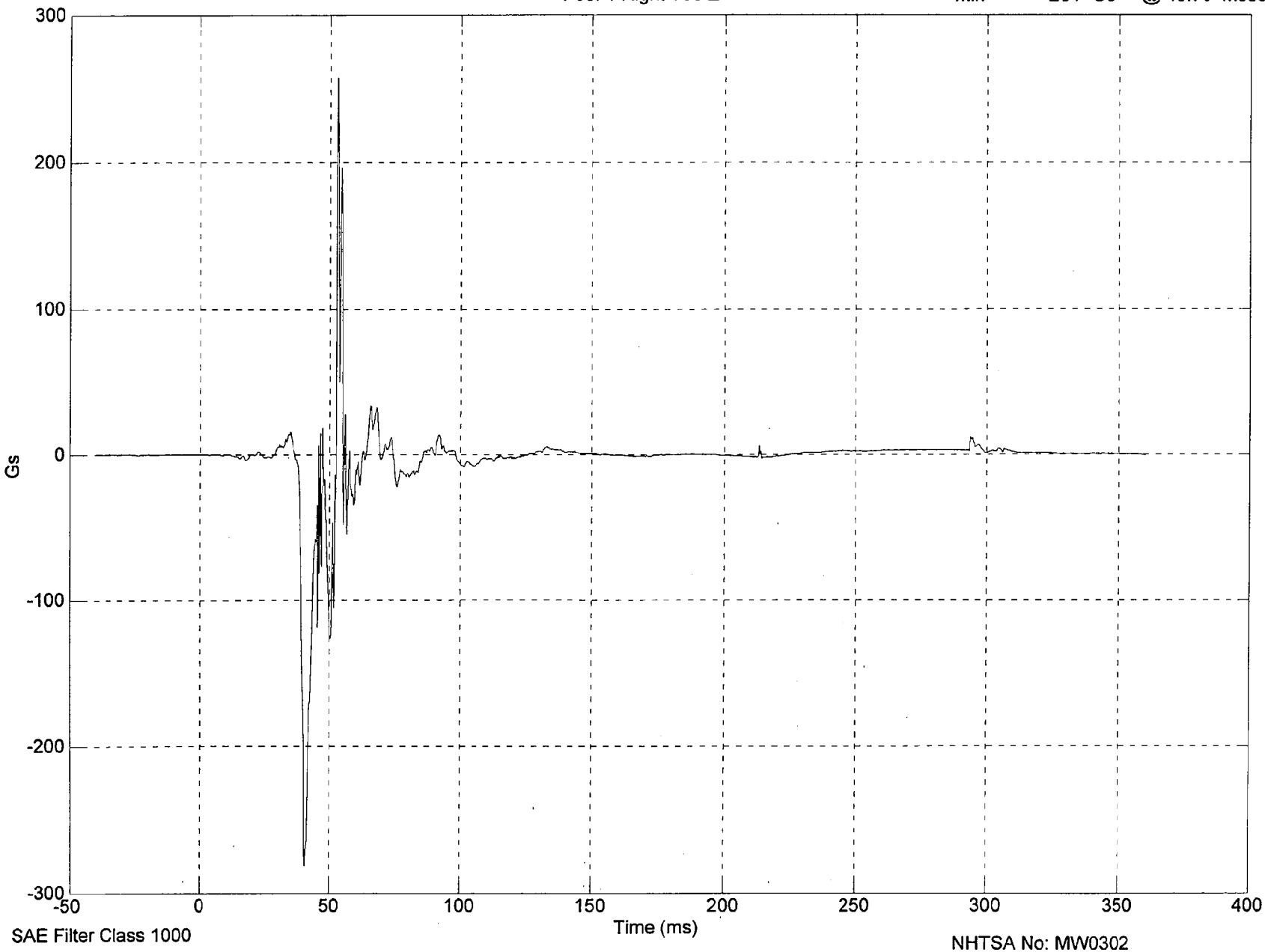
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Right Toe Z

Max = 258 Gs @ 52.80 msec
Min = -281 Gs @ 40.70 msec

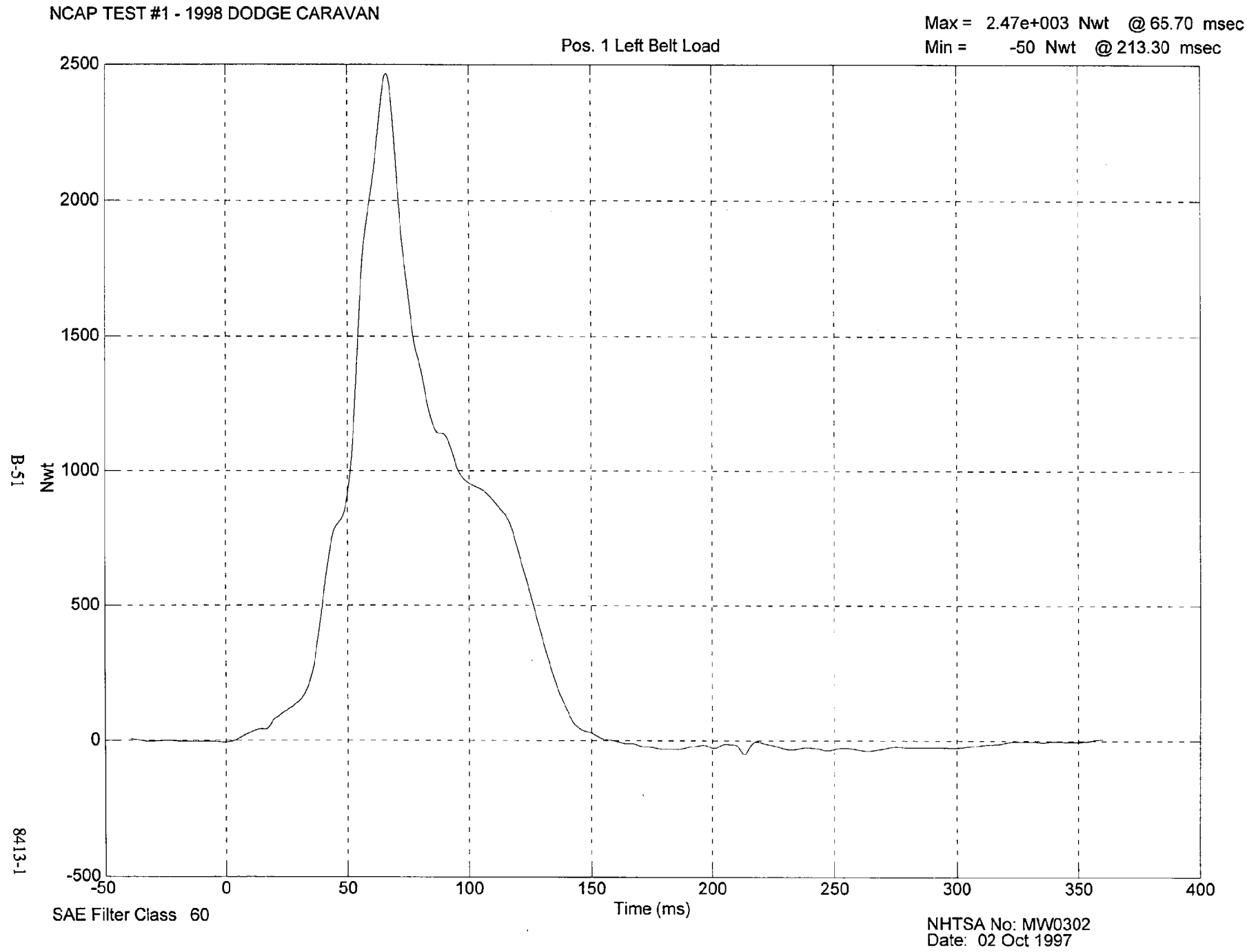


B-50

8413-1

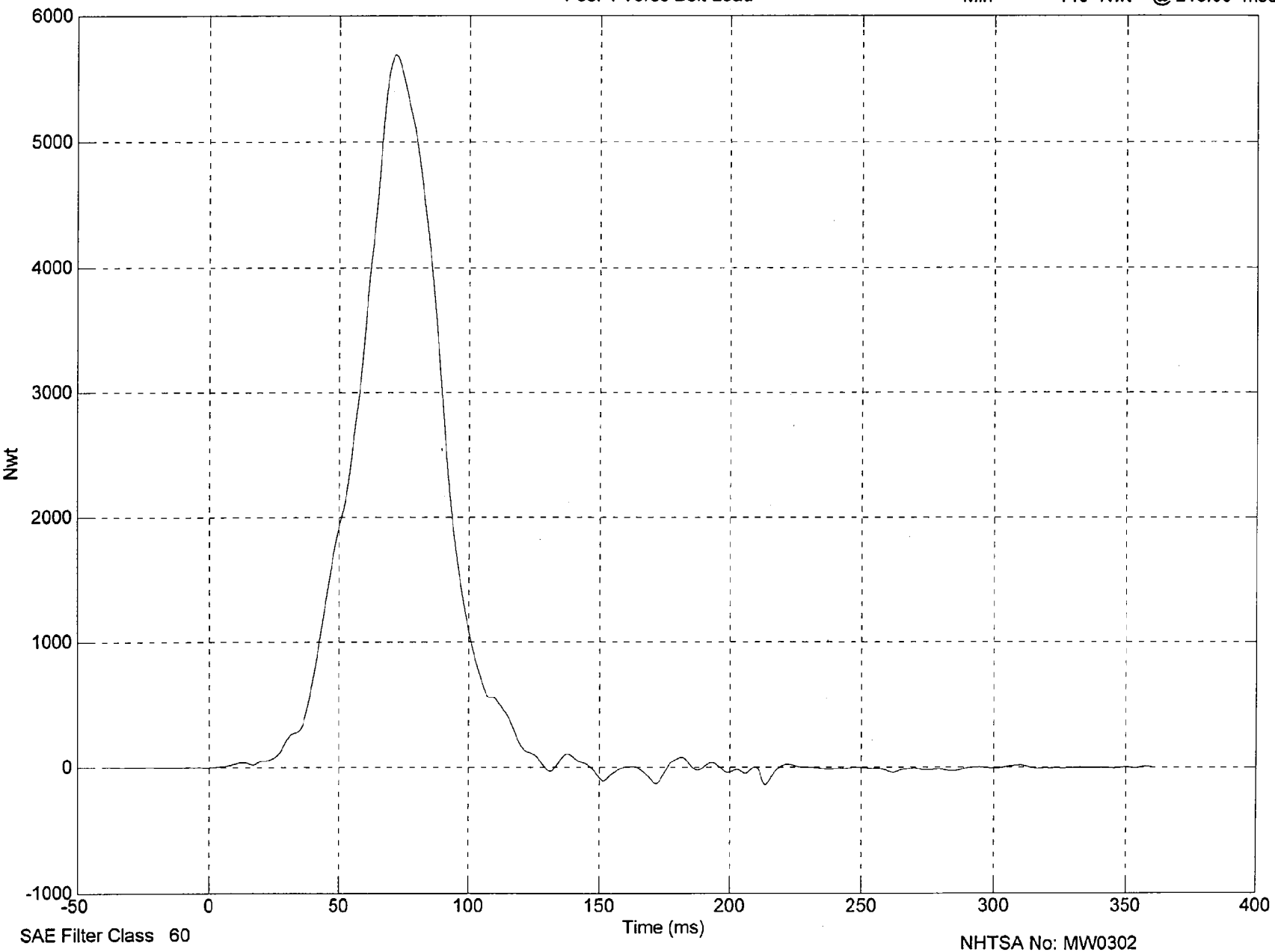
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997


NCAP TEST #1 - 1998 DODGE CARAVAN
Pos. 1 Left Belt Load
Max = 2.47e+003 Nwt @ 65.70 msec
Min = -50 Nwt @ 213.30 msec
2500
2000
1500
1000
500
0
-500
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 60
NHTSA No: MW0302
Date: 02 Oct 1997
B-51
8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 5.69e+003 Nwt @ 71.60 msec
Min = -140 Nwt @ 213.60 msec



B-52

8413-1

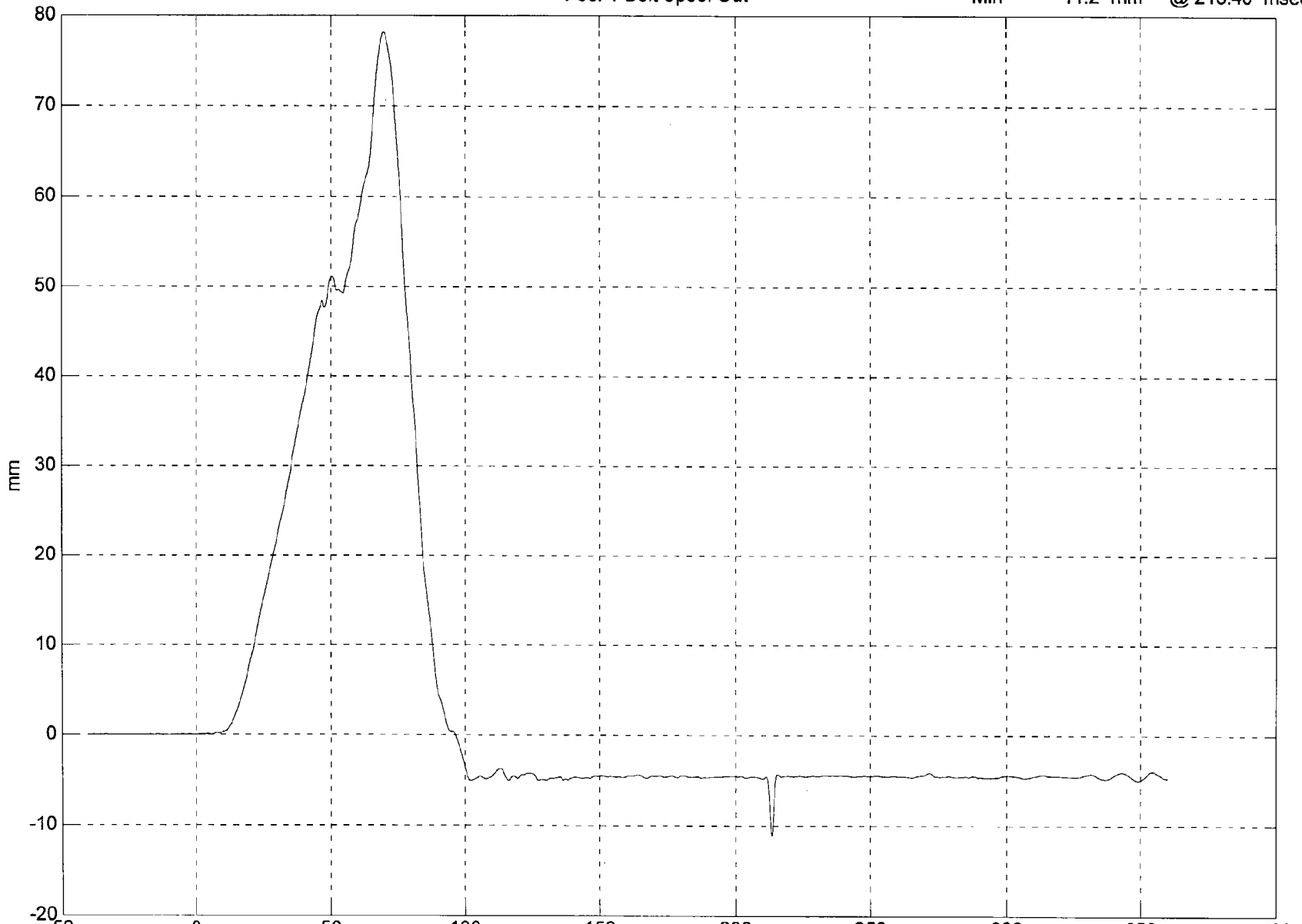
SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Belt Spool Out

Max = 78.2 mm @ 69.60 msec
Min = -11.2 mm @ 213.40 msec



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

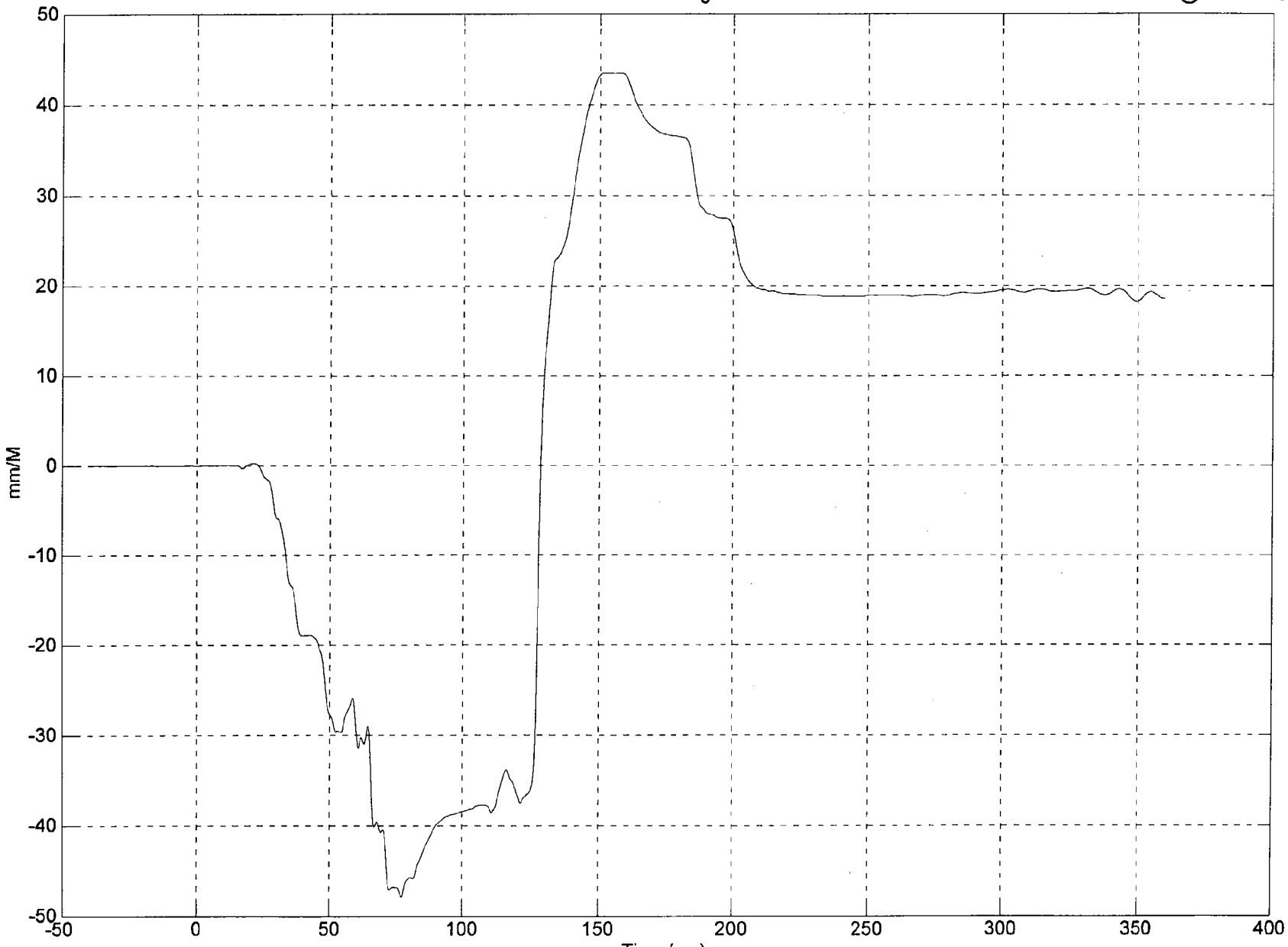
B-53

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 1 Belt Elongation

Max = 43.5 mm/M @ 151.50 msec
Min = -47.9 mm/M @ 77.60 msec



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

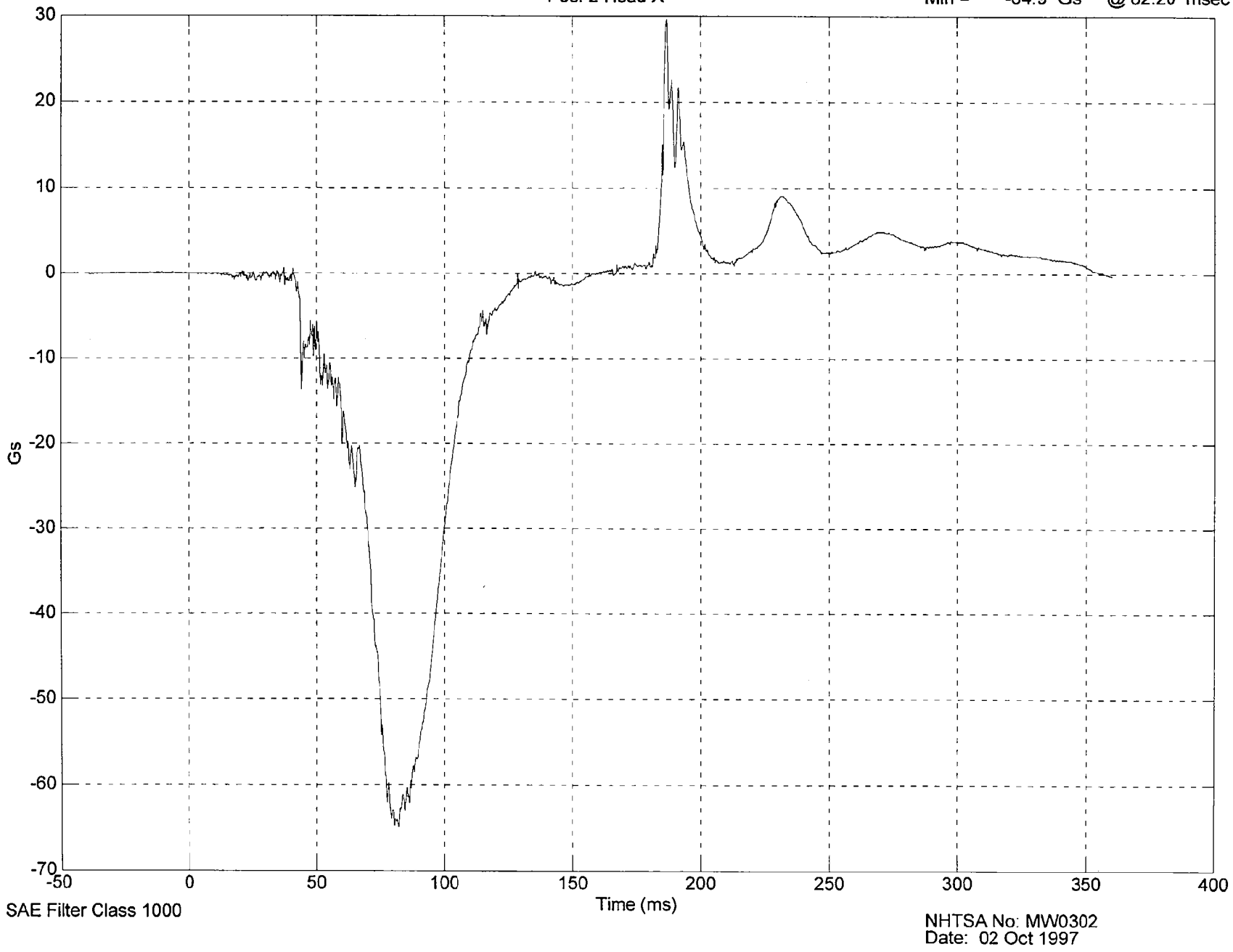
B-54

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Head X

Max = 29.7 Gs @ 186.90 msec
Min = -64.9 Gs @ 82.20 msec

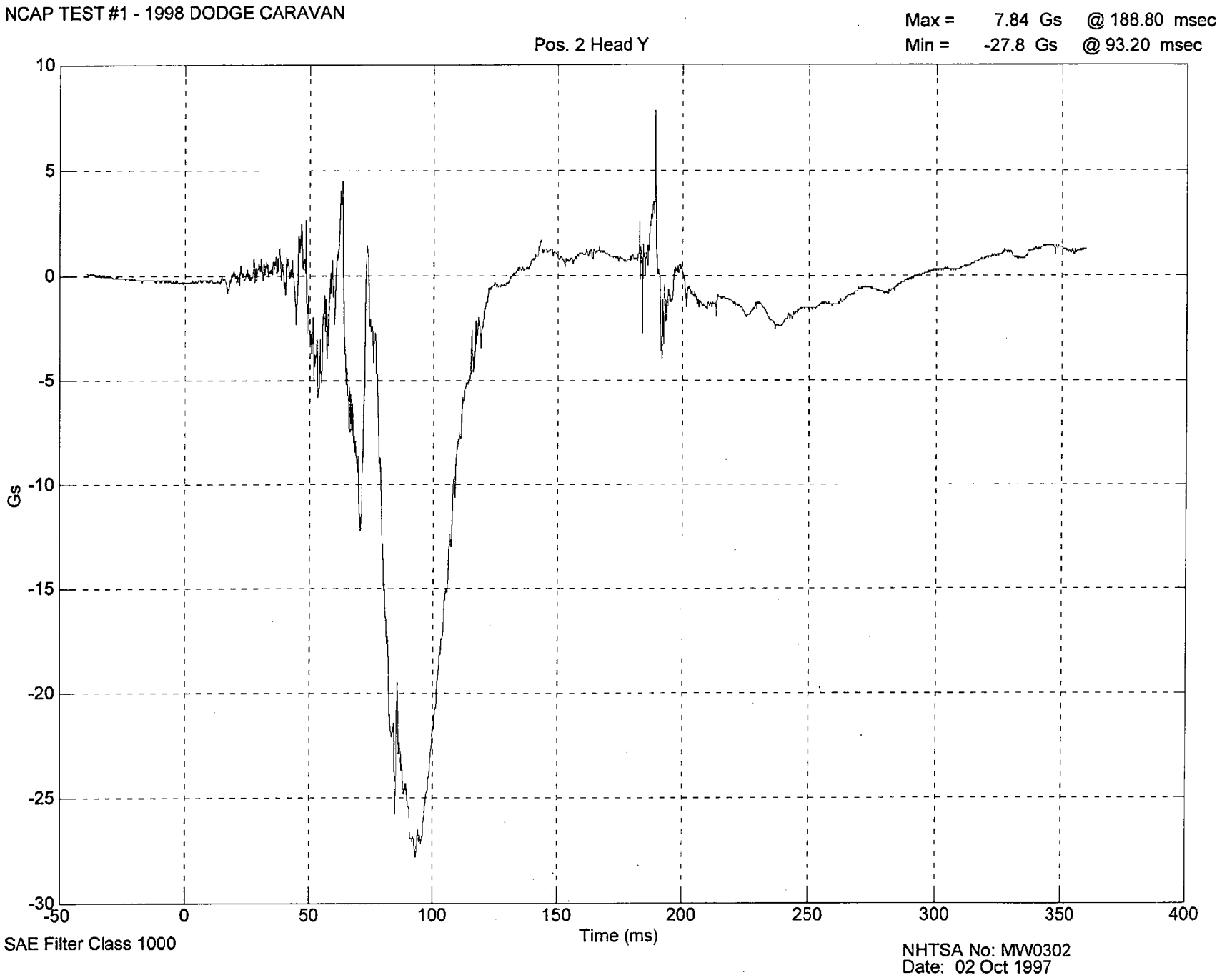


SAE Filter Class 1000

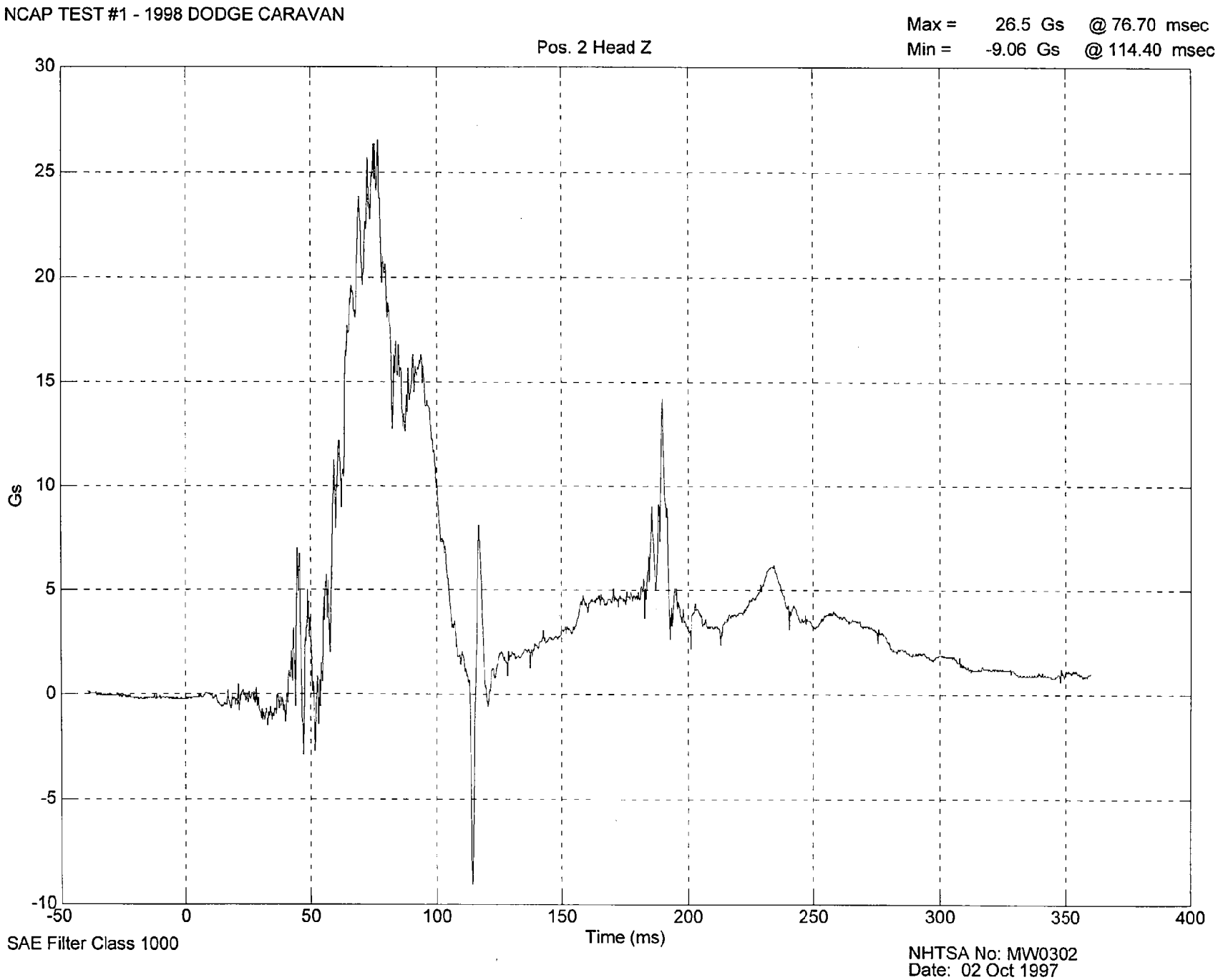
NHTSA No: MW0302
Date: 02 Oct 1997

B-55

8413-1


NCAP TEST #1 - 1998 DODGE CARAVAN
Pos. 2 Head Y
Max = 7.84 Gs @ 188.80 msec
Min = -27.8 Gs @ 93.20 msec
10
5
0
-5
-10
-15
-20
-25
-30
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
NHTSA No: MVV0302
Date: 02 Oct 1997

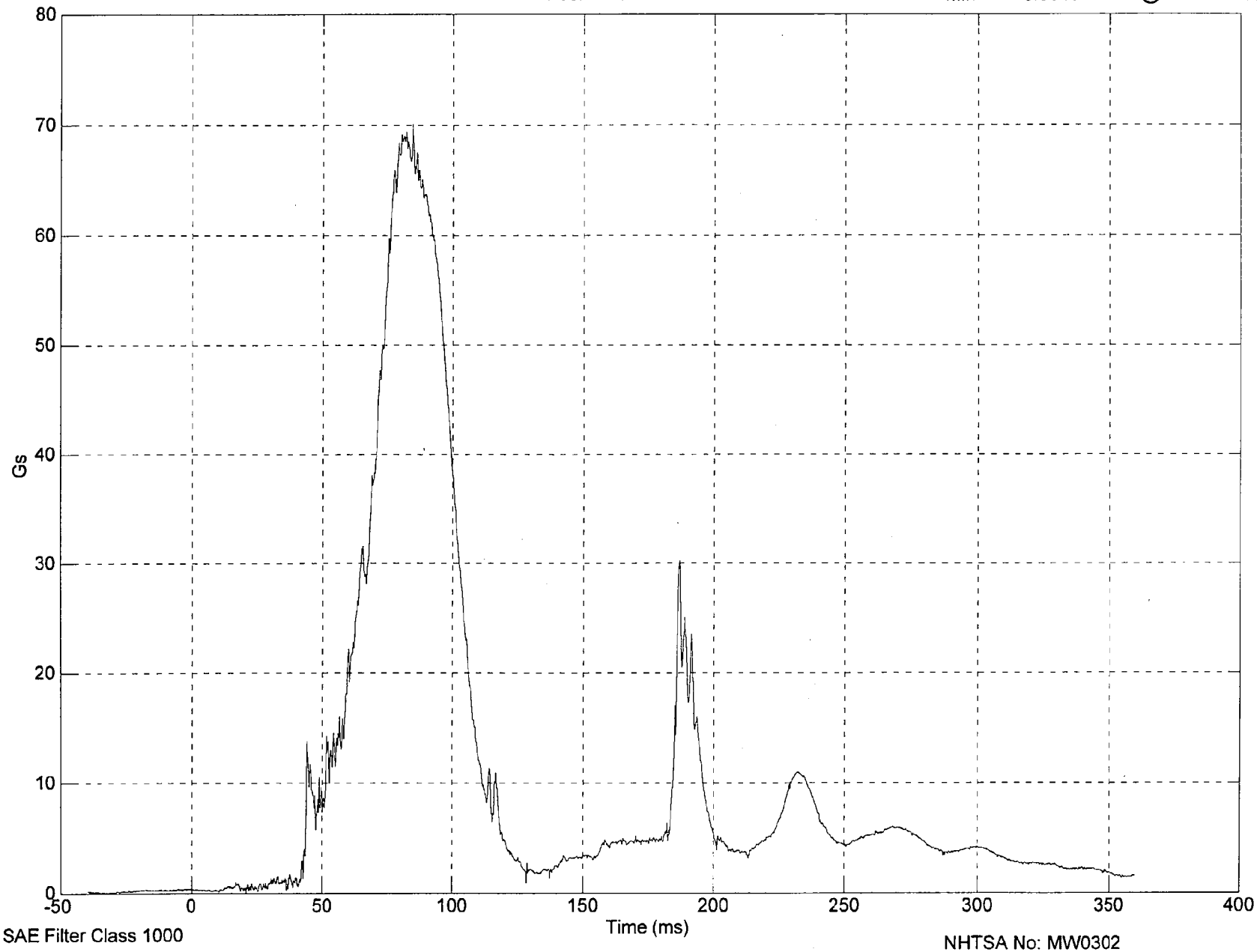
8413-1


NCAP TEST #1 - 1998 DODGE CARAVAN
Pos. 2 Head Z
Max = 26.5 Gs @ 76.70 msec
Min = -9.06 Gs @ 114.40 msec
Gs
Time (ms)
SAE Filter Class 1000
NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Head Resultant

Max = 70.1 Gs @ 84.70 msec
Min = 0.0619 Gs @ -32.40 msec



SAE Filter Class 1000

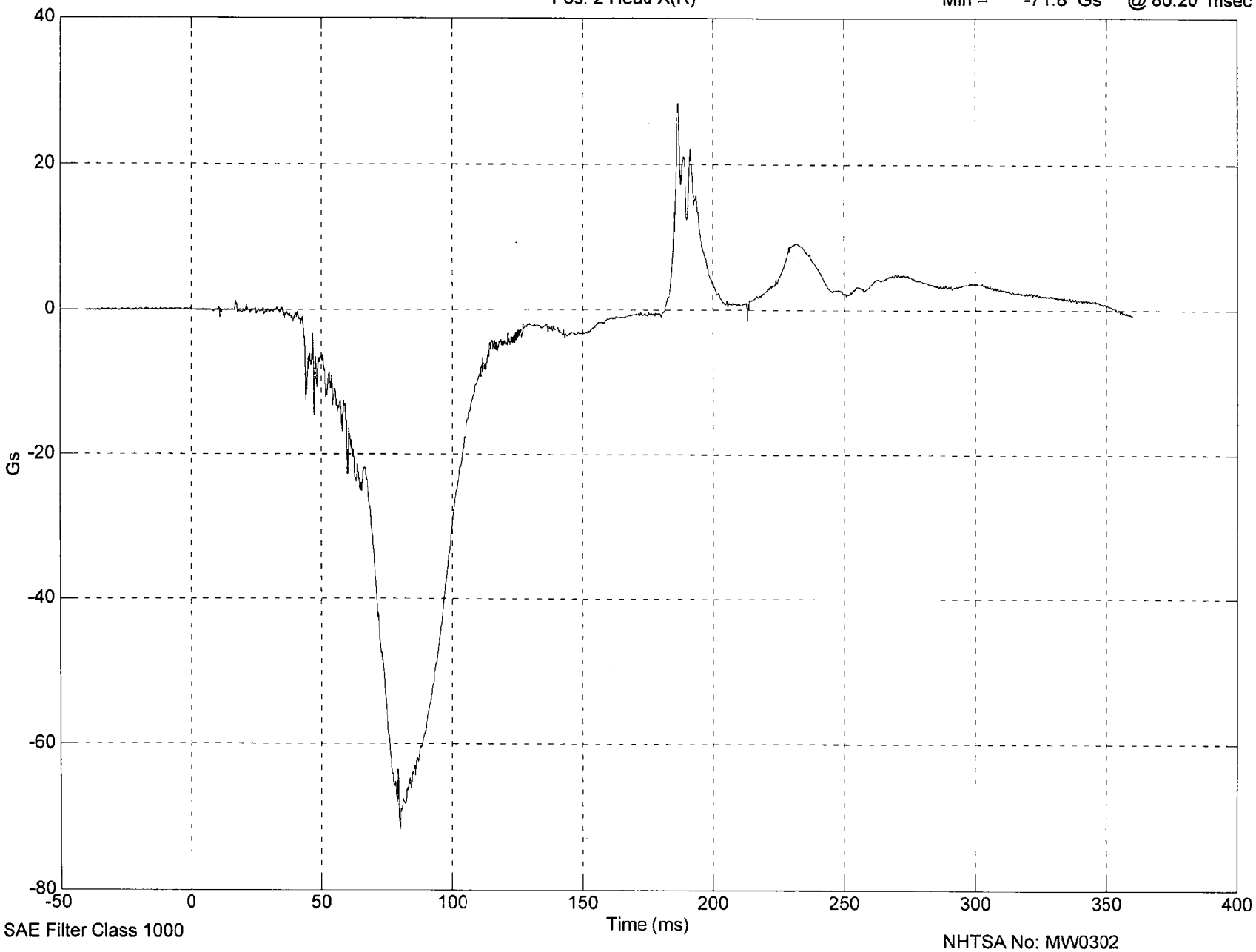
NHTSA No: MW0302
Date: 02 Oct 1997

B-58

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 28.4 Gs @ 186.90 msec
Min = -71.8 Gs @ 80.20 msec



SAE Filter Class 1000

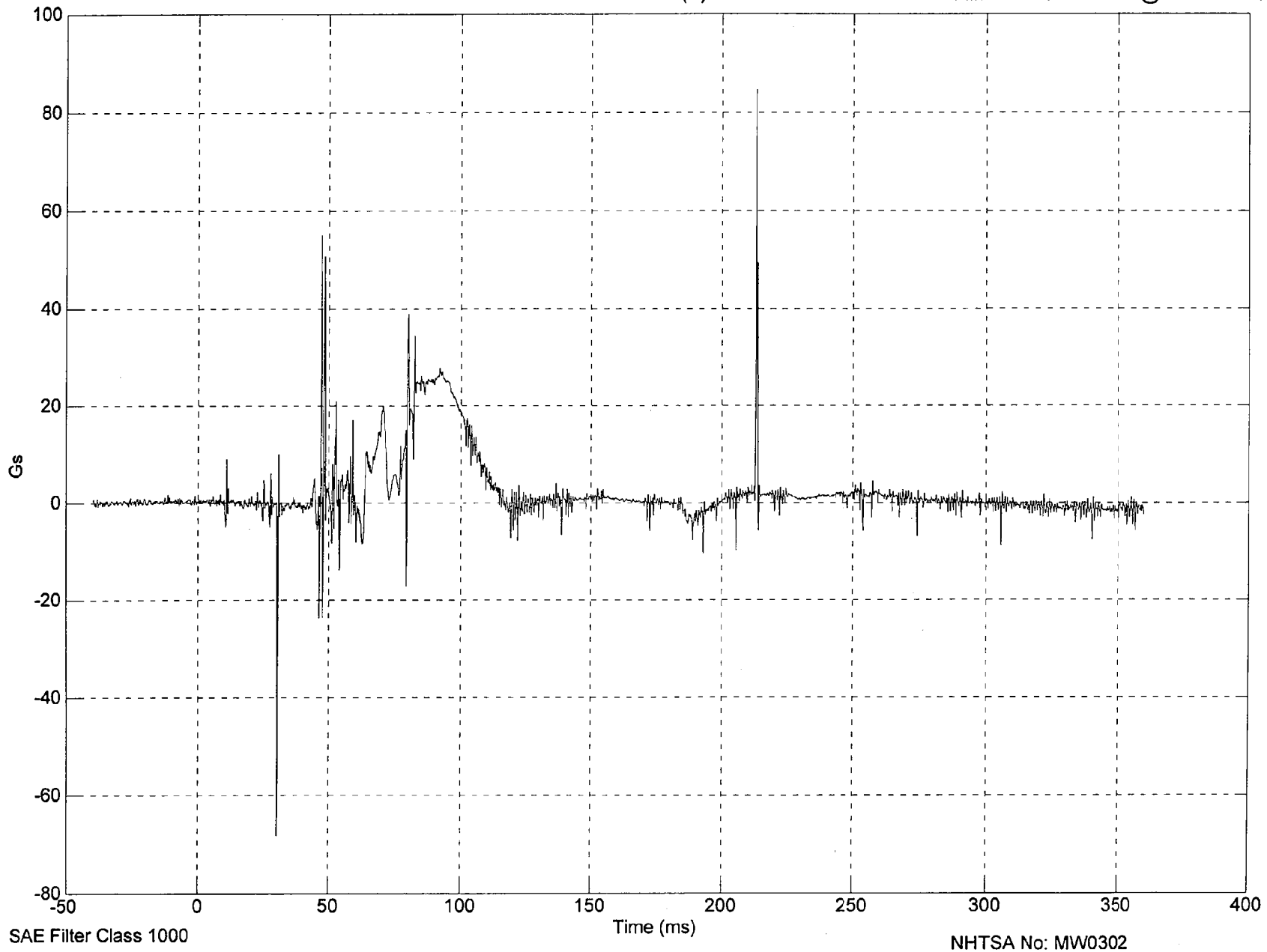
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Head Y(R)

