V2826

REPORT NUMBER: 301-CAL-98-2

SAFETY COMPLIANCE TESTING FOR FMVSS 301
FUEL SYSTEM INTEGRITY

FORD MOTOR CORPORATION
1998 FORD ESCORT ZX2
2-DOOR COUPE

NHTSA NUMBER: CW0202

CALSPAN TEST NUMBER: 8412-2

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

February 27, 1998

FINAL REPORT

PREPARED FOR:

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

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FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

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9. Performing Organization Name and Address Calspan Corporation 4455 Genesee Street Buffalo, New York 14225		10. Work Unit No. 11. Contract or Grant No. DTNH22-95-D-11000
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15. Supplementary Notes		

16. Abstract

Compliance tests were conducted on the subject 1998 Ford Escort ZX2 2-Door Coupe in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-01 for the determination of FMVSS 301 compliance. Test failures identified were as follows:

The test vehicle appeared to comply with all requirements of FMVSS 301 "Fuel System Integrity."

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Section 1

PURPOSE OF COMPLIANCE TEST

This 30 mph rear moving barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 301 Compliance Test Program conducted for the National Highway Traffic Safety Administration (NHTSA) by Calspan Corporation under Contract No. DTNH22-95-D-11000. The purpose of this test was to determine if the subject vehicle, a 1998 Ford Escort ZX2 2-Door Coupe, meets the performance requirements of FMVSS No. 301, "Fuel System Integrity." This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-301-01, dated March 28, 1994.

Section 2

COMPLIANCE TEST RESULTS SUMMARY

A 2885 pound 1998 Ford Escort ZX2 2-Door Coupe was impacted from the rear by a 3961 pound moving barrier at a velocity of 29.4 mph. The test was performed by the Calspan Corporation on February 27, 1998.

One instrumented Part 572 E and non-instrumented Part 572 B, 50th percentile male Anthropomorphic Test Device (ATD) were placed in the driver and right-front passenger seating positions respectively.

Average longitudinal crush was 16.2 inches. Pre- and post-test photographs of the vehicle can be found in appendix A.

The 12.8 gallon fuel tank was filled to 92.9 percent capacity with orange Stoddard fluid prior to the impact. After the impact, there was no fluid leakage for the first 30 minutes nor during any phase of the rollover test. The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity." Section 3 presents the results of these tests.

The crash event was recorded by one real-time and eight high-speed cameras. Camera locations and other pertinent camera information are found on pages 3-9 and 3-10 of this report.

The Moving Barrier View camera did not operate during the event. Therefore this view is not available. Pelvic Z data is not accurate due to a broken connector. The right rear cross member x accelerometer data is questionable after 10 ms.

Table 1

CRASH TEST SUMMARY

Vehicle NHTSA No.: CW0202 Test Mode: 30 mph Rear Barrier

Test Date: February 27, 1998 Time: 10:10 Temperature : 44 °F

Vehicle Make/Model/Body Style: 1998 Ford Escort ZX2 2-Door Coupe

Vehicle Test Weight: 2885 lbs Impact Velocity: 29.4 mph

Static Crush: Left Side = 16.0 inches

Right Side = 15.5 inches

Centerline = 17.0 inches

Average Crush: 16.2 inches

TYPE OF FRONT OCCUPANT RESTRAINT SYSTEM INSTALLED IN TEST VEHICLE:

Driver's DSP: Seatbelt, Airbag, Knee Bolster

Right Passenger's DSP: Seatbelt, Airbag, Knee Bolster

VISIBLE DUMMY CONTACT POINTS:

Driver: The back of the head to the center of the headrest.

Passenger: The back of the head to the center of the headrest.

DOOR OPENING DATA: Closed/Operable - Left Front

Closed/Operable - Right Front

Stoddard Solvent Spillage from Vehicle's Fuel System: There was no Stoddard solvent leakage from any portion of the vehicle fuel system during the impact, the 25 minutes following the impact, nor during any phase of the static vehicle rollover.

Remarks: The rear window shattered upon impact. The driver's seatback reclined 12° rearward from its pre-test position during the impact. The ratchet recline mechanism was stripped over this 12° range. The passenger seatback twisted counter clockwise due to the impact. The passenger seatback reclined 26° rearward from its pre-test position. The passenger seat recline mechanism was stripped over the 26° range. There was no shift in either the driver or passenger side seat tracks.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1998 Ford Escort ZX2 2-Door Coupe

NHTSA No.: CW0202 ; VIN: 3FALP113XWR127005 ; Color: White

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

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

Transmission Data: 5 speeds; X Manual; -0 Automatic; X Overdrive

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

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

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

Date Received: 11/26/97 ; Odometer Reading 755 miles

Selling Dealer: Koons Ford of Annapolis, Inc.

& Address: 2540 Riva Road Annapolis, MD 21401

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Ford Motor Corporation

Date of Manufacture: 6/97

GVWR: 3375 lbs.; GAWR: 1931 lbs. FRONT; 1444 lbs. REAR

DATA FROM TIRE PLACARD:

Location of Placard on Vehicle: Driver's Door

Tire Pressure with Maximum Capacity Vehicle Load: 44 psi FRONT 44 psi REAR

Recommended Tire Size: 185/65R14

* Recommended Cold Tire Pressure: 32 psi FRONT; 35 psi REAR

Size of Tires on Test Vehicle: 185/65R14

Type of Spare Tire: Space Saver

Vehicle Capacity Data:

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

Number of Occupants: 2 Front; 2 Rear; 4 Total

Vehicle Capacity Weight (VCW) = 680 lbs.

No. of Occupants x 150 lbs. = 600 lbs.

Rated Cargo/Luggage Weight (RCLW) = 80

*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 =	785.0	lbs.	Right Rear =	458.0	lbs.
Left Front =	775.0	lbs.	Left Rear =	467.0	lbs.
TOTAL FRONT =	1,560	lbs.	TOTAL REAR =	925	lbs.

TOTAL DELIVERED WEIGHT = 2,485 lbs.

% of Total Front of Vehicle Weight = 63 % of Total Rear Weight = 37 %

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight =	2,485	lbs.
Rated Cargo/Luggage Weight (RCLW) =	80	lbs.
Weight of 2 p.572 Dummies, 167 & 164 lbs =	331	lbs.
TARGET TEST WEIGHT =	2,896	lbs.

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 69 POUNDS OF CARGO WEIGHT:

Right Front =	903.0	lbs.	Right Rear =	527.0	lbs.
Left Front =	906.0	lbs.	Left Rear =	549.0	lbs.
TOTAL FRONT =	1,809	lbs.	TOTAL REAR =	1,076	lbs.

TOTAL TEST WEIGHT = 2,885.0 lbs.

% of Total Front Weight = 62.7 % % of Total Rear Weight = 37.3 %

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

Type of Ballast: None

Method of Securing Ballast: Not Applicable

Vehicle Components Removed for Weight Reduction: Side Mirrors, Wheel Covers

VEHICLE ATTITUDE (all dimension in inches):

AS DELIVERED:	RF	26.4	LF	26.7	RR	26.7	LR	26.6
AS TESTED:	RF	26.2	LF	25.7	RR	25.6	LR	26.1

Vehicle's Wheel Base: 98.4 in.

Location of Vehicle's C.G.: 36.7 inches rearward of front wheel center.

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 12.8 gallons

Usable Capacity Figure Furnished by COTR = 12.7 gallons

Test Volume Range (91 to 94% of Usable Capacity) = 11.6 to 11.9 gallons

ACTUAL TEST VOLUME= 11.8 gallons (with entire fuel system filled)

* Ballast weight includes the RCLW, the weight of drained vehicle fluids and the weight of any removed vehicle components less the weight of onboard instrumentation, cameras, and hardware.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

FUEL SYSTEM DATA (continued):

Test Fluid Type:	Stoddard Solution	
Test Fluid Specific Gravity:	0.764	
Test Fluid Kinematic Viscosity:	0.96	centistokes
Test Fluid Color:	Orange	("red" is preferred)
Type of Vehicle Fuel Pump:	Electric	

Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF -
Fuel pump operated.

Details of Fuel System: Fuel Filler - Left side, behind rear axle; Tank - Center, ahead of rear axle;
Lines - Along the inside of the left frame rail.

Table 3

MOVING BARRIER PARAMETER DATA

WEIGHT OF MOVING BARRIER:

Right Front	=	1113 lbs.	Right Rear	=	868 lbs.
Left Front	=	1102 lbs.	Left Rear	=	878 lbs.
TOTAL FRONT	=	2,215 lbs.	TOTAL REAR	=	1,746 lbs.

TOTAL BARRIER WEIGHT = 3,961 lbs.

MOVING BARRIER DIMENSIONS:

Barrier Face Height: 60.0 in.

Barrier Face Width: 78.0 in.

Barrier Face Ground Clearance: 5.0 in.

Tread Width: 59.5 in.

Wheel Base: 120.0 in.

Location of C.G.:

X: 52.9 inches rearward of front wheel center.

Y: 0.0 inches from longitudinal-vertical plane of symmetry.

Z: 16.3 inches above ground.

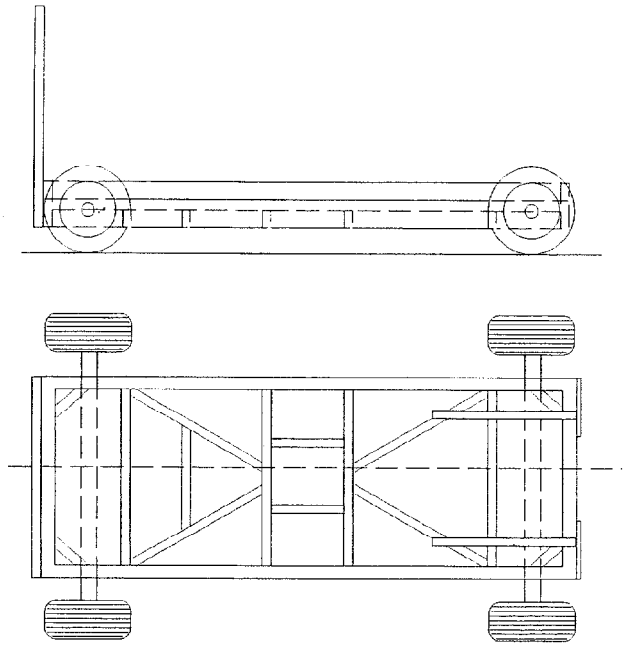


Table 4

POST IMPACT DATA

TYPE OF TEST:

Type of Test: Rear Barrier Impact Angle: 0°

Test Date: February 27, 1998 Time: 10:10 Temperature: 44 °F

Vehicle NHTSA No.: CW0202

Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.4 mph; Trap No. 2 = 29.4 mph

Average Impact Speed = 29.4 mph

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

Vehicle Length:

Pre-Test	Right =	168.0	; C/L =	175.5	;Left =	168.0
Post-Test	Right =	152.5	; C/L =	158.5	;Left =	152.0
Crush	Right =	15.5	; C/L =	17.0	;Left =	16.0
AVERAGE	=	16.2	inches			

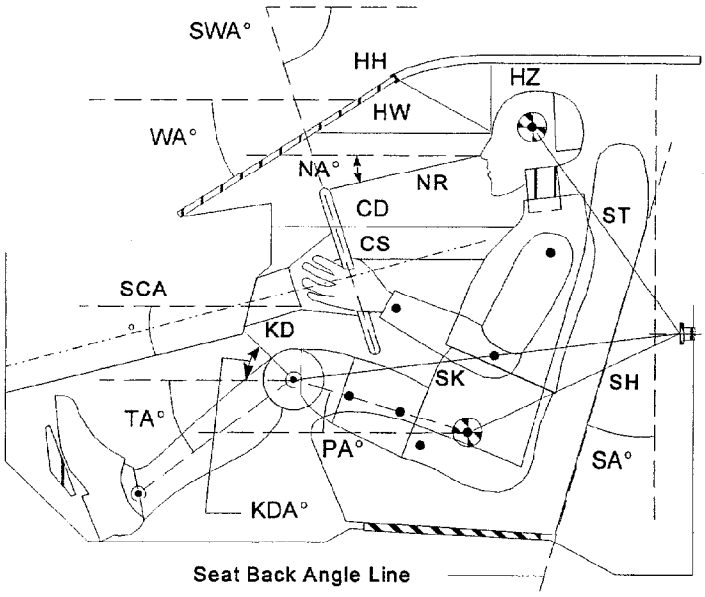
Section 3

COMPLIANCE TEST DATA

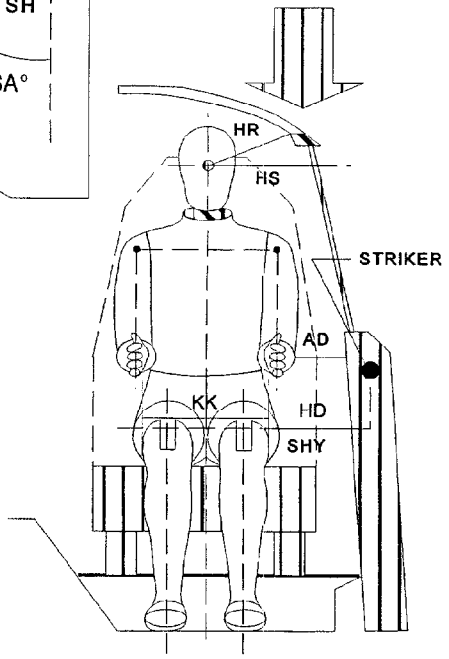
Figure 1

PART 572 DUMMY IN-VEHICLE POSITION
(FOR REAR IMPACTS ONLY)

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

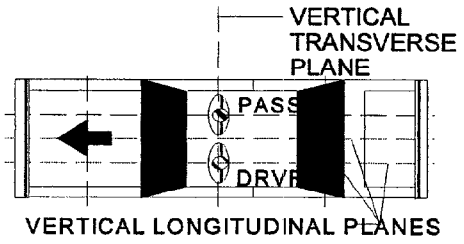


Table 5

FRONT SEAT OCCUPANT MEASUREMENTS
(FOR REAR IMPACT ONLY)

	DRIVER (Serial # 116)		
WA°	30 deg.		
SWA°	68 deg.		
SCA°	22 deg.		
SA°	21 deg.		
HZ	6.2		
HH	12.3		
HW	21.5		
HR	9.1		
NR	15.5	Angle	-13 deg.
CD	19.9		
CS	11.6		
RA	7.8		
KDL	6.7	Angle (KDA)	31 deg.
KDR	6.1		
PA°	24 deg.		
TA°	-39 deg.		
KK	10.0		
ST	23.5	Angle	34 deg.
SK	33.0	Angle	94 deg.
SH	18.7	Angle	118 deg.
SHY	10.1		
HS	12.3		
HD	5.3		
AD	3.0		

Table 6
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: CW0202 TEST DATE: February 27, 1998

Vehicle Mfgr./Make/Model: 1998 Ford Escort ZX2 2-Door Coupe

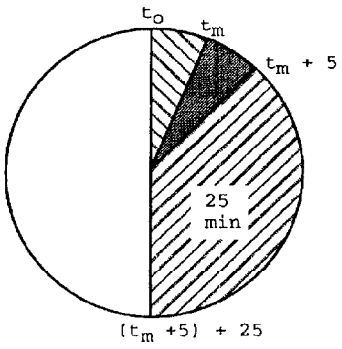
Test vehicle fuel tank filled to 91% to 94% of manufacturer's "usable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

****

TEST VEHICLE IMPACT TYPE:

- \- Frontal (30 mph)
- \- Oblique (30 mph) with - ° barrier face first contacting - (driver/passenger) side
- X Rear Moving Barrier (30 mph)
- \- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT:



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

ACTUAL	MAX ALLOWED
0	1 oz.
0	5 oz.
0	1 oz./1 min.

SOLVENT SPILLAGE DETAILS:

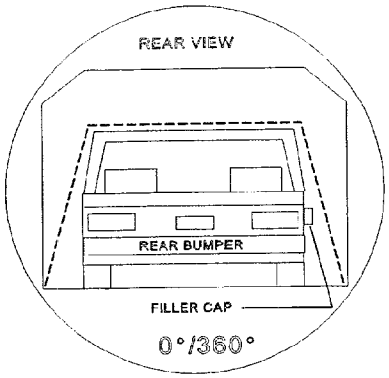
None

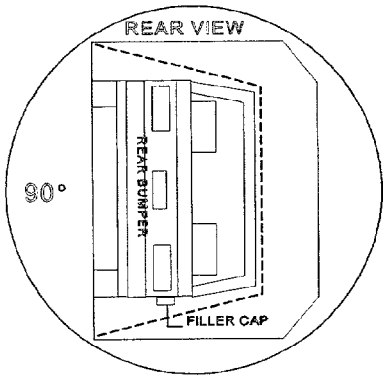
Table 7

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE :
0-90 Deg.

Vehicle NHTSA ID No. :
CW0202





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	1	minutes	10	seconds
FMVSS 301 Position Hold Time +	5	minutes	00	seconds
TOTAL	6	minutes	10	seconds
Next whole minute interval	7	minutes		

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:

0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

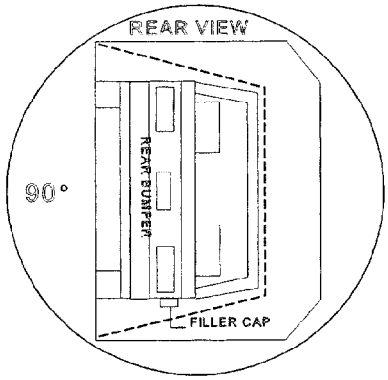
None

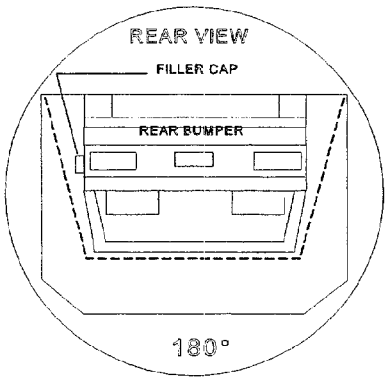
Table 7

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

TEST PHASE :
90-180 Deg.

Vehicle NHTSA ID No. :
CW0202





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

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:

0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

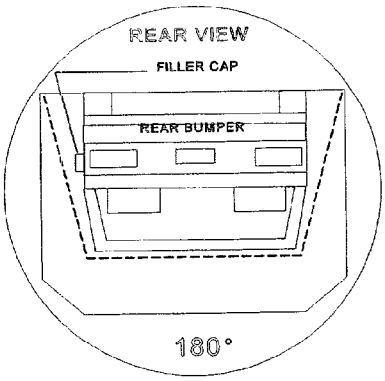
None

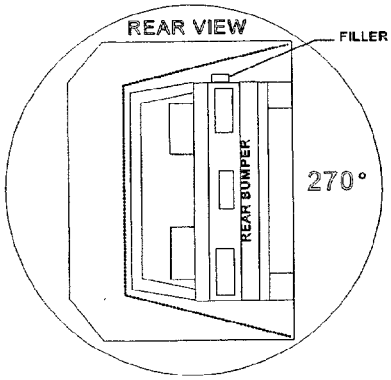
Table 7

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

TEST PHASE :
180-270 Deg.

Vehicle NHTSA ID No. :
CW0202





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

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:

0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

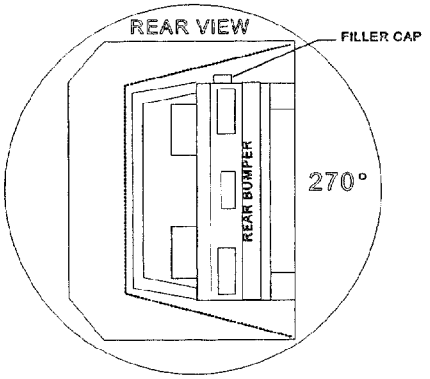
None

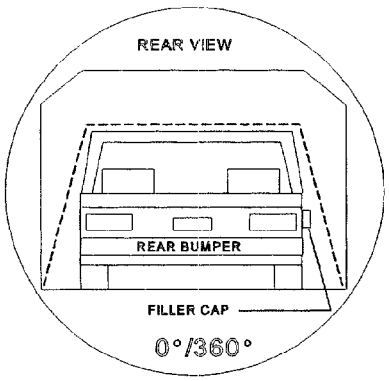
Table 7

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

TEST PHASE :
270-360 Deg.

Vehicle NHTSA ID No. :
CW0202





I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)		1	minutes	11	seconds
FMVSS 301 Position Hold Time +		5	minutes	00	seconds
	TOTAL	6	minutes	11	seconds
Next whole minute interval		7	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:

0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

None

Figure 2

CAMERA POSITIONS FOR REAR IMPACTS

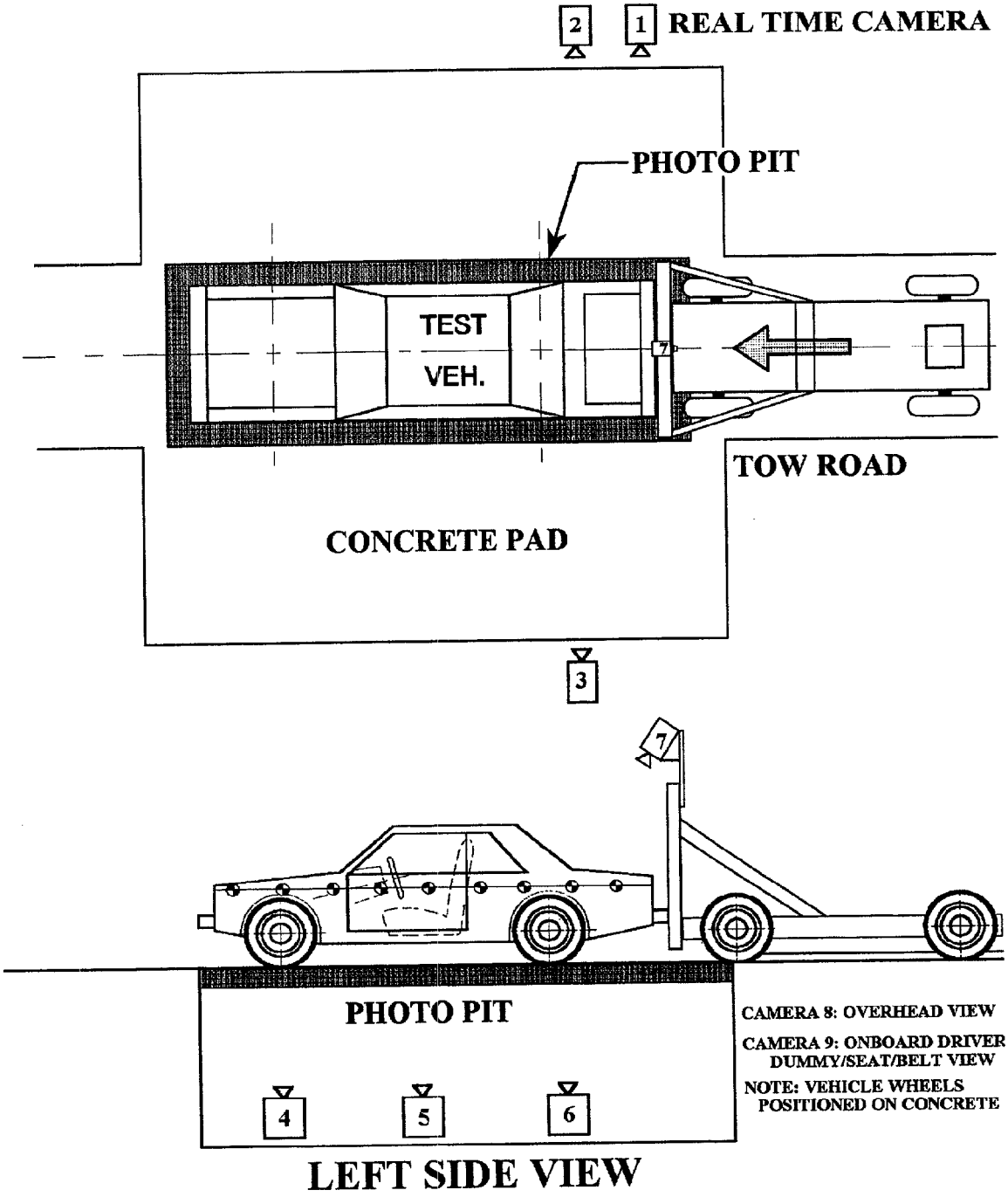


Table 8

HIGH-SPEED CAMERA LOCATIONS

NHTSA No. : CW0202 Vehicle : 1998 Ford Escort ZX2 2-Door Coupe

CAMERA NO.	VIEW	CAMERA POSITIONS (inches)*			ANGLE** (degrees)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Camera	-	-	-	-	-	24
2	Right Side View	-441.1	-35.7	43	0	25	1000
3	Left Side View	468	89.2	38.3	1	25	1010
4	Vehicle Front Underbody View	0	136	-77	90	13	650
5	Vehicle Mid-Section Underbody View	0	78	-77	90	13	800
6	Vehicle Rear Underbody View	0	40	-77	90	13	650
7	Moving Barrier View	0	0	99	-70	7.5	N/A
8	Overhead Overall View	-20	0	386	-90	25	N.T.
9	Onboard Driver Dummy/Seat/Belt View	-	-	-	-	12.5	500

* X = film plant to monorail centerline (+ to left of rail)
Y = film plane to impact location (+ ahead of impact location)
Z = film plane to ground (+ above ground)
** = referenced to horizontal plane
N.T. Indicates no timing

Appendix A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

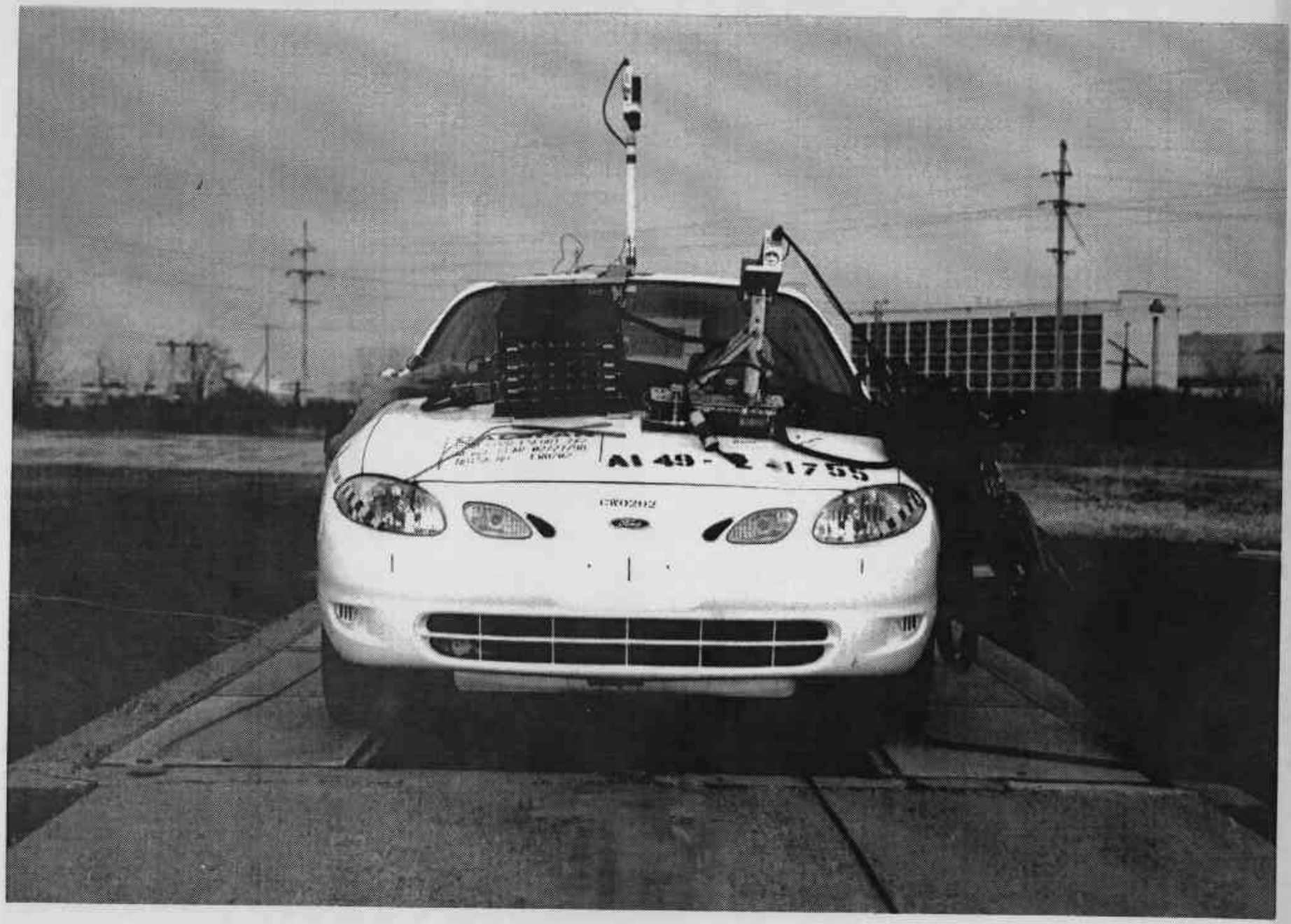


Figure A-1 PRE-TEST FRONT VIEW

Figure A-2 POST-TEST FRONT VIEW

Figure A-3 PRE-TEST LEFT SIDE VIEW

Figure A-4 POST-TEST LEFT SIDE VIEW

8412-2

Figure A-5 PRE-TEST RIGHT SIDE VIEW

Figure A-6 POST-TEST RIGHT SIDE VIEW

Figure A-7 PRE-TEST REAR VIEW

Figure A-8 POST-TEST REAR VIEW

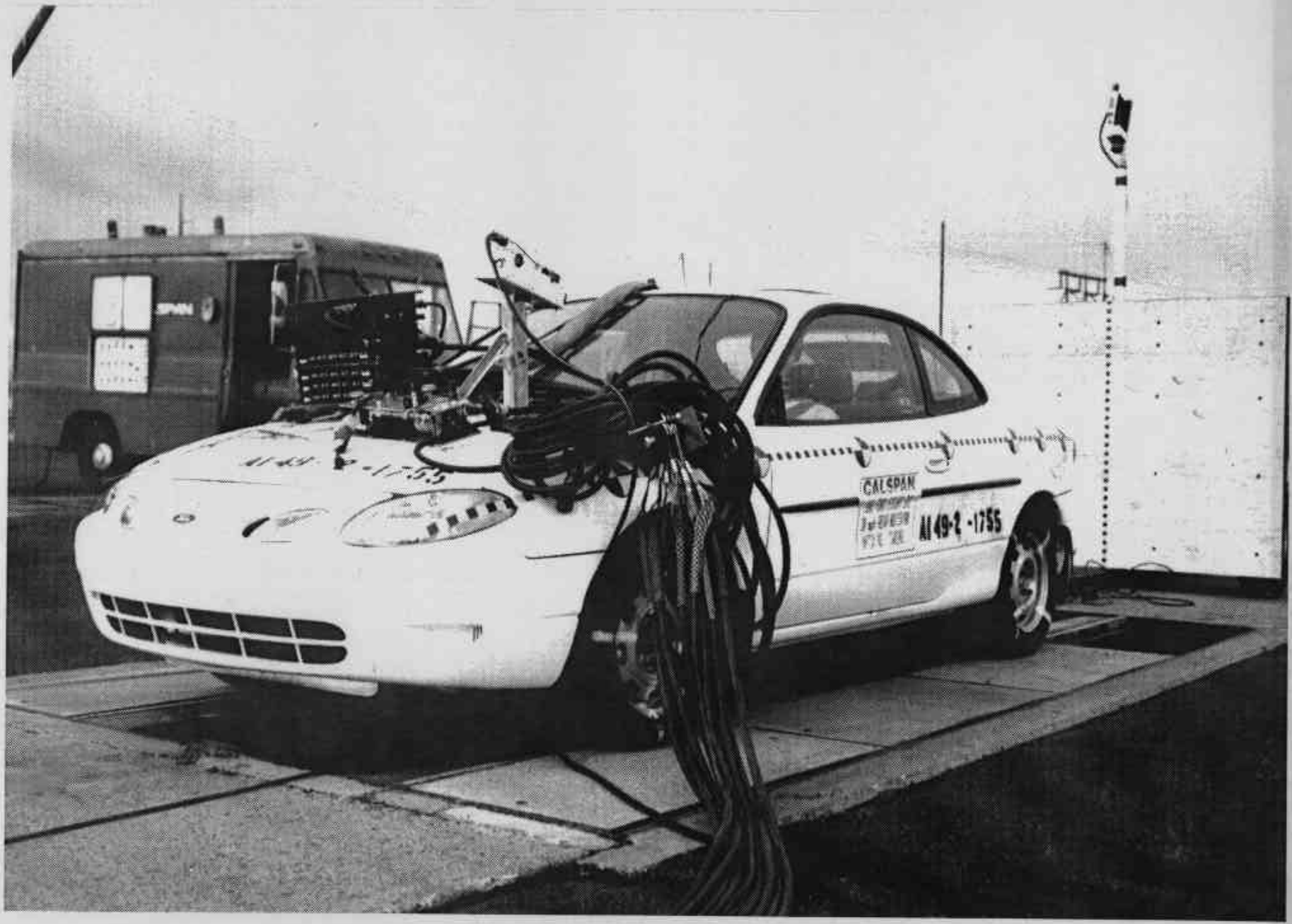


Figure A-9 PRE-TEST LEFT FRONT THREE-QUARTER VIEW

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

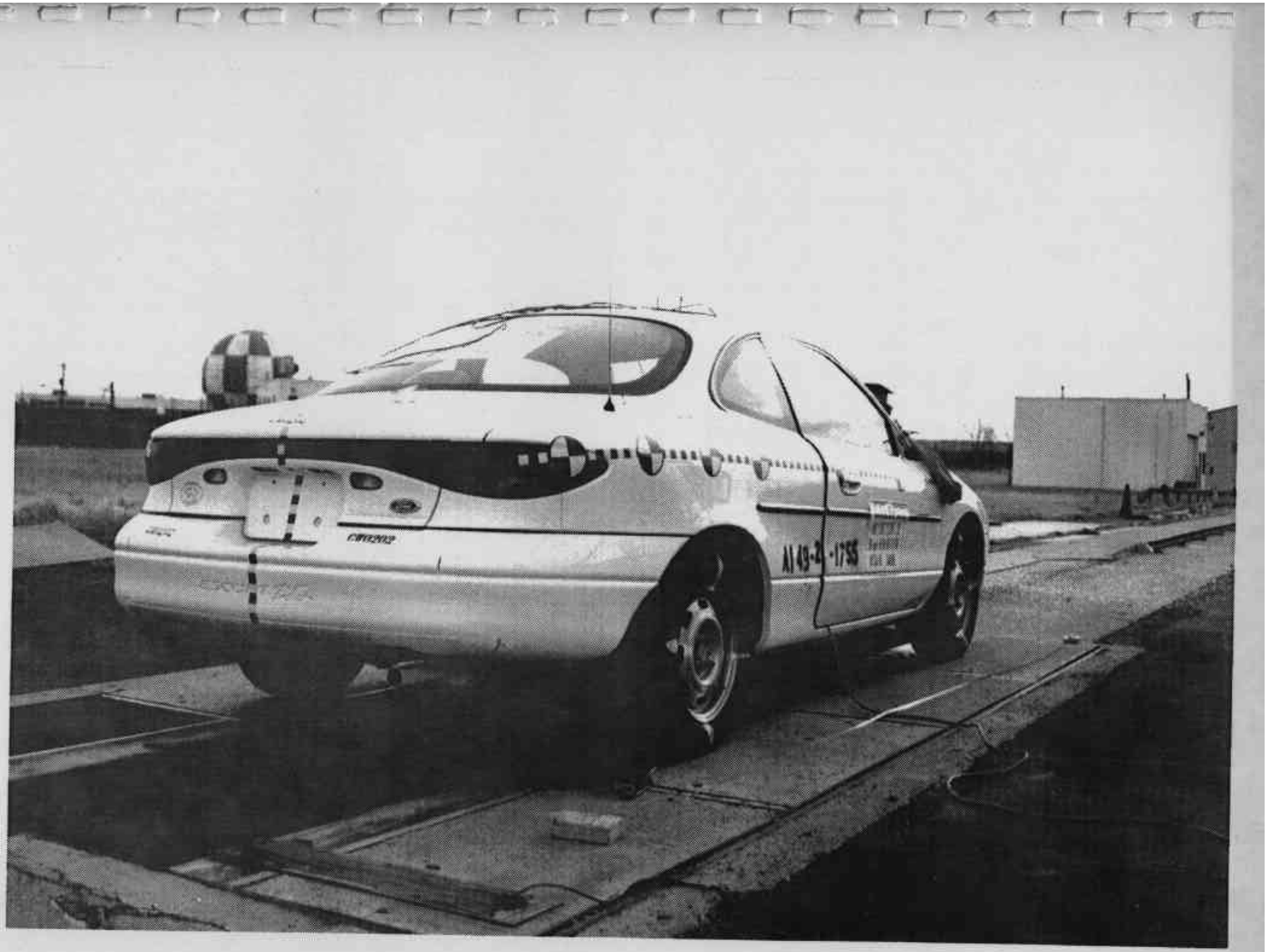


Figure A-11 PRE-TEST RIGHT REAR THREE-QUARTER VIEW

Figure A-12 POST-TEST RIGHT REAR THREE-QUARTER VIEW

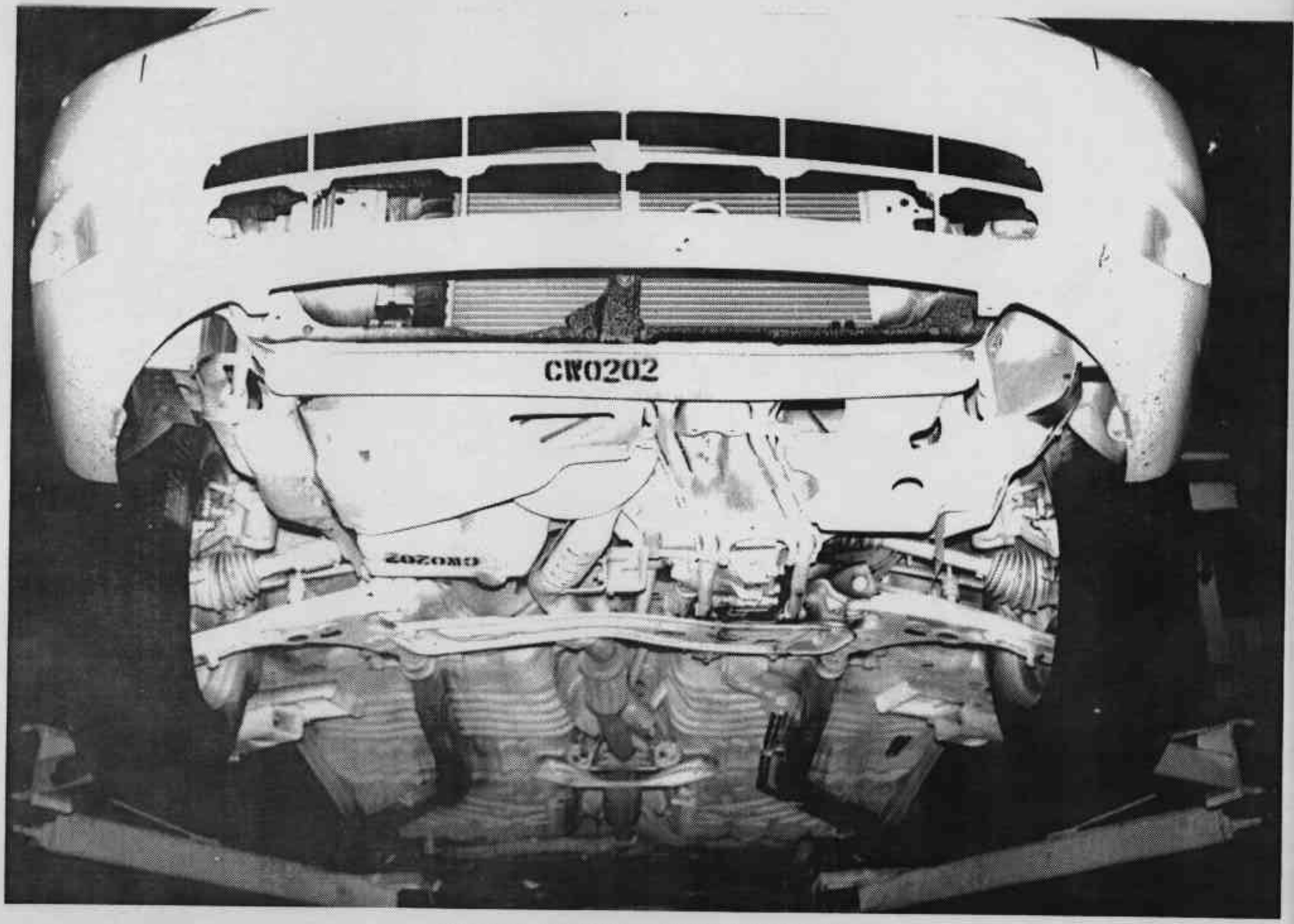


Figure A-13 PRE-TEST FRONT UNDERBODY VIEW

Figure A-14 POST-TEST FRONT UNDERBODY VIEW

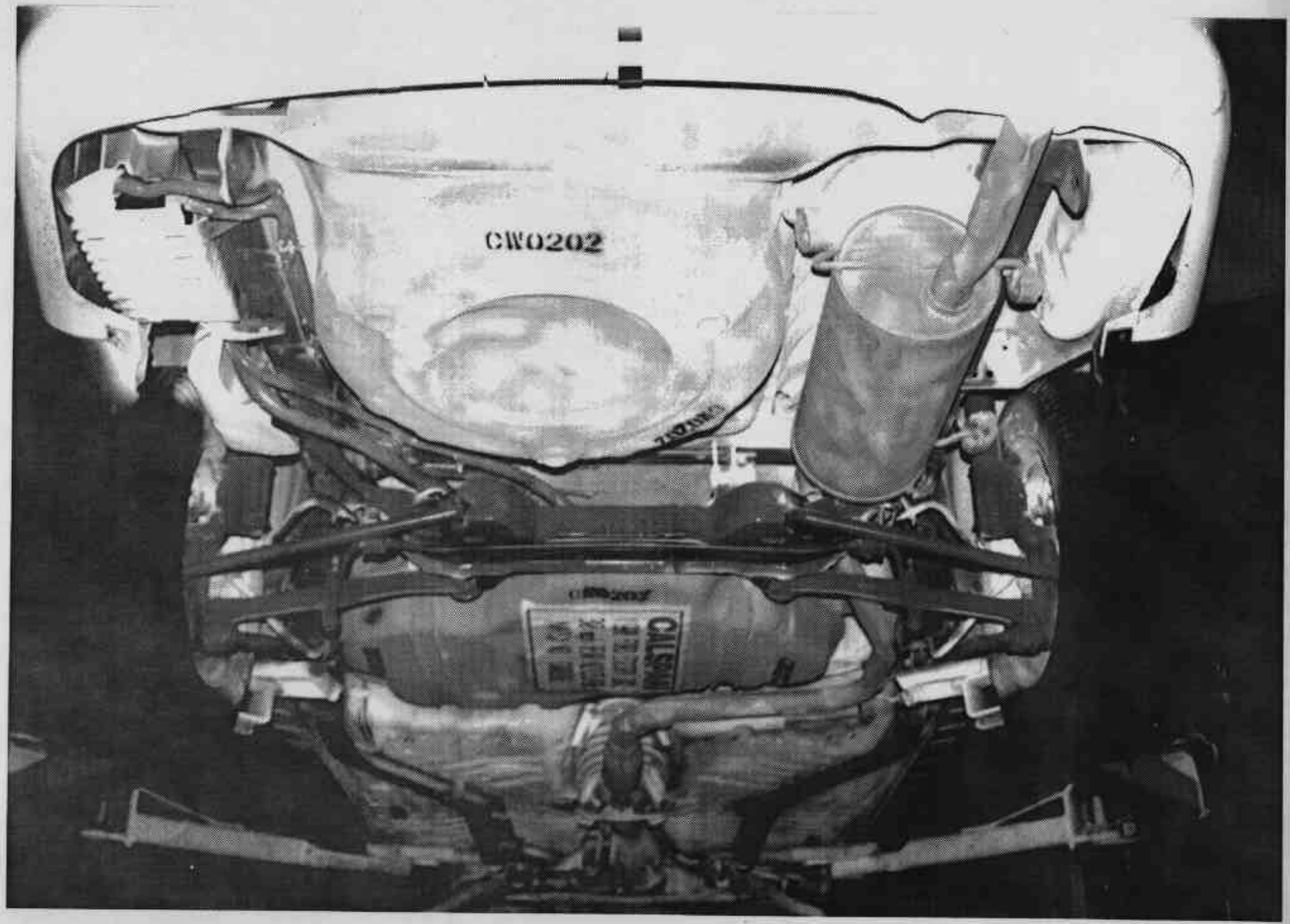


Figure A-15 PRE-TEST REAR UNDERBODY VIEW

Figure A-16 POST-TEST REAR UNDERBODY VIEW

Figure A-17 CERTIFICATION PLACARD

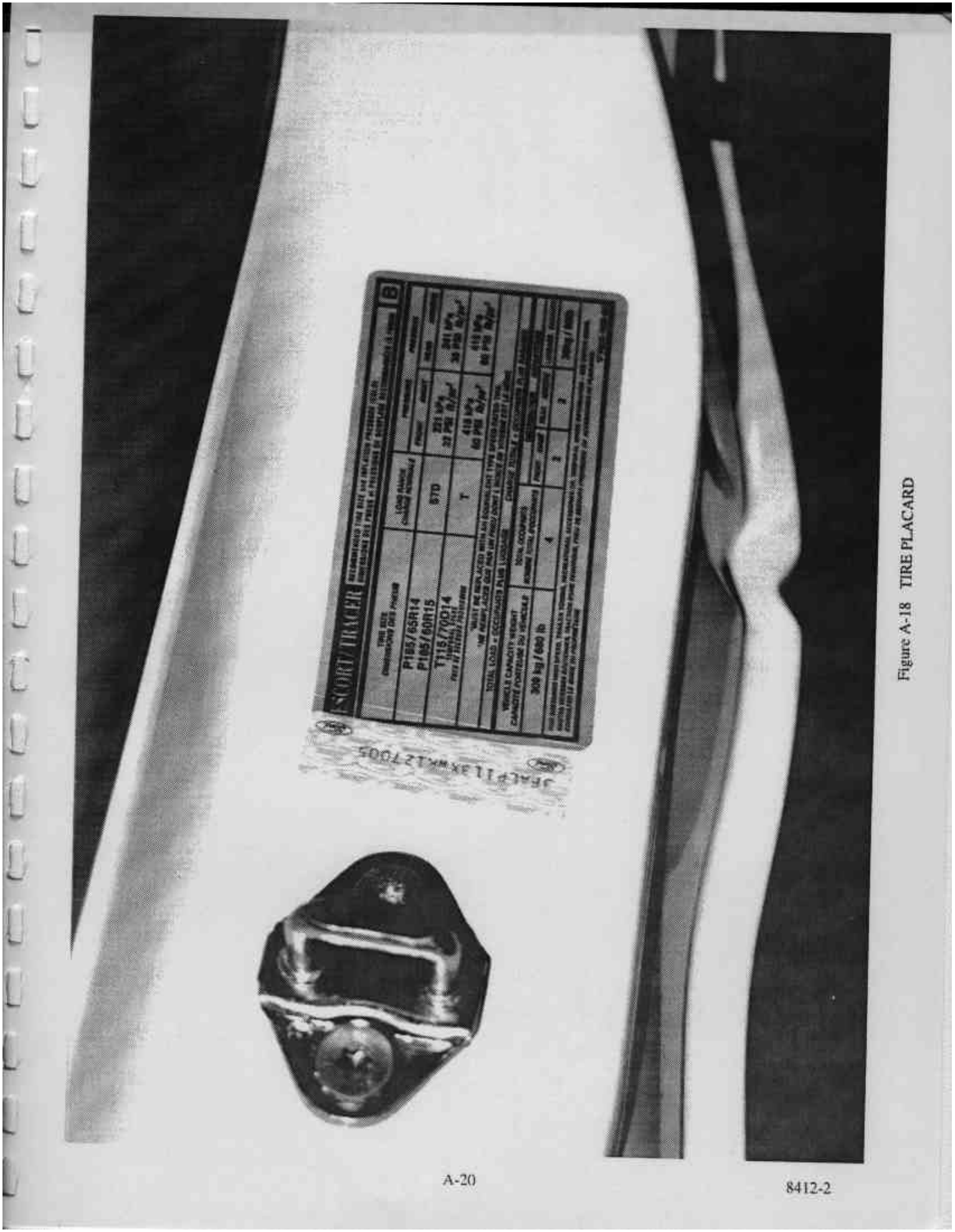


Figure A-18 TIRE PLACARD

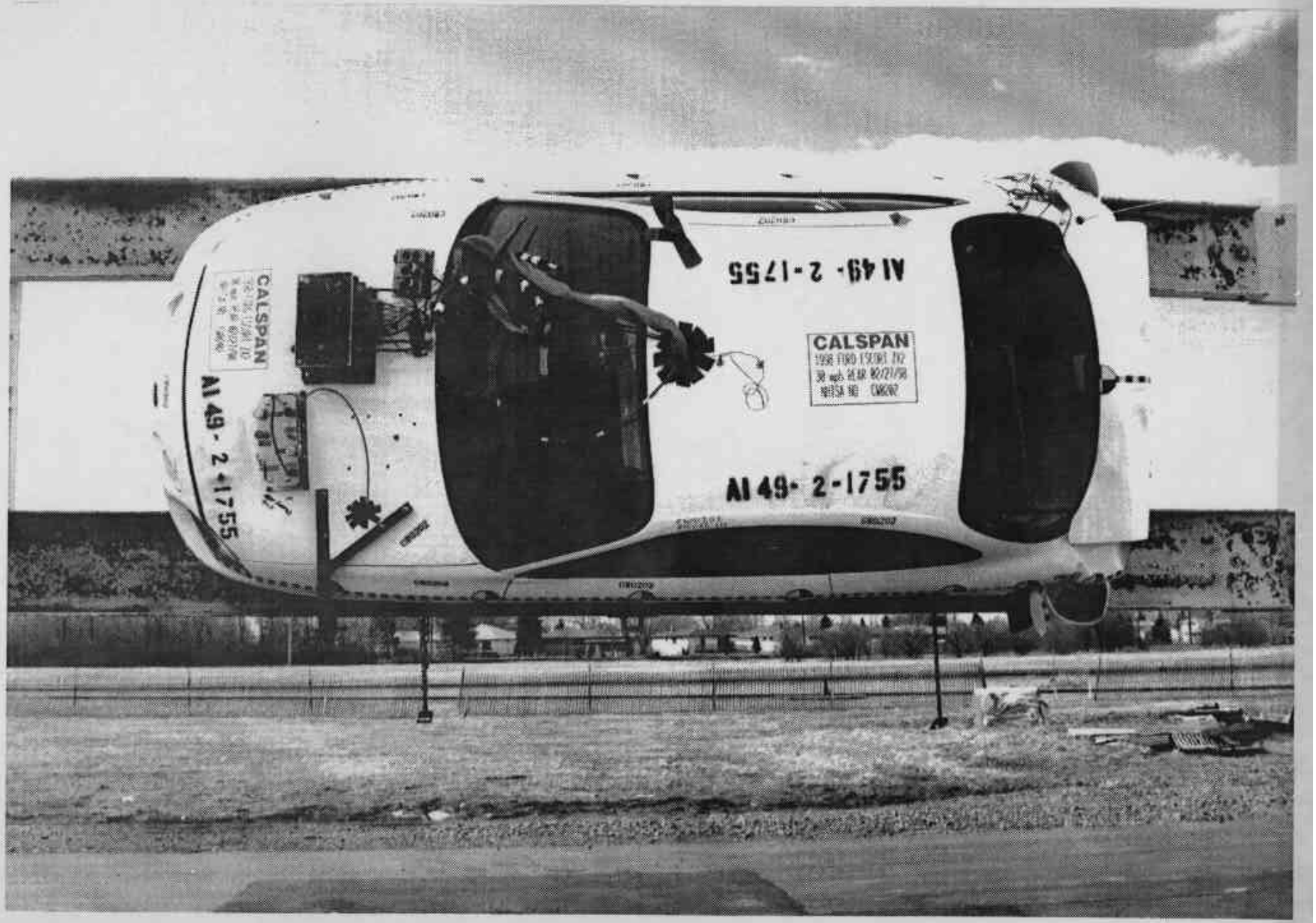


Figure A-19 ROLLOVER 90°

Figure A-20 ROLLOVER 180

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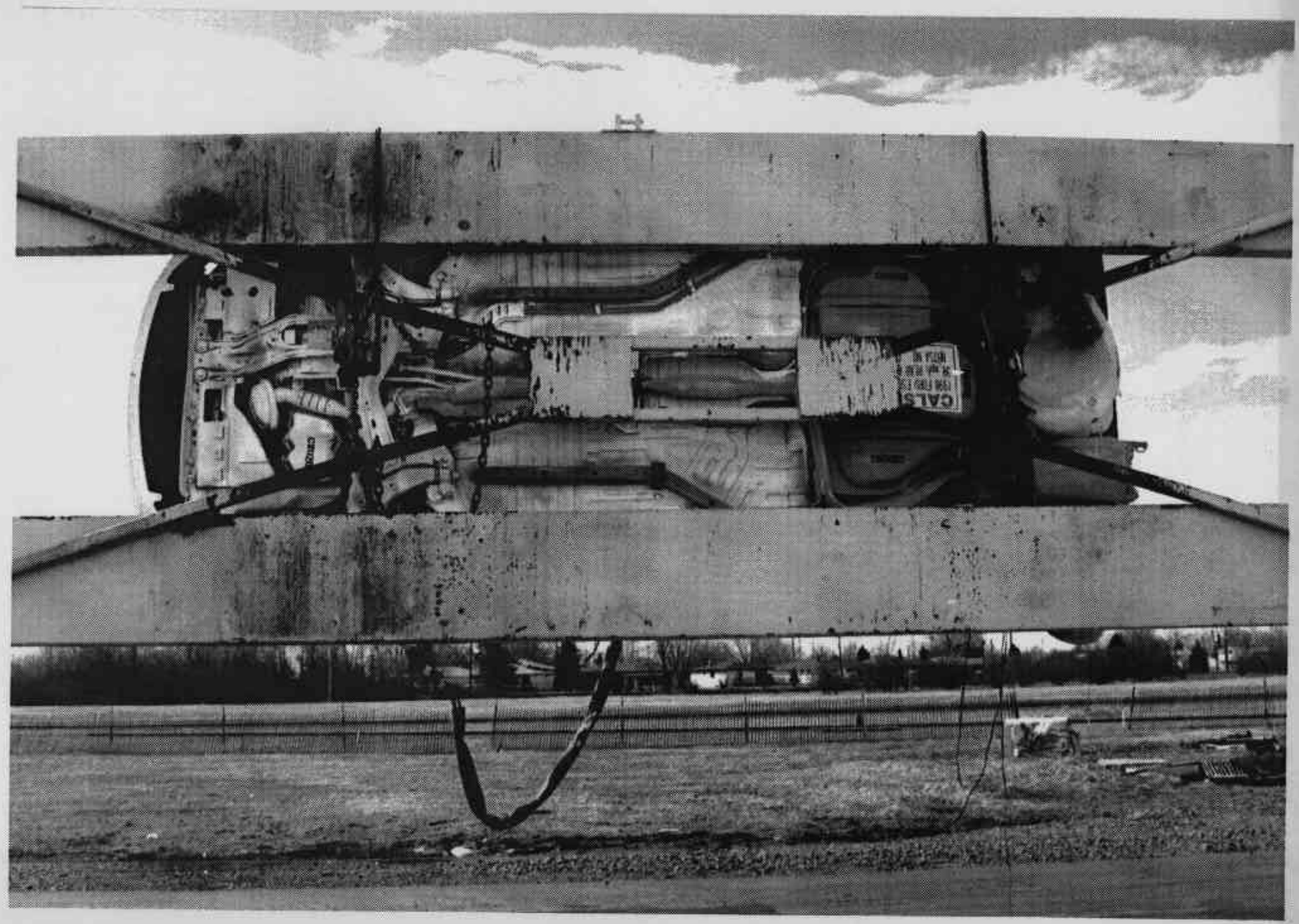


Figure A-21 ROLLOVER 270°

Figure A-22 ROLLOVER 360°

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

(REAR IMPACT ONLY)

FACILITY: track TEST DATE: 27 Feb 1998
RUN #:1755 TEST TIME: 09:45:27
SERIES#:1 BOARD: a

TITLE: 301 Rear 30 MPH-1998 Ford Escort

CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
1	Pos. 1 Head X	Gs	27.4	138.9	-3.2	47.9	1000
2	Pos. 1 Head Y	Gs	3.3	130.9	-4.9	153.1	1000
3	Pos. 1 Head Z	Gs	29.1	122.1	-0.1	1.1	1000
4	Pos. 1 Chest Disp	ins	0.0	359.1	0.0	140.6	60
5	Pos. 1 Chest X	Gs	10.7	88.7	-0.7	353.2	180
6	Pos. 1 Chest Y	Gs	1.2	70.5	-2.4	169.7	180
7	Pos. 1 Chest Z	Gs	7.7	72.5	-0.3	178.0	180
8	Pos. 1 Lap Belt Load	lbs	90.8	58.4	-10.1	106.0	60
9	Pos. 1 Pelvic X	Gs	17.9	58.0	-1.3	275.1	1000
10	Pos. 1 Pelvic Y	Gs	1.9	164.1	-2.2	140.7	1000
*11	Pos. 1 Pelvic Z	Gs	246.8	286.2	-153.1	12.2	1000
12	Pos. 1 Belt Spoolout	ins	0.0	2.5	-4.5	56.5	60
13	Pos. 1 Upper Neck Fx	lbs	15.3	205.7	-76.7	136.1	1000
14	Pos. 1 Upper Neck Fy	lbs	15.6	315.4	-25.7	132.5	1000
15	Pos. 1 Upper Neck Fz	lbs	448.7	134.6	-161.1	22.4	1000
16	Left Rear Xmember X	Gs	22.7	12.4	-1.8	168.5	60
17	Pos. 1 Head Resultant	Gs	35.0	135.5	0.0	6.1	1000
18	Pos. 1 Chest Resultant	Gs	12.7	79.9	0.0	-33.2	180
*19	Pos. 1 Pelvic Res.	Gs	247.2	48.2	0.1	-10.6	1000
20	Pos. 1 Upper Neck F(Res)	lbs	455.7	134.6	0.4	9.2	1000

* Data is not accurate

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

hic: 189.9
t1 = 113.400 msec
t2 = 149.400 msec
Average G's Over Hic Duration = 30.82

CLIP V2.1 SUMMARY: Pos. 1 Chest Resultant

Peak Resultant (3 ms CLIPPED DURATION) =12.266 G's
Tstart = 70.5000 ms
Tend = 73.5000 ms
CSI = 30.041

FACILITY: track TEST DATE: 27 Feb 1998
RUN #: 1755 TEST TIME: 09:45:27
SERIES#:1 BOARD: b

TITLE: 301 Rear 30 MPH-1998 Ford Escort

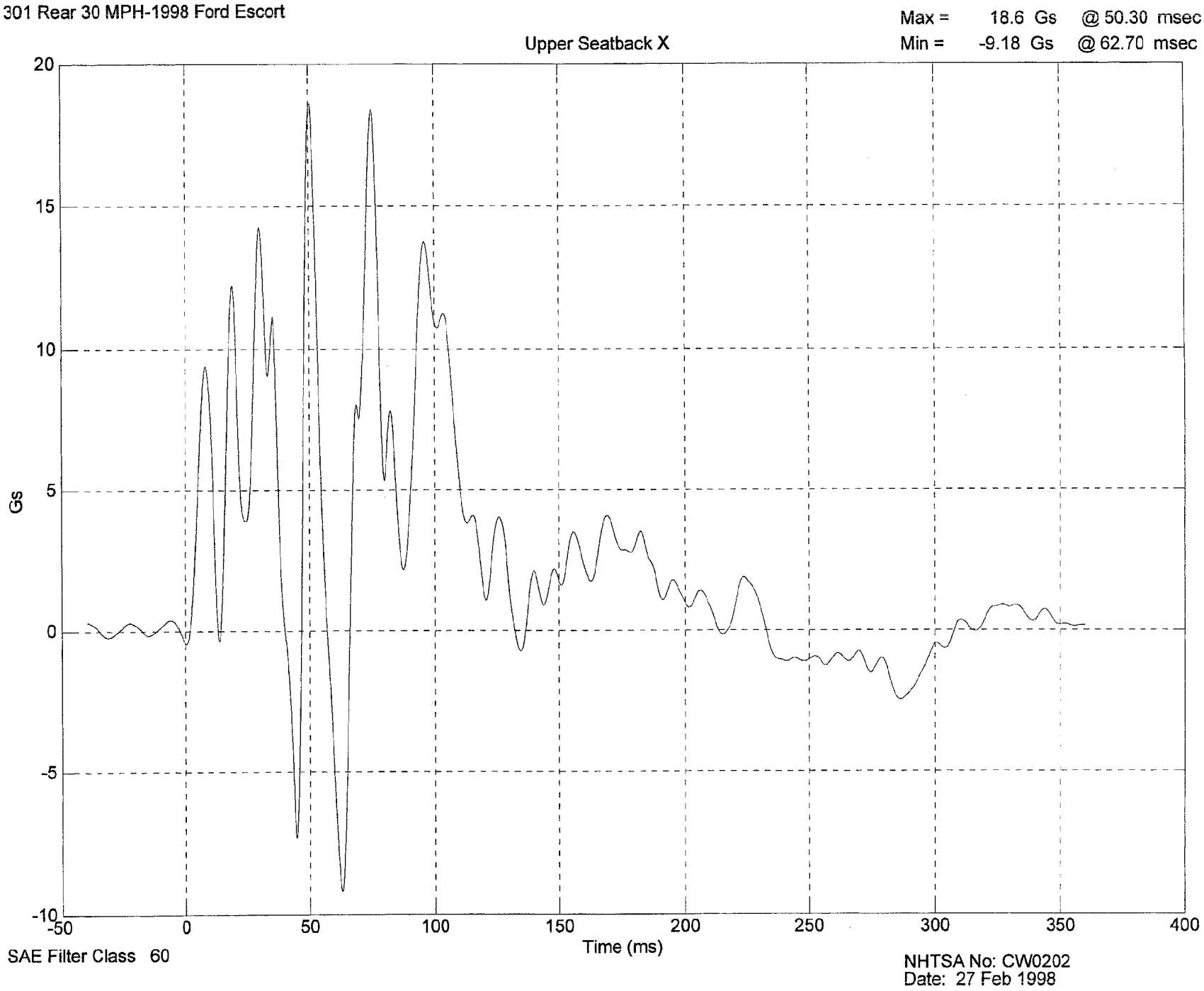
CHANNEL NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM AMP	MAXIMUM msec	MINIMUM AMP	MINIMUM msec	FILTER CLASS
1	Pos. 1 Upper Neck Mx	Ft-Lbs	6.9	136.3	-5.2	165.9	600
2	Pos. 1 Upper Neck My	Ft-Lbs	9.6	84.2	-36.0	146.3	600
3	Pos. 1 Upper Neck Mz	Ft-Lbs	5.0	139.6	-6.1	196.9	600
*4	Right Rear Xmember X	Gs	15.8	24.9	-15.9	17.6	60
5	Upper Seatback X	Gs	18.6	50.2	-9.2	62.6	60
6	Lower Seatback X	Gs	18.3	48.4	-3.4	43.4	60
7	NULL		0.0	359.9	0.0	359.9	1000
8	NULL		0.0	359.9	0.0	359.9	1000
17	Pos. 1 Neck Moment Res.	Ft-Lbs	36.2	146.3	0.0	-18.7	600

* Data is questionable after 10 ms.

TEST NO. CW0202

VEHICLE	SAE FILTER CHANNEL CLASS
	60

Note: Angular seatback position is measured in degrees of rotation from the initial (design) position.


301 Rear 30 MPH-1998 Ford Escort
Upper Seatback X
Max = 18.6 Gs @ 50.30 msec
Min = -9.18 Gs @ 62.70 msec
Gs
Time (ms)
20
15
10
5
0
-5
-10
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 60
NHTSA No: CW0202
Date: 27 Feb 1998

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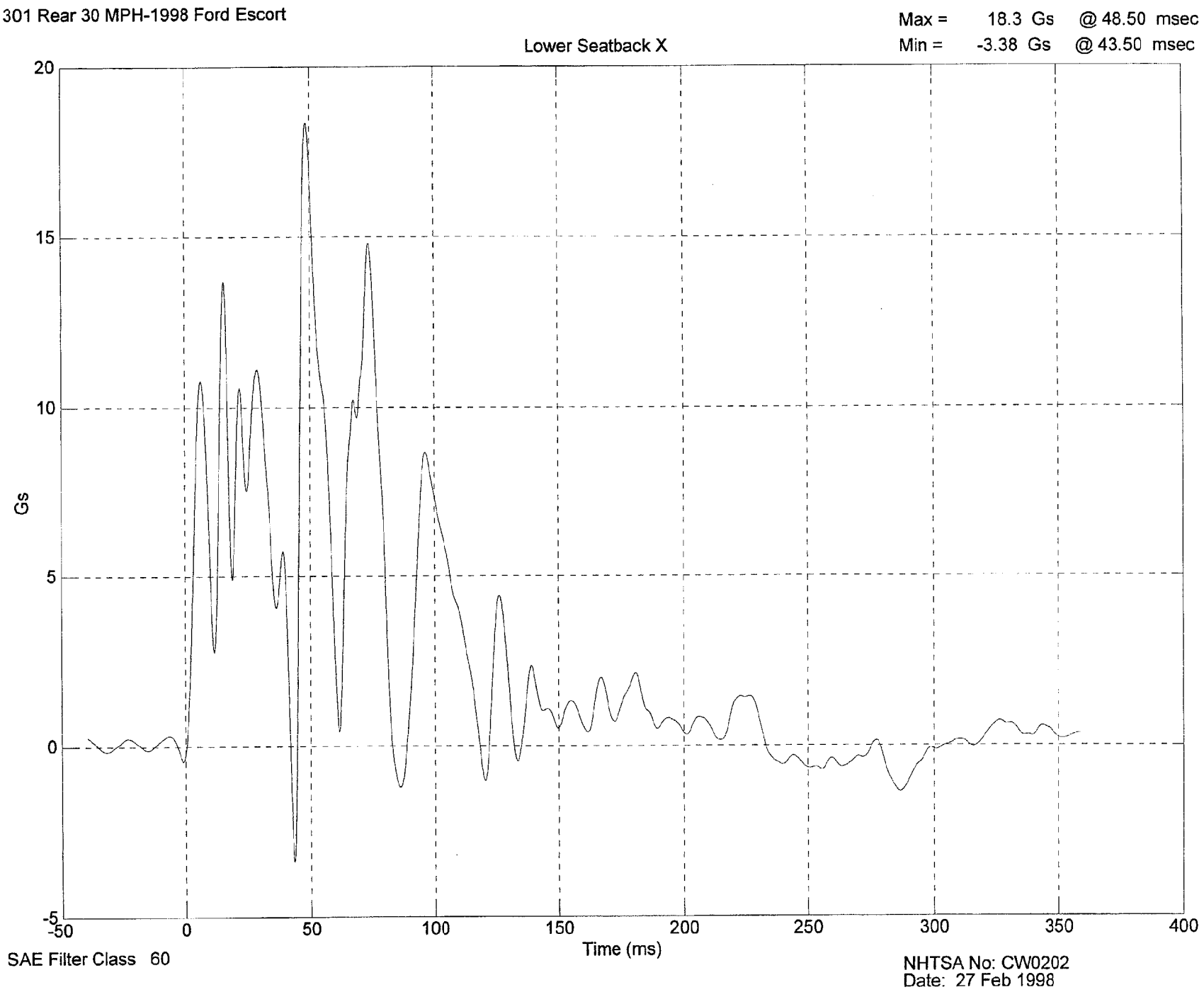
301 Rear 30 MPH-1998 Ford Escort
Lower Seatback X
Max = 18.3 Gs @ 48.50 msec
Min = -3.38 Gs @ 43.50 msec
Gs
Time (ms)
20
15
10
5
0
-5
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 60
NHTSA No: CW0202
Date: 27 Feb 1998

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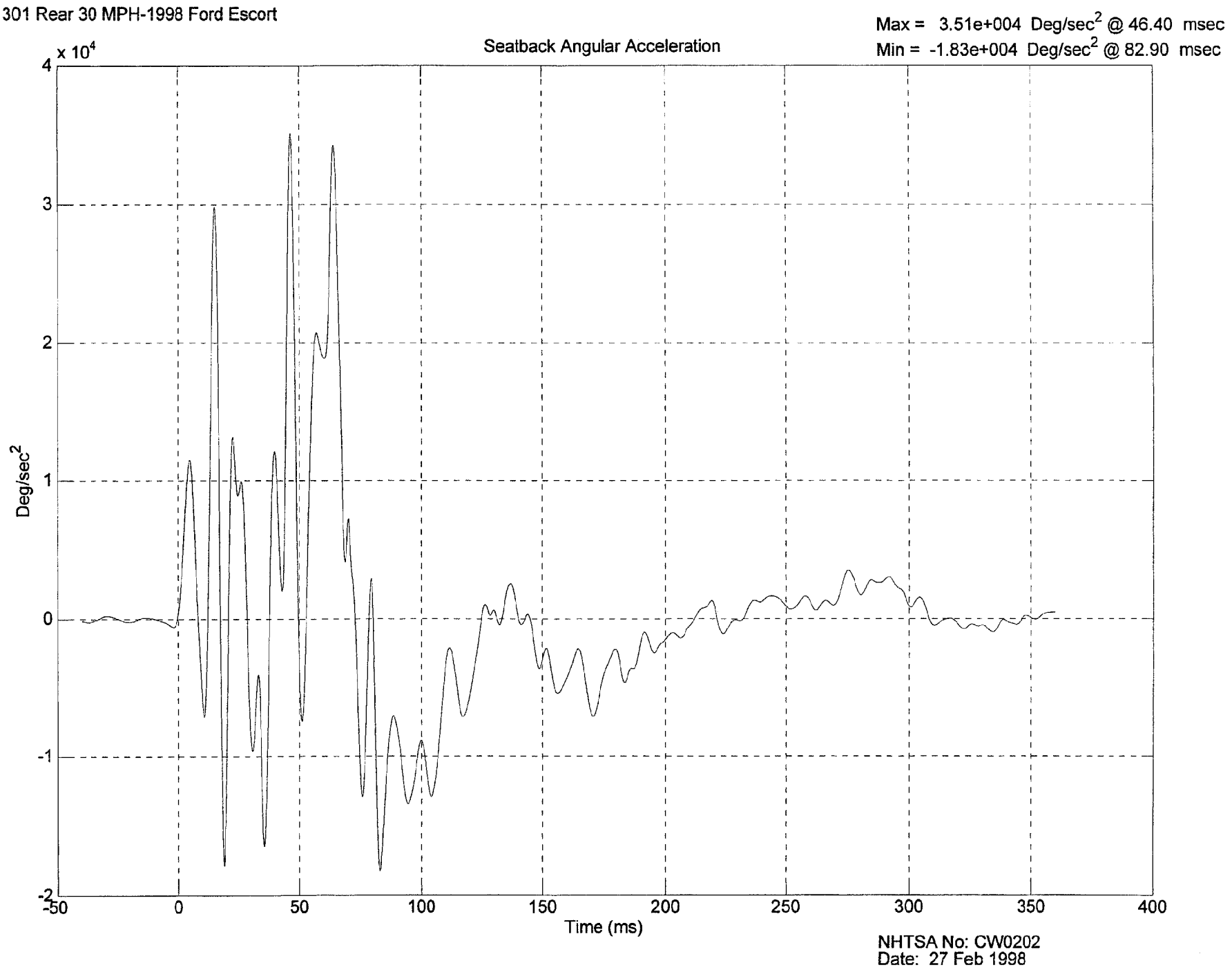
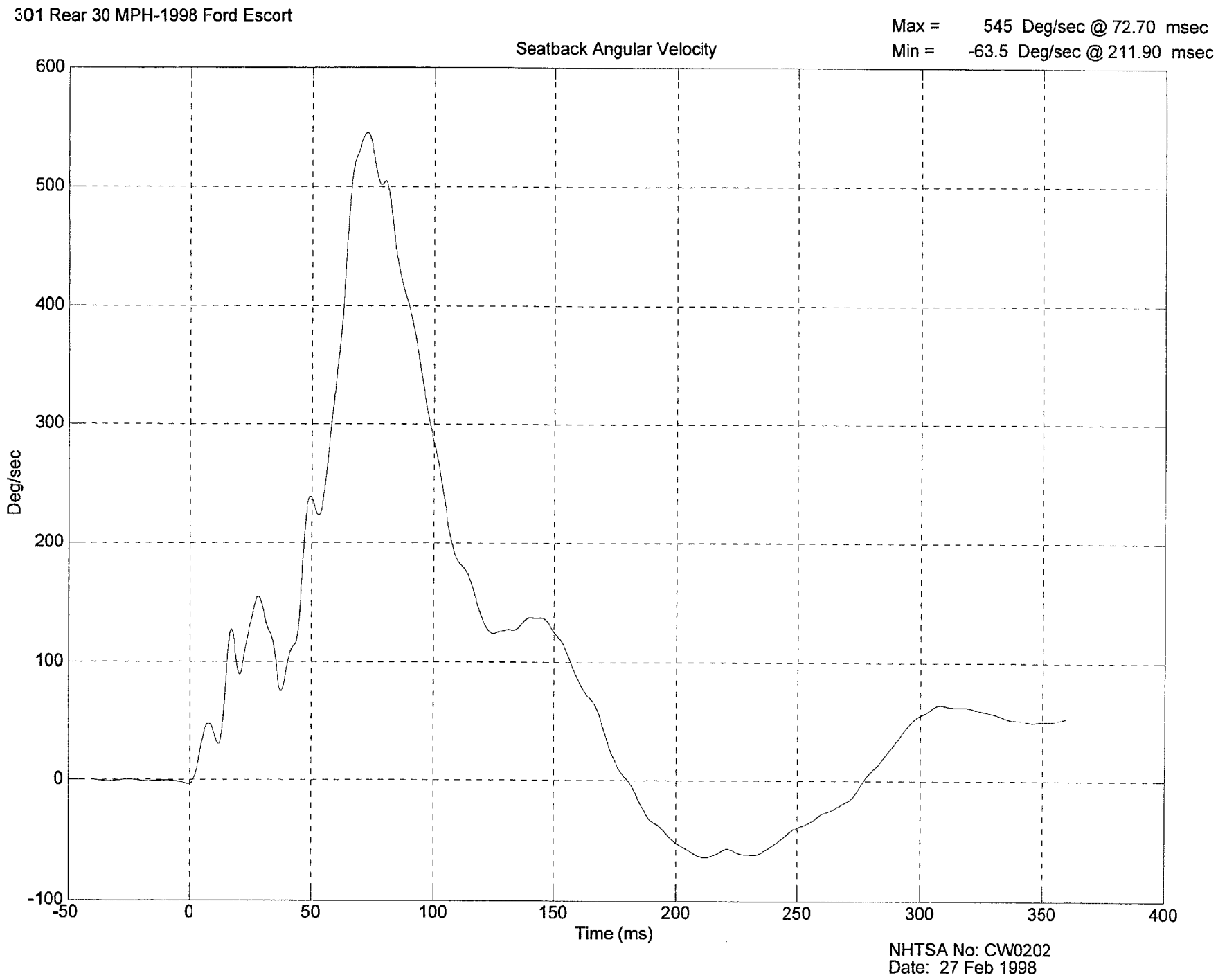

301 Rear 30 MPH-1998 Ford Escort
Seatback Angular Acceleration
Max = 3.51e+004 Deg/sec^2 @ 46.40 msec
Min = -1.83e+004 Deg/sec^2 @ 82.90 msec
x 10^4
Deg/sec^2
Time (ms)
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Seatback Angular Velocity
Max = 545 Deg/sec @ 72.70 msec
Min = -63.5 Deg/sec @ 211.90 msec
600
500
400
300
200
100
0
-100
Deg/sec
-50
0
50
100
150
200
250
300
350
400
Time (ms)
NHTSA No: CW0202
Date: 27 Feb 1998

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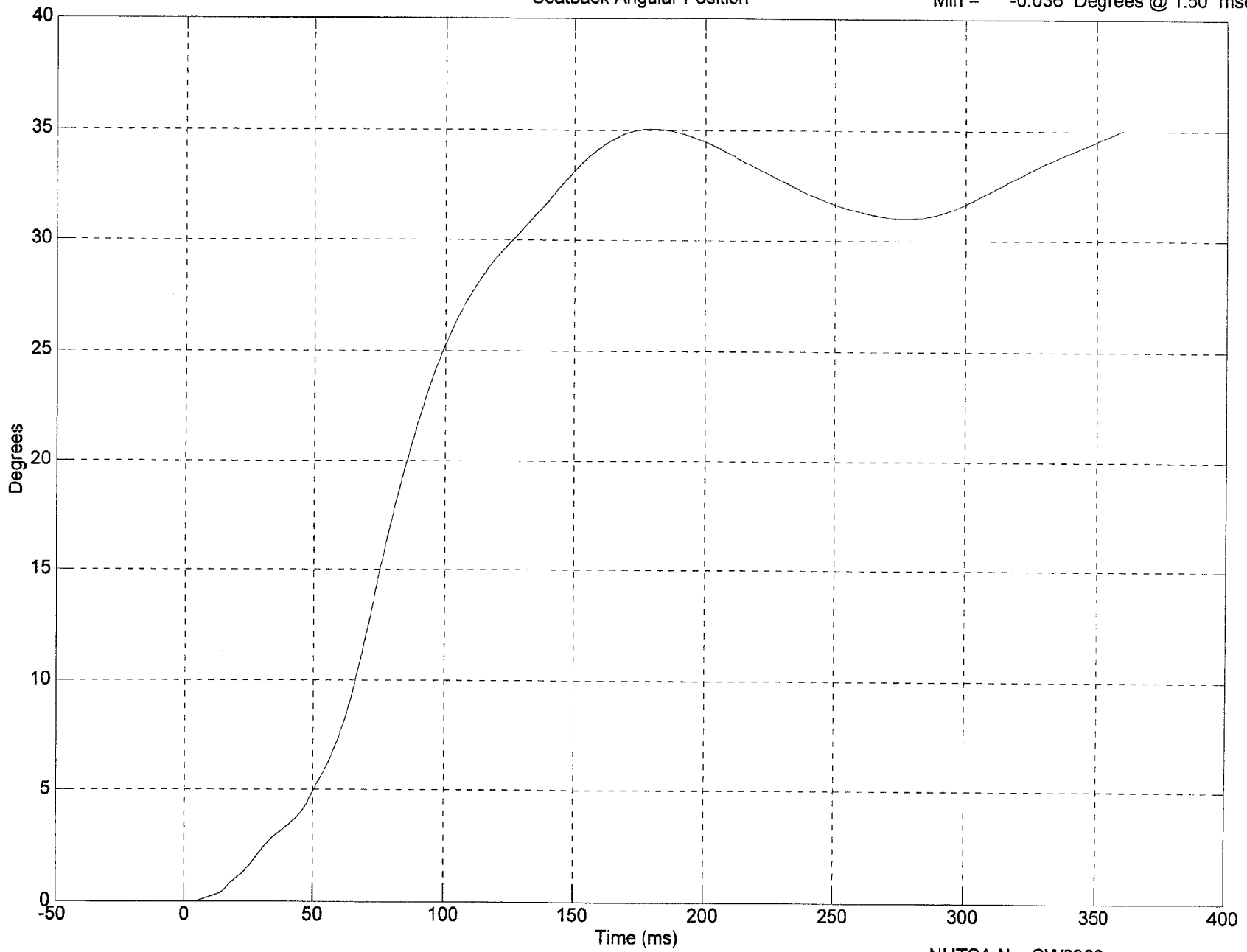
301 Rear 30 MPH-1998 Ford Escort

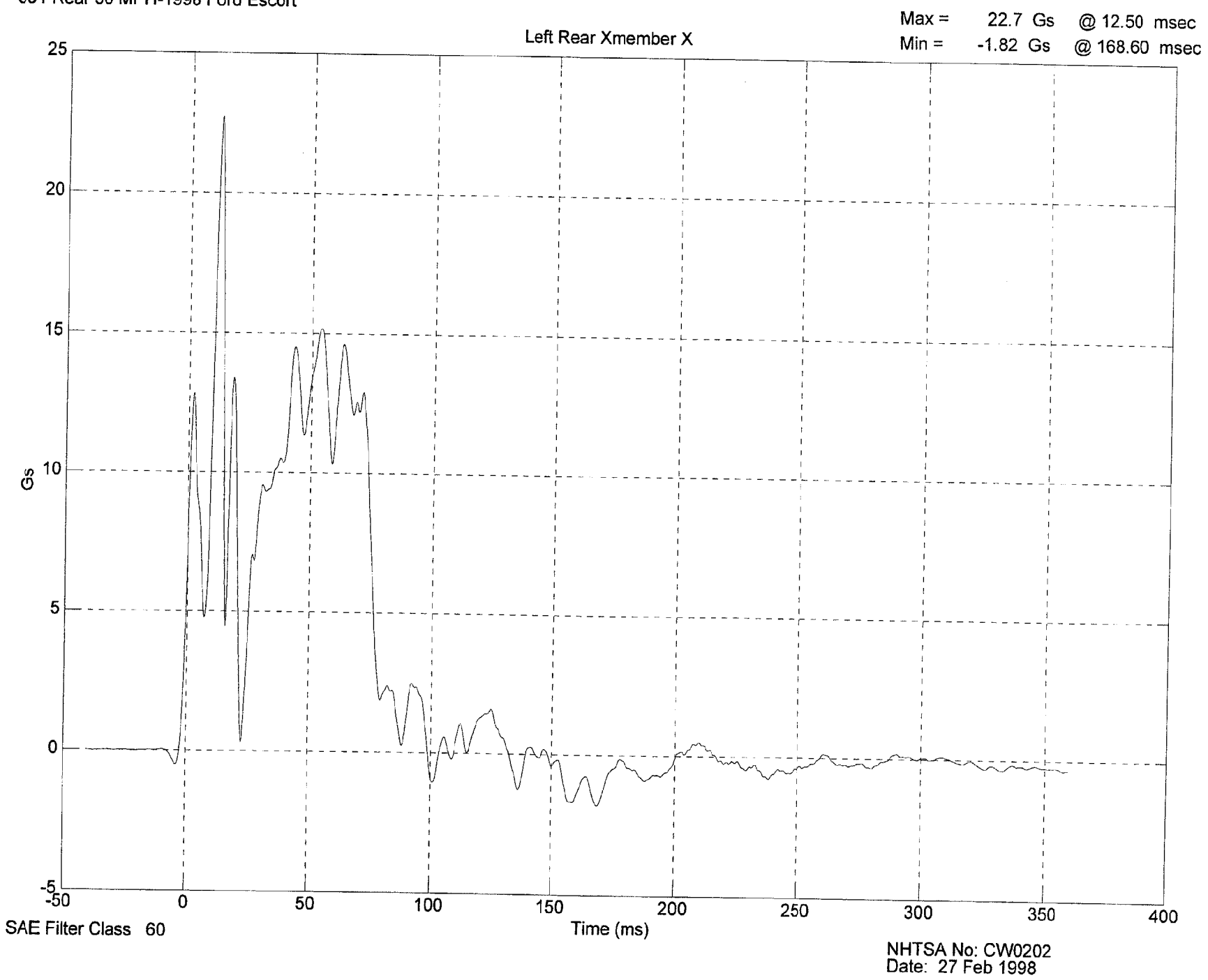
Seatback Angular Position

Max = 35.1 Degrees @ 180.20 msec
Min = -0.036 Degrees @ 1.50 msec



NHTSA No: CW0202
Date: 27 Feb 1998

301 Rear 30 MPH-1998 Ford Escort



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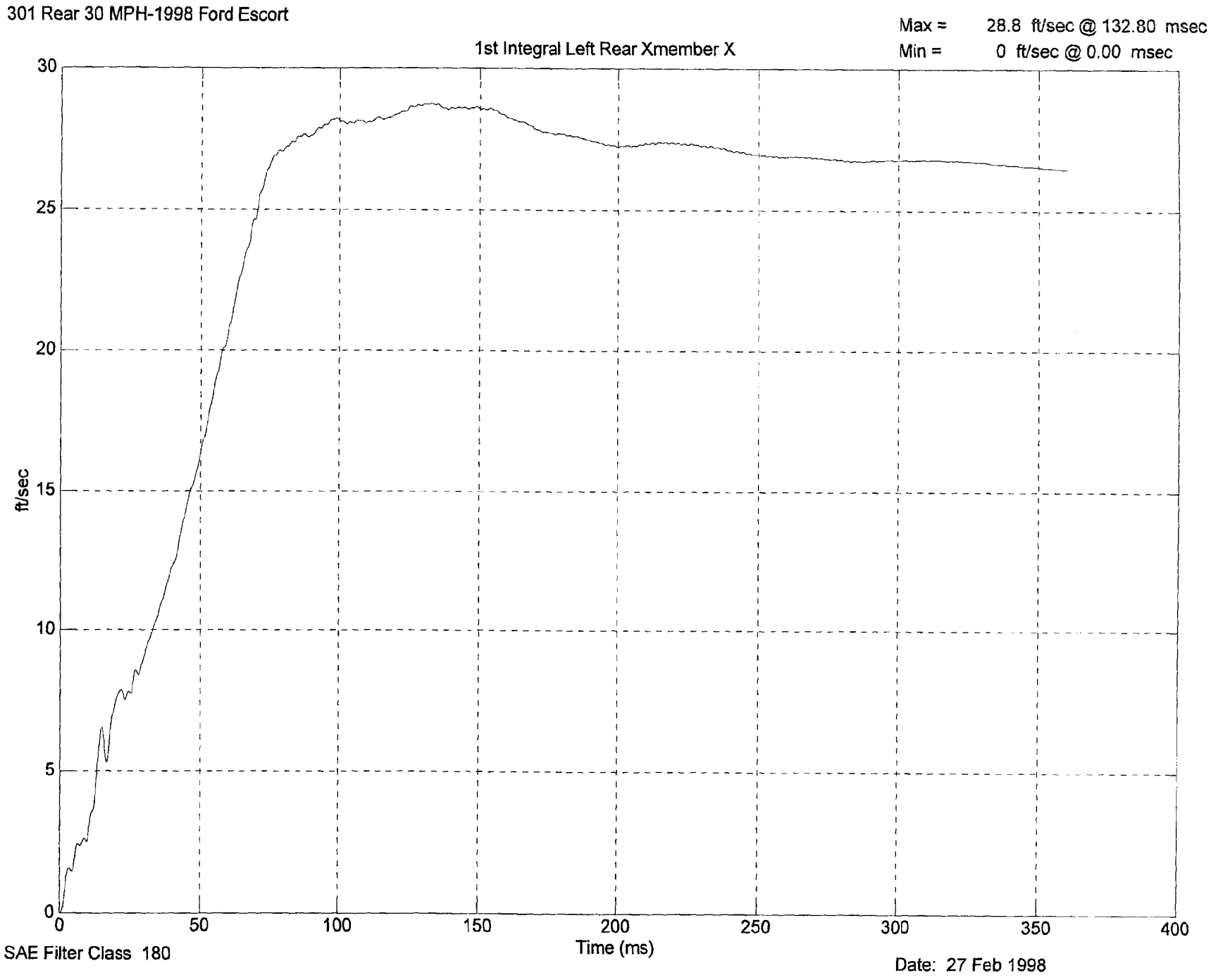
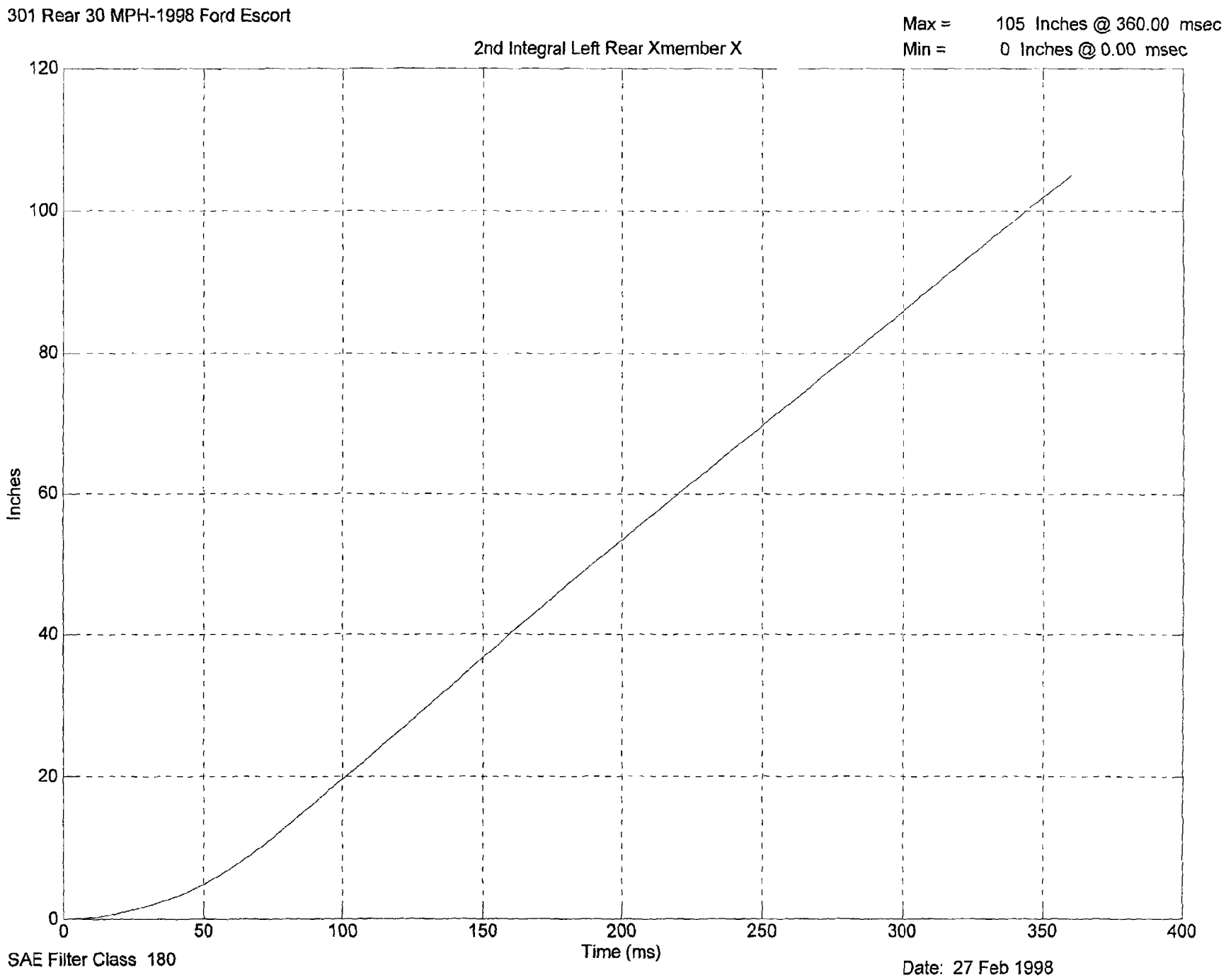
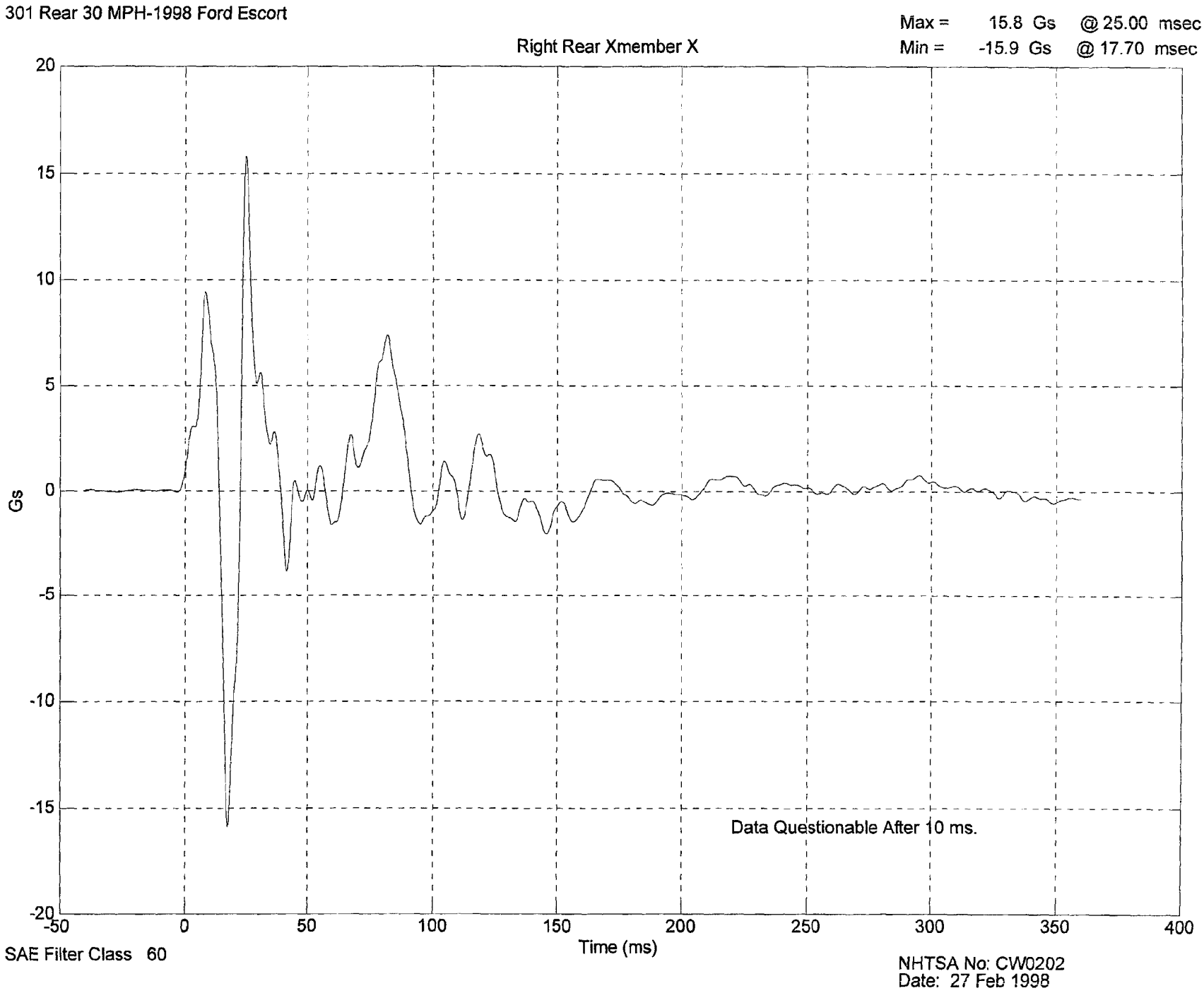
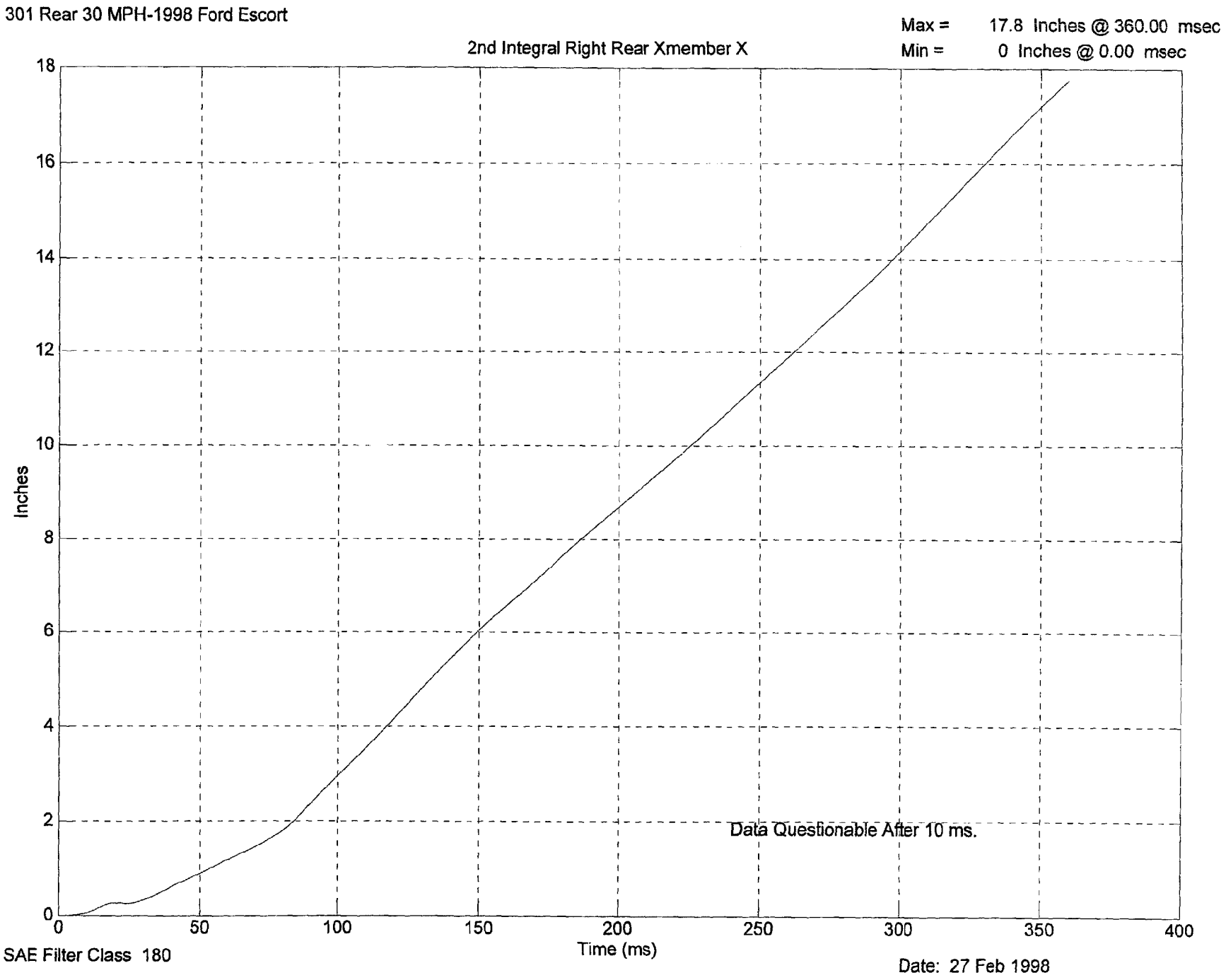

