REPORT NUMBER: CAL-91-N14

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NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

FORD MOTOR COMPANY
1991 FORD TAURUS
4-DOOR WAGON

NHTSA NUMBER: MM0203

CALSPAN TEST NUMBER: 7893-10

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

April 25, 1991

FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Market Incentives
400 Seventh Street, S.W.
Room No. 5313 (NRM-20)
Washington, DC 20590

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15. Supplementary Notes

16. Abstract

A frontal load cell barrier test of a 1991 Ford Taurus 4-Door Station Wagon was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York on April 25, 1991.

The impact speed was 35.0 mph and the ambient temperature at the barrier face at the time of impact was 55°F. The maximum post-test vehicle crush was 20.9 inches. The test vehicle was equipped with a 3-point continuous belt system at each of the front outboard seating positions. The vehicle was also equipped with a driver side airbag as a supplemental restraint device.

With regard to FMVSS 208 "Occupant Crash Protection," injury criteria, both the driver and passenger dummies appear to satisfy the head, chest and femur requirements.

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Section 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 90 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-02121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

Section 2

SUMMARY OF TEST NUMBER MM0203

A load cell barrier consisting of 36 load cells was impacted by a 1991 Ford Taurus 4-Door Station Wagon at a velocity of 35.0 mph. The test was performed at the Calspan Corporation Advanced Technology center on April 25, 1991. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 320) was used in two previous tests (MM0202 and MM5302) and the passenger ATD (Serial No. 358) was used in tests (MM5102 and MM5302). The Injury Criteria Values were not exceeded in any previous test. Certification details, along with instrumentation calibration data, can be found in Appendices C and D.

The 67 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Accelerometer #5 (X), located on the Right Disc Brake Caliper, sustained a cut wire at approximately 104 milliseconds. Position 1 Belt Elongation potentiometer did not record accurately during test.

The driver's HIC was 480.4. The maximum chest deceleration over 3 milliseconds was 44.1 g's and femur loads were 1900.6 and 1593.5 pounds.

The right front passenger's HIC was 258.2 and maximum chest deceleration over 3 milliseconds was 38.4 g's. Femur loads were 327.5 and 707.8 pounds.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1991 Ford Taurus 4-Door Wagon

NHTSA No.: MM0203 VIN.: 1FACP55U7MG101895

Body Color: Silver Date Of Manufacture: August 1990

Engine: 6 Cylinders; - C.I.D.; 3.0 Liters; - CC
X Gas; - Diesel; - Turbocharged
- Longitudinal; X Transverse

Transmission: 3 Speed; - Manual; X Automatic; X Overdrive

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

Date Received: 2-19-91 Odometer Reading: 67 miles

X A/C; X P/S; X P/B; - P/wdo.; X Tilt Wheel
- P/seats; X Cruise Control

Type of Occupant Restraint: 3-point continuous belt system with driver side airbag.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 35 psi, Rear 35 psi

Recommended Tire Size: P205/70R14

Recommended Cold Tire Pressure: Front 35 psi, Rear 35 psi

Tires on Vehicle: P205/70R14 ; Manufacturer: Goodyear

Number of Occupants: 3 Front; 3 Rear; - 3rd Seat; 6 TOTAL

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

Type of Front Seat Back: - Fixed X Adj. With X Lever - Rot. Knob

Vehicle Capacity Weight (VCW) = 1200 lbs. (A)

No. of Occupants x 150 lbs. = 900 lbs. (B)

Rated Cargo and Luggage
Weight (RCLW) A-B = 300 lbs.

GVWR 4870 lbs. GAWR: Front 2470 lbs. Rear 2400 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 980 lbs. Right Rear = 650 lbs.

Left Front = 1000 lbs. Left Rear = 660 lbs.

TOTAL FRONT WEIGHT = 1980 lbs. (60.2 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1310 lbs. (39.8 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 3290 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3290 lbs.)

VCW = Vehicle Capacity Weight (1200 lbs.)

DSC = Designated Seating Capacity (6)

RCLW = VCW - 150 (DSC) = 300 lbs.

Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)

Target Test Weight = 3918 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 292 POUNDS CARGO:

Right Front = 1060 lbs. Right Rear = 900 lbs.

Left Front = 1060 lbs. Left Rear = 890 lbs.

TOTAL FRONT WEIGHT = 2120 lbs. (54.2 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1790 lbs. (45.8 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3910 lbs.

Weight of ballast secured in vehicle trunk area = 135 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.7 LF 27.6 RR 24.6 LR 24.5

Test Attitude: RF 27.7 LF 27.7 RR 22.4 LR 22.6

Wheel Base: 106.3 in.; C.G. = 48.7 in. rearward of front wheel C/L.

Remarks: 14.9 gallons of stoddard solution was placed in the fuel tank.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0°

Date of Test: April 25, 1991 Time of Test: 11:45

Ambient Temperature: 55 °F at impact area

Temperature in Occupant Compartment: 70 °F

Windshield Molding Temperature: 70 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 35.0 mph, secondary = 34.9 mph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 52 inches

Exiting Speed Trap: 12 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length:						
	Pre-test	= R	187.2	C_L 191.5	L	187.1
	Post-test	= R	167.3	C_L 170.6	L	168.5
	Crush	= R	19.9	C_L 20.9	L	18.6

Distance from front of test vehicle to point of impact:

R 14.7 C_L 12.8 L 15.7

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Sun Visor and Air Bag	No Contact
Chest	Air Bag	No Contact
Abdomen	No Contact	No Contact
Left Knee	Dash Panel	Glove Box
Right Knee	Dash Panel	Glove Box

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	Front		Rear	
	Left	Right	Left	Right
Door Opening	operable	operable	operable	operable

	Front		Rear	
Seat Movement	Left	Right	Left	Left
Seat Back Failure	None	None	-	-
Seat Shift (in.)	0.0	0.0	-	-

Glazing Damage

Backlight/Windshield: The windshield sustained stress fractures but remained intact.

Other Notable Impact Effects: None.

Section 3

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Driver Dummy to Steering Column Dimensions
6. Camera Locations
7. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data
3. Test Vehicle Measurements

Table 2

DUMMY INJURY CRITERIA VALUES

NHTSA No.: MM0203 Vehicle: 1991 Ford Taurus 4-Door Station Wagon

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-51.1	-27.3	33.6	58.4
Position #2 - Passenger	-24.8	11.9	37.6	42.4

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-45.4	-11.3	-12.2	44.1
Position #2 - Passenger	-42.3	11.8	-10.6	38.4

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

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	1900.6	1593.5
Position #2 - Passenger	327.5	707.8

	MAXIMUM FORCE - SEAT BELT LOADS (lbs.)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	1245.9	-	653.9
Position #2 - Passenger	1789.2	1124.4	-

	HEAD INJURY CRITERIA (HIC)			
	HIC	t_1 (SEC)	t_2 (SEC)	Average Acceleration t_1 TO t_2
Position #1 - Driver	480.4	.05868	.09288	45.6
Position #2 - Passenger	258.2	.07080	.10668	34.9

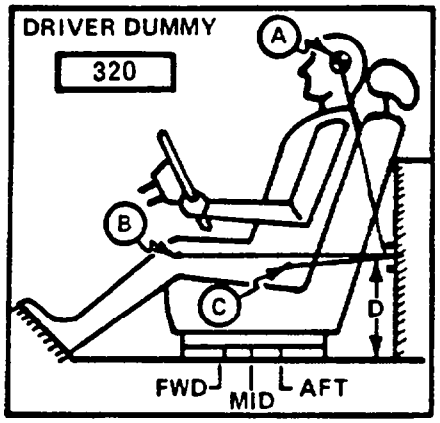
HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

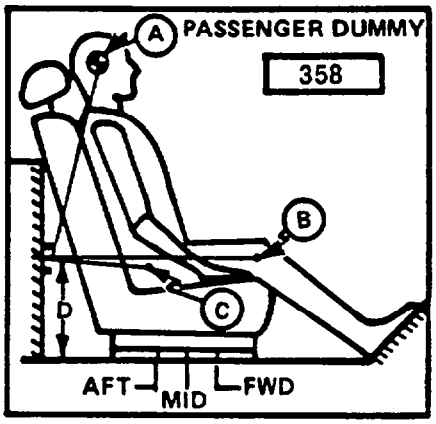
Test No.: MM0203 Vehicle: 1991 Ford Taurus 4-Door Station Wagon

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

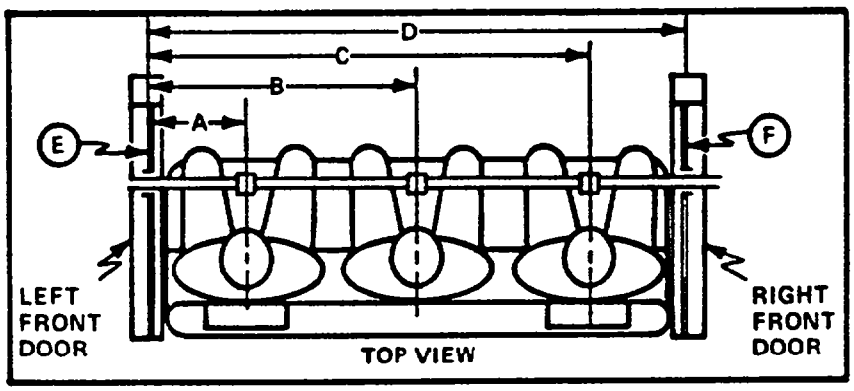


MEASUREMENT LOCATION

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



A =	20.5 in.	5 Degrees	A =	20.2 in.	2 Degrees
B =	22.3 in.	100 Degrees	B =	21.8 in.	100 Degrees
C =	7.8 in.	135 Degrees	C =	8.0 in.	135 Degrees
D =	13.6 in.		D =	13.6 in.	



DUMMY ID

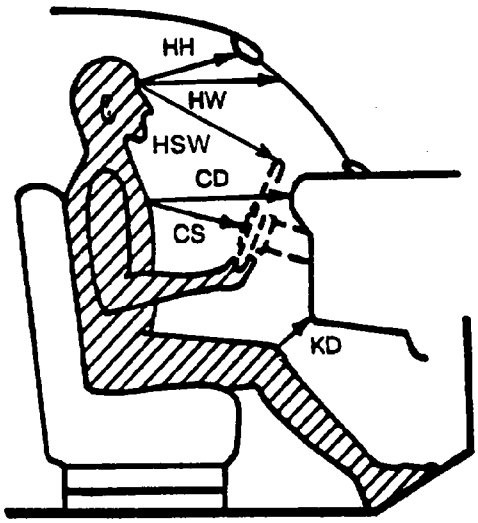
S/N 320 S/N 358

A =	Left Door to Driver Centerline	12.7	in.
B =	Left Door to Center Passenger Centerline	-	in.
C =	Left Door to Right Passenger Centerline	41.4	in.
D =	Left Door to Right Door	53.6	in.
E,F =	Window Glass Height (Right and Left Must Be Equal)	12.0	in.

Figure 2

OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	13.4	13.8
HW	18.1	18.4
CD	21.8	22.3
CS	12.8	–
KDL	5.2	5.9
KDR	5.8	5.9
SA	See Note	See Note
TA	22°	22°
HSW	18.5	–



HH = Head to Windshield Header

HW = Head to Windshield

HSW = Head to Steering Wheel

CD = Chest to Dash

CS = Chest to Steering Wheel

KD(L/R) = Knee to Dash (Left/Right)

SA = Seat Back Angle

TA = Torso Angle

HA = Head Target to "A" Pillar

HR = Head to Side Roof

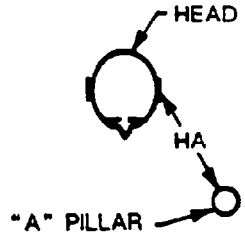
HS = Head to Side Window

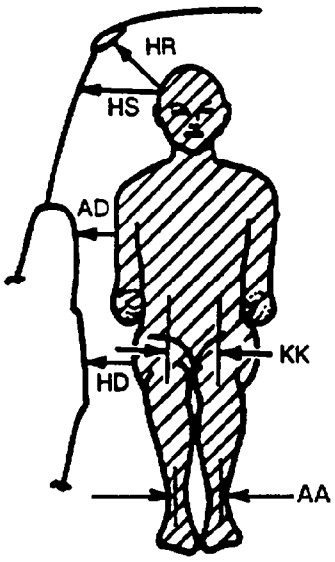
AD = Arm to Door

HD = Hip to Door

KK = Knee to Knee

AA = Ankle to Ankle



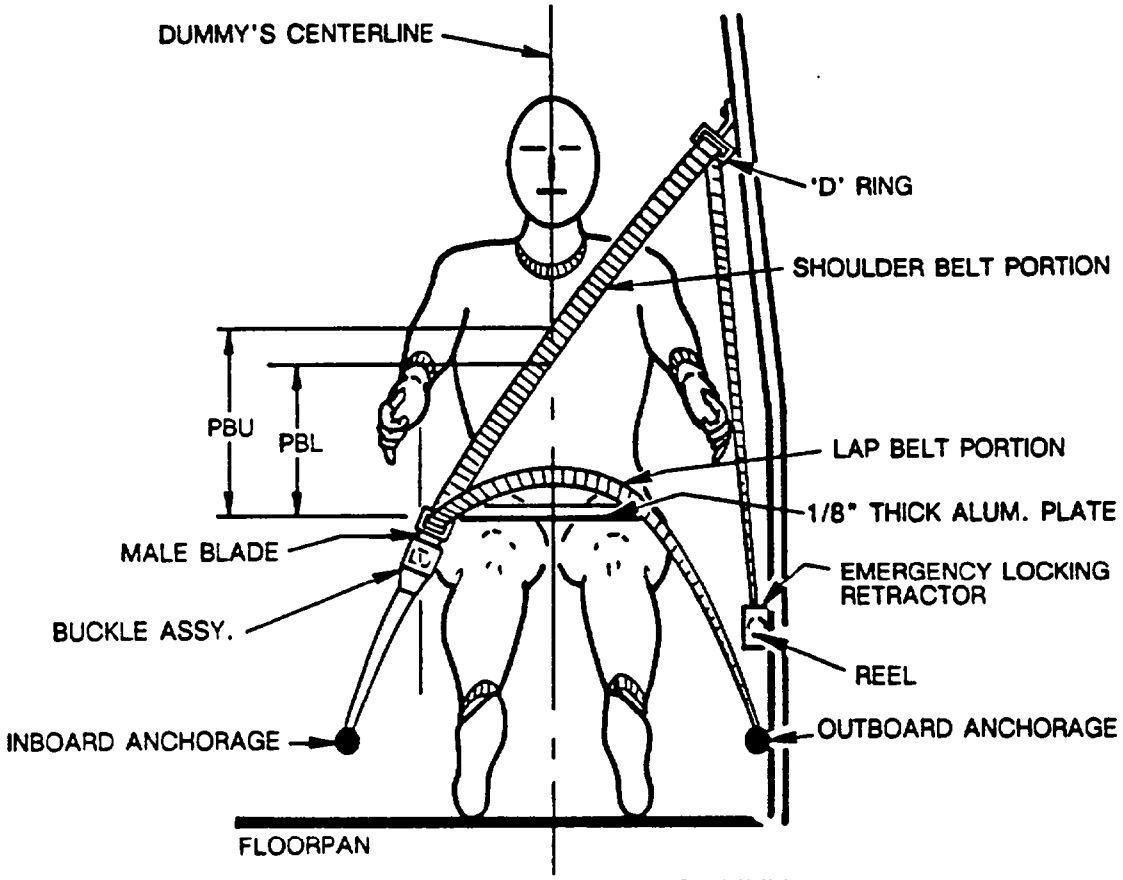


	DRIVER	PASSENGER
HR	5.9	5.9
HS	9.7	9.2
AD	5.1	5.1
HD	7.4	6.8
KK	9.6	8.5
HA	18.7	19.5
AA	12.1	8.5

Note: Seat back was positioned according to manufacturer's specifications

Figure 3

SEAT BELT POSITIONING DATA



FRONT VIEW OF DRIVER DUMMY

	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	13.6	13.7
PBL -- Top surface of alum. plate to belt lower edge	10.6	10.7
LAP BELT TENSION	2.0 lbs.	2.0 lbs.
SHOULDER BELT TENSION	-	-

Table 3

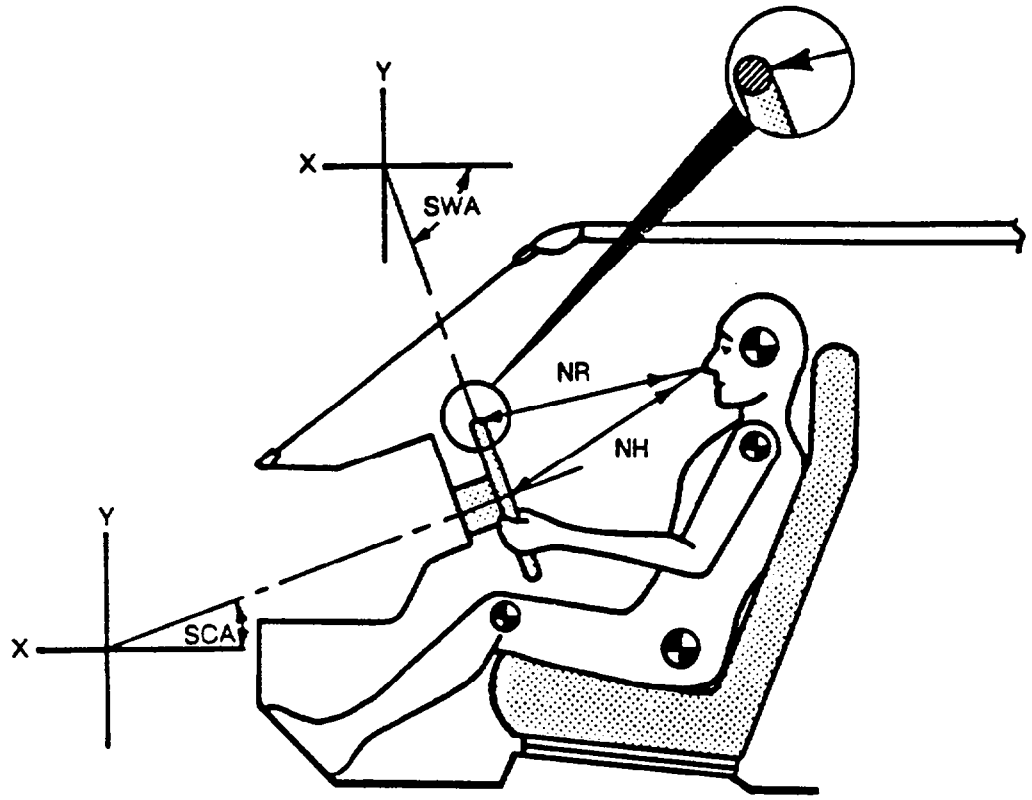
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	69.5	69.5
Shoulder belt length as measured on Part 572 Dummy.	33.0	33.0
Lap belt length as measured on Part 572 Dummy.	26.0	26.0
LAP BELT SPOOL-OFF DATA:		
As determined by film analysis.	2.5"	2.5"
As determined mechanically.	1.7"	2.2"
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	* in/ft	0.62 in/ft
Measured mechanically	0.0 in/ft	0.0 in/ft

*Driver belt elongation potentiometer did not record accurately during test, therefore, a belt stretch measurement is not possible.

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



LEFT SIDE VIEW

	MEASUREMENTS	
NR -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	16.6	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	17.3	Inches
SCA -- Angle of steering column relative to the horizontal X axis	22.0	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-68.0	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

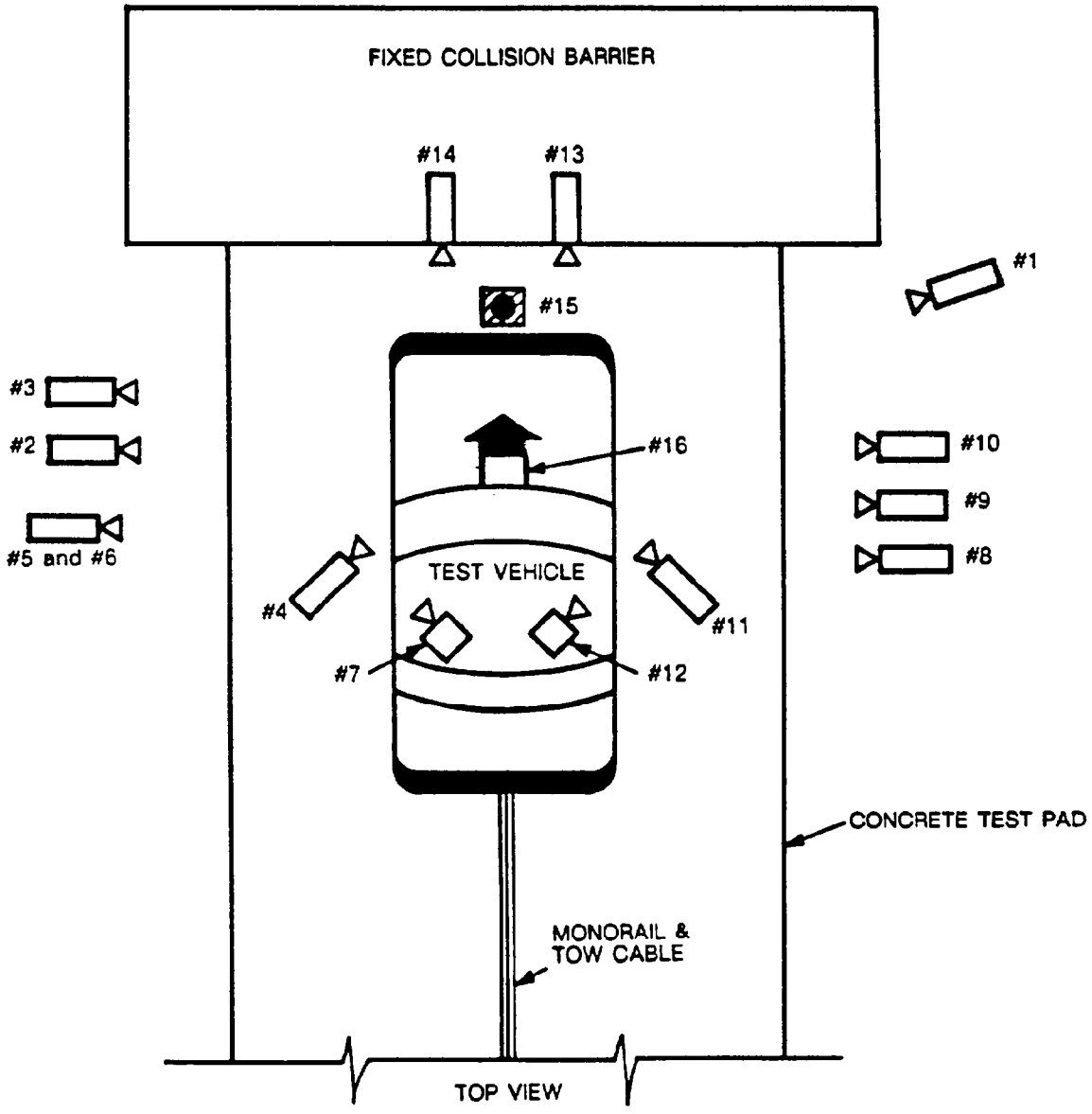


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Table 4

HIGH-SPEED CAMERA LOCATIONS

Test No. MM0203 Vehicle: 1991 Ford Taurus 4-Door Station Wagon

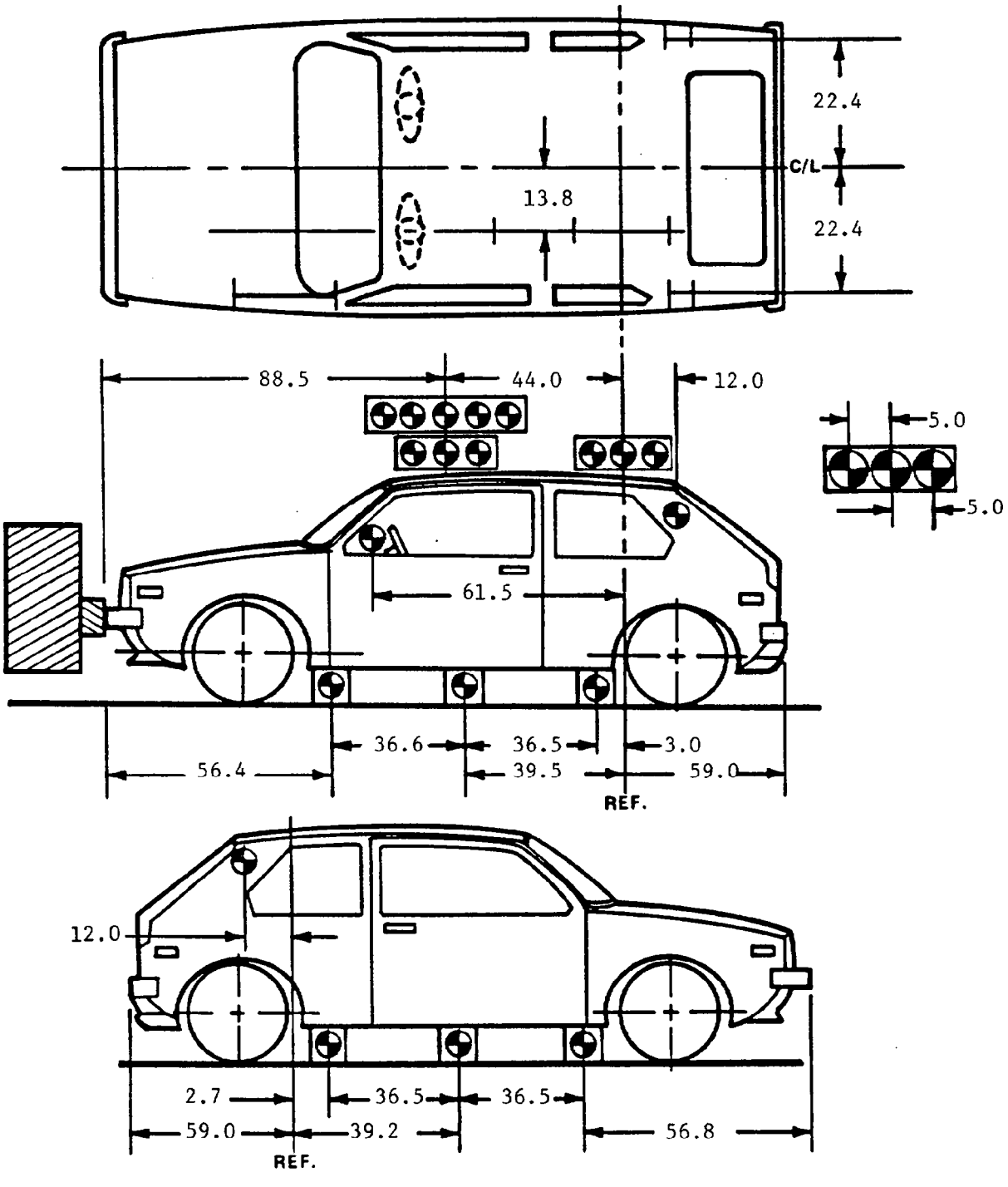
CAMERA NO.	VIEW	CAMERA POSITIONS (in)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	–	–	–	–	–	–	24
2	Overall Left Side	228	59	42	-5	211.2	13	550
3	Left Side View	301	30	41	-4	284.2	25	570
4	Driver and Interior View	108	102	70	-17	91.2	13	650
5	Steering Column (Bottom)	277	71	46	-5	260.2	25	550
6	Steering Column (Top)	277	71	70	-10	260.2	25	565
7	Left Belt	–	–	–	–	–	8	685
8	Overall Right Side	239	71	42	-2	222.2	13	N.T.
9	Right Side View	296	58	41	-3	279.2	25	630
10	Right Passenger View	302	74	54	-4	285.2	35	530
11	Passenger and Interior View	102	105	66	-13	85.2	25	540
12	Right Belt	–	–	–	–	–	8	540
13	Passenger Front View	24	-6	72	-37	–	13	N.T.
14	Driver Front View	24	-6	72	-37	–	13	N.T.
15	Windshield View	0	0	125	-45	–	13	550
16	Pit View of Engine	0	33	-120	90	–	13	700

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

N.T. = No Timing

Figure 6

VEHICLE TARGET LOCATIONS

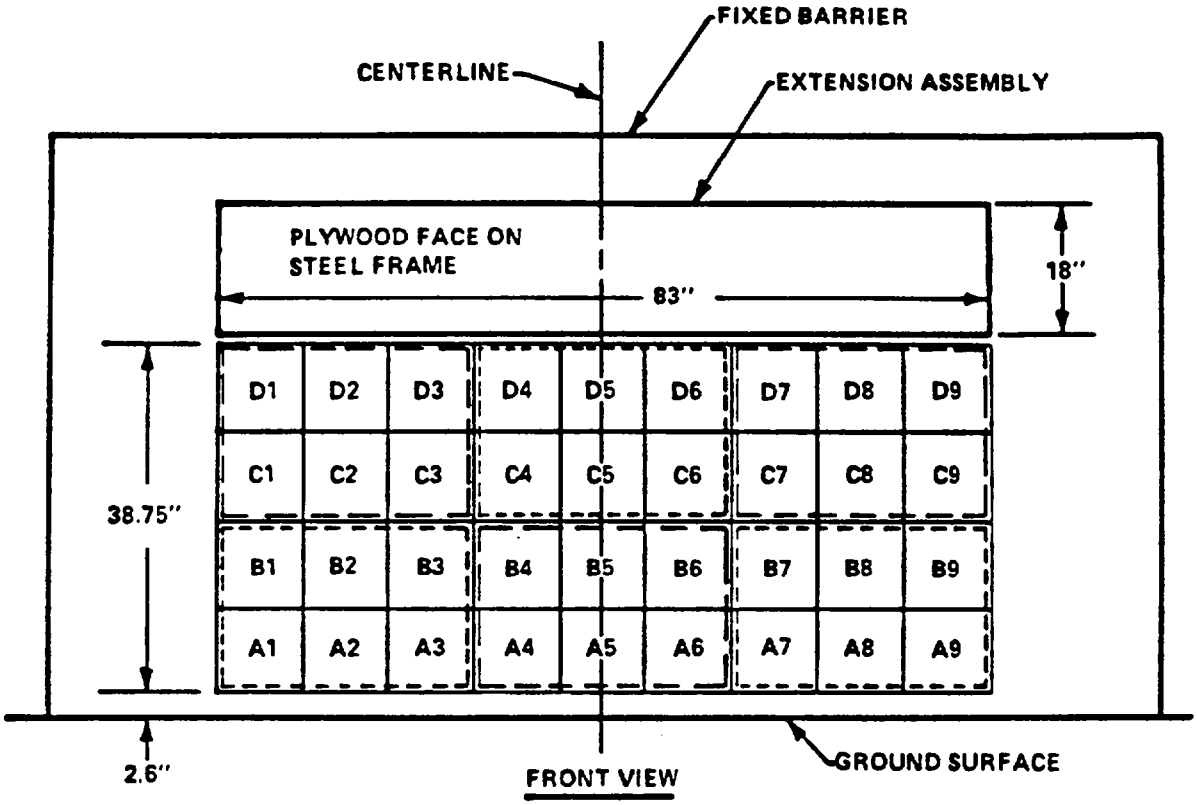


(DIMENSIONS IN INCHES)

Figure 7

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

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

The following data is presented in Appendix B:

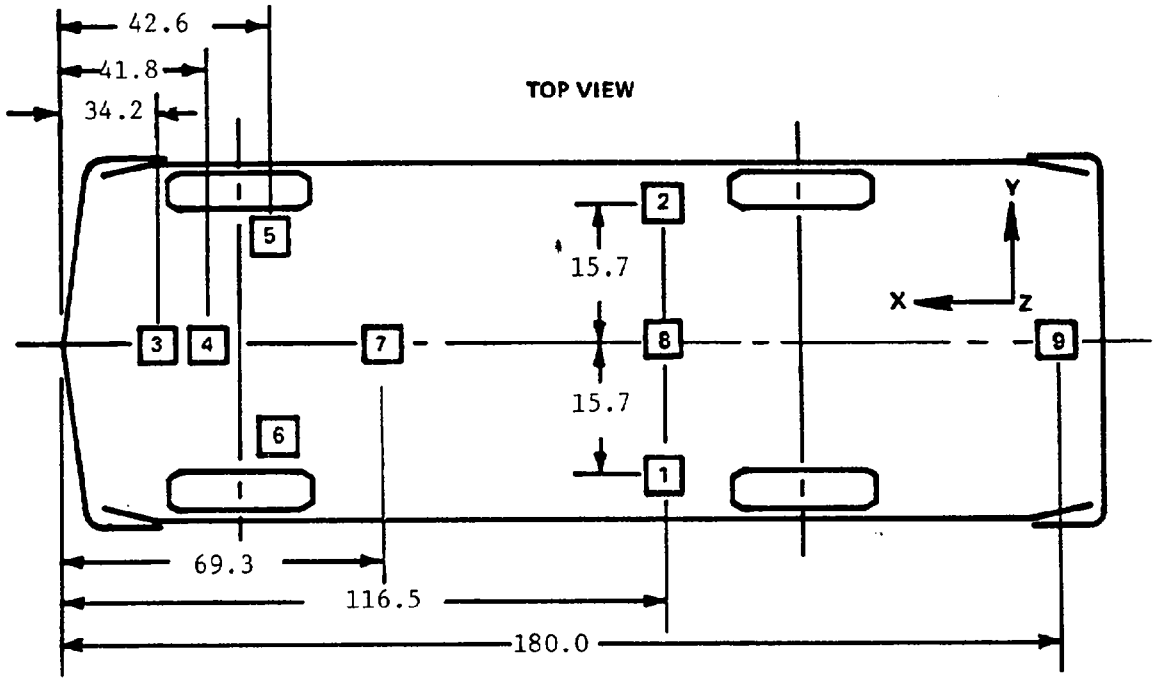
(1) Data from 36 individual load cells

(2) Total or Sum of 36 individual load cells

(3) Data from 6 Groupings shown above (6 cells/group)

Figure 8

VEHICLE ACCELEROMETER LOCATIONS



(All Measurements in Inches)

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

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

Figure 9

TEST VEHICLE MEASUREMENTS

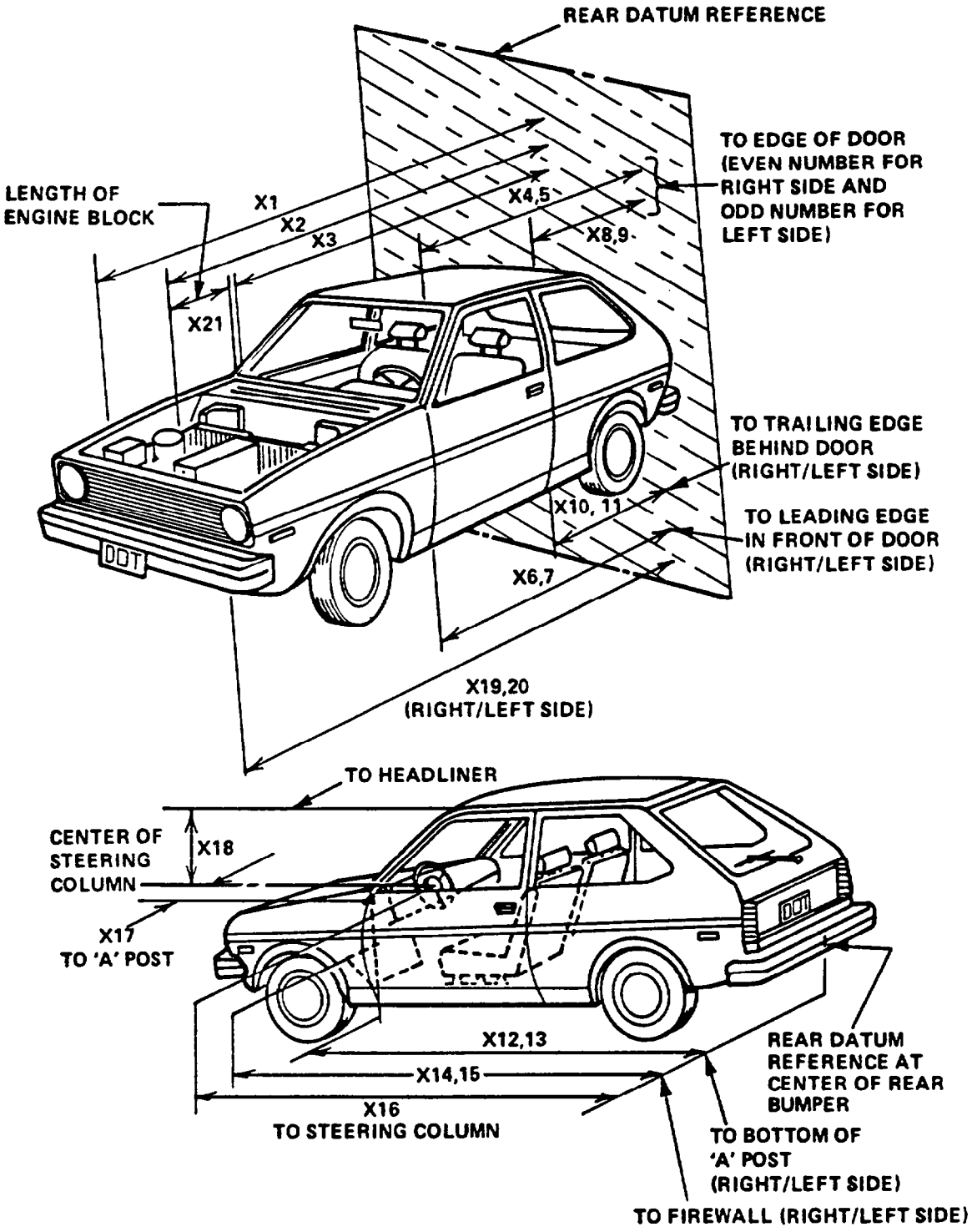


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Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	191.5	170.6	20.9
X2	Rear Surface of Vehicle to Front of Engine	170.2	160.0	10.2
X3	Rear Surface of Vehicle to Firewall	148.0	139.7	8.3
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	133.8	132.9	0.9
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	133.2	133.5	-0.3
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	131.2	130.4	0.8
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	130.5	133.0	-2.5
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	91.5	90.8	0.7
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	90.6	91.4	-0.8
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	90.3	89.6	0.7
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	89.5	90.1	-0.6
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	131.6	130.9	0.7
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	131.3	131.8	-0.5
X14	Rear Surface of Vehicle to Firewall, Right Side	144.5	139.2	5.3
X15	Rear Surface of Vehicle to Firewall, Left Side	143.8	140.7	3.1
X16	Rear Surface of Vehicle to Steering Column	113.3	113.8	-0.5
X17	Center of Steering Column to "A" Post	16.4	13.2	3.2
X18	Center of Steering Column to Headliner	15.5	13.3	2.2
X19	Rear Surface of Vehicle to Right Side of Front Bumper	187.2	167.3	19.9
X20	Rear Surface of Vehicle to Left Side of Front Bumper	187.1	168.5	18.6
X21	Length of Engine Block	16.5	16.5	0.0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	122.0	121.3	0.7
CD	Rear Surface of Vehicle to Center of Dash Panel	122.0	119.9	2.1
LD	Rear Surface of Vehicle to Left Side of Dash Panel	120.9	121.4	-0.5

Appendix A

PHOTOGRAPHS

PHOTOGRAPHS

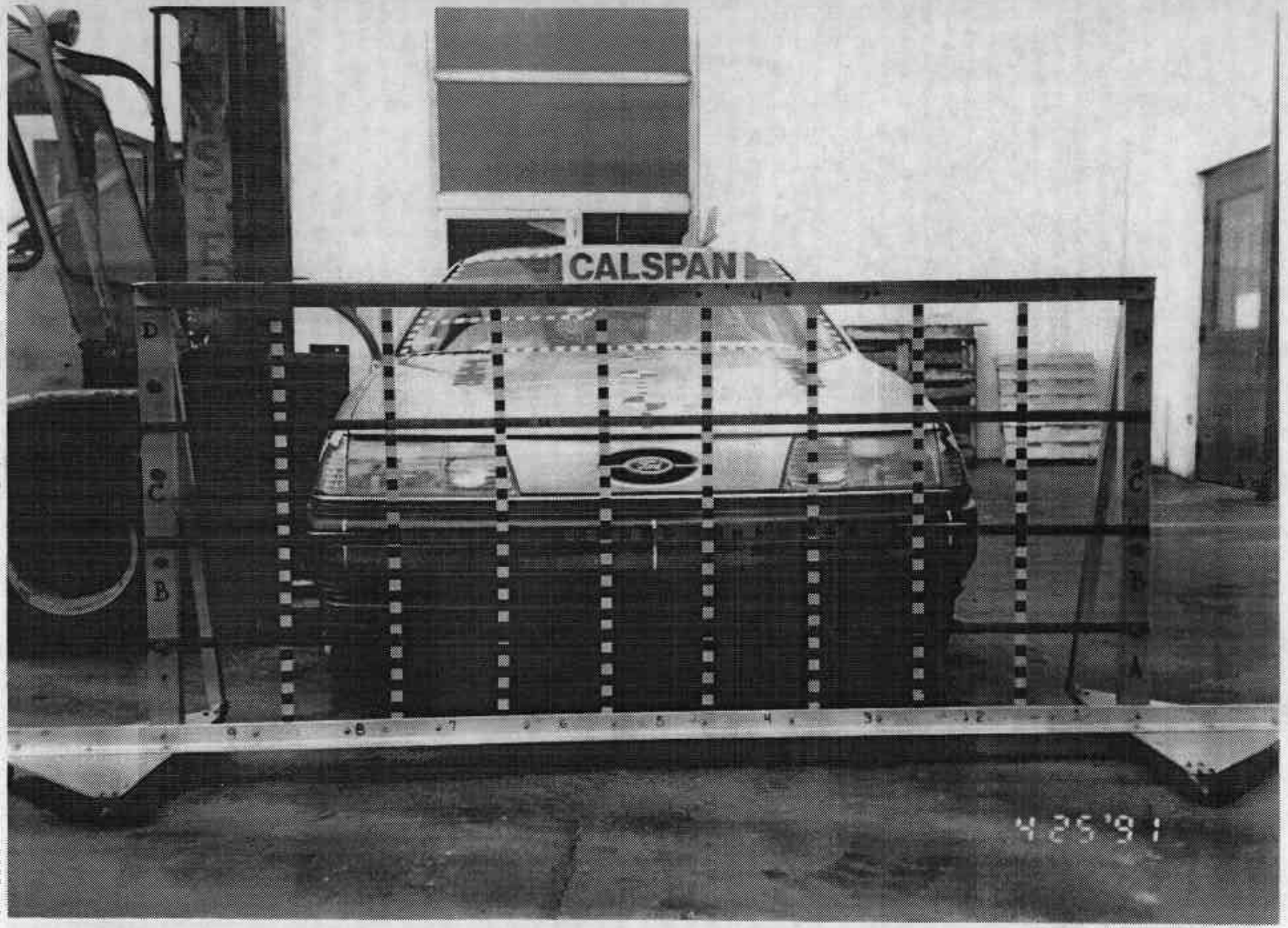


Figure A-1 LOAD CELL LOCATIONS

7893-10

Figure A-2 PRE-TEST FRONT VIEW

Figure A-3 POST TEST FRONT VIEW

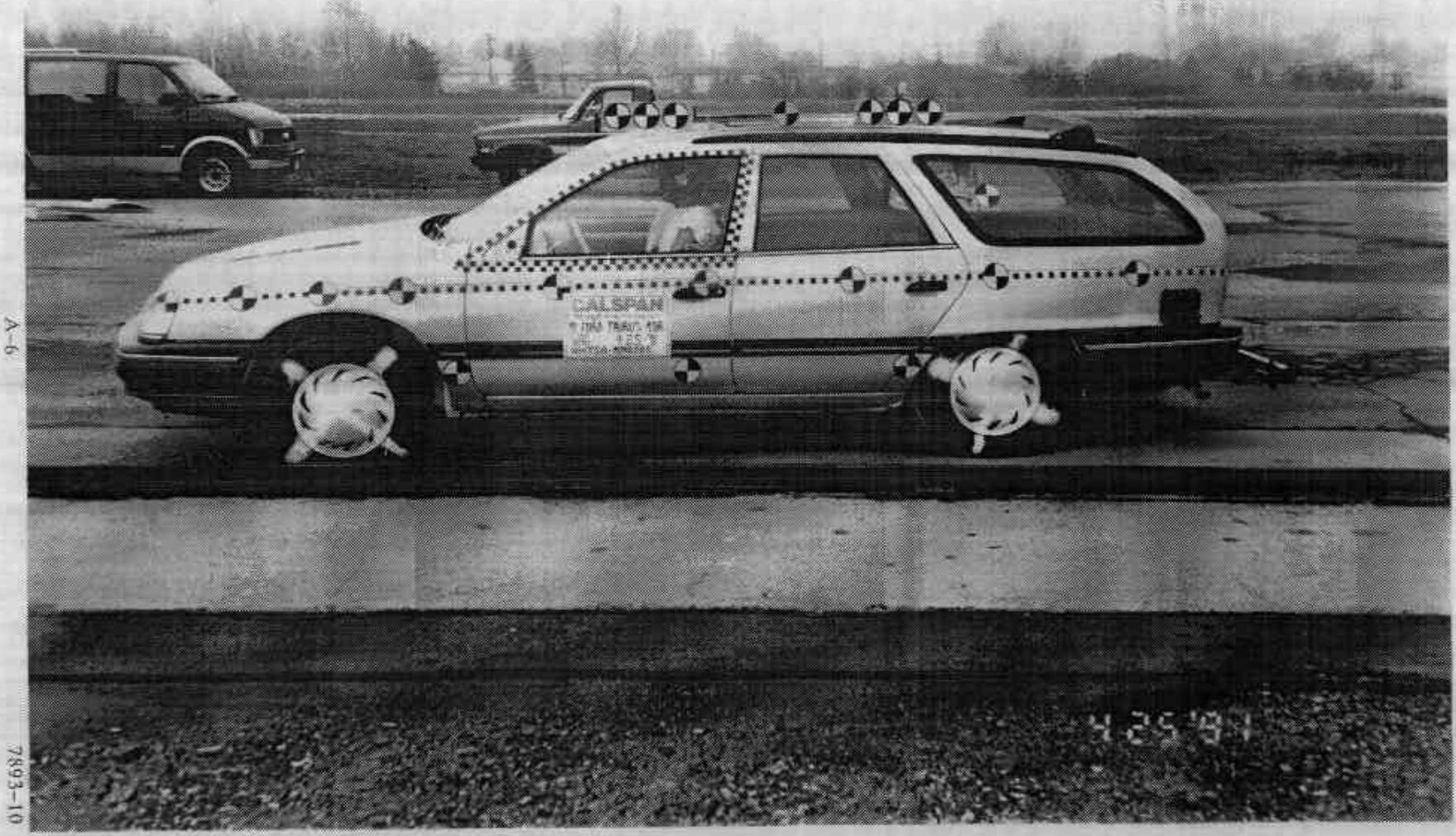


Figure A-4 PRE-TEST LEFT SIDE VIEW

7893-10

Figure A-5 POST TEST LEFT SIDE VIEW

7893-10

Figure A-6 PRE-TEST RIGHT SIDE VIEW

Figure A-7 POST-TEST RIGHT SIDE VIEW

7893-10

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

A-11

7893-10

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

A-12

7893-10

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

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

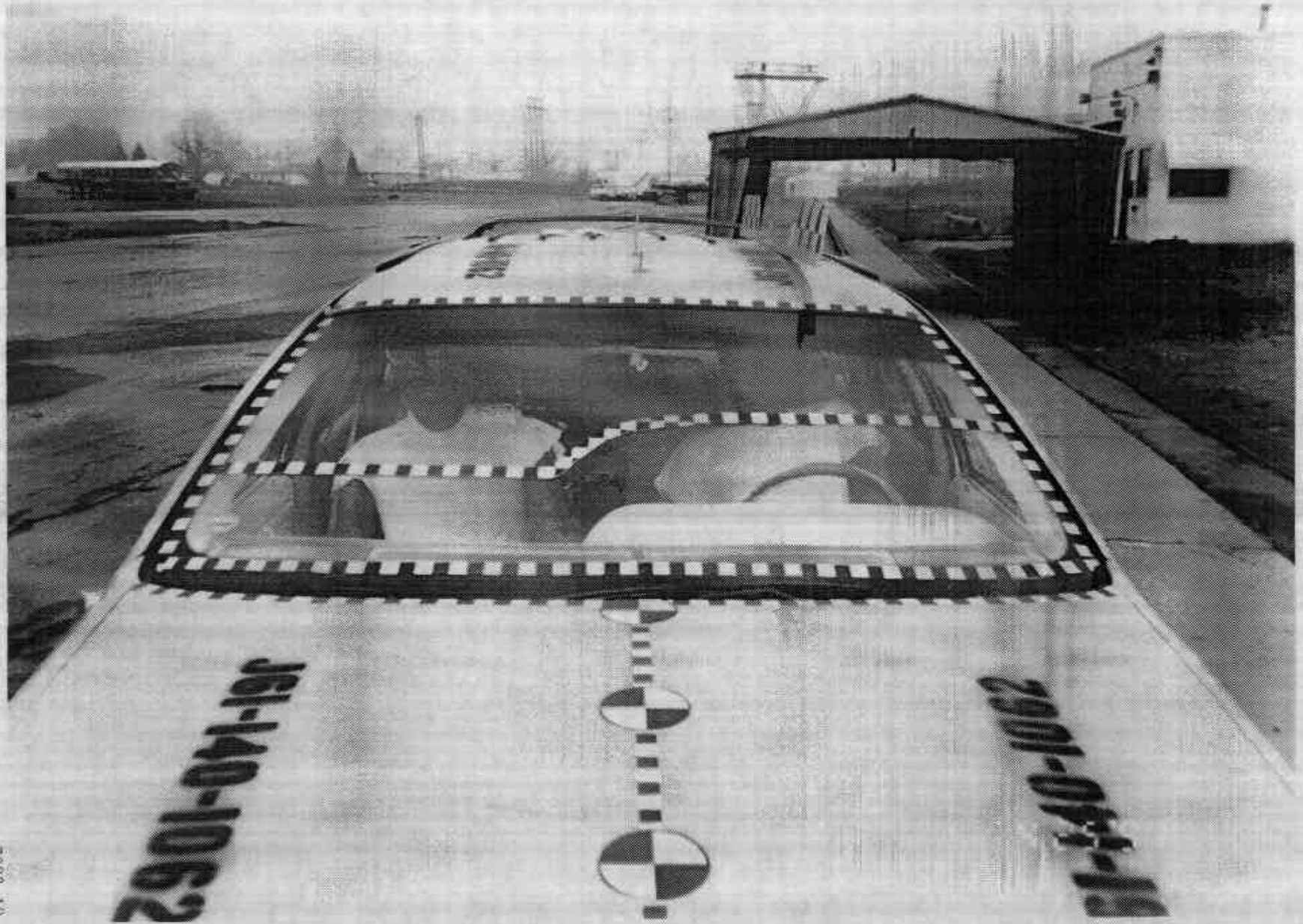


Figure A-12 PRE-TEST WINDSHIELD VIEW

Figure A-13 POST-TEST WINDSHIELD VIEW

7893-10

Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

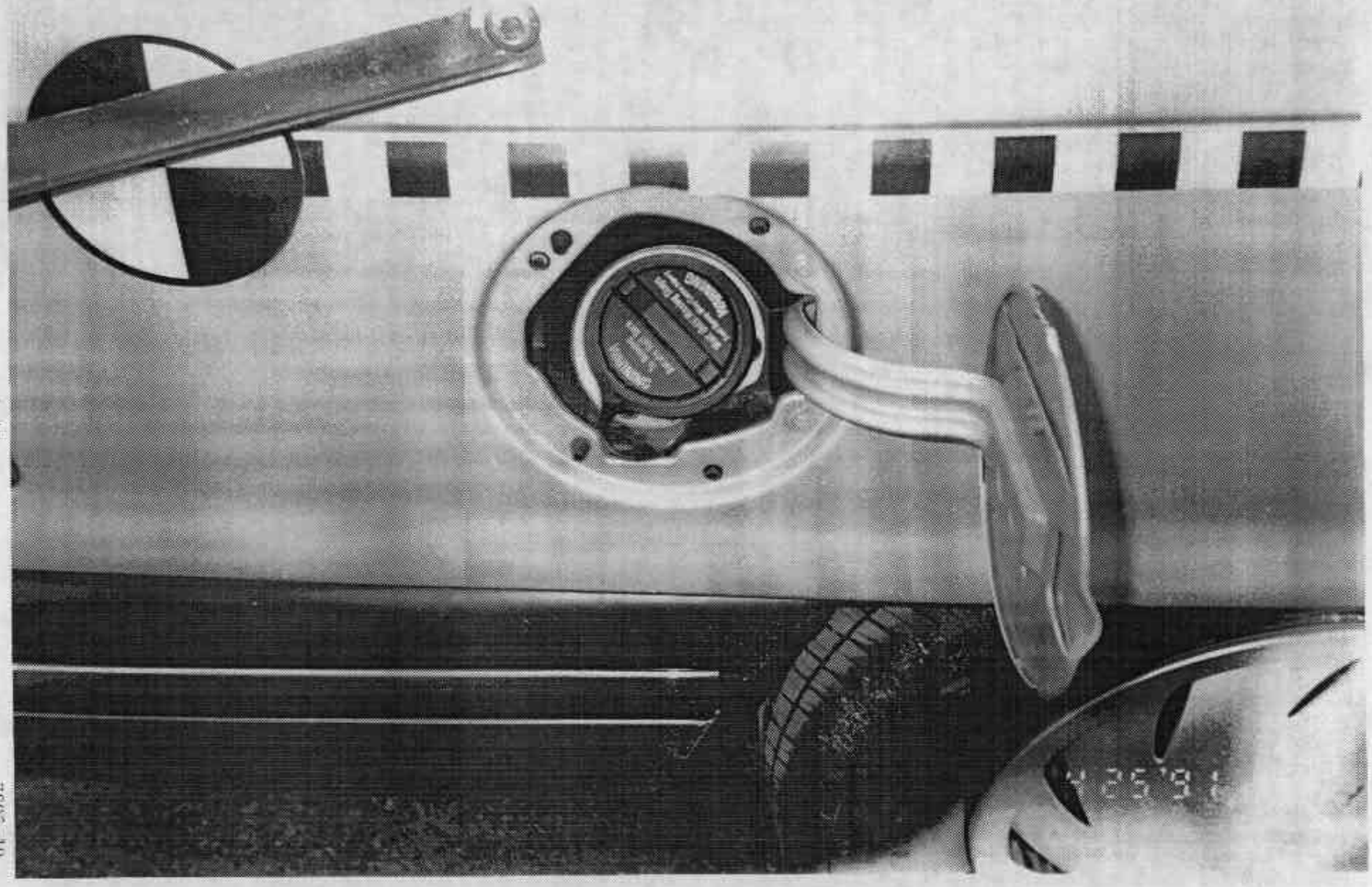


Figure A-15 FUEL CAP VIEW

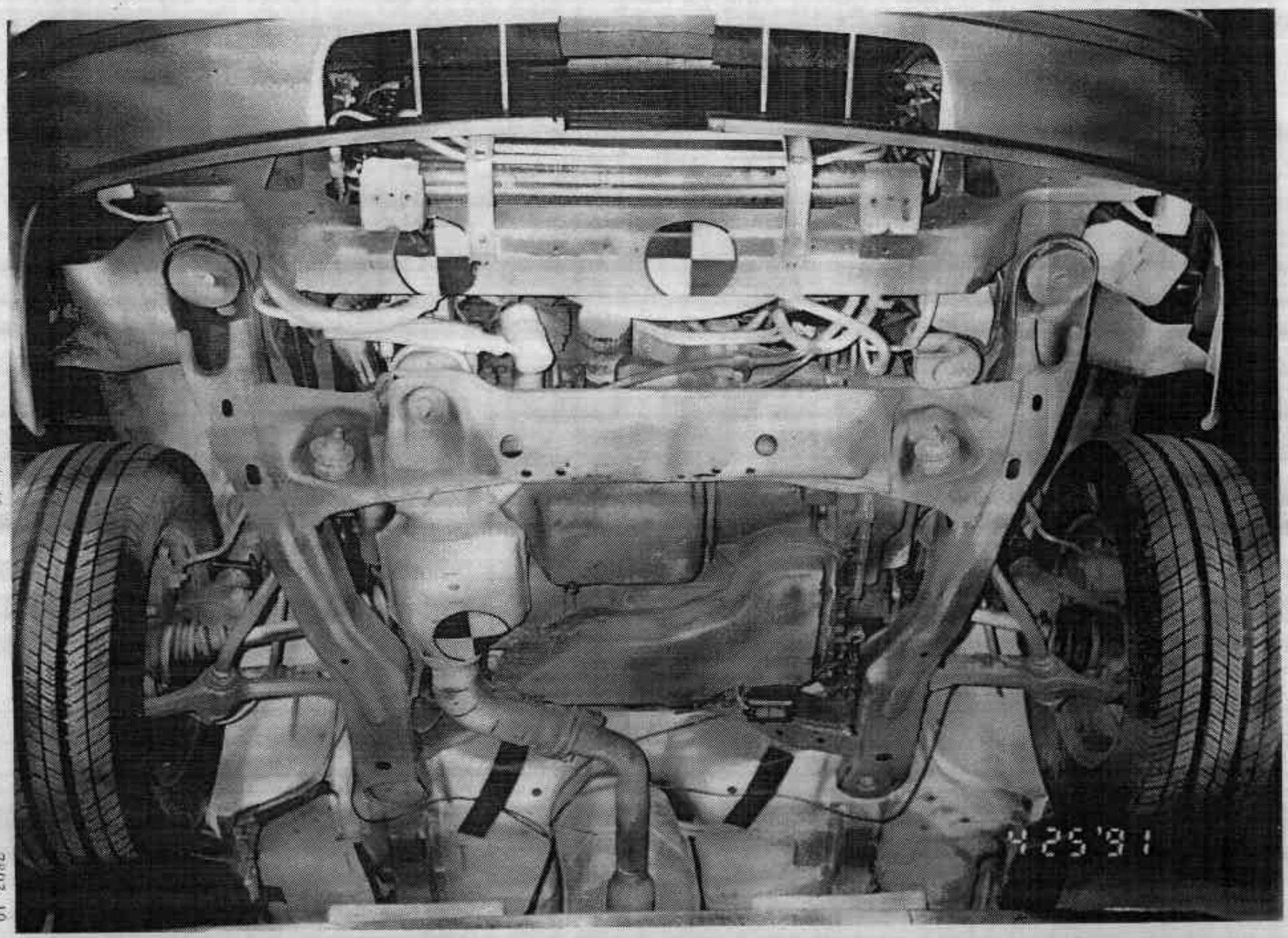
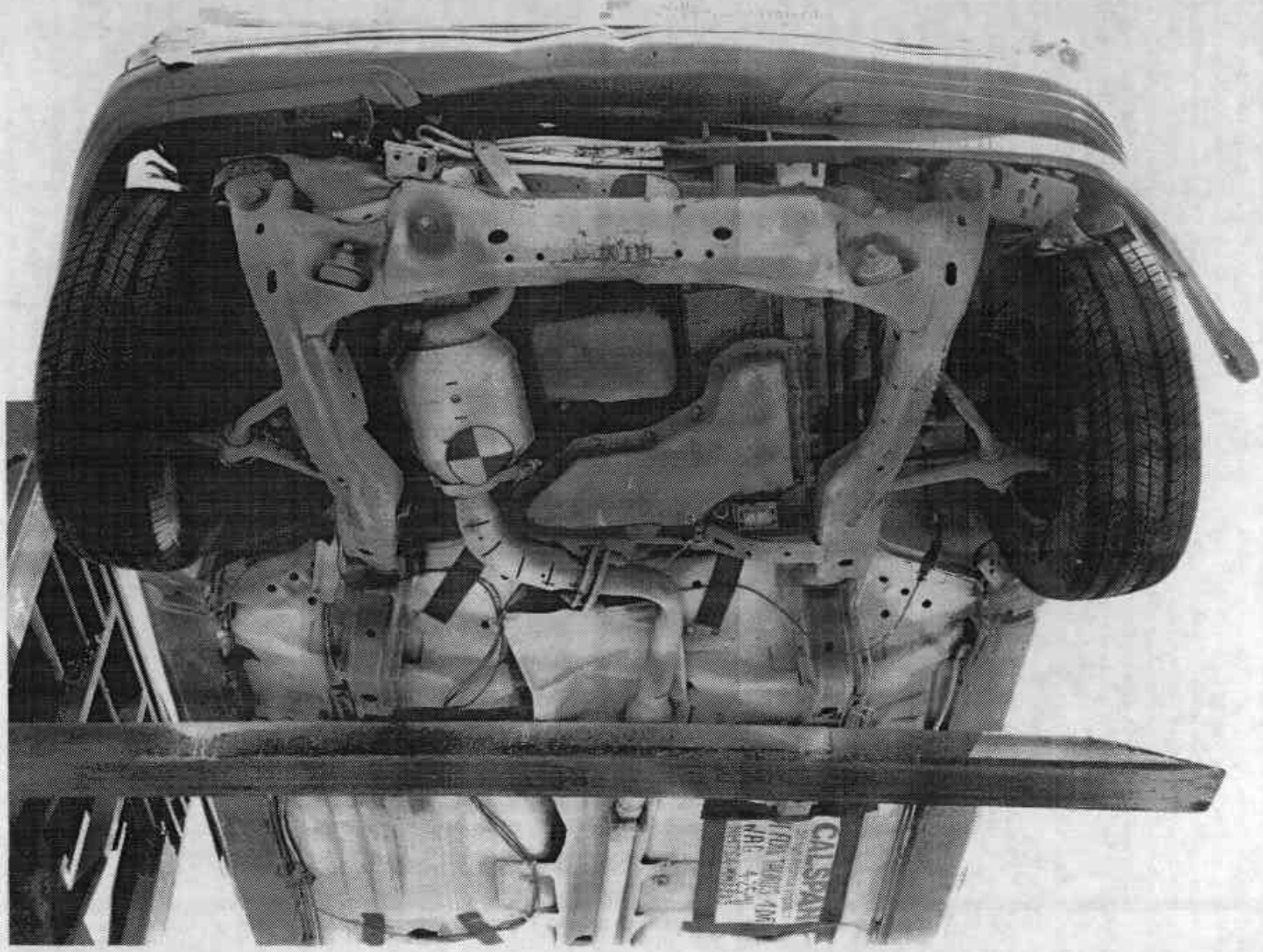