Max = 84.7 Gs @ 213.30 msec
Min = -68.2 Gs @ 30.40 msec



B-60

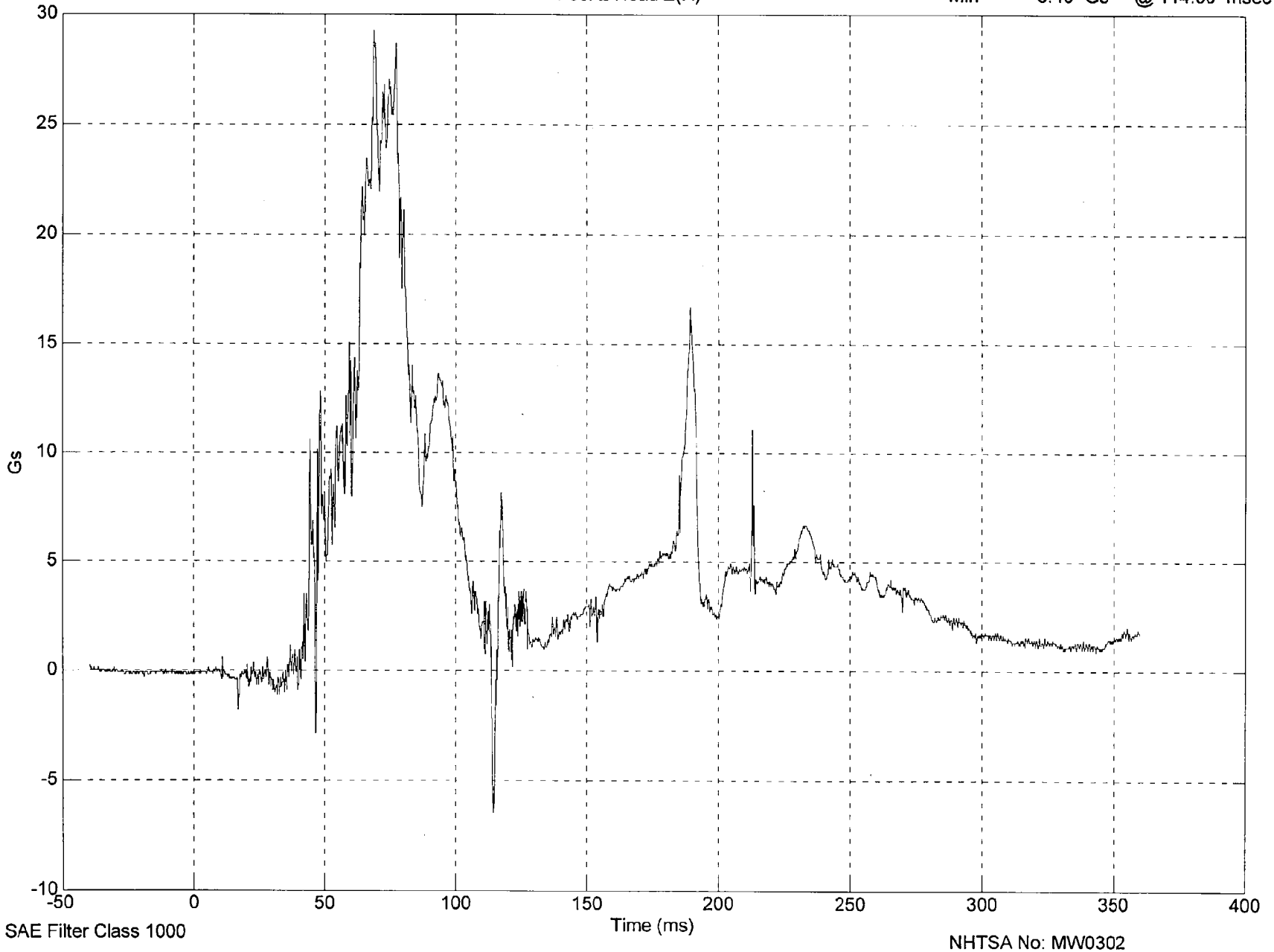
8413-1

SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 29.3 Gs @ 68.60 msec
Min = -6.49 Gs @ 114.50 msec

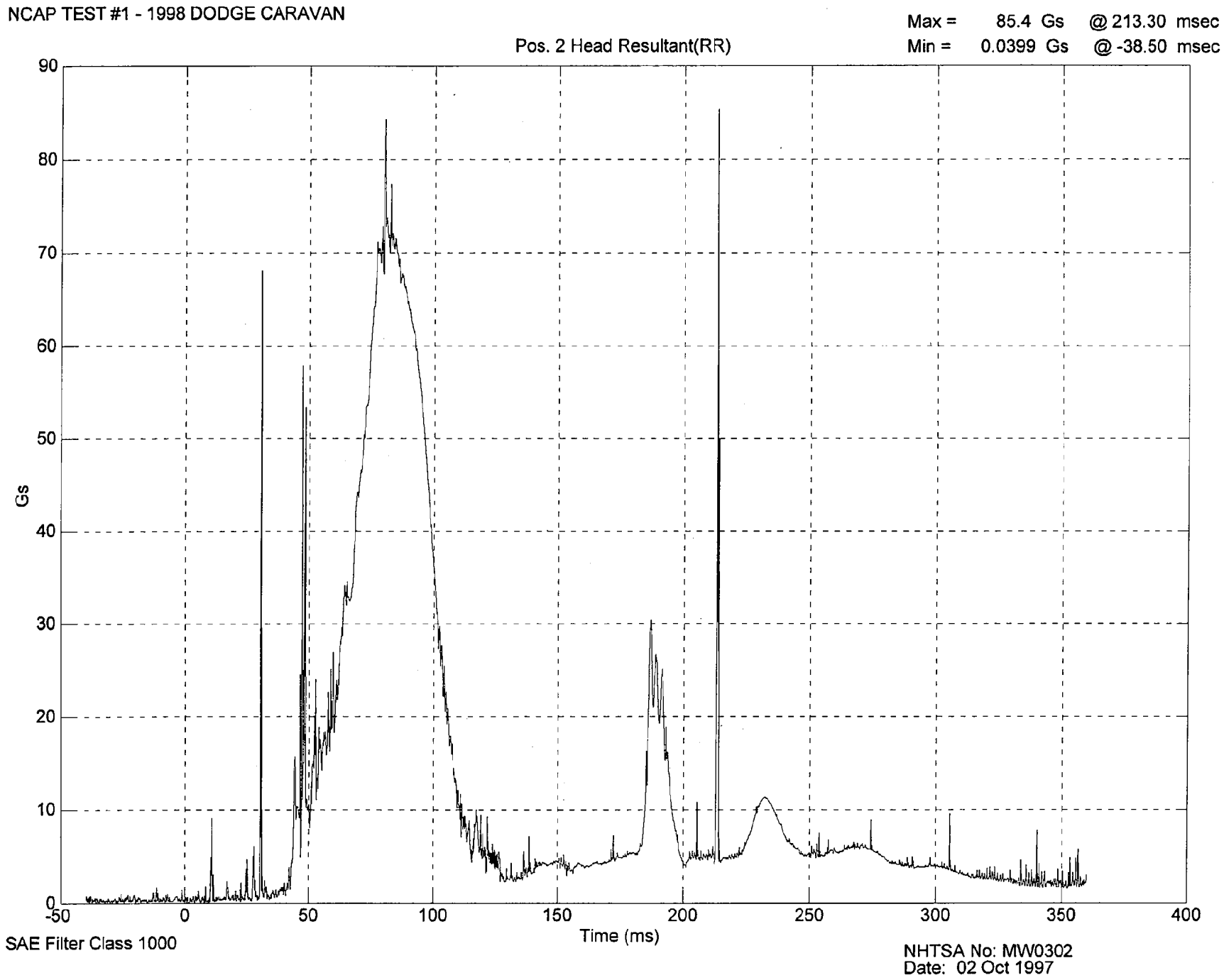


SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

B-61

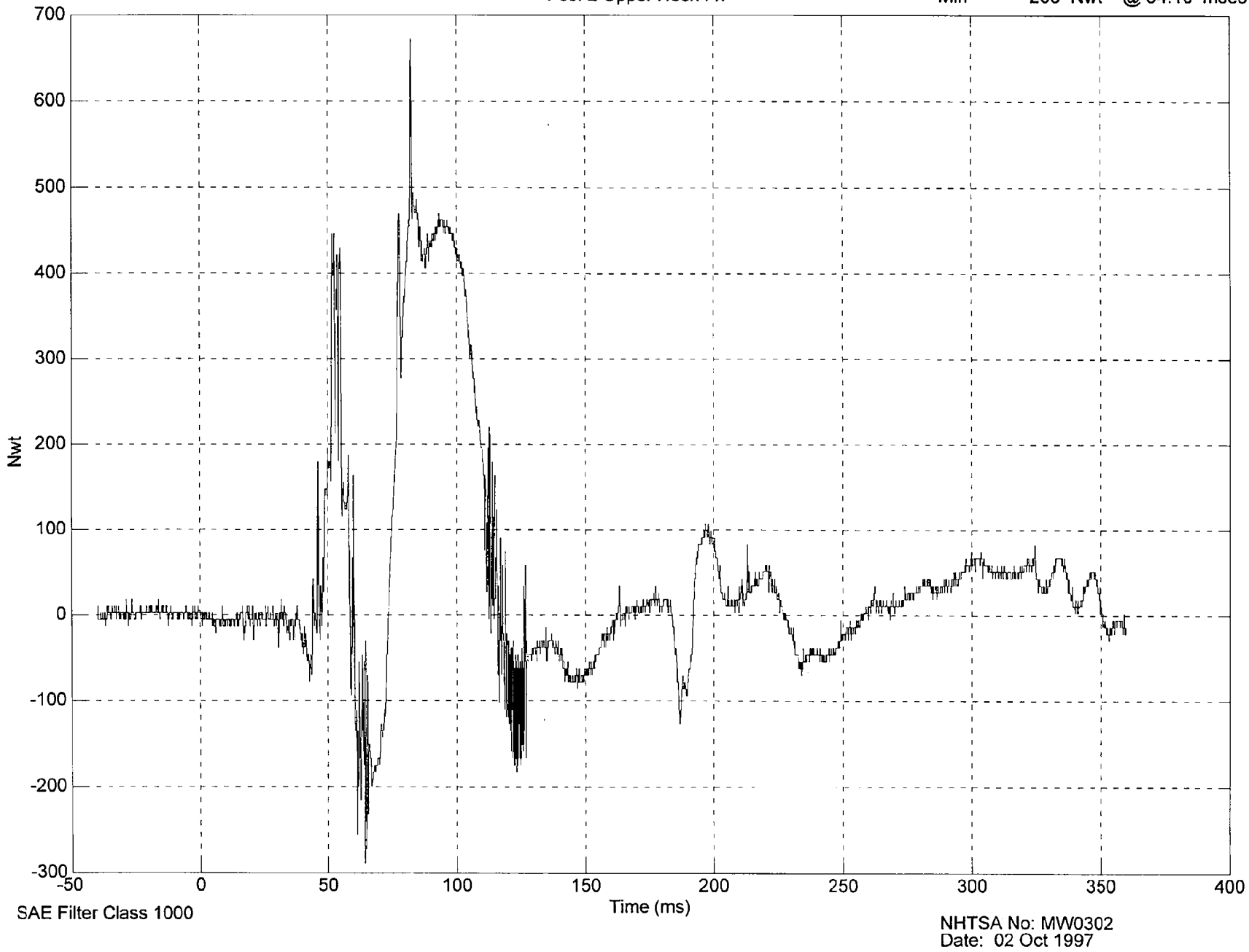
8413-1


NCAP TEST #1 - 1998 DODGE CARAVAN
Max = 85.4 Gs @ 213.30 msec
Min = 0.0399 Gs @ -38.50 msec
Pos. 2 Head Resultant(RR)
Gs
Time (ms)
SAE Filter Class 1000
NHTSA No: MW0302
Date: 02 Oct 1997
B-62
8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Upper Neck Fx

Max = 672 Nwt @ 82.40 msec
Min = -288 Nwt @ 64.10 msec



B-63

8413-1

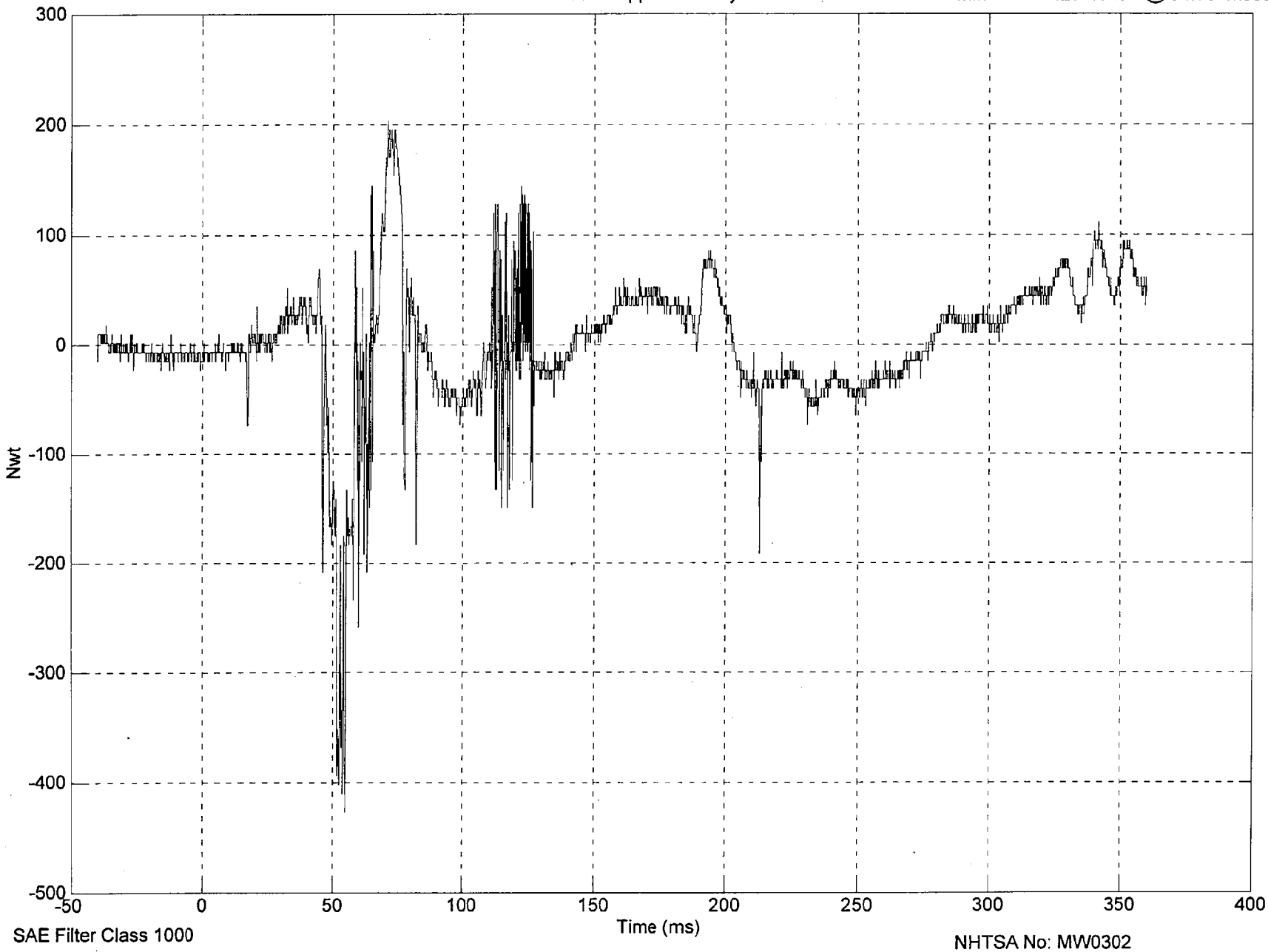
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Upper Neck Fy

Max = 204 Nwt @ 71.20 msec
Min = -427 Nwt @ 54.70 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

B-64

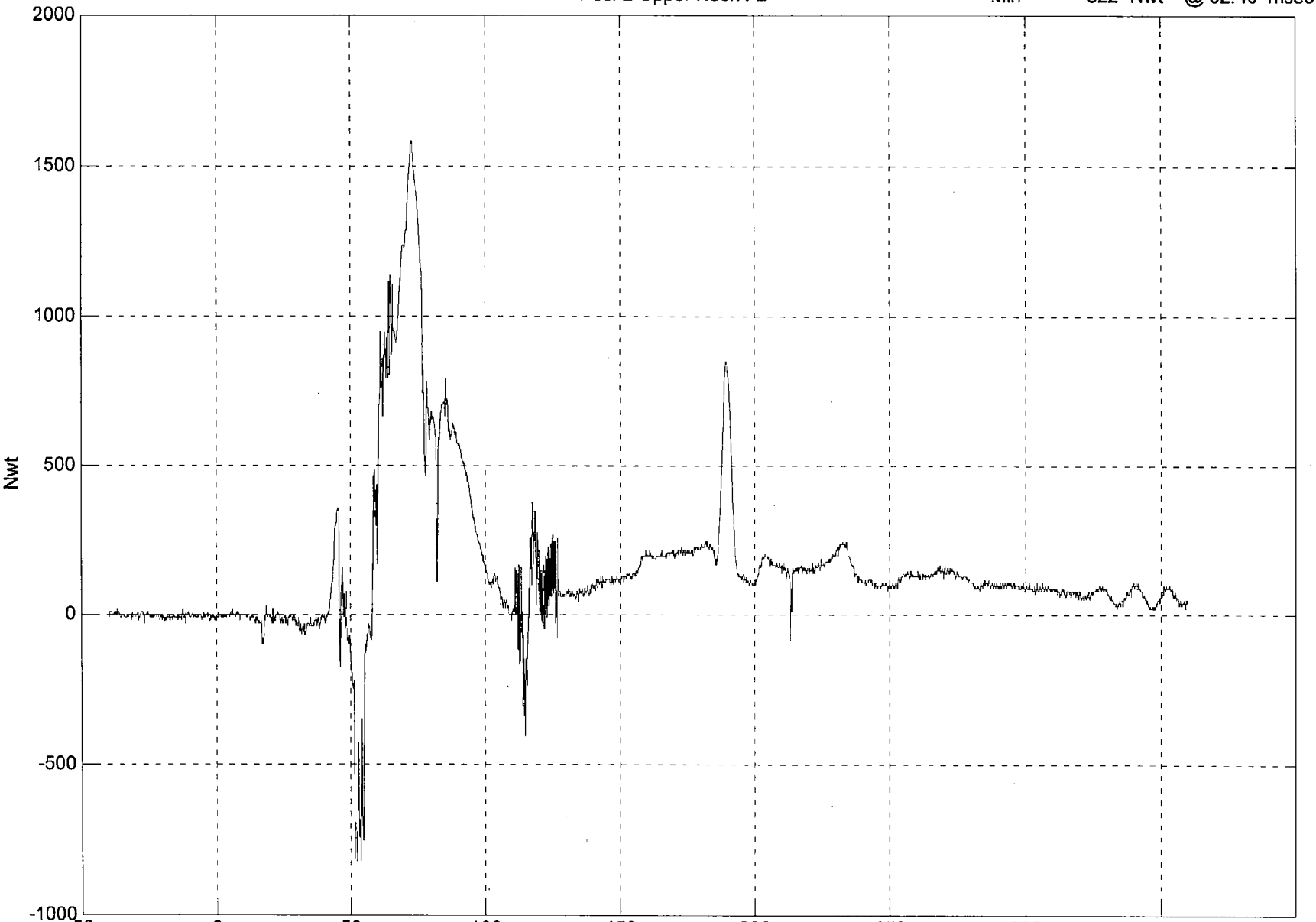
8413-1

[redacted]

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Upper Neck Fz

Max = 1.58e+003 Nwt @ 72.30 msec
Min = -822 Nwt @ 52.40 msec



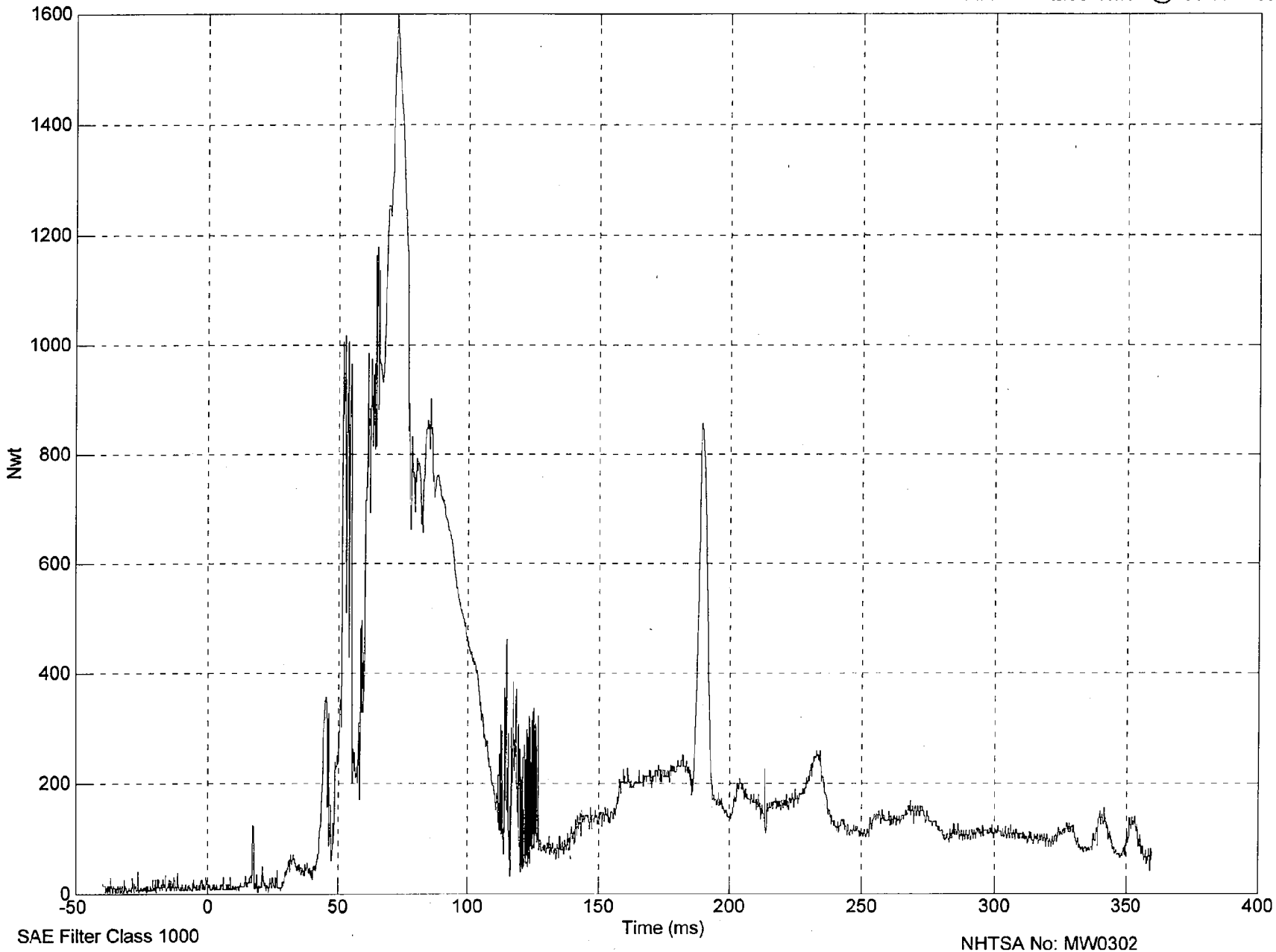
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Neck Force Res.

Max = 1.6e+003 Nwt @ 72.40 msec
Min = 2.96 Nwt @ -38.80 msec



B-66

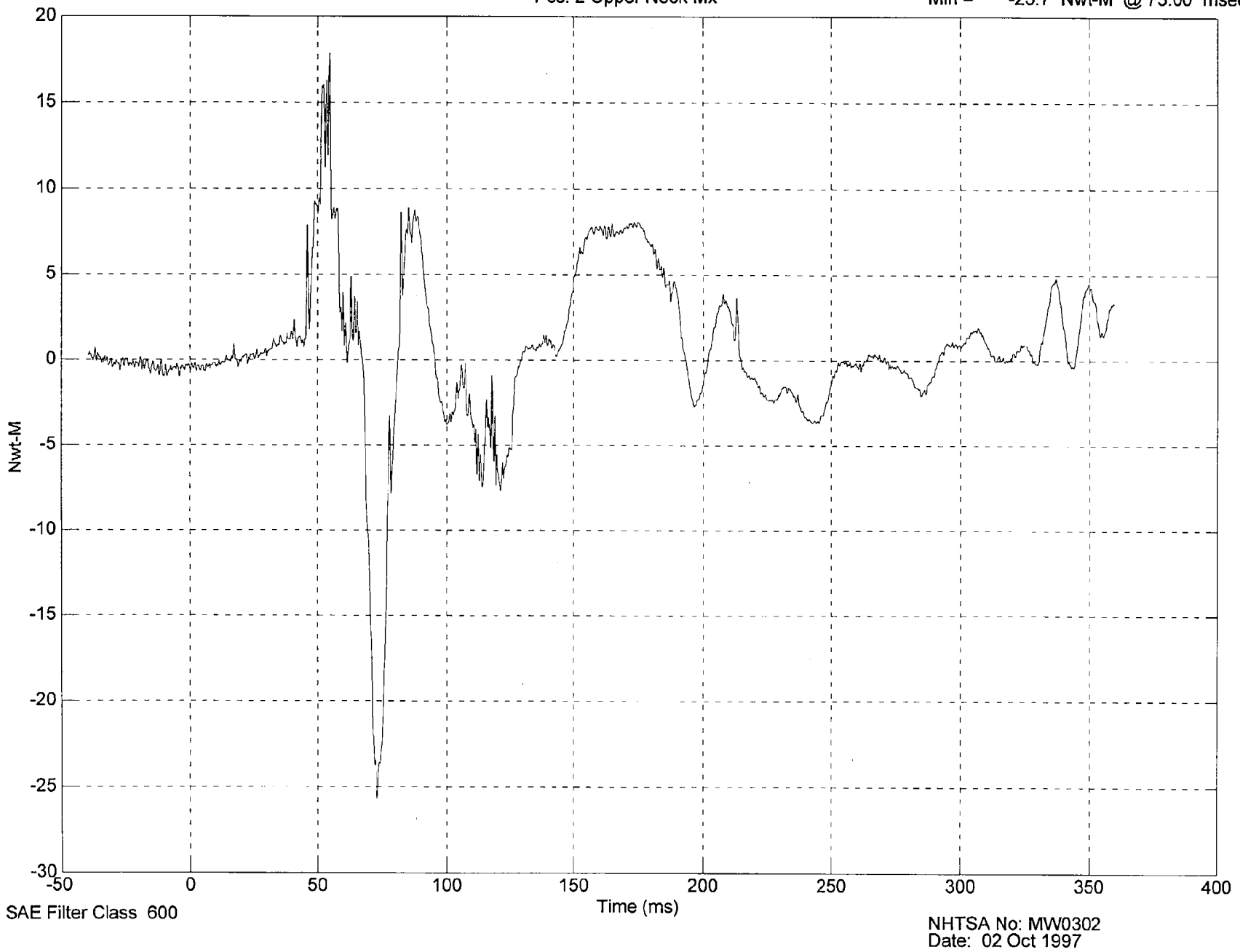
8413-1

SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 17.9 Nwt-M @ 54.60 msec
Min = -25.7 Nwt-M @ 73.00 msec



SAE Filter Class 600

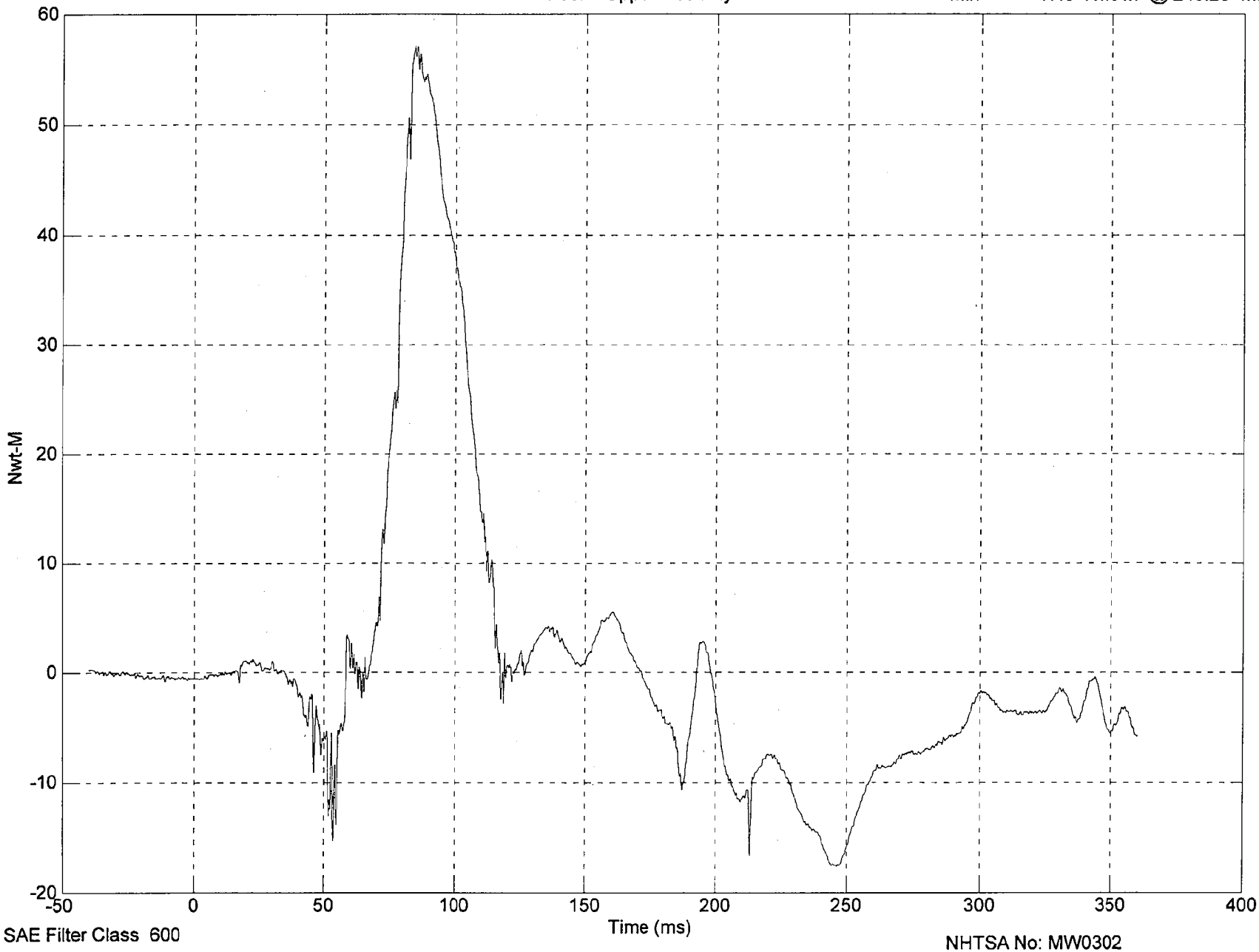
NHTSA No: MW0302
Date: 02 Oct 1997

B-67

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 57.1 Nwt-M @ 84.10 msec
Min = -17.6 Nwt-M @ 246.20 msec



SAE Filter Class 600

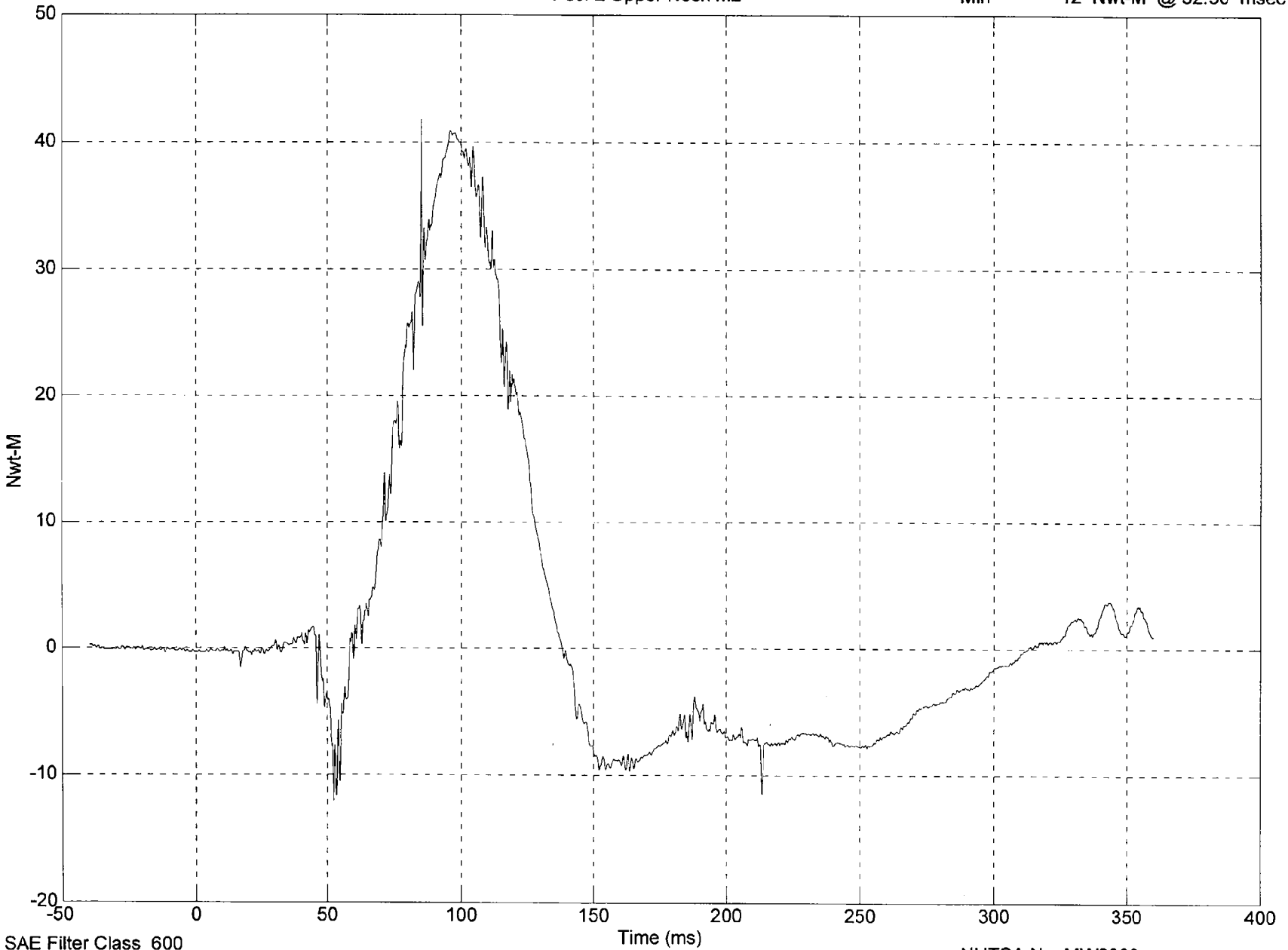
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Upper Neck Mz

Max = 41.8 Nwt-M @ 85.20 msec
Min = -12 Nwt-M @ 52.30 msec



SAE Filter Class 600

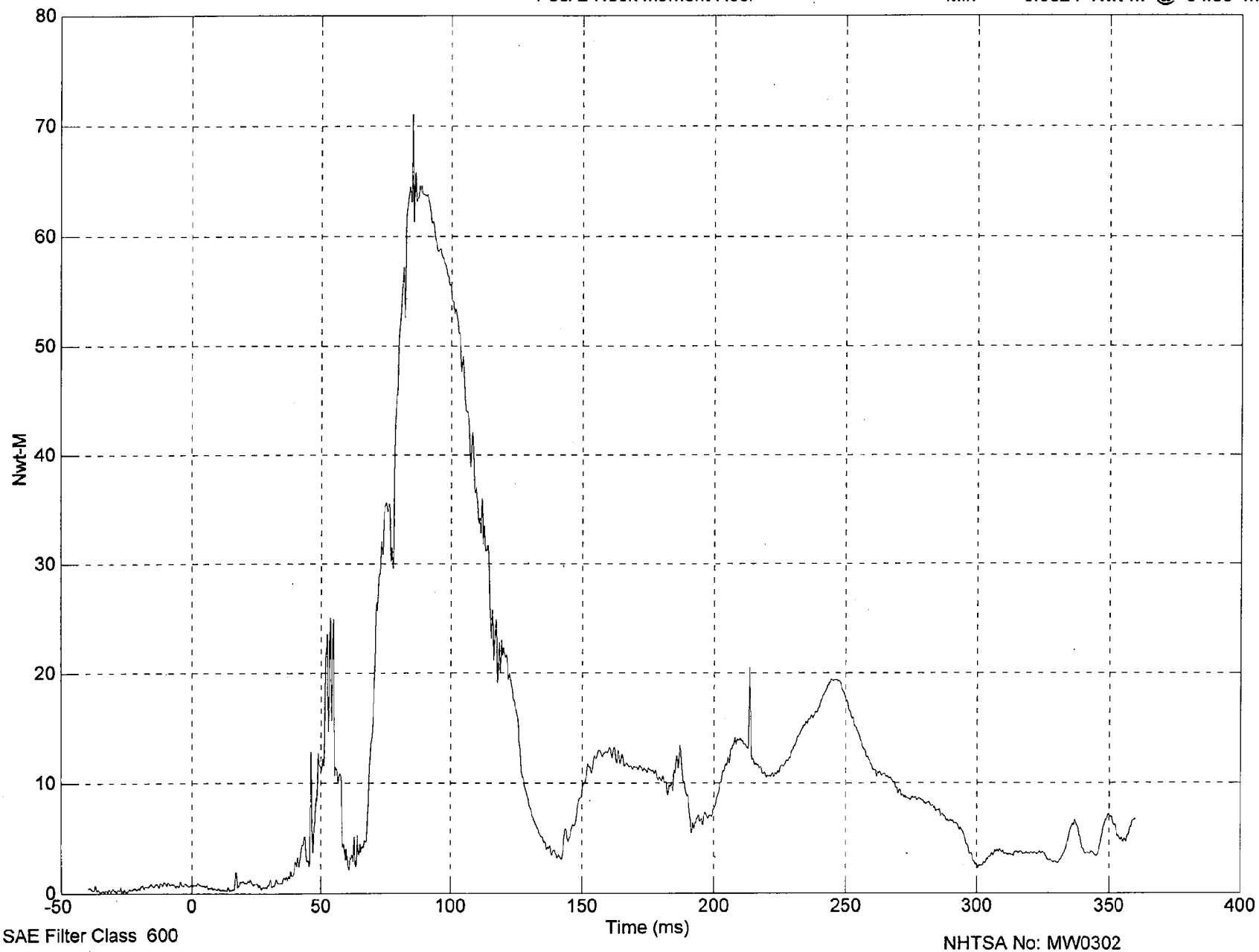
NHTSA No: MW0302
Date: 02 Oct 1997

B-69

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 71.1 Nwt-M @ 85.20 msec
Min = 0.0524 Nwt-M @ -34.80 msec



SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

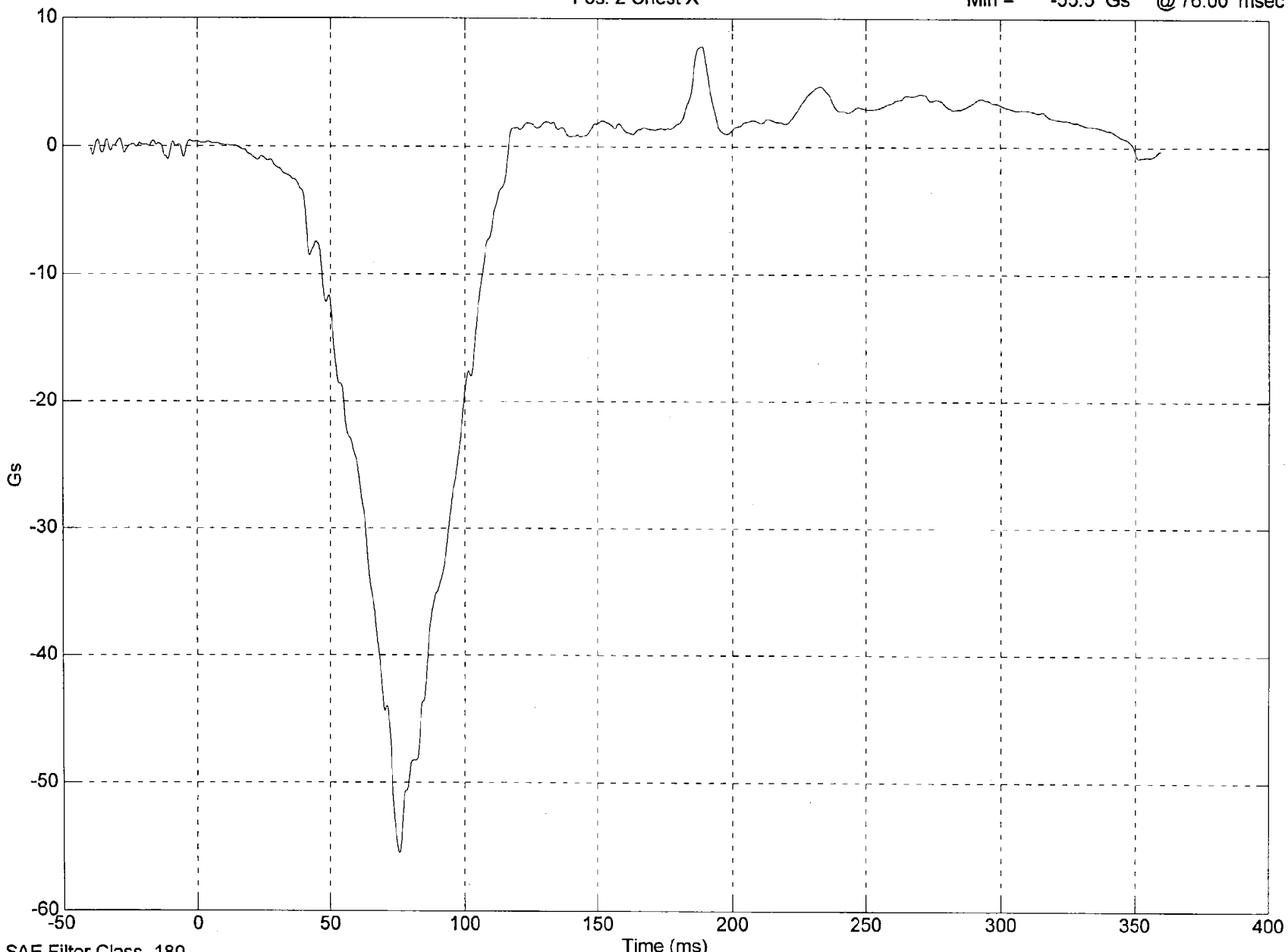
B-70

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Chest X

Max = 7.84 Gs @ 188.80 msec
Min = -55.5 Gs @ 76.00 msec



SAE Filter Class 180

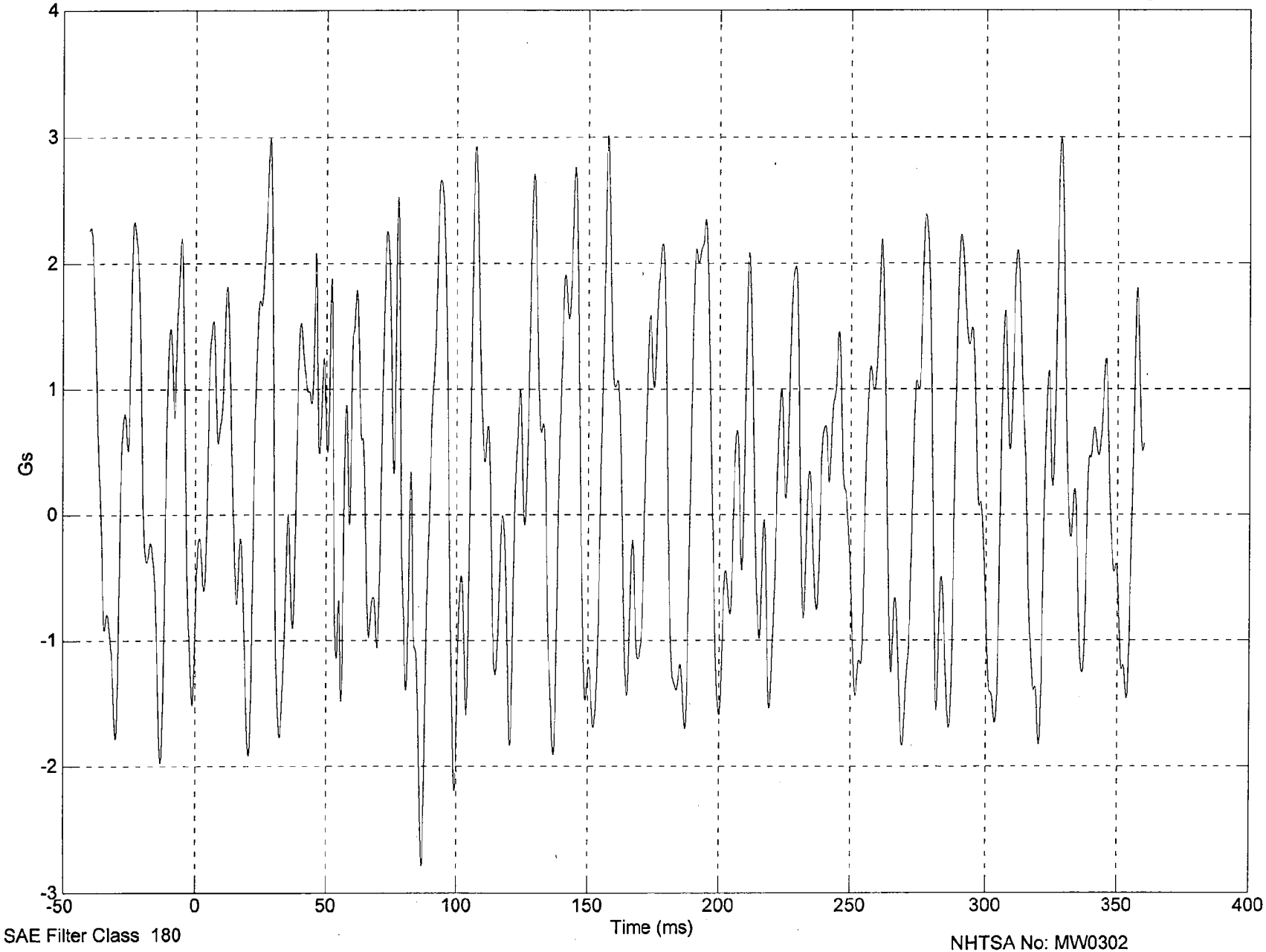
NHTSA No: MW0302
Date: 02 Oct 1997

B-71

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 3.01 Gs @ 157.30 msec
Min = -2.78 Gs @ 86.70 msec



SAE Filter Class 180

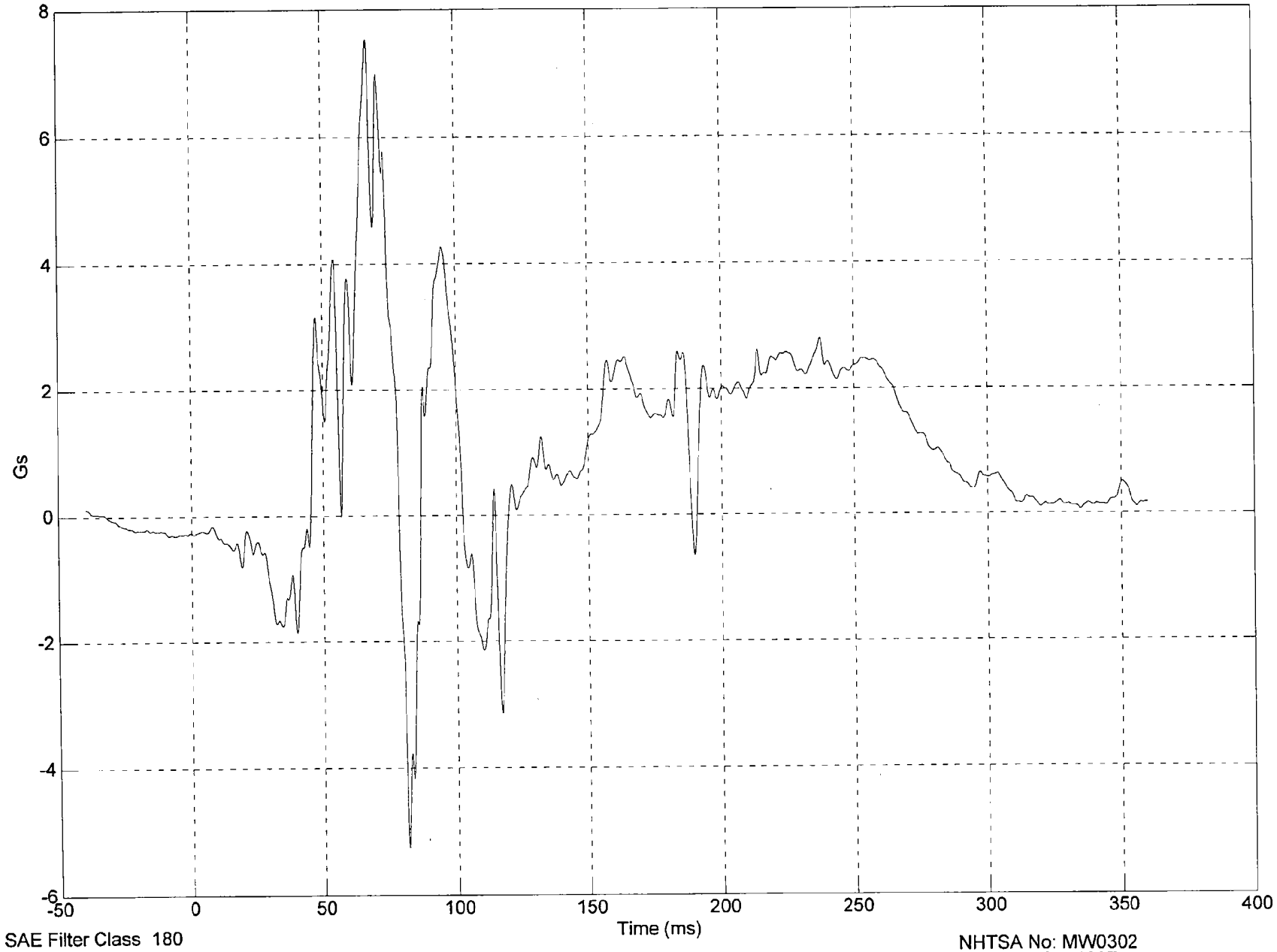
NHTSA No: MW0302
Date: 02 Oct 1997

B-72

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 7.54 Gs @ 67.00 msec
Min = -5.25 Gs @ 81.60 msec



SAE Filter Class 180

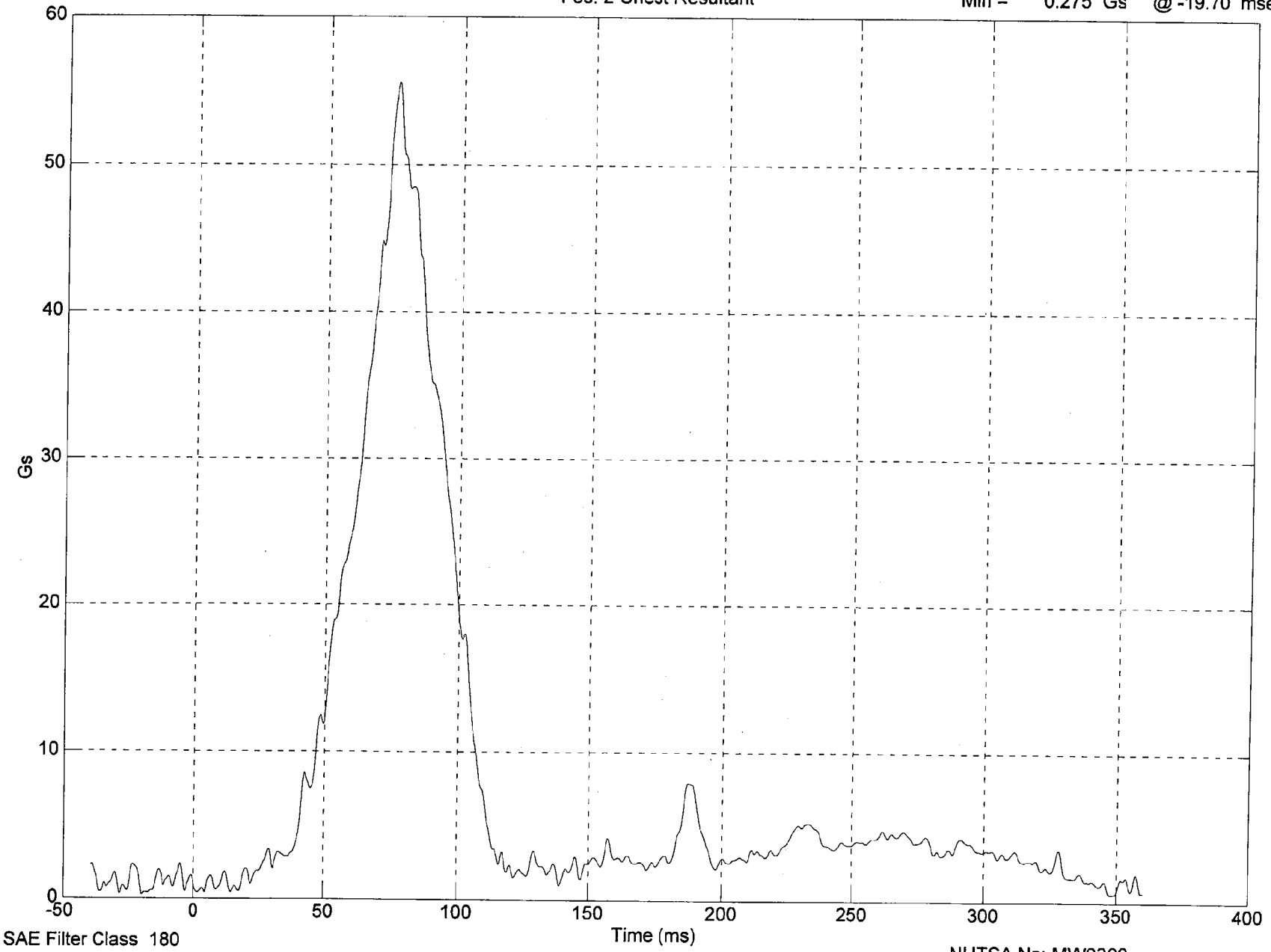
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Chest Resultant

Max = 55.5 Gs @ 76.00 msec
Min = 0.275 Gs @ -19.70 msec



SAE Filter Class 180

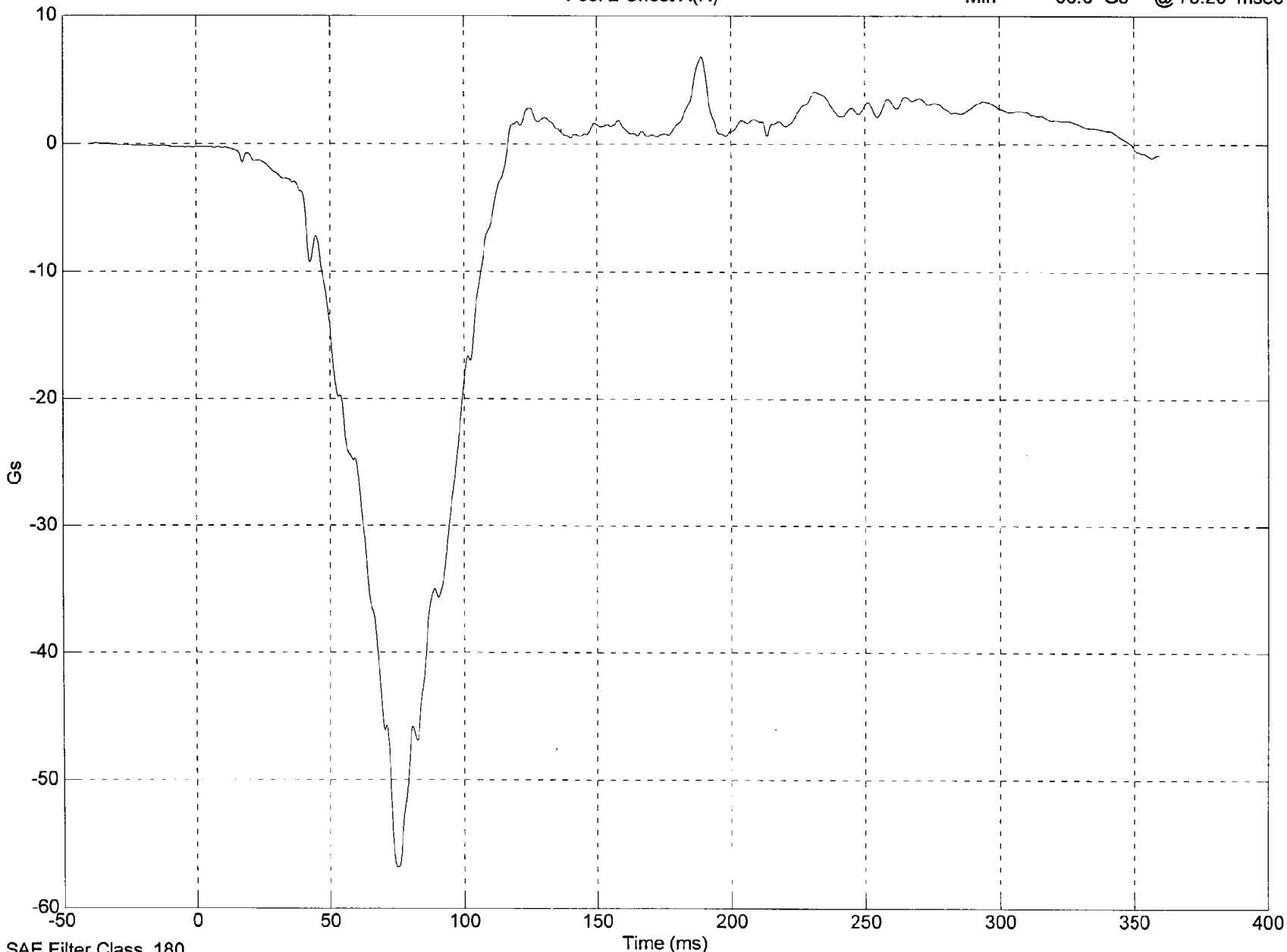
NHTSA No: MW0302
Date: 02 Oct 1997

B-74

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 6.8 Gs @ 189.00 msec
Min = -56.8 Gs @ 75.20 msec



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

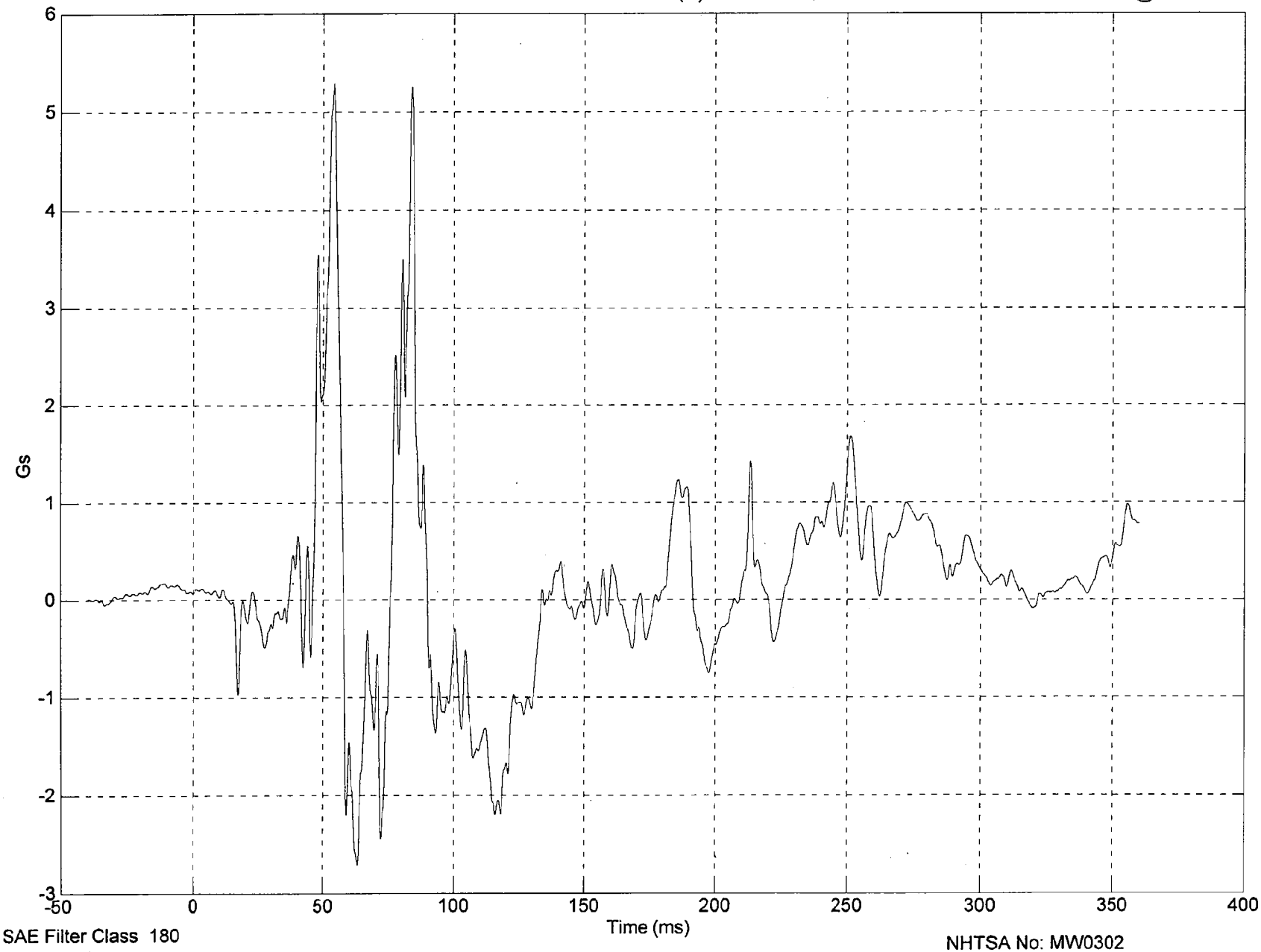
B-75

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Chest Y(R)

Max = 5.29 Gs @ 54.10 msec
Min = -2.71 Gs @ 63.10 msec



SAE Filter Class 180

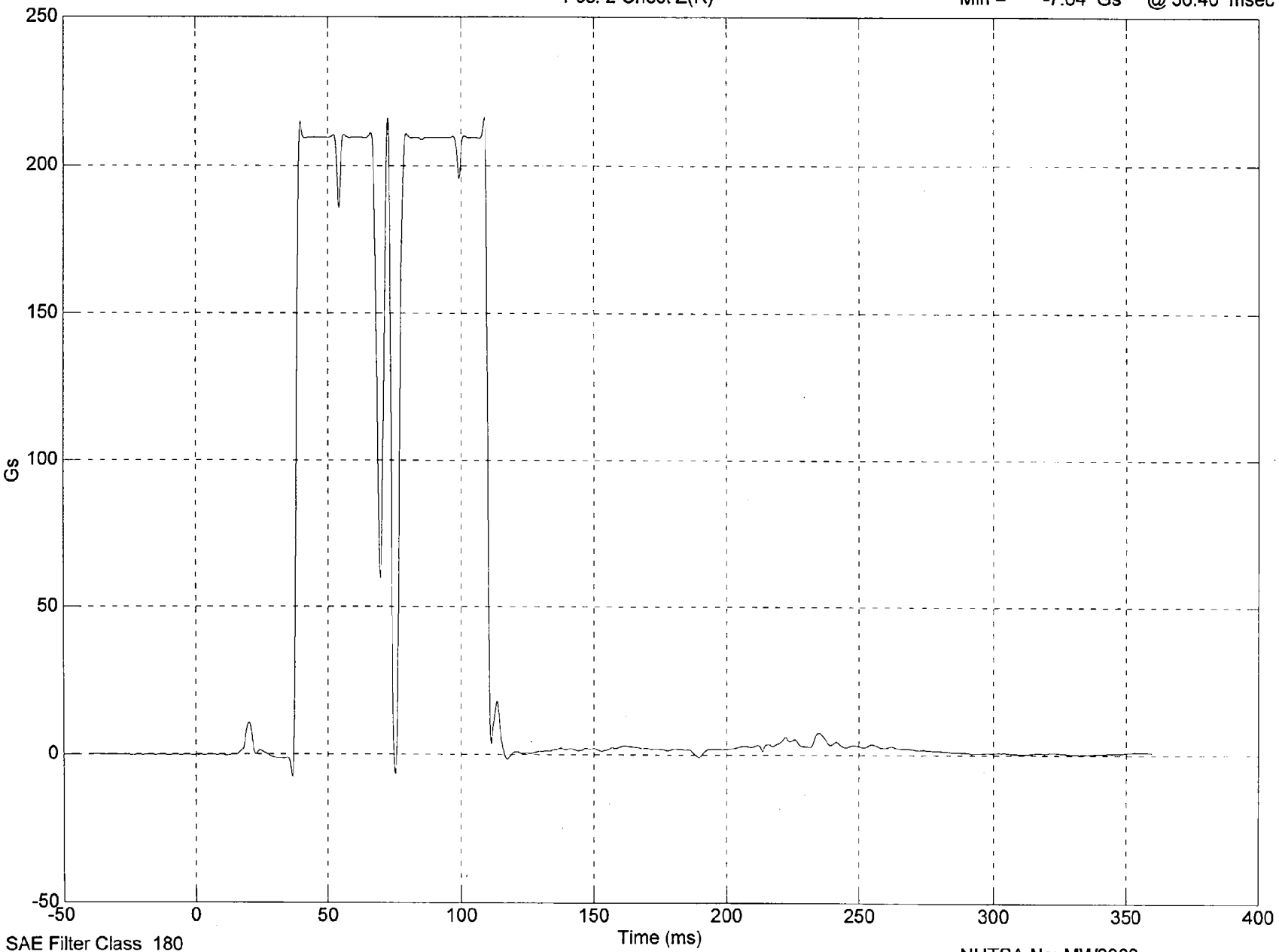
NHTSA No: MW0302
Date: 02 Oct 1997

B-76

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 216 Gs @ 108.80 msec
Min = -7.64 Gs @ 36.40 msec



SAE Filter Class 180

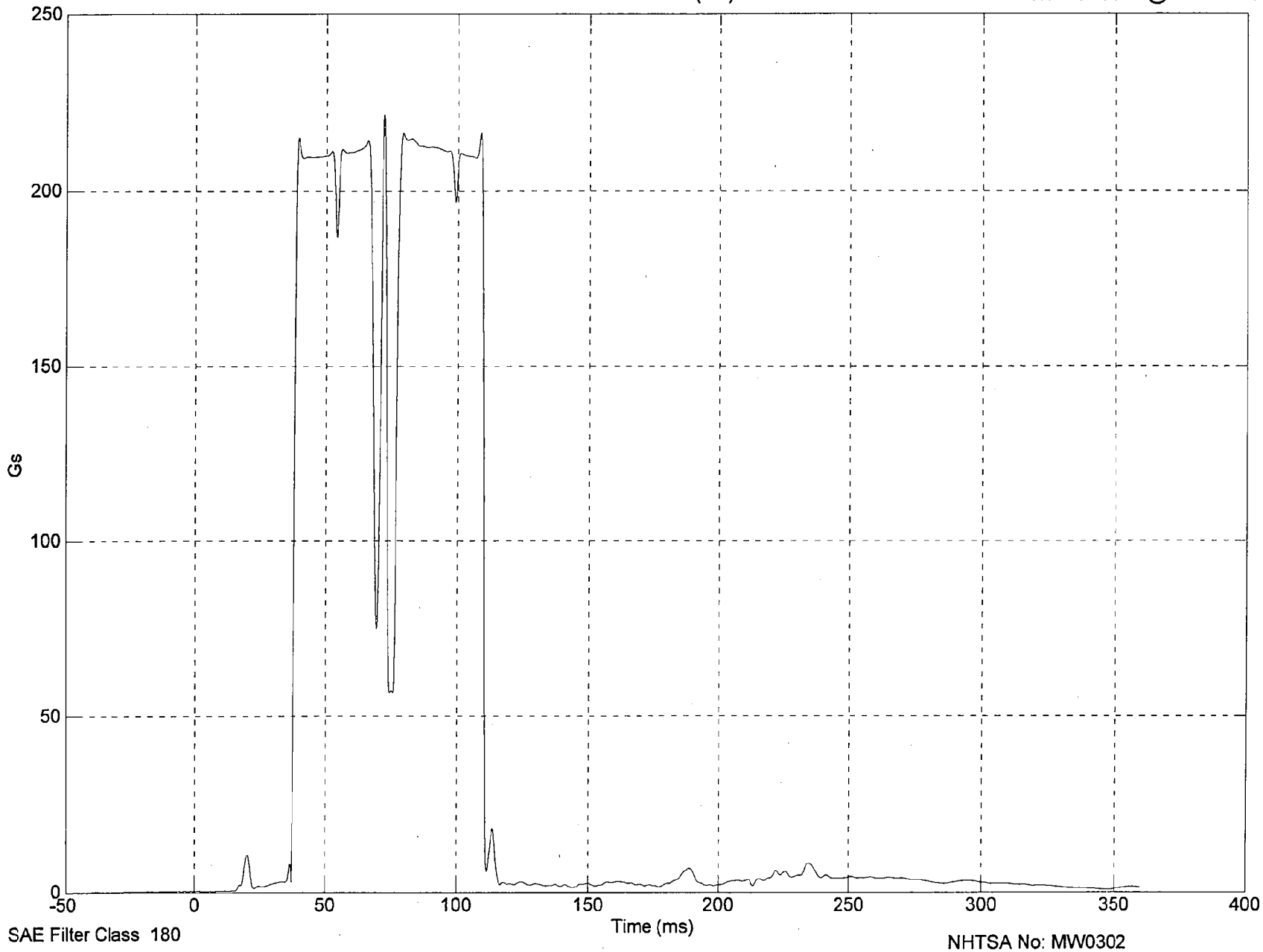
NHTSA No: MW0302
Date: 02 Oct 1997

B-77

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 221 Gs @ 72.30 msec
Min = 0.0415 Gs @ -34.50 msec



B-78

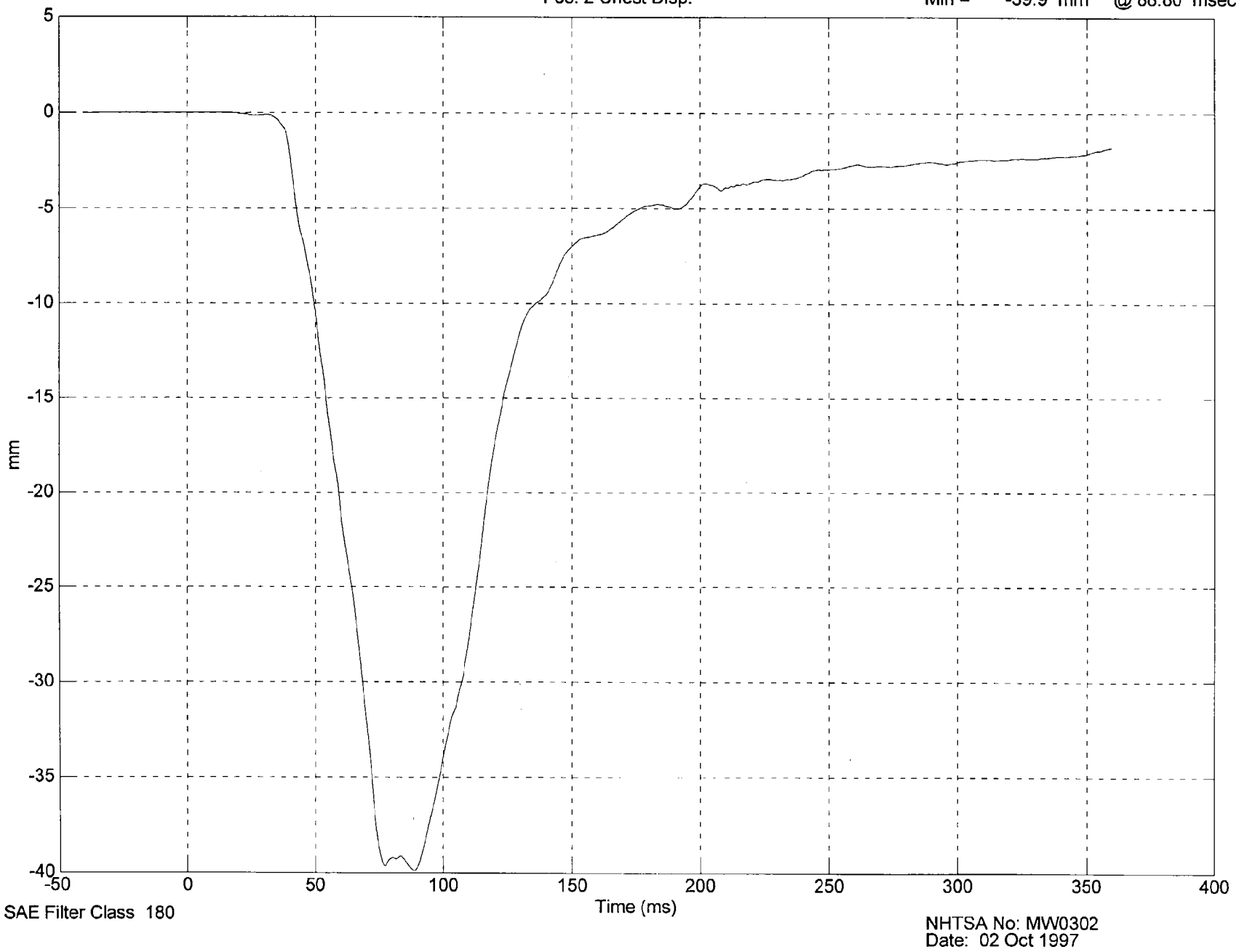
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 0.0171 mm @ 10.80 msec
Min = -39.9 mm @ 88.80 msec



B-79

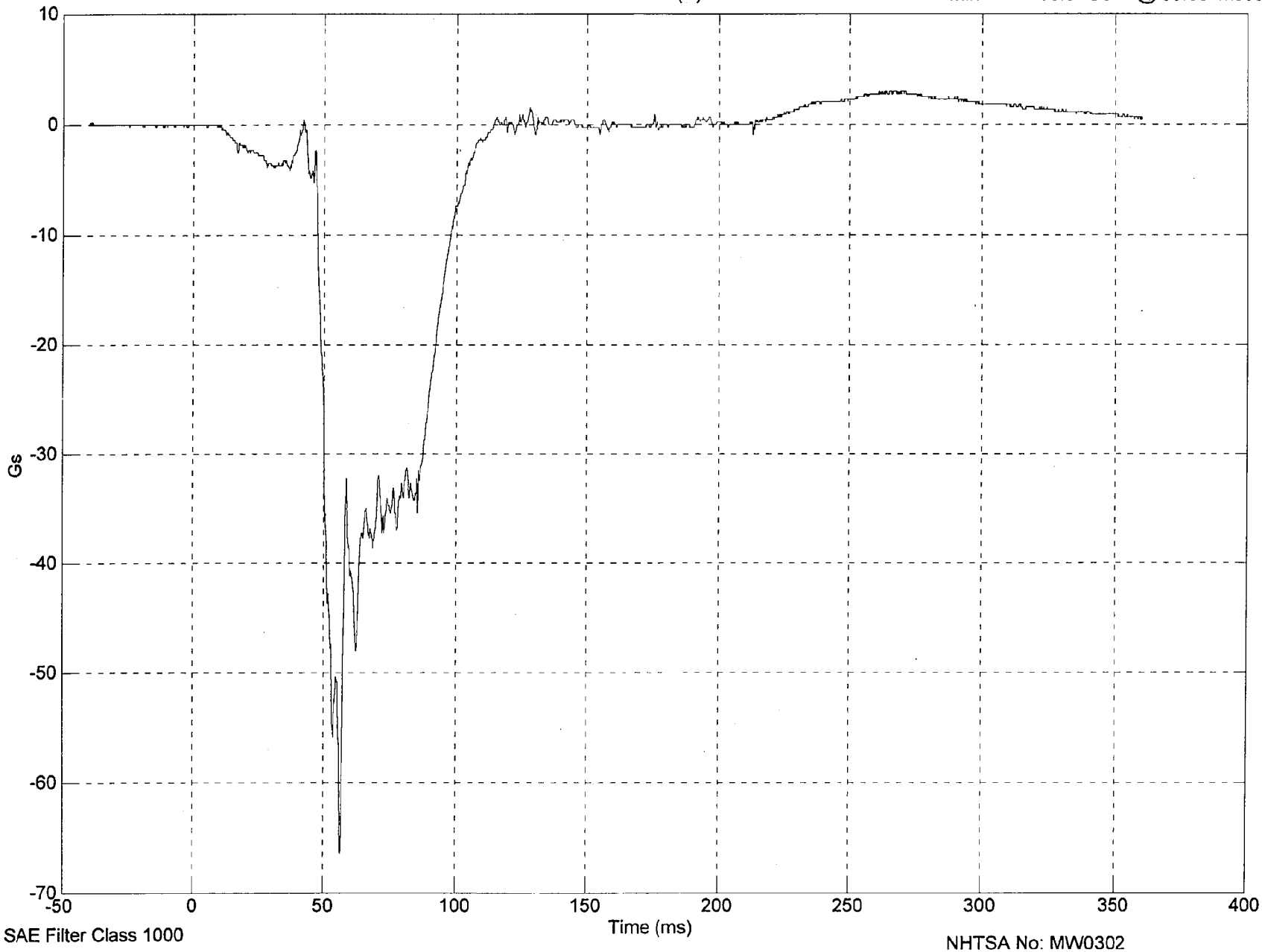
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 2.98 Gs @ 261.00 msec
Min = -66.5 Gs @ 56.30 msec



SAE Filter Class 1000

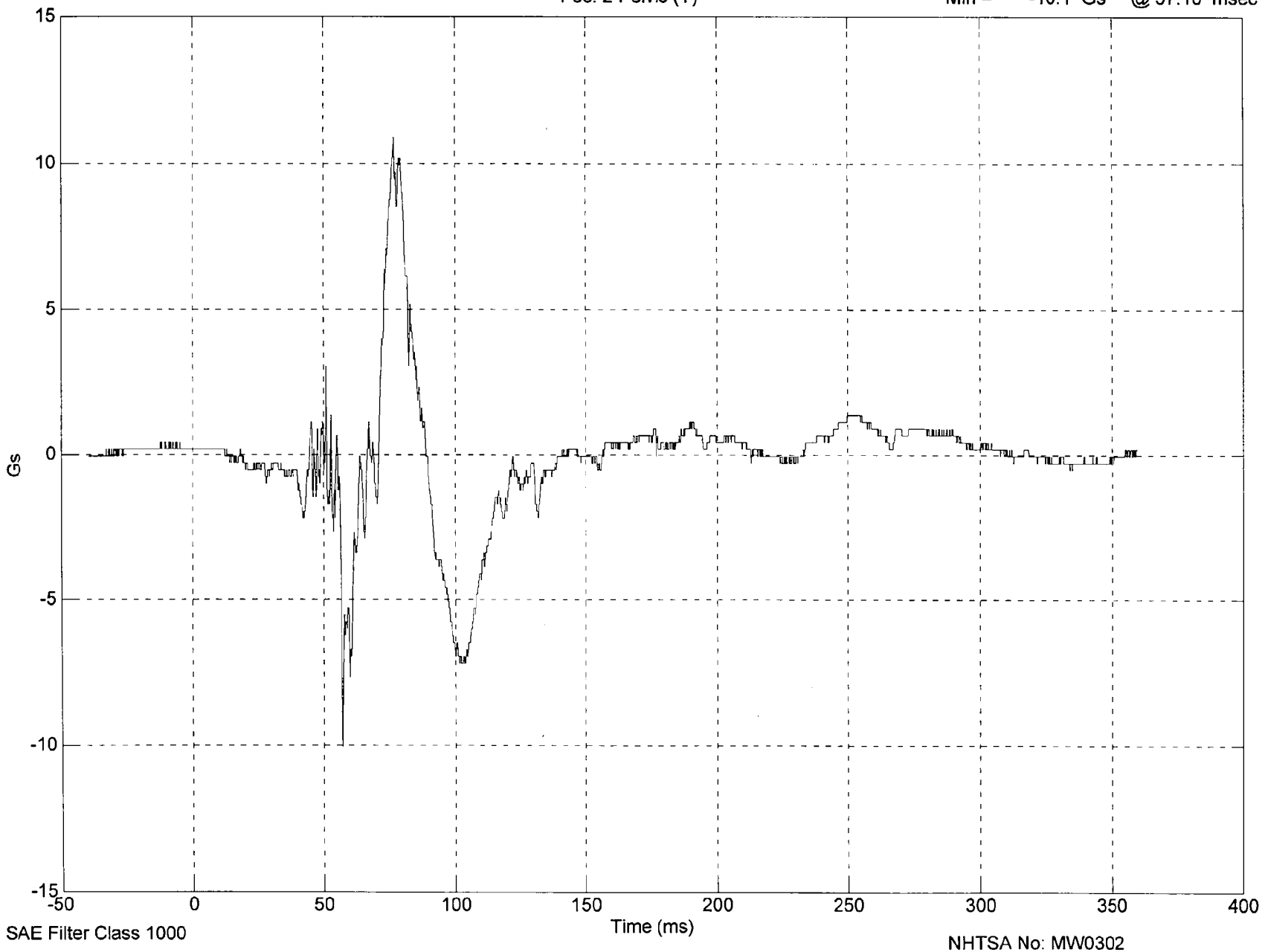
NHTSA No: MW0302
Date: 02 Oct 1997

B-80

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 10.9 Gs @ 76.70 msec
Min = -10.1 Gs @ 57.10 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

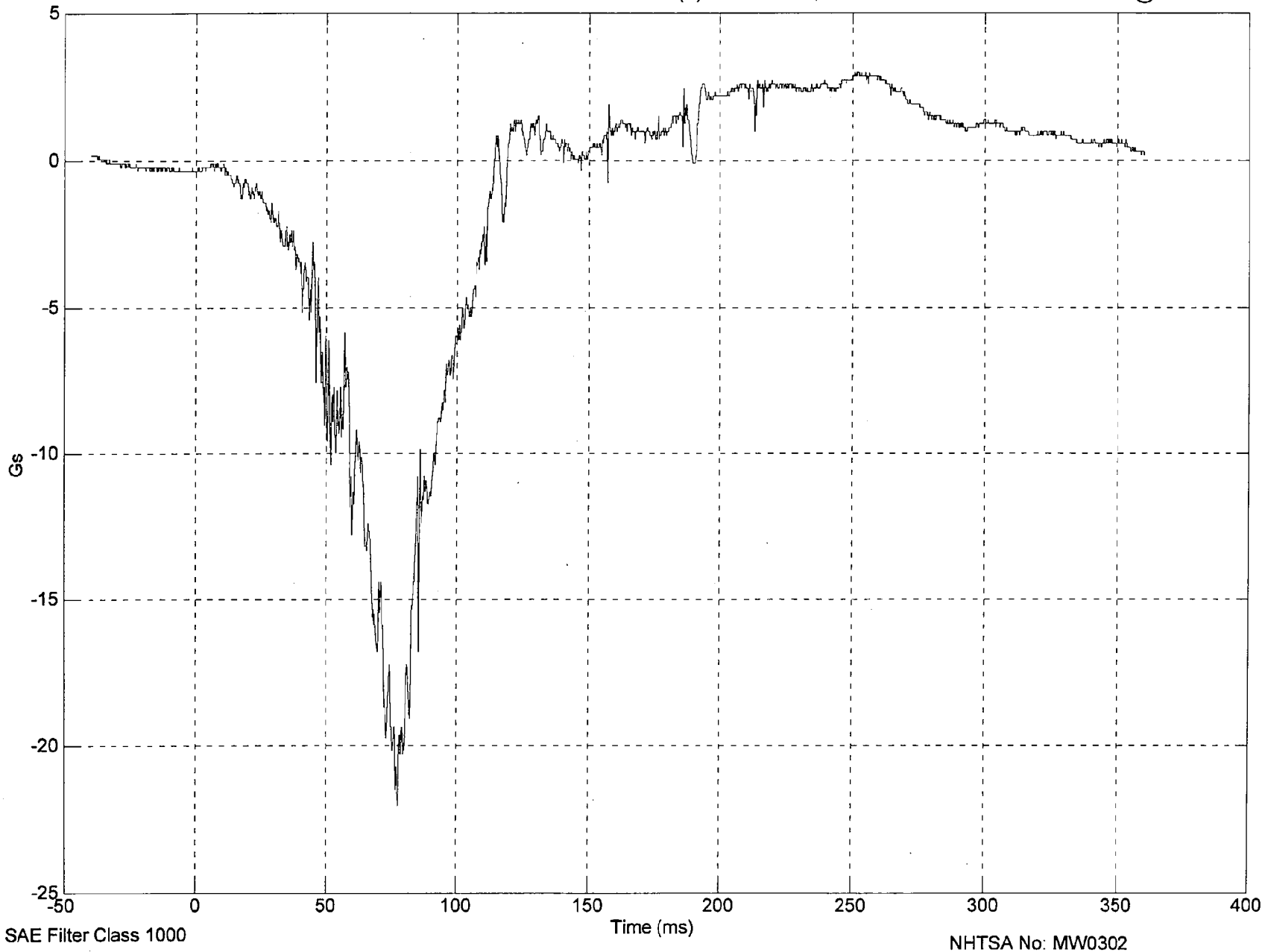
B-81

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Pelvic (Z)

