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**National Highway
Traffic Safety
Administration**

FILE Memorandum

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Subject: **ACTION:** Docket No. 91-02
Submission of NCAP Document

Date: SEP 28 1993

From: *James R. Hackney*
James R. Hackney, Deputy Director
Office of Market Incentives

Reply to
Attn. of:

To: Docket: No. 91-02
Thru: *Stanley R. Scheiner*
Stanley R. Scheiner, Director
Office of Market Incentives
John Womack
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Acting Chief Counsel

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p 3:28

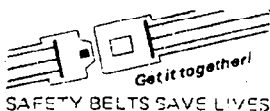
Please place the attached program summary, the final reports,
and 16mm films for the following vehicles in Docket No. 91-02,
"Side Impact New Car Assessment Program":

		Docket #
F-003643	1993 Toyota Corolla 4-dr.	(MP5101) 91-02-NOI-011
F-003644	1993 Toyota Corolla 4-dr.	(MP5102) 91-02-NOI-012
F-003645	1993 Ford Probe 2-dr.	(MP0207) 91-02-NOI-013
F-003646	1993 Ford Probe 2-dr.	(MP0208) 91-02-NOI-014
F-003647	1993 Oldsmobile Achieva 2-dr.	(MP0104) 91-02-NOI-015
F-003648	1993 Oldsmobile Achieva 2-dr.	(MP0105) 91-02-NOI-016
F-003649	1993 Dodge Intrepid 4-dr.	(MP0306) 91-02-NOI-017
F-003650	1993 Dodge Intrepid 4-dr.	(MP0307) 91-02-NOI-018
F-003651	1993 Acura Legend 4-dr.	(MP5305) 91-02-NOI-019
F-003652	1993 Acura Legend 4-dr.	(MP5306) 91-02-NOI-020
F-003653	1993 Honda Civic 2-dr.	(MP5303) 91-02-NOI-021
F-003654	1993 Honda Civic 2-dr.	(MP5304) 91-02-NOI-022

3 Attachments

1. Status Report: "Office of Market Incentives Side Impact Protection Study"
2. Four (4) copies of each test report
3. Three (3) 16mm films of each test

#

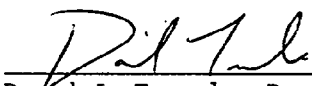


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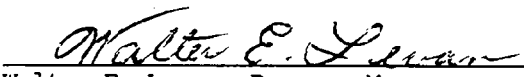
This Test Report was prepared for the U.S. Department of Transportation, Research and Special Programs Administration, under Contract No. DTRS57-90-C-00104.

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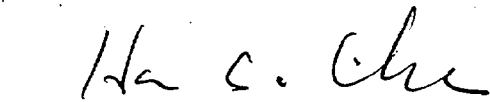
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V1869

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4. Title and Subtitle Final Report - Side Impact Testing of a 1993 Toyota Corolla 4-Door Sedan NHTSA No. MP5101		5. Report Date January 7, 1993																			
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7. Author(s) David J. Travale, Project Engineer Walter E. Levan, Program Manager		8. Performing Organization Report No. 8017-3																			
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12. Sponsoring Agency Name and Address U.S. Department of Transportation Research and Special Programs Administration Volpe National Transportation Systems Center Kendall Square, Cambridge, MA 02142		13. Type of Report and Period Covered Final Report January-February 1993																			
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15. Supplementary Notes																					
16. Abstract A 30/15 mph 90° Impact (Moving Deformable Barrier) Test was conducted on the subject 1993 Toyota Corolla 4-Door Sedan in accordance with the specifications of the Office of Market Incentives Test Procedure. The test was conducted at the Calspan Corporation Advanced Technology Center Crash Test Facility in Buffalo, New York, on January 7, 1993. The impact velocity of the Moving Deformable Barrier (MDB) was 54.1 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 2°C. The target vehicle post-test maximum crush was 411 millimeters at level 2. The test or target vehicle's performance is given below: <table border="1"> <thead> <tr> <th></th> <th>Driver SID</th> <th>Left Rear SID</th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration</td> <td>79.4 g's</td> <td>71.1 g's</td> </tr> <tr> <td>Left Lower Rib Acceleration</td> <td>87.1 g's</td> <td>87.4 g's</td> </tr> <tr> <td>Lower Spine Acceleration</td> <td>99.0 g's</td> <td>84.4 g's</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>93.1 g's</td> <td>85.9 g's</td> </tr> <tr> <td>Pelvis Acceleration</td> <td>113.7 g's</td> <td>150.5 g's</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges and the opposite doors did not open during side impact event. However the left rear door latch separated from the striker.					Driver SID	Left Rear SID	Left Upper Rib Acceleration	79.4 g's	71.1 g's	Left Lower Rib Acceleration	87.1 g's	87.4 g's	Lower Spine Acceleration	99.0 g's	84.4 g's	Thoracic Trauma Index (TTI)	93.1 g's	85.9 g's	Pelvis Acceleration	113.7 g's	150.5 g's
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Section 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the Composite FY92 Side Impact Protection Study Program sponsored by the National Highway Traffic Safety Administration (NHTSA) through the Research and Special Programs Administration, Volpe National Transportation Systems Center under Contract No. DTRS57-90-C-00104. The purpose of this test was to evaluate side impact protection in a 1993 Toyota Corolla 4-Door Sedan.

The side impact test was conducted in accordance with the Office of Market Incentive (OMI) Laboratory Indicant Test Procedure.

Section 2

SUMMARY OF SIDE IMPACT TEST

A stationary 1993 Toyota Corolla 4-Door Sedan was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 54.1 kph on January 7, 1993. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. Pre- and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SIDs) are shown in Appendix A.

Two restrained Side Impact Dummies (SIDs) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to instructions specified in the OMI Side Impact Protection Laboratory Test Procedure which is dated December 1991. The side impact event was documented by ten high speed cameras. Camera locations and other pertinent camera information can be found in this report.

The SIDs were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial accelerometer (Y-direction)
4. Head assembly triaxial accelerometer (X,Y,Z-directions)
5. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

A summary of the side impact dummy (SID) configuration and performance verification test data can be found in Appendix C.

A total of 50 channels of data were recorded. Appendix B contains the vehicle and dummy response data traces.

The driver's HIC was 268 and a Thoracic Trauma Index (TTI) of 93.1 g's. Maximum pelvic Y acceleration was 113.7 g's.

The left rear passenger's HIC was 607 and a TTI of 85.9 g's. Maximum pelvic Y acceleration was 150.5 g's.

Section 3

SUMMARY OF TEST RESULTS

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1993 Toyota Corolla 4-Door Sedan
 Vehicle NHTSA No.: MP5101 VIN: JT2AE04E9P0003509
 Vehicle Body Color: White Month & Year of Manufacture: 06/92
 Engine Data: 4 cylinders; - CID; 1.6 Liters; - cc
 Placement - Longitudinal; or ✓ Lateral
 Transmission: 5 speed; ✓ Manual; - Automatic; - Overdrive
 Final Drive: - Rear Wheel Drive; ✓ Front Wheel Drive; - Four Wheel Drive
 Odometer Reading 4.5 miles
 Options: ✓ A/C; ✓ Power Steering.; ✓ Pwr. Brakes; - Pwr. Windows

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 psi FRONT
30 psi REAR
 Recommended Tire Size: P175/65R14 81S
 Tires on Test Vehicle: P175/65R14 81S; Manufacturer: Goodyear
 Vehicle Capacity Data:
 Number of Occupants: 2 Front; 3 Rear; - 3rd Seat 5 Total
 Type of Front Seats: ✓ Bucket; - Bench; - Split Bench
 Type of Front Seat Back: - Fixed; ✓ Adjustable with ✓ Lever
 Vehicle Maximum Capacity Loading = 850 lbs. (A)
 No. of Occupants x 150 lbs. = 750 lbs. (B)
 Cargo Capacity (A-B) = 100 lbs.

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front = 308 kgf Right Rear = 191 kgf
 Left Front = 322 kgf Left Rear = 191 kgf
 TOTAL FRONT = 630 kgf TOTAL REAR = 382 kgf
 % of Total Vehicle Weight = 62.3 %; % of Total Weight = 37.8 %
 TOTAL WEIGHT = 1012 kgf

Table 2
TEST VEHICLE DATA

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	<u>1012</u>	kgf
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>45</u>	kgf
Weight of 2 Side Impact Dummies (2 x <u>76.2</u> kgf)	=	<u>152</u>	kgf
TEST VEHICLE TARGET WEIGHT:	=	<u>1209</u>	kgf

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO:

Right Front	=	<u>322</u>	kgf	Right Rear	=	<u>263</u>	kgf
Left Front	=	<u>363</u>	kgf	Left Rear	=	<u>286</u>	kgf
TOTAL FRONT	=	<u>685</u>	kgf	TOTAL REAR	=	<u>549</u>	kgf
% of Total Weight	=	<u>55.5</u>	%	% of Total Weight	=	<u>44.5</u>	%
TOTAL TEST WEIGHT	=	<u>1234</u>	kgf				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

AS DELIVERED:

right front 643 left front 650 right rear 643 left rear 645

READY FOR TEST:

right front 630 left front 635 right rear 592 left rear 584

Test Vehicle Wheelbase: 2464 millimeters

C.G. = 1096 millimeters rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side	=	<u>4308</u>	millimeters
Left Side	=	<u>4305</u>	millimeters
Centerline	=	<u>4374</u>	millimeters

Figure 1

PRE-TEST CONDITIONS

VEHICLE IDENTIFICATION:

Vehicle: 1993 Toyota Corolla 4-Door Sedan

NHTSA No. MP5101

FRONT SEAT CUSHION PLACEMENT: Mid position

Total Length of Adjustment Travel: 239 millimeters

Total Number of Adjustment Positions or Detents: 17 (placed in 9th position)

FRONT SEAT BACK ADJUSTMENT POSITION: Seat back in 4th notch, full up is
position one

Seat Back Torso Angle = not available degrees

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: not adjustable inches

Seat Back Adjustment Position: not adjustable

ADJUSTABLE STEERING COLUMN POSITION:

not adjustable

WINDOW POSITIONS: Left Front closed Left Rear closed
Right Front open Right Rear open

Note: Windows will be in closed position on struck side
of test vehicle and in open position on opposite side.

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

3.8 liters

LOCATION OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase: = 2464 millimeters

Impact Point is 292 millimeters rearward of front axle centerline
(which is 37 inches forward of the wheelbase midpoint)

026

Table 3

CRASH TEST SUMMARY FOR TEST VEHICLEVEHICLE IDENTIFICATION:Vehicle Year/Make/Model: 1993 Toyota Corolla 4-Door SedanBody Style: 4-Door Sedan VIN: JT2AE04E9P0003509NHTSA No.: MP5101 Test Date: January 7, 1993Overall Length = 4374 millimeters; Overall Width = 1684 millimetersTEST WEIGHT:

Left Front	=	<u>363</u> kgf	Left Rear	=	<u>286</u> kgf
Right Front	=	<u>322</u> kgf	Right Rear	=	<u>263</u> kgf
TOTAL FRONT	=	<u>685</u> kgf	TOTAL REAR	=	<u>549</u> kgf

TOTAL VEHICLE WEIGHT 1234 kgfWheelbase = 2464 millimetersLongitudinal C.G. from Center of Front Axle = 1096 millimetersImpact Angle with Respect to Impactor = 90 degreesMAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (	<u>287</u> mm. above ground)	=	<u>239</u> millimeters
2. LEVEL 2 (	<u>470</u> mm. above ground)	=	<u>411</u> millimeters
3. LEVEL 3 (	<u>592</u> mm. above ground)	=	<u>394</u> millimeters
4. LEVEL 4 (	<u>884</u> mm. above ground)	=	<u>269</u> millimeters
5. LEVEL 5 (	<u>1303</u> mm. above ground)	=	<u>40</u> millimeters

Maximum Post-Test Intrusion = 411 millimetersOCCUPANTS:Front PassengerRear Passenger

Type of Dummy	<u>SID</u>	<u>SID</u>
Restraints Used	<u>3-point manual seat belt</u>	<u>3-point manual seat belt</u>

INSTRUMENTATION:

Number of Vehicle Data Channels:	=	<u>50</u>
Number of Cameras:	Onboard	= <u>3</u>
	Offboard	= <u>7</u>
	TOTAL	= <u>10</u>

Table 4
CRASH TEST SUMMARY FOR SIDE IMPACTOR

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	=	<u>1251</u> millimeters
Overall Length of MDB (incl. honeycomb impact face)	=	<u>4115</u> millimeters
Wheelbase of Framework Carriage	=	<u>2591</u> millimeters
Tread of Framework Carriage (Front & Rear)	=	<u>1880</u> millimeters
C.G. Location Rearward of Front Axle	=	<u>1006</u> millimeters

MDB WEIGHT:

Left Front	=	<u>449</u> kgf	Left Rear	=	<u>231</u> kgf
Right Front	=	<u>381</u> kgf	Right Rear	=	<u>281</u> kgf
TOTAL FRONT	=	<u>830</u> kgf	TOTAL REAR	=	<u>512</u> kgf
TOTAL MDB WEIGHT		<u>1342</u> kgf			

Impact Angle (MDB C/L to Target Vehicle C/L) = 90° degrees
Impact Speed = 54.1 kph

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A at Bumper Level	=	<u>74</u> millimeters
2. Row B at Mid-Stack Level	=	<u>46</u> millimeters
3. Row C at Top of Stack Level	=	<u>28</u> millimeters

INSTRUMENTATION:

Number of MDB Data Channels = 5

Table 5

POST-TEST OBSERVATIONS

TEST VEHICLE: 1993 Toyota Corolla 4-Door Sedan NHTSA No. MP5101

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>No contact</u>	<u>Left "C" pillar</u>
Chest	<u>Left front door</u>	<u>Left rear door</u>
Abdomen	<u>Arm rest</u>	<u>Arm rest</u>
Left Knee	<u>Left front door</u>	<u>Left rear door</u>
Right Knee	<u>No contact</u>	<u>No contact</u>

DOOR OPENING:

	<u>LEFT SIDE</u>	<u>RIGHT SIDE</u>
Front	<u>Closed</u>	<u>Closed</u>
Rear	<u>Closed</u>	<u>Closed</u>

MDB DISTANCE FROM TARGET IMPACT POINT: 23 millimeters forward

ARM REST LOCATIONS:

Front: Contacted abdomen

Rear: Contacted abdomen

SEAT MOVEMENT:

None

GLAZING DAMAGE:

Windshield cracked. Left side door windows broken

PILLAR FAILURE:

None

SILL SEPARATION:

None

OTHER NOTABLE IMPACT EFFECTS:

Left rear door latch separated from striker mounted on "C" pillar

but did not open

Section 4

OCCUPANT AND VEHICLE INFORMATION

Table 6

SIDE IMPACT DUMMY (SID) TEST DATA SUMMARYVehicle: 1993 Toyota Corolla 4-Door Sedan Test Date: January 7, 1993

	Front Dummy ID #171				Rear Dummy ID #186			
	Pos. Direct.		Neg. Direct.		Pos. Direct.		Neg. Direct.	
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
HEAD ACCELERATIONS:								
Longitudinal X	27	63	-22	73	12	102	-28	73
Lateral Y	48	48	-8	34	86	54	-16	40
Vertical Z	46	63	-13	45	31	46	-47	54
RESULTANT R	60	63			99	54		
HIC	268				607			
RIB ACCELERATIONS:								
Upper Rib Lateral Y	79	35	-14	85	71	41	-5	129
Upper Rib Lateral .. Y(R)	81	34	-11	87	68	41	-4	86
Lower Rib Lateral Y	87	35	-17	86	87	41	-15	61
Lower Rib Lateral .. Y(R)	89	34	-17	86	83	41	-18	61
SPINE ACCELERATIONS:								
Lower Lateral Y	99	34	-19	89	84	39	-31	59
Lower Lateral Y(R)	98	34	*	*	84	39	-32	59
PELVIC ACCELERATIONS:								
Lateral Y	114	31	-22	78	150	34	-33	70
Lateral Y(R)	115	31	-21	78	150	34	-34	70

REFERENCE: Positive Direction - Longitudinal (X) = forward
 Lateral (Y) = to right
 Vertical (Z) = up

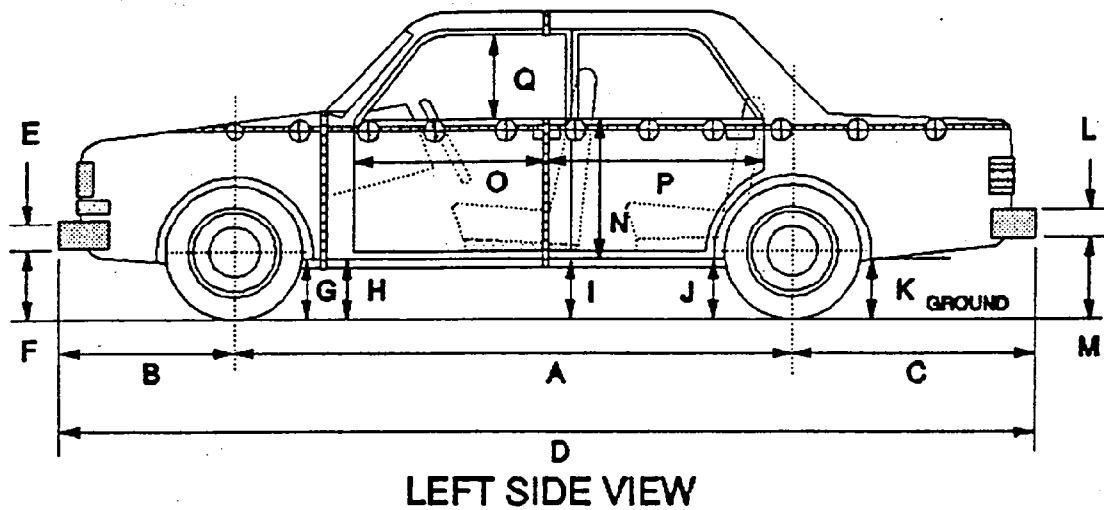
Negative Direction - Longitudinal (X) = rearward
 Lateral (Y) = to left
 Vertical (Z) = down

Note: Y(R) denotes redundant Y direction accelerometer.

*Intermittent data after 23 milliseconds. An accurate maximum g level for this channel could not be measured.

Figure 2

PRE- AND POST-TEST MEASUREMENTS

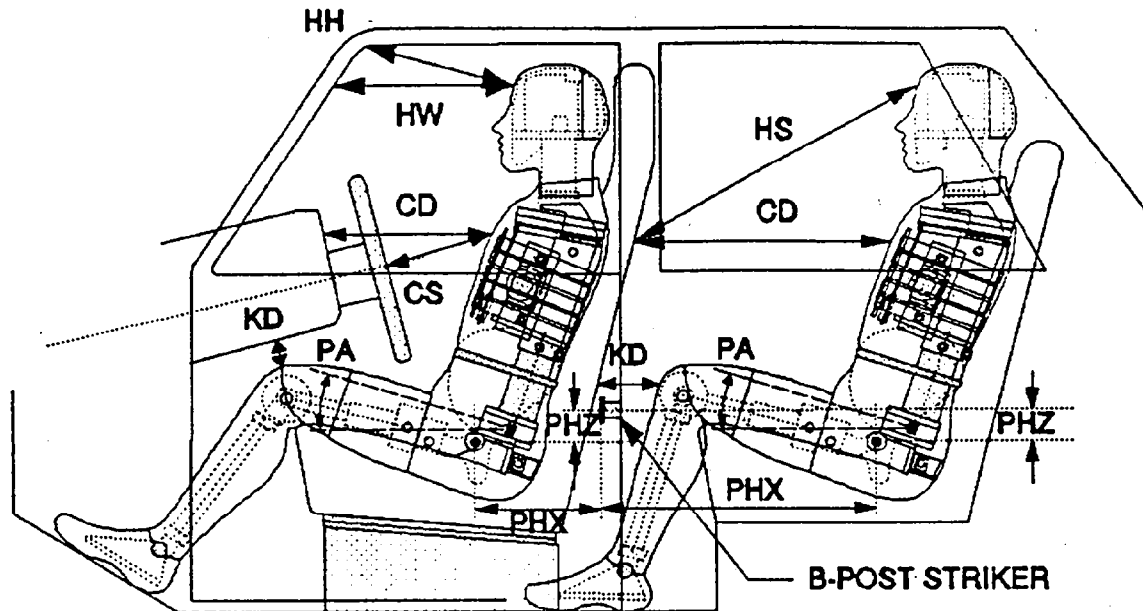


NOTE: All dimensions are in millimeters

	PRE-TEST	POST-TEST	Δ CHANGE
A	2459	388	71
B	869	878	-9
C	1041	1040	1
D	4374	4350	24
E	292	292	0
F	234	236	-2
G	203	227	-24
H	203	257	-54
I	211	137	74
J	229	246	-17
K	254	291	-37
L	254	255	-1
M	325	367	-42
N	648	520	128
O	681	645	36
P	1240	1080	160
Q	401	400	1

Figure 3

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS



LEFT SIDE VIEW

NOTE: All dimensions are in millimeters

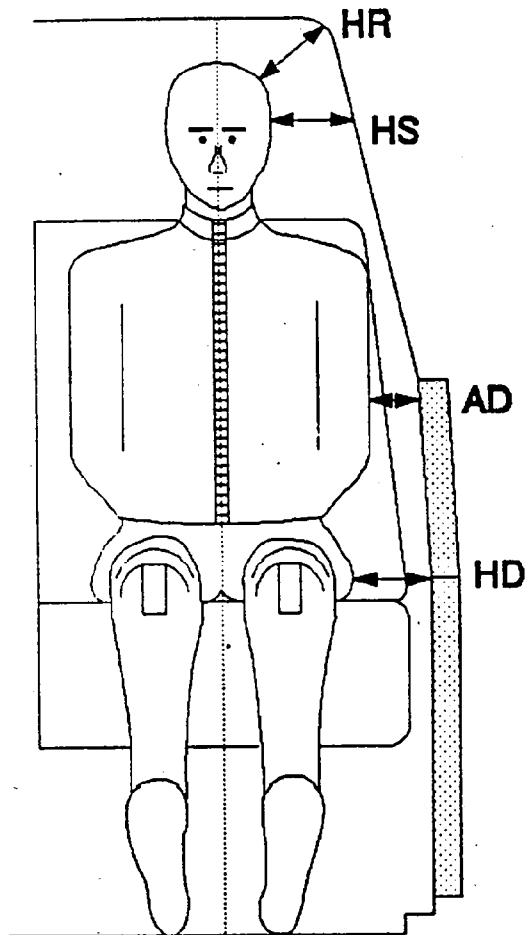
	DRIVER ID # <u>171</u>	LEFT REAR PASSENGER ID # <u>186</u>
HH	335	-
HW	480	-
HS	-	676
CD	551	488
CS	371	-
KDL	97	145
KDR	56 *	142
PA	23.5°	24.0°
PHX	188	213
PHZ	114	282

Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

*Measurement was taken to steering column cover.

Figure 4

SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS

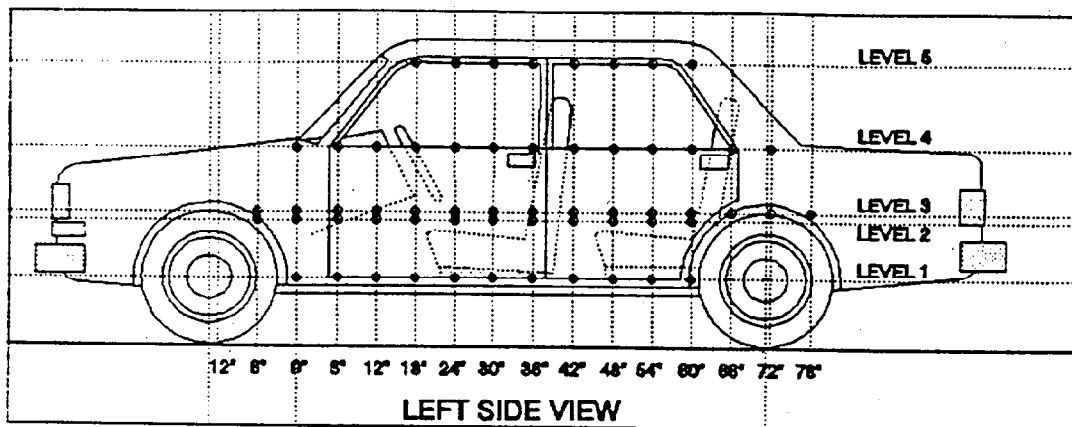


NOTE: All dimensions are in millimeters

	DRIVER ID # <u>171</u>	LEFT REAR PASSENGER ID # <u>186</u>
HR	160	170
HS	229	163 to "C" pillar
AD	97	104
HD	175	208

Figure 5

VEHICLE SIDE MEASUREMENT



Measurements Along the Vertical 30" Line Shown Above:

30" Side Profile

Level 5 @ Window Top	= <u>N/A*</u> millimeters
Level 4 @ Window Sill	= <u>478</u> millimeters
Level 3 @ Mid Door	= <u>381</u> millimeters
Level 2 @ Occupant H-Point	= <u>381</u> millimeters
Level 1 @ Sill Top Height	= <u>447</u> millimeters

*N/A - Due to window curve

Table 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE* AND STATIC CRUSH DATA

Test Date: January 7, 1993

Vehicle: 1993 Toyota Corolla 4-Door Sedan

Location	Height (mm)	Profiles/Crush	V———— Impact Point													
			6"	0	6"	12"	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"
1. Side Sill		Post-Test	N/A	N/A	521	622	587	640	655	660	686	622	528	429	N/A	
	287	Pre-Test	N/A	N/A	437	445	447	447	447	447	447	447	445	445	N/A	
		Static Crush	N/A	N/A	84	177	140	193	208	213	213	239	175	83	-16	N/A
2. H-Point		Post-Test	N/A	546	658	676	696	719	734	744	749	782	785	792	782	N/A
	470	Pre-Test	N/A	N/A	389	386	384	381	381	381	381	381	381	381	384	381
		Static Crush	N/A	N/A	269	290	312	338	353	363	368	401	404	411	398	N/A
3. Mid-Door		Post-Test	N/A	533	660	671	683	699	711	726	747	772	775	757	747	648
	592	Pre-Test	N/A	381	389	386	386	384	381	381	381	381	381	384	386	381
		Static Crush	N/A	152	271	285	297	315	330	345	366	391	394	373	361	267
4. Window		Post-Test	N/A	N/A	528	572	N/A	632	655	665	676	696	721	726	726	513
	884	Pre-Test	N/A	N/A	513	483	N/A	478	478	467	467	467	462	460	457	478
		Static Crush	N/A	N/A	15	89	N/A	154	177	198	209	229	259	266	269	35
5. Window		Post-Test	N/A	N/A	N/A	N/A	N/A	498	701	701	711	686	683	699	683	686
	1303	Pre-Test	N/A	N/A	N/A	N/A	N/A	N/A	N/A	668	671	668	668	671	671	681
		Static Crush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	33	40	18	15	28	12	5

*Reference plane is parallel to and 48 inches from test vehicle longitudinal centerline
 Given Dimensions = Reference Plane to Car Body.

Figure 6

VEHICLE EXTERIOR STATUS CRUSH

287 millimeters above ground level

CRUSH PROFILE LEVEL 1

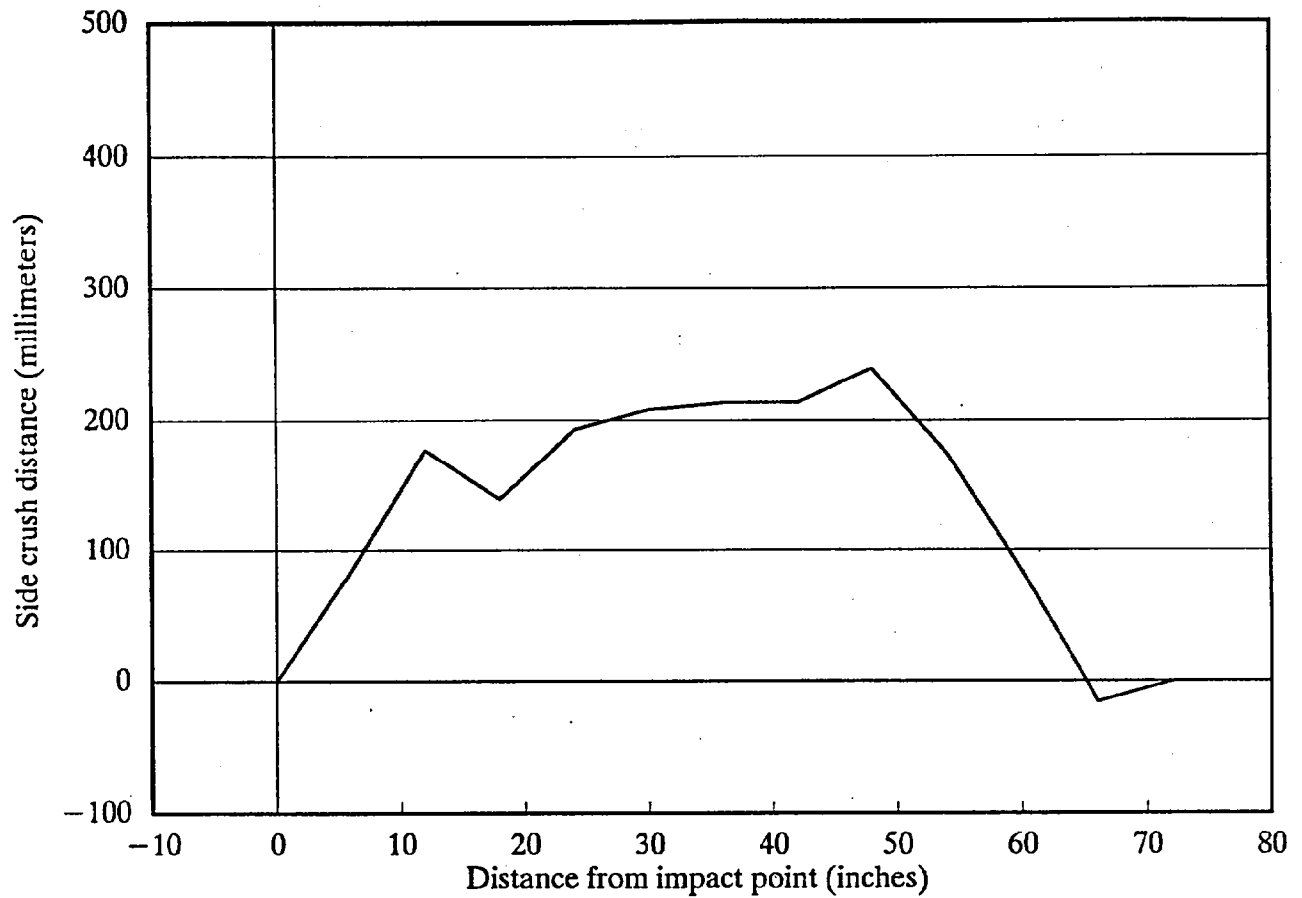


Figure 6

VEHICLE EXTERIOR STATUS CRUSH (cont.)

470 millimeters above ground level

CRUSH PROFILE LEVEL 2

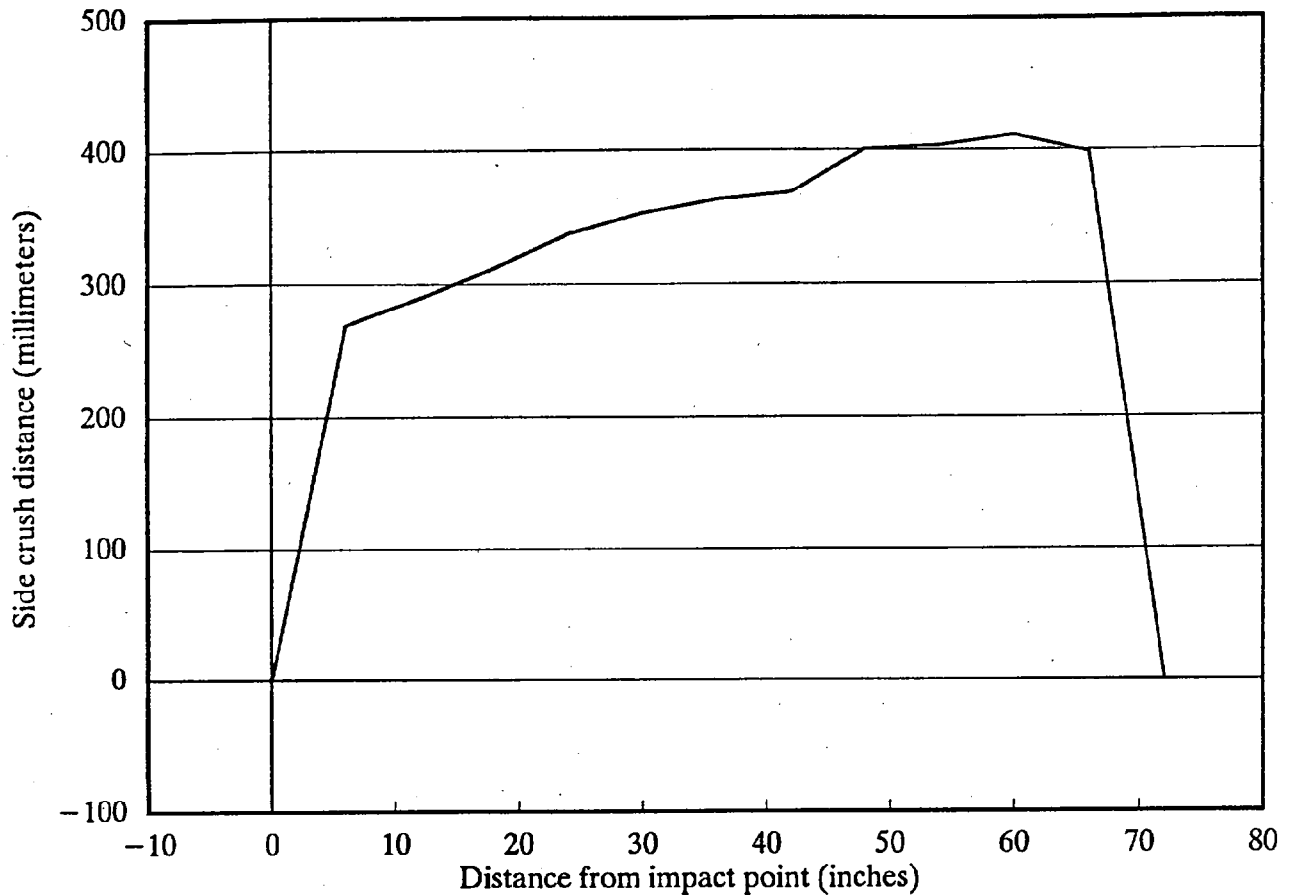
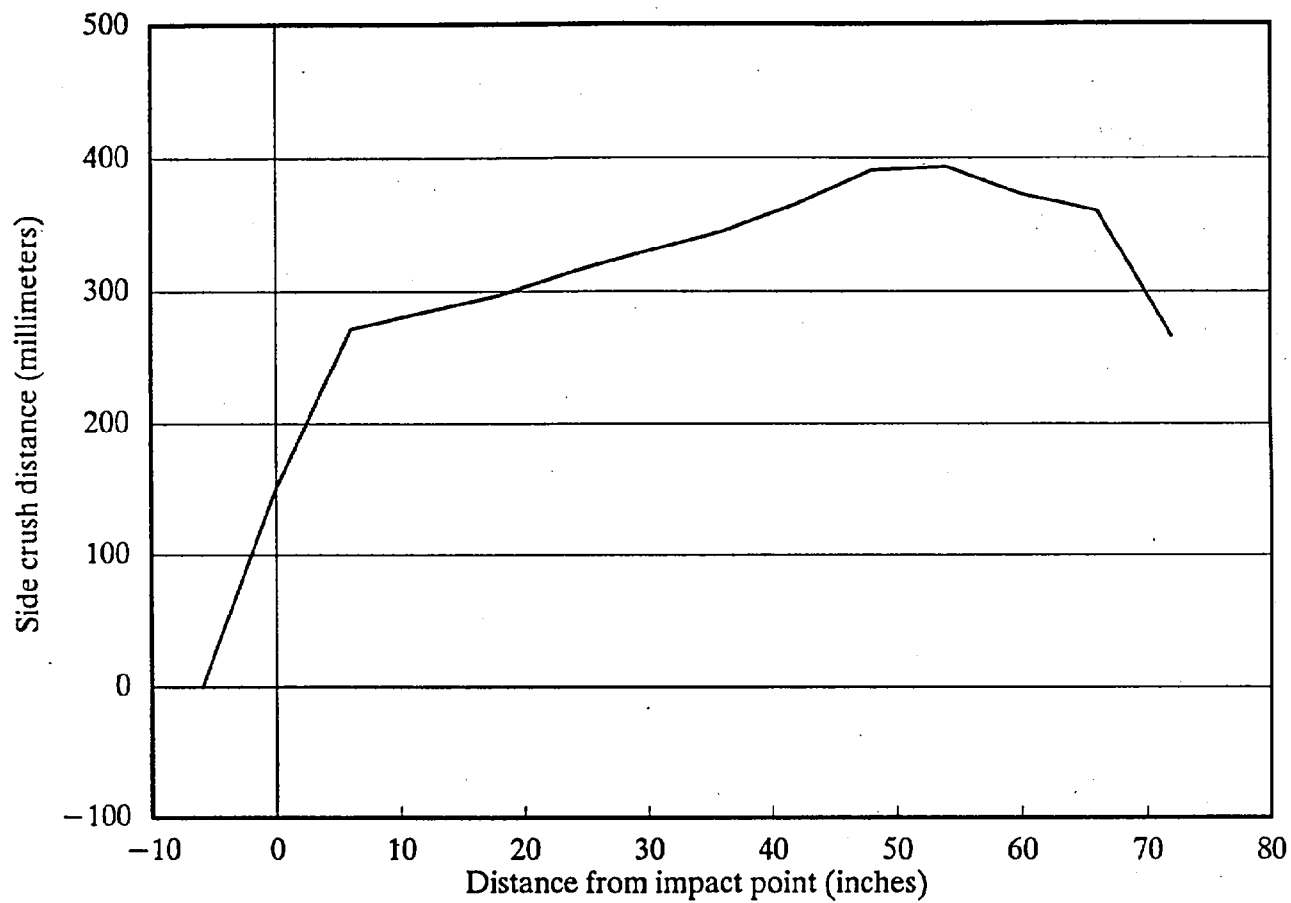


Figure 6

VEHICLE EXTERIOR STATUS CRUSH (cont.)

592 millimeters above ground level

CRUSH PROFILE LEVEL 3



540

Figure 6

VEHICLE EXTERIOR STATUS CRUSH (cont.)

884 millimeters above ground level

CRUSH PROFILE LEVEL 4

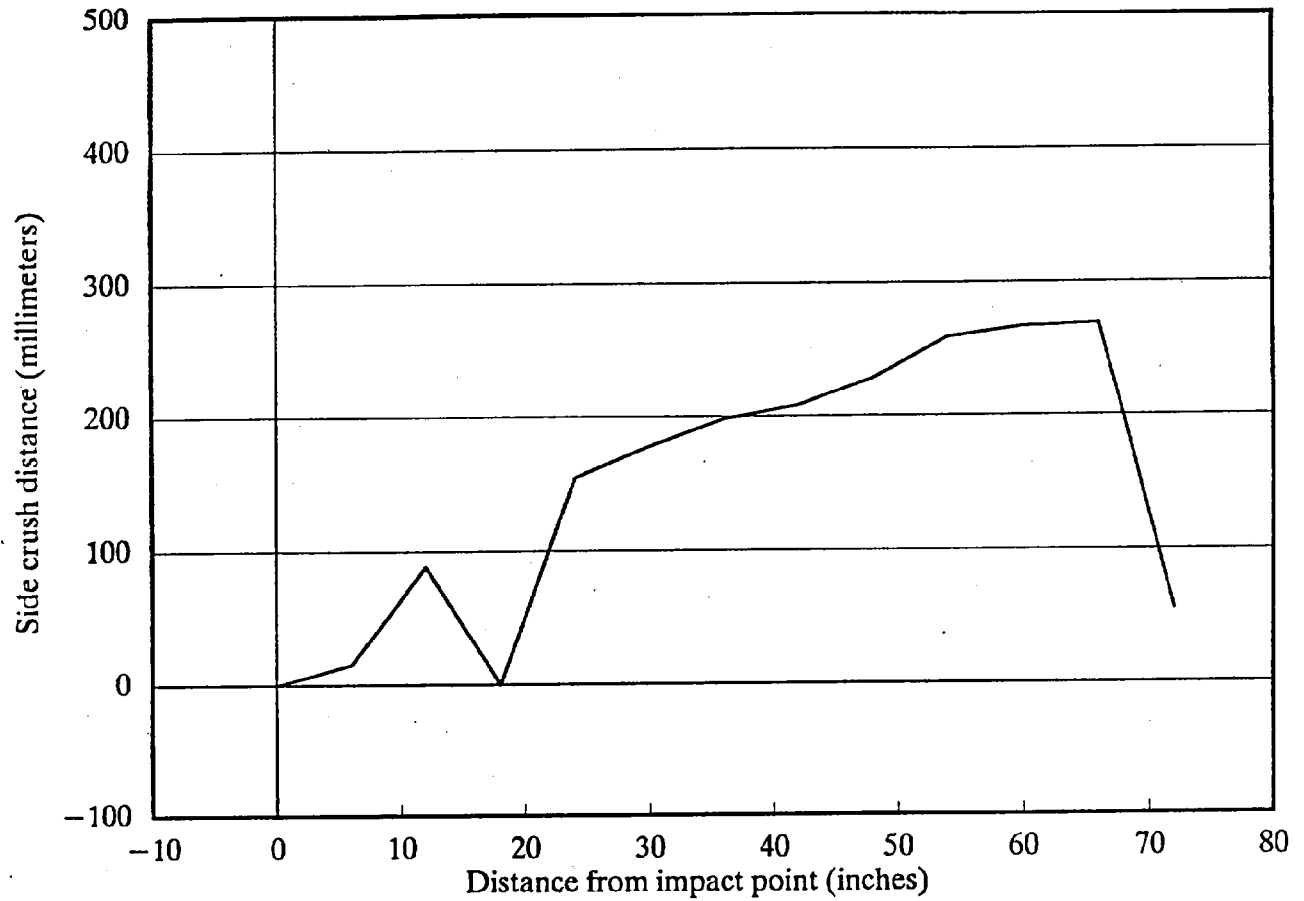


Figure 6

VEHICLE EXTERIOR STATUS CRUSH (cont.)

1303 millimeters above ground level

CRUSH PROFILE LEVEL 5

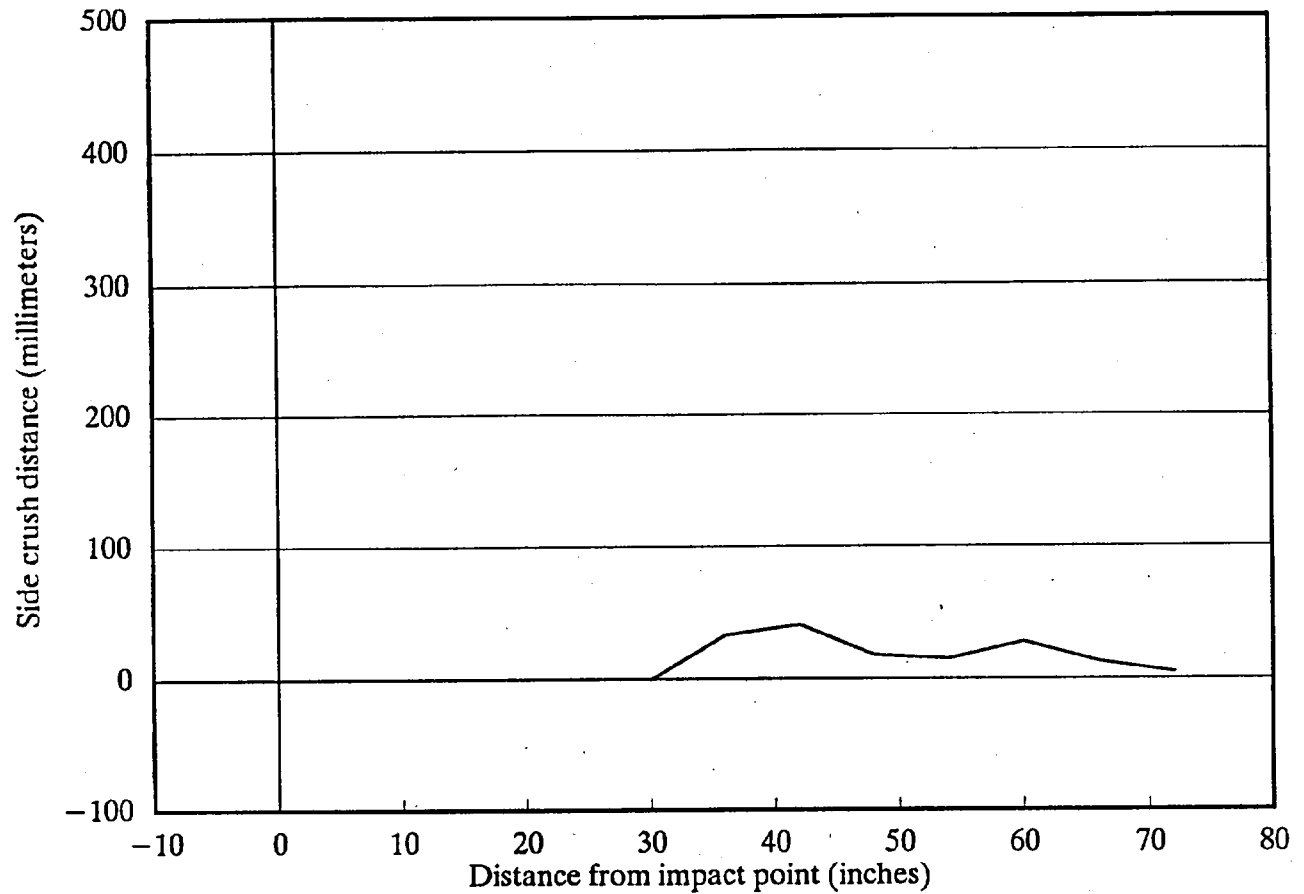


Table 8

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

(Grid as looking at MDB from front.)

Test Date: January 7, 1993

Vehicle: 1993 Toyota Corolla 4-Door Sedan

(Static crush is measured in millimeters)

		Distances Right of Center									Distances Left of Center							
Location	Height at CL*	32"	28"	24"	20"	16"	12"	8"	4"	0"	4"	8"	12"	16"	20"	24"	28"	32"
Top of Stack Level	32"	28	-3	-3	-3	0	0	3	0	0	0	0	0	0	0	0	0	0
Mid-Stack Level	22"	8	-13	-13	-13	-10	-10	-10	-8	-8	-8	-3	0	-3	0	8	25	46
Bumper Level	17"	-3	-8	-13	-10	0	0	-3	0	3	8	10	13	15	23	36	48	74

*Heights measured above ground level.

**Impact side.

Figure 7

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 1993 Toyota Corolla 4-Door Sedan NHTSA No.: MP5101

Test Date: January 7, 1993

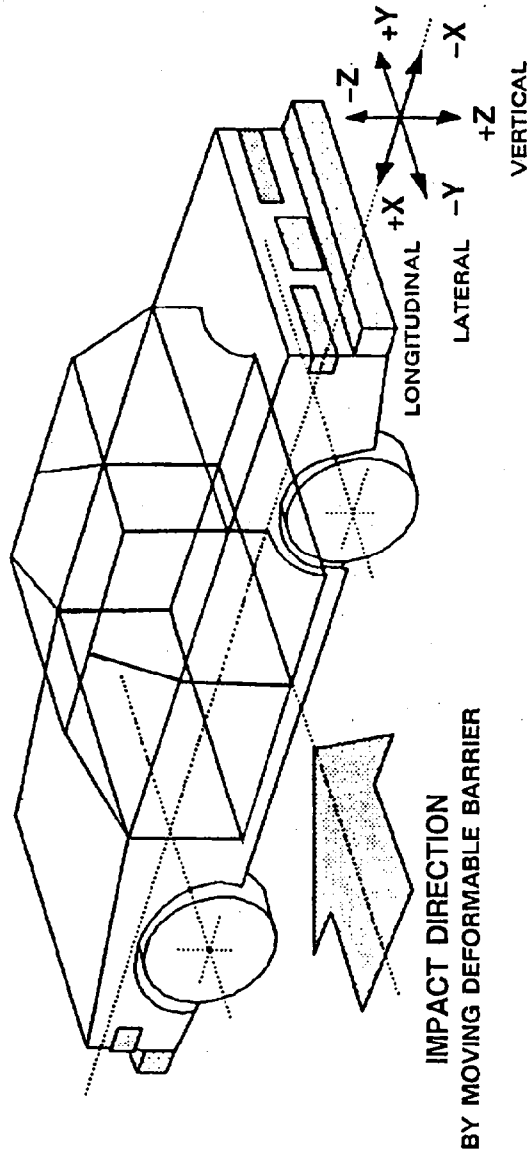


Table 9

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

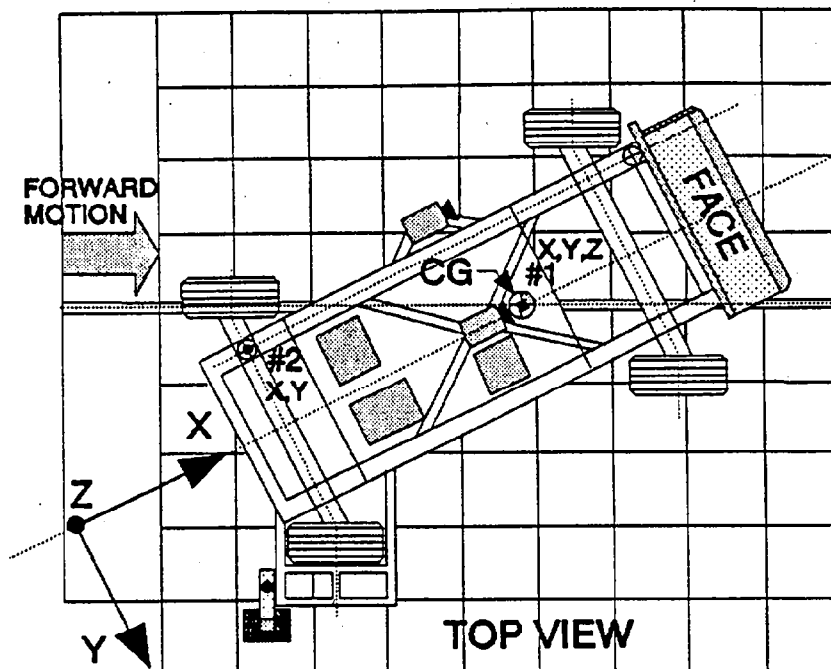
Accel. Time No.	Location	Coordinates (mm.)			Long. (X) Pos./Neg.		Lat. (Y) Pos./Neg.		Vert. (Z) Pos./Neg.		Resultant Pos./Neg.	
		X*	Y*	Z*	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Tim (msec)	Max (g)	(msec)
1	Right Front Sill at Front Seat	2703	622	259	4 -7	61 21	17 -2	41 174	4 -6	59 92	17	41
2	Right Rear Sill at Rear Seat	1905	622	244	3 -7	63 20	20 -2	30 174	7 -4	30 10	21	30
3	Rear Floorpan Above Axle	800	38	495	5 -12	18 10	17 -3	21 173	10 -13	57 73	18	31
4	Left Side Sill at Rear Seat	1908	-622	272	-	-	56 -32	2 14	-	-	-	-
5	Left Side Sill at Front Seat	2730	-622	274	-	-	74 -65	10 14	-	-	-	-
6	Left Front Door on Centerline	2565	-724	582	-	-	126 -221	6 49	-	-	-	-
7	Right Rear Occupant Compartment	1984	330	206	3 -8	39 25	-	-	-	-	-	-
8	Midrear of Left Front Door	2370	-724	688	-	-	68 -68	32 20	-	-	-	-
9	Left Front Door Upper Centerline	2535	-724	787	-	-	111 -44	12 17	-	-	-	-
10	Midrear of Left Rear Door	1471	-711	658	-	-	93 -42	4 29	-	-	-	-
11	Left Rear Door Upper Centerline	1621	-711	833	-	-	78 -48	6 12	-	-	-	-

*Reference: X - Rear Bumper (+ Forward)
 Y - Vehicle Centerline (+ To right)
 Z - Ground Level (+ Up)

Figure 8

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Test Vehicle: 1993 Toyota Corolla 4-Door Sedan Test Date: January 7, 1993

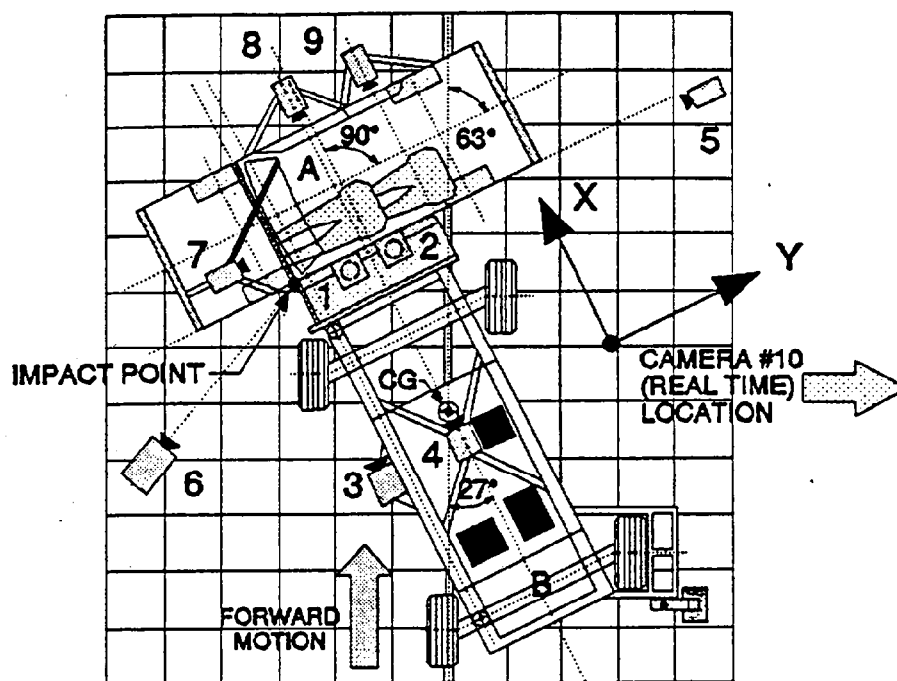


Accel. No.	Location	Coordinates (mm)			Pos. Direct.		Neg. Direct.	
		X*	Y*	Z*	Max (g)	Time (msec)	Max (g)	Time (msec)
1	MDB Center of Gravity							
	Longitudinal ... X				1	167	-17	36
	Lateral Y				6	17	-2	51
	Vertical Z	1872	20	335	7	42	-5	38
	Resultant R				18	38		
2	Rear Frame Member							
	Lateral X				2	123	-18	33
	Vertical Y	384	-660	638	7	28	-2	80

*Reference: X = Rear Bumper (+Forward)
Y = Vehicle Centerline (+ To Right)
Z = Ground Level (+ Up)

Figure 9

HIGH SPEED CAMERA LOCATIONS AND DATA



Camera No.	View	Coordinates (mm)			Angle	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead Overall View	1981	610	9804	-90	13	580
2	Overhead Closeup View of Impact	1829	610	9804	-90	25	605
3	MDB Onboard Closeup of Impact	-	-	-	-	8	N.T.
4	MDB Onboard View of Dummy	-	-	-	-	8	N.T.
5	Right Side Ground Overall View	-3353	7518	1067	-2	13	555
6	Left Side Ground Overall View	-2997	-8280	1016	-1	25	600
7	Test Vehicle Onboard Driver Front View	-	-	-	-	13	N.T.
8	Test Vehicle Onboard Driver Side View	-	-	-	-	8	580
9	Test Vehicle Onboard Passenger Side View	-	-	-	-	8	600
10	Real Time	-	-	-	-	-	24

*Reference: (from point of impact)
 +X = Forward
 +Y = To Right
 +Z = Upward

N.T. = No Timing

Appendix A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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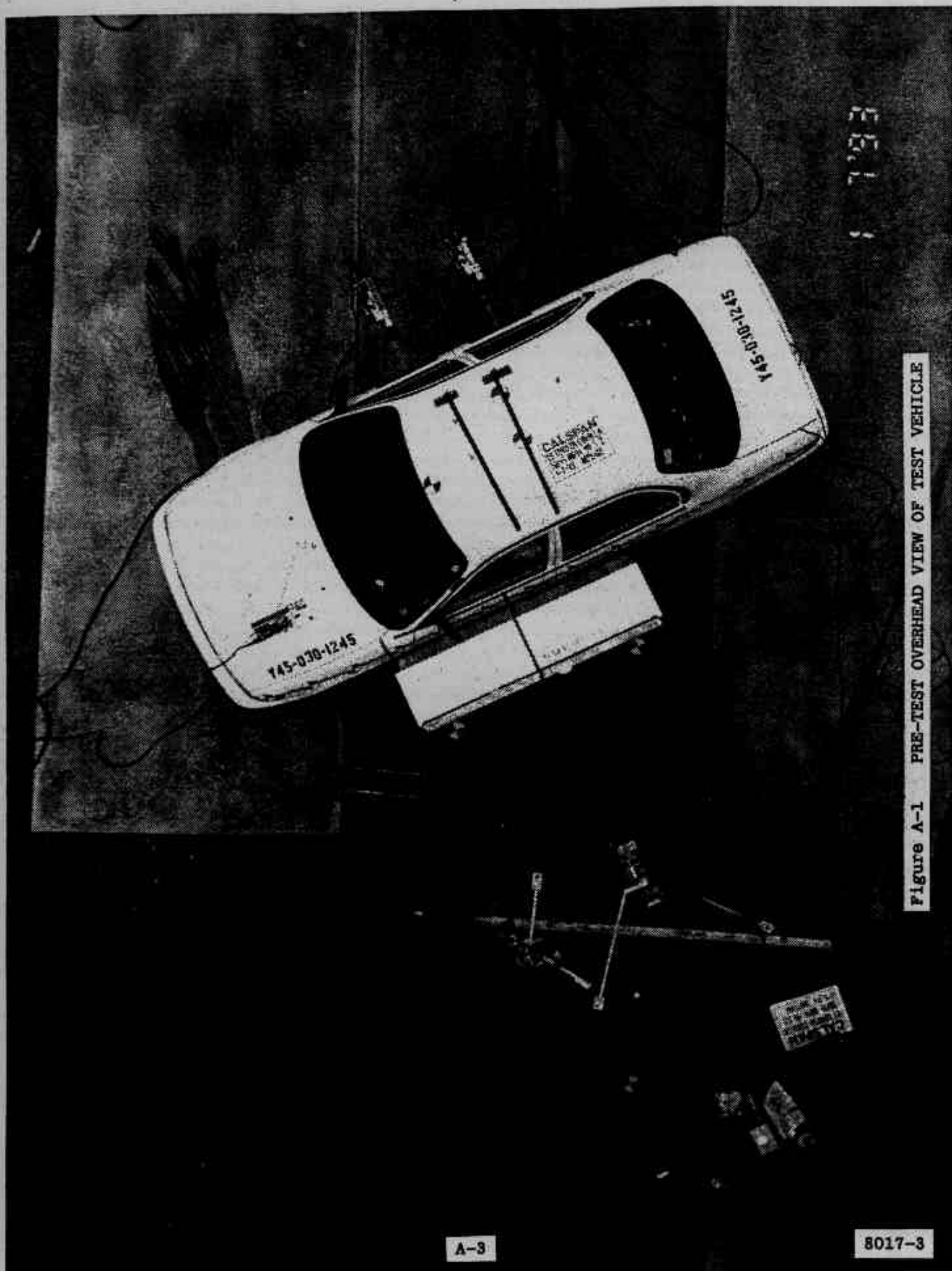


