

REPORT NO. MCW-DOT-02SN07

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING**

KIA MOTOR CORPORATION
2002 KIA SPECTRA 4 DOOR SEDAN

NHTSA NUMBER: M2 0511

MEDICAL COLLEGE OF WISCONSIN
5000 WEST NATIONAL AVENUE
MILWAUKEE, WI 53295



18 APRIL 2002

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
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Washington, DC 20590

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16. Abstract A 55/28 km/h 90° Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2002 Kia Spectra 4 Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for generation of consumer information on vehicle side crash protection. This test was conducted at the Medical College of Wisconsin Vehicle Crashworthiness Lab in Milwaukee, Wisconsin, on 18 April 2002. The impact velocity of the Moving Deformable Barrier (MDB) was 61.6 km/h, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 24.5° C. The target vehicle post-test maximum crush was 315 mm at Level 2. The test vehicle's performance follows: <table border="1"> <thead> <tr> <th></th><th><u>DRIVER</u></th><th><u>PASSENGER</u></th></tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration G</td><td>76.6</td><td>51.7</td></tr> <tr> <td>Left Lower Rib Acceleration G</td><td>70.0</td><td>69.8</td></tr> <tr> <td>Lower Spine Acceleration G</td><td>96.3</td><td>78.3</td></tr> <tr> <td>Thoracic Trauma Index TTI</td><td>86</td><td>74</td></tr> <tr> <td>Pelvis Acceleration G</td><td>61</td><td>75</td></tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches, and the opposite doors did not open during the side impact event.					<u>DRIVER</u>	<u>PASSENGER</u>	Left Upper Rib Acceleration G	76.6	51.7	Left Lower Rib Acceleration G	70.0	69.8	Lower Spine Acceleration G	96.3	78.3	Thoracic Trauma Index TTI	86	74	Pelvis Acceleration G	61	75
	<u>DRIVER</u>	<u>PASSENGER</u>																			
Left Upper Rib Acceleration G	76.6	51.7																			
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17. Key Words New Car Assessment Program (NCAP) Side Impact MDB Side Impact Dummy (SID) NHTSA No. M2 0511		18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division, Room 5108(NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590																			
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test was part of the FY02 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-01-D-02003. The purpose of this test was to evaluate side impact protection of a 2002 Kia Spectra 4 Door Sedan. This side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated May 1999.

The Medical College of Wisconsin does not endorse or certify products. The manufacturer's name appears solely for identification purposes only.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 2002 Kia Spectra 4 Door Sedan was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) that was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.6 km/h (38.3 mph). The target vehicle was stationary and positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Medical College of Wisconsin in Milwaukee, Wisconsin, on 18 April 2002.

Two restrained Side Impact Dummies (SIDs) were placed in the driver and left rear designated seating positions, according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated May 1999. The side impact event was documented by nine high-speed cameras, one real-time camera, and one high-speed video. Camera locations and other pertinent camera information can be found in this report.

The SIDs were instrumented with the following accelerometers.

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

Pre- and post-test photographs of the test vehicle, the MDB, and the side impact dummies (SIDs) are included in Appendix A. Appendix B contains the vehicle, MDB, and dummy response data traces. A summary of the side impact dummy (SID) configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report.

The following table summarizes the results of this test.

Injury Criteria	Front SID	Rear SID
TTI (G)	86	74
PELVIS (G)	61	75
HIC36	326.1	816.5

SECTION 3
SUMMARY OF TEST RESULTS

DATA SHEET NO. 1

GENERAL VEHICLE TEST PARAMETER DATA

TEST VEHICLE INFORMATION

Year/ Make/ Model/ Body Style				2002 Kia Spectra 4 Door Sedan			
Vehicle NHTSA NO.		M2 0511		VIN		KNAFB121725114385	
Vehicle Body Color		Green		Build Date		June 2001	
Engine Data	<u>4</u> Cylinders	CID	<u>1.8</u> Liter	<u>cc</u>			
Placement	<u>Longitudinal</u>	<u>X</u> Lateral					
Transmission	<u>5</u> Speed	<u>X</u> Manual	<u>Automatic</u>	<u>Overdrive</u>			
Final Drive	<u>Rear Wheel Drive</u>	<u>X</u> Front Wheel Drive	<u>Four Wheel Drive</u>				
Odometer Reading	<u>55</u>	Date	<u>12 March 2002</u>				
Options	<u>X</u> A/C	<u>X</u> Power Steering	<u>X</u> Power Brakes	<u>Power Windows</u>			
	<u>Cruise Control</u>	<u>Tilt Wheel</u>	<u>Power Locks</u>				

DATA FROM TIRE PLACARD:

Tire Pressure (at Capacity)	<u>29</u> PSI Front
	<u>29</u> PSI Rear
Recommended Tire Size	<u>P185/65R14</u>
Tires on Test Vehicle	<u>P185/65R14</u> Manufacturer <u>Kumho</u>

TEST VEHICLE AIRBAG INFORMATION:

	<u>Frontal</u>	<u>Side-Torso</u>	<u>Side-Torso/Head</u>	<u>Side-Head</u>
Driver	Yes-Steering Wheel	None	None	None
Left Rear Passenger	None	None	None	None

VEHICLE CAPACITY DATA:

Number of Occupants:	<u>2</u> Front	<u>3</u> Rear	<u>3rd Seat</u>	<u>5</u> Total
Type of Front Seats	<u>X</u> Bucket	<u>Bench</u>	<u>Split Bench</u>	
Type of Front Seat Back	<u>Fixed</u>	<u>X</u> Adjustable w/	<u>X</u> Lever	<u>Knob</u>
Vehicle Max Capacity Loading	<u>385.1</u> kg		<u>(A)</u>	
No. of Occupants X 68.04 kg	<u>340.2</u> kg		<u>(B)</u>	
Cargo Capacity (A) – (B)	<u>44.9</u> kg			

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front	=	<u>367</u> kg	Left Rear	=	<u>232.2</u> kg
Right Front	=	<u>367</u> kg	Right Rear	=	<u>232.7</u> kg
TOTAL FRONT	=	<u>734</u> kg	TOTAL REAR	=	<u>464.9</u> kg
% Total Weight	=	<u>61.2</u> %	%Total Weight	=	<u>38.8</u> %
TOTAL WEIGHT	=	<u>1198.9</u> kg			

DATA SHEET 1 (continued)**GENERAL VEHICLE TEST PARAMETER DATA**Vehicle: 2002 Kia Spectra 4 Door SedanNHTSA No. M2 0511**CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:**

Total Test Vehicle Delivered Weight with Max Fluids	=	<u>1198.9</u>	kg	(A)
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>44.9</u>	kg	(B)
Weight of (2) instrumented Side Impact Dummies	=	<u>161.5</u>	kg	(C)
TEST VEHICLE TARGET WEIGHT	=	<u>1405.3</u>	kg	(A+B+C)

FULLY LOADED TEST VEHICLE (UDVW + 1 OR 2 SID(s) + CARGO)

Left Front	=	<u>409.2</u>	kg	Left Rear	=	<u>327.9</u>	kg
Right Front	=	<u>372.5</u>	kg	Right Rear	=	<u>295.7</u>	kg
TOTAL FRONT	=	<u>781.7</u>	kg	TOTAL REAR	=	<u>623.6</u>	kg
% Total Weight	=	<u>55.6</u>	%	%Total Weight	=	<u>44.4</u>	%
TOTAL WEIGHT	=	<u>1405.3</u>	kg				

AS TESTED WEIGHT OF TEST VEHICLE (UDVW+ 1 OR 2 SID(s)+CARGO+EQUIPMENT & INSTRUMENTATION)

Left Front	=	<u>406.9</u>	kg	Left Rear	=	<u>324.8</u>	kg
Right Front	=	<u>372.4</u>	kg	Right Rear	=	<u>293.9</u>	kg
TOTAL FRONT	=	<u>779.3</u>	kg	TOTAL REAR	=	<u>618.7</u>	kg
% Total Weight	=	<u>55.7</u>	%	%Total Weight	=	<u>44.3</u>	%
TOTAL WEIGHT	=	<u>1398</u>	kg				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):**AS DELIVERED**

Left Front	<u>675</u>	Right Front	<u>667</u>	Left Rear	<u>655</u>	Right Rear	<u>659</u>
------------	------------	-------------	------------	-----------	------------	------------	------------

FULLY LOADED

Left Front	<u>654</u>	Right Front	<u>662</u>	Left Rear	<u>608</u>	Right Rear	<u>626</u>
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AS TESTED

Left Front	<u>655</u>	Right Front	<u>663</u>	Left Rear	<u>609</u>	Right Rear	<u>627</u>
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Test Vehicle Wheelbase 2552 mmAs Tested CG = 1131.0 mm rearward of front wheel centerline**TOTAL VEHICLE LENGTH:**

Right Side	=	<u>4187</u>	mm
Left Side	=	<u>4187</u>	mm
Centerline	=	<u>4513</u>	mm

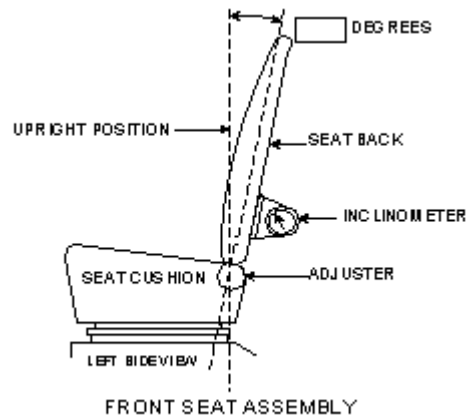
DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

Nominal Design Riding Position for adjustable driver and passenger seats. Please describe how to position the inclinometer to measure the seat back angle. Include a description of the adjustment latch detent if applicable



FRONT SEAT CUSHION PLACEMENT:

Total Number of Detents	<u>21</u>	Test Position	<u>Mid-Position</u>
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FRONT SEAT BACK ADJUSTMENT:

Seat Back Angle	<u>22 degrees measured along seat back frame</u>
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SECOND POSITION SEAT:

Total Length Fore/Aft Adjustment	<u>N/a</u>
Seat Back Adjustment Position	<u>N/a</u>

ADJUSTABLE STEERING COLUMN POSITION:

<u>N/a</u>	
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WINDOW POSITIONS:

Left Front	<u>Up</u>	Right Front	<u>Down</u>
Left Rear	<u>Up</u>	Right Rear	<u>Down</u>