Max = 3 Gs @ 250.60 msec
Min = -22 Gs @ 78.00 msec

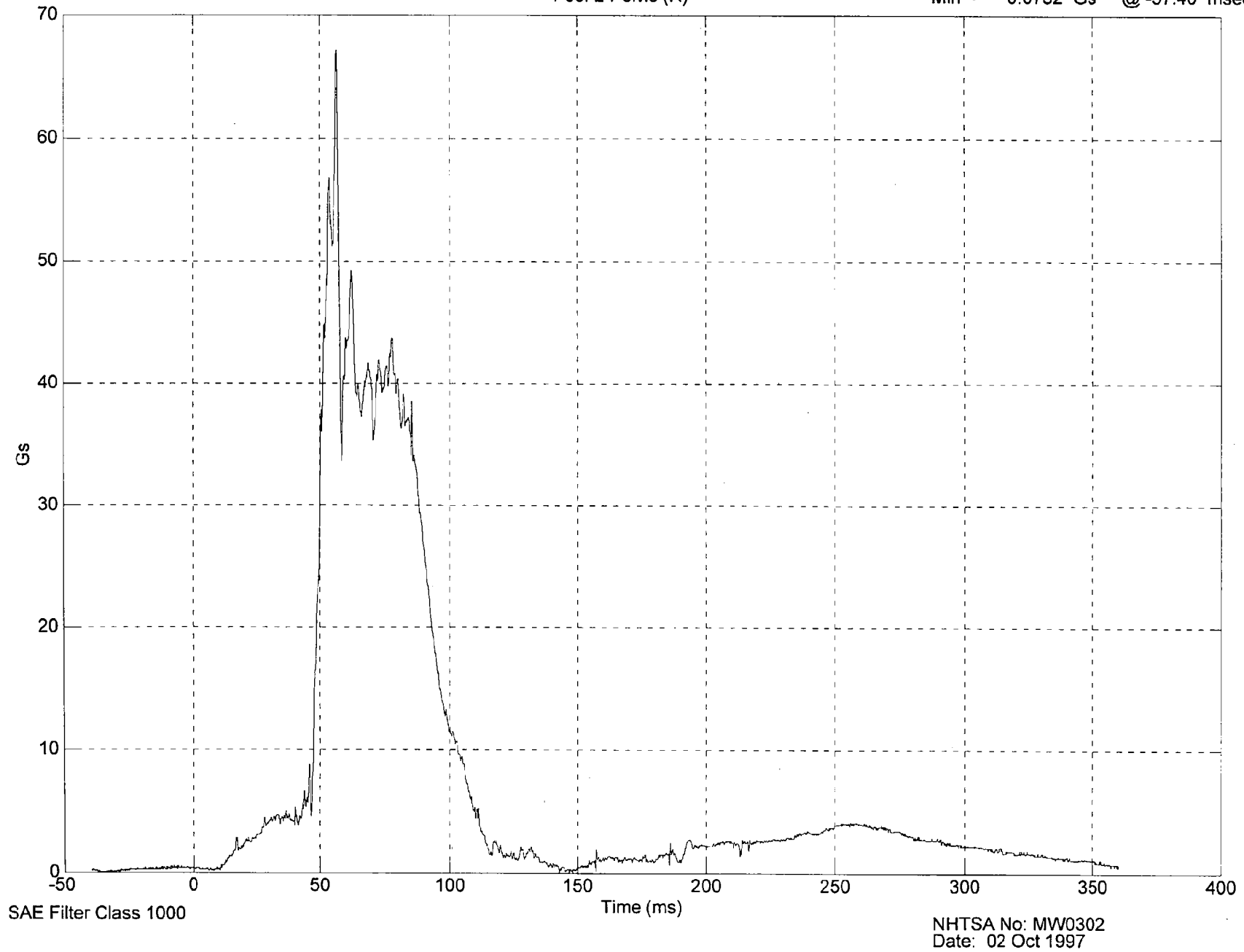


SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

B-82

8413-1

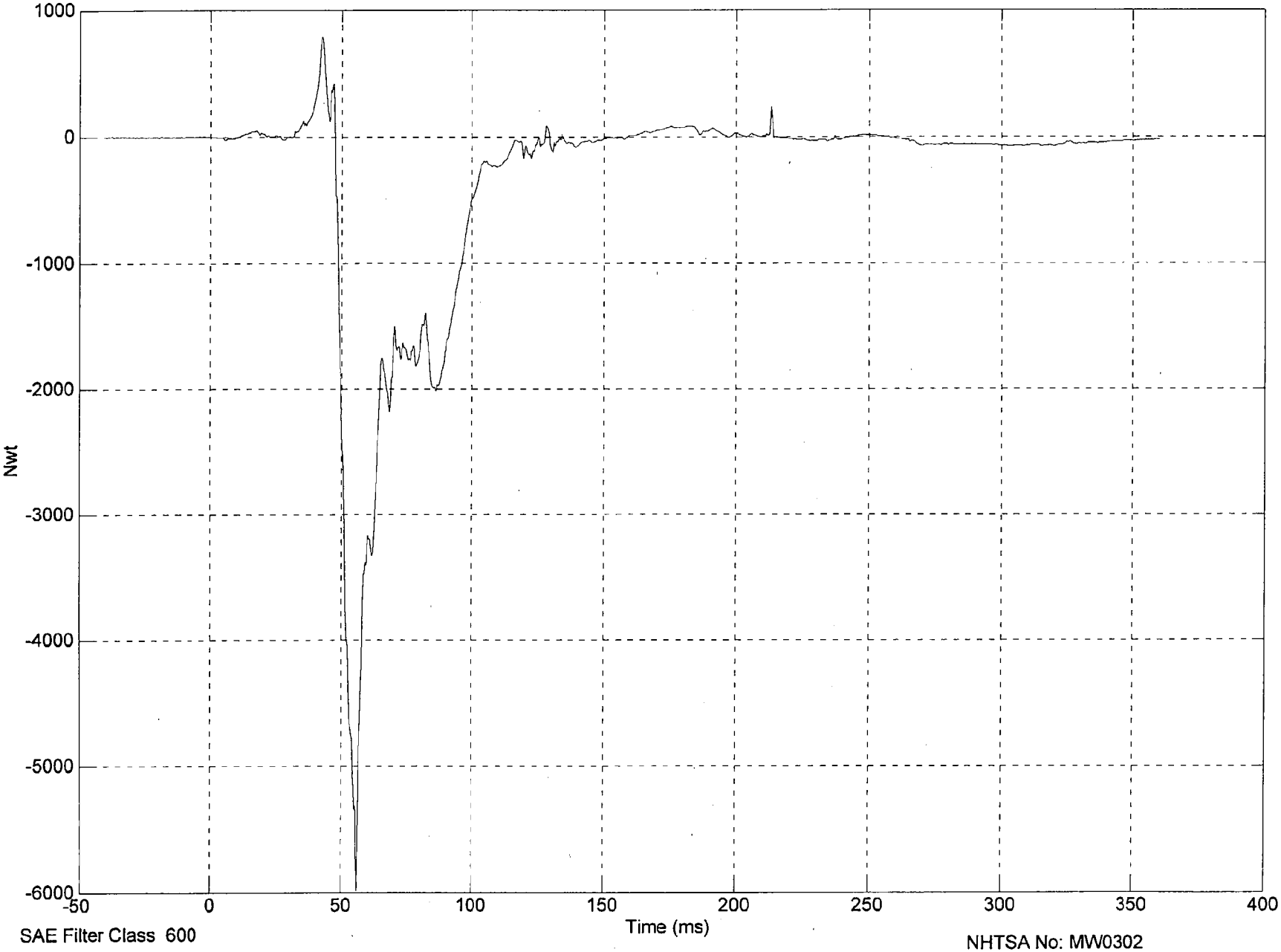

NCAP TEST #1 - 1998 DODGE CARAVAN
Max = 67.1 Gs @ 56.30 msec
Min = 0.0732 Gs @ -37.40 msec
Pos. 2 Pelvic (R)
Gs
Time (ms)
70
60
50
40
30
20
10
0
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 1000
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Left Femur

Max = 789 Nwt @ 42.50 msec
Min = -5.98e+003 Nwt @ 55.80 msec



B-84

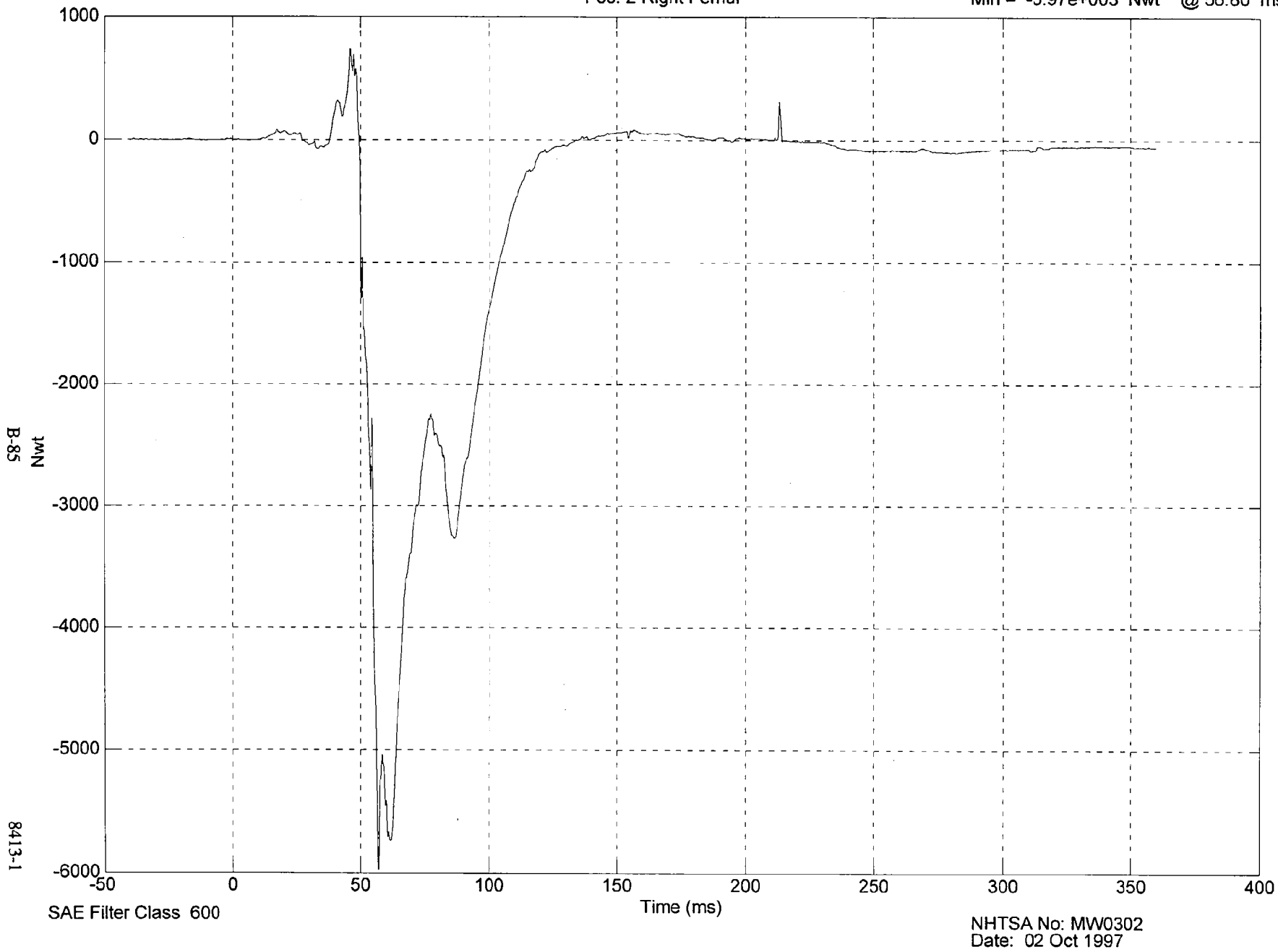
8413-1

SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 739 Nwt @ 46.00 msec
Min = -5.97e+003 Nwt @ 56.80 msec



B-85

8413-1

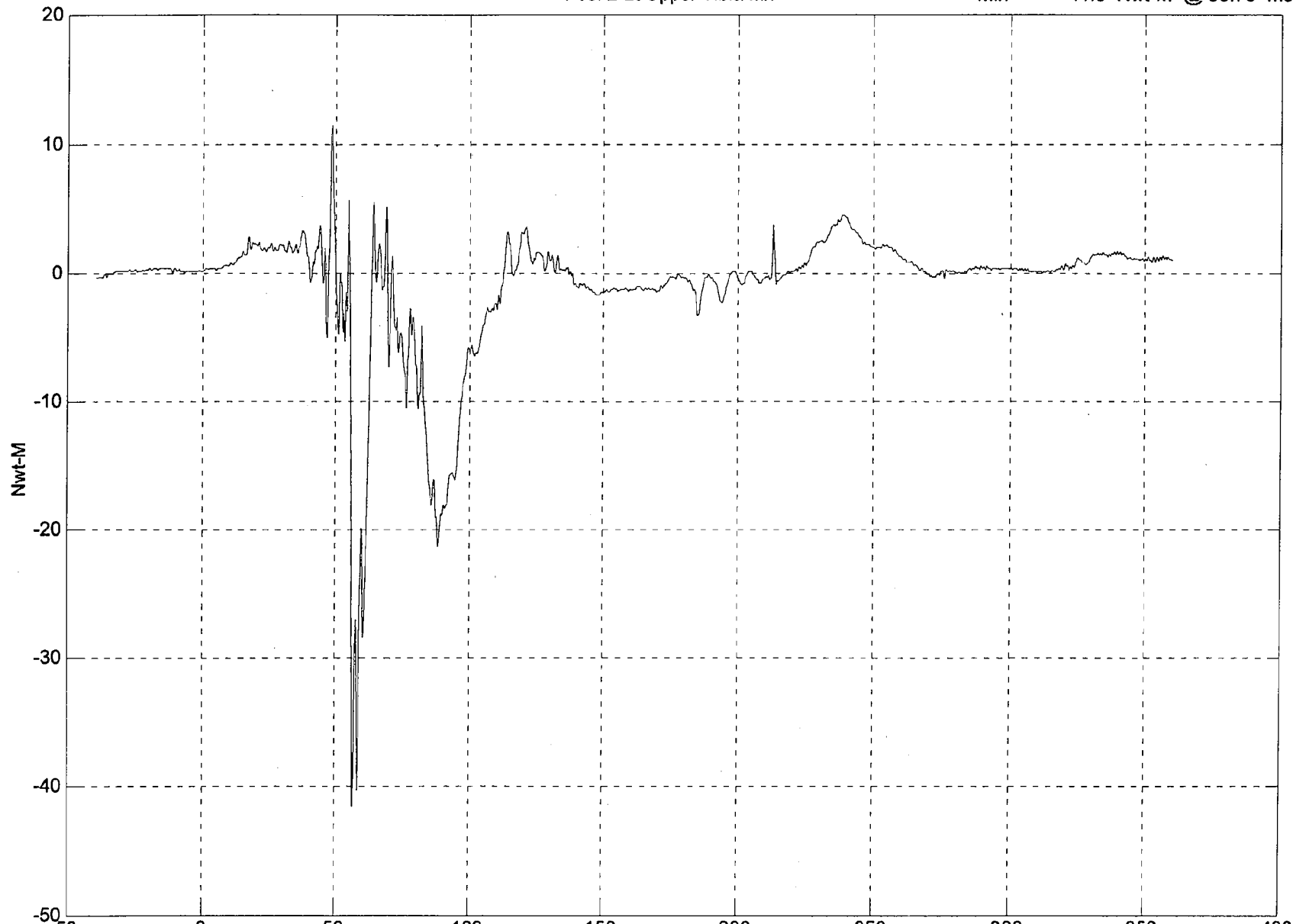
SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Lt Upper Tibia Mx

Max = 11.5 Nwt-M @ 48.50 msec
Min = -41.6 Nwt-M @ 56.70 msec



SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

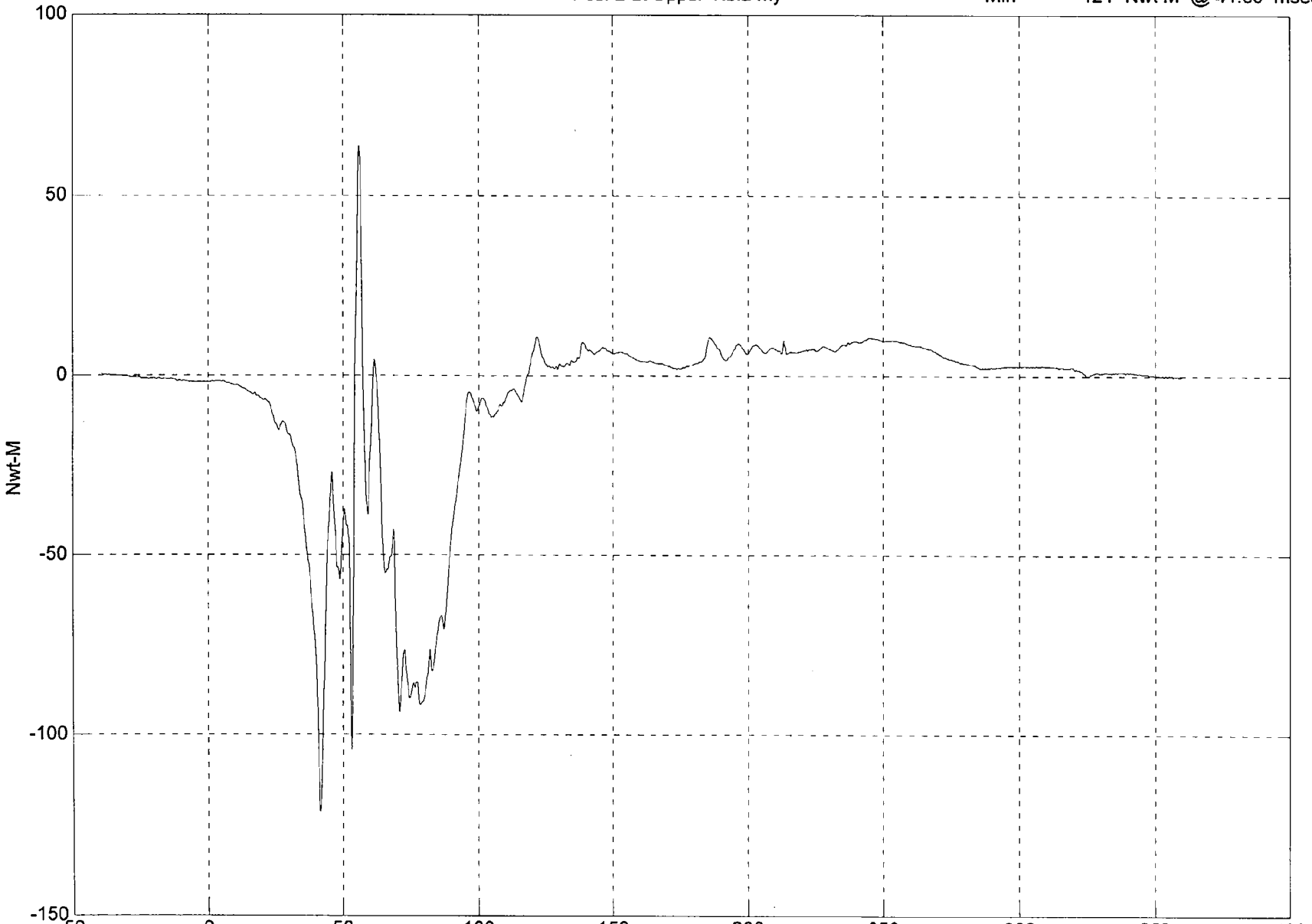
B-86

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Lt Upper Tibia My

Max = 63.8 Nwt-M @ 55.80 msec
Min = -121 Nwt-M @ 41.80 msec



B-87

8413-1

SAE Filter Class 600

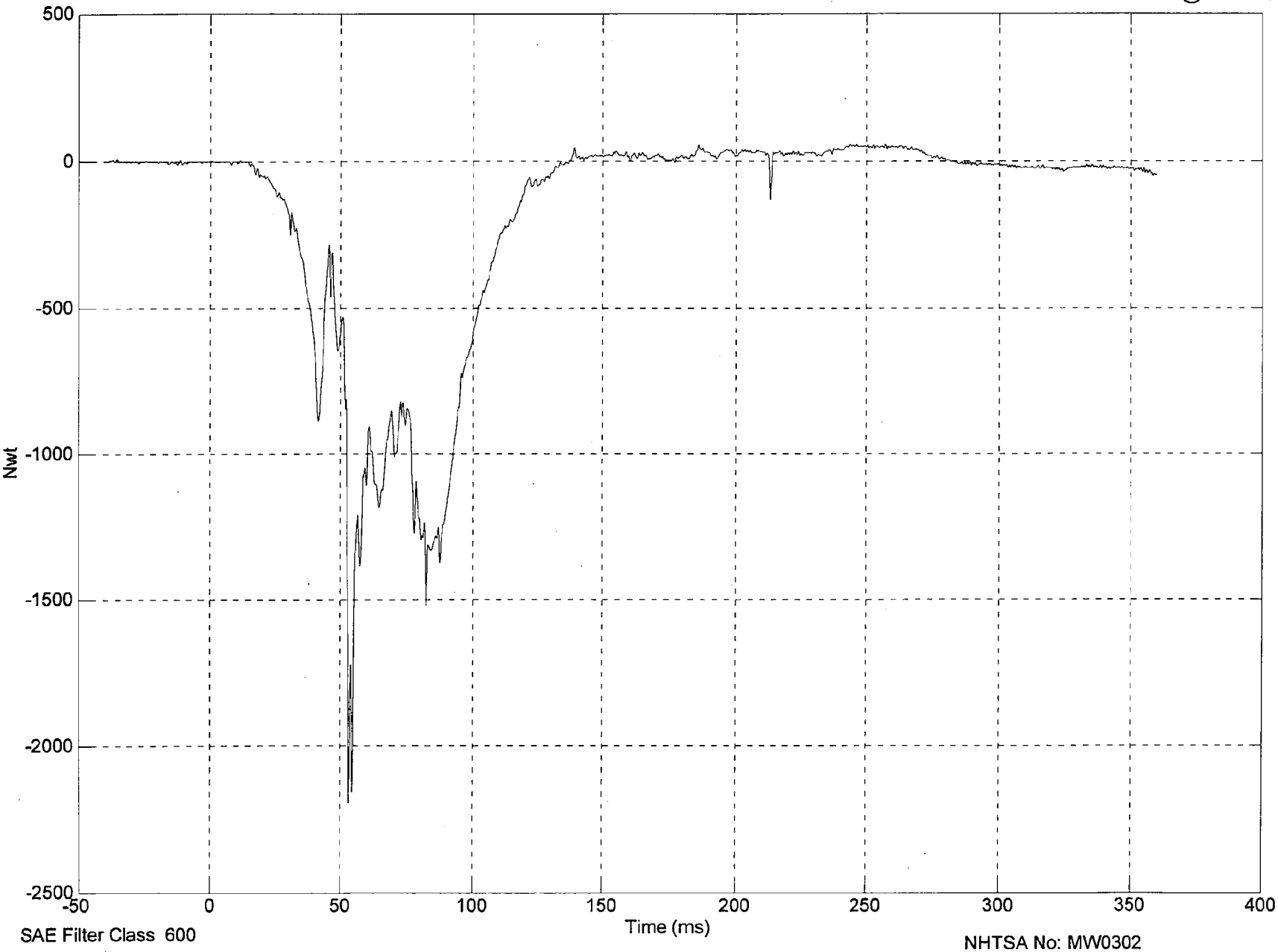
NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 57.4 Nwt @ 243.40 msec

Pos. 2 Lt Lower Tibia Fx

Min = -2.19e+003 Nwt @ 53.20 msec



B-88

8413-1

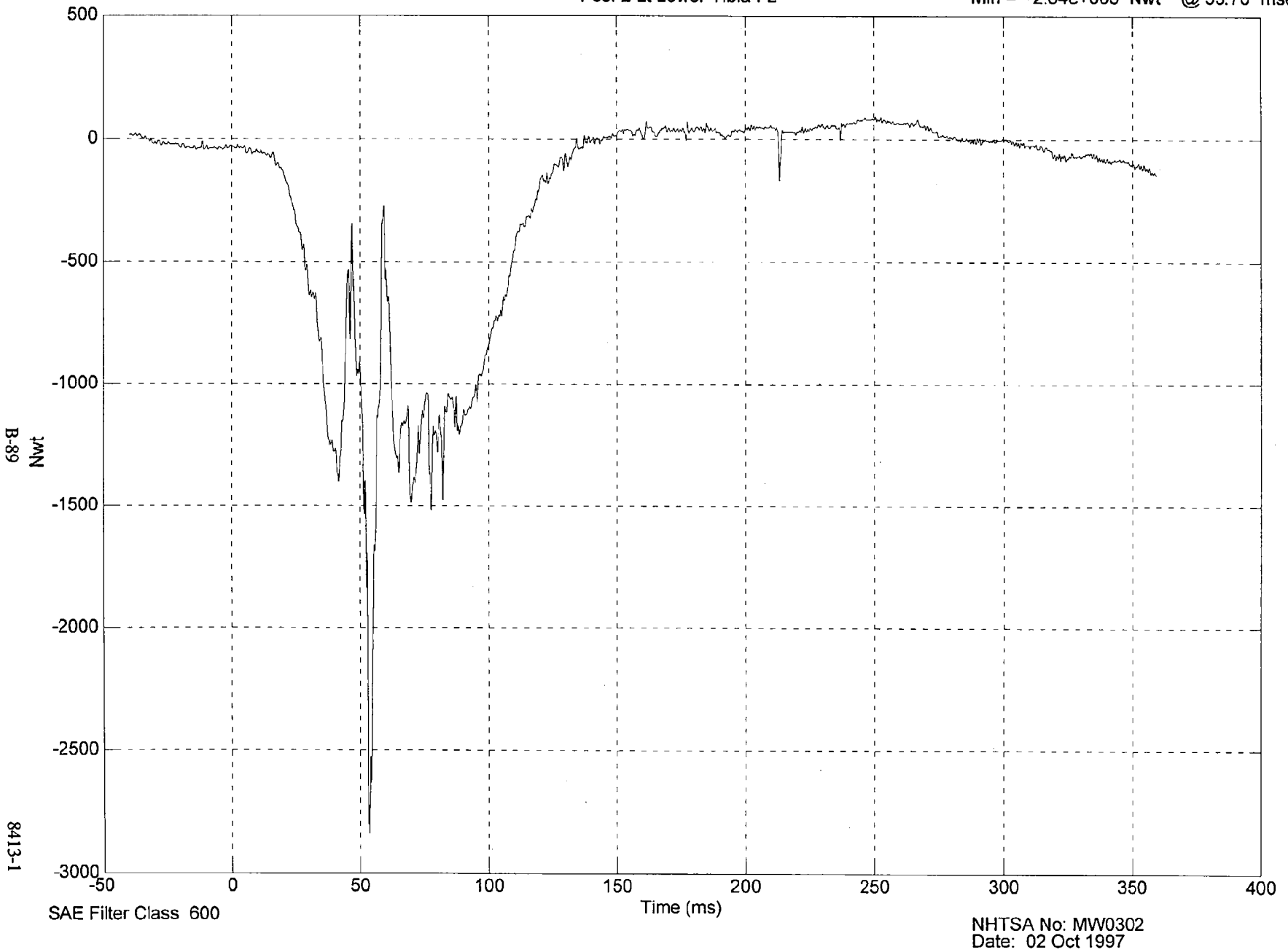
SAE Filter Class 600

NHTSA No: MW0302

Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 93.6 Nwt @ 250.50 msec
Min = -2.84e+003 Nwt @ 53.70 msec



B-89

8413-1

SAE Filter Class 600

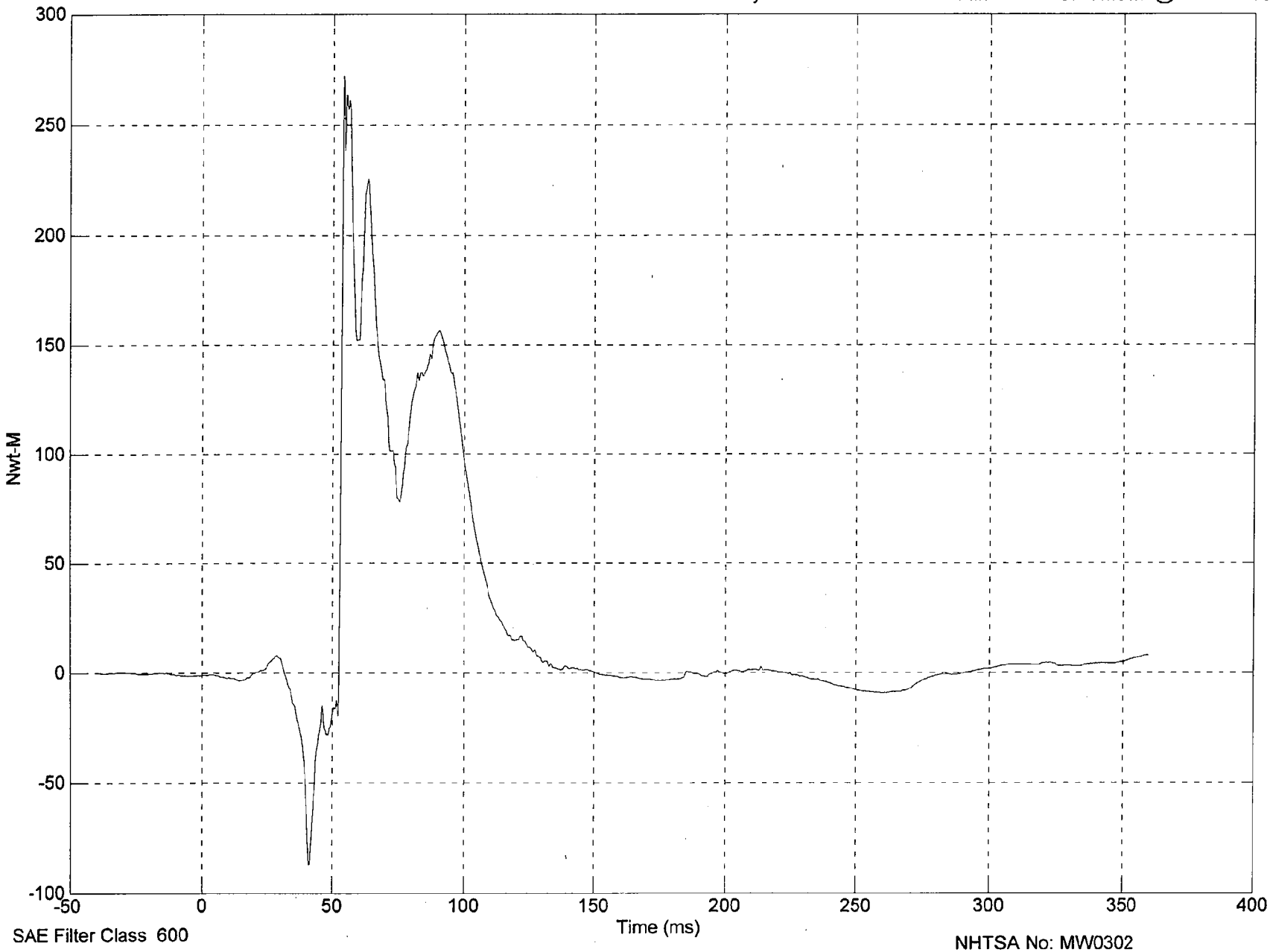
NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Lt Lower Tibia My

Max = 272 Nwt-M @ 53.80 msec

Min = -87 Nwt-M @ 41.20 msec



B-90

8413-1

SAE Filter Class 600

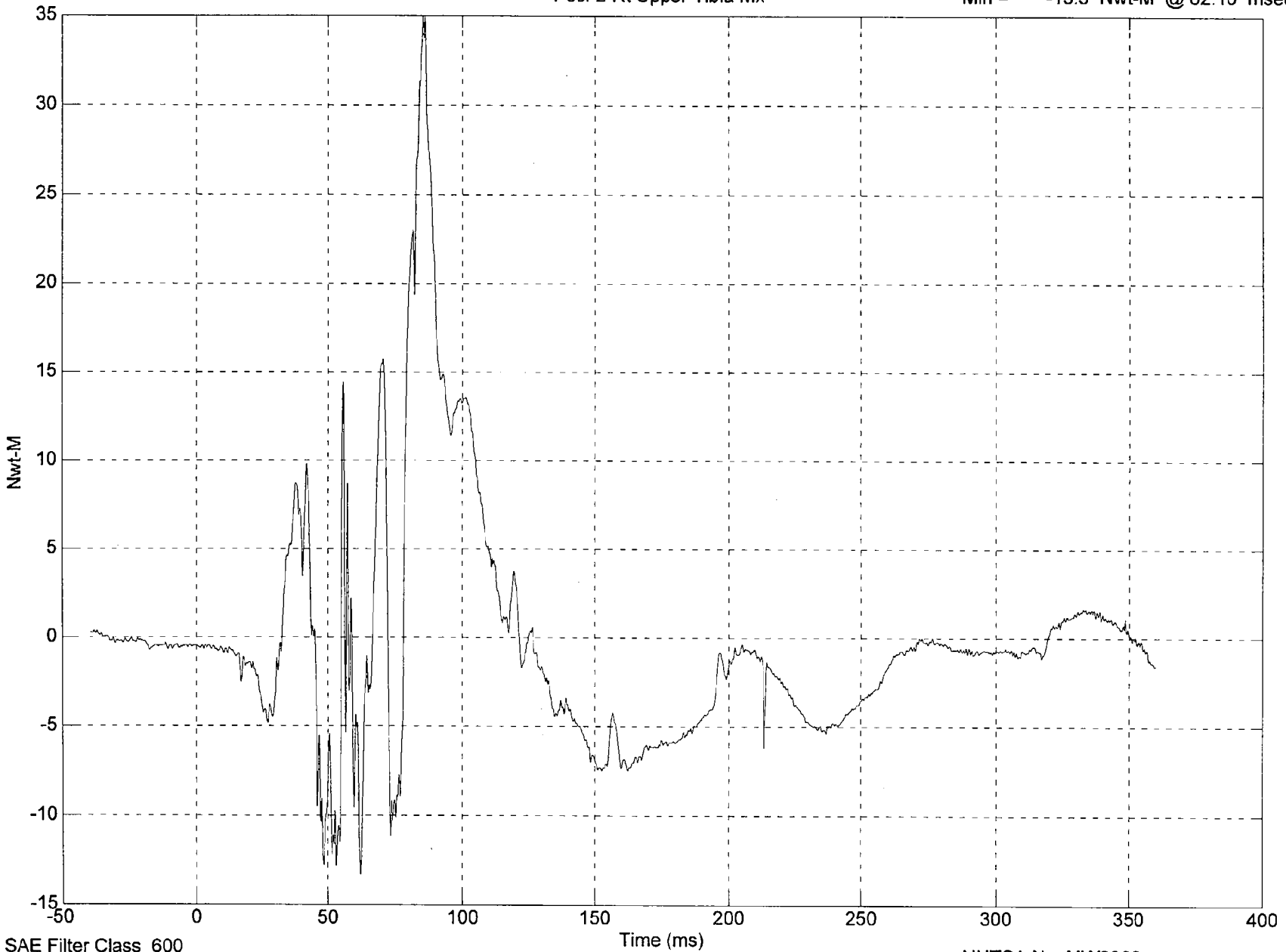
NHTSA No: MW0302

Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Rt Upper Tibia Mx

Max = 35 Nwt-M @ 85.40 msec
Min = -13.3 Nwt-M @ 62.10 msec



SAE Filter Class 600

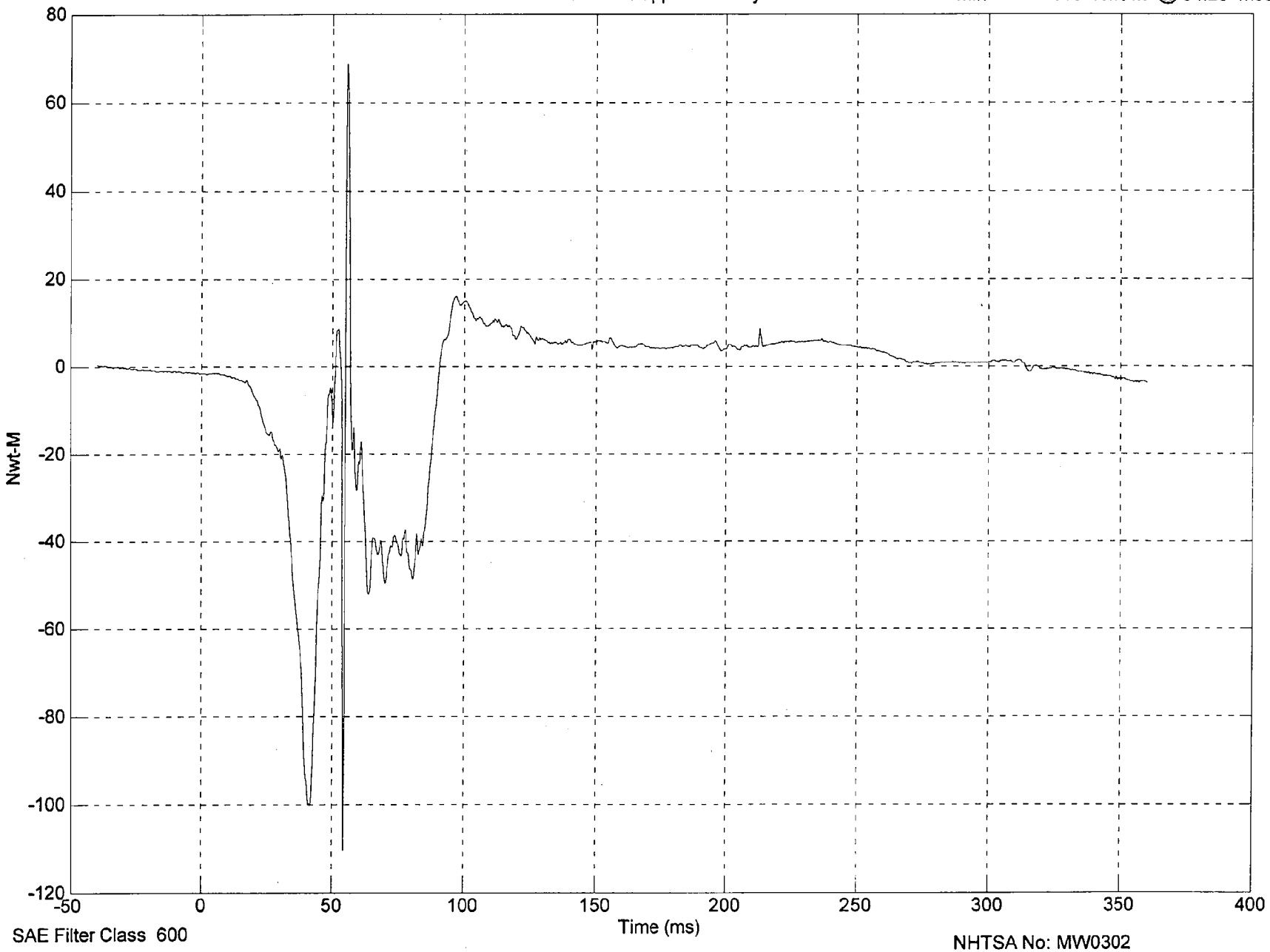
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Rt Upper Tibia My