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW



7893-10

Figure A-17 POST-TEST FRONT UNDERBODY VIEW

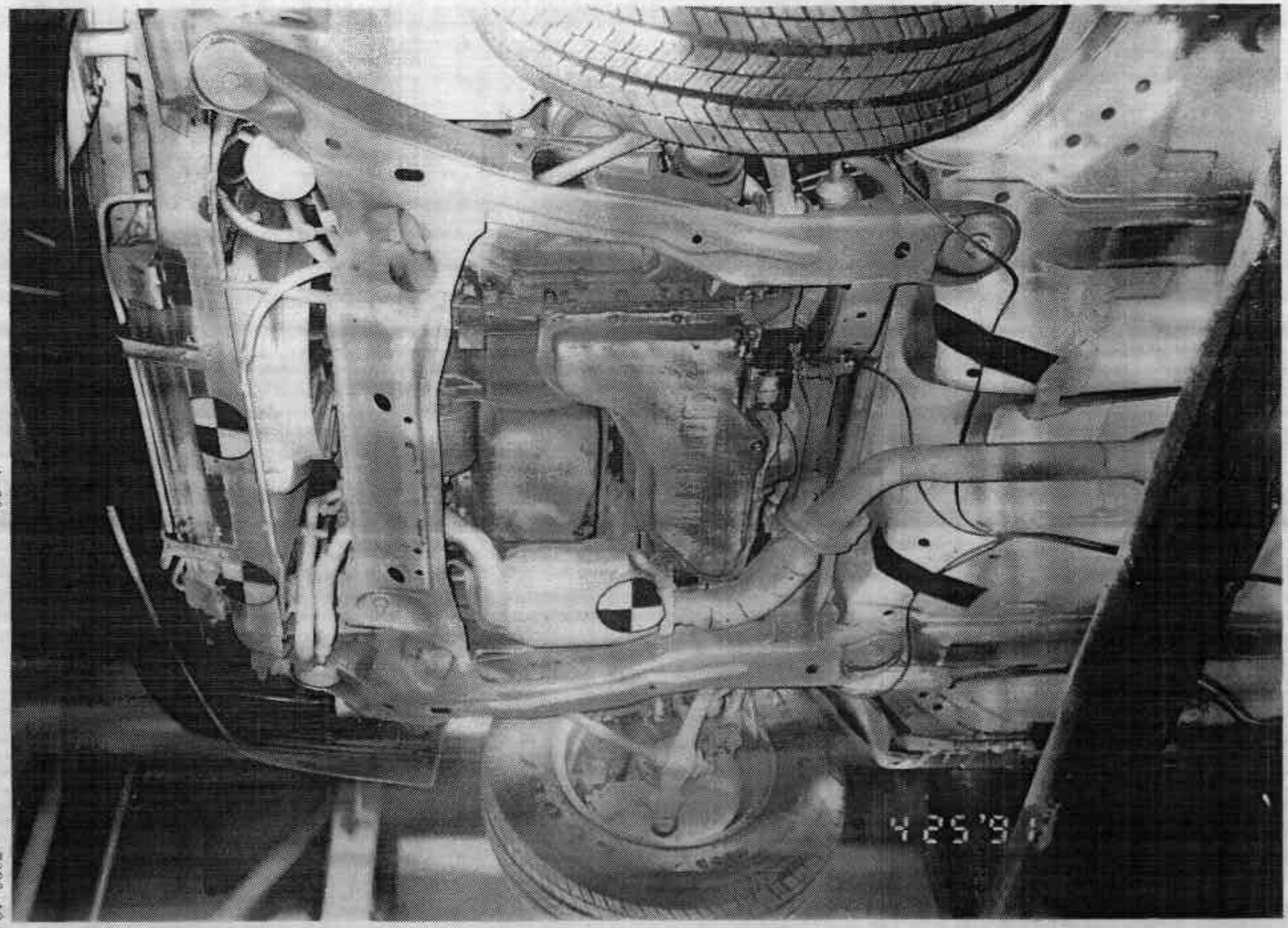


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

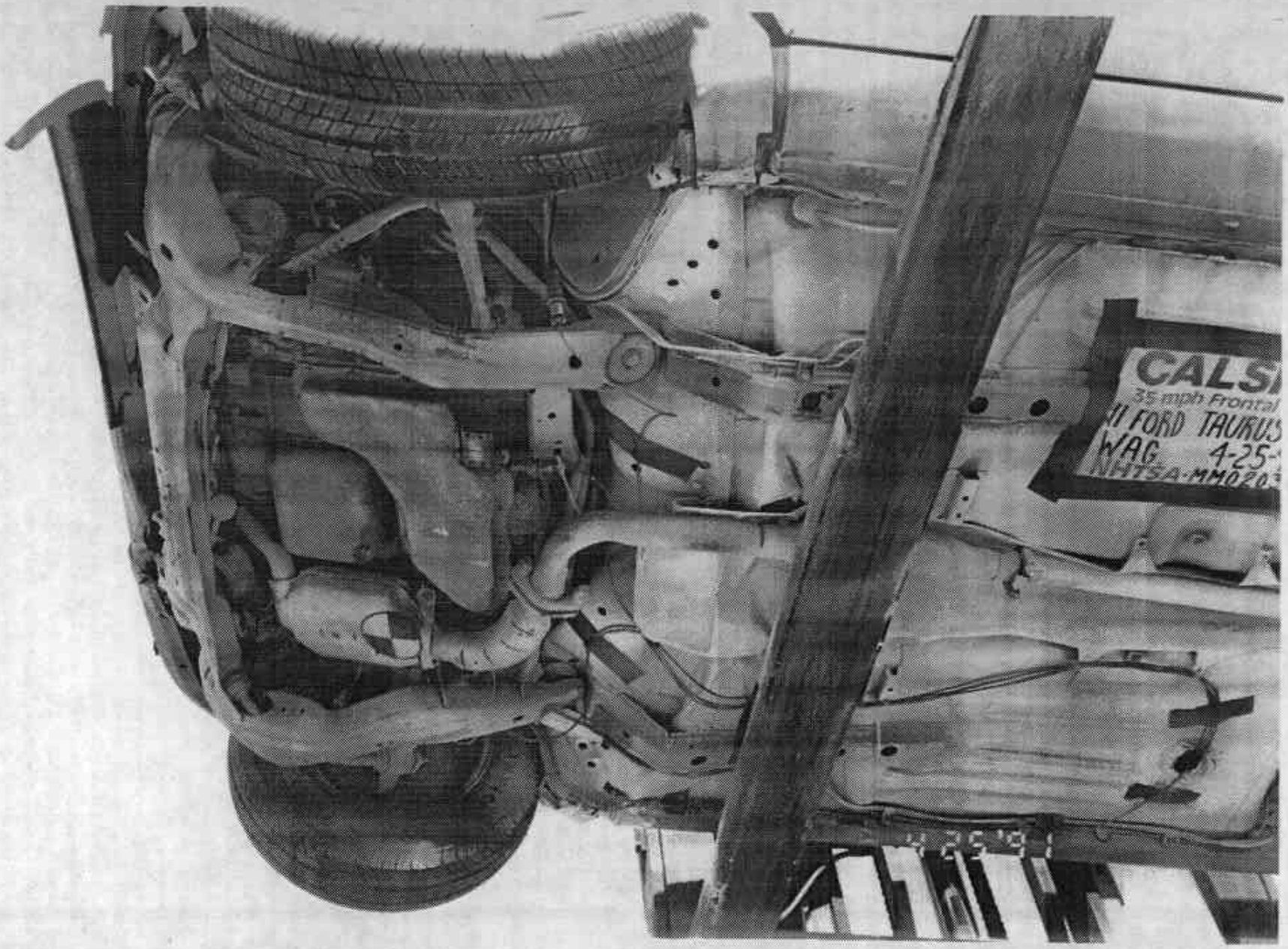


Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW

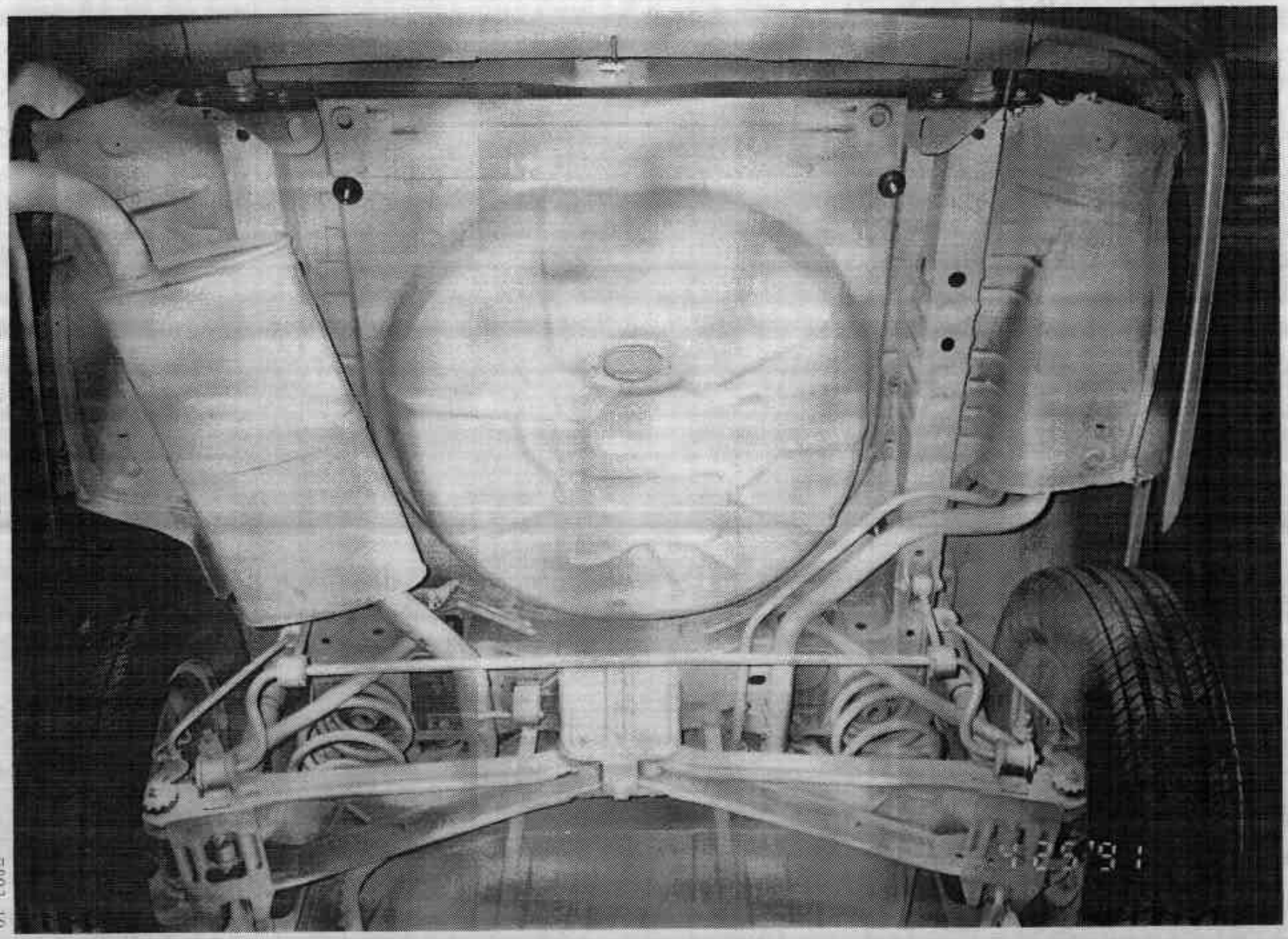


Figure A-20 PRE-TEST REAR UNDERBODY VIEW

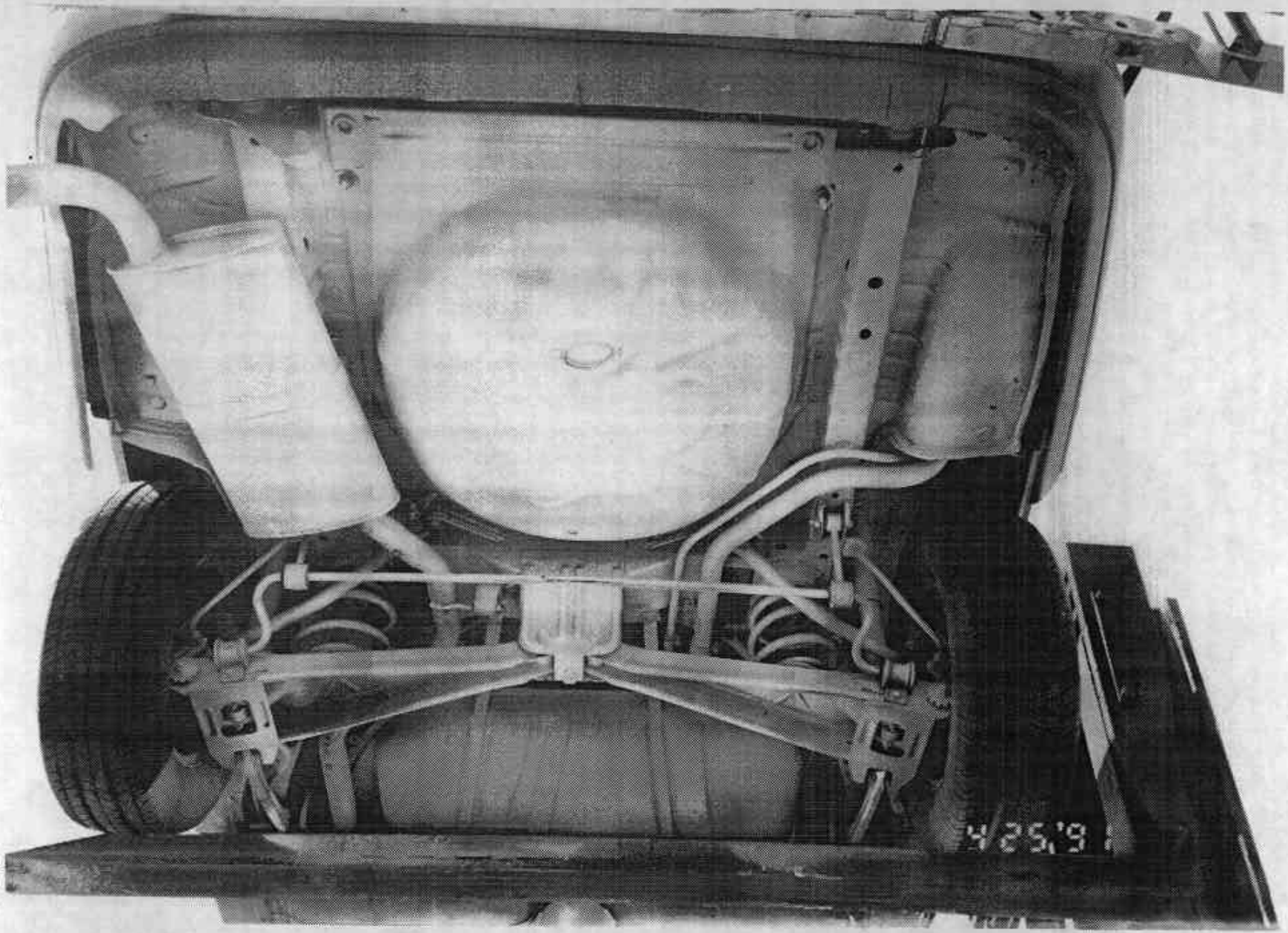


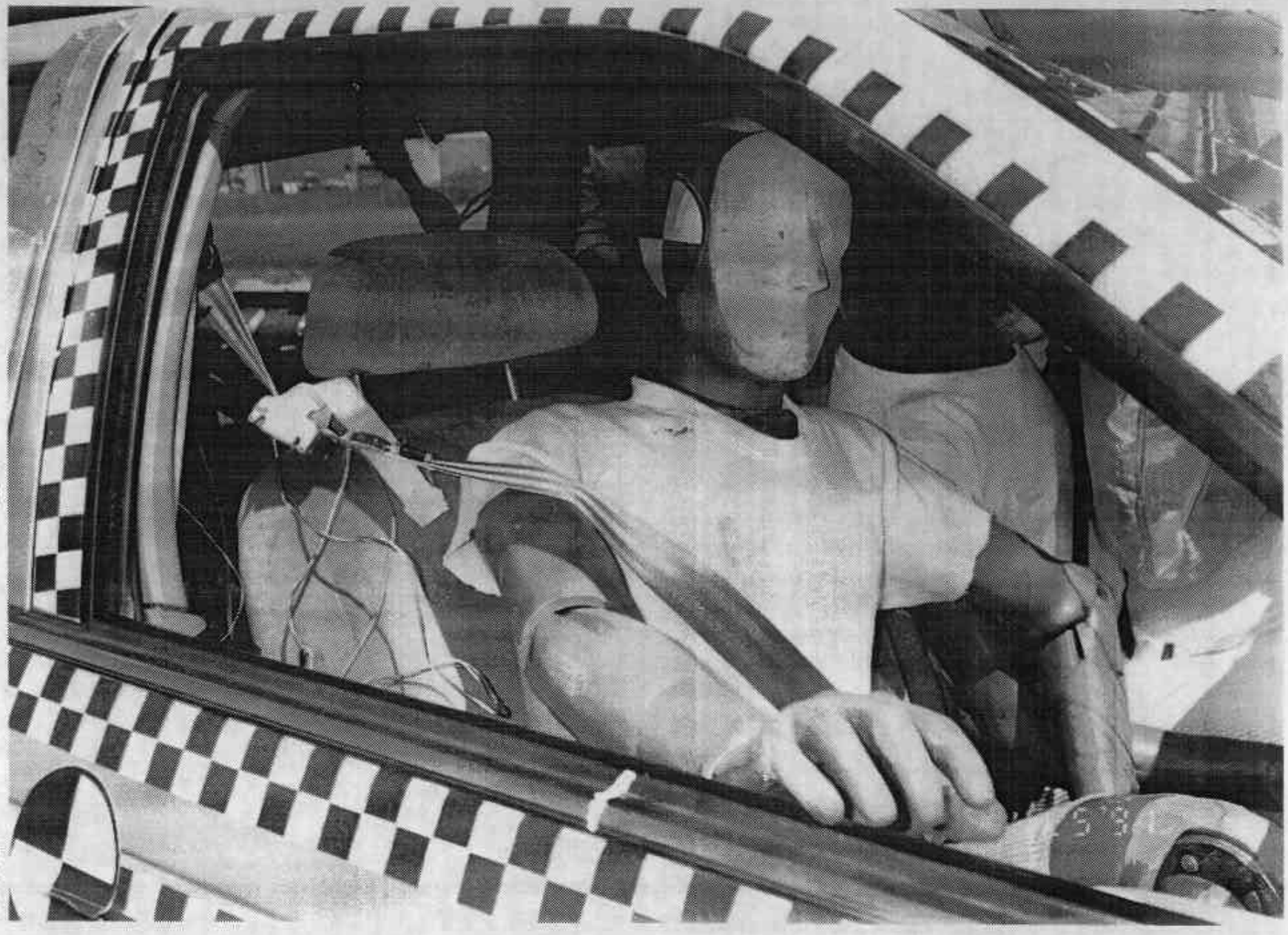
Figure A-21 POST-TEST REAR UNDERBODY VIEW

Figure A-22 PRE-TEST DRIVER POSITION VIEW

Figure A-25 POST-TEST DRIVER POSITION VIEW

Figure A-24 PRE-TEST PASSENGER POSITION VIEW

7893-10



7393-10

Figure A-25 POST-TEST PASSENGER POSITION VIEW

Figure A-20 PRE-TEST DRIVER AND INTERIOR VIEW

Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW

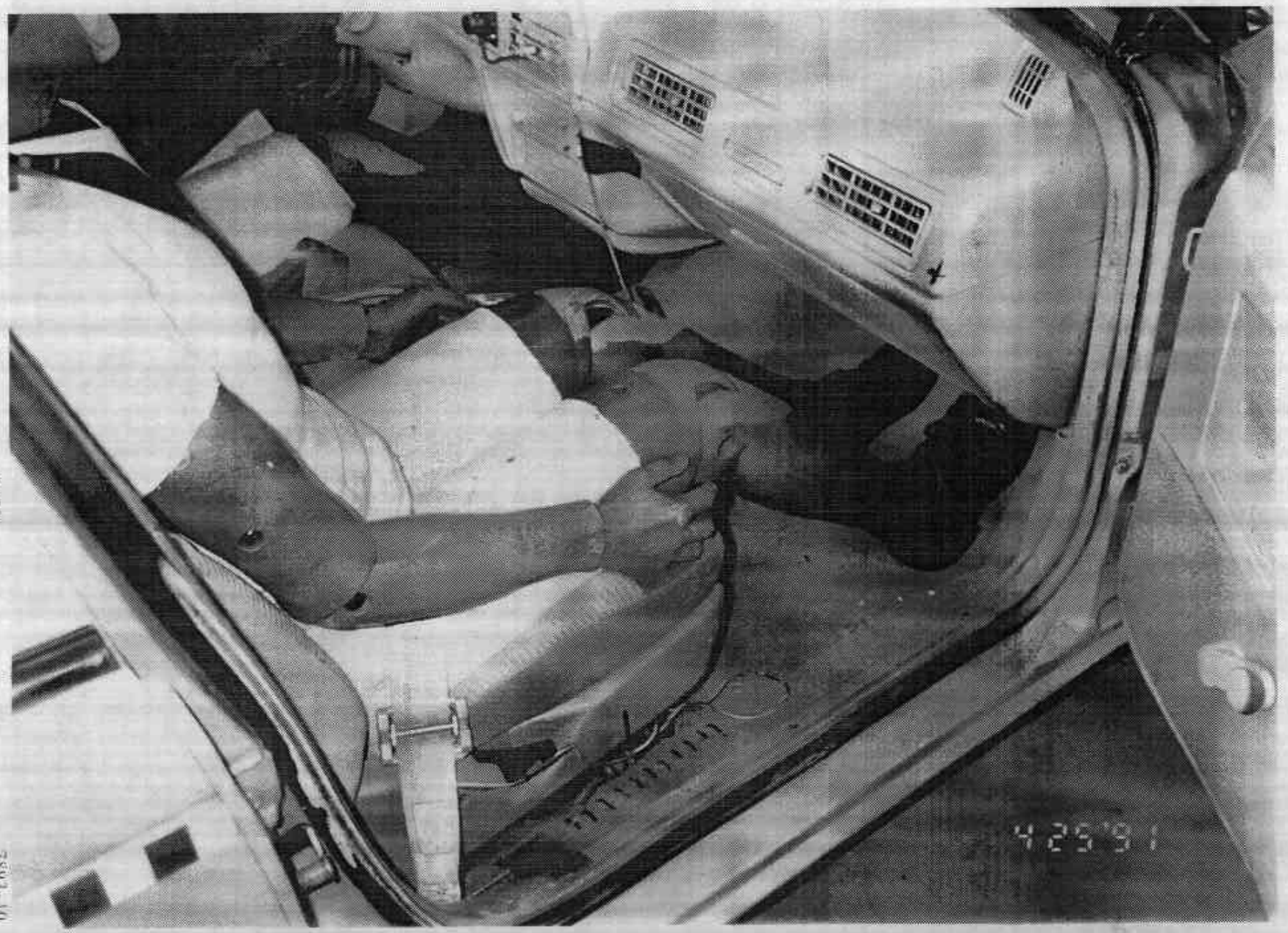


Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

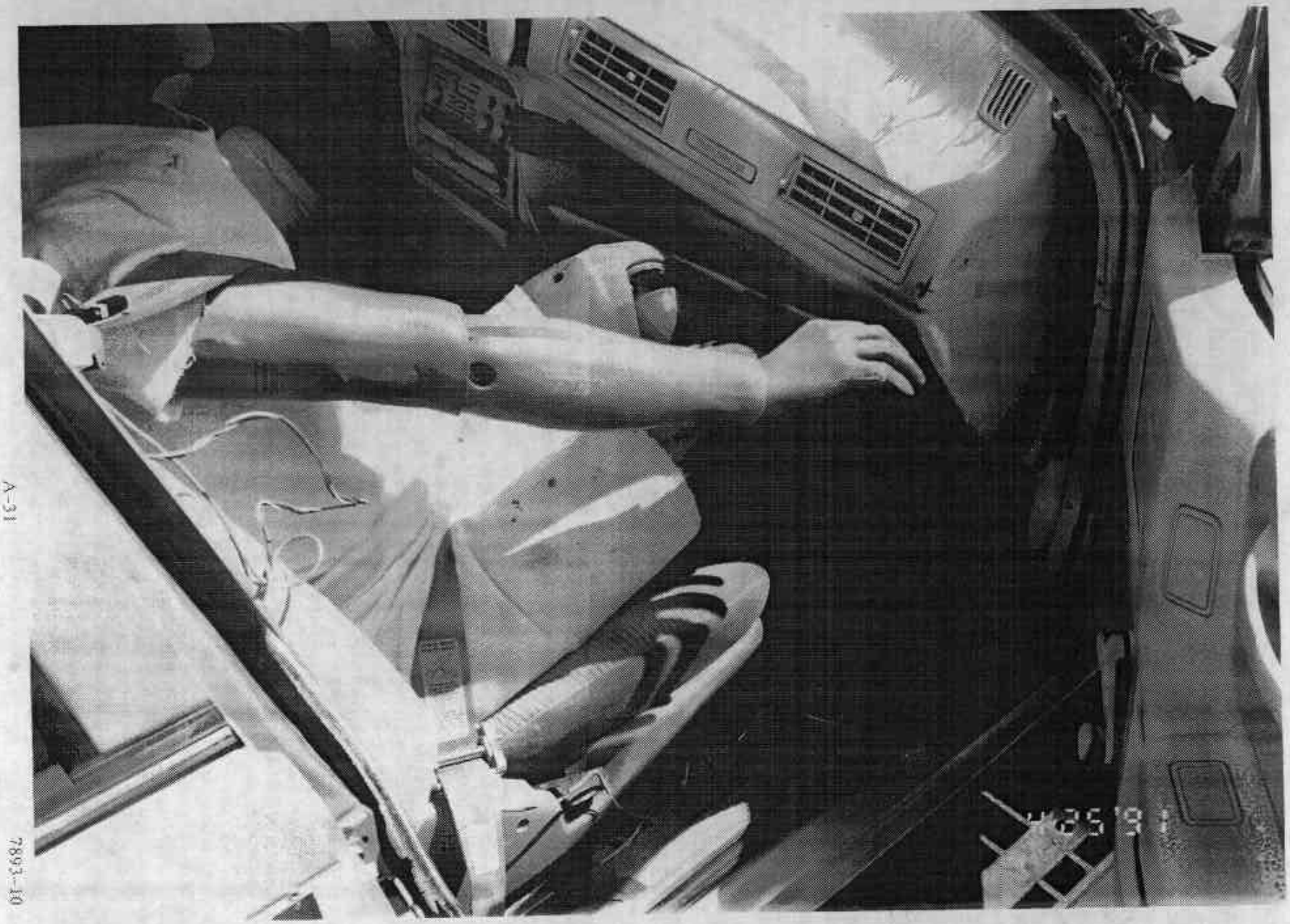


Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

Figure A-30 IMPACT VIEW

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

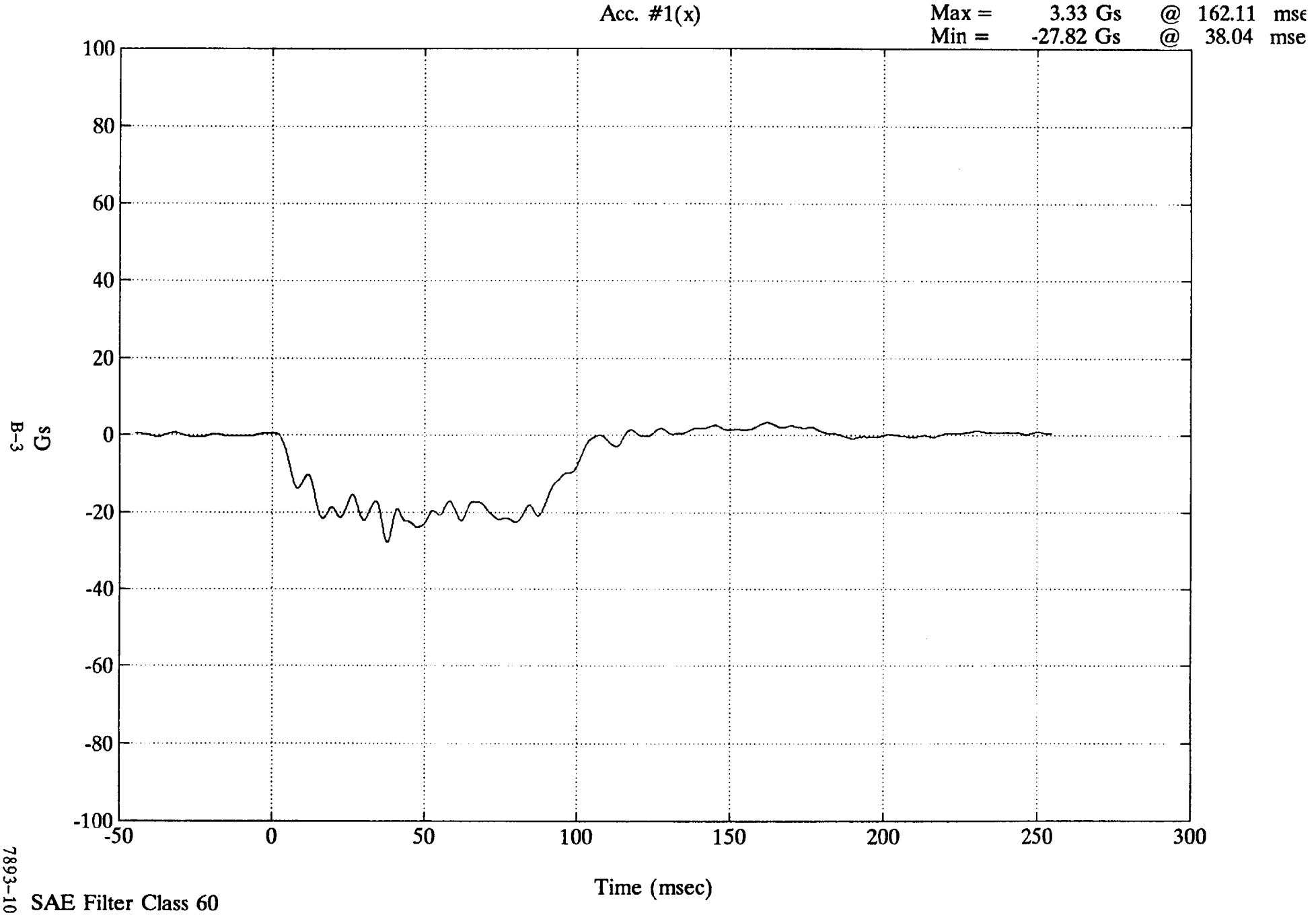
TEST NO. MM0203

VEHICLE DATA

FILTER CHANNEL CLASS

60

NCAP TEST 14 1991 FORD TAURUS WAGON

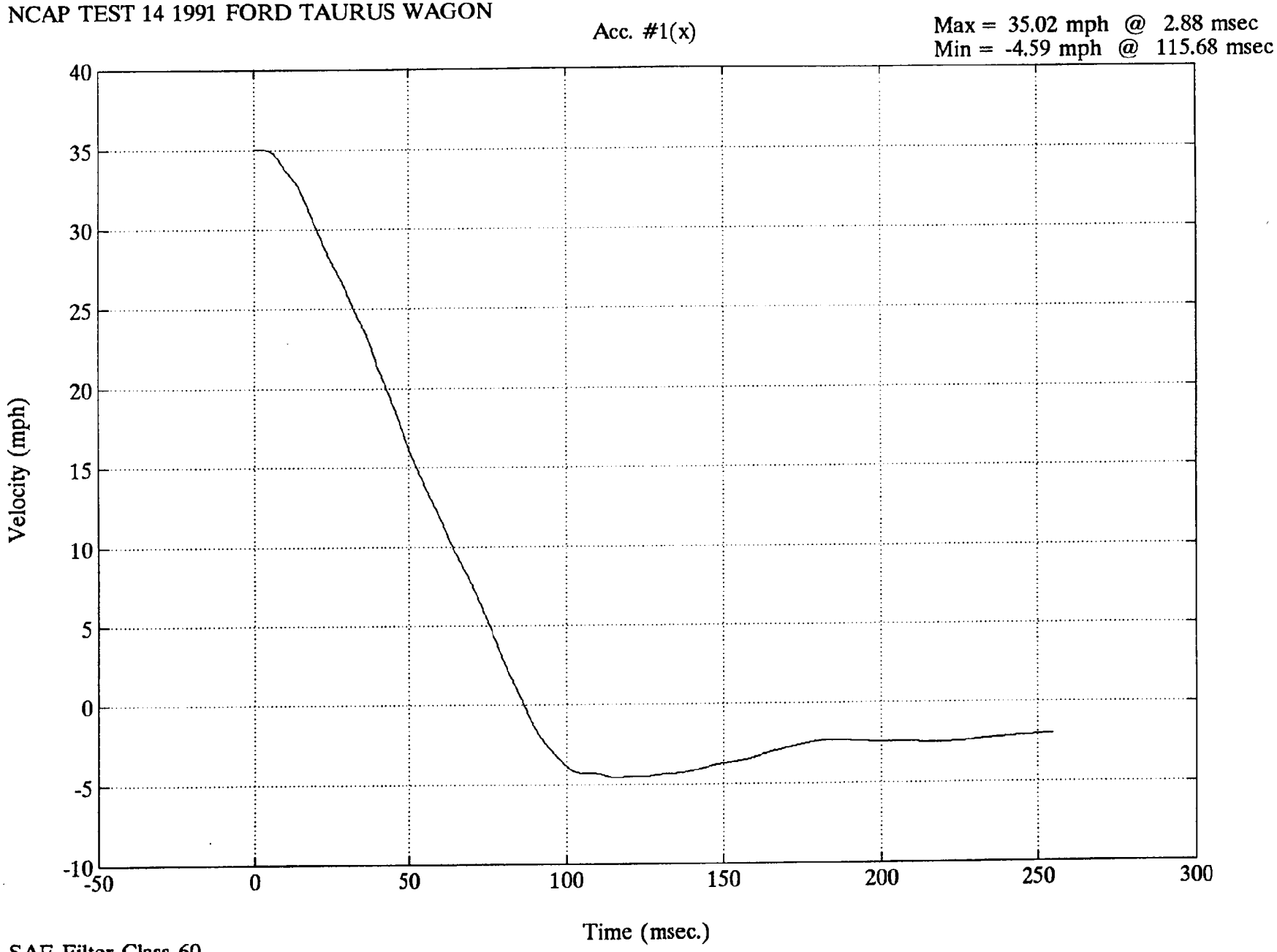


B-3

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

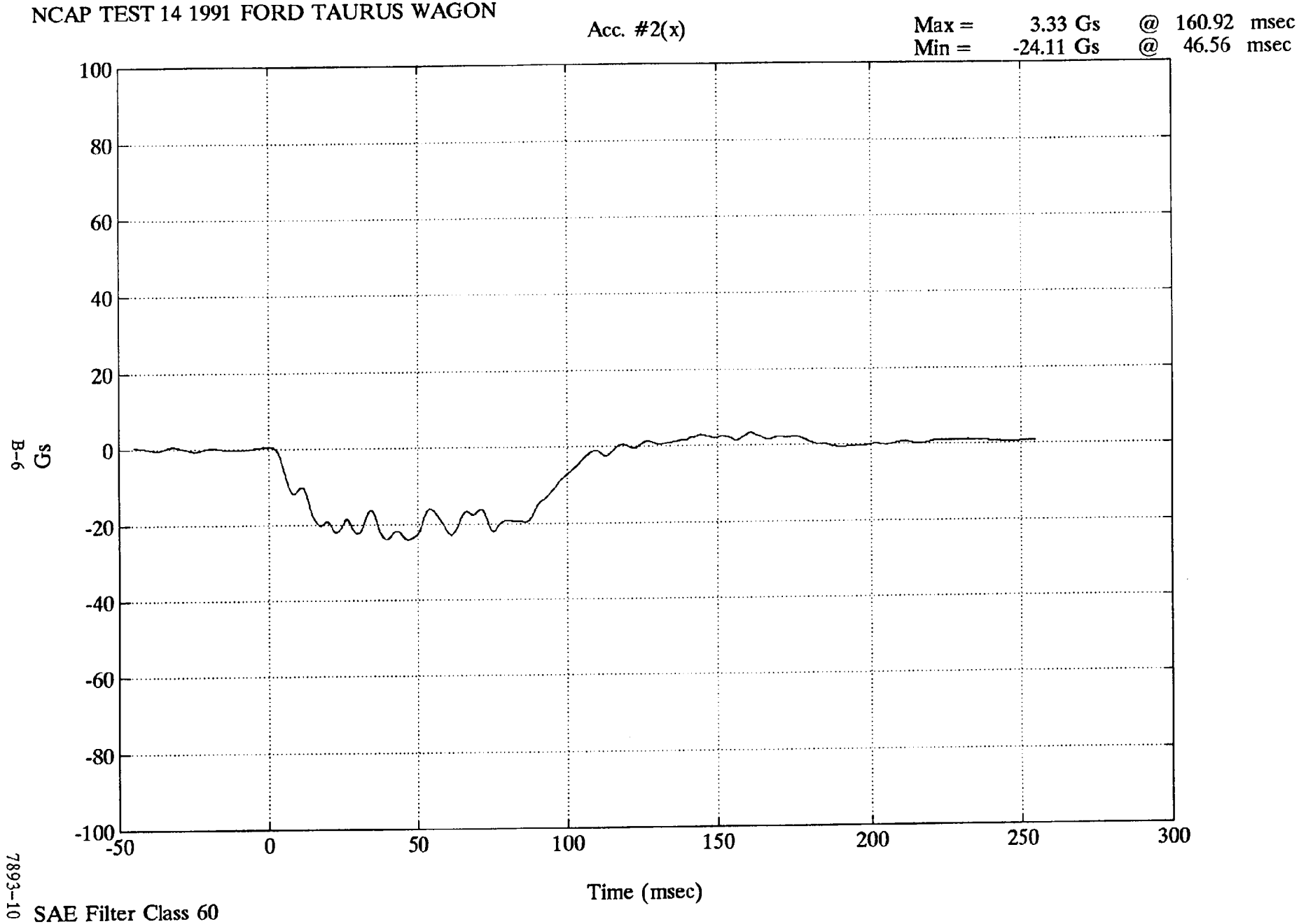
7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

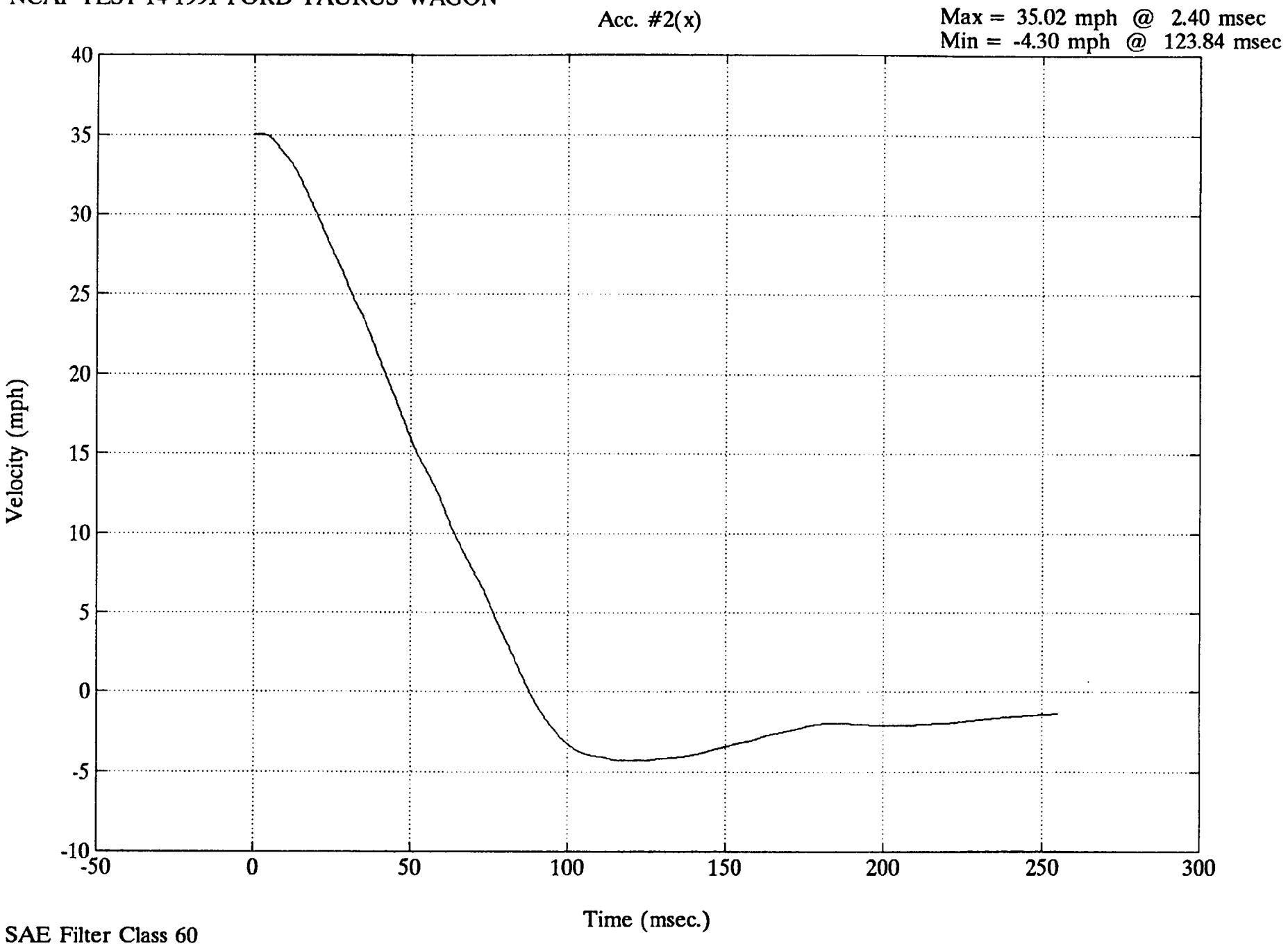


B-6

7893-10

SAE Filter Class 60

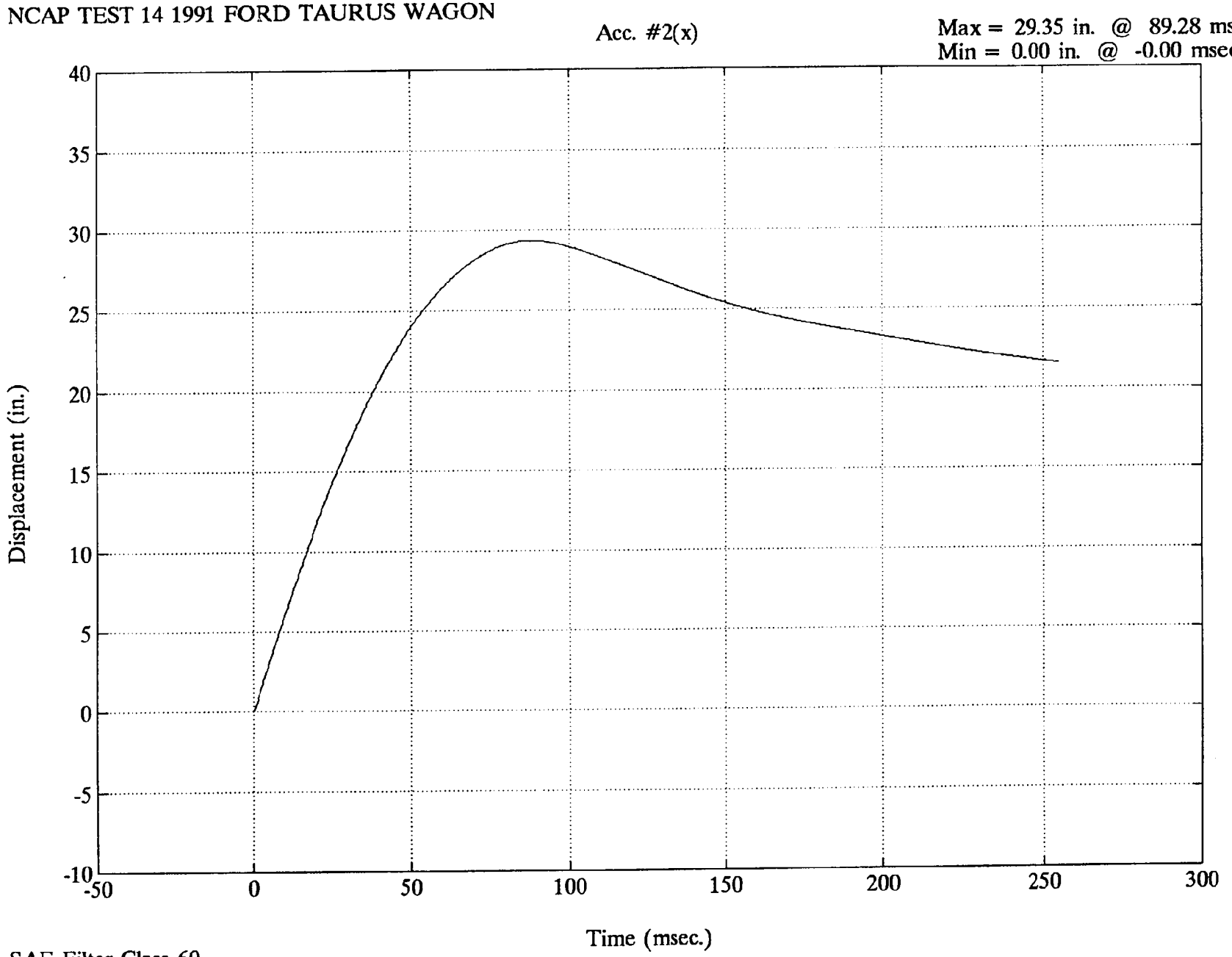
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

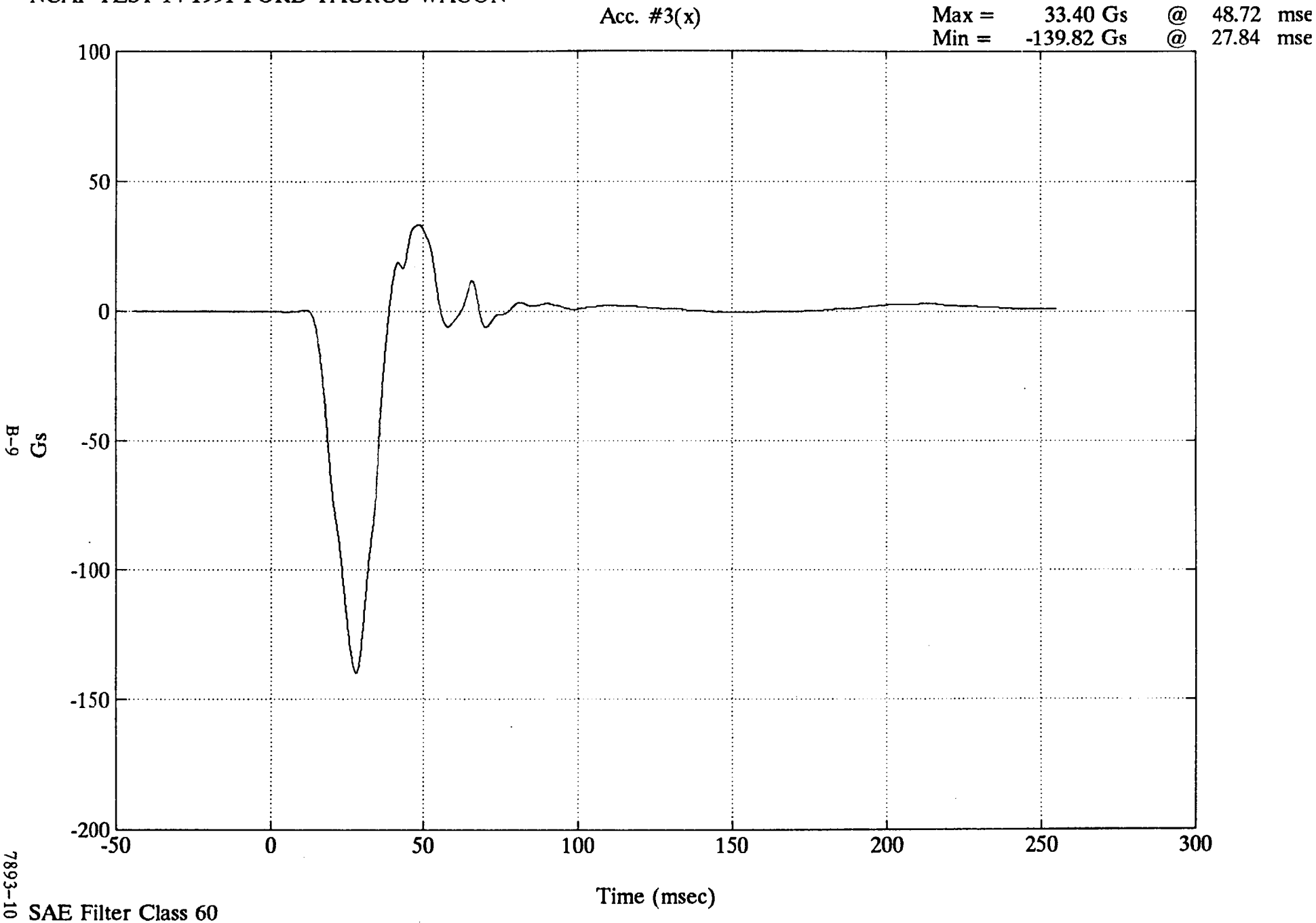
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON



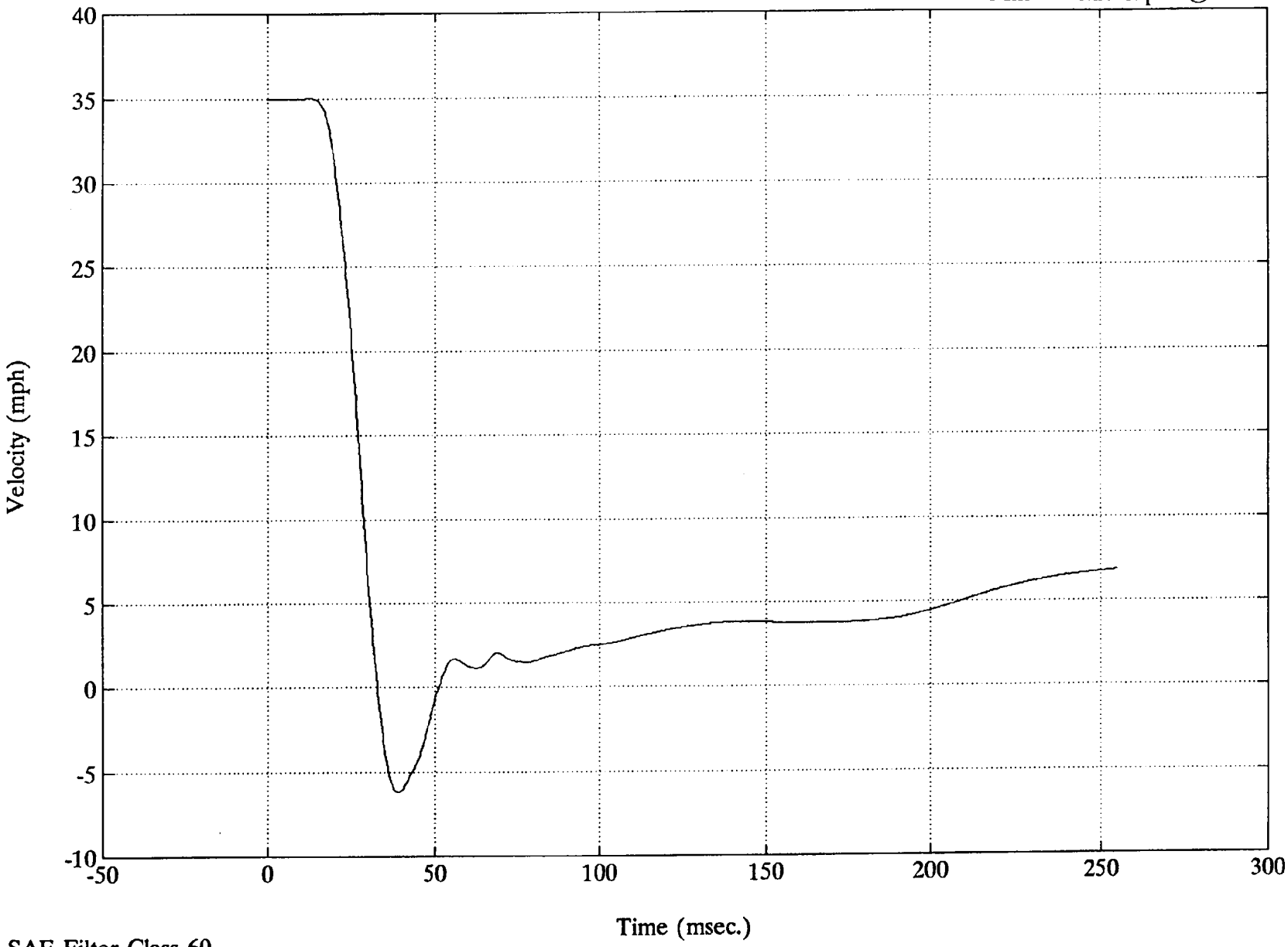
SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

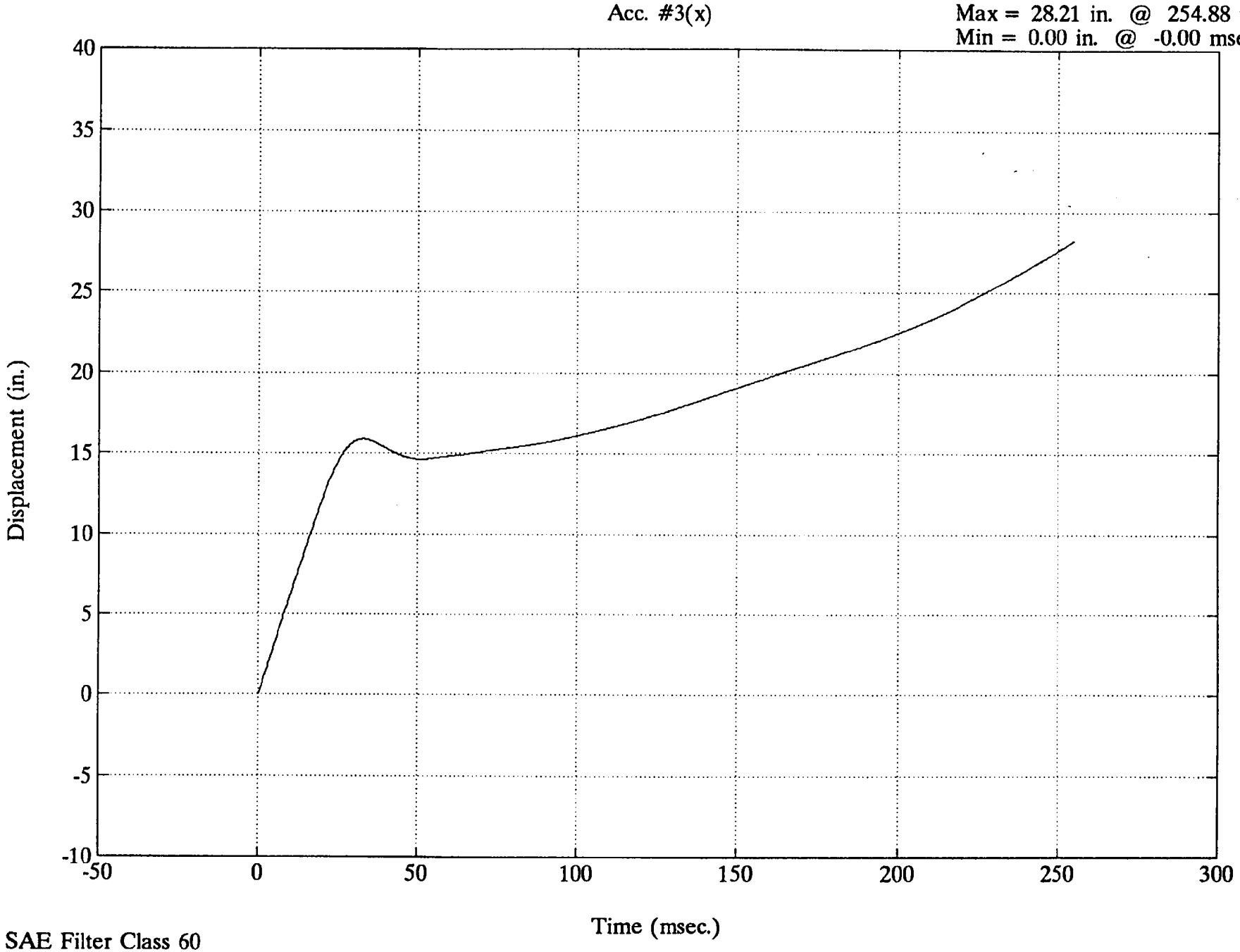
Acc. #3(x)

