V2434

REPORT NUMBER: 208-CAL-96-06
212-CAL-96-06
213-CAL-96-001
301-CAL-96-06

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

CHRYSLER CORPORATION
1996 Dodge Neon
4-Door Sedan

NHTSA NUMBER: CT0305

CALSPAN TEST NUMBER: 8353-4

May 1,1996

CALSPAN SRL CORPORATION
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 NSA-31
Washington, DC 20590

PCa

Prepared By: Vincent M. Paolini, Project Engineer

Approved By: David J. Travale, Program Manager
Transportation Sciences Center

Approval Date: June 4, 1996

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By:

Acceptance Date: 10/24/96

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
208-CAL-96-06 212-CAL-96-06 213-CAL-96-001 301-CAL-96-06		

4. Title and Subtitle	5. Report Date
Final Report of FMVSS 208, 212, 219 (Partial), and 301 Compliance Testing and FMVSS 213 testing of a 1996 Dodge Neon 4-Door Sedan NHTSA No.CT0305	May 1,1996
	6. Performing Organization Code CAL

7. Author(s)	8. Performing Organization Report No.
Vincent Paolini, Project Engineer David J. Travale, Program Manager	8354-4

9. Performing Organization Name and Address	10. Work Unit No.
Calspan SRL Corporation P.O. Box 400 Buffalo, New York 14225	A41-4-1613
	11. Contract or Grant No. DTNH22-93-D-11089

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
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, D.C. 20590	Final - May 1996
	14. Sponsoring Agency Code NSA-31

15. Supplementary Notes

16. Abstract

A 30 mph vehicle safety compliance test was conducted on a 1996 Dodge Neon 4-Door Sedan.

This test was performed at the Calspan SRL Corporation in Buffalo, New York on May1,1996.

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. 213, "Child Restraint Systems"
4. FMVSS No. 219 (partial), "Windshield Zone Intrusion"
5. FMVSS No. 301, "Fuel System Integrity"

The test mode was perpendicular (0°) and the impact velocity was 29.3 mph. The ambient temperature at the impact face was 70 °F.

The subject test vehicle appears to comply with the requirements of FMVSS Nos. 208, 213, 219 (partial) and 301. The test vehicle does not appear to comply with the requirements of FMVSS 212 .

Type of Restraint System: The test vehicle was equipped with a driver airbag and a passengerairbag restraint system. The manual seat belts were not used for this test. The test vehicle however was equipped with an integrated child restraint located in the center of the rear bench. The rear integrated child restraint contained a Part 572 three year old dummy which was used to perform the FMVSS 213 test.

17. Key Words	18. Distribution Statement
Compliance Testing Safety Engineering FMVSS 208 FMVSS 213	Copies of this report are available from: NHTSA Technical Reference Division ; Mail Code: NAD-52 400 Seventh , S.W., Room 5108, Washington, D.C. 20590 Telephone No. (202) 366-4946 Attn: Robert Hornickle

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	250 pages	

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. DTNH22-93-D-11089. The purpose of this test was to determine if the subject vehicle, a 1996 Dodge Neon 4-Door Sedan, 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-208-09, dated March 15, 1993. In addition, a FMVSS 213 "Child Restraint System" test was performed on the rear middle integrated child restraint.

Section 2

SUMMARY OF TEST NUMBER CT0305

A frontal barrier was impacted by a 1996 Dodge Neon 4-Door Sedan at a velocity of 29.3 mph. The test was performed at the Calspan SRL Corporation on May 1, 1996. Pre- and Post-test photographs of the vehicle and dummies can be found in Appendix A.

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

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the OVSC Laboratory Test Procedure. In addition, a FMVSS 213 test was performed using one Part 572 three year old dummy placed in the integrated child seat of the rear bench seat. To film the three-year old ATD, the vehicle's rear windows were removed to locate the high-speed camera on the right rear side door.

Both 50th percentile ATDs (driver and right front passenger occupants) were fully instrumented with head and chest three axis (x, y, and z) accelerometers, chest displacement potentiometers and left/right femur load cells. The Part 572 three year old ATD contained head and chest three axis (x,y, and z) accelerometers. All ATDs had been certified prior to the test.

The 52 channels of data were recorded on a P.C. based data acquisition system. Appendix B contains the vehicle and dummy response data traces. The left brake caliper (X) accelerometer data cable was damaged at 50 milliseconds. Position 1 Left Lower Tibia Force (X) transducer did not record properly during test.

The driver's HIC was 238.0. The maximum chest deceleration over 3 milliseconds was 47.3 g's with 1.2 inches of deflection. The maximum compressive force on the driver's left femur was 1284.0 pounds and 1594.1 pounds on the right femur.

The right front passenger's HIC was 170.5. The maximum chest deceleration over 3 milliseconds was 46.1 g's with 0.9 inches of deflection. Compressive loads of 1513.8 and 1758.6 pounds were recorded on the left and right femurs respectively.

The FMVSS 213 test information can be found in Appendix E and F.

Table 1

CRASH TEST SUMMARY

Vehicle NHTSA No. :	CT0305	Test Mode :	30 mph Frontal Barrier		
Test Date :	May 1, 1996	Time:	13:40	Temperature :	70 °F
Vehicle Make/Model/Body Style :	1996 Dodge Neon 4-Door Sedan				
Vehicle Test Weight :	3009 lbs				
Vehicle/Barrier Impact Angle :	0 °				
Impact Velocity :	29.3 mph				
Maximum Static Crush :	17.9 inches				
Vehicle Rebound :	14.0 inches				

DUMMIES:	DRIVER	PASSENGER
Type :	Part 572E	Part 572E
Restraint System :	Airbag	Airbag

Number of Data Channels :	52	
Number of Cameras :	1	Real Time
	15	High Speed
DOOR OPENING DATA :	Closed/operable (tools required)	- Left Front
	Closed/operable (tools required)	- Right Front

Front Seat(s) Data :	DRIVER	PASSENGER
Seat Track Failure :	0.0	0.0
	Inches of shift	
Seat Back Failure :	None	None

VISIBLE DUMMY CONTACT POINTS :	DRIVER	PASSENGER
Head :	•Face into airbag •Rear of head - headrest	Face into airbag
Abdomen :	airbag	airbag
Chest	airbag	airbag
Knees	knee bolster	glove box door

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION :

Year/Make/Model/Body Style : 1996 Dodge Neon 4-Door Sedan

NHTSA No. : CT0305 ; VIN: 3B3ES47C3TT201116 ; Color : Green

Engine Data: 4 cylinders; --- CID; 2.0 Liters; --- cc

Placement : --- Longitudinal or In-Line; X Transverse of 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; X Tilt Wheel

Date Received : 10/30/96 ; Odometer Reading 23 miles

Selling Dealer : State ST Body Works, Inc.

& Address: 420 State Street Watertown, NY 13601

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by : CHRYSLER CORPORATION

Date of Manufacture 8/95

GVWR : 3490 lbs.; GAWR: 1954 lbs. FRONT; 1611 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load : 32 psi FRONT

32 psi REAR

Recommended Tire Size : P165/80R13

* Recommended Cold Tire Pressure : 32 psi FRONT; 32 psi REAR

Size of Tires on Test Vehicle: P185/65R14 ; Manufacturer: Goodyear

Vehicle Capacity Data :

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

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 865 lbs.

No. of Occupants x 150 lbs. = 750 lbs.

Rated Cargo/Luggage Weight (RCLW) = 115 lbs.

*Tire pressure used for test

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

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

Right Front	= 826	lbs.	Right Rear	= 435	lbs.
Left Front	= 826	lbs.	Left Rear	= 454	lbs.
TOTAL FRONT	= 1,652	lbs.	TOTAL REAR	= 889	lbs.

TOTAL DELIVERED WEIGHT = 2,541.0 lbs.

% of Total Front of Vehicle Weight = 65.0 % of Total Rear Weight = 35.0 %

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

Total Delivered Weight	= 2,541	lbs.
Rated Cargo/Luggage Weight (RCLW)	= 115	lbs.
Weight of 2 p.572 Dummies @ 167 each	= 369 *	lbs.
TARGET TEST WEIGHT	= 3,025	lbs.

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 99 POUNDS OF CARGO WEIGHT:

Right Front	= 911	lbs.	Right Rear	= 607	lbs.
Left Front	= 881	lbs.	Left Rear	= 610	lbs.
TOTAL FRONT	= 1,792	lbs.	TOTAL REAR	= 1,217	lbs.

TOTAL TEST WEIGHT = 3,009.0 lbs.

% of Total Front Weight = 59.6 % % of Total Rear Weight = 40.5 %

Weight of Ballast Secured in Vehicle Trunk Area = 0 lbs.

Vehicle Components Removed for Weight Reduction: tail lights, rear door glass/trim

VEHICLE ATTITUDE (all dimension in inches) :

AS DELIVERED :	RF	26.7	LF 26.5	RR	27.3	LR	27.0
FULLY LOADED :	RF	25.8	LF 25.7	RR	26.0	LR	25.6
AS TESTED :	RF	25.8	LF 25.8	RR	26.0	LR	25.6

Vehicle's Wheel Base : 103.8 in.

Location of Vehicle's C.G. : 42.0 inches rearward of front wheel center.

FUEL SYSTEM DATA :

Fuel System Capacity From Owner's Manual = 11.2 gallons

Usable Capacity Figure Furnished by COTR = 11.2 gallons

Test Volume Range (92 to 94% of Usable Capacity) = 10.3 to 10.5 gallons

ACTUAL TEST VOLUME= 10.3 gallons (with entire fuel system filled)

* This weight also includes a Part 572 Three Year Old ATD weighing 35 lbs.

Table 3

POST IMPACT DATA

TYPE OF TEST:

Type of Test : Frontal Barrier Impact Angle : 0°

Test Date : May 1, 1996 Time: 13:40 Temperature: 70 °F

Vehicle NHTSA No. : CT0305

Required Impact Velocity Range : 28.9 to 29.9 mph

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

Trap No. 1 = 29.3 mph; Trap No. 2 = 29.3 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 =	166.2	; C/L =	170.9	; Left =	166.2
Post-Test	Right =	152.2	; C/L =	153.0	; Left =	153.0
Crush	Right =	14.0	; C/L =	17.9	; Left =	13.2
AVERAGE	=	15.0	inches			

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point :

Right =	13.8	; C/L =	13.5	; Left =	14.7
AVERAGE =	14.0	inches			

DOOR OPENING :	Left	Right
Front	closed/operable (tools required)	closed/operable (tools required)
Rear	closed/operable (no tools required)	N/A
SEAT MOVEMENT :	Seat Back Failure	Seat Shift
Front	None	0.0 in.
Rear	---	---

Table 3

POST IMPACT (cont.)

GLAZING DAMAGE :

None.

OTHER NOTABLE IMPACT FEATURES :

None.

Section 3

OCCUPANT AND VEHICLE DATA

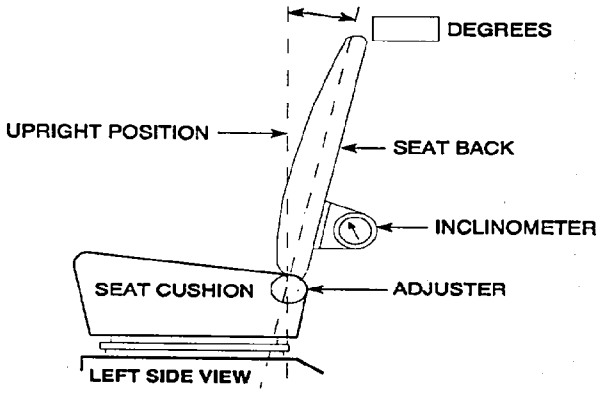
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1996 Vehicle Model: Dodge Neon Body Style : 4-Door Sedan

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 : N/A

Measurement instructions : Remove seat recliner mechanism (seat in full up position), insert 6 mm. dowel pin in gauge hole, recline seat rearward until it stops at dowel.

Seat back angle for passenger's seat : N/A

Measurement instructions : Same as driver

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Place seat in 12th detent (mid-position) from a total of 23 detent locations.

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

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 11.2 gallons

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

4. Steering Column Position :

27 mm. up from lowest position.

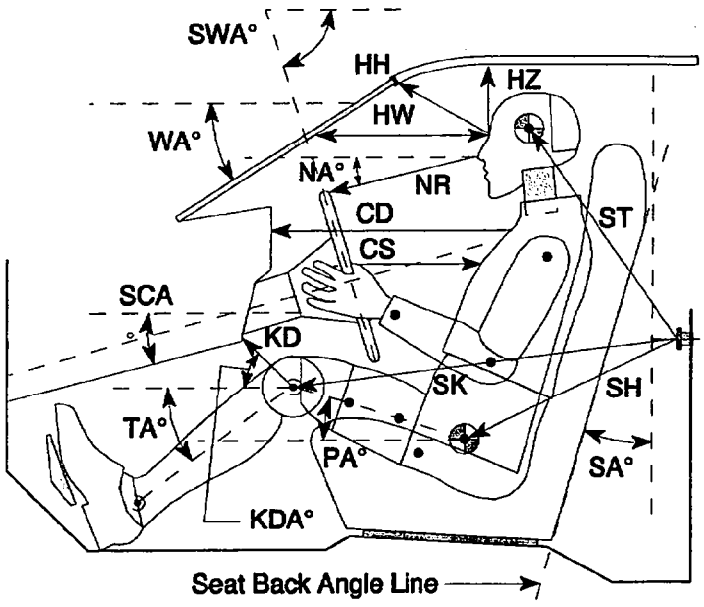
5. Other:

None.

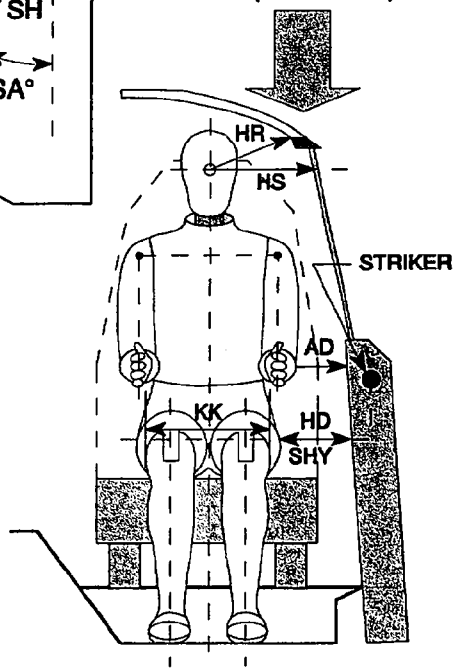
Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

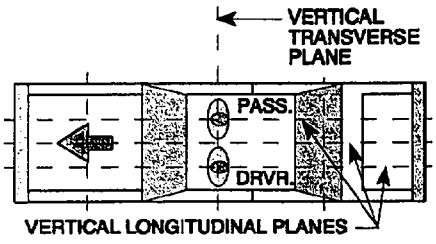
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



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



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



8353-4

Table 4

FRONT SEAT OCCUPANT MEASUREMENTS

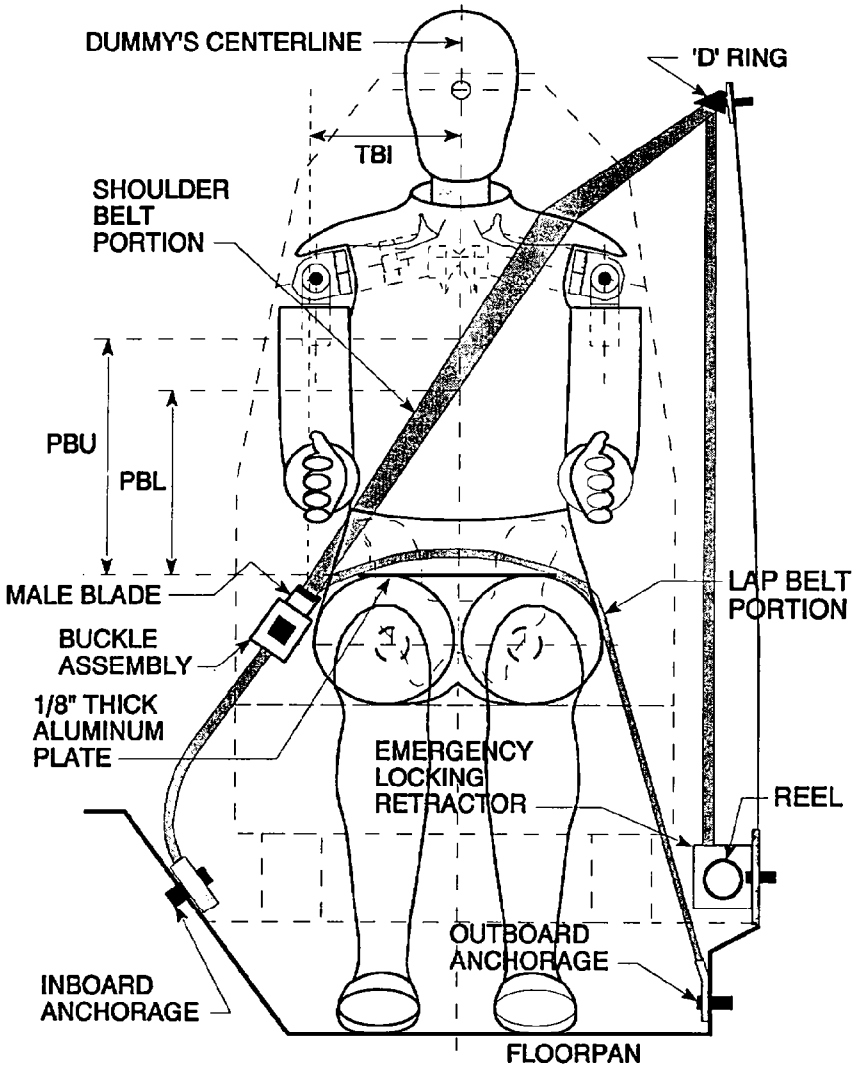
(All dimensions excluding angles are in inches).

	DRIVER (Serial #341)			PASSENGER (Serial #342)		
WA°	26 deg.			-		
SWA°	23 deg.			-		
SCA°	67 deg.			-		
SA°	18 deg.			18 deg.		
HZ	7.4			6.8		
HH	11.1			11.2		
HW	20.2			18.7		
HR	8.5			7.6		
NR	13.2	Angle	9 deg.	-		
CD	19.5			18.2		
CS	10.0			-		
RA	5.5			-		
KDL/KDA	4.6	Angle	38 deg.	6.1		
KDR/KDA	3.5			6.2	Angle	40 deg.
PA°	24 deg.			24 deg.		
TA°	36 deg.			34 deg.		
KK	12.1			10.5		
ST	21.5	Angle	75 deg.	21.5	Angle	81 deg.
SK	23.5	Angle	-1 deg.	22.2	Angle	-2 deg.
SH	9.6	Angle	-34 deg.	9.1	Angle	-32 deg.
SHY	9.5			9.8		
HS	11.6			10.8		
HD	4.0**			4.5**		
AD	2.4			2.9		

** Measurement taken to door pocket

Figure 3

SEAT BELT POSITIONING DATA



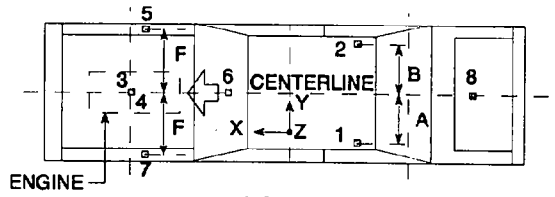
FRONT VIEW OF DUMMY

	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	*	*
PBL -- Top surface of alum. plate to belt lower edge	*	*
TBI -- Distance from torso centerline to buckle	*	*

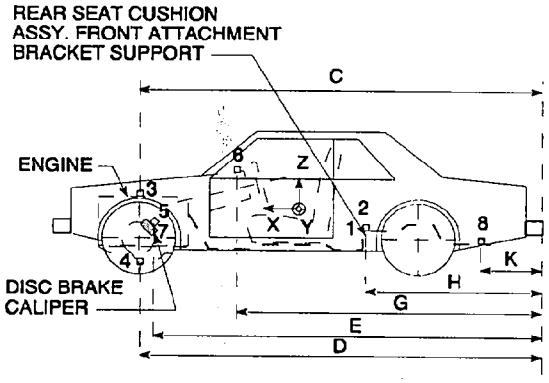
* Vehicle equipped with air bag, manual seat belt not used for this position.

Figure 4

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



TOP VIEW



LEFT SIDE VIEW

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	Instrument Panel	X		
7	Left Disc Brake Caliper	X		
8	Trunk Z			X

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

Table 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

DIMENSION	LENGTH (Inches)	
	PRE-TEST VALUES	POST-TEST VALUES
A Left Rear Seat Crossmember Y	23.9	23.9
B Right Rear Seat Crossmember Y	25.1	25.1
C Top of Engine X	141.7	137.8
D Bottom of Engine X	156.3	149.5
E Disc Brake Calipers X	134.0	133.0
F Disc Brake Calipers Y	22.4	22.1
G Instrument Panel X	101.9	101.6
H Rear Seat Crossmembers X	64.9	64.5
K Trunk X	14.5	14.5

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE			
		Pos.	msec.	Neg.	msec.
1	Rear Seat X-Member @ Left Side	24.0	159.0	N/A	N/A
2	Rear Seat X-Member @ Right Side	1.2	114.5	-28.3	57.4
3	Top of Engine Block	50.3	43.0	-111.0	30.5
4	Bottom of Engine	48.4	13.7	-120.6	23.9
5	Disc Brake Caliper @ Right Side	4.8	66.5	-67.2	43.8
6	Instrument Panel	34.8	26.3	-68.5	42.7
7	Disc Brake Caliper @ Left Side	*	*	*	*
8	Trunk	7.6	33.2	-7.1	20.2

* This accelerometer contained questionable data after approximately 91 milliseconds, therfore the stated maximum value will not be published in this test report.

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information shown on Table 6.

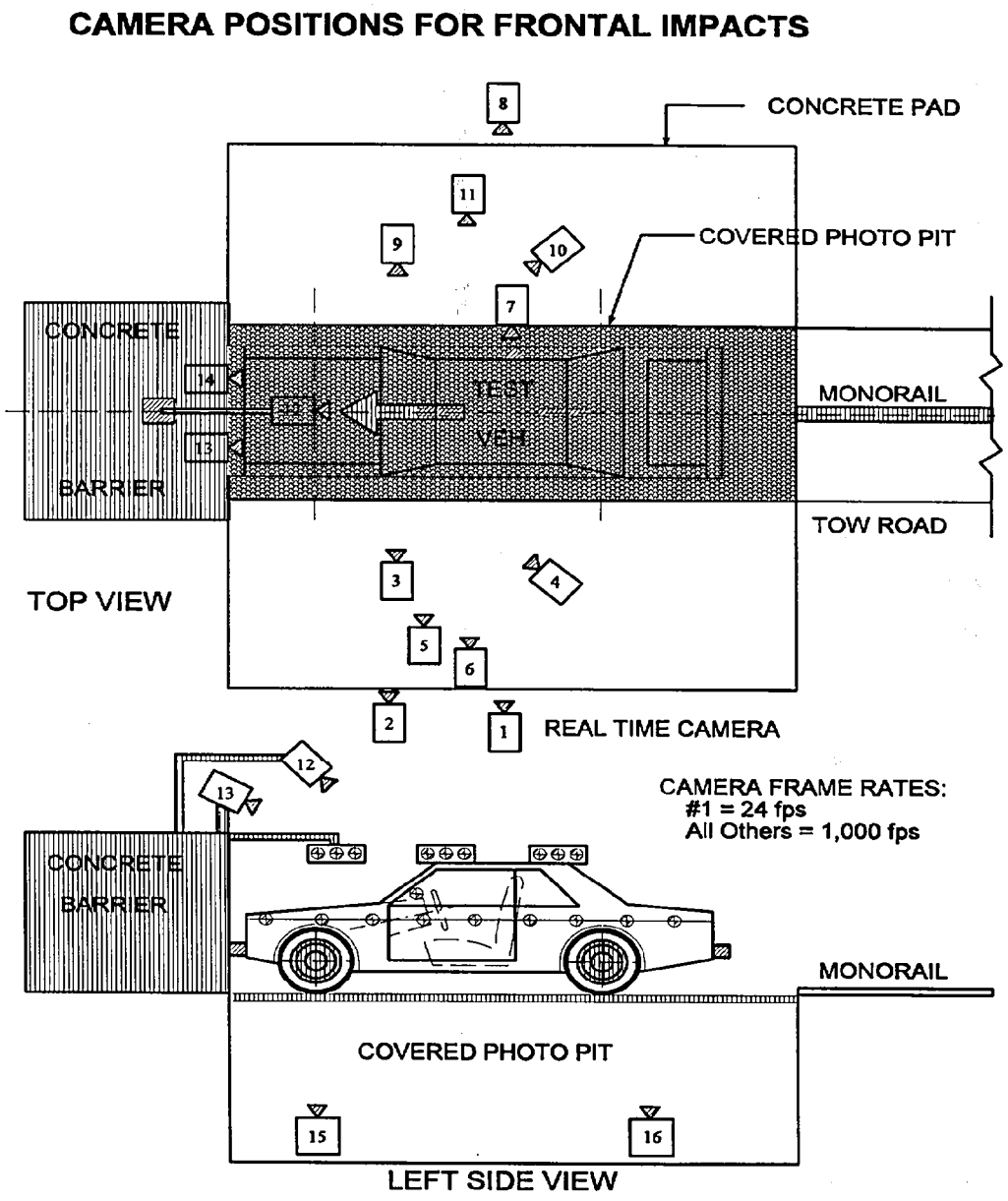


Table 6

HIGH-SPEED CAMERA LOCATIONS

Test No. CT0305 Vehicle: 1996 Dodge Neon 4-Door Sedan

Camera No.	VIEW	CAMERA POSITIONS (In.)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET (In.)	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	414	64	46	-1	400	25	1020
3	Left Side View	308	34	45	-1	294	25	1050
4	Driver and Interior View	213	115	75	-15	-	25	1005
5	Steering Column (Bottom)	378	75	46	-2	364	35	710
6	Steering Column (Top)	378	75	70	-6	364	35	1105
7	Right Side Child Seat View	--	--	--	--	--	8	680
8	Overall Right Side	395	75	50	-1	381	25	1040
9	Right Side View	396	58	48	-2	381	35	1000
10	Passenger and Interior View	209	130	72	-14	-	25	1110
11	Right Passenger View	393	86	47	-3	-	50	920
12	Windshield View	12	0	120	-42	-	13	1090
13	Driver Front View	18	22	73	-42	-	8	1005
14	Passenger Front View	18	22	72	-50	-	8	1000
15	Pit View of Engine	36	0	-86	90	-	13	1025
16	Pit View of Fuel Tank	120	0	-86	90	-	13	910

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

Figure 6

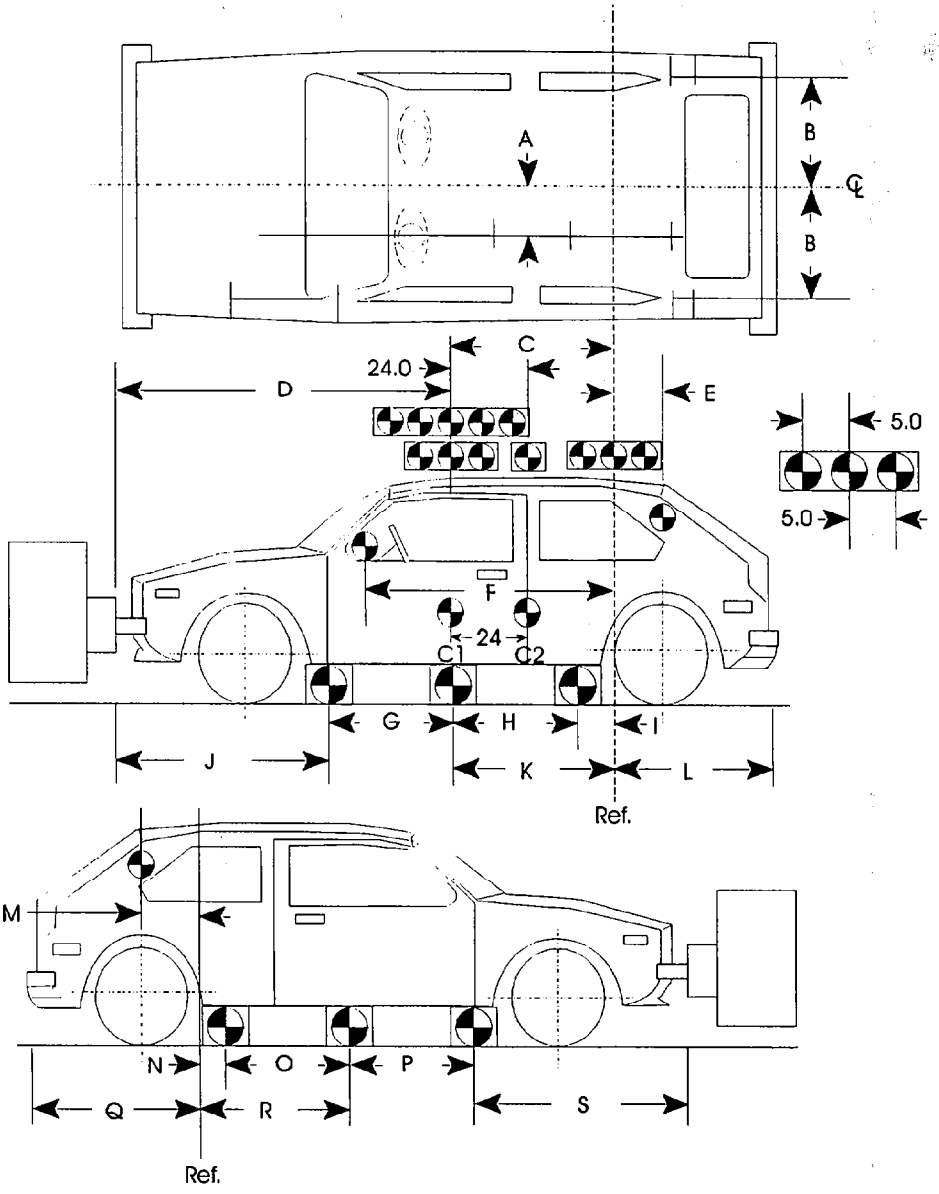
VEHICLE TARGET LOCATIONS
(All dimensions in inches)

Key (Inches)

A =	10.9
B =	18.7

C =	35.8
D =	90.5
E =	0.8
F =	59.8
G =	32.0
H =	37.8
I =	5.3
J =	50.2
K =	43.1
L =	45.6

M =	0.0
N =	3.8
O =	36.0
P =	36.0
Q =	45.6
R =	39.8
S =	49.5



Note: Targets on front fender are 12.0 inches apart. Targets rearward of front fender are 24.0 inches apart.

Figure 7

TEST VEHICLE MEASUREMENTS

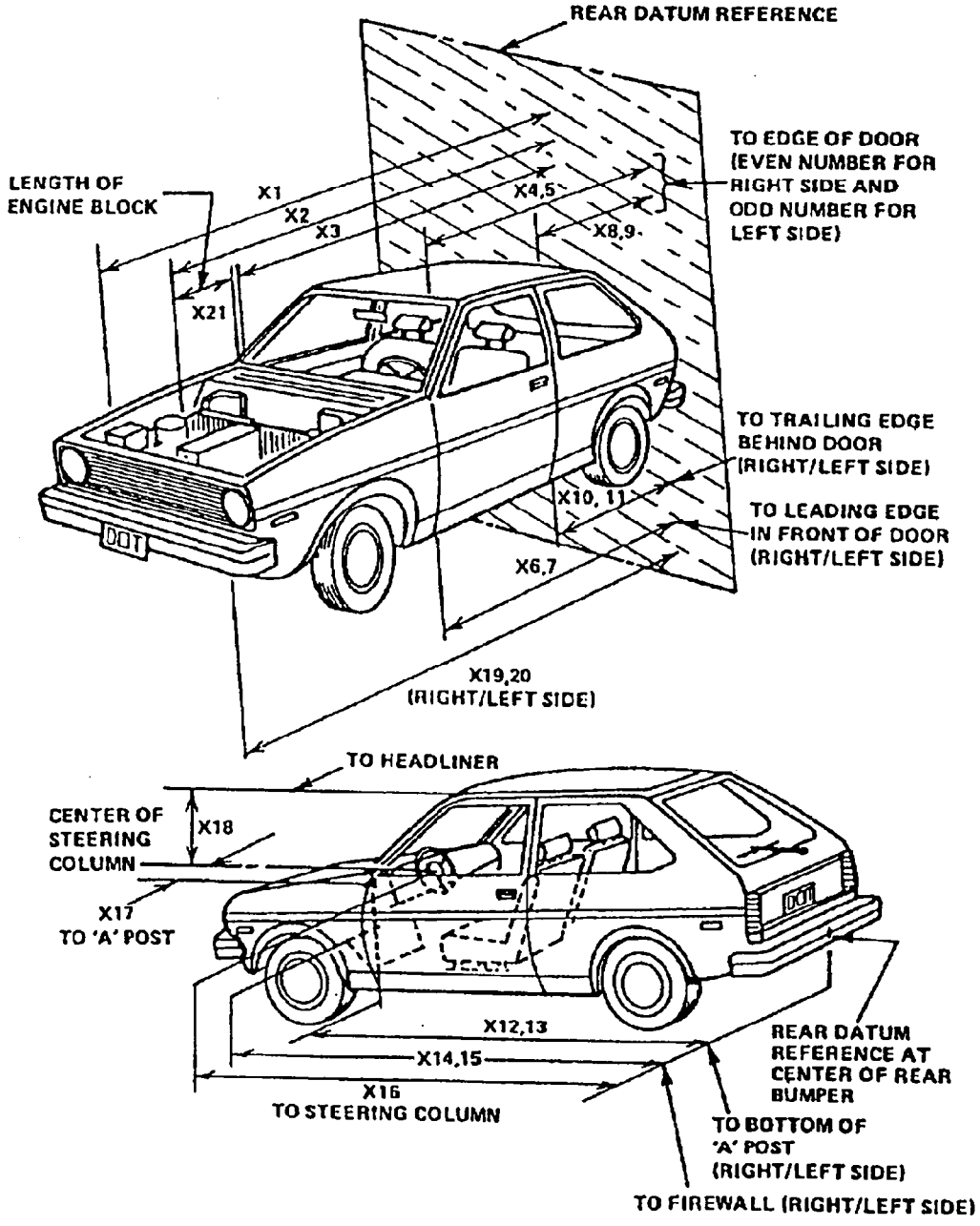


Table 7

VEHICLE MEASUREMENTS

		All Dimensions in inches		
No.		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	170.9	153.0	17.9
X2	Rear Surface of Vehicle to Front of Engine	148.5	139.5	9.0
X3	Rear Surface of Vehicle to Firewall	136.0	130.5	5.5
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	116.0	115.4	0.6
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	116.5	115.4	1.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	118.1	117.8	0.3
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	118.5	118.1	0.4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	76.5	75.5	1.0
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	76.6	76.0	0.6
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	76.2	75.8	0.4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	76.5	76.4	0.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	120.8	120.8	0.0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	121.5	121.0	0.5
X14	Rear Surface of Vehicle to Firewall, Right Side	131.0	128.0	3.0
X15	Rear Surface of Vehicle to Firewall, Left Side	131.1	130.2	0.9
X16	Rear Surface of Vehicle to Steering Column	100.0	99.0	1.0
X17	Center of Steering Column to "A" Post	15.8	17.8	-2.0
X18	Center of Steering Column to Headliner	16.5	15.0	1.5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	166.2	152.2	14.0
X20	Rear Surface of Vehicle to Left Side of Front Bumper	166.2	153.0	13.2
X21	Length of Engine Block	18.0	18.0	0.0

Section 4

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

- "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

Table 8

DUMMY INJURY CRITERIA VALUES

NHTSA No. : CT0305 Vehicle : 1996 Dodge Neon 4-Door Sedan

	MAXIMUM ACCELERATION (g's)								
	HEAD				CHEST				
	X	Y	Z	R	X	Y	Z	R*	Displacement
Dummy (1)	-43.4	6.7	25.3	44.5	-48.9	-6.1	11.0	47.3	-1.2
Dummy (2)	-38.0	-19.3	33.6	50.5	-44.8	-7.5	22.4	46.1	-0.9

	MAXIMUM COMPRESSIVE FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	1284.0	1594.1
Dummy (2)	1513.8	1758.6

	HEAD INJURY CRITERIA**			
		36 millisecond Maximum		Avg. Acc (g)
	HIC	t_1 (msec)	t_2 (msec)	t_1 TO t_2
Dummy (1)	238.0	45.72	81.24	33.92
Dummy (2)	170.5	55.56	91.56	29.52

* Defined as exceeding 0.003 sec. duration
**As defined in FMVSS No. 208

Table 9

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 X

Table 10

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 :

** No label present describing maintenance. Owner's manual states no normal maintenance is required.

Were appropriate instructions concerning maintenance and/or replacement of this system provided ?

YES X NO --

Was a description of the functional operation of the system provided ?

YES X NO --

Is there a reference to the instructions and description of the system on the label ?

YES X NO --

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

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the system ?

YES X NO --

Table 11

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 X

Describe the location of the readiness indicator :

Readiness indicator located on the right side of instrument cluster.

Is the readiness indicator clearly visible to the driver ? YES X NO --

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

YES X NO --

Table 12

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No. :	CT0305
Make/Model :	1996 Dodge Neon 4-Door Sedan
Date of Comfort/Convenience Check :	4/29/96
Technician Performing Check :	DJT
GVWR :	3490 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 X

If yes, go to requirements D1, D2, and D3

2. Manual seat belts* — YES X 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 X

(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 12 (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 X

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 (non-engaged)

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 X

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 cancelled each time the adjacent door is opened.

YES N/A NO N/A

(If NO, provide explanation.)

Table 12 (cont.)

2. This vehicle is equipped with manual belts, required to meet FMVSS 208 S4.6, and the tension relieving device is cancelled 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 X

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

YES X NO --

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

YES X 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 12 (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 X NO --

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

D5
RETRACTION

1. Seats and seat backs are adjusted according to instructions in Appendix B "General Test Conditions" in TP-208-09, dated March 15, 1993.

YES X 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 X NO --

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

YES X NO --

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 X NO --

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

YES X 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 X 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 X NO --

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

YES X NO --

Table 12 (cont.)

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

   a. The belt is completely retracted or, if the belt is non-retractable, the belt is unattached.

   YES X NO --

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

   YES X NO --

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

   YES X NO --

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 X 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 X 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 X NO --

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

   YES X NO --

Figure 8

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

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

The windshield is bonded in place with 0.75 in. rubber trim along top and sides of the windshield. Lower portion covered by a plastic shroud and 0.3 inch rubber trim.

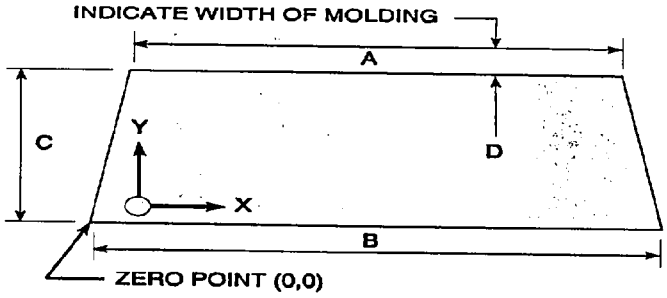
FMVSS 212 REQUIREMENTS :

The Post - Test periphery retention amount must be at least 75% of the Pre - Test periphery measurement for vehicle 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	83.0	29.2	35.2
LEFT SIDE	83.0	66.5	80.1
TOTAL	166.0	95.7	57.7

AREA OF RETENTION FAILURE:



FRONT VIEW OF WINDSHIELD

FAILURE DETAILS : The length of retention loss on the right side of windshield was from (0,0) to (0,11.5") then from (0,12.0") to (0,23.3"). The lower portion of the windshield exhibited 47.5" of retention loss (0,0) to (47.5",0). See photo figure A-12, page A-14 . Red and blue tape indicates area of retention loss in photo.

Figure 9

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

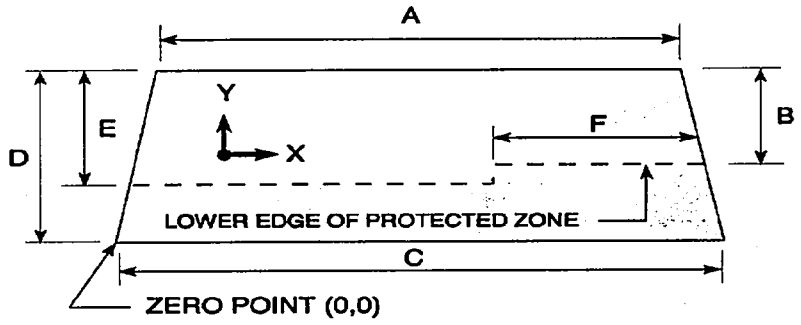
PROTECTED ZONE LOWER EDGE REQUIREMENT :

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.)

KEY (Inches):

A =	44.0
B =	17.3
C =	63.4
D =	29.3
E =	20.3
F =	21.4



FRONT VIEW OF WINDSHIELD

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

(Show location of penetration on above sketch)

	COORDINATES	
	X	Y
1		
2		
3		
4		

None.

Table 13

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO. : CT0305 TEST DATE : May 1, 1996

Vehicle Mfgr./Make/Model : 1996 Dodge Neon 4-Door Sedan

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:

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

SOLVENT SPILLAGE DETAILS :

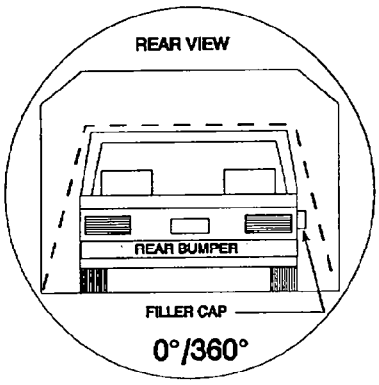
None.

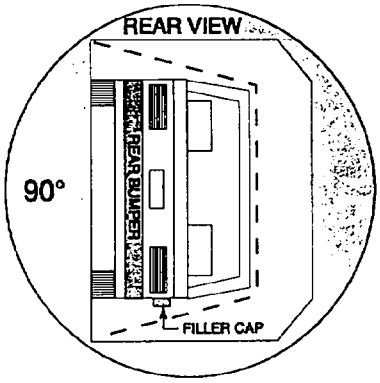
Table 14

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE :
0-90 Deg.

Vehicle NHTSA ID No. :
CT0305





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)		_____	minutes	_____	seconds
FMVSS 301 Position Hold Time +		5	minutes	00	seconds
	TOTAL	5	minutes	0	seconds
Next whole minute interval		6	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes 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 :

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

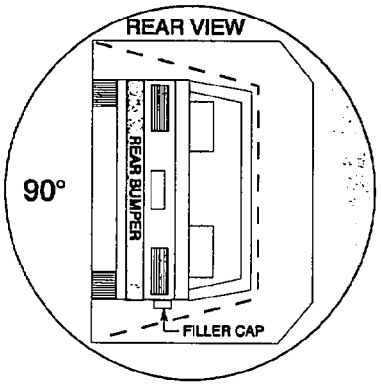
IV. SOLVENT SPILLAGE LOCATION(S) :

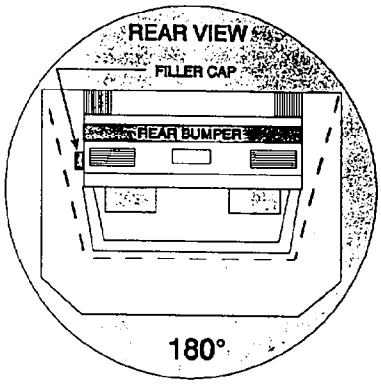
Note: A FMVSS 301 Static Rollover was not performed for this test due to the FMVSS 212 performance.

Table 14
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
90-180 Deg.

Vehicle NHTSA ID No. :
CT0305





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)			minutes		seconds
FMVSS 301 Position Hold Time +		5	minutes	00	seconds
	TOTAL	5	minutes	0	seconds
Next whole minute interval		6	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes 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 :

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

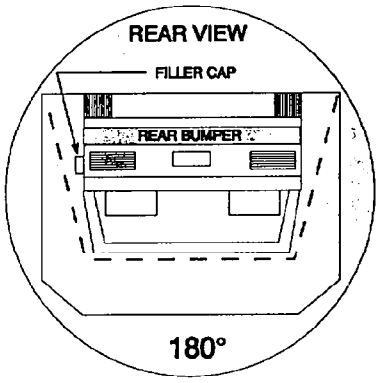
IV. SOLVENT SPILLAGE LOCATION(S) :

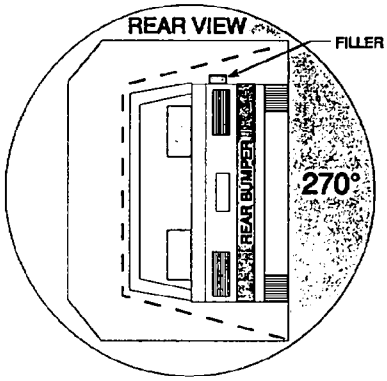
Note: A FMVSS 301 Static Rollover was not performed for this test due to the FMVSS 212 performance.

Table 14
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
180-270 Deg.

Vehicle NHTSA ID No. :
CT0305





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)			minutes		seconds
FMVSS 301 Position Hold Time +		5	minutes	00	seconds
	TOTAL	5	minutes	0	seconds
Next whole minute interval		6	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes 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 :

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

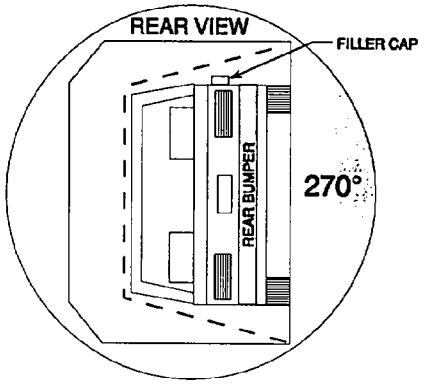
IV. SOLVENT SPILLAGE LOCATION(S) :

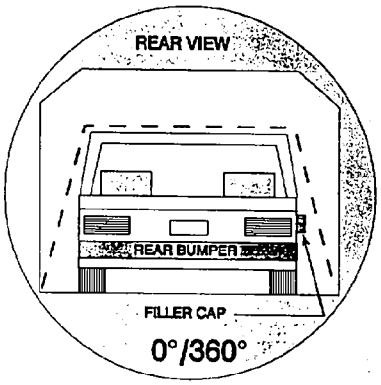
Note: A FMVSS 301 Static Rollover was not performed for this test due to the FMVSS 212 performance.

Table 14
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

TEST PHASE :
270-360 Deg.

Vehicle NHTSA ID No. :
CT0305





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD :

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)			minutes		seconds
FMVSS 301 Position Hold Time +		5	minutes	00	seconds
	TOTAL	5	minutes	0	seconds
Next whole minute interval		6	minutes		

II. FMVSS 301 REQUIREMENTS :

(1) Time Period

First 5 minutes 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 :

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

IV. SOLVENT SPILLAGE LOCATION(S) :

Note: A FMVSS 301 Static Rollover was not performed for this test due to the FMVSS 212 performance.

Table 15

POST TEST AIR BAG DATA

NHTSA No. : CT0305 Test Date: May 1, 1996 Technician: VMP

Vehicle Model Year/Make/Model: 1996 Dodge Neon 4-Door Sedan

A. No. of vent holes: 2 -Driver 1 -Passenger

B. Size of vent holes: ($In.^2$) 1.23 -Driver 3.98 -Passenger

C. Total vent area: ($In.^2$) 2.45 -Driver 3.98 -Passenger

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

Driver: --- -Length; --- -Width; 23 in. -Diameter

Passenger: 12 in. -Height; 17 in. -Width; 16 in. -Depth

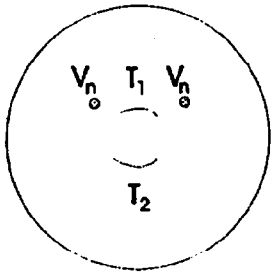
E. Is the air bag tethered?

Driver: X -Yes; --- -No; If yes, record length of tether- 9 in.

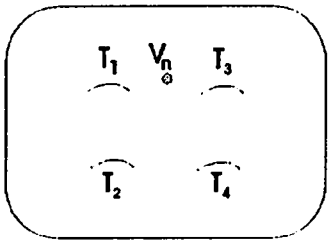
Passenger: X -Yes; --- -No; If yes, record length of tether- 14 in.

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



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

Driver: Air bag: **Airbags not removed due to FMVSS 212 performance.**

Generator:

Passenger: Air bag: **Airbags not removed due to FMVSS 212 performance.**

Generator:

G. Cut out a 6 inch by 6 inch swatch of the bag material and at least one tether from each bag, mark the vehicle's NHTSA number on the swatch, and send these parts to the COTR with the test report.

Table 16

ACCIDENT INVESTIGATION DIVISION DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1996 Dodge Neon 4-Door Sedan

VEHICLE NHTSA NO. : CT0305 VIN NO. : 3B3ES47C3TT201116

WHEELBASE: 103.8 in. BUILD DATE: 8/95 TEST DATE: 5/1/96

VEH SIZE CATEGORY: Compact TEST WEIGHT: 3009 lbs.

FRONT OVERHANG: 32.5 in. OVERALL WIDTH: 67.5 in.

COLLISION DEFORMATION (CDC) CODE: 12FDEW2

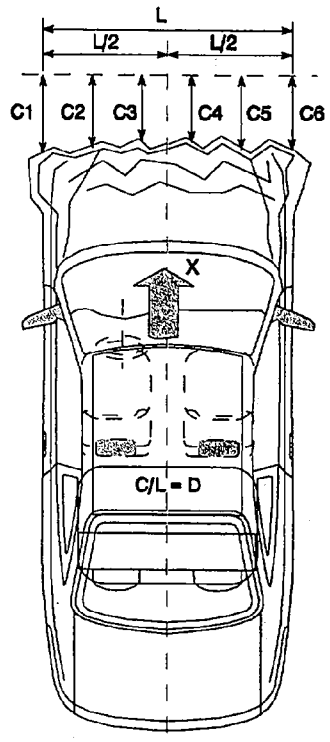
IMPACT MODE: 30 mph zero degree frontal barrier.

CRUSH DEPTH DIMENSIONS: (Inches)

C1 =	12.2	C4 =	17.3
C2 =	15.0	C5 =	16.0
C3 =	16.8	C6 =	13.1

MIDPOINT OF DAMAGE: D=
(Vehicle Longitudinal Centerline) 28.5 in.

LENGTH OF DAMAGE
REGION: L= 57.0 in.



Remarks: None.

Table 17
TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA Contract Lab : Calspan Advanced Technology Center

Lab Project Manager & Telephone No. : David J. Travale (716) 632 - 7500

Date of Test : 5/1/96 Vehicle NHTSA No. : CT0305

Vehicle Manufacturer : Chrysler Corporation

Model Year : 1996 VIN : 3B3ES47C3TT201116

Model : Neon Body Style: 4-Door Sedan Build Date : 8/95

Dummy Stabilized Temperature at Time of Test : 70 °F (Spec. = 69 - 72 °F)

Impact Velocity : 29.3 mph; Time of Test : 13:40

Type of Automatic Restraint System :

Driver : Airbag

Passenger : Airbag

Failure Details :

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

Requirements :

The FMVSS 212 requirement states that the post-test windshield periphery retention amount must be at least 50% for each side of the windshield for vehicles equipped with an automatic restraint system for the front occupants. The post-test measurement on the test vehicle was 35.2% of windshield retention on the right side of the windshield.