Max = 68.7 Nwt-M @ 55.50 msec
Min = -110 Nwt-M @ 54.20 msec



B-92

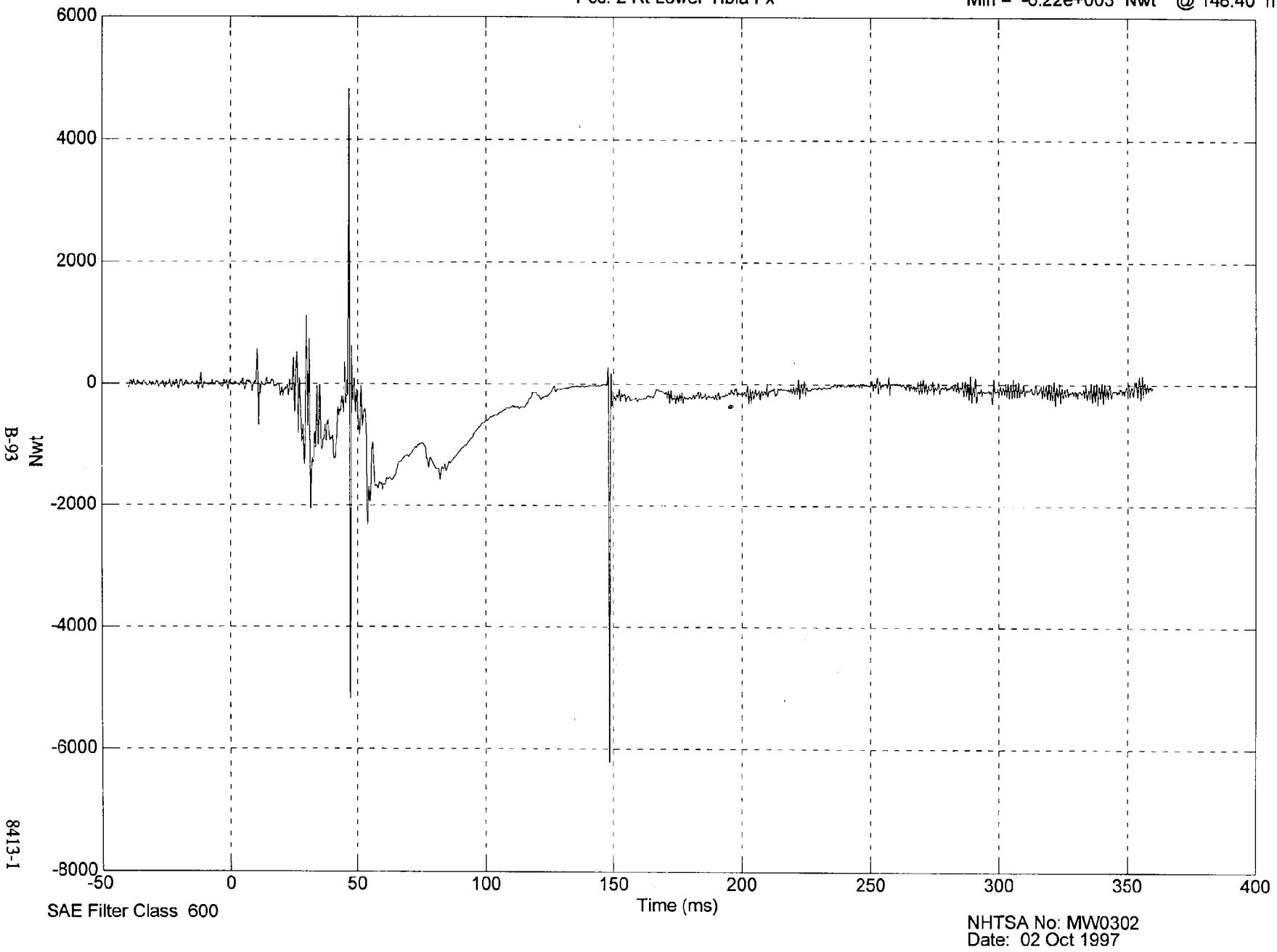
8413-1

SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 4.83e+003 Nwt @ 46.60 msec
Min = -6.22e+003 Nwt @ 148.40 msec



B-93

8413-1

SAE Filter Class 600

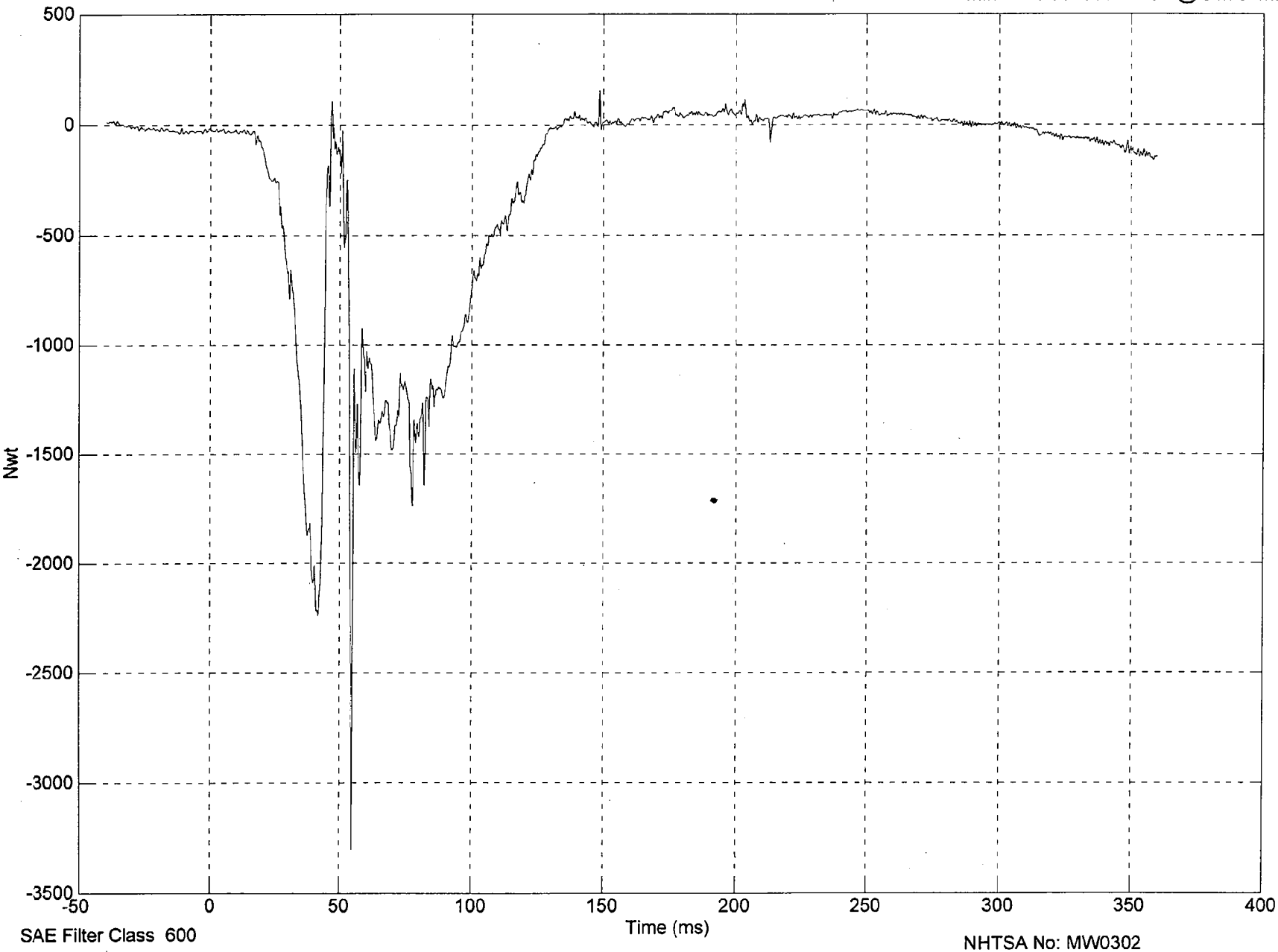
NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 155 Nwt @ 148.40 msec

Pos. 2 Rt Lower Tibia Fz

Min = -3.3e+003 Nwt @ 54.70 msec



B-94

8413-1

SAE Filter Class 600

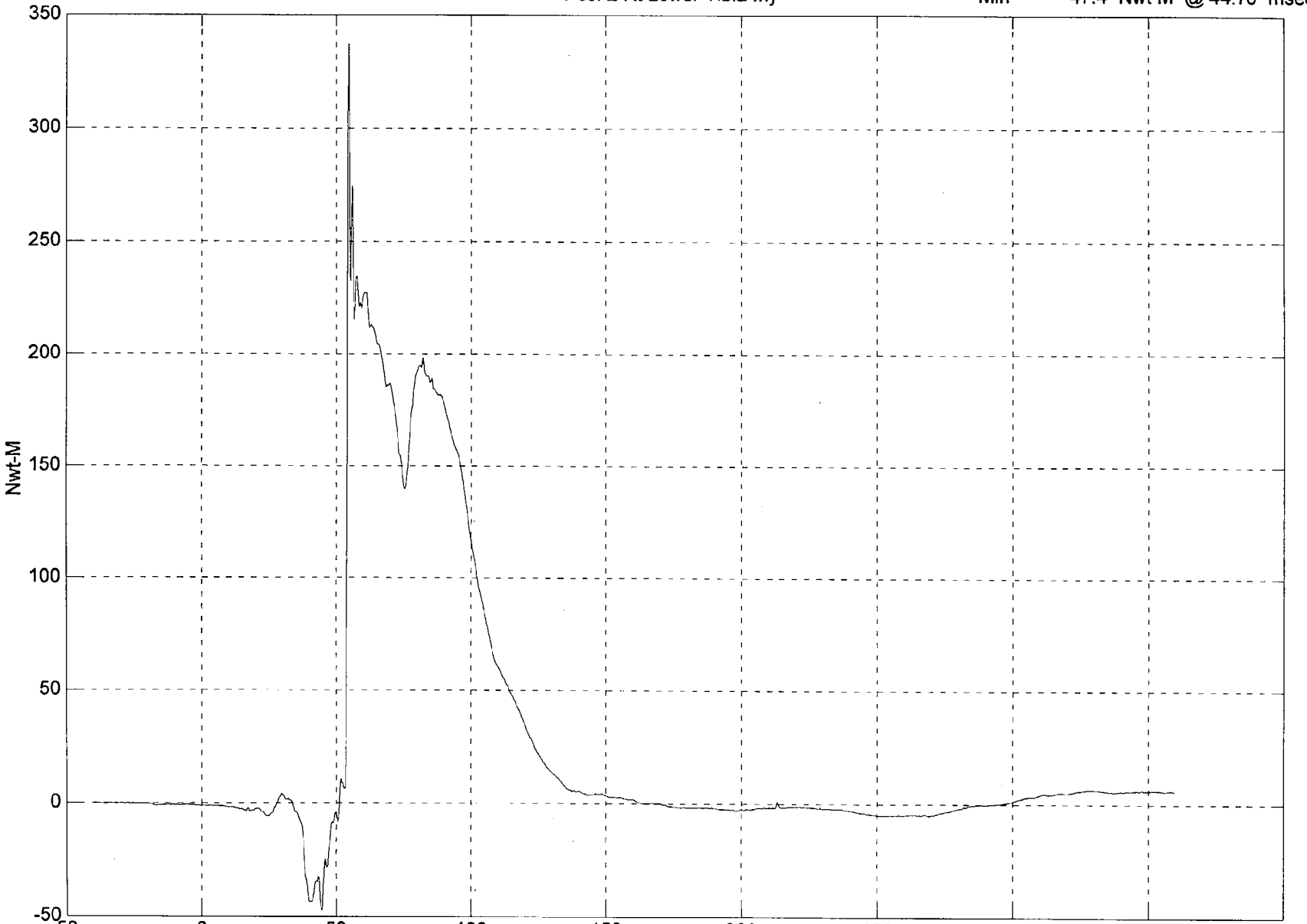
NHTSA No: MW0302

Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Rt Lower Tibia My

Max = 337 Nwt-M @ 54.60 msec
Min = -47.4 Nwt-M @ 44.70 msec



B-95

8413-1

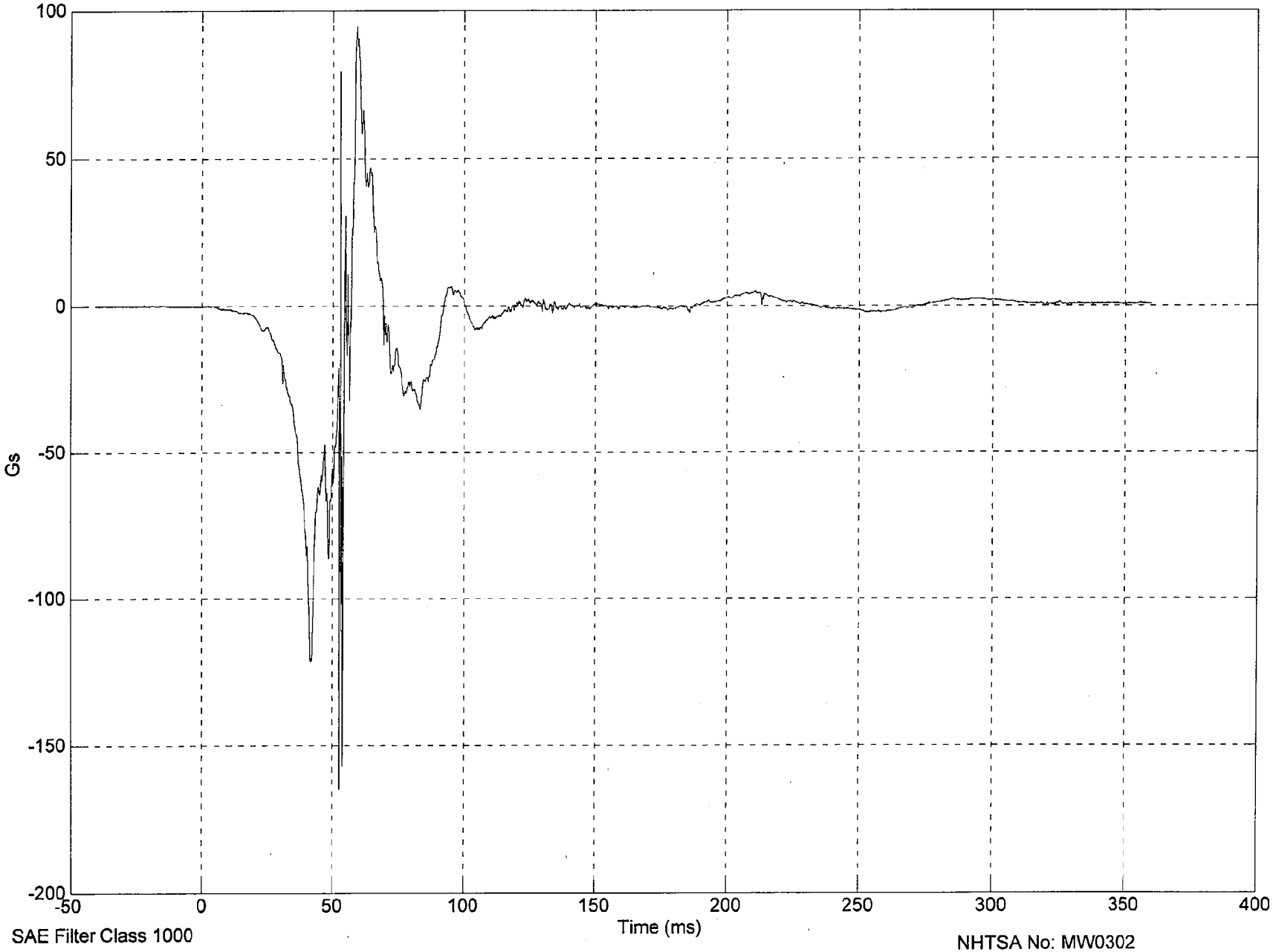
SAE Filter Class 600

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Left Ankle X

Max = 94.7 Gs @ 59.00 msec
Min = -165 Gs @ 52.50 msec



SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

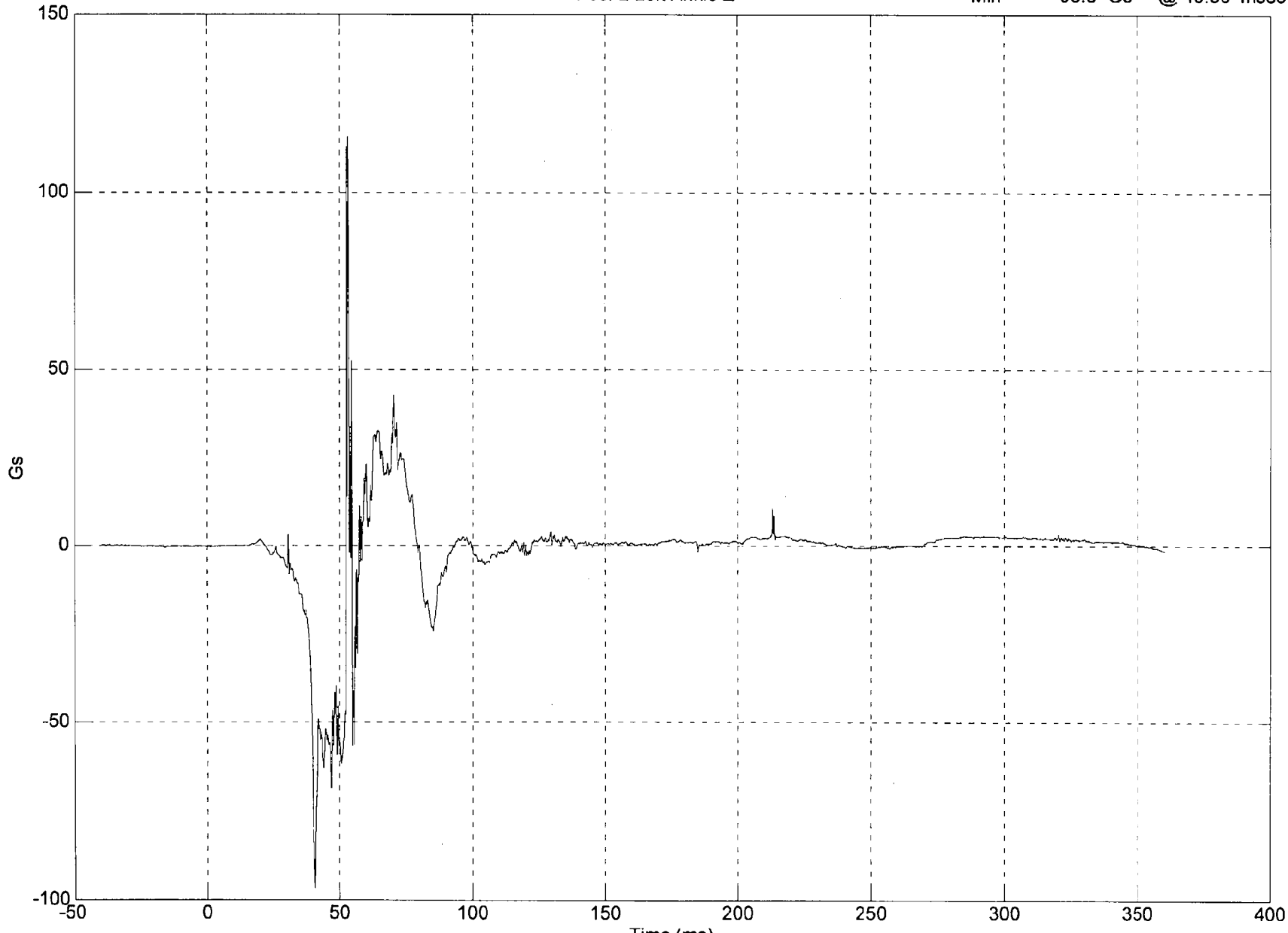
B-96

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Left Ankle Z

Max = 116 Gs @ 53.10 msec
Min = -96.6 Gs @ 40.80 msec



B-97

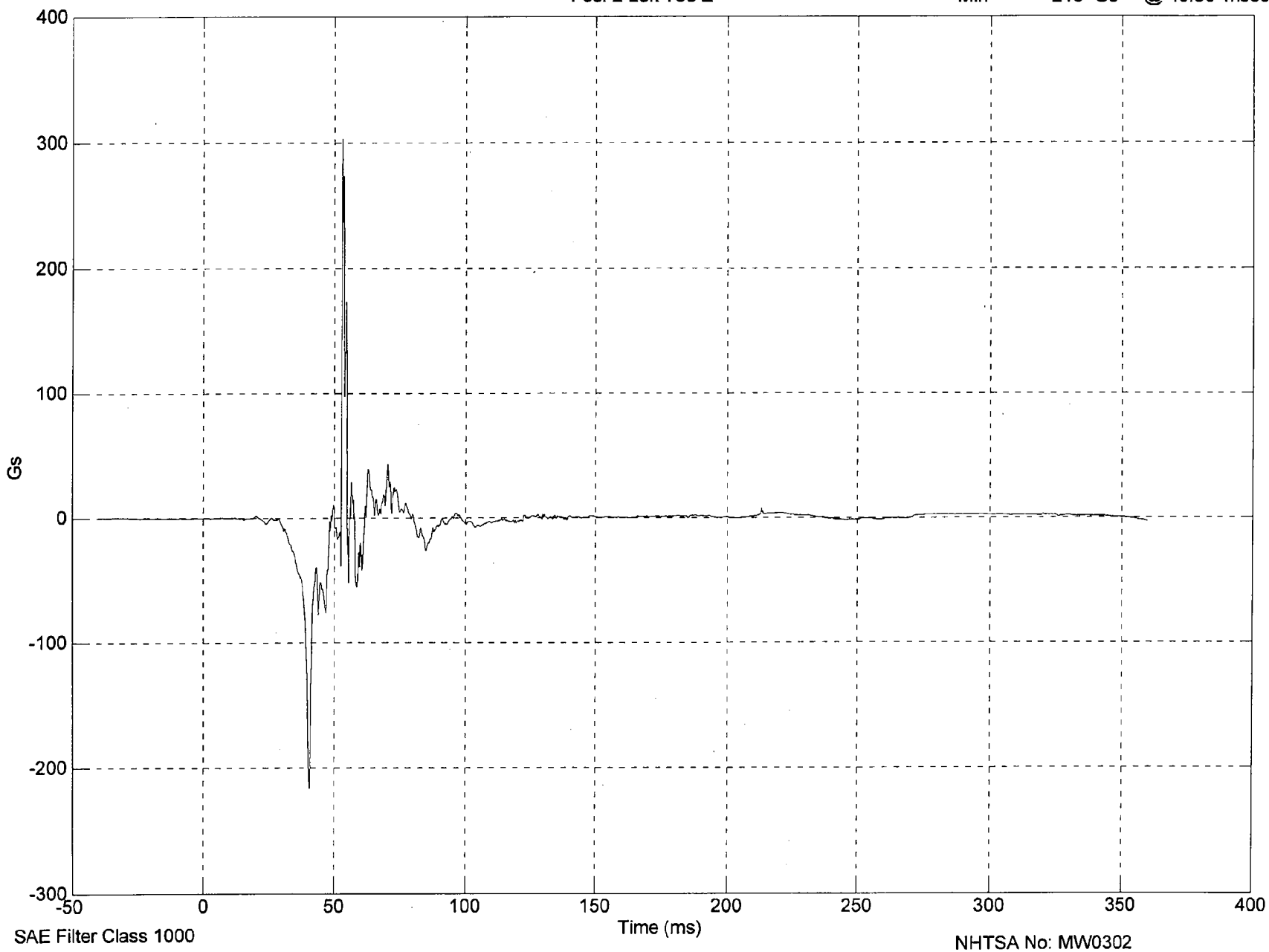
8413-1

SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 303 Gs @ 52.90 msec
Min = -216 Gs @ 40.60 msec

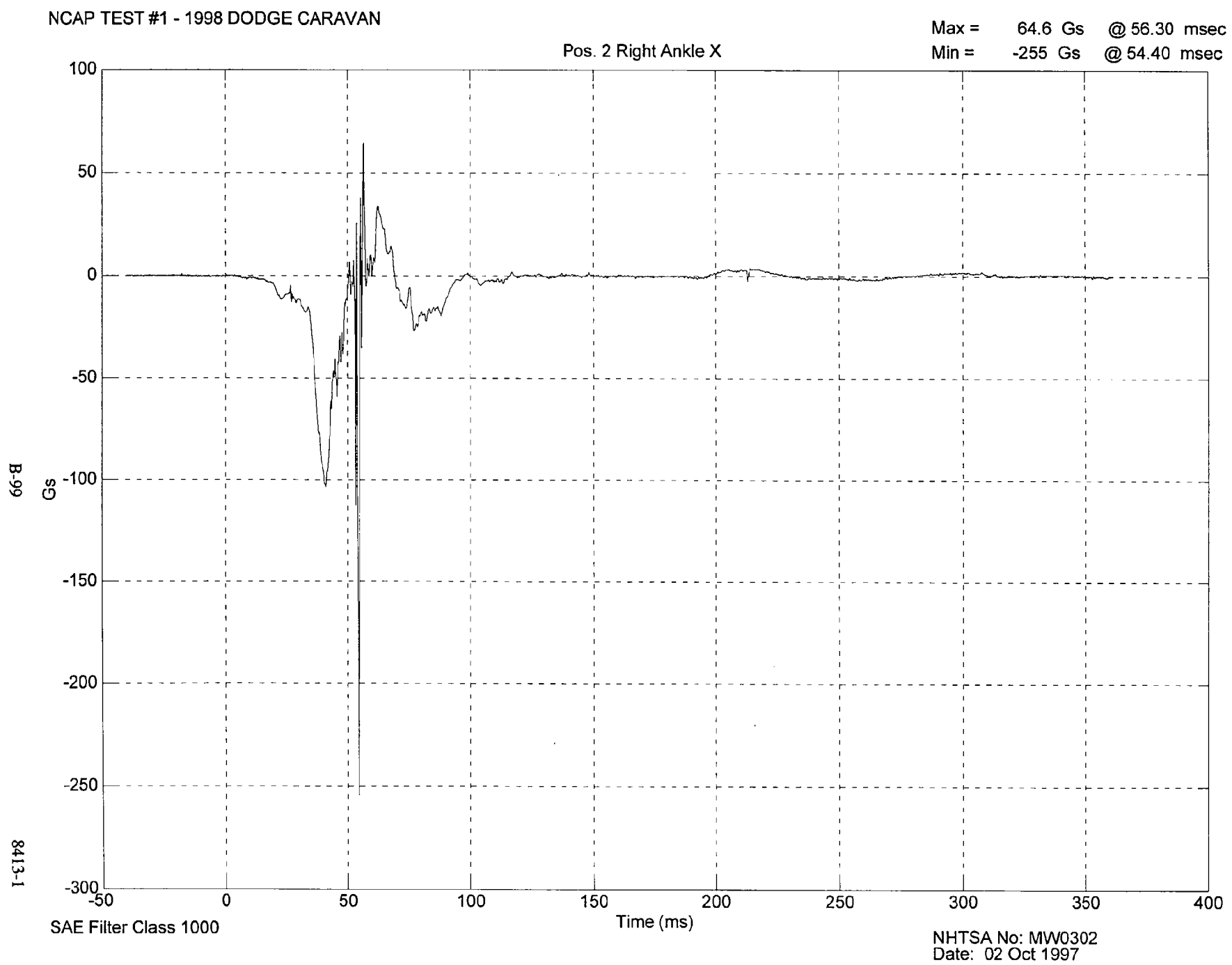


B-98

8413-1

SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

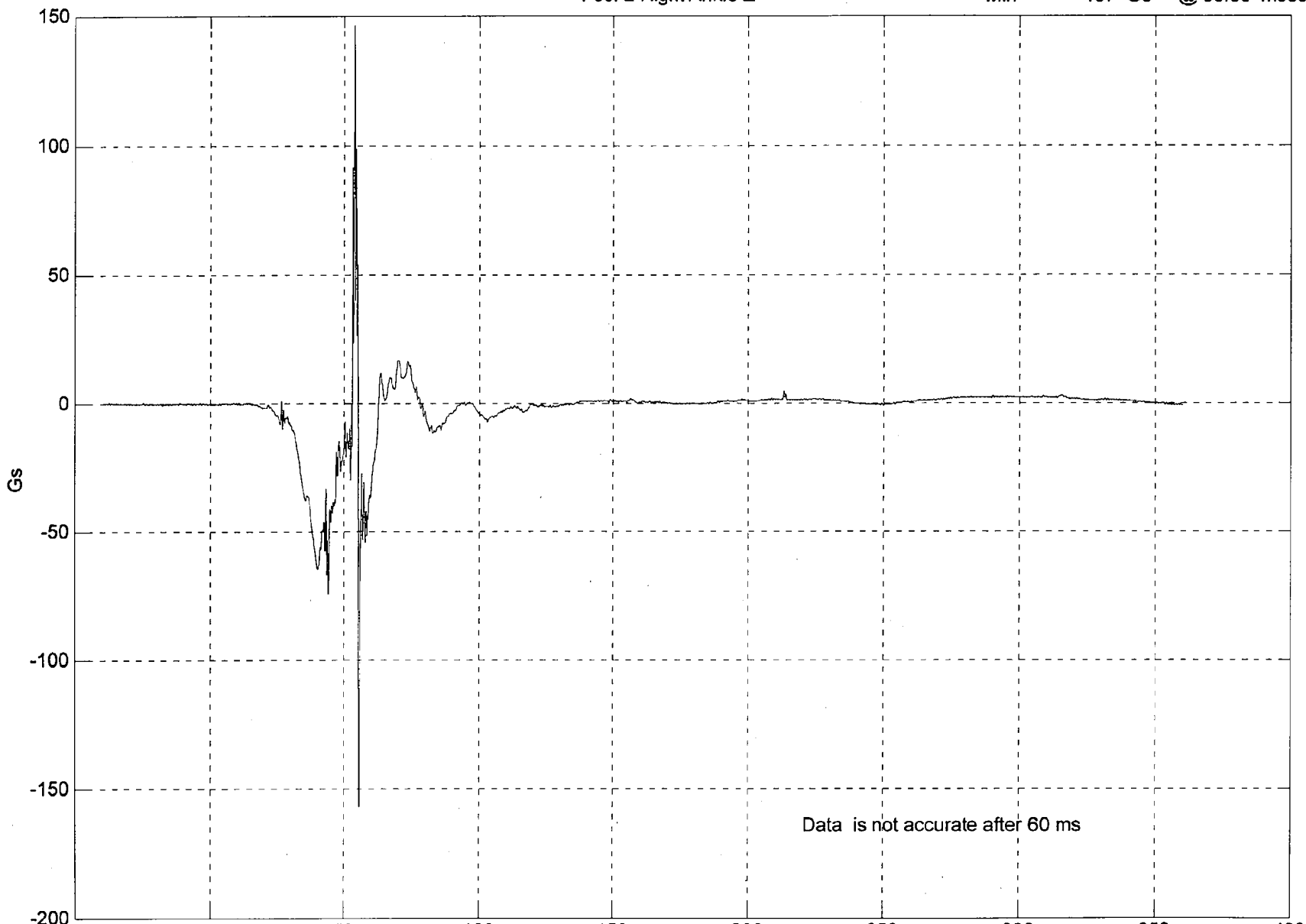

NCAP TEST #1 - 1998 DODGE CARAVAN
Pos. 2 Right Ankle X
Max = 64.6 Gs @ 56.30 msec
Min = -255 Gs @ 54.40 msec
100
50
0
-50
-100
-150
-200
-250
-300
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Right Ankle Z

Max = 147 Gs @ 53.80 msec
Min = -157 Gs @ 55.60 msec



B-100

8413-1

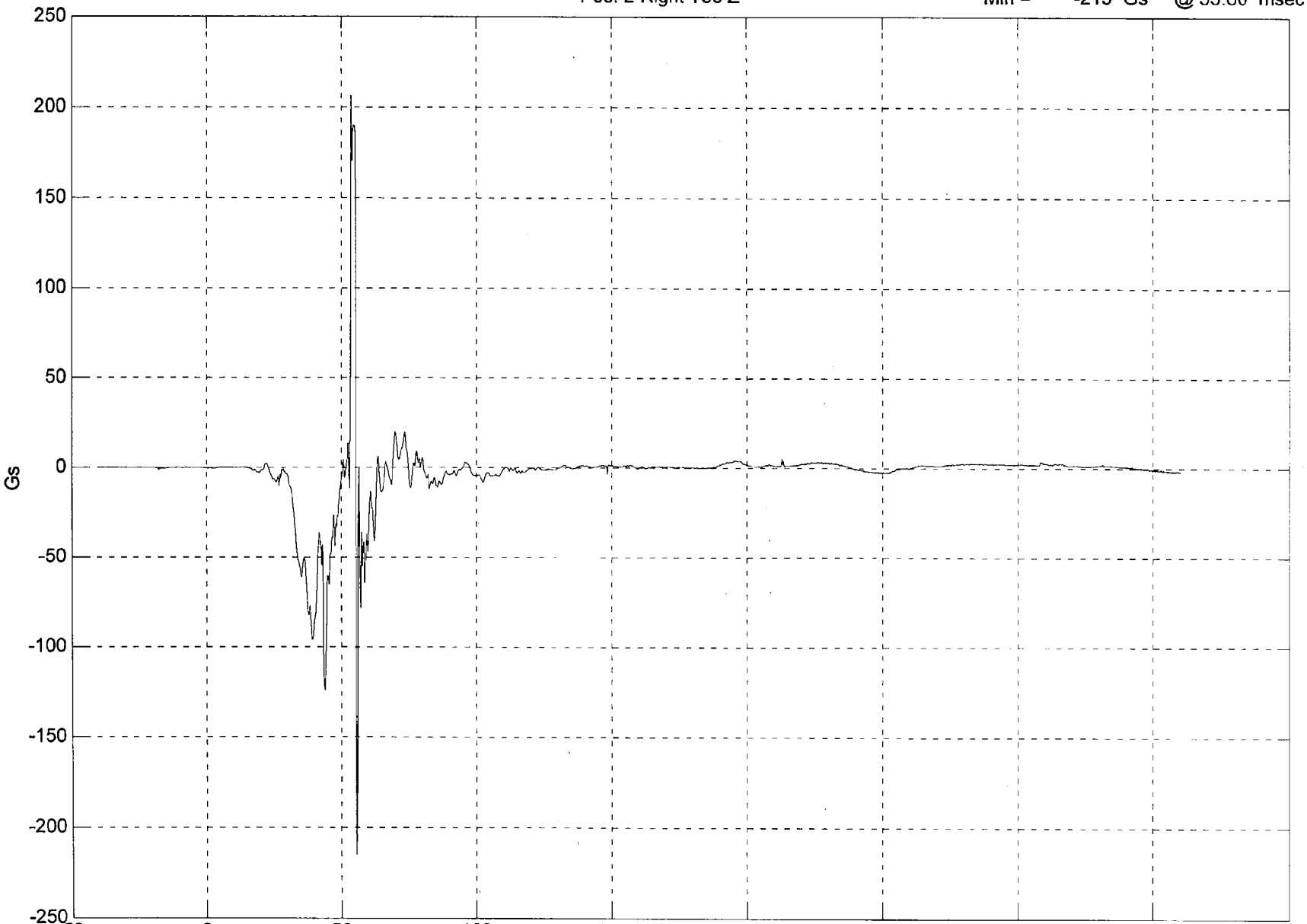
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Right Toe Z

Max = 206 Gs @ 53.60 msec
Min = -215 Gs @ 55.60 msec



B-101

8413-1

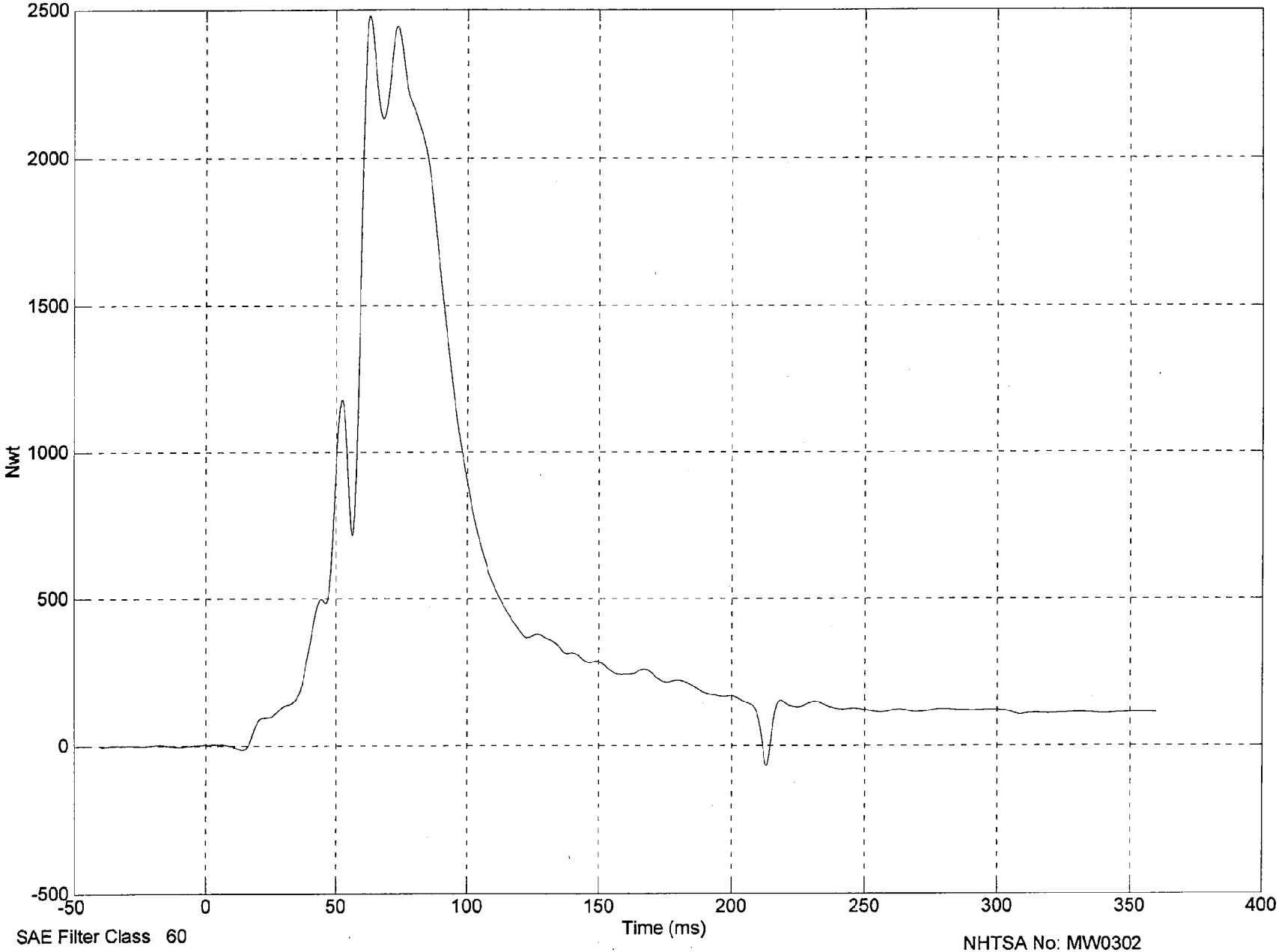
SAE Filter Class 1000

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Pos. 2 Right Belt Load

Max = 2.48e+003 Nwt @ 62.80 msec
Min = -68.7 Nwt @ 213.30 msec



B-102

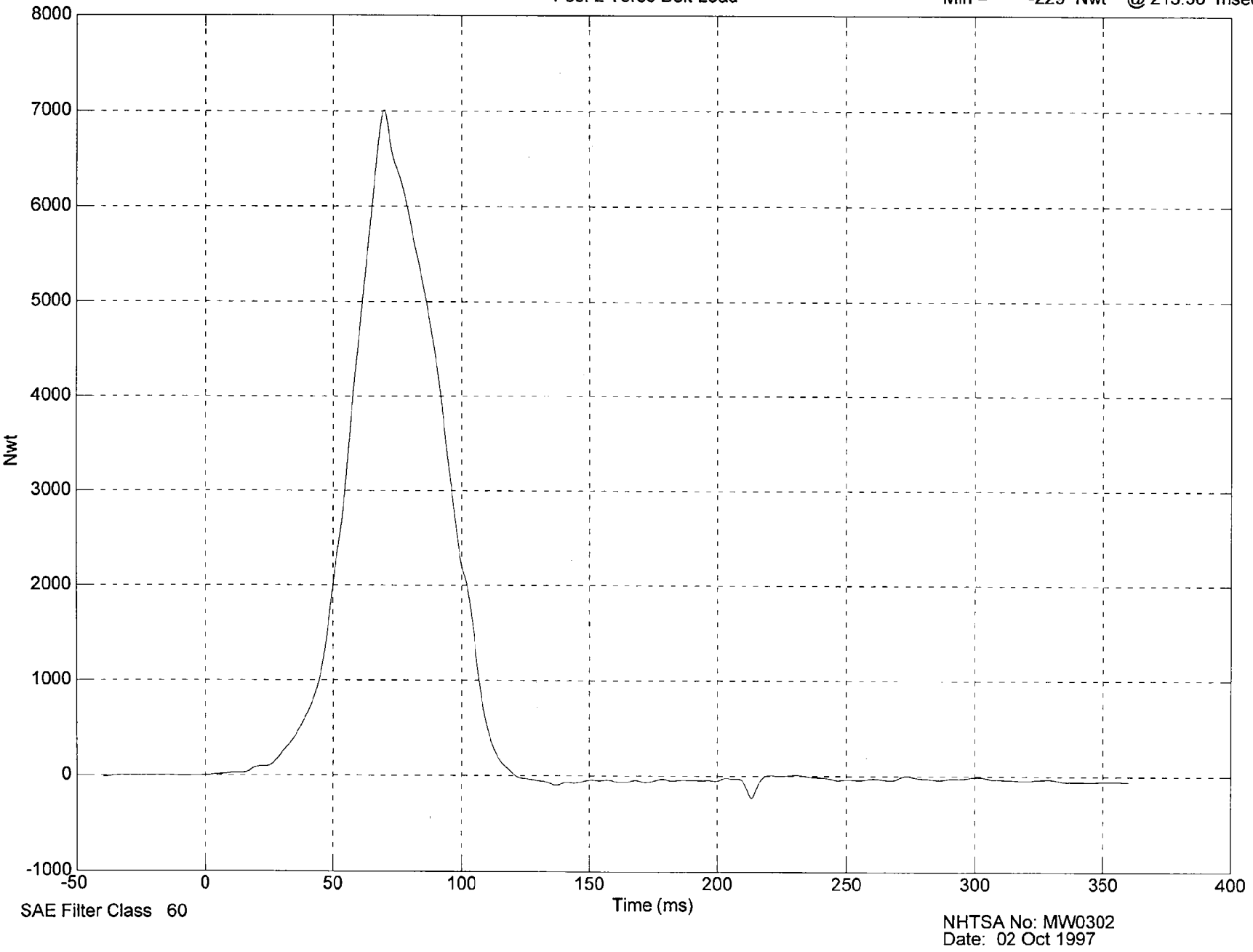
8413-1

SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 7.01e+003 Nwt @ 69.70 msec
Min = -229 Nwt @ 213.30 msec



