V1662

REPORT NUMBERS: 208-CAL-92-05
212-CAL-92-05
301-CAL-92-05

VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT CRASH PROTECTION, WINDSHIELD MOUNTING, WINDSHIELD ZONE INTRUSION (PARTIAL) AND FUEL SYSTEM INTEGRITY

CHRYSLER CORPORATION
1992 PLYMOUTH VOYAGER
7-PASSENGER MPV

NHTSA NUMBER: CN0305

CALSPAN TEST NUMBER: 7941-4

OCTOBER 22, 1991

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225

FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
ENFORCEMENT
Office of Vehicle Safety Compliance
400 Seventh Street, S.W.
Room No. 6115 (NEF-30)
Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-90-C-01003. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

Prepared: David J. Travale

David J. Travale, Project Engineer

Approved: Walter E. Levan

Walter E. Levan, Program Manager
Transportation Sciences Center

FINAL REPORT ACCEPTED BY:

Charles L. Cave

Contracting Office's Technical Representative
(COTR), NHTSA, Office of Vehicle Safety Compliance

4/8/92

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
208-CAL-92-05 212-CAL-92-05 301-CAL-92-05		

4. Title and Subtitle	5. Report Date
Final Report of FMVSS Nos. 208, 212, 219 (Partial), and 301 Compliance Testing of a 1992 Plymouth Voyager 7-Passenger MPV	October 22, 1991
	6. Performing Organization Code CAL
7. Author(s) Vincent M. Paolini, Engineer David J. Travale, Project Engineer Walter E. Levan, Program Manager	8. Performing Organization Report No. 7941-4
9. Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, New York 14225	10. Work Unit No. J80-040-1126
	11. Contract or Grant No. DTNH22-90-C-01003
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (NEF-30) 400 Seventh St., S.W., Rm. 6115, Washington, DC 20590	13. Type of Report and Period Covered Final Report October-November 1991
	14. Sponsoring Agency Code DOT/NHTSA/NEF/OVSC

15. Supplementary Notes

16. Abstract

A 30 mph vehicle safety compliance test was conducted on a 1992 Plymouth Voyager 7-Passenger MPV.

This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on October 22, 1991. The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards:

1. FMVSS No. 208, "Occupant Crash Protection"
2. FMVSS No. 212, "Windshield Mounting"
3. FMVSS No. 219 (partial), "Windshield Zone Intrusion"
4. FMVSS No. 301, "Fuel System Integrity"

The test mode was perpendicular (0°) and the impact velocity was 29.6 mph. The ambient temperature at the impact face was 67°F.

The subject test vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219 (partial) and 301.

Type of Restraint System: The test vehicle was equipped with a driver side air bag and passenger side manual 3-point seat belt. The driver was also restrained with a manual 3-point belt for this test.

17. Key Words	18. Distribution Statement
30 mph Vehicle Safety Compliance Testing FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity" Frontal Impact	Copies of this report are available from: Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 (NAD-52) 400 Seventh St., S.W., Washington, DC 20590

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED		

Form DOT F1700.7 (8-69)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Section 1

PURPOSE AND TEST PROCEDURE

This 30 mph frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial) and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by Calspan Advanced Technology Center under Contract No. DTNH22-90-C-01003. The purpose of this test was to determine if the subject vehicle, a 1992 Plymouth Voyager 7-Passenger MPV, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS No. 212, "Windshield Mounting"; FMVSS No. 219 (partial), "Windshield Zone Intrusion"; and FMVSS No. 301, "Fuel System Integrity". This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-208-08, dated September 8, 1989.

Section 2

SUMMARY OF TEST NUMBER CN0305

A frontal barrier was impacted by a 1992 Plymouth Voyager 7-Passenger MPV at a velocity of 29.6 mph. The test was performed at the Calspan Corporation Advanced Technology Center on October 22, 1991. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 14 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 OVSC Laboratory Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers, chest displacement potentiometers, and left/right femur load cells. These ATDs had been certified prior to the test.

The 25 channels of data were recorded on two 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces. Accelerometer #4(x), located on the bottom of the engine block, sustained a cut data cable at approximately 34 milliseconds.

The driver's HIC was 426. The maximum chest deceleration over 3 milliseconds was 35.5 g's with 1.6 inches of deflection. The maximum force on the driver's left femur was 403 pounds and 815 pounds on the right femur.

The right front passenger's HIC was 175. The maximum chest deceleration over 3 milliseconds was 42.4 g's with 1.6 inches of deflection. The maximum force on the right femur was 495 pounds. The maximum force on the left femur was approximated to be 93 pounds.

Table 1

CRASH TEST SUMMARY

Vehicle NHTSA No.: CN0305 Test Mode: 30 mph Frontal Barrier

Test Date: October 22, 1991 Time: 14:20 Temperature: 67 F°

Vehicle Make/Model/Body Style: 1992 Plymouth Voyager 7-Passenger MPV

Vehicle Test Weight: 4100 lbs.

Vehicle/Barrier Impact Angle: 0 °

Impact Velocity: 29.6 mph

Maximum Static Crush: 20.5 inches

Vehicle Rebound: 14.7 inches

DUMMIES:	DRIVER	PASSENGER
Type:	Part 572E	Part 572E
Restraint System:	Driver Air Bag and Manual 3-pt seat belt	Manual 3-point seat belt

Number of Data Channels: 25

Number of Cameras: 1 Real Time

14 High Speed

DOOR OPENING DATA: Closed-Operable - Left Front

Closed-Operable - Right Front

Front Seat(s) Data:	DRIVER	PASSENGER
Seat Track Failure:	3.5 in. rearward of mid position inches of shift	None
Seat Back Failure:	None	None

VISIBLE DUMMY CONTACT POINTS:	DRIVER	PASSENGER
Head:	1-Face with airbag 2-Rear of head with headrest 3-Top of head with D-ring anchor cover	Rear of head with headrest
Abdomen:	No Contact	No Contact
Chest:	Air Bag	No Contact
Knees:	Lower Dashpanel	Lower Dashpanel

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1992 Plymouth Voyager 7-Passenger MPV

NHTSA No.: CN0305 ; VIN: 2P4GH25K6NR532794 ; Color: Light Champagne

Engine Data: 4 cylinders; - CID; 2.5 Liters; - cc

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

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

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

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

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

Date Received: 9-26-91 ; Odometer Reading 22 miles

Selling Dealer: Mullane Motors Inc.

& Address 6200 South Transit Rd. Lockport NY 14094

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Chrysler Corporation

Date of Manufacture: 9-91

GVWR: 5040 lbs.; GAWR: 2544 lbs. FRONT; 2544 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 35 psi FRONT

35 psi REAR

Recommended Tire Size: P195/75R14

Recommended Cold Tire Pressure: 35 psi FRONT; 35 psi REAR

Size of Tires on Test Vehicle: P195/74R14 ; Manufacturer: Goodyear

Vehicle Capacity Data:

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

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

Rated Cargo/Luggage Weight (RCLW) = 300* lbs. (Difference)

* RCLW of 300 lbs is used for MPVs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

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

Right Front = 1010 lbs. Right Rear = 700 lbs.

Left Front = 1050 lbs. Left Rear = 720 lbs.

TOTAL FRONT = 2060 lbs. TOTAL REAR = 1420 lbs.

% of Total Vehicle Weight = 59.2 % of Total Weight = 40.8 %

TOTAL DELIVERED WEIGHT = 3480 lbs.

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 3480 lbs.

Rated Cargo/Luggage Weight (RCLW) = 300 lbs.

Weight of 2 P.572 Dummies @ 167 ea. = 334 lbs.

TARGET TEST WEIGHT = 4114 lbs. (sum)

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 286 POUNDS OF CARGO WEIGHT:

Right Front = 1160 lbs. Right Rear = 910 lbs.

Left Front = 1100 lbs. Left Rear = 930 lbs.

TOTAL FRONT = 2260 lbs. TOTAL REAR = 1840 lbs.

% of Total Weight = 55.1 % % of Total Weight = 44.9 %

TOTAL TEST WEIGHT = 4100 lbs.

Weight of Ballast Secured in Vehicle Trunk Area = 275 lbs.

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimensions in inches):

AS DELIVERED:	RF 29.3"	LF 29.2"	RR 29.8"	LR 29.5"
FULLY LOADED:	RF 27.9"	LF 27.9"	RR 27.1"	LR 27.1"
AS TESTED:	RF 28.8"	LF 28.9"	RR 28.3"	LR 28.1"

Vehicle's Wheel Base: 112.3 in.

Location of Vehicle's C.G.: 50.4 inches rearward of front wheel center

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 20.0 gallons

Usable Capacity Figure Furnished by COTR = 20.0 gallons

Test Volume Range (92 to 94% of Usable Capacity) = 18.4 to 18.8 gallons

ACTUAL TEST VOLUME = 18.6 gallons (with entire fuel system filled)

Table 3

POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°

Test Date: October 22, 1991 Time: 14:20 Temperature: 67°F

Vehicle NHTSA No.: CN0305

Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.6 mph; Trap No. 2 = 29.5 mph

Distance from vehicle to barrier: (1) entering trap = 52 inches

(2) exiting trap = 12 inches

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

Vehicle Length:

Pre-Test Right = 174.4 ; C/L = 178.0 ; Left = 174.7

Post-Test Right = 157.8 ; C/L = 157.5 ; Left = 158.6

Crush Right = 16.6 ; C/L = 20.5 ; Left = 16.1

AVERAGE = 17.7 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

Right = 13.9 ; C/L = 15.2 ; Left = 15.1

AVERAGE = 14.7 inches

DOOR OPENING:	Left	Right
Front	Closed	Closed
Rear	N/A	Closed

SEAT MOVEMENT:	Seat Back Failure	Seat Shift
Front	None	Driver seat-3.5 inches rearward of mid-position
Rear	N/A	N/A

Table 3

POST IMPACT DATA (cont.)

GLAZING DAMAGE: Windshield cracked near "A" pillars

OTHER NOTABLE IMPACT FEATURES: Steering column stroked

Section 3

OCCUPANT AND VEHICLE DATA

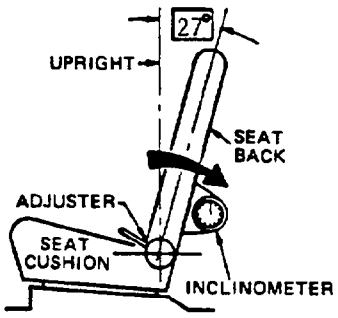
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year: 1992 Vehicle Model: Plymouth Voyager Body Style: MPV

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



LEFT SIDE VIEW

Seat back angle for driver's seat: 27°

Measurement instructions: Measure along seat back frame by inboard arm rest.

Seat back angle for passenger's seat: 27°

Measurement instructions: Same as driver

2. Seat Fore and Aft Positioning

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat: Place seat in rearmost position (position 1), then move seat to fifth position.

Positioning of the passenger's seat (if applicable): Nonadjustable

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 20.0 gallons

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

Additional Instructions: None.

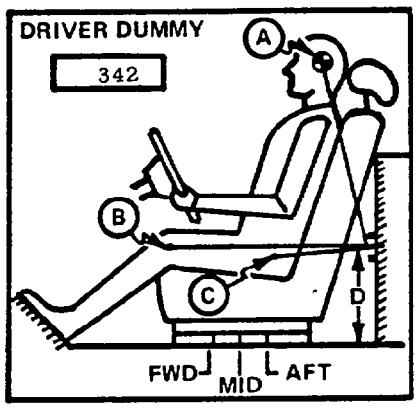
Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

Test No.: CN0305 Vehicle: 1992 Plymouth Voyager MPV

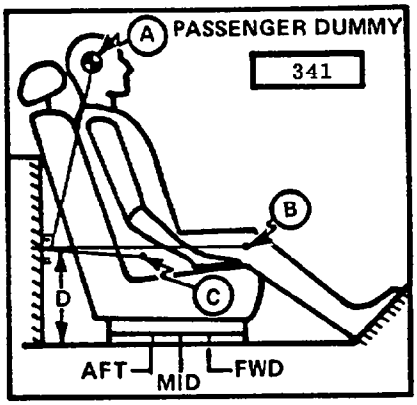
SEAT TYPE:	ADJUSTER TYPE*:	SEAT BACK TYPE:
- Bench	X Manual	- Fixed
X Bucket	- Power	X Adjustable Reclining
- Split Bench		

*Passenger-seat track nonadjustable

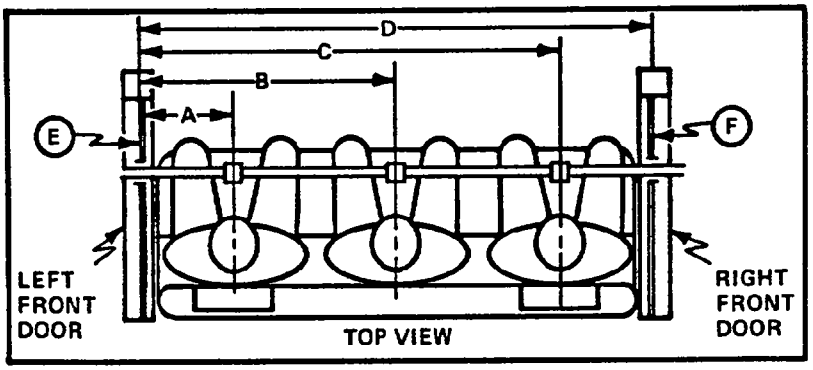


MEASUREMENT LOCATION

A - Head Target
B - Knee Joint
C - Approximate 'H' Point
D - Sill to Reference Point



DRIVER DUMMY	PASSENGER DUMMY
A = 23.5 in. 14 Degrees	A = 23.8 in. 12 Degrees
B = 24.5 in. 90 Degrees	B = 22.8 in. 89 Degrees
C = 9.0 in. 109 Degrees	C = 7.8 in. 109 Degrees
D = 18.0 in.	D = 18.0 in.



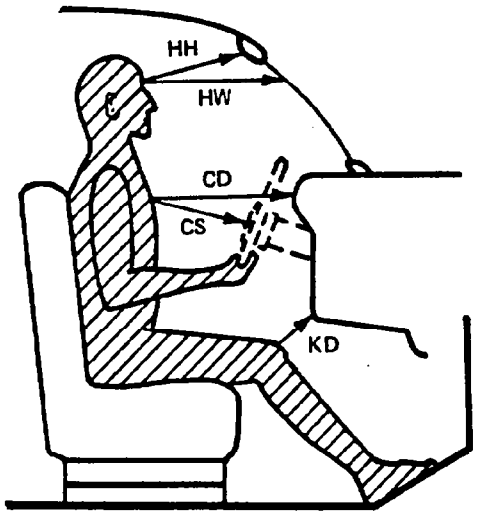
DUMMY ID

S/N 342 S/N 341

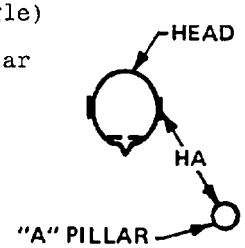
A	= Left Door to Driver Centerline	13.3 in.
B	= Left Door to Center Passenger Centerline	- in.
C	= Left Door to Right Passenger Centerline	45.0 in.
D	= Left Door to Right Door	57.9 in.
E,F	= Window Glass Height (Right and Left Must Be Equal)	12.2 in.

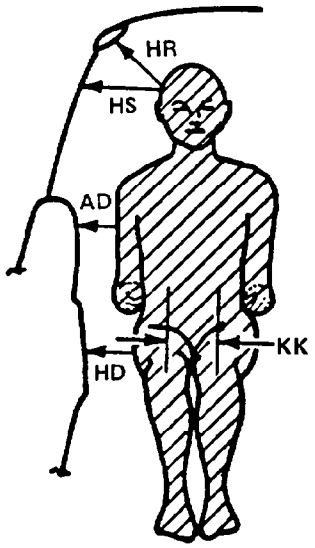
Figure 3
OCCUPANT CLEARANCE DIMENSIONS
(Dimensions in inches)

	DRIVER	PASSENGER
HH	17.7	18.0
HW	24.3	24.7
CD	20.1	22.7
CS	11.2	-
KDL	5.9	8.2
KDR	5.4	7.7
SA	See Note	See Note
TA	23°	24°



HH = Head to Windshield Header
HW = Head to Windshield
CD = Chest to Dash
CS = Chest to Steering Wheel
KD(L/R) = Knee to Dash (Left/Right)
SA = Seat Back Angle
TA = Torso Angle (Pelvic Angle)
HA = Head Target to "A" Pillar
HR = Head to Side Roof
HS = Head to Side Window
AD = Arm to Door
HD = Hip to Door
KK = Knee to Knee





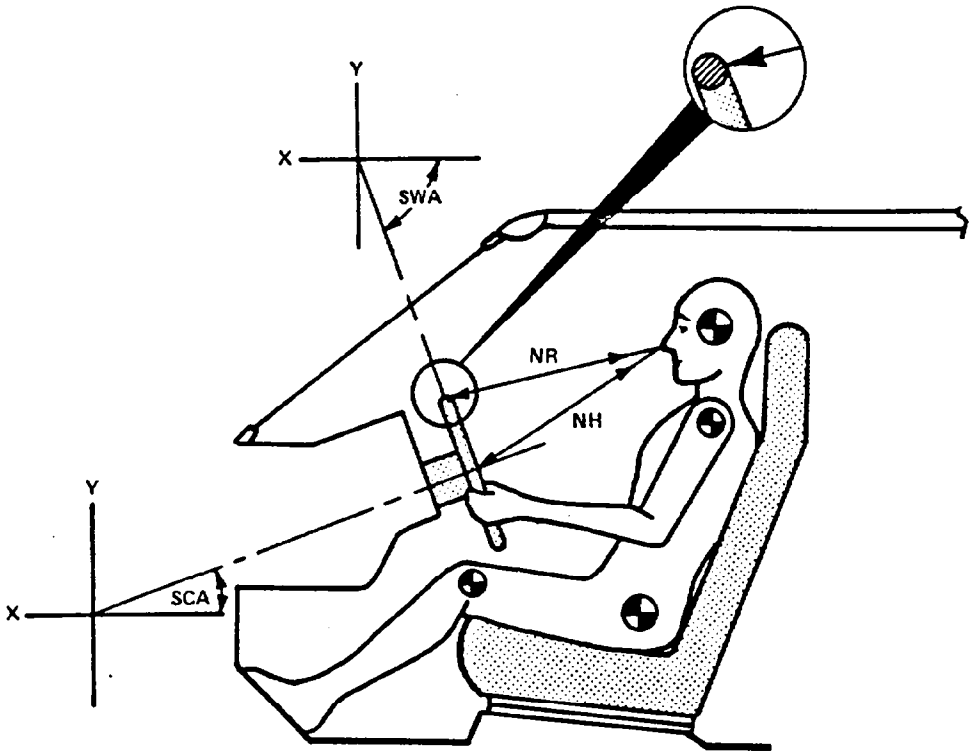
	DRIVER	PASSENGER
HR	8.3	8.0
HS	10.2	9.8
AD	3.2	3.0
HD	5.7	5.6
KK	9.1	8.6
HA	20.4	21.1

Note: Seat back was positioned as specified by manufacturer.

H-Point Location	Driver	Relative to target	Passenger	Relative to target
To sill	13.9	0.0	13.8	+0.3
To striker	8.4	+0.1	7.7	-0.2

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY REFERENCE DIMENSIONS

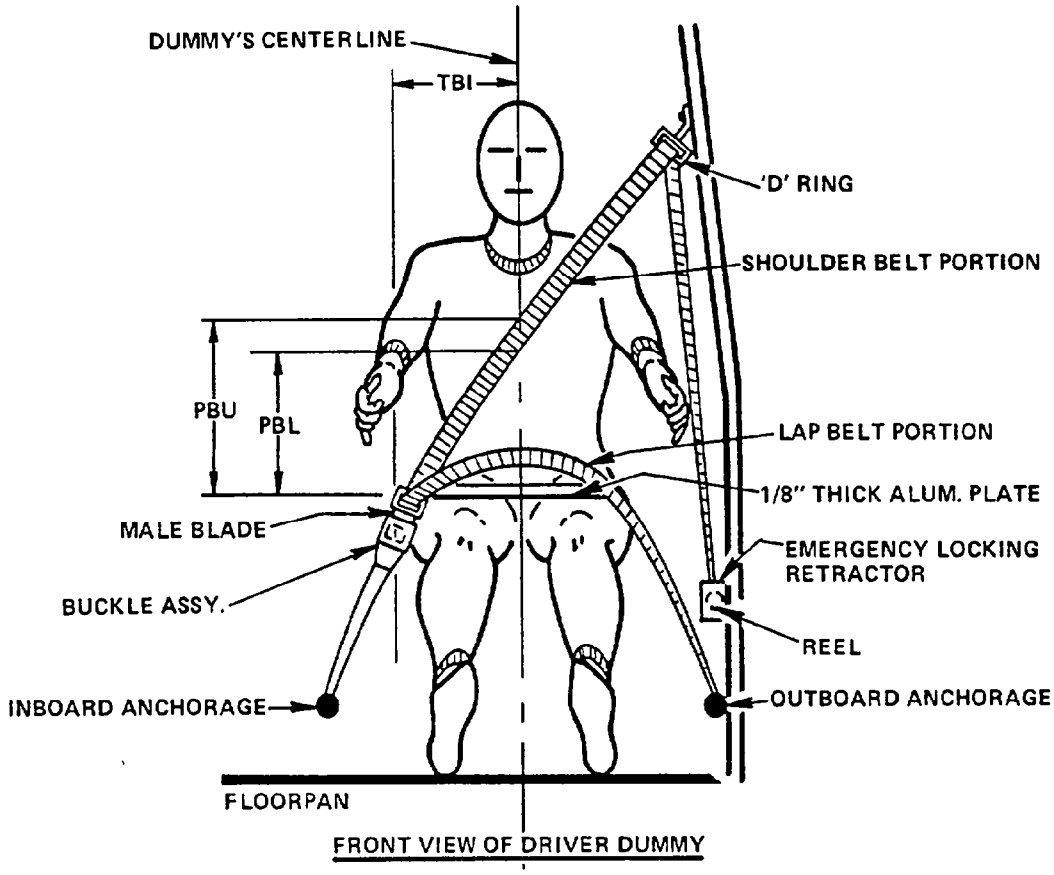


LEFT SIDE VIEW

	MEASUREMENTS	
NR -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	16.0	Inches
NH -- Distance from tip of dummy's nose to center of steering wheel hub	15.3	Inches
SCA -- Angle of steering column relative to the horizontal X axis	34	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-56	Degrees

Figure 5

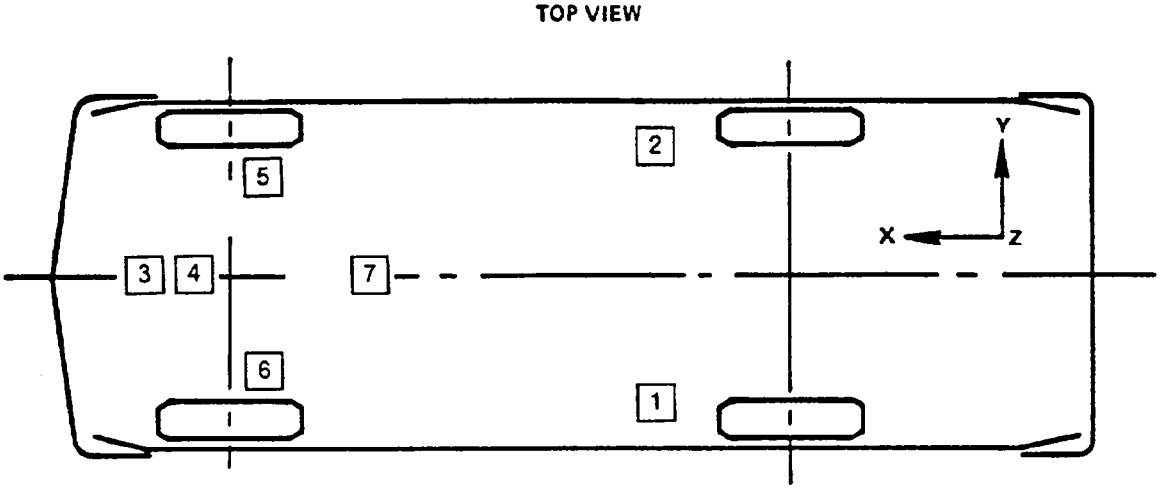
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	13.7	13.5
PBL -- Top surface of alum. plate to belt lower edge	10.6	10.4
TBI -- Distance from torso centerline to buckle	10.7	10.1

Figure 6

VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Left Rear Seat Crossmember	X		
2	Right Rear Seat Crossmember	X		
3	Top of Engine	X		
4	Bottom of Engine	X		
5	Right Disc Brake Caliper	X		
6	Left Disc Brake Caliper	X		
7	Instrument Panel	X		

*The accelerometer pack number can be correlated with the vehicle response data traces found in Appendix B.

Table 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION** MAX (g)	POSITIVE DIRECTION** TIME (msec)	NEGATIVE DIRECTION** MAX (g)	NEGATIVE DIRECTION** TIME (msec)
1	REAR SEAT X-MEMBER AT LEFT SIDE	PRE:	62.5	23.4	18.2				
		POST:	62.5	23.4	18.3				
	LONGITUDINAL ACCELERATION					3	118	-39	37
2	REAR SEAT X-MEMBER AT RIGHT SIDE	PRE:	62.0	-24.0	18.2				
		POST:	62.0	-24.0	18.3				
	LONGITUDINAL ACCELERATION					4	127	-44	37
3	TOP OF ENGINE BLOCK	PRE:	150.3	-9.0	33.7				
		POST:	140.1	-9.1	34.8				
	LONGITUDINAL ACCELERATION					26	42	-109	29
4	BOTTOM OF ENGINE	PRE:	153.4	-14.9	10.1				
		POST:	140.1	-15.0	10.6				
	LONGITUDINAL ACCELERATION					***	***	-150	25
5	BRAKE CALIPER AT RIGHT SIDE	PRE:	143.1	-23.3	20.2				
		POST:	139.0	-23.3	20.4				
	LONGITUDINAL ACCELERATION					37	68	-74	53
6	BRAKE CALIPER AT LEFT SIDE	PRE:	143.1	-23.3	20.0				
		POST:	139.0	-23.3	20.2				
	LONGITUDINAL ACCELERATION					39	67	-103	43
7	DASH PANEL	PRE:	119.0	-5.6	36.6				
		POST:	119.0	-5.6	38.7				
	LONGITUDINAL ACCELERATION					22	70	-53	48

		**	POSITIVE	NEGATIVE
*X	+ Forward from rear bumper	LONGITUDINAL:	FORWARD	REARWARD
Y	+ Left from vehicle centerline	LATERAL:	LEFTWARD	RIGHTWARD
Z	+ Up from ground	VERTICAL:	UPWARD	DOWNWARD

***Accelerometer sustained a cut data cable at approximately 34 milliseconds.

DISTANCE MEASUREMENTS IN INCHES

Figure 7

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5.

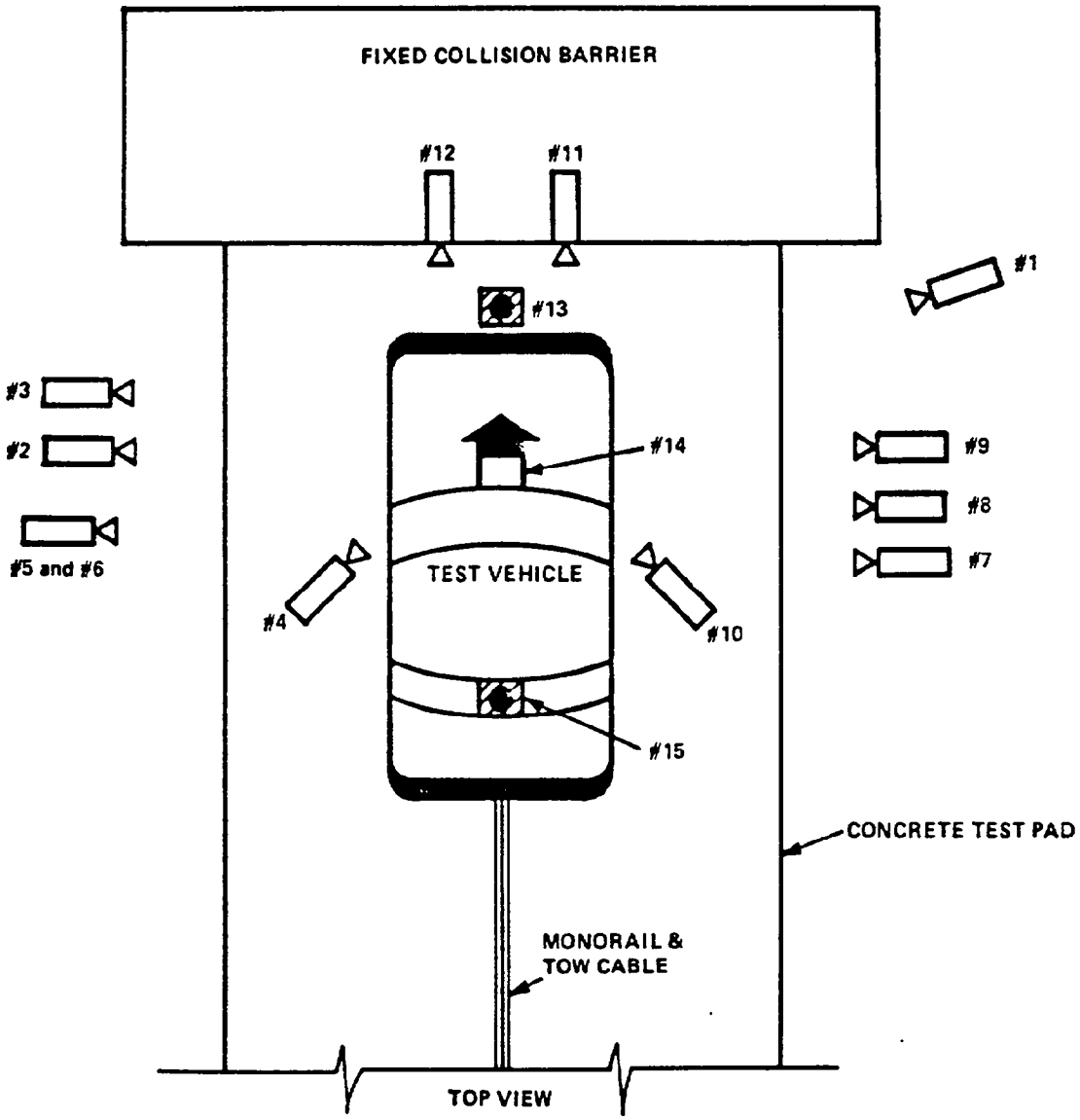


Table 5

HIGH-SPEED CAMERA LOCATIONS

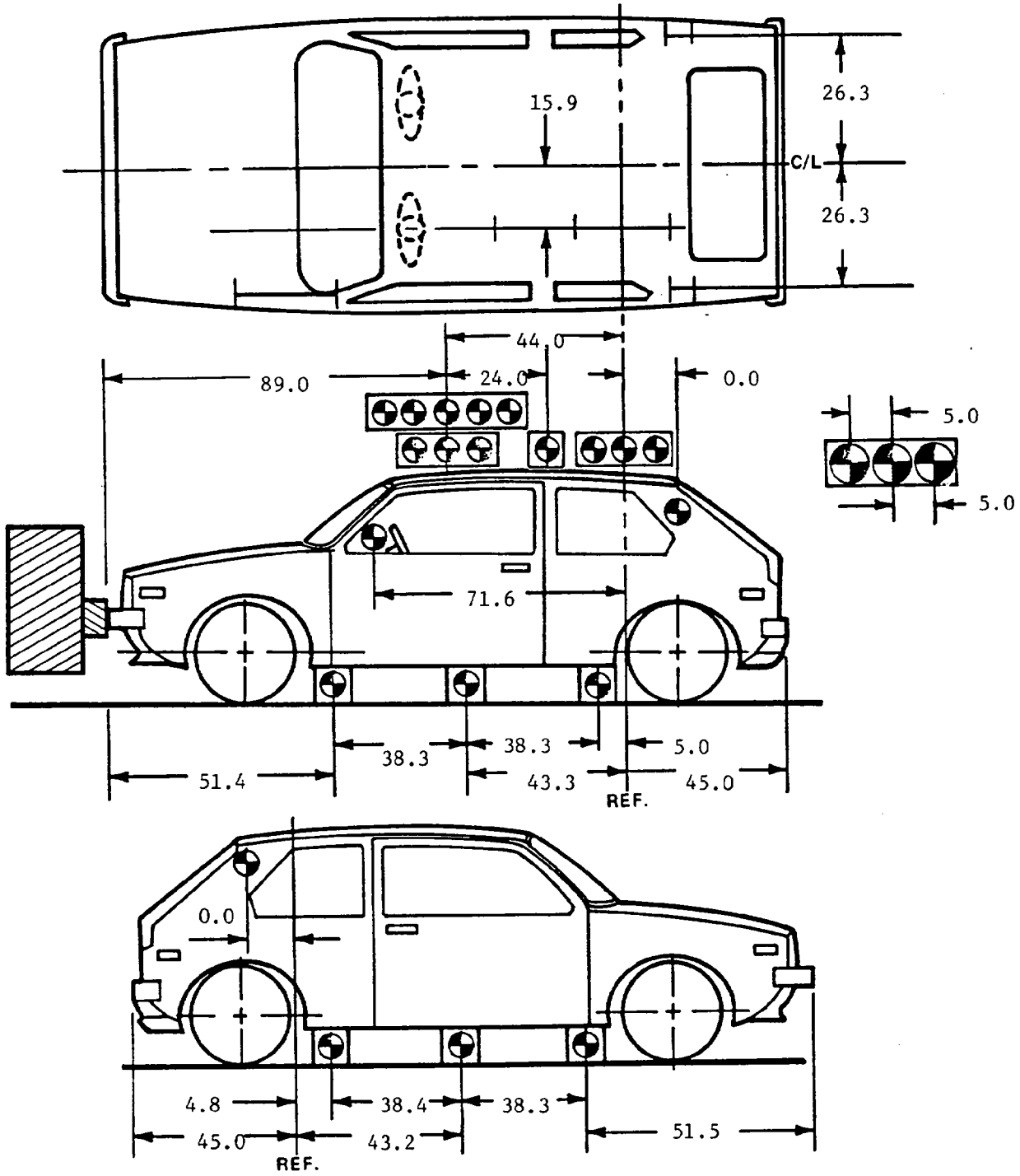
Test No. CN0305 Vehicle: 1992 Plymouth Voyager 7-Passenger MPV

CAMERA NO.	VIEW	CAMERA POSITIONS (in)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	227	56	41	-3	208.1	13	545
3	Left Side View	287	34	41	-1	268.1	25	570
4	Driver and Interior View	105	95	69	-14	-	13	590
5	Steering Column (Bottom)	276	66	46	-2	257.1	25	550
6	Steering Column (Top)	276	66	70	-8	257.1	25	535
7	Overall Right Side	239	76	42	-2	220.1	13	605
8	Right Side View	293	43	41	-1	274.1	25	600
9	Right Passenger View	300	65	55	-3	281.1	35	585
10	Passenger and Interior View	109	95	68	-13	-	13	495
11	Passenger Front View	22	18	72	-46	-	13	N.T.
12	Driver Front View	22	18	72	-45	-	13	N.T.
13	Windshield View	0	0	130	-57	-	13	540
14	Pit View of Engine	0	22	-125	90	-	13	700
15	Pit View of Fuel Tank	0	135	-125	90	-	13	875