Approximate date that final test report will be made available to CTM:

May 24, 1996

Date Mfg. Rep. Notified : _____ Rep. Name: _____

Remarks: _____

Date of Proposed Joint Inspection of Test Vehicle : _____

NHTSA CMT : _____ CIR No.: _____ Date : _____

Appendix A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

8353-4

Figure A-1 PRE-TEST FRONT VIEW

Figure A-2 POST-TEST FRONT VIEW

8353-4

Figure A-3 PRE-TEST LEFT SIDE VIEW

8353-4

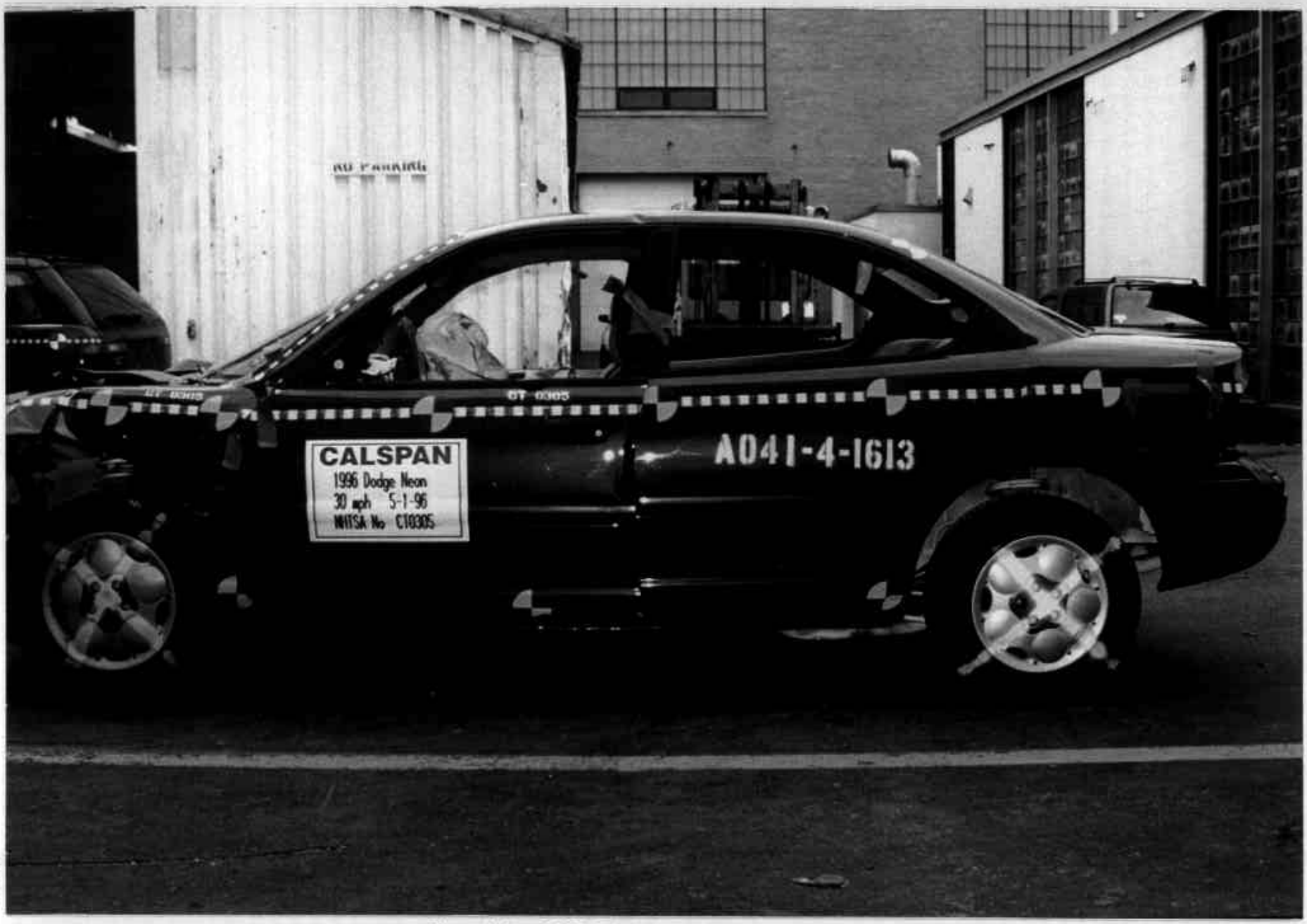


Figure A-4 POST-TEST LEFT SIDE VIEW

Figure A-5 PRE-TEST RIGHT SIDE VIEW

8353-4

Figure A-6 POST-TEST RIGHT SIDE VIEW

8353-4

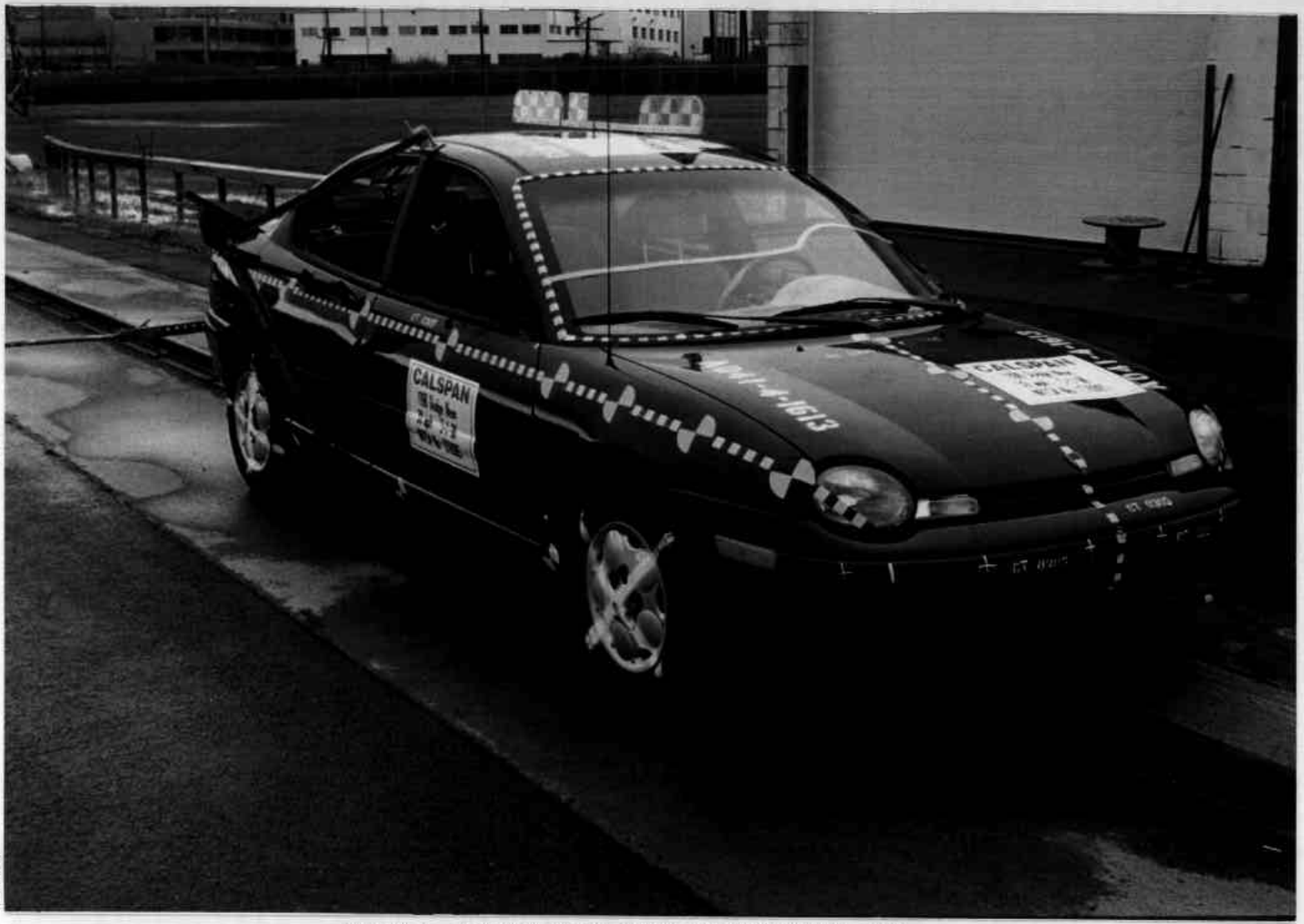


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

8353-4

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

8353-4

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

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

Figure A-11 RRC TEST WINDSHIELD VIEW

8353-4

Figure A-12 POST-TEST WINDSHIELD VIEW

Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

8353-4

Figure A-14 POST-TEST ENGINE COMPARTMENT VIEW

Figure A-15 PRE-TEST FUEL FILLER CAP PHOTO

8353-4

Figure A-16 POST-TEST FUEL FILLER CAP PHOTO

8353-4

Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

Figure A-18 POST-TEST FRONT UNDERBODY VIEW

8353-4

Figure A-19 PRE-TEST REAR UNDERBODY VIEW

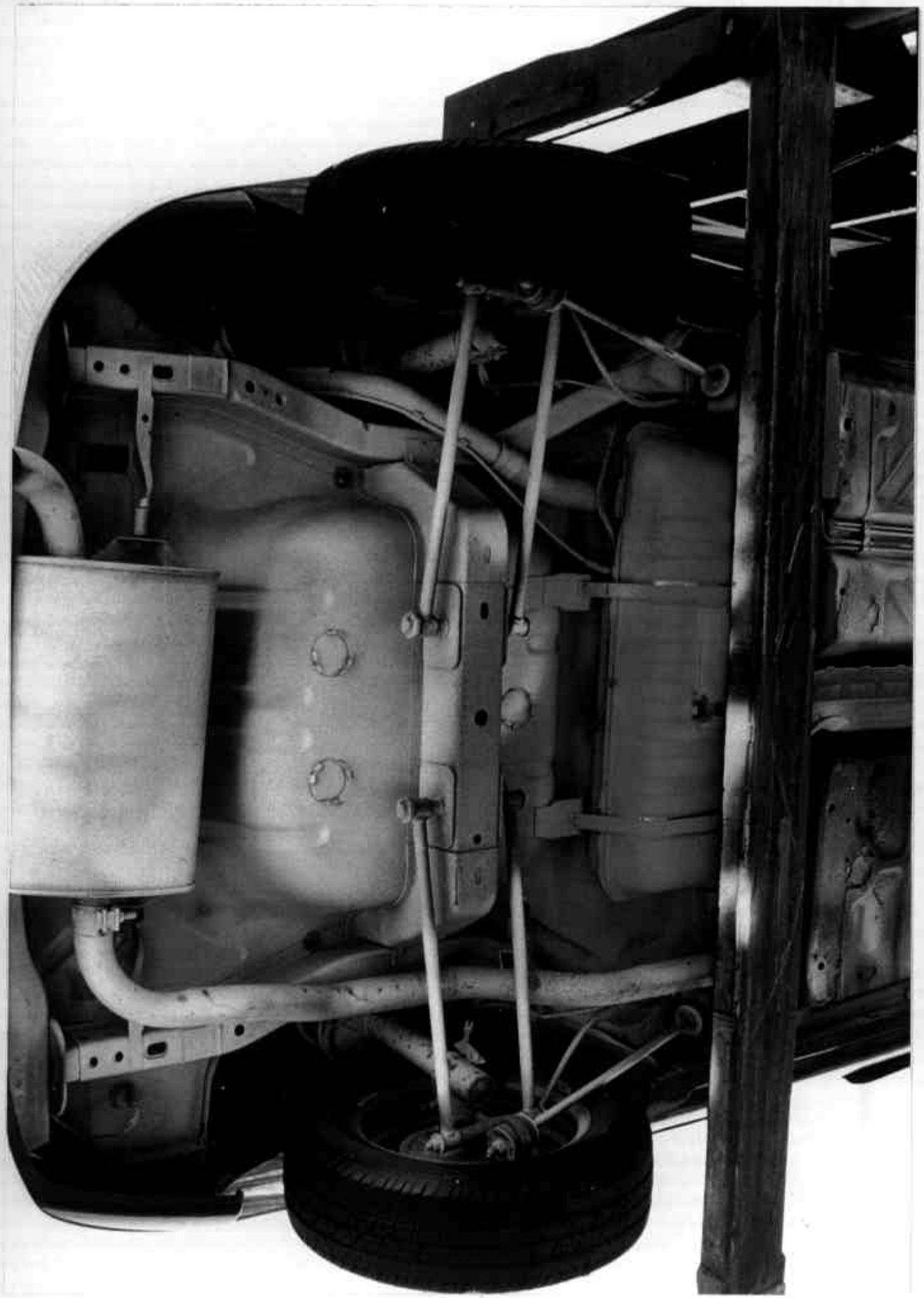


Figure A-20 POST-TEST REAR UNDERBODY VIEW

Figure A-21 PRE-TEST DRIVER SIDE VIEW

PHOTOGRAPH NOT AVAILABLE

Figure A-22 POST-TEST DRIVER SIDE VIEW

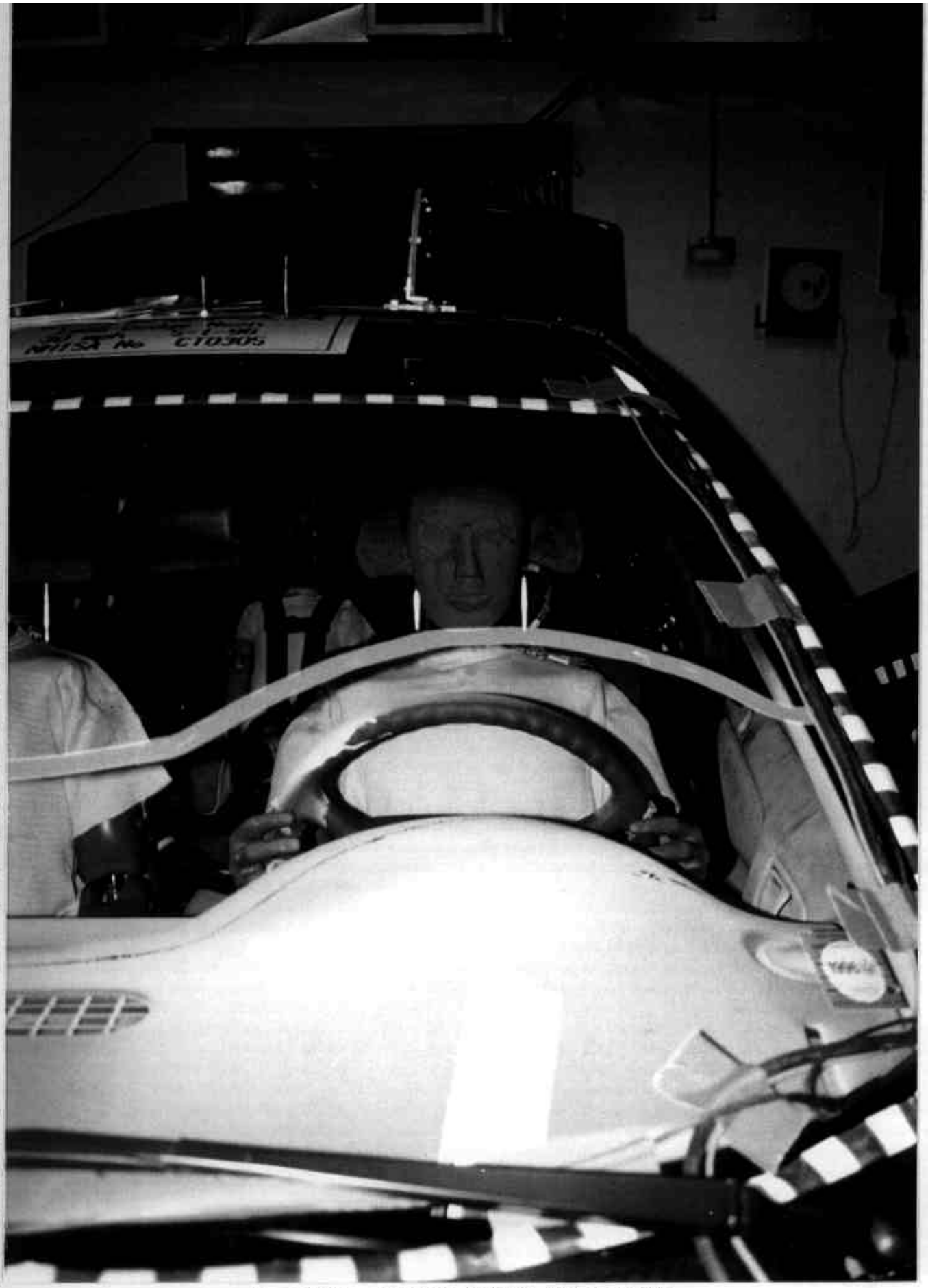


Figure A-23 PRE-TEST DRIVER FRONT VIEW

PHOTOGRAPH NOT AVAILABLE

Figure A-24 POST-TEST DRIVER FRONT VIEW

Figure A-25 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

PHOTOGRAPH NOT AVAILABLE

Figure A-26 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

Figure A-27 PRE-TEST PASSENGER SIDE VIEW

8353-4

PHOTOGRAPH NOT AVAILABLE

Figure A-28 POST-TEST PASSENGER SIDE VIEW

8353-4

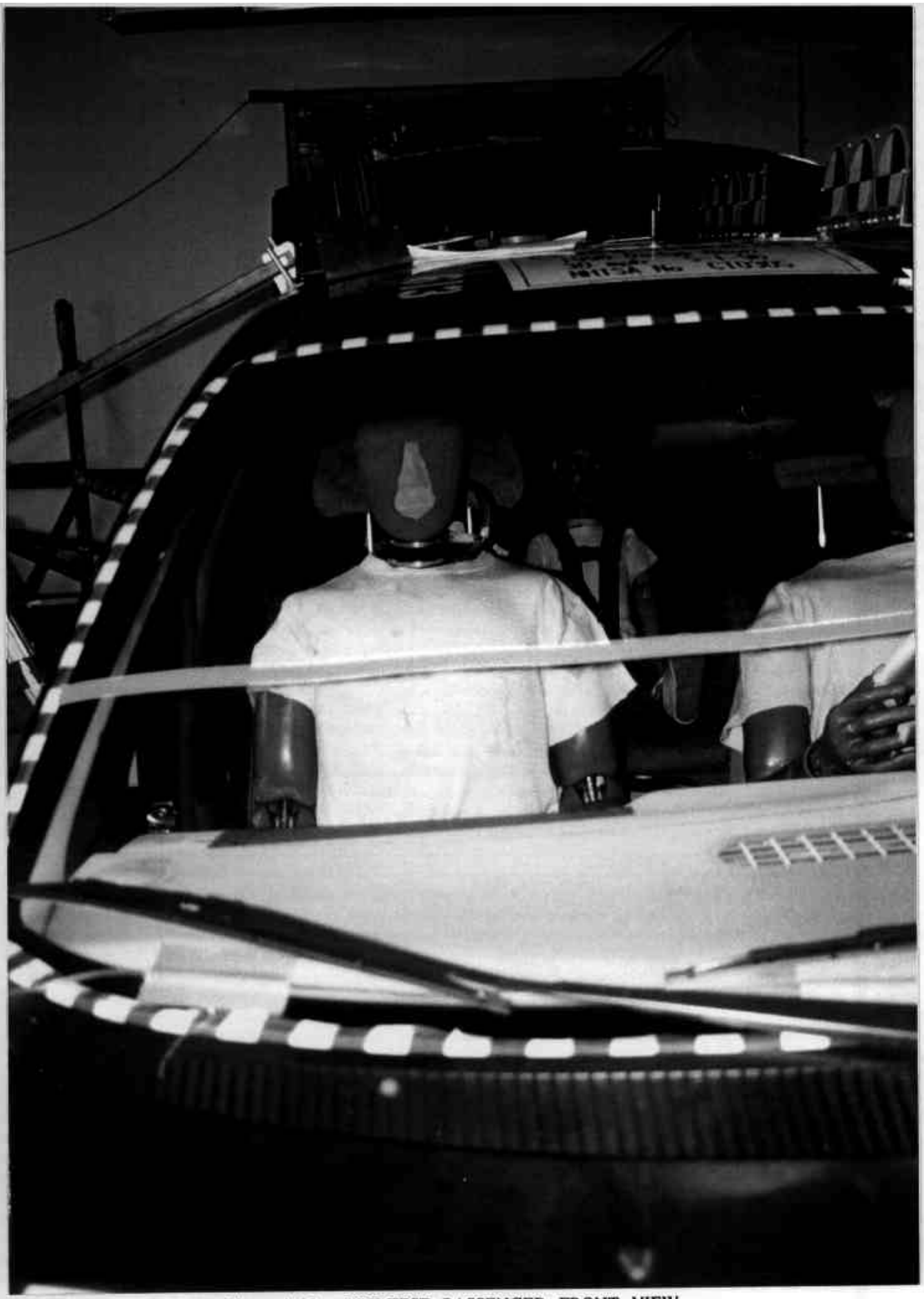


Figure A-29 PRE-TEST PASSENGER FRONT VIEW

8353-4

PHOTOGRAPH NOT AVAILABLE

Figure A-30 POST-TEST PASSENGER FRONT VIEW

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

8353-4

PHOTOGRAPH NOT AVAILABLE

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

PHOTOGRAPH NOT AVAILABLE

Figure A-33 PRE-TEST UNDERBODY STEERING SHAFT

8353-4

Figure A-34 POST-TEST UNDERBODY STEERING SHAFT

8353-4

A-37

8353-4

Figure A-35 PRE-TEST STEERING COLUMN/FIREWALL INSIDE VIEW

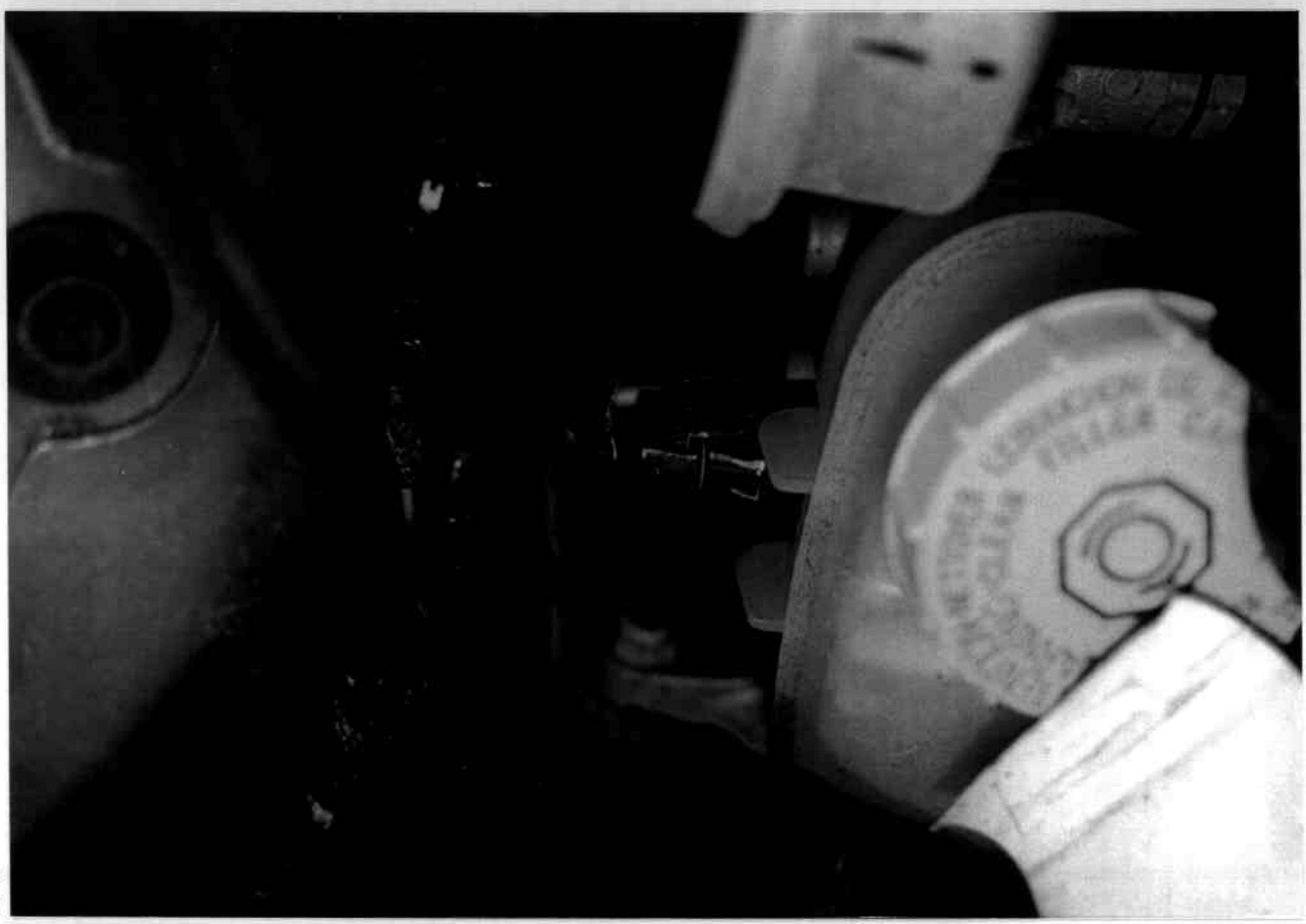
8353-4

Figure A-36 POST-TEST STEERING COLUMN/FIREWALL INSIDE VIEW

A-39

8353-4

Figure A-37 PRE-TEST STEERING COLUMN/FIREWALL UNDER HOOD VIEW



A-40

8353-4

Figure A-38 POST-TEST STEERING COLUMN/FIREWALL UNDER HOOD VIEW

Figure A-39 PRE-TEST STEERING COLUMN SHEAR CAPSULE VIEW

Figure A-40 POST-TEST STEERING COLUMN SHEAR CAPSULE VIEW

A-43

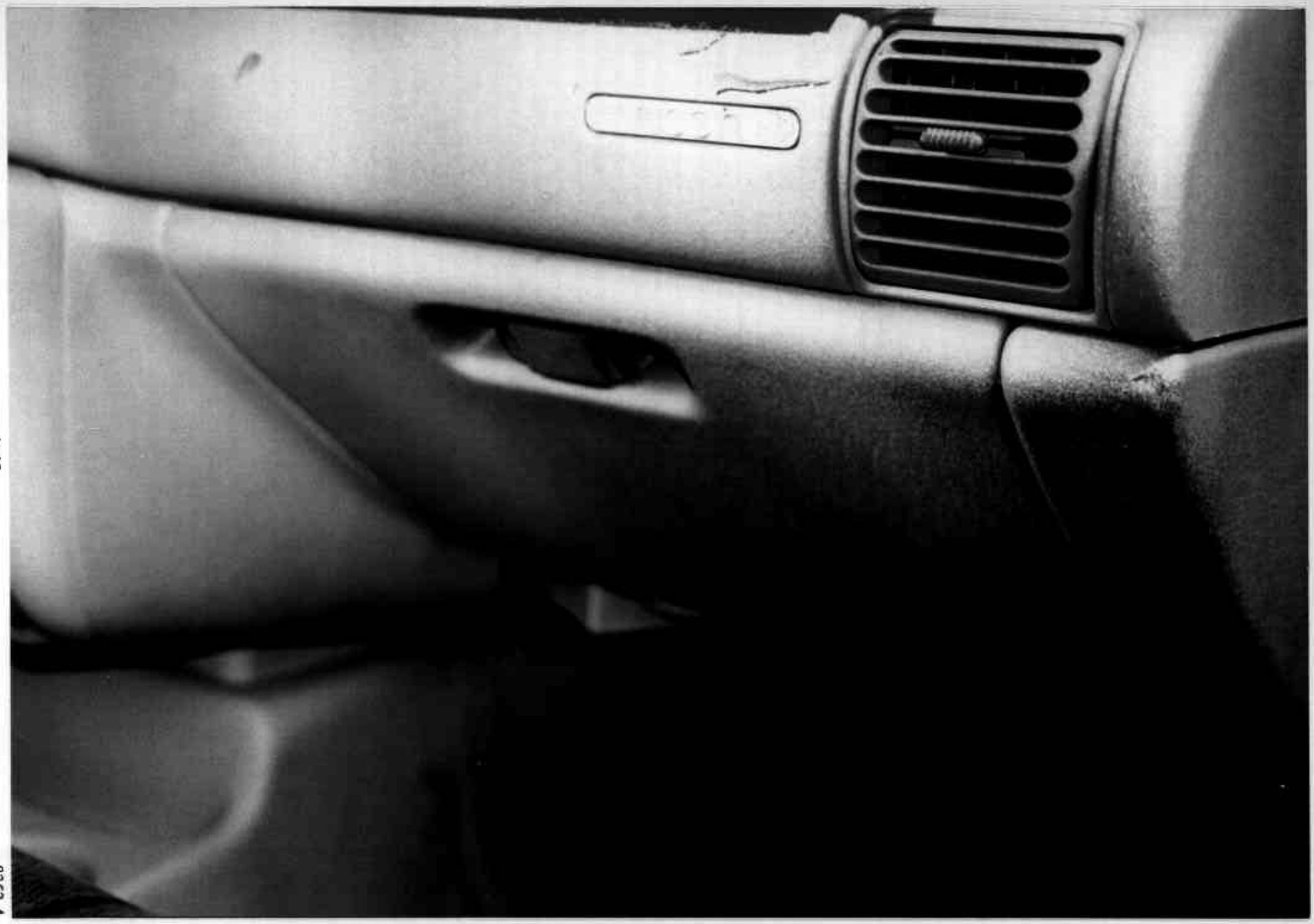
8353-4

Figure A-41 PRE-TEST DRIVER KNEE BOLSTER

A-44

8353-4

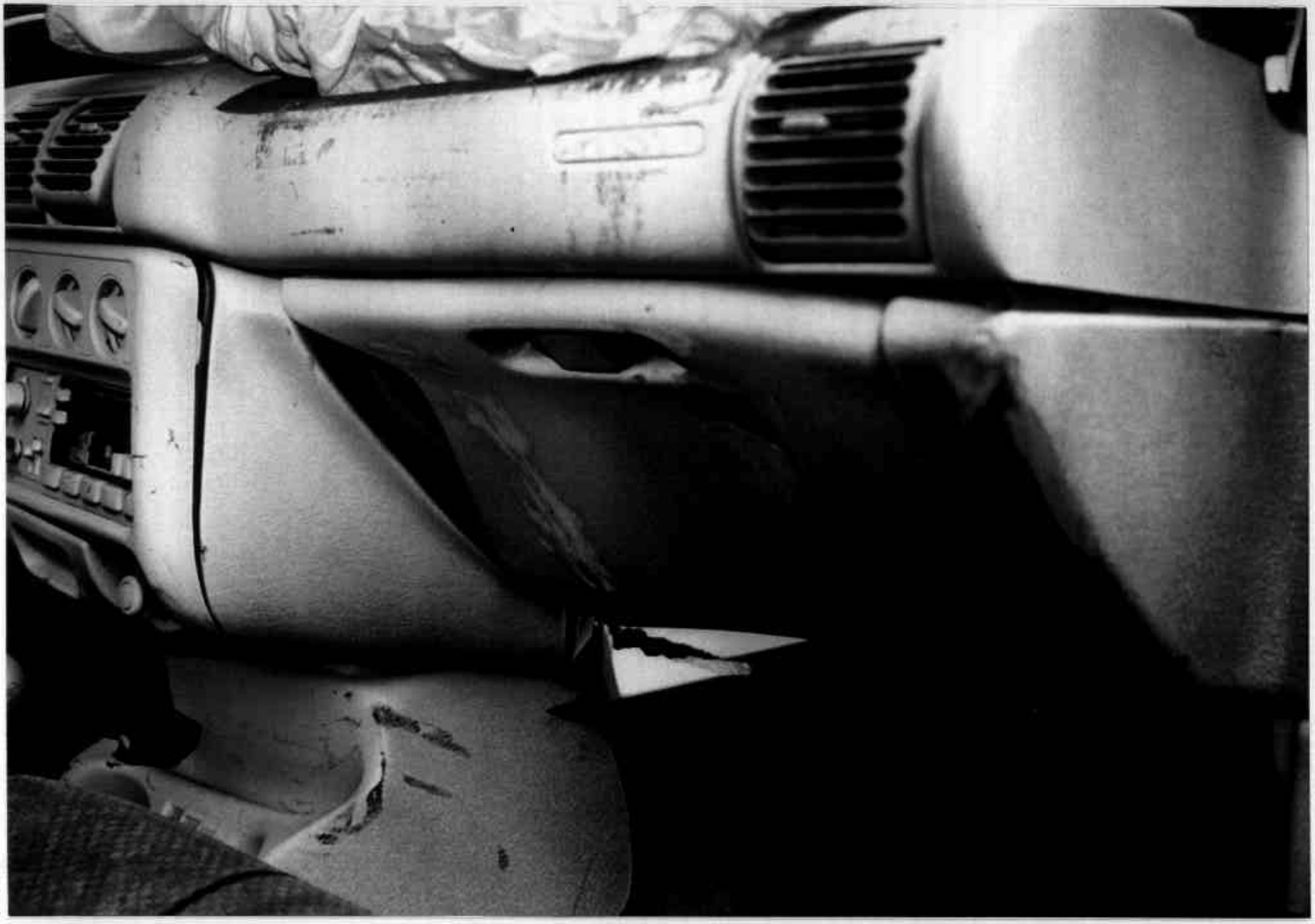
Figure A-42 POST-TEST DRIVER KNEE BOLSTER



A-45

8353-4

Figure A-43 PRE-TEST PASSENGER KNEE BOLSTER/ GLOVE BOX DOOR



A-46

8353-4

Figure A-44 POST-TEST PASSENGER KNEE BOLSTER/ GLOVE BOX DOOR

Figure A-45 VEHICLE IMPACT

8353-4

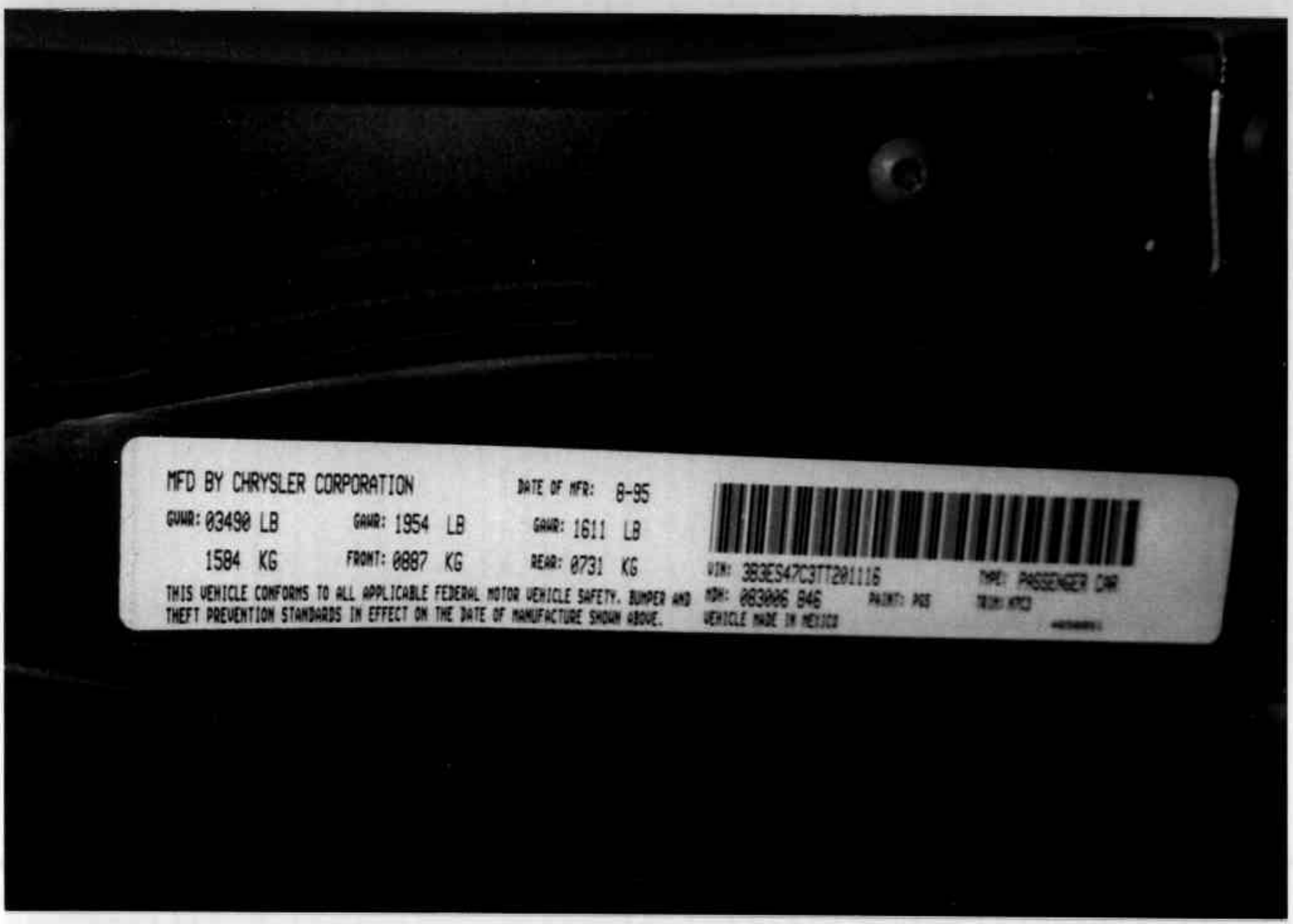


Figure A-46 CERTIFICATION PLACARD

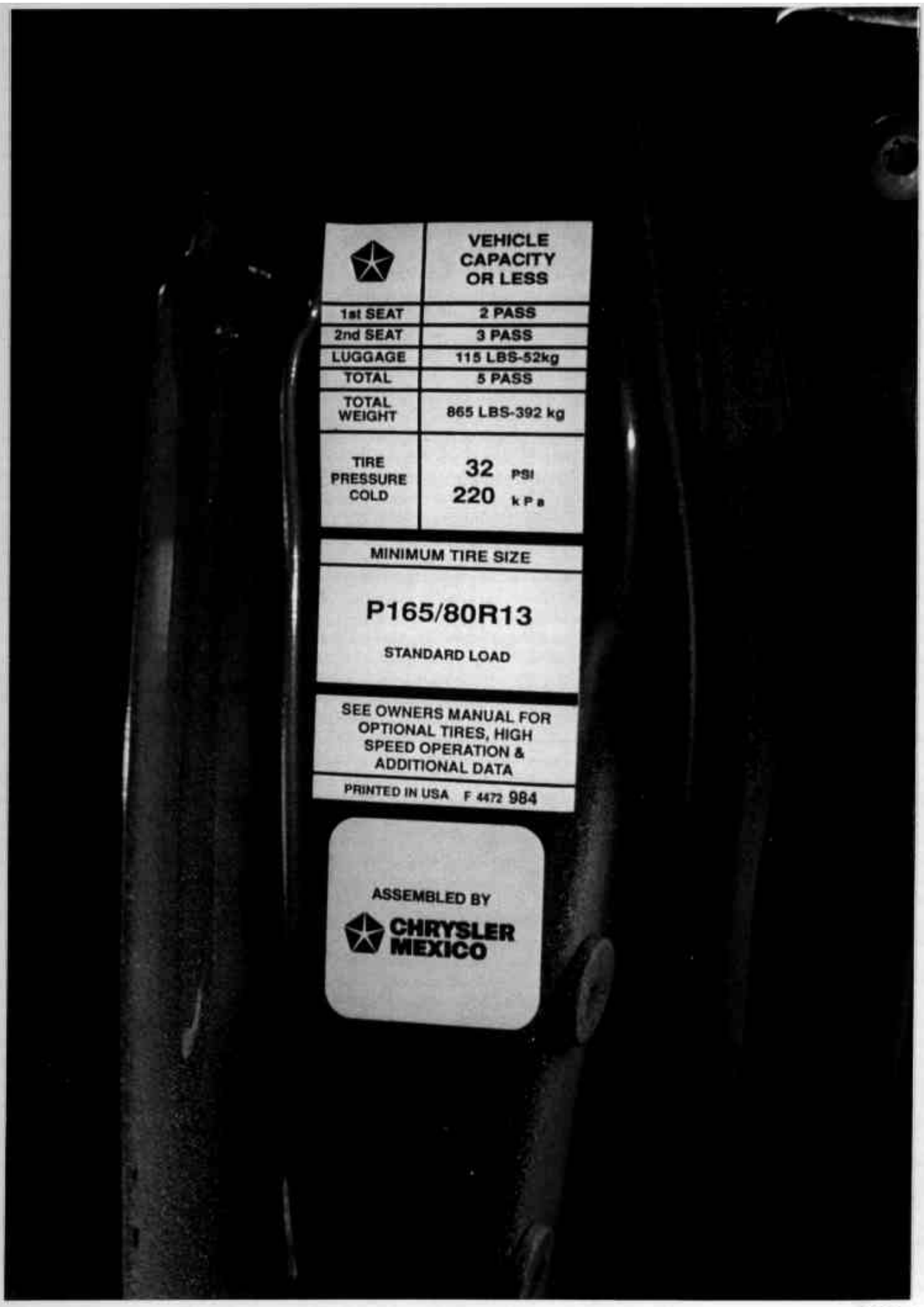


Figure A-47 TIRE PLACARD

Figure A-48 POST-TES DRIVER SIDE AIRBAG VIEW

A-51

8353-4

Figure A-49 POST-TEST DRIVER SIDE REAR OF HEAD CONTACT AREA

Figure A-50 POST-TEST RIGHT FRONT PASSENGER AIRBAG VIEW

Figure A-51 POST-TEST SIDE VIEW OF WINDSHIELD RETENTION LOSS

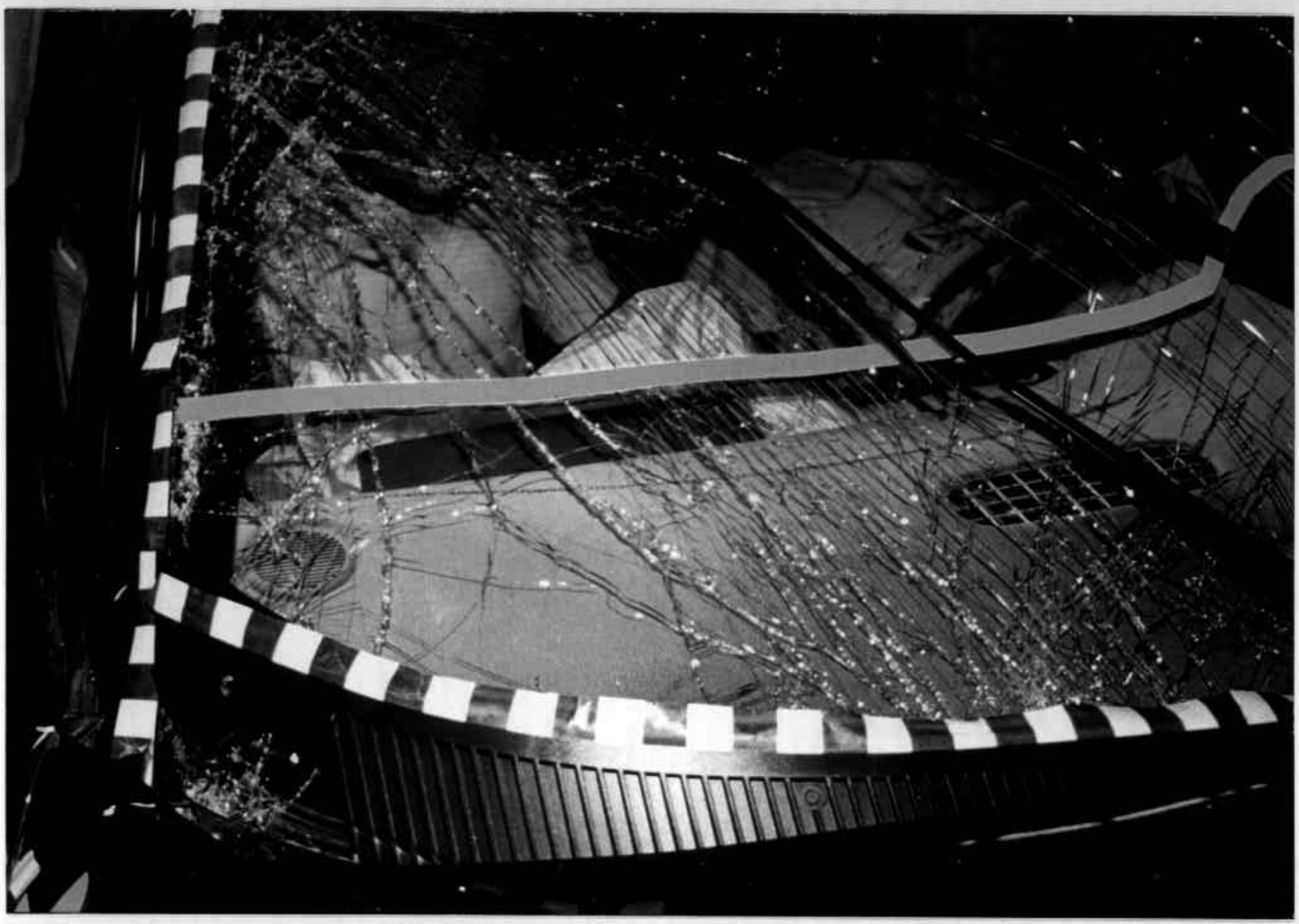


Figure A-52 POST-TEST FRONT SIDE OF WINDSHIELD RETENTION LOSS

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

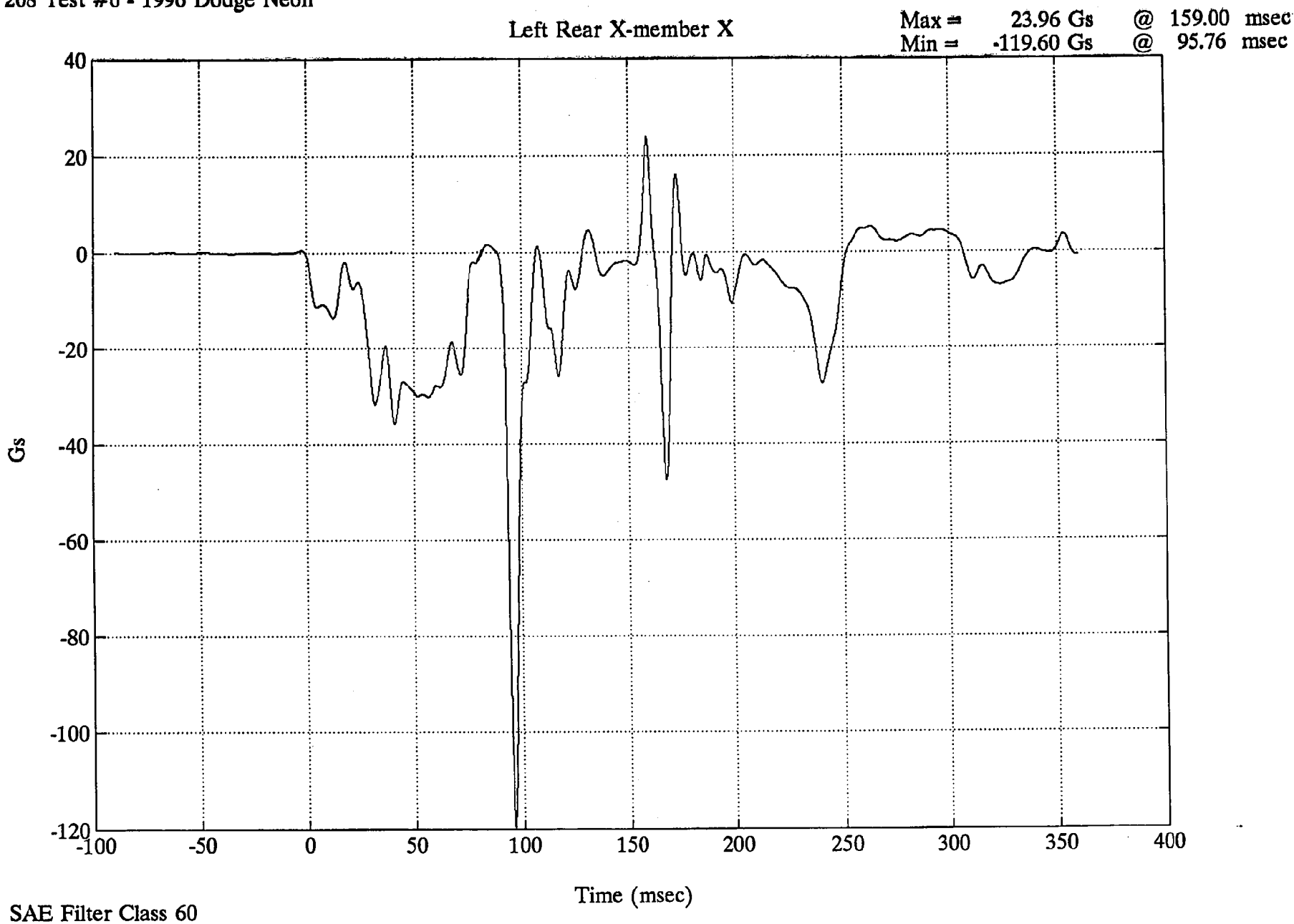
(Part 572E 50th percentile ATD's only)

NOTE: Data trace scales are automatically scaled at the request of the COTR. Use caution when reviewing data.

TEST NO. CT0305

VEHICLE	SAE FILTER CHANNEL CLASS
Acceleration	60
Velocity	180
Displacement	180

208 Test #6 - 1996 Dodge Neon

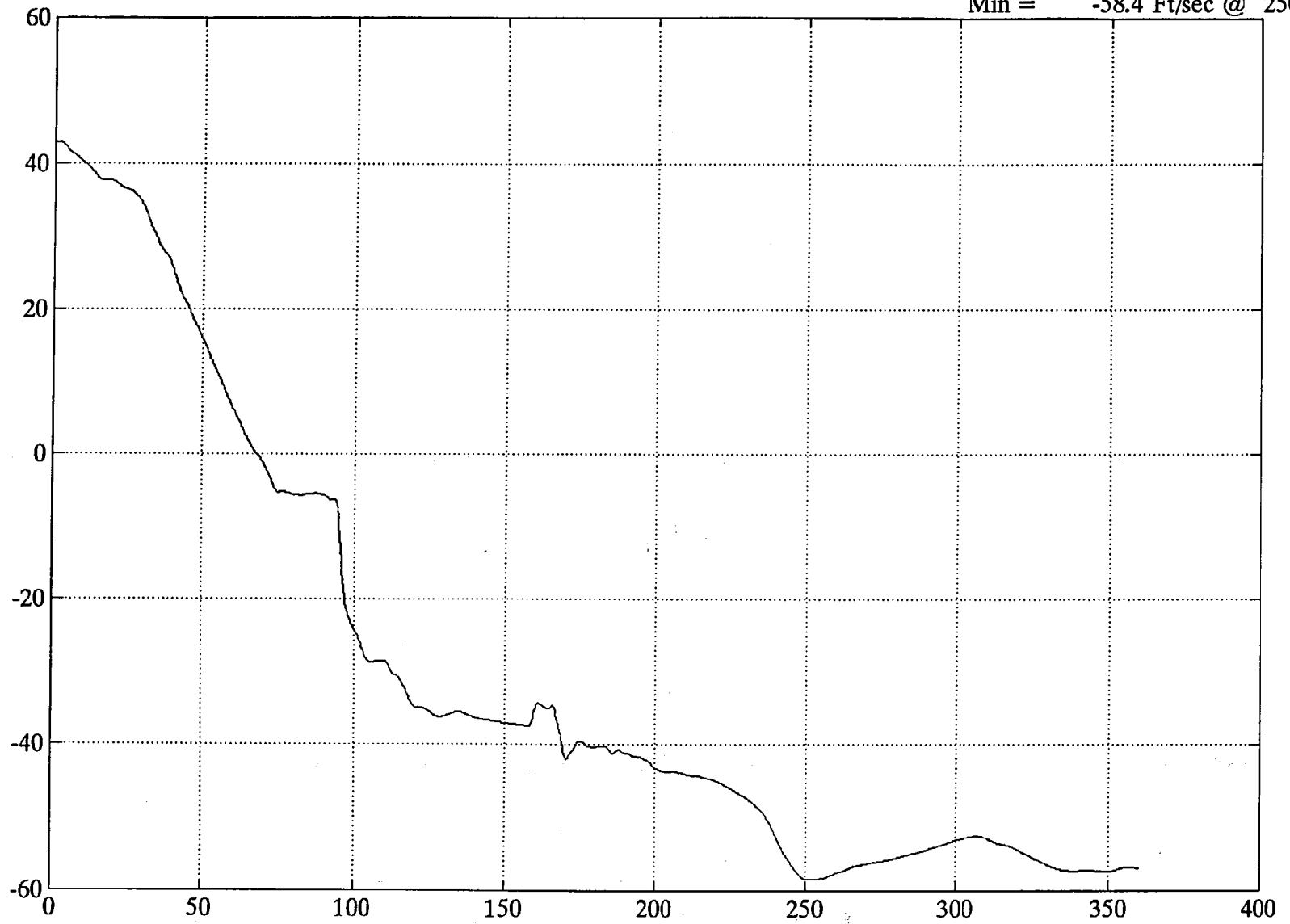


SAE Filter Class 60

208 Test #6 - 1996 Dodge Neon

1st Integral Left Rear X-member X

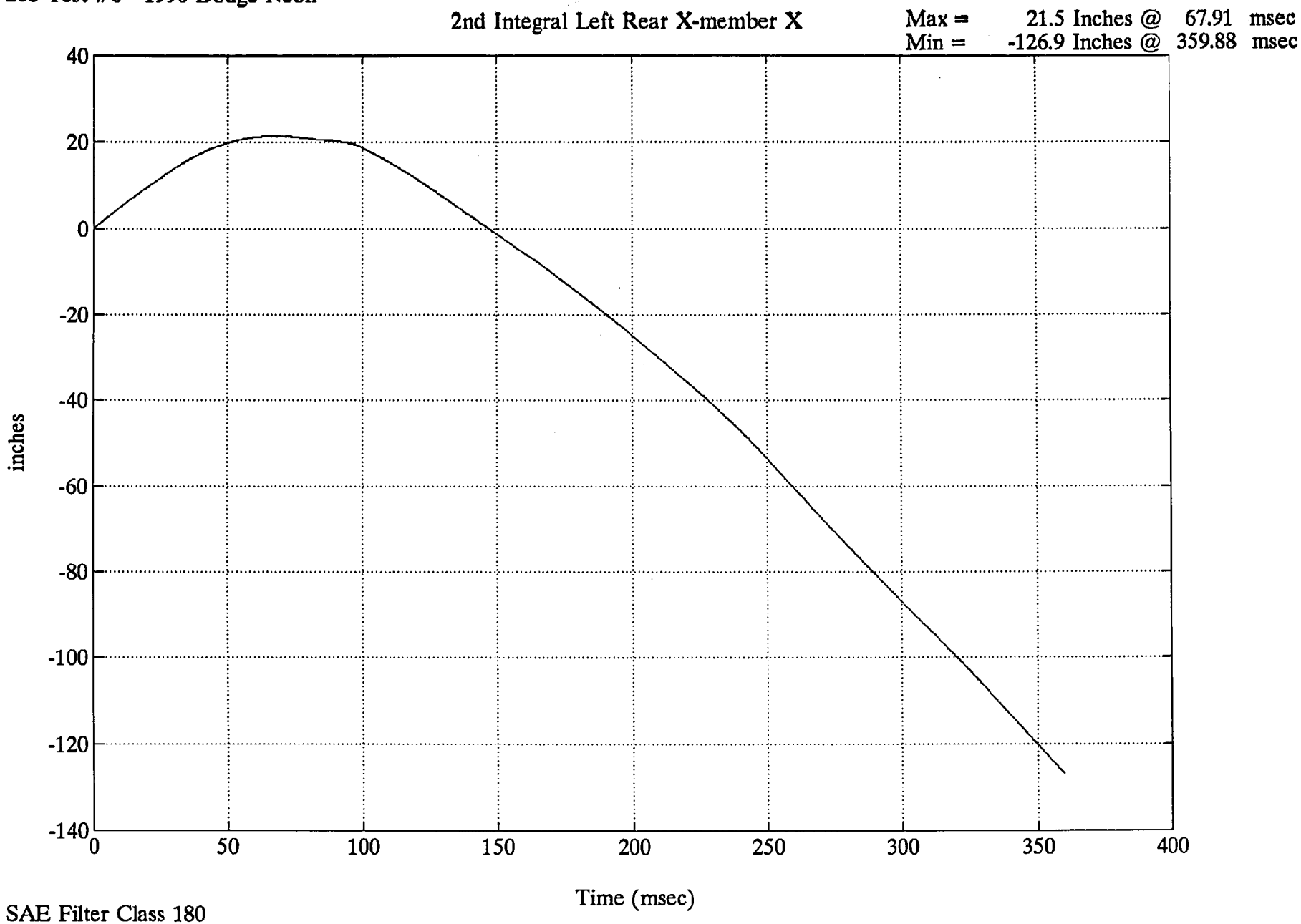
Max = 42.9 Ft/sec @ 0.59 msec
Min = -58.4 Ft/sec @ 250.91 msec



SAE Filter Class 180

8353-4

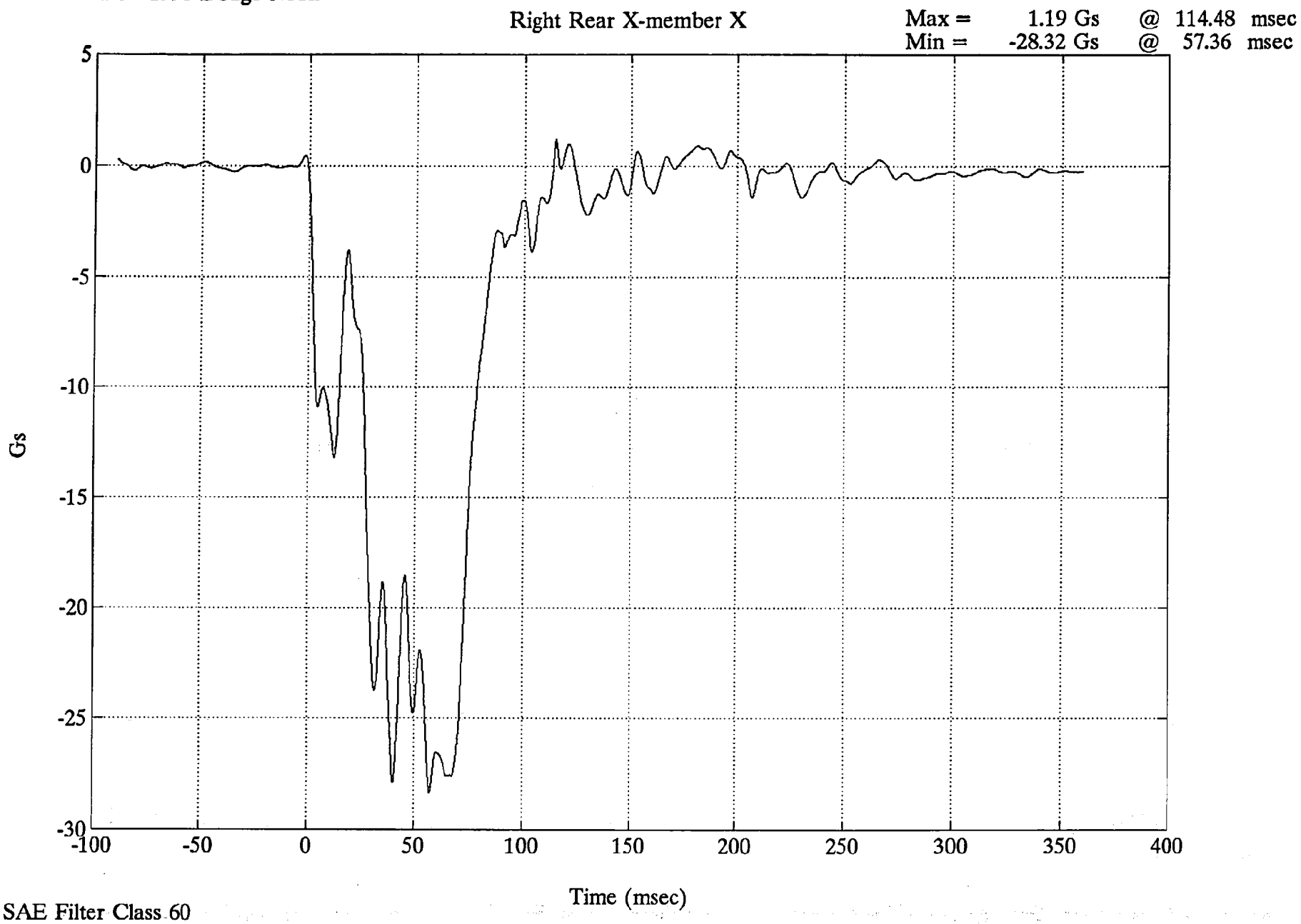
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