B-103

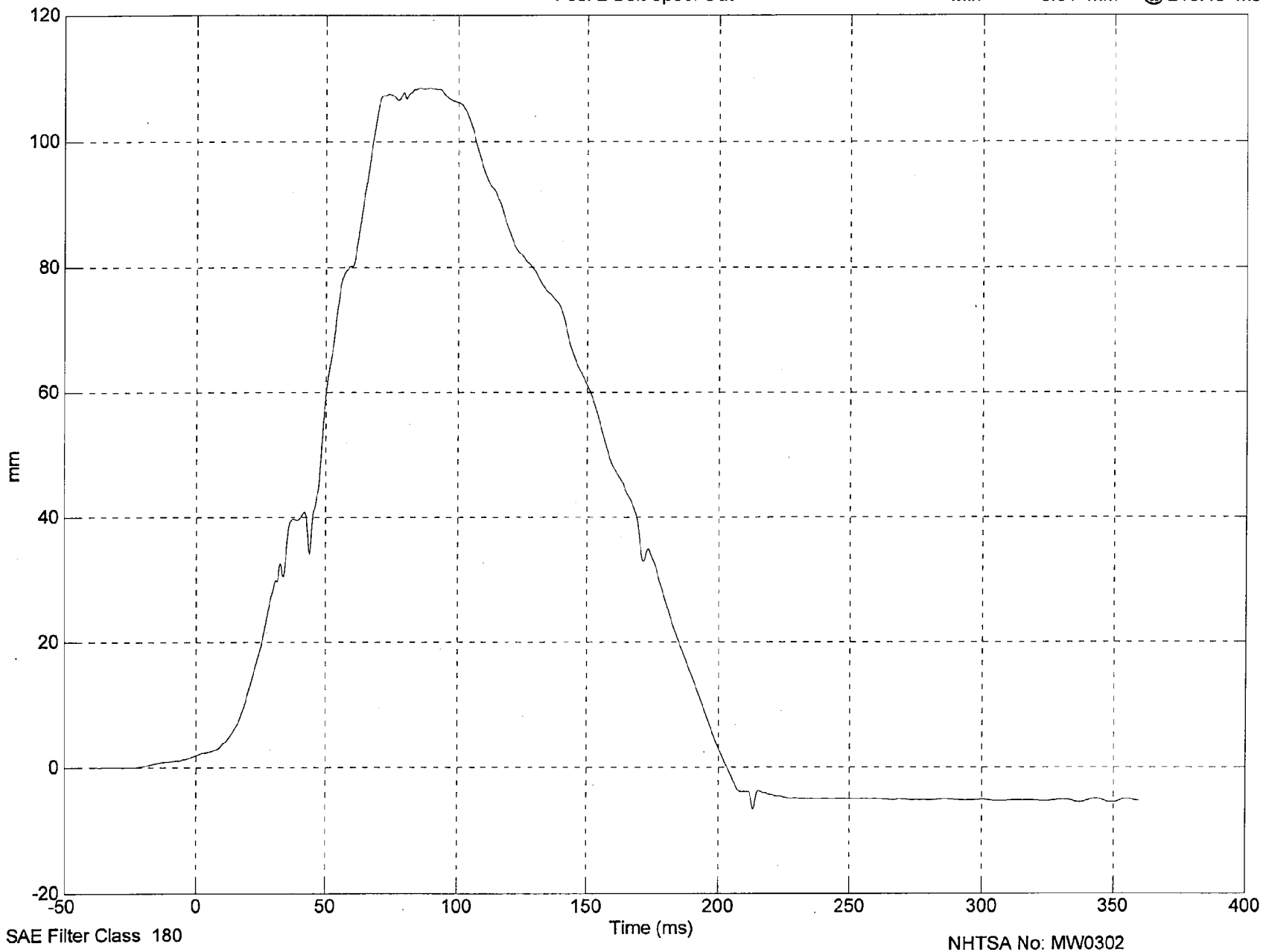
8413-1

SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 108 mm @ 85.40 msec
Min = -6.61 mm @ 213.40 msec



B-104

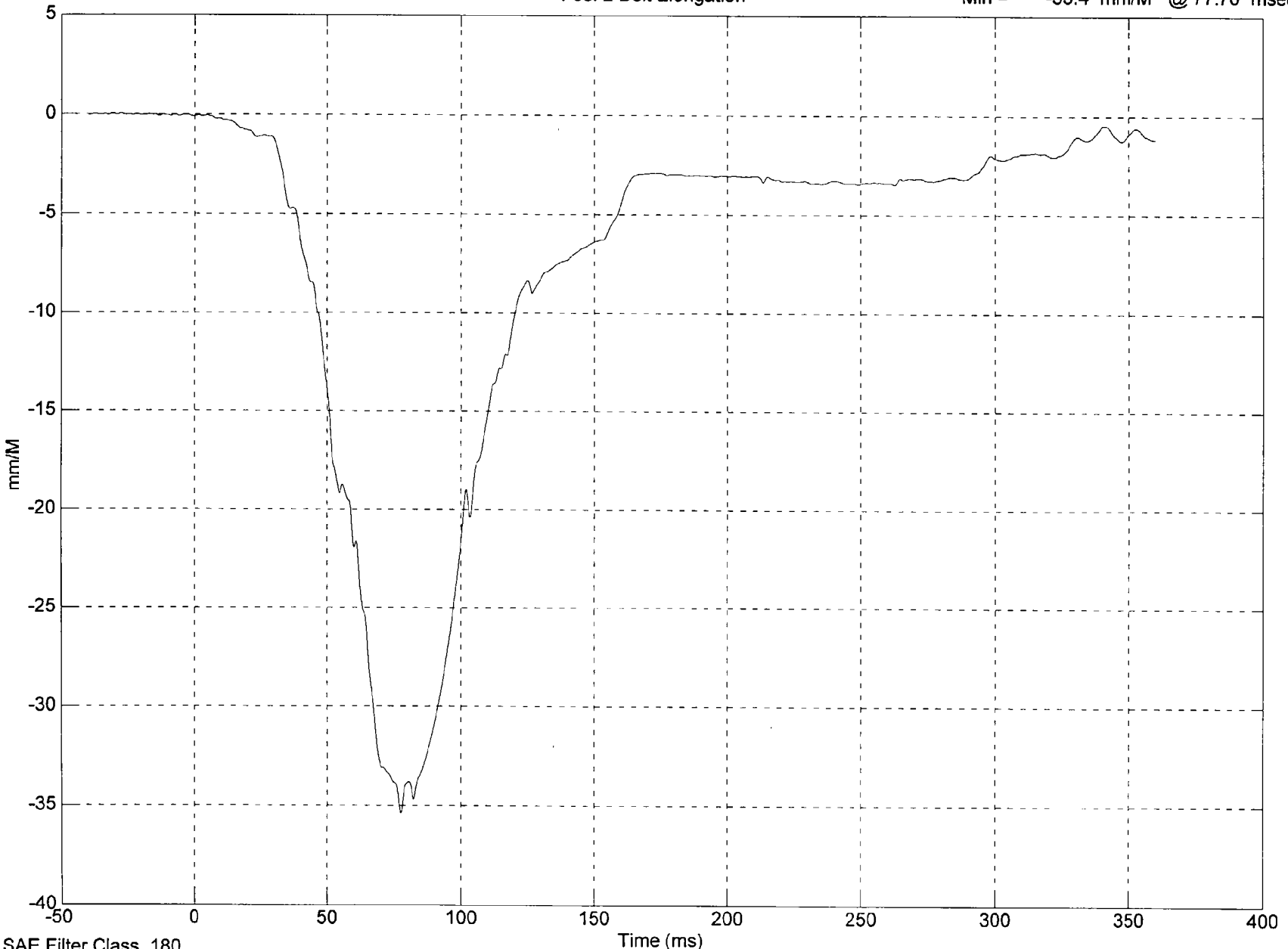
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 0.0455 mm/M @ -30.90 msec
Min = -35.4 mm/M @ 77.70 msec



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

B-105

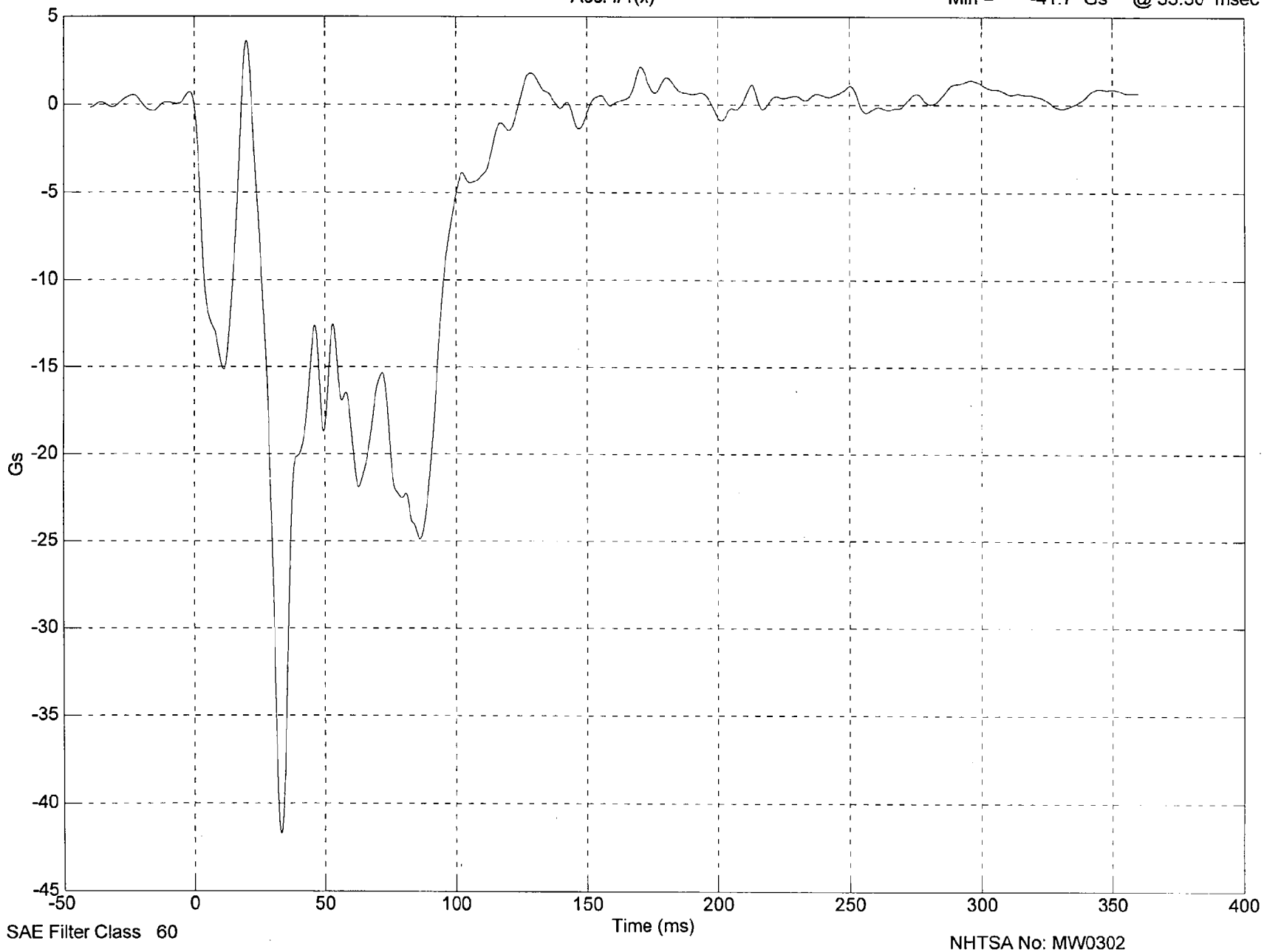
8413-1

NHTSA TEST NO. MW0302

VEHICLE DATA	FILTER CHANNEL CLASS
Acceleration	60
Velocity	180
Displacement	180

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 3.61 Gs @ 19.80 msec
Min = -41.7 Gs @ 33.30 msec



SAE Filter Class 60

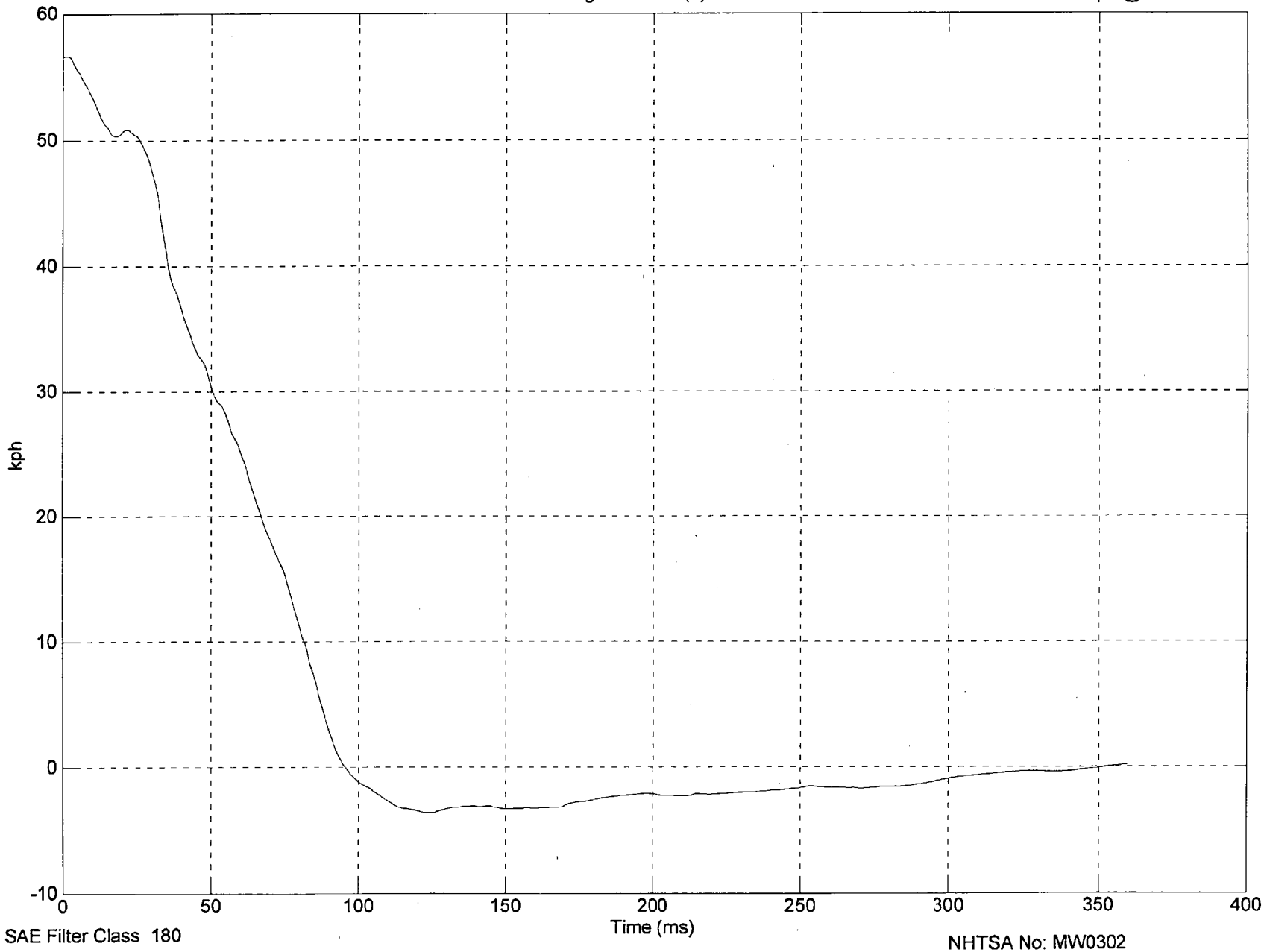
NHTSA No: MW0302
Date: 02 Oct 1997

B-107

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 56.6 kph @ 1.50 msec
Min = -3.59 kph @ 124.50 msec



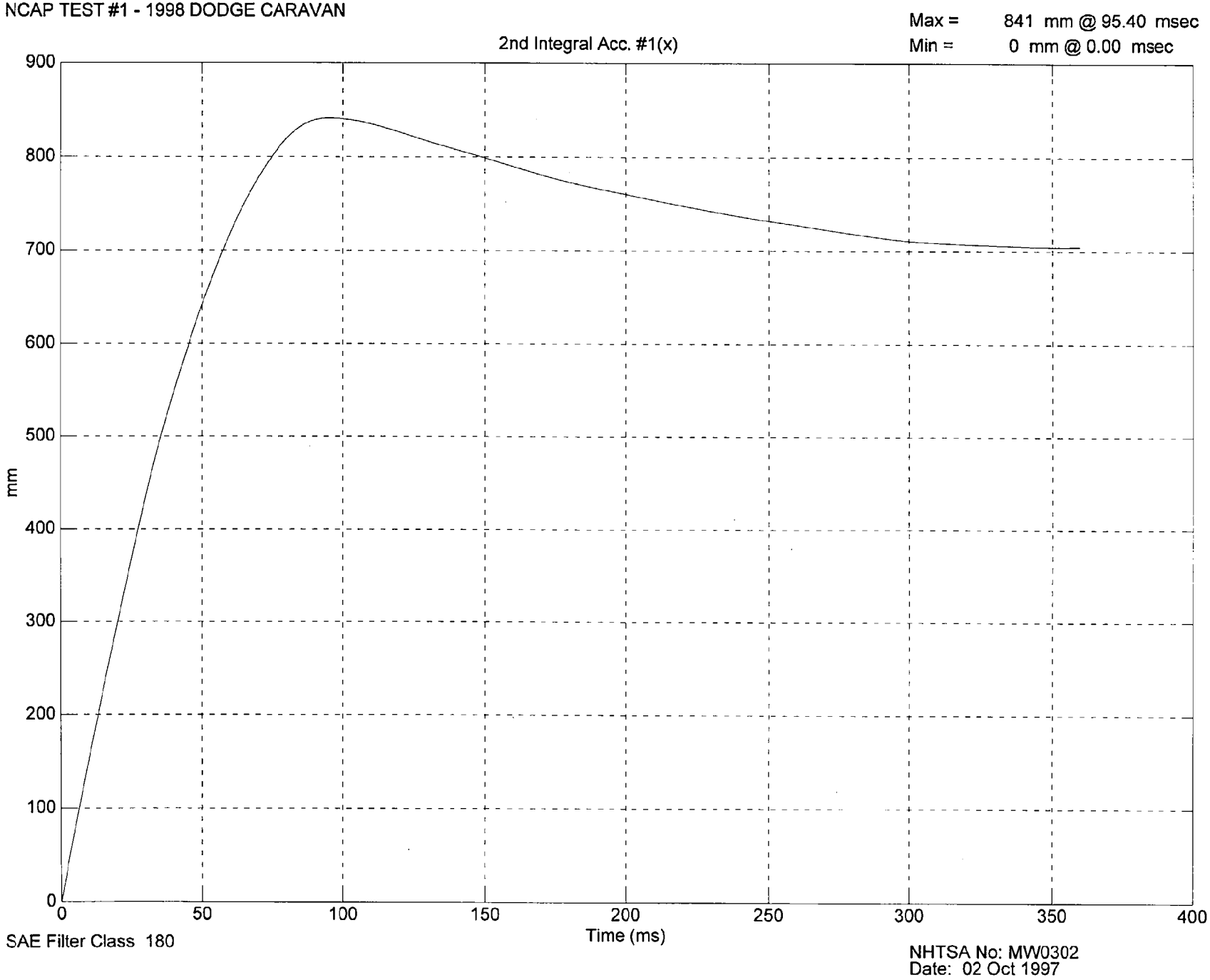
B-108

8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN



SAE Filter Class 180

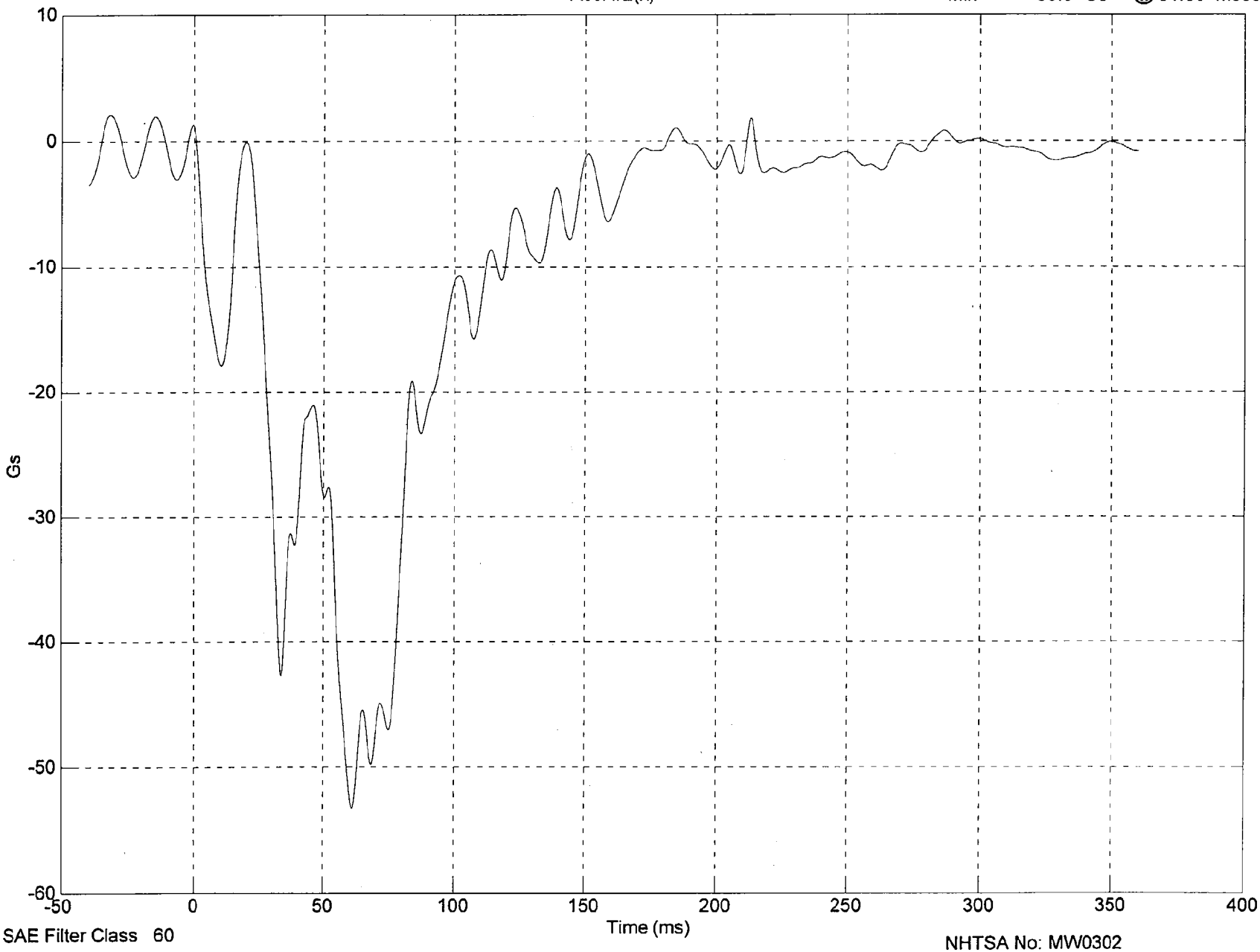
NHTSA No: MW0302
Date: 02 Oct 1997

B-109

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 2.11 Gs @ -31.50 msec
Min = -53.3 Gs @ 61.00 msec



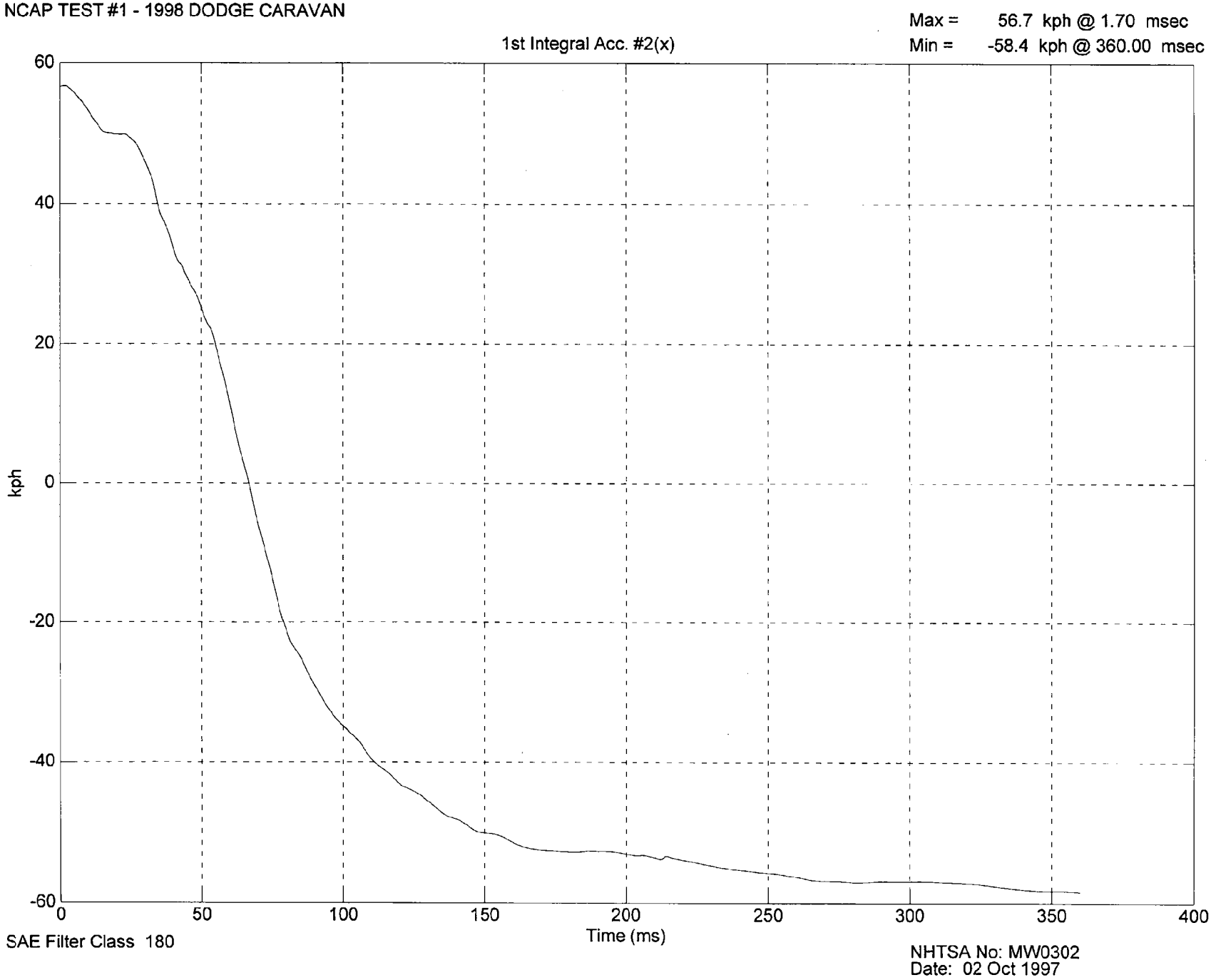
SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

B-110

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

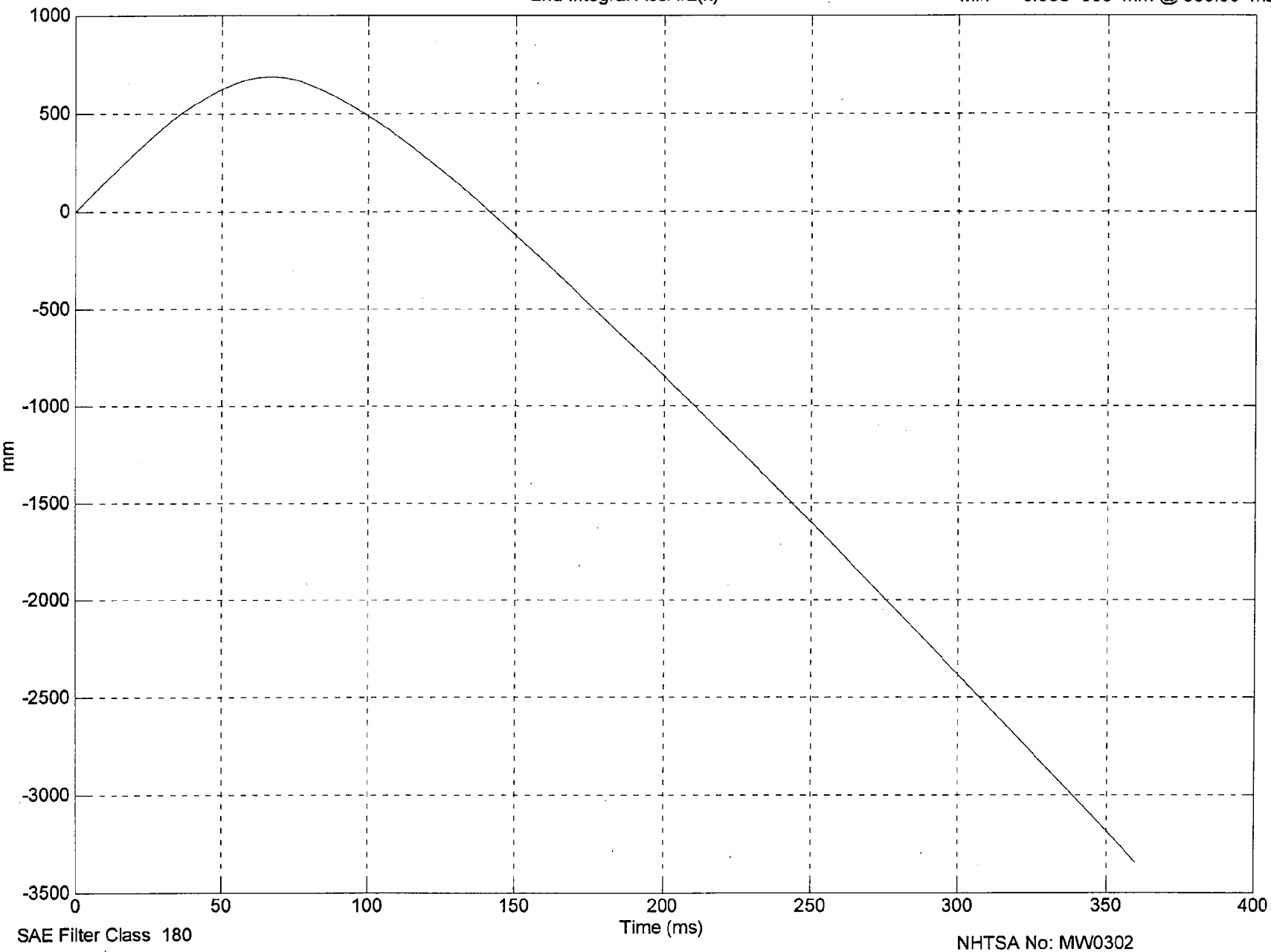


B-111

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 687 mm @ 66.80 msec
Min = -3.35e+003 mm @ 360.00 msec



B-112

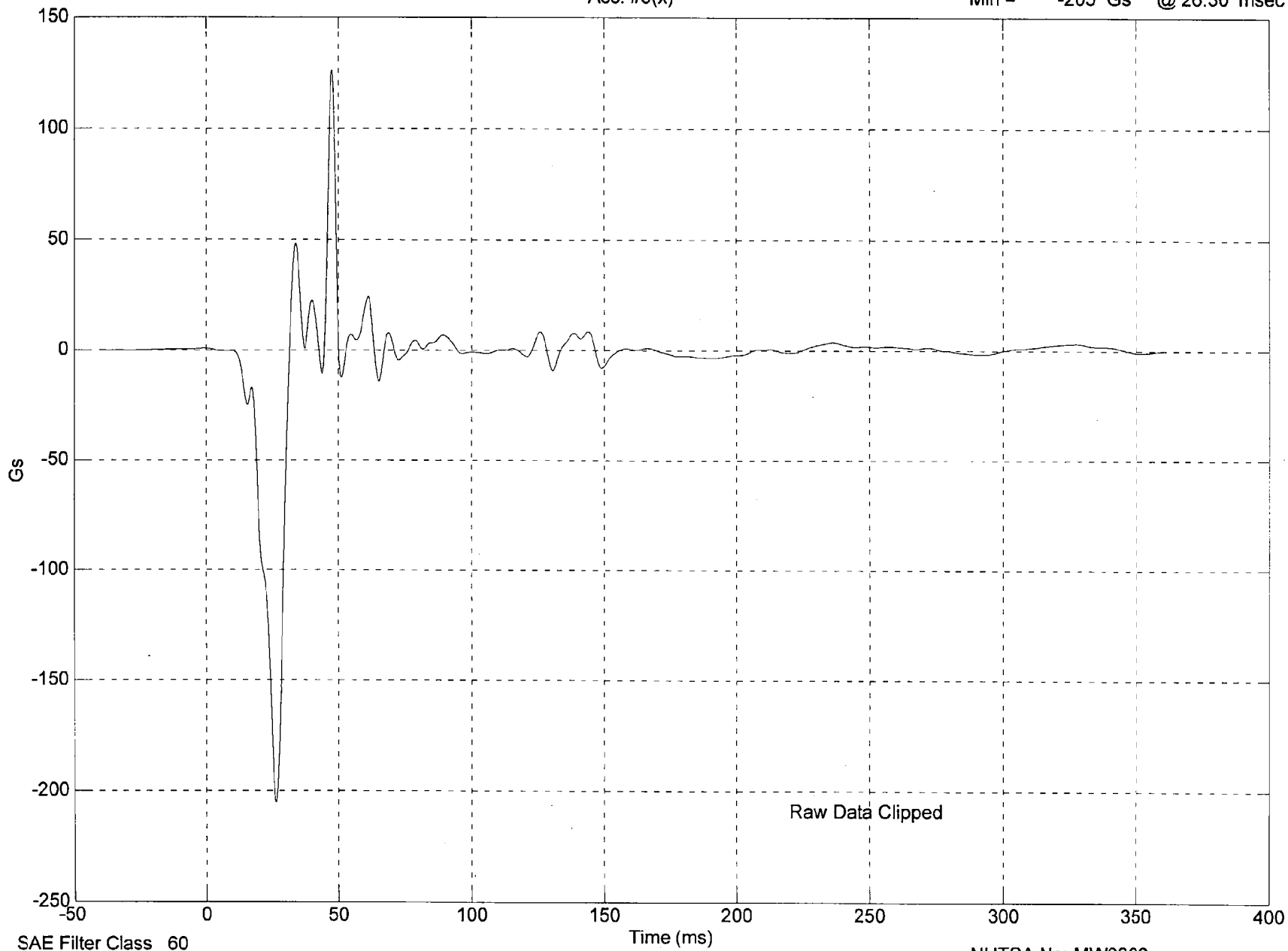
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 126 Gs @ 47.40 msec
Min = -205 Gs @ 26.30 msec



B-113

8413-1

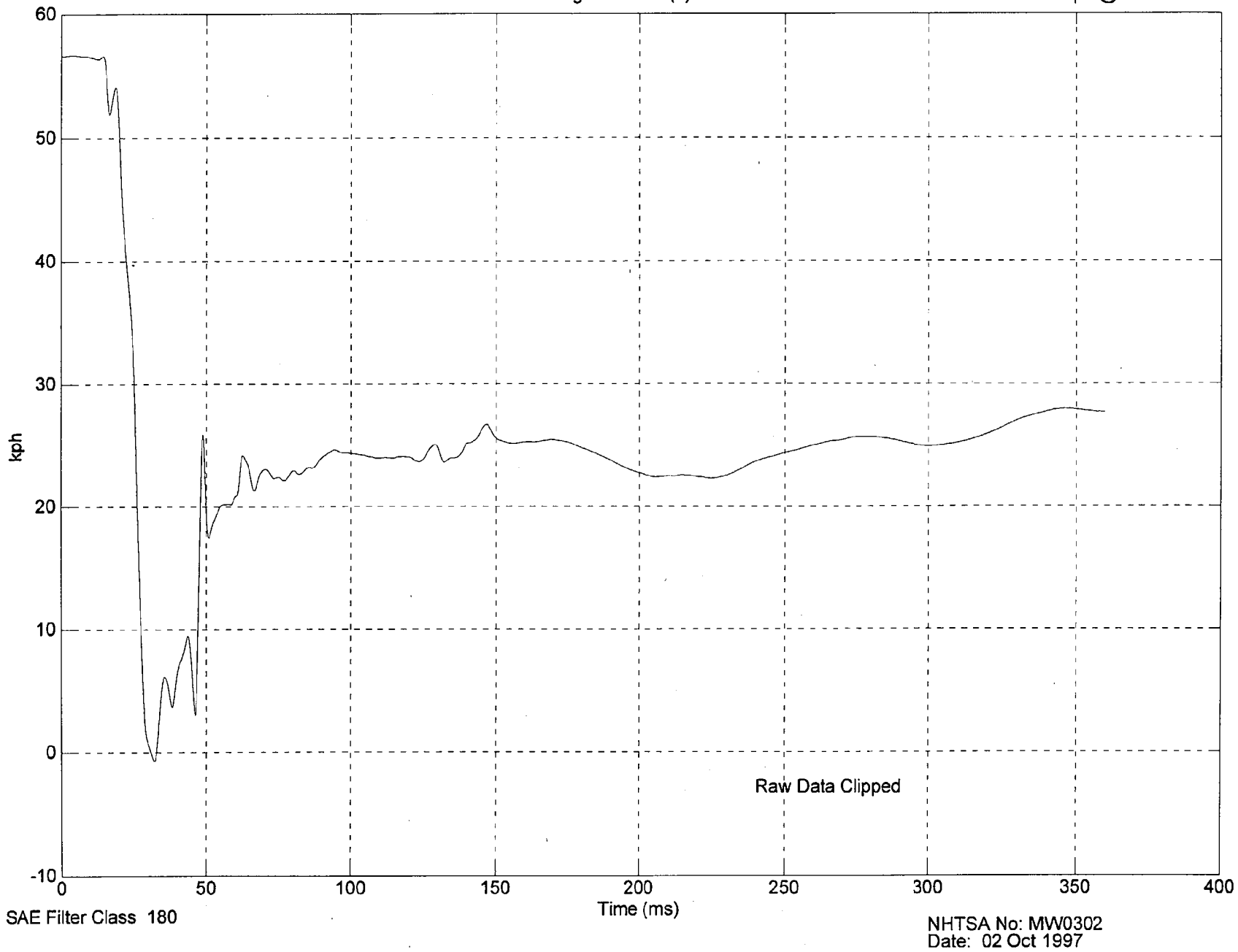
SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

1st Integral Acc. #3(x)

Max = 56.7 kph @ 3.90 msec
Min = -0.72 kph @ 32.20 msec



SAE Filter Class 180

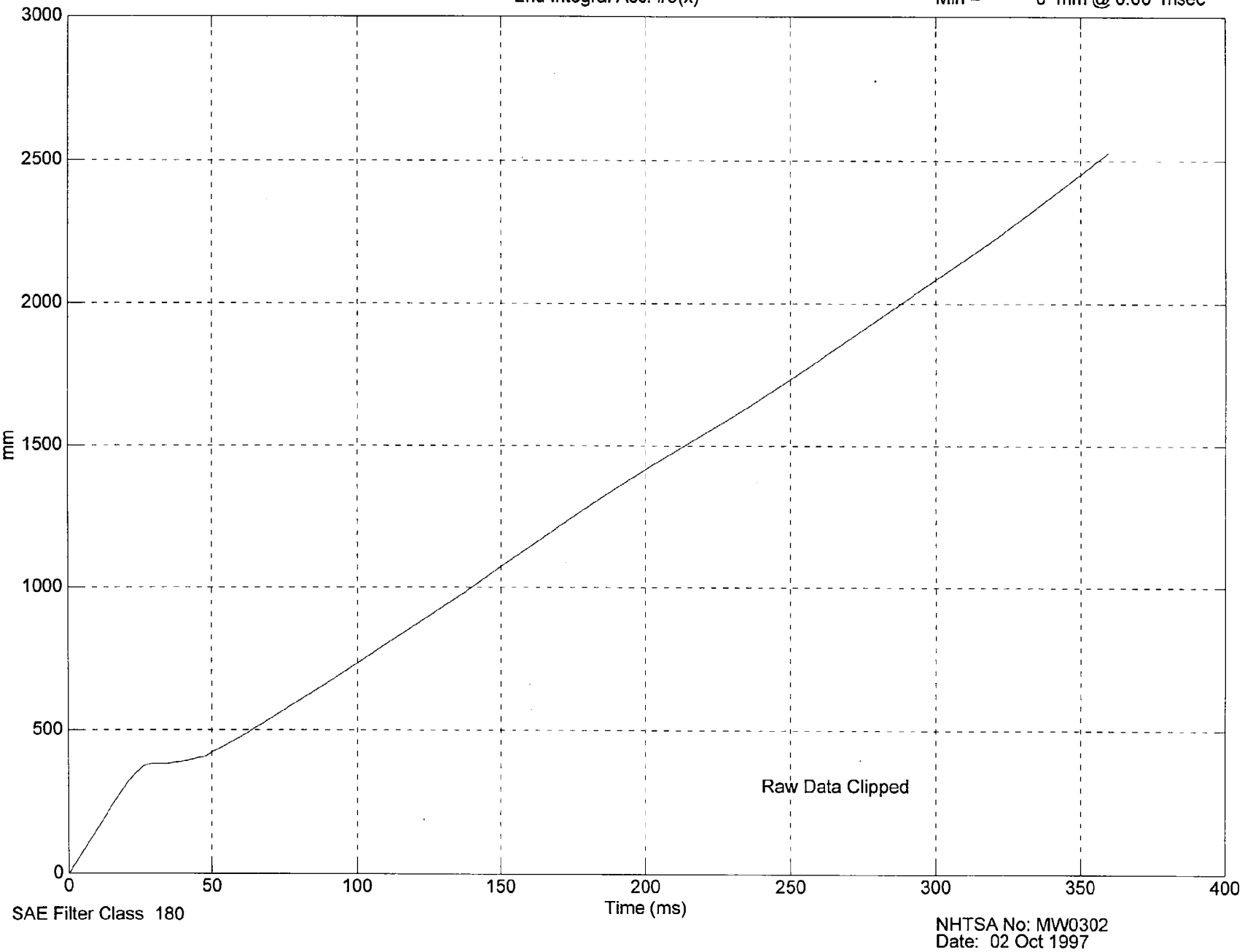
NHTSA No: MW0302
Date: 02 Oct 1997

B-114

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 2.53e+003 mm @ 360.00 msec
Min = 0 mm @ 0.00 msec