Figure A-1 PRE-TEST OVERHEAD VIEW OF TEST VEHICLE

A-3

8017-3

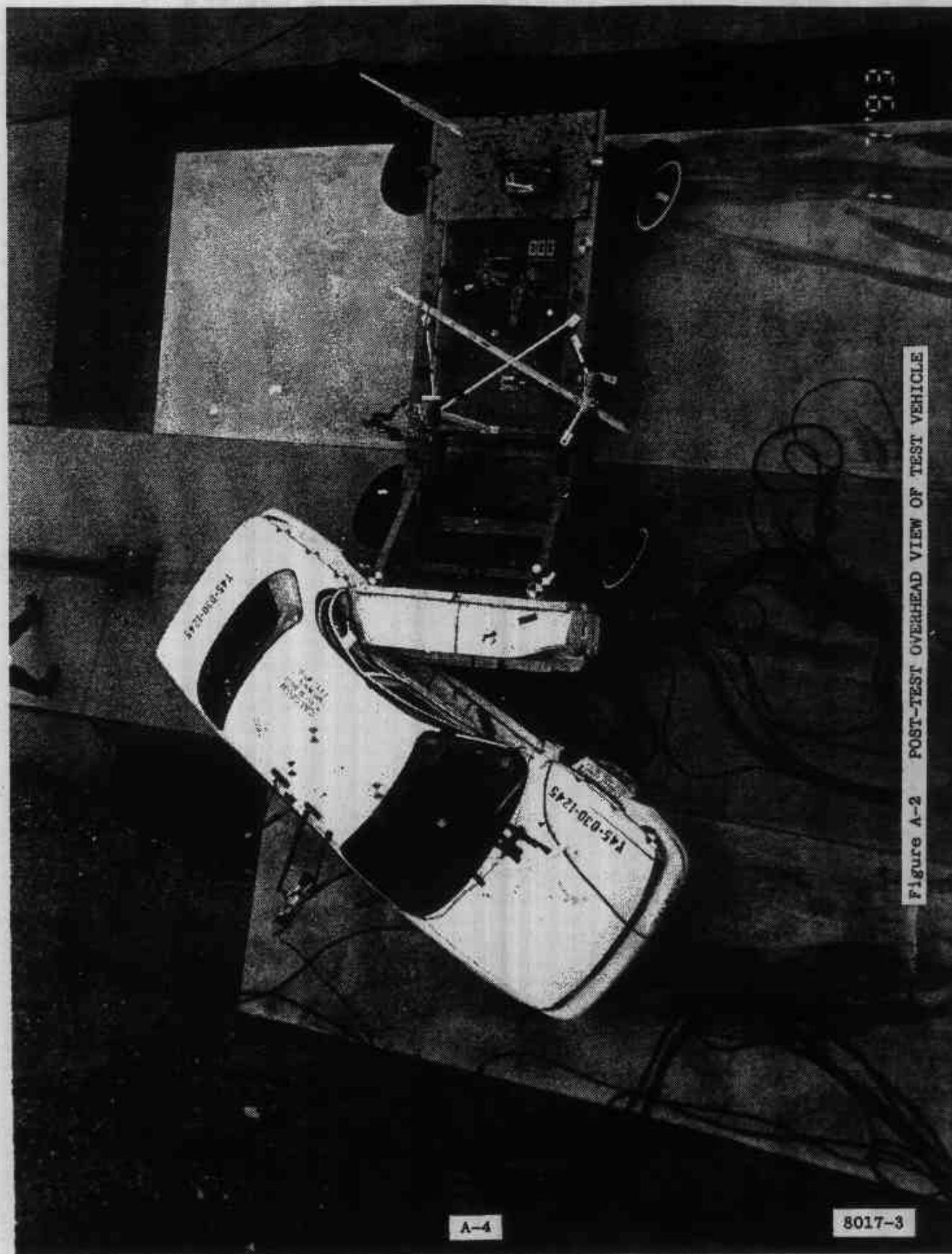




Figure A-3 PRE-TEST FRONT VIEW OF TEST VEHICLE

A-5

8017-3

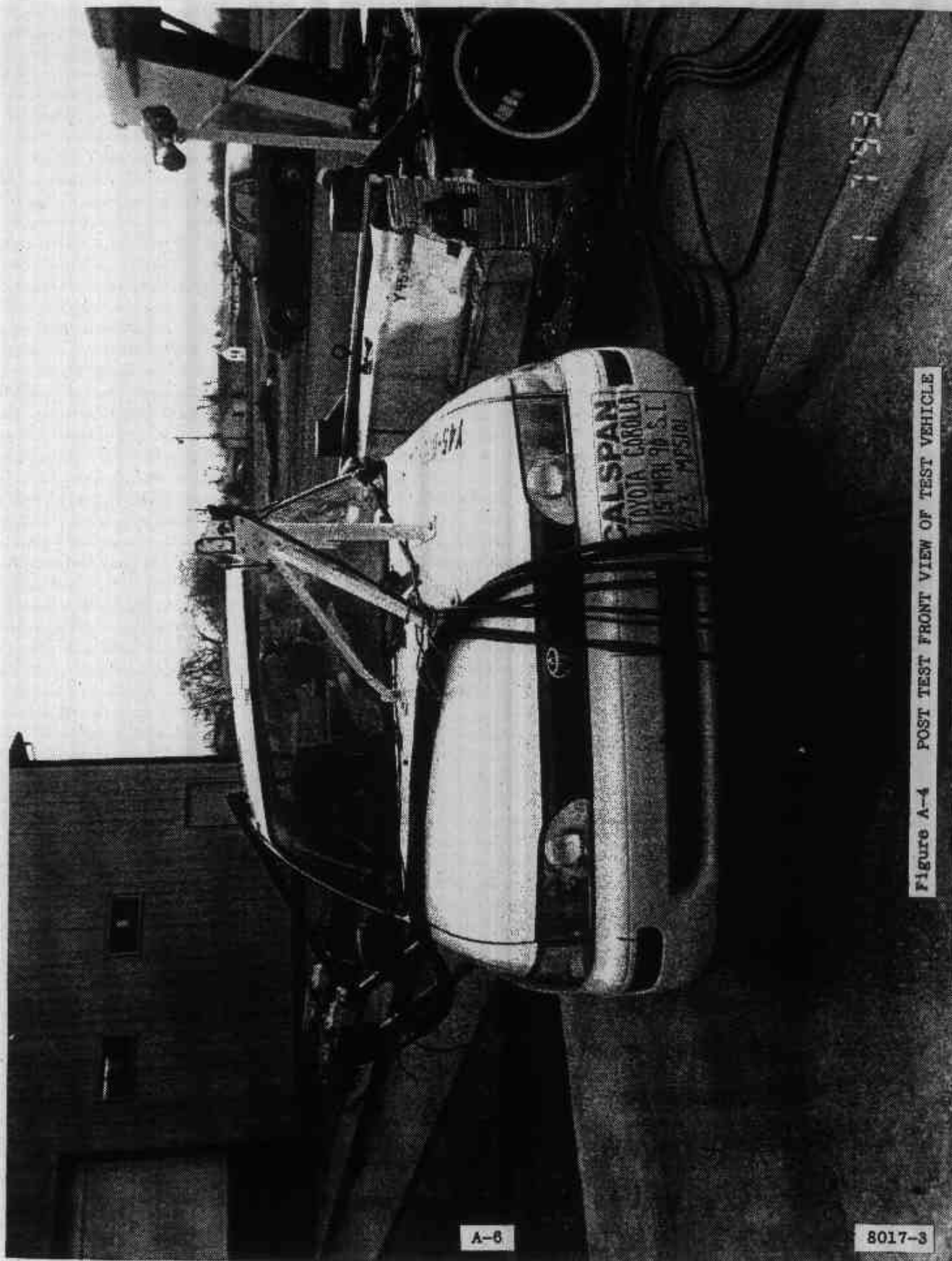


Figure A-4 POST TEST FRONT VIEW OF TEST VEHICLE



Figure A-5 PRE-TEST REAR VIEW OF TEST VEHICLE



Figure A-8 POST-TEST REAR VIEW OF TEST VEHICLE

A-8

8017-3

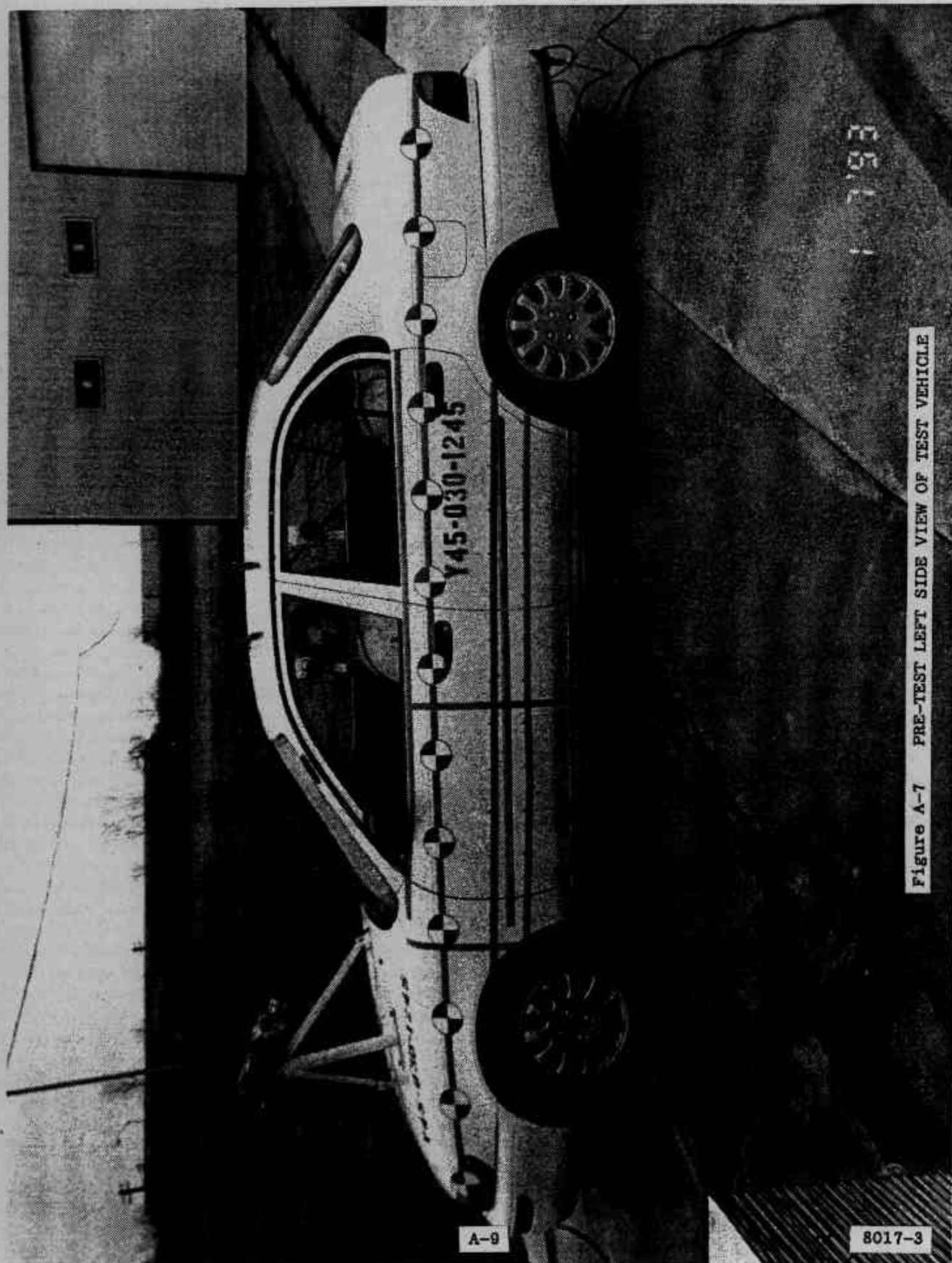


Figure A-7 PRE-TEST LEFT SIDE VIEW OF TEST VEHICLE

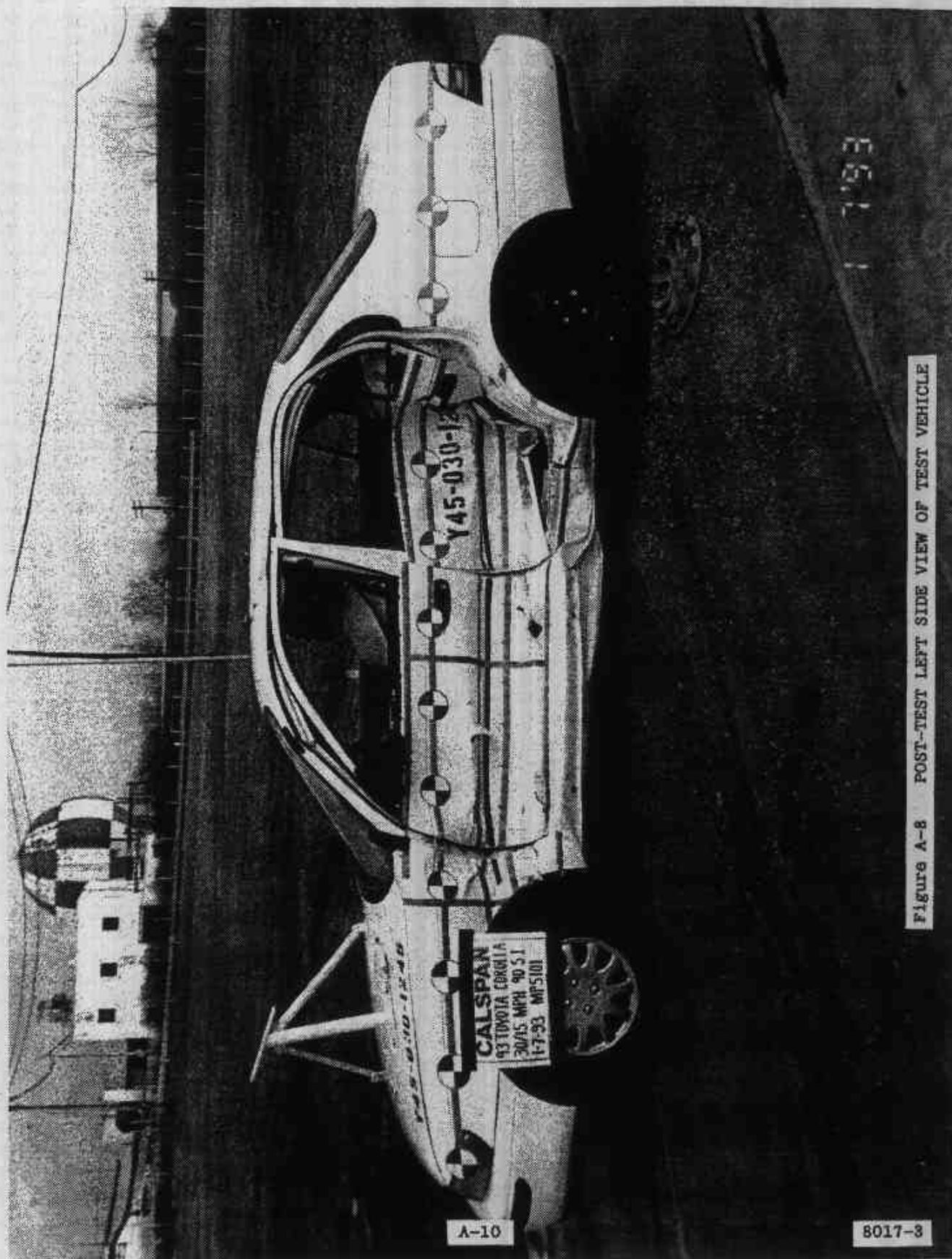


Figure A-8 POST-TEST LEFT SIDE VIEW OF TEST VEHICLE

A-10

8017-3

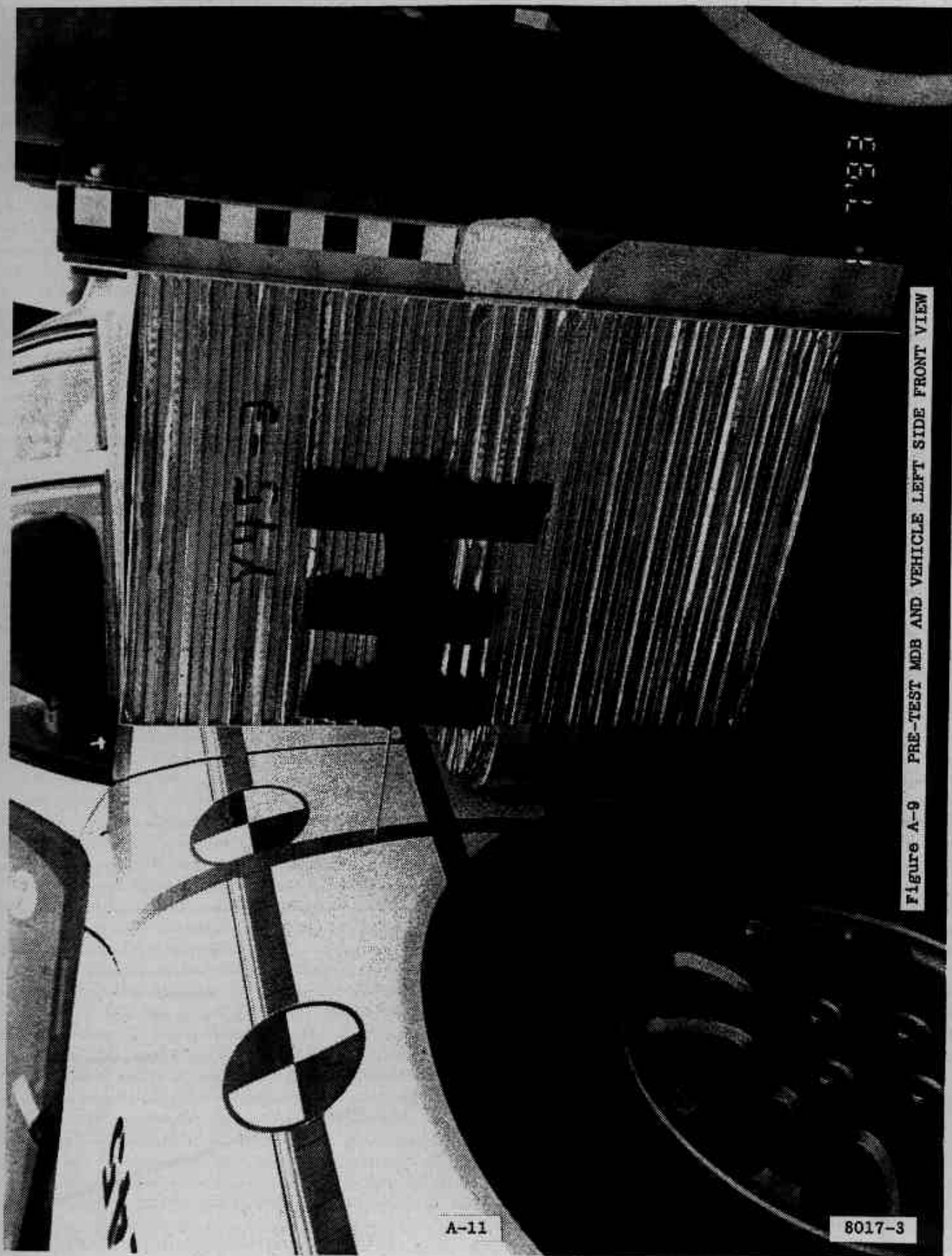


Figure A-9 PRE-TEST MDB AND VEHICLE LEFT SIDE FRONT VIEW

A-11

8017-3

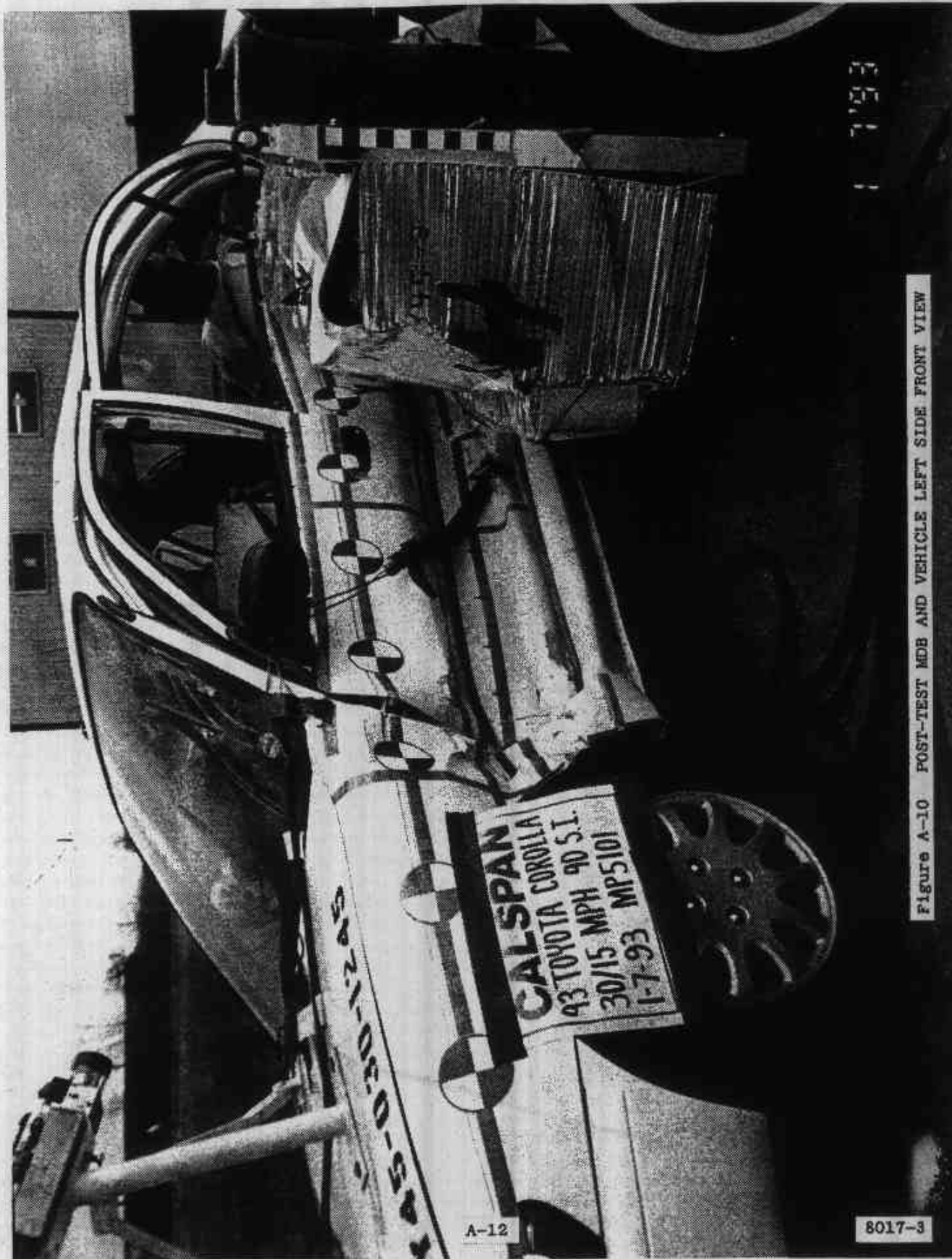


Figure A-10 POST-TEST MDB AND VEHICLE LEFT SIDE FRONT VIEW

A-12

8017-3



Figure A-11 PRE-TEST MDB AND VEHICLE LEFT SIDE REAR VIEW

A-13

8017-3

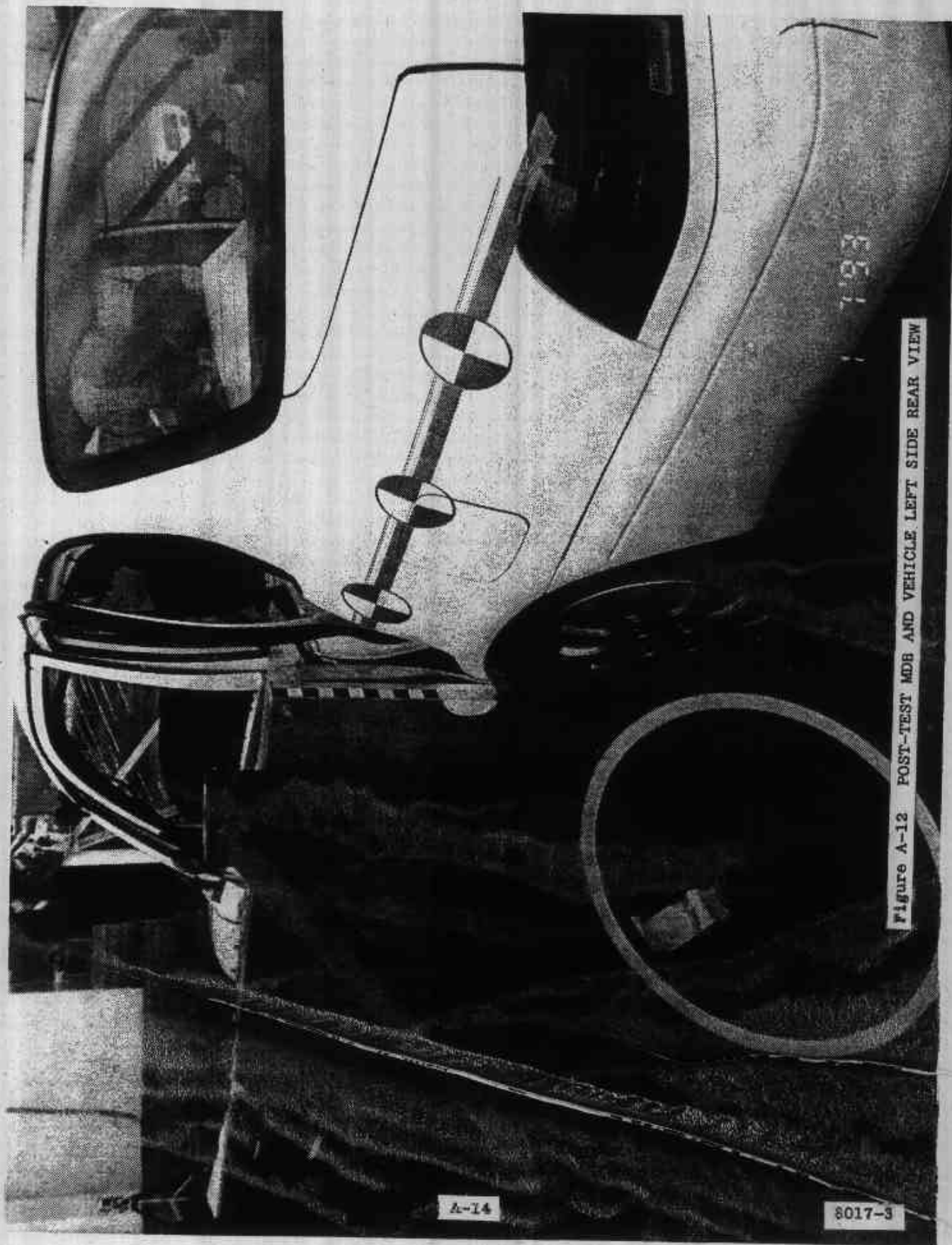


Figure A-12 POST-TEST MDB AND VEHICLE LEFT SIDE REAR VIEW

A-14

8017-3



Figure A-13 PRE-TEST MDB TOP VIEW

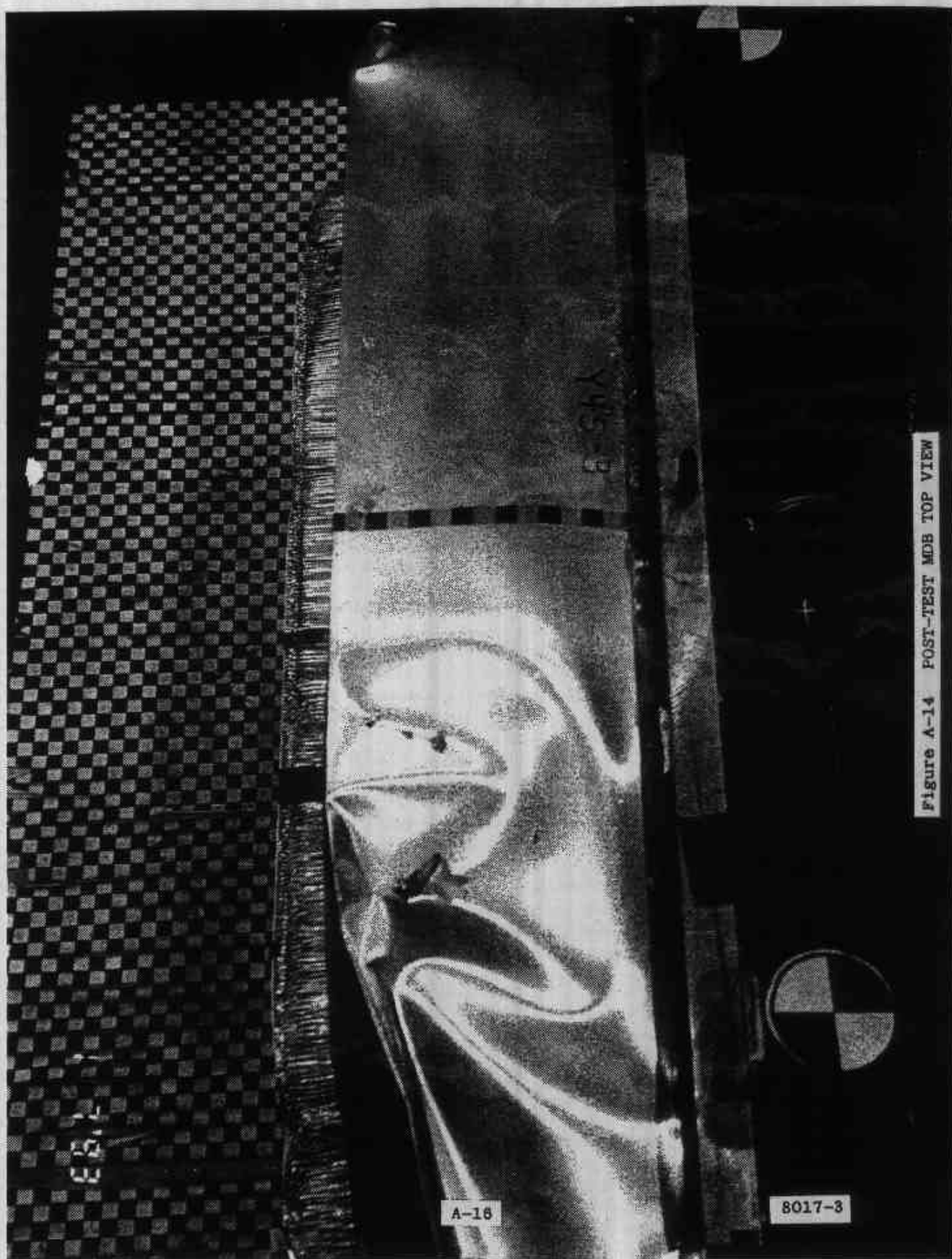
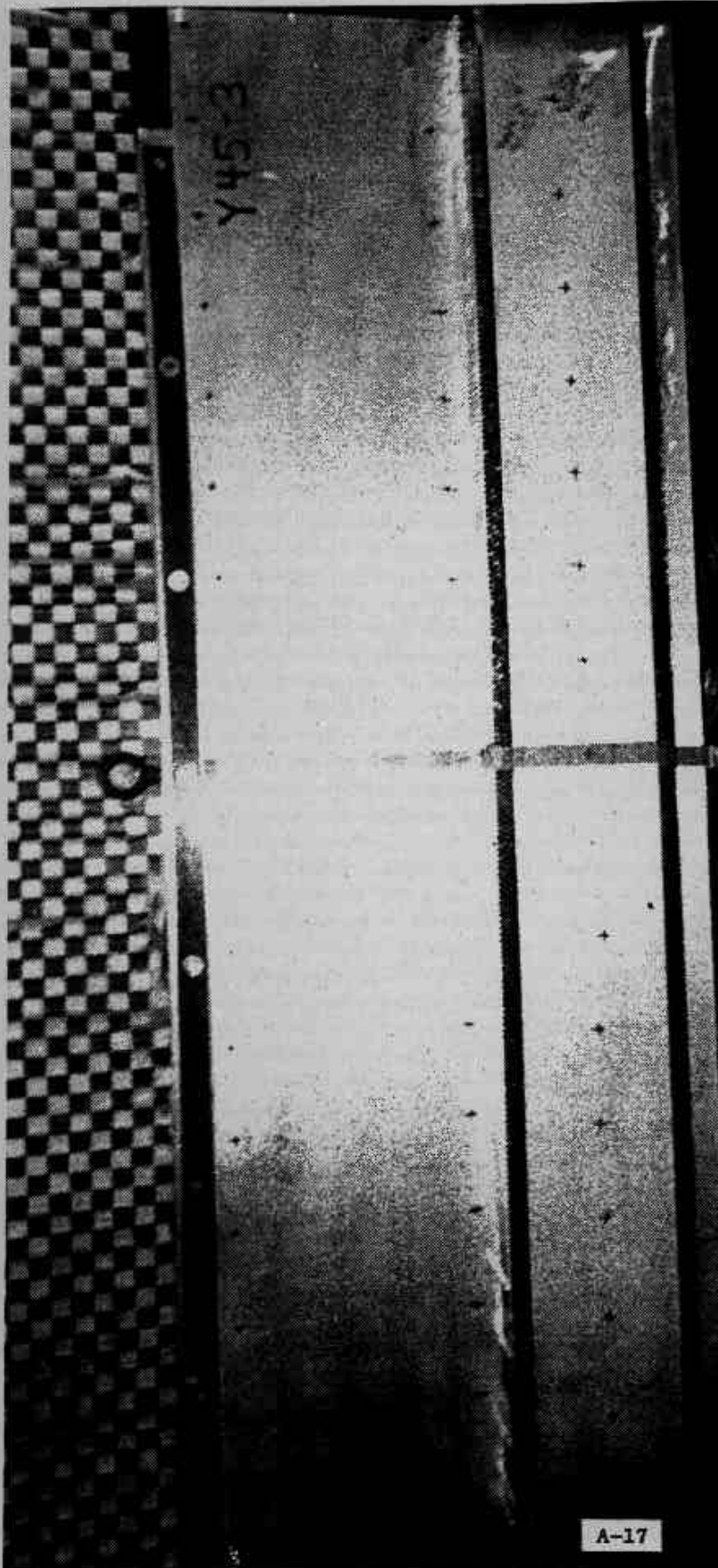


Figure A-14 POST-TEST MDB TOP VIEW



1 793

Figure A-15 PRE-TEST MDB FRONT VIEW

A-17

8017-3

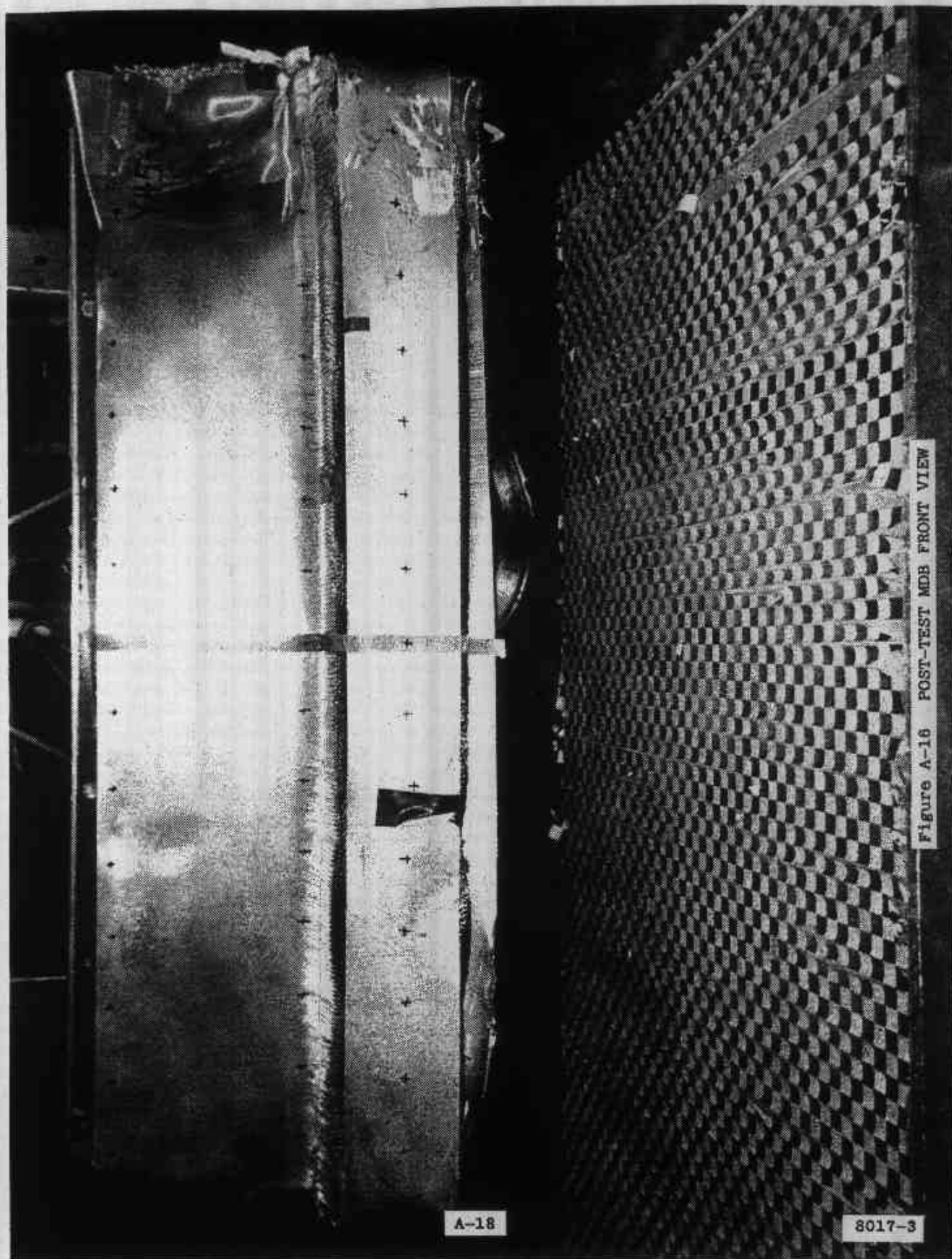


Figure A-16 POST-TEST MDB FRONT VIEW

A-18

8017-3



Figure A-17 PRE-TEST MDB LEFT SIDE VIEW

A-19

8017-3

069

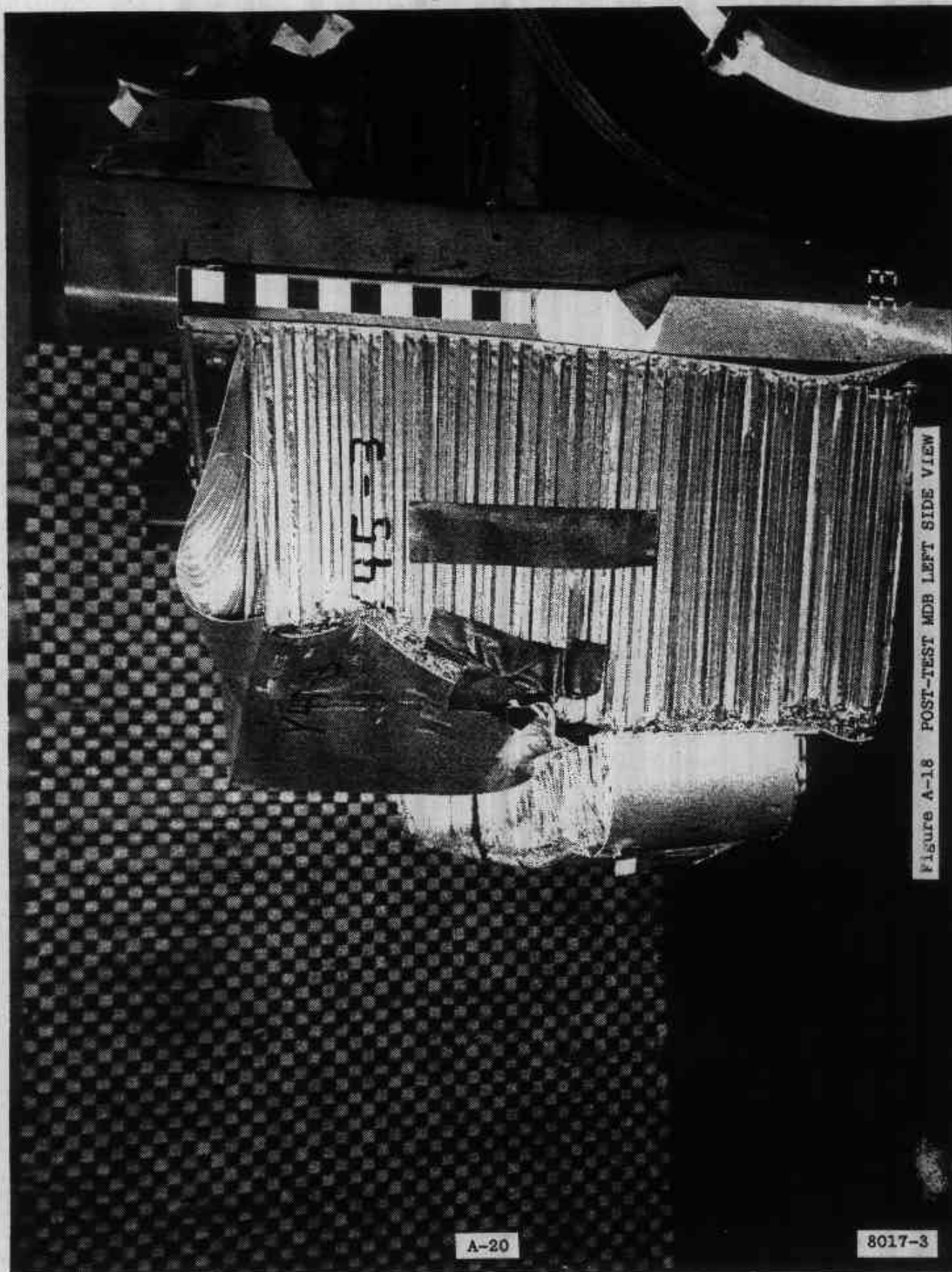


Figure A-18 POST-TEST MDB LEFT SIDE VIEW

A-20

8017-3

070

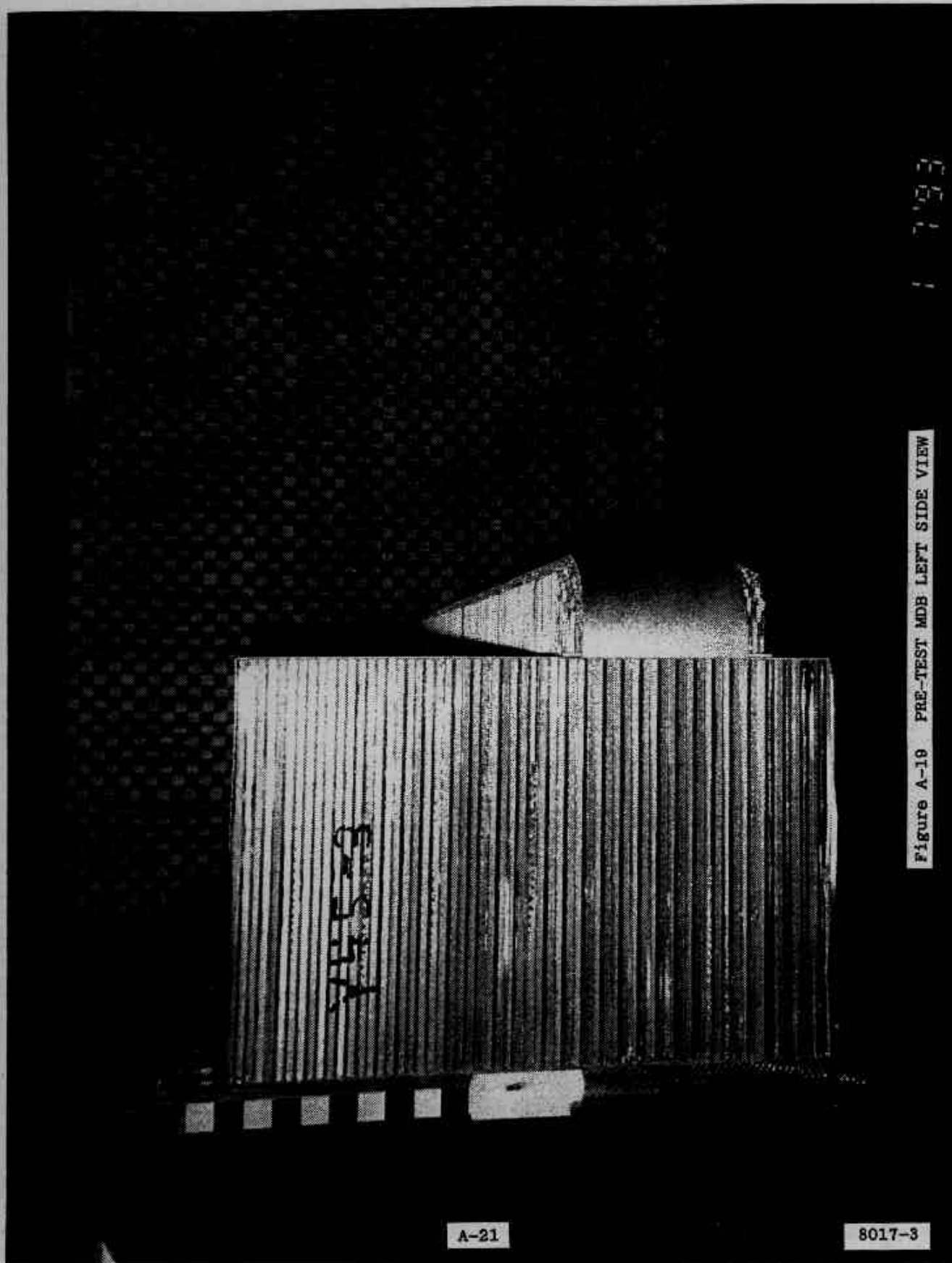


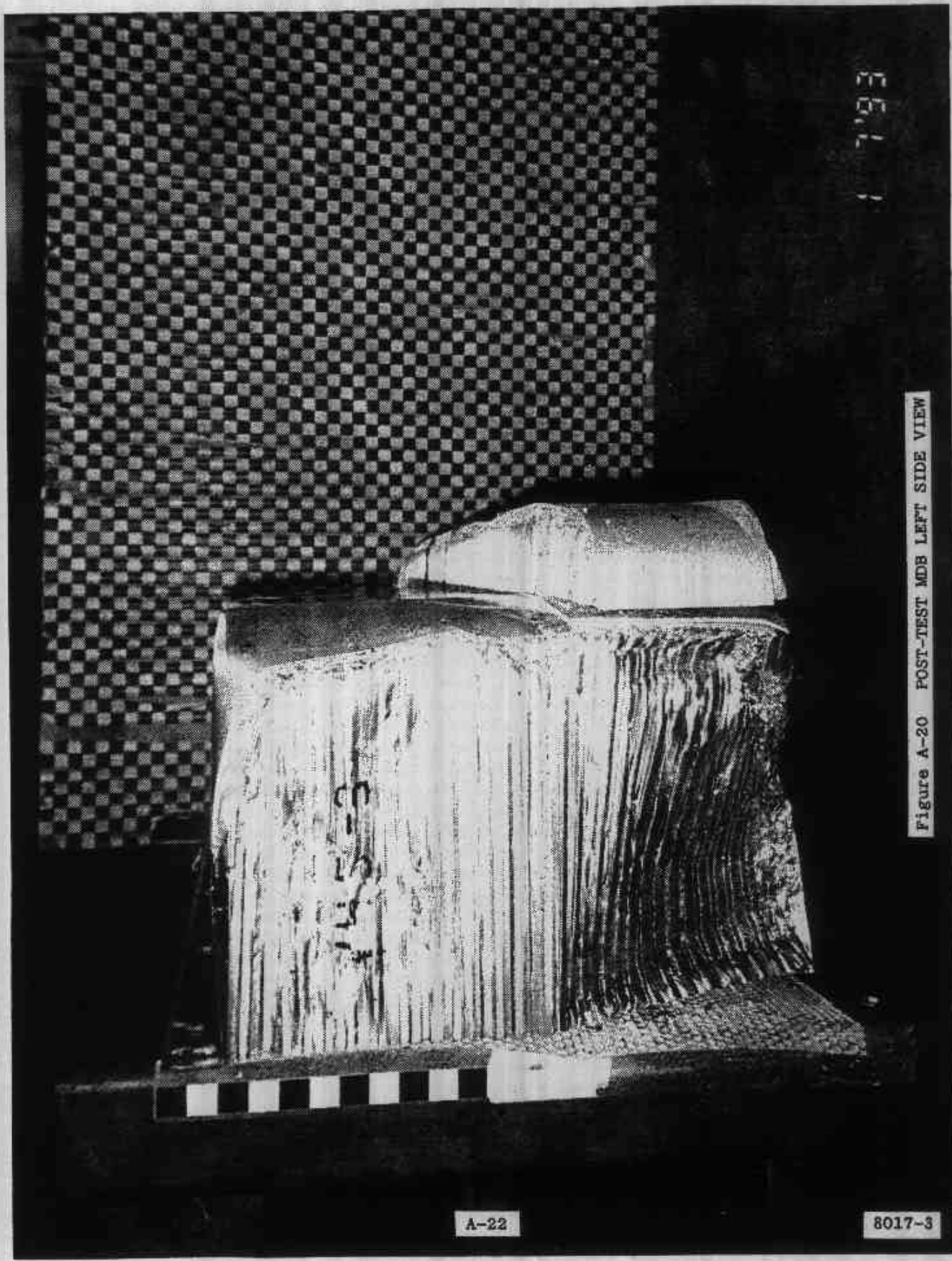
Figure A-19 PRE-TEST MDB LEFT SIDE VIEW

A-21

8017-3

1 793

Figure A-20 POST-TEST MDB LEFT SIDE VIEW



A-22

8017-3

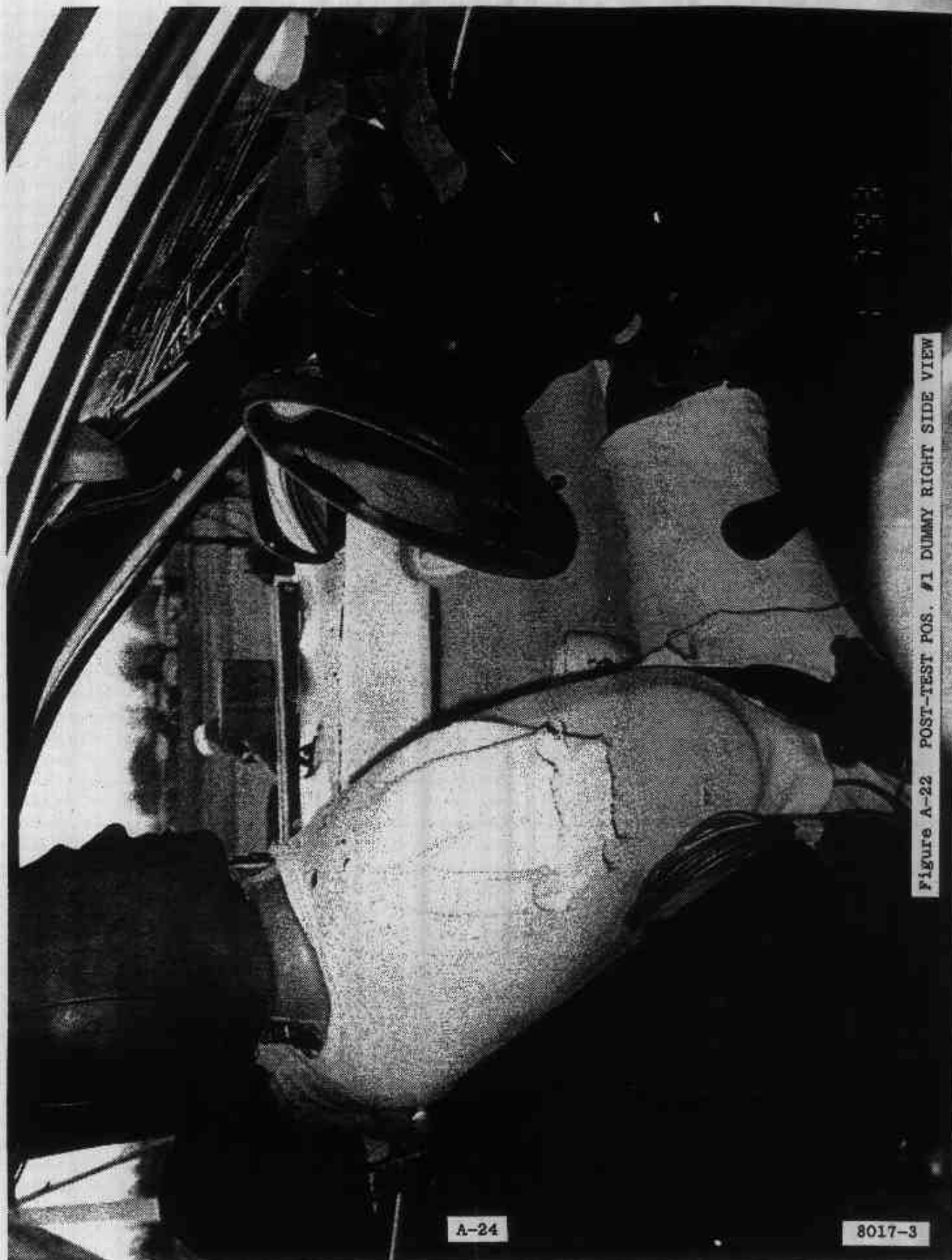
512



Figure A-21 PRE-TEST POS. #1 DUMMY RIGHT SIDE VIEW

A-23

8017-3



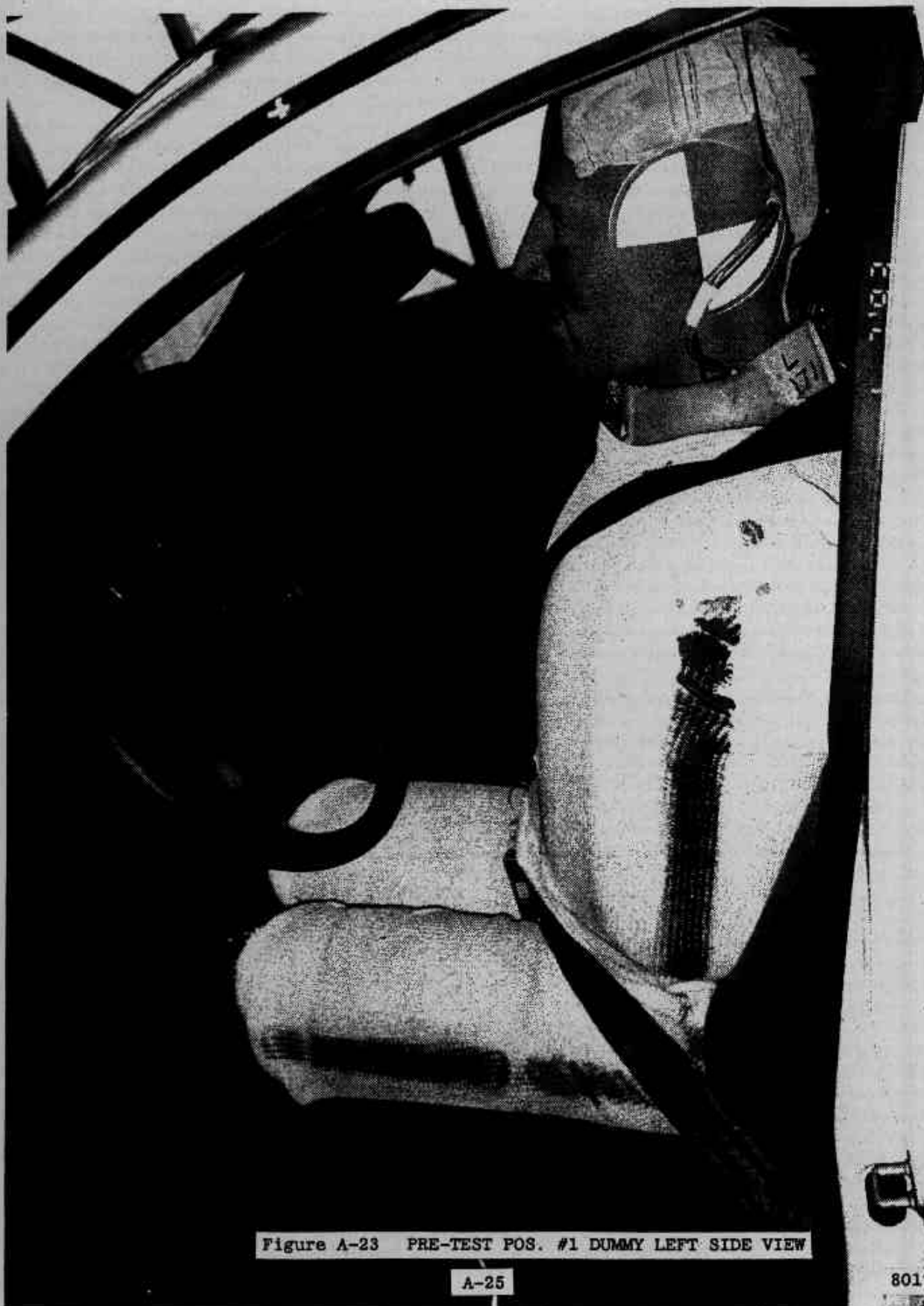


Figure A-23 PRE-TEST POS. #1 DUMMY LEFT SIDE VIEW

A-25

8017-3



Figure A-24 POST-TEST POS. #1 DUMMY LEFT SIDE VIEW

A-26

8017-3

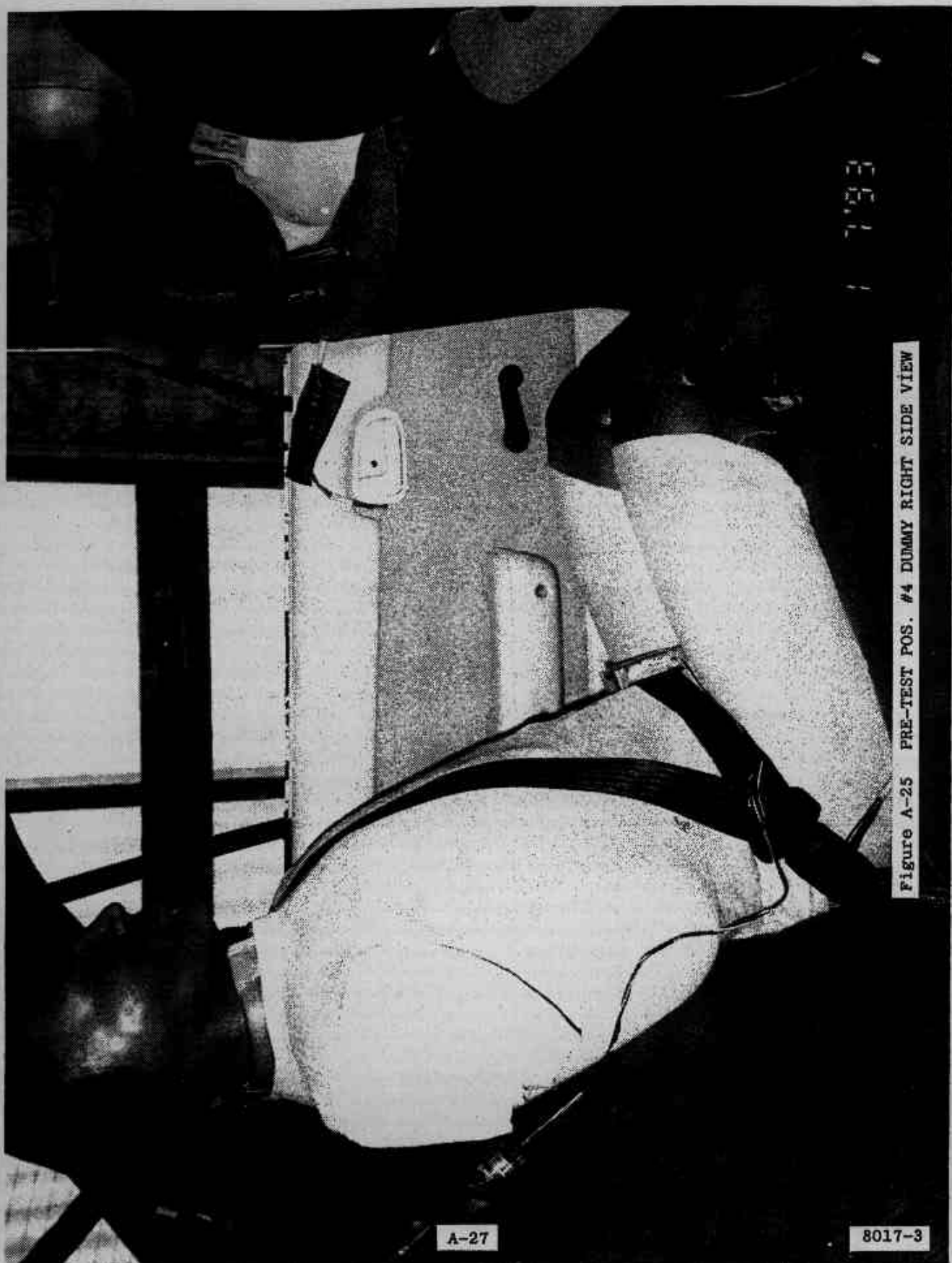


Figure A-25 PRE-TEST POS. #4 DUMMY RIGHT SIDE VIEW

A-27

8017-3

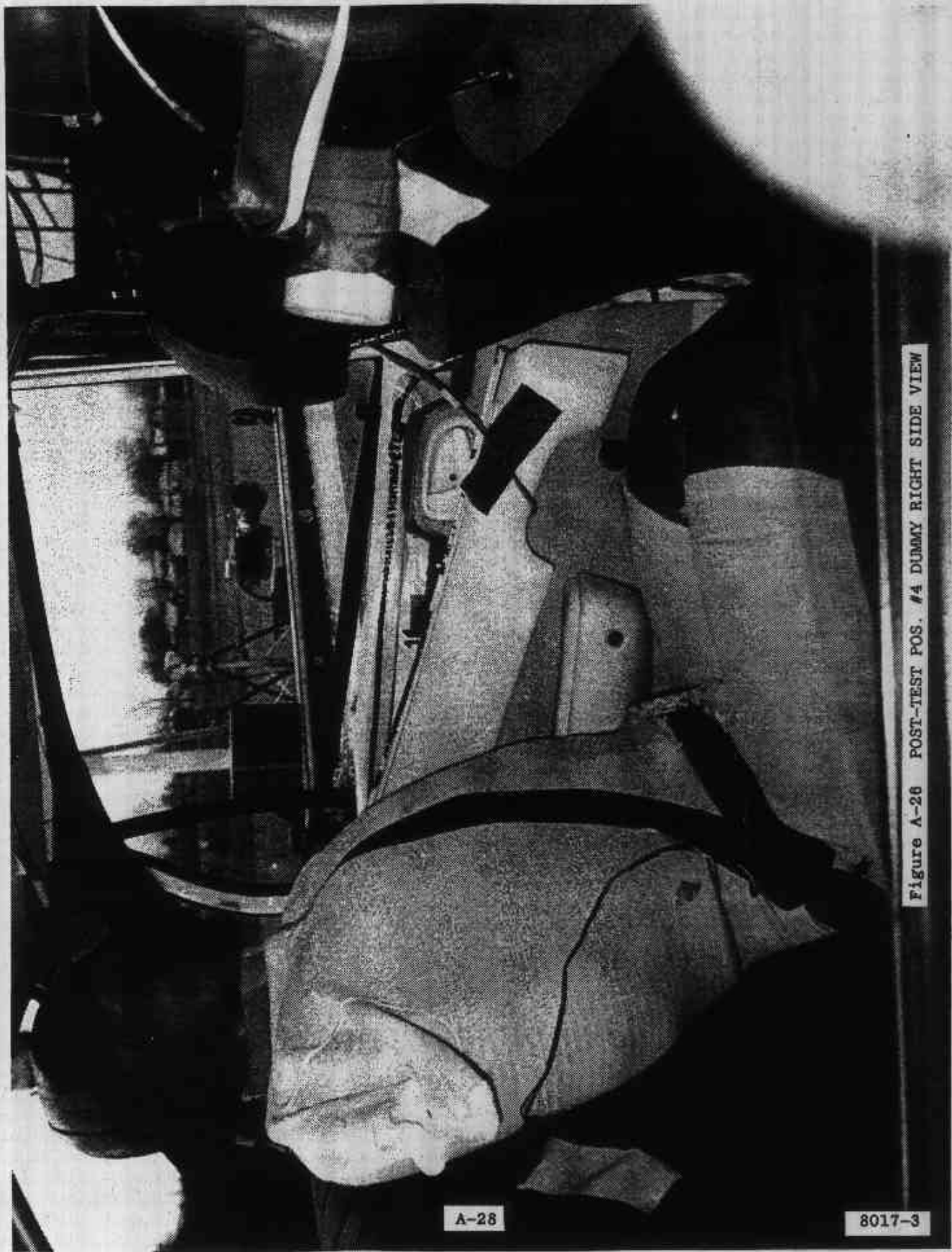


Figure A-26 POST-TEST POS. #4 DUMMY RIGHT SIDE VIEW

A-28

8017-3

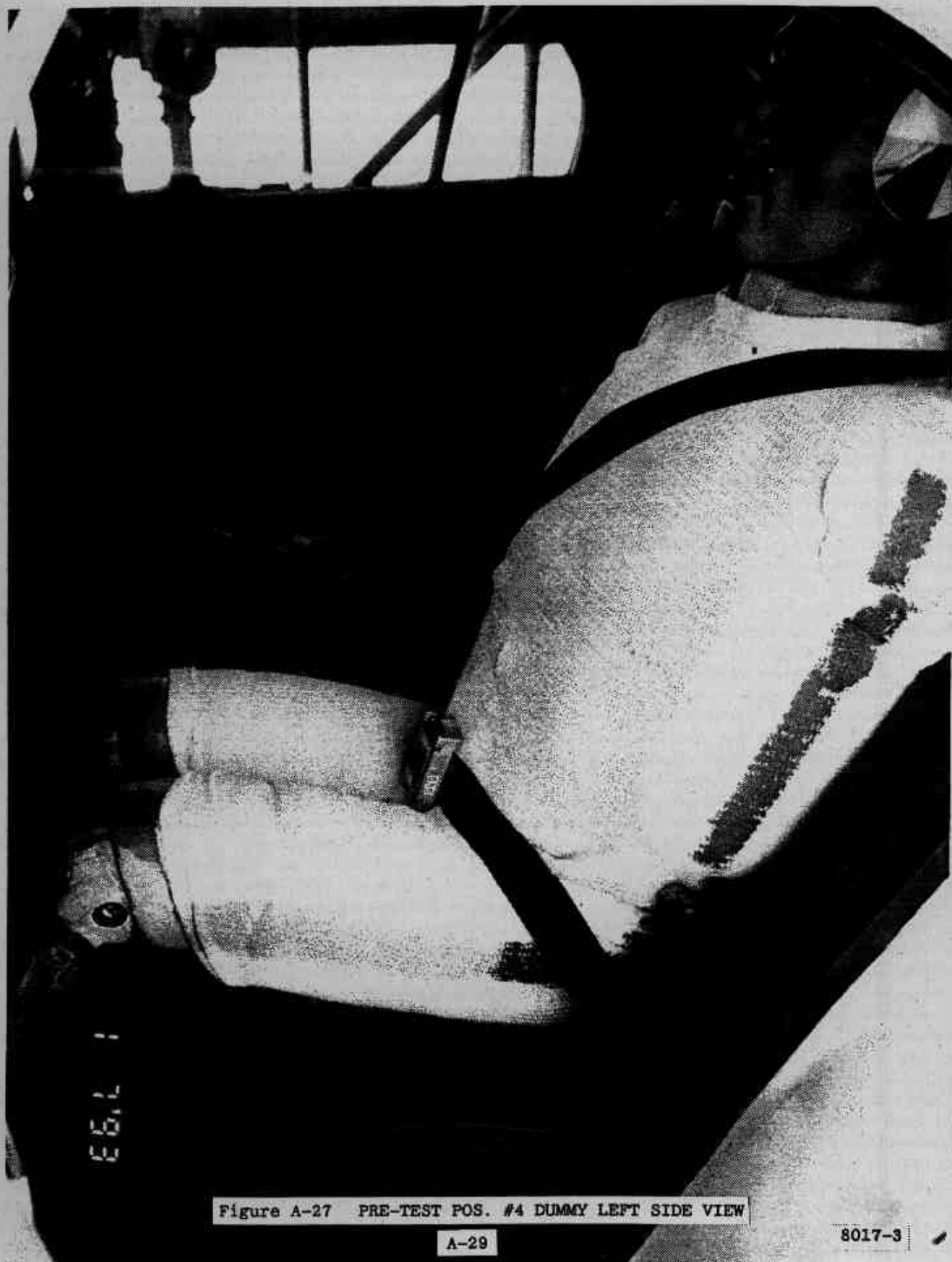


Figure A-27 PRE-TEST POS. #4 DUMMY LEFT SIDE VIEW

A-29

8017-3



Figure A-28 POST-TEST POS. #4 DUMMY LEFT SIDE VIEW

A-30

8017-3

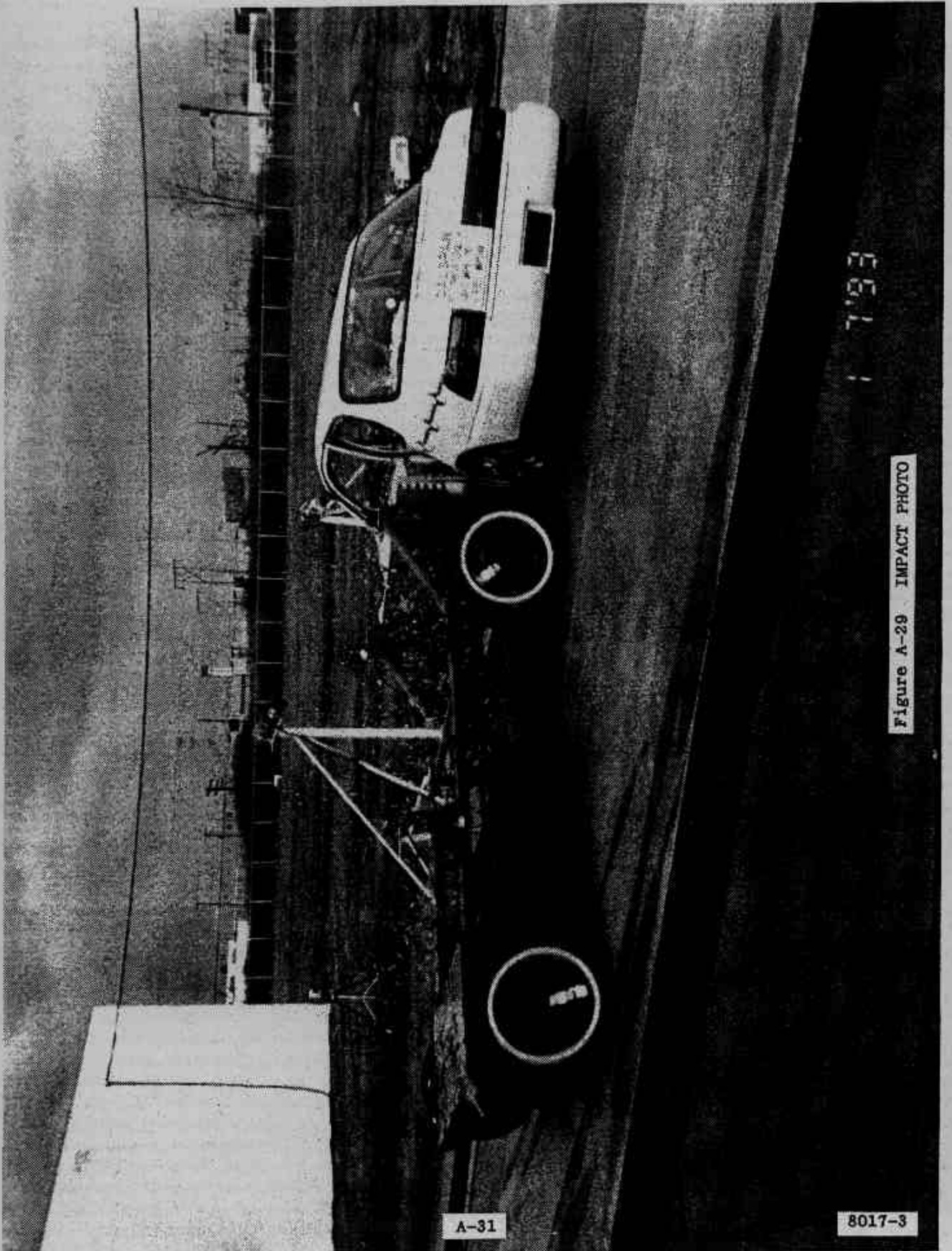


Figure A-29 IMPACT PHOTO

1 7'93

A-31

8017-3

Appendix B

DATA PLOTS

All vehicle data and dummy head and chest deflection data were filtered following SAE J211b. Data from the Side Impact Dummies' thorax and pelvis were filtered in the following manner:

- a. Filter the data with a 300 Hz SAE Class 180 filter;
- b. Subsample the data to a 1600 Hz sampling rate; and
- c. Filter the data with a Finite Impulse Response (FIR) filter having the following characteristics:
 1. Passband frequency 100 Hz
 2. Stopband frequency 189 Hz
 3. Stopband gain -50 dB
 4. Passband ripple 0.0225 dB

FIR filtered data is so noted in this appendix.

DUMMY DATA

P1 - DRIVER

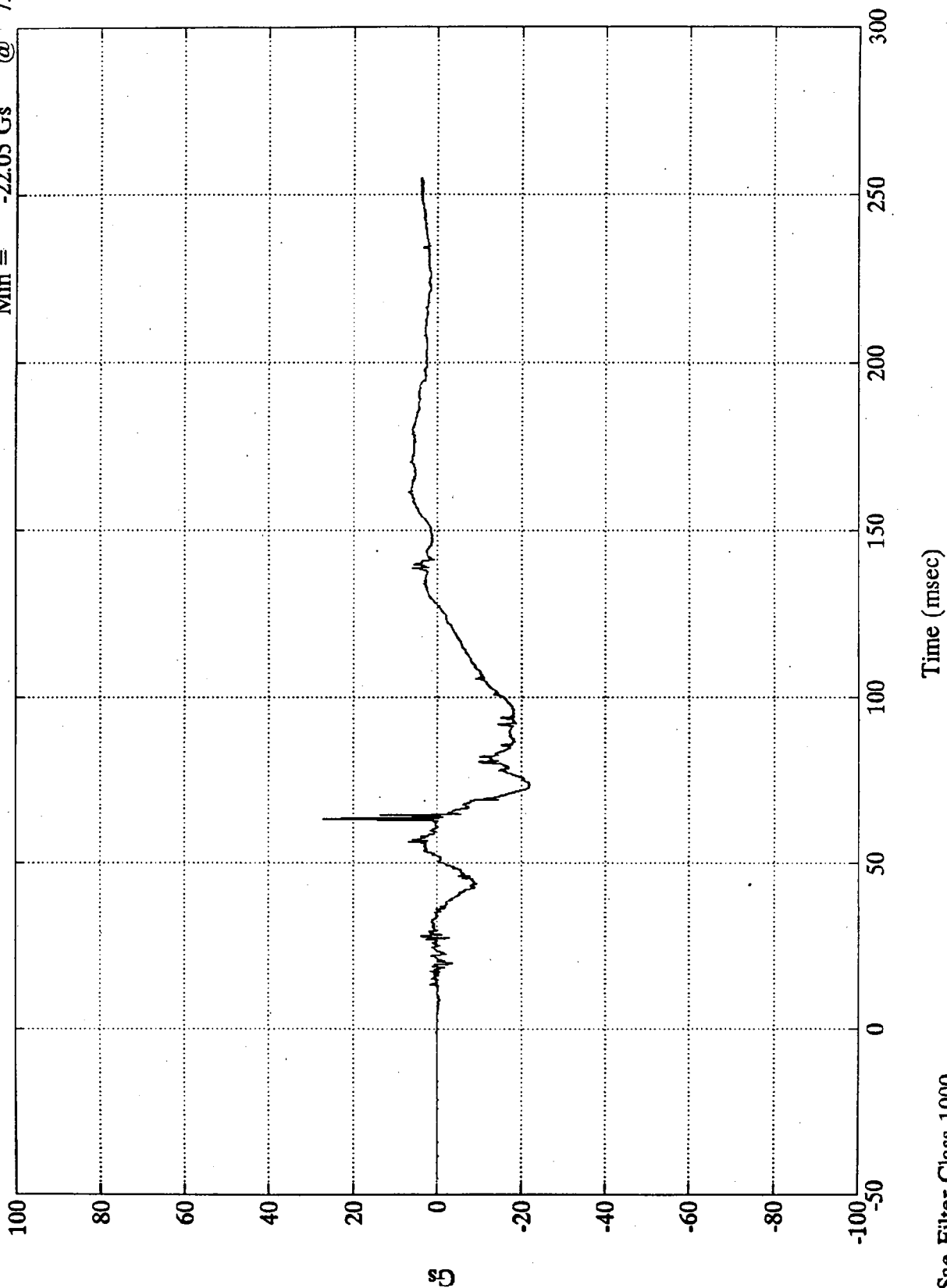
P4 - LEFT REAR PASSENGER

U84

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Head X

Max = 27.20 Gs @ 63.11 msec
Min = -22.05 Gs @ 73.44 msec



B-3

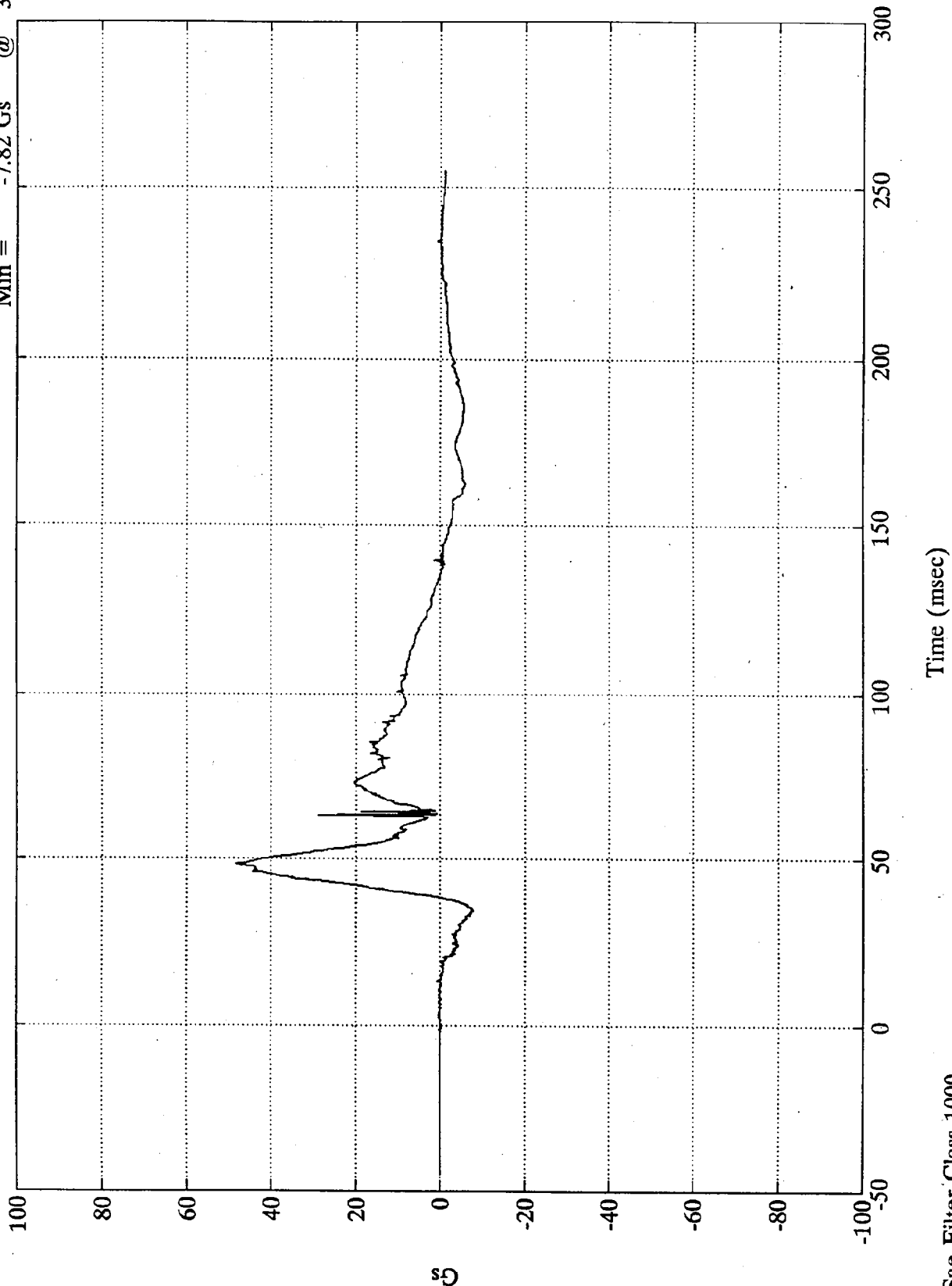
085

8017-3
Sae Filter Class 1000

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Head Y

Max = 48.33 Gs @ 48.36 msec
Min = -7.82 Gs @ 34.31 msec



Sae Filter Class 1000

8017-3

086

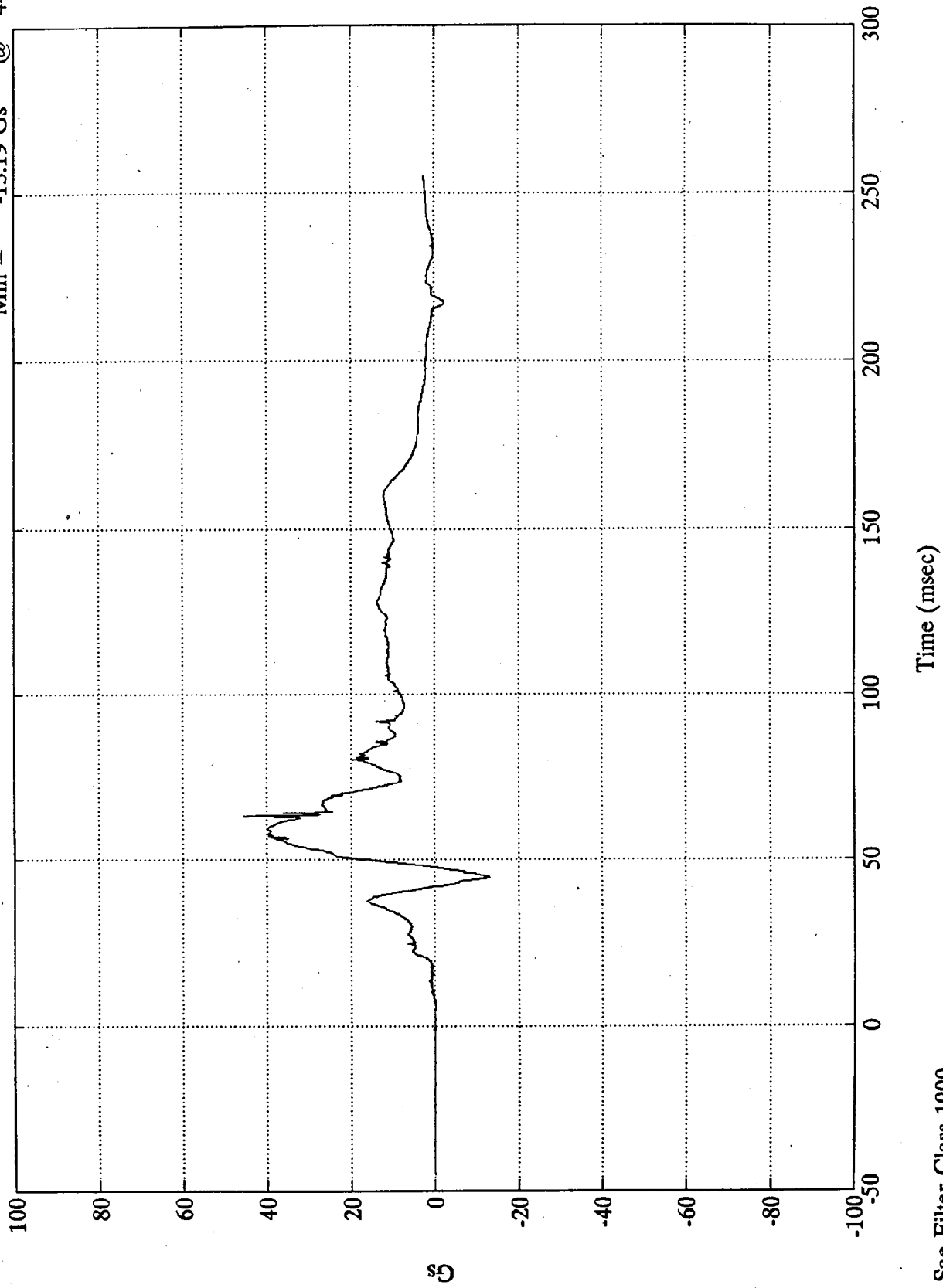
Gs

B-4

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Head Z

Max = 45.53 Gs @ 63.11 msec
Min = -13.19 Gs @ 44.75 msec



B-5

J87

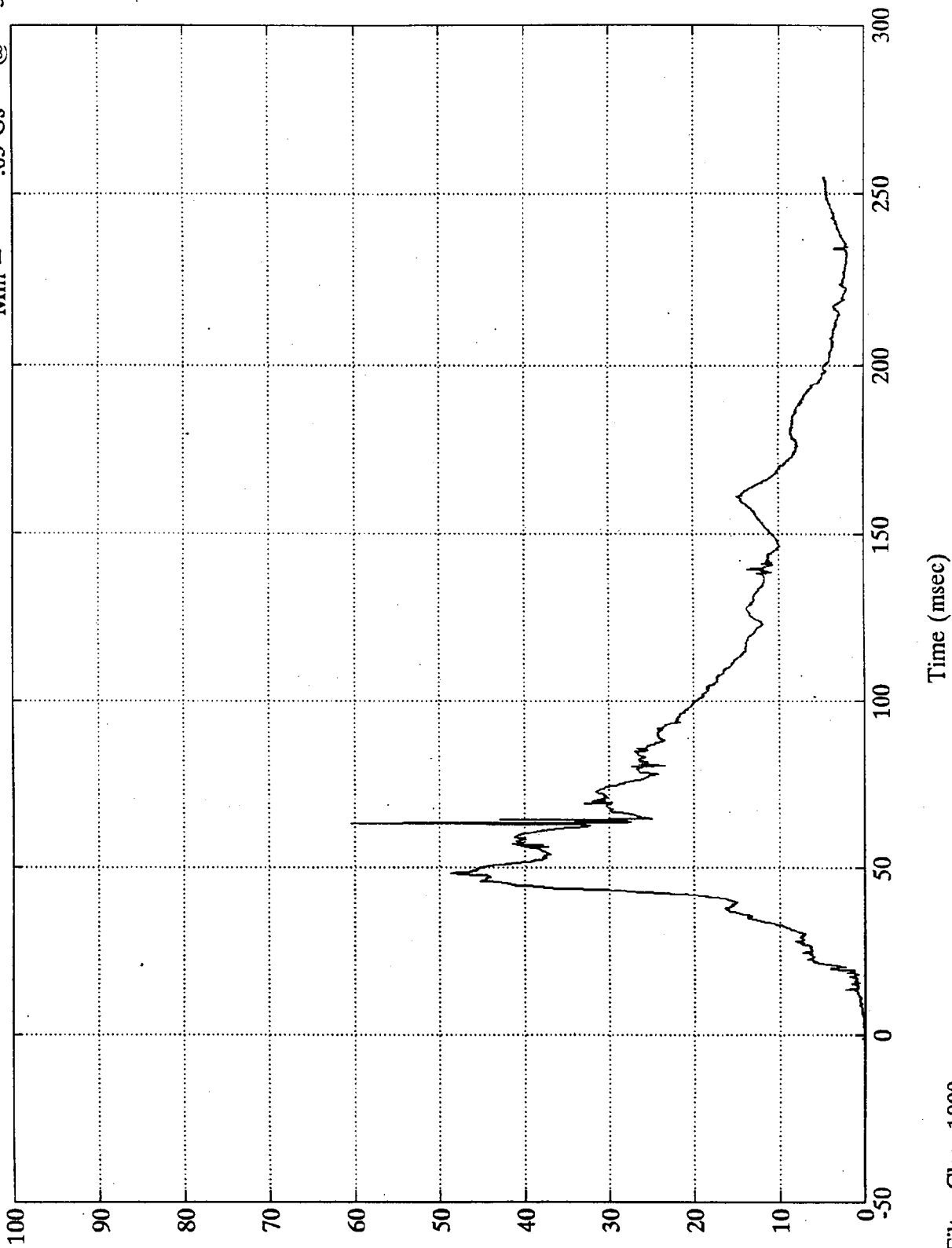
8017-3

Sae Filter Class 1000

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Head Resultant

Max = 60.41 Gs @ 63.11 msec
Min = .03 Gs @ 3.83 msec

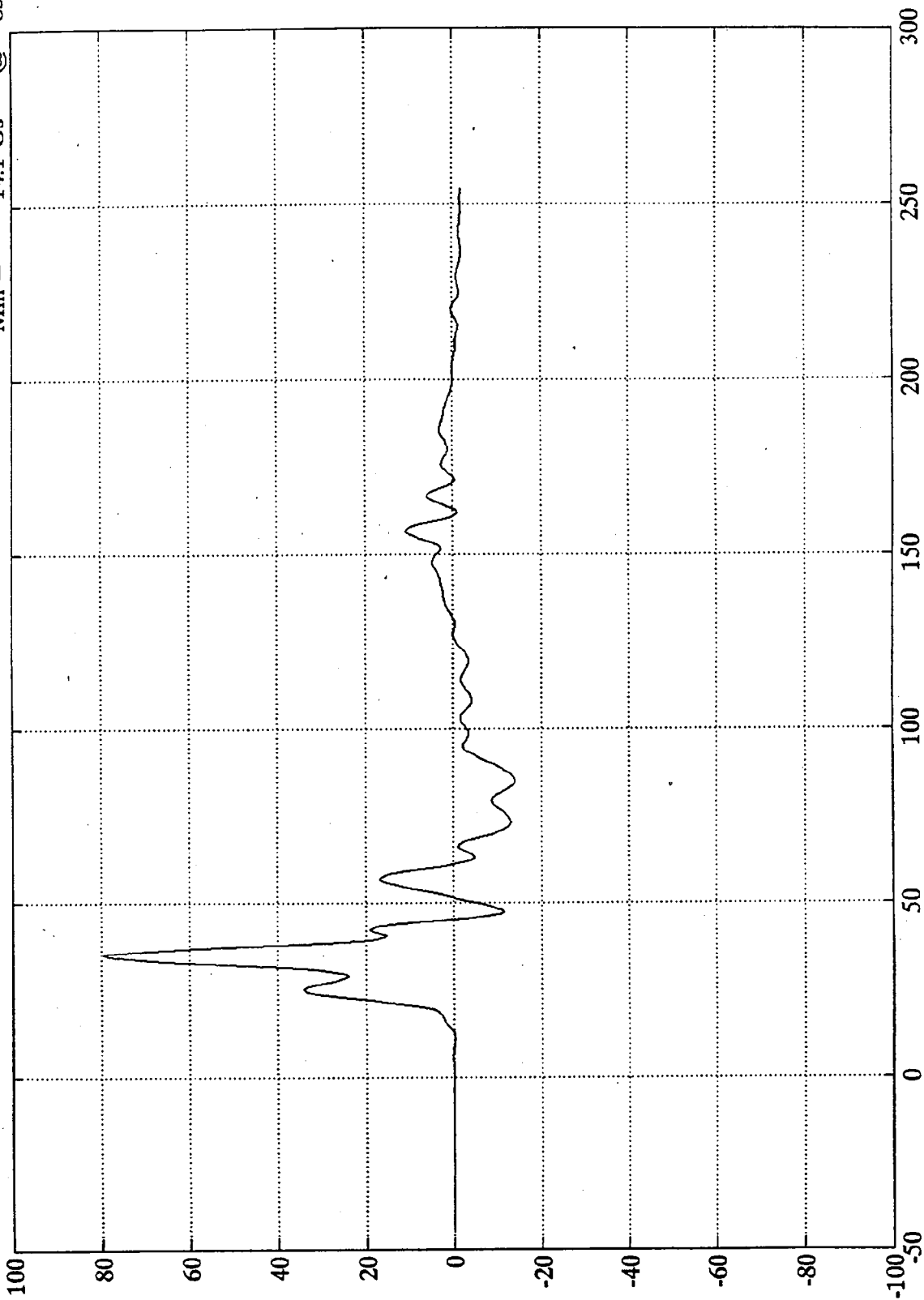


Sae Filter Class 1000

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Upper Rib Y

Max = 79.4 Gs @ 35.000 msec
Min = -14.1 Gs @ 85.00 msec



50

B-7

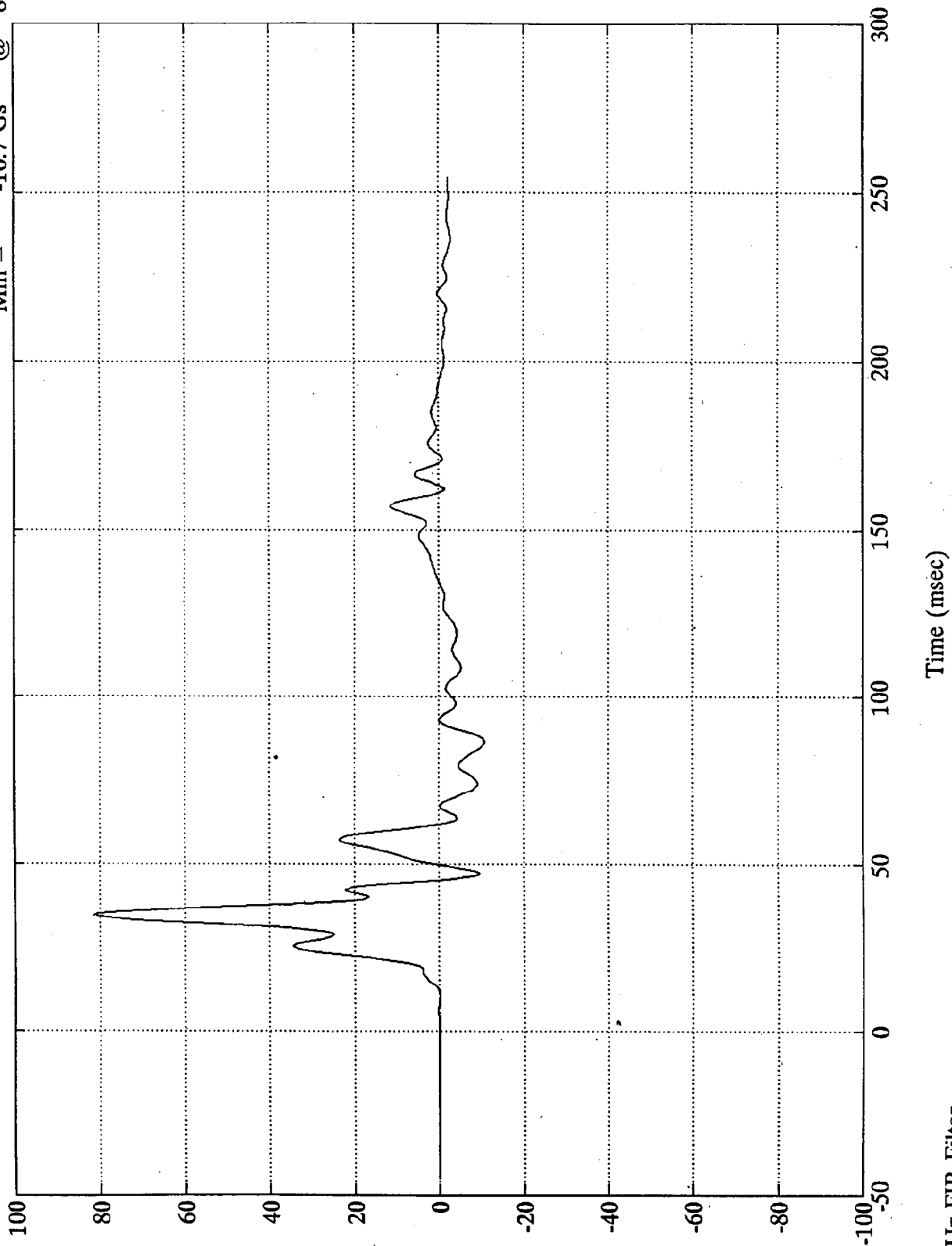
089

8017-3 100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Upper Rib Y(R)

Max = 81.4 Gs @ 34.375 msec
Min = -10.7 Gs @ 86.87 msec



090

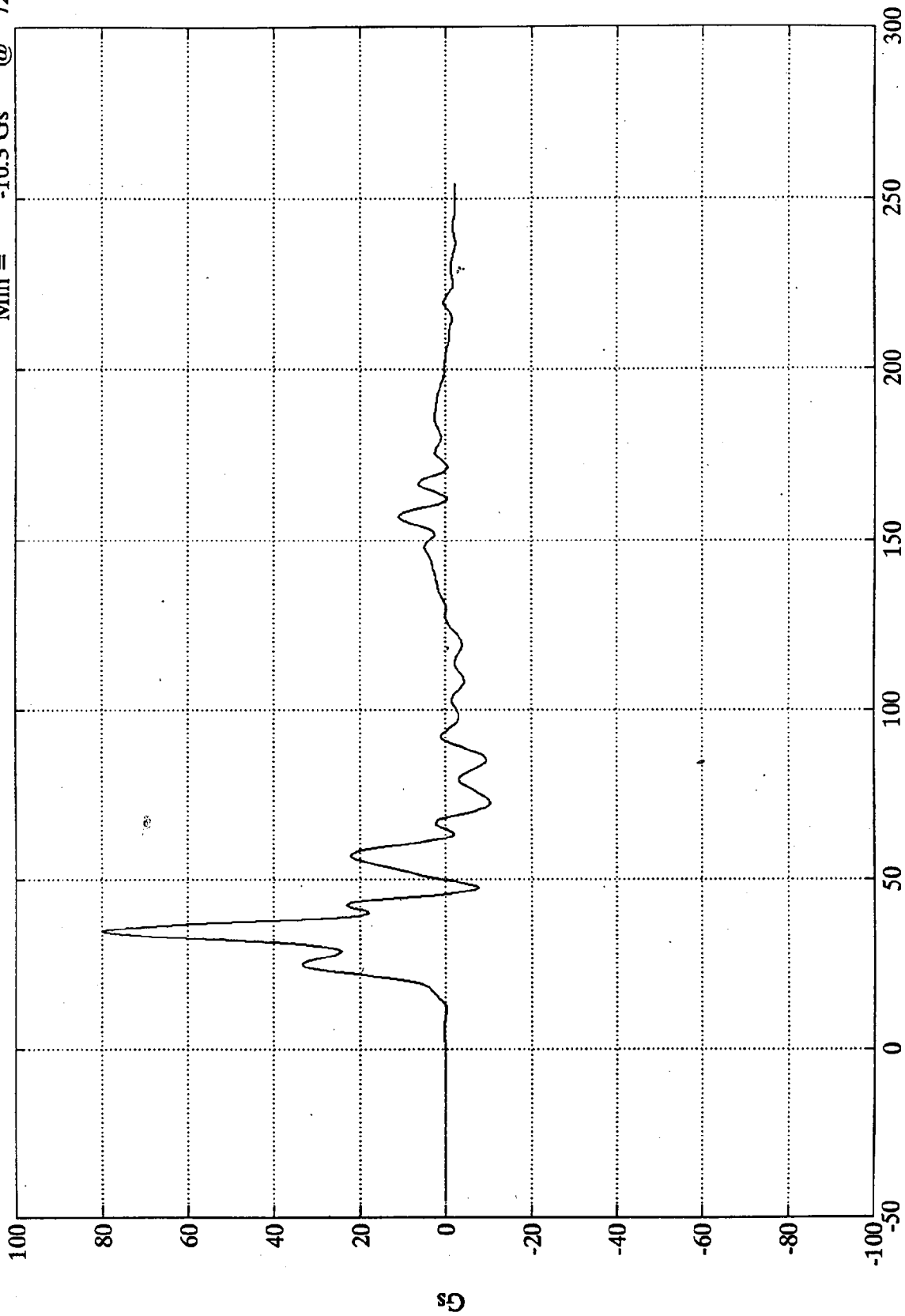
B-8

8017-3 100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Upper Rib Y(R.R.)

Max = 79.8 Gs @ 35.000 msec
Min = -10.3 Gs @ 72.50 msec



B-9

091

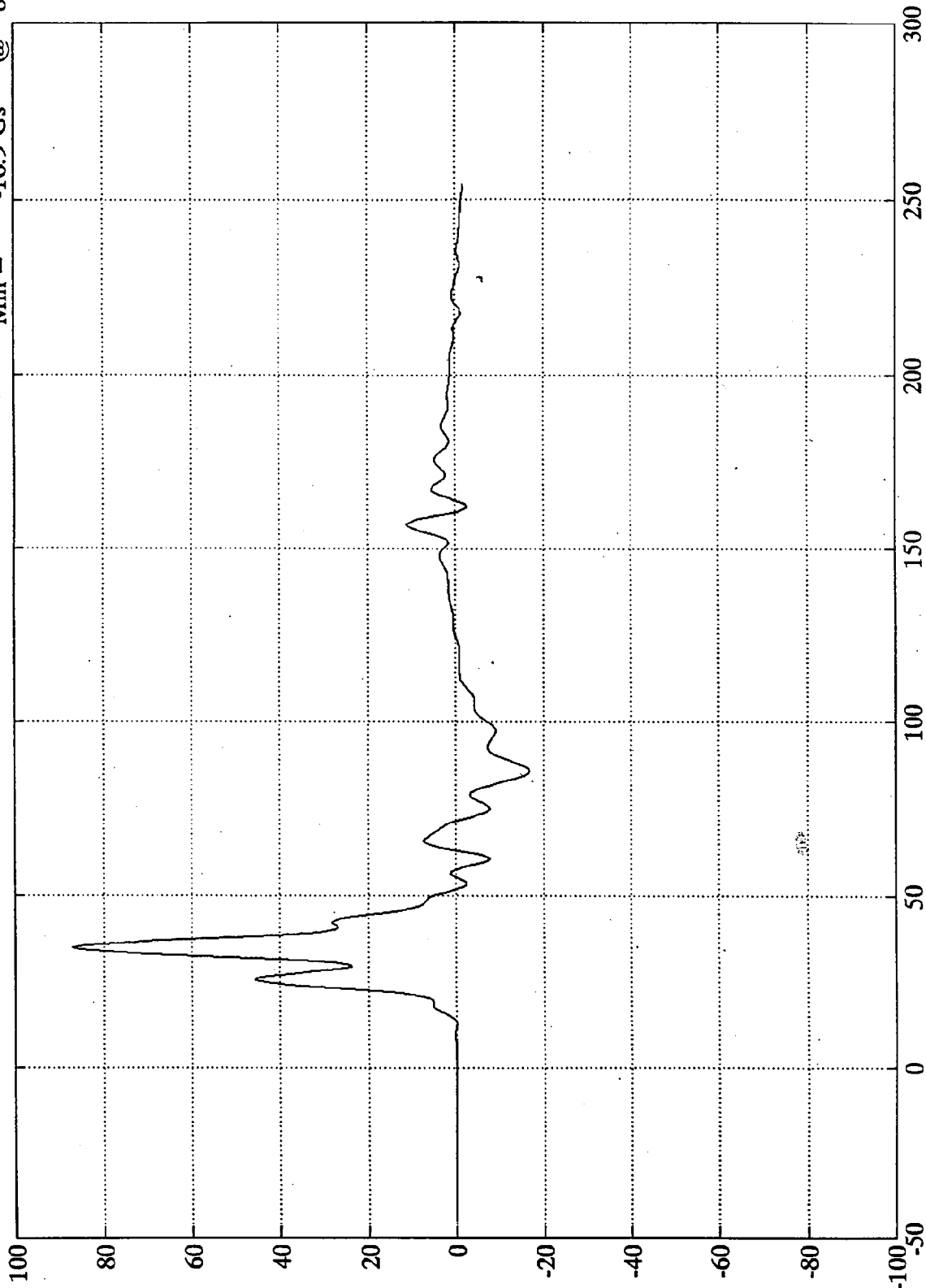
8017-3

100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

Max = 87.1 Gs @ 35.000 msec
 Min = -16.9 Gs @ 85.62 msec

P1 Lower Rib Y



Time (msec)

100 Hz FIR Filter

092

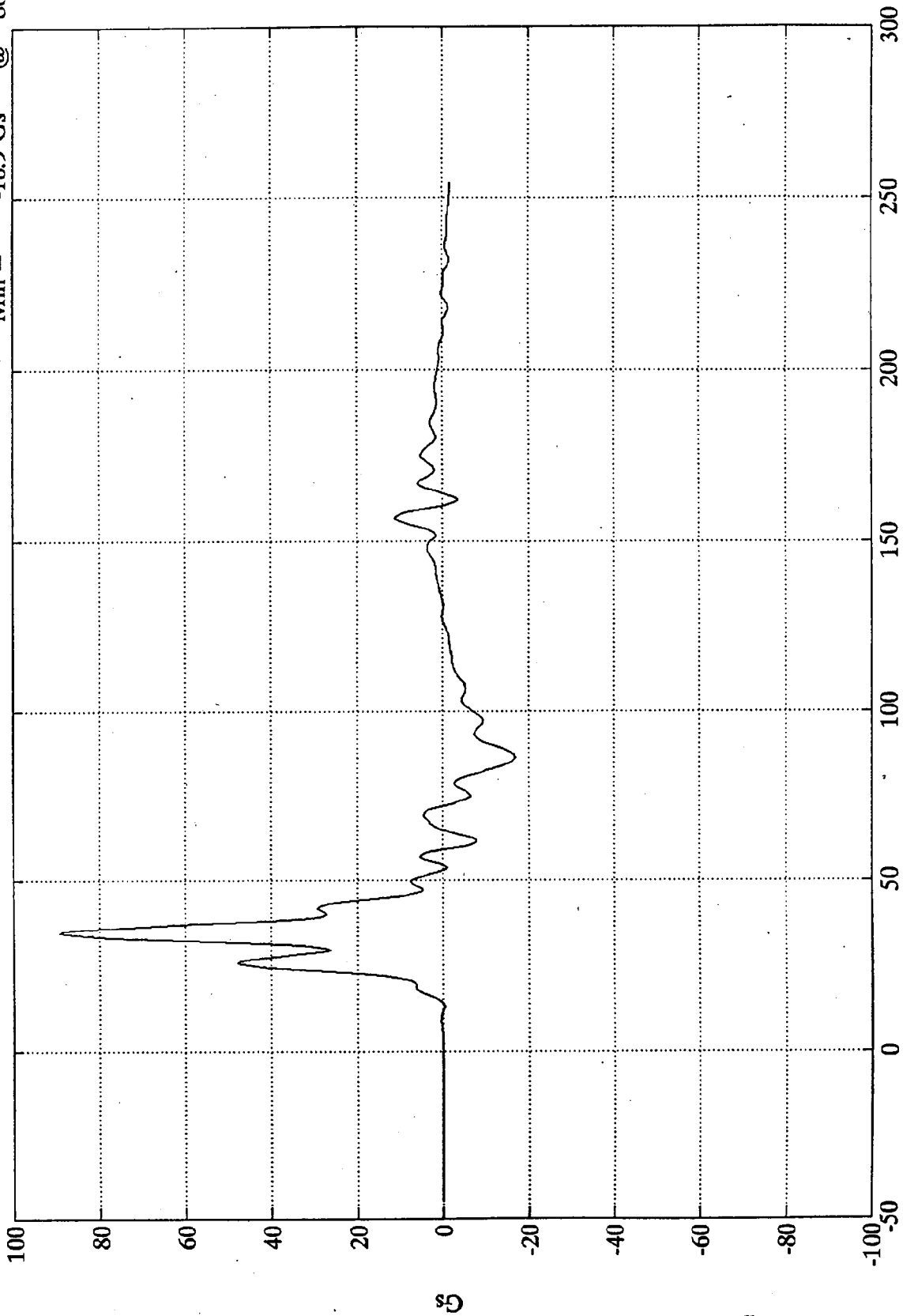
B-10

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Lower Rib Y(R)

Max = 89.4 Gs @ 34.375 msec
Min = -16.9 Gs @ 86.25 msec



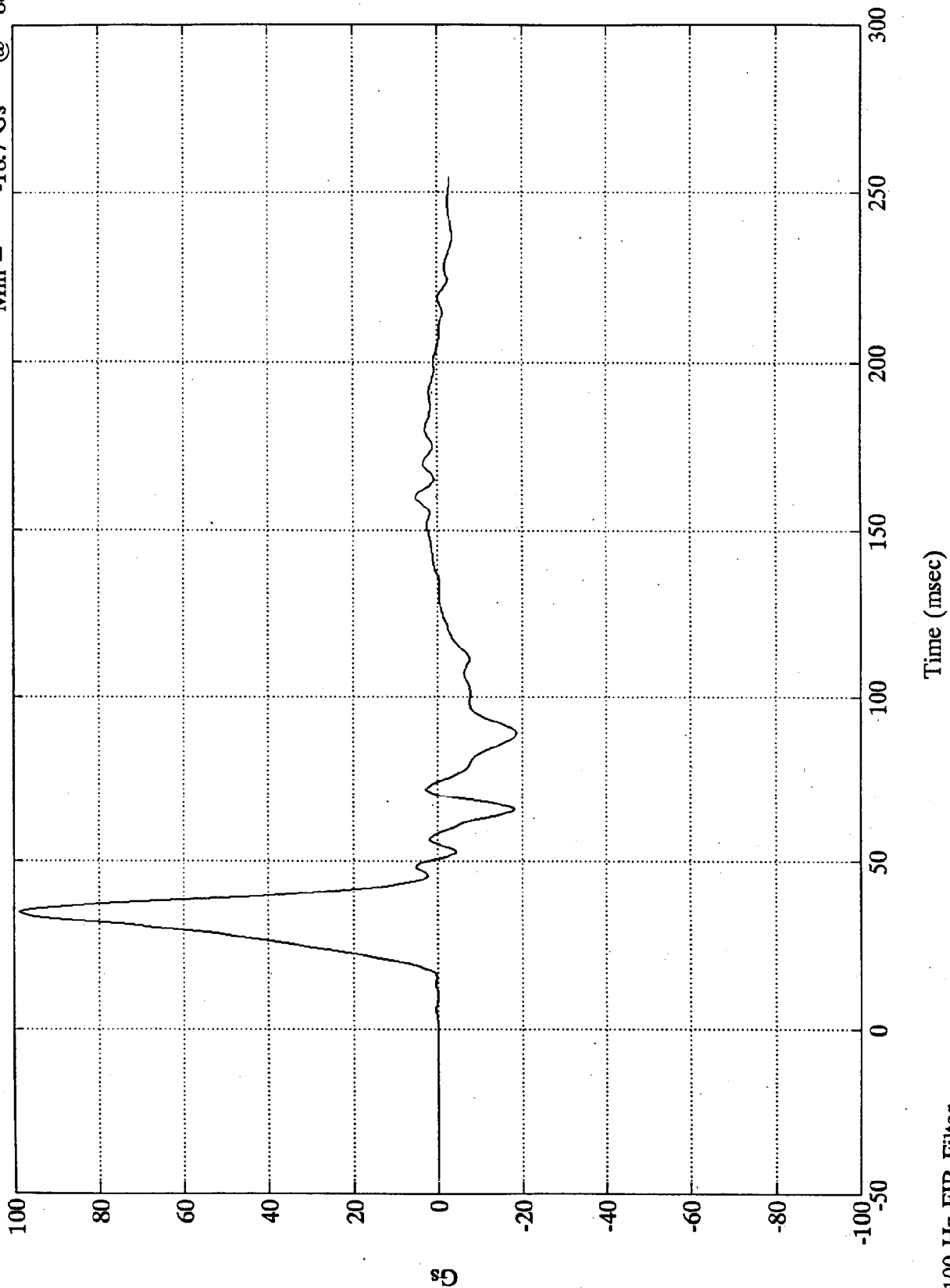
Time (msec)

100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Lower Spine Y

Max = 98.9 Gs @ 34.375 msec
Min = -18.7 Gs @ 88.75 msec



100 Hz FIR Filter

U94

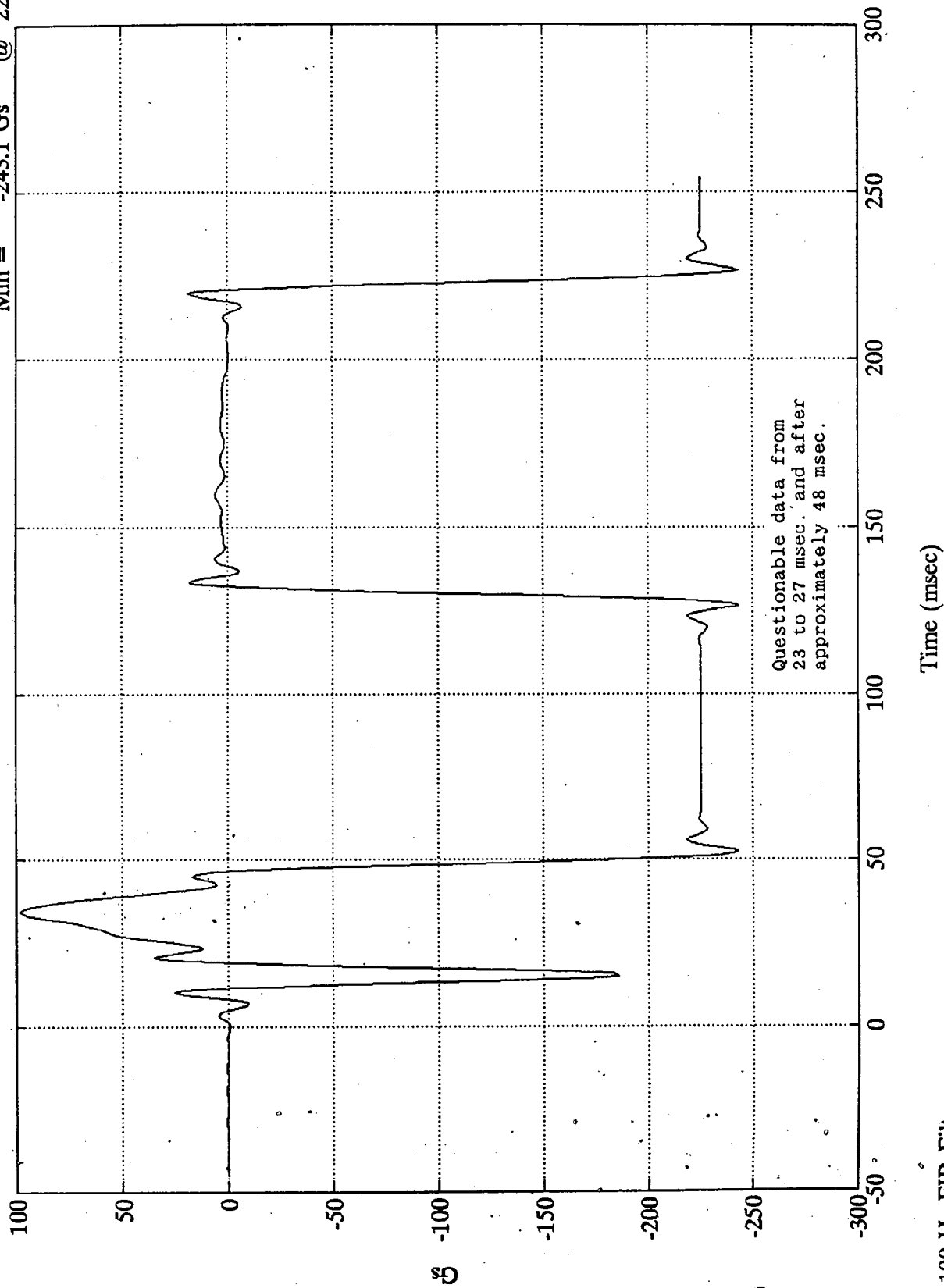
B-12

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Lower Spine Y(R)

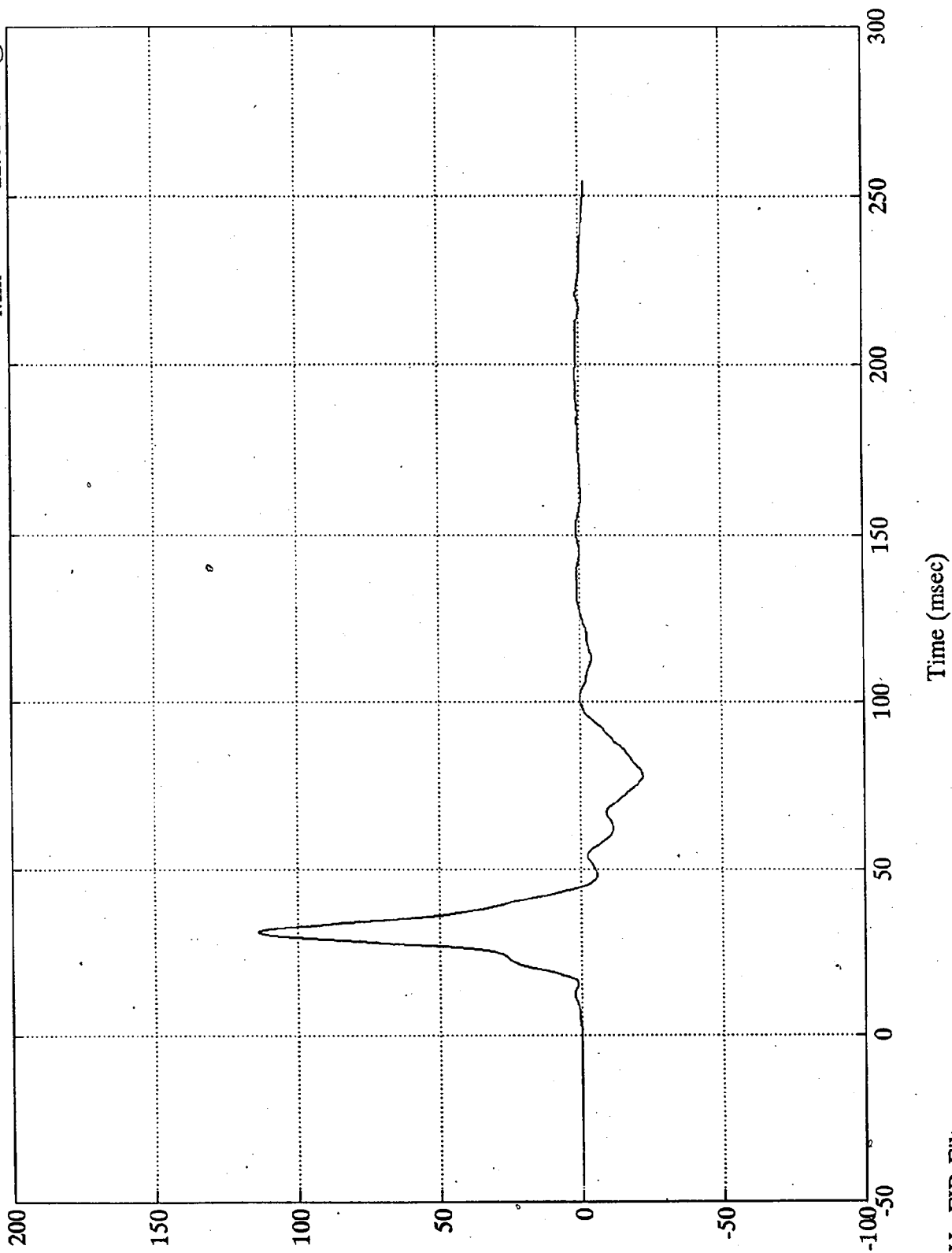
Max = 98.4 Gs @ 34.375 msec
Min = -243.1 Gs @ 226.25 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Pelvic Y

Max = 113.7 Gs @ 31.250 msec
 Min = -22.0 Gs @ 78.12 msec



100 Hz FIR Filter

096

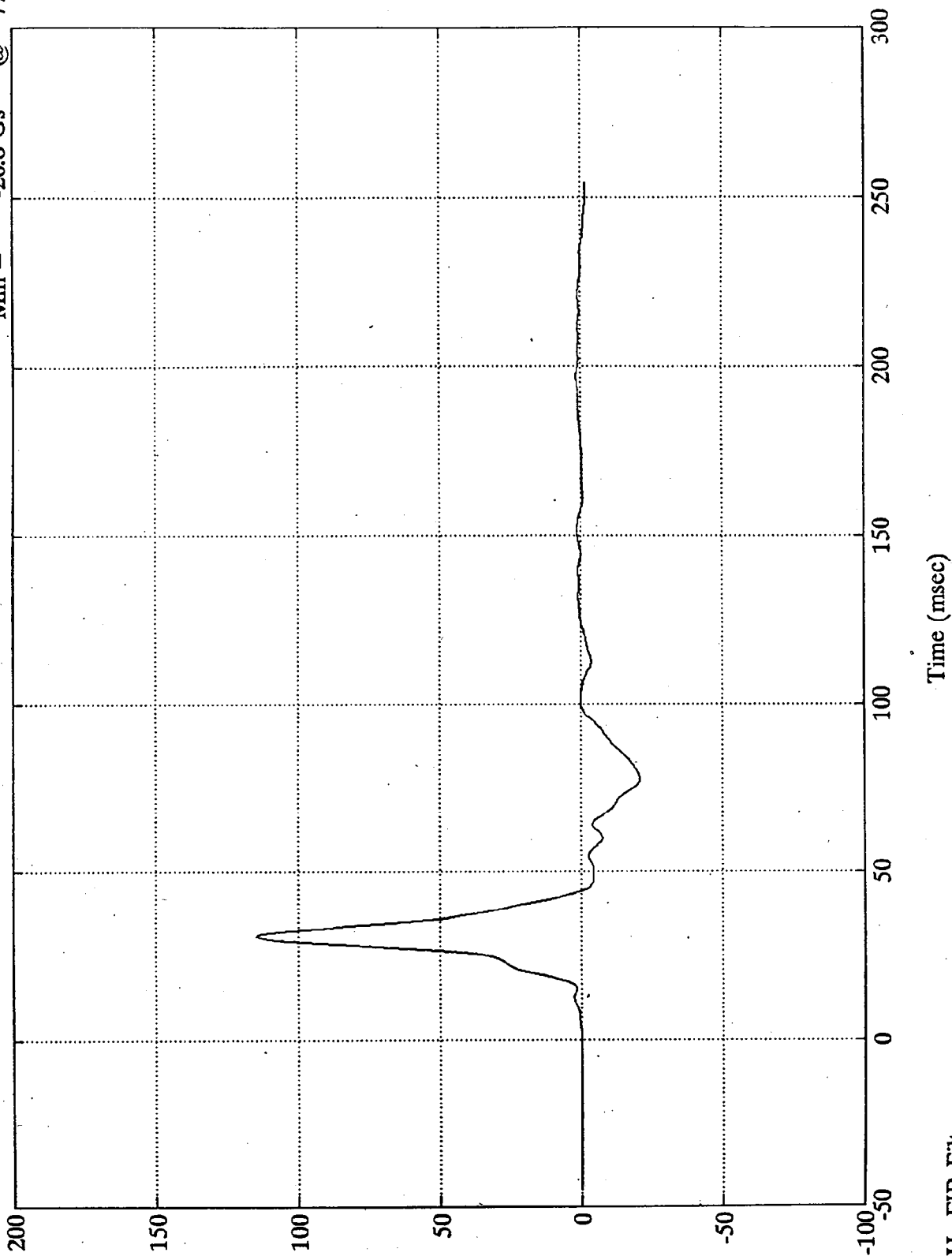
B-14

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Pelvic Y(R)

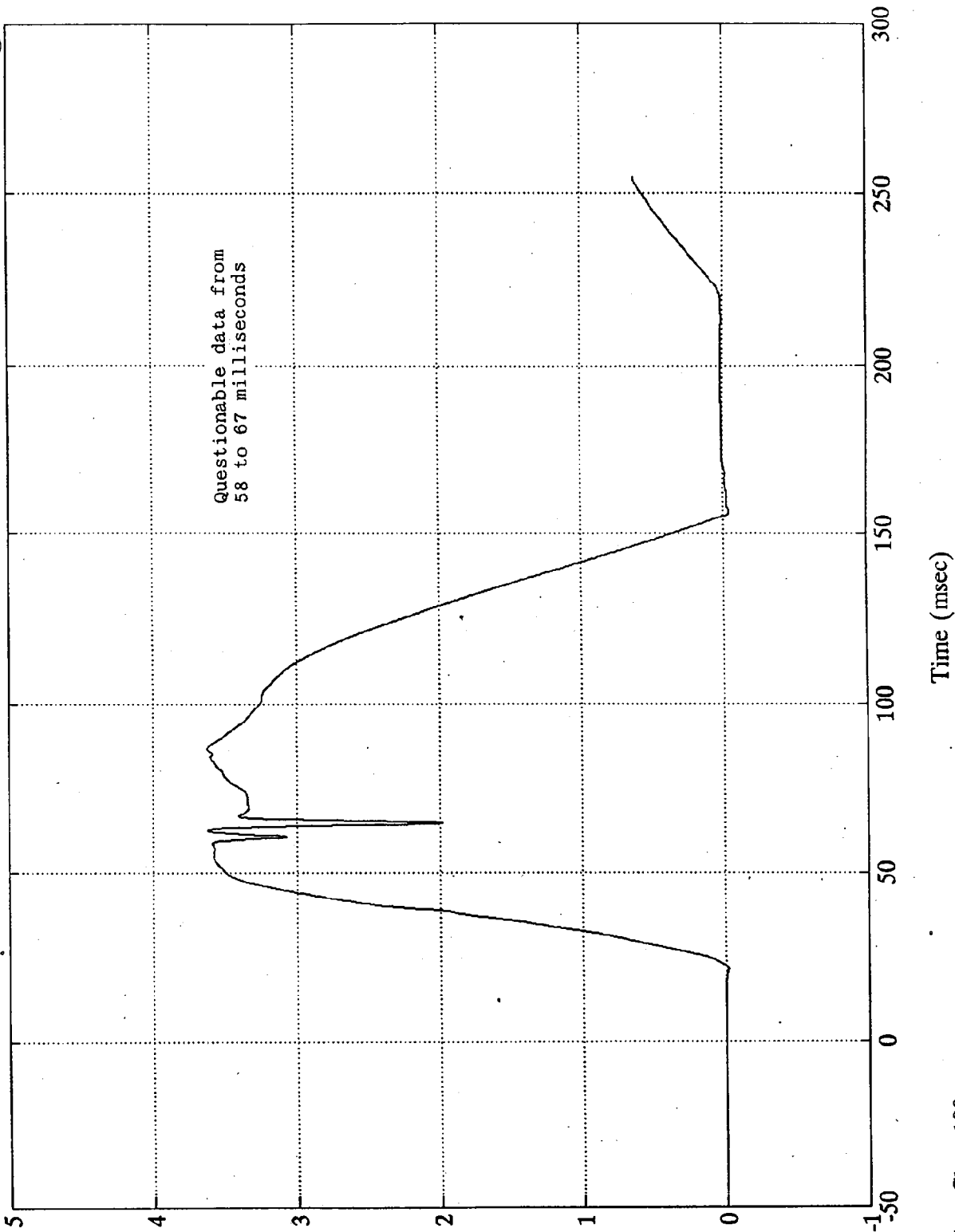
Max = 114.7 Gs @ 30.625 msec
Min = -20.8 Gs @ 77.50 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

Max = 3.62 Cms @ 62.51 msec
 Min = -.04 Cms @ 156.00 msec

P1 Chest Deflection



Sae Filter Class 180

8017-3

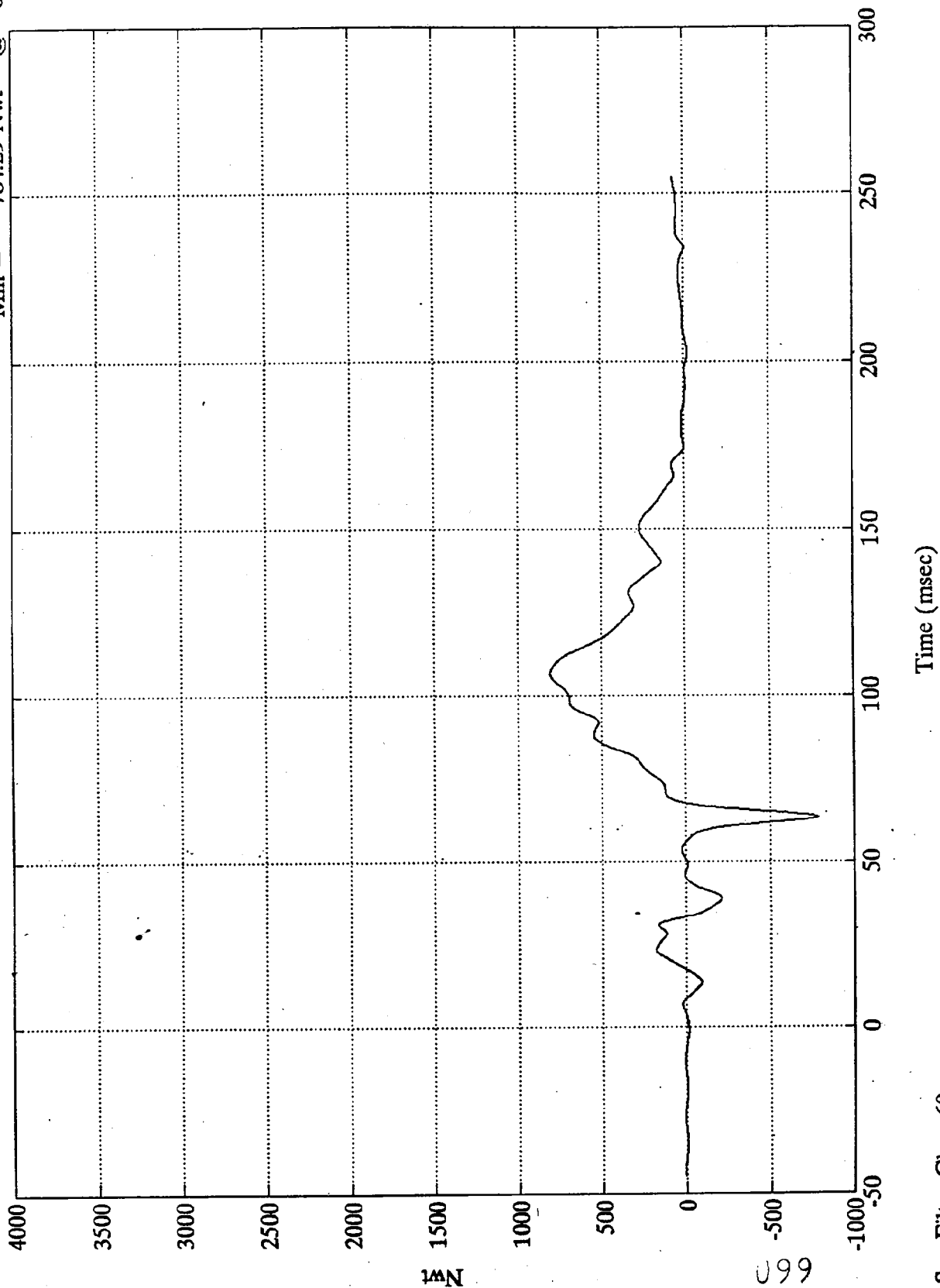
B-16

098

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P1 Torso Belt Load

Max = 805.36 Nwt @ 106.68 msec
Min = -784.29 Nwt @ 63.35 msec



14N
B-17

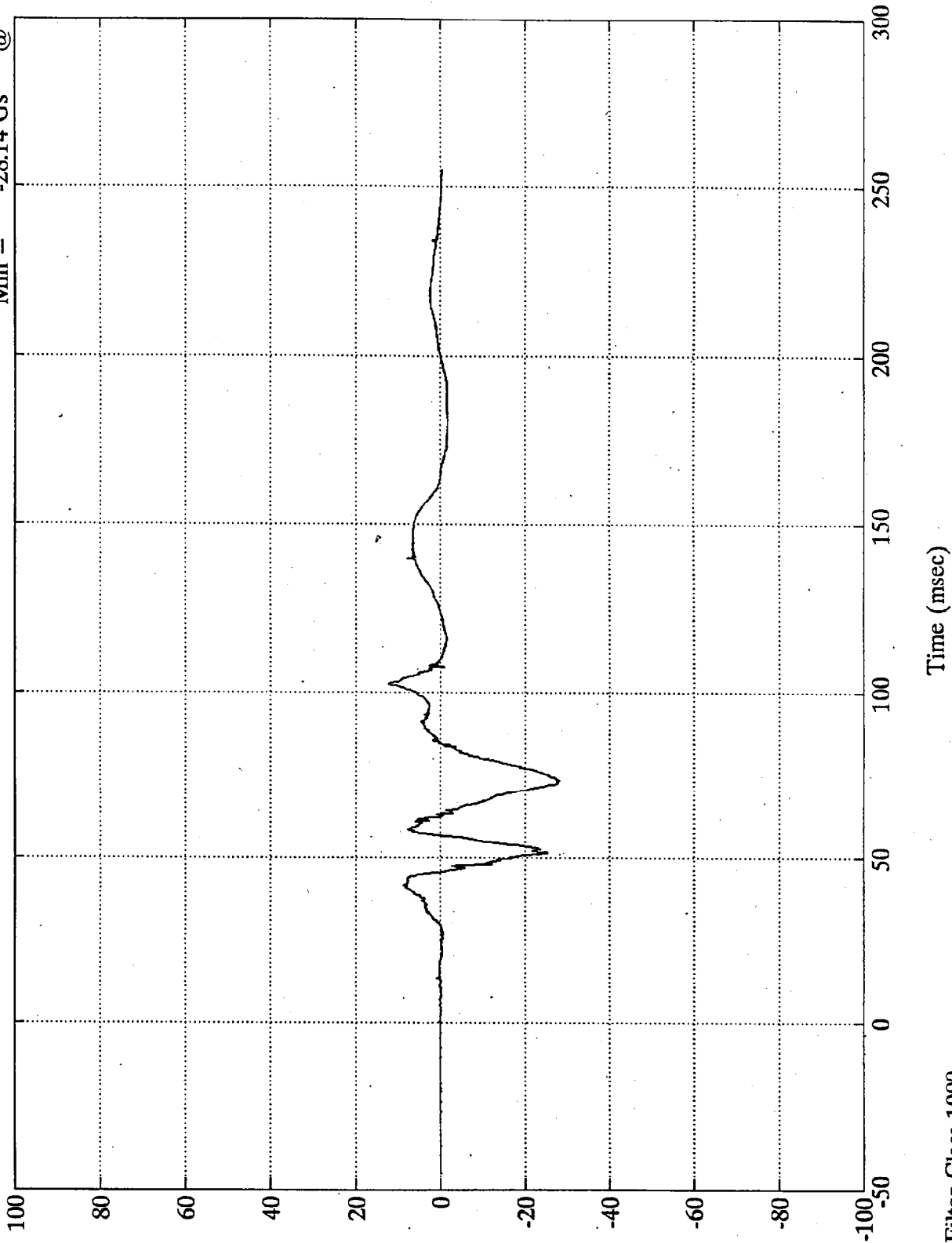
099

Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Head X

Max = 12.31 Gs @ 102.36 msec
Min = -28.14 Gs @ 73.44 msec



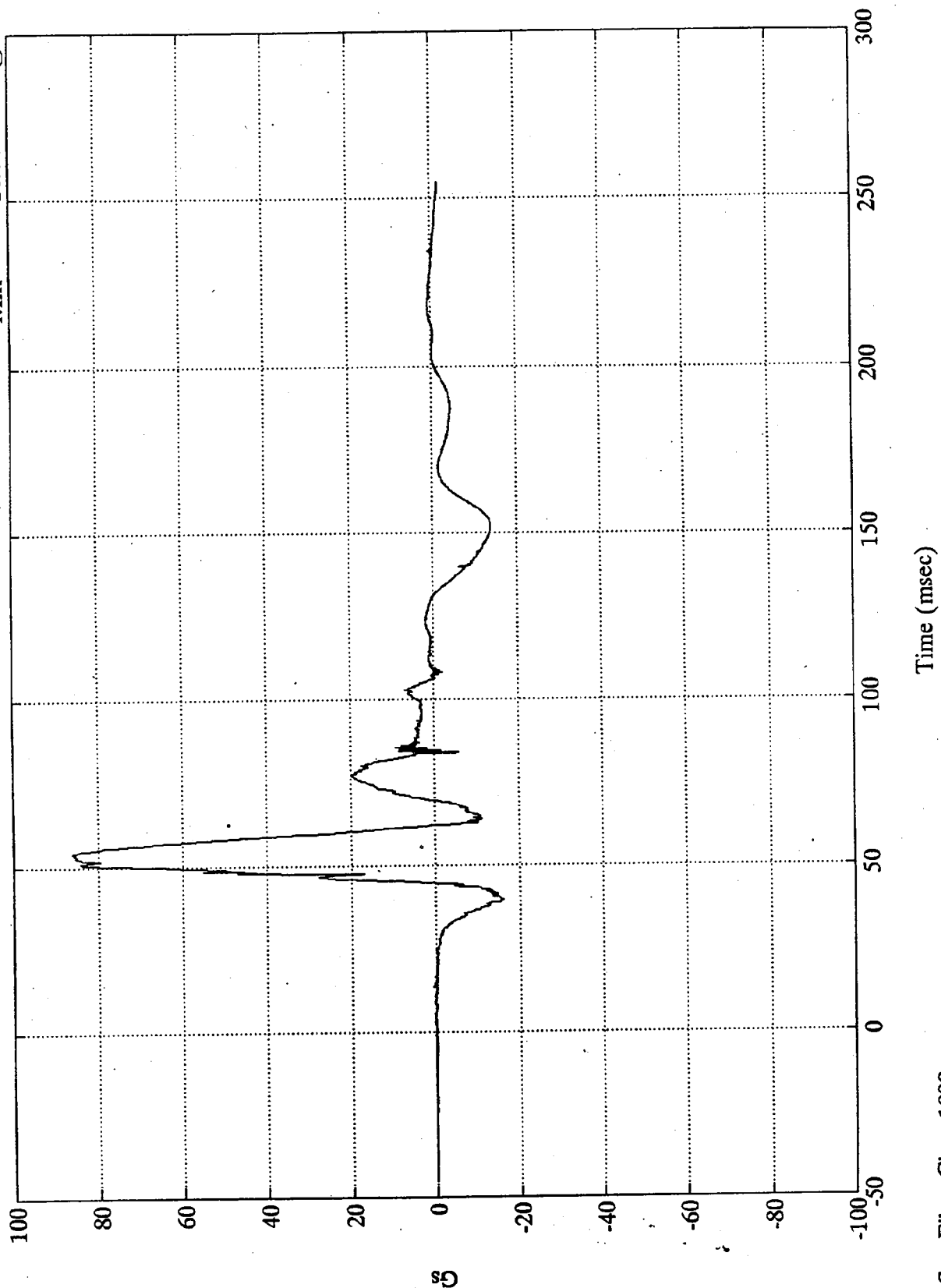
GD
B-18

8017-3
Sae Filter Class 1000

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Head Y

Max = 86.16 Gs @ 54.00 msec
Min = -16.04 Gs @ 39.84 msec



B-19

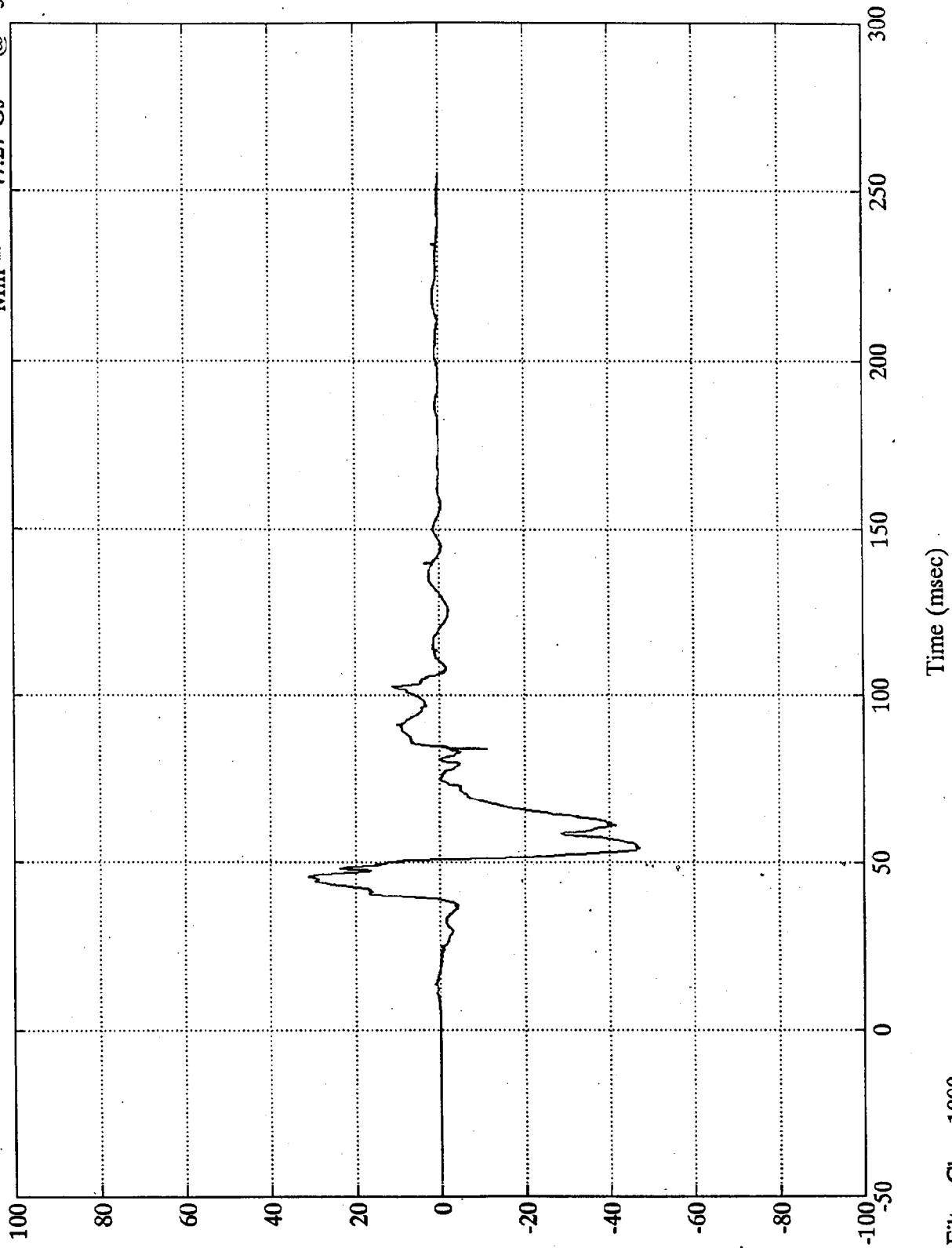
Sae Filter Class 1000

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Head Z

Max = 31.21 Gs @ 45.60 msec
Min = -47.27 Gs @ 54.23 msec



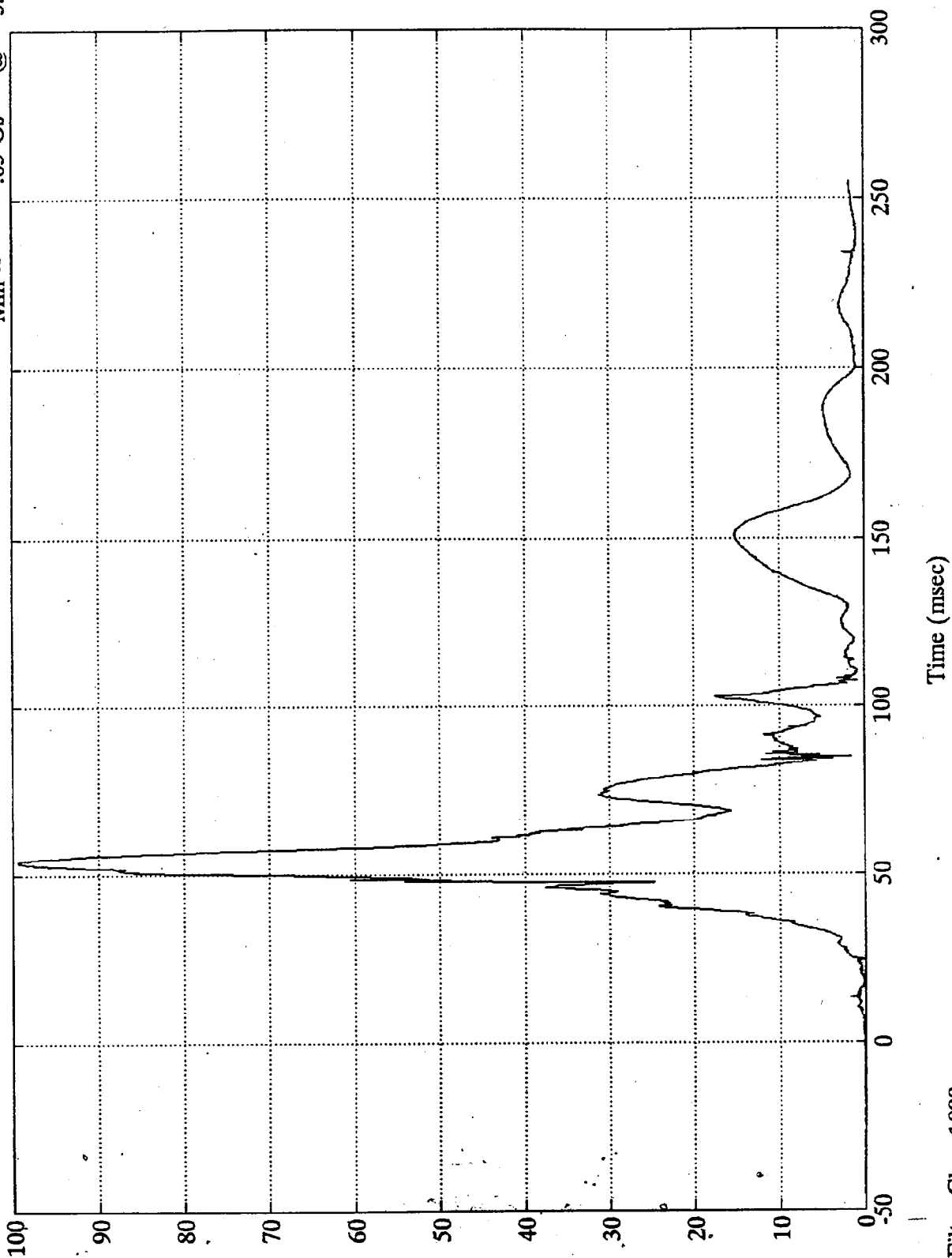
Sae Filter Class 1000

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Head Resultant

Max = 99.42 Gs @ 54.00 msec
Min = .05 Gs @ 5.99 msec



B-21

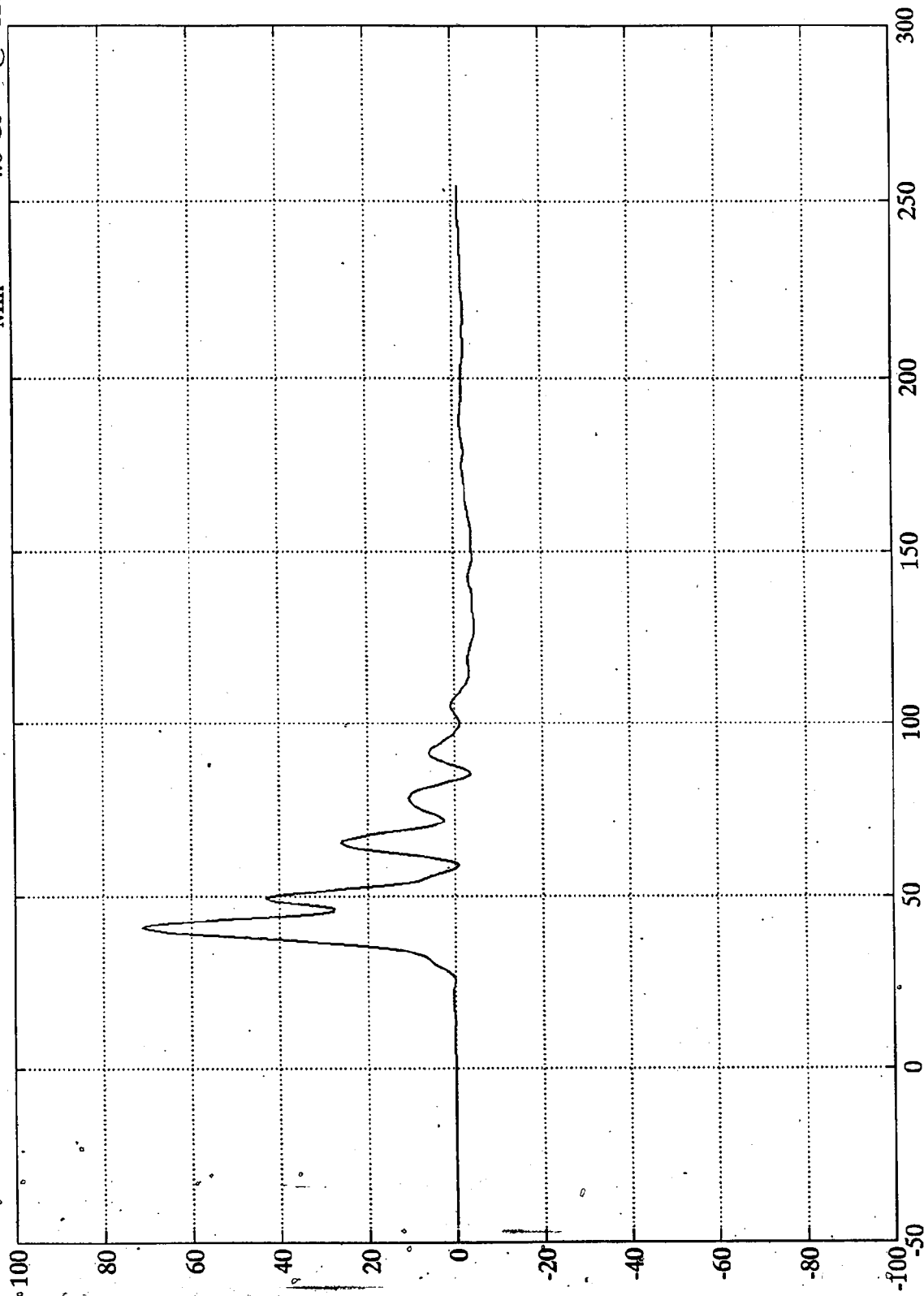
103

Sae Filter Class 1000
8017-8

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Upper Rib Y

Max = 71.0 Gs @ 40.625 msec
Min = -4.6 Gs @ 128.75 msec



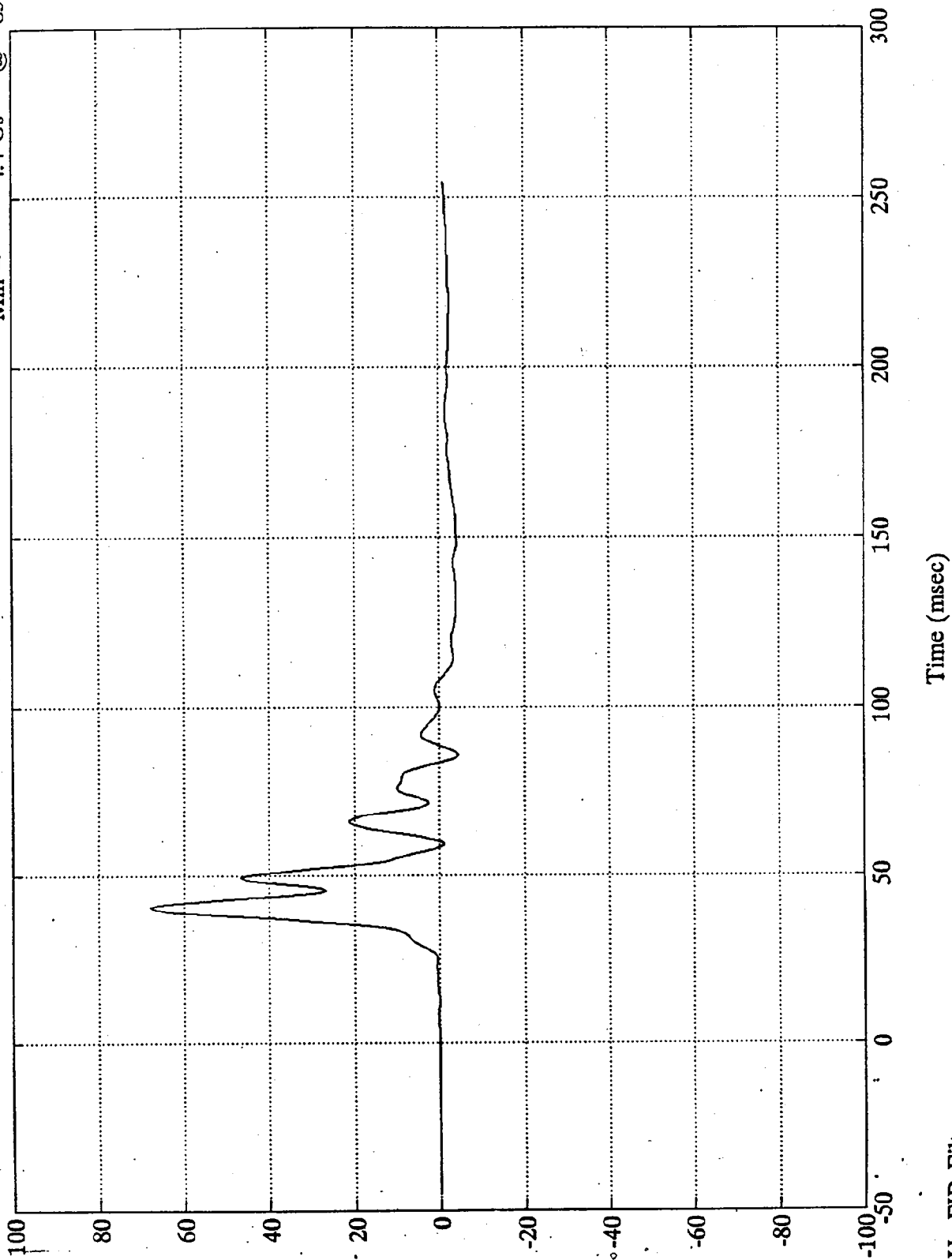
Time (msec)

100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Upper Rib Y(R)

Max = 67.8 Gs @ 40.625 msec
Min = -4.4 Gs @ 85.62 msec

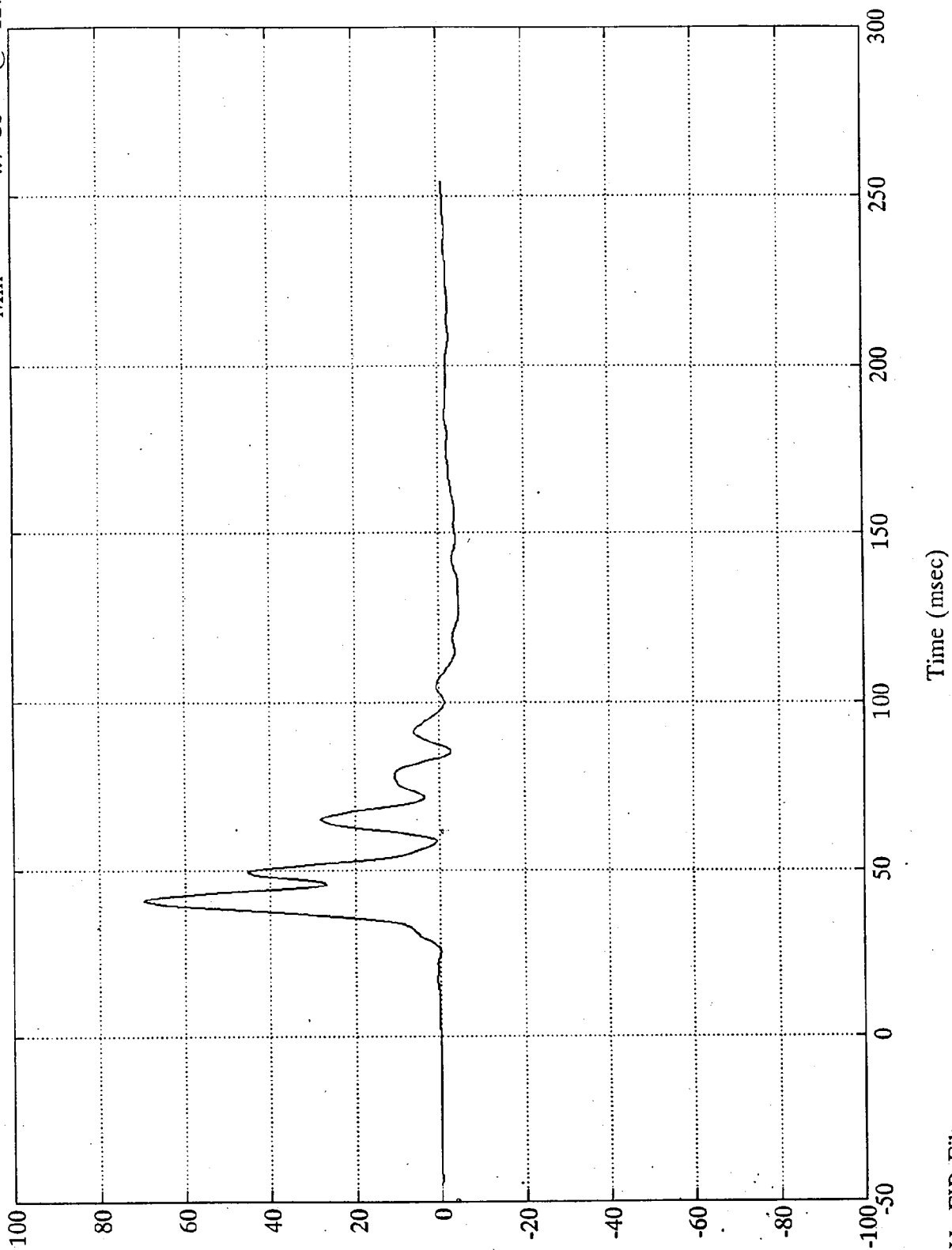


100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Upper Rib Y(R.R.)

Max = 69.6 Gs @ 40.625 msec
Min = -4.7 Gs @ 127.50 msec



100 Hz FIR Filter

106

B-24

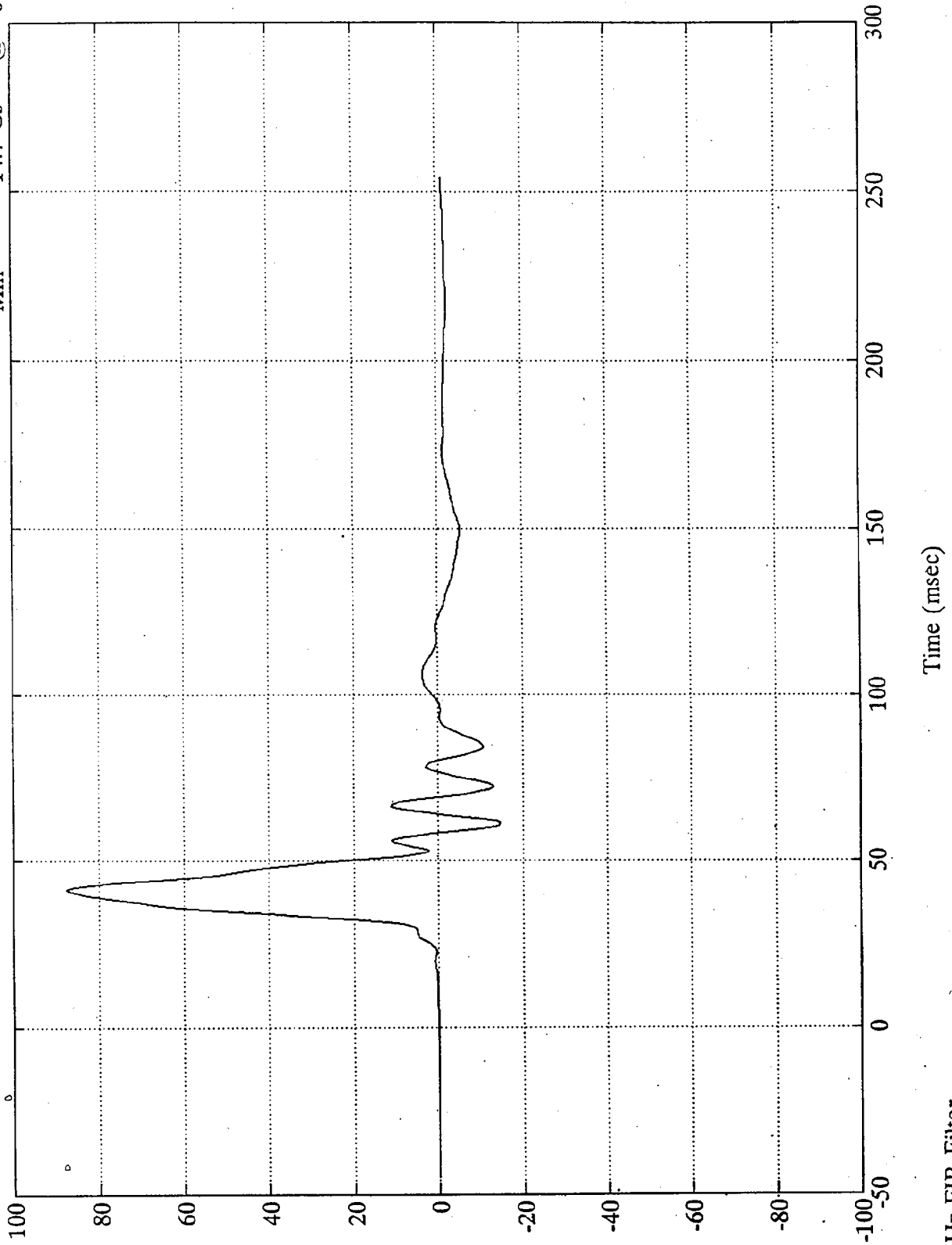
8017-3

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Lower Rib Y

Max = 87.4 Gs @ 41.250 msec
 Min = -14.7 Gs @ 61.25 msec

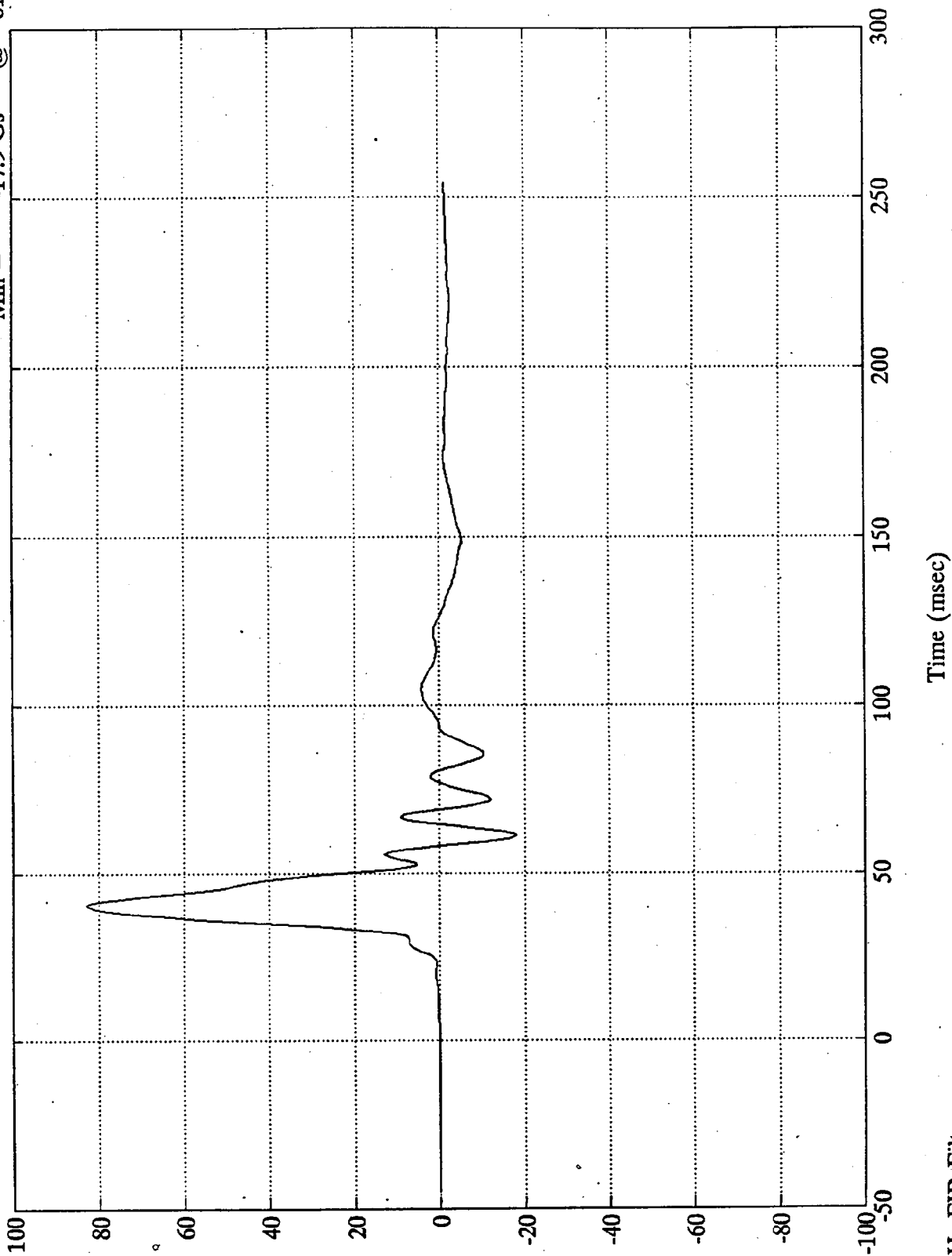


100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Lower Rib Y(R)

Max = 82.7 Gs @ 40.625 msec
Min = -17.9 Gs @ 61.25 msec



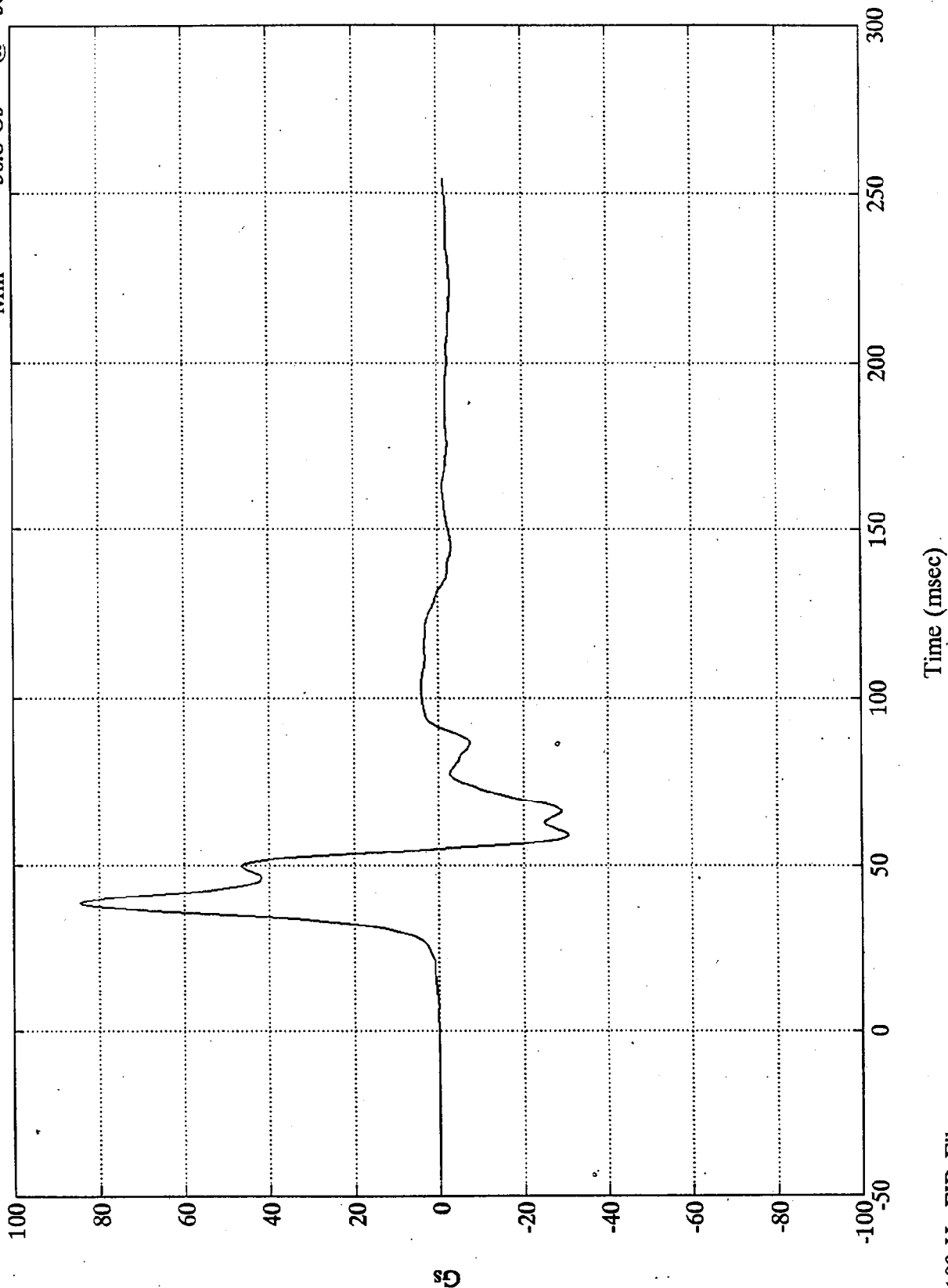
B-27

8017-3 100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Lower Spine Y

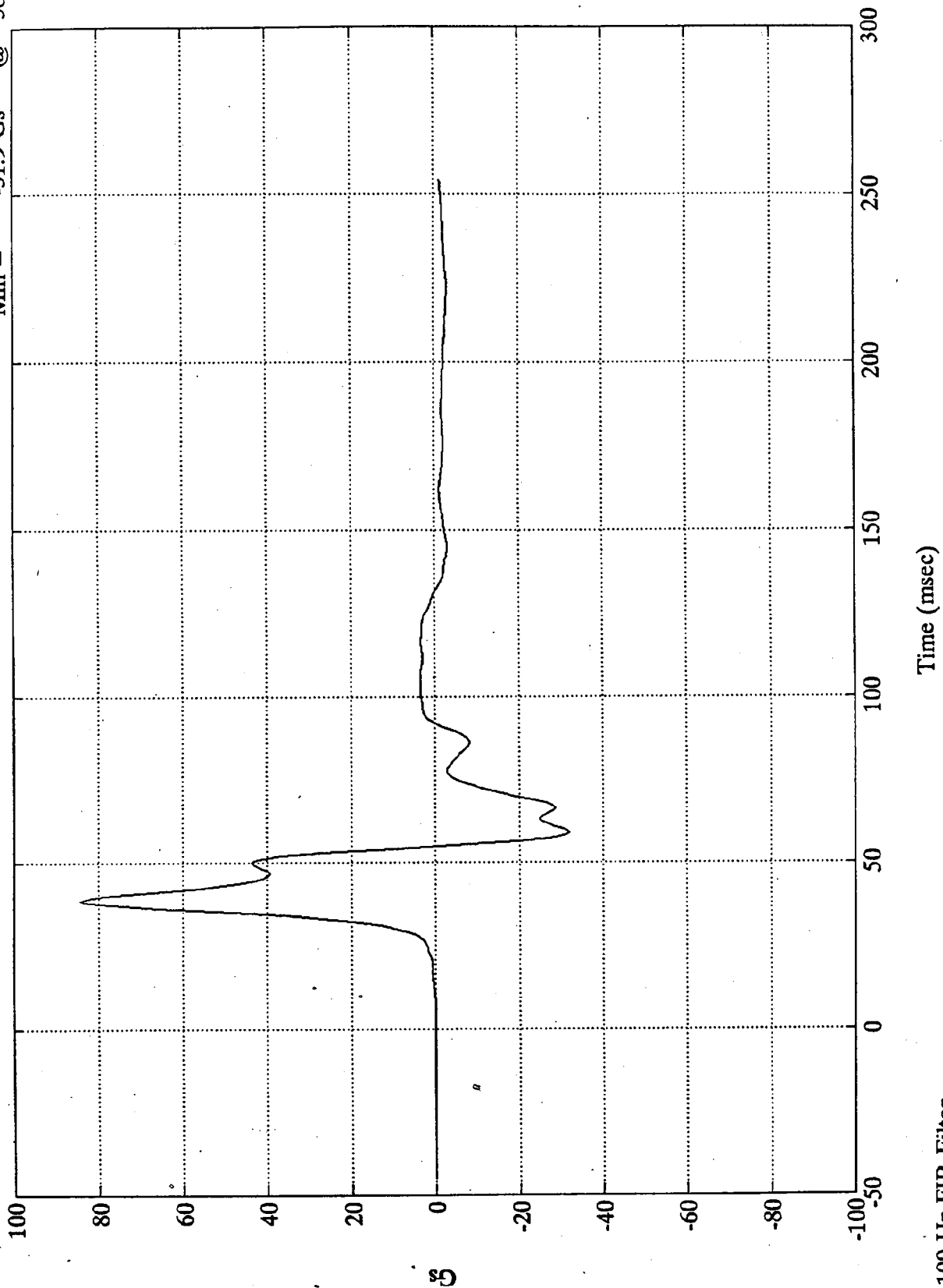
Max = 84.4 Gs @ 38.750 msec
Min = -30.8 Gs @ 58.75 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Lower Spine Y(R)

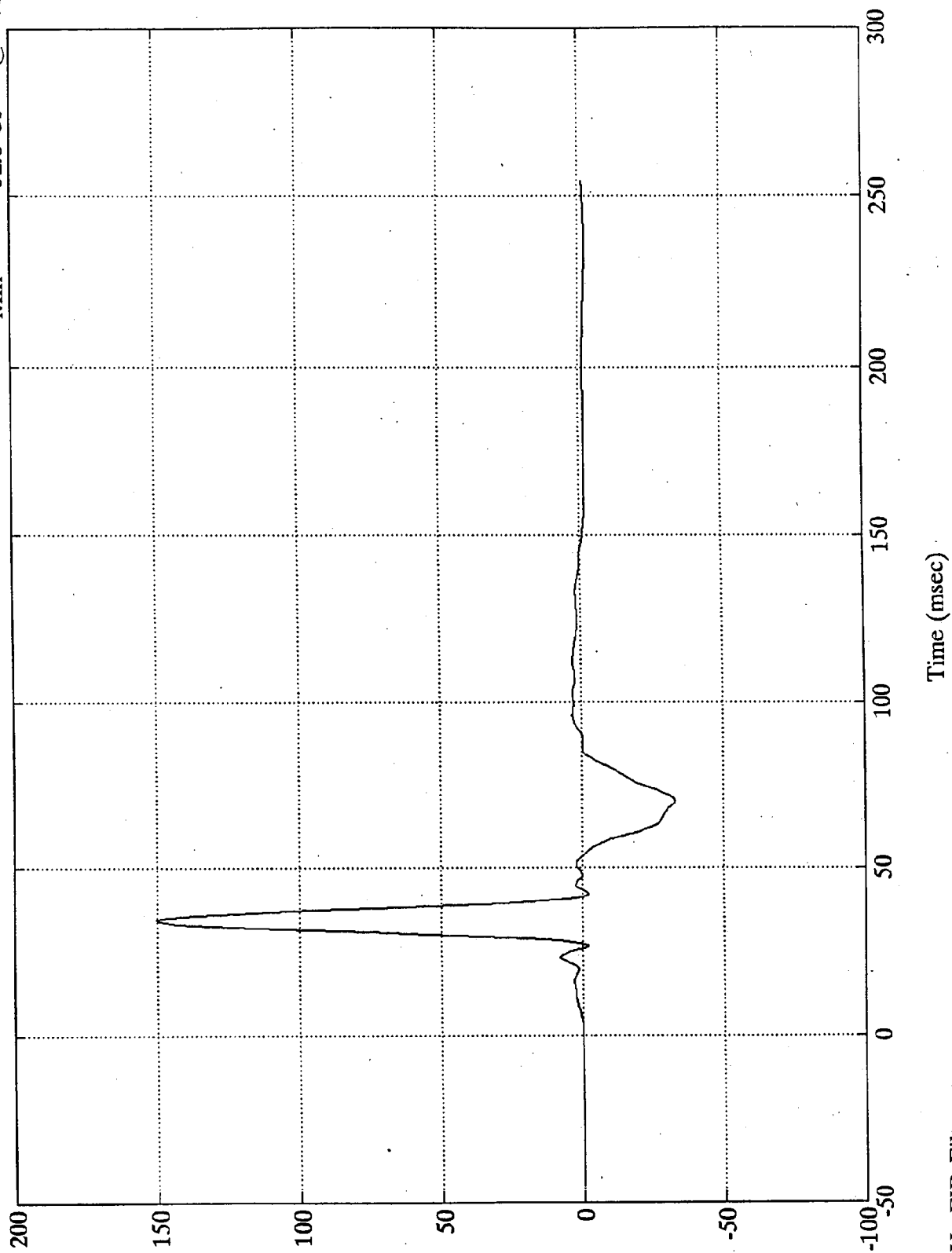
Max = 84.3 Gs @ 38.750 msec
Min = -31.9 Gs @ 58.75 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Pelvic Y

Max = 150.4 Gs @ 34.375 msec
Min = -32.8 Gs @ 70.00 msec

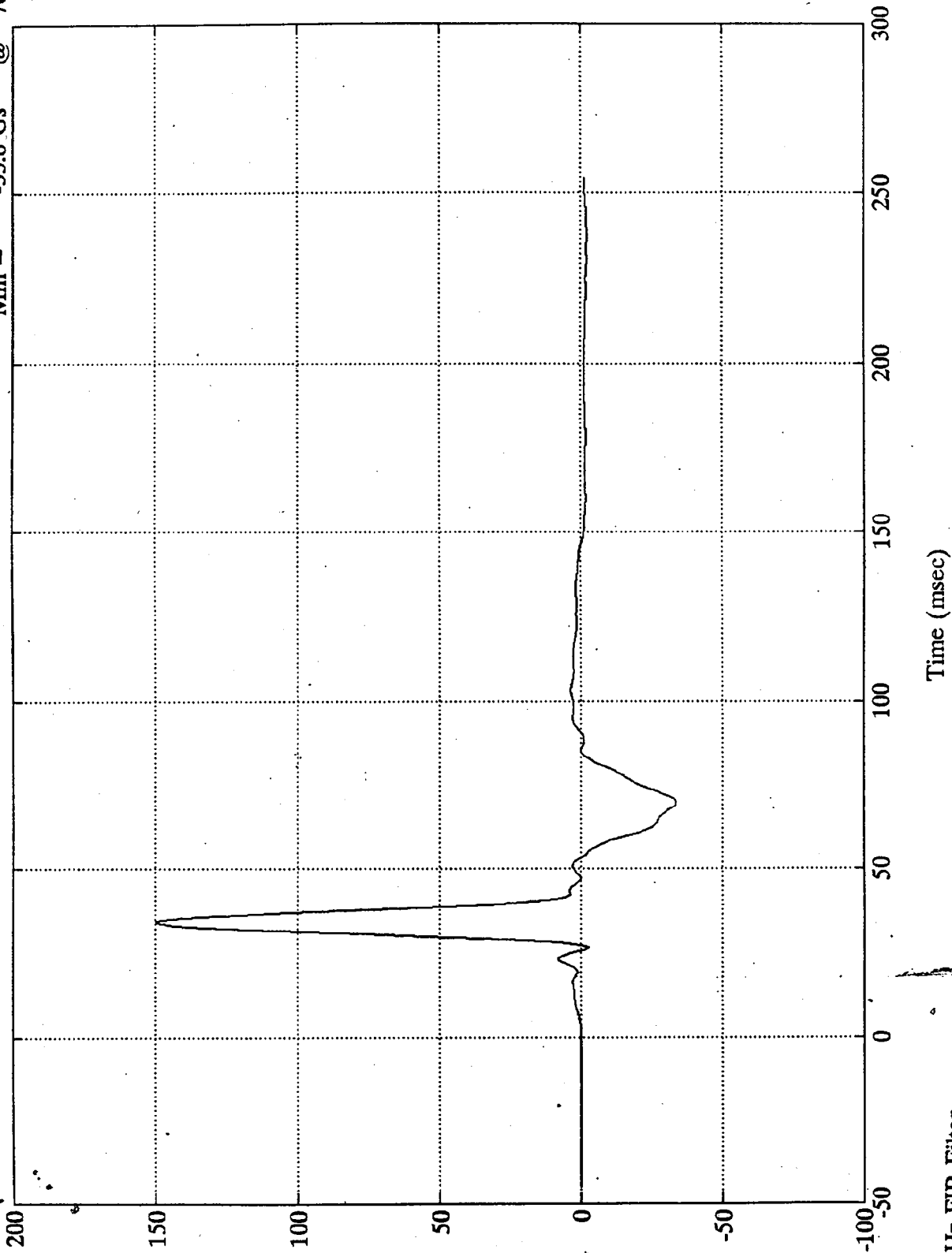


100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Pelvic Y(R)

Max = 149.7 Gs @ 34.375 msec
Min = -33.6 Gs @ 70.00 msec

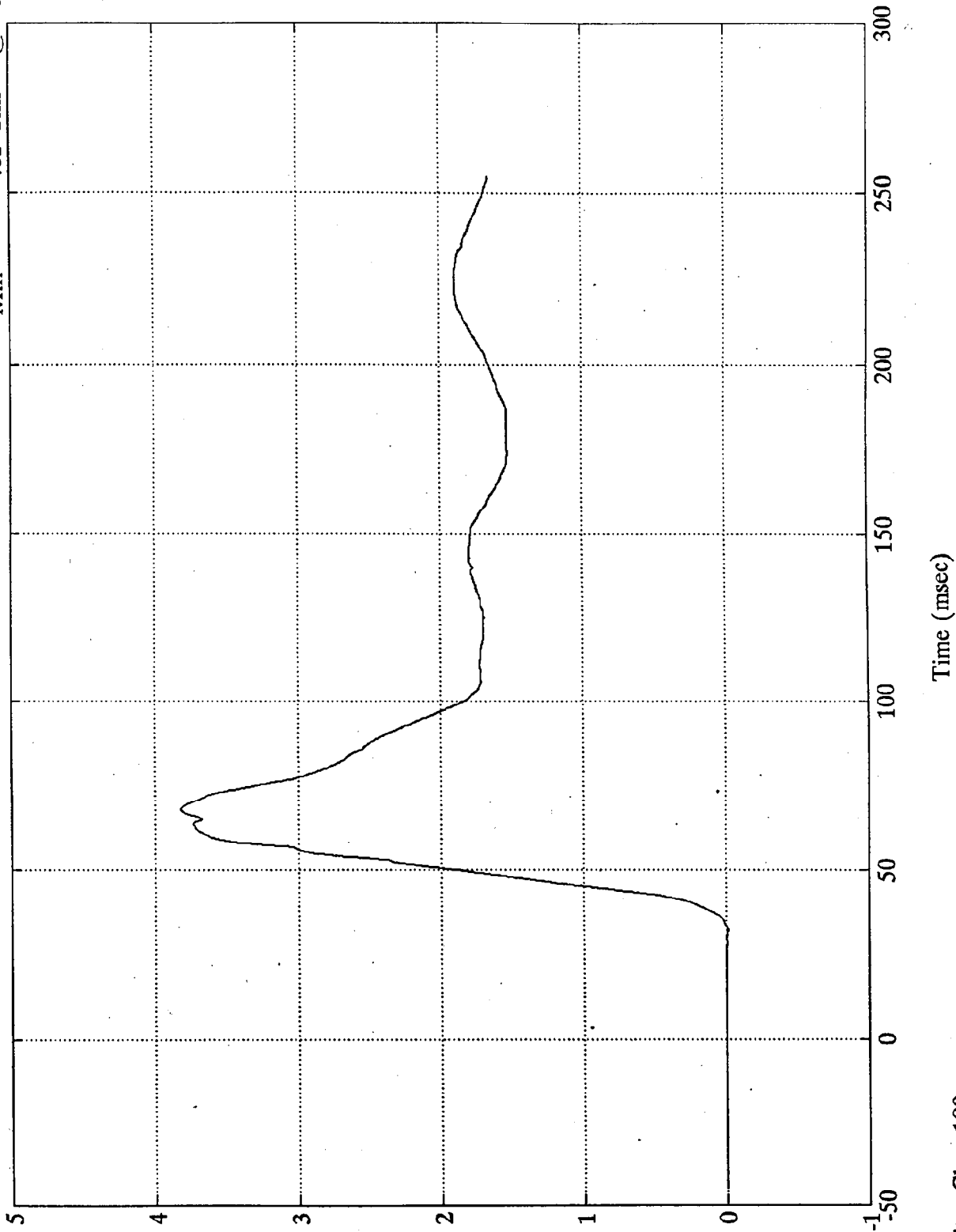


100 Hz FIR Filter

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Chest Deflection

Max = 3.82 Cms @ 67.80 msec
Min = -.01 Cms @ 32.04 msec



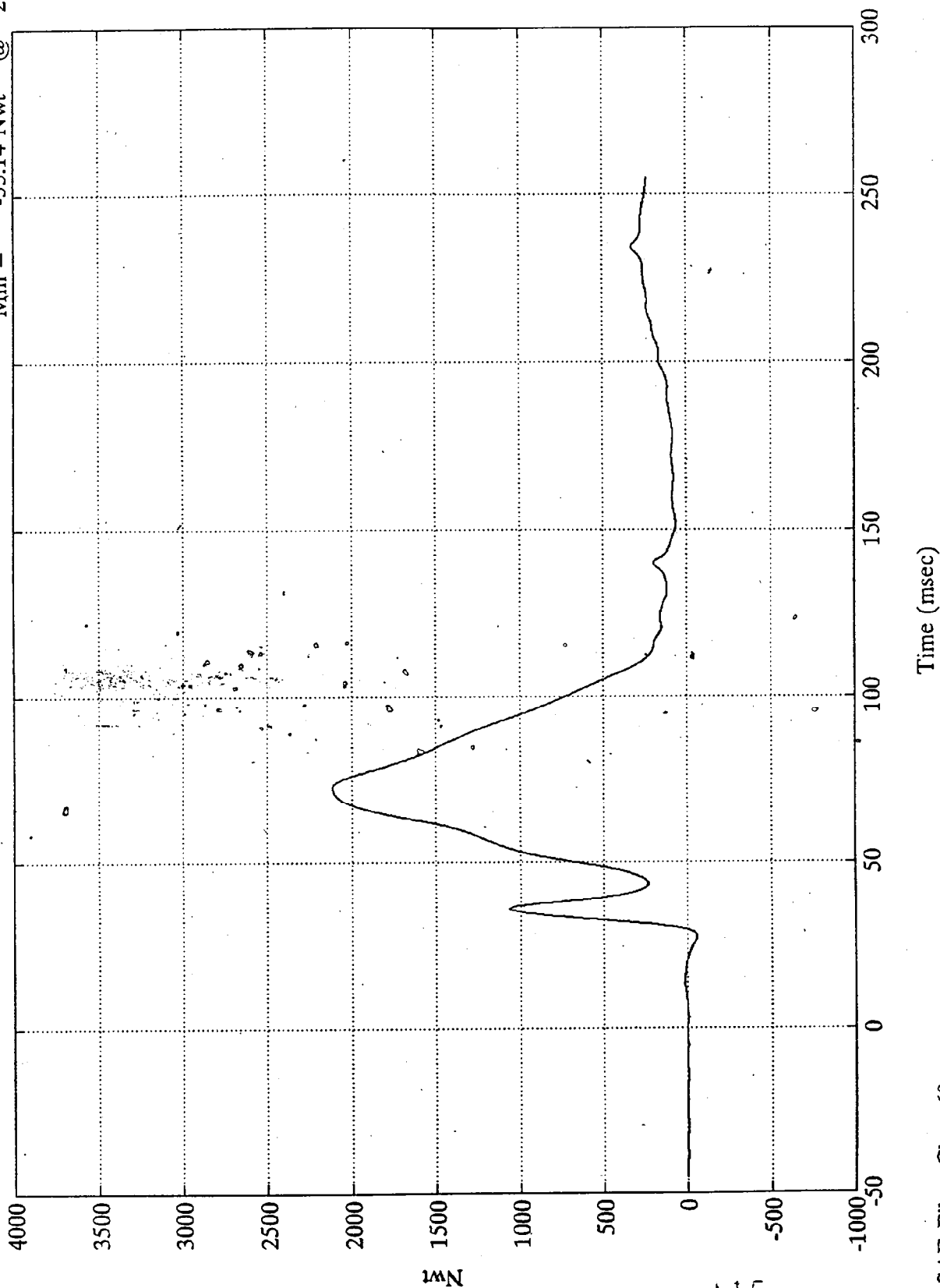
B-32
Cms

8017-3
Sae Filter Class 180

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

P4 Torso Belt Load

Max = 2115.47 Nwt @ 72.48 msec
Min = -55.14 Nwt @ 27.36 msec



B-33

VEHICLE AND MDB DATA

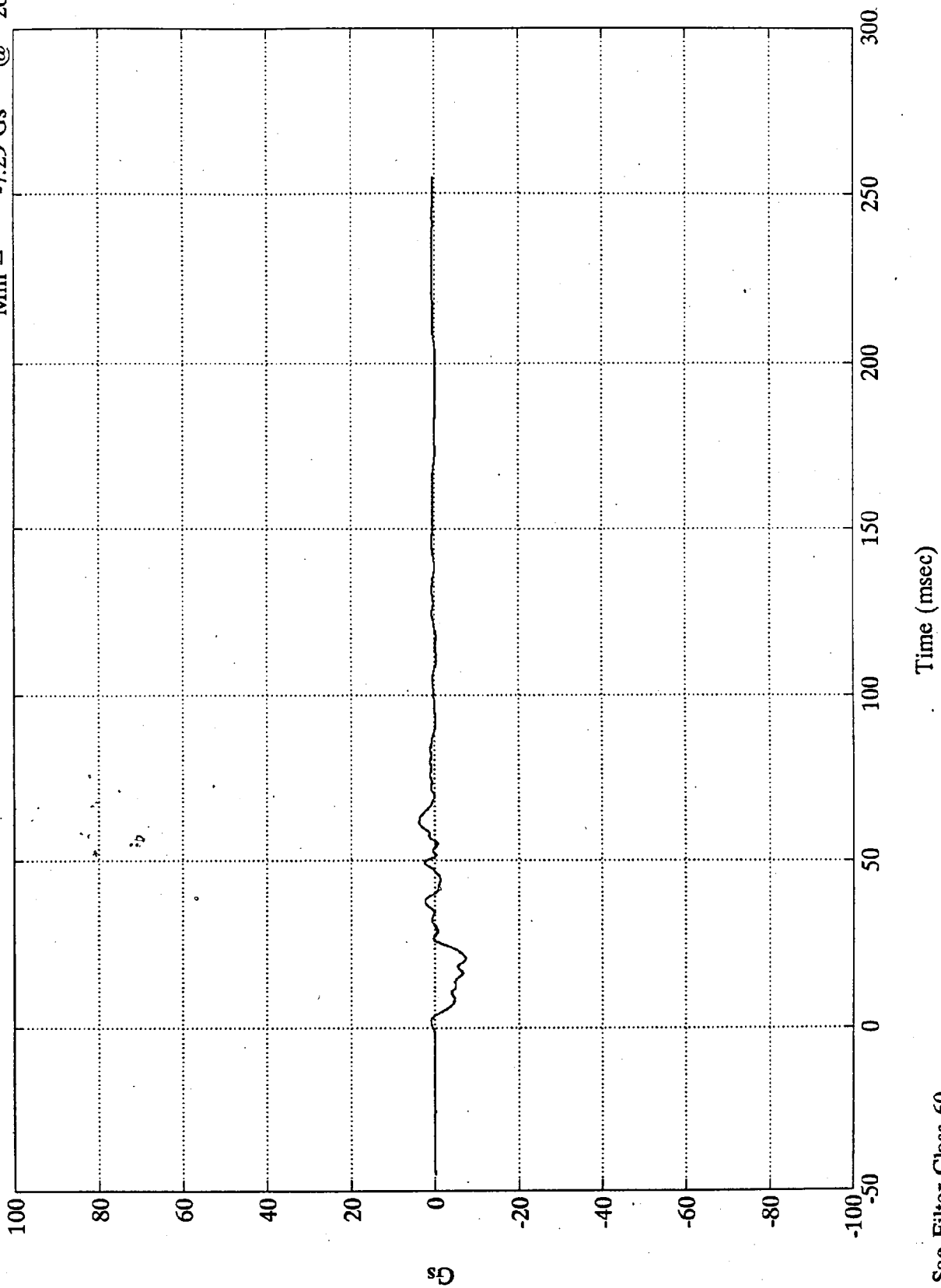
V1 - 1993 TOYOTA COROLLA

V2 - MDB

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill X

Max = 3.73 Gs @ 61.31 msec
Min = -7.29 Gs @ 20.76 msec



B-35

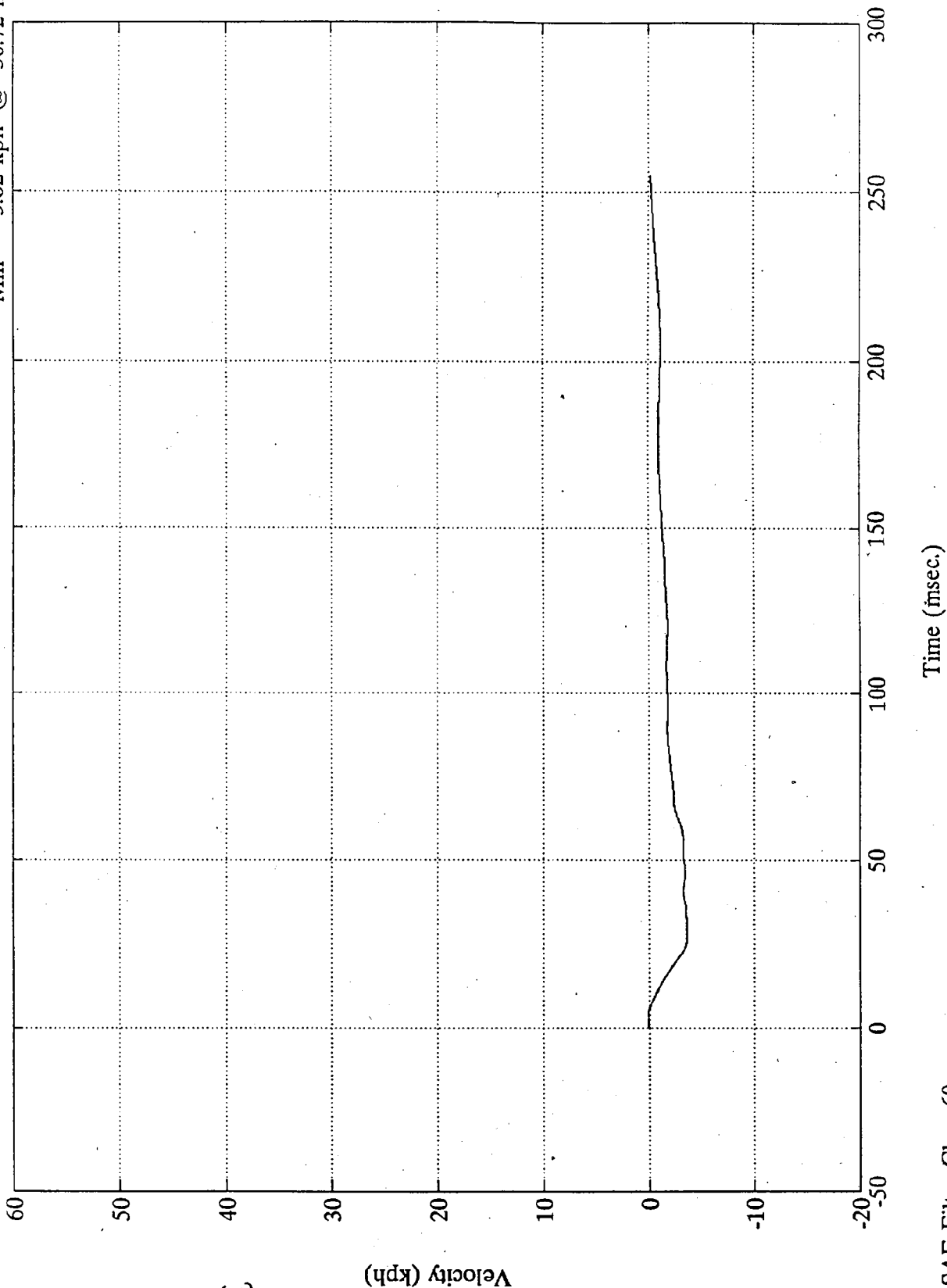
Sae Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill X

Max = 0.09 kph @ 3.60 msec
Min = -3.62 kph @ 30.72 msec

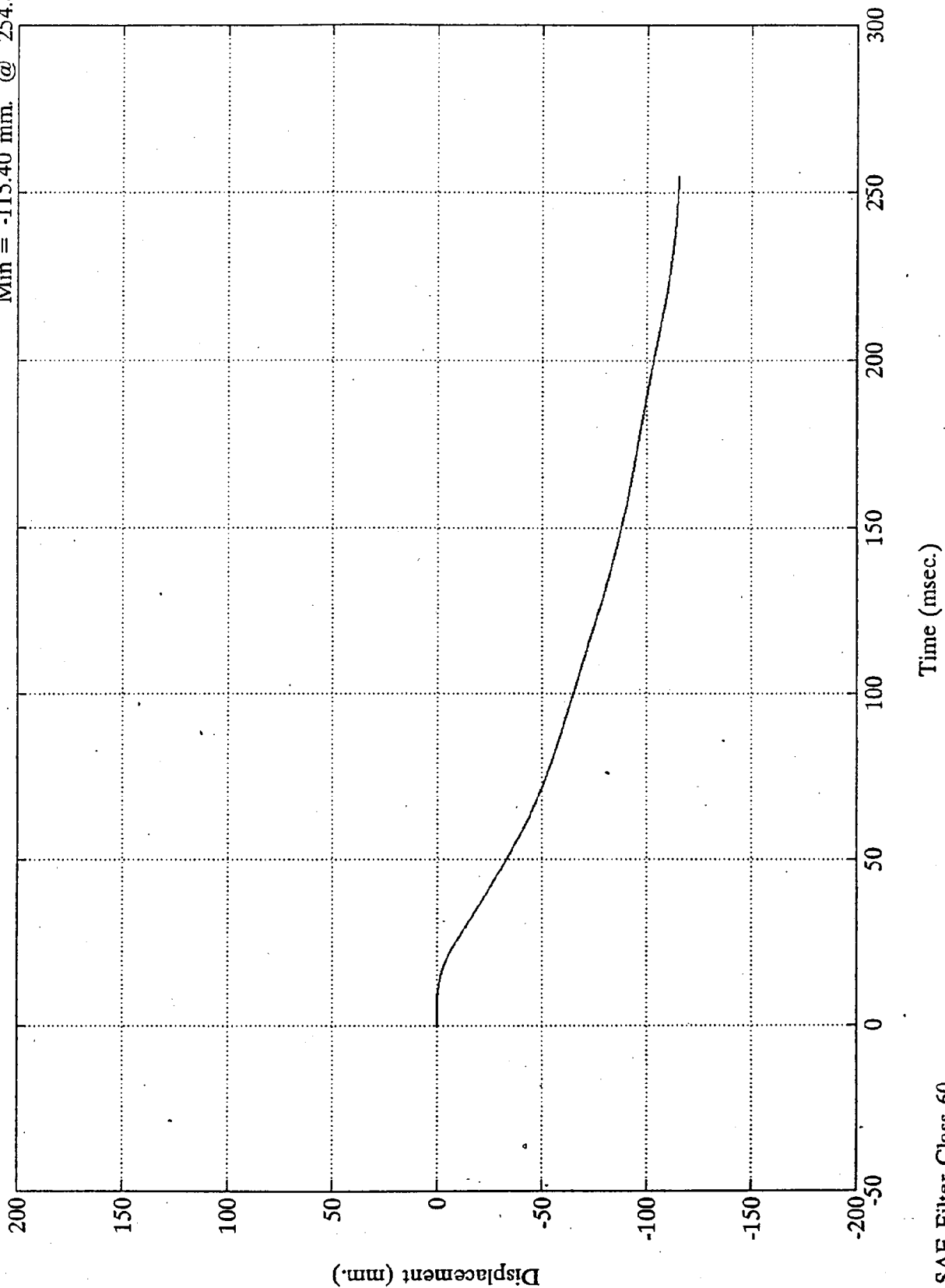


SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill X

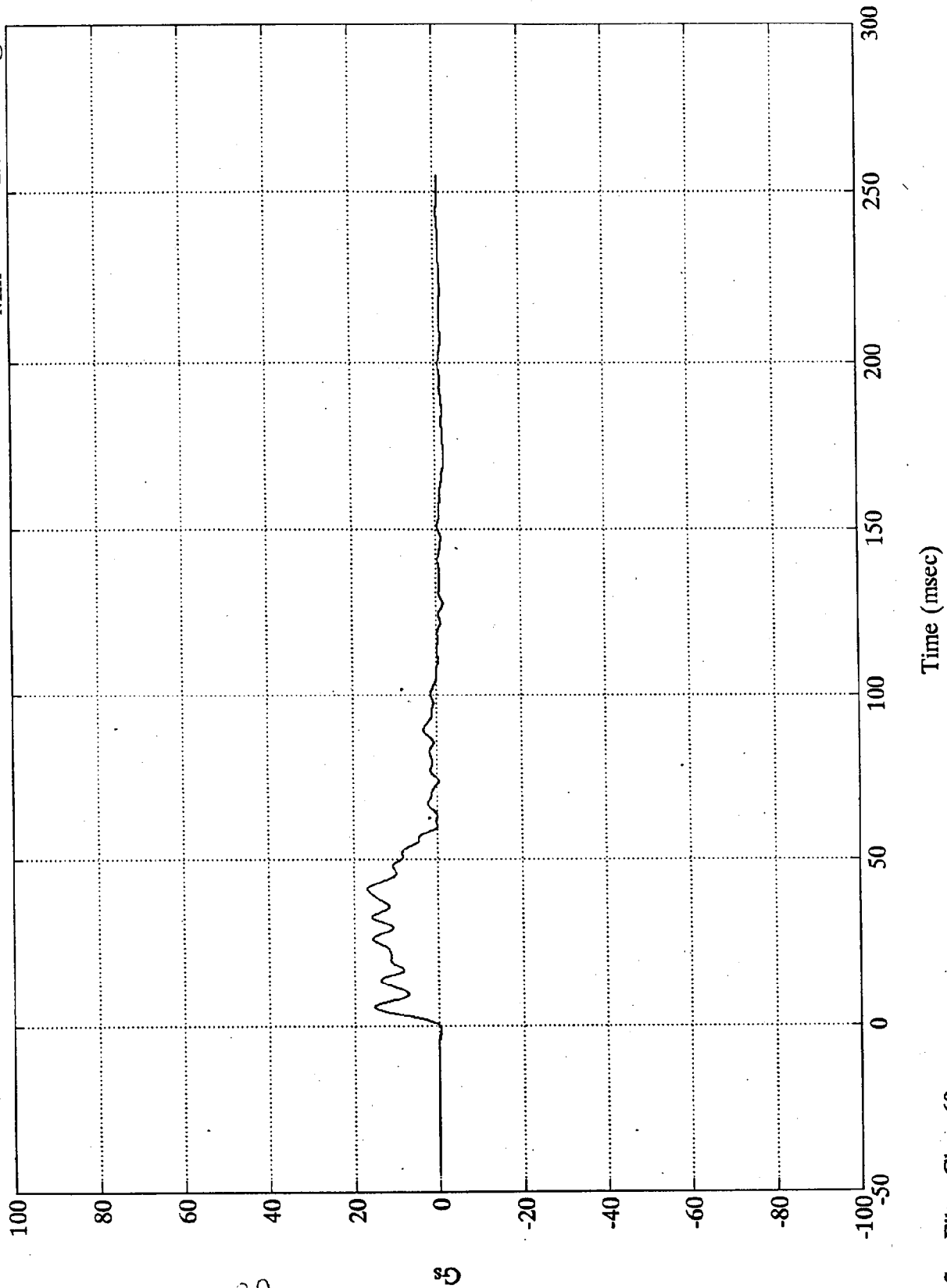
Max = 0.08 mm. @ 5.52 msec
Min = -115.40 mm. @ 254.88 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill Y

Max = 16.81 Gs @ 41.04 msec
Min = -2.08 Gs @ 174.12 msec



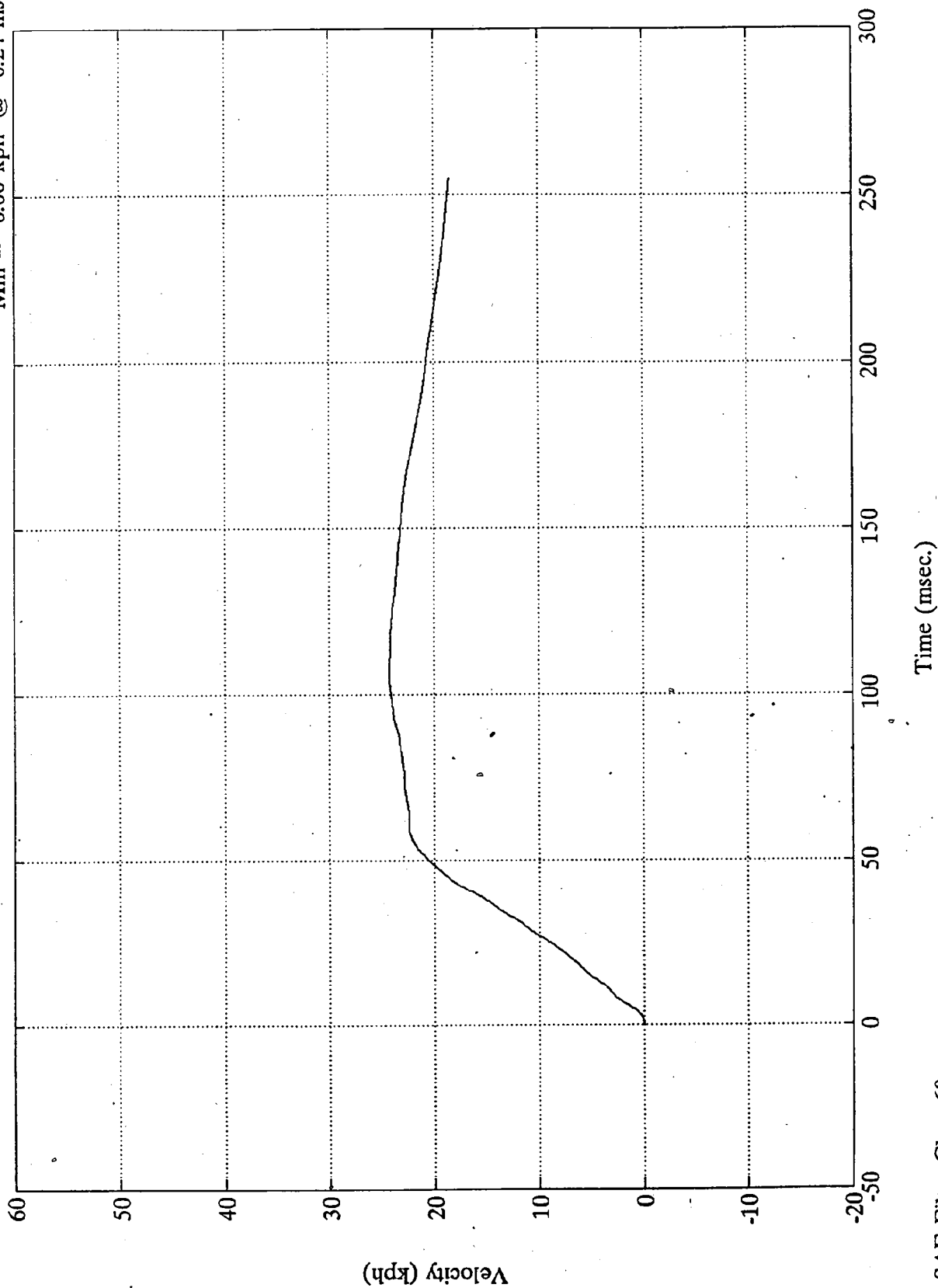
Sae Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill Y

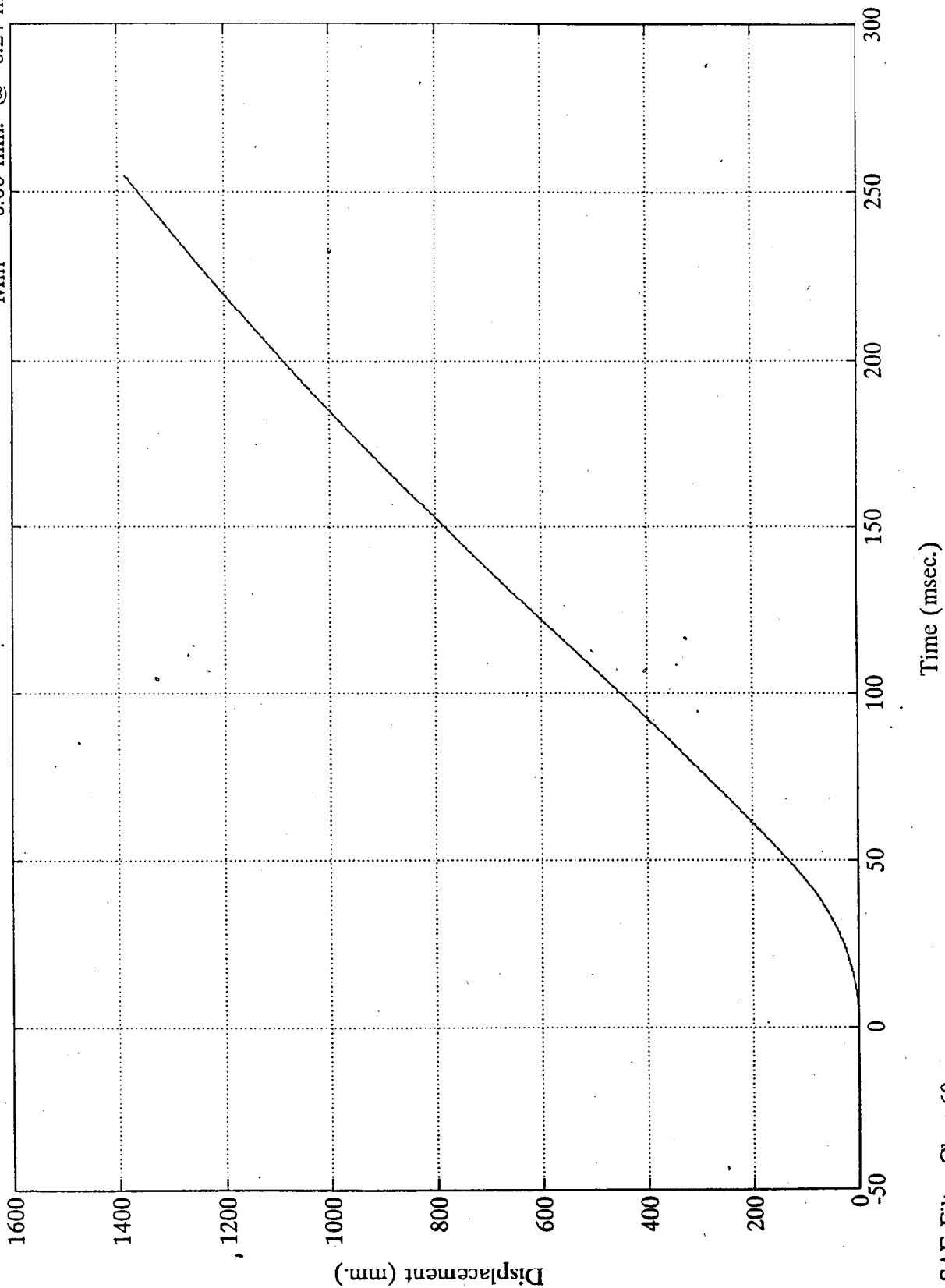
Max = 24.29 kph @ 109.44 msec
Min = -0.00 kph @ 0.24 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill Y

Max = 1386.00 mm. @ 254.88 msec
Min = -0.00 mm. @ 0.24 msec



SAE Filter Class 60

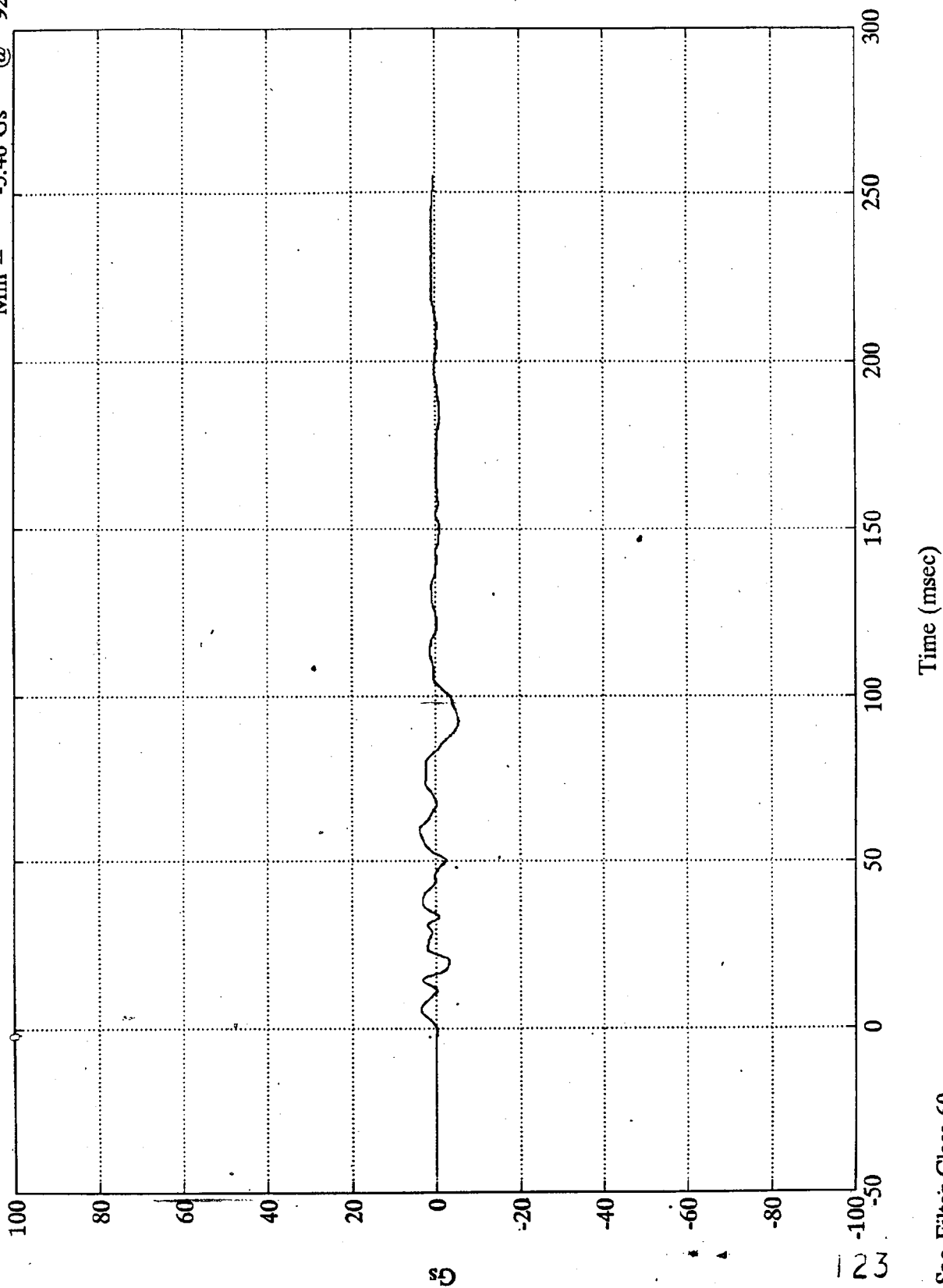
8017-3

B-40

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill Z

Max = 3.85 Gs @ 59.15 msec
Min = -5.46 Gs @ 92.16 msec



B-41

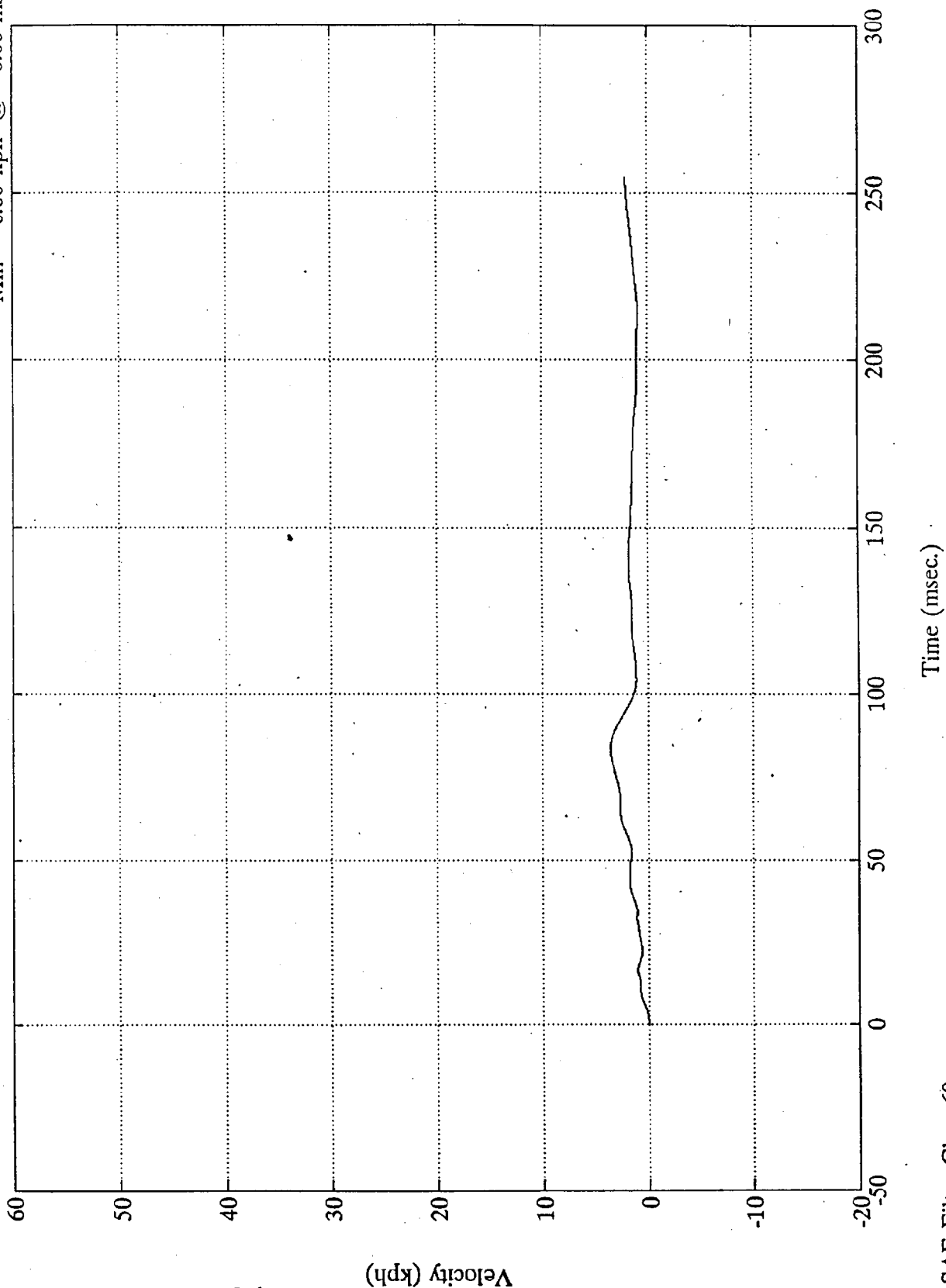
Sae Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill Z

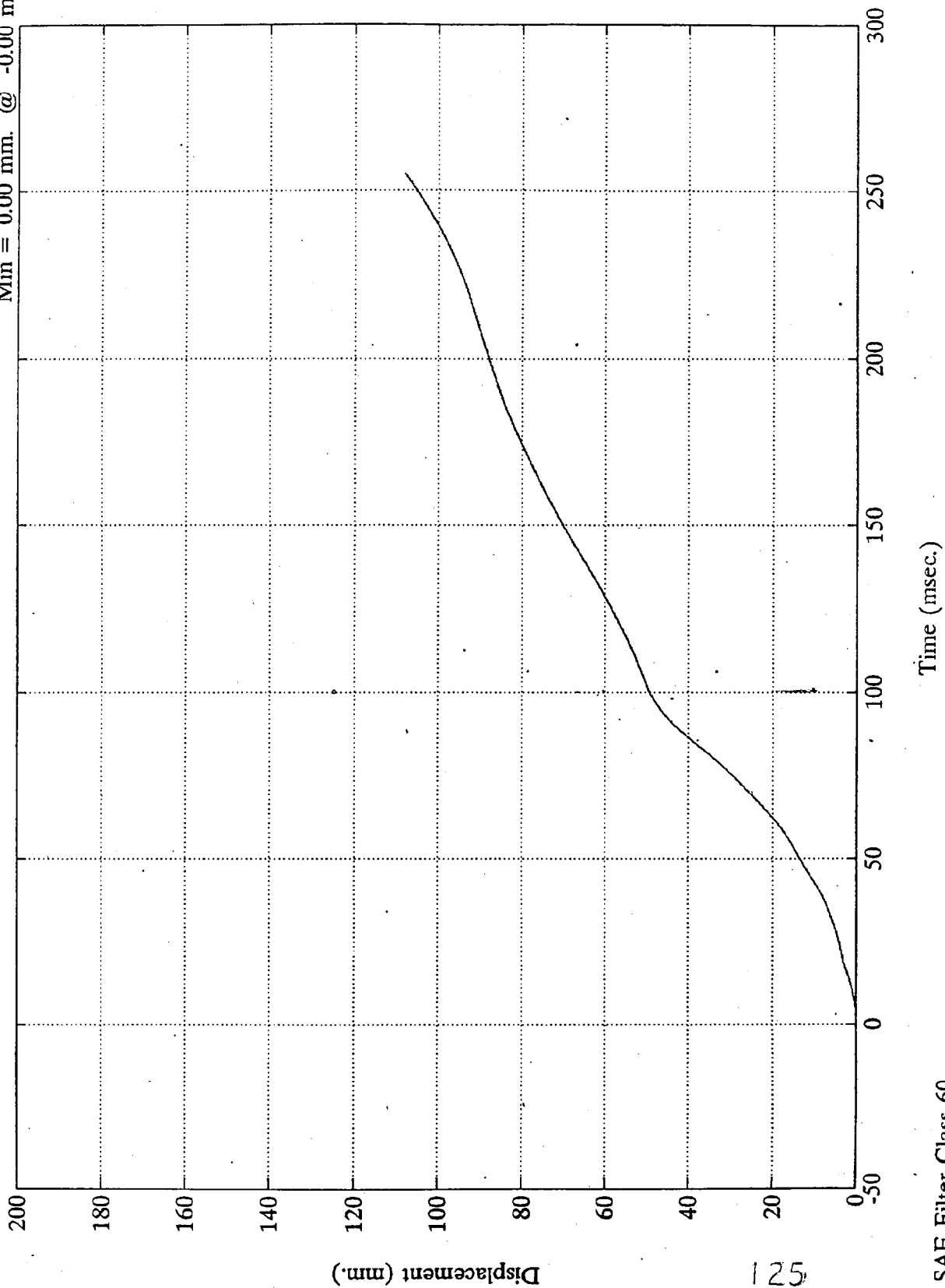
Max = 3.56 kph @ 83.28 msec
Min = 0.00 kph @ -0.00 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill Z

Max = 108.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



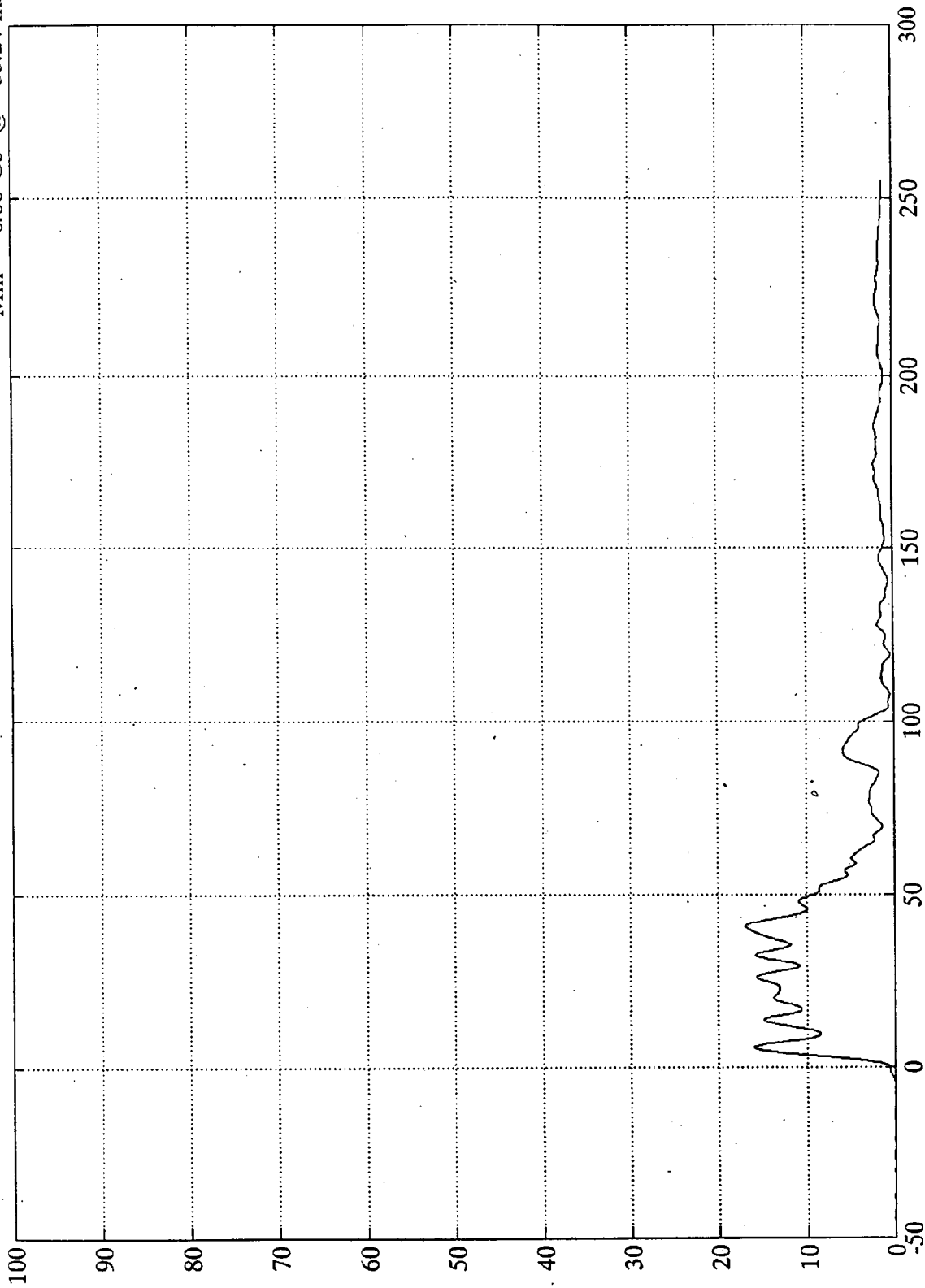
B-43

521

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Front Sill Resultant

Max = 16.98 Gs @ 40.92 msec
Min = 0.00 Gs @ -33.24 msec



Time (msec.)

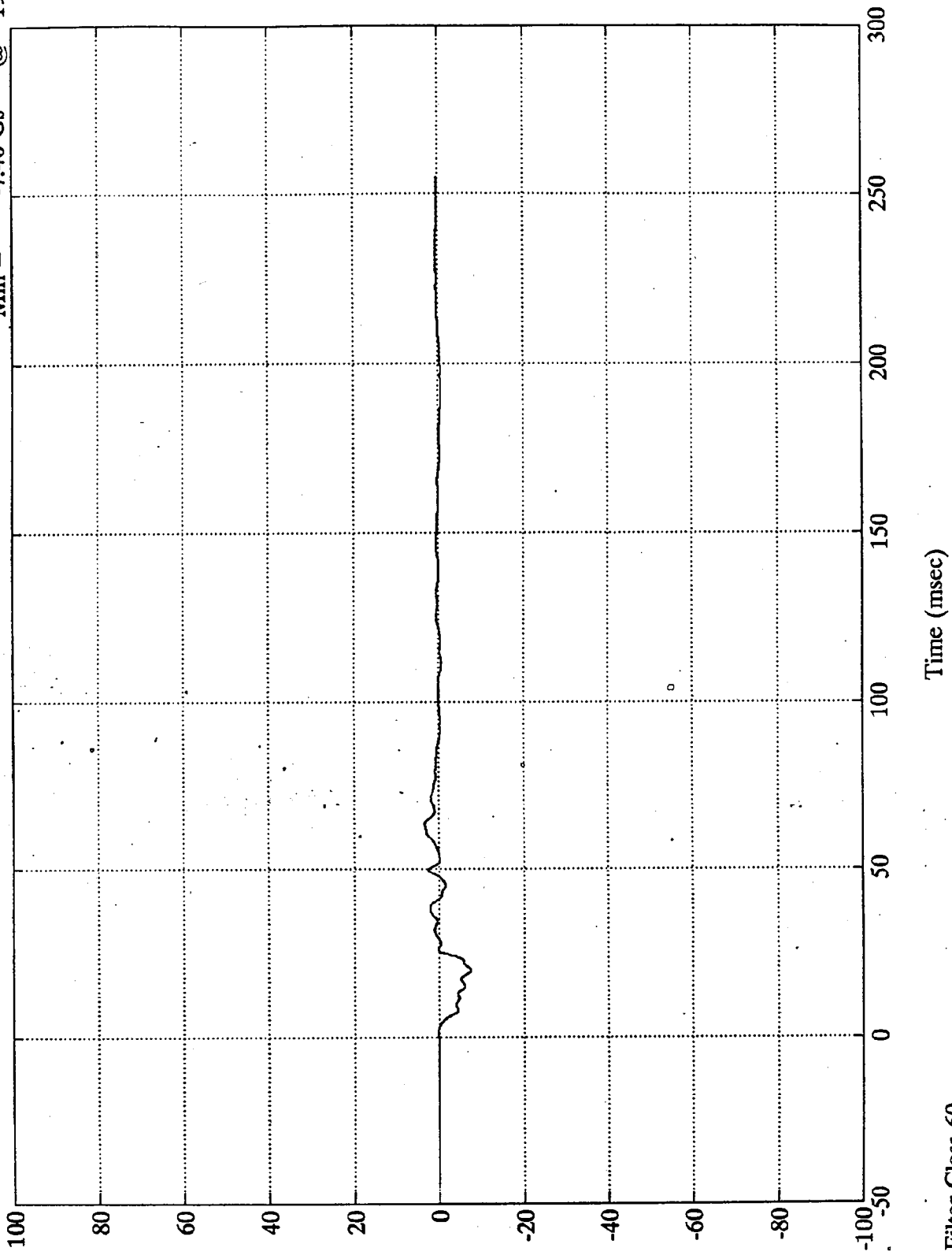
SAE Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill X

Max = 3.31 Gs @ 63.11 msec
Min = -7.40 Gs @ 19.91 msec



B-45

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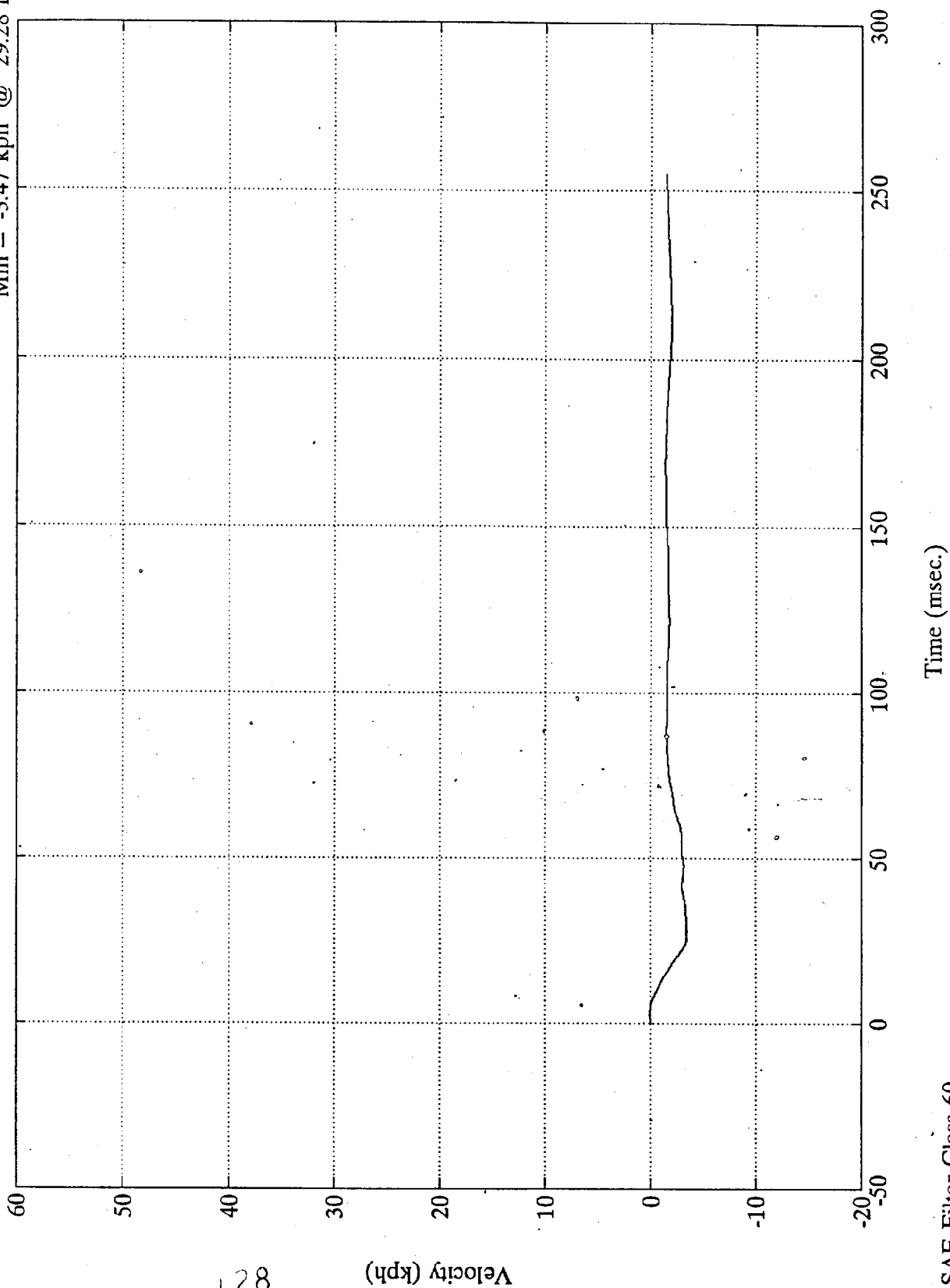
8017-3

Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill X

Max = 0.02 kph @ 2.88 msec
Min = -3.47 kph @ 29.28 msec



SAE Filter Class 60

8017-3

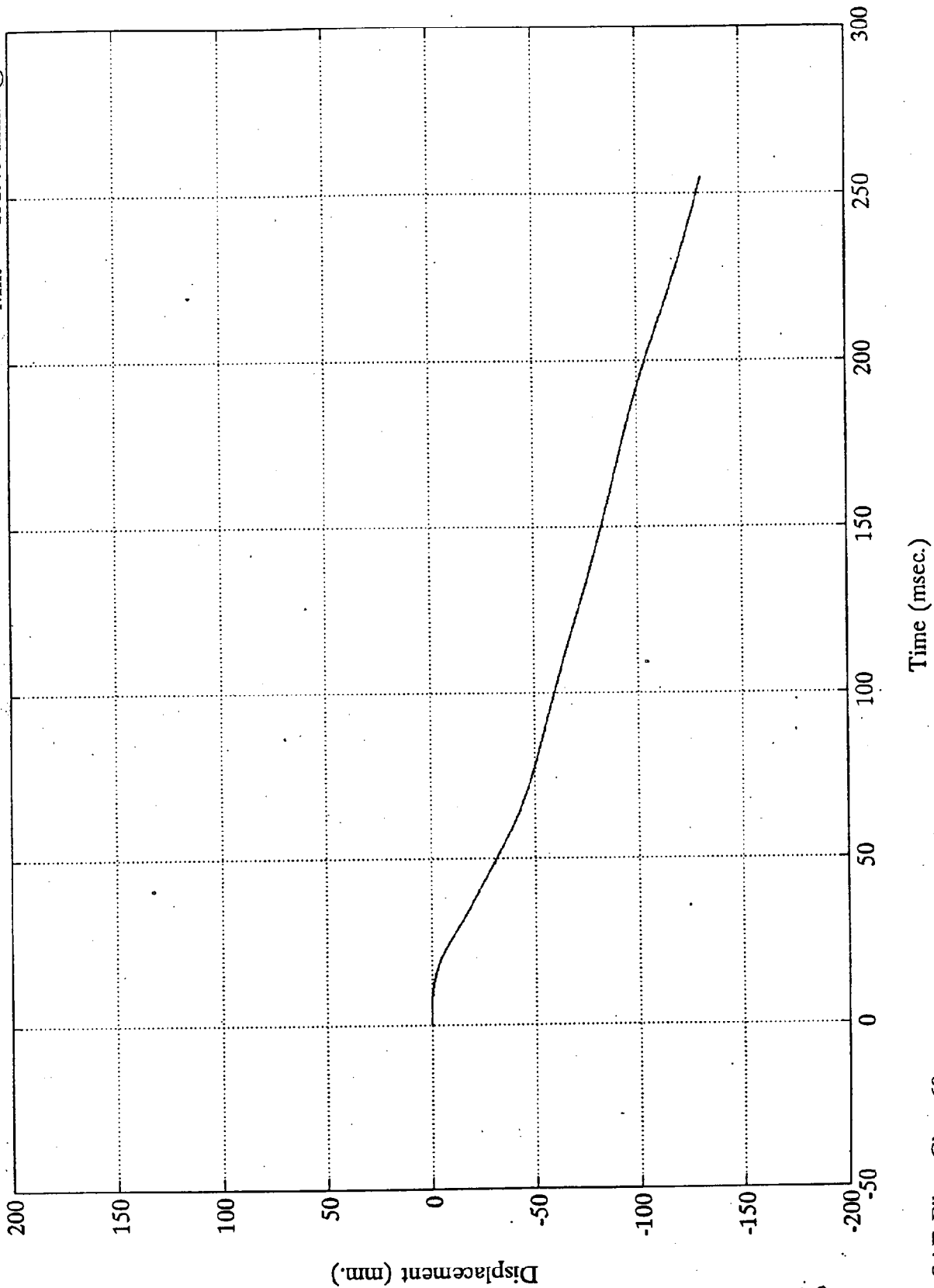
B-46

128

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill X

Max = 0.01 mm. @ 4.32 msec
Min = -131.40 mm. @ 254.88 msec



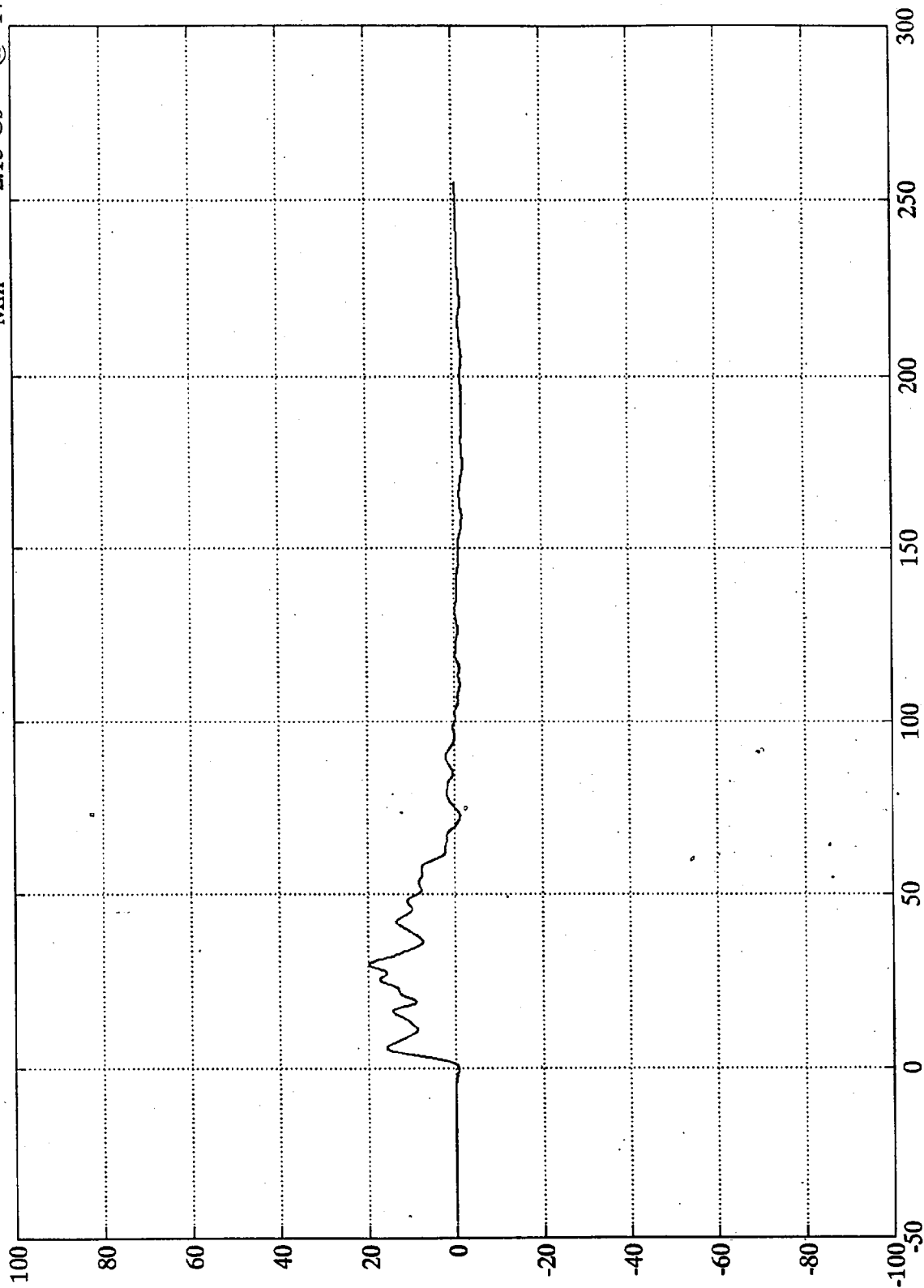
B-47

621

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill Y

Max = 19.73 Gs @ 29.88 msec
Min = -2.15 Gs @ 174.24 msec



Time (msec)

Sae Filter Class 60

8017-3

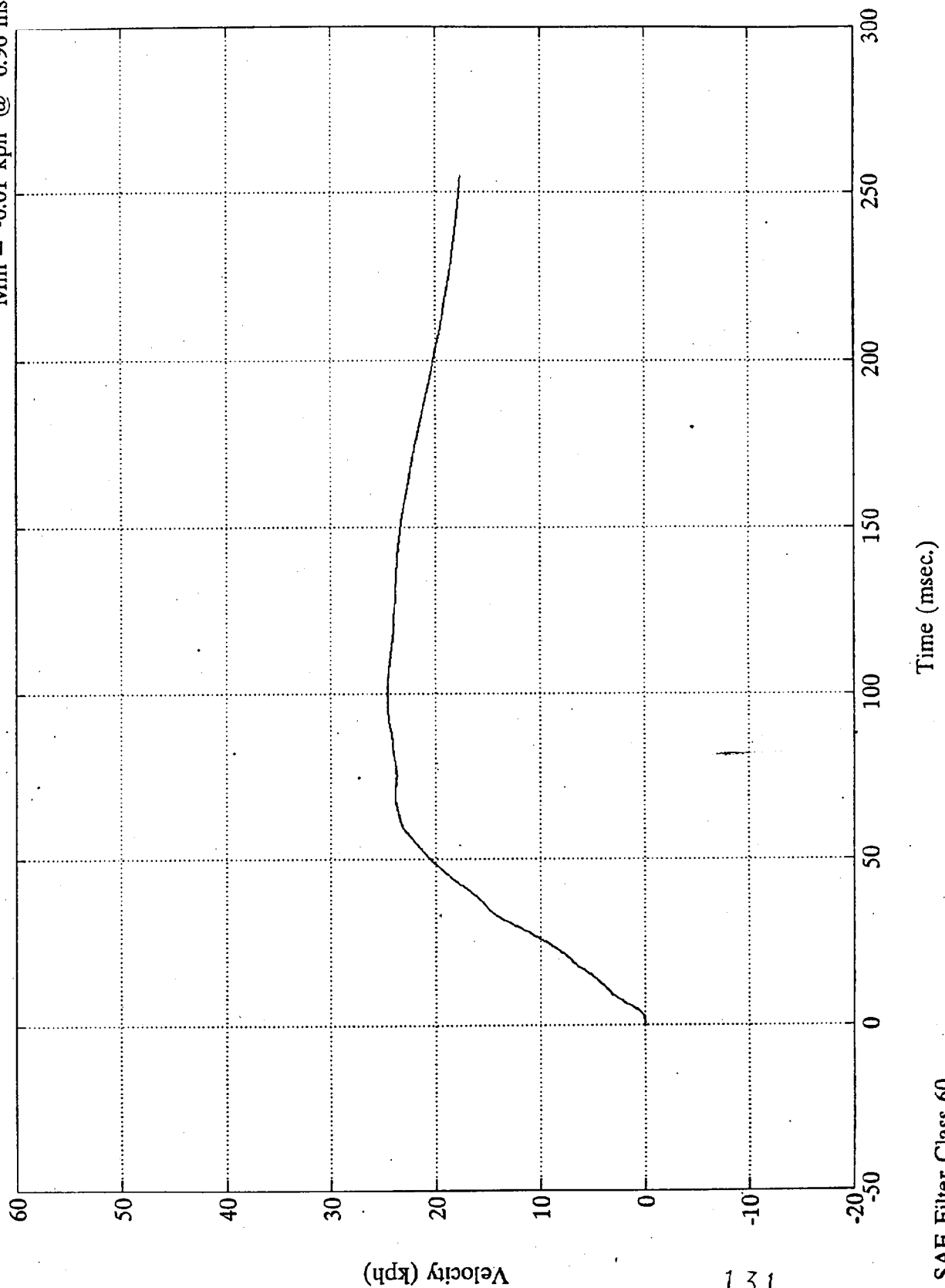
130

B-48

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill Y

Max = 24.58 kph @ 100.32 msec
Min = -0.01 kph @ 0.96 msec



B-49

131

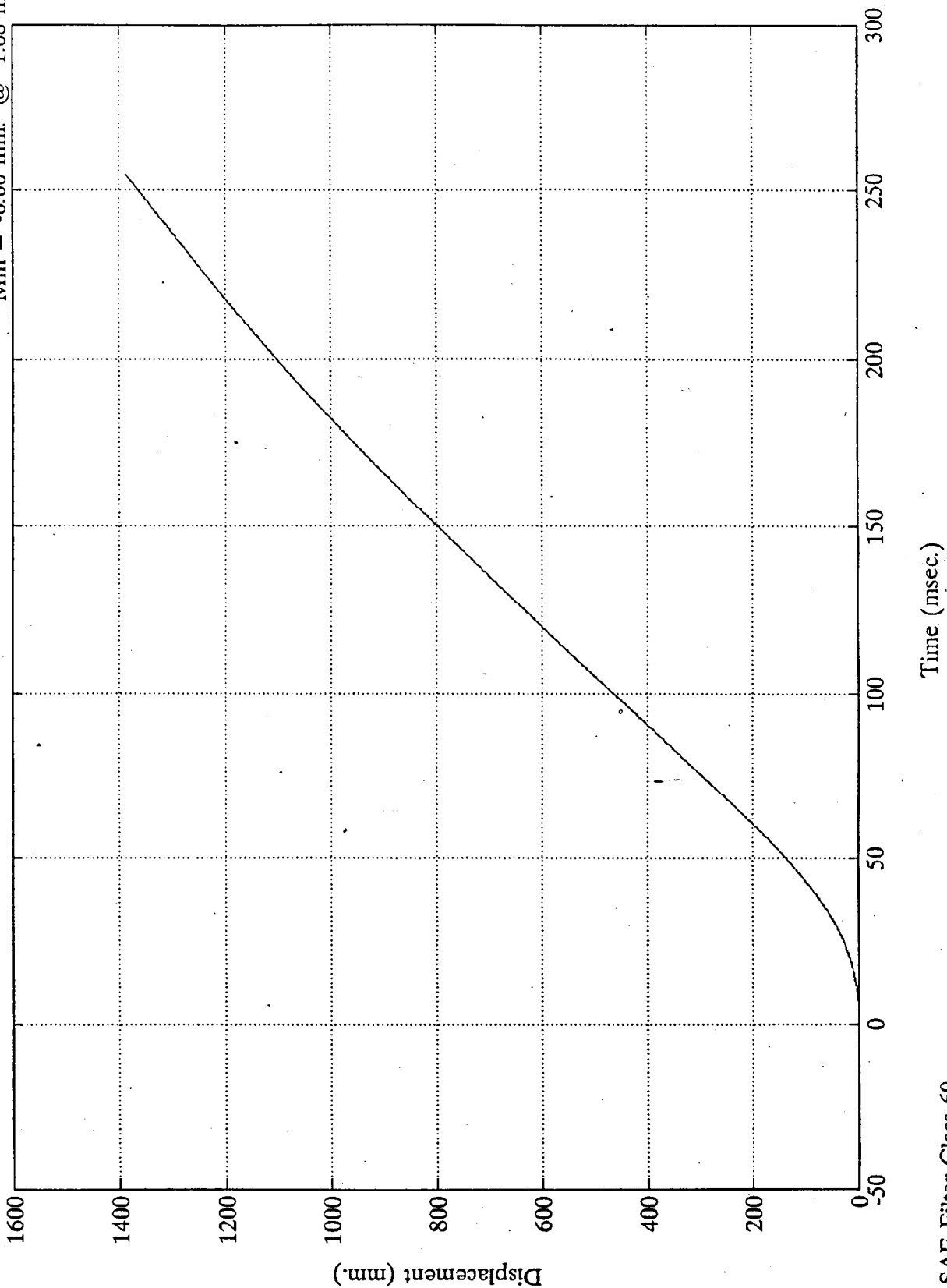
8017-3

SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill Y

Max = 1388.00 mm. @ 254.88 msec
Min = -0.00 mm. @ 1.68 msec



SAE Filter Class 60

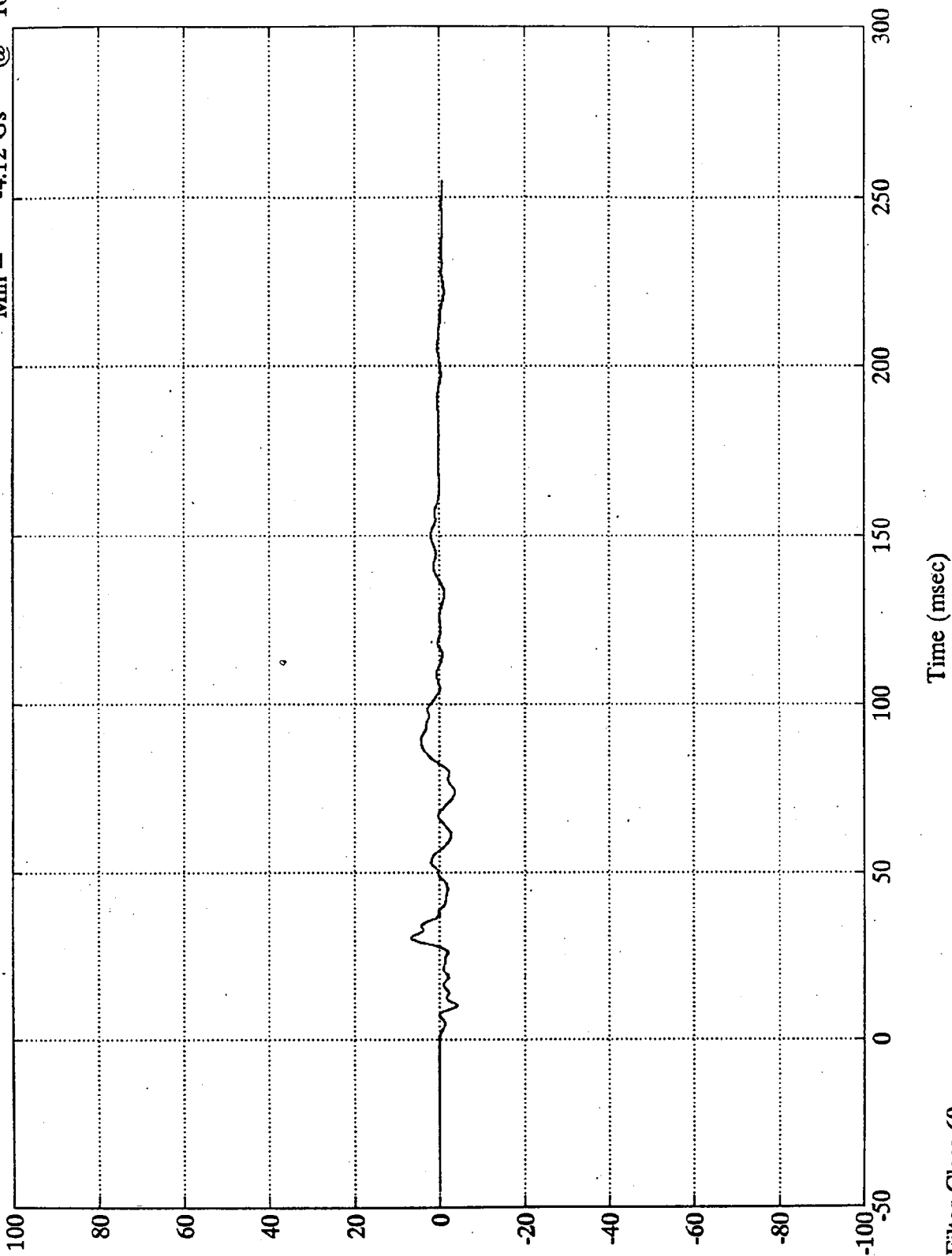
8017-3

B-50

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill Z

Max = 6.79 Gs @ 30.23 msec
Min = -4.12 Gs @ 10.07 msec



B-51

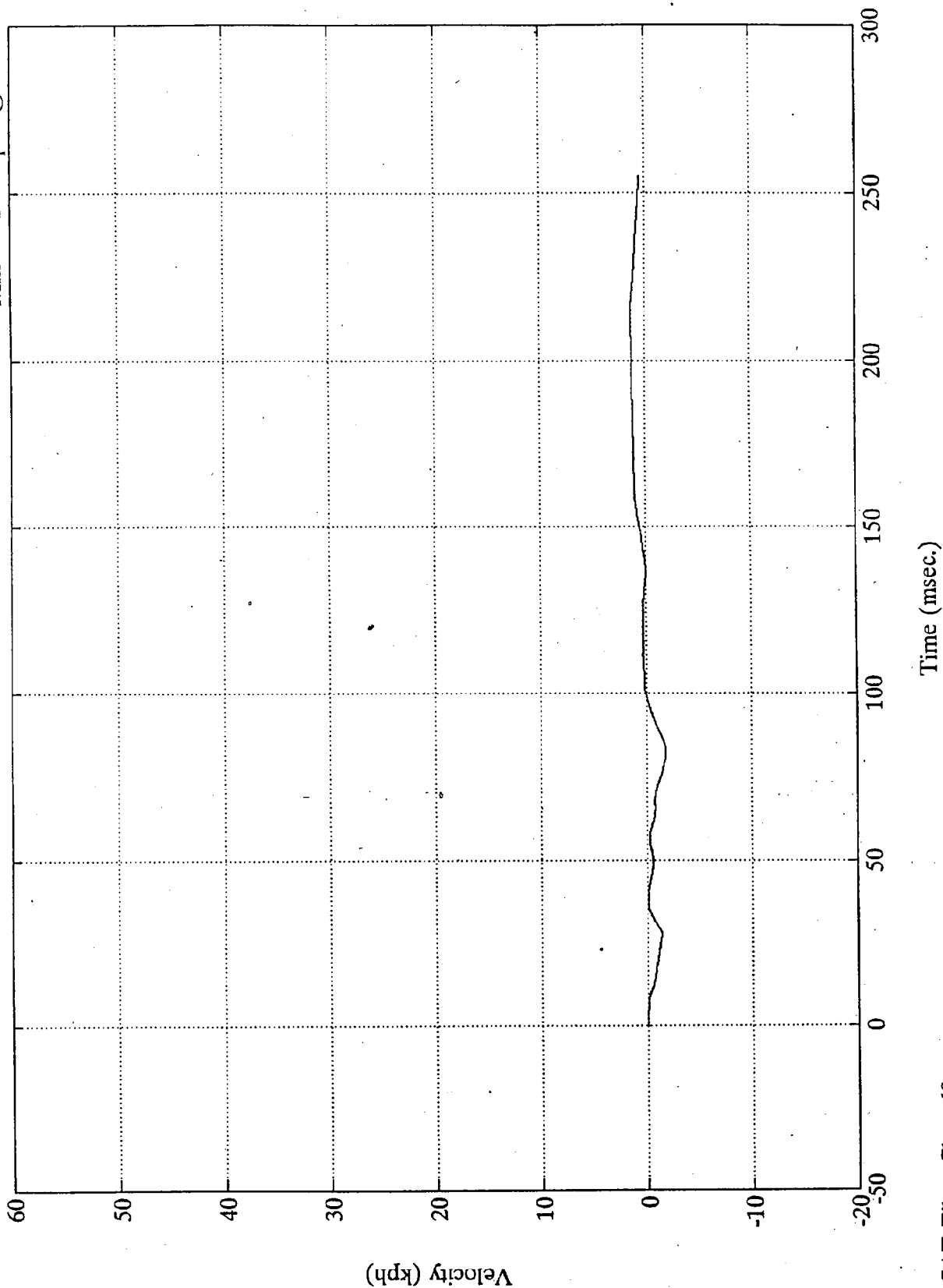
133

8017-3 Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill Z

Max = 1.30 kph @ 212.40 msec
Min = -1.86 kph @ 82.32 msec



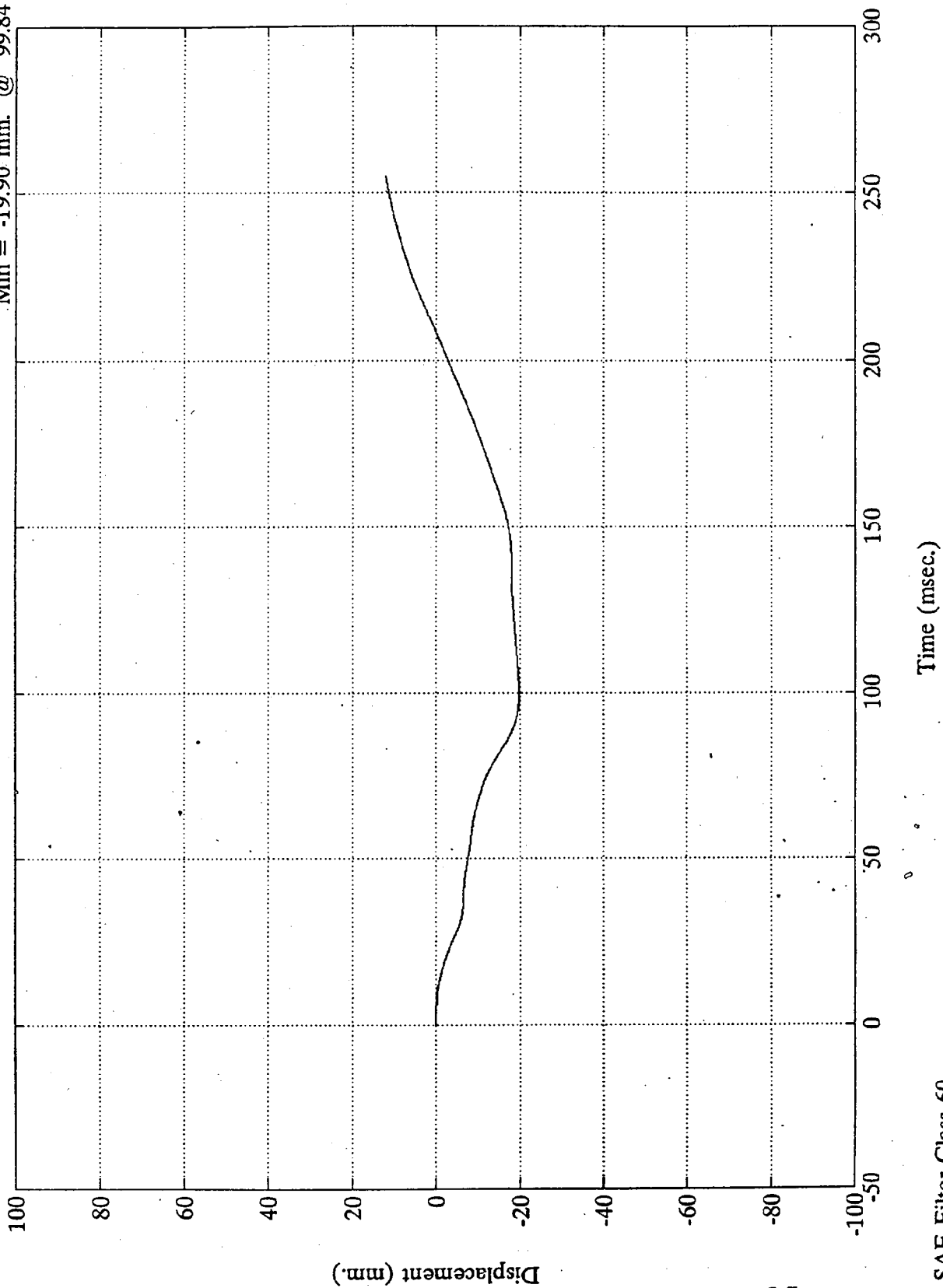
SAE Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill Z

Max = 12.06 mm. @ 254.88 msec
Min = -19.90 mm. @ 99.84 msec



B-53

135

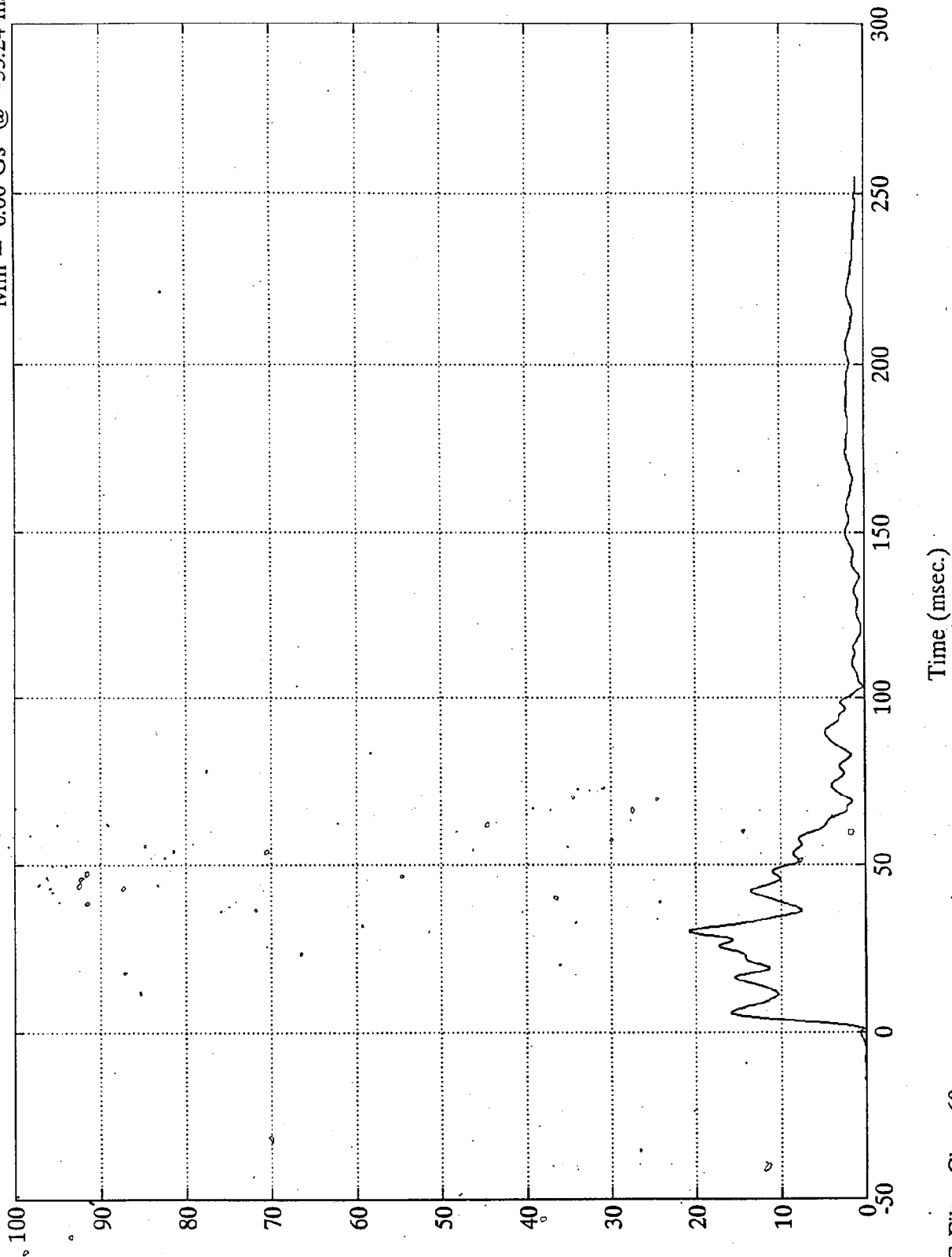
8017-3

SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Right Rear Sill Resultant

Max = 20.82 Gs @ 30.00 msec
Min = 0.00 Gs @ -33.24 msec



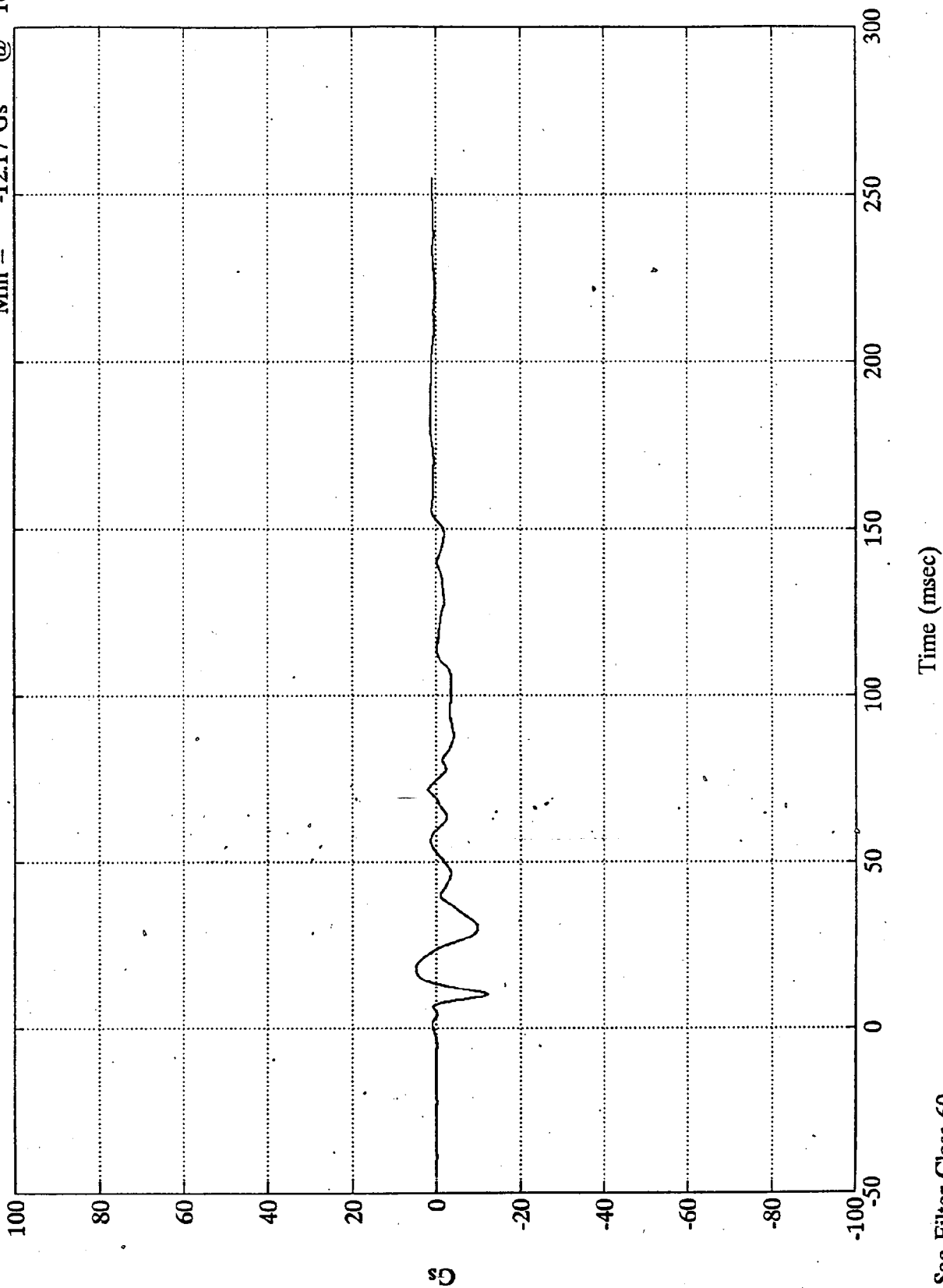
SAE Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor X

Max = 4.83 Gs @ 17.75 msec
Min = -12.17 Gs @ 10.07 msec



B-55

137

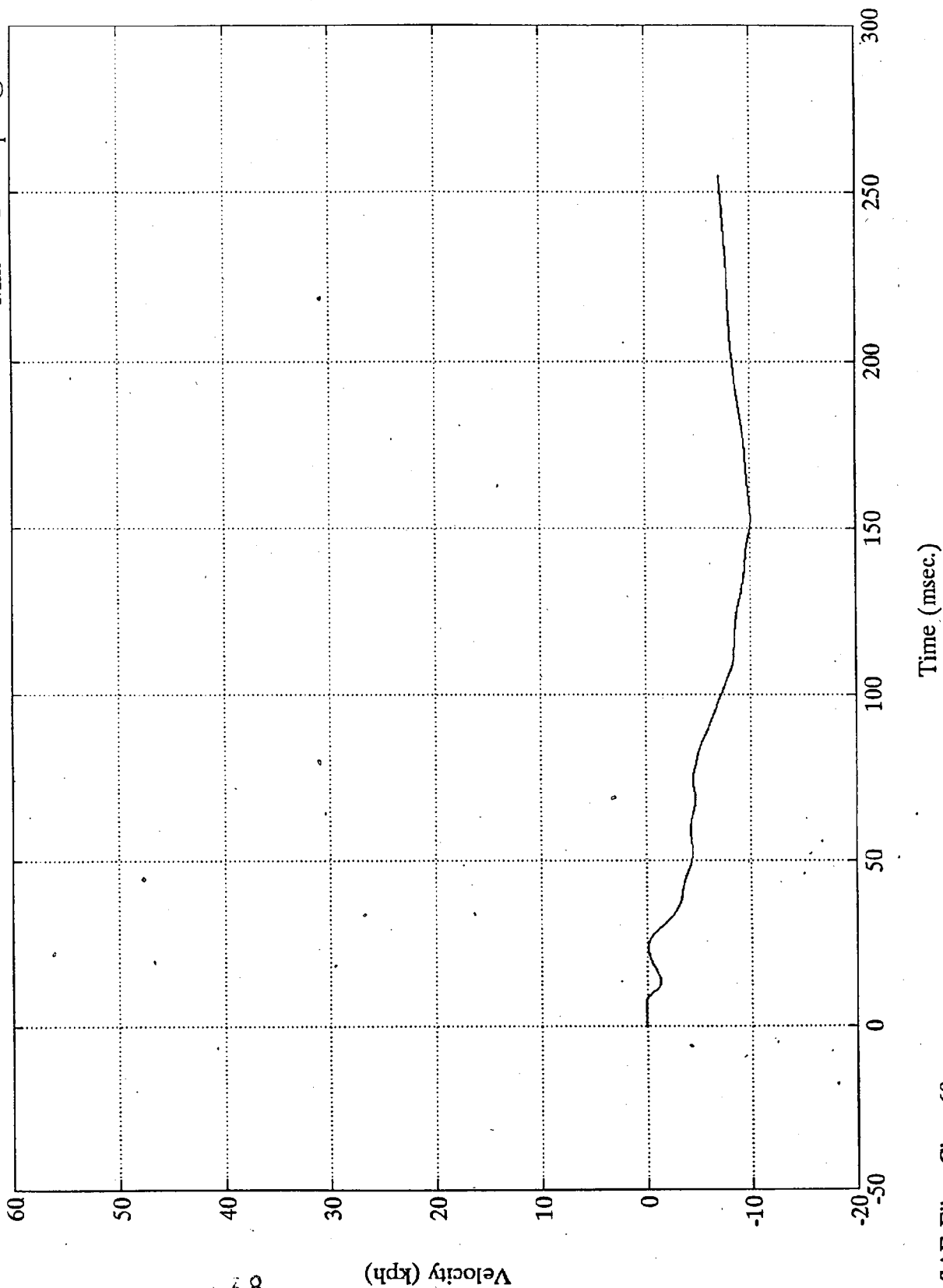
8017-3

Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

Max = 0.10 kph @ 6.96 msec
Min = -10.04 kph @ 153.12 msec

V1 Rear Floor X



SAE Filter Class 60

8017-3

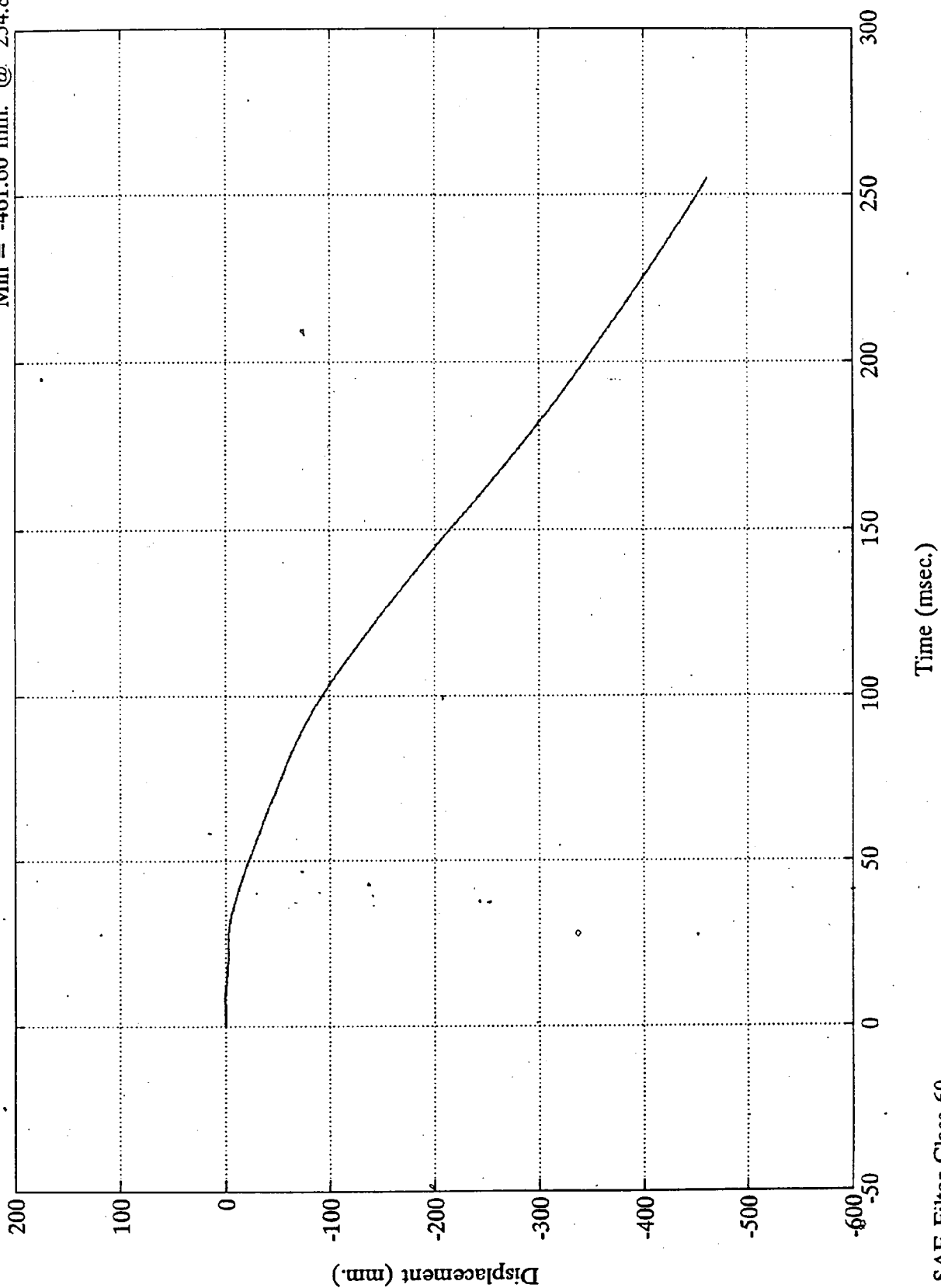
B-56

158

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor X

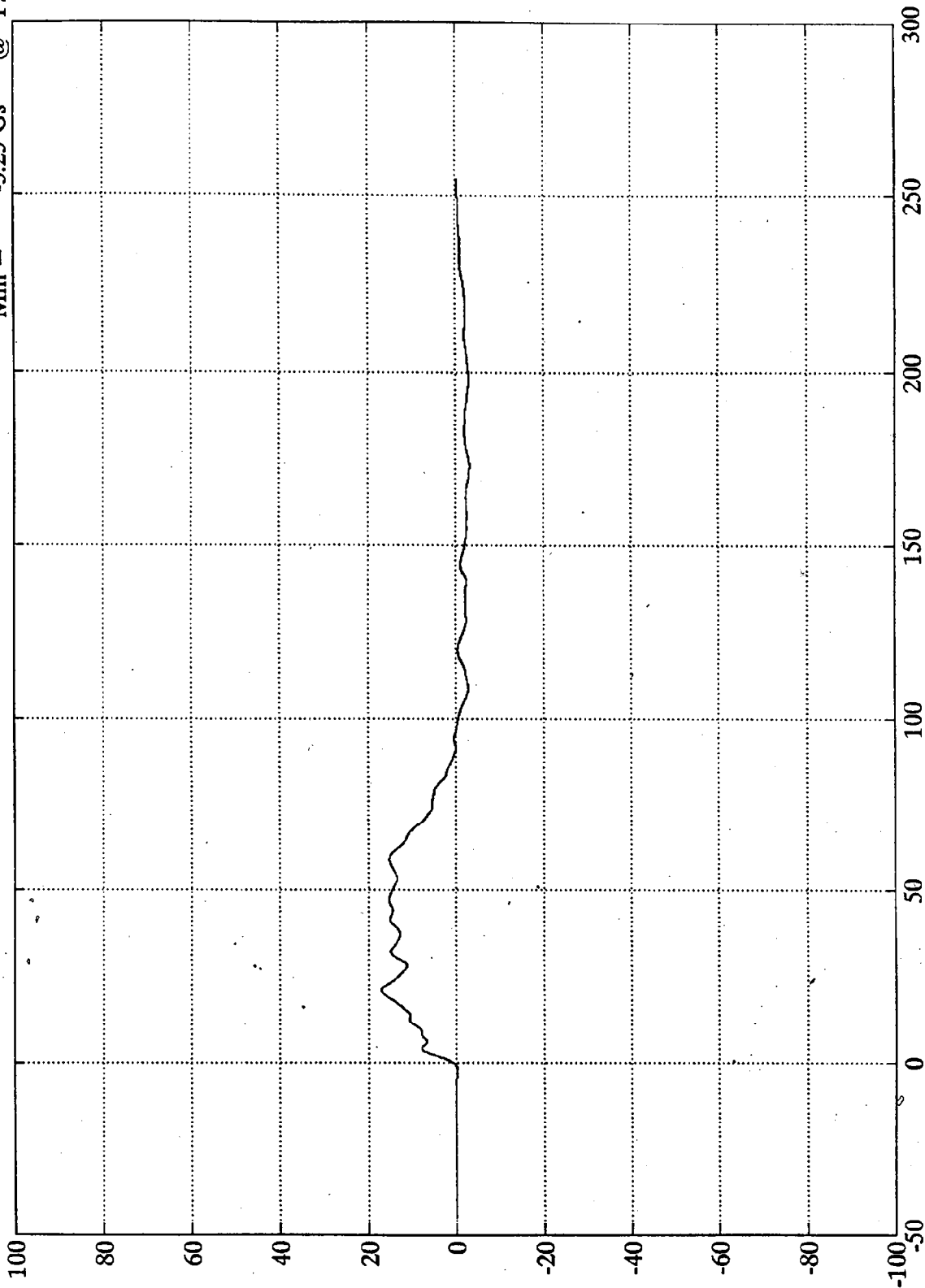
Max = 0.14 mm. @ 8.40 msec
Min = -461.60 mm. @ 254.88 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor Y

Max = 17.13 Gs @ 20.76 msec
Min = -3.23 Gs @ 173.39 msec



Time (msec)

Sae Filter Class 60

8017-3

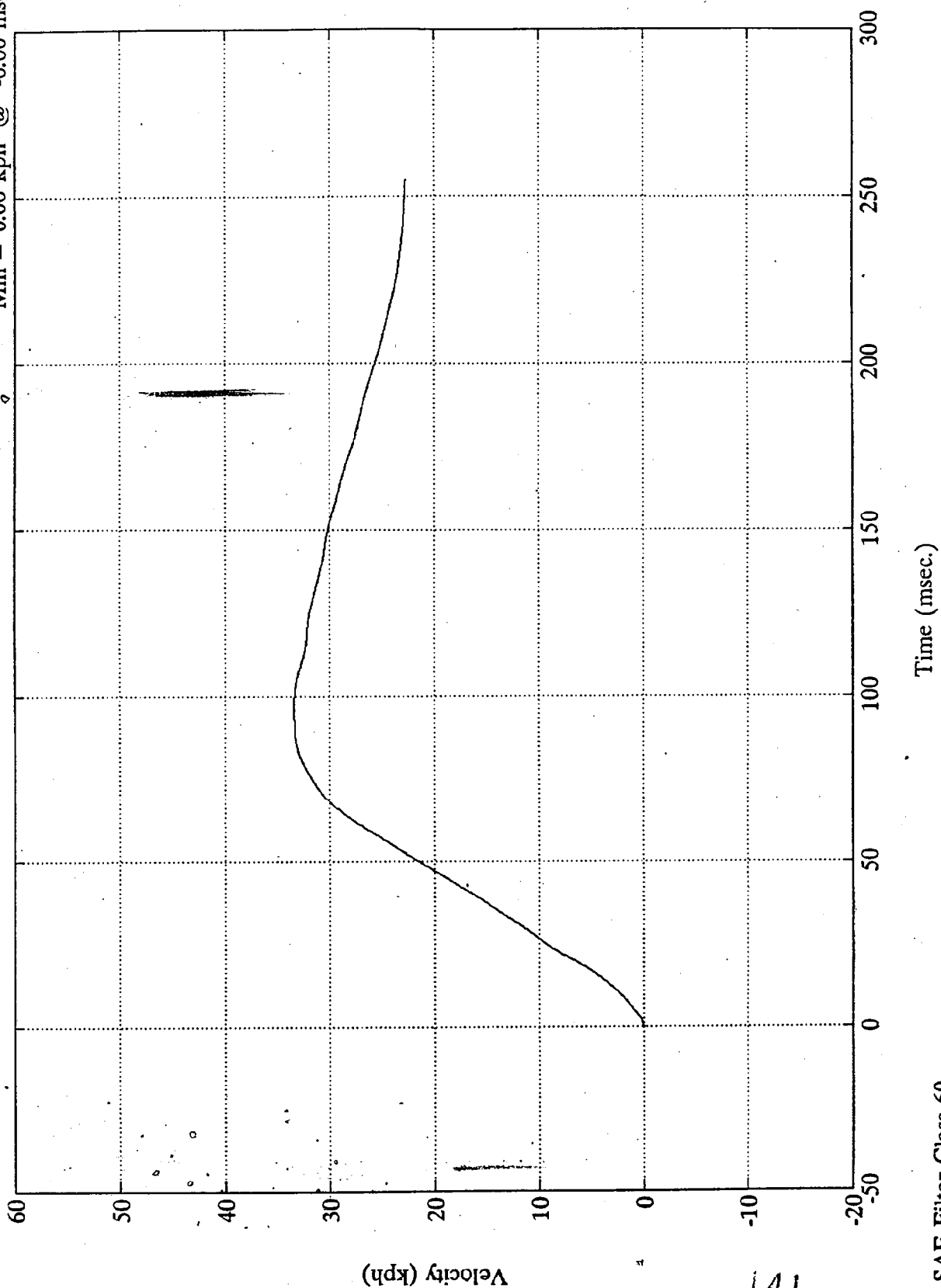
140

B-58

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor Y

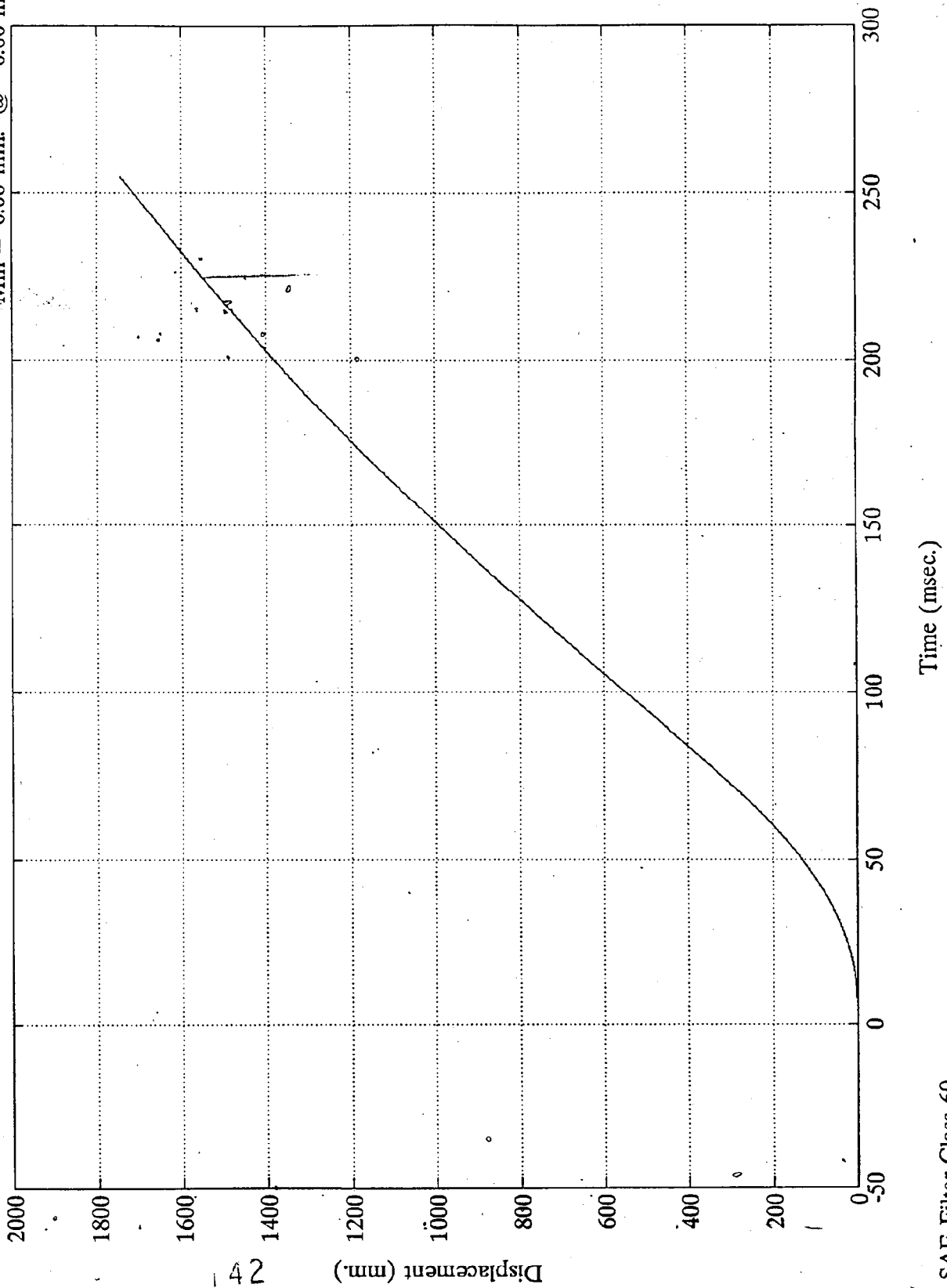
Max = 33.42 kph @ 97.68 msec
Min = 0.00 kph @ -0.00 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

Max = 1743.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec

V1 Rear Floor Y



SAE Filter Class 60

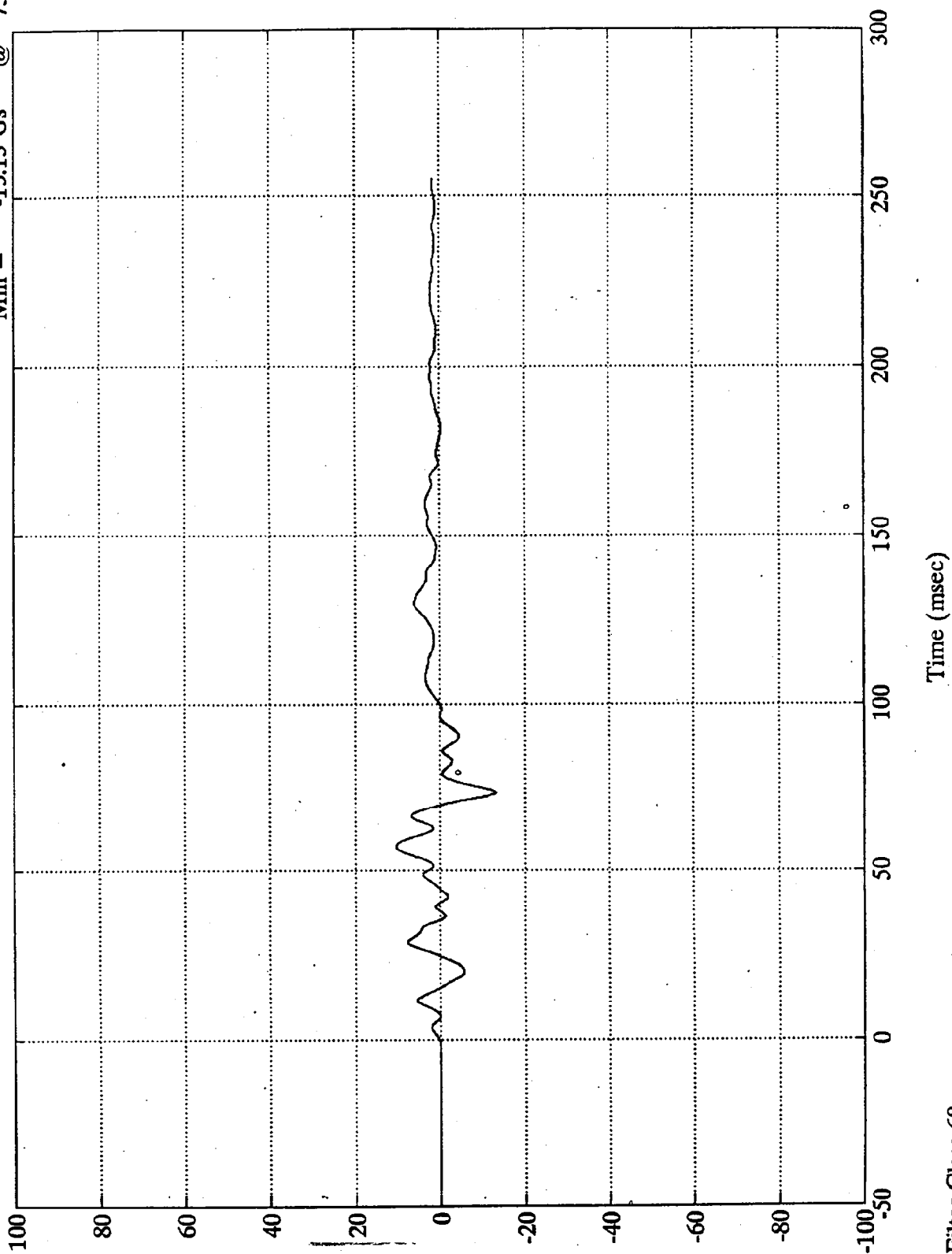
8017-3

B-60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor Z

Max = 10.33 Gs @ 57.11 msec
Min = -13.13 Gs @ 73.44 msec



B-61

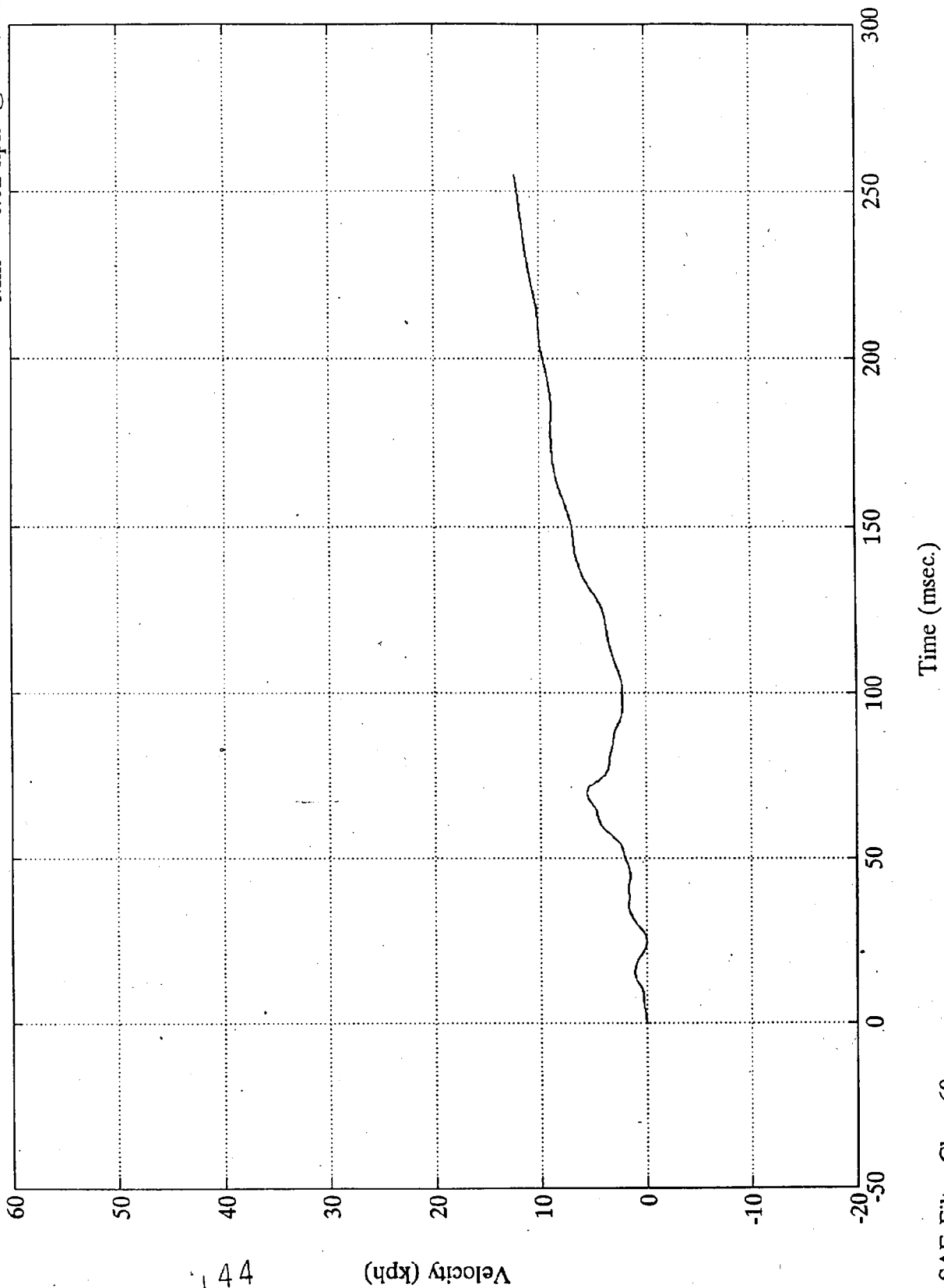
143

8017-3
Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor Z

Max = 12.31 kph @ 254.88 msec
Min = -0.02 kph @ 24.72 msec



B-62

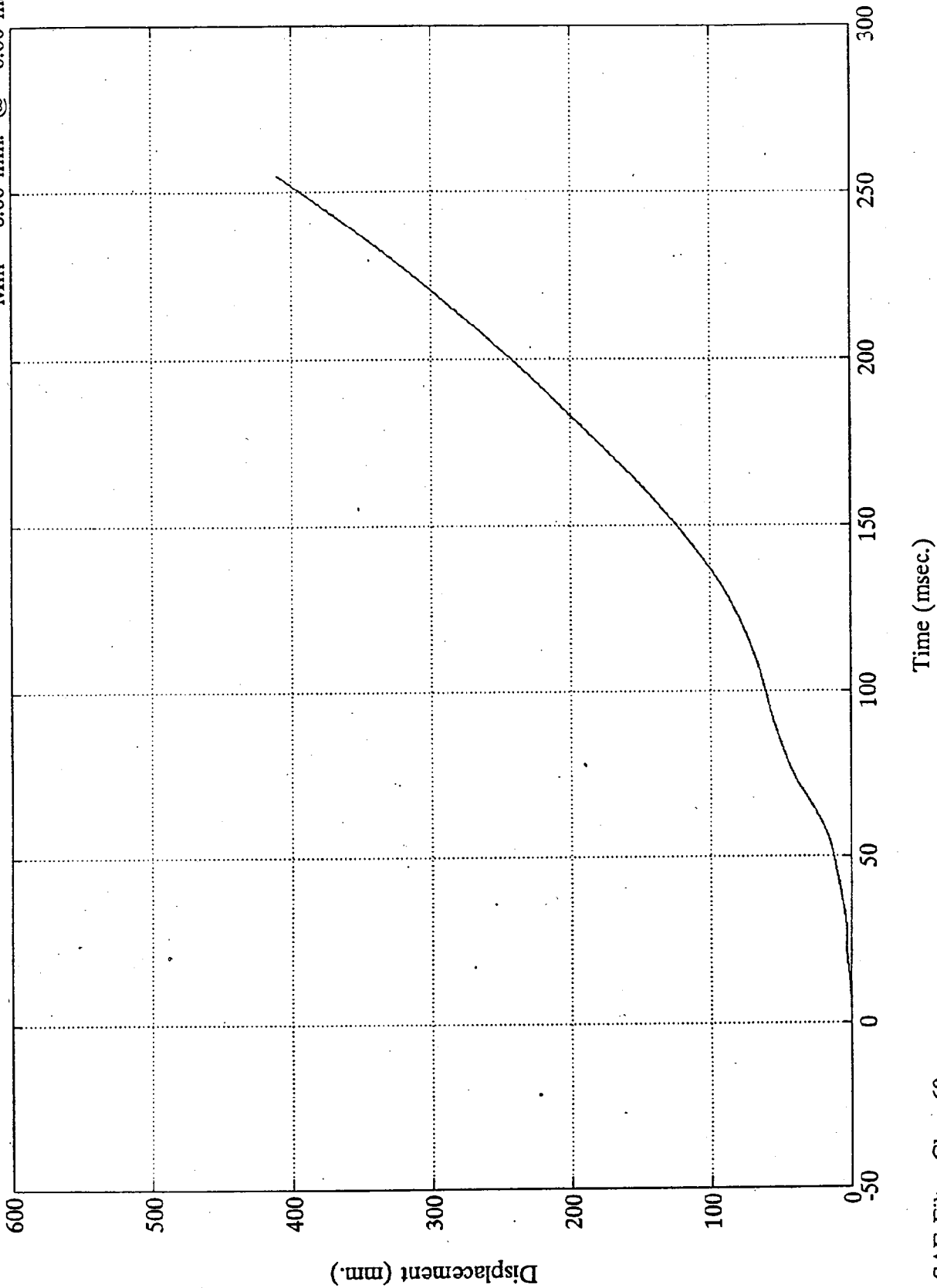
8017-3

SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor Z

Max = 410.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



SAE Filter Class 60

8017-3

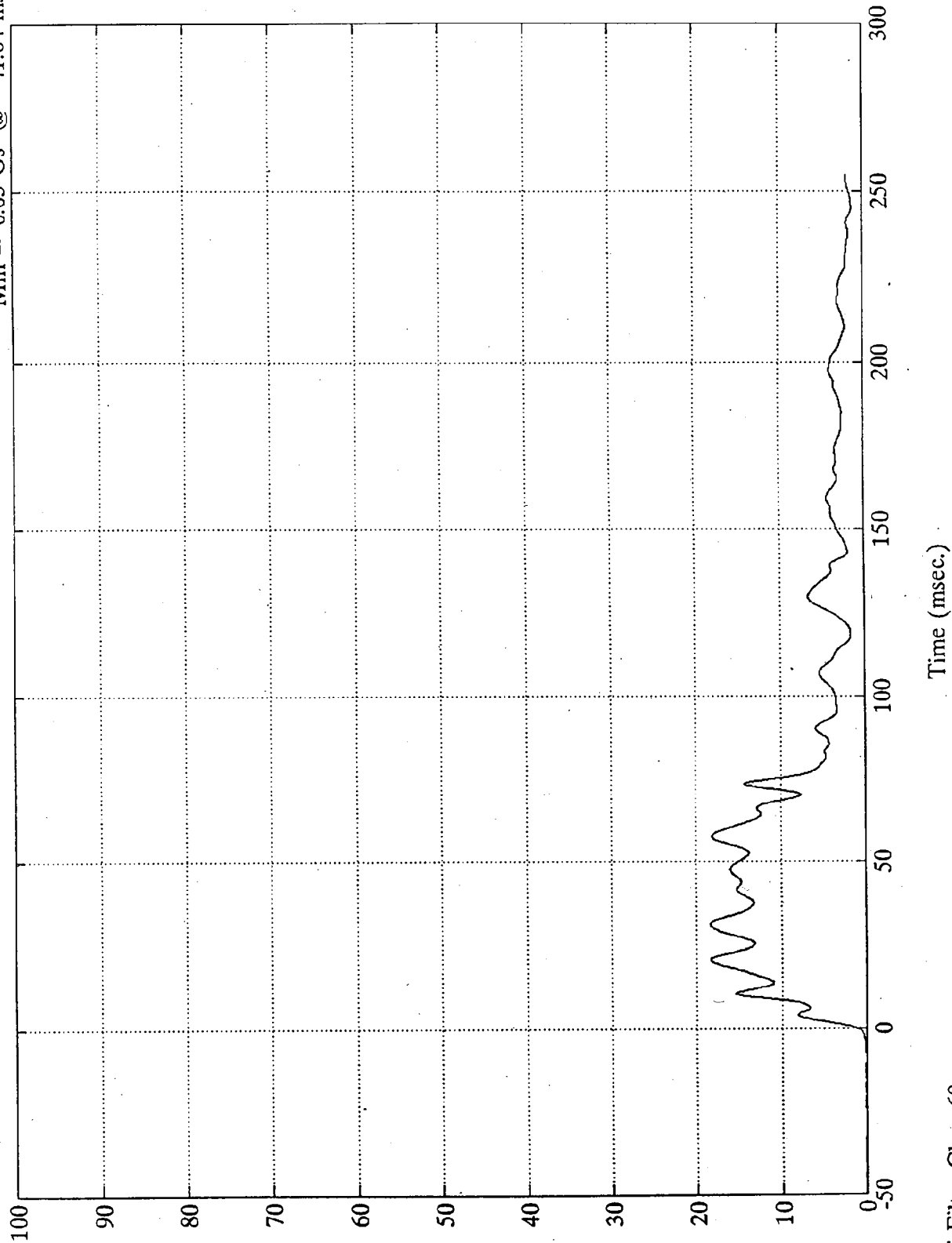
B-63

145

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Rear Floor Resultant

Max = 18.39 Gs @ 31.08 msec
Min = 0.03 Gs @ -41.64 msec



146

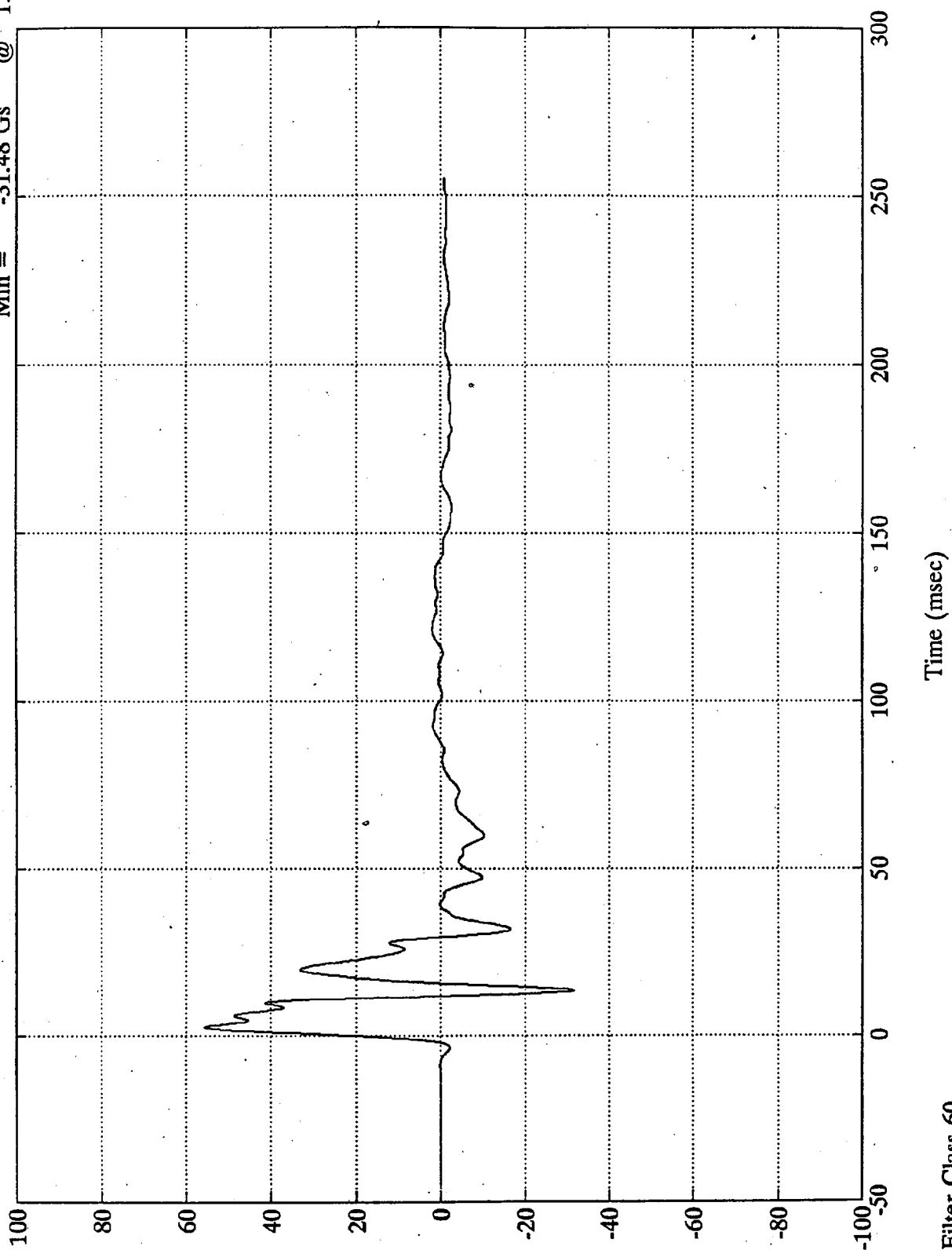
B-64

8017-3
SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Left Rear Sill Y

Max = 55.65 Gs @ 2.39 msec
Min = -31.48 Gs @ 13.55 msec



B-65

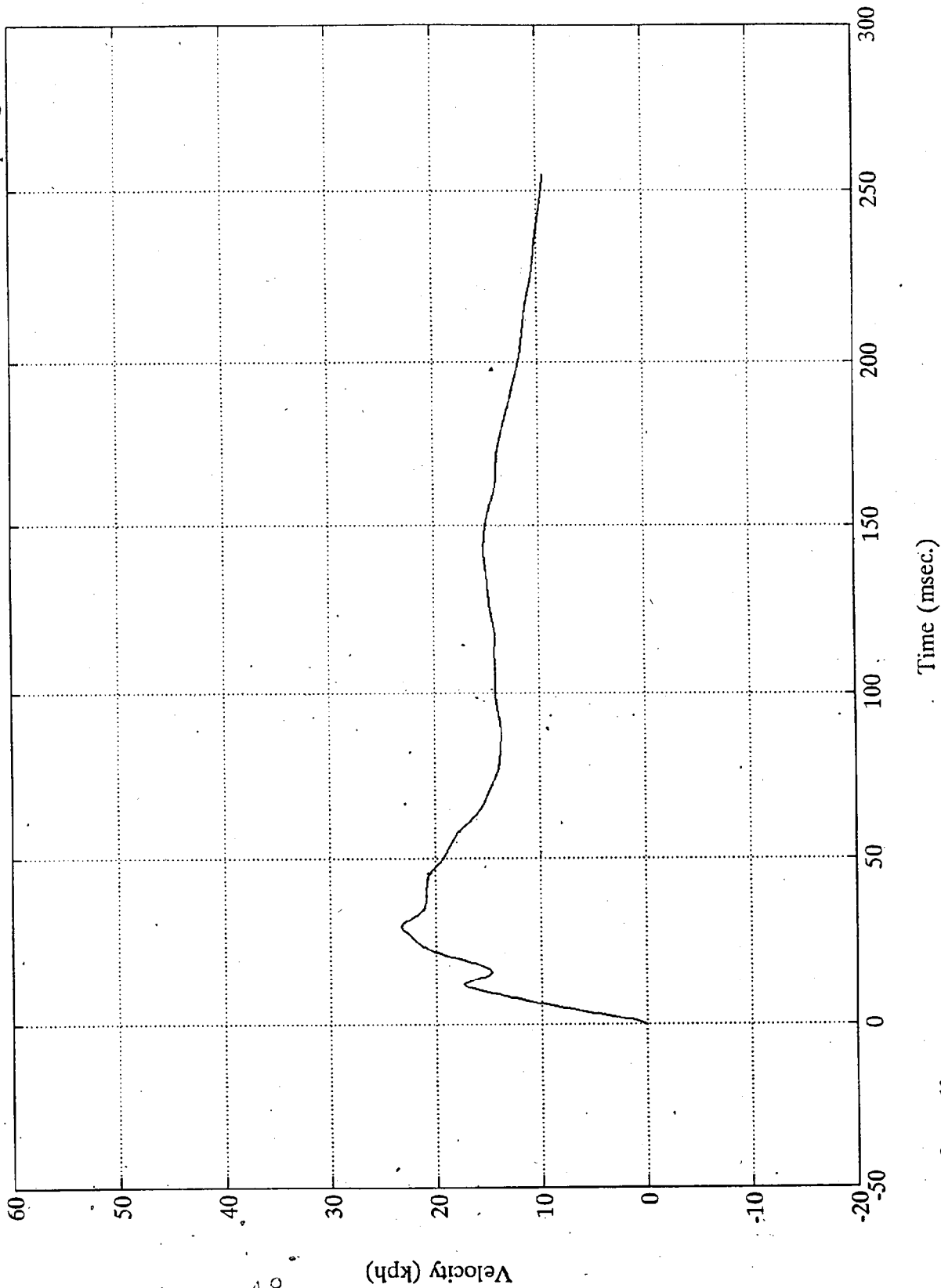
147

8017-3
Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Left Rear Sill Y

Max = 23.30 kph @ 29.52 msec
Min = 0.00 kph @ -0.00 msec



SAE Filter Class 60

8017-3

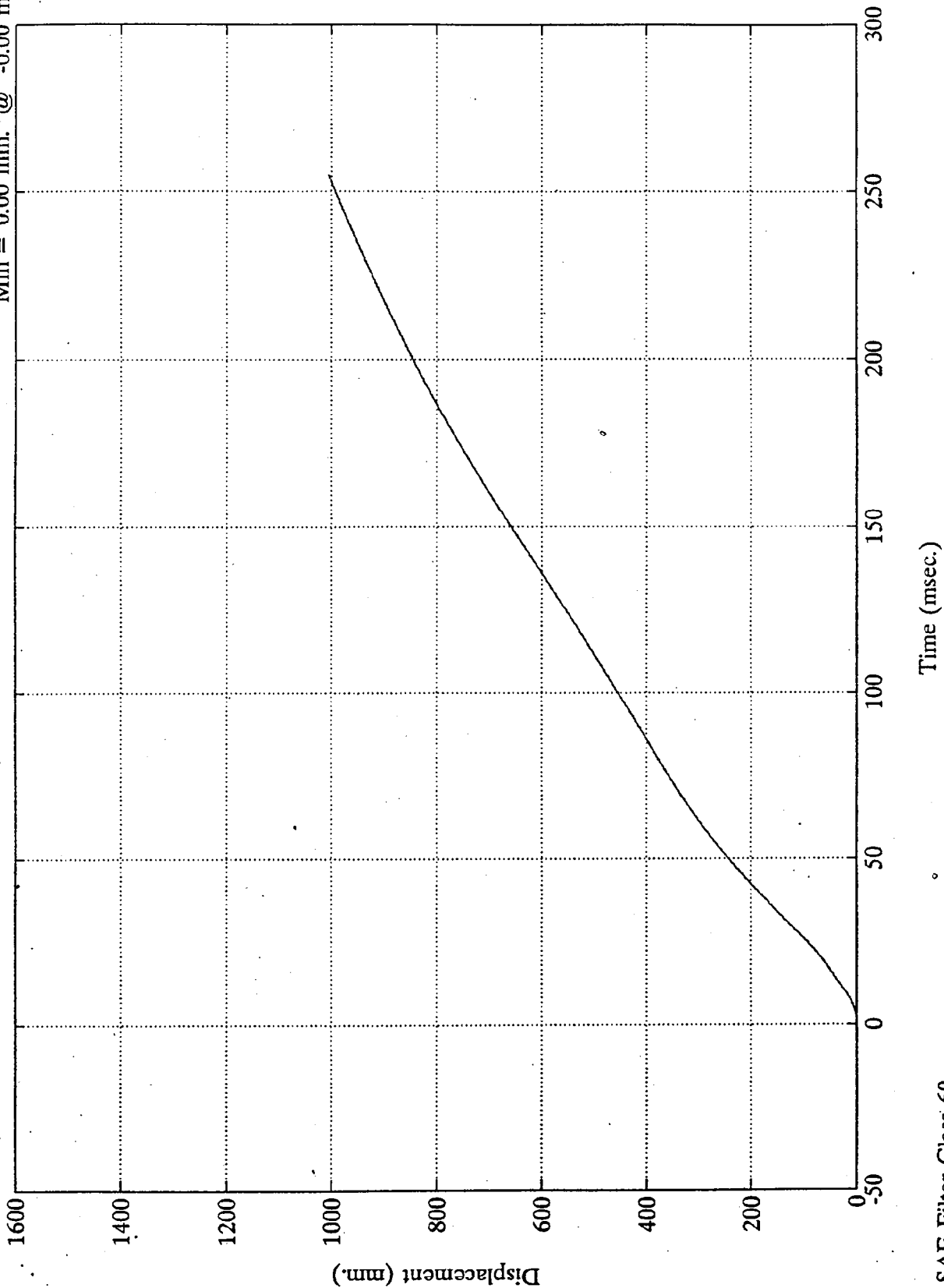
B-66

48

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Left Rear Sill Y

Max = 1006.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



SAE Filter Class 60

8017-3

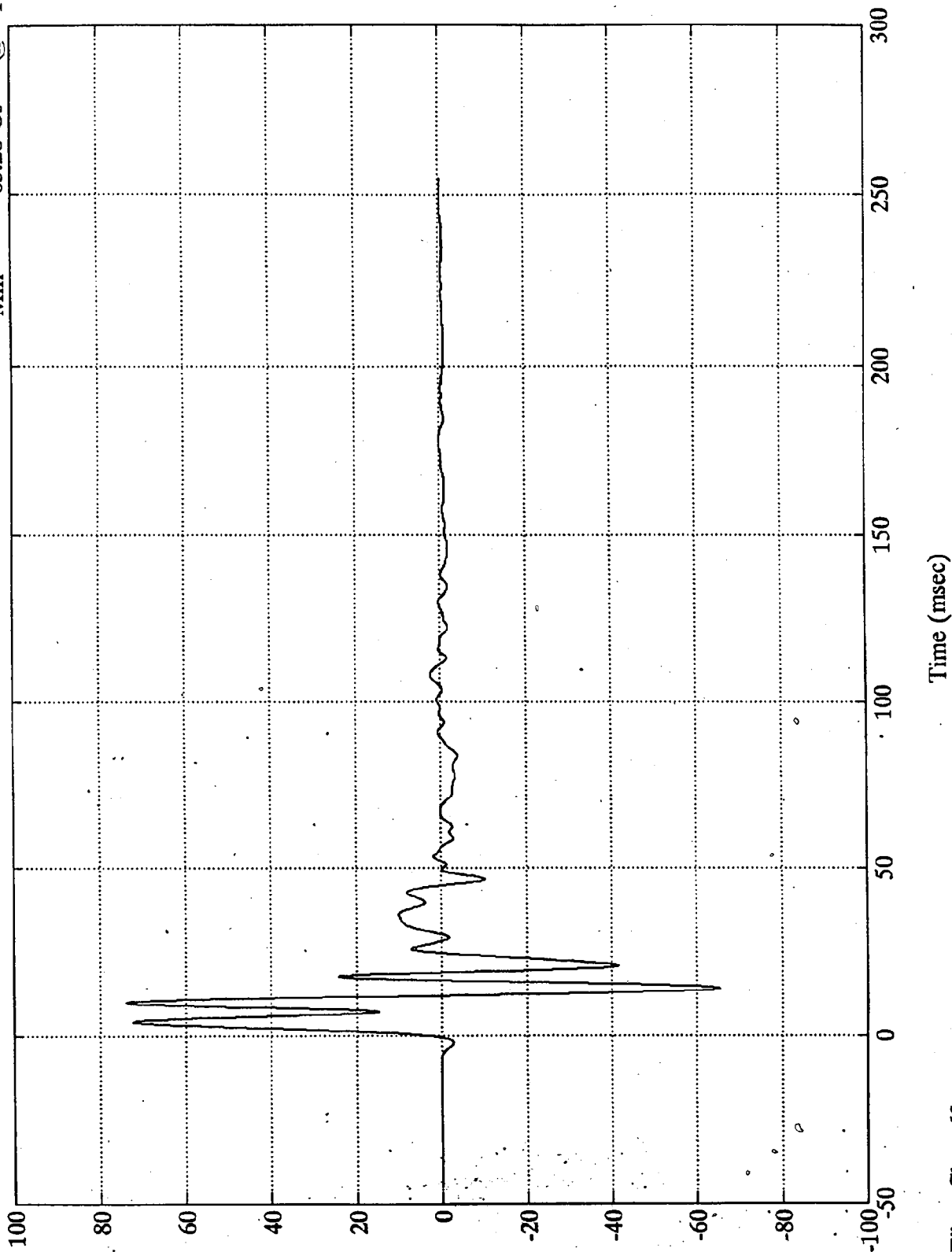
19-B

149

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

Max = 73.74 Gs @ 9.71 msec
 Min = -65.28 Gs @ 14.15 msec

V1 Left Front Sill Y



Sae Filter Class 60

8017-3

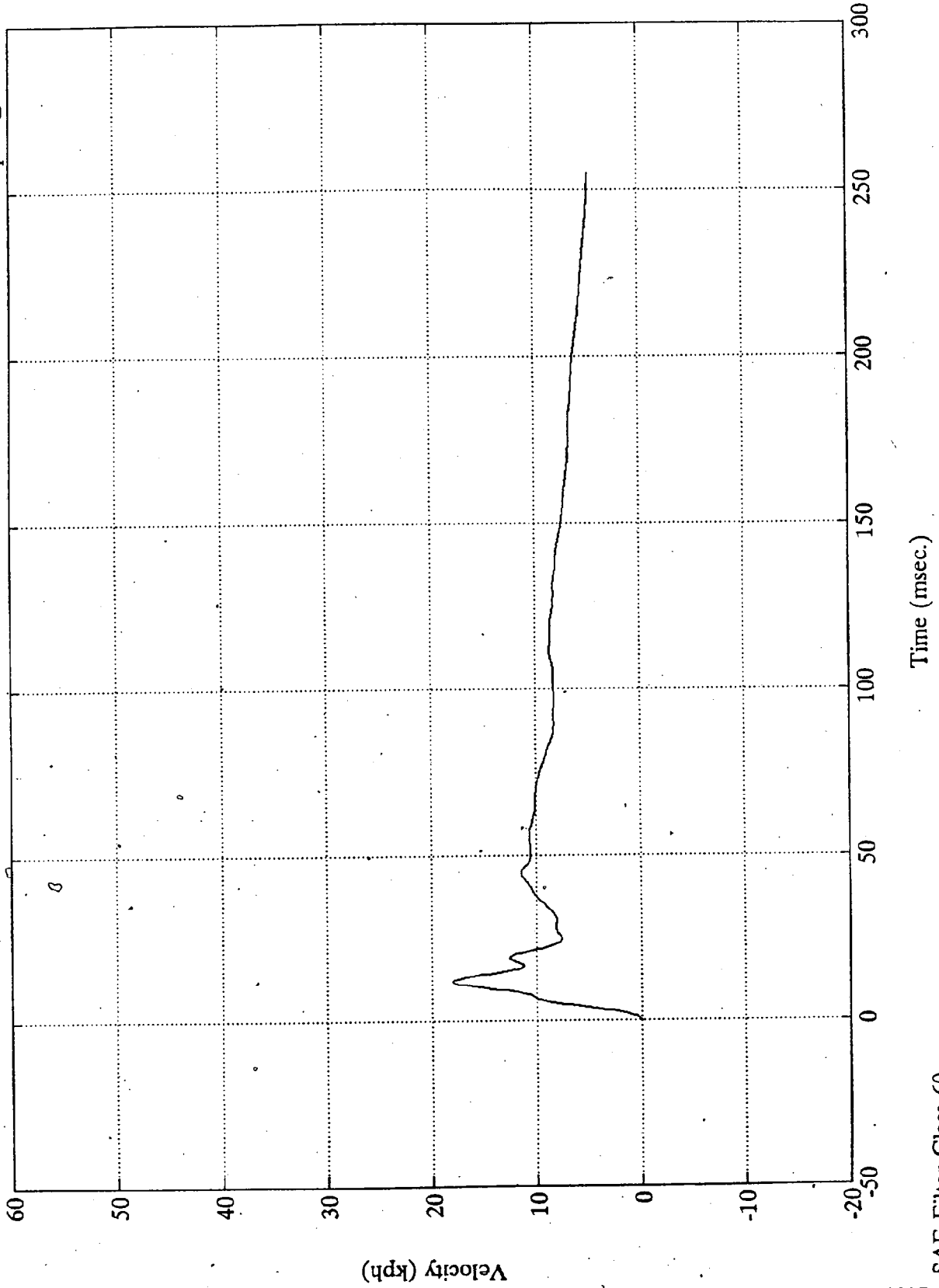
B-68

150

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Left Front Sill Y

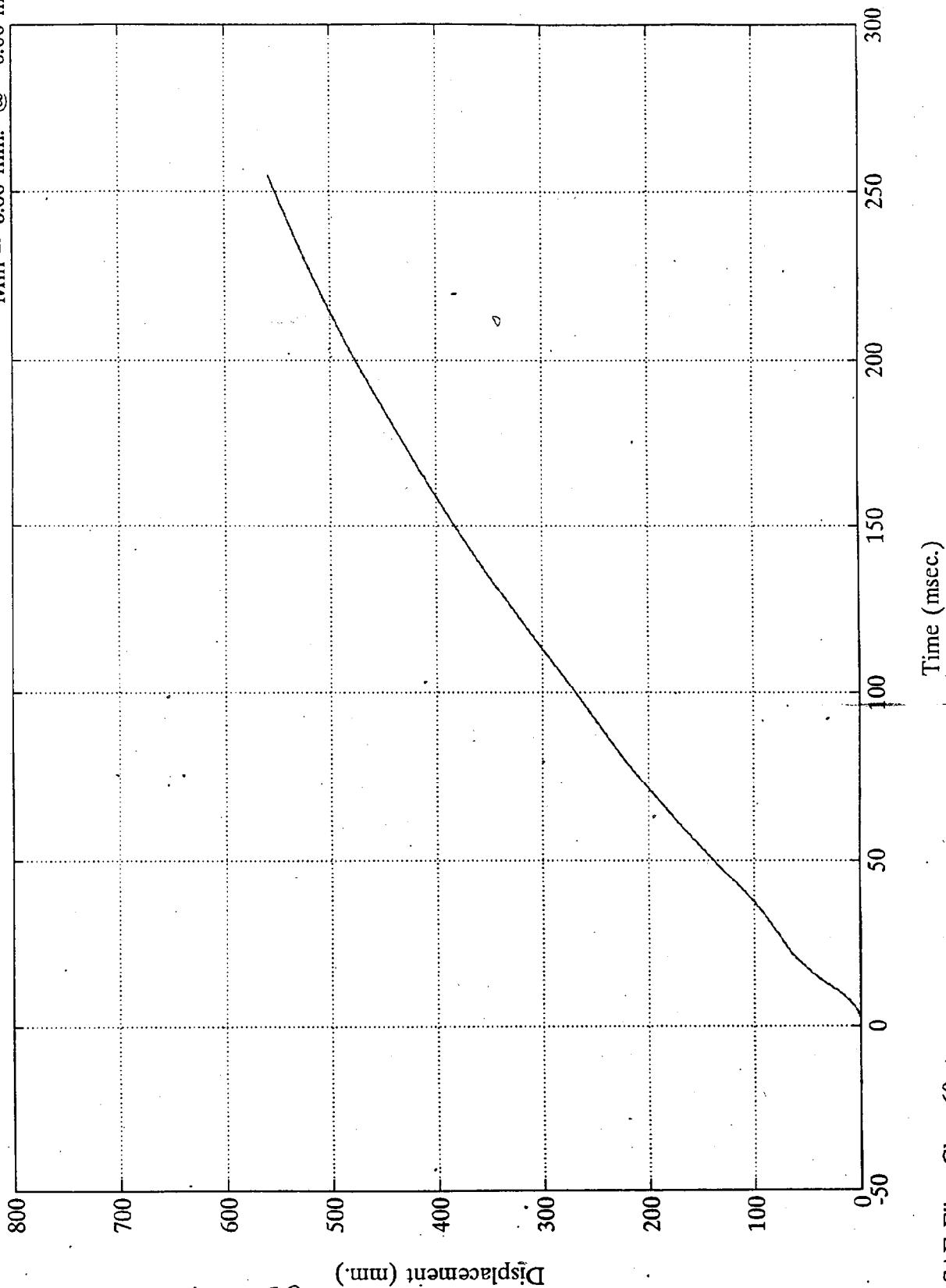
Max = 18.06 kph @ 12.00 msec
Min = 0.00 kph @ -0.00 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

Left Front Sill Y

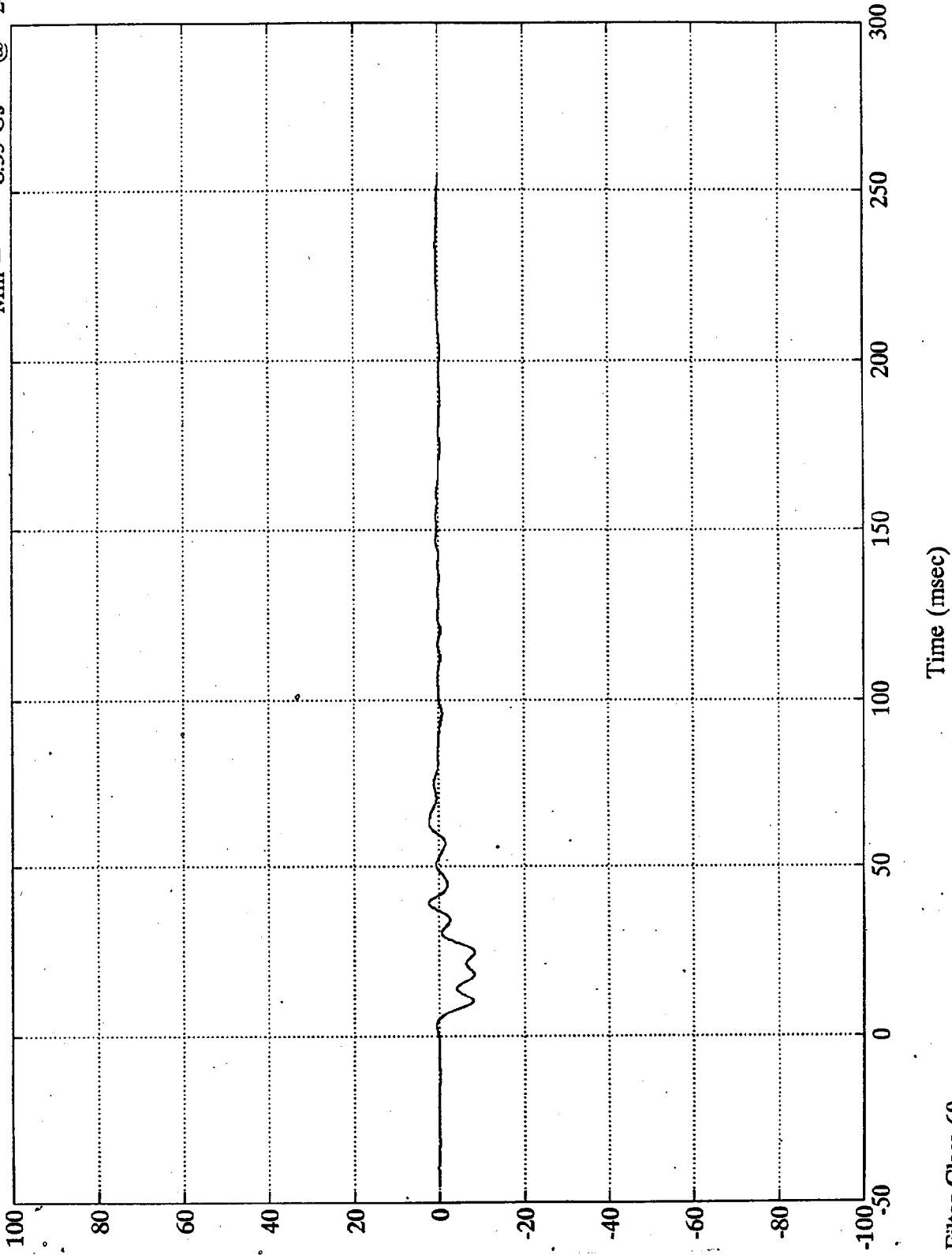
Max = 558.40 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Center Rear Floor X

Max = 2.53 Gs @ 39.00 msec
Min = -8.35 Gs @ 24.59 msec



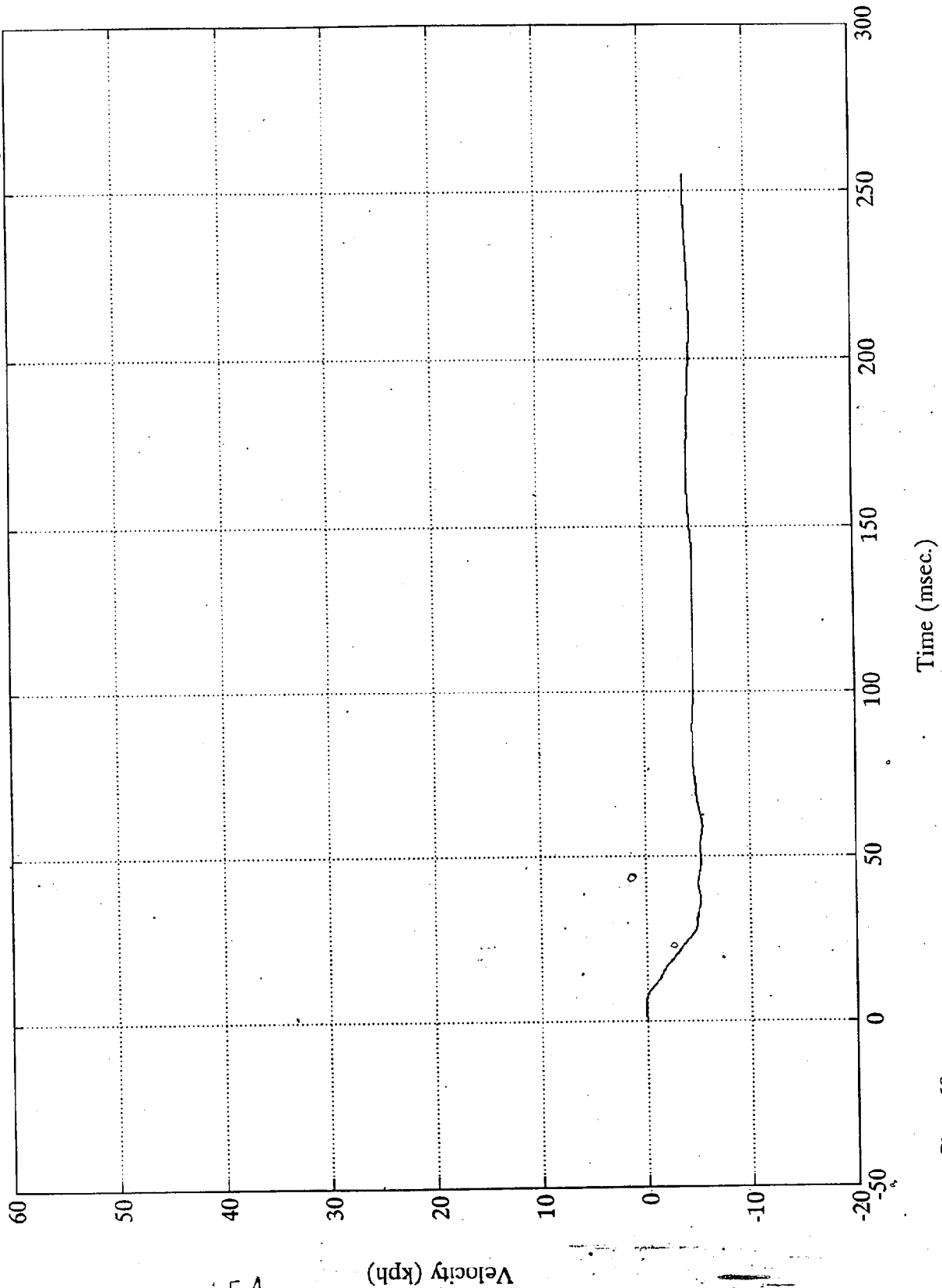
B-71

153

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Center Rear Floor X

Max = 0.08 kph @ 5.04 msec
Min = -5.45 kph @ 59.28 msec



SAE Filter Class 60

8017-3

Velocity (kph)

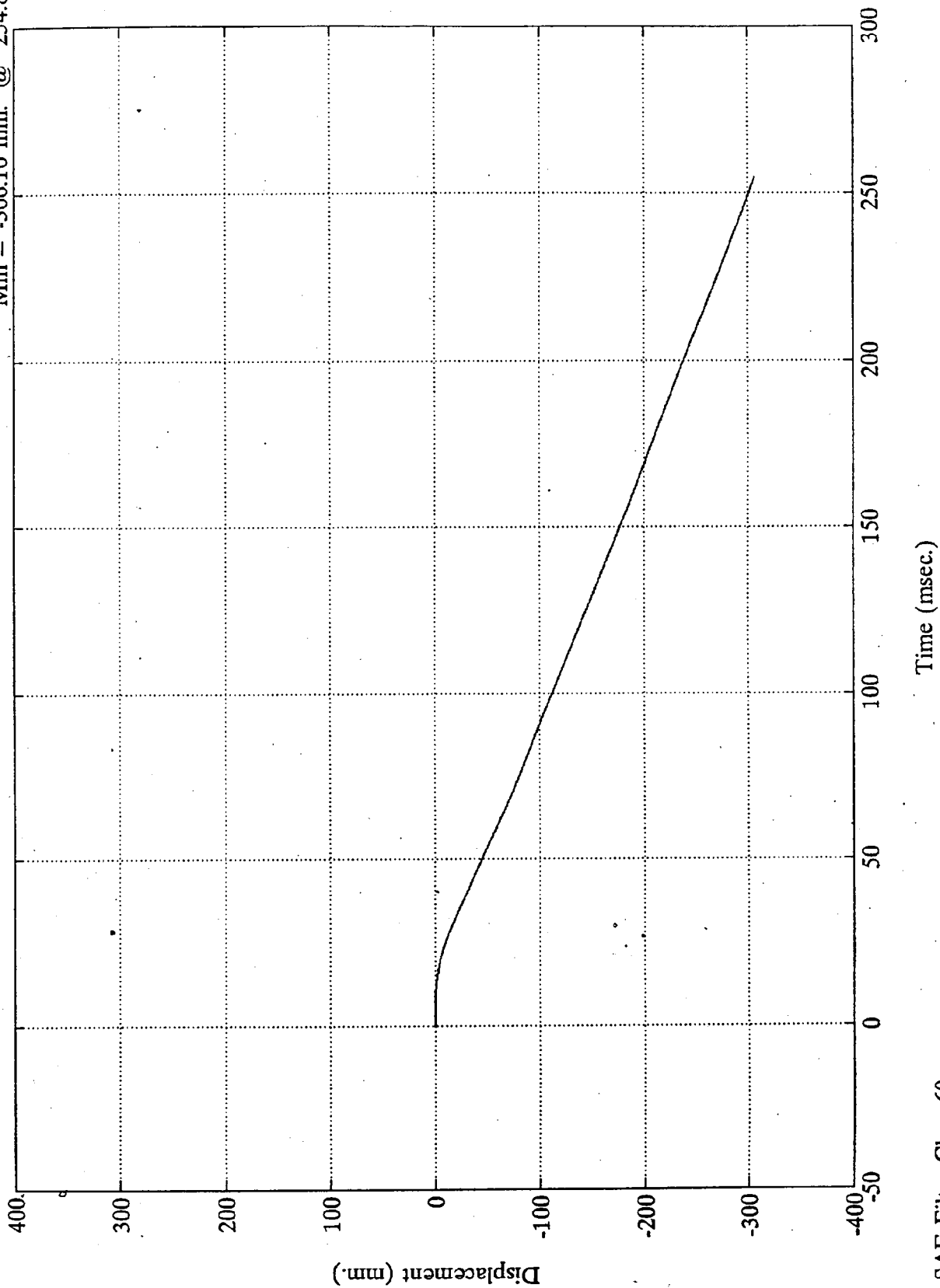
B-72

154

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 Center Rear Floor X

Max = 0.08 mm. @ 6.96 msec.
Min = -306.10 mm. @ 254.88 msec



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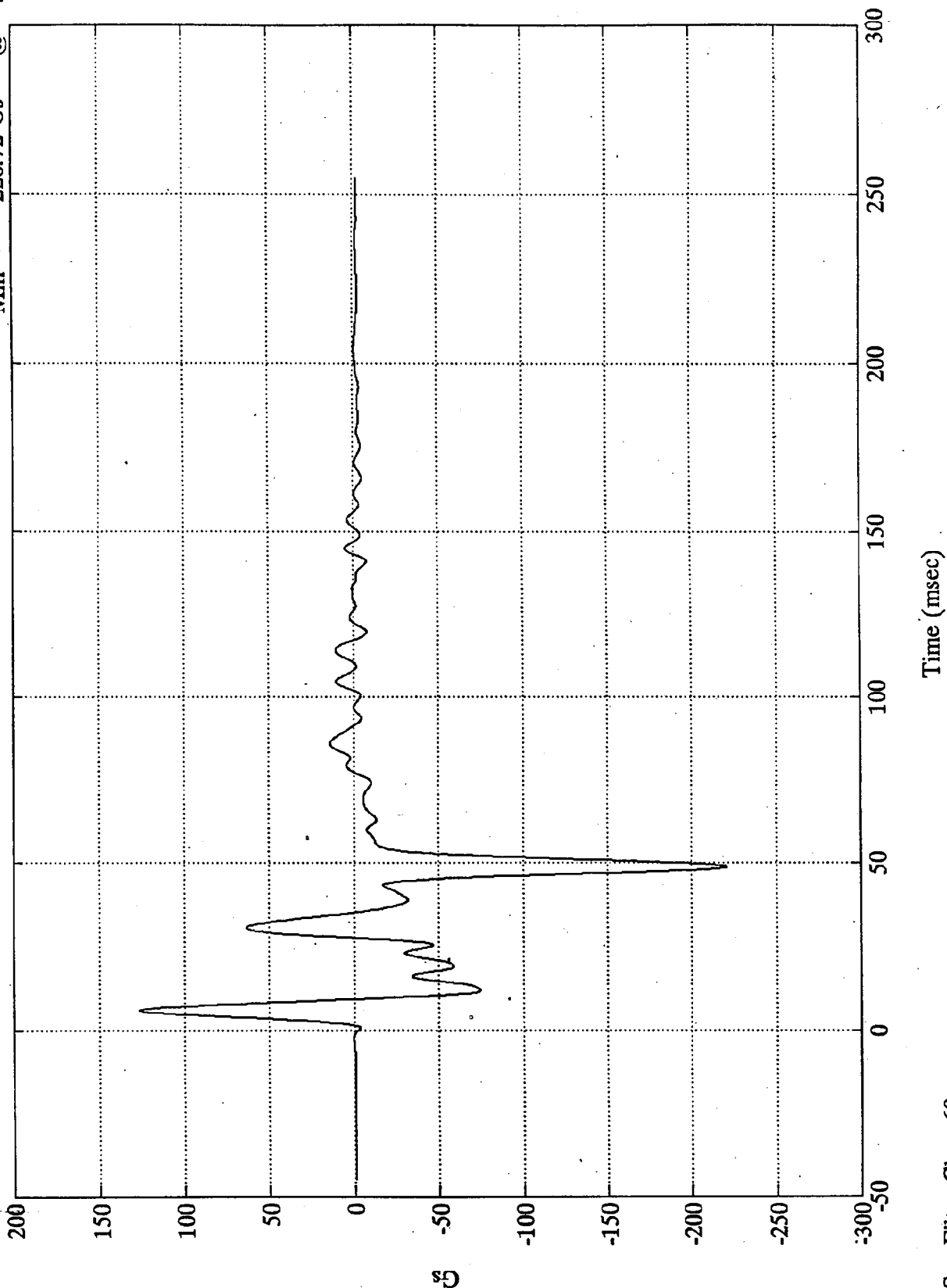
8017-3

SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Center Y

Max = 126.40 Gs @ 5.99 msec
Min = -220.72 Gs @ 48.84 msec



Sae Filter Class 60

8017-3

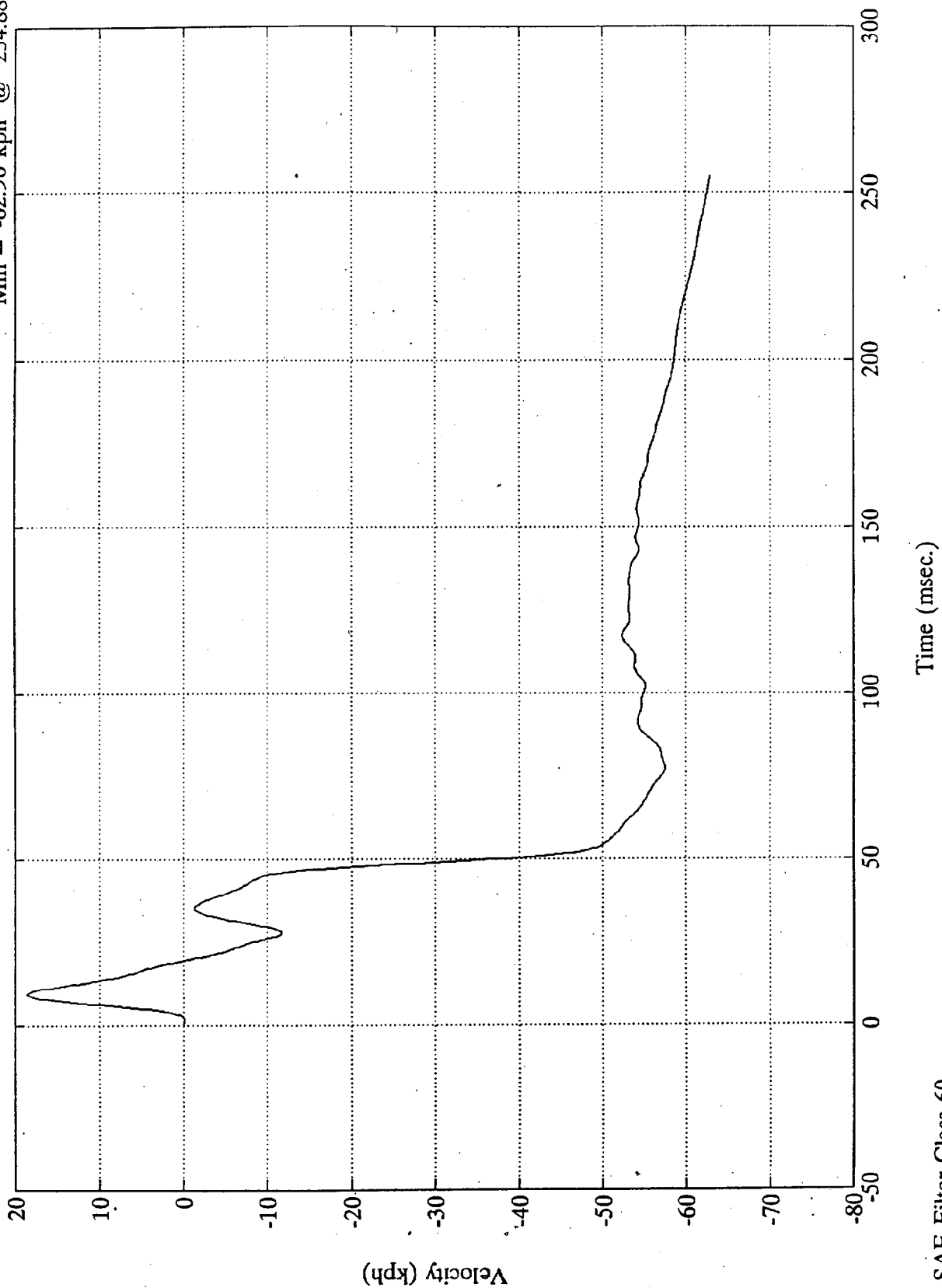
B-74

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L Front Door Center Y

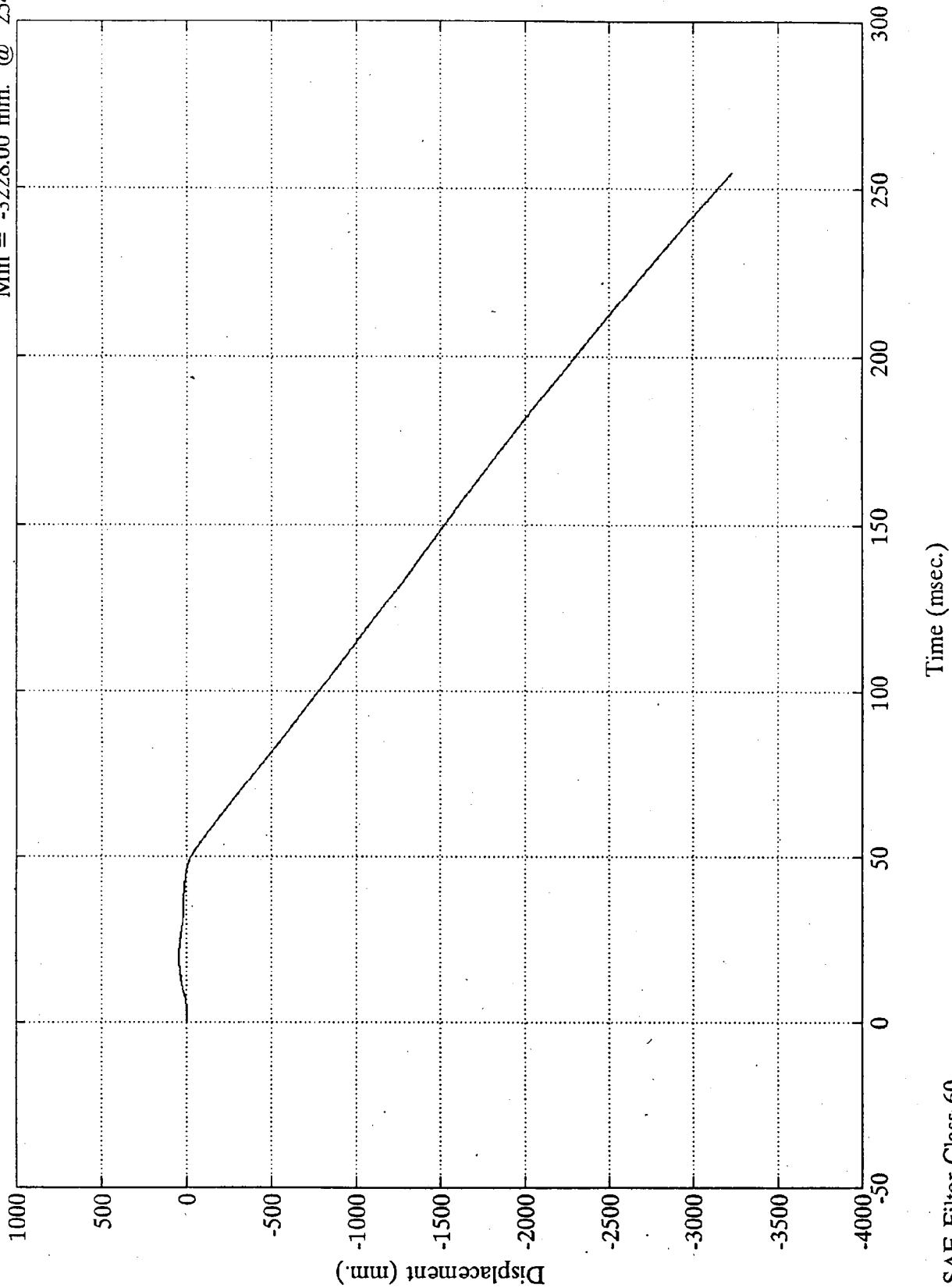
Max = 18.62 kph @ 9.36 msec
Min = -62.90 kph @ 254.88 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Center Y

Max = 43.63 mm. @ 19.44 msec
Min = -3228.00 mm. @ 254.88 msec



SAE Filter Class 60

8017-3

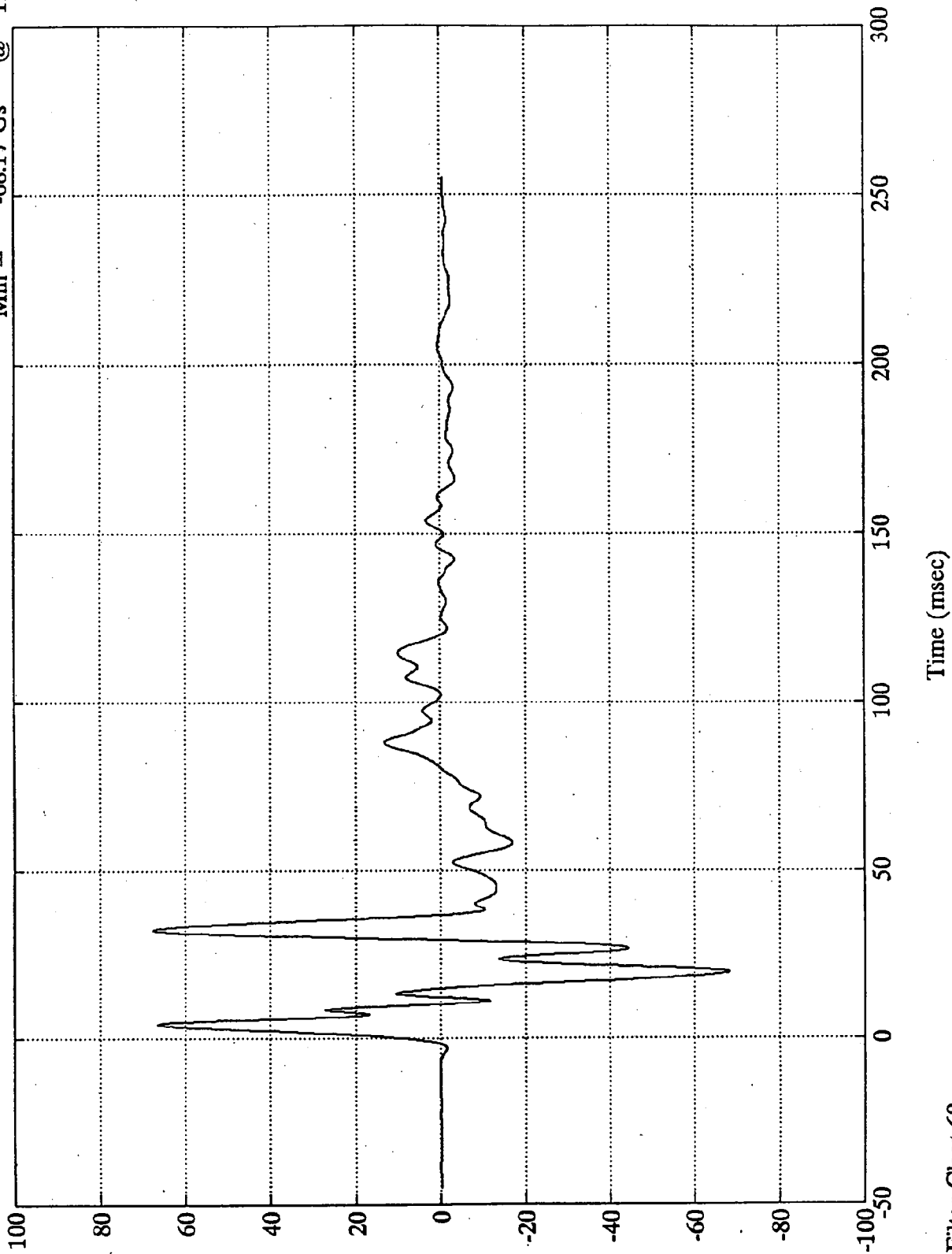
B-76

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Mid Y

Max = 67.48 Gs @ 32.28 msec
Min = -68.17 Gs @ 19.67 msec



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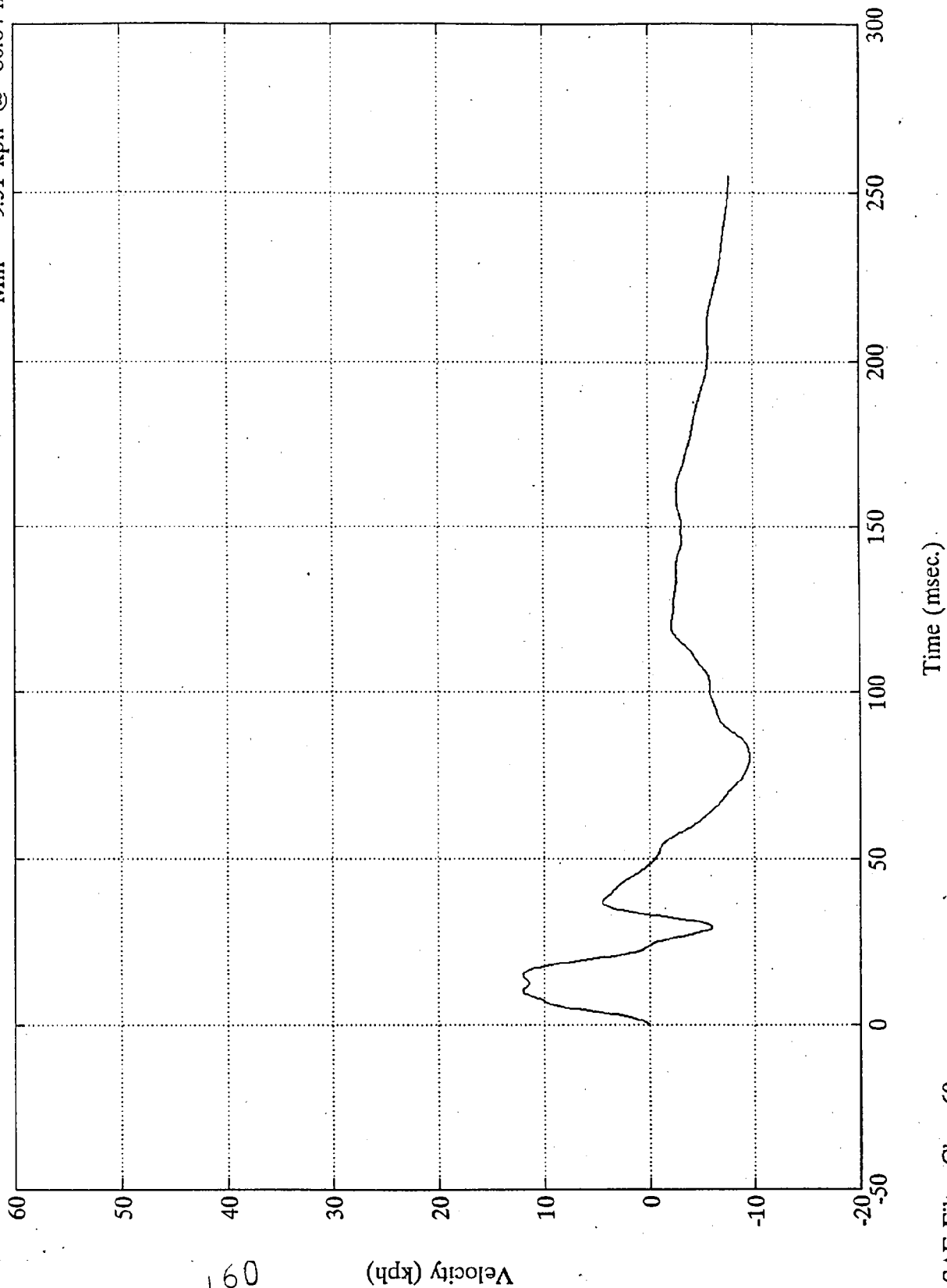
Sae Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Mid Y

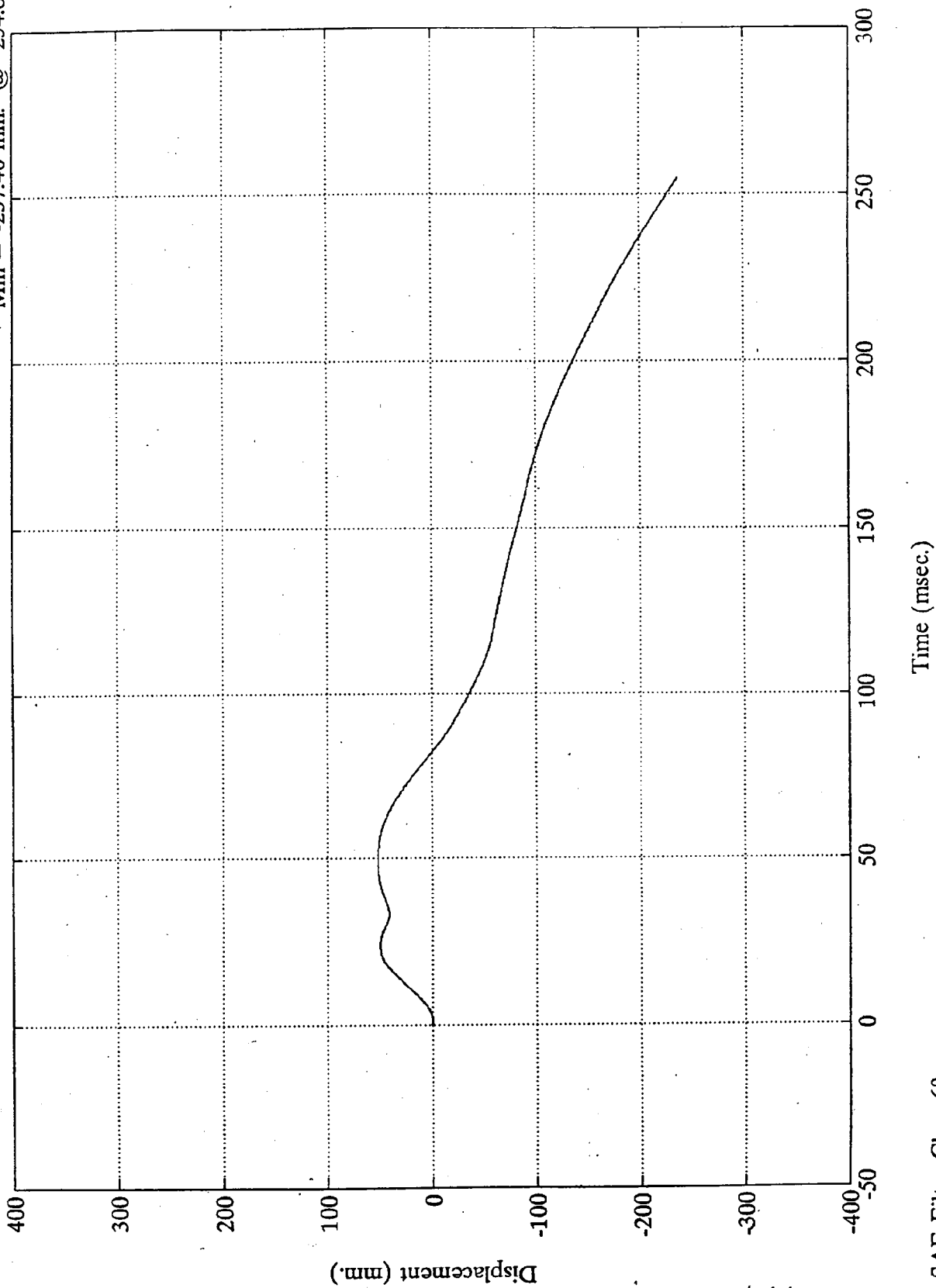
Max = 12.00 kph @ 14.88 msec
Min = -9.51 kph @ 80.64 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Mid Y

Max = 52.36 mm. @ 48.48 msec
Min = -237.40 mm. @ 254.88 msec



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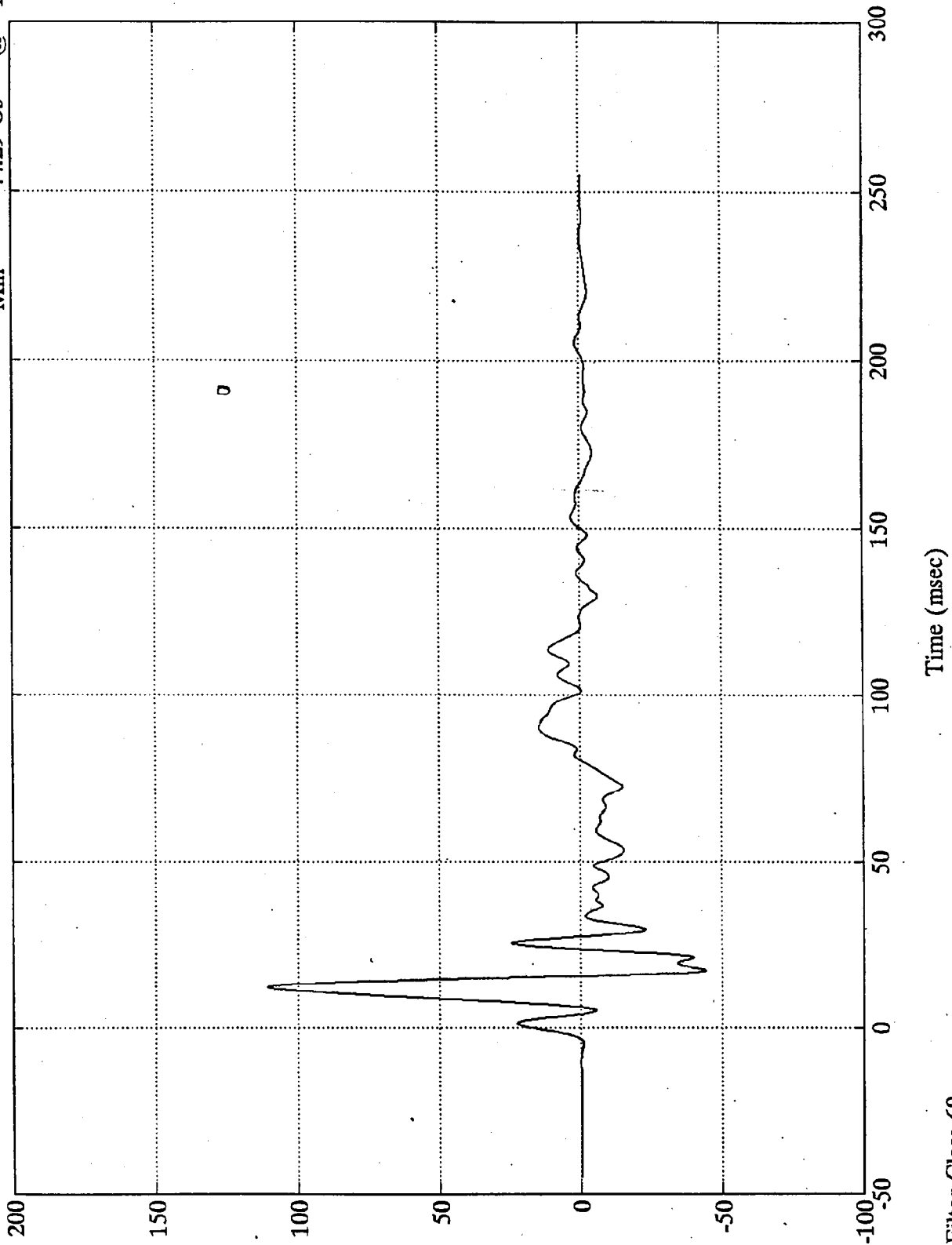
8017-3

SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Upper Y

Max = 110.62 Gs @ 12.11 msec
Min = -44.29 Gs @ 17.15 msec



Sae Filter Class 60

8017-3

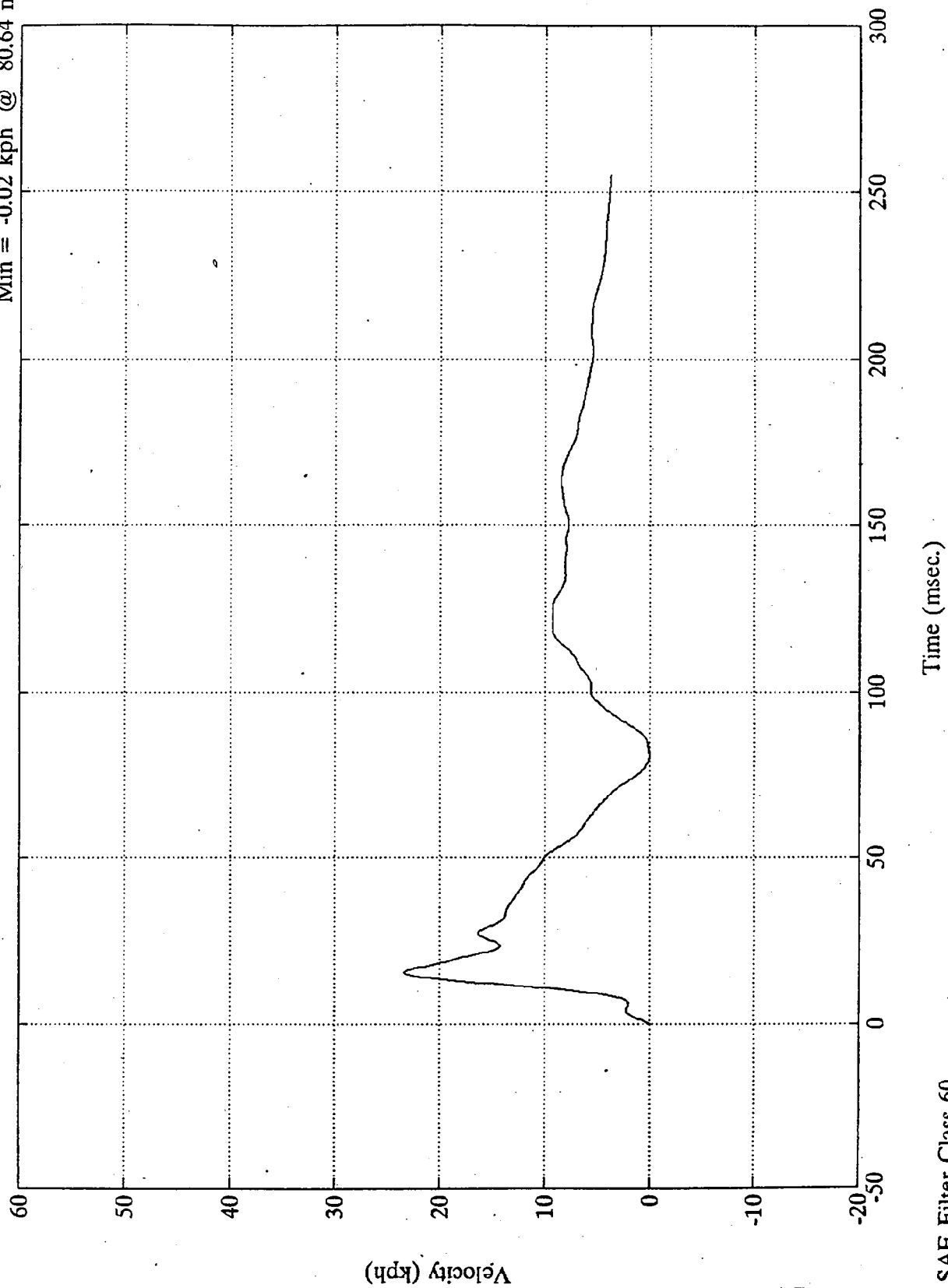
B-80

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Upper Y

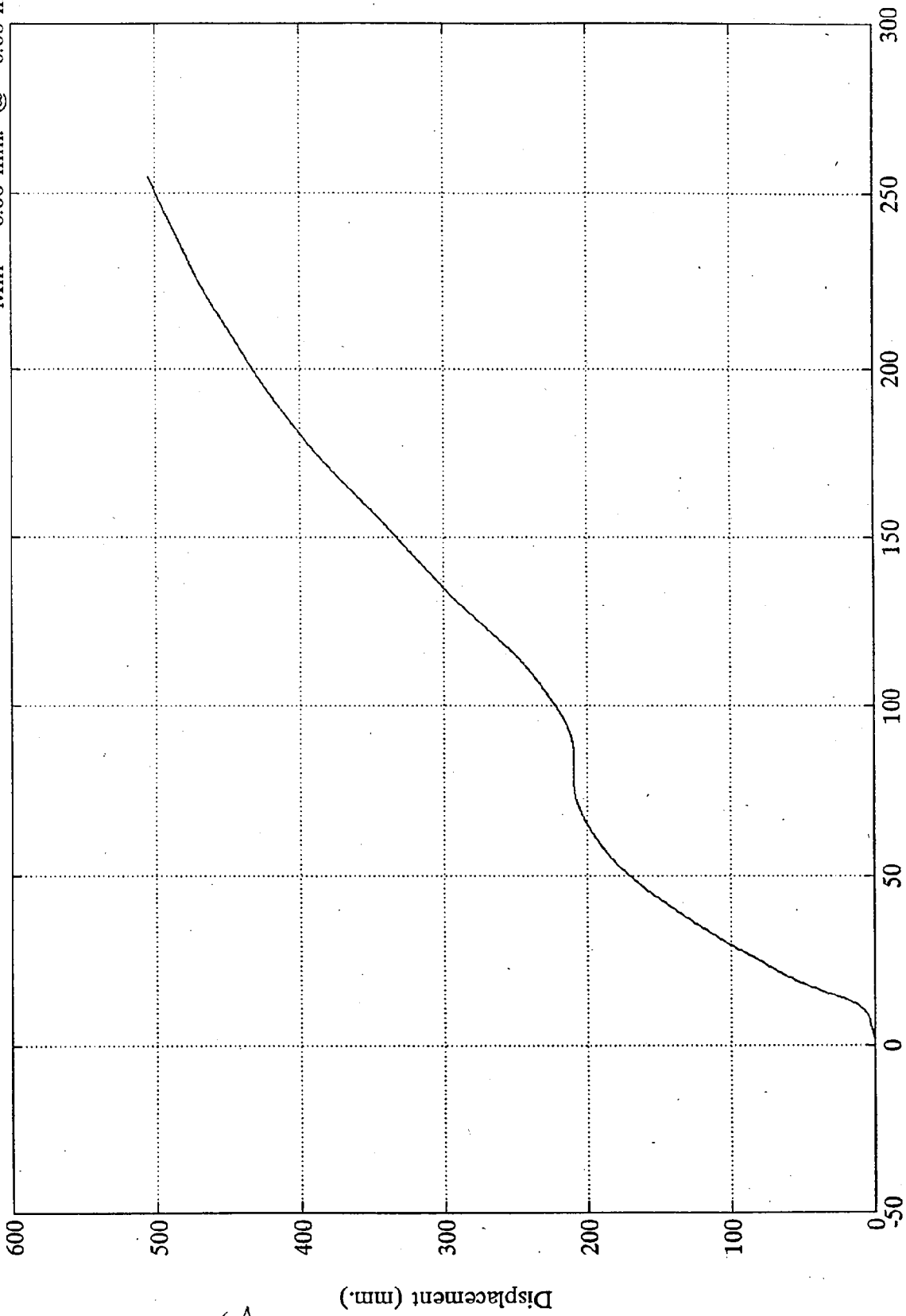
Max = 23.44 kph @ 15.60 msec
Min = -0.02 kph @ 80.64 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Front Door Upper Y

Max = 504.80 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



Time (msec.)

SAE Filter Class 60

8017-3

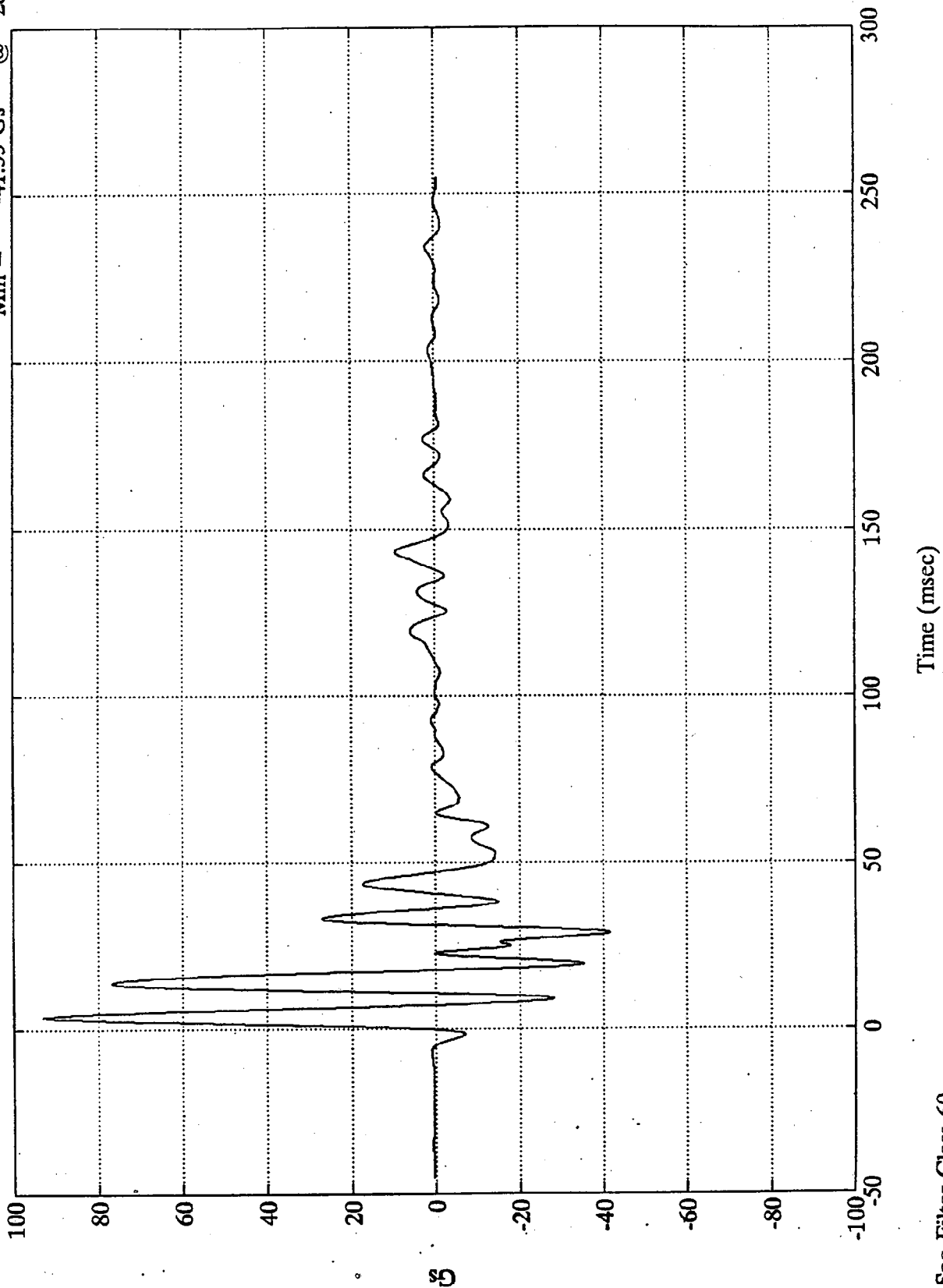
B-82

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L. Rear Door Midrear Y

Max = 93.01 Gs @ 3.59 msec
Min = -41.55 Gs @ 28.92 msec



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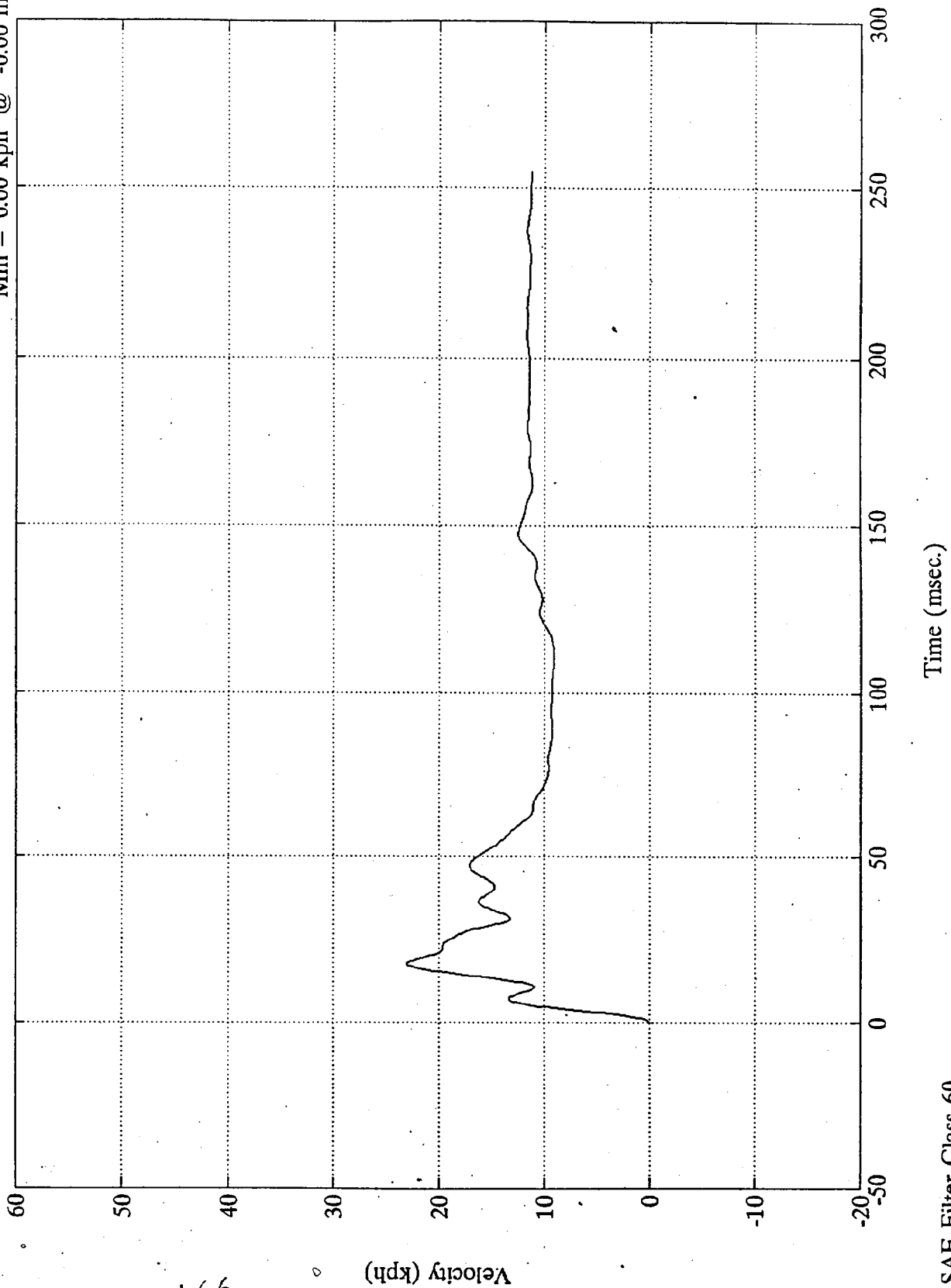
165

8017-3 Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L Rear Door Midrear Y

Max = 23.08 kph @ 17.76 msec
Min = 0.00 kph @ -0.00 msec



SAE Filter Class 60

8017-3

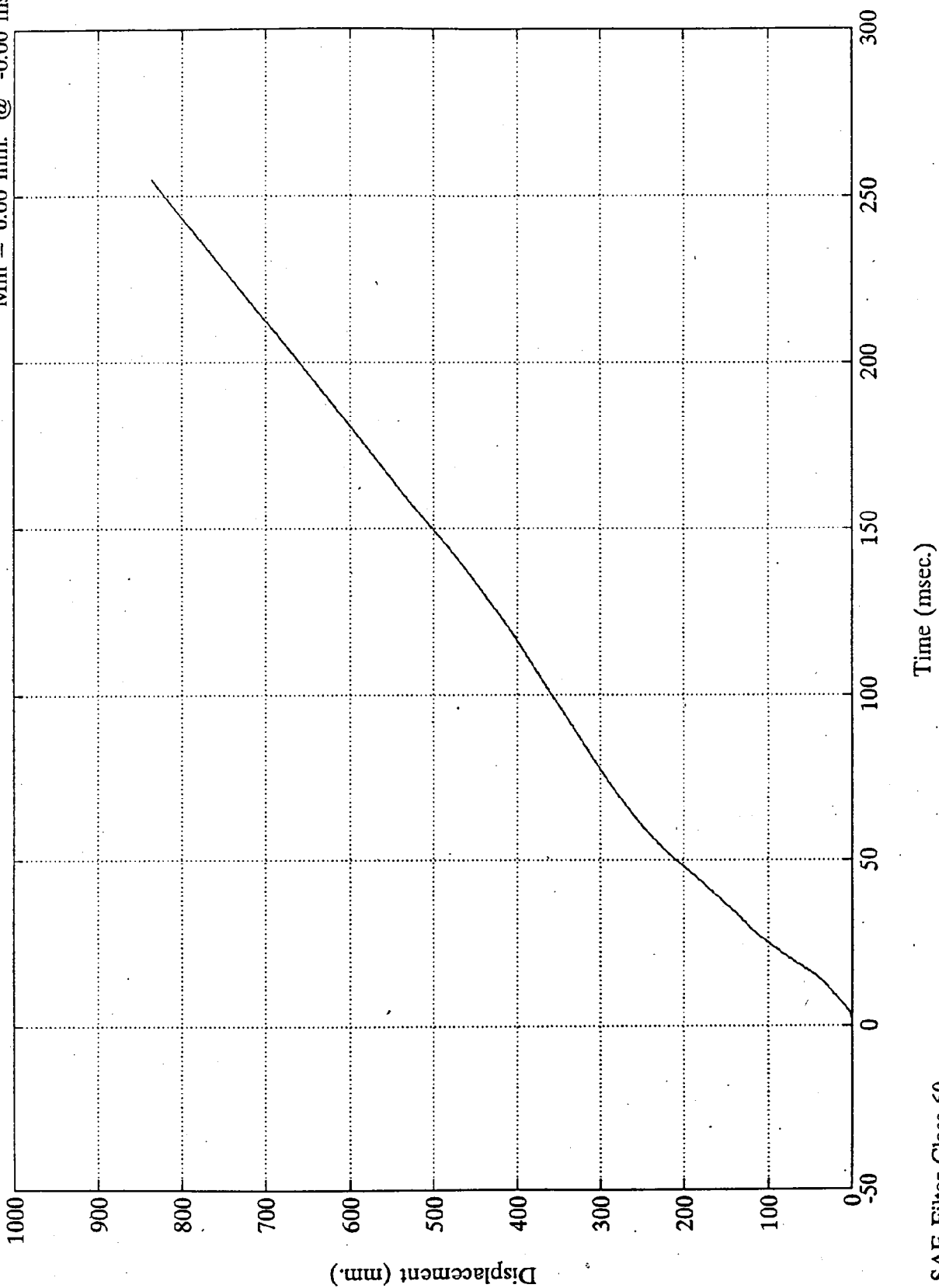
B-84

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

L. Rear Door Midrear Y

Max = 835.80 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



SAE Filter Class 60

8017-3

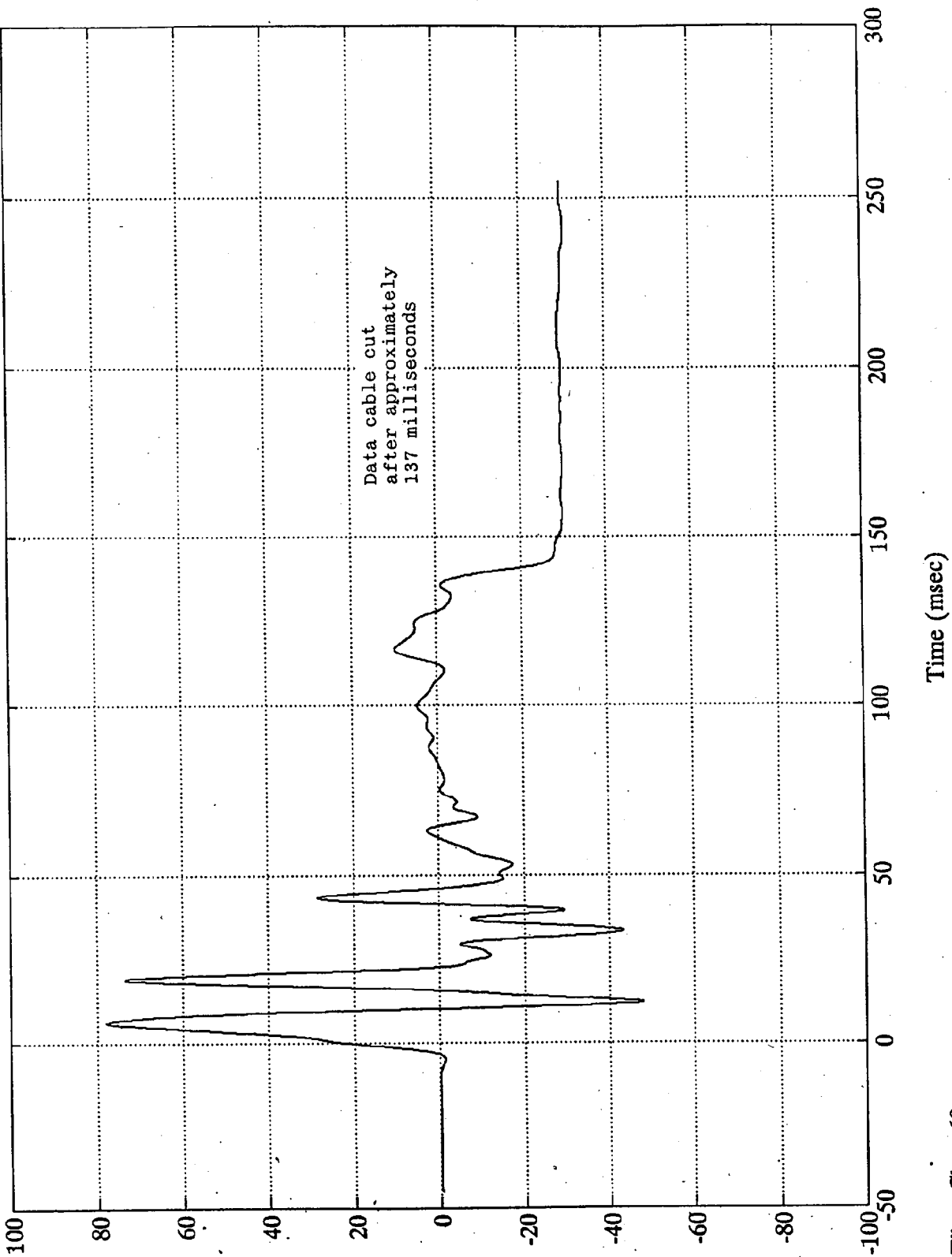
B-85

167

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L Rear Door Upper Y

Max = 77.79 Gs @ 6.11 msec
Min = -47.86 Gs @ 11.99 msec



Sae Filter Class 60

8017-3

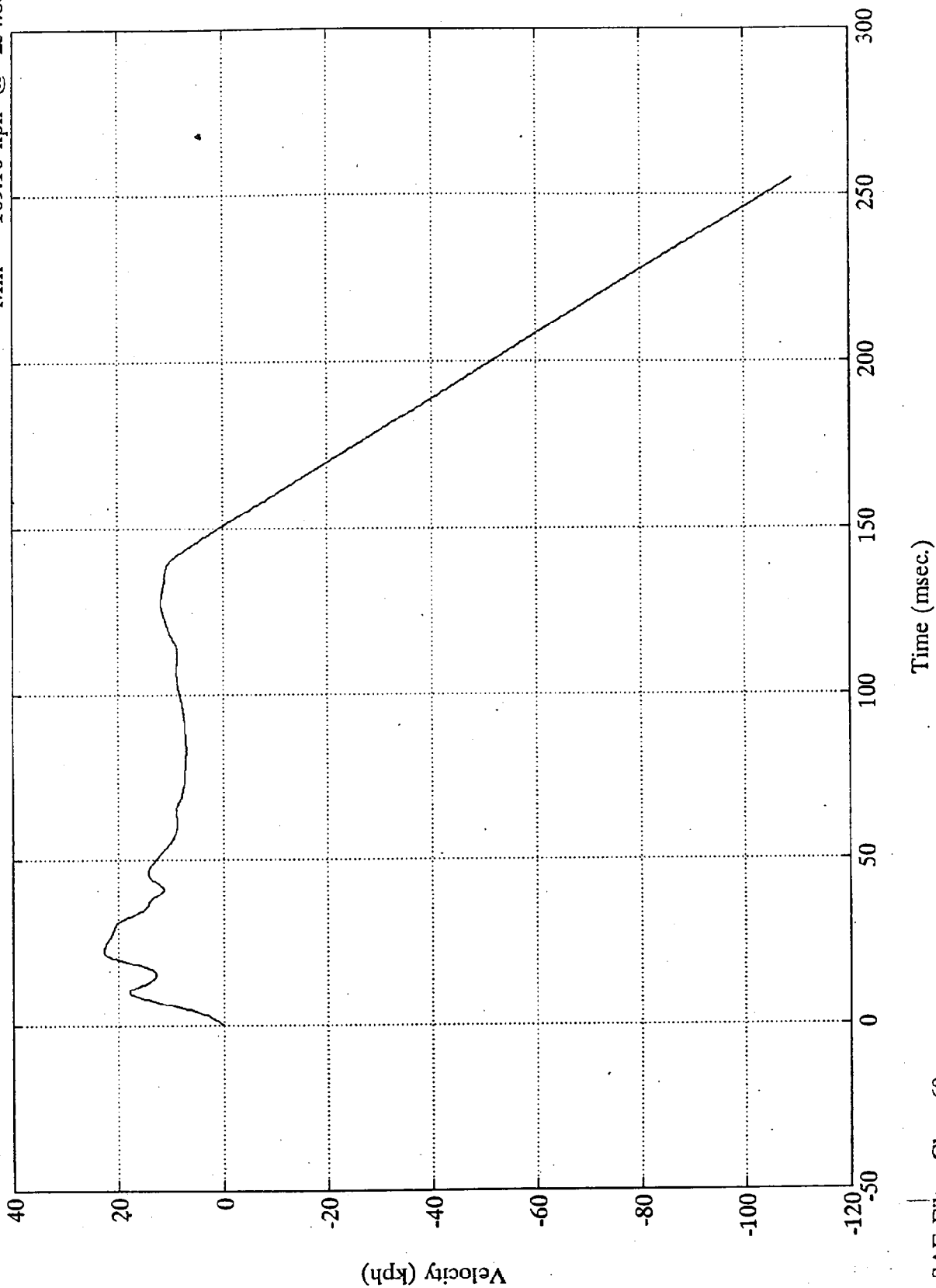
B-86

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 L Rear Door Upper Y

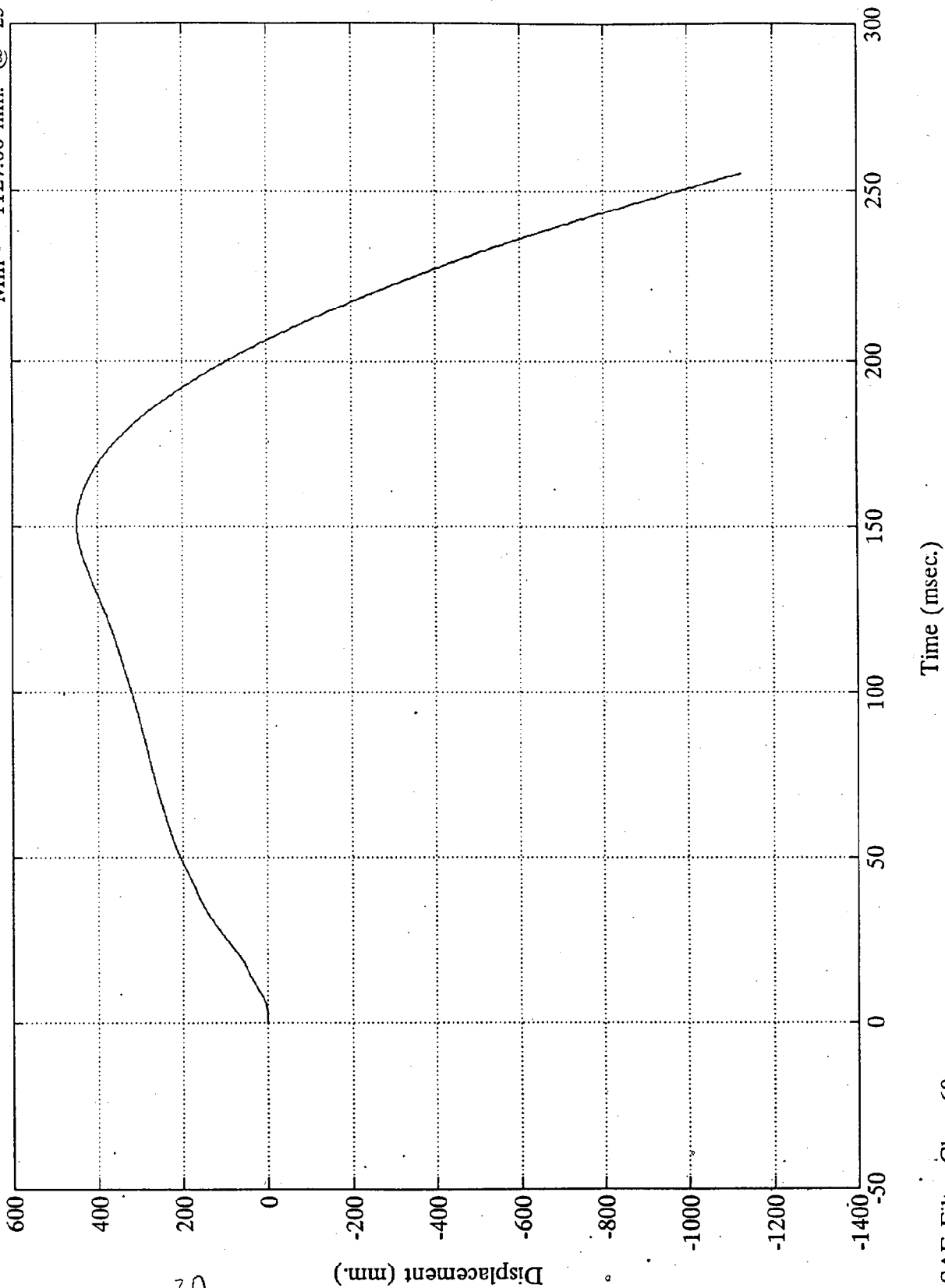
Max = 22.68 kph @ 22.56 msec
Min = -109.10 kph @ 254.88 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

L. Rear Door Upper Y

Max = 448.00 mm. @ 151.20 msec
Min = -1127.00 mm. @ 254.88 msec



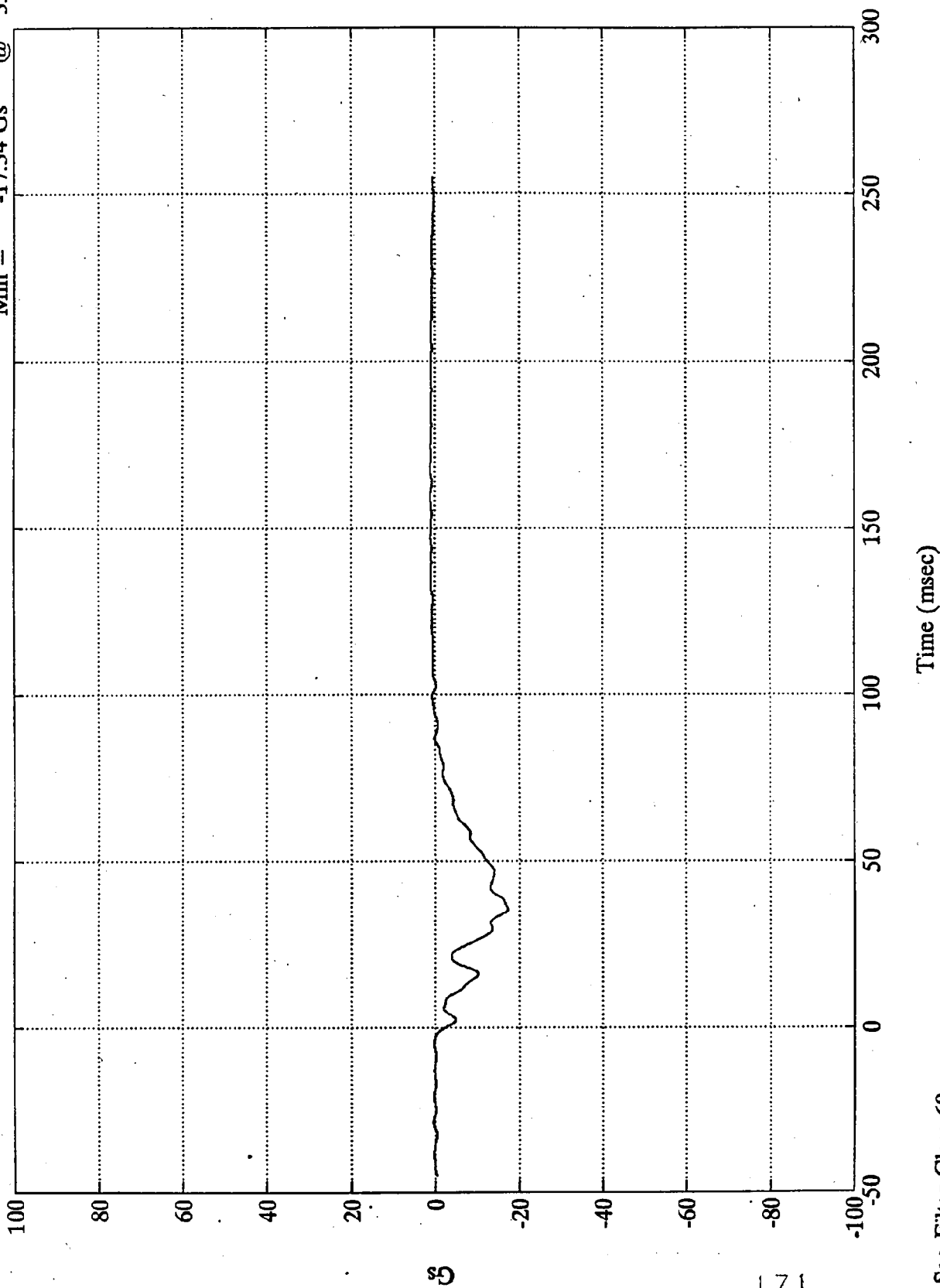
SAE Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. X

Max = 1.21 Gs @ 167.40 msec
Min = -17.34 Gs @ 35.63 msec



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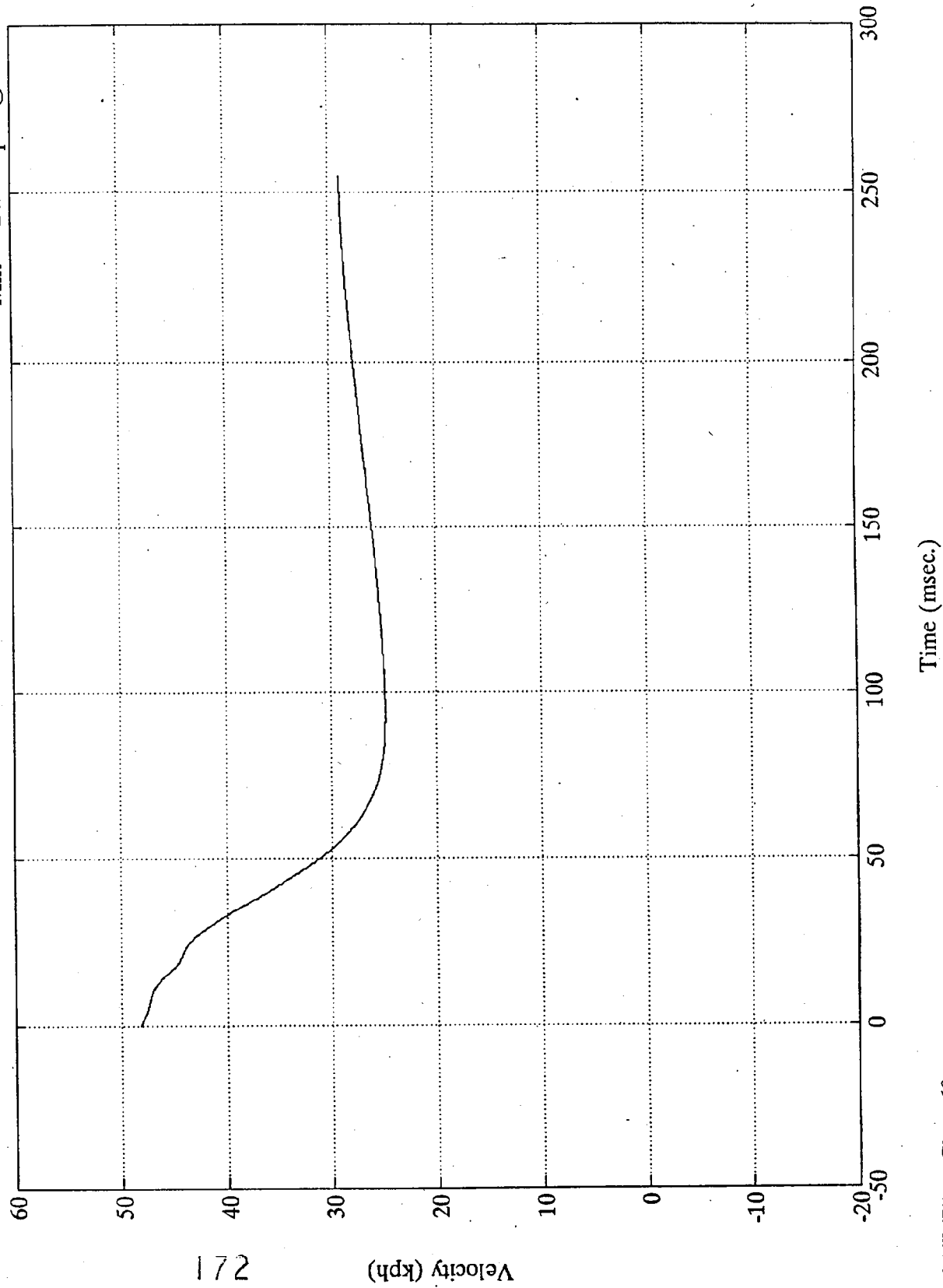
Sae Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. X

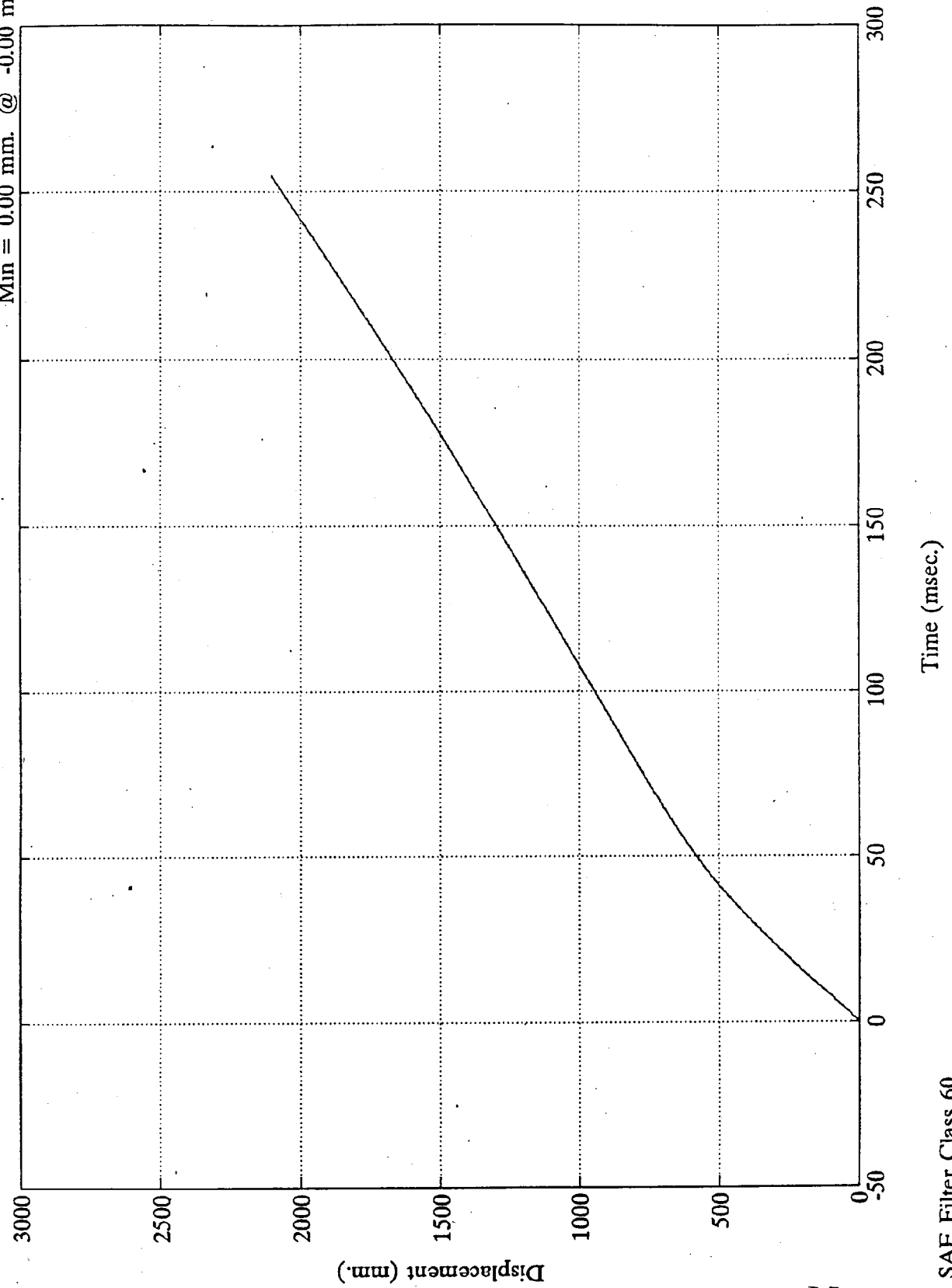
Max = 48.17 kph @ -0.00 msec
Min = 24.85 kph @ 95.28 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. X

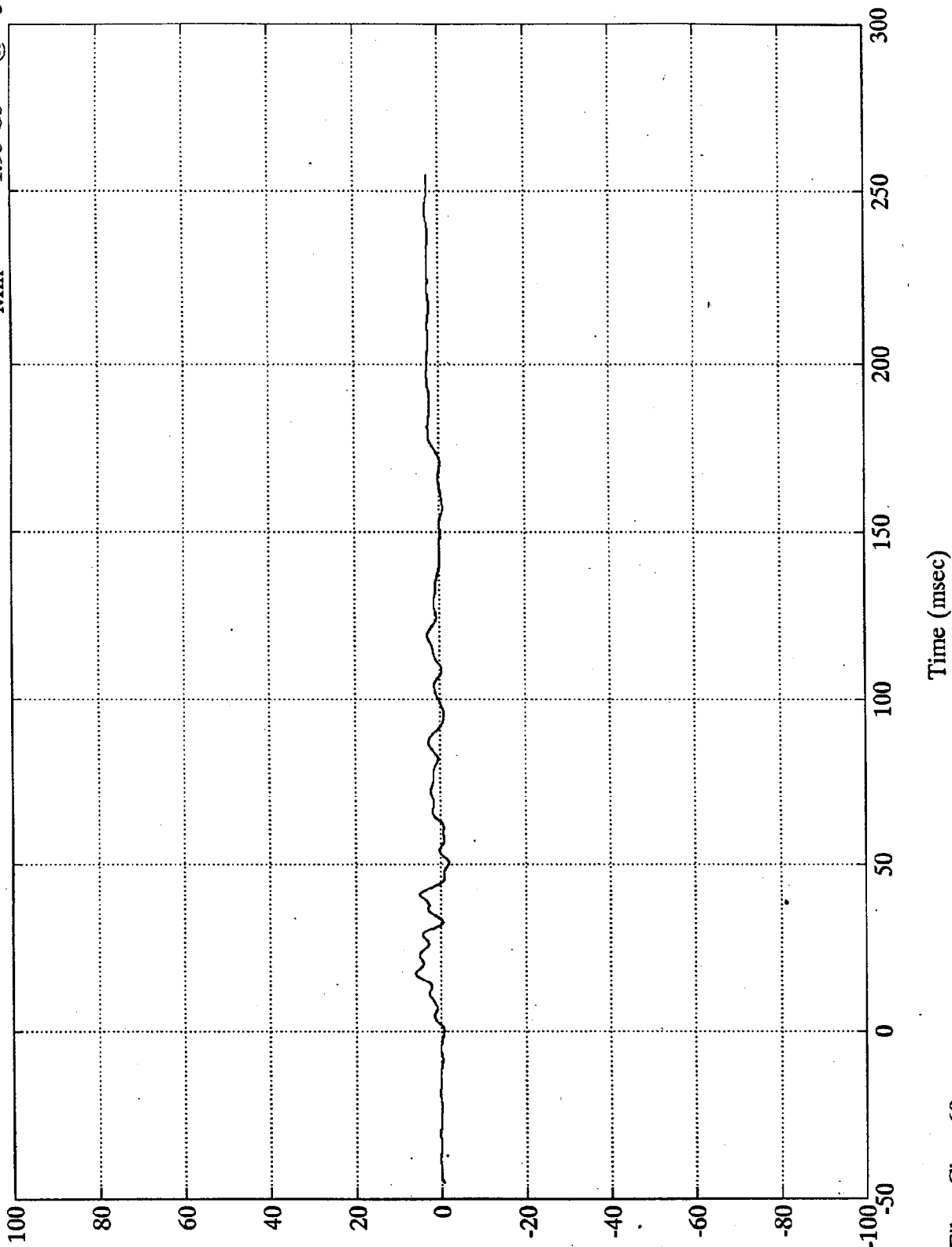
Max = 2106.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. Y
 Max = 5.98 Gs @ 17.27 msec
 Min = -1.93 Gs @ 50.52 msec



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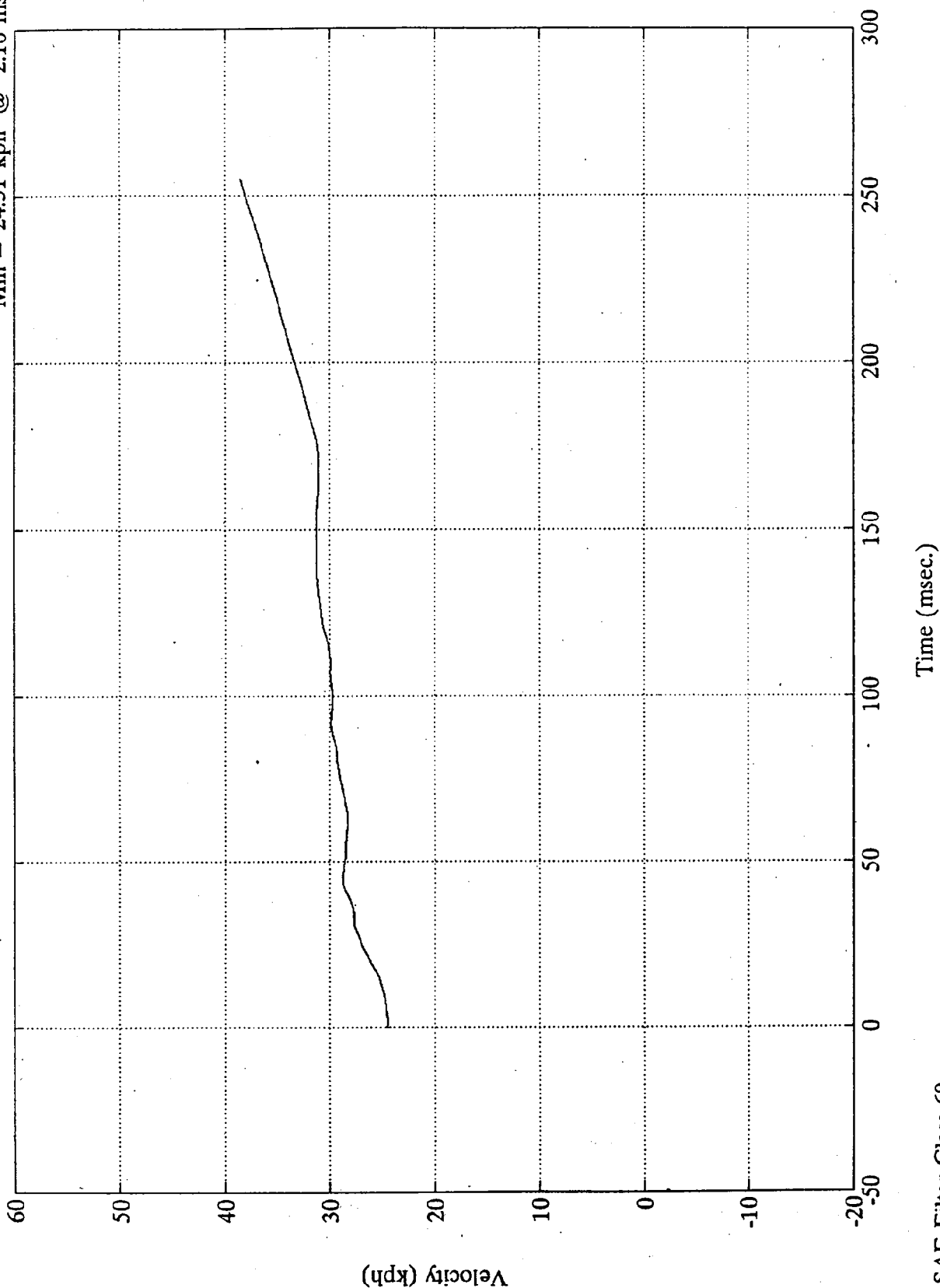
B-92

8017-3
 Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. Y

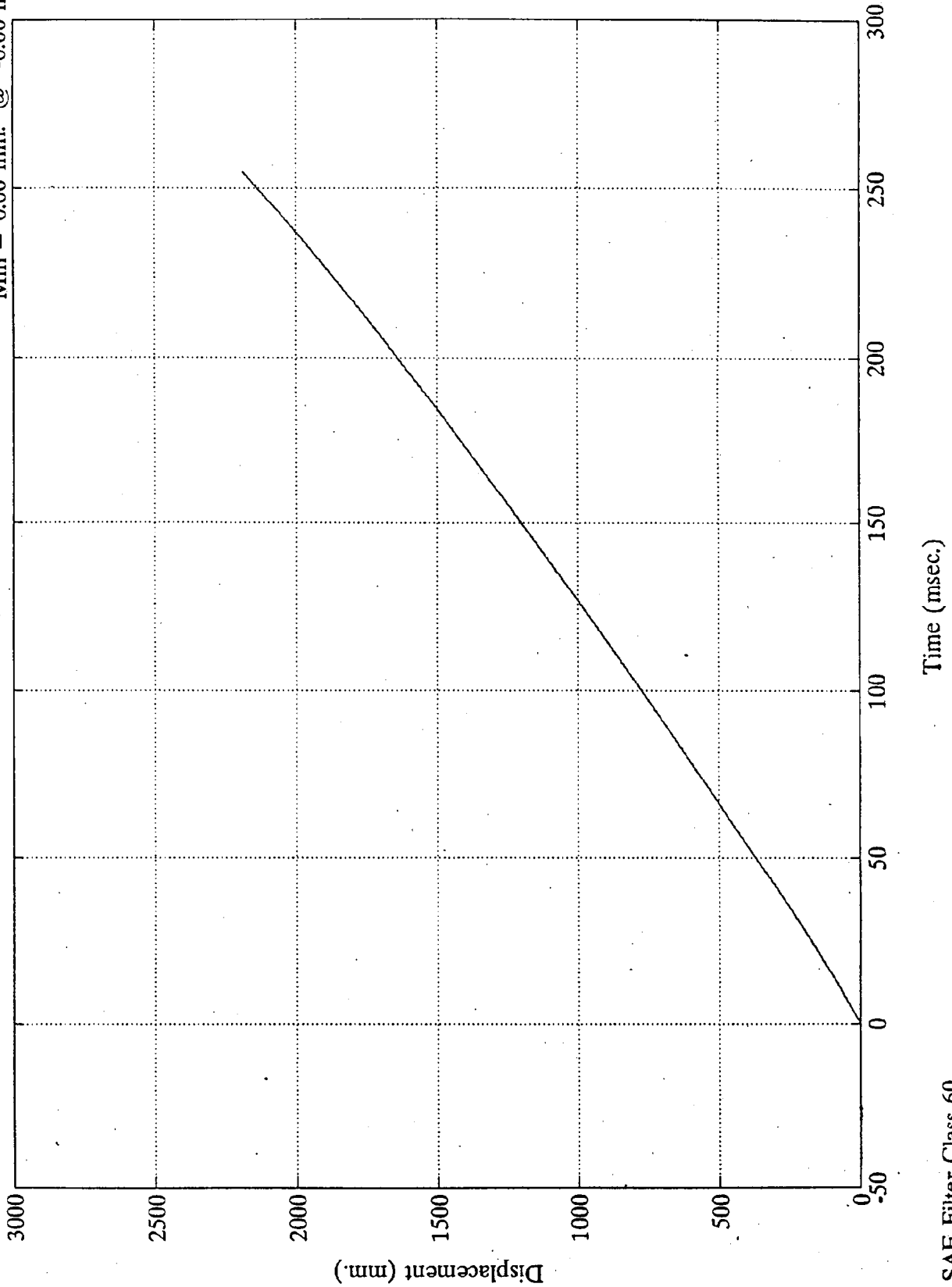
Max = 38.51 kph @ 254.88 msec
Min = 24.51 kph @ 2.16 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. Y

Max = 2188.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



SAE Filter Class 60

8017-3

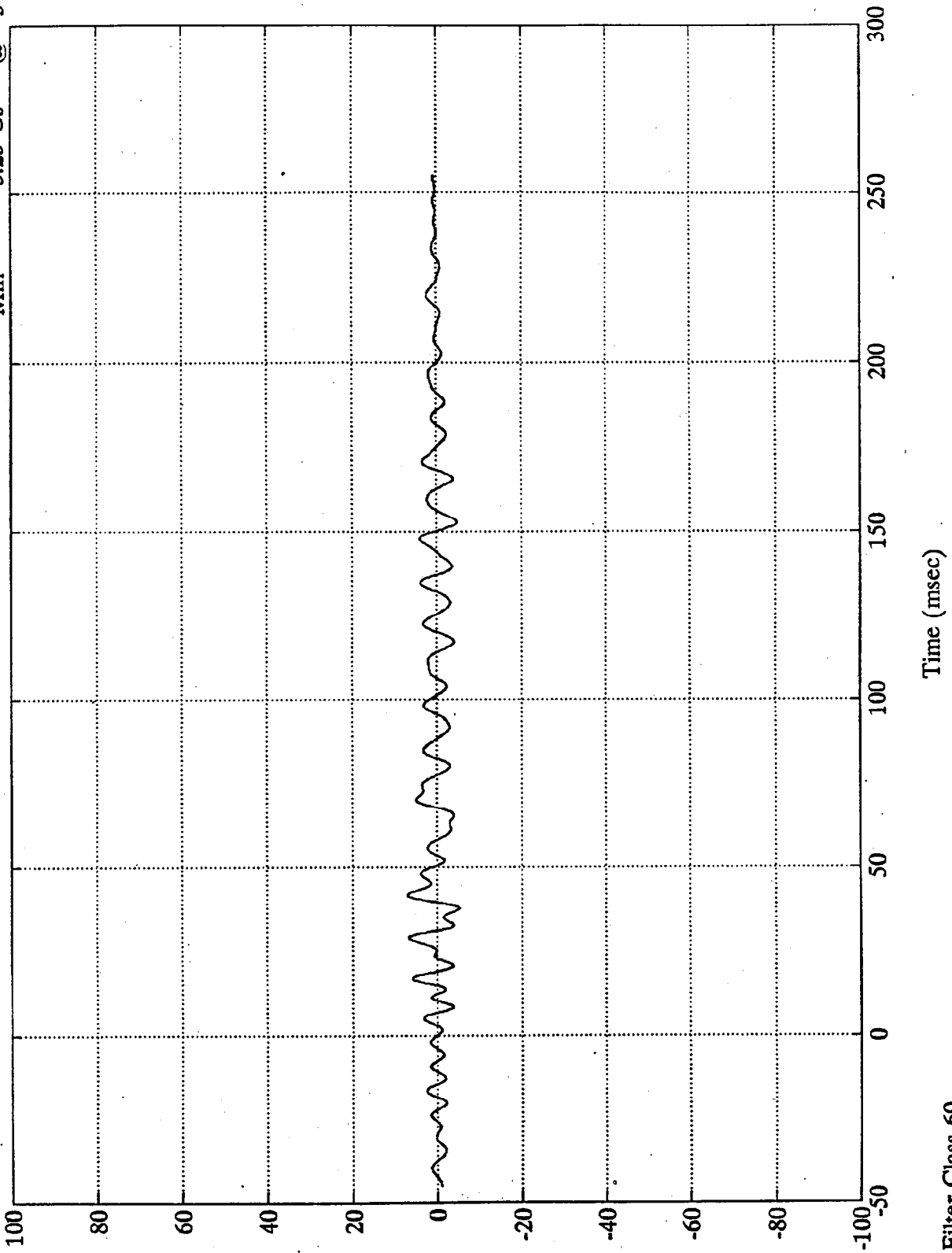
B-94

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. Z

Max = 7.03 Gs @ 41.88 msec
Min = -5.25 Gs @ 37.79 msec



B-95

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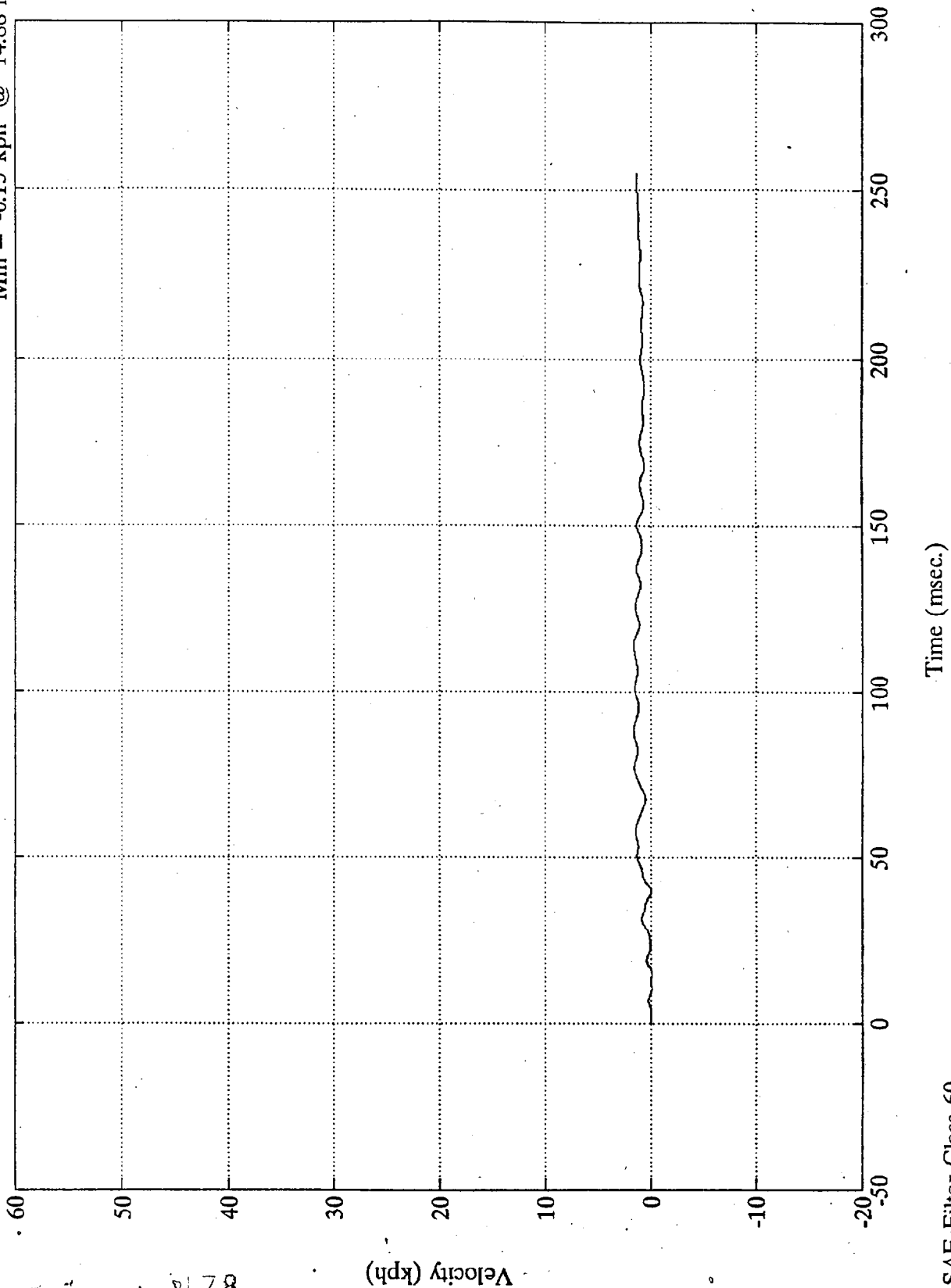
8017-3

Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

Max = 1.60 kph @ 114.24 msec
Min = -0.15 kph @ 14.88 msec

V2 C.G. Z



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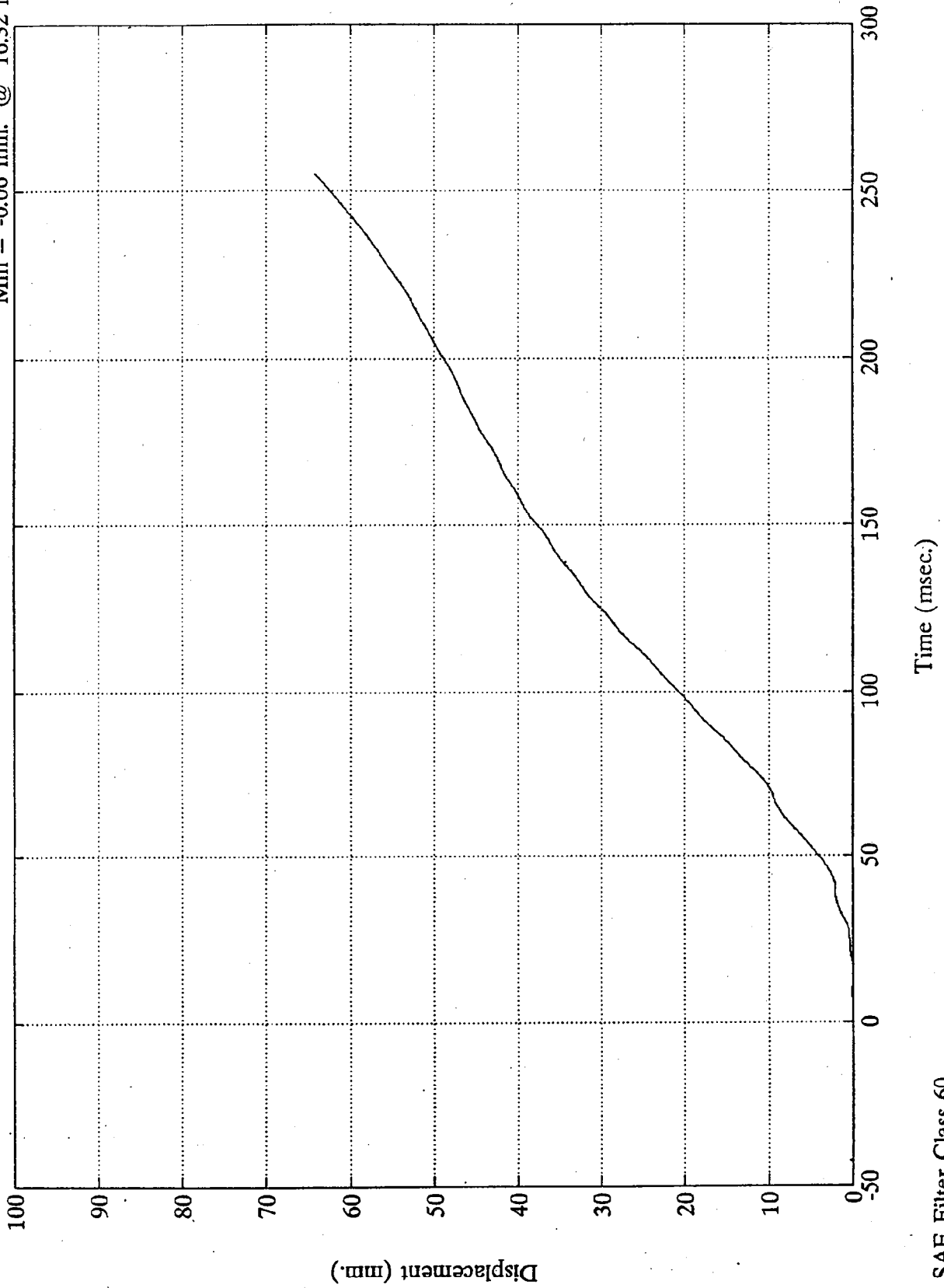
SAE Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 C.G. Z

Max = 64.20 mm. @ 254.88 msec
Min = -0.06 mm. @ 16.32 msec



SAE Filter Class 60

8017-3

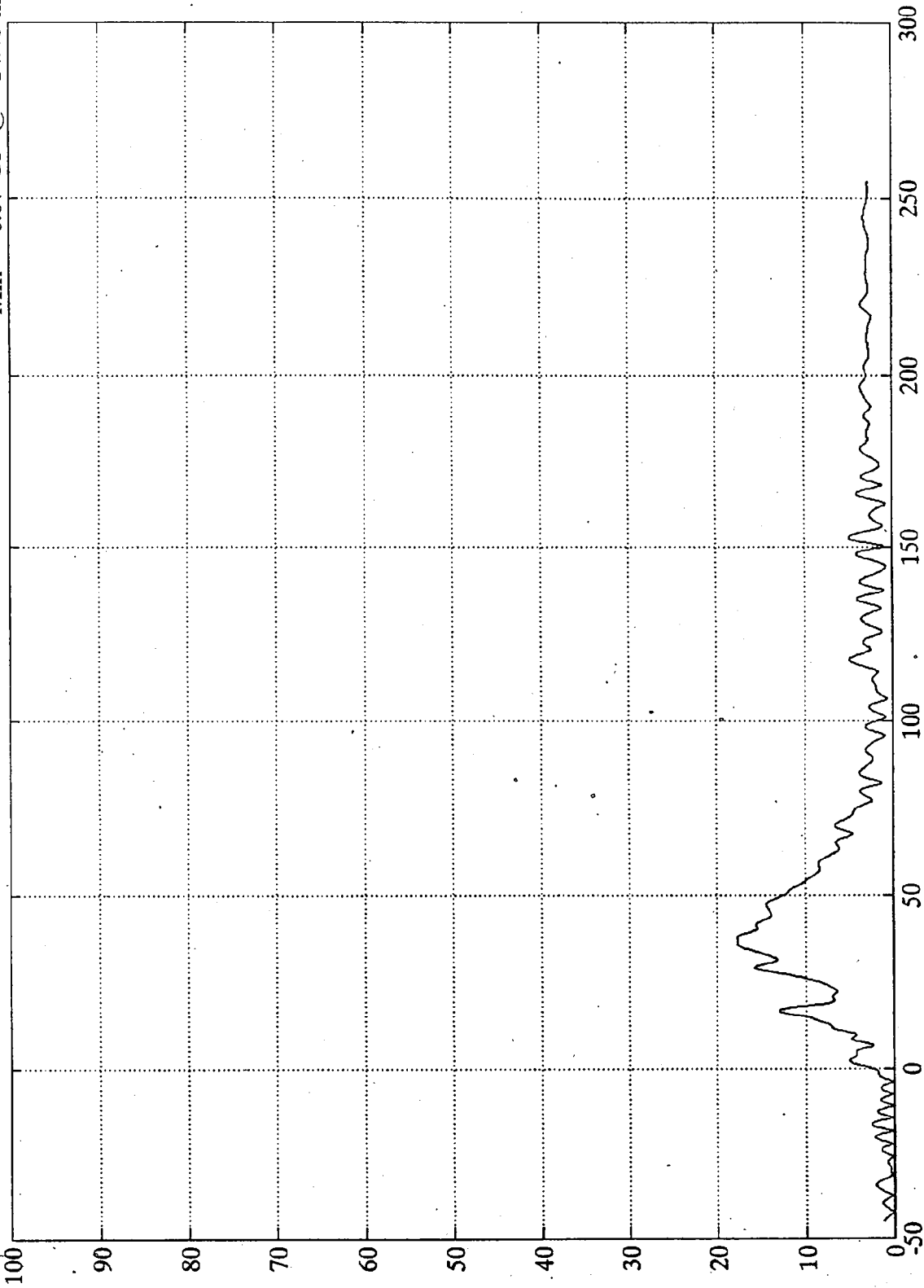
B-97

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NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V1 C.G. Resultant

Max = 17.73 Gs @ 37.56 msec
Min = 0.07 Gs @ -14.40 msec



Time (msec.)

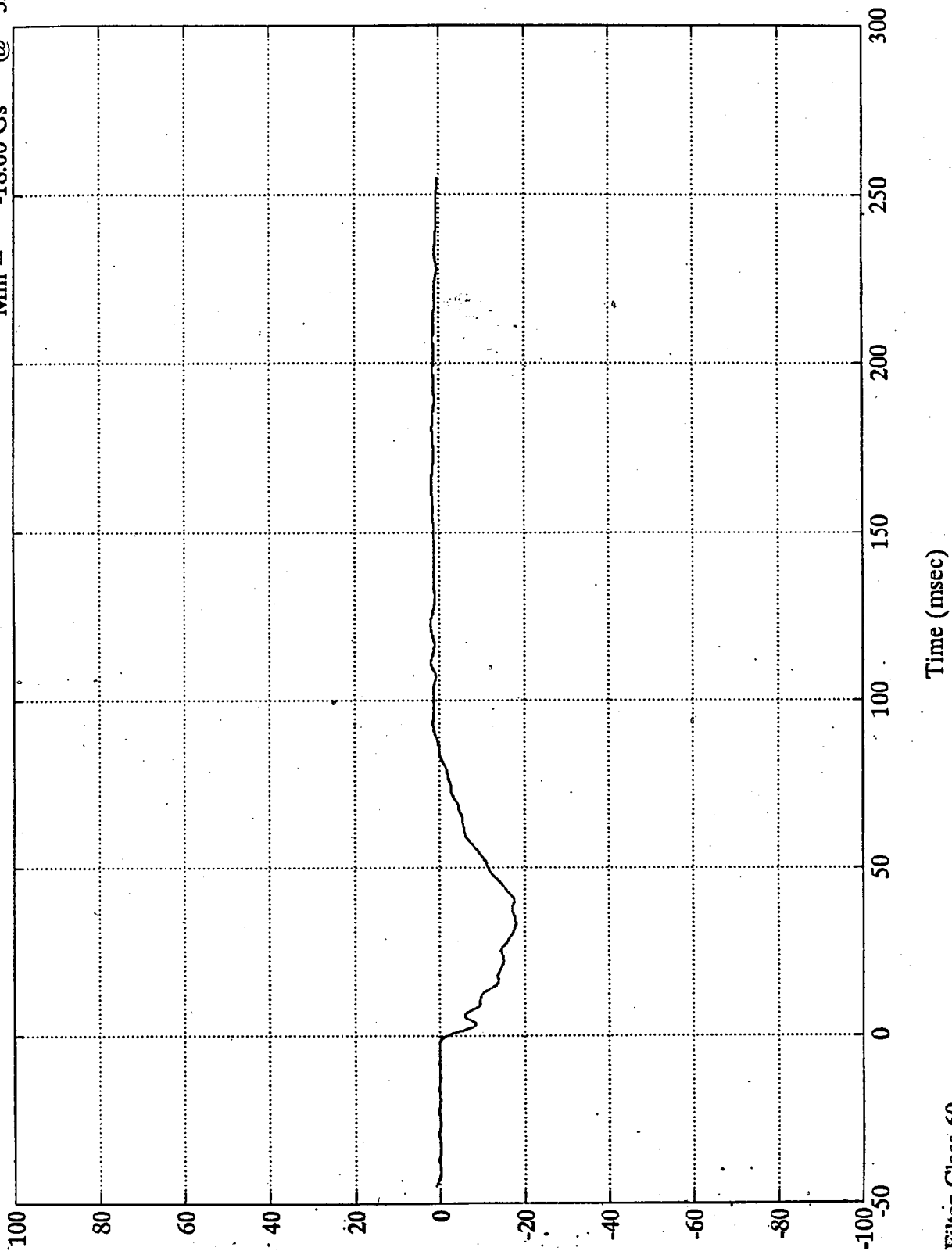
SAE Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 Left Rail X

Max = 2.06 Gs @ 122.76 msec
Min = -18.00 Gs @ 33.11 msec



B-99

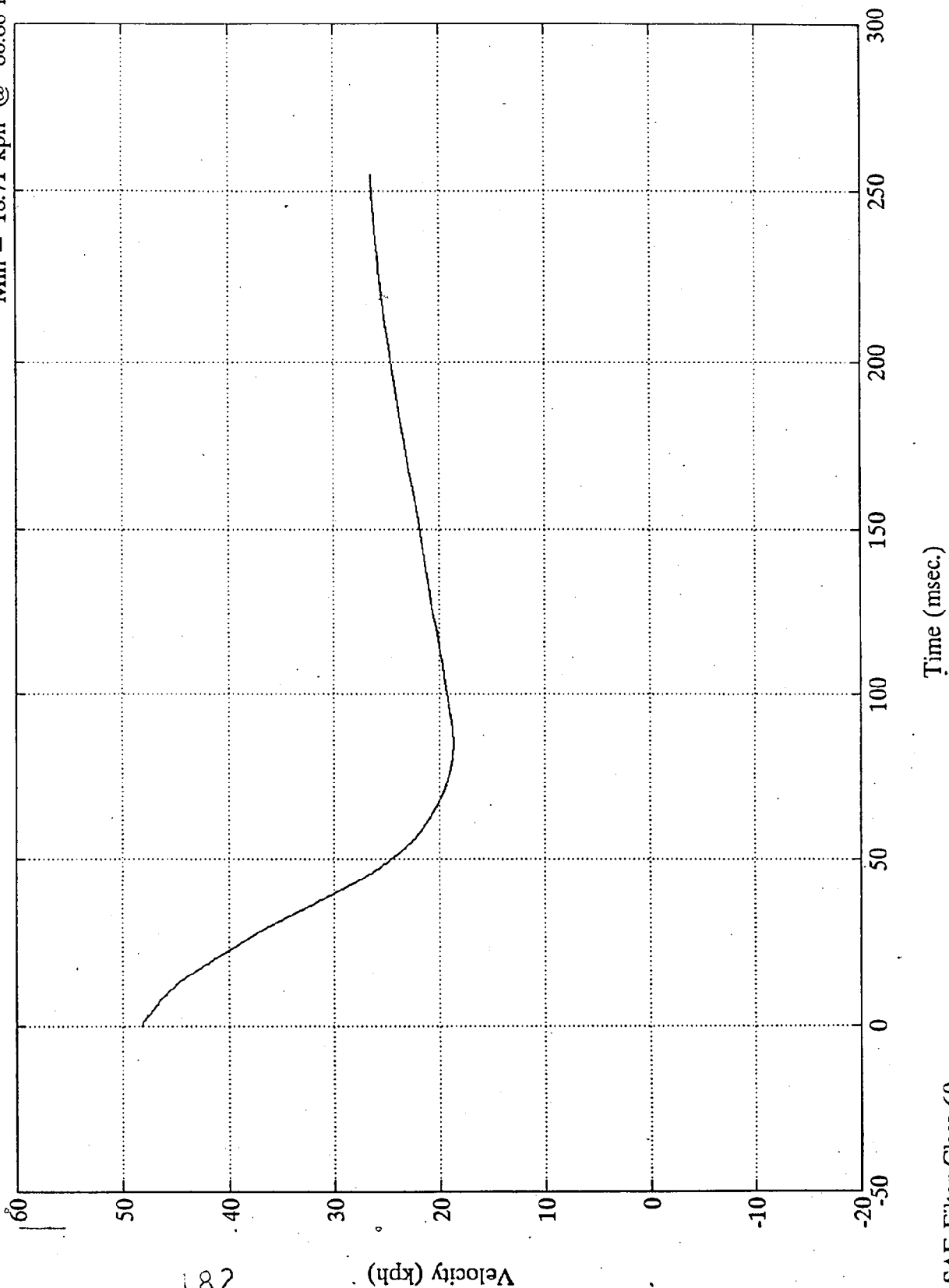
181

8017-3 Sae Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 Left Rear Rail X

Max = 48.17 kph @ -0.00 msec
Min = 18.71 kph @ 86.88 msec



SAE Filter Class 60

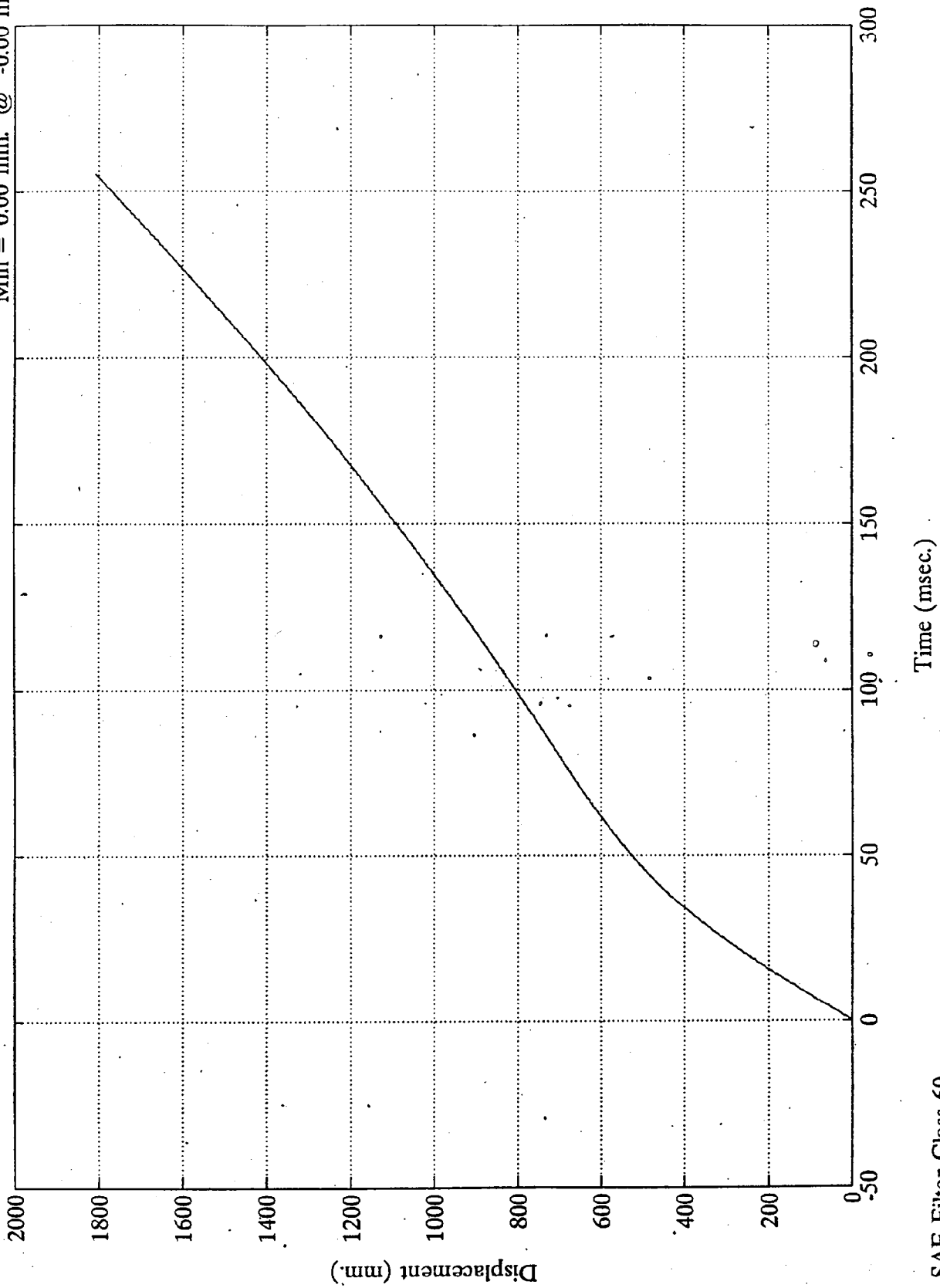
8017-3

B-100

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 Left Rear Rail X

Max = 1805.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



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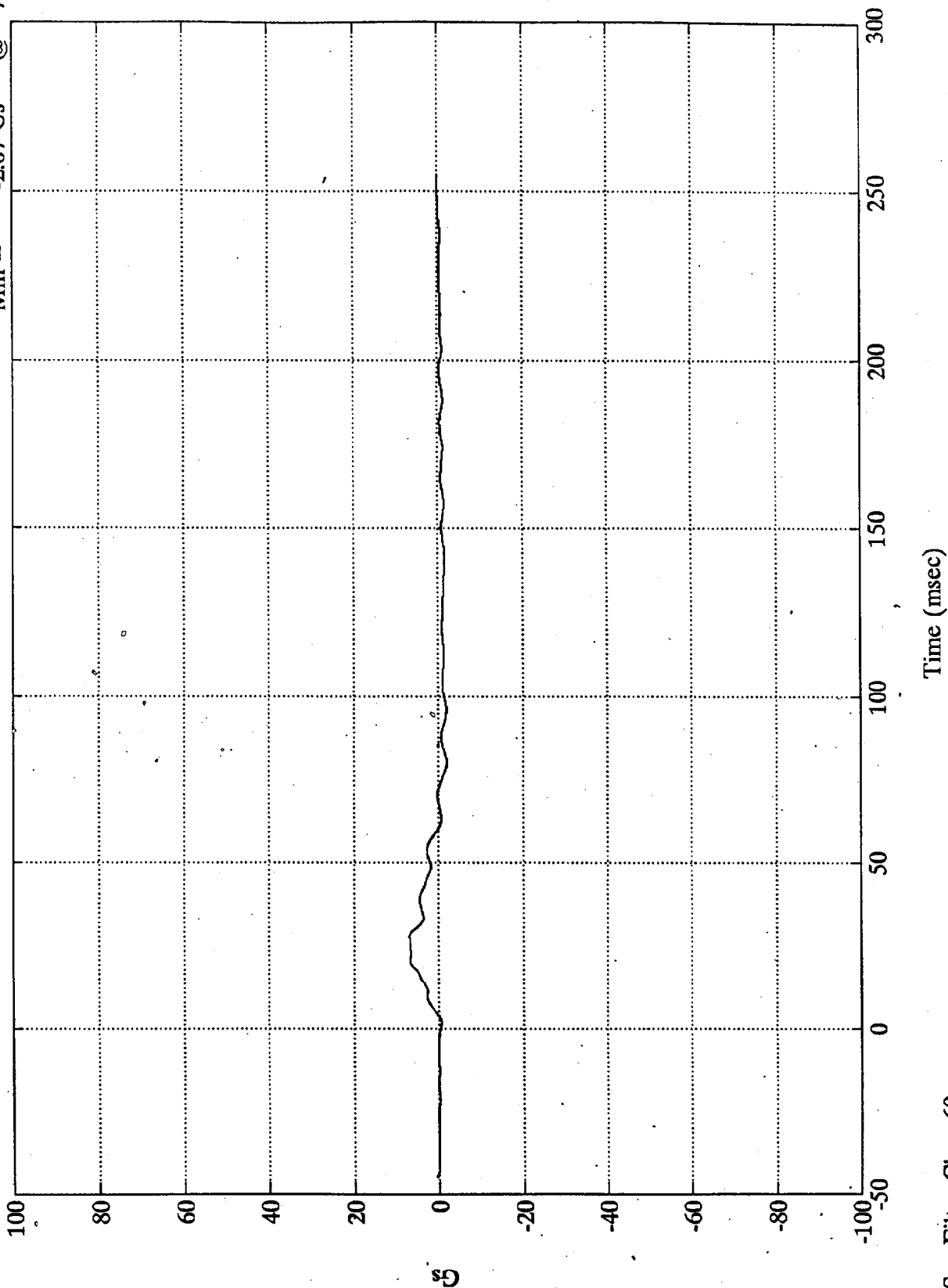
8017-3

SAE Filter Class 60

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 Left Rail Y

Max = 6.90 Gs @ 27.96 msec
 Min = -2.07 Gs @ 79.91 msec



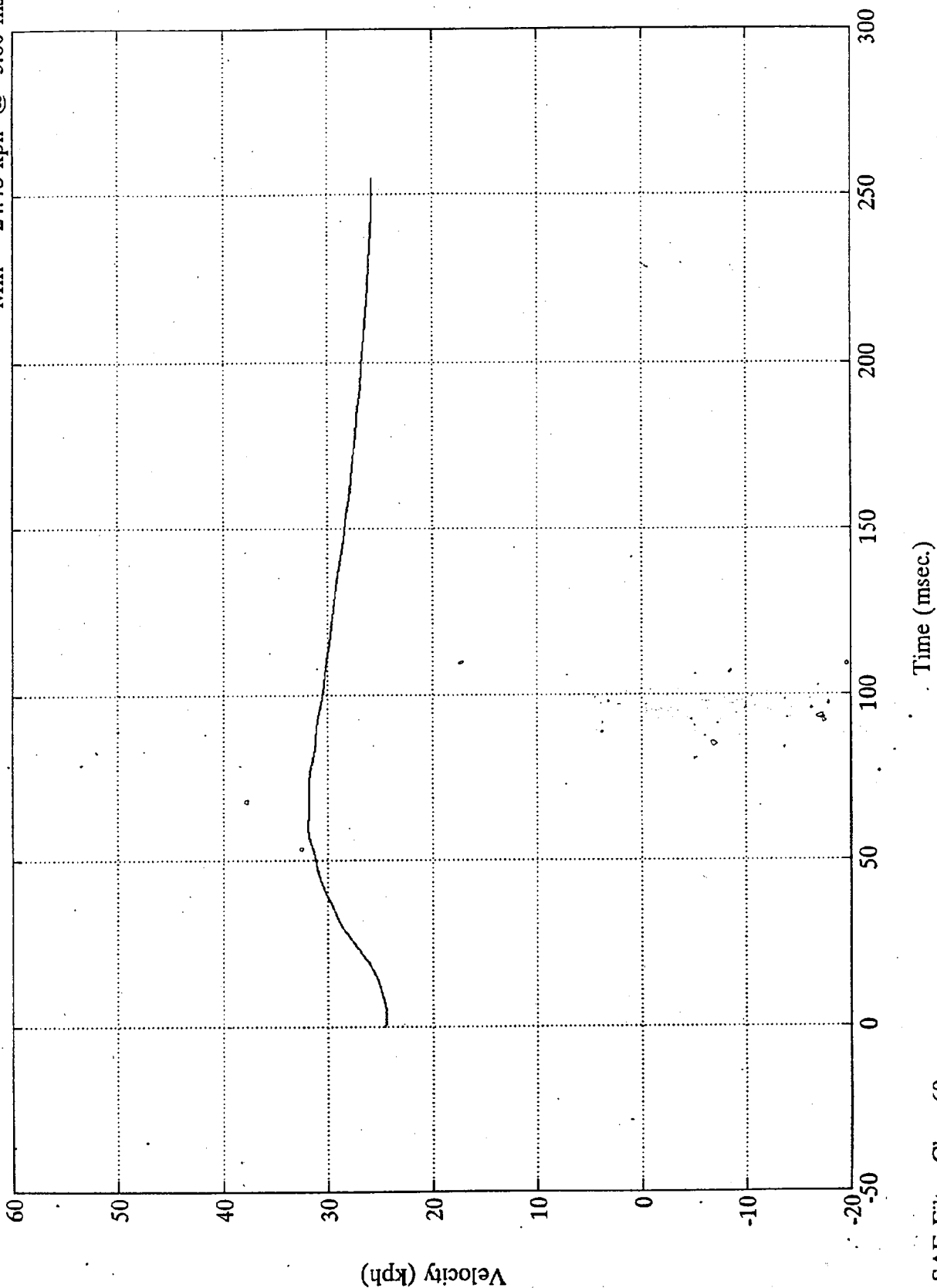
Sae Filter Class 60

8017-3

NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 Left Rear Rail Y

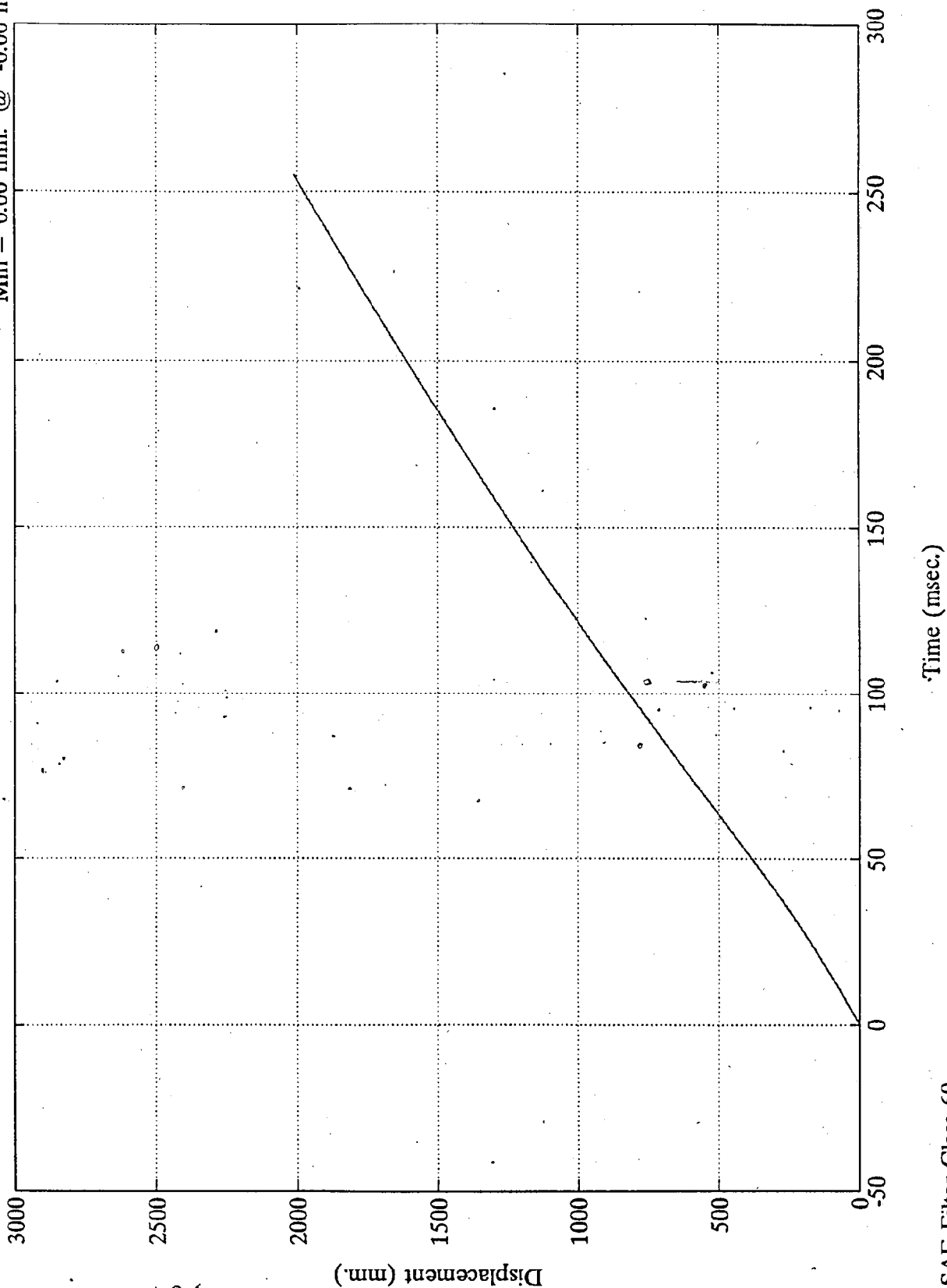
Max = 31.89 kph @ 60.96 msec
Min = 24.48 kph @ 3.60 msec



NCAP S.I. TEST #3 1993 TOYOTA COROLLA

V2 Left Rear Rail Y

Max = 2010.00 mm. @ 254.88 msec
Min = 0.00 mm. @ -0.00 msec



SAE Filter Class 60

8017-3

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Appendix C

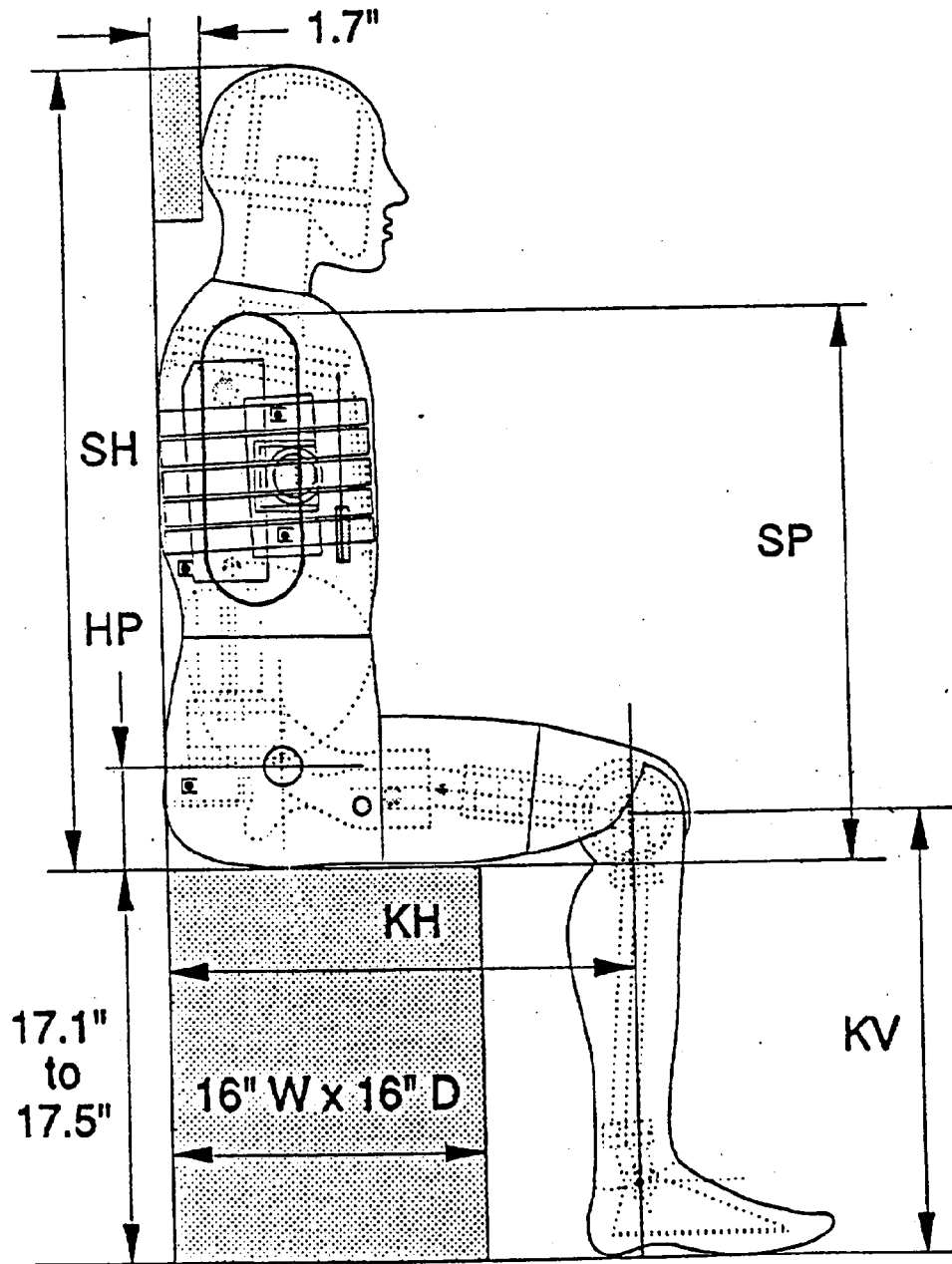
SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SID PRE-TEST INSPECTION

Prior to each test, each SID is inspected to ensure the integrity of its components. The inspection includes observation of the head and neck areas for lacerations and/or reduction in stiffness. Inspection of the legs is performed to adjust joints to the specified torques and to identify any component failures. Inspection of the thorax is performed to verify the integrity of the SID outer jacket; location of "arm" foam; rib wrap assembly, rib anti-sag device; rib assembly; piston, and spine. The abdomen is inspected to identify any reduction in stiffness.

These inspections are performed prior to every test in addition to the verification tests performed on the following pages at the selected intervals.

Figure 10
DUMMY CONFIGURATION DIMENSIONS



SID CONFIGURATION VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER: 171

	PART 572F SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION		9-11-92	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXXXX		
SH - Seated Height	35.0 to 35.8"	35.6 "	
SP - Shoulder Height with Chest Flesh Installed	"	"	"
SP - Shoulder Height with Chest Flesh Removed	"	"	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.7 "	
KV - Knee Pivot to Floor	19.3 to 19.9"	19.5 "	
SW - Shoulder Width	"	"	"
HW - Hip Width	14.0 to 15.4"	14.5 "	
OW - Overall External Width (At Widest Point)	"	"	"

SEQUENTIAL VERIFICATION NUMBER FOR DUMMY: 1

(Sequential number beginning with "1" at the start of each fiscal year's
crash test program)

TECHNICIAN'S NAME: Ivan Minkewicz

SID PERFORMANCE VERIFICATION DATANHTSA DUMMY I.D. NUMBER: 171

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		9-11-92	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		XXXXXXXXXXXX	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		45 %	
TEST PARAMETER	SPECIFICATION		
1. <u>PELVIC IMPACT TEST</u>			
a. Pendulum Velocity (ft/s)	13.8 to 14.2	14.1	
b. Pelvic Y acceleration	40 to 60 G's	59.7 G's	
2. <u>THORAX IMPACT TEST</u>			
a. Pendulum Velocity (ft/s)	13.8 to 14.2	14.0	
b. Upper Rib Y Accel.	37 to 46 G's	40.2 G's	
c. Lower Rib Y Accel.	37 to 46 G's	39.7 G's	
b. Lower Spine Y Accel.	15 to 22 G's	18.0 G's	

TECHNICIAN'S NAME: Ivan Minkewicz

SID CONFIGURATION VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER: 186

	PART 572F SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION		9-18-92	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXXX		
SH - Seated Height	35.0 to 35.8"	35.6 "	
SP - Shoulder Height with Chest Flesh Installed	"	"	"
SP - Shoulder Height with Chest Flesh Removed	"	"	"
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 to Floor	19.3 to 19.9"	19.5 "	
SW - Shoulder Width	"	"	"
HW - Hip Width	14.0 to 15.4"	14.5 "	
OW - Overall External Width (At Widest Point)	"	"	"

SEQUENTIAL VERIFICATION NUMBER FOR DUMMY: 1

(Sequential number beginning with "1" at the start of each fiscal year's crash test program)

TECHNICIAN'S NAME: Ivan Minkewicz

SID PERFORMANCE VERIFICATION DATANHTSA DUMMY I.D. NUMBER: 186

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		9-18-92	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		XXXXXXXXXXXX	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		72 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		47 %	
TEST PARAMETER	SPECIFICATION		
1. <u>PELVIC IMPACT TEST</u>			
a. Pendulum Velocity (ft/s)	13.8 to 14.2	13.9	
b. Pelvic Y acceleration	40 to 60 G's	46.0 G's	
2. <u>THORAX IMPACT TEST</u>			
a. Pendulum Velocity (ft/s)	13.8 to 14.2	14.1	
b. Upper Rib Y Accel.	37 to 46 G's	40.0 G's	
c. Lower Rib Y Accel.	37 to 46 G's	39.1 G's	
b. Lower Spine Y Accel.	15 to 22 G's	19.4 G's	

TECHNICIAN'S NAME: Ivan Minkewicz