*X = film plane to monorail centerline
Y = film plane to impact location
Z = film plan to ground
** = referenced to horizontal plane

Figure 8

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

Figure 9

TEST VEHICLE MEASUREMENTS

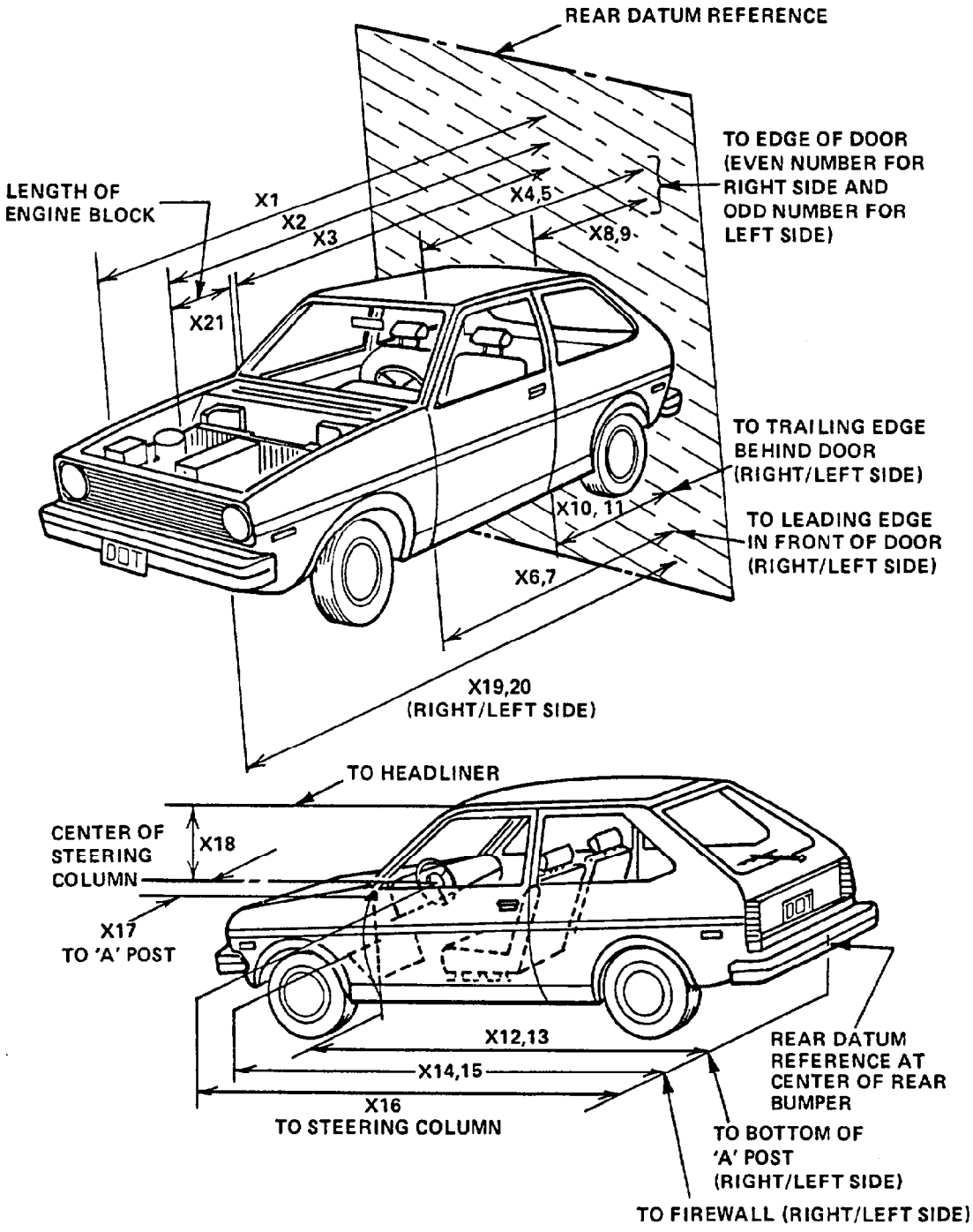


Table 6

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	178.0	157.5	20.5
X2	Rear Surface of Vehicle to Front of Engine	157.7	148.8	8.9
X3	Rear Surface of Vehicle to Firewall	137.2	141.5	-4.3
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	128.9	128.4	0.5
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	129.2	128.9	0.3
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	125.8	126.2	-0.4
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	126.3	126.0	0.3
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	86.0	86.4	-0.4
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	86.6	86.3	0.3
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	86.1	86.0	0.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	86.4	86.2	0.2
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	126.5	126.8	-0.3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	126.6	127.0	-0.4
X14	Rear Surface of Vehicle to Firewall, Right Side	139.6	137.6	2.0
X15	Rear Surface of Vehicle to Firewall, Left Side	140.7	138.2	2.5
X16	Rear Surface of Vehicle to Steering Column	109.2	111.0	-1.8
X17	Center of Steering Column to "A" Post	16.2	16.4	-0.2
X18	Center of Steering Column to Headliner	18.2	15.3	2.9
X19	Rear Surface of Vehicle to Right Side of Front Bumper	174.4	157.8	16.6
X20	Rear Surface of Vehicle to Left Side of Front Bumper	174.7	158.6	16.1
X21	Length of Engine Block	17.5	17.5	0.0

Section 4

SUMMARY OF RESULTS OF FMVSS NOS. 208, 212, 219 AND 301-75

- "Occupant Crash Protection," FMVSS No. 208 Data
- "Windshield Mounting," FMVSS No. 212 Data
- "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- "Fuel System Integrity," FMVSS No. 301-75

Table 7

DUMMY INJURY CRITERIA VALUES

NHTSA No.: CN0305 Vehicle: 1992 Plymouth Voyager 7-Passenger MPV

	MAXIMUM ACCELERATION (g's)							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
Dummy (1)	-58	21	35	62	-36	-8	-13	35.5
Dummy (2)	106	-13	-45	111	-42	-12	11	42.4

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	403 ****	815
Dummy (2)	52	93***

	HEAD INJURY CRITERIA**			
		36 millisecond Maximum		Avg. Acc. (g)
	HIC	t_1 (msec)	t_2 (msec)	t_1 TO t_2
Dummy (1)	426	56.880	89.640	44.2
Dummy (2)	175	61.960	96.960	29.9

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

***Pos. 2 Right Femur maximum load is approximated.

**** This value occurs at a spike in the data that also occurs in other data channels and therefore may not reflect the true load.

Table 8

FMVSS NO. 208 – SEAT BELT WARNING SYSTEM CHECK

With occupant in driver's position, the lap belt in stowed position, and ignition switch placed in "Start/On" position:

Log time duration of audible warning signal = 6 sec.

Log time duration of reminder light operation = 6 sec.

With occupant in driver's position, lap belt in use, and the ignition switch placed in "Start/On" position:

Log time duration of audible warning signal = 0 sec.
(audible warning should not operate)

Log time duration of reminder light operation = 6 sec.

Note wording of visual warning:

Fasten Seat Belt –

Fasten Belt –

Symbol 101-80 X

Table 9

FMVSS NO. 208 - LABELING AND DRIVER'S MANUAL INFORMATION

Locate label which describes manufacturers maintenance or replacement schedule for crash-deployed occupant protection system.

Describe location:

Inside Glove Box Door

The manufacturers recommended schedule is to inspect this system:

a. by ___-___ month, ___-___ year

b. by 30,000 miles

c. or after a time interval of 3 years.

or, "If 'air bag' light does not come on momentarily when ignition is turned on, or comes on or flashes while driving. The system must be serviced promptly by an authorized dealer."

Were appropriate instructions concerning maintenance and/or replacement of this system provided? YES ✓ NO -

Was a description of the functional operation of the system provided? YES ✓ NO -

Is there a reference to the instructions and description of the system on the label? YES ✓ NO -

Was an owner's manual provided? YES ✓ NO -

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the systems? YES ✓ NO -

Table 10

FMVSS NO. 208 - READINESS INDICATOR

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement.

Is the system totally mechanical? YES - NO ✓

Describe the location of the readiness indicator:

Top of dashboard on right side of "Information Center."

Is the readiness indicator clearly visible to the driver?

YES ✓ NO -

Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided?

YES ✓ NO -

Table 11

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No.:	CN0305
Make/Model:	1992 Plymouth Voyager MPV
Date of Comfort/Convenience Check:	10/21/91
Technician Performing Check:	D.J.T.
GVWR:	5040 lbs.

Seat belt comfort and convenience requirements cover vehicles manufactured on or after September 1, 1986, which have a gross vehicle weight rating of 10,000 pounds or less. Exemptions to this rule are belts installed in a walk-in, van-type vehicle and manual Type 2 belt systems installed in the front outboard seating positions of passenger automobiles. On or after September 1, 1989, the exemption of the type 2 manual seat belts installed in the front outboard seating positions of passenger automobiles will change depending on the states' enactment of mandatory usage laws.

Was vehicle built after or on September 1, 1986, and is it equipped with:

1. Automatic seat belts YES - NO ✓

If yes, go to requirements D1, D2 and D3

2. Manual seat belts* YES ✓ NO -

a. The seat belts, other than Type 2 lap/shoulder belts, are located in the front outboard seating positions of a passenger automobile.

YES - NO ✓

(Go to requirements D3, D4, D5, and D6)

b. The seat belt system is Type 2 lap/shoulder belt in the front outboard seating positions or the seat belts are located in a walk-in van.

STOP

*If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

Table 11 (cont.)

D1

CONVENIENCE HOOKS

A convenience hook or other device is provided to stow seat belt webbing to facilitate entering or exiting the vehicle.

YES ✓ NO –

Check the option which applies to this test vehicle:

1. A convenience hook or other device automatically releases the webbing when the automatic belt system is operational and remains in the released mode as long as the vehicle's ignition switch is moved to the "on" or "start" position and the vehicle's drivetrain is engaged.

   YES N/A NO N/A

2. A convenience hook or other device automatically releases the webbing when the automatic belt system is operational and remains in the released mode as long as the vehicle's ignition switch is moved to the "on" or "start" position and the vehicle's parking brake is in the released mode (nonengaged).

   YES N/A NO N/A

D2

WEBBING TENSION - RELIEVING DEVICE

The seat belt assembly installed in the outboard designated seating position has either manual or automatic tension relieving devices permitting the introduction of slack in the webbing of the shoulder belt ("comfort clips" or "window shade" devices).

YES – NO ✓

Check the owner's manual and determine the maximum amount of slack recommended by the manufacturer in inches. The recommended slack is – inches. Introduce this slack into the shoulder belt before testing the vehicle to comply with the requirements of FMVSS 208 S5.1. A warning is included in the owner's manual that introducing slack beyond the amount specified can significantly reduce the effectiveness of the shoulder belt.

YES N/A NO N/A

(If NO, provide explanation.)

Check the option which applies to this test vehicle:

1. This vehicle is equipped with automatic seat belts and the tension relieving device is canceled each time the adjacent door is opened.

   YES N/A NO N/A

(If NO, provide explanation.)

2. This vehicle is equipped with manual belts, required to meet FMVSS 208 S4.6, and the tension relieving device is canceled each time one of the following options occurs:

   a. The adjacent door is opened. YES N/A NO N/A

   b. The latch plate is released from the buckle. YES N/A NO N/A

3. This is an open-body vehicle, without doors. Does the manual mean to cancel any shoulder belt slack introduced by a tension relieving device to operate properly?

   YES N/A NO N/A

(If NO, provide explanation.)

D3

BELT CONTACT FORCE

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in this vehicle incorporate a webbing tension relieving device. Does the vehicle incorporate a tension relieving device?

   YES - NO ✓

2. Seats are adjusted according to instructions in Appendix B.

   YES ✓ NO -

3. The test dummies are positioned according to dummy position placement instructions in Appendix B and Appendix C.

   YES ✓ NO -

4. Close the vehicle's adjacent door, pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest, then fasten the latch. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. Measure the contact force exerted by the belt webbing on the dummy's chest. The contact force is 0.3 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Table 11 (cont.)

D4

LATCHPLATE ACCESSIBILITY

1. Position the test dummy in the driver's seat or passenger's seat in its forward most adjustment position.

YES ✓ NO -

2. Attach the inboard and outboard reach string. YES ✓ NO -

3. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. With the latchplate in the normal stowed position, check to assure that the latchplates are within the reach envelope.

YES ✓ NO -

4. Using the clearance test block, determine if there is sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latchplate or buckle.

YES ✓ NO -

D5

RETRACTION

1. Seats and seat backs are adjusted according to instructions in Appendix B "General Test Conditions" in TP-208-8.

YES ✓ NO -

2. Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B and restrain the dummies, using the belt systems for the positions being tested.

YES ✓ NO -

3. Outboard armrests which are capable of being stowed on vehicle seats shall be placed in their stowed positions.

YES N/A NO N/A

4. Check the option which applies to this test vehicle:

   a. The torso and lap belt webbing of the seat belt system automatically retract to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.

YES ✓ NO -

b. The torso and lap belt webbing of the seat belt system automatically retract when the seat belt latch plate is released.

YES ✓ NO –

5. With the webbing and hardware in the stowed position, close the door to assure that the webbing and hardware are prevented from being pinched.

YES ✓ NO –

6. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, check to assure that the belt system fully retracts when the tension-relief device is manually deactivated.

YES N/A NO N/A

D6

ACCESSIBILITY

The requirements for accessibility do not apply to:

1. Seats whose seat cushions are removable so that the seat back serves a function other than seating;

2. Seats which are removable;

3. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above, then determine if:

1. Each manual seat belt assembly whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back has one of the following three parts (the seat belt latchplate, the buckle, or the seat belt webbing) on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant).

YES ✓ NO –

2. The remaining two seat belt parts are accessible under normal conditions.

YES ✓ NO –

Table 11 (cont.)

3. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:

   a. The belt is completely retracted or, if the belt is nonretractable, the belt is unattached.

   YES __-__ NO __✓__

   b. The seat is moved to any position to which it is designed to be adjusted.

   YES __-__ NO __✓__

   c. The seat back, if foldable, is folded forward as far as possible and then moved backward into positions.

   YES __N/A__ NO __N/A__

4. Is the inboard receptacle end of the seat belt assembly which is installed in the outboard designated seating position accessible with the center arm rest in any position to which it can be adjusted without moving the armrest?

   YES __✓__ NO __-__

D7

LATCH MECHANISM

A seat belt assembly installed in a passenger car, except an automatic belt assembly, shall have a latch mechanism:

1. Whose components are accessible to a seated occupant in both the stowed and operational positions.

   YES __✓__ NO __-__

2. That releases both the upper torso restraint and the lap belt simultaneously, if the assembly has a lap belt and an upper torso restraint that require unlatching for release of the occupant.

   YES __✓__ NO __-__

3. That releases at a single point by a push button action.

   YES __✓__ NO __-__

Figure 10

FMVSS NO. 212 – "WINDSHIELD MOUNTING" DATA SHEET

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

Windshield is bonded in place with 0.5 inch rubber trim along top and both sides. Bottom of windshield is covered by a plastic shroud.

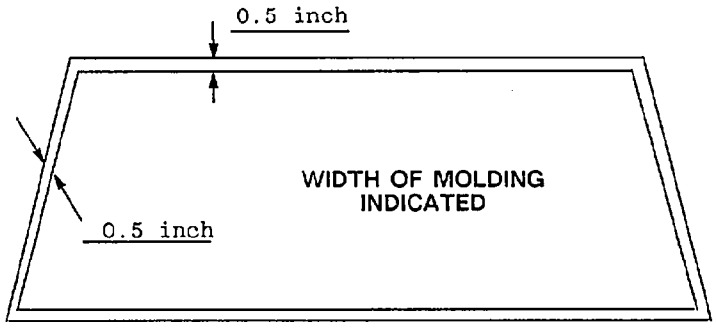
FMVSS 212 REQUIREMENTS:

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

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	84.2	84.2	100%
LEFT SIDE	84.2	84.2	100%
TOTAL	168.4	168.4	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

None

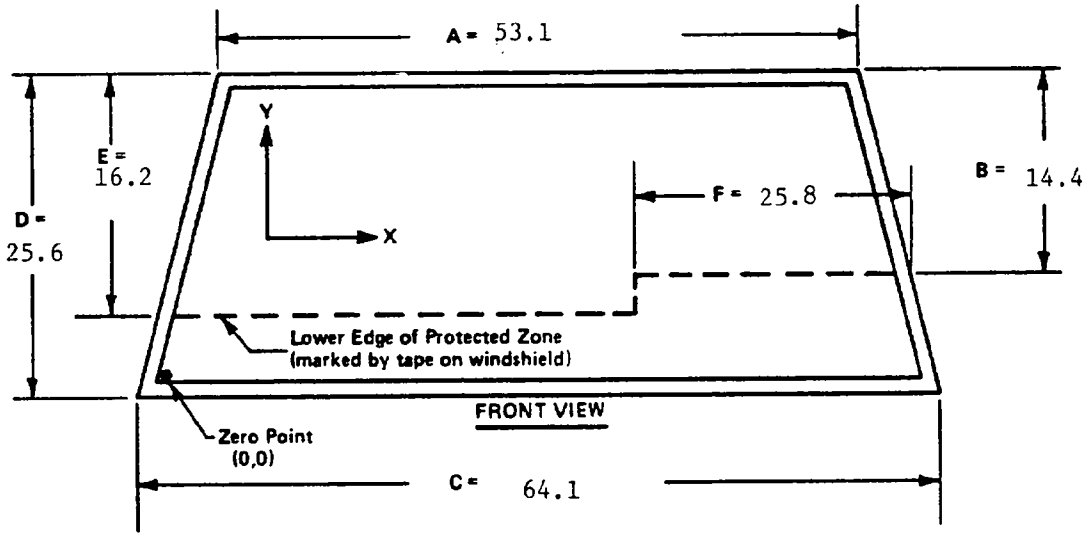
Figure 11

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the 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, and then draw a line on the inner surface of the windshield below and 1/2" 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 inches.)



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

(Show location of penetration on above sketch)

None

	COORDINATES	
	X	Y
1.		
2.		
3.		
4.		

Table 12

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

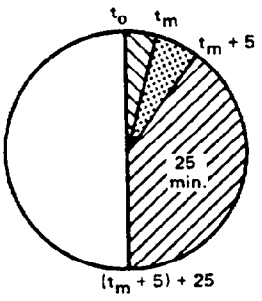
TEST VEHICLE NHTSA NO.: | C | N | 0 | 3 | 0 | 5 | TEST DATE: October 22, 1991

Vehicle Mfgr./Make/Model: 1992 Plymouth Voyager 7 Passenger MPV

Test vehicle fuel tank filled to 92% to 94% of manufacturer's "usable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE:
- X Frontal (30 mph)
- - Oblique (30 mph) with - ° barrier face first contacting _____ (driver/passenger) side
- - Rear Moving Barrier (30 mph)
- - Lateral Moving Barrier (20 mph)

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
1.	0	1 oz.
2.	0	5 oz.
3.	0	1 oz./1 min.

SOLVENT SPILLAGE DETAILS:

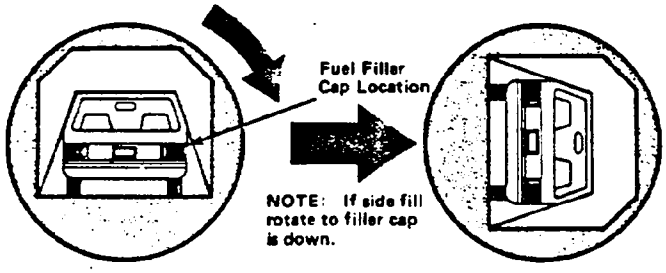
None.

Table 13

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° 90°

Vehicle NHTSA ID No.: CN0305



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	2	minutes 00	seconds
FMVSS 301 Position Hold Time +	5	minutes 00	seconds
TOTAL	7	minutes 00	seconds
Next whole minute interval	7	minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATION(S):

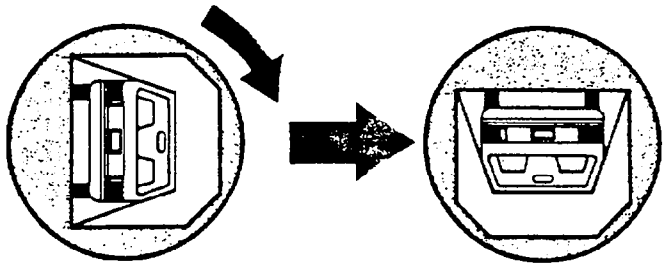
None.

Table 13

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

TEST PHASE: 90° 180°

Vehicle NHTSA ID No.: CN0305



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	1 minutes	54 seconds
FMVSS 301 Position Hold Time +	5 minutes	00 seconds
TOTAL	6 minutes	54 seconds
Next whole minute interval	7 minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

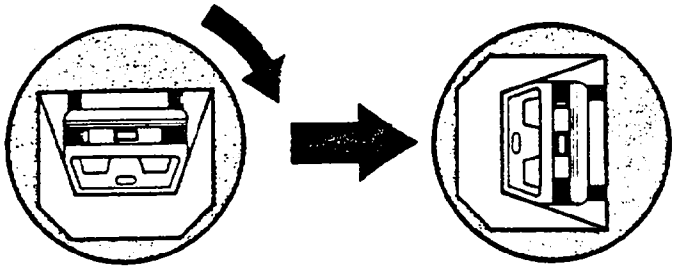
None.

Table 13

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

TEST PHASE: 180° 270°

Vehicle NHTSA ID No.: CN0305



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	2 minutes	05 seconds
FMVSS 301 Position Hold Time +	5 minutes	00 seconds
TOTAL	7 minutes	05 seconds
Next whole minute interval	8 minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0.57 ounces	0.47 ounce	0.03 ounce	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

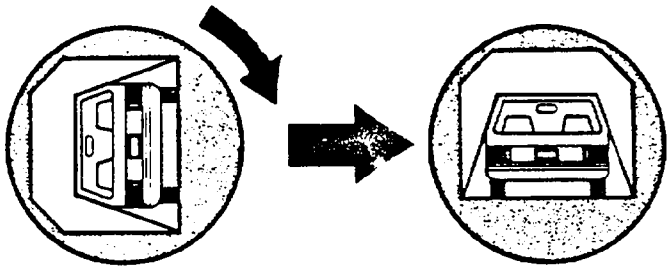
Spillage location not clearly visible.

Table 13

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

TEST PHASE: 270° 360°

Vehicle NHTSA ID No.: CN0305



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	2 minutes	05 seconds
FMVSS 301 Position Hold Time +	5 minutes	00 seconds
TOTAL	7 minutes	05 seconds
Next whole minute interval	8 minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0.37 ounces	0.0 ounce	0.0 ounce	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

Spillage location not clearly visible.

Table 14

TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA Contract Lab: Calspan Advanced Technology Center

Lab Project Manager & Telephone No.: Walter E. Levan (716) 632-7500

Date of Test: October 22, 1991 Vehicle NHTSA No.: CN0305

Vehicle Manufacturer: Chrysler Corporation

Model Year: 1992 VIN: 2P4GH25K6NR532794

Model: Plymouth Voyager Body Style: MPV Build Date: 9/91

Dummy Stabilized Temperature at Time of Test: 71 °F (Spec. = 66-78°F)

Impact Velocity: 29.6 mph Time of Test: 14:20

Type of Automatic Restraint System: Driver side airbag

Failure Details:

Vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219 (Partial), and 301.

Appendix A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

Figure A-2 POST-TEST FRONT

Figure A-3 PRE-TEST LEFT SIDE VIEW

7941-4

Figure A-4 POST-TEST LEFT SIDE VIEW

7041-4

Figure A-5 PRE-TEST RIGHT SIDE VIEW

7041-4

Figure A-6 POST-TEST RIGHT SIDE VIEW

Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

7941-4

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

7941-4

A-13

7041-4

Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

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

7911-4

Figure A-11 POST-TEST TOP VIEW

7941-4

Figure A-12 PRE-TEST WINDSHIELD VIEW

7041-4

Figure A-13 POST-TEST WINDSHIELD VIEW

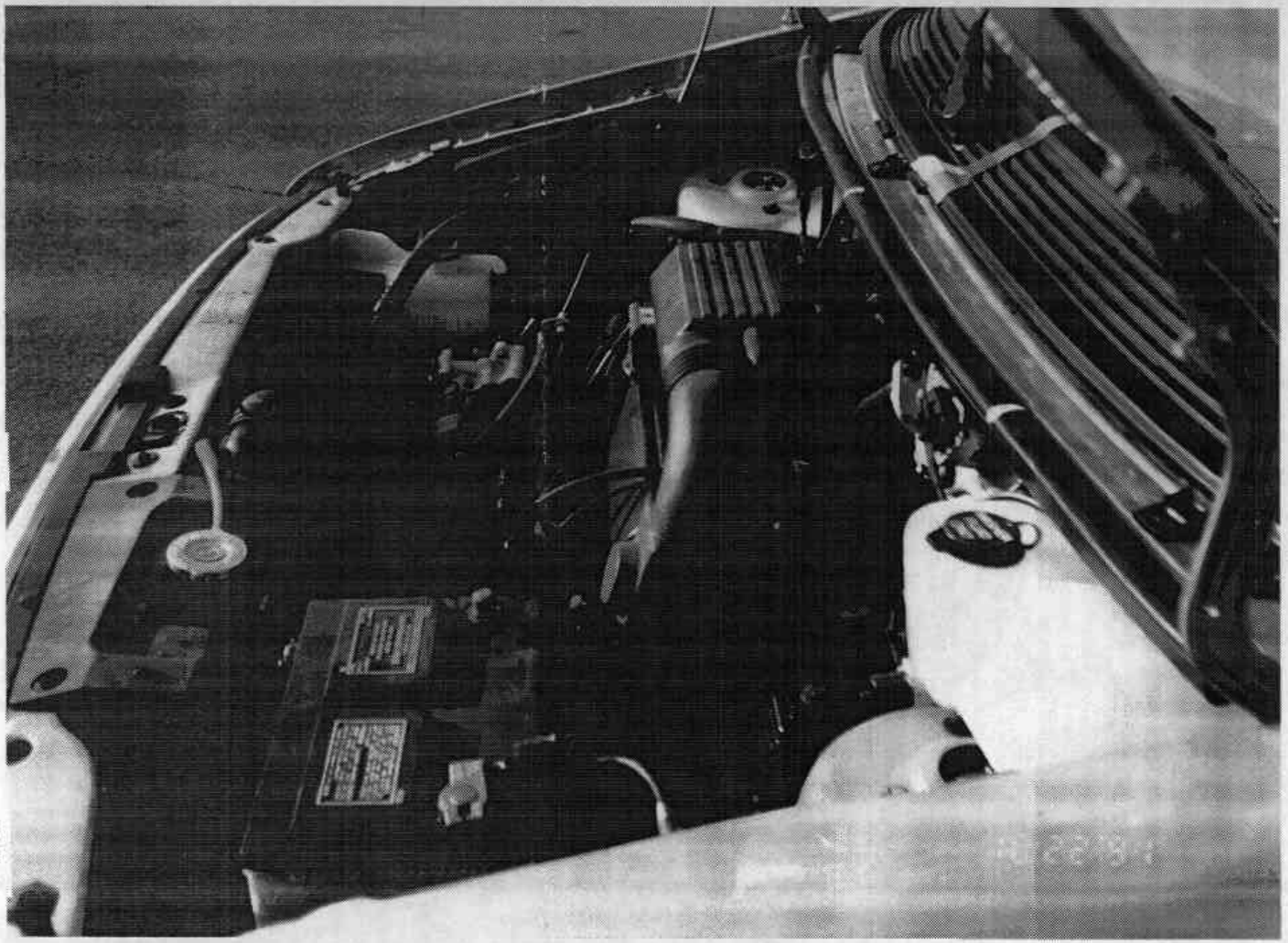


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

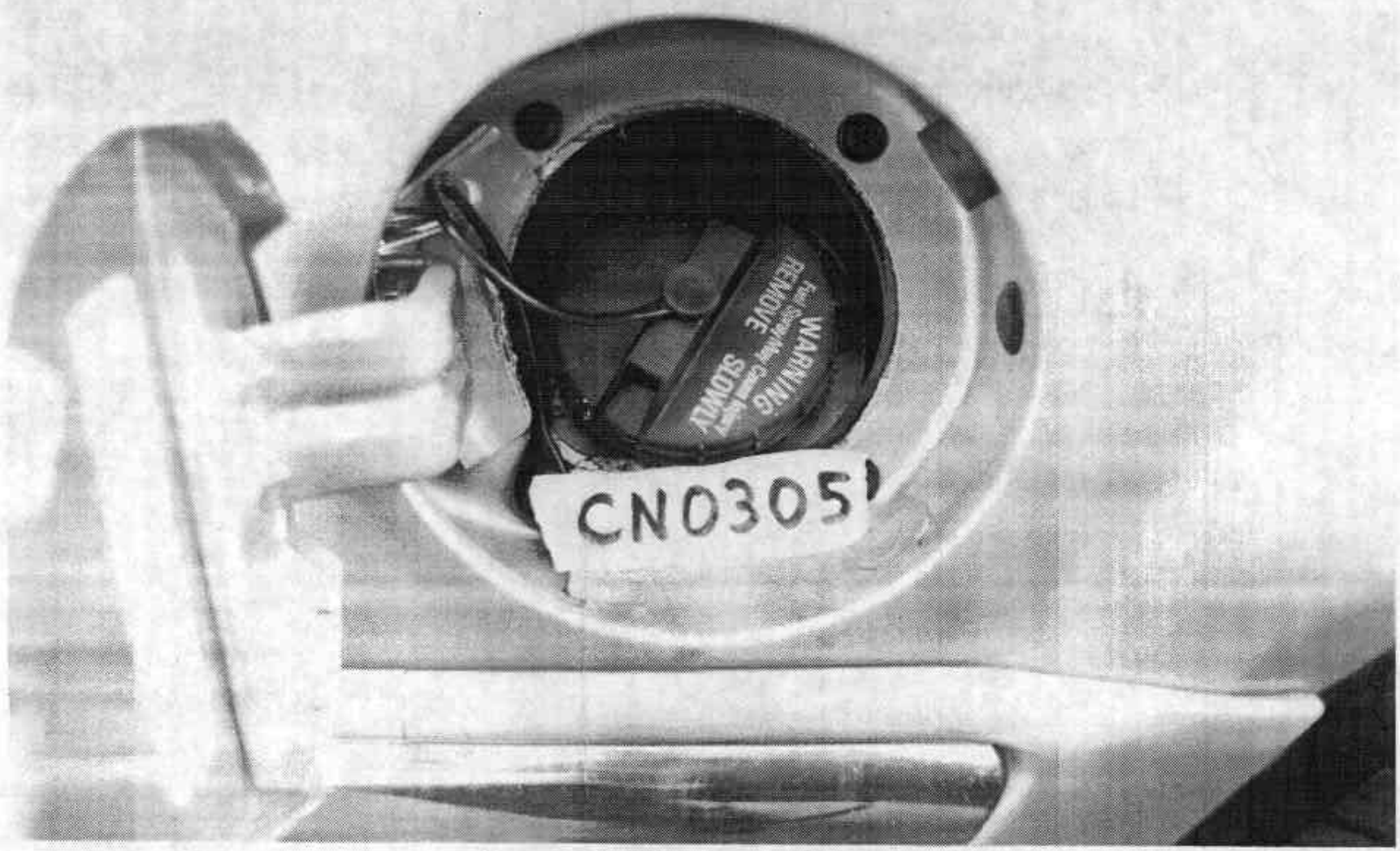
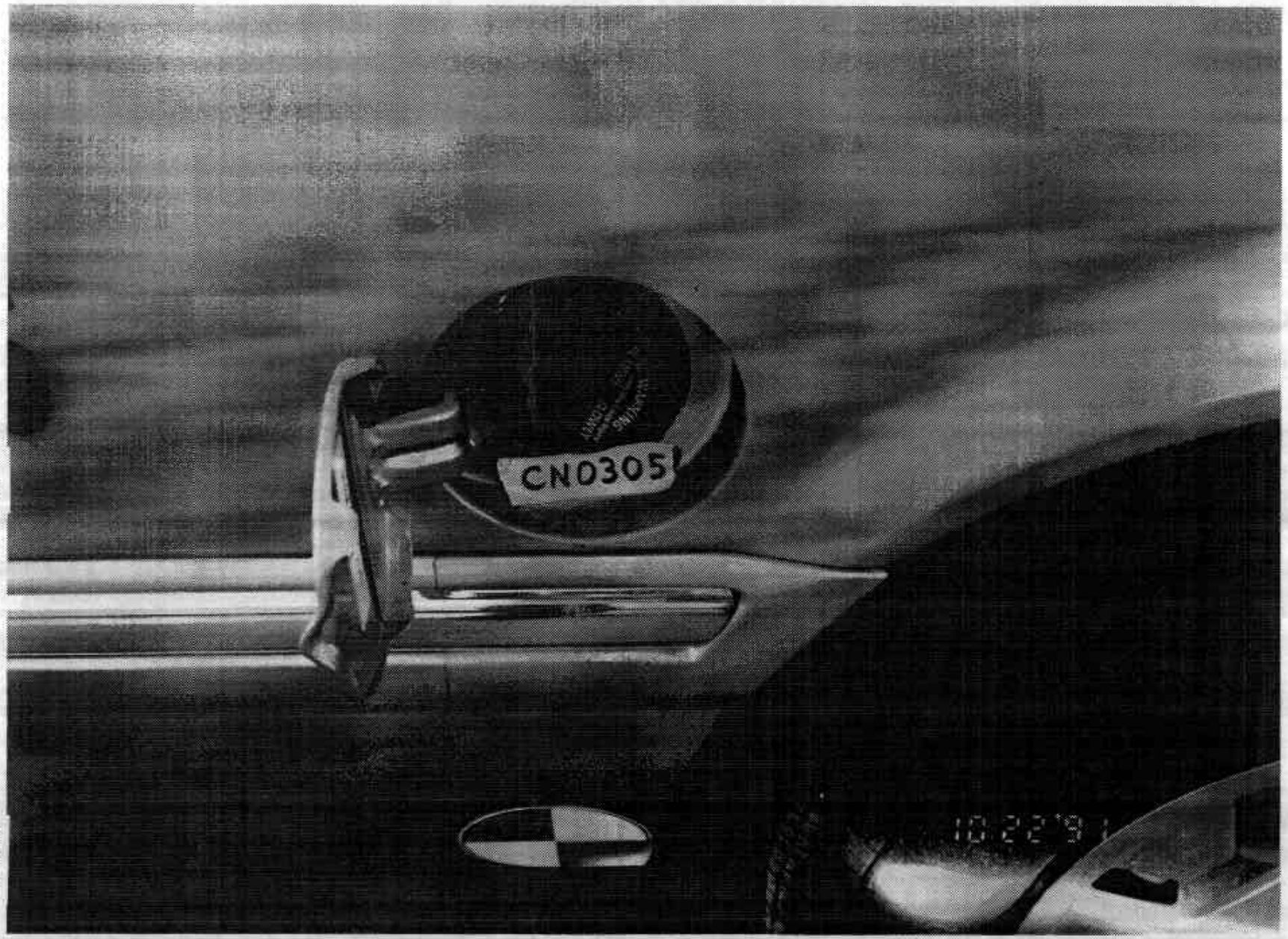


