V2779

CALSPAN REPORT NUMBER: 8404-6

VEHICLE-TO-VEHICLE 132° FRONTAL IMPACT OF A A 1987 TOYOTA MR2 2-DOOR COUPE TRAVELING 72.4 KPH INTO THE RIGHT FRONT CORNER OF 1994 TOYOTA COROLLA 4-DOOR SEDAN TRAVELING 24.1 KPH

CALSPAN TEST NUMBER: A109-6-1732

November 11, 1997

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

FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
Research and Special Programs Administration
Volpe National Transportation Systems Center
Kendall Square
Cambridge, MA 02142

This Test Report was prepared for the U.S. Department of Transportation, Research and Special Programs Administration, under Contract No. DTRS57-95-C-00009.

Prepared By: _____
Patrick G. MacDiarmid, Jr., Project Engineer

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

Approval Date: December 2, 1997

FINAL REPORT ACCEPTANCE BY:

Accepted By: _____
Contract Technical Manager

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

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

4. Title and Subtitle	5. Report Date
Vehicle-to-Vehicle 132° Frontal Impact of a 1987 Toyota MR2 2-Door Coupe traveling at 72.4 kph into the right front corner of a 1994 Toyota Corolla traveling at 24.1 kph.	November 11, 1997
	6. Performing Organization Code: CAL
7. Author(s): Patrick G. MacDiarmid, Jr., Project Engineer; David J. Travale, Program Manager	8. Performing Organization Report No.: 8404-6
9. Performing Organization Name and Address: Calspan SRL Corporation, P.O. Box 400, Buffalo, New York 14225	10. Work Unit No.
	11. Contract or Grant No.: DTRS57-95-C-00009
12. Sponsoring Agency Name and Address: U.S. Department of Transportation, Research and Special Programs Administration, Transportation Systems Center, Kendall Square, Cambridge, MA 02142	13. Type of Report and Period Covered: Final, November 1997
	14. Sponsoring Agency Code: DOT/NHTSA/NRD

15. Supplementary Notes

16. Abstract

A vehicle to vehicle 132° frontal impact test of a 1987 Toyota MR2 2-Door Coupe traveling at 72.4 kph into the right front corner of a 1994 Toyota Corolla 4-Door Sedan traveling at 24.1 kph was performed at the Calspan SRL Corporation crash facility in Buffalo, New York on November 11, 1997.

The 1994 Toyota Corolla (Vehicle 1) contained a 5th percentile Hybrid III dummy in the left front driver seating position and a 6 year old toddler Hybrid III in the right front passenger seating position. The driver dummy was restrained using the vehicle's driver airbag and active 3-point belt system. The right front passenger dummy was restrained using the vehicle's passenger airbag and active 3-point belt system. The vehicle airbag system deployed the airbags during the impact prior to the 80 ms time that the Calspan system was programmed to deploy the bags. From film analysis, the passenger bag deployed at approximately 28 ms.

All injury criteria for the driver and passenger dummies were within that allowed by the Laboratory Test Procedure FMVSS 208, Occupant Crash Protection, TP-208-09 dated March 15, 1993.

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

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Section 1

PURPOSE AND TEST PROCEDURE

This vehicle-to-vehicle impact test is part of the Crashworthiness Testing and Analysis Program sponsored by the Research and Special Programs Administration under Contract No. DTRS57-95-C-00009. The purpose of this Technical Task Directive (TTD 3) is to obtain responses from a 6 year old toddler Hybrid III Anthropomorphic Test Devices (ATD) during various vehicle-to-vehicle crashes.

This test was performed using two vehicles, a 1994 Toyota Corolla 4-Door Sedan (Vehicle 1) and a 1987 Toyota MR2 2-Door Coupe (Vehicle 2). The vehicles were aligned so Vehicle 1's right front corner would contact the left front corner of Vehicle 2 with Vehicle 1 traveling at a speed of 24.1 kph and Vehicle 2 traveling at 72.4 kph. The test track was configured so that the direction of travel for Vehicle 2 was 132 degrees counter clockwise from that of Vehicle 1.

The 1994 Toyota Corolla 4-Door Sedan contained a fully restrained 5th percentile Hybrid III ATD in the left front driver seating position and a fully restrained 6 year old toddler Hybrid III ATD in the right front passenger position. The 1987 Toyota MR2 2-Door Coupe, contained one ballast 50th percentile male ATD in the driver seating position. The ATDs was restrained using the vehicle's 3-point belt system.

Section 2

SUMMARY OF TEST

A 132° vehicle-to-vehicle frontal impact of a 1987 Toyota MR2 2-Door Coupe 1994 traveling forward at 72.4 kph into the right front corner of a Toyota Corolla 4-Door Sedan (Vehicle 1) traveling forward at 24.1 kph, was performed at the Calspan SRL Corporation Crash Test Facility on November 11, 1997. The vehicles were aligned so the right front corner Vehicle 1's front bumper would contact the left front corner of Vehicle 2 with Vehicle 2 traveling forward at 72.4 kph and Vehicle 1 traveling forward at 24.1 kph. The test track was configured so that the direction of travel for Vehicle 2 was 132 degrees counter clockwise from that of Vehicle 1.

Pre- and Post-test still photographs of the vehicles and dummies can be found in Appendix A. The impact event was documented with 1 real time movie camera and 9 high speed movie cameras. Vehicle photographic target locations can be found in Figure 5 and movie camera locations can be found in Figure 12.

A 5th percentile female Anthropomorphic Test Devices (ATD) was placed in the driver seating position and a 6 year old toddler ATD was placed in the right front passenger seating position. The driver ATD was restrained using the vehicle's driver airbag and 3-point belt system. The right front passenger dummy was restrained using the vehicle's passenger airbag and 3-point belt system. The right front seat was placed in the second from rear-most seating position.

The driver and right front passenger ATDs were instrumented with head and chest triaxial accelerometer packages; chest displacement potentiometers; and upper neck force and moment transducers packages. The driver ATD also contained left and right femur axial force load cells.

The 45 channels of vehicle and dummy transducer data were recorded on a PC based data acquisition system. The data was reduced, filtered and processed as required by the appropriate test procedures using PC based software. Appendix B contains the vehicle and the dummy response data in plotted format.

The vehicle's onboard systems deployed the airbags during the impact. Film analysis shows that the passenger side airbag deployed at approximately 28 ms. Chalk from the driver ATD's face was transferred to the center of the driver side airbag. Chalk from the passenger ATD's face was transferred to the right third of the passenger airbag. Chalk from the right side of the passenger ATD's face and top of head was transferred to the top right portion of the passenger door trim. The back of the passenger ATD's head contacted the back of the upper passenger seatback and seatbelt shoulder harness.

The driver's (5th female) HIC was 107.80. The 3 millisecond chest clip was 41.064 g's with 8.3 mm of chest deflection. The driver's left and right femur loads were -1607.3 and -3144.3 Newtons respectively.

The 6 year old right front passenger's HIC was 301.85. The 3 millisecond chest clip was 47.295 g's with 8.7 mm of chest deflection.

Vehicle 2 right Y accelerometer data is not accurate after 75 ms. Position 1 chest displacement is not accurate after 150 ms. Position 1 upper neck Fy did not record accurately.

Section 3

VEHICLE ONE AND OCCUPANT INFORMATION

Figure 1

VEHICLE-TO-VEHICLE IMPACT LAYOUT

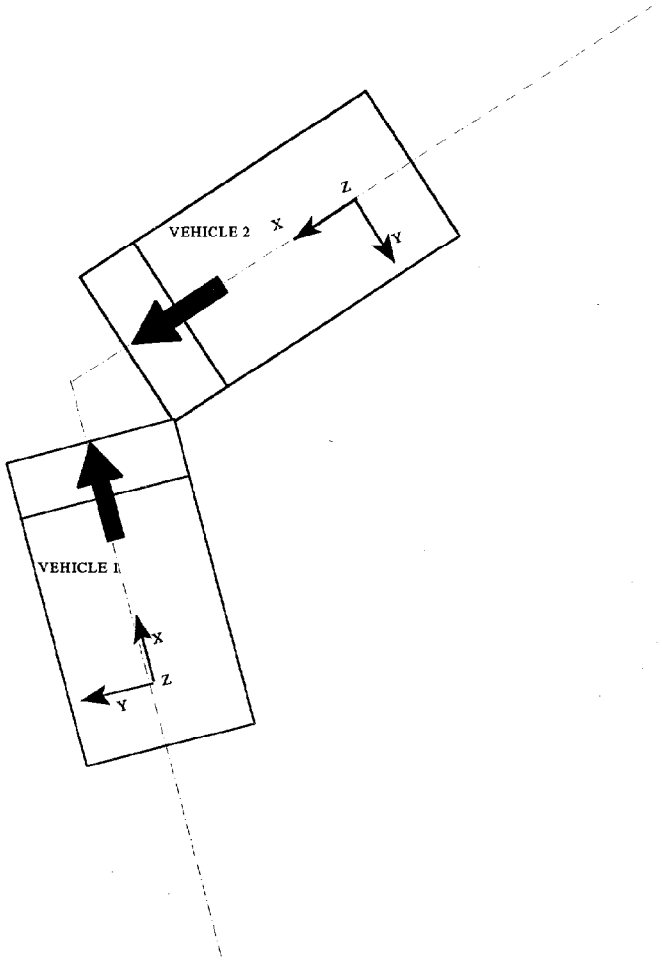


Table 1

VEHICLE 1 TEST PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1994 Toyota Corolla 4-Door Sedan

NHTSA Test No.: - VIN.: 2T1AE04B4RC031630

Body Color: Light Blue Date of Manufacture: 10/93

Engine: 4 Cylinders; - C.I.D.; 1.6 Liters; - CC

X Gas; - Diesel; - Turbocharged

- Longitudinal; X Transverse

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

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

X A/C; X P/S; X P/B; - P/wdo

- Tilt Wheel; - P/seats; - Cruise Control

Type of Occupant Restraint: Driver: Airbag and active 3-point belt system
Passenger: Airbag and active 3-point belt system

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 210 kpa, Rear 210 kpa

Recommended Tire Size: P175/65R14

Recommended Cold Tire Pressure: Front 210 kpa, Rear 210 kpa

Tires on Vehicle: P175/65R14 ; Manufacturer: Goodyear

Number of Occupants: 2 Front; 3 Rear; 0 3rd Seat; 5 TOTAL

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

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

GVWR: 1590 kg GAWR: Front 841 kg Rear 758 kg

Table 1

VEHICLE 1 TEST PARAMETER DATA (continued)

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

Right Front	= 337.0 kg		Right Rear	= 204.0	kg
Left Front	= 350.5 kg		Left Rear	= 202.0	kg
TOTAL FRONT WEIGHT	=	687.5 kg	(62.9 % of Total Vehicle Weight)		
TOTAL REAR WEIGHT	=	406.0 kg	(37.1 % of Total Vehicle Weight)		
TOTAL DELIVERED WEIGHT	=	1093.5 kg			

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMY:

Right Front	= 341.0 kg		Right Rear	= 240.0	kg
Left Front	= 363.0 kg		Left Rear	= 251.5	kg
TOTAL FRONT WEIGHT	=	704.0 kg	(58.9 % of Total Vehicle Weight)		
TOTAL REAR WEIGHT	=	491.5 kg	(41.1 % of Total Vehicle Weight)		
TOTAL TEST WEIGHT	=	1195.5 kg			

TARGET TEST WEIGHT PROVIDED BY COTR = 1154 kg

The target test weight is the vehicle curb weight plus the occupant weight.

Vehicle's Wheel Base = 2470 mm

Location of Vehicle's C.G. = 1015 mm rearward of front wheel C/L

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

Delivered Attitude:	RF 643 ;	LF 645 ;	RR 637 ;	LR 630
Test Attitude:	RF 651 ;	LF 637 ;	RR 598 ;	LR 592

Table 1

VEHICLE 1 TEST PARAMETER DATA (continued)

POST-IMPACT DATA:

Type of Test: Vehicle-to-Vehicle Frontal Impact Angle: 132 degrees

Date of Test: November 11, 1997 Time of Test: 15:30

Ambient Temperature: 4 °C at impact area

Temperature in Occupant Compartment: 20 °C

Windshield Molding Temperature: 20 °C

Required Impact Velocity Range: 23.3 to 24.9 kph

Impact Velocity: primary = 24.1 kph, secondary = 24.1 kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 81.3 cm.

Exiting Speed Trap: 30.5 cm.

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Face to center of airbag	Face to right-third of airbag. Back of head to right upper seatback and seatbelt. Side of head and face to passenger door trim.
Chest	Airbag, Seatbelt	Seatbelt
Abdomen	Seatbelt	Seatbelt
Left Knee	Knee Bolster	-
Right Knee	Knee Bolster	-

	Front		Rear	
Door Opening	Left	Right	Left	Right
	Closed/Operable	Closed/Operable	Closed/Operable	Closed/Operable

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

Table 2

VEHICLE 1 DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-72.1	31.8	17.0	74.0	-41.9	14.7	13.1	41.064
DUMMY (2)	-39.3	26.9	-38.5	57.2	-44.0	34.0	-22.3	47.295

	MAXIMUM CHEST DISPLACEMENT (mm)
DUMMY (1)	-8.3
DUMMY (2)	-8.7

	MAXIMUM COMPRESSIVE FEMUR LOAD (NEWTONS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	-3144.3	-1607.3
DUMMY (2)	-	-

	MAXIMUM LOAD (NEWTONS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	-	-	-
DUMMY (2)	-	-	-

	MAXIMUM ACCELERATION ("G")			
	HIC	t_1 (SEC)	t_2 (SEC)	Average Acceleration t_1 TO t_2
DUMMY (1)	107.80	24.300	56.100	25.83
DUMMY (2)	301.85	75.800	100.200	43.35

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

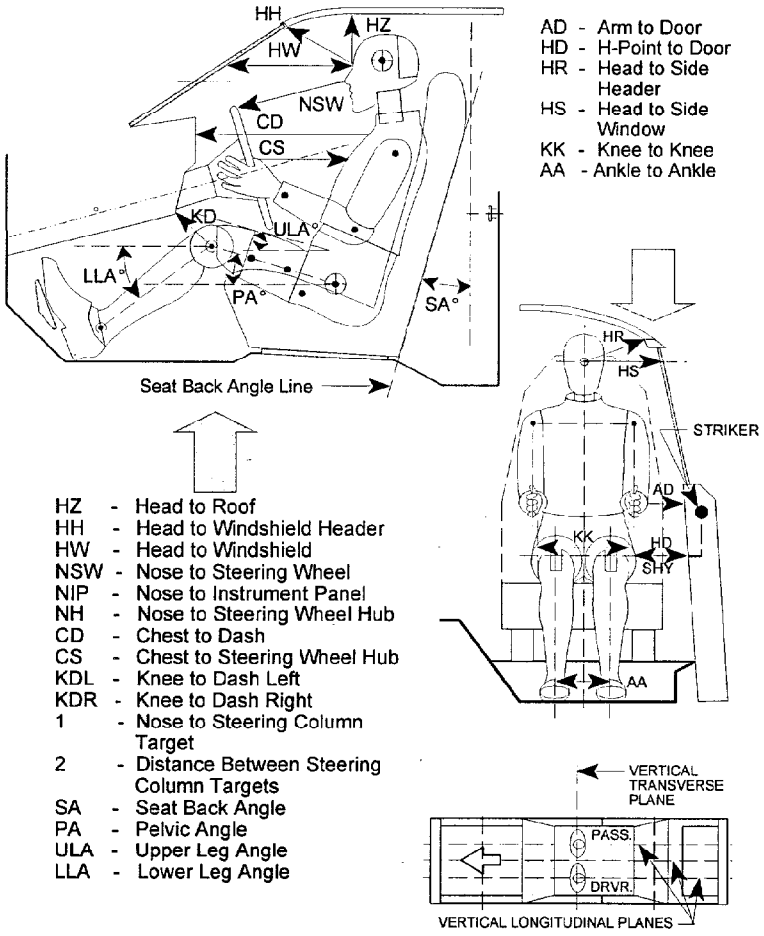
Figure 2

VEHICLE 1 OCCUPANT CLEARANCE DIMENSIONS (mm)

	DRIVER (mm)	PASSENGER
HZ	212	422
HH	260	535
HW	557	960
NSW	265	-
NIP	382	668
NH	251	-
CD	425	635
CS	196	-
KDL	103	405
KDR	112	404
1	417	-
2	50	-
SA	20 deg	20 deg
PA	24 deg	-
ULA	14 deg	17 deg
LLA	-47 deg	-21 deg

	DRIVER (mm)	PASSENGER
HR*	275	378
HS*	344	367
AD	147	158
HD	207	252
KK	248	200
AA	200	138
DT	20°C	20°C

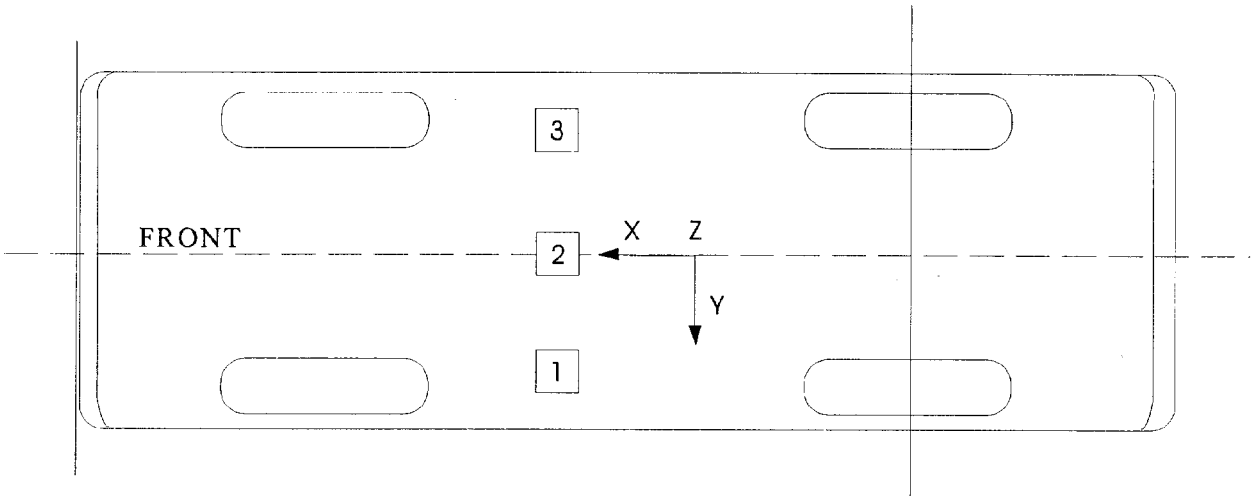
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



* Measurements taken from intersection of nose and forehead in accordance with revised FMVSS 208 instructions.

Figure 3

SUMMARY OF VEHICLE 1 ACCELEROMETER DATA

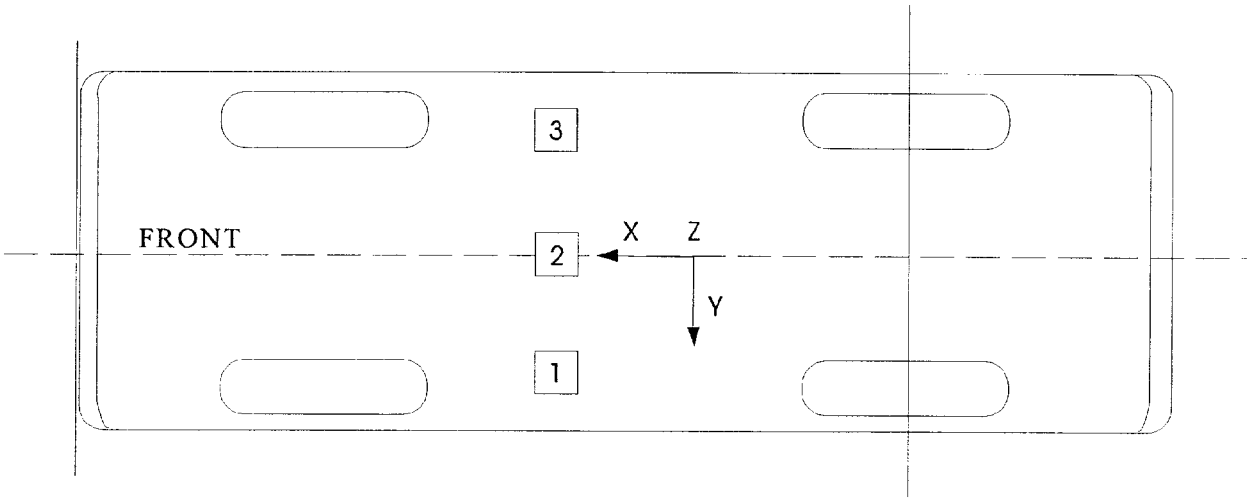


Vehicle: 1994 Toyota Corolla 4-Door Sedan

NUMBER	DESCRIPTION	ENGR	MAXIMUM		MINIMUM		FILTER
		UNIT	AMP	msec	AMP	msec	CLASS
1	V1 Left X	Gs	1.5	-31.5	-22.3	60	60
1	V1 Left Y	Gs	11.4	34.5	-3.1	158.1	60
2	V1 Center X	Gs	1.9	-33.2	-22	74	60
2	V1 Center Y	Gs	10.7	33.8	-1.5	0.0	60
2	V1 Center Z	Gs	9.7	54.5	-14.9	39.5	60
3	V1 Right X	Gs	1.5	-31.5	-16	73.6	60
3	V1 Right Y	Gs	10.3	33.6	-4.6	0.1	60

Figure 4

VEHICLE 1 PRE-TEST ACCELEROMETER LOCATIONS



Test Description: 15.0 kph Frontal Vehicle to Vehicle Impact

Test Vehicle: 1994 Toyota Corolla 4-Door Sedan

Reference Plane: X: Vehicle plane at rear bumper, positive forward;

Y: Vehicle longitudinal centerline, positive to the left; Z: Ground, positive up

VEHICLE No. 1		PRE-TEST AXIS (mm)			POST-TEST AXIS (mm)		
Loc. No.	DESCRIPTION	X	Y	Z	X	Y	Z
1	LEFT "B" PILLAR	1692	405	397	1692	405	397
2	CENTER BETWEEN "B" PILLARS	1725	0	428	1725	0	428
3	RIGHT "B" PILLAR	1692	-405	398	1692	-405	398

Figure 5

VEHICLE 1 TARGET LOCATIONS

(All dimensions in millimeters)

A = 440

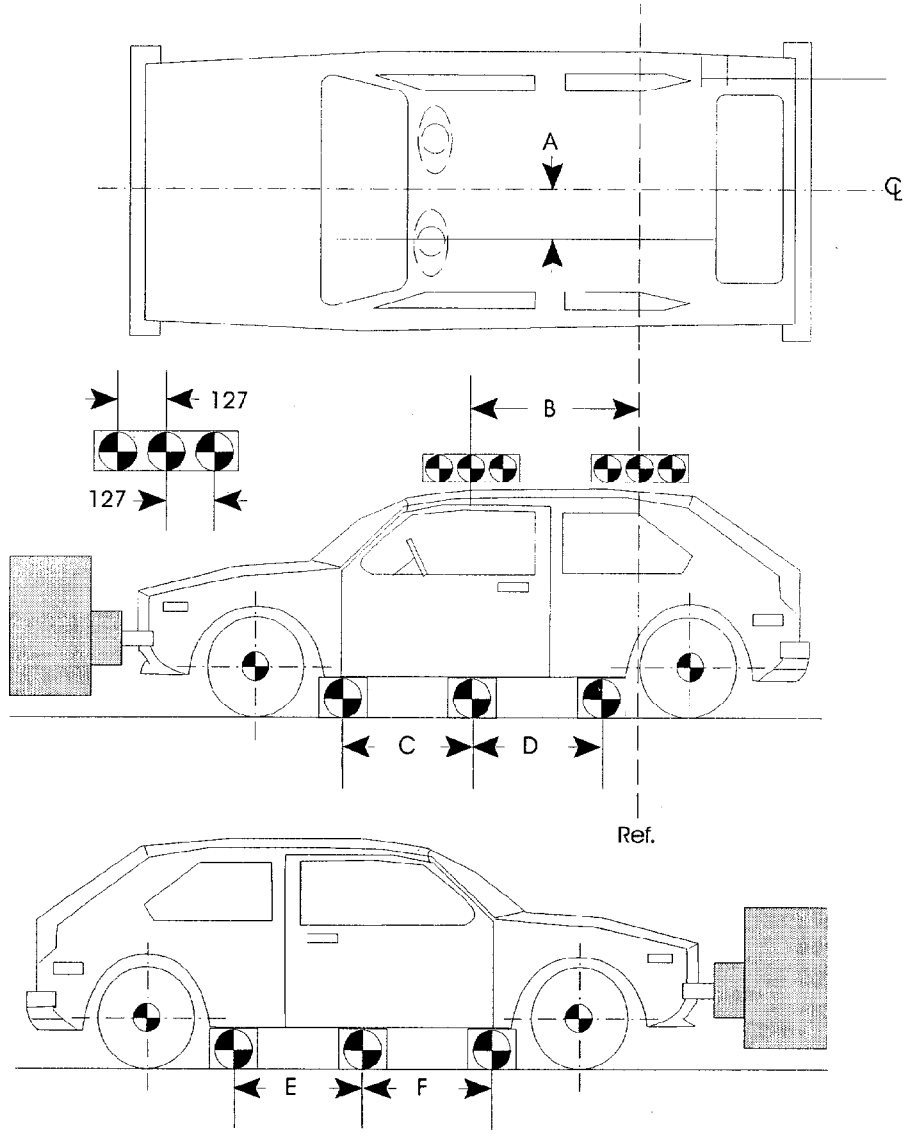
B = 913

C = 835

D = 831

E = 843

F = 843



Section 4

VEHICLE TWO AND OCCUPANT INFORMATION

Table 3

VEHICLE 2 TEST PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1987 Toyota MR2 2-Door Coupe

NHTSA Test No.: - VIN.: JT2AW15C8H0102517

Body Color: Black Date of Manufacture: 11/86

Engine:	4 Cylinders;	- C.I.D.;	1.6 Liters;	- CC
	X Gas;	- Diesel;	- Turbocharged	
	- Longitudinal;	X Transverse		
Transmission:	5 Speed;	X Manual;	- Automatic;	X Overdrive
Final Drive:	- Front Wheel;	X Rear Wheel;	- Four Wheel	
	X A/C;	X P/S;	X P/B;	- P/wdo
	X Tilt Wheel;	- P/seats;	- Cruise Control	

Type of Occupant Restraint: Driver: Active 3-point belt system
Passenger: Active 3-point belt system

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 210 kpa, Rear 210 kpa

Recommended Tire Size: P185/60R14

Recommended Cold Tire Pressure: Front 210 kpa, Rear 210 kpa

Tires on Vehicle: P185/60R14 ; Manufacturer: Goodyear and Wintermaster Plus

Number of Occupants:	2 Front;	- Rear;	- 3rd Seat;	2 TOTAL
Type of Front Seats:	X Bucket;	- Bench;	- Split Bench;	
Type of Front Seat Back:	- Fixed;	X Adj. With;	X Lever	- Rot. Knob

GVWR: 1370 kg GAWR: Front 660 kg Rear 810 kg

Table 3

VEHICLE 2 TEST PARAMETER DATA (continued)

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

Right Front	= 245.5 kg		Right Rear	= 311.0 kg	
Left Front	= 246.5 kg		Left Rear	= 302.5 kg	
TOTAL FRONT WEIGHT	=	492.0 kg	(44.5 % of Total Vehicle Weight)		
TOTAL REAR WEIGHT	=	613.5 kg	(55.5 % of Total Vehicle Weight)		
TOTAL DELIVERED WEIGHT	=	1105.5 kg			

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMY:

Right Front	= 237.5 kg		Right Rear	= 335.5 kg	
Left Front	= 265.5 kg		Left Rear	= 339.5 kg	
TOTAL FRONT WEIGHT	=	503.0 kg	(42.7 % of Total Vehicle Weight)		
TOTAL REAR WEIGHT	=	675.0 kg	(57.3 % of Total Vehicle Weight)		
TOTAL TEST WEIGHT	=	1178.0 kg			

TARGET TEST WEIGHT PROVIDED BY COTR = 1150 kg

The target test weight is the vehicle curb weight plus the occupant weight.

Vehicle's Wheel Base	=	3220	mm
Location of Vehicle's C.G.	=	1845	mm rearward of front wheel C/L

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

Delivered Attitude:	RF 617 ;	LF 614 ;	RR 619 ;	LR 618
Test Attitude:	RF 630 ;	LF 616 ;	RR 620 ;	LR 595

Table 3

VEHICLE 2 TEST PARAMETER DATA (continued)

POST-IMPACT DATA:

Type of Test: Vehicle-to-Vehicle Frontal Impact Angle: 132 degrees

Date of Test: November 11, 1997 Time of Test: 15:30

Ambient Temperature: 4 °C at impact area

Required Impact Velocity Range: 71.6 to 73.2 kph

Impact Velocity: primary = 72.4 kph, secondary = 72.4 kph

Distance From Front Bumper to Barrier Face When

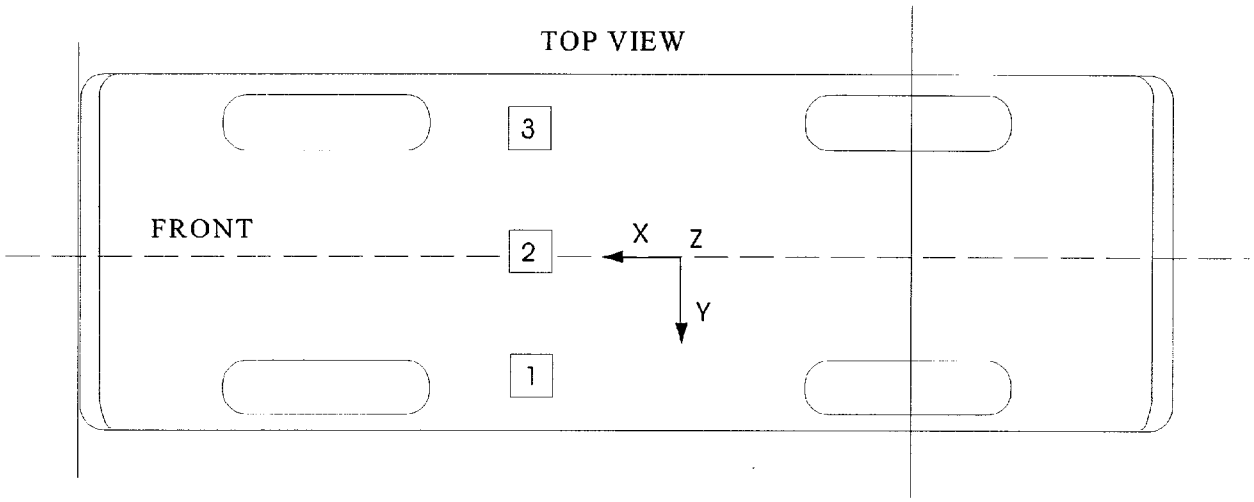
Entering Speed Trap: 81.3 cm.

Exiting Speed Trap: 30.5 cm.

	Front		Rear	
Door Opening	Left	Right	Left	Right
	Closed/Operable	Closed/Operable	-	-

Figure 6

SUMMARY OF VEHICLE 2 ACCELEROMETER DATA



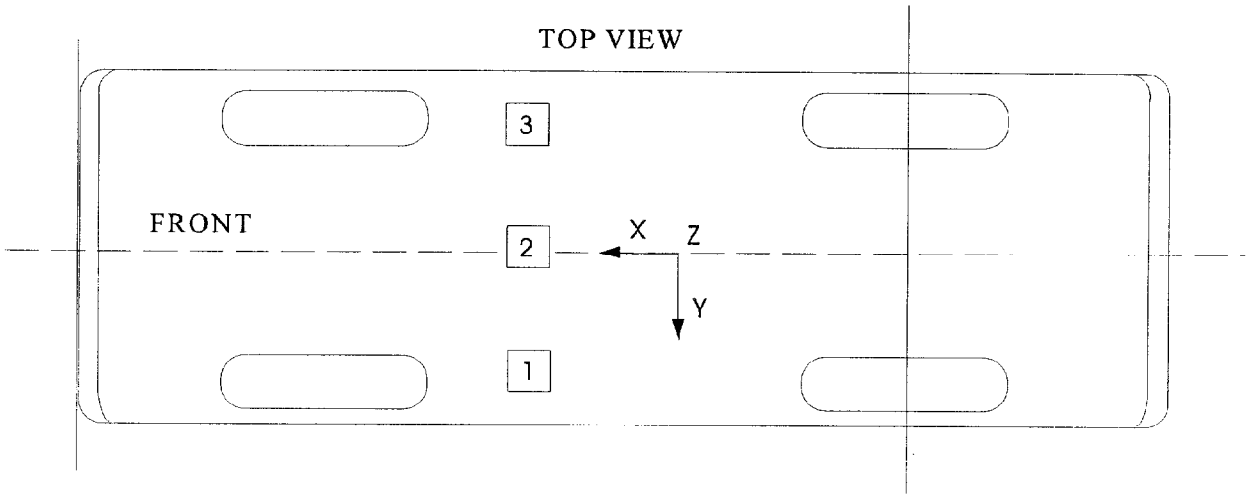
Vehicle: 1987 Toyota MR2 2-Door Coupe

NUMBER	DESCRIPTION	ENGR UNIT	MAXIMUM		MINIMUM		FILTER CLASS
			AMP	msec	AMP	msec	
1	V2 Left X	Gs	1.3	-22.4	-27.2	41.6	60
1	V2 Left Y	Gs	2.8	54.2	-11.9	73.5	60
2	V2 Center X	Gs	2.2	-23	-27.8	69.8	60
2	V2 Center Y	Gs	2.3	84.5	-10.5	71.1	60
2	V2 Center Z	Gs	5.8	14.9	-6.4	30.8	60
3	V2 Right X	Gs	1.3	-22.7	-26.4	70.3	60
3	V2 Right Y	Gs	*	*	*	*	60

* Data is not accurate after 75 ms.

Figure 7

VEHICLE 2 PRE-TEST ACCELEROMETER LOCATIONS



Test Description: 15.0 kph Frontal Vehicle to Vehicle Impact

Test Vehicle: 1987 Toyota MR2 2-Door Coupe

Reference Plane: X: Vehicle plane at rear bumper, positive forward;
Y: Vehicle longitudinal centerline, positive to the left; Z: Ground, positive up

VEHICLE No. 1		PRE-TEST AXIS (mm)			POST-TEST AXIS (mm)		
Loc. No.	DESCRIPTION	X	Y	Z	X	Y	Z
1	LEFT "B" PILLAR	1568	370	190	1568	370	190
2	CENTER BETWEEN "B" PILLARS	1538	0	530	1538	0	530
3	RIGHT "B" PILLAR	1545	-370	190	1545	-370	190

Figure 8

VEHICLE 2 TARGET LOCATIONS

(All dimensions in millimeters)

A = 430

B = 910

C = 794

D = 793

E = 778

F = 782

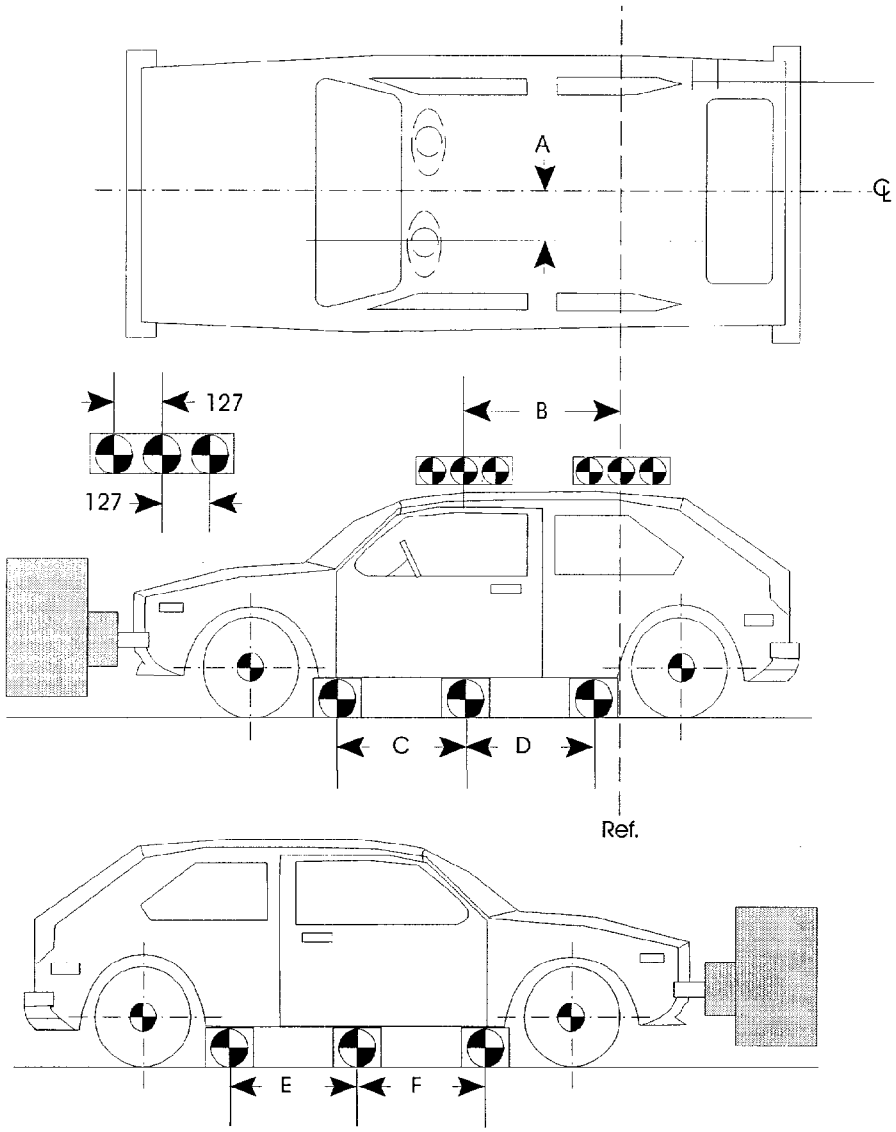


Figure 9

CAMERA POSITIONS FOR VEHICLE-TO-VEHICLE IMPACT TEST

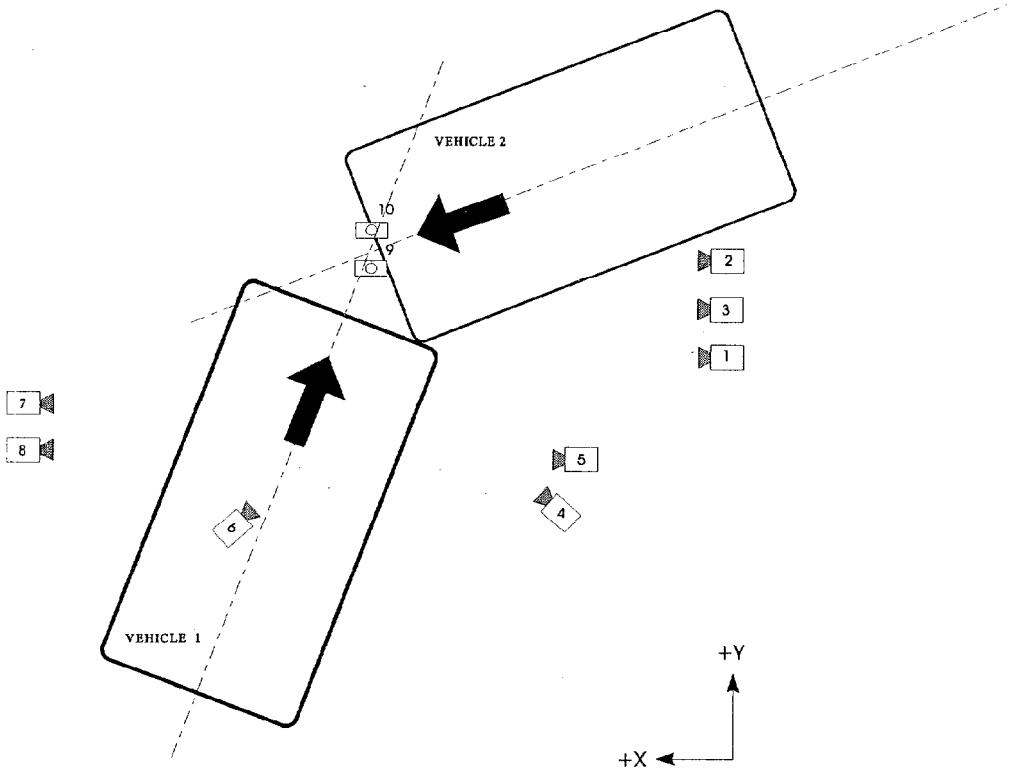


Table 4

HIGH-SPEED CAMERA LOCATIONS

Test No. A109-6-1732 Vehicle: 1994 Toyota Corolla 4-Door Sedan, 1987 Toyota MR2 2-Door Coupe

CAMERA LOCATION	VIEW	CAMERA POSITIONS (mm)*			ANGLE**	LENS	SPEED
		X	Y	Z	(deg)	(mm)	(fps)
1	Real-Time Camera	-	-	-	-	-	24
2	Overall Right Side View	6495	1025	1095	0	13	510
3	Right Impact Point View	8705	1455	1495	-5	35	550
4	Right Passenger and Interior View	3800	3050	1985	-15	13	520
5	Vehicle 1 Closeup Passenger Side View	5555	700	1555	-7	25	550
6	Vehicle 1 Closeup Passenger Rear View	-	-	-	-	8	790
7	Overall Left Side View	14376	790	1105	-1	35	500
8	Left Driver View	14973	985	1315	-2	50	520
9	Overhead Overall View	540	305	9805	-90	13	500
10	Overhead Closeup View	540	0	9805	-90	25	510

*X = film plane to Vehicle 1 longitudinal centerline, positive left
Y = film plane to impact location, positive forward
Z = film plane to ground
** = referenced to horizontal plane

APPENDIX A

PHOTOGRAPHS: OVERALL TEST SETUP

APPENDIX A

TABLE OF CONTENTS

Figure A-1 PRE-TEST OVERHEAD VIEW

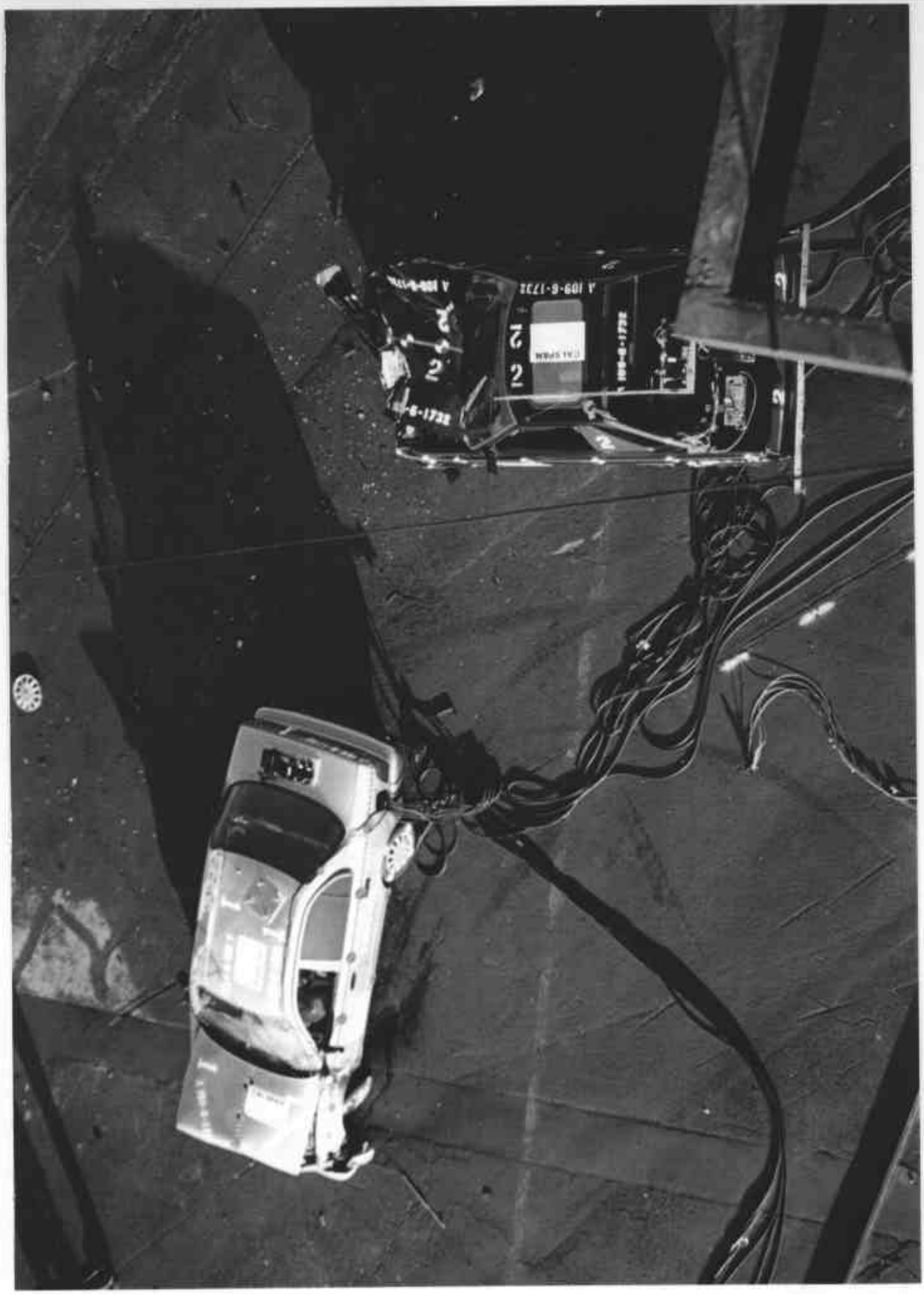


Figure A-2 POST-TEST OVERHEAD VIEW

Figure A-3 PRE-TEST OVERALL LEFT SIDE VIEW

Figure A-4 POST-TEST OVERALL LEFT SIDE VIEW

Figure A-5 PRE-TEST OVERALL RIGHT SIDE VIEW

Figure A-6 POST-TEST OVERALL RIGHT SIDE VIEW

Figure A-7 IMPACT PHOTO

APPENDIX B

PHOTOGRAPHS: VEHICLE 1 AND OCCUPANT

APPENDIX B

TABLE OF CONTENTS

Figure B-1 PRE-TEST FRONT VIEW

Figure B-2 POST-TEST FRONT VIEW

Figure B-3 PRE-TEST FRONT RIGHT THREE QUARTER VIEW

Figure B-4 POST-TEST FRONT RIGHT THREE QUARTER VIEW

Figure B-5 PRE-TEST RIGHT SIDE VIEW

Figure B-6 POST-TEST RIGHT SIDE VIEW

Figure B-7 PRE-TEST REAR RIGHT THREE QUARTER VIEW

Figure B-8 POST-TEST REAR RIGHT THREE QUARTER VIEW

Figure B-9 PRE-TEST REAR VIEW

Figure B-10 POST-TEST REAR VIEW

Figure B-11 PRE-TEST REAR LEFT THREE QUARTER VIEW

Figure B-12 POST-TEST REAR LEFT THREE QUARTER VIEW

Figure B-13 PRE-TEST LEFT SIDE VIEW

Figure B-14 POST-TEST LEFT SIDE VIEW

Figure B-15 PRE-TEST FRONT LEFT THREE QUARTER VIEW

Figure B-16 POST-TEST FRONT LEFT THREE QUARTER VIEW

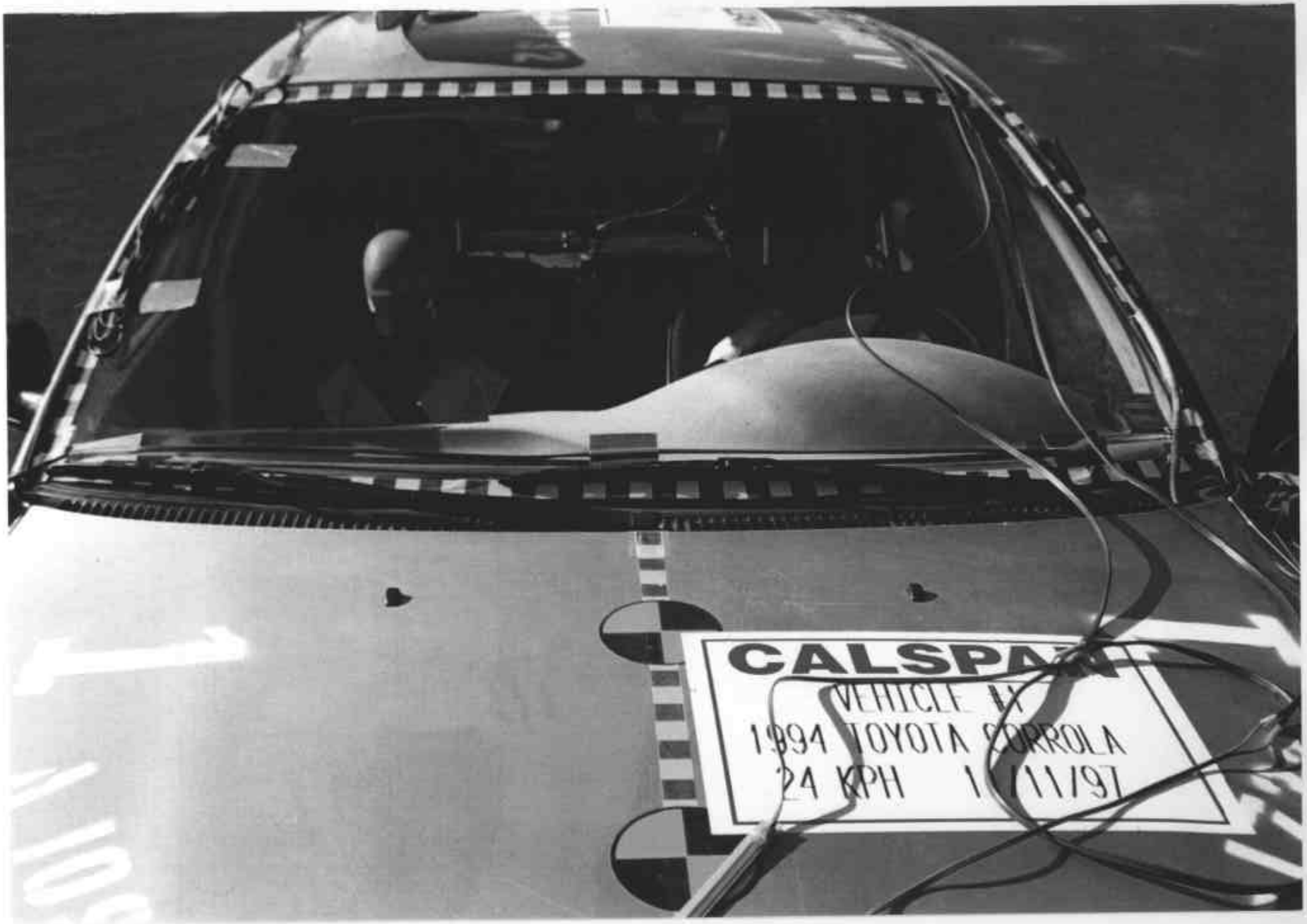


Figure B-17 PRE-TEST WINDSHIELD VIEW

Figure B-18 POST-TEST WINDSHIELD VIEW

Figure B-19 PRE-TEST DRIVER SIDE VIEW

Figure B-20 POST-TEST DRIVER SIDE VIEW

Figure B-21 PRE-TEST DRIVER AND INTERIOR VIEW

Figure B-22 POST-TEST DRIVER AND INTERIOR VIEW

Figure B-23 PRE-TEST DRIVER INSIDE VIEW

Figure B-24 POST-TEST DRIVER INSIDE VIEW

Figure B-25 PRE-TEST PASSENGER SIDE VIEW

Figure B-26 POST-TEST PASSENGER SIDE VIEW

Figure B-27 PRE-TEST PASSENGER AND INTERIOR VIEW

Figure B-28 POST-TEST PASSENGER AND INTERIOR VIEW

Figure B-29 PRE-TEST PASSENGER INSIDE VIEW

Figure B-30 POST-TEST PASSENGER INSIDE VIEW

Figure B-31 POST-TEST DRIVER FACE/CHEST CONTACT POINT

Figure B-32 POST-TEST DRIVER KNEE BOLSTER/TOE PAN

Figure B-33 POST-TEST PASSENGER FACE/CHEST CONTACT POINT

Figure B-34 POST-TEST PASSENGER KNEE BOLSTER/TOE PAN

Figure B-35 CERTIFICATION PLACARD

APPENDIX C

PHOTOGRAPHS: VEHICLE 2

APPENDIX C

TABLE OF CONTENTS

Figure C-1 PRE-TEST FRONT VIEW

Figure C-2 POST-TEST FRONT VIEW

Figure C-3 PRE-TEST FRONT RIGHT THREE QUARTER VIEW

Figure C-4 POST-TEST FRONT RIGHT THREE QUARTER VIEW

Figure C-5 PRE-TEST RIGHT SIDE VIEW

Figure C-6 POST-TEST RIGHT SIDE VIEW

Figure C-7 PRE-TEST REAR RIGHT THREE QUARTER VIEW

Figure C-8 POST-TEST REAR RIGHT THREE QUARTER VIEW

Figure C-9 PRE-TEST REAR VIEW

Figure C-10 POST-TEST REAR VIEW

Figure C-11 PRE-TEST REAR LEFT THREE QUARTER VIEW

Figure C-12 POST-TEST REAR LEFT THREE QUARTER VIEW

Figure C-13 PRE-TEST LEFT SIDE VIEW

Figure C-14 POST-TEST LEFT SIDE VIEW

Figure C-15 PRE-TEST FRONT LEFT THREE QUARTER VIEW

Figure C-16 POST-TEST FRONT LEFT THREE QUARTER VIEW

APPENDIX D

VEHICLE AND DUMMY RESPONSE DATA

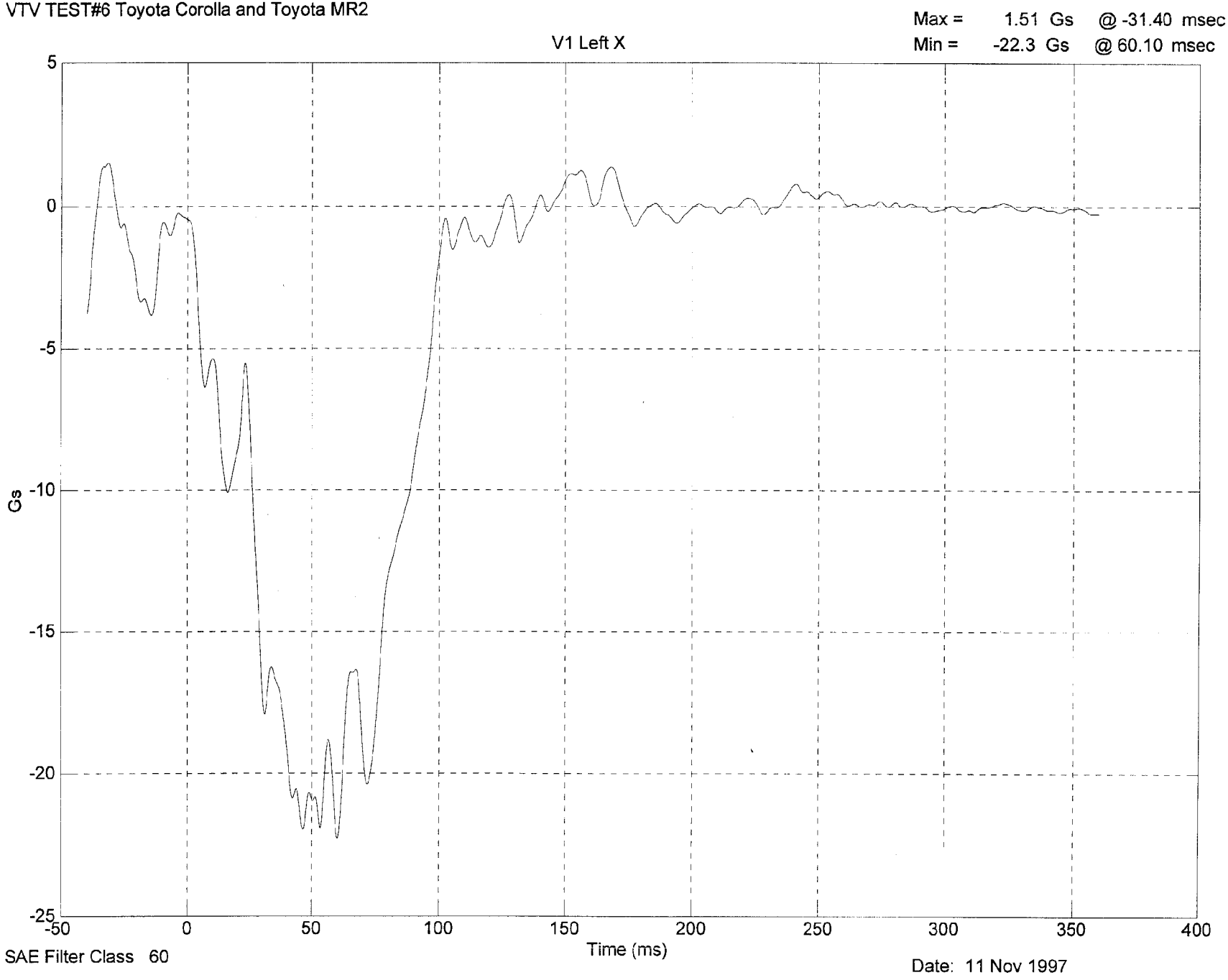
Key: V1 - Vehicle 1
V2 - Vehicle 2
P1 - Driver Side Dummy (5^{th} female)
P2 - Right Front Passenger Side Dummy (6 year old)