Max = 35.01 mph @ 12.72 msec
Min = -6.20 mph @ 38.88 msec



SAE Filter Class 60

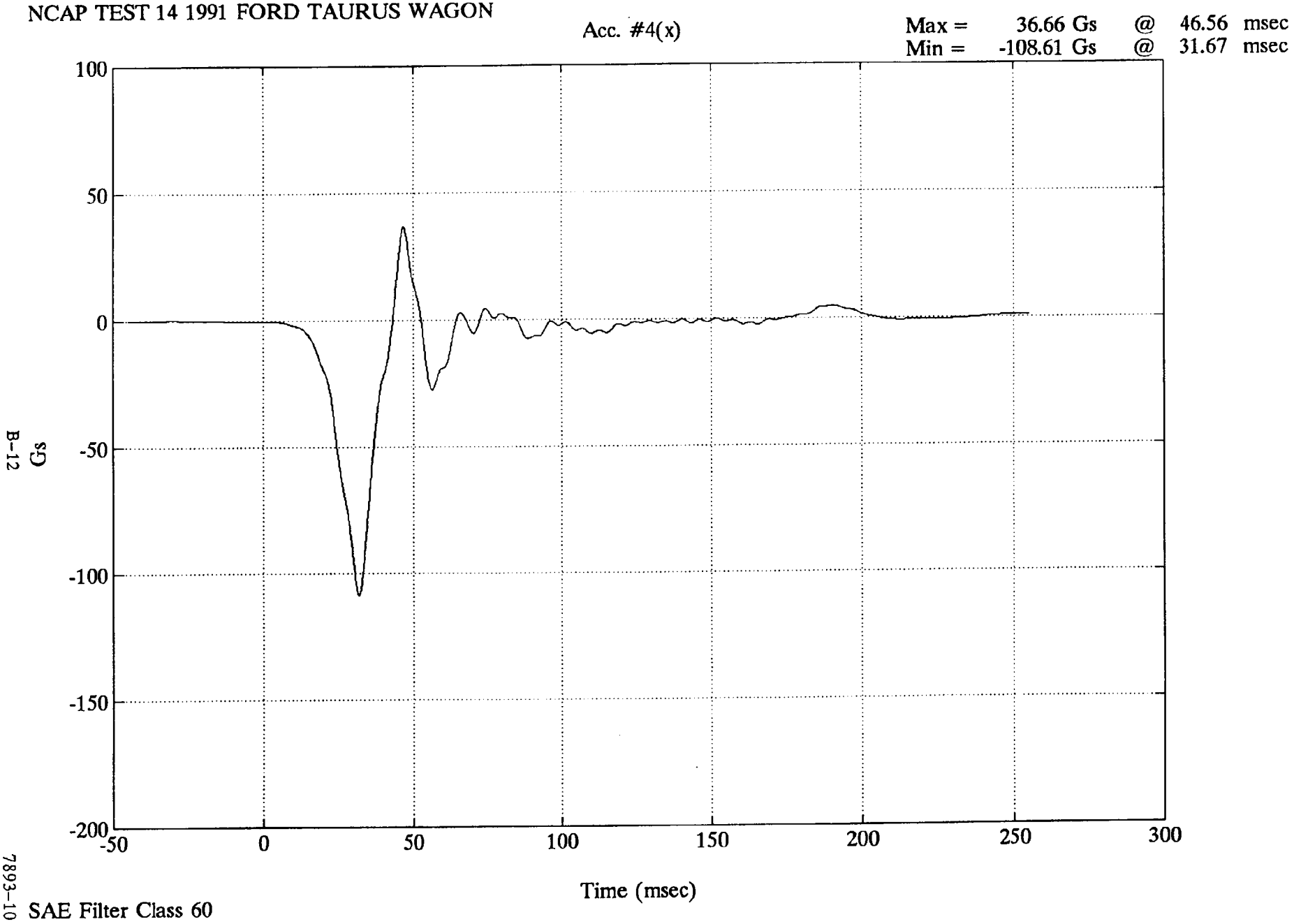
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

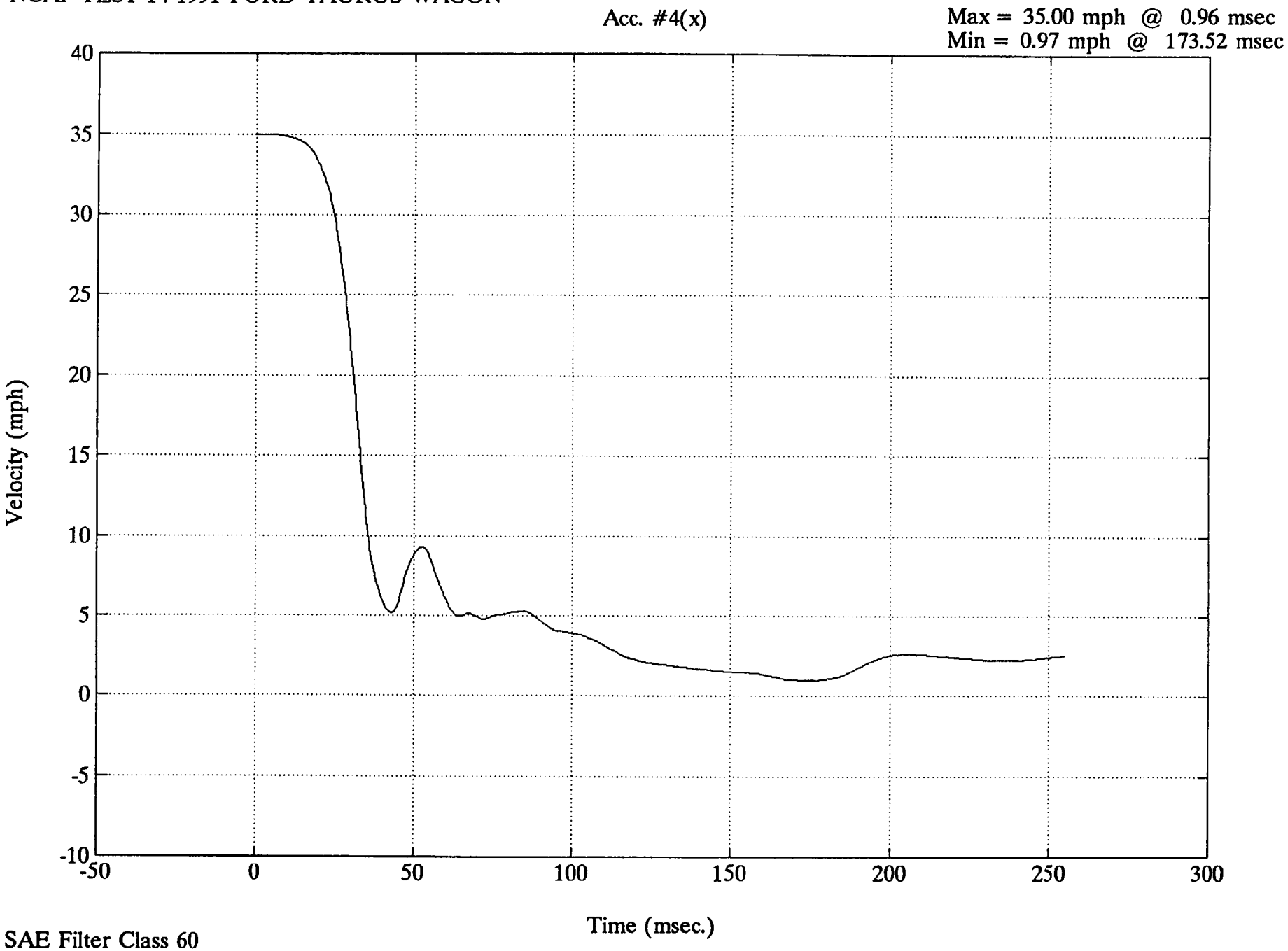


B-12

7893-10

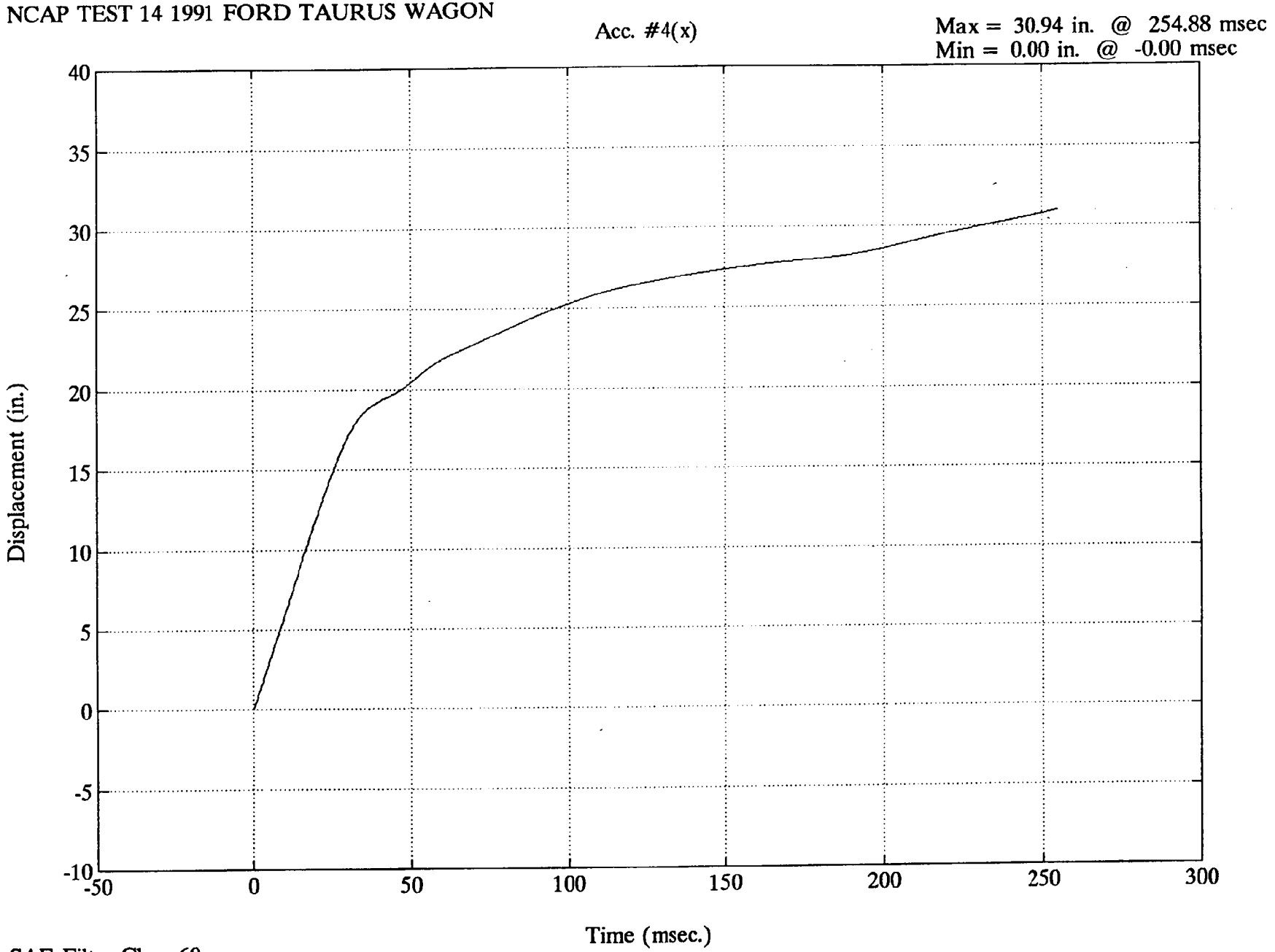
SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

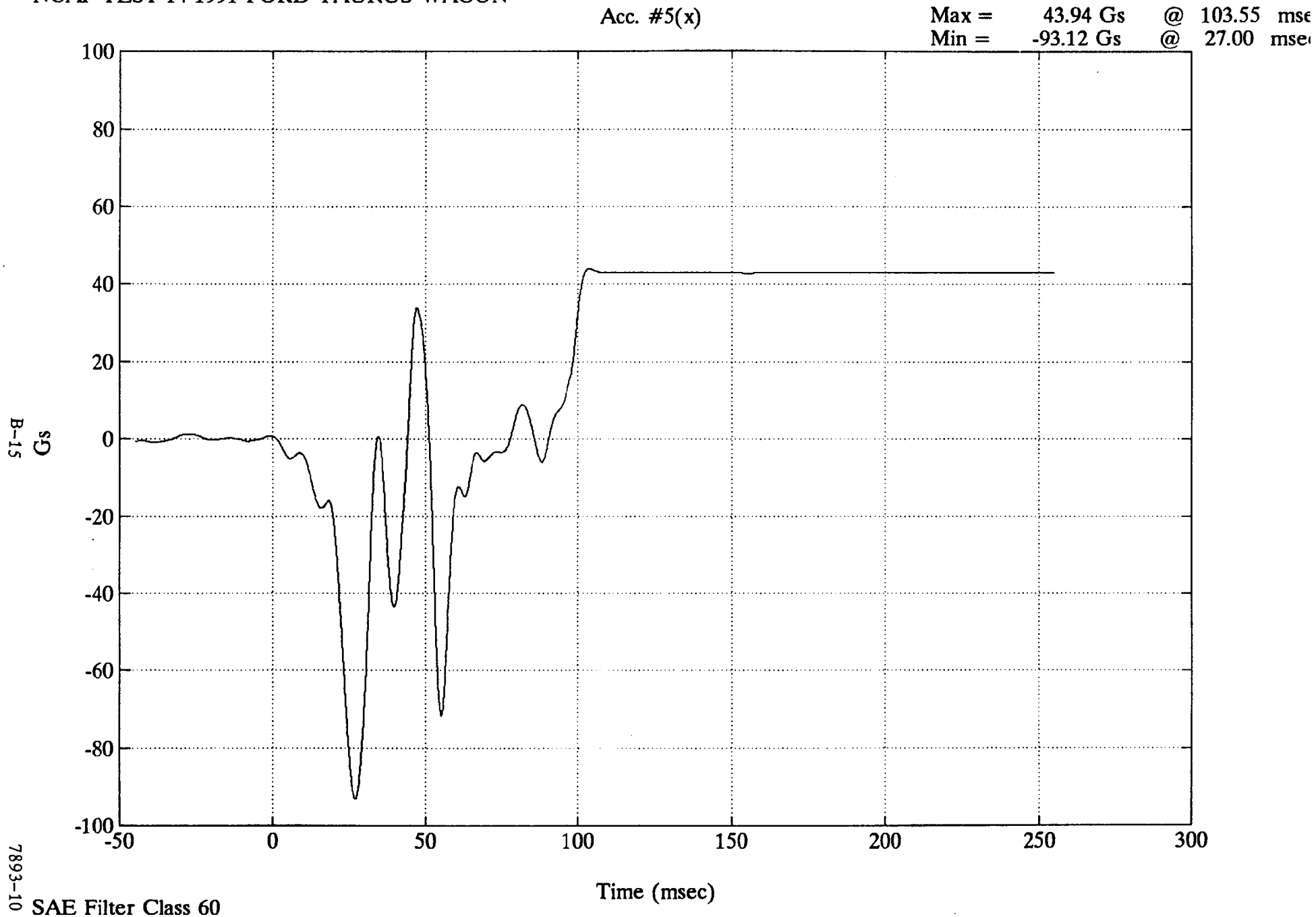
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON



B-15

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Acc. #5(x)

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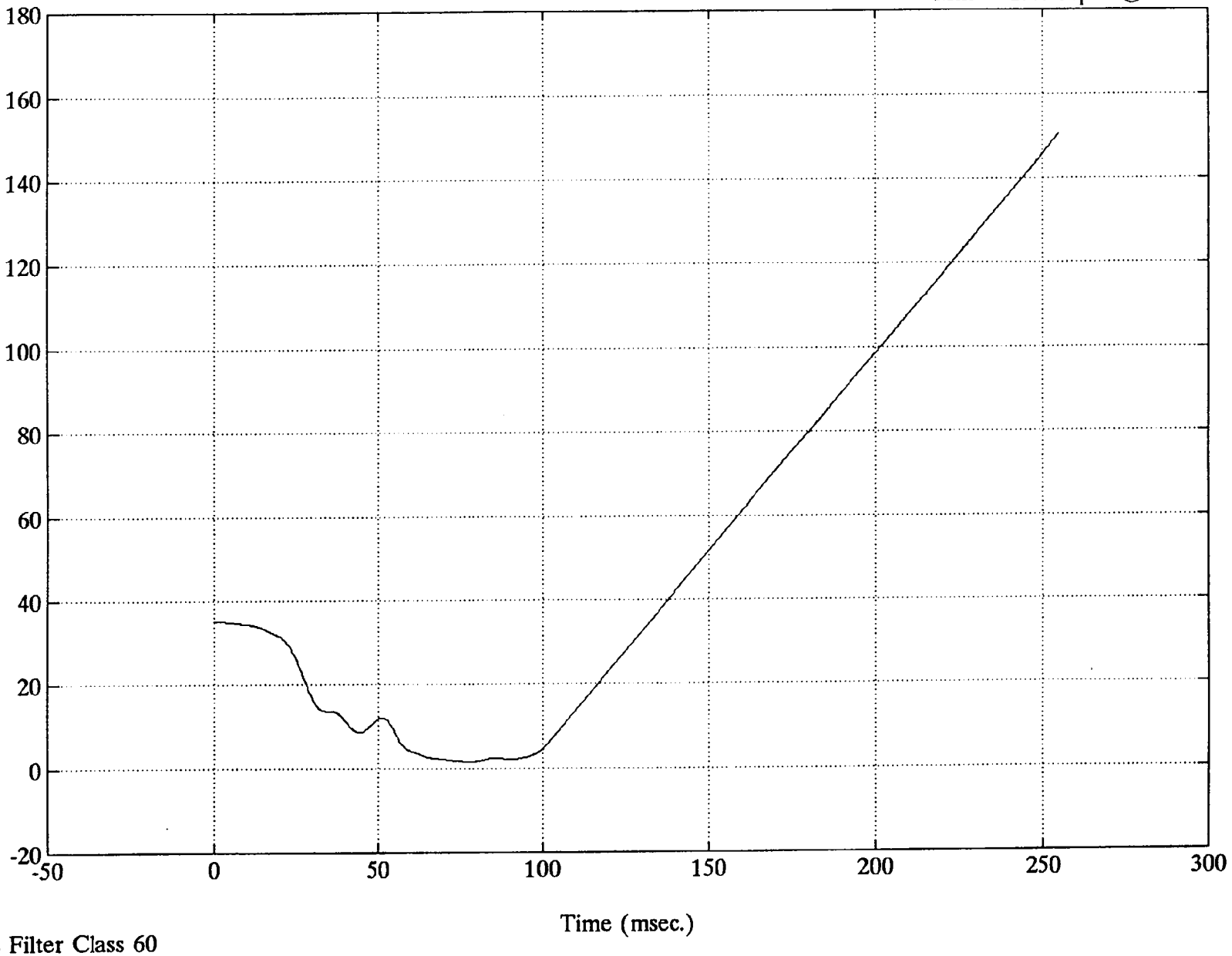
Min = 1.48 mph @ 78.00 msec

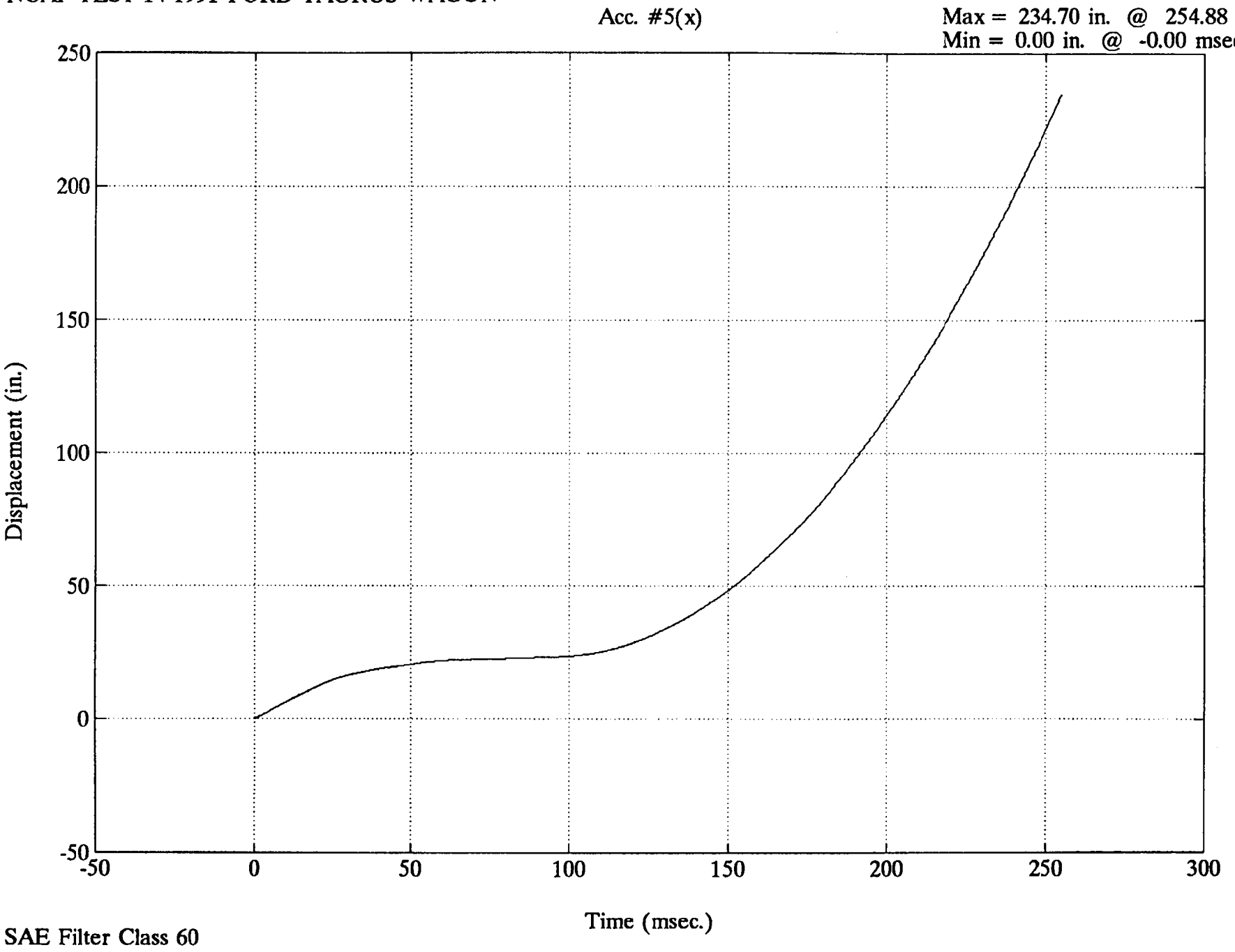


B-16

7893-10

SAE Filter Class 60

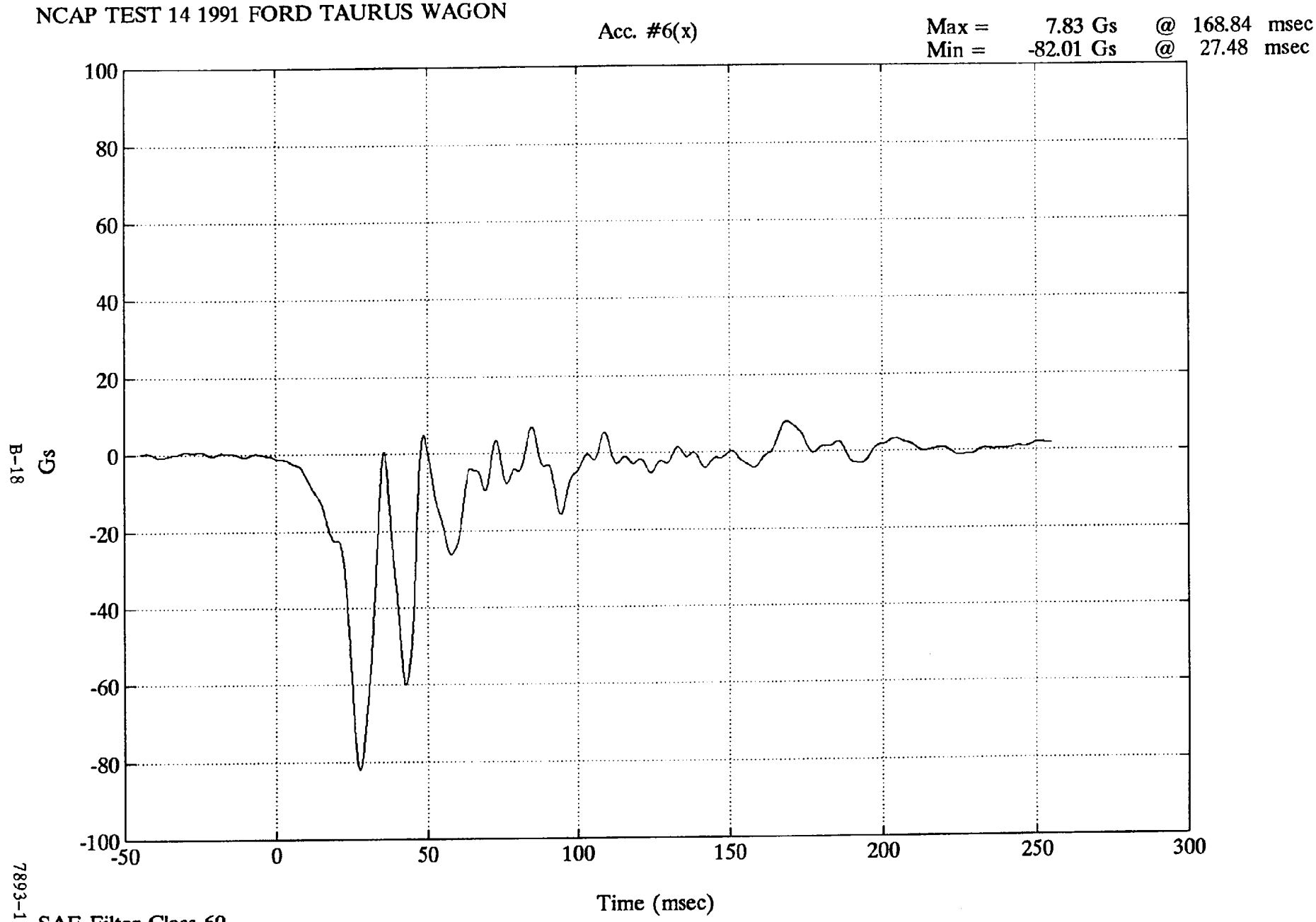
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

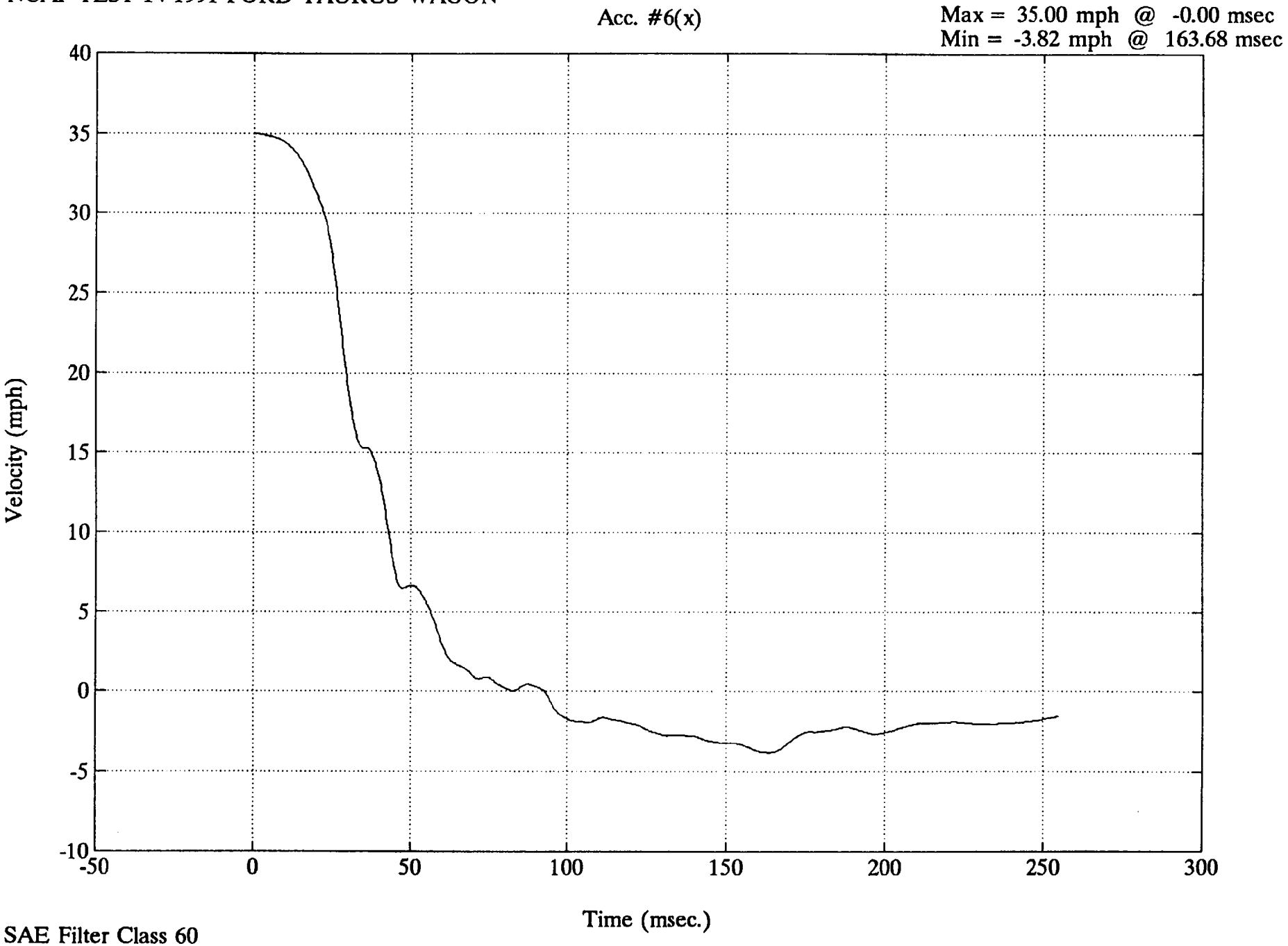
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

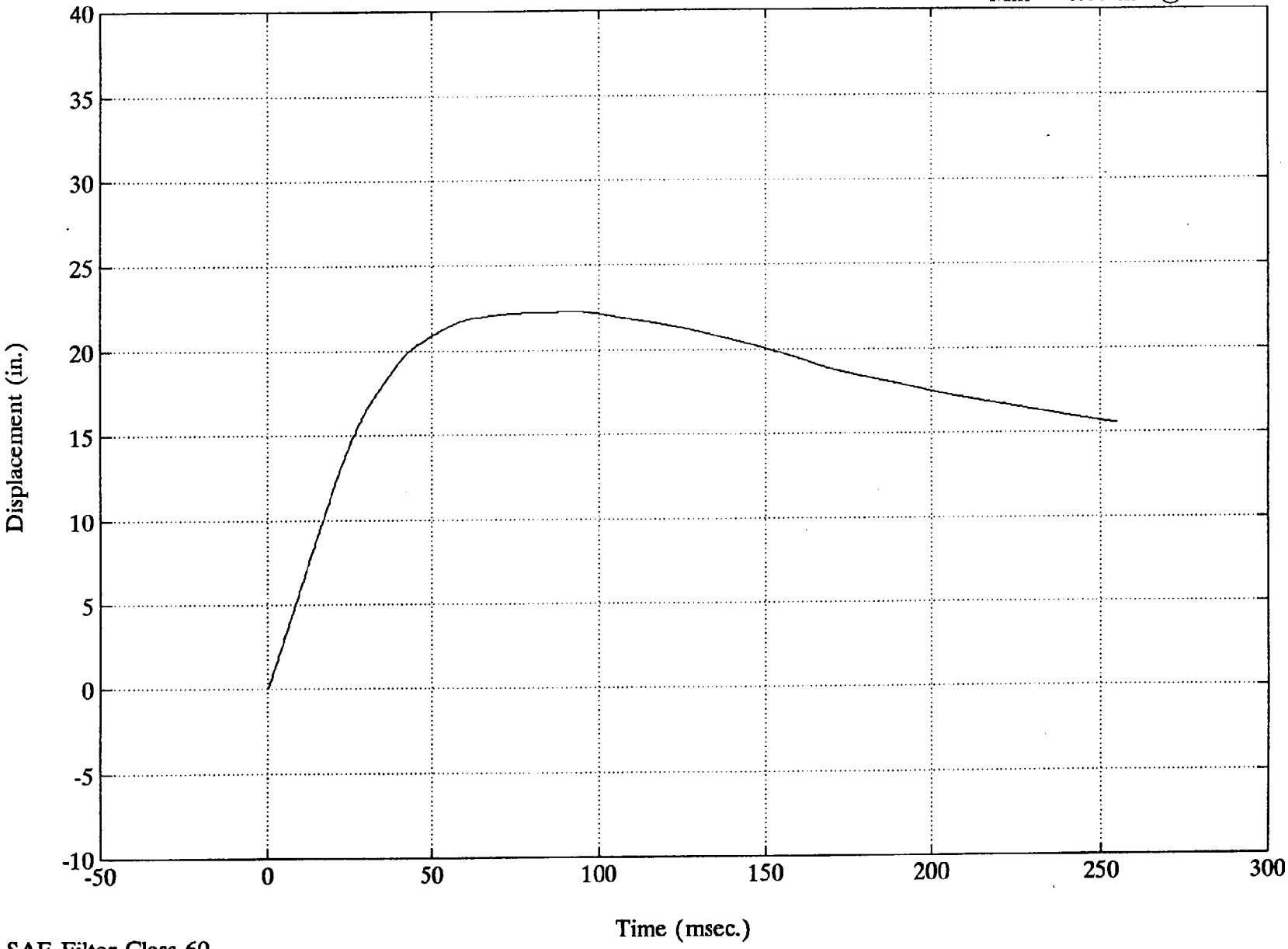


SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Acc. #6(x)

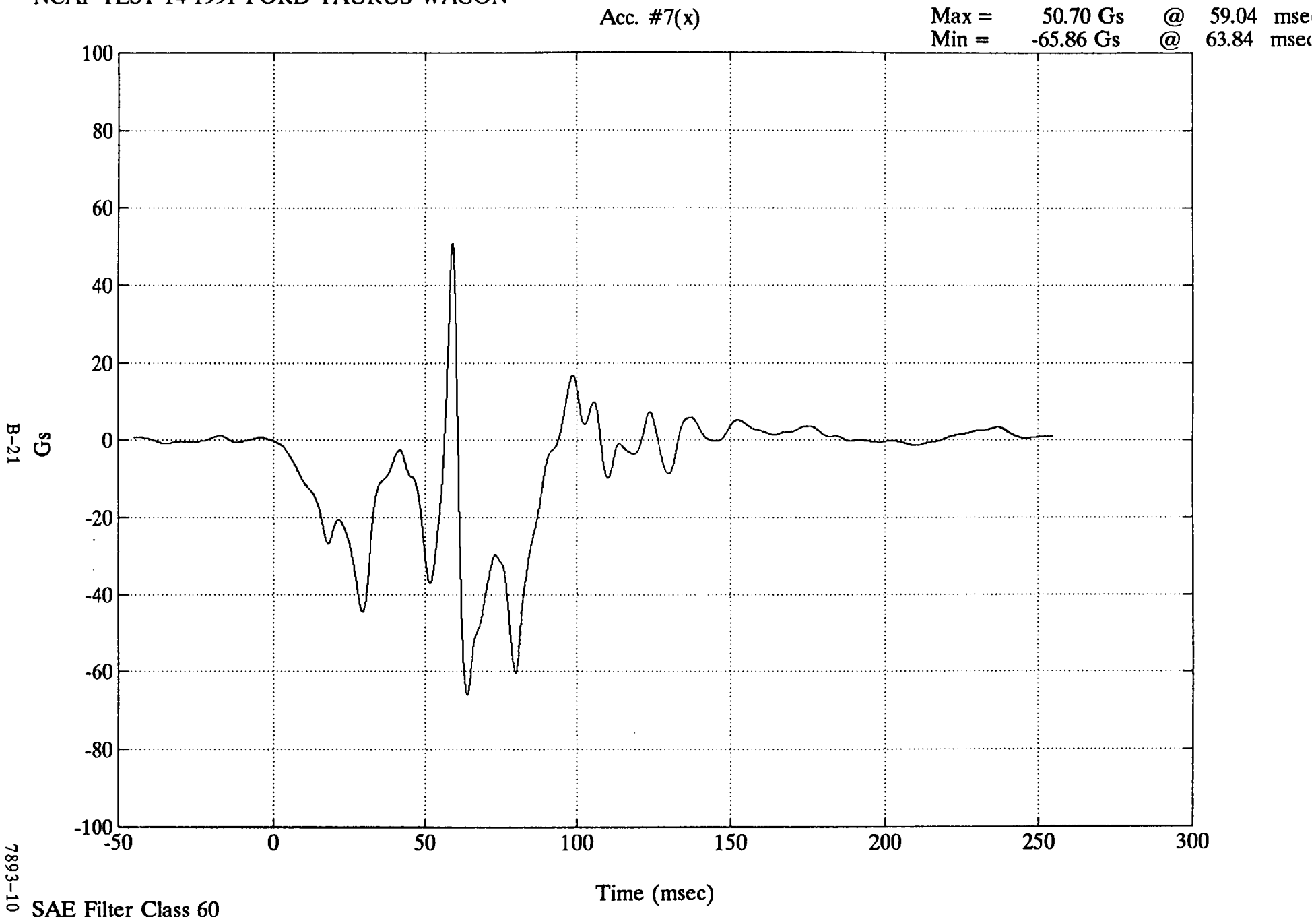
Max = 22.27 in. @ 93.12 msec
Min = 0.00 in. @ -0.00 msec



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

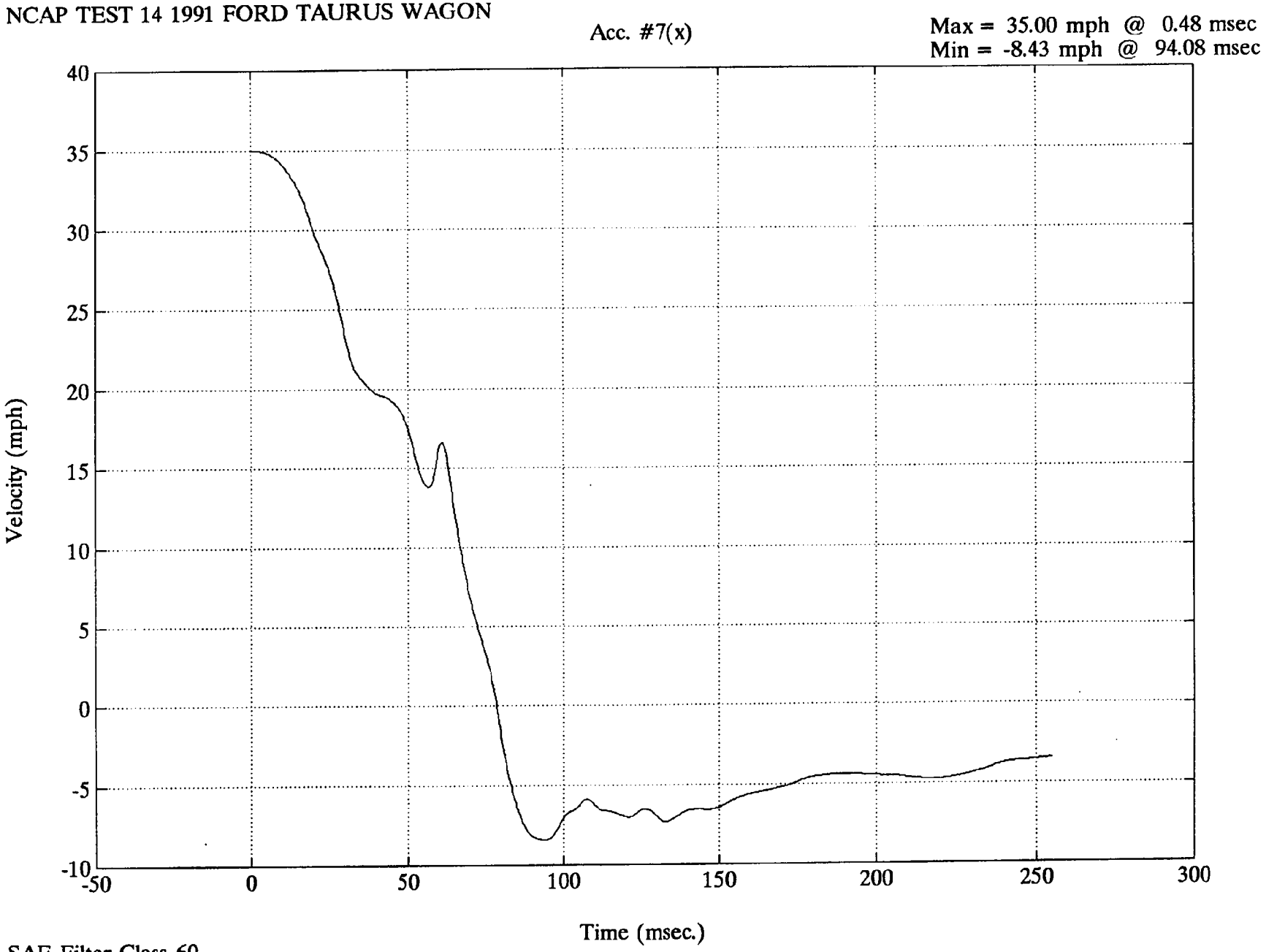


B-21

7893-10

SAE Filter Class 60

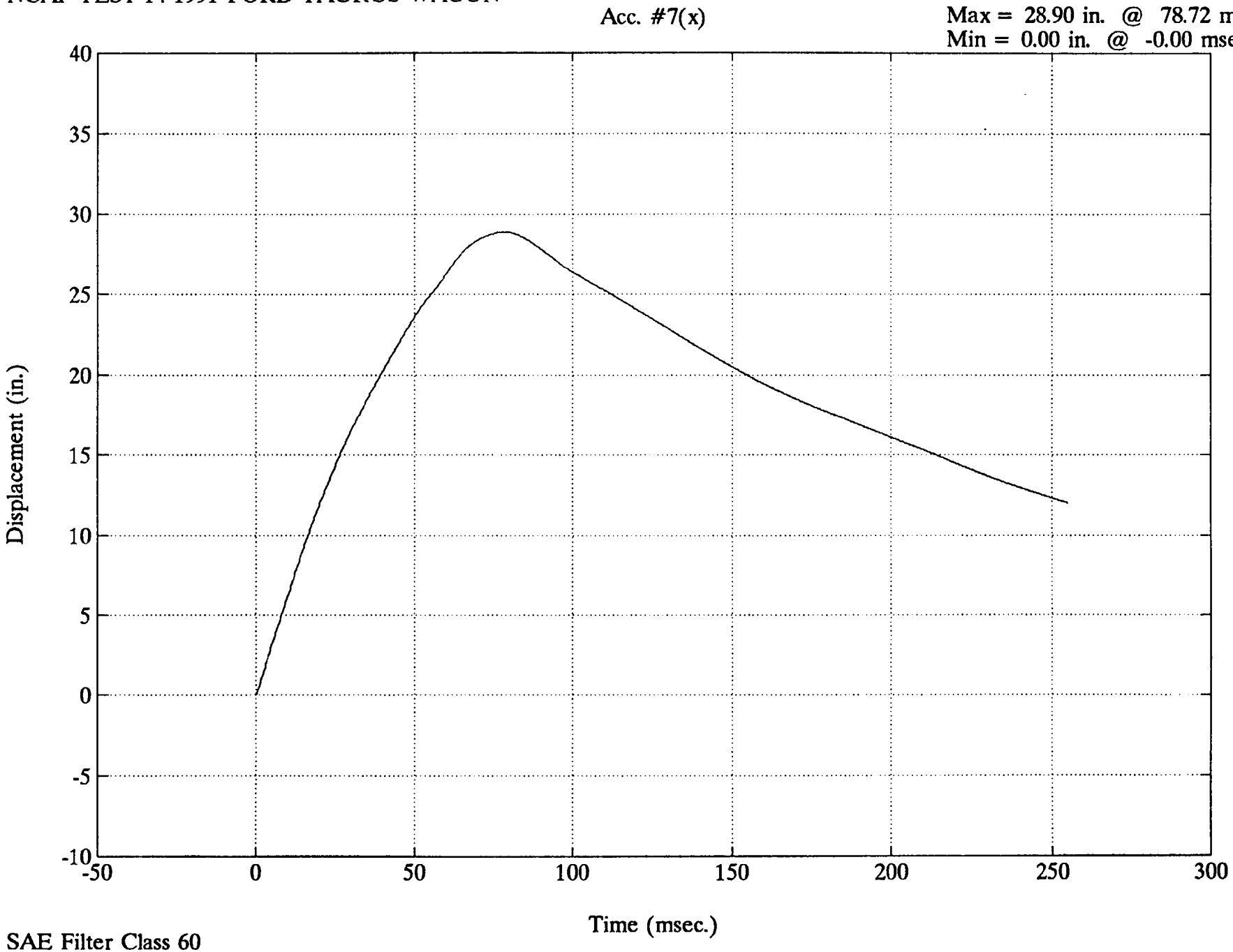
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

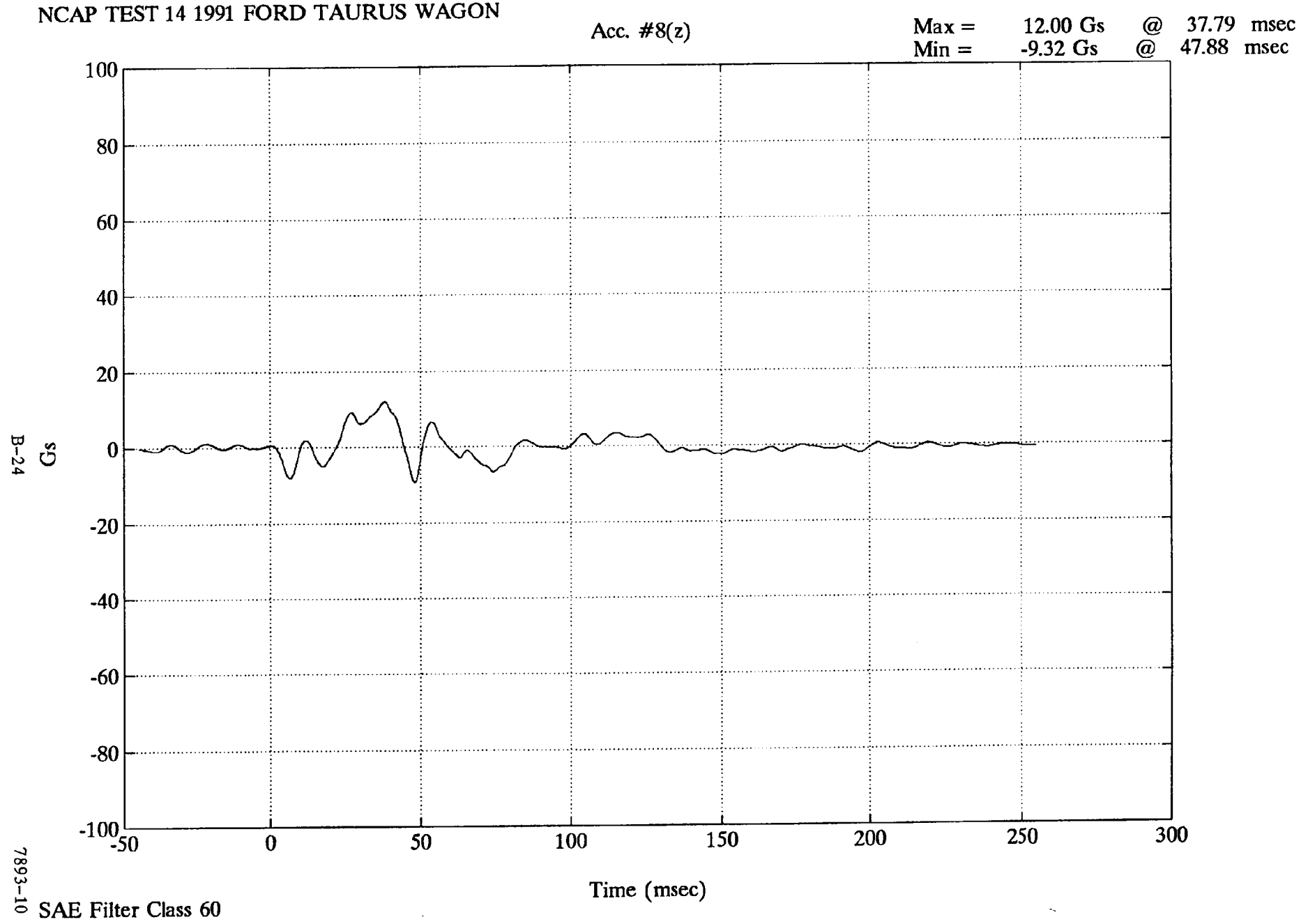
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

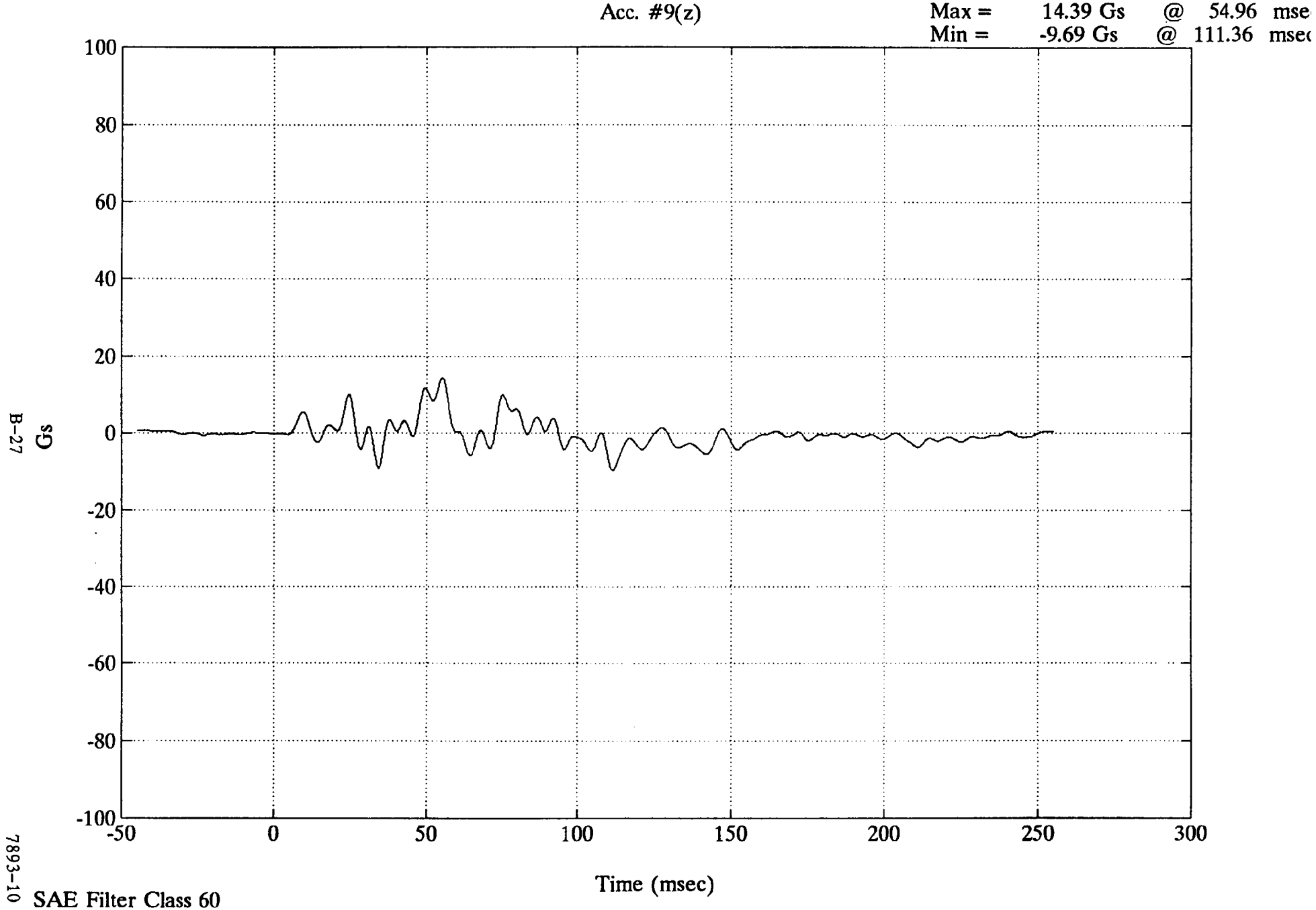
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON



B-27

7893-10

SAE Filter Class 60

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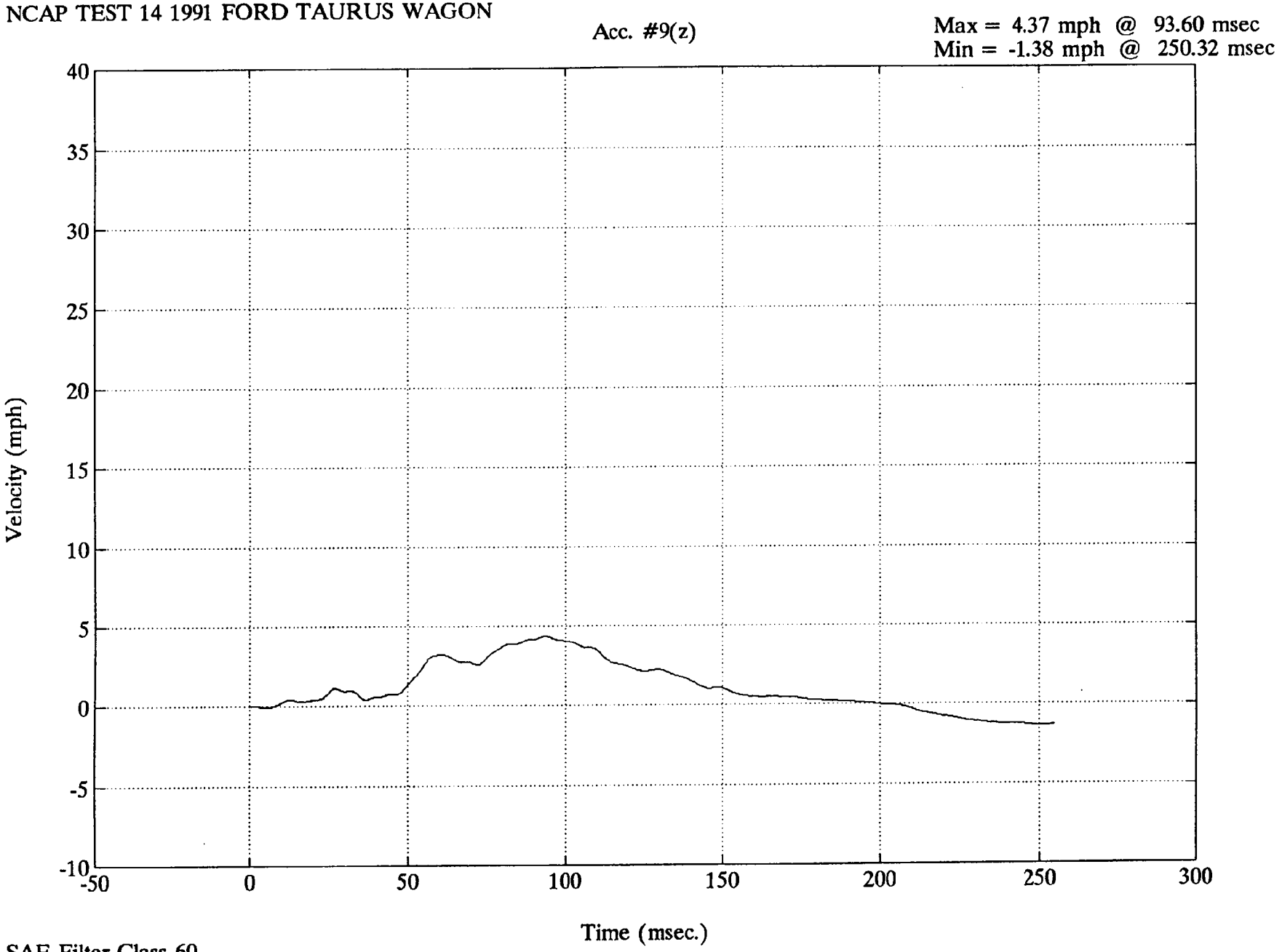
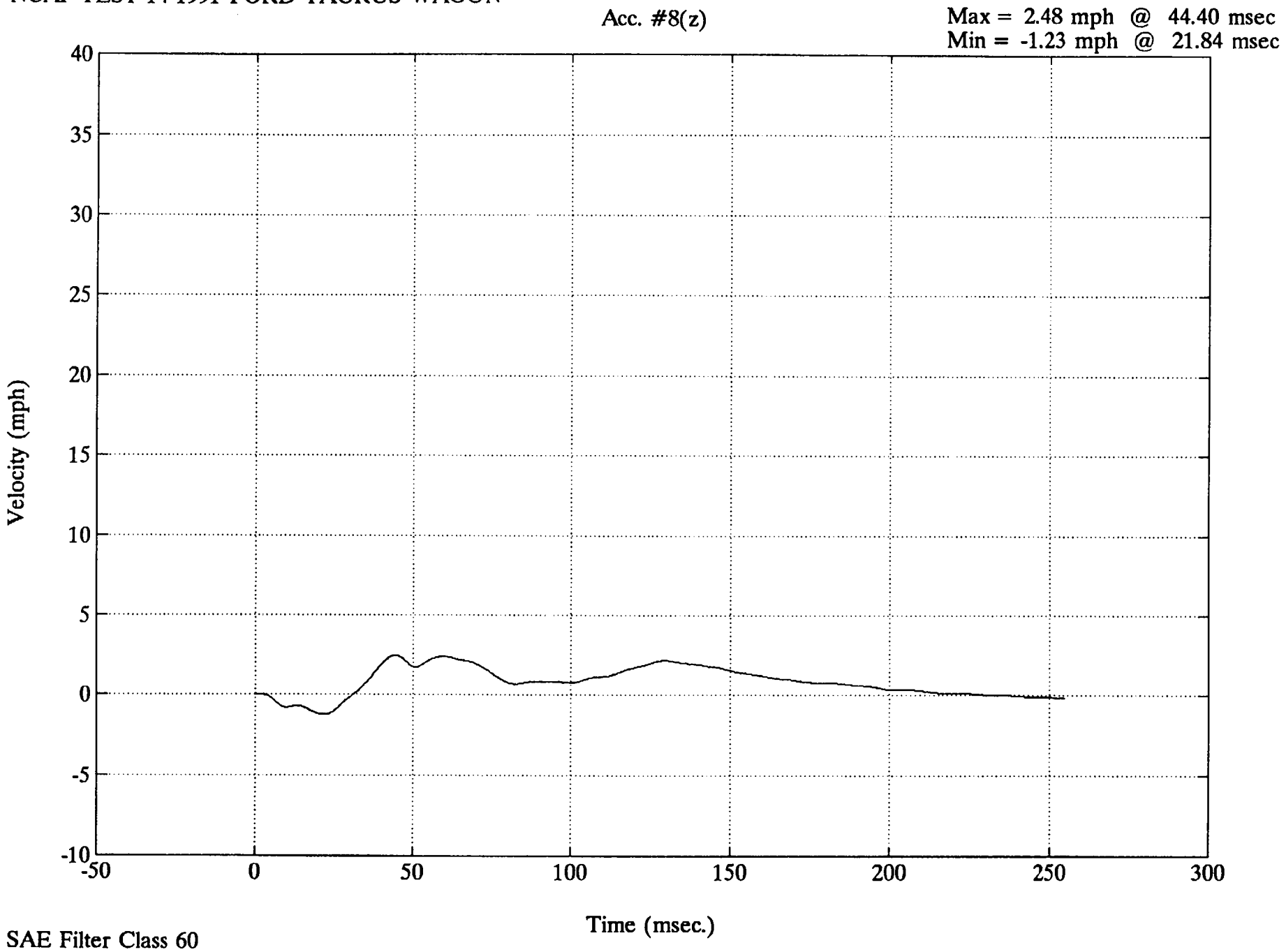


SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

Acc. #8(z)

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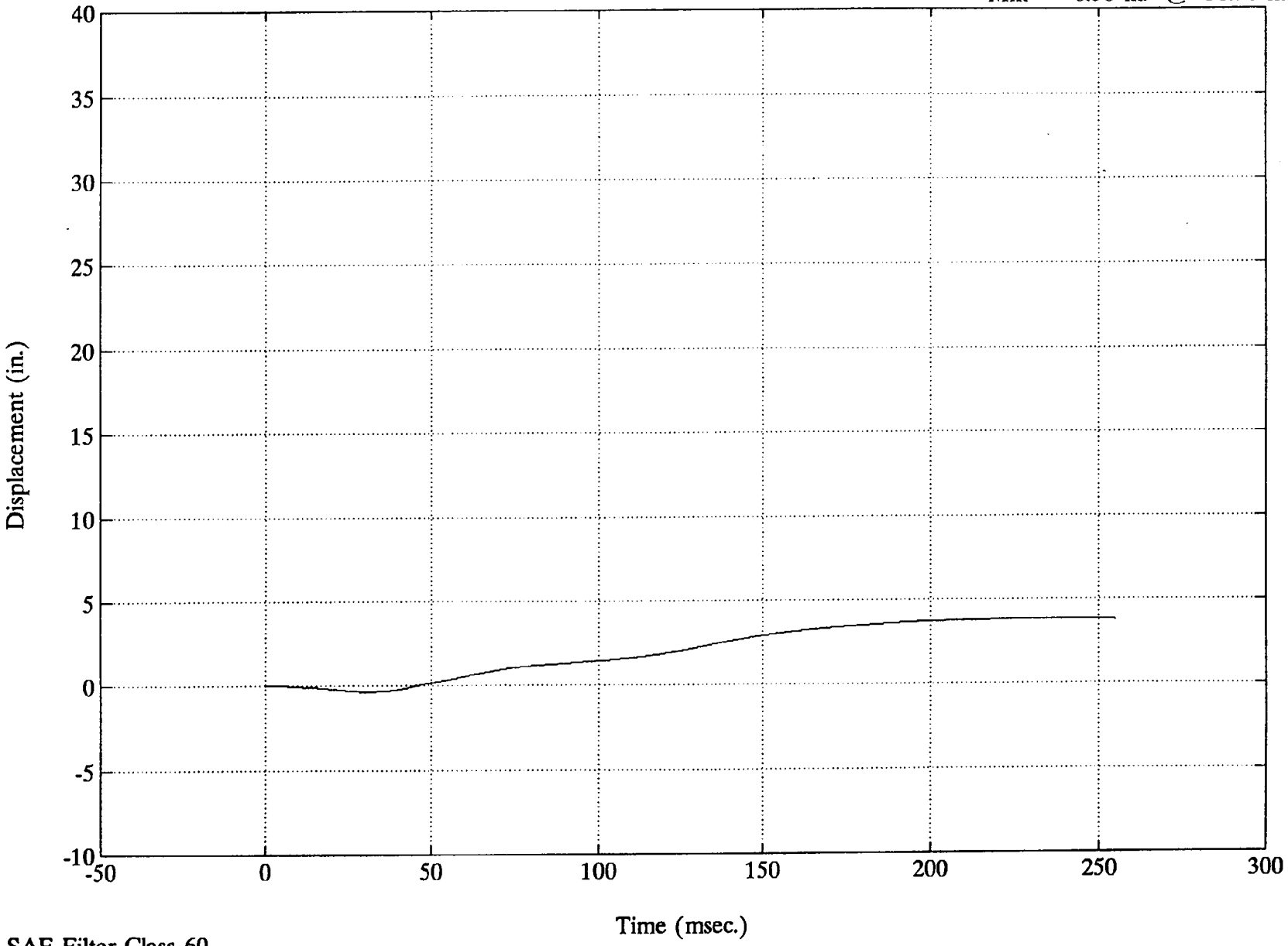
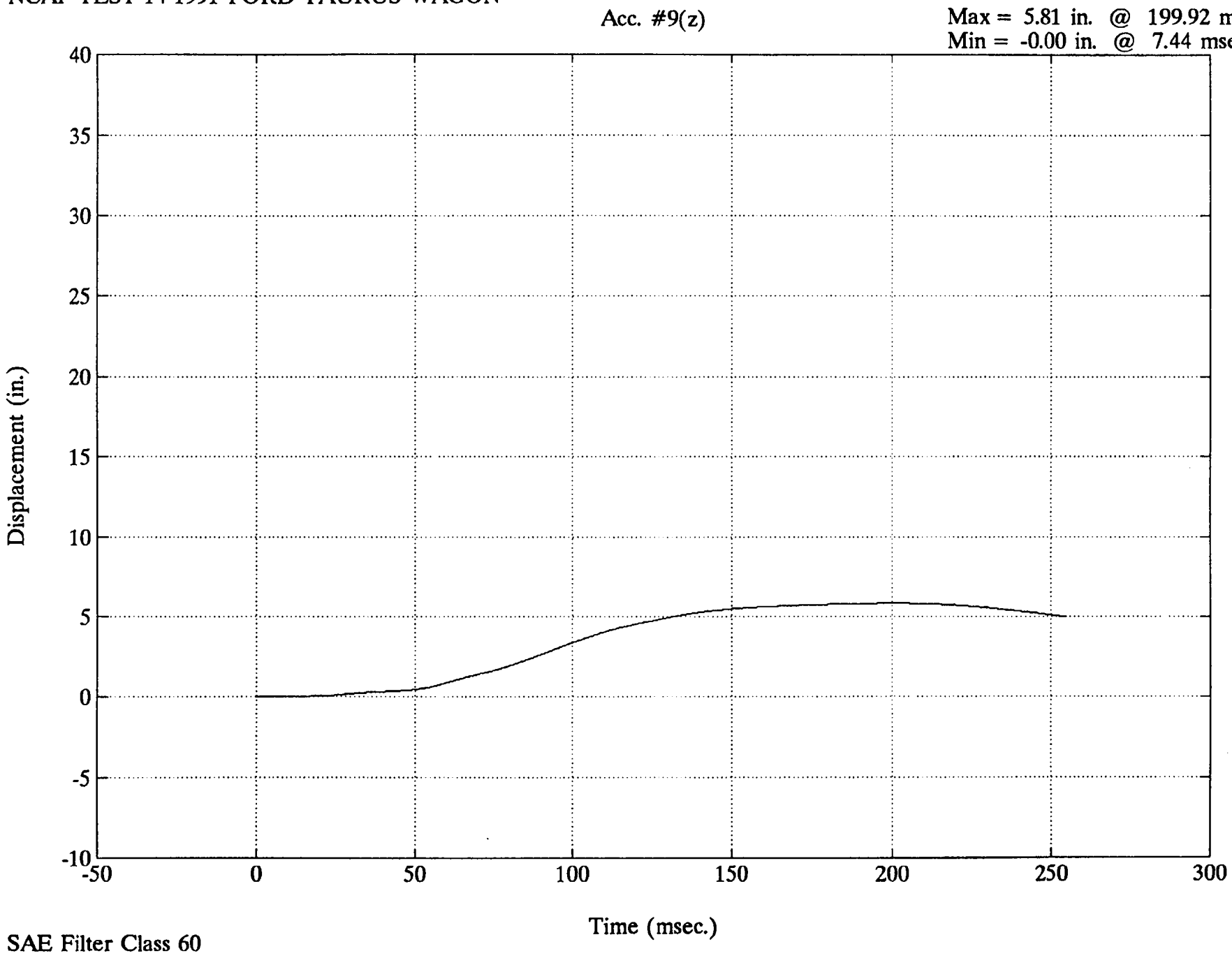
Min = -0.36 in. @ 30.96 msec



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

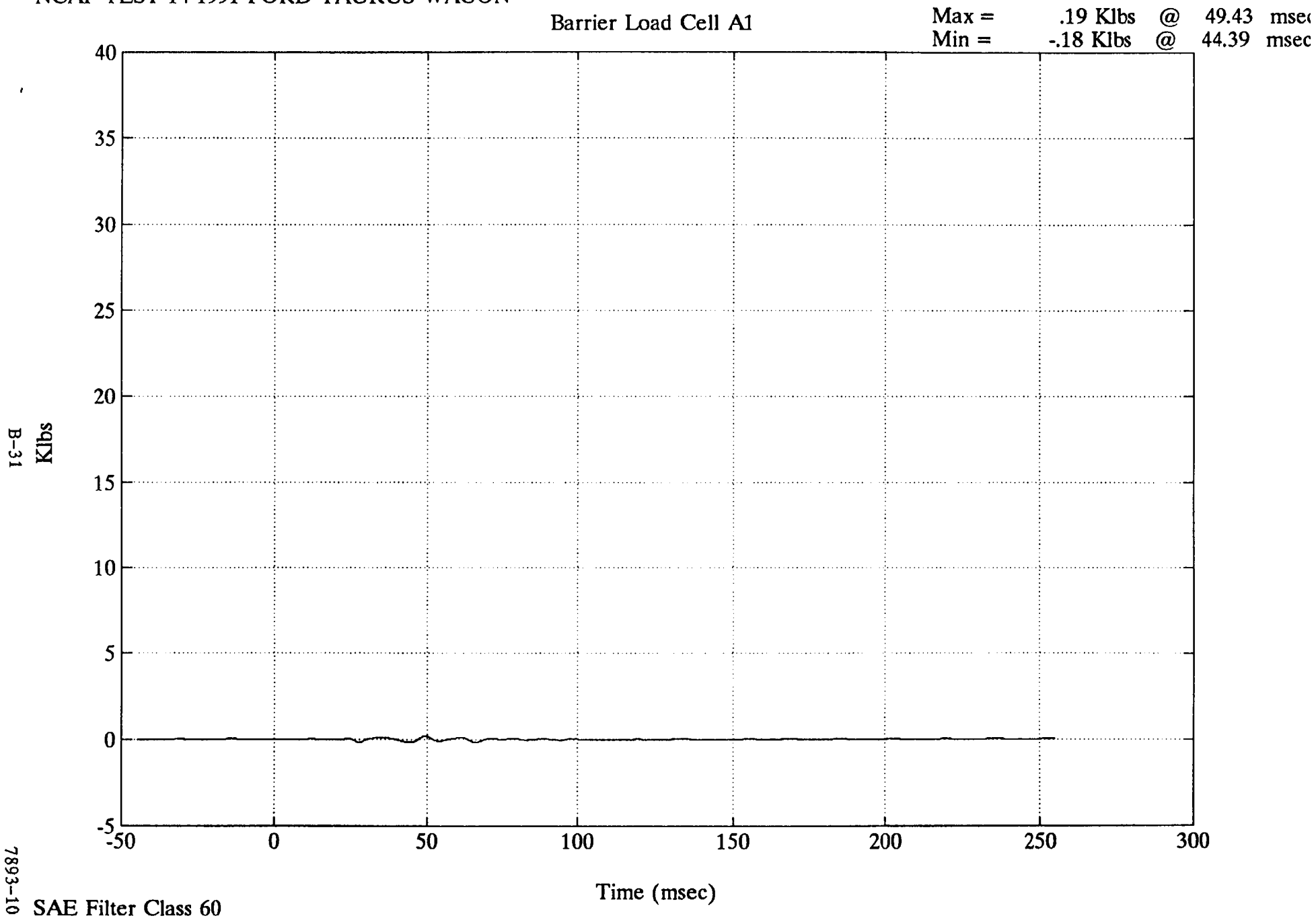
TEST NO. MM0203

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

60

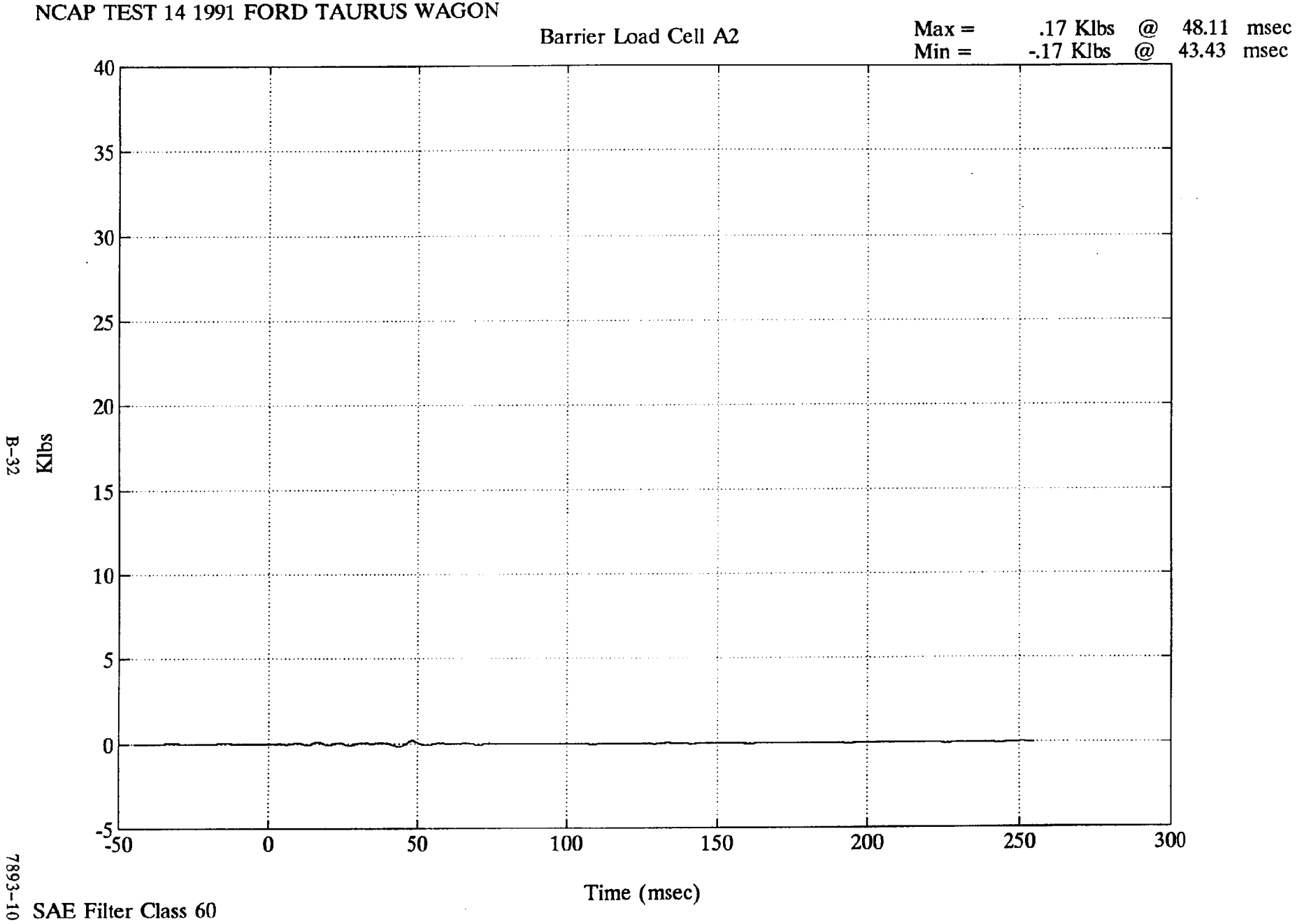
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

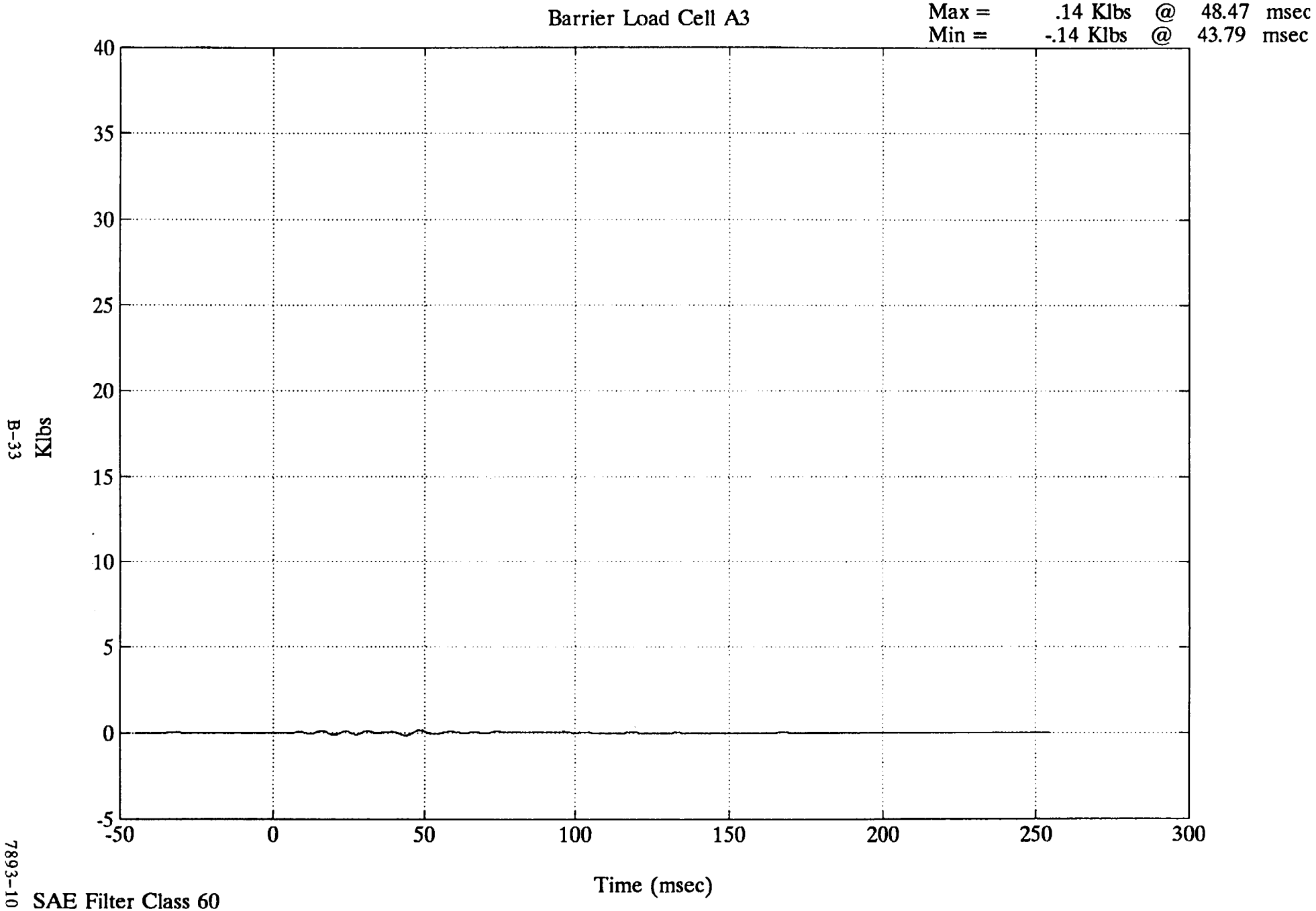


B-32

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

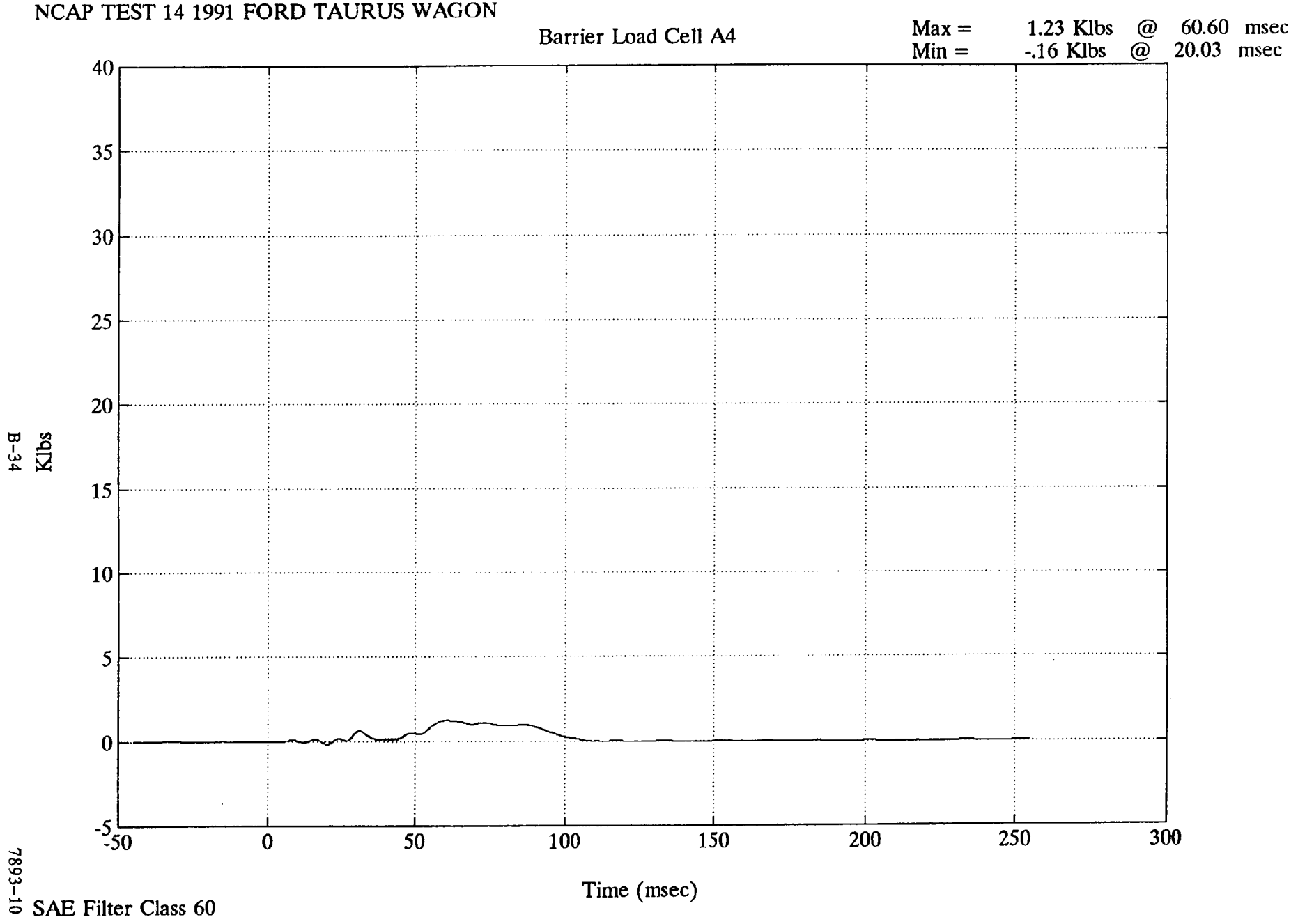


B-33

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

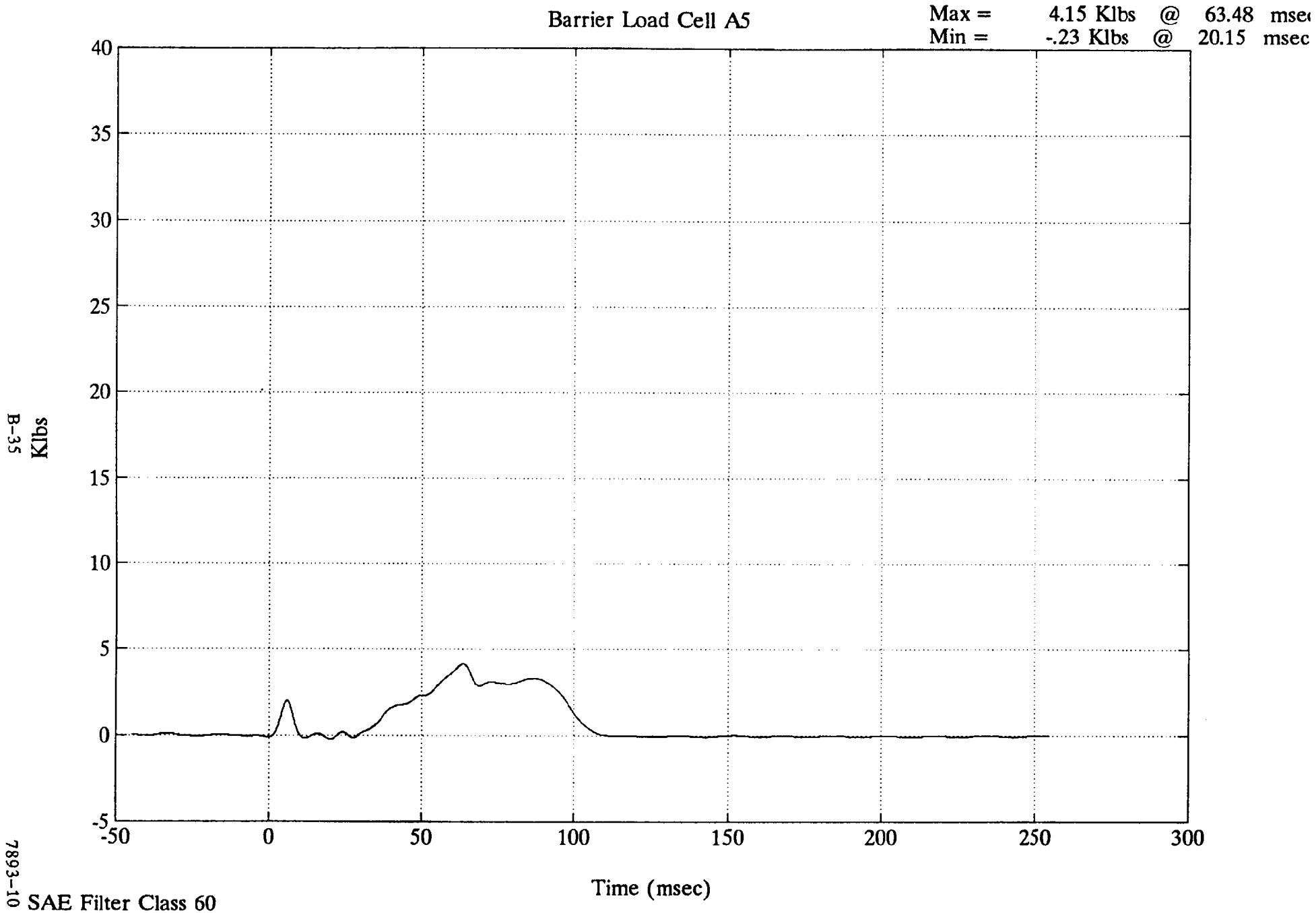


B-34

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

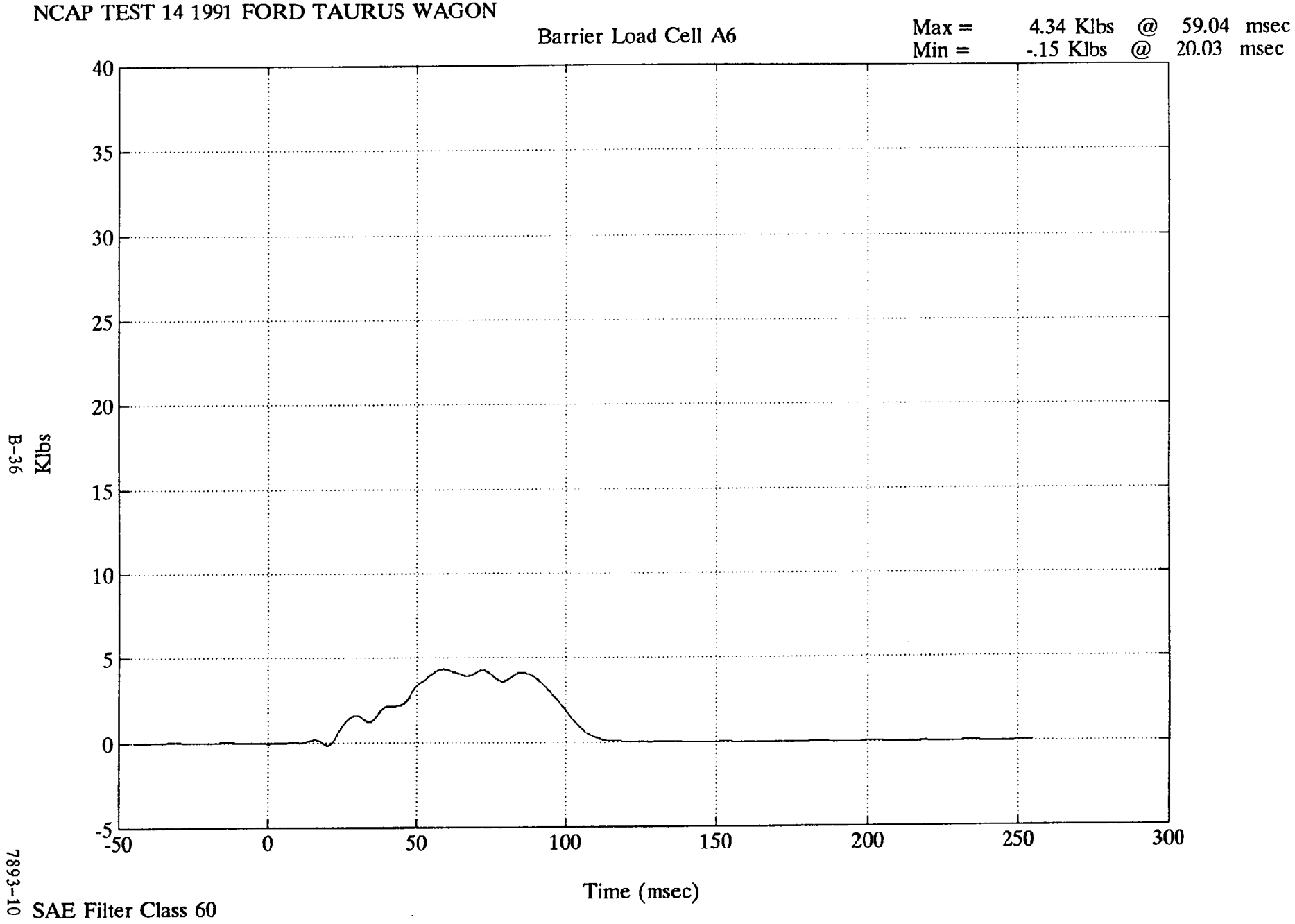


B-35

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

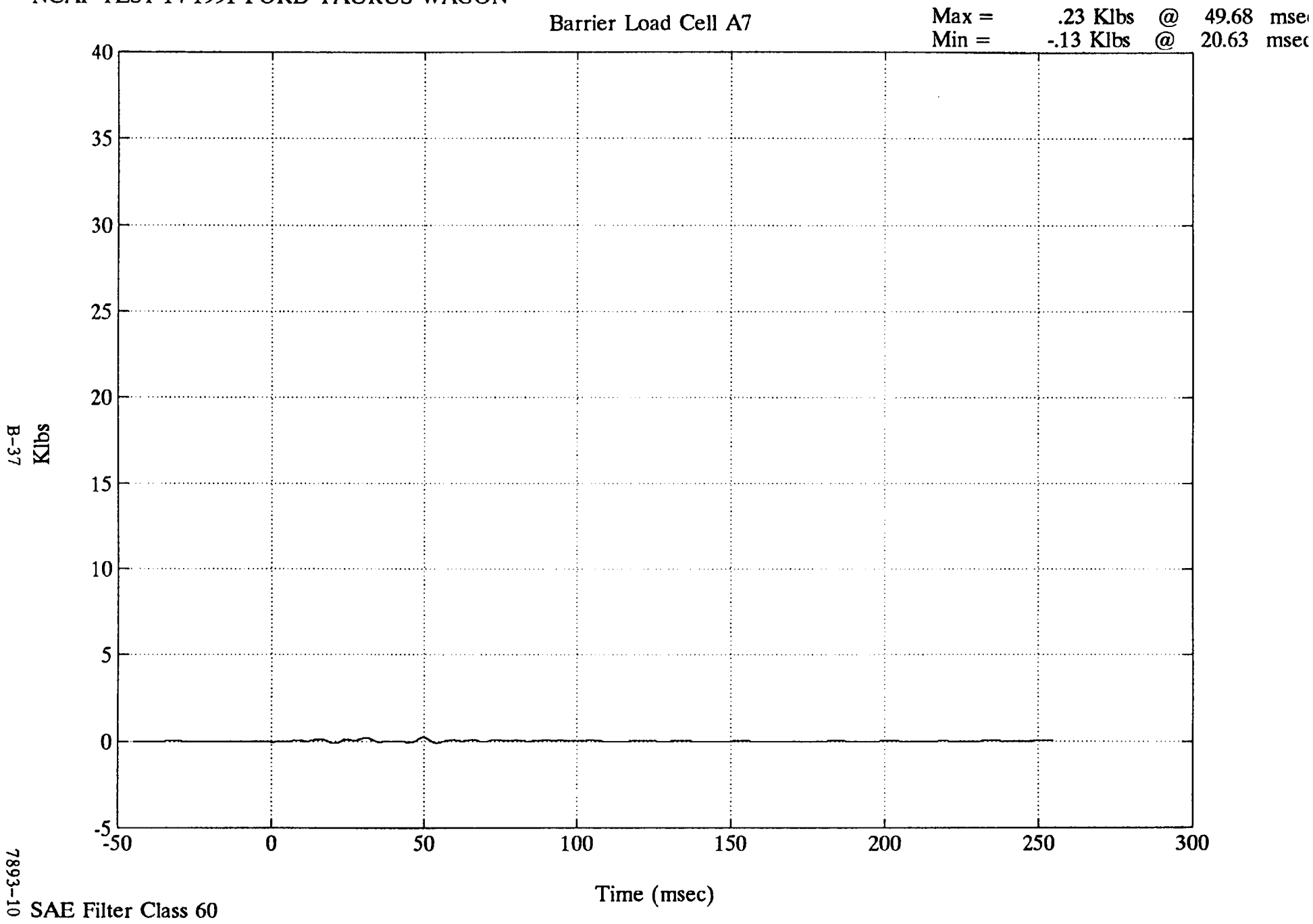


B-36

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

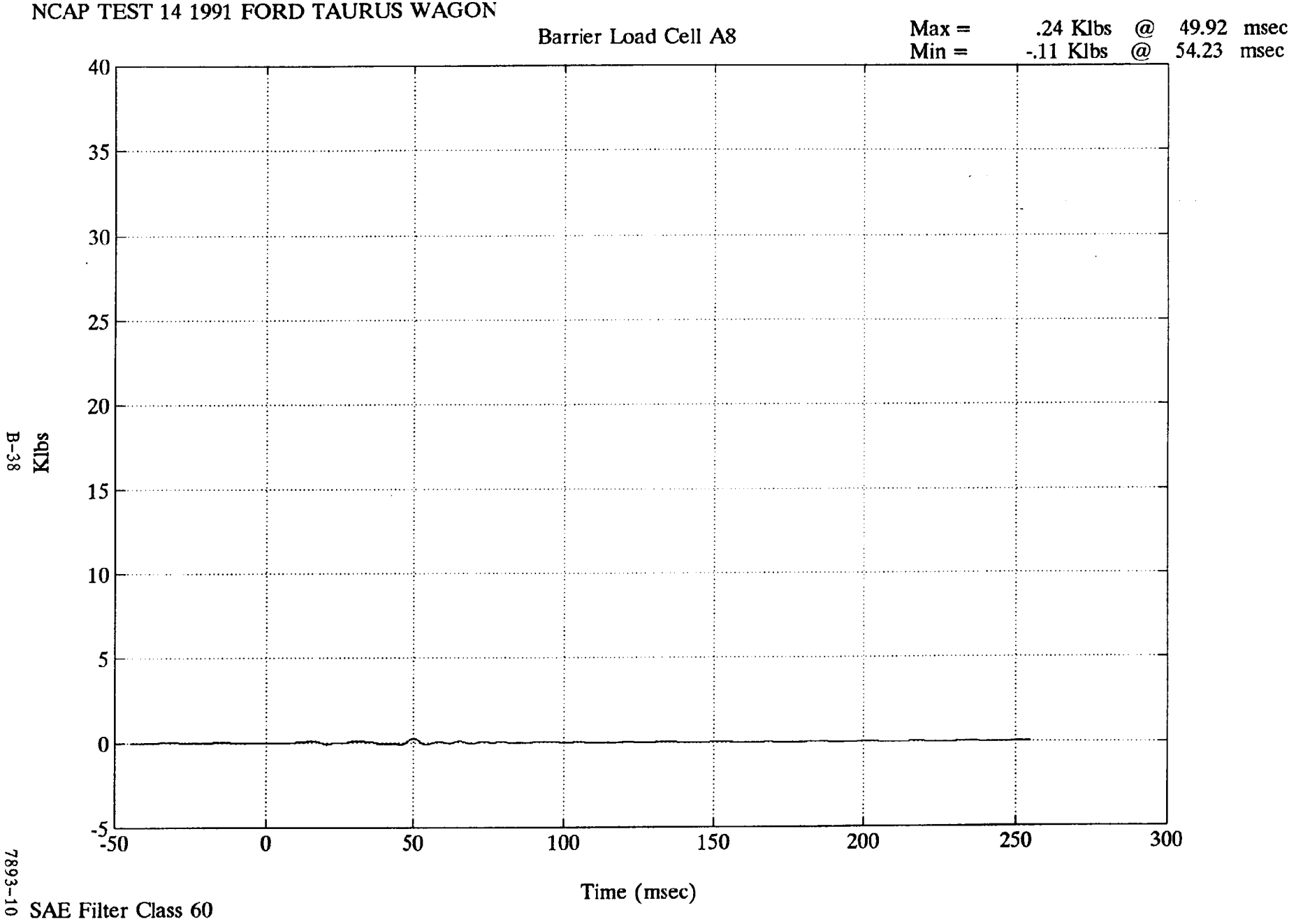


B-37

7893-10

SAE Filter Class 60

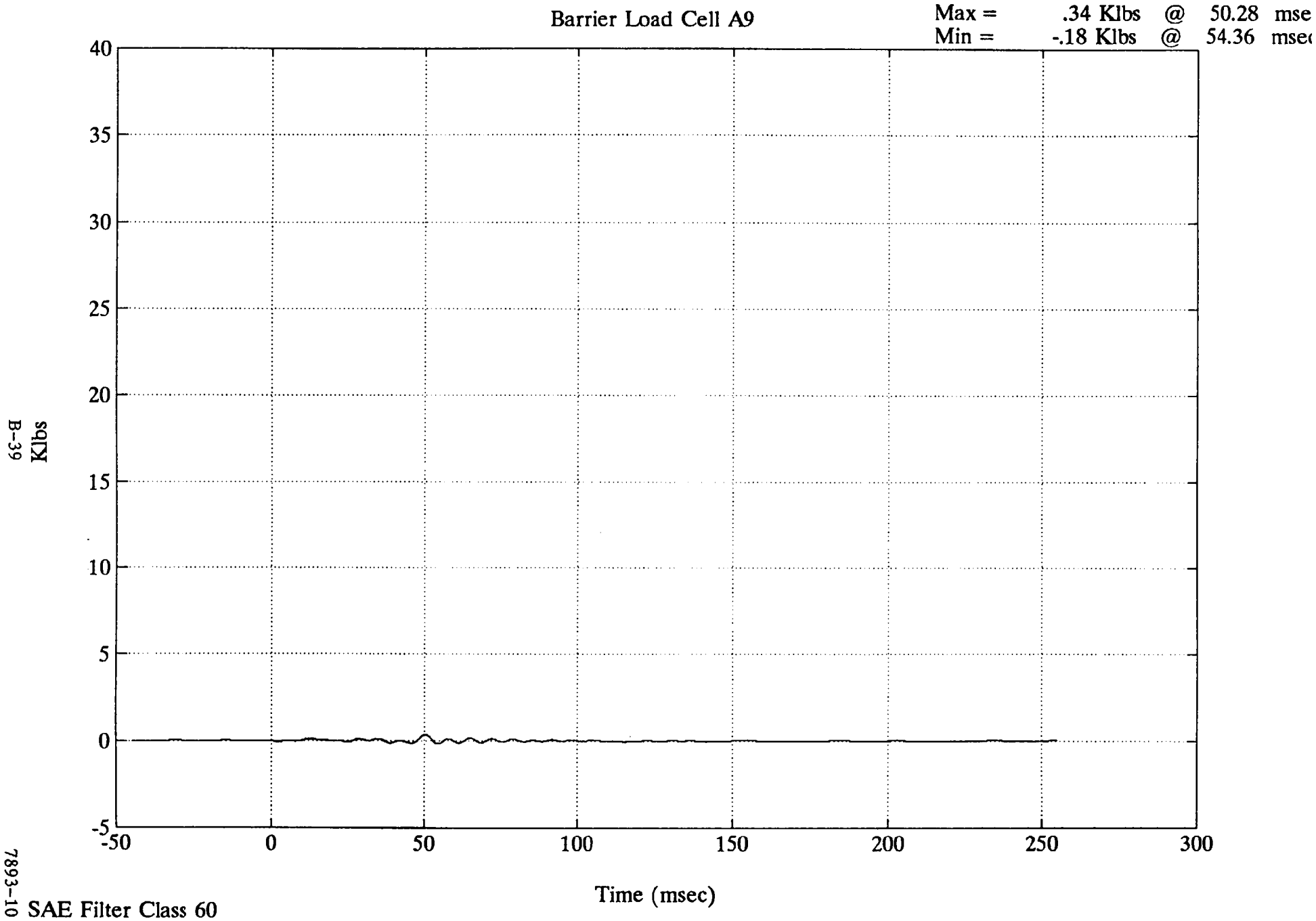
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

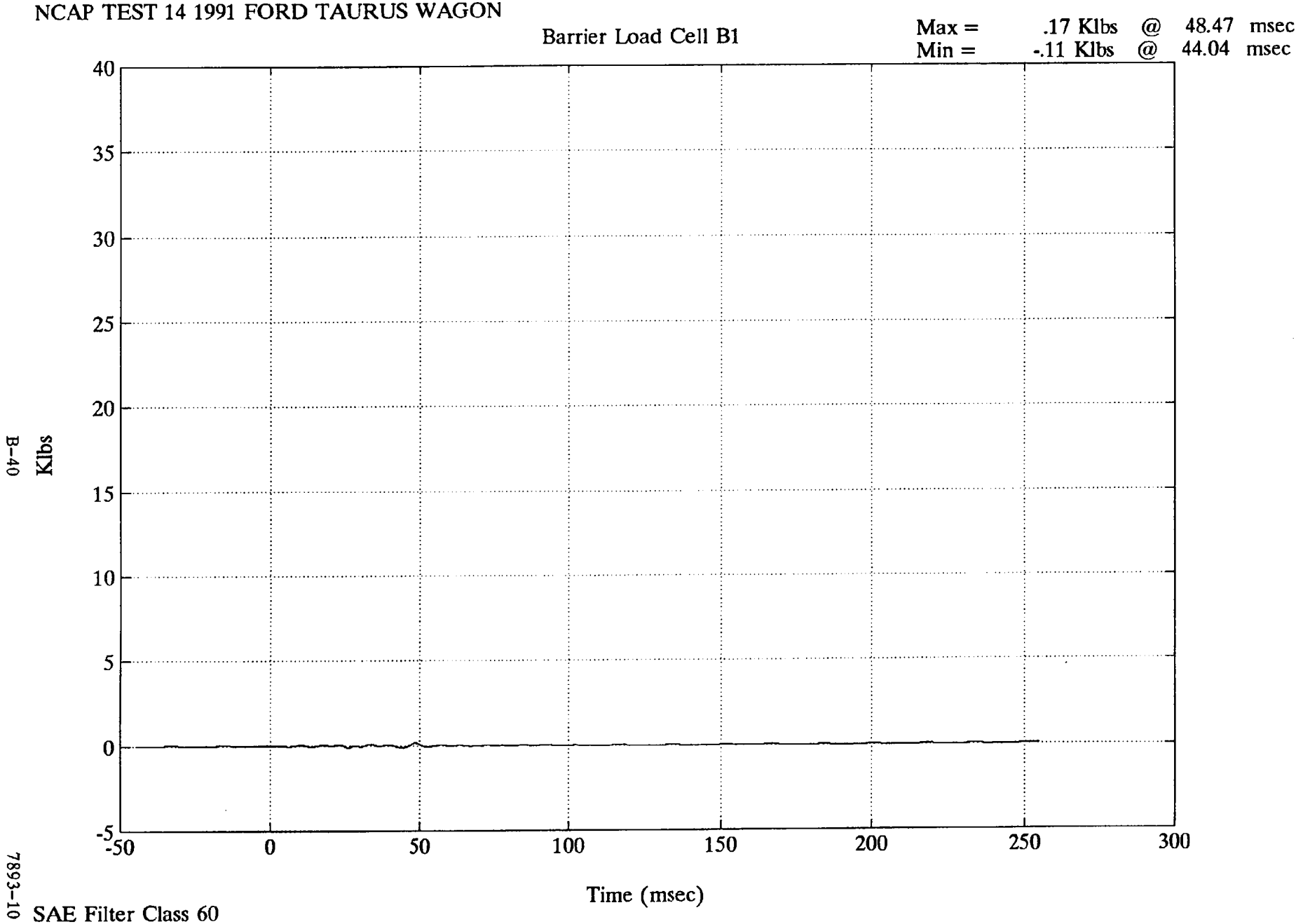
NCAP TEST 14 1991 FORD TAURUS WAGON



B-39

7893-10 SAE Filter Class 60

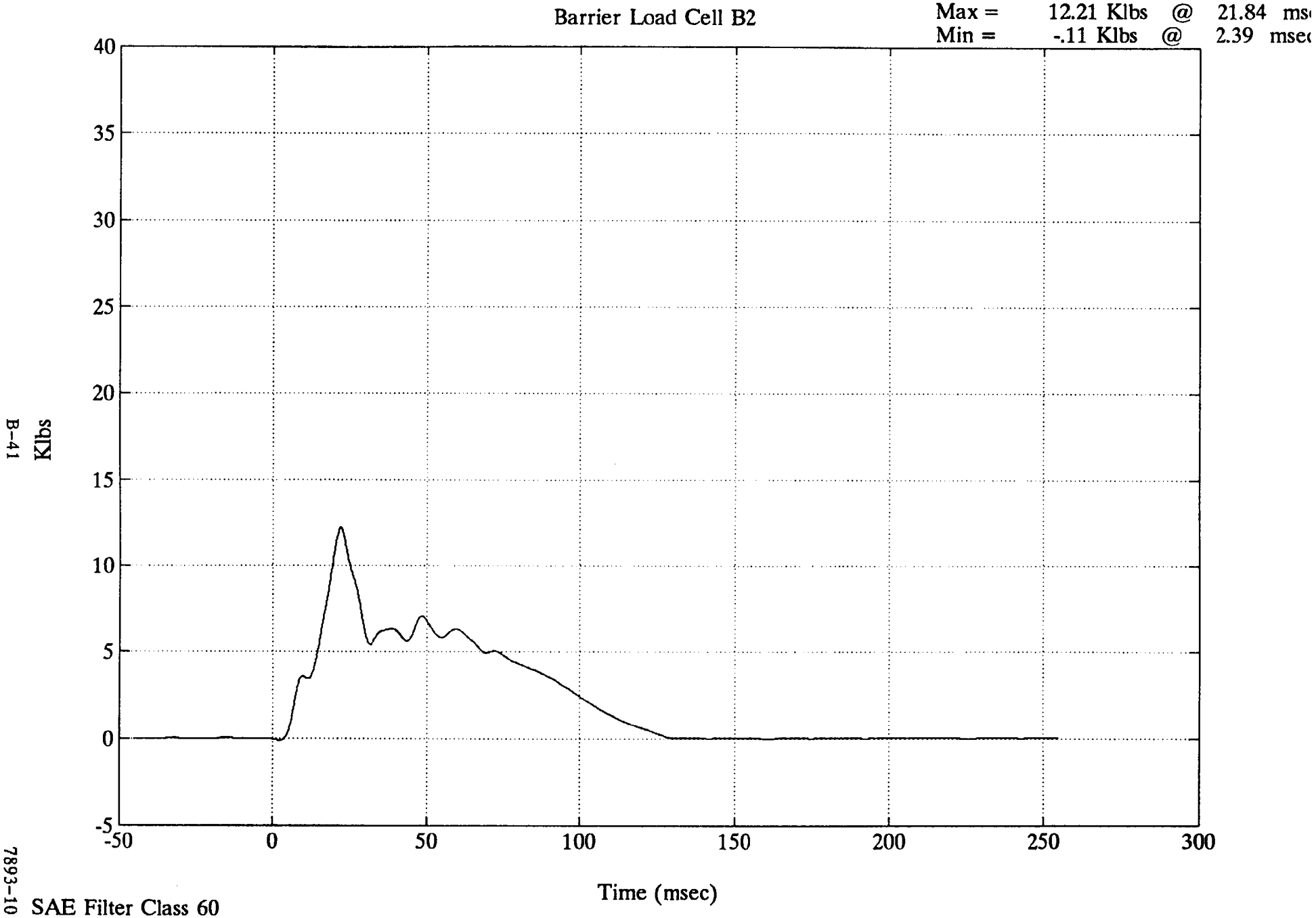
NCAP TEST 14 1991 FORD TAURUS WAGON



SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

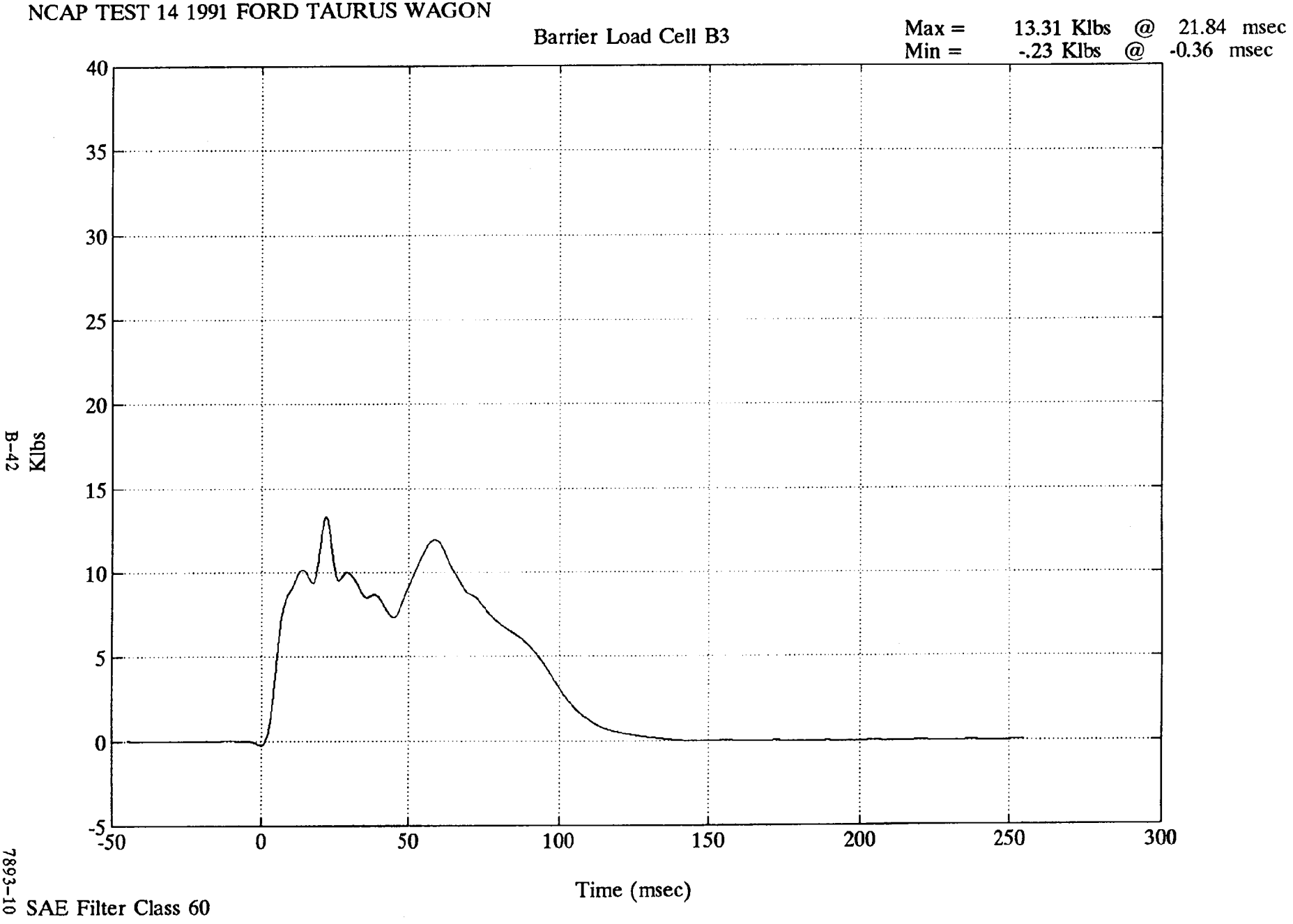


B-41

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

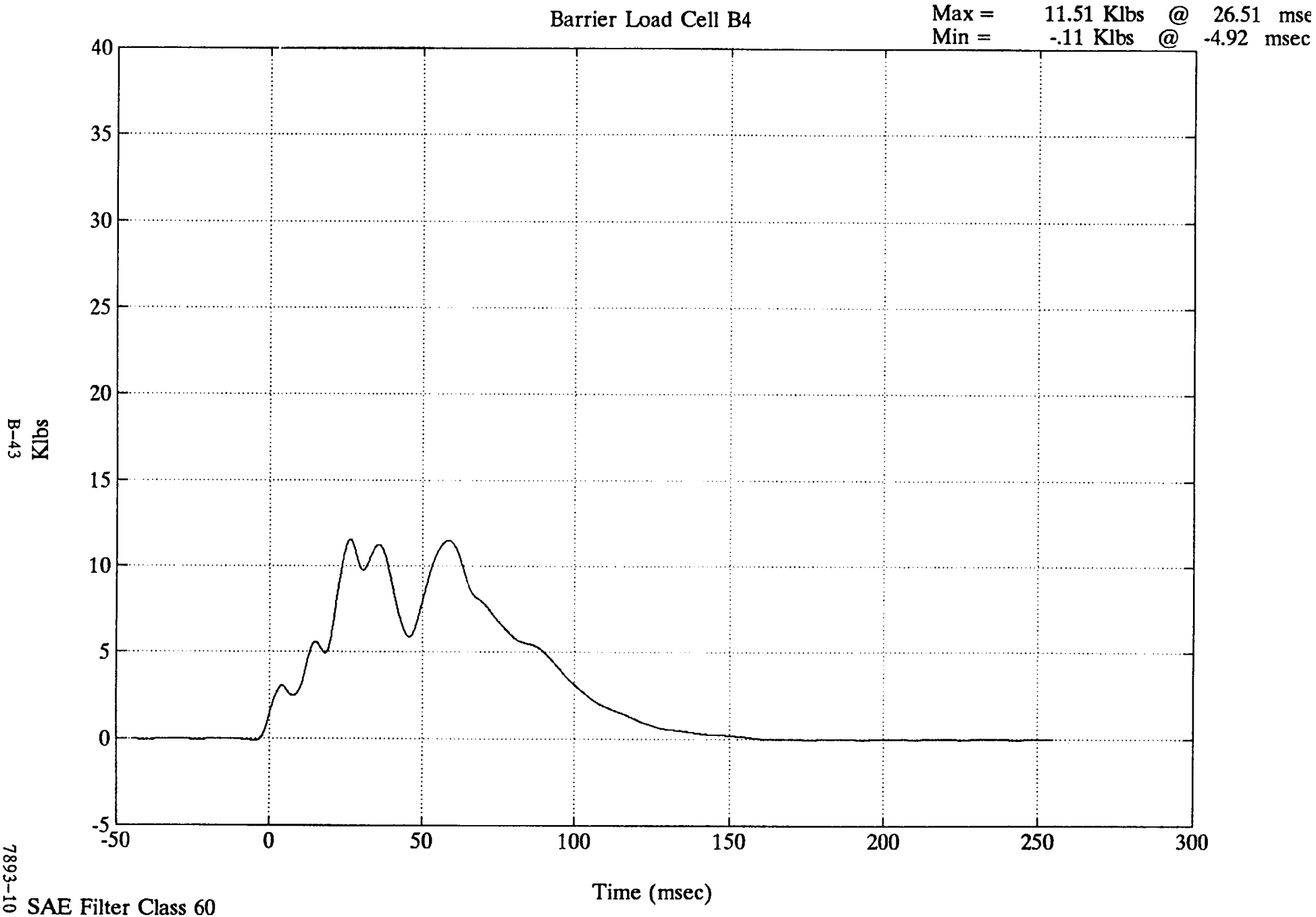


B-42

7893-10

SAE Filter Class 60

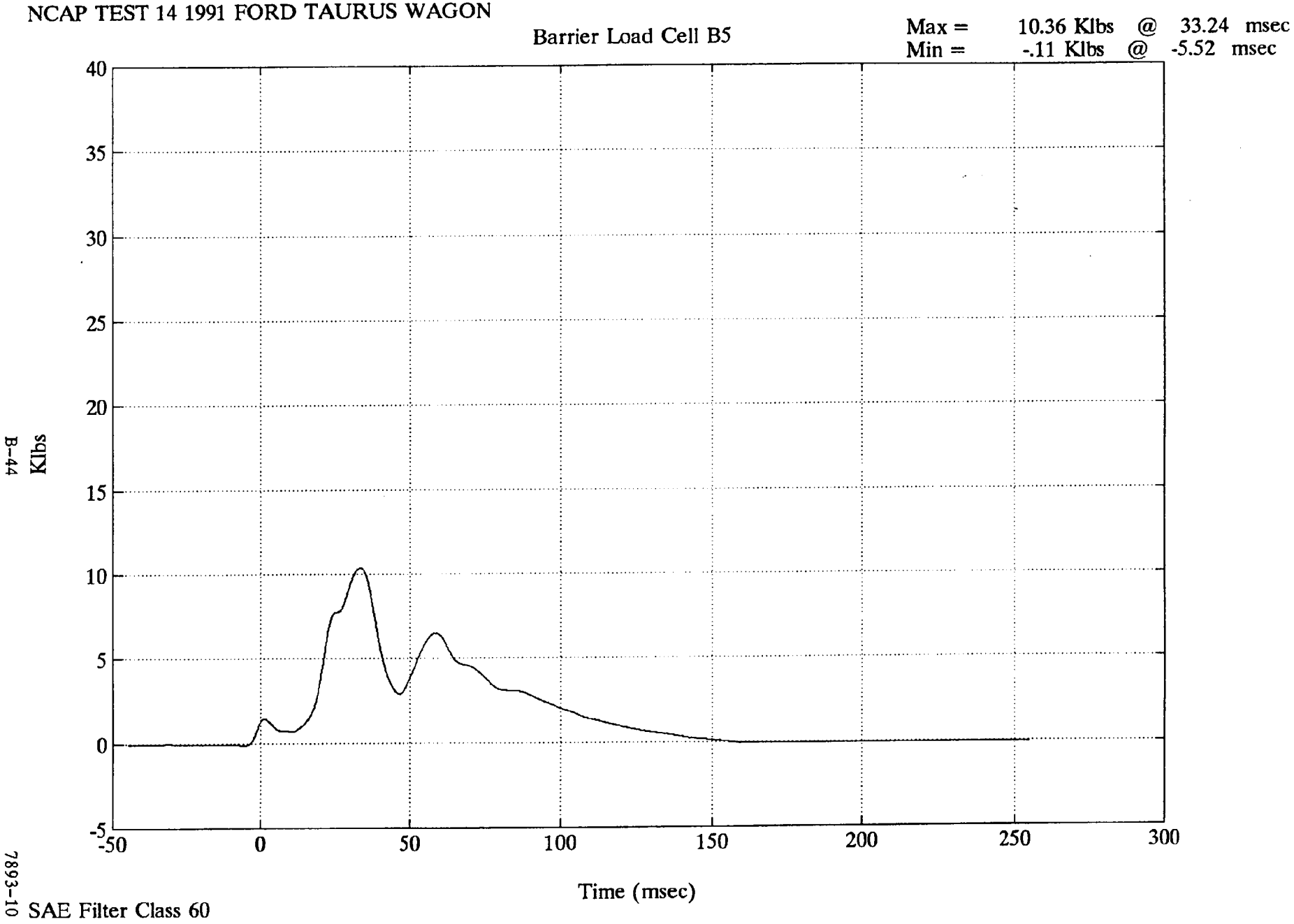
NCAP TEST 14 1991 FORD TAURUS WAGON



B-43

7893-10 SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

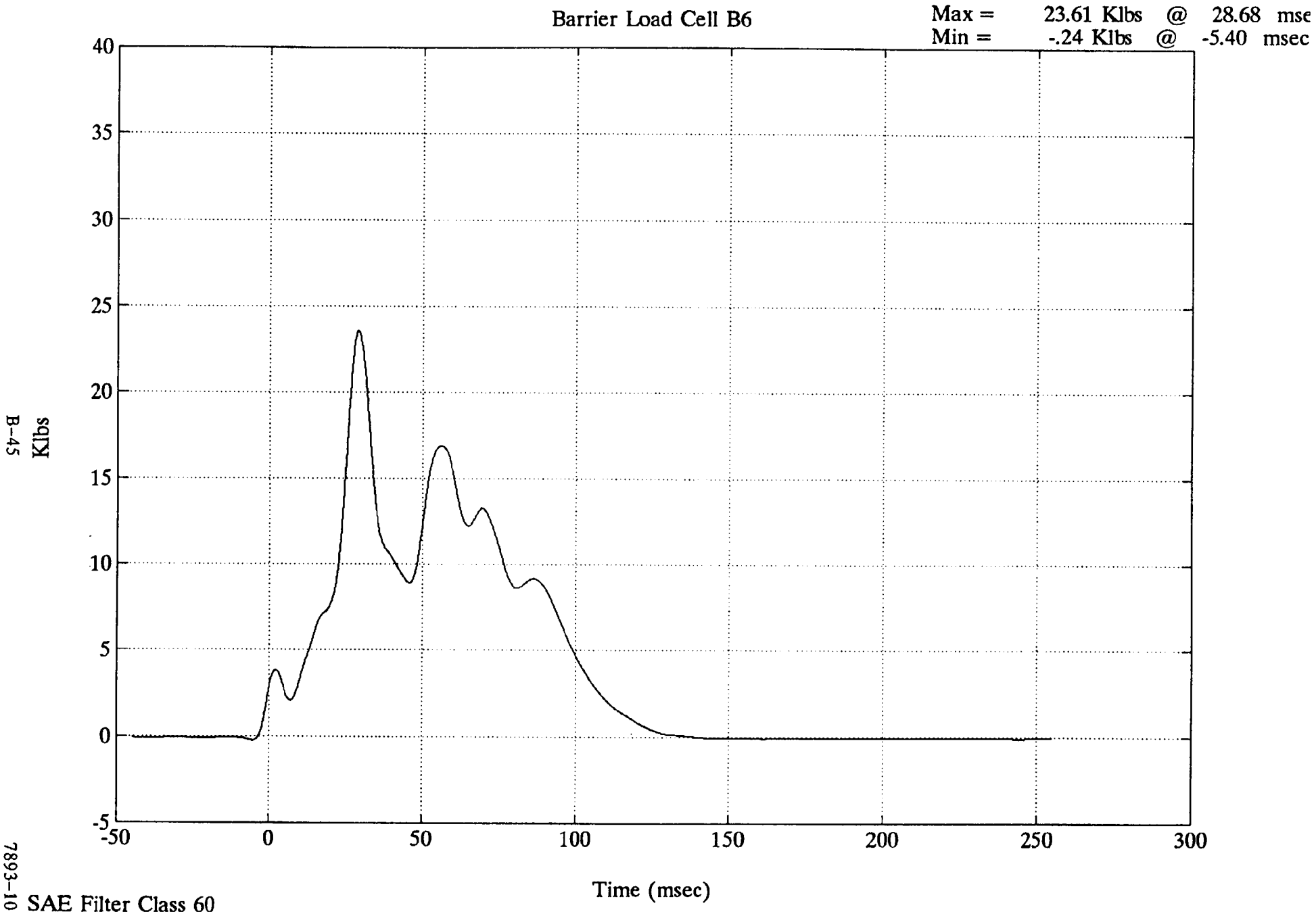


B-44

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



B-45

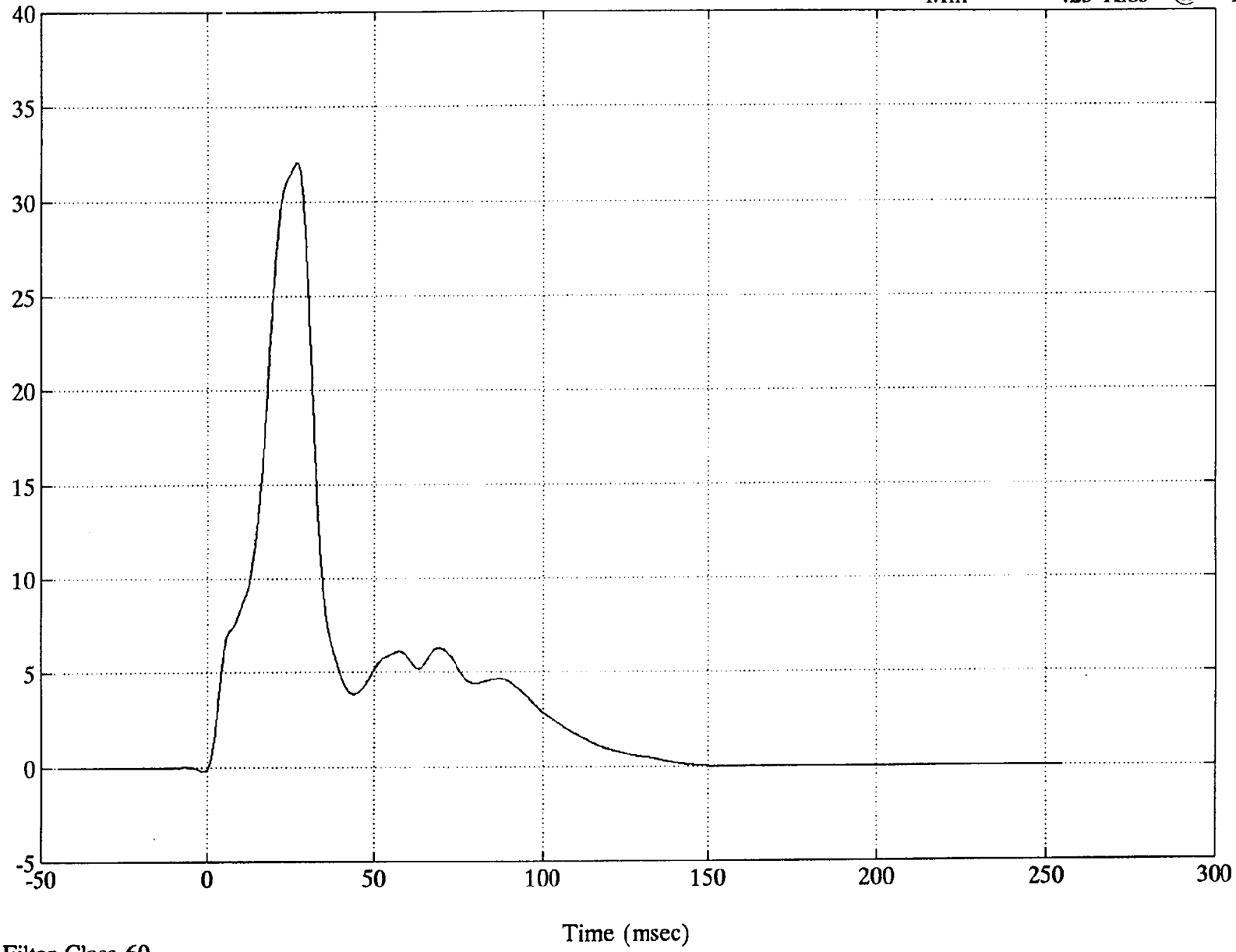
7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Barrier Load Cell B7