Figure A-16 PRE-TEST FUEL FILLER CAP PHOTO



A-18

7911-4

Figure A-17 POST-TEST FUEL FILLER CAP PHOTO

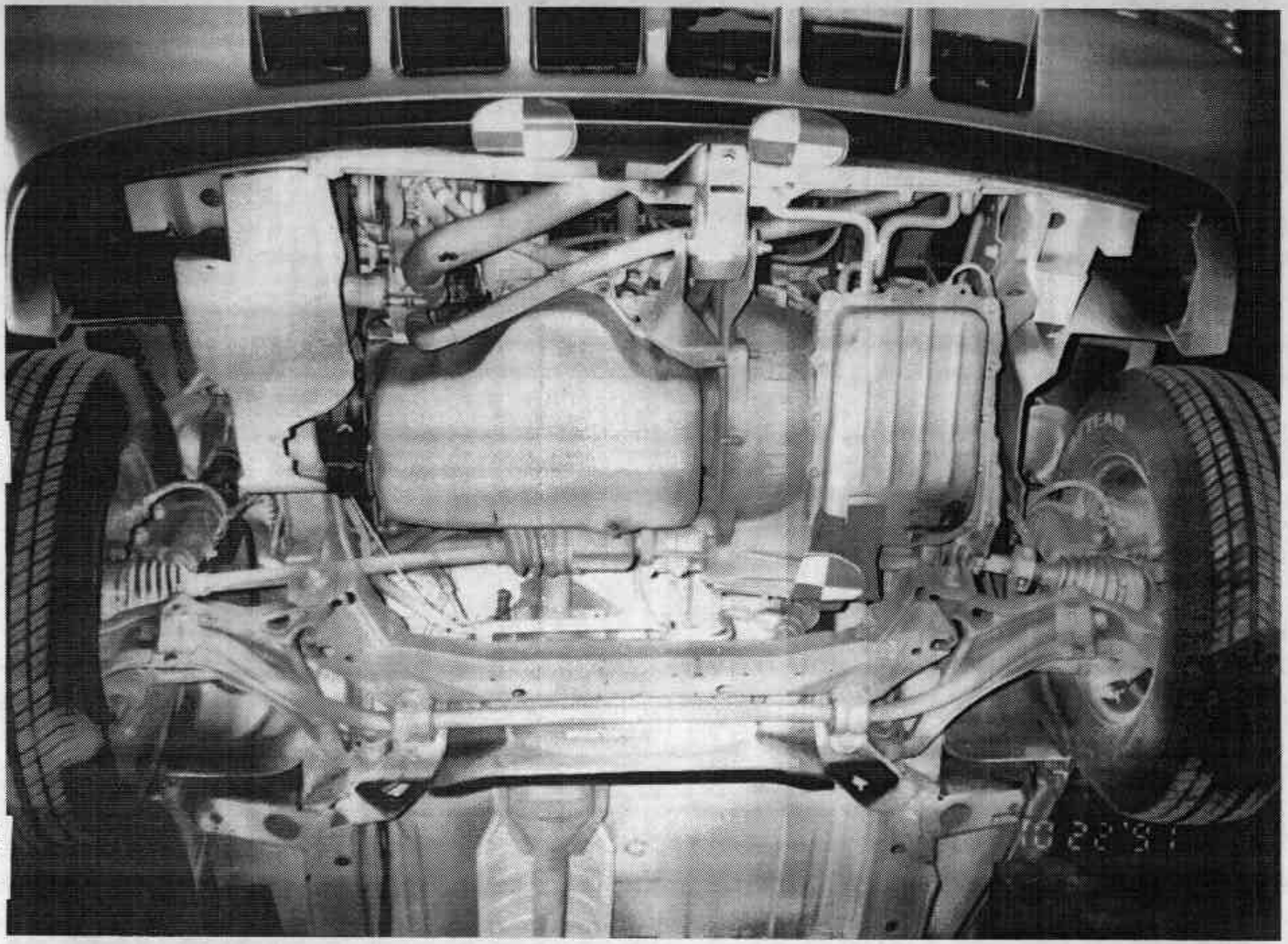


Figure A-18 PRE-TEST FRONT UNDERBODY VIEW

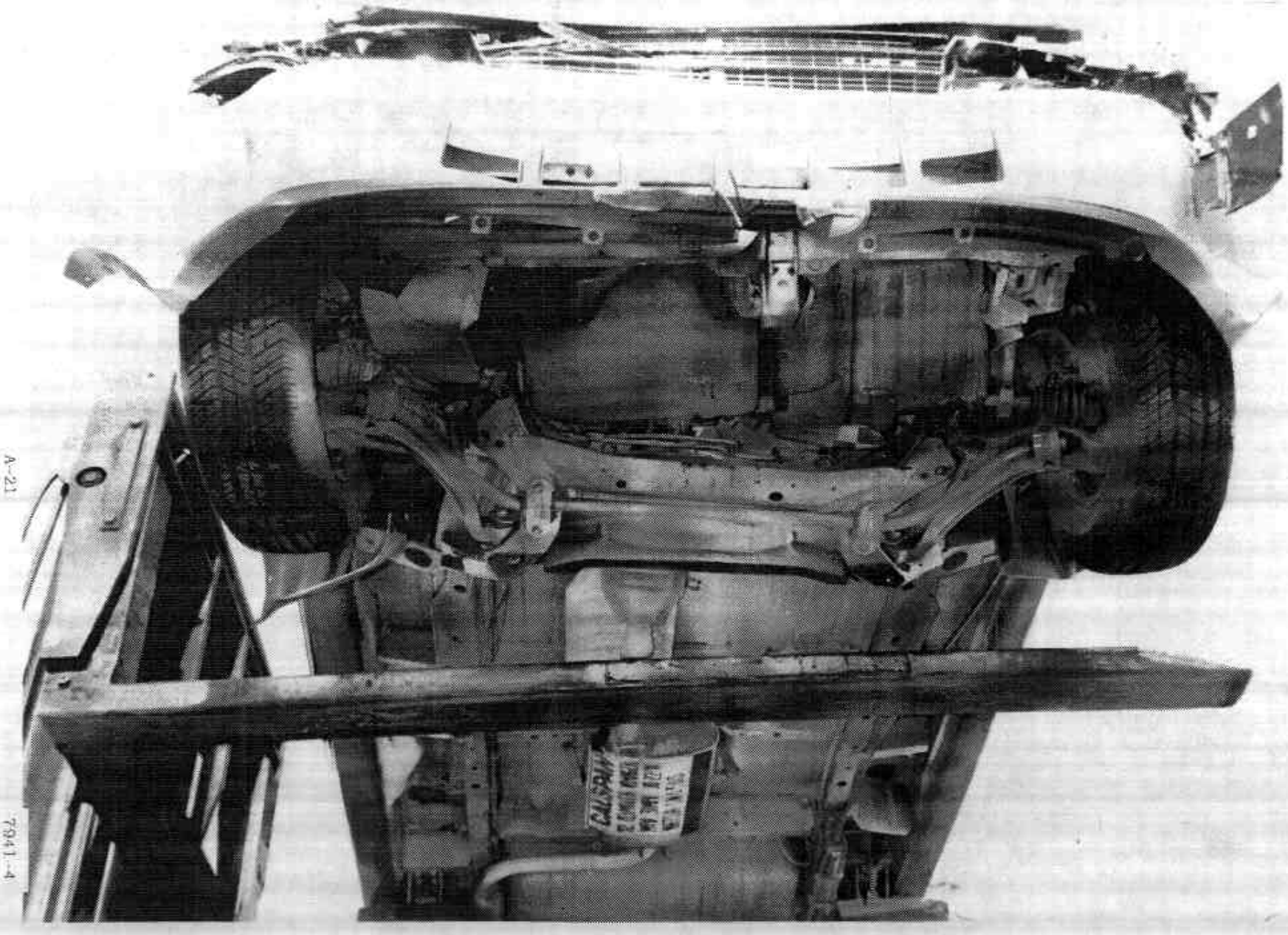


Figure A-19 POST-TEST FRONT UNDERBODY VIEW

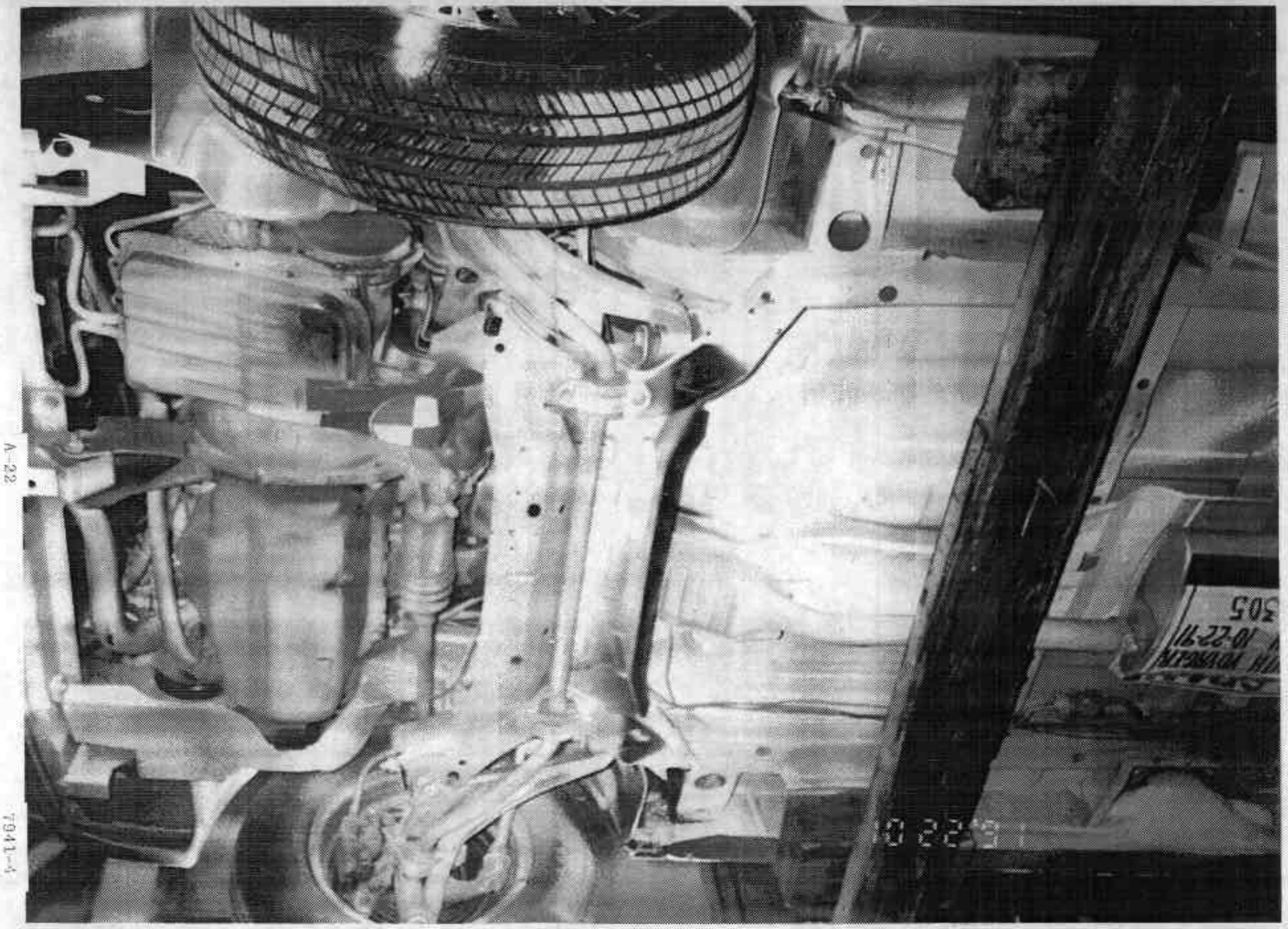


Figure A-20 PRE-TEST FRONT SIDE UNDERBODY VIEW

Figure A-21 POST-TEST FRONT SIDE UNDERBODY VIEW

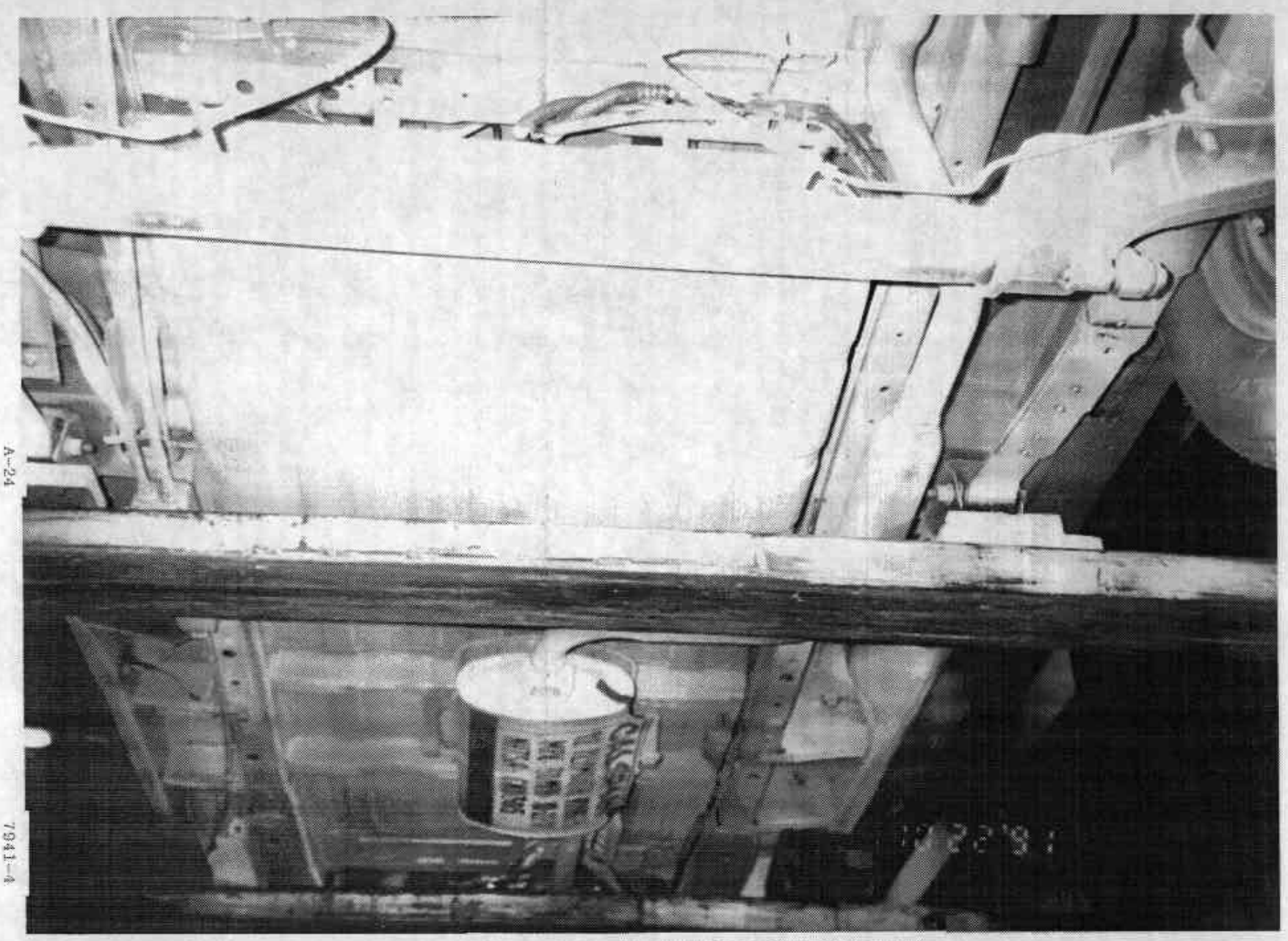


Figure A-22 PRE-TEST REAR UNDERBODY VIEW

7941-4

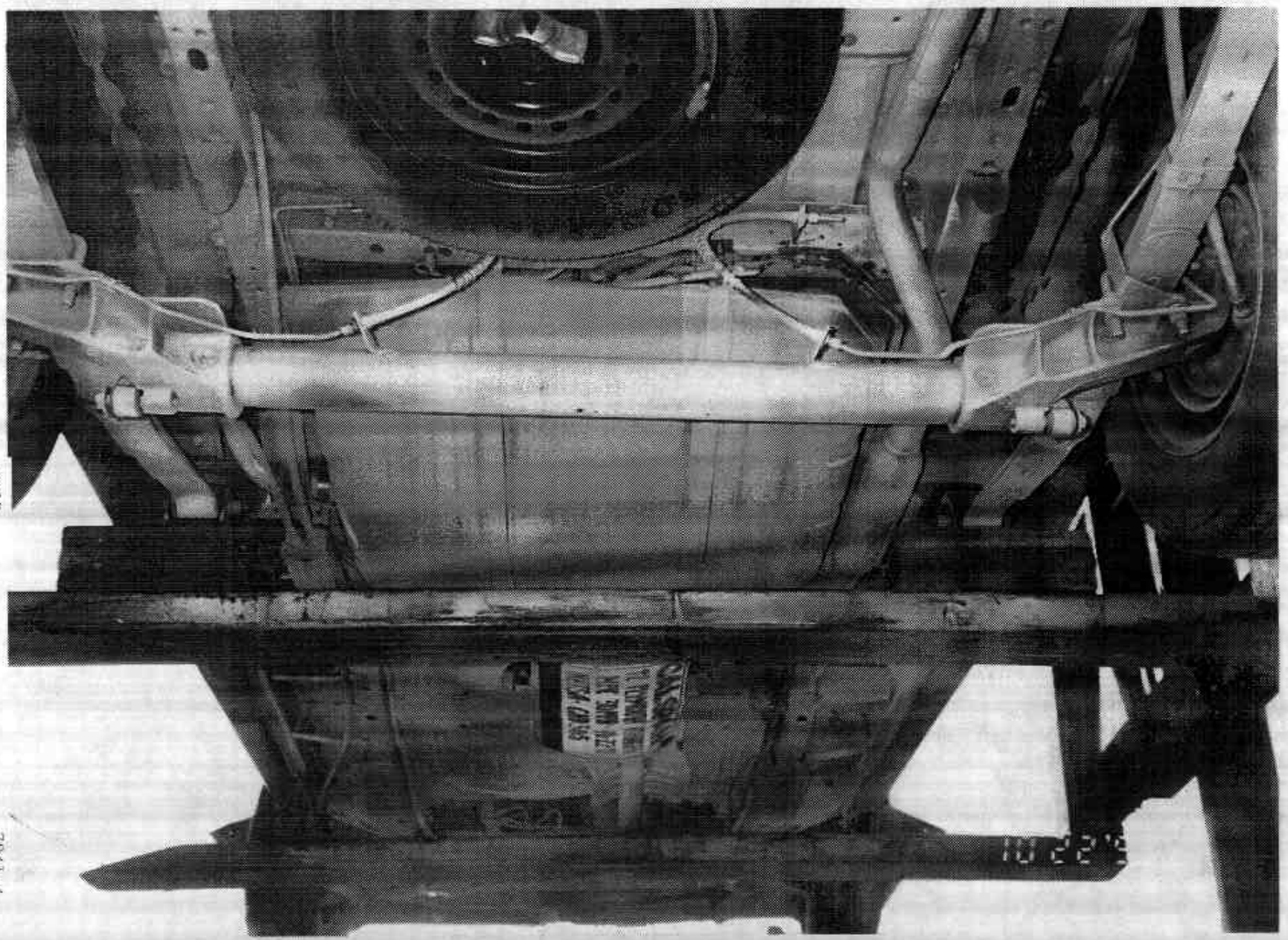


Figure A-23 POST-TEST REAR UNDERBODY VIEW

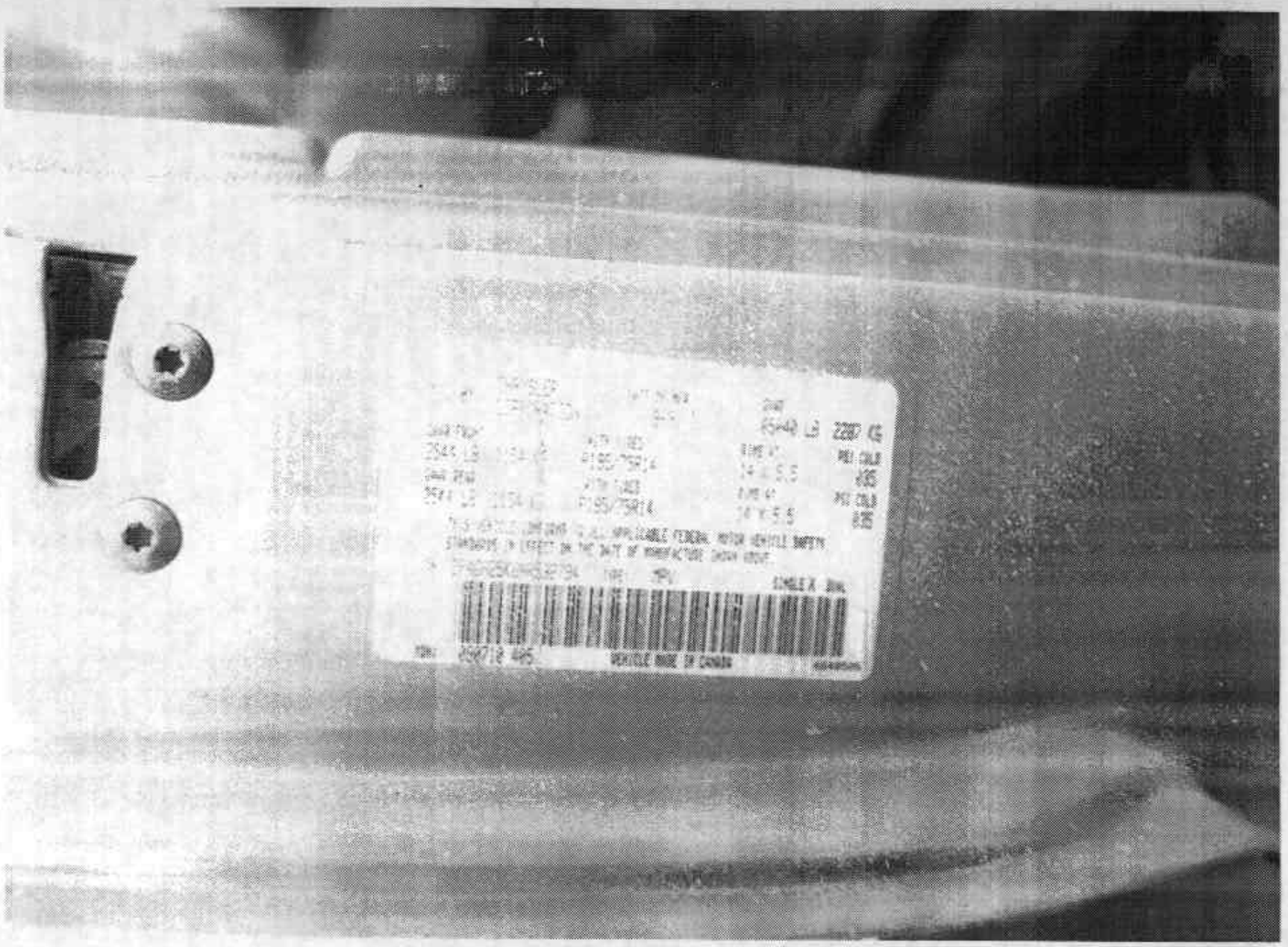


Figure A-24 CERTIFICATION/TIRE PLACARD

Figure A-25 PRE-TEST DRIVER DUMMY POSITION

Figure A-26 POST-TEST DRIVER DUMMY POSITION

Figure A-27 PRE-TEST PASSENGER DUMMY POSITION

Figure A-28

POST-TEST PASSENGER DUMMY POSITION

(Photograph is not available)

Figure A-29 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

Figure A-30 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

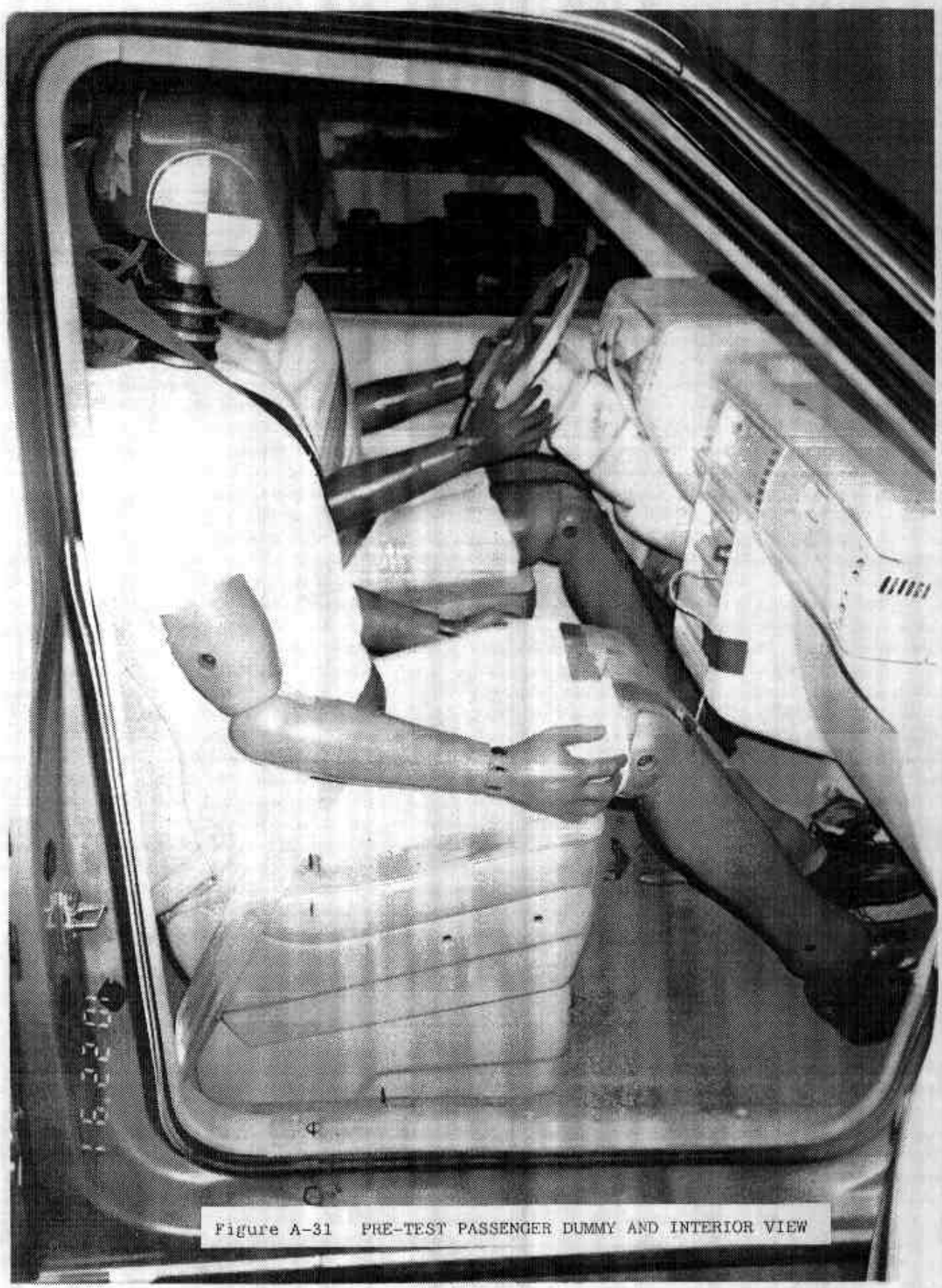


Figure A-31 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW

Figure A-32 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW

Figure A-33 POST-TEST DRIVER AIRBAG VIEW

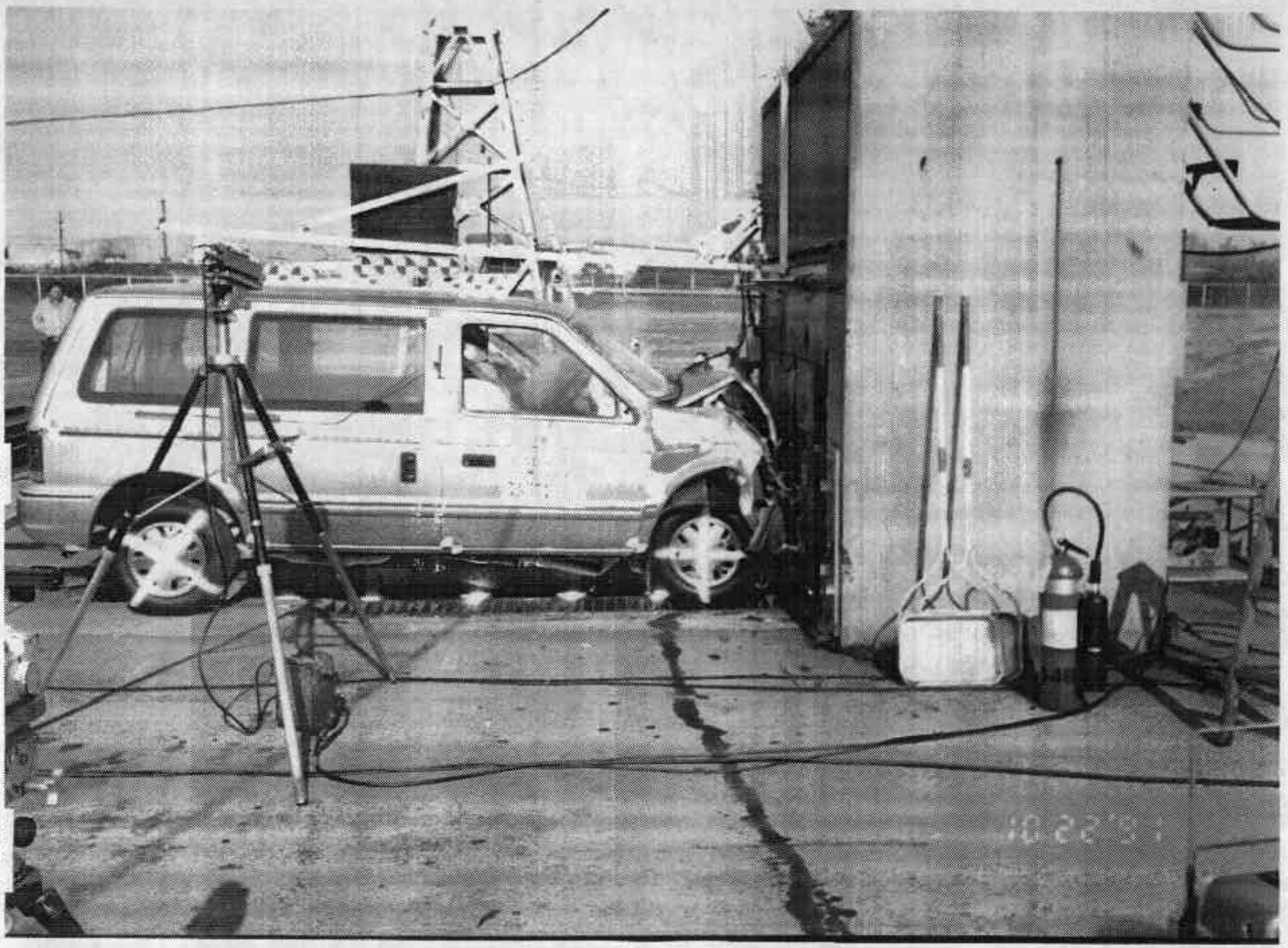


Figure A-34 VEHICLE IMPACT

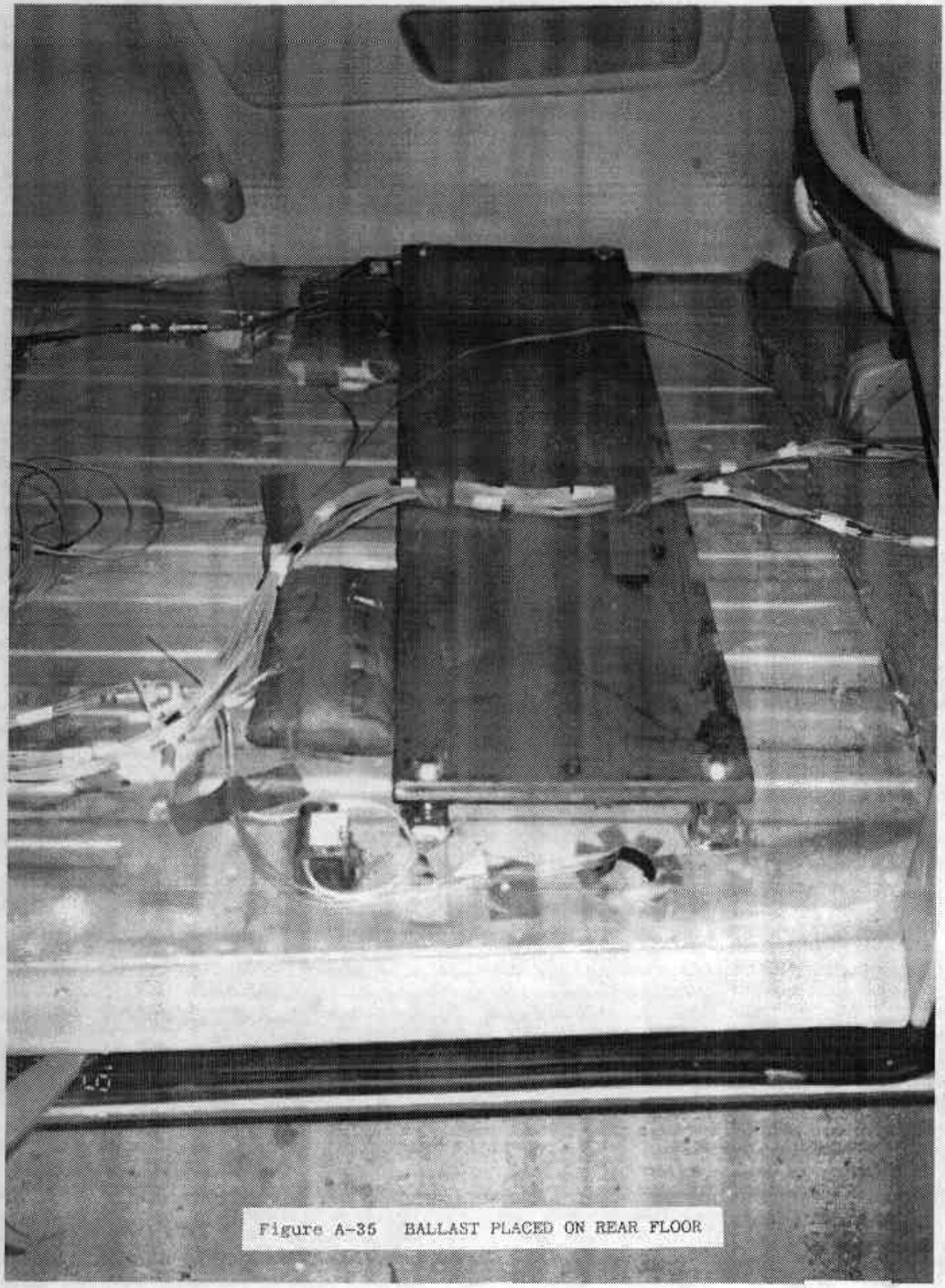
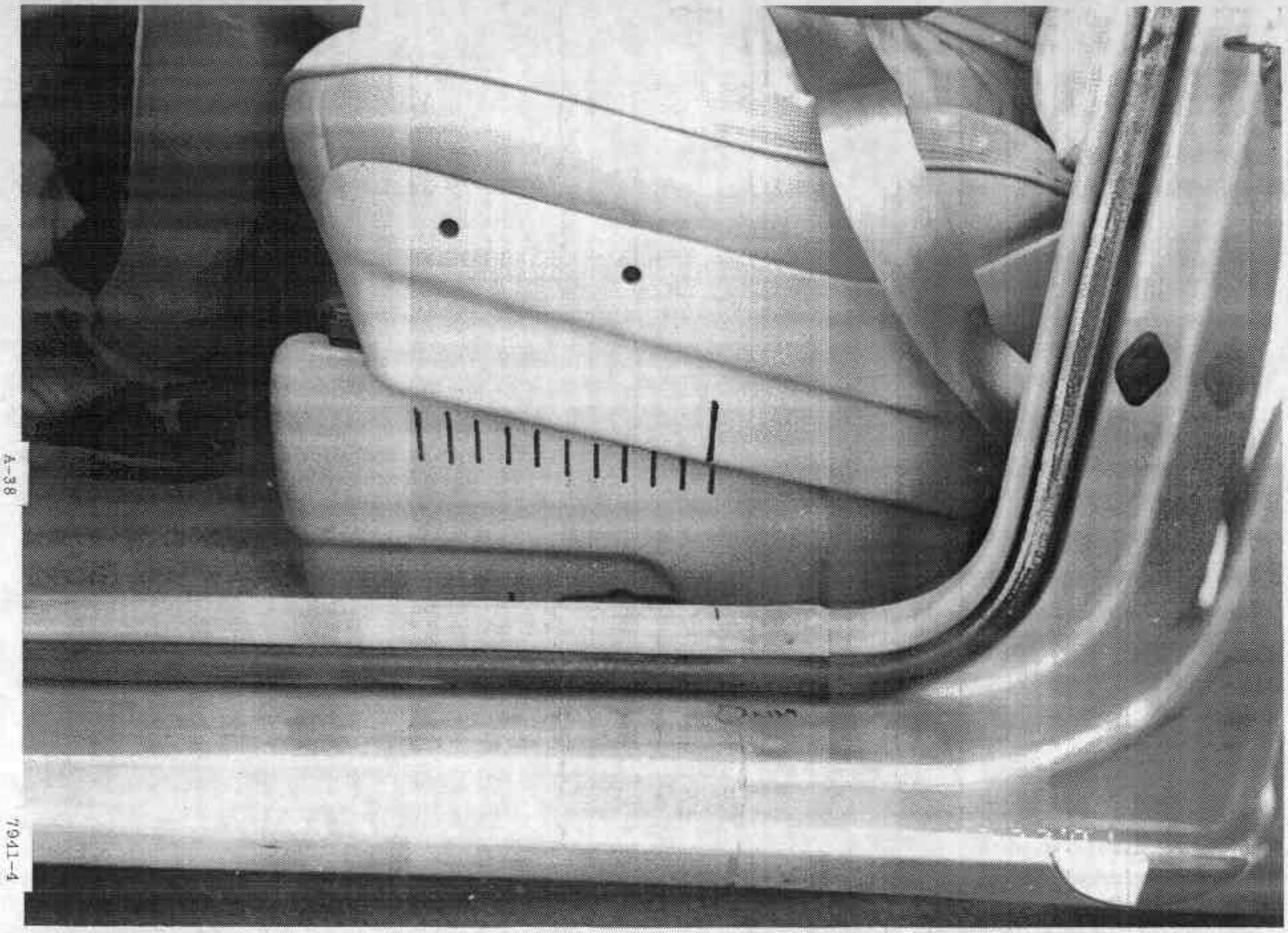