B-115

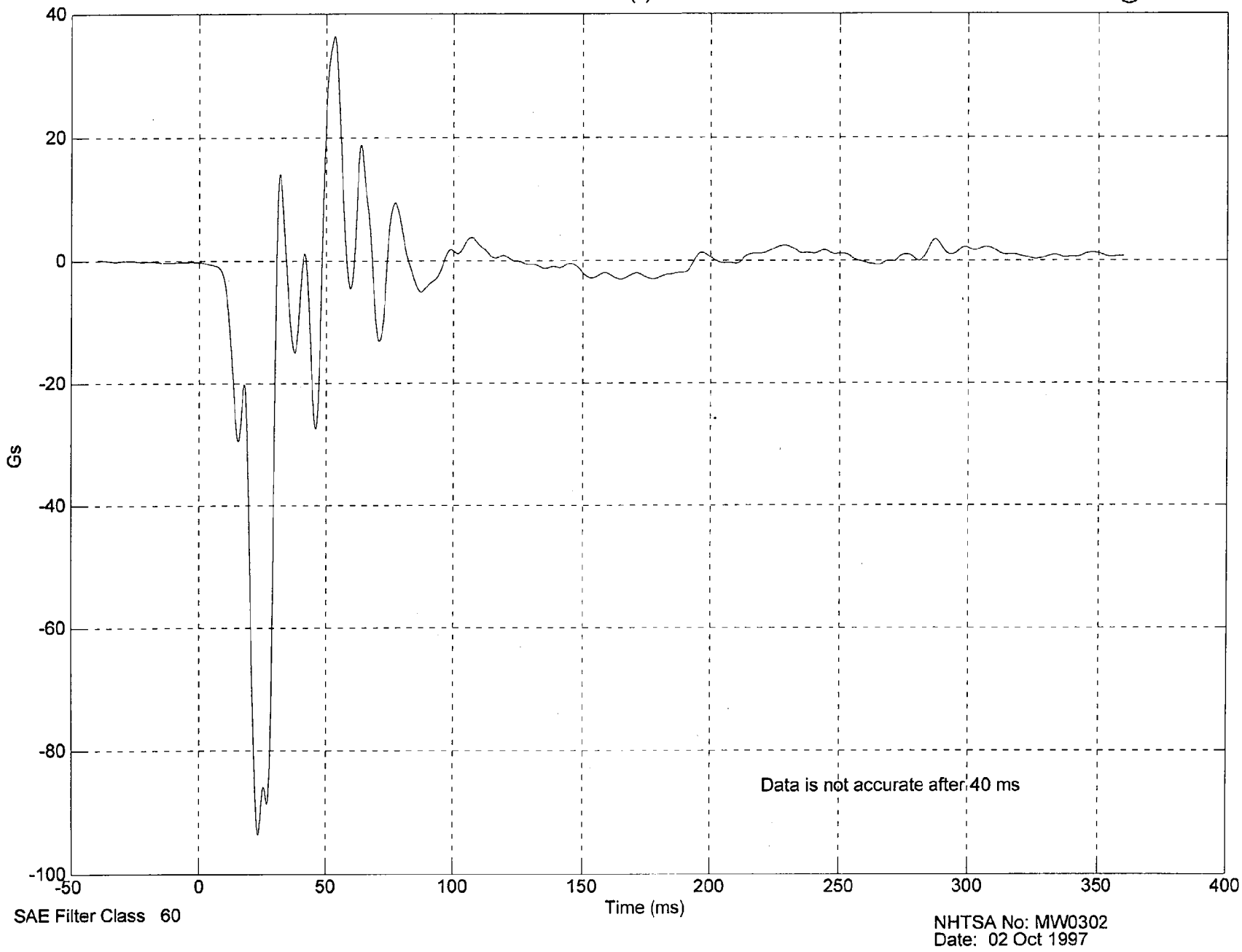
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 36.4 Gs @ 53.30 msec
Min = -93.6 Gs @ 23.20 msec



B-116

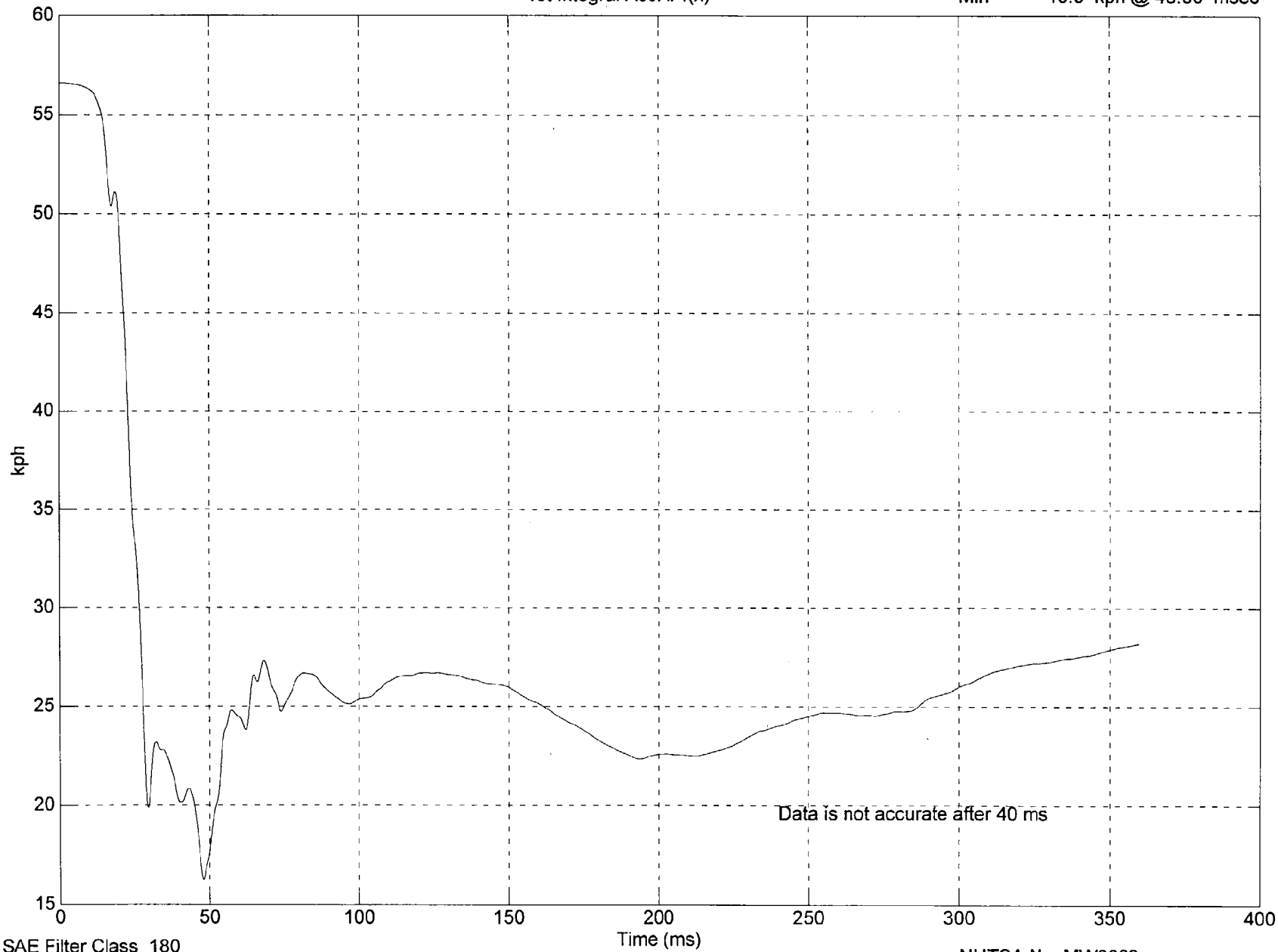
8413-1

SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 56.6 kph @ 0.00 msec
Min = 16.3 kph @ 48.00 msec



B-117

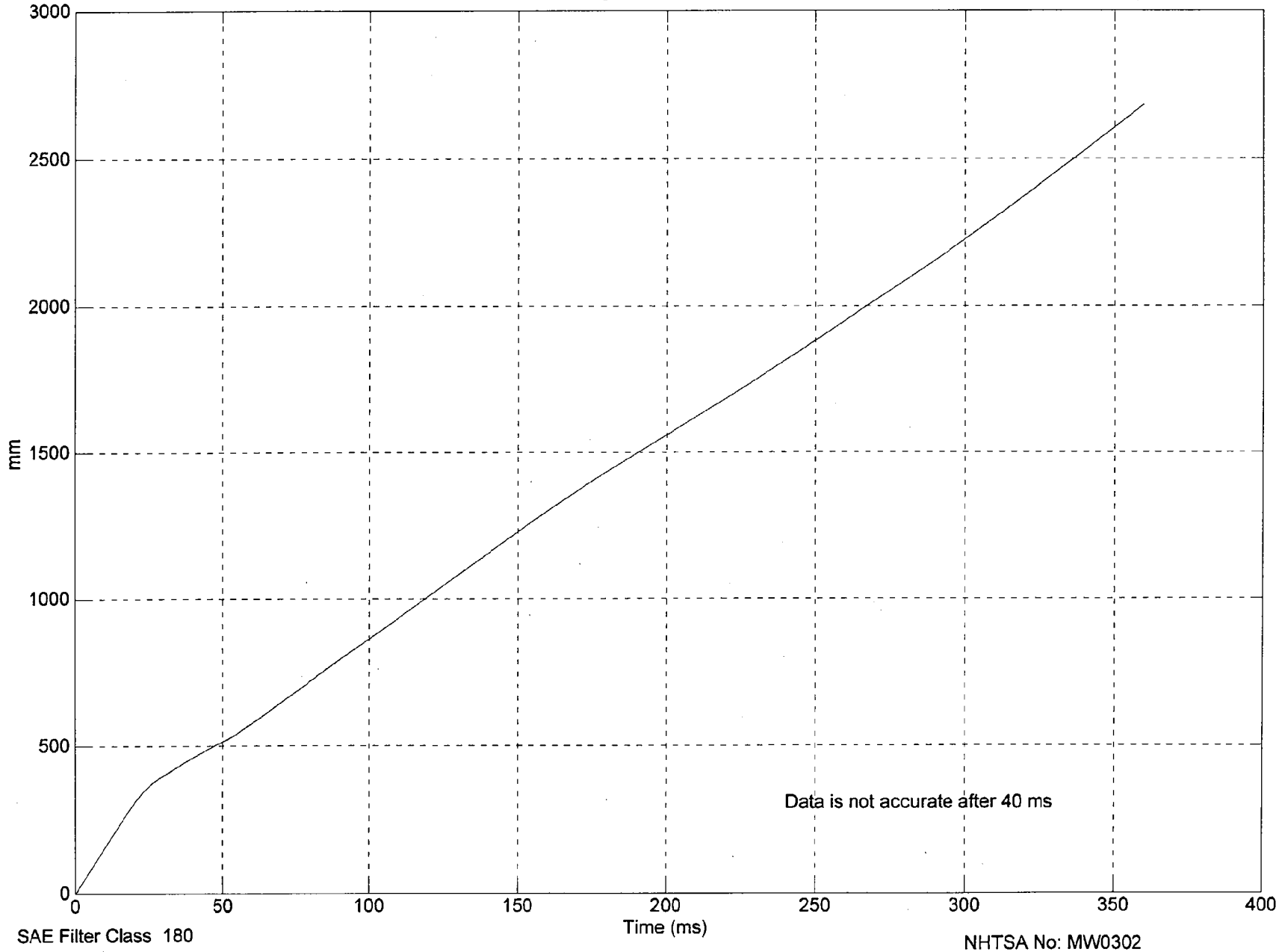
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 2.68e+003 mm @ 360.00 msec
Min = 0 mm @ 0.00 msec



B-118

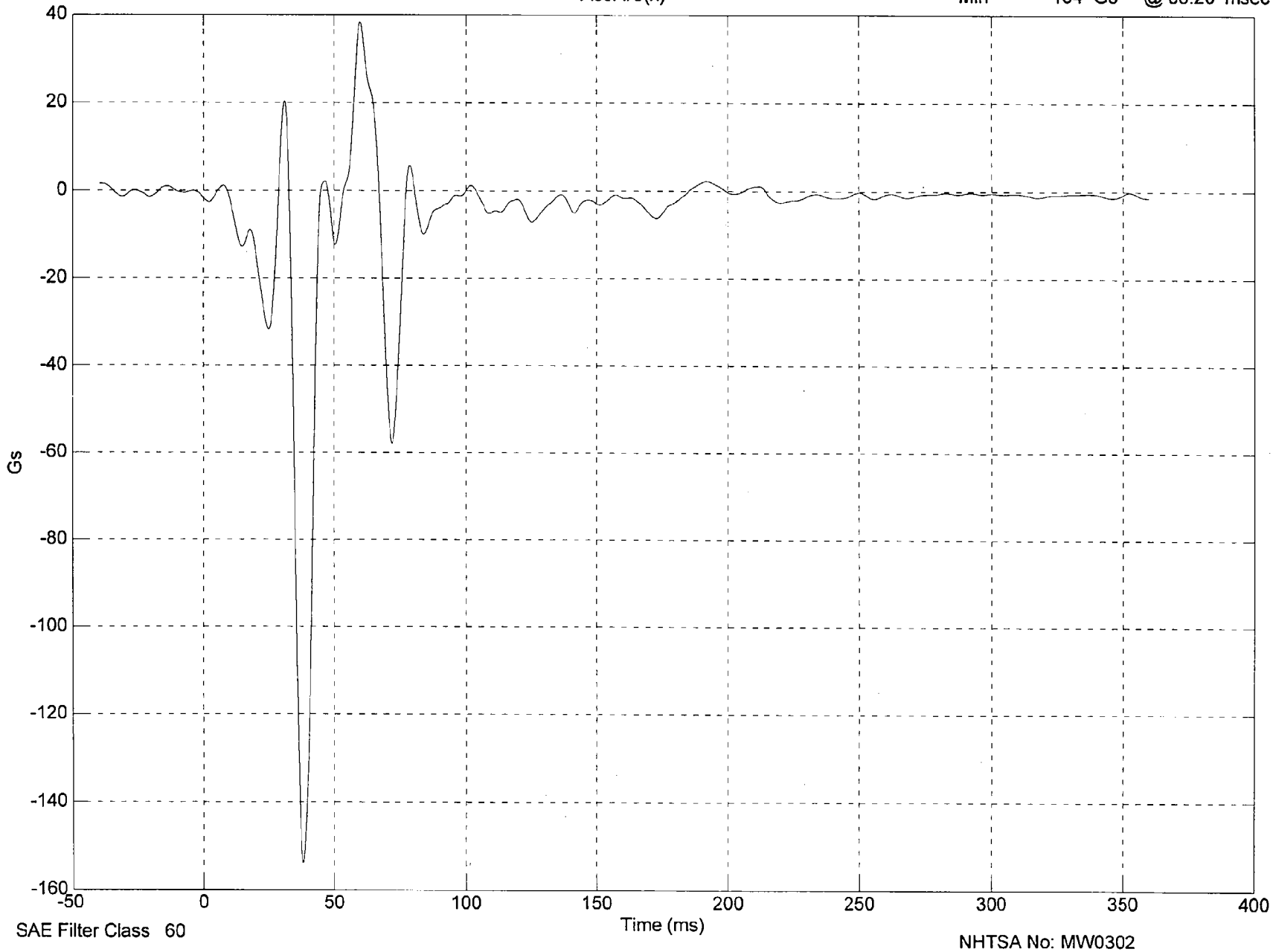
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 38.3 Gs @ 59.60 msec
Min = -154 Gs @ 38.20 msec



B-119

8413-1

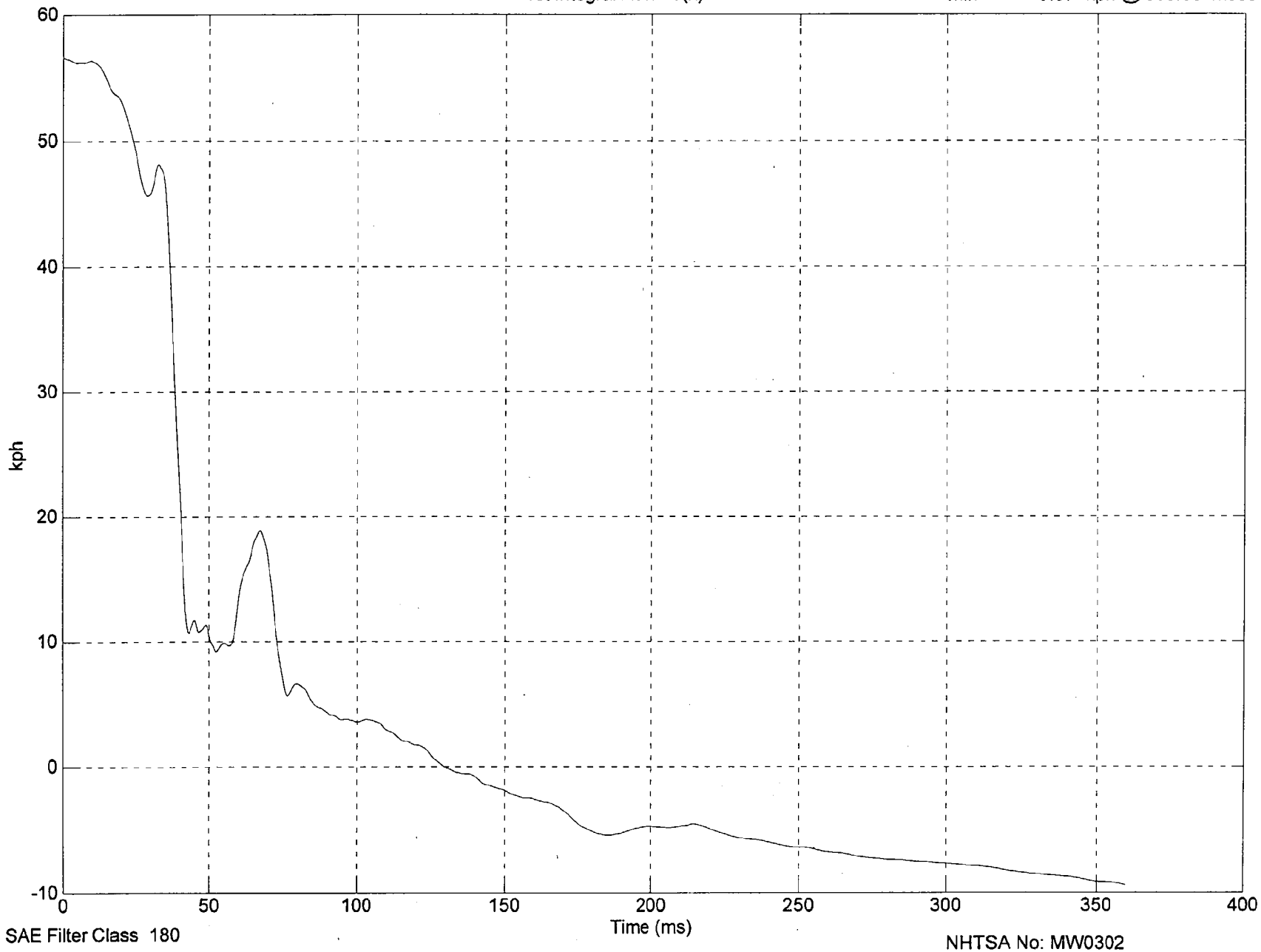
SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

1st Integral Acc. #5(x)

Max = 56.6 kph @ 0.00 msec
Min = -9.37 kph @ 360.00 msec



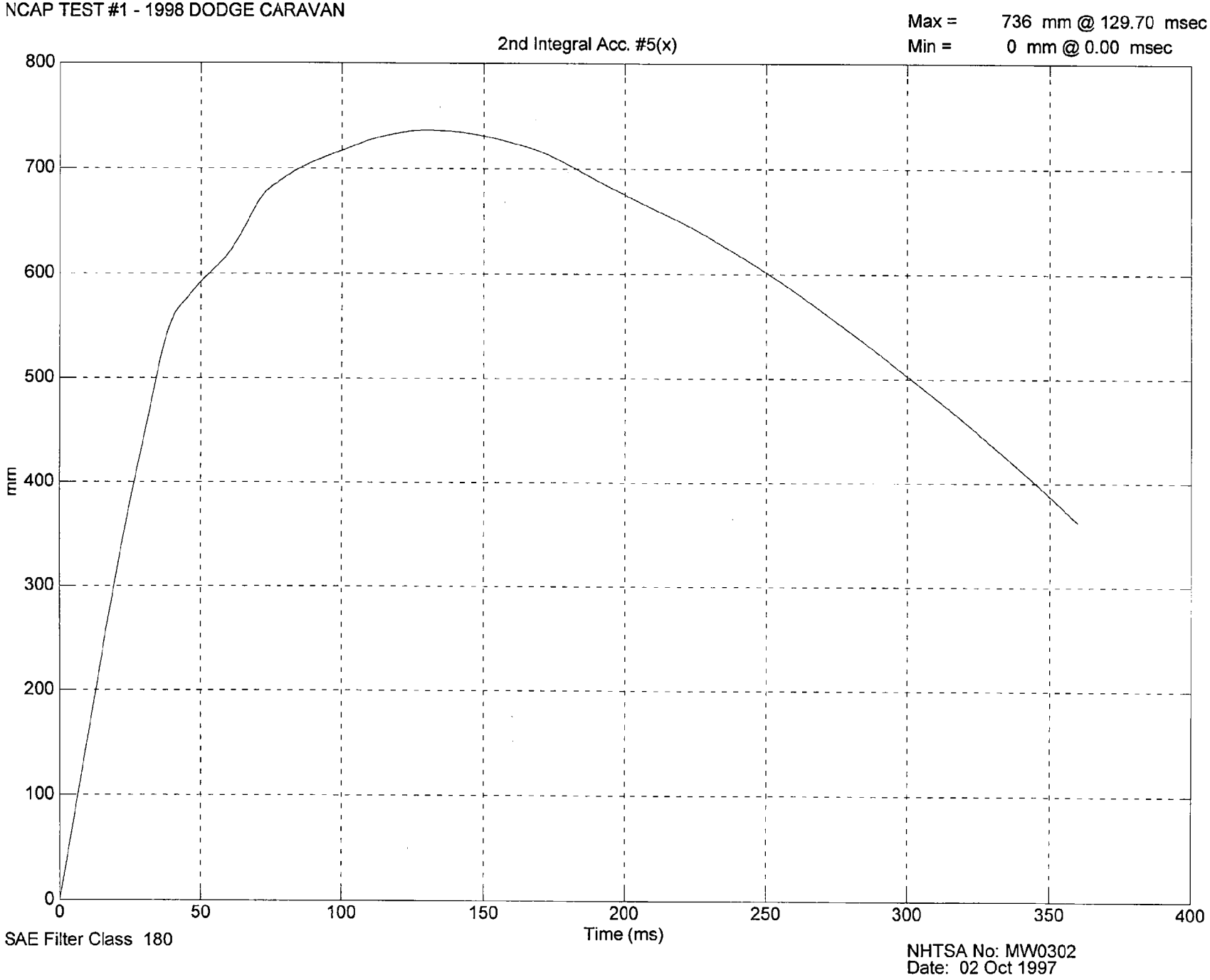
SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

B-120

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN



SAE Filter Class 180

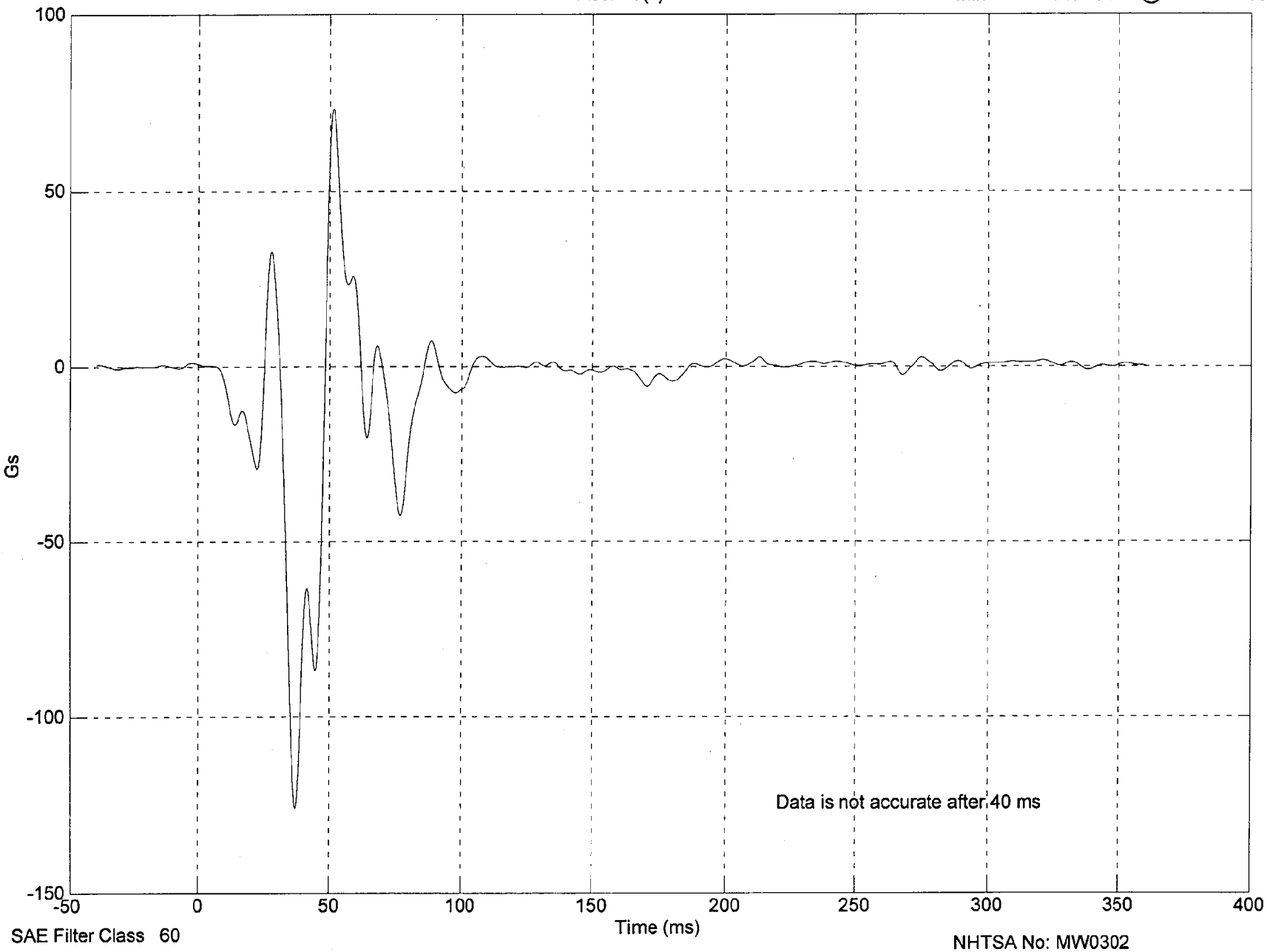
NHTSA No: MW0302
Date: 02 Oct 1997

B-121

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 73.3 Gs @ 51.30 msec
Min = -126 Gs @ 37.20 msec



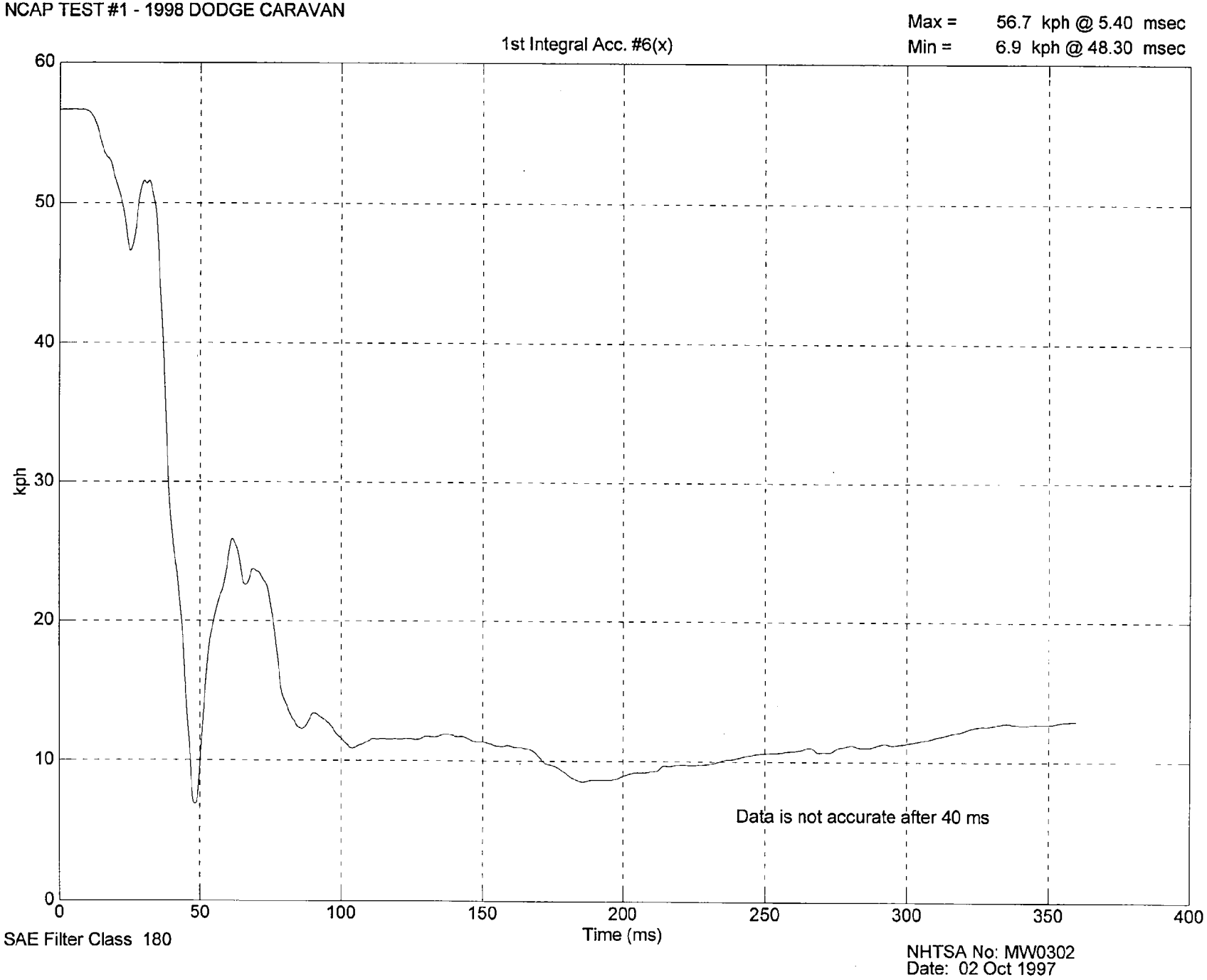
B-122

8413-1

SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN



SAE Filter Class 180

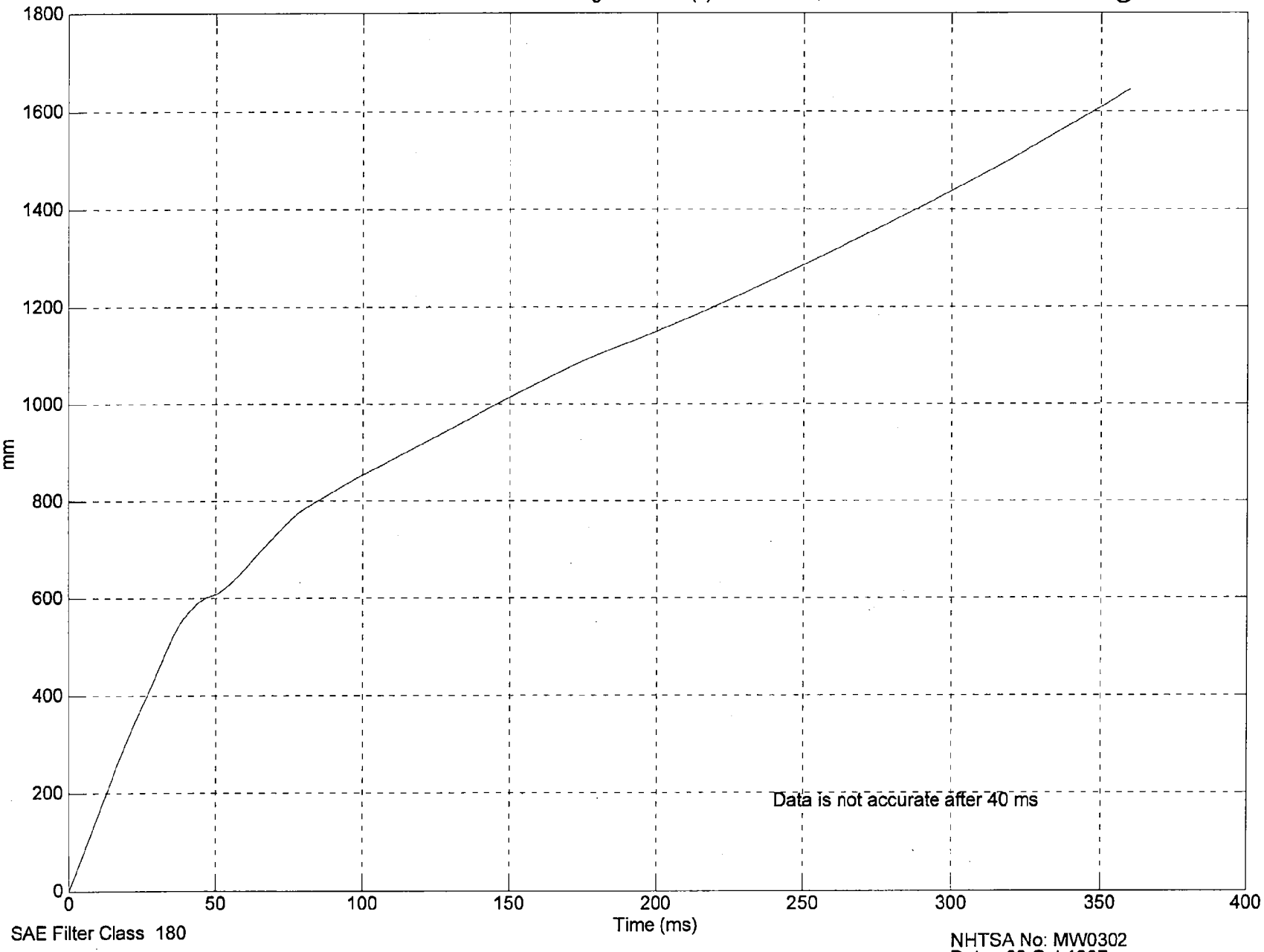
NHTSA No: MW0302
Date: 02 Oct 1997

B-123

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 1.64e+003 mm @ 360.00 msec
Min = 0 mm @ 0.00 msec



B-124

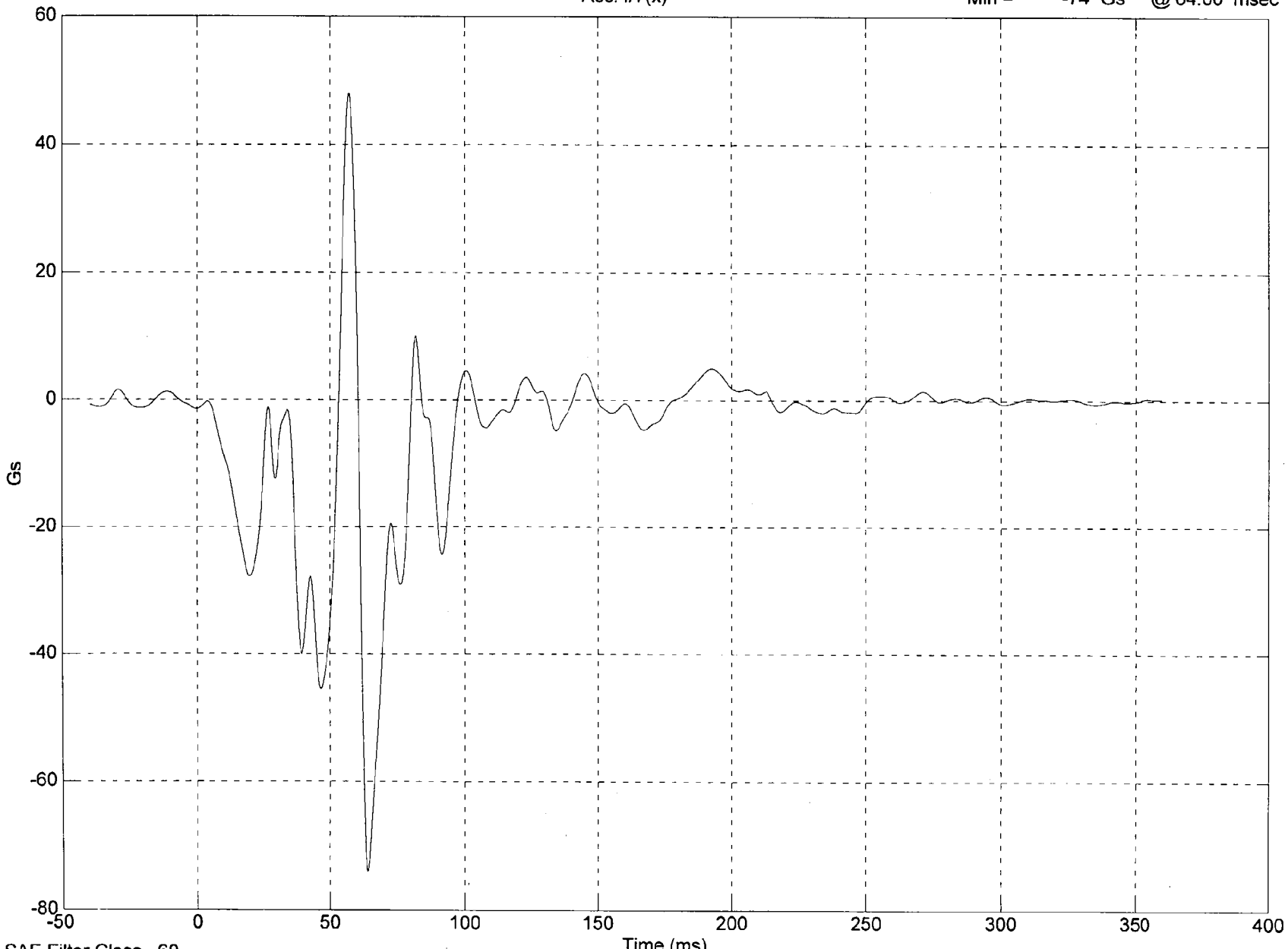
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 48 Gs @ 56.90 msec
Min = -74 Gs @ 64.00 msec



SAE Filter Class 60

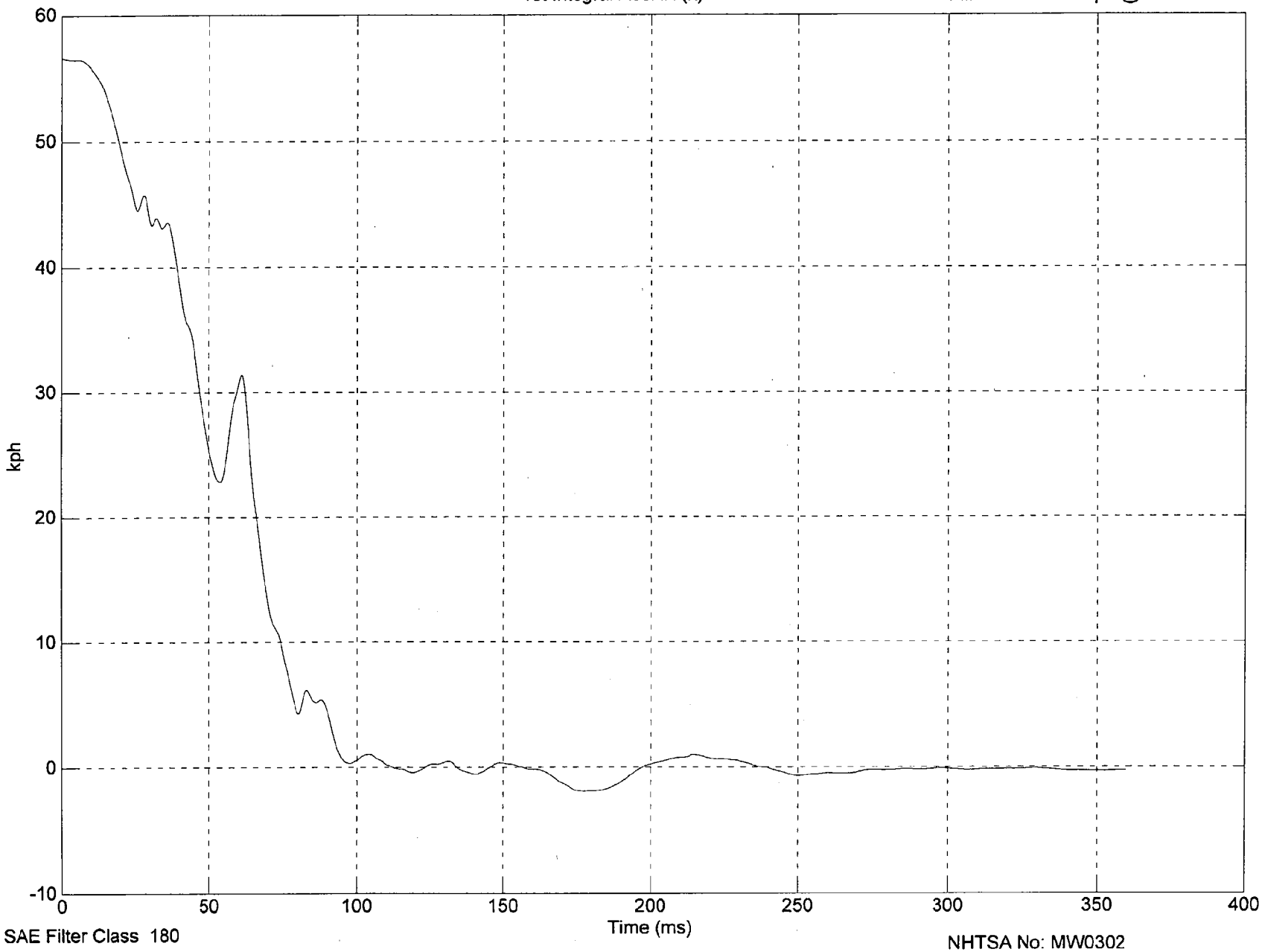
NHTSA No: MW0302
Date: 02 Oct 1997

B-125

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 56.6 kph @ 0.00 msec
Min = -1.87 kph @ 178.00 msec