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel System usable Capacity	<u>50.0 L</u>	
Test Volume	<u>46.5 L</u>	<u>93% usable capacity</u>

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

Wheelbase	<u>2552 mm</u>	
Impact Point is	<u>336 mm rearward</u>	of front axle centerline
Actual Impact Point is	<u>358 mm rearward</u>	of front axle centerline

DATA SHEET 2
TEST VEHICLE SUMMARY

VEHICLE IDENTIFICATION:

Year/Make/Model/Body Style	2002 Kia Spectra 4 Door Sedan		
Body Color	<u>Green</u>	VIN	<u>KNAFB121725114385</u>
NHTSA No.	<u>M2 0511</u>	Test Date	<u>18 April 2002</u>
Overall Length	<u>4513 mm</u>	Overall Width	<u>1703 mm</u>

VEHICLE TEST WEIGHT (Pre-Test):

Left Front	=	<u>406.9</u>	kg	Left Rear	=	<u>324.8</u>	kg
Right Front	=	<u>372.4</u>	kg	Right Rear	=	<u>293.9</u>	kg
TOTAL FRONT	=	<u>779.3</u>	kg	TOTAL REAR	=	<u>618.7</u>	kg
% Total Weight	=	<u>55.7</u>	%	%Total Weight	=	<u>44.3</u>	%
TOTAL WEIGHT	=	<u>1398</u>	kg				
Wheelbase				=		<u>2552 mm</u>	
Longitudinal CG from Center of Front Axle				=		<u>1131 mm</u>	
Impact Angle with Respect to Impactor				=		<u>90</u>	

ACTUAL IMPACT POINT

Actual Impact Point is 22 mm rearward of nominal impact reference line (lateral)

Actual Impact Point is 8 mm below nominal impact line (vertical)

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1	(258 mm above ground)	=	<u>123</u>	mm
2. LEVEL 2	(460 mm above ground)	=	<u>315</u>	mm
3. LEVEL 3	(570 mm above ground)	=	<u>299</u>	mm
4. LEVEL 4	(872 mm above ground)	=	<u>300</u>	mm
5. LEVEL 5	(1282 mm above ground)	=	<u>84</u>	mm

Maximum Post-Test intrusion at Level 2 is 315 mm

OCCUPANTS

	<u>Left Front Passenger</u>	<u>Left Rear Passenger</u>
Dummy Identification	<u>SID/058</u>	<u>SID/056</u>
Restraints Used	<u>3-Point Belt</u>	<u>3-Point-Belt</u>

INSTRUMENTATION:

Number of Vehicle Data Channels	<u>48</u>
Number of Cameras	<u>3</u>
Onboard	<u>5</u>
Off board	<u>2</u>
MDB	<u>10</u>
TOTAL	<u>10</u>

DATA SHEET NO. 3**MOVING DEFORMABLE BARRIER (MDB) SUMMARY**Vehicle: 2002 Kia Spectra 4 Door SedanNHTSA No. M2 0511**MDB FACE MANUFACTURER AND SERIAL NUMBER:**Plascore Serial Number 059C0901-4 020C1001**POSITION OF IMPACT (MDB) ON TOW SYSTEM**Crabbed 27° to the left**MDB DETAILS:**

Overall Width of Framework Carriage	=	<u>1250 mm</u>
Overall Length of MDB (incl. honeycomb impact face)	=	<u>4116 mm</u>
Wheelbase of Framework Carriage	=	<u>2578 mm</u>
Tread of Framework Carriage (Front & Rear)	=	<u>1880 mm</u>
C.G. Location Rearward of Front Axle	=	<u>1109.3 mm</u>
C.G. Location From Center Line	=	<u>-1.9 mm</u>
C.G. Location Above Ground Level	=	<u>477.2 mm</u>

MDB WEIGHT:

Left Front	=	<u>495.2</u>	kg	Left Rear	=	<u>184.8</u>	kg
Right Front	=	<u>278</u>	kg	Right Rear	=	<u>399.2</u>	kg
TOTAL FRONT	=	<u>773.2</u>	kg	TOTAL REAR	=	<u>584</u>	kg
% Total Weight	=	<u>57.0</u>	%	%Total Weight	=	<u>43.0</u>	%
TOTAL WEIGHT	=	<u>1357.2</u>	kg				

MDB IMPACT:

Impact Angle (MDB C/L to Target Vehicle)		<u>90°</u>	
Impact Speed	Primary	<u>61.6 km/h</u>	<u>38.3 mph</u>
	Secondary	<u>61.5 km/h</u>	<u>38.2 mph</u>
	On-Board	<u>61.6 km/h</u>	<u>38.3 mph</u>

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Center of Bumper	=	<u>239</u>	mm
2. Row B Top of Bumper	=	<u>108</u>	mm
3. Row C Mid-Level	=	<u>138</u>	mm
4. Row D Top of Stack	=	<u>173</u>	mm

INSTRUMENTATION:

Number of MDB Data Channels	=	<u>5</u>
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DATA SHEET NO. 4**POST-TEST OBSERVATIONS**Vehicle: 2002 Kia Spectra 4 Door SedanNHTSA No. M2 0511**VISIBLE DUMMY CONTACT POINTS:****LEFT FRONT SID**

Head	<u>Back of head to B-Pillar</u>
Upper Torso	<u>To left front door panel below window sill</u>
Lower Torso	<u>To left front door panel above arm rest</u>
Left Knee	<u>To left front door panel in front of window lever</u>
Right Knee	<u>To left front door panel below arm rest</u>

LEFT REAR SID

<u>Top and back of head to C-Pillar</u>
<u>To left rear door panel below window sill</u>
<u>To left rear door panel at arm rest</u>
<u>To left rear door panel below door handle</u>
<u>To left rear door panel below arm rest</u>

DOOR OPENING:**LEFT DOOR**

Front	<u>Closed/Inoperable/Remained Latched</u>
Rear	<u>Closed/Inoperable/Remained Latched</u>

RIGHT DOOR

<u>Closed/Operable/Remained Latched</u>
<u>Closed/Operable/Remained Latched</u>

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal	<u>22 mm rearward</u>	Vertical	<u>8 mm below</u>
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ARM REST LOCATIONS:

Front	<u>250 mm below window sill</u>
Rear	<u>260 mm below window sill</u>

SEAT MOVEMENT:

Front	<u>Seat crush 120 mm; seat back crush 60 mm</u>
Rear	<u>Seat crush 15 mm; seat back crush 20 mm</u>

GLAZING DAMAGE

Windshield	<u>Crack in upper left corner</u>
Window	<u>Front and rear struck side windows shattered on impact</u>

PILLAR PERFORMANCE:

<u>None Noted</u>

SILL SEPARATION

<u>None Noted</u>

AIRBAG DEPLOYMENT STATUS:

	DRIVER	FRONT PASSENGER	REAR PASSENGER
FRONT	Did not deploy	Did not deploy	N/a
SIDE	N/a	N/a	N/a

OTHER NOTABLE IMPACT EFFECTS:

<u>Separation of struck side pinch welds below B-Pillar</u>

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5

SID INSTRUMENTATION DATA

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

	Front Dummy ID 056 Accelerations				Rear Dummy ID 058 Accelerations			
	Max		Min		Max		Min	
	G's	msec	G's	msec	G's	msec	G's	msec
HEAD ACCELERATIONS								
Longitudinal (X)	11.9	165.1	-26.3	85.3	6.4	162.6	-30.0	54.4
Lateral (Y)	48.8	38.6	-9.6	49.0	106.6	52.2	-4.2	199.1
Vertical (Z)	39.4	45.5	-1.6	9.6	31.5	50.4	-57.1	57.9
Resultant (R)	52.2	39.4			110.7	52.2		
HIC36	326.1				816.5			
RIB ACCELERATIONS								
Upper Rib Lateral (Y)	76.6	25.0	-27.2	71.2	51.7	43.8	-4.9	128.8
Upper Rib Lateral (Y _R)	79.9	25.0	-27.4	71.2	50.1	43.1	-4.6	128.8
Lower Rib Lateral (Y)	70.0	26.2	-22.9	70.0	69.8	32.5	-7.0	72.5
Lower Rib Lateral (Y _R)	71.1	26.2	-22.2	70.0	68.2	32.5	-7.6	73.1
SPINE ACCELERATIONS								
Lower Lateral (Y)	96.3	37.5	-34.9	63.1	78.3	46.9	-23.5	66.2
Lower Lateral (Y _R)	97.3	37.5	-35.1	63.1	75.9	46.9	-23.5	66.2
PELVIS ACCELERATIONS								
Lateral (Y)	60.7	31.9	-15.6	75.0	74.5	42.5	-8.7	83.1
Lateral (Y _R)	60.0	31.2	-15.5	75.0	76.1	42.5	-9.0	83.1

REFERENCE:

Positive Direction -	Anterior/Posterior	+(X) = anterior
	Lateral	+(Y)= right
	Superior/Inferior	+(Z)= inferior
Negative Direction	Anterior/Posterior	-(X) = posterior
	Lateral	-(Y)= left
	Superior/Inferior	-(Z)= superior

All the above data (except head accelerations) has been filtered using FIR (Version 1.0; July 16, 1990)

Head Accelerations have been filtered at SAE Class 1000

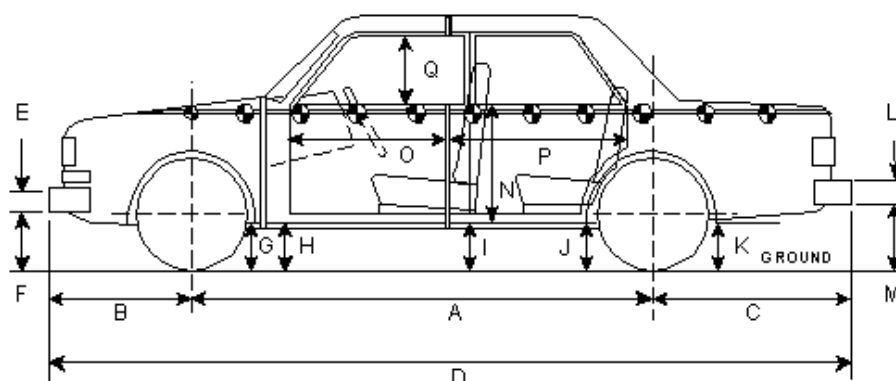
Y_R denotes redundant Y-direction accelerometer