301 Rear 30 MPH-1998 Ford Escort
1st Integral Left Rear Xmember X
Max = 28.8 ft/sec @ 132.80 msec
Min = 0 ft/sec @ 0.00 msec
ft/sec
Time (ms)
0
5
10
15
20
25
30
0
50
100
150
200
250
300
350
400
SAE Filter Class 180
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
2nd Integral Left Rear Xmember X
Max = 105 Inches @ 360.00 msec
Min = 0 Inches @ 0.00 msec
120
100
80
60
40
20
0
Inches
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 27 Feb 1998

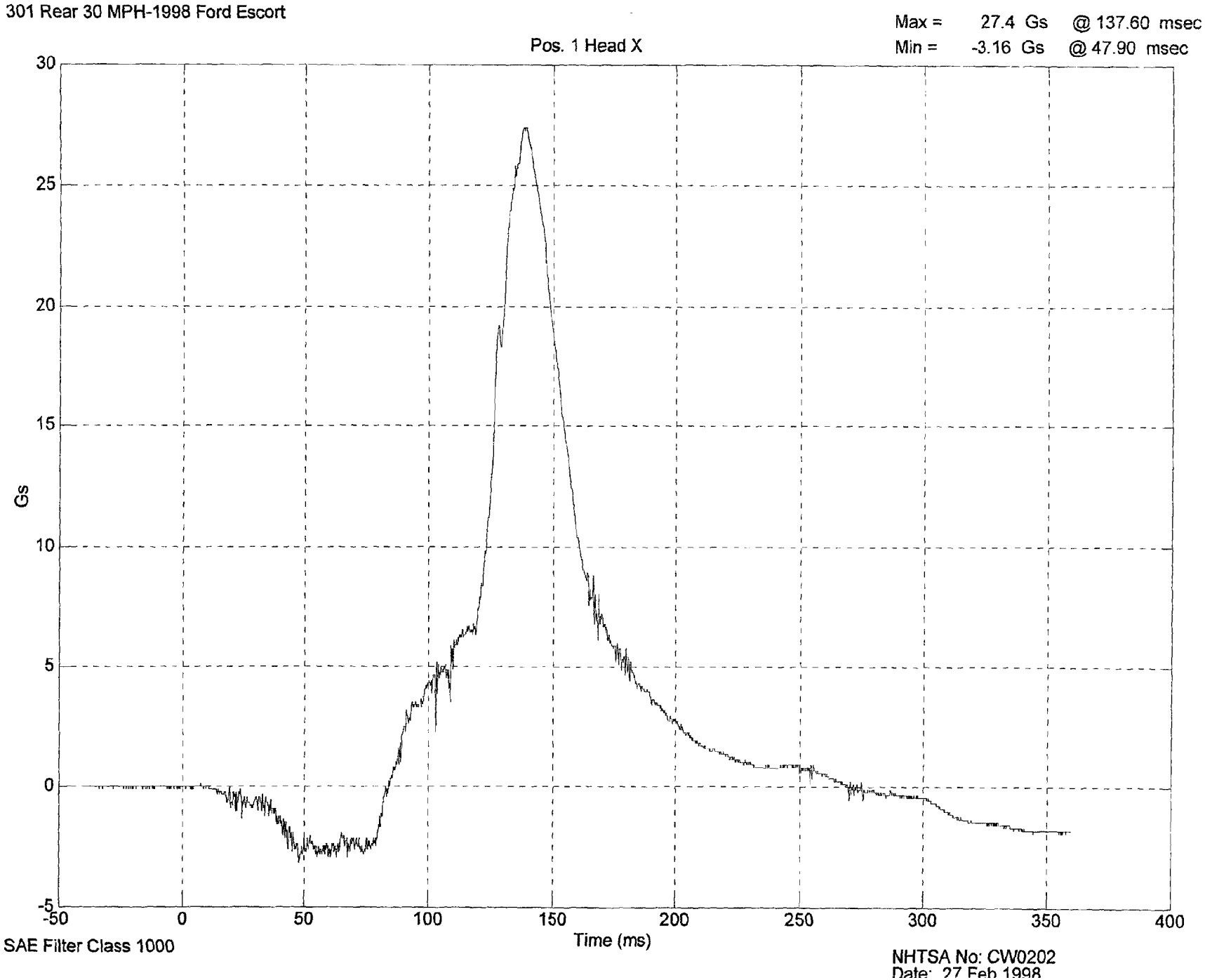

301 Rear 30 MPH-1998 Ford Escort
Right Rear Xmember X
Max = 15.8 Gs @ 25.00 msec
Min = -15.9 Gs @ 17.70 msec
Gs
Time (ms)
Data Questionable After 10 ms.
SAE Filter Class 60
NHTSA No: CW0202
Date: 27 Feb 1998

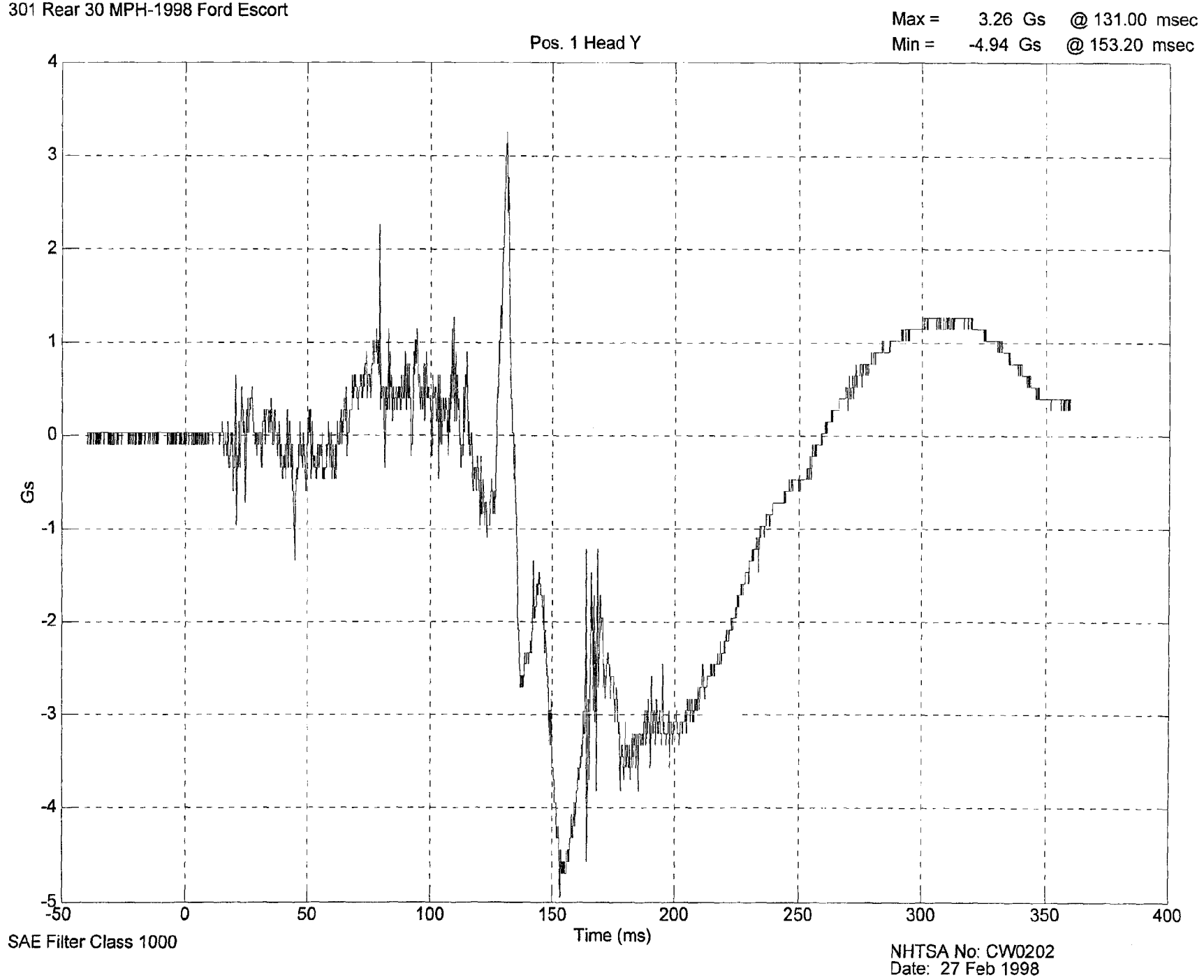

301 Rear 30 MPH-1998 Ford Escort
1st Integral Right Rear Xmember X
Max = 5.58 ft/sec @ 124.90 msec
Min = -0.976 ft/sec @ 23.10 msec
ft/sec
Time (ms)
Data Questionable After 10 ms.
SAE Filter Class 180
Date: 27 Feb 1998

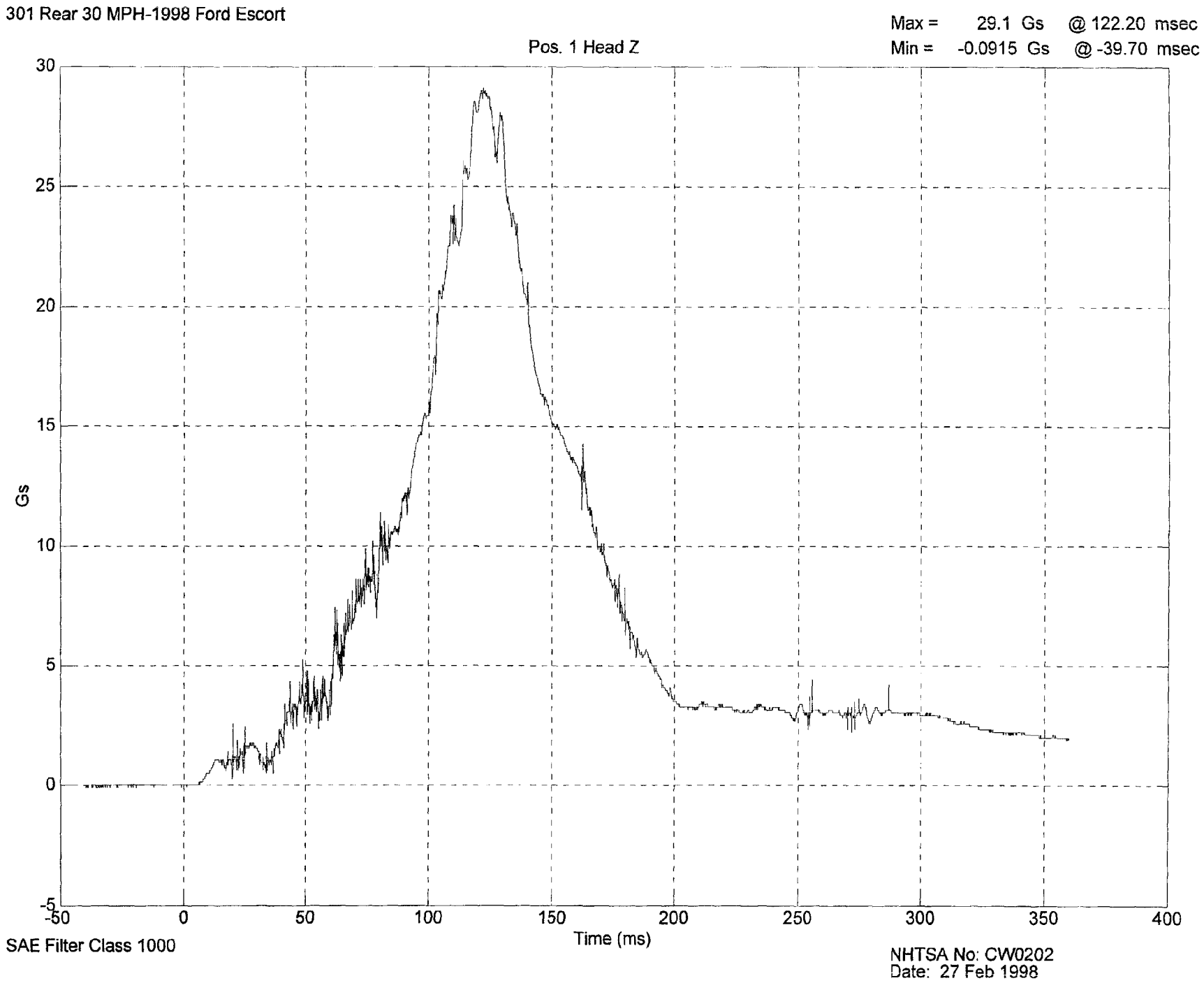

301 Rear 30 MPH-1998 Ford Escort
Max = 17.8 Inches @ 360.00 msec
Min = 0 Inches @ 0.00 msec
2nd Integral Right Rear Xmember X
Inches
Time (ms)
Data Questionable After 10 ms.
SAE Filter Class 180
Date: 27 Feb 1998

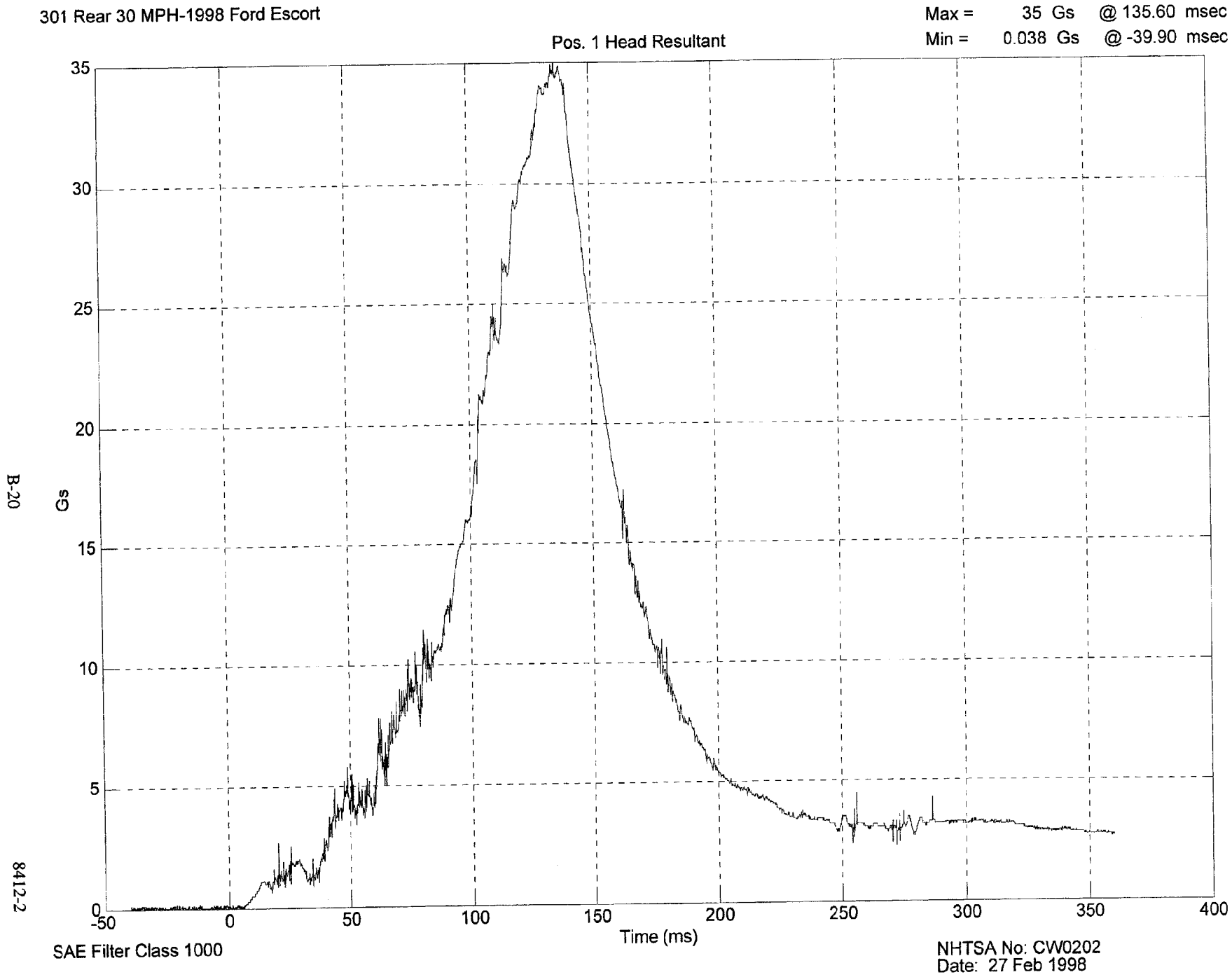
TEST NO. CW0202

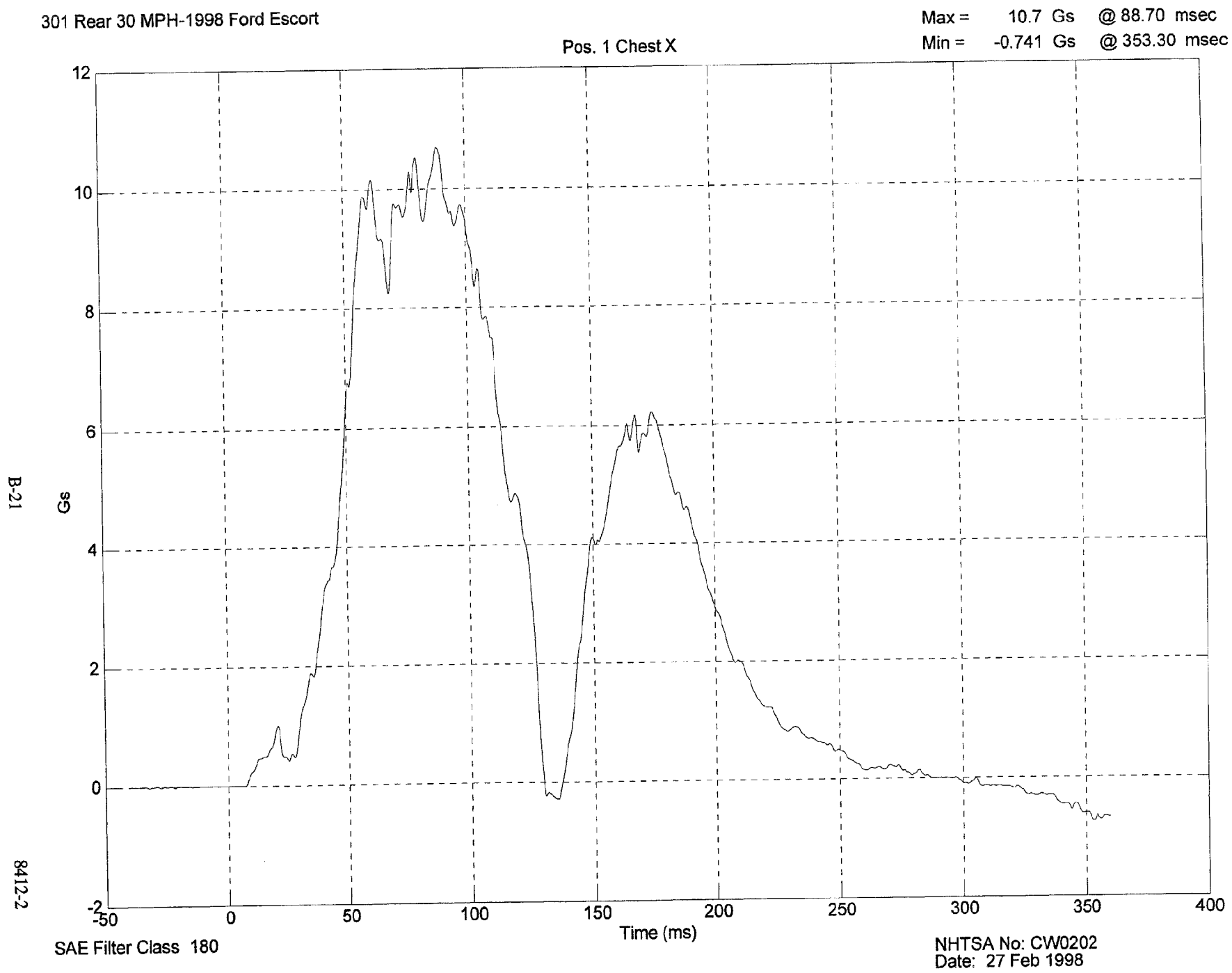
DRIVER DUMMY (Pos. 1)	SAE FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Pelvic Accelerations	1000
Upper Neck Forces	1000
Upper Neck Moments	600
Belt Forces	60
Belt Spoolout	60


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Head X
Max = 27.4 Gs @ 137.60 msec
Min = -3.16 Gs @ 47.90 msec
Gs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Head Y
Max = 3.26 Gs @ 131.00 msec
Min = -4.94 Gs @ 153.20 msec
Gs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Head Z
Max = 29.1 Gs @ 122.20 msec
Min = -0.0915 Gs @ -39.70 msec
Gs
Time (ms)
30
25
20
15
10
5
0
-5
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Head Resultant
Max = 35 Gs @ 135.60 msec
Min = 0.038 Gs @ -39.90 msec
Gs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Chest X
Max = 10.7 Gs @ 88.70 msec
Min = -0.741 Gs @ 353.30 msec
Gs
Time (ms)
12
10
8
6
4
2
0
-2
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 180
NHTSA No: CW0202
Date: 27 Feb 1998

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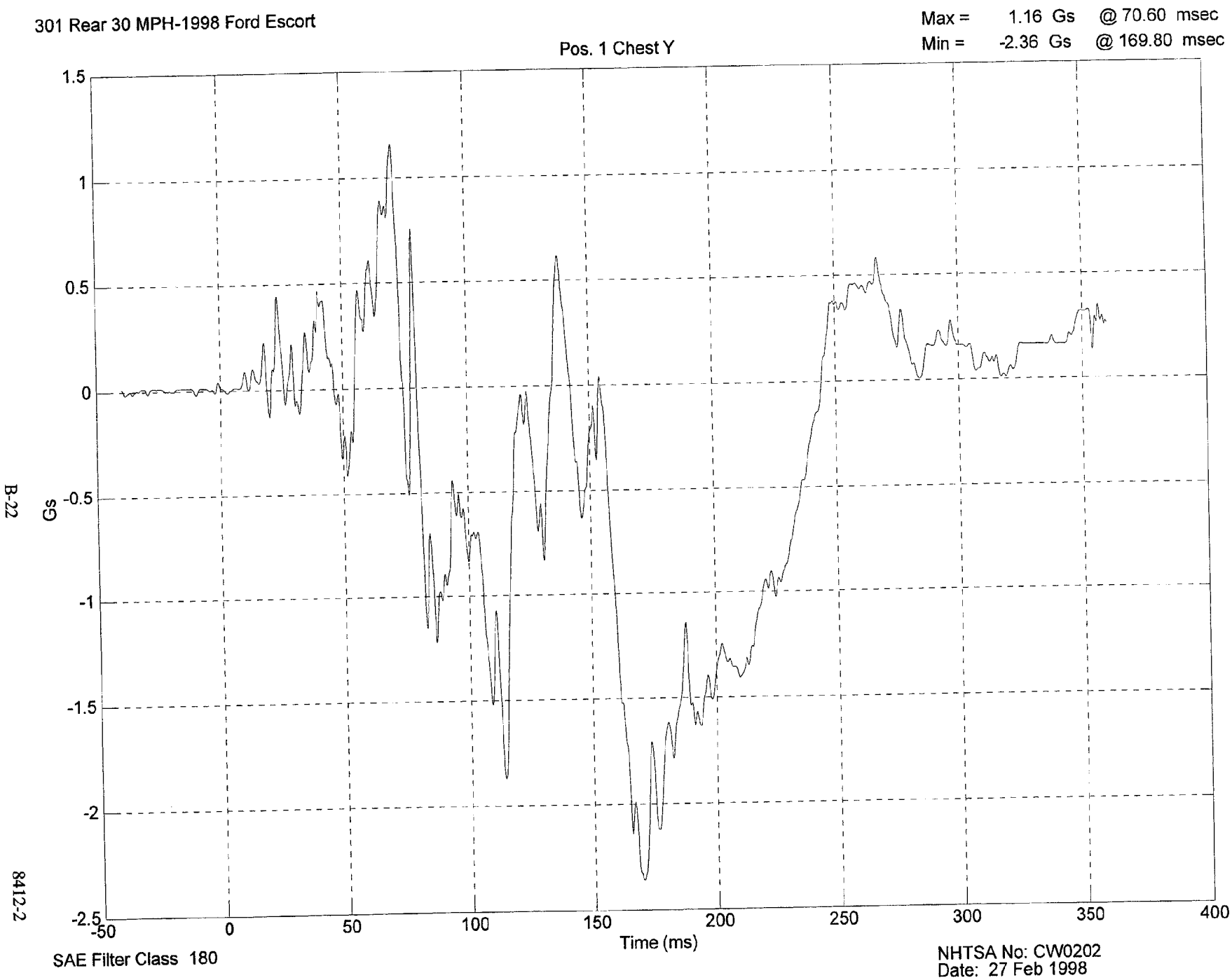
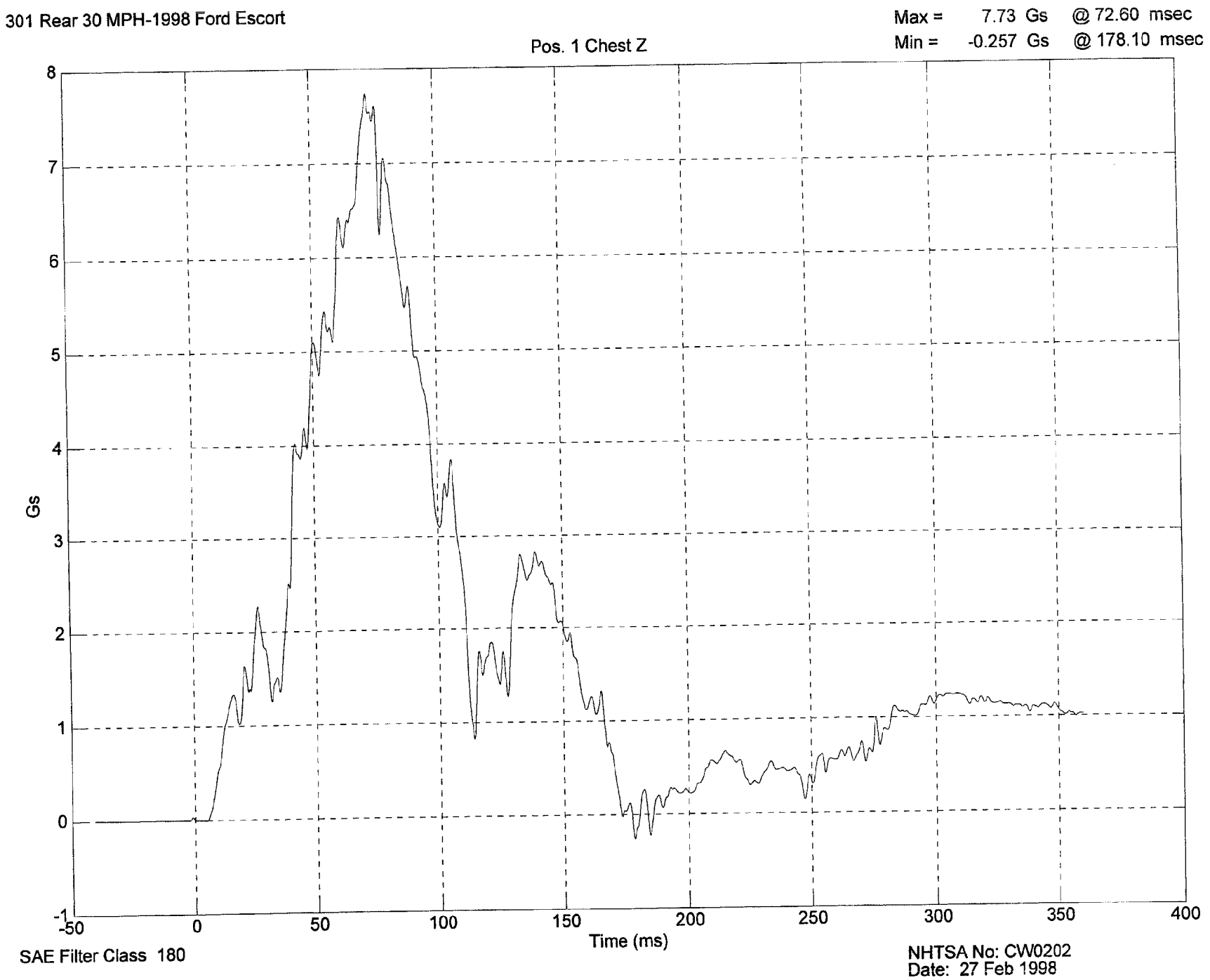

301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Chest Y
Max = 1.16 Gs @ 70.60 msec
Min = -2.36 Gs @ 169.80 msec
Gs
Time (ms)
SAE Filter Class 180
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Chest Z
Max = 7.73 Gs @ 72.60 msec
Min = -0.257 Gs @ 178.10 msec
Gs
Time (ms)
8
7
6
5
4
3
2
1
0
-1
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 180
NHTSA No: CW0202
Date: 27 Feb 1998

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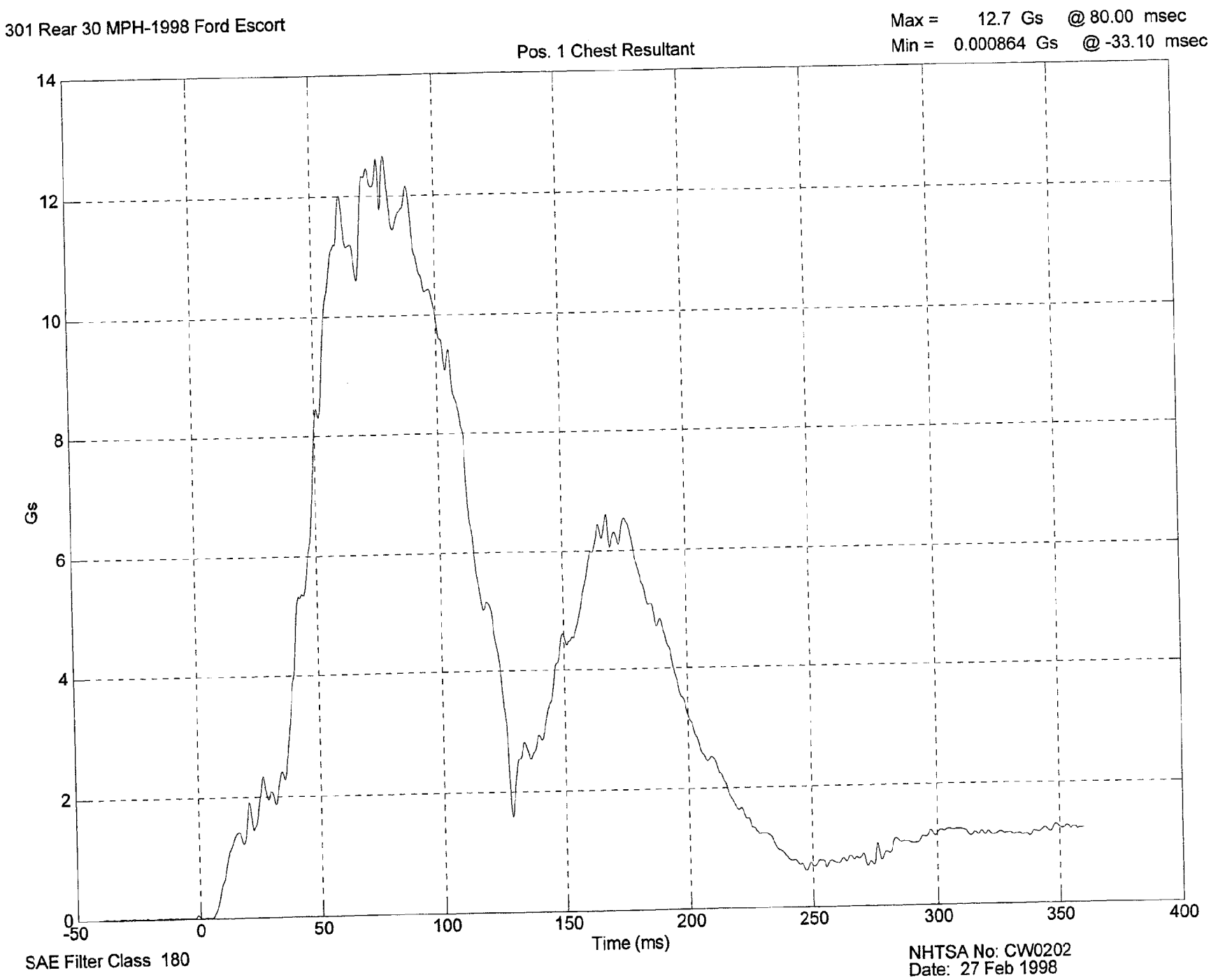
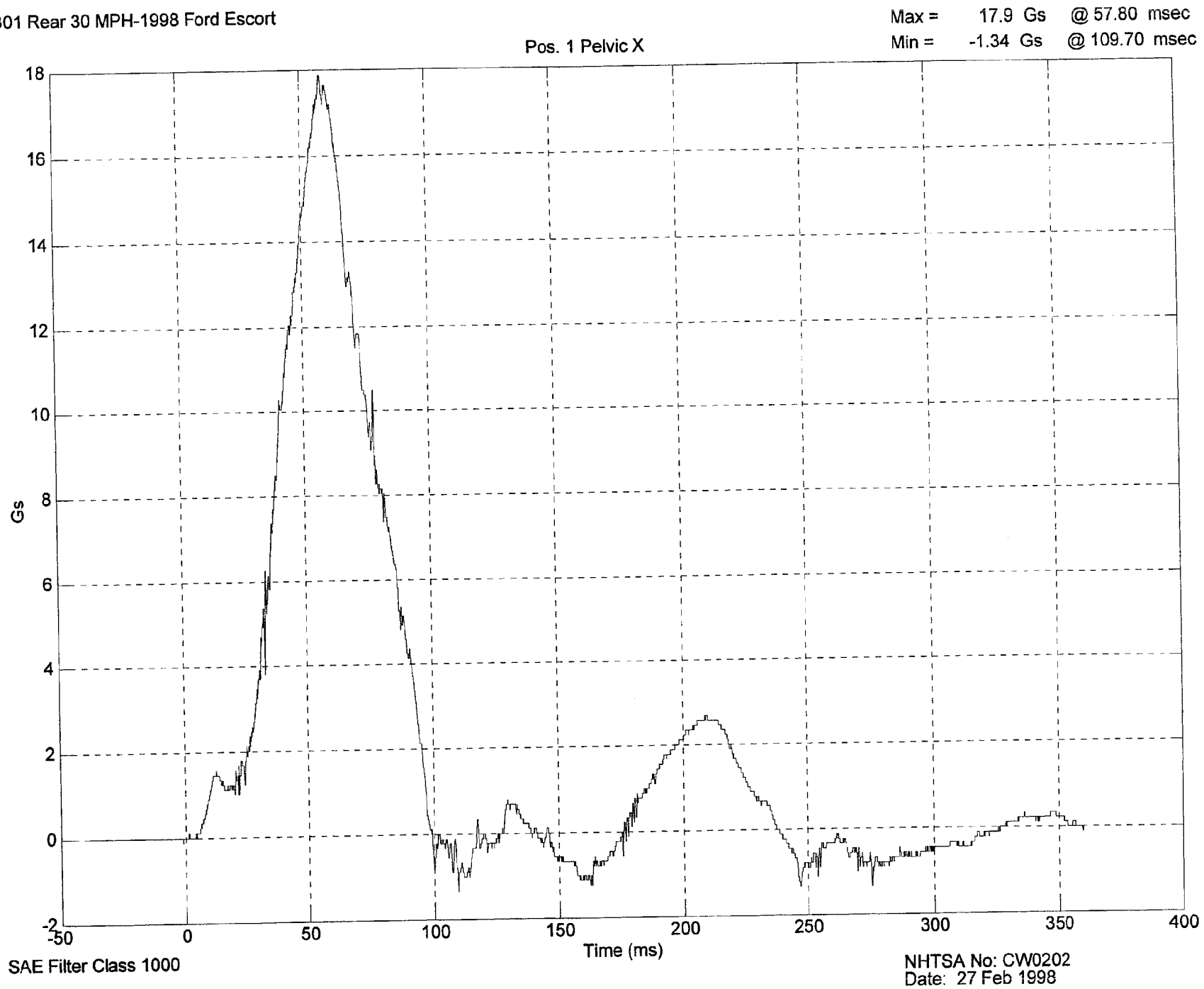
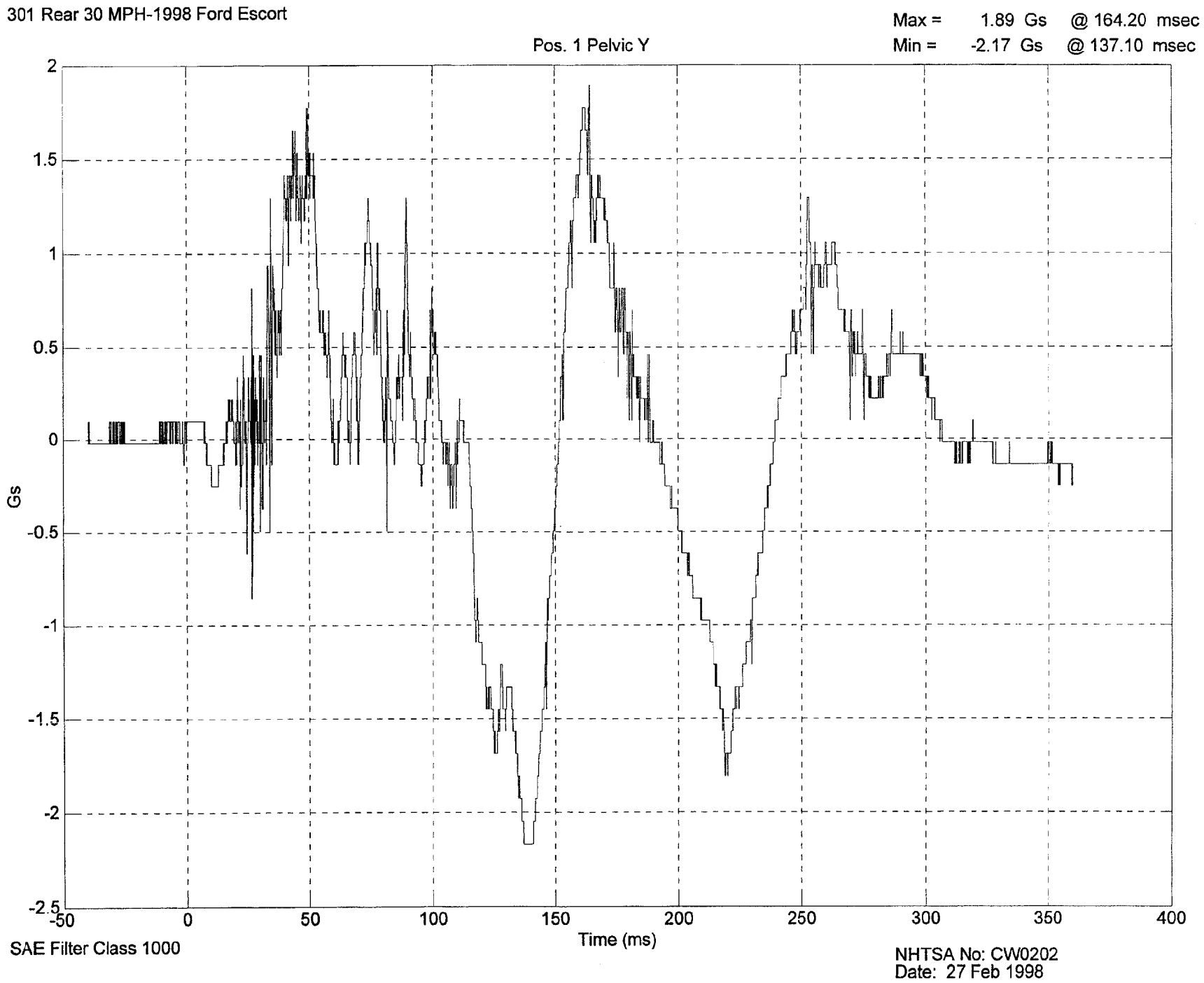
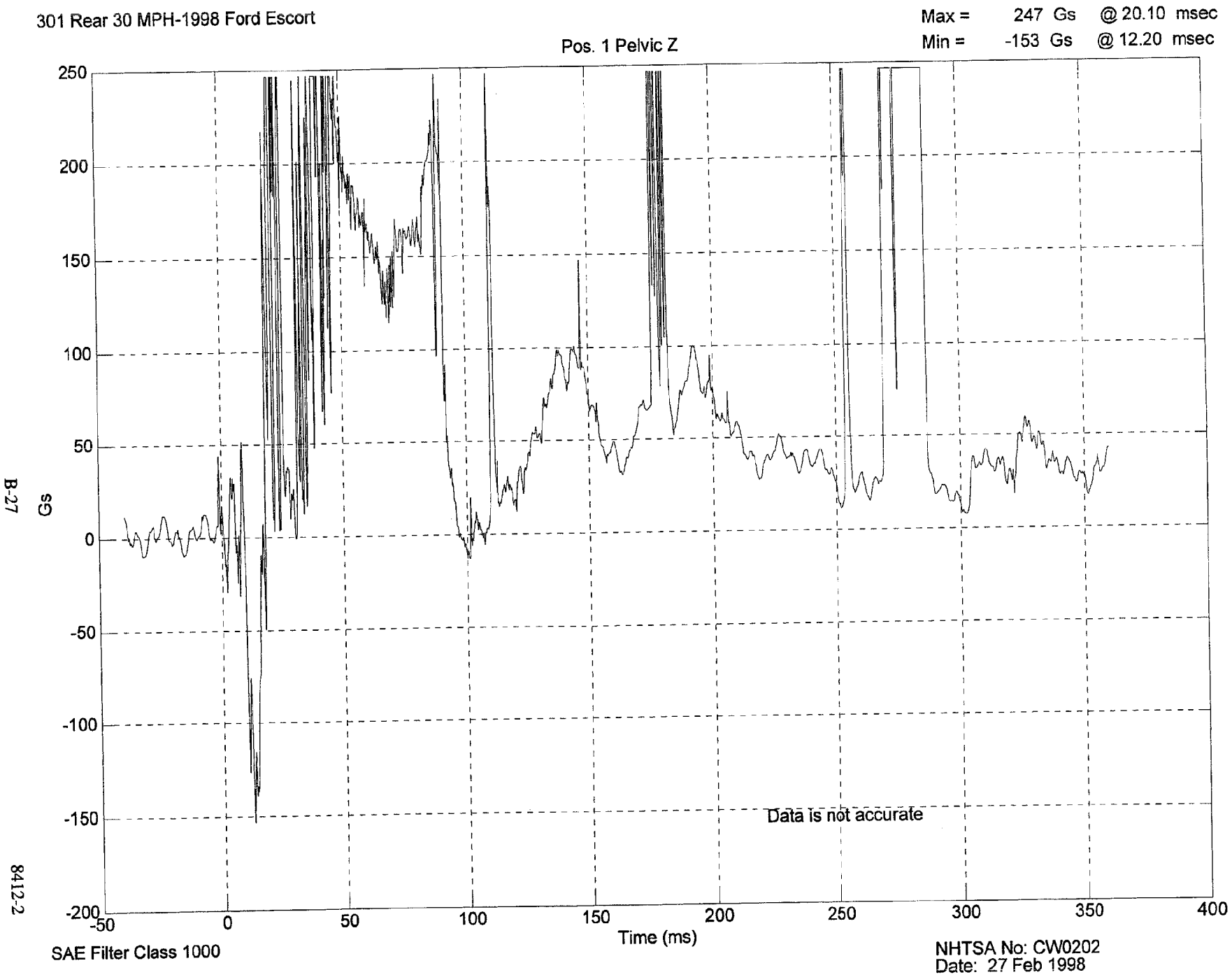

301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Chest Resultant
Max = 12.7 Gs @ 80.00 msec
Min = 0.000864 Gs @ -33.10 msec
Gs
Time (ms)
SAE Filter Class 180
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Pelvic X
Max = 17.9 Gs @ 57.80 msec
Min = -1.34 Gs @ 109.70 msec
Gs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Pelvic Y
Max = 1.89 Gs @ 164.20 msec
Min = -2.17 Gs @ 137.10 msec
Gs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Pelvic Z
Max = 247 Gs @ 20.10 msec
Min = -153 Gs @ 12.20 msec
Gs
Time (ms)
Data is not accurate
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998
B-27
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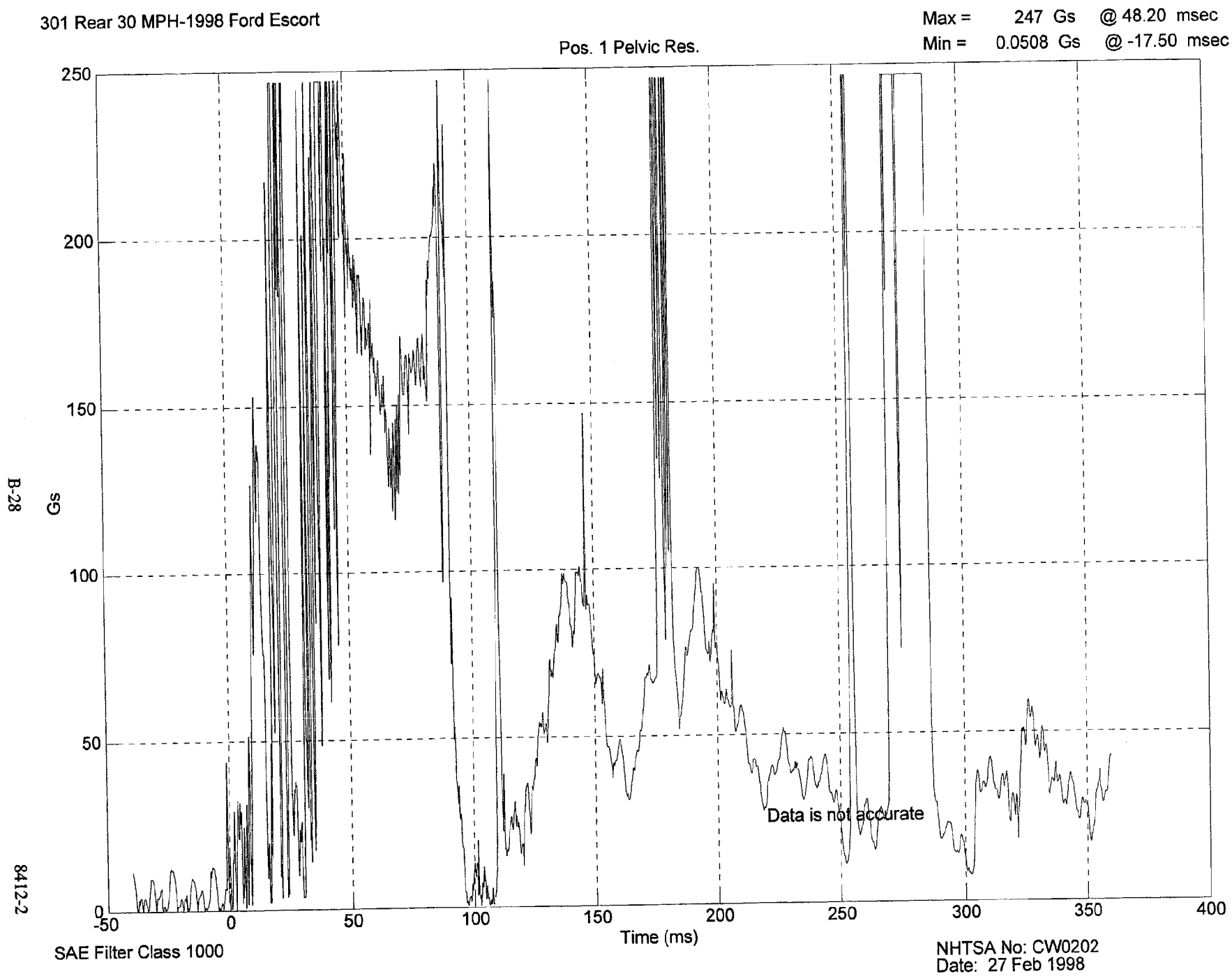
301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Pelvic Res.
Max = 247 Gs @ 48.20 msec
Min = 0.0508 Gs @ -17.50 msec
250
200
150
100
50
0
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
Data is not accurate
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998

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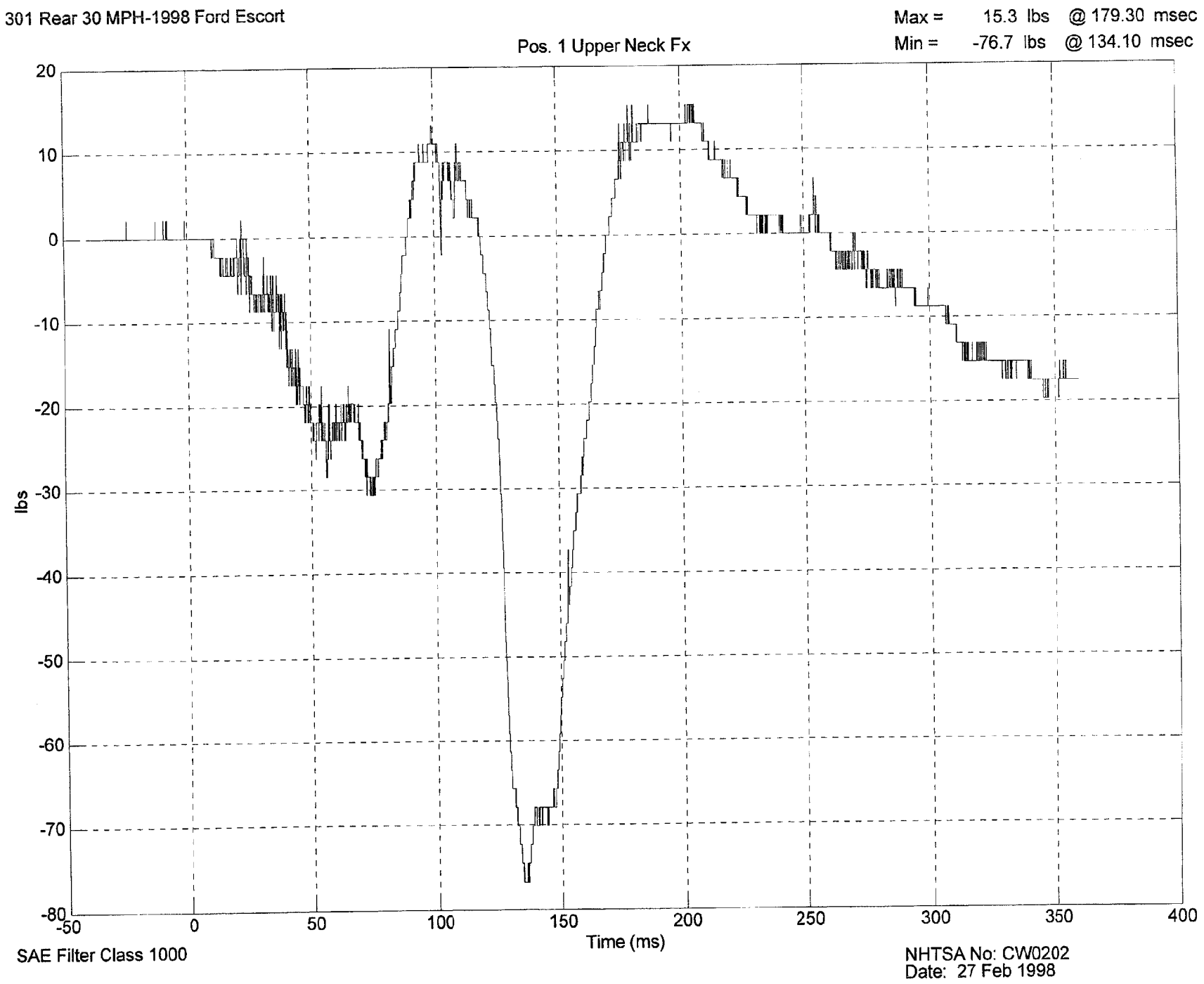
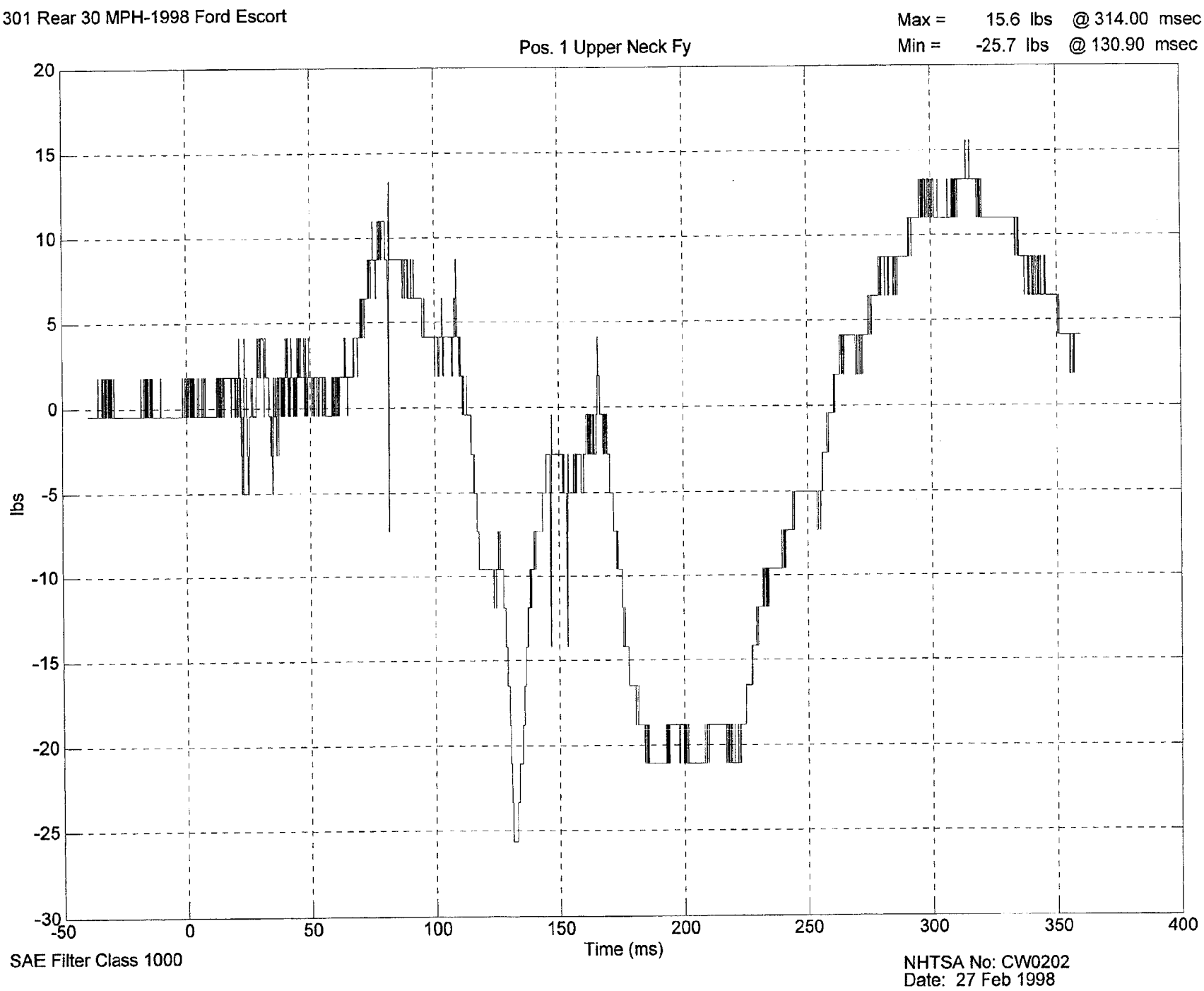
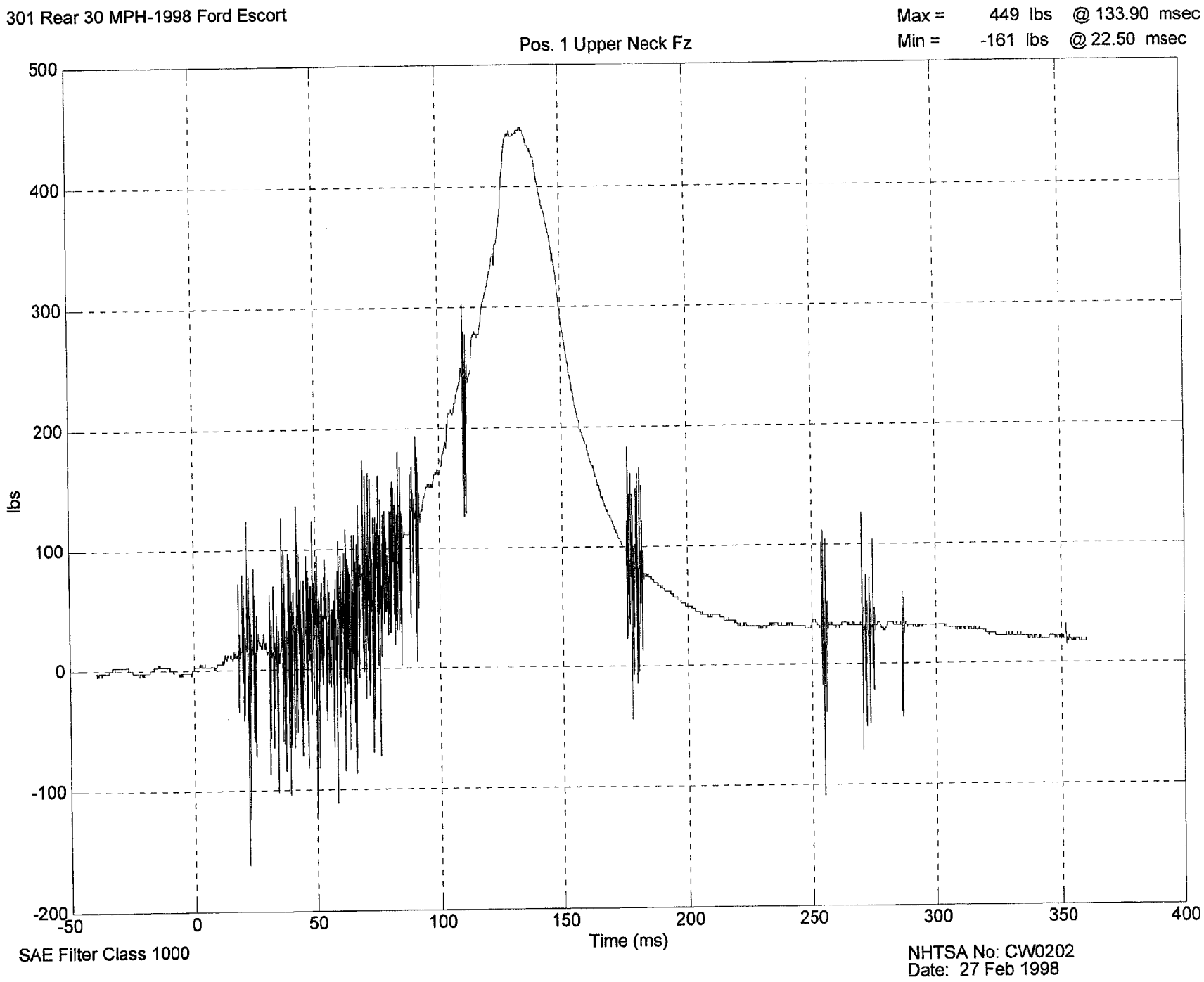
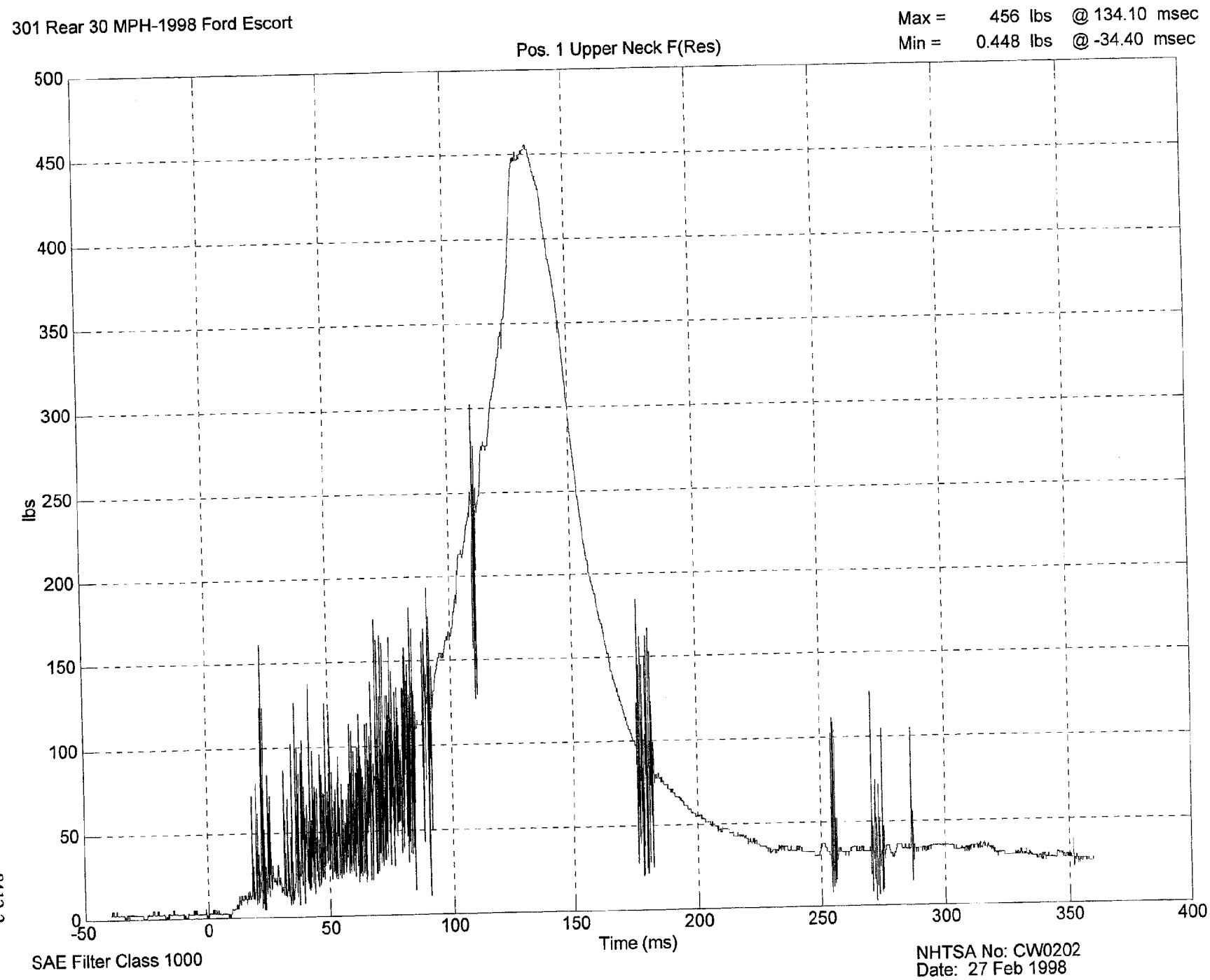
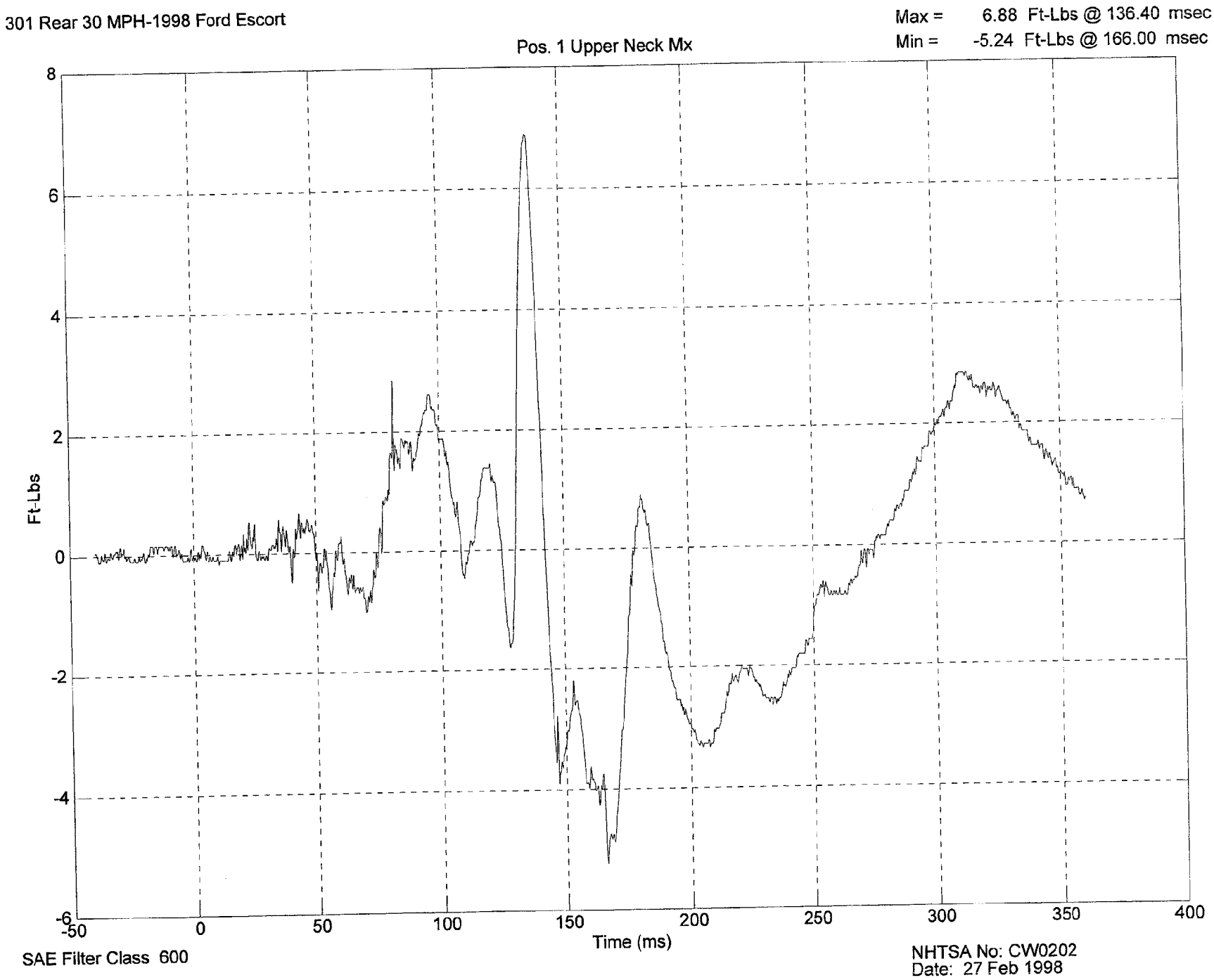
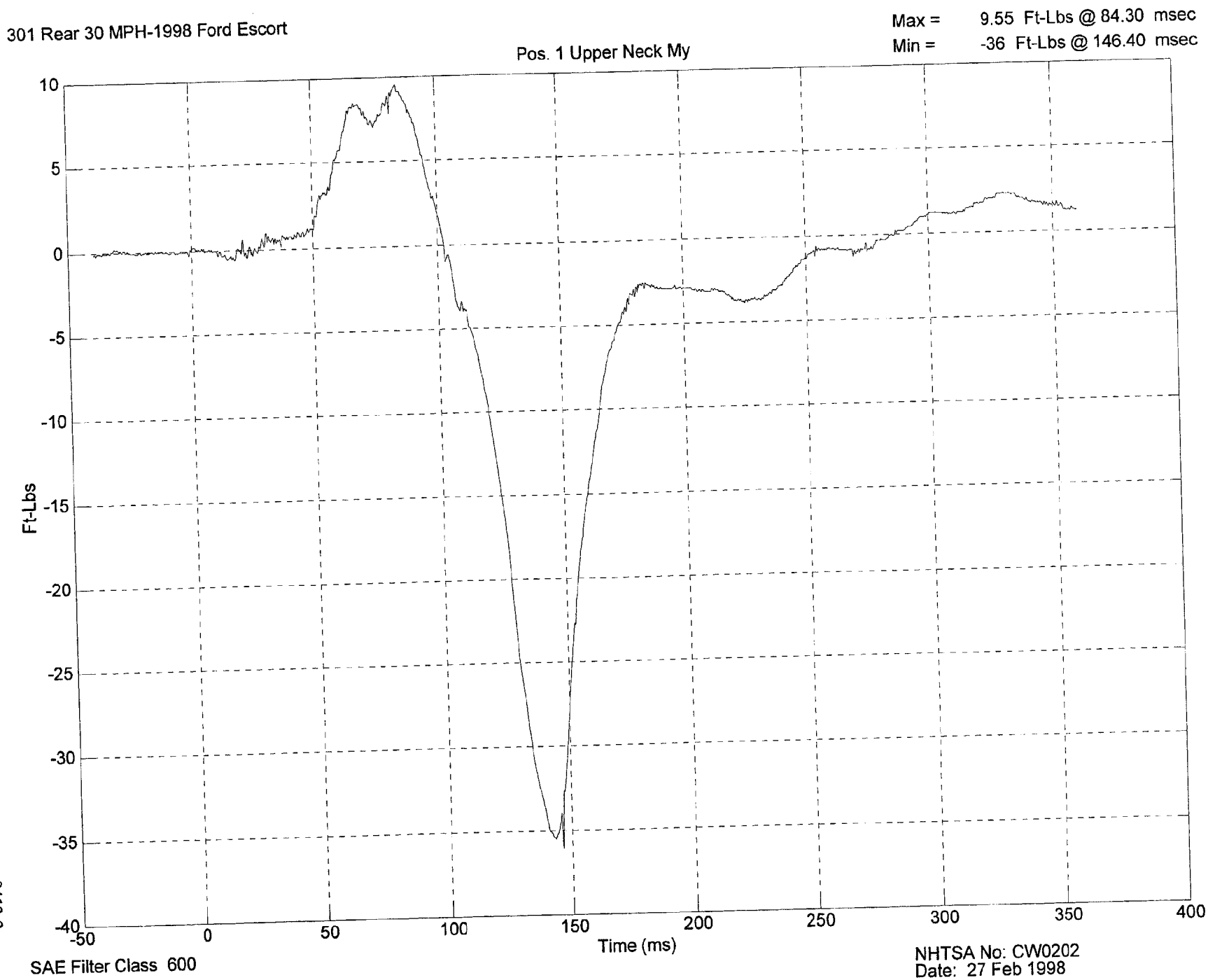

301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Upper Neck Fx
Max = 15.3 lbs @ 179.30 msec
Min = -76.7 lbs @ 134.10 msec
lbs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Upper Neck Fy
Max = 15.6 lbs @ 314.00 msec
Min = -25.7 lbs @ 130.90 msec
lbs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Upper Neck Fz
Max = 449 lbs @ 133.90 msec
Min = -161 lbs @ 22.50 msec
500
400
300
200
100
0
-100
-200
lbs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Upper Neck F(Res)
Max = 456 lbs @ 134.10 msec
Min = 0.448 lbs @ -34.40 msec
lbs
Time (ms)
SAE Filter Class 1000
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Upper Neck Mx
Max = 6.88 Ft-Lbs @ 136.40 msec
Min = -5.24 Ft-Lbs @ 166.00 msec
Ft-Lbs
Time (ms)
8
6
4
2
0
-2
-4
-6
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 600
NHTSA No: CW0202
Date: 27 Feb 1998


301 Rear 30 MPH-1998 Ford Escort
Pos. 1 Upper Neck My
Max = 9.55 Ft-Lbs @ 84.30 msec
Min = -36 Ft-Lbs @ 146.40 msec
Ft-Lbs
Time (ms)
SAE Filter Class 600
NHTSA No: CW0202
Date: 27 Feb 1998

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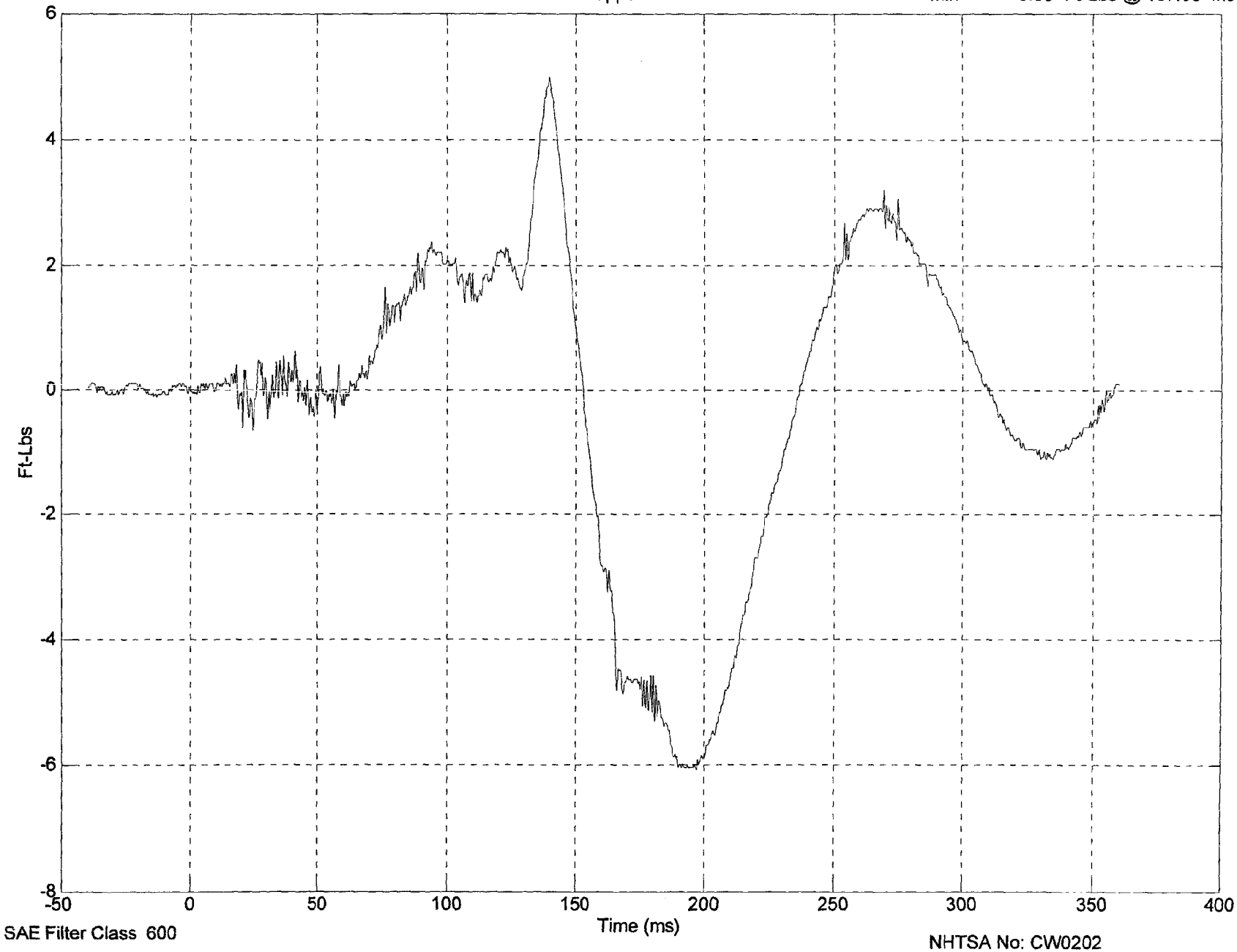
301 Rear 30 MPH-1998 Ford Escort

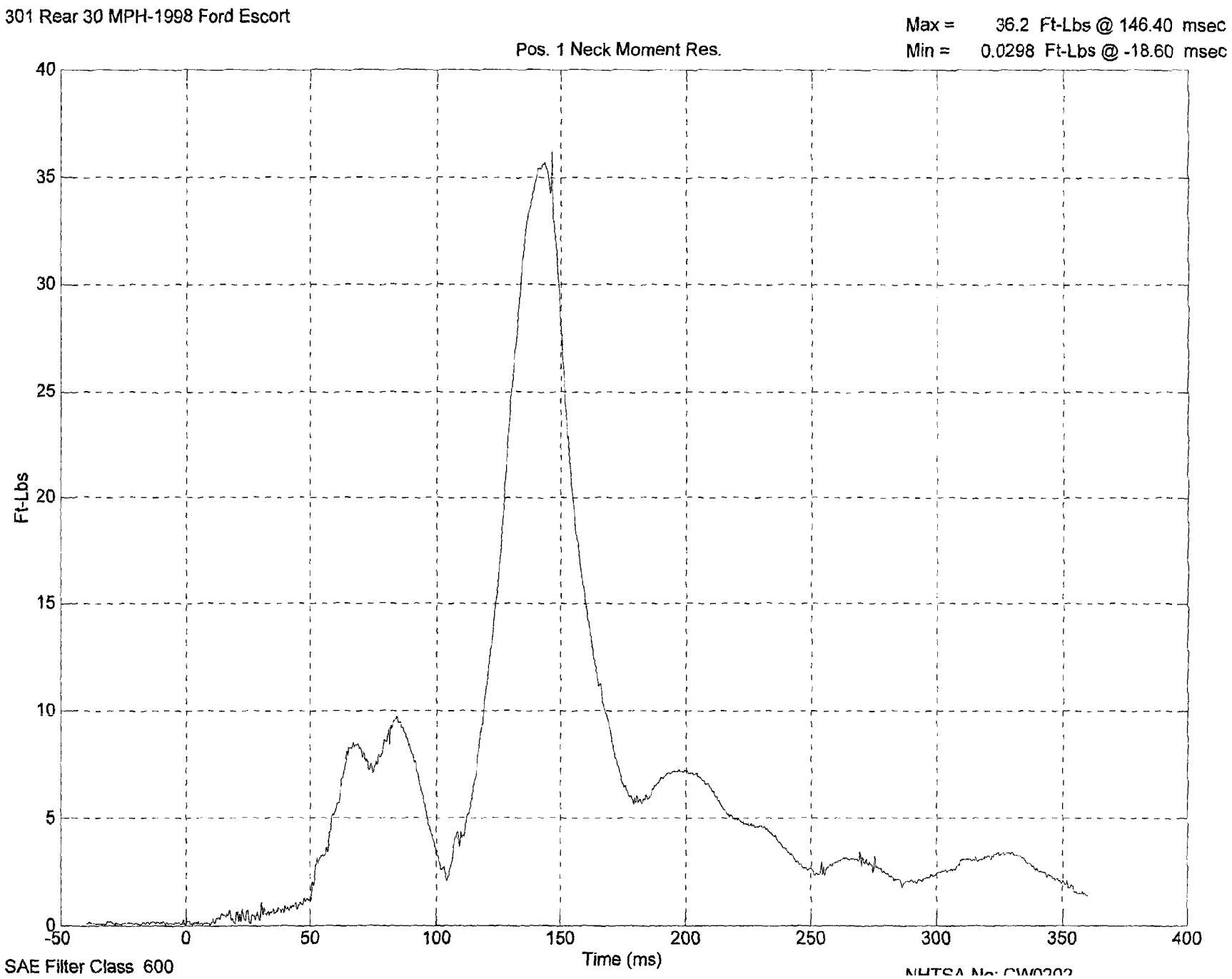
Max = 5 Ft-Lbs @ 139.70 msec
Min = -6.08 Ft-Lbs @ 197.00 msec



SAE Filter Class 600

NHTSA No: CW0202
Date: 27 Feb 1998

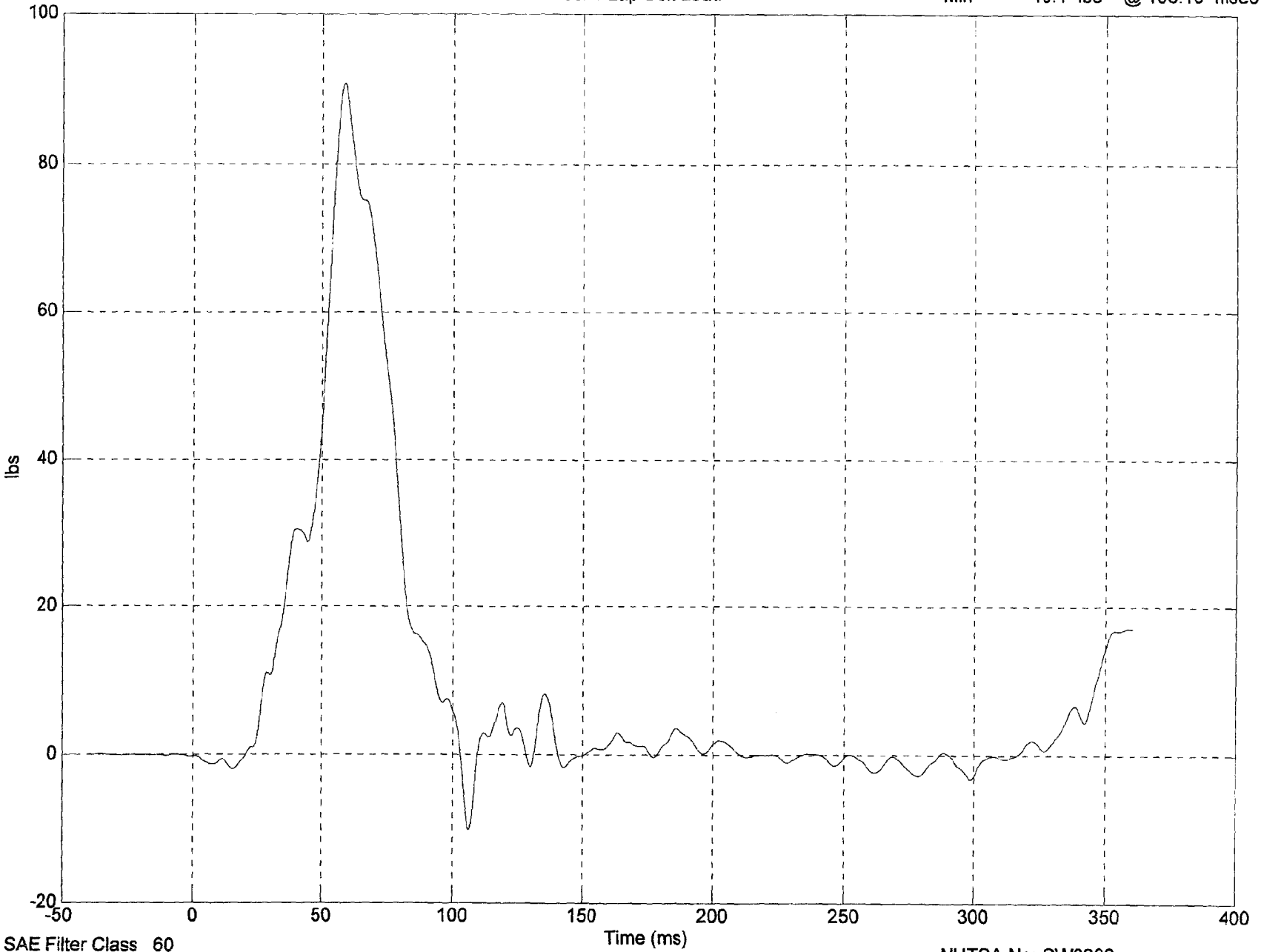
8412-2


301 Rear 30 MPH-1998 Ford Escort
Max = 36.2 Ft-Lbs @ 146.40 msec
Min = 0.0298 Ft-Lbs @ -18.60 msec
Pos. 1 Neck Moment Res.
Ft-Lbs
Time (ms)
SAE Filter Class 600
NHTSA No: CW0202

301 Rear 30 MPH-1998 Ford Escort

Pos. 1 Lap Belt Load

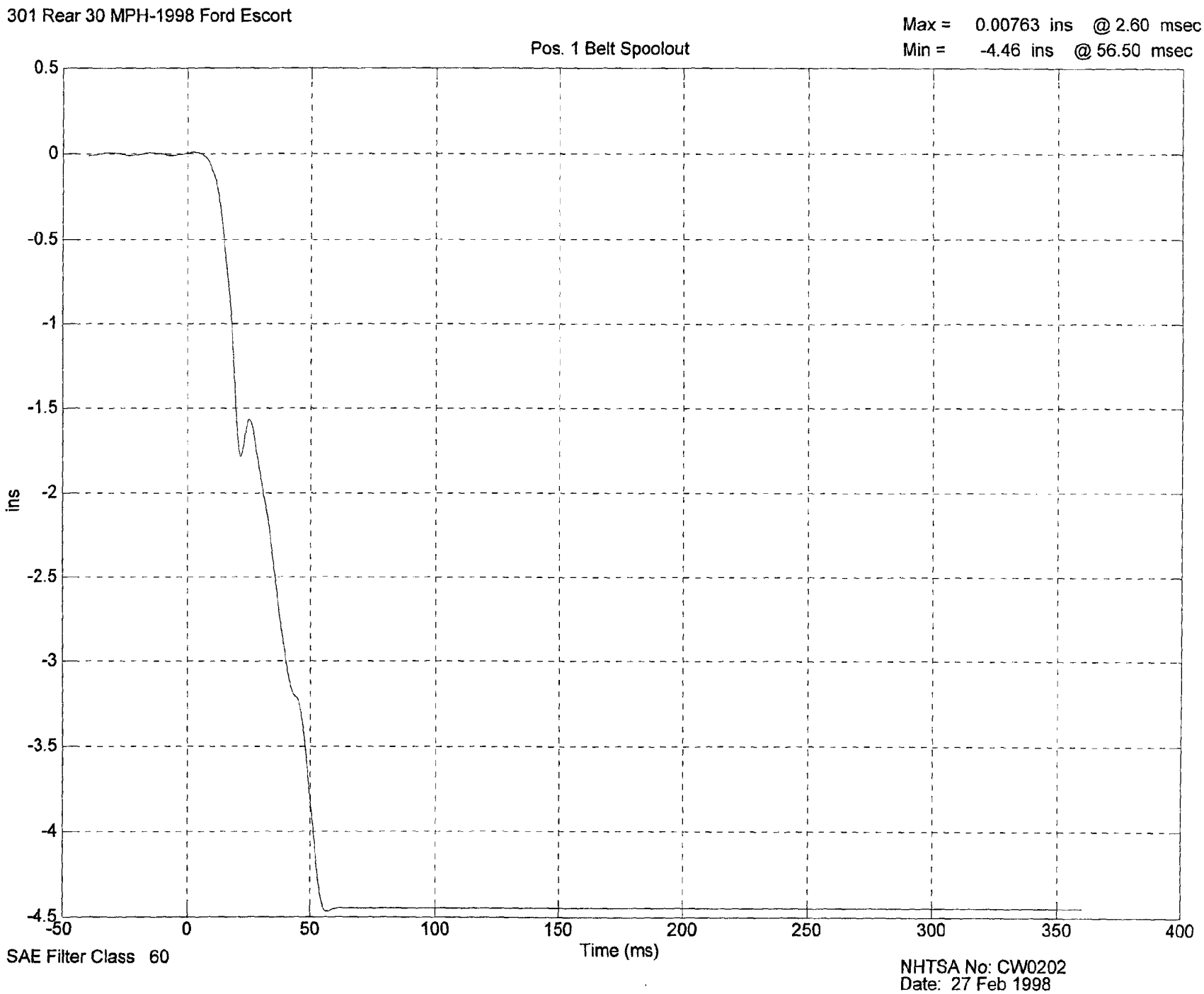
Max = 90.8 lbs @ 58.50 msec
Min = -10.1 lbs @ 106.10 msec



SAE Filter Class 60

NHTSA No: CW0202
Date: 27 Feb 1998

8412-2


301 Rear 30 MPH-1998 Ford Escort
Max = 0.00763 ins @ 2.60 msec
Pos. 1 Belt Spoolout
Min = -4.46 ins @ 56.50 msec
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
-4.5
ins
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 60
NHTSA No: CW0202
Date: 27 Feb 1998