8353-4

208 Test #6 - 1996 Dodge Neon

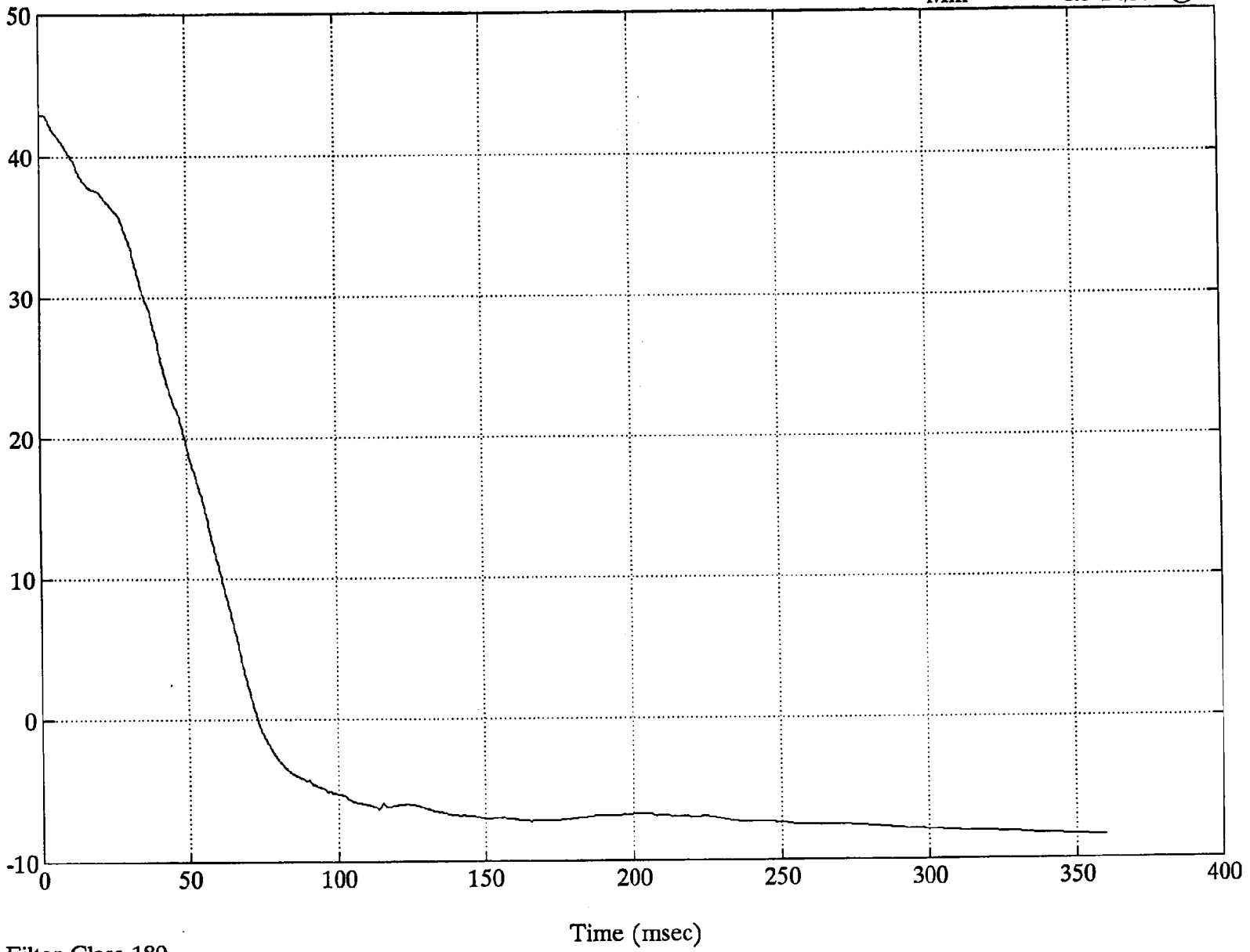


SAE Filter Class 60

208 Test #6 - 1996 Dodge Neon

1st Integral Right Rear X-member X

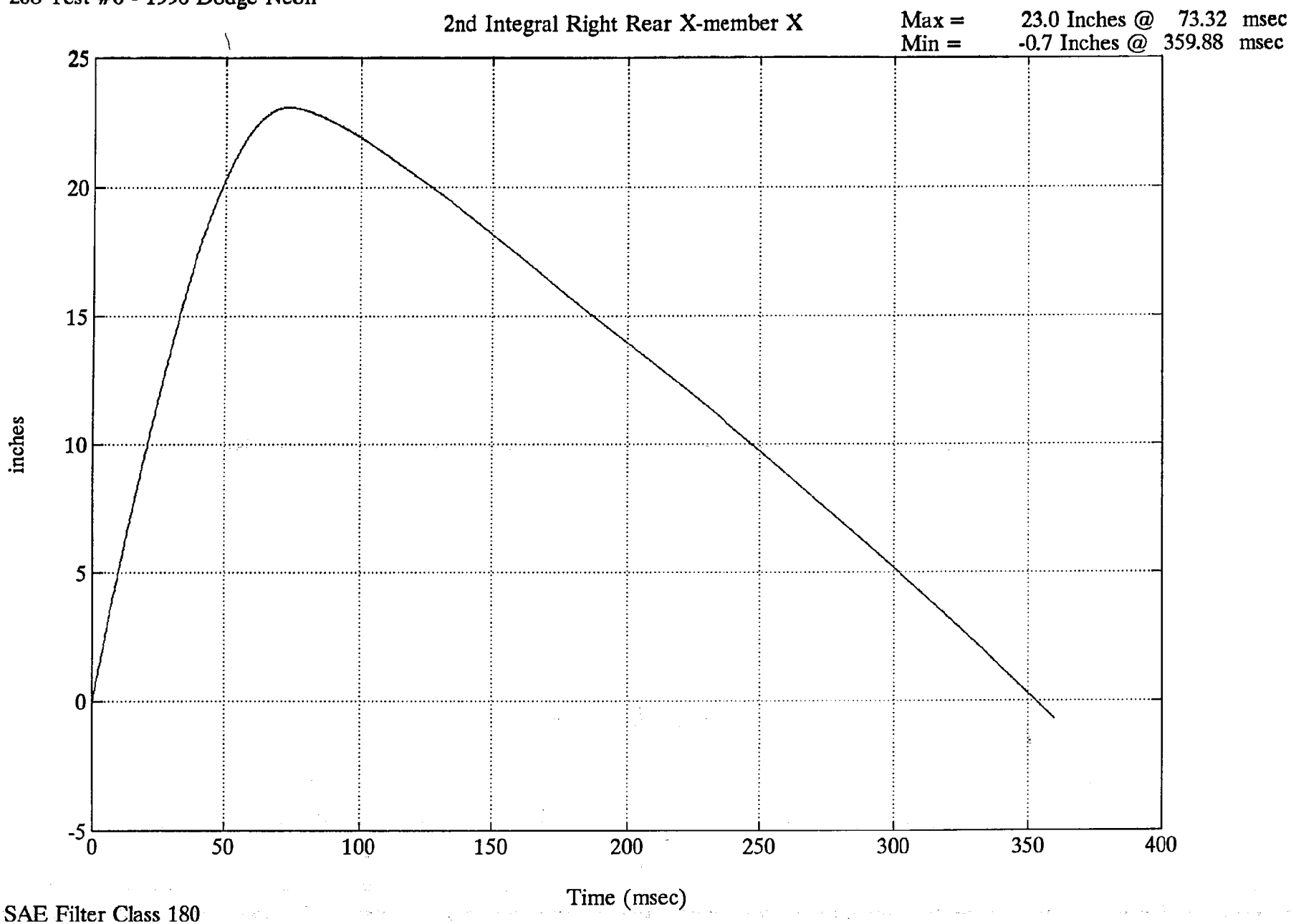
Max = 42.9 Ft/sec @ 0.83 msec
Min = -8.3 Ft/sec @ 359.88 msec



SAE Filter Class 180

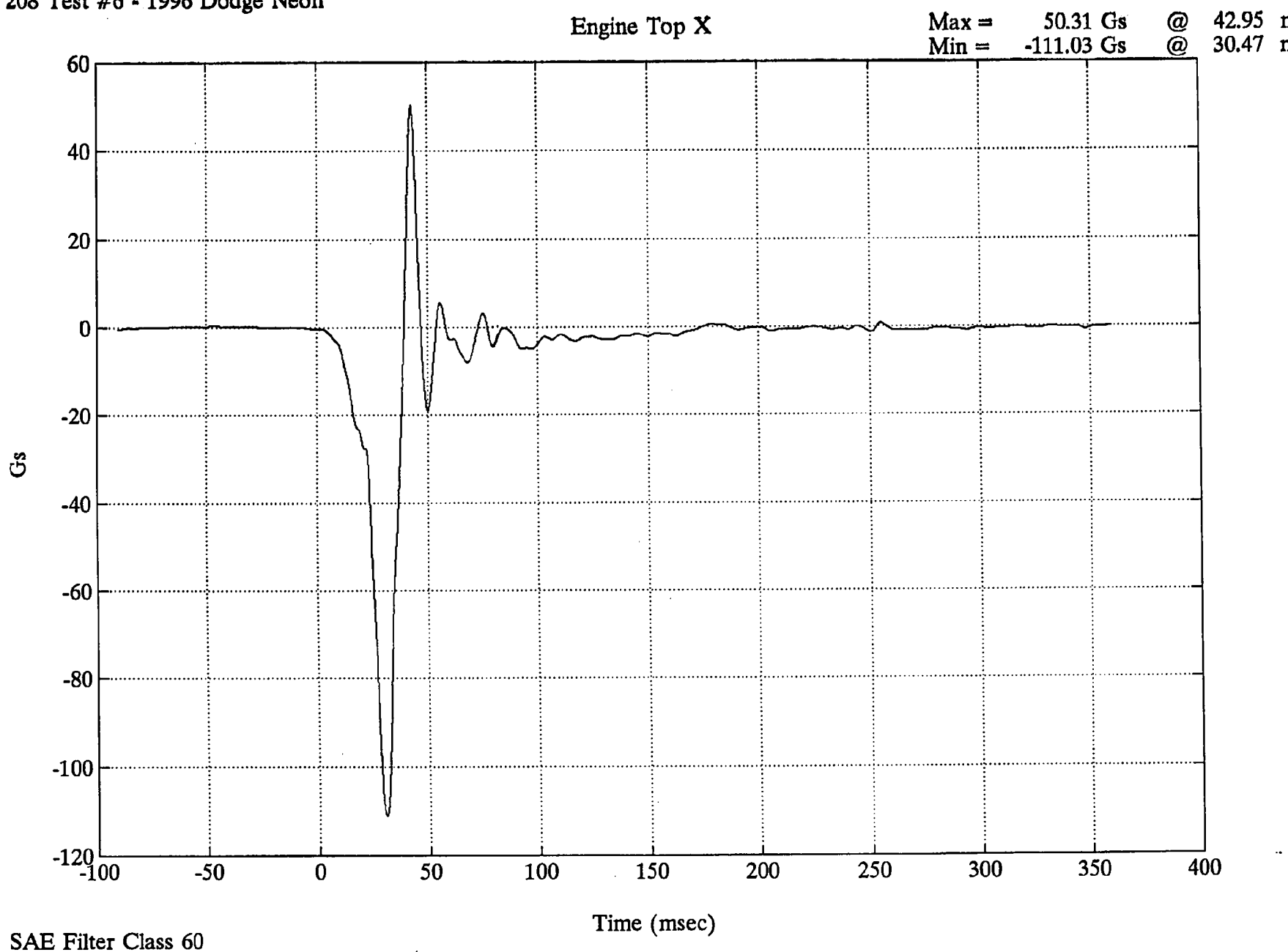
8353-4

208 Test #6 - 1996 Dodge Neon



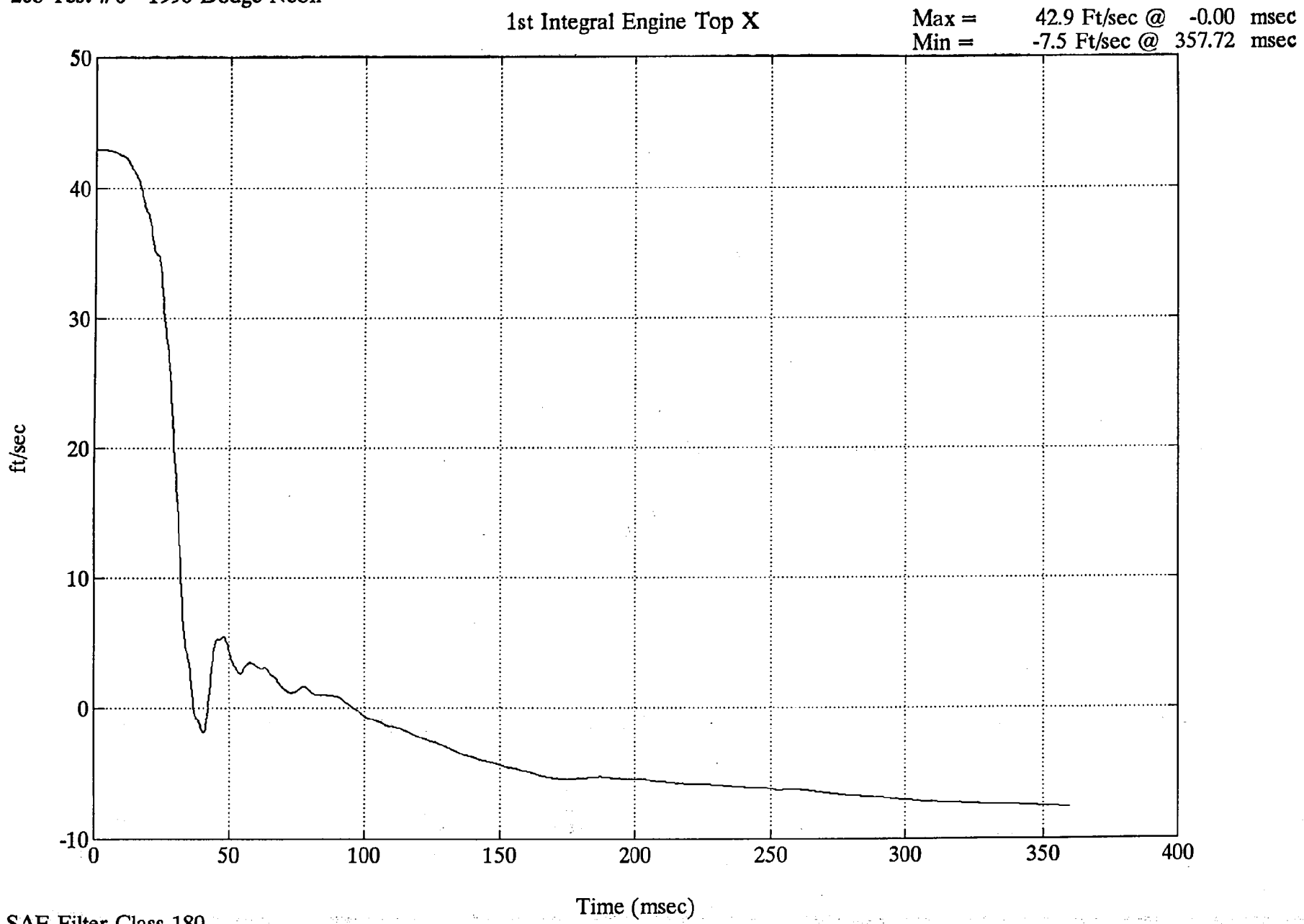
SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 60

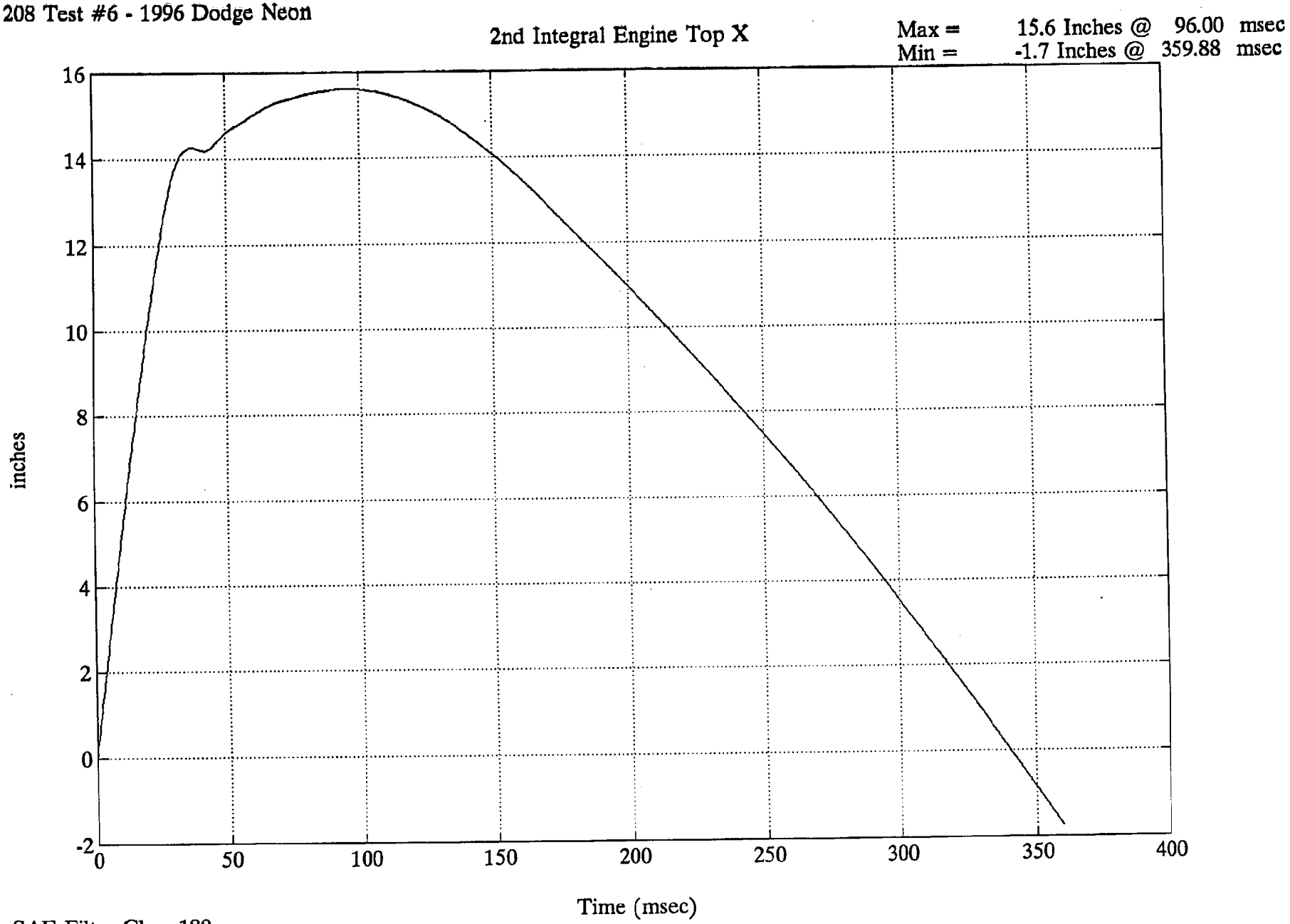
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

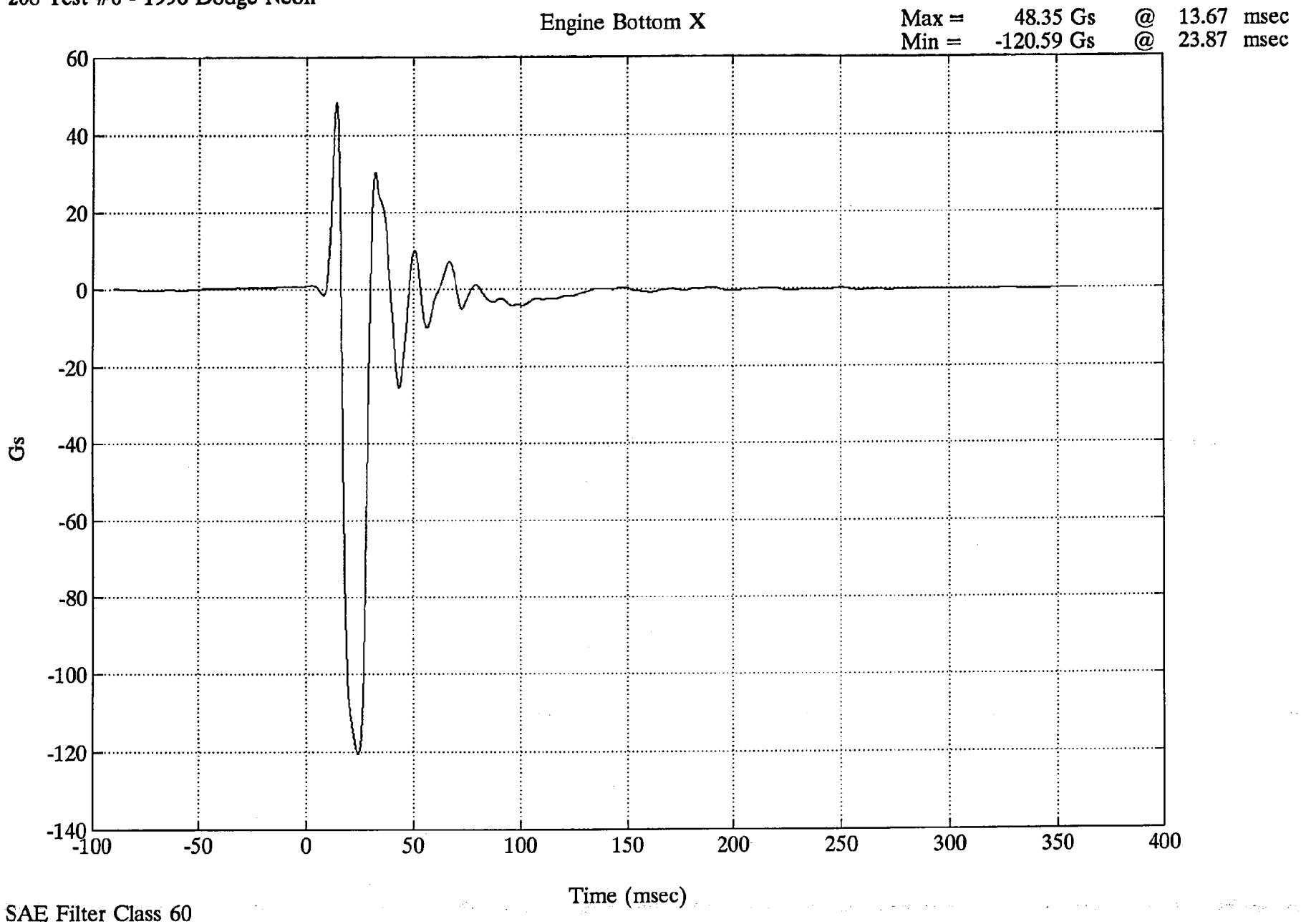
8353-4

208 Test #6 - 1996 Dodge Neon



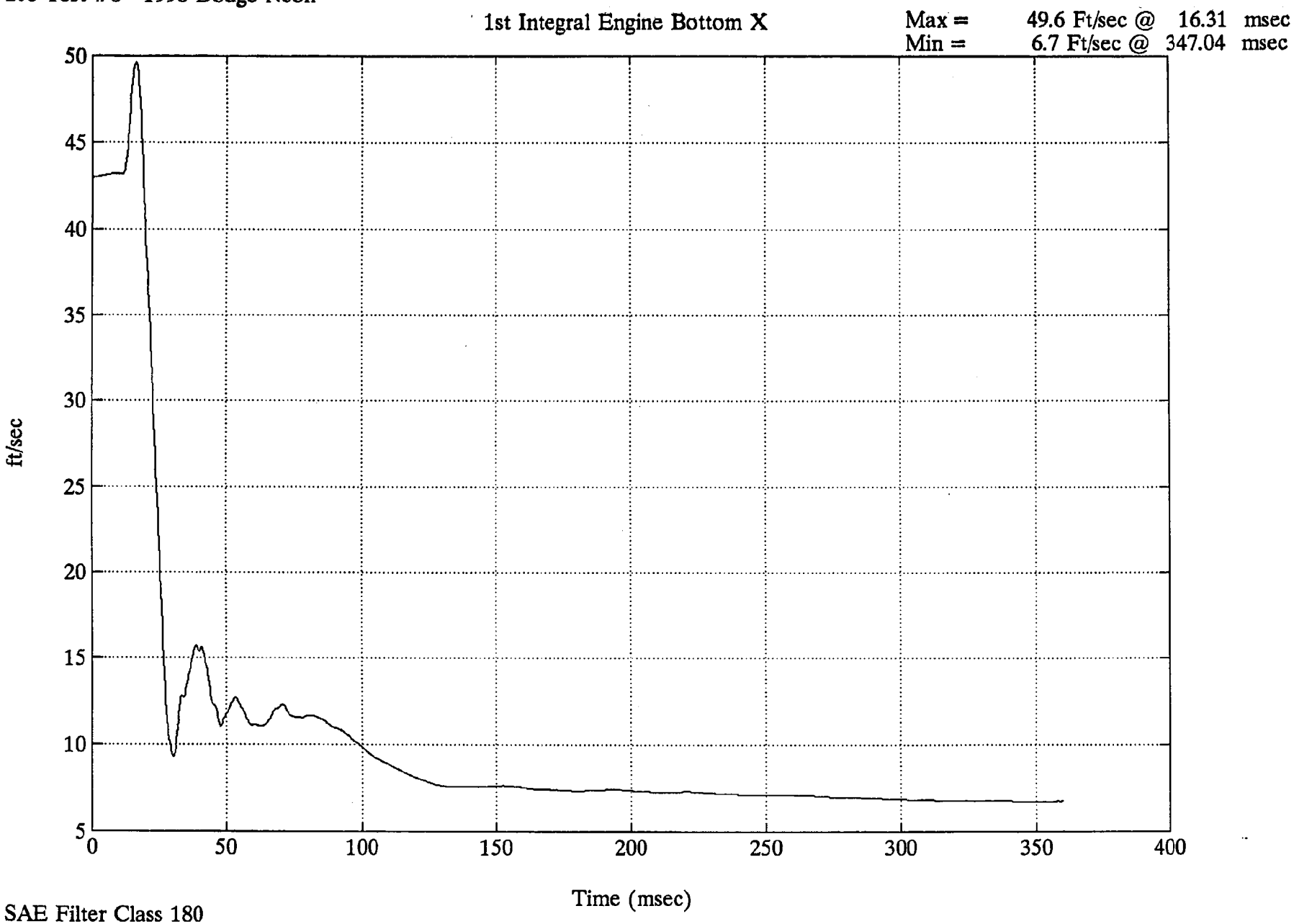
SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



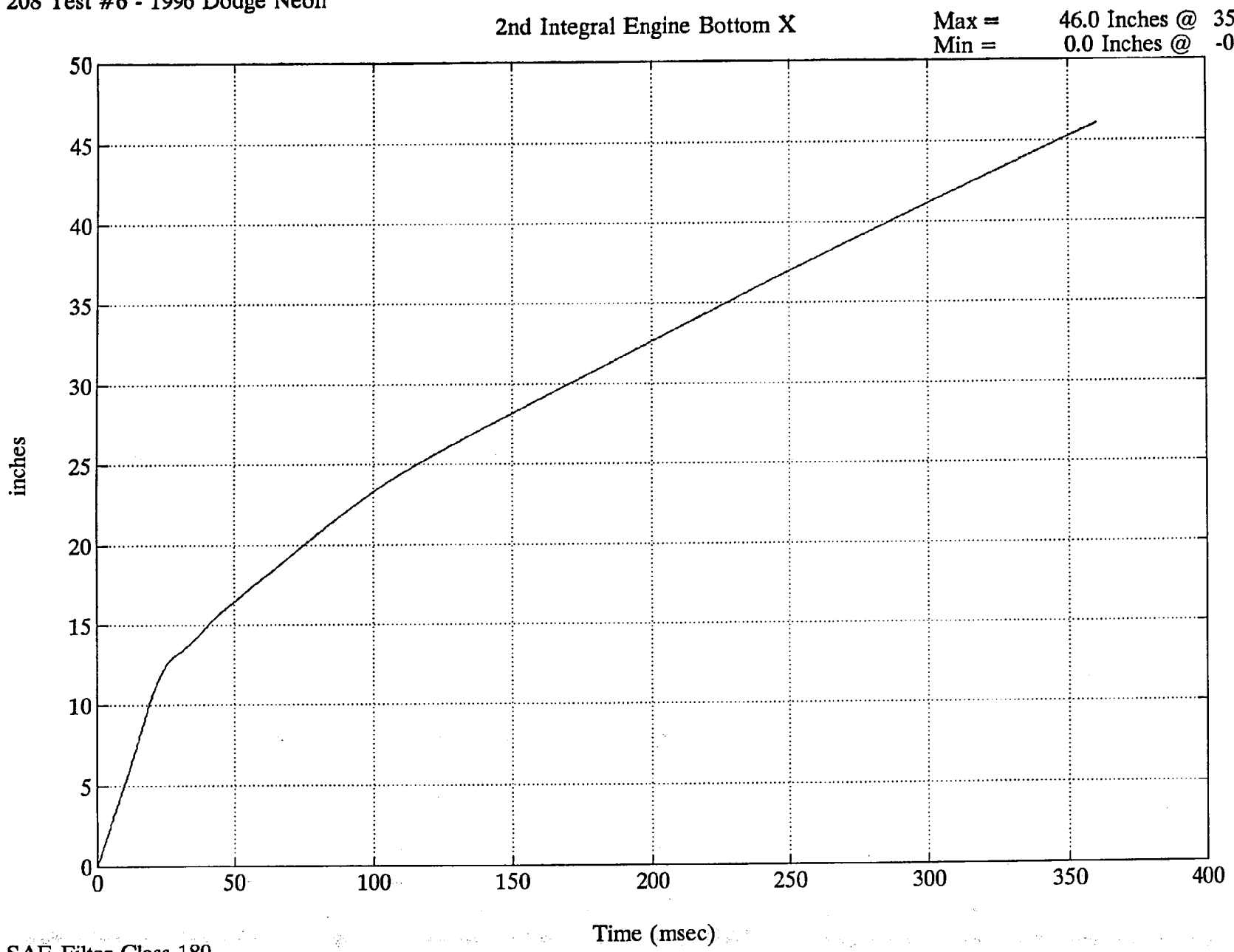
SAE Filter Class 60

208 Test #6 - 1996 Dodge Neon



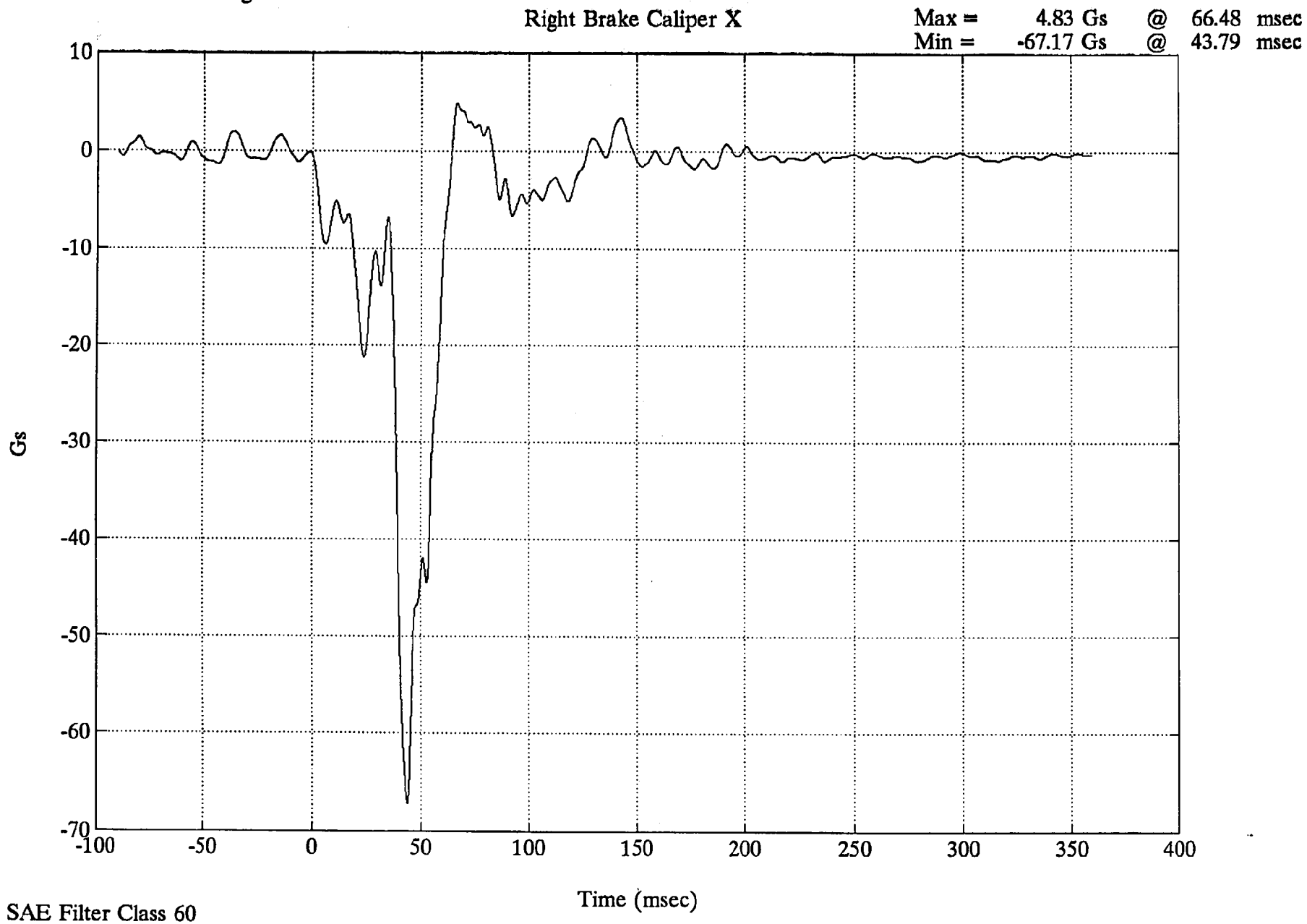
SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

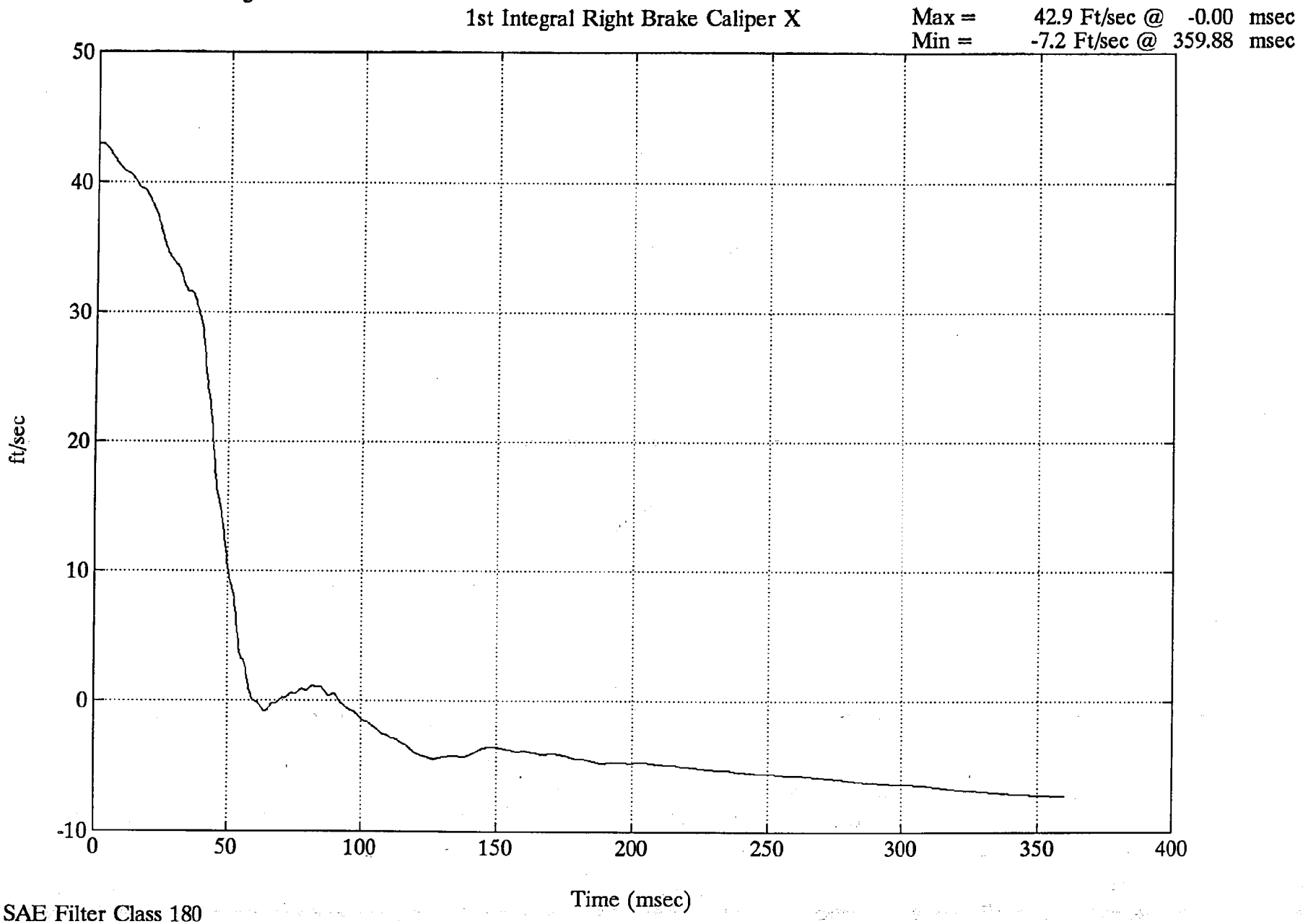
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 60

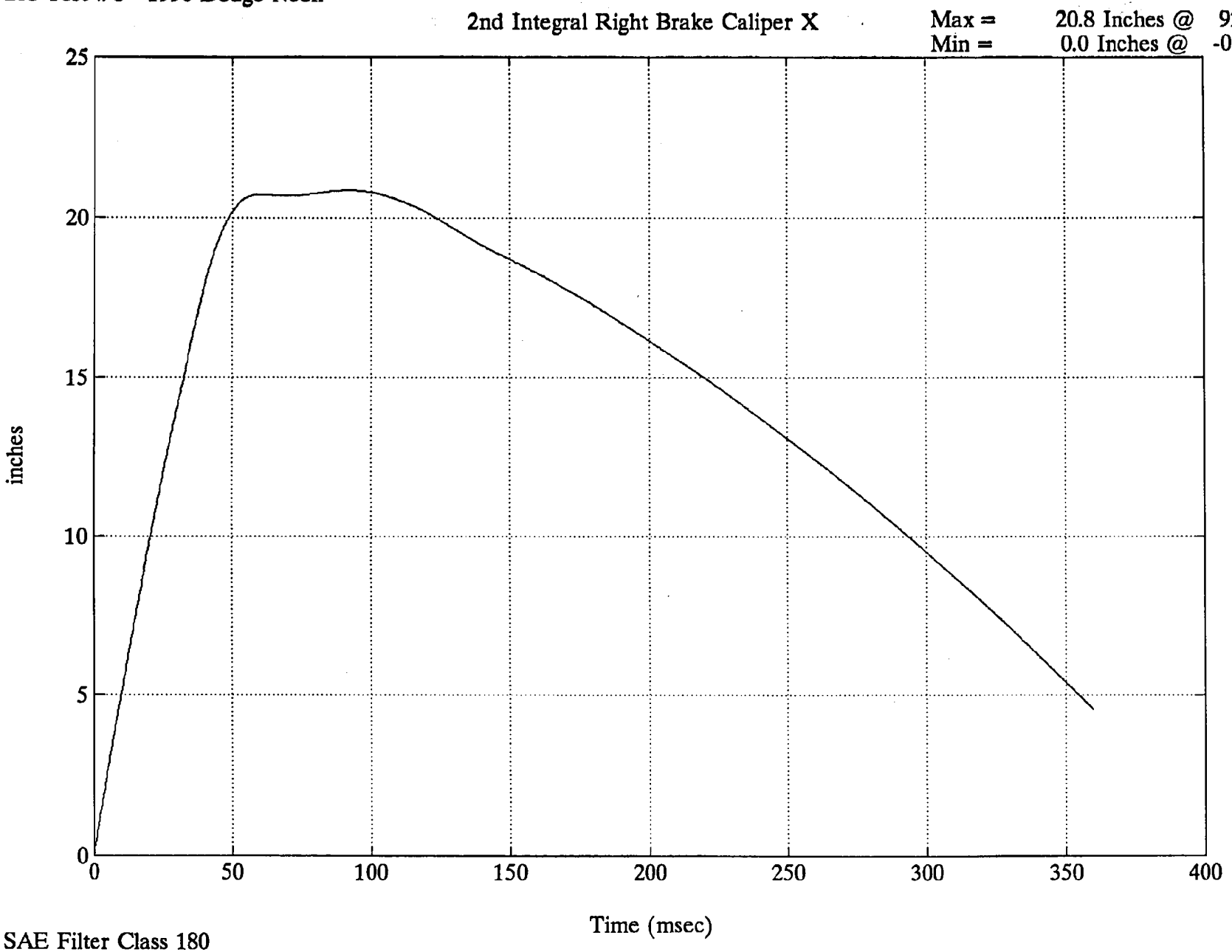
8353-4

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



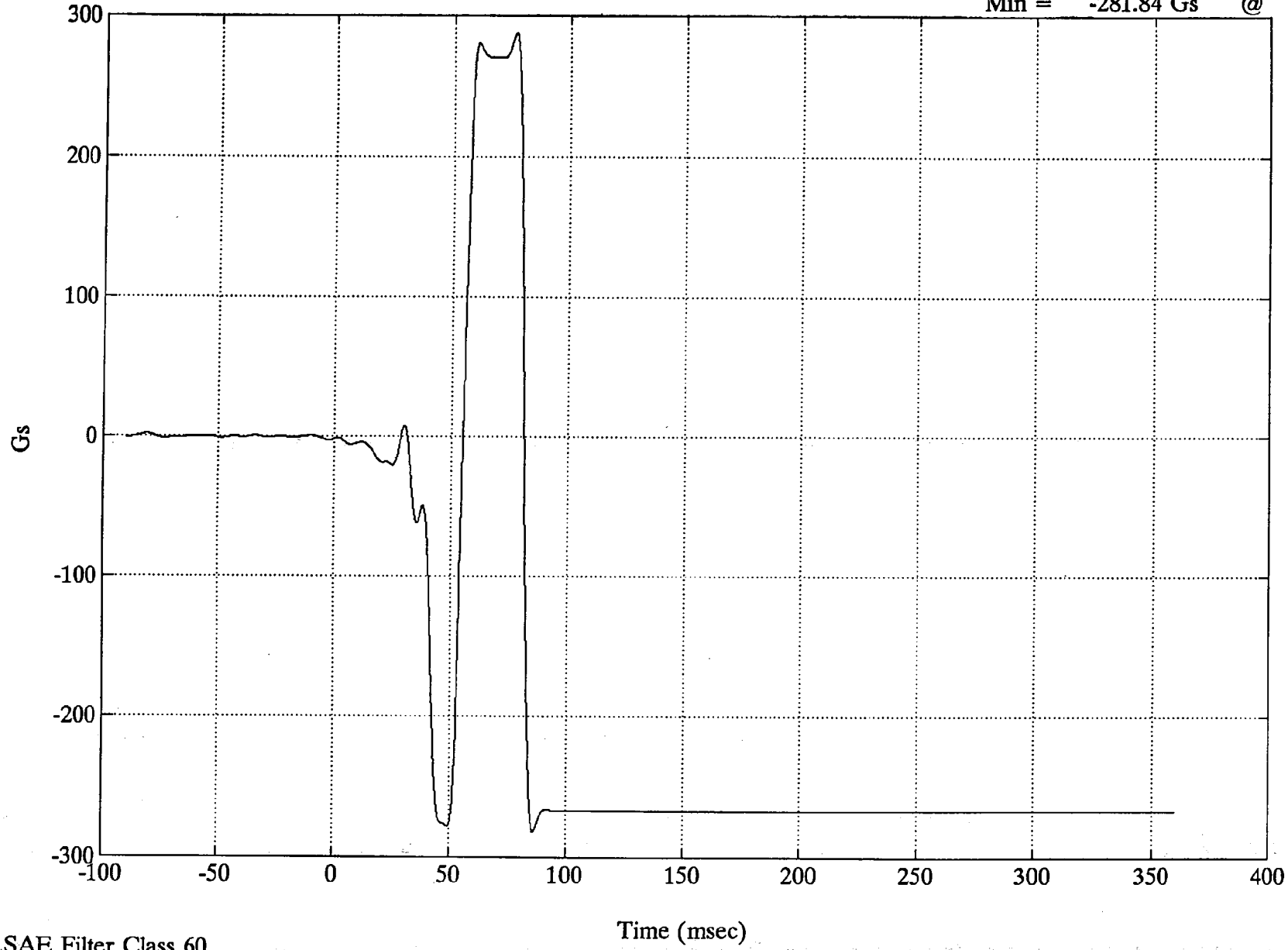
SAE Filter Class 180

8353-4

208 Test #6 - 1996 Dodge Neon

Left Brake Caliper X

Max = 287.08 Gs @ 77.04 msec
Min = -281.84 Gs @ 86.16 msec

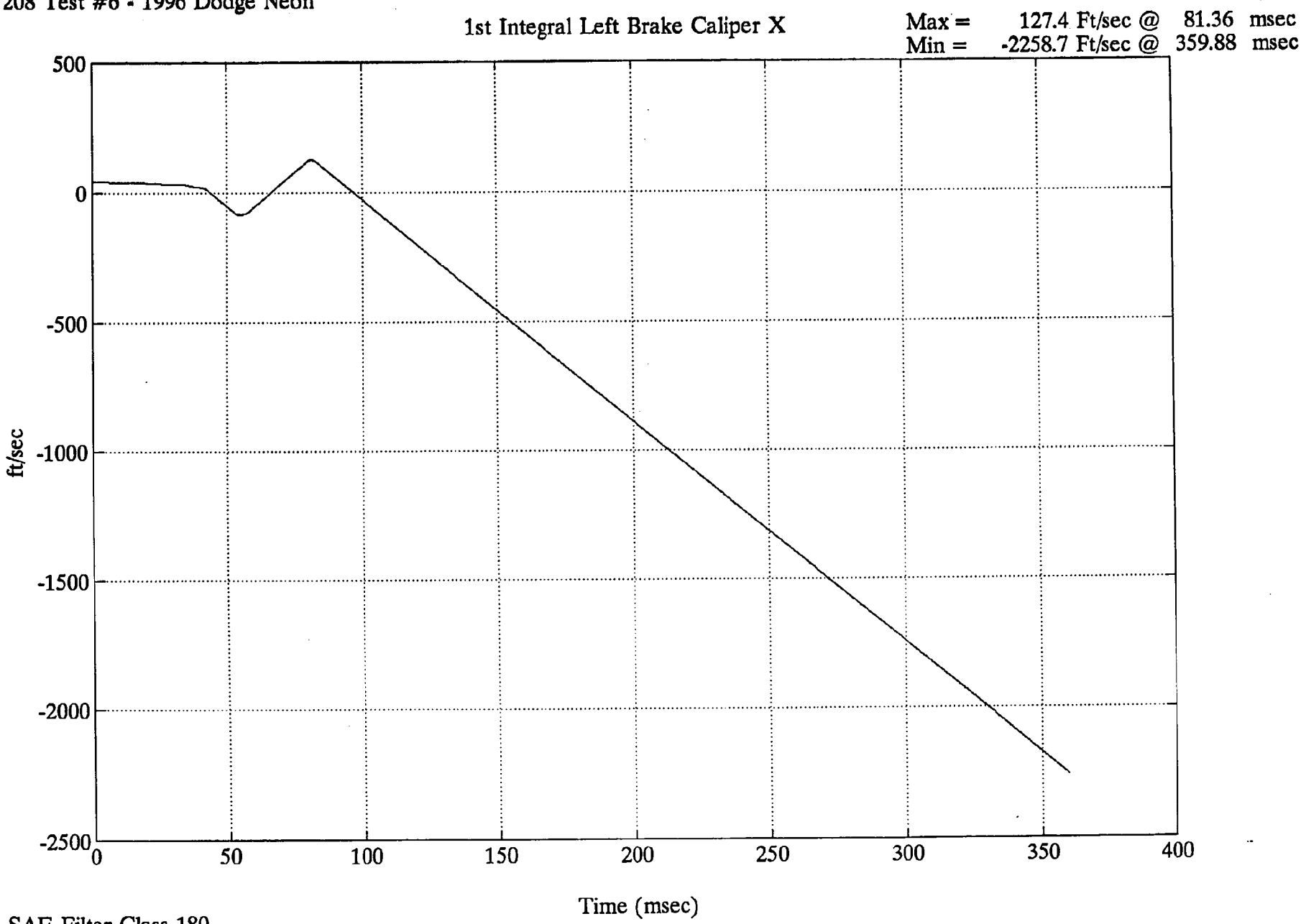


SAE Filter Class 60

Data cable damaged at 50 milliseconds into the event.

8353-4

208 Test #6 - 1996 Dodge Neon

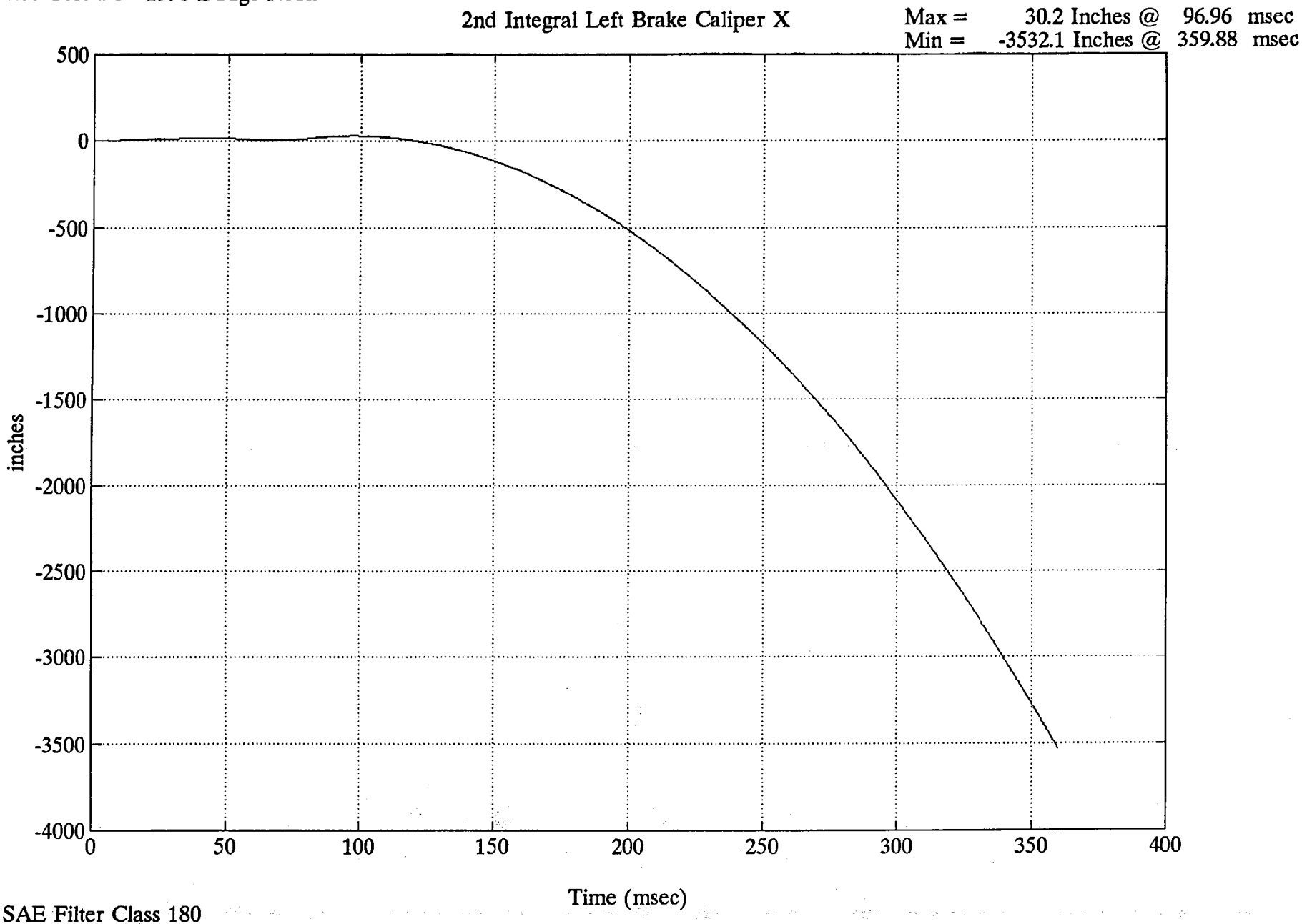


SAE Filter Class 180

Data cable damaged at 50 milliseconds into the event.