Max = 32.07 Klbs @ 26.87 msec
Min = -.23 Klbs @ -1.32 msec

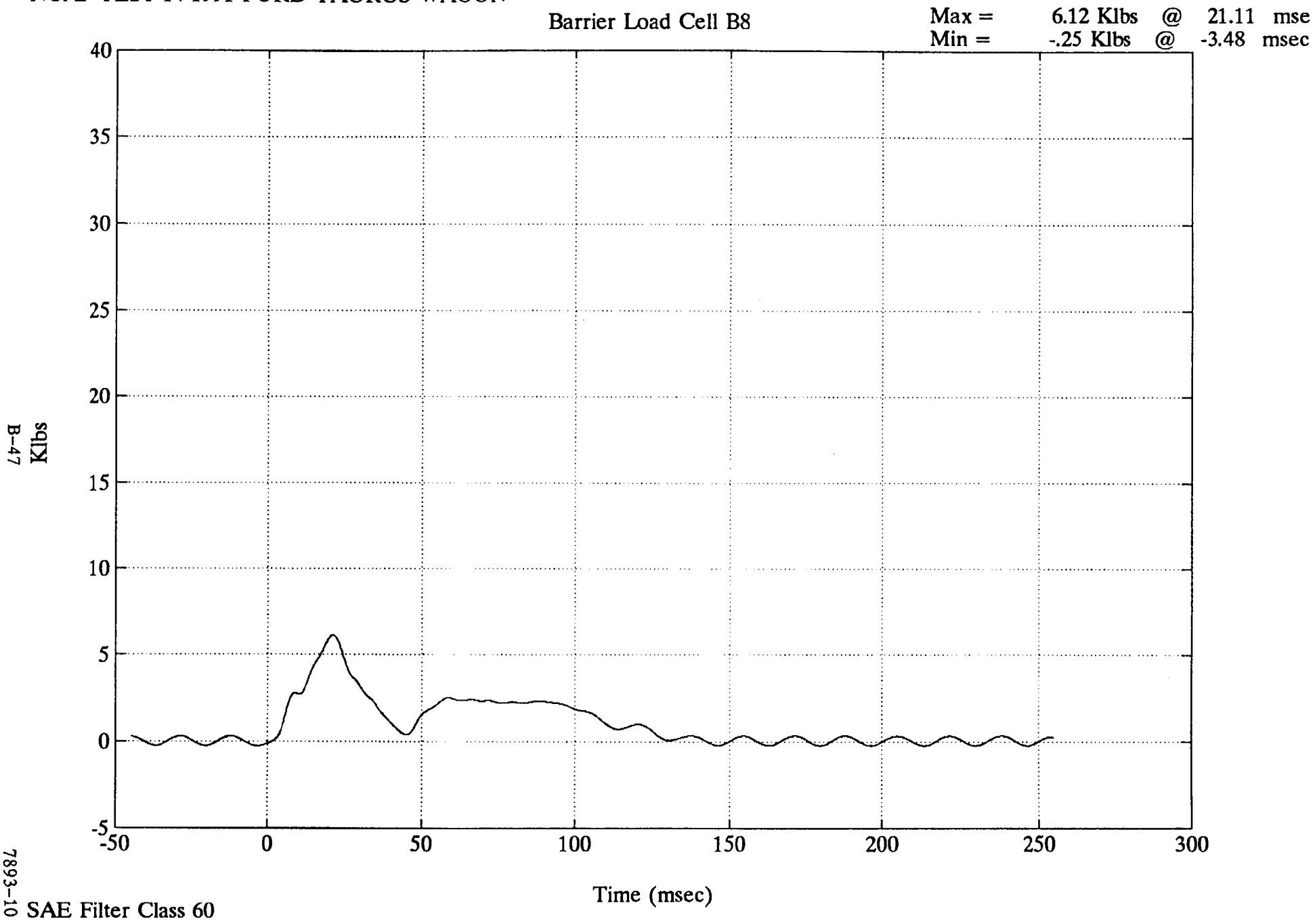


B-46

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



B-47

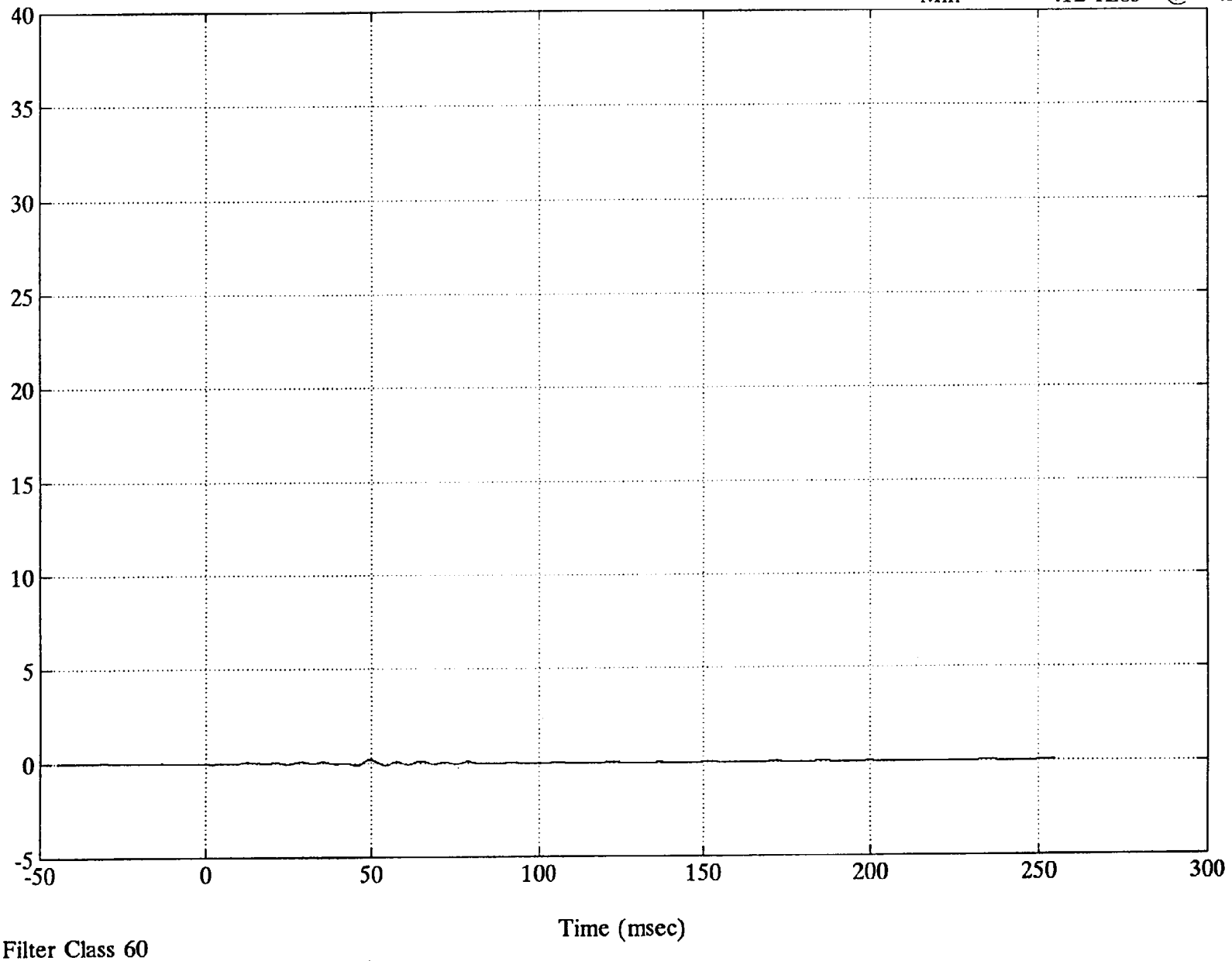
7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Barrier Load Cell B9

Max = .19 Klbs @ 49.55 msec
Min = -.12 Klbs @ 45.48 msec

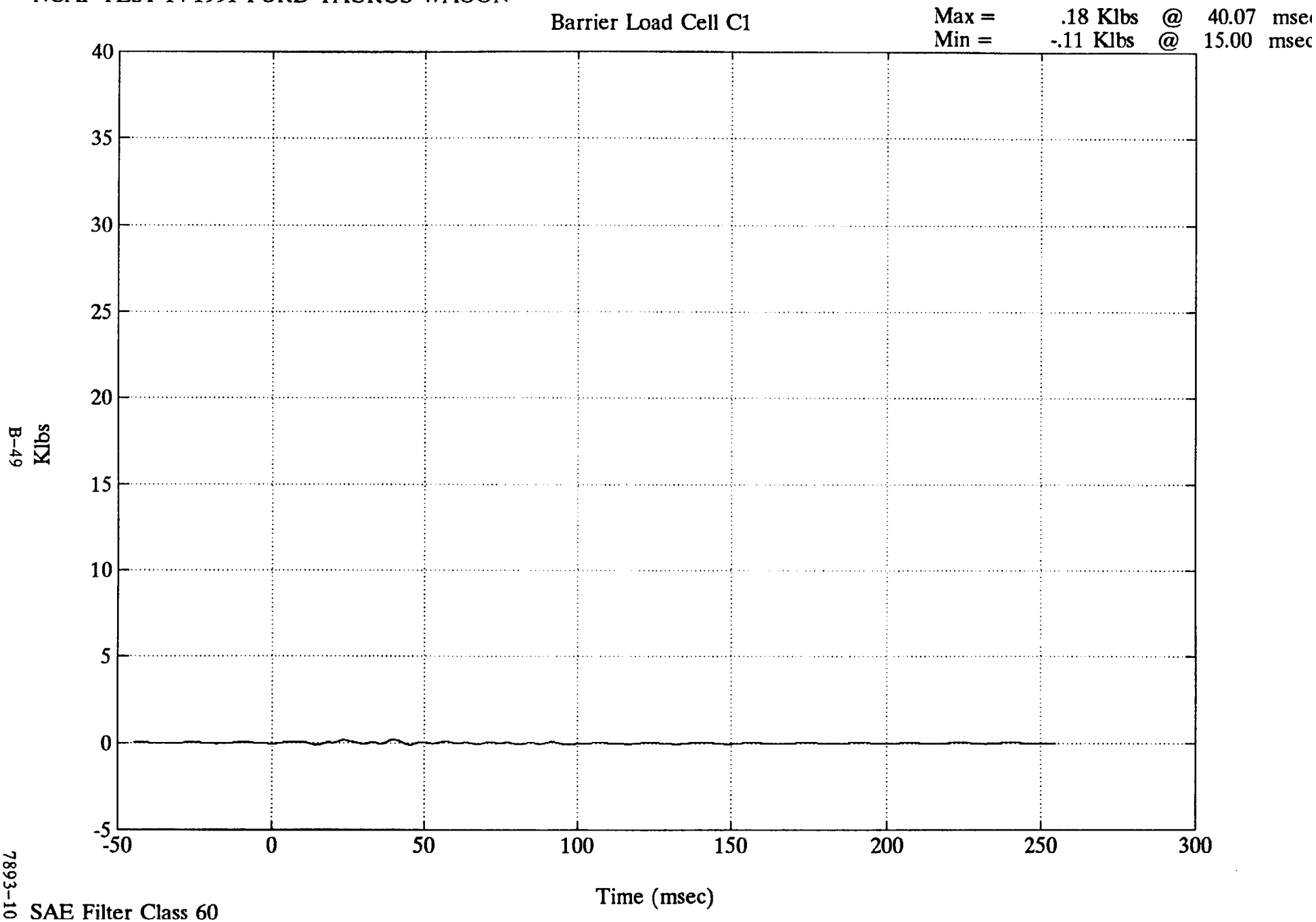


B-48

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



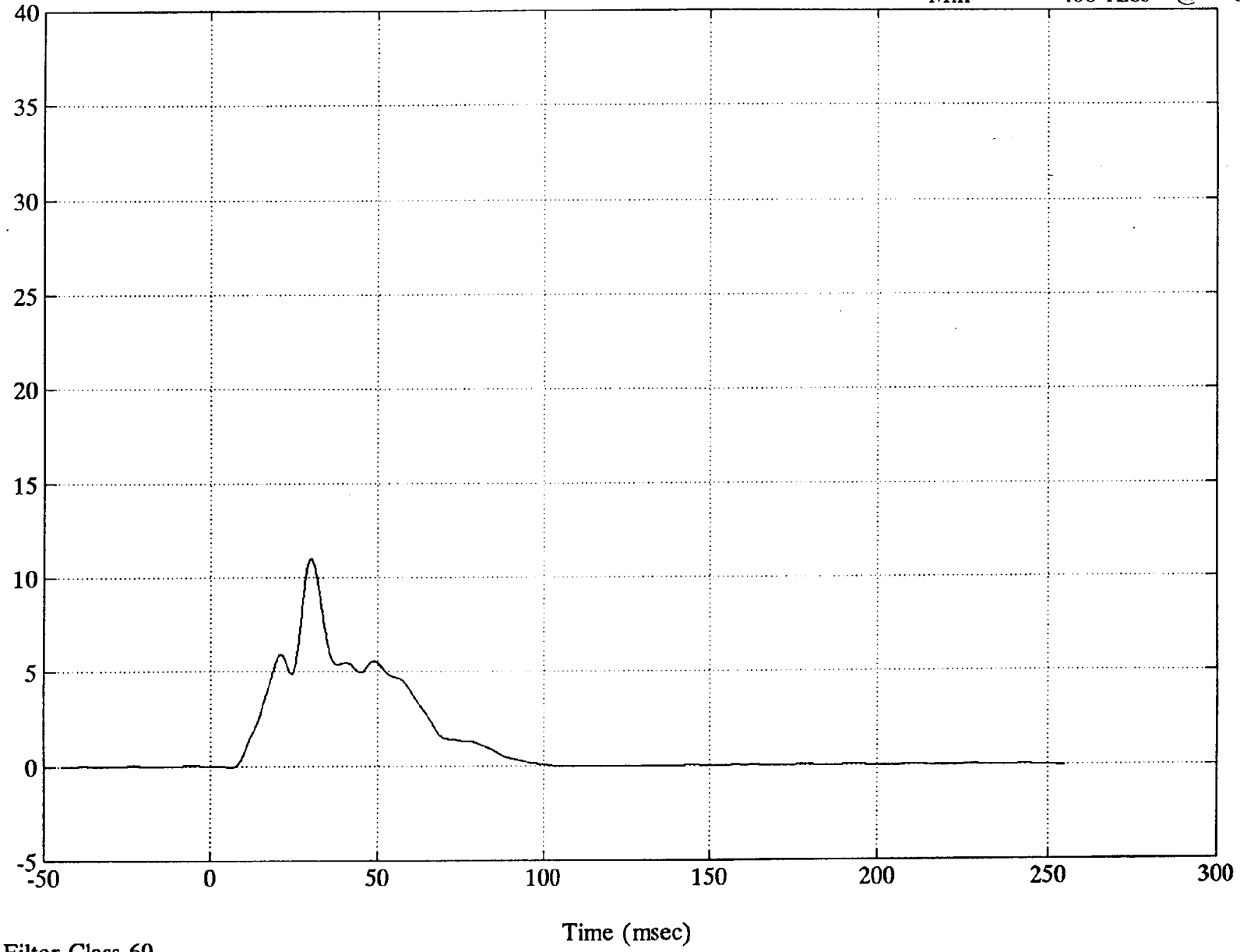
SAE Filter Class 60

7893-10

NCAP TEST 14 1991 FORD TAURUS WAGON

Barrier Load Cell C2

Max = 10.99 Klbs @ 30.00 msec
Min = -.06 Klbs @ 6.23 msec

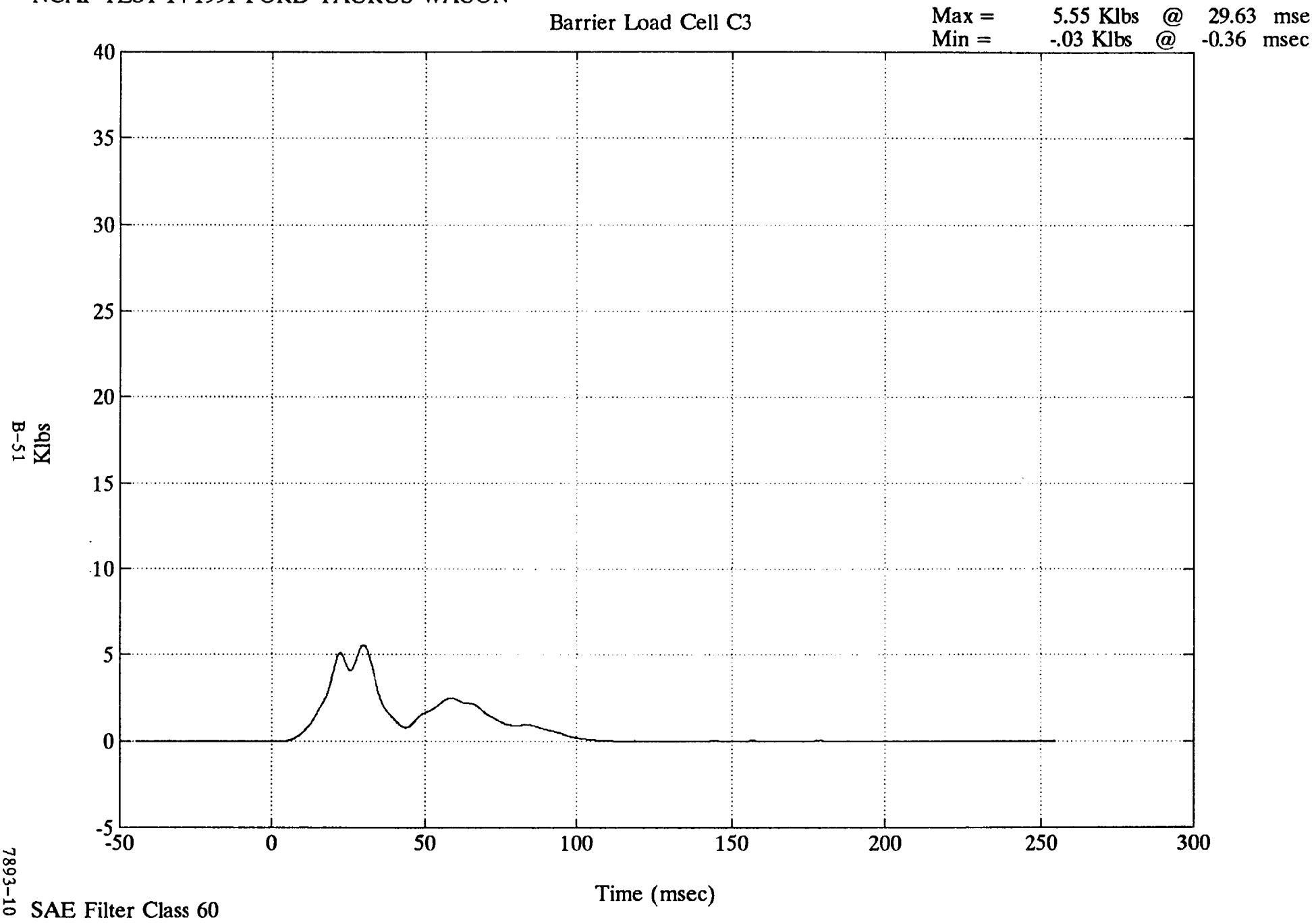


B-50

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

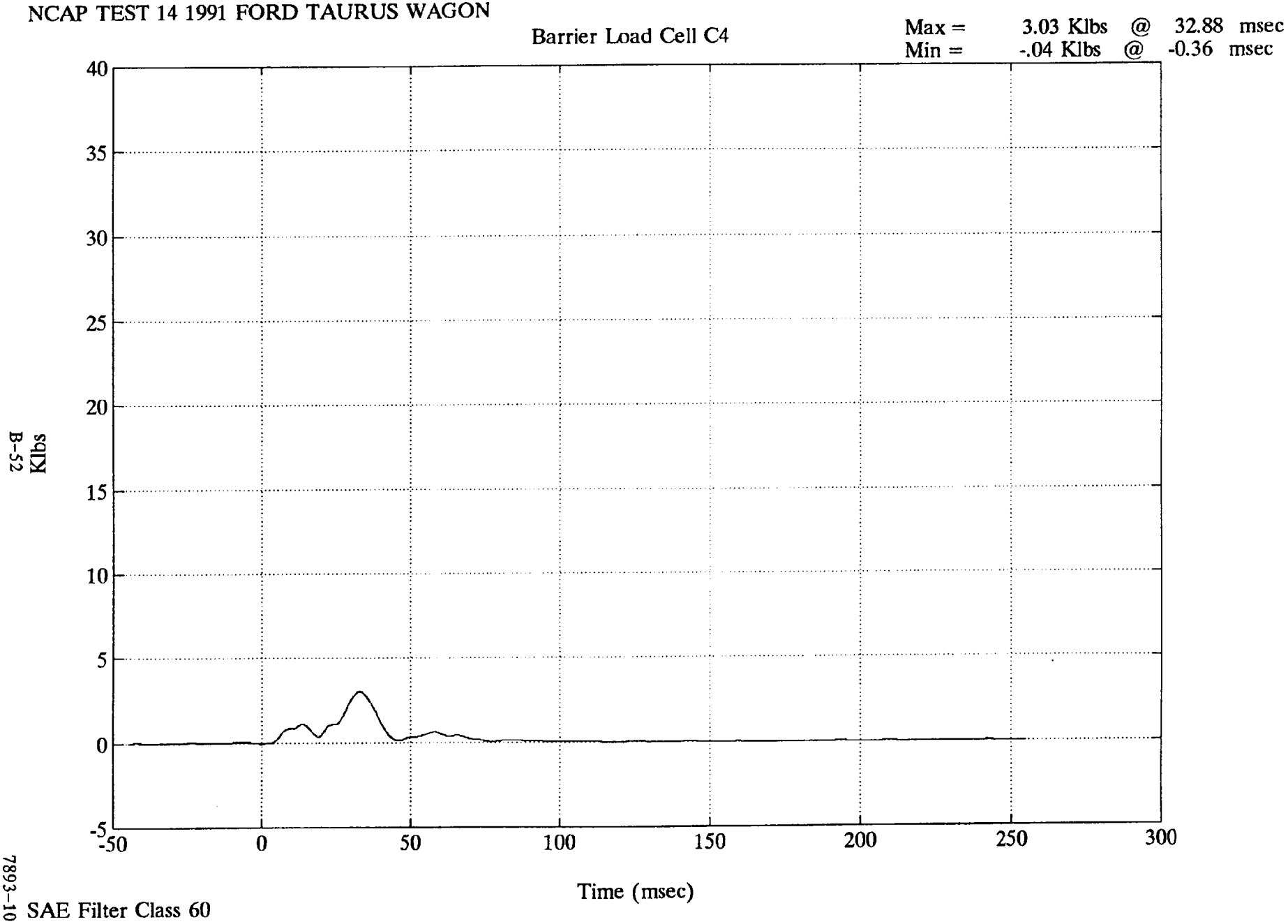


B-51

7893-10

SAE Filter Class 60

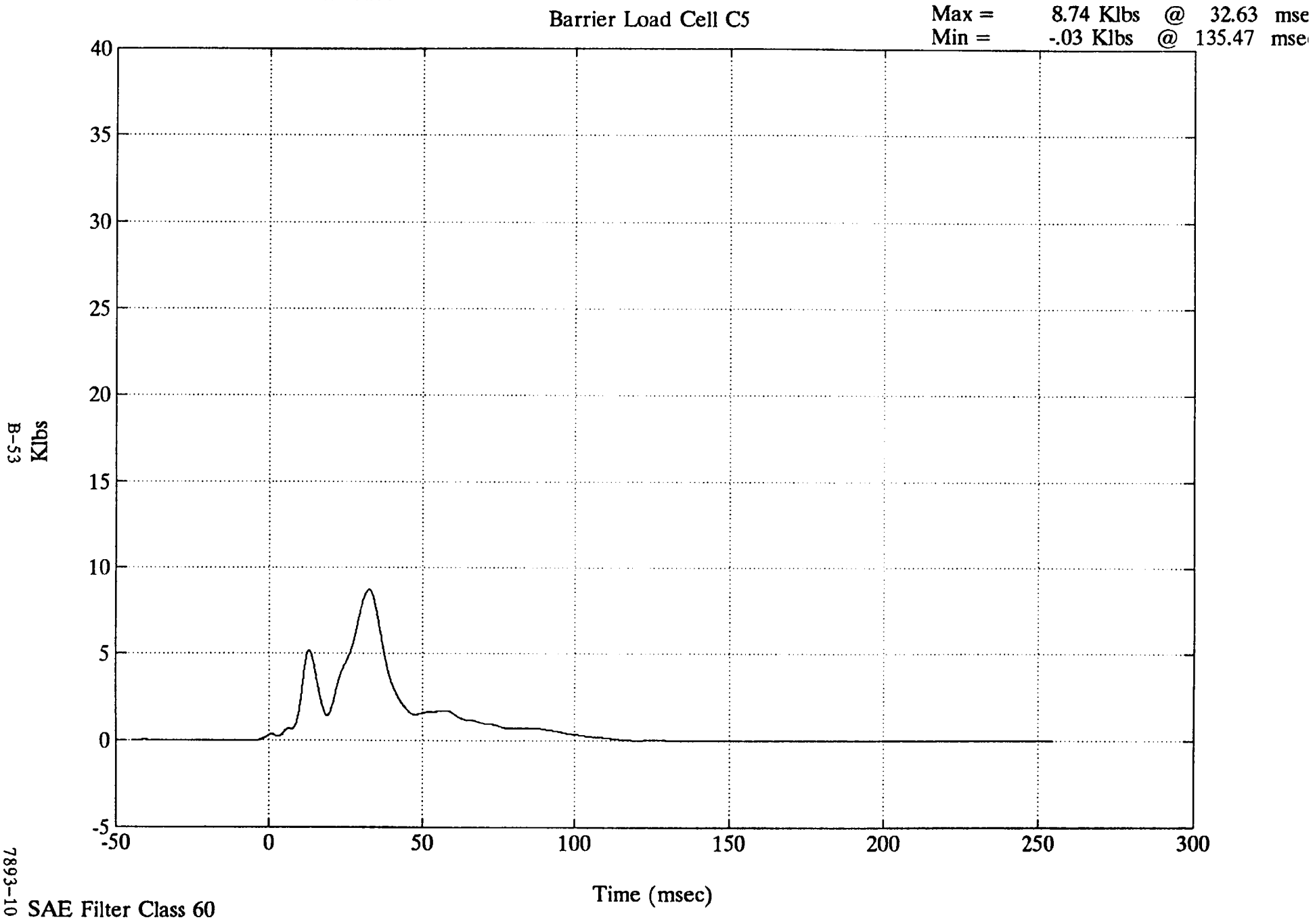
NCAP TEST 14 1991 FORD TAURUS WAGON



7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

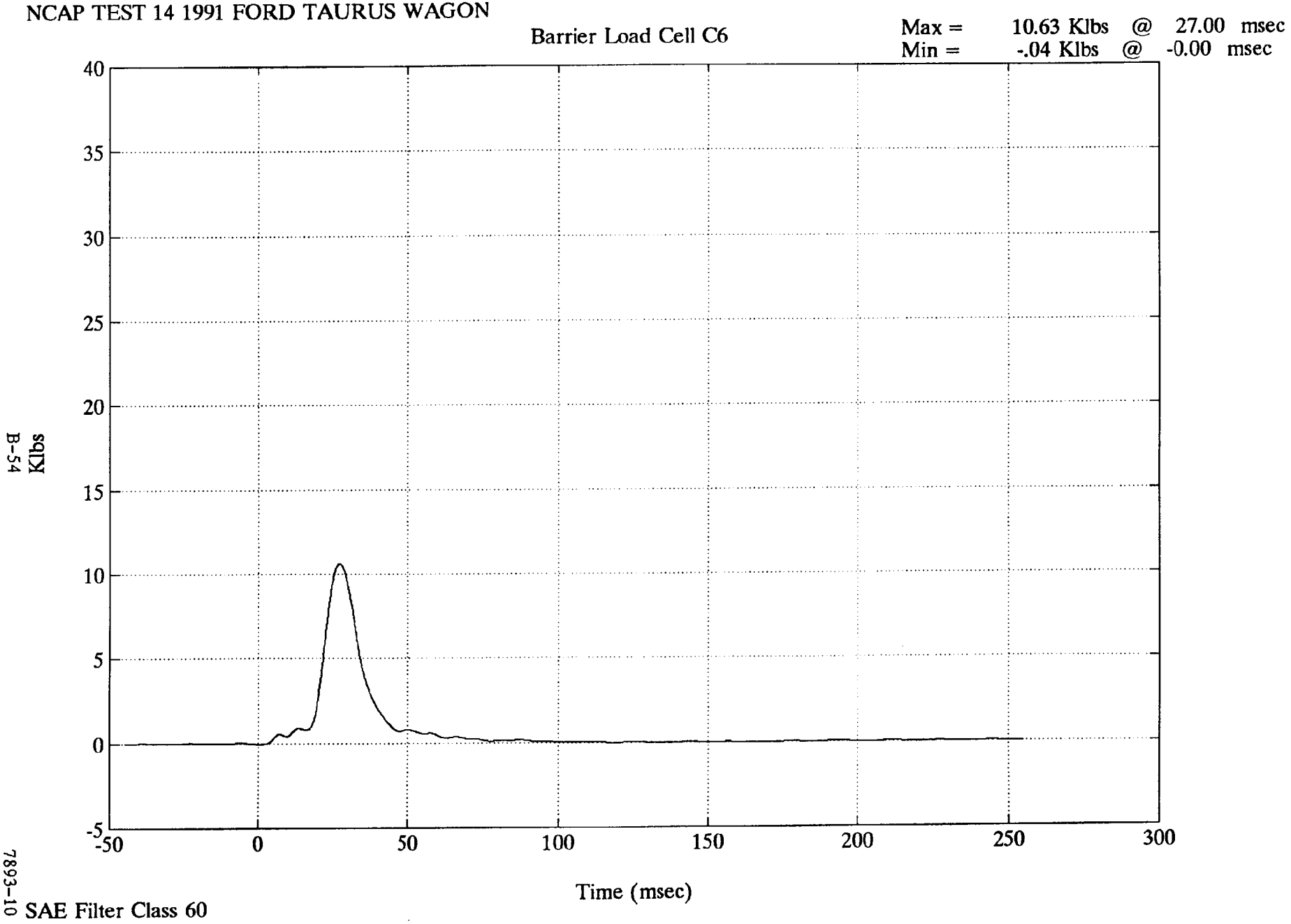


B-53

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

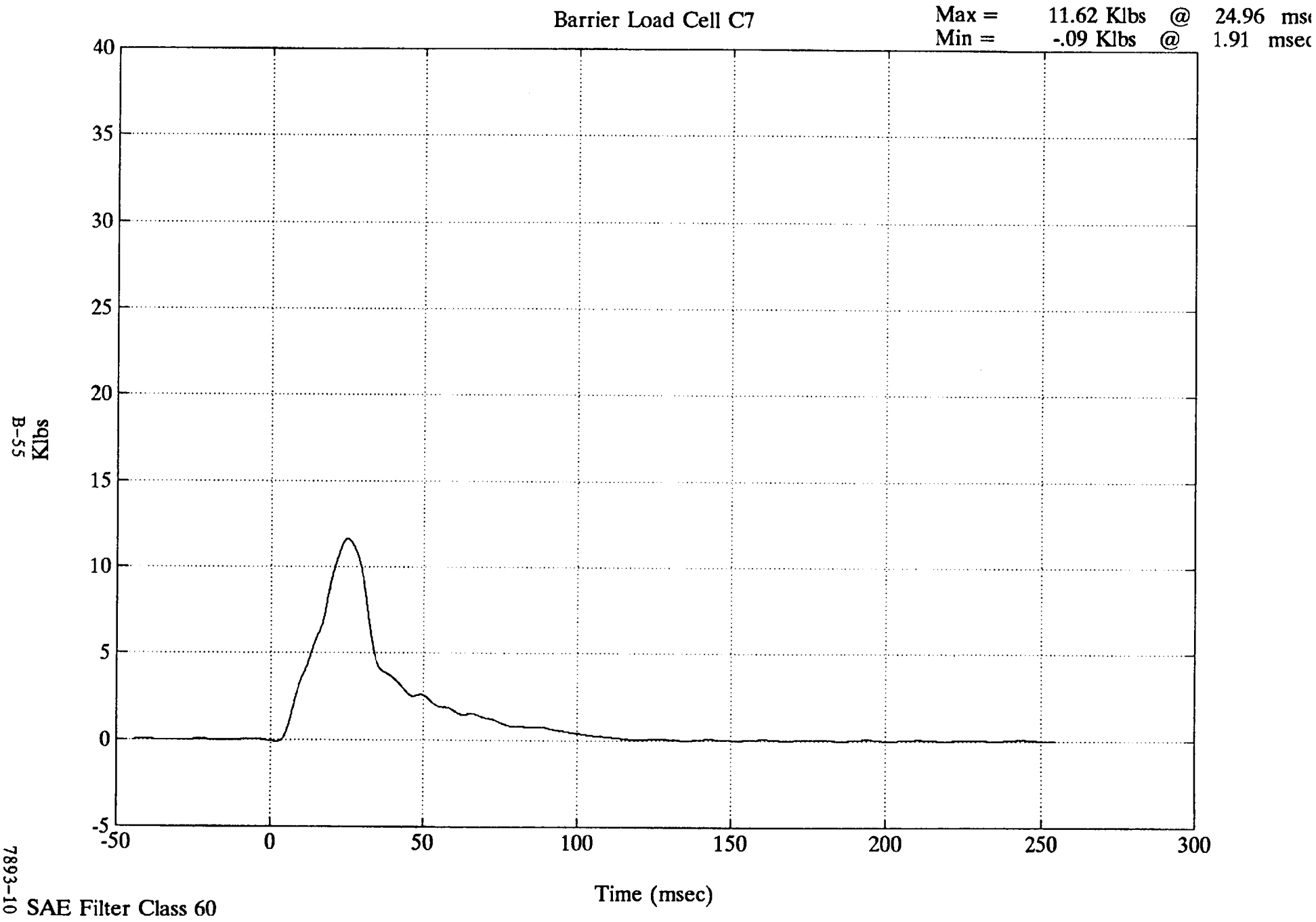


B-54

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

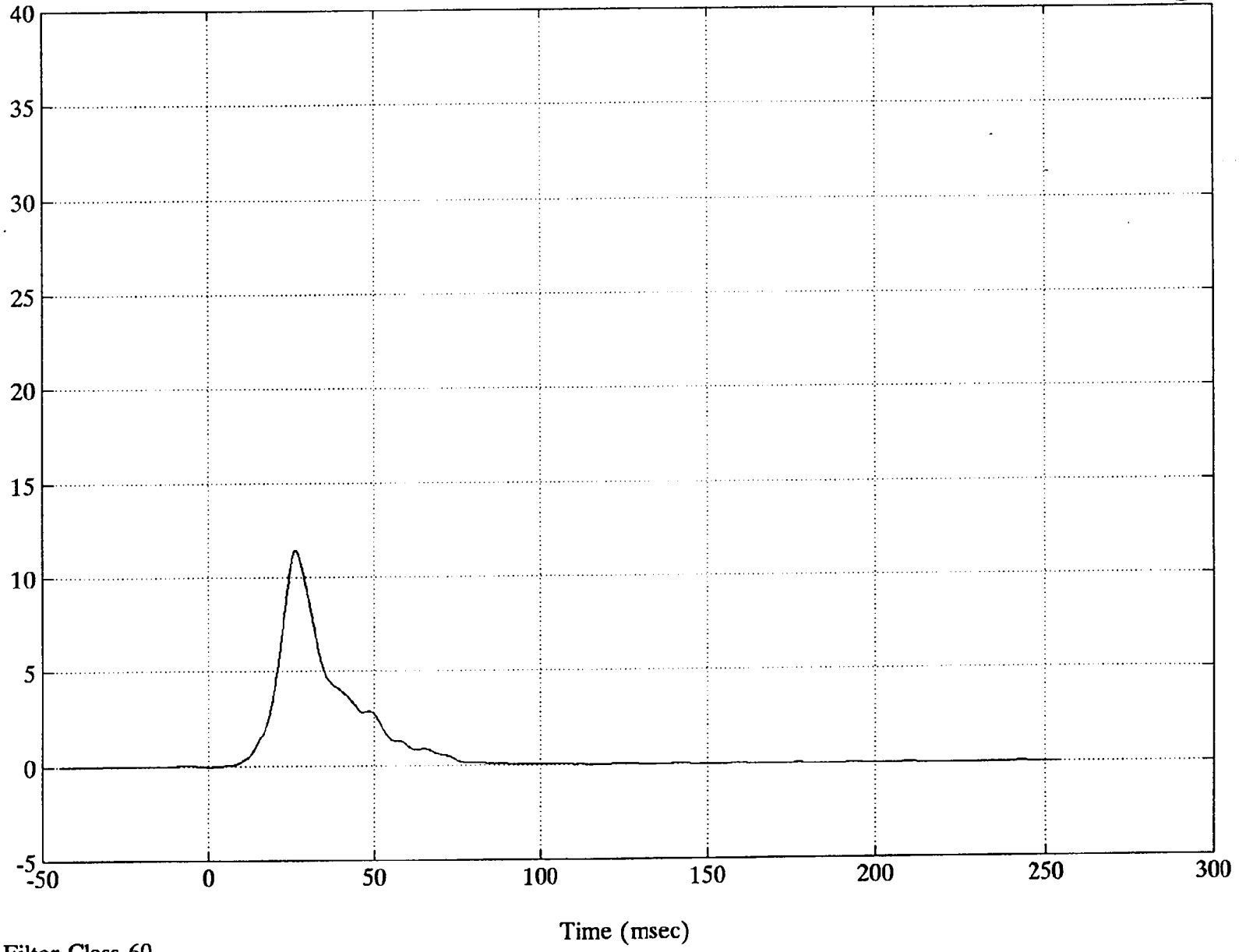


7893-10 SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Barrier Load Cell C8