B-126

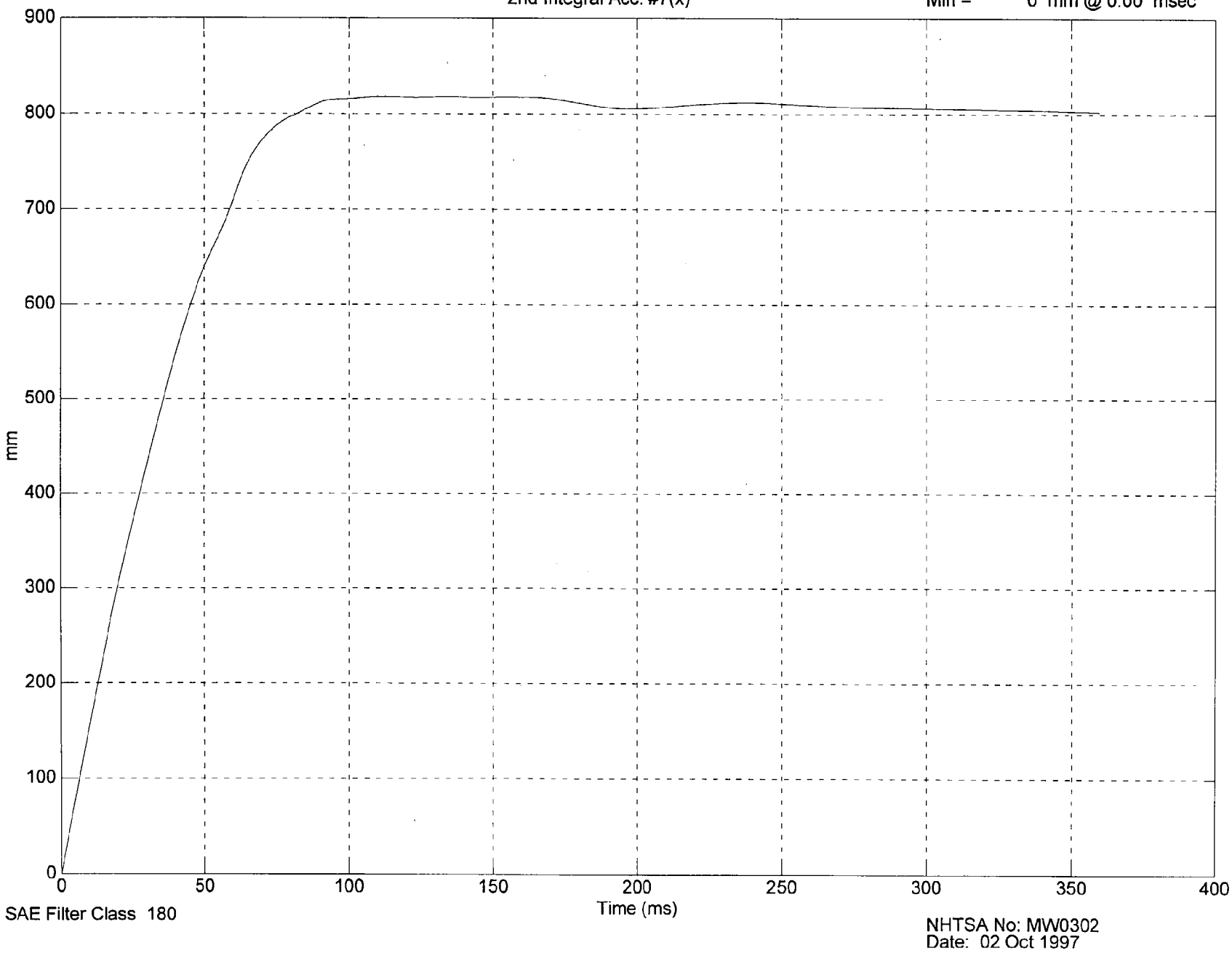
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 818 mm @ 134.20 msec
Min = 0 mm @ 0.00 msec



B-127

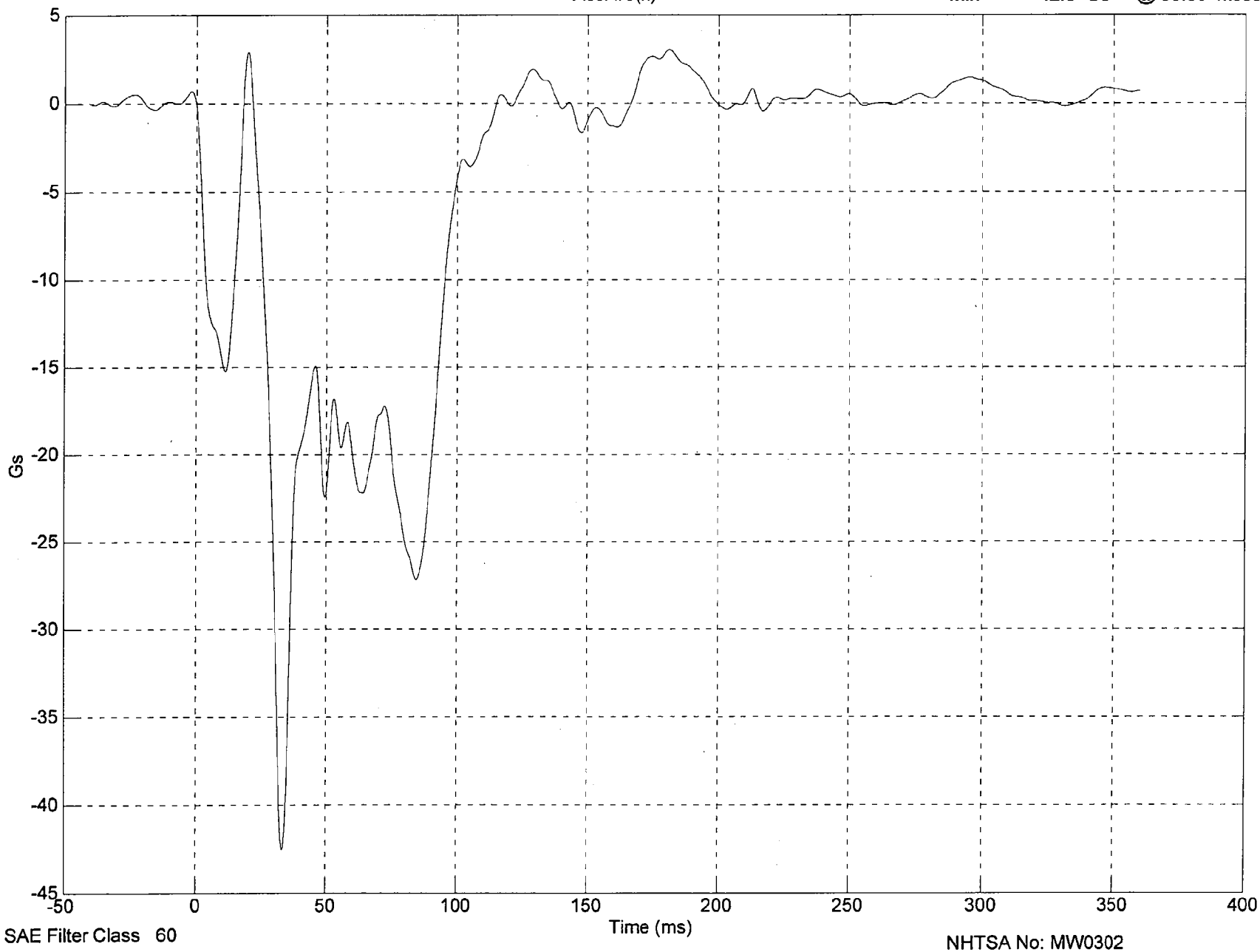
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 3.02 Gs @ 181.10 msec
Min = -42.5 Gs @ 33.30 msec



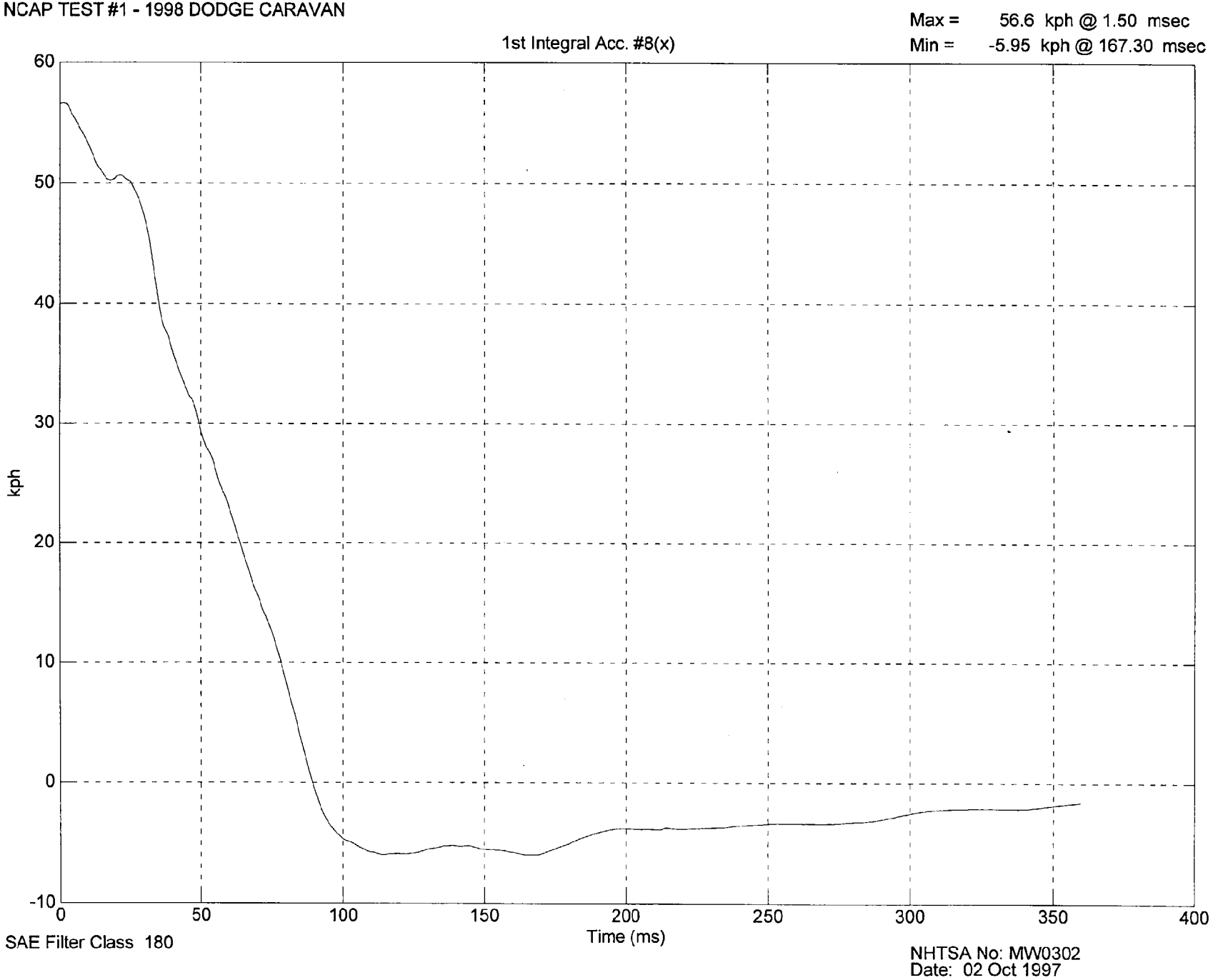
SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

B-128

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN



SAE Filter Class 180

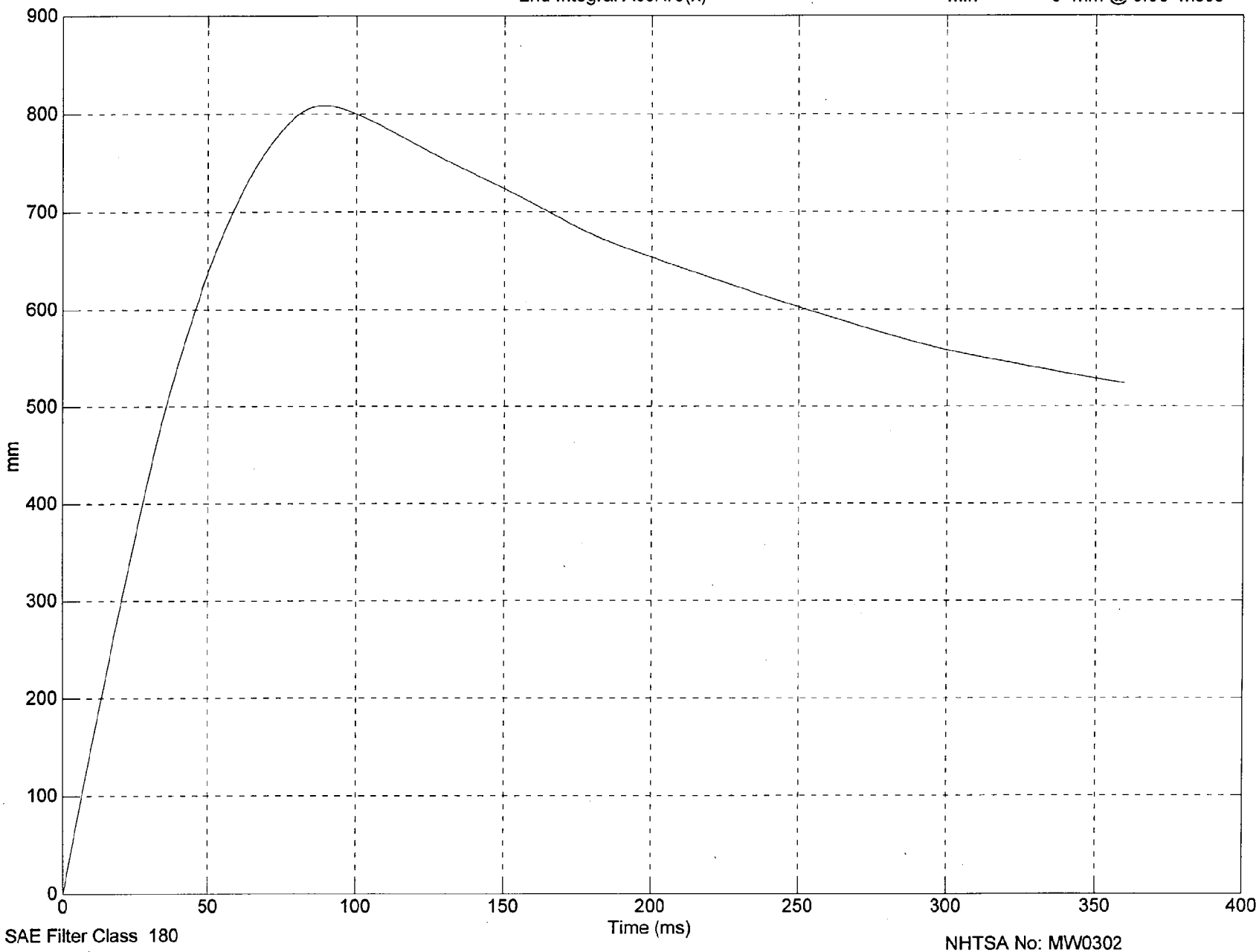
NHTSA No: MW0302
Date: 02 Oct 1997

B-129

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 809 mm @ 89.20 msec
Min = 0 mm @ 0.00 msec



B-130

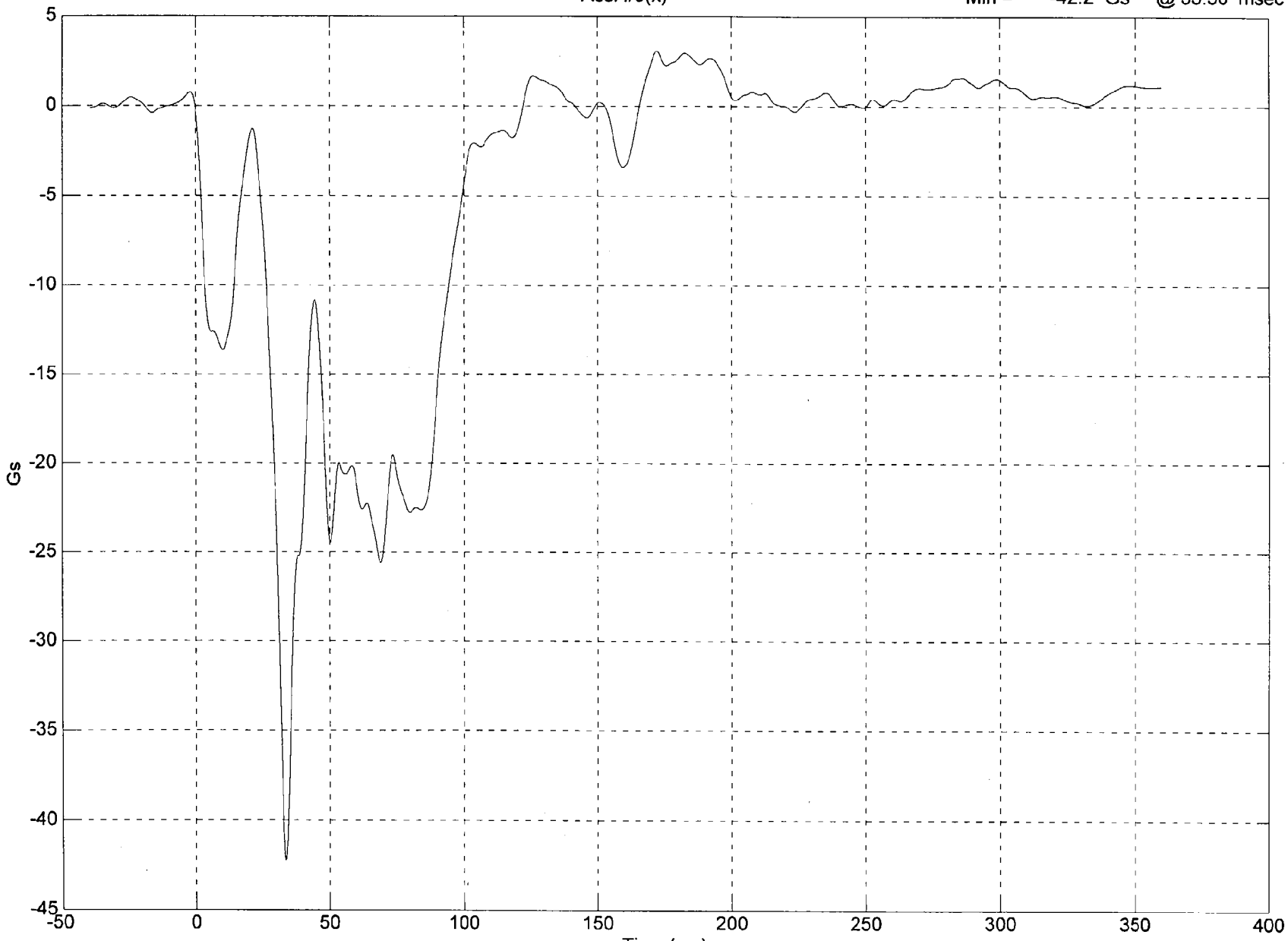
8413-1

SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

NCAP TEST #1 - 1998 DODGE CARAVAN

Max = 3.07 Gs @ 172.10 msec
Min = -42.2 Gs @ 33.50 msec



SAE Filter Class 60

NHTSA No: MW0302
Date: 02 Oct 1997

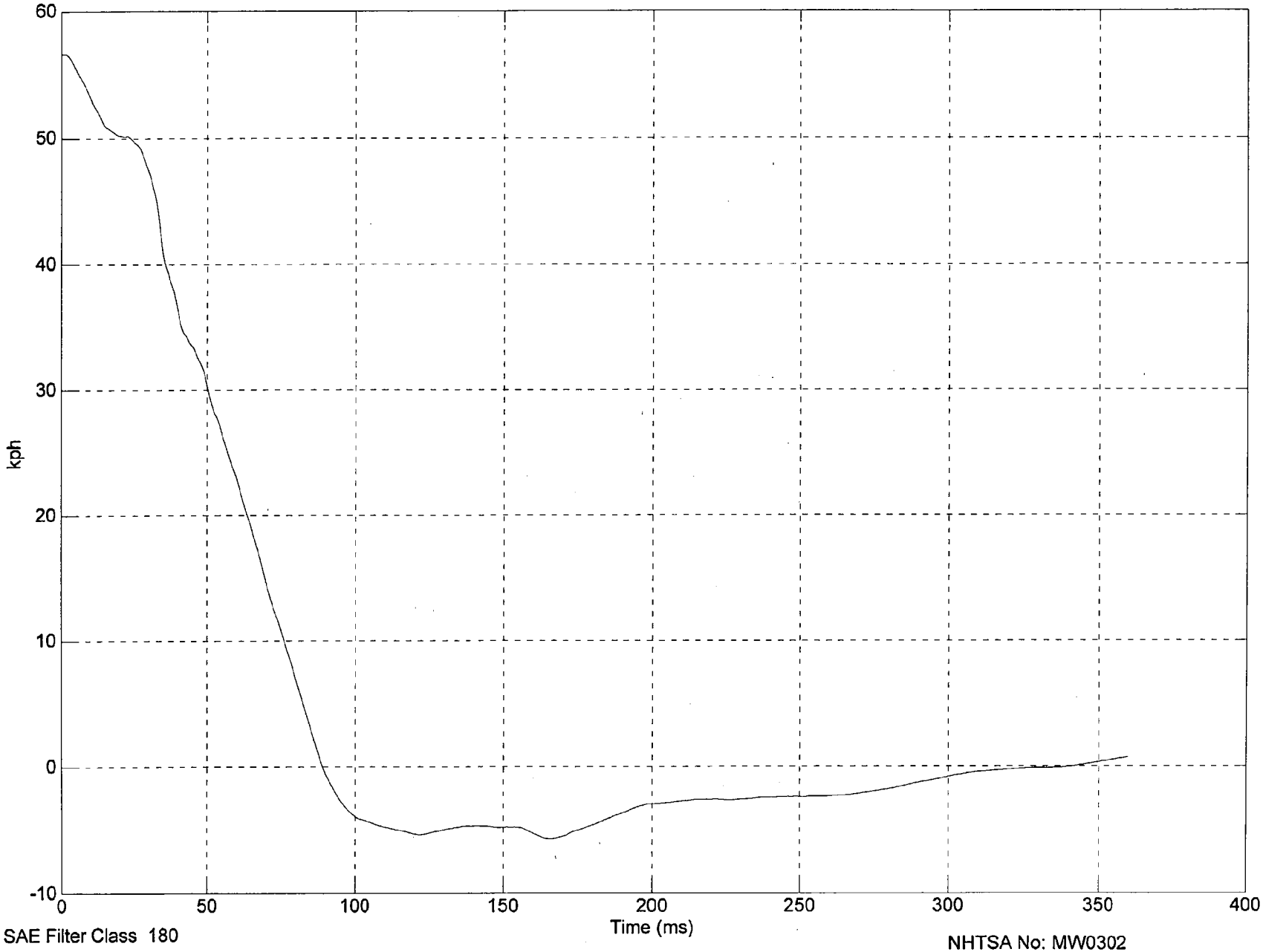
B-131

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN

1st Integral Acc. #9(x)

Max = 56.6 kph @ 1.00 msec
Min = -5.68 kph @ 165.80 msec

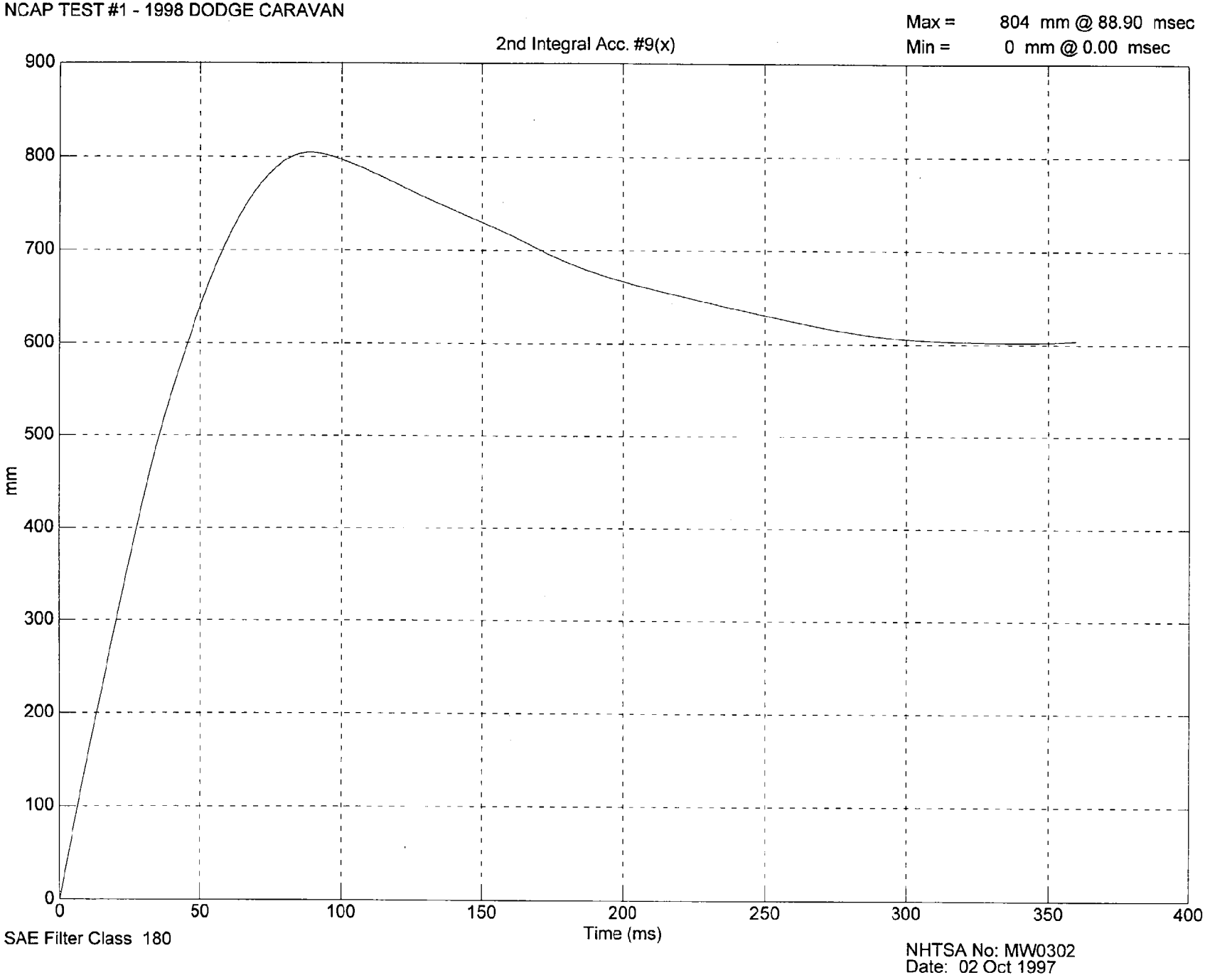


SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

NCAP TEST #1 - 1998 DODGE CARAVAN



SAE Filter Class 180

NHTSA No: MW0302
Date: 02 Oct 1997

8413-1

Appendix C

PART 572B/E DUMMY CONFIGURATION

AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan SRL Corporation. A summary of the test results, and Part 572 specifications are included in this Appendix.

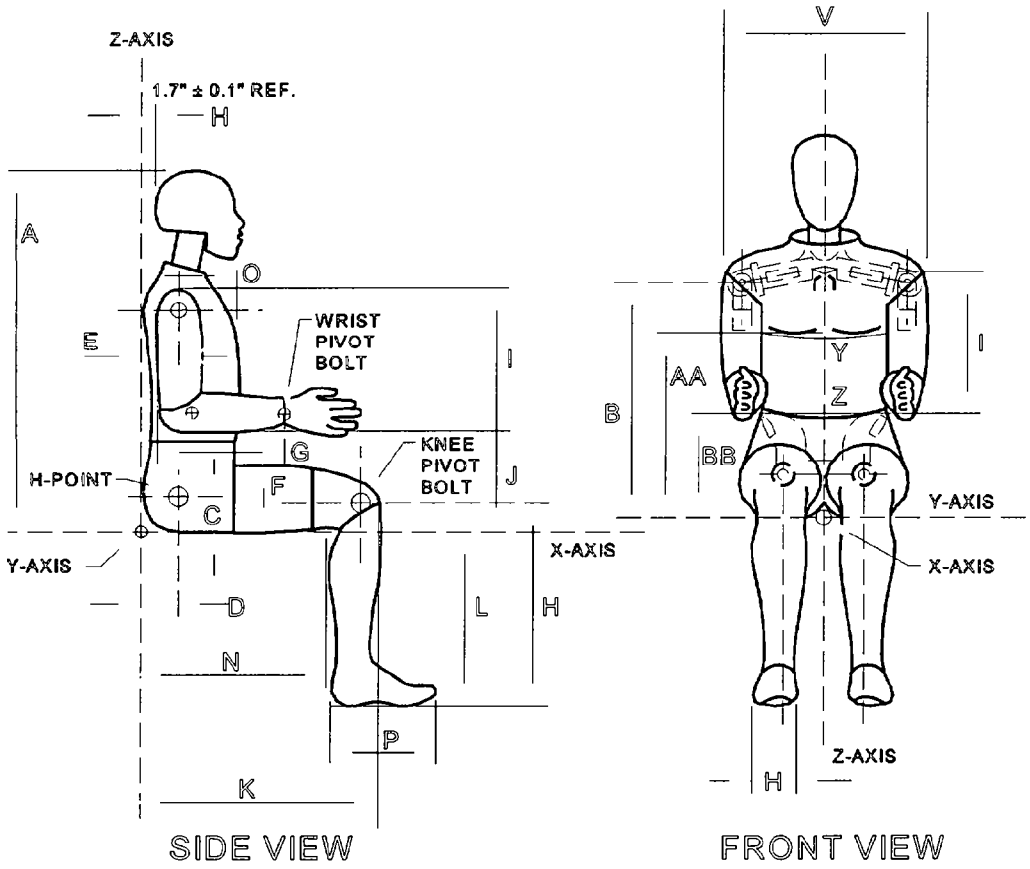
Dummy serial numbers and certification dates are:

Position No./Location	Serial No.	Completion Date
#1/Driver	245	9/24/97
#2/Right Front Passenger	150	9/24/97

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Indicant Testing Final Report No. 6525-V-1.

EXTERNAL DIMENSIONS SPECIFICATIONS



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. (REF: S572.31(A)(6))

CALSPAN CORPORATION

Transportation Sciences Center

PART 572E
HEAD DROP TEST

Dummy Serial Number	150
Calspan Sequential Test Number	3
Date	9/23/97
Workfile	150397.hdp

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	30
Peak Resultant Acceleration	225-275 G's	267.8
Peak Lateral Acceleration	15 G's Max	11.5
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION
Transportation Sciences Center

PART 572E
NECK FLEXION TEST

Dummy Serial Number	150	
Calspan Sequential Test Number	3	
Date	9/23/97	6 Axis Neck Transducer
Workfile	150397.nfl	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	30
Impact Velocity		22.60 - 23.40 Ft/s	22.70
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.90
	20 ms	17.60 - 22.60 G's	20.19
	30 ms	12.50 - 18.50 G's	14.66
Max Pendulum G's Above 30 ms		29 G's Max	14.66
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.38
D Plane Rotation	Max	64 - 78 Deg	70.99
	Time	57 - 64 ms	60.63
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	76.36
	Time	47 - 58 ms	53.88
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	121.13
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	97.00

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION
Transportation Sciences Center

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	150
Calspan Sequential Test Number	3
Date	9/23/97
Workfile	150397.nex

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	30
Impact Velocity		19.50 - 20.30 Ft/s	19.70
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	20.13
	20 ms	14.00 - 19.00 G's	17.55
	30 ms	11.00 - 16.00 G's	14.23
Max Pendulum G's Above 30 ms		22 G's Max	14.23
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.25
D Plane Rotation	Max	81 - 106 Deg	96.03
	Time	72 - 82 ms	74.75
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-51.89
	Time	65 - 79 ms	71.75
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	152.75
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	140.38

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION

Transportation Sciences Center

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	150
Calspan Sequential Test Number	3
Date	9/24/97
Workfile	150397.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	30
Pendulum Velocity	21.6 - 22.4 Ft/s	21.70
Maximun Deflection	2.50 - 2.86 in	2.57
Maximum Resistive Force	1160 - 1325 Lbs	1211.84
Internal Hysteresis	69 - 85 %	69.8

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	150
Calspan Sequential Test Number	3
Date	9/24/97
Workfile	150397

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	30
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 -1300 Lbs	1131.0
RIGHT KNEE		
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	30
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 -1300 Lbs	1152.0

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION
Transportation Sciences Center

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number	150
Calspan Sequential Test Number	3
Date	9/24/97

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			30
Location for Chest Circumference	AA	16.9 -17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	5.7
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.5
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.6
Foot Length	P	9.9 - 10.5 in	10.1
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.7
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.1
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION

Transportation Sciences Center

PART 572E
HEAD DROP TEST

Dummy Serial Number	245
Calspan Sequential Test Number	3
Date	9/23/97
Workfile	245397.hdp

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	30
Peak Resultant Acceleration	225-275 G's	268.0
Peak Lateral Acceleration	15 G's Max	4.4
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION
Transportation Sciences Center

PART 572E
NECK FLEXION TEST

Dummy Serial Number	245	
Calspan Sequential Test Number	3	
Date	9/23/97	6 Axis Neck Transducer
Workfile	245397.nfl	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	30
Impact Velocity		22.60 - 23.40 Ft/s	22.61
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.27
	20 ms	17.60 - 22.60 G's	20.05
	30 ms	12.50 - 18.50 G's	16.88
Max Pendulum G's Above 30 ms		29 G's Max	16.88
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.00
D Plane Rotation	Max	64 - 78 Deg	64.29
	Time	57 - 64 ms	60.88
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	72.47
	Time	47 - 58 ms	52.38
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	119.38
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	97.63

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION
Transportation Sciences Center

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	245	
Calspan Sequential Test Number	3	
Date	9/23/97	6 Axis Neck Transducer
Workfile	245397.nex	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	30
Impact Velocity		19.50 - 20.30 Ft/s	19.70
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.84
	20 ms	14.00 - 19.00 G's	16.35
	30 ms	11.00 - 16.00 G's	13.87
Max Pendulum G's Above 30 ms		22 G's Max	13.87
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	40.88
D Plane Rotation	Max	81 - 106 Deg	96.94
	Time	72 - 82 ms	76.88
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-52.49
	Time	65 - 79 ms	73.13
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	154.00
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	141.25

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION

Transportation Sciences Center

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	245
Calspan Sequential Test Number	3
Date	9/24/97
Workfile	245397.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	30
Pendulum Velocity	21.6 - 22.4 Ft/s	21.70
Maximun Deflection	2.50 - 2.86 in	2.51
Maximum Resistive Force	1160 - 1325 Lbs	1310.92
Internal Hysteresis	69 - 85 %	71.3

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	245
Calspan Sequential Test Number	3
Date	9/24/97
Workfile	245397

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	30
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 -1300 Lbs	10966.0
RIGHT KNEE		
Temperature	66-78 Deg F	70
Relative Humidity	10% - 70%	30
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 -1300 Lbs	1114.0

Remarks:

Laboratory Technician: B. Swiecicki

CALSPAN CORPORATION

Transportation Sciences Center

PART 572E

EXTERNAL DIMENSIONS

Dummy Serial Number	245
Calspan Sequential Test Number	3
Date	9/24/97

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			30
Location for Chest Circumference	AA	16.9 -17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.0
Waist Circumference	Z	32.9 - 34.1 in	33.7
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.9
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.3
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.2
Foot Length	P	9.9 - 10.5 in	10.2
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician: B. Swiecicki

Appendix D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY (S/N 245)		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X	ADL98	ENDEVCO	8/97	2/98
	Y	AE8K0	ENDEVCO	8/97	2/98
	Z	ADMB6	ENDEVCO	8/97	2/98
Chest	X	A26A	ENDEVCO	8/97	2/98
	Y	A27A	ENDEVCO	8/97	2/98
	Z	A51A	ENDEVCO	8/97	2/98
Right Femur Load Cell		952	GSE	9/97	3/98
Left Femur Load Cell		951	GSE	9/97	3/98
Neck Load Cell	X	440	DENTON	8/97	2/98
	Y	440	DENTON	8/97	2/98
	Z	440	DENTON	8/97	2/98
Neck Moment	X	440	DENTON	8/97	2/98
	Y	440	DENTON	8/97	2/98
	Z	440	DENTON	8/97	2/98
Chest Deflection Gauge		245	HUMANOID	5/97	11/97
Hybrid III Use Only					
Lap Belt Load Cells		706	LEBOW	6/97	12/97
Shoulder Belt Load Cells		707	LEBOW	6/97	12/97
Spool-Out Potentiometer		M10	MAGNETEK	9/97	3/98
Belt Stretch Transducer		E1	CALSPAN	9/97	3/98

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X (R)	AP1A0	ENDEVCO	8/97	2/98
	Y (R)	AC8F6	ENDEVCO	8/97	2/98
	Z (R)	ACCW0	ENDEVCO	8/97	2/98
Chest	X (R)	AHRC9	ENDEVCO	8/97	2/98
	Y (R)	AC7W8	ENDEVCO	8/97	2/98
	Z (R)	ACC06	ENDEVCO	8/97	2/98
Pelvic	X	AL6N5	ENDEVCO	8/97	2/98
	Y	AL6R7	ENDEVCO	8/97	2/98
	Z	A12C	ENDEVCO	8/97	2/98
Left Upper Tibia	Mx	038	DENTON	4/97	10/97
Left Upper Tibia	My	038	DENTON	4/97	10/97
Left Lower Tibia	Fy	032	DENTON	4/97	10/97
Left Lower Tibia	Fz	032	DENTON	4/97	10/97
Left Lower Tibia	Mx	032	DENTON	4/97	10/97
Right Upper Tibia	Mx	045	DENTON	4/97	10/97
Right Upper Tibia	My	045	DENTON	4/97	10/97
Right Lower Tibia	Fy	041	DENTON	4/97	10/97
Right Lower Tibia	Fz	041	DENTON	4/97	10/97
Right Lower Tibia	Mx	041	DENTON	4/97	10/97

INSTRUMENT CALIBRATION FOR DRIVER DUMMY

(6 Month Calibration Minimum)

DRIVER DUMMY		Serial #	Manufacture	Calibration	
				Last	Next
Left Foot Front	Z	A14058	ENDEVCO	9/97	3/98
Left Foot Rear	X	A13929	ENDEVCO	9/97	3/98
Left Foot Rear	Z	A14150	ENDEVCO	9/97	3/98
Right Foot Front	Z	A14124	ENDEVCO	9/97	3/98
Right Foot Rear	X	A14181	ENDEVCO	9/97	3/98
Right Foot Rear	Z	A14126	ENDEVCO	9/97	3/98

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY (S/N 150)	Serial #	Manufacturer	Calibration Last	Calibration Next
Head X	AH5M9	ENDEVCO	8/97	2/98
Y	AGHF5	ENDEVCO	8/97	2/98
Z	AL6K2	ENDEVCO	8/97	2/98
Chest X	A33A	ENDEVCO	8/97	2/98
Y	FB32L	ENDEVCO	8/97	2/98
Z	AD395	ENDEVCO	8/97	2/98
Right Femur Load Cell	232	GSE	9/97	3/98
Left Femur Load Cell	231	GSE	9/97	3/98
Neck Load Cell X	205	DENTON	8/97	2/98
Y	205	DENTON	8/97	2/98
Z	205	DENTON	8/97	2/98
Neck Moment X	205	DENTON	8/97	2/98
Y	205	DENTON	8/97	2/98
Z	205	DENTON	8/97	2/98
Chest Deflection Gauge	150	HUMANOID	10/97	4/98
Hybrid III Use Only				
Lap Belt Load Cells	635	LEBOW	6/97	12/97
Shoulder Belt Load Cells	711	LEBOW	6/97	12/97
Spool-Out Potentiometer	M7	MAGNETEK	9/97	3/98
Belt Stretch Transducer	E2	CALSPAN	9/97	3/98

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY		Serial #	Manufacturer	Calibration	
				Last	Next
Head	X (R)	APBF4	ENDEVCO	8/97	2/98
	Y (R)	APBD7	ENDEVCO	8/97	2/98
	Z (R)	AN967	ENDEVCO	8/97	2/98
Chest	X (R)	J18406	ENDEVCO	8/97	2/98
	Y (R)	AP1B5	ENDEVCO	8/97	2/98
	Z (R)	AP057	ENDEVCO	8/97	2/98
Pelvic	X	AF480	ENDEVCO	8/97	2/98
	Y	AL508	ENDEVCO	8/97	2/98
	Z	AF5C1	ENDEVCO	8/97	2/98
Left Upper Tibia	Mx	015	DENTON	4/97	10/97
Left Upper Tibia	My	015	DENTON	4/97	10/97
Left Lower Tibia	Fy	011	DENTON	4/97	10/97
Left Lower Tibia	Fz	011	DENTON	4/97	10/97
Left Lower Tibia	Mx	011	DENTON	4/97	10/97
Right Upper Tibia	Mx	016	DENTON	4/97	10/97
Right Upper Tibia	My	016	DENTON	4/97	10/97
Right Lower Tibia	Fy	012	DENTON	4/97	10/97
Right Lower Tibia	Fz	012	DENTON	4/97	10/97
Right Lower Tibia	Mx	012	DENTON	4/97	10/97

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY

(6 Month Calibration Minimum)

PASSENGER DUMMY		Serial #	Manufacture	Calibration	
				Last	Next
Left Foot Front	Z	A13011	ENDEVCO	9/97	3/98
Left Foot Rear	X	A13506	ENDEVCO	9/97	3/98
Left Foot Rear	Z	A12268	ENDEVCO	9/97	3/98
Right Foot Front	Z	J18418	ENDEVCO	8/97	2/98
Right Foot Rear	X	AEWK1	ENDEVCO	8/97	2/98
Right Foot Rear	Z	AKD92	ENDEVCO	8/97	2/98

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	D75	ICS	9/97	3/98
Right Rear Seat Crossmember	X91	ICS	9/97	3/98
Top of Engine	X93	ICS	9/97	3/98
Bottom of Engine	D32	ICS	9/97	3/98
Left Disc Brake Caliper	A145	CEC	9/97	3/98
Right Disc Brake Caliper	A56	CEC	9/97	3/98
Instrument Panel	A129	CEC	5/97	11/97
Left Seat Rear Crossmember (R)	Y95	ICS	4/97	10/97
Right Seat Rear Crossmember (R)	Y13	ICS	4/97	10/97