Figure A-35 BALLAST PLACED ON REAR FLOOR



7941-4

Figure A-36 POST-TEST DRIVER SEAT MOVEMENT

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CNO305

VEHICLE DATA

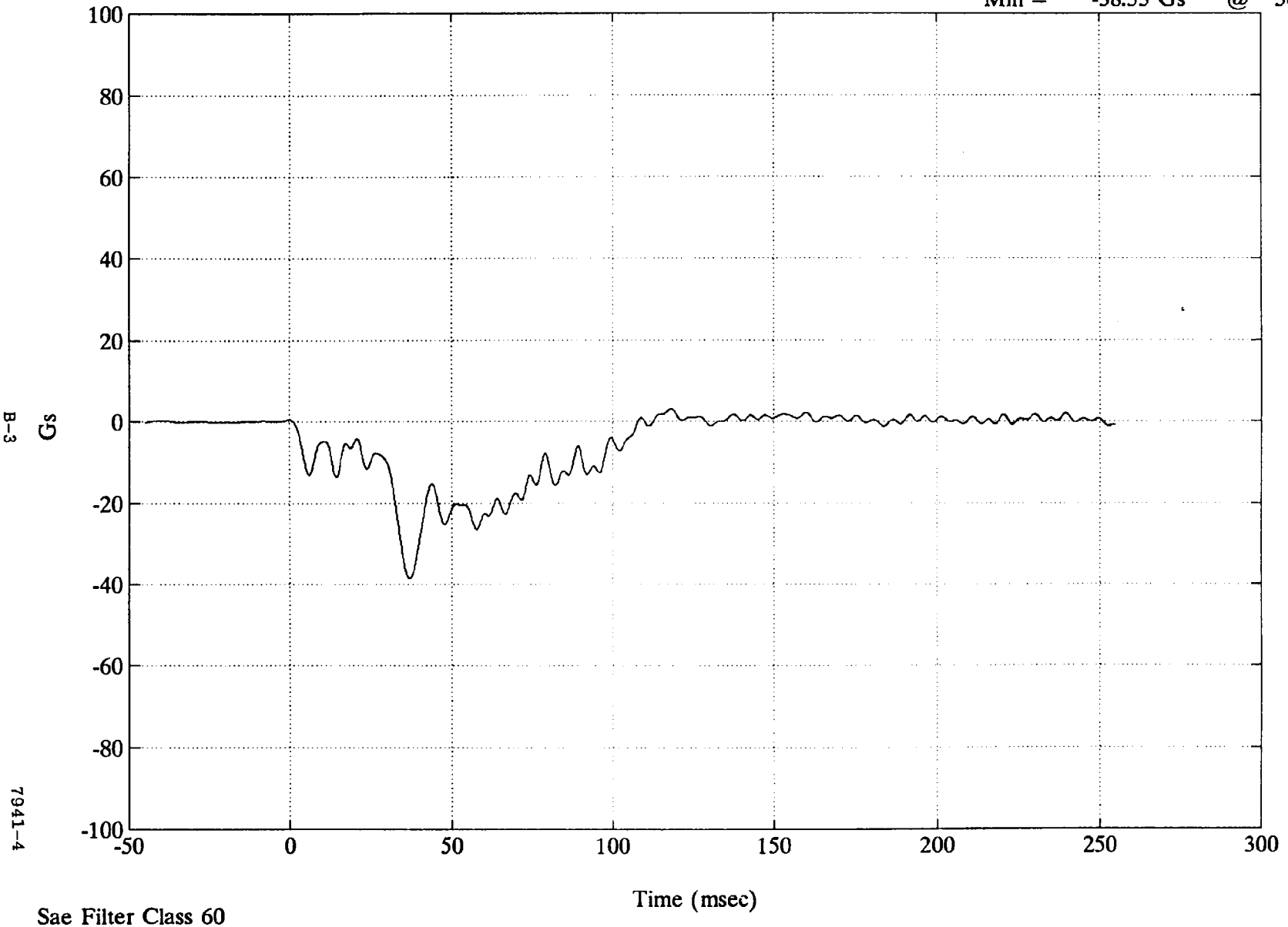
SAE FILTER CHANNEL CLASS

60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

L. Rear X-member X (#1)

Max = 3.06 Gs @ 118.08 msec
Min = -38.53 Gs @ 36.84 msec



Sae Filter Class 60

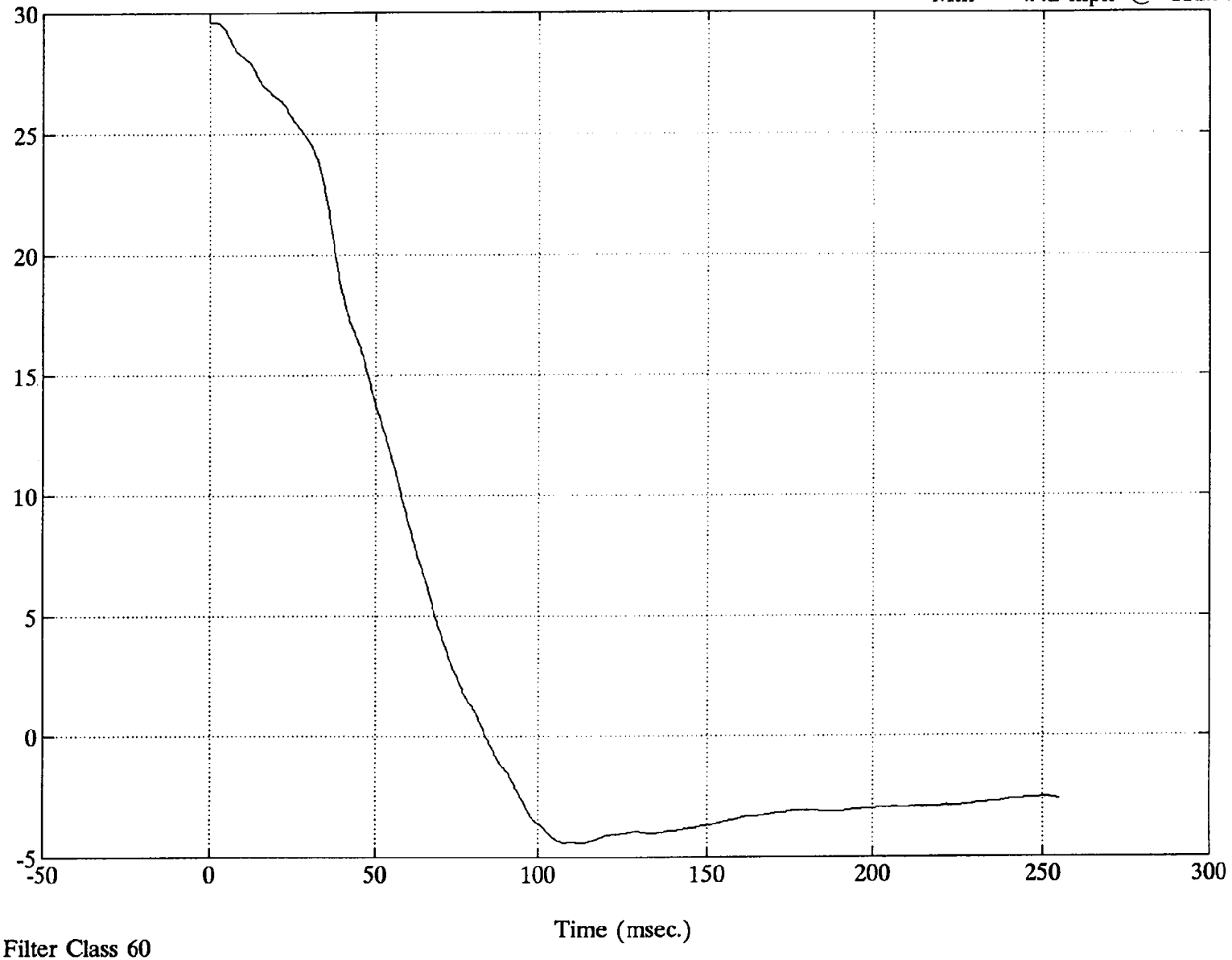
B-3

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

L. Rear X-member X (#1)

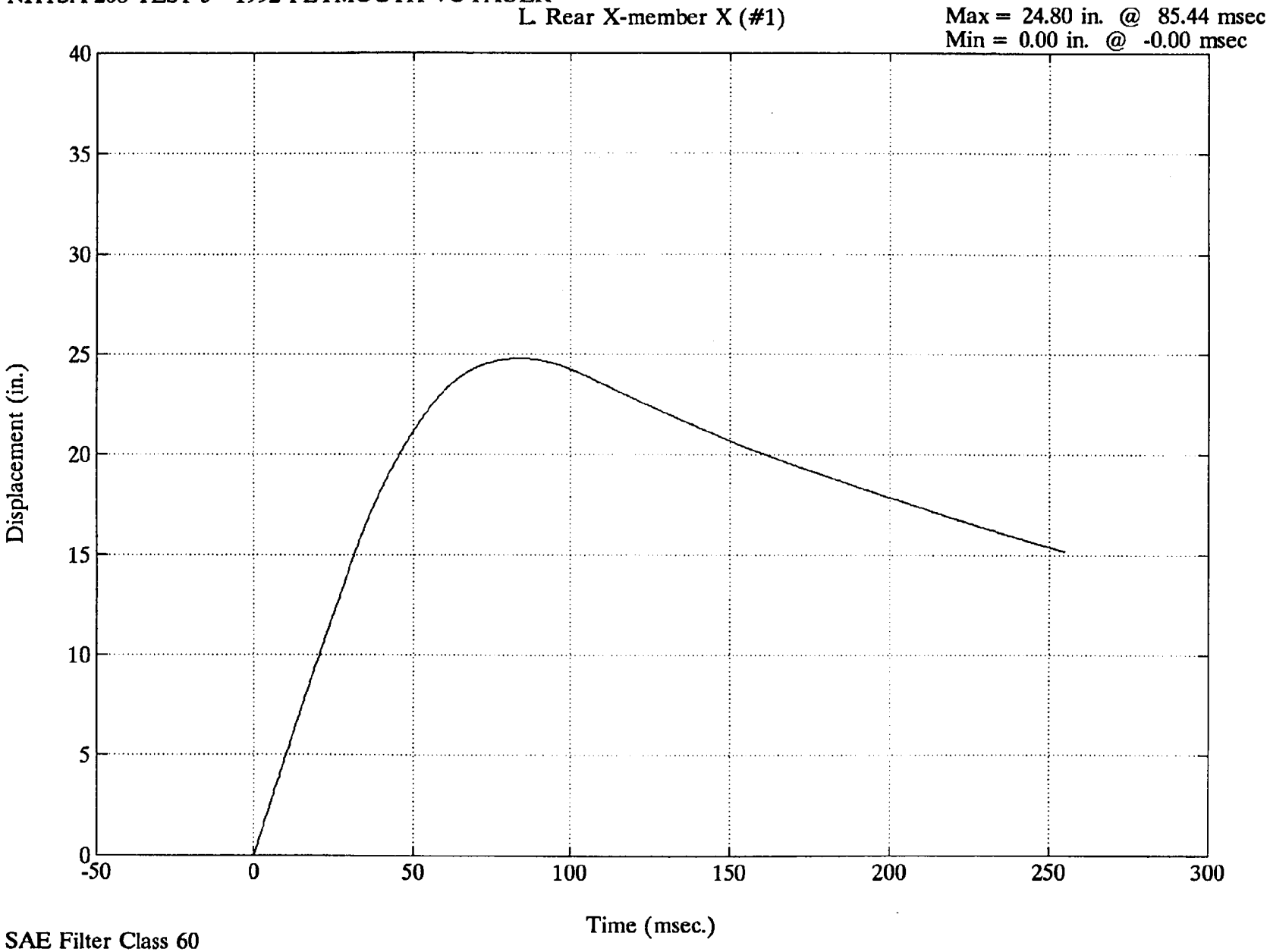
Max = 29.60 mph @ 1.44 msec
Min = -4.42 mph @ 112.56 msec



SAE Filter Class 60

7041-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



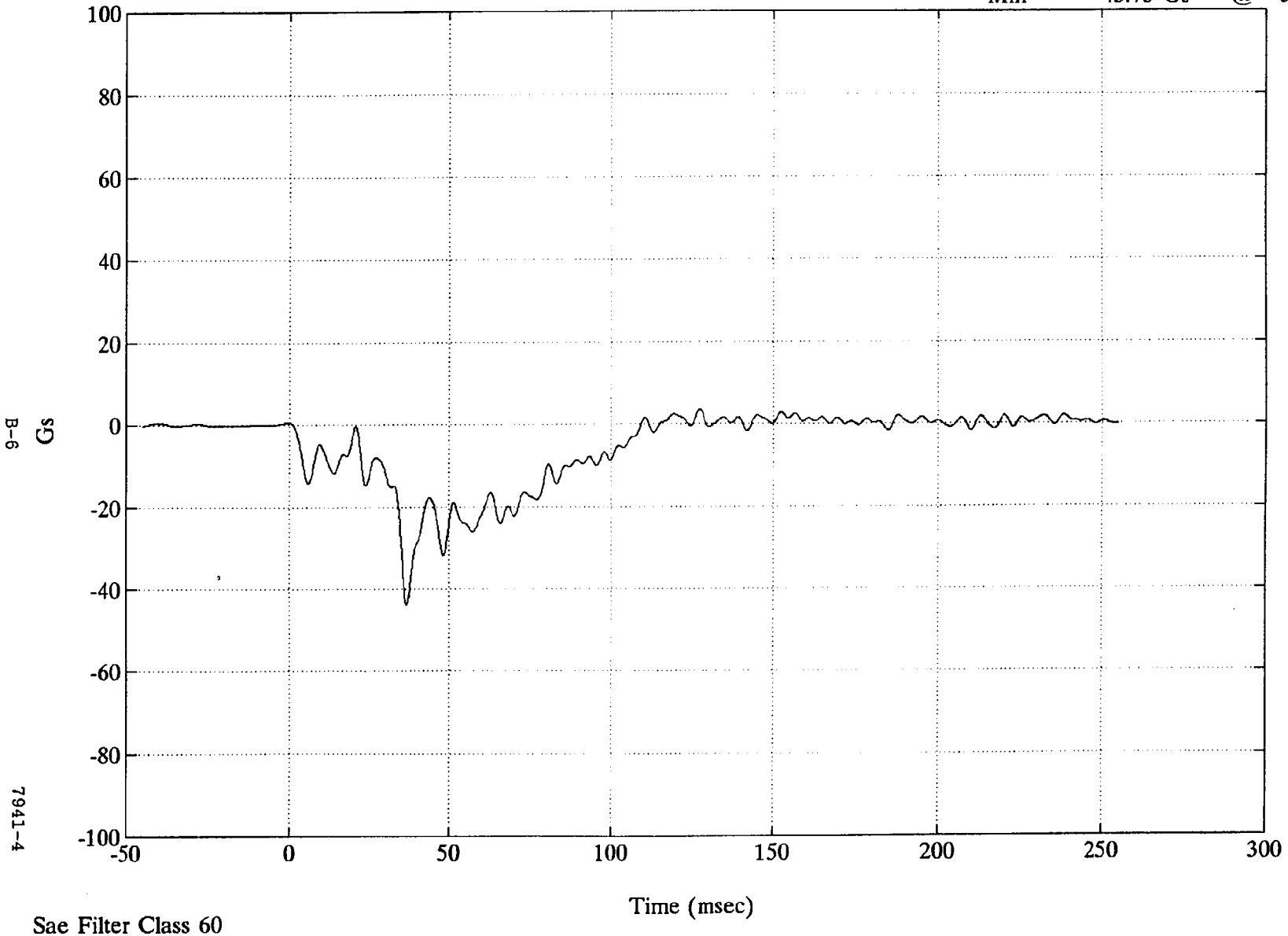
SAE Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

R. Rear X-member X (#2)

Max = 3.61 Gs @ 127.44 msec
Min = -43.75 Gs @ 36.60 msec



B-6

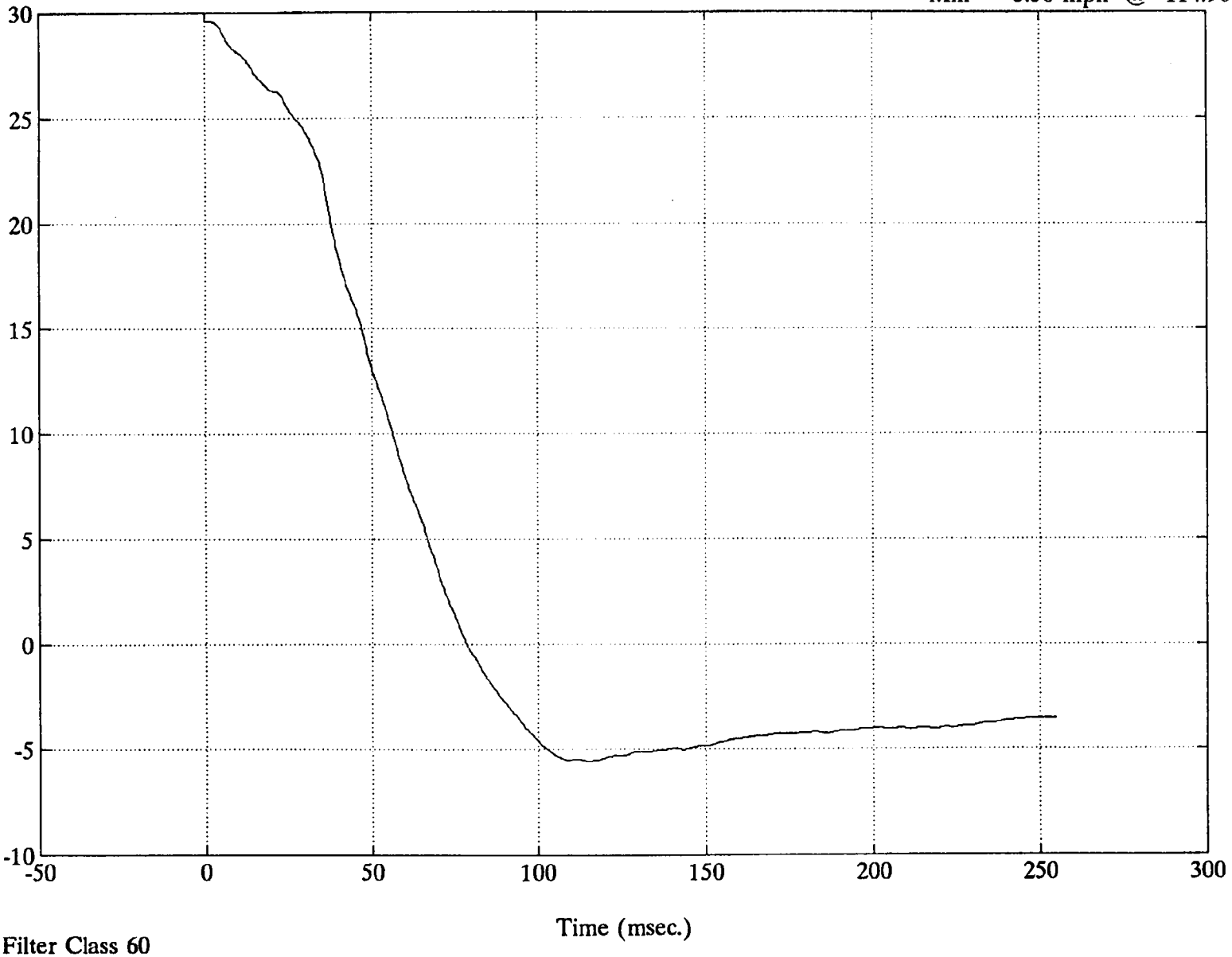
7941-4

Sae Filter Class 60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

R. Rear X-member X (#2)

Max = 29.60 mph @ 1.20 msec
Min = -5.56 mph @ 114.96 msec



B-7

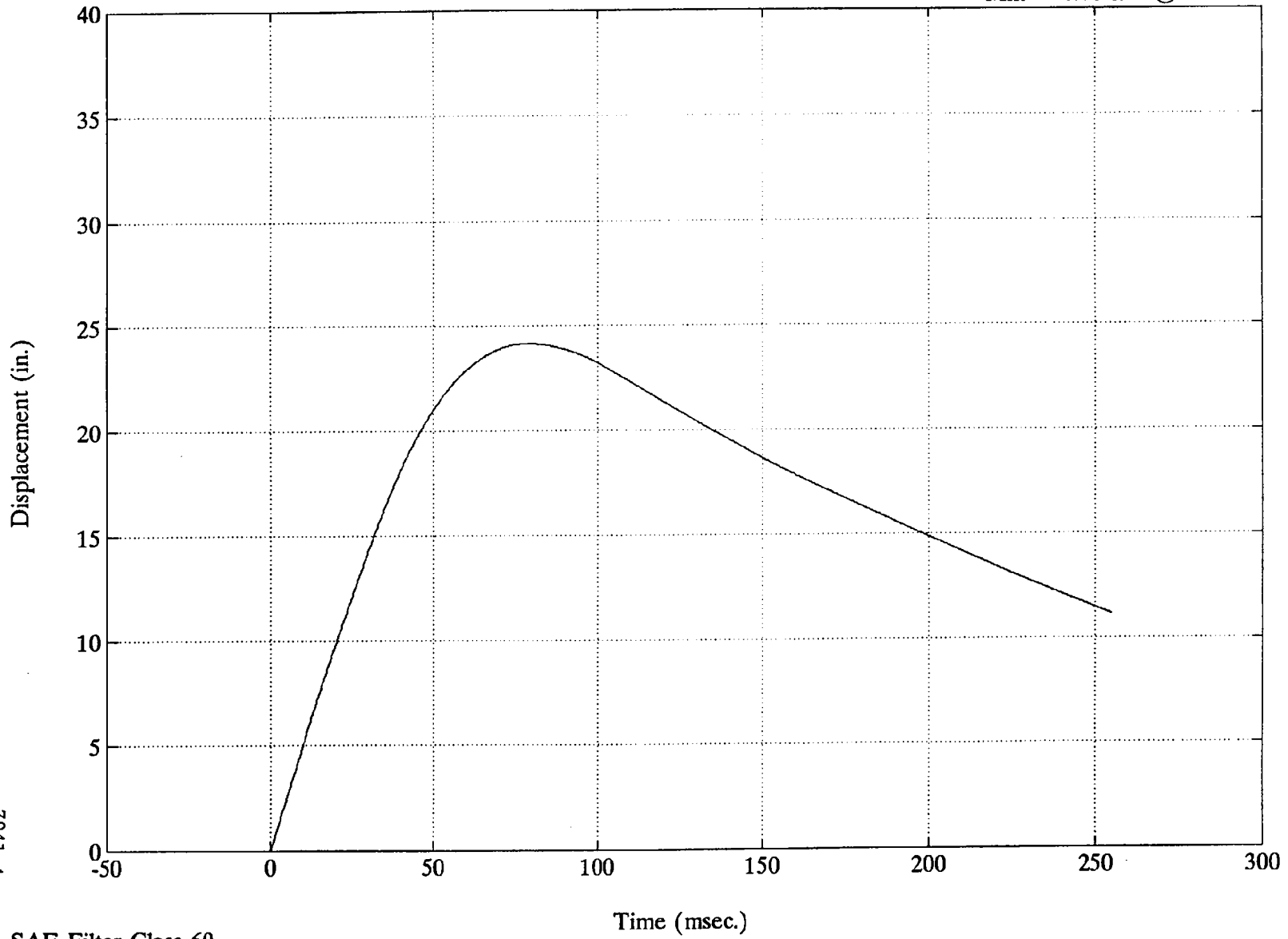
7941-4

SAE Filter Class 60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

R. Rear X-member X (#2)

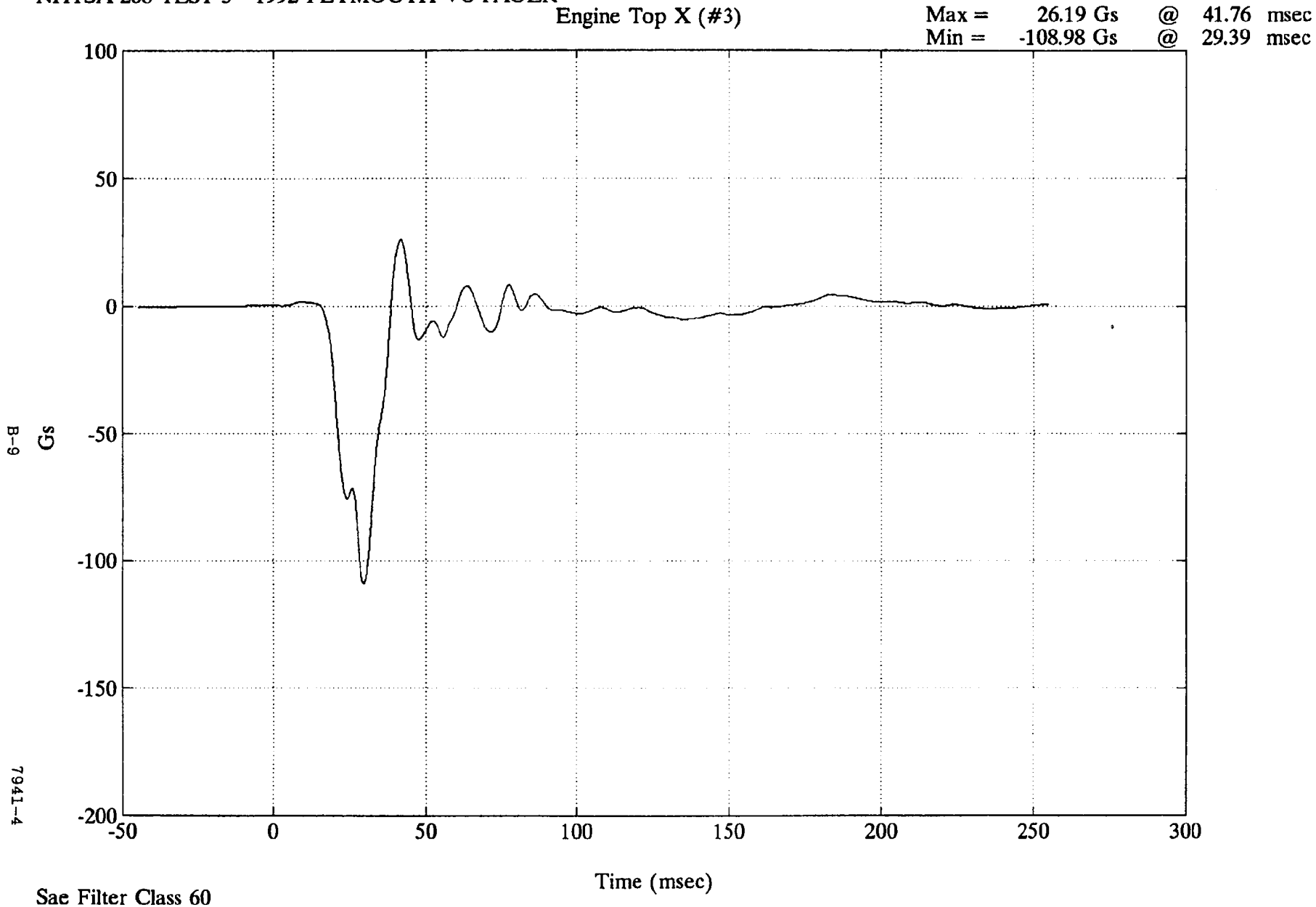
Max = 24.16 in. @ 80.40 msec
Min = 0.00 in. @ -0.00 msec



SAE Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

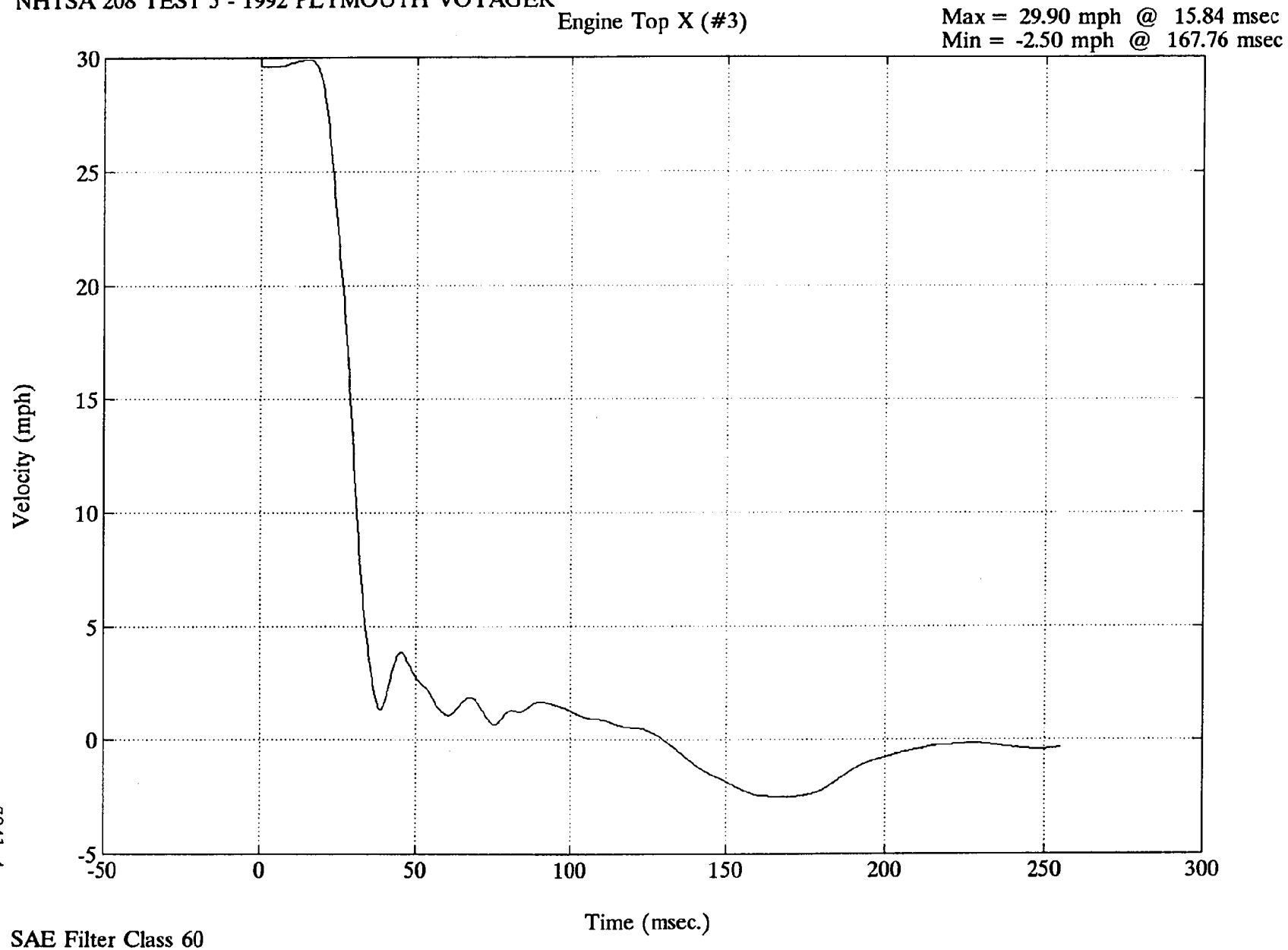


Sae Filter Class 60

B-9

7941-4

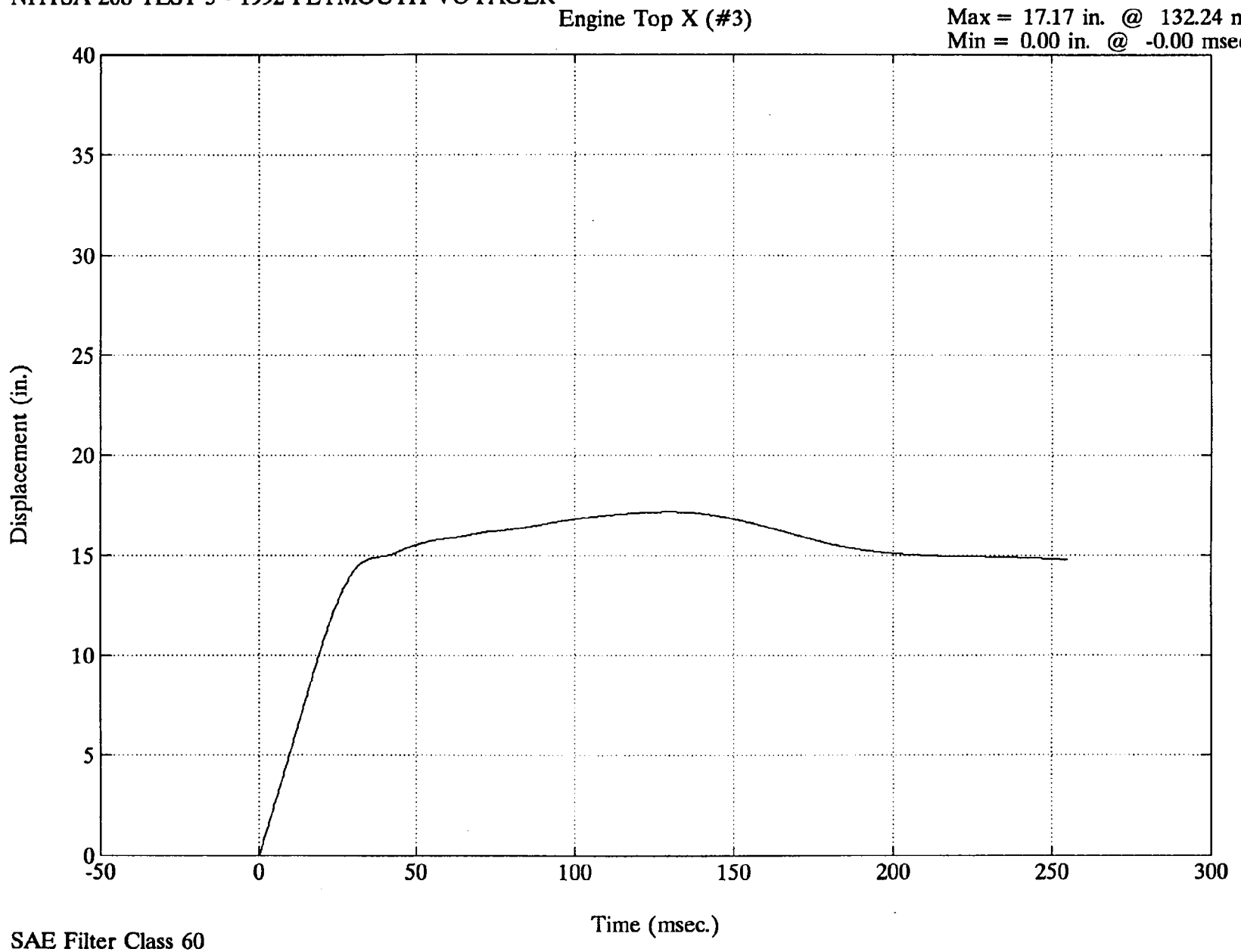
NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