8353-4

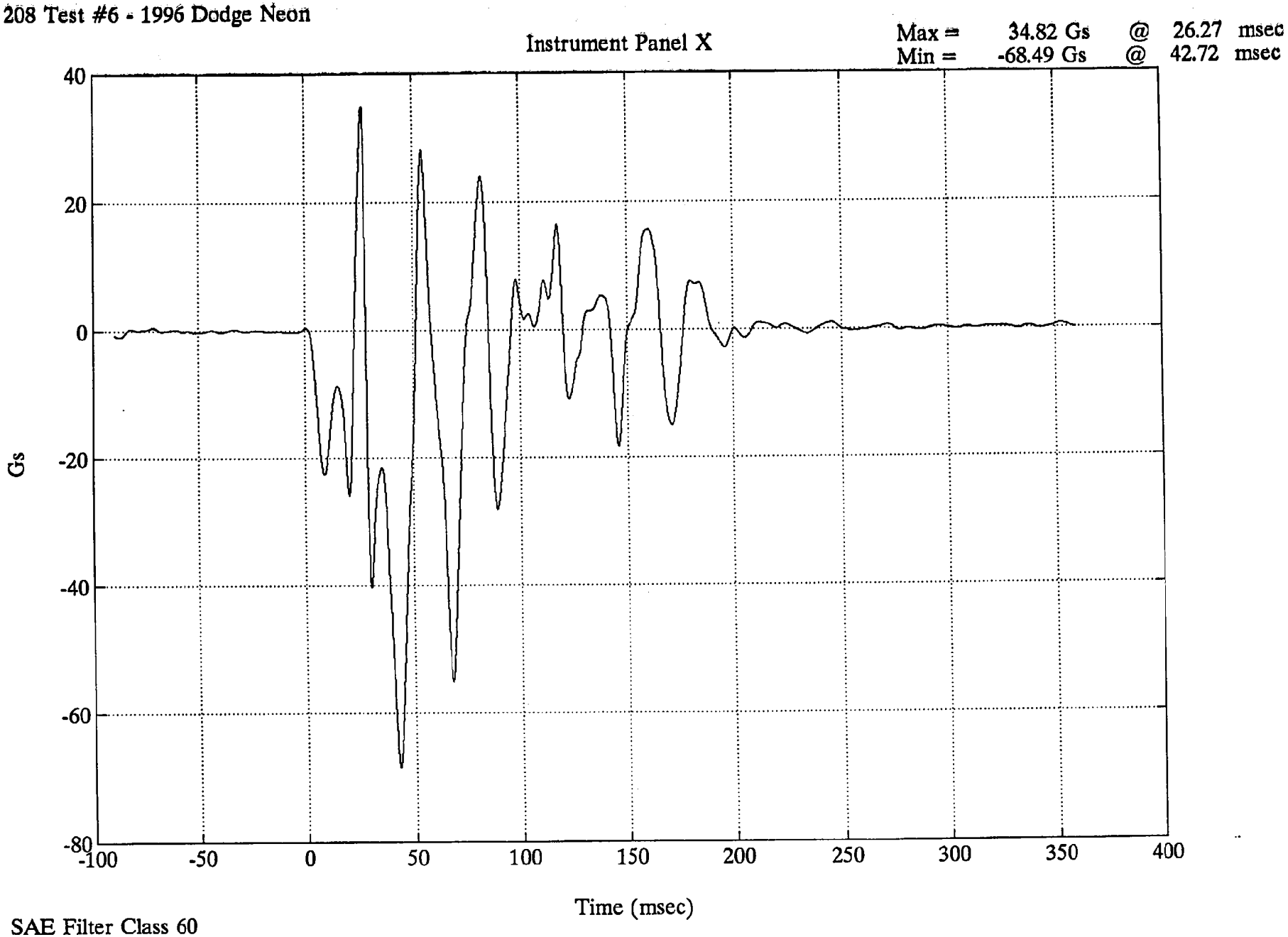
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

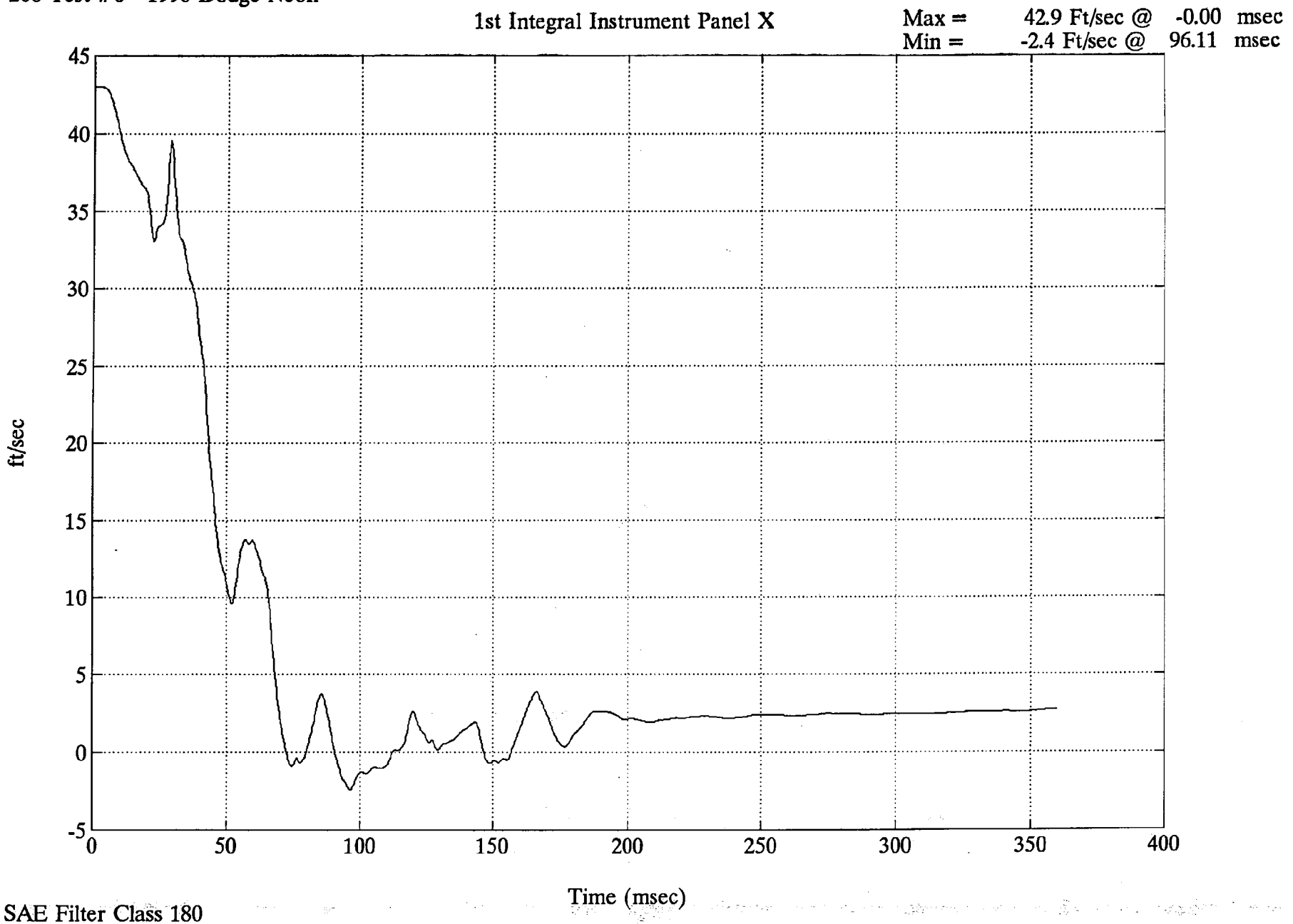
Data cable damaged at 50 milliseconds into the event.

208 Test #6 - 1996 Dodge Neon



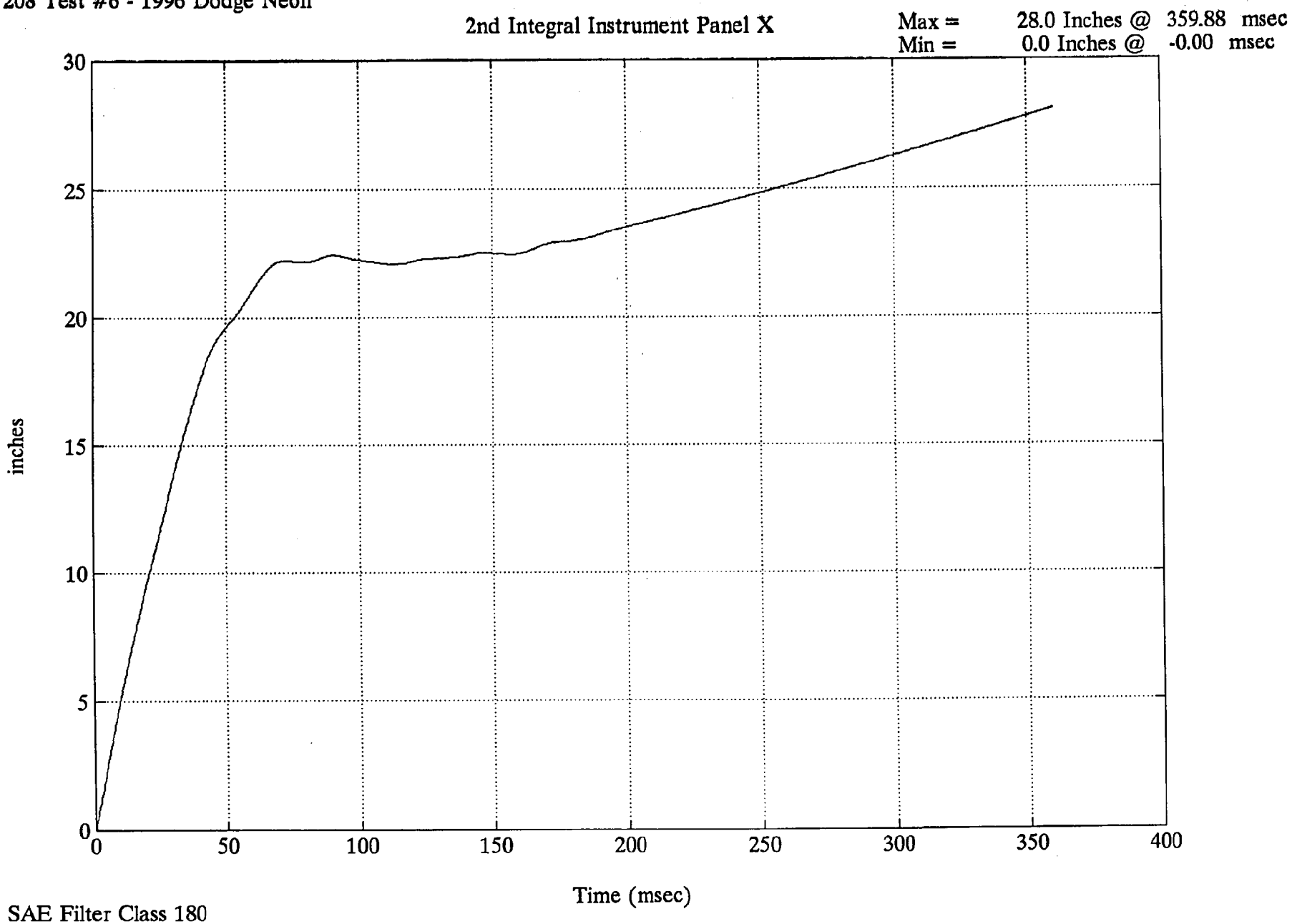
SAE Filter Class 60

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

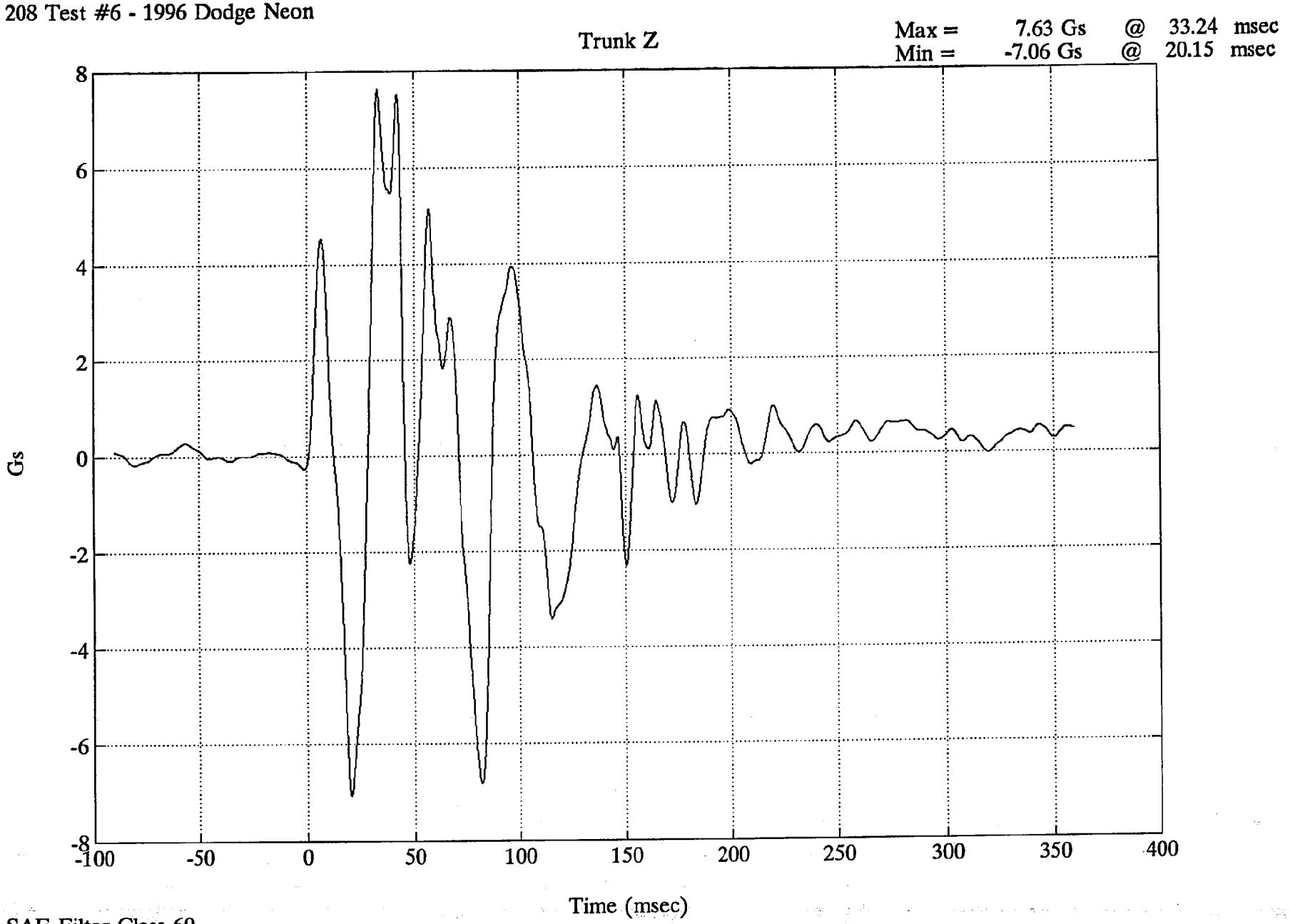
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

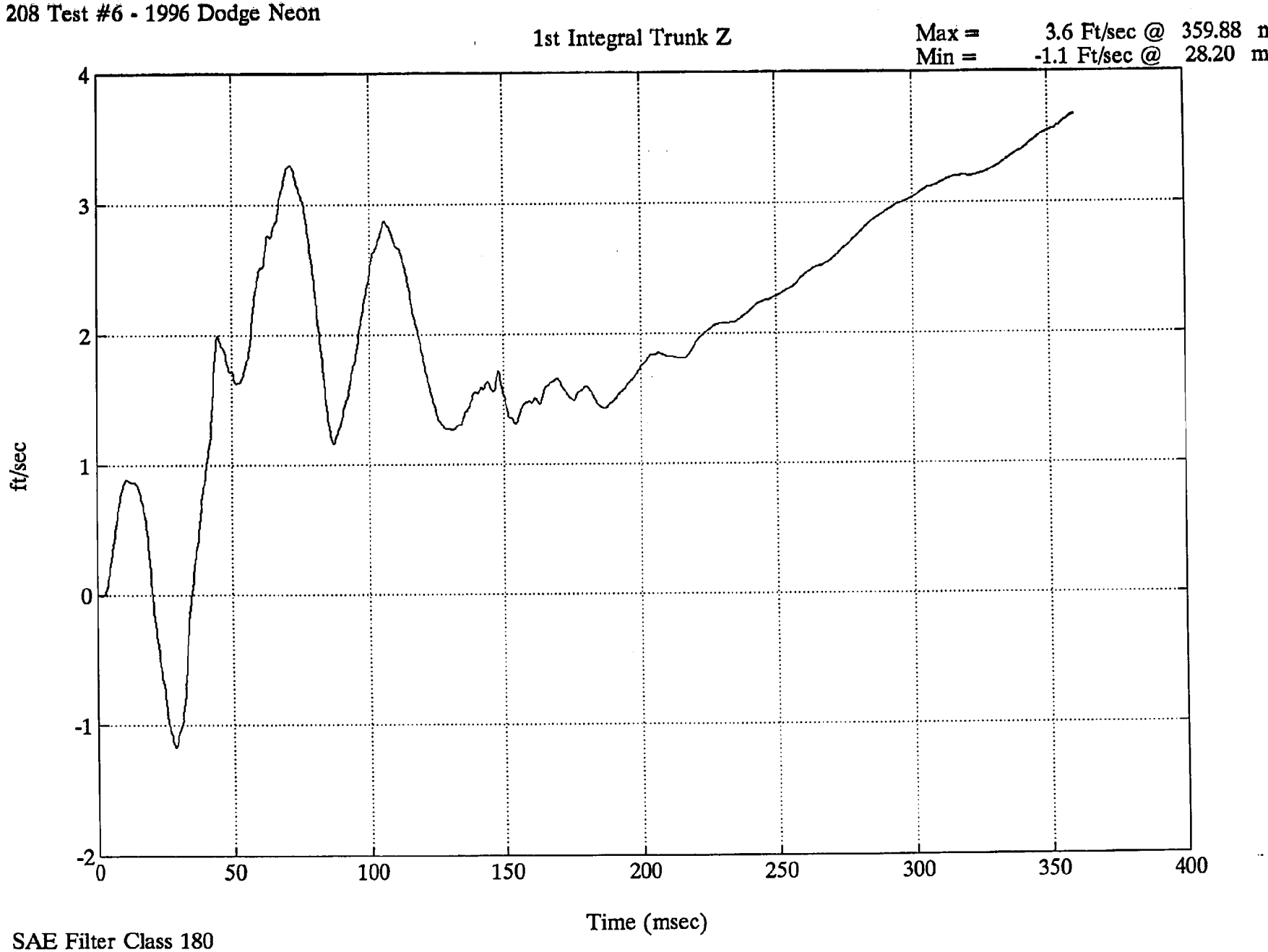
8353-4

208 Test #6 - 1996 Dodge Neon



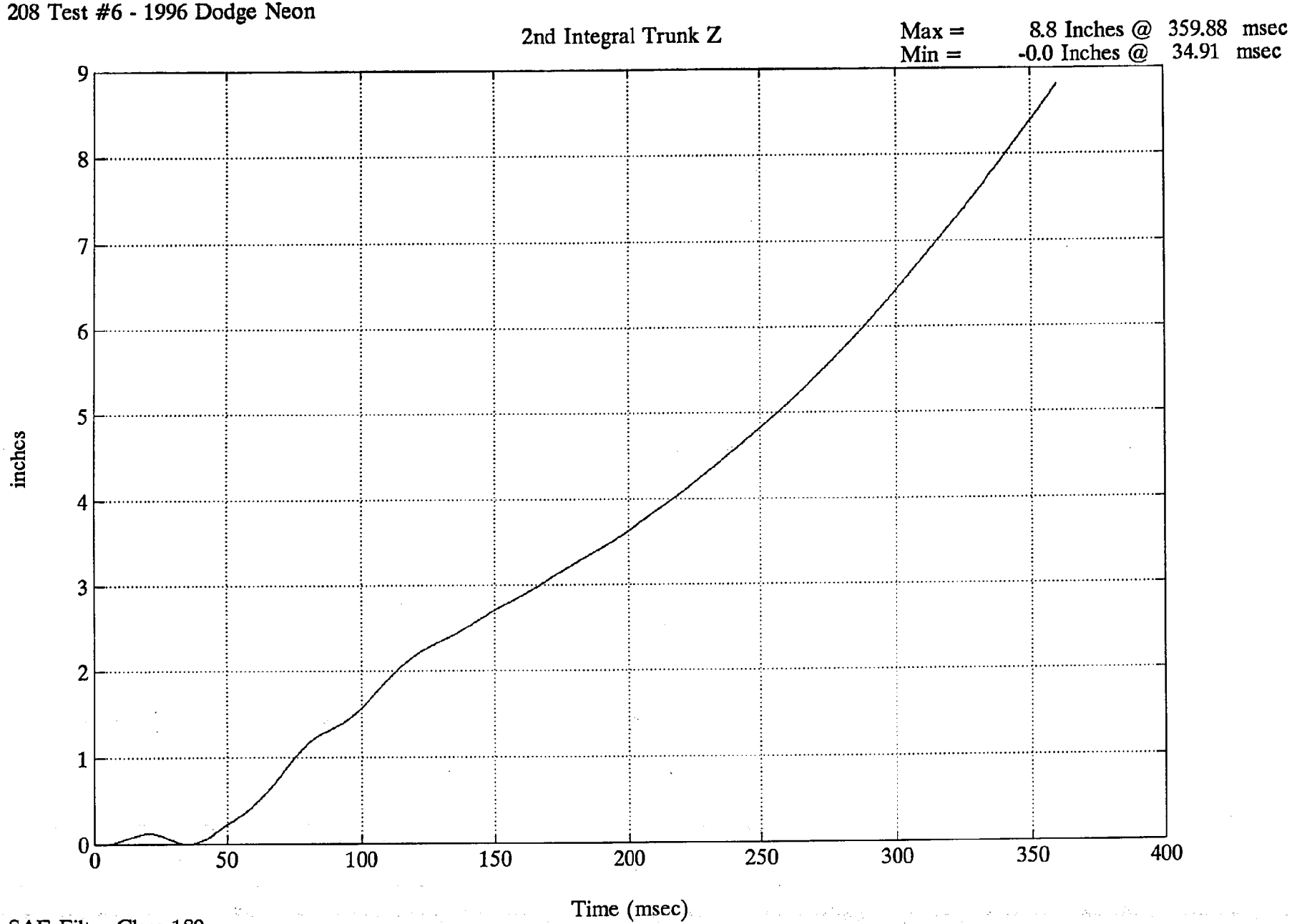
SAE Filter Class 60

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

TEST NO. CT0305

DUMMY	SAE FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Chest Displacements	180
Femur Forces	600
Tibia Forces	600
Tibia Moments	600

FACILITY: track TEST DATE: 01 May 1996
RUN #: 1613 TEST TIME: 12:15:21
SERIES #: 1 BOARD: a

TITLE: 208 Test #6 - 1996 Dodge Neon

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
1	Pos. 1 Head X	Gs	8.5	271.1	-43.4	59.3	1000.0
2	Pos. 1 Head Y	Gs	6.7	86.2	-4.7	52.0	1000.0
3	Pos. 1 Head Z	Gs	25.3	70.8	-13.4	96.5	1000.0
4	Pos. 1 Left Femur	lbs	34.5	18.8	-1284.0	57.8	600.0
5	Pos. 1 Chest X	Gs	3.0	314.9	-48.9	73.2	180.0
6	Pos. 1 Chest Y	Gs	5.1	57.5	-6.1	52.7	180.0
7	Pos. 1 Chest Z	Gs	11.0	68.9	-5.8	57.2	180.0
8	Pos. 1 Right Femur	lbs	62.4	165.6	-1594.1	59.6	600.0
9	Pos. 2 Head X	Gs	6.8	100.6	-38.0	69.7	1000.0
10	Pos. 2 Head Y	Gs	10.6	54.1	-19.3	147.5	1000.0
11	Pos. 2 Head Z	Gs	33.6	70.3	-20.9	100.0	1000.0
12	Pos. 2 Left Femur	lbs	17.6	17.8	-1513.8	52.8	600.0
13	Pos. 2 Chest X	Gs	4.8	144.4	-44.8	76.2	180.0
14	Pos. 2 Chest Y	Gs	4.7	57.2	-7.5	97.7	180.0
15	Pos. 2 Chest Z	Gs	22.4	68.3	-5.5	145.8	180.0
16	Pos. 2 Right Femur	lbs	19.2	43.9	-1758.6	67.7	600.0
17	Pos. 1 Head Resultant	Gs	44.5	59.3	.1	-88.0	1000.0
18	Pos. 1 Chest Resultant	Gs	49.4	73.1	.0	-68.0	180.0
19	Pos. 2 Head Resultant	Gs	50.0	70.3	.0	-68.9	1000.0
20	Pos. 2 Chest Resultant	Gs	46.4	73.8	.0	-63.8	180.0

DRIVER (Pos. 1)

V2 36 ms Fixed Duration HIC SUMMARY: Pos. 1 Head Resultant
hic: 238.02
t1 = 45.720 msec
t2 = 81.240 msec
Average G's Over Hic Duration = 33.92

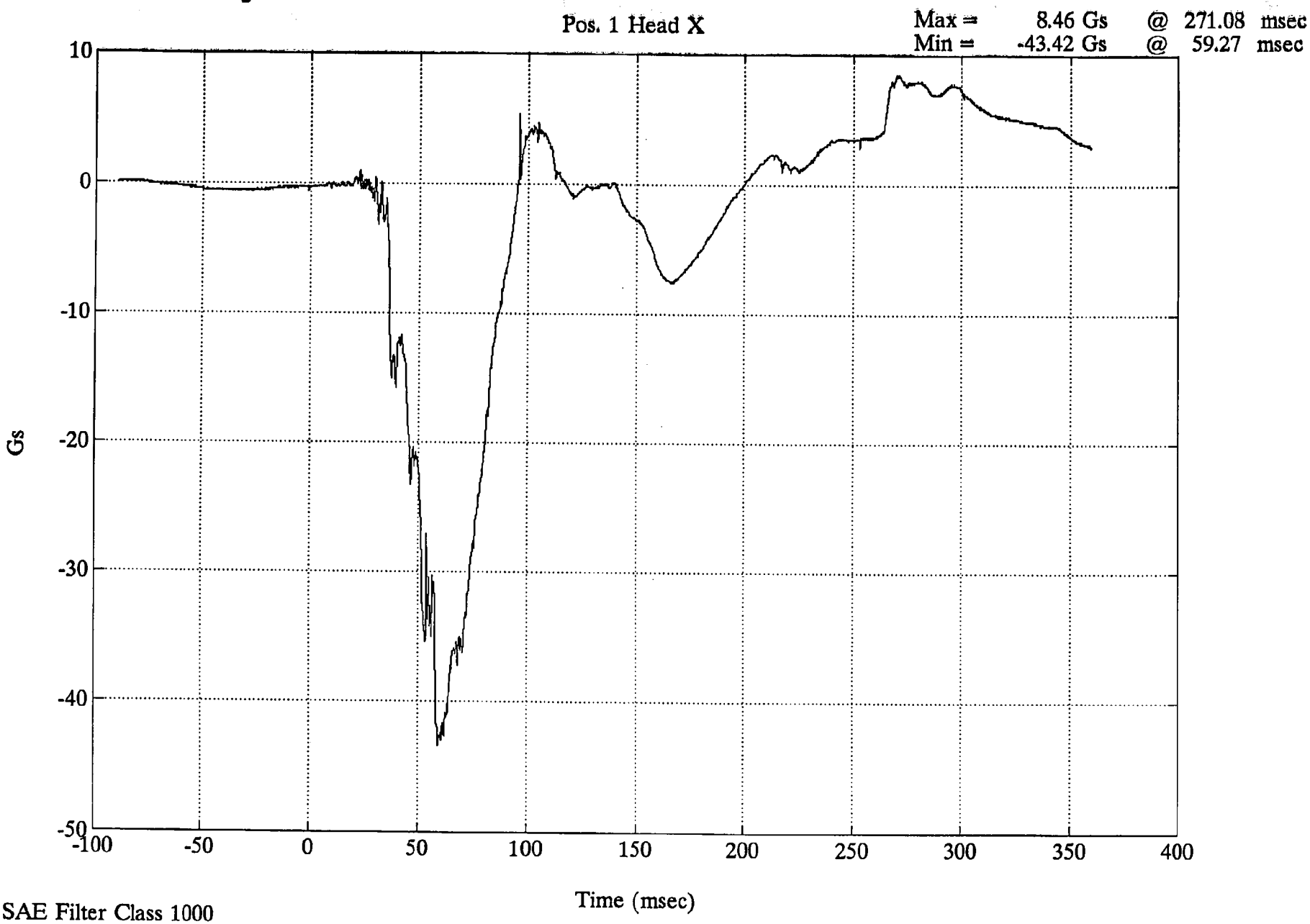
CLIP V2.1 SUMMARY: Pos. 1 Chest Resultant
Peak Resultant (3 ms CLIPPED DURATION) = 47.343 G's
Tstart = 71.3345 ms
Tend = 74.3345 ms
CSI = 304.506

RIGHT FRONT PASSENGER (Pos. 2)

V2 36 ms Fixed Duration HIC SUMMARY: Pos. 2 Head Resultant
hic: 170.46
t1 = 55.560 msec
t2 = 91.560 msec
Average G's Over Hic Duration = 29.52

CLIP V2.1 SUMMARY: Pos. 2 Chest Resultant
Peak Resultant (3 ms CLIPPED DURATION) = 46.134 G's
Tstart = 73.1919 ms
Tend = 76.1919 ms
CSI = 302.630

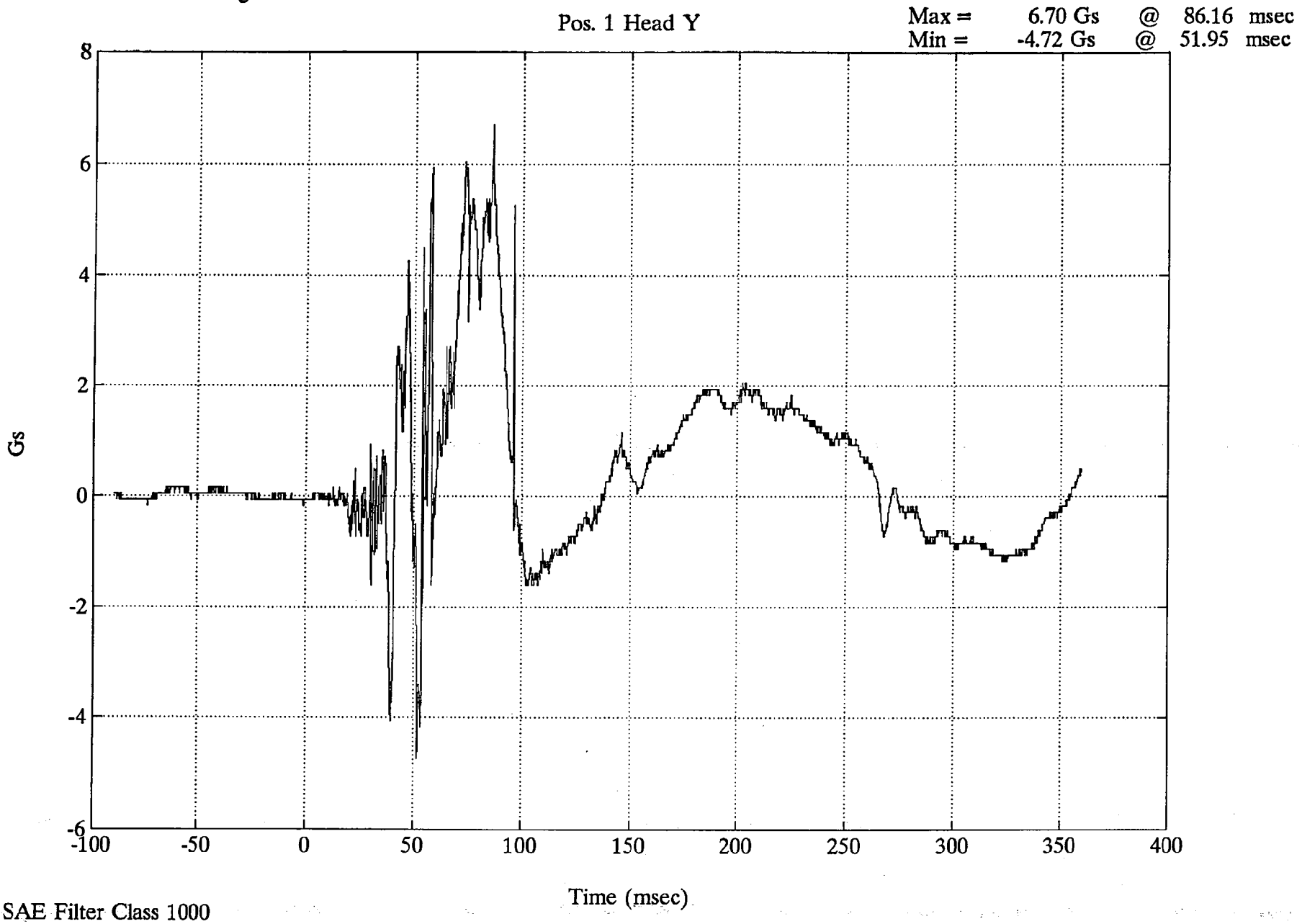
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 1000

8353-4

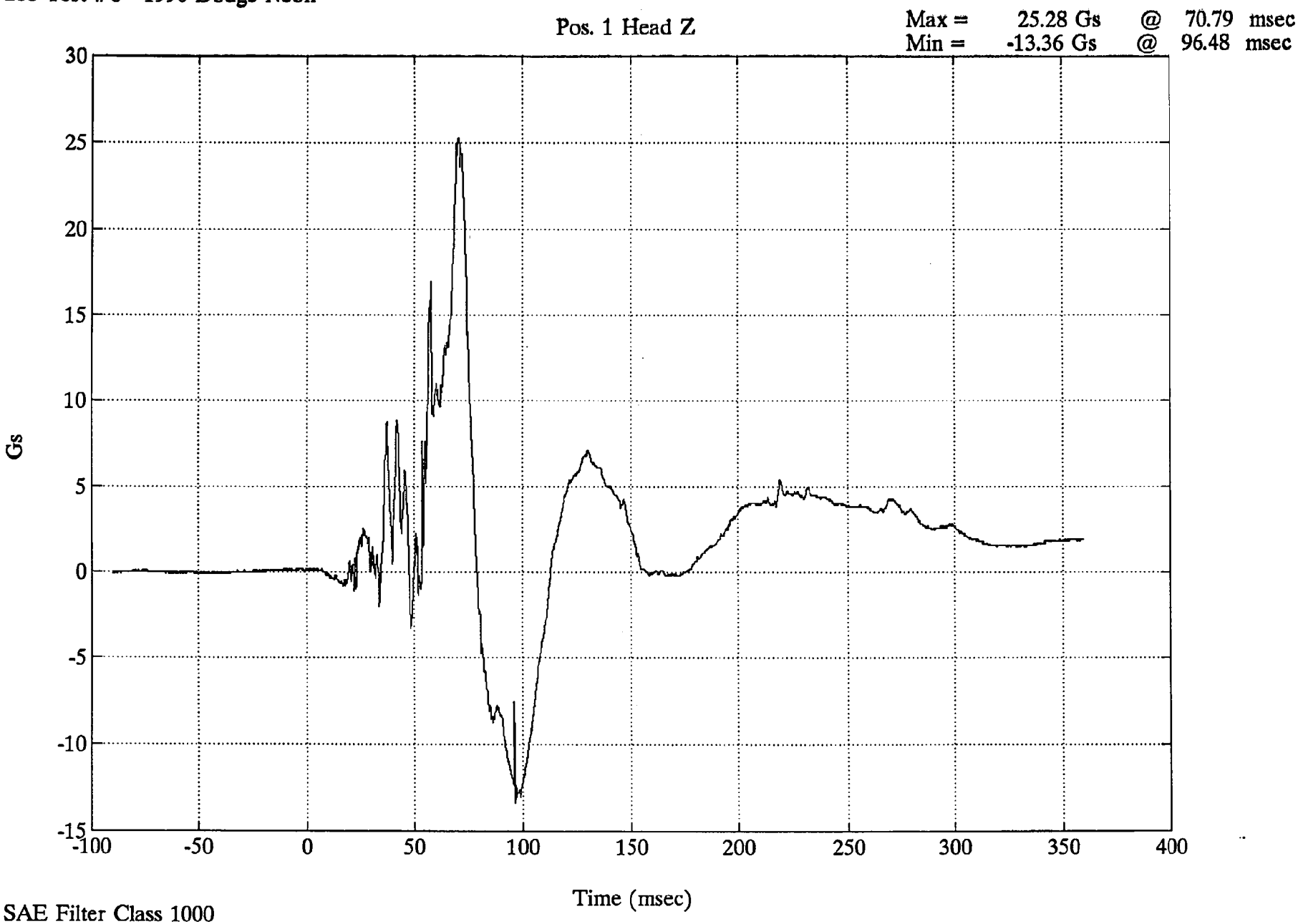
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 1000

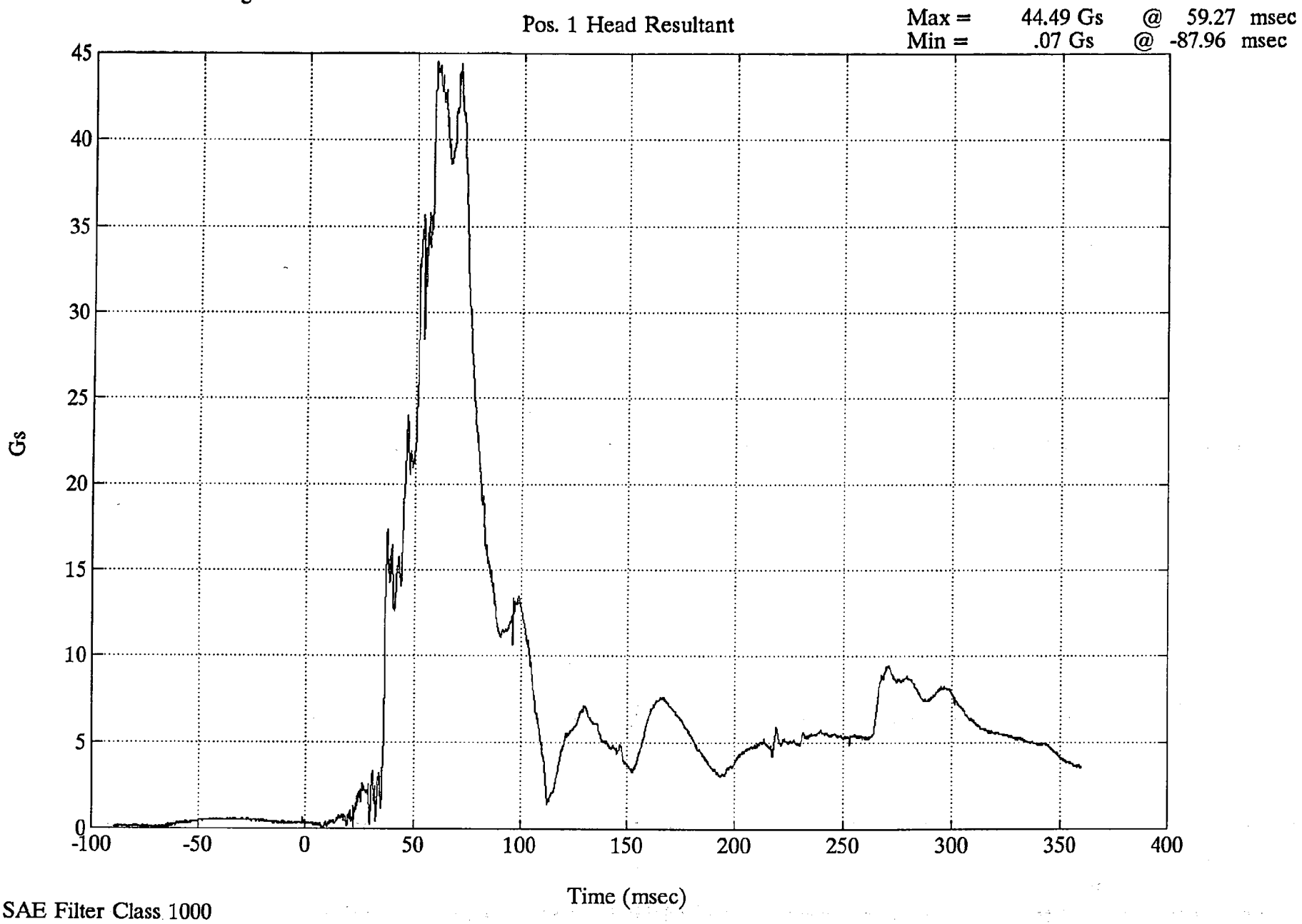
8353-4

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 1000

208 Test #6 - 1996 Dodge Neon

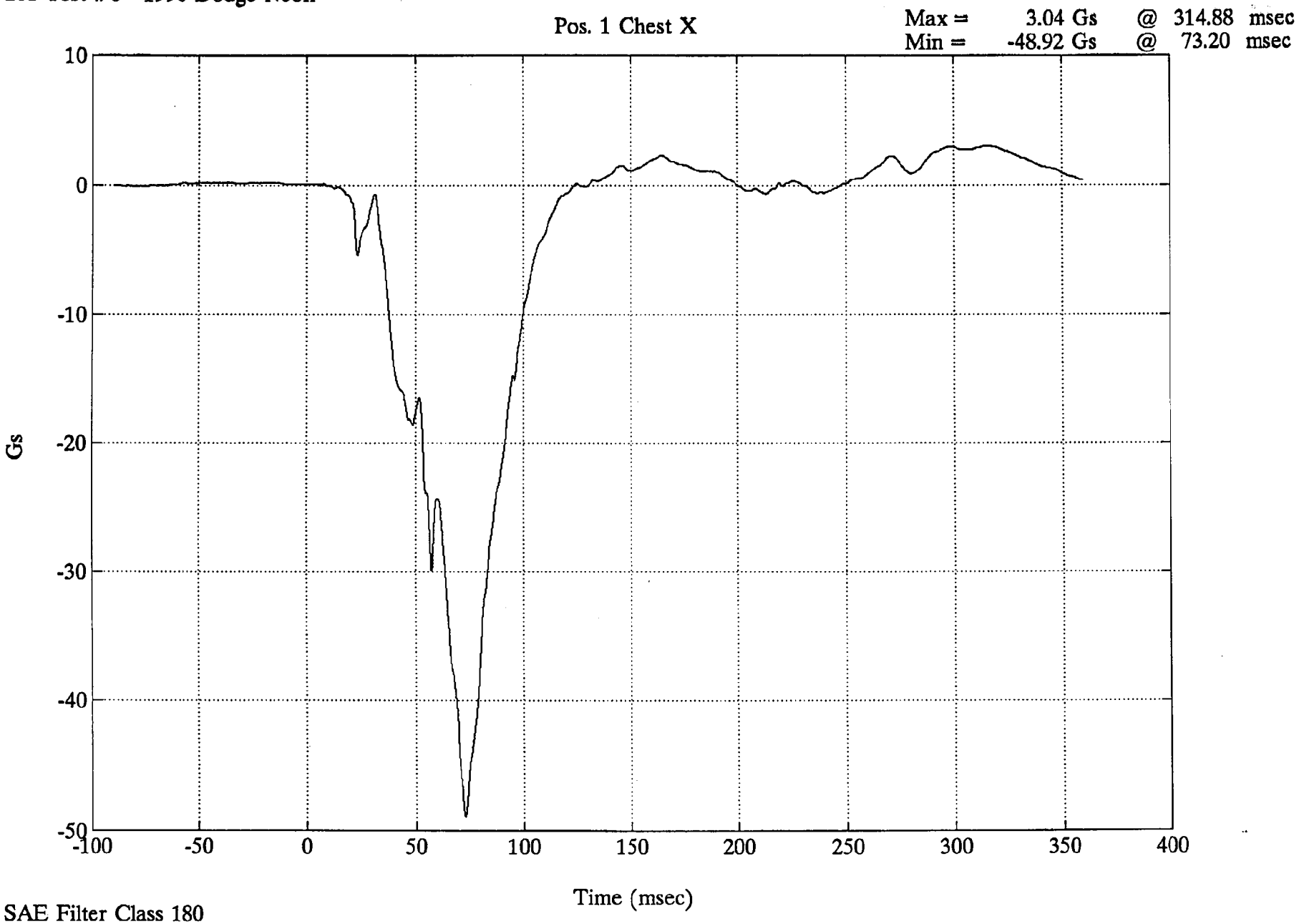


SAE Filter Class 1000

B-32

8353-4

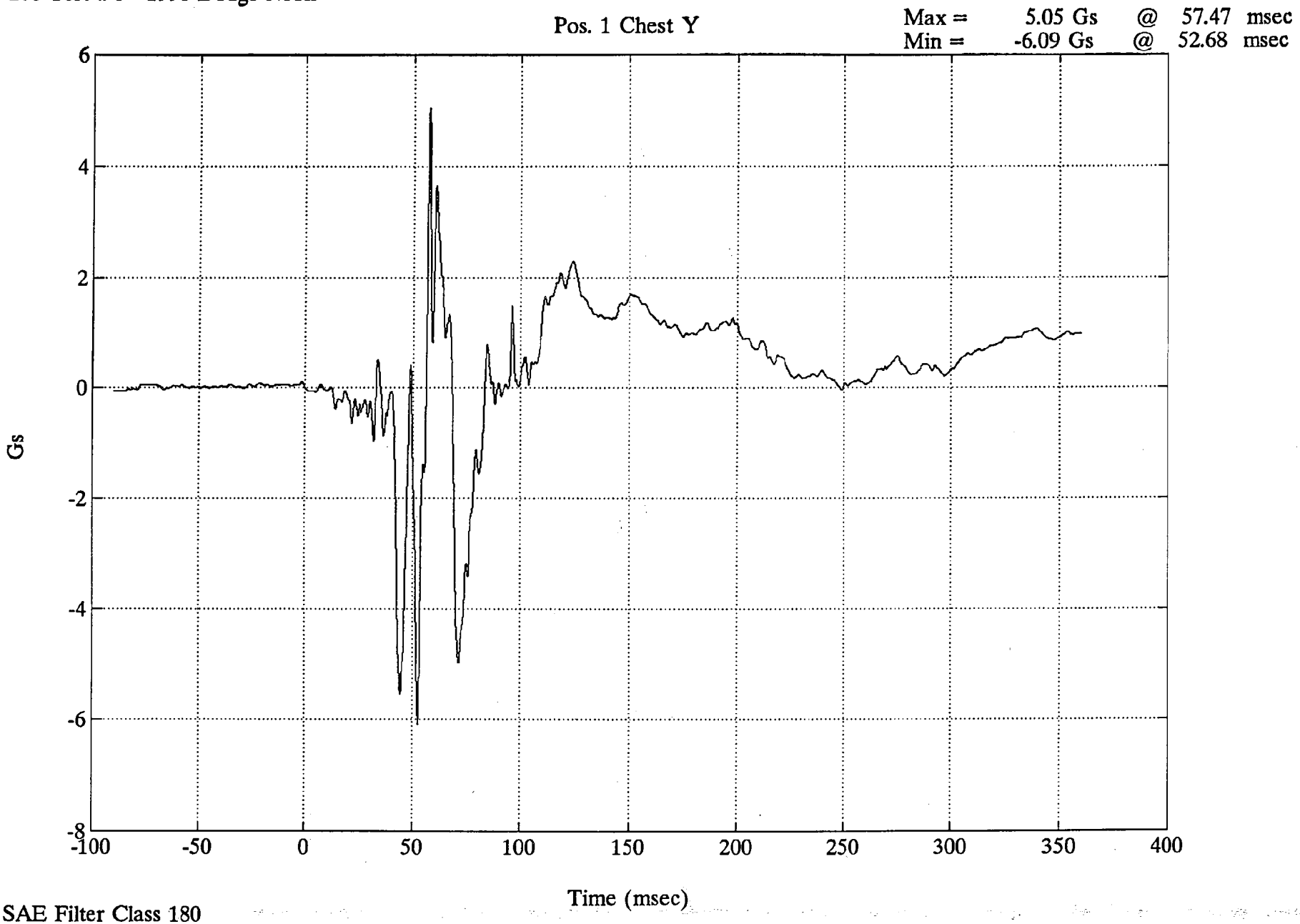
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

8353-4

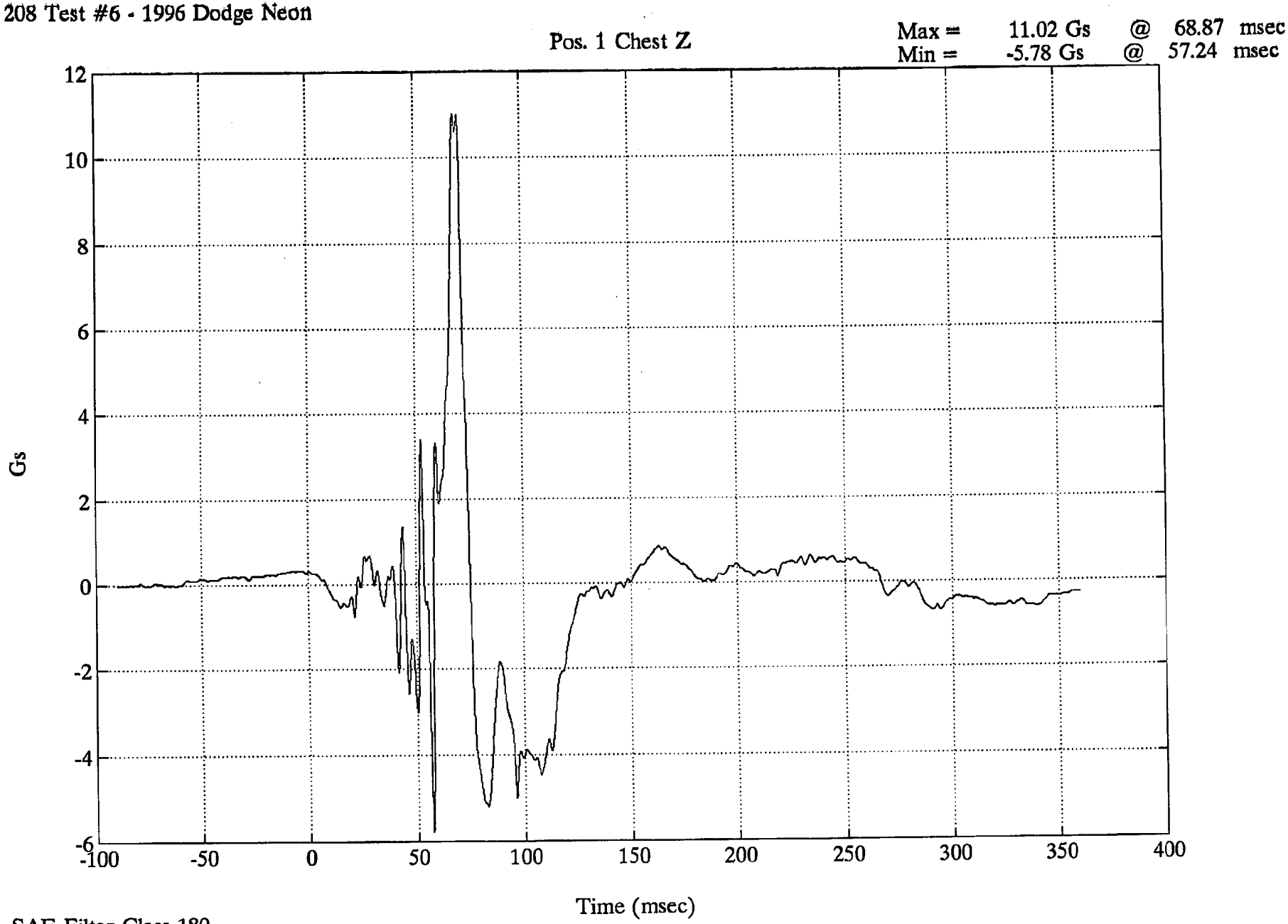
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

8353-4

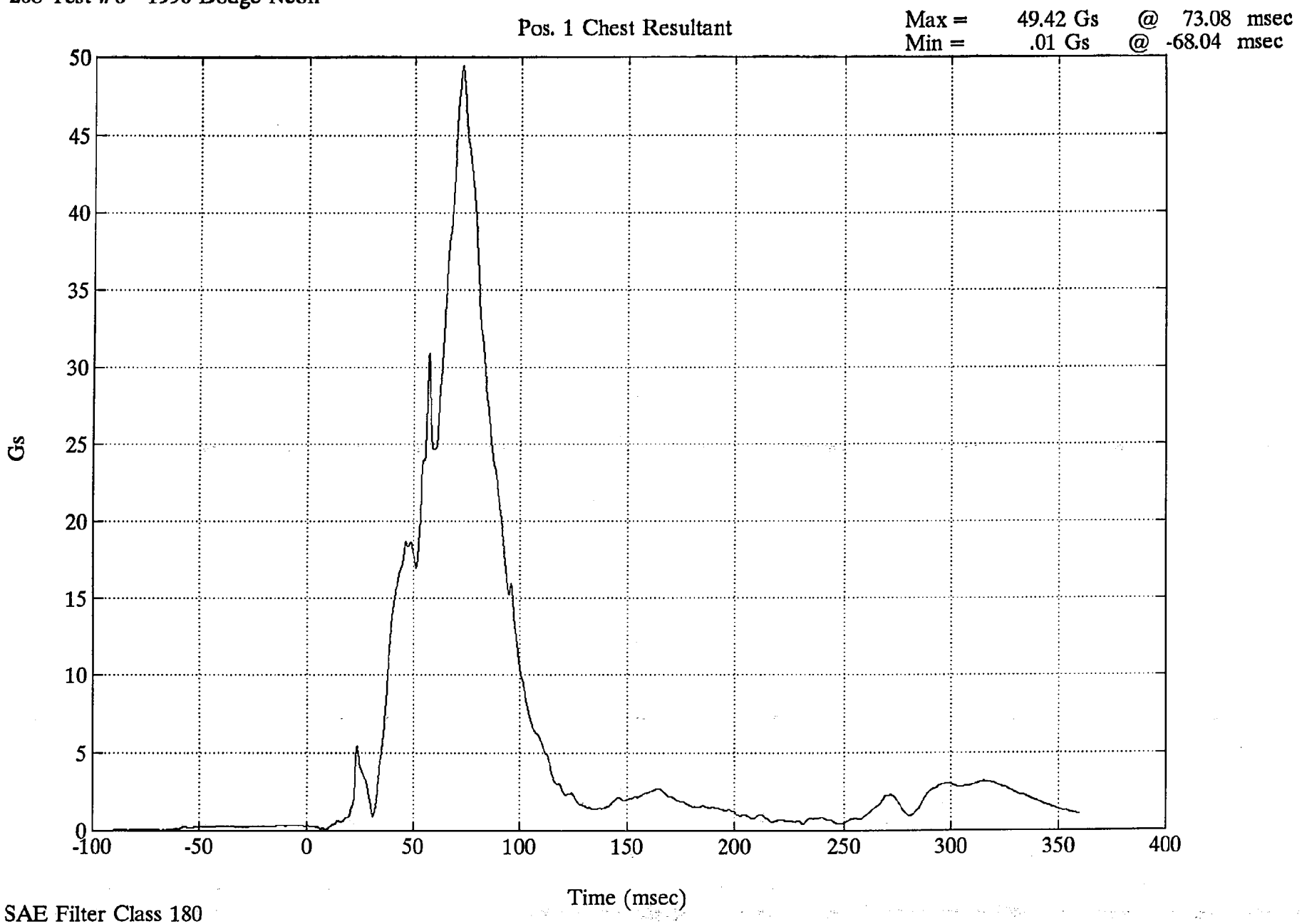
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

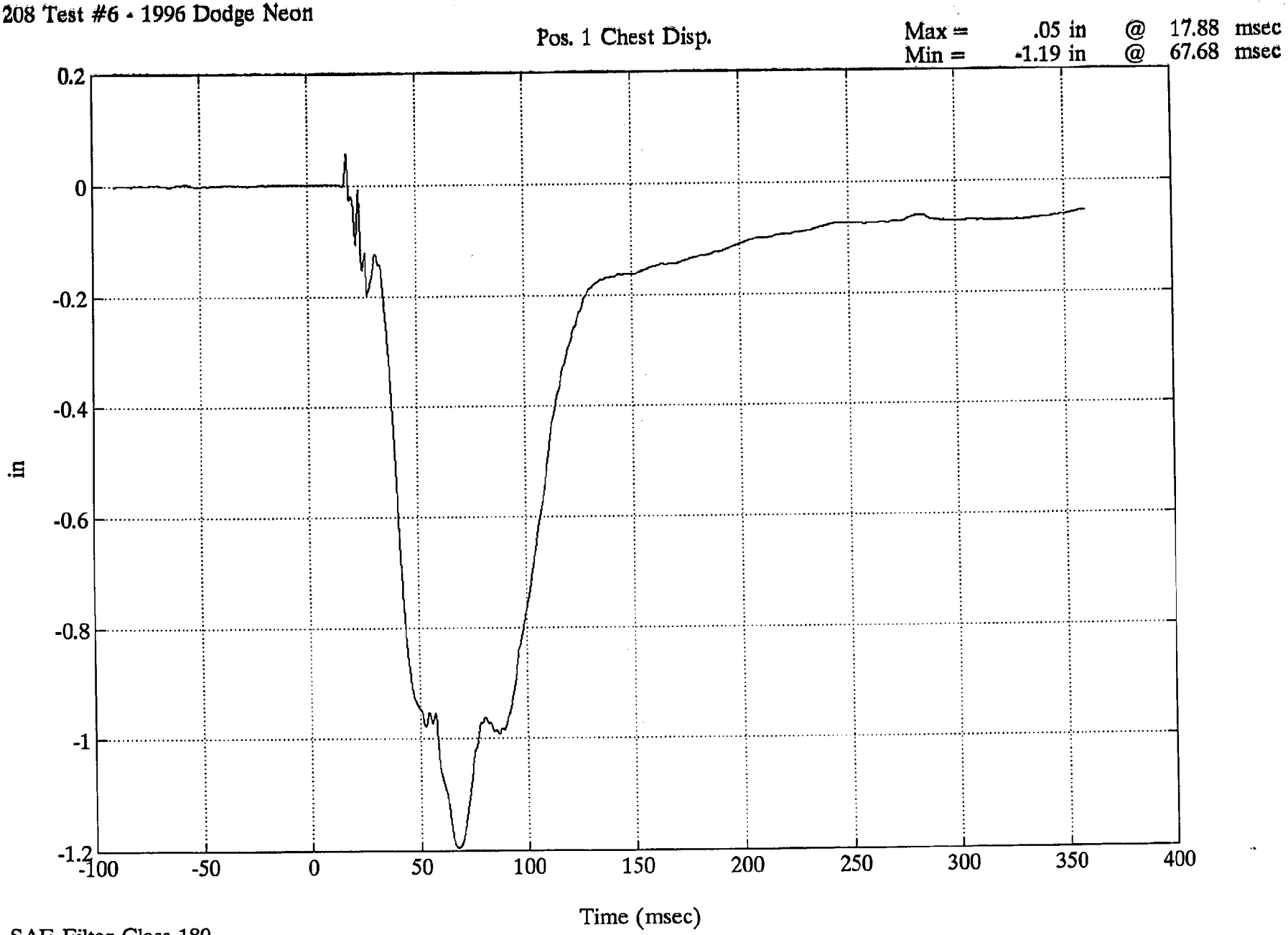
8353-4

208 Test #6 - 1996 Dodge Neon



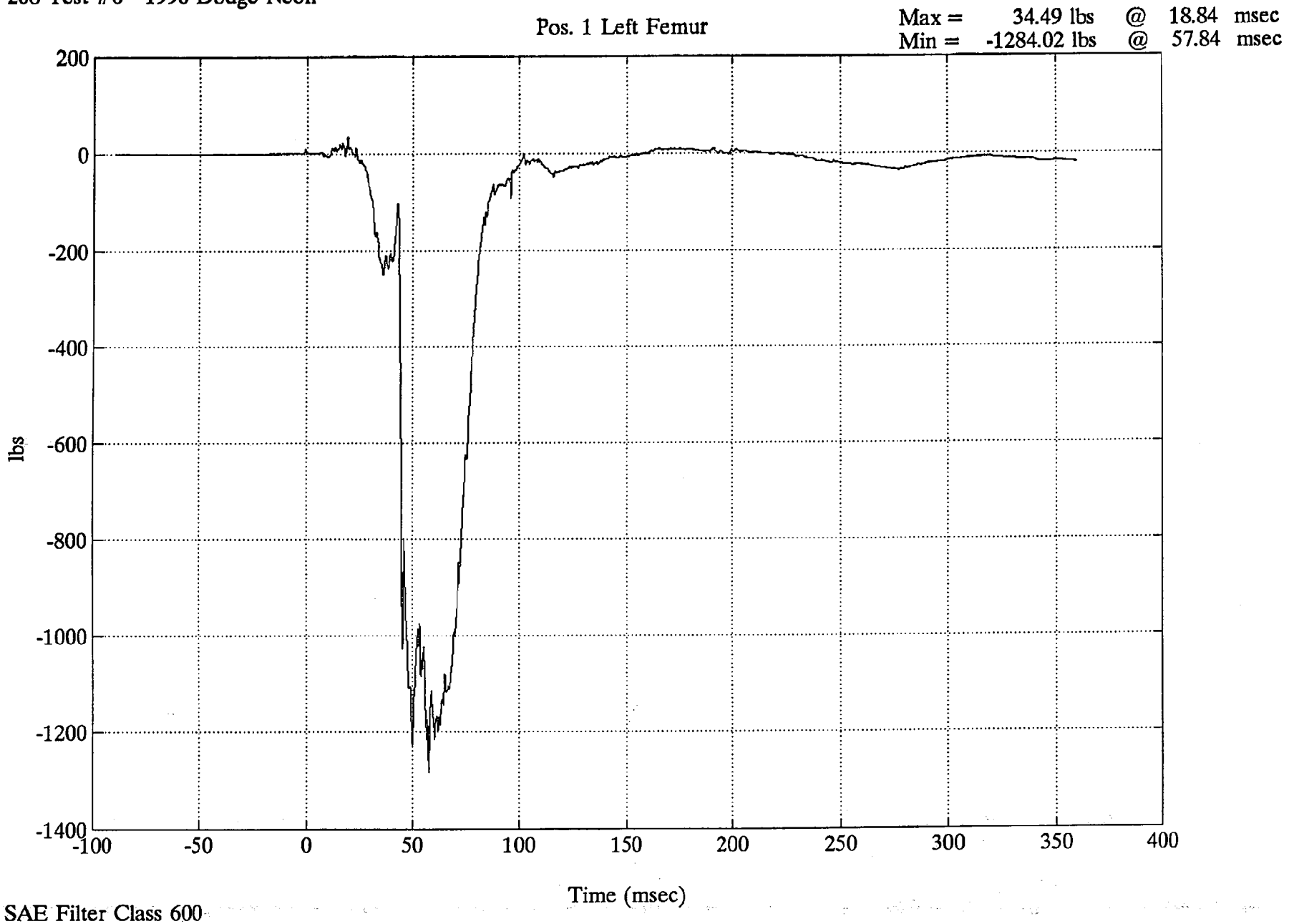
SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



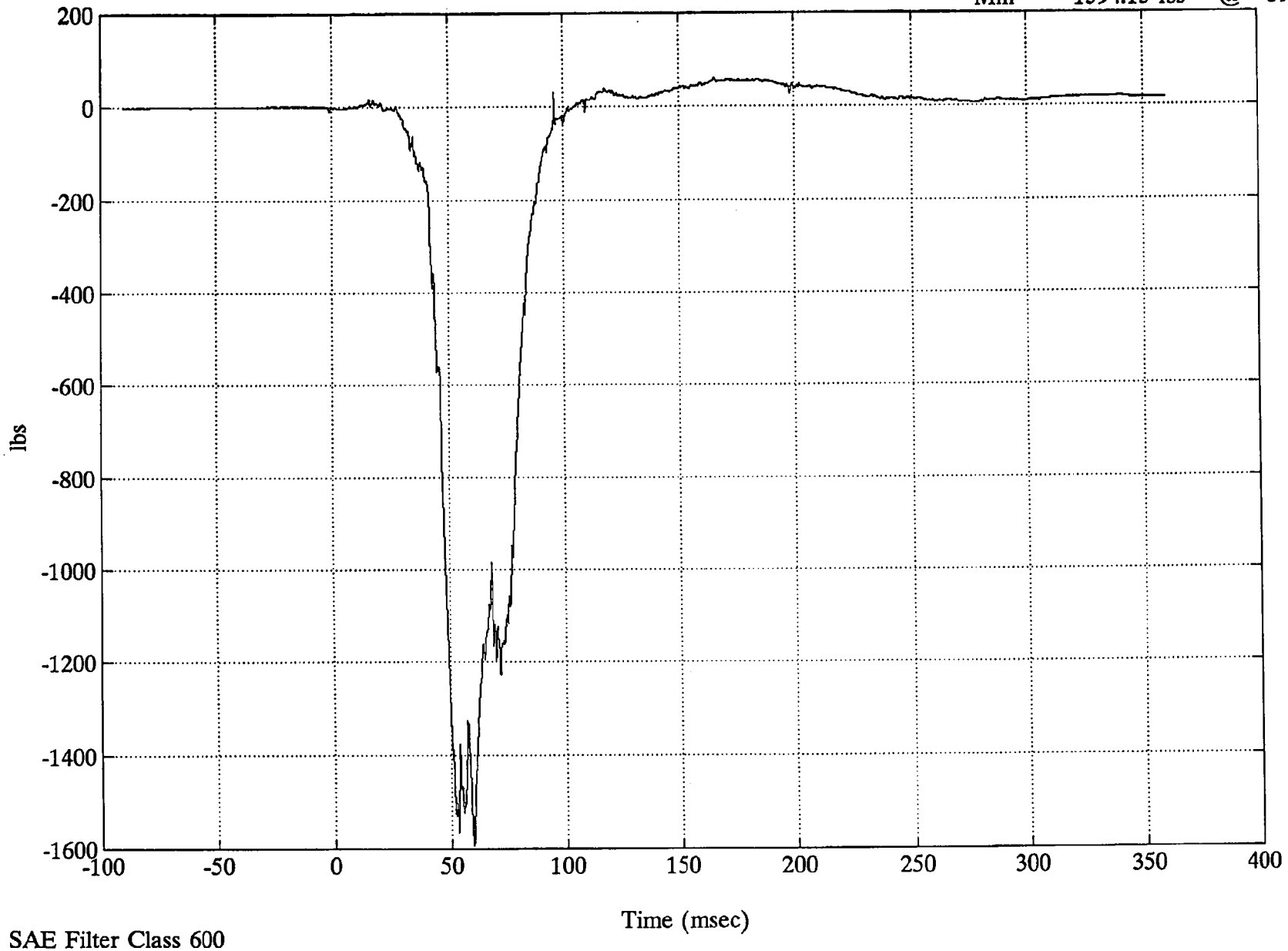
SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon

Pos. 1 Right Femur

Max = 62.36 lbs @ 165.60 msec
Min = -1594.13 lbs @ 59.64 msec



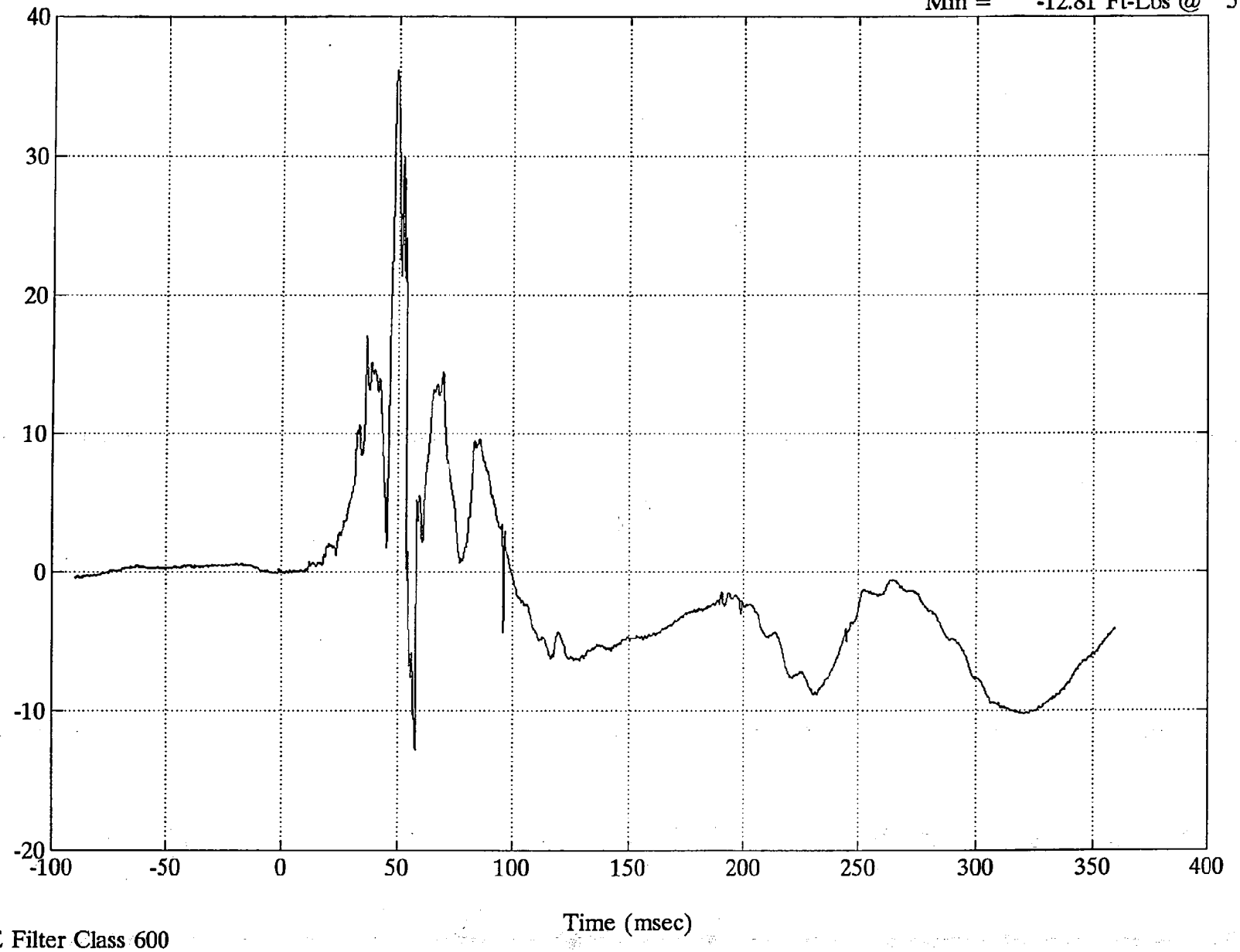
SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon

P1 Lt Upper Tibia Mx

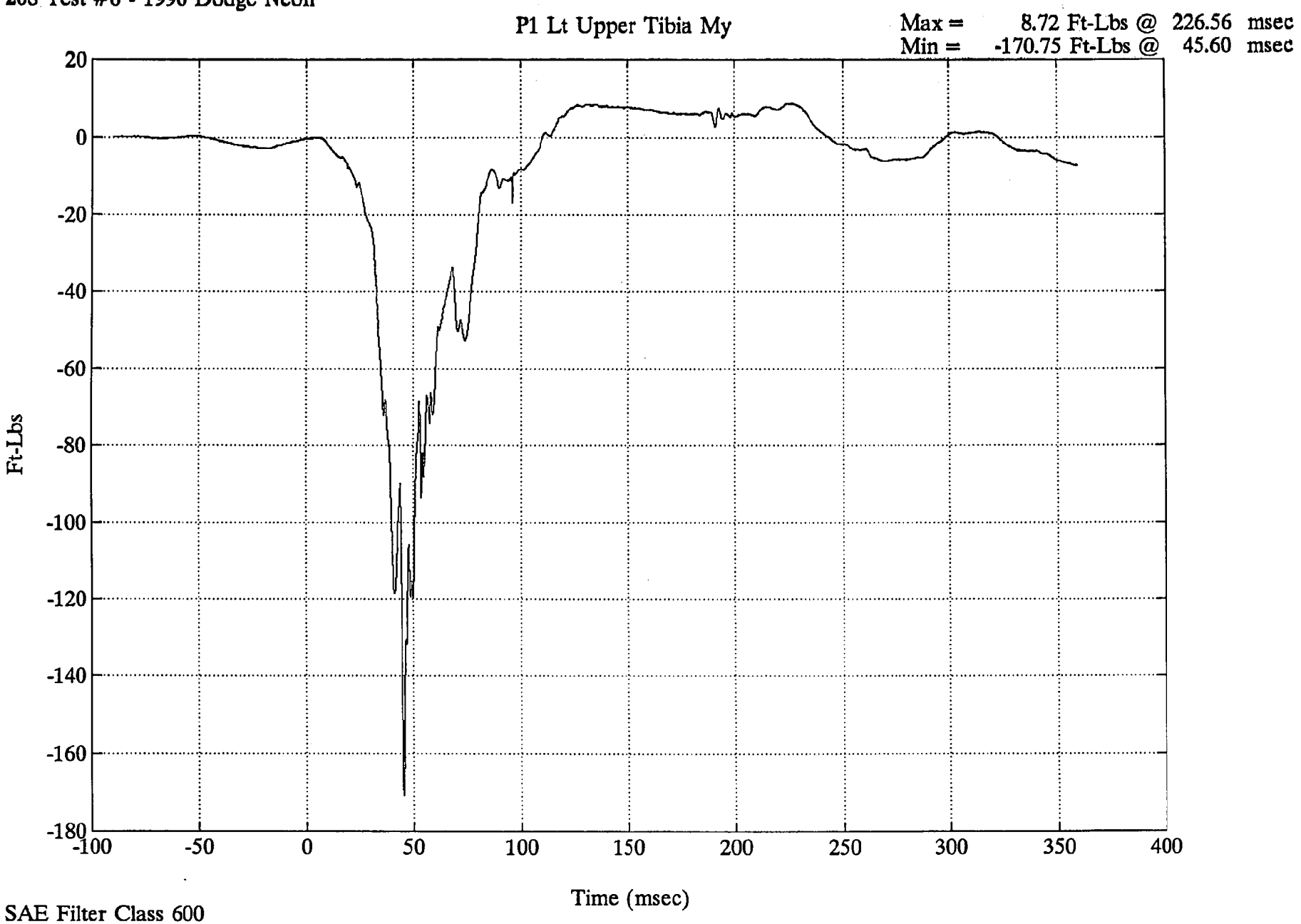
Max = 36.13 Ft-Lbs @ 49.31 msec
Min = -12.81 Ft-Lbs @ 57.72 msec



SAE Filter Class 600

8353-4

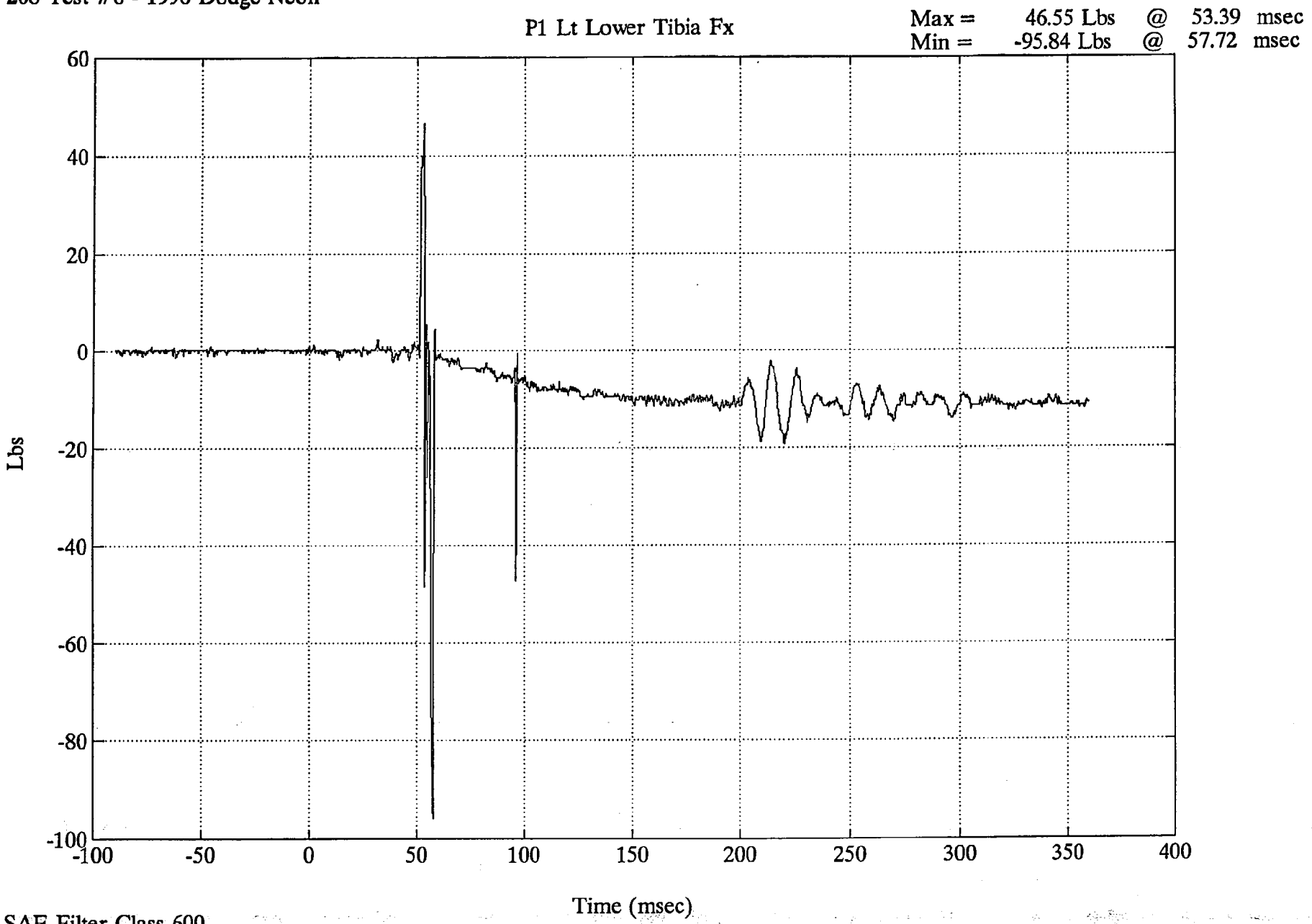
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

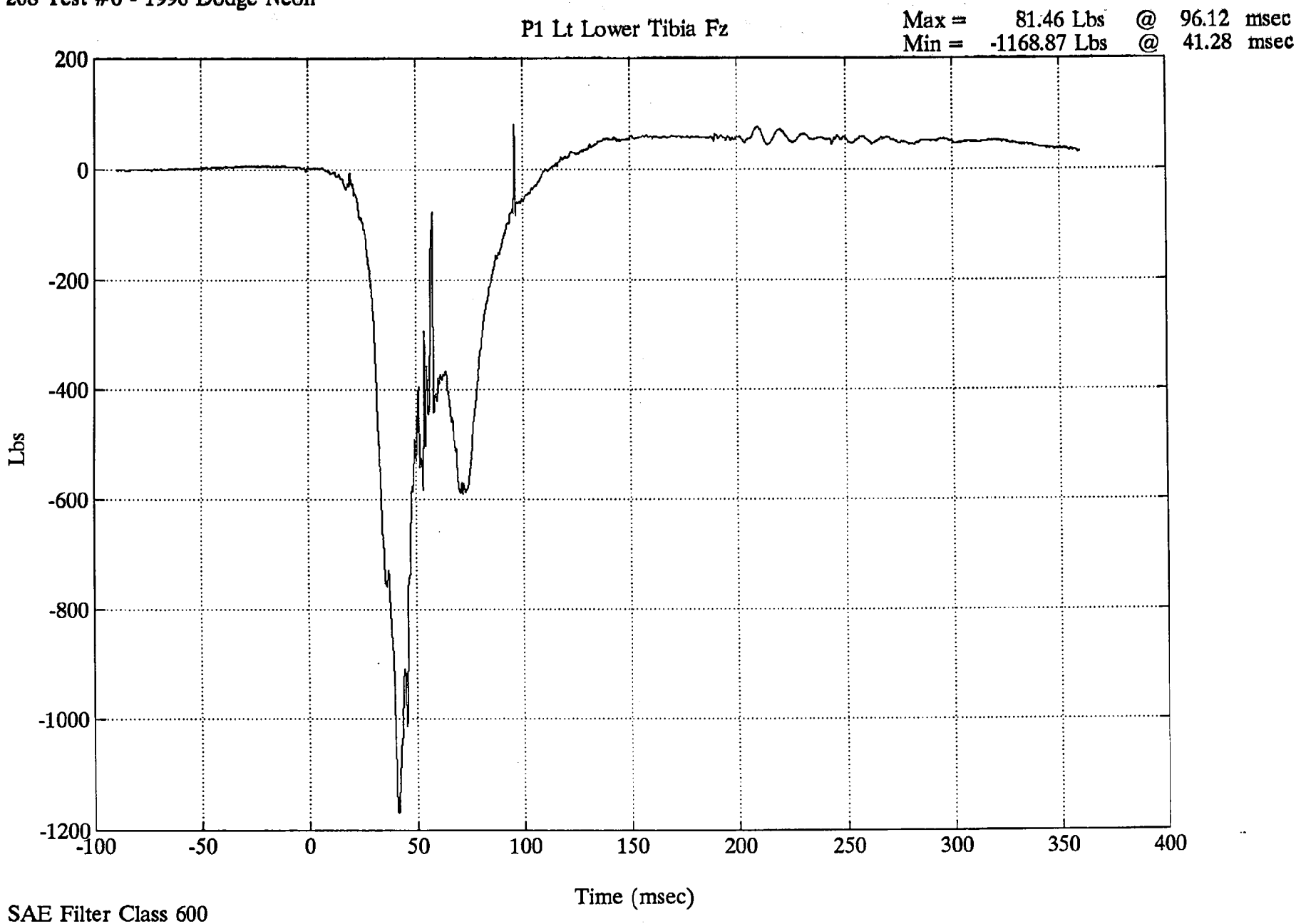
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

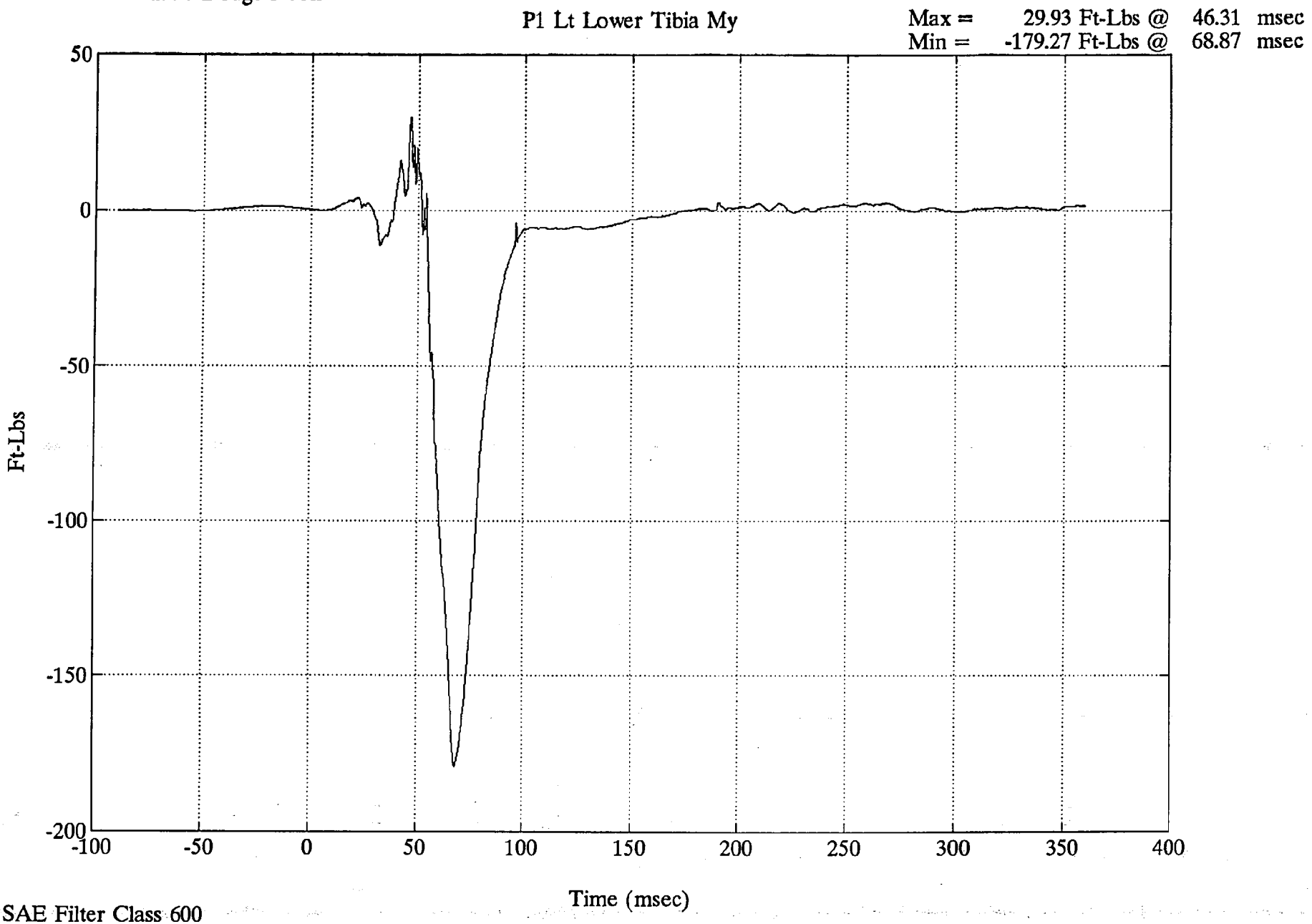
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

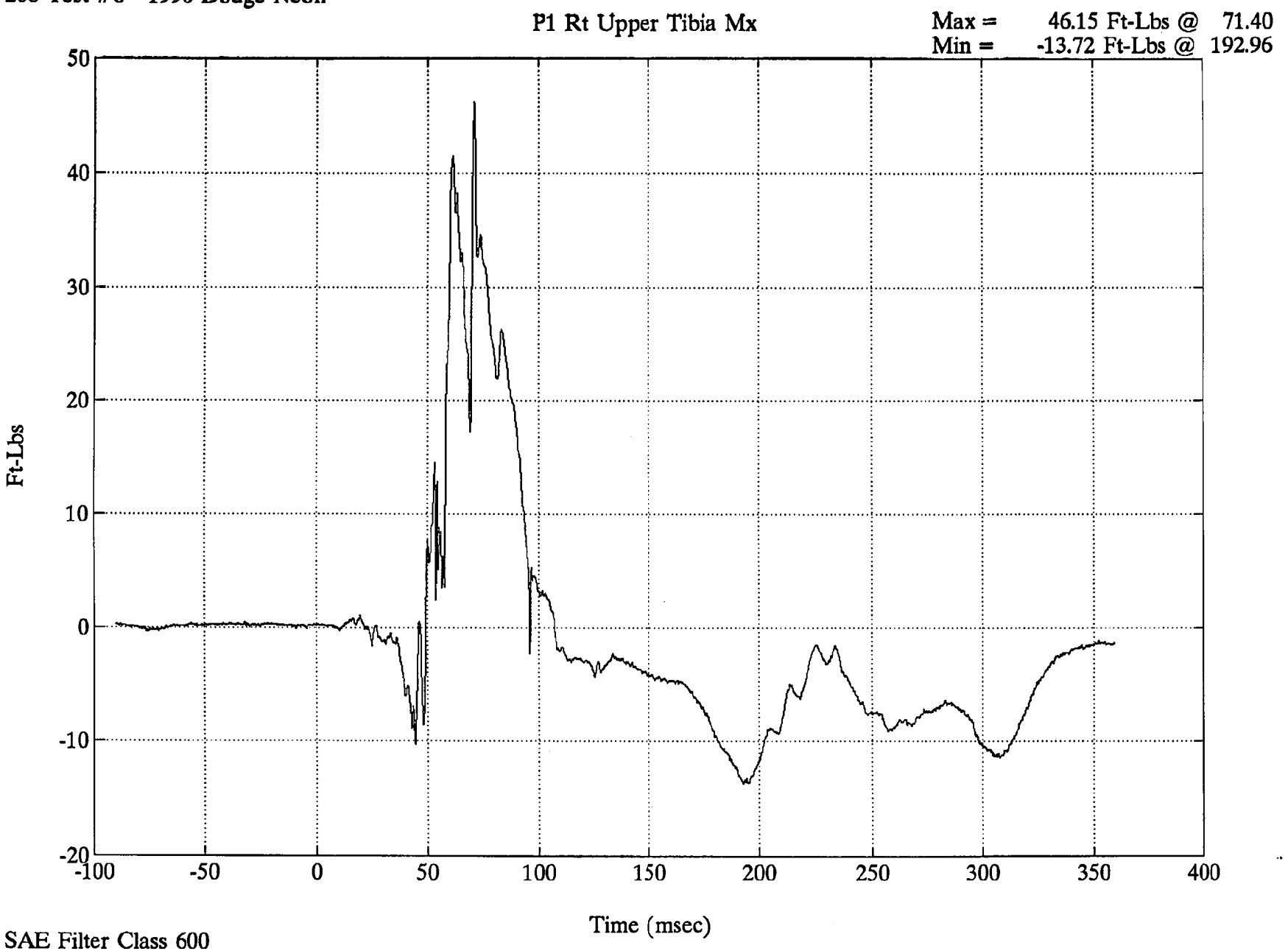
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

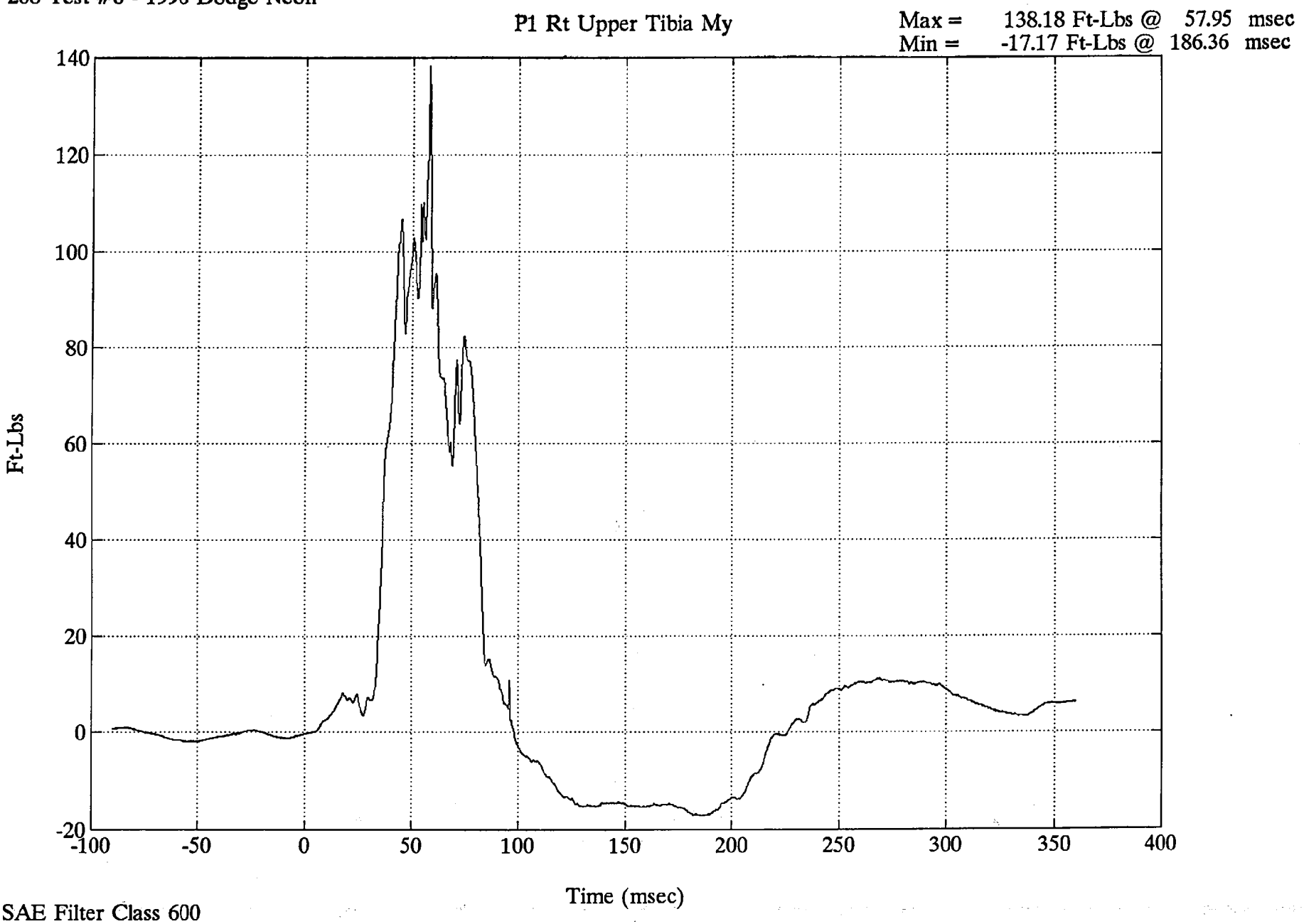
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

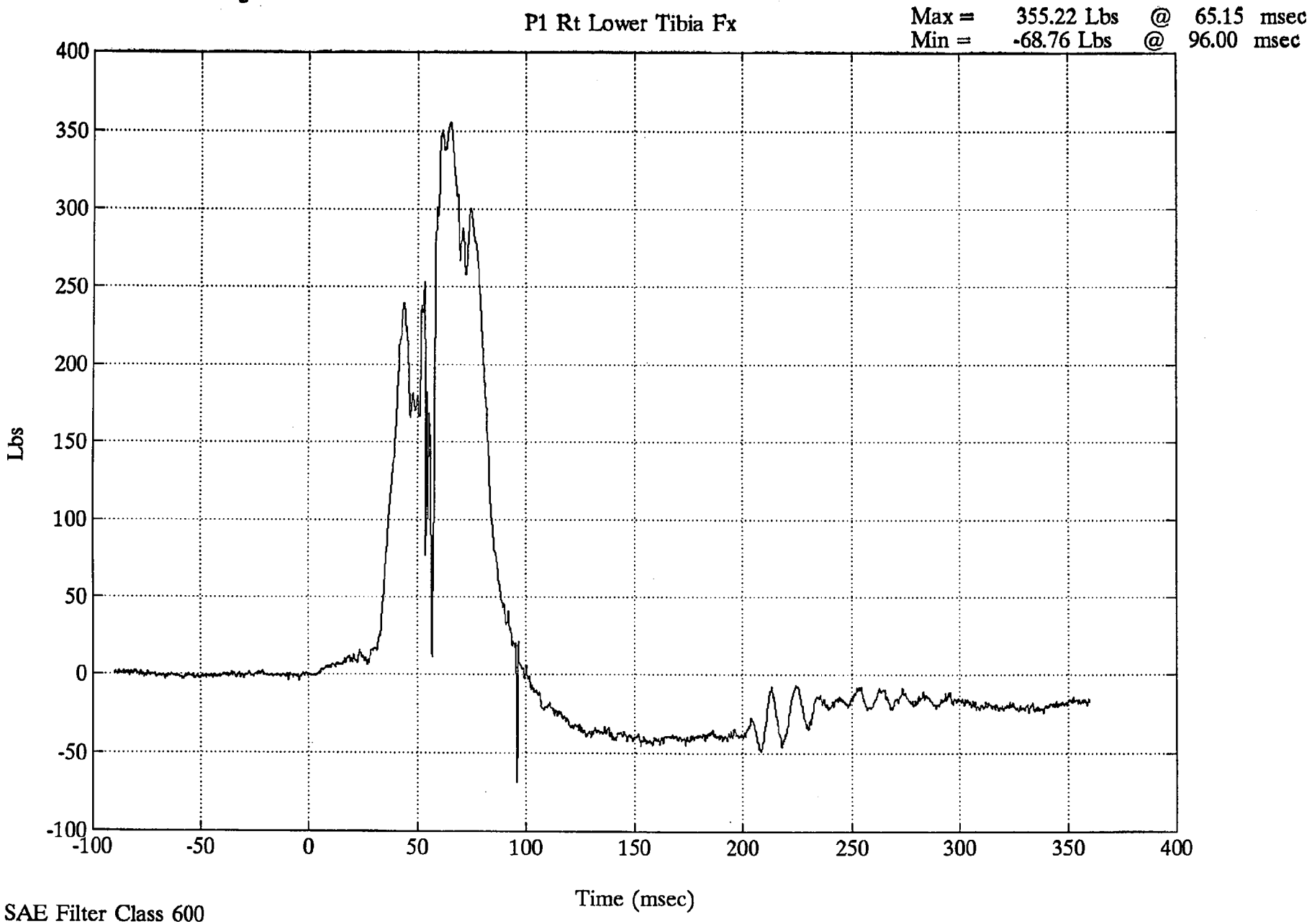
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

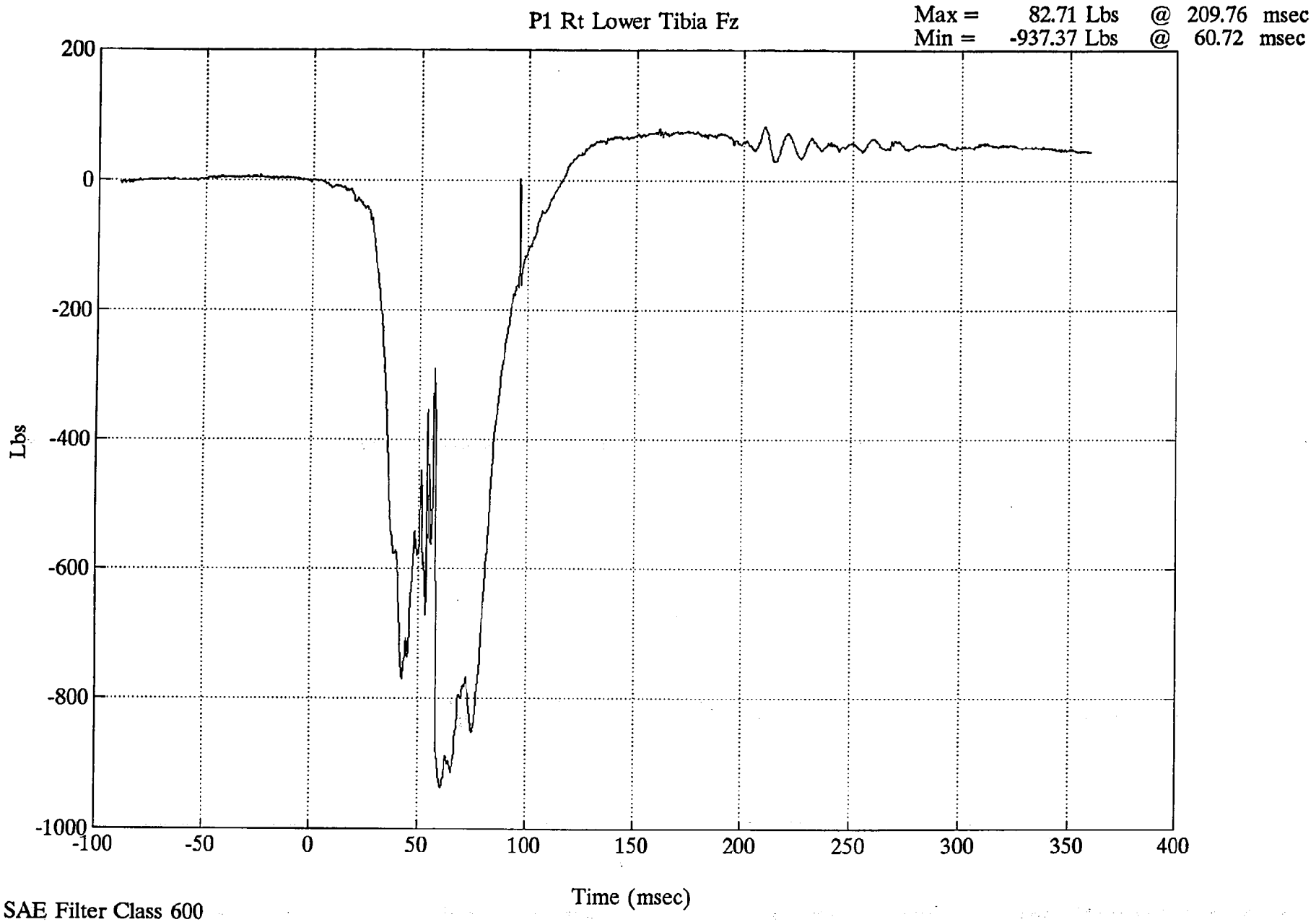
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

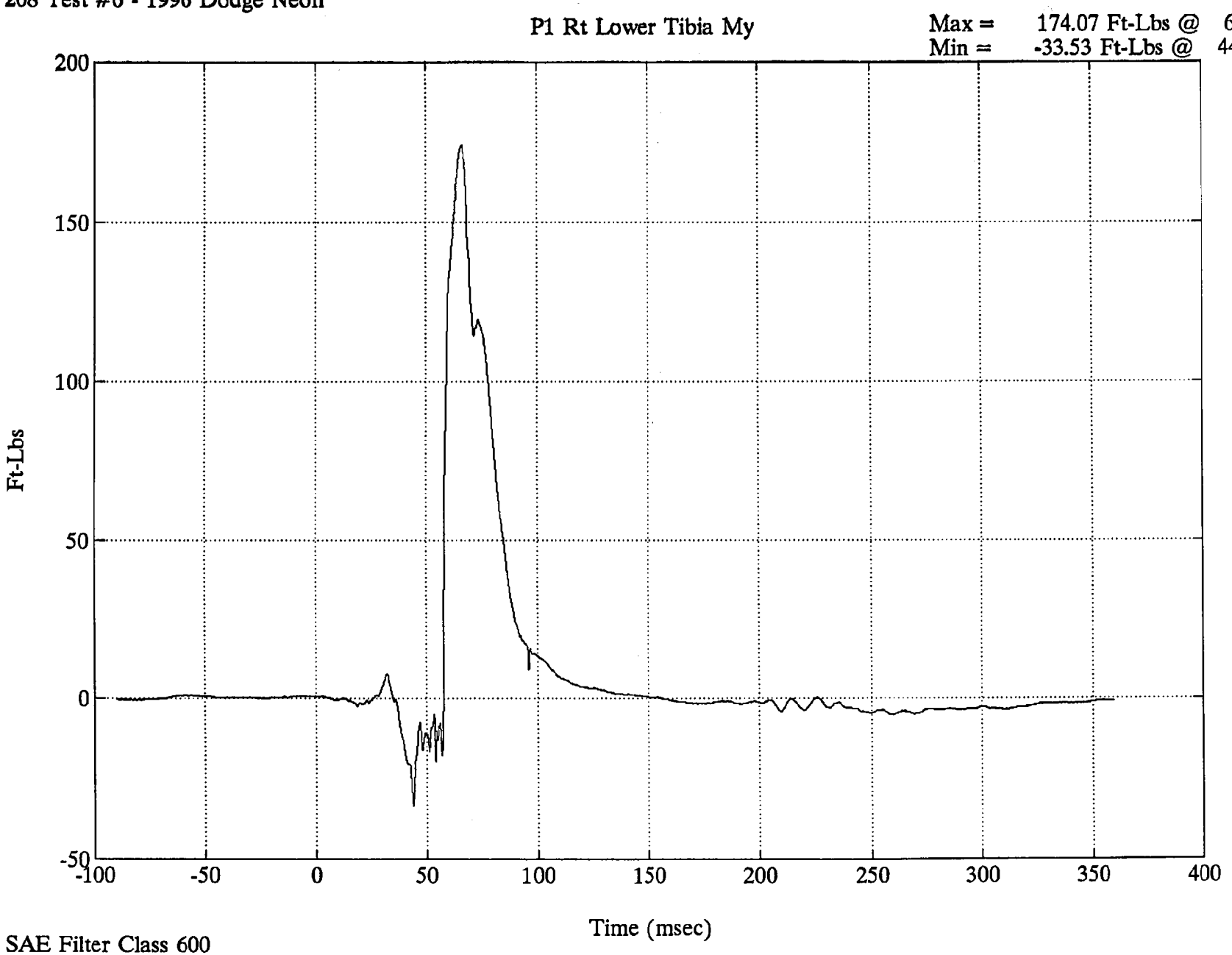
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

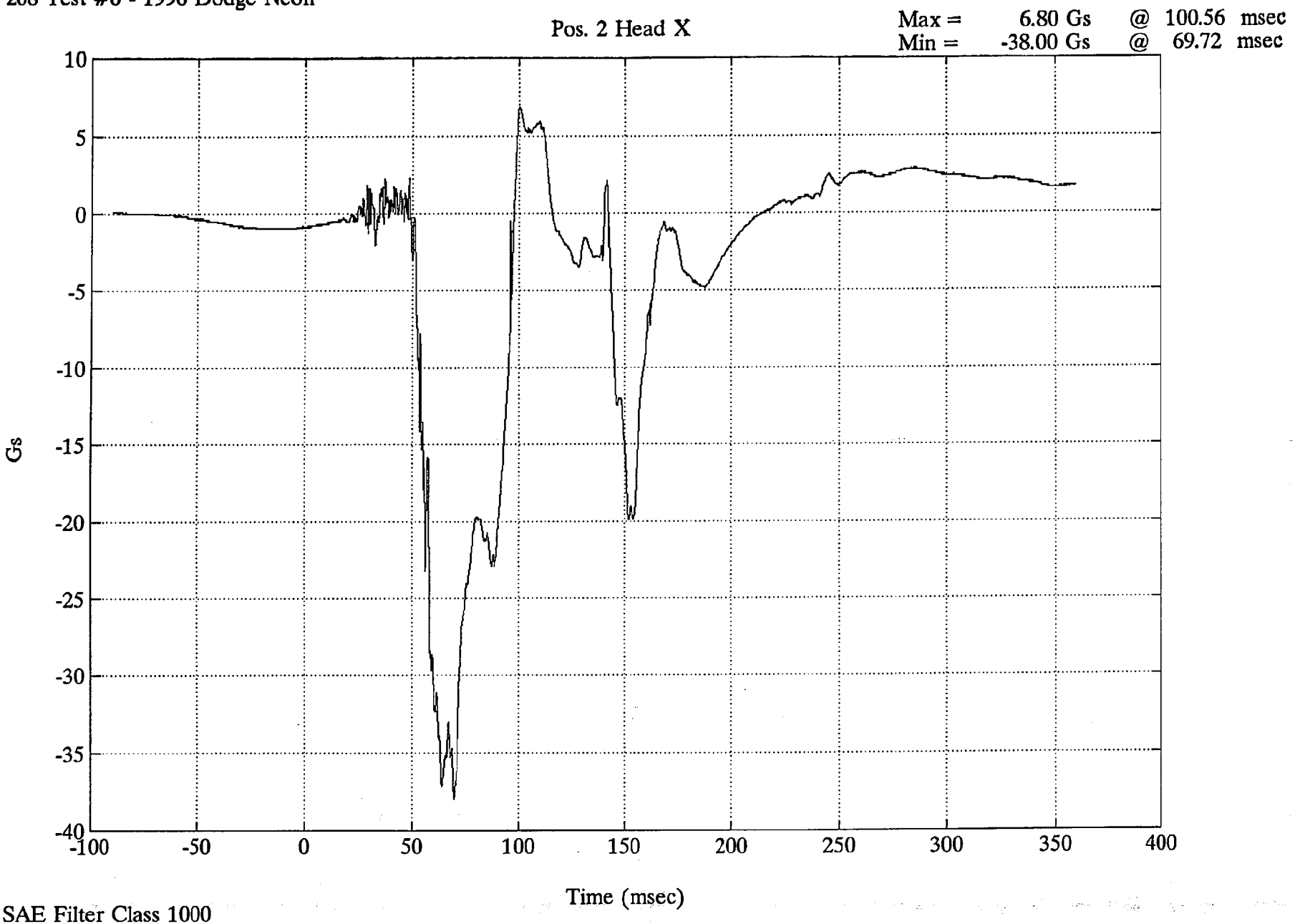
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon

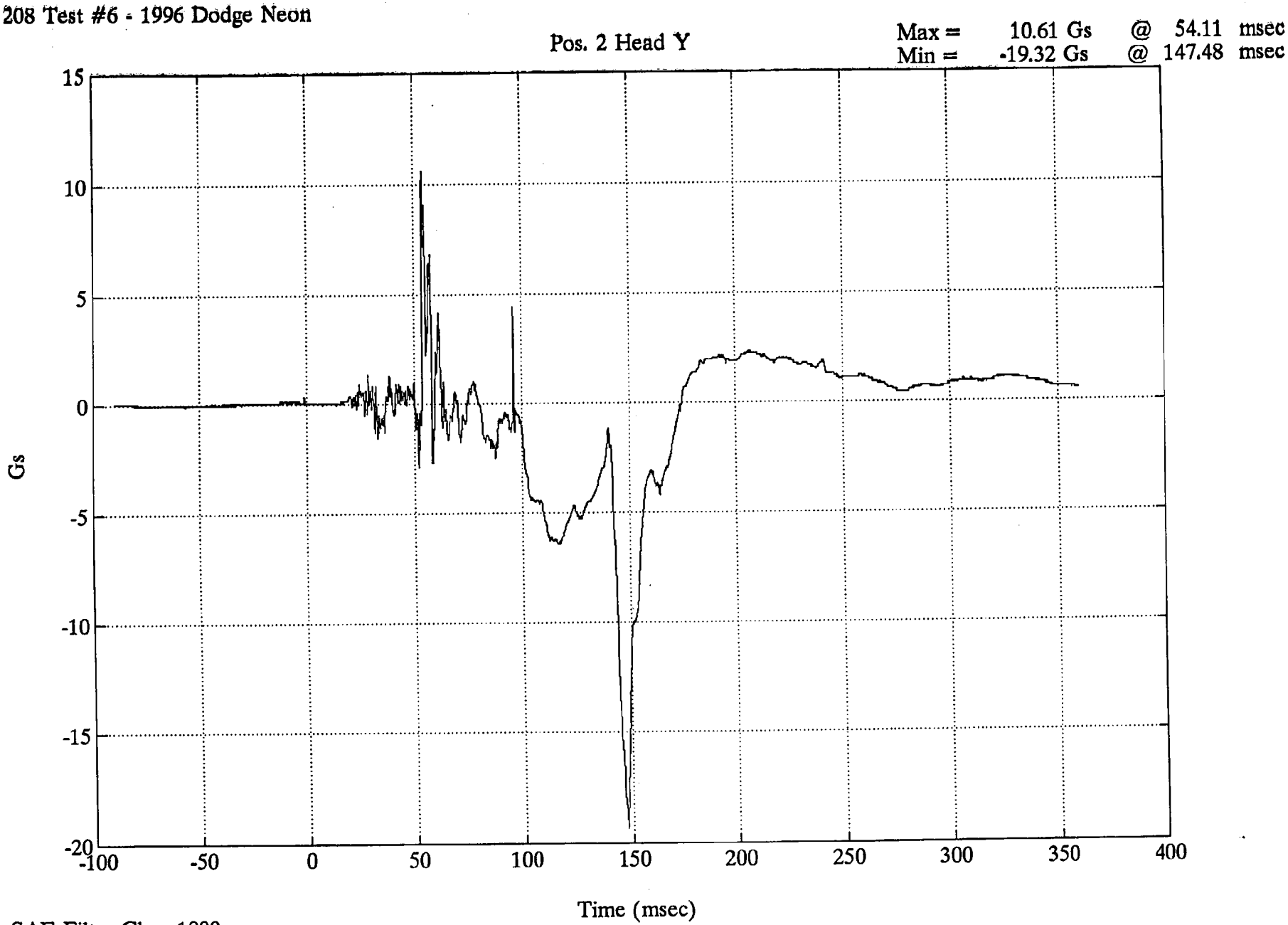


SAE Filter Class 1000

B-50

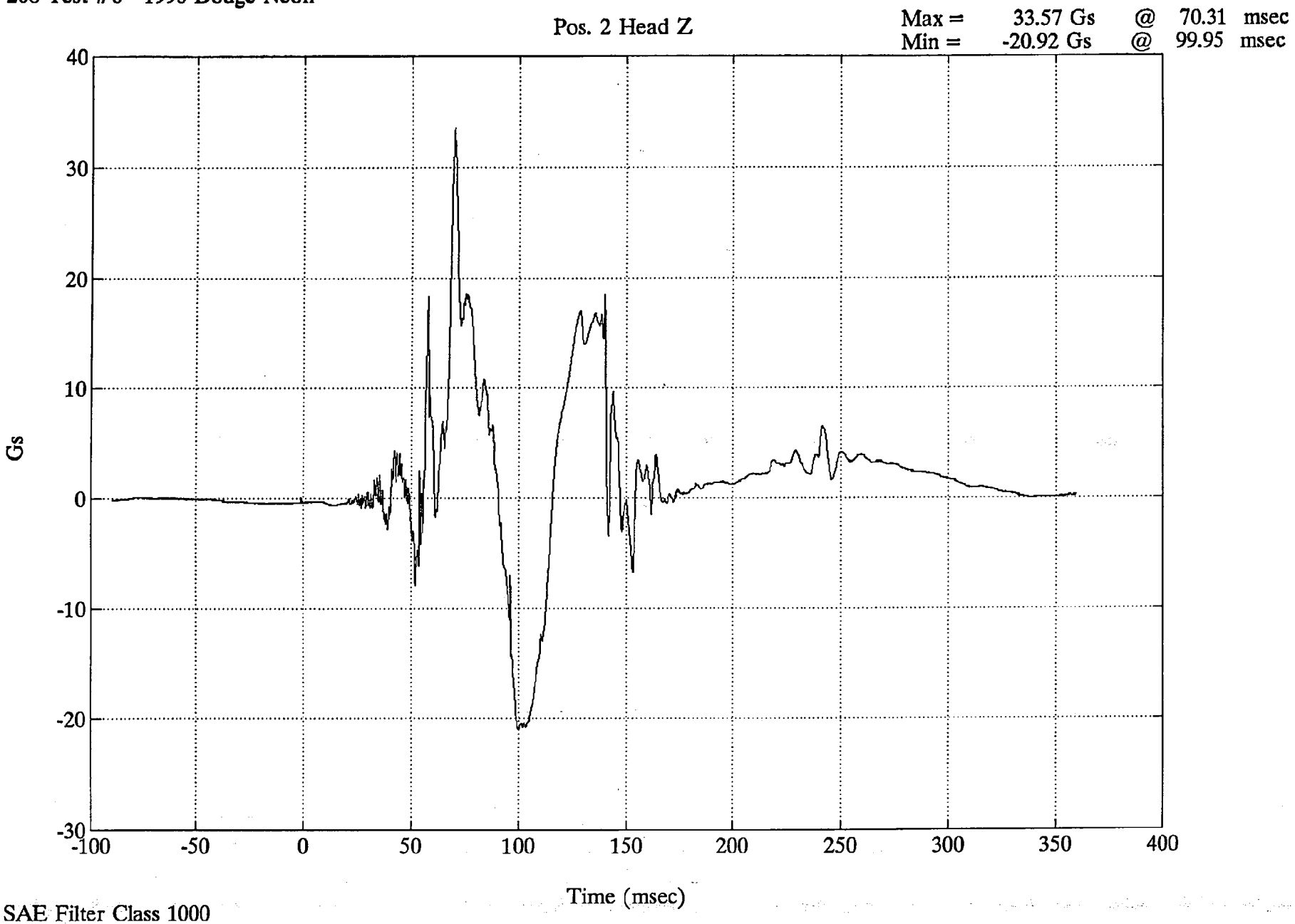
8353-4

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 1000

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 1000

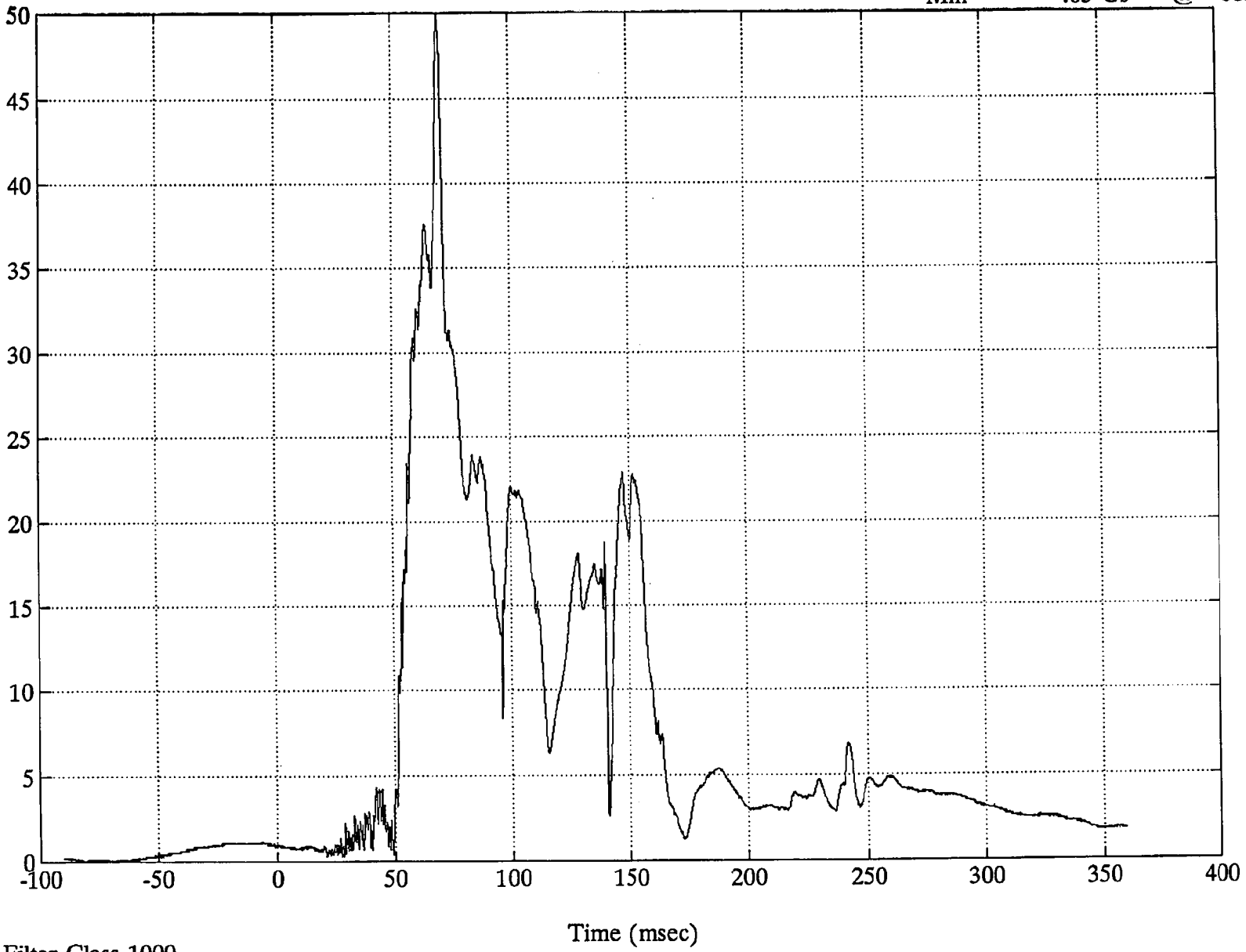
B-52

8353-4

208 Test #6 - 1996 Dodge Neon

Pos. 2 Head Resultant

Max = 49.96 Gs @ 70.31 msec
Min = .03 Gs @ -68.88 msec

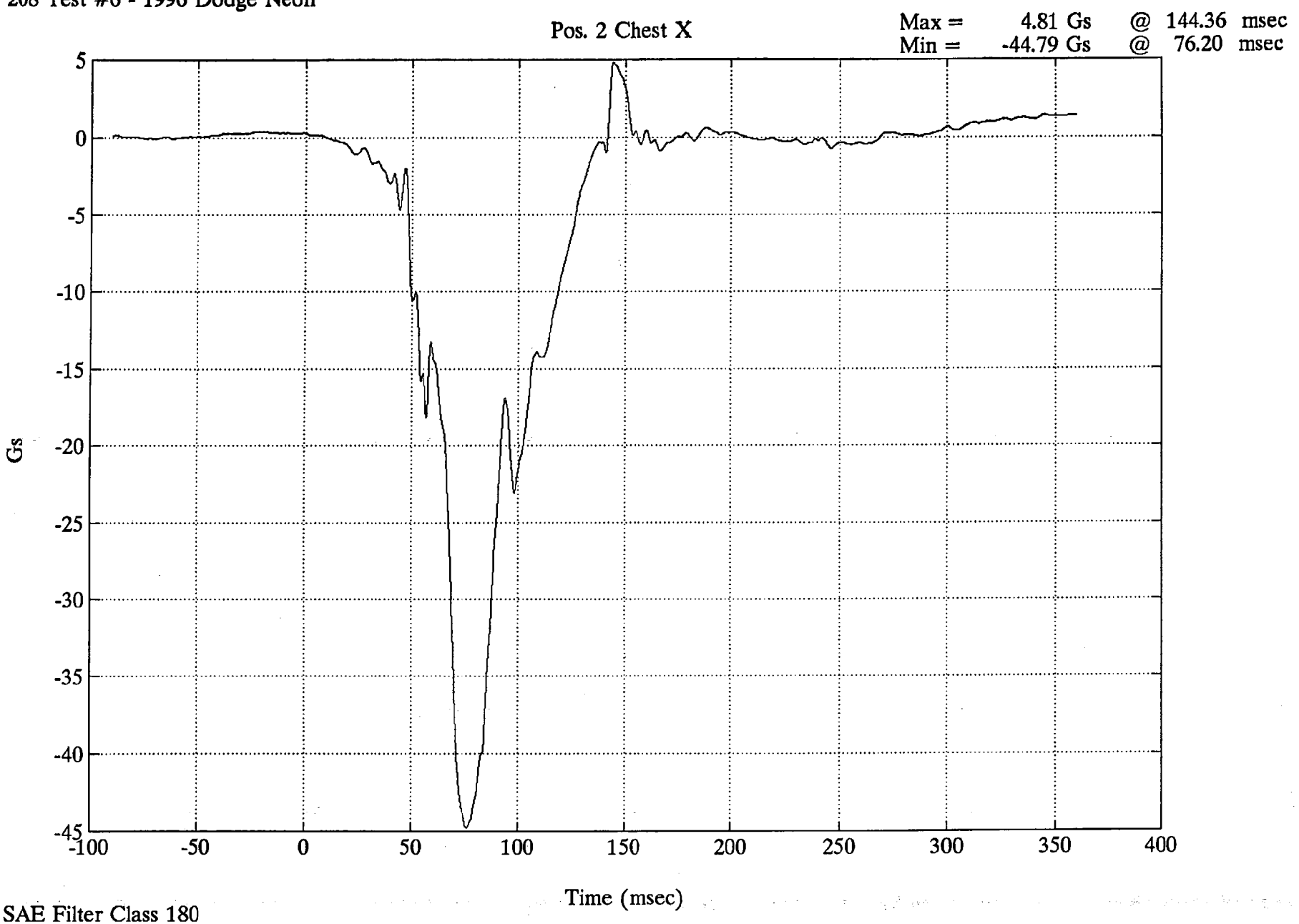


SAE Filter Class 1000

B-53

8353-4

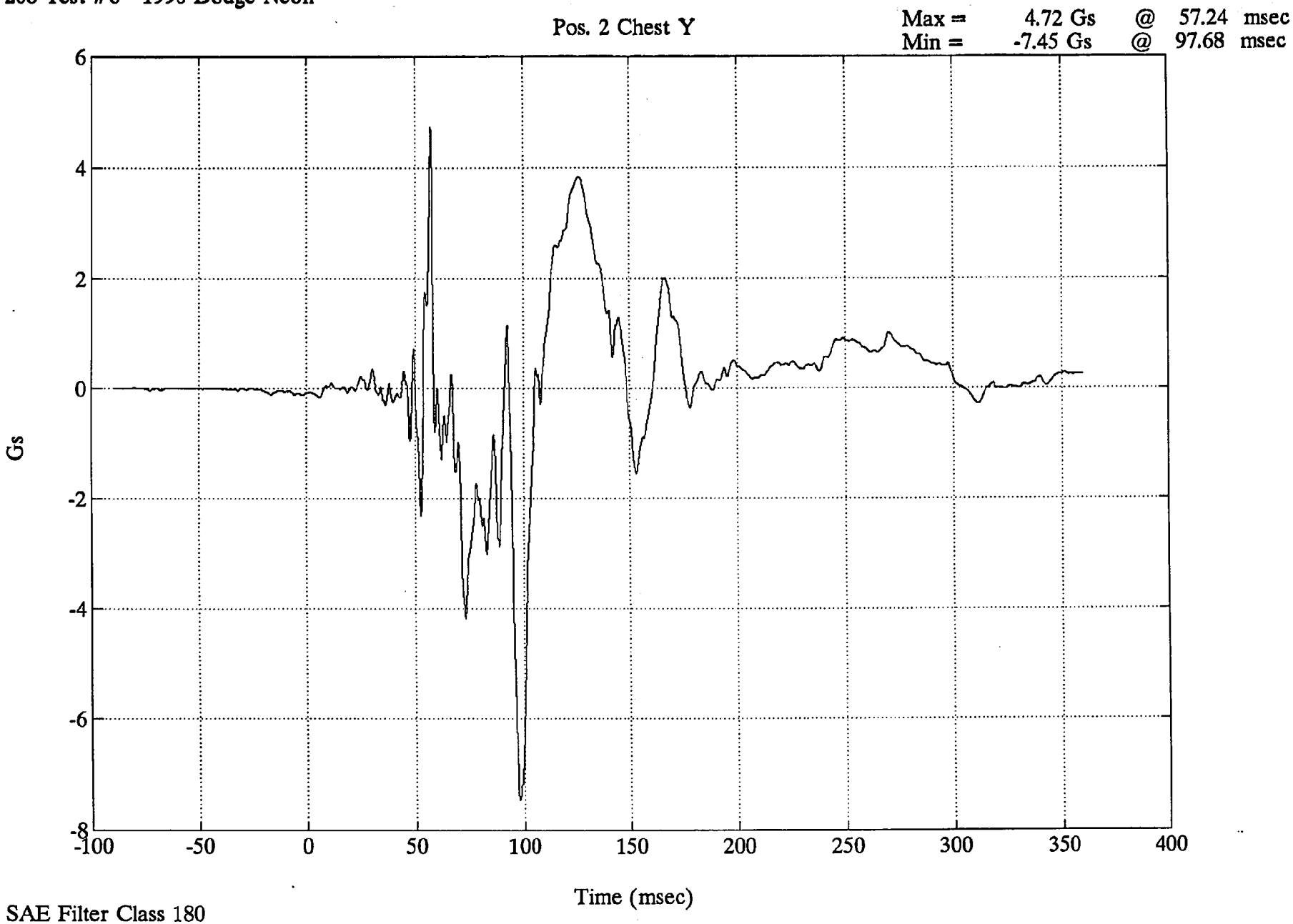
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

8353-4

208 Test #6 - 1996 Dodge Neon



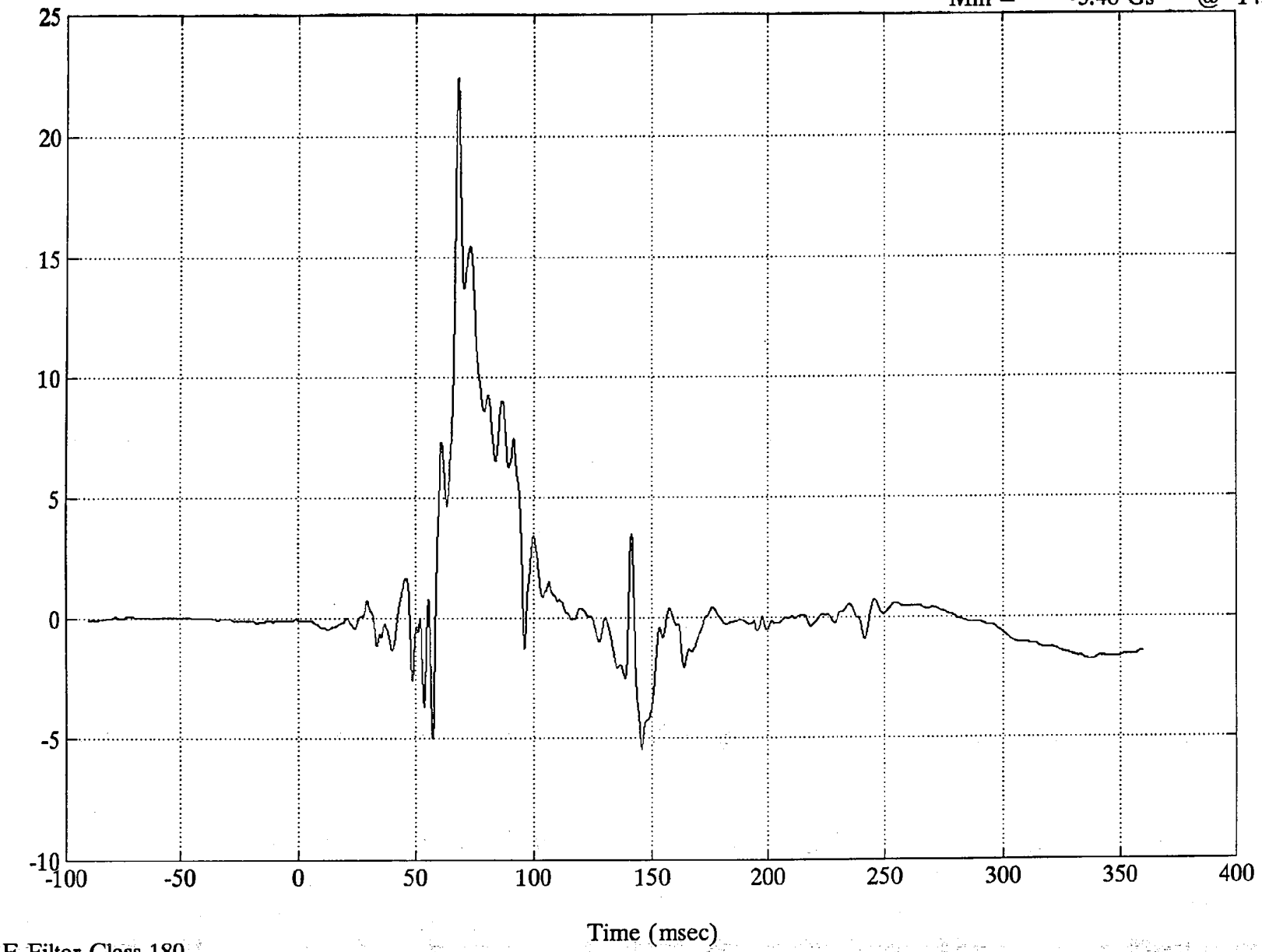
SAE Filter Class 180

8353-4

208 Test #6 - 1996 Dodge Neon

Pos. 2 Chest Z

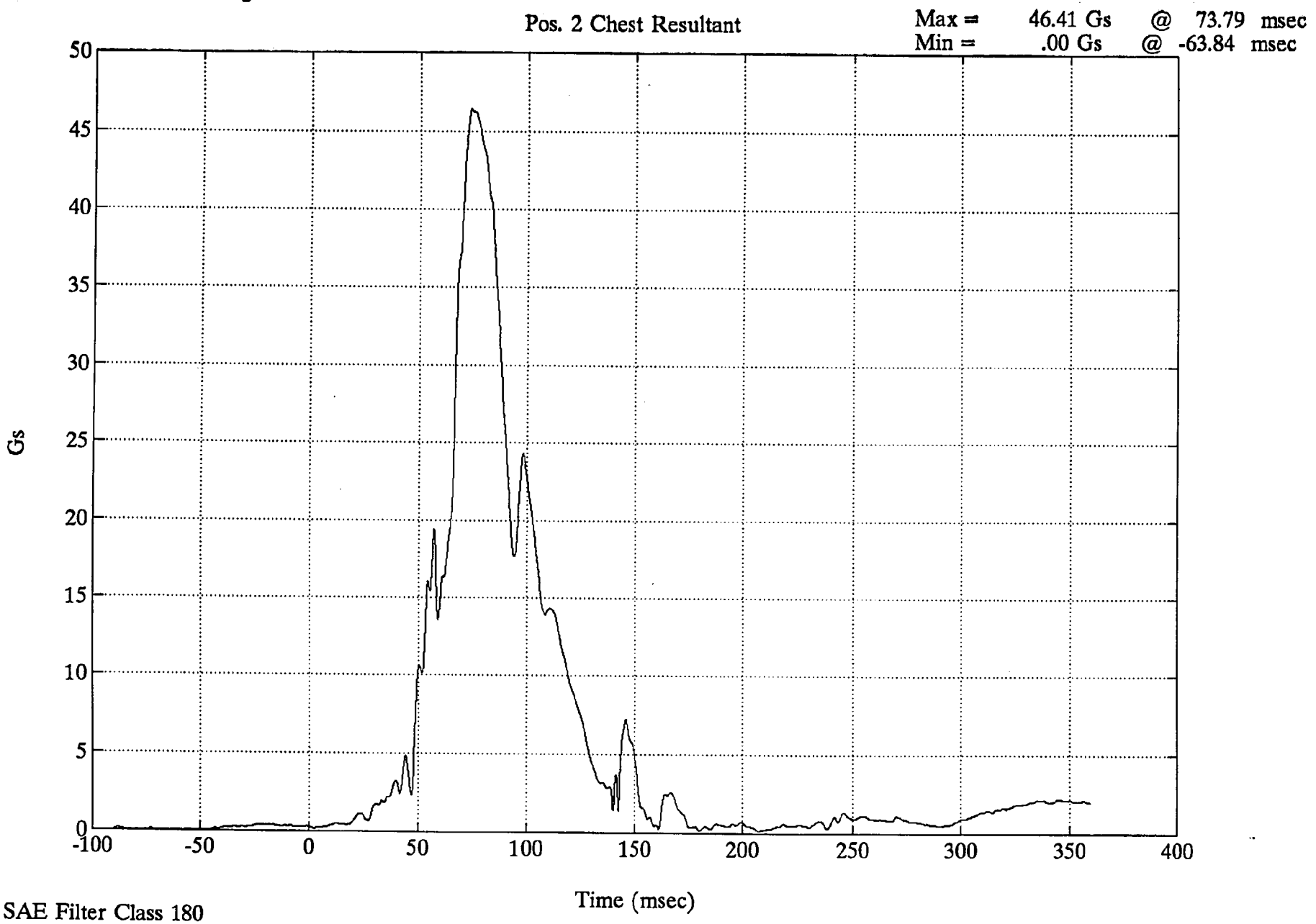
Max = 22.38 Gs @ 68.28 msec
Min = -5.46 Gs @ 145.80 msec



SAE Filter Class 180

8353-4

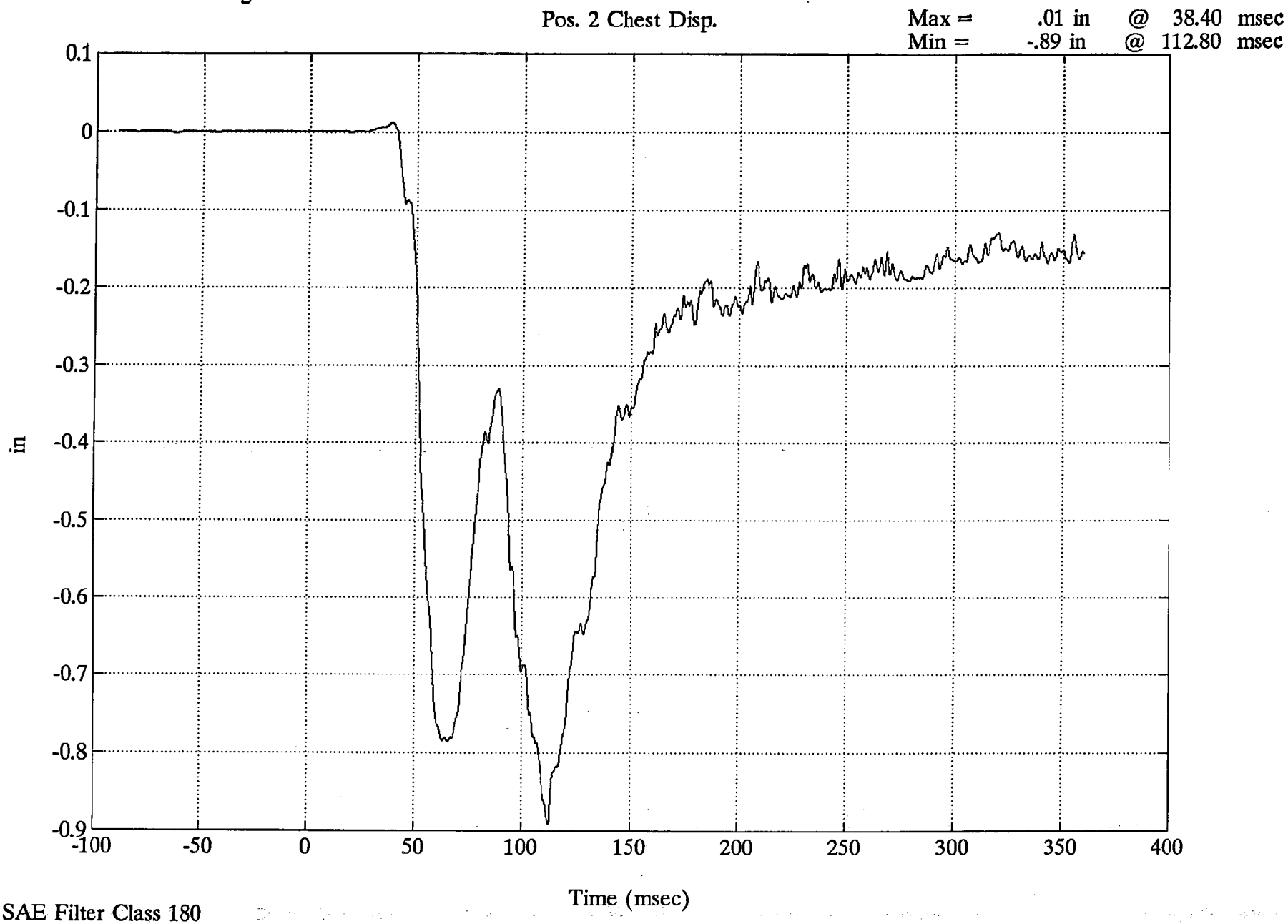
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

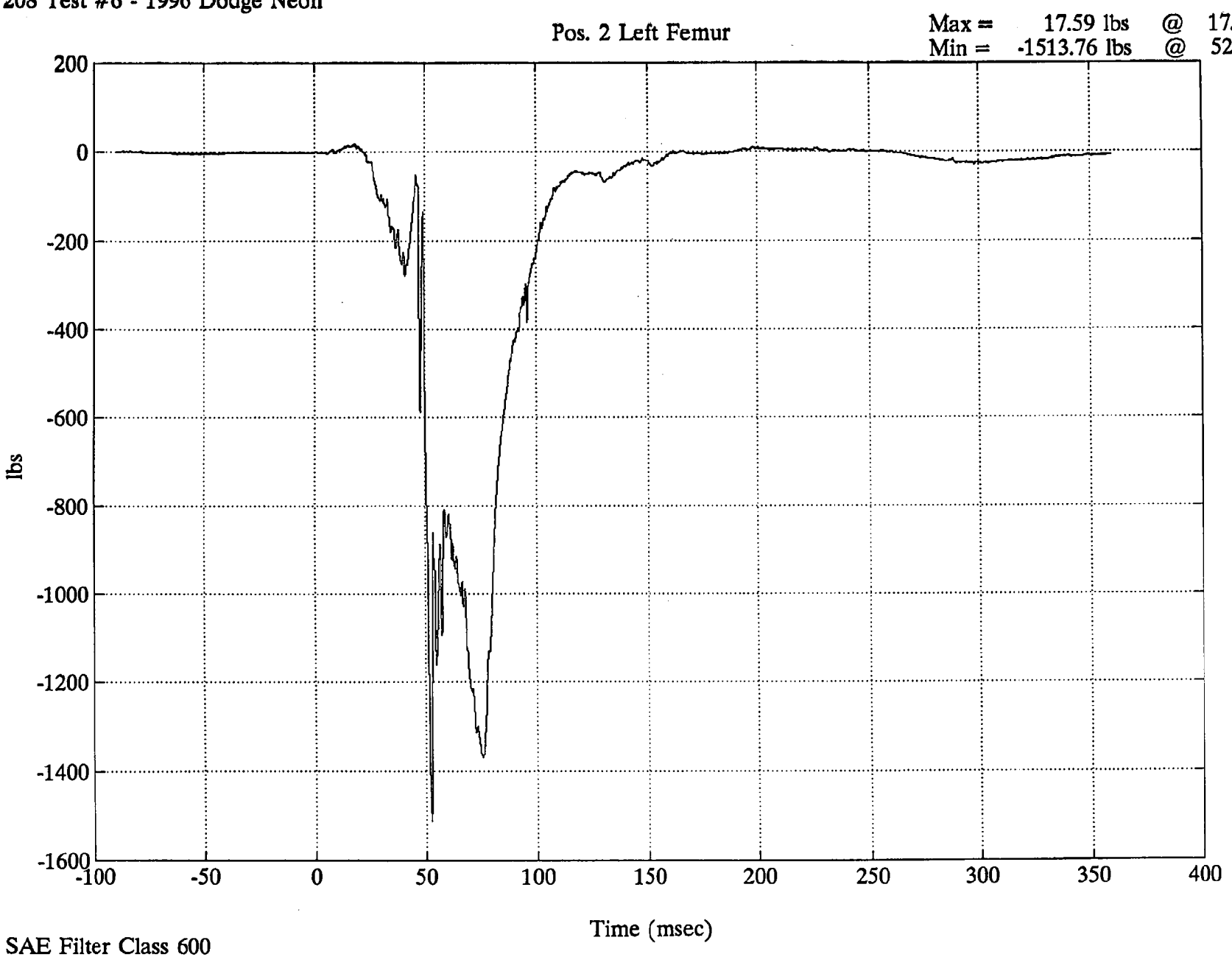
8353-4

208 Test #6 - 1996 Dodge Neon



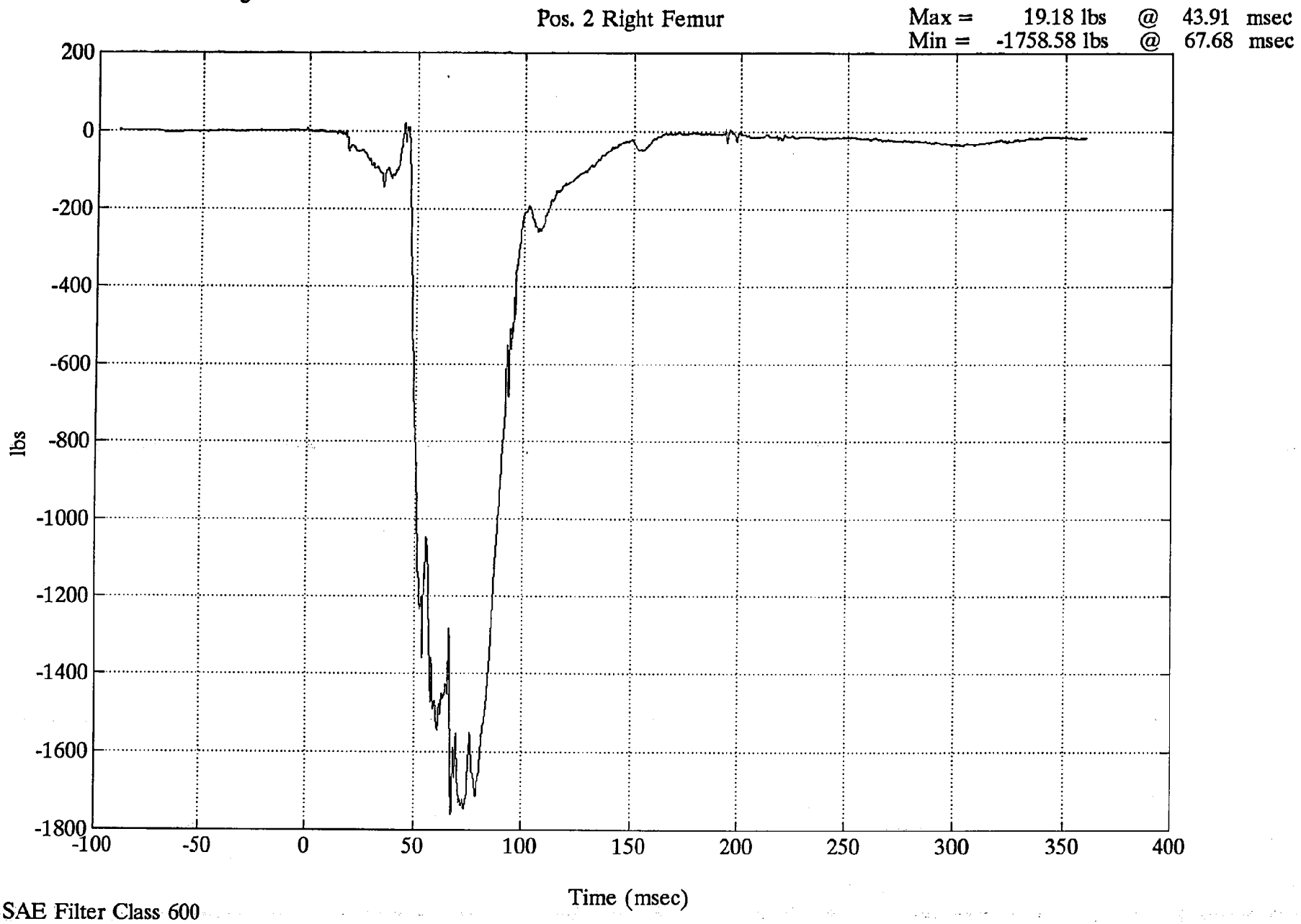
SAE Filter Class 180

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

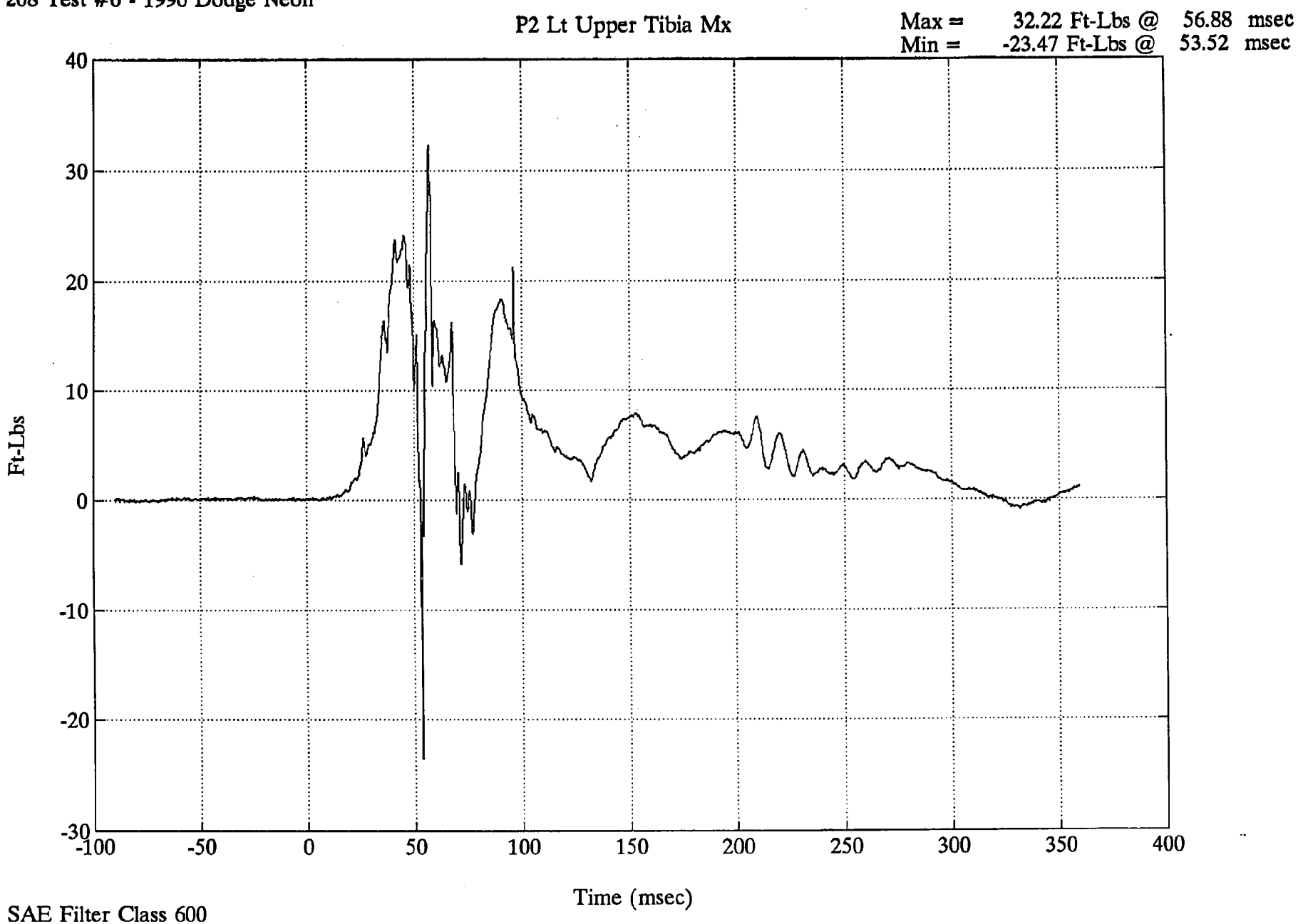
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon



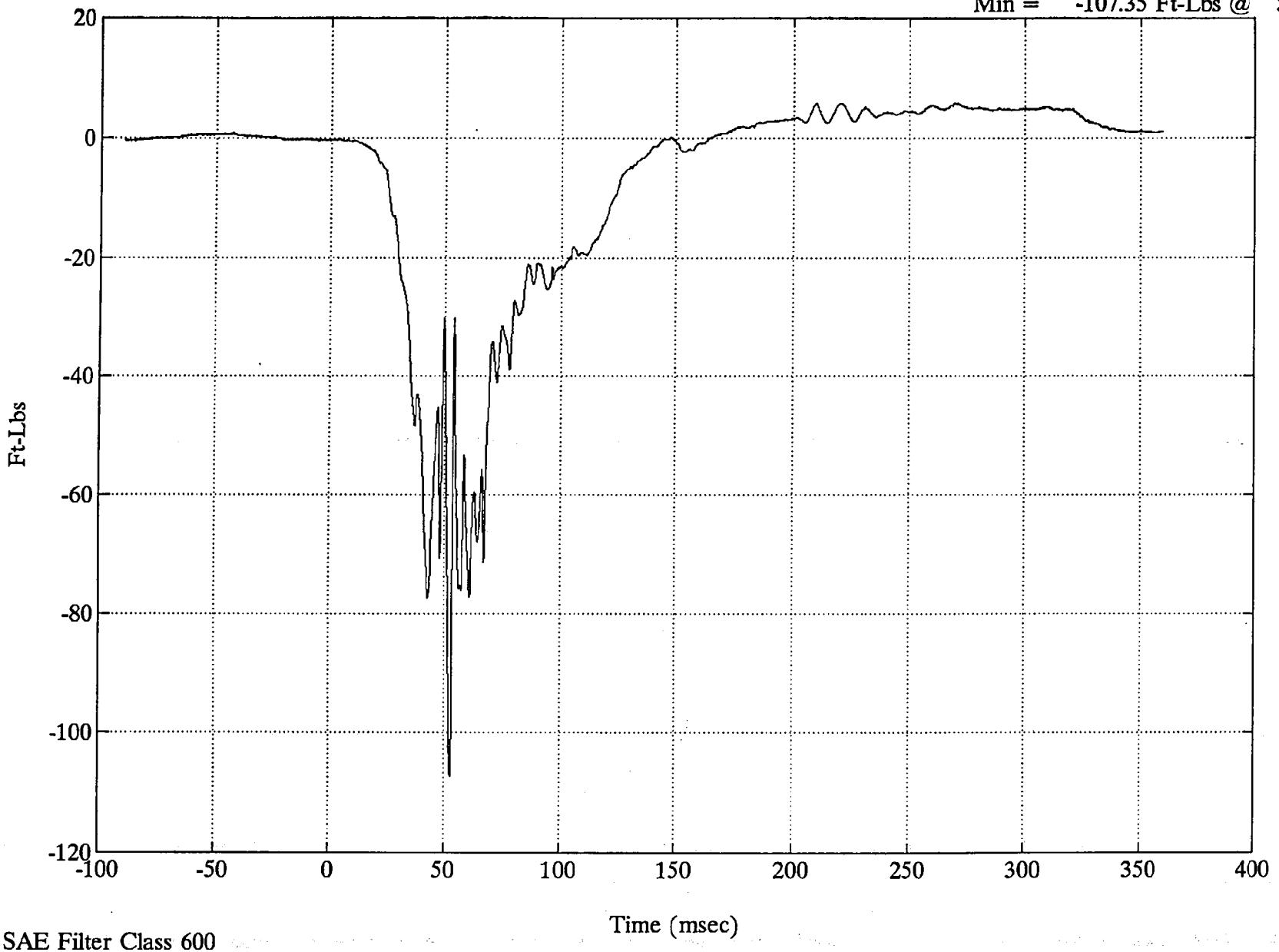
SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon

P2 Lt Upper Tibia My

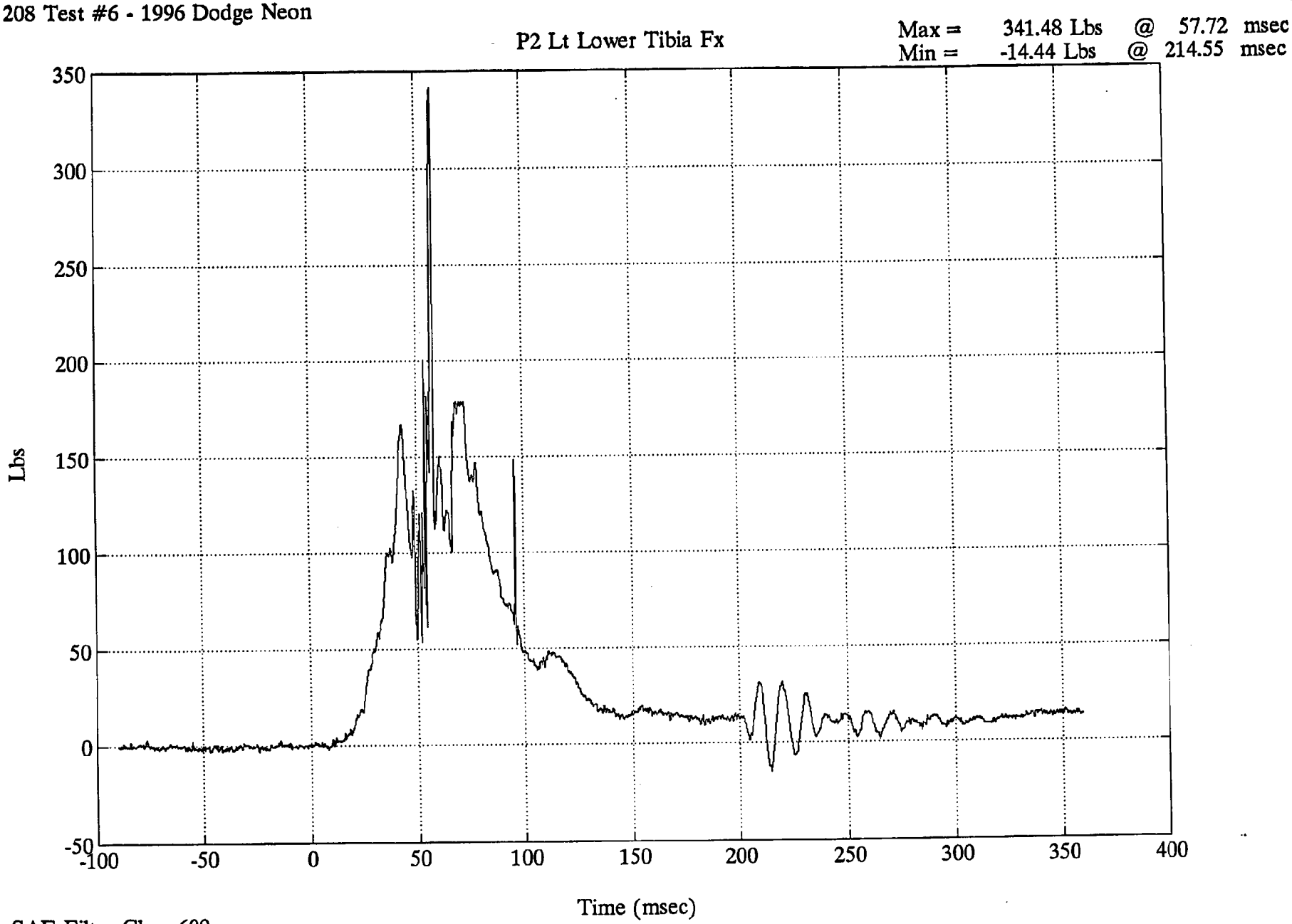
Max = 5.76 Ft-Lbs @ 220.08 msec
Min = -107.35 Ft-Lbs @ 52.91 msec



SAE Filter Class 600

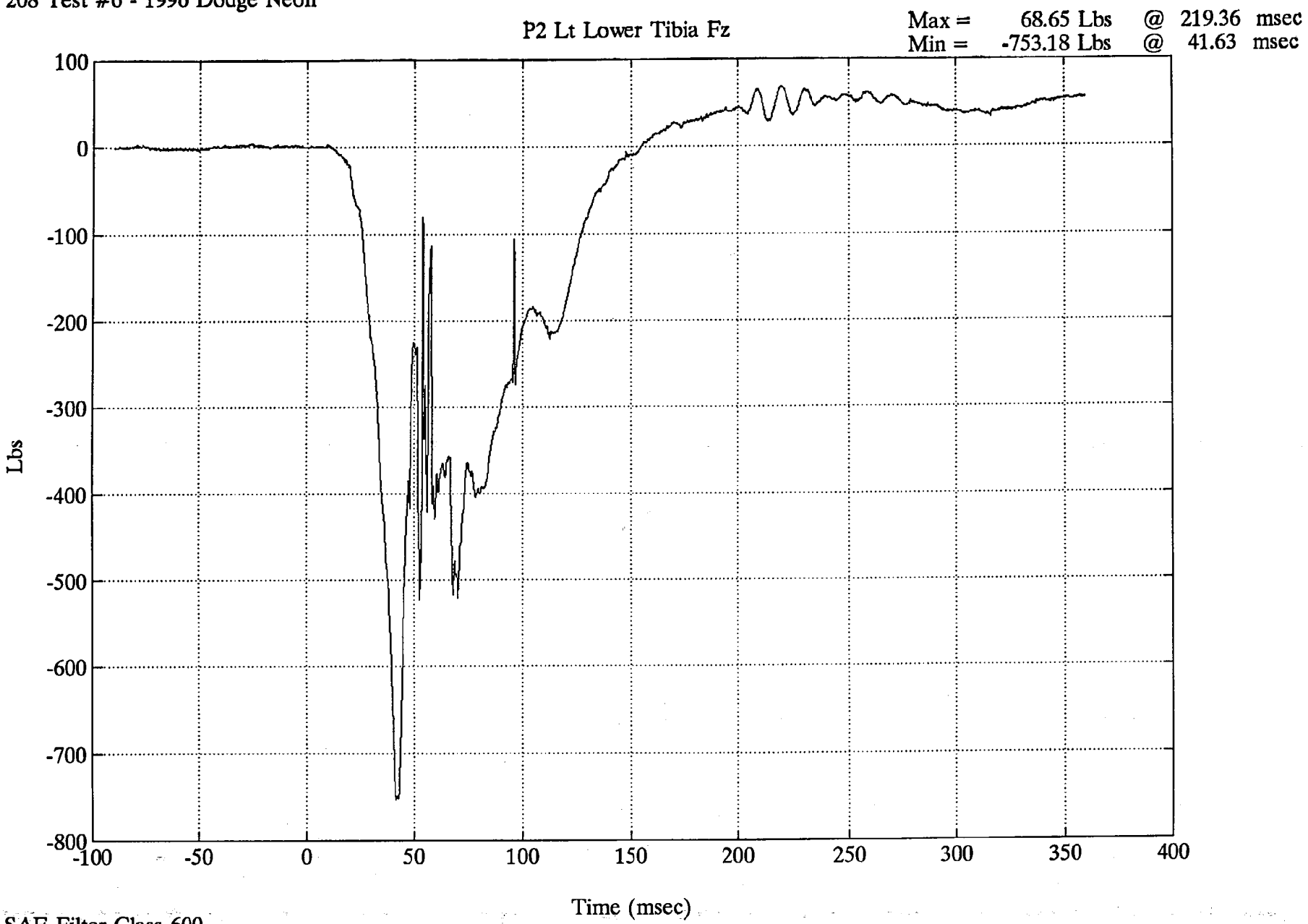
8353-4

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

208 Test #6 - 1996 Dodge Neon



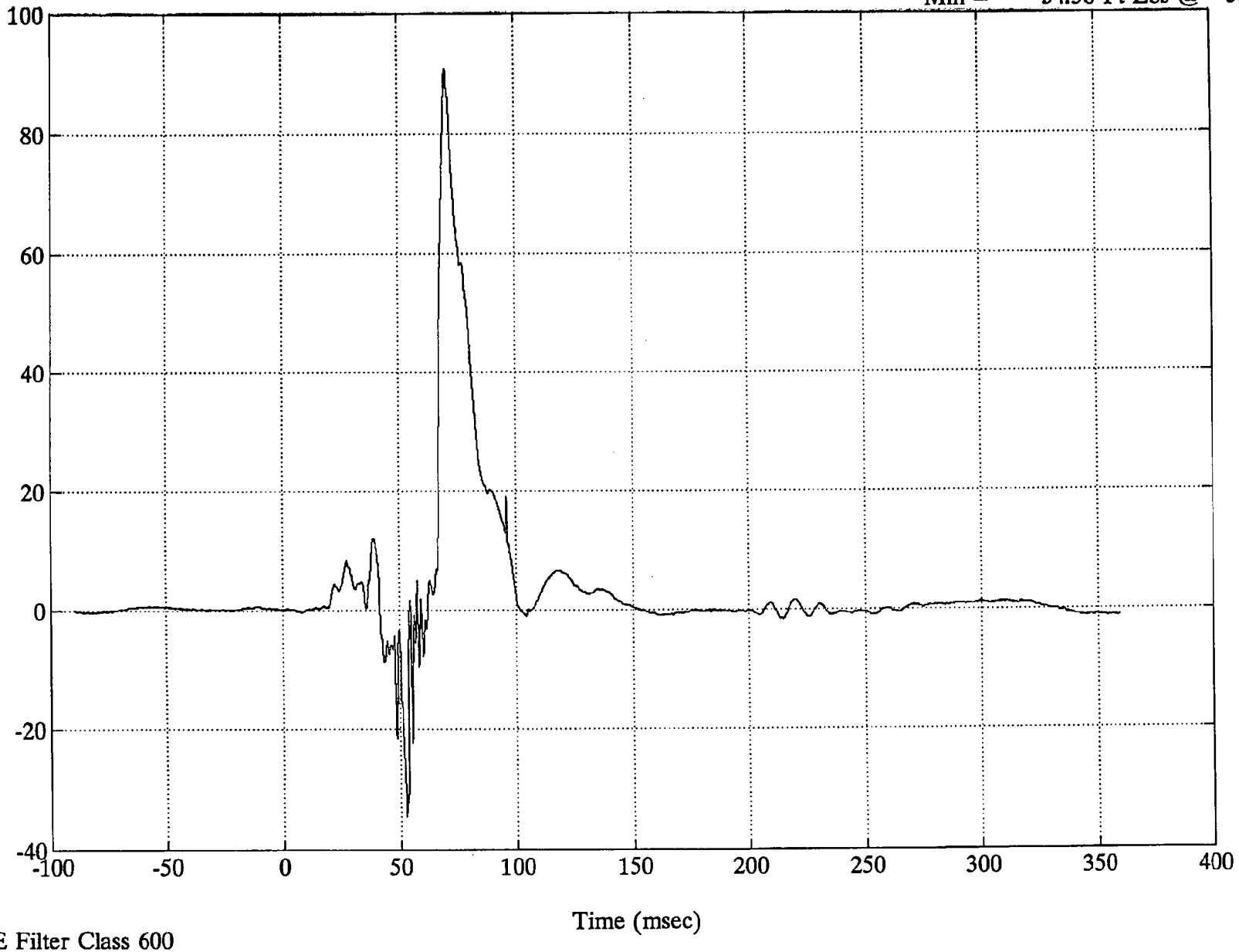
SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon

P2 Lt Lower Tibia My

Max = 90.72 Ft-Lbs @ 70.79 msec
Min = -34.56 Ft-Lbs @ 52.79 msec



SAE Filter Class 600

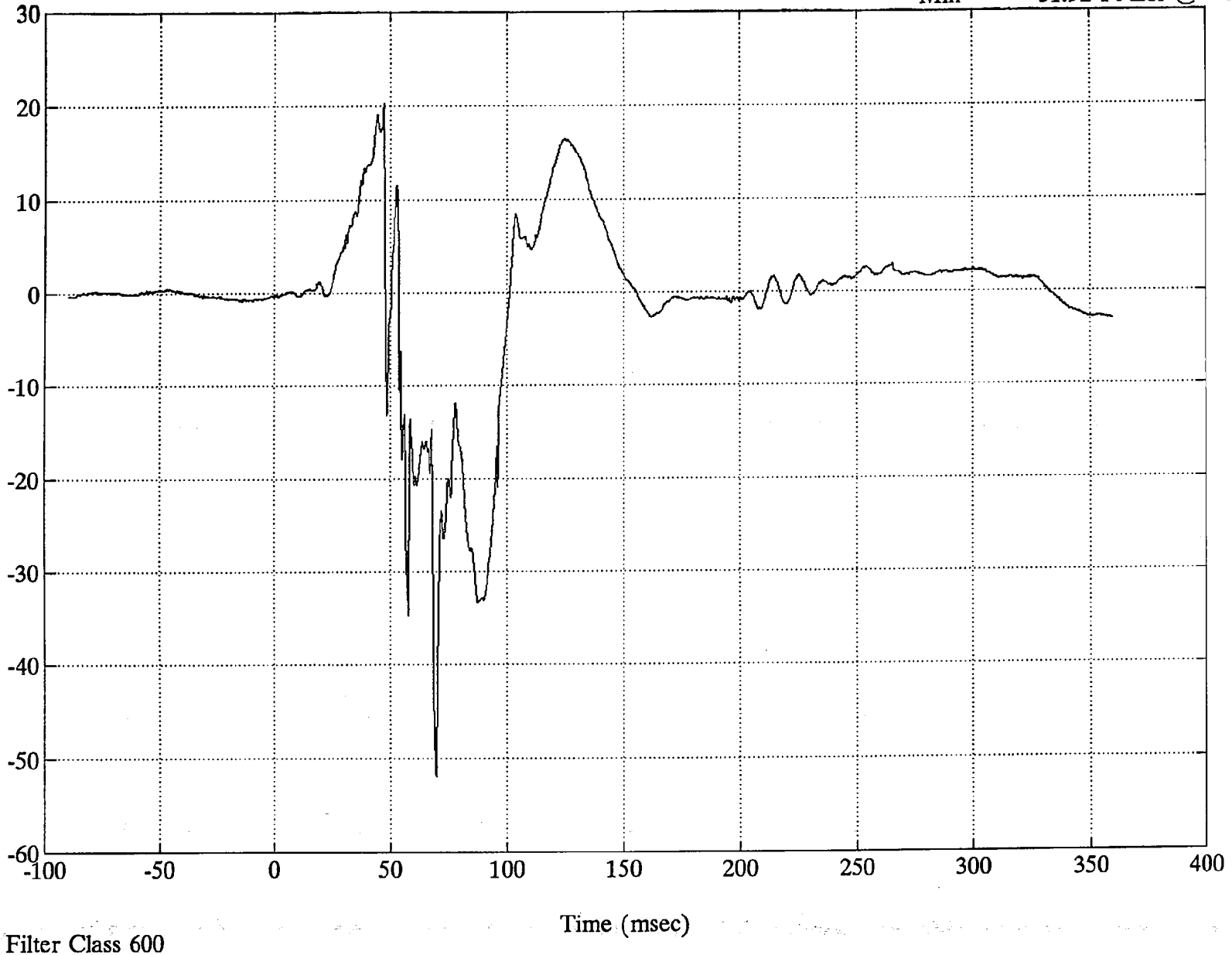
B-65

8353-4

208 Test #6 - 1996 Dodge Neon

P2 Rt Upper Tibia Mx

Max = 20.31 Ft-Lbs @ 47.15 msec
Min = -51.92 Ft-Lbs @ 69.83 msec



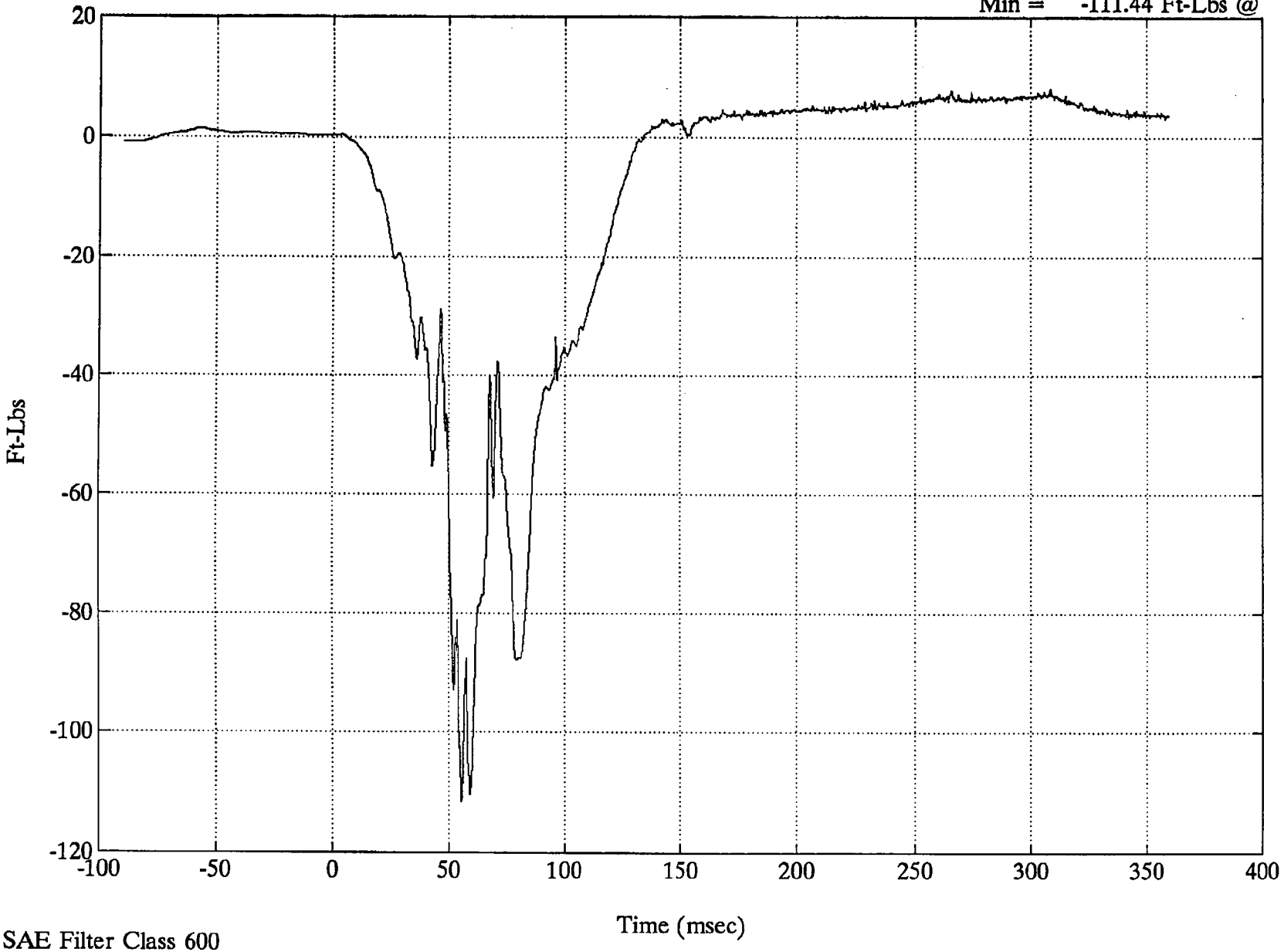
SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon

P2 Rt Upper Tibia My

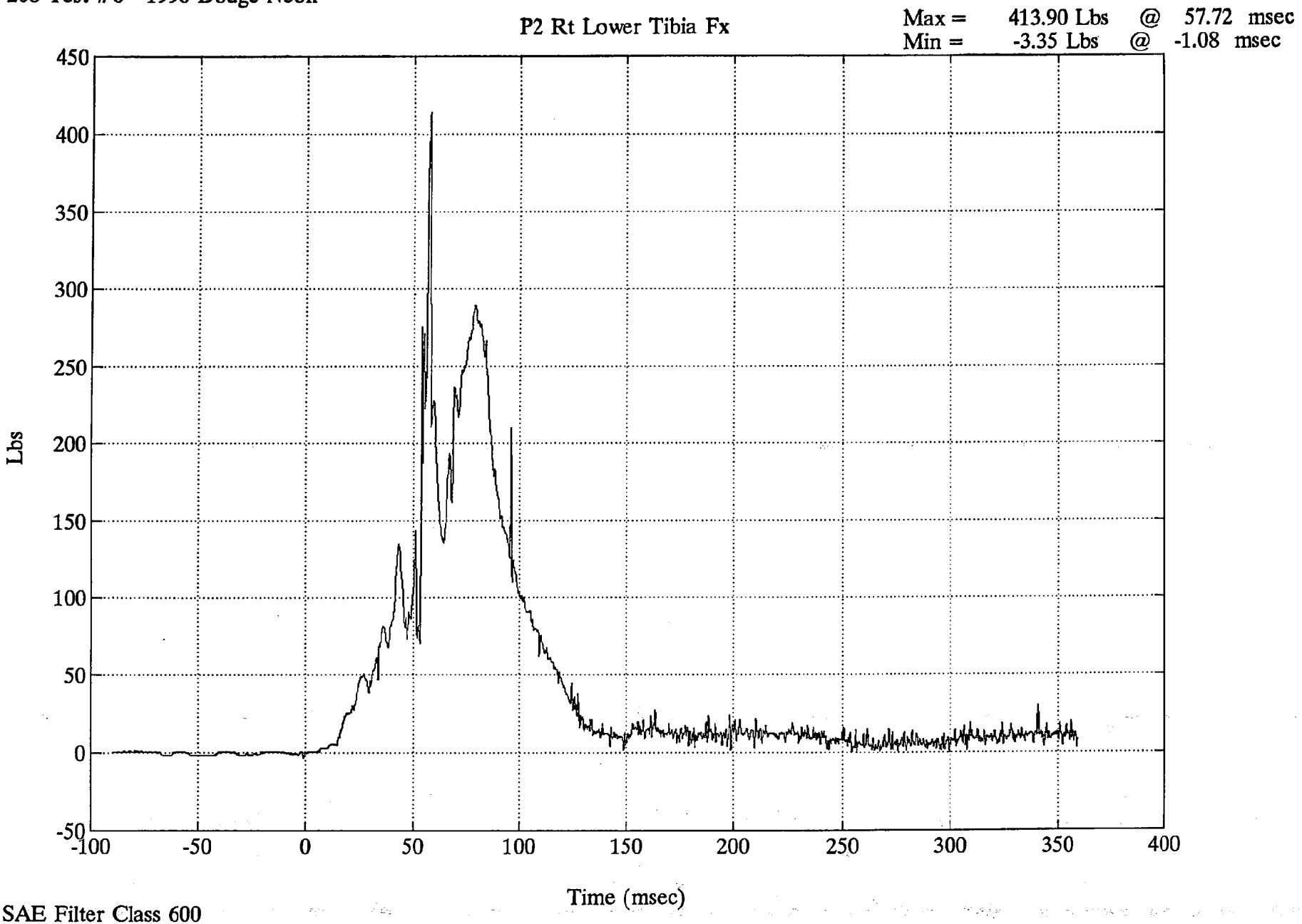
Max = 8.11 Ft-Lbs @ 308.39 msec
Min = -111.44 Ft-Lbs @ 55.56 msec



SAE Filter Class 600

8353-4

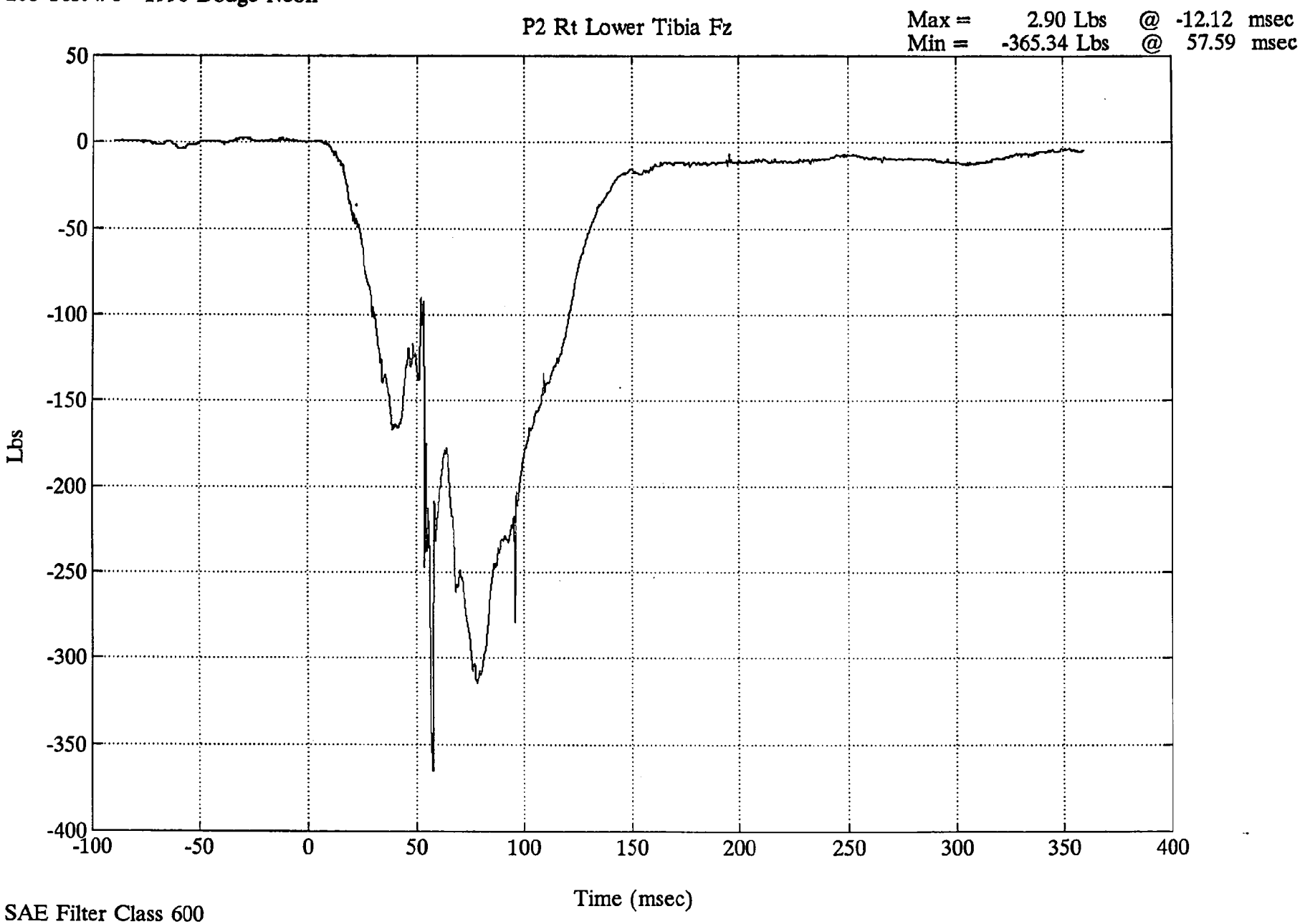
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 600

8353-4

208 Test #6 - 1996 Dodge Neon

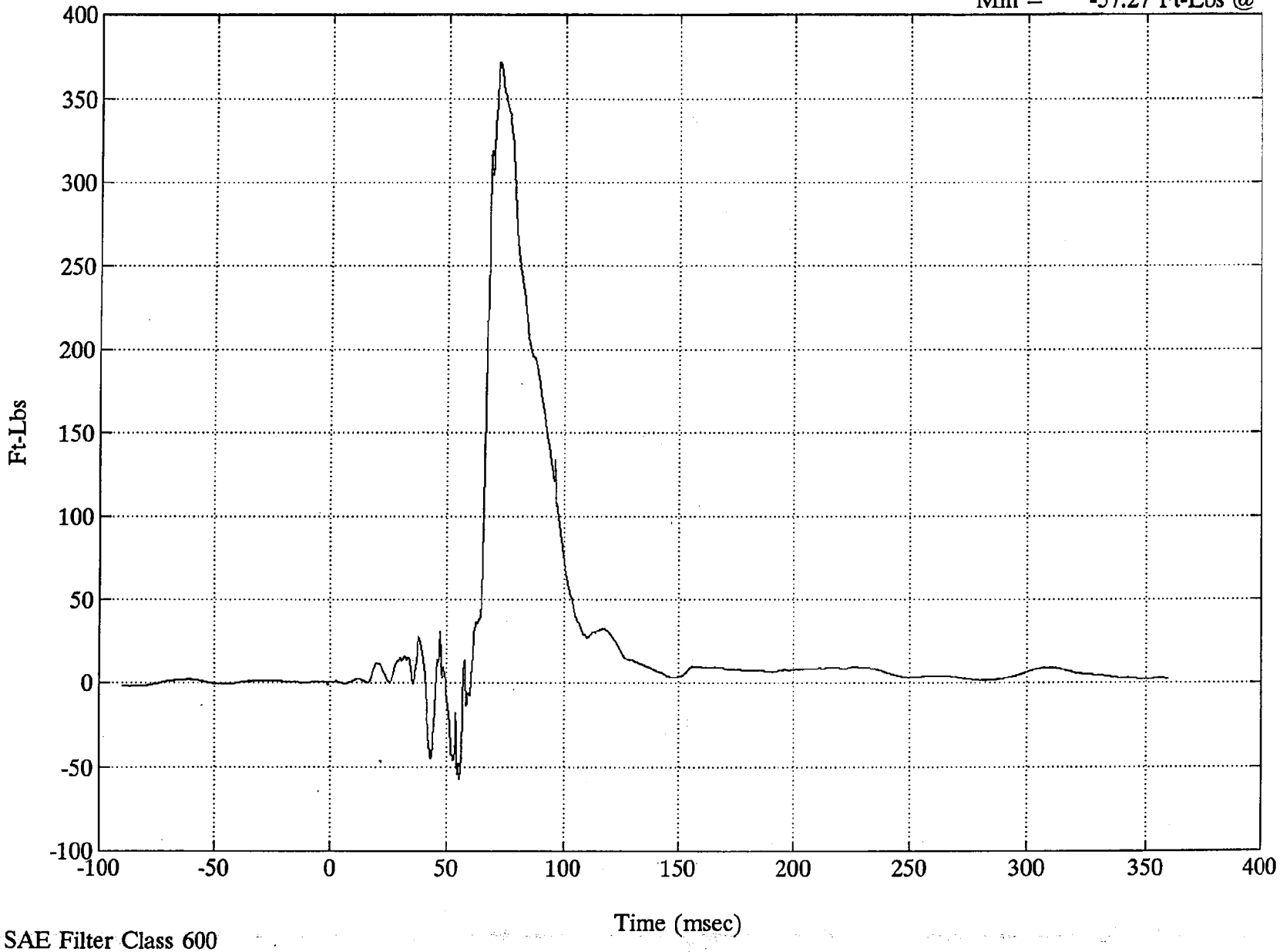


SAE Filter Class 600

208 Test #6 - 1996 Dodge Neon

P2 Rt Lower Tibia My

Max = 371.77 Ft-Lbs @ 71.87 msec
Min = -57.27 Ft-Lbs @ 55.44 msec



SAE Filter Class 600

8353-4

Appendix C

DUMMY RESPONSE DATA

(Part 572 3 Year old ATD only)

NOTE: Data trace scales are automatically scaled at the request of the COTR. Use caution when reviewing data.

FACILITY: track TEST DATE: 01 May 1996
RUN #: 1613 TEST TIME: 12:15:21
SERIES #: 1 BOARD: d

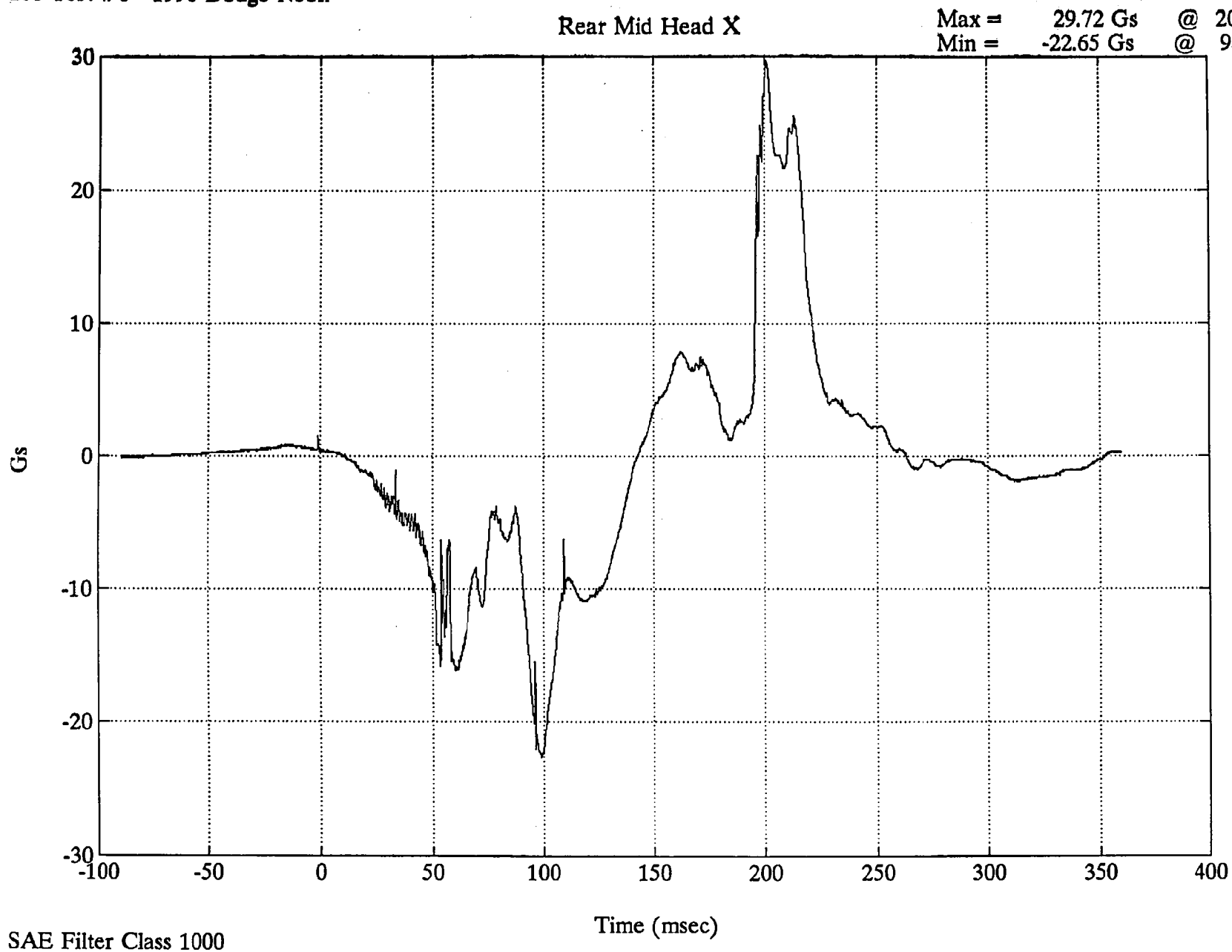
TITLE: 208 Test #6 - 1996 Dodge Neon

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
1	Rear Mid Head X	Gs	29.7	200.8	-22.7	98.9	1000.0
2	Rear Mid Head Y	Gs	8.8	57.8	-3.8	53.4	1000.0
3	Rear Mid Head Z	Gs	52.4	79.7	-2.0	218.5	1000.0
5	Rear Mid Chest Y	Gs	4.5	52.4	-7.6	57.1	180.0
6	Rear Mid Chest Z	Gs	38.7	57.5	-8.7	83.9	180.0
7	Rear Mid Chest X	Gs	16.8	218.0	-38.3	52.9	180.0
17	Rear Mid Head Resultant	Gs	52.7	79.7	.1	10.9	1000.0
18	Rear Mid Chest Resultant	Gs	45.0	63.4	.0	-82.7	180.0

V2 Full Duration HIC SUMMARY: Rear Mid Head Resultant
hic: 375.36
t1 = 63.840 msec
t2 = 104.520 msec
Average G's Over Hic Duration = 38.55

CLIP V2.1 SUMMARY: Rear Mid Chest Resultant
Peak Resultant (3 ms CLIPPED DURATION) = 42.739 G's
Tstart = 62.0326 ms
Tend = 65.0326 ms
CSI = 329.466

208 Test #6 - 1996 Dodge Neon

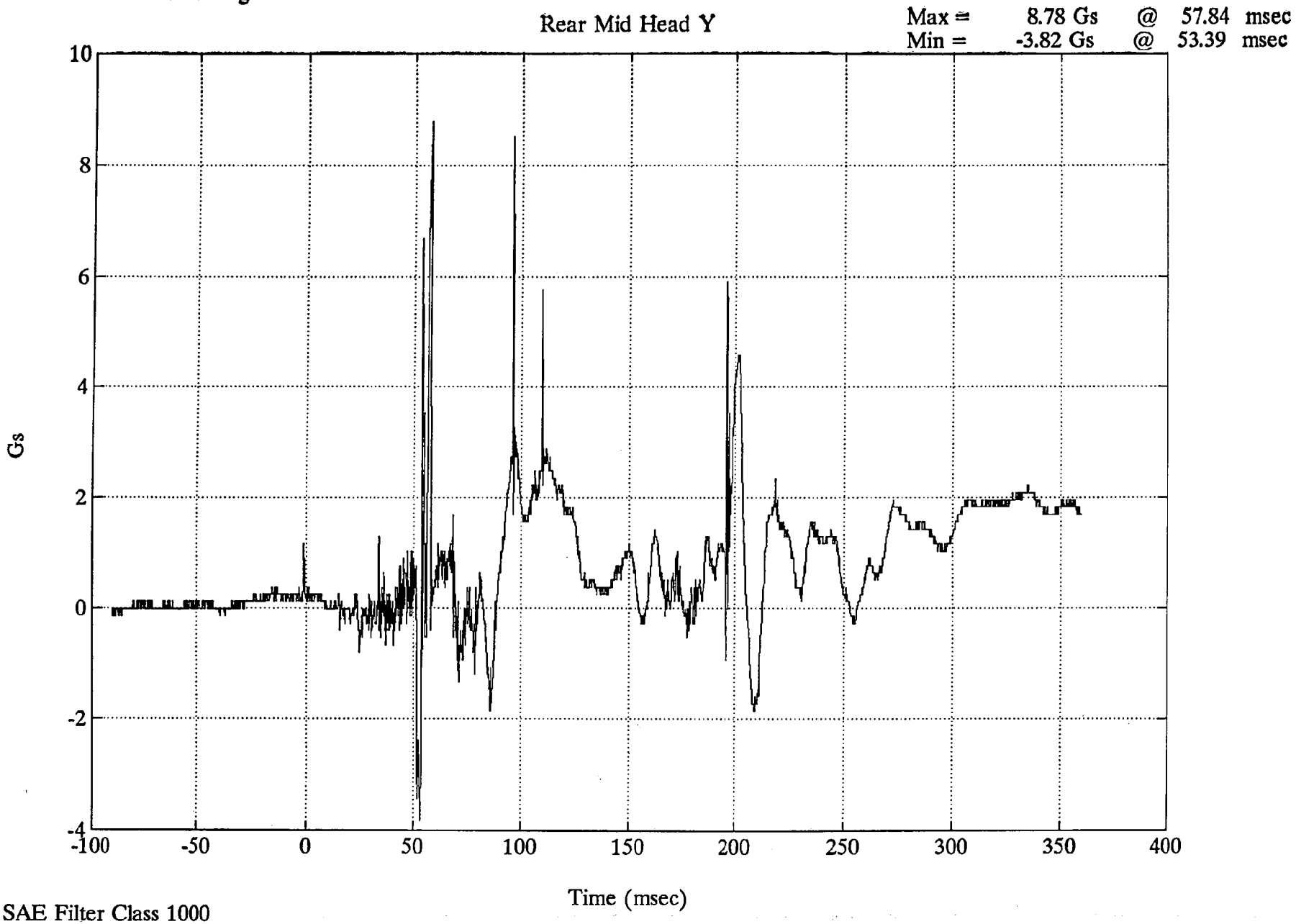


SAE Filter Class 1000

C-3

8353-4

208 Test #6 - 1996 Dodge Neon

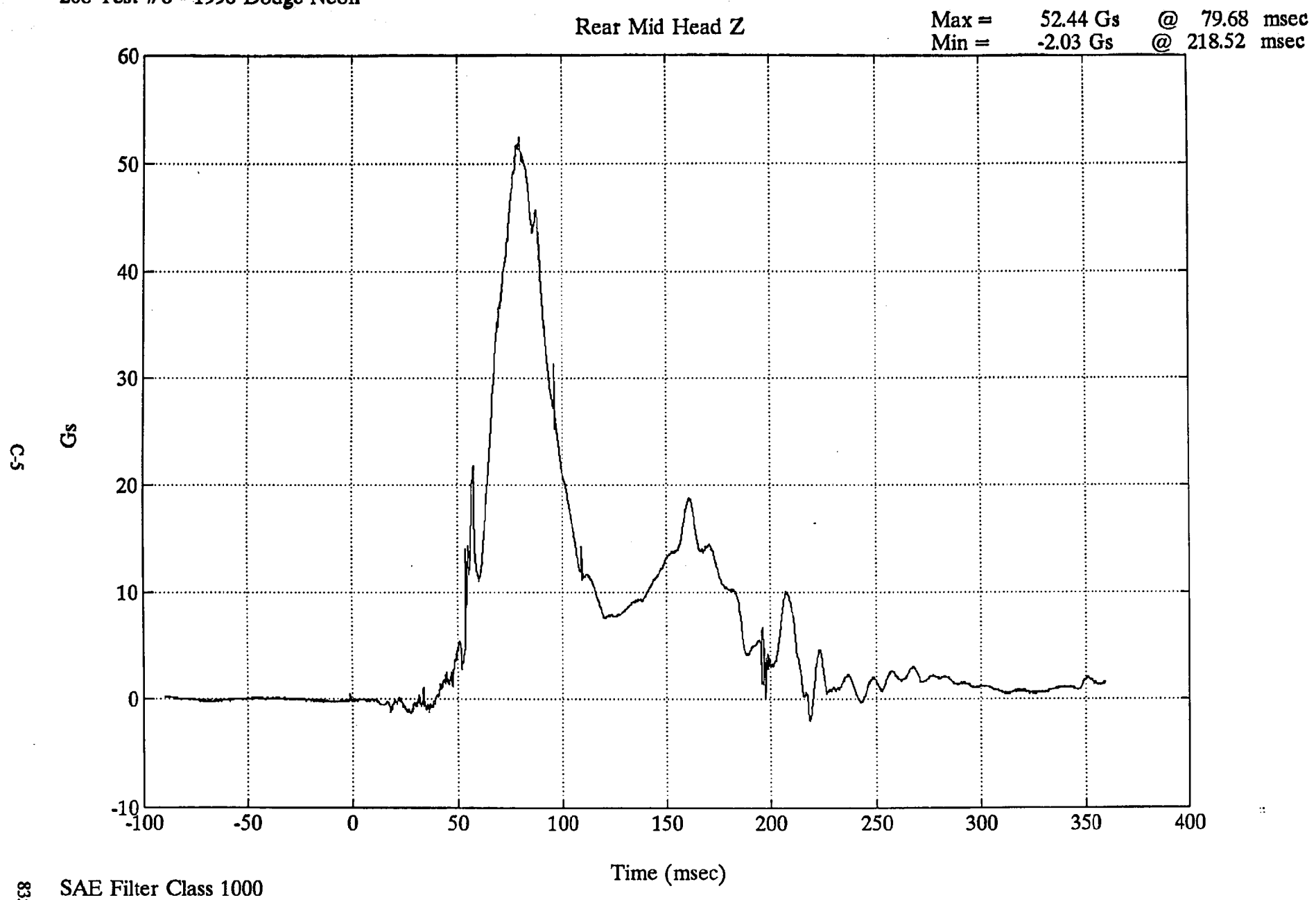


SAE Filter Class 1000

C-4

8353-4

208 Test #6 - 1996 Dodge Neon

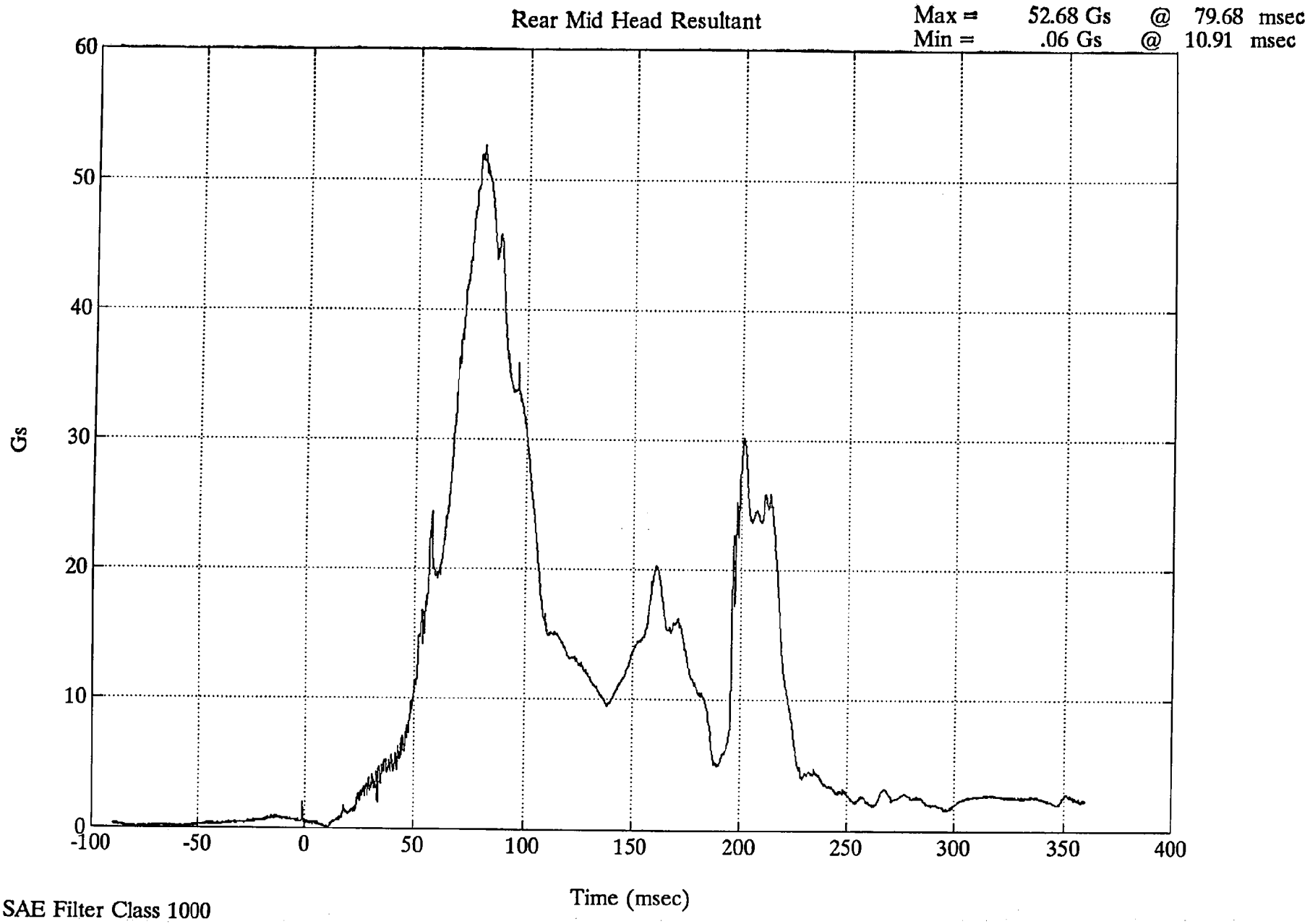


C-5

SAE Filter Class 1000

8353-4

208 Test #6 - 1996 Dodge Neon

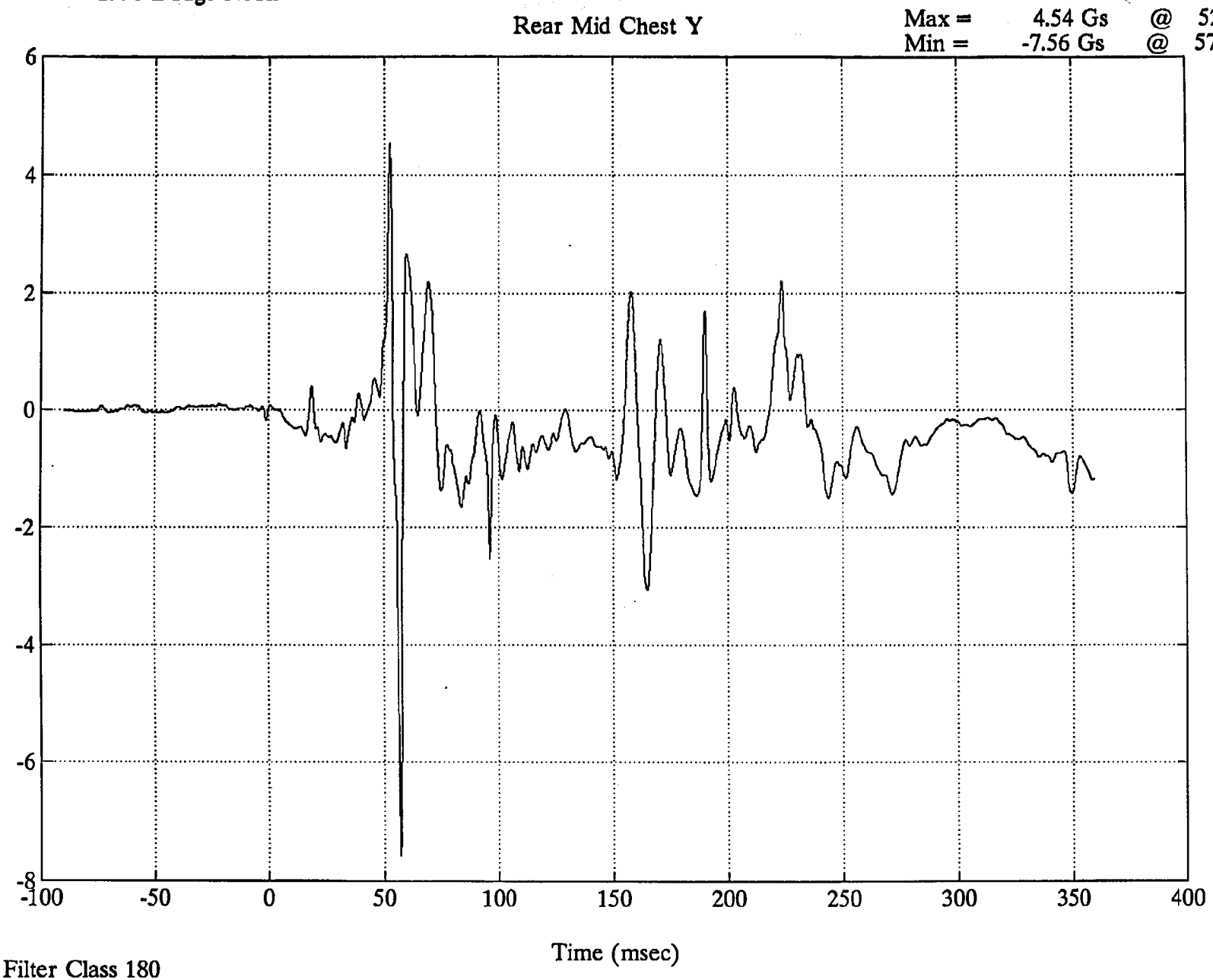


SAE Filter Class 1000

C-6

8353-4

208 Test #6 - 1996 Dodge Neon

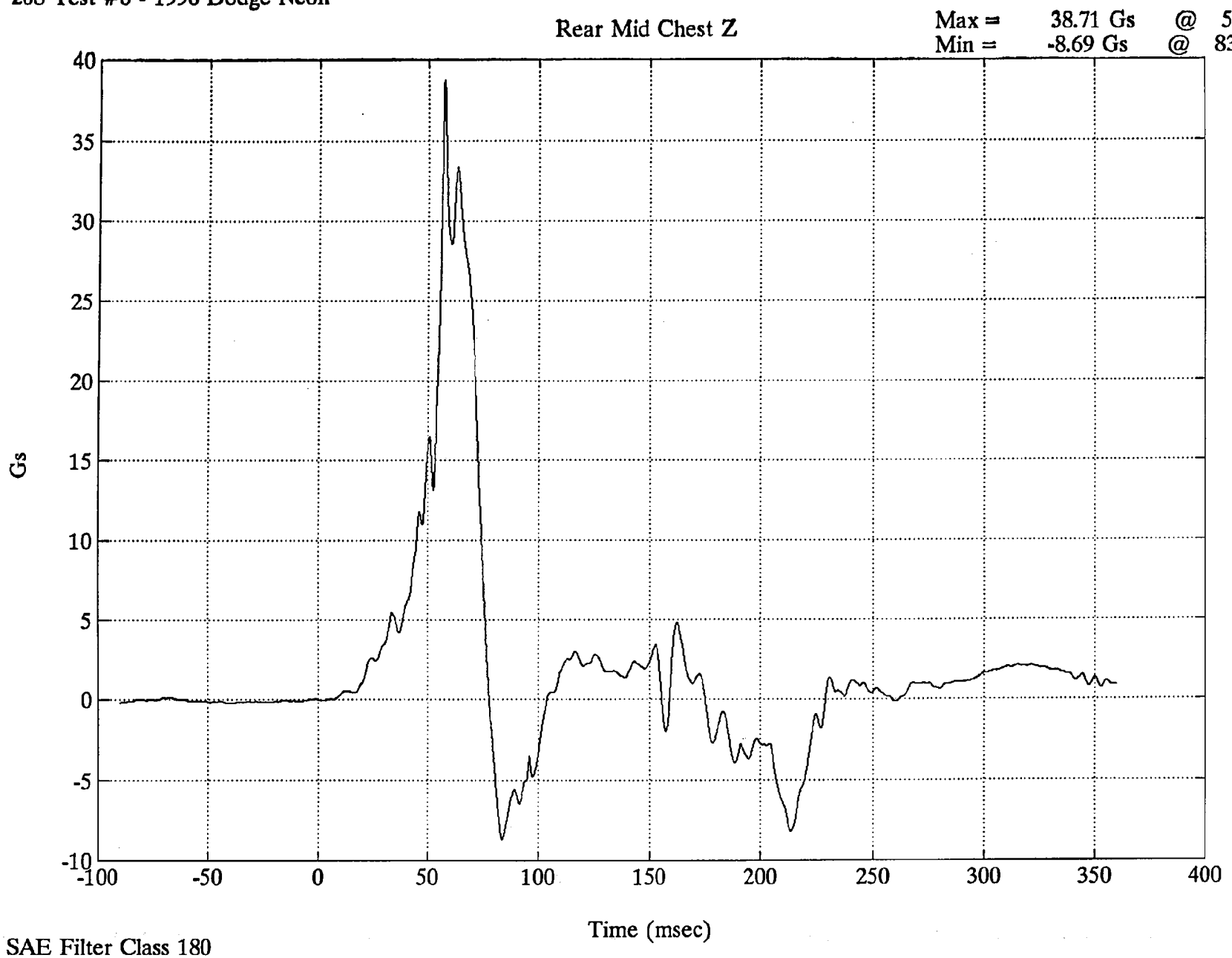


SAE Filter Class 180

C-7

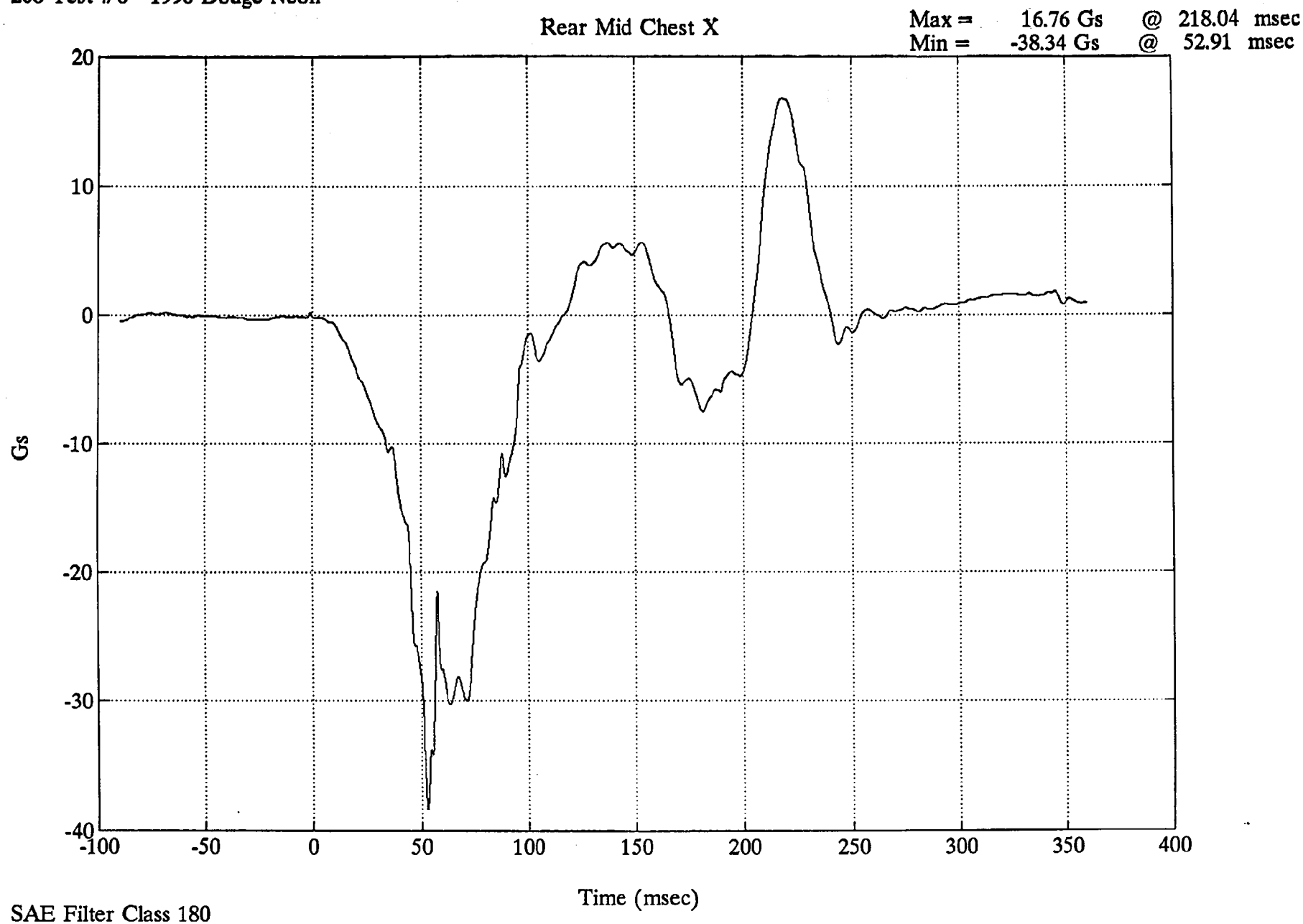
83534

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

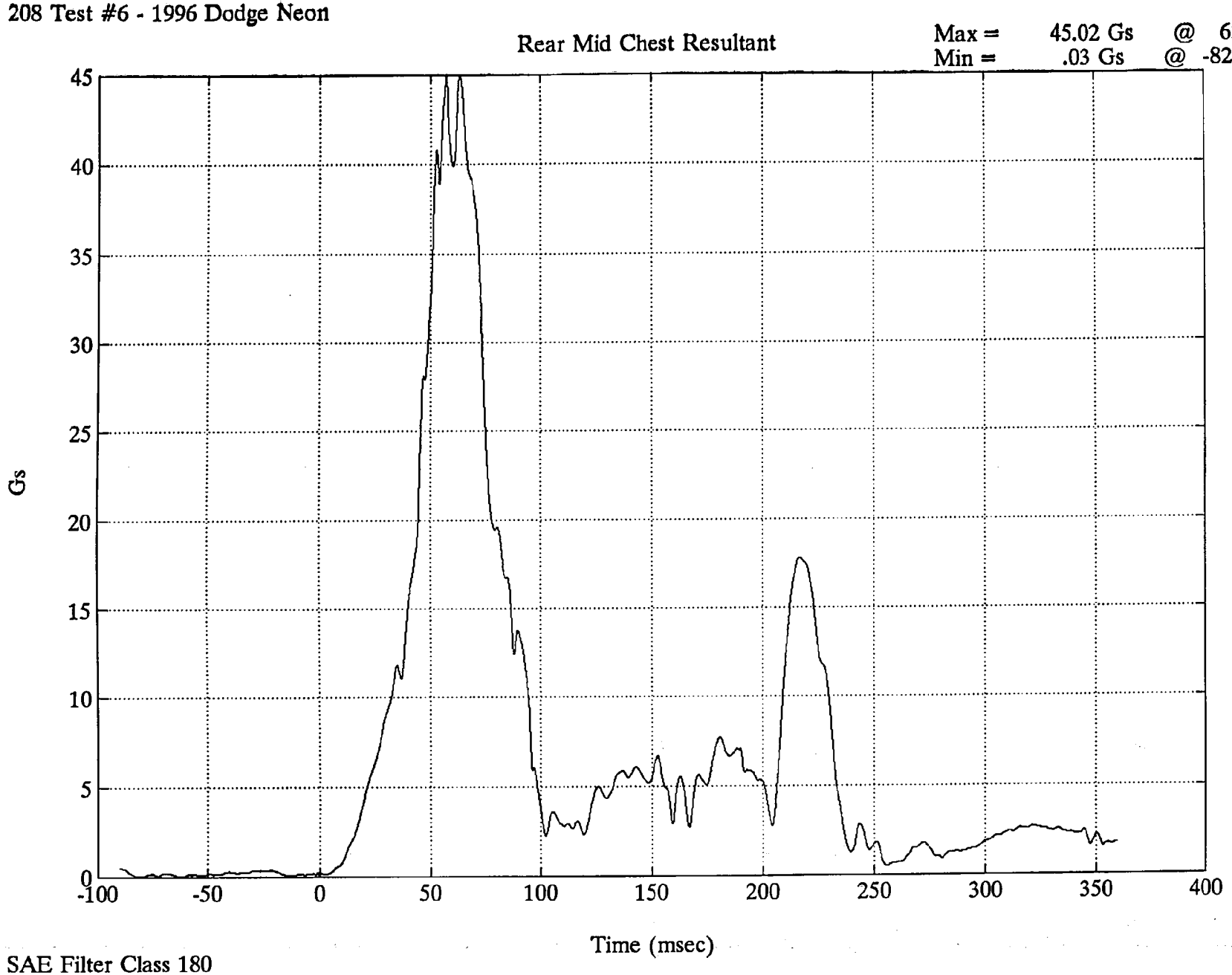
208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

8353-4

208 Test #6 - 1996 Dodge Neon



SAE Filter Class 180

Appendix D

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

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

Unibelts

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

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

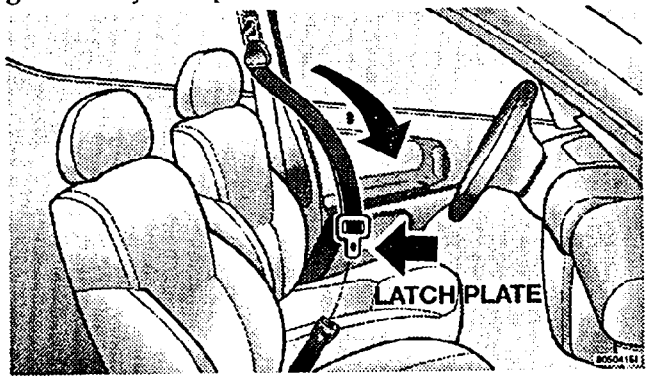
WARNING!

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

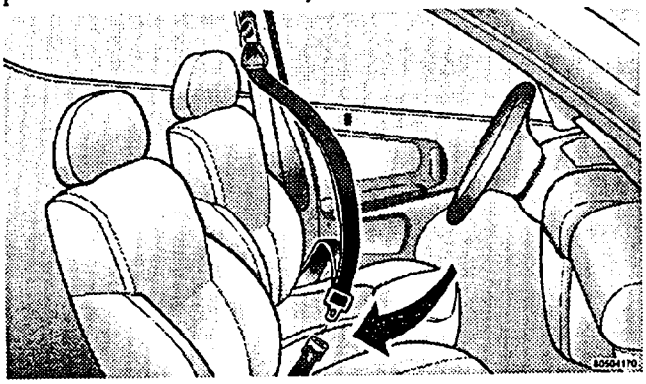
Unibelt Operating Instructions

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

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



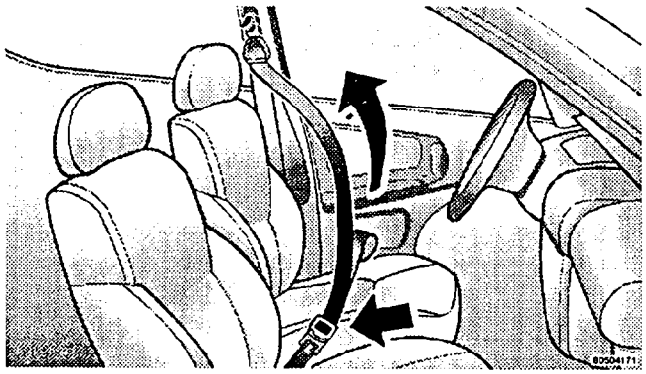
3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click".



WARNING!

- **A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.**
- **A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.**
- **A belt that is worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a collision, increasing head and neck injury. And a belt worn under the arm can cause internal injuries. 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. 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 belt reduces the risk of sliding under the belt in a collision.



WARNING!

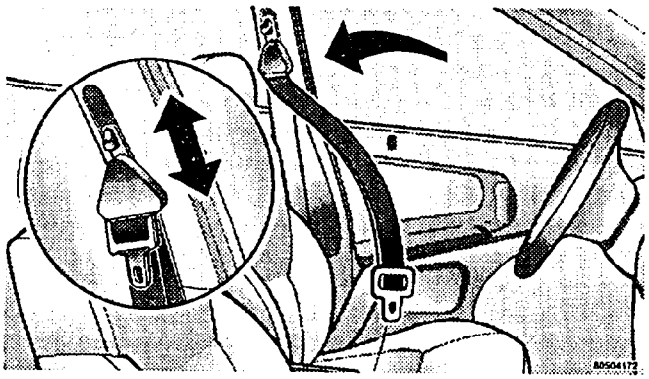
- **A lap belt worn too high can increase the risk of internal injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap belt as low as possible and keep it snug.**
- **A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure the belt is straight. Use the Unibelt Untwisting Procedure. If you can't straighten a belt in your vehicle, take it to your dealer and have it fixed.**

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

6. Adjustable Upper Shoulder Belt Anchorage

4 Door Models

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



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

2 Door Models

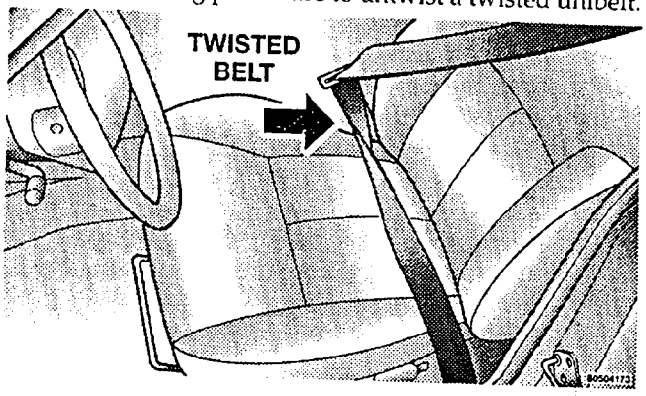
In the front seats, the shoulder belt upper anchorage adjusts automatically to your height as you position the shoulder belt on your chest. If the belt is not comfortable, pull the shoulder belt webbing forward from the retractor and guide it over the desired point on your shoulder belt as it retracts.

In the rear seat, move toward the center of the seat to position the belt away from your neck.

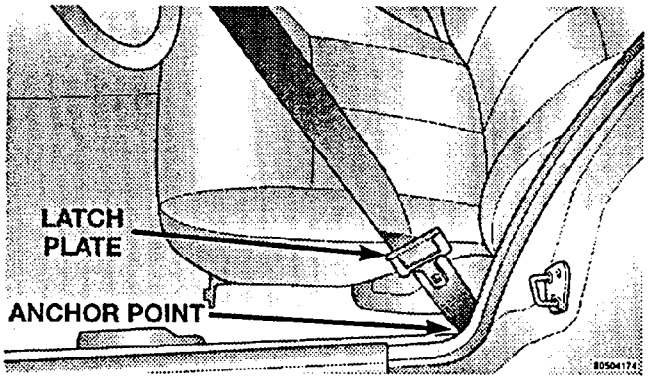
To release the belt, push the red button marked PRESS on the buckle. The belt will automatically retract to its stowed position. If necessary, slide the latch plate down the webbing to allow it to retract fully.

Unibelt Untwisting Procedure

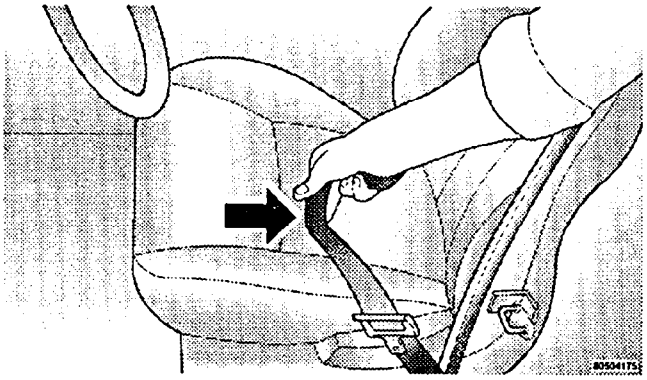
Use the following procedure to untwist a twisted unibelt.



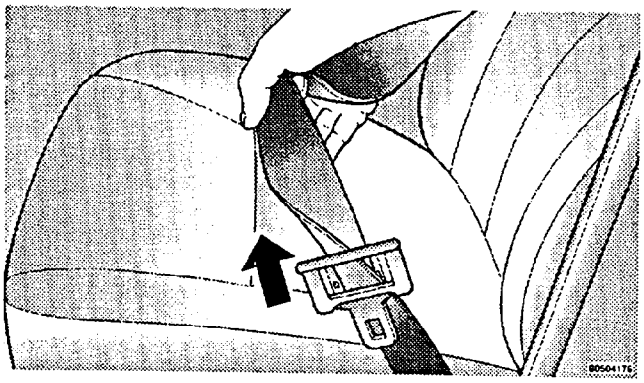
1. Position the latchplate as close as possible to the anchor point.



2. At about 6 to 12 inches above the latchplate, grasp and twist the belt webbing 180° to create a fold that begins immediately above the latchplate.



3. Slide the latchplate upward over the folded webbing. The folded webbing must enter the slot at the top of the latchplate.



4. Continue to slide the latchplate up until it clears the folded webbing.

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.

Rear Center Lap Belts

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

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

WARNING!

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

WARNING!

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

Seat Belt Extender

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

WARNING!

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

Child Restraint

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

WARNING!

In a collision, an unrestrained child, even a tiny baby, can become a missile inside the vehicle. The force required to hold even an infant on your lap could become so great that you could not hold the child, no matter how strong you are. The child and others could be badly injured. Any child riding in your vehicle should be in a proper restraint for the child's size. All states and Canadian provinces require small children to ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.

Chrysler Integrated Child Seat — Optional

Operating Instructions for this seat are included with the seat. If the instructions are not with the seat or in the owner's manual package, replacement instructions can be obtained.

To obtain replacement instructions:

Use the order form at the rear of this manual and specify publication 81-016-9470.

Infants And Small Children

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

Two different child restraint systems are generally available:

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

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

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

- Before buying any restraint system, make sure that it has a label certifying that it meets Motor Vehicle Safety Standard 213. Chrysler also recommends that before you buy a child restraint, you try it in the vehicle seats where you will use it.
- The restraint must be appropriate for your child's weight and height. Check the label on the restraint for this too.

WARNING!

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

- If possible, install the restraint in the rear seat. According to accident statistics, children are safer when properly restrained in the rear seats than in the front.
- Carefully follow the instructions that come with the restraint. If you install the restraint improperly, it may not work when you need it.

  Infant and child restraints are secured in the vehicle seats by the lap belt or the lap part of the lap/shoulder belt.

In the rear seats, you may have trouble tightening the belt on the child restraint because the buckle or latch plate interferes with the belt path opening on the restraint. Disconnect the latch plate from the buckle and twist the short buckle-end belt several turns to shorten it. Reassemble the latch plate to the buckle with the release button facing out.

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

In the center rear seat if the belt 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 manufacturers recommend the use of a top anchorage (tether) strap in addition to the lap belt. Your vehicle has tether strap anchorages behind the rear seating positions for use with these child seats. Your dealer can provide you with anchorage hardware and installation instructions.
- Buckle the child into the seat exactly as the seat manufacturer's directions tell you. The latch plate will keep the belt tight.
- When your infant carrier or child seat is not in use, secure it with the seat belt or remove it from the vehicle. Don't leave it loose in the vehicle. In a sudden stop or collision, it could strike occupants and injure them.

Children Too Large For Child Seats

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

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

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

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

Driver and Right Front Passenger Supplemental Restraint System (SRS) - Airbag

This vehicle has airbags for the driver and right front passenger as a supplement to the seat belt restraint systems. The driver's airbag is mounted in the steering wheel. The passenger side airbag is mounted in the

instrument panel, above the glove compartment, under a cover marked SRS/AIRBAG. These airbags inflate in higher speed impacts. They work with the instrument panel knee bolsters and the seat belts to provide improved protection for the driver and right front passenger.

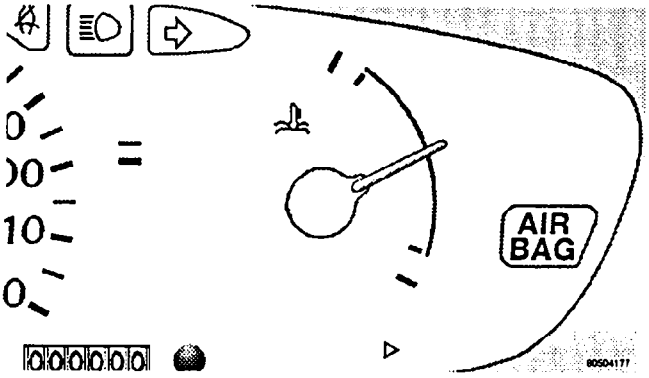
WARNING!

- **Relying on the airbags alone could lead to more severe injuries in a collision. The airbags work with your seat belt to restrain you properly. In some collisions the airbags won't deploy at all. Wear your seat belts even though you have airbags.**
- **Being too close to the steering wheel or instrument panel during airbag deployment could cause serious injury. Airbags need room to inflate. Sit back, comfortably extending your arms to reach the steering wheel or instrument panel.**

The seat belts are designed to protect you in many types of collisions. The airbags deploy only in frontal collisions and will not deploy in collisions at slow speed. But even in collisions where the airbags work, you need the seat belts to keep you in the right position for the airbags to protect you properly.

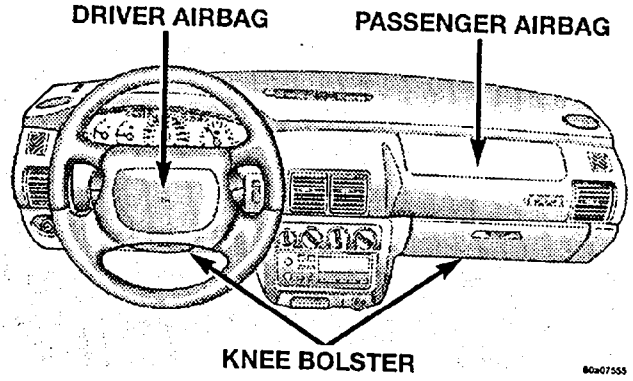
The airbag system consists of the following:

- Crash Sensors
- Diagnostic Unit
- AIRBAG Readiness Light.



- Driver and Passenger Airbag/Inflator Units

- Unique Steering Wheel and Column
- Unique Instrument Panel
- Interconnecting Wiring
- Knee Impact Bolster.



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 previously except the knee bolster, instrument panel, and steering column. 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.

WARNING!

Ignoring the AIRBAG light in your instrument panel could mean you won't have the airbags 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/Inflator Units** are in the center of the steering wheel and in the instrument panel. The words SRS/AIRBAG are embossed on the airbag covers.

WARNING!

Do not put anything on or around the airbag covers or attempt to manually open them. You may damage the airbags and you could be injured because the airbags are not there to protect you. These protective covers for the airbag cushions are designed to open only when the airbags are inflating.

- When the crash sensors detect an impact requiring the airbags, they signal the inflator units. A large quantity of non-toxic nitrogen gas is generated to inflate the airbags. The airbag covers separate and fold out of the way as the airbags inflate to their full size. The airbags fully inflate in about 50 milliseconds. This is only about half of the time it takes you to blink your eyes. The airbags then quickly deflate while helping to restrain the driver and right front passenger. The airbag gas is vented through the airbag material towards the instrument panel. In this way the airbags do not interfere with your control of the vehicle.
- The **Knee Impact Bolsters**help protect the knees and position you for the best interaction with the airbags.

2

If A Deployment Occurs

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

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

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

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver and right front passenger as the airbags deploy and unfold. The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals.

They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.

- As the airbags deflate you may see some smoke-like particles. The particles are a normal by-product of the process that generates the non-toxic 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 airbags deploy. If so, you can tuck the deployed airbags inside the opening in the steering wheel hub and instrument panel trim covers to make driving somewhat easier.

WARNING!

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

Transporting Pets

Airbags deploying in the front seat could harm your pet. An unrestrained pet will be thrown about and possibly injured, or injure a passenger during panic braking or in a collision.

Pets should be restrained in the rear seat in pet harnesses or pet carriers that are secured by seat belts.

Maintaining Your Airbag System

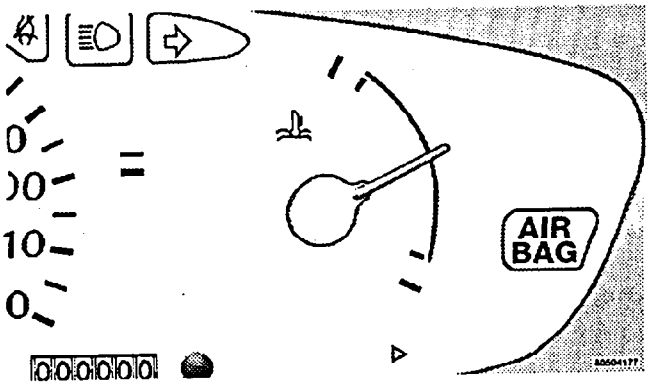
WARNING!

- **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 airbag covers. Do not modify the front bumper or vehicle body structure.**
- **You need proper knee impact protection in a collision. Do not mount or locate any aftermarket equipment on or behind the knee bolsters.**
- **It is dangerous to try to repair any part of the airbag system yourself. Don't try to repair the airbag system. Be sure to tell anyone who works on your vehicle that it has airbags.**

You will want to have the airbags ready for your protection in a collision. The airbag Supplemental Restraint System (SRS) is designed to be maintenance free.

If any of the following occurs, have an authorized dealer service the system immediately.

- 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.

Appendix E

BUILT-IN CHILD RESTRAINT SYSTEM TESTS - FMVSS NO. 213

Chrysler Corporation
Chrysler Integrated Child Seat, Type LH/JA/PL

REPORT NUMBER : 8353-4

BUILT-IN CHILD RESTRAINT SYSTEM TESTS - FMVSS NO. 213

Chrysler Corporation
Chrysler Integrated Child Seat - Type LH/JA/PL
1996 Dodge Neon

Calspan SRL Corporation
4455 Genesee Street
Buffalo, New York 14225

May 1996

FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
400 Seventh Street, S. W.
Washington, DC 20590

Prepared for the United States Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-93-D-11089, and P.O. DTNH22-96-P-01095. This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

REPORT ACCEPTED BY:

_____

Contract Technical Manager
Office of Vehicle Safety Compliance

_____

Acceptance Date

TECHNICAL REPORT STANDARD TITLE PAGE

1. *Report No.*	2. *Government Accession No.*	3. *Recipient's Catalog No.*
4. *Title and Subtitle* Child Restraint Systems Tests - FMVSS 213 Chrysler Corporation Chrysler Integrated Child Seat - Type LH/JA/PL		5. *Report Date* May 1996 6. *Performing Organization Code*
7. *Author(s)* Robert F. Hathaway		8. *Performing Organization Report No.* 8353-4
9. *Performing Organization Name and Address* Calspan SRL Corporation 4455 Genesee Street Buffalo, New York 14225		10. *Work Unit No.* 11. *Contract or Grant No.* DTNH22-93-D-11089 P.O. DTNH22-96-P-01095
12. *Sponsoring Agency Name and Address* U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh, S.W. Washington, D.C. 20590		13. *Type of Report and Period Covered* Final Report July 1993 - July 1996 14. *Sponsoring Agency Code*

15. *Supplementary Notes*

Reviewed by : Robert F. Hathaway — Program Manager

Approved by : David Roberts — Head, Safety Research Section, Transportation Sciences Center

16. *Abstract*

This report contains the results of tests performed in accordance with FMVSS 213, Child Restraint Systems, on the Chrysler Corporation, 1996 Dodge Neon, equipped with a Chrysler Integrated Child Restraint. The child restraint appears to comply with all the requirements of FMVSS 213, except as follows:

- S5.5 Labeling
  S5.5.5: The information specified in paragraphs (a) through (l) of this section that is required by S5.5.4 shall be stated in the English language and lettered in letters and numbers that are not smaller than 10 point type and are on a contrasting background.

Final determination of compliance is made by the National Highway Traffic Safety Administration.

17. *Key Words*	18. *Distribution Statement*		
FMVSS 213 Child Restraint Systems Compliance Testing			
19. *Security Classif. (of this report)* UNCLASSIFIED	20. *Security Classif. (of this page)* UNCLASSIFIED	21. *No. of Pages*	22. *Price*

TABLE OF CONTENTS

SECTION I

PURPOSE AND TEST PROCEDURE

Purpose: The purpose of the test was to determine if the production built-in child restraint system(s) in the Chrysler Corporation's Dodge Neon met the requirements of Federal Motor Vehicle Safety Standard (FMVSS) No. 213, Child Restraint Systems.

Test Procedure: The "Calspan Operating Test Procedure for FMVSS No. 213", submitted to and approved by the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration, contains the specific procedures used to conduct this test. This procedure shall not be interpreted to be in conflict with any portion of FMVSS No. 213 and amendments in effect as noted in the applicable contract.

SECTION II

INTRODUCTION AND SUMMARY

This report presents all of the FMVSS 213 compliance inspection and test data obtained on the Chrysler Integrated Child Seat - Type LH/JA/PL child restraint system. This test was performed in conjunction with a full-scale FMVSS 208 compliance test of a 1995 Dodge Neon. The restraint was dynamically tested in the forward-facing upright configuration. The results from all inspections and tests indicate that the Chrysler Integrated Child Seat - Type LH/JA/PL child restraint complied with all of the requirements of FMVSS 213 except as follows:

- S5.5 Labeling

  S5.5.5: All the information given on the restraint's permanent labels is given in 8-point type.

Restraint system inspection and, full-scale dynamic testing were performed by Calspan SRL Corporation's Transportation Sciences Center. Compliance test data sheets for all tests are found in Section III of this report.

SECTION III

INSPECTION AND TEST DATA

FMVSS 213 - BUILT-IN CHILD RESTRAINT SYSTEMS

Report No. 8353-4

Child Restraint System Identification

Manufacturer:

Name Chrysler Corporation

Address

Model No. Type LH/JA/PL

Group No. 2

1. Item Code 001-CICS-01-DTU
   Date of Manufacture (1)
   Test No. 1613

2. Item Code
   Date of Manufacture
   Test No.

3. Item Code
   Date of Manufacture
   Test No.

4. Item Code
   Date of Manufacture
   Test No.

5. Item Code
   Date of Manufacture
   Test No.

6. Item Code
   Date of Manufacture
   Test No.

Remarks:
The date of manufacture does not accompany the restraint.

Technician Donald W. Hess

Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Labeling
(FMVSS 213, S5.5)

Date of Test 4/29/96 Item Code 001-CICS-01-DTU

Pass / Fail

S5.5.4
(a) Each built-in child restraint system other than a factory-installed built-in restraint shall be permanently labeled with the information specified in S5.5.5 (a) through (l). The information specified in S5.5.5 (a) through (j) and in S5.5.5(l) shall be visible when the system is activated for use. N/A (1)

(b) Each factory-installed built-in child restraint shall be permanently labeled with the information specified in S5.5.5 (f) through (j) and S5.5.5(l), so that the information is visible when the restraint is activated for use. The information shall also be included in the vehicle owner's manual. (2)

S5.5.5 The information specified in paragraphs (a) through (l) of this section that is required by S5.5.4 shall be stated in the English and lettered in letters and numbers that are not smaller than 10-point type and are on a contrasting background. Fail (3)(4)

Remarks:

(1) This restraint system is a factory-installed built-in unit.

(2) The statements of items S5.5.5(g)(2), and S5.5.5(h) are under the removable seat pad, and may be partially obscured unless the pad is repositioned.

(3) All information given on the restraint's permanent labels is presented in 8-point type.

(4) Labels may be seen in photographs presented in Appendix B.

Technician Donald W. Hess Program Manager Robert F. Hathaway

Labeling (cont'd)

S5.5.5 (cont'd)

The following information is included:

(a)	The model name or number of the system.	N/A (5)
(b)	The manufacturer's name. A distributor's or dealer's name may be used instead if the distributor or dealer assumes all responsibility for all duties and liabilities imposed on the manufacturer with respect to the system by the National Traffic and Motor Vehicle Safety Act, as amended.	N/A (5)
(c)	The statement: "Manufactured in _____," inserting the month and year of manufacture.	N/A (5)
(d)	The place of manufacture (city and State, or foreign country). However, if the manufacturer uses the name of the distributor or dealer, then it shall state the location (city and State, or foreign country) of the principle offices of the distributor or dealer.	N/A (5)
(e)	The statement: "This child restraint system conforms to all applicable Federal Motor Vehicle Safety Standards."	N/A (5)(6)

Remarks:

(5) This restraint system is a factory-installed built-in unit, and therefore is exempt from this requirement.

(6) However, the label states: "This child restraint system conforms to U.S. Motor Vehicle Safety Standard 213 and Canada Motor Vehicle Safety Standard 213.4"

Technician Donald W. Hess Program Manager Robert F. Hathaway

Labeling (cont'd)

(f) One of the following statements, inserting the manufacturer's recommendations for the maximum weight and height of children who can safely occupy the system: (7)

(i) THIS INFANT RESTRAINT IS DESIGNED FOR USE BY CHILDREN WHO WEIGH _____ POUNDS OR LESS AND WHOSE HEIGHT IS _____ INCHES OR LESS ; or

(ii) THIS CHILD RESTRAINT IS DESIGNED FOR USE ONLY BY CHILDREN WHO WEIGH BETWEEN _____ AND ____ POUNDS AND WHOSE HEIGHT IS ____ INCHES OR LESS AND WHO ARE CAPABLE OF SITTING UPRIGHT ALONE ; or

(iii) THIS CHILD RESTRAINT IS DESIGNED FOR USE ONLY BY CHILDREN WHO WEIGH BETWEEN ____ AND ____ POUNDS AND ARE BETWEEN ____ AND ____ INCHES IN HEIGHT.

(g) The statement specified in paragraph (1), and if appropriate, the statement in paragraph (2).

(1) WARNING! FAILURE TO FOLLOW THE MANUFACTURER'S INSTRUCTIONS ON THE USE OF THIS CHILD RESTRAINT SYSTEM CAN RESULT IN YOUR CHILD STRIKING THE VEHICLE'S INTERIOR DURING A SUDDEN STOP OR CRASH. Pass

(2) In the case of each built-in child restraint system which is not intended for use in the motor vehicle at certain adjustment positions or under certain circumstances an appropriate statement of the manufacturer's restrictions regarding those positions or circumstances, in capitalized letters. Pass (8)

(h) In the case of each built-in child restraint system that has belts designed to restrain children using them, the statement:

SNUGLY ADJUST THE BELTS PROVIDED WITH THIS CHILD RESTRAINT AROUND YOUR CHILD. Pass

Remarks:

(7) The label states: "This child restraint is for use only by children who weigh between 9kg (20 lb) and 30 kg (66 lb), whose shoulder height is 127 cm (50 in) or less, who are capable of sitting upright alone and whose shoulder height is less than the shoulder belt slot in use."

(8) The labels states: "Do not use the center lap belt with the child restraint." However, this statement is under the removable seat pad, and may be partially obscured unless the pad is repositioned.

Technician Donald W. Hess Program Manager Robert F. Hathaway

Labeling (cont'd)

(i) In the case of each built-in child restraint system which can be used in a rear-facing position, the following statement: N/A

PLACE AN INFANT IN A REAR-FACING POSITION IN THIS CHILD RESTRAINT.

(j) A diagram or diagrams showing the fully activated child restraint system in infant and/or child configurations. Pass

(k) The following statement, inserting an address and telephone number: N/A (9)

"Child restraints could be recalled for safety reasons. You must register this restraint to be reached in a recall. Send your name, address and the restraint's model number and manufacturing date to (*insert address*) or call (*insert telephone number*). For recall information, call the U.S. Government's Auto Safety Hotline at 1-800-424-9393 (202-366-0123 in D.C. area)."

(l) In the case of a built-in belt-positioning seat that uses either the vehicle's Type I or Type II belt systems or both, a statement describing the manufacturer's recommendations for the maximum height and weight of children who can safely occupy the system, and how the booster should be used (e.g.; with or without shield) with the different vehicle belt systems. N/A

Remarks:

(9) This restraint system is a factory-installed built-in unit, and therefore is exempt from this requirement.

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Installation Instructions
(FMVSS 213, S5.6)

Date of Test 4/29/96 Item Code 001-CICS-01-DTU

Pass / Fail

S5.6.2
(a) Each built-in child restraint system shall be accompanied by printed instructions in the English that provide a step-by-step procedure, including diagrams, for activating the restraint system, positioning a child in the system, adjusting the restraint and, if provided, the restraint harness to fit the child. The instructions for each built-in car bed shall explain that the child should be positioned in the bed in such a way that the child's head is near the center of the vehicle. Pass

(b) Each motor vehicle equipped with a factory-installed built-in child restraint shall have the information specified in paragraph (a) of this section included in it's vehicle owner's manual. (1)

S5.6.2.1 The instructions shall explain the primary consequences of not following the manufacturer's warnings for proper use of the child restraint system in accordance with S5.5.5 (f) through (i). Pass

S5.6.2.2 The instructions for each built-in child restraint system, other than a factory-installed restraint, shall include the following statement, inserting an address and telephone number: N/A (2)

"Child restraints could be recalled for safety reasons. You must register this restraint to be reached in a recall. Send your name, address and the restraint's model number and manufacturing date to (*insert address*) or call (*insert telephone number*). For recall information, call the U.S. Government's Auto Safety Hotline at 1-800-424-9393 (202-366-0123 in D.C. area)."

Remarks:
(1) The vehicle owner's manual supplement contains the required information. The vehicle owner's manual states: "Chrysler Integrated Child Seat - Optional Operating instructions for this seat are included with the seat."

(2) This child restraint system is a factory-installed built-in unit.

Technician Donald W. Hess Program Manager Robert F. Hathaway

Installation Instructions (cont'd)

S5.6.2.3 Each built-in child restraint system other than a factory-installed built-in restraint, shall have a location on the restraint for storing the instructions. N/A (2)

S5.6.3 Each built-in child restraint system, other than a system that has been installed in a vehicle or a factory-installed built-in system that is designed for a specific vehicle model and seating position, shall be accompanied by instructions in English that provide a step-by-step procedure for installing the system in a motor vehicle. The instructions shall specify the types of vehicles and the seating positions into which the restraint can or cannot be installed. The instructions for each car bed shall explain that the car bed should be installed so that the child's head will be near the center of the vehicle. N/A (2)

S5.6.4 In the case of a built-in belt-positioning seat that uses either the vehicle's Type I or Type II belt systems or both, the instructions shall include a statement describing the manufacturer's recommendations for the maximum height and weight of children who can safely occupy the system and how the booster must be used with the vehicle belt systems appropriate for the booster seat. The instructions shall explain the consequences of not following the directions. The instructions shall specify that, if the booster seat is recommended for use with only the lap-belt part of a Type II assembly, the shoulder belt portion of the assembly must be placed behind the child. N/A (3)

Remarks:

(2) This child restraint system is a factory-installed built-in unit.

(3) This restraint system is not capable of belt-positioning usage.

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Registration Form
(FMVSS 213, S5.8)

Date of Test 4/29/96 Item Code 001-CICS-01-DTU

Pass / Fail

S5.8 Information requirements - registration form.

(a) Each child restraint system, except a factory-installed built-in restraint system, shall have a registration form attached to any surface of the restraint that contacts the dummy when the dummy is positioned in the system in accordance with S6.1.2 of Standard 213. N/A (1)

(b) Each form shall:

(1) Consist of a postcard that is attached at a perforation to an informational card; N/A

(2) Conform in size, content and format to Figures 9a and 9b of Standard 213; N/A

(3) Have a thickness of at least 0.007 inches and not more than 0.0095 inches. N/A

(c) Each postcard shall provide the model name or number and date of manufacture (month, year) of the child restraint system to which the form is attached, shall contain space for the purchaser to record his or her name and mailing address, shall be addressed to the manufacturer, and shall be postage paid. No other information shall appear on the postcard, except identifying information that distinguishes a particular child restraint system from other systems of that model name or number may be preprinted in the shaded area of the postcard, as shown in Figure 9a of Standard 213. N/A

Remarks:

(1) This child restraint system is a factory-installed built-in unit.

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Minimum Head Support Surface
(FMVSS 213, S5.2.1)

Date of Test 4/29/96 Item Code 001-CICS-01-DTU

S5.2.1.2 The child restraint system is low enough to be exempt from this requirement. No (yes, no)

S5.2.1.1

Back Support Height

Maximum Child Weight (lbs.)	Required Minimum Height (in.)	Measured Height (in.)	Pass / Fail
66	22	22 1/2	Pass

Back Support Width

Required Minimum Width (in.)	Measured Width (in.)	Side Wing Depth (in.)	Pass / Fail
8	12 1/4	2 3/4	Pass

Remarks:

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Torso Impact Protection
(FMVSS 213, S5.2.2)

Date of Test 4/29/96 Item Code 001-CICS-01-DTU

S5.2.2.1

Test	Compliance Requirement	Test Result	Pass / Fail
Back Support Surface	Flat or concave	Flat	Pass
	Area ≥ 85 sq. in.	> 85 sq. in.	Pass
Side Support Surface	Flat or concave	Flat	Pass
Max. weight ≥ 20 lb.	Area ≥ 24 sq. in.	> 24 sq. in.	Pass
Max. weight < 20 lb.	Area ≥ 48 sq. in.	N/A	N/A
Forward Restraining Surface Horiz. Cross Section	Flat or concave	N/A	N/A
Vertical Longitudinal Cross Section	Flat or convex	N/A	N/A
	Radius of curvature ≥ 2 in.	N/A	N/A

	Yes / No	Pass / Deferred
S5.2.2.2 Forward Fixed or Movable Surface	No	Pass

Remarks:

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Protrusion Limitation
(FMVSS 213, S5.2.4)

Date of Test 4/29/96 Item Code 001-CICS-01-DTU

Test	Compliance Requirement (in.)	Test Result (in.)	Pass / Fail
Height	≤ 3/8 in.	< 3/8	Pass
Edge Radius	≥ 1/4 in.	(1)	(1)

Remarks:

(1) There are several cut-outs on the seat back that create edges with radii of less than 1/4 inch. However this area is covered with a 1/2 inch foam seat pad.

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Dynamic Impact Test Conditions
(FMVSS 213, S6.1)

Date of Test 5/1/96 Test No. 1613

Item Code 001-CICS-01-DTU

Laboratory Ambient Conditions During Testing

Temperature Range 70 to 70 Degrees F

Relative Humidity Range 41 % to 41 %

Test Device	1996 Dodge Neon
Nominal velocity (mph)	30 MPH
Dummy Used	3 Year old toddler S/N: 04
Child Restraint System	
Location	Center Rear Bench Seat
Installation mode	Forward-facing (1)
Adjustment mode	Upright (2)
"Misuse" mode	N/A
Test Results	
Actual velocity	42.9 ft/s
	29.3 mph
Vehicle Seat Position	
Vertical position	N/A (2)
Horizontal position	N/A (2)
Vehicle seat back position	N/A (2)

Include pre- and post-test photographs and acceleration-time history plot.

Remarks:

Pre- and post-test photographs are presented in Appendix B.

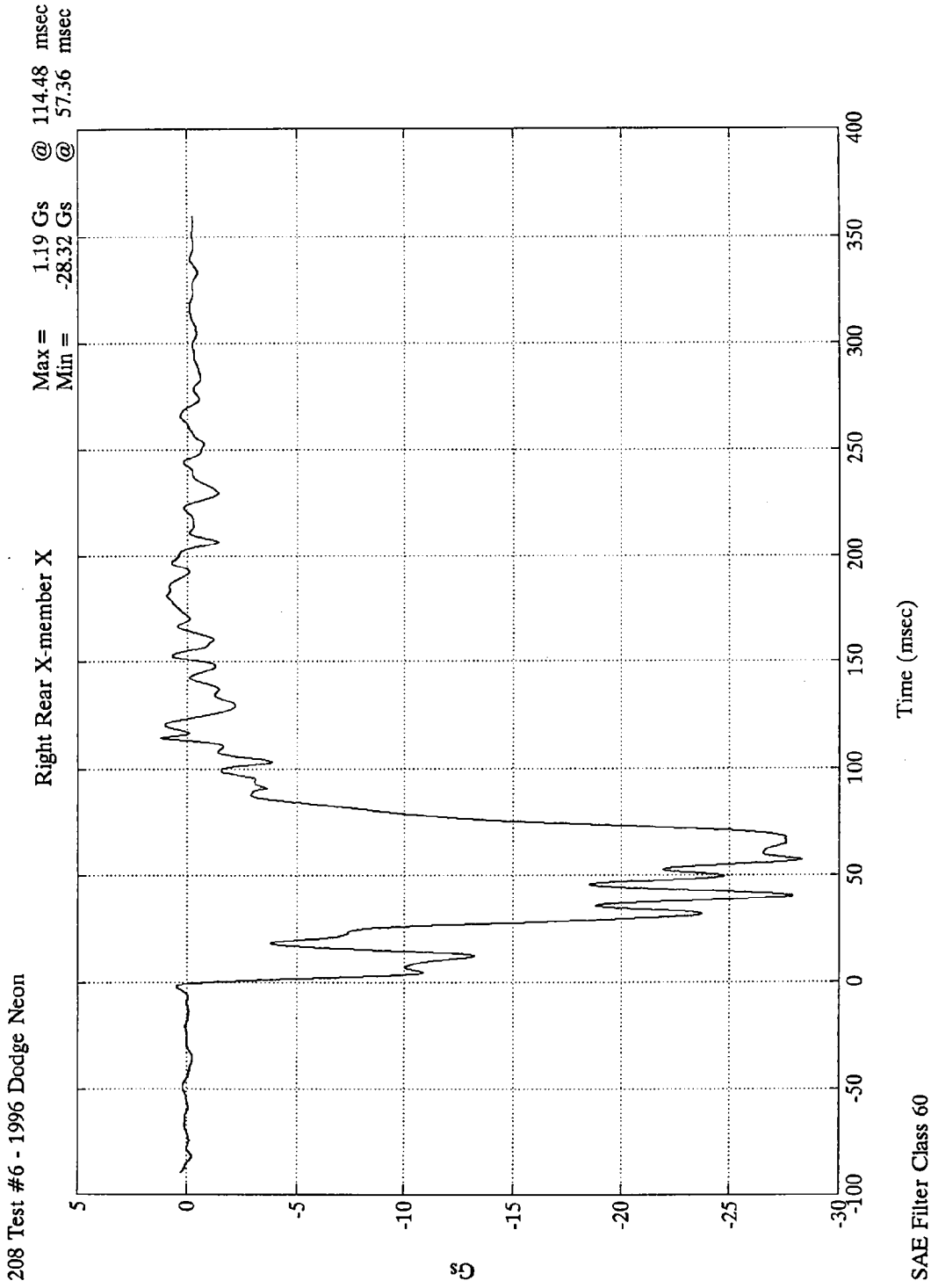
(1) The belts were threaded through the lowest slots on the seat back.
(2) The integrated child restraint is built-into a non-adjustable bench seat.

Technician Donald W. Hess Program Manager Robert F. Hathaway

Date of Test 5/1/96

Test No. 1613

Item Code 001-CICS-01-DTU



30 MPH CRASH PULSE

8353-4

COMPLIANCE TEST DATA: FMVSS 213

Belt Restraint
(FMVSS 213, S5.4.3)

Date of Test 5/1/96 Test No. 1613

Item Code 001-CICS-01-DTU

Pass / Fail

S5.4.3.1 Snug Fit of Belts Pass

Extra Webbing

Dummy	Each Shoulder Belt (in.)	Each Lap Belt Side (in.)	Crotch Belt (in.)
3 year old	13 3/8	(1)	N/A (1)

S5.4.3.2 Direct Restraint Belts Pass

		Yes / No
(1)	Belt / dummy contact for restraint	No
(2)	Rigid structure behind dummy	Yes
(3)	Belt / child restraint slip possible	No

Note : If all "yes", restraint fails.

S5.4.3.3 Seating System Belts and / or Shields Pass

(1)	Upper torso	Yes
(2)	Lower torso	Yes
(3)	Crotch restraint	Yes

S5.4.3.4 Child Harness Belts N/A

(1)	Upper torso	N/A
(2)	Lower torso	N/A
(3)	Prevent standing	N/A

Remarks:
(1) The shoulder and lap belts are a continuous system with both ends of the belt connected through a yoke to a single strap adjustable at the front of the seat.

Chest retainer clip positioned 3 inches below dummy's chin.

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Buckle Release
(FMVSS 213, S5.4.3.5, S6.2)

Date of Test 5/1/96 Test No. 1613

Item Code 001-CICS-01-DTU

Test	Compliance Requirement	Test Result	Pass / Fail
Buckle Minimum Surface Area	Area $\geq$ 0.6 in.^{2}	0.68 in^2	Pass
Pre - Impact Release Force	Force range : 9 to 14 lbs.	Right: 10.5 Lbs. Left:10.5 Lbs.	Pass (1)
Buckle Integrity	Not release during test	No Release	Pass
Post - Impact Release Force	Force range : $\leq$ 16 lbs.	Right: 12.8 Lbs. Left:12.8 Lbs.	Pass

Remarks:

The buckle is an integral part of the seat and, therefore, the buckle release test was performed on the entire seat assembly.

(1) The buckle is comprised of right and left buckle tangs that do not always release at the same force.

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Restraint System Integrity
(FMVSS 213, S5.1.1)

Date of Test 5/1/96 Test No. 1613

Item Code 001-CICS-01-DTU

Test	Compliance Requirement	Test Result	Pass / Fail
Structural Integrity	No complete separation	None	Pass
	No partial separation with exposed edge radius < 1/4 in.	None	Pass
	No partial separation with protrusions > 3/8 in.	None	Pass
Adjustment Position	No change	No Change	Pass
Back Surface / Seating Surface Angle	Not < 45 degrees	> 45 deg.	Pass

Remarks:

Technician Donald W. Hess Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Injury Criteria
(FMVSS 213, S5.1.2)

Date of Test 5/1/96

Test No. 1613

Item Code 001-CICS-01-DTU

Test	Compliance Requirement	Test Result	Pass / Fail
Head Injury Criterion	≤ 1000	375	Pass
Chest Injury Criterion	Cumulative duration over 60 g ≤ 3 ms	Peak g = 42.7 Duration exceeding 60 g = 0.0	Pass

Remarks:

Technician Donald W. Hess

Program Manager Robert F. Hathaway

COMPLIANCE TEST DATA: FMVSS 213

Occupant Excursion
(FMVSS 213, S5.1.3, S5.1.4, S5.2.1.1 (c))

Date of Test 5/1/96 Test No. 1613

Item Code 001-CICS-01-DTU

Forward-Facing Restraints

Test	Compliance Requirement	Test Result	Pass / Fail
Torso Retention (FMVSS 213, S5.1.3.1)	Retain within system	Retained	Pass
Knee Target Excursion (FMVSS 213, S5.1.3.1)	≤ 36 in.	17.0 in.	Pass
Head - Torso Angle (FMVSS 213, S5.2.1.1 (c))	Rearward change ≤ 45 degrees	< 45 deg.	Pass

Rear-Facing Restraints

Test	Compliance Requirement	Test Result	Pass / Fail
Torso Retention (FMVSS 213, S5.1.3.2)	Retain within system	N/A	N/A
Head Target Excursion (FMVSS 213, S5.1.3.2)	Not beyond restraint's top and forward edge	N/A	N/A
Back Support Angle (FMVSS 213, S5.1.4)	≤ 70 degrees	N/A	N/A
Head - Torso Angle (FMVSS 213 S5.2.1.1 (c))	Rearward change ≤ 45 degrees	N/A	N/A

Remarks:

Technician Donald W. Hess Program Manager Robert F. Hathaway

APPENDIX A
EQUIPMENT LIST AND CALIBRATION SCHEDULES

CERTIFICATION INSTRUMENTATION

Instrument[1]	Certification Test	Calibration Date	Due Date
Slide Potentiometer Oceanside Mfg. Co. Model LCP 20-50 2 inches travel, 10,000 ohms	Neck Pendulum	12/95	6/96
C.G. Head Potentiometer Oceanside Mfg. Co. Model SP 221 Serial HNR2 10K, linearity = 1.5%	Neck Pendulum	12/95	6/96
C.G. Pend. Potentiometer Oceanside Mfg. Co. Model SP 221 Serial HNR1 10K, linearity = 1.5%	Neck Pendulum	12/95	6/96
Bourns Potentiometer Model 3520S--1-502 5K +/-, linearity = 0.3%	Lumbar Spine Flexion	2/96	8/96
Transducer Inc. Load Cell S/N 20051, 50#	Lumbar Spine Flexion	2/96	8/96
Hewlett Packard 7035B X-Y Recorder +/- .02% Full Scale Accuracy	Lumbar Spine Flexion	7/95	7/96
Hewlett Packard 7045B X-Y Recorder +/- .02% Full Scale Accuracy	Lumbar Spine Flexion	7/95	7/96
Endevco Accelerometers			
S/N 160 +/- .075% Accuracy CEC 4-202	Neck Pendulum (ATD)	2/96	8/96
Endevco Triaxial Accelerometers, 7267A:			
S/N BK60	Head Impact (ATD)	2/96	8/96
S/N BA42	Chest Impact (ATD)	2/96	8/96

CERTIFICATION INTRUMENTATION (cont'd)

Instrument[1]	Certification Test	Calibration Date	Due Date
Systron/Donner Counter +/- 1 count	Head Impact Chest Impact Neck Pendulum	3/96	3/97
White Box Temp. & Humidity Recorder S/N PL90301003		4/15/96	10/15/96
Chatillon 20 Pound Gauge +/- 8 oz. Accuracy		6/95	6/96
Chatillon 40 Pound Gauge +/- 1% Accuracy		6/95	6/96
Dillon Force Gauge Model E Serial # 4346 50#		5/96	1/97

[1]Pendulum velocity measurements for the Head Impact, Chest Impact and Neck Pendulum tests are measured by a Calspan-designed light beam velocity trap which consists of two .040 inch field stops placed 5.020 inches apart. This system includes General Electric light sources #SL520D6 and Texas Instruments photo diodes.

Technician Donald W. Hess Program Manager Robert F. Hathaway

APPENDIX B

PHOTOGRAPHS OF EQUIPMENT

B-2

8353-4

ITEM CODE 001-CICS-01-DTU

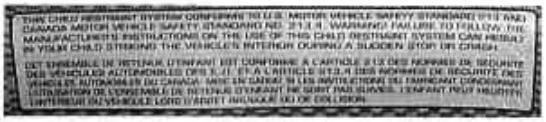
TRACK TEST 1613 PRE - TEST

B-3

8353-4

ITEM CODE 001-CICS-01-DTU

TRACK TEST 1613 POST - TEST



LABELS

ITEM CODES : 001-CICS-01-DTU

CONFIGURATION

ITEM CODES : 001-CICS-01-DTU

Appendix F

Performance Calibration Report for Part 572

Three-Year-Old Child Test Dummy No. 04

Prepared for the United States Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-93-D-11089. This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange.

REPORT ACCEPTED BY:

_____

Contract Technical Manager
Office of Vehicle Safety Compliance

_____

Acceptance Date

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle Performance Calibration Report for Part 572 Three-Year-Old Child Test Dummy No. 04	5. Report Date June 1996
	6. Performing Organization Report No.
7. Author(s) Robert F. Hathaway	8. Performing Organization Report No.
9. Performing Organization Name and Address Calspan SRL Corporation 4455 Genesee Street Buffalo, New York 14225	10. Work Unit No.
	11. Contract or Grant No. DTNH22-93-D-11089 P.O. DTNH22-96-P-01095
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh, S.W. Washington, D.C. 20590	13. Type of Report and Period Covered Final Report
	14. Sponsoring Agency Code

15. Supplementary Notes

Reviewed by : Robert F. Hathaway — Program Manager

Approved by : David L. Colbert — Head, Safety Research Section, Transportation Sciences Center

16. Abstract

This report contains results of performance calibration tests performed on a Part 572 three-year-old size child test dummy at the Calspan SRL Corporation's Transportation Sciences Center dummy certification test facility. The following tests were performed:

1. Head Impact Test
2. Chest Impact Test
3. Lumbar Flexion Test
4. Head-Neck Pendulum Test

The child test dummy manufactured by Vector Research Incorporated, Serial No. 04 met the performance calibration requirements of CFR 49 Part 572, Subpart C.

17. Key Words	18. Distribution Statement
Part 572, Subpart C - Three-Year-Old Child Dummy FMVSS 213 - Child Restraint Systems	Copies of this report are available from: Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., SW, Washington, DC 20590

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SECTION I

INTRODUCTION AND SUMMARY

This report presents the results obtained during certification tests of a three-year-old size child test dummy that was manufactured in accordance with the requirements of 49 CFR Part 572, Subpart C. The objective of these tests was to demonstrate that the test dummy (Serial No. 04, manufactured by Vector Research Incorporated) was suitable for use before and after the FMVSS 208/213 compliance full-scale test program. The tests were performed in the Dummy Certification Laboratory of Calspan's SRL Corporation's Transportation Sciences Center using procedures[1] approved by the NHTSA Contract Technical Manager (CTM). These certification test procedures together with photographs of the apparatus for the four required tests (head impact, chest impact, lumbar spine flexion, and head-neck pendulum impact) are presented in Appendix A of this report. These certification tests were performed on this dummy prior to full-scale testing and after the full-scale test program was completed.

Data from these tests demonstrate that each of the dummy components (and their systems), that are required to be certifiable, were in compliance with the specifications of 49 CFR Part 572, Subpart C. All of the original data from each certification test are on file in the Calspan Dummy Certification Laboratory. Typical data traces are presented in Reference (1).

The data sheets presented in this test report were taken directly from TP-213-02 "Laboratory Procedure for Child Restraint System Testing." These data sheets use the word "calibration" when referring to certification procedures. Therefore, these words are used interchangeably in this report.

(1) "Operating Test Procedure for Test Program for FMVSS 213, Child Restraint Systems," Calspan Report No. 6974-V-1, Contract No. DTNH22-81-C-87088, Task Order No. 7.

SECTION II

Table 1

SUMMARY OF HEAD IMPACT TEST CALIBRATION DATA :

PRE-TEST / POST-TEST

CHILD DUMMY I. D. NO. 04

DATE OF CALIBRATION	4/26/96	5/20/96	
ROOM TEMPERATURE (66-78°F)	70	70	
ROOM RELATIVE HUMIDITY (10-70%)	30	30	
TEST MEASUREMENTS :	**PRE-TEST DATA**	**POST-TEST DATA**	**PART 572 REQMT.**
TEST PROBE IMPACT VELOCITY, fps	7.0	6.9	6.86 - 7.14
PEAK HEAD RESULTANT ACCEL., g	108.5	94.9	95 - 118
PEAK HEAD LATERAL ACCEL., g	5.1	3.3	≤7
PULSE Δ TIME @ 50 g, ms	2.0	1.88	1.3 - 2.0

REMARKS:

Technician (s) Brian Swiecicki

Project Engineer (s) Robert Hathaway

Table 2

SUMMARY OF CHEST IMPACT TEST CALIBRATION DATA :

PRE-TEST / POST-TEST

CHILD DUMMY I. D. NO. 04

DATE OF CALIBRATION	4/26/96	5/20/96	
ROOM TEMPERATURE (66-78°F)	70	70	
ROOM RELATIVE HUMIDITY (10-70%)	30	30	
TEST MEASUREMENTS :	**PRE-TEST DATA**	**POST-TEST DATA**	**PART 572 REQMT.**
TEST PROBE IMPACT VELOCITY, fps	12.9	12.9	12.87-13.13
PEAK CHEST RESULTANT ACCEL., g	67.5	65.7	50-70
PEAK CHEST LATERAL ACCEL., g	1.8	4.9	≤5
PULSE Δ TIME @ 30 g, ms	3.75	3.88	2.5 - 4.0

REMARKS:

Technician (s) Brian Swiecicki

Project Engineer (s) Robert Hathaway

Table 3

SUMMARY OF LUMBAR FLEXION TEST DATA :

PRE-TEST / POST-TEST

CHILD DUMMY I. D. NO. 04

DATE OF CALIBRATION	4/26/94	5/20/96	
ROOM TEMPERATURE (66-78°F)	70	70	
ROOM RELATIVE HUMIDITY (10-70%)	30	30	
TEST MEASUREMENTS :	**PRE-TEST DATA**	**POST-TEST DATA**	**PART 572 REQMT.**
FORCE @ 40° FLEXION ANGLE, lbs.	41.5	46.5	34 - 47
SPINAL COLUMN ANGLE @ 3 MIN. POST TEST, degrees	2.5	3.5	≤5

REMARKS:

Technician (s) Brian Swiecicki

Project Engineer (s) Robert Hathaway

Table 4

SUMMARY OF HEAD-NECK PENDULUM TEST DATA :

PRE-TEST / POST-TEST

CHILD DUMMY I. D. NO. 04

DATE OF CALIBRATION		4/26/96	5/20/96	
ROOM TEMPERATURE (66-78°F)		70	70	
ROOM RELATIVE HUMIDITY (10-70%)		30	30	
TEST MEASUREMENTS :		**PRE-TEST DATA**	**POST-TEST DATA**	**PART 572 REQMT.**
PENDULUM IMPACT VELOCITY, fps		17.8	17.6	16 - 18
PEND. MIN./MAX. DECEL. OVER (t_3 - t_2), g		24.0	25.8	20 - 34
PEAK HEAD RESULT. ACCEL., g		25.16	27.38	≤ 30
PEND. DECEL. PULSE Δ TIME (t_2 - t_1), ms		4.0	2.23	≤ 4
PEND. DECEL. PULSE Δ TIME (t_3 - t_2), ms		18.73	18.11	18 - 21
PEND. DECEL. PULSE Δ TIME (t_4 - t_3), ms		4.46	3.1	≤ 5
HEAD ZERO POSITION TIME / PEND. REVERSAL TIME, ms		117.9/127.0	118.5/128.7	- / -
HEAD MAX. ROTATION ANGLE, degrees		79.3	79.93	76 - 92
TIME (ms) @ HEAD ROT. ANGLE :	0 deg.	0.0	0.0	-2 - +2
	30 deg.	24.43	24.68	17.3 - 24.7
	60 deg.	38.44	37.57	31.1 - 40.9
	Max.	60.02	58.78	55.0 - 69.0
	60 deg.	87.43	87.55	81.7 - 100.3
	30 deg.	102.93	103.55	97.4 - 118.6
	0 deg.	117.93	118.55	111.2 - 134.8
CHORDAL DISPLACEMENT (in) @ HEAD ROTATION ANGLE OF :	0 deg.	0.6	0.6	-0.8 - +0.8
	30 deg.	2.35	2.48	1.4 - 3.0
	60 deg.	4.32	4.33	3.5 - 5.1
	Max.	5.54	5.73	5.0 - 6.6
	60 deg.	4.31	4.39	3.5 - 5.1
	30 deg.	2.43	2.4	1.4 - 3.0
	0 deg.	0.16	0.17	-0.8 - +0.8

Technician (s) Brian Swiecicki

Project Engineer (s) Robert Hathaway

SECTION III

INSTRUMENT CALIBRATION

Prior to pre-test certification testing, all test instrumentation was recalibrated in accordance with the requirements and procedures described in TP-213-02 and Section 3.0, Instrumentation Calibration, of the Operating Test Procedure. Table 5 lists all of the applicable test equipment for each of the certification tests and the calibration dates.

Table 5

CERTIFICATION INSTRUMENTATION

Instrument[1]	Certification Test	Calibration Date	Due Date
Slide Potentiometer Oceanside Mfg. Co. Model LCP20-50 2.00 inches travel, 10,000 ohms	Neck Pendulum	12/95	6/96
C.G. Head Potentiometer Oceanside Mfg. Co. Model SP221 Serial HNR2 10K, linearity = 1.5%	Neck Pendulum	12/95	6/96
C.G. Pend. Potentiometer Oceanside Mfg. Co. 10K, linearity = 1.5%	Neck Pendulum	12/95	6/96
Bourns Potentiometer Model 3520S--1-502 5K +/-, linearity = 0.3%	Lumbar Spine Flexion	2/96	8/96
Transducer Inc. Load Cell S/N 20051, 50#	Lumbar Spine Flexion	2/96	8/96
Hewlett Packard 7035B X-Y Recorder +/- .02% Full Scale Accuracy	Lumbar Spine Flexion	7/95	7/96
Hewlett Packard 7045B X-Y Recorder +/- .02% Full Scale Accuracy	Lumbar Spine Flexion	7/95	7/96
Endevco Accelerometers			
S/N 160 +/- .075% Accuracy CEC 4-202	Neck Pendulum (ATD)	2/96	8/96

CERTIFICATION INSTRUMENTATION (cont'd)

Instrument[1]	Certification Test	Calibration Date	Due Date
Endevco Triaxial Accelerometers, 7267A :			
S/N BK60	Head Impact (ATD)	2/96	8/96
S/N BA42	Chest Impact (ATD)	2/96	8/96
Systron/Donner Counter +/- 1 count	Head Impact Chest Impact Neck Pendulum	3/96	3/97

[1]Pendulum velocity measurements for the Head Impact, Chest Impact and Neck Pendulum tests are measured by a Calspan-designed light beam velocity trap which consists of two .040 inch field stops placed 5.020 inches apart. This system includes General Electric light sources #SL520D6 and Texas Instruments photo diodes.

Prior to post-test certification testing, all test instrumentation was recalibrated in accordance with the requirements and procedures described in TP-213-02 and Section 3.0, Instrumentation Calibration, of the Operating Test Procedure. Table 6 lists all of the applicable test equipment for each of the certification tests and the calibration dates.

Table 6
CERTIFICATION INSTRUMENTATION

Instrument[2]	Certification Test	Calibration Date	Due Date
Slide Potentiometer Oceanside Mfg. Co. Model LCP20-50 2 inches travel, 10,000 ohms	Neck Pendulum	12/95	6/96
C.G. Head Potentiometer Oceanside Mfg. Co. Model SP221, S/N HNR2 10K linearity = 1.5%	Neck Pendulum	12/95	6/96
C.G. Pendulum Potentiometer Oceanside Mfg. Co. Model SP221, S/N HNR1 10K linearity = 1.5%	Neck Pendulum	12/95	6/96
Bourns Potentiometer Model 3520S--1-502 5K +/-, linearity = 0.3%	Lumbar Spine Flexion	2/96	8/96
Transducer Inc. Load Cell S/N 20051, 50#	Lumbar Spine Flexion	2/96	8/96
Hewlett Packard 7035B X-Y Recorder +/- .02% Full Scale Accuracy	Lumbar Spine Flexion	7/95	7/96
Hewlett Packard 7045B X-Y Recorder +/- .02% Full Scale Accuracy	Lumbar Spine Flexion	7/95	7/96
Endevco Accelerometers			
S/N 160 +/- .075% Accuracy CEC 4-202	Neck Pendulum (ATD)	2/96	8/96

CERTIFICATION INSTRUMENTATION (cont'd)

Instrument[2]	Certification Test	Calibration Date	Due Date
Endevco Triaxial Accelerometers, 7267A :			
S/N BK60	Head Impact (ATD)	2/96	8/96
S/N BA42	Chest Impact (ATD)	2/96	8/96
Systron/Donner Counter +/- 1 count	Head Impact Chest Impact Neck Pendulum	3/96	3/97

[2]Pendulum velocity measurements for the Head Impact, Chest Impact and Neck Pendulum tests are measured by a Calspan-designed light beam velocity trap which consists of two .040 inch field stops placed 5.020 inches apart. This system includes General Electric light sources #SL520D6 and Texas Instruments photo diodes.

APPENDIX A

CALIBRATION TEST PROCEDURES

1. Head Impact Test

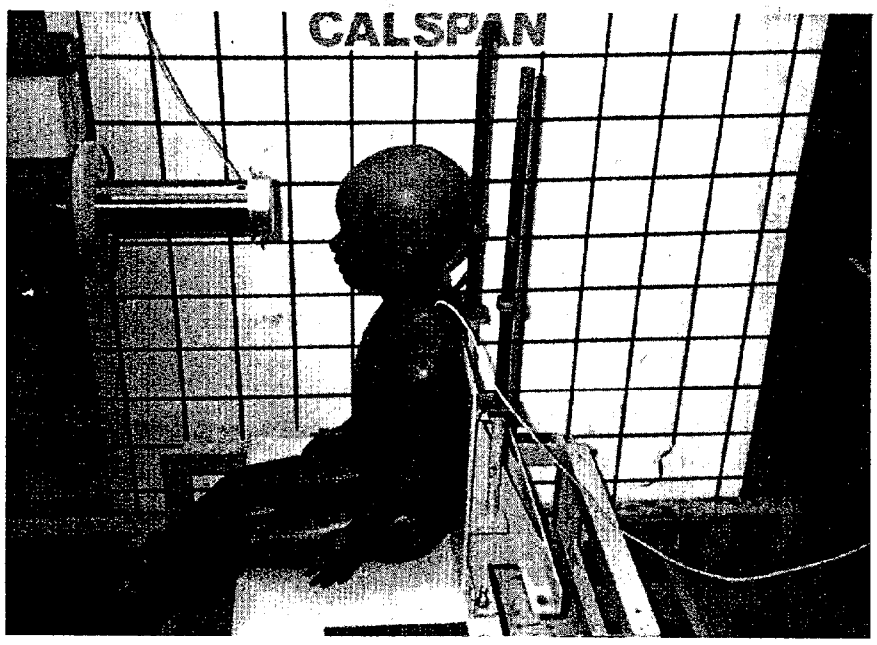
The Calspan linear impactor and the pre-impact position of the three-year-old size ATD are shown in Figure A-1. The impacting steel cylinder conforms dimensionally with the specifications of Part 572.21, Subpart C. Triaxial accelerometers are mounted in the head of the dummy and on the front of the cylinder. Impact velocity is measured by infrared photo reflective sensors located 6 cm apart at the rear of the impact cylinder.

The ATD head impact point is determined by aligning the center of the impact 2.9 inches below the top of the head. The flat front face of the probe is positioned adjacent to the ATD head impact point, and the light beam velocity trap is positioned with the probe interrupter at the second field stop. A dummy back support, 12.4 inches high, is employed in this test. The impactor is then pressurized to a pre-determined setting and fired. The impactor's travel is controlled by ball bearing guides encased in a metal cylinder.

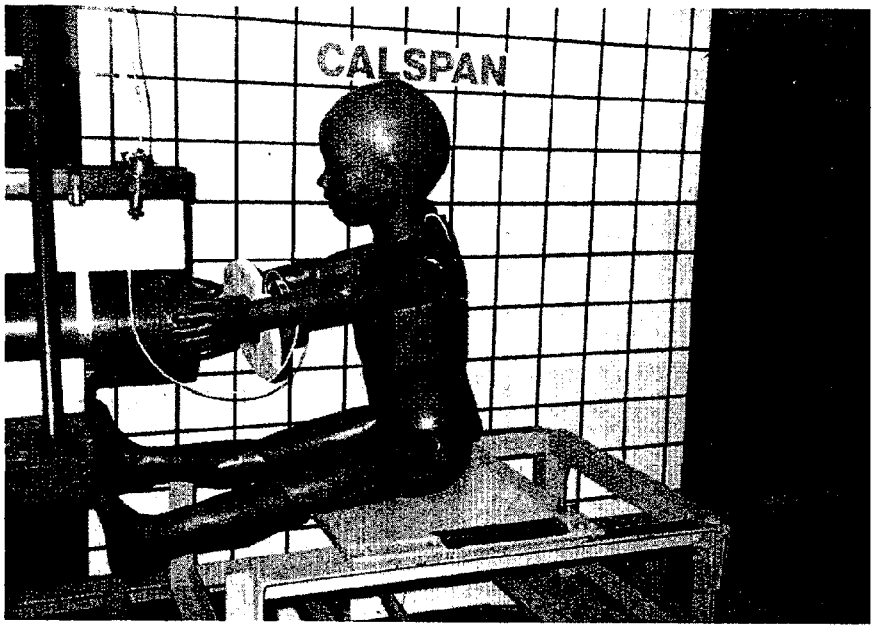
Impactor velocity is immediately available on the EPUT meter and is also recorded electronically for a permanent record. All data is collected on analog tape and played back on brush recordings for quick turnaround data analysis. All head impact data traces are on file at the Calspan Dummy Certification Laboratory.

2. Chest Impact Test

The pre-test chest impact setup is also shown in Figure A-1. The same impactor is used for both head and chest impact certification tests. The chest impact point is determined by seating the ATD against a rigid back surface with the chest skin jacket removed. A measurement is taken from the seating surface to the longitudinal centerline of the bolt attaching the top of the rib cage sternum to the thoracic spine box. The chest skin is then replaced and marked at a position 1.5 inches below the initial measurement.



(a) HEAD IMPACT TEST



(b) CHEST IMPACT TEST

Figure A-1 SETUPS FOR HEAD AND CHEST IMPACT TESTS

The ATD is seated on the teflon seating surface and adjusted to allow the striking mass face surface to be approximately tangent to the most vertical surface of the chest. The accelerator is then pressurized to a pre-determined setting and fired.

Data is collected in the same manner as the head impact test. All data traces are on file at Calspan's Dummy Certification Laboratory.

3. Lumbar Spine Flexion Test

The lumbar spine flexion test apparatus is shown in Figure A-2. The pulley is positioned so that the applied force is perpendicular to the thoracic spine box when the lumbar spine reaches 40 degrees of flexion.

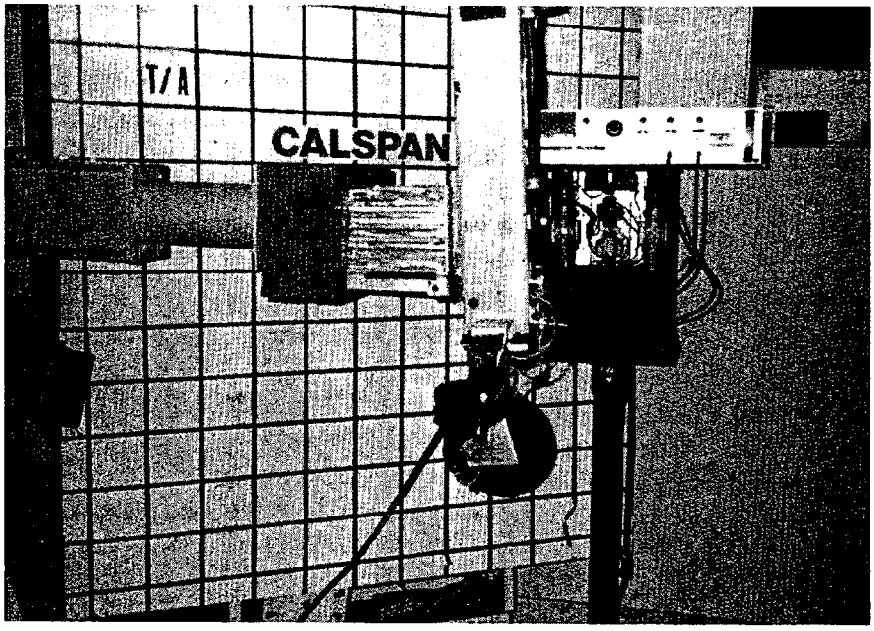
The ATD lower torso and upper legs are bolted to the seating surface after the neck has been replaced with a cylindrical aluminum adapter. A pull force is applied to the ATD neck adapter, through a load cell, at a continuously monitored deflection rate of between 0.5 and 1.5 degrees per second by cranking the cable through the pulley systems until 40 degrees of flexion is reached. This flexion angle is maintained for 10 seconds, the cable is cut to rapidly release the force, and the torso return angle is recorded after 3 minutes.

Rotation vs. time and flexion angle vs. force are plotted concurrently. The force required to flex the torso forward to a 40 deg. angle is recorded. Torso return angle is indicated on the flexion angle plot by a straight line through the ordinate. These plots are on file at Calspan's Dummy Certification Laboratory.

4. Neck Pendulum Test

The pendulum impact test apparatus used for neck certification tests is shown in Figure A-2. The inertial and dimensional properties of the rigid pendulum conform to the requirements of Part 572, Subpart C, and TP-213-02, Appendix No. 1.

(a) LUMBAR SPINE FLEXION TEST



(b) NECK PENDULUM TEST

Figure A-2 SETUPS FOR LUMBER SPINE FLEXION AND NECK PENDULUM TESTS

The ATD head and neck are mounted on the bottom of the pendulum as required (Calspan performs all neck certification tests with the appropriate ATD head attached), and the pendulum is raised and released from a pre-determined height required to achieve the desired impact velocity. The pendulum is decelerated by a block of aluminum honeycomb. Velocity is measured by means of the light beam velocity trap. The light beam interrupter is located a known distance below the center of the pendulum accelerometer in order to preclude any interference between the interrupter and the honeycomb. The velocity trap reading is corrected for this distance so the recorded velocity is that of the center of the accelerometer.

The three potentiometers, mounted on the right side of the head, are arranged to measure the linear and angular geometric components required for computation of the chordal displacements and head rotation angles. The voltage outputs of these three potentiometers are processed by the analog circuitry depicted in Figure A-3 which provides complete time histories of chordal displacement and head rotation angle. These time histories are plotted simultaneously on a brush recorder, along with a common timing trace, thus allowing for accurate correlation between chordal displacement, head rotation angle and time. These brush records are on file at Calspan's Dummy Certification Laboratory.

An electronic time zero switching device is attached to the pendulum/honeycomb contact point on the pendulum. Time zero is electronically recorded at the time of pendulum/honeycomb contact and pendulum reversal time is recorded at the end of the pendulum/honeycomb contact. These times are also plotted on a brush record concurrent with the chordal displacement and head rotation angle. This brush record allows for immediate determination of pendulum reversal time to head zero position time.