Max = 11.42 Klbs @ 26.15 msec
Min = -.04 Klbs @ 0.23 msec

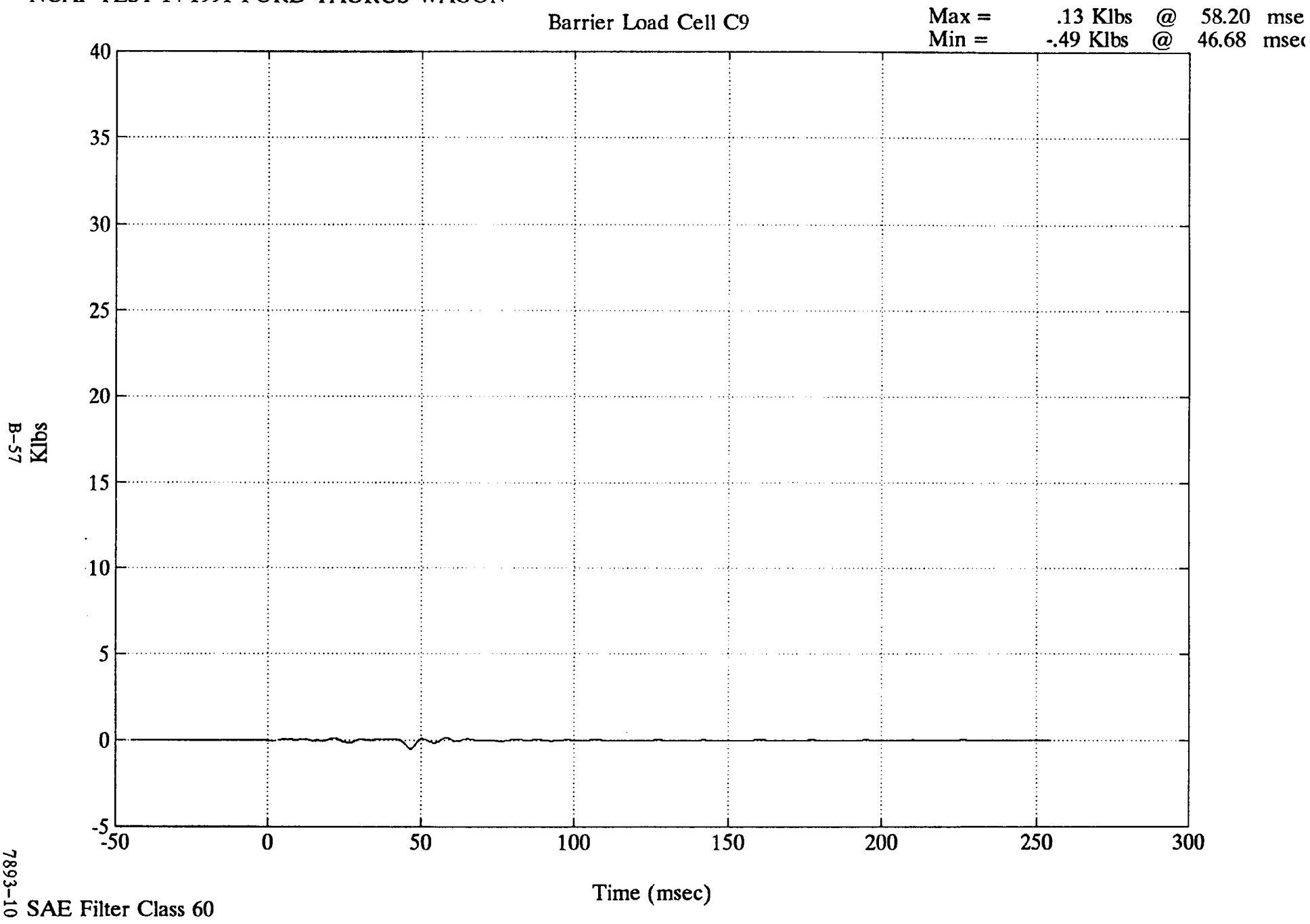


B-56
Klbs

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

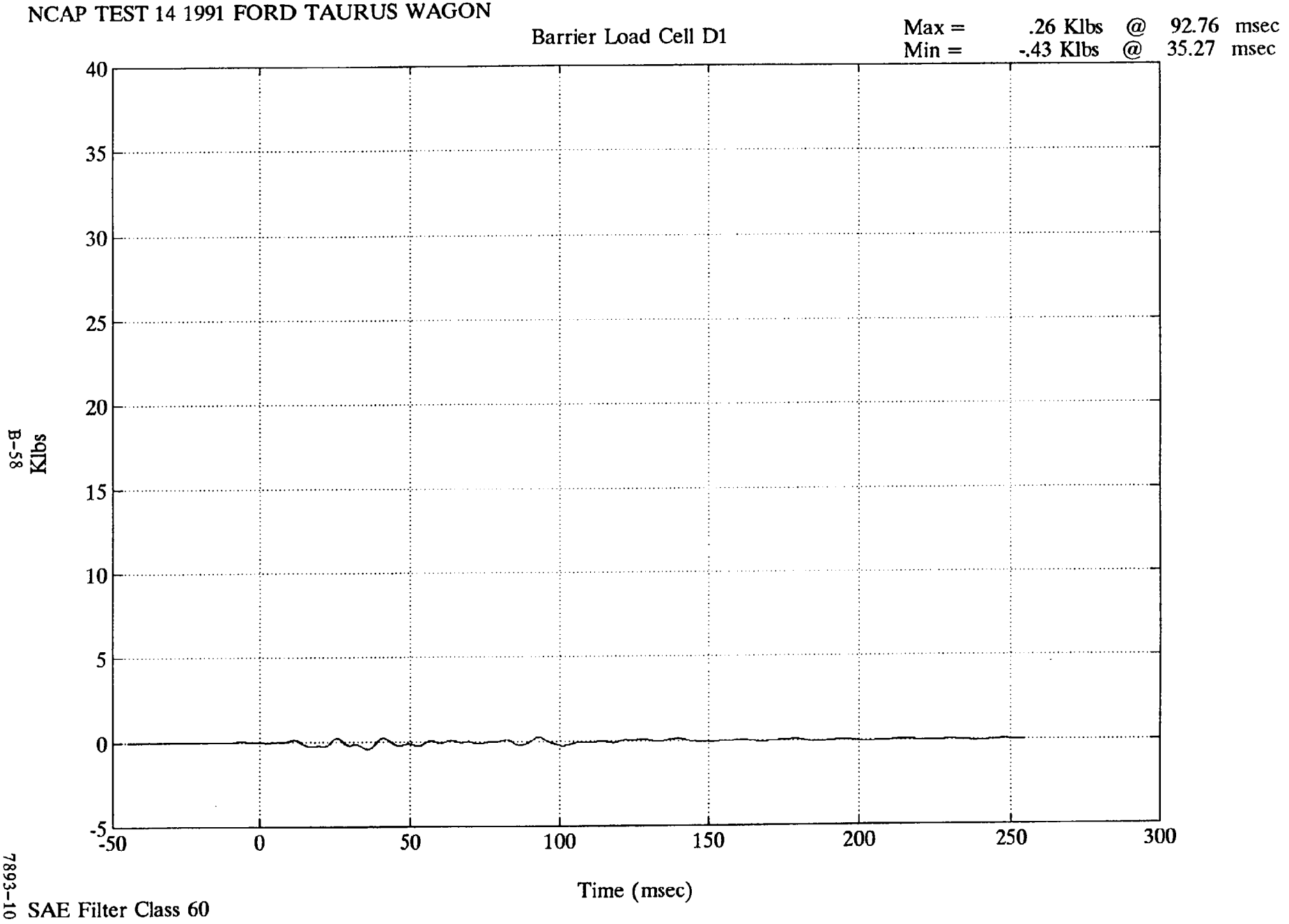


B-57

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

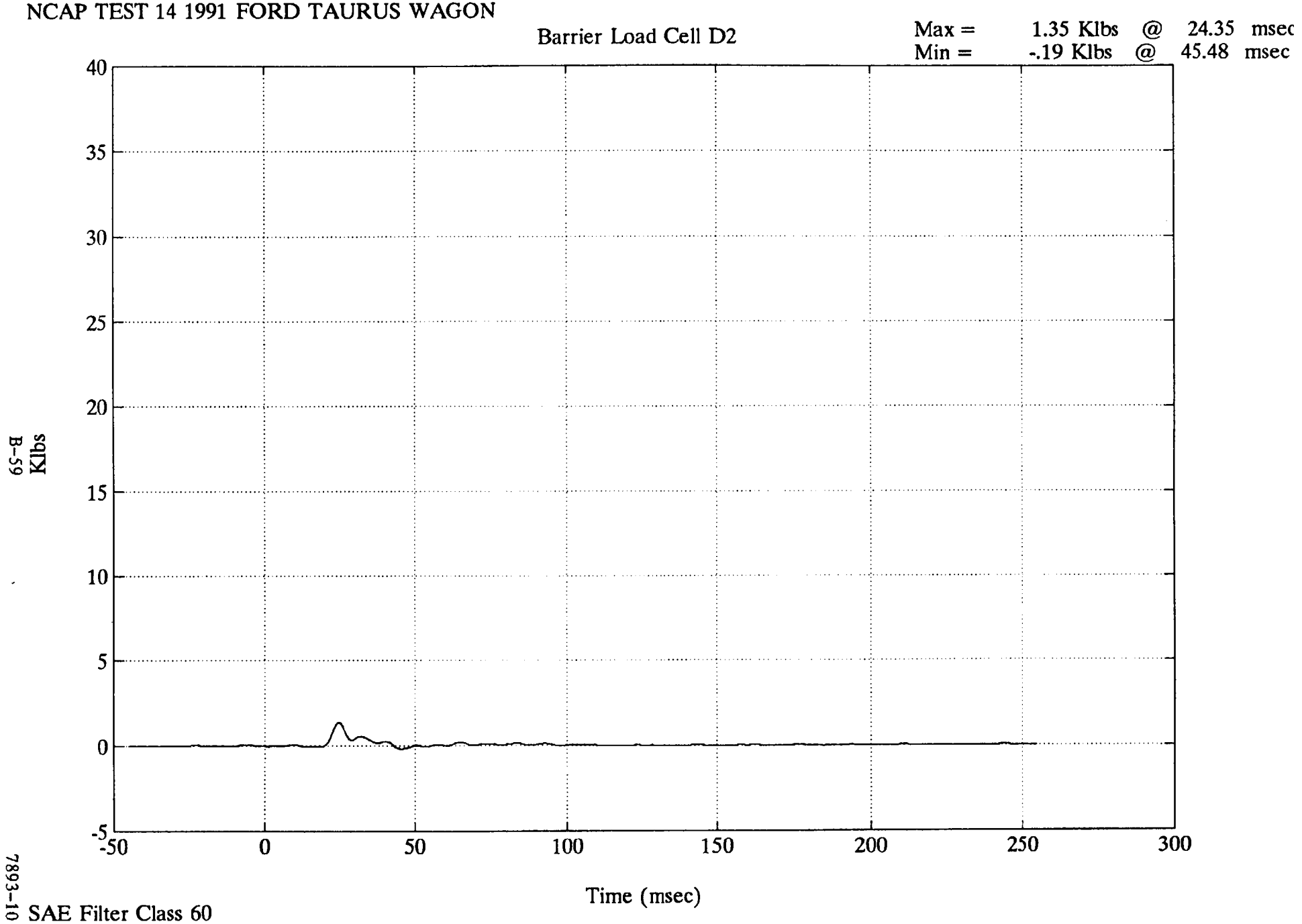


B-58

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

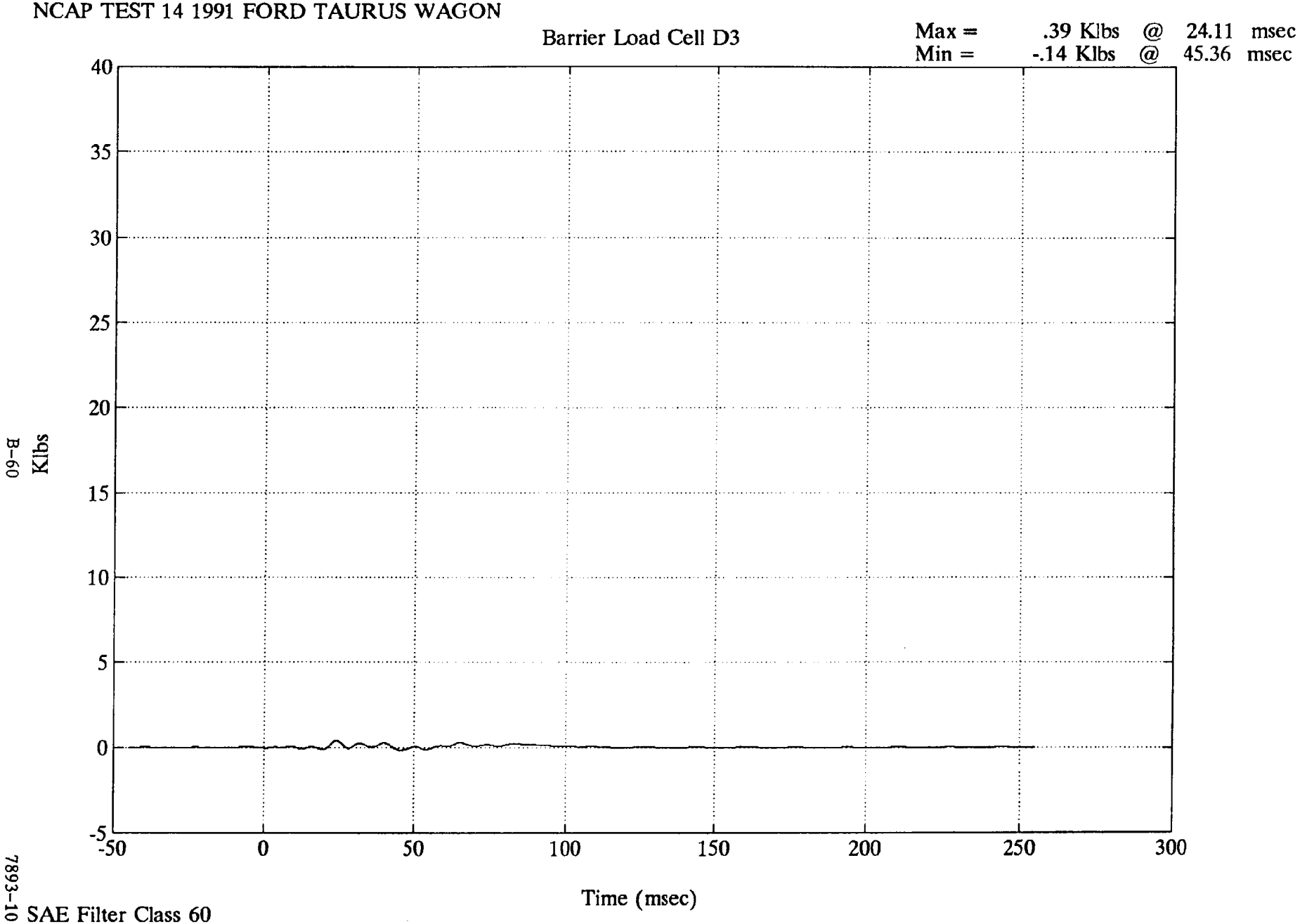


B-59

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

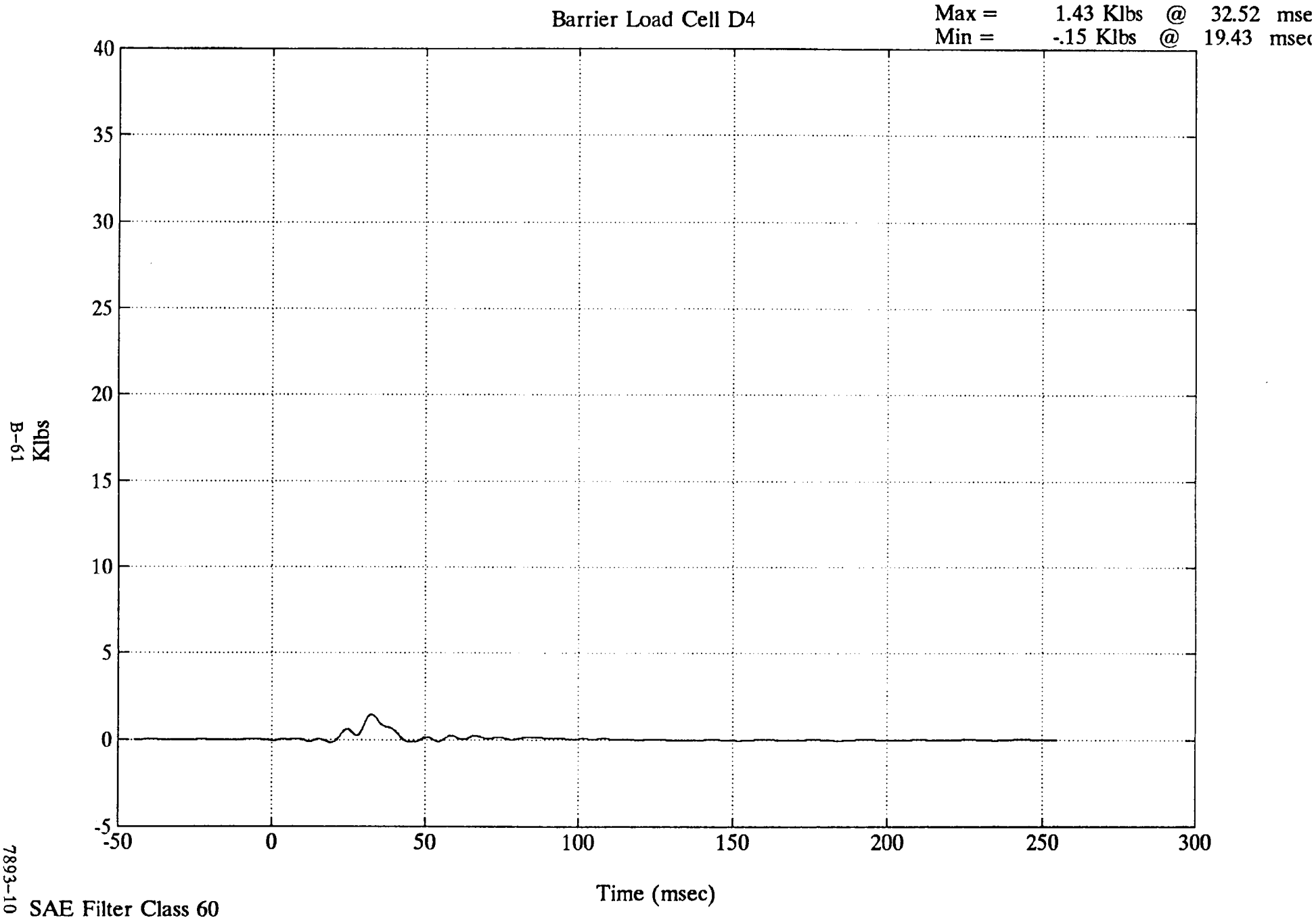


B-60

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



B-61

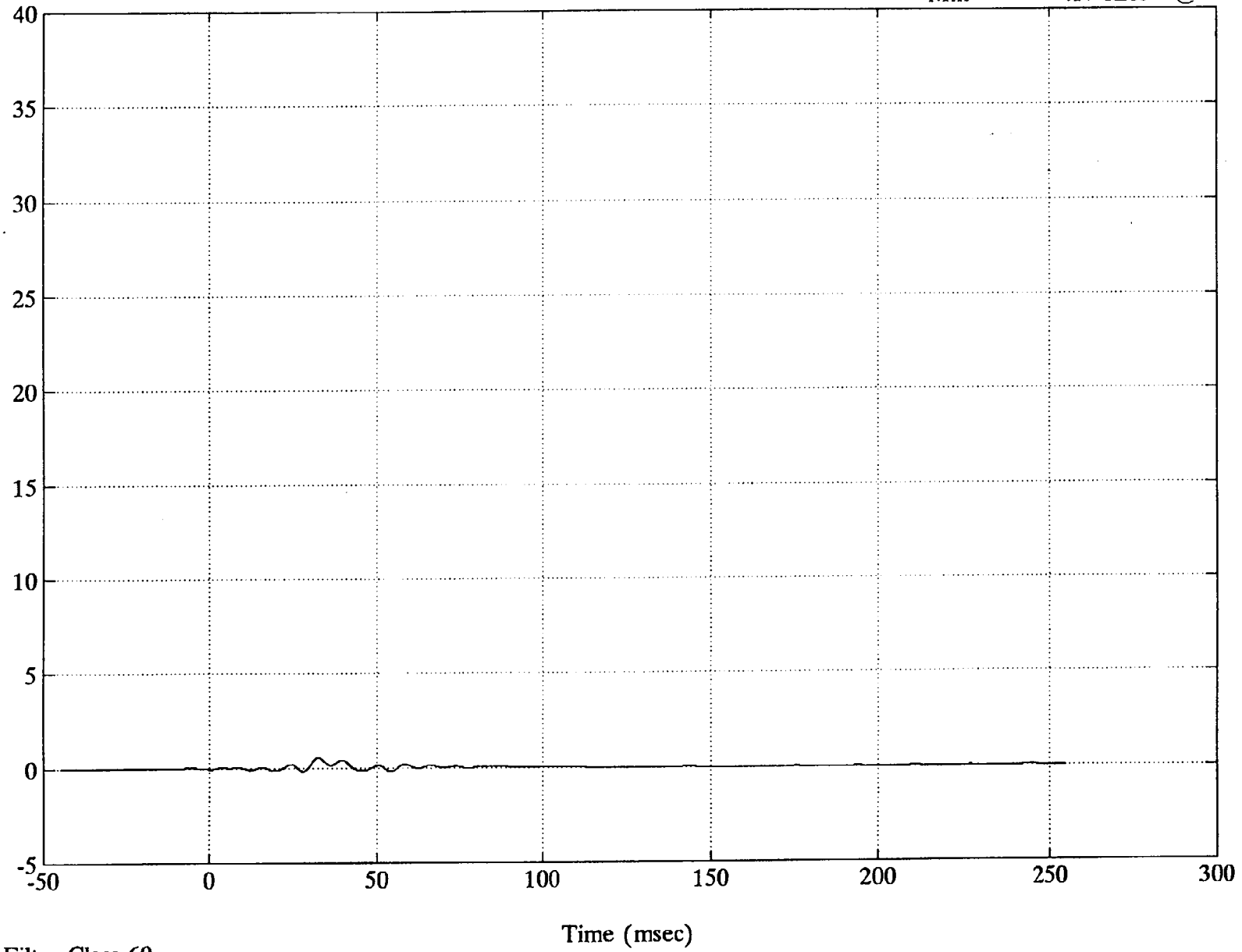
7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Barrier Load Cell D5

Max = .55 Klbs @ 32.28 msec
Min = -.17 Klbs @ 54.11 msec

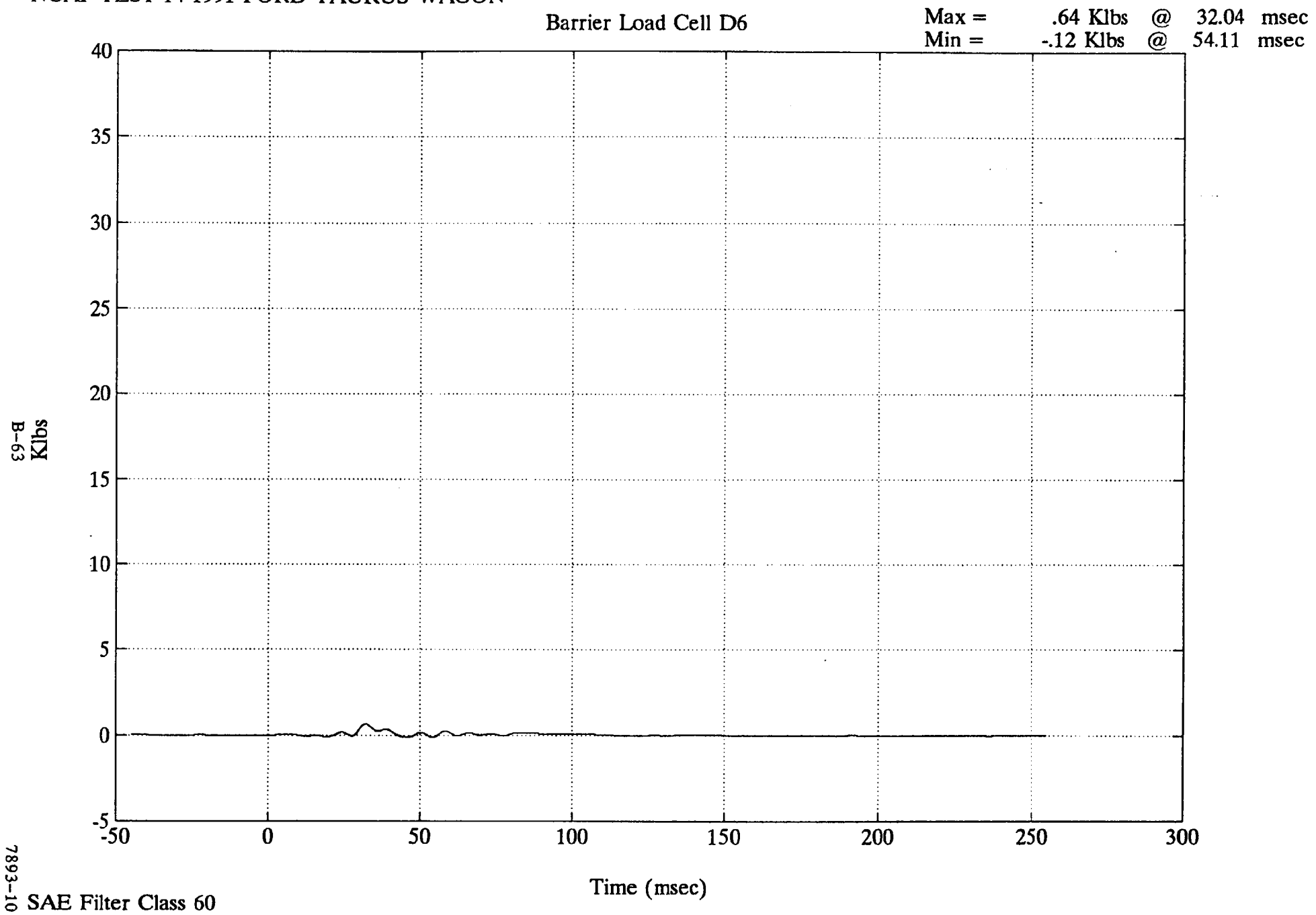


B-62

7893-10

SAE Filter Class 60

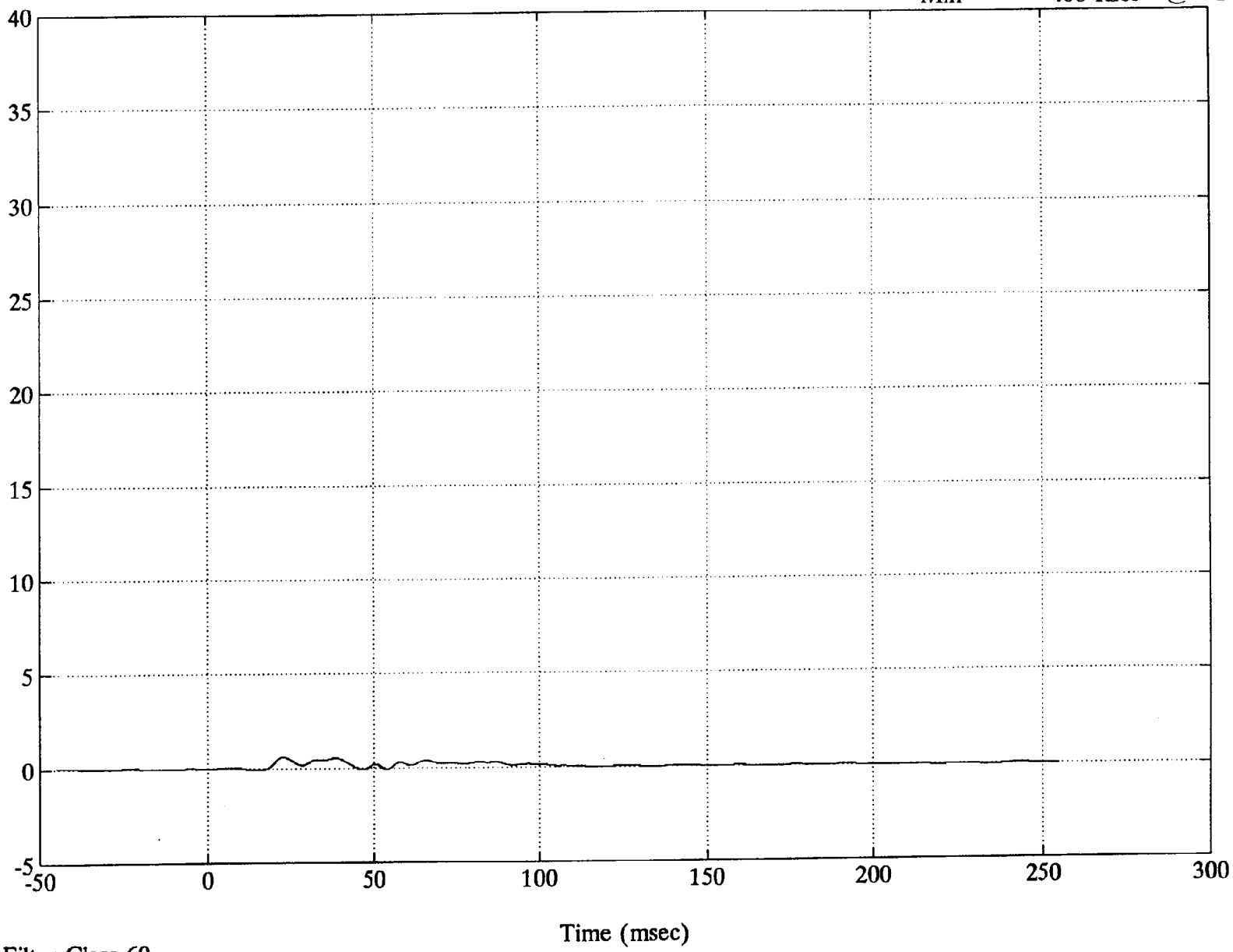
NCAP TEST 14 1991 FORD TAURUS WAGON



NCAP TEST 14 1991 FORD TAURUS WAGON

Barrier Load Cell D7

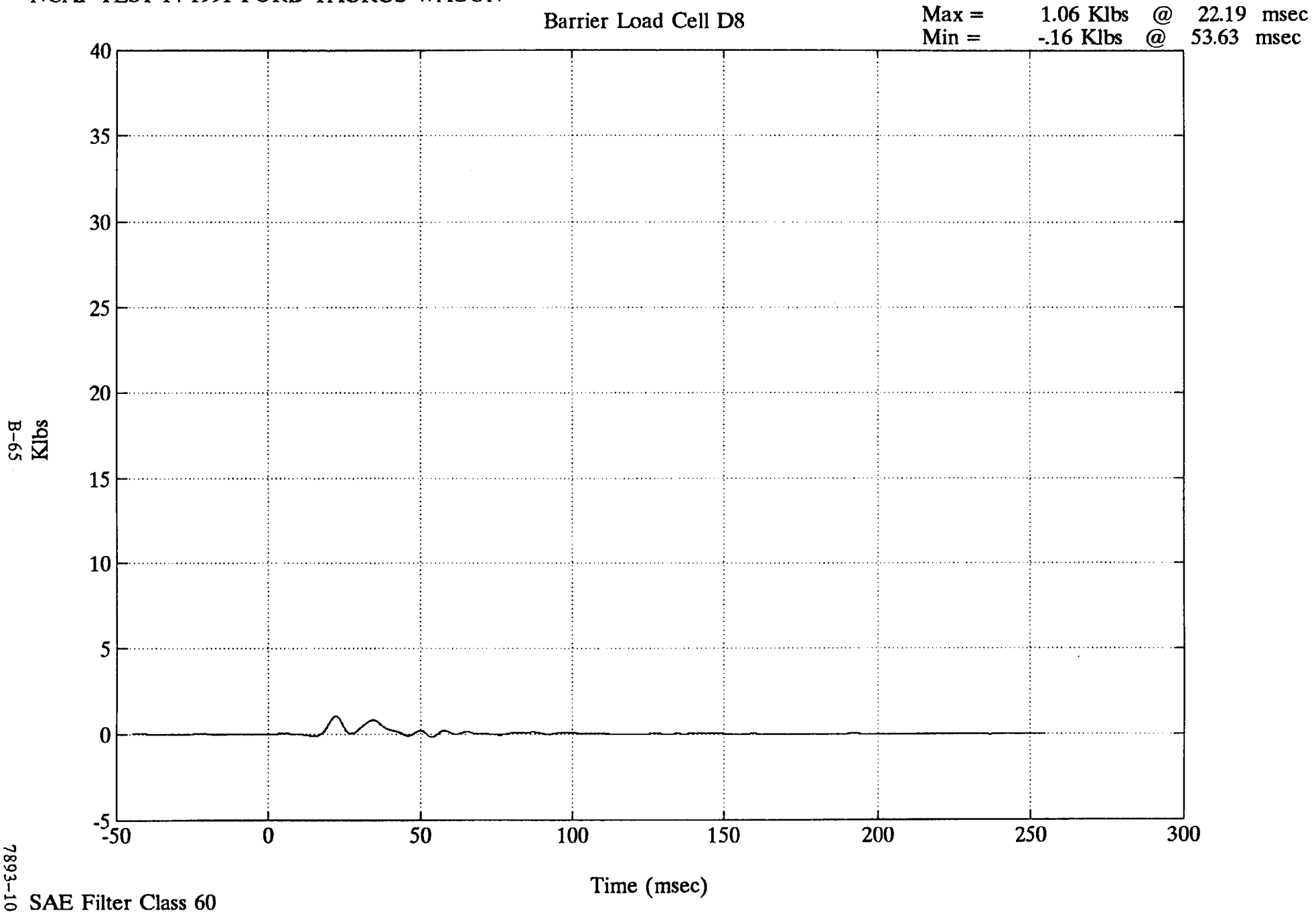
Max = .59 Klbs @ 22.68 msec
Min = -.08 Klbs @ 13.31 msec



7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



B-65

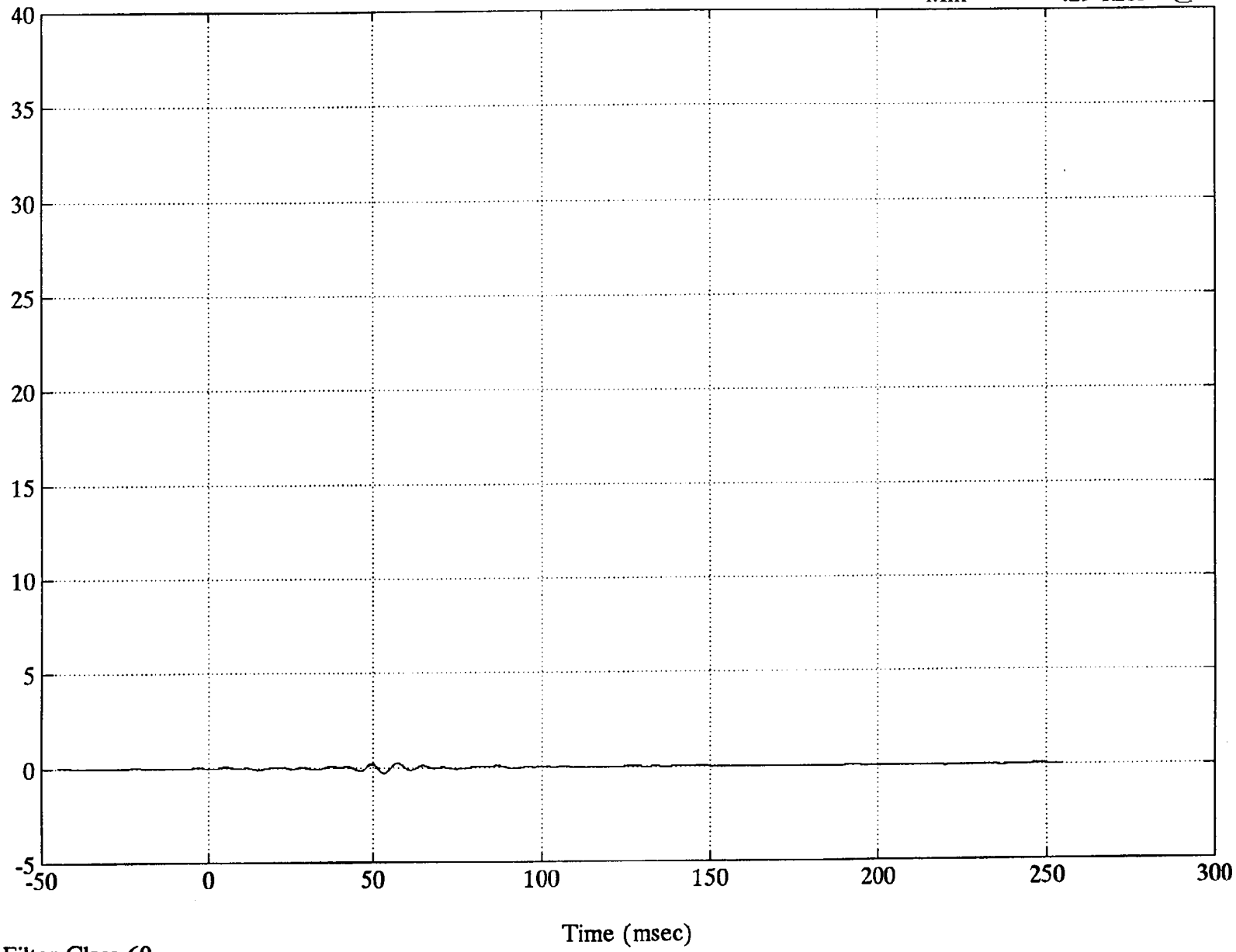
7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Barrier Load Cell D9

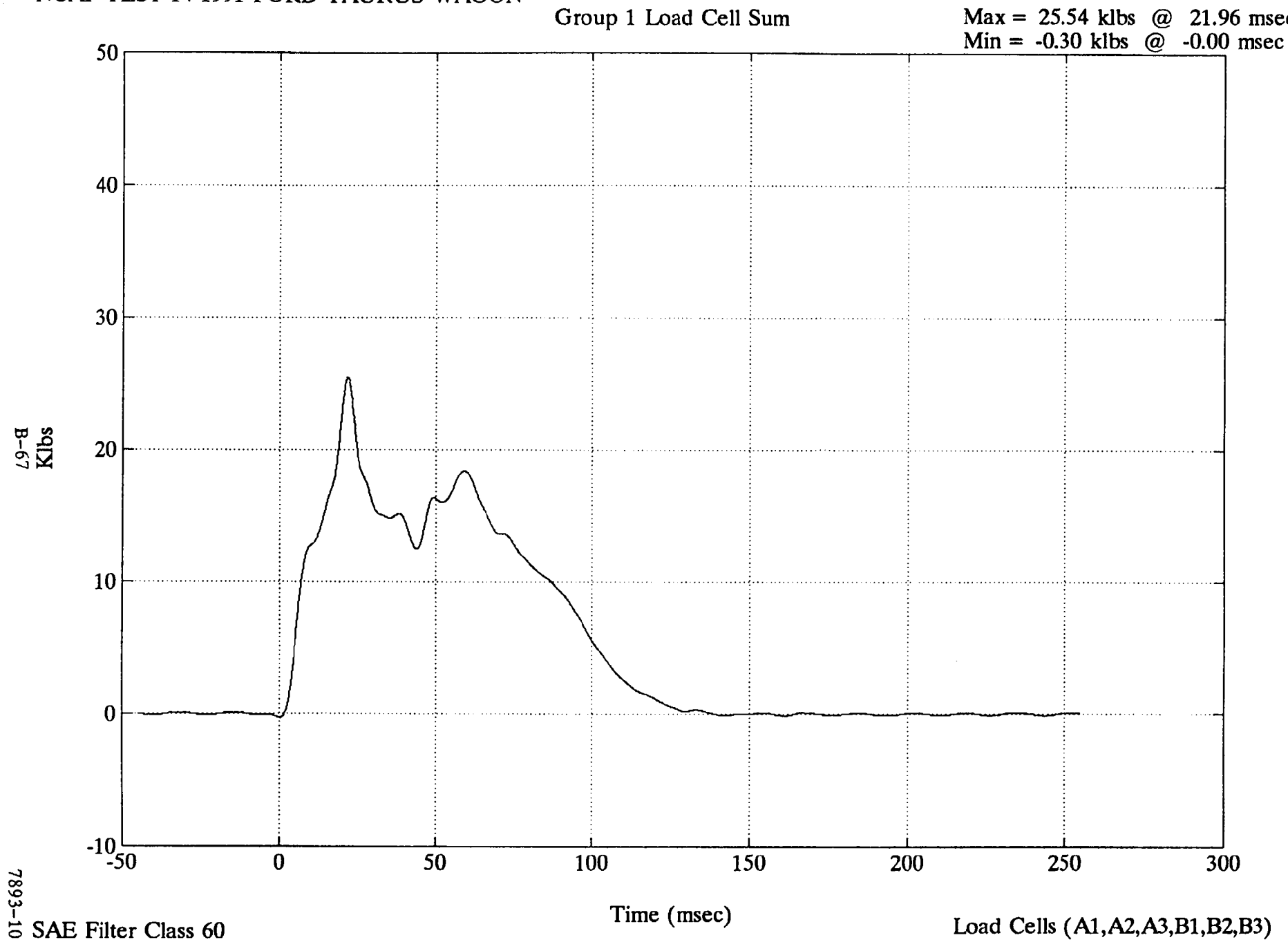
Max = .24 Klbs @ 57.36 msec
Min = -.29 Klbs @ 53.27 msec



7893-10

SAE Filter Class 60

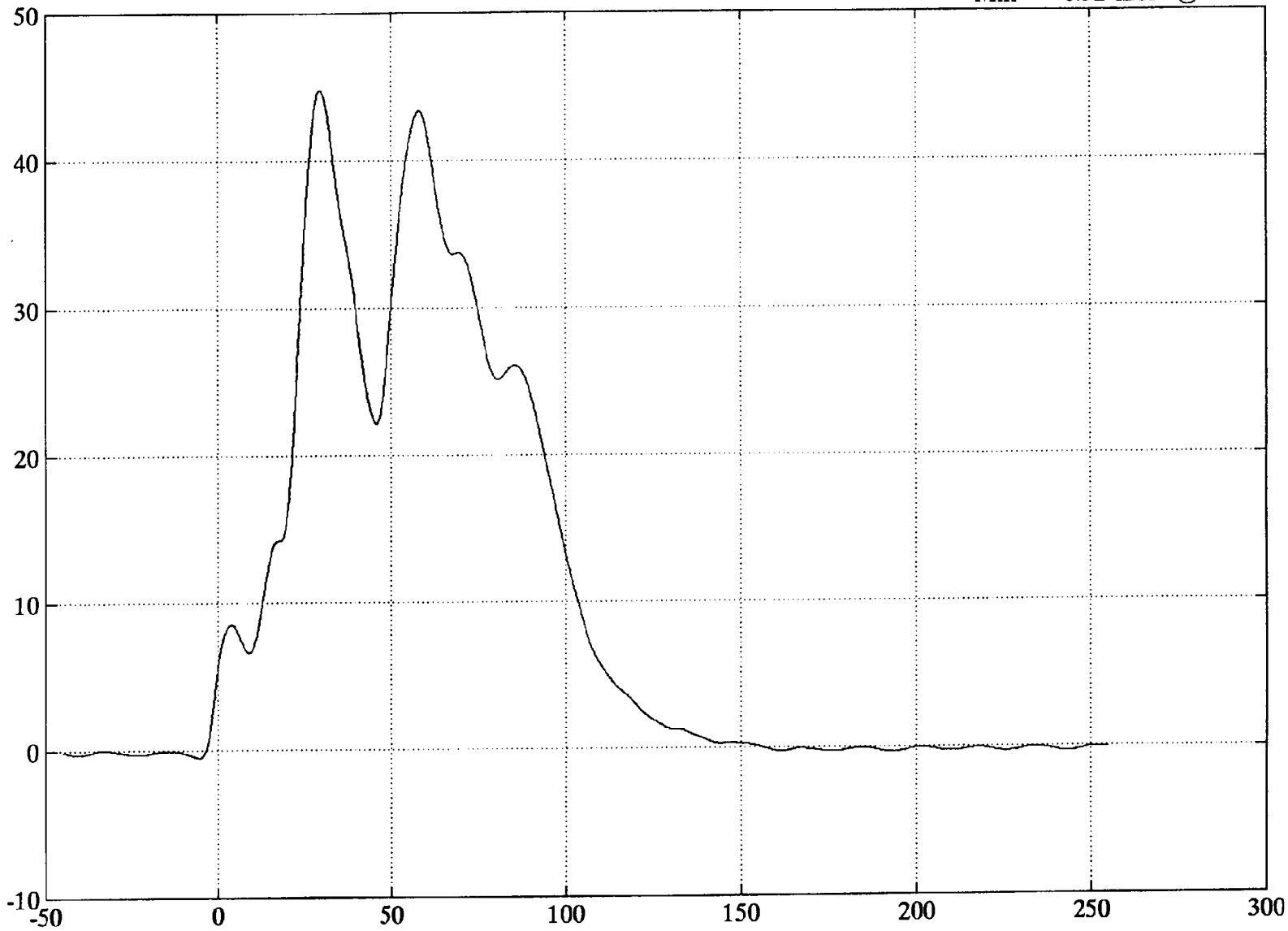
NCAP TEST 14 1991 FORD TAURUS WAGON



NCAP TEST 14 1991 FORD TAURUS WAGON

Group 2 Load Cell Sum

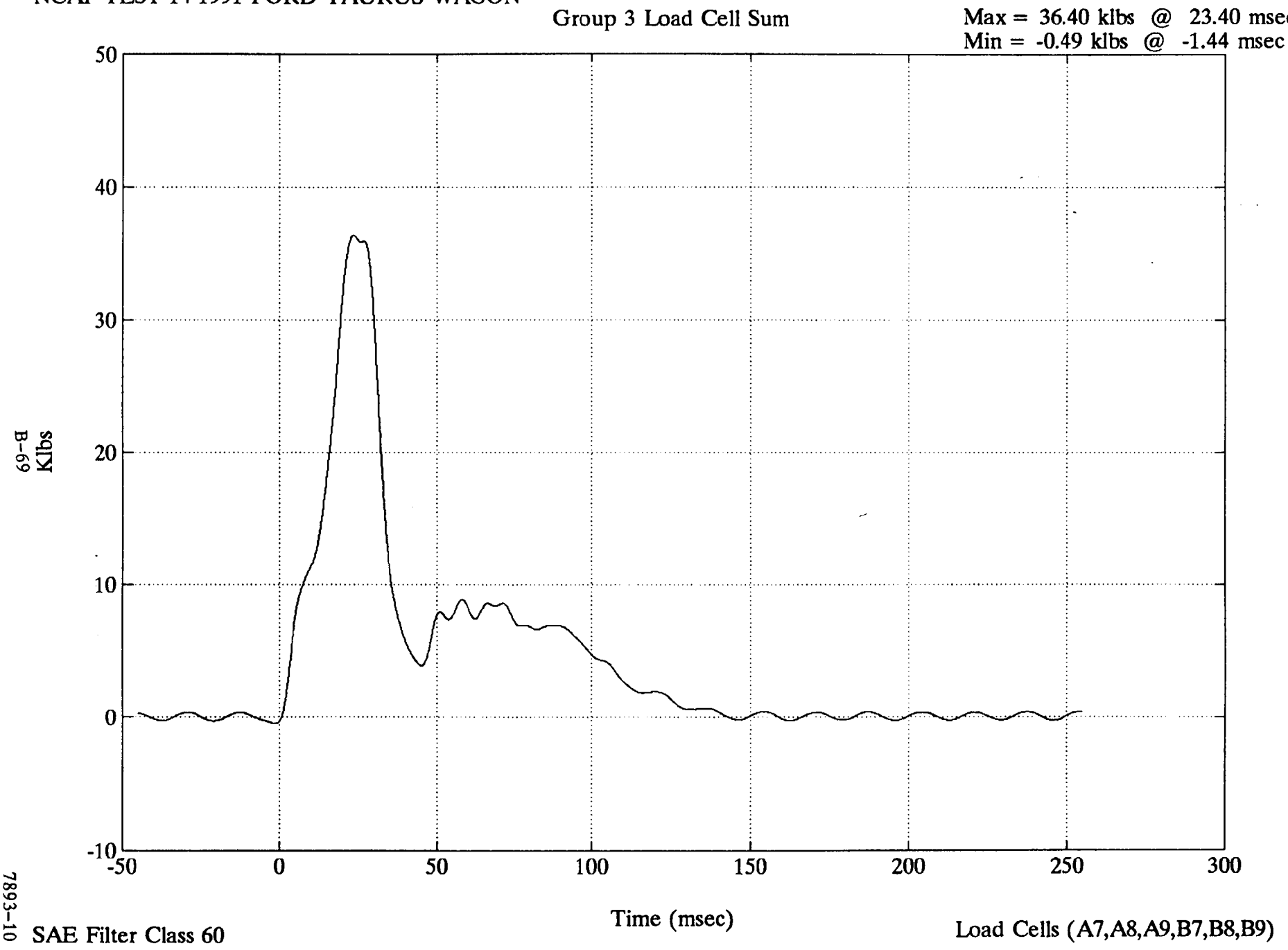
Max = 44.79 klbs @ 29.16 msec
Min = -0.52 klbs @ -5.40 msec



Load Cells (A4,A5,A6,B4,B5,B6)

7893-10 SAE Filter Class 60

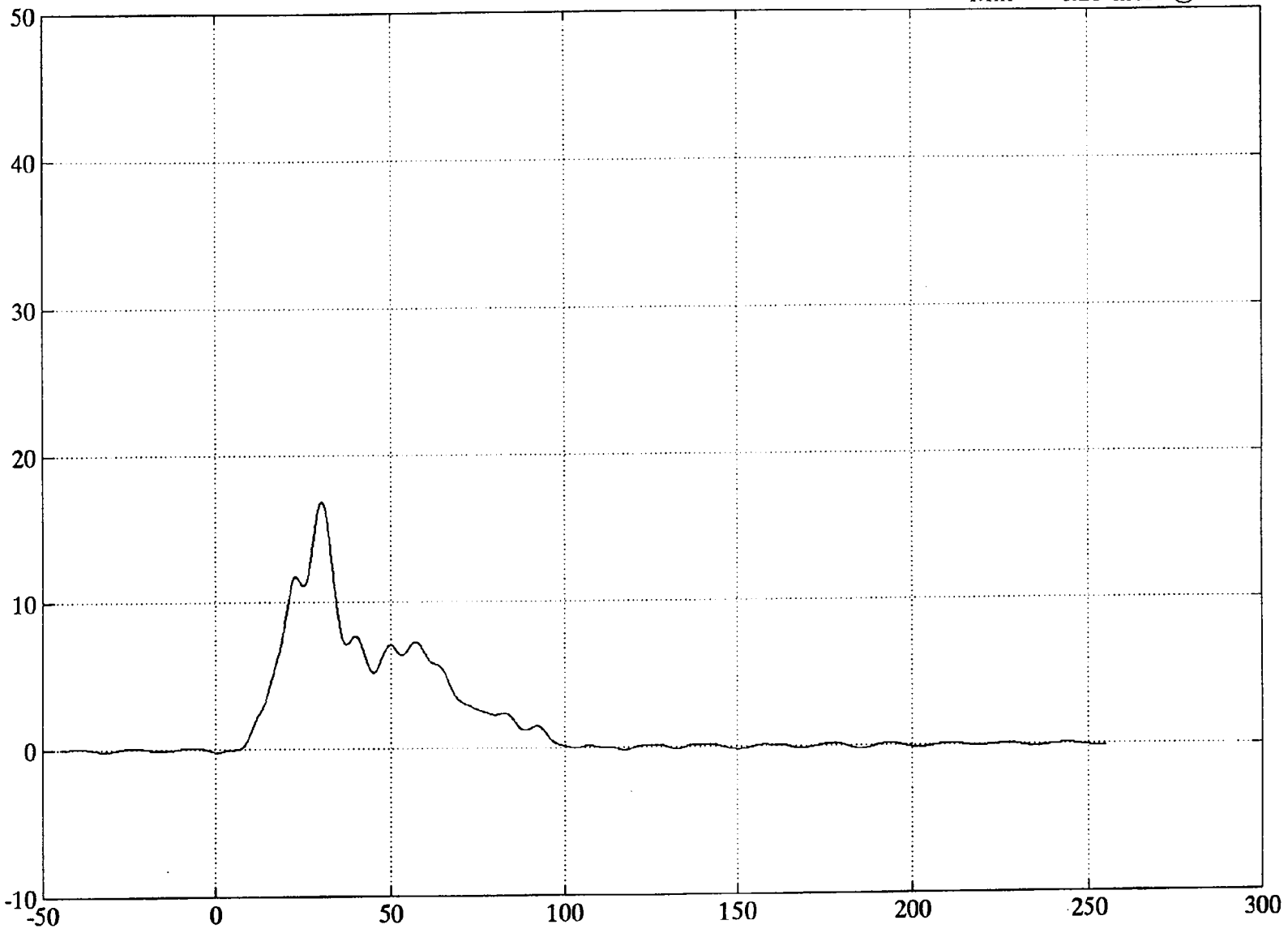
NCAP TEST 14 1991 FORD TAURUS WAGON



NCAP TEST 14 1991 FORD TAURUS WAGON

Group 4 Load Cell Sum

Max = 16.82 klbs @ 30.12 msec
Min = -0.20 klbs @ 185.16 msec

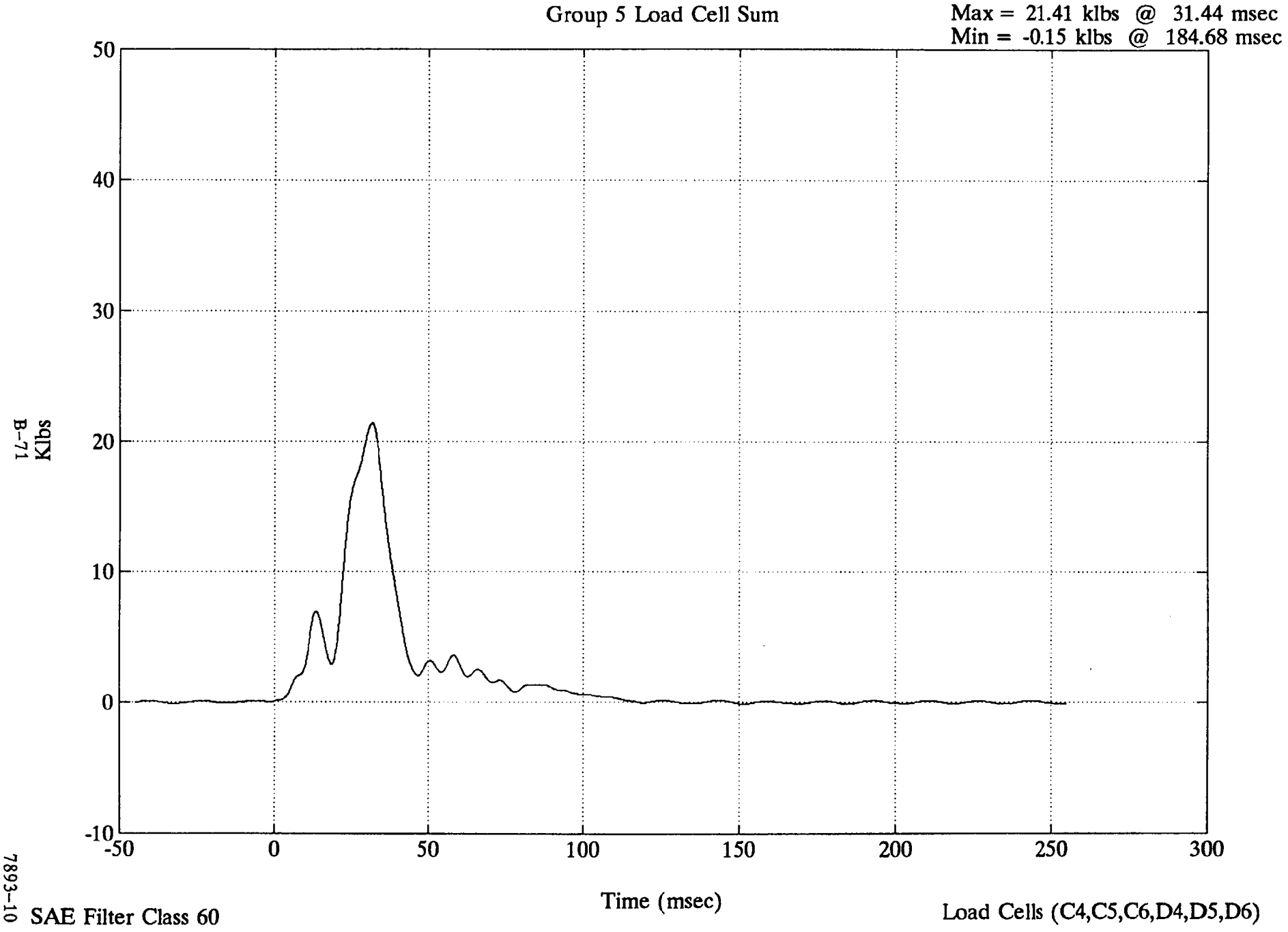


7893-10

SAE Filter Class 60

Load Cells (C1,C2,C3,D1,D2,D3)

NCAP TEST 14 1991 FORD TAURUS WAGON



B-71

7893-10

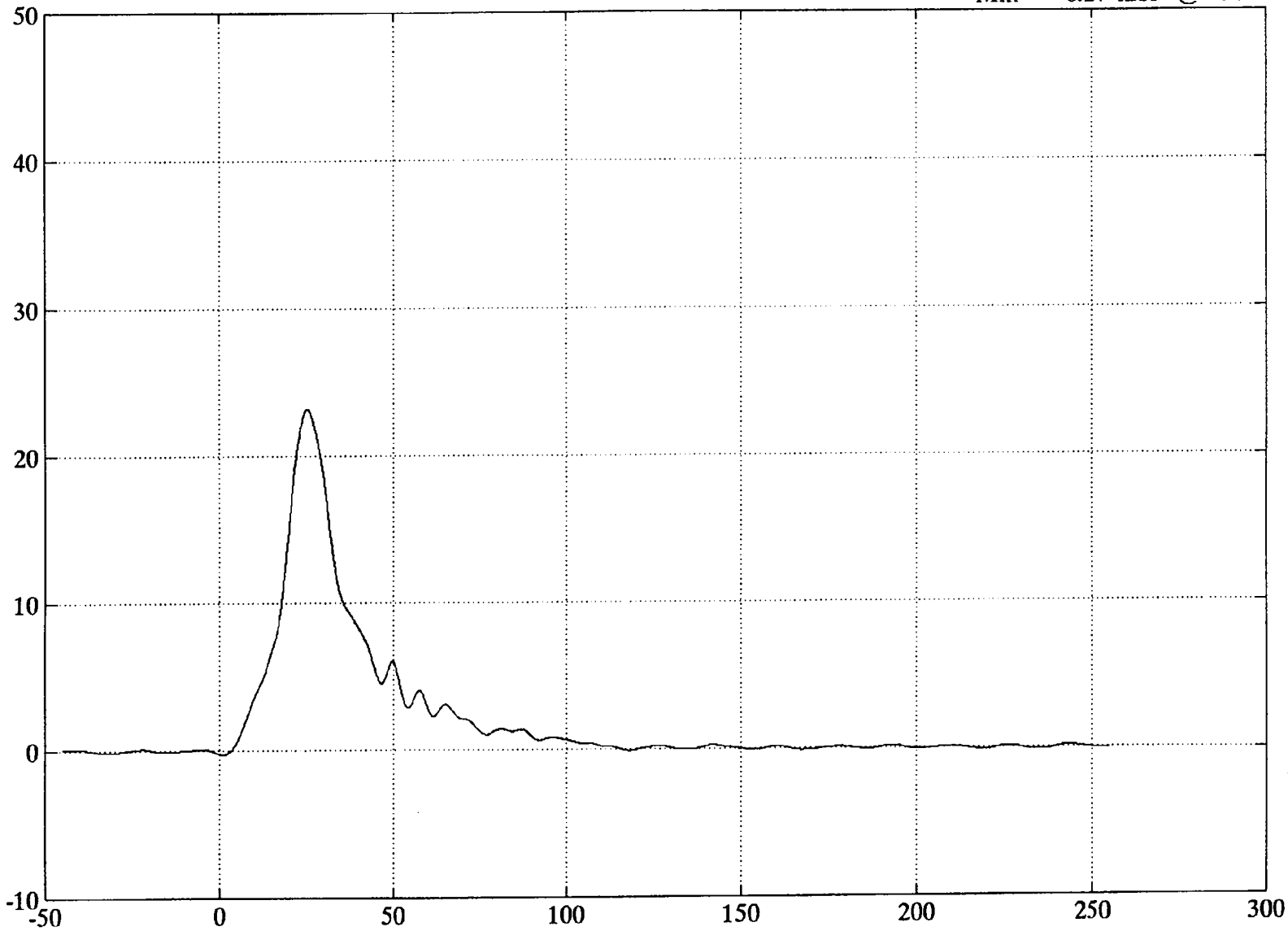
SAE Filter Class 60

Load Cells (C4,C5,C6,D4,D5,D6)

NCAP TEST 14 1991 FORD TAURUS WAGON

Group 6 Load Cell Sum

Max = 23.18 klbs @ 25.68 msec
Min = -0.27 klbs @ 0.96 msec



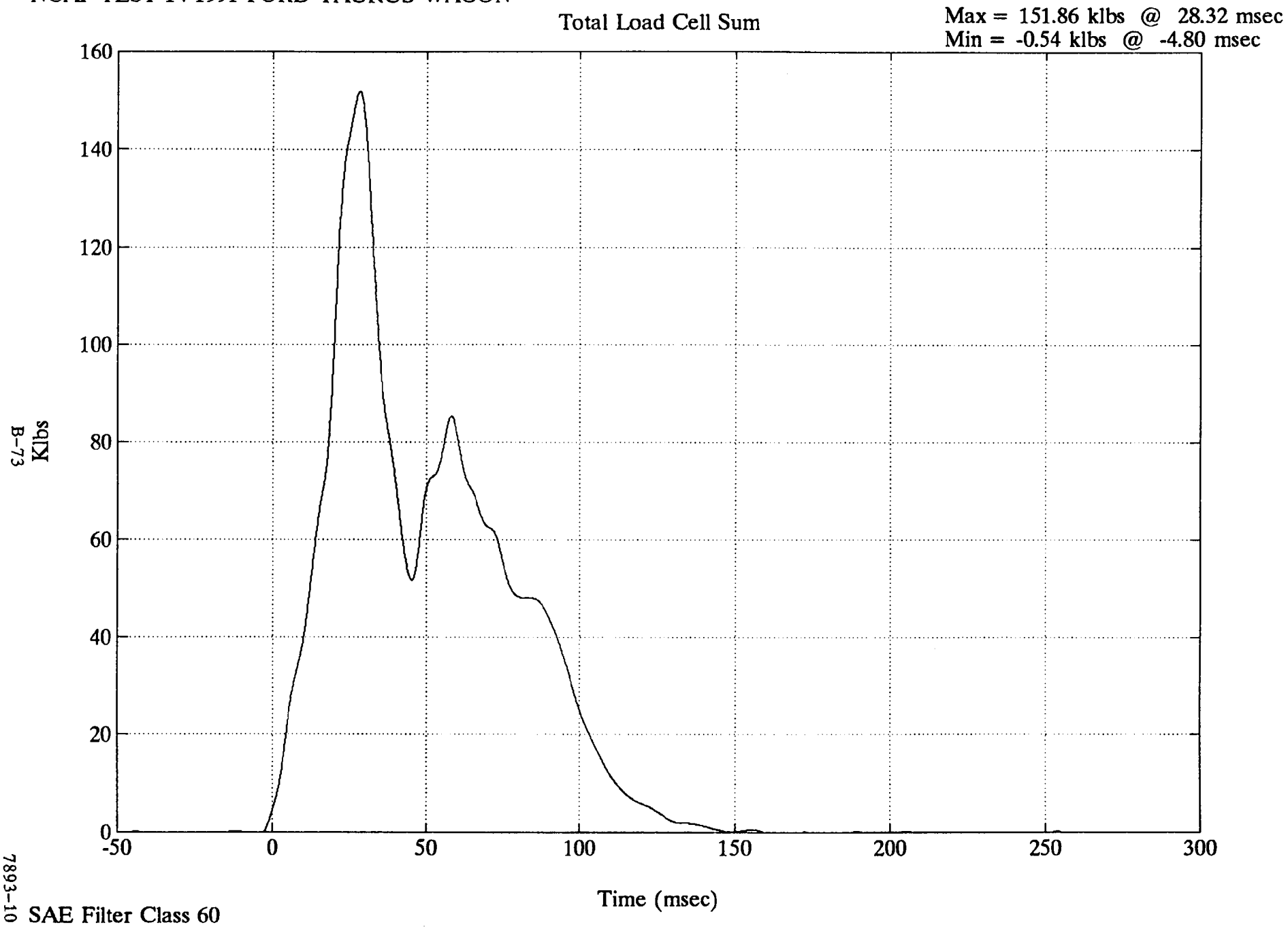
B-72

7893-10

SAE Filter Class 60

Load Cells (C7,C8,C9,D7,D8,D9)

NCAP TEST 14 1991 FORD TAURUS WAGON



B-73

7893-10

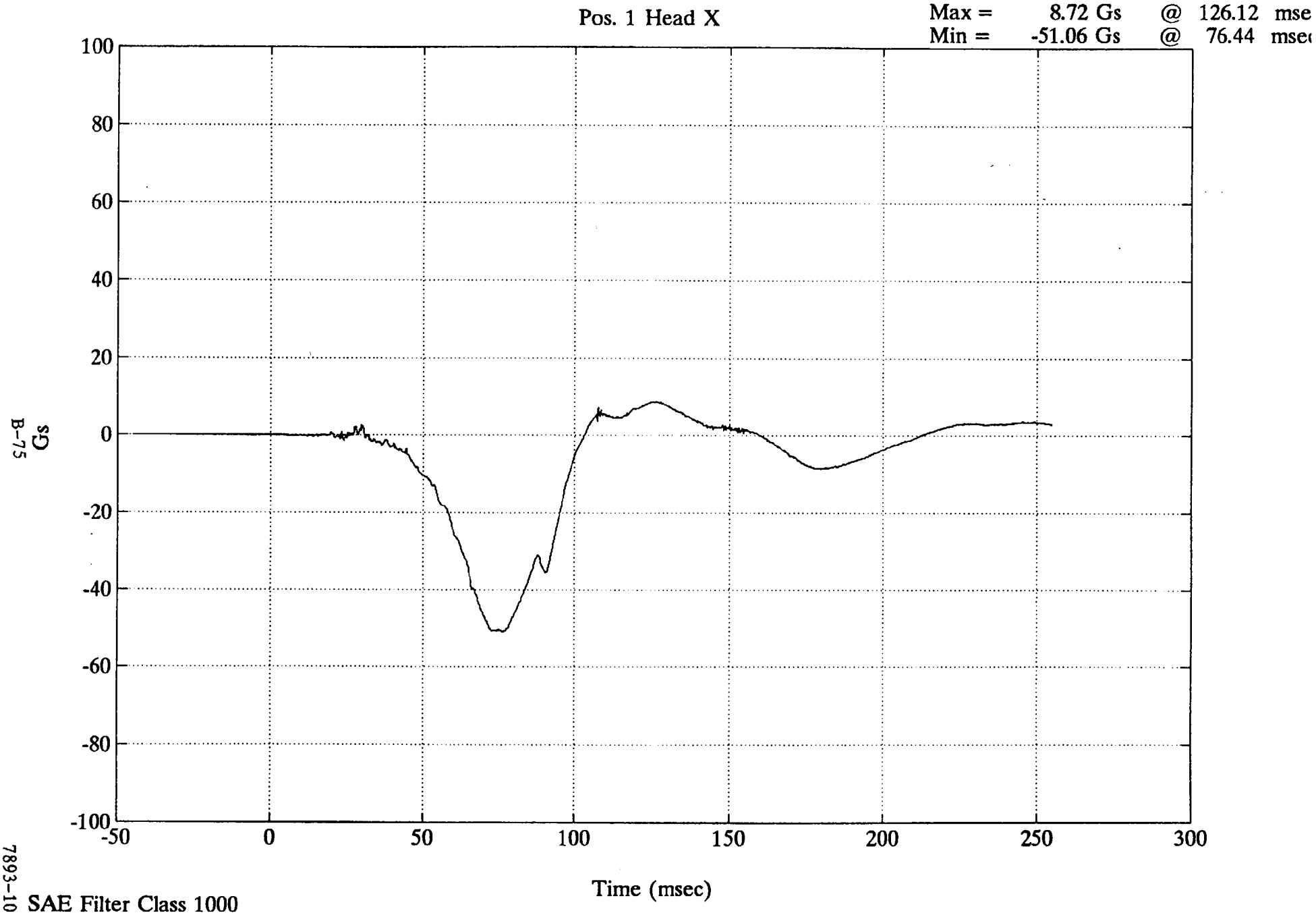
SAE Filter Class 60

TEST NO. MM0203

DUMMY DATA

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

NCAP TEST 14 1991 FORD TAURUS WAGON



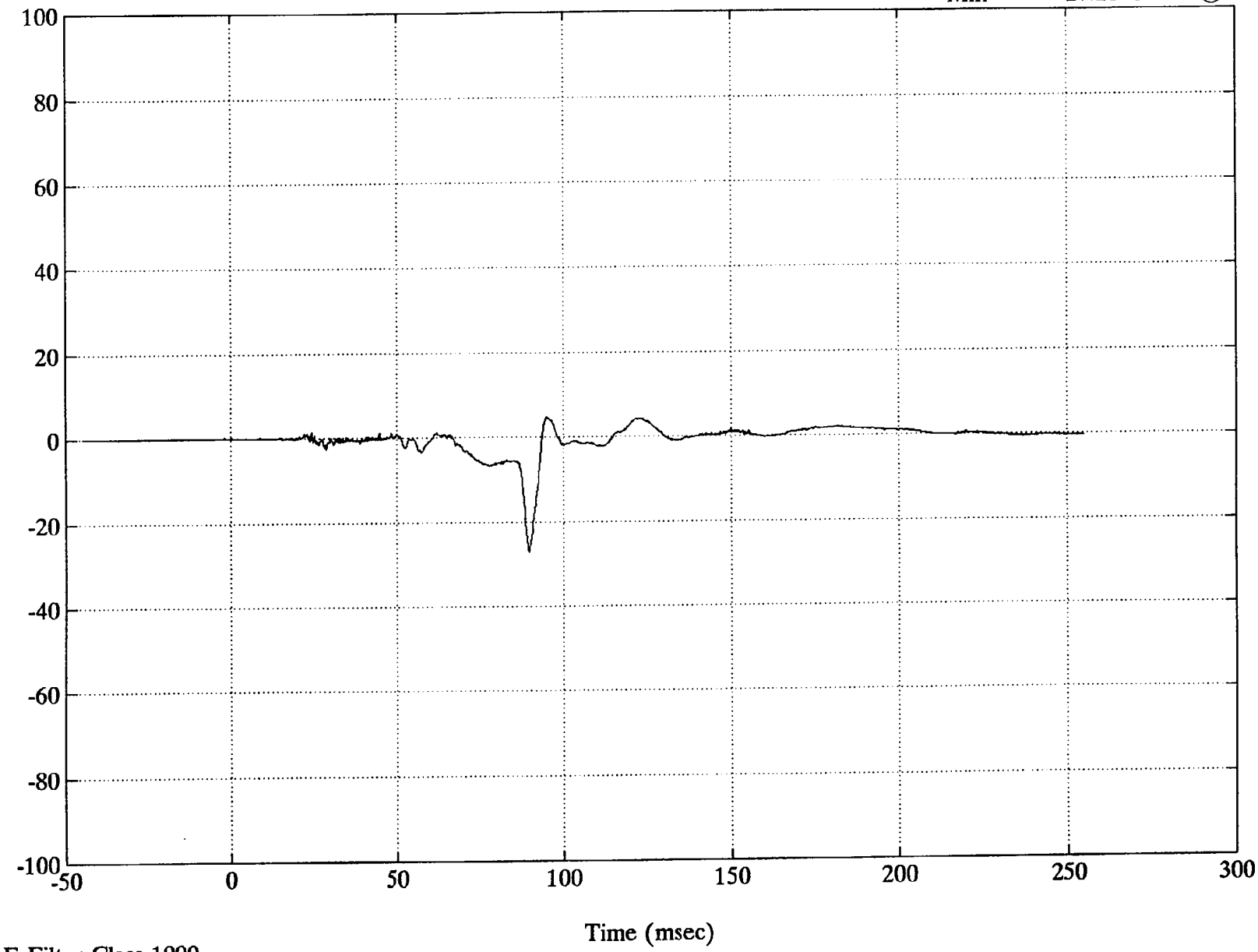
B-75

7893-10 SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 1 Head Y

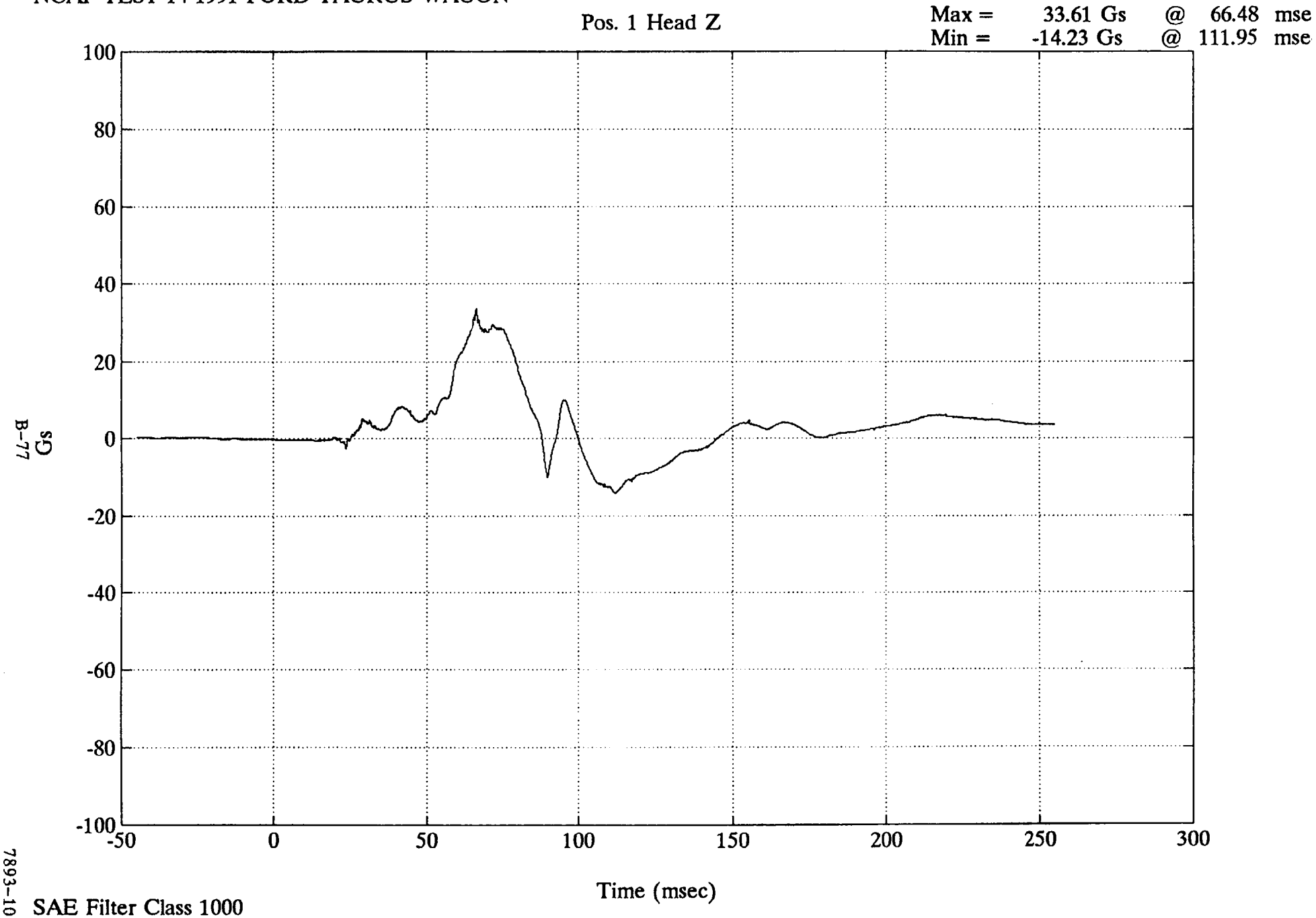
Max = 4.79 Gs @ 95.04 msec
Min = -27.26 Gs @ 89.76 msec