TEST NO. A109-6-1732

VEHICLE 1 - VEHICLE DATA

CHANNEL	SAE FILTER CHANNEL CLASS
Vehicle Data	60
Integrations	180

VTV TEST#6 Toyota Corolla and Toyota MR2



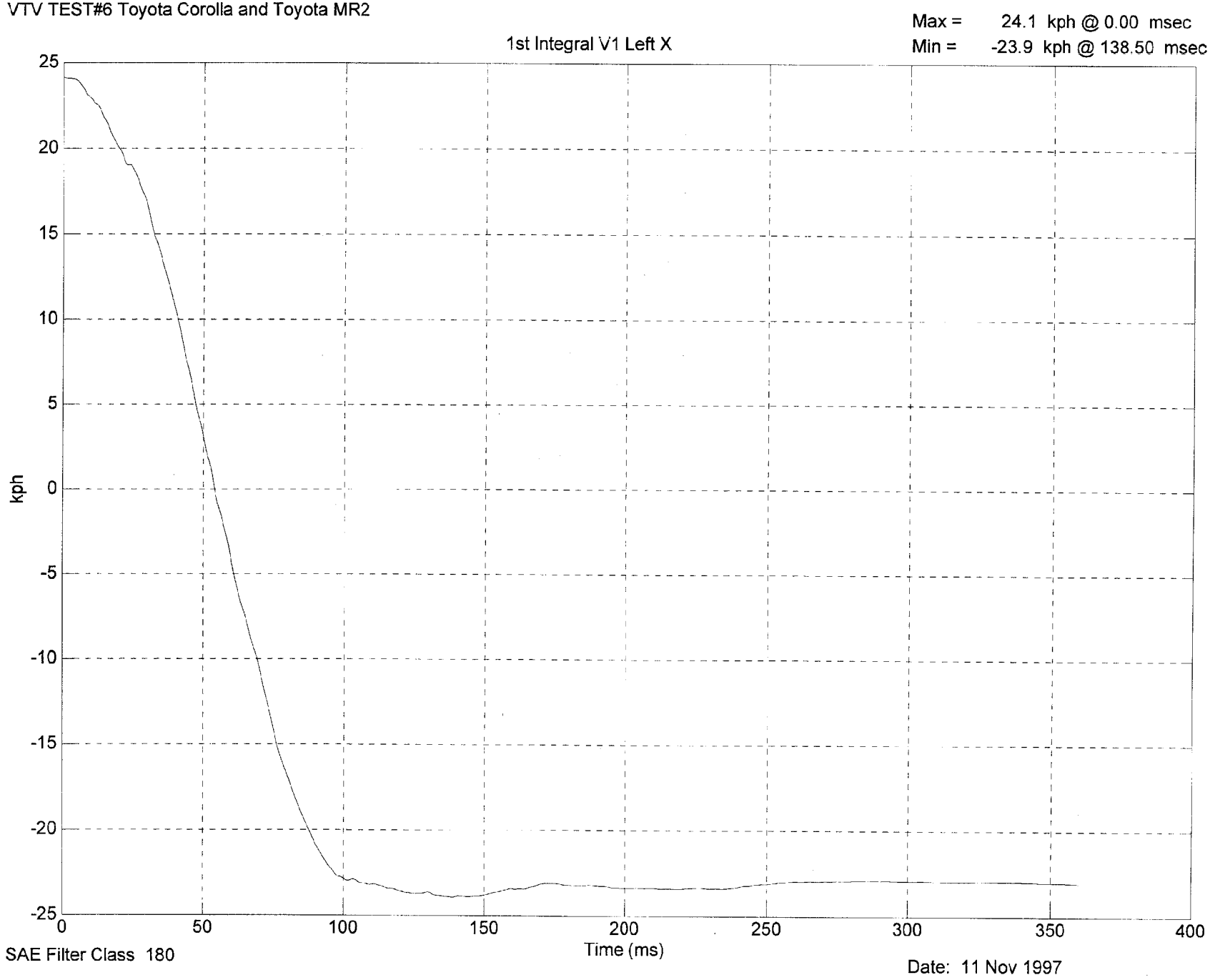
SAE Filter Class 60

Date: 11 Nov 1997

D-3

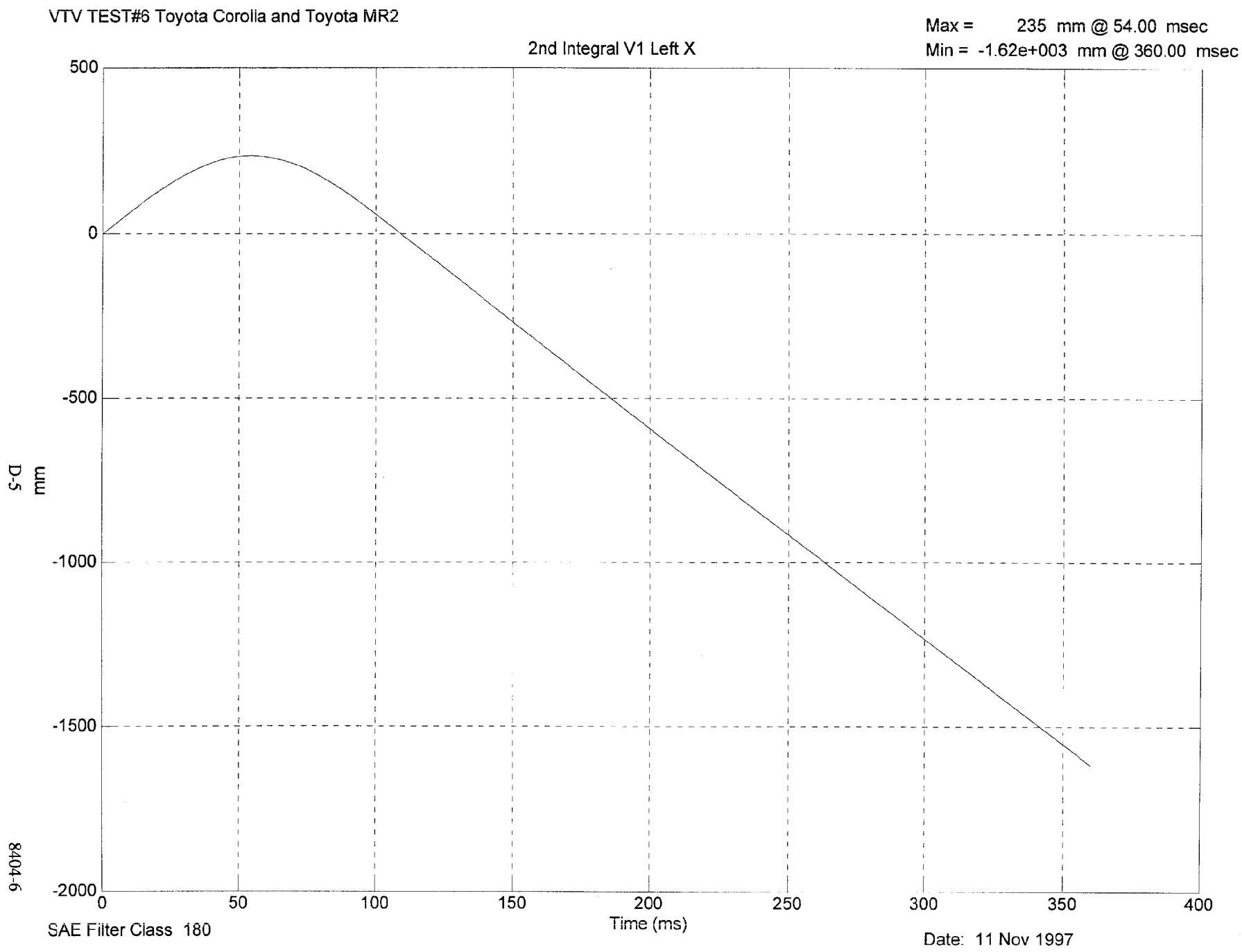
8404-6

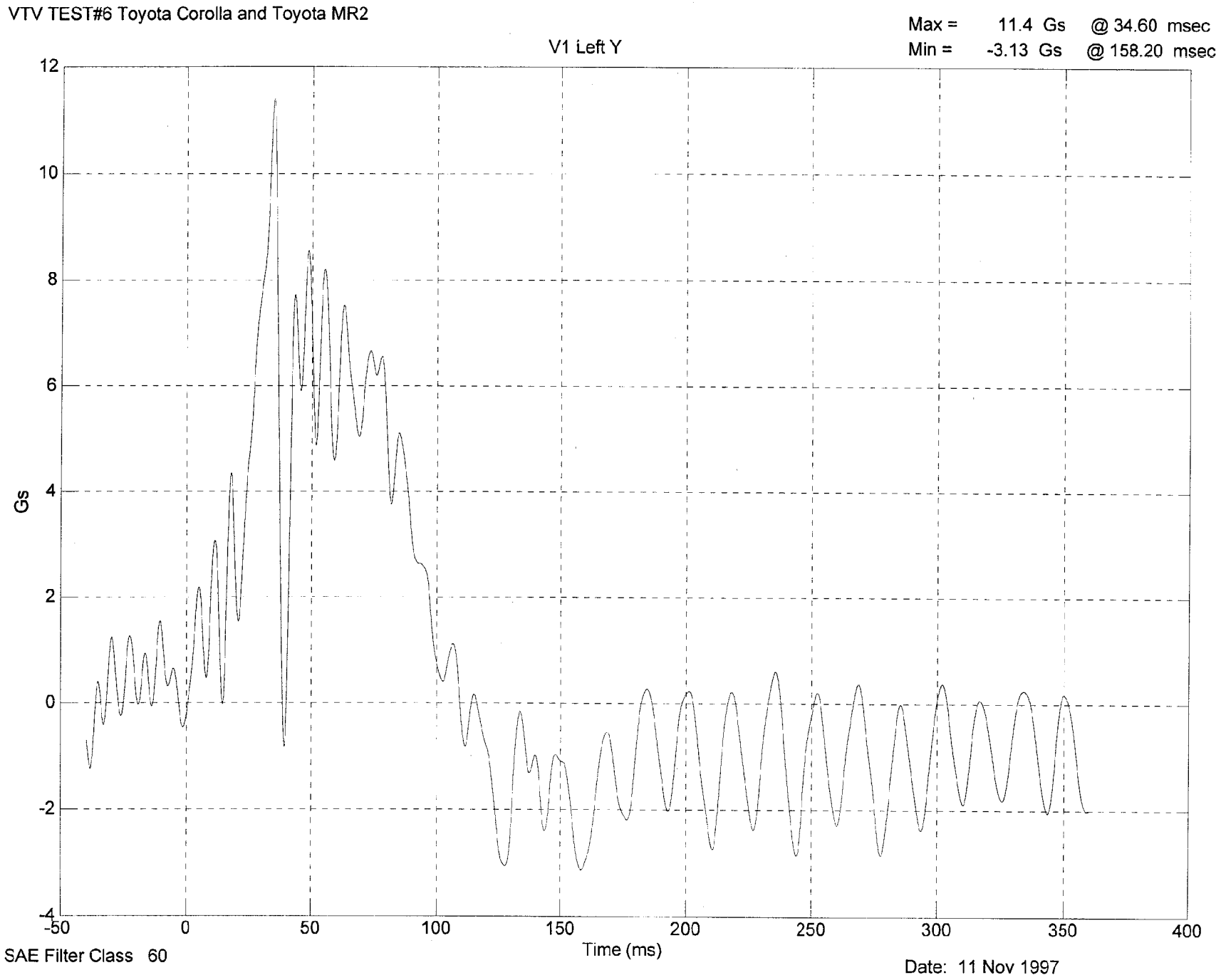
VTV TEST#6 Toyota Corolla and Toyota MR2



SAE Filter Class 180

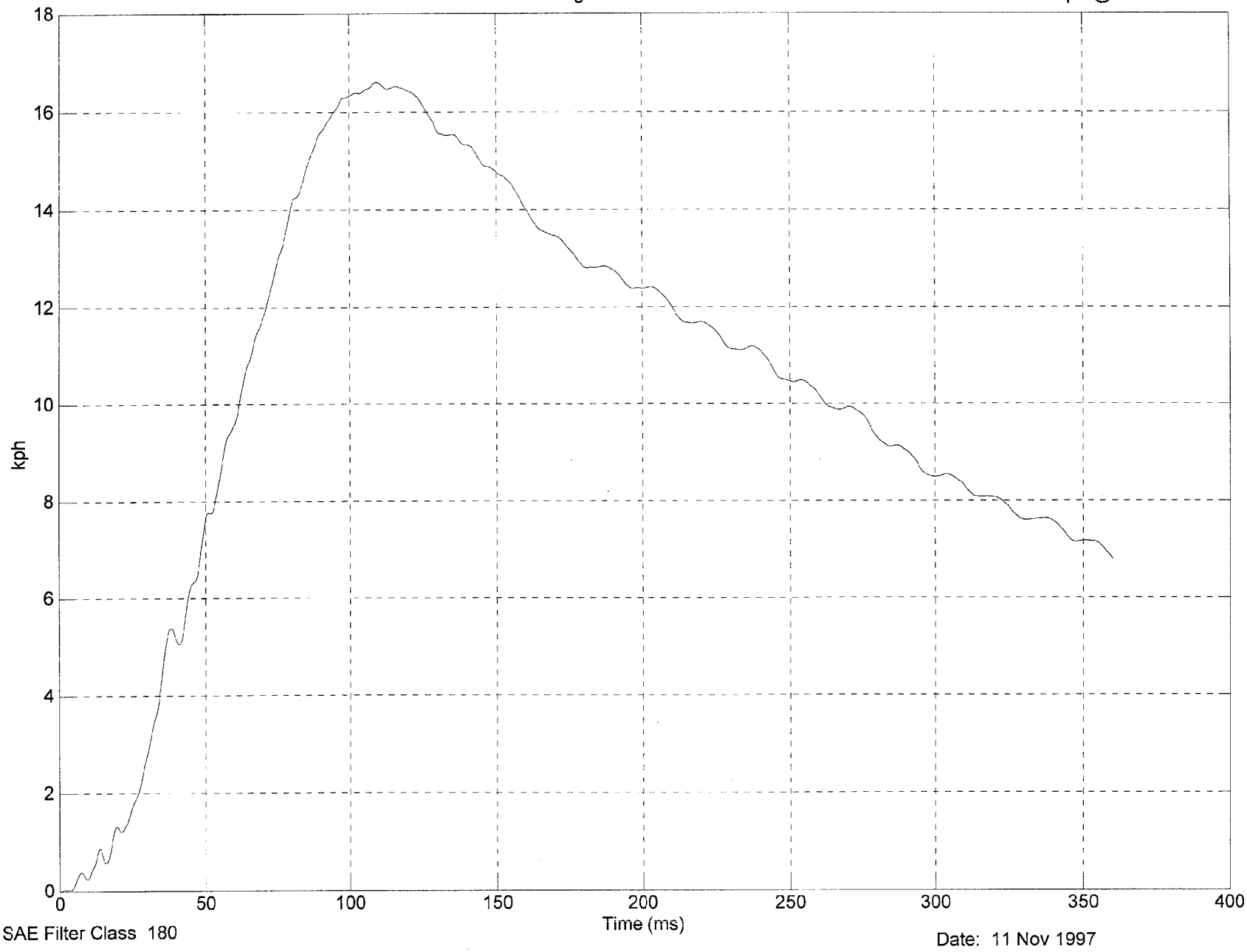
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
2nd Integral V1 Left X
Max = 235 mm @ 54.00 msec
Min = -1.62e+003 mm @ 360.00 msec
500
0
-500
-1000
-1500
-2000
mm
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997
D-5
8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
V1 Left Y
Max = 11.4 Gs @ 34.60 msec
Min = -3.13 Gs @ 158.20 msec
Gs
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

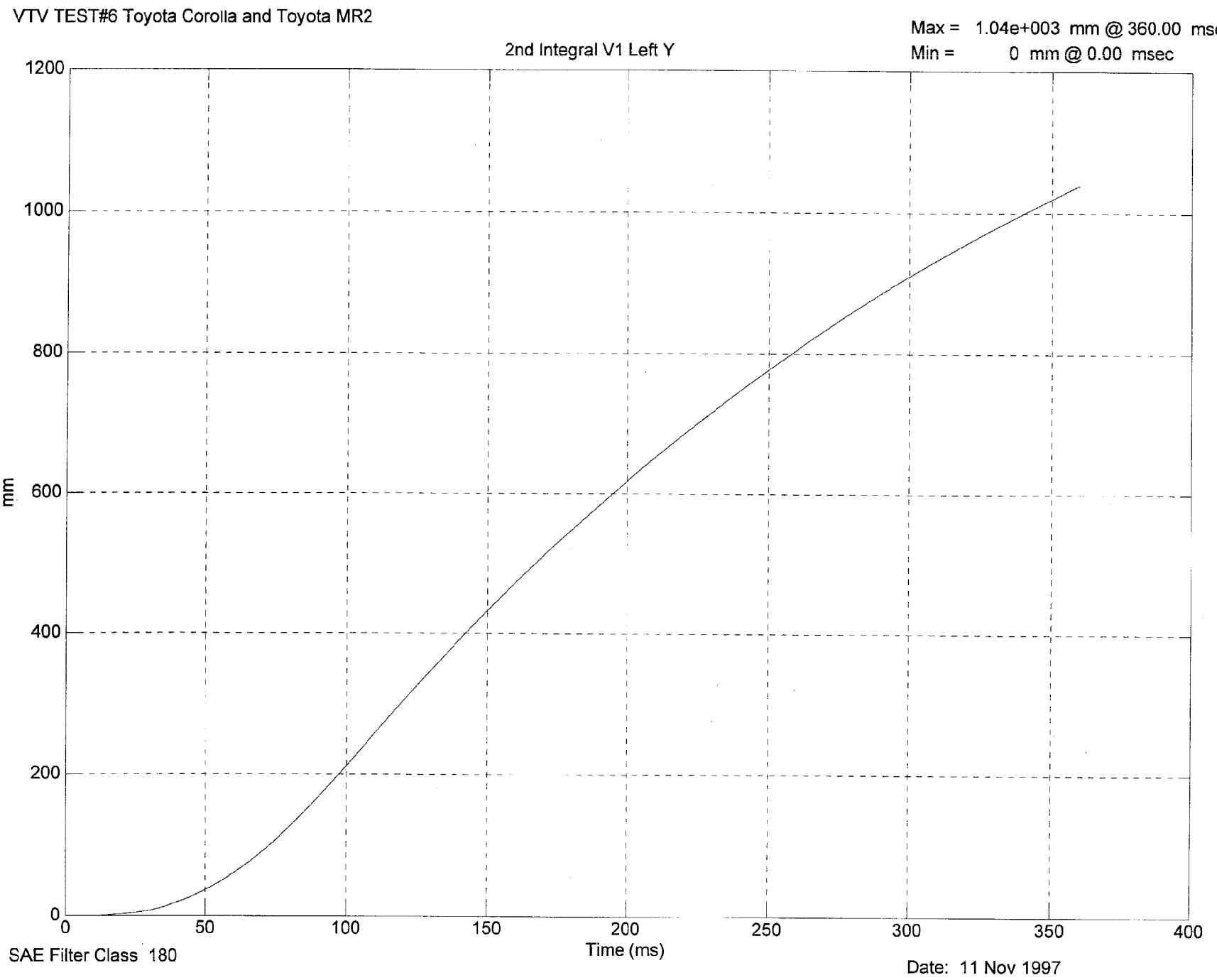
Max = 16.6 kph @ 109.50 msec
Min = 0 kph @ 0.00 msec



SAE Filter Class 180

Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

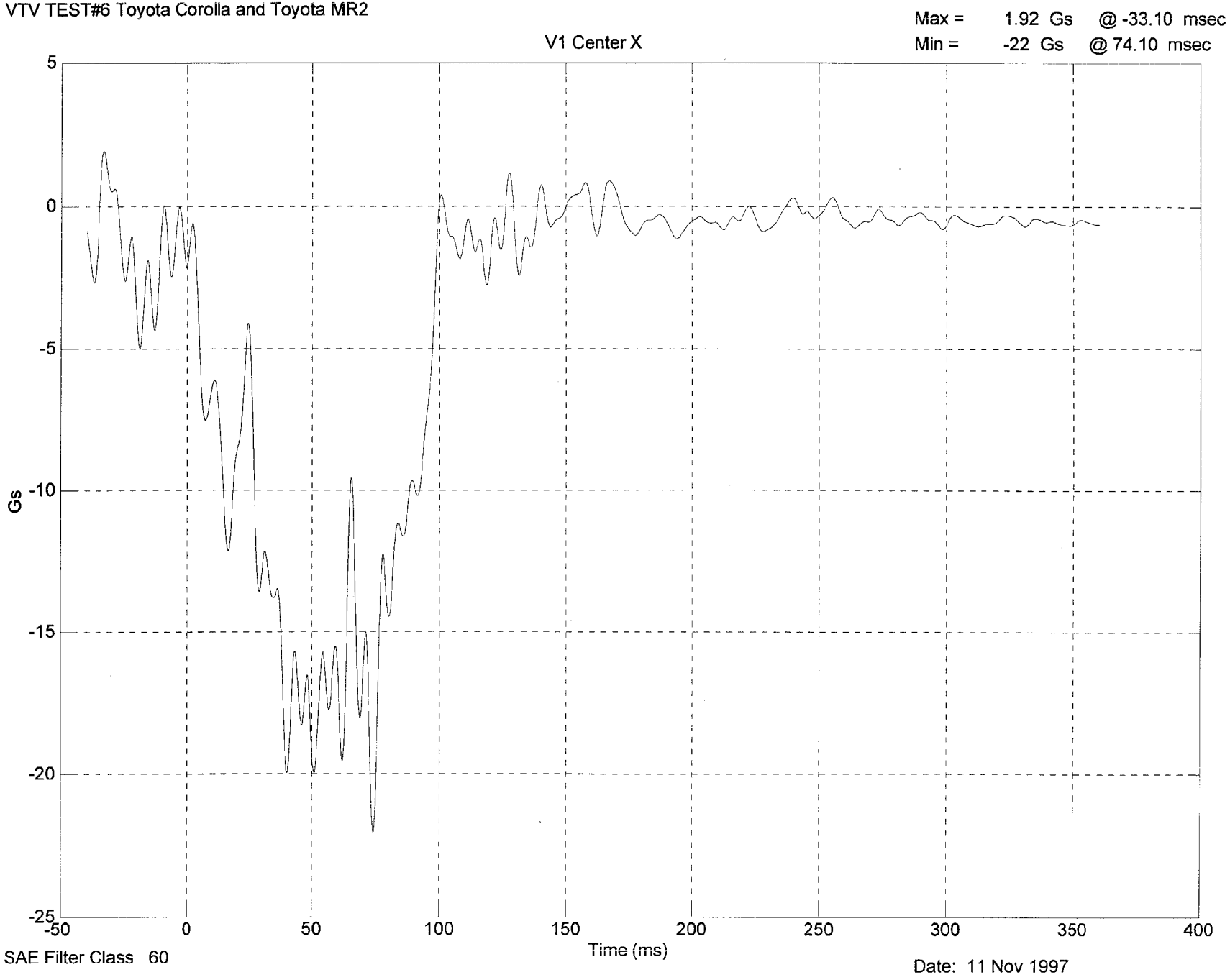


SAE Filter Class 180

Date: 11 Nov 1997

8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

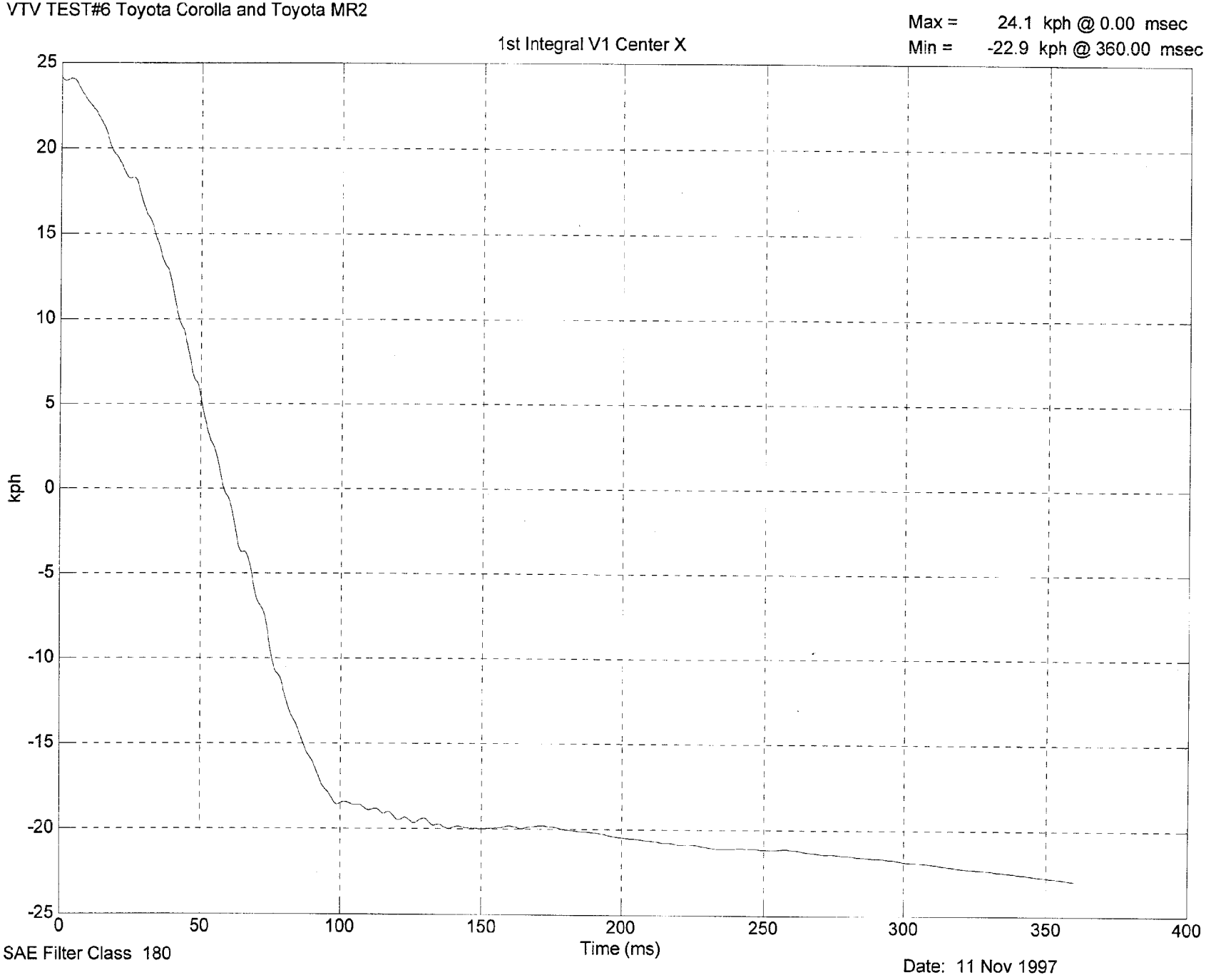


SAE Filter Class 60

Date: 11 Nov 1997

8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2



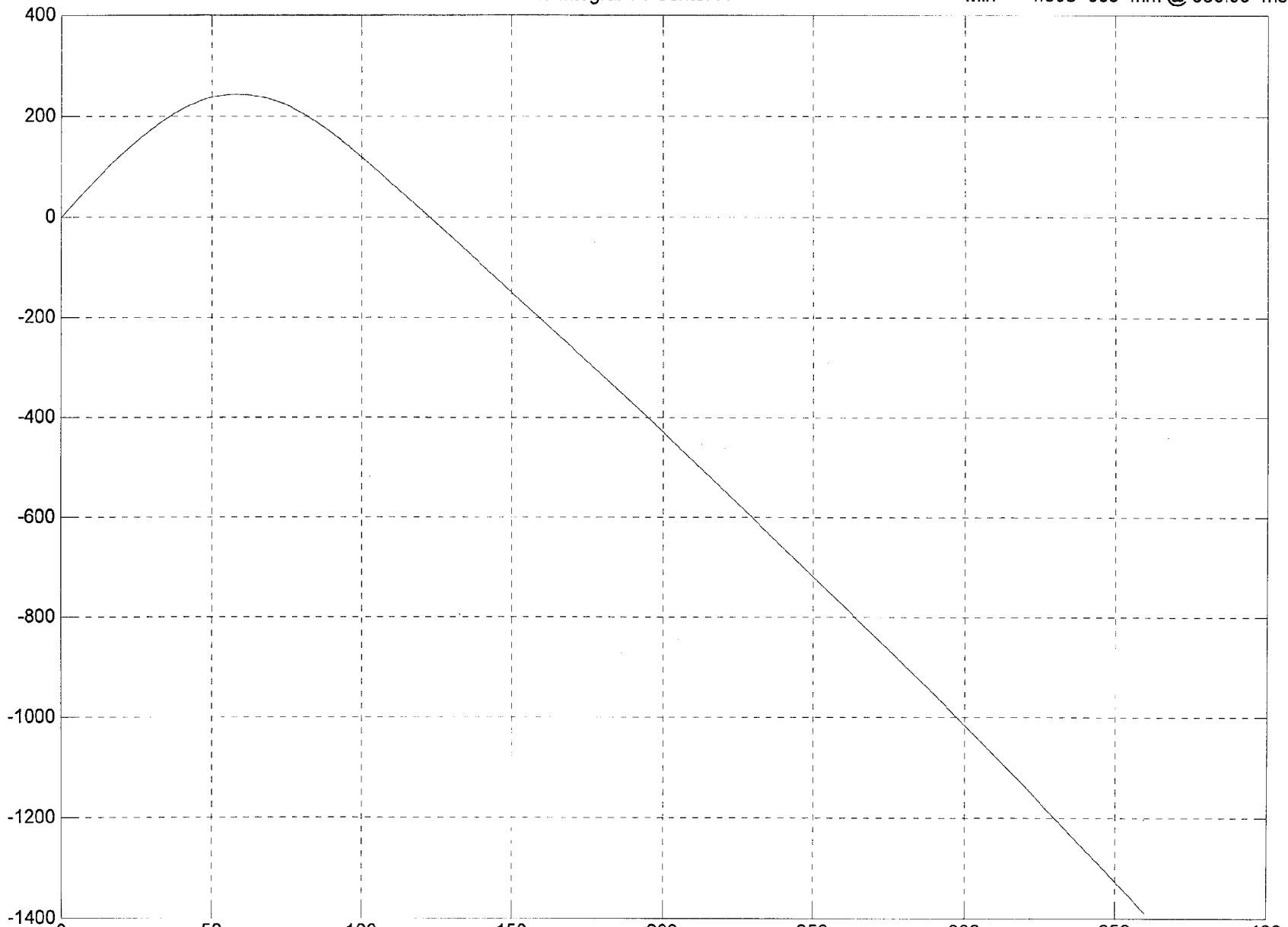
SAE Filter Class 180

Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

2nd Integral V1 Center X

Max = 243 mm @ 58.10 msec
Min = -1.39e+003 mm @ 360.00 msec



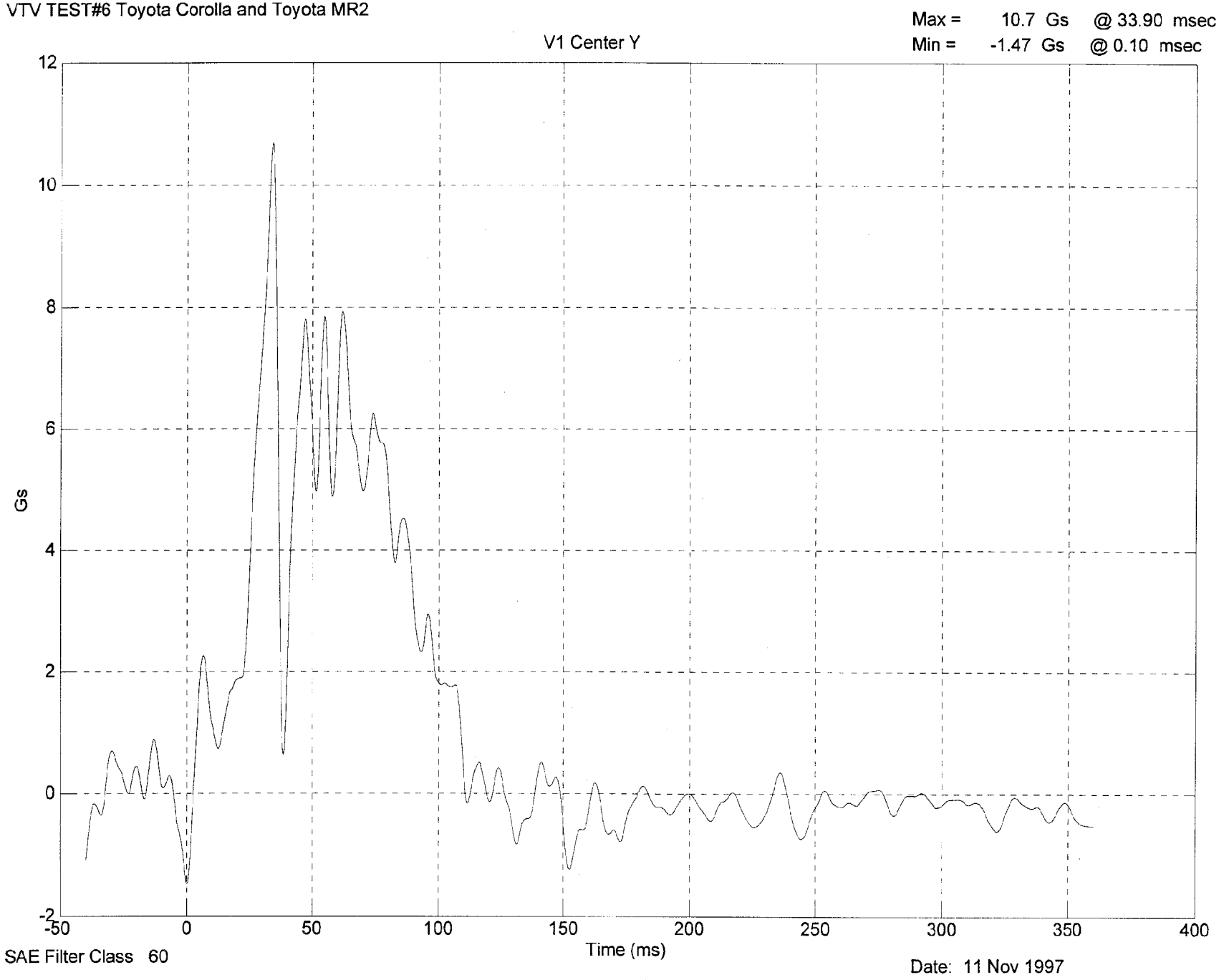
D-11

8404-6

SAE Filter Class 180

Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

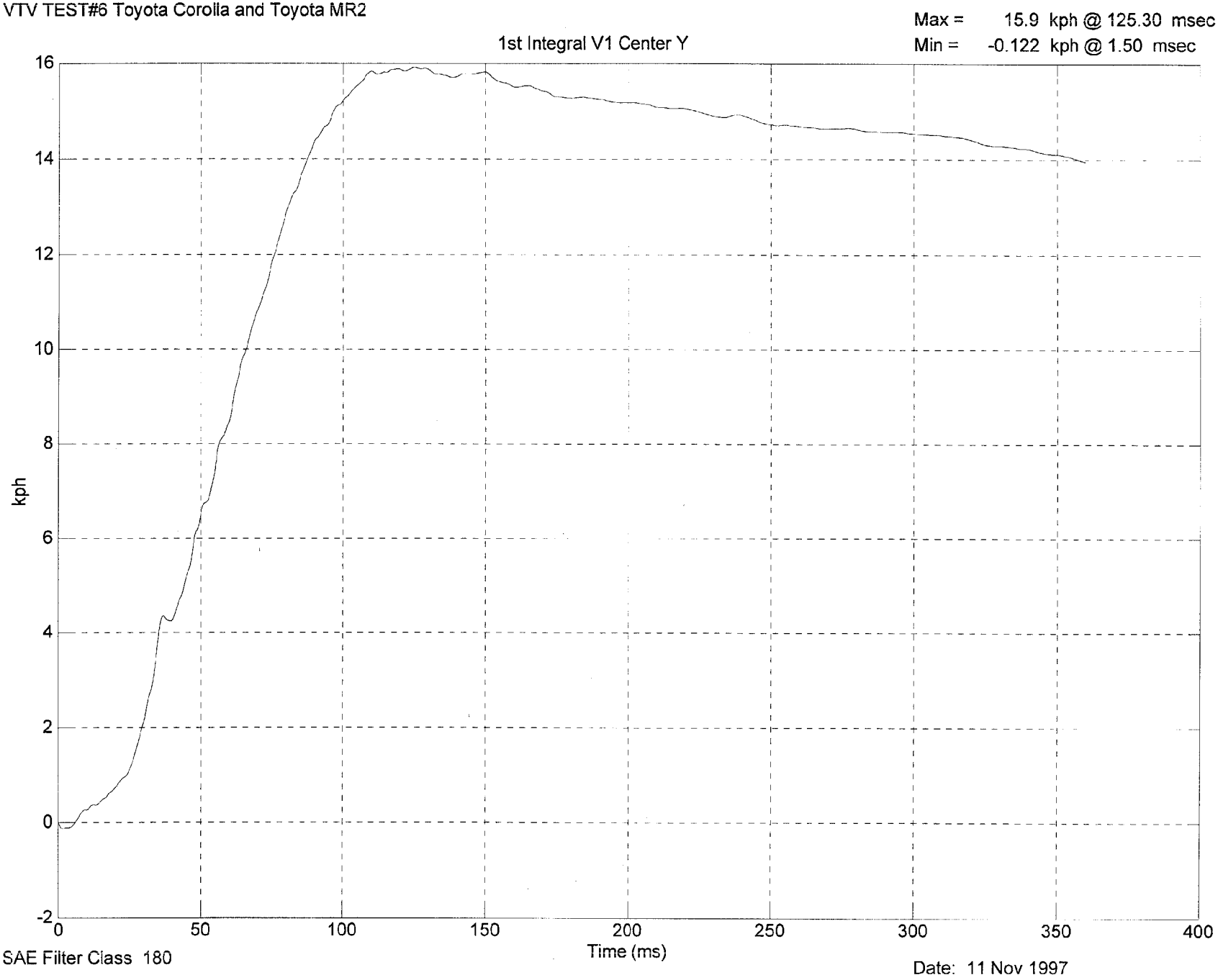


SAE Filter Class 60

Date: 11 Nov 1997

8404-6

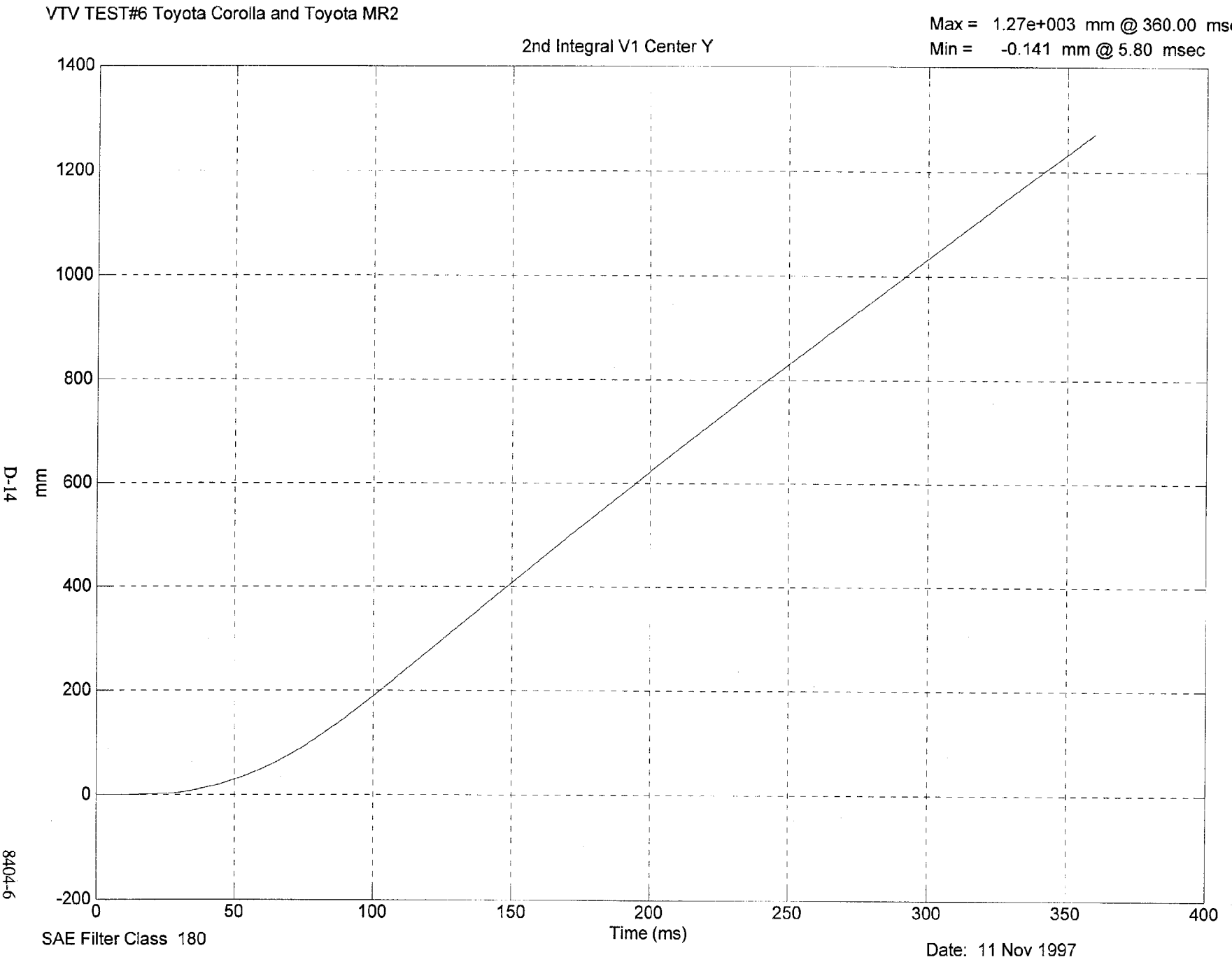
VTV TEST#6 Toyota Corolla and Toyota MR2



SAE Filter Class 180

Date: 11 Nov 1997

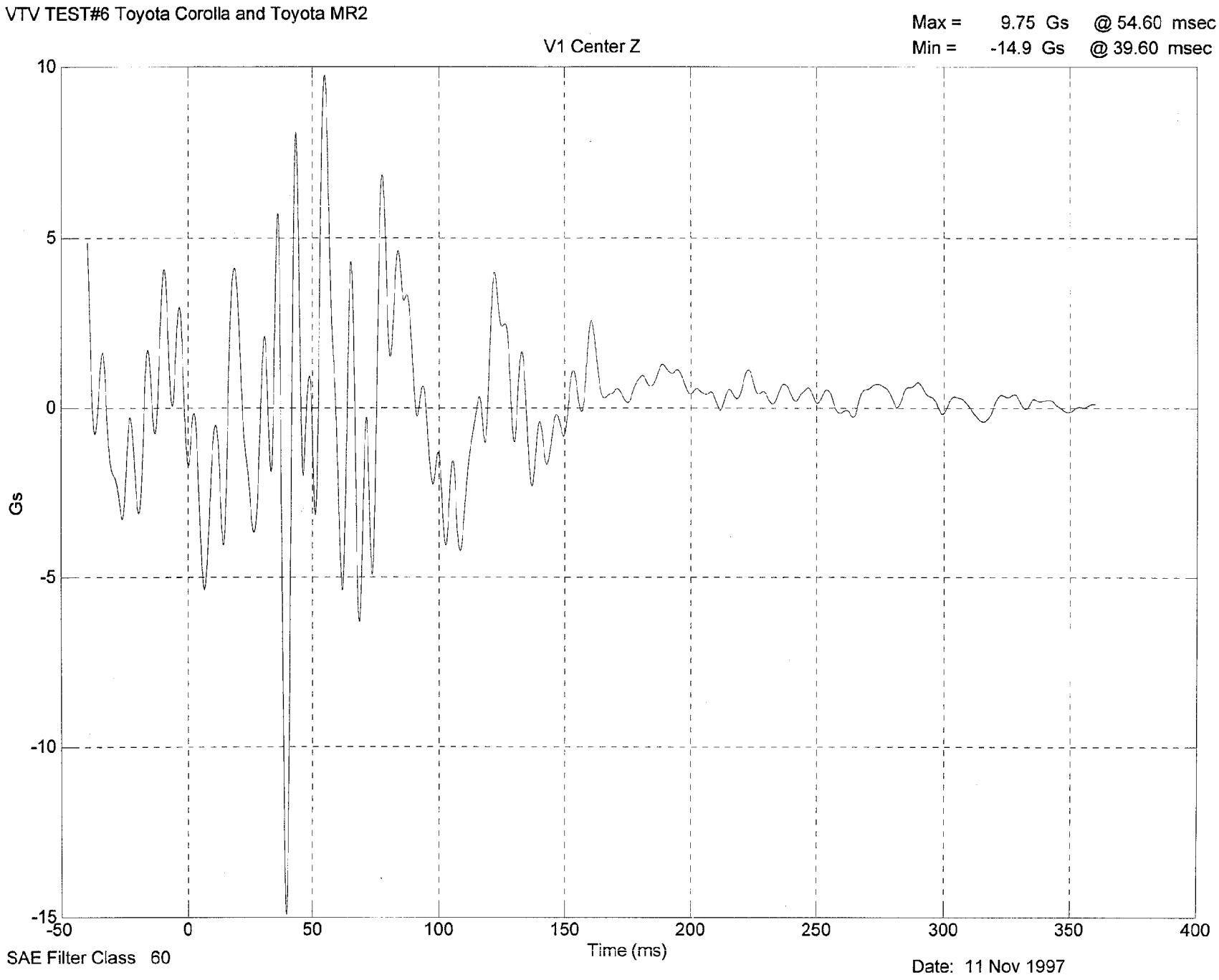
VTV TEST#6 Toyota Corolla and Toyota MR2



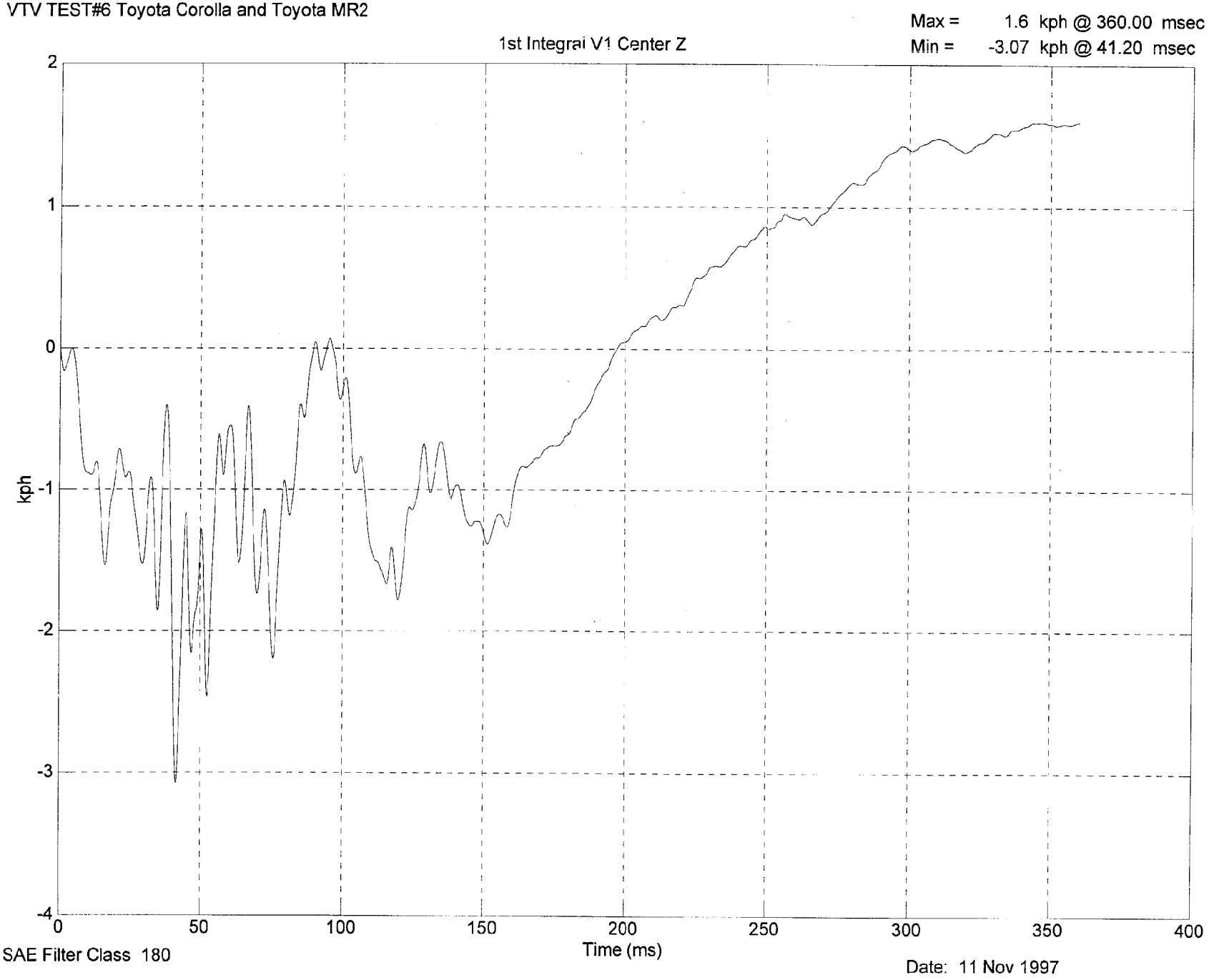
SAE Filter Class 180

Date: 11 Nov 1997

8404-6

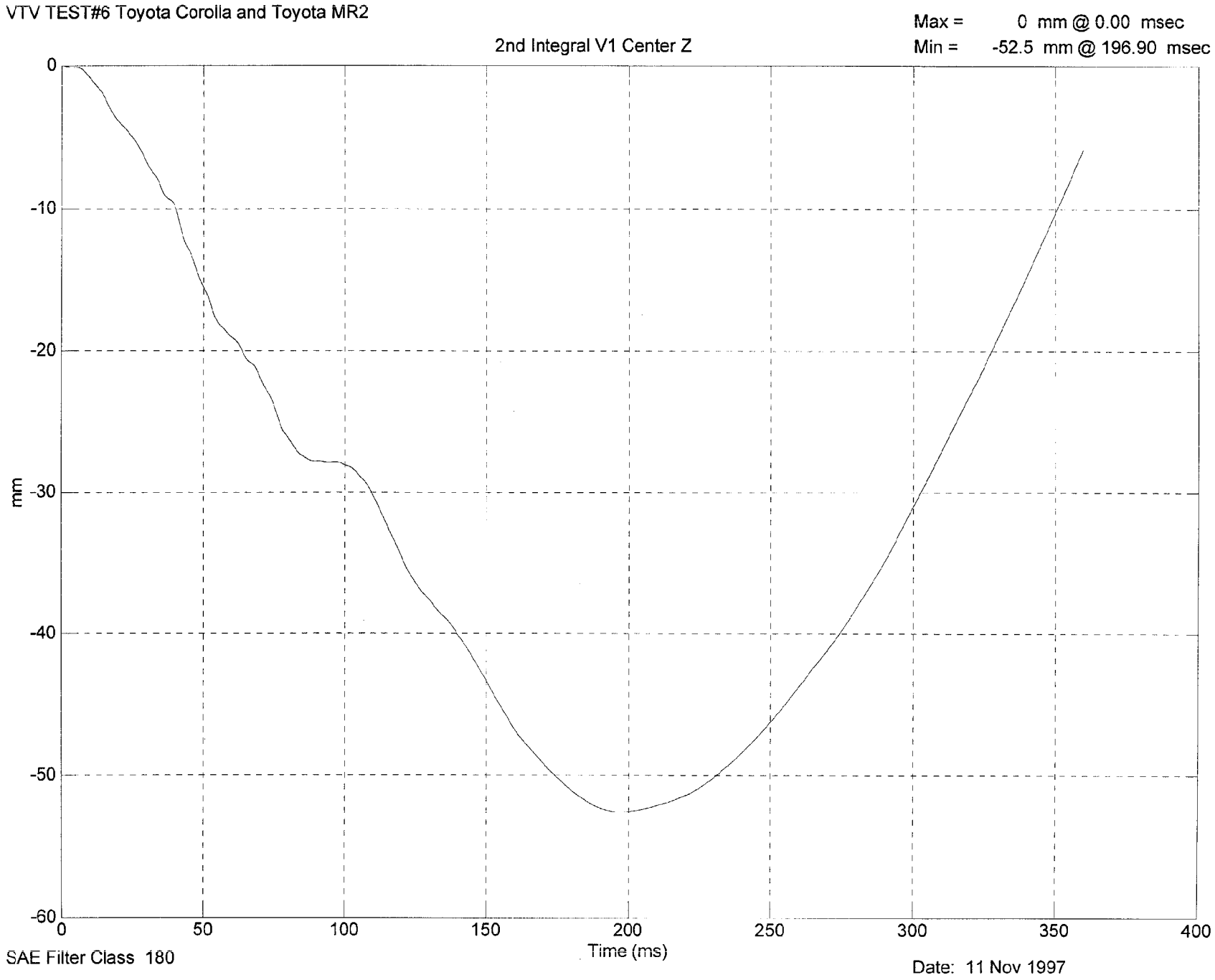

VTV TEST#6 Toyota Corolla and Toyota MR2
V1 Center Z
Max = 9.75 Gs @ 54.60 msec
Min = -14.9 Gs @ 39.60 msec
10
5
0
-5
-10
-15
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

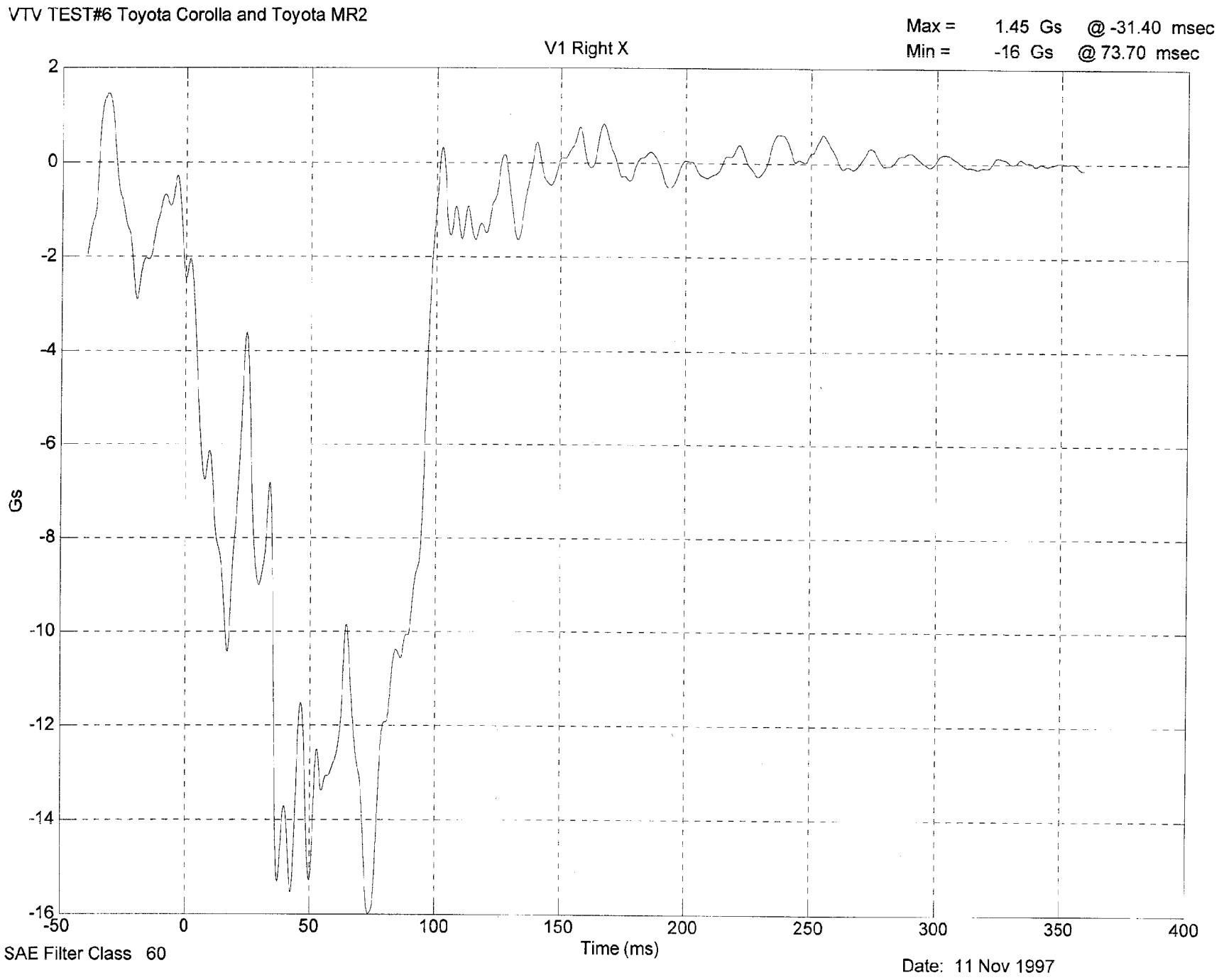
VTV TEST#6 Toyota Corolla and Toyota MR2