SAE Filter Class 60

7941-4

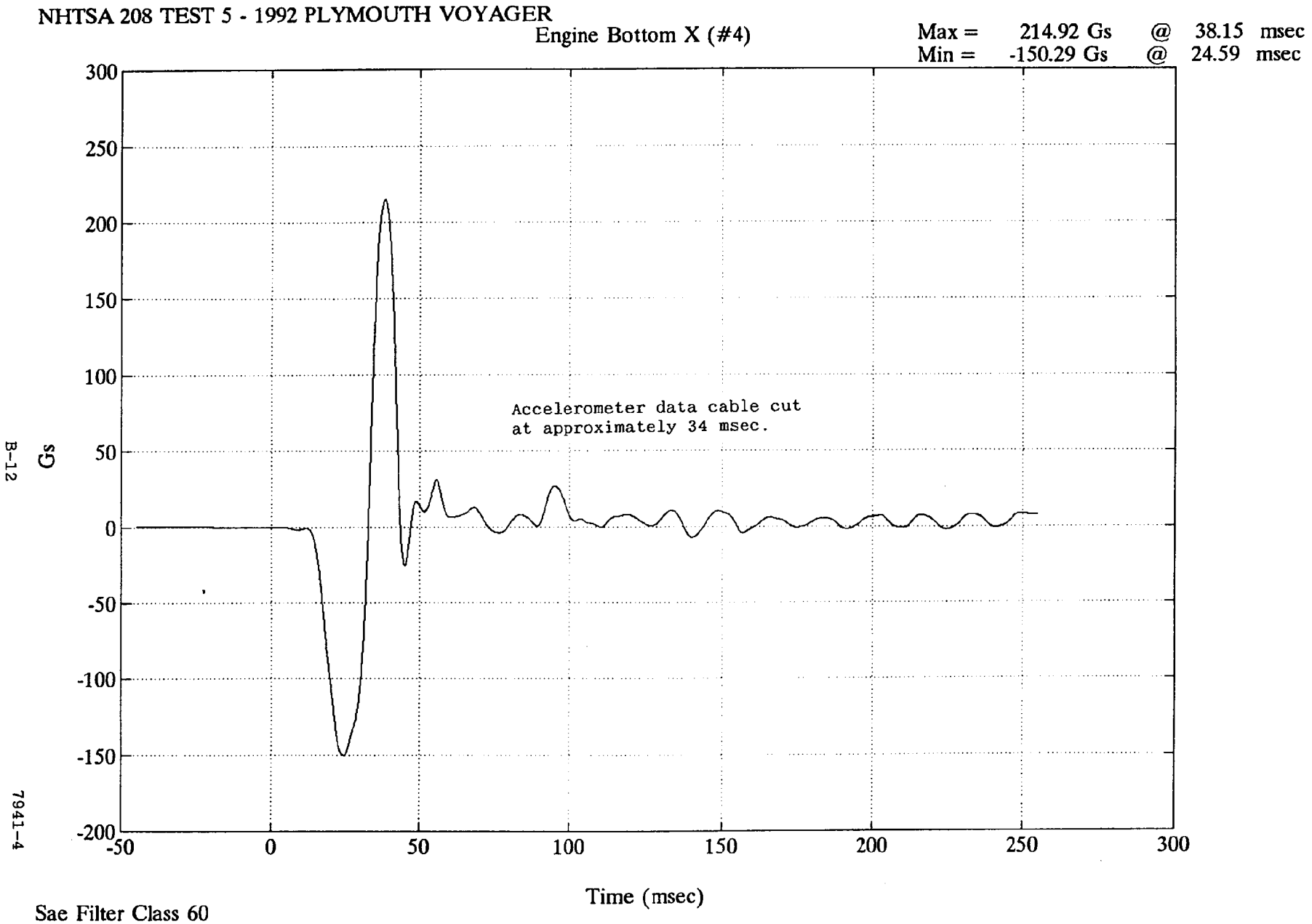
NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



SAE Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

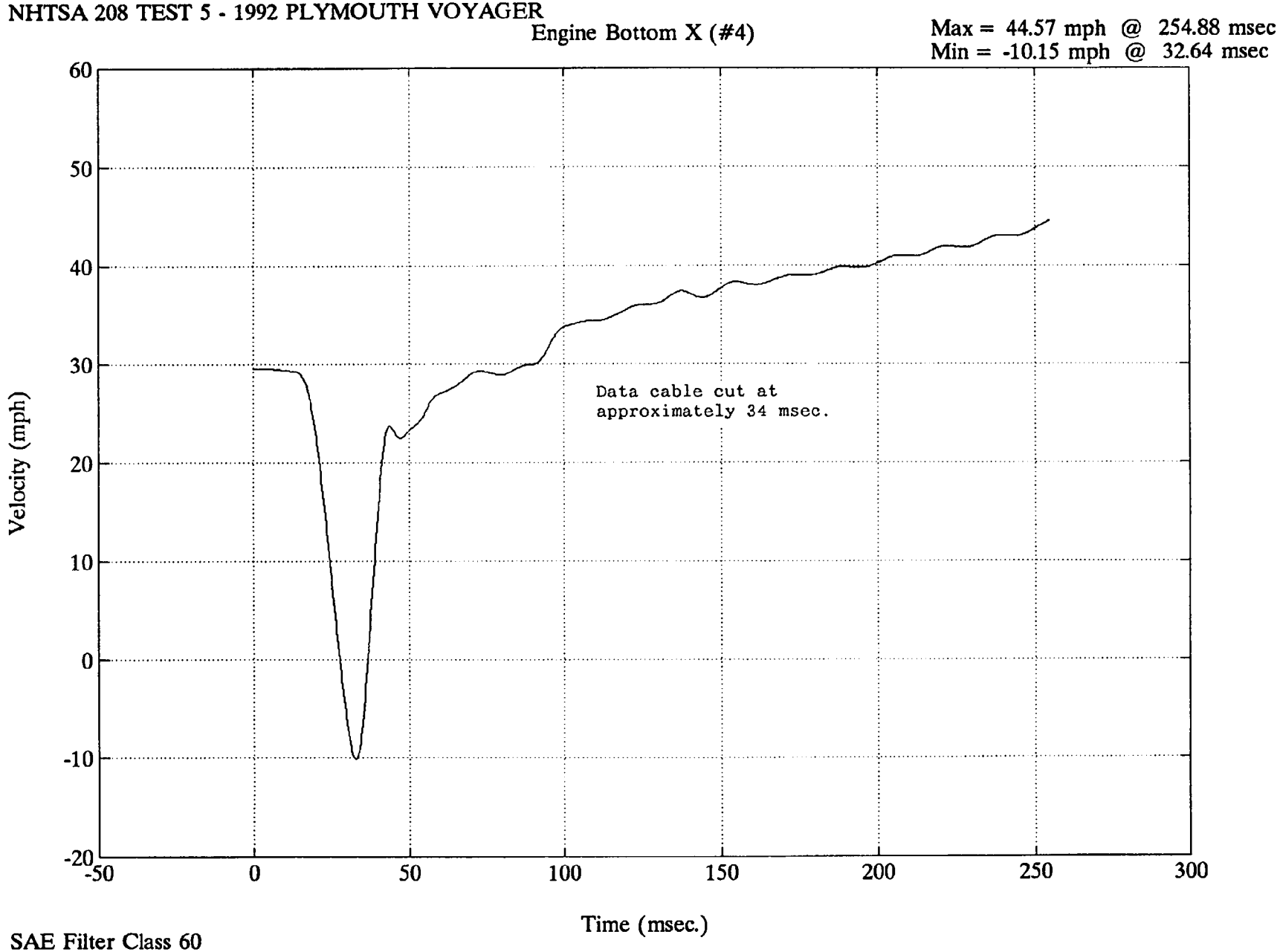


B-12

7941-4

Sae Filter Class 60

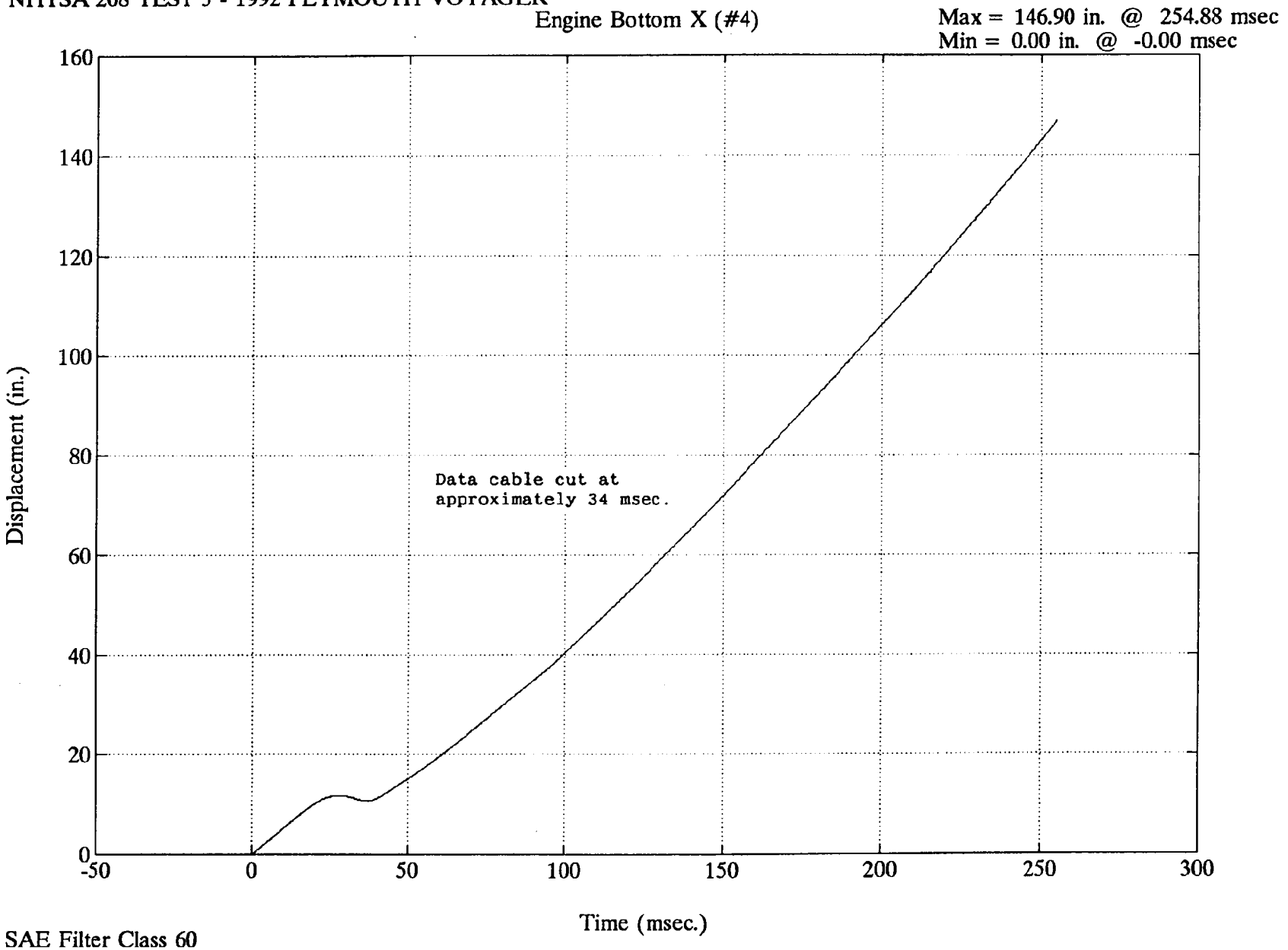
NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



SAE Filter Class 60

7941-4

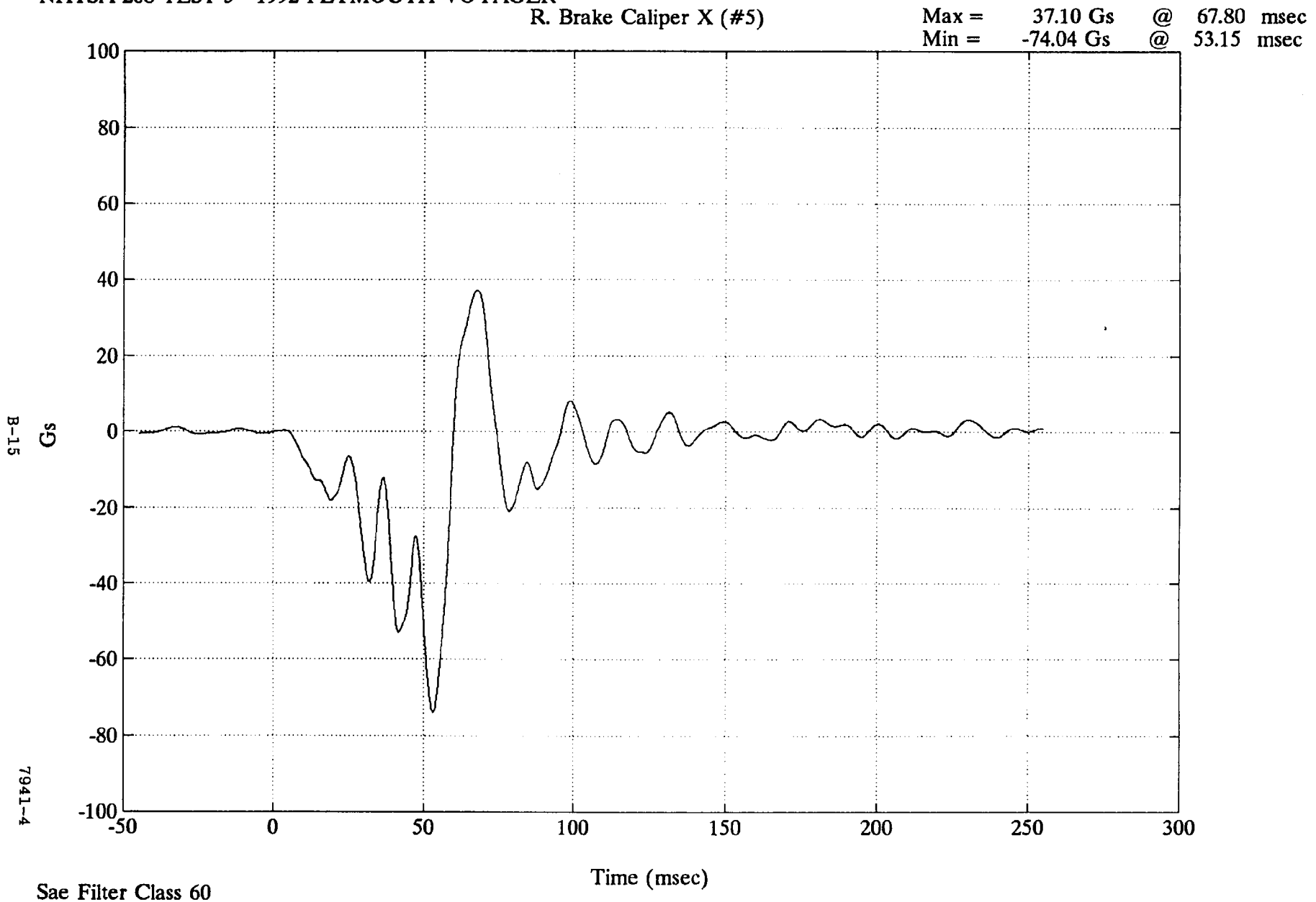
NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



SAE Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

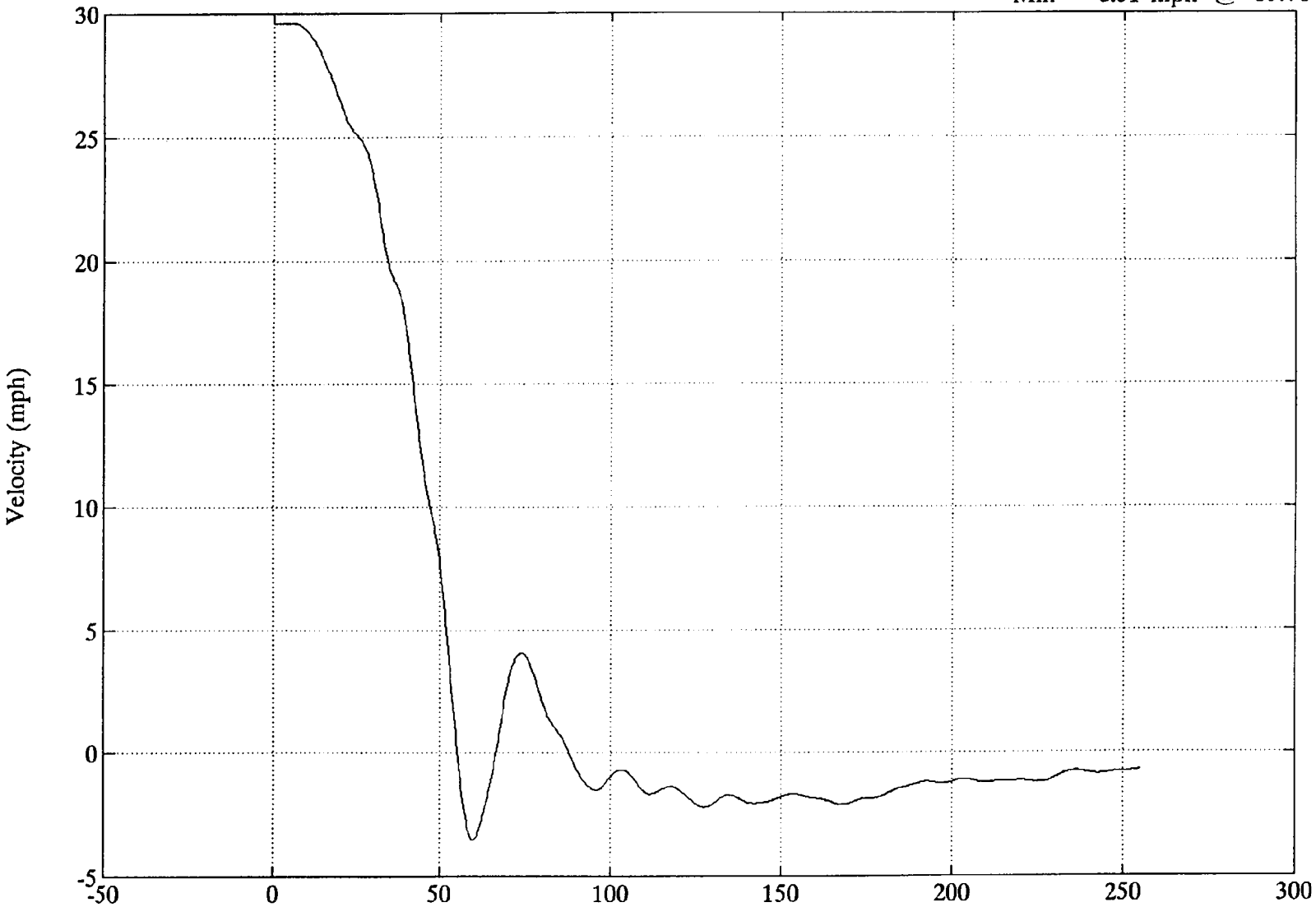


Sae Filter Class 60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

R. Brake Caliper X (#5)

Max = 29.63 mph @ 5.52 msec
Min = -3.51 mph @ 59.76 msec



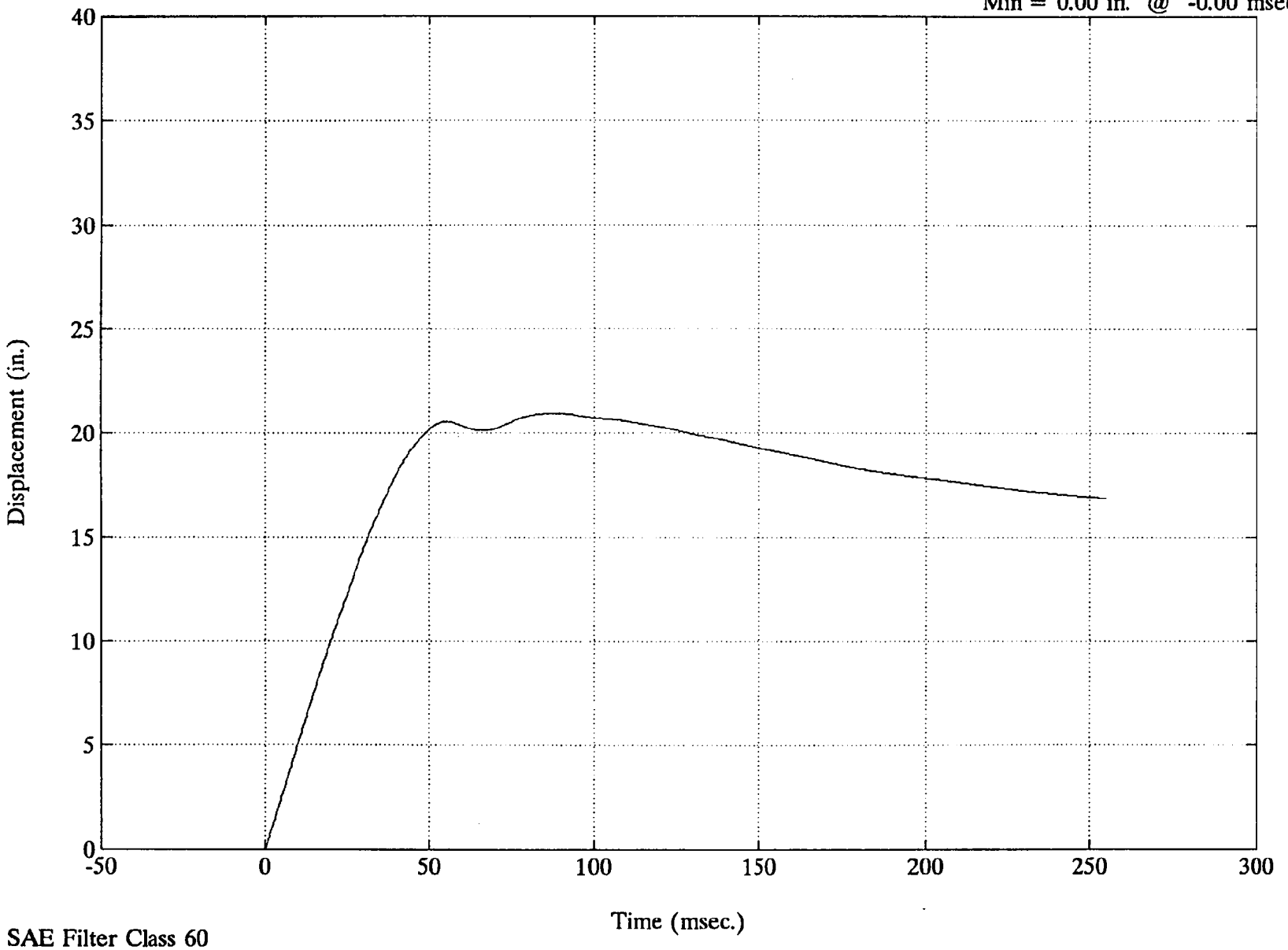
SAE Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

R. Brake Caliper X (#5)

Max = 20.96 in. @ 88.56 msec
Min = 0.00 in. @ -0.00 msec

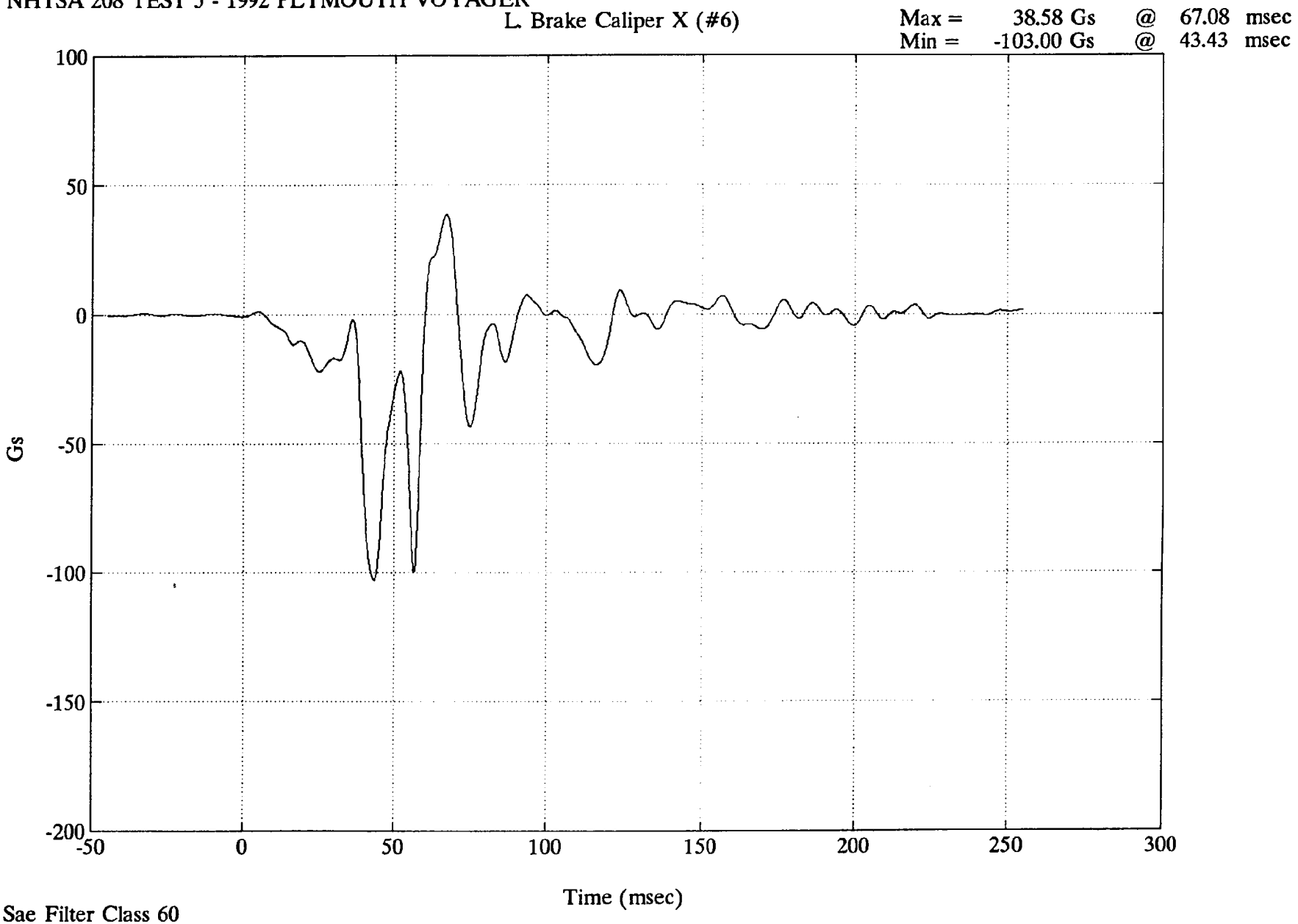


B-17

7941-4

SAE Filter Class 60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



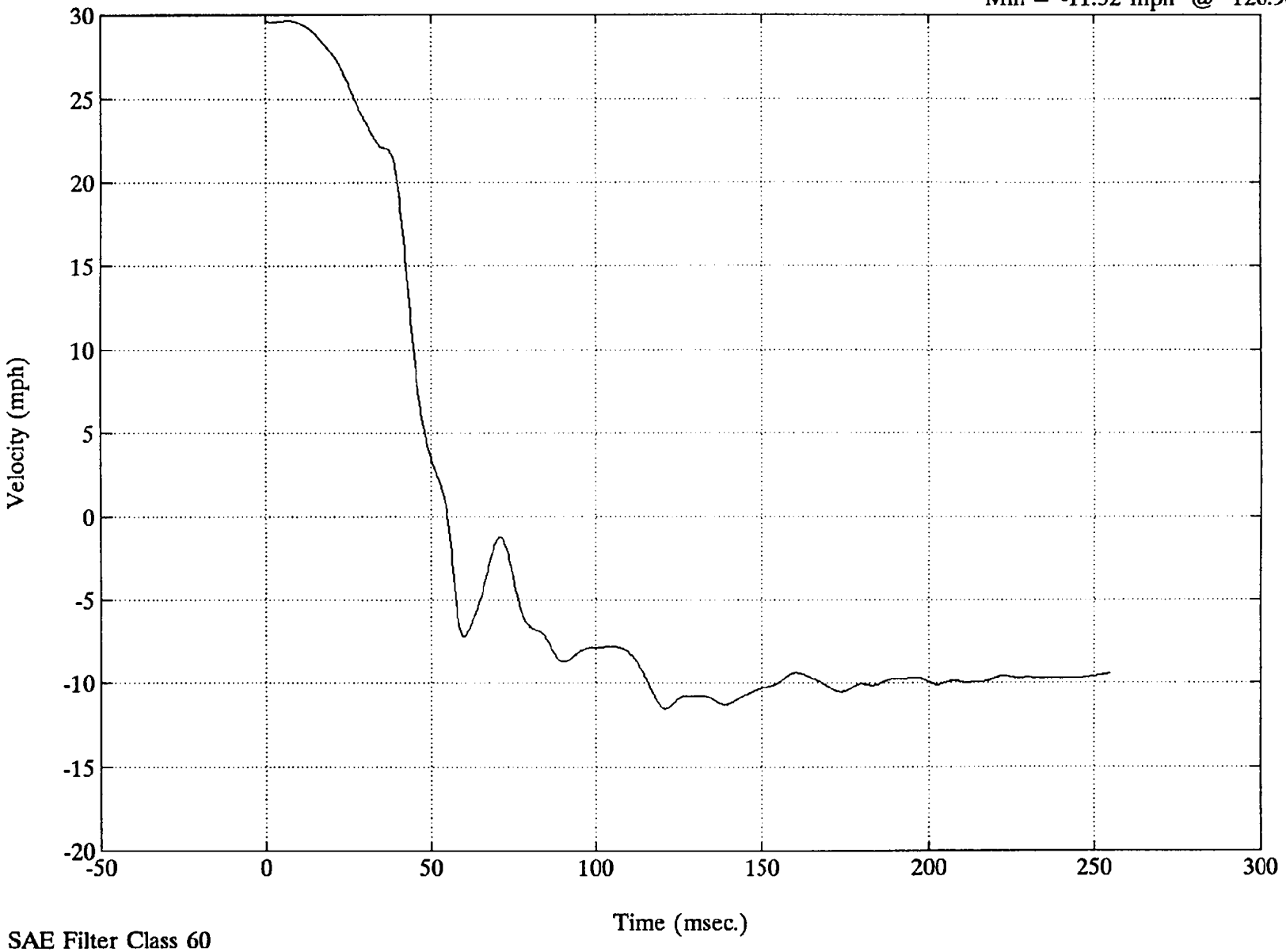
Sae Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

L. Brake Caliper X (#6)

Max = 29.66 mph @ 7.20 msec
Min = -11.52 mph @ 120.96 msec



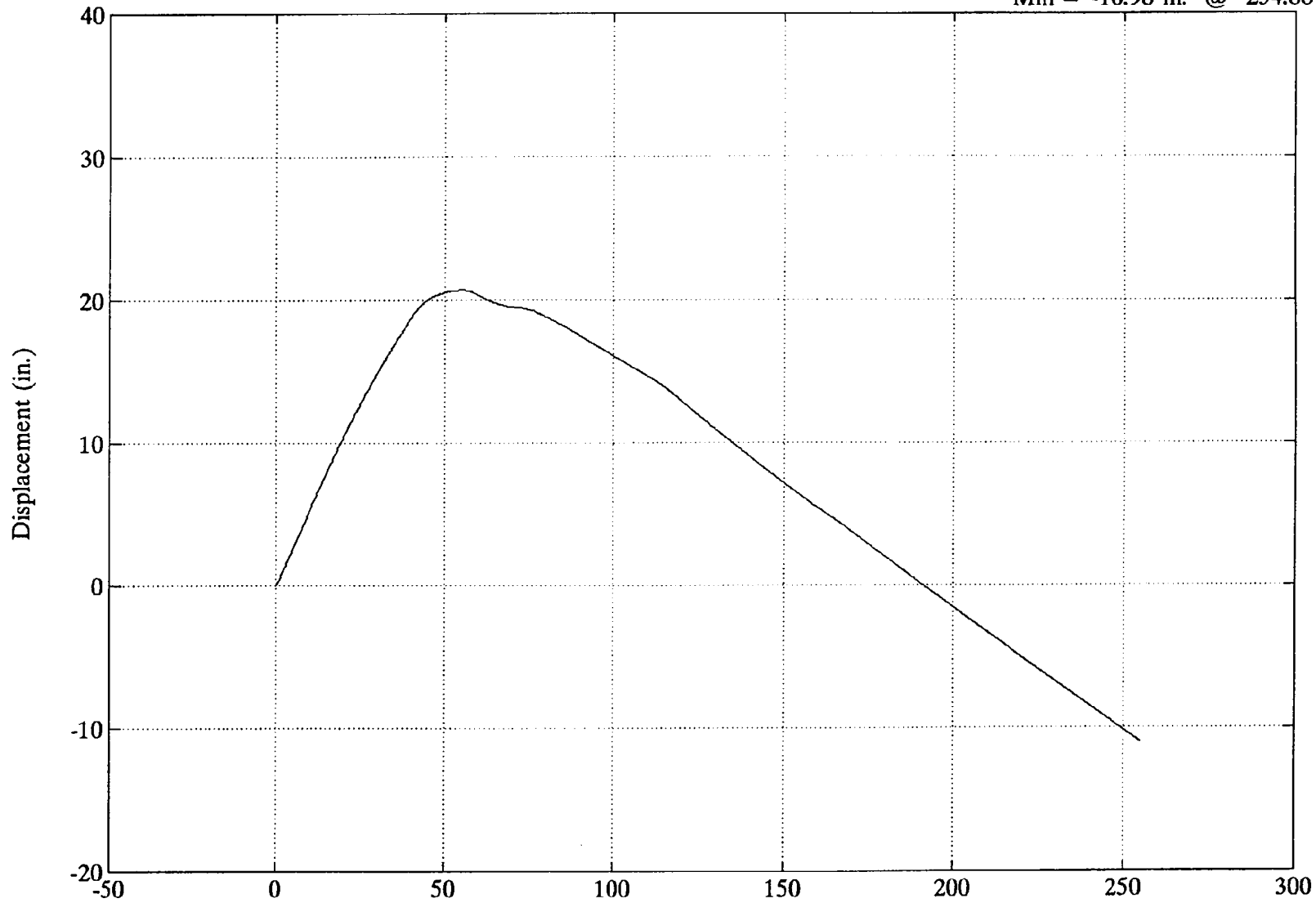
SAE Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