7893-10

SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON



B-77

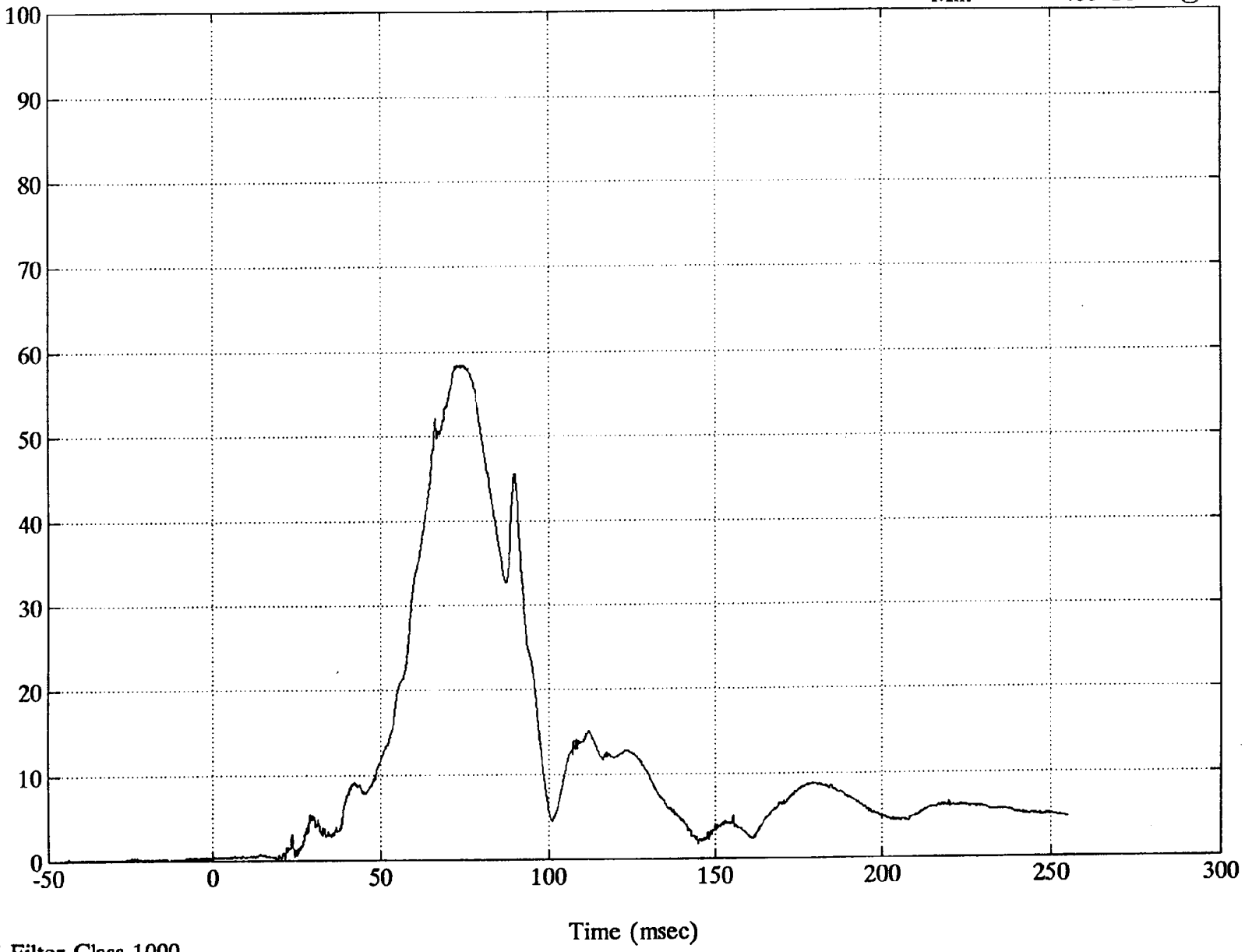
7893-10

SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 1 Head Resultant

Max = 58.44 Gs @ 72.72 msec
Min = .06 Gs @ -10.92 msec

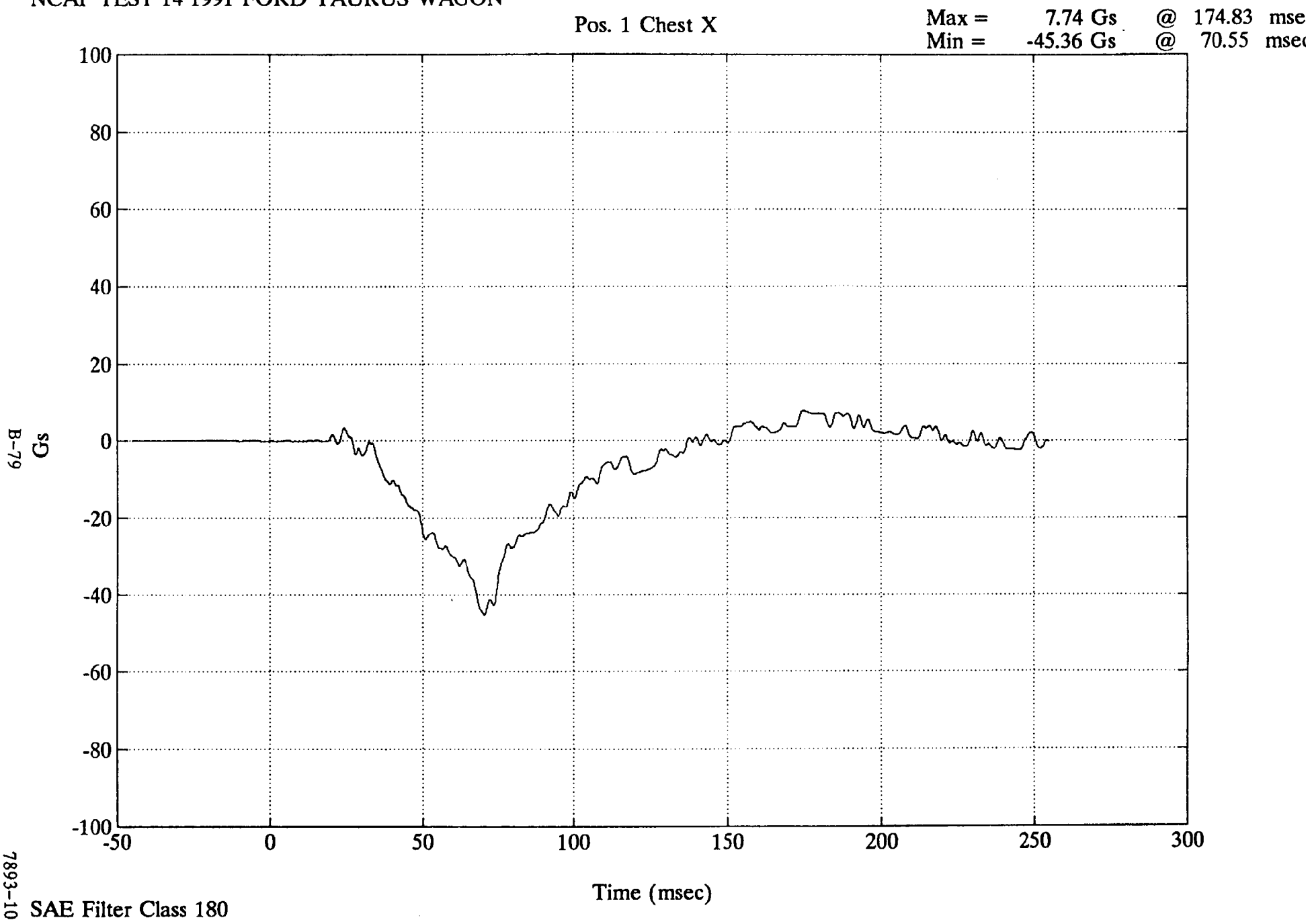


B-78

7893-10

SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON



B-79

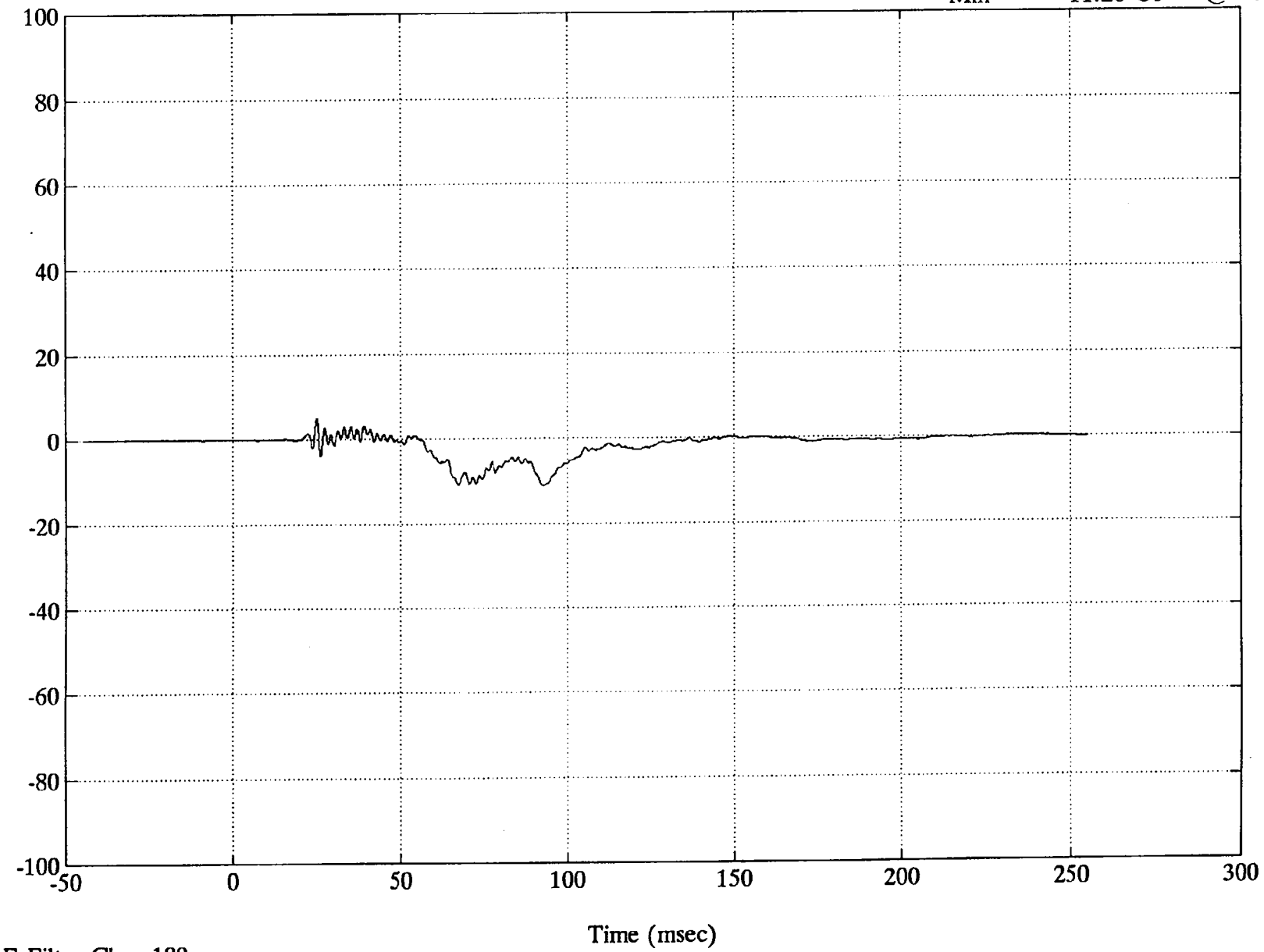
7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 1 Chest Y

Max = 4.86 Gs @ 24.96 msec
Min = -11.26 Gs @ 92.51 msec

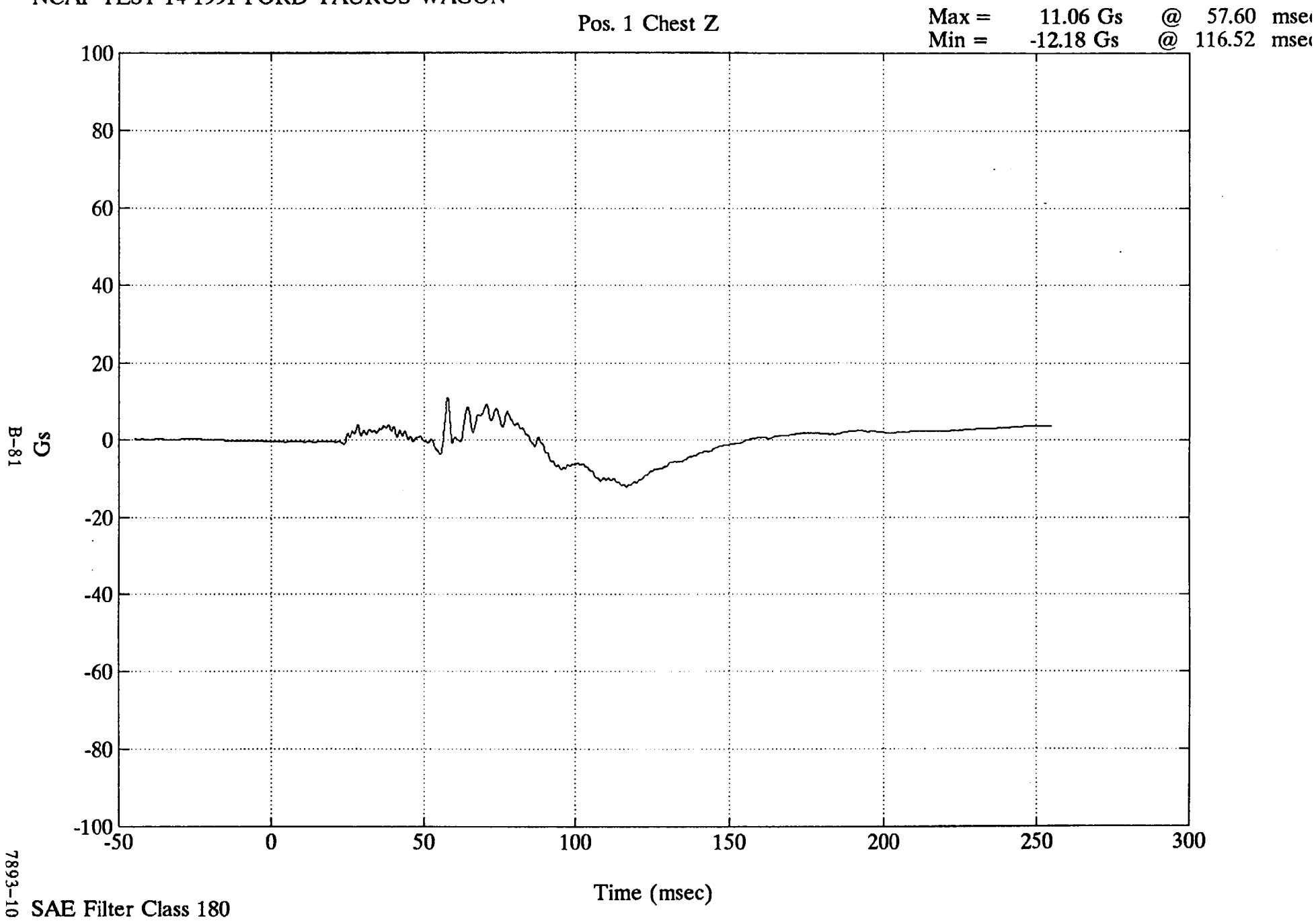


B-80

7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON



B-81

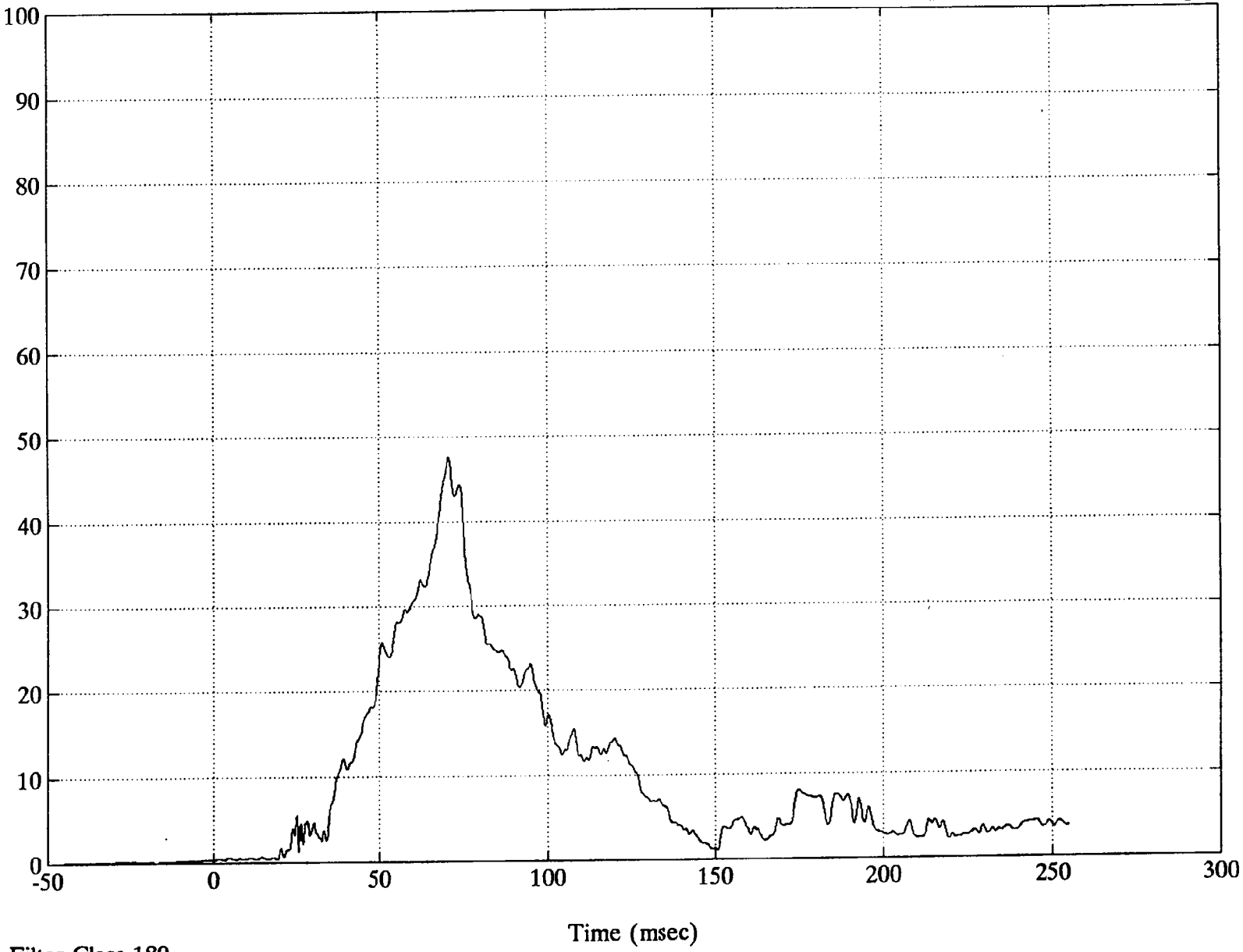
7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 1 Chest Resultant

Max = 47.53 Gs @ 70.55 msec
Min = .03 Gs @ -17.28 msec

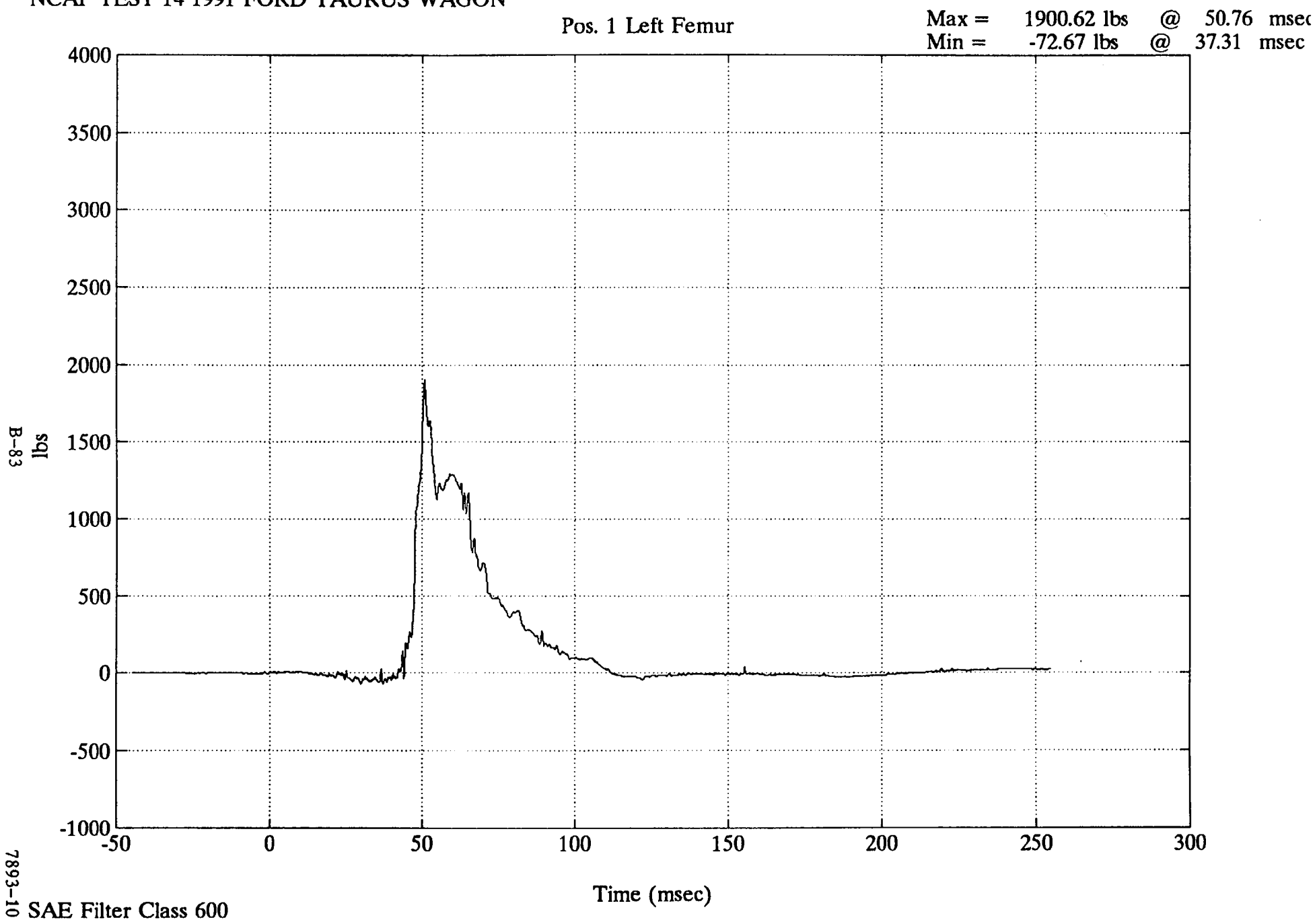


B-82

7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON



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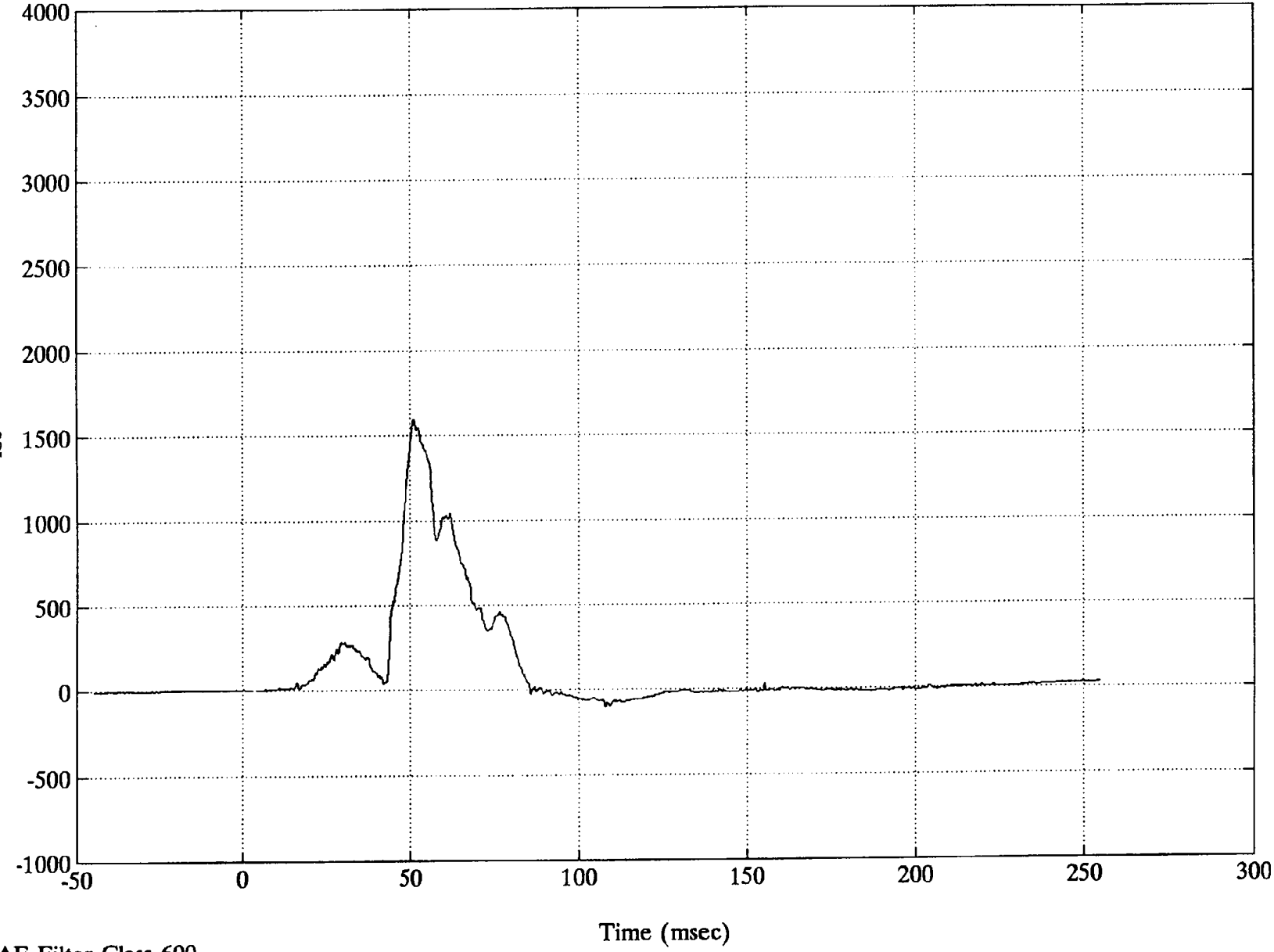
7893-10 SAE Filter Class 600

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 1 Right Femur

Max = 1593.53 lbs @ 51.12 msec
Min = -104.14 lbs @ 107.88 msec



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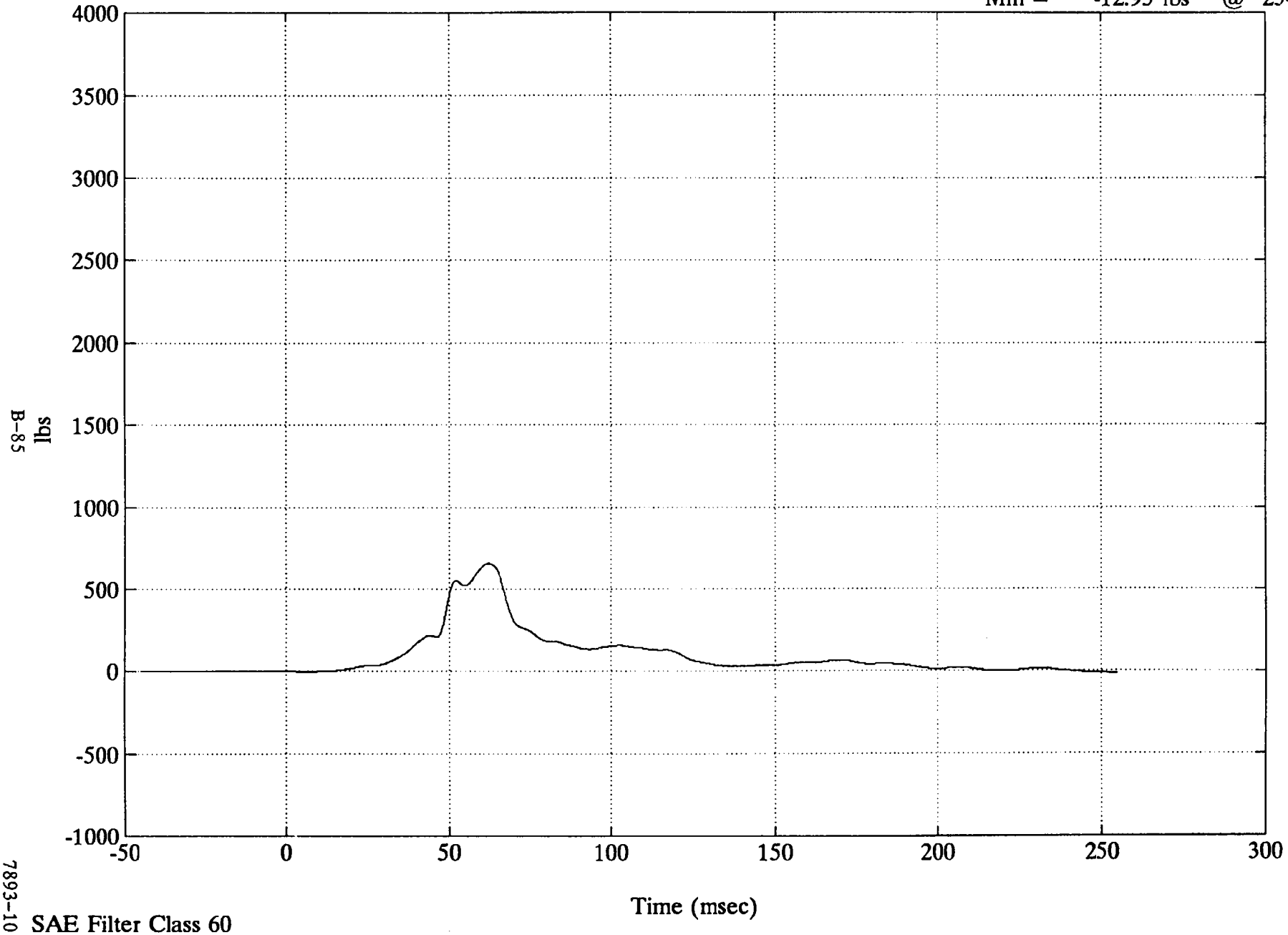
7893-10

SAE Filter Class 600

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 1 Left Belt Load

Max = 653.87 lbs @ 61.92 msec
Min = -12.95 lbs @ 254.04 msec

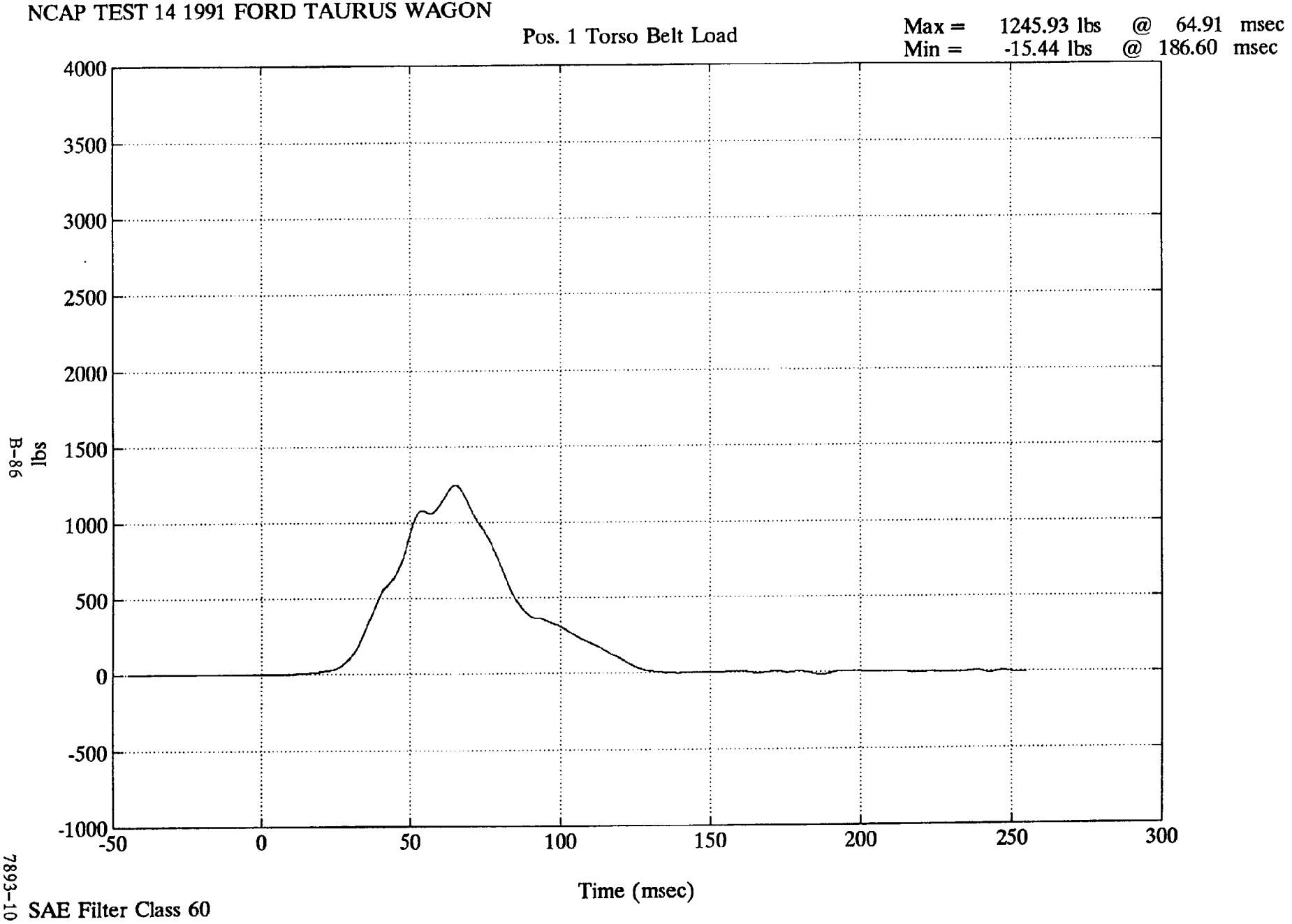


B-85

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



B-86

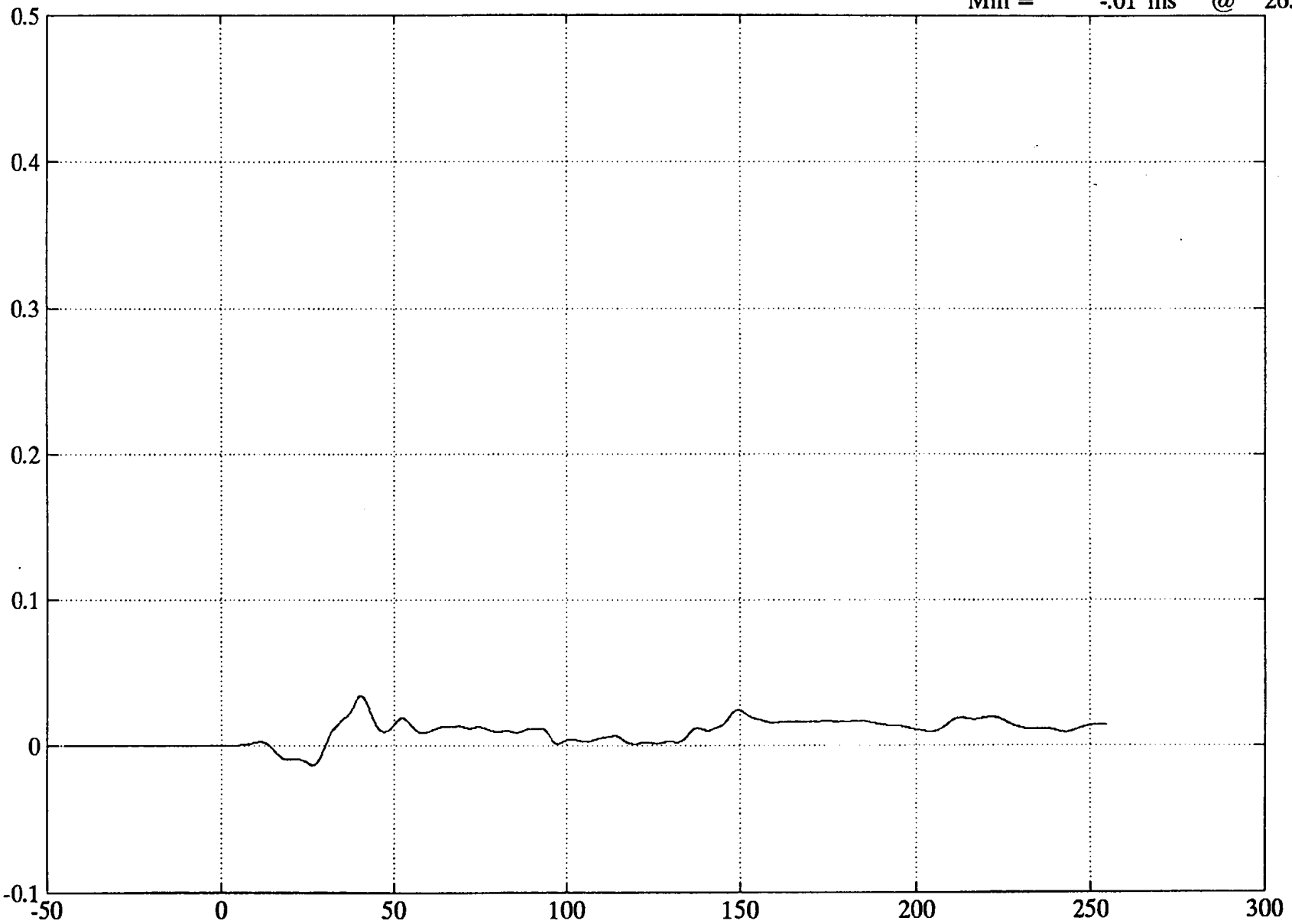
7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 1 Belt Elongation