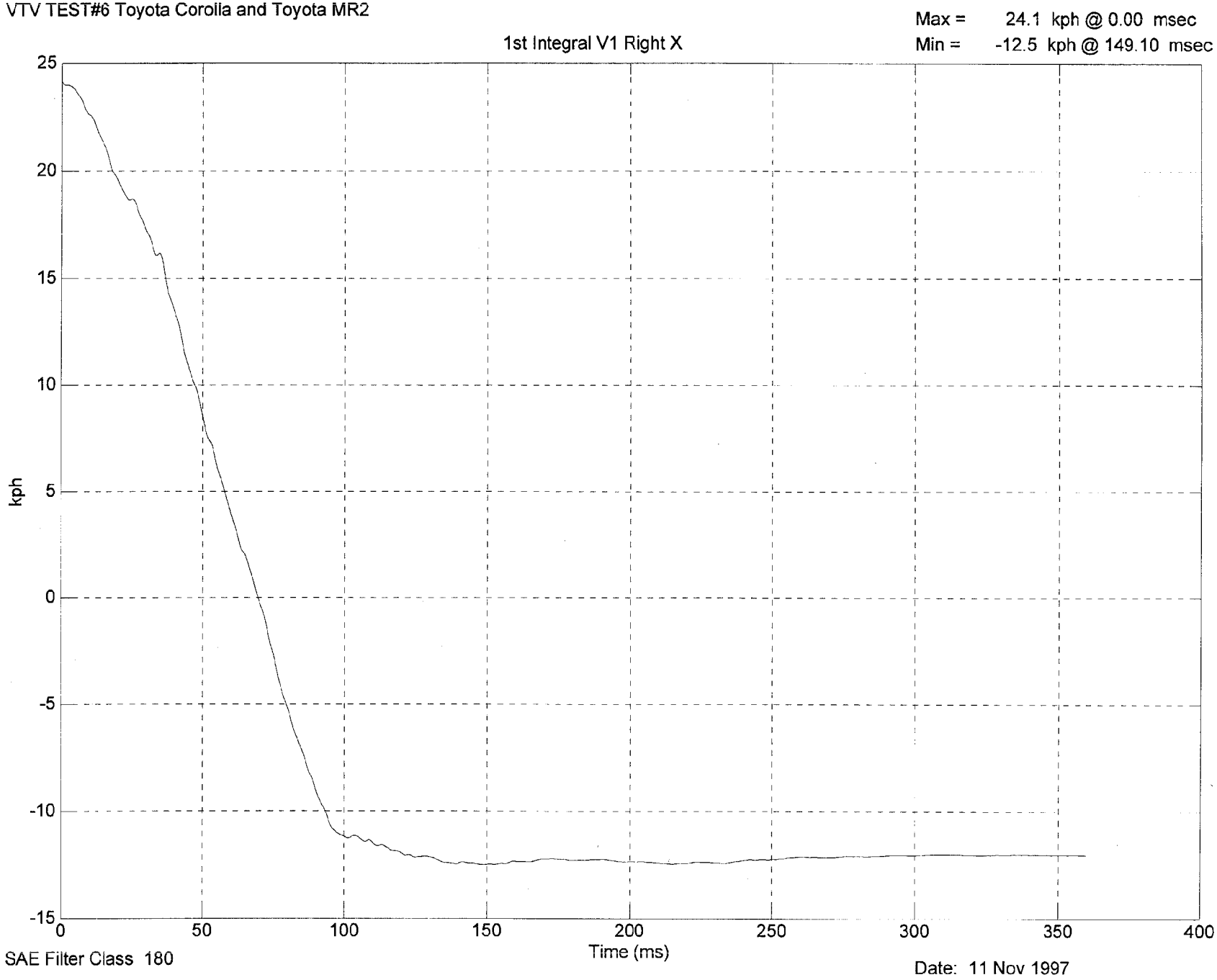
SAE Filter Class 180

Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
2nd Integral V1 Center Z
Max = 0 mm @ 0.00 msec
Min = -52.5 mm @ 196.90 msec
0
-10
-20
-30
-40
-50
-60
mm
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997

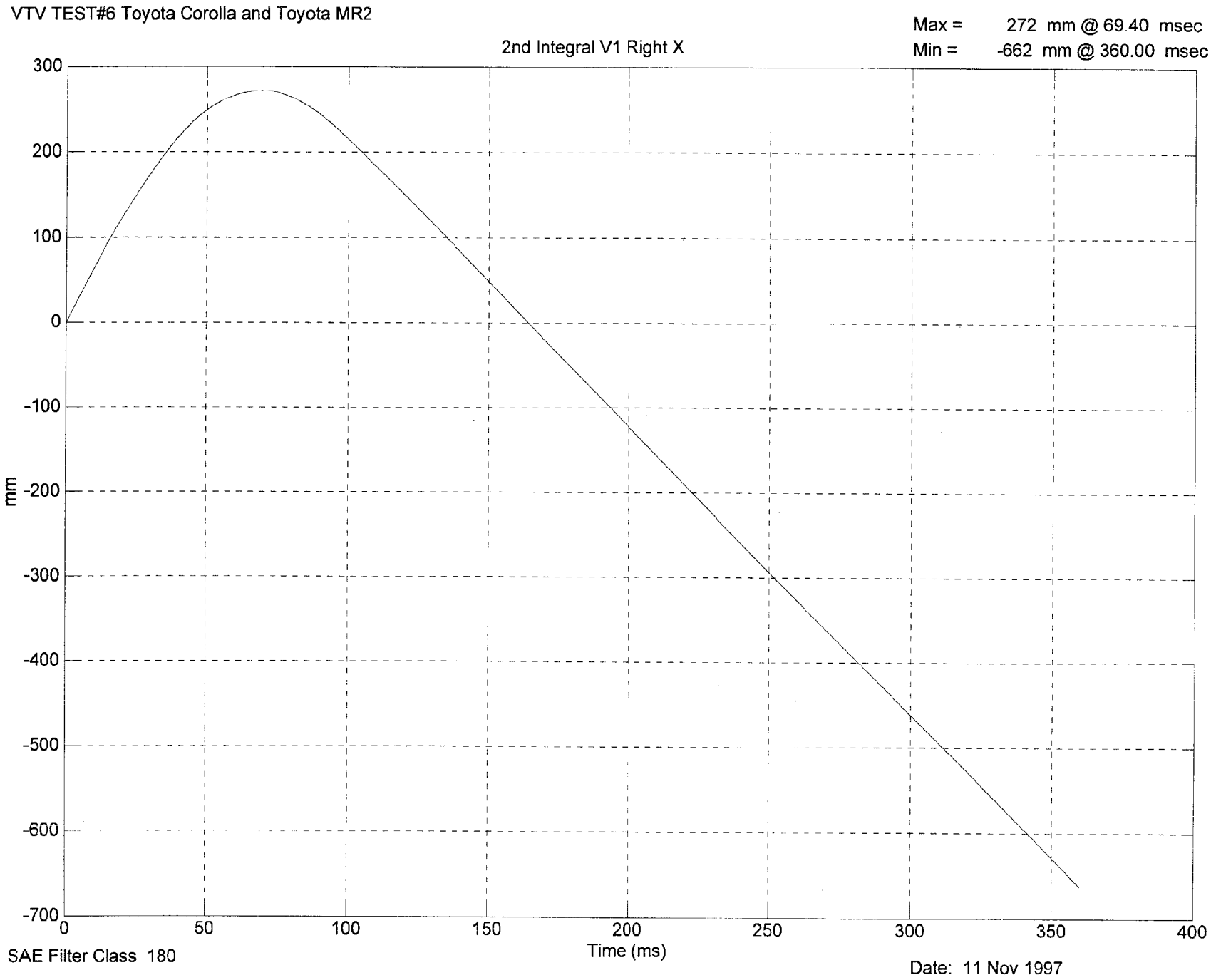

VTV TEST#6 Toyota Corolla and Toyota MR2
V1 Right X
Max = 1.45 Gs @ -31.40 msec
Min = -16 Gs @ 73.70 msec
Gs
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

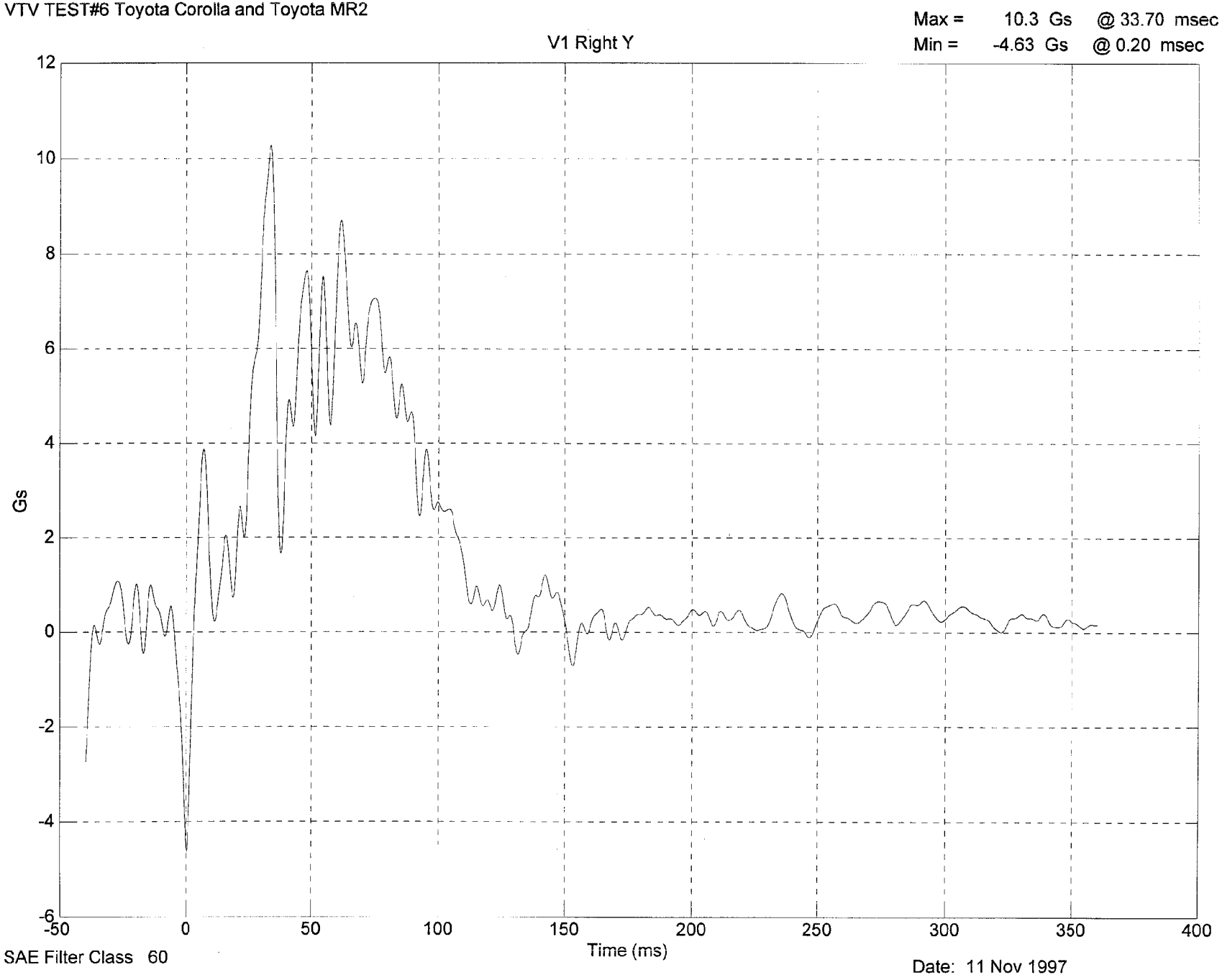


SAE Filter Class 180

Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
2nd Integral V1 Right X
Max = 272 mm @ 69.40 msec
Min = -662 mm @ 360.00 msec
300
200
100
0
-100
-200
-300
-400
-500
-600
-700
mm
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997

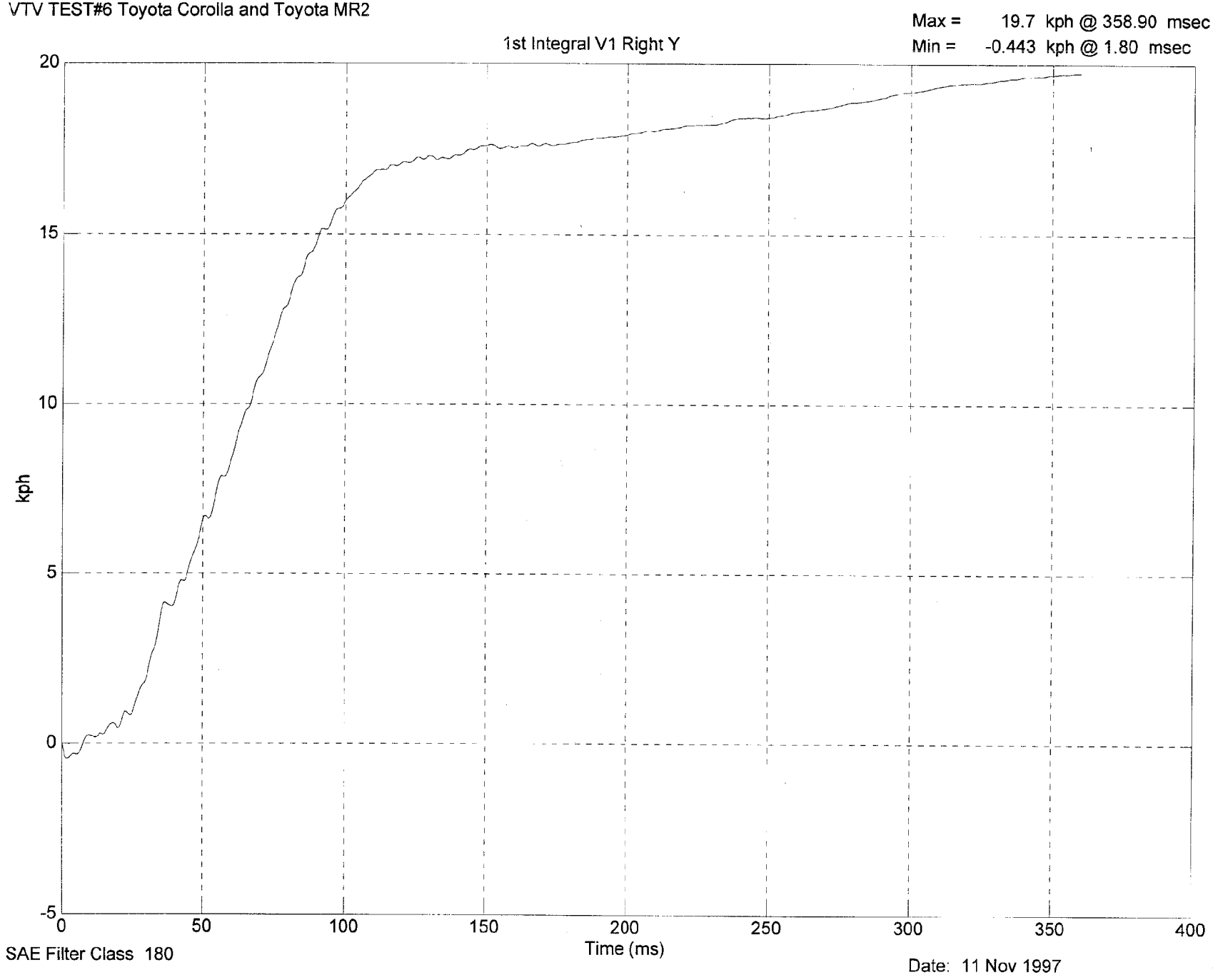
VTV TEST#6 Toyota Corolla and Toyota MR2



SAE Filter Class 60

Date: 11 Nov 1997

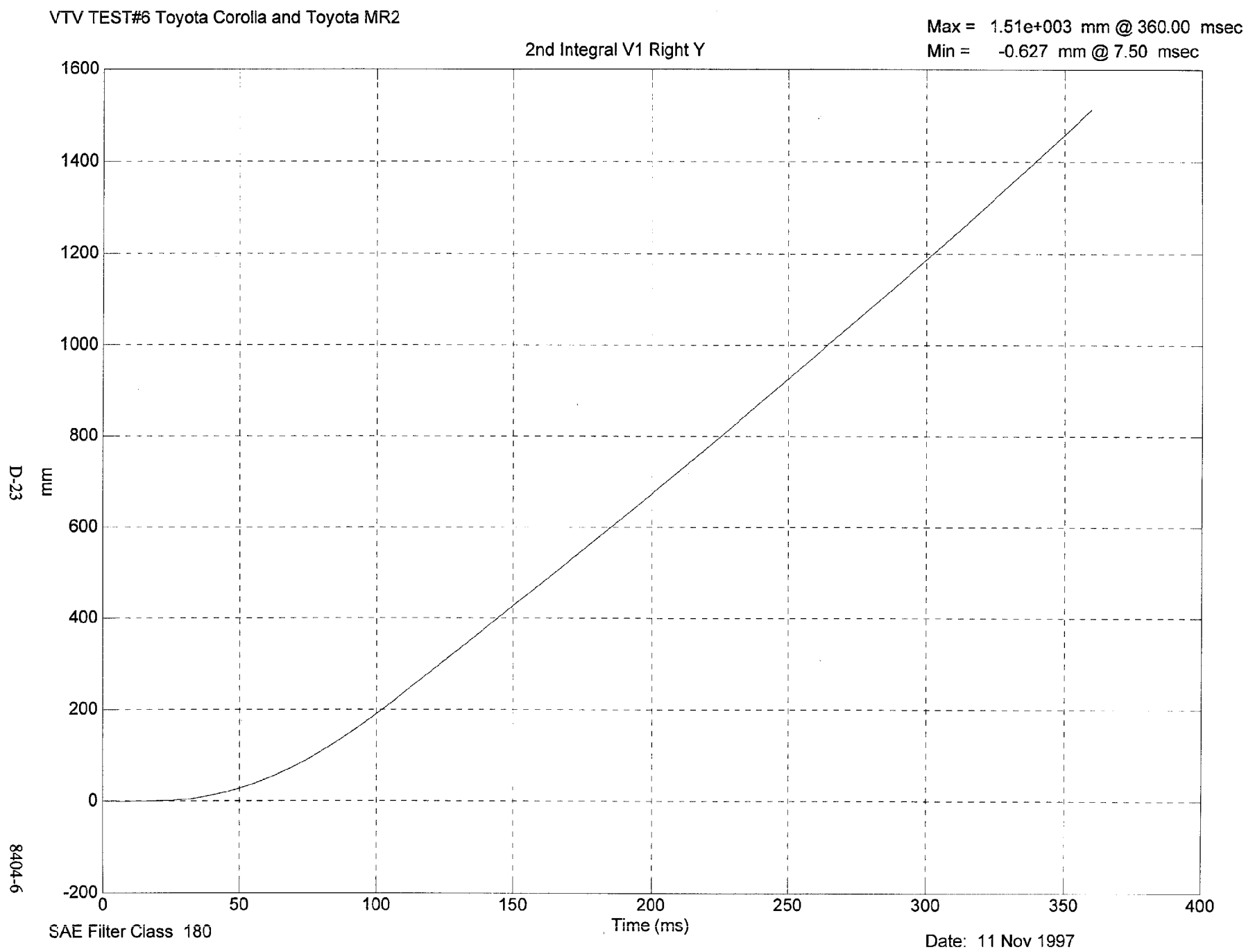
VTV TEST#6 Toyota Corolla and Toyota MR2



SAE Filter Class 180

Date: 11 Nov 1997

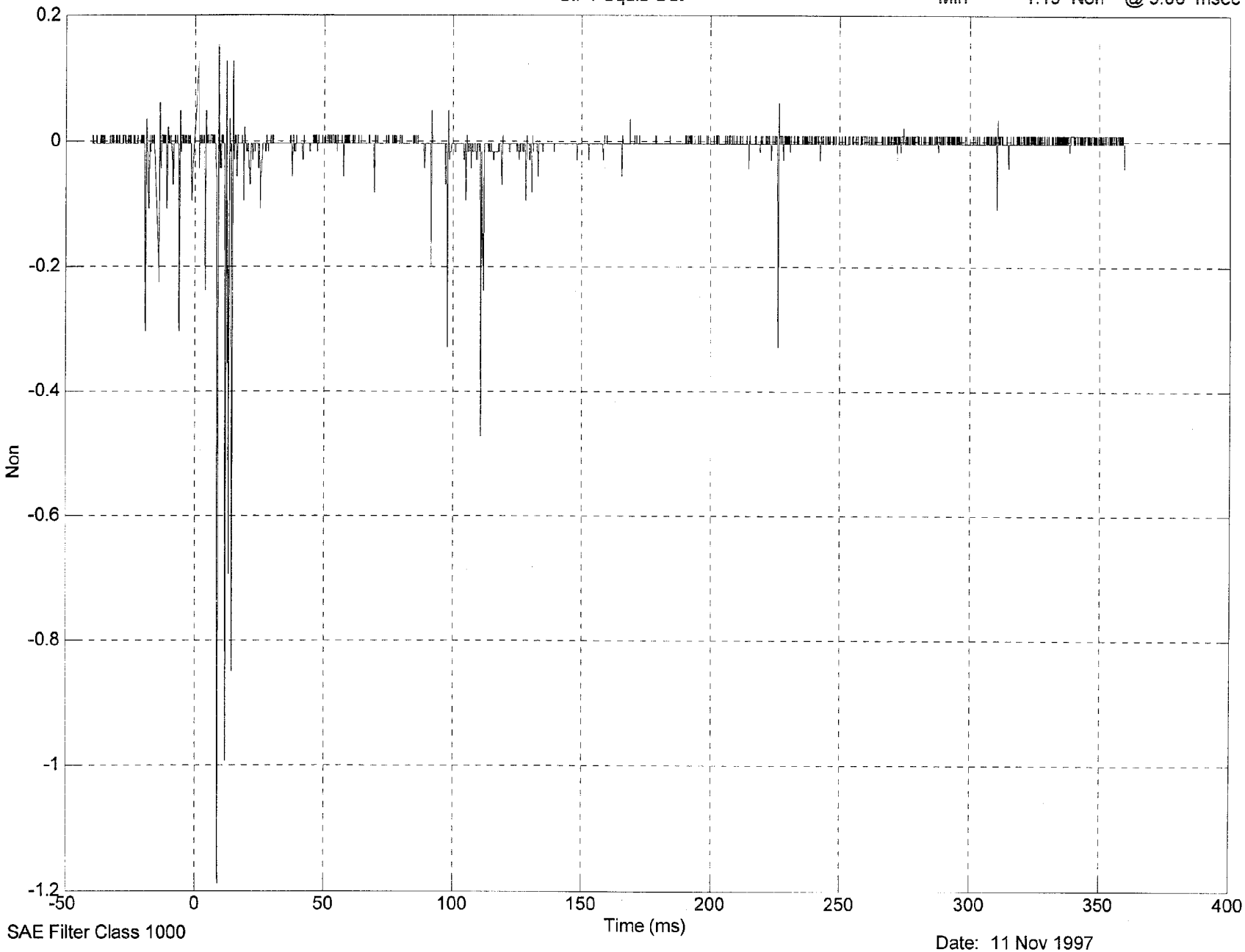
8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
2nd Integral V1 Right Y
Max = 1.51e+003 mm @ 360.00 msec
Min = -0.627 mm @ 7.50 msec
1600
1400
1200
1000
800
600
400
200
0
-200
mm
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997
D-23
8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

Cir 1 Squib Out

Max = 0.153 Non @ 9.40 msec
Min = -1.19 Non @ 9.00 msec

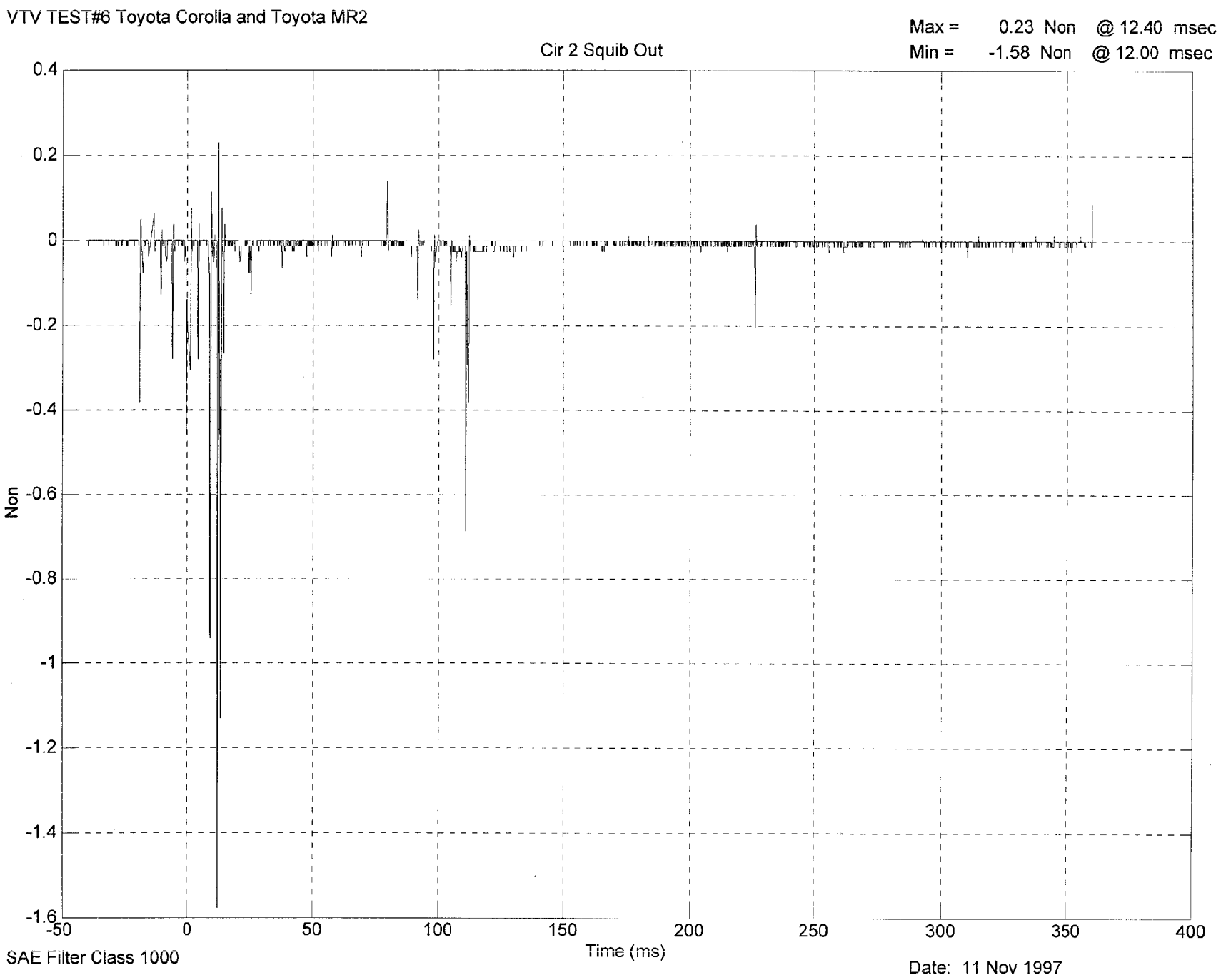


SAE Filter Class 1000

Date: 11 Nov 1997

D-24

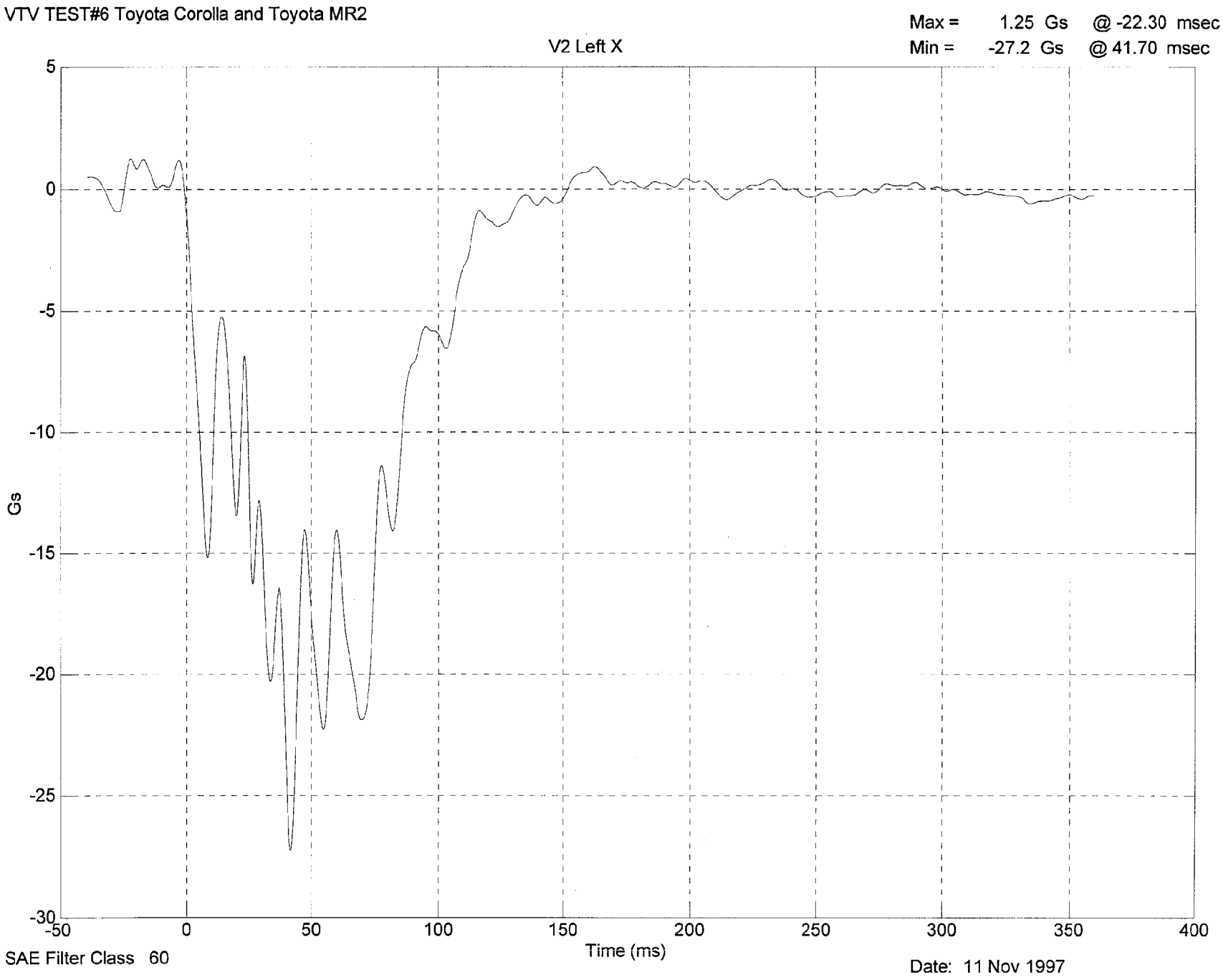
8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
Cir 2 Squib Out
Max = 0.23 Non @ 12.40 msec
Min = -1.58 Non @ 12.00 msec
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
Non
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997

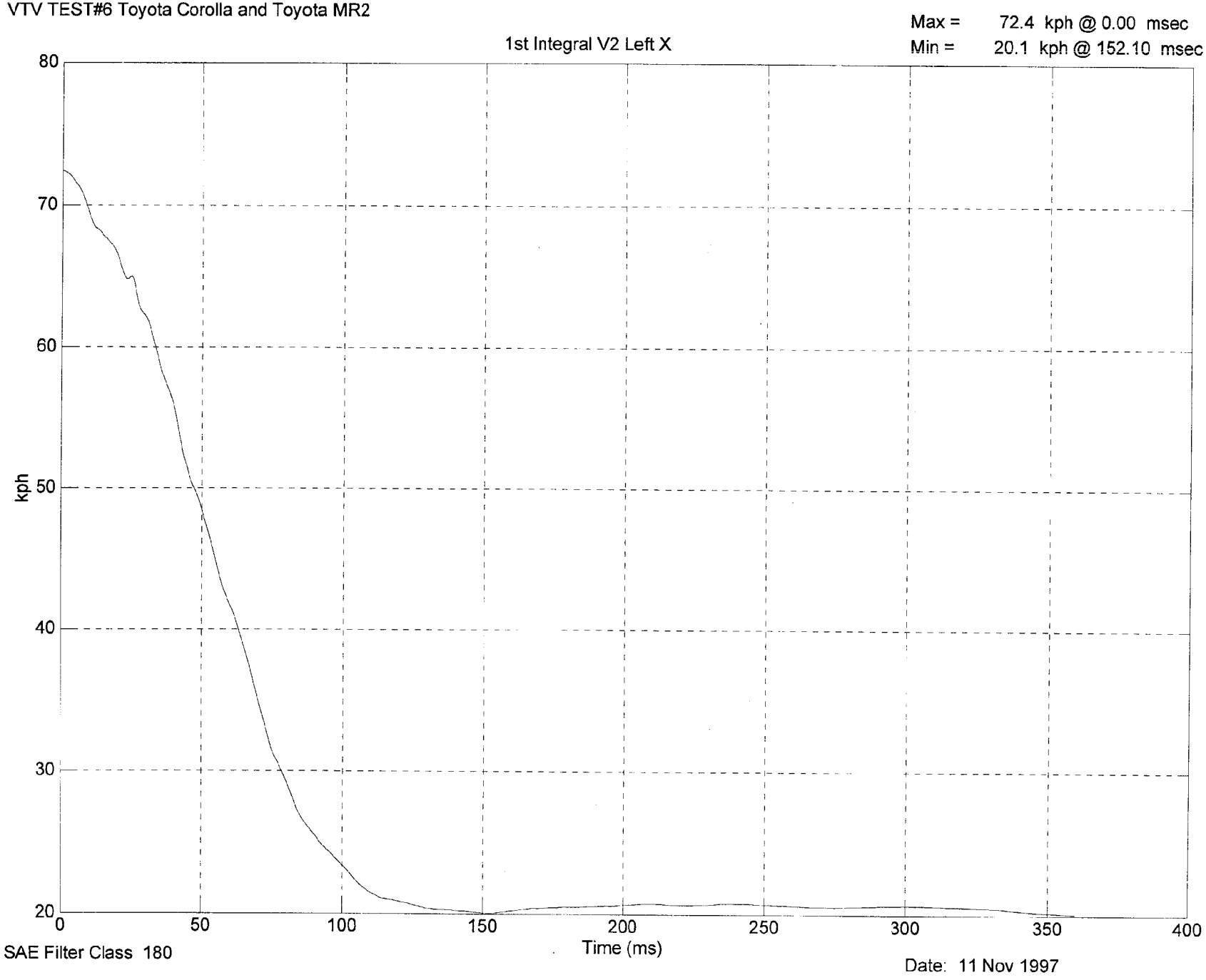
TEST NO. A109-6-1732

VEHICLE 2 - VEHICLE DATA

CHANNEL	SAE FILTER CHANNEL CLASS
Vehicle Data	60
Integrations	180

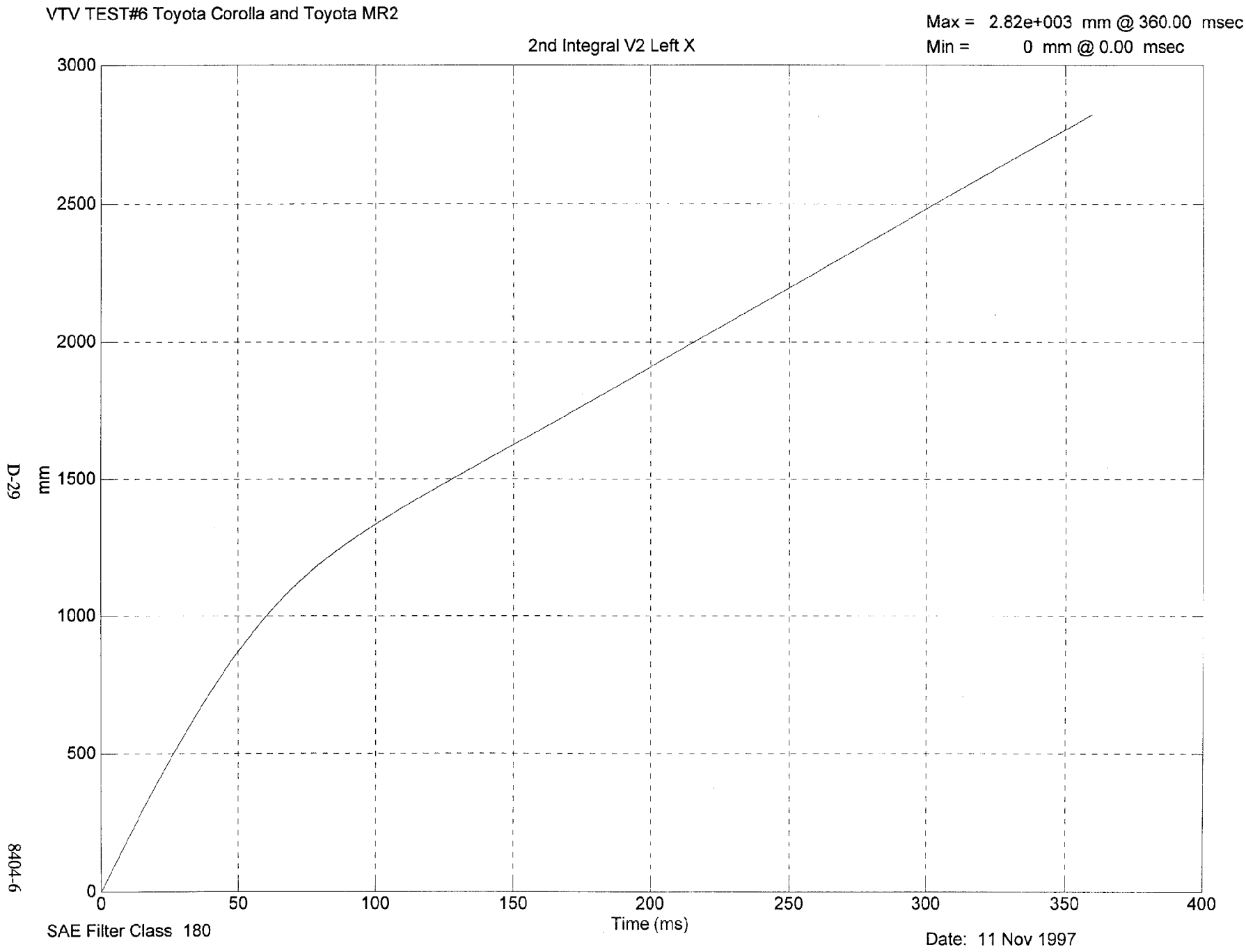

VTV TEST#6 Toyota Corolla and Toyota MR2
V2 Left X
Max = 1.25 Gs @ -22.30 msec
Min = -27.2 Gs @ 41.70 msec
5
0
-5
-10
-15
-20
-25
-30
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

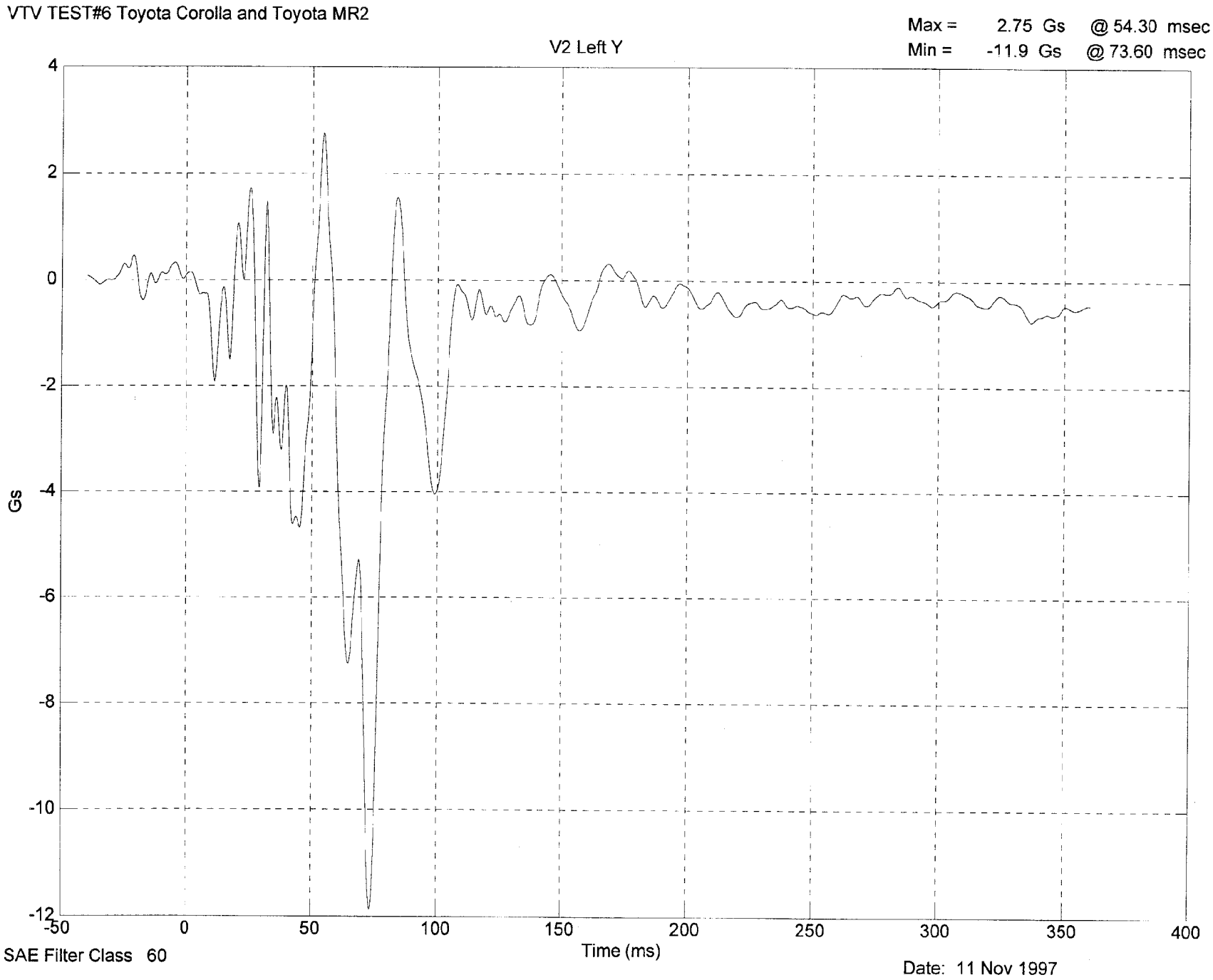
VTV TEST#6 Toyota Corolla and Toyota MR2



SAE Filter Class 180

Date: 11 Nov 1997

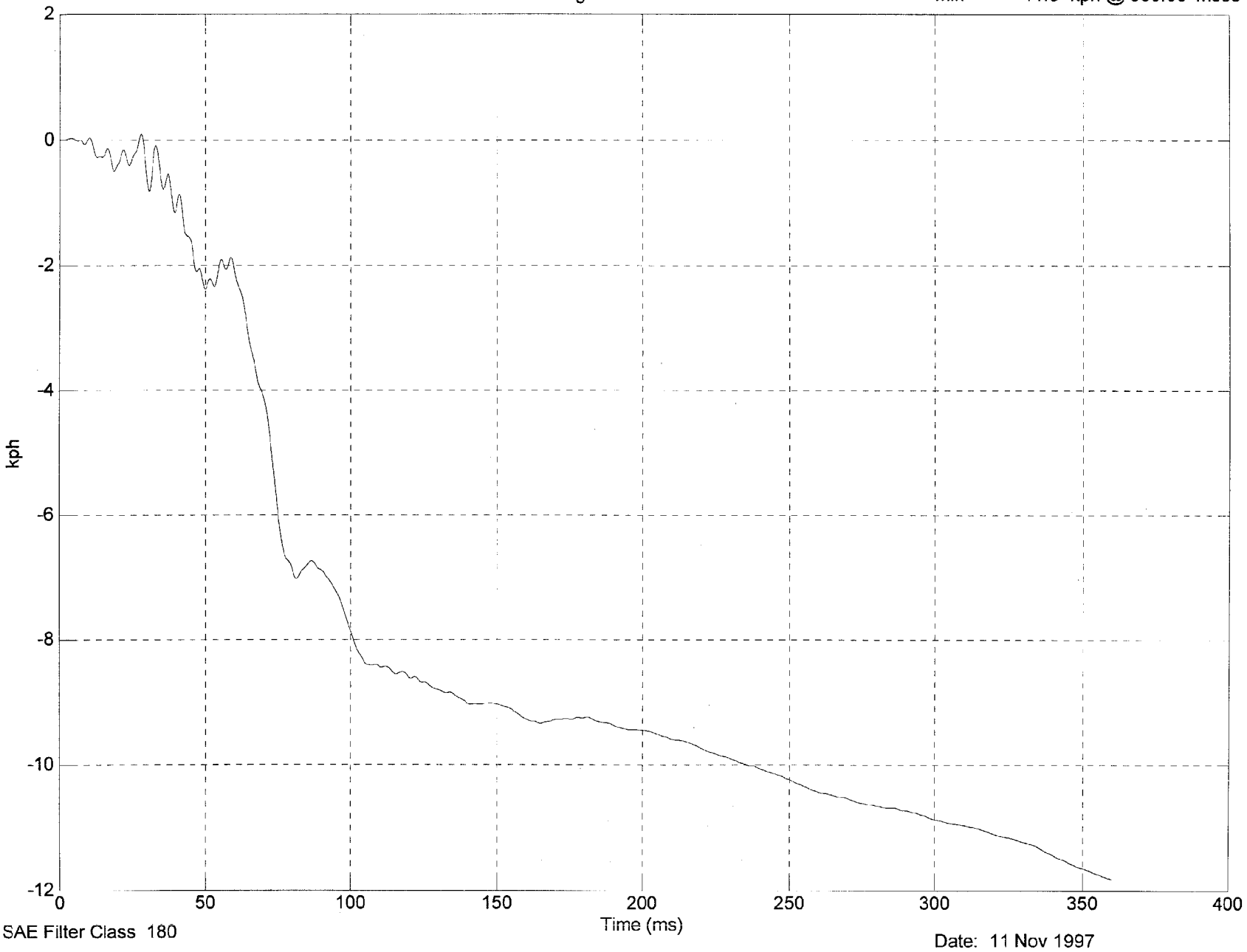

VTV TEST#6 Toyota Corolla and Toyota MR2
2nd Integral V2 Left X
Max = 2.82e+003 mm @ 360.00 msec
Min = 0 mm @ 0.00 msec
3000
2500
2000
1500
1000
500
0
mm
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997
8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
V2 Left Y
Max = 2.75 Gs @ 54.30 msec
Min = -11.9 Gs @ 73.60 msec
Gs
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

1st Integral V2 Left Y

Max = 0.0916 kph @ 27.80 msec
Min = -11.8 kph @ 360.00 msec



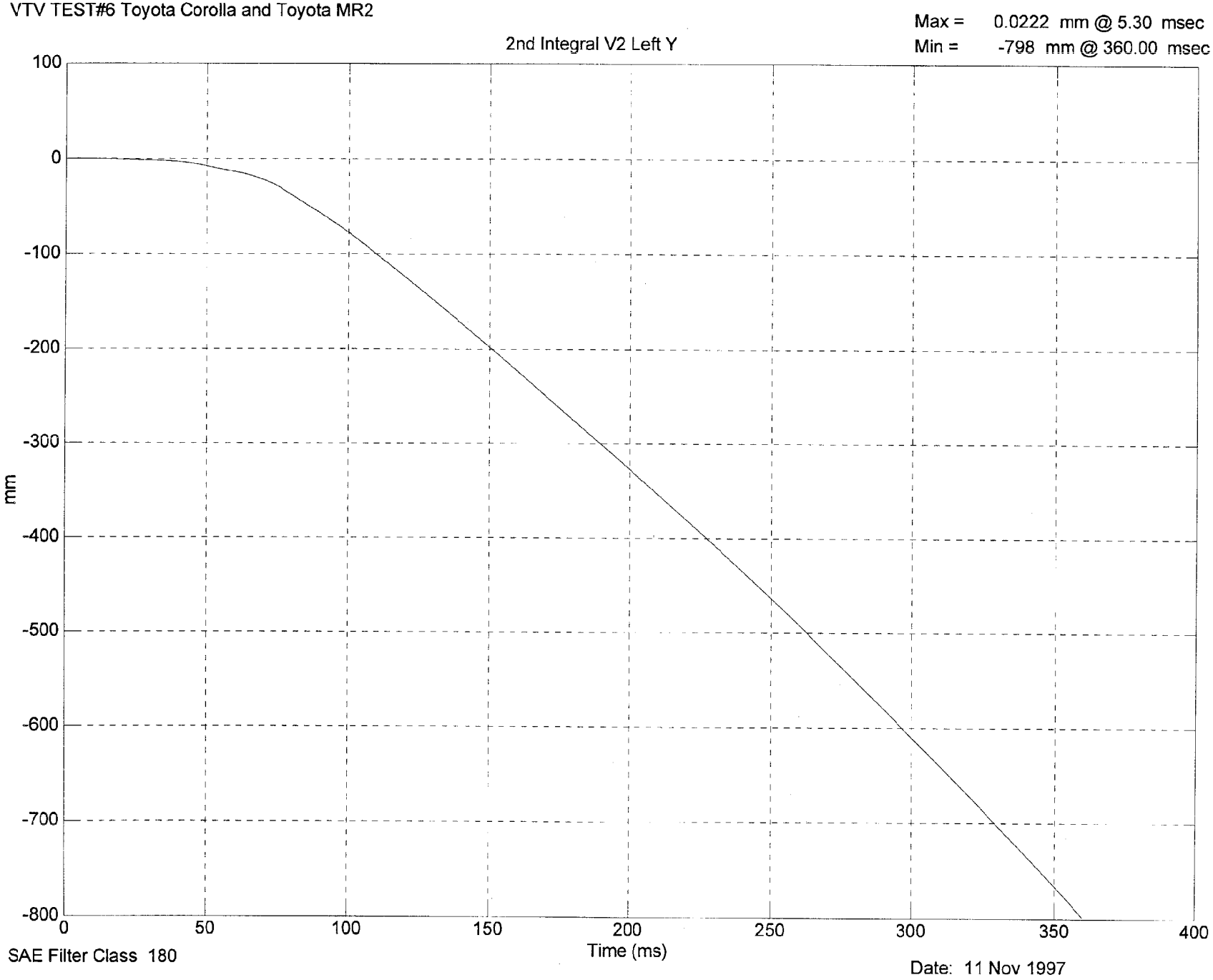
SAE Filter Class 180

Date: 11 Nov 1997

D-31

8404-6

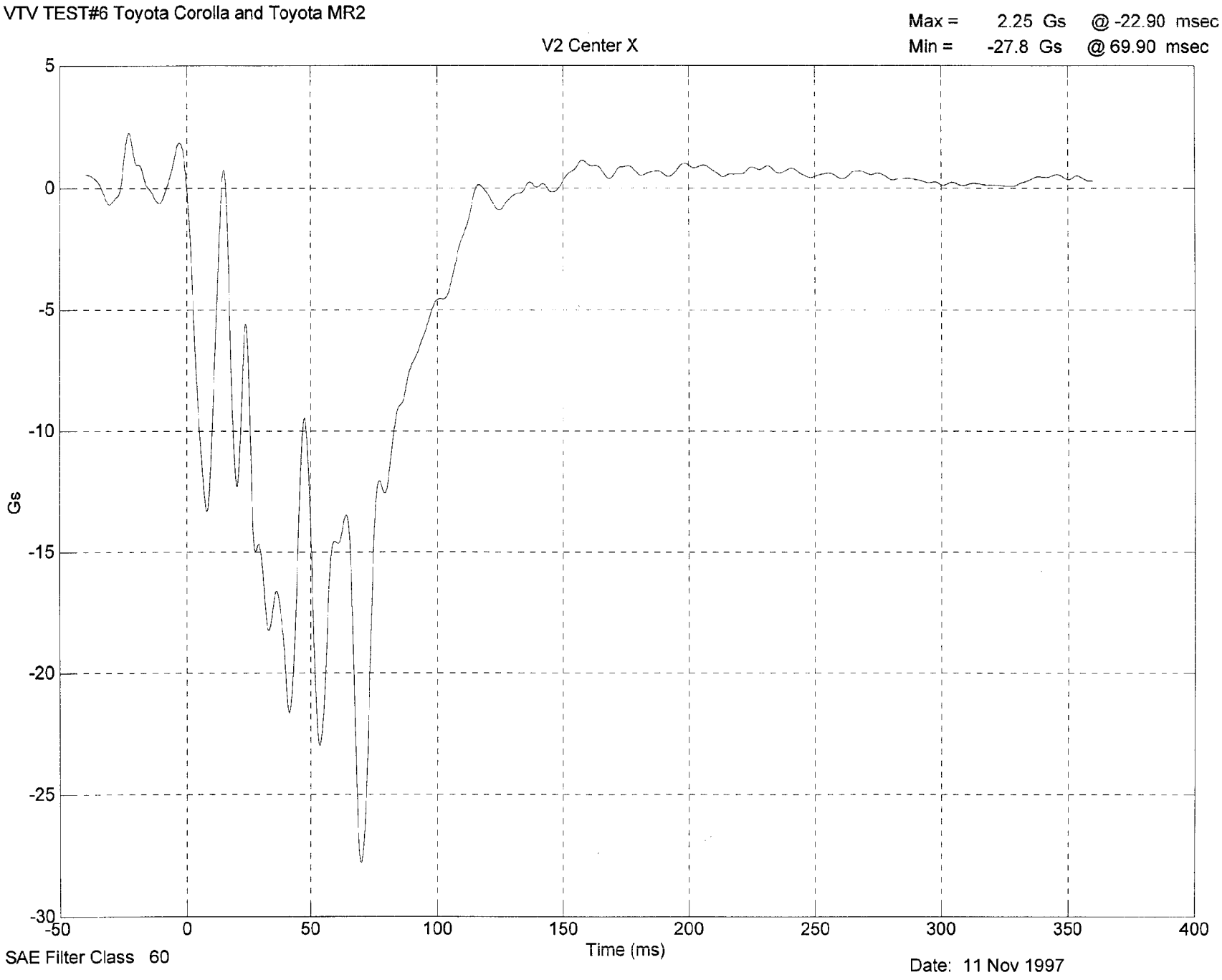
VTV TEST#6 Toyota Corolla and Toyota MR2