L. Brake Caliper X (#6)

Max = 20.72 in. @ 55.68 msec
Min = -10.98 in. @ 254.88 msec

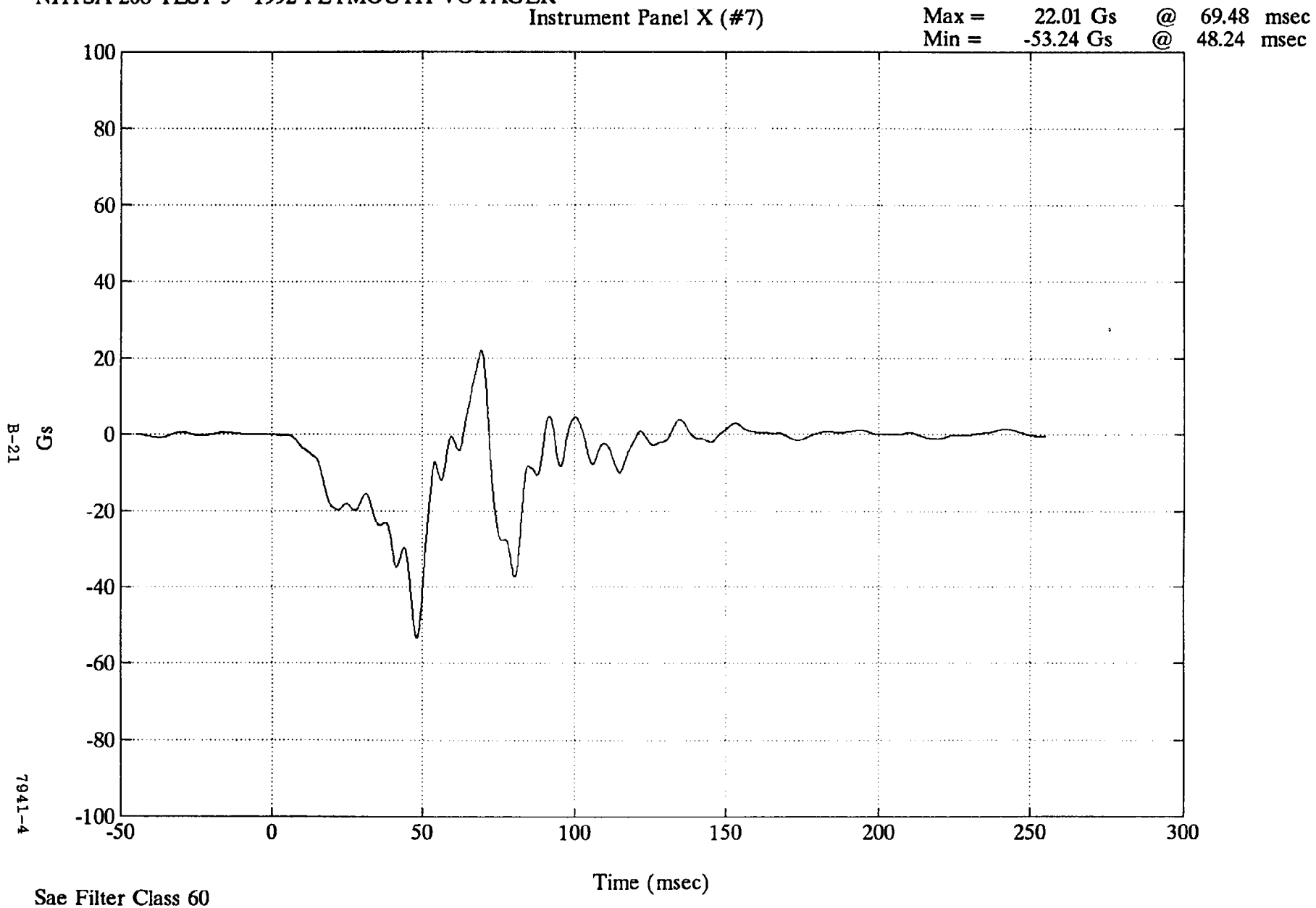


B-20

7941-4

SAE Filter Class 60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

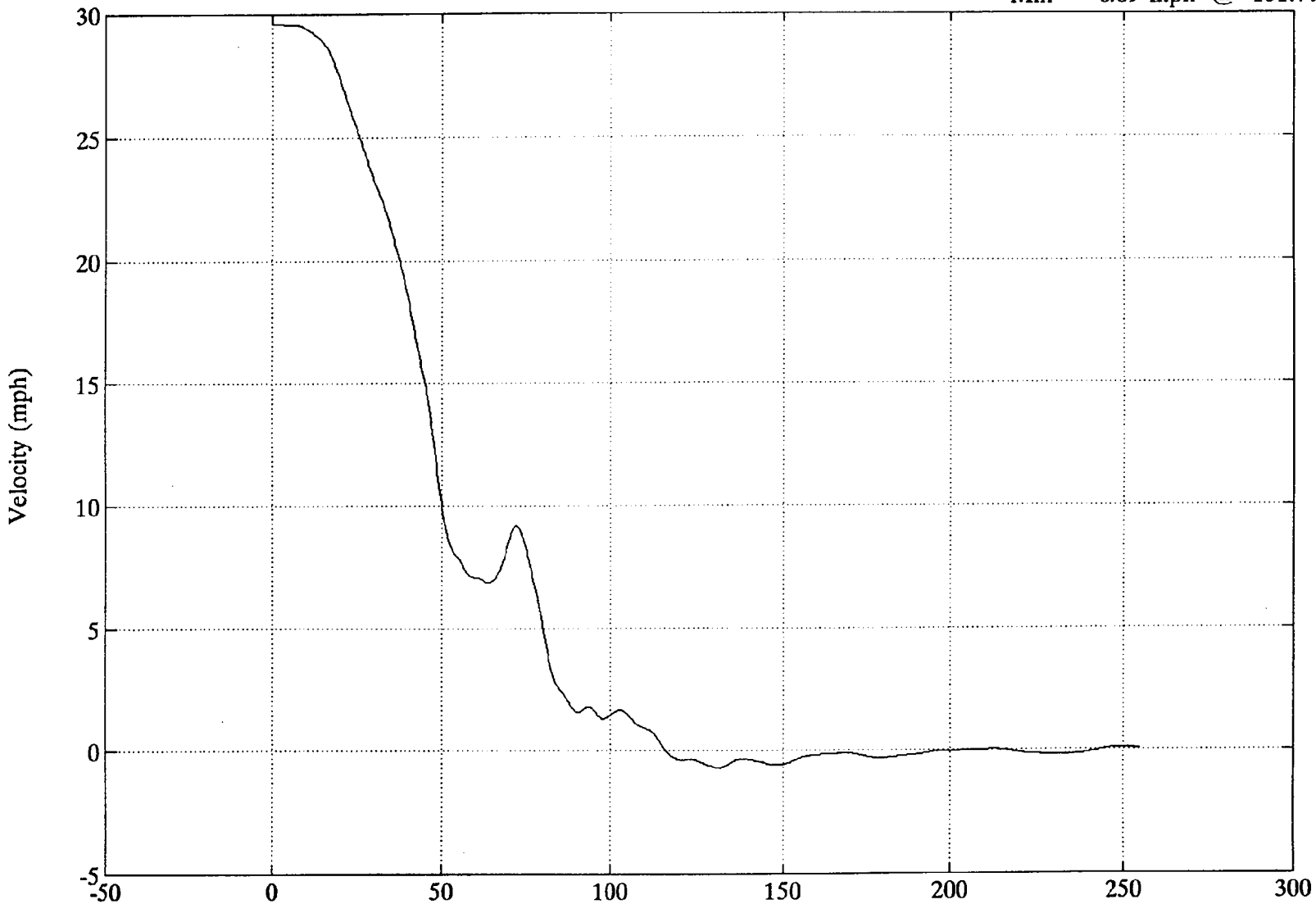


Sae Filter Class 60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Instrument Panel X (#7)

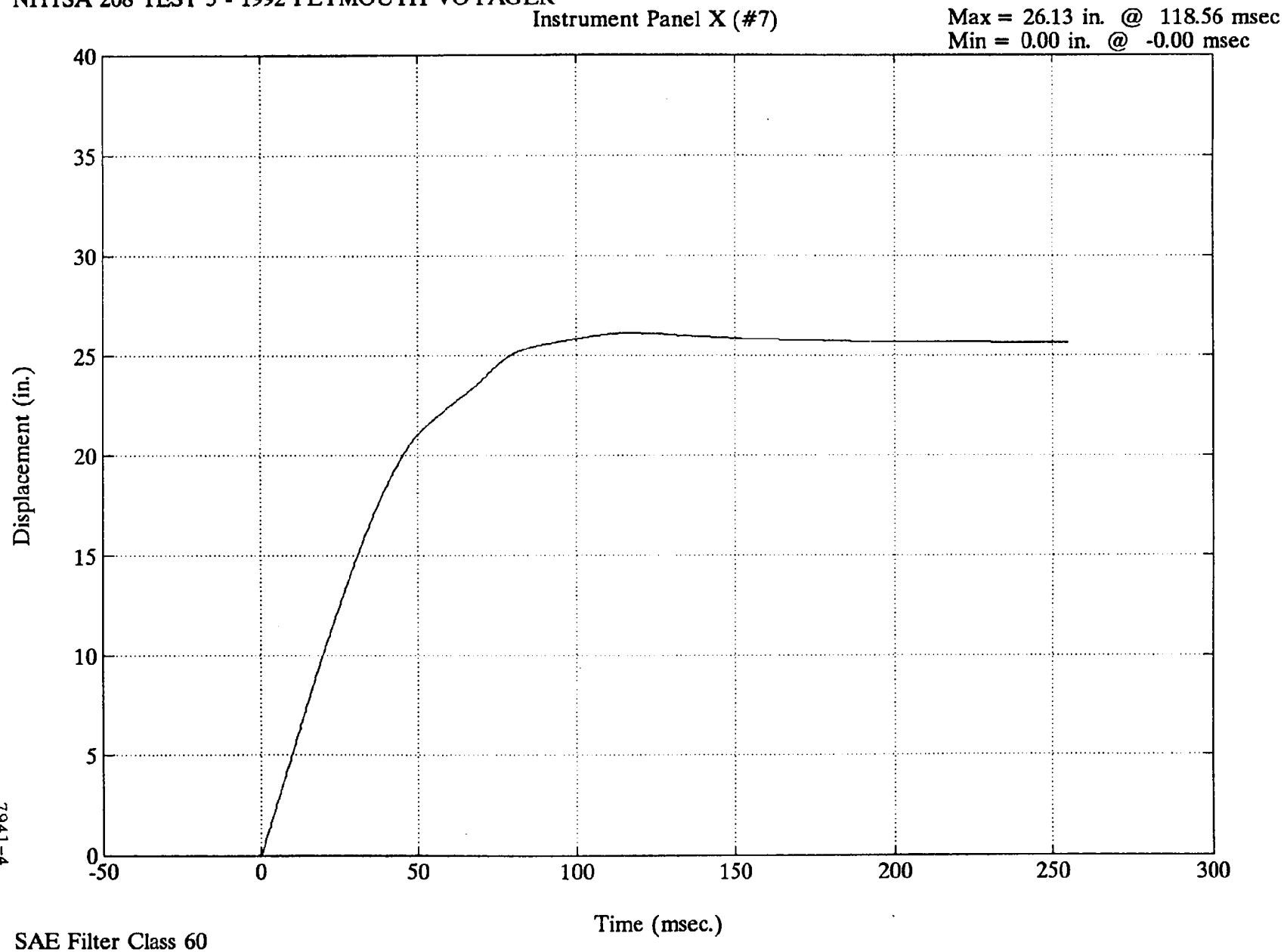
Max = 29.60 mph @ 3.12 msec
Min = -0.69 mph @ 131.76 msec



SAE Filter Class 60

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



SAE Filter Class 60

7941-4

TEST NO. CN0305

DUMMY DATA	SAE FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600

FACILITY: TRACK TEST DATE: 22 Oct 1991
RUN #: 1126
SERIES #: 5

TITLE: NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

HIC SUMMARY: Pos. 2 Head Resultant

hic: 174.96
t1 = 61.080 msec
t2 = 96.960 msec
Average G's Over Hic Duration = 29.87

HIC SUMMARY: Pos. 1 Head Resultant

hic: 426.22
t1 = 56.880 msec
t2 = 89.640 msec
Average G's Over Hic Duration = 44.23

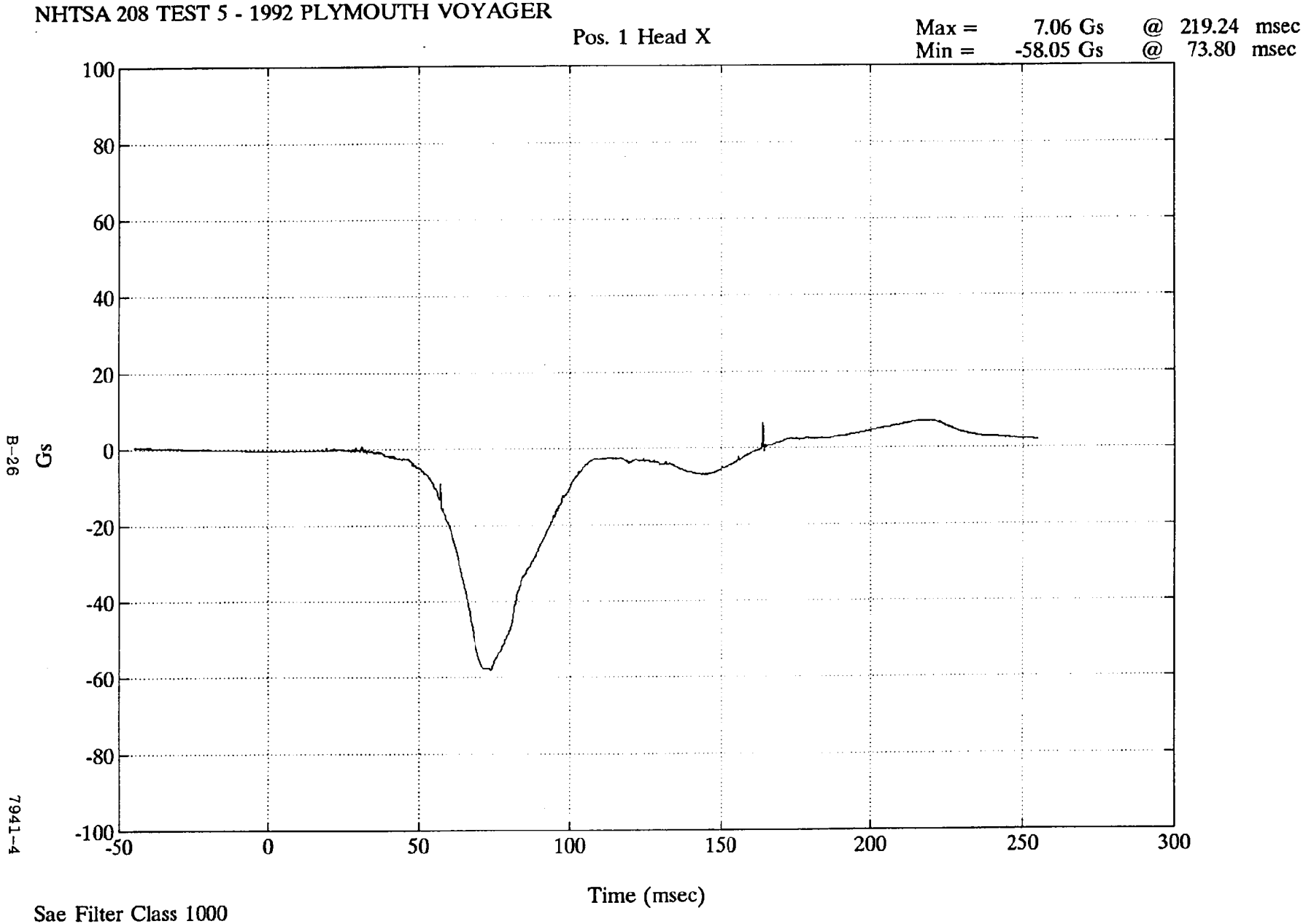
CLIP SUMMARY: Pos. 2 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 42.426 G's
Tstart = 81.0000 ms
Tend = 84.1200 ms
CSI = 292.647

CLIP SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) = 35.498 G's
Tstart = 84.6000 ms
Tend = 87.6000 ms
CSI = 282.084

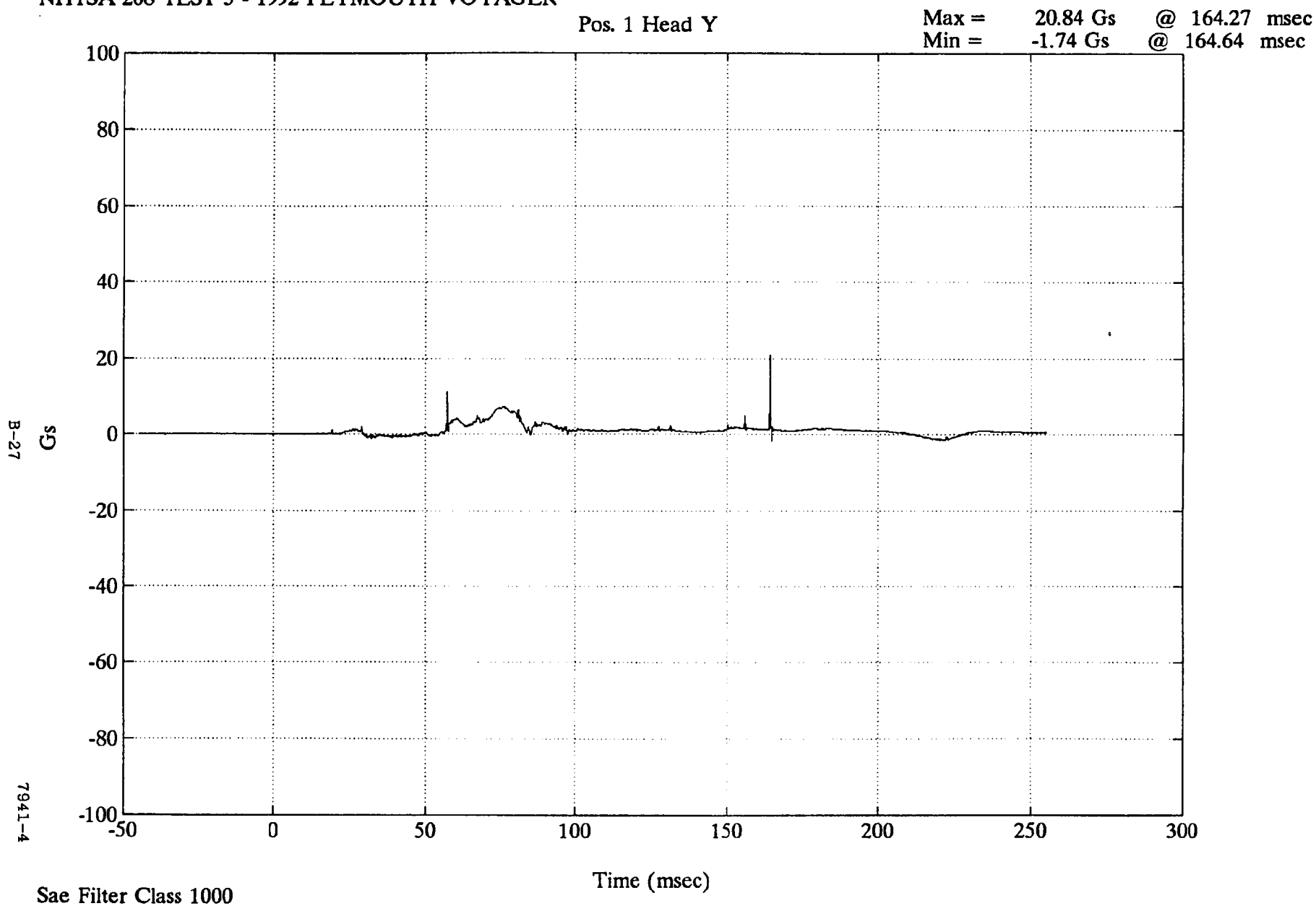
NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



Sae Filter Class 1000

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



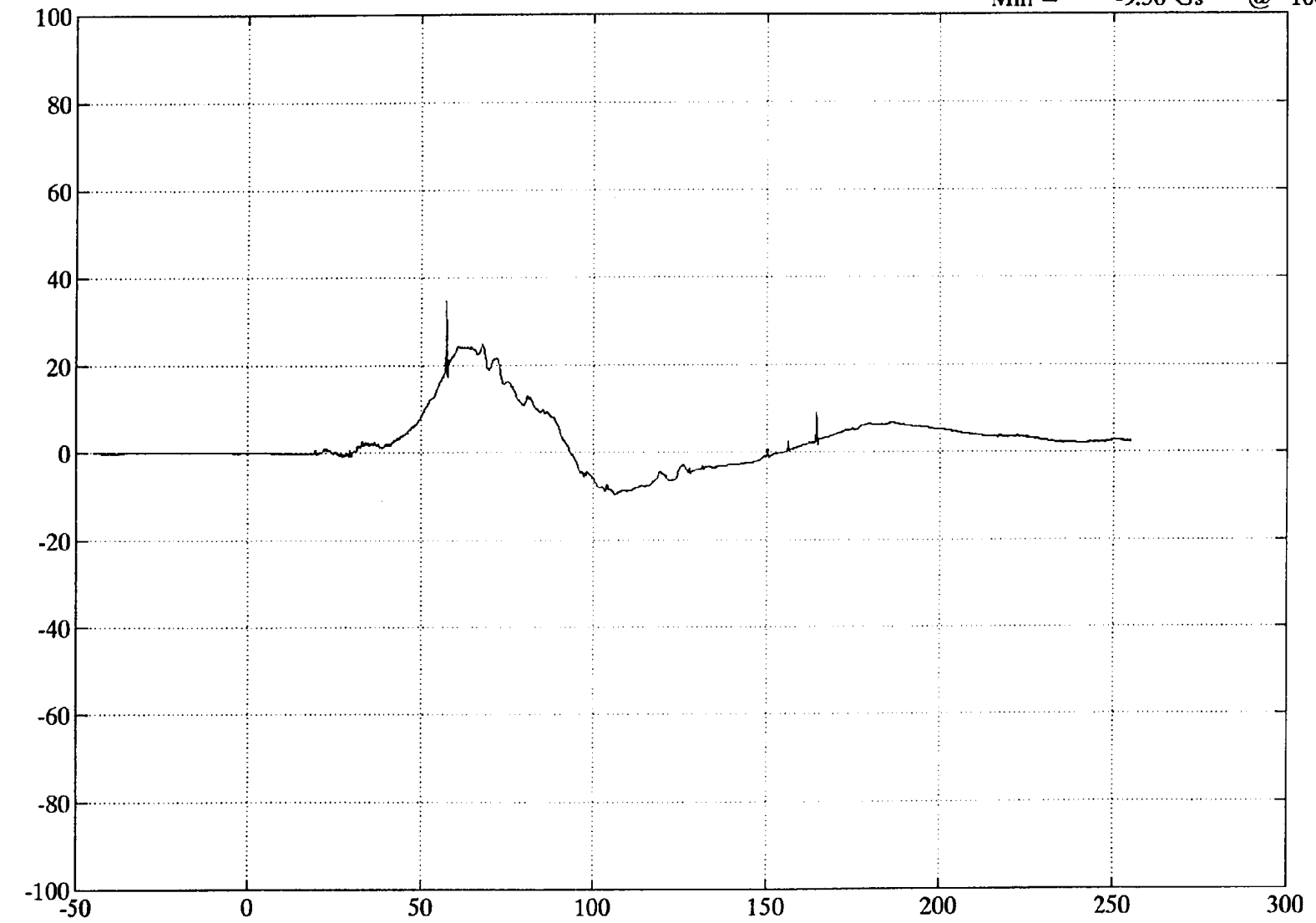
Sae Filter Class 1000

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos. 1 Head Z

Max = 35.03 Gs @ 57.24 msec
Min = -9.50 Gs @ 106.44 msec



B-28

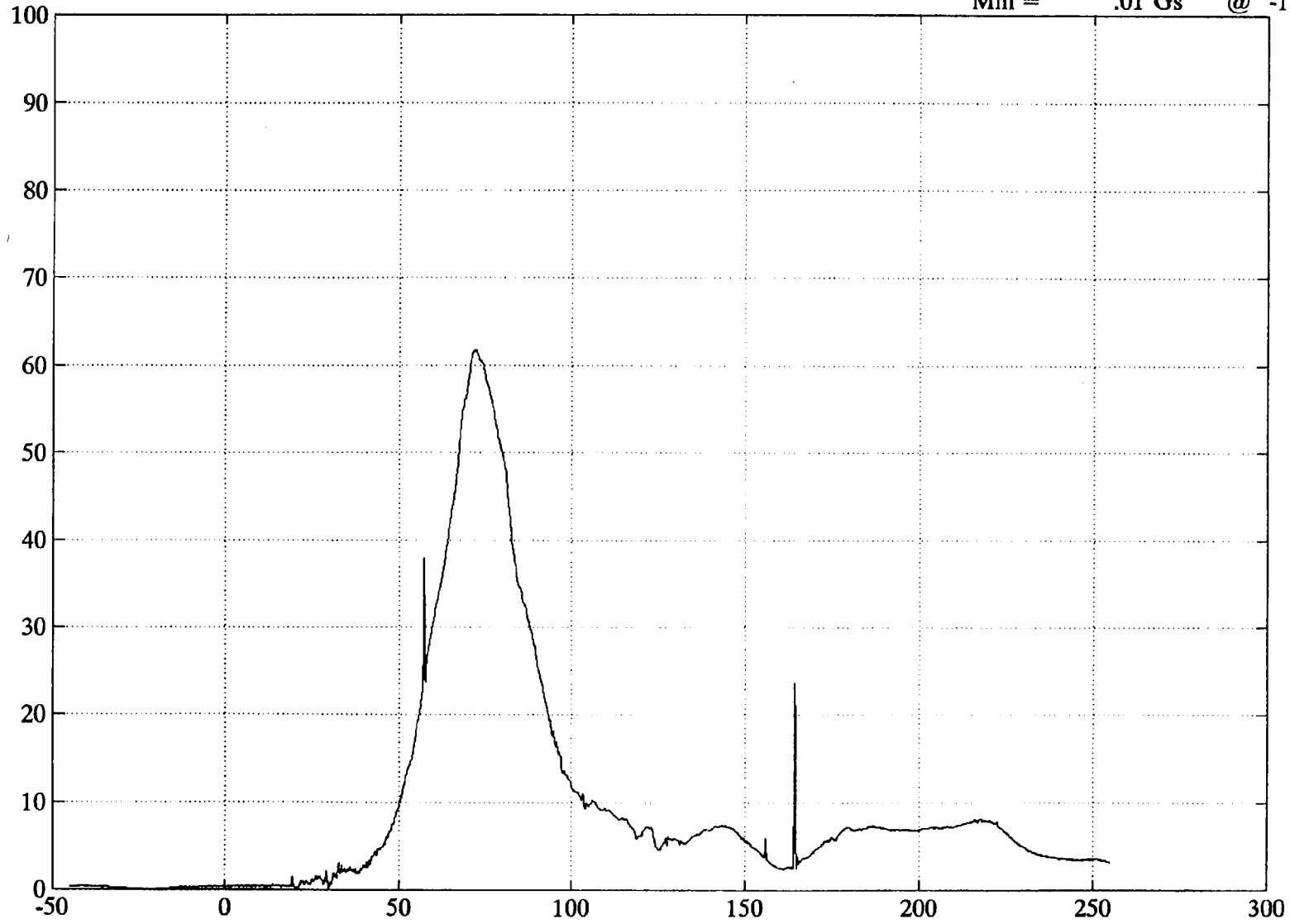
7941-4

Sae Filter Class 1000

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos. 1 Head Resultant

Max = 61.80 Gs @ 71.87 msec
Min = .01 Gs @ -18.96 msec

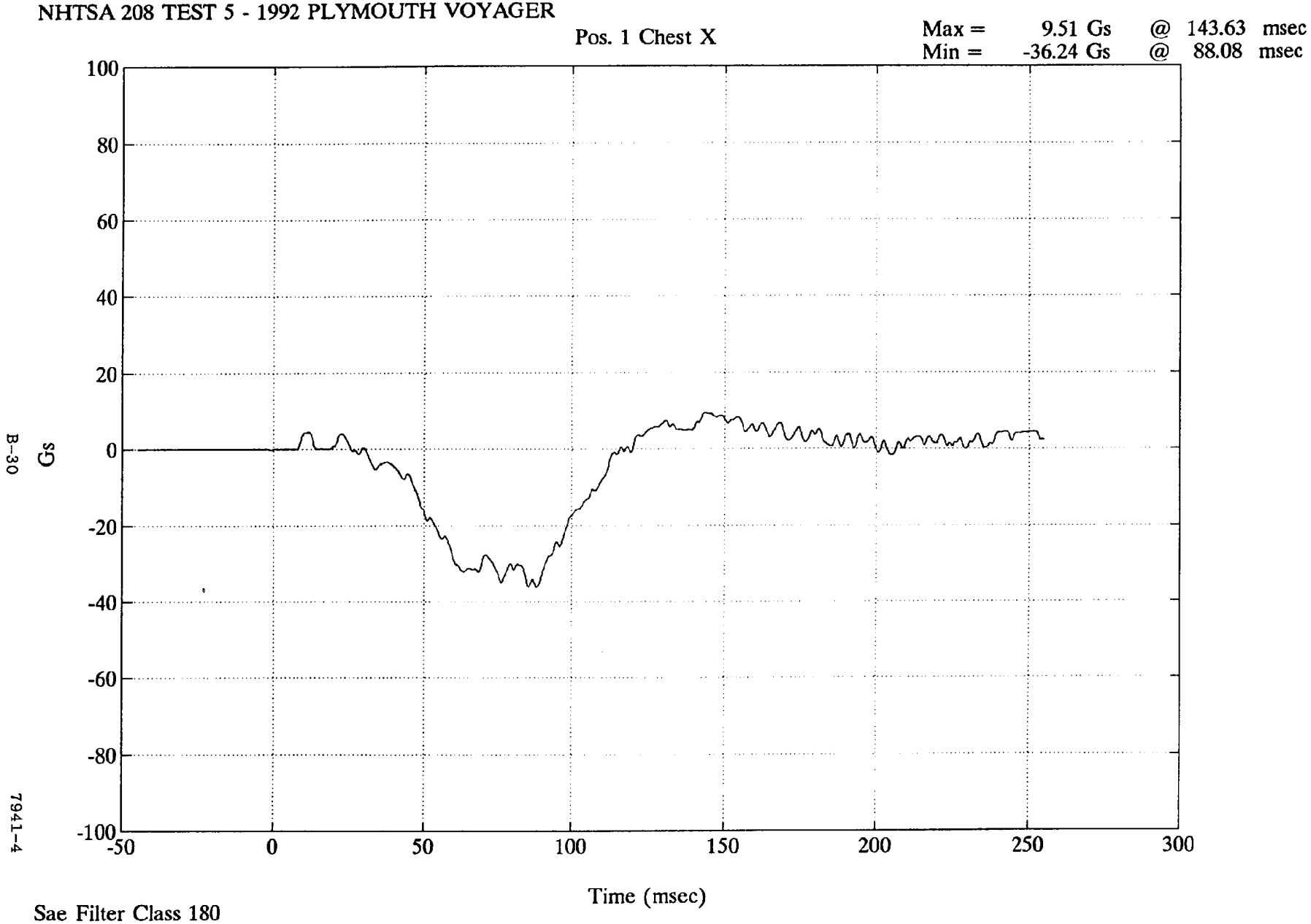


B-29

7941-4

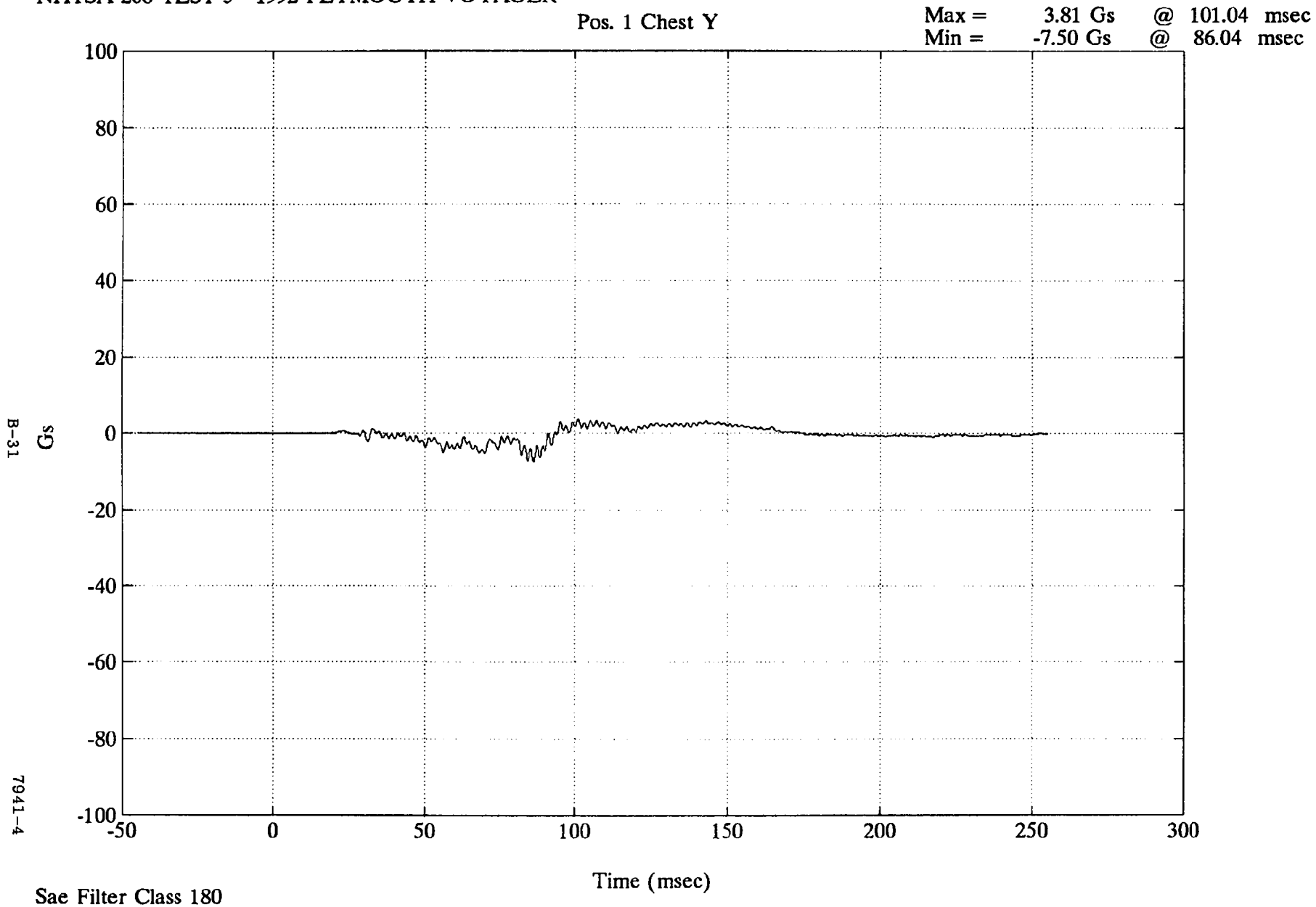
Sae Filter Class 1000

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



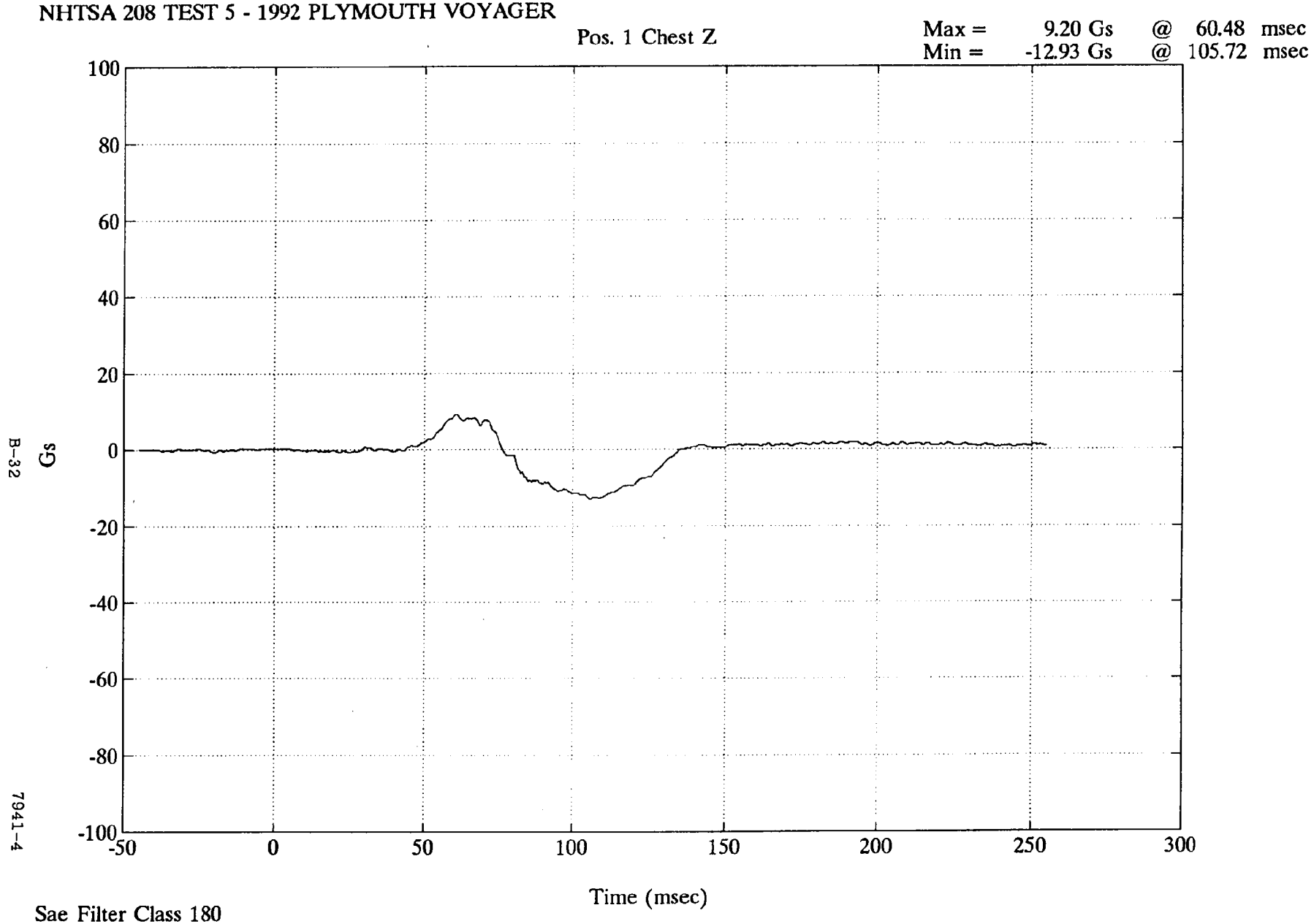
Sae Filter Class 180

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



Sae Filter Class 180

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

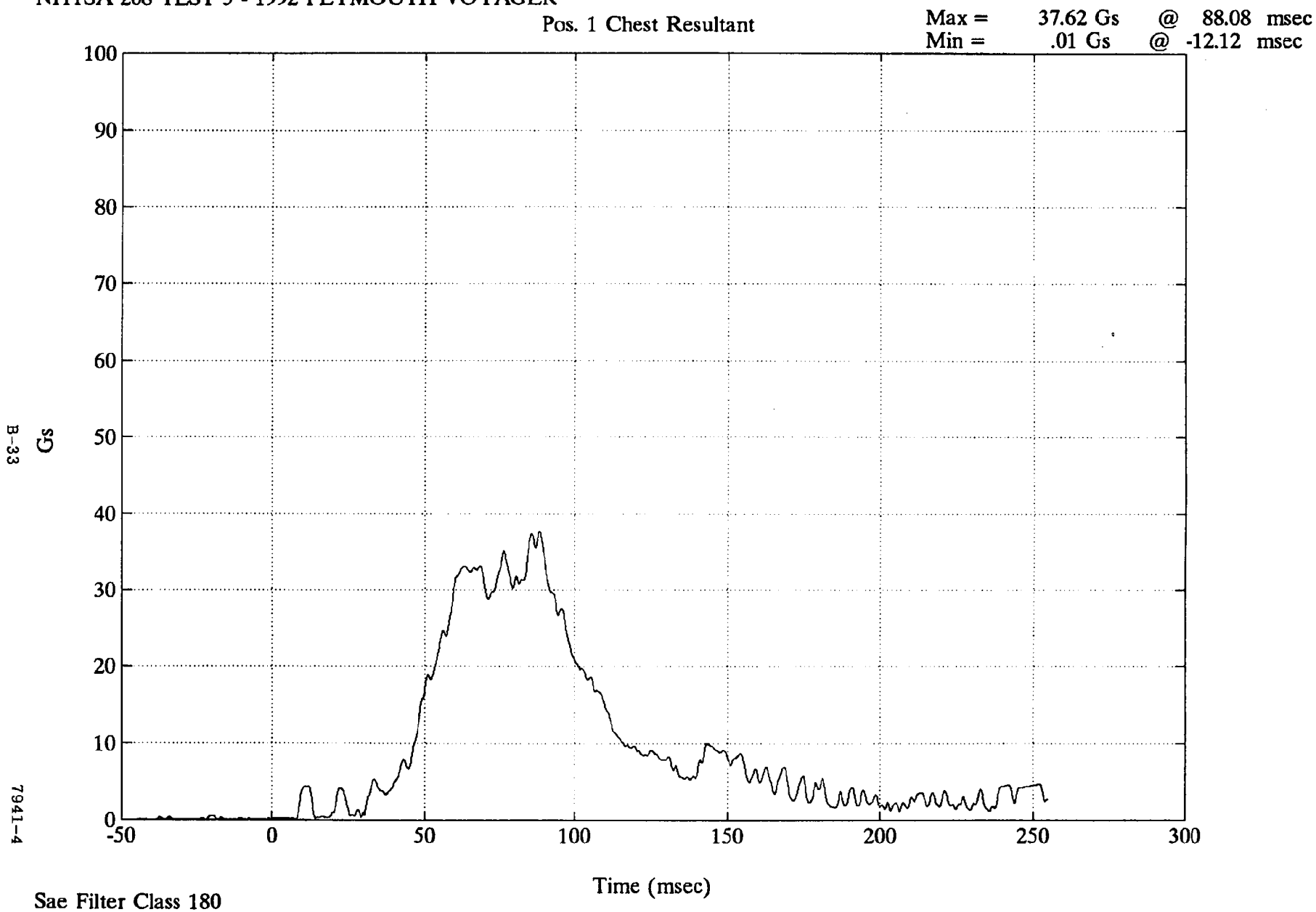


B-32

7941-4

Sae Filter Class 180

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



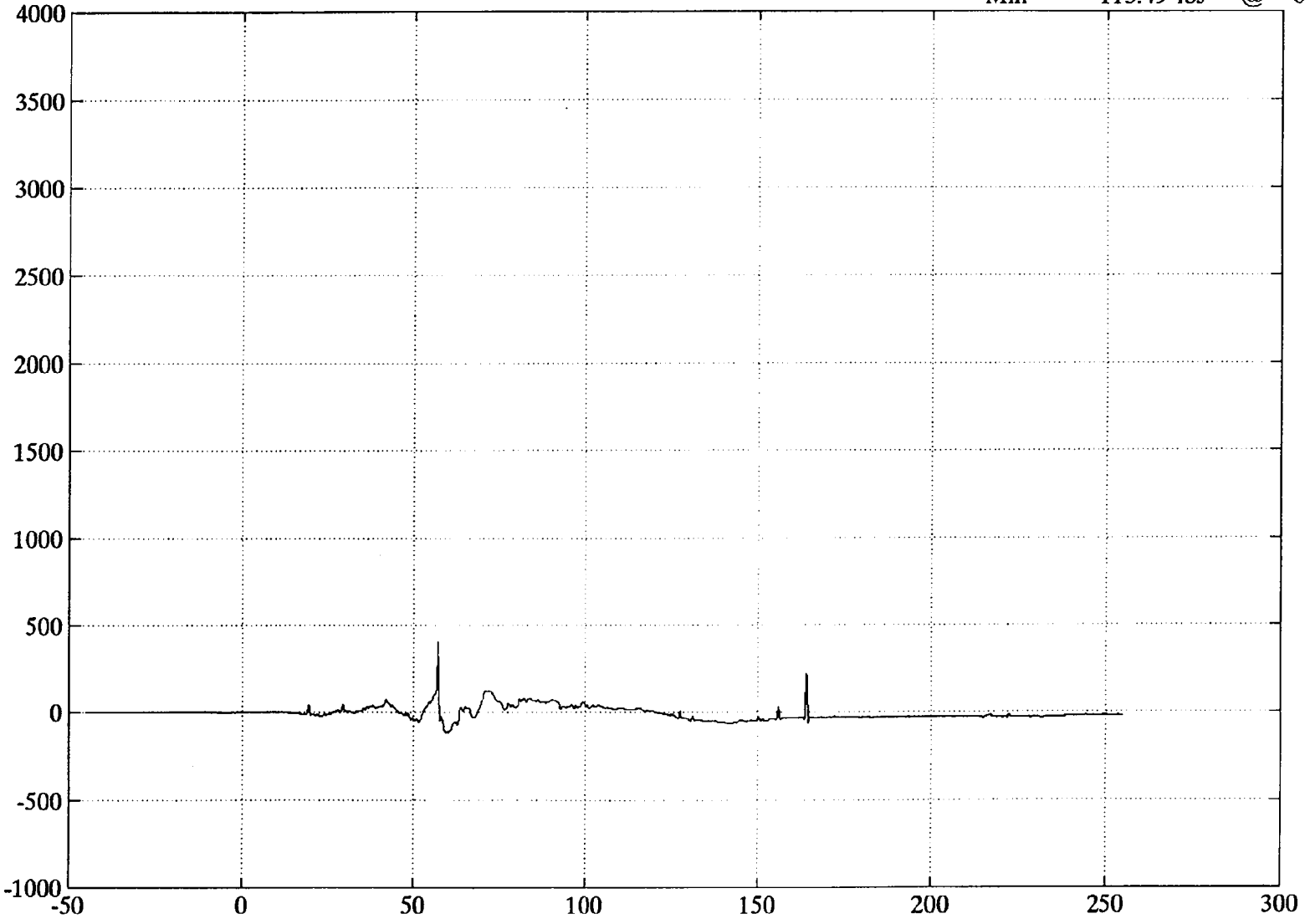
Sae Filter Class 180

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos. 1 Left Femur

Max = 402.95 lbs @ 57.11 msec
Min = -113.49 lbs @ 60.12 msec

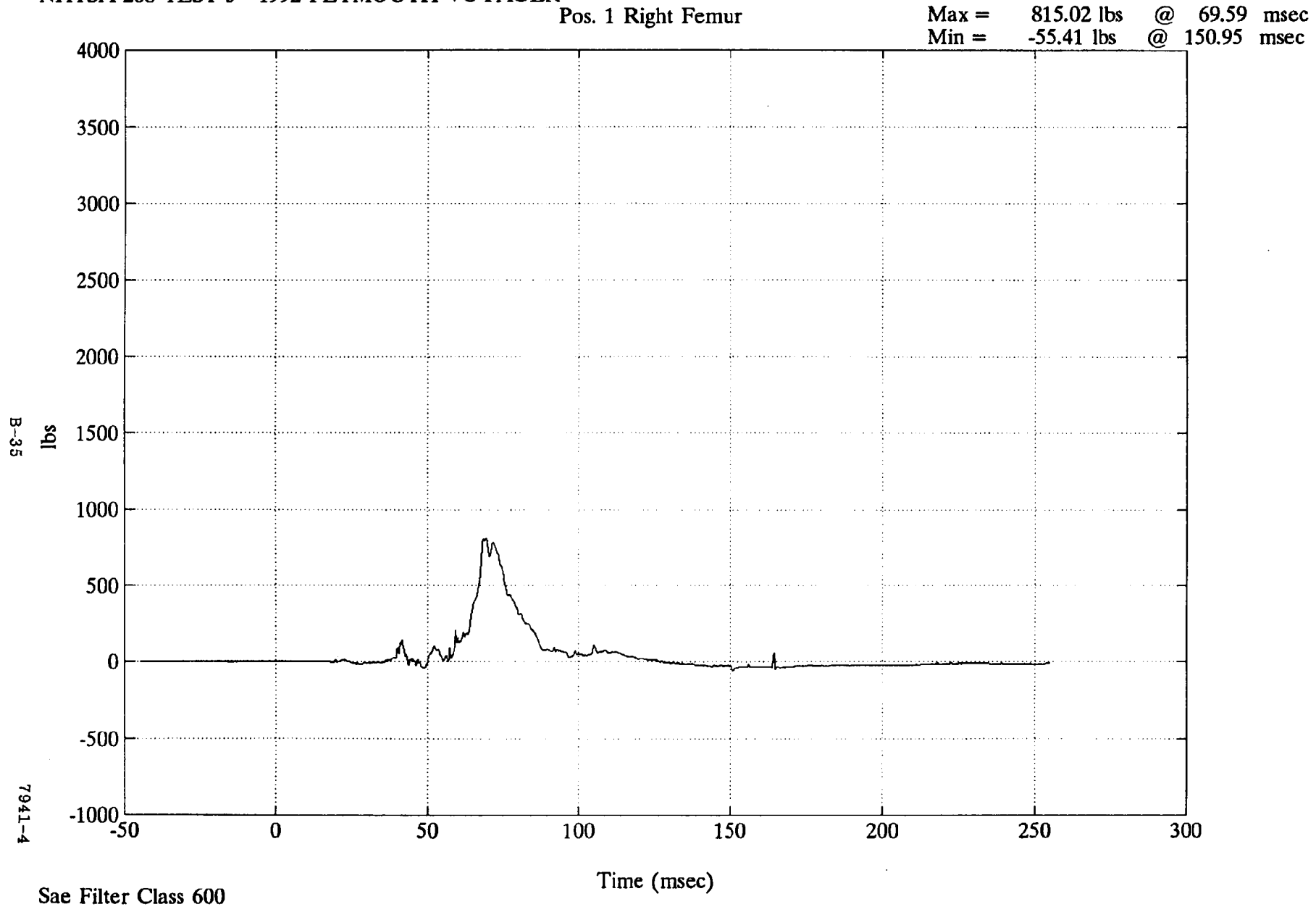


B-34

7941-4

Sae Filter Class 600

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



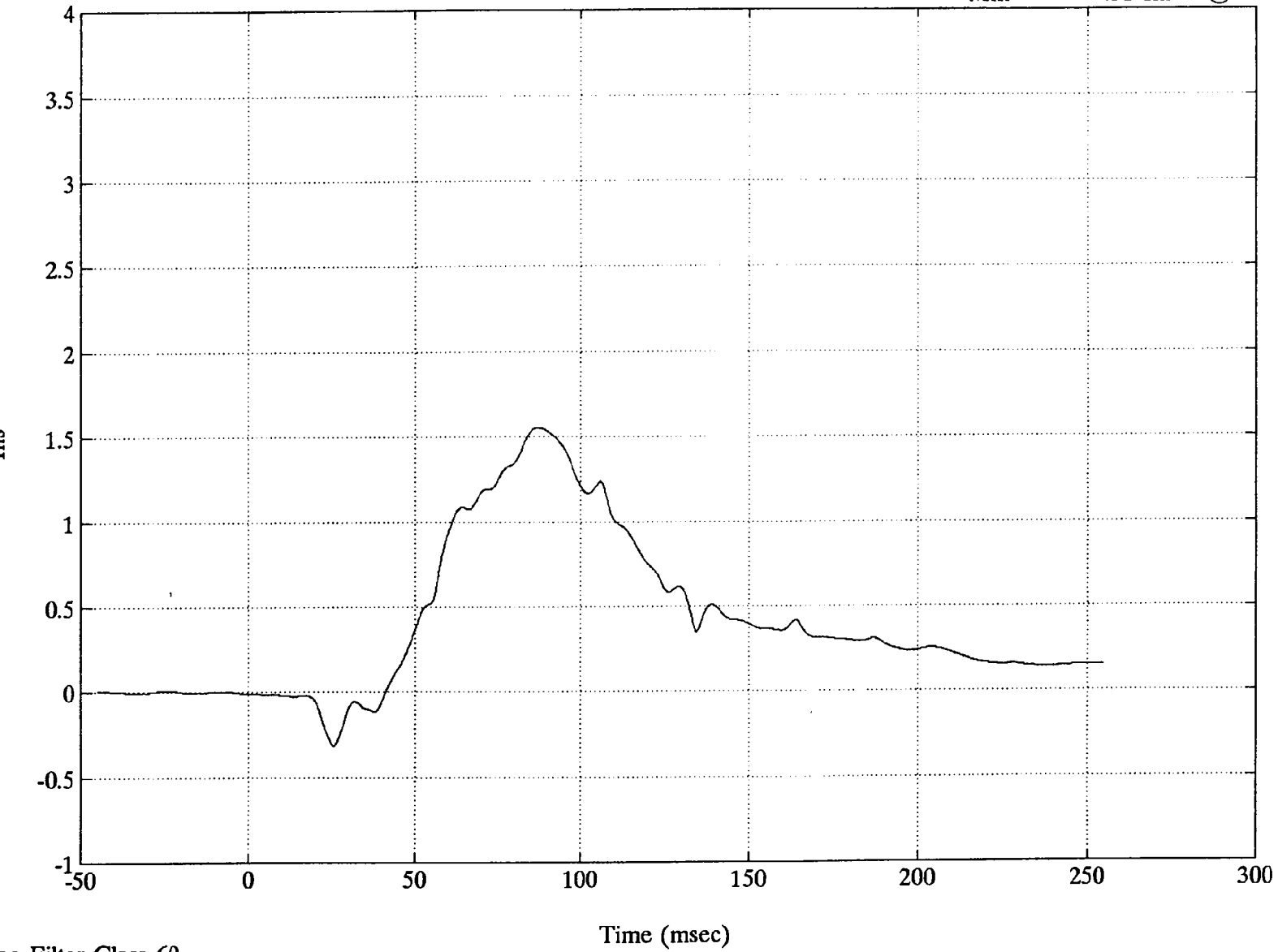
Sae Filter Class 600

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos #1 Chest Disp.

Max = 1.55 Ins @ 87.12 msec
Min = -.31 Ins @ 25.20 msec

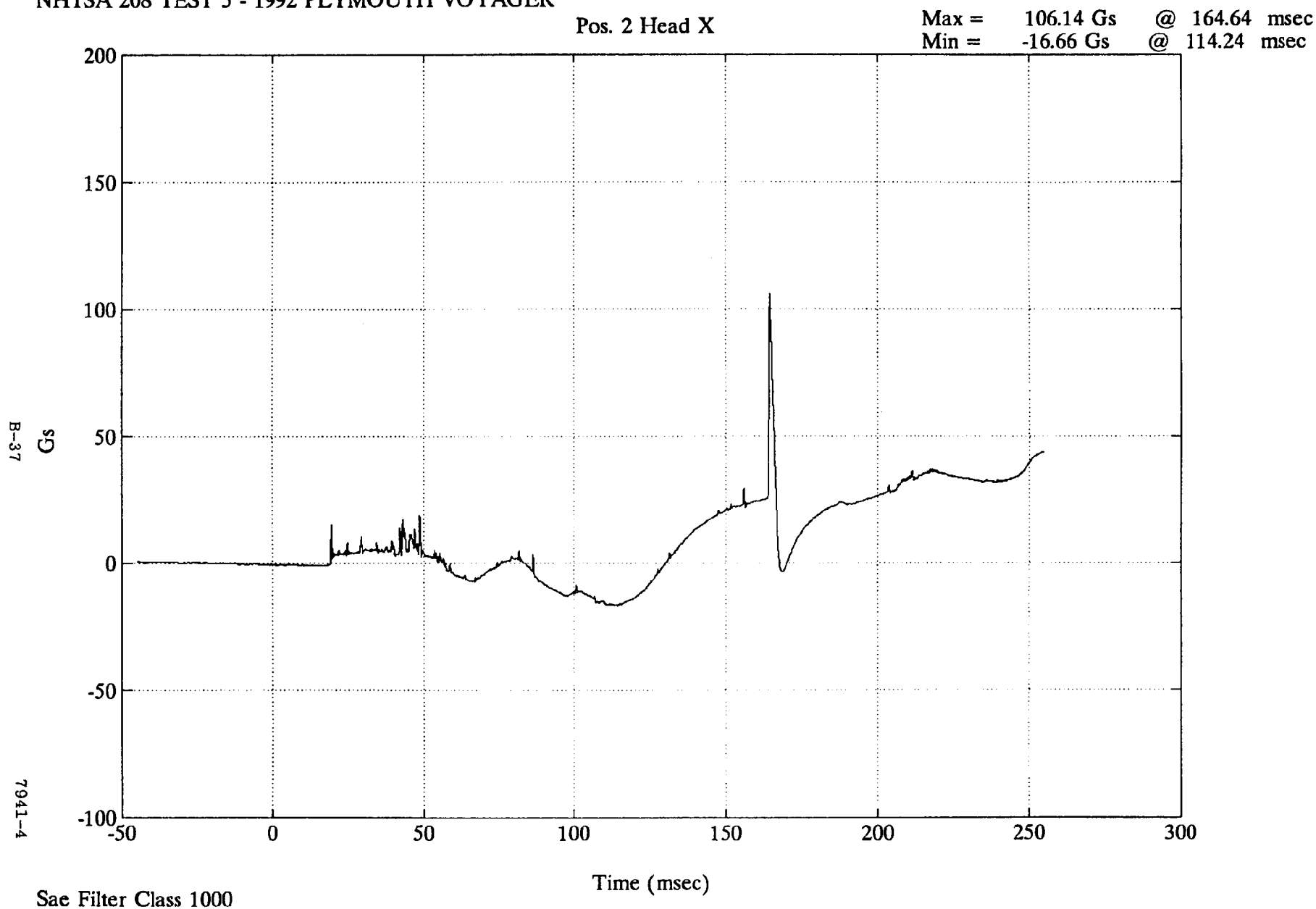


B-36

7941-4

Sae Filter Class 60

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

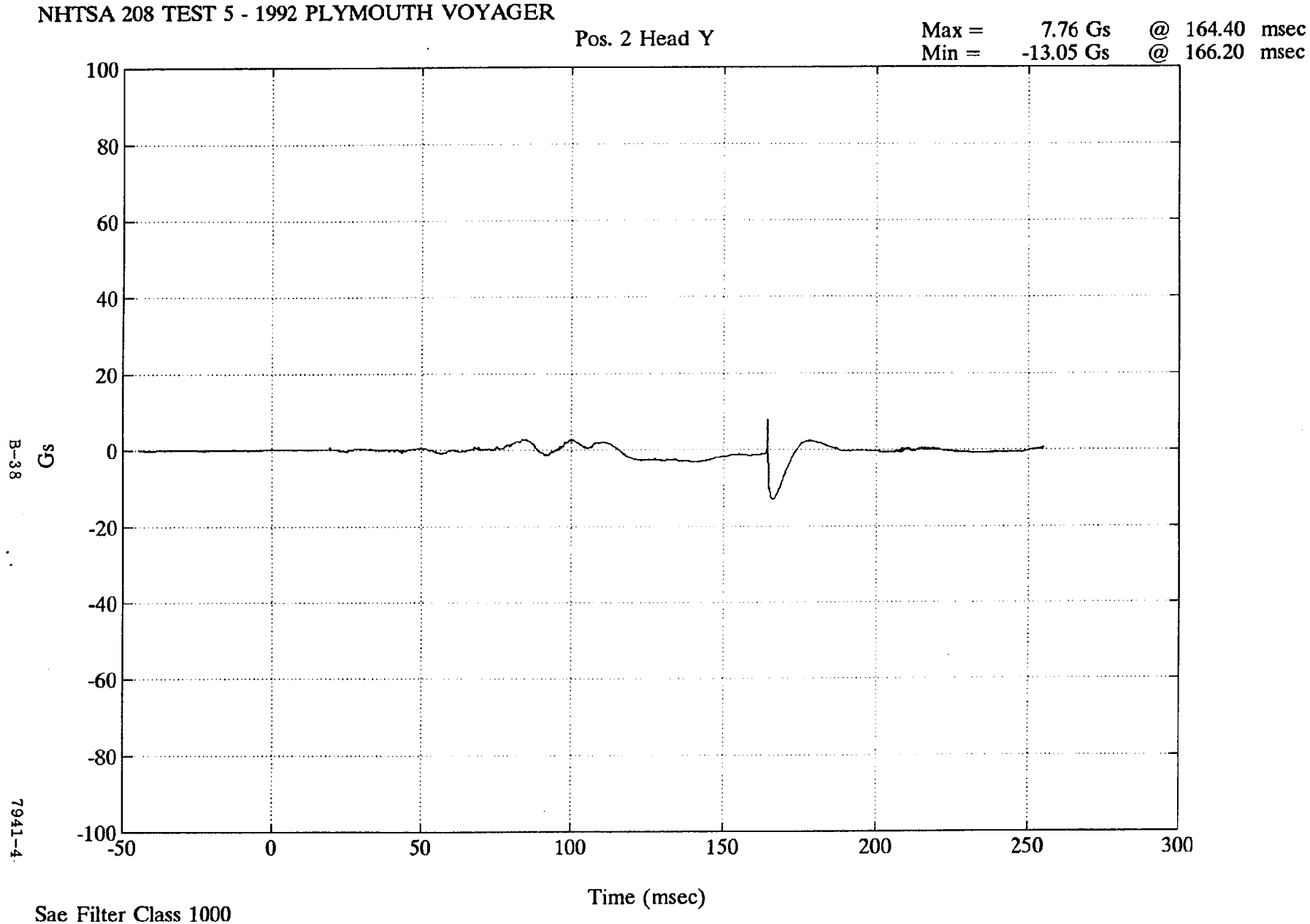


B-37

7941-4

Sae Filter Class 1000

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER



Sae Filter Class 1000

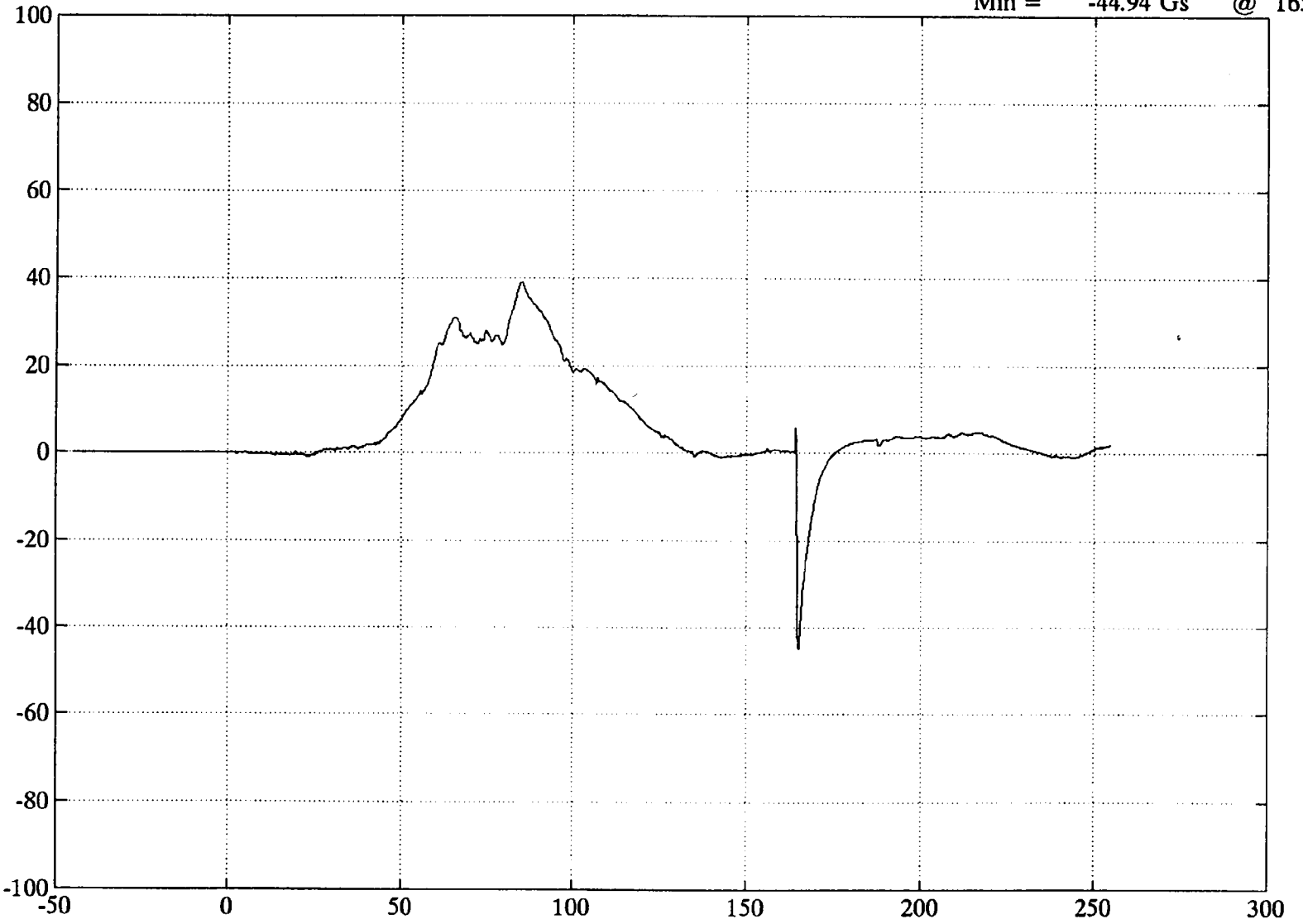
B-38

7941-4

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos. 2 Head Z

Max = 39.11 Gs @ 85.44 msec
Min = -44.94 Gs @ 165.24 msec



B-39

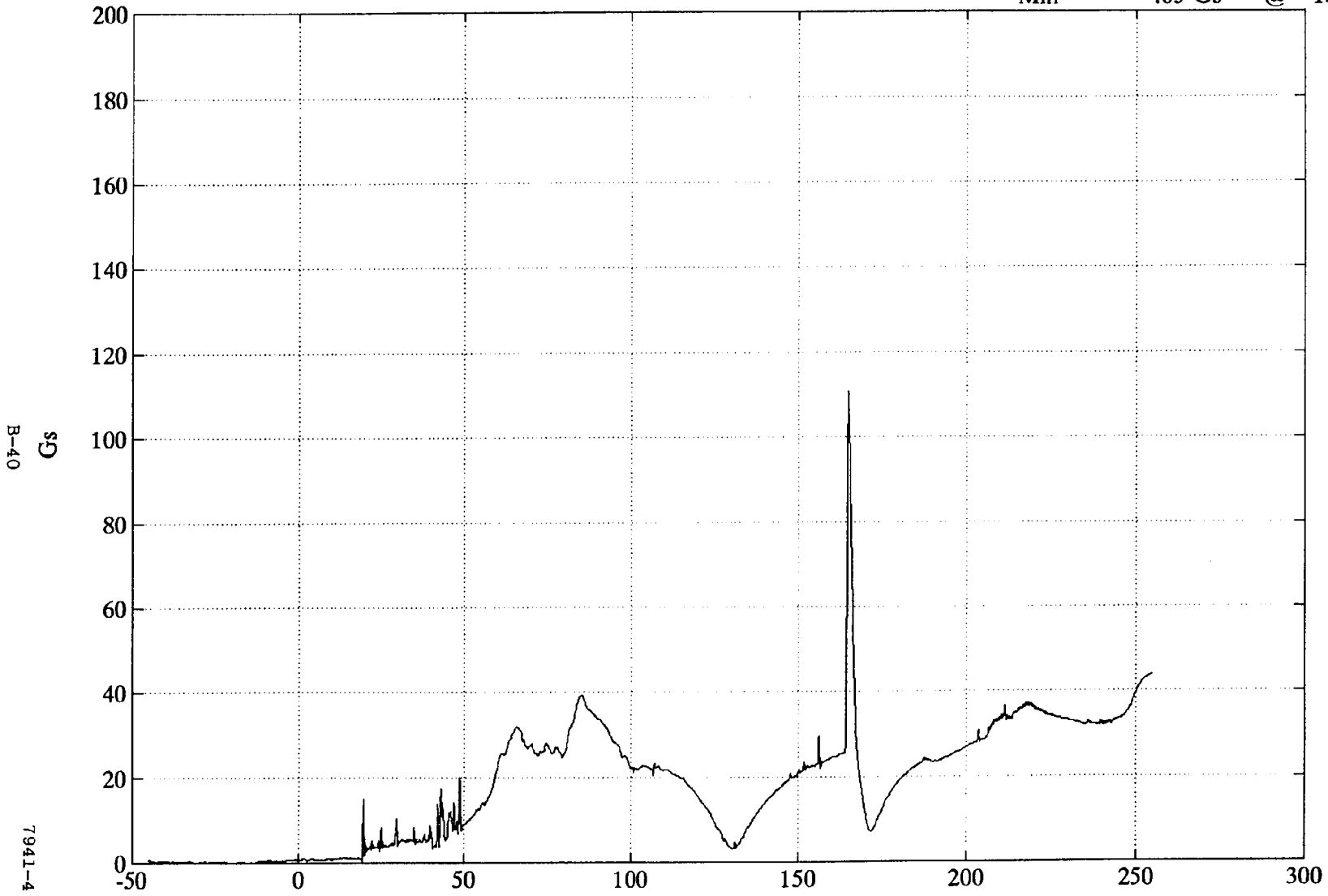
7941-4

Sae Filter Class 1000

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos. 2 Head Resultant

Max = 110.87 Gs @ 164.76 msec
Min = .05 Gs @ -13.80 msec

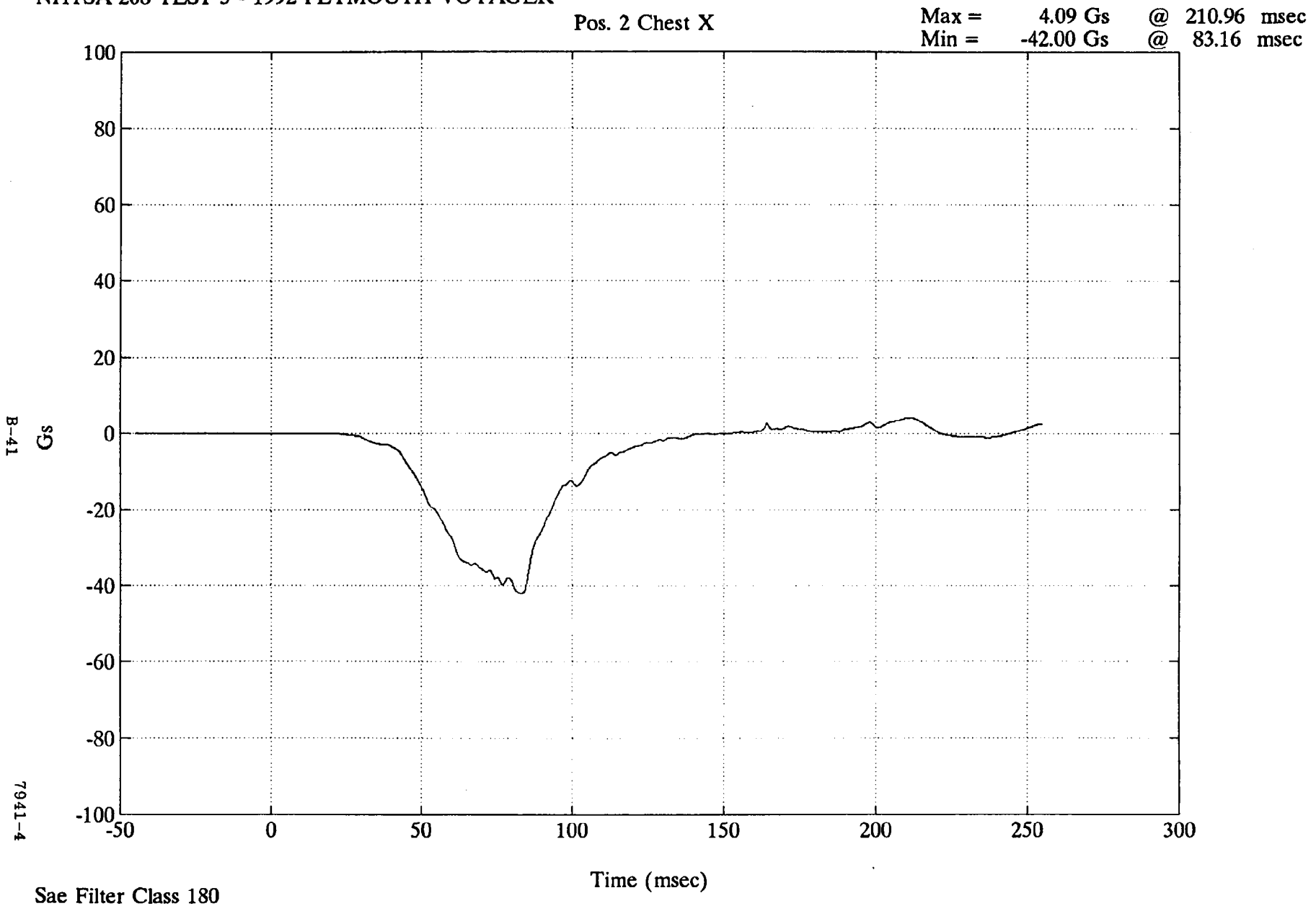


B-40

7941-4

Sae Filter Class 1000

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

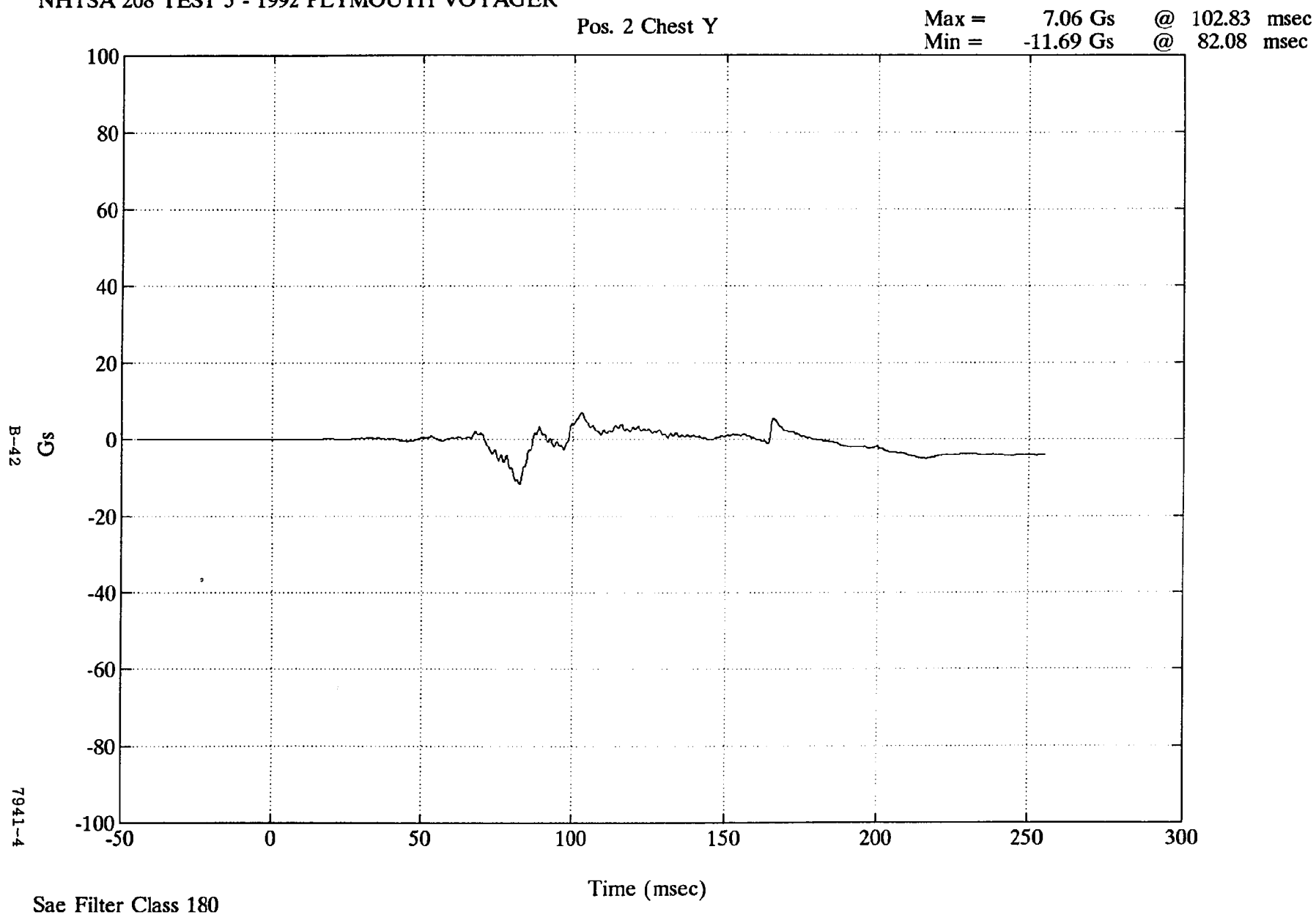


B-41

7941-4

Sae Filter Class 180

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

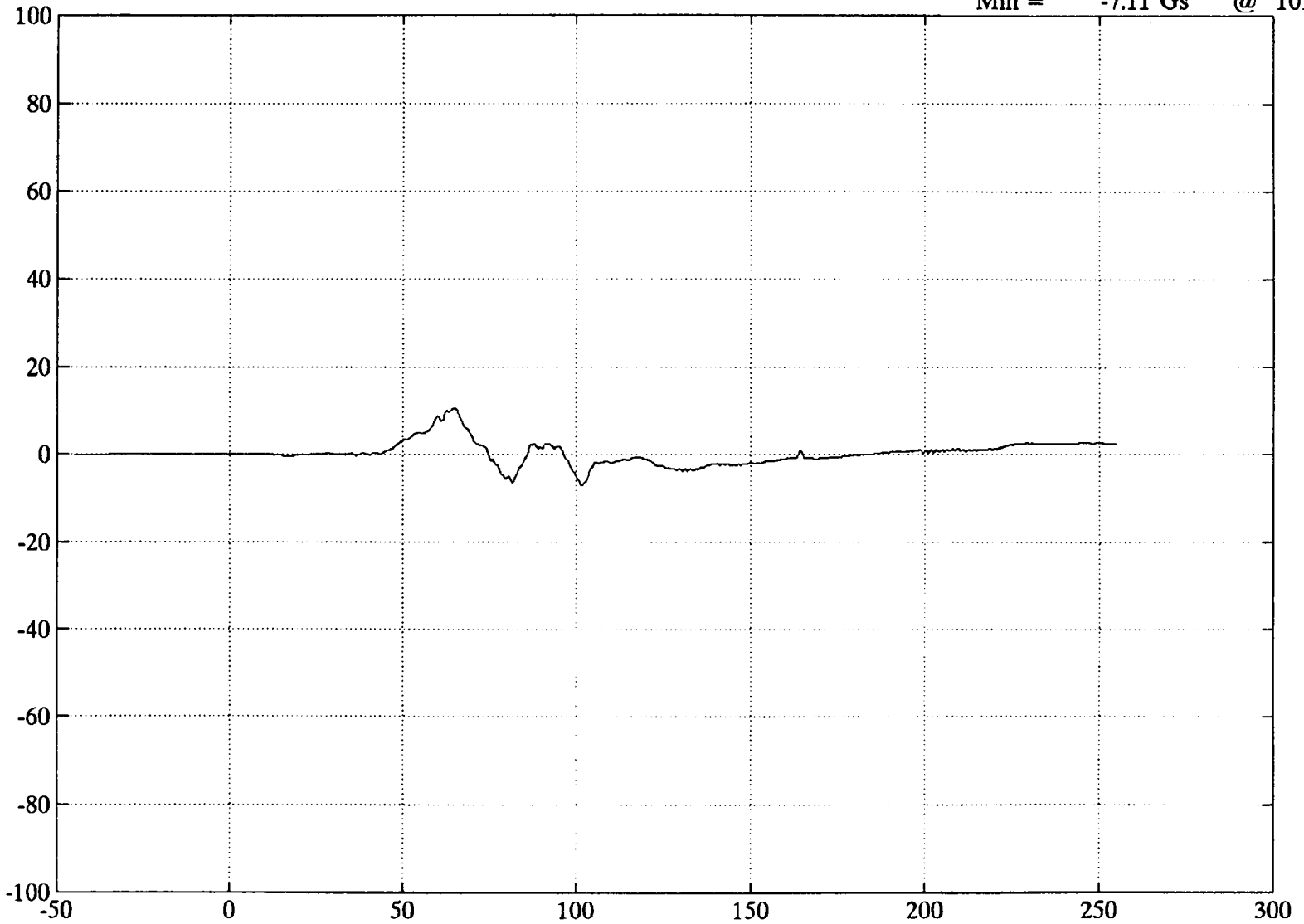


Sae Filter Class 180

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos. 2 Chest Z

Max = 10.55 Gs @ 65.04 msec
Min = -7.11 Gs @ 101.52 msec

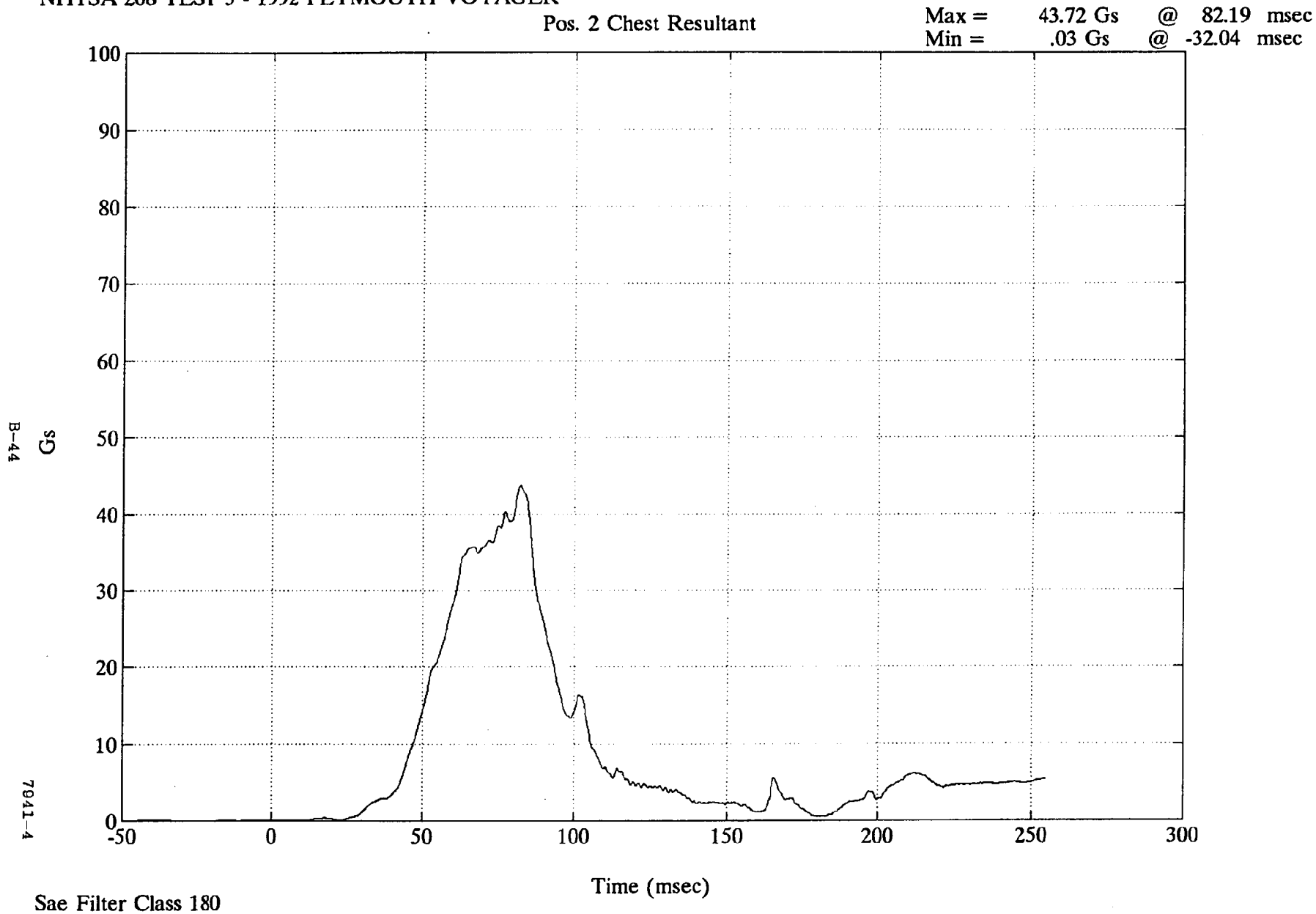


B-43

7941-4

Sae Filter Class 180

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

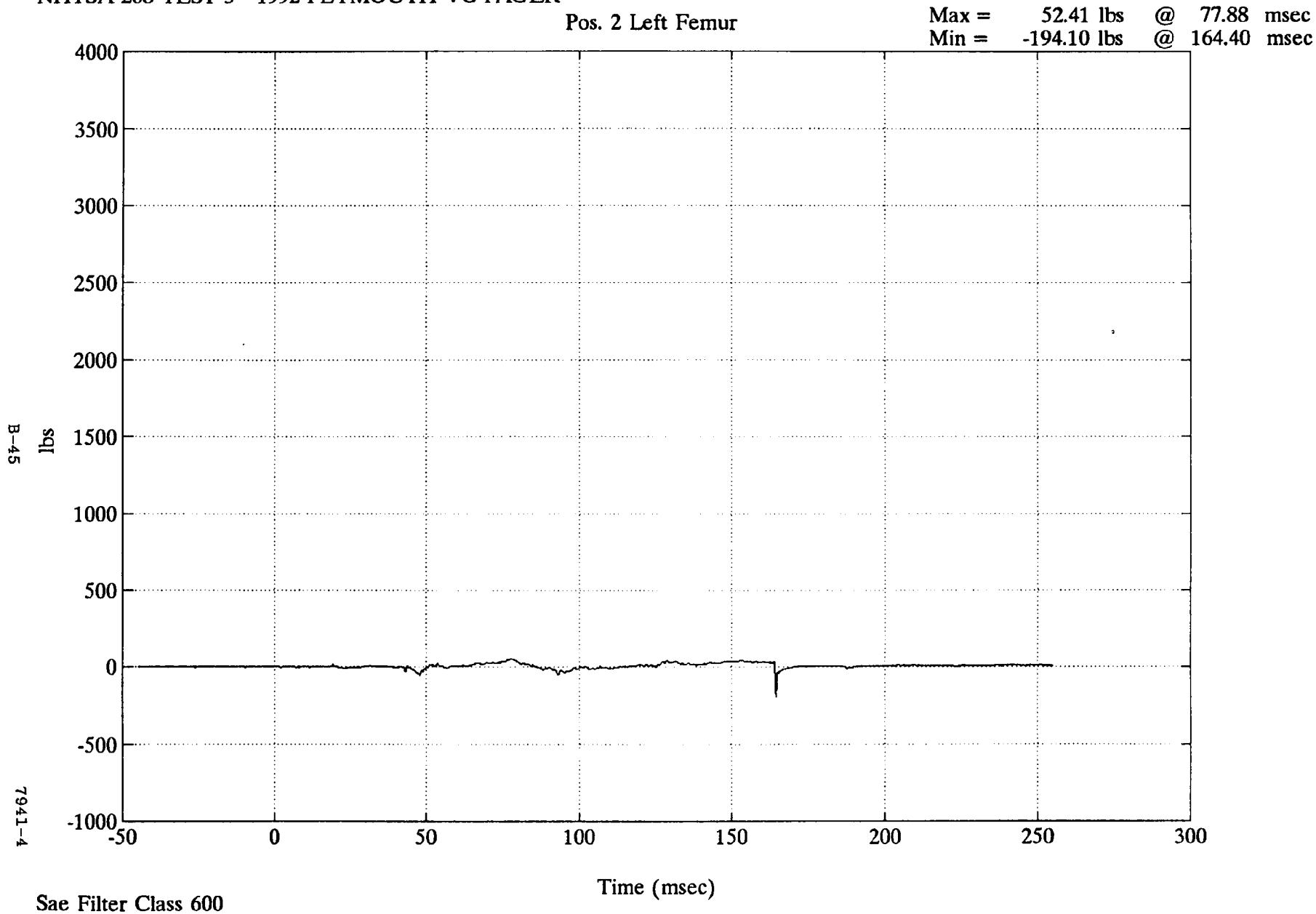


B-44

7941-4

Sae Filter Class 180

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

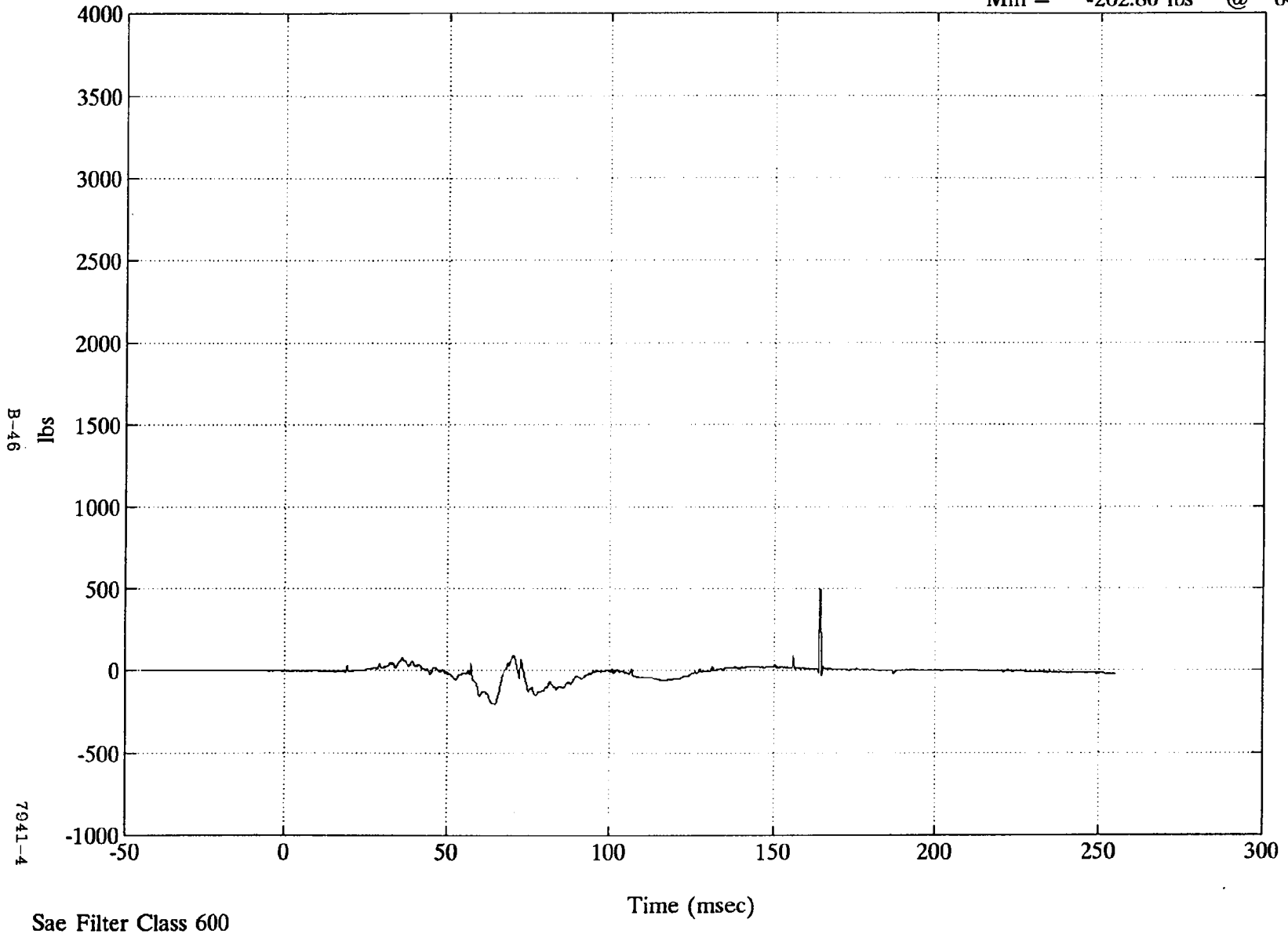


Sae Filter Class 600

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos. 2 Right Femur

Max = 494.64 lbs @ 164.40 msec
Min = -202.80 lbs @ 64.56 msec



B-46

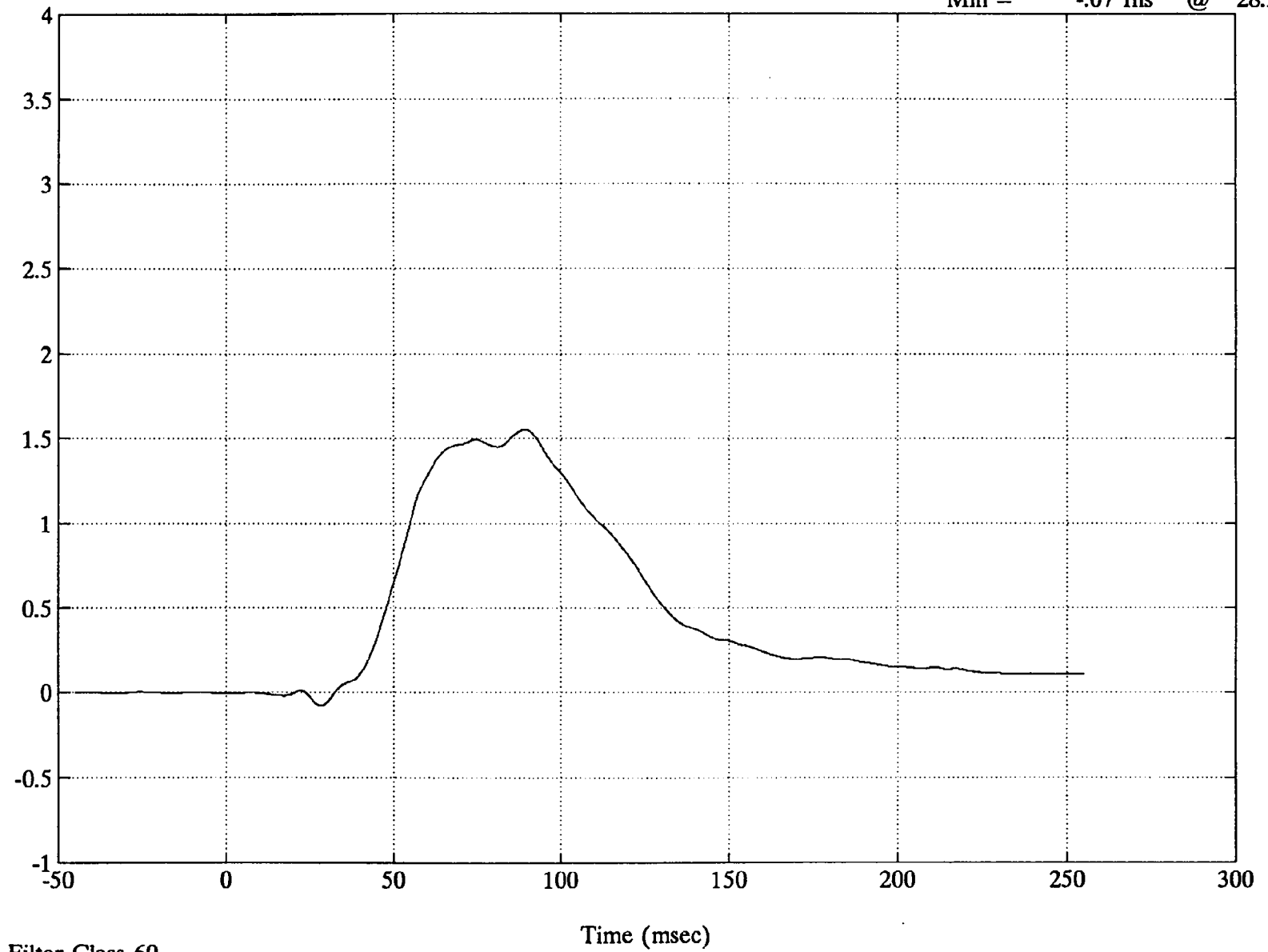
7941-4

Sae Filter Class 600

NHTSA 208 TEST 5 - 1992 PLYMOUTH VOYAGER

Pos #2 Chest Disp.

Max = 1.55 Ins @ 89.16 msec
Min = -.07 Ins @ 28.20 msec



B-47

7941-4

Sae Filter Class 60

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

assist the props when opening the gate in cold weather.

WINDOWS

Rear Quarter Windows

A lever at the rear of each window releases the window so that it can be pushed out for ventilation.

Power Vent Windows (If so equipped)

Switches on the overhead console, let you or the front seat passenger operate the two vent windows from the front seat.

Power Windows (if so equipped)

You can control either front window using switches on the door armrest. There is a single switch on the passenger's armrest. The switches will operate only when the ignition is in the ON position.

OCCUPANT RESTRAINTS

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

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

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

sure you and others in your vehicle are buckled up properly.

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

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

C-3

UNIBELTS

The UNIBELT, or single continuous-belt restraint system, is installed for the driver, front seat passenger, and right and left rear seating positions.

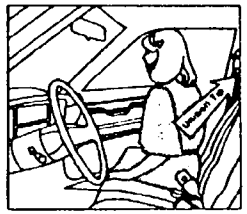
Each unibelt is a combined lap/shoulder belt system. The belt webbing retractor will lock only during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under normal conditions. But in a collision, the belt will lock and reduce the risk of your striking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

WARNING! Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a

7941-4

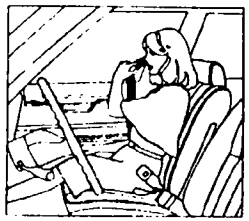
collision the best. Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.

Unibelt Operating Instructions



1

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



2

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

3

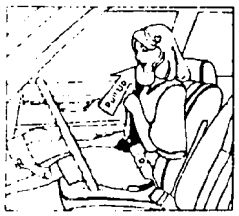
3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click."

WARNING! A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too

high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.

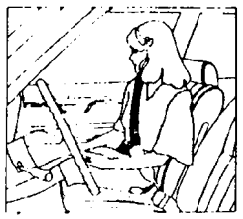
A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.

A belt that is worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a collision, increasing head and neck injury. And a belt worn under the arm is very likely to break your ribs. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.


4

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

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


5

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

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


6

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

SEAT BELTS AND PREGNANT WOMEN

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

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

- In the center rear seat, if the belt still can't be tightened, or if pulling and pushing on the restraint loosens the belt, you may need to do something more. Disconnect the latch plate from the buckle, turn it over, and reconnect it to the buckle. If you still can't make the child restraint secure, try a different seating position.
- Some child seat manufacturer's recommend the use of a top anchorage (tether) strap in addition to the lap belt. Your vehicle has tether strap anchorages behind some rear seating positions for use with these child seats. Your dealer can provide you with anchorage hardware and installation instructions.
- Buckle the child into the seat exactly as the seat manufacturers directions tell you. The cinching latch plate will keep the belt tight.
- When your infant carrier or child seat is not in use, secure it with the seat belt or remove it from the vehicle. Don't leave it loose in the vehicle. In a sudden stop or collision, it could strike occupants and injure them.

Children Too Large For Child Seats

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

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

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

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

DRIVER SUPPLEMENTAL MINIVAN RESTRAINT SYSTEM - AIRBAG

This vehicle has an airbag for the driver as a supplement to the seat belt restraint system. The airbag is mounted in the steering wheel. It works in more severe frontal collisions to provide additional protection for the head and chest of the seat belted driver.

> **WARNING!** Relying on the airbag alone could lead to more severe injuries in a collision. The airbag is NOT a complete restraint system and does not provide restraint to the lower body in frontal collisions, nor does it provide any restraint in side or rear collisions or rollovers. This Minivan airbag does not qualify as a passenger car passive restraint system. Always wear the seat belt.
>
> The seat belt system is designed to protect you in many types of collisions. The airbag deploys only in frontal collisions. And it will not deploy in collisions at slow speed. But even in collisions where the airbag does work, you need the seat belt to keep you in the right position for the airbag to protect you properly.
>
> Ignoring the AIRBAG light in your instrument panel could mean you don't have

the airbag to protect you in a collision. If the light does not come on, stays on after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

The airbag system consists of the following:

- Crash Sensors
- Diagnostic Unit
- AIRBAG Readiness Light
- Airbag/inflator Unit
- Unique Steering Wheel and Column
- Interconnecting Wiring

How The Airbag System Works

- **Crash Sensors** in the front of the vehicle and in the occupant compartment determine if a frontal impact is severe enough to require the airbag. The sensors will not detect side, rollover, or rear impacts. Switches in the sensors are connected to the diagnostic unit and to the airbag/inflator unit.
- The **Diagnostic Unit** monitors the readiness of the electronic parts of the system whenever the ignition switch is in the START or RUN positions. These include all of the items listed above. The diagnostic unit also turns on the AIRBAG light in the instrument panel for 6 to 8 seconds when the ignition is first turned on, then turns the light off. If it detects a malfunction in any part of the system, it turns on the light either momentarily or continuously.
- The **Airbag/Inflator Unit** is in the center of the steering wheel. When the crash sensors detect an impact requiring the airbag, they signal the inflator unit. A large quantity of non-toxic nitrogen gas is generated to

inflate the airbag. The steering wheel hub trim cover separates and folds out of the way as the bag inflates to its full size. The bag fully inflates in about 50 milliseconds. This is about half of the time it takes to blink your eyes. It then quickly deflates by venting the nitrogen gas through holes in the airbag toward the instrument panel. In this way the bag does not interfere with your control of the vehicle.

If A Deployment Occurs

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

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

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

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver as the airbag deploys and unfolds itself from the steering wheel.

  The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.
- As the airbag deflates you may see some smoke-like particles. The particles are a normal by-product of the process that generates the non-toxic nitrogen gas used for airbag inflation. These airborne particles may irritate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose

or throat irritation, move to fresh air. If the irritation continues, see your doctor.

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

- Your vehicle may be safely driveable after the airbag deploys. If so, you can tuck the deployed airbag inside the opening in the steering wheel hub trim cover to make driving somewhat easier.

WARNING! A deployed airbag cannot protect you in another collision. You could have much worse injuries without a working airbag. Have the airbag replaced by an authorized dealer as soon as possible.

MAINTAINING YOUR AIRBAG SYSTEM

WARNING!

- Modifications to any part of the airbag system could cause it to fail when you need it. You could be injured because the airbag is not there to protect you. Do not modify the components or wiring, including adding any kind of badges or stickers to the steering wheel hub trim cover. Do not modify the front bumper or vehicle body structure.

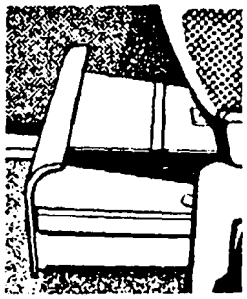
- You can be injured if you are too close to the steering wheel hub if the airbag inflates. For this reason, it is dangerous to try to repair any part of the airbag system yourself. Don't try to repair the airbag system. Be sure to tell anyone who works on your vehicle that it has an airbag.

You will want to have the airbag ready to inflate for your protection in an impact. So, if any of the following occurs, have an authorized dealer service the system promptly.

- The AIRBAG light does not come on or flickers during the 6 to 8 seconds when the ignition switch is first turned on.
- .The light remains on or flickers after the 6 to 8 second interval.
- The light flickers or comes on and remains on while driving.

The regular maintenance service recommended for every 3 years or 30,000 miles (48 000 km.) includes inspection of the mechanical and electrical components of the airbag system. See the Maintenance Schedule in Section 4.

STORAGE BIN (if so equipped)



The storage bin located under the front passenger's seat can be locked with the master key. If you must leave your vehicle with a parking attendant, give the attendant the "valet" key to maintain secure storage.

A plastic tool retainer is clipped to the inside wall on vehicles equipped with special wheel covers.

SEATS

Reclining Bucket Seats (if so equipped)

Use the control on the inboard side of the seat cushion to operate the recliner. Lean forward slightly before lifting the control, then lean back to the desired position and release the control.