Max = .03 ins @ 40.56 msec
Min = -.01 ins @ 26.15 msec



B-87

7893-10

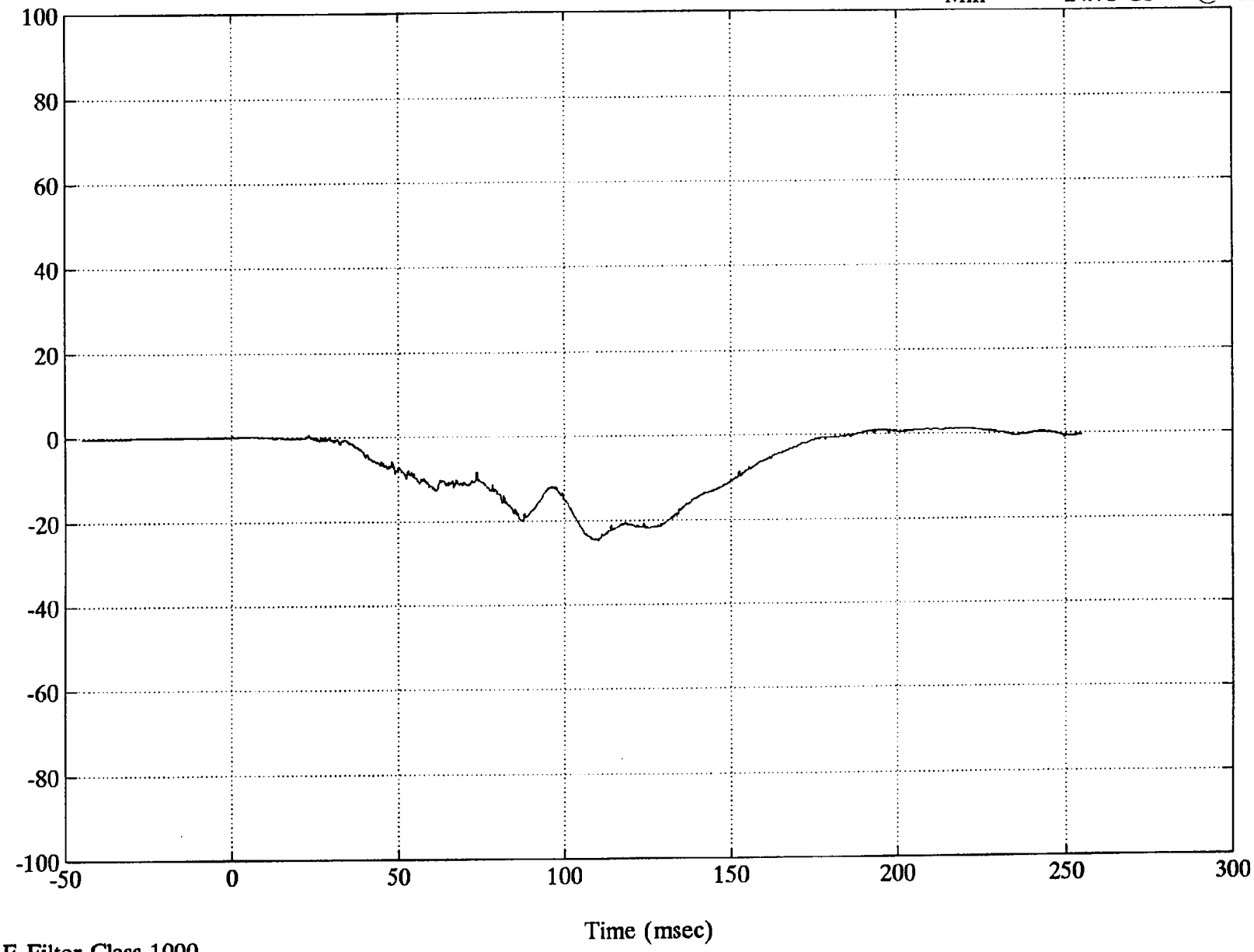
SAE Filter Class 60

Measured over 2.5 inches

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 2 Head X

Max = 1.25 Gs @ 219.84 msec
Min = -24.78 Gs @ 110.27 msec

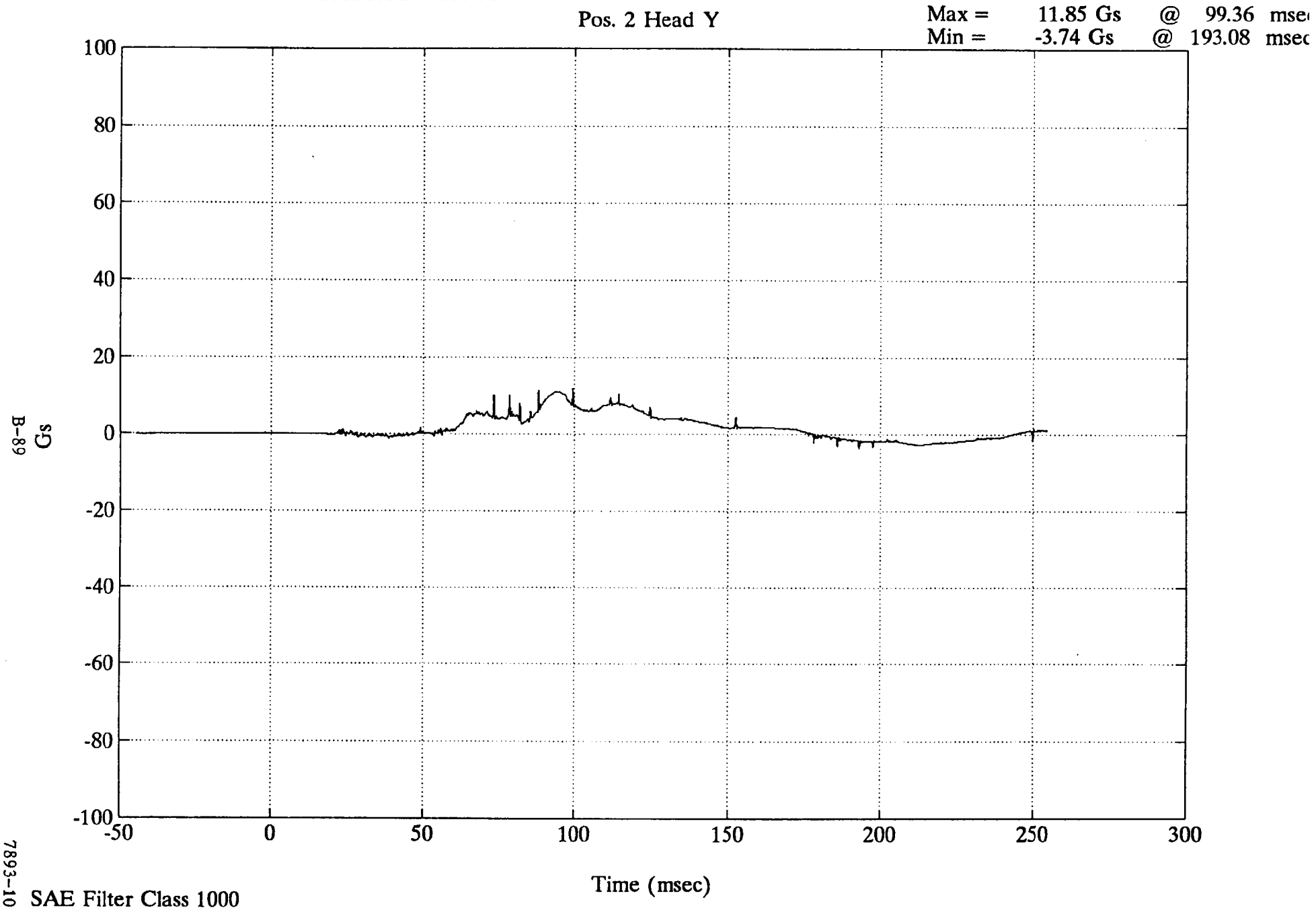


B-88

7893-10

SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON



B-89

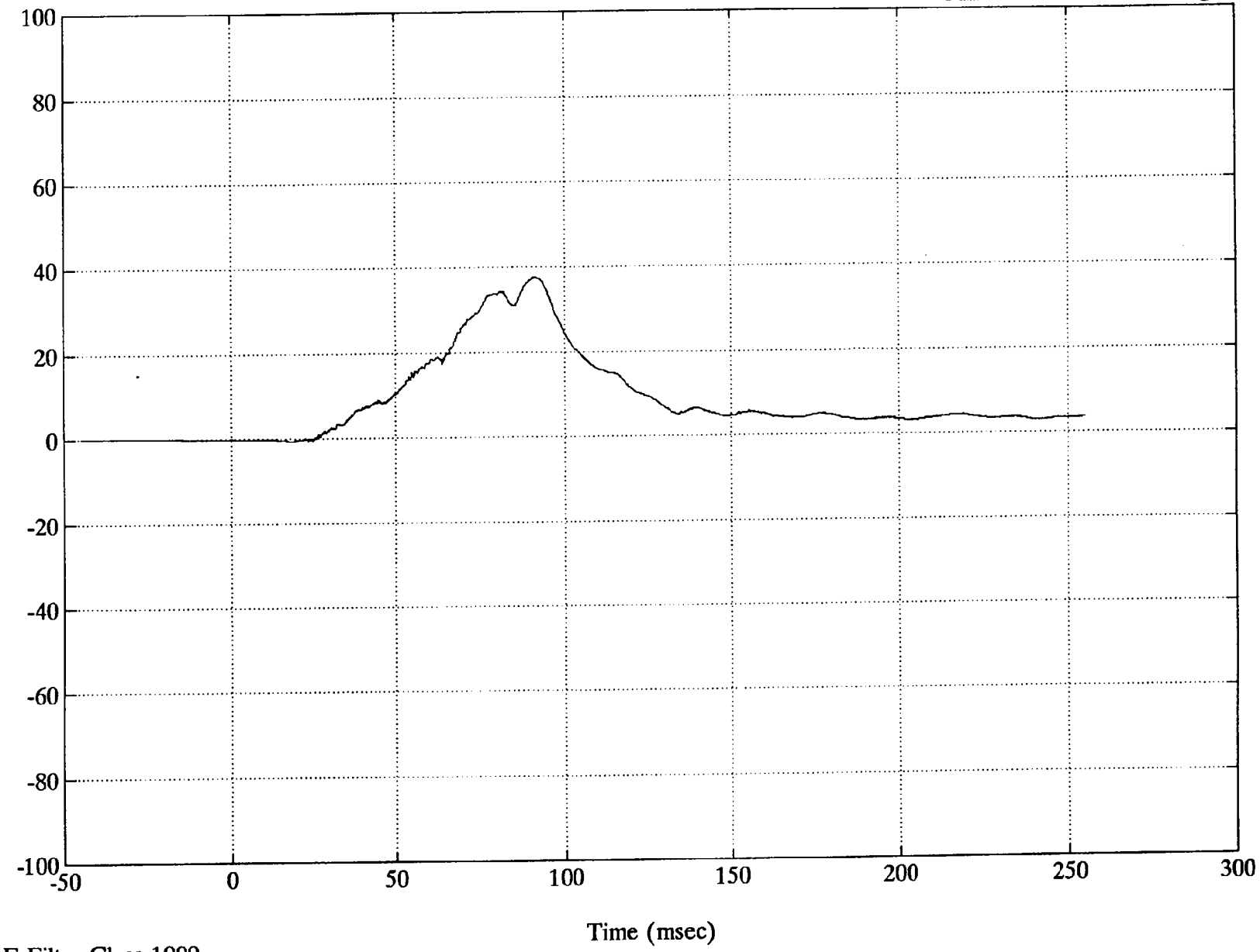
7893-10

SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 2 Head Z

Max = 37.62 Gs @ 91.68 msec
Min = -.73 Gs @ 18.95 msec



B-90

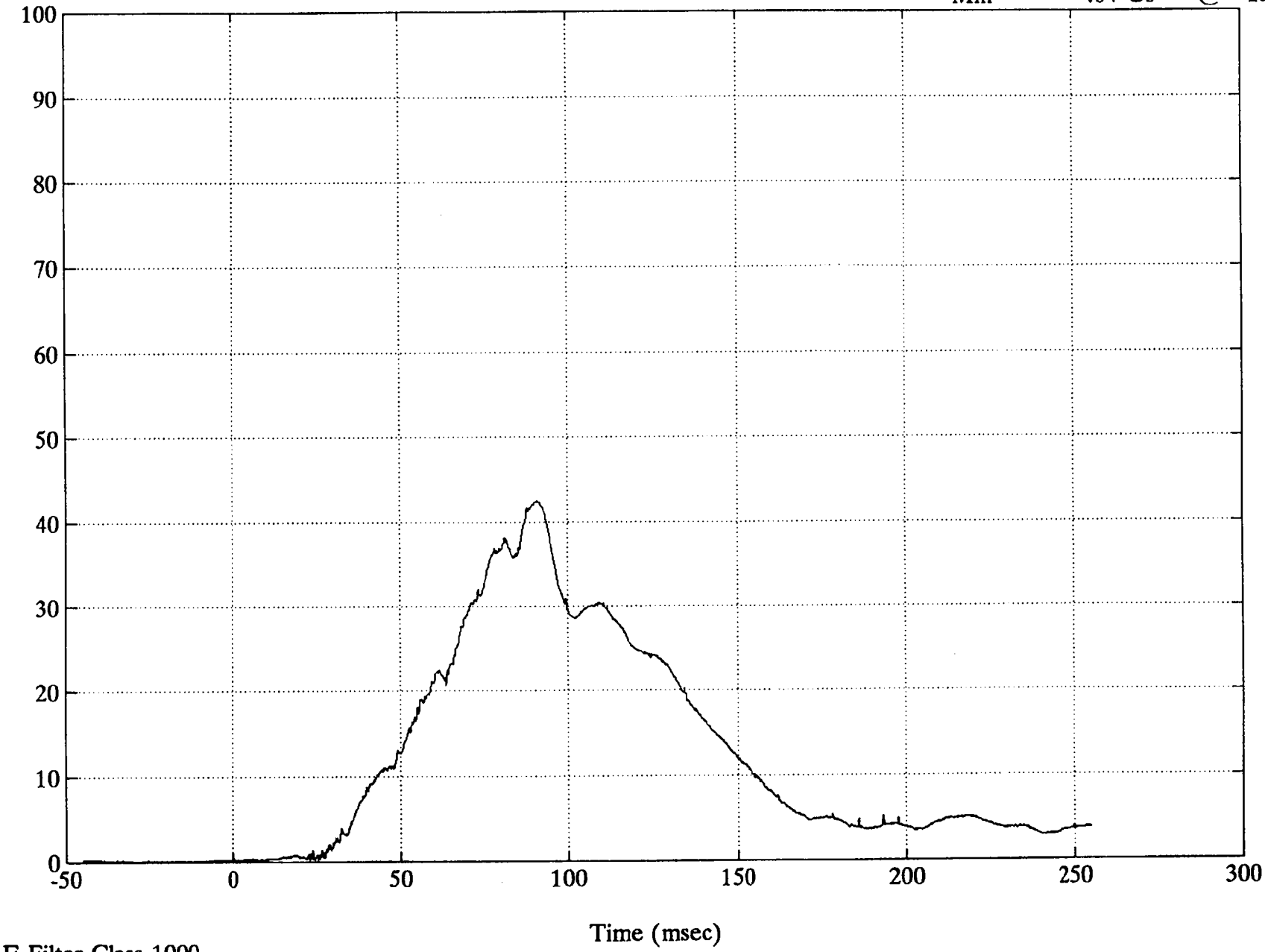
7893-10

SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 2 Head Resultant

Max = 42.35 Gs @ 90.96 msec
Min = .04 Gs @ -15.60 msec

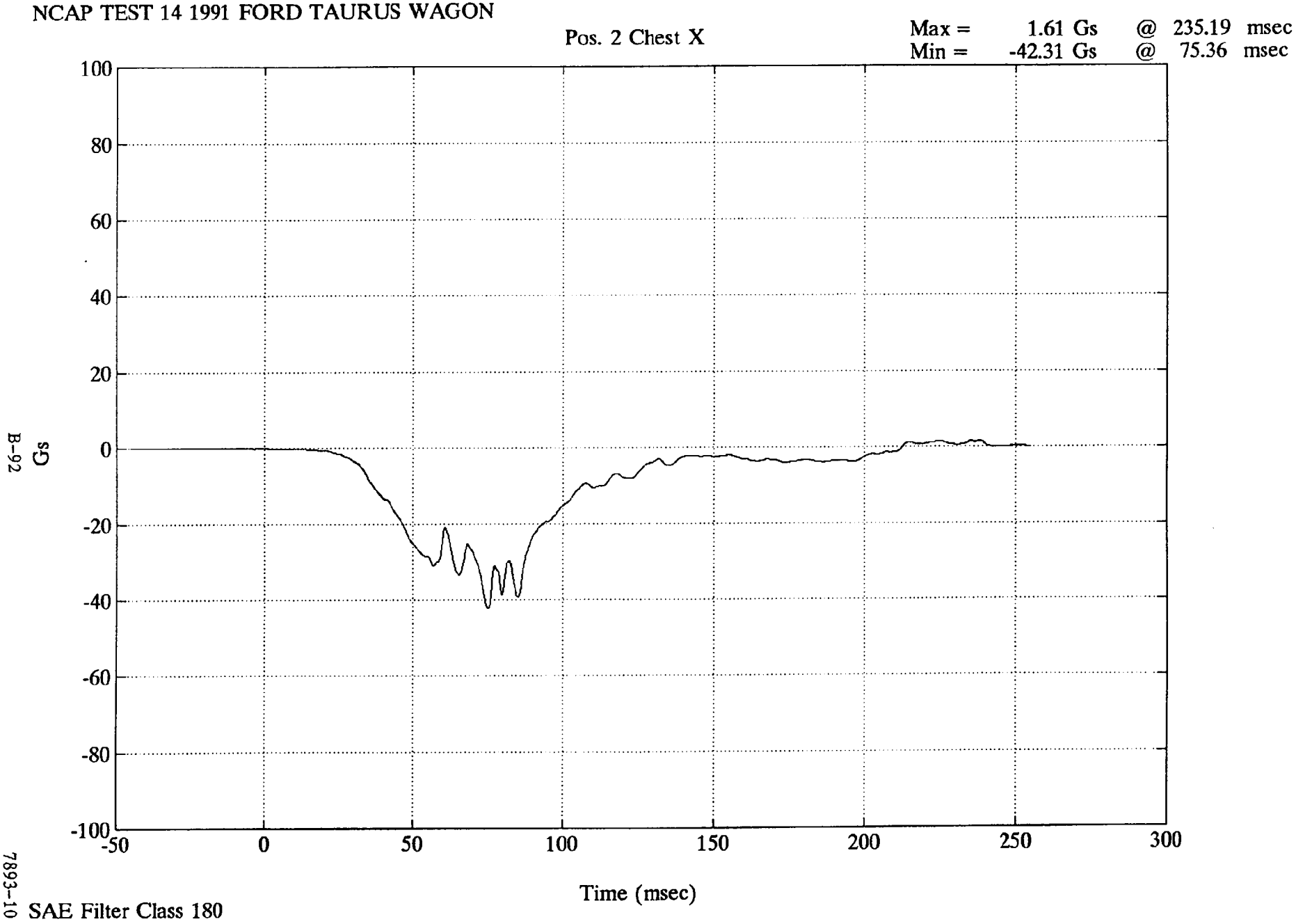


B-91

7893-10

SAE Filter Class 1000

NCAP TEST 14 1991 FORD TAURUS WAGON

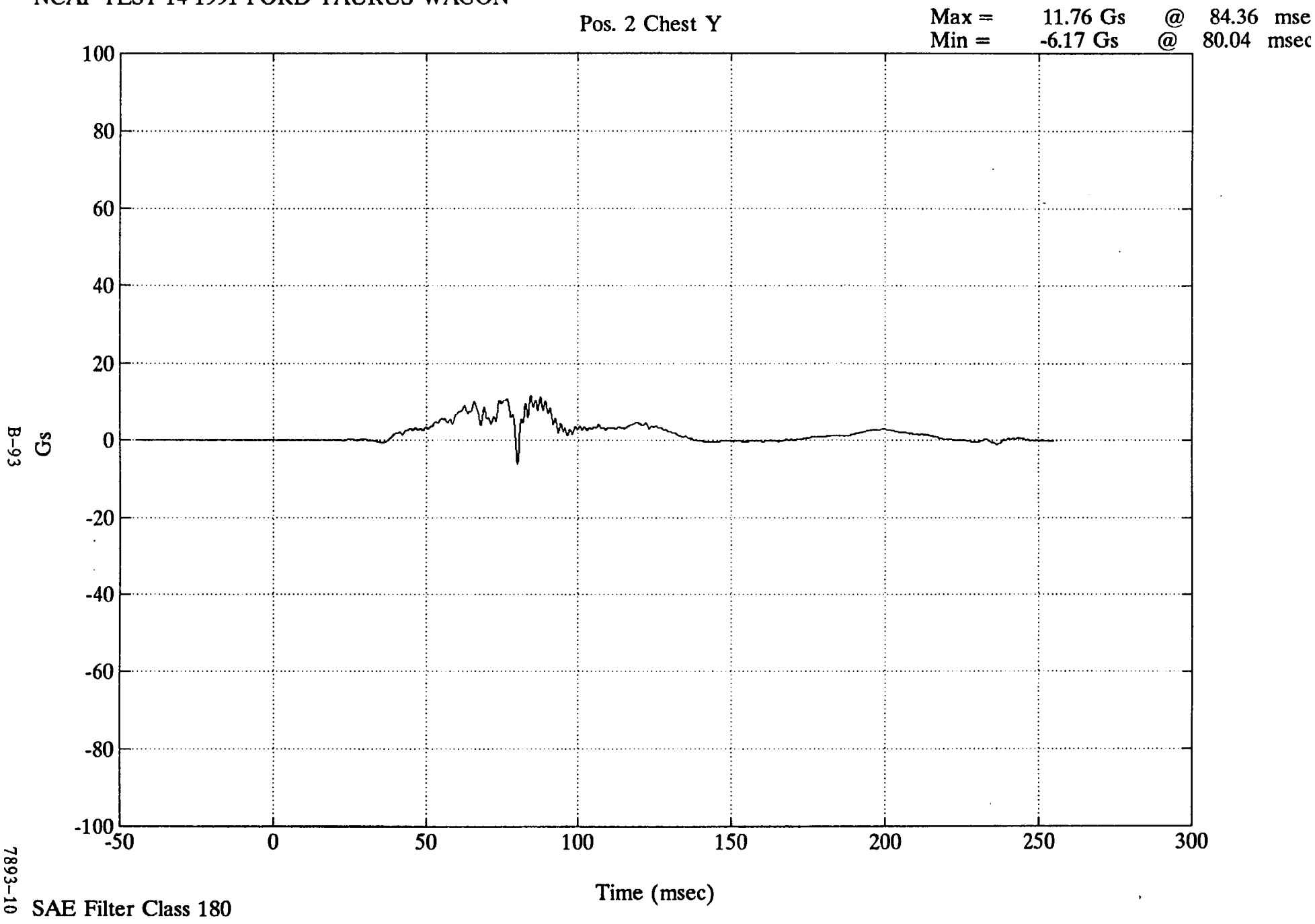


B-92

7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON

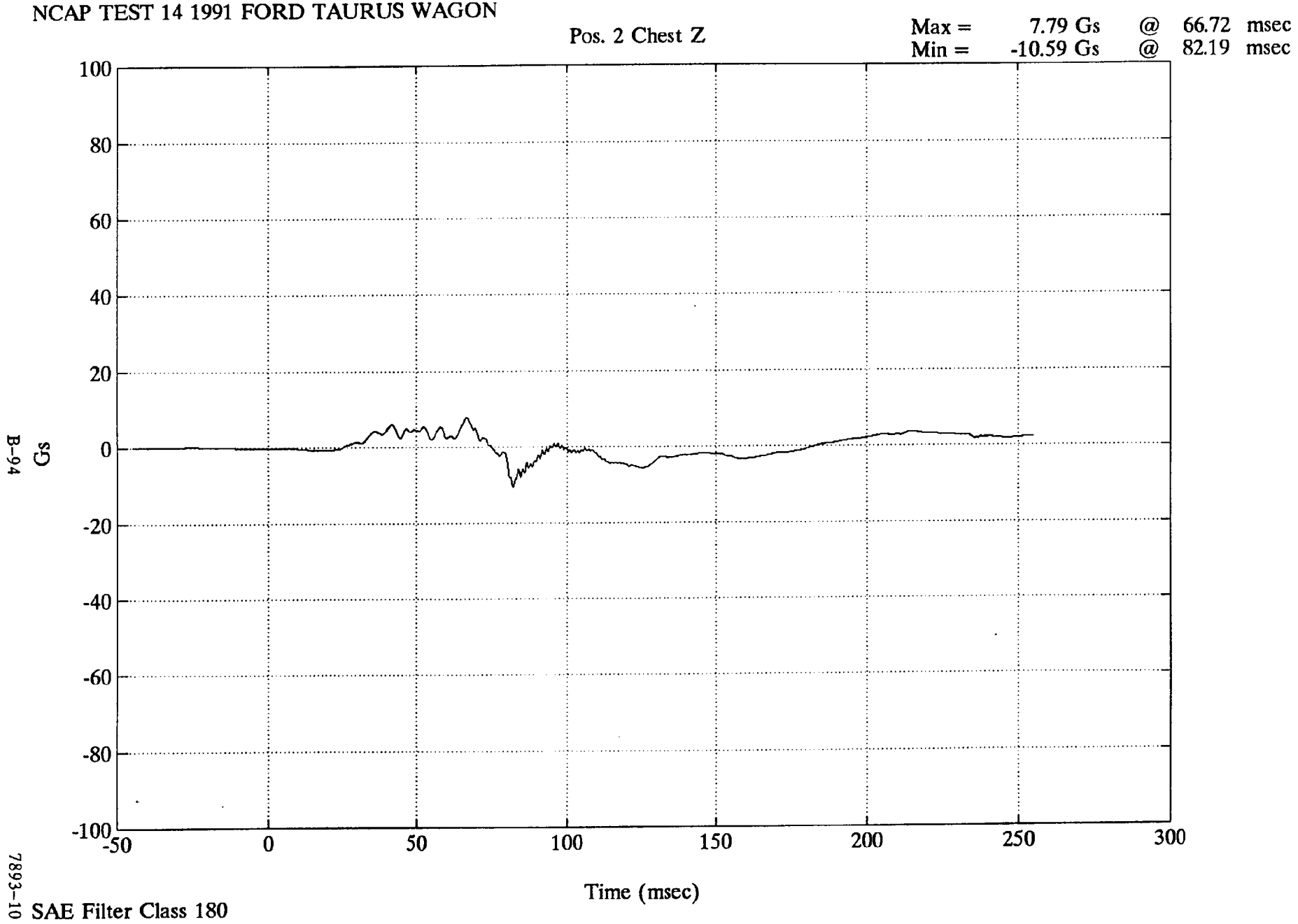


B-93

7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON

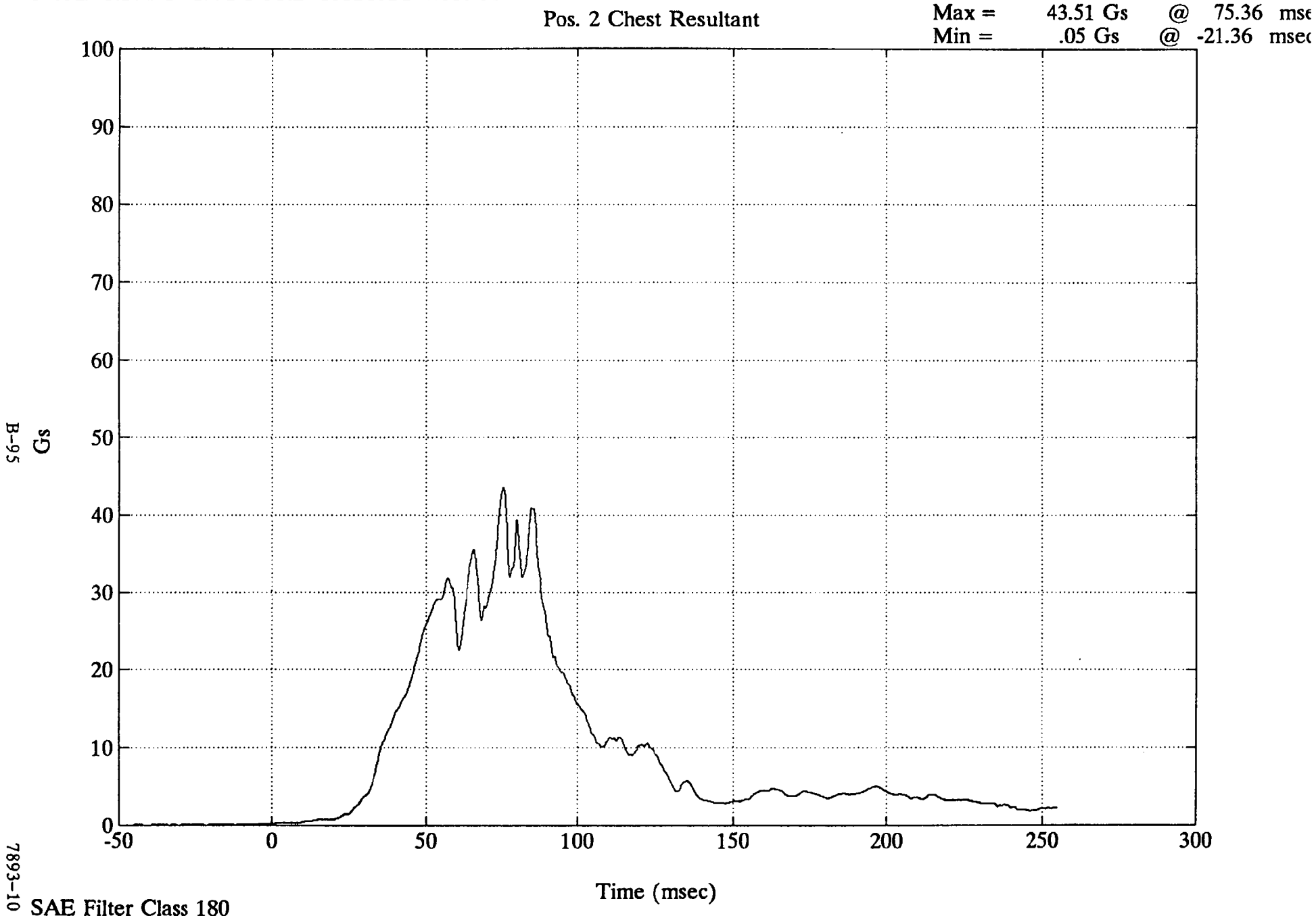


B-94

7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON



B-95

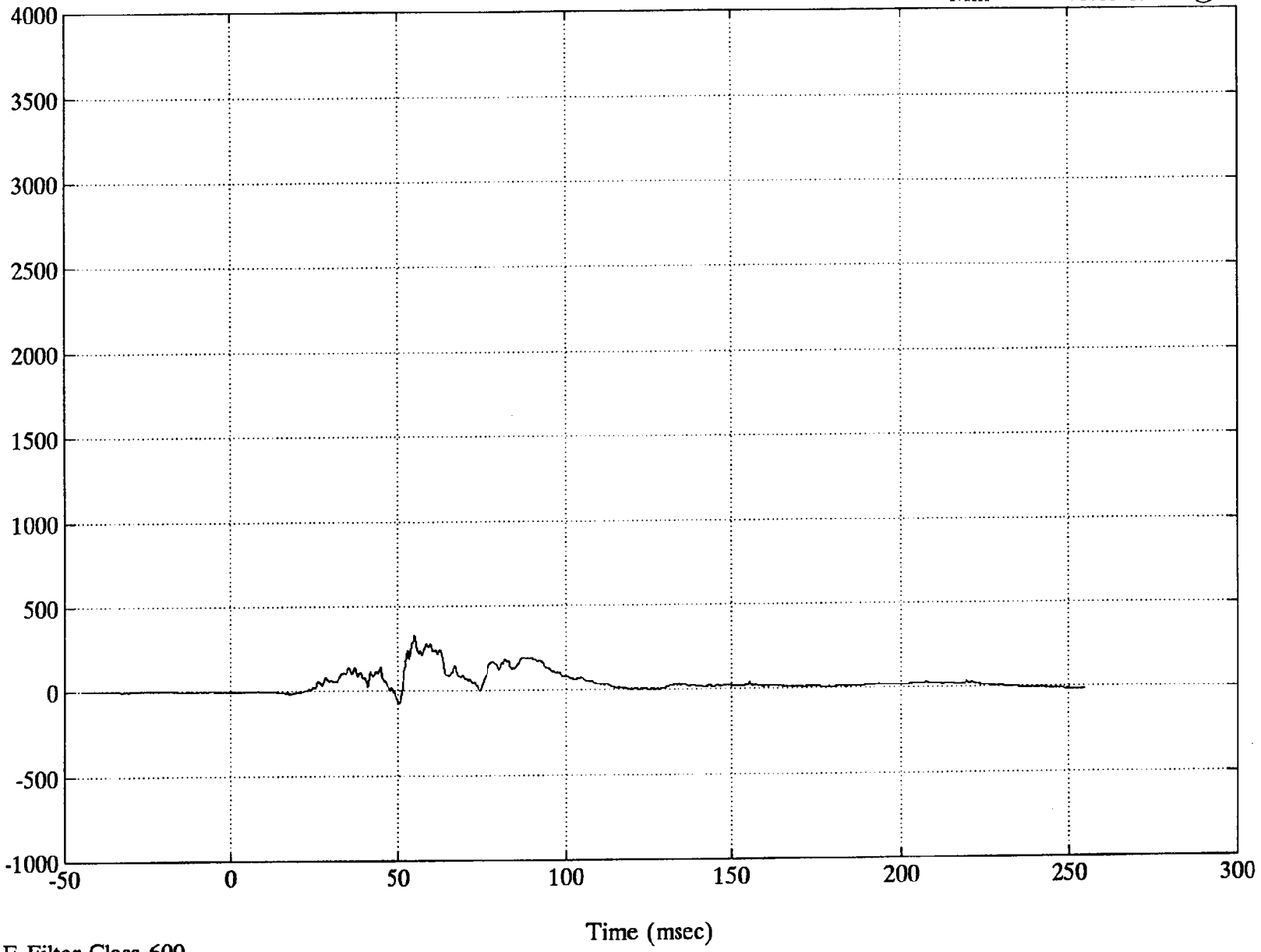
7893-10

SAE Filter Class 180

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 2 Left Femur

Max = 327.46 lbs @ 54.96 msec
Min = -73.03 lbs @ 50.52 msec

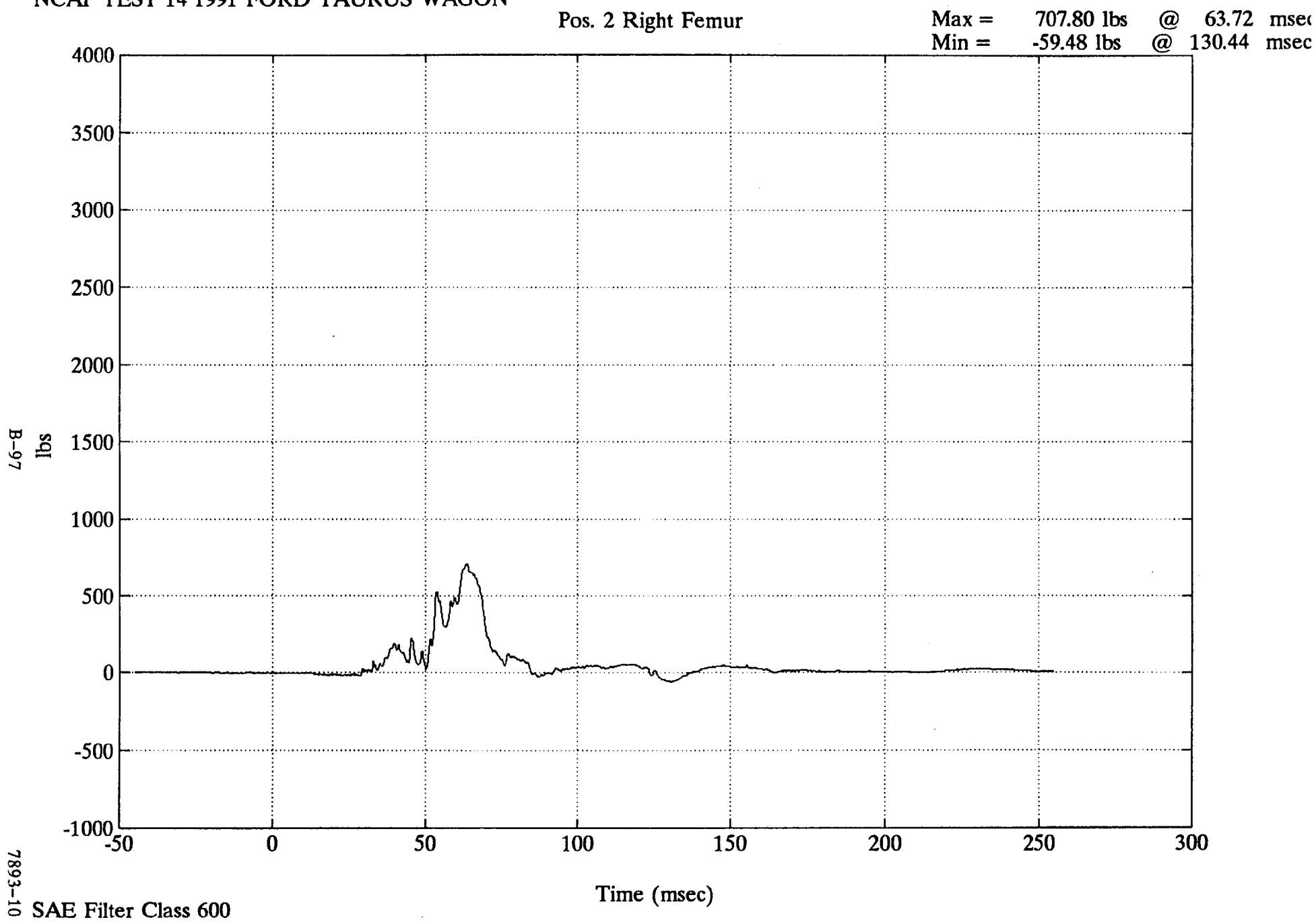


B-96

7893-10

SAE Filter Class 600

NCAP TEST 14 1991 FORD TAURUS WAGON



B-97

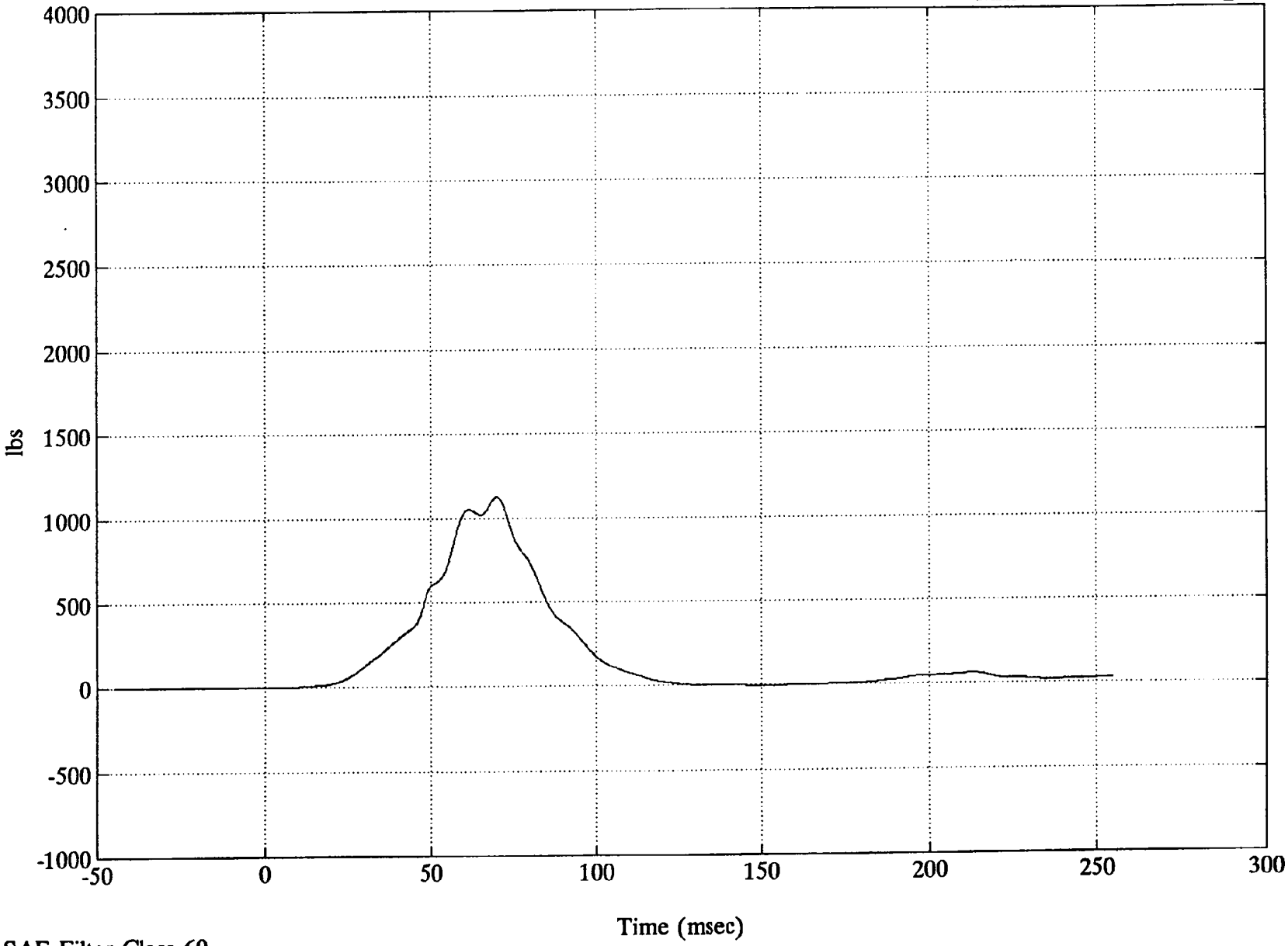
7893-10

SAE Filter Class 600

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 2 Right Belt Load

Max = 1124.42 lbs @ 69.95 msec
Min = -3.59 lbs @ 153.36 msec

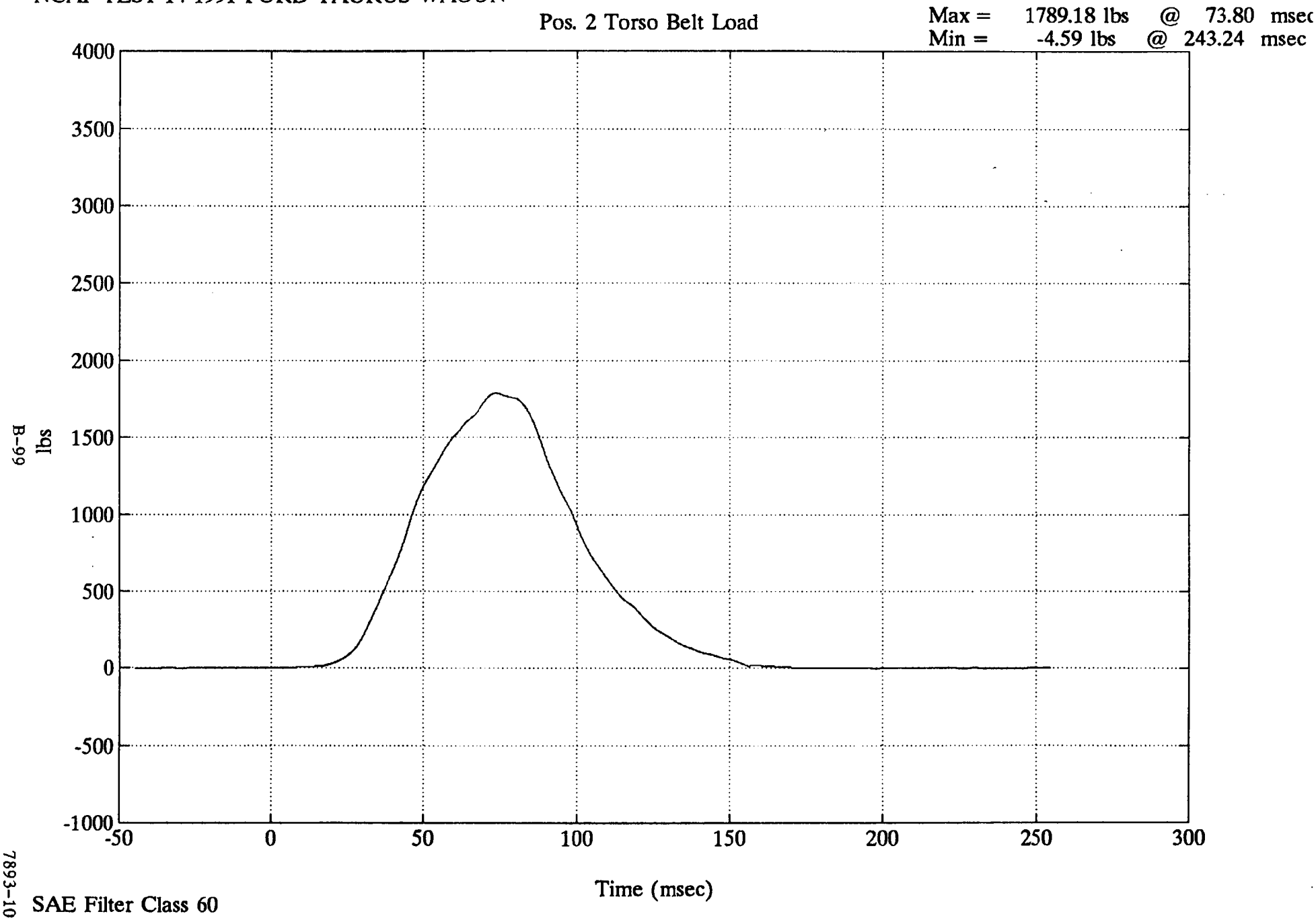


B-98

7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON



B-99

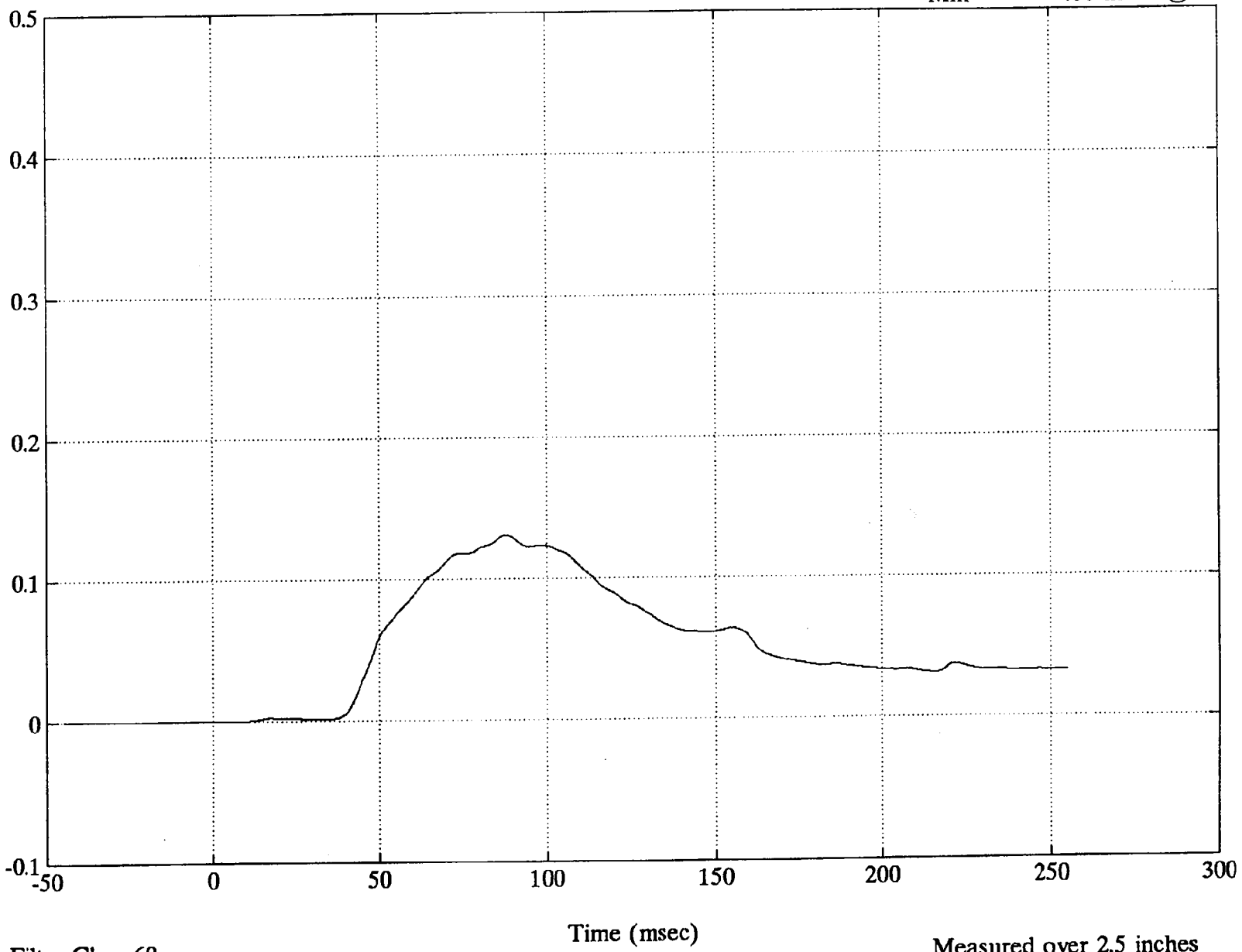
7893-10

SAE Filter Class 60

NCAP TEST 14 1991 FORD TAURUS WAGON

Pos. 2 Belt Elongation

Max = .13 ins @ 87.96 msec
Min = -.00 ins @ -19.08 msec



B-100

7893-10

SAE Filter Class 60

Measured over 2.5 inches

Appendix C

PART 572-B DUMMY CONFIGURATION

AND PERFORMANCE VERIFICATION DATA SHEETS

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

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

Dummy serial numbers and certification dates are:

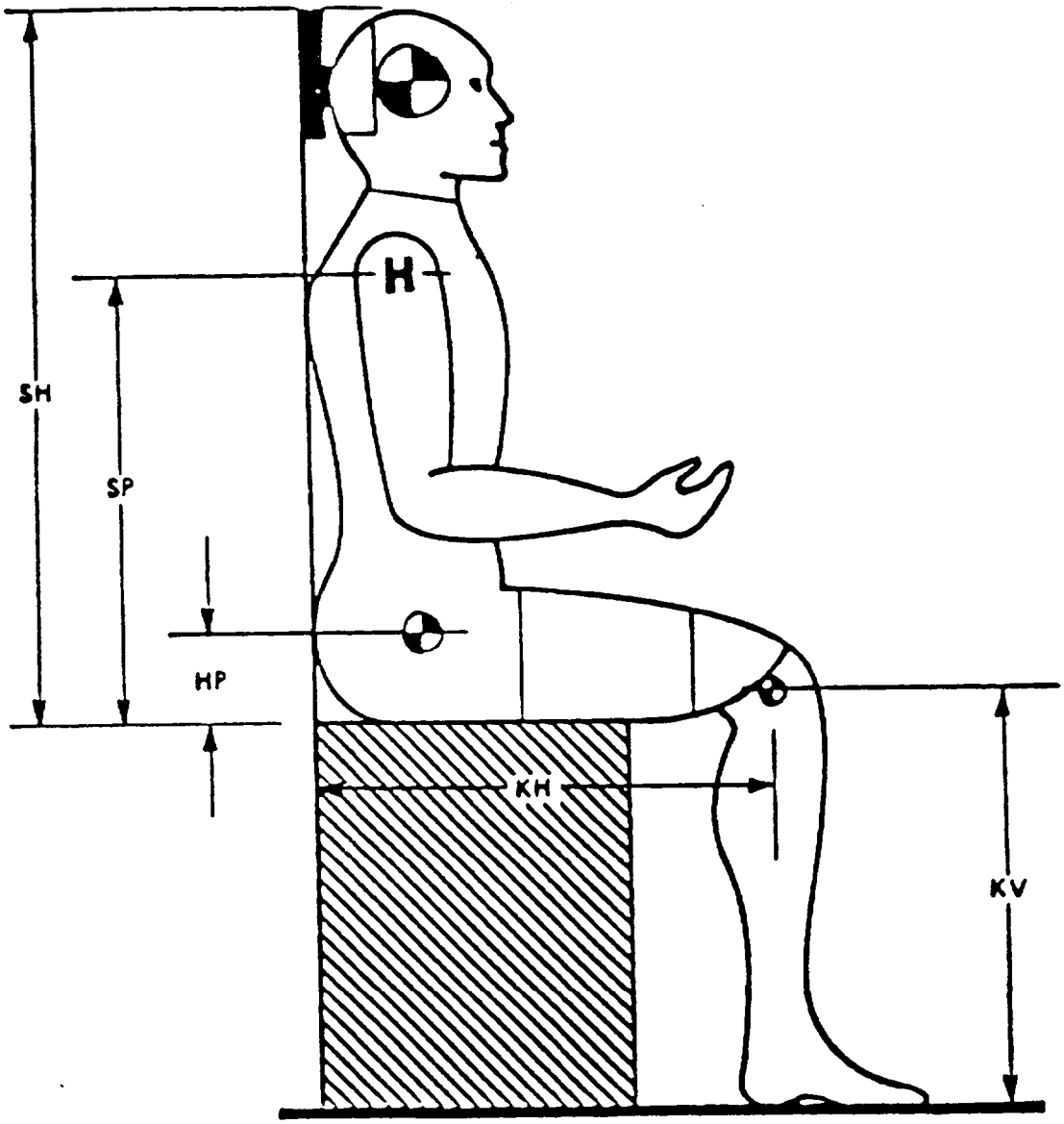
Serial No.	Completion Date
320	3-7-91
358	3-8-91

Electronic Test Equipment

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

Figure 10

DUMMY CONFIGURATION DIMENSIONS



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 320

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXX	3-7-91	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	2	
SH - Seated Height	35.6 to 35.8"	35.7 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	22.0 "	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	"
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4 "	"
KV - Knee Pivot from floor	19.3 to 19.9"	19.6 "	"
SW - Shoulder Width	17.8 to 18.4"	18.1 "	"
HW - Hip Width	14.0 to 15.4"	14.8 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		3-7-91	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		2	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		69-70 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		29-32 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	258.5 G's	G's
b. peak lateral accel.	<= 10 G's	3.8 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.13 ms	ms

* Sequential number beginning with "1" at the start of each fiscal years's crash test program.

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	23.5 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.0 G's	
c. Peak Resultant Head Acceleration		26 G's max.	25.81 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.73 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.41 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	6.94 ms	
g. Max. Head Rotation		63 to 73 deg.	71.52 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	
	Displ.	-.5 to .5"	0.0 "	
30 deg.	Time	25.6 to 34.4 ms.	29.39 ms	
	Displ.	2.1 to 3.1"	2.85 "	
60 deg.	Time	40.3 to 51.7 ms.	42.66 ms	
	Displ.	4.3 to 5.3"	4.9 "	
Maximum	Time	53.2 to 66.8 ms.	58.04 ms	
	Displ.	5.0 to 6.0"	5.76 "	
60 deg.	Time	67.0 to 83.0 ms.	73.29 ms	
	Displ.	4.3 to 5.3"	4.79 "	
30 deg.	Time	85.4 to 104.6 ms.	90.28 ms	
	Displ.	2.1 to 3.1"	2.12 "	
0 deg.	Time	101.0 - 123.0 ms.	104.41 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	26.5 lbs	
b. Force @ 0.75"	36 to 50 lbs.	40.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	57.5 lbs	
d. Force @ 1.3"	73 to 88 lbs.	83 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	27 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	40 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	51 lbs	
d. Return Angle	12 deg. maximum	7 deg	
5. CHEST IMPACT TESTS:			
A.High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.61 "	
(3) Peak Resistive Force	2250 lbs maximum	2130 lbs	
(4) Internal Hysteresis	50 to 70%	57.7 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.0 fps	
(2) Peak Deflection	1.1" maximum	1.07 "	
(3) Peak Resistive Force	1450 lbs maximum	1325 lbs	
(4) Internal Hysteresis	50 to 70%	56.4 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	1972 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.875 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	1969 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.875 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER _____320_____

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CP30	4-91	10-91
HY LATERAL--	ENDEVCO	CX05	4-91	10-91
HZ VERTICAL--	ENDEVCO	DB47	4-91	10-91
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A74	4-91	10-91
CY LATERAL--	ENDEVCO	FH01	4-91	10-91
CZ VERTICAL--	CEC	A128	4-91	10-91
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	951	3-91	9-91
LEFT SIDE	GSE	952	3-91	9-91
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A160	11-90	5-91
2. TEST PROBE ACCELEROMETER--	CEC	A161	11-90	5-91
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	1-91	7-91
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	1-91	7-91
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	1-91	7-91

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 358

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXX	3-8-91	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.6 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	22.1 "	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	"
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.5 "	"
KV - Knee Pivot from floor	19.3 to 19.9"	19.6 "	"
SW - Shoulder Width	17.8 to 18.4"	18.0 "	"
HW - Hip Width	14.0 to 15.4"	14.8 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		3-8-91	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		69-70 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		27-33 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	237 G's	G's
b. peak lateral accel.	<= 10 G's	7.4 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.38 ms	ms

* Sequential number beginning with "1" at the start of each fiscal years's crash test program.

TECHNICIAN'S NAME: IVAN MINKEWICZ

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA...continued

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 358

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	23.7 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.6 G's	
c. Peak Resultant Head Acceleration		26 G's max.	25.89 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.73 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	27.53 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	5.46 ms	
g. Max. Head Rotation		63 to 73 deg.	70.68 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	
	Displ.	-.5 to .5"	0.0 "	
30 deg.	Time	25.6 to 34.4 ms.	28.77 ms	
	Displ.	2.1 to 3.1"	2.51 "	
60 deg.	Time	40.3 to 51.7 ms.	43.03 ms	
	Displ.	4.3 to 5.3"	4.81 "	
Maximum	Time	53.2 to 66.8 ms.	58.9 ms	
	Displ.	5.0 to 6.0"	5.47 "	
60 deg.	Time	67.0 to 83.0 ms.	72.17 ms	
	Displ.	4.3 to 5.3"	4.46 "	
30 deg.	Time	85.4 to 104.6 ms.	88.05 ms	
	Displ.	2.1 to 3.1"	2.11 "	
0 deg.	Time	101.0 - 123.0 ms.	102.93 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 358

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	28.5 lbs	
b. Force @ 0.75"	36 to 50 lbs.	43 lbs	
c. Force @ 1.0"	50 to 63 lbs.	59 lbs	
d. Force @ 1.3"	73 to 88 lbs.	84.5 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	30 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	41 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	53 lbs	
d. Return Angle	12 deg. maximum	7 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.66 "	
(3) Peak Resistive Force	2250 lbs maximum	2016 lbs	
(4) Internal Hysteresis	50 to 70%	55.7 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	13.9 fps	
(2) Peak Deflection	1.1" maximum	1.06 "	
(3) Peak Resistive Force	1450 lbs maximum	1256 lbs	
(4) Internal Hysteresis	50 to 70%	54 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 358

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2369 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.75 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2049 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.875 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER ____358_____

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	FY05	3-91	9-91
HY LATERAL--	ENDEVCO	GD98	3-91	9-91
HZ VERTICAL--	ENDEVCO	CD75	3-91	9-91
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A73	3-91	9-91
CY LATERAL--	ENDEVCO	CE06	3-91	9-91
CZ VERTICAL--	CEC	A44	3-91	9-91
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	954	3-91	9-91
RIGHT SIDE	GSE	955	3-91	9-91
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A160	11-90	5-91
2. TEST PROBE ACCELEROMETER--	CEC	A161	11-90	5-91
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	1-91	7-91
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	1-91	7-91
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	1-91	7-91

Appendix D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(6 Month Calibration Minimum)

DRIVER DUMMY	Serial #	Manufacturer	Calibration Last	Calibration Next
Head X	CP30	ENDEVCO	3-91	9-91
Y	CX05	ENDEVCO	3-91	9-91
Z	DB47	ENDEVCO	3-91	9-91
Chest X	A74	CEC	3-91	9-91
Y	FH01	ENDEVCO	3-91	9-91
Z	A128	CEC	3-91	9-91
Right Femur Load Cell	952	GSE	3-91	9-91
Left Femur Load Cell	951	GSE	3-91	9-91
Neck Load Cell X				
Y				
Z				
Neck Moment X				
Y				
Z				
Chest Deflection Gauge Hybrid III Use Only				
Lap Belt Load Cells	123	LEBOW	3-91	9-91
Shoulder Belt Load Cells	127	LEBOW	3-91	9-91
Spool-Out Potentiometer	-	-	-	-
Belt Stretch Transducer	E1	CALSPAN	10-90	4-91

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(6 Month Calibration Minimum)

PASSENGER DUMMY	Serial #	Manufacturer	Calibration Last	Calibration Next
Head X	FY05	ENDEVCO	3-91	9-91
Y	GD98	ENDEVCO	3-91	9-91
Z	CD75	ENDEVCO	3-91	9-91
Chest X	A73	CEC	3-91	9-91
Y	CE06	ENDEVCO	3-91	9-91
Z	A44	CEC	3-91	9-91
Right Femur Load Cell	955	GSE	3-91	9-91
Left Femur Load Cell	054	GSE	3-91	9-91
Neck Load Cell X				
Y				
Z				
Neck Moment X				
Y				
Z				
Chest Deflection Gauge Hybrid III Use Only				
Lap Belt Load Cells	133	LEBOW	3-91	9-91
Shoulder Belt Load Cells	135	LEBOW	3-91	9-91
Spool-Out Potentiometer	-	-	-	-
Belt Stretch Transducer	E3	CALSPAN	10-90	4-91

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Left Seat Rear Crossmember	A181	CEC	12-90	6-91
Right Rear Seat Crossmember	A177	CEC	12-90	6-91
Top of Engine	A83	CEC	3-91	9-91
Bottom of Engine	A144	CEC	10-90	4-91
Left Disc Brake Caliper	A24	CEC	3-91	9-91
Right Disc Brake Caliper	A68	CEC	10-90	4-91
Instrument Panel	A179	CEC	12-90	6-91
Center Rear Crossmember Z	A70	CEC	10-90	6-91
Vehicle Rear Z	A146	CEC	2-91	8-91

INSTRUMENT CALIBRATION FOR LABORATORY INSTRUMENTS
(6 Month Calibration Minimum)

	Serial #	Manufacturer	Calibration	
			Last	Next
Neck Bending Pendulum Accel.	A160	CEC	11-90	5-91
Neck Bending Rotary Potentiometer	None	BOURNS	1-91	7-91
Femur Probe Accelerometer	A160	CEC	11-90	5-91
Chest/Thorax Probe Accel.	A161	CEC	11-90	5-91
Lumbar Flexion Force Gauge	20051	TRANSDUCER INC.	1-91	7-91

Appendix E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Warning: If you see or smell fuel, do not reset the switch or try to start your vehicle. You could injure yourself or others. Have all the passengers get out of the vehicle and call the local fire department or a towing service.

If your engine cranks but does not start after a collision:

1. Turn the key in the ignition to OFF.
2. Check under the vehicle for leaking fuel.
3. If you do not see or smell fuel, push the red reset button on the fuel pump shut-off switch down.
4. Turn the ignition key ON for a few seconds, then turn it OFF.
5. Check under the vehicle again for leaking fuel. If you see or smell fuel, do not start your vehicle again. If there is no fuel, you can try to start your vehicle again.

Using Safety Restraints Properly

Safety Belts

The use of safety belts helps to restrain you and your passengers in case of a collision. In most states, the law requires their use. We strongly recommend that you use them every time you travel in your vehicle.

Safety belts provide best restraint when:

- the seat back is upright
- the occupant is sitting upright (not slouched)
- the lap belt is snug and low on the hips
- the shoulder belt is snug against the chest
- the knees are straight forward

For your safety, your vehicle has different types of safety belts:

- **Manual Front Lap and Shoulder Belts** – for people who sit in the driver's seat or the right front passenger seat. (Available only on Canadian vehicles and vehicles equipped with the Supplemental Driver Air Bag Restraint System.)
- **Lap and Shoulder Belts** –For people who sit next to the side windows in either the front or back seats.
- **Lap Belts** – For people who use the middle of the seat in either the front or back seats or for passengers who sit in the third seat if you have a wagon with this option.

See the following sections for directions on how to properly use these safety belts. Also see *Safety restraints for children* in this chapter for special instructions about using safety belts for children.

Warning: Make sure that you and your passengers, including pregnant women, wear safety belts. Be sure that lap belts fit snugly and as low as possible around the hips. If safety belts are not used properly, the risk of you or your passengers being injured in a collision greatly increases.

Do not allow any people to ride in the cargo area of your vehicle. People who are not riding in seats with their safety belts fastened are much more likely to be injured in a collision.

Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the risk and/or severity of injury in an accident.

Warning: Always drive and ride with your seat back upright and the lap belt snug across the hips to reduce the risk of serious injury to the abdomen or neck that could be caused by sliding under the safety belts in a collision.

Children should always ride with the seat in the fully upright position. When the seat back is not fully upright, there is a greater risk that the child will slide under the safety belt and be seriously injured in a collision.

Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision.

Never use a single belt for more than one person or across seating positions. This greatly increases the risk that one or both of the people will be injured in a collision. Each seating position in your vehicle has a specific safety belt assembly which is made up of one buckle and one tongue. Each assembly is designed to be used as a pair.

Warning: Be sure to lock all doors before you drive away. This will lessen your risk of being thrown from the vehicle in a collision.

Safety Belt Maintenance

Check the safety belt systems periodically to make sure that they work properly and are not damaged.

Warning: All safety belt assemblies including retractors and attaching hardware should be inspected after any collision. Ford recommends that all safety belt assemblies used during a collision be replaced unless the collision was minor and a qualified technician finds that the belts do not show damage and continue to operate properly. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

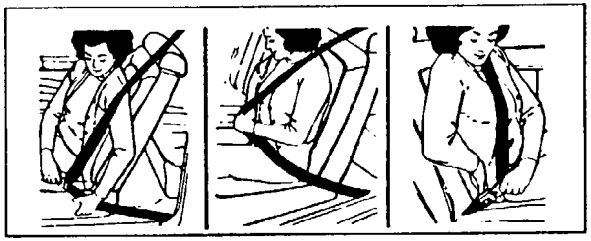
Front and Rear Seat Combination Lap and Shoulder Belts

While you drive, the combination lap and shoulder belt adjusts to your movement. However, if you brake hard, turn hard, or if your vehicle receives an impact of 5 mph (8 km/h) or more, the lap and shoulder belt locks.

After you get into your vehicle, close the door and lock it. Then adjust the seat to the position that suits you best.

To fasten the belt, find the long strap of the belt near the door, pull it across your shoulder and chest, and insert the tongue into the proper

buckle on your seat until you hear a snap and feel it lock. Be sure to use the correct buckle and check to make sure the buckle is securely fastened.



Fastening the front seat lap and shoulder belt

Warning: Make sure that the lap belt is as low around your hips as possible. Do not wear the lap belt around your waist. If you do not use the lap belts properly, the risk of being injured in a collision greatly increases.

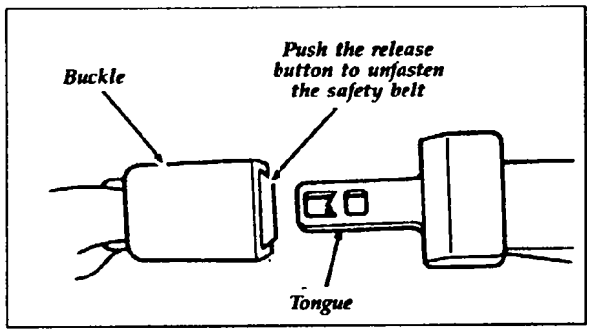
Warning: Front and rear seat occupants (including pregnant women) should wear both lap and shoulder belts, for optimum protection in an accident.

Warning: Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around the neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the risk and/or severity of injury in an accident.

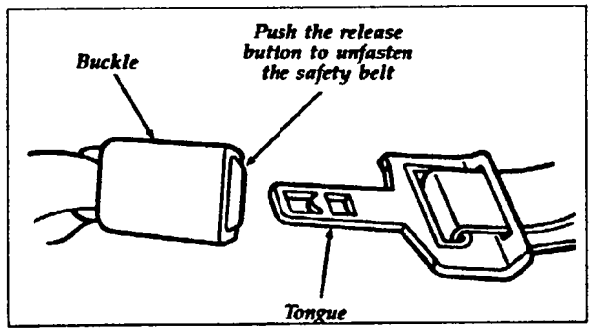
Adjust the lap part of the belt by pulling up on the shoulder belt until the lap belt fits snugly and as low as possible around your hips.

To unfasten the belt:

1. Push the release button on the buckle. This allows the tongue to unlatch from the buckle.



Unfastening the lap belts in the center front and center rear seating positions



Unfastening the lap and shoulder belts

2. While the belt retracts, guide the tongue to its original position. If you do not guide the tongue, it may strike you or part of the vehicle.

Lap Belts

The lap belts in the center of the front and back seats do not adjust automatically. You must adjust them to fit snugly and as low as possible around your hips.

If you have a wagon with a third seat, the lap belts in the third seat have retractors that adjust the belts automatically.

Before you fasten your lap belt, you may need to lengthen it.

To lengthen the belts, tip the belt tongue at a right angle to the belt. Pull the belt tongue over your lap until it reaches the buckle.

To fasten the belt, pull the belt across your hips and insert the tongue into the correct buckle on your seat until you hear a snap and feel it lock. Make sure the buckle is securely fastened.

Adjust the belt so that it fits snugly around your hips:

- ❑ If you need to lengthen the belt, unfasten it and repeat the procedure above.
- ❑ If you need to shorten the belt, pull on the loose end of the webbing.

To unfasten the belt, push the red release button on the end of the buckle. This allows the tongue to unlatch from the buckle.

Safety Belt Extension Assembly

For some people, the safety belt may be too short even when it is fully extended. You can add about eight inches (20 cm) to the belt length with a safety belt extension assembly. Safety belt extensions are available from your dealer.

Warning: To ensure that the safety belt extension assembly will hold in the event of a collision, only safety belt extensions manufactured by the same supplier as the safety belt should be used. Manufacturer identification is located at the end of the webbing on a label.

To Untwist or Unjam a Safety Belt:

If you should jam the lap belt retractor by allowing the belt to retract when it is twisted, you can free the webbing with this procedure:

1. Pull on the belt with both hands to tighten it on the retractor spool.
2. Feed the belt back into the retractor until it is completely retracted. Repeat previous step if necessary.
3. Pull the belt out of its holder as far as it will go and untwist the belt or remove the object that is jamming the belt. Let the belt retract.
4. Then, pull the belt out and let it retract several times to make sure that the belt works properly.

Supplemental Air Bag Restraint System (SRS)

Your car is equipped with an air bag for the driver. This air bag is a supplemental restraint system. It is designed to be used in addition to safety belts to help protect against head and chest injuries in certain moderate to severe frontal collisions.

The Importance of Wearing Safety Belts

Warning: Safety belts must be worn by all vehicle occupants to be properly restrained and help reduce the risk of injury in an accident.

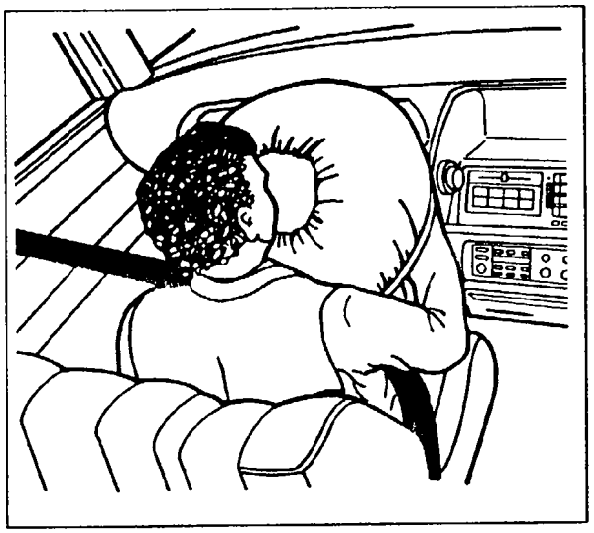
There are four very important reasons to use safety belts even with an air bag system. Use your safety belts to:

- ❑ help keep you in the proper position when the air bag inflates
- ❑ reduce the risk of harm in rollover, side or rear impact accidents, since an air bag is not designed to inflate in such situations
- ❑ reduce the risk of harm in frontal collisions that are not severe enough to activate the air bag
- ❑ reduce the risk of being thrown from your car

The Importance of Proper Seated Position

In an accident, the air bag must inflate extremely fast to help provide additional protection for you. In order to do this, the air bag must inflate with considerable force. If you are not seated in a normal riding position with your back against the seat back, the air bag may not protect you properly and could possibly hurt you as it inflates.

Warning: Do not put objects in front of the air bag system storage area that might restrict inflation or that might increase personal injury.



Inflated Driver-Side Air Bag

Report Air Bag Inflation

If an air bag inflates during a collision or for any other reason, Ford Motor Company wants to know. Please report the inflation to the Accident Investigation Team by calling "collect" (313) 337-8040.

The Accident Investigation Team reviews the information you provide. An investigator may contact you for more information. In some cases, the investigator may want to examine your car, and if an accident occurred, to get an accident report.

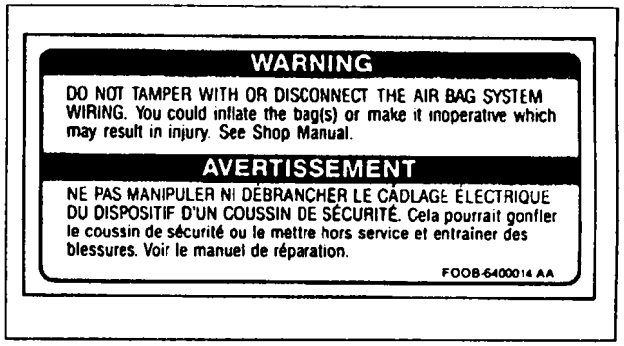
Warning: The air bag will inflate only once. The system is designed to function on a one-time-only basis. If the air bag is inflated, THE AIR BAG WILL NOT FUNCTION AGAIN AND MUST BE REPLACED IMMEDIATELY. If the air bag is not replaced, the unrepaired area will increase the risk of injury in a collision.

Disposal of Air Bag Equipped Vehicles

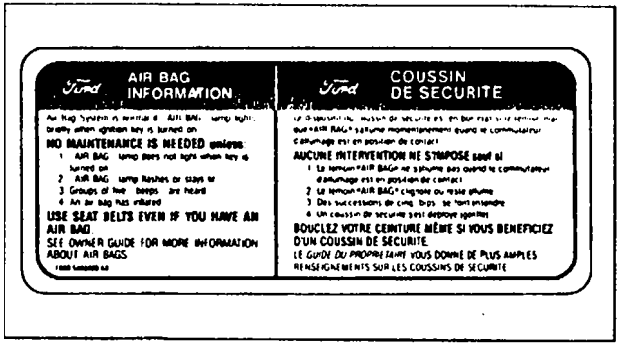
For disposal of air bags or air bag equipped vehicles, refer to the procedures in the 1991 Ford Shop Manual. Information on how to order a shop manual is available at an authorized Ford or Lincoln-Mercury Dealer. You can also order a shop manual using the order form in the back of your Owner's Guide.

Service and Information Labels

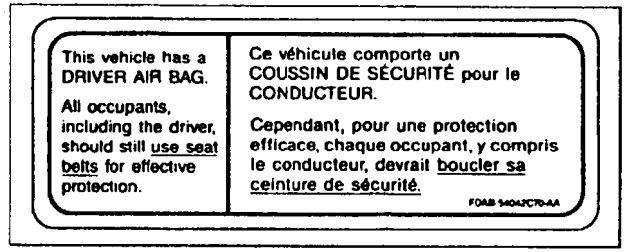
Service and information labels are attached inside the glove compartment, on both sides of the sun visor, and on the radiator support in the engine compartment.



Label on the radiator support sight shield in the engine compartment



Label located in glove compartment



Label located on the back of driver visor

Safety Restraints for Children

In most states, you are required by law to use safety restraints for children. If small children ride in your vehicle – this generally includes children who are four years old or younger and who weigh 40 pounds (18 kg) or less – you must put them in safety seats that are made specially for children. Safety belts alone do not provide maximum protection for these children. Check your local and state laws for specific requirements.

Warning: Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision.