12684

REPORT NUMBER: CAL-98-3

**NEW CAR ASSESSMENT PROGRAM (NCAP)**
**FRONTAL BARRIER IMPACT TEST**

**FORD MOTOR CO. INC.**
**1998 FORD RANGER XLT**
**PICKUP**

NHTSA NUMBER: MW0203

CALSPAN TEST NUMBER: 8413-2

CALSPAN SRL CORPORATION
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October 3,1997

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
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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.*<br>CAL-98-3 | 2. *Government Accession No.* | 3. *Recipient's Catalog No.* |
| 4. *Title and Subtitle*<br>Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Testing of a 1998 Ford Ranger XLT Pickup<br>NHTSA No. MW0203 | | 5. *Report Date*<br>October 3,1997<br>6. *Performing Organization Code*<br>CAL |
| 7. *Author(s)*<br>David J. Travale, Program Manager<br>James A. Czarnecki, Project Engineer | | 8. *Performing Organization Report No.*<br>8413-2 |
| 9. *Performing Organization Name and Address*<br>Calspan SRL Corporation<br>4455 Genesee Street<br>Buffalo, New York 14225 | | 10. *Work Unit No.*<br>11. *Contract or Grant No.*<br>DTNH22-96-D-02010 |
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| 15. *Supplementary Notes* | | |

16. *Abstract*

A frontal test of a 1998 Ford Ranger XLT Pickup was performed at Calspan SRL Corporation crash test facility in Buffalo, New York, on October 3,1997.

The impact velocity was 56.3 kph and the temperature at the barrier face was 20.5°C. The maximum post-test vehicle crush was 455 mm. The test vehicle was equipped with a 3-point belt system and supplemental airbags at both front outboard seating positions.

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

| | | | |
|---|---|---|---|
| 17. *Key Words*<br>56 kph Frontal Barrier Impact test<br>New Car Assessment Program (NCAP) | | 18. *Distribution Statement*<br>Copies of this report are available from:<br>NHTSA Technical Reference Division<br>National Highway Traffic Safety Admin.<br>400 Seventh St., SW, Room 5108<br>Washington, DC 20590 | |
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**Form DOT F1700.7** (8-69)

TABLE OF CONTENTS

Section 1

# PURPOSE AND SUMMARY OF TEST MW0203

## PURPOSE

This 56.3 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 56.3 kph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

## SUMMARY

A barrier was impacted by a 1998 Ford Ranger XLT Pickup at a velocity of 56.3 kph. The test was performed at the Calspan SRL Corporation on October 3,1997. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by 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, a chest displacement potentiometer, 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 two previous tests (MW0301 and MW0302) prior to being used for this test. Injury criteria for ATD's No.245 and 150 were not exceeded in previous tests MW0301 AND MW0302. 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 and dummy response data traces. Vehicle accelerometer number 8 (redundant left rear x-member) data is not accurate after 60 msec and their integrations were omitted from this report. The Ford representative requested that the seat belt restraint system not be instrumented with load cells and displacement sensors. Load cell barrier data was not requested for this test.

The driver's HIC was 441.8. The maximum chest deceleration over 3 milliseconds was 51.1 g's and maximum chest deflection was 41.8 mm. Femur loads were -4637.9 Newtons on the left and -6015.3 Newtons on the right.

The right front passenger's HIC was 544.67. Maximum chest deceleration over 3 milliseconds was 42.5 g's and maximum chest deflection was 29.5 mm. Femur loads were -2965.6 Newtons on the left and -1698.4 Newtons on the right.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No. : MW0203 Test Mode : 56 kph Frontal Barrier

Test Date : October 3,1997 Time: 14:00 Temperature : 20.5 °C

Vehicle Make/Model/Body Style : 1998 Ford Ranger XLT Pickup

Vehicle Test Weight : 1886.5 kg

Vehicle/Barrier Impact Angle : 0 °

Impact Velocity : 56.3 kph

Maximum Static Crush : 455 mm

Vehicle Rebound : 230 mm

| DUMMIES: | DRIVER | PASSENGER |
|---|---|---|
| Type : | 572E | 572E |
| Restraint System : | Airbag with 3 point belt system | Airbag with 3 point belt system |

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) | 0 | 0 |
| Seat Back Failure : | None | None |

| VISIBLE DUMMY CONTACT POINTS : | DRIVER | PASSENGER |
|---|---|---|
| Head : | Airbag/ Back of head to head rest/ Back left side of head to d-ring | Airbag/ Back of head to head rest |
| Abdomen : | - | - |
| Chest | Airbag | Airbag |
| Knees | Knee Bolster | Knee Bolster |

## DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1998 Ford Ranger XLT Pickup

NHTSA No. : MW0203 ; VIN: 1FTYR10U7WUA00726 ; Color : Red

Engine Data: 6 cylinders; - CID; 3.01 Liters; - cc

Placement : x Longitudinal or In-Line; - Transverse of Lateral

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

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

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

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

Date Received : 9/16/97 ; Odometer Reading 33 km

Selling Dealer : West Herr Ford Inc.

& Address: S 5025 Camp Rd, Hamburg, N.Y. 14075

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : Ford Motor Co. Inc.

Date of Manufacture 8/97

GVWR : 1977 kg; GAWR: 1043 kg FRONT; 1156 kg REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 207 kpa FRONT

207 kpa REAR

Recommended Tire Size : P225/70R15SL

* Recommended Cold Tire Pressure : 207 kpa FRONT; 207 kpa REAR

Size of Tires on Test Vehicle: P225/70R15SL ; Manufacturer: Firestone

Vehicle Capacity Data :

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

Number of Occupants: 3 Front; - Rear; 3 Total

Vehicle Capacity Weight (VCW) = 470 kg

No. of Occupants x 68 kg = 204 kg

Rated Cargo/Luggage Weight (RCLW) = 266 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 = | 489 | kg | Right Rear = | 325 | kg |
| Left Front = | 477 | kg | Left Rear = | 315.5 | kg |
| TOTAL FRONT = | 966 | kg | TOTAL REAR = | 641 | kg |

TOTAL DELIVERED WEIGHT = 1,607.0 kg

% of Total Front of Vehicle Weight = 60.1 % of Total Rear Weight = 39.9 %

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

| | | | |
|---|---|---|---|
| Total Delivered Weight (UDW) = | 1,607 | kg | |
| Rated Cargo/Luggage Weight (RCLW) = | 136 | kg | 136 kg max. |
| Weight of 2 p.572 Dummies @ 76 each = | 152 | kg | |
| TARGET TEST WEIGHT = | 1,895 | kg | |

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 128 KG OF CARGO WEIGHT:

| | | | | | |
|---|---|---|---|---|---|
| Right Front = | 483.5 | kg | Right Rear = | 460.5 | kg |
| Left Front = | 482.0 | kg | Left Rear = | 460.5 | kg |
| TOTAL FRONT = | 966 | kg | TOTAL REAR = | 921 | kg |

TOTAL TEST WEIGHT = 1,887.0 kg

% of Total Front Weight = 51.2 % % of Total Rear Weight = 48.8 %

Weight of Ballast Secured in Vehicle Trunk Area = 100 kg

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| AS DELIVERED : | RF | 822 | LF | 809 | RR | 867 | LR | 845 |
| FULLY LOADED : | RF | 817 | LF | 795 | RR | 804 | LR | 796 |
| AS TESTED : | RF | 817 | LF | 797 | RR | 805 | LR | 796 |

Vehicle's Wheel Base : 2990 mm

Location of Vehicle's C.G. : 1,459.3 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) = 69.6 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 Fuel filler and tank before rear axle on left side, fuel lines run along left frame rail

## DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test : Frontal Barrier Impact Angle : 0°

Test Date : October 3,1997 Time: 14:00 Temperature: 20.5 °C

Vehicle NHTSA No. : MW0203

Required Impact Velocity Range : 55.7 to 57.1 kph

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

Trap No. 1 = 56.3 kph; Trap No. 2 = 56.3 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 = | 5045 | ; C/L = | 5060 | ; Left = | 5046 |
| Post-Test | Right = | 4605 | ; C/L = | 4605 | ; Left = | 4610 |
| Crush | Right = | 440.0 | ; C/L = | 455.0 | ; Left = | 436.0 |
| AVERAGE | = | 443.7 | mm | | | |

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point :

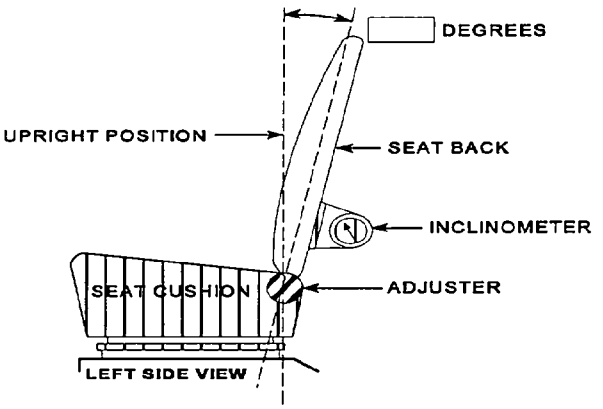
| | | | | | | |
|---|---|---|---|---|---|---|
| | Right = | 215 | ; C/L = | 264 | ; Left = | 211 |
| AVERAGE | = | 230.0 | mm | | | |

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1998 Vehicle Model: Ford Ranger XLT Body Style : Pickup

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 : 21.5

Measurement instructions : Cut seat 13" above seat pivot to expose seat frame, measured 21.5 degrees back from vertical.

Seat back angle for passenger's seat : 21.5

Measurement instructions : Cut seat 13" above seat pivot to expose seat frame, measured 21.5 degrees back from vertical.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Located 23 detents and placed in 12th (mid-position)

Positioning of the passenger's seat (if applicable) : Located 23 detents and placed in 12th

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.

With ignition turned on

4. STEERING COLUMN ADJUSTMENTS :

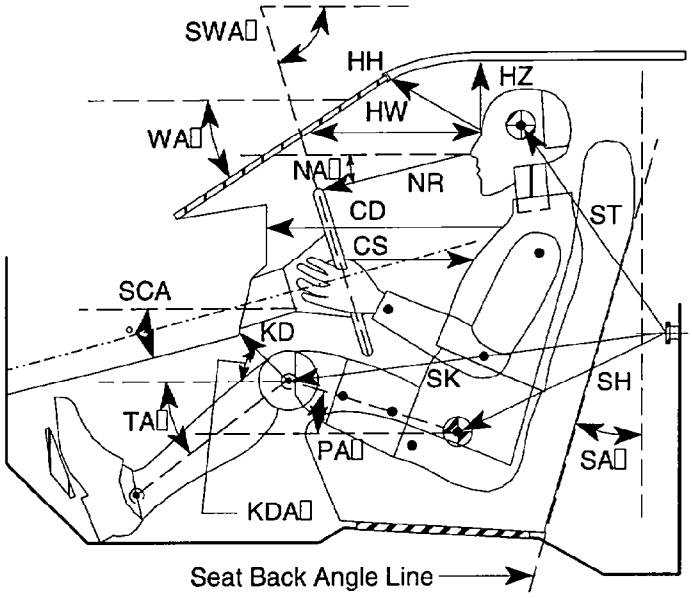
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine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

Operational Instructions: Located 5 detents placed in middle detent #3

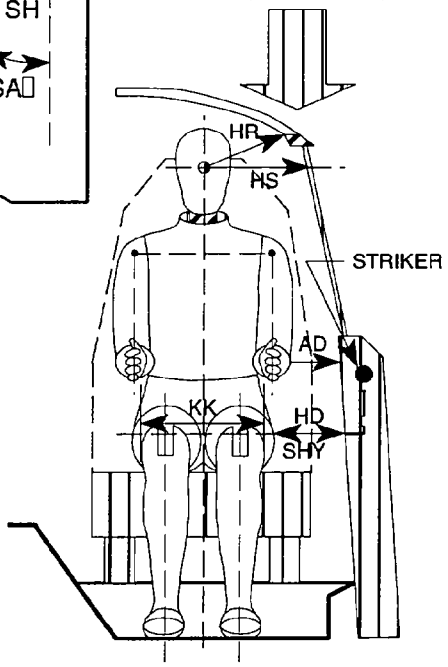
5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Located 4 detents placed in 3rd detent (1st detent being #1 on top)

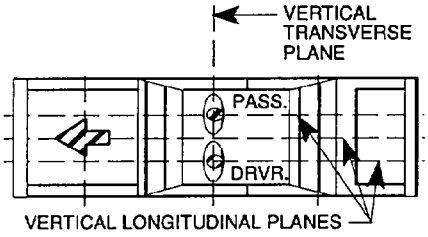
# DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS




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



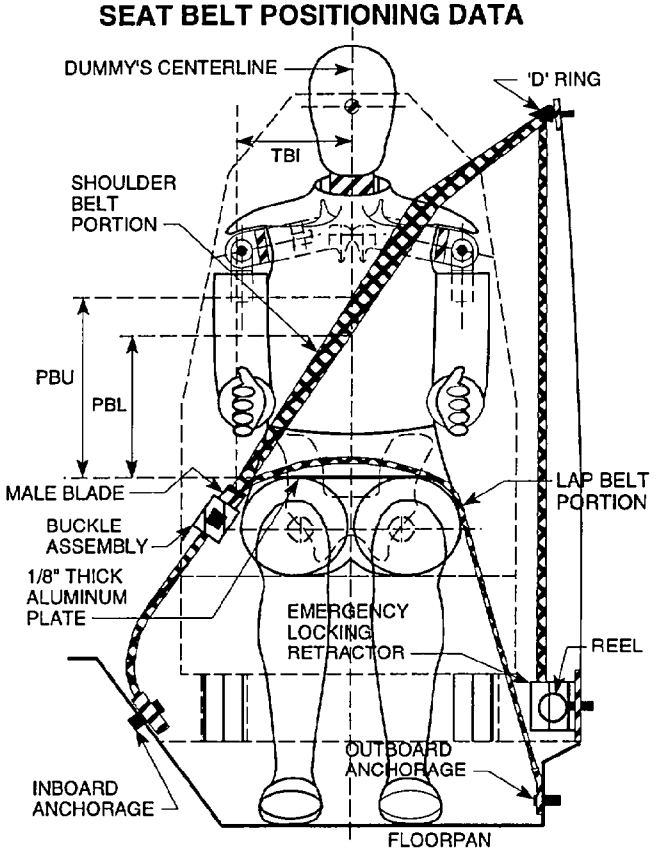
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITONING MEASUREMENTS IN VEHICLE

| | DRIVER (Serial #245) | | | PASS. (Serial # 150) | | |
|---|---|---|---|---|---|---|
| WA° | 40 deg. | | | N/A | | |
| SWA° | 21.5 deg. | | | N/A | | |
| SCA° | 68.5 deg. | | | N/A | | |
| SA° | 21.5 deg. | | | 21.5 deg. | | |
| HZ | 212 | | | 202 | | |
| HH | 446 | | | 406 | | |
| HW | 574 | | | 567 | | |
| HR | 280 | | | 277 | | |
| NR | 341 | Angle | -13 deg. | N/A | | |
| CD | 502 | | | 523 | | |
| CS | 262 | | | N/A | | |
| RA | 170 | | | N/A | | |
| KDL | 174 | Angle (KDA) | 36 deg. | 137 | | |
| KDR | 150 | | | 161 | Angle (KDA) | 36 deg. |
| PA° | 23 deg. | | | 23.5 deg. | | |
| TA° | -39 deg. | | | -41 deg. | | |
| KK | 310 | | | 269 | | |
| ST | 575 | Angle | 71 deg. | 561 | Angle | 61 deg. |
| SK | 673 | Angle | 91 deg. | 696 | Angle | 91 deg. |
| SH | 312 | Angle | 115 deg. | 281 | Angle | 122 deg. |
| SHY | 228 | | | 207 | | |
| HS | 319 | | | 317 | | |
| HD | 133 | | | 149 | | |
| AD | 66 | | | 76 | | |

Dimensions in millimeters

DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

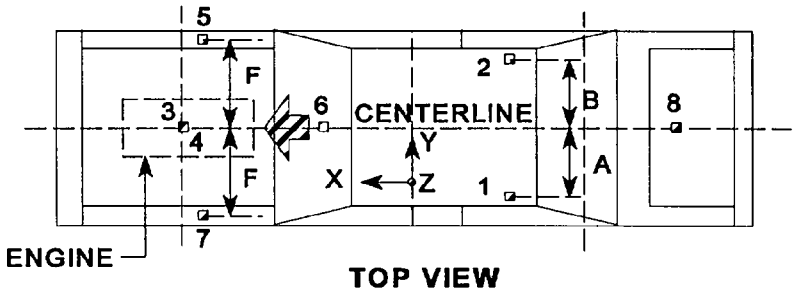
**SEAT BELT POSITIONING DATA**



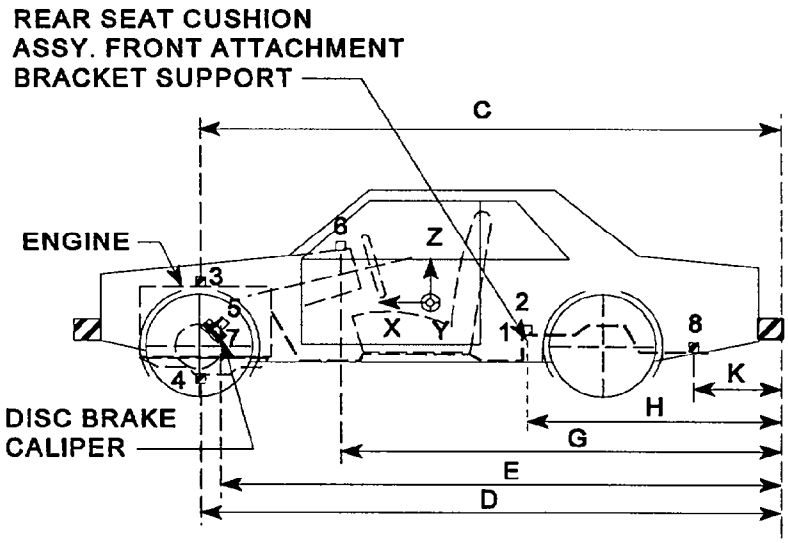

**FRONT VIEW OF DUMMY**

| | DRIVER DUMMY (mm) | PASSENGER DUMMY (mm) |
|---|---|---|
| PBU -- Top surface of alum. plate to upper edge | 305 | 321 |
| PBL-- Top surface of alum. plate to belt lower edge | 214 | 236 |
| LAP BELT TENSION | 10 nwt | 10 nwt |
| 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 | 476 | 511 redundant |
| B Right Rear Seat Crossmember Y | 475 | 505 redundant |
| C Top of Engine X | 4149 | |
| D Bottom of Engine X | 4037 | |
| E Disc Brake Calipers X | 4081 | |
| F Disc Brake Calipers Y | 515 | |
| G Instrument Panel X | 3415 | |
| H Rear Seat Crossmembers X | 2586 | |
| | | |

| LOCATION NUMBER | DESCRIPTION | MAXIMUM VALUE (g's) | | | |
|---|---|---|---|---|---|
| | | Pos. | msec. | Neg. | msec. |
| 1 | Rear Seat X-Member @ Left Side | 3.9 | 157.7 | -49.1 | 33.4 |
| 2 | Rear Seat X-Member @ Right Side | 7.9 | 50.9 | -36.4 | 14.5 |
| 3 | Top of Engine Block | 71.9 | 45.6 | -116.3 | 35.4 |
| 4 | Bottom of Engine | 29.6 | 45.7 | -100.6 | 37.7 |
| 5 | Disc Brake Caliper @ Right Side | 63.8 | 67.5 | -100.9 | 52.8 |
| 6 | Instrument Panel | 69.1 | 49.9 | -148.9 | 33.2 |
| 7 | Disc Brake Caliper @ Left Side | 57.9 | 53.8 | -91.8 | 49.2 |
| 8 | Rear Seat X-Member @ Left-Redundant | n/a | n/a | n/a | n/a |
| 9 | Rear Seat X-Member @ Right-Redundant | 3.0 | 51.2 | -37.8 | 14.6 |

Accelerometer #8 data is not accurate after 50 msec.

## DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

TITLE: NCAP TEST #2 - 1998 FORD RANGER PICKUP

| DESCRIPTION | ENGR UNIT | MAXIMUM AMP | MAXIMUM msec | MINIMUM AMP | MINIMUM msec | FILTER CLASS |
|---|---|---|---|---|---|---|
| Pos. 1 Head X | Gs | 15.4 | 243.1 | -50.2 | 73.0 | 1000.0 |
| Pos. 1 Head Y | Gs | 5.2 | 42.9 | -13.8 | 75.8 | 1000.0 |
| Pos. 1 Head Z | Gs | 22.7 | 68.2 | -15.7 | 112.1 | 1000.0 |
| Pos. 1 Head Resultant | Gs | 54.6 | 72.4 | .1 | -30.5 | 1000.0 |
| Pos. 2 Head X | Gs | 17.0 | 223.8 | -55.1 | 78.5 | 1000.0 |
| Pos. 2 Head Y | Gs | 12.5 | 37.9 | -14.5 | 88.6 | 1000.0 |
| Pos. 2 Head Z | Gs | 30.0 | 62.6 | -17.0 | 114.6 | 1000.0 |
| Pos. 2 Head Resultant | Gs | 59.8 | 78.5 | .0 | -30.3 | 1000.0 |
| Pos. 1 Chest X | Gs | 3.7 | 168.0 | -50.3 | 79.7 | 180.0 |
| Pos. 1 Chest Y | Gs | 2.2 | 133.7 | -12.0 | 89.8 | 180.0 |
| Pos. 1 Chest Z | Gs | 17.8 | 72.3 | -18.0 | 113.3 | 180.0 |
| Pos. 1 Chest Resultant | Gs | 52.2 | 79.7 | .0 | -34.6 | 180.0 |
| Pos. 2 Chest X | Gs | 3.4 | 171.1 | -41.9 | 76.6 | 180.0 |
| Pos. 2 Chest Y | Gs | 6.4 | 72.8 | -7.5 | 116.8 | 180.0 |
| Pos. 2 Chest Z | Gs | 17.5 | 61.5 | -21.9 | 115.6 | 180.0 |
| Pos. 2 Chest Resultant | Gs | 44.0 | 70.4 | .0 | -30.3 | 180.0 |
| Pos. 1 Left Femur | Nwt | 169.1 | 38.5 | -4637.9 | 44.1 | 600.0 |
| Pos. 1 Right Femur | Nwt | 110.1 | 111.3 | -6015.3 | 37.8 | 600.0 |
| Pos. 2 Left Femur | Nwt | 240.7 | 37.1 | -2965.6 | 42.3 | 600.0 |
| Pos. 2 Right Femur | Nwt | 167.4 | 37.9 | -1698.4 | 46.1 | 600.0 |

V2 36 ms Fixed Duration HIC SUMMARY: Pos. 1 Head Resultant

hic: 441.80
t1 = 56.100 msec
t2 = 92.100 msec
Average G's Over Hic Duration = 43.21

V2 36 ms Fixed Duration HIC SUMMARY: Pos. 2 Head Resultant

hic: 544.67
t1 = 60.000 msec
t2 = 96.000 msec
Average G's Over Hic Duration = 46.98

CLIP V2.1 SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 51.057 G's
Tstart = 78.8450 ms
Tend = 81.8450 ms
CSI = 497.116

CLIP V2.1 SUMMARY: Pos. 2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 42.458 G's
Tstart = 68.2151 ms
Tend = 71.2151 ms
CSI = 466.612

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

TITLE: NCAP TEST #2 - 1998 FORD RANGER PICKUP

| DESCRIPTION | ENGR UNIT | MAXIMUM AMP | MAXIMUM msec | MINIMUM AMP | MINIMUM msec | FILTER CLASS |
|---|---|---|---|---|---|---|
| Pos. 1 Upper Neck Fx | Nwt | 278.0 | 62.7 | -337.8 | 138.6 | 1000.0 |
| Pos. 1 Upper Neck Fy | Nwt | 140.5 | 175.0 | -216.3 | 120.0 | 1000.0 |
| Pos. 1 Upper Neck Fz | Nwt | 2045.4 | 68.8 | -654.3 | 112.5 | 1000.0 |
| Pos. 1 Upper Neck Mx | Nwt-M | 10.7 | 50.2 | -30.3 | 98.9 | 600.0 |
| Pos. 1 Upper Neck My | Nwt-M | 30.6 | 157.0 | -28.8 | 87.6 | 600.0 |
| Pos. 1 Upper Neck Mz | Nwt-M | 14.7 | 91.1 | -4.8 | 44.7 | 600.0 |
| Pos. 2 Upper Neck Fx | Nwt | 617.3 | 68.8 | -611.0 | 142.6 | 1000.0 |
| Pos. 2 Upper Neck Fy | Nwt | 105.3 | 223.9 | -392.0 | 35.1 | 1000.0 |
| Pos. 2 Upper Neck Fz | Nwt | 1095.7 | 62.7 | -778.7 | 114.5 | 1000.0 |
| Pos. 2 Upper Neck Mx | Nwt-M | 41.7 | 83.5 | -17.6 | 129.8 | 600.0 |
| Pos. 2 Upper Neck My | Nwt-M | 52.1 | 152.3 | -28.6 | 247.9 | 600.0 |
| Pos. 2 Upper Neck Mz | Nwt-M | 34.0 | 90.8 | -18.4 | 144.9 | 600.0 |
| Pos. 1 Neck Force Res. | Nwt | 2052.0 | 68.8 | 5.2 | -1.6 | 1000.0 |
| Pos. 1 Neck Moment Res. | Nwt-M | 43.3 | 99.6 | .0 | -34.3 | 600.0 |
| Pos. 2 Neck Force Res. | Nwt | 1170.2 | 62.6 | 7.1 | 22.4 | 1000.0 |
| Pos. 2 Neck Moment Res. | Nwt-M | 63.2 | 81.9 | .0 | -35.3 | 600.0 |
| Pos. 1 Left Belt Load | Nwt | 4101.0 | 56.1 | -26.9 | 139.9 | 60.0 |
| Pos. 1 Torso Belt Load | Nwt | 1344.6 | 72.6 | -98.5 | 26.8 | 60.0 |
| Pos. 2 Right Belt Load | Nwt | 6692.9 | 57.6 | -8.1 | 11.2 | 60.0 |
| Pos. 2 Torso Belt Load | Nwt | 550.5 | 137.0 | -106.9 | 93.0 | 60.0 |
| Pos. 1 Chest Disp. | mm | .0 | 14.5 | -41.8 | 79.2 | 180.0 |
| Pos. 2 Chest Disp. | mm | .2 | 11.0 | -29.5 | 83.9 | 180.0 |
| Pos. 1 Left Ankle X | Gs | 25.9 | 142.2 | -64.2 | 33.5 | 1000.0 |
| Pl Lt Upper Tibia Mx | Nwt-M | 14.5 | 190.1 | -35.0 | 78.3 | 600.0 |
| Pos. 1 Left Ankle Z | Gs | 109.3 | 68.0 | -43.9 | 33.0 | 1000.0 |
| Pos. 1 Left Toe Z | Gs | 158.6 | 68.1 | -52.9 | 32.8 | 1000.0 |
| Pos. 1 Right Ankle X | Gs | 58.3 | 69.6 | -164.5 | 47.9 | 1000.0 |
| Pos. 1 Pelvic (X) | Gs | 6.9 | 148.0 | -51.5 | 43.9 | 1000.0 |
| Pos. 1 Pelvic (Y) | Gs | 6.6 | 111.2 | -19.7 | 37.6 | 1000.0 |
| Pos. 1 Pelvic (Z) | Gs | 7.6 | 75.2 | -21.2 | 111.2 | 1000.0 |
| Pl Lt Upper Tibia My | Nwt-M | 23.7 | 149.6 | -80.1 | 34.7 | 600.0 |
| Pos. 2 Pelvic (X) | Gs | 8.9 | 119.2 | -49.5 | 49.0 | 1000.0 |
| Pos. 2 Pelvic (Y) | Gs | 10.2 | 58.0 | -10.3 | 99.7 | 1000.0 |
| Pos. 2 Pelvic (Z) | Gs | 3.5 | 40.3 | -24.9 | 107.1 | 1000.0 |
| Pl Lt Lower Tibia Fx | Nwt | 105.8 | 149.3 | -581.9 | 35.0 | 600.0 |
| Pl Lt Lower Tibia Fz | Nwt | 118.2 | 161.4 | -2599.0 | 34.3 | 600.0 |
| Pl Lt Lower Tibia My | Nwt-M | 18.1 | 91.4 | -24.8 | 52.4 | 600.0 |
| Pl Rt Upper Tibia Mx | Nwt-M | 48.8 | 46.5 | -21.1 | 37.7 | 600.0 |
| Pl Rt Upper Tibia My | Nwt-M | 252.6 | 46.3 | -68.6 | 78.2 | 600.0 |
| Pl Rt Lower Tibia Fx | Nwt | 109.9 | 158.7 | -1471.4 | 46.3 | 600.0 |
| Pl Rt Lower Tibia Fz | Nwt | 363.6 | 69.7 | -3738.4 | 37.8 | 600.0 |
| Pl Rt Lower Tibia My | Nwt-M | 274.3 | 62.7 | -126.1 | 45.9 | 600.0 |
| Pos. 1 Right Ankle Z | Gs | 79.2 | 60.1 | -121.6 | 47.1 | 1000.0 |
| Pos. 1 Pelvic (R) | Gs | 52.1 | 43.9 | .1 | -27.9 | 1000.0 |
| Pos. 2 Pelvic (R) | Gs | 49.8 | 49.0 | .1 | -30.6 | 1000.0 |
| Pos. 2 Lt Upper Tibia Mx | Nwt-M | 17.2 | 74.7 | -10.8 | 61.3 | 600.0 |
| Pos. 2 Lt Upper Tibia My | Nwt-M | 13.8 | 124.6 | -76.9 | 30.3 | 600.0 |
| Pos. 2 Lt Lower Tibia Fx | Nwt | 298.6 | 59.8 | -637.3 | 30.3 | 600.0 |
| Pos. 2 Lt Lower Tibia Fz | Nwt | 2144.0 | 52.9 | -2314.2 | 60.2 | 600.0 |
| Pos. 2 Lt Lower Tibia My | Nwt-M | 22.9 | 29.1 | -2.9 | 72.6 | 600.0 |
| Pos. 2 Rt Upper Tibia Mx | Nwt-M | 5.1 | 129.6 | -51.6 | 92.4 | 600.0 |
| Pos. 2 Rt Upper Tibia My | Nwt-M | 12.5 | 41.4 | -78.5 | 29.4 | 600.0 |
| Pos. 2 Rt Lower Tibia Fx | Nwt | 381.0 | 123.2 | -1787.3 | 32.5 | 600.0 |
| Pos. 2 Rt Lower Tibia Fz | Nwt | 198.4 | 165.6 | -2803.6 | 29.7 | 600.0 |
| Pos. 2 Rt Lower Tibia My | Nwt-M | 21.8 | 95.3 | -18.1 | 72.2 | 600.0 |
| Pos. 1 Right Toe Z | Gs | 193.7 | 61.7 | -212.9 | 44.9 | 1000.0 |
| Pos. 2 Left Ankle X | Gs | 14.1 | 93.5 | -63.7 | 28.1 | 1000.0 |
| Pos. 2 Left Ankle Z | Gs | 29.9 | 43.3 | -43.5 | 53.0 | 1000.0 |
| Pos. 2 Left Toe Z | Gs | 35.3 | 43.3 | -63.7 | 53.5 | 1000.0 |
| Pos. 2 Right Ankle X | Gs | 26.1 | 90.7 | -77.8 | 27.4 | 1000.0 |
| Pos. 2 Right Ankle Z | Gs | 17.3 | 41.7 | -32.1 | 101.9 | 1000.0 |
| Pos. 2 Right Toe Z | Gs | 32.3 | 42.8 | -50.9 | 75.4 | 1000.0 |

TITLE: NCAP TEST #2 - 1998 FORD RANGER PICKUP

| DESCRIPTION | ENGR UNIT | MAXIMUM AMP | MAXIMUM msec | MINIMUM AMP | MINIMUM msec | FILTER CLASS |
|---|---|---|---|---|---|---|
| Pos. 1 Head X(R) | Gs | 14.8 | 243.2 | -53.1 | 76.2 | 1000.0 |
| Pos. 1 Head Y(R) | Gs | 7.6 | 43.3 | -13.2 | 73.3 | 1000.0 |
| Pos. 1 Head Z(R) | Gs | 23.4 | 68.7 | -16.1 | 112.4 | 1000.0 |
| Pos. 1 Head Resultant(RR) | Gs | 56.8 | 76.2 | .0 | -26.2 | 1000.0 |
| Pos. 2 Head X(R) | Gs | 16.0 | 223.0 | -58.4 | 79.0 | 1000.0 |
| Pos. 2 Head Y(R) | Gs | 18.0 | 37.4 | -51.9 | 71.8 | 1000.0 |
| Pos. 2 Head Z(R) | Gs | 29.4 | 62.9 | -15.4 | 114.0 | 1000.0 |
| Pos. 2 Head Resultant(RR) | Gs | 74.3 | 71.8 | .1 | -22.5 | 1000.0 |
| Pos. 1 Chest X(R) | Gs | 4.1 | 186.2 | -50.3 | 81.9 | 180.0 |
| Pos. 1 Chest Y(R) | Gs | 2.6 | 118.5 | -10.3 | 89.9 | 180.0 |
| Pos. 1 Chest Z(R) | Gs | 18.4 | 72.2 | -19.0 | 113.4 | 180.0 |
| Pos. 1 Chest Res(RR) | Gs | 52.5 | 81.7 | .0 | -34.7 | 180.0 |
| Pos. 2 Chest X(R) | Gs | 4.0 | 142.5 | -41.2 | 70.7 | 180.0 |
| Pos. 2 Chest Y(R) | Gs | 7.7 | 72.8 | -7.2 | 117.6 | 180.0 |
| Pos. 2 Chest Z(R) | Gs | 19.4 | 62.6 | -20.4 | 114.9 | 180.0 |
| Pos. 2 Chest Res(RR) | Gs | 43.6 | 70.7 | .0 | -33.3 | 180.0 |

V2 36 ms Fixed Duration HIC SUMMARY: Pos. 1 Head Resultant(RR)

hic: 485.50
t1 = 56.500 msec
t2 = 92.500 msec
Average G's Over Hic Duration = 44.87

V2 36 ms Fixed Duration HIC SUMMARY: Pos. 2 Head Resultant(RR)

hic: 587.34
t1 = 58.100 msec
t2 = 94.100 msec
Average G's Over Hic Duration = 48.42

CLIP V2.1 SUMMARY: Pos. 1 Chest Res(RR)

Peak Resultant (3 ms CLIPPED DURATION) = 52.090 G's
Tstart = 79.3102 ms
Tend = 82.3392 ms
CSI = 511.219

CLIP V2.1 SUMMARY: Pos. 2 Chest Res(RR)

Peak Resultant (3 ms CLIPPED DURATION) = 42.574 G's
Tstart = 69.6111 ms
Tend = 72.6111 ms
CSI = 454.659

DATA SHEETS 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. | 2000 | 1987 |
| Shoulder belt length as measured on Part 572 Dummy. | 813 | 827 |
| Lap belt length as measured on Part 572 Dummy. | 812 | 773 |
| SHOULDER BELT SPOOL-OFF DATA: | | |
| As determined by film analysis. | - | - |
| As determined mechanically. | 56 (est.) | 121 (est.) |
| As determined electronically. | - | - |
| BELT STRETCH DATA: | | |
| Measured electronically between shoulder belt load cell and the "D" ring. | - | - |
| Measured mechanically. | - | - |

NOTE : Restraint system is a load limiting type. The Ford representative requested that the seat belt restraint system not be instrumented with load cells and displacement sensors.

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 20 mm molding.

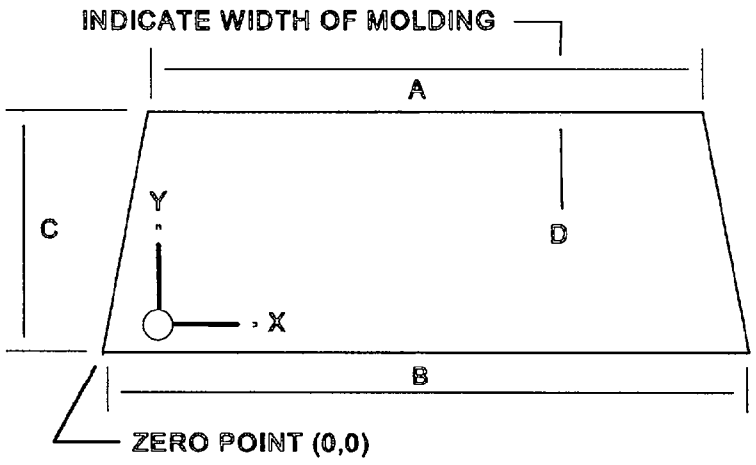
FMVSS 212 REQUIREMENTS:

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 | 1930 | 1930 | 100 |
| LEFT SIDE | 1930 | 1930 | 100 |
| TOTAL | 3,860 | 3,860 | 100 |

AREA OF RETENTION FAILURE:




FRONT VIEW OF WINDSHIELD

| DIMENSIONS (mm) | |
|---|---|
| A | 1200 |
| B | 1500 |
| C | 580 |
| D | 20 |

FAILURE DETAILS: None

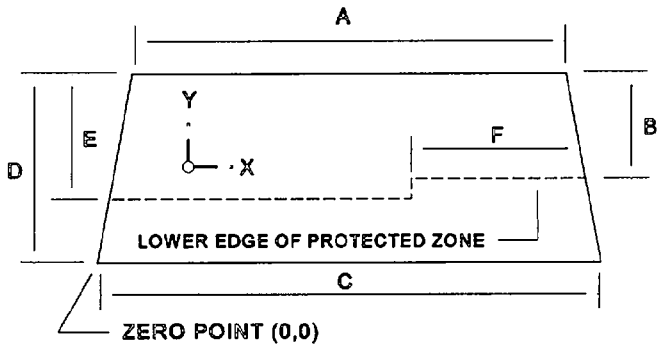
DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

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 | 1200 |
| B | 290 |
| C | 1500 |
| D | 580 |
| E | 345 |
| F | 735 |

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

NHTSA TEST No.: MW0203 TEST DATE: October 3,1997

VEHICLE MAKE/MODEL: 1998 Ford Ranger XLT

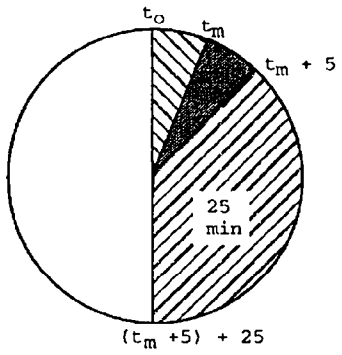
The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

==========

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:




1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

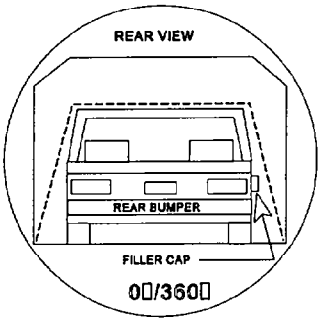
| ACTUAL | MAX ALLOWED |
|---|---|
| 0 | 28 g |
| 0 | 141 g |
| 0 | 28 g/min. |

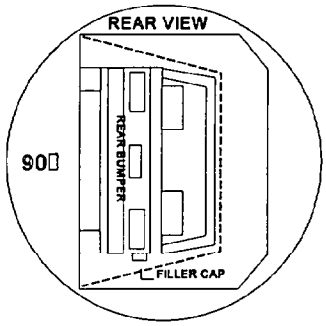
SOLVENT SPILLAGE DETAILS:
None

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

TEST PHASE:
0-90 deg.

NHTSA Test No.:
MW0203




I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| | | | | |
|---|---|---|---|---|
| Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes) | 1 | minutes | 8 | 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 |

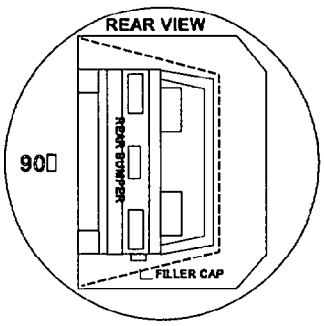
Note: Record spillage for whole minute intervals only as determined above.

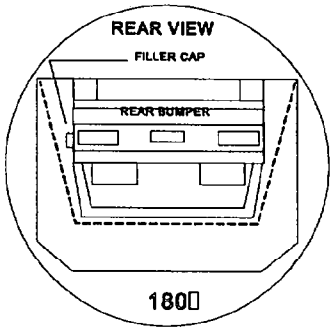
IV. SOLVENT SPILLAGE LOCATION(S): None

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

TEST PHASE:
90-180 deg.

NHTSA Test No.
MW0203




I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| | | | | |
|---|---|---|---|---|
| Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes) | 1 | minutes | 6 | 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 |
|---|---|---|---|

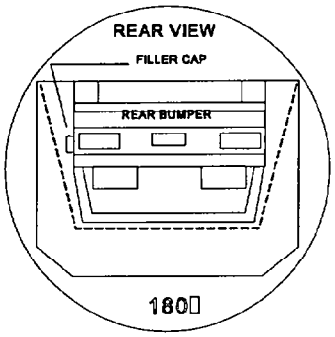
Note: Record spillage for whole minute intervals only as determined above.

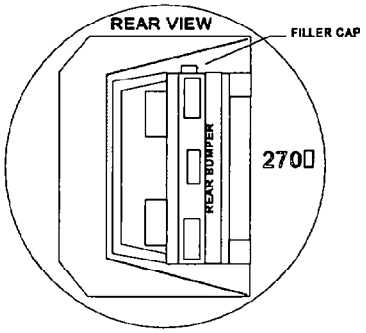
IV. SOLVENT SPILLAGE LOCATION(S): None

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

TEST PHASE:
180-270 deg.

NHTSA Test No.:
MW0203




I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| | | | | |
|---|---|---|---|---|
| Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes) | 1 | minutes | 1 | seconds |
| FMVSS 301 Position Hold Time + | 5 | minutes | 00 | seconds |
| **TOTAL** | 6 | minutes | 1 | 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 |

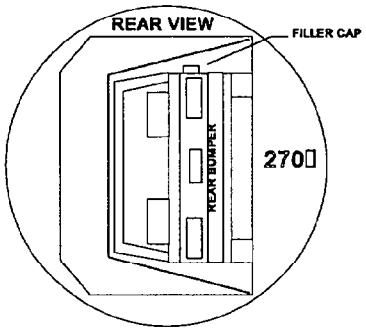
Note: Record spillage for whole minute intervals only as determined above.

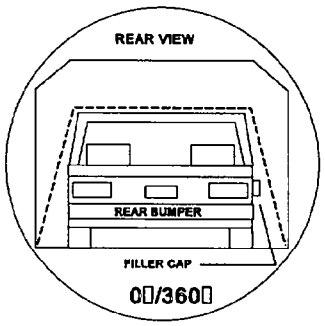
IV. SOLVENT SPILLAGE LOCATION(S): None

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

TEST PHASE:
270-360 deg.

NHTSA Test No.:
MW0203




I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| | | | | |
|---|---|---|---|---|
| Rollover Fixture 90 deg. Rotation Time (Spec. Range = 1 to 3 minutes) | 1 | minutes | 10 | seconds |
| FMVSS 301 Position Hold Time + | 5 | minutes | 00 | seconds |
| **TOTAL** | 6 | minutes | 10 | 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 |

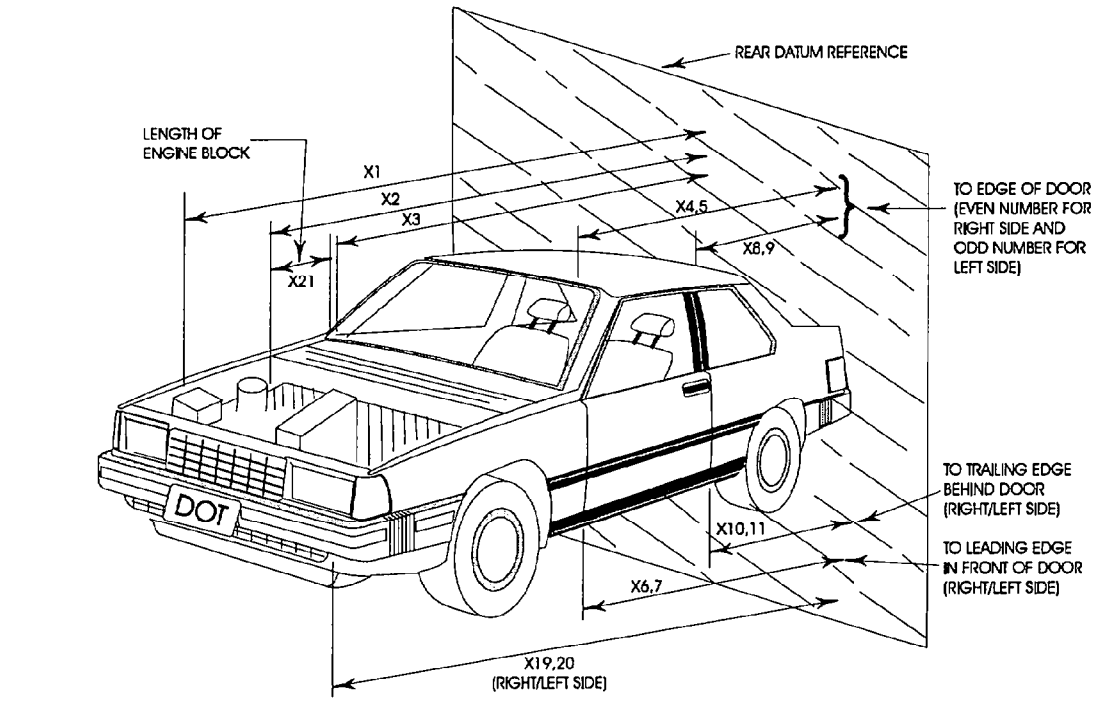
III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

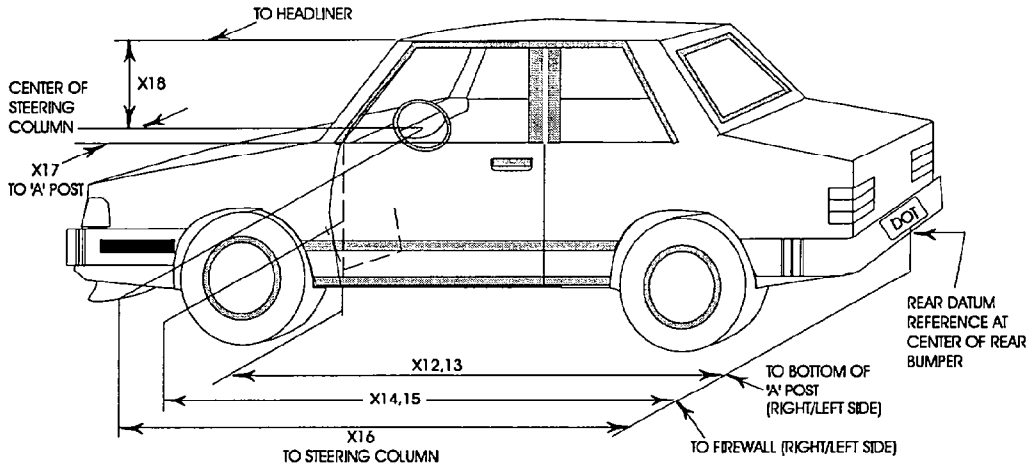
| | | | |
|---|---|---|---|
| 0 | 0 | 0 | n/a |

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

IV. SOLVENT SPILLAGE LOCATION(S): None

# TEST VEHICLE MEASUREMENTS



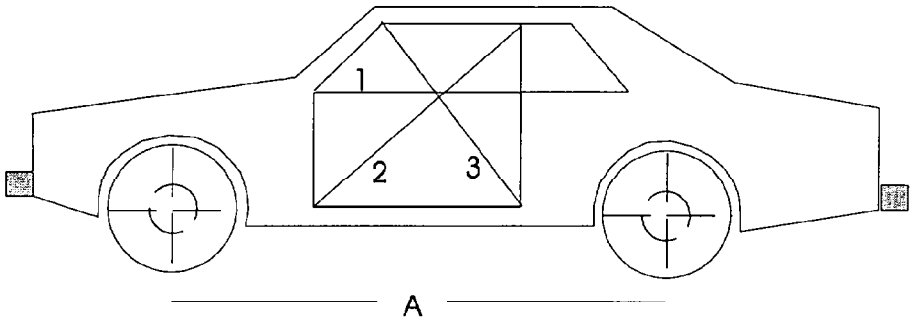
DATA SHEET NO.14 VEHICLE MEASUREMENTS

| | | All Dimensions in mm | | |
|---|---|---|---|---|
| No. | | Pre-Test | Post-Test | Differences |
| X1 | Total Length of Vehicle at Centerline | 5060 | 4605 | 455 |
| X2 | Rear Surface of Vehicle to Front of Engine | 4280 | 4195 | 85 |
| X3 | Rear Surface of Vehicle to Firewall | 3900 | 3930 | -30 |
| X4 | Rear Surface of Vehicle to Upper Leading Edge of Right Door | 3643 | 3607EST | 36 |
| X5 | Rear Surface of Vehicle to Upper Leading Edge of Left Door | 3644 | 3552EST | 92 |
| X6 | Rear Surface of Vehicle to Lower Leading Edge of Right Door | 3560 | 3577EST | -17 |
| X7 | Rear Surface of Vehicle to Lower Leading Edge of Left Door | 3558 | 3519 | 39 |
| X8 | Rear Surface of Vehicle to Upper Trailing Edge of Right Door | 2503 | 2488 | 15 |
| X9 | Rear Surface of Vehicle to Upper Trailing Edge of Left Door | 2505 | 2443 | 62 |
| X10 | Rear Surface of Vehicle to Lower Trailing Edge of Right Door | 2503 | 2500 | 3 |
| X11 | Rear Surface of Vehicle to Lower Trailing Edge of Left Door | 2504 | 2463 | 41 |
| X12 | Rear Surface of Vehicle to Bottom of "A" Post of Right Side | 3554 | 3540 | 14 |
| X13 | Rear Surface of Vehicle to Bottom of "A" Post of Left Side | 3555 | 3529 | 26 |
| X14 | Rear Surface of Vehicle to Firewall, Right Side | 3860 | 4005 | -145 |
| X15 | Rear Surface of Vehicle to Firewall, Left Side | 3870 | 3970 | -100 |
| X16 | Rear Surface of Vehicle to Steering Column | 3155 | 3190 | -35 |
| X17 | Center of Steering Column to "A" Post | 400 | 405 | -5 |
| X18 | Center of Steering Column to Headliner | 445 | 370 | 75 |
| X19 | Rear Surface of Vehicle to Right Side of Front Bumper | 5045 | 4605 | 440 |
| X20 | Rear Surface of Vehicle to Left Side of Front Bumper | 5046 | 4610 | 436 |
| X21 | Length of Engine Block | 400 | 400 | 0 |
| RD | Rear Surface of Vehicle to Right Side of Dash Panel | 3400 | 3395 | 5 |
| CD | Rear Surface of Vehicle to Center of Dash Panel | 3365 | 3360 | 5 |
| LD | Rear Surface of Vehicle to Left Side of Dash Panel | 3415 | 3410 | 5 |

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

VEHICLE INTRUSION MEASUREMENTS

DOOR OPENING WIDTH



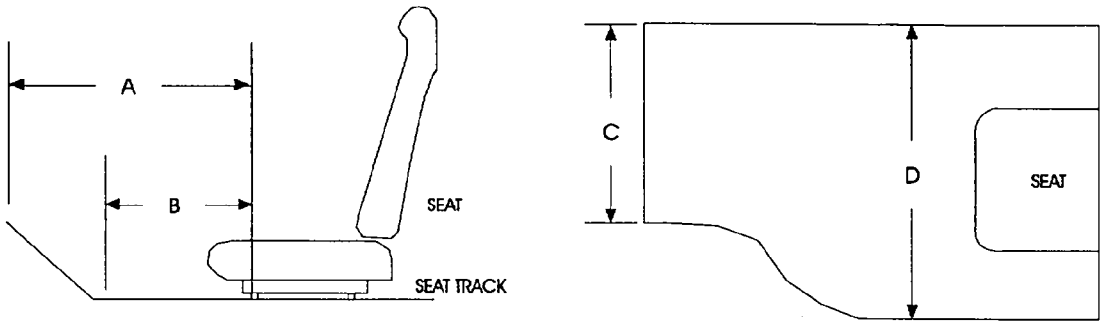

| UNITS (mm) | LEFT | | | RIGHT | | |
|---|---|---|---|---|---|---|
| MEASUREMENT | 1 | 2 | 3 | 1 | 2 | 3 |
| BEFORE TEST | 1040 | 1485 | 1220 | 1045 | 1485 | 1225 |
| AFTER TEST | 1020 | 1455 | 1255 | 1030 | 1475 | 1245 |
| DIFFERENCE | 20 | 30 | -35 | 15 | 10 | -20 |

| UNITS (mm) | A = WHEELBASE LEFT | A = WHEELBASE RIGHT |
|---|---|---|
| BEFORE TEST | 2985 | 2985 |
| AFTER TEST | 2910 | 2935 |
| DIFFERENCE | 75 | 50 |

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

VEHICLE INTRUSION MEASUREMENTS

STATIC FOOTWELL DEFORMATION




DRIVER

| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| A | 600 | 600 | 0 |
| B | 500 | 500 | 0 |
| C | 430 | 430 | 0 |
| D | 440 | 435 | 5 |

PASSENGER

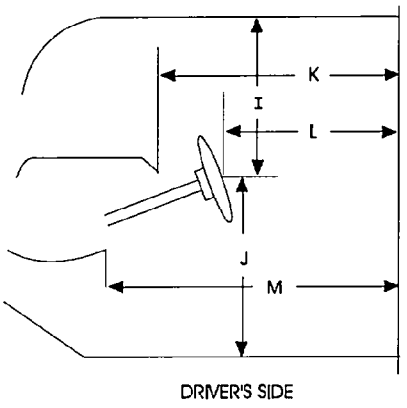
| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| A | 590 | 595 | -5 |
| B | 475 | 485 | -10 |
| C | 360 | 370 | -10 |
| D | 440 | 435 | 5 |

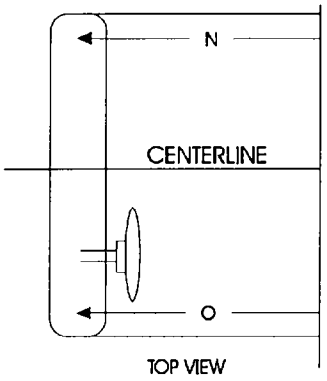
Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

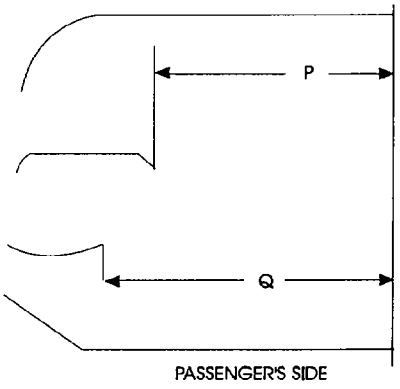
VEHICLE INTRUSION MEASUREMENTS

STATIC PASSENGER COMPARTMENT INTRUSION




MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE

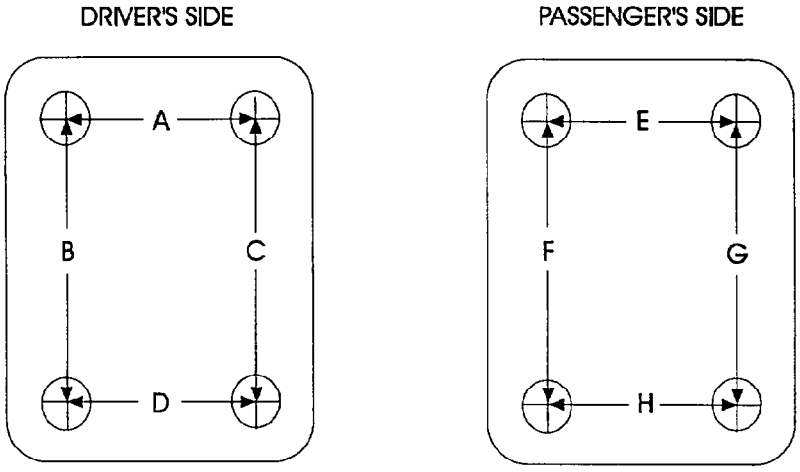



| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| I | 420 | 350 | 70 |
| J | 660 | 730 | -70 |
| K | 755 | 780 | -25 |
| L | 535 | 570 | -35 |
| M | 770 | 780 | -10 |
| N | 780 | 775 | 5 |
| O | 795 | 790 | 5 |
| P = K (PASS.) | 770 | N/A | N/A |
| Q = M (PASS.) | 760 | 780 | -20 |

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

FLOORBOARD DEFORMATION



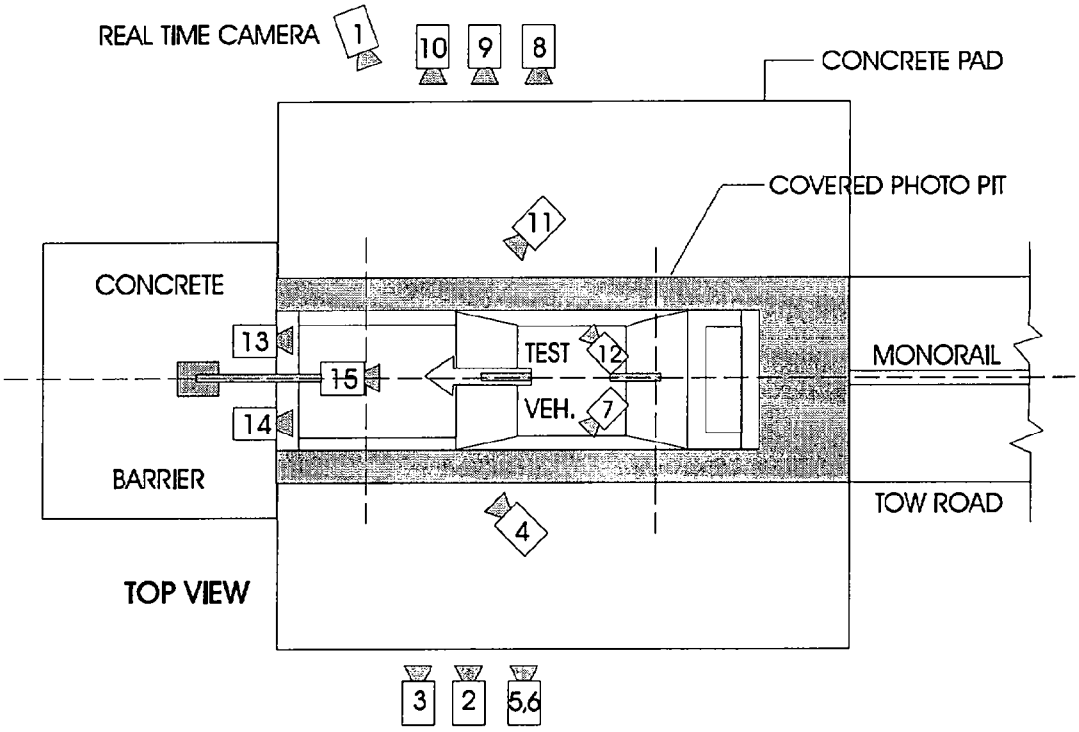

TOP VIEW THROUGH FLOOR PAN

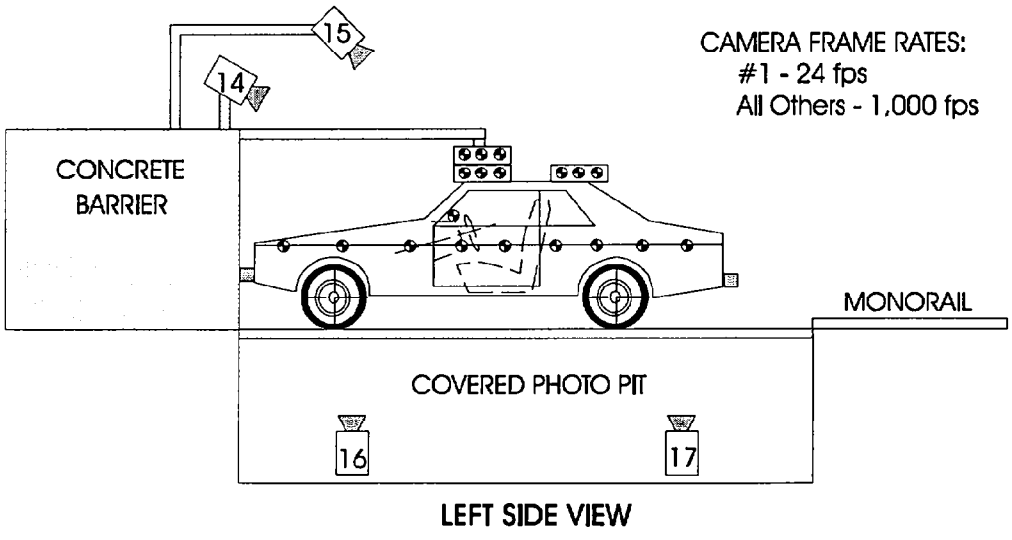
| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| A | 550 | 540 | 10 |
| B | 605 | 600 | 5 |
| C | 570 | 570 | 0 |
| D | 320 | 335 | -15 |
| E | 355 | 360 | -5 |
| F | 590 | 570 | 20 |
| G | 605 | 600 | 5 |
| H | 275 | 275 | 0 |

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.: MW0203 Vehicle: 1998 Ford Ranger XLT Pickup

| 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 | 6601 | 1608 | 1089 | -3 | 6315 | 13 | 1000 |
| 3 | Left Side View | 8011 | 1043 | 1095 | -2 | 7725 | 25 | 1000 |
| 4 | Driver and Interior View | 5087 | 2987 | 1919 | -12 | - | 25 | 1000 |
| 5 | Steering Column (Bottom) | 7795 | 1933 | 1171 | -3.5 | 7509 | 25 | 1010 |
| 6 | Steering Column (Top) | 7795 | 1933 | 1777 | -8 | 7509 | 25 | 1000 |
| 7 | Left Belt | - | - | - | - | - | 8 | - |
| 8 | Overall Right Side | 6565 | 2035 | 1085 | -3 | 6279 | 13 | 1000 |
| 9 | Right Side View | 7851 | 1471 | 1146 | -3 | 7565 | 25 | 1000 |
| 10 | Right Passenger View | 8069 | 1881 | 1400 | -3 | 7783 | 35 | 1000 |
| 11 | Passenger and Interior View | 5328 | 3111 | 1893 | -11 | - | 25 | 1000 |
| 12 | Right Belt | - | - | - | - | - | 8 | - |
| 13 | Passenger Front View | 580 | 0 | 2000 | -40 | - | 8 | 1000 |
| 14 | Driver Front View | 580 | 0 | 2000 | -40 | - | 8 | 1000 |
| 15 | Windshield View | 0 | 530 | 3048 | -53 | - | 8 | 1000 |
| 16 | Pit View of Engine | 0 | 505 | -3048 | 90 | - | 13 | 1000 |
| 17 | Pit View of Fuel Tank | 0 | 3432 | -3048 | 90 | - | 13 | 1000 |

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

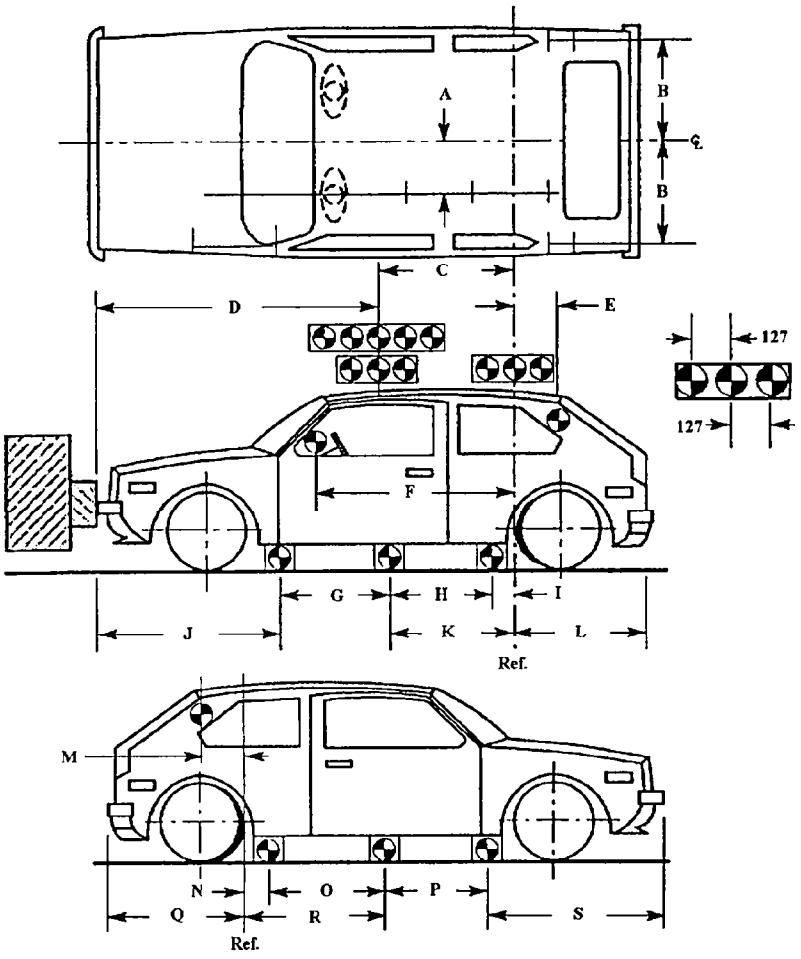
** = referenced to horizontal plane

N.T. indicates No Timing

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

(Dimensions in millimeters)

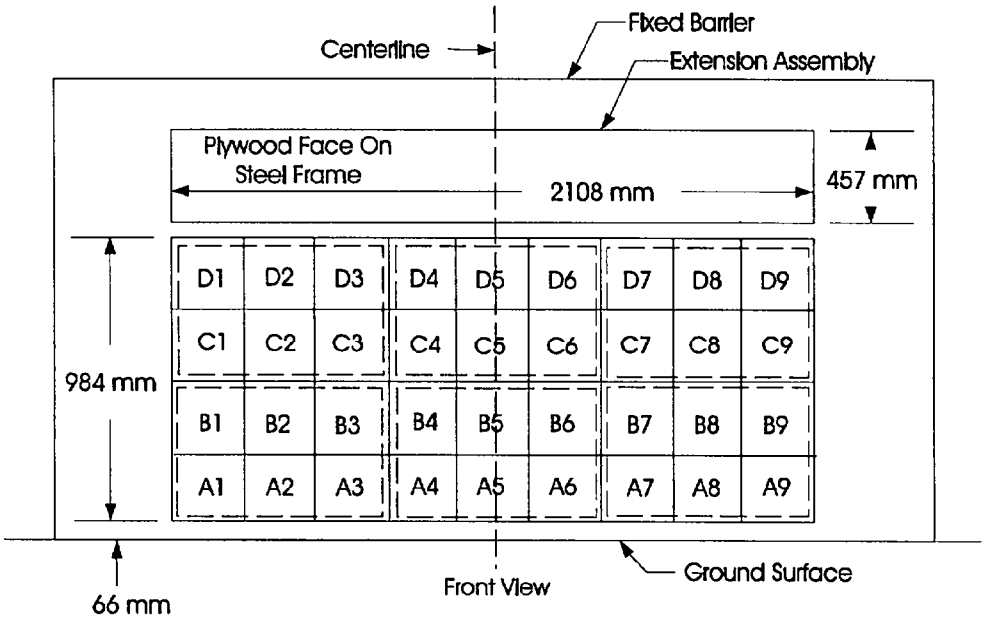
| | |
|---|---|
| A | 362 |
| B | 1378 |
| C | 254 |
| D | 2274 |
| E | - |
| F | 1726 |
| G | 1003 |
| H | 1003 |
| I | 123 |
| J | 1324 |
| K | 1123 |
| L | 1610 |
| M | - |
| N | 123 |
| O | 1003 |
| P | 1003 |
| Q | 1610 |
| R | 1123 |
| S | 1324 |



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

LOAD CELL BARRIER 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<br>C1 thru D3 | Group 5<br>C4 thru D6 | Group 6<br>C7 thru D9 |
| Group 1<br>A1 thru B3 | Group 2<br>A4 thru B6 | Group 3<br>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. : MW0203; Test Date: October 3,1997; Technician: J.Cz.

Vehicle Model Year/Make/Model: 1998 Ford Ranger XLT

A. No. of vent holes: 2 -Driver 0 -Passenger

B. Size of vent holes: ($mm^2$) 25 -Driver - -Passenger

C. Total vent area: ($mm^2$) 50 -Driver - -Passenger

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

Driver: - -Length; - -Width; 630 -Diameter

Passenger: 580 -Height; 580 -Width; 440 -Depth

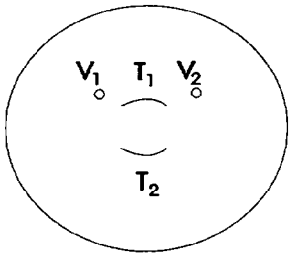
E. Is the air bag tethered?

Driver: x -Yes; - -No; If yes, record length of tether- 280

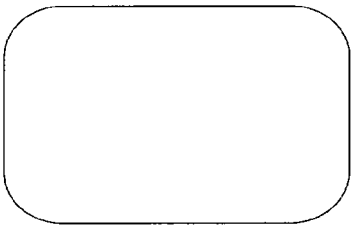
Passenger: - -Yes; x -No; If yes, record length of tether- -

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**
**vents underneath bag**




**PASSENGER**
**vents underneath bag**



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

Driver: Air bag: None

Generator: T1JE148K10002

Passenger: Air bag: None

Generator: F87B 10044R74 BBA4C0

DATA SHEET NO.19 ACCIDENT INVESTIGATION DIVISION DATA

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Ford Ranger XLT Pickup

NHTSA Test No.: MW0203 VIN: IFTYR10U7WUA00726

Model Year: 1998 Build Date: 8/97 Test Date: October 3,1997

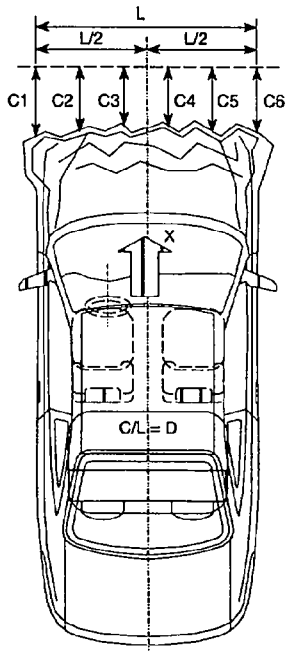
Vehicle Size Category: Pick Up Test Weight: 1886.5 kg

Vehicle Wheelbase: 2990 mm; Front Overhang: 1324 mm; Overall Width: 1785 mm

Collision Deformation Classification (CDC) Code: 12FDEW2

Crush Depth Dimensions;

| | PRE | POST | DIFF | |
|---|---|---|---|---|
| C1 = | 4915 | 4540 | -375 | mm |
| C2 = | 5040 | 4610 | -430 | mm |
| C3 = | 5060 | 4605 | -455 | mm |
| C4 = | 5060 | 4605 | -455 | mm |
| C5 = | 5040 | 4605 | -435 | mm |
| C6 = | 4915 | 4540 | -375 | mm |




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

Longitude Length of Damaged Region:

L1= 1635 mm

L2= 817.5 mm

L3= 327 mm

Appendix A

PHOTOGRAPHS

PHOTOGRAPHS

PHOTOGRAPHS (continued)

PHOTOGRAPH NOT AVAILABLE

Figure A-1 LOAD CELL LOCATIONS

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-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

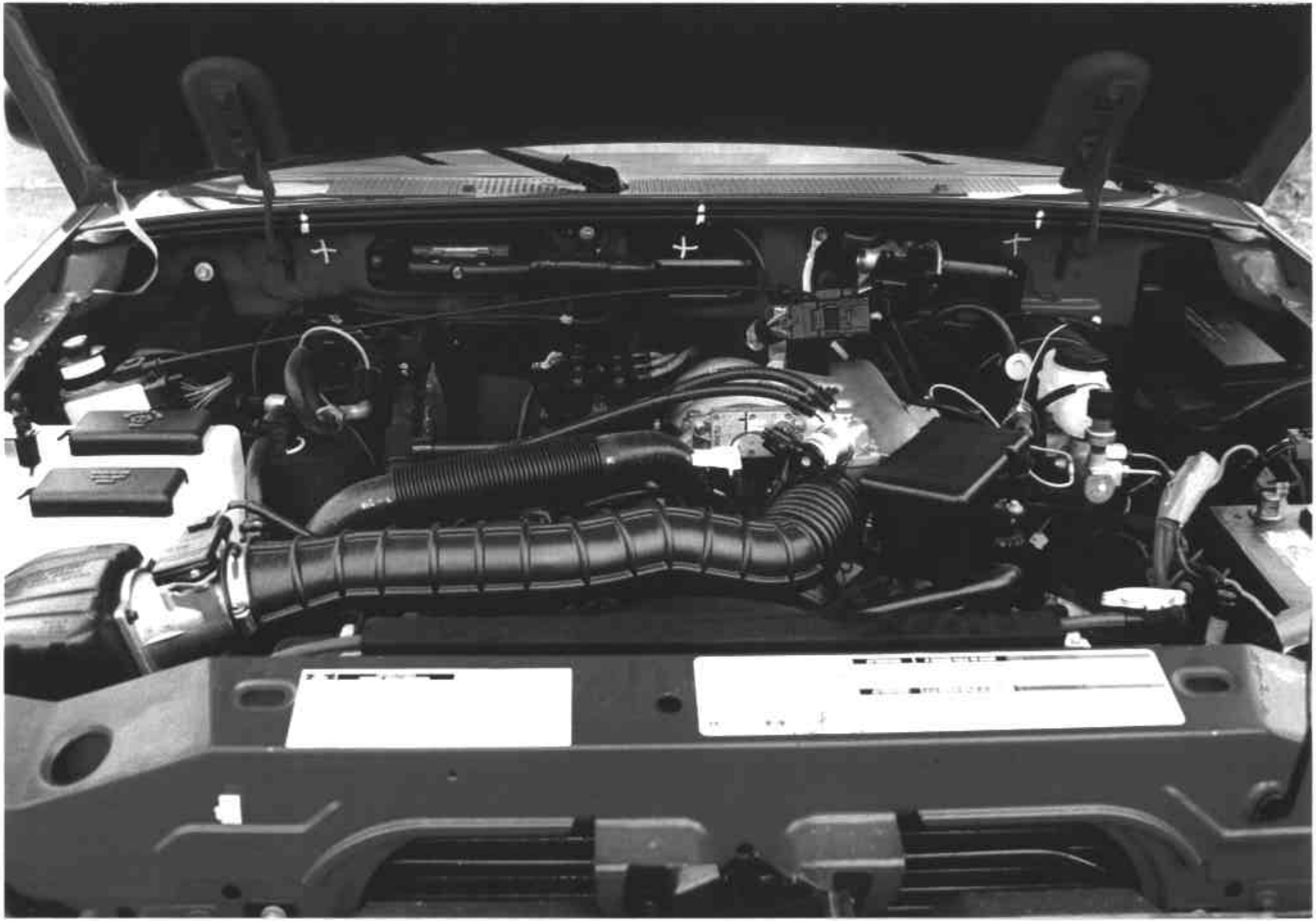


Figure A-10 PRE-TEST LEFT REAR THREE-QUARTER VIEW


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


Figure A-12 PRE-TEST WINDSHIELD VIEW

Figure A-13 POST-TEST WINDSHIELD VIEW



A-17

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Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW


Figure A-15 FUEL CAP VIEW

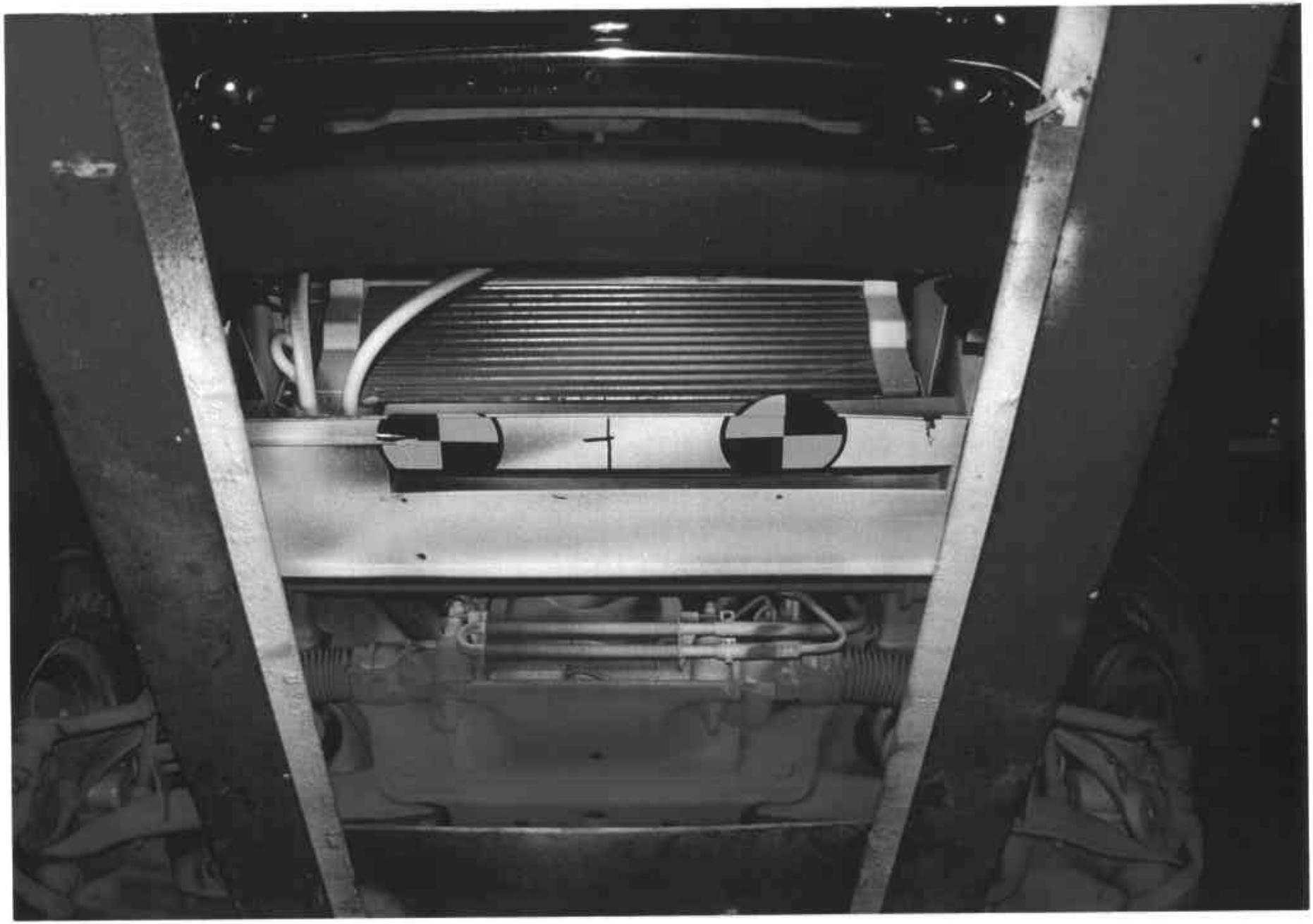

Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

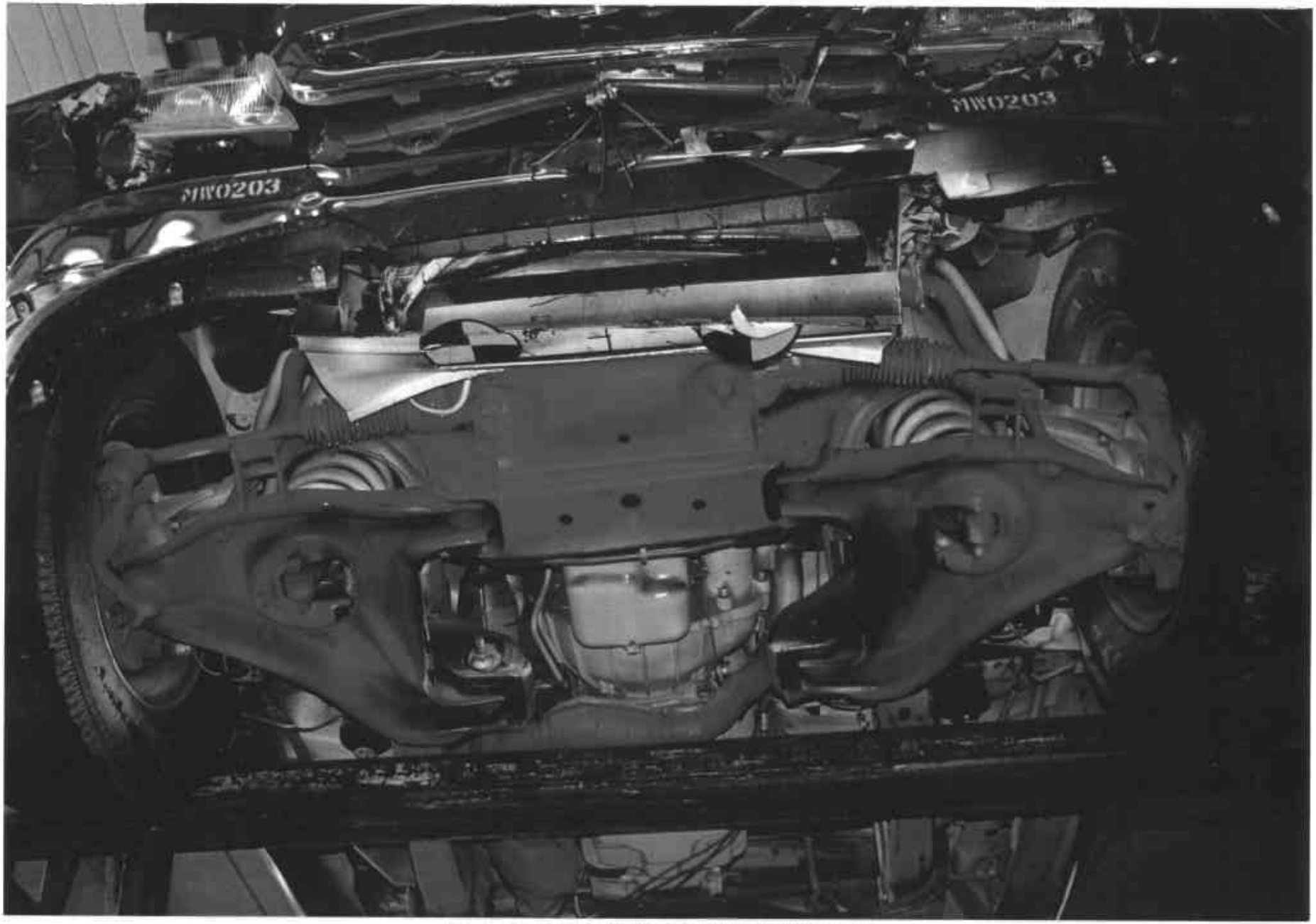


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

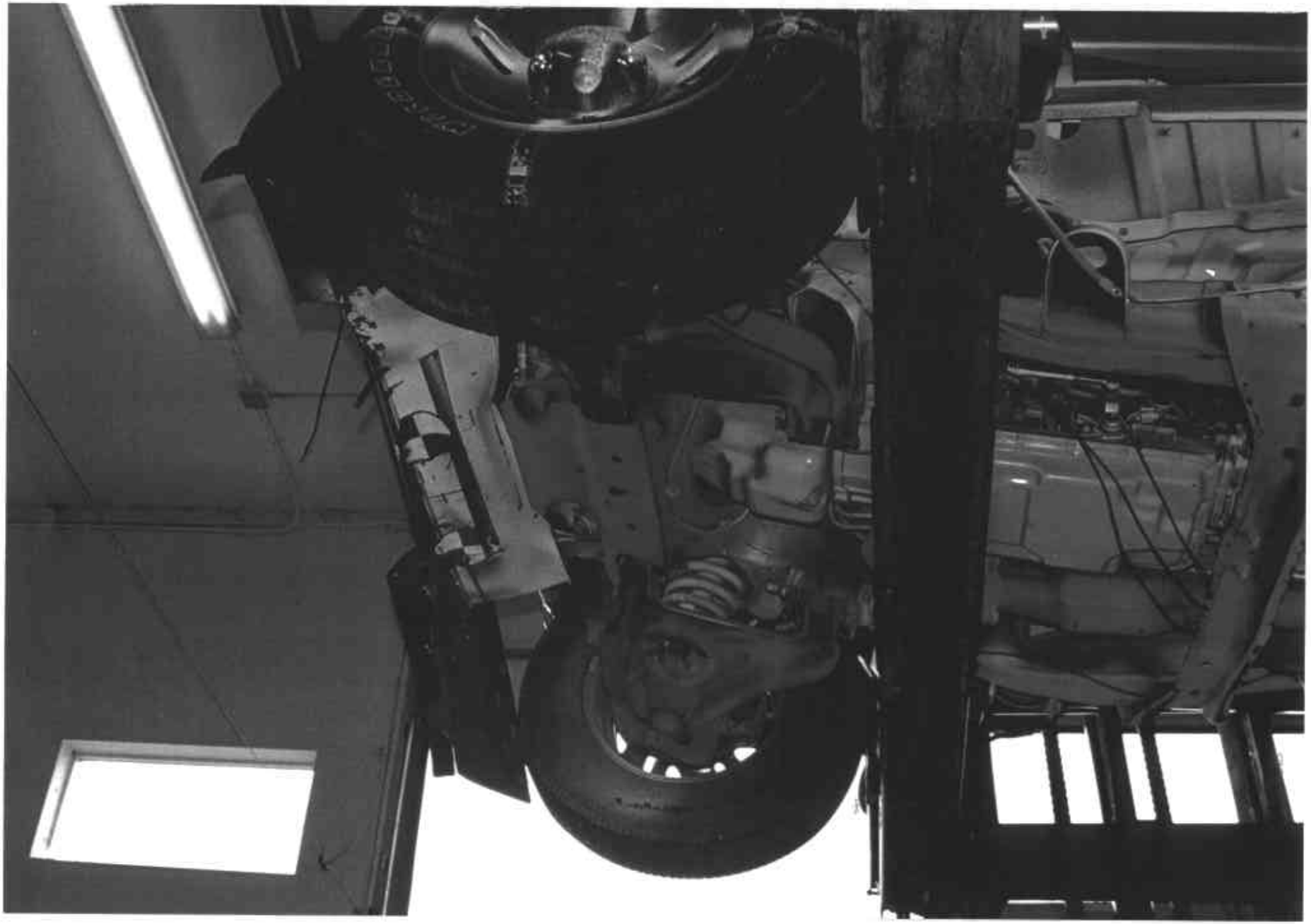





Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW


Figure A-20 PRE-TEST REAR UNDERBODY VIEW

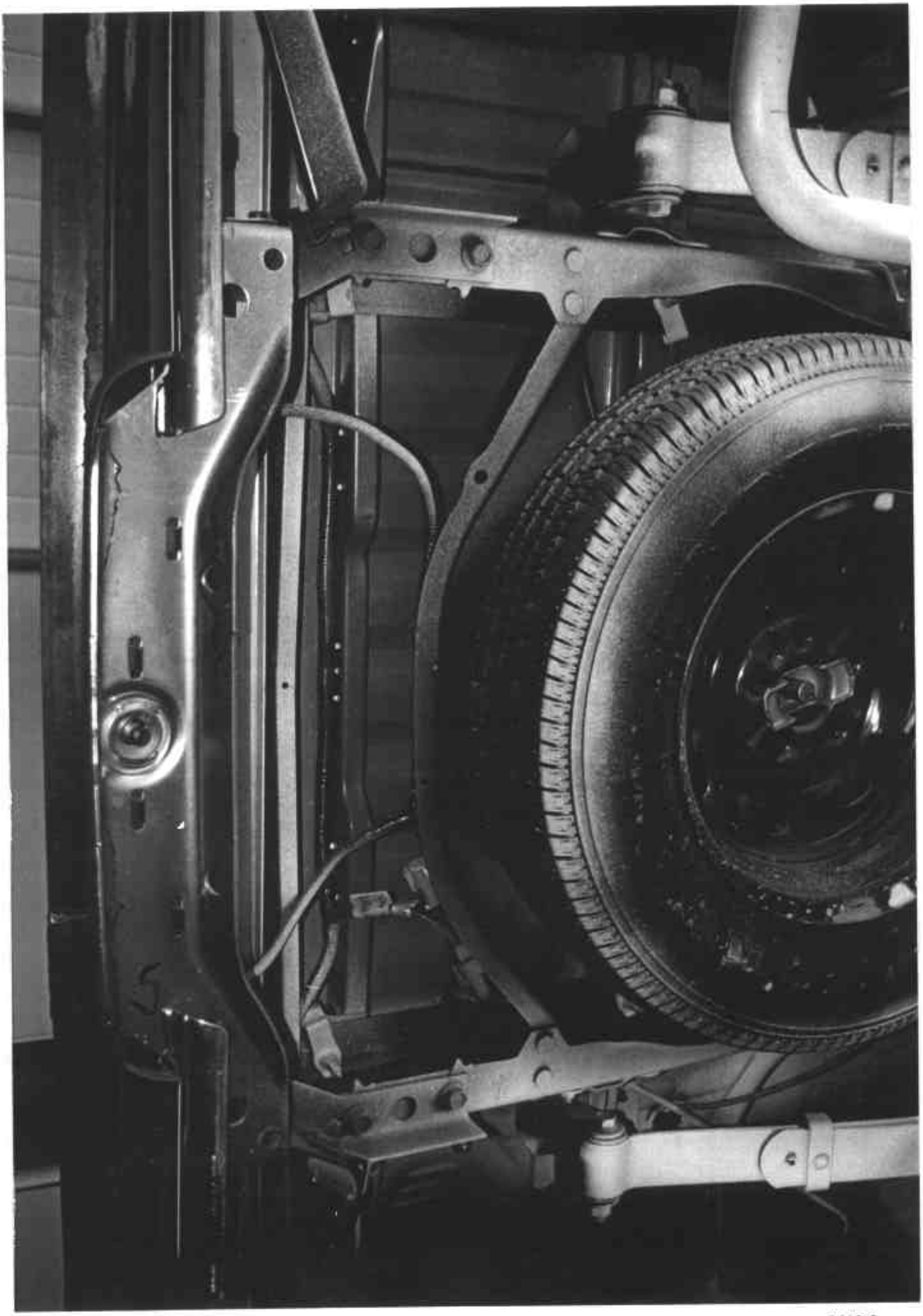

Figure A-21 POST-TEST REAR UNDERBODY VIEW


Figure A-22 PRE-TEST DRIVER POSITION VIEW

PHOTOGRAPH NOT AVAILABLE

Figure A-23 POST-TEST DRIVER POSITION VIEW


Figure A-24 PRE-TEST PASSENGER POSITION VIEW

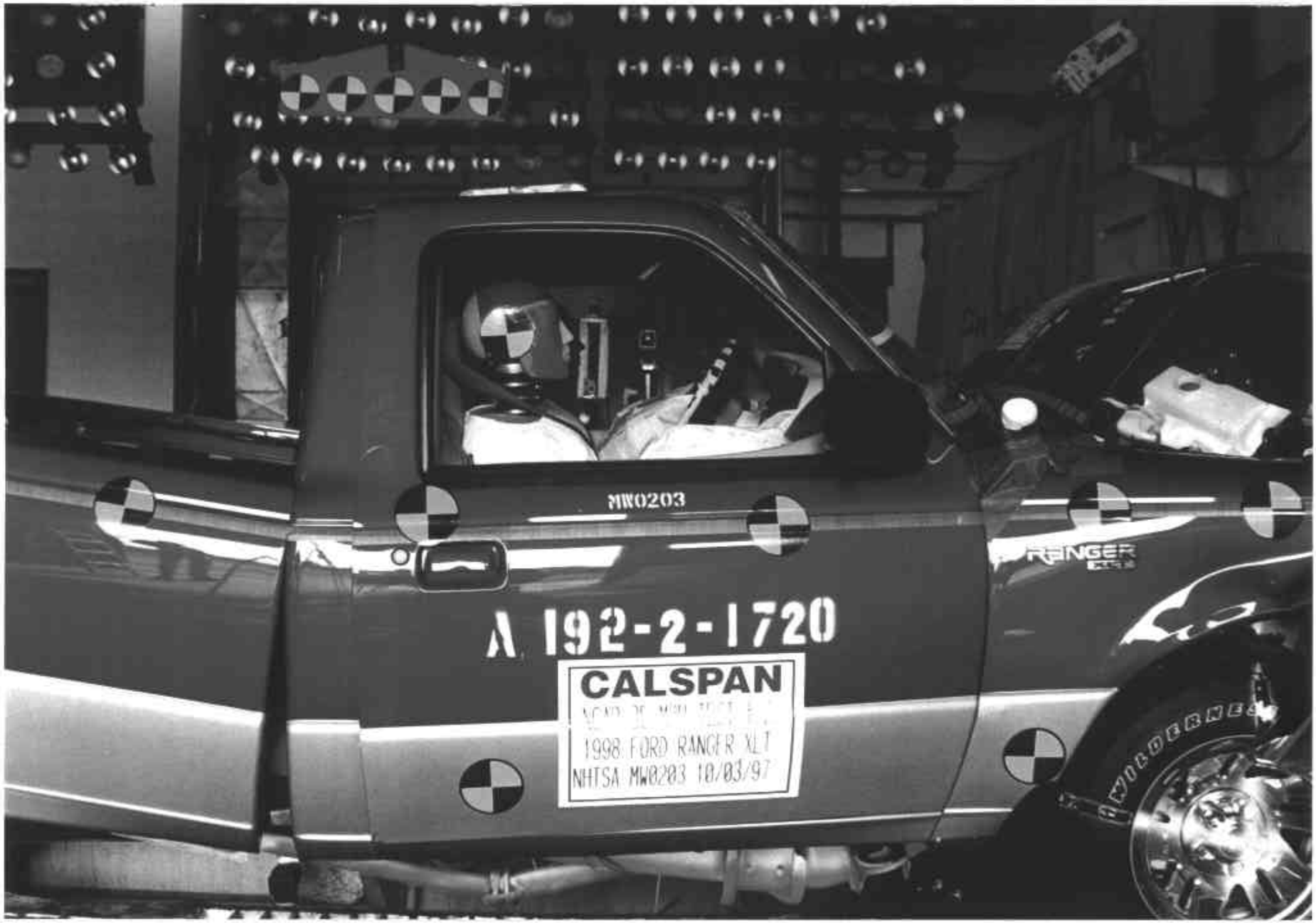


Figure A-25 POST-TEST PASSENGER POSITION VIEW


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



8413-2


Figure A-35 POST-TEST DRIVER FLOOR PAN VIEW

Figure A-36 PRE-TEST PASSENGER FLOOR PAN VIEW


A-40

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Figure A-37 POST-TEST PASSENGER FLOOR PAN VIEW

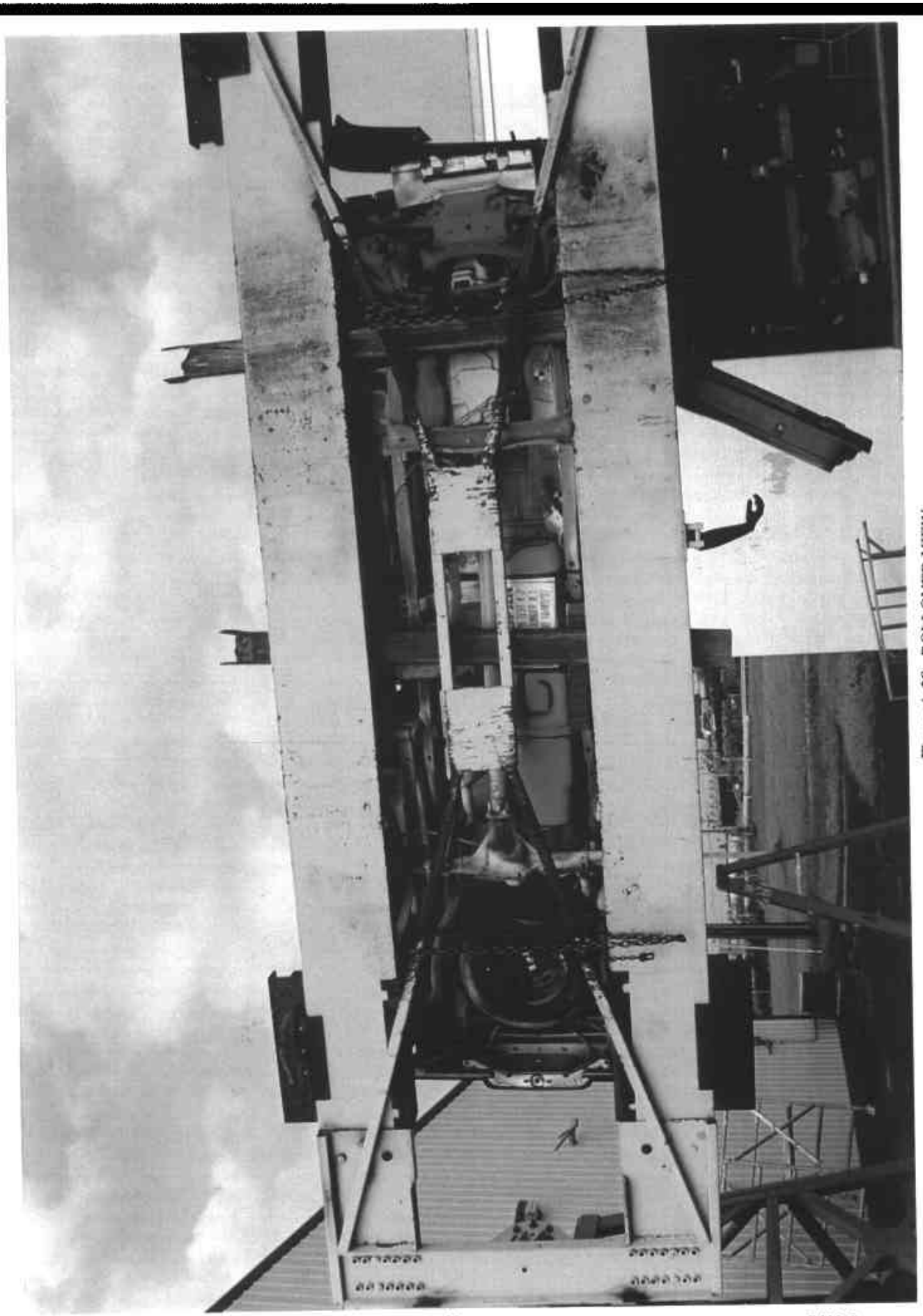


Figure A-38 ROLLOVER VIEW


Figure A-39 IMPACT VIEW

Appendix B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

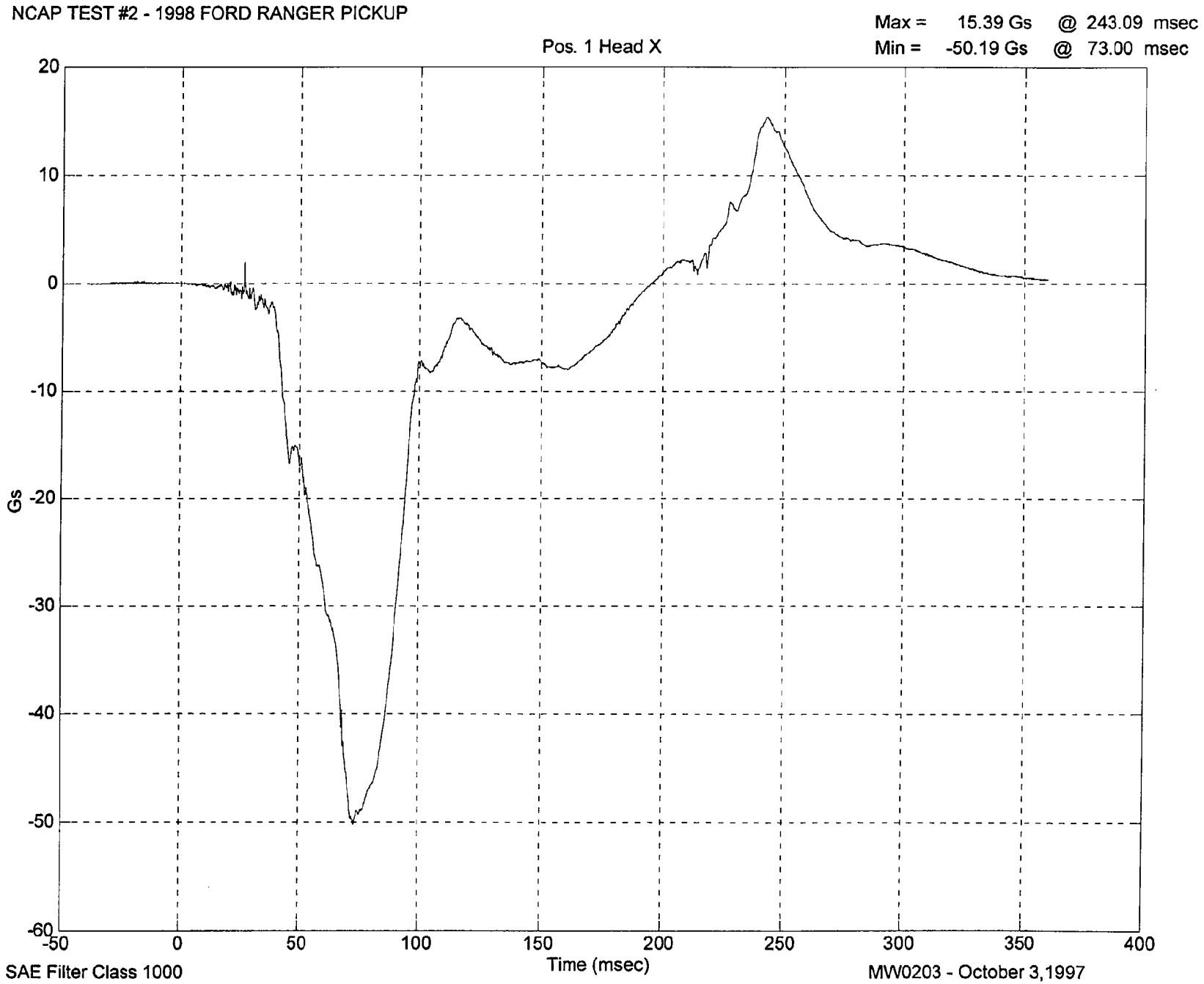
NHTSA TEST NO. MW0203

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 |

**Hybrid III Dummy Sign Conventions**
**Load Cells and Special Transducers**

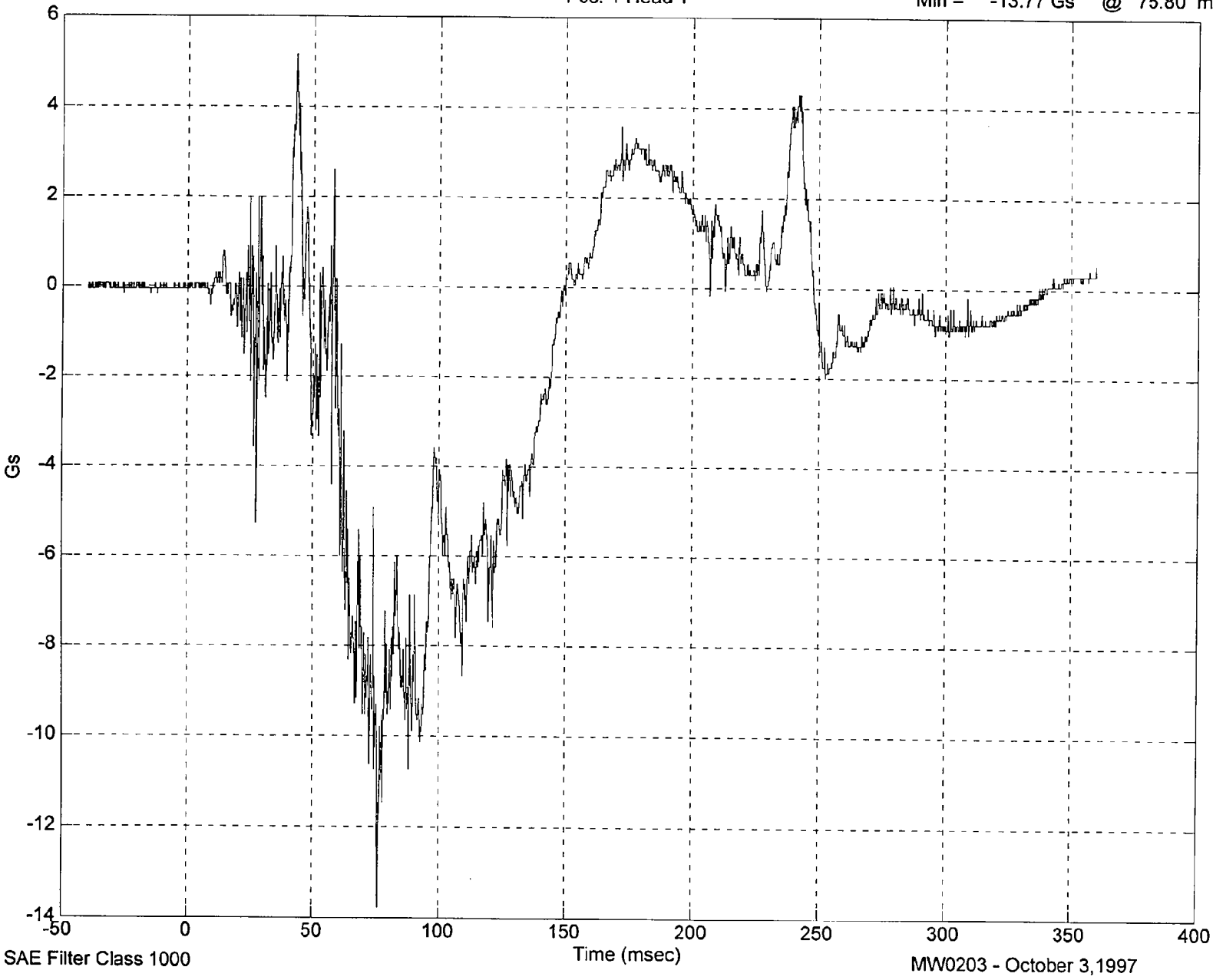
| Transducer | DOT/NHTSA Sign Convention (positive unless noted) |
|---|---|
| Upper Neck Load Cell | Fx Head forward<br>Fy Head left<br>Fz Neck in tension<br>Mx Right ear to right shoulder<br>My Chin to chest (flexion)<br>Mz Chin to left shoulder (look left) |
| Chest Displacement Potentiometer | Compression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


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Max = 15.39 Gs @ 243.09 msec
Min = -50.19 Gs @ 73.00 msec
Pos. 1 Head X
20
10
0
-10
-20
-30
-40
-50
-60
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3,1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

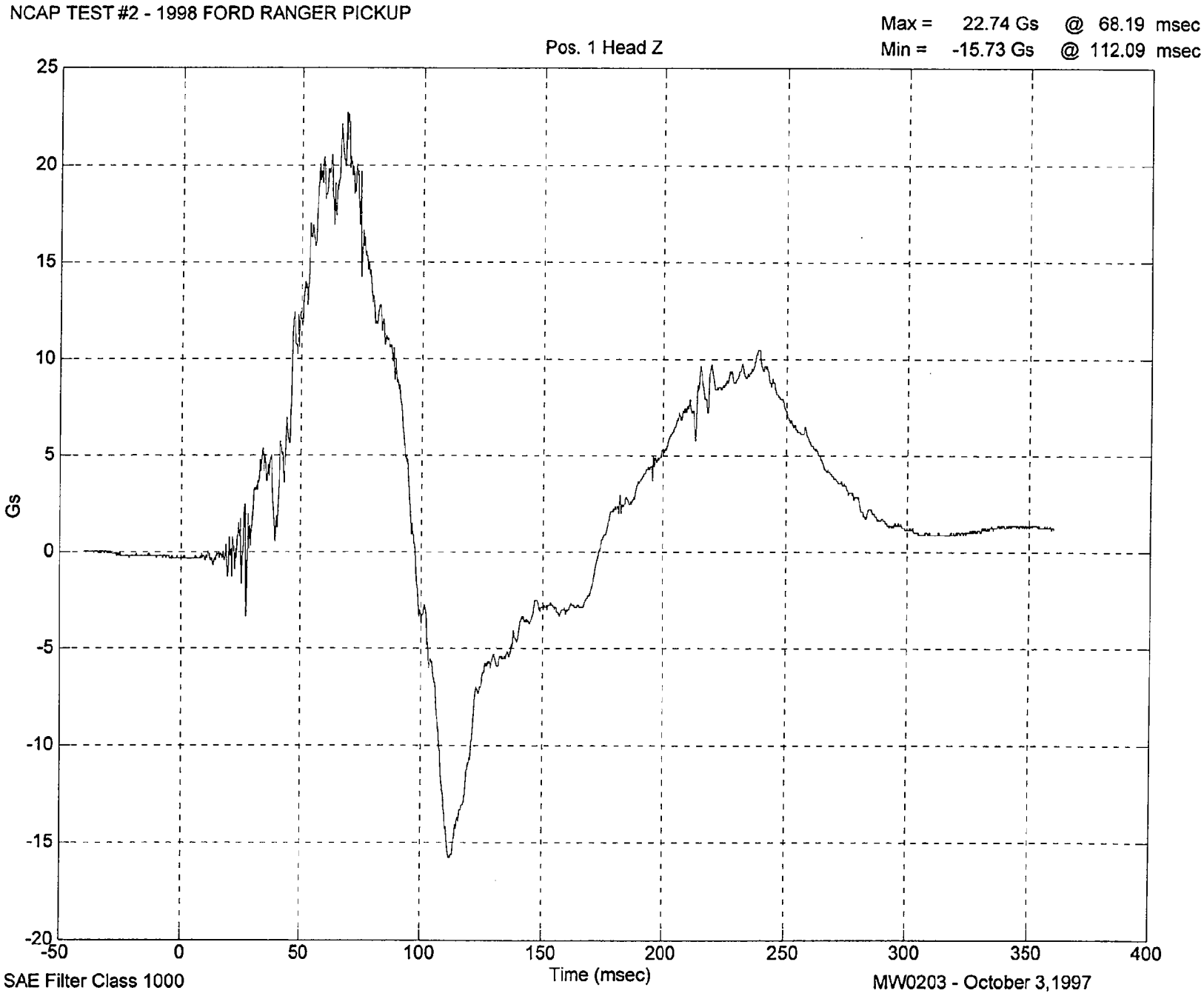
Pos. 1 Head Y

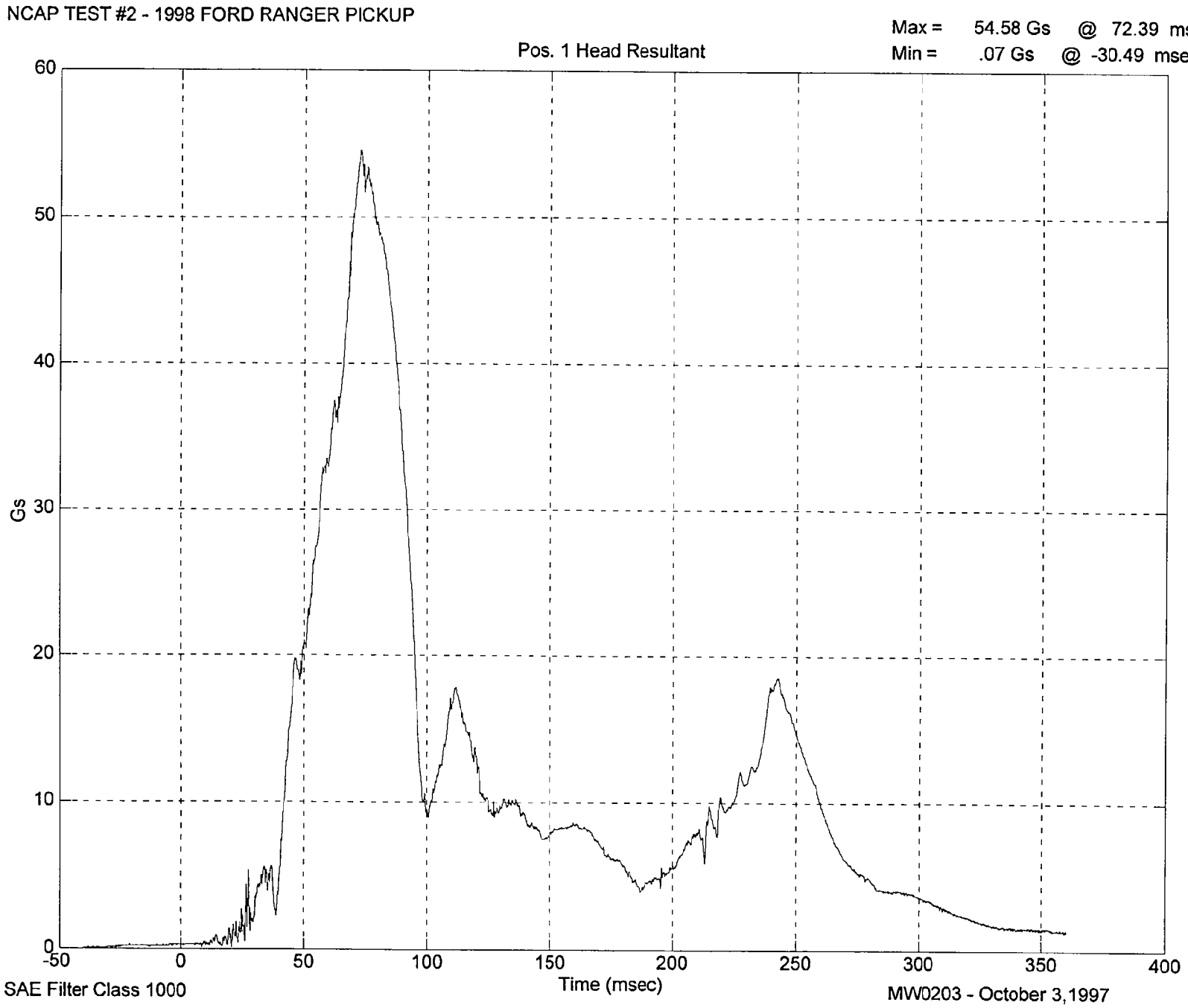
Max = 5.16 Gs @ 42.90 msec
Min = -13.77 Gs @ 75.80 msec

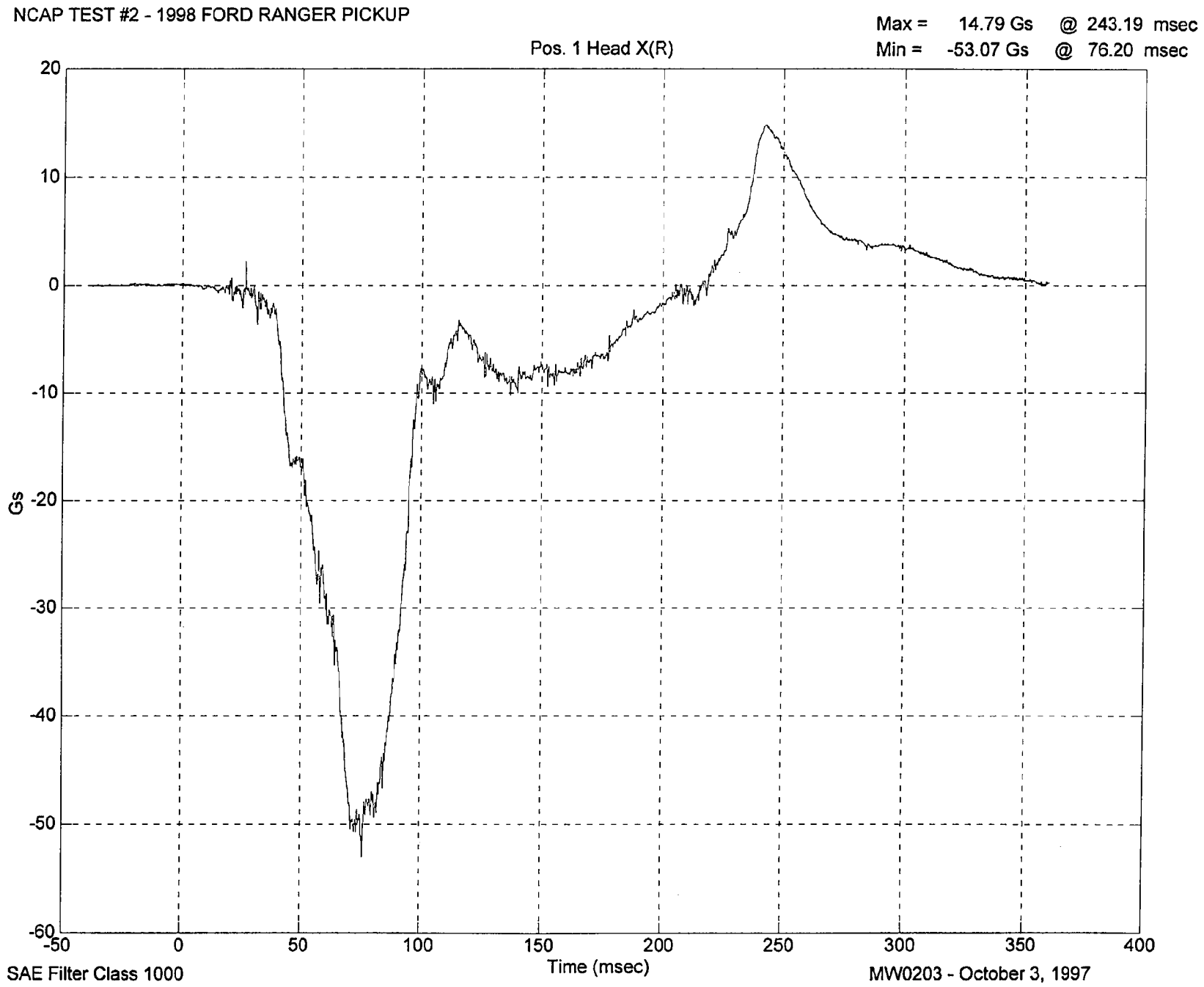


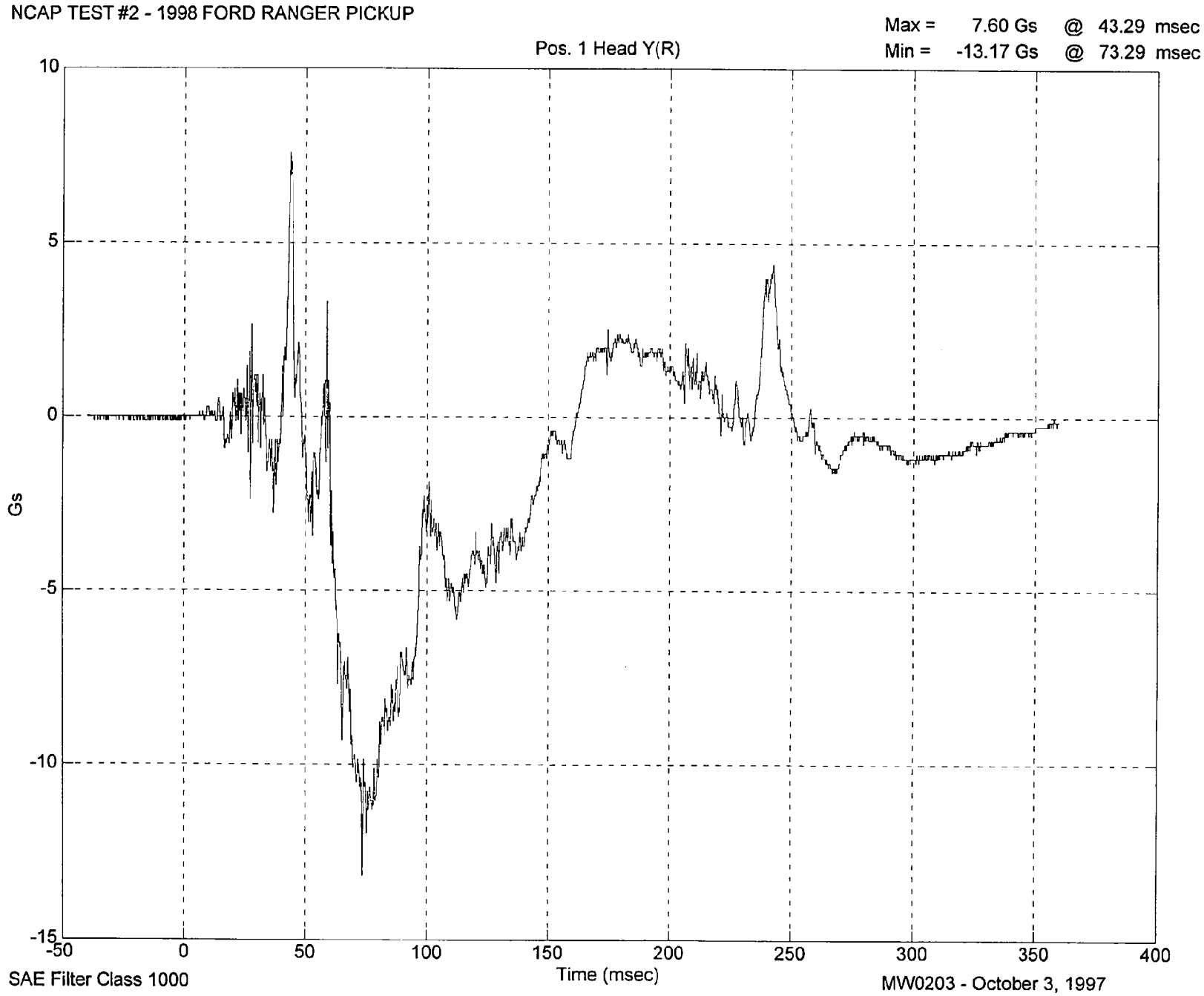

SAE Filter Class 1000

MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Head Z
Max = 22.74 Gs @ 68.19 msec
Min = -15.73 Gs @ 112.09 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Head Resultant
Max = 54.58 Gs @ 72.39 msec
Min = .07 Gs @ -30.49 msec
Gs
60
50
40
30
20
10
0
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3,1997

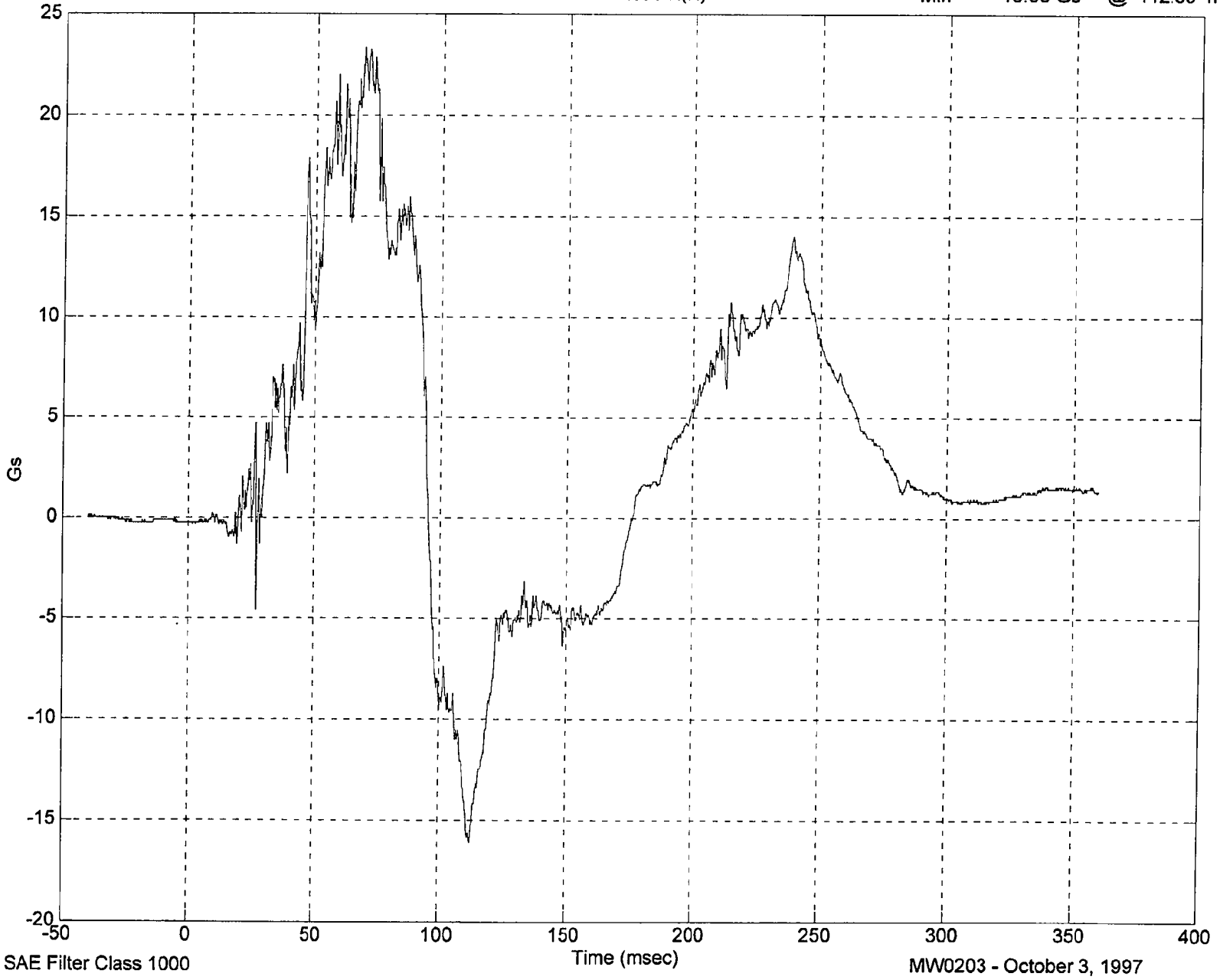

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Head X(R)
Max = 14.79 Gs @ 243.19 msec
Min = -53.07 Gs @ 76.20 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Head Y(R)
Max = 7.60 Gs @ 43.29 msec
Min = -13.17 Gs @ 73.29 msec
10
5
0
-5
-10
-15
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

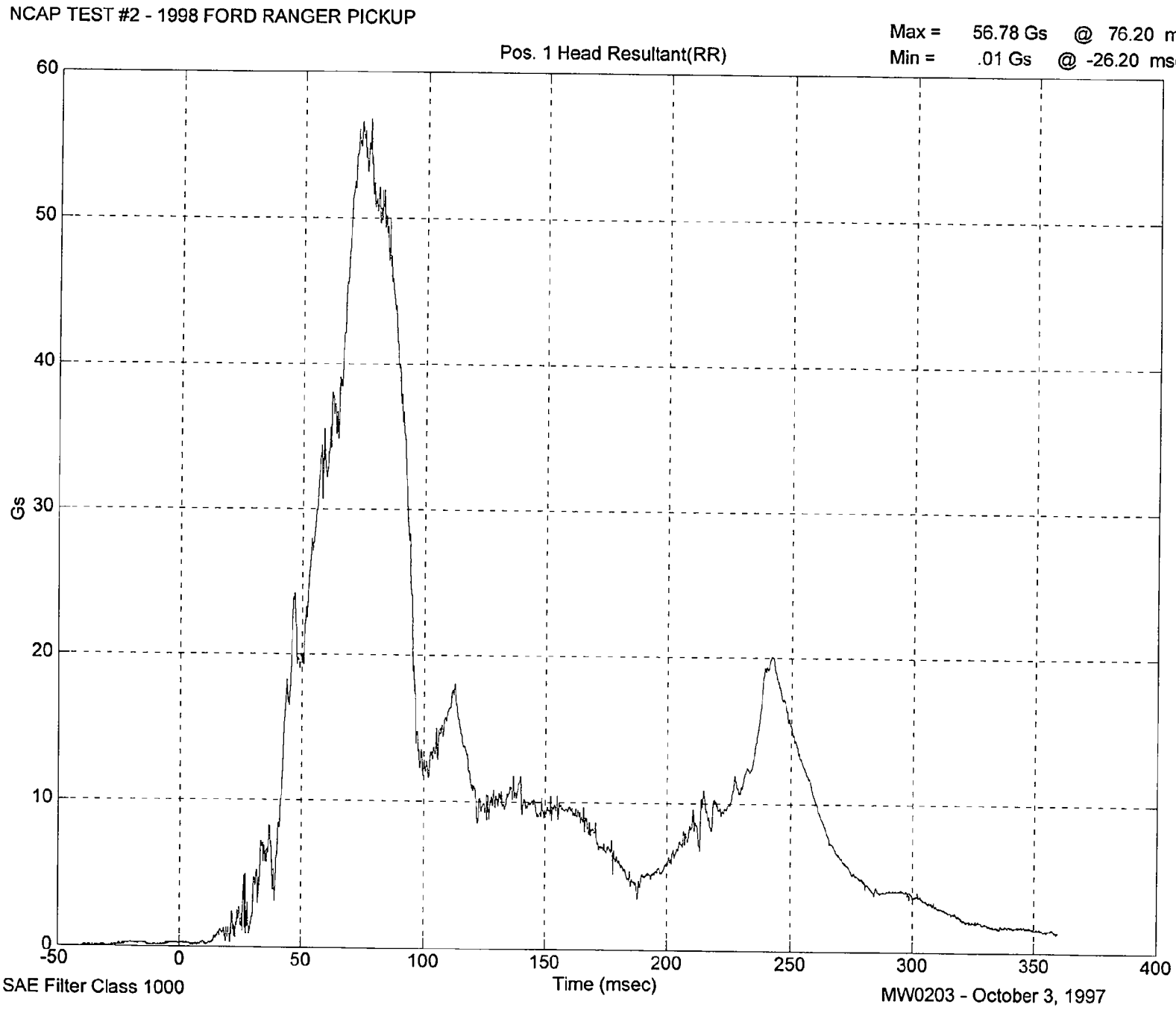
Pos. 1 Head Z(R)

Max = 23.36 Gs @ 68.69 msec
Min = -16.08 Gs @ 112.39 msec




SAE Filter Class 1000

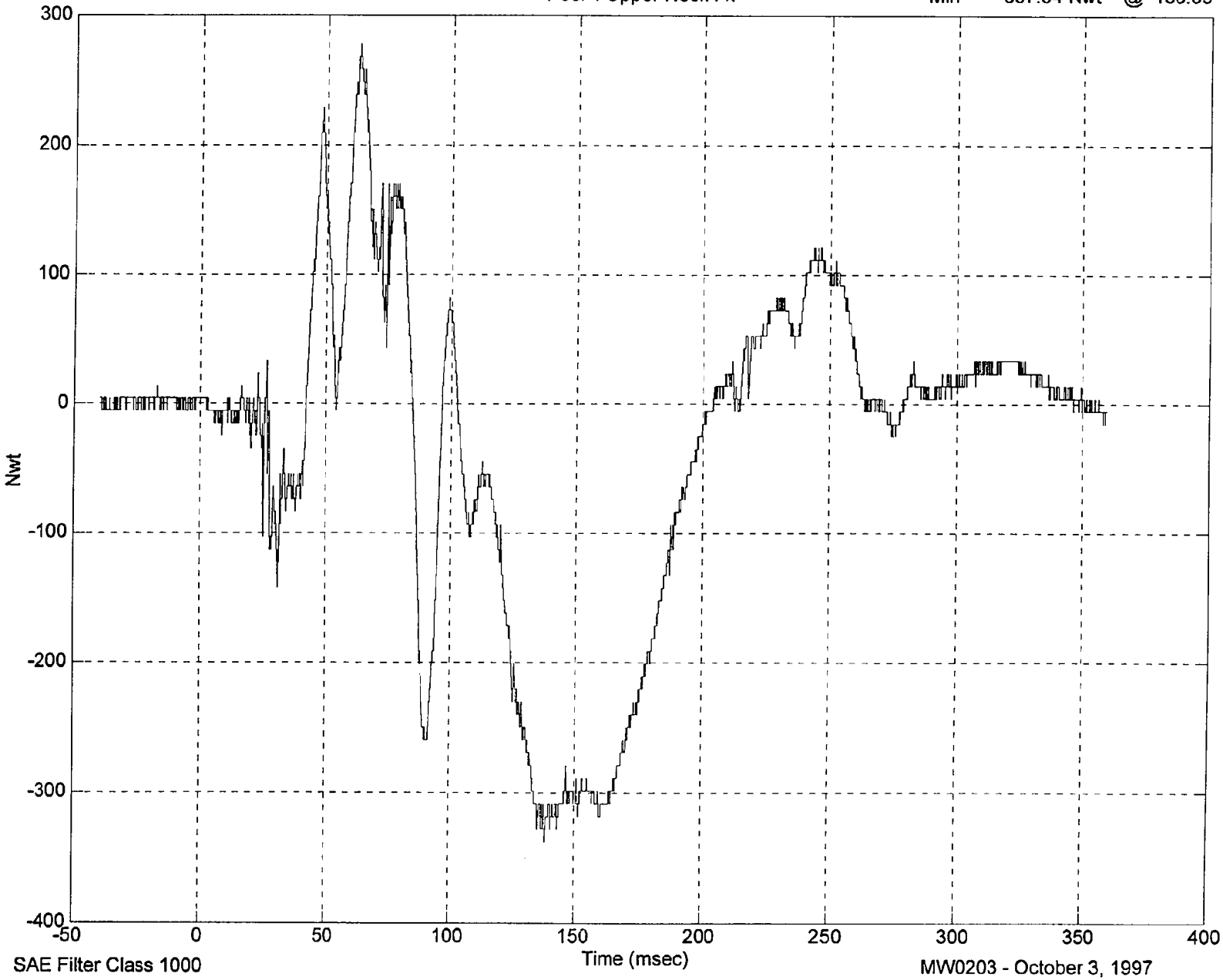
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Head Resultant(RR)
Max = 56.78 Gs @ 76.20 msec
Min = .01 Gs @ -26.20 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

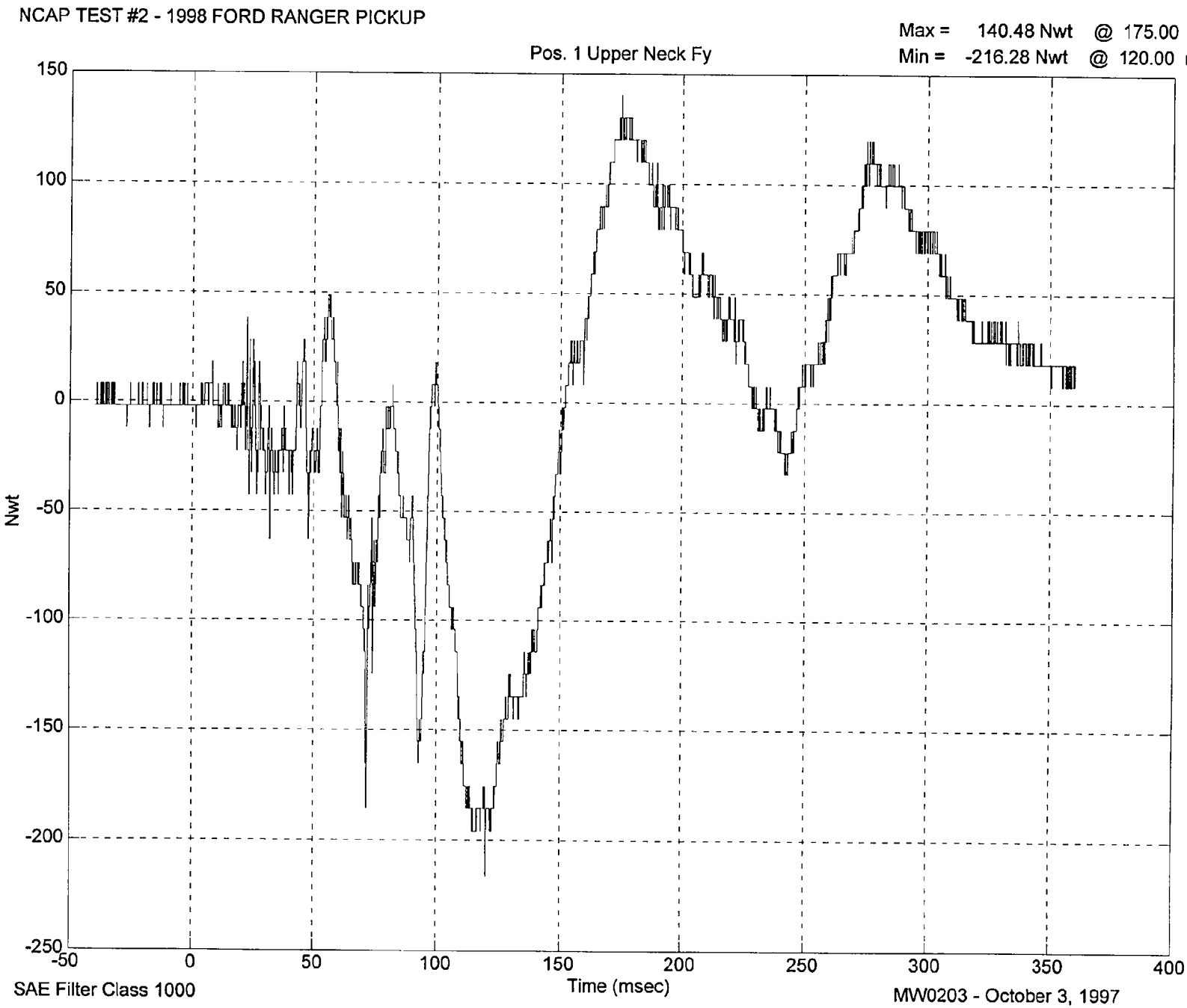
Pos. 1 Upper Neck Fx

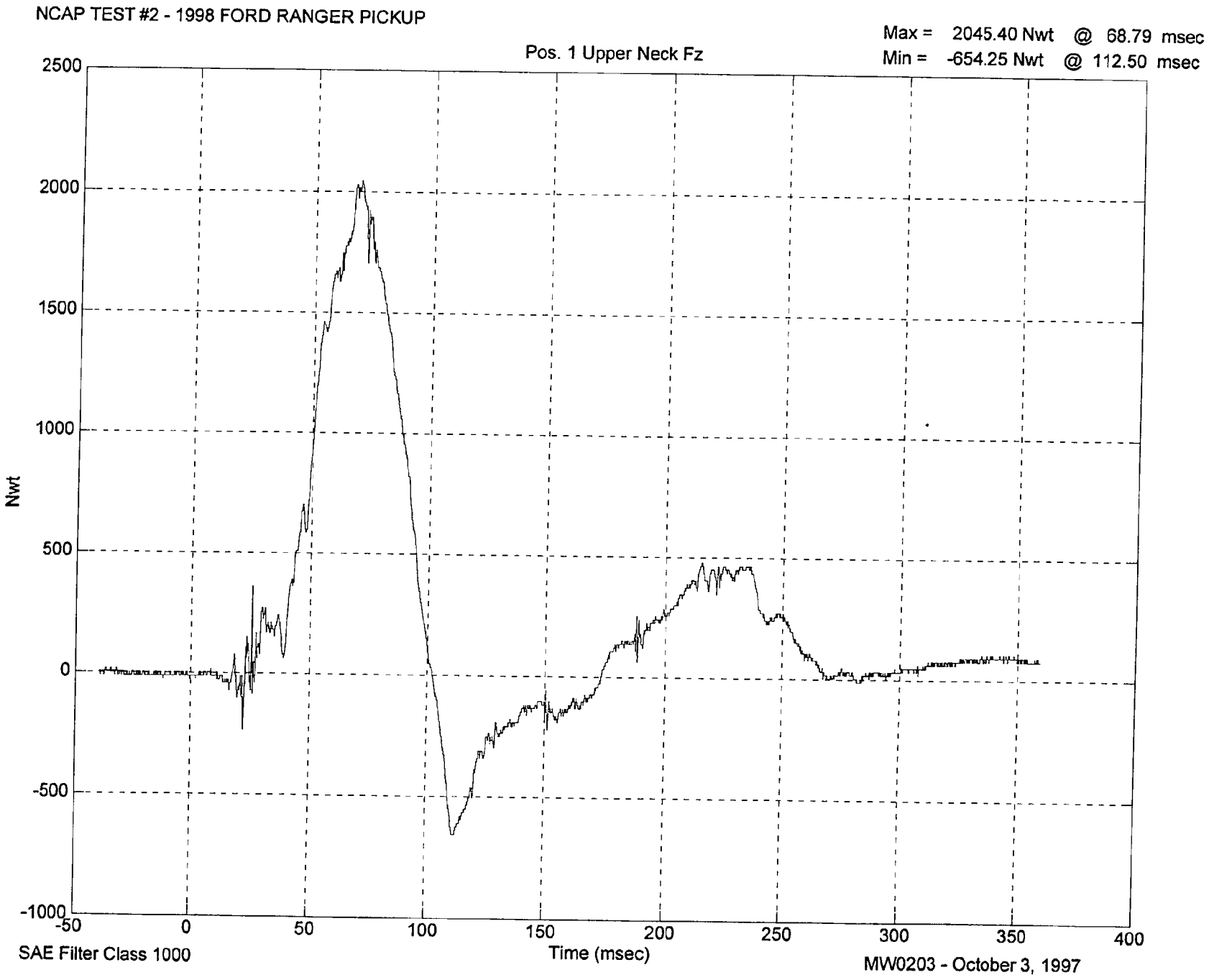
Max = 277.95 Nwt @ 62.69 msec
Min = -337.84 Nwt @ 138.59 msec

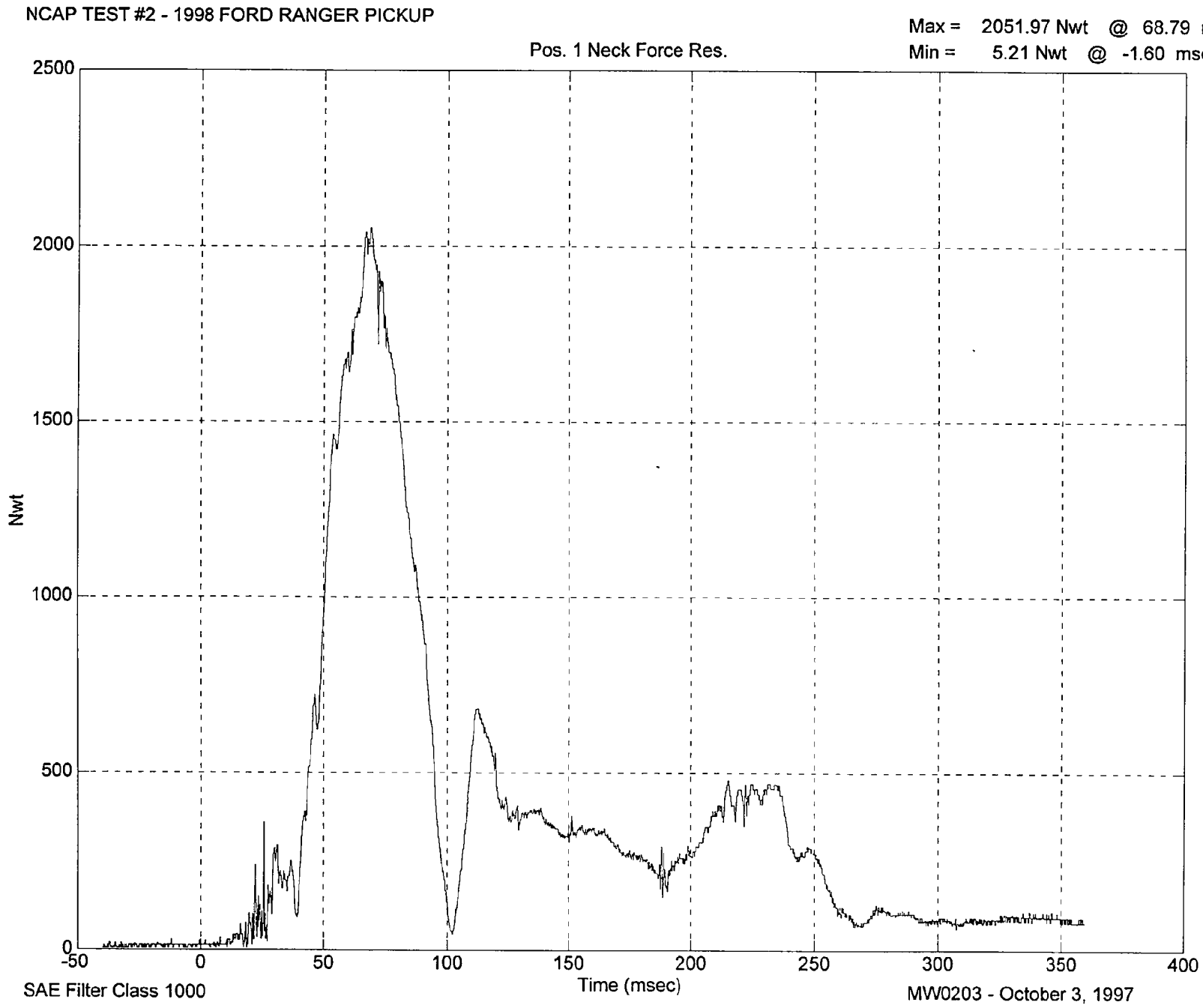



SAE Filter Class 1000

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Upper Neck Fy
Max = 140.48 Nwt @ 175.00 msec
Min = -216.28 Nwt @ 120.00 msec
Nwt
150
100
50
0
-50
-100
-150
-200
-250
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

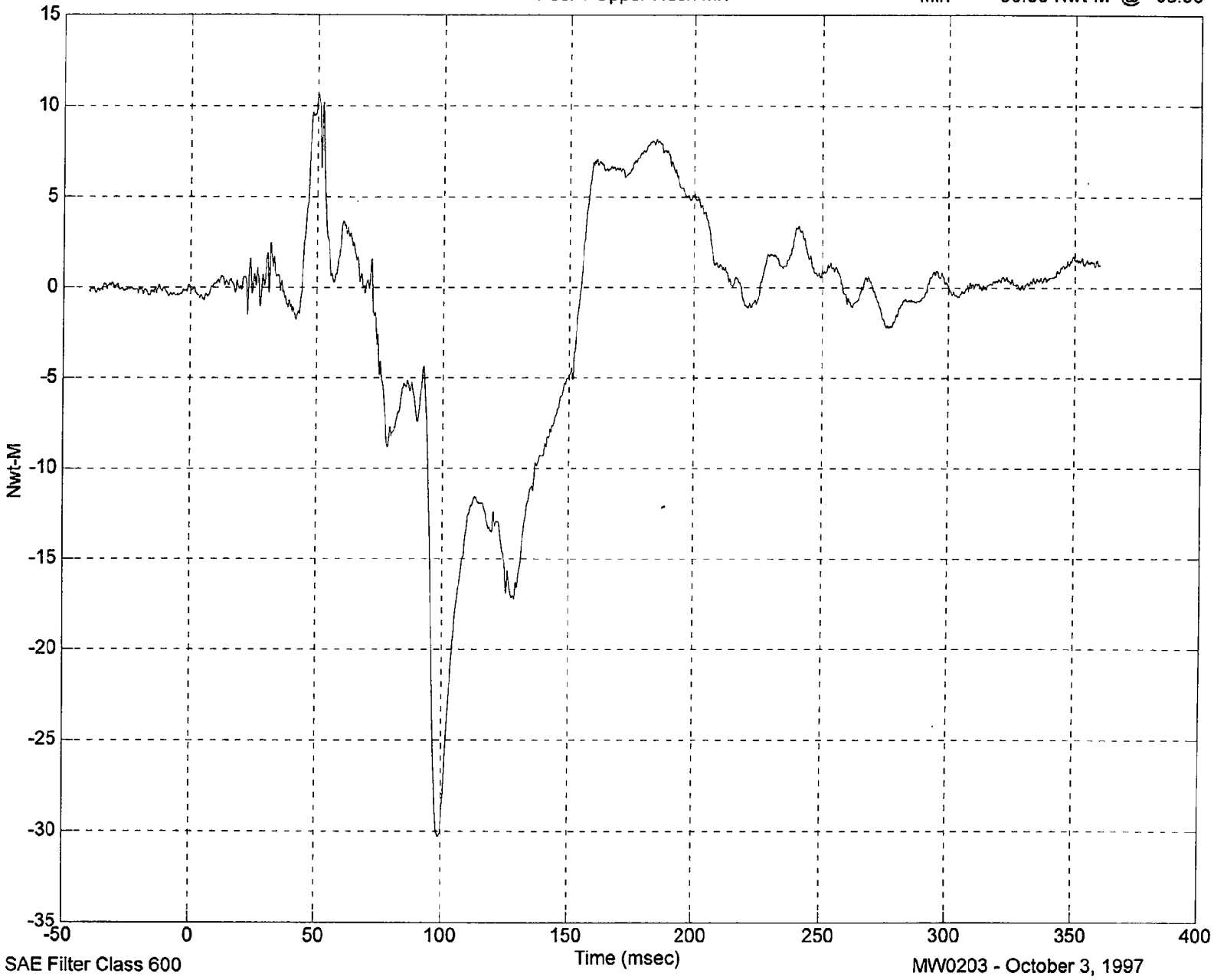

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Upper Neck Fz
Max = 2045.40 Nwt @ 68.79 msec
Min = -654.25 Nwt @ 112.50 msec
Nwt
2500
2000
1500
1000
500
0
-500
-1000
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Neck Force Res.
Max = 2051.97 Nwt @ 68.79 msec
Min = 5.21 Nwt @ -1.60 msec
2500
2000
1500
1000
500
0
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

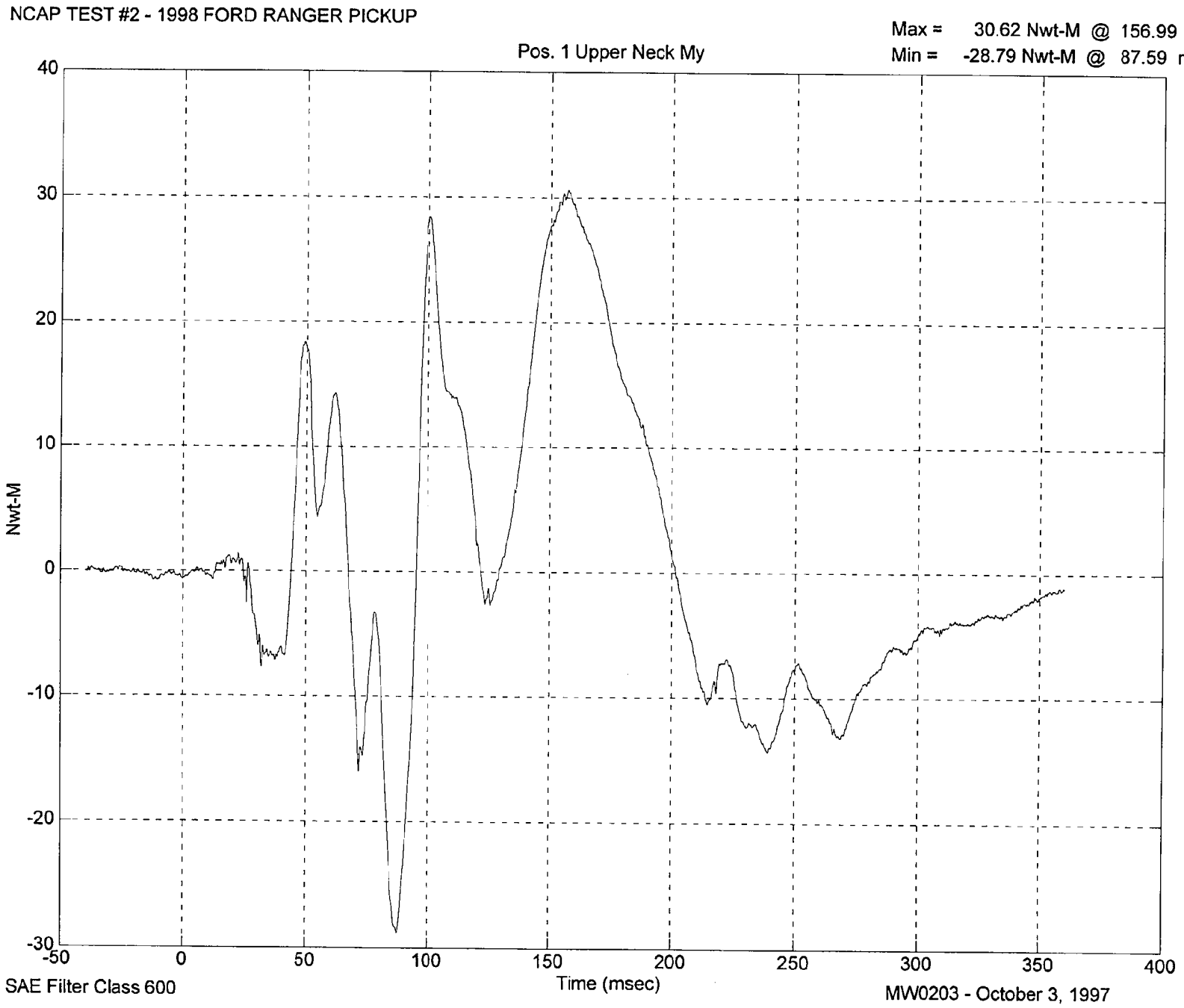
Pos. 1 Upper Neck Mx

Max = 10.65 Nwt-M @ 50.20 msec
Min = -30.30 Nwt-M @ 98.90 msec




SAE Filter Class 600

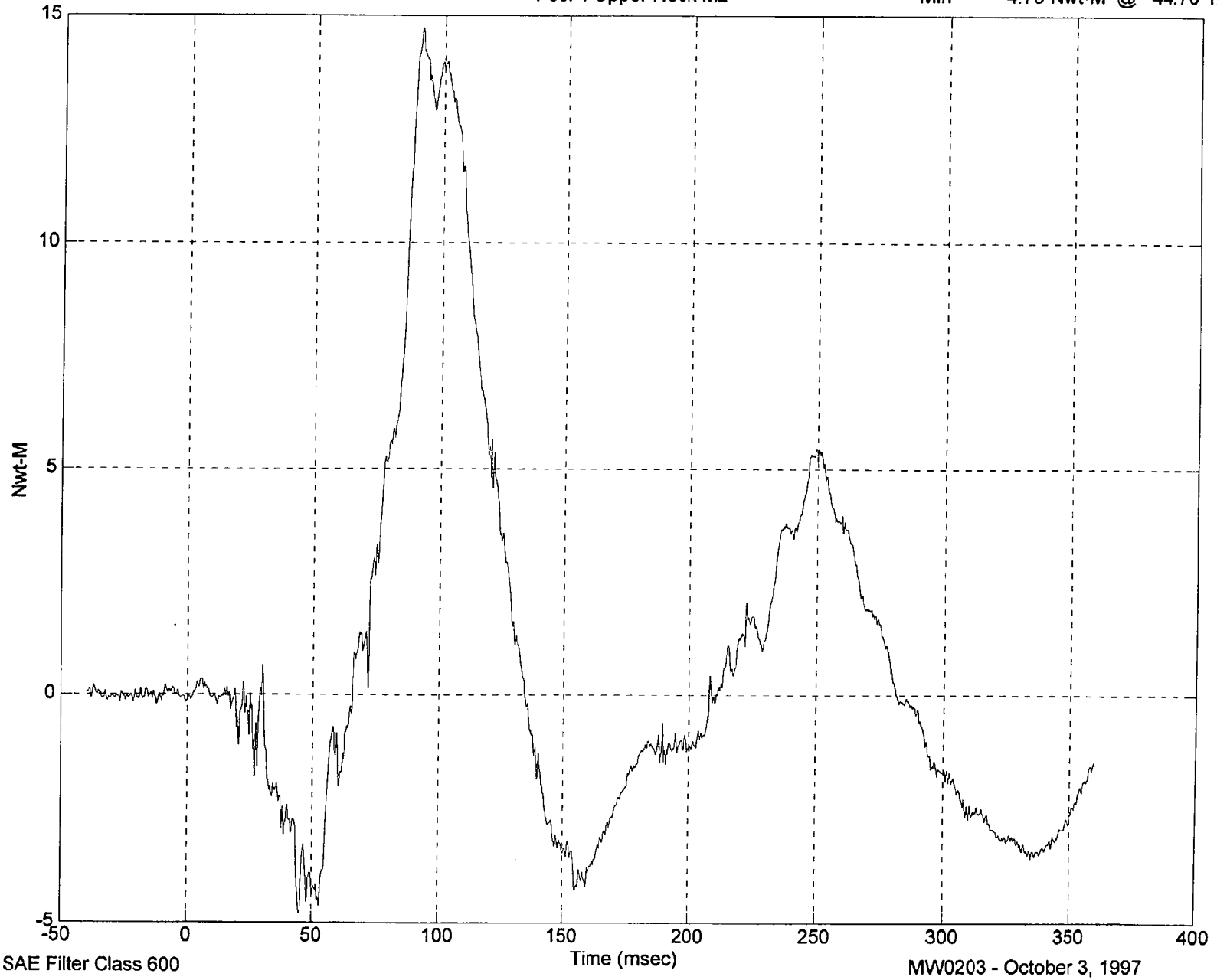
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Upper Neck My
Max = 30.62 Nwt-M @ 156.99 msec
Min = -28.79 Nwt-M @ 87.59 msec
Nwt-M
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Pos. 1 Upper Neck Mz

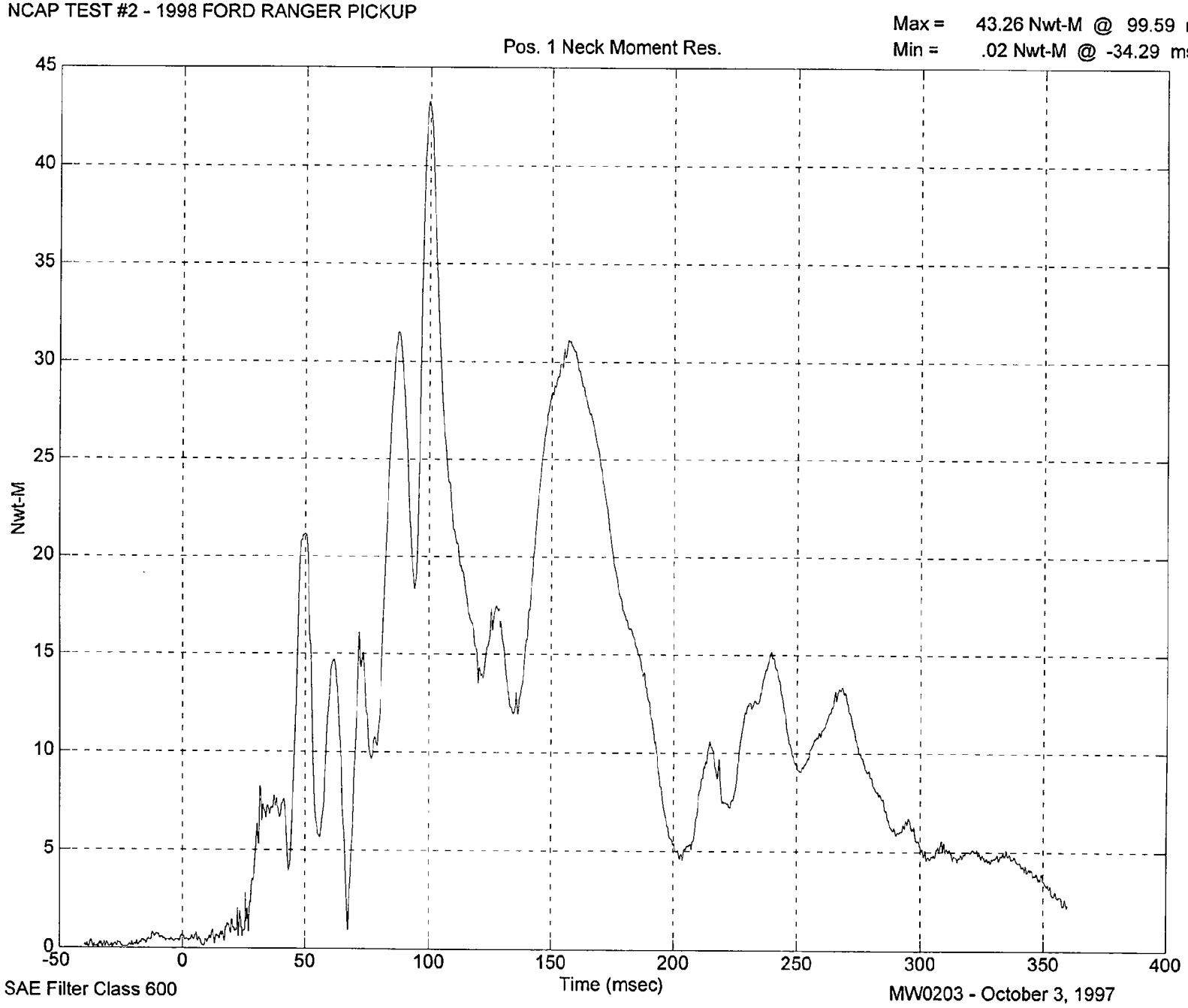
Max = 14.73 Nwt-M @ 91.09 msec
Min = -4.79 Nwt-M @ 44.70 msec




SAE Filter Class 600

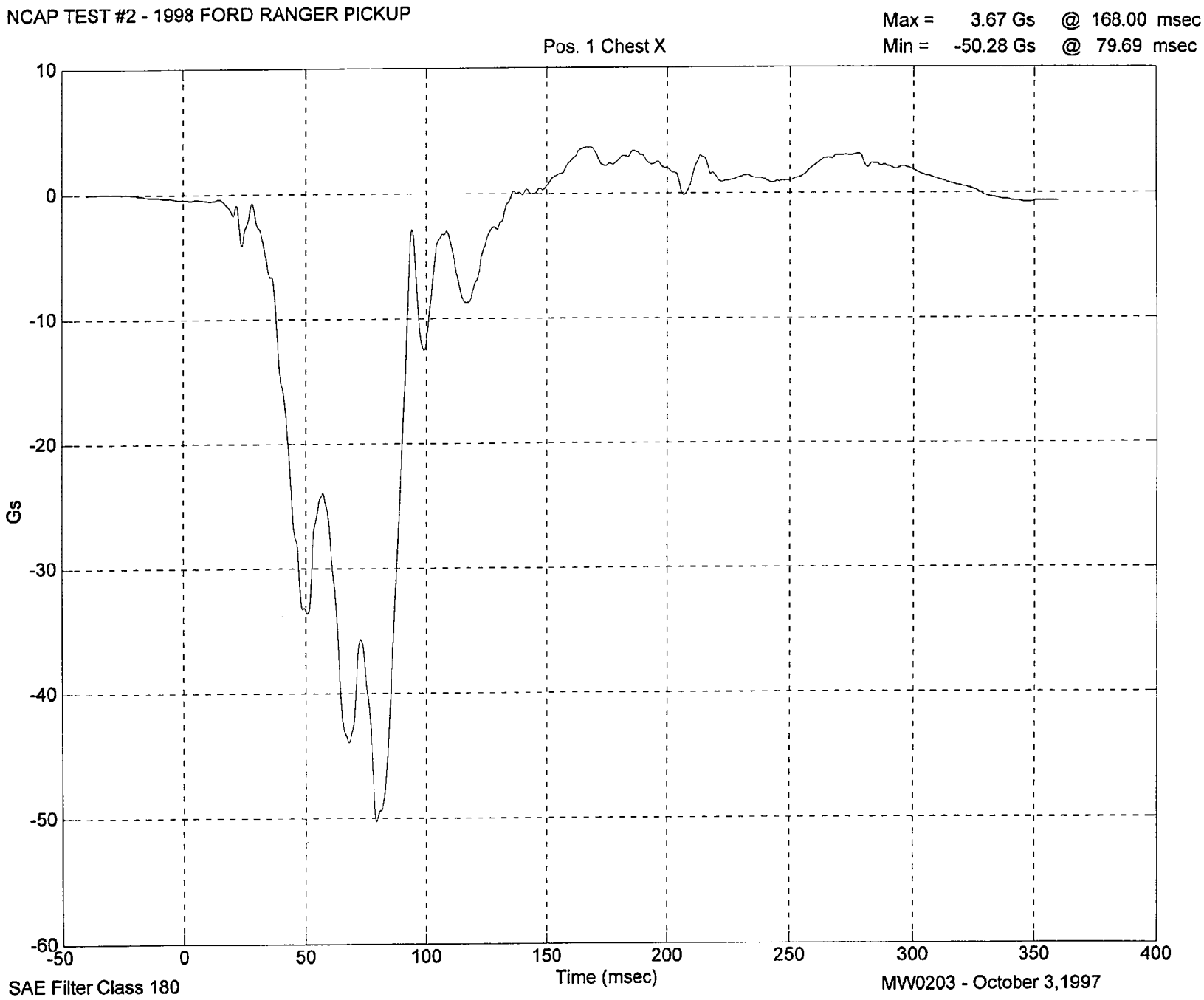
MW0203 - October 3, 1997

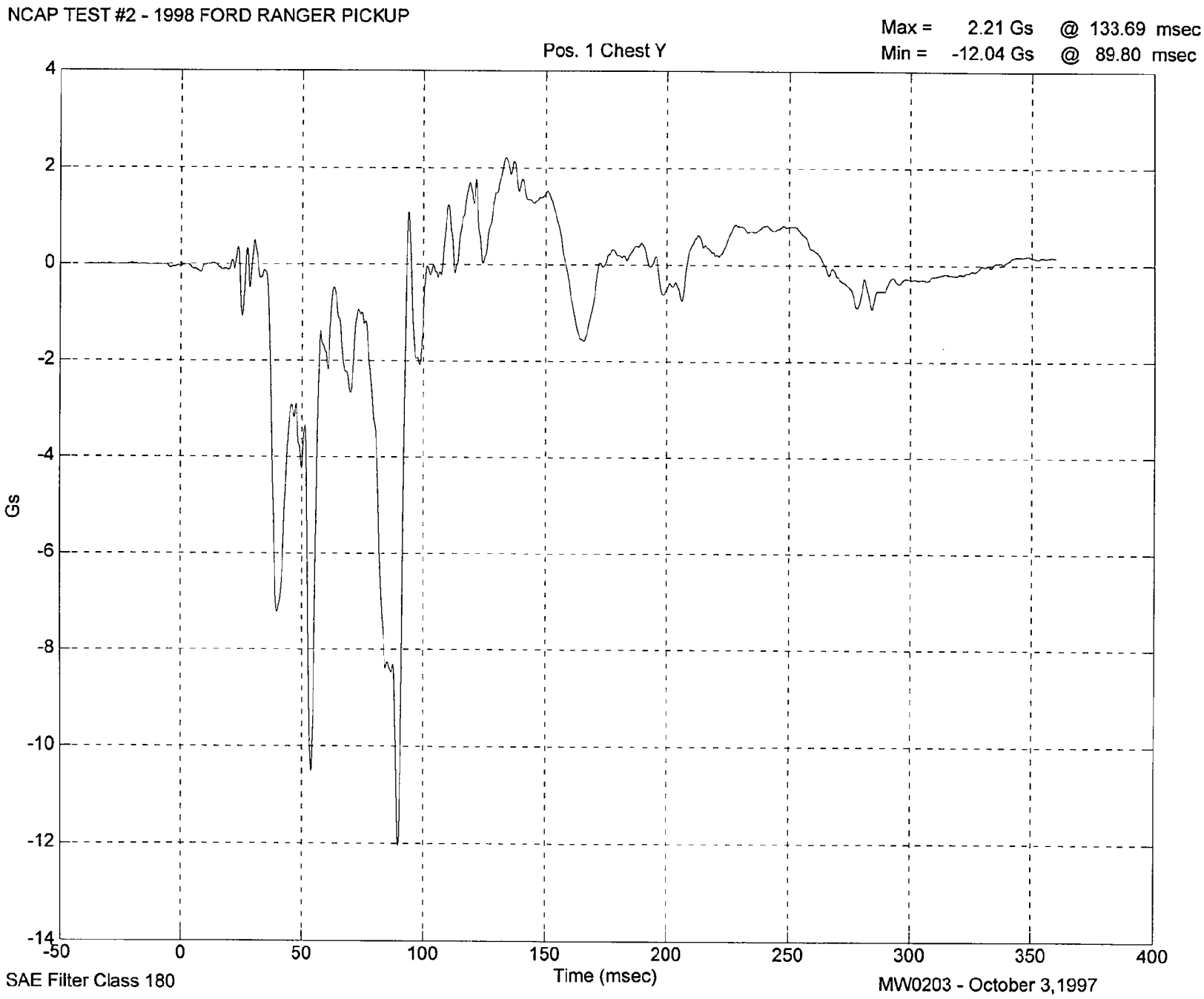
NCAP TEST #2 - 1998 FORD RANGER PICKUP




SAE Filter Class 600

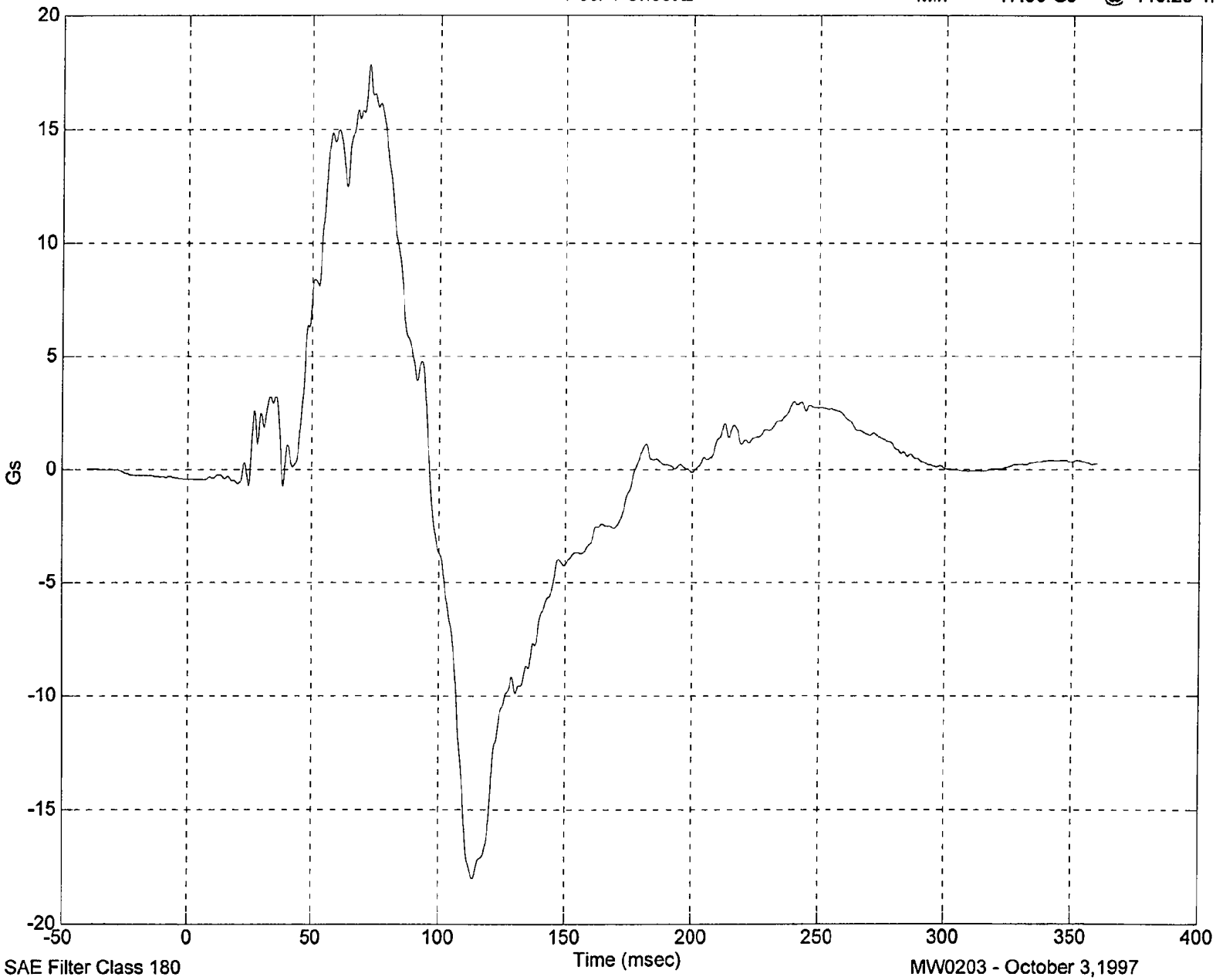
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Chest X
Max = 3.67 Gs @ 168.00 msec
Min = -50.28 Gs @ 79.69 msec
10
0
-10
-20
-30
-40
-50
-60
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Chest Y
Max = 2.21 Gs @ 133.69 msec
Min = -12.04 Gs @ 89.80 msec
Gs
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

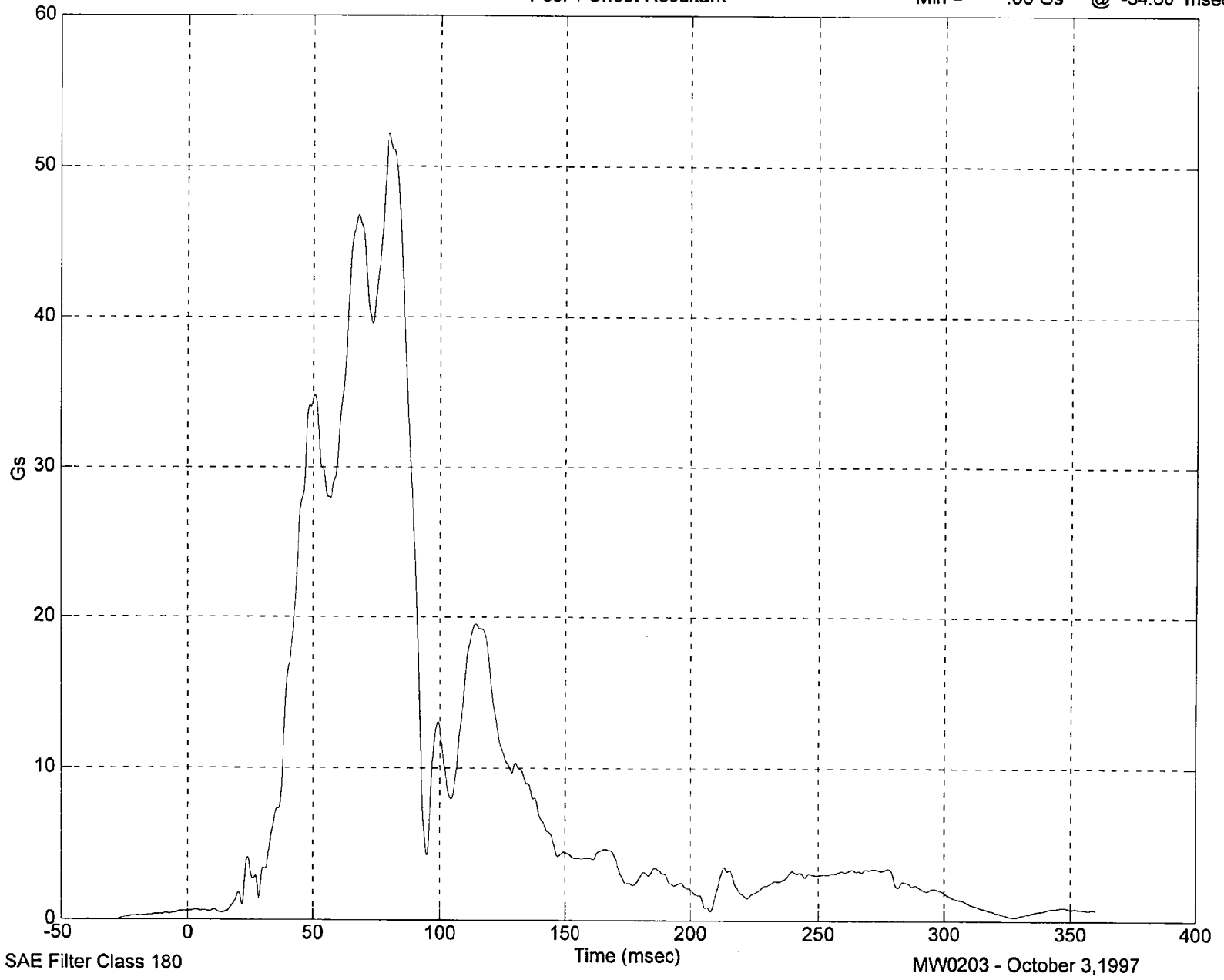
Max = 17.83 Gs @ 72.29 msec
Min = -17.99 Gs @ 113.29 msec



NCAP TEST #2 - 1998 FORD RANGER PICKUP

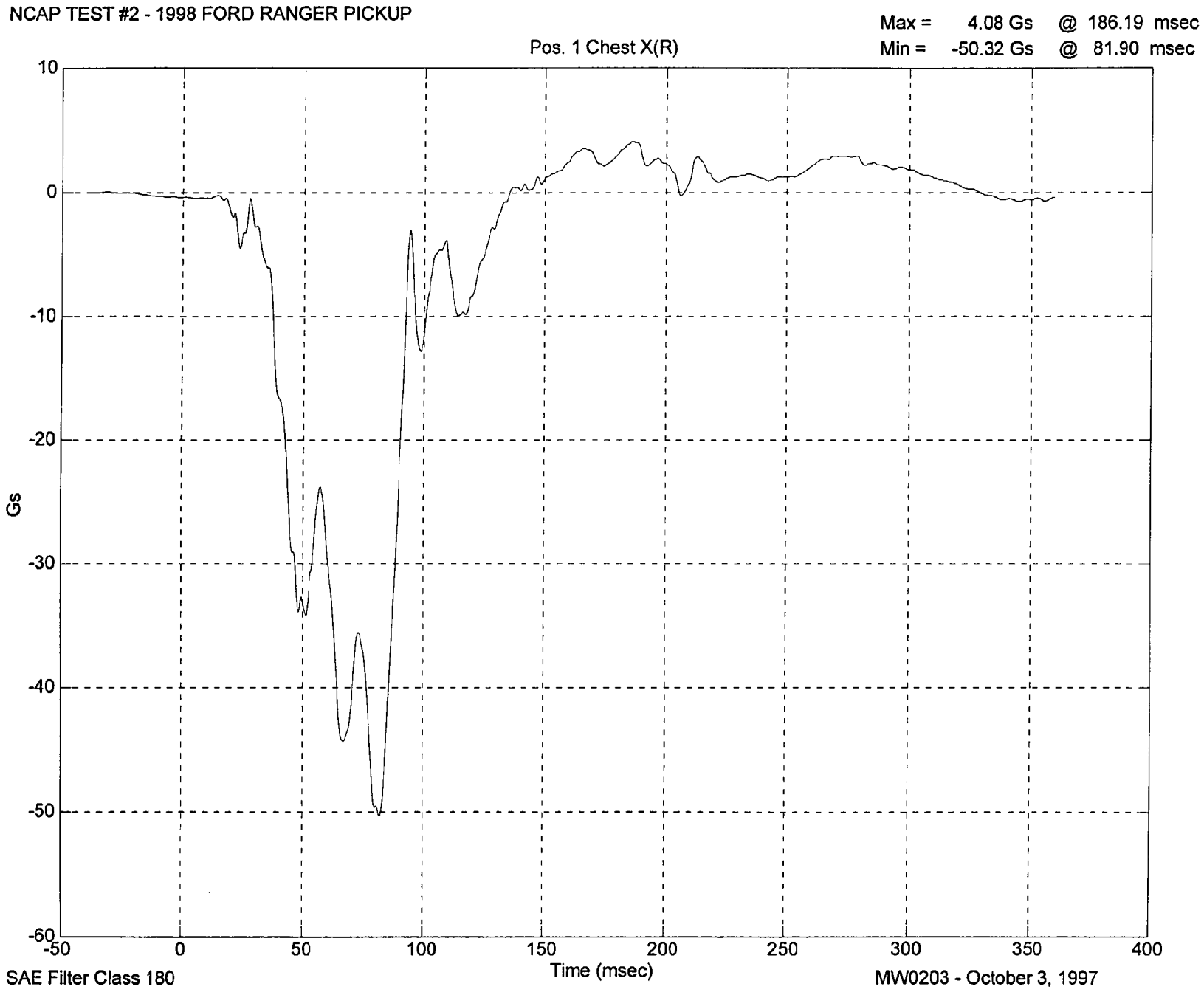
Pos. 1 Chest Resultant

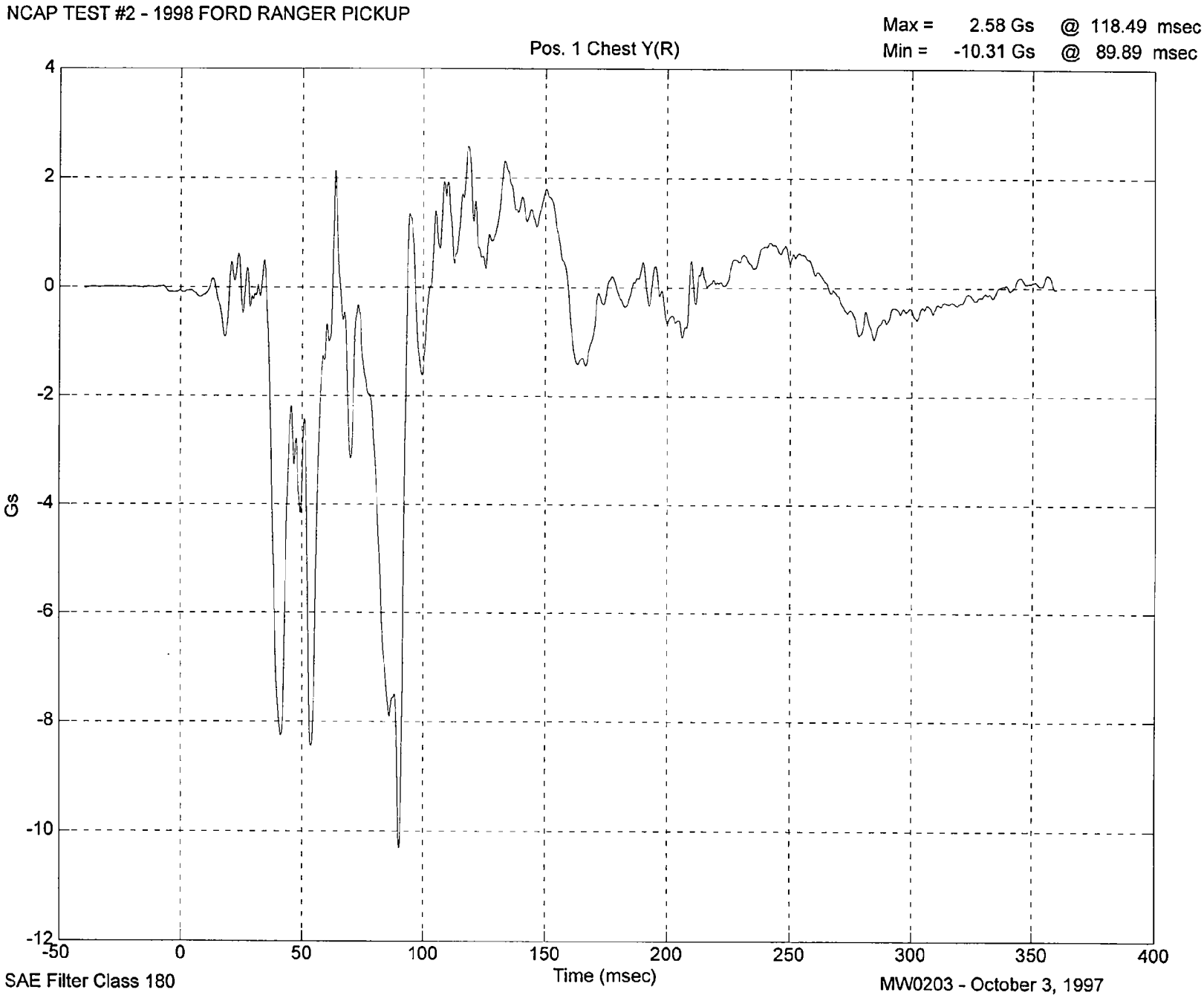
Max = 52.23 Gs @ 79.69 msec
Min = .00 Gs @ -34.60 msec

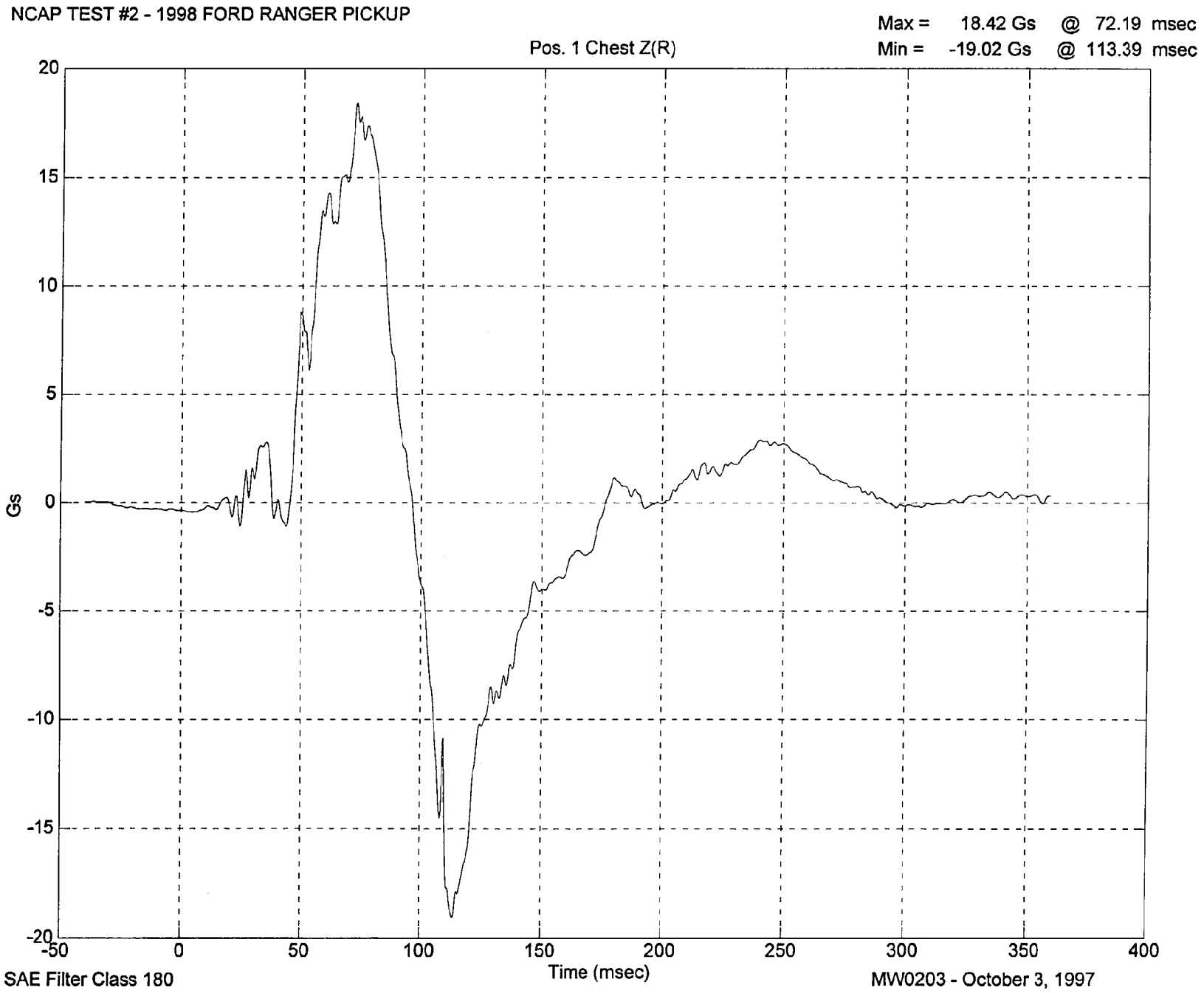



SAE Filter Class 180

MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Chest X(R)
Max = 4.08 Gs @ 186.19 msec
Min = -50.32 Gs @ 81.90 msec
10
0
-10
-20
-30
-40
-50
-60
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3, 1997

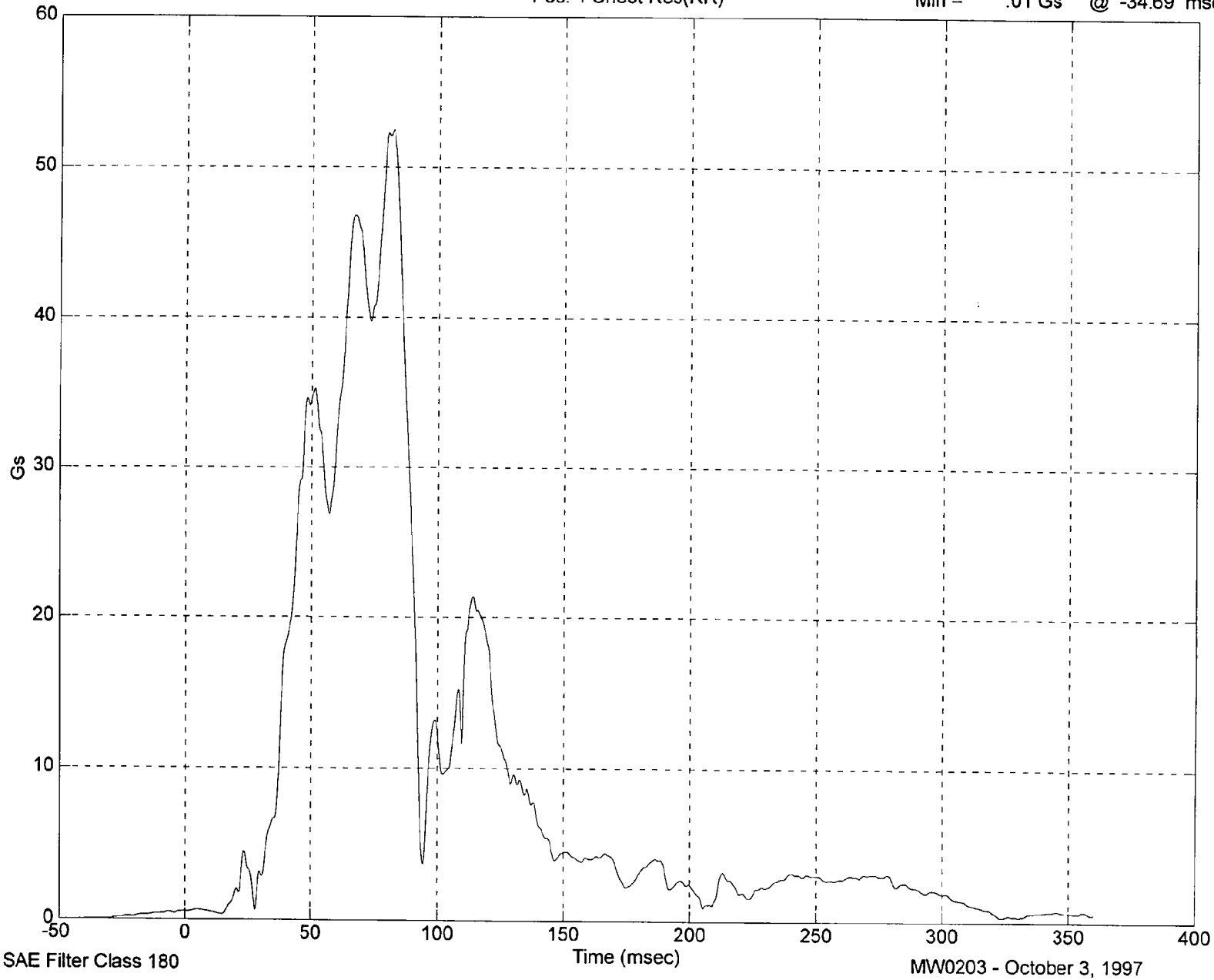

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Chest Y(R)
Max = 2.58 Gs @ 118.49 msec
Min = -10.31 Gs @ 89.89 msec
Gs
4
2
0
-2
-4
-6
-8
-10
-12
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Chest Z(R)
Max = 18.42 Gs @ 72.19 msec
Min = -19.02 Gs @ 113.39 msec
Gs
Time (msec)
SAE Filter Class 180
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Pos. 1 Chest Res(RR)

Max = 52.49 Gs @ 81.69 msec
Min = .01 Gs @ -34.69 msec




SAE Filter Class 180

MW0203 - October 3, 1997

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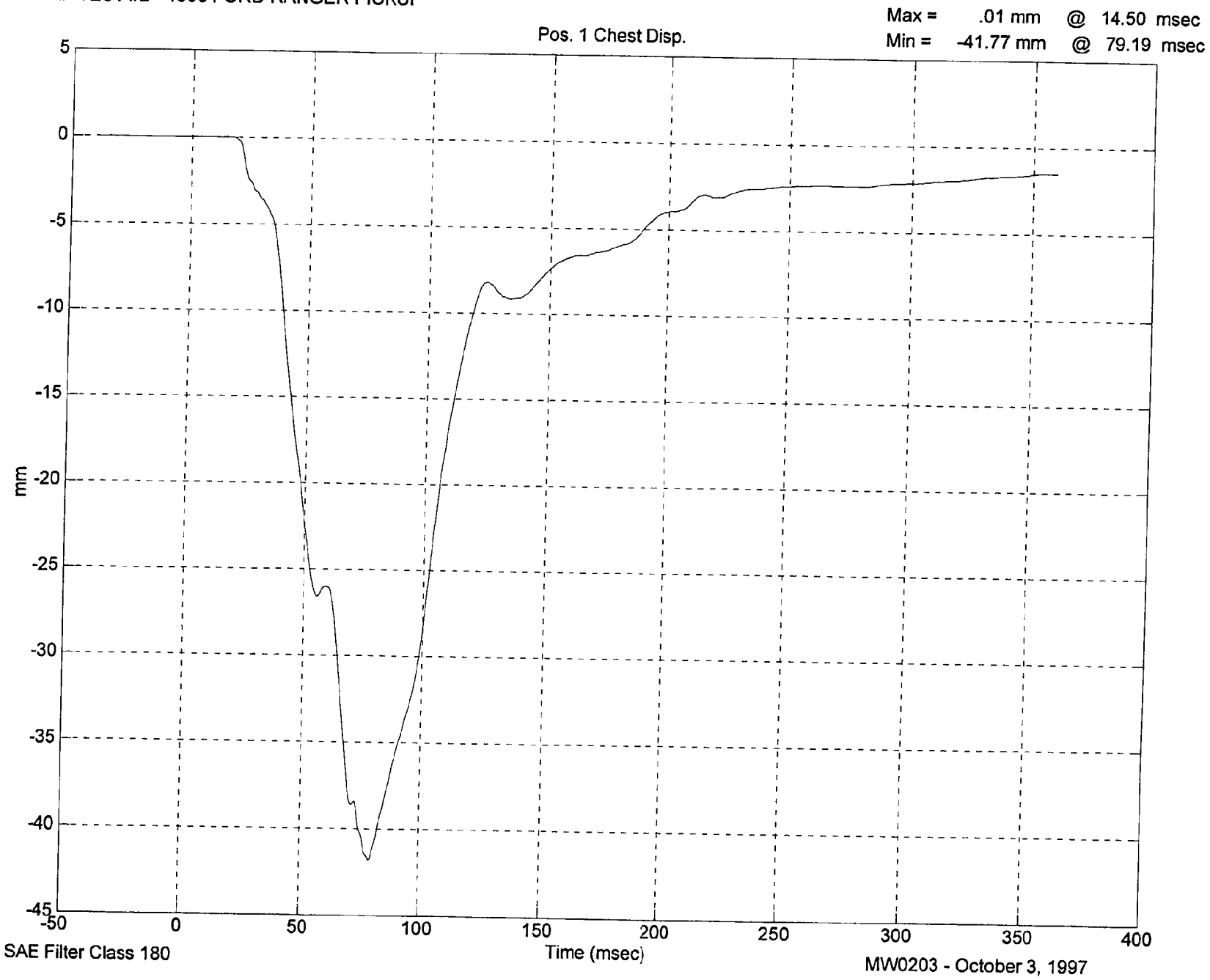
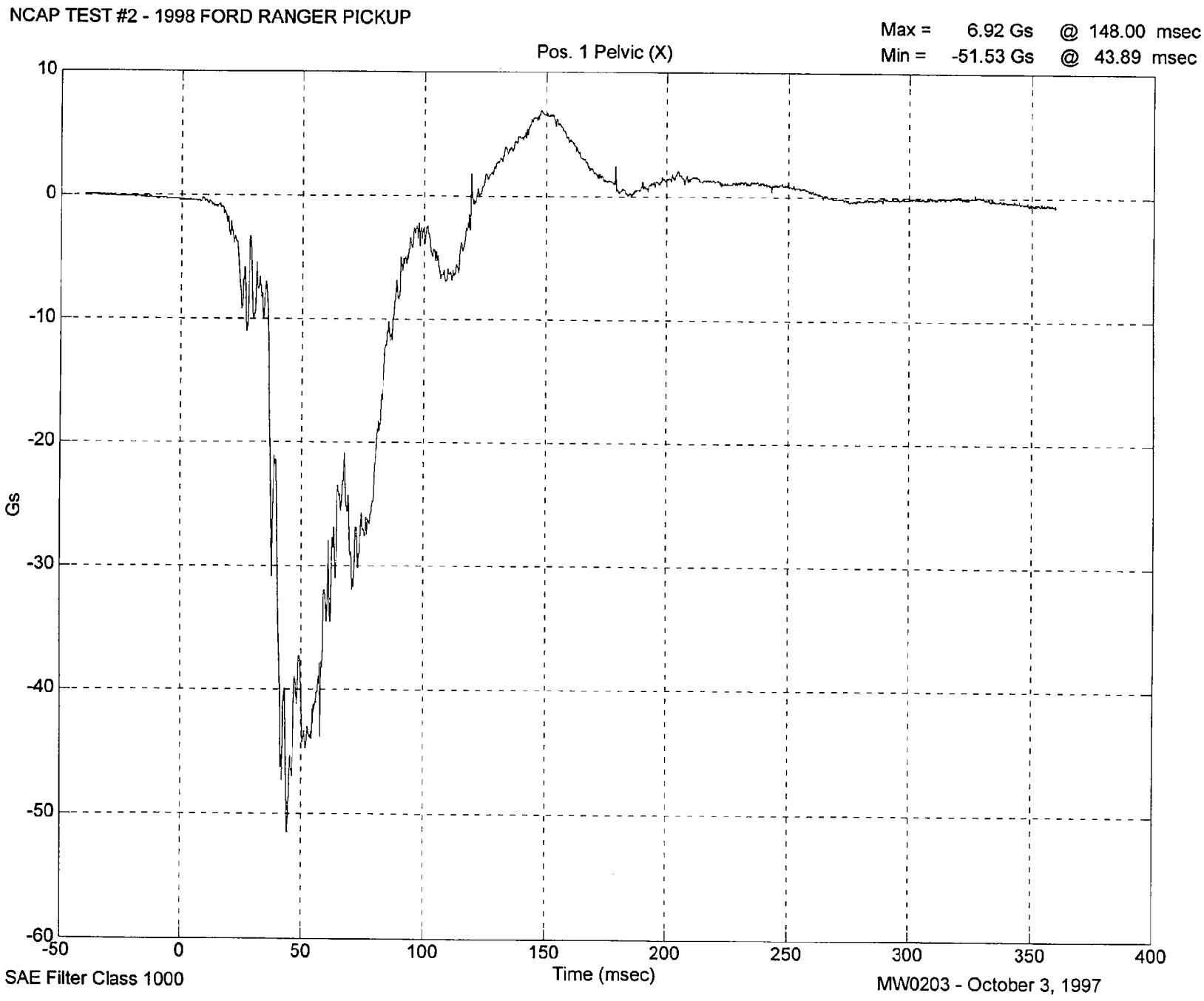
NCAP TEST #2 - 1998 FORD RANGER PICKUP

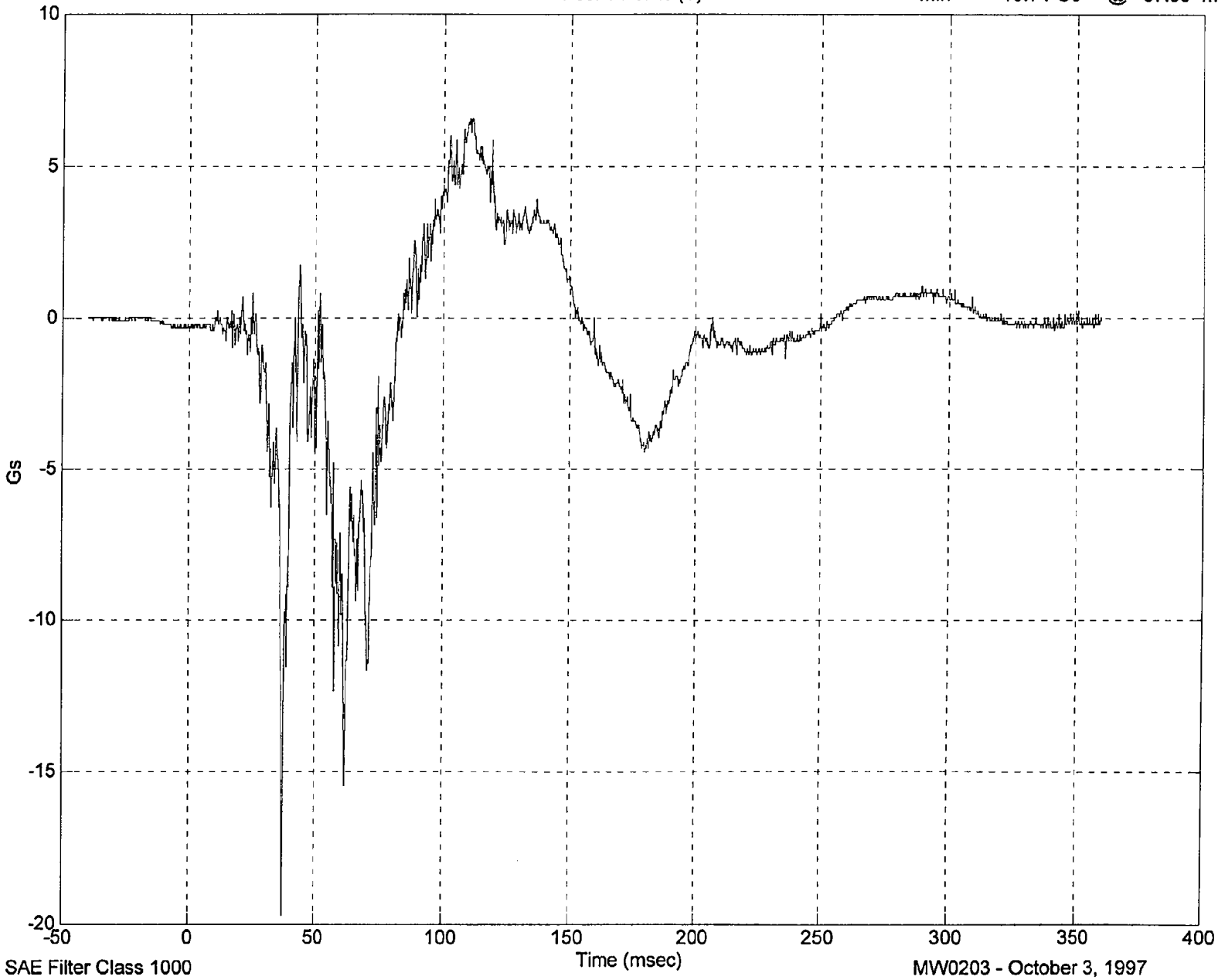



NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Pelvic (X)
Max = 6.92 Gs @ 148.00 msec
Min = -51.53 Gs @ 43.89 msec
10
0
-10
-20
-30
-40
-50
-60
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

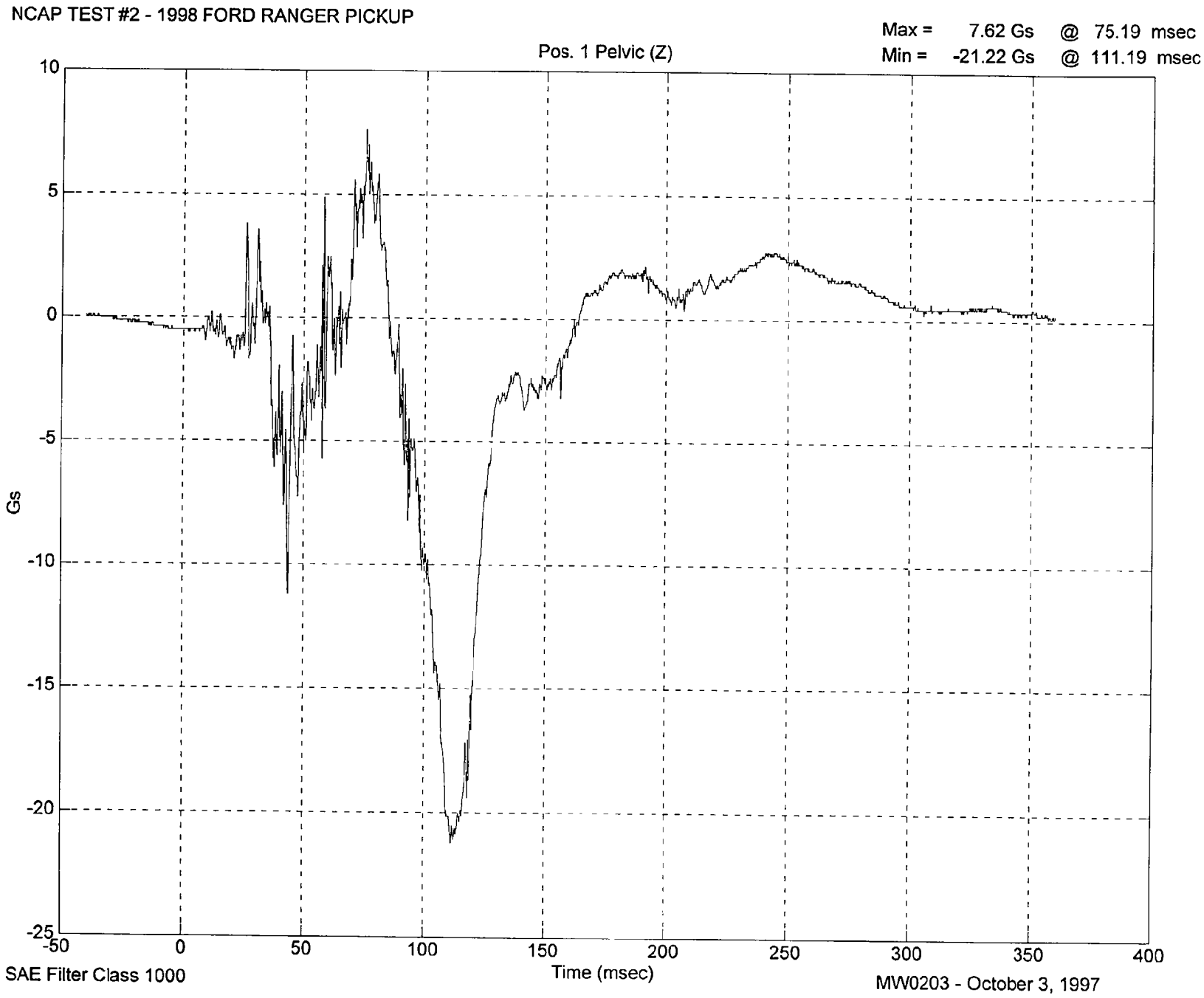
Pos. 1 Pelvic (Y)

Max = 6.57 Gs @ 111.19 msec
Min = -19.71 Gs @ 37.59 msec




SAE Filter Class 1000

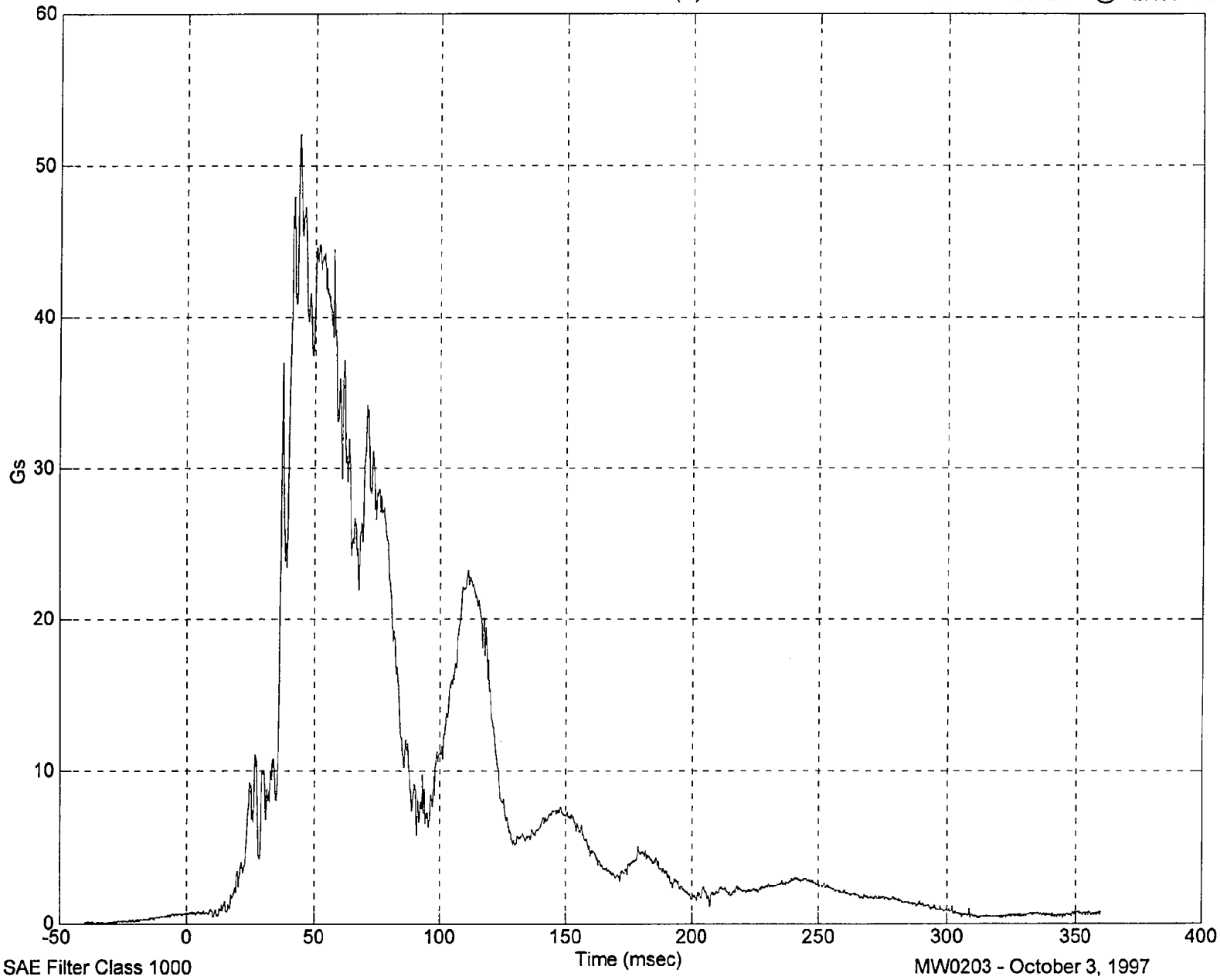
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Pelvic (Z)
Max = 7.62 Gs @ 75.19 msec
Min = -21.22 Gs @ 111.19 msec
10
5
0
-5
-10
-15
-20
-25
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

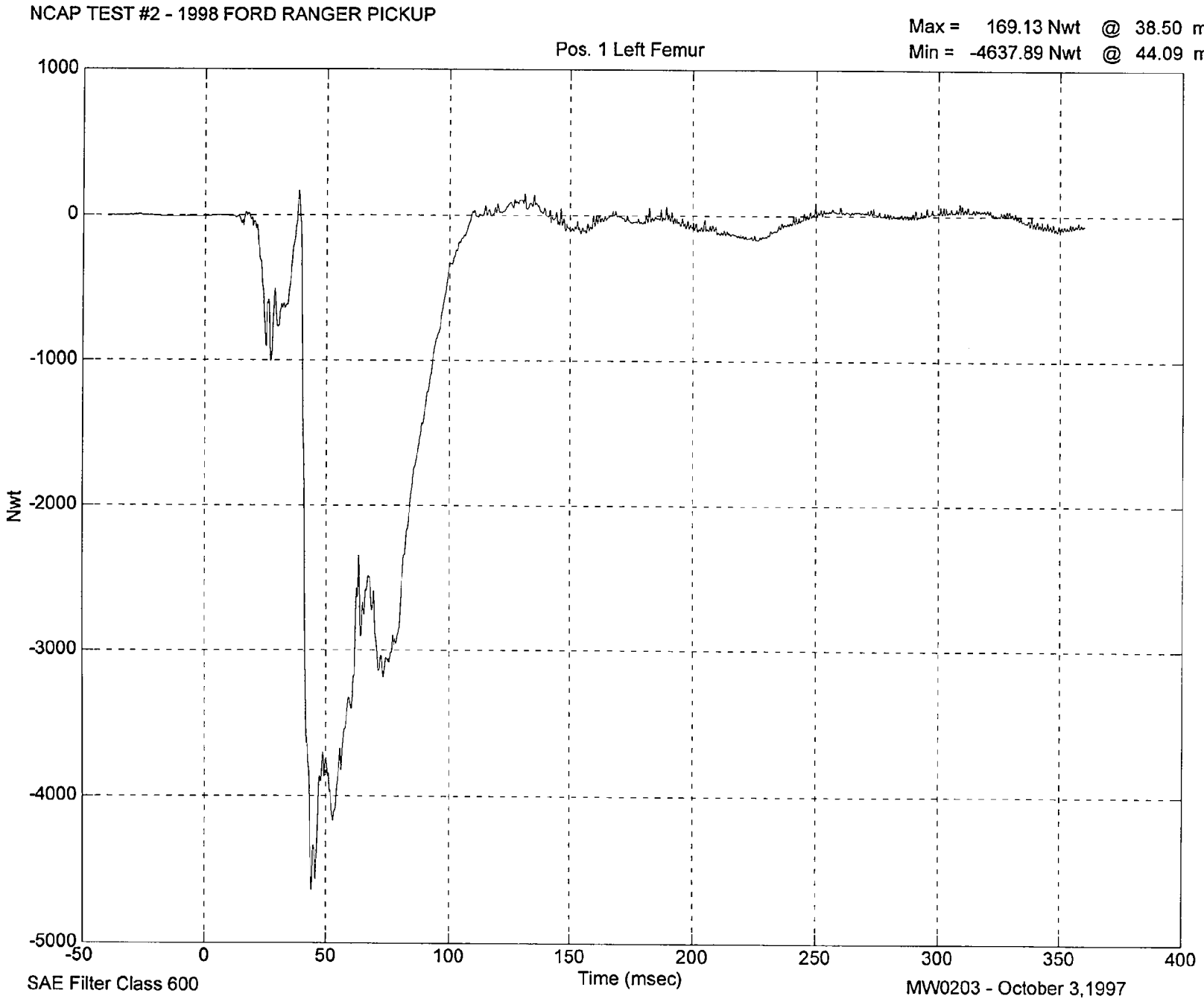
Pos. 1 Pelvic (R)

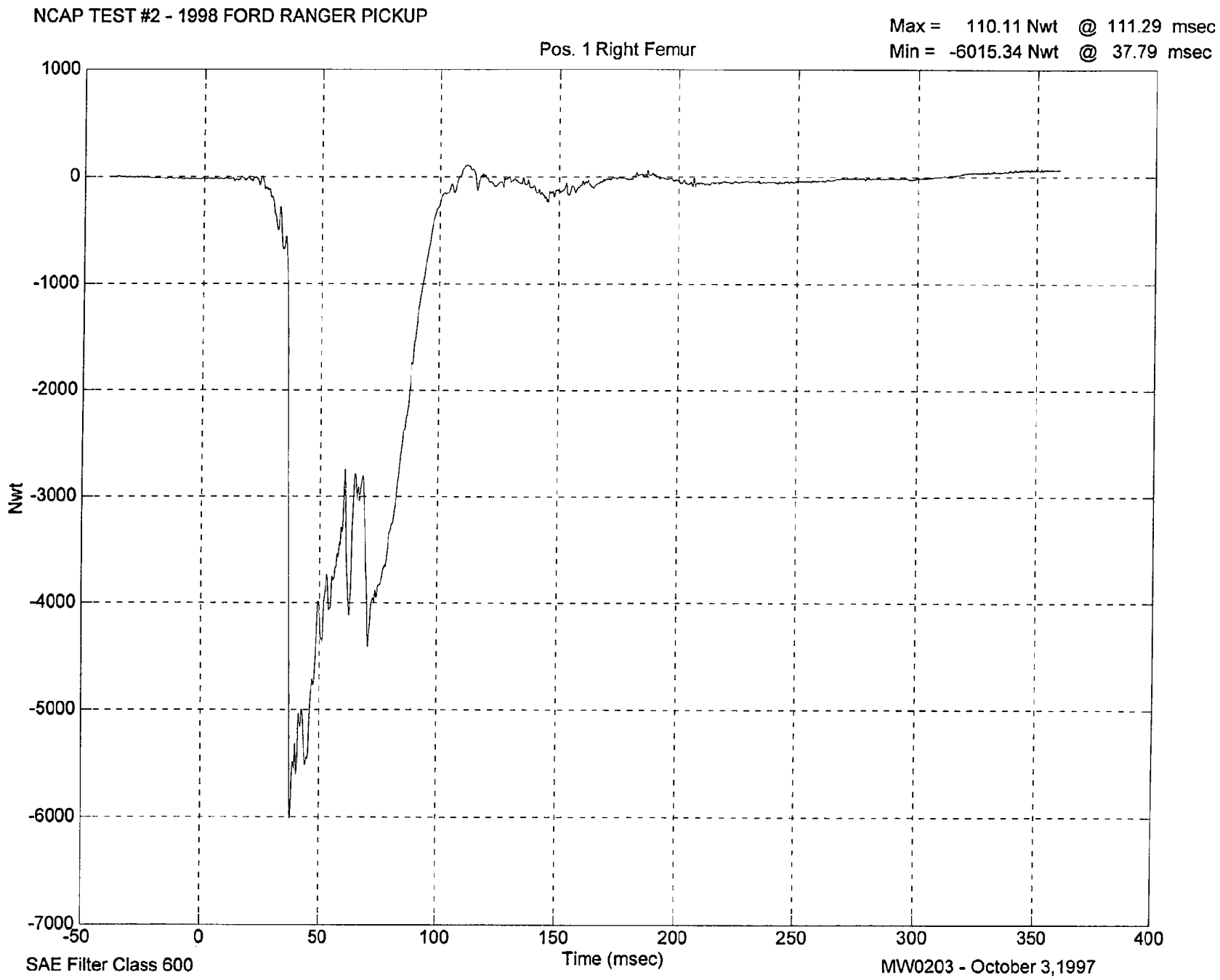
Max = 52.06 Gs @ 43.89 msec
Min = .05 Gs @ -27.89 msec

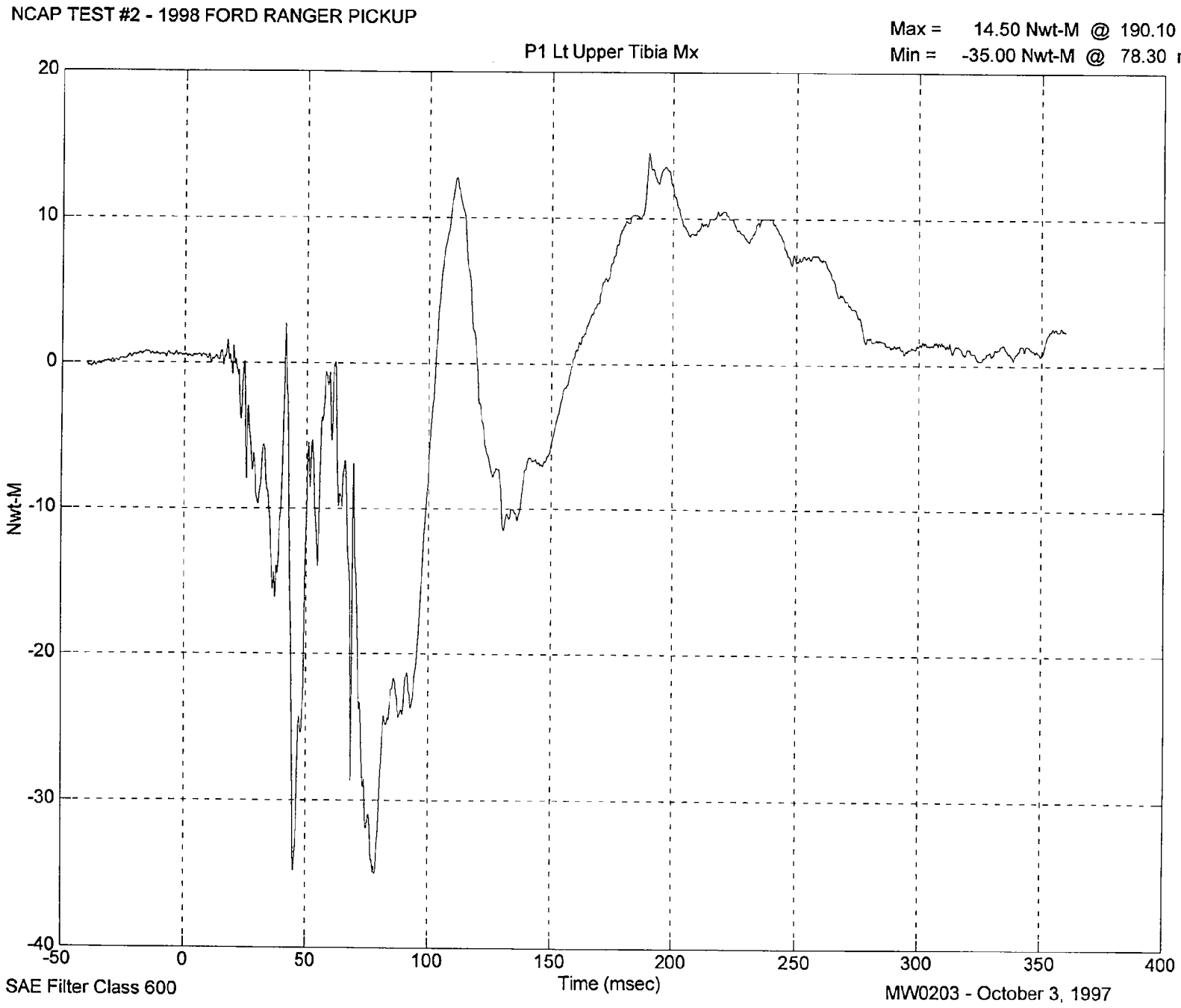



SAE Filter Class 1000

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Left Femur
Max = 169.13 Nwt @ 38.50 msec
Min = -4637.89 Nwt @ 44.09 msec
1000
0
-1000
-2000
-3000
-4000
-5000
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3,1997

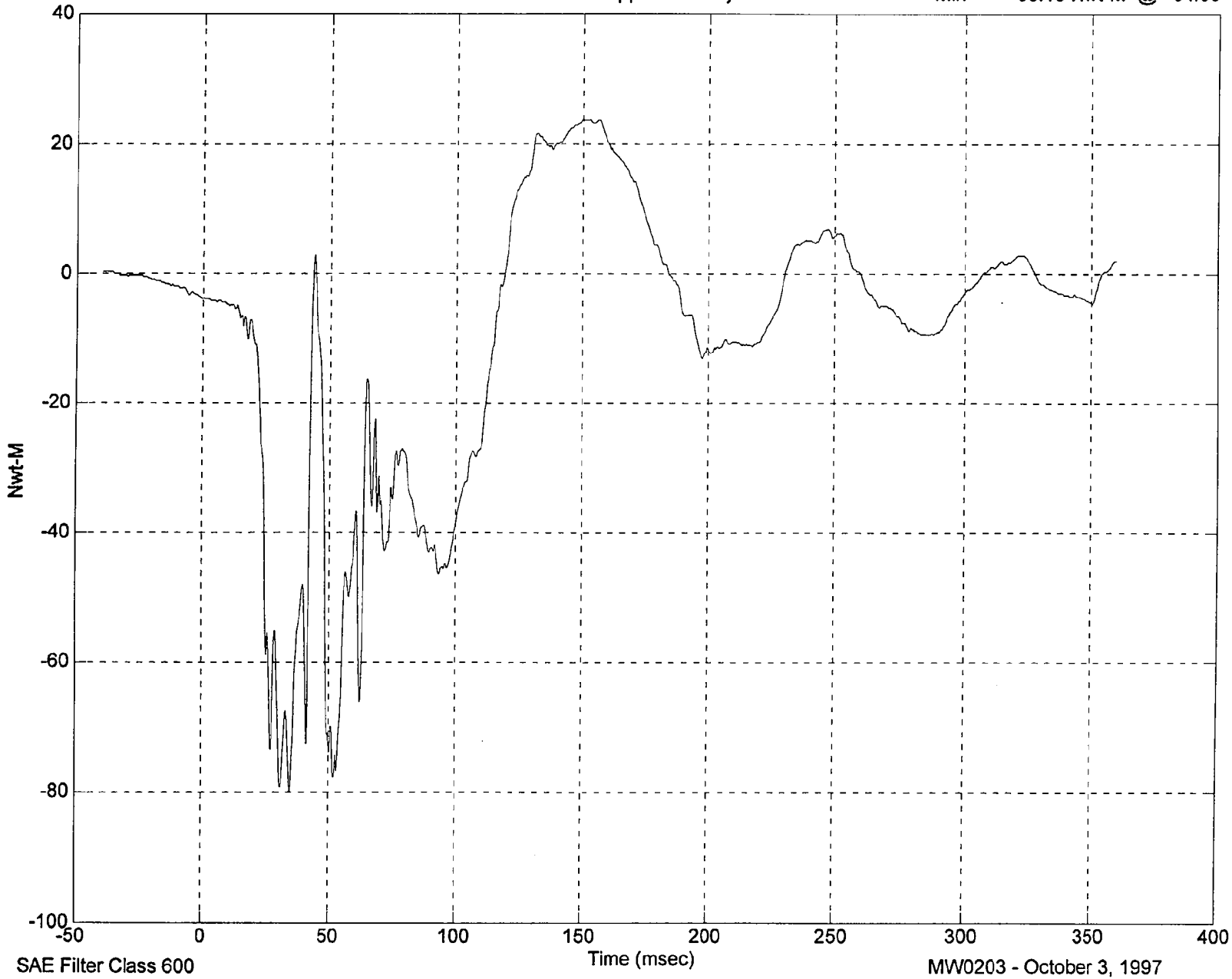

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Right Femur
Max = 110.11 Nwt @ 111.29 msec
Min = -6015.34 Nwt @ 37.79 msec
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
P1 Lt Upper Tibia Mx
Max = 14.50 Nwt-M @ 190.10 msec
Min = -35.00 Nwt-M @ 78.30 msec
Nwt-M
20
10
0
-10
-20
-30
-40
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

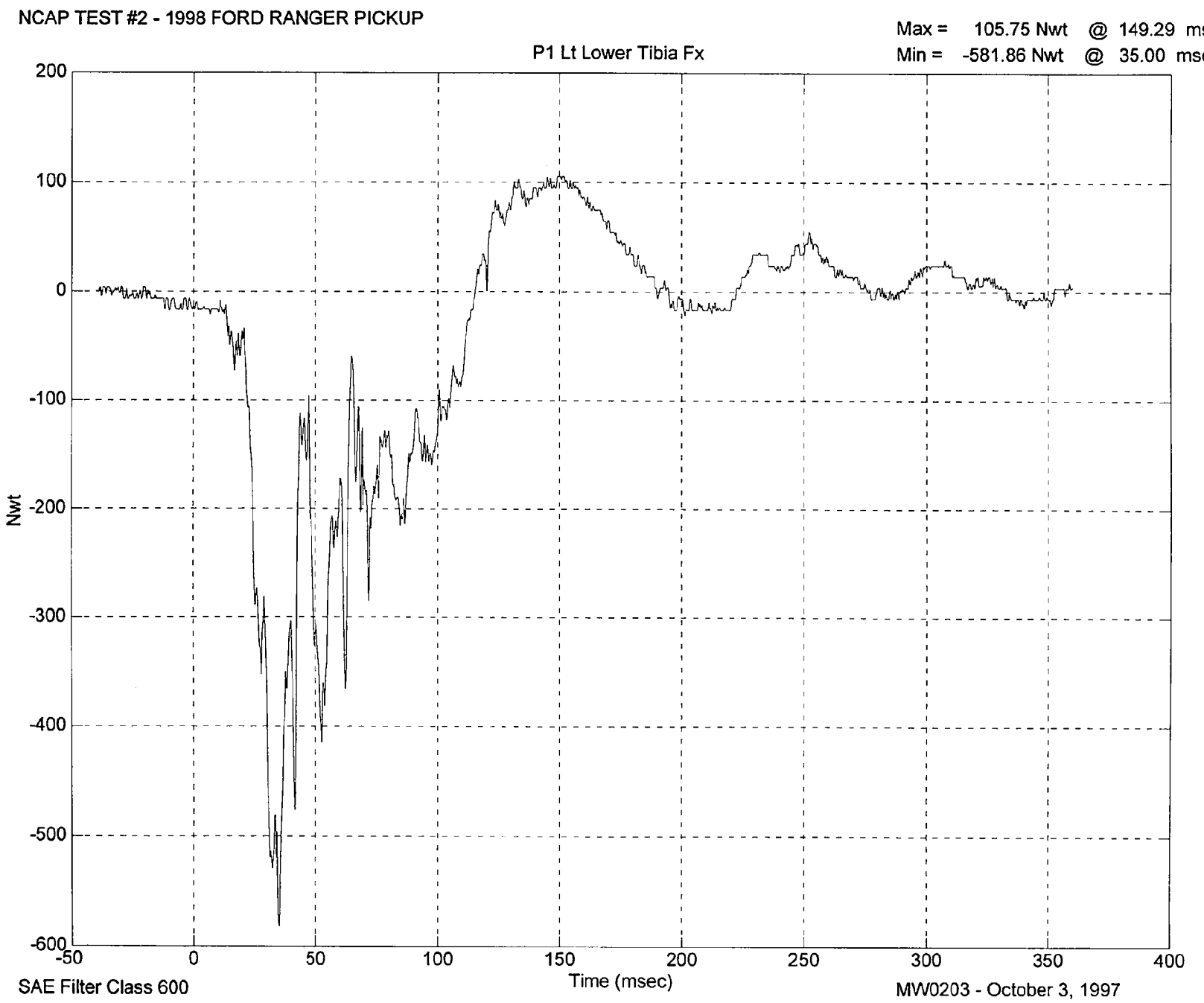
P1 Lt Upper Tibia My

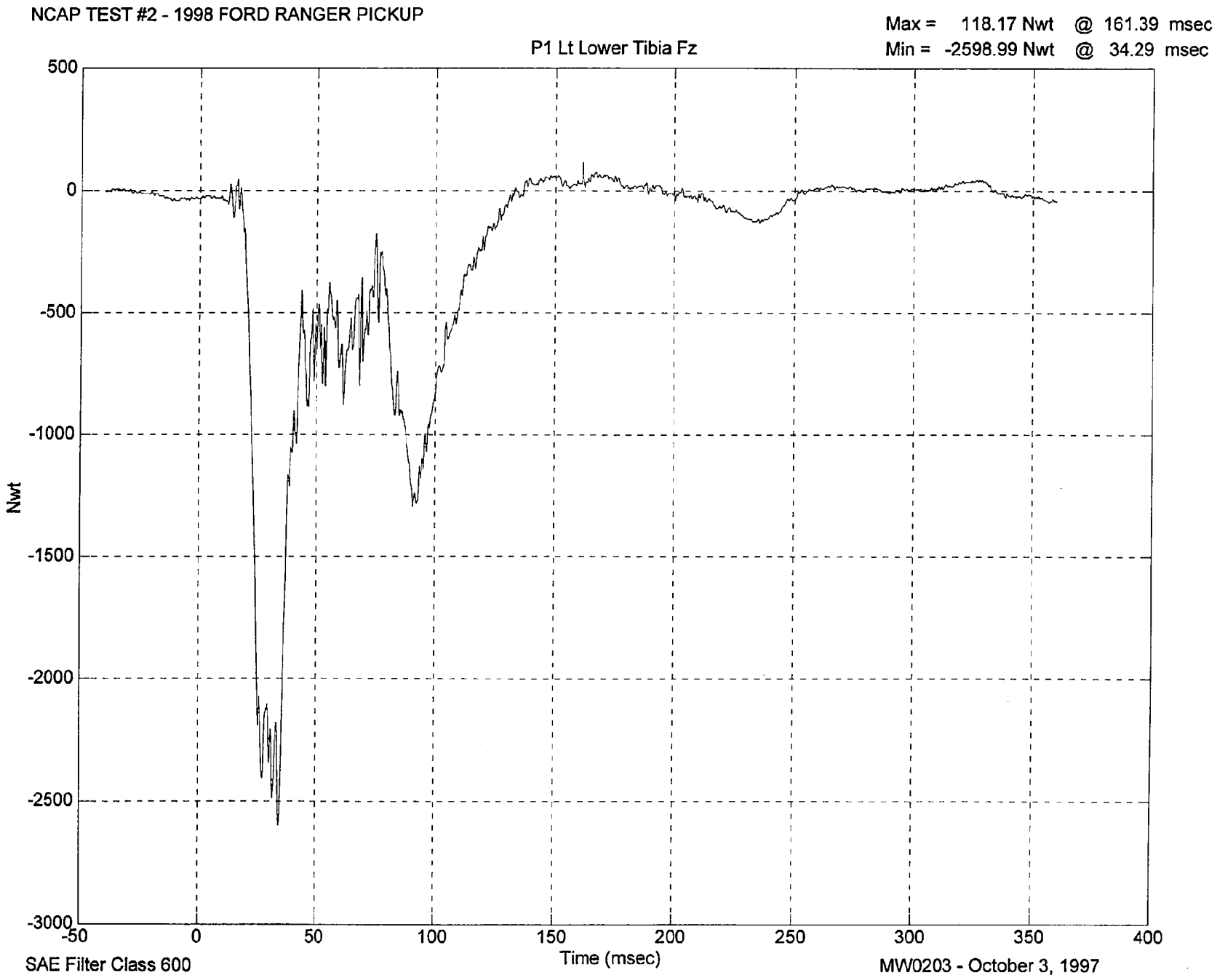
Max = 23.74 Nwt-M @ 149.60 msec
Min = -80.13 Nwt-M @ 34.69 msec

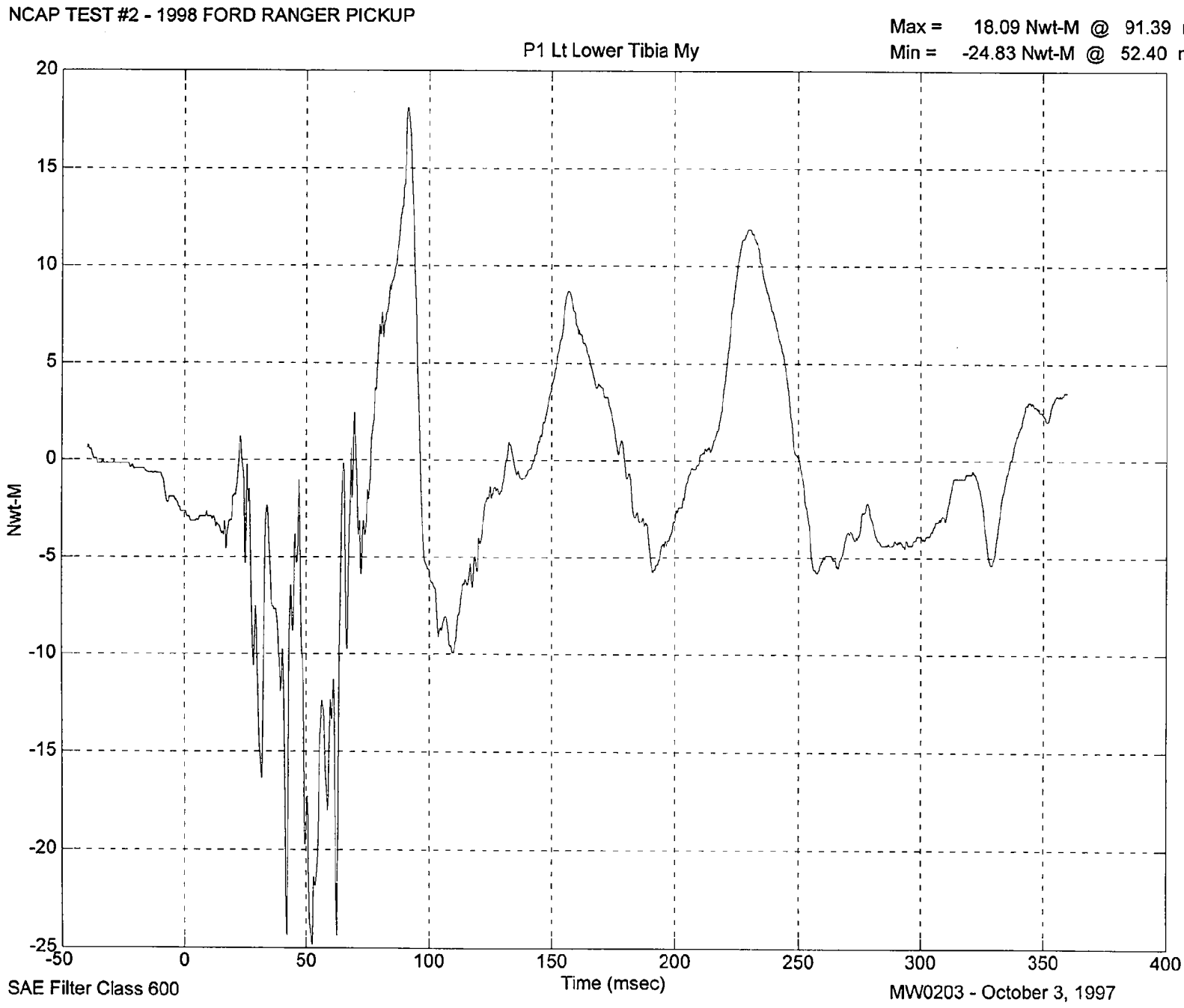



SAE Filter Class 600

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
P1 Lt Lower Tibia Fx
Max = 105.75 Nwt @ 149.29 msec
Min = -581.86 Nwt @ 35.00 msec
Nwt
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

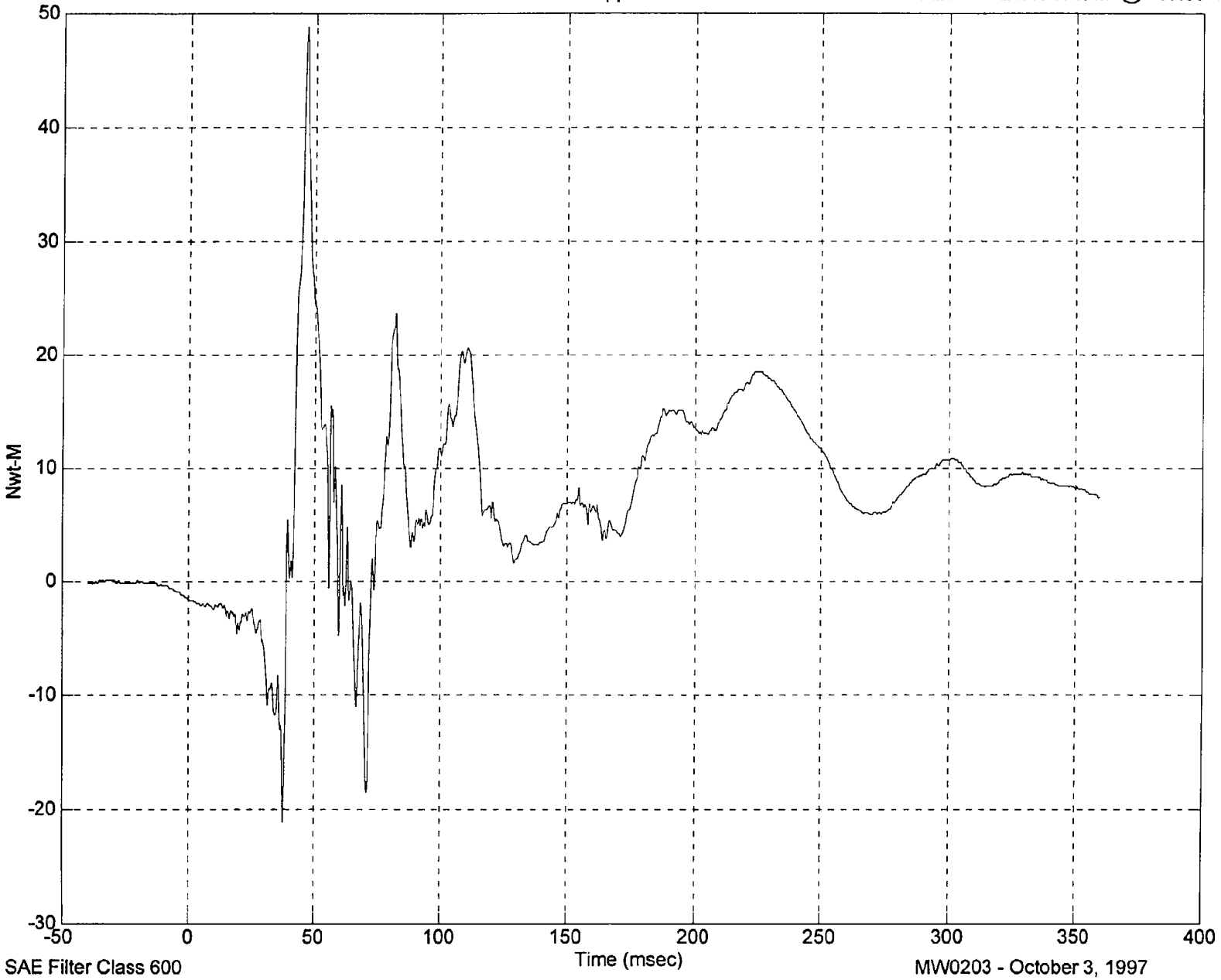

NCAP TEST #2 - 1998 FORD RANGER PICKUP
P1 Lt Lower Tibia Fz
Max = 118.17 Nwt @ 161.39 msec
Min = -2598.99 Nwt @ 34.29 msec
500
0
-500
-1000
-1500
-2000
-2500
-3000
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
P1 Lt Lower Tibia My
Max = 18.09 Nwt-M @ 91.39 msec
Min = -24.83 Nwt-M @ 52.40 msec
Nwt-M
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

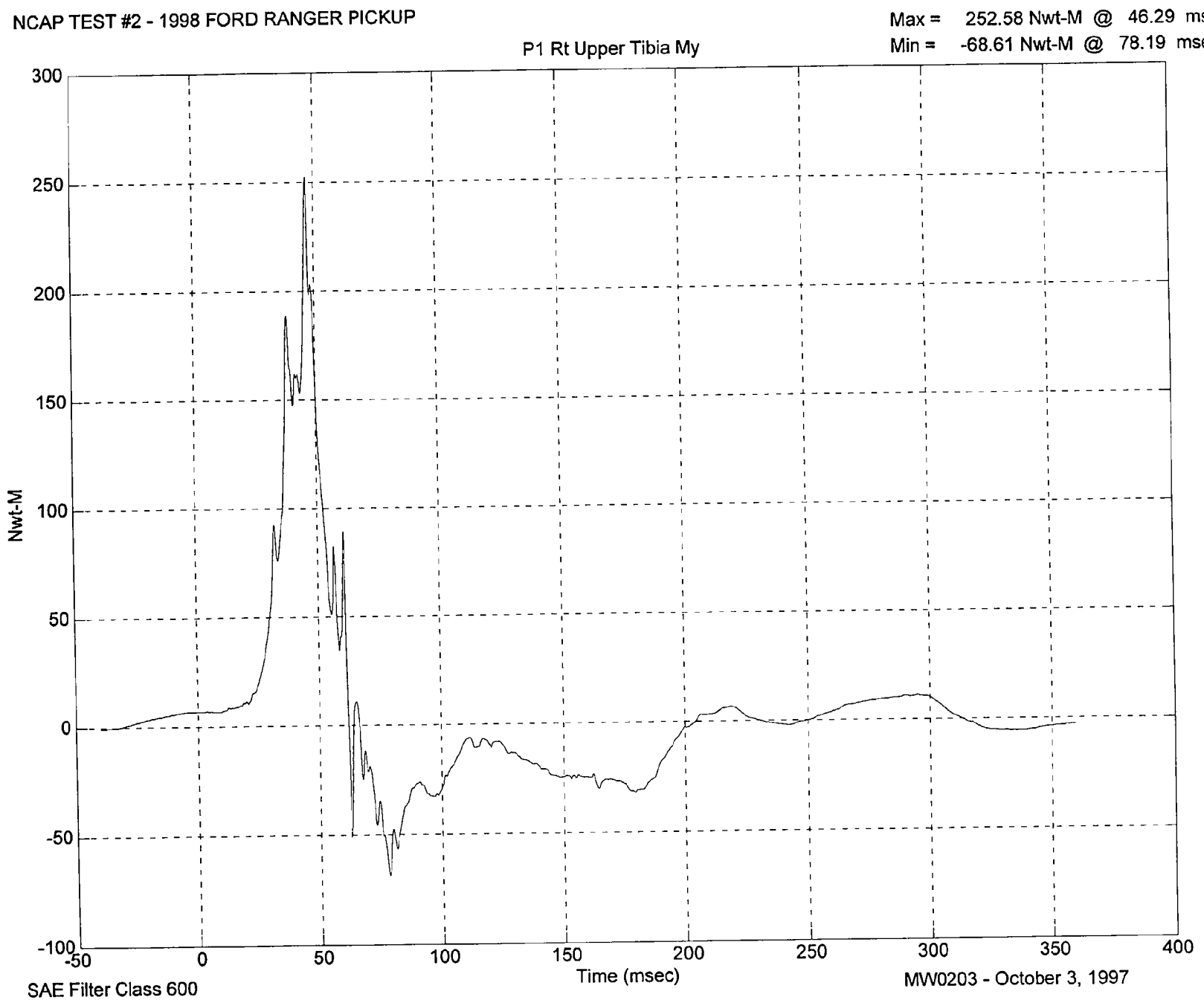
P1 Rt Upper Tibia Mx

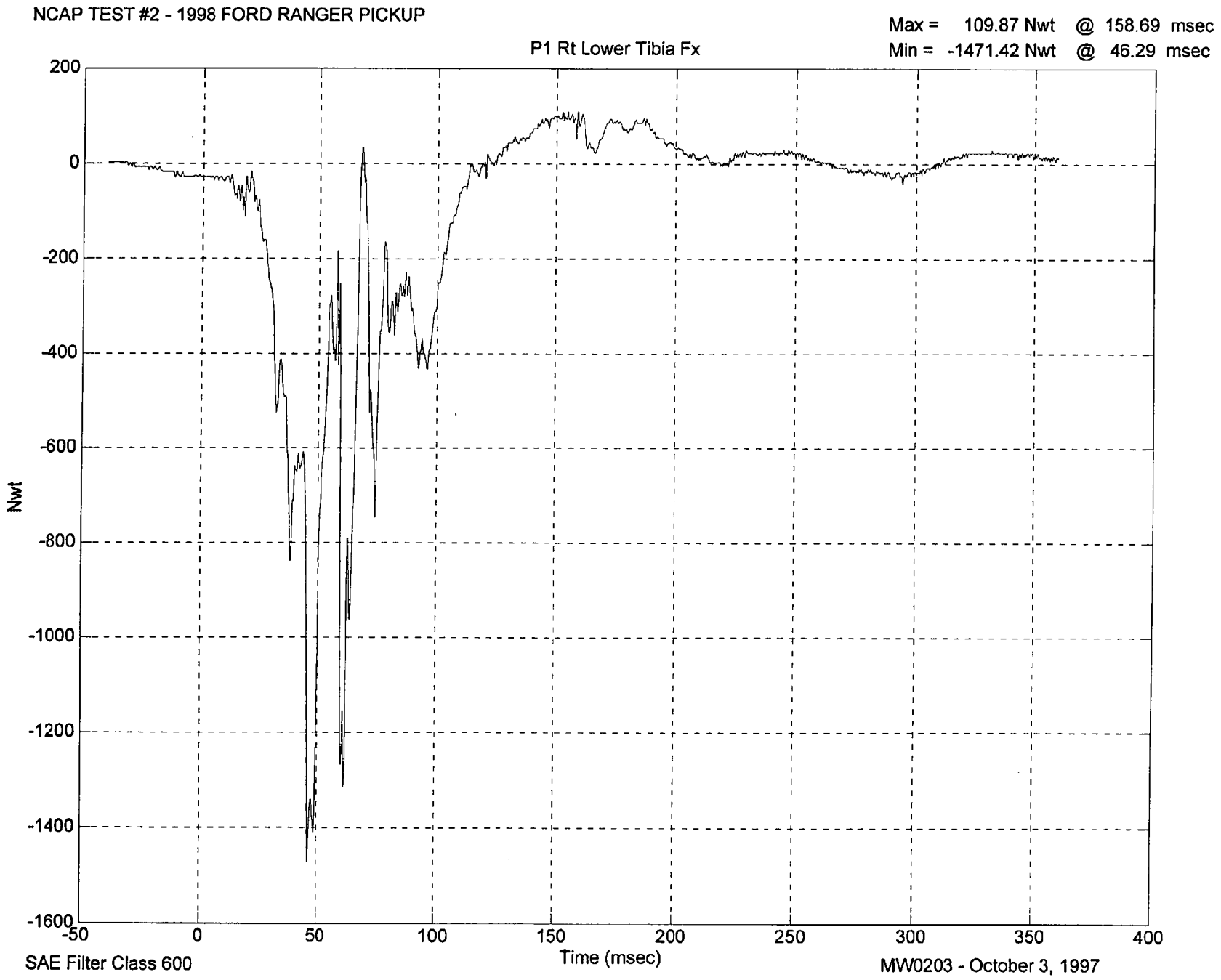
Max = 48.79 Nwt-M @ 46.49 msec
Min = -21.13 Nwt-M @ 37.69 msec

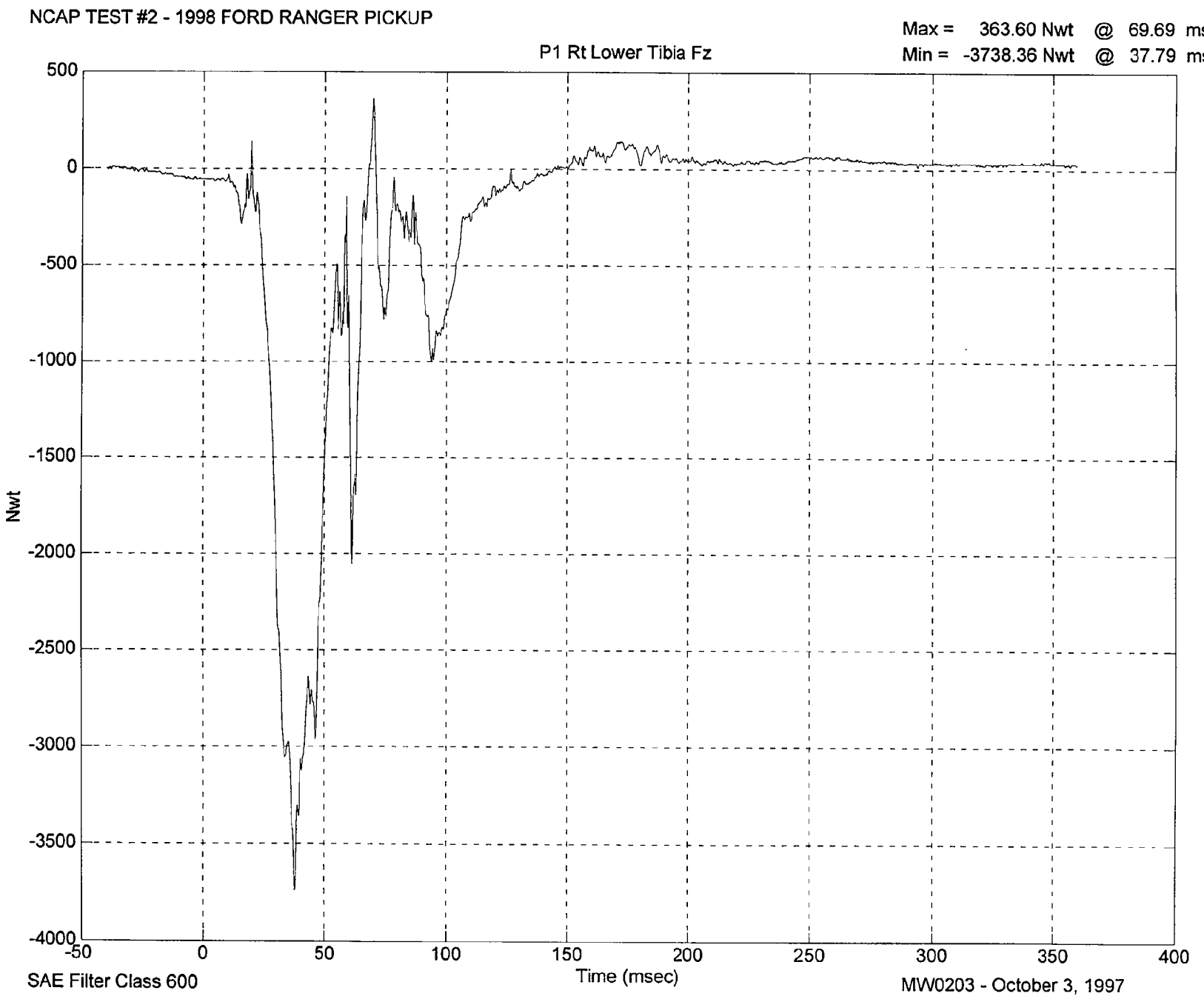



SAE Filter Class 600

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
P1 Rt Upper Tibia My
Max = 252.58 Nwt-M @ 46.29 msec
Min = -68.61 Nwt-M @ 78.19 msec
Nwt-M
300
250
200
150
100
50
0
-50
-100
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

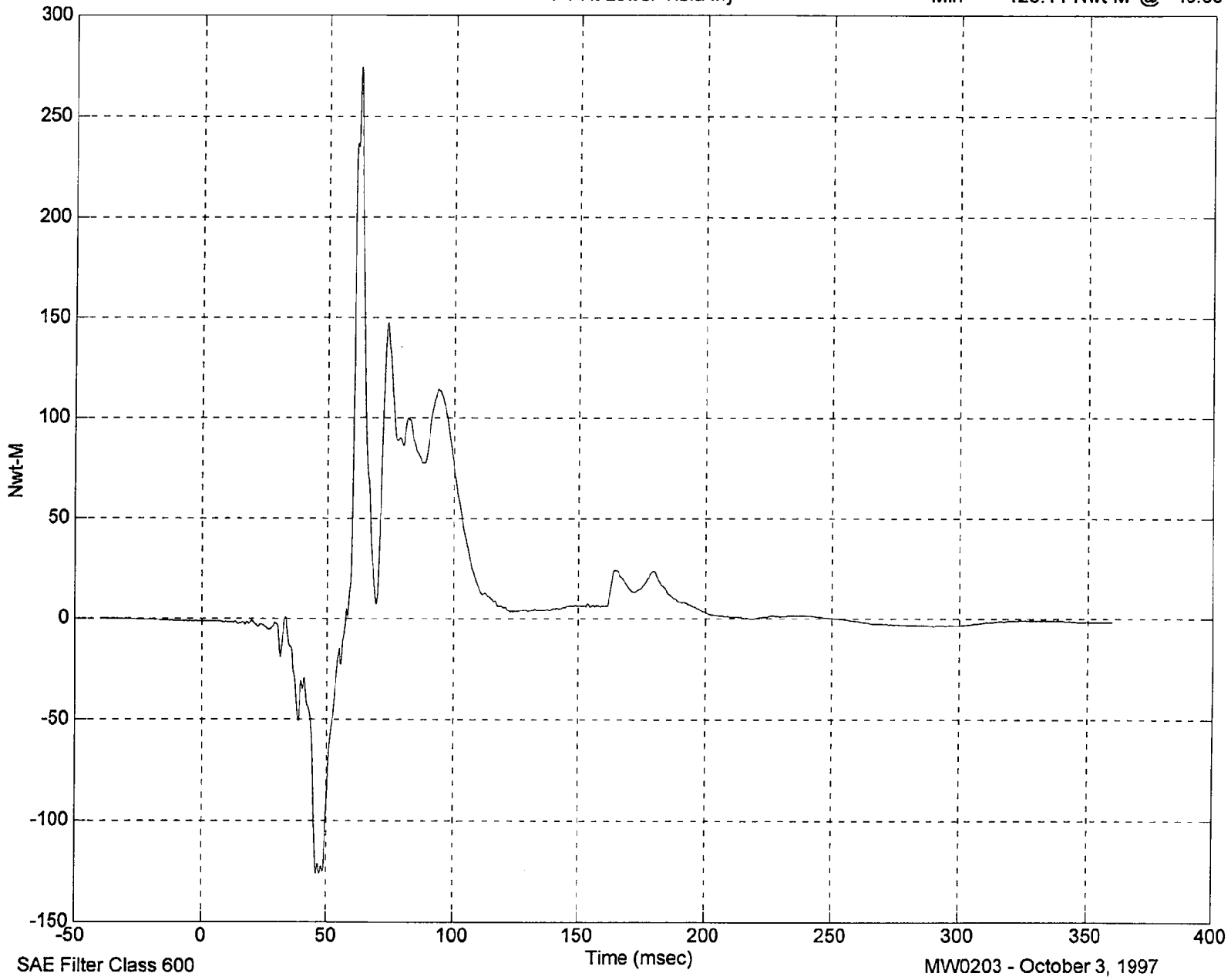

NCAP TEST #2 - 1998 FORD RANGER PICKUP
P1 Rt Lower Tibia Fx
Max = 109.87 Nwt @ 158.69 msec
Min = -1471.42 Nwt @ 46.29 msec
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
P1 Rt Lower Tibia Fz
Max = 363.60 Nwt @ 69.69 msec
Min = -3738.36 Nwt @ 37.79 msec
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-4000
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

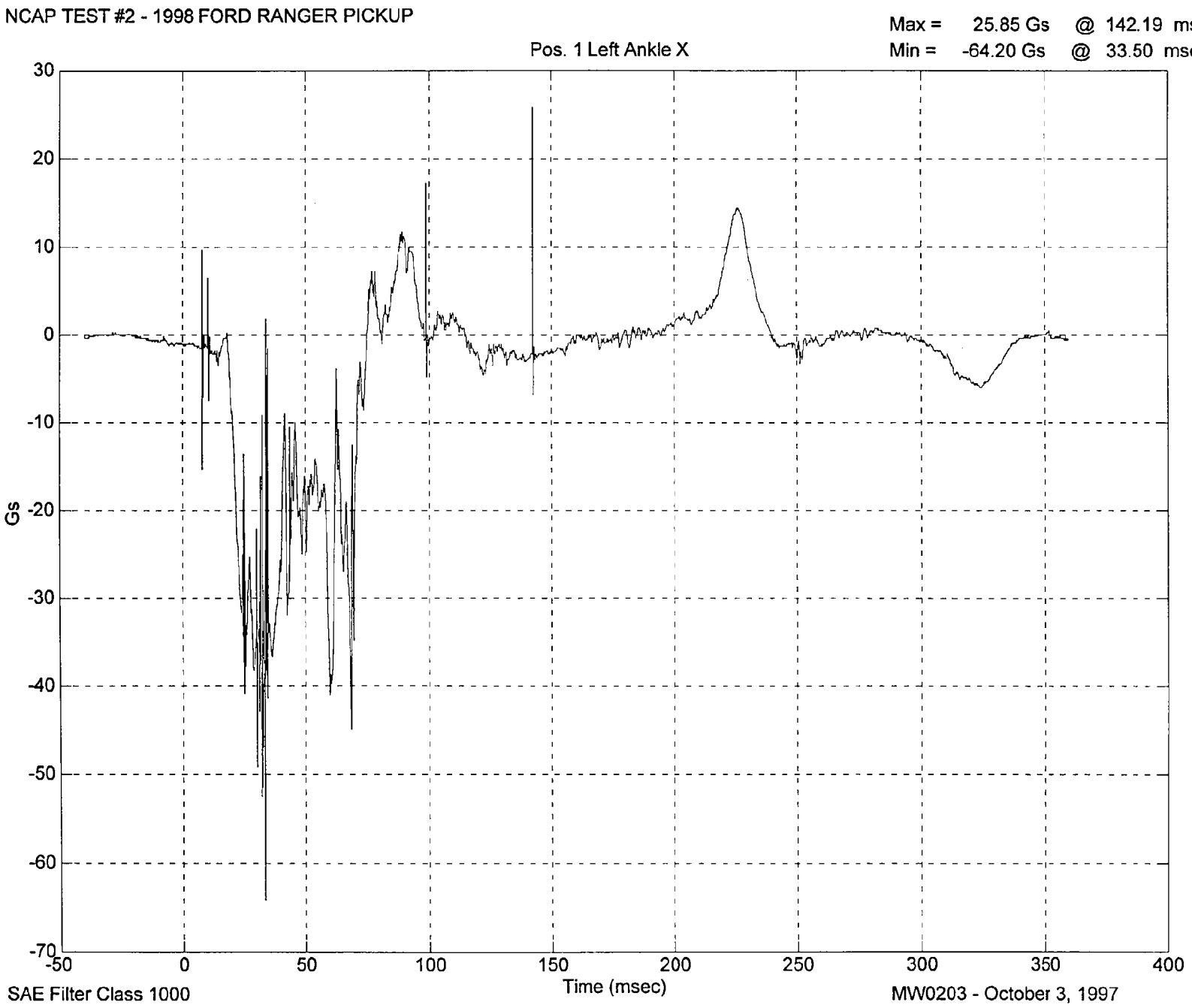
P1 Rt Lower Tibia My

Max = 274.32 Nwt-M @ 62.69 msec
Min = -126.11 Nwt-M @ 45.89 msec




SAE Filter Class 600

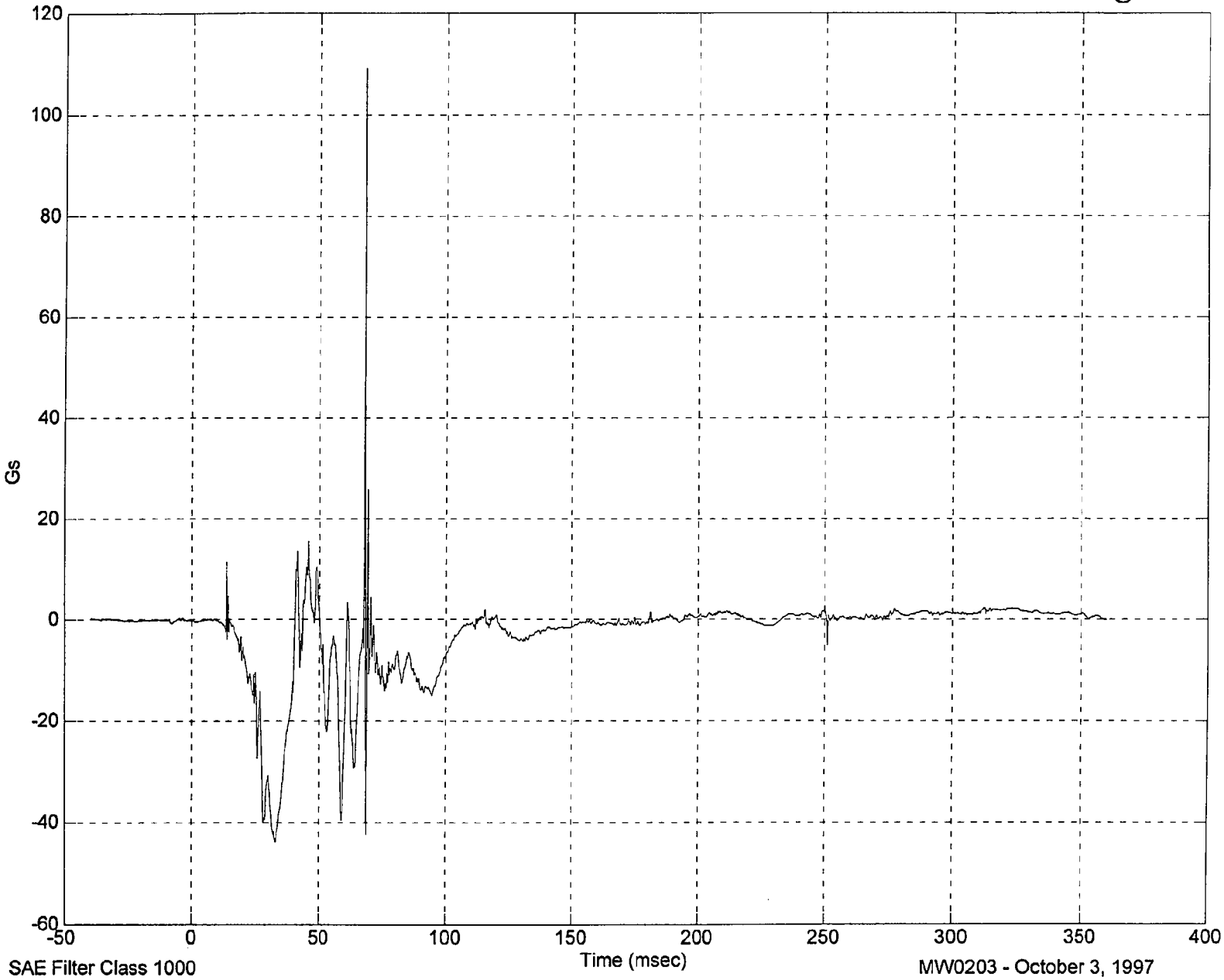
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Left Ankle X
Max = 25.85 Gs @ 142.19 msec
Min = -64.20 Gs @ 33.50 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

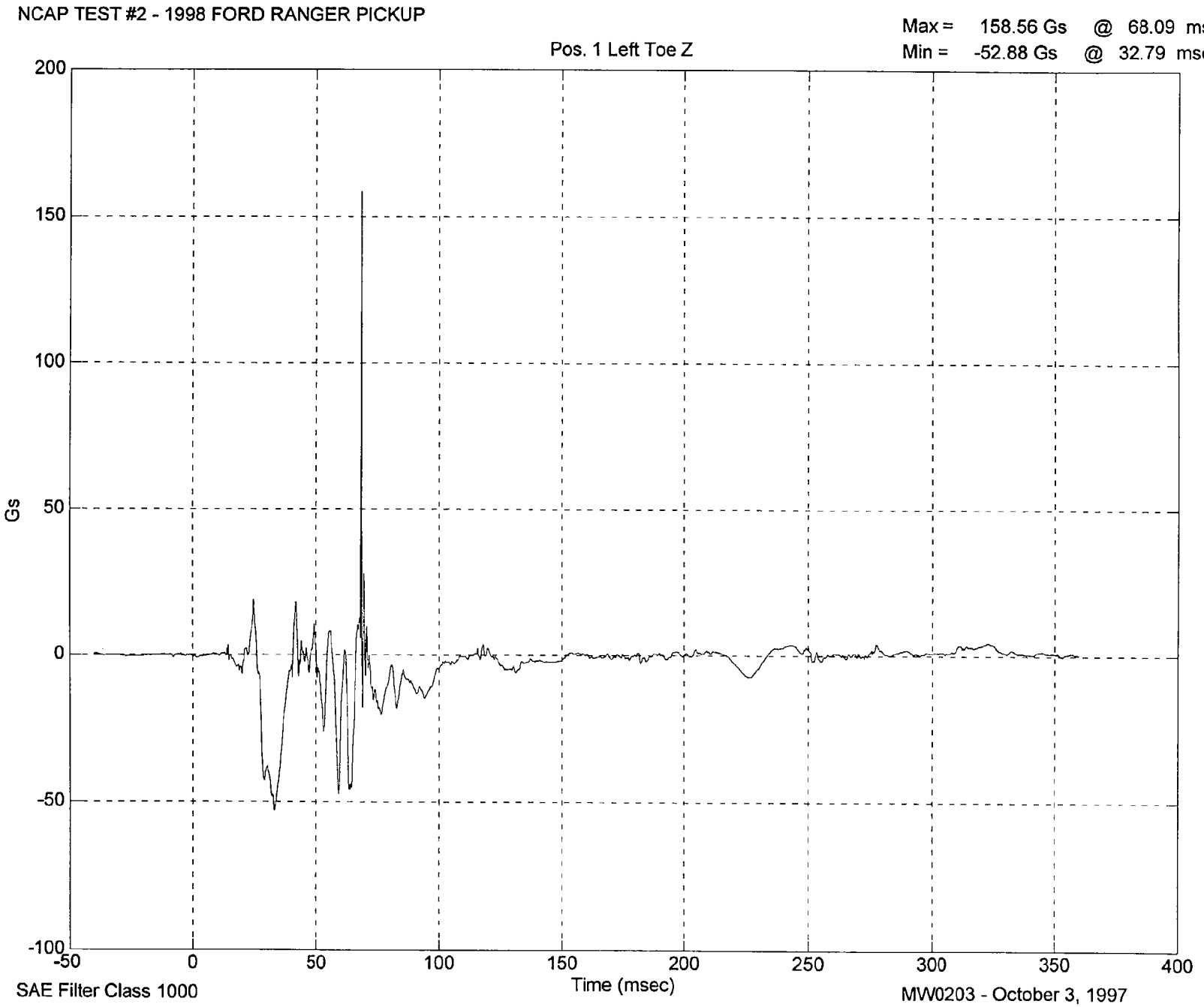
Max = 109.29 Gs @ 68.00 msec
Min = -43.90 Gs @ 33.00 msec

Pos. 1 Left Ankle Z




SAE Filter Class 1000

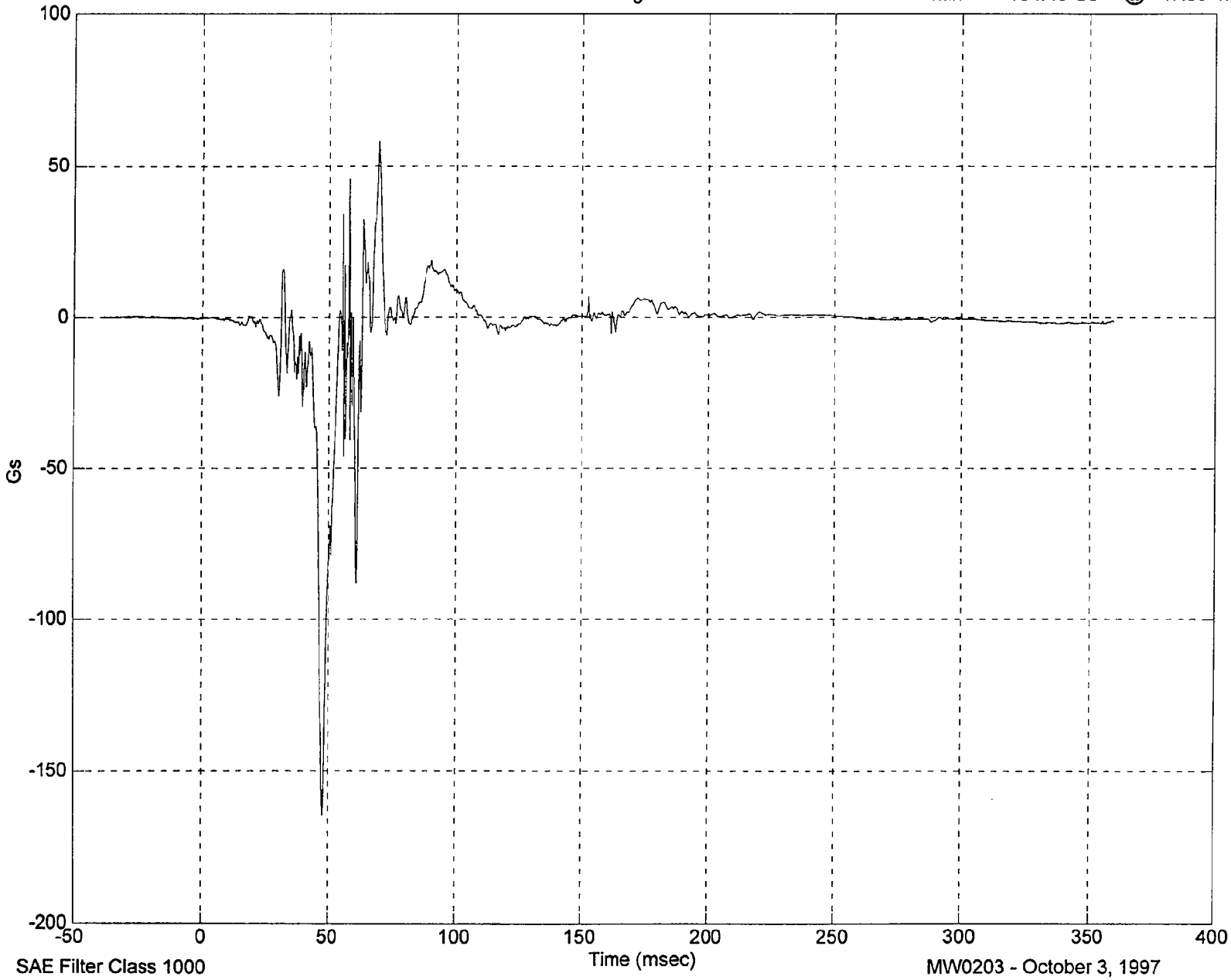
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Left Toe Z
Max = 158.56 Gs @ 68.09 msec
Min = -52.88 Gs @ 32.79 msec
Gs
200
150
100
50
0
-50
-100
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Pos. 1 Right Ankle X

Max = 58.25 Gs @ 69.59 msec
Min = -164.45 Gs @ 47.89 msec



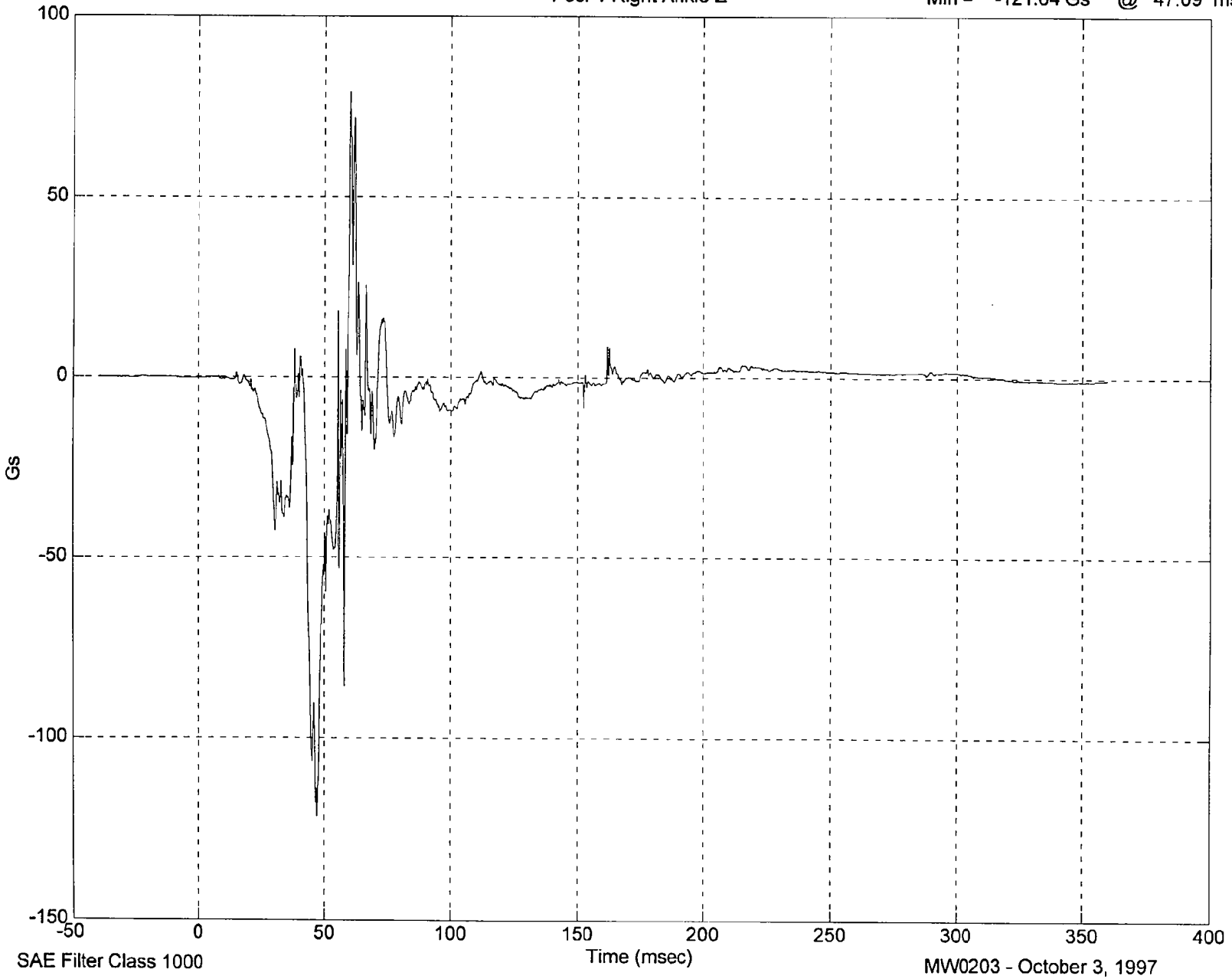

SAE Filter Class 1000

MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

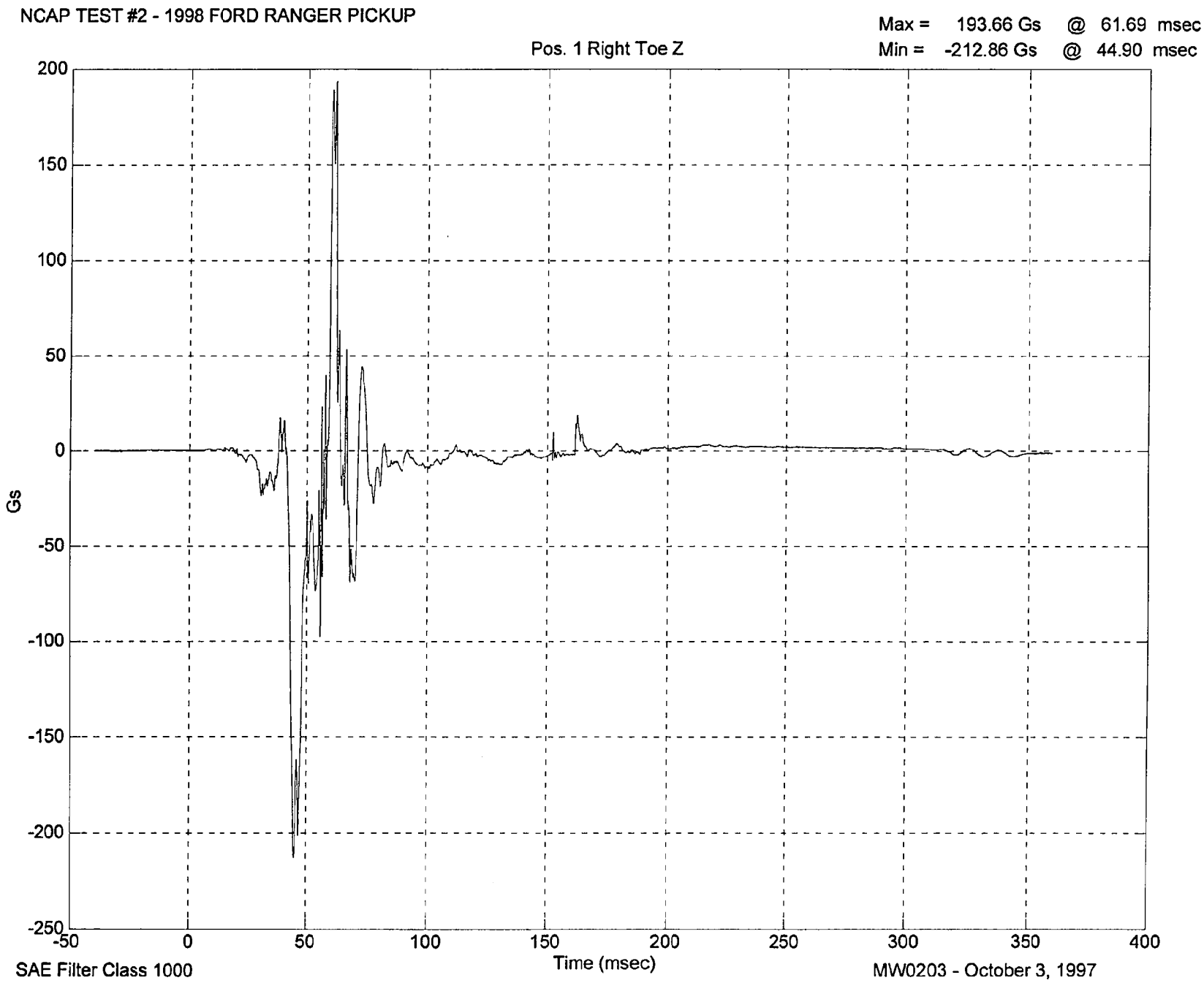
Pos. 1 Right Ankle Z

Max = 79.15 Gs @ 60.09 msec
Min = -121.64 Gs @ 47.09 msec




SAE Filter Class 1000

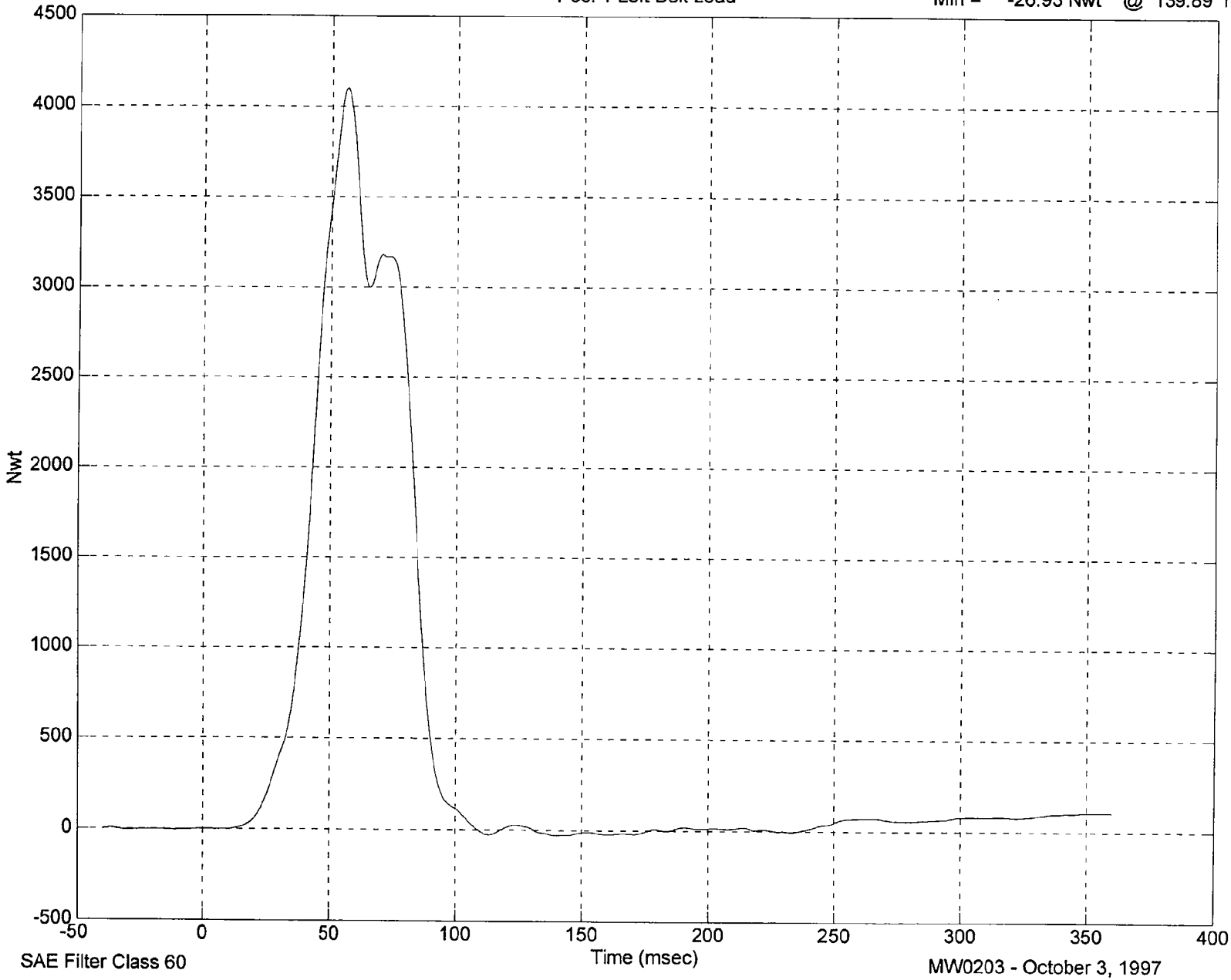
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Right Toe Z
Max = 193.66 Gs @ 61.69 msec
Min = -212.86 Gs @ 44.90 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

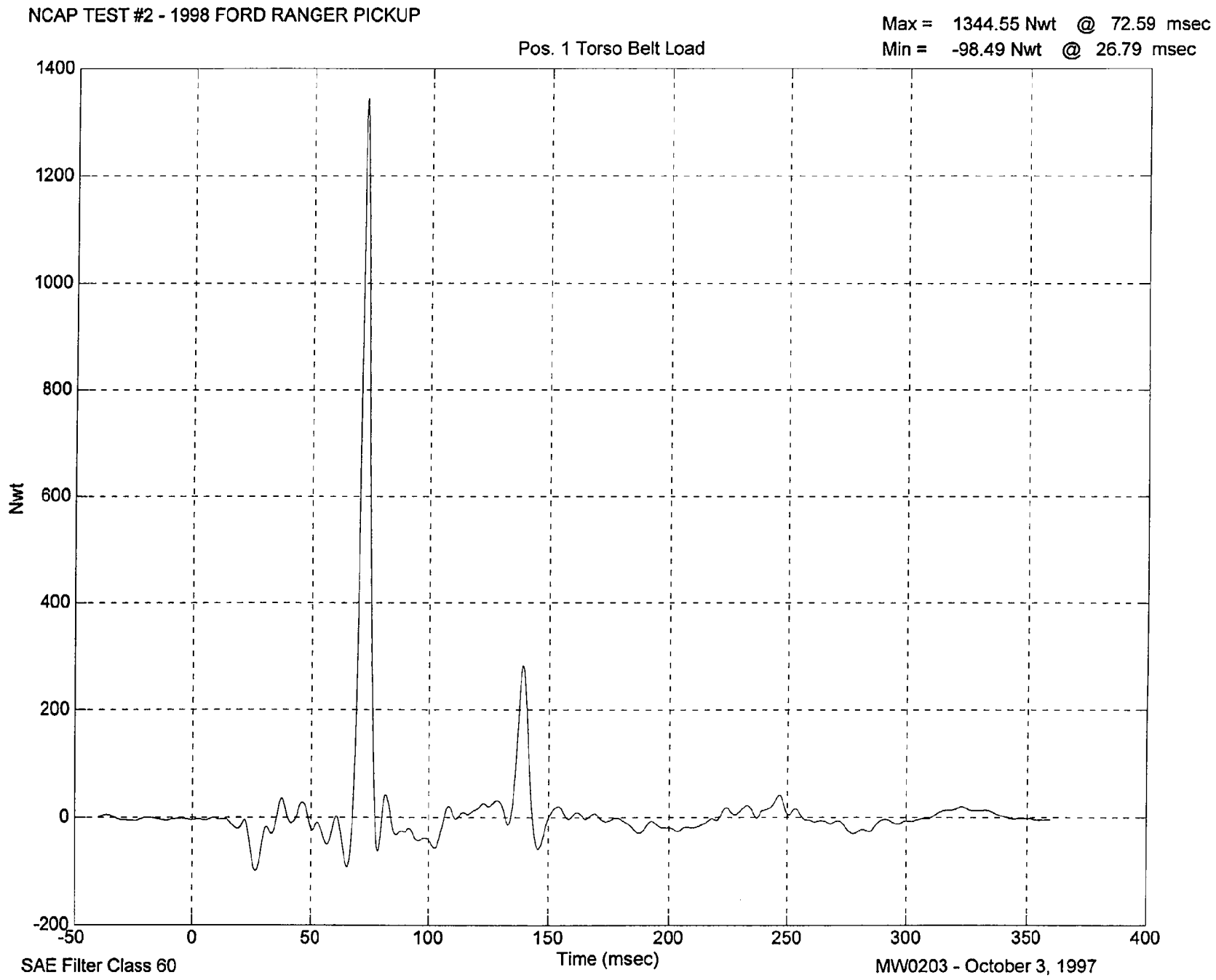
Pos. 1 Left Belt Load

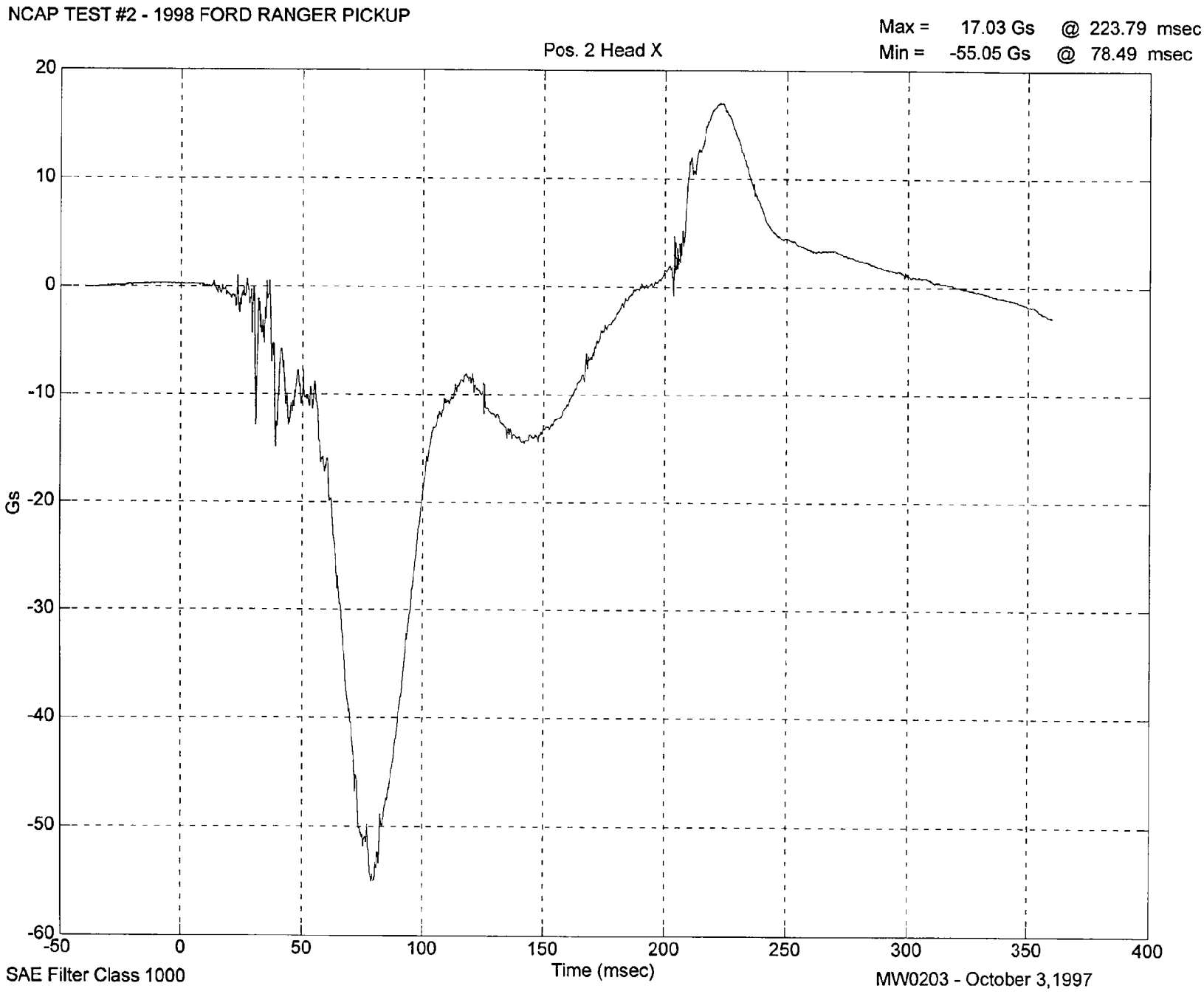
Max = 4101.01 Nwt @ 56.09 msec
Min = -26.93 Nwt @ 139.89 msec

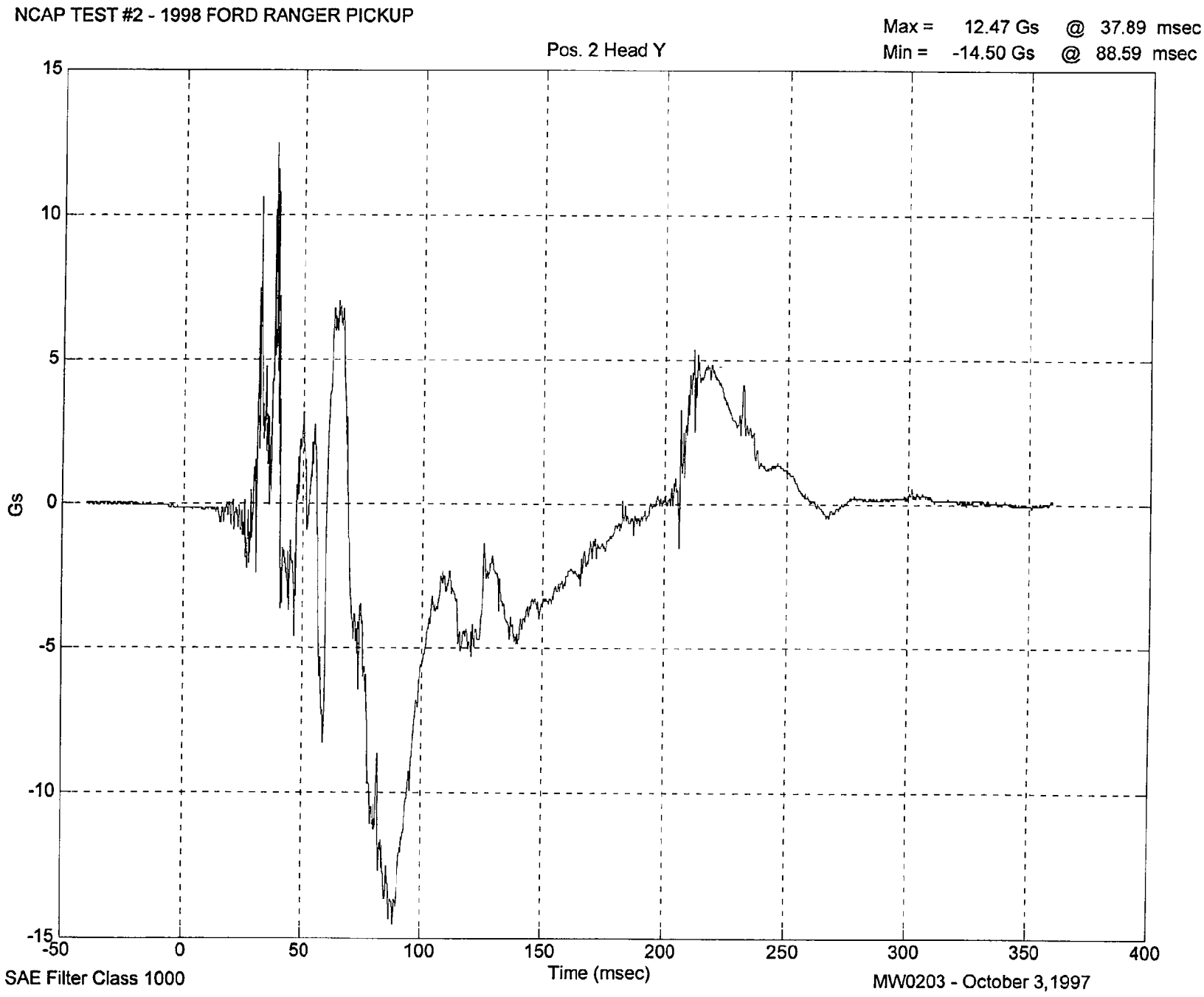


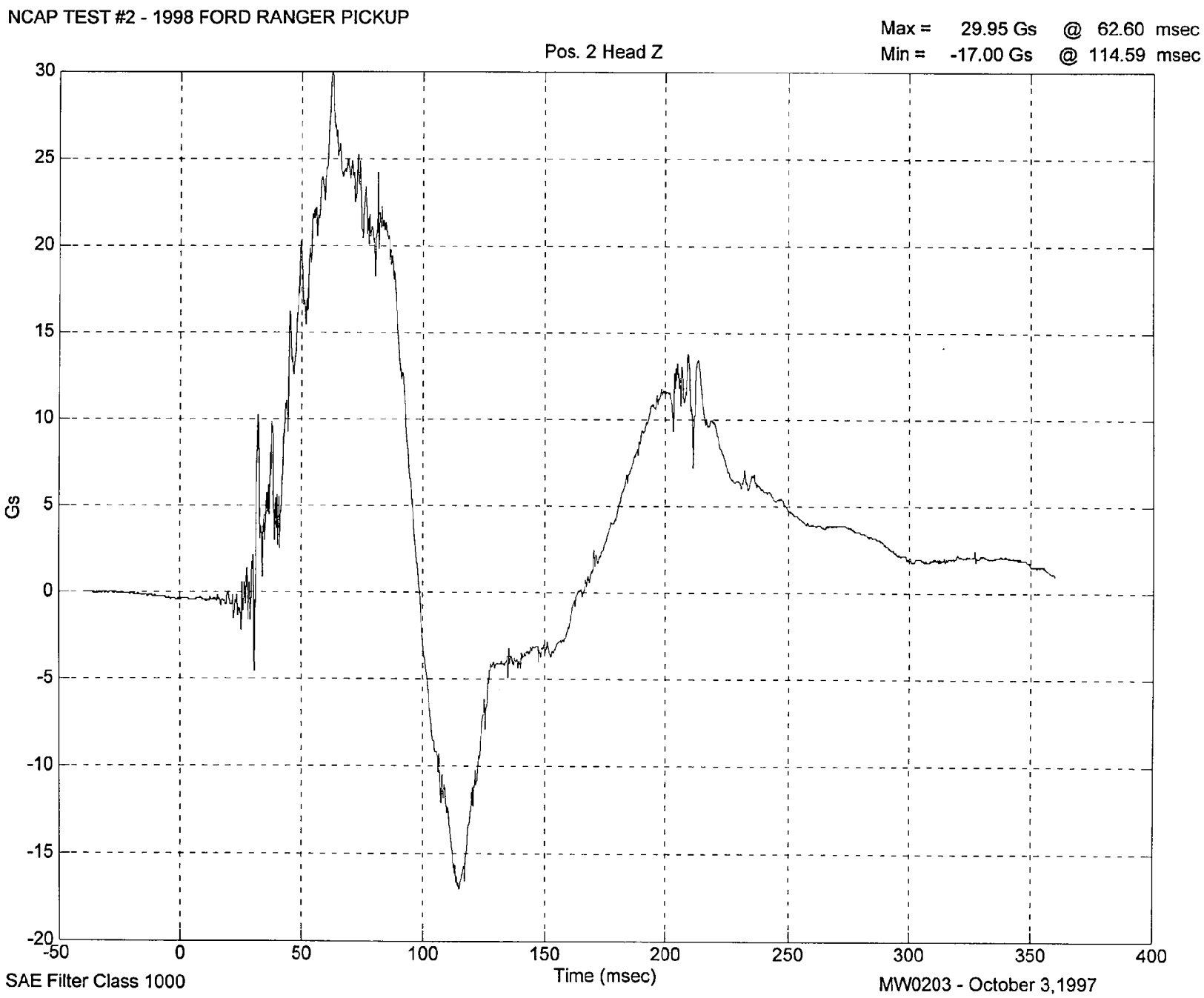

SAE Filter Class 60

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 1 Torso Belt Load
Max = 1344.55 Nwt @ 72.59 msec
Min = -98.49 Nwt @ 26.79 msec
Nwt
1400
1200
1000
800
600
400
200
0
-200
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Head X
Max = 17.03 Gs @ 223.79 msec
Min = -55.05 Gs @ 78.49 msec
20
10
0
-10
-20
-30
-40
-50
-60
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3,1997

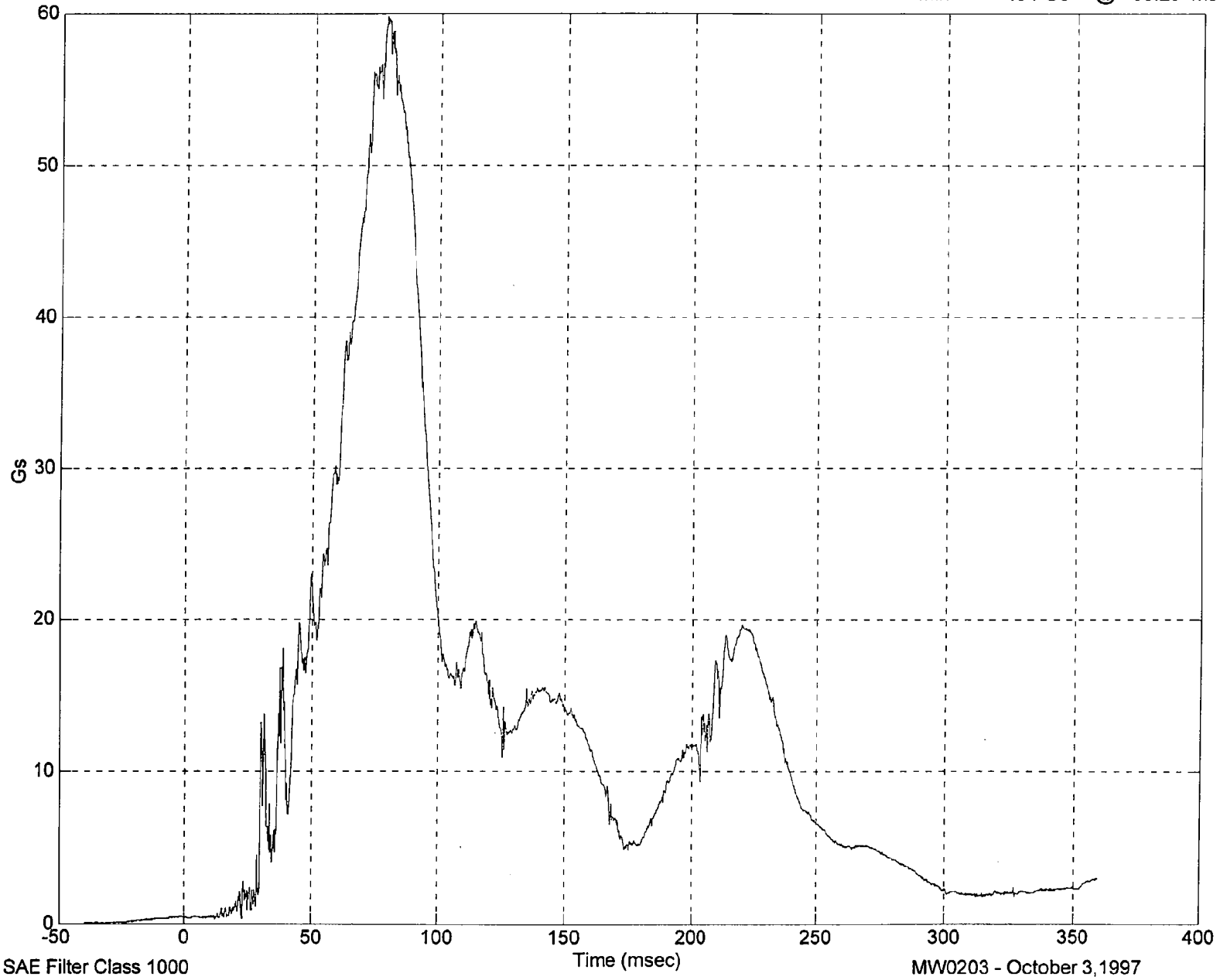

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Head Y
Max = 12.47 Gs @ 37.89 msec
Min = -14.50 Gs @ 88.59 msec
15
10
5
0
-5
-10
-15
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Head Z
Max = 29.95 Gs @ 62.60 msec
Min = -17.00 Gs @ 114.59 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3,1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

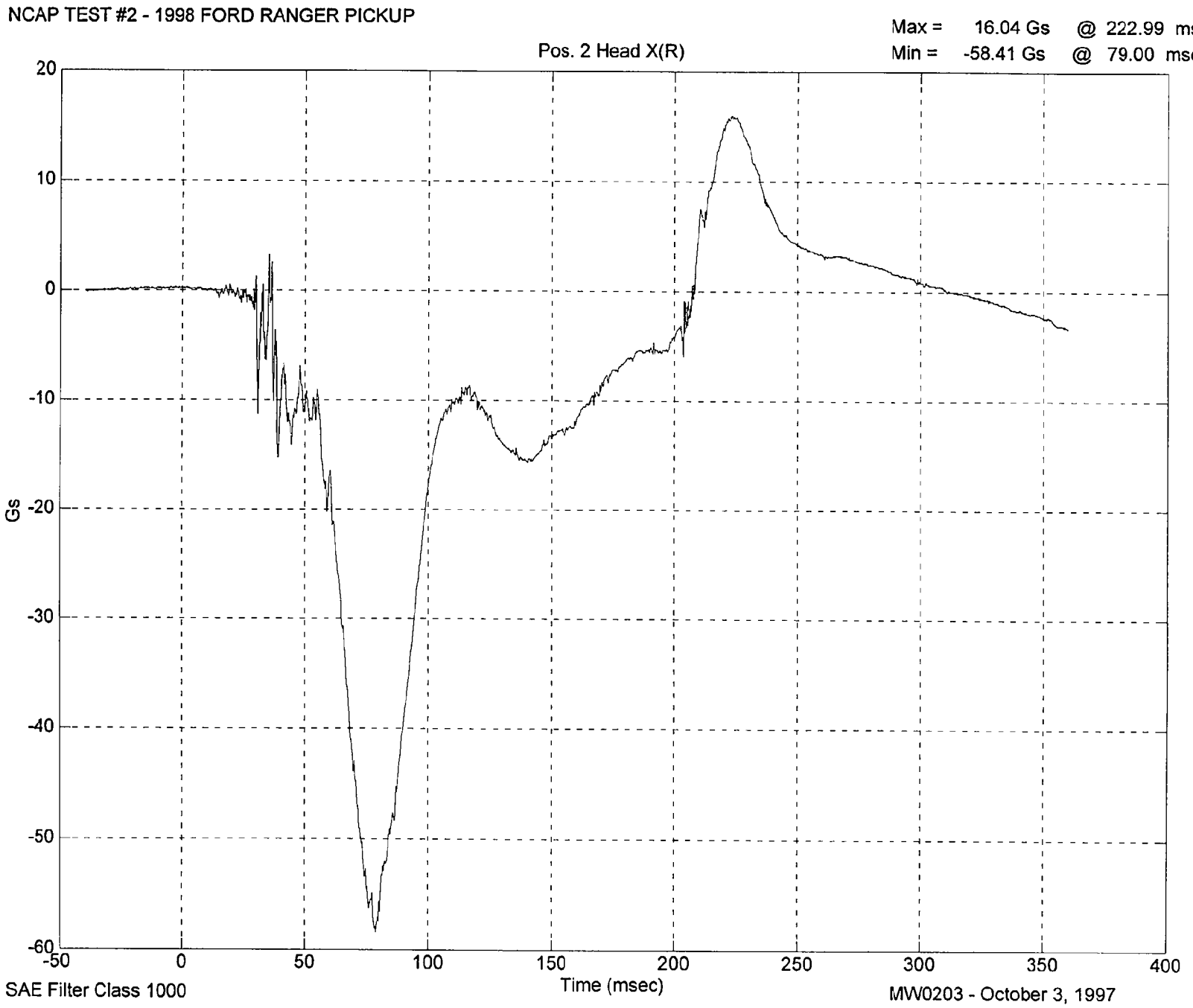
Pos. 2 Head Resultant

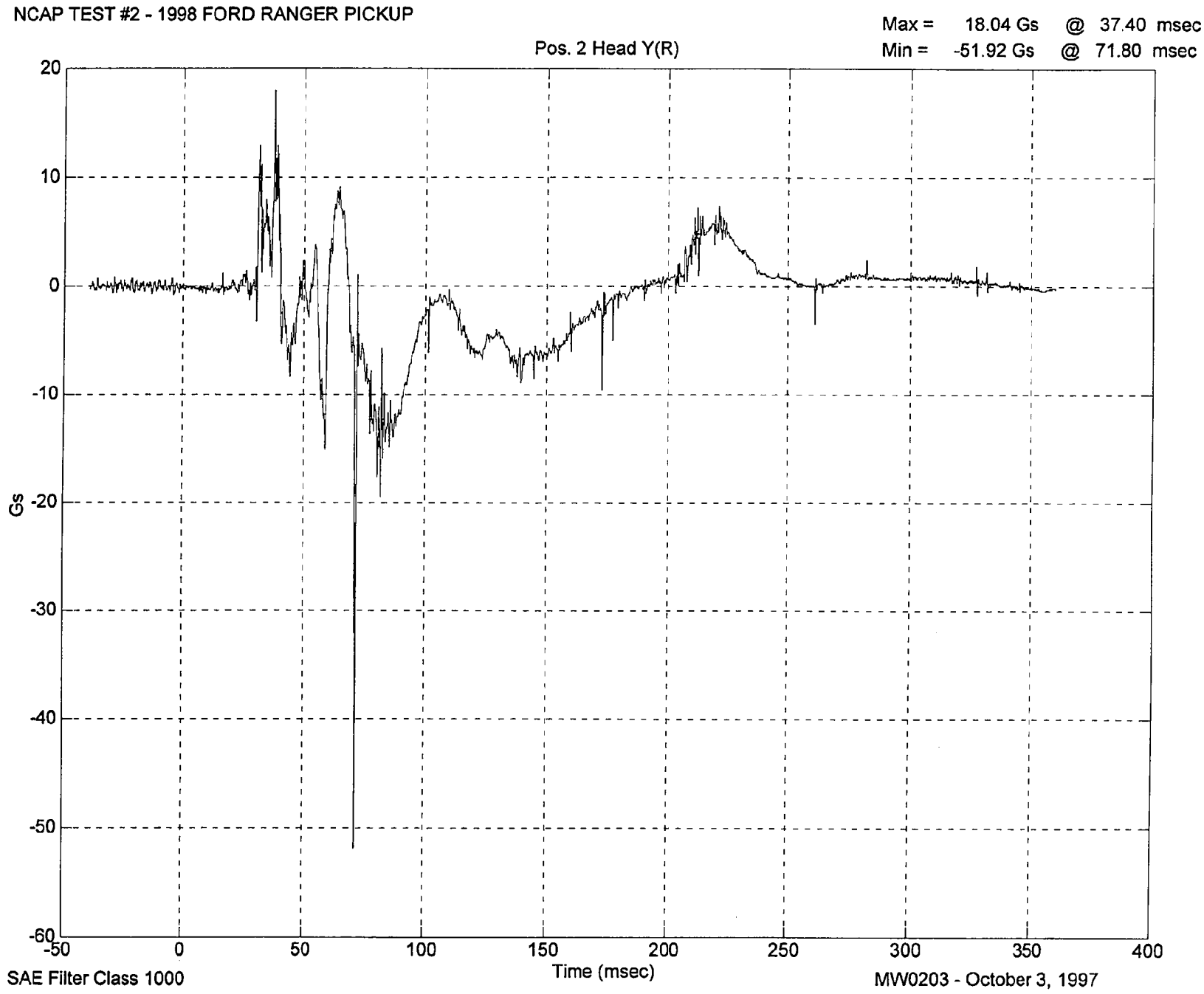
Max = 59.81 Gs @ 78.49 msec
Min = .04 Gs @ -30.29 msec

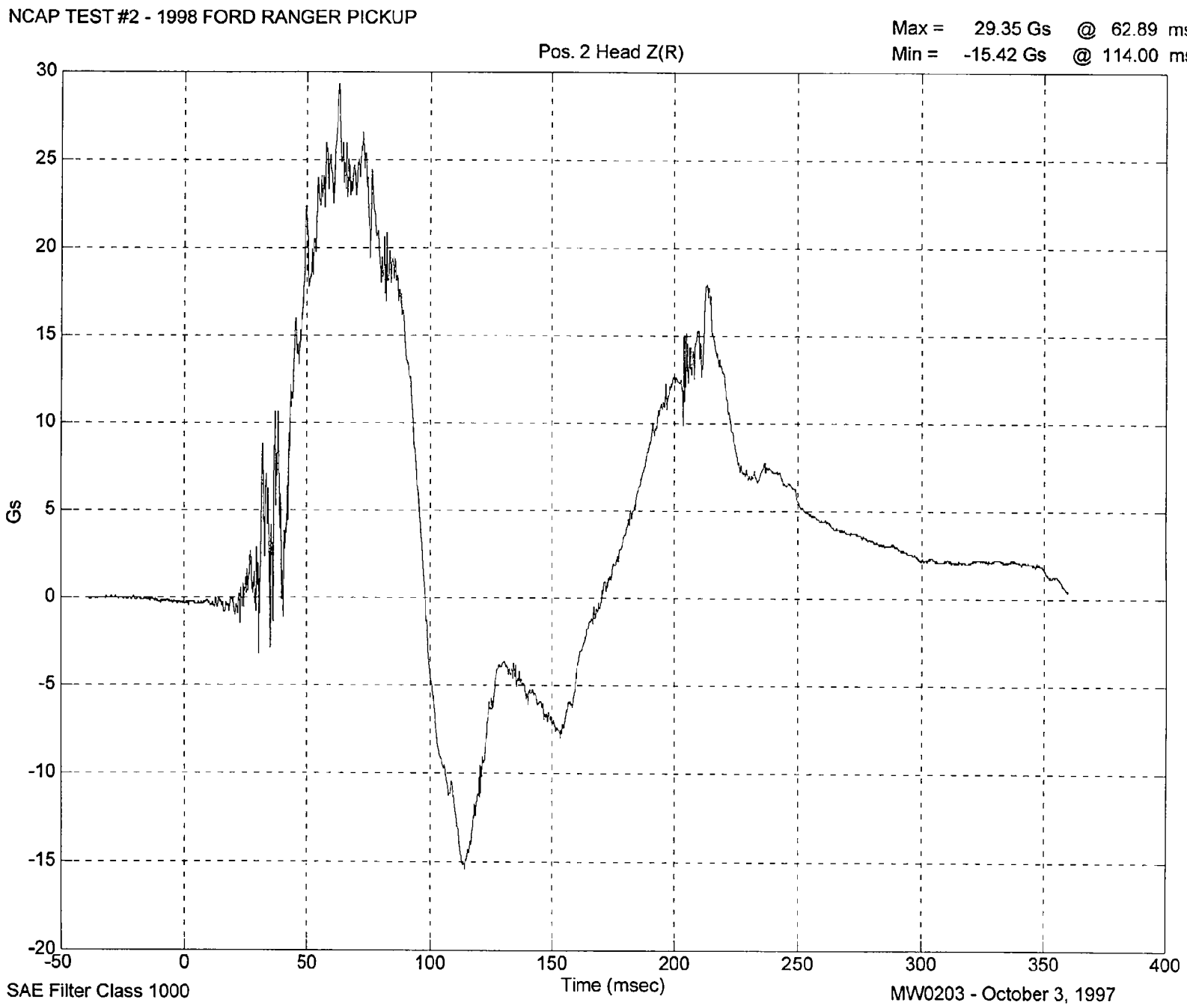



SAE Filter Class 1000

MW0203 - October 3,1997

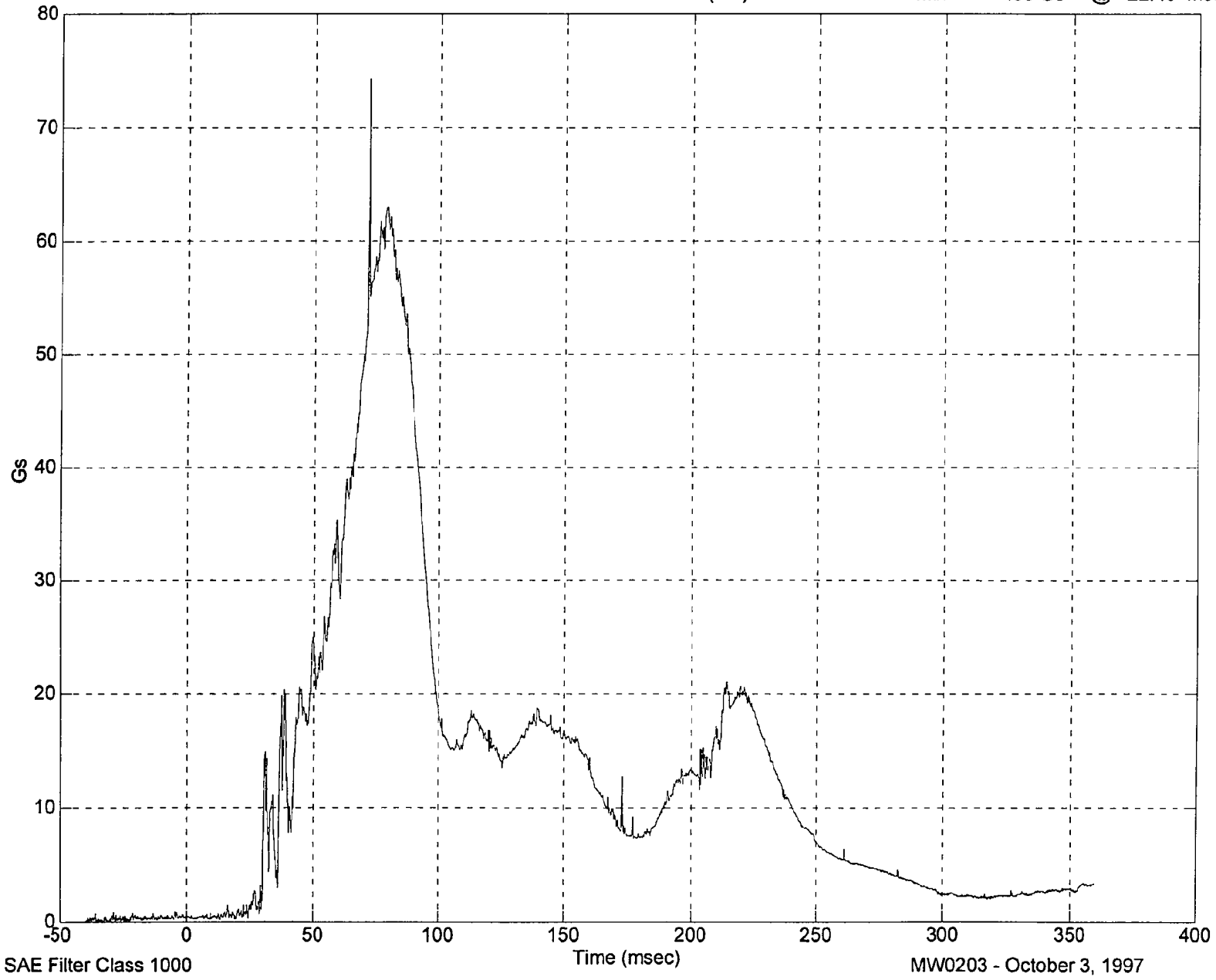

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Head X(R)
Max = 16.04 Gs @ 222.99 msec
Min = -58.41 Gs @ 79.00 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Head Y(R)
Max = 18.04 Gs @ 37.40 msec
Min = -51.92 Gs @ 71.80 msec
20
10
0
-10
-20
-30
-40
-50
-60
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MVV0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Head Z(R)
Max = 29.35 Gs @ 62.89 msec
Min = -15.42 Gs @ 114.00 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

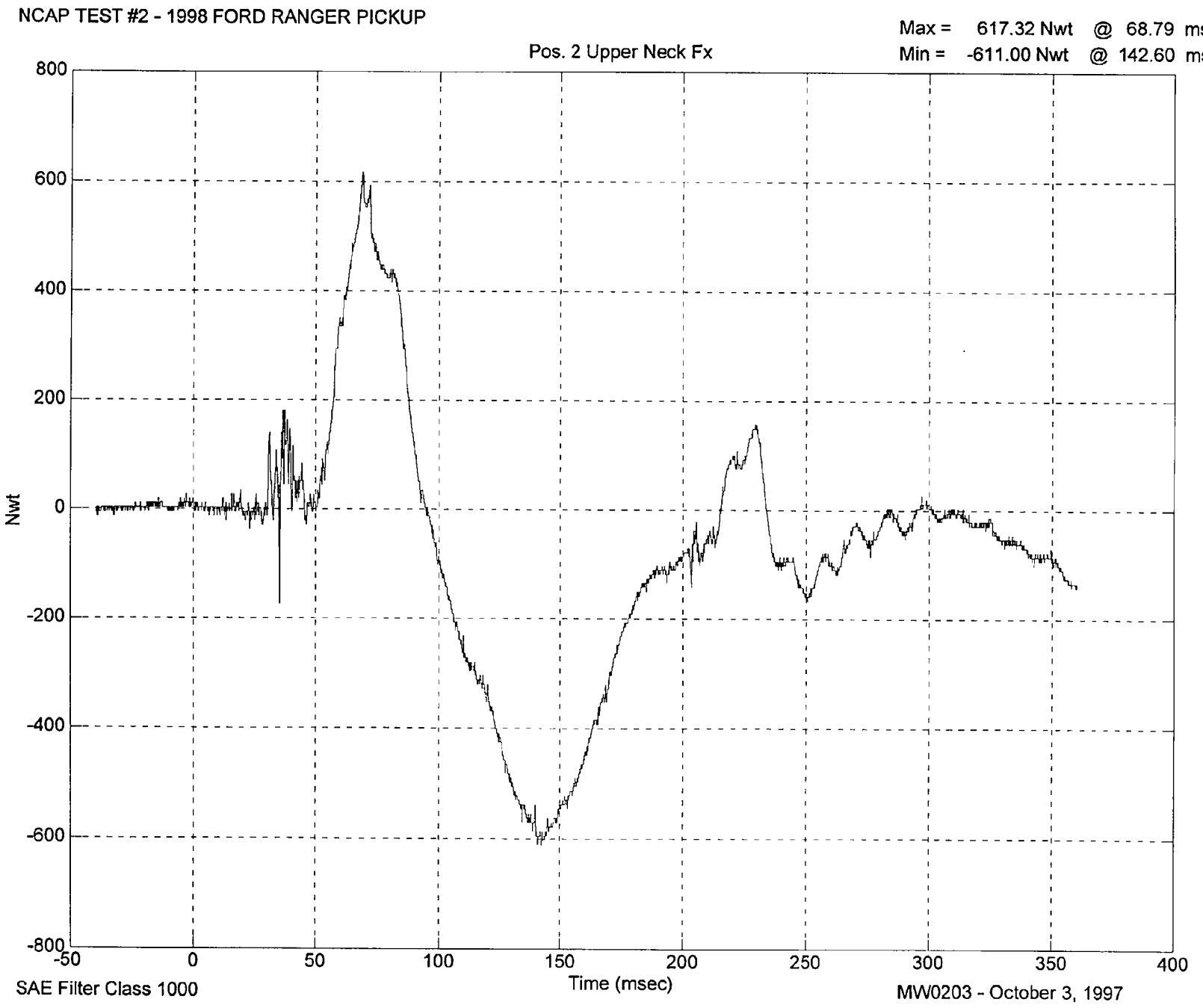
NCAP TEST #2 - 1998 FORD RANGER PICKUP

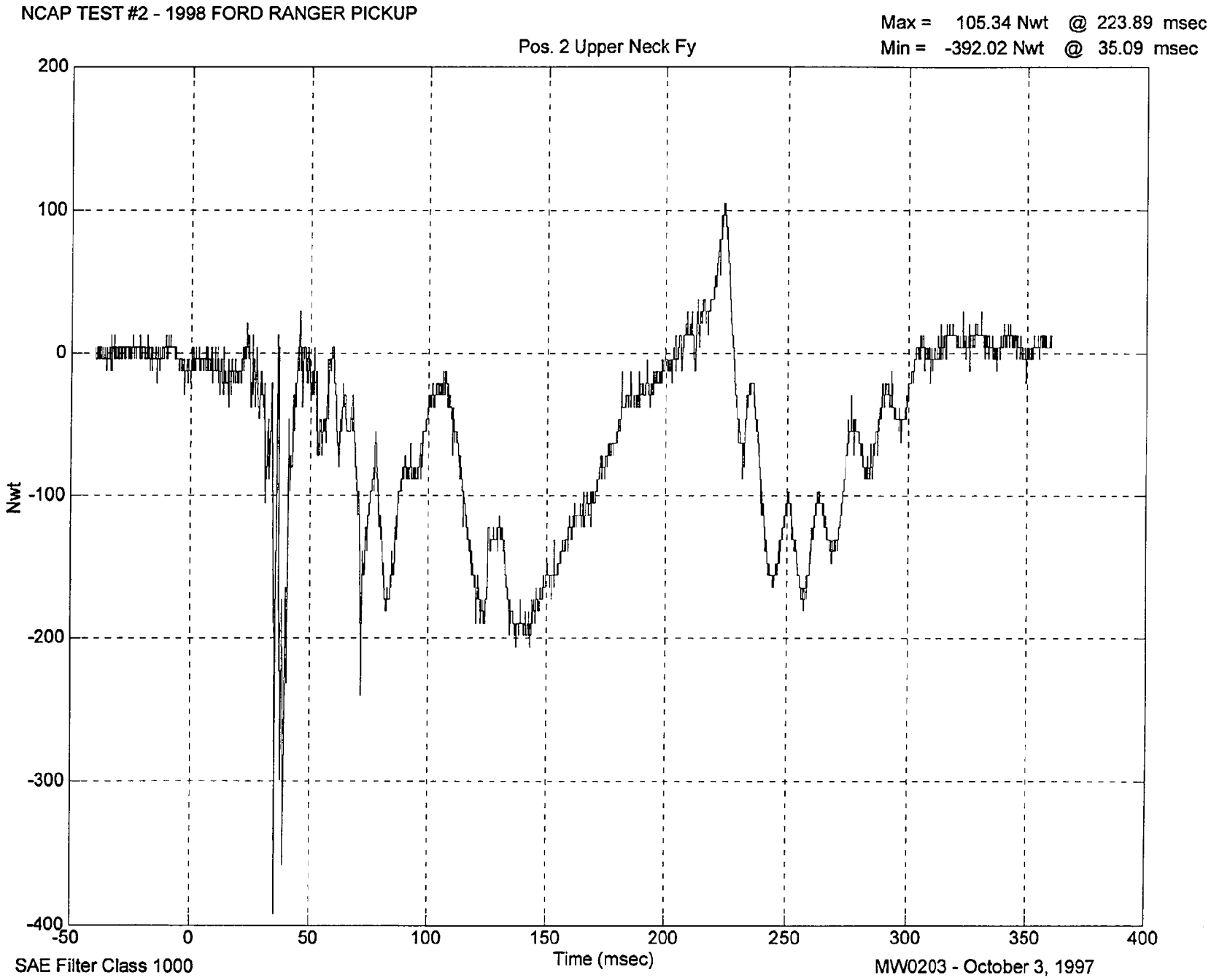
Max = 74.28 Gs @ 71.80 msec
Min = .05 Gs @ -22.49 msec




SAE Filter Class 1000

MW0203 - October 3, 1997

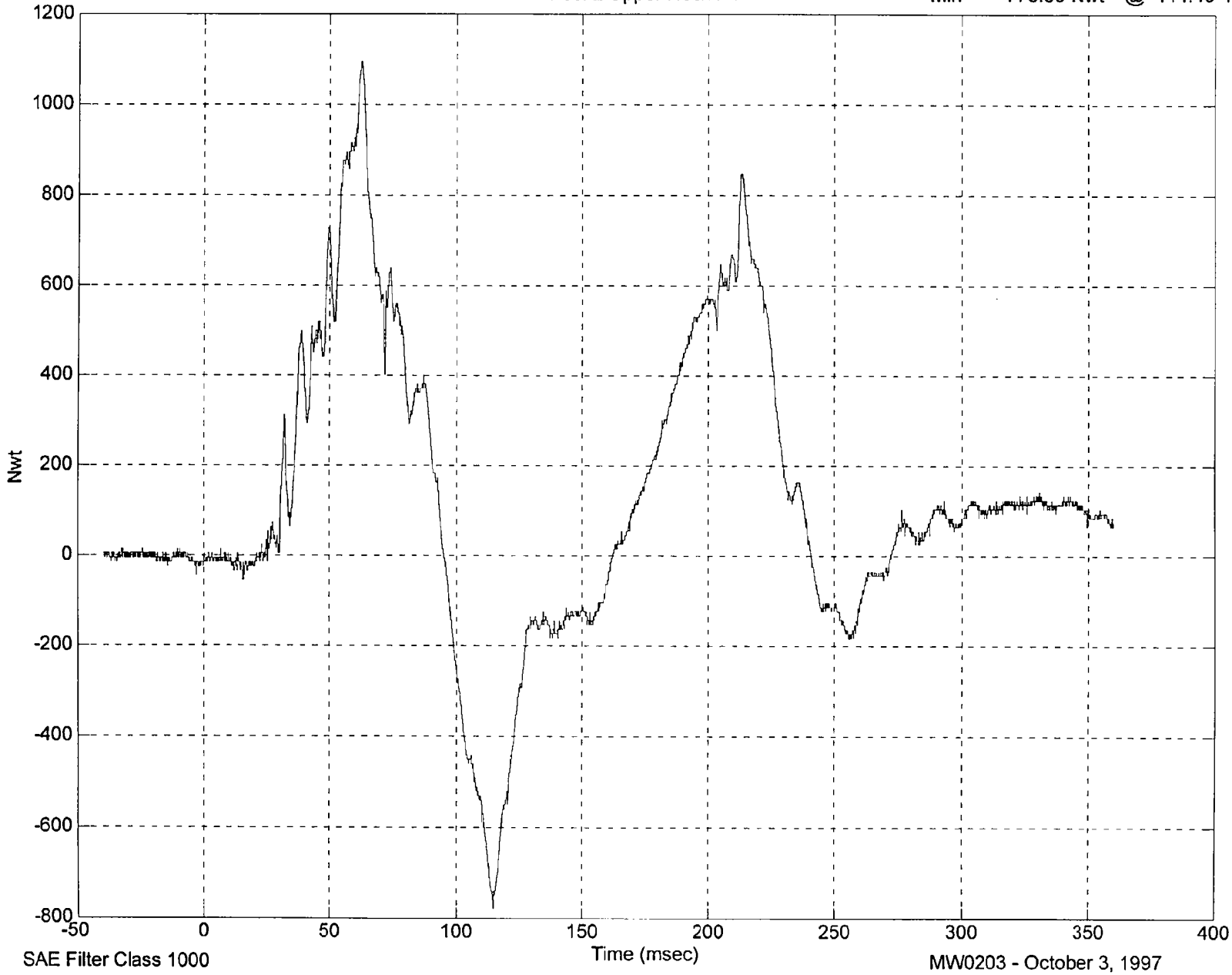

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Upper Neck Fx
Max = 617.32 Nwt @ 68.79 msec
Min = -611.00 Nwt @ 142.60 msec
800
600
400
200
0
-200
-400
-600
-800
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Upper Neck Fy
Max = 105.34 Nwt @ 223.89 msec
Min = -392.02 Nwt @ 35.09 msec
200
100
0
-100
-200
-300
-400
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

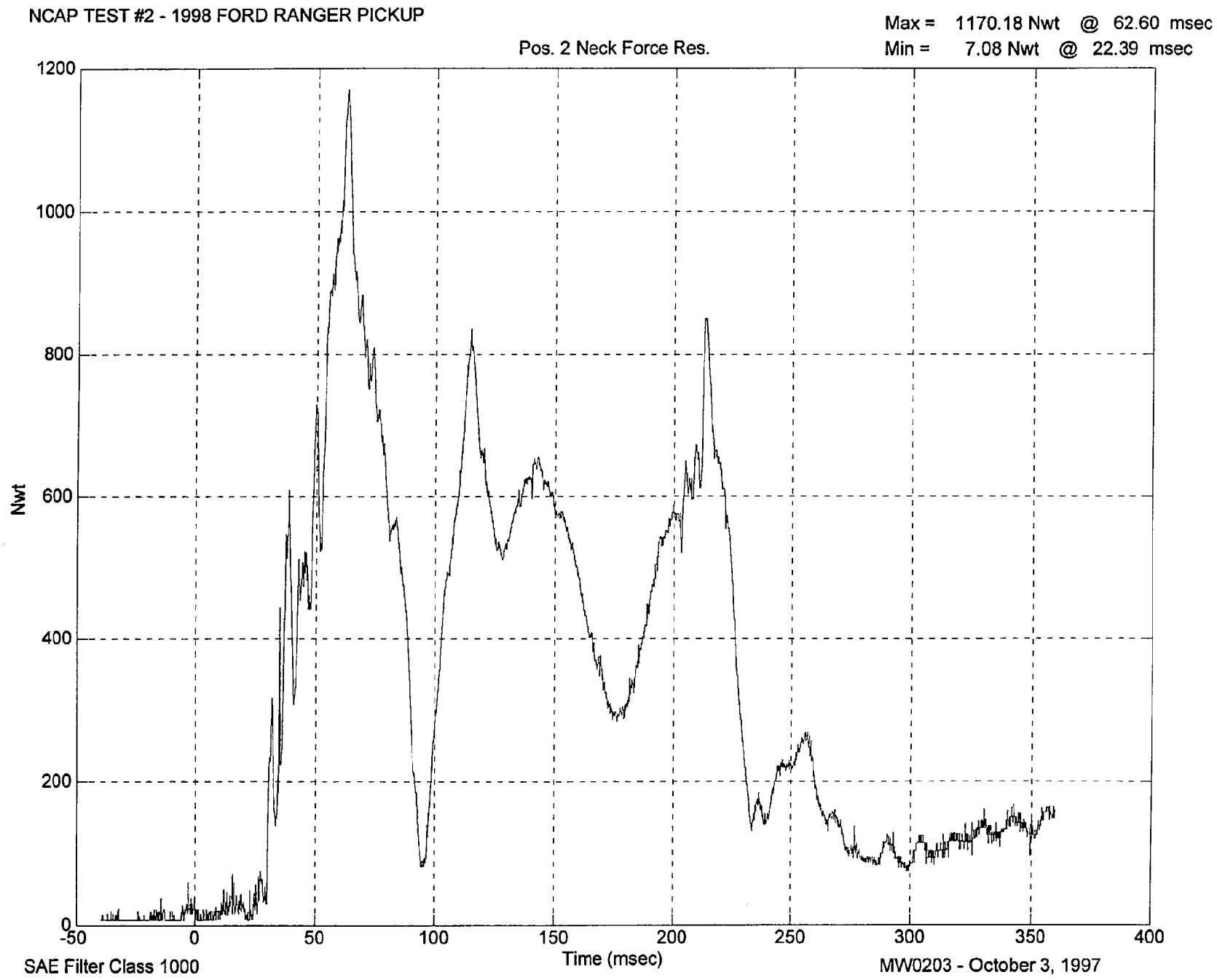
Pos. 2 Upper Neck Fz

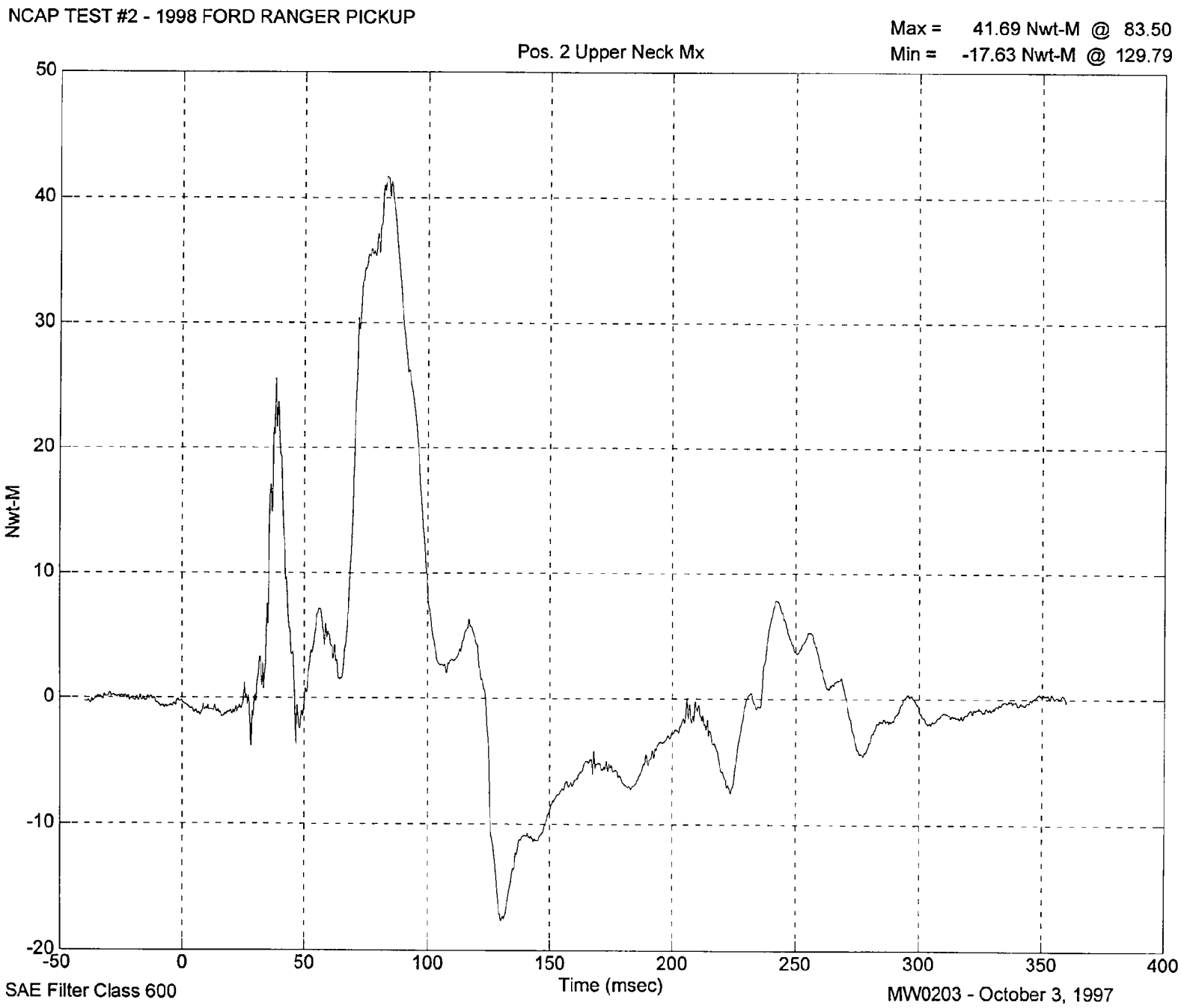
Max = 1095.68 Nwt @ 62.69 msec
Min = -778.69 Nwt @ 114.49 msec

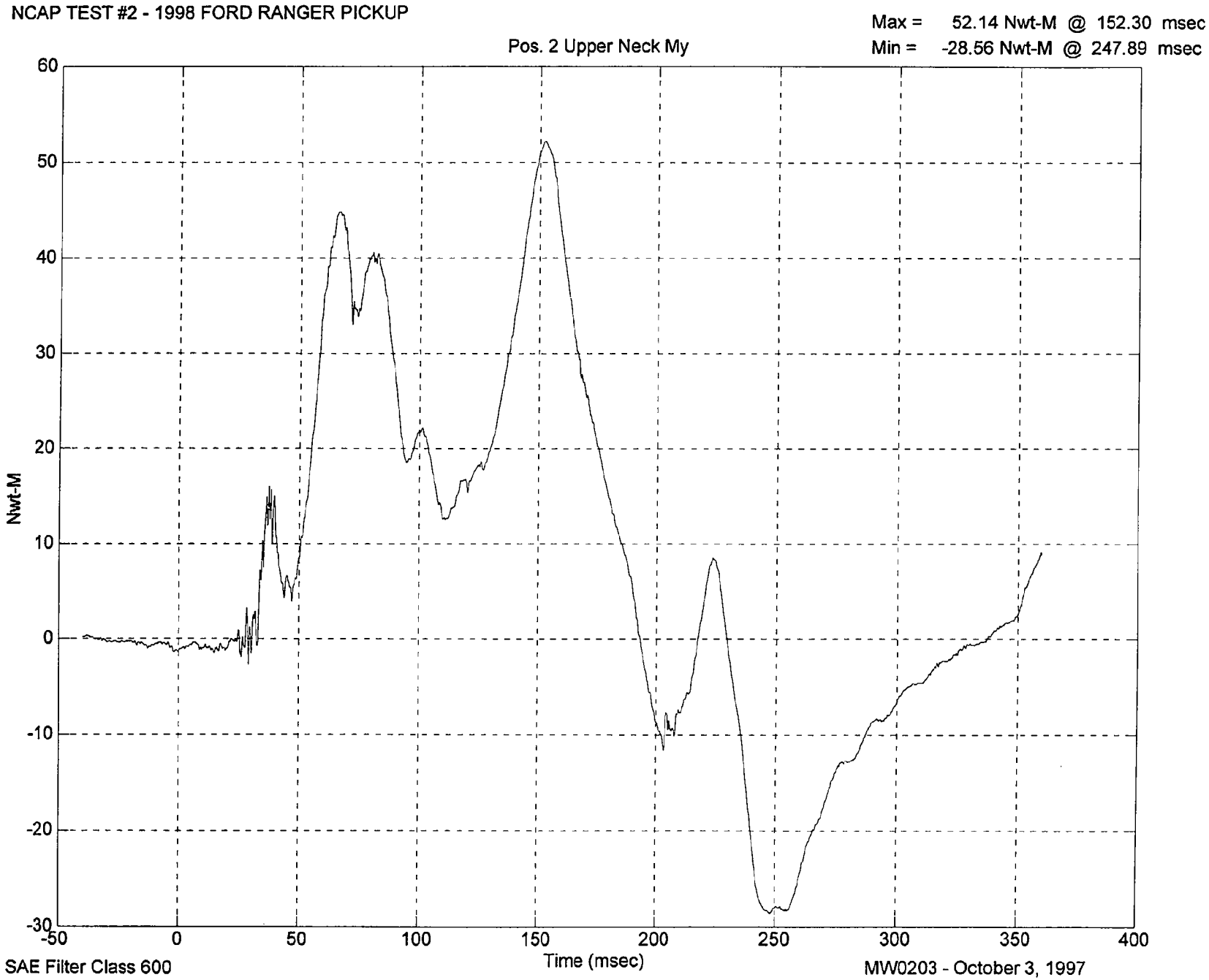



SAE Filter Class 1000

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Neck Force Res.
Max = 1170.18 Nwt @ 62.60 msec
Min = 7.08 Nwt @ 22.39 msec
Nwt
1200
1000
800
600
400
200
0
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

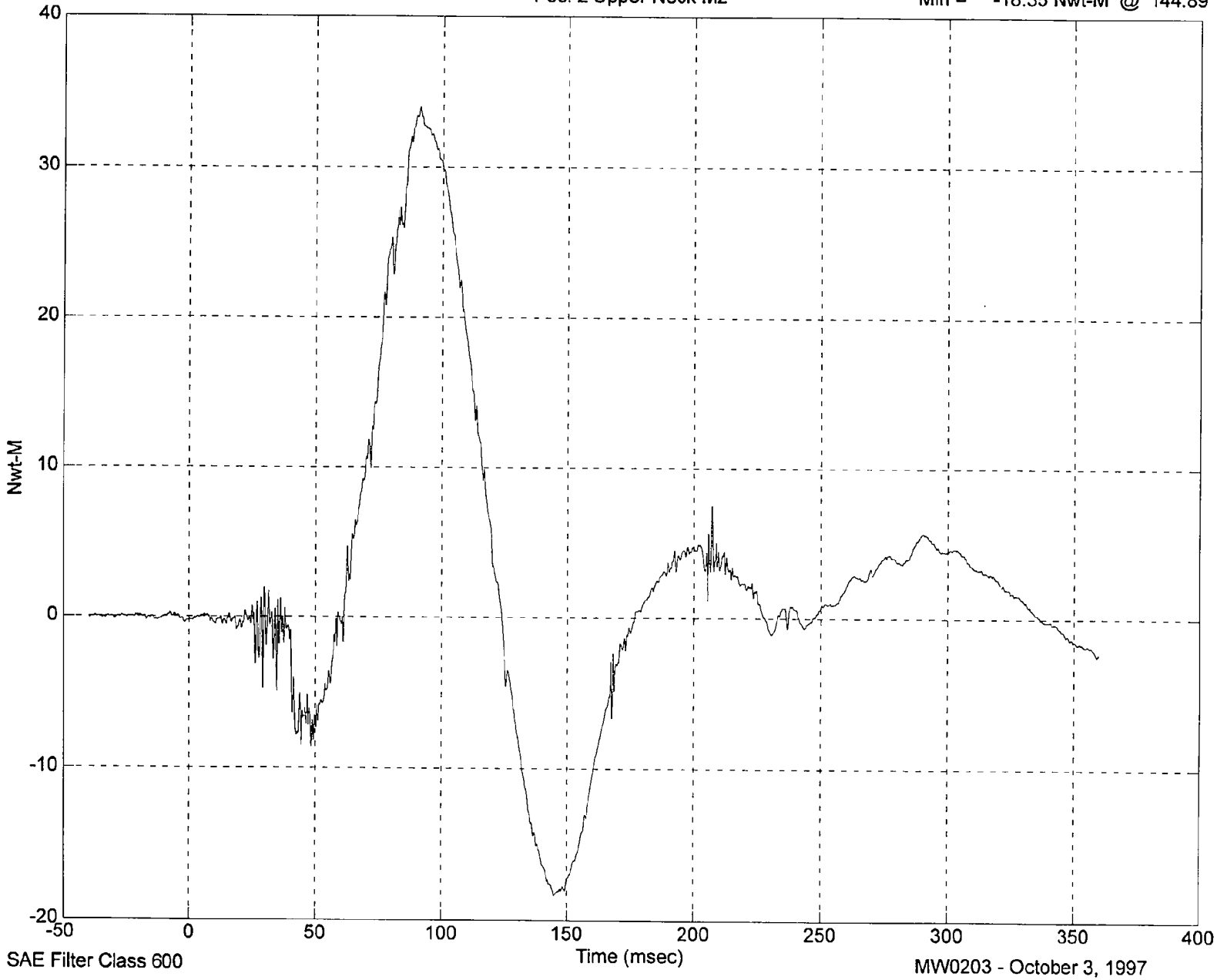

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Upper Neck Mx
Max = 41.69 Nwt-M @ 83.50 msec
Min = -17.63 Nwt-M @ 129.79 msec
Nwt-M
50
40
30
20
10
0
-10
-20
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Upper Neck My
Max = 52.14 Nwt-M @ 152.30 msec
Min = -28.56 Nwt-M @ 247.89 msec
Nwt-M
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Pos. 2 Upper Neck Mz

Max = 33.99 Nwt-M @ 90.79 msec
Min = -18.35 Nwt-M @ 144.89 msec



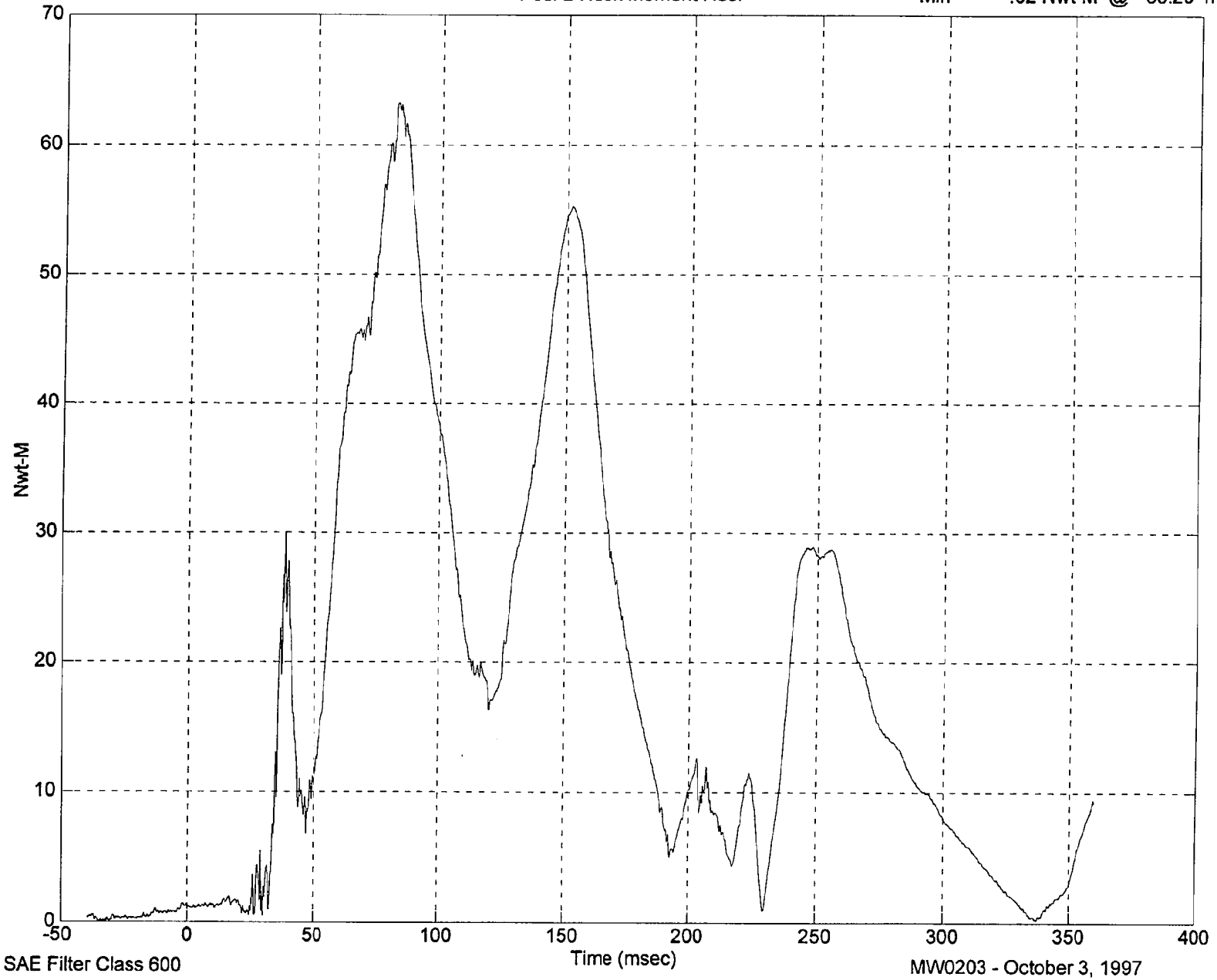

SAE Filter Class 600

MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

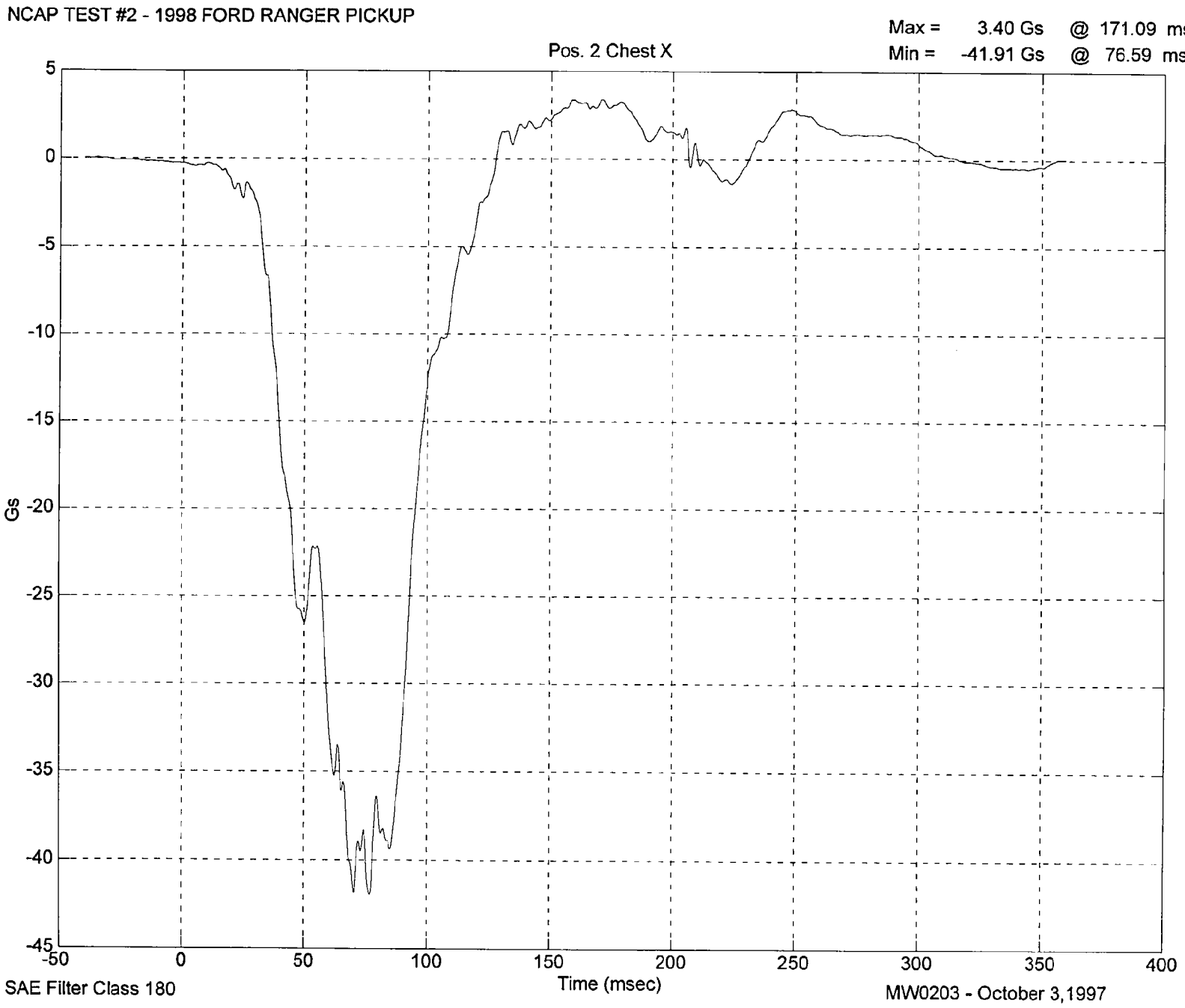
Pos. 2 Neck Moment Res.

Max = 63.23 Nwt-M @ 81.90 msec
Min = .02 Nwt-M @ -35.29 msec




SAE Filter Class 600

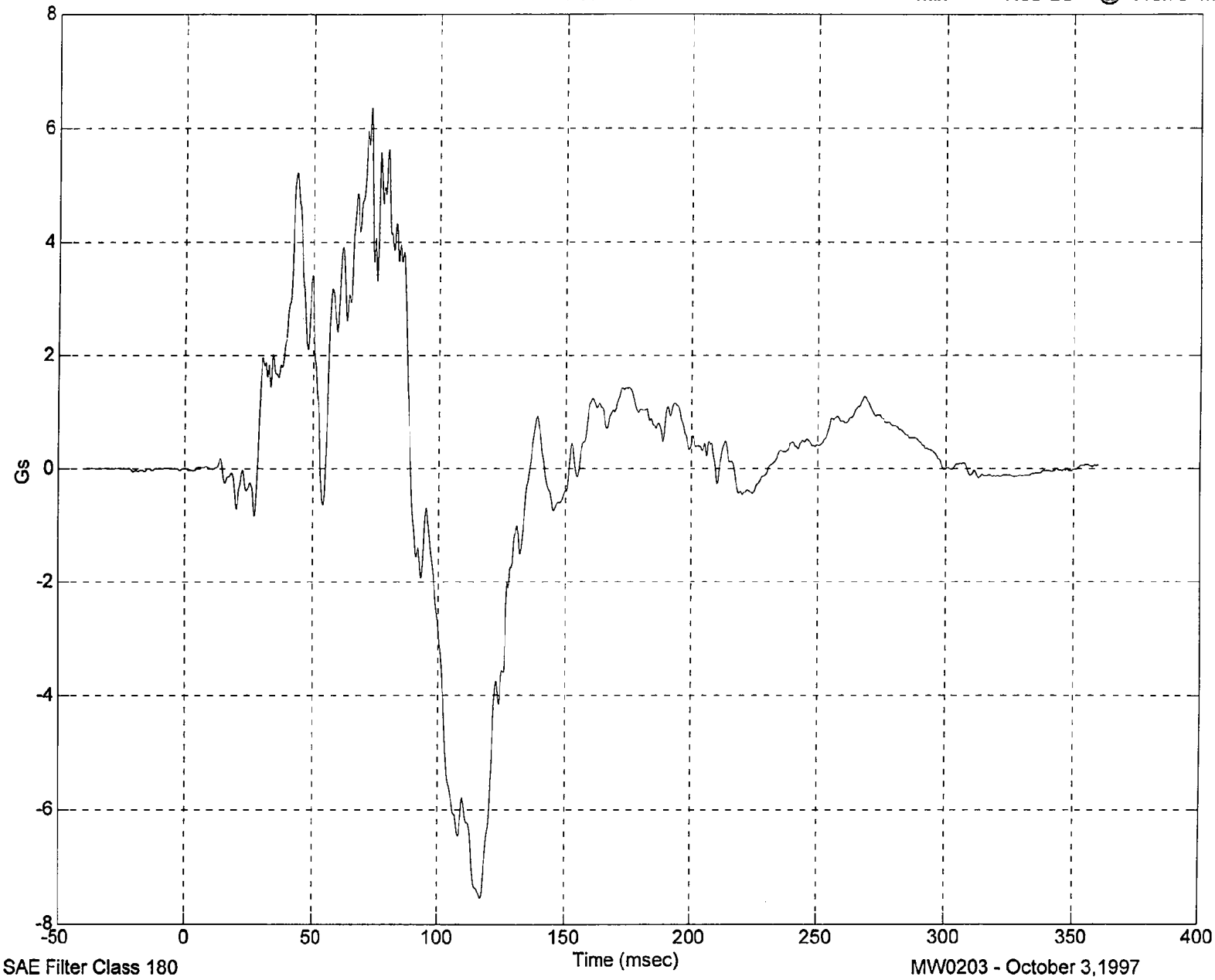
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Chest X
Max = 3.40 Gs @ 171.09 msec
Min = -41.91 Gs @ 76.59 msec
Gs
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

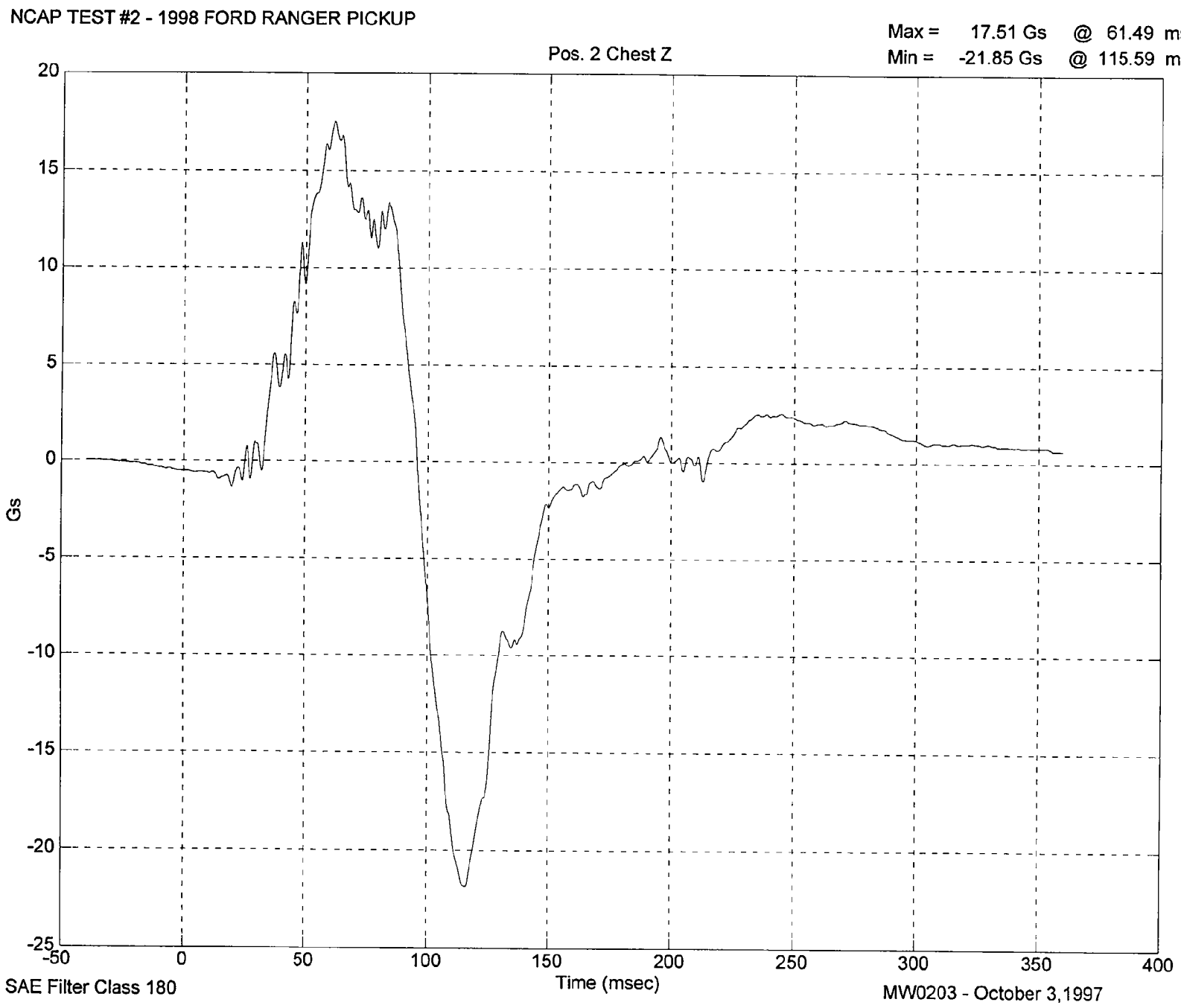
Pos. 2 Chest Y

Max = 6.35 Gs @ 72.79 msec
Min = -7.53 Gs @ 116.79 msec




SAE Filter Class 180

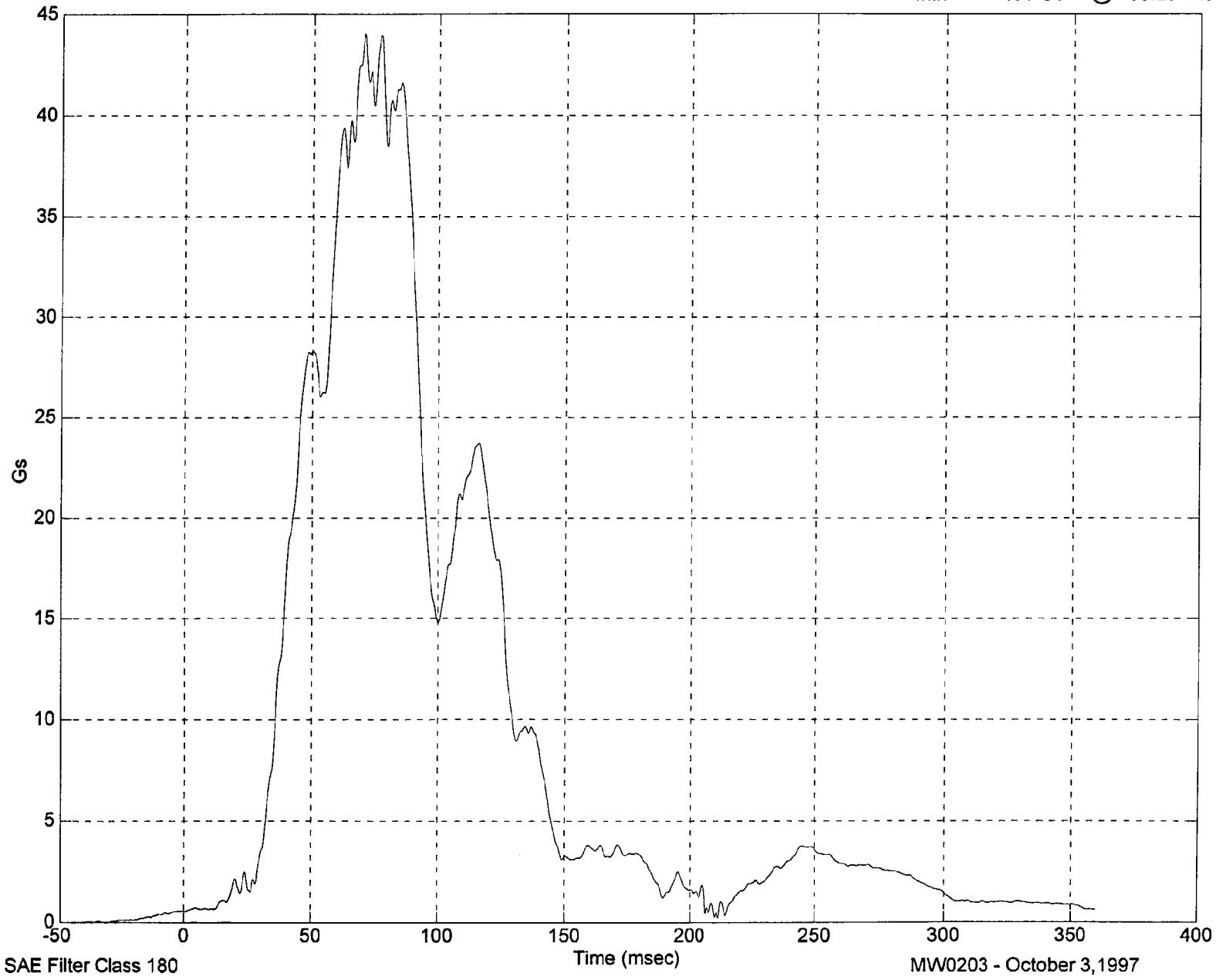
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Chest Z
Max = 17.51 Gs @ 61.49 msec
Min = -21.85 Gs @ 115.59 msec
Gs
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Pos. 2 Chest Resultant

Max = 44.03 Gs @ 70.40 msec
Min = .01 Gs @ -30.29 msec

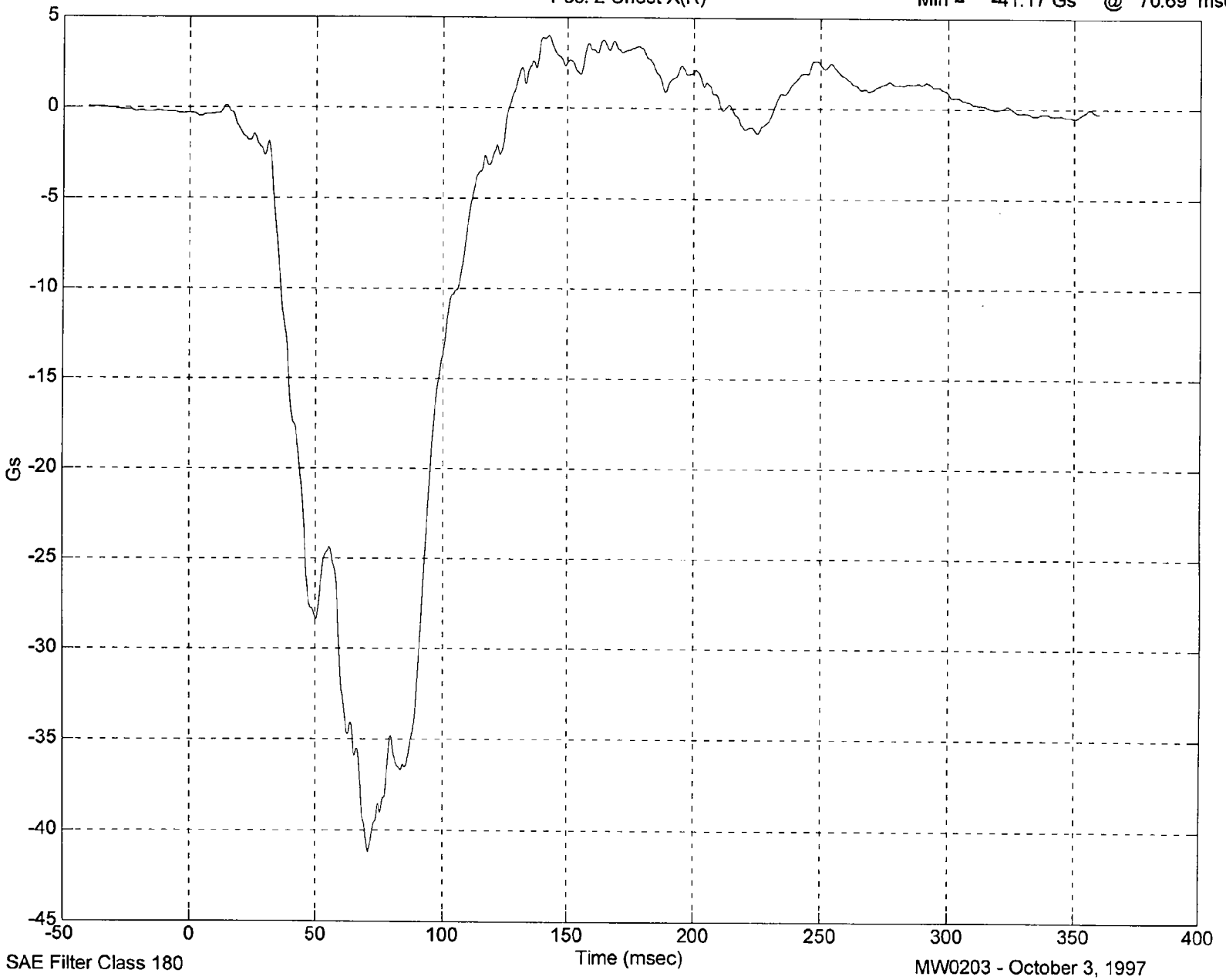



SAE Filter Class 180

MW0203 - October 3,1997

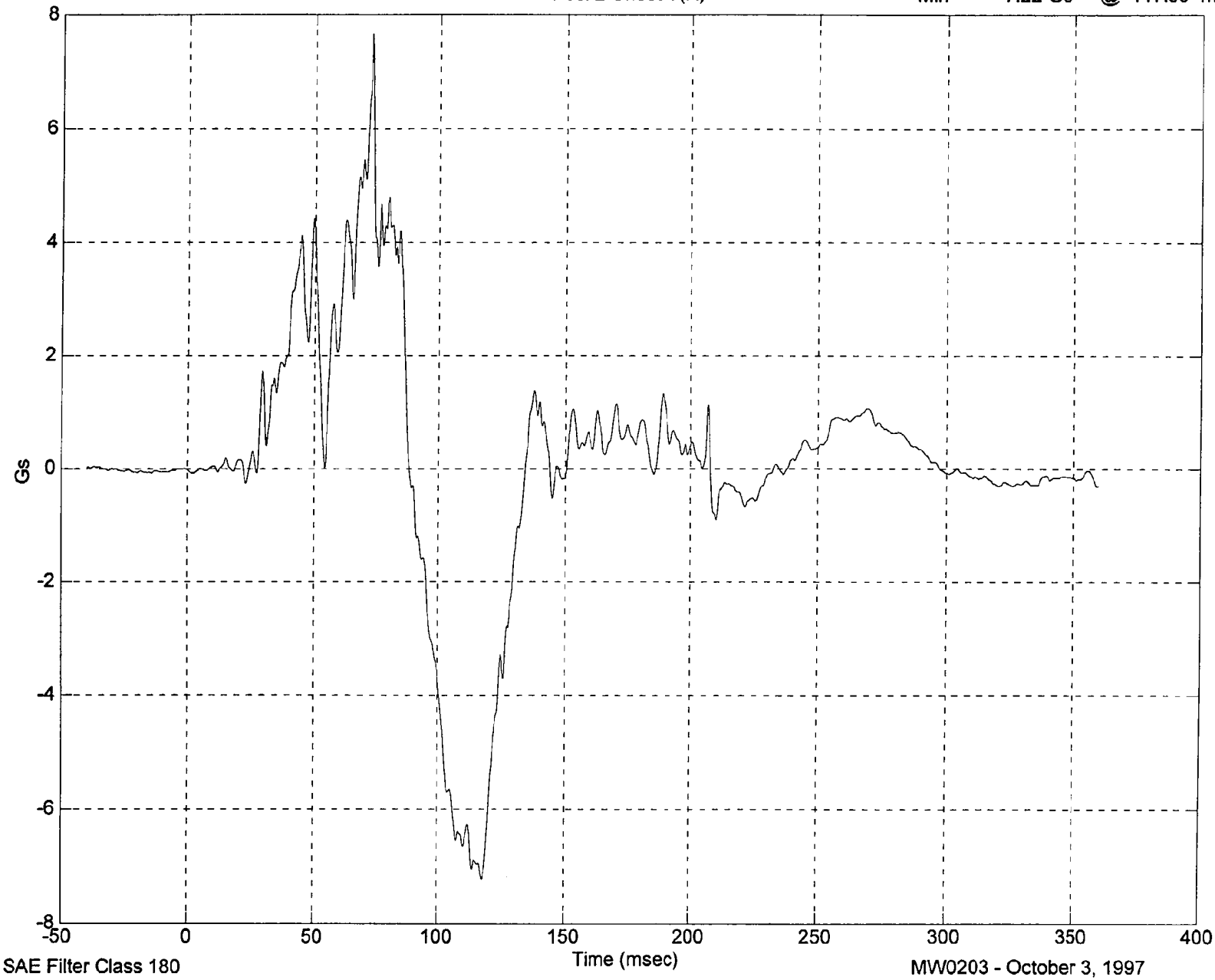
NCAP TEST #2 - 1998 FORD RANGER PICKUP

Max = 4.01 Gs @ 142.50 msec
Min = -41.17 Gs @ 70.69 msec



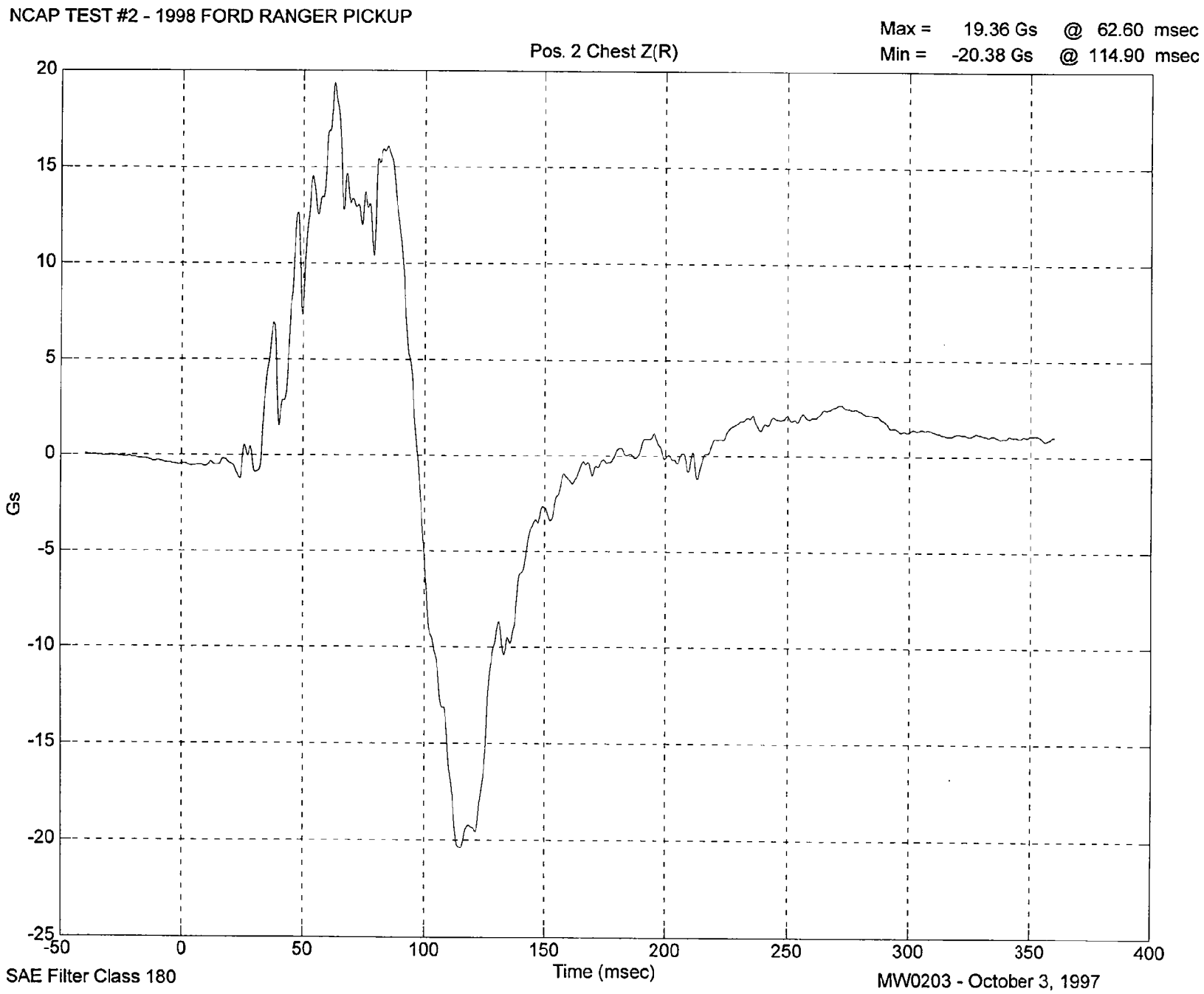
NCAP TEST #2 - 1998 FORD RANGER PICKUP

Max = 7.66 Gs @ 72.79 msec
Min = -7.22 Gs @ 117.59 msec



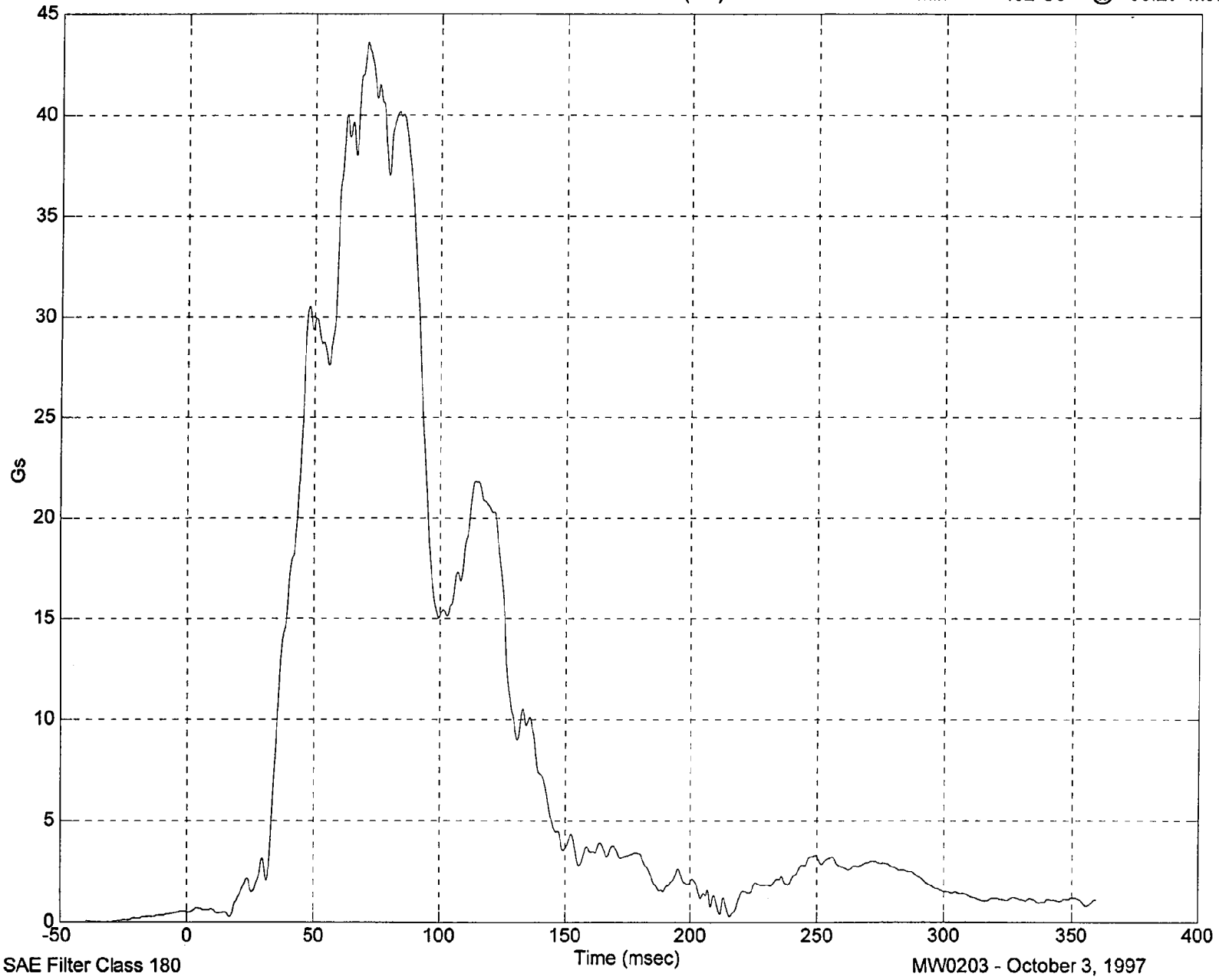

SAE Filter Class 180

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Chest Z(R)
Max = 19.36 Gs @ 62.60 msec
Min = -20.38 Gs @ 114.90 msec
Gs
Time (msec)
SAE Filter Class 180
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Max = 43.59 Gs @ 70.69 msec
Min = .02 Gs @ -33.29 msec



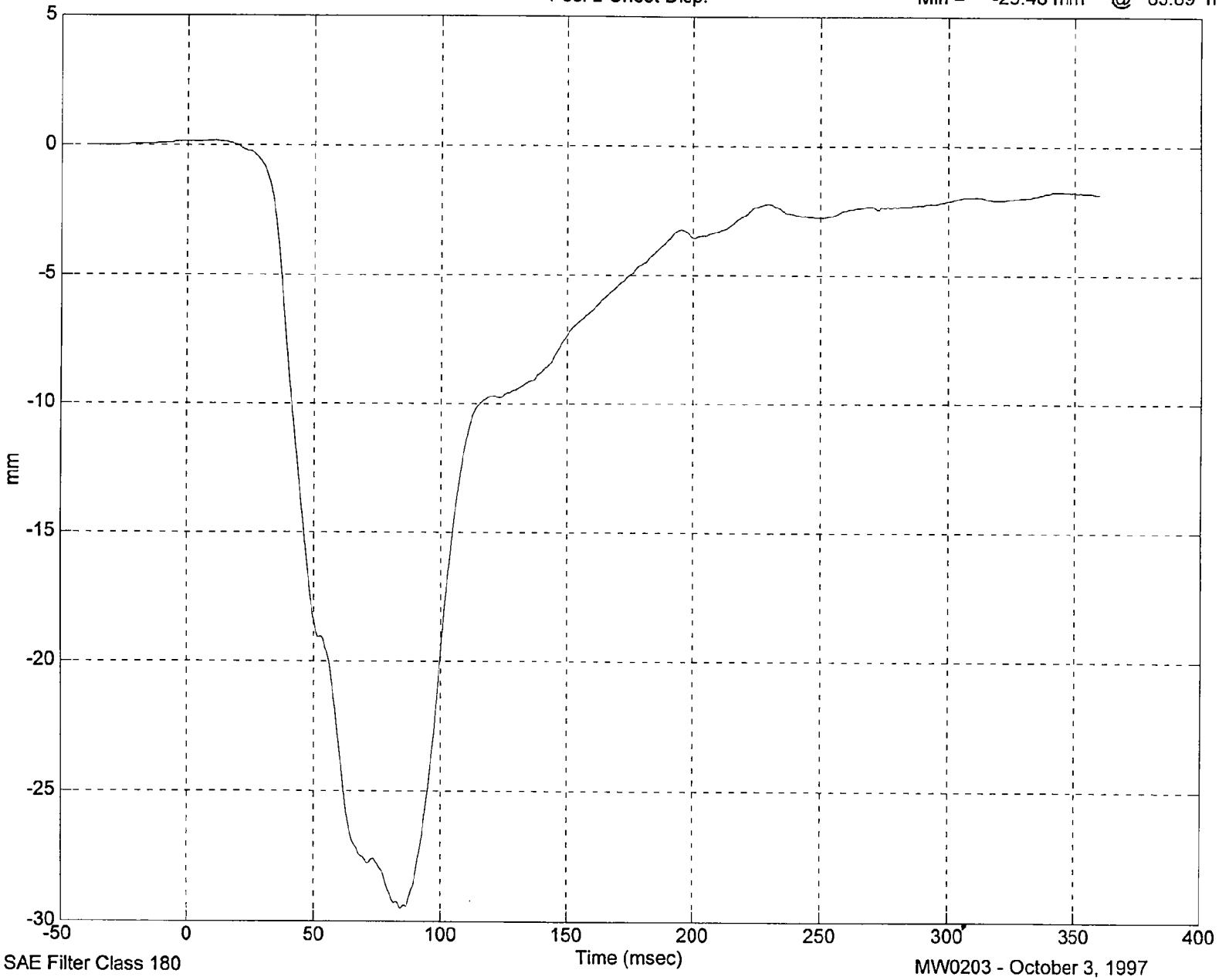

SAE Filter Class 180

MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Pos. 2 Chest Disp.

Max = .18 mm @ 11.00 msec
Min = -29.48 mm @ 83.89 msec




SAE Filter Class 180

MW0203 - October 3, 1997

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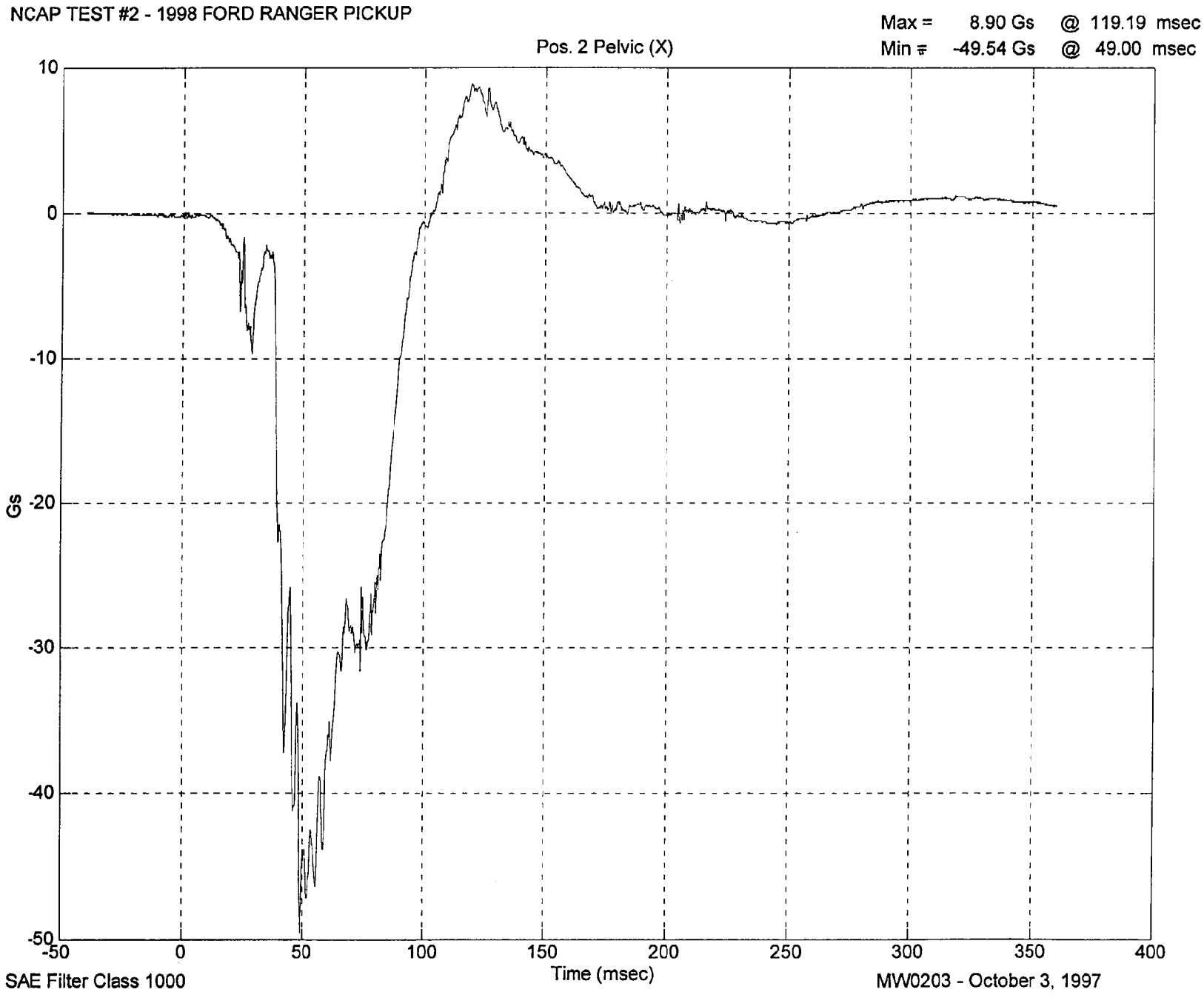
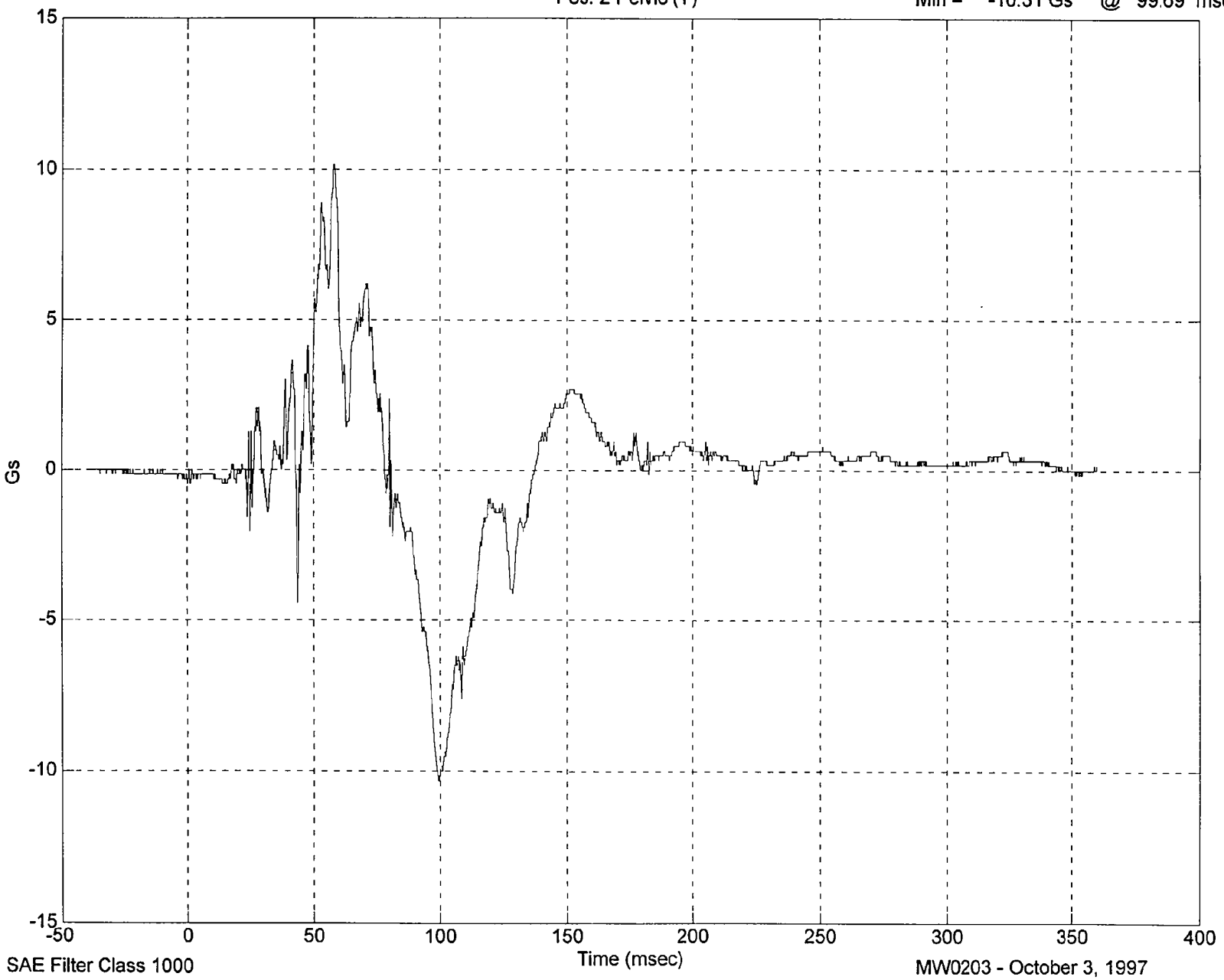

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Pelvic (X)
Max = 8.90 Gs @ 119.19 msec
Min = -49.54 Gs @ 49.00 msec
10
0
-10
-20
-30
-40
-50
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

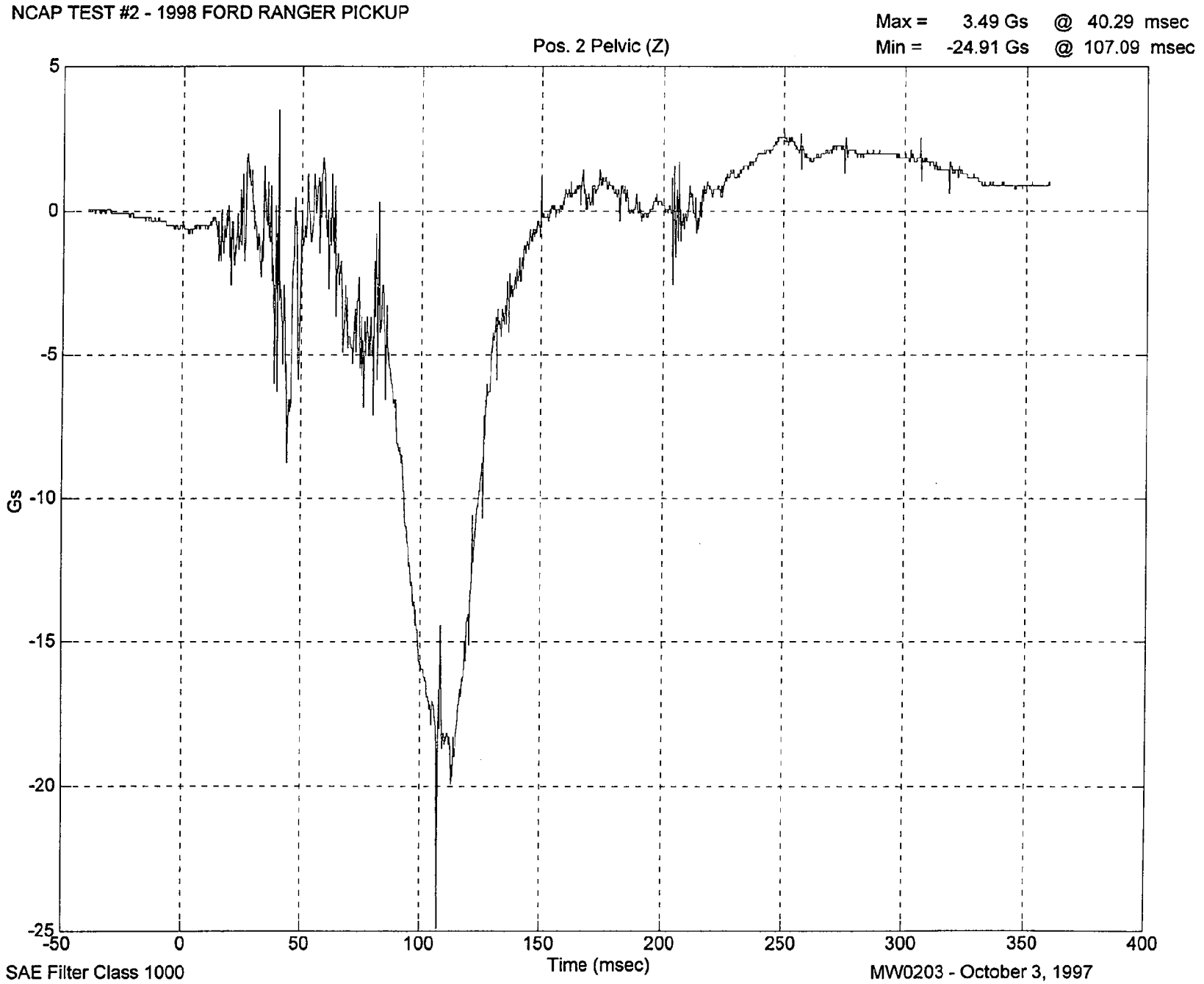
Pos. 2 Pelvic (Y)

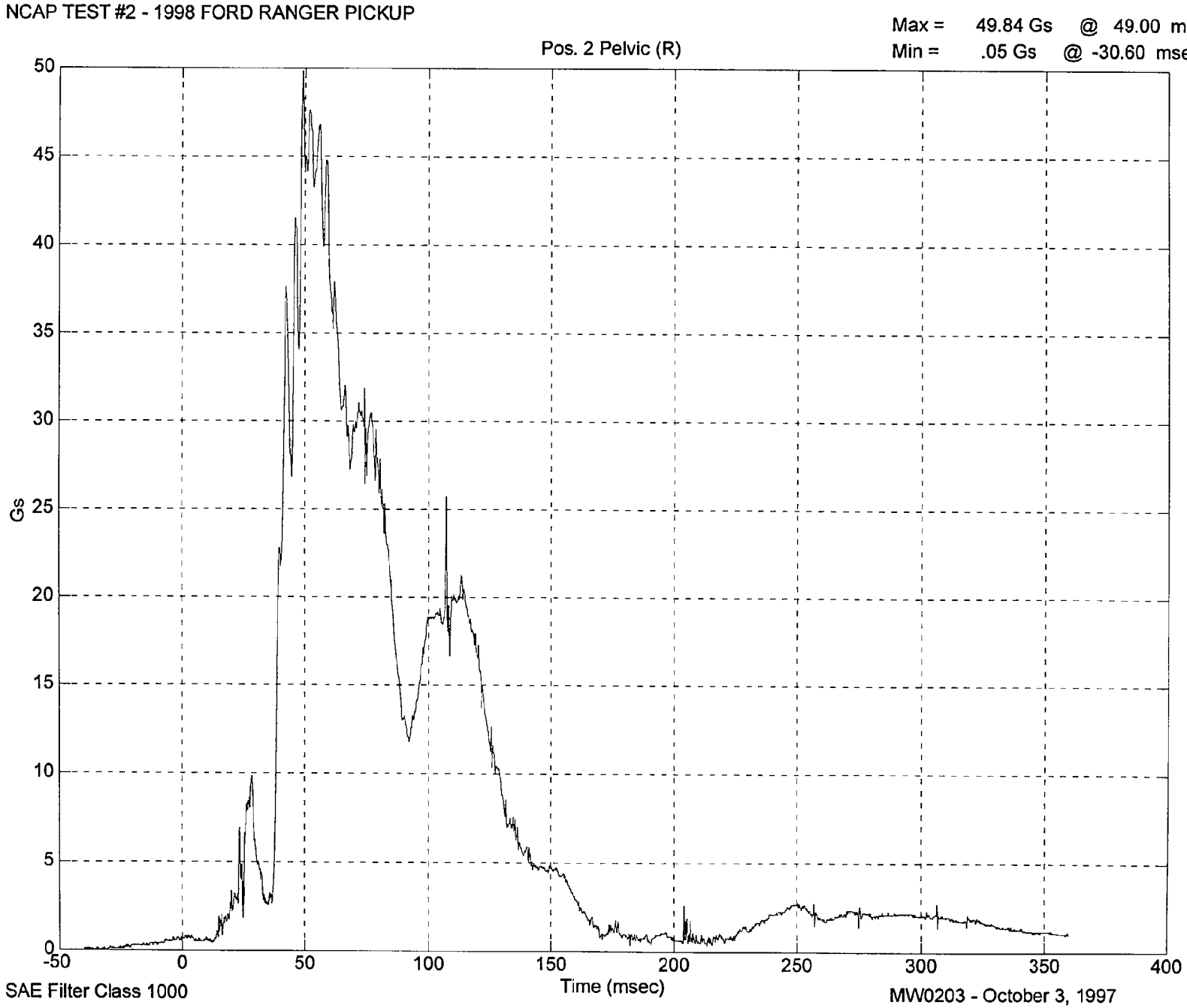
Max = 10.16 Gs @ 58.00 msec
Min = -10.31 Gs @ 99.69 msec

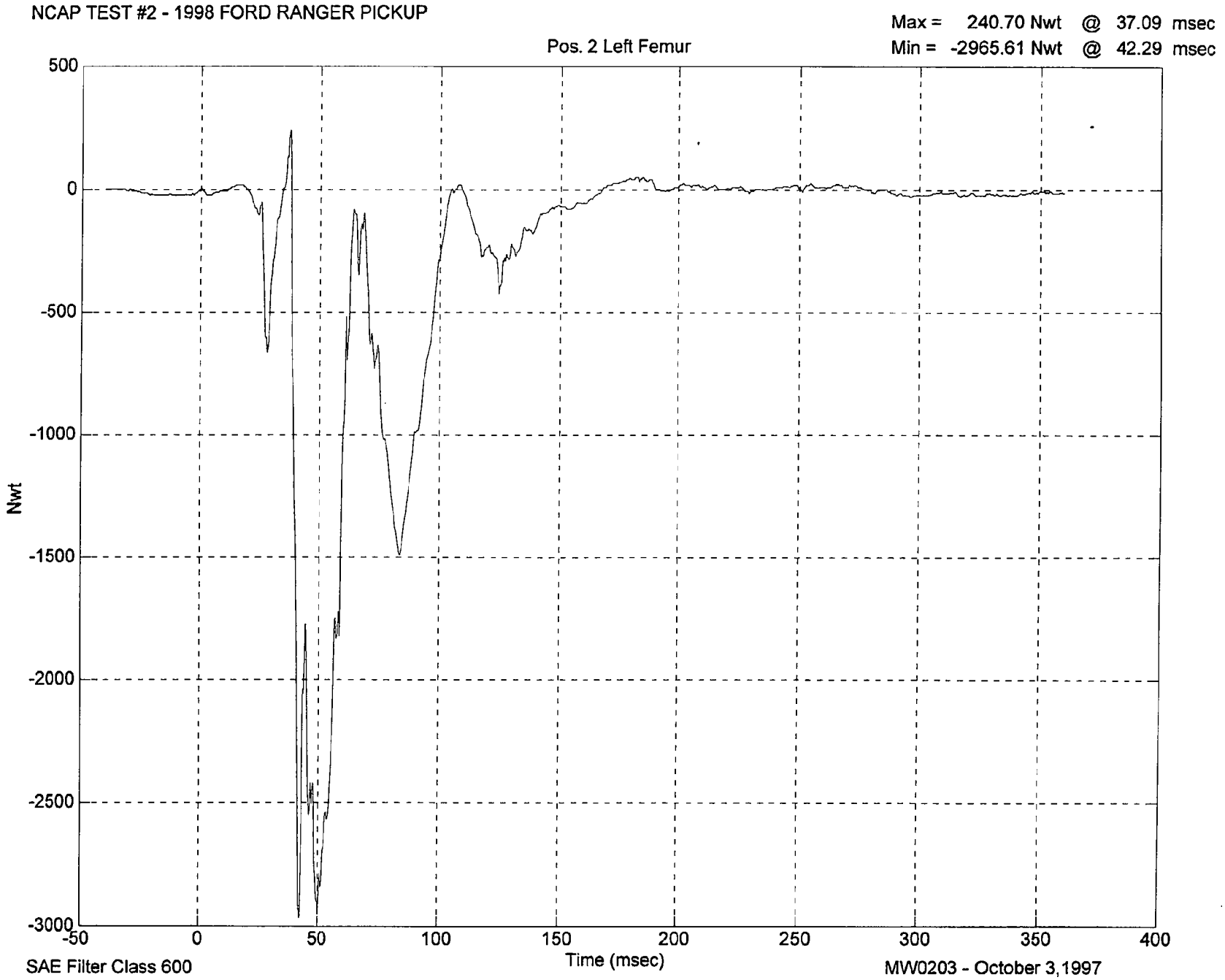


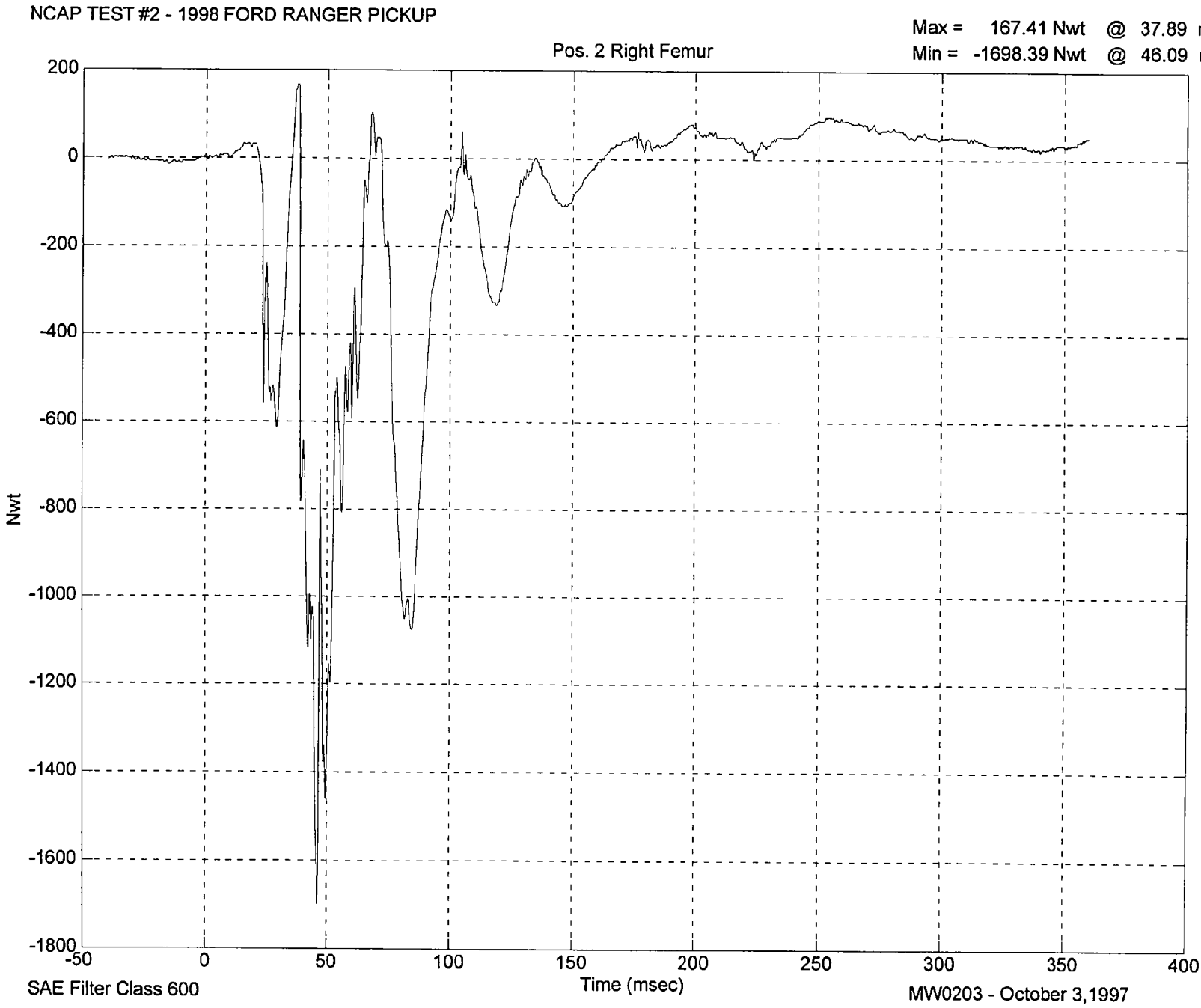

SAE Filter Class 1000

MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Pelvic (Z)
Max = 3.49 Gs @ 40.29 msec
Min = -24.91 Gs @ 107.09 msec
Gs
5
0
-5
-10
-15
-20
-25
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

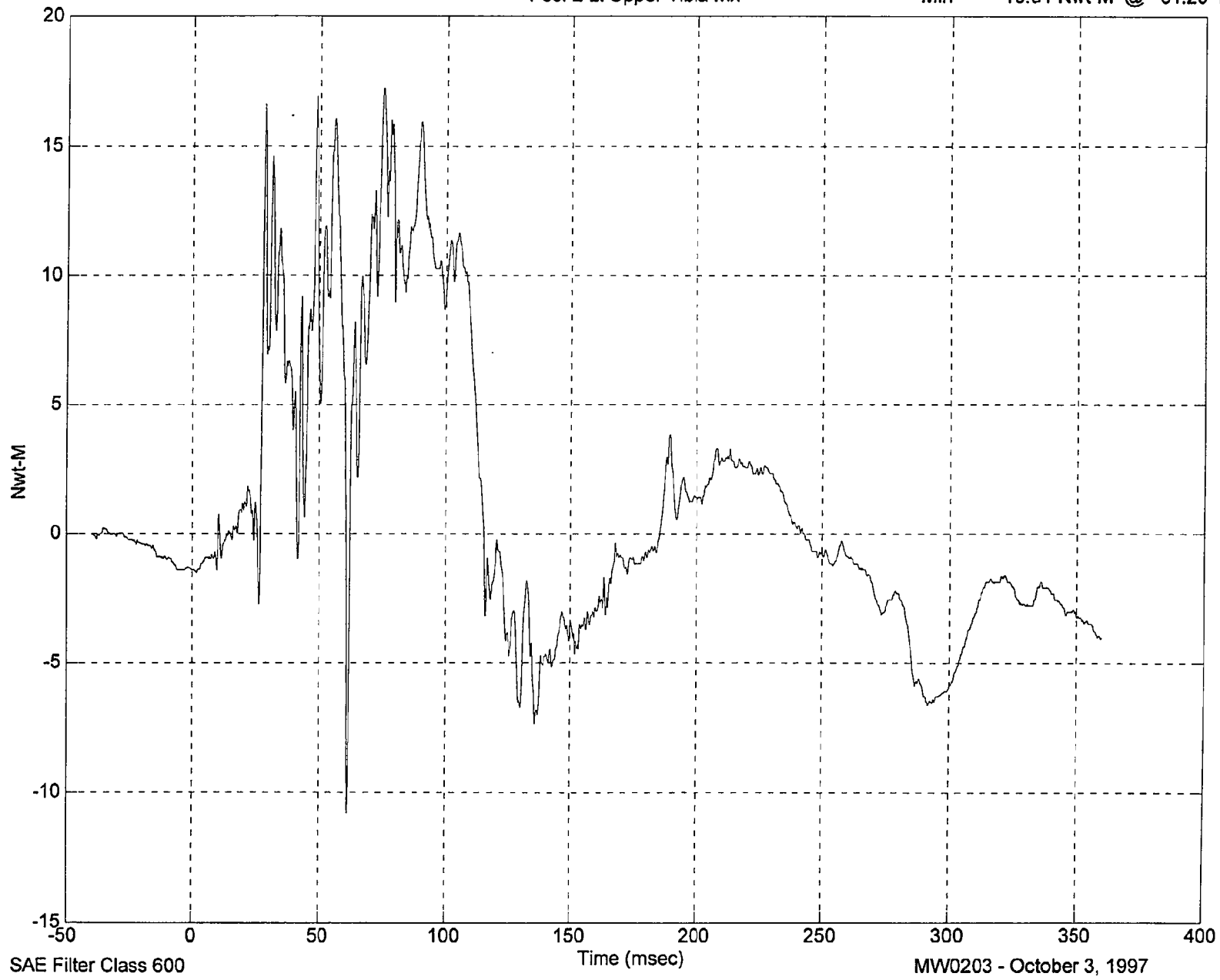

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Max = 49.84 Gs @ 49.00 msec
Min = .05 Gs @ -30.60 msec
Pos. 2 Pelvic (R)
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Max = 240.70 Nwt @ 37.09 msec
Min = -2965.61 Nwt @ 42.29 msec
Pos. 2 Left Femur
500
0
-500
-1000
-1500
-2000
-2500
-3000
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Right Femur
Max = 167.41 Nwt @ 37.89 msec
Min = -1698.39 Nwt @ 46.09 msec
Nwt
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3,1997

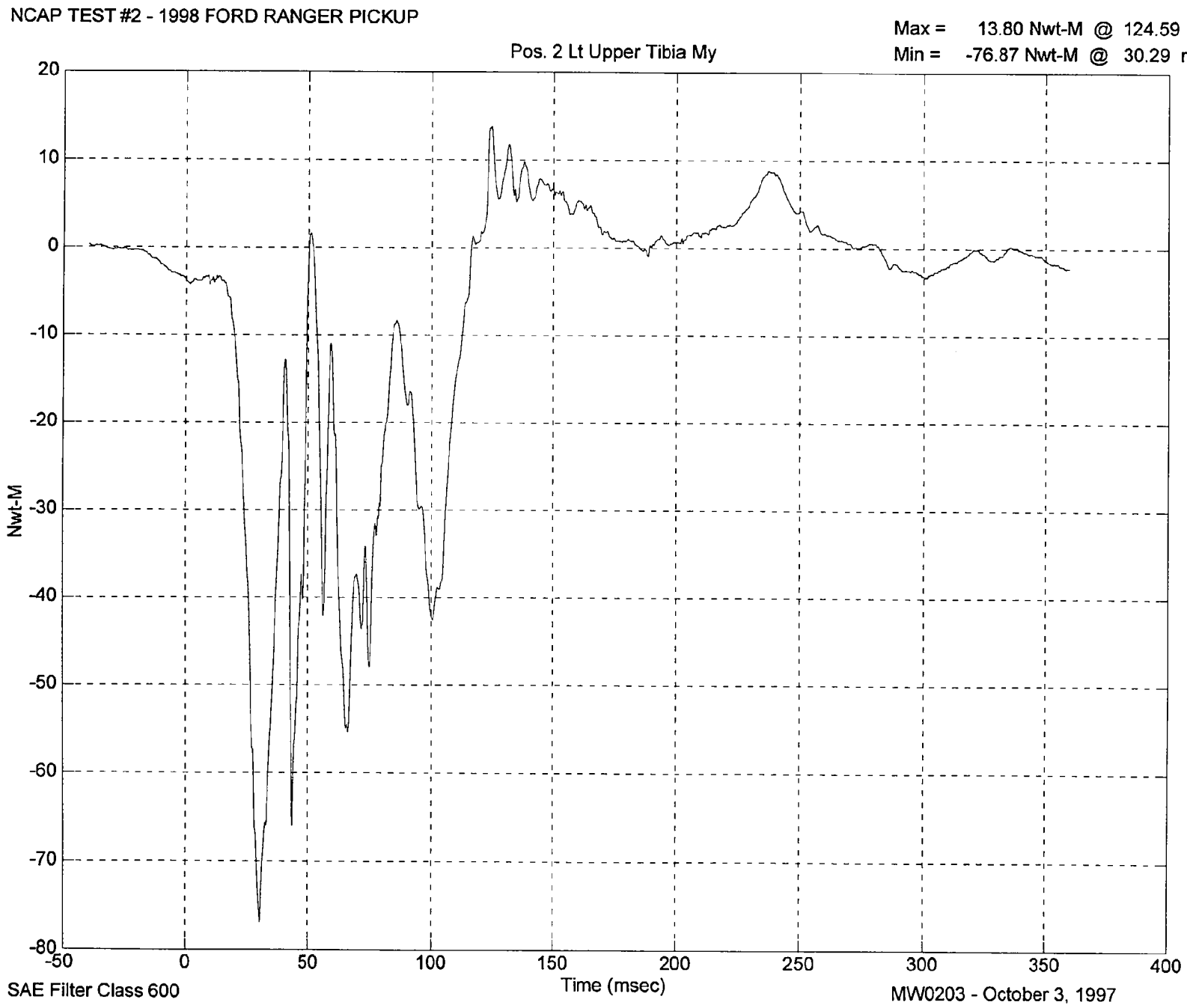
NCAP TEST #2 - 1998 FORD RANGER PICKUP

Max = 17.22 Nwt-M @ 74.69 msec
Min = -10.81 Nwt-M @ 61.29 msec




SAE Filter Class 600

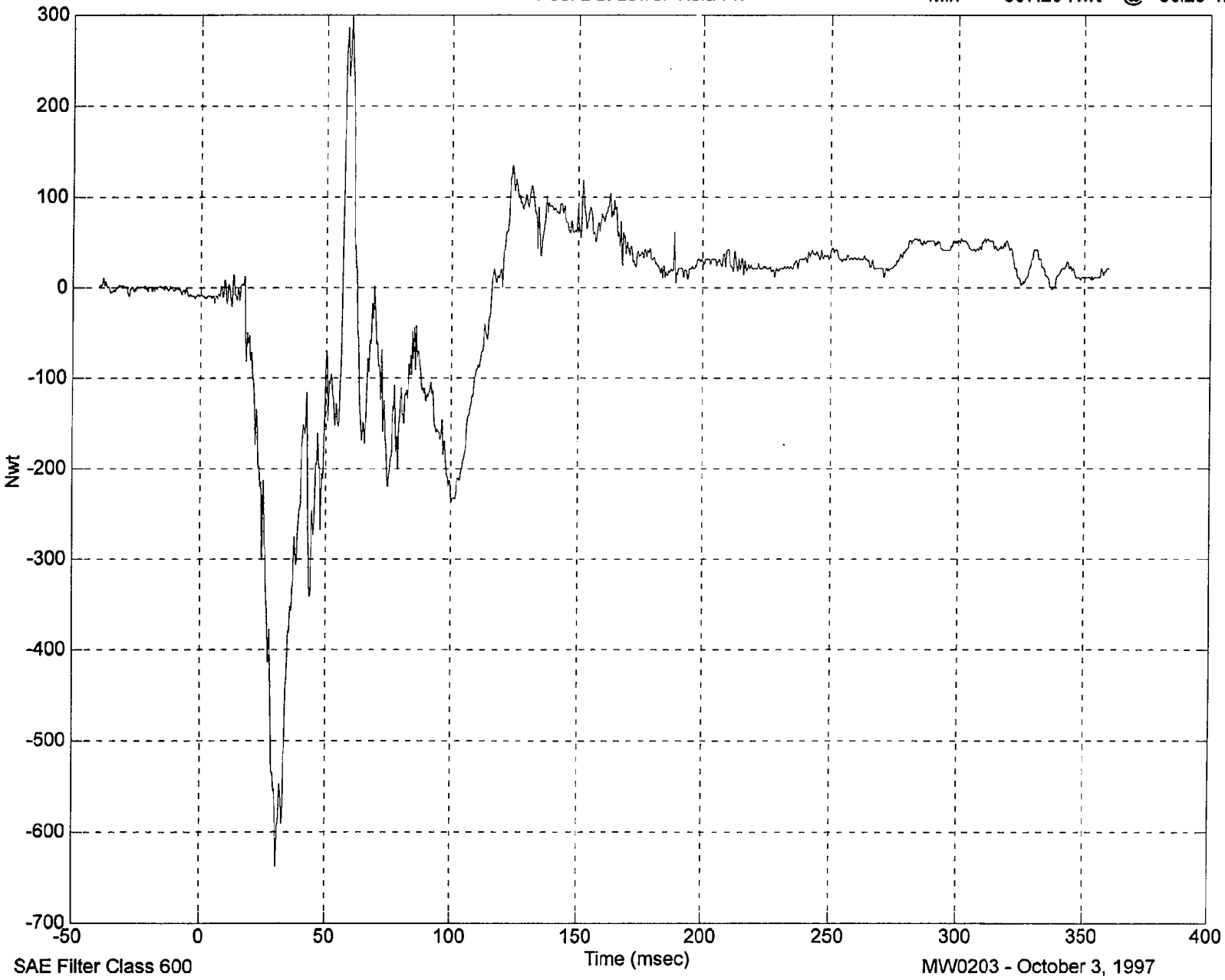
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Lt Upper Tibia My
Max = 13.80 Nwt-M @ 124.59 msec
Min = -76.87 Nwt-M @ 30.29 msec
Nwt-M
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

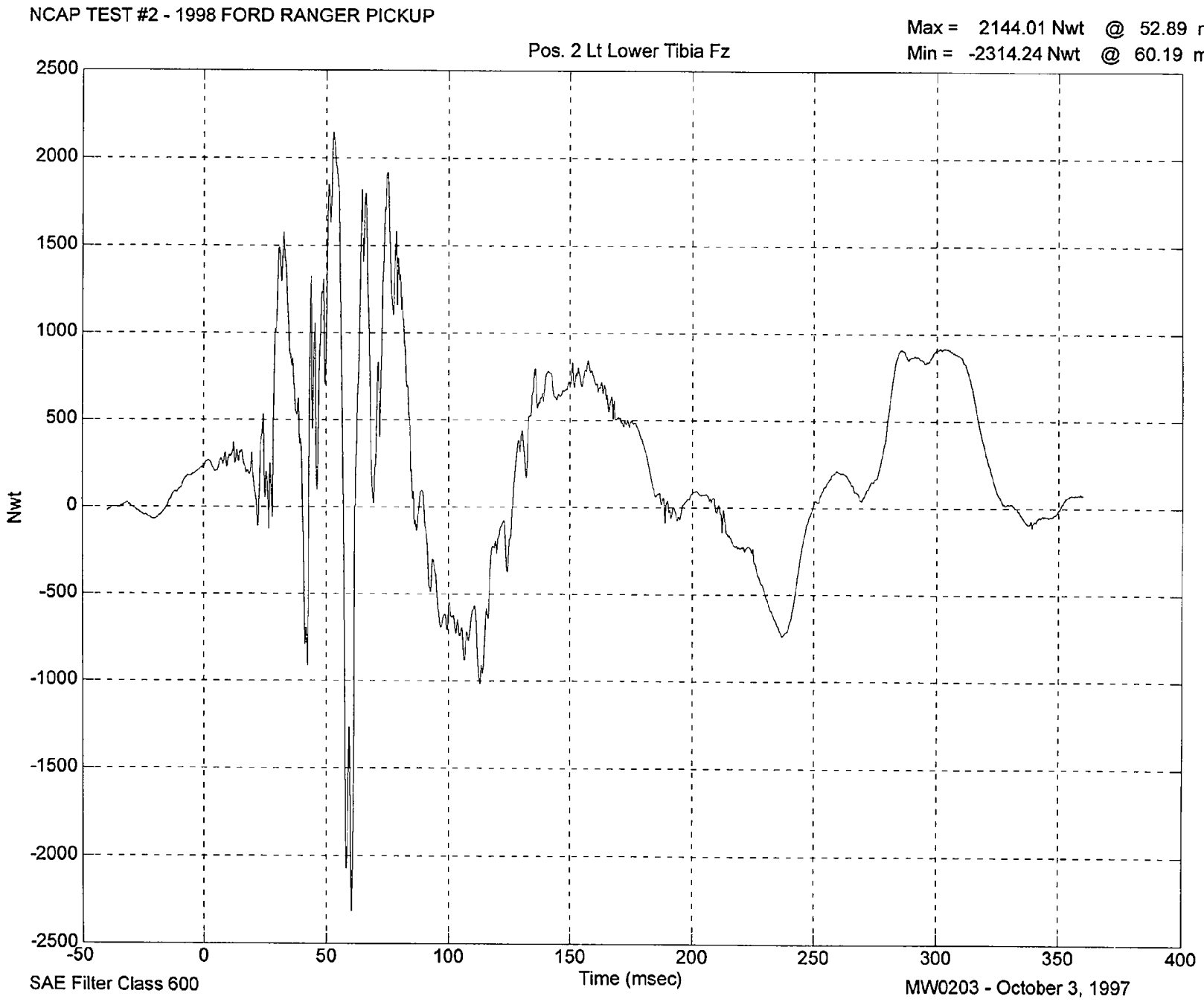
Pos. 2 Lt Lower Tibia Fx

Max = 298.58 Nwt @ 59.79 msec
Min = -637.29 Nwt @ 30.29 msec




SAE Filter Class 600

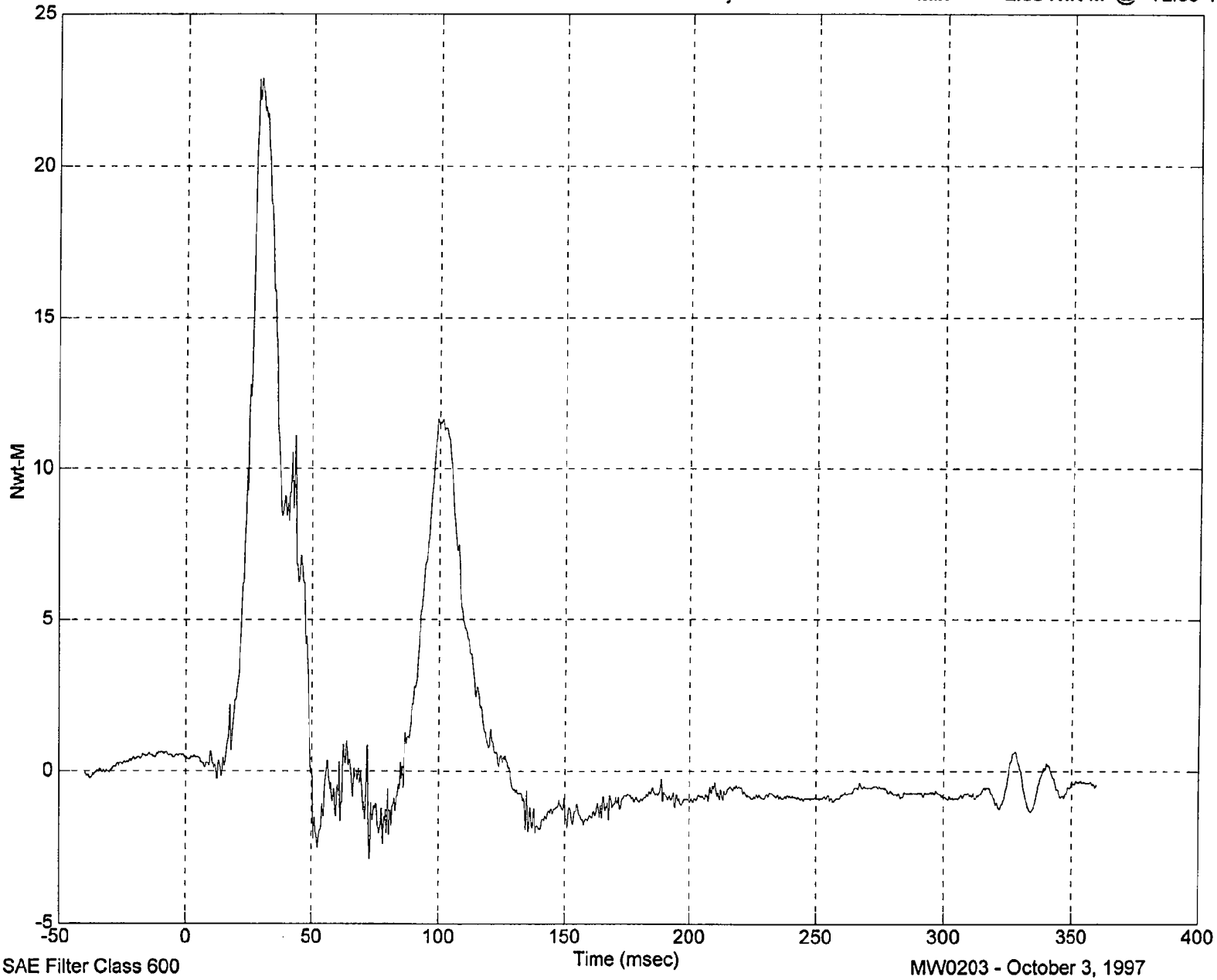
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Lt Lower Tibia Fz
Max = 2144.01 Nwt @ 52.89 msec
Min = -2314.24 Nwt @ 60.19 msec
Nwt
2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

Pos. 2 Lt Lower Tibia My

Max = 22.88 Nwt-M @ 29.09 msec
Min = -2.86 Nwt-M @ 72.59 msec

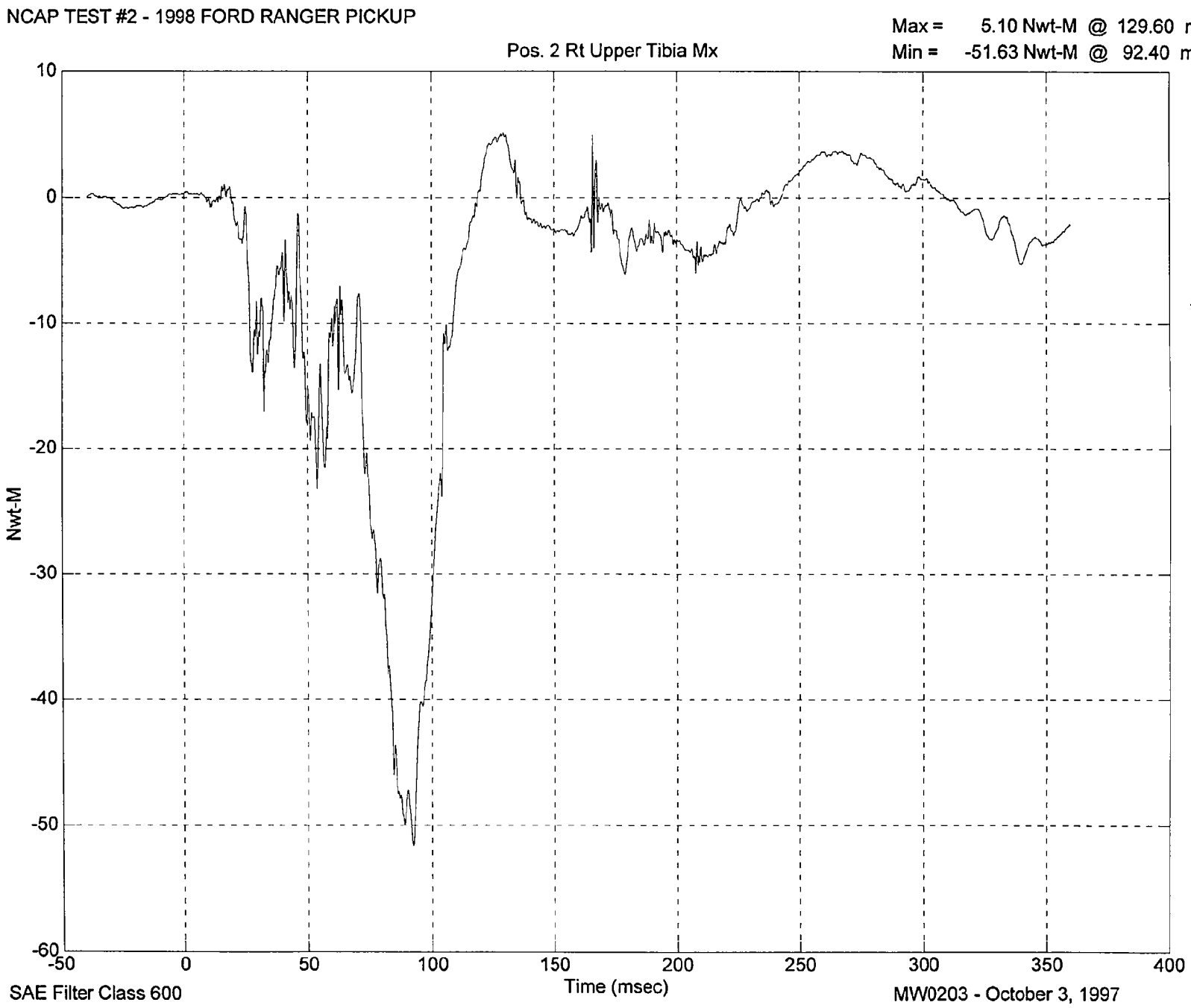



SAE Filter Class 600

MW0203 - October 3, 1997



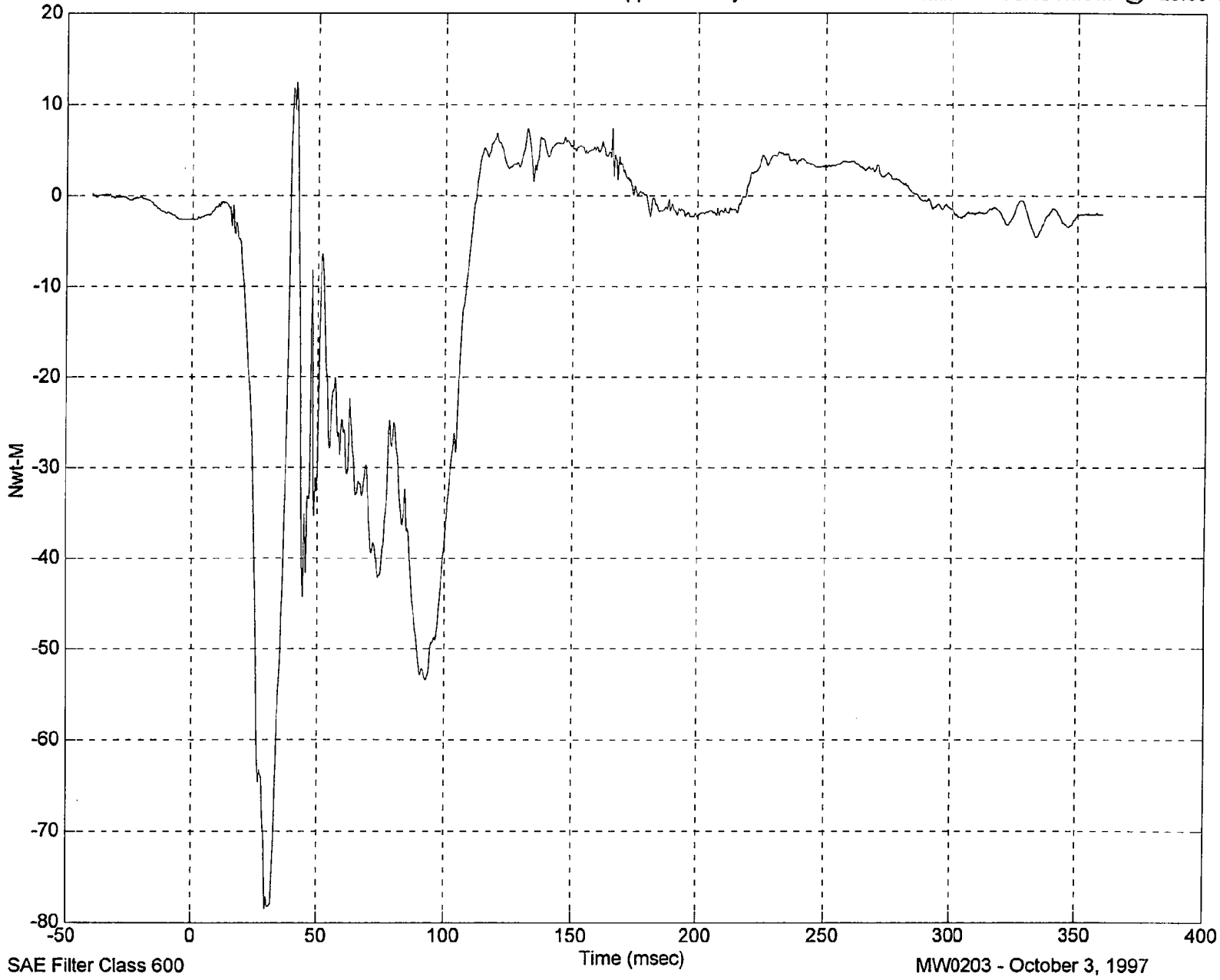
8413-2


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Max = 5.10 Nwt-M @ 129.60 msec
Min = -51.63 Nwt-M @ 92.40 msec
Pos. 2 Rt Upper Tibia Mx
Nwt-M
10
0
-10
-20
-30
-40
-50
-60
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

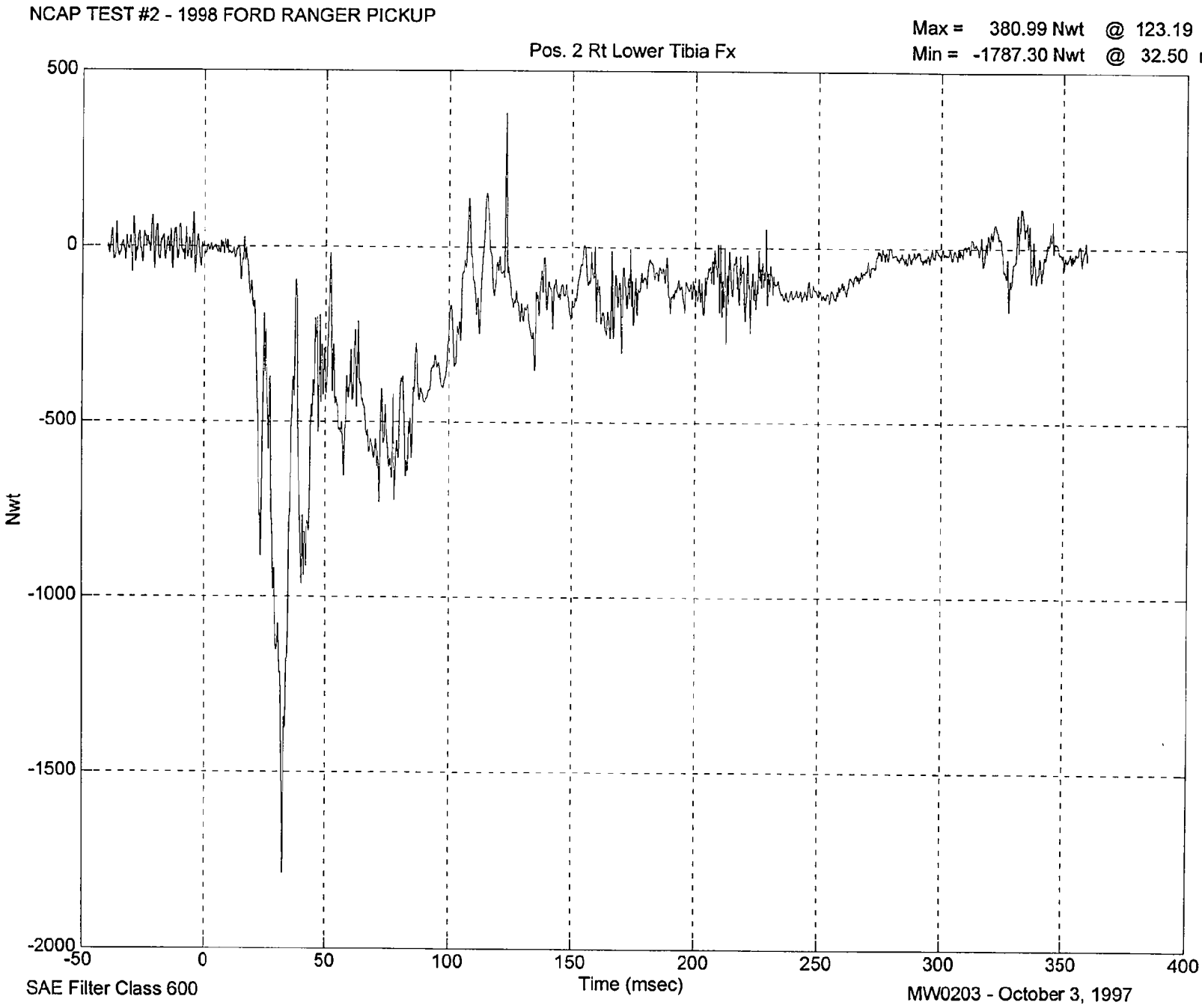
Pos. 2 Rt Upper Tibia My

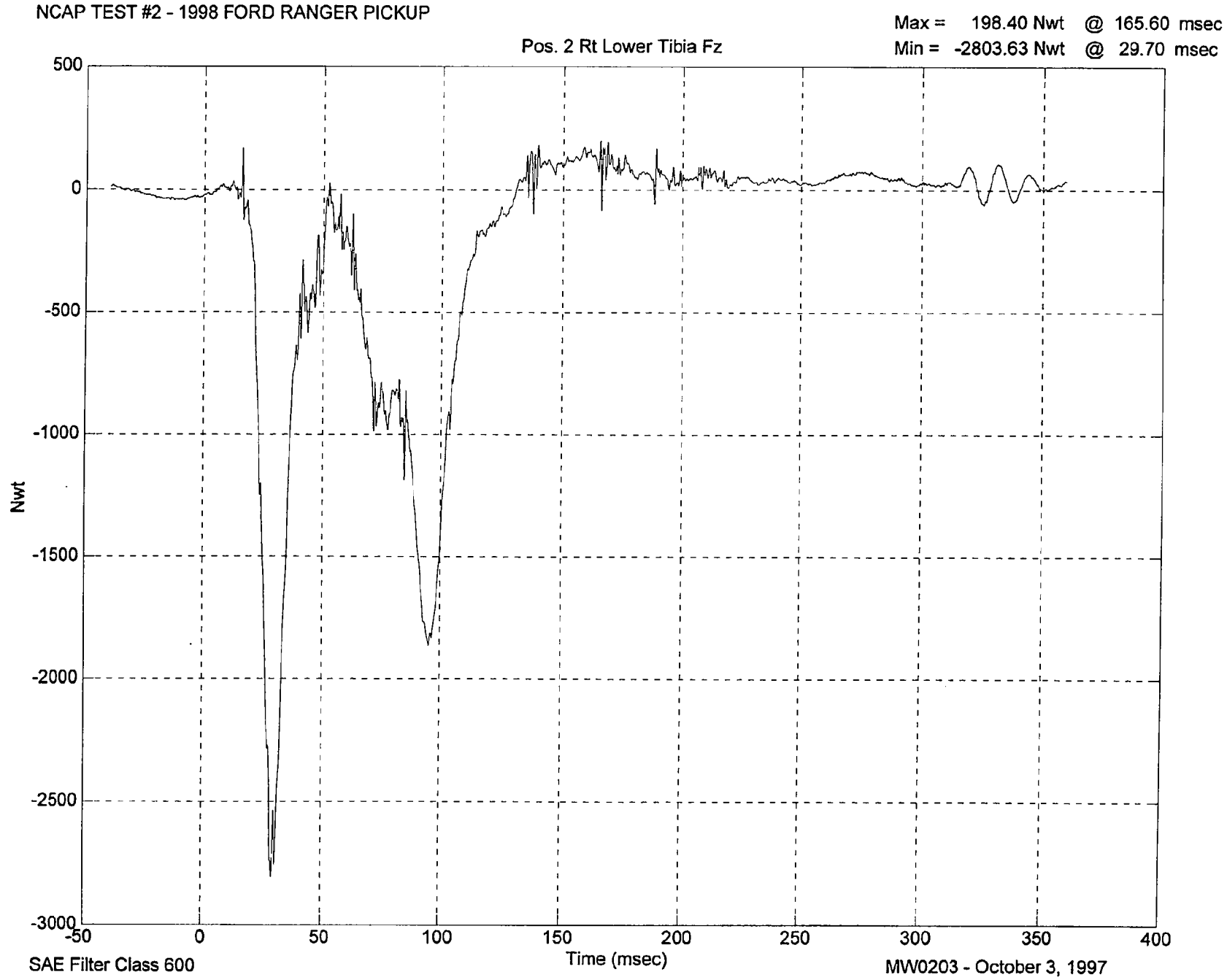
Max = 12.46 Nwt-M @ 41.40 msec
Min = -78.48 Nwt-M @ 29.39 msec




SAE Filter Class 600

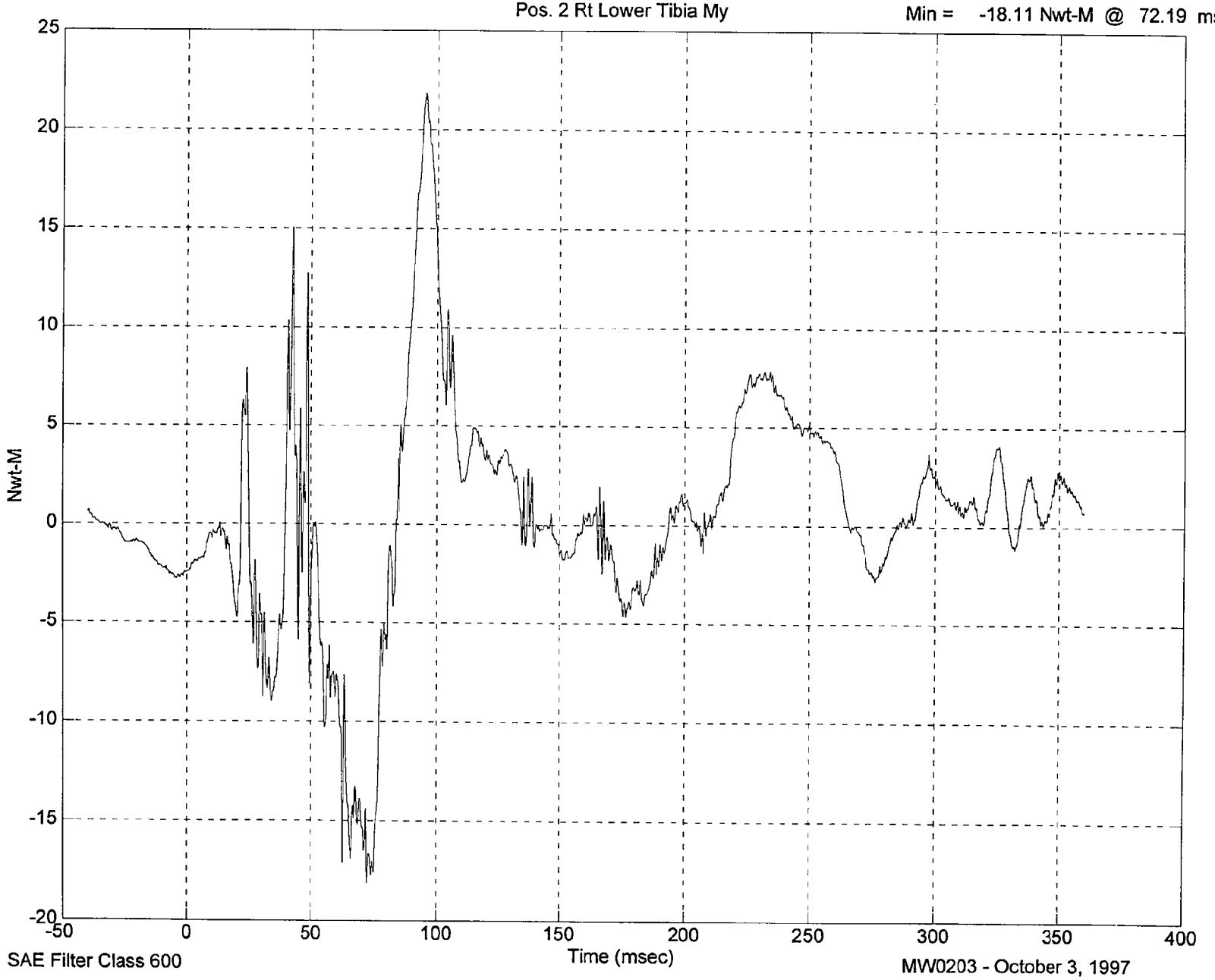
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Rt Lower Tibia Fx
Max = 380.99 Nwt @ 123.19 msec
Min = -1787.30 Nwt @ 32.50 msec
500
0
-500
-1000
-1500
-2000
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Rt Lower Tibia Fz
Max = 198.40 Nwt @ 165.60 msec
Min = -2803.63 Nwt @ 29.70 msec
500
0
-500
-1000
-1500
-2000
-2500
-3000
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 600
MW0203 - October 3, 1997

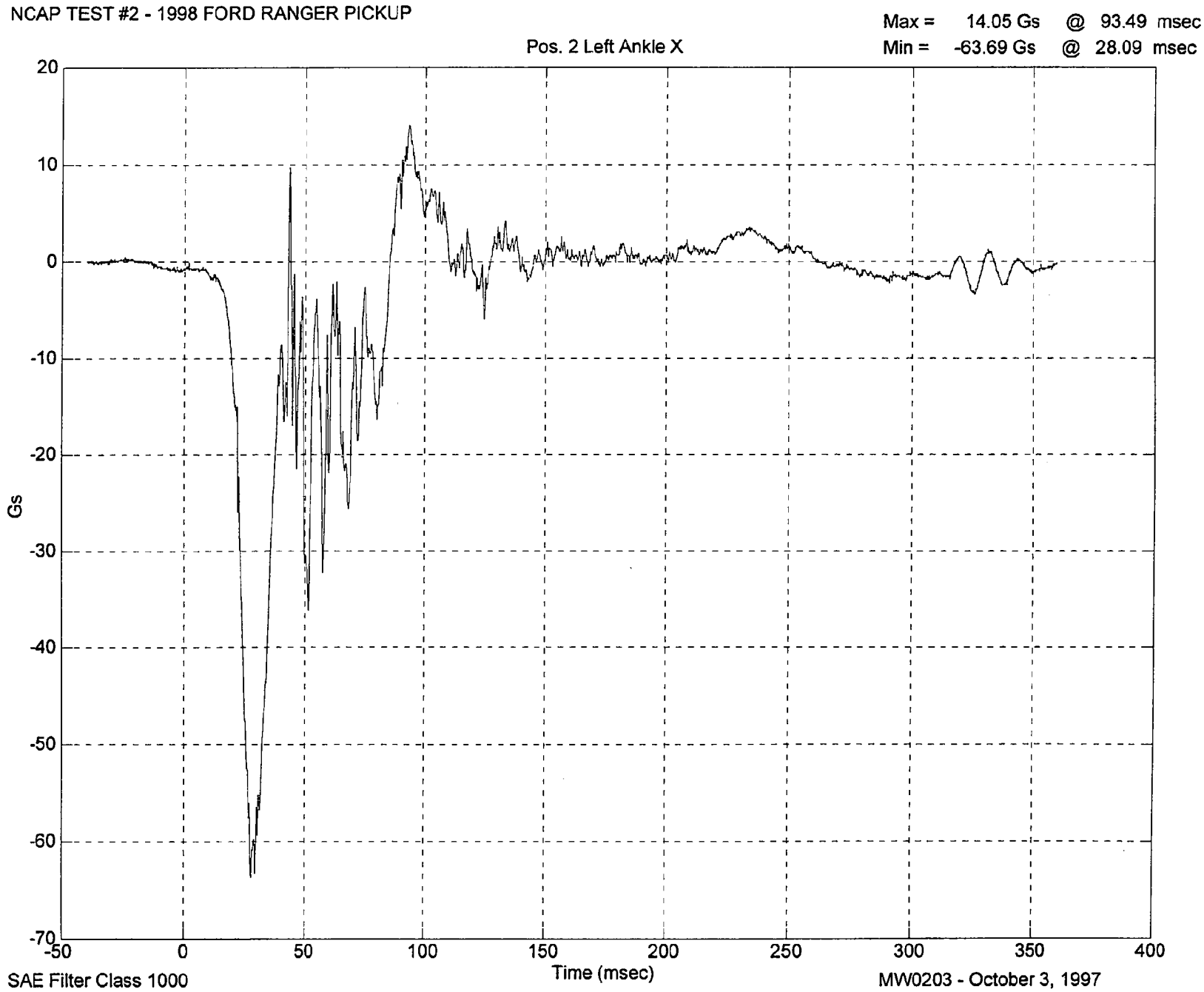
NCAP TEST #2 - 1998 FORD RANGER PICKUP

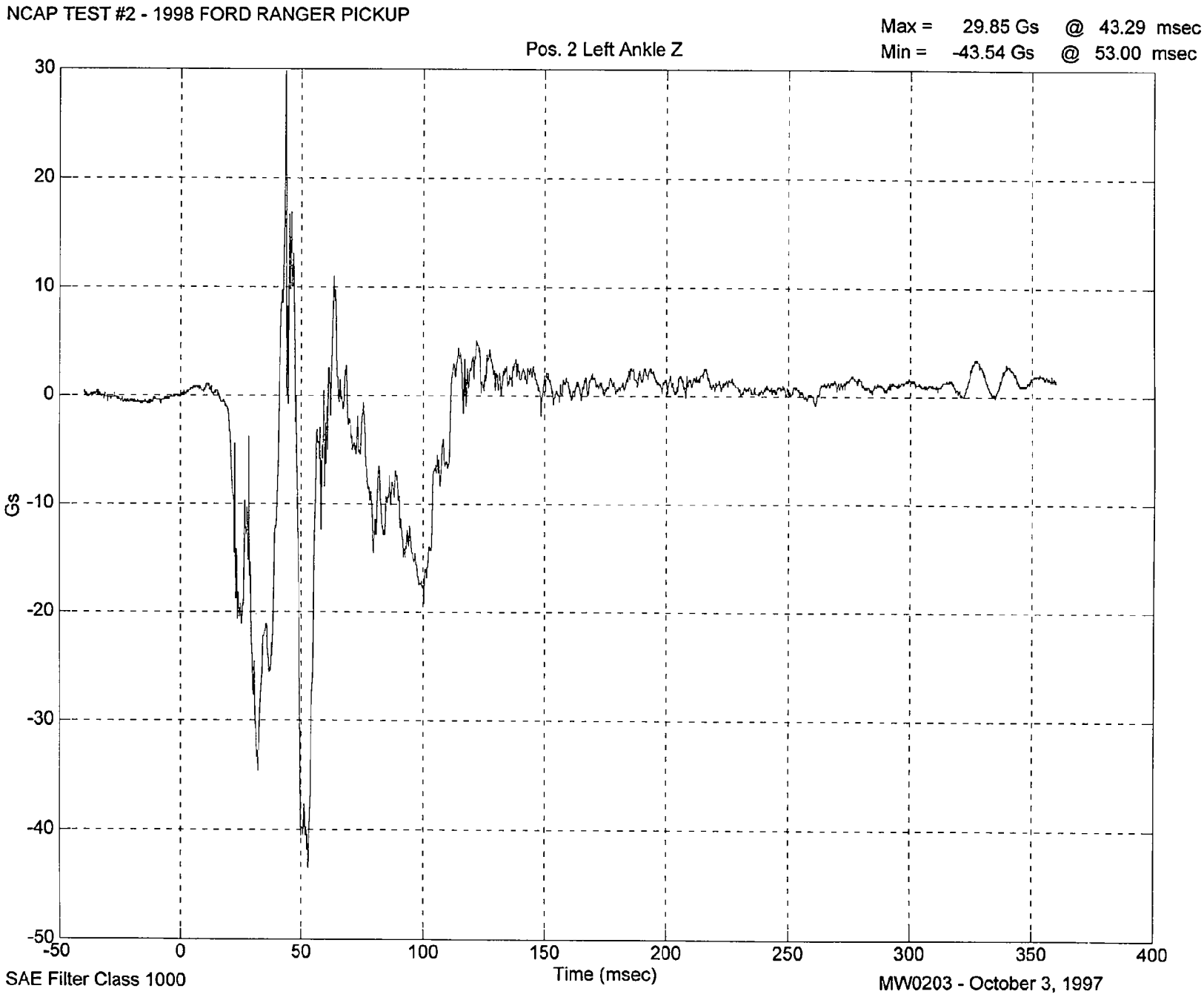
Max = 21.84 Nwt-M @ 95.29 msec
Min = -18.11 Nwt-M @ 72.19 msec

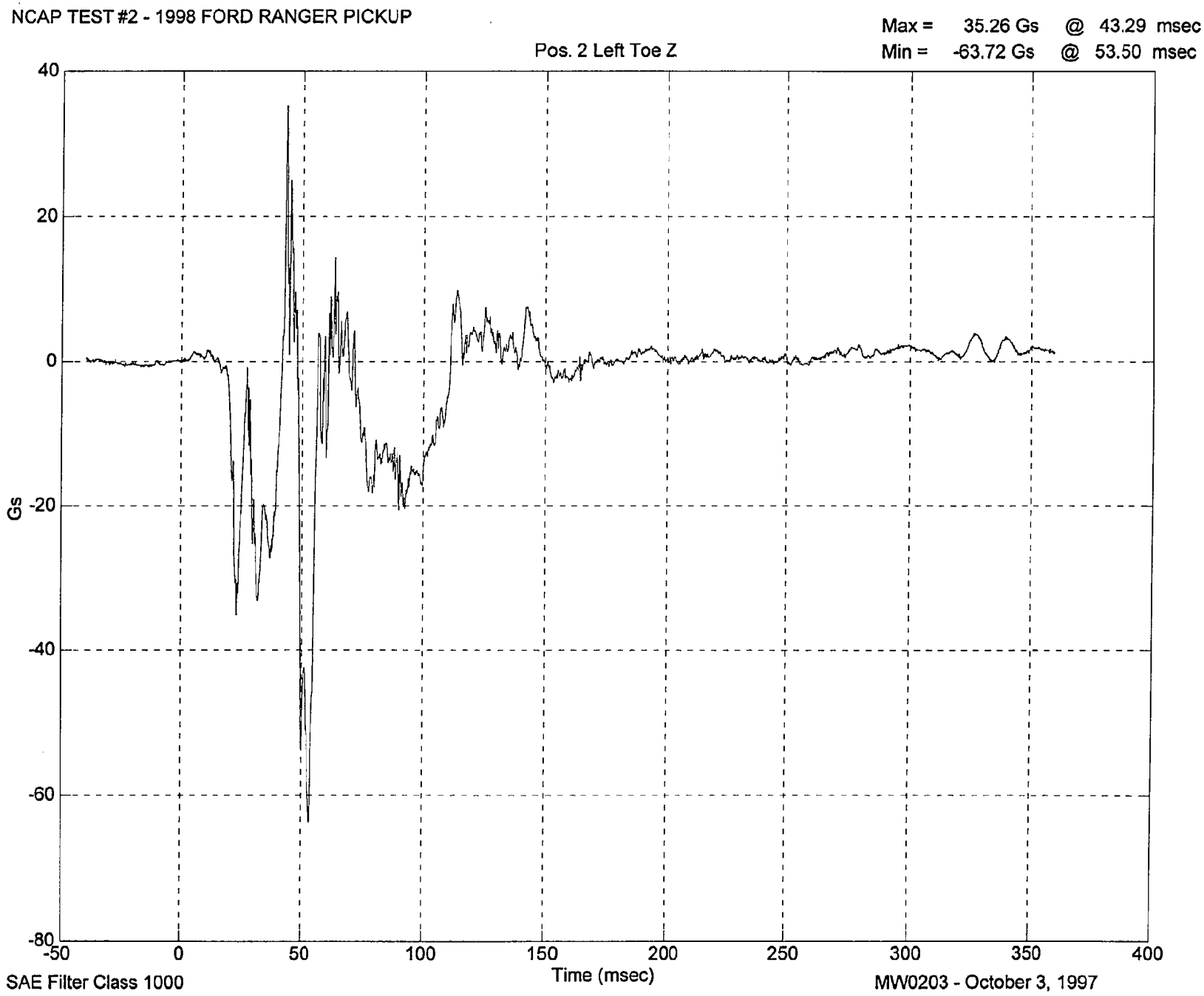



SAE Filter Class 600

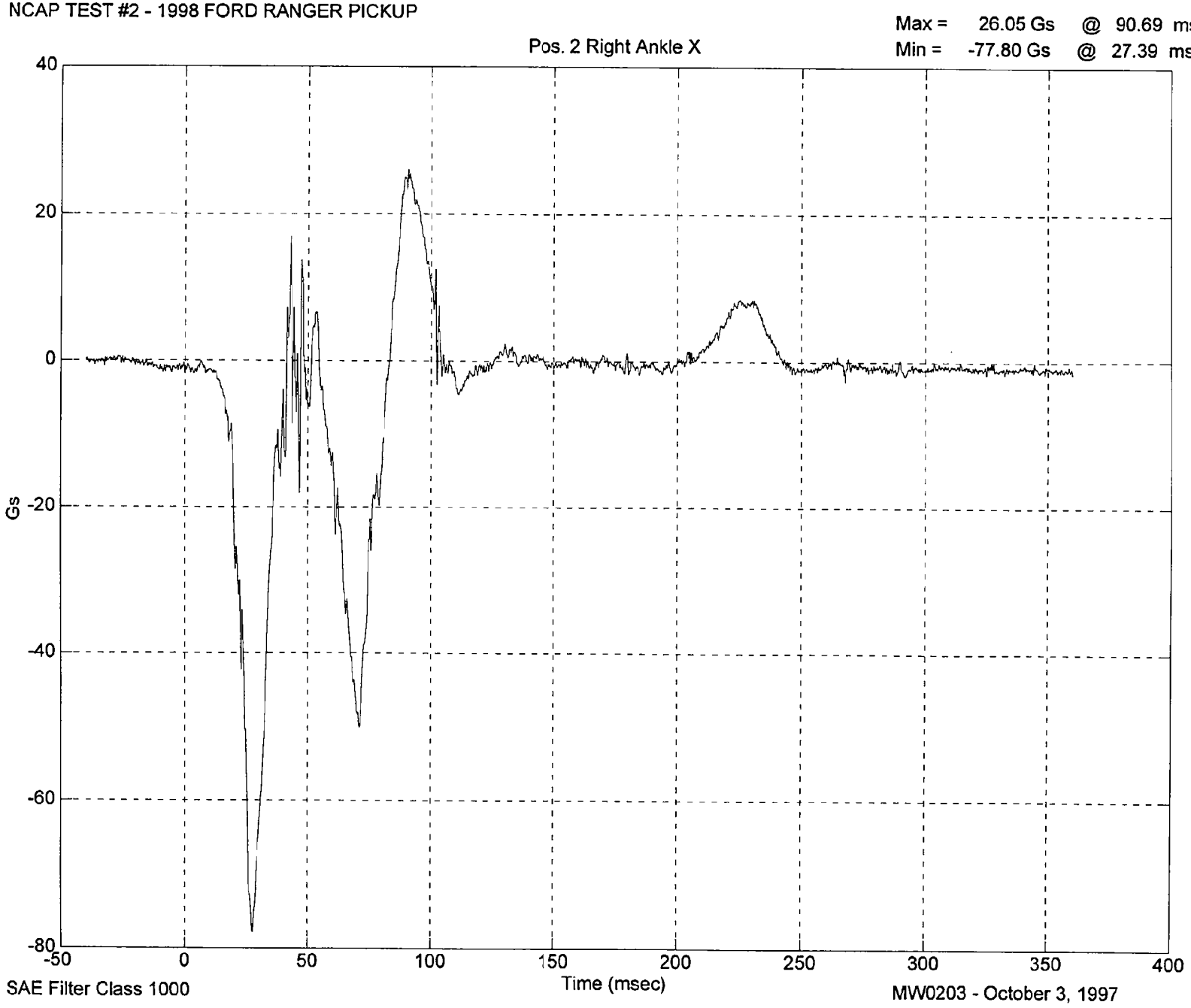
MW0203 - October 3, 1997

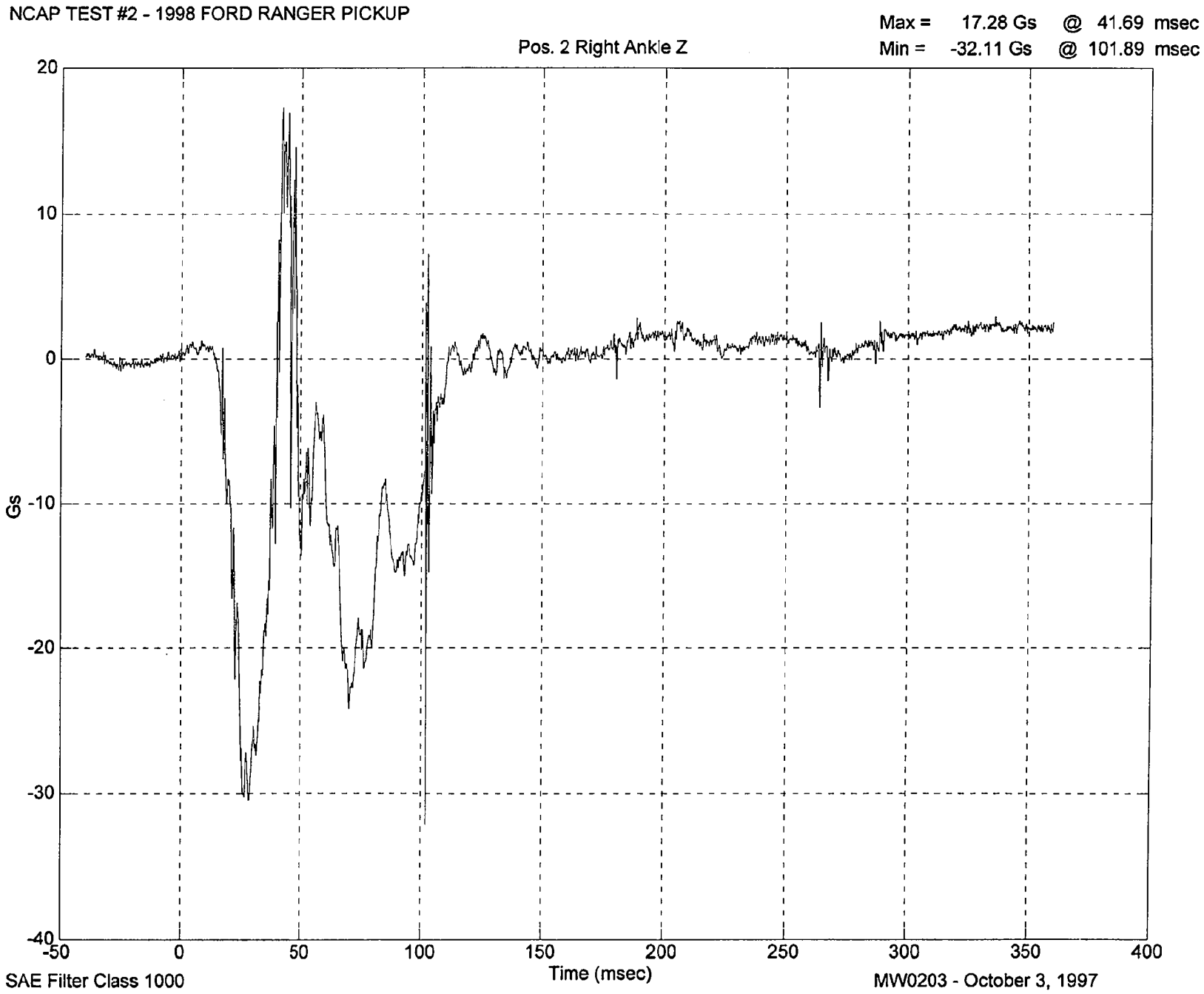

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Left Ankle X
Max = 14.05 Gs @ 93.49 msec
Min = -63.69 Gs @ 28.09 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

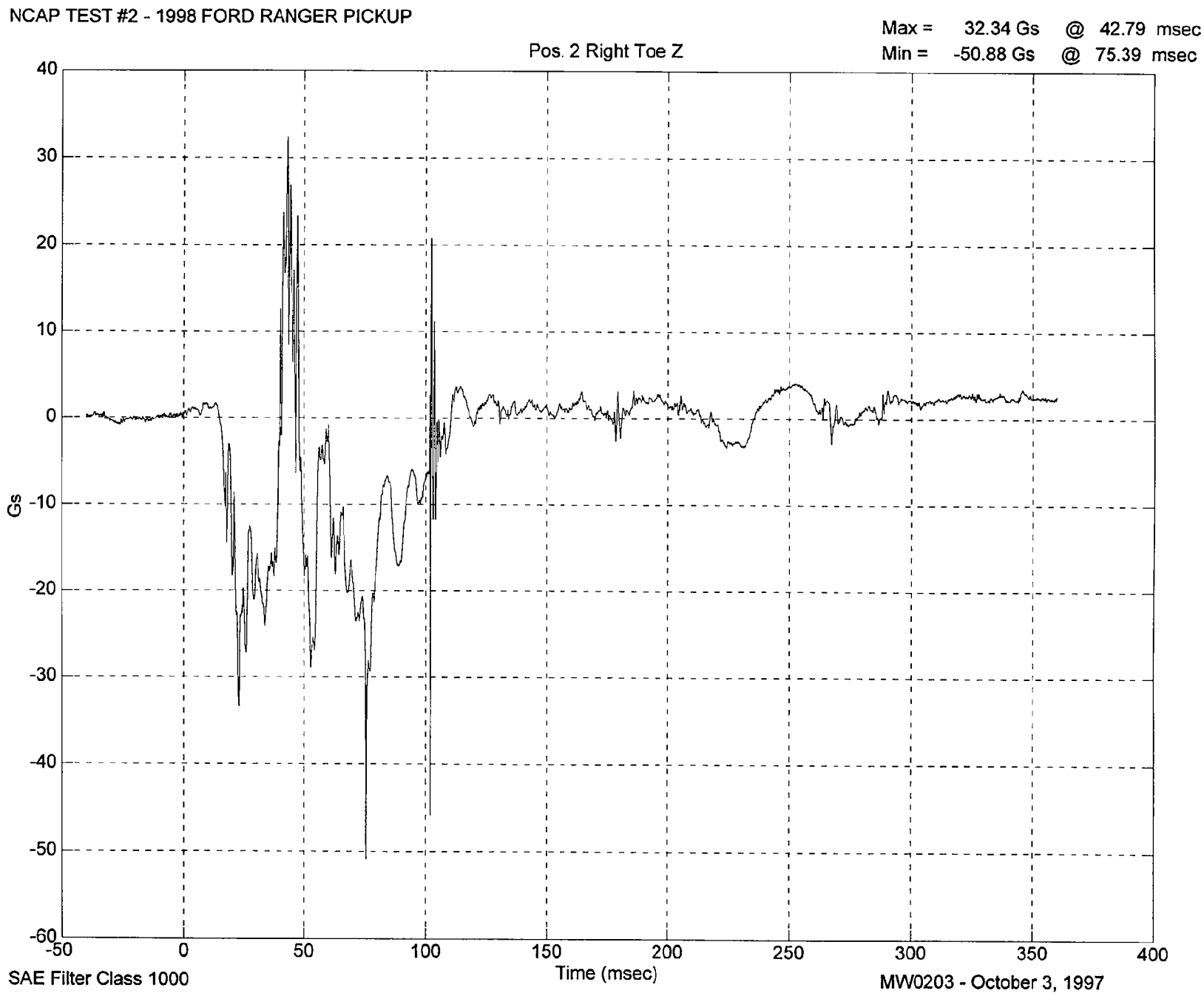

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Left Ankle Z
Max = 29.85 Gs @ 43.29 msec
Min = -43.54 Gs @ 53.00 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Left Toe Z
Max = 35.26 Gs @ 43.29 msec
Min = -63.72 Gs @ 53.50 msec
40
20
0
-20
-40
-60
-80
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP



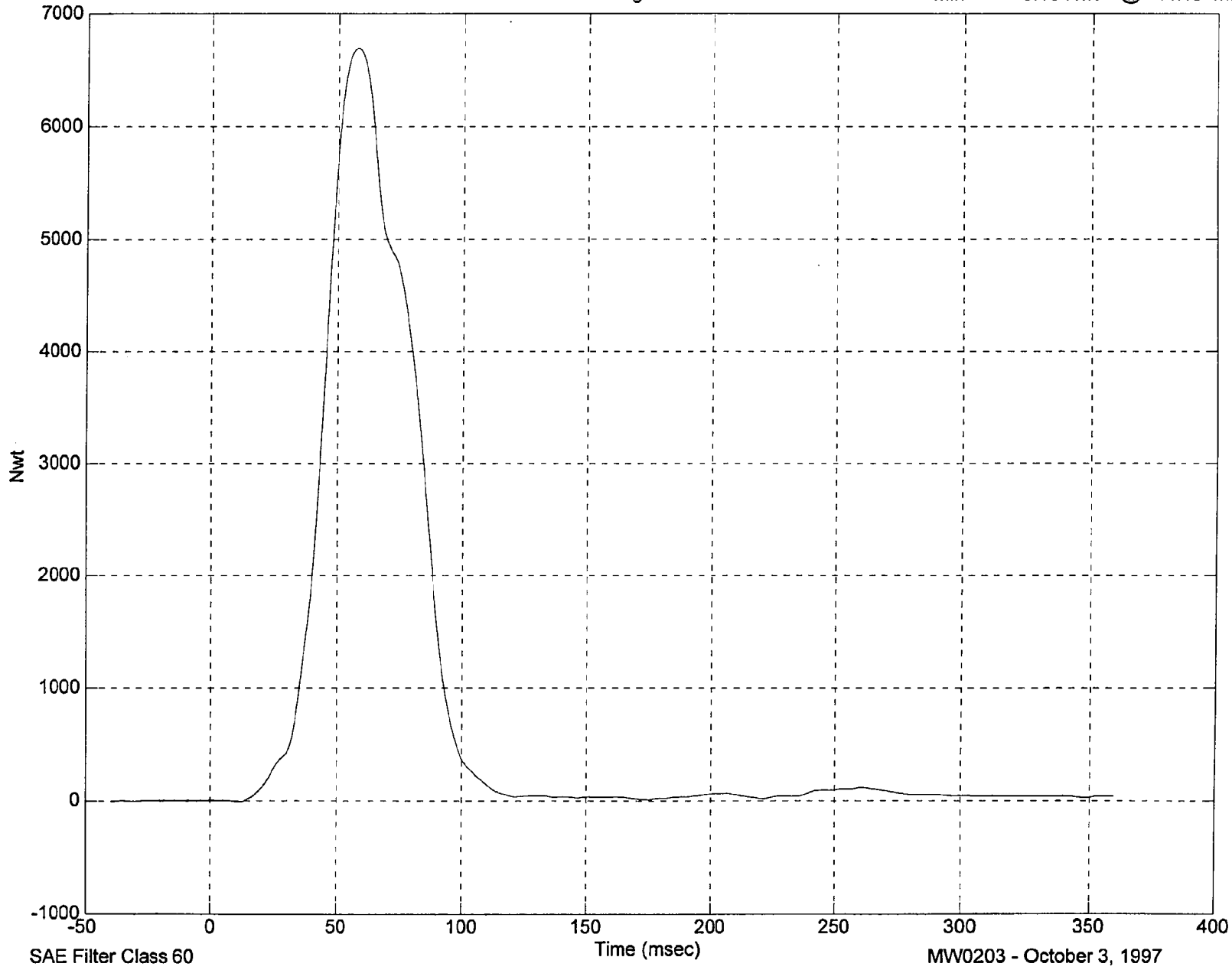

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Right Ankle Z
Max = 17.28 Gs @ 41.69 msec
Min = -32.11 Gs @ 101.89 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Right Toe Z
Max = 32.34 Gs @ 42.79 msec
Min = -50.88 Gs @ 75.39 msec
Gs
Time (msec)
SAE Filter Class 1000
MW0203 - October 3, 1997

NCAP TEST #2 - 1998 FORD RANGER PICKUP

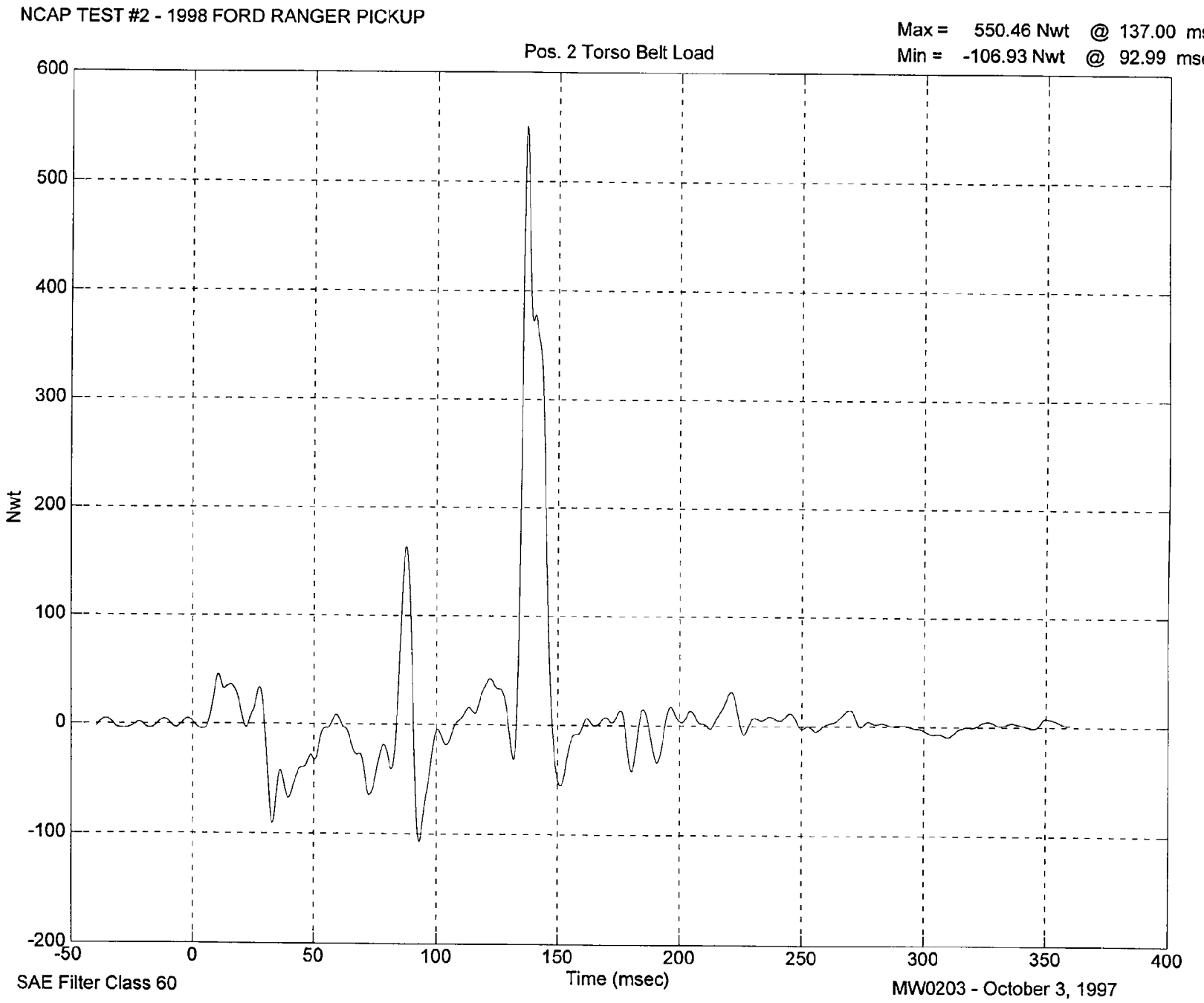
Pos. 2 Right Belt Load

Max = 6692.94 Nwt @ 57.59 msec
Min = -8.13 Nwt @ 11.19 msec



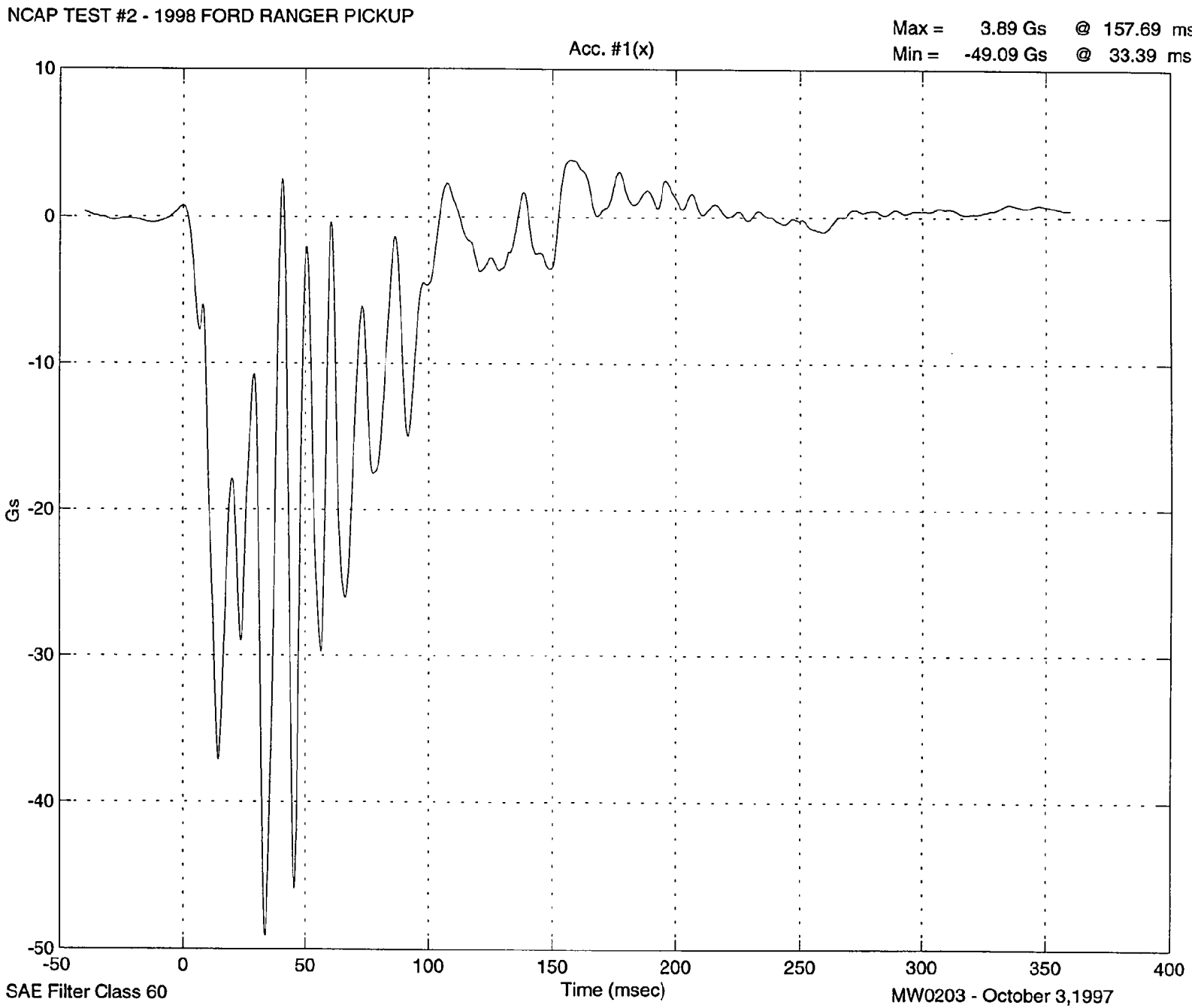

SAE Filter Class 60

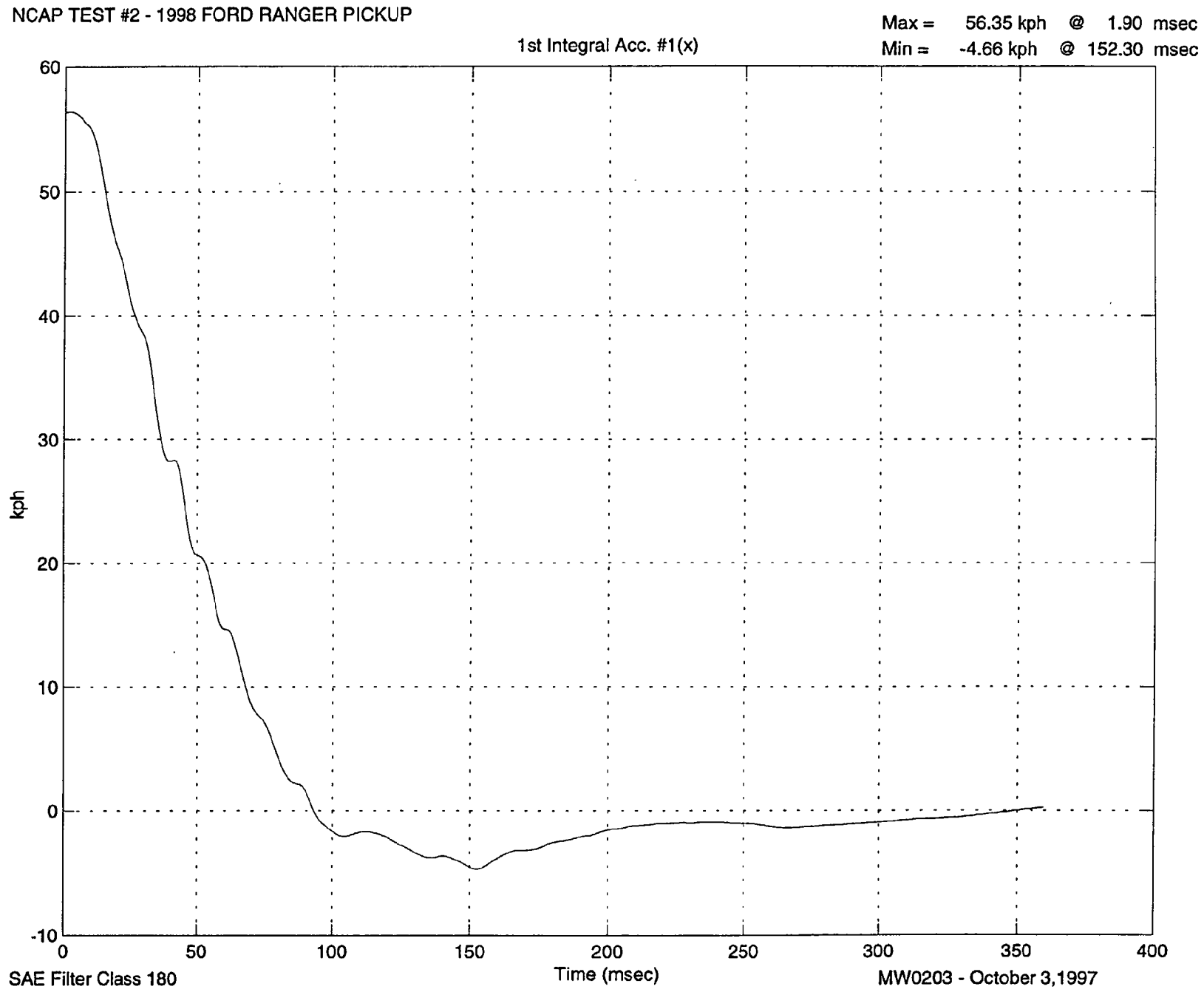
MW0203 - October 3, 1997

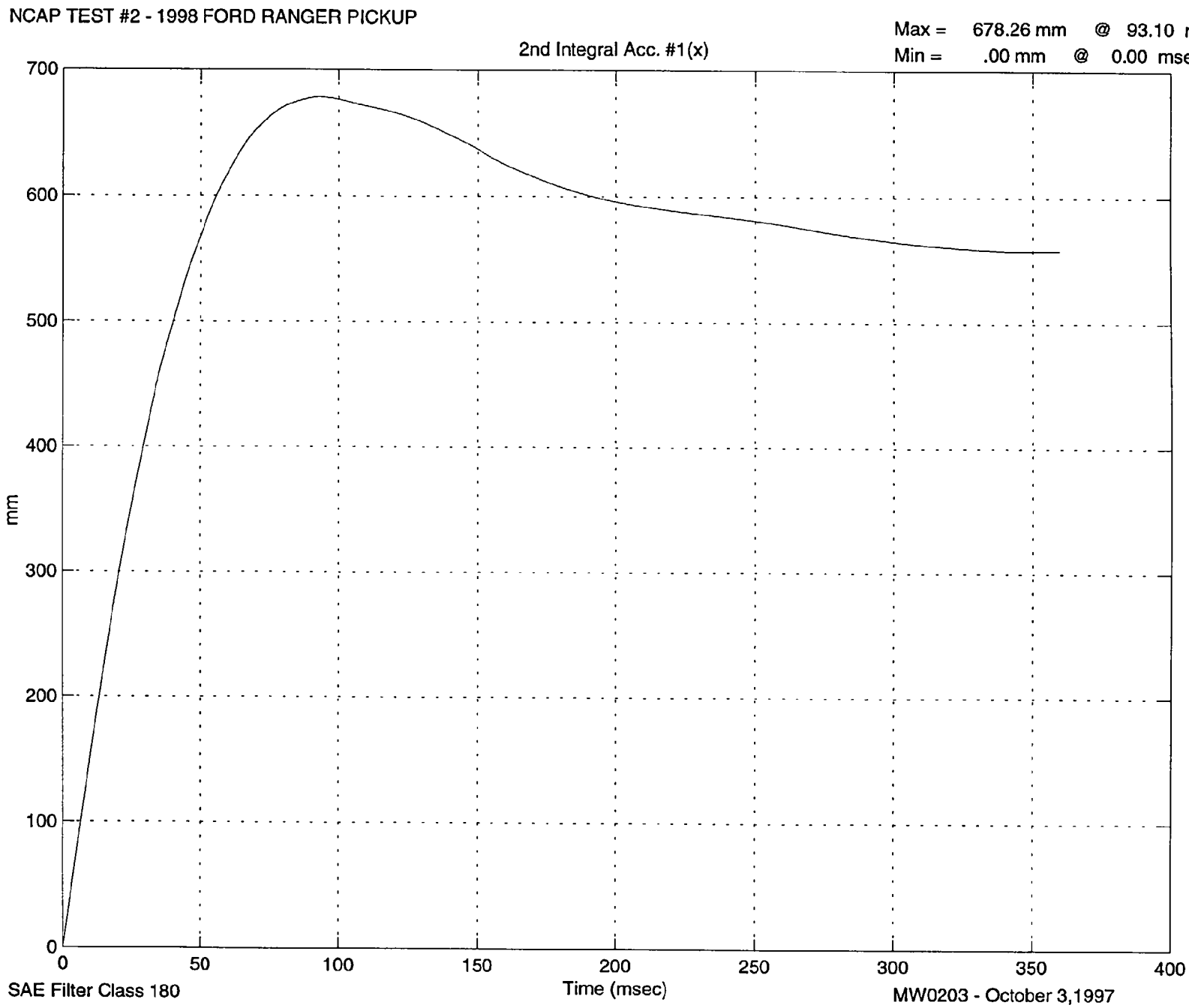

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Pos. 2 Torso Belt Load
Max = 550.46 Nwt @ 137.00 msec
Min = -106.93 Nwt @ 92.99 msec
Nwt
600
500
400
300
200
100
0
-100
-200
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3, 1997

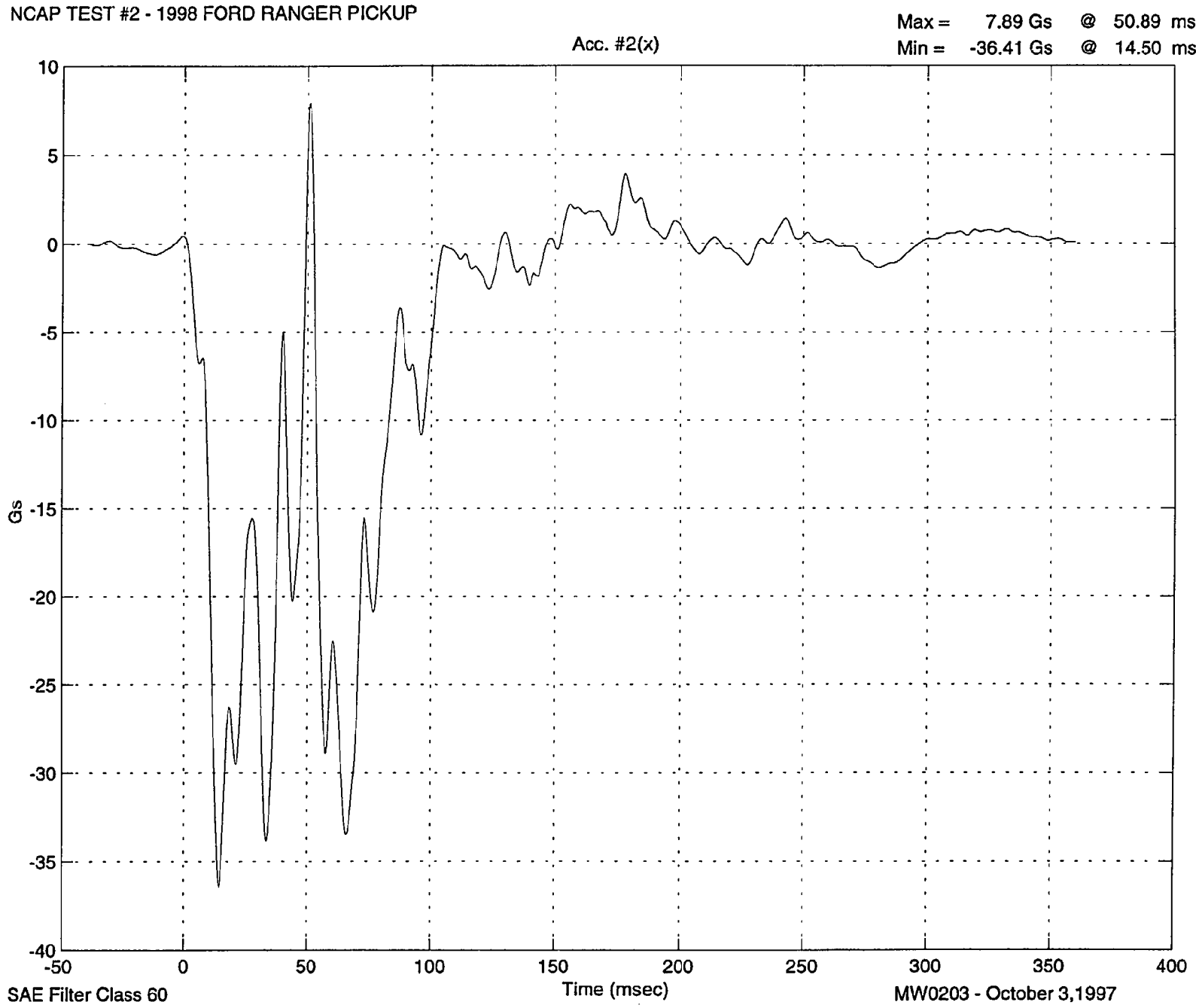
NHTSA TEST NO. MW0203

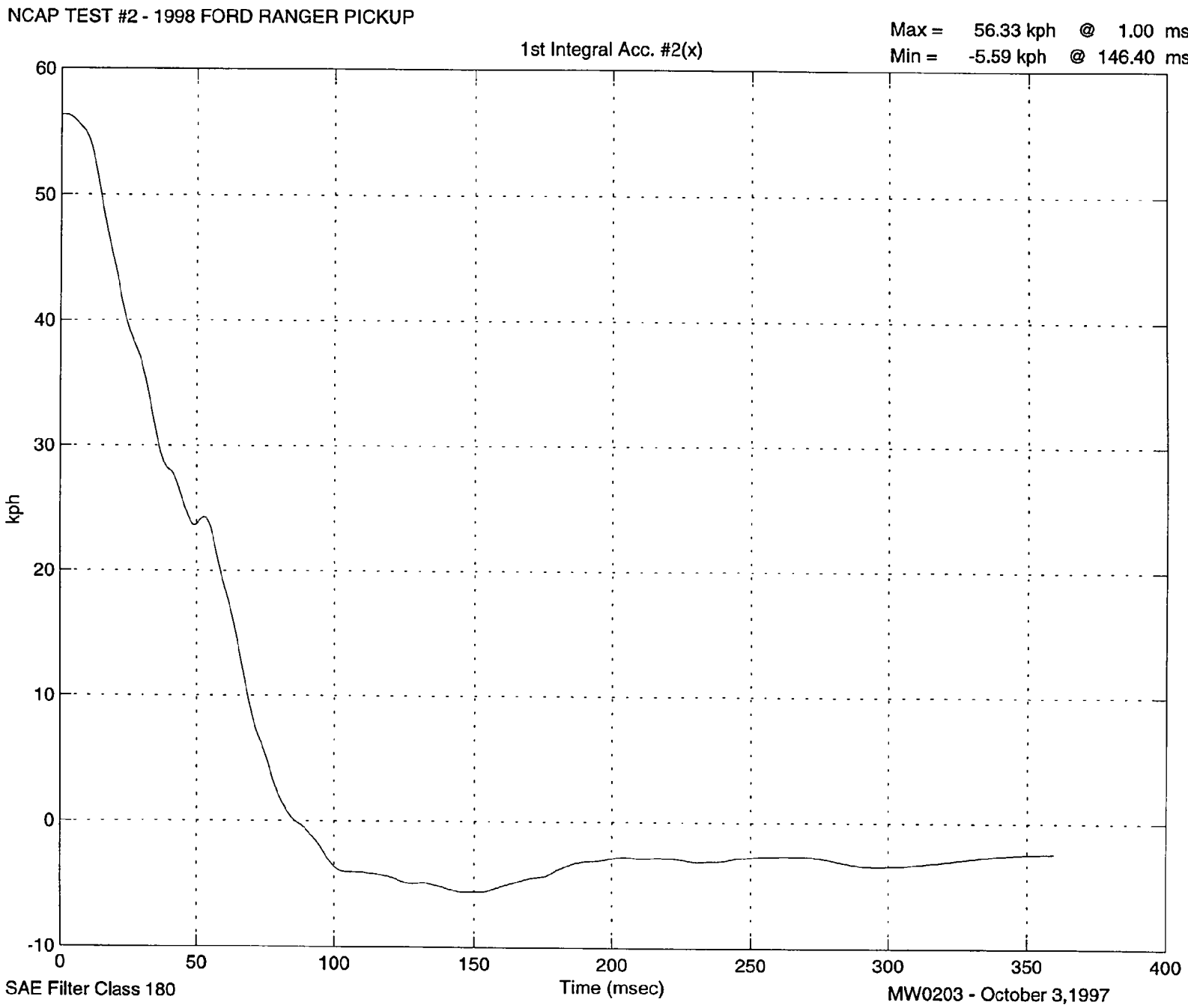
| VEHICLE DATA | FILTER CHANNEL CLASS |
|---|---|
| Acceleration | 60 |
| Velocity | 180 |
| Displacement | 180 |

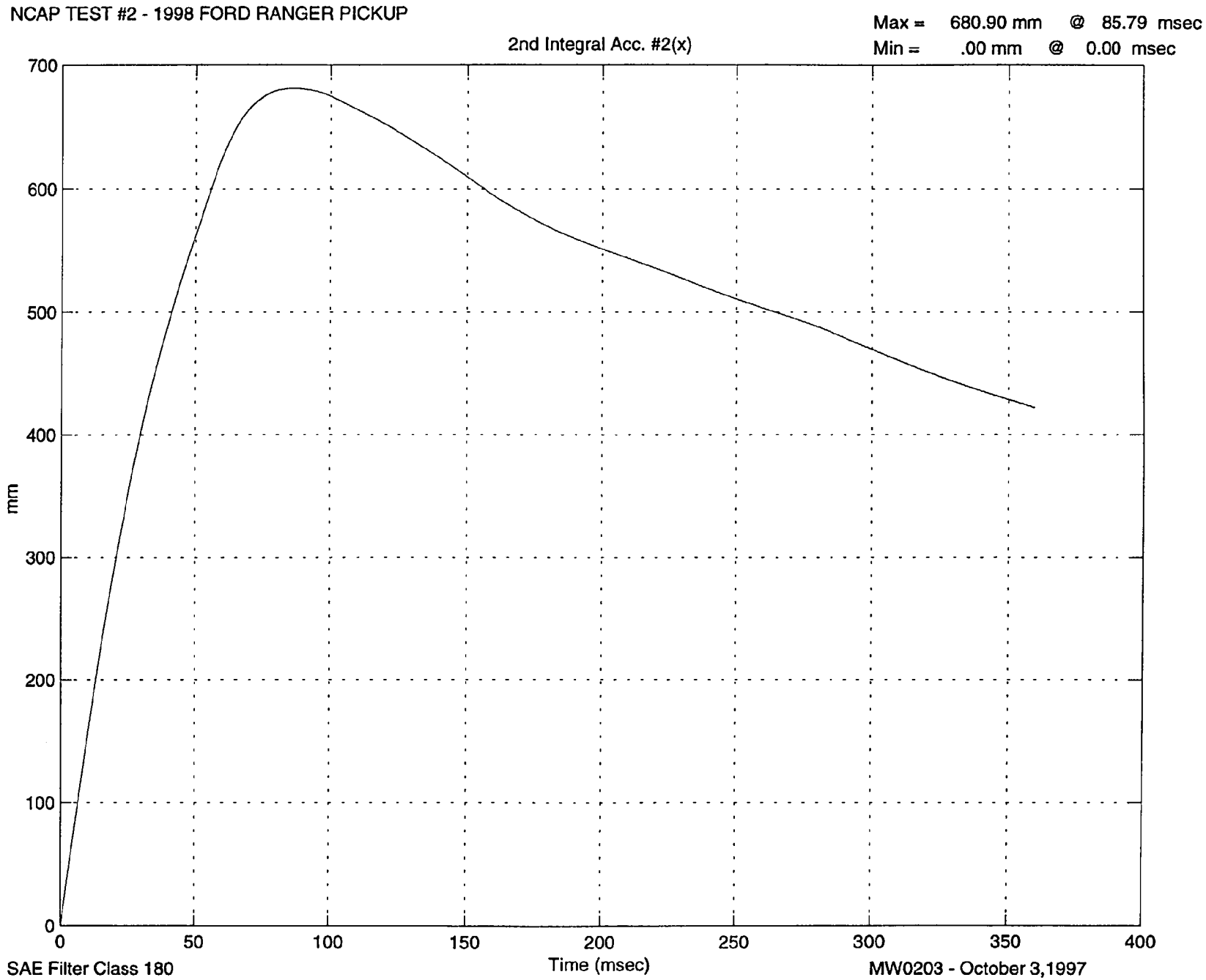

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #1(x)
Max = 3.89 Gs @ 157.69 msec
Min = -49.09 Gs @ 33.39 msec
10
0
-10
-20
-30
-40
-50
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997

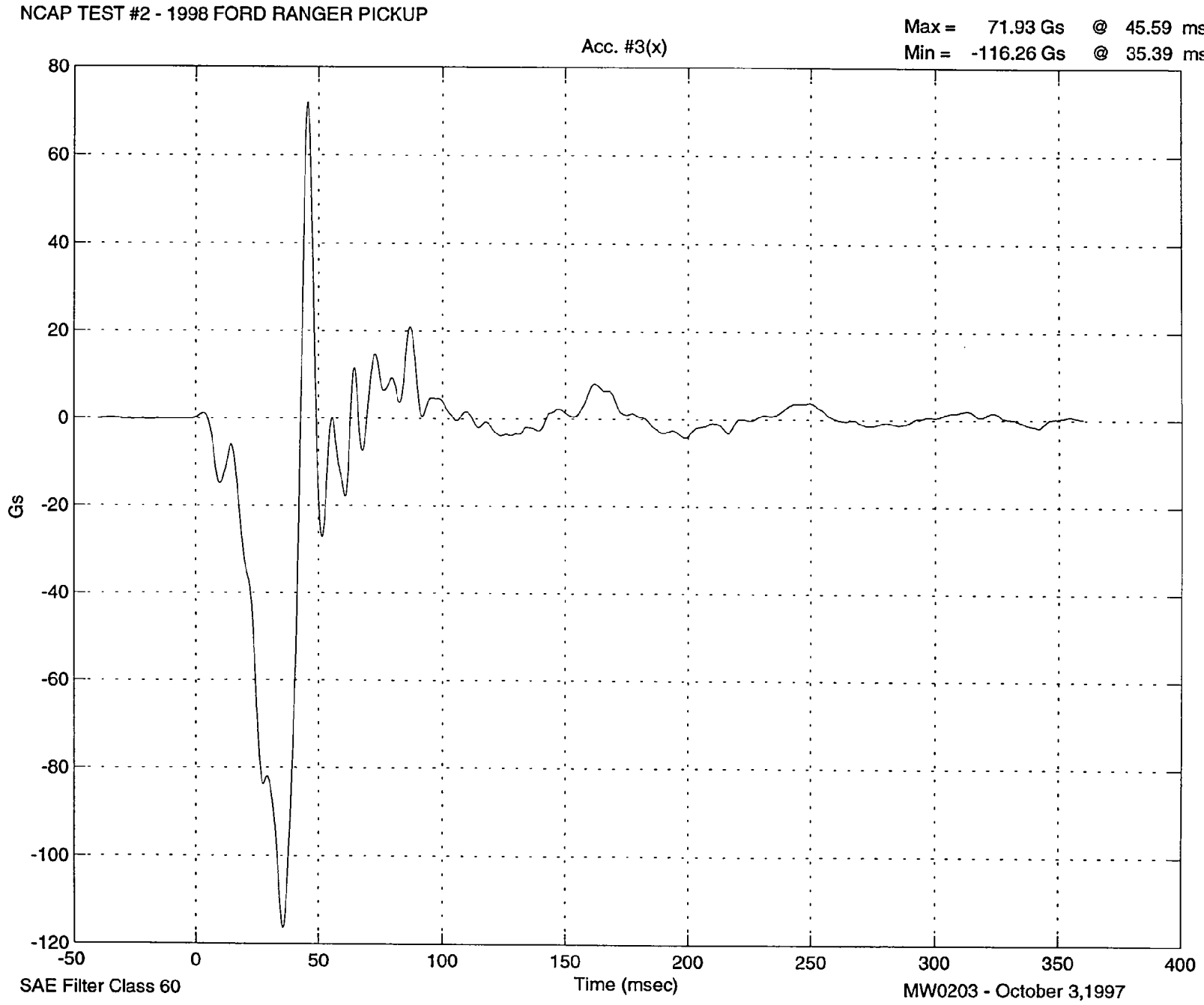

NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #1(x)
Max = 56.35 kph @ 1.90 msec
Min = -4.66 kph @ 152.30 msec
60
50
40
30
20
10
0
-10
kph
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

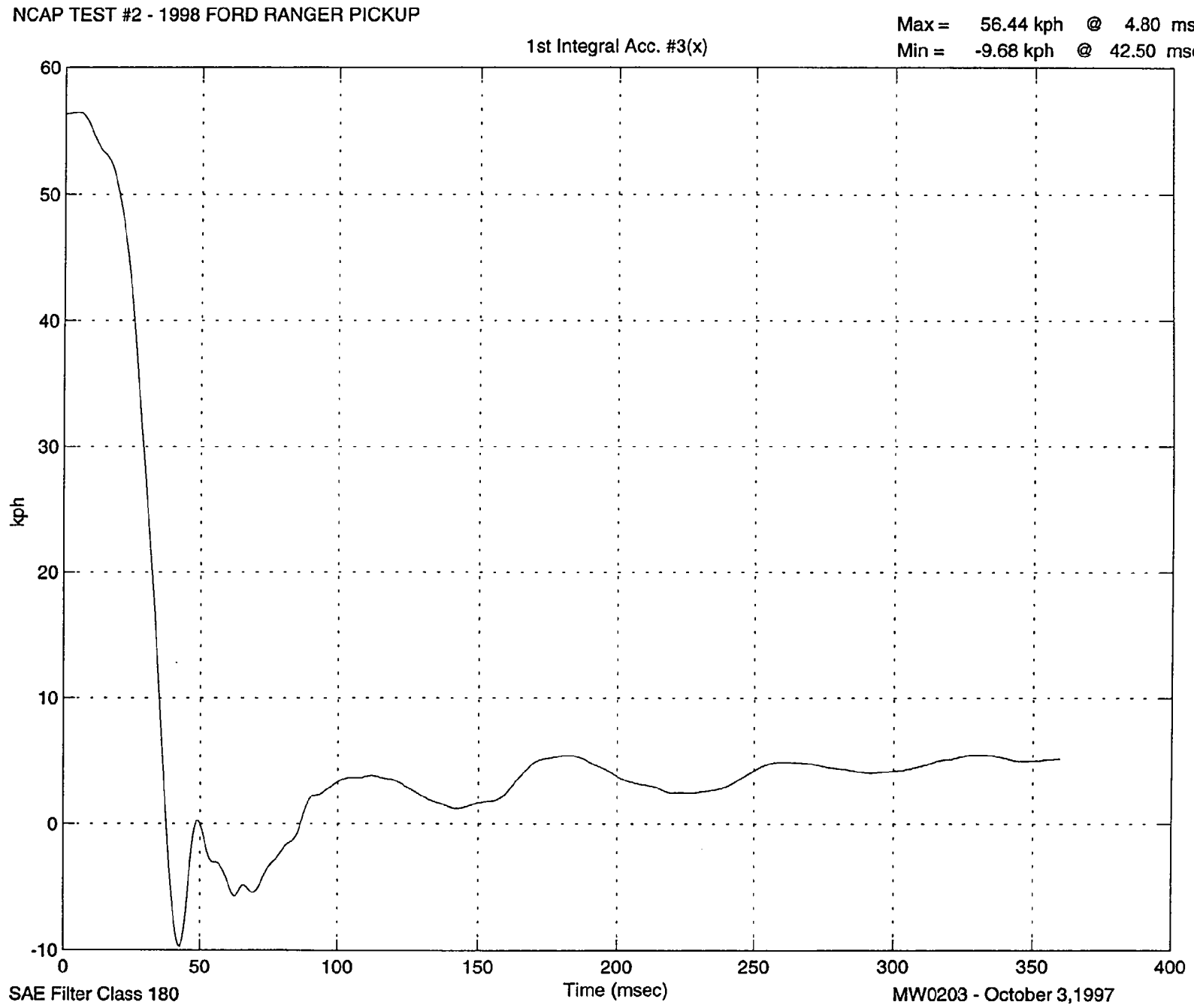

NCAP TEST #2 - 1998 FORD RANGER PICKUP
2nd Integral Acc. #1(x)
Max = 678.26 mm @ 93.10 msec
Min = .00 mm @ 0.00 msec
700
600
500
400
300
200
100
0
mm
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

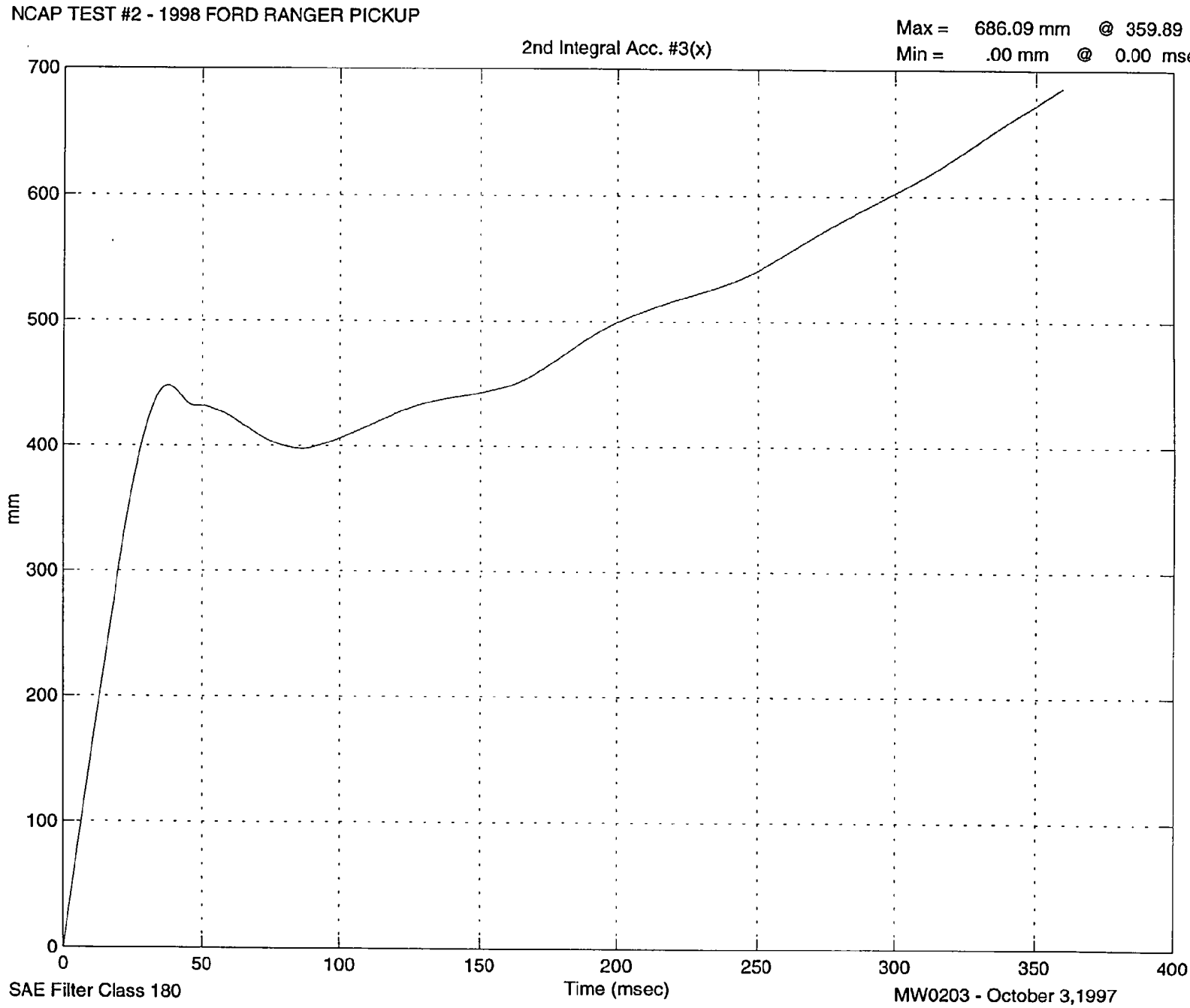

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #2(x)
Max = 7.89 Gs @ 50.89 msec
Min = -36.41 Gs @ 14.50 msec
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997

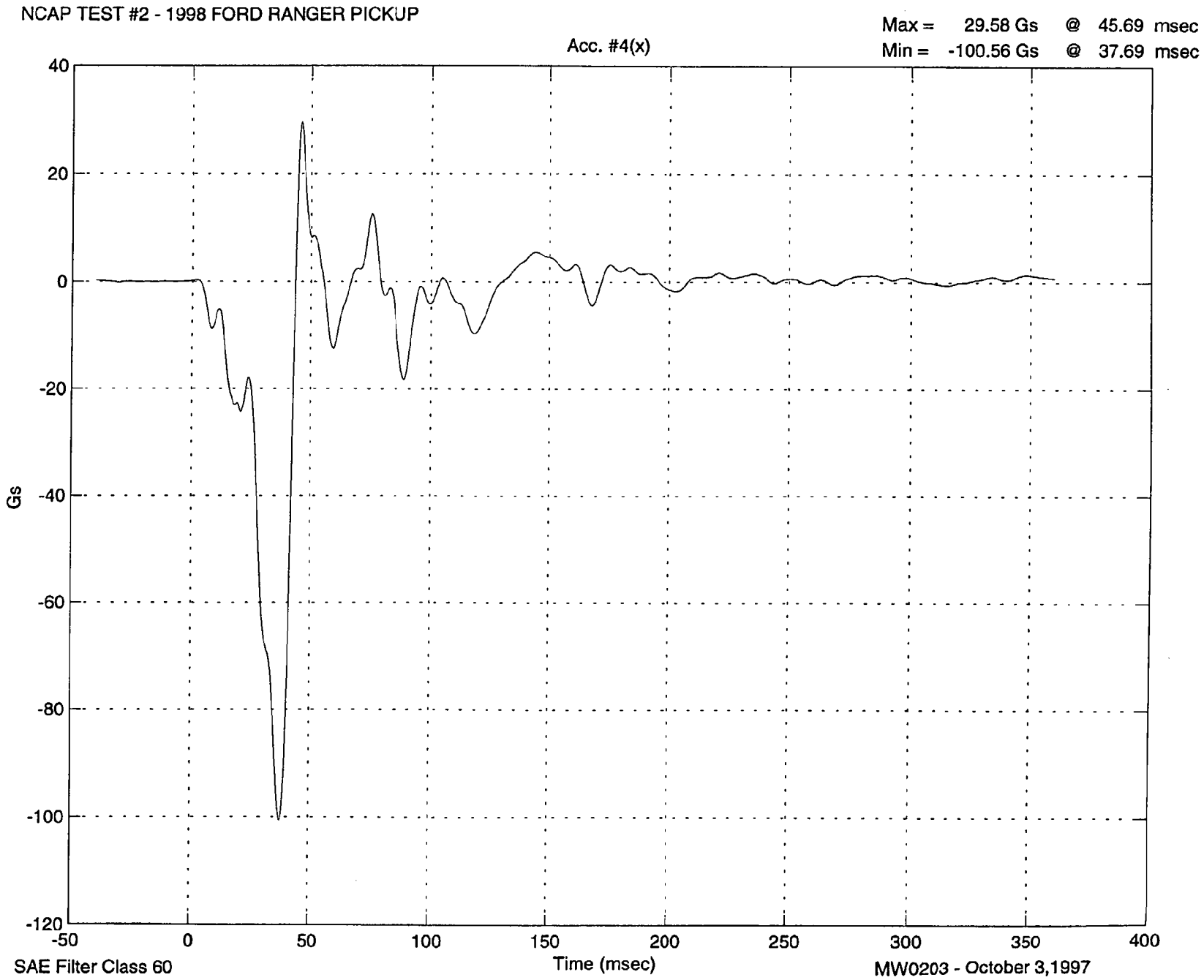

NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #2(x)
Max = 56.33 kph @ 1.00 msec
Min = -5.59 kph @ 146.40 msec
60
50
40
30
20
10
0
-10
kph
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

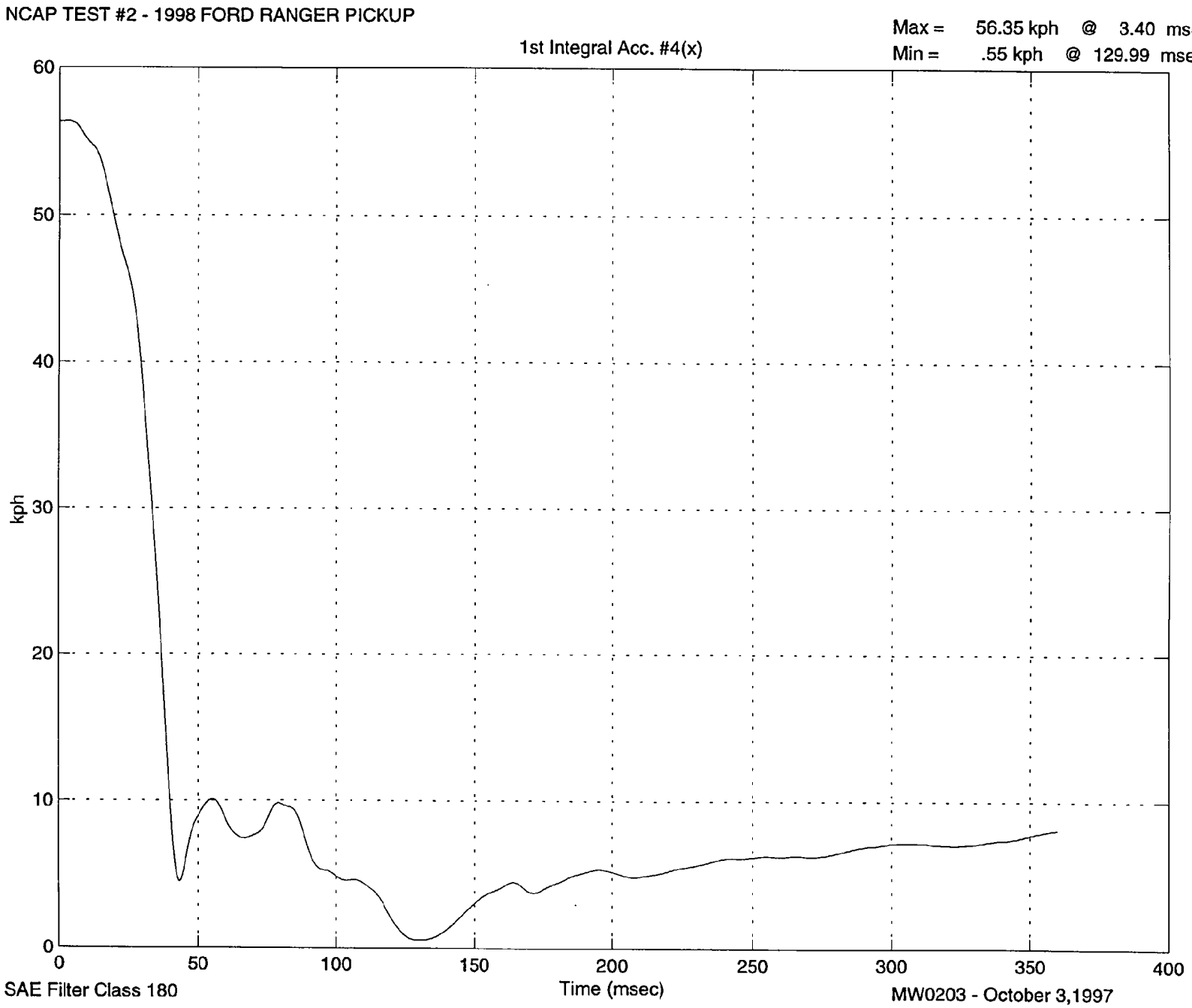

NCAP TEST #2 - 1998 FORD RANGER PICKUP
2nd Integral Acc. #2(x)
Max = 680.90 mm @ 85.79 msec
Min = .00 mm @ 0.00 msec
700
600
500
400
300
200
100
0
mm
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

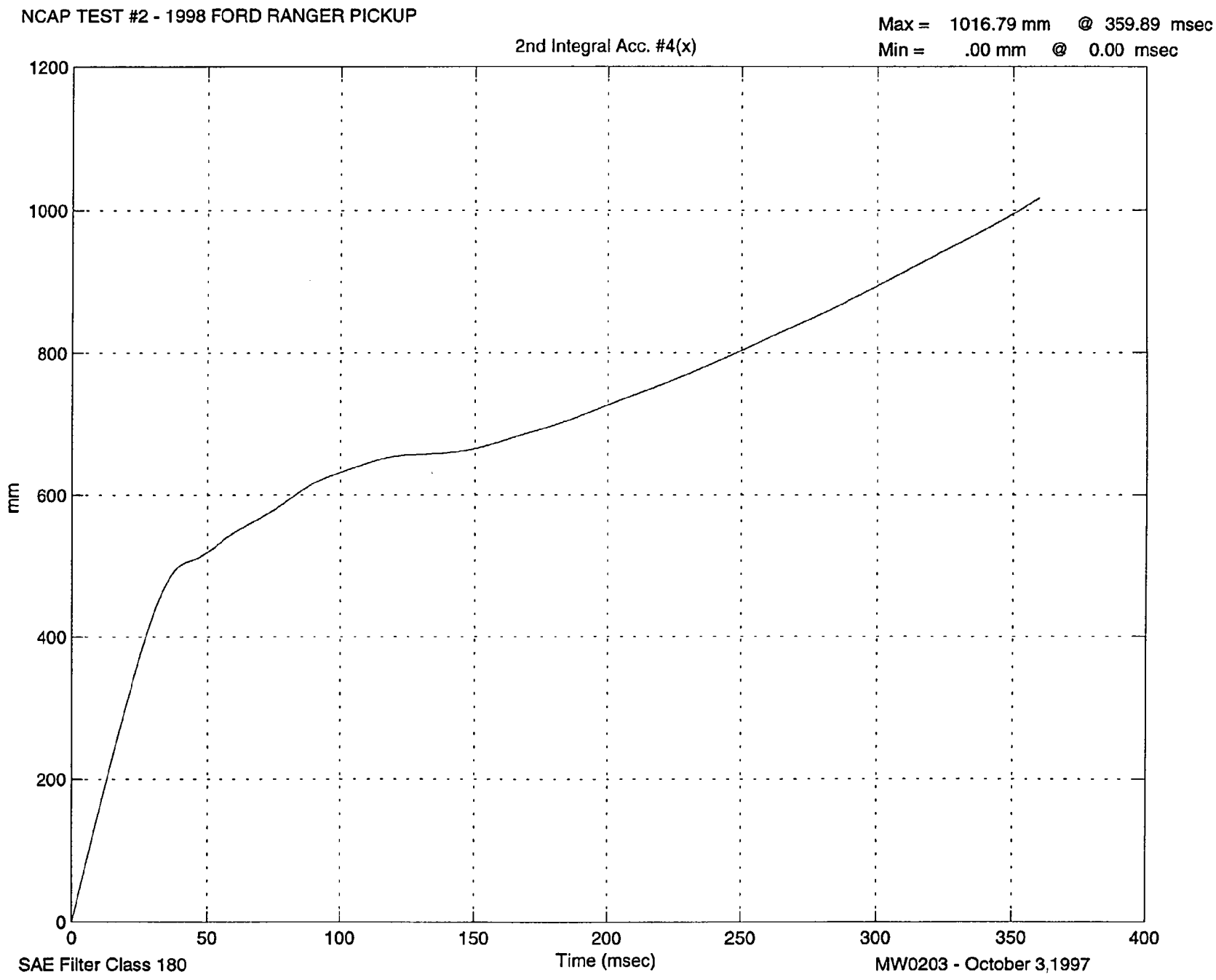

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #3(x)
Max = 71.93 Gs @ 45.59 msec
Min = -116.26 Gs @ 35.39 msec
Gs
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997

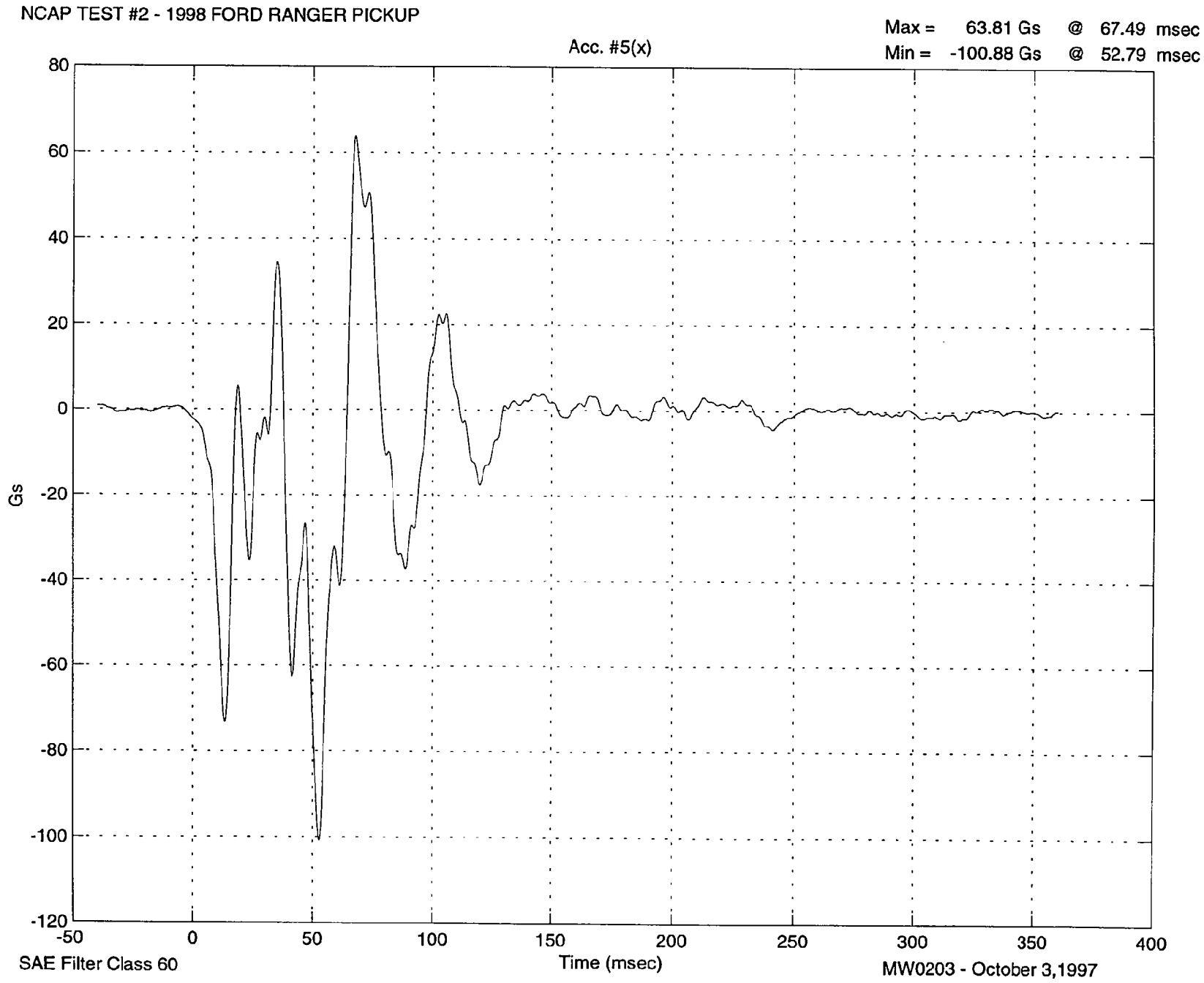

NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #3(x)
Max = 56.44 kph @ 4.80 msec
Min = -9.68 kph @ 42.50 msec
60
50
40
30
20
10
0
-10
kph
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

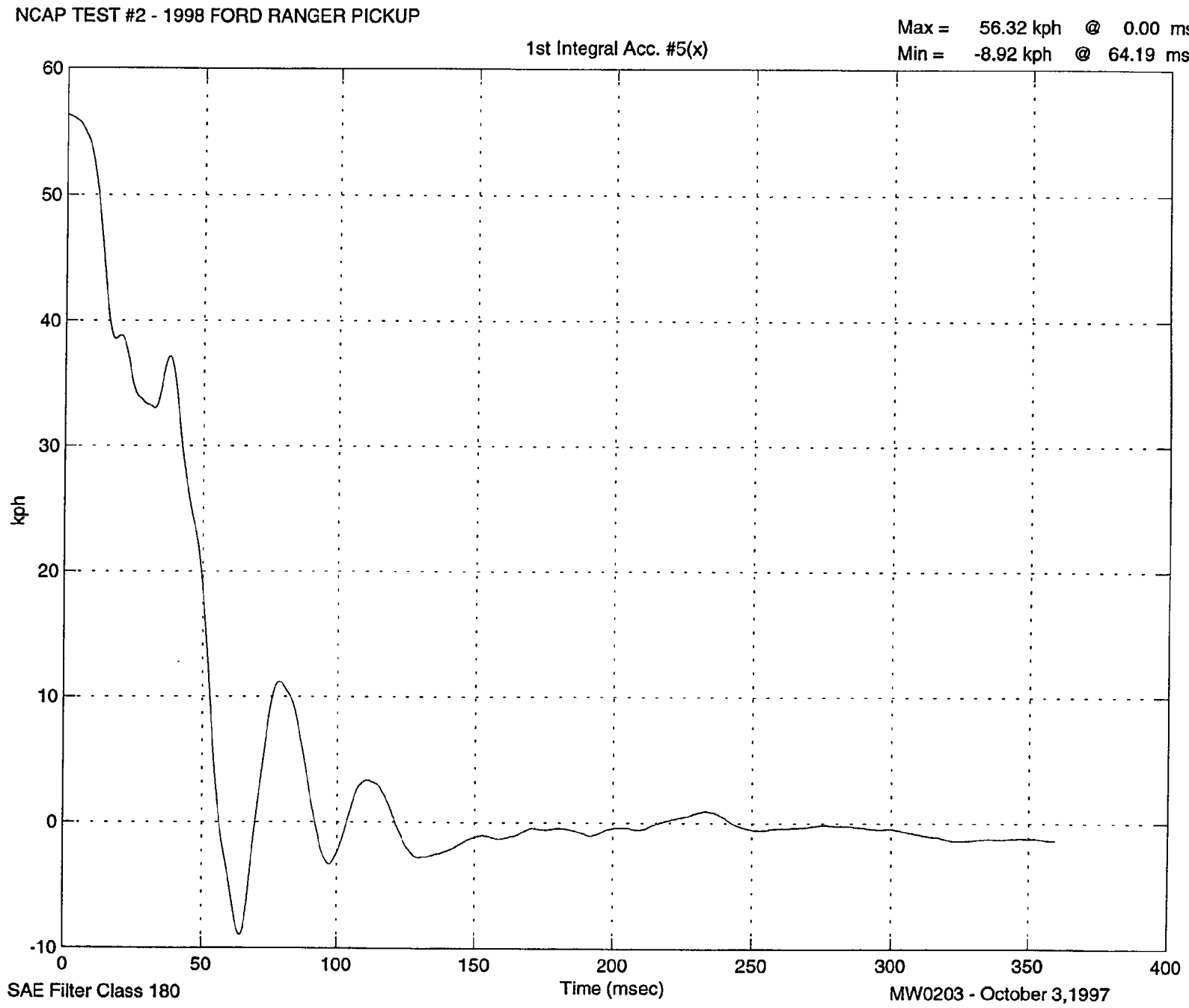

NCAP TEST #2 - 1998 FORD RANGER PICKUP
2nd Integral Acc. #3(x)
Max = 686.09 mm @ 359.89 msec
Min = .00 mm @ 0.00 msec
700
600
500
400
300
200
100
0
mm
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

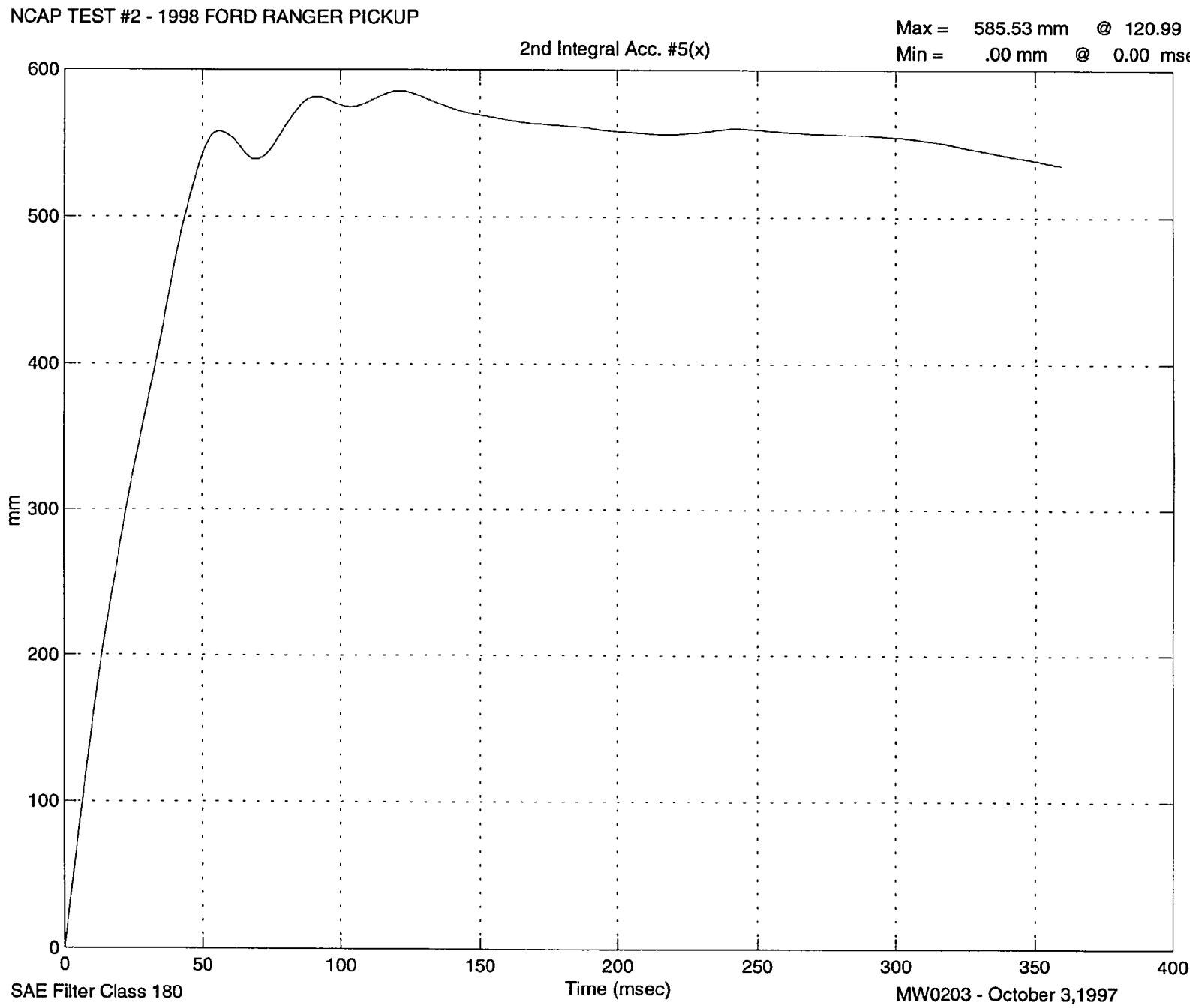

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #4(x)
Max = 29.58 Gs @ 45.69 msec
Min = -100.56 Gs @ 37.69 msec
40
20
0
-20
-40
-60
-80
-100
-120
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997

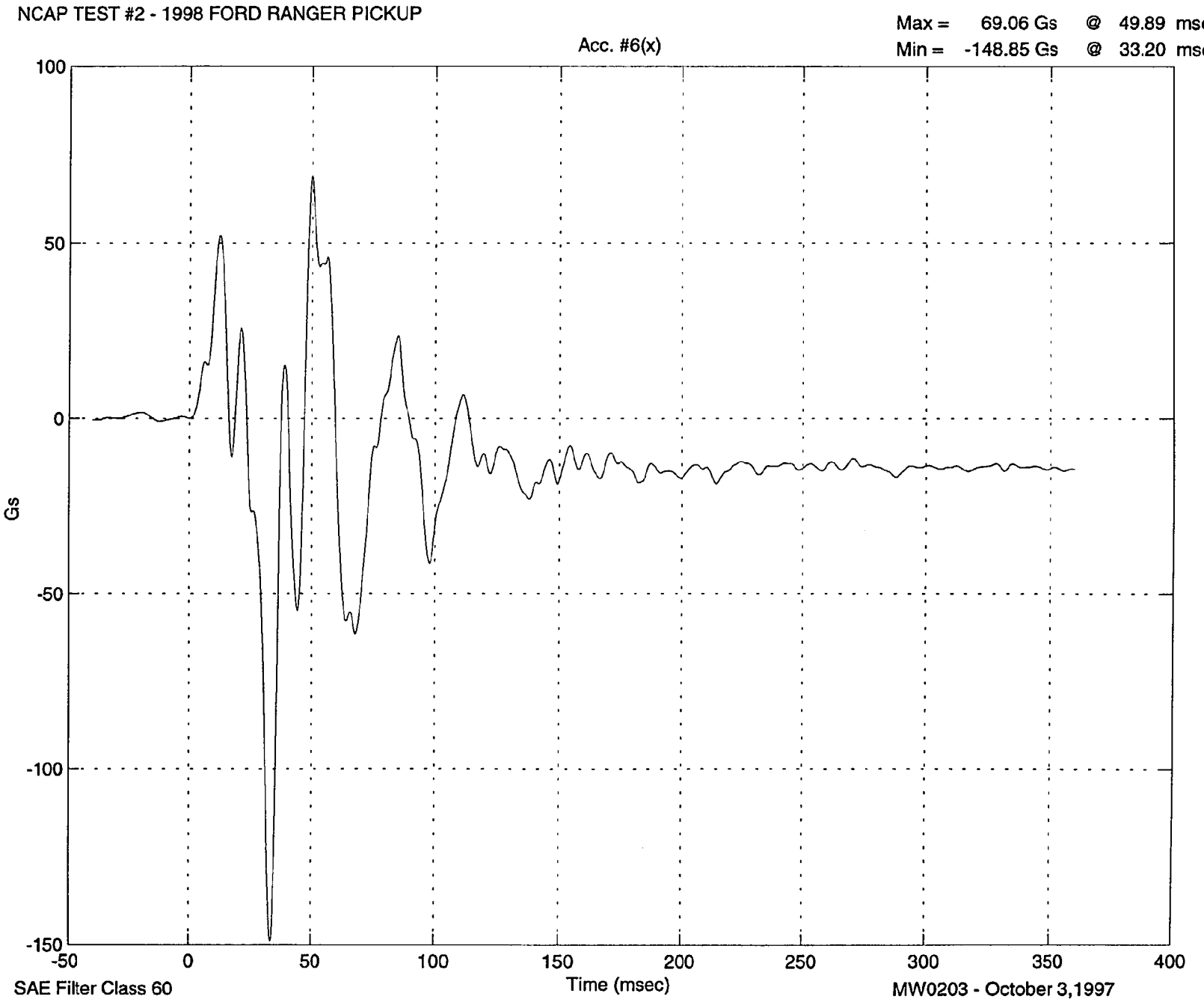

NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #4(x)
Max = 56.35 kph @ 3.40 msec
Min = .55 kph @ 129.99 msec
kph
60
50
40
30
20
10
0
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

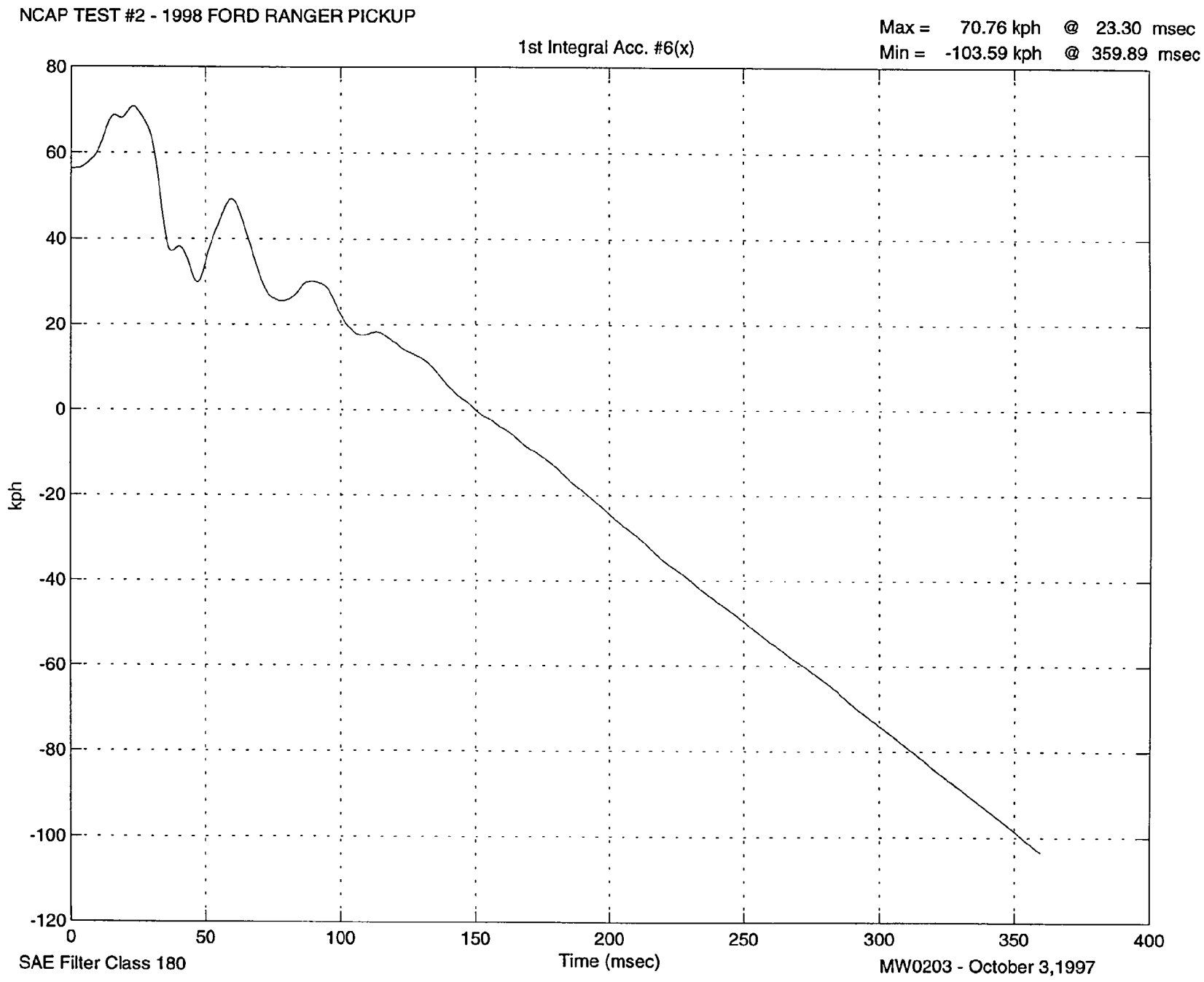

NCAP TEST #2 - 1998 FORD RANGER PICKUP
2nd Integral Acc. #4(x)
Max = 1016.79 mm @ 359.89 msec
Min = .00 mm @ 0.00 msec
mm
1200
1000
800
600
400
200
0
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #5(x)
Max = 63.81 Gs @ 67.49 msec
Min = -100.88 Gs @ 52.79 msec
Gs
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997

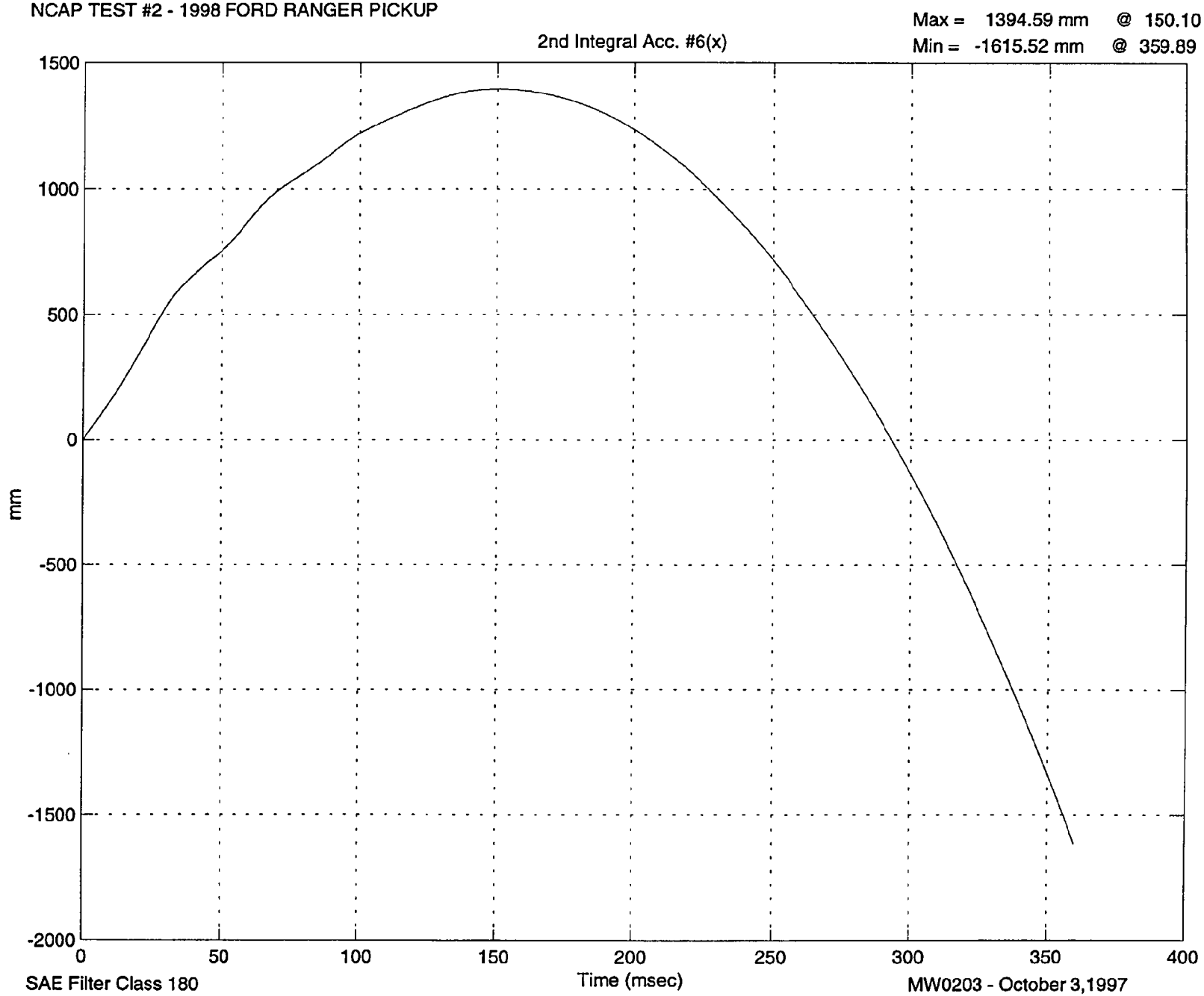

NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #5(x)
Max = 56.32 kph @ 0.00 msec
Min = -8.92 kph @ 64.19 msec
60
50
40
30
20
10
0
-10
kph
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

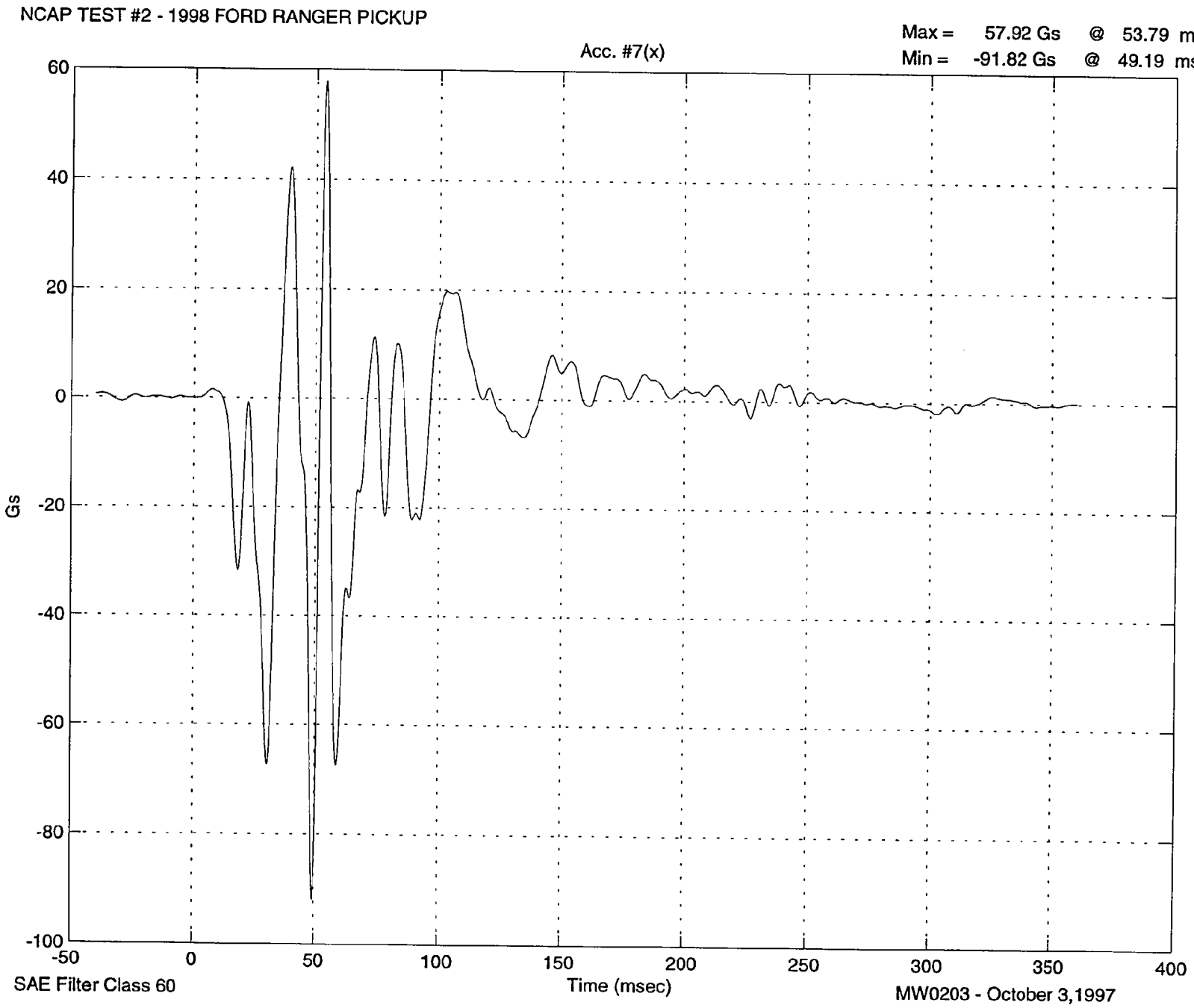

NCAP TEST #2 - 1998 FORD RANGER PICKUP
2nd Integral Acc. #5(x)
Max = 585.53 mm @ 120.99 msec
Min = .00 mm @ 0.00 msec
600
500
400
300
200
100
0
mm
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

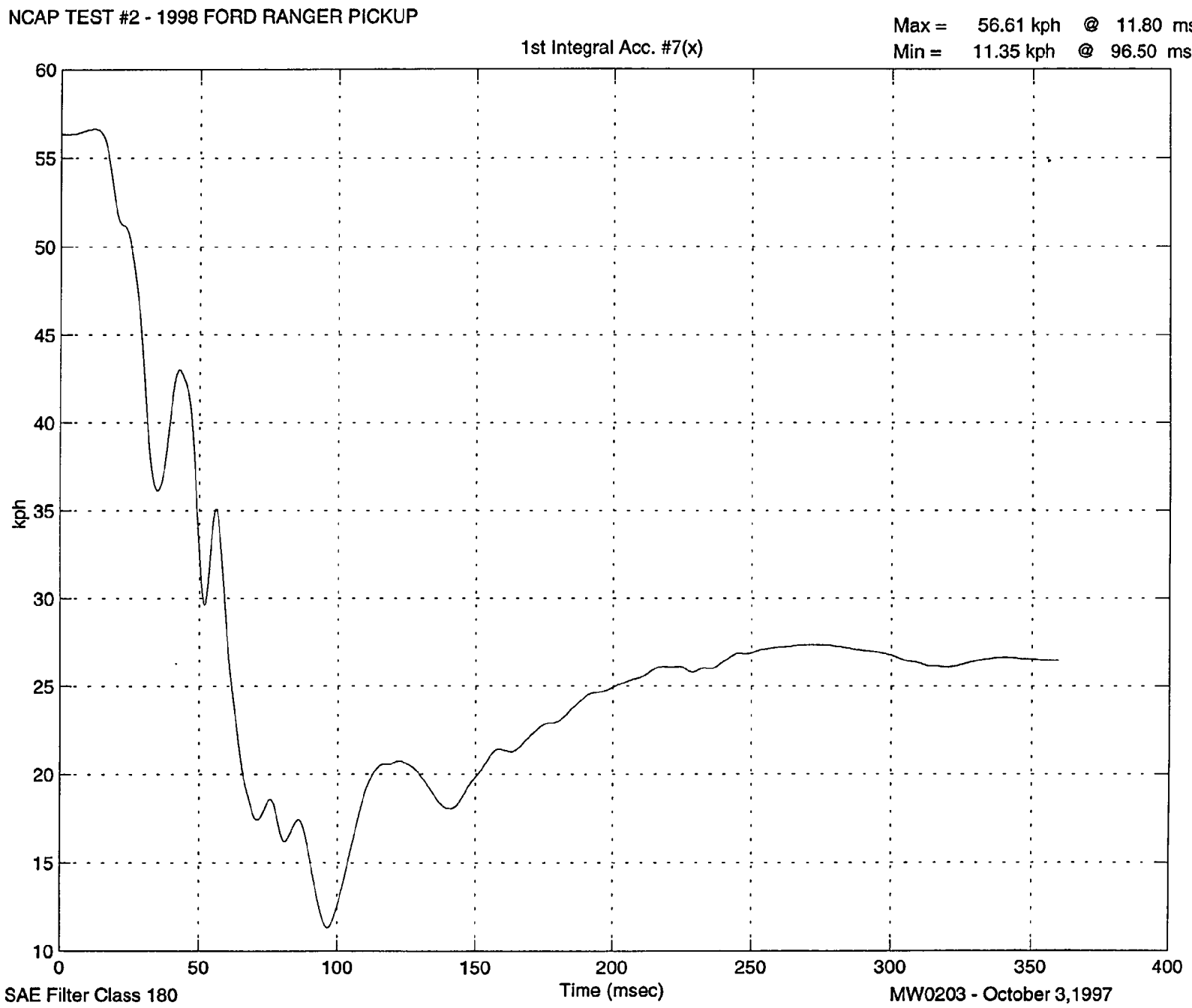

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #6(x)
Max = 69.06 Gs @ 49.89 msec
Min = -148.85 Gs @ 33.20 msec
100
50
0
-50
-100
-150
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997

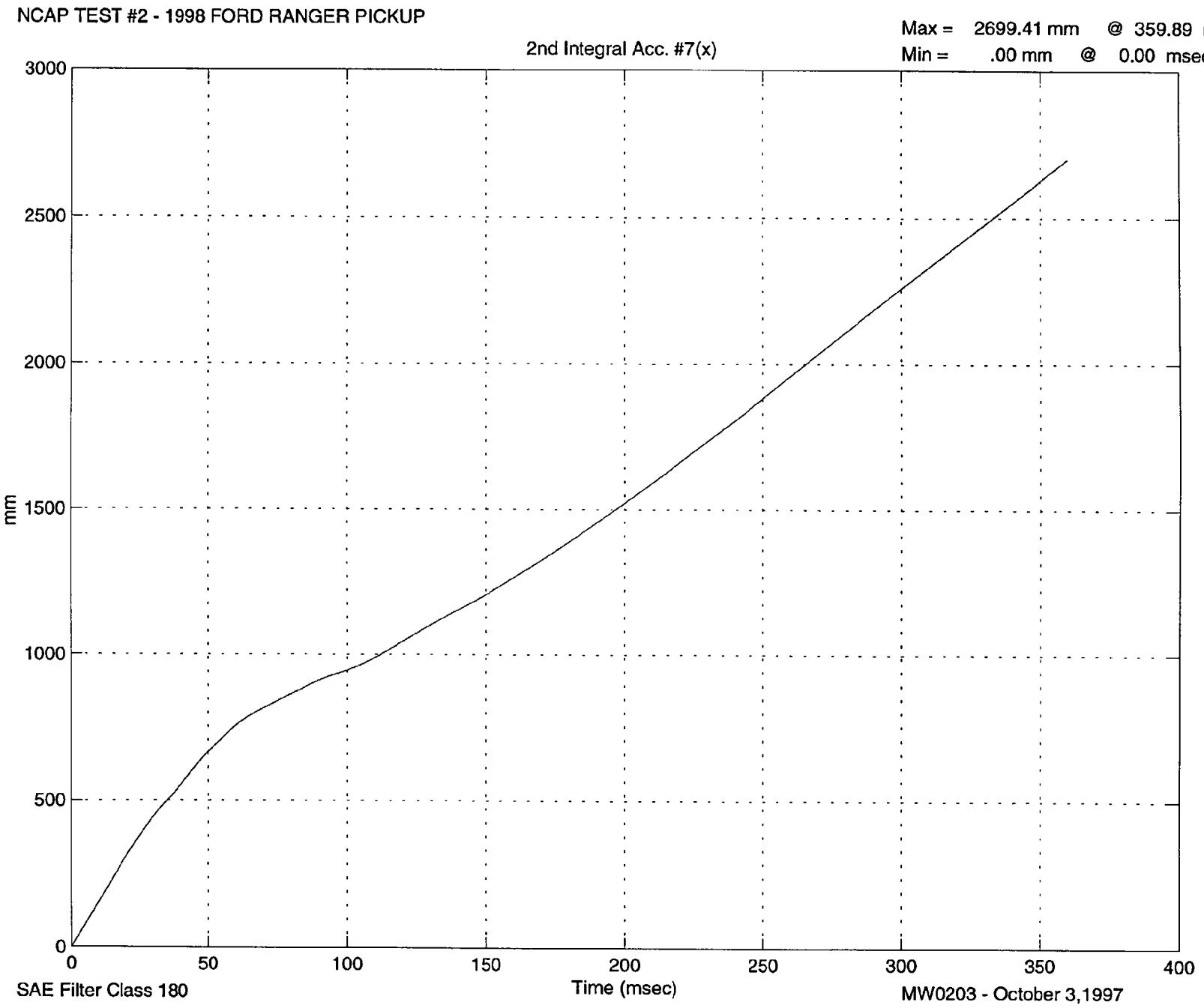

NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #6(x)
Max = 70.76 kph @ 23.30 msec
Min = -103.59 kph @ 359.89 msec
kph
80
60
40
20
0
-20
-40
-60
-80
-100
-120
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

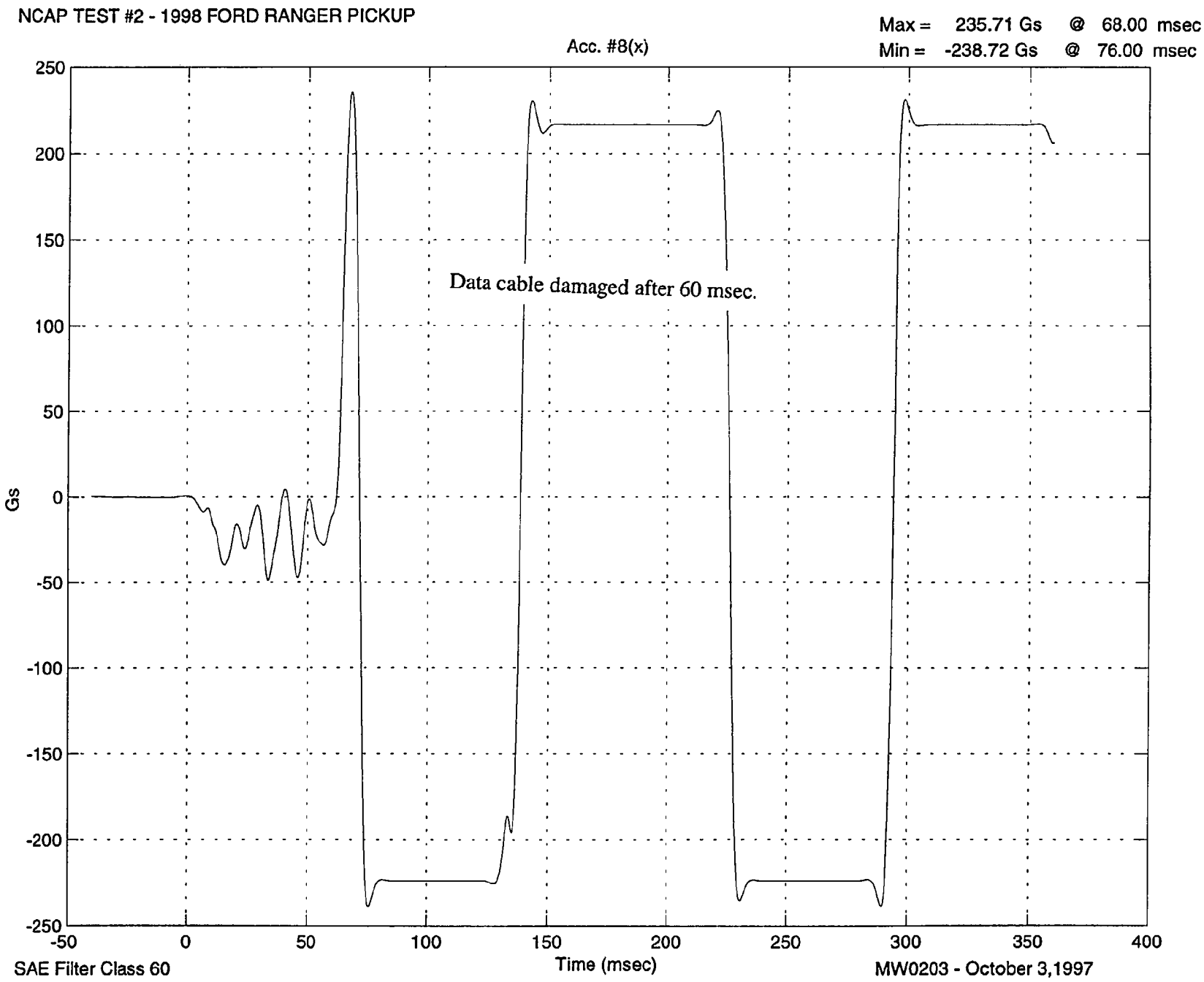
NCAP TEST #2 - 1998 FORD RANGER PICKUP

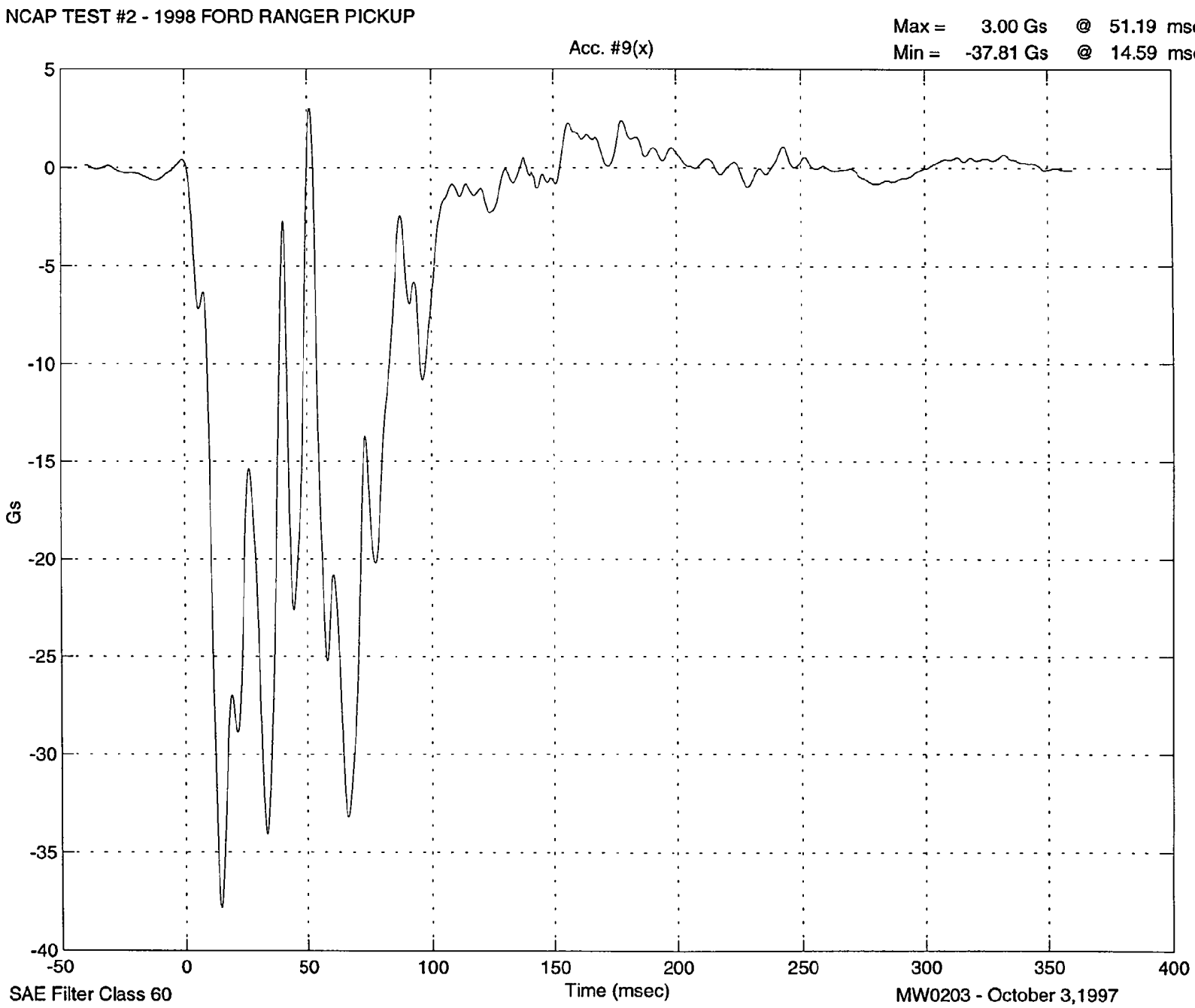


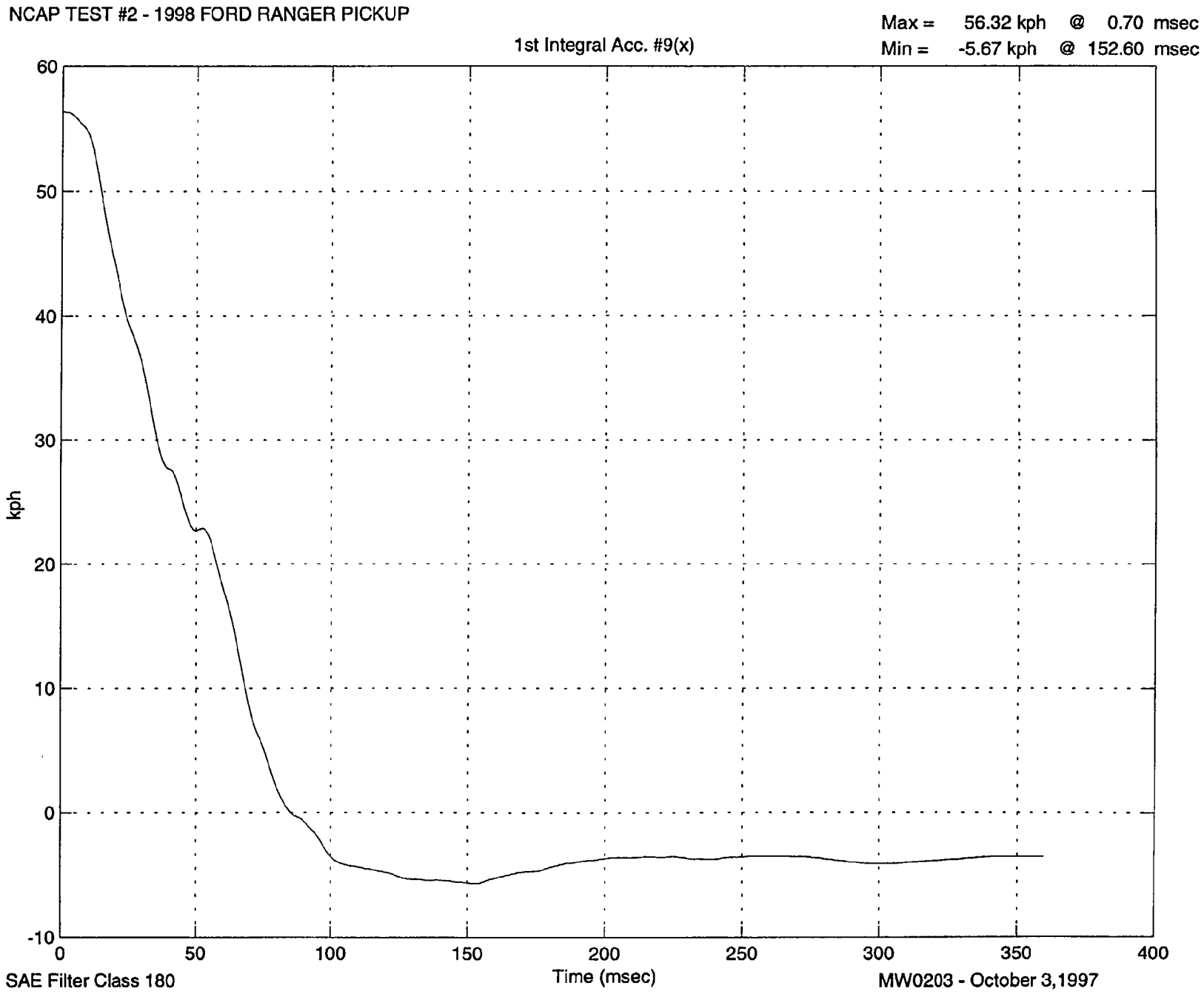

NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #7(x)
Max = 57.92 Gs @ 53.79 msec
Min = -91.82 Gs @ 49.19 msec
60
40
20
0
-20
-40
-60
-80
-100
Gs
-50
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997

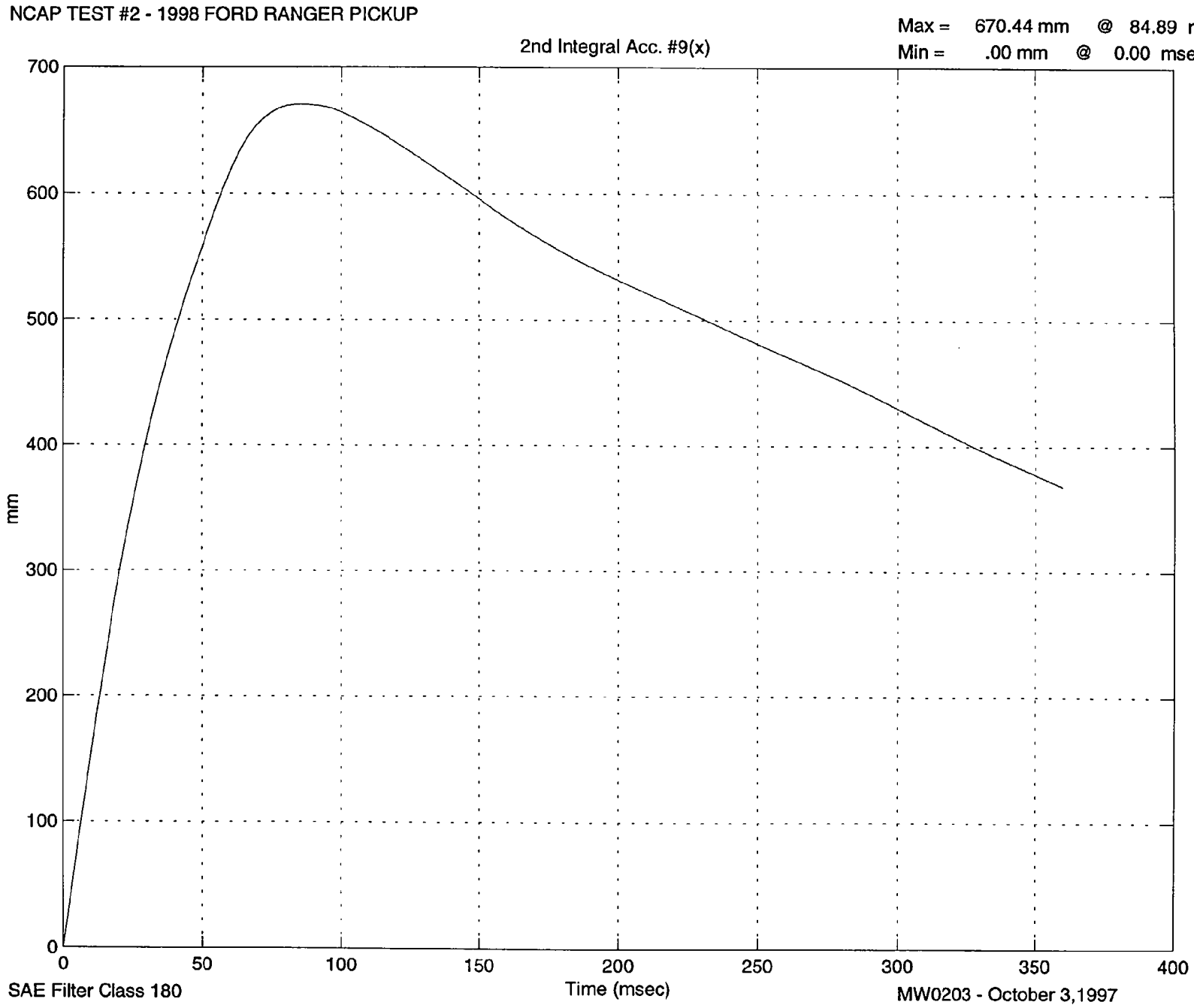

NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #7(x)
Max = 56.61 kph @ 11.80 msec
Min = 11.35 kph @ 96.50 msec
kph
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
2nd Integral Acc. #7(x)
Max = 2699.41 mm @ 359.89 msec
Min = .00 mm @ 0.00 msec
3000
2500
2000
1500
1000
500
0
mm
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Max = 235.71 Gs @ 68.00 msec
Min = -238.72 Gs @ 76.00 msec
Acc. #8(x)
Data cable damaged after 60 msec.
Gs
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997
250
200
150
100
50
0
-50
-100
-150
-200
-250
-50
0
50
100
150
200
250
300
350
400


NCAP TEST #2 - 1998 FORD RANGER PICKUP
Acc. #9(x)
Max = 3.00 Gs @ 51.19 msec
Min = -37.81 Gs @ 14.59 msec
Gs
Time (msec)
SAE Filter Class 60
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
1st Integral Acc. #9(x)
Max = 56.32 kph @ 0.70 msec
Min = -5.67 kph @ 152.60 msec
60
50
40
30
20
10
0
-10
kph
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997


NCAP TEST #2 - 1998 FORD RANGER PICKUP
2nd Integral Acc. #9(x)
Max = 670.44 mm @ 84.89 msec
Min = .00 mm @ 0.00 msec
700
600
500
400
300
200
100
0
mm
0
50
100
150
200
250
300
350
400
Time (msec)
SAE Filter Class 180
MW0203 - October 3,1997

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.

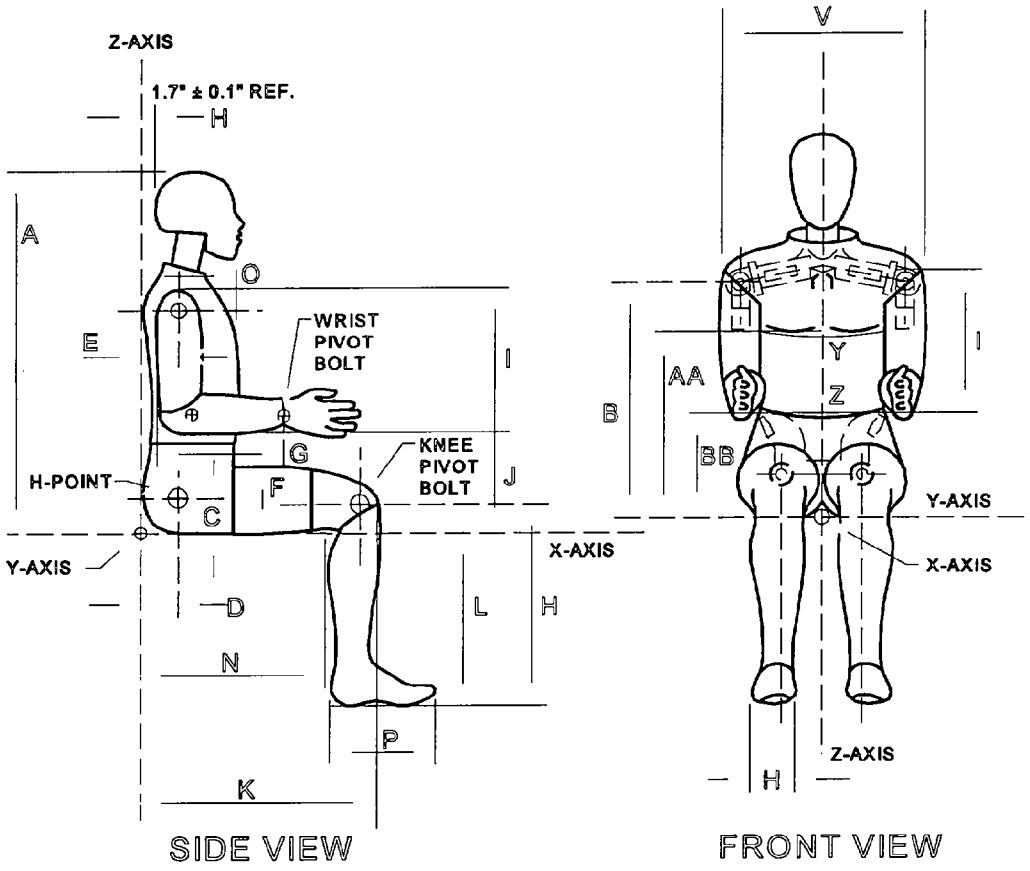
Dummy serial numbers and certification dates are:

| 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 | 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

# *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 | 6 Axis Neck Transducer |
| Workfile | 150397.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 | 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

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

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 | | 951 | GSE | 9/97 | 3/98 |
| Left Femur Load Cell | | 952 | 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 | | M7 | 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 | A13929 | ENDEVCO | 9/97 | 3/98 |
| Left Foot Rear | X | A14150 | ENDEVCO | 9/97 | 3/98 |
| Left Foot Rear | Z | A14058 | ENDEVCO | 9/97 | 3/98 |
| Right Foot Front | Z | A14181 | ENDEVCO | 9/97 | 3/98 |
| Right Foot Rear | X | A14126 | ENDEVCO | 9/97 | 3/98 |
| Right Foot Rear | Z | A14124 | 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 | 231 | GSE | 9/97 | 3/98 |
| Left Femur Load Cell | 232 | 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 | 064 | HUMANOID | 5/97 | 11/97 |
| 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 | M10 | 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) | APA30 | 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 | A13506 | ENDEVCO | 9/97 | 3/98 |
| Left Foot Rear | X | A12268 | ENDEVCO | 9/97 | 3/98 |
| Left Foot Rear | Z | A13011 | ENDEVCO | 9/97 | 3/98 |
| Right Foot Front | Z | AEWK1 | ENDEVCO | 8/97 | 2/98 |
| Right Foot Rear | X | AKD92 | ENDEVCO | 8/97 | 2/98 |
| Right Foot Rear | Z | J18418 | ENDEVCO | 8/97 | 2/98 |

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS

( 6 Month Calibration Minimum )

| | Serial # | Manufacturer | Calibration | |
|---|---|---|---|---|
| | | | Last | Next |
| Left Seat Rear Crossmember | Y93 | ICS | 8/97 | 2/98 |
| Right Rear Seat Crossmember | D72 | ICS | 10/97 | 4/98 |
| Top of Engine | D74 | ICS | 10/97 | 4/98 |
| Bottom of Engine | D29 | ICS | 9/97 | 3/98 |
| Left Disc Brake Caliper | A93 | CEC | 4/97 | 10/97 |
| Right Disc Brake Caliper | A189 | CEC | 8/97 | 2/98 |
| Instrument Panel | E02 | CEC | 6/97 | 12/97 |
| Left Seat Rear Crossmember (R) | Y85 | ICS | 4/97 | 10/97 |
| Right Seat Rear Crossmember (R) | Y22 | ICS | 4/97 | 10/97 |