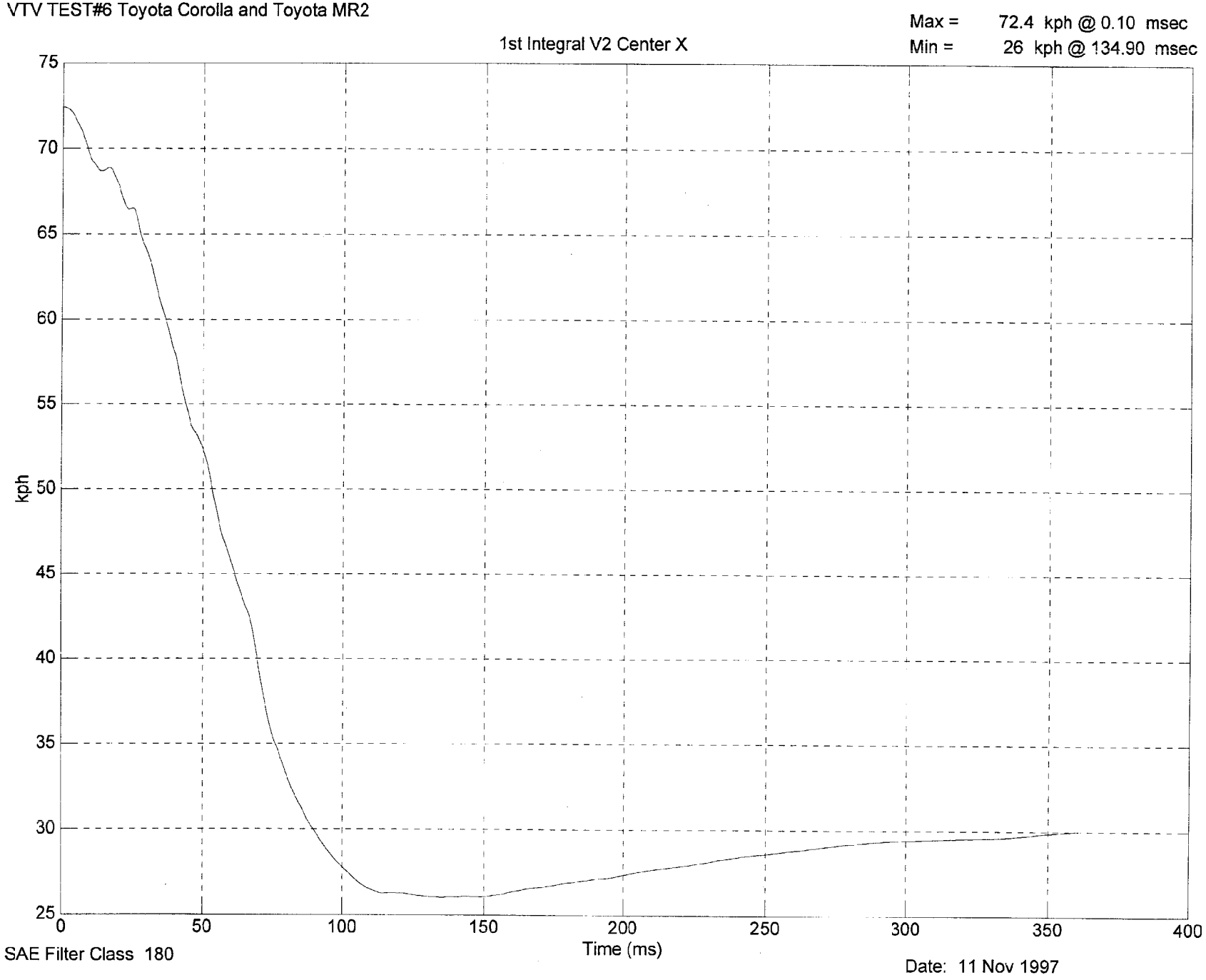
SAE Filter Class 180

Date: 11 Nov 1997

8404-6

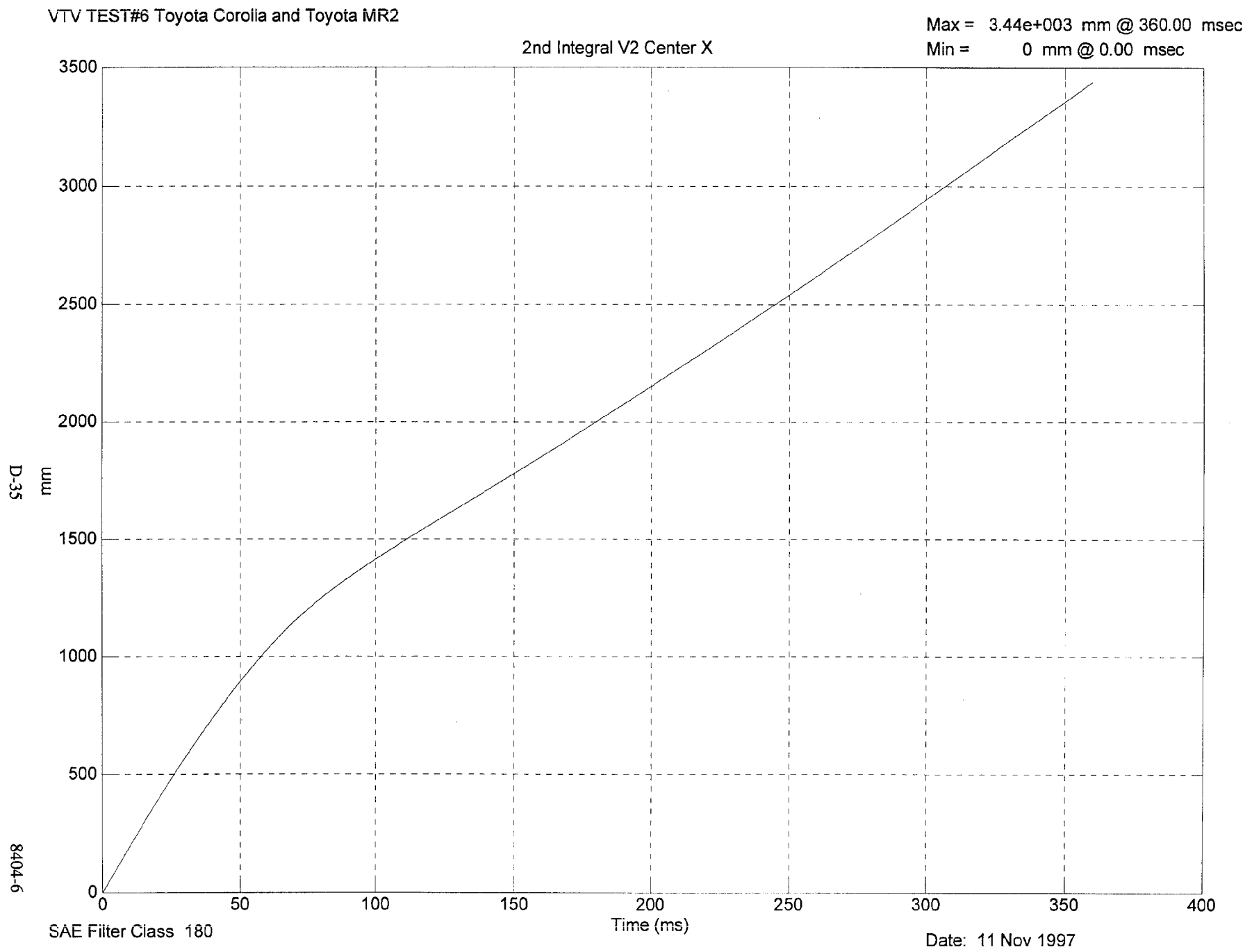

VTV TEST#6 Toyota Corolla and Toyota MR2
V2 Center X
Max = 2.25 Gs @ -22.90 msec
Min = -27.8 Gs @ 69.90 msec
5
0
-5
-10
-15
-20
-25
-30
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2



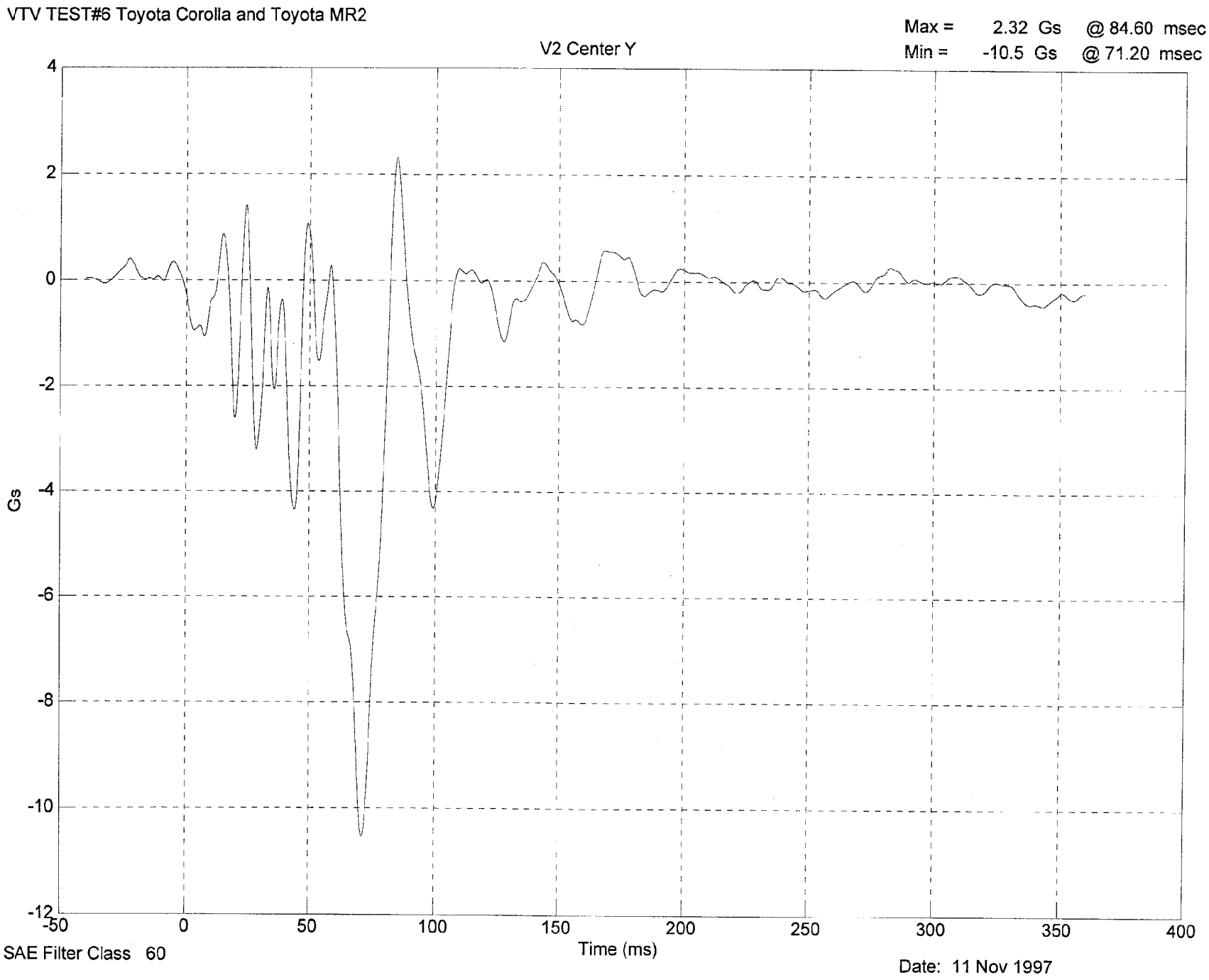
SAE Filter Class 180

Date: 11 Nov 1997

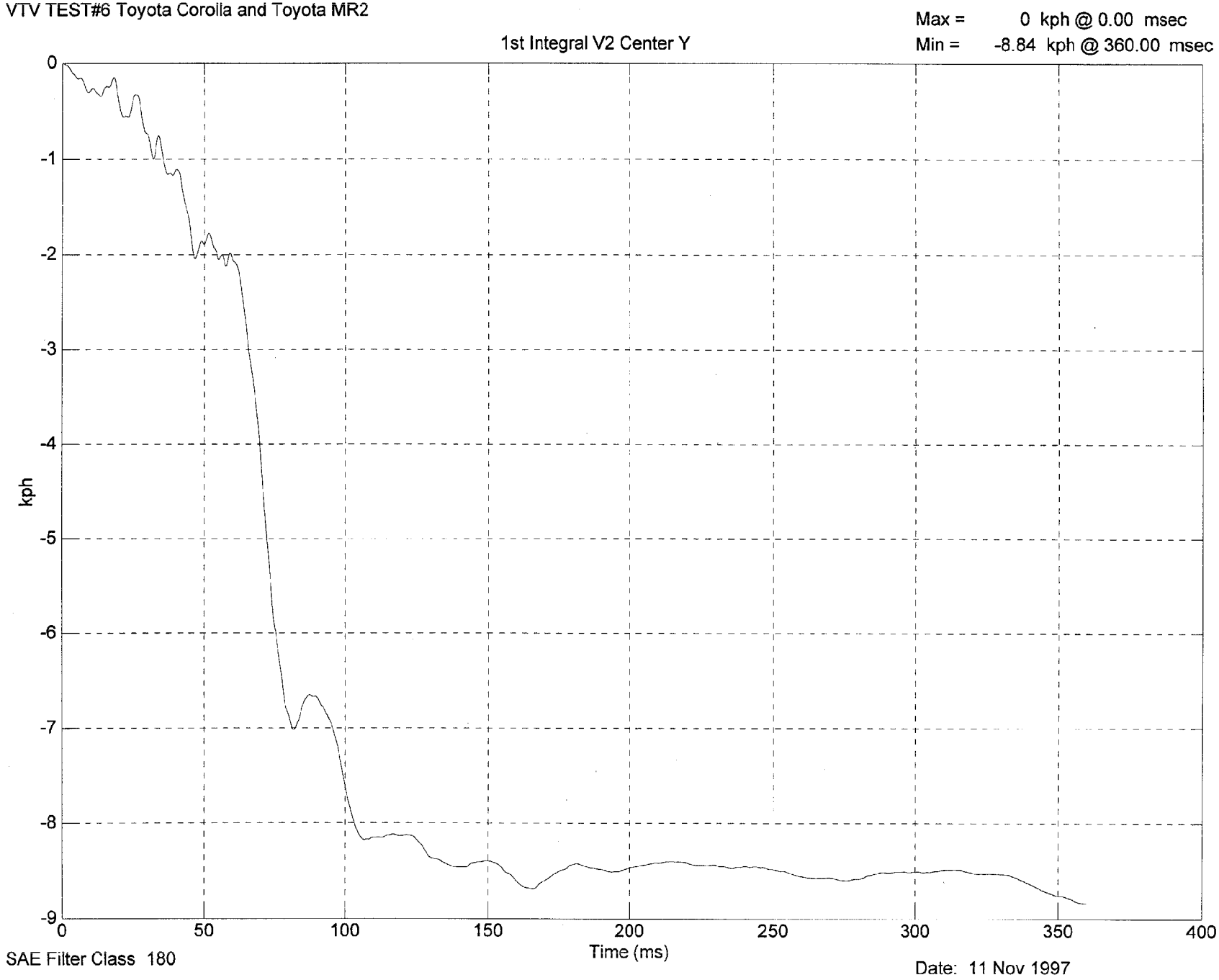

VTV TEST#6 Toyota Corolla and Toyota MR2
2nd Integral V2 Center X
Max = 3.44e+003 mm @ 360.00 msec
Min = 0 mm @ 0.00 msec
3500
3000
2500
2000
1500
1000
500
0
mm
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997

D-35

8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
V2 Center Y
Max = 2.32 Gs @ 84.60 msec
Min = -10.5 Gs @ 71.20 msec
Gs
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997
8404-6

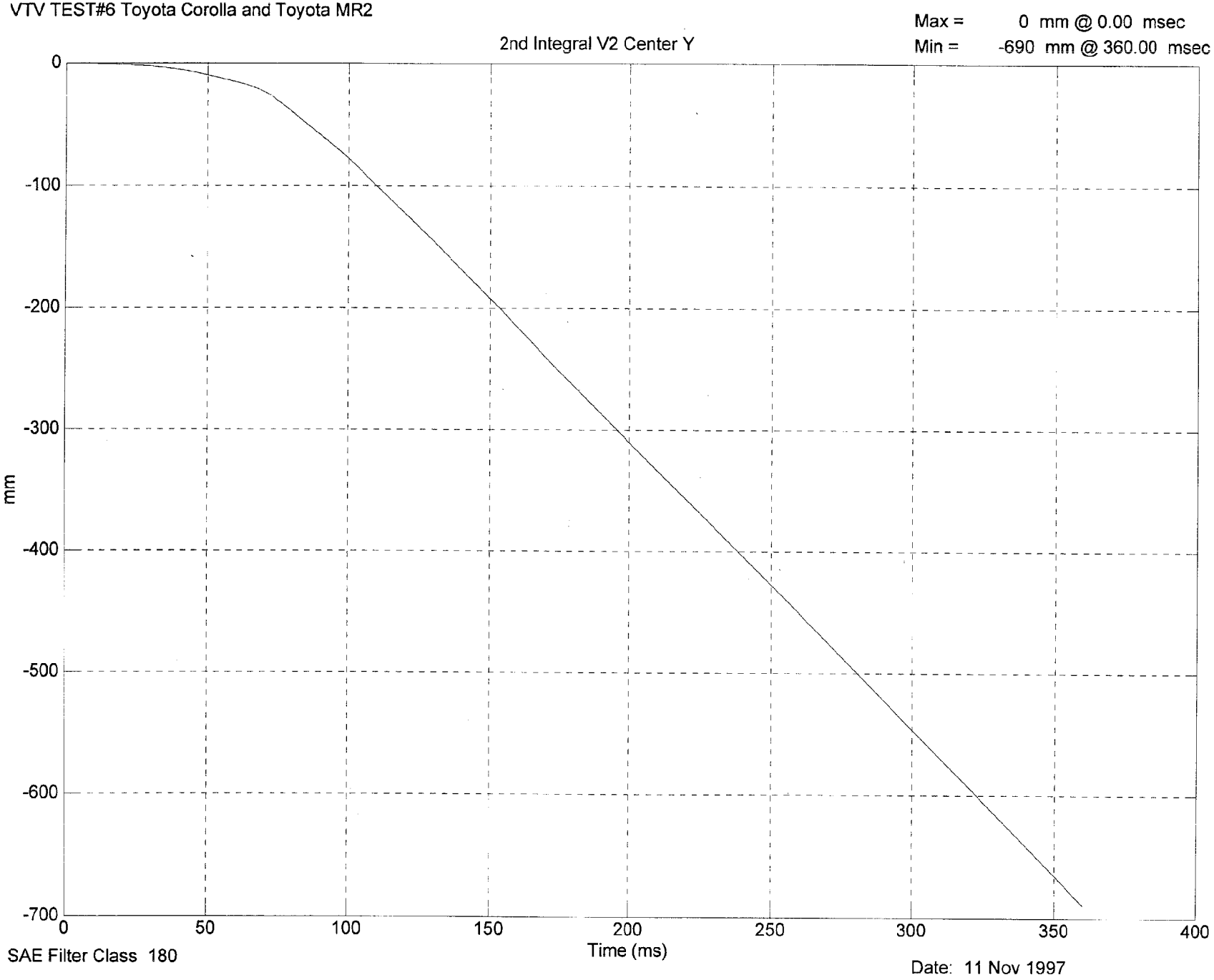
VTV TEST#6 Toyota Corolla and Toyota MR2



SAE Filter Class 180

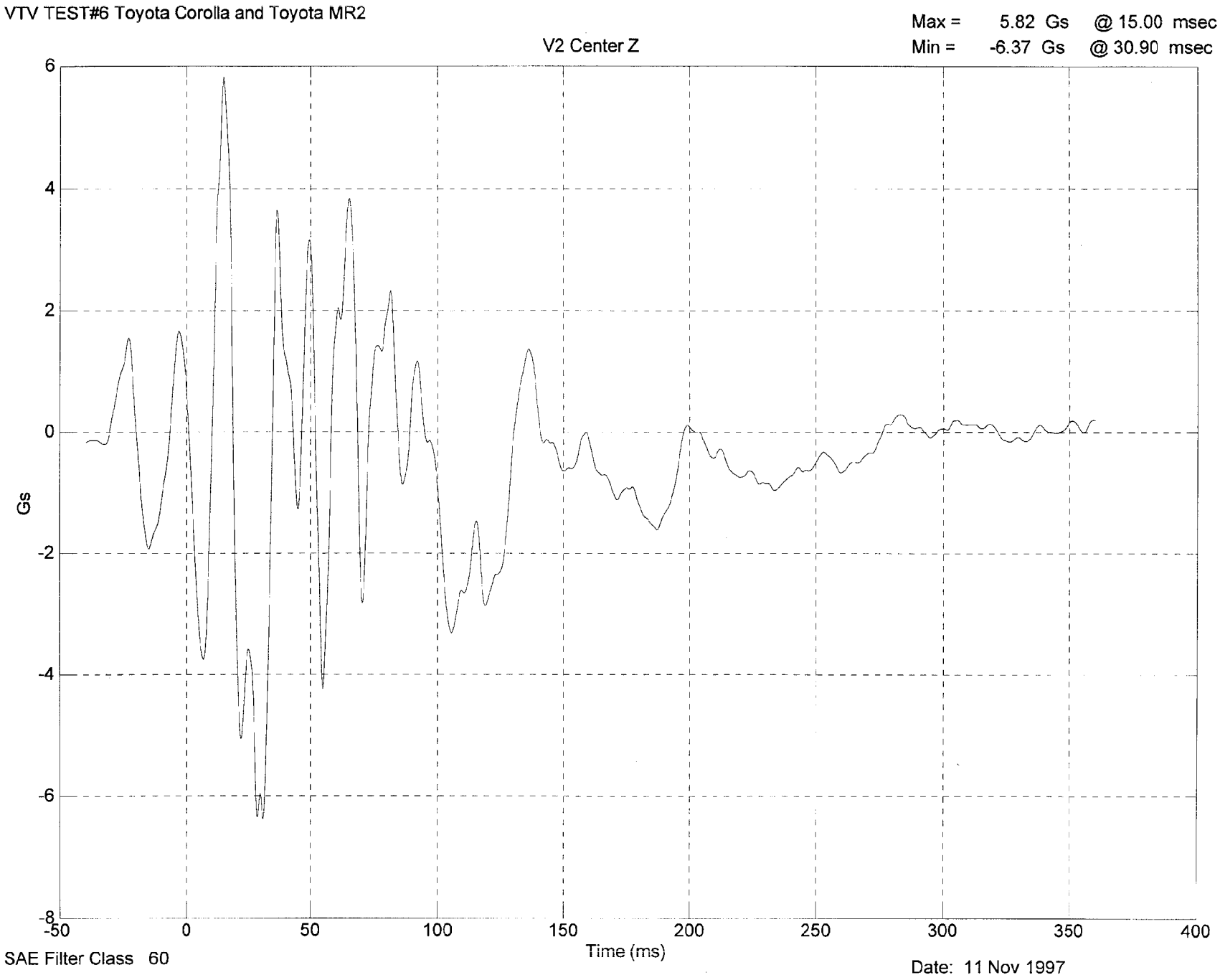
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

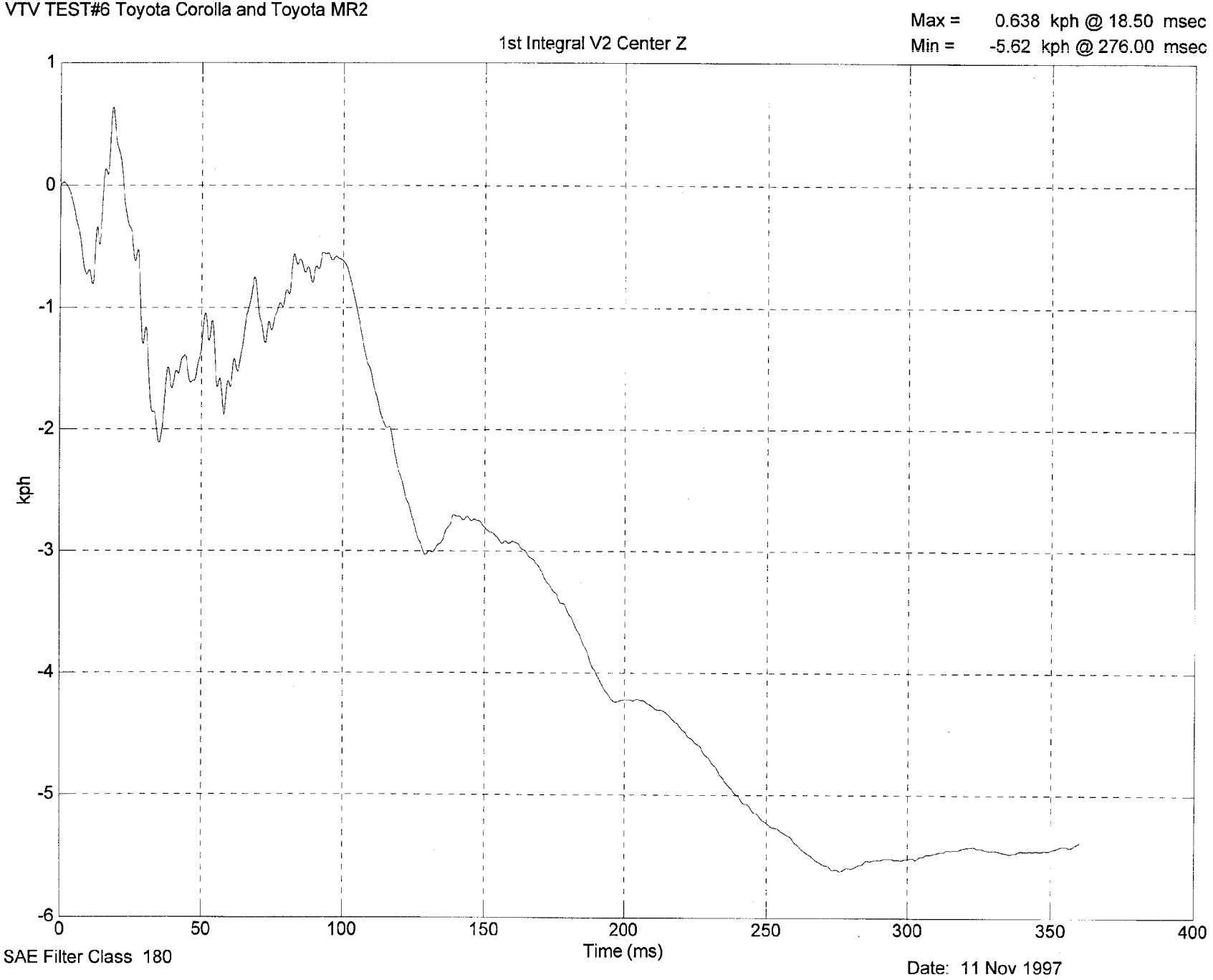


SAE Filter Class 180

Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
V2 Center Z
Max = 5.82 Gs @ 15.00 msec
Min = -6.37 Gs @ 30.90 msec
Gs
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

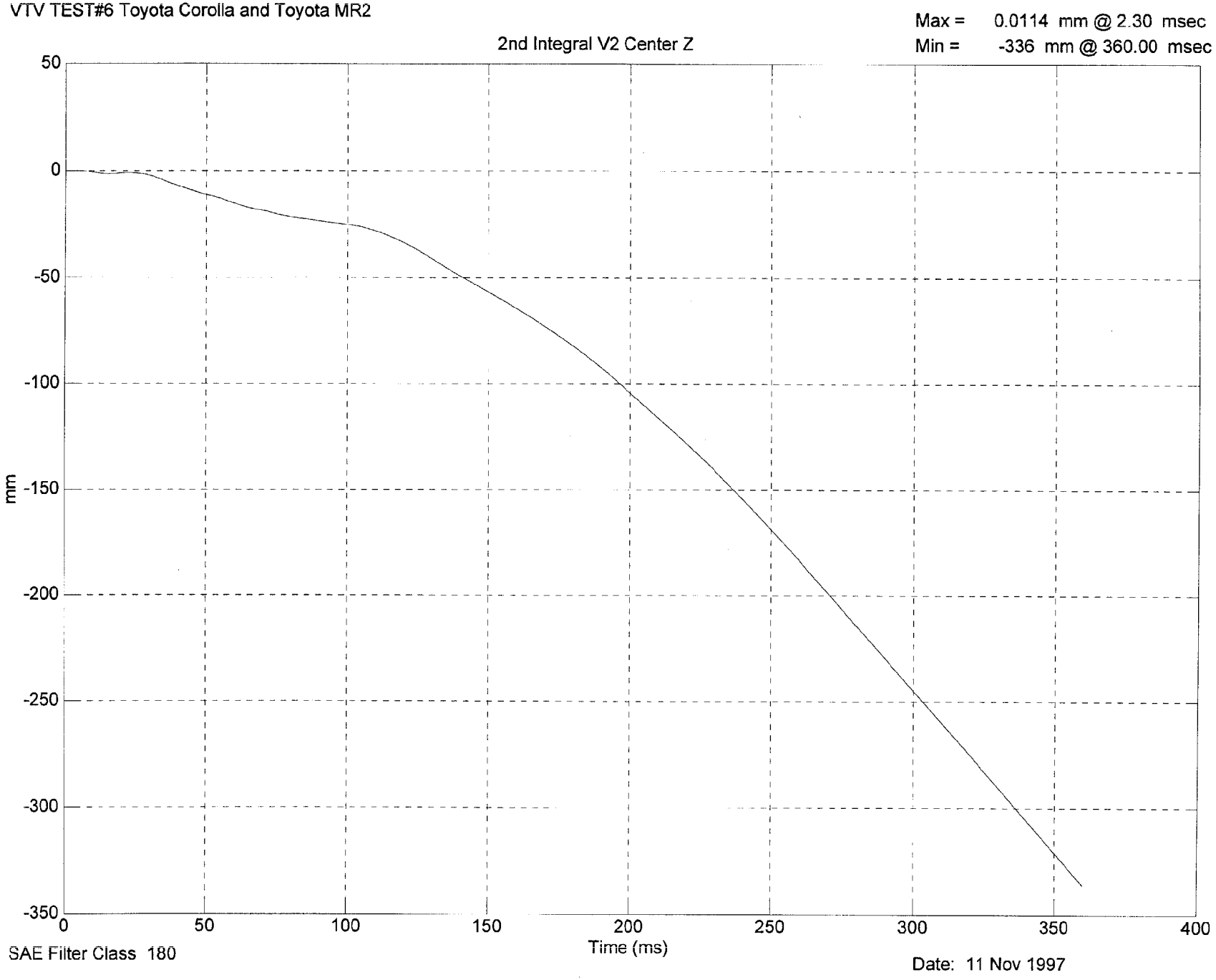


SAE Filter Class 180

Date: 11 Nov 1997

8404-6

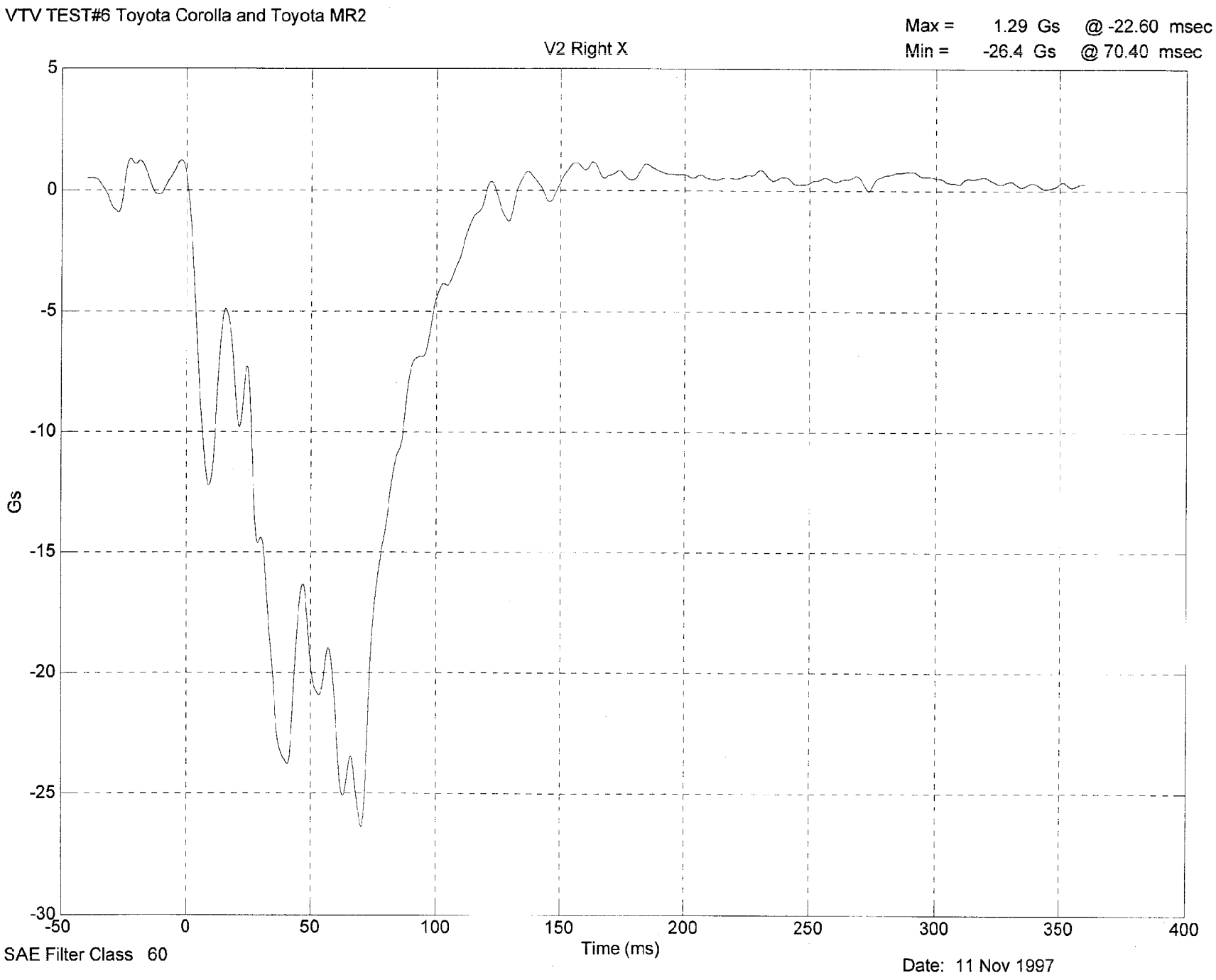
VTV TEST#6 Toyota Corolla and Toyota MR2



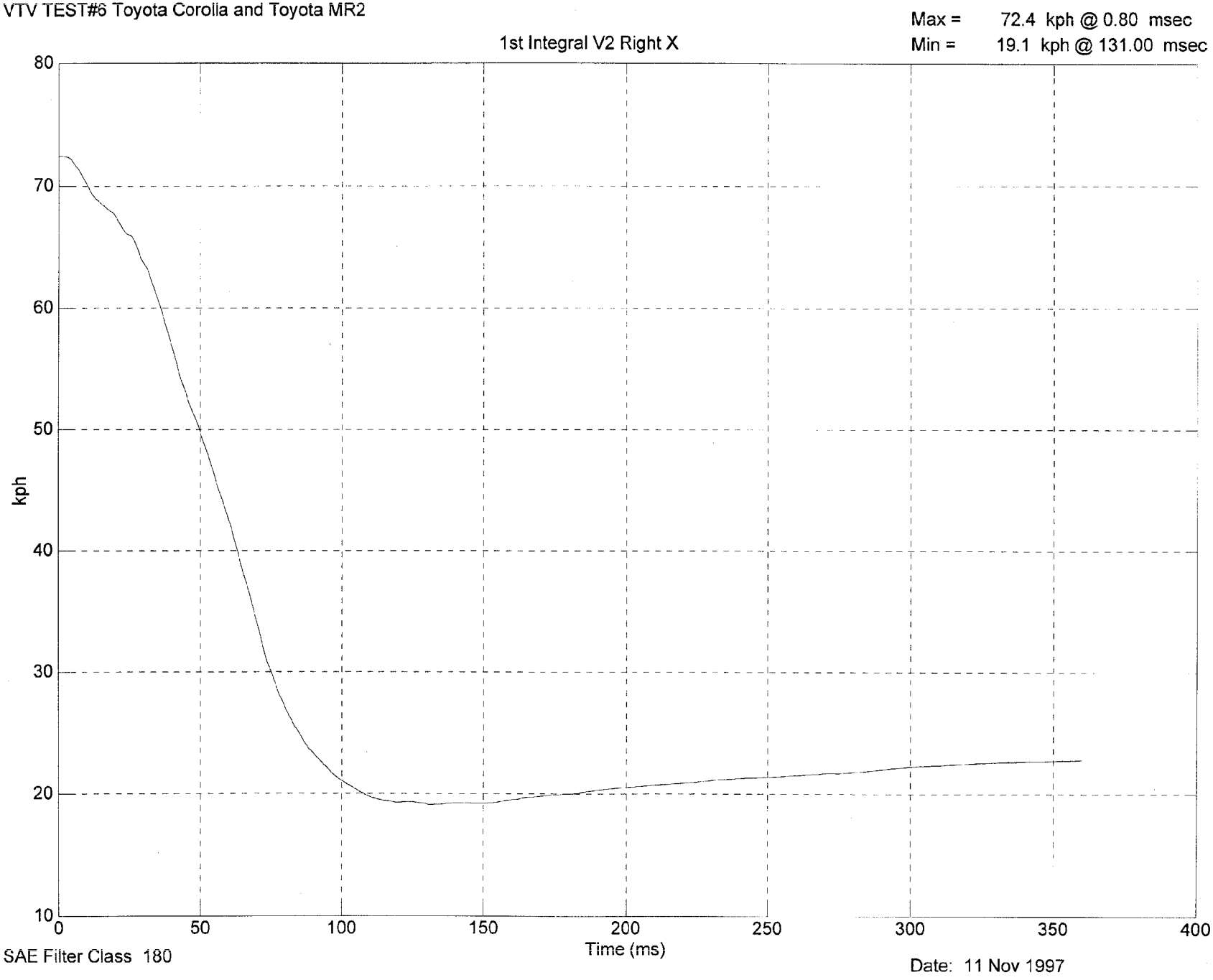
SAE Filter Class 180

Date: 11 Nov 1997

8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
V2 Right X
Max = 1.29 Gs @ -22.60 msec
Min = -26.4 Gs @ 70.40 msec
5
0
-5
-10
-15
-20
-25
-30
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

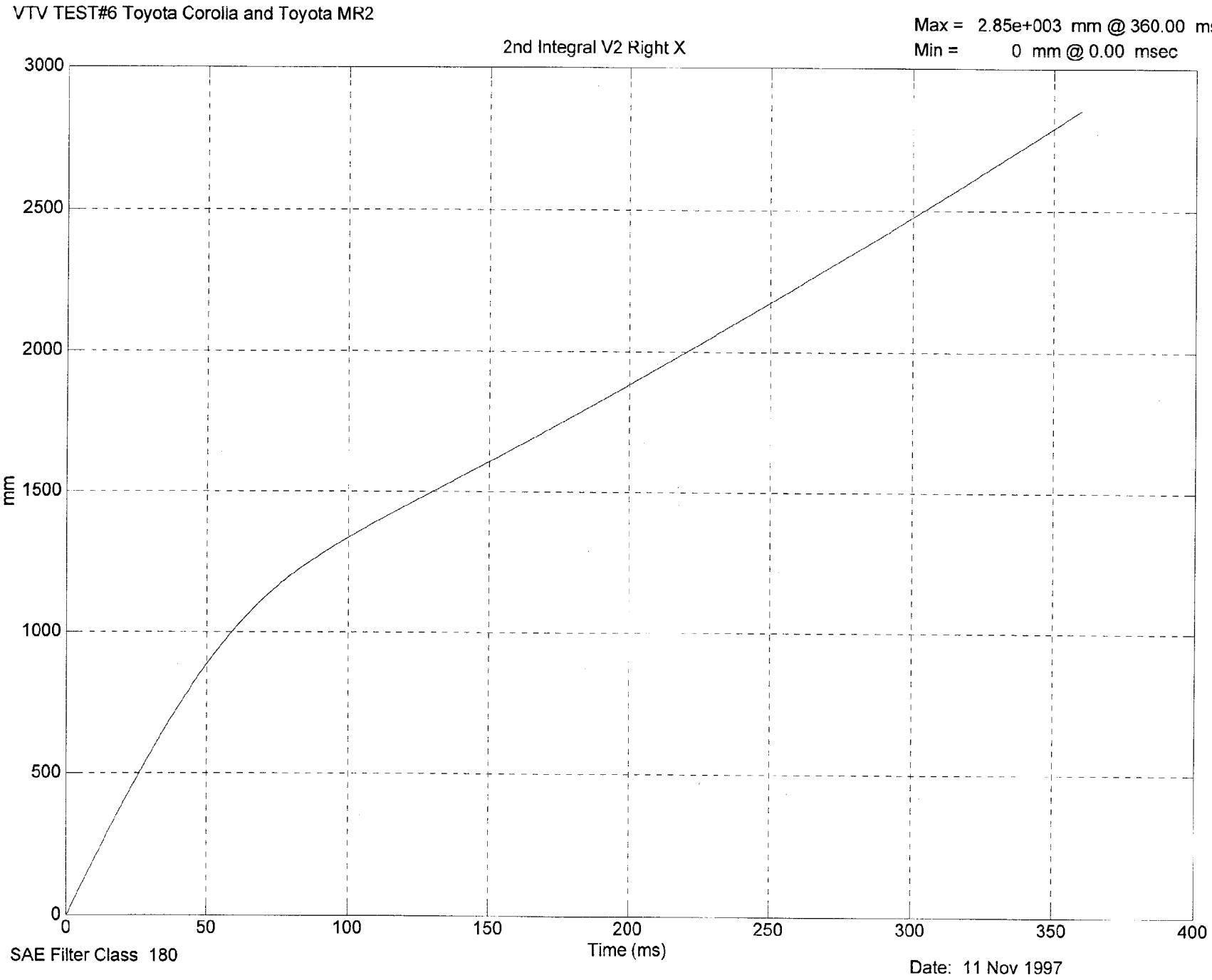


SAE Filter Class 180

Date: 11 Nov 1997

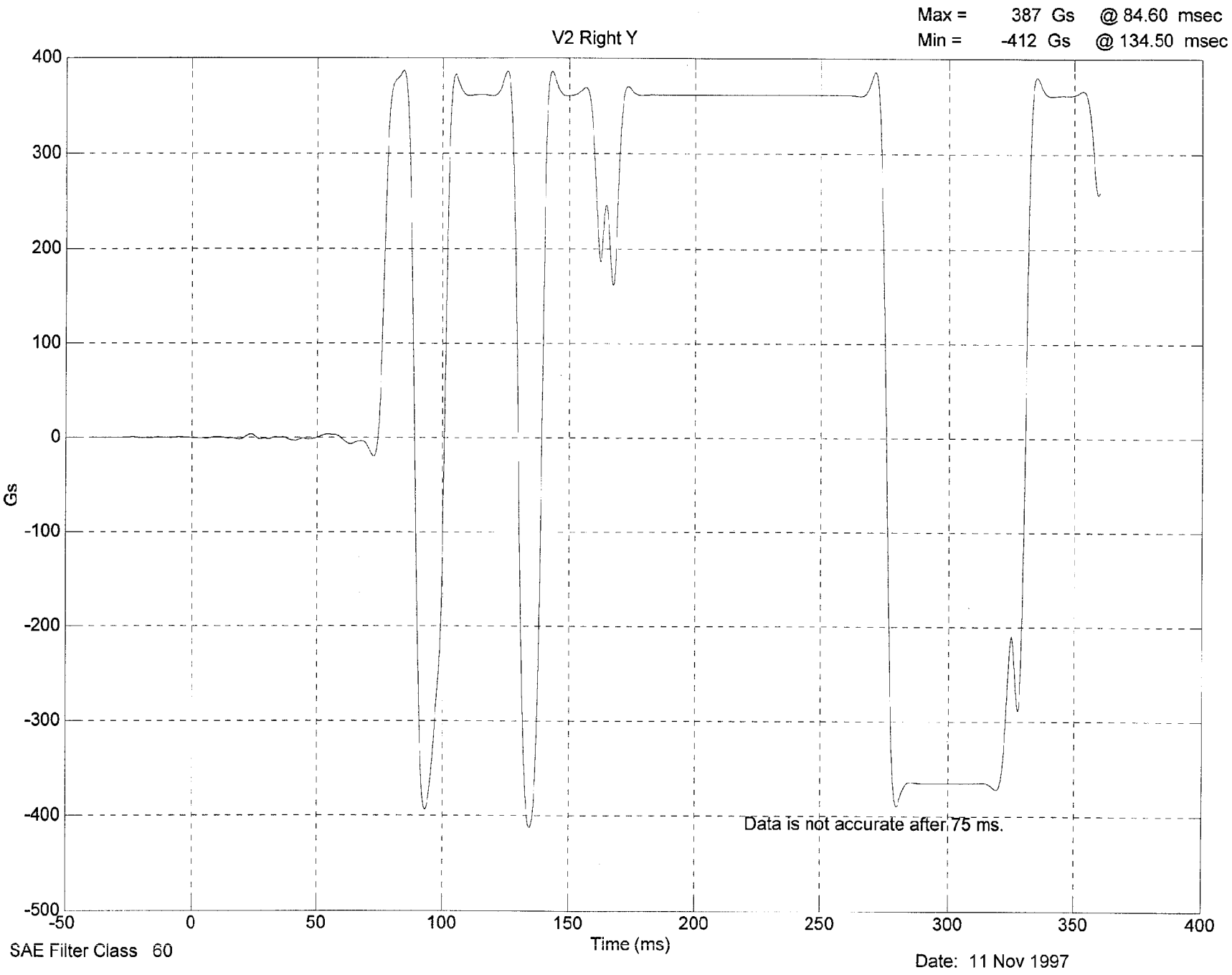
8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2



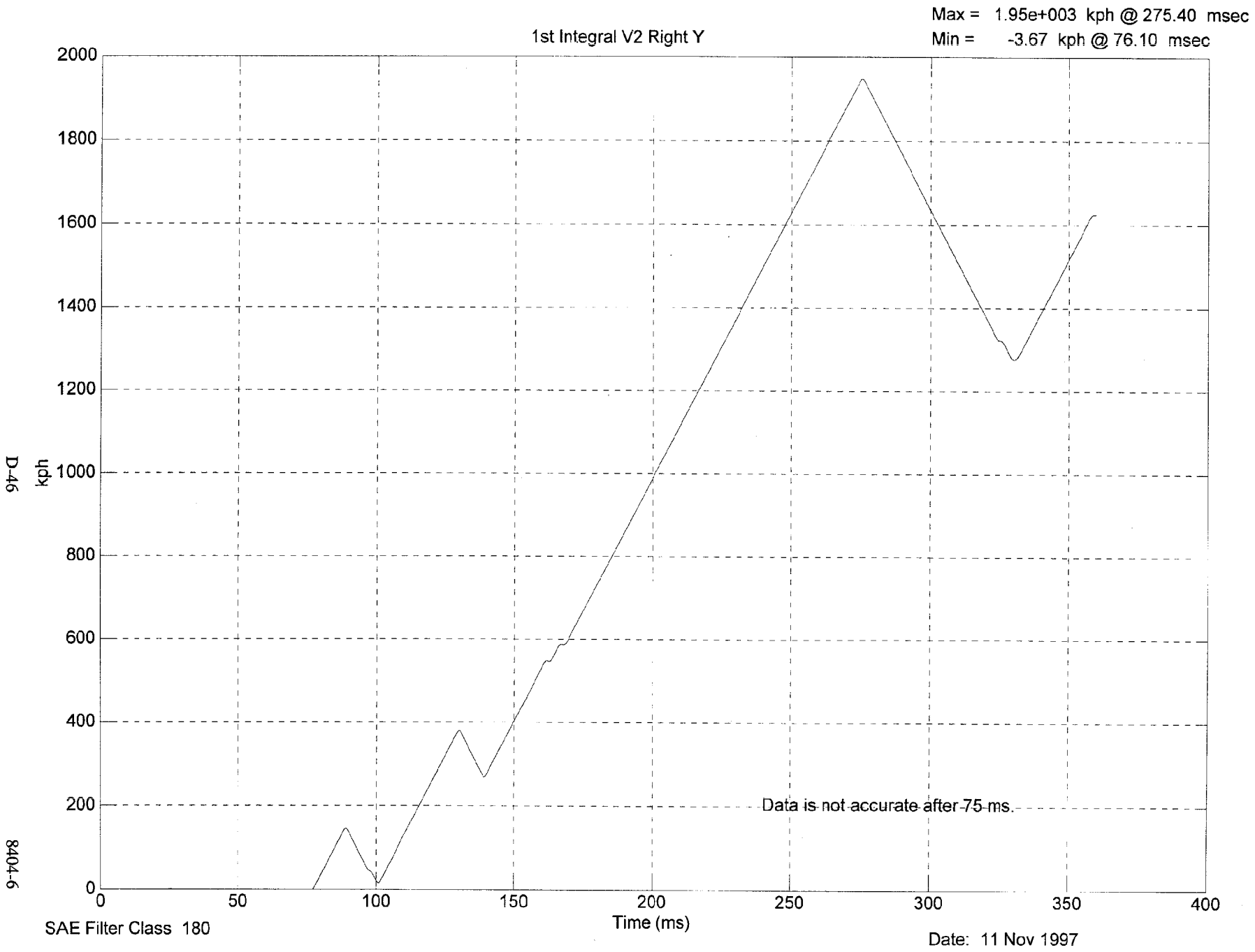
SAE Filter Class 180

Date: 11 Nov 1997

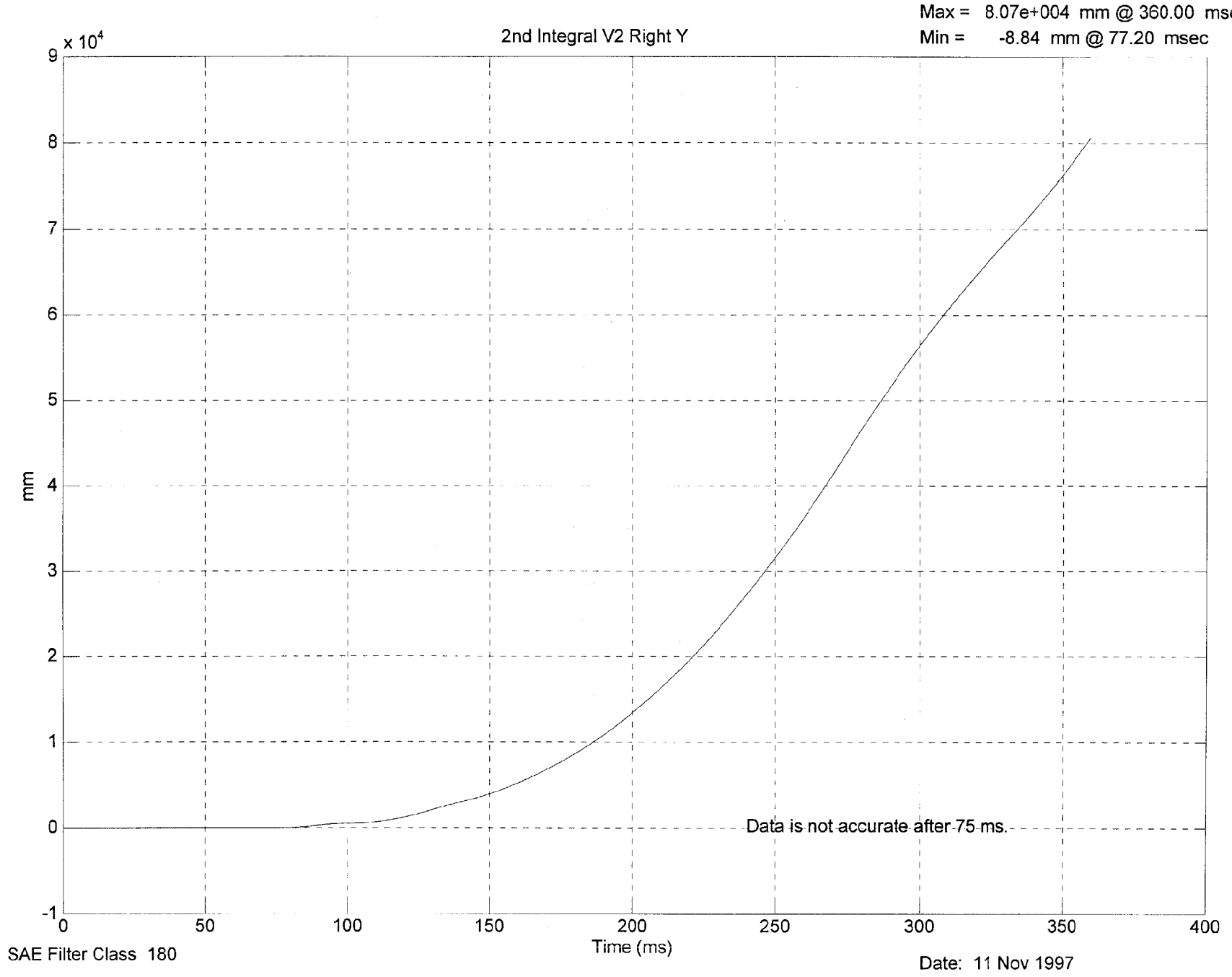

Max = 387 Gs @ 84.60 msec
Min = -412 Gs @ 134.50 msec
V2 Right Y
400
300
200
100
0
-100
-200
-300
-400
-500
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
Data is not accurate after 75 ms.
SAE Filter Class 60
Date: 11 Nov 1997

D-45

8404-6


Max = 1.95e+003 kph @ 275.40 msec
Min = -3.67 kph @ 76.10 msec
1st Integral V2 Right Y
2000
1800
1600
1400
1200
1000
800
600
400
200
0
kph
0
50
100
150
200
250
300
350
400
Time (ms)
Data is not accurate after 75 ms.
SAE Filter Class 180
Date: 11 Nov 1997

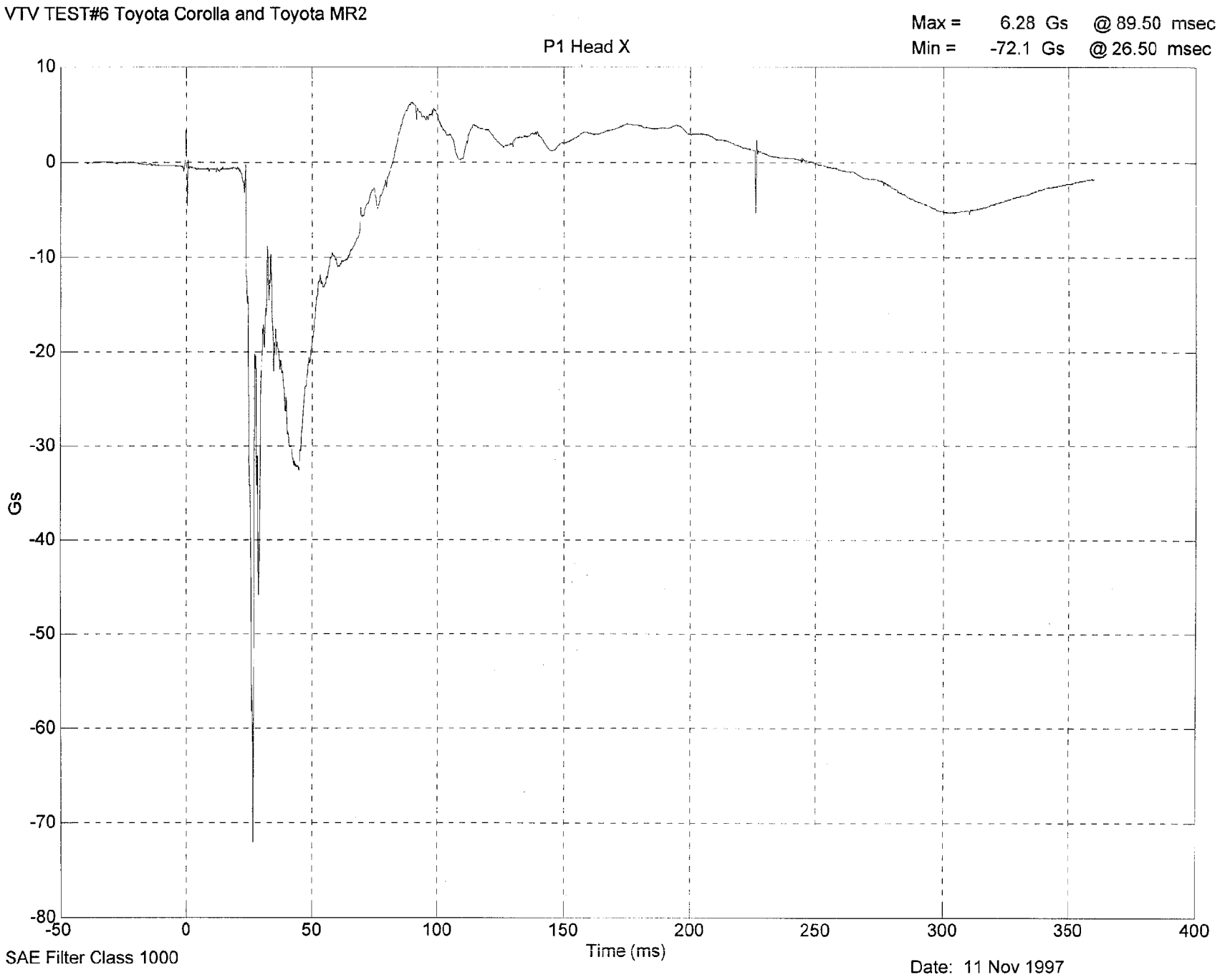
8404-6

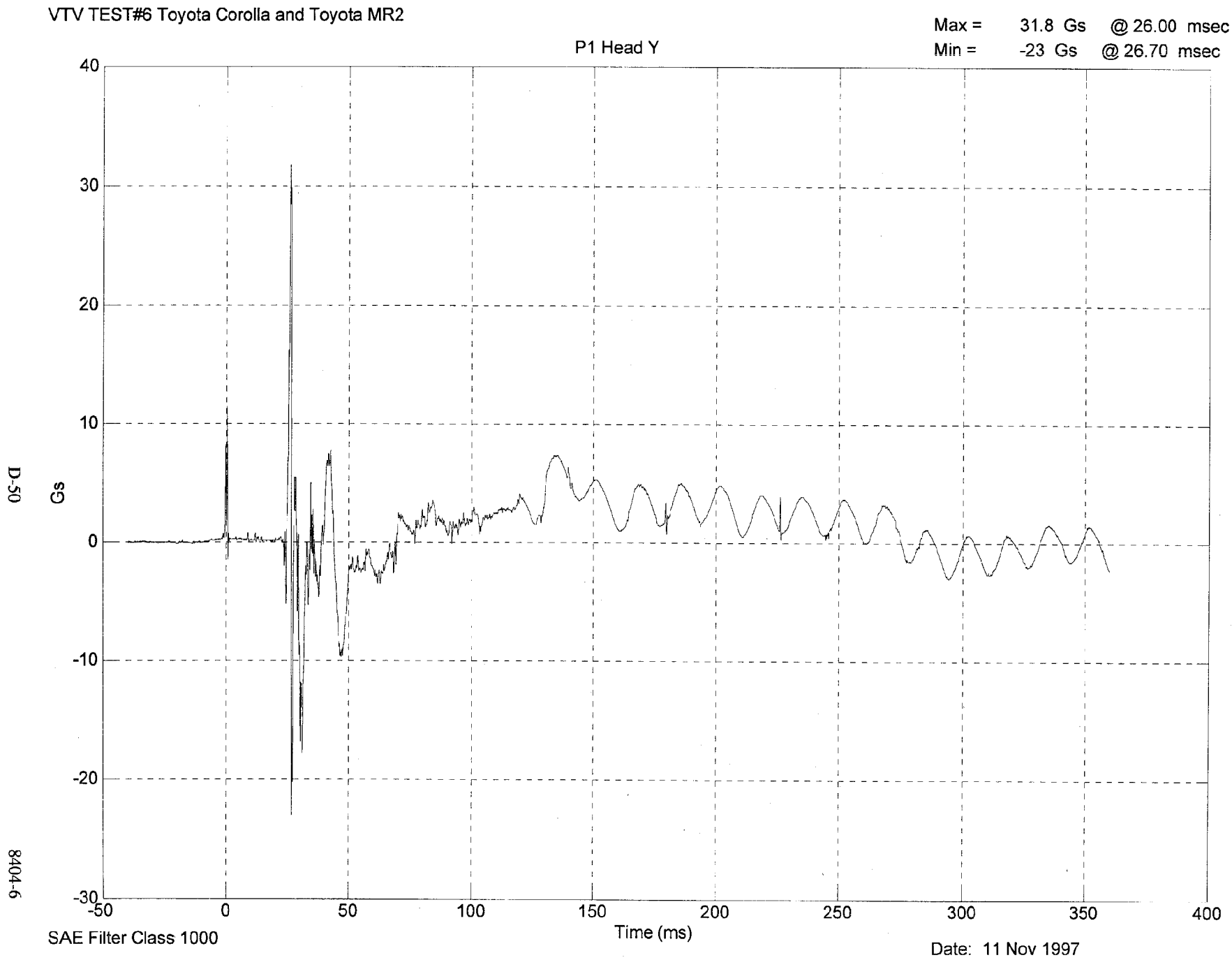

Max = 8.07e+004 mm @ 360.00 msec
Min = -8.84 mm @ 77.20 msec
2nd Integral V2 Right Y
x 10^4
9
8
7
6
5
4
3
2
1
0
-1
mm
0
50
100
150
200
250
300
350
400
Time (ms)
Data is not accurate after 75 ms.
SAE Filter Class 180
Date: 11 Nov 1997

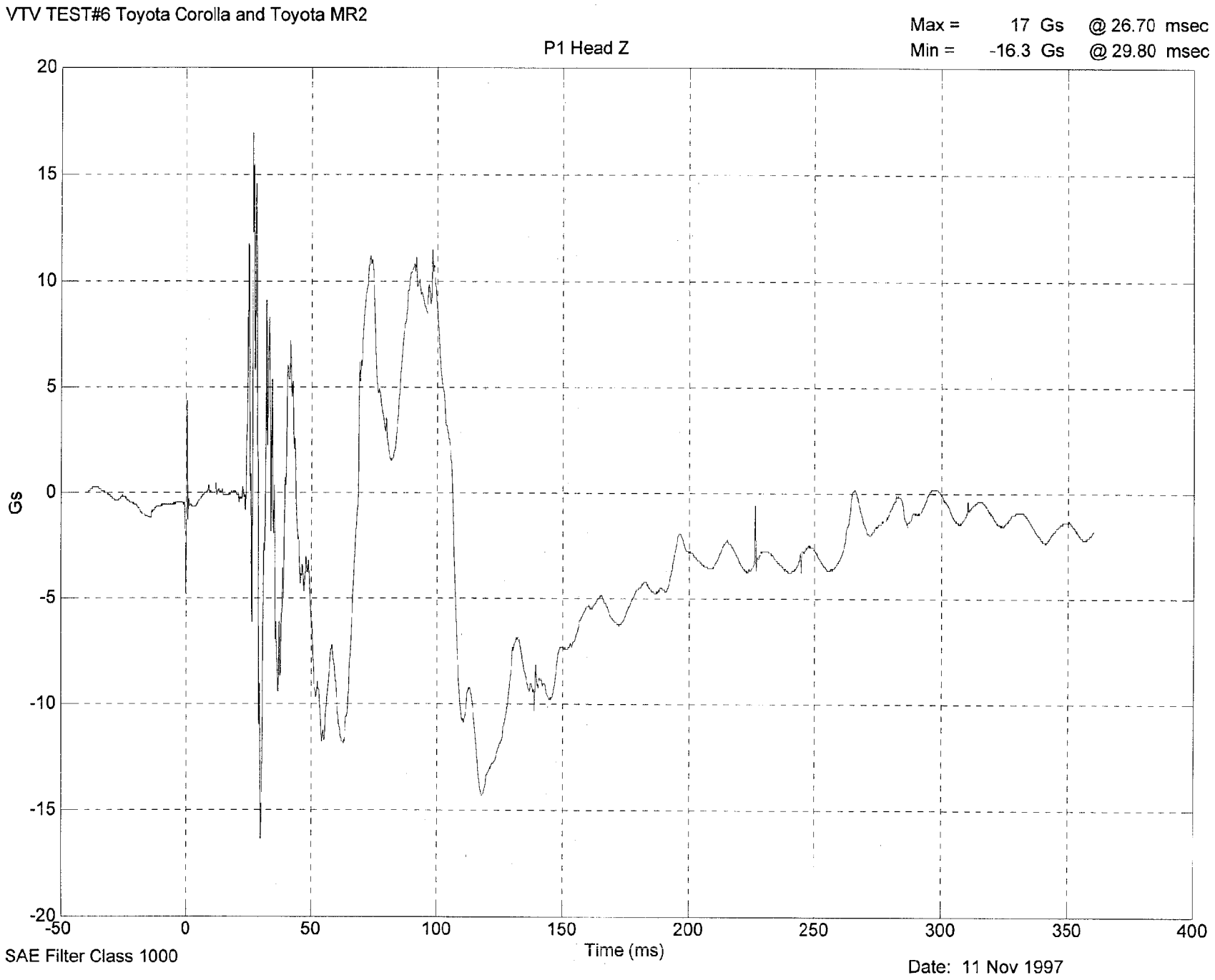
TEST NO. A109-6-1732

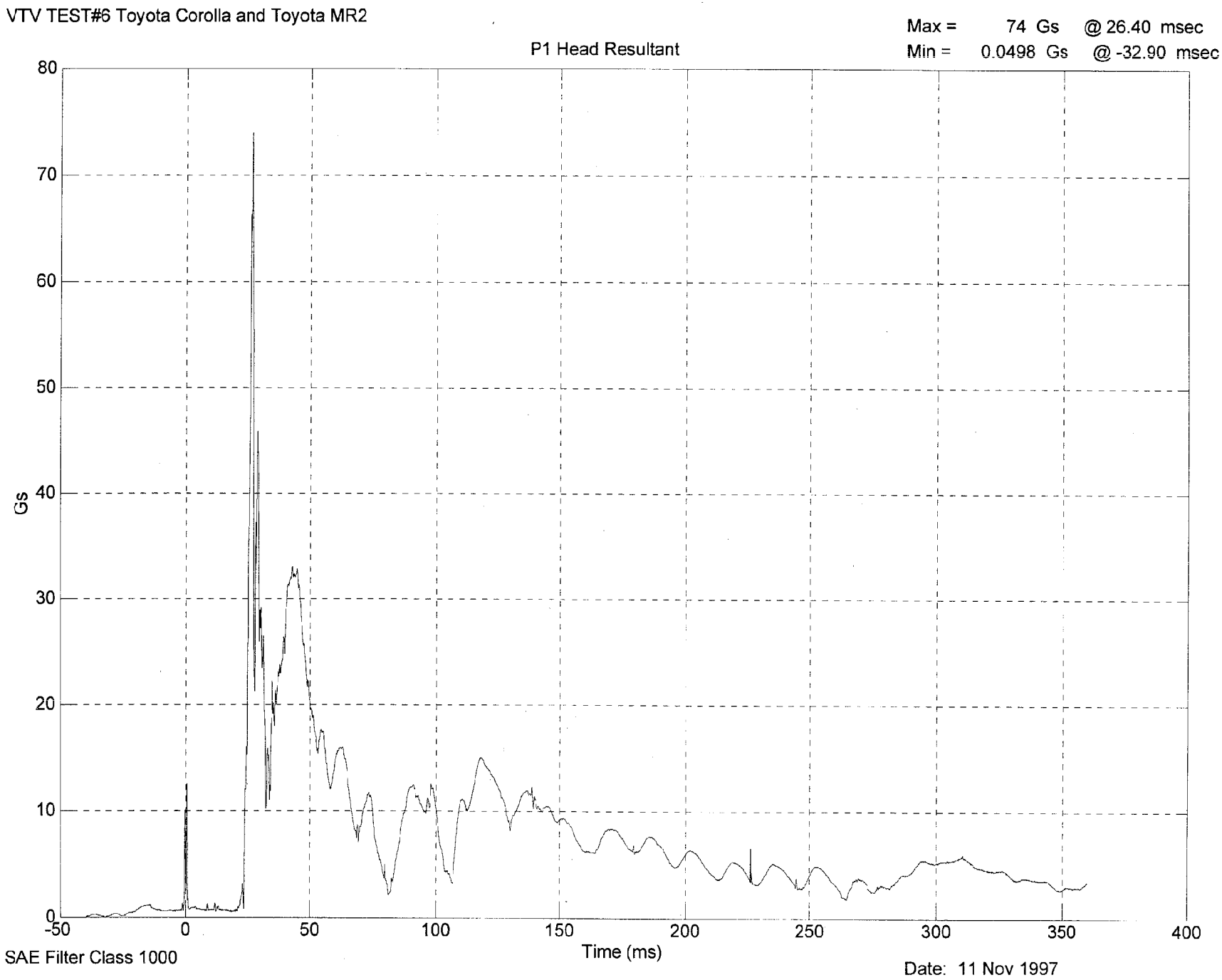
VEHICLE 1 - DUMMY DATA

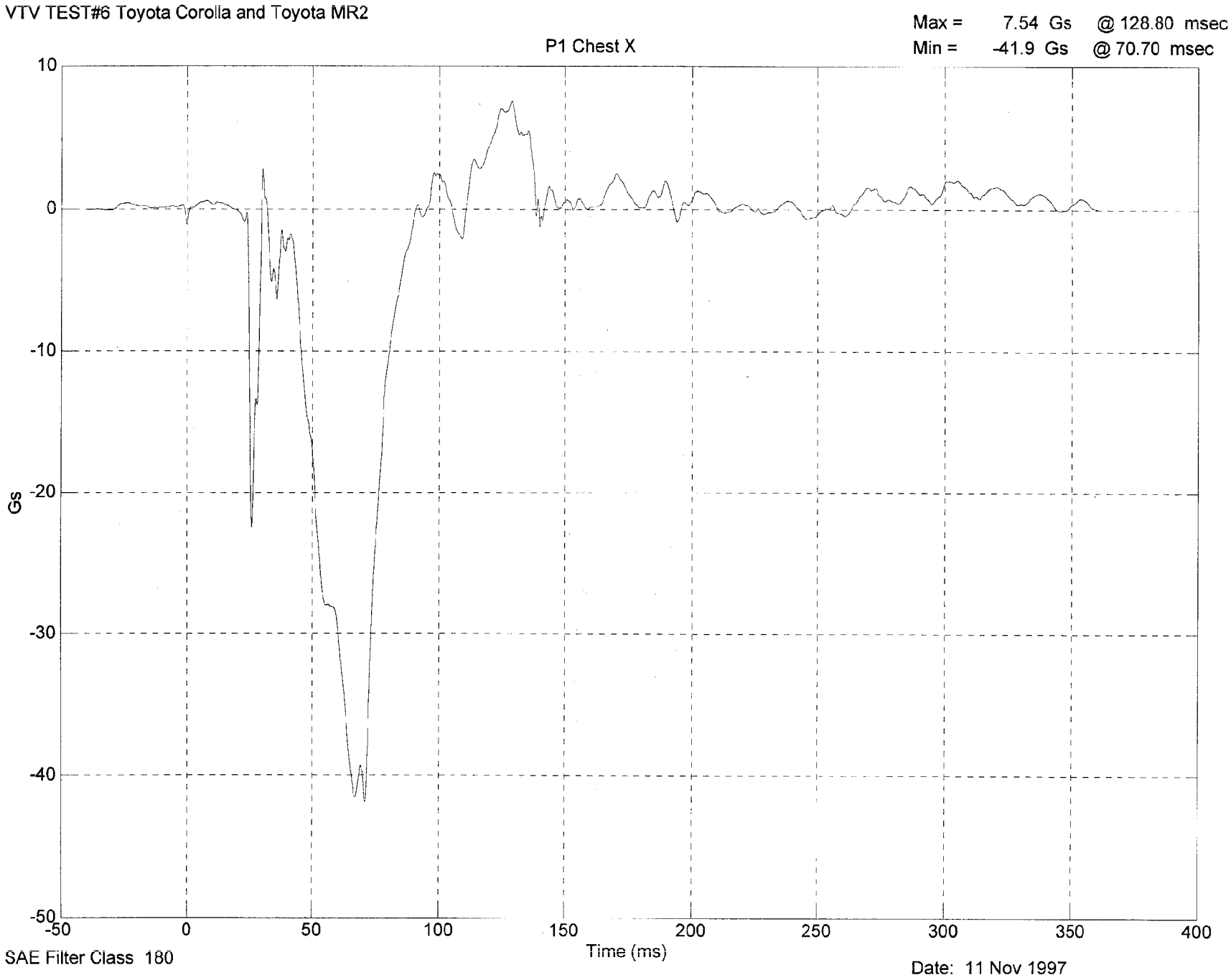
CHANNEL	SAE FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600
Torso Belt	60
Chest Displacement	180
Neck Forces	1000
Neck Moments	600
Tibia Forces, Moments	600


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Head X
Max = 6.28 Gs @ 89.50 msec
Min = -72.1 Gs @ 26.50 msec
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Head Y
Max = 31.8 Gs @ 26.00 msec
Min = -23 Gs @ 26.70 msec
Gs
Time (ms)
40
30
20
10
0
-10
-20
-30
-50
0
50
100
150
200
250
300
350
400
D-50
8404-6
SAE Filter Class 1000
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Head Z
Max = 17 Gs @ 26.70 msec
Min = -16.3 Gs @ 29.80 msec
Gs
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997

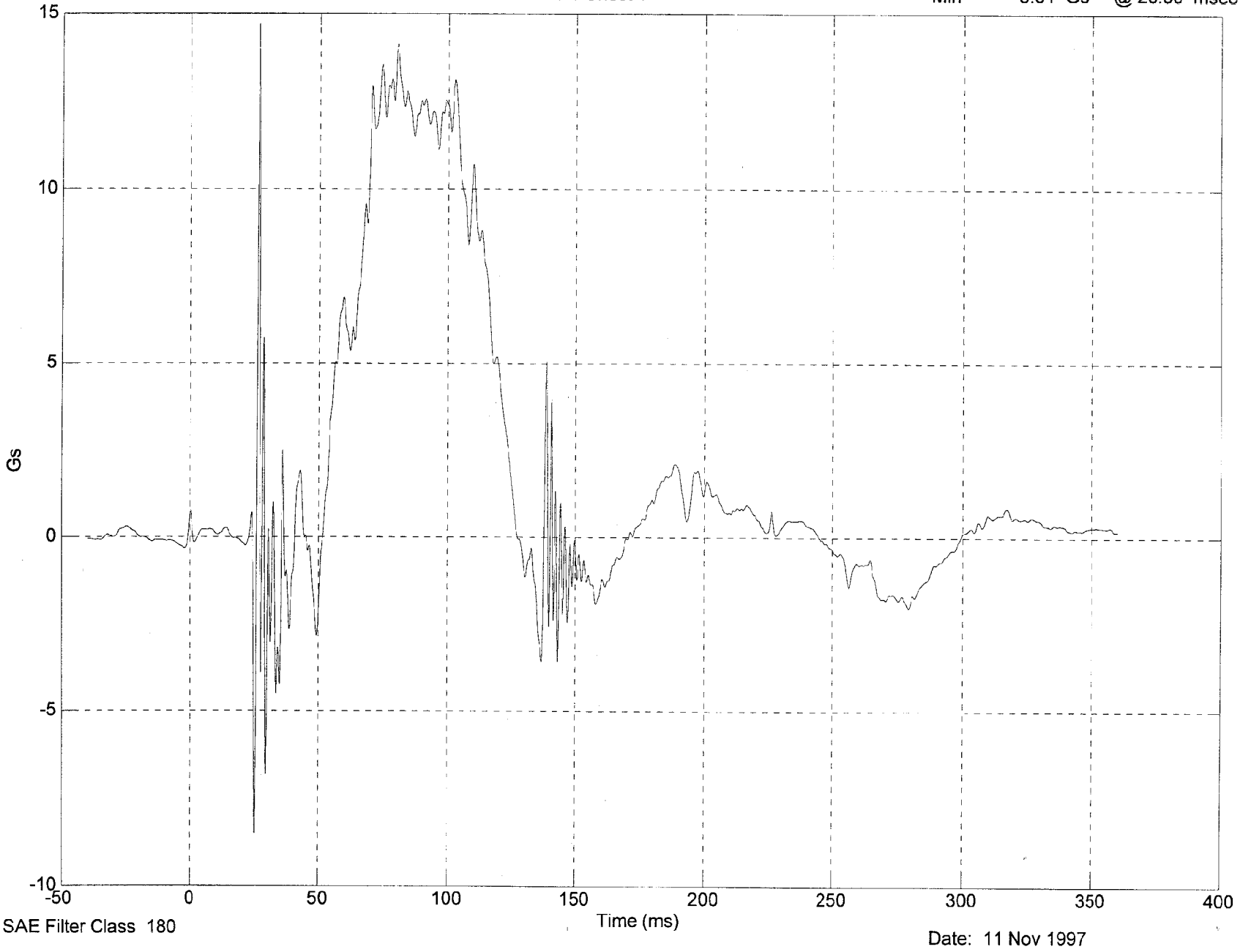

VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Head Resultant
Max = 74 Gs @ 26.40 msec
Min = 0.0498 Gs @ -32.90 msec
Gs
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Chest X
Max = 7.54 Gs @ 128.80 msec
Min = -41.9 Gs @ 70.70 msec
10
0
-10
-20
-30
-40
-50
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

P1 Chest Y

Max = 14.7 Gs @ 26.60 msec
Min = -8.51 Gs @ 25.30 msec

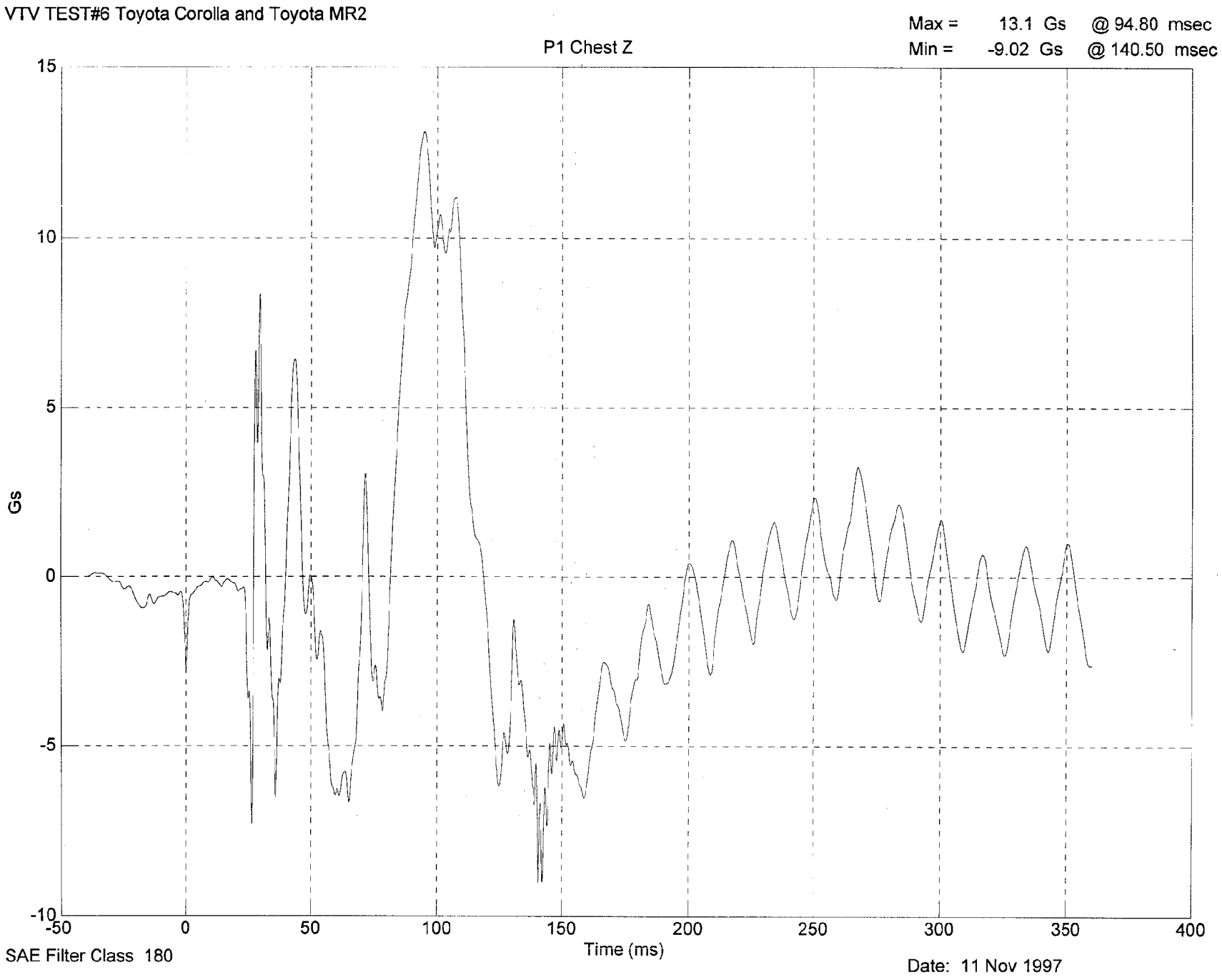


SAE Filter Class 180

Date: 11 Nov 1997

D-54

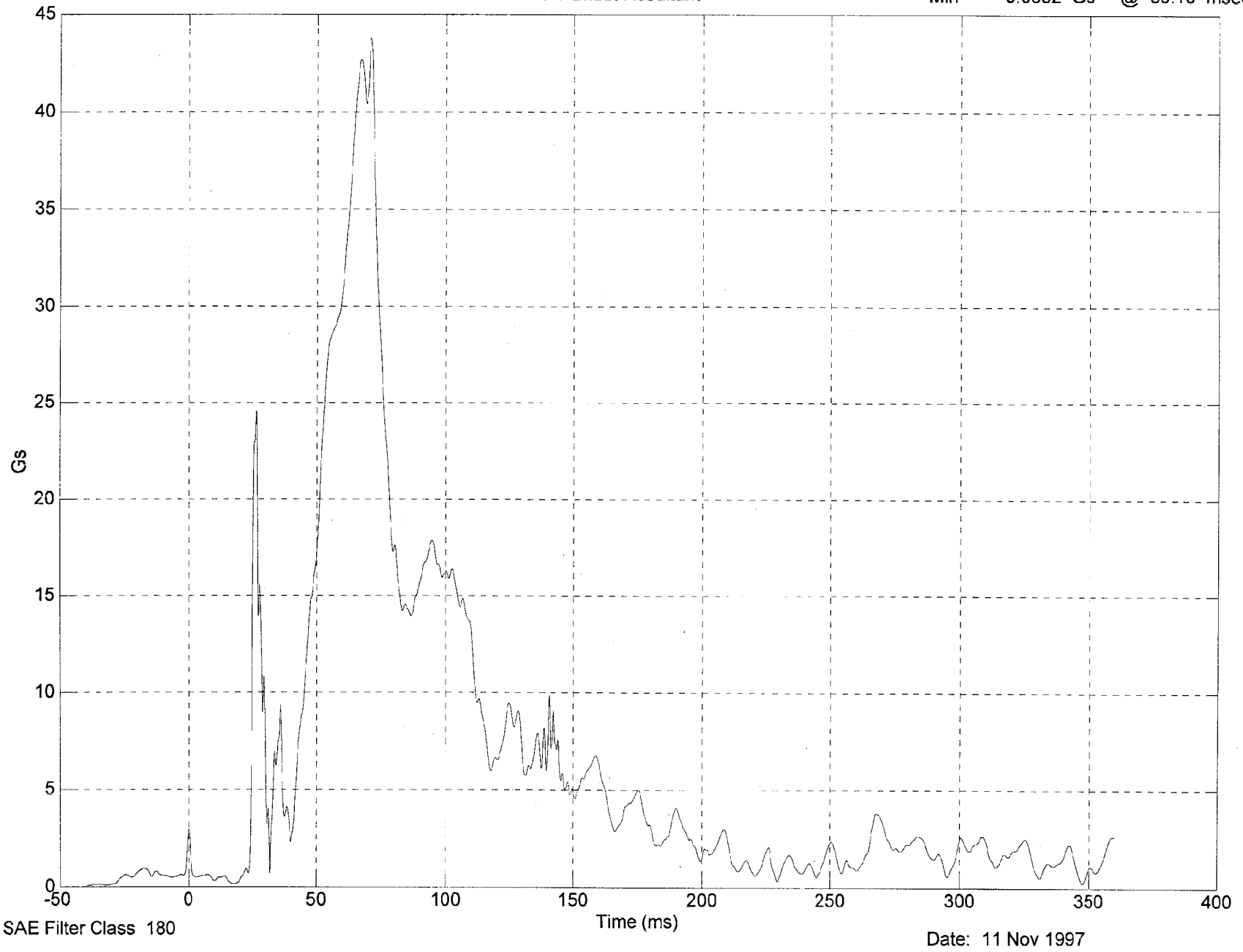
8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Chest Z
Max = 13.1 Gs @ 94.80 msec
Min = -9.02 Gs @ 140.50 msec
Gs
Time (ms)
15
10
5
0
-5
-10
-50
0
50
100
150
200
250
300
350
400
SAE Filter Class 180
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

P1 Chest Resultant

Max = 43.8 Gs @ 70.70 msec
Min = 0.0632 Gs @ -39.10 msec



SAE Filter Class 180

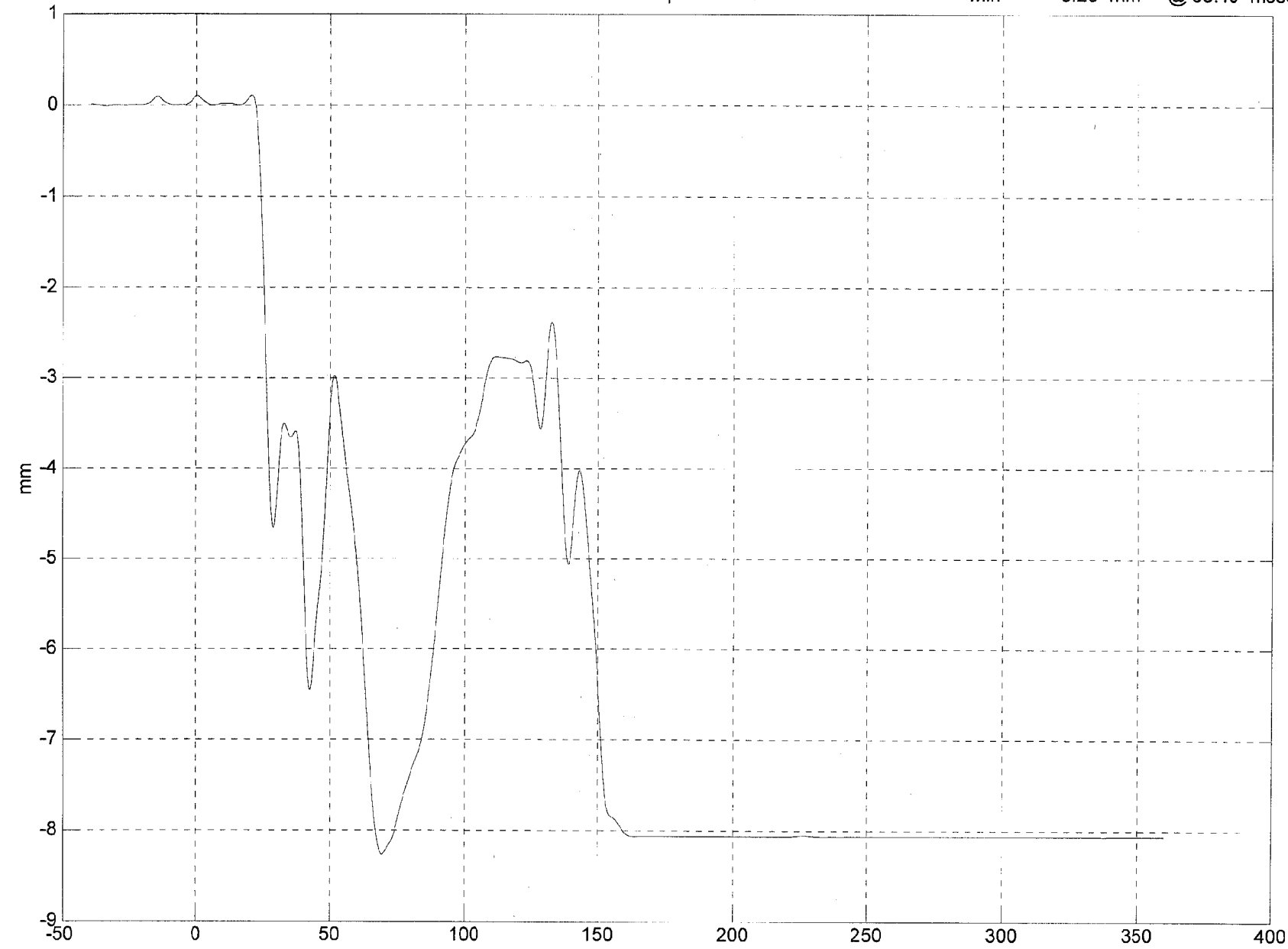
Date: 11 Nov 1997

8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

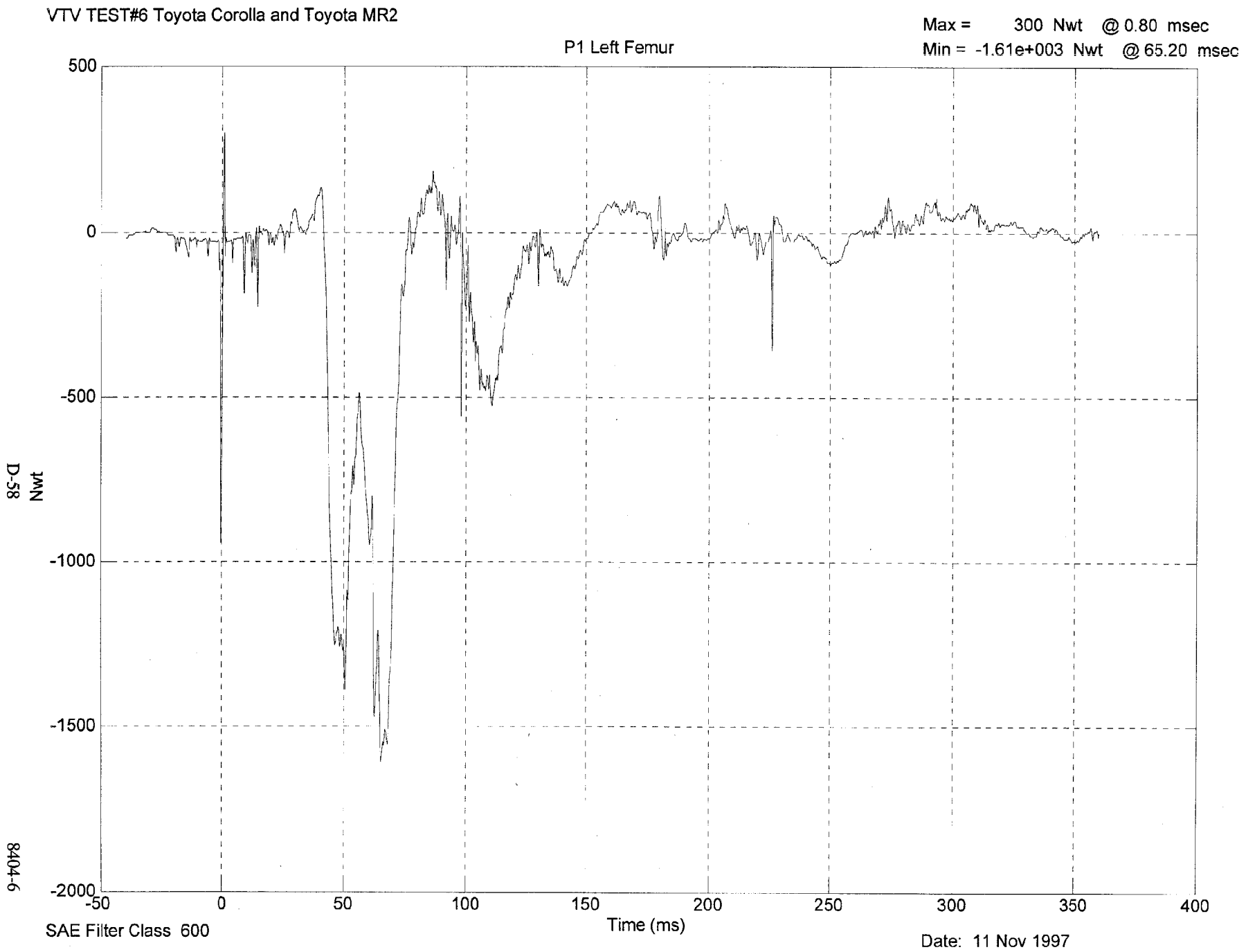
P1 Chest Displacement

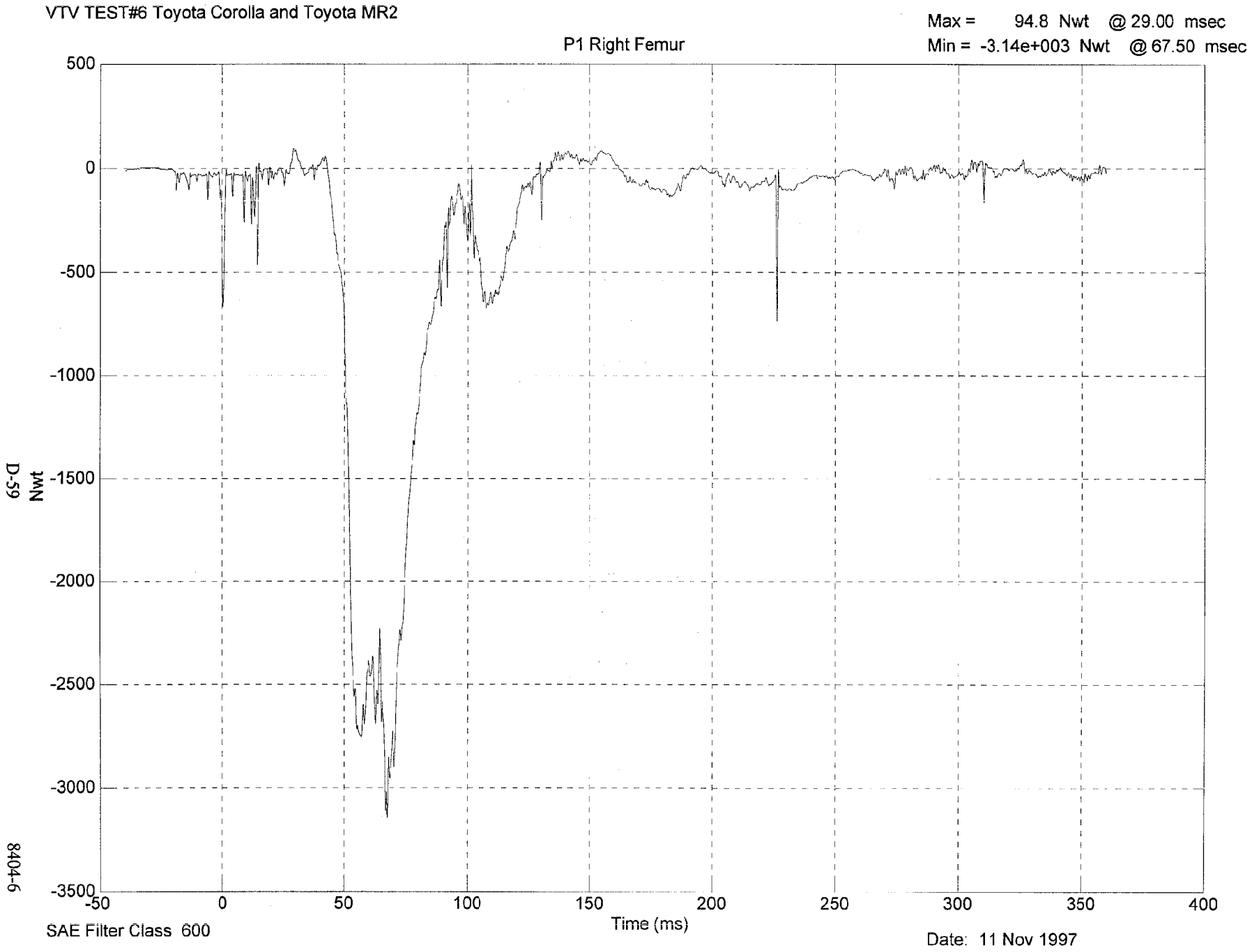
Max = 0.11 mm @ 20.80 msec
Min = -8.26 mm @ 69.10 msec

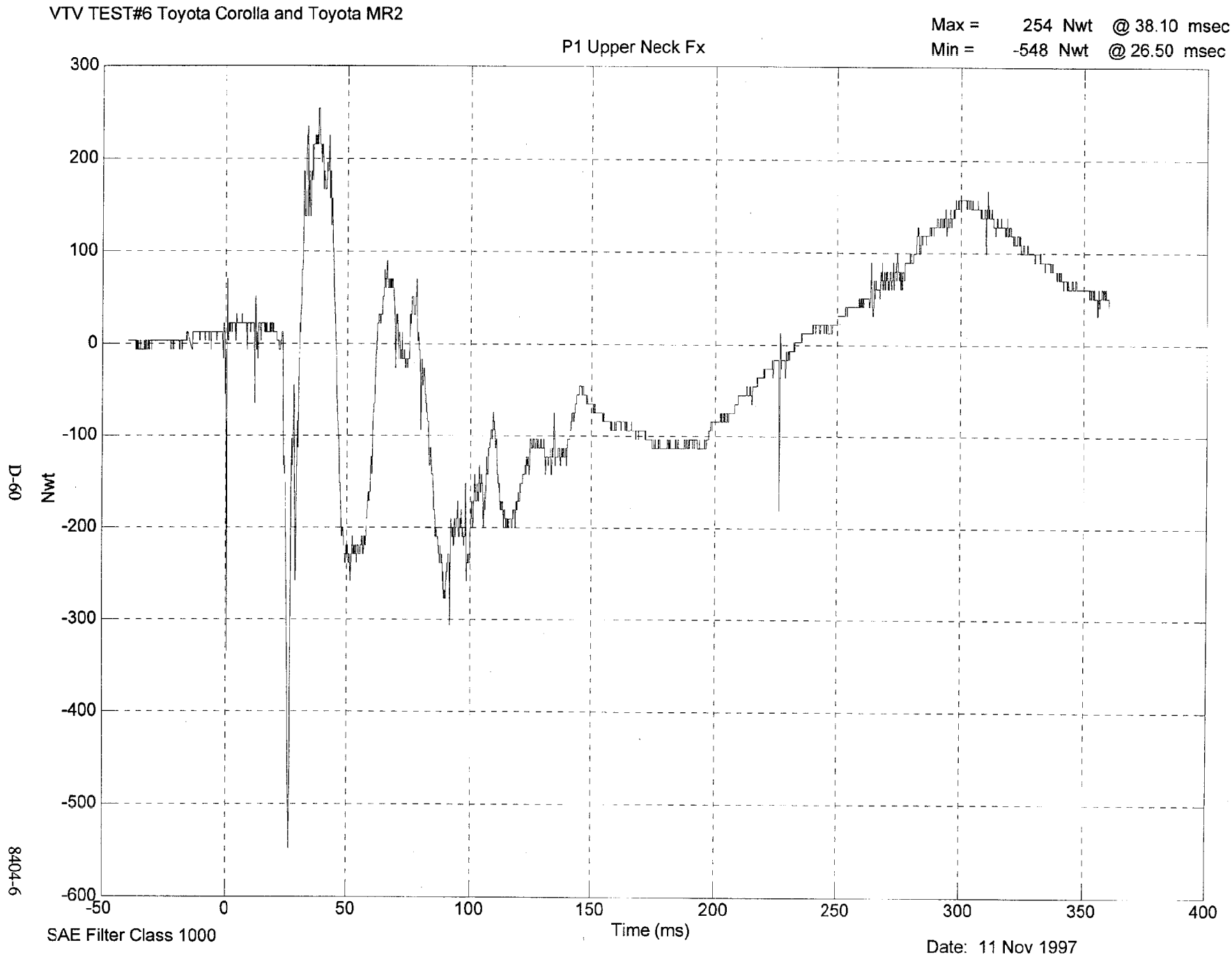


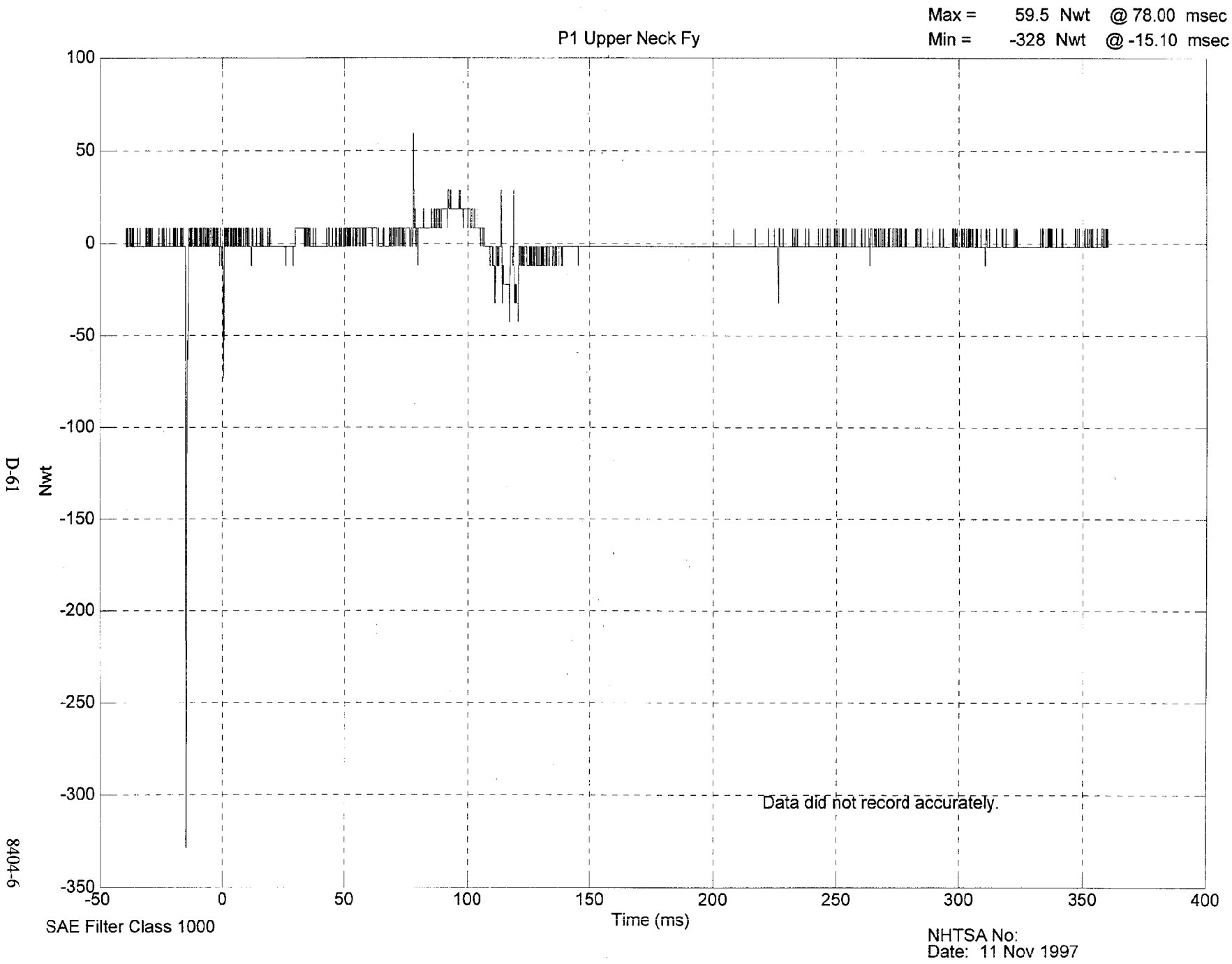
SAE Filter Class 60

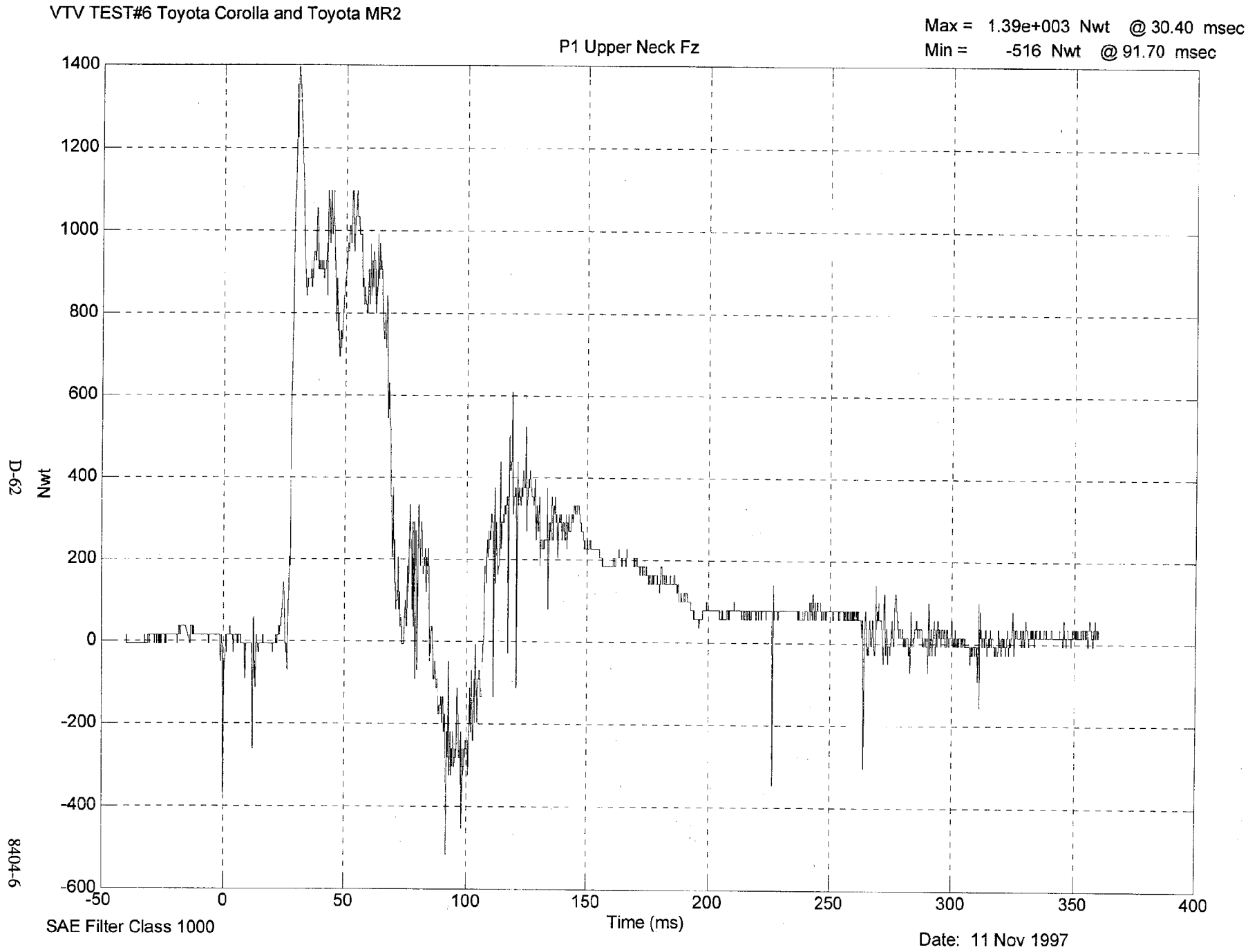
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Left Femur
Max = 300 Nwt @ 0.80 msec
Min = -1.61e+003 Nwt @ 65.20 msec
500
0
-500
-1000
-1500
-2000
D-58
Nwt
8404-6
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 600
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Right Femur
Max = 94.8 Nwt @ 29.00 msec
Min = -3.14e+003 Nwt @ 67.50 msec
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
D-59
8404-6
SAE Filter Class 600
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Upper Neck Fx
Max = 254 Nwt @ 38.10 msec
Min = -548 Nwt @ 26.50 msec
300
200
100
0
-100
-200
-300
-400
-500
-600
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997
D-60
8404-6

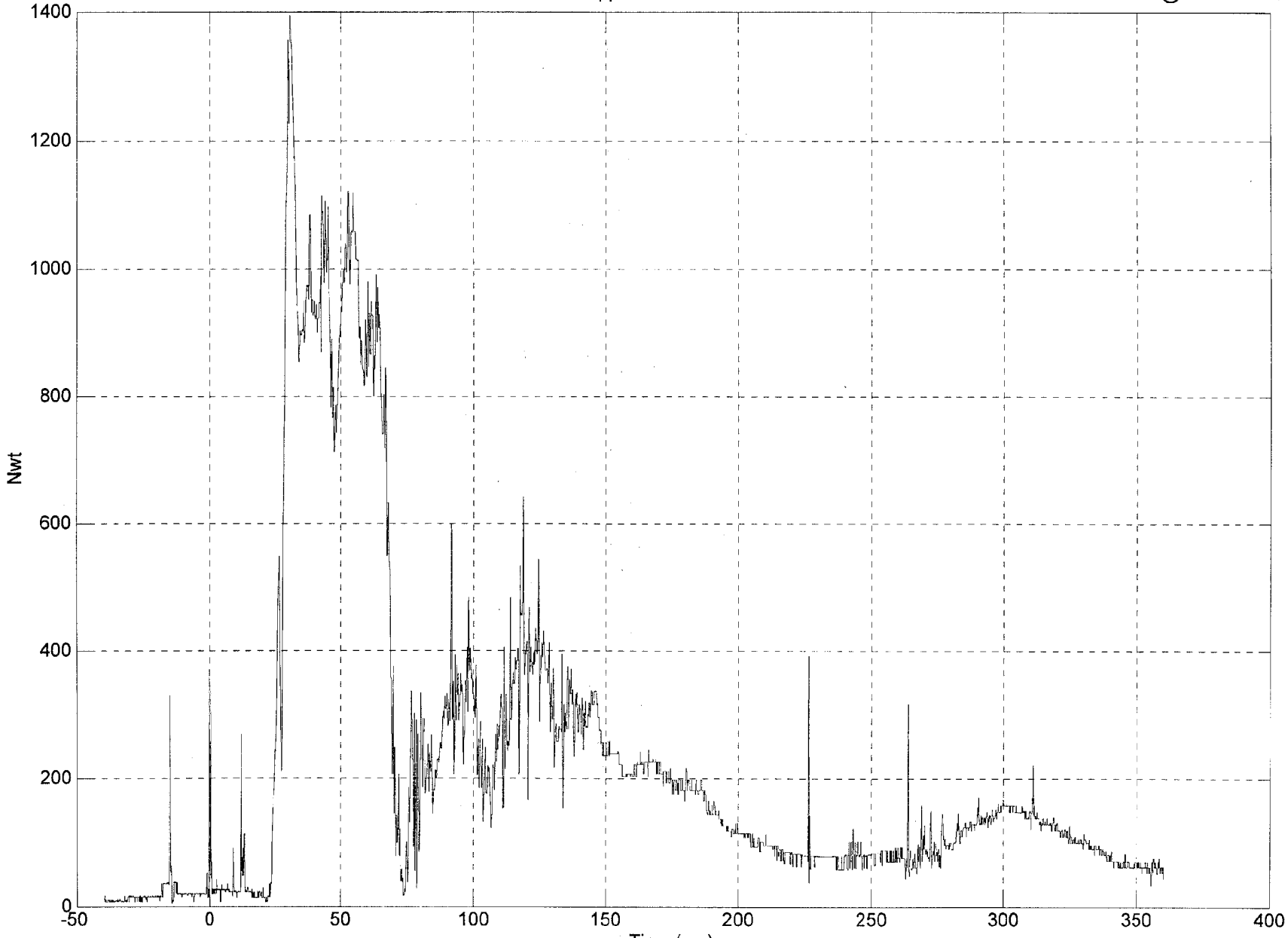

Max = 59.5 Nwt @ 78.00 msec
Min = -328 Nwt @ -15.10 msec
P1 Upper Neck Fy
100
50
0
-50
-100
-150
-200
-250
-300
-350
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
Data did not record accurately.
SAE Filter Class 1000
NHTSA No:
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Upper Neck Fz
Max = 1.39e+003 Nwt @ 30.40 msec
Min = -516 Nwt @ 91.70 msec
1400
1200
1000
800
600
400
200
0
-200
-400
-600
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997
D-62
8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

P1 Upper Neck Force Res

Max = 1.39e+003 Nwt @ 30.40 msec
Min = 5.14 Nwt @ -14.20 msec



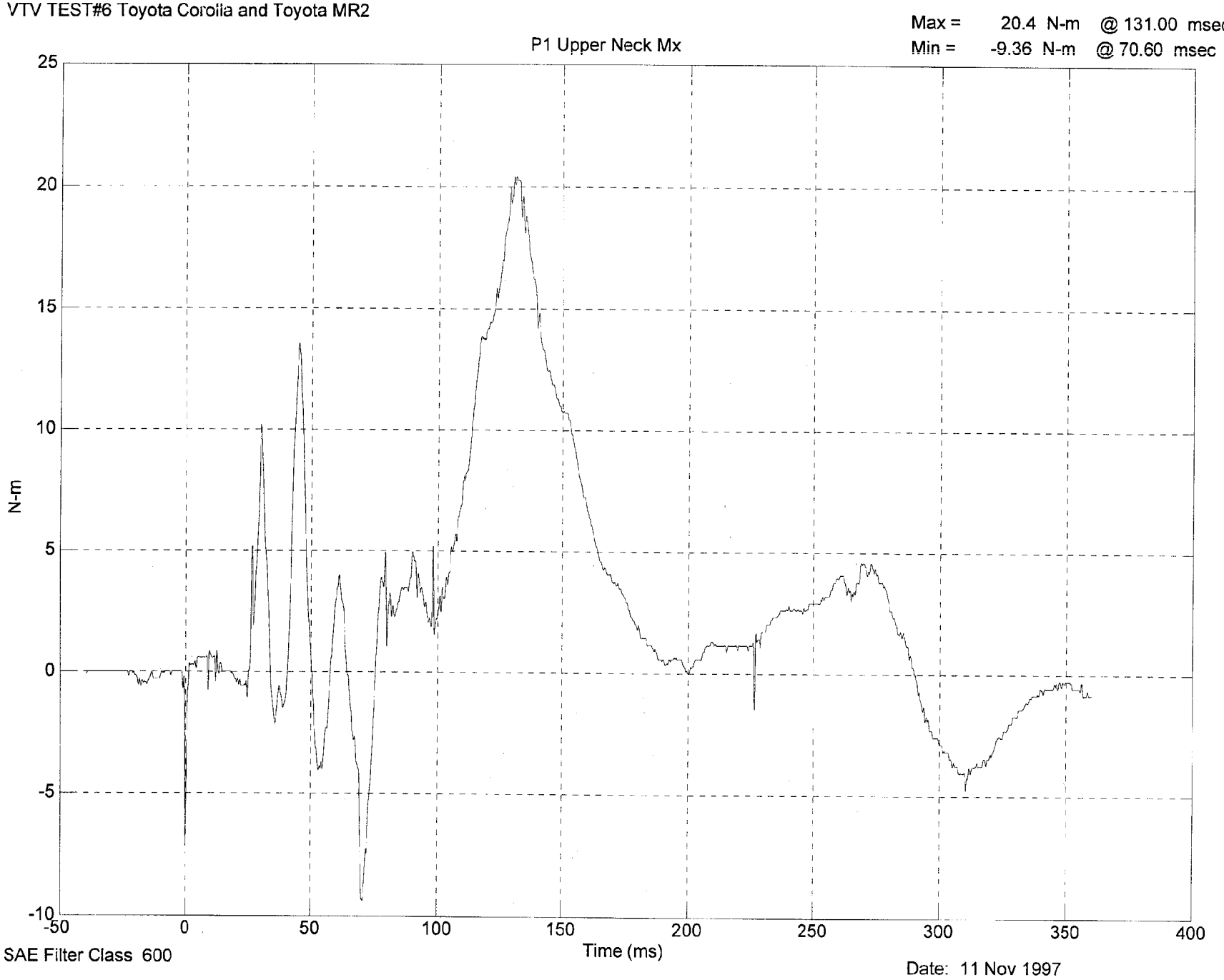
D-63

8404-6

SAE Filter Class 1000

Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2



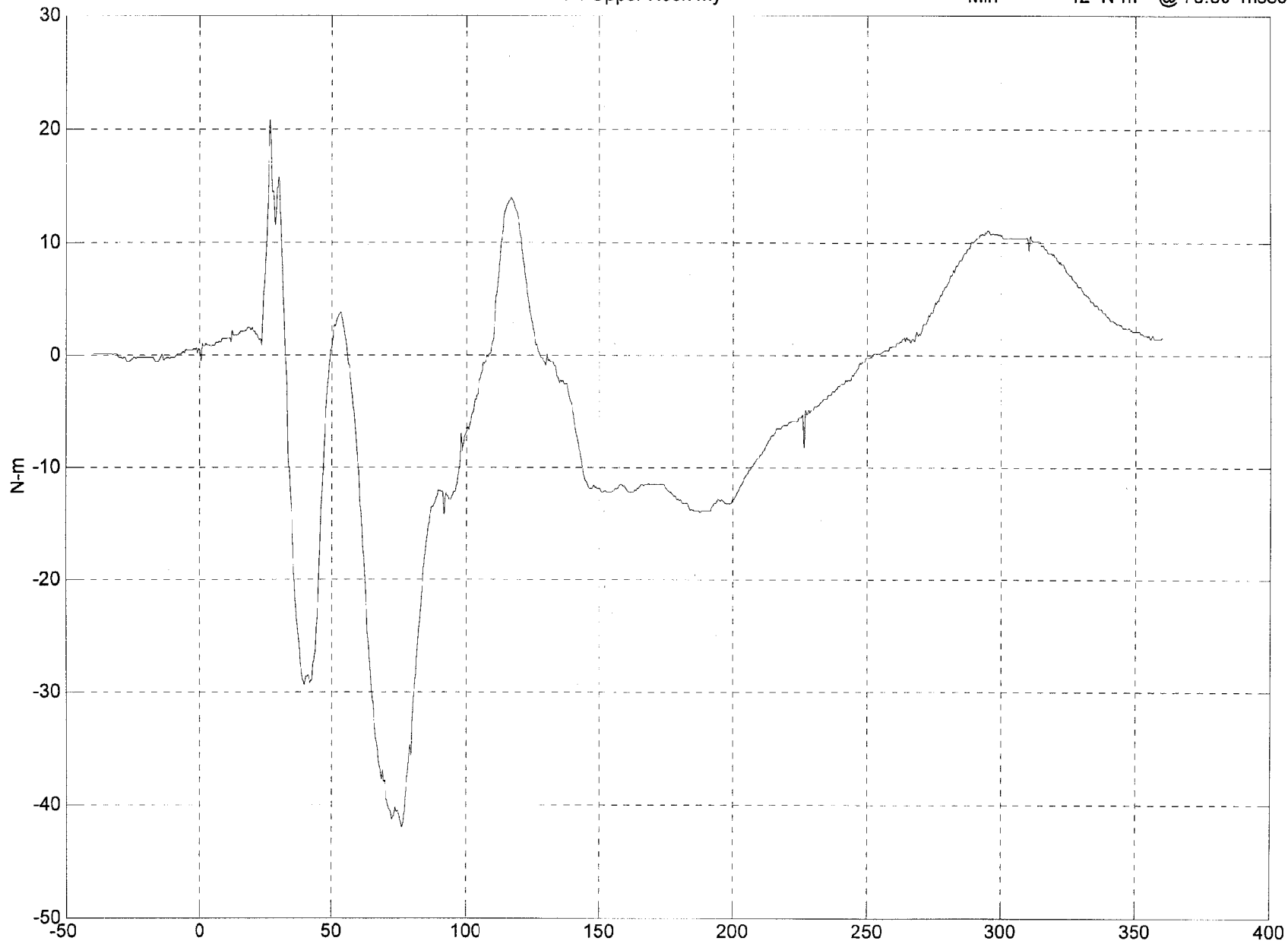
SAE Filter Class 600

Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

P1 Upper Neck My

Max = 20.8 N-m @ 26.50 msec
Min = -42 N-m @ 76.30 msec

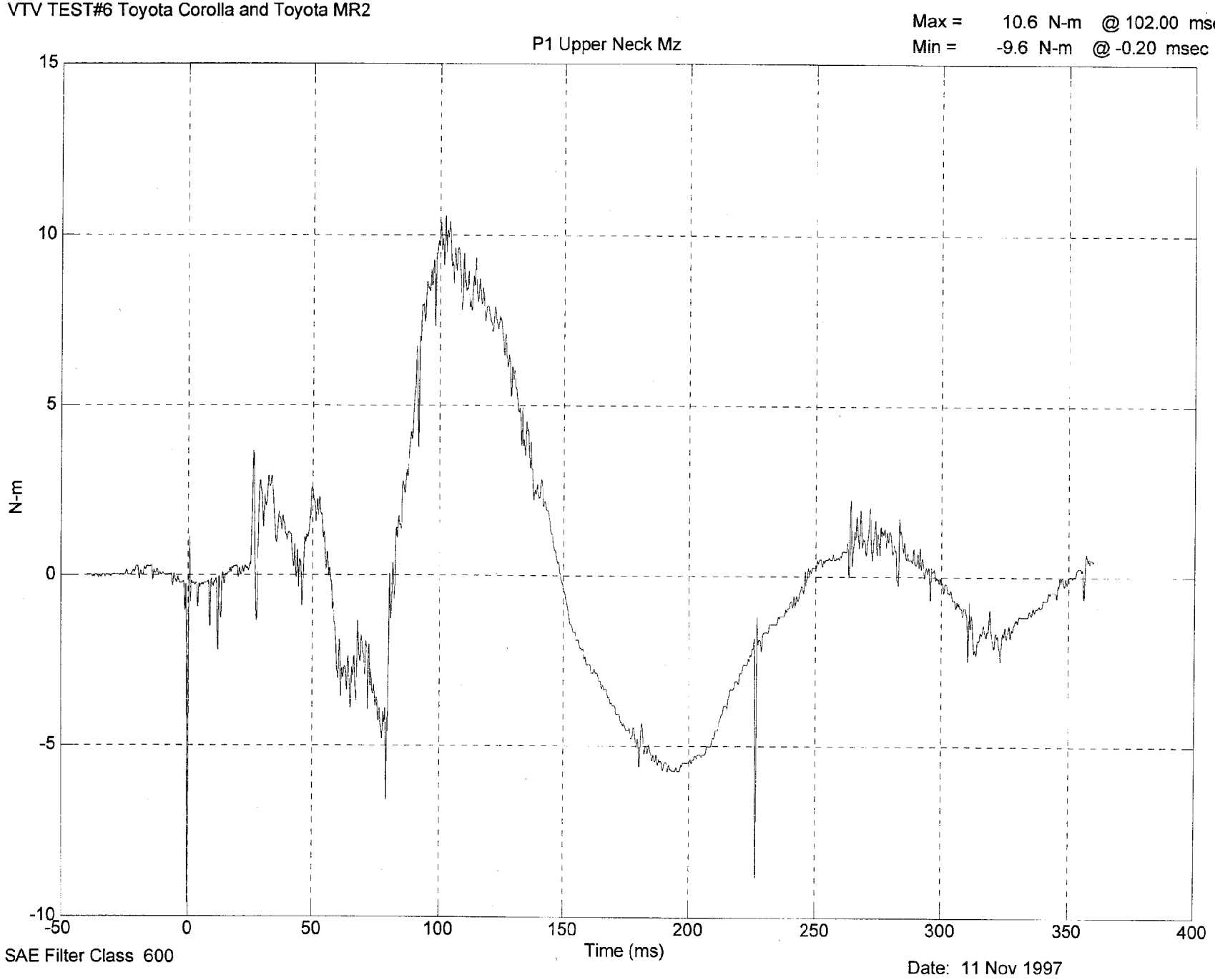


SAE Filter Class 600

Date: 11 Nov 1997

8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

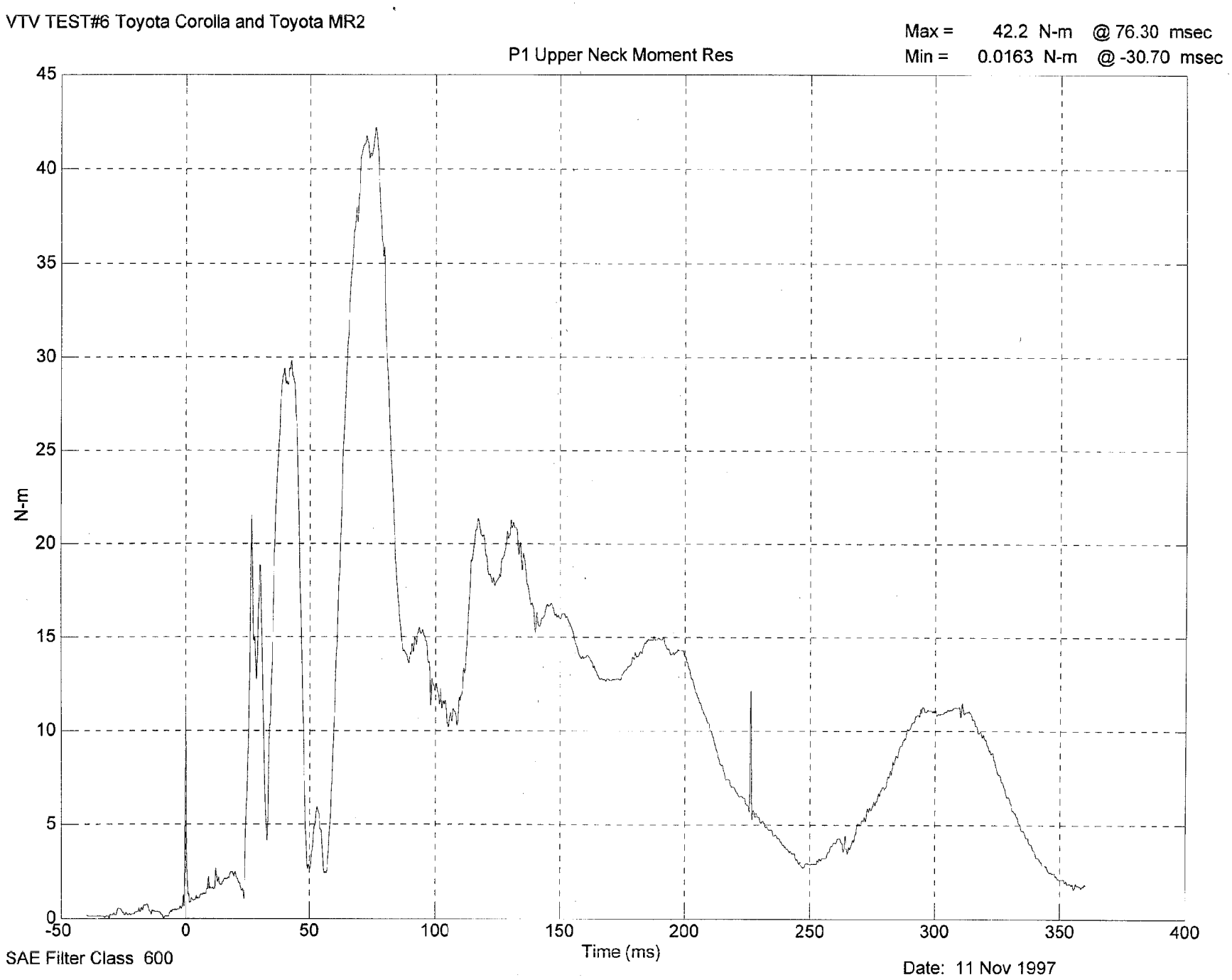


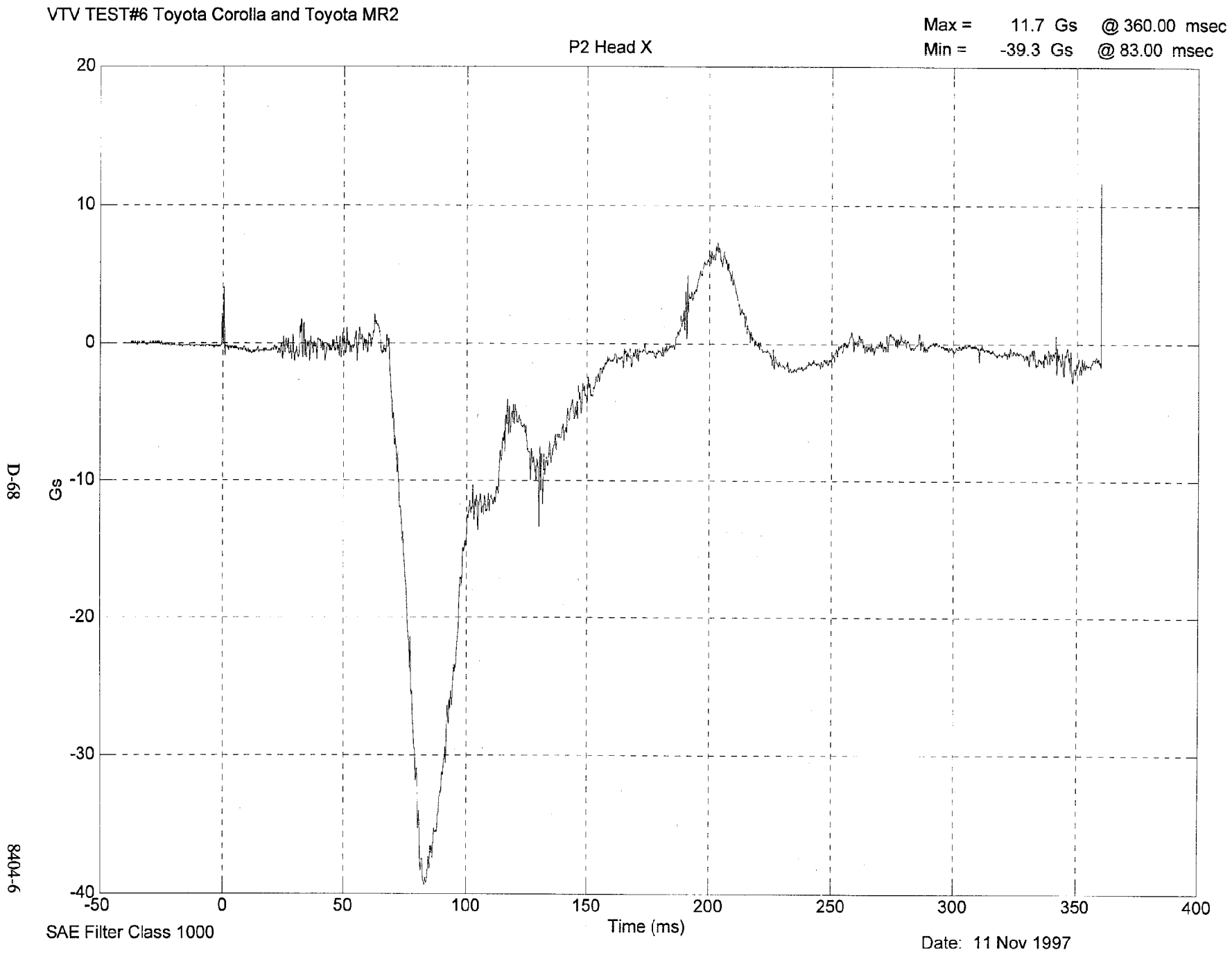
SAE Filter Class 600

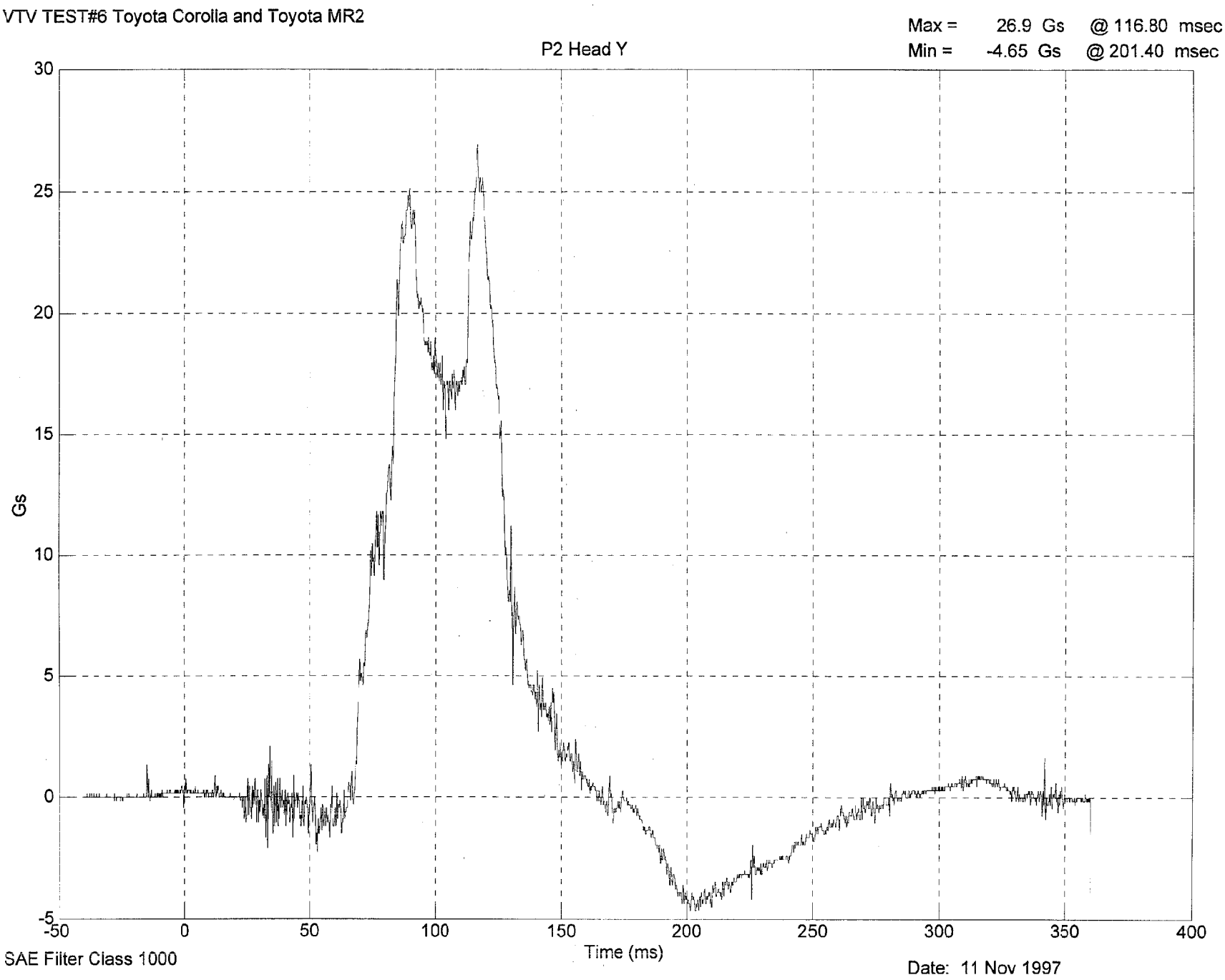
Date: 11 Nov 1997

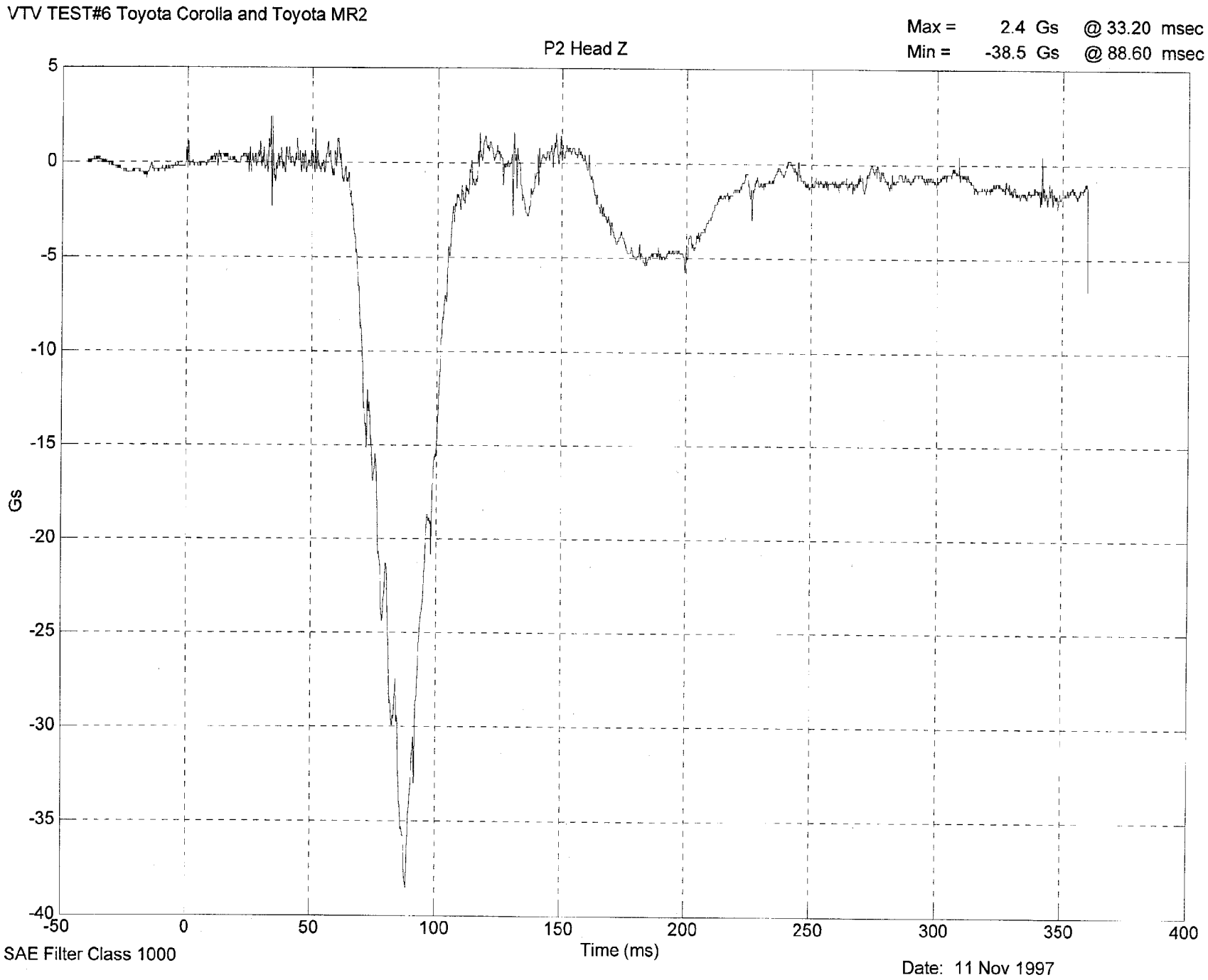
D-66

8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
P1 Upper Neck Moment Res
Max = 42.2 N-m @ 76.30 msec
Min = 0.0163 N-m @ -30.70 msec
N-m
Time (ms)
SAE Filter Class 600
Date: 11 Nov 1997

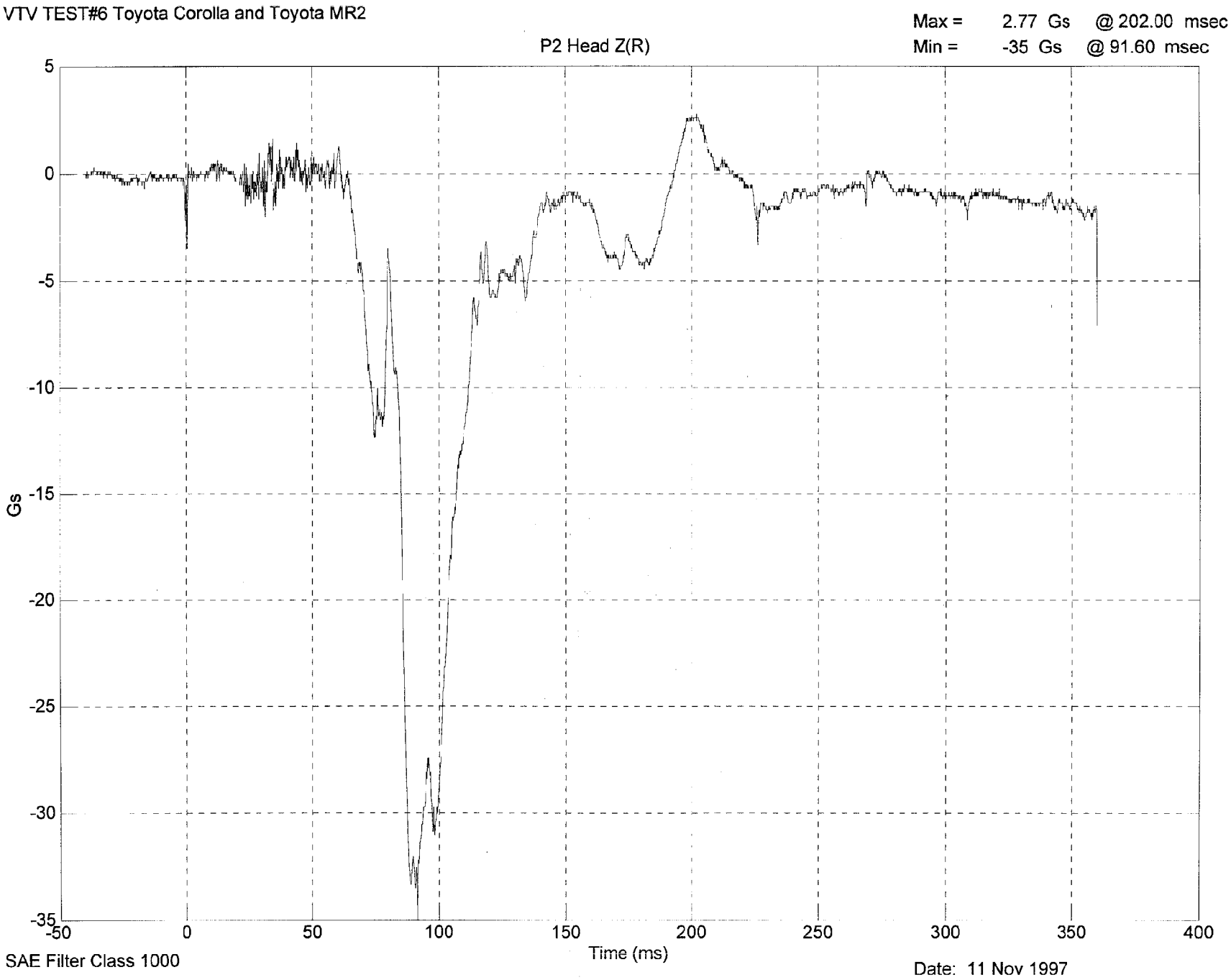

VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Head X
Max = 11.7 Gs @ 360.00 msec
Min = -39.3 Gs @ 83.00 msec
Gs
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997
D-68
8404-6

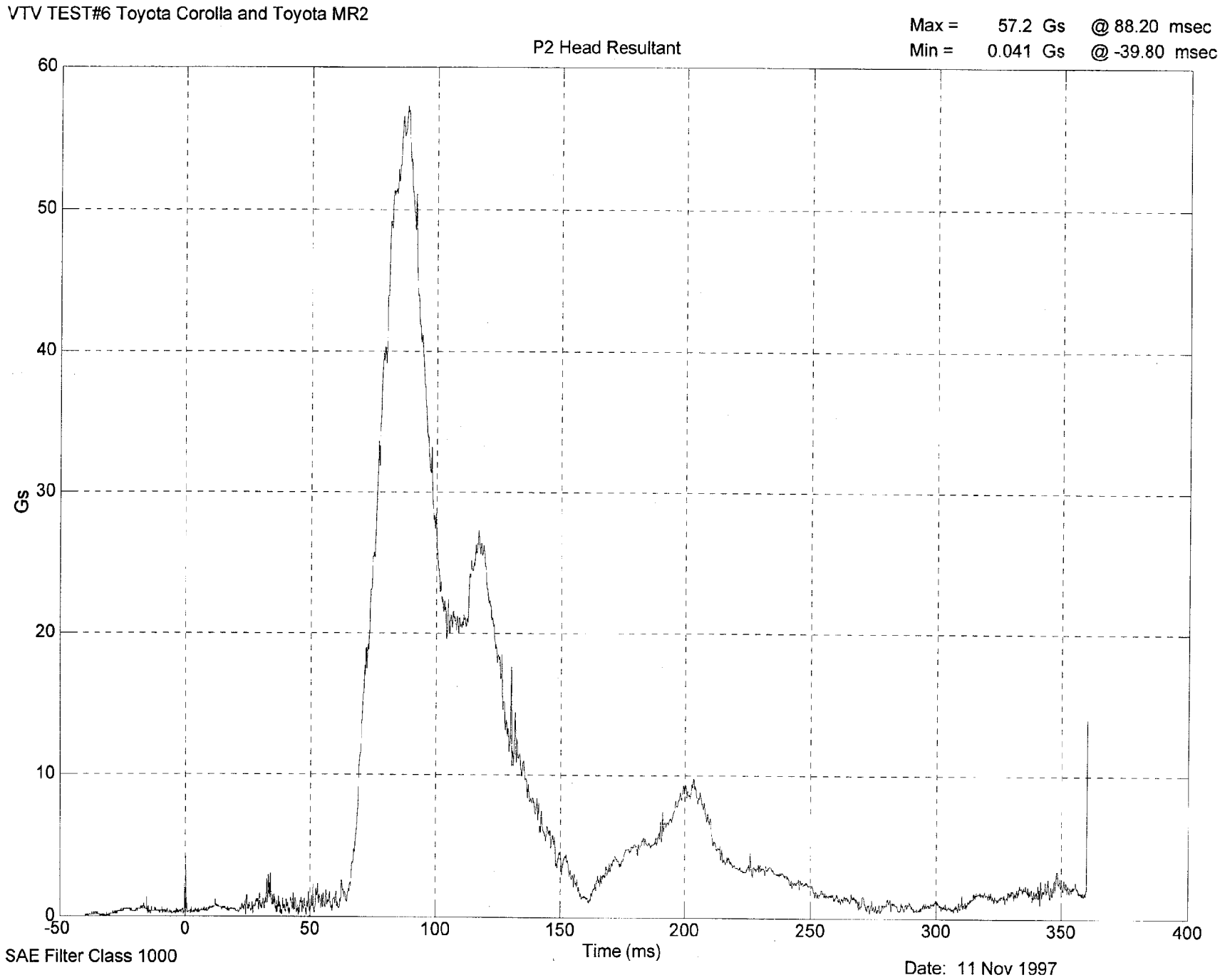

VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Head Y
Max = 26.9 Gs @ 116.80 msec
Min = -4.65 Gs @ 201.40 msec
Gs
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997

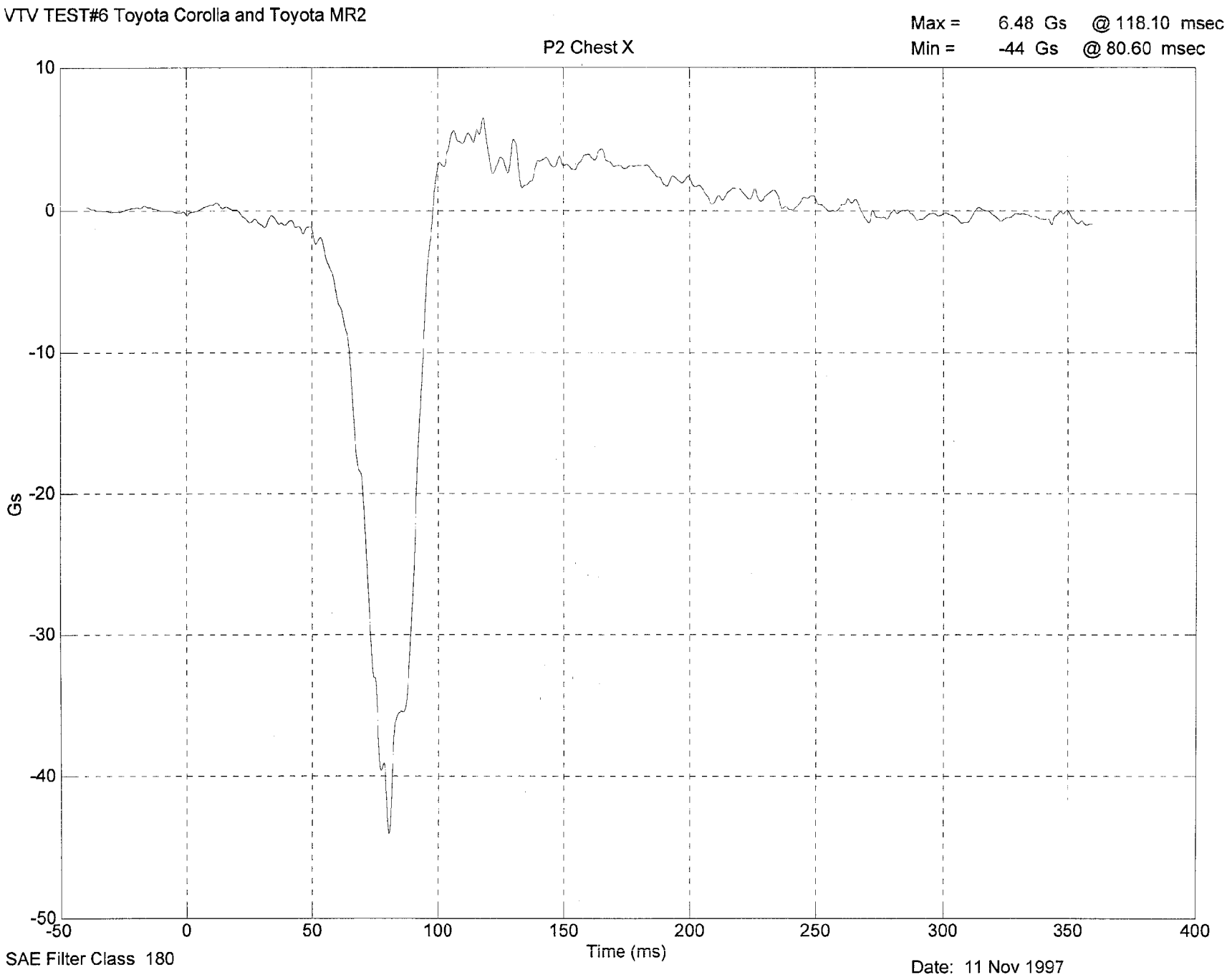

VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Head Z
Max = 2.4 Gs @ 33.20 msec
Min = -38.5 Gs @ 88.60 msec
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997

D-70

8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Head Z(R)
Max = 2.77 Gs @ 202.00 msec
Min = -35 Gs @ 91.60 msec
Gs
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997

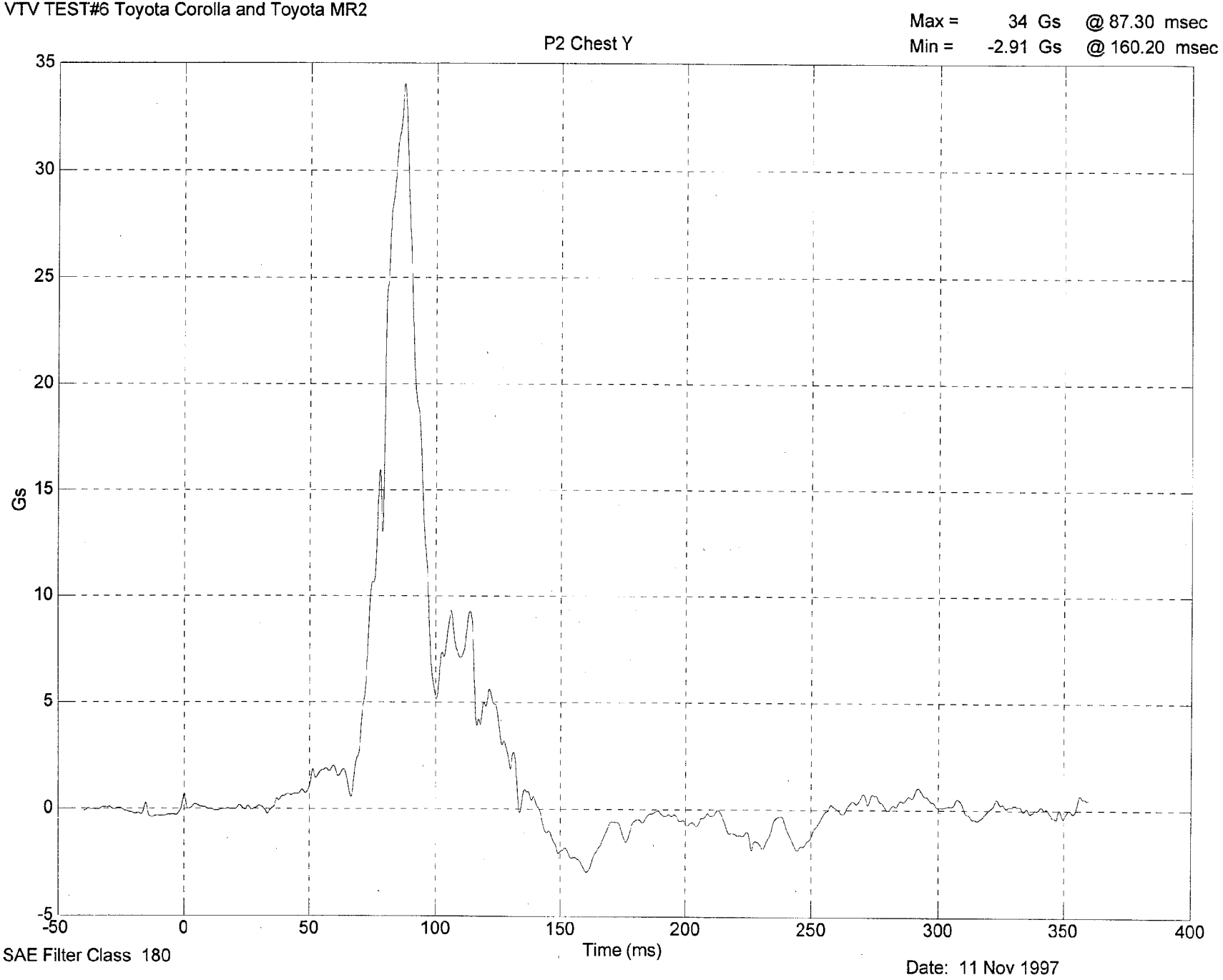

VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Head Resultant
Max = 57.2 Gs @ 88.20 msec
Min = 0.041 Gs @ -39.80 msec
Gs
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Chest X
Max = 6.48 Gs @ 118.10 msec
Min = -44 Gs @ 80.60 msec
10
0
-10
-20
-30
-40
-50
Gs
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997

D-73

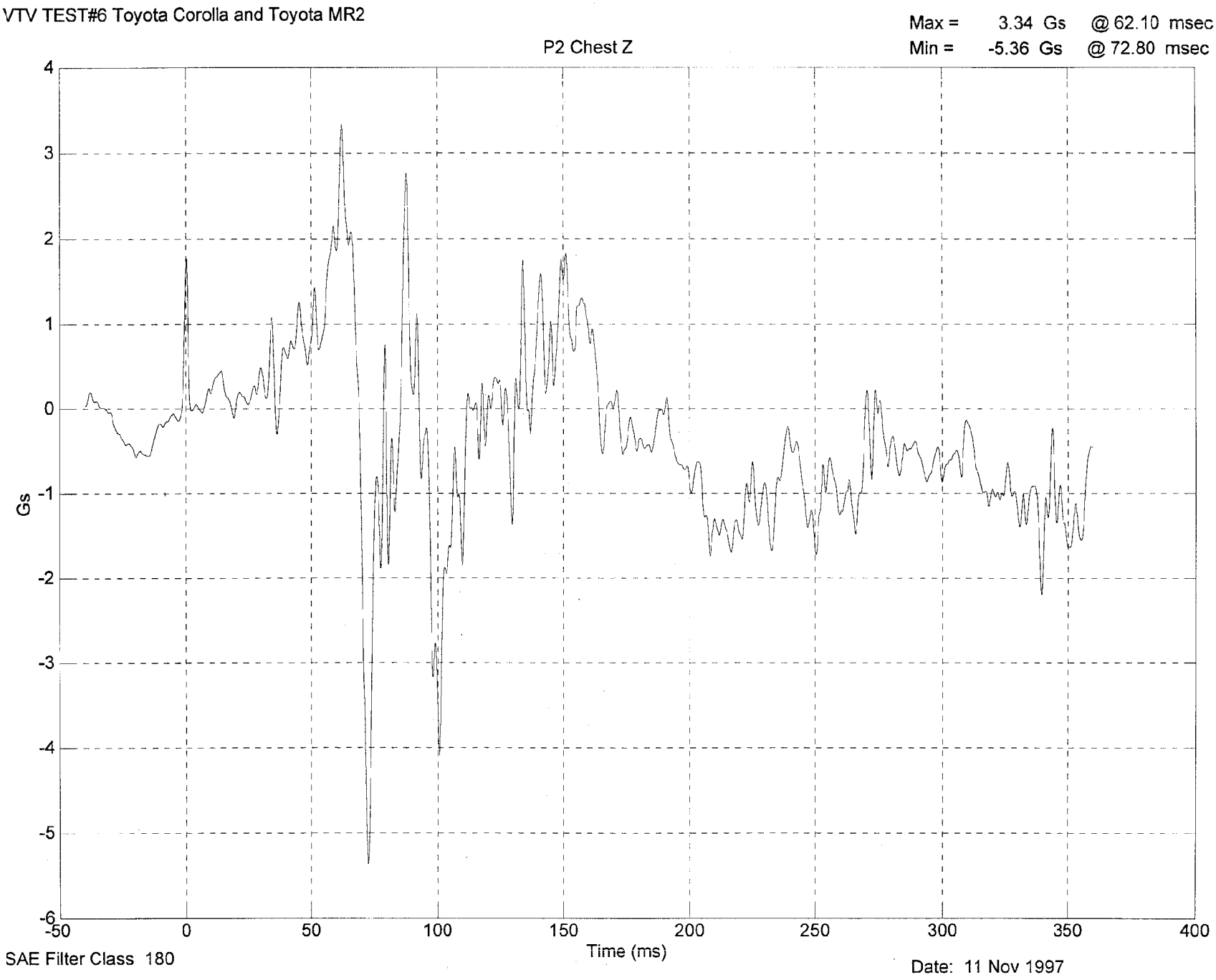
8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2



D-74

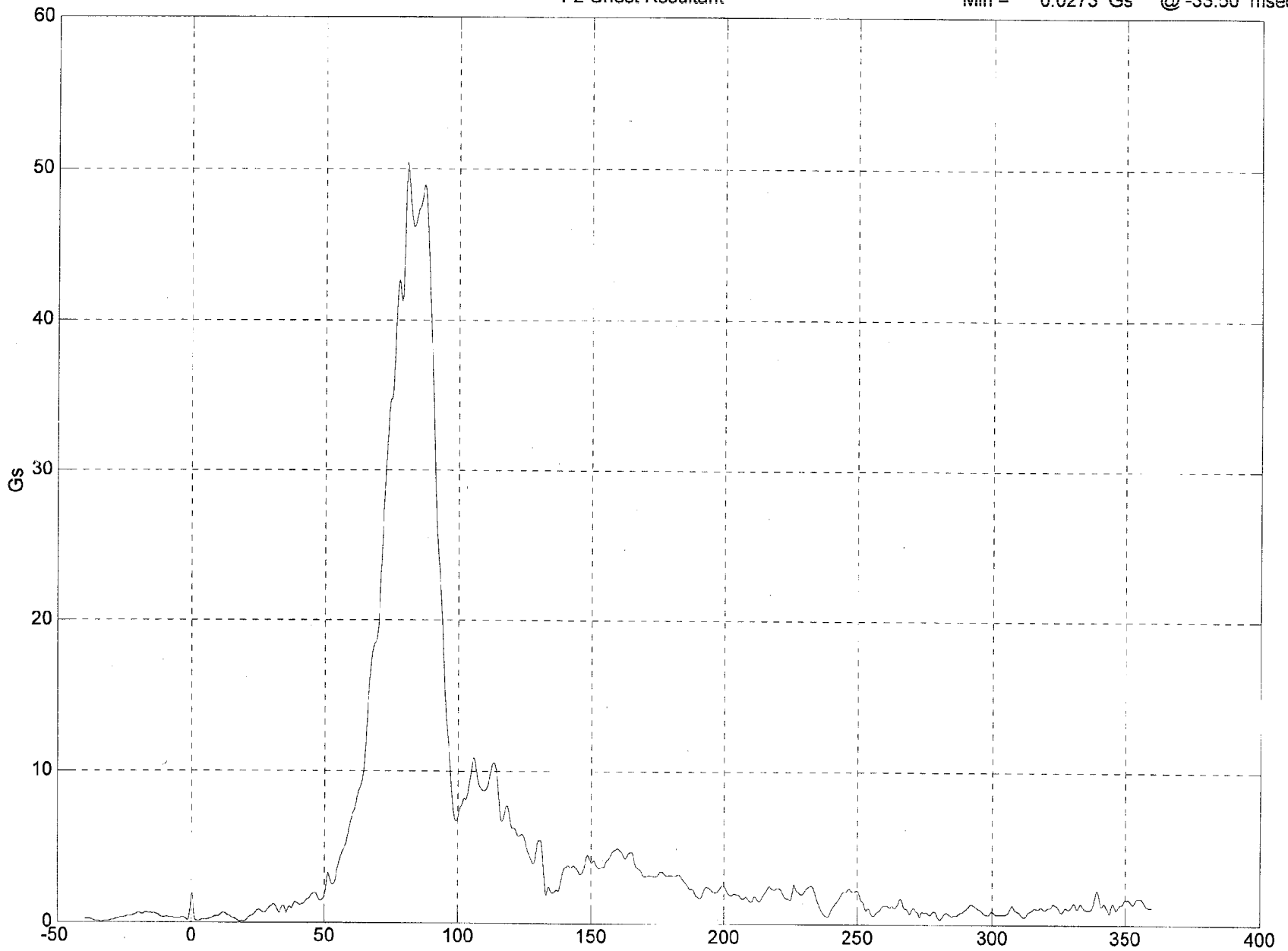
8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Chest Z
Max = 3.34 Gs @ 62.10 msec
Min = -5.36 Gs @ 72.80 msec
Gs
Time (ms)
SAE Filter Class 180
Date: 11 Nov 1997

VTV TEST#6 Toyota Corolla and Toyota MR2

P2 Chest Resultant

Max = 50.4 Gs @ 80.70 msec
Min = 0.0273 Gs @ -33.50 msec

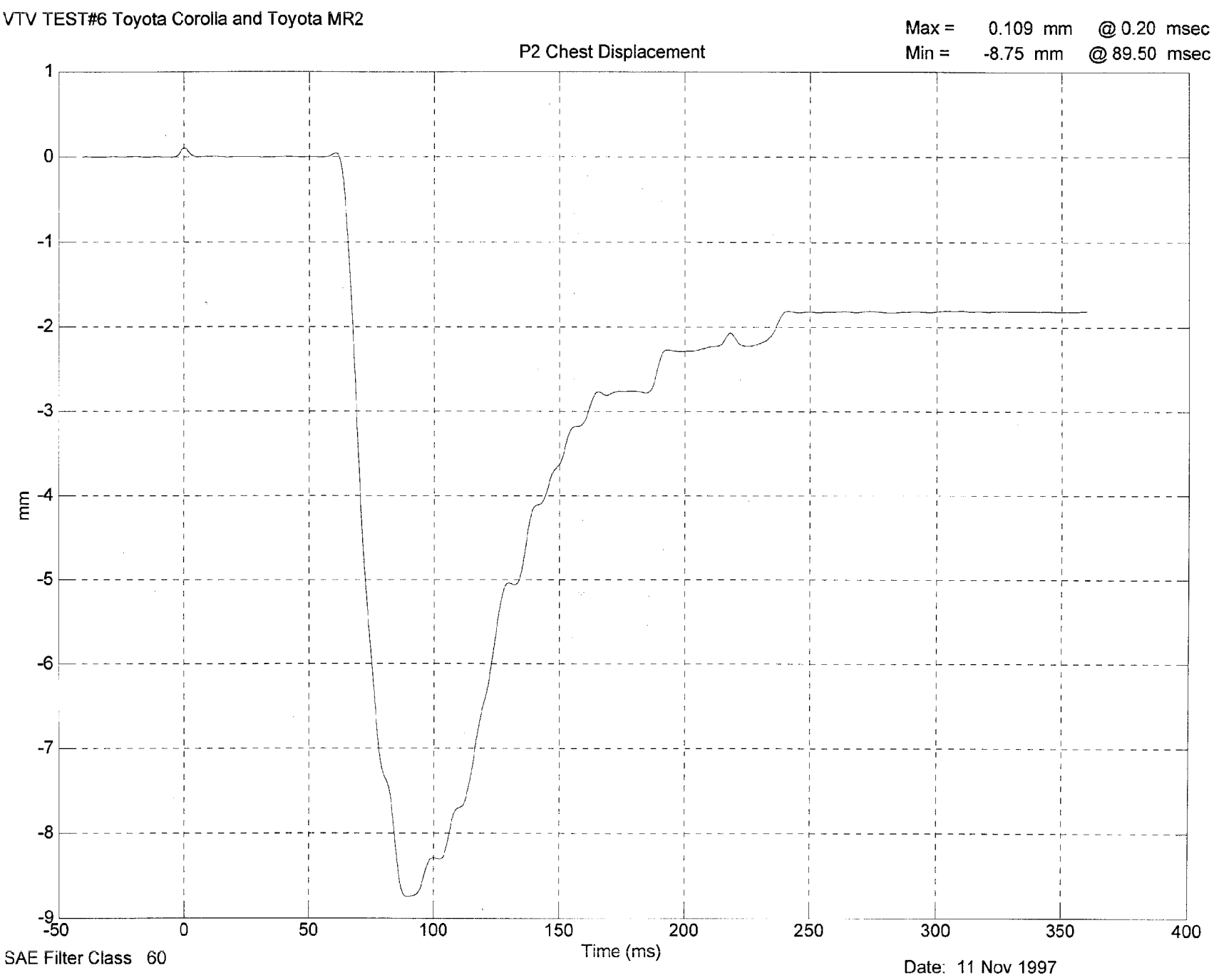


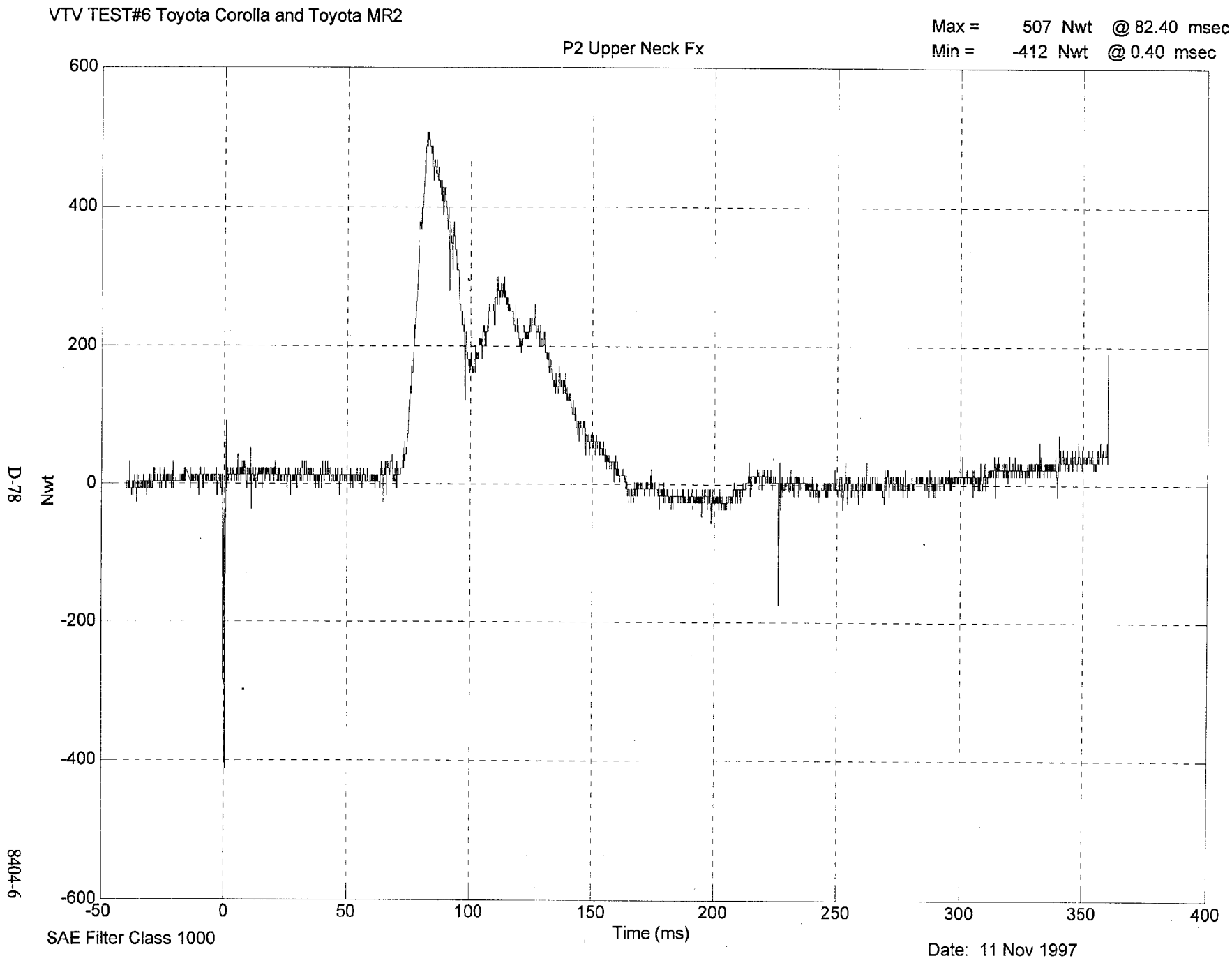
SAE Filter Class 180

Date: 11 Nov 1997

D-76

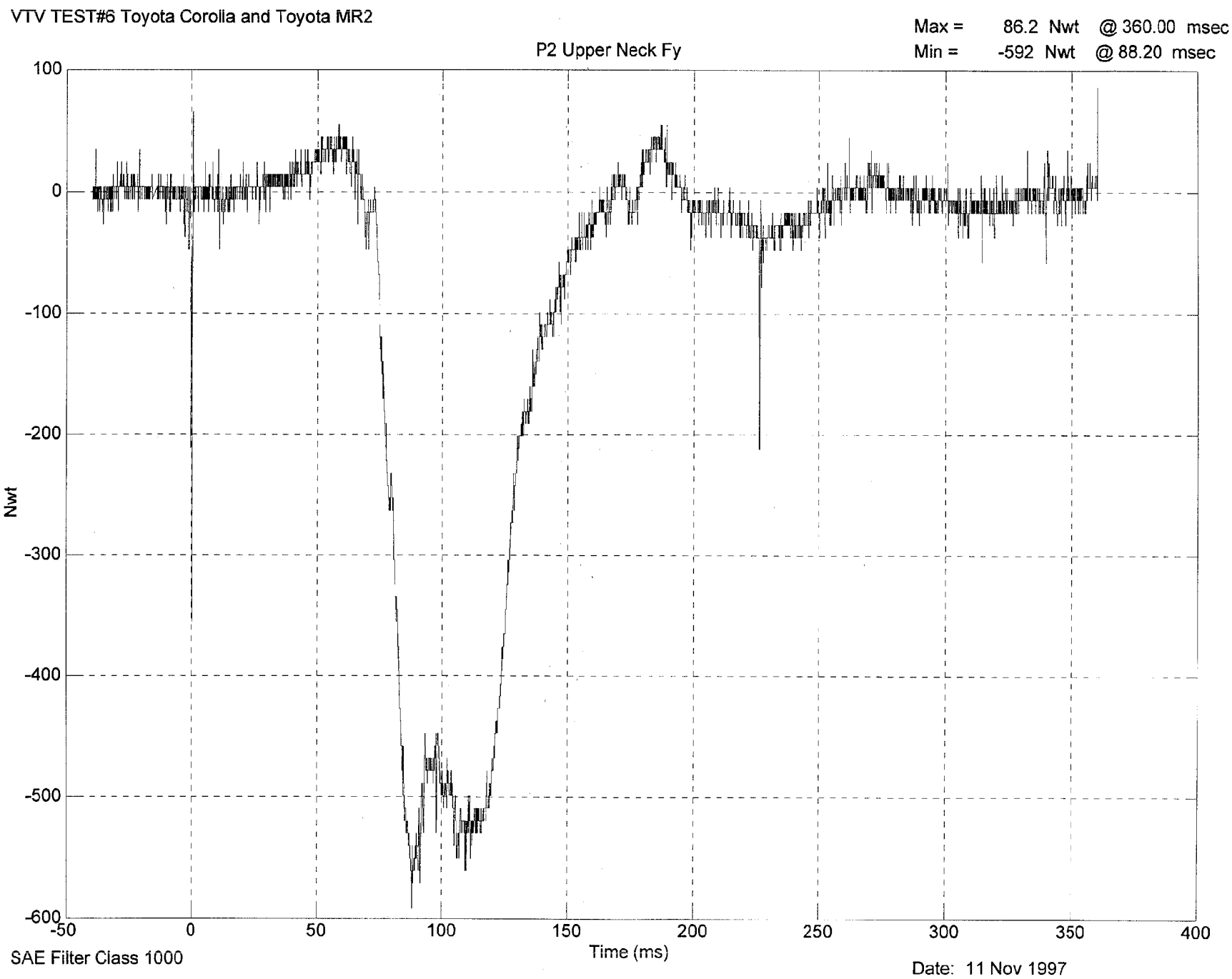
8404-6

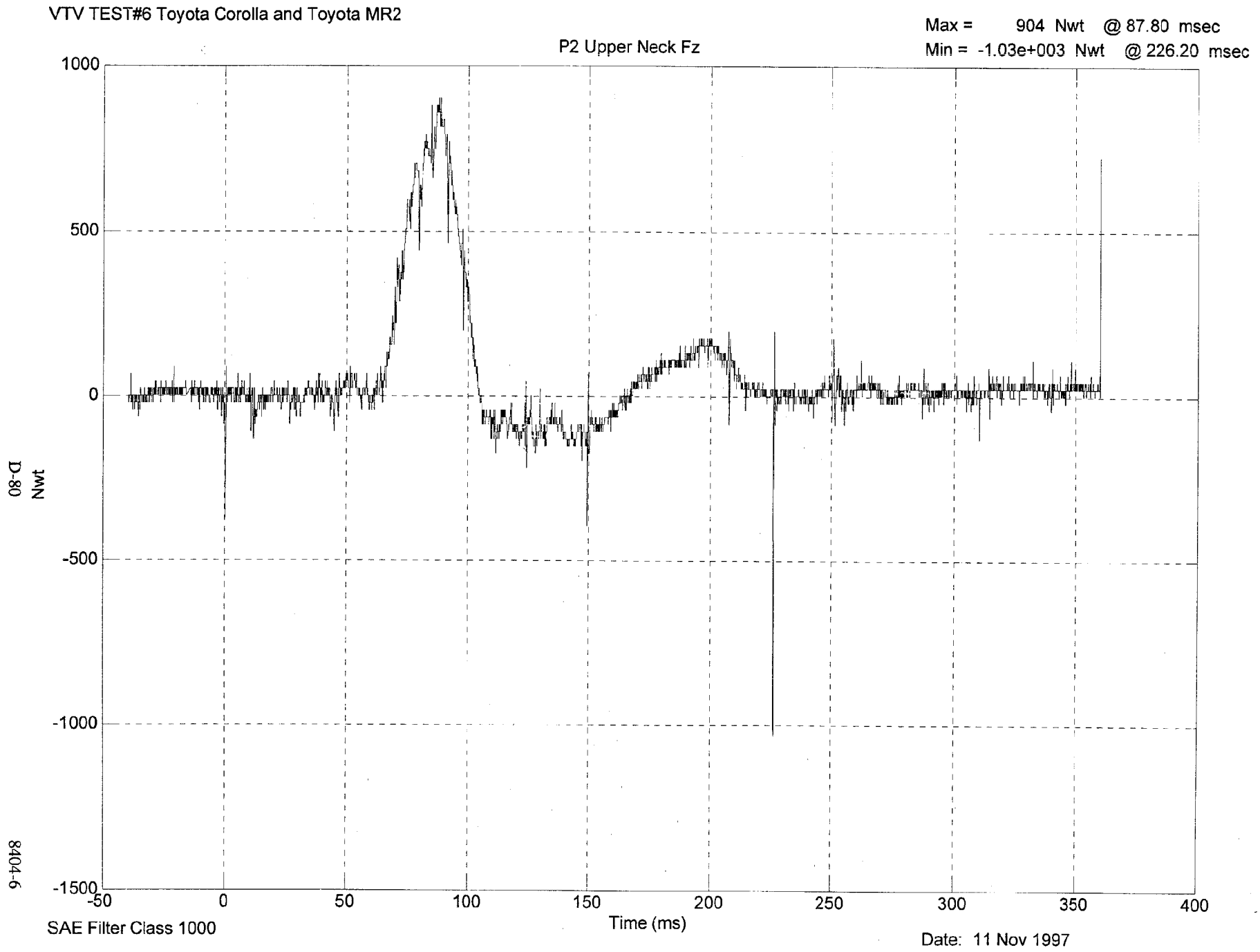

VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Chest Displacement
Max = 0.109 mm @ 0.20 msec
Min = -8.75 mm @ 89.50 msec
mm
Time (ms)
SAE Filter Class 60
Date: 11 Nov 1997

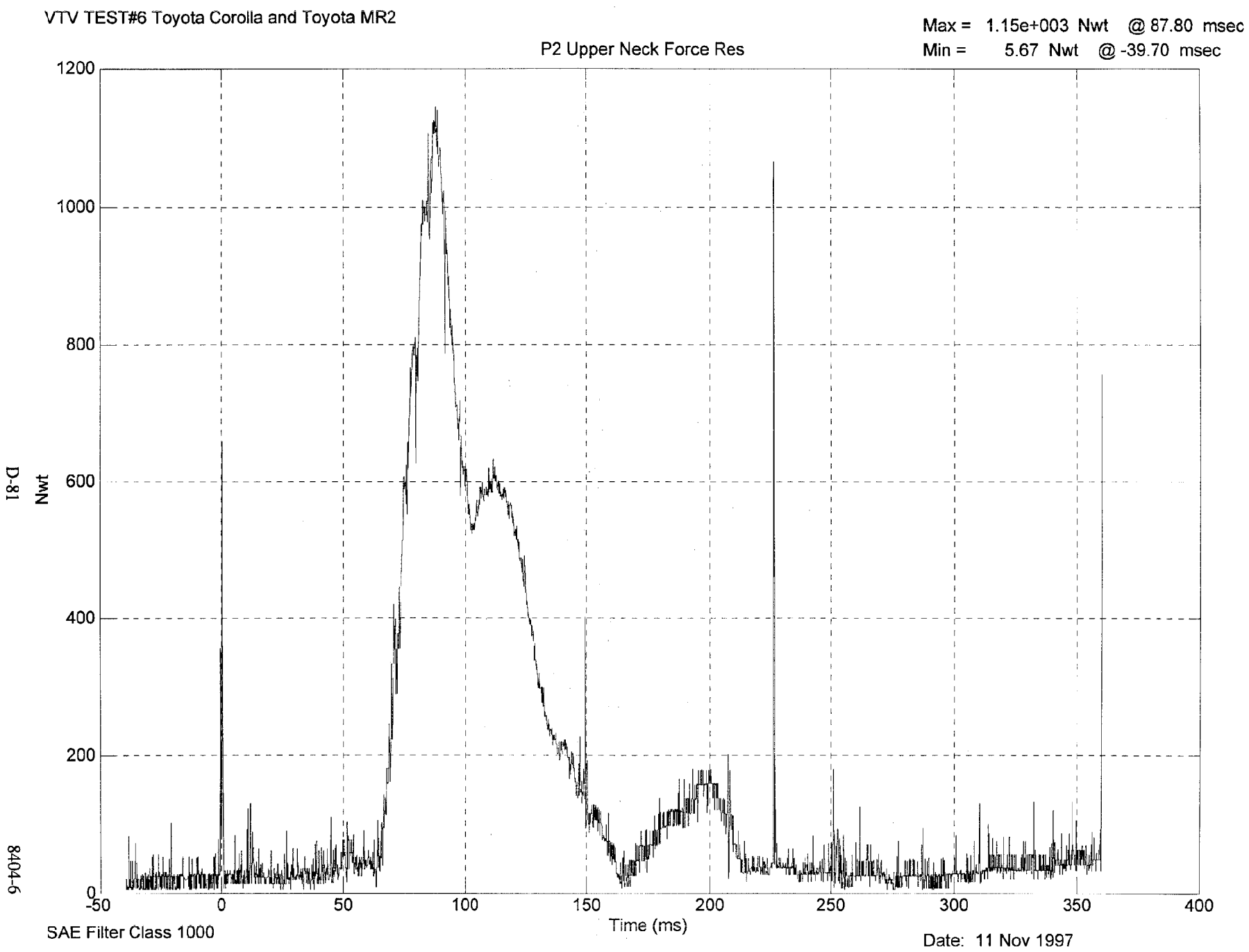

VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Upper Neck Fx
Max = 507 Nwt @ 82.40 msec
Min = -412 Nwt @ 0.40 msec
600
400
200
0
-200
-400
-600
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997

D-78

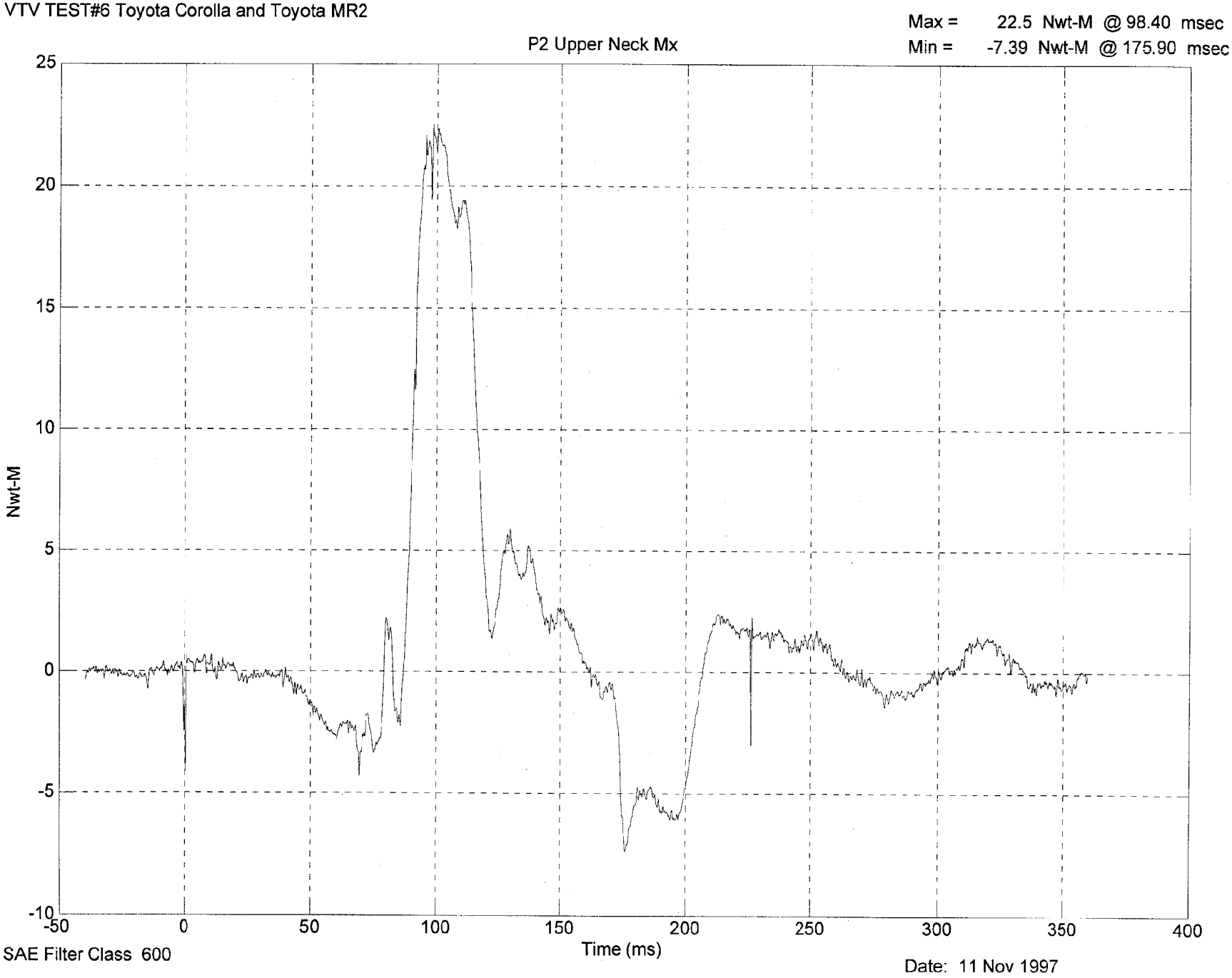
8404-6


VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Upper Neck Fy
Max = 86.2 Nwt @ 360.00 msec
Min = -592 Nwt @ 88.20 msec
100
0
-100
-200
-300
-400
-500
-600
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Upper Neck Fz
Max = 904 Nwt @ 87.80 msec
Min = -1.03e+003 Nwt @ 226.20 msec
1000
500
0
-500
-1000
-1500
D-80
Nwt
8404-6
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997


VTV TEST#6 Toyota Corolla and Toyota MR2
P2 Upper Neck Force Res
Max = 1.15e+003 Nwt @ 87.80 msec
Min = 5.67 Nwt @ -39.70 msec
1200
1000
800
600
400
200
0
Nwt
-50
0
50
100
150
200
250
300
350
400
Time (ms)
SAE Filter Class 1000
Date: 11 Nov 1997
D-81
8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2



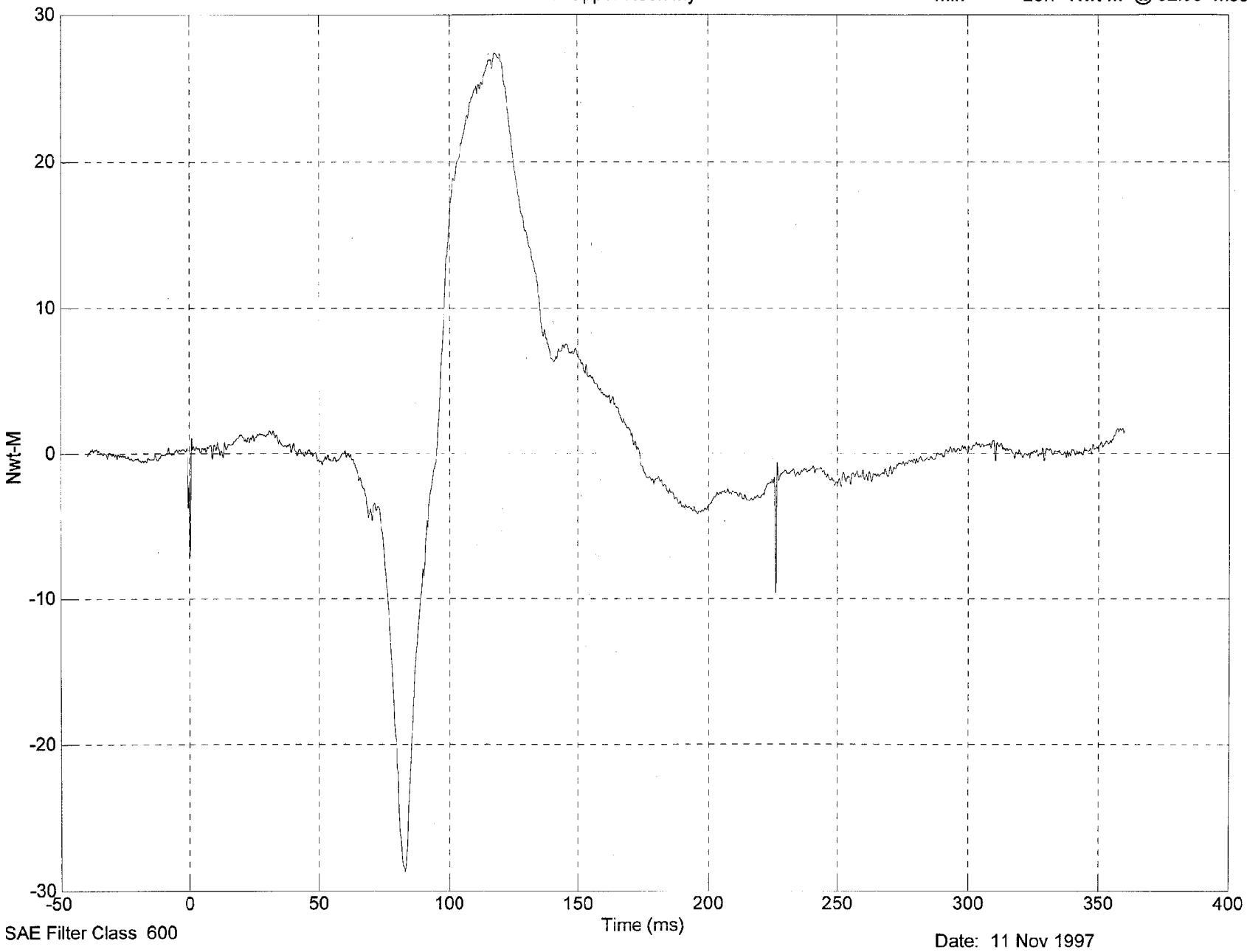
D-82

8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

P2 Upper Neck My

Max = 27.4 Nwt-M @ 117.80 msec
Min = -28.7 Nwt-M @ 82.90 msec



SAE Filter Class 600

Date: 11 Nov 1997

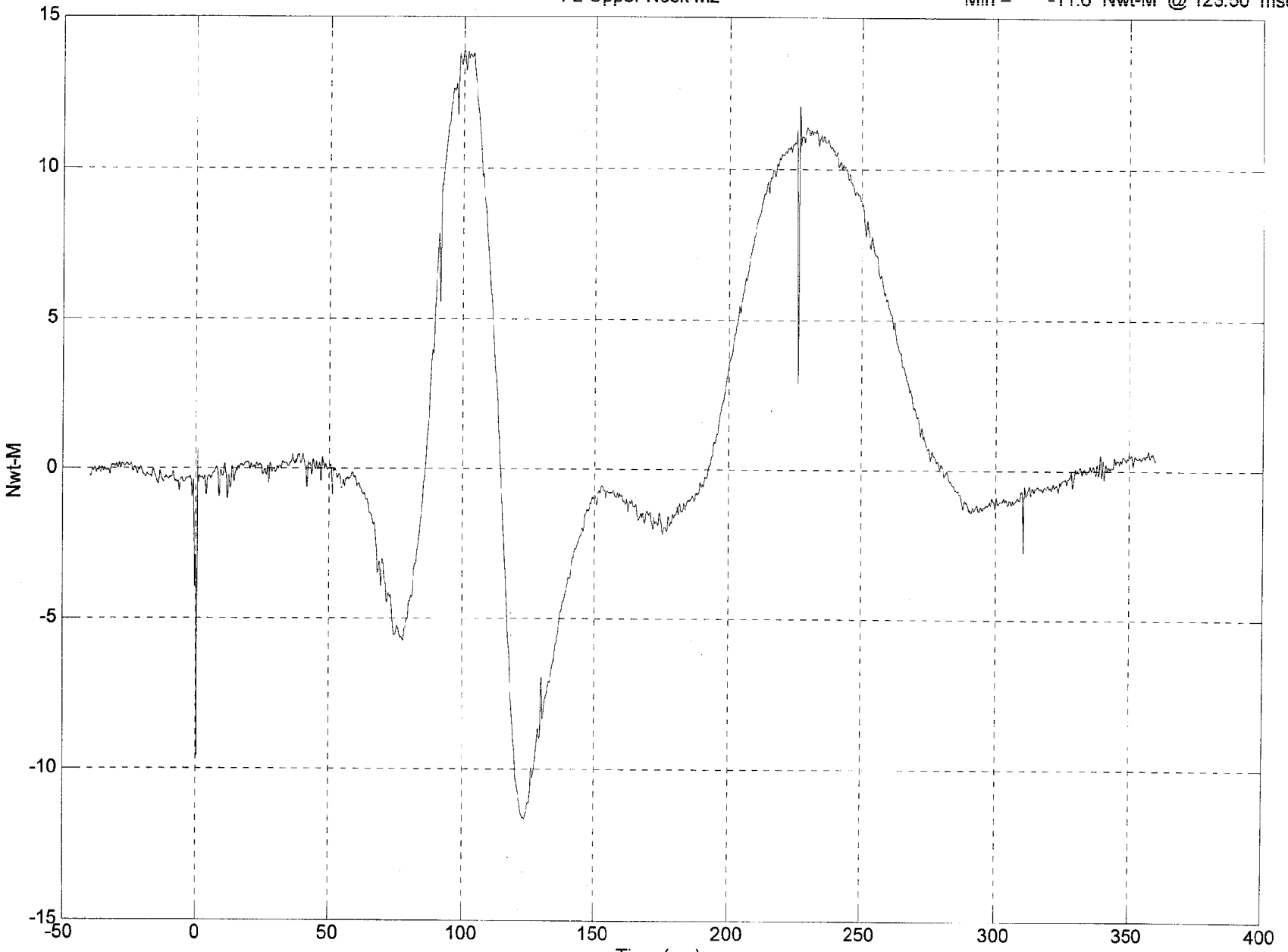
D-83

8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

P2 Upper Neck Mz

Max = 13.9 Nwt-M @ 100.10 msec
Min = -11.6 Nwt-M @ 123.50 msec



SAE Filter Class 600

Date: 11 Nov 1997

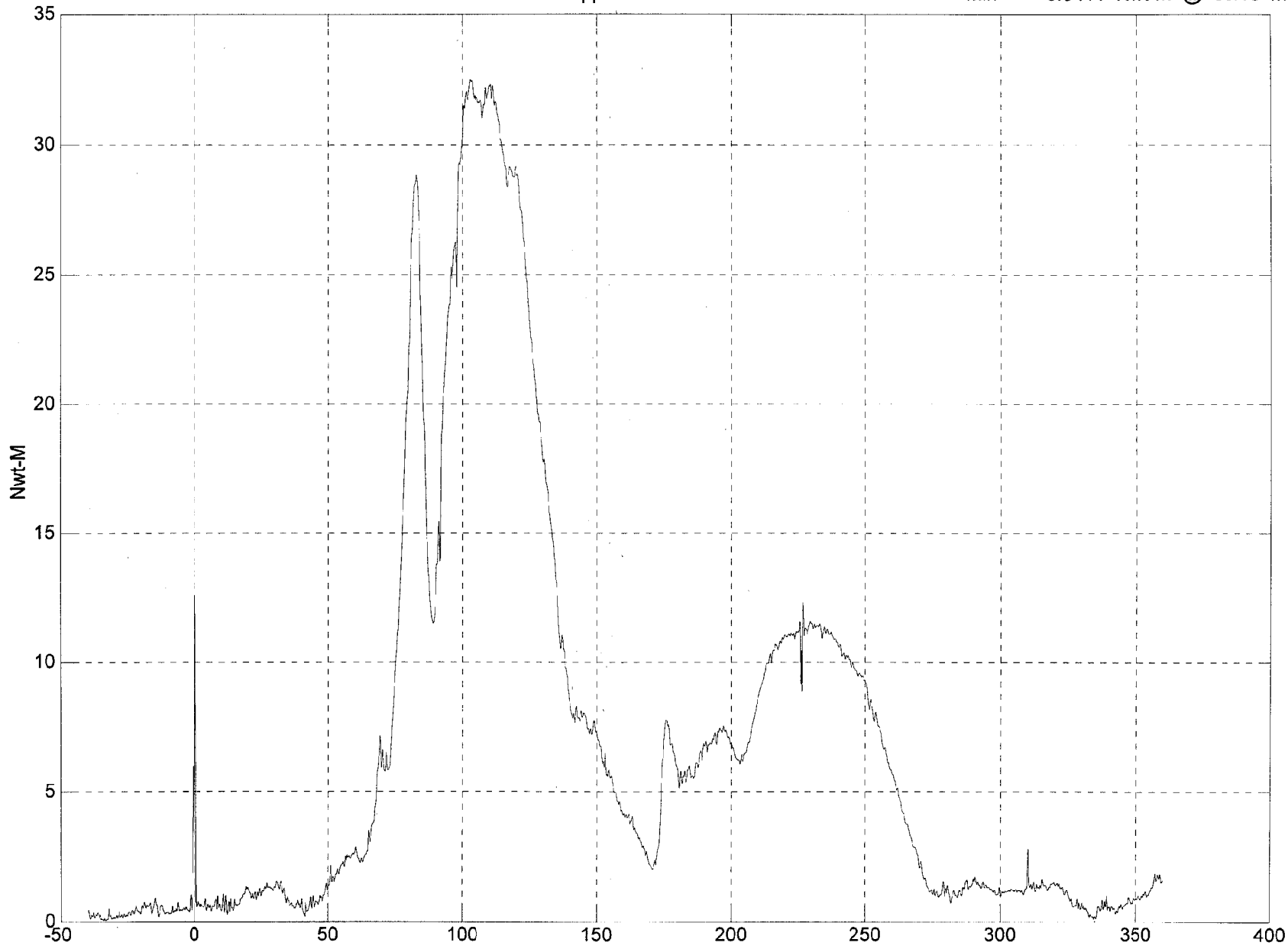
D-84

8404-6

VTV TEST#6 Toyota Corolla and Toyota MR2

P2 Upper Neck Moment Res

Max = 32.5 Nwt-M @ 102.90 msec
Min = 0.0411 Nwt-M @ -33.10 msec



SAE Filter Class 600

Date: 11 Nov 1997

D-85

8404-6

APPENDIX E

ACCIDENT RESEARCH DIVISION DATA

U.S. Department of Transportation
National Highway Traffic Safety Administration

EXTERIOR VEHICLE FORM

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. Primary Sampling Unit Number
2. Case Number - Stratum: 95-04-0406
3. Vehicle Number: 01

VEHICLE IDENTIFICATION

VIN: 2T1AE04B4RC031630 Model Year: 94

Vehicle Make (specify): Toyota Vehicle Model (specify): Corolla

LOCATOR

Locate the end of the damage with respect to the vehicle's damaged center point or bumper corner for end impacts or an undamaged axle for side impacts.

Specific Impact No.	Location of Direct Damage	Location of Field L	Location of Max Crush
1	front bumper extends from RF BC → 120cm left	entire front bumper	C4

CRUSH PROFILE IN CENTIMETERS

NOTES: Identify the plane at which the C-measurements are taken (e.g., at bumper, above bumper, at sill, above sill, etc.) and label adjustments (e.g., free space).

Measure C1 to C6 from driver to passenger side in front or rear impacts and rear to front in side impacts.

Free space value is defined as the distance between the baseline and the original body contour taken at the individual C locations. This may include the following: bumper lead, bumper taper, side protrusion, side taper, etc. Record the value for each C-measurement and maximum crush.

Use as many lines/columns as necessary to describe each damage profile.

Specific Impact Number	Plane of Impact C-Measurements	Direct Damage Width (CDC)	Direct Damage Max Crush	Field L	C_1	C_2	C_3	C_4	C_5	C_6	±D
1	front bumper	120cm		140.5	7.5	6	15.5	24	25.75	33.5	⊕12
	free space				12	6	2	2	6	12	
	residual crush	120cm	22	140.5	C	0	13.5	22	19.75	21.5	⊕12

ORIGINAL SPECIFICATIONS WORK SHEET

Wheelbase	97.0	inches	x 2.54	=	246	cm
Overall Length	172.0	inches	x 2.54	=	437	cm
Maximum Width	66.3	inches	x 2.54	=	168	cm
Curb Weight	2315	pounds	x .4536	=	1050	kg
Average Track	57.3	inches	x 2.54	=	146	cm
Front Overhang	34.6	inches	x 2.54	=	88	cm
Rear Overhang	40.5	inches	x 2.54	=	103	cm
Undeformed End Width	56.7	inches	x 2.54	=	144	cm
Engine Size: cyl./displ.	____	cc	x .001	=	__.__	L
	___	CID	x .0164	=	__.__	L

VEHICLE DAMAGE SKETCH

TIRE—WHEEL DAMAGE

a. Rotation physically restricted

RF 2
LF 2
RR 2
LR 2

b. Tire deflated

RF 2
LF 2
RR 2
LR 2

(1) Yes (2) No (8) NA (9) Unk.

TYPE OF TRANSMISSION

☐ Manual ☒ Automatic

END SHIFT ≥ 10 CM

☐ Yes ☐ No

ORIGINAL SPECIFICATIONS

Wheelbase	246	cm
Overall Length	437	cm
Maximum Width	168	cm
Curb Weight	1050	kg
Average Track	146	cm
Front Overhang	88	cm
Rear Overhang	103	cm
Undeformed End Width	144	cm
Engine Size: cyl./displ.		L

WHEEL STEER ANGLES

(For locked front wheels or displaced rear axles only)

RF ± ___ ___ °
LF ± ___ ___ °
RR ± ___ ___ °
LR ± ___ ___ °

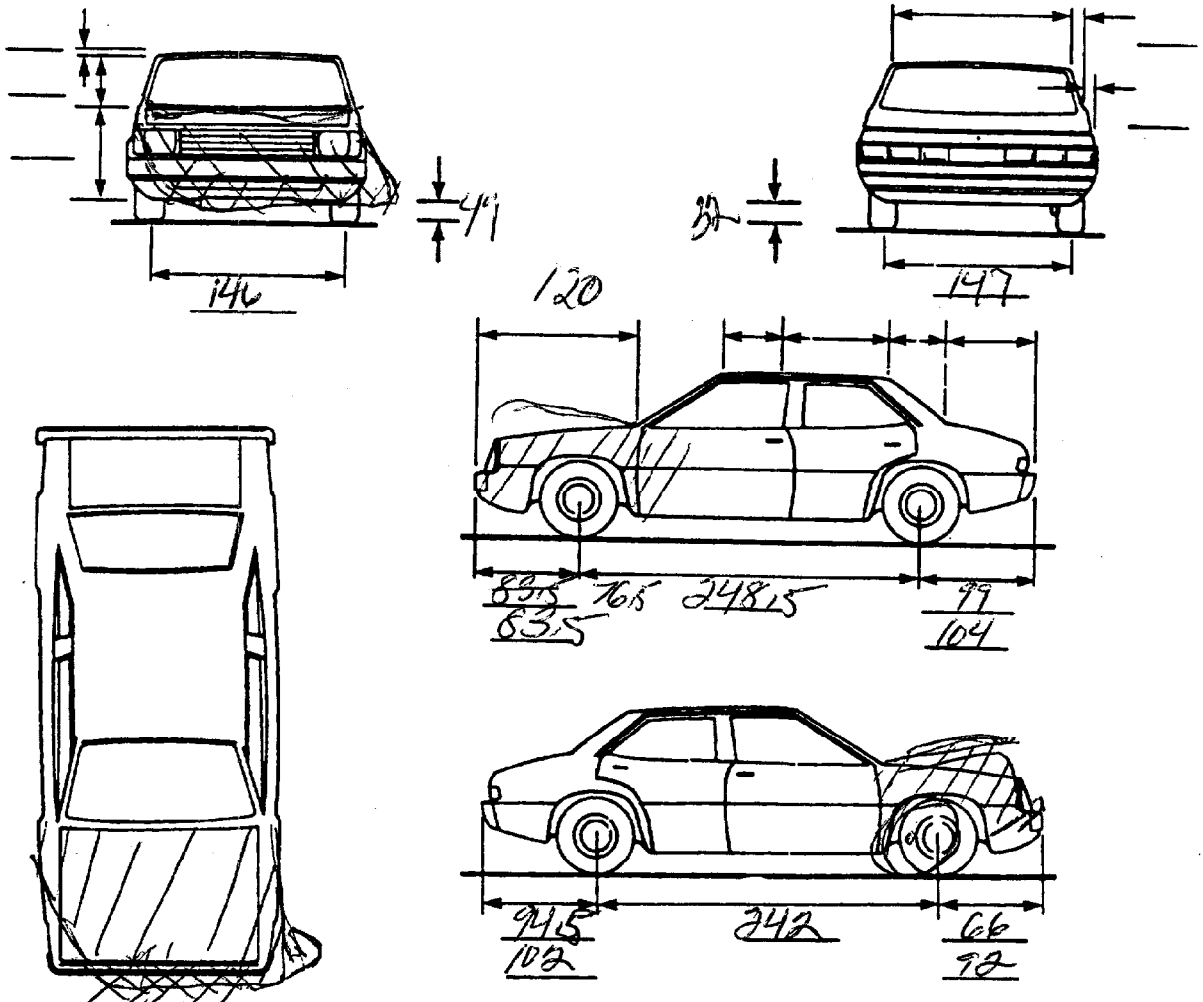
Within ± 5 degrees

DRIVE WHEELS

☒ FWD ☐ RWD ☐ 4WD

Approximate Cargo Weight Ø kg

MEASUREMENTS IN CENTIMETERS



NOTES: Sketch new perimeter and cross hatch direct damage and single hatch induced damage on all views. Annotate observations which might be useful in reconstructing the accident (e.g., grass in tire bead, direction of striations, scuff on sidewalls, etc.). If pulling trailer, sketch type of trailer and damage received on the back of this page.

Annotate any damage caused by extrication such as component removal by torching, prying, or hydraulic shears.

CDC WORKSHEET

CODES FOR OBJECT CONTACTED

(01-30) — Vehicle Number

Noncollision
- (31) Overturn — rollover (excludes end-over-end)
- (32) Rollover—end-over-end
- (33) Fire or explosion
- (34) Jackknife
- (35) Other intraunit damage (specify): _____
- (36) Noncollision injury
- (38) Other noncollision (specify): _____
- (39) Noncollision — details unknown

Collision With Fixed Object
- (41) Tree (≤ 10 cm in diameter)
- (42) Tree (> 10 cm in diameter)
- (43) Shrubbery or bush
- (44) Embankment
- (45) Breakaway pole or post (any diameter)

Nonbreakaway Pole or Post
- (50) Pole or post (≤ 10 cm in diameter)
- (51) Pole or post (> 10 cm but ≤ 30 cm in diameter)
- (52) Pole or post (> 30 cm in diameter)
- (53) Pole or post (diameter unknown)
- (54) Concrete traffic barrier
- (55) Impact attenuator
- (56) Other traffic barrier (includes guardrail) (specify): _____
- (57) Fence
- (58) Wall
- (59) Building
- (60) Ditch or culvert
- (61) Ground
- (62) Fire hydrant
- (63) Curb
- (64) Bridge
- (68) Other fixed object (specify): _____
- (69) Unknown fixed object

Collision with Nonfixed Object
- (70) Passenger car, light truck, van, or other vehicle not in-transport
- (71) Medium/heavy truck or bus not in-transport
- (72) Pedestrian
- (73) Cyclist or cycle
- (74) Other nonmotorist or conveyance _____
- (75) Vehicle occupant
- (76) Animal
- (77) Train
- (78) Trailer, disconnected in transport
- (79) Object fell from vehicle in-transport
- (88) Other nonfixed object (specify): _____
- (89) Unknown nonfixed object
- (98) Other event (specify): _____
- (99) Unknown event or object

DEFORMATION CLASSIFICATION BY EVENT NUMBER

Accident Event Sequence Number	Object Contacted	(1) (2) Direction of Force (degrees)	Incremental Value of Shift	(3) Deformation Location	(4) Specific Longitudinal or Lateral Location	(5) Specific Vertical or Lateral Location	(6) Type of Damage Distribution	(7) Deformation Extent
01	02	035	00	F	D	E	2	01

COLLISION DEFORMATION CLASSIFICATION

HIGHEST DELTA "V"

Accident Event Sequence Number	Object Contacted	(1) (2) Direction of Force	(3) Deformation Location	(4) Longitudinal or Lateral Location	(5) Vertical or Lateral Location	(6) Type of Damage Distribution	(7) Deformation Extent
4. 01	5. 02	6. 01	7. F	8. D	9. E	10. W	11. 01

Second Highest Delta "V"

12.	13.	14.	15.	16.	17.	18.	19.

CRUSH PROFILE IN CENTIMETERS

The crush profile for the damage described in the CDC(s) above should be documented in the appropriate space below. (ALL MEASUREMENTS ARE IN CENTIMETERS.)

HIGHEST DELTA "V"

20. L	21. C_1	C_2	C_3	C_4	C_5	C_6	22. ±D
144	000	000	014	022	020	022	+ 012

Second Highest Delta "V"

23. L	24. C_1	C_2	C_3	C_4	C_5	C_6	25. ±D
							+

26. Undeformed End Width (Coded when highest severity impact is an end plane impact.) 144
____ Code to the nearest centimeter
(250) 250 centimeters or more
(998) No highest severity end plane impact
(999) Unknown

27. Direct Damage Width (For highest severity impact) 120
____ Code to the nearest centimeter
(250) 250 centimeters or more
(999) Unknown

28. Original Wheelbase 246
____ Code to the nearest centimeter
(650) 650 centimeters or more
(999) Unknown
97.0 inches X 2.54 = 246 centimeters

29. Original Average Track Width 146
____ Code to the nearest centimeter
(185) 185 centimeters or more
(999) Unknown
57.3 inches X 2.54 = 146 centimeters

30. Are CDCs Documented but Not Coded on The Automated File? 0
(0) No
(1) Yes

31. Researcher's Assessment of Vehicle Disposition 1
(0) Not towed due to vehicle damage
(1) Towed due to vehicle damage
(9) Unknown

32. Is This A Multi-Stage Manufactured Vehicle And/Or A Certified Altered Vehicle? 0
(0) No post manufacturer modifications
(1) Yes - post manufacturer modifications (specify): _____
(Include photograph of CERTIFICATION PLACARD in case report)
(9) Unknown if vehicle is modified

FIRE OCCURRENCE

33. Fire Occurrence 0
(0) No fire

Yes, fire occurred
(1) Minor
(2) Major
(9) Unknown

34. Origin of Fire 0
(0) No fire
(1) Vehicle exterior (front, side, back, top)
(2) Exhaust system
(3) Fuel tank (and other fuel retention system parts)
(4) Engine compartment
(5) Cargo/trunk compartment
(6) Instrument panel
(7) Passenger compartment area
(8) Other location (specify): _____
(9) Unknown

FUEL SYSTEM

35. Location of Fuel Tank-1 Filler Cap 2

36. Location of Fuel Tank-2 Filler Cap 0
(0) No fuel tank
(1) On back plane
(2) Aft of center of the rear wheels (rear axle) on left side plane
(3) Aft of center of the rear wheels (rear axle) on right side plane
(4) Forward of center of the rear wheels (rear axle) on left side plane
(5) Forward of center of the rear wheels (rear axle) on right side plane
(6) Over the center of the rear wheels (rear axle) on left side plane
(7) Over the center of the rear wheels (rear axle) on right side plane
(8) Other (specify): _____
(9) Unknown

37. Type of Fuel Tank-1 1

38. Type of Fuel Tank-2 0
(0) No fuel tank (electrical vehicle)
(1) Metallic
(2) Non-metallic
(9) Unknown

39. Location of Fuel Tank-1 5

40. Location of Fuel Tank-2 0
(0) No fuel tank
(1) Aft of center of the rear wheels (rear axle) centered
(2) Aft of center of the rear wheels (rear axle) left side
(3) Aft of center of the rear wheels (rear axle) right side
(4) Forward of center of the rear wheels (rear axle) centered
(5) Forward of center of the rear wheels (rear axle) left side
(6) Forward of center of the rear wheels (rear axle) right side
(7) Over center of the rear wheels (rear axle)
(8) Other (specify): _____
(9) Unknown

41. Damage to Fuel Tank-1 1

42. Damage to Fuel Tank-2 0
(0) No fuel tank
(1) No damage to fuel tank
(2) Deformed, no seam failure
(3) Deformed, with a seam failure
(4) Punctured
(5) Lacerated (ripped)
(6) Abraded (scraped)
(7) Filler neck separation from the fuel tank
(8) Other damage (specify): _____
(9) Unknown

43. Leakage Location of Fuel System-1 1

44. Leakage Location of Fuel System-2 0
(0) No fuel tank
(1) No fuel leakage

Primary Area Of Leakage
(2) Tank
(3) Filler neck
(4) Cap
(5) Lines/pump/filter
(6) Vent/emission recovery
(8) Other (specify):_____
(9) Unknown

45. Fuel Type-1 01

46. Fuel Type-2 00

Single Fuel Type
(00) No fuel tank
(01) Gasoline
(02) Diesel
(03) CNG (Compressed Natural Gas)
(04) LPG (Liquid Petroleum Gas) also known as Propane
(05) LNG (Liquid Natural Gas)
(06) Methanol (M100 or M85)
(07) Ethanol (E100 or E85)
(08) Other (Hydrogen or others) (specify):
_____

Electric Powered or Electric/Solar Powered Vehicles
(10) Lead Acid Battery
(11) Nickel-Iron Battery
(12) Nickel-Cadmium Battery
(13) Sodium Metal Chloride Battery
(14) Sodium Sulfur Battery
(18) Other (Specify):_____

(98) Other Hybrid (specify):
_____

(99) Unknown fuel type

47. Is This Vehicle Equipped With More Than Two Fuel Tanks? 0
(0) No (one or two tanks only)

Yes - More Than Two Tanks
(1) Yes -- no damage to any tank or filler cap and no fuel system leakage
(2) Yes -- no damage to any tank or filler cap but there is fuel system leakage (specify leakage location):
_____
(3) Yes -- damage to an additional tank or filler cap and there is fuel system leakage (specify the following):
Type of tank _____
Tank location _____
Filler cap location _____
Tank damage _____
Location of leakage _____
Type of fuel _____
(9) Unknown if more than two tanks

COMMENTS

*** STOP: IF THE CDS APPLICABLE VEHICLE WAS NOT TOWED ***

(GV10=0)

DO NOT COMPLETE THE INTERIOR VEHICLE FORM.

U.S. Department of Transportation
National Highway Traffic Safety Administration

EXTERIOR VEHICLE LOG

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

TO BE COMPLETED BY TEAM

1. PSU Number ___ ___
2. Case Number—Stratum ___ ___ ___ ___
3. Researcher Completing Form ___
4. Vehicle Number ___ ___
5. Date Vehicle Inspected ___ ___/___ ___/___ ___
6. Number of Exterior Vehicle Slides ___ ___

TO BE COMPLETED BY ZONE CENTER

7. Applicable Precrash Measurements ___
   (0) Not applicable
   (1) Substandard - beyond researcher control
   (2) Substandard
   (3) Standard

8. Reference Line Placement ___
   (0) Not applicable (e.g. rollover)
   (1) Substandard - beyond researcher control
   (2) Substandard
   (3) Standard

9. Impact Damage Documentation ___
   (0) Not applicable
   (1) Substandard - beyond researcher control
   (2) Substandard
   (3) Standard

10. Quality Of Vehicle Damage Sketch ___
    (0) Not applicable (e.g., repaired vehicle)
    (1) Substandard - beyond researcher control
    (2) Substandard
    (3) Standard

11. Exterior Slides Subject Quality ___
    (0) Not applicable
    (1) Substandard - beyond researcher control
    (2) Substandard
    (3) Standard

12. Exterior Slides Quality ___
    (0) Not applicable
    (1) Substandard - beyond researcher control
    (2) Substandard
    (3) Standard

13. Primary Error Source (Vehicle Plane) ___
    (0) No error
    (1) Front
    (2) Side (left or right)
    (3) Back (rear)
    (4) Top
    (5) Undercarriage
    (8) Other (specify): _____

14. Number of Coded CDCs (0,1,2) ___
15. Number of Coded Crush Profiles (0,1,2) ___

DATA STATUS OF VARIABLE NUMBERS 4–47

Highest CDC

4	5	6	7	8	9	10	11

Secondary CDC

12	13	14	15	16	17	18	19

Highest Crush Profile

20	21	22

Secondary Crush Profile

23	24	25

26	27	28	29	30	31	32	33	34	35	36

37	38	39	40	41	42	43	44	45	46	47

Data Status Codes:

(Blank) Correct
(1) Derived error
(2) Non-correctable error
(3) Correctable error
(4) Change—no error
(5) Sequencing error
(7) Incorrect edit override
(8) MDE error
(9) Unknown coded

IF THIS VEHICLE WAS NOT TOWED (I.E., GV09 ≠ 1), DO NOT COMPLETE THE INTERIOR VEHICLE LOG

U.S. Department of Transportation
National Highway Traffic Safety Administration

INTERIOR VEHICLE FORM

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. Primary Sampling Unit Number ___
2. Case Number - Stratum 95-04-040E
3. Vehicle Number 01

INTEGRITY

4. Passenger Compartment Integrity 00
(00) No integrity loss

Yes, Integrity Was Lost Through
(01) Windshield
(02) Door (side)
(03) Door/hatch (back door)
(04) Roof
(05) Roof glass
(06) Side window
(07) Rear window (backlight)
(08) Roof and roof glass
(09) Windshield and door (side)
(10) Windshield and roof
(11) Side and rear window (side window and backlight)
(12) Windshield and side window
(13) Door and side window
(98) Other combination of above (specify): _____
(99) Unknown

Door, Tailgate or Hatch Opening

5. LF 1 6. RF 1 7. LR 1 8. RR 1 9. TG/H 0

(0) No door/gate/hatch
(1) Door/gate/hatch remained closed and operational
(2) Door/gate/hatch came open during collision
(3) Door/gate/hatch jammed shut
(8) Other (specify): _____
(9) Unknown

Damage/Failure Associated with Door, Tailgate or Hatch Opening in Collision. If IV05-IV09 ≠ 2, Then code Ø

10. LF 0 11. RF 0 12. LR 0 13. RR 0 14. TG/H 0

(0) No door/gate/hatch or door not opened

Door, Tailgate or Hatch Came Open During Collision
(1) Door operational (no damage)
(2) Latch/striker failure due to damage
(3) Hinge failure due to damage
(4) Door structure failure due to damage
(5) Door support (i.e., pillar, sill, roof side rail, etc.) failure due to damage
(6) Latch/striker and hinge failure due to damage
(8) Other failure (specify): _____
(9) Unknown

GLAZING

Type of Window/Windshield Glazing

15. WS 1 16. LF 2 17. RF 2 18. LR 2 19. RR 2
20. BL 2 21. Roof 0 22. Other 2

(0) No glazing
(1) AS-1 — Laminated
(2) AS-2 — Tempered
(3) AS-3 — Tempered-tinted (original)
(4) AS-2 — Tempered-with after market tint
(5) AS-3 — Tempered-tinted (with additional after market tint)
(6) AS-14 — Glass/Plastic
(7) Glazing removed prior to accident
(8) Other (specify): _____
(9) Unknown

Window Precrash Glazing Status

23. WS 1 24. LF 4 25. RF 4 26. LR 2 27. RR 2
28. BL 1 29. Roof 0 30. Other 1

(0) No glazing
(1) Fixed
(2) Closed
(3) Partially opened
(4) Fully opened
(7) Glazing removed prior to accident
(9) Unknown

Glazing Damage from Impact Forces

31. WS 2 32. LF 1 33. RF 1 34. LR 1 35. RR 1
36. BL 1 37. Roof 1 38. Other 0

(0) No glazing
(1) No glazing damage from impact forces
(2) Glazing in place and cracked from impact forces
(3) Glazing in place and holed from impact forces
(4) Glazing out-of-place (cracked or not) and not holed from impact forces
(5) Glazing out-of-place and holed from impact forces
(6) Glazing disintegrated from impact forces
(7) Glazing removed prior to accident
(9) Unknown if damaged

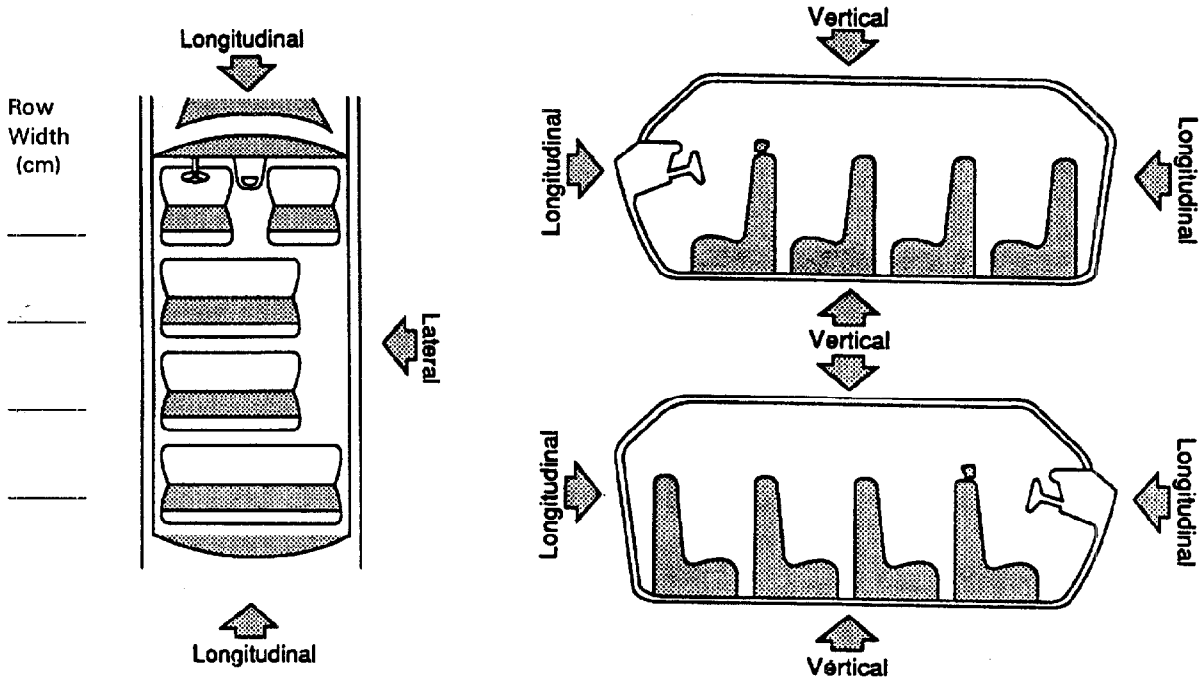
Glazing Damage from Occupant Contact

39. WS 1 40. LF 1 41. RF 1 42. LR 1 43. RR 1
44. BL 1 45. Roof 0 46. Other 1

(0) No glazing
(1) No occupant contact to glazing
(2) Glazing contacted by occupant but no glazing damage
(3) Glazing in place and cracked by occupant contact
(4) Glazing in place and holed by occupant contact
(5) Glazing out-of-place (cracked or not) by occupant contact and not holed by occupant contact
(6) Glazing out-of-place by occupant contact and holed by occupant contact
(7) Glazing removed prior to accident
(8) Glazing disintegrated by occupant contact
(9) Unknown if contacted by occupant

INTRUSION WORKSHEET

NOTE: SKETCH INTRUDED AREAS



LOCATION OF INTRUSION	INTRUDED COMPONENT	(All Measurements Are In Centimeters) COMPARISON VALUE — INTRUDED VALUE = INTRUSION	DOMINANT CRUSH DIRECTION
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	
		— =	

Document no more than the 15 most severe intrusions

OCCUPANT AREA INTRUSION

Note: If no intrusions, leave variables IV47-IV86 blank.

	Location of Intrusion	Intruding Component	Magnitude of Intrusion	Dominant Crush Direction
1st	47.___ ___	48.___ ___	49.___	50.___
2nd	51.___ ___	52.___ ___	53.___	54.___
3rd	55.___ ___	56.___ ___	57.___	58.___
4th	59.___ ___	60.___ ___	61.___	62.___
5th	63.___ ___	64.___ ___	65.___	66.___
6th	67.___ ___	68.___ ___	69.___	70.___
7th	71.___ ___	72.___ ___	73.___	74.___
8th	75.___ ___	76.___ ___	77.___	78.___
9th	79.___ ___	80.___ ___	81.___	82.___
10th	83.___ ___	84.___ ___	85.___	86.___

LOCATION OF INTRUSION

Front Seat
- (11) Left
- (12) Middle
- (13) Right

Second Seat
- (21) Left
- (22) Middle
- (23) Right

Third Seat
- (31) Left
- (32) Middle
- (33) Right

Fourth Seat
- (41) Left
- (42) Middle
- (43) Right

- (97) Catastrophic
- (98) Other enclosed area (specify) _____
- (99) Unknown

INTRUDING COMPONENT

Interior Components
- (01) Steering assembly
- (02) Instrument panel left
- (03) Instrument panel center
- (04) Instrument panel right
- (05) Toe pan
- (06) A (A1/A2)-pillar
- (07) B-pillar
- (08) C-pillar
- (09) D-pillar
- (10) Side panel - forward of the A1/A2-pillar
- (11) Door panel (side)
- (12) Side panel - rear of the B-pillar
- (13) Roof (or convertible top)
- (14) Roof side rail
- (15) Windshield
- (16) Windshield header
- (17) Window frame
- (18) Floor pan (includes sill)
- (19) Backlight header
- (20) Front seat back
- (21) Second seat back
- (22) Third seat back
- (23) Fourth seat back
- (24) Fifth seat back
- (25) Seat cushion
- (26) Back door/panel (e.g., tailgate)
- (27) Other interior component (specify): _____

Exterior Components
- (30) Hood
- (31) Outside surface of this vehicle (specify): _____
- (32) Other exterior object in the environment (specify): _____
- (33) Unknown exterior object
- (97) Catastrophic
- (98) Intrusion of unlisted component(s) (specify): _____
- (99) Unknown

MAGNITUDE OF INTRUSION

- (1) ≥ 3 centimeters but < 8 centimeters
- (2) ≥ 8 centimeters but < 15 centimeters
- (3) ≥ 15 centimeters but < 30 centimeters
- (4) ≥ 30 centimeters but < 46 centimeters
- (5) ≥ 46 centimeters but < 61 centimeters
- (6) ≥ 61 centimeters
- (7) Catastrophic
- (9) Unknown

DOMINANT CRUSH DIRECTION

- (1) Vertical
- (2) Longitudinal
- (3) Lateral
- (7) Catastrophic
- (9) Unknown

STEERING RIM/SPOKE DEFORMATION

(All Measurements Are in Centimeters)

COMPARISON VALUE	—	DAMAGE VALUE	=	DEFORMATION
	—		=	
	—		=	
	—		=	
	—		=	

STEERING COLUMN

87. Steering Column Type — 1
(1) Fixed column
(2) Tilt column
(3) Telescoping column
(4) Tilt and telescoping column
(8) Other column type (specify): _____
(9) Unknown

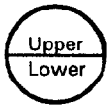
88. Tilt Steering Column Adjustment — 0
(0) No tilt steering column
(1) Full up
(2) Between full up and center
(3) Center
(4) Between center and full down
(5) Full down
(9) Unknown

89. Telescoping Steering Column Adjustment — 0
(0) No telescoping steering column
(1) Full back
(2) Between full back and midpoint
(3) Midpoint
(4) Between midpoint and full forward
(5) Full forward
(9) Unknown

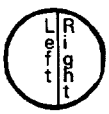
90. Steering Rim/Spoke Deformation — 02
____Code actual measured deformation to the nearest centimeter
(00) No steering rim deformation
(01-14) Actual measured value in centimeters
(15) 15 centimeters or more
(98) Observed deformation cannot be measured
(99) Unknown

91. Location of Steering Rim/Spoke Deformation — 05
(00) No steering rim deformation

Quarter Sections
(01) Section A
(02) Section B
(03) Section C
(04) Section D



Half Sections
(05) Upper half of rim/spoke
(06) Lower half of rim/spoke
(07) Left half of rim/spoke
(08) Right half of rim/spoke



(09) Complete steering wheel collapse
(10) Undetermined location
(99) Unknown

INSTRUMENT PANEL

92. Odometer Reading — 081,000
____ kilometers
Code to the nearest 1,000 kilometers
(000) No odometer
(001) Less than 1,500 kilometers
(500) 499,500 kilometers or more
(999) Unknown
50327 miles X 1.6093 = 81,007 kilometers
Source: odometer

93. Instrument Panel Damage from Occupant Contact? — 0
(0) No
(1) Yes
(9) Unknown

94. Type of Knee Bolster Covering — 2
(0) No knee bolster
(1) Padded
(2) Rigid plastic
(8) Other (specify): _____
(9) Unknown

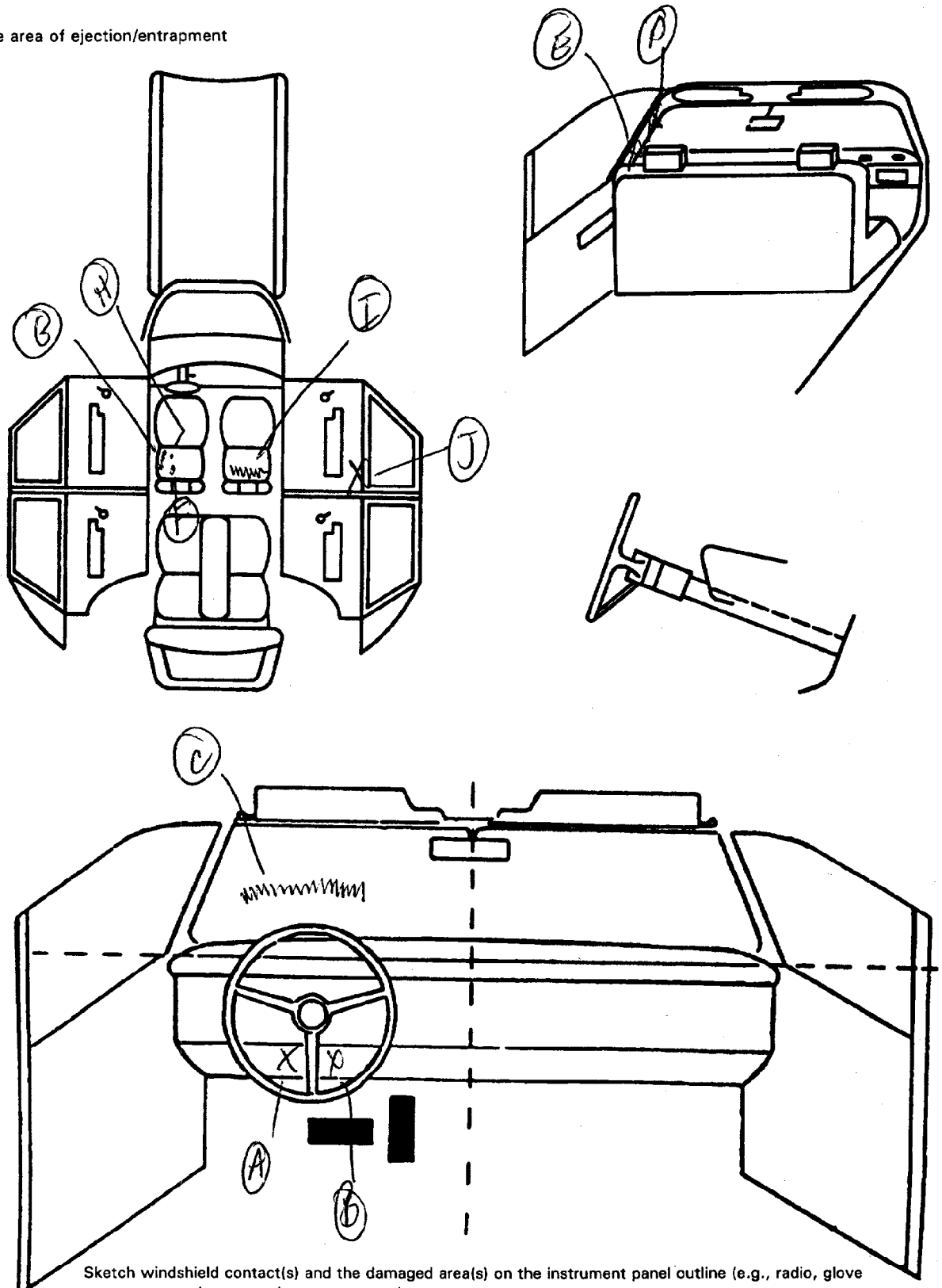
95. Knee Bolsters Deformed from Occupant Contact? — 1
(0) No knee bolster
(1) No deformation
(2) Yes - deformation
(9) Unknown

96. Did Glove Compartment Door Open During Collision(s)? — 1
(0) No glove compartment door
(1) No - door did not open
(2) Yes - door opened
(9) Unknown

97. Adaptive (Assistive) Driving Equipment — 0
(0) No adaptive driving equipment
(1) Adaptive driving equipment installed (Check all that apply.)
[ ] Hand controls for braking/acceleration
[ ] Steering control devices (attached to OEM steering wheel
[ ] Steering knob attached to steering wheel
[ ] Low effort power steering (unit or device)
[ ] Replacement steering wheel (i.e., reduced diameter)
[ ] Joy-stick steering controls
[ ] Wheelchair tie-downs
[ ] Modification to seat belts (specify): _____
[ ] Additional or relocated switches (specify): _____
[ ] Raised roof
[ ] Wall-mounted head rest (used behind wheelchair)
[ ] Other adaptive device (specify): _____
(9) Unknown

VEHICLE INTERIOR SKETCHES

Note area of ejection/entrapment



Sketch windshield contact(s) and the damaged area(s) on the instrument panel outline (e.g., radio, glove compartment, damage to instrument panel structure.
Cross hatch contact points, draw spider webs or use other annotation as may be appropriate.
Annotate the contacted area with a letter (begin with A) and list on the Points of Occupant Contact page.

A Begins 17 cm right of the knee bolster's left aspect and 1.5 cm inferior of the junction of the instrument panel and knee bolster, extending 5 cm right and 3 cm down.

B Begins 40 cm right of the knee bolster's left aspect and 6 cm inferior of the junction of the instrument panel and knee bolster, extending 2 cm right and 12 cm down.

C Begins 25 cm inferior to the windshield header (along the [plane of the windshield) and 7 cm right of the left A-pillar, extending 1.5 cm down and 23 cm right.

D Begins 17 cm inferior of the left roof side rail and A-pillar apex and 7 cm forward of the rear aspect of the left A-pillar, extending 5.5 cm down and 7 cm forward on the left A-pillar.

E Begins 46 cm inferior to the left roof side rail and A-pillar apex and 6 cm of the rear aspect of the left A-pillar, extending 9 cm down and 1.5 cm forward on the left A-pillar.

F Begins 10 cm inferior to the superior aspect of the left front seat back and 8.5 cm right of the left seat back seam, extending 2 cm down and 3 cm right.

G Begins 21 cm inferior to the superior aspect of the left front seat back and 11 cm from the left seat back seam, 1 cm diameter.

H Begins 10 cm inferior to the superior aspect of the left front seat back and 2 cm from the left seat back seam, extending 12 cm down and 2 cm right.

I Begins 4.5 cm inferior to the right front seat back and 4 cm left of the right seat back seam, extending 9 cm down and 35 cm to the right.

J Begins 41 cm inferior to the superior aspect of the right front door frame and 17 cm forward of the rear door panel, extending 3.5 cm down and 6 cm forward.

POINTS OF OCCUPANT CONTACT

Contact	Interior Component Contacted	Occupant No. If Known	Body Region If Known	Supporting Physical Evidence	Confidence Level of Contact Point
A	014	01	(1) knee	chalk transfer	1
B	014	01	(2) knee	chalk transfer	1
C	001	—	driver airbag	plastic airbag transfers	1
D	053	01	(2) hand	abrasions	2
E	053	01	(1) hand	abrasions	2
F	151	01		chalk	1
G	151	01		chalk	1
H	151	01		chalk	1
I	151	02		chalk	1
J	101	02		abrasions	2
K					
L					
M					
N					

CODES FOR INTERIOR COMPONENTS

FRONT
(001) Windshield
(002) Mirror
(003) Sunvisor
(004) Steering wheel rim
(005) Steering wheel hub/spoke
(006) Steering wheel (combination of codes 004 and 005)
(007) Steering column,transmission selector lever, other attachment
(008) Cellular telephone or CB radio
(009) Add on equipment(e.g., tapedeck, air conditioner)
(010) Left instrument panel and below
(011) Center instrument panel and below
(012) Right instrument panel and below
(013) Glove compartment door
(014) Knee bolster
(015) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, mirror, or steering assembly (driver side only)
(016) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, or mirror (passenger side only)
(017) Windshield reinforced by exterior object, (specify): _____
(019) Other front object (specify): _____

LEFT SIDE
(051) Left side interior surface, excluding hardware or armrests
(052) Left side hardware or armrest
(053) Left A (A1/A2)-pillar
(054) Left B-pillar
(055) Other left pillar (specify): _____
(056) Left side window glass
(057) Left side window frame
(058) Left side window sill
(059) Left side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(060) Other left side object (specify): _____

RIGHT SIDE
(101) Right side interior surface, excluding hardware or armrests
(102) Right side hardware or armrest
(103) Right A (A1/A2)-pillar
(104) Right B-pillar
(105) Other right pillar (specify): _____
(106) Right side window glass
(107) Right side window frame
(108) Right side window sill
(109) Right side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(110) Other right side object (specify): _____

INTERIOR
(151) Seat, back support
(152) Belt restraint webbing/buckle
(153) Belt restraint B-pillar or door frame attachment point
(154) Other restraint system component (specify): _____
(155) Head restraint system
(160) Other occupants (specify): _____
(161) Interior loose objects
(162) Child safety seat (specify): _____
(163) Other interior object (specify): _____

AIR BAG
(170) Air bag-driver side
(175) Air bag compartment cover-driver side
(180) Air bag-passenger side
(185) Air bag compartment cover-passenger side
(190) Other air bag (specify) _____
(195) Other air bag compartment cover (specify) _____

ROOF
(201) Front header
(202) Rear header
(203) Roof left side rail
(204) Roof right side rail
(205) Roof or convertible top

FLOOR
(251) Floor (including toe pan)
(252) Floor or console mounted transmission lever, including console
(253) Parking brake handle
(254) Foot controls including parking brake

REAR
(301) Backlight (rear window)
(302) Backlight storage rack, door, etc.
(303) Other rear object (specify): _____

ADAPTIVE (ASSISTIVE) DRIVING EQUIPMENT
(401) Hand controls for braking/acceleration
(402) Steering control devices (attached to OEM steering wheel)
(403) Steering knob attached to steering wheel
(405) Replacement steering wheel (i.e., reduced diameter)
(406) Joy stick steering controls
(407) Wheelchair tie-downs
(408) Modification to seat belts, (specify): _____
(409) Additional or relocated switches, (specify): _____
(410) Raised roof
(411) Wall mounted head rest (used behind wheel chair)
(412) Other adaptive device (specify): _____

CONFIDENCE LEVEL OF CONTACT POINT
(1) Certain
(2) Probable
(3) Possible

MANUAL RESTRAINTS

NOTES: Encode the applicable data **for each seat position** in the vehicle. The attribute for the variable may be found below. Restraint systems should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.

If a child safety seat is present, encode the data on the back of this page 11.

If the vehicle has automatic restraints available, encode the appropriate data on page 6.

		Left	Center	Right
FIRST	A-Availability			
	B-Evidence of usage			
	C-Used in this crash?			
	D-Proper Use			
	E-Failure Modes			
	F-Anchorage Adjustment			
SECOND	A-Availability			
	B-Evidence of usage			
	C-Used in this crash?			
	D-Proper Use			
	E-Failure Modes			
	F-Anchorage Adjustment			
OTHER	A-Availability			
	B-Evidence of usage			
	C-Used in this crash?			
	D-Proper Use			
	E-Failure Modes			
	F-Anchorage Adjustment			

A-Manual (Active) Belt System Availability

(0) None available
(1) Belt removed/destroyed
(2) Shoulder belt
(3) Lap belt
(4) Lap and shoulder belt
(5) Belt available - type unknown

Integral Belt Partially Destroyed

(6) Shoulder belt (lap belt destroyed/removed)
(7) Lap belt (shoulder belt destroyed/removed)
(8) Other belt (specify): _____
(9) Unknown

B/C-Manual (Active) Belt System Use

(00) None used, not available, or belt removed/destroyed
(01) Inoperable (specify): _____
(02) Shoulder belt
(03) Lap belt
(04) Lap and shoulder belt
(05) Belt used - type unknown
(08) Other belt used (specify): _____
(12) Shoulder belt used with child safety seat
(13) Lap belt used with child safety seat
(14) Lap and shoulder belt used with child safety seat
(15) Belt used with child safety seat - type unknown
(18) Other belt used with child safety seat (specify): _____
(99) Unknown if belt used

D-Proper Use of Manual (Active) Belts

(0) None used or not available
(1) Belt used properly
(2) Belt used properly with child safety seat

Belt Used Improperly

(3) Shoulder belt worn under arm
(4) Shoulder belt worn behind back or seat
(5) Belt worn around more than one person
(6) Lap belt worn on abdomen
(7) Lap belt or lap and shoulder belt used improperly with child safety seat (specify): _____
(8) Other improper use of manual belt system (specify): _____
(9) Unknown

E-Manual (Active) Belt Failure Modes During Accident

(0) No manual belt used or not available
(1) No manual belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify): _____
(6) Broken retractor
(7) Combination of above (specify): _____
(8) Other manual belt failure (specify): _____
(9) Unknown

F-Shoulder Belt Upper Anchorage Adjustment

(0) No shoulder belt
(1) No upper anchorage adjustment for shoulder belt

Adjustable shoulder Belt Upper Anchorage

(2) In full up position
(3) In mid position
(4) In full down position
(5) Position unknown
(9) Unknown if position has adjustable upper anchorage adjustment

AUTOMATIC RESTRAINTS

NOTES: Encode the data for each applicable front seat position. The attribute for the variables may be found below. Restraint systems should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.

AIR BAGS

		Frontal Air Bags--**Left Front**	Frontal Air Bags-**Right Front**	OtherAir Bag
FIRST	Availability/Function	/	/	
	Deployment	/	/	
	Failure	/	/	

Air Bag System Availability/Function
(0) Not equipped/not available
(1) Air bag

Non-functional
(2) Air bag disconnected (specify):

_____
(3) Air bag not reinstalled
(9) Unknown

Air Bag System Deployment
(This Occupant Position)
(0) Not equipped/not available
(1) Deployed during accident (as a result of impact)
(2) Deployed inadvertently just prior to accident
(3) Deployed, accident sequence undetermined
(4) Deployed as a result of a noncollision event during accident sequence (e.g., fire, explosion, electrical)
(5) Unknown if deployed
(7) Nondeployed
(9) Unknown

Are There Indications of Air Bag System Failure? (This Occupant Position)
(0) Not equipped/not available
(1) No
(2) Yes (specify):

_____
(9) Unknown

AUTOMATIC BELTS

		Left	Right
FIRST	A-Availability/Function		
	B-Use		
	C-Type		
	D-Proper Use		
	E-Failure Modes		

A-Automatic (Passive) Belt System Availability/Function
(0) Not equipped/not available
(1) 2 point automatic belts
(2) 3 point automatic belts
(3) Automatic belts - type unknown

Non-functional
(4) Automatic belts destroyed or rendered inoperative
(9) Unknown

B-Automatic (Passive) Belt System Use
(0) Not equipped/not available/destroyed or rendered inoperative
(1) Automatic belt in use
(2) Automatic belt not in use (manually disconnected, motorized track inoperative)
(3) Automatic belt use unknown
(9) Unknown

C-Automatic (Passive) Belt System Type
(0) Not equipped/not available
(1) Non-motorized system
(2) Motorized system
(9) Unknown

D-Proper Use of Automatic (Passive) Belt System
(0) Not equipped/not available/not used
(1) Automatic belt used properly
(2) Automatic belt used properly with child safety seat

Automatic Belt Used Improperly
(3) Automatic shoulder belt worn under arm
(4) Automatic shoulder belt worn behind back
(5) Automatic belt worn around more than one person
(6) Lap portion of automatic belt worn on abdomen
(7) Automatic lap and shoulder belt or automatic shoulder belt used improperly with child safety seat (specify):

_____
(8) Other improper use of automatic belt system (specify):_____
(9) Unknown

E-Automatic (Passive) Belt Failure Modes During Accident
(0) Not equipped/not available/not in use
(1) No automatic belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify):

_____
(6) Broken retractor
(7) Combination of above (specify):
(8) Other automatic belt failure (specify):

_____
(9) Unknown

FIRST SEAT FRONTAL AIR BAGS

NOTES: Encode the applicable data ***for the driver and first seat passenger*** in the vehicle. The attribute for the variable may be found below. Restraint systems should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.

	Driver	Passenger
A-Type of air bag?	1	1
B-Flaps open at tear points?	2	2
C-Flaps damaged?	1	1
D-Air bag damaged?	01	01
E-Source of air bag damage	01	01
F-Air bag tethered?	1	1
G-Air bag have vent ports?	2	2
H-Other occupant contact air bag?	1	1
I-Occupant wearing eyewear?	1	1

A-Type of Air Bag
- (0) Not equipped/not available
- (1) Original manufacturer installed system
- (2) Retrofitted air bag
- (3) Replacement air bag
- (8) Unknown type of air bag
- (9) Unknown

B-Did Air Bag Module Cover Flap(s) Open At Designated Tear Points?
- (0) Not equipped/not available
- (1) No
- (2) Yes
- (3) Deployed, unknown if flap(s) opened at designated tear points
- (7) Not deployed
- (8) Unknown if deployed
- (9) Unknown

C-Were Air Bag Module Cover Flap(s) Damaged?
- (0) Not equipped/not available
- (1) No
- (2) Yes (specify): _____
- (3) Deployed, unknown if air bag module cover flap(s) damaged
- (7) Not deployed
- (8) Unknown if deployed
- (9) Unknown

Drivers Air Bag
2 vent ports
1 and 11 o'clock
2.75 cm diameter

D-Was There Damage To The Air Bag?
- (00) Not equipped/not available
- (01) Not damaged

Yes - Air Bag Damage
- (02) Ruptured
- (03) Cut
- (04) Torn
- (05) Holed
- (06) Burned
- (07) Abraded
- (88) Other damage (specify): _____
- (95) Damaged, details unknown
- (96) Deployed, unknown if damaged
- (97) Not deployed
- (98) Unknown if deployed
- (99) Unknown

E-Source of Air Bag Damage
- (00) Not equipped/not available
- (01) Not damaged
- (02) Object worn by occupant, (specify): _____
- (03) Object carried by occupant, (specify): _____
- (04) Adaptive/assistive controls, (specify): _____
- (05) Fire in vehicle
- (06) Thermal burns
- (07) Rescue or emergency efforts
- (88) Other damage source (specify): _____
- (95) Damaged, unknown source
- (96) Deployed, unknown if damaged
- (97) Not deployed
- (98) Unknown if deployed
- (99) Unknown

Passenger Air Bag
2 vent ports
3 and 9 o'clock
5½ cm diameter

F-Was The Air Bag Tethered?
- (0) Not equipped/not available
- (1) No
- (2) Yes (specify number of tether straps): _____
- (3) Deployed, unknown if tethered
- (7) Not deployed
- (8) Unknown if deployed
- (9) Unknown

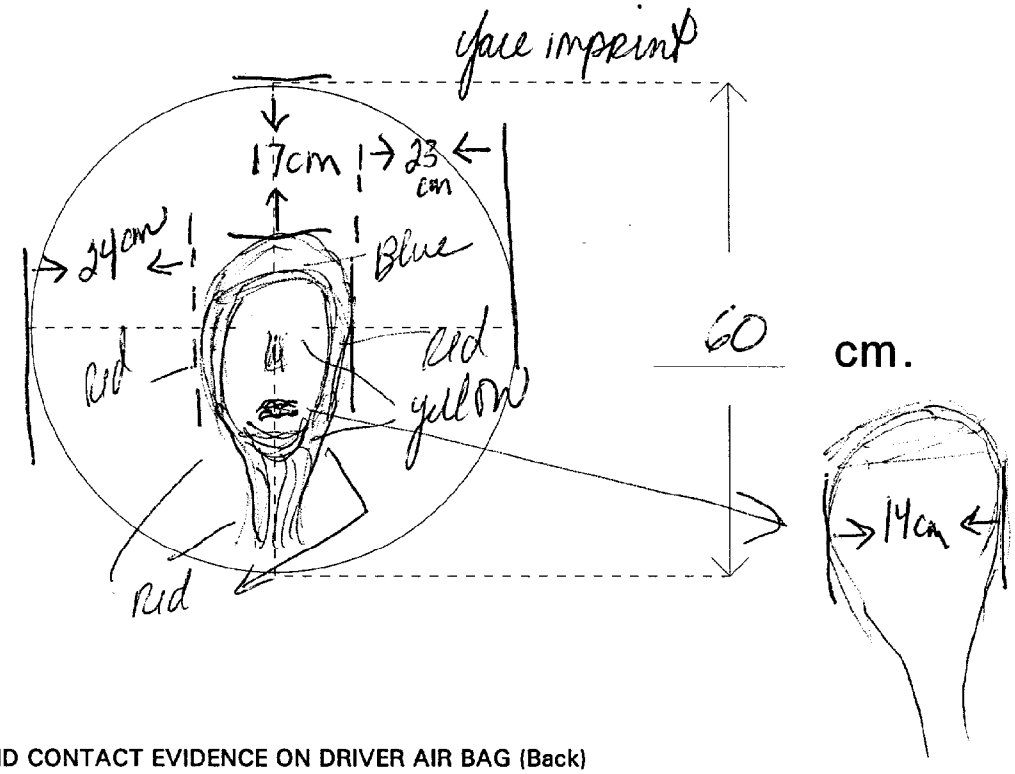
G-Did The Air Bag Have Vent Ports?
- (0) Not equipped/not available
- (1) No
- (2) Yes (specify number of vent ports): _____
- (3) Deployed, unknown if vent ports present
- (7) Not deployed
- (8) Unknown if deployed
- (9) Unknown

H-Was the Air Bag in this Occupant's Position Contacted by Another Occupant?
- (0) Not equipped/not available
- (1) No
- (2) Yes (specify): _____
- (3) Deployed, unknown if other occupant contact to air bag
- (7) Not deployed
- (8) Unknown if deployed
- (9) Unknown

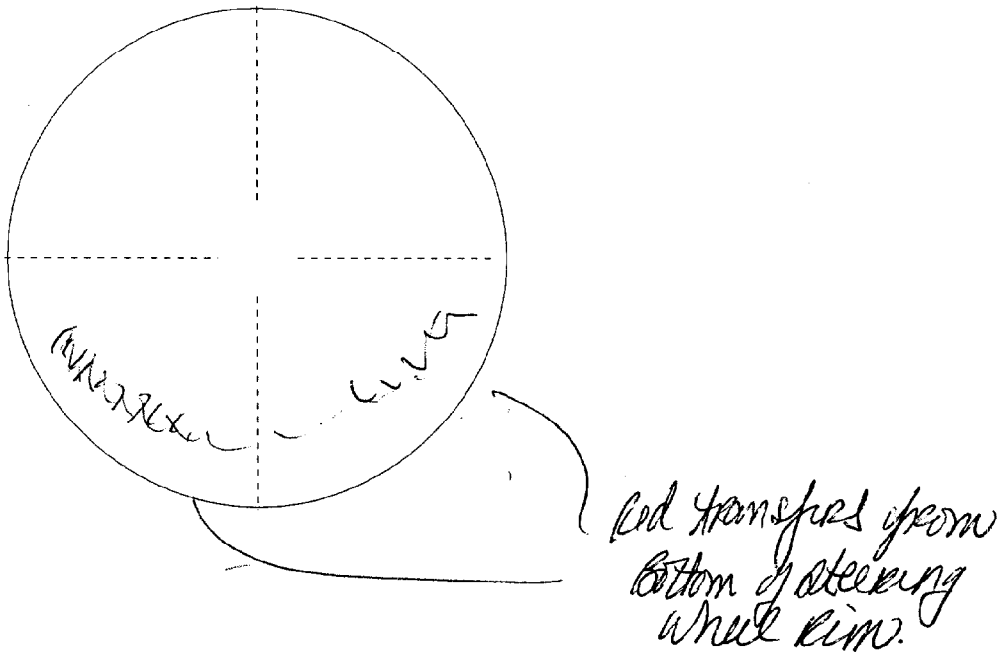
I-Was This Occupant Wearing Eye-wear?
- (0) Not equipped/not available
- (1) No
- (2) Eyeglasses/sunglasses
- (3) Contact lenses
- (4) Deployed, unknown if eyewear worn
- (7) Not deployed
- (8) Unknown if deployed
- (9) Unknown

DRIVER AIR BAG DAMAGE AND CONTACT SKETCHES

1. SKETCH DAMAGE AND CONTACT EVIDENCE ON DRIVER AIR BAG (Front)



2. SKETCH DAMAGE AND CONTACT EVIDENCE ON DRIVER AIR BAG (Back)

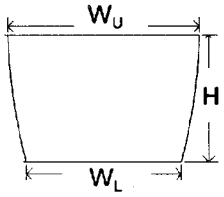


DRIVER AIR BAG SKETCHES (Cont'd)

3. DRIVER AIR BAG MODULE COVER FLAP SIZE (SINGLE)

width (W_U) _____ width (W_L) _____

height (H) _____

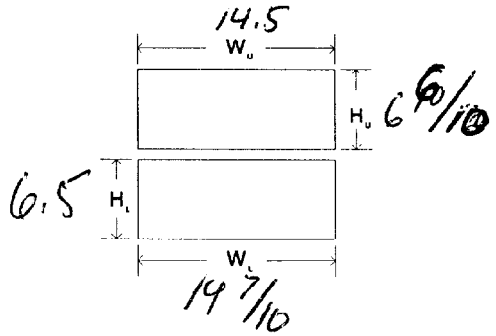


4. DRIVER AIR BAG MODULE COVER FLAP SIZE (DOUBLE)

a. Upper Flap b. Lower Flap

width (W_U) 14.5 width (W_L) 14 7/10

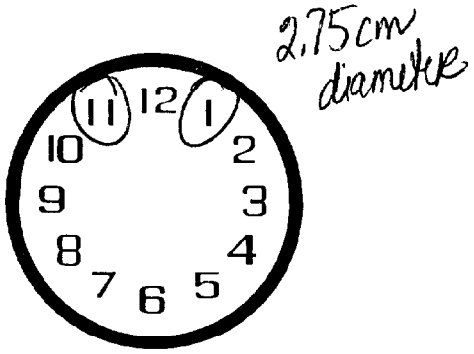
height (H_U) 6 6/10 height (H_L) 6.5



5. SKETCH OF OTHER TYPE OF AIR BAG MODULE FLAP AND SIZE

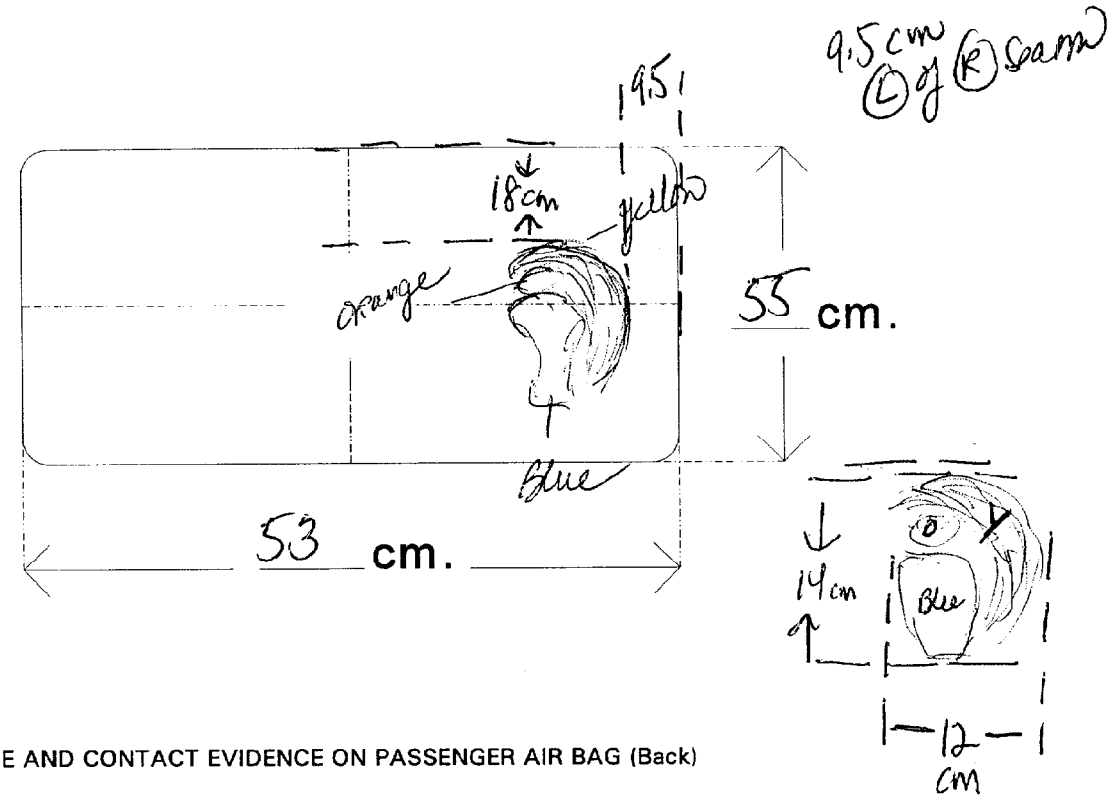
6. SKETCH OF OTHER TYPE OF AIR BAG VENT PORTS

7. SKETCH LOCATION OF CIRCULAR AIR BAG VENT PORTS

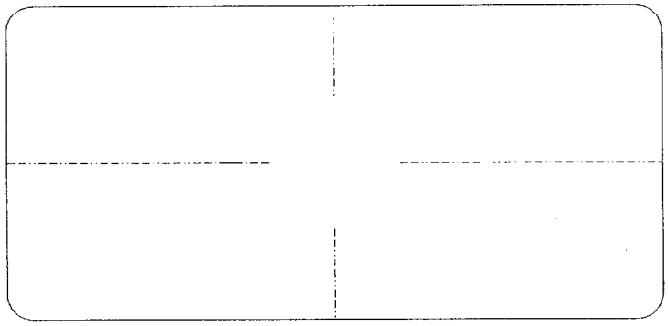


PASSENGER AIR BAG DAMAGE AND CONTACT SKETCHES

1. SKETCH DAMAGE AND CONTACT EVIDENCE ON PASSENGER AIR BAG (Front)



2. SKETCH DAMAGE AND CONTACT EVIDENCE ON PASSENGER AIR BAG (Back)

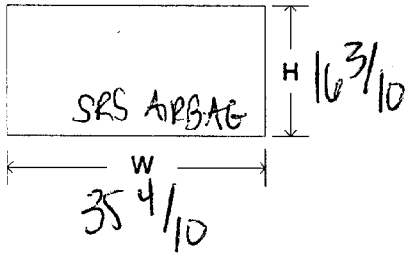


PASSENGER AIR BAG SKETCHES (Cont'd)

3. PASSENGER AIR BAG MODULE COVER FLAP SIZE (SINGLE)

width (W) 35 4/10

height (H) 16 3/10



Mud-mounted flap

4. PASSENGER AIR BAG MODULE COVER FLAP SIZE (DOUBLE)

a. Upper Flap

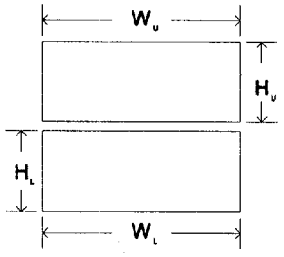
width (W_U) _____

height (H_U) _____

b. Lower Flap

width (W_L) _____

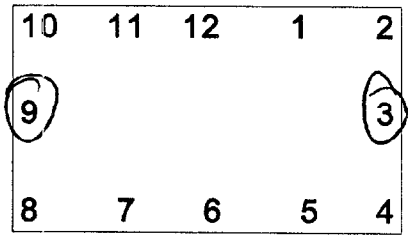
height (H_L) _____



5. SKETCH OF OTHER TYPE OF AIR BAG MODULE FLAP AND SIZE

6. SKETCH OF OTHER TYPE OF AIR BAG VENT PORTS

7. SKETCH LOCATION OF RECTANGULAR AIR BAG VENT PORTS



5/8 cm in diameter

"OTHER" AIR BAG DAMAGE AND CONTACT SKETCHES

1. SKETCH DAMAGE AND CONTACT EVIDENCE ON *"OTHER"* AIR BAG (Front)

2. SKETCH DAMAGE AND CONTACT EVIDENCE ON *"OTHER"* AIR BAG (Back)

"OTHER" AIR BAG SKETCHES (Cont'd)

3. SKETCH AIR BAG MODULE FLAP AND SIZE OR OPENING FOR AIRBAG

4. SKETCH AIR BAG VENT PORTS

HEAD RESTRAINTS/SEAT EVALUATION

NOTES: **Encode the applicable data for each seat position in the vehicle. The attribute for these variables may be found on the next page. Head restraint type/damage and seat type/performance should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.**

		Left	Center	Right
FIRST	A-Head Restraint Type/Damage	1		1
	B-Seat Type	01		01
	C-Seat Orientation	1		1
	D-Seat Track Position	3 (2 notches from full forward)		5 (1 notch from full Back.)
	E-Seat Back Incline Pre/Post Impact	14		14
	F-Seat Performance	1		1
SECOND	A-Head Restraint Type/Damage			
	B-Seat Type			
	C-Seat Orientation	1	NO Seat available	1
	D-Seat Track Position			
	E-Seat Back Incline Pre/Post Impact			
	F-Seat Performance			
THIRD	A-Head Restraint Type/Damage			
	B-Seat Type			
	C-Seat Orientation			
	D-Seat Track Position			
	E-Seat Back Incline Pre/Post Impact			
	F-Seat Performance			
OTHER	A-Head Restraint Type/Damage			
	B-Seat Type			
	C-Seat Orientation			
	D-Seat Track Position			
	E-Seat Back Incline Pre/Post Impact			
	F-Seat Performance			

RF passenger Seat Back reclined 17° in full up position

DESCRIBE ANY INDICATION OF ABNORMAL OCCUPANT POSTURE

(I.E., UNUSUAL OCCUPANT CONTACT PATTERN)

HEAD RESTRAINTS/SEAT EVALUATION

A-Head Restraint Type/Damage by Occupant at This Occupant Position
(0) No head restraints
(1) Integral — no damage
(2) Integral — damaged during accident
(3) Adjustable — no damage
(4) Adjustable — damaged during accident
(5) Add-on — no damage
(6) Add-on — damaged during accident
(8) Other Specify):_____
(9) Unknown

B-Seat Type (this Occupant Position)
(00) Occupant not seated or no seat
(01) Bucket
(02) Bucket with folding back
(03) Bench
(04) Bench with separate back cushions
(05) Bench with folding back(s)
(06) Split bench with separate back cushions
(07) Split bench with folding back(s)
(08) Pedestal (i.e., column supported)
(09) Box mounted seat (i.e., van type)
(10) Other seat type (specify):

_____
(99) Unknown

C-Seat Orientation (this Occupant Position)
(0) Occupant not seated or no seat
(1) Forward facing seat
(2) Rear facing seat
(3) Side facing seat (inward)
(4) Side facing seat (outward)
(8) Other (specify):

_____
(9) Unknown

D-Seat Track Adjusted Position Prior To Impact
(0) Occupant not seated or no seat
(1) Non-adjustable seat track

Adjustable Seat Track
(2) Seat at forward most track position
(3) Seat between forward most and middle track positions
(4) Seat at middle track position
(5) Seat between middle and rear most track positions
(6) Seat at rear most track position
(9) Unknown

E-Seat Back Incline Prior and Post Impact
(00) Occupant not seated or no seat
(01) Not adjustable

Upright prior to impact
(11) Moved to completely rearward position
(12) Moved to rearward midrange position
(13) Moved to slightly rearward position
(14) Retained pre-impact position
(15) Moved to slightly forward position
(16) Moved to forward midrange position
(17) Moved to completely forward position

Slightly reclined prior to impact
(21) Moved to completely rearward position
(22) Moved to rearward midrange position
(23) Retained pre-impact postion
(24) Moved to upright position
(25) Moved to slightly forward position
(26) Moved to forward midrange position
(27) Moved to completely forward position

Completely reclined prior to impact
(31) Retained pre-impact position
(32) Moved to rearward midrange position
(33) Moved to slightly rearward position
(34) Moved to upright position
(35) Moved to slightly forward position
(36) Moved to forward midrange position
(37) Moved to completely forward position

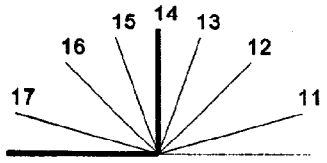
(99) Unknown

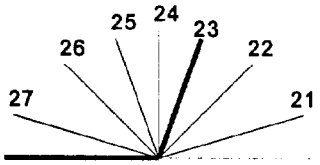
F-Seat Performance (this Occupant Position)
(0) Occupant not seated or no seat
(1) No seat performance failure(s)
(2) Seat adjusters failed
(3) Seat back folding locks or "seat back" failed (specify):

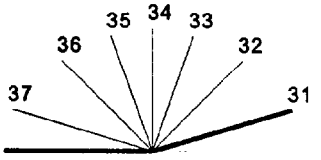
_____
(4) Seat tracks/anchors failed
(5) Deformed by impact of occupant
(6) Deformed by passenger compartment intrusion (specify):_____
(7) Combination of above (specify):

_____
(8) Other (specify):

_____
(9) Unknown







Coding diagrams for *Seat Back Incline Position Prior and Post Impact*

DESCRIBE ANY INDICATION OF ABNORMAL OCCUPANT POSTURE (I.E., UNUSUAL OCCUPANT CONTACT PATTERN)

CHILD SAFETY SEAT FIELD ASSESSMENT

When a child safety seat is present enter the occupant's number in the first row and complete the column below the occupant's number using the codes listed below. Complete a column for each child safety seat present.

Occupant Number						
1. Type of Child Safety Seat						
2. Child Safety Seat Orientation						
3. Child Safety Seat Harness Usage						
4. Child Safety Seat Shield Usage						
5. Child Safety Seat Tether Usage						
6. Child Safety Seat Make/Model	Specify Below for Each Child Safety Seat					

1. Type of Child Safety Seat
   - (0) No child safety seat
   - (1) Infant seat
   - (2) Toddler seat
   - (3) Convertible seat
   - (4) Booster seat
   - (7) Other type child safety seat (specify): _____
   - (8) Unknown child safety seat type
   - (9) Unknown if child safety seat used

2. Child Safety Seat Orientation

   (00) No child safety seat

   Designed for Rear Facing for This Age/Weight
   - (01) Rear facing
   - (02) Forward facing
   - (08) Other orientation (specify): _____
   - (09) Unknown orientation

   Designed for Forward Facing for This Age/Weight
   - (11) Rear facing
   - (12) Forward facing
   - (18) Other orientation (specify): _____
   - (19) Unknown orientation

   Unknown Design or Orientation For This Age/Weight, or Unknown Age/Weight
   - (21) Rear facing
   - (22) Forward facing
   - (28) Other orientation (specify): _____
   - (29) Unknown orientation

   (99) Unknown if child safety seat used

3. Child Safety Seat Harness Usage

4. Child Safety Seat Shield Usage

5. Child Safety Seat Tether Usage
   Note: Options Below Are Used for Variables 3-5.

   (00) No child safety seat

   Not Designed with Harness/Shield/Tether
   - (01) After market harness/shield/tether added, not used
   - (02) After market harness/shield/tether used
   - (03) Child safety seat used, but no after market harness/shield/tether added
   - (09) Unknown if harness/shield/tether added or used

   Designed With Harness/Shield/Tether
   - (11) Harness/shield/tether not used
   - (12) Harness/shield/tether used
   - (19) Unknown if harness/shield/tether used

   Unknown If Designed With Harness/Shield/Tether
   - (21) Harness/shield/tether not used
   - (22) Harness/shield/tether used
   - (29) Unknown if harness/shield/tether used

   (99) Unknown if child safety seat used

6. Child Safety Seat Make/Model
   (Specify make/model and occupant number)

   _____

   _____

   _____

   _____

EJECTION/ENTRAPMENT DATA

Complete the following if the researcher has any indication that an occupant was either ejected from or entrapped in the vehicle. Code the appropriate data on the Occupant Assessment Form.

EJECTION No [X] Yes [ ]

Describe indications of ejection and body parts involved in partial ejection(s):

Occupant Number						
Ejection						
(Note on Vehicle Interior Sketch) Ejection Area						
Ejection Medium						
Medium Status						

Ejection
(1) Complete ejection
(2) Partial ejection
(3) Ejection, Unknown degree
(9) Unknown

Ejection Area
(1) Windshield
(2) Left front
(3) Right front
(4) Left rear
(5) Right rear
(6) Rear
(7) Roof
(8) Other area (e.g., back of pickup, etc.) (specify): _____
(9) Unknown

Ejection Medium
(1) Door/hatch/tailgate
(2) Nonfixed roof structure
(3) Fixed glazing
(4) Nonfixed glazing (specify): _____
(5) Integral structure
(8) Other medium (specify): _____
(9) Unknown

Medium Status (Immediately Prior to Impact)
(1) Open
(2) Closed
(3) Integral structure
(9) Unknown

ENTRAPMENT No [X] Yes [ ]

Describe entrapment mechanism: _____

Component(s): _____

(Note on vehicle interior sketch)

U.S. Department of Transportation
National Highway Traffic Safety Administration

INTERIOR VEHICLE LOG

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

TO BE COMPLETED BY TEAM

1. PSU Number ____
2. Case Number—Stratum ____ ____
3. Researcher Completing Form ____
4. Vehicle Number ____
5. Number of Interior Vehicle Slides ____

TO BE COMPLETED BY ZONE CENTER

6. Documentation Of Integrity ____
7. Documentation Of Glazing ____
8. Documentation of Intrusions ____
9. Documentation of Steering Column/Wheel ____
10. Documentation of Occupant Contacts ____
11. Documentation of Seat Belt Type/Availability/Usage ____
12. Documentation of Air Bag Type/Availability/Deployment ____
13. Documentation of Seats ____
14. Documentation of Ejection/Entrapment ____
15. Interior Slides Subject Quality ____
16. Interior Slides Quality ____

Codes For Log Variables 6-16
(0) Not applicable
(1) Substandard - beyond researcher control
(2) Substandard
(3) Standard

17. Number of Coded Intrusions ____

DATA STATUS OF VARIABLE NUMBERS 4–97

Integrity

4	5	6	7	8	9	10	11	12	13	14

Glazing

15	16	17	18	19	20	21	22	23	24	25

26	27	28	29	30	31	32	33	34	35	36

37	38	39	40	41	42	43	44	45	46

Intrusion

47	48	49	50	51	52	53	54	55	56	57

58	59	60	61	62	63	64	65	66	67	68

69	70	71	72	73	74	75	76	77	78	79

80	81	82	83	84	85	86

Steering Column/Wheel and Instrument Panel

87	88	89	90	91	92	93	94	95	96	97

Data Status Codes:

(Blank) Correct
(1) Derived error
(2) Non-correctable error
(3) Correctable error
(4) Change—no error
(5) Sequencing error
(7) Incorrect edit override
(8) MDE error
(9) Unknown coded

U.S. Department of Transportation
National Highway Traffic Safety Administration

EXTERIOR VEHICLE FORM

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. Primary Sampling Unit Number ____
2. Case Number - Stratum 95-04-040E
3. Vehicle Number 02

VEHICLE IDENTIFICATION

VIN JT2AW15C8H0102517 Model Year 87

Vehicle Make (specify): Toyota Vehicle Model (specify): MR2

LOCATOR

Locate the end of the damage with respect to the vehicle's damaged center point or bumper corner for end impacts or an undamaged axle for side impacts.

Specific Impact No.	Location of Direct Damage	Location of Field L	Location of Max Crush
1	LF bumper corner	LF bumper corner	C6
	extending 20 cm	extending 82 cm	
	rearward	rearward	

CRUSH PROFILE IN CENTIMETERS

NOTES: Identify the plane at which the C-measurements are taken (e.g., at bumper, above bumper, at sill, above sill, etc.) and label adjustments (e.g., free space).

Measure C1 to C6 from driver to passenger side in front or rear impacts and rear to front in side impacts.

Free space value is defined as the distance between the baseline and the original body contour taken at the individual C locations. This may include the following: bumper lead, bumper taper, side protrusion, side taper, etc. Record the value for each C-measurement and maximum crush.

Use as many lines/columns as necessary to describe each damage profile.

Specific Impact Number	Plane of Impact C-Measurements	Direct Damage Width (CDC)	Direct Damage Max Crush	Field L	C_1	C_2	C_3	C_4	C_5	C_6	±D
1	left mid-door	20 cm		82	10	6.5	7	7	12	55	@20
	& adjustment				8	8	8	8	8	8	
	free space				2	3	4	6	7	14	
	resultant	20 cm	33	82	0	0	0	0	0	33	T20

ORIGINAL SPECIFICATIONS WORK SHEET

Wheelbase	91.3	inches	x	2.54	=	232 cm
Overall Length	155.5	inches	x	2.54	=	395 cm
Maximum Width	65.3	inches	x	2.54	=	167 cm
Curb Weight	2,350	pounds	x	.4536	=	1,066 kg
Average Track	56.6	inches	x	2.54	=	144 cm
Front Overhang	35.4	inches	x	2.54	=	90 cm
Rear Overhang	28.7	inches	x	2.54	=	73 cm
Undeformed End Width	___.___	inches	x	2.54	=	___ cm
Engine Size: cyl./displ.	____	cc	x	.001	=	___.___ L
	___	CID	x	.0164	=	___.___ L

VEHICLE DAMAGE SKETCH

TIRE–WHEEL DAMAGE

	a. Rotation physically restricted	b. Tire deflated
RF	2	2
LF	1	2
RR	2	2
LR	2	2

(1) Yes (2) No (8) NA (9) Unk.

TYPE OF TRANSMISSION

☐ Manual ☒ Automatic

END SHIFT ≥ 10 CM

☒ Yes ☐ No

ORIGINAL SPECIFICATIONS

Wheelbase	232	cm
Overall Length	395	cm
Maximum Width	166.6	cm
Curb Weight	1066	kg
Average Track	144	cm
Front Overhang	90	cm
Rear Overhang	73	cm
Undeformed End Width	—	cm
Engine Size: cyl./displ.		L

WHEEL STEER ANGLES

(For locked front wheels or displaced rear axles only)

RF ± ___ ___ °
LF ± ___ ___ °
RR ± ___ ___ °
LR ± ___ ___ °

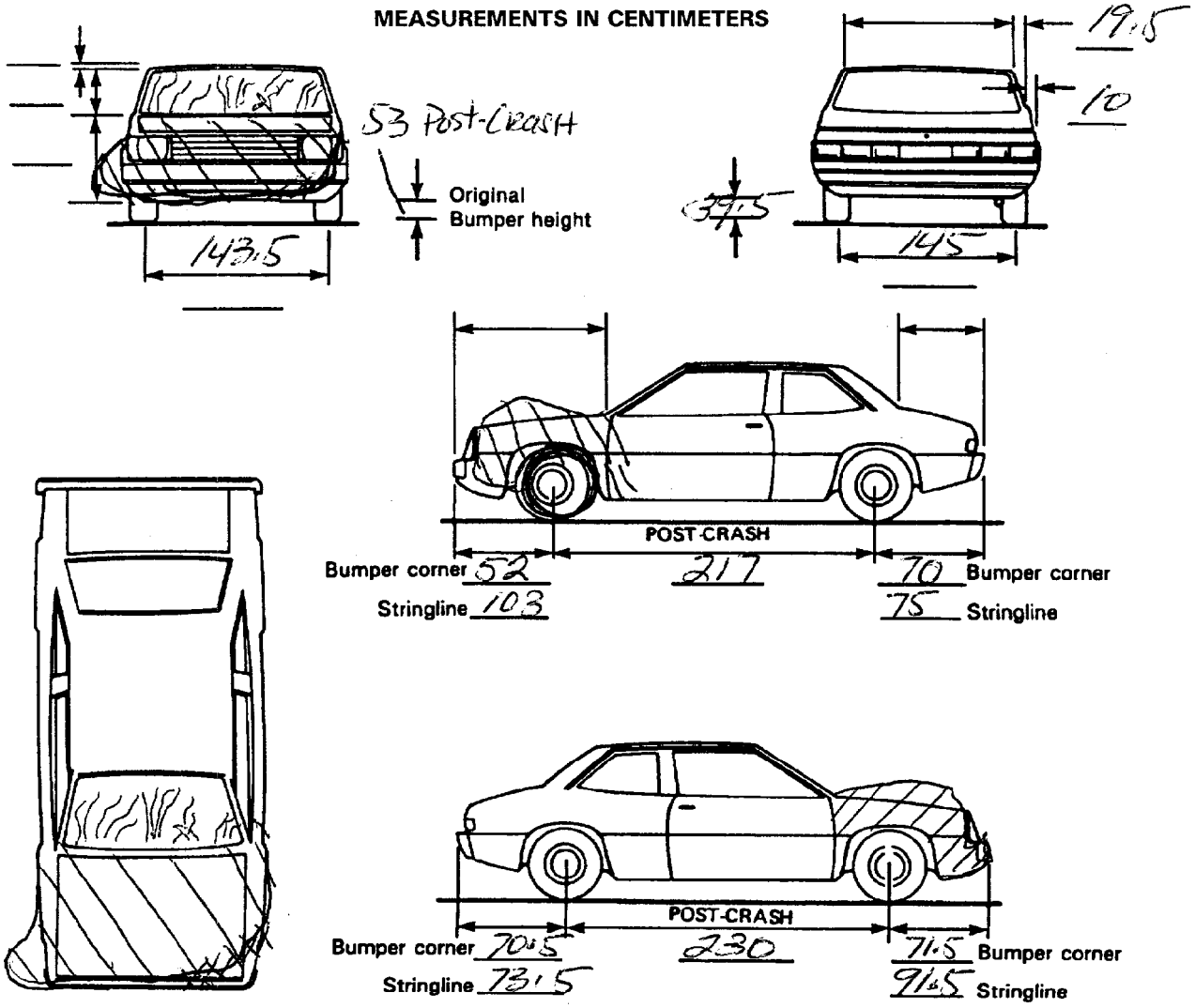
Within ± 5 degrees

DRIVE WHEELS

☐ FWD ☐ RWD ☐ 4WD

Approximate Cargo Weight 0 kg

MEASUREMENTS IN CENTIMETERS



NOTES: Sketch new perimeter and cross hatch direct damage and single hatch induced damage on all views. Annotate observations which might be useful in reconstructing the accident (e.g., grass in tire bead, direction of striations, scuff on sidewalls, etc.). If pulling trailer, sketch type of trailer and damage received on the back of this page.

Annotate any damage caused by extrication such as component removal by torching, prying, or hydraulic shears.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1996 - 405-552/35318

CDC WORKSHEET

CODES FOR OBJECT CONTACTED

(01-30) -- Vehicle Number

Noncollision
- (31) Overturn — rollover (excludes end-over-end)
- (32) Rollover—end-over-end
- (33) Fire or explosion
- (34) Jackknife
- (35) Other intraunit damage (specify): _____
- (36) Noncollision injury
- (38) Other noncollision (specify): _____
- (39) Noncollision — details unknown

Collision With Fixed Object
- (41) Tree (≤ 10 cm in diameter)
- (42) Tree (> 10 cm in diameter)
- (43) Shrubbery or bush
- (44) Embankment
- (45) Breakaway pole or post (any diameter)

Nonbreakaway Pole or Post
- (50) Pole or post (≤ 10 cm in diameter)
- (51) Pole or post (> 10 cm but ≤ 30 cm in diameter)
- (52) Pole or post (> 30 cm in diameter)
- (53) Pole or post (diameter unknown)
- (54) Concrete traffic barrier
- (55) Impact attenuator
- (56) Other traffic barrier (includes guardrail) (specify): _____
- (57) Fence
- (58) Wall
- (59) Building
- (60) Ditch or culvert
- (61) Ground
- (62) Fire hydrant
- (63) Curb
- (64) Bridge
- (68) Other fixed object (specify): _____
- (69) Unknown fixed object

Collision with Nonfixed Object
- (70) Passenger car, light truck, van, or other vehicle not in-transport
- (71) Medium/heavy truck or bus not in-transport
- (72) Pedestrian
- (73) Cyclist or cycle
- (74) Other nonmotorist or conveyance
- (75) Vehicle occupant
- (76) Animal
- (77) Train
- (78) Trailer, disconnected in transport
- (79) Object fell from vehicle in-transport
- (88) Other nonfixed object (specify): _____
- (89) Unknown nonfixed object
- (98) Other event (specify): _____
- (99) Unknown event or object

DEFORMATION CLASSIFICATION BY EVENT NUMBER

Accident Event Sequence Number	Object Contacted	(1) (2) Direction of Force (degrees)	Incremental Value of Shift	(3) Deformation Location	(4) Specific Longitudinal or Lateral Location	(5) Specific Vertical or Lateral Location	(6) Type of Damage Distribution	(7) Deformation Extent
01	01	300	60	L	F	E	E	06

COLLISION DEFORMATION CLASSIFICATION

HIGHEST DELTA "V"

Accident Event Sequence Number	Object Contacted	(1) (2) Direction of Force	(3) Deformation Location	(4) Longitudinal or Lateral Location	(5) Vertical or Lateral Location	(6) Type of Damage Distribution	(7) Deformation Extent
4. 01	5. 01	6. 10	7. L	8. F	9. E	10. E	11. 06

Second Highest Delta "V"

12.	13.	14.	15.	16.	17.	18.	19.

CRUSH PROFILE IN CENTIMETERS

The crush profile for the damage described in the CDC(s) above should be documented in the appropriate space below. (ALL MEASUREMENTS ARE IN CENTIMETERS.)

HIGHEST DELTA "V"

20. L	21. C_1	C_2	C_3	C_4	C_5	C_6	22. ±D
082	000	000	000	600	000	033	+ 201

Second Highest Delta "V"

23. L	24. C_1	C_2	C_3	C_4	C_5	C_6	25. ±D
							+

26. Undeformed End Width (Coded when highest severity impact is an end plane impact.) 998
- ___ Code to the nearest centimeter
- (250) 250 centimeters or more
- (998) No highest severity end plane impact
- (999) Unknown

27. Direct Damage Width (For highest severity impact) 020
- ___ Code to the nearest centimeter
- (250) 250 centimeters or more
- (999) Unknown

28. Original Wheelbase 232
- ___ Code to the nearest centimeter
- (650) 650 centimeters or more
- (999) Unknown

91.3 inches X 2.54 = 232 centimeters

29. Original Average Track Width 144
- ___ Code to the nearest centimeter
- (185) 185 centimeters or more
- (999) Unknown

56.6 inches X 2.54 = 144 centimeters

30. Are CDCs Documented but Not Coded on The Automated File? 0
(0) No
(1) Yes

31. Researcher's Assessment of Vehicle Disposition 1
(0) Not towed due to vehicle damage
(1) Towed due to vehicle damage
(9) Unknown

32. Is This A Multi-Stage Manufactured Vehicle And/Or A Certified Altered Vehicle? 0
(0) No post manufacturer modifications
(1) Yes - post manufacturer modifications (specify): _____
(Include photograph of CERTIFICATION PLACARD in case report)
(9) Unknown if vehicle is modified

FIRE OCCURRENCE

33. Fire Occurrence 0
(0) No fire

Yes, fire occurred
(1) Minor
(2) Major
(9) Unknown

34. Origin of Fire 0
(0) No fire
(1) Vehicle exterior (front, side, back, top)
(2) Exhaust system
(3) Fuel tank (and other fuel retention system parts)
(4) Engine compartment
(5) Cargo/trunk compartment
(6) Instrument panel
(7) Passenger compartment area
(8) Other location (specify): _____
(9) Unknown

FUEL SYSTEM

35. Location of Fuel Tank-1 Filler Cap 4
36. Location of Fuel Tank-2 Filler Cap 0
(0) No fuel tank
(1) On back plane
(2) Aft of center of the rear wheels (rear axle) on left side plane
(3) Aft of center of the rear wheels (rear axle) on right side plane
(4) Forward of center of the rear wheels (rear axle) on left side plane
(5) Forward of center of the rear wheels (rear axle) on right side plane
(6) Over the center of the rear wheels (rear axle) on left side plane
(7) Over the center of the rear wheels (rear axle) on right side plane
(8) Other (specify): _____
(9) Unknown

37. Type of Fuel Tank-1 1
38. Type of Fuel Tank-2 0
(0) No fuel tank (electrical vehicle)
(1) Metallic
(2) Non-metallic
(9) Unknown

39. Location of Fuel Tank-1 9
40. Location of Fuel Tank-2 0
(0) No fuel tank
(1) Aft of center of the rear wheels (rear axle) centered
(2) Aft of center of the rear wheels (rear axle) left side
(3) Aft of center of the rear wheels (rear axle) right side
(4) Forward of center of the rear wheels (rear axle) centered
(5) Forward of center of the rear wheels (rear axle) left side
(6) Forward of center of the rear wheels (rear axle) right side
(7) Over center of the rear wheels (rear axle)
(8) Other (specify): _____
(9) Unknown

41. Damage to Fuel Tank-1 1
42. Damage to Fuel Tank-2 0
(0) No fuel tank
(1) No damage to fuel tank
(2) Deformed, no seam failure
(3) Deformed, with a seam failure
(4) Punctured
(5) Lacerated (ripped)
(6) Abraded (scraped)
(7) Filler neck separation from the fuel tank
(8) Other damage (specify): _____
(9) Unknown

43. Leakage Location of Fuel System-1 1

44. Leakage Location of Fuel System-2 0

(0) No fuel tank
(1) No fuel leakage

Primary Area Of Leakage
(2) Tank
(3) Filler neck
(4) Cap
(5) Lines/pump/filter
(6) Vent/emission recovery
(8) Other (specify):_____
(9) Unknown

45. Fuel Type-1 01

46. Fuel Type-2 00

Single Fuel Type
(00) No fuel tank
(01) Gasoline
(02) Diesel
(03) CNG (Compressed Natural Gas)
(04) LPG (Liquid Petroleum Gas) also known as Propane
(05) LNG (Liquid Natural Gas)
(06) Methanol (M100 or M85)
(07) Ethanol (E100 or E85)
(08) Other (Hydrogen or others) (specify):
_____

Electric Powered or Electric/Solar Powered Vehicles
(10) Lead Acid Battery
(11) Nickel-Iron Battery
(12) Nickel-Cadmium Battery
(13) Sodium Metal Chloride Battery
(14) Sodium Sulfur Battery
(18) Other (Specify):_____

(98) Other Hybrid (specify):
_____

(99) Unknown fuel type

47. Is This Vehicle Equipped With More Than Two Fuel Tanks? 0
(0) No (one or two tanks only)

Yes - More Than Two Tanks
(1) Yes -- no damage to any tank or filler cap and no fuel system leakage
(2) Yes -- no damage to any tank or filler cap but there is fuel system leakage (specify leakage location):
_____
(3) Yes -- damage to an additional tank or filler cap and there is fuel system leakage (specify the following):
Type of tank _____
Tank location _____
Filler cap location _____
Tank damage _____
Location of leakage _____
Type of fuel _____
(9) Unknown if more than two tanks

COMMENTS

*** STOP: IF THE CDS APPLICABLE VEHICLE WAS NOT TOWED ***

(GV10=0)

DO NOT COMPLETE THE INTERIOR VEHICLE FORM.

U.S. Department of Transportation
National Highway Traffic Safety Administration

EXTERIOR VEHICLE LOG

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

TO BE COMPLETED BY TEAM

1. PSU Number ___ ___
2. Case Number—Stratum ___ ___ ___ ___
3. Researcher Completing Form ___
4. Vehicle Number ___ ___
5. Date Vehicle Inspected ___ ___/___ ___/___ ___
6. Number of Exterior Vehicle Slides ___ ___

TO BE COMPLETED BY ZONE CENTER

7. Applicable Precrash Measurements ___
   (0) Not applicable
   (1) Substandard - beyond researcher control
   (2) Substandard
   (3) Standard

8. Reference Line Placement ___
   (0) Not applicable (e.g. rollover)
   (1) Substandard - beyond researcher control
   (2) Substandard
   (3) Standard

9. Impact Damage Documentation ___
   (0) Not applicable
   (1) Substandard - beyond researcher control
   (2) Substandard
   (3) Standard

10. Quality Of Vehicle Damage Sketch ___
    (0) Not applicable (e.g., repaired vehicle)
    (1) Substandard - beyond researcher control
    (2) Substandard
    (3) Standard

11. Exterior Slides Subject Quality ___
    (0) Not applicable
    (1) Substandard - beyond researcher control
    (2) Substandard
    (3) Standard

12. Exterior Slides Quality ___
    (0) Not applicable
    (1) Substandard - beyond researcher control
    (2) Substandard
    (3) Standard

13. Primary Error Source (Vehicle Plane) ___
    (0) No error
    (1) Front
    (2) Side (left or right)
    (3) Back (rear)
    (4) Top
    (5) Undercarriage
    (8) Other (specify): _____

14. Number of Coded CDCs (0,1,2) ___
15. Number of Coded Crush Profiles (0,1,2) ___

DATA STATUS OF VARIABLE NUMBERS 4–47

Highest CDC

4	5	6	7	8	9	10	11

Secondary CDC

12	13	14	15	16	17	18	19

Highest Crush Profile

20	21	22

Secondary Crush Profile

23	24	25

26	27	28	29	30	31	32	33	34	35	36

37	38	39	40	41	42	43	44	45	46	47

Data Status Codes:

(Blank) Correct
(1) Derived error
(2) Non-correctable error
(3) Correctable error
(4) Change—no error
(5) Sequencing error
(7) Incorrect edit override
(8) MDE error
(9) Unknown coded

IF THIS VEHICLE WAS NOT TOWED (I.E., GV09 ≠ 1), DO NOT COMPLETE THE INTERIOR VEHICLE LOG

(Rev. 1/96)