DATA SHEET 6

VEHICLE PRE- AND POST- MEASUREMENTS

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



LEFT SIDE VIEW

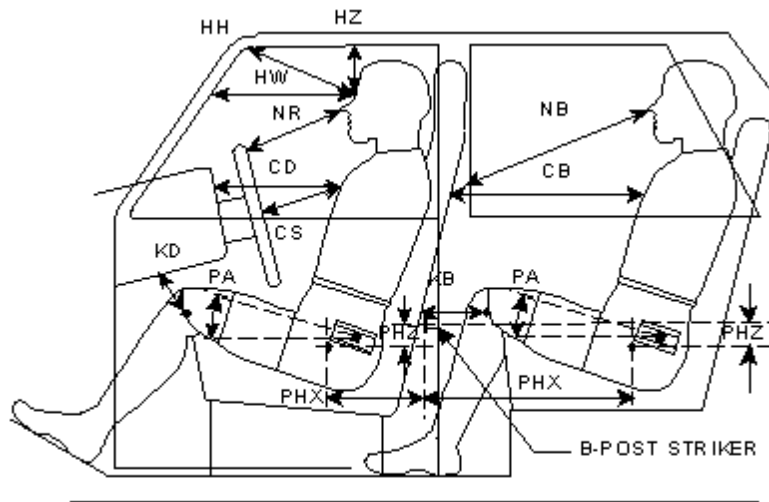
	PRE-TEST As delivered (mm)	PRE-TEST As Tested (mm)	POST-TEST (mm)	Δ CHANGE (mm)
A	2552	-	2548	-4
B	759	-	749	-10
C	876	-	867	-9
D	4513	-	4497	-16
E	131	-	130	-1
F	366	368	376	8
G	245	221	218	-3
H	241	215	225	10
I	250	220	263	43
J1	193	153	146	-7
J2	247	206	205	-1
K	264	212	215	3
L	167	-	168	1
M	371	314	330	16
N	663	-	586	-77
O	1060	-	1035	-25
P	838	-	754	-84
Q	473	-	421	-52
R	4187	-	4192	5
S	4187	-	4164	-23
T	1703	-	1436	-267

DATA SHEET 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



LEFT SIDE VIEW

NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

	DRIVER ID# 058	LEFT REAR PASSENGER ID# 056
HH	401	N/a
HW	623	N/a
HZ	177	172
NR/NB	506	571
CD/CB	569	486
CS	381	N/a
KDL(KDA°)/KBL(KDA°)	197/17°	180/27°
KDR(KDA°)/KBR(KDA°)	183/22°	175/11.5°
PA°	23.5°	24.6°
PHX	183	310
PHZ	128	294

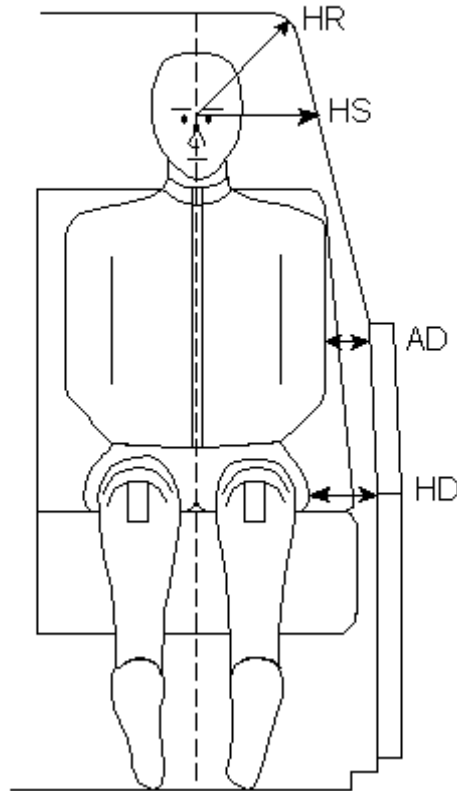
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-Pillar striker as a reference point

DATASHEET 8

SID LATERAL CLEARANCE DIMENSIONS

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

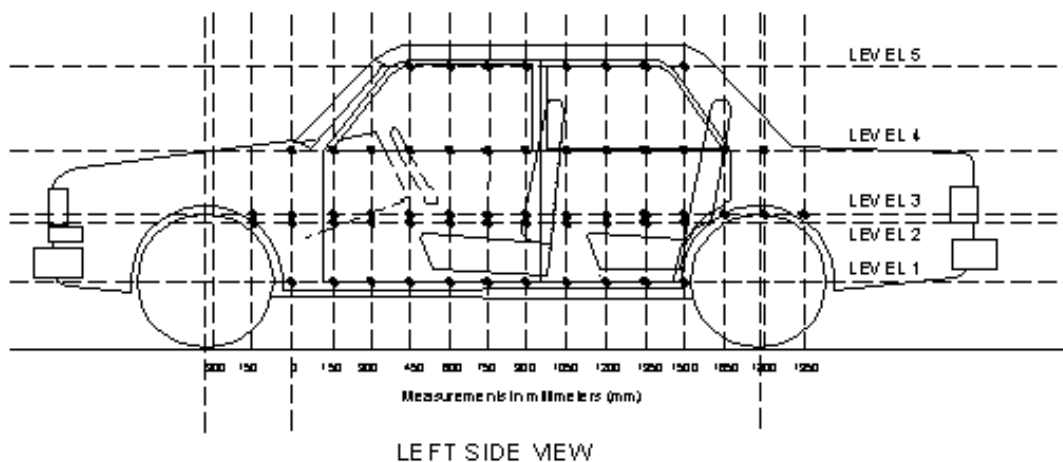
	DRIVER ID# 058		LEFT REAR PASSENGER ID# 056	
HR	178		204	
HS	235		238	
AD	Upper 99	Lower 75	Upper 120	Lower 73
HD	151		179	

DATA SHEET 9

VEHICLE SIDE MEASUREMENTS

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



LEVEL 5 = WINDOW TOP
LEVEL 4 = WINDOW SILL
LEVEL 3 = MID-DOOR
LEVEL 2 = OCCUPANT H-POINT
LEVEL 1 = AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE “AS TESTED” CONFIGURATION
Measurements along the Vertical 750 mm line as shown

Level 5 @ Window Top	1282 mm
Level 4 @ Window Sill	872 mm
Level 3 @ Mid-Door	570 mm
Level 2 @ Occupant H-Point	460 mm
Level 1 @ Axle Centerline or Sill Top Height	258 mm

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES – ALL LEVELS

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

Note: All Dimensions are in millimeters with a tolerance of ± 3 mm

			DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT																												
HEIGHT			-900	-750	-600	-450	-300	-150	0	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000		
LEVEL 1	258	PRE								260	265	265	266	266	266	267	267	268	267	267	263										
		POST								303	376	379	382	384	382	382	386	391	338	313	320										
		CRUSH								43	111	114	116	118	116	115	119	123	71	46	57										
LEVEL 2	460	PRE	280	247					220	221	221	221	221	220	216	215	215	217	214	213	212	212					227	244	266	297	
		POST	283	249						269	467	499	510	518	525	526	530	528	518	497	470	434	257					237	250	269	298
		CRUSH	3	2						49	246	278	289	297	305	310	315	313	301	283	257	222	45					10	6	3	1
LEVEL 3	570	PRE	292	257					215	214	214	213	213	213	212	212	212	212	212	212	212	212	212			224	245	263	289	330	
		POST	290	260						260	453	498	511	512	505	500	495	502	501	502	500	483	370	242		237	253	267	385	325	
		CRUSH	-2	3						45	239	284	298	299	292	288	283	290	289	290	288	271	158	30		13	8	4	96	-5	
LEVEL 4	872	PRE	400	380	360	347	333	328	316	305	295	302	300	297	298	300	298	299	303	306	308	311	318	325	335	343	352	366	395		
		POST	393	377	365	350	344	337	334	343	405	465	494	519	532	547	598	596	587	524	452	381	332	340	347	349	350	359	384		
		CRUSH	-7	-3	5	3	11	9	18	38	110	163	194	222	234	247	300	297	284	218	144	70	14	15	12	6	-2	-7	-11		
LEVEL 5	1282	PRE													510	515	521	526	529	530	523	512	509								
		POST													529	555	581	610	598	581	559	538	523								
		CRUSH													19	40	60	84	69	51	36	26	14								

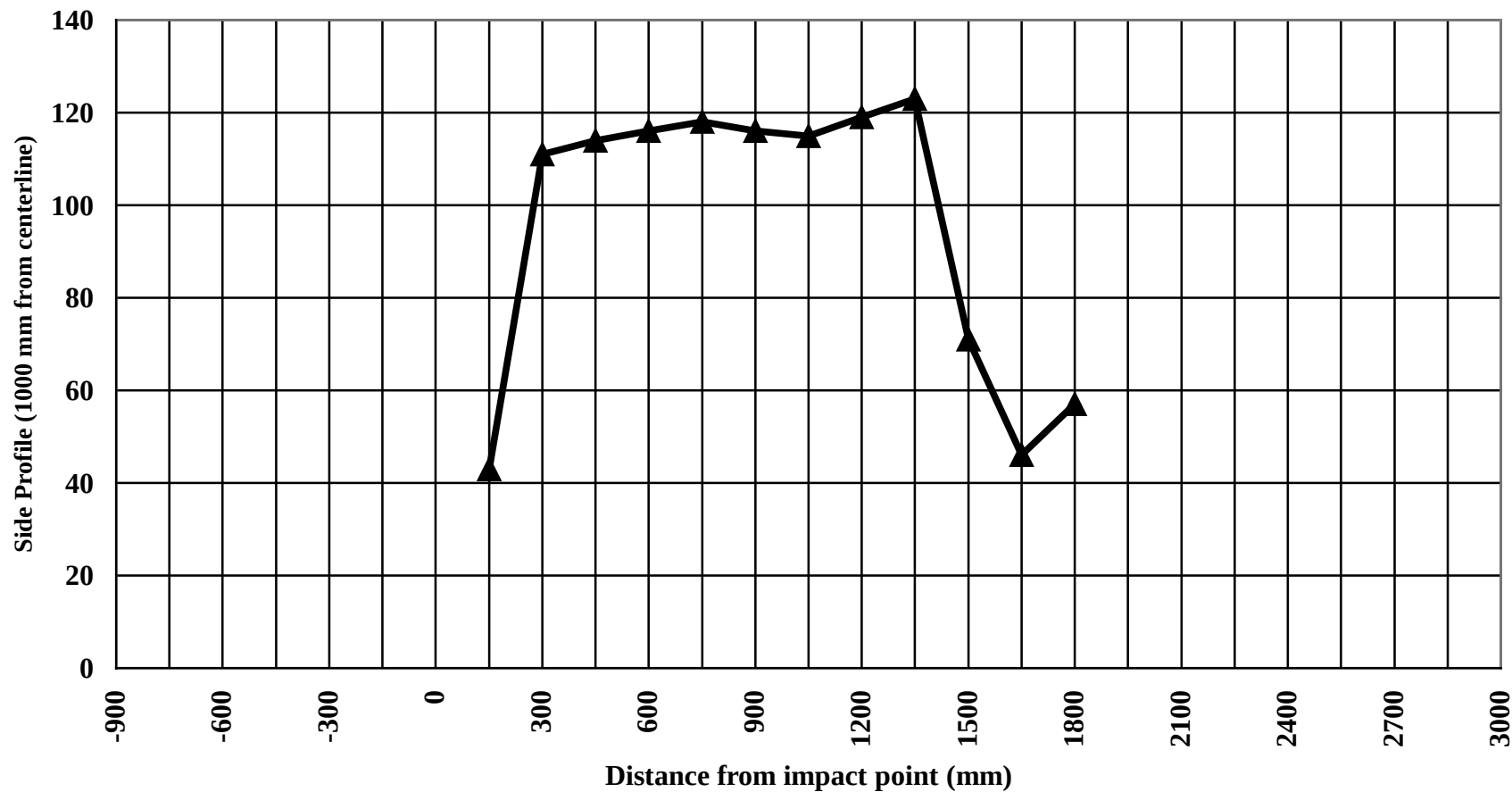
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

SIDE PROFILE LEVEL 1 -258 mm above ground



DATA SHEET 10 (continued)

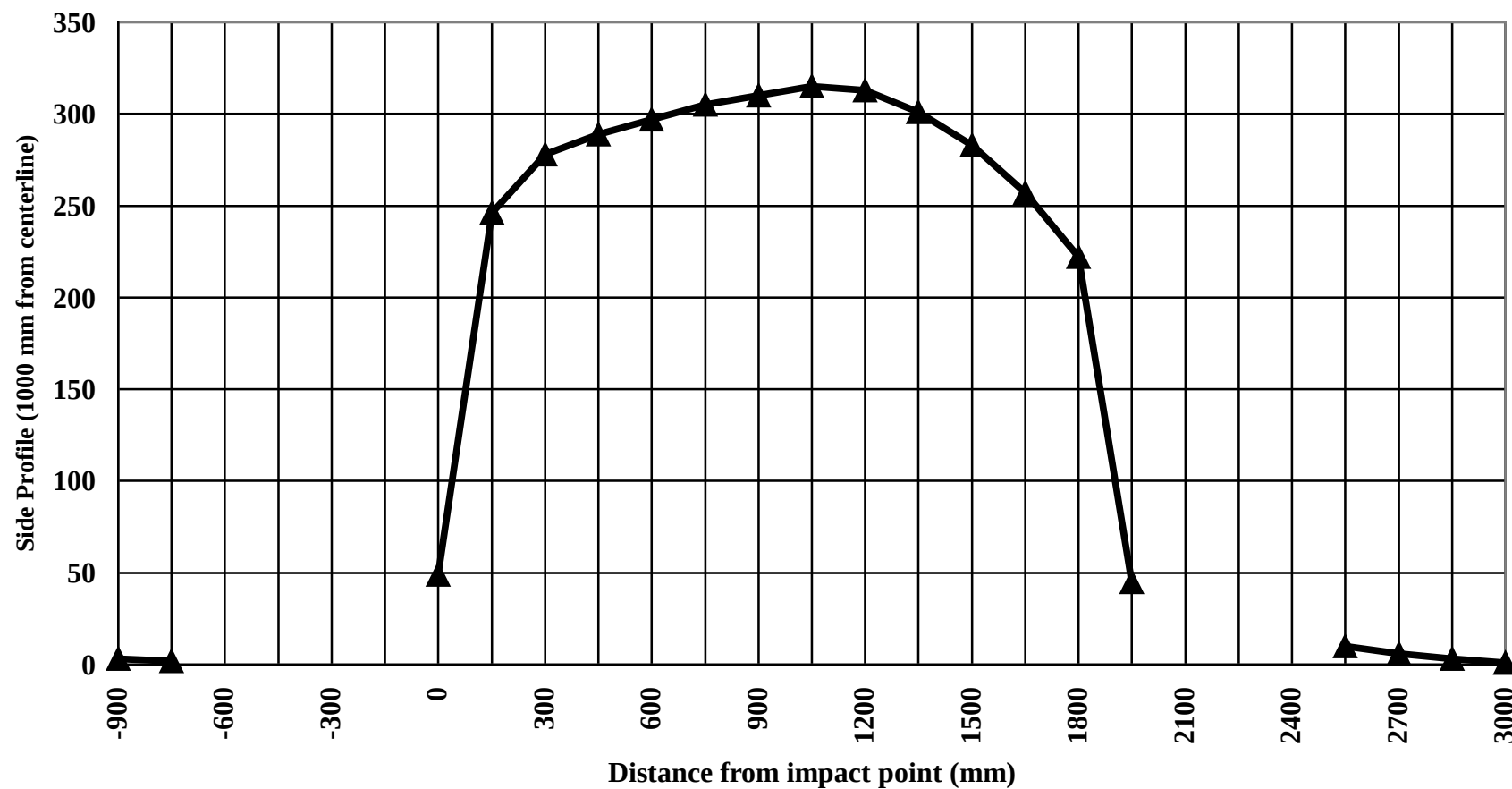
Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

VEHICLE EXTERIOR CRUSH PROFILES

SIDE PROFILE LEVEL 2 - 460 mm above ground

6-7



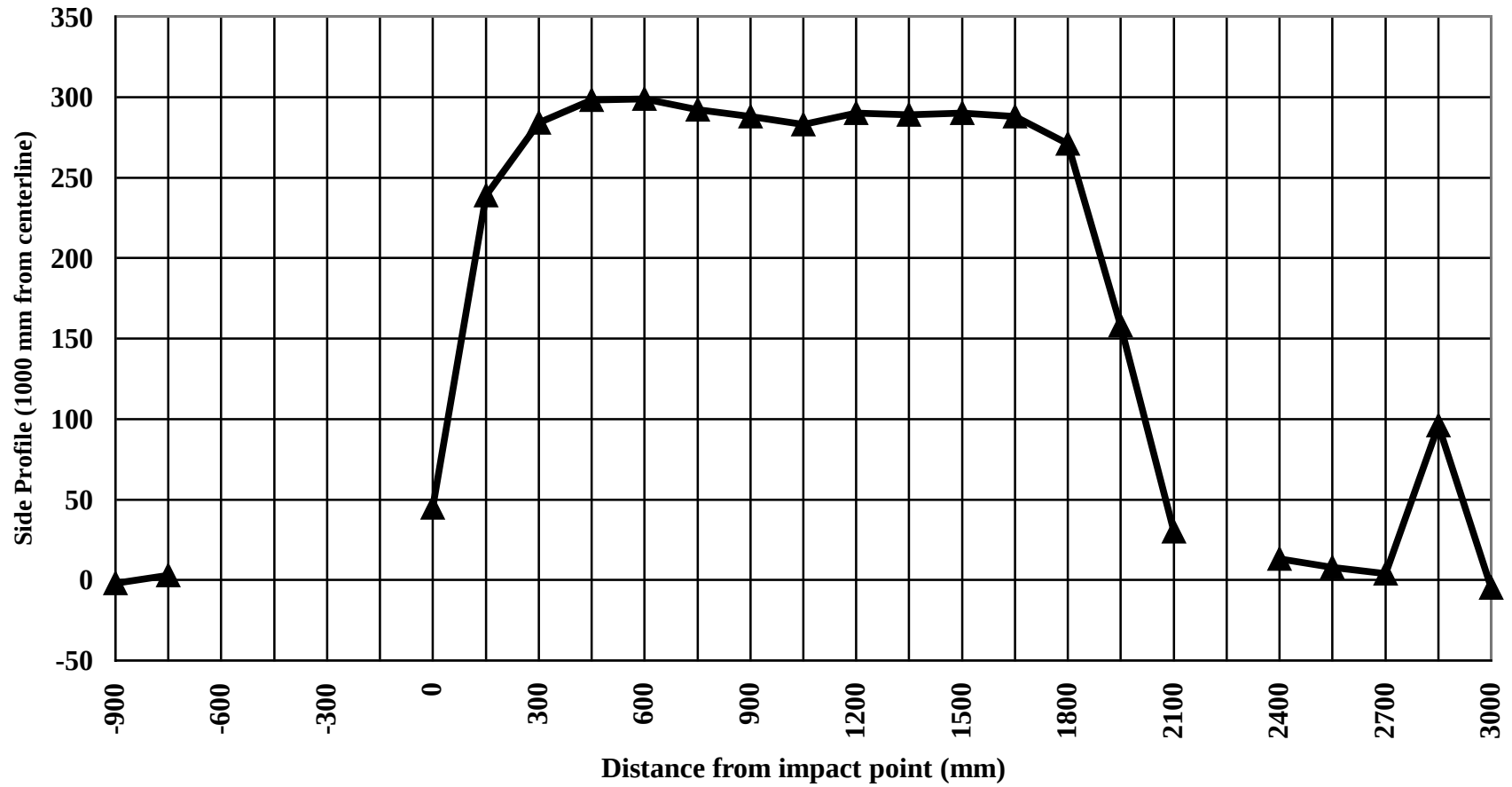
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

SIDE PROFILE LEVEL 3 - 570 mm above ground



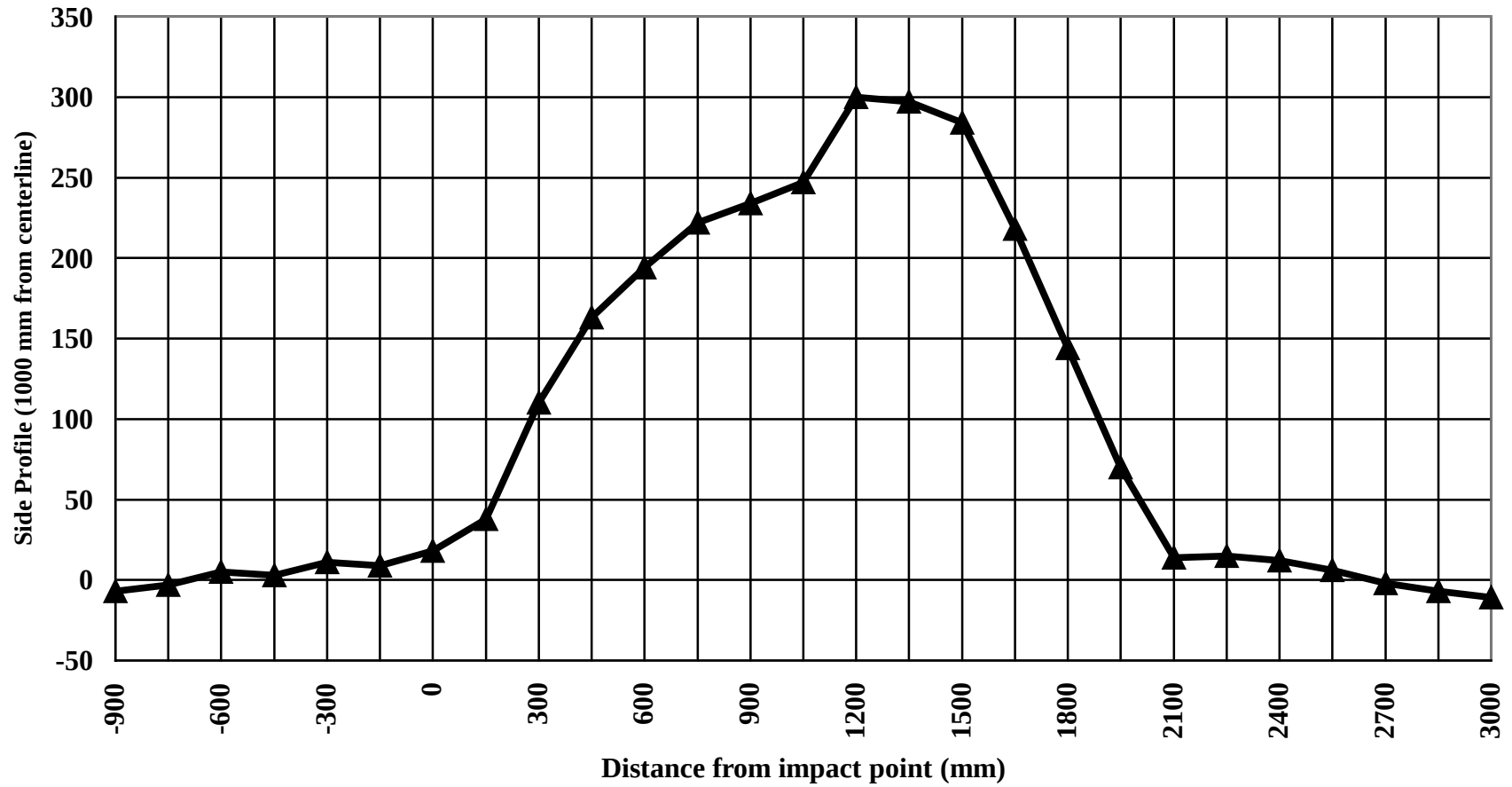
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

SIDE PROFILE LEVEL 4 - 930 mm above ground



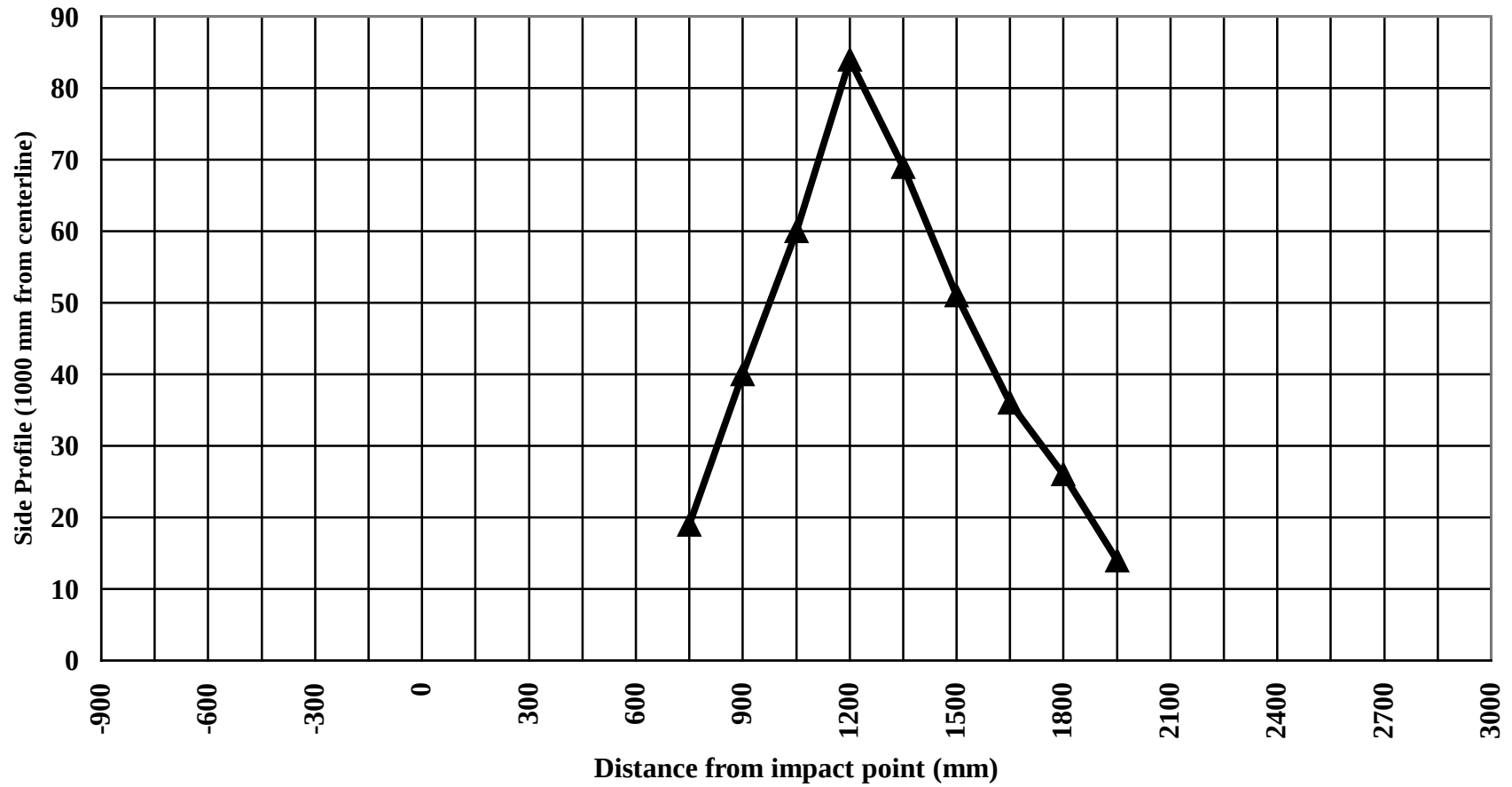
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

SIDE PROFILE LEVEL 5 - 1933 mm above ground

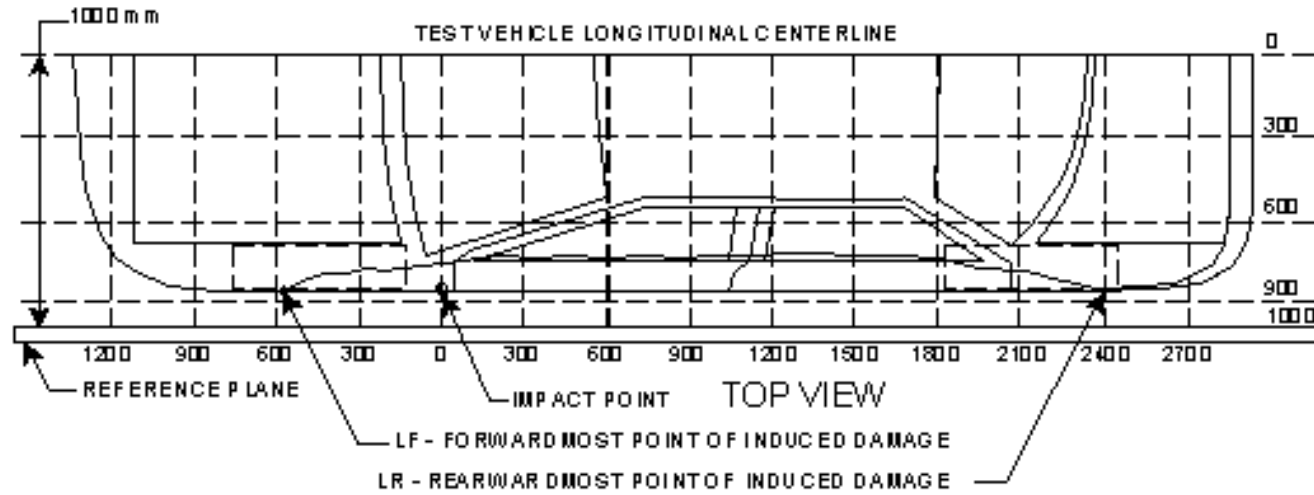


DATA SHEET 11

VEHICLE DAMAGE PROFILE DISTANCES

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



DPD MEASUREMENTS (mm)		POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1	0	327	327	0
2	450	479	328	151
3	900	532	325	207
4	1350	597	326	271
5	1800	410	323	87
6	2250	338	338	0

DATA SHEET 12

STATIC CRUSH OF IMPACTOR FACE (Grid as looking at MDB from front)

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

Note: All Dimensions are in millimeters with a tolerance of ± 3 mm

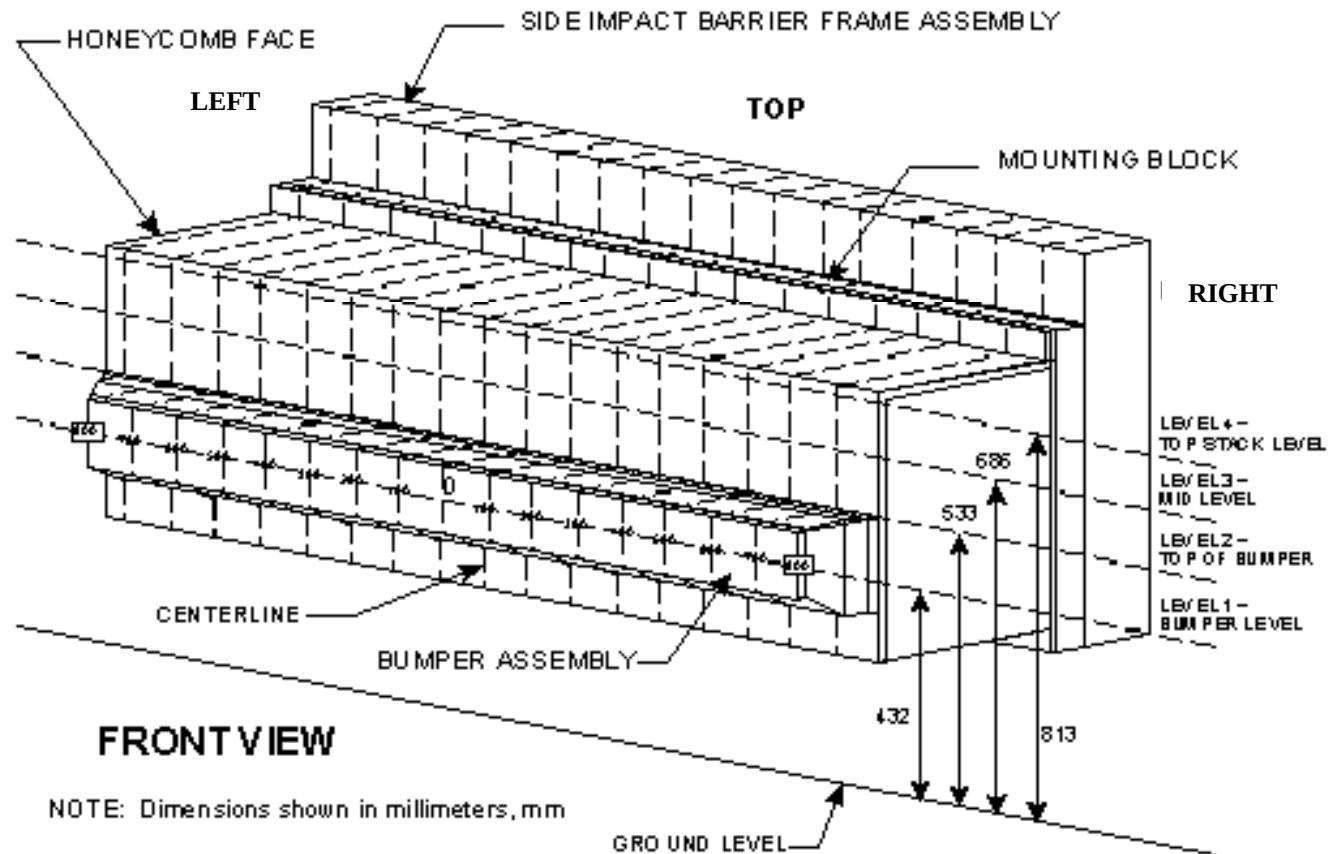
LEVEL	HEIGHT AT CL (mm)		DISTANCE LEFT OF CENTER								0	DISTANCE RIGHT OF CENTER							
			800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
LEVEL 4 TOP STACK	810	PRE-	529	529	529	529	530	530	530	530	530	531	532	531	532	532	532	533	533
		POST-	632	568	528	527	529	530	533	538	539	540	546	550	558	568	596	660	706
		CRUSH	103	39	-1	-2	-1	0	3	8	9	9	14	19	26	36	64	127	173
LEVEL 3 MID- LEVEL	685	PRE-	527	527	527	527	527	528	528	528	528	529	529	529	530	530	530	530	531
		POST-	603	555	544	542	542	543	549	544	544	542	540	542	548	555	568	610	669
		CRUSH	76	28	17	15	15	15	21	16	16	13	11	13	18	25	38	80	138
LEVEL 2 TOP BUMPER	560	PRE-	525	525	524	525	524	525	525	525	525	525	525	525	525	525	526	526	526
		POST-	633	612	602	590	582	578	575	575	577	568	573	571	572	574	579	584	613
		CRUSH	108	87	78	65	58	53	50	50	52	43	48	46	47	49	53	58	87
LEVEL 1 MID- BUMPER	432	PRE-	433	421	421	421	421	421	421	421	421	421	421	421	422	422	422	423	435
		POST-	672	647	623	510	596	587	580	576	564	560	555	550	548	545	546	553	570
		CRUSH	239	226	202	89	175	166	159	155	143	139	134	129	126	123	124	130	135

DATA SHEET 12 (continued)

STATIC CRUSH OF IMPACTOR FACE

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

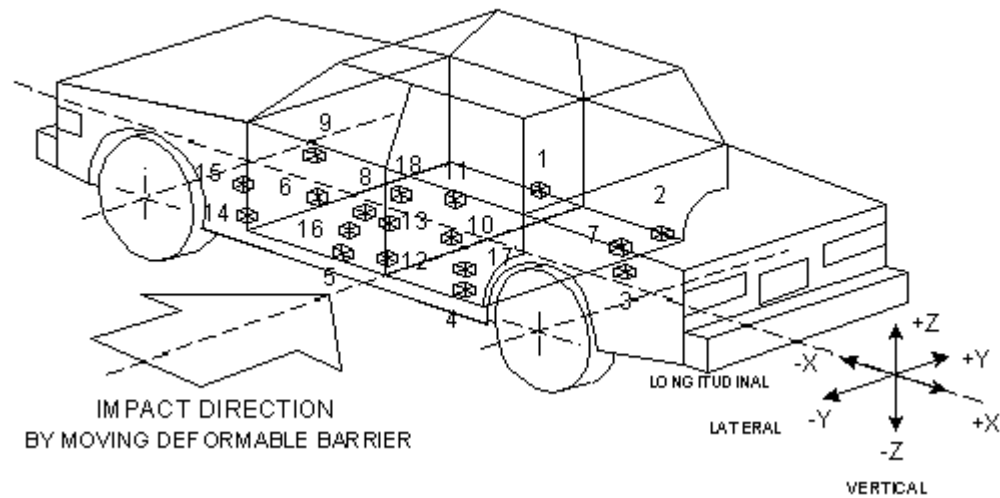


DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



1. Right Side Sill at Front Seat	10. Mid-rear of Left Rear Door
2. Right Side Sill at Rear Seat	11. Left Rear Door Upper Centerline
3. Rear Floorpan Above Axle	12. Left Lower B-Pillar
4. Left Side Sill at Rear Seat	13. Left Middle B-Pillar
5. Left Side Sill at Front Seat	14. Left Lower A-Pillar
6. Left Front Door on Centerline	15. Left Middle A-Pillar
7. Right Rear Occupant Compartment	16. Front Seat Track
8. Mid-rear of Left Front Door	17. Rear Seat Track
9. Left Front Door Upper Centerline	18. Vehicle CG

DATASHEET 13

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z mm	Max		Min		Max		Min		Max		Min		Max	
					G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
1	Right Side Sill at Front Seat	2722	630	329	3.7	64.4	-5.3	10.2	22.7	15.0	-2.6	139.1	3.7	60.5	-4.8	9.4	23.0	15.0
2	Right Side Sill at Rear Seat	1818	660	274	4.1	64.0	-5.7	10.2	27.0	6.6	-2.6	144.6	5.1	33.0	-8.1	19.1	27.1	6.6
3	Rear Floorpan Above Axle	1100	7	83	2.0	63.8	-6.9	17.4	24.5	6.6	-1.4	110.9	11.2	17.2	-7.7	43.7	24.7	6.6
4	Left Side Sill at Rear Seat	1774	-705	323					36.0	13.5	-2.9	0.6						
5	Left Side Sill at Front Seat	2704	-679	324					21.3	12.0	-2.7	142.4						
6	Left Front Door on Centerline	2502	-721	-30					89.5	4.1	-53.3	11.0						
7	Right Rear Occupant Compartment	1794	278	146					25.9	6.2	-2.0	144.2						
8	Midrear of Left Front Door	2282	-731	-21					123.7	6.6	-67.5	23.3						
9	Left Front Door Upper Centerline	2522	-734	-381					270.3	16.0	-81.7	22.2						
10	Midrear of Left Rear Door	1477	-709	-355					93.1	15.0	-129.0	31.5						

Axis Origin

X – Rear Bumper

Y – Vehicle Centerline

Z – Middle of rear bumper

Axis Orientation

+(X) Forward

+(Y) Right

+(Z) Down

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

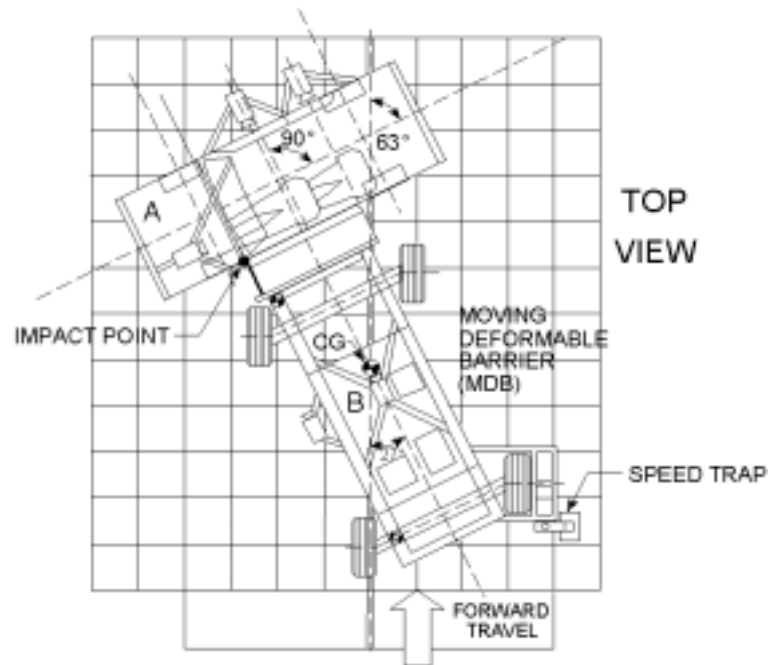
NHTSA No. M2 0511

Axis Origin	X – Rear Bumper	Axis Orientation	+(X) Forward
	Y – Vehicle Centerline		+(Y) Right
	Z – Middle of rear bumper		+(Z) Down

Axis Origin	X – Rear Bumper	Axis Orientation	+(X) Forward
	Y – Vehicle Centerline		+(Y) Right
	Z – Middle of rear bumper		+(Z) Down

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY



Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z mm	Max		Min		Max		Min		Max		Min		Max	
					G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
1	MDB Center of Gravity	1113	-1	311	1.3	88.2	-19.0	36.0	2.0	66.2	-6.0	33.4	4.9	54.2	-4.4	42.9	19.5	35.7
2	MDB Rear Frame Member	2812	-614	585	2.0	103.7	-21.2	30.9	3.8	24.6	-1.1	178.2						

Axis Origin

X – Rear Bumper
Y – Vehicle Centerline
Z – Middle of rear bumper

Axis Orientation

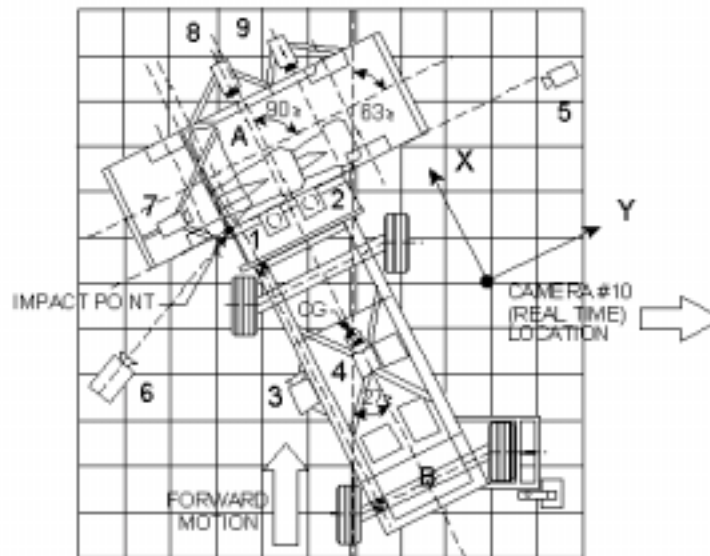
+(X) Forward
+(Y) Right
+(Z) Down

DATA SHEET 15

HIGH-SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



Camera No.	View	Coordinates (mm)*			Angle wrt Horiz.	Lens (mm)	Film Speed (fps)
		X	Y	Z			
1	Overhead view of test vehicle	110	990	4623	-90	7	1000
2	Overhead close-up view of impact plane	30	305	4629	-90	12	1000
3	MDB onboard close-up view of impact point	-2333	-60	-32	0.4	13	1000
4	MDB onboard view of driver dummy	-2262	840	468	-3.9	13	1000
5	Right side ground level overall view	3900	13577	620	-4.2	45	1000
6	Left side ground level overall view	-401	-4447	820	-13.1	8	1000
7	Test vehicle onboard driver front view	600	-280	335	-10	10	1000
8	Test vehicle onboard driver side view	940	920	207	-5	7.5	1000
9	Test vehicle onboard passenger side view	930	1797	242	-5	7.5	1000
10	Real-time film coverage of test	-	-	-	-	-	-

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

SECTION 5
FUEL SYSTEM INTEGRITY

DATA SHEET 16

FUEL SYSTEM INTEGRITY DATA

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511

TEST REQUIREMENTS:

Drain the test vehicle's fuel system and operate the engine until the fuel system is dry. Add Stoddard solvent, which has been dyed purple, until 92-94% of the stated usable capacity is reached. Operate the engine to assure the Stoddard solvent is present throughout the entire fuel system.

TEST VEHICLE IMPACT TYPE: Side impacting Moving Deformable Barrier contacting the driver side.

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0	29.6 ml
2. For 5 minute period after vehicle motion ceases	0	147.9 ml
3. For next 25 minutes	0	29.6 ml / 1 min.

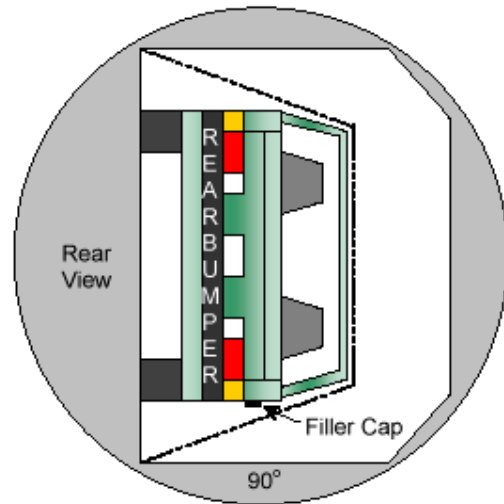
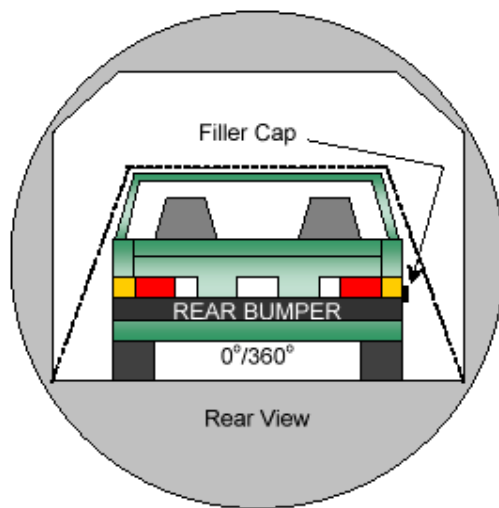
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17

ROLLOVER DATA

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



0° TO 90°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u>	minutes	<u>4</u>	seconds
(Spec Range =1 to 3 minutes)				
FMVSS 301 Position Hold Time	<u>5</u>	minutes	<u>0</u>	seconds
TOTAL	<u>6</u>	minutes	<u>4</u>	seconds
Next whole minute interval	<u>7</u>	minutes		

FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

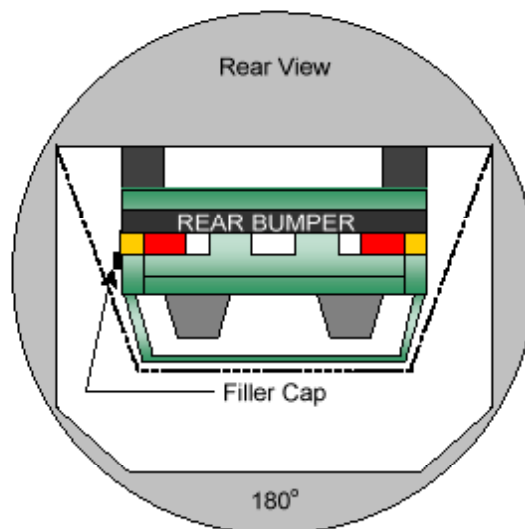
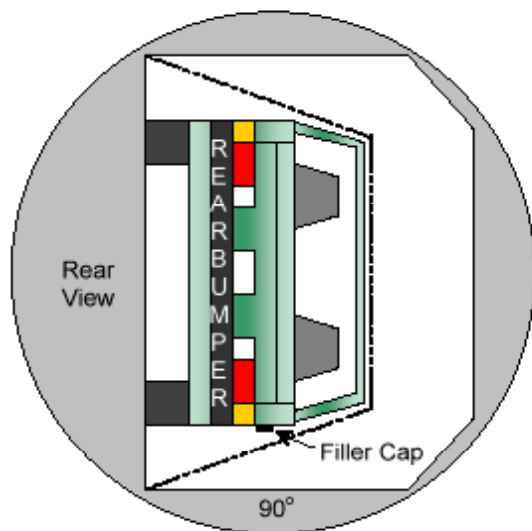
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



90° TO 180°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>7</u> seconds
(Spec Range =1 to 3 minutes)		
FMVSS 301 Position Hold Time	<u>5</u> minutes	<u>0</u> seconds
TOTAL	<u>6</u> minutes	<u>7</u> seconds
Next whole minute interval	<u>7</u> minutes	

FUEL SPILLAGE MEASUREMENT:

90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

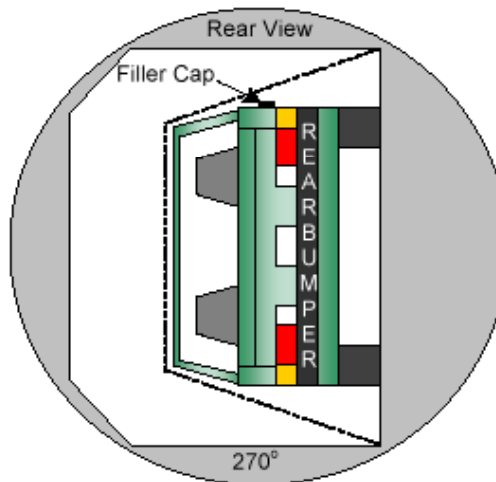
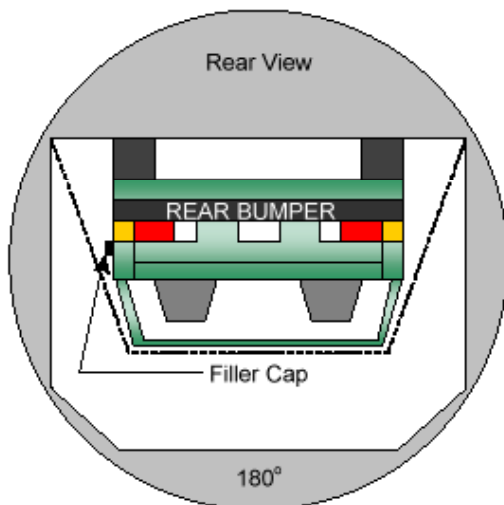
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



180° TO 270°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>5</u> seconds
(Spec Range =1 to 3 minutes)		
FMVSS 301 Position Hold Time	<u>5</u> minutes	<u>0</u> seconds
TOTAL	<u>6</u> minutes	<u>5</u> seconds
Next whole minute interval	<u>7</u> minutes	

FUEL SPILLAGE MEASUREMENT:

180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute From Onset of Rotation	-	29.6 ml

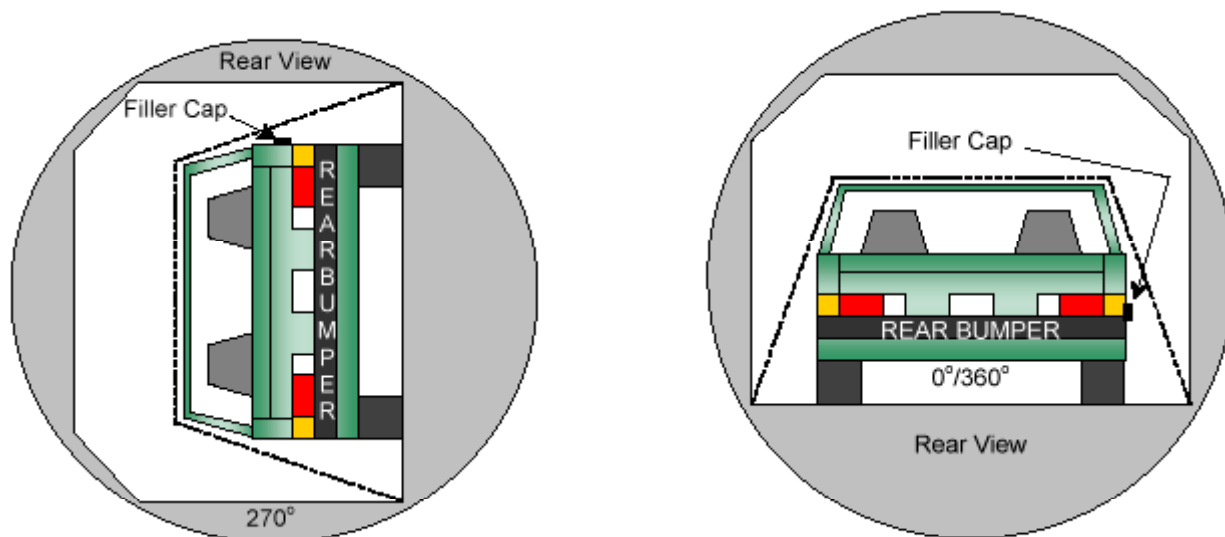
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2002 Kia Spectra 4 Door Sedan

NHTSA No. M2 0511



270° TO 360°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>5</u> seconds
(Spec Range =1 to 3 minutes)		
FMVSS 301 Position Hold Time	<u>5</u> minutes	<u>0</u> seconds
TOTAL	<u>6</u> minutes	<u>5</u> seconds
Next whole minute interval	<u>7</u> minutes	

FUEL SPILLAGE MEASUREMENT:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

FUEL SPILLAGE LOCATION(S): None

APPENDIX A
PHOTOGRAPHS

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Figure A-1: PRE-TEST FRONTAL VIEW OF TEST VEHICLE



Figure A-2: POST-TEST FRONTAL VIEW OF TEST VEHICLE



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



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Figure A-11 PRE-TEST RIGHT REAR VIEW OF TEST VEHICLE



Figure A-12 POST-TEST RIGHT REAR VIEW OF TEST VEHICLE



Figure A-13: PRE-TEST RIGHT SIDE VIEW OF TEST VEHICLE



Figure A-14: POST-TEST RIGHT SIDE VIEW OF TEST VEHICLE



Figure A-15: PRE-TEST FRONT RIGHT VIEW OF TEST VEHICLE



Figure A-16: POST-TEST FRONT RIGHT VIEW OF TEST VEHICLE



Figure A-17: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-18: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-19: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-20: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-21: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-22: POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-23: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-24: POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-25: PRE-TEST INTERIOR OF FRONT DOOR



Figure A-26: POST-TEST INTERIOR OF FRONT DOOR SHOWING SID IMPACT LOCATIONS



Figure A-27: PRE-TEST INTERIOR OF REAR DOOR



Figure A-28: POST-TEST INTERIOR OF REAR DOOR SHOWING SID IMPACT LOCATIONS



Figure A-29: PRE-TEST LEFT SIDE VIEW OF MDB IN IMPACT POSITION



Figure A-30: POST-TEST LEFT SIDE VIEW OF MDB



Figure A-31: PRE-TEST RIGHT SIDE VIEW OF MDB IN IMPACT POSITION



Figure A-32: POST-TEST FRONT RIGHT VIEW OF MDB



Figure A-33: PRE-TEST OVERHEAD VIEW OF MDB IN IMPACT POSITION



Figure A-34: POST-TEST OVERHEAD VIEW OF MDB



Figure A-35: PRE-TEST CLOSE-UP OF IMPACT POINT TARGET SHOWING WELDING ROD

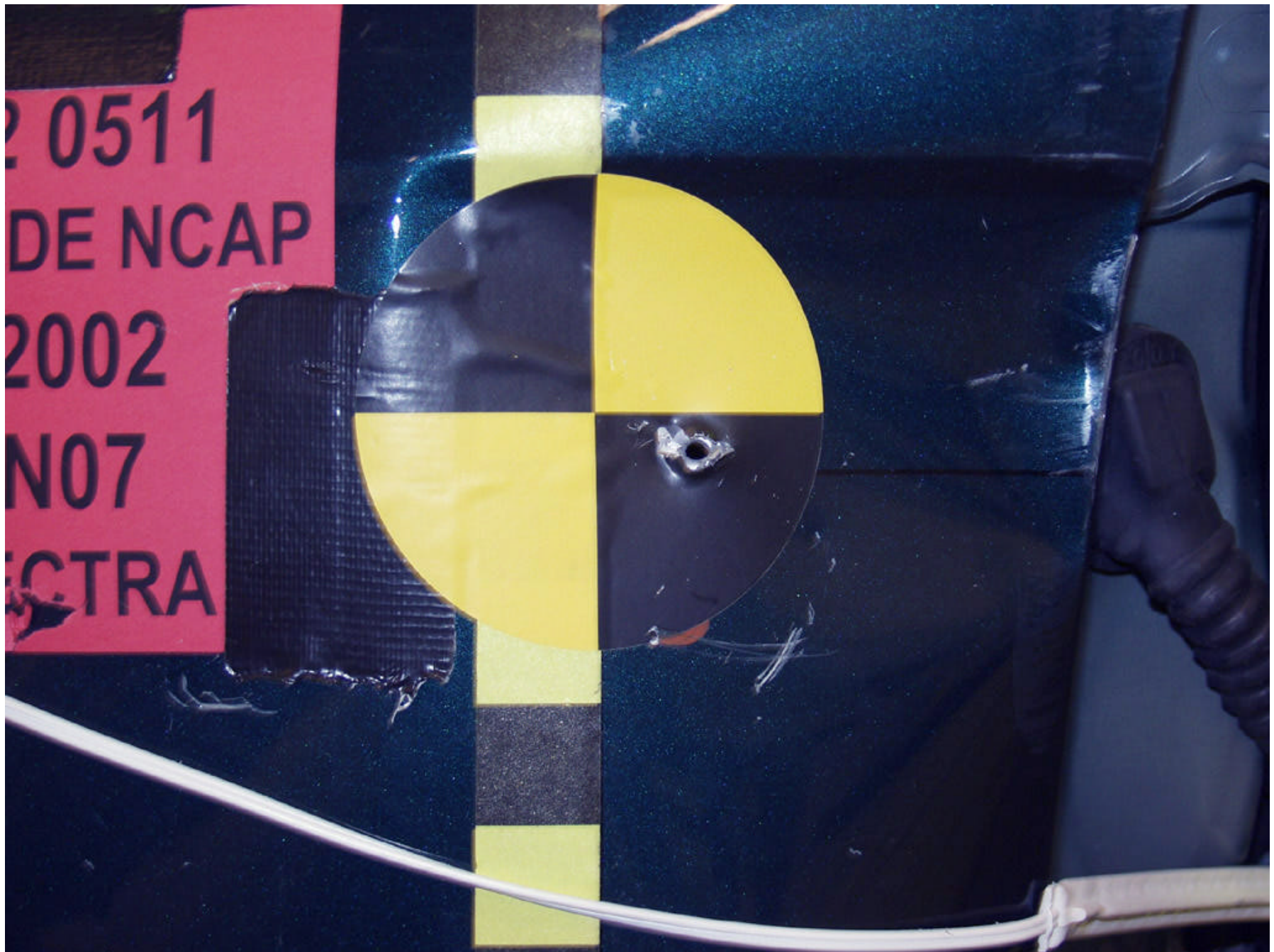


Figure A-36: POST-TEST CLOSE-UP OF IMPACT POINT TARGET

MFD. BY KIA MOTORS CORP.

DATE: 06/04/01

GVWR 3660 LB GAWR FRT 1918 LB GAWR RR 1742 LB
 PNBV 1660 KG PNBE FRT 870 KG PNBE RR 790 KG

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN KNAFB121725114385

TYPE PASSENGER CAR

5E

C

EXTERIOR PAINT COLORS

BODY	VR	MLDG.	INT. TRIM	TAPE	R	S	AX	TR
------	----	-------	-----------	------	---	---	----	----

DSO

Figure A-37: CLOSE-UP OF VEHICLE'S CERTIFICATION LABELS

SPECTRA**RECOMMENDED TIRE SIZE AND INFLATION**
DIMENSIONS DES PNEUS et PRESSIONS DE GONFLAGE RECOMMANDÉES (à froid)

LOAD RANGE CHARGE NOMINALE	TIRE SIZE (LOAD RANGE C&D NOT PERMISSIBLE) DIMENSIONS DES PNEUS (CHARGES NOMINALES C ET D NON PERMISES)	PRESSURE PRESSION	
		FRONT AVANT	REAR ARRIÈRE
STD	P185/65R14 85H	29 psi 200 kPa	29 psi 200 kPa
T	T115/70D15 TEMPORARY SPARE T115/70R15 PNEU DE SECOURS PROVISOIRE	60 psi 415 kPa	

TOTAL LOAD = OCCUPANTS PLUS LUGGAGE CHARGE GLOBALE = OCCUPANTS PLUS BAGAGES

MODEL MODÈLE	MAXIMUM LOAD CHARGE MAXIMALE	OCCUPANTS OCCUPANTS	DISTRIBUTION RÉPARTITION		
			FRONT AVANT	REAR ARRIÈRE	LUGGAGE BAGAGES
ALL TOUS	849 lb/385 kg	5	2	3	99 lb/45 kg

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

VOIR MANUEL DE CONDUCTEUR POUR DES INFORMATIONS SUPPLÉMENTAIRES

Figure A-38: CLOSE-UP OF VEHICLE'S TIRE PLACARD LABELS



Figure A-39: IMPACT



Figure A-40: ROLLOVER 0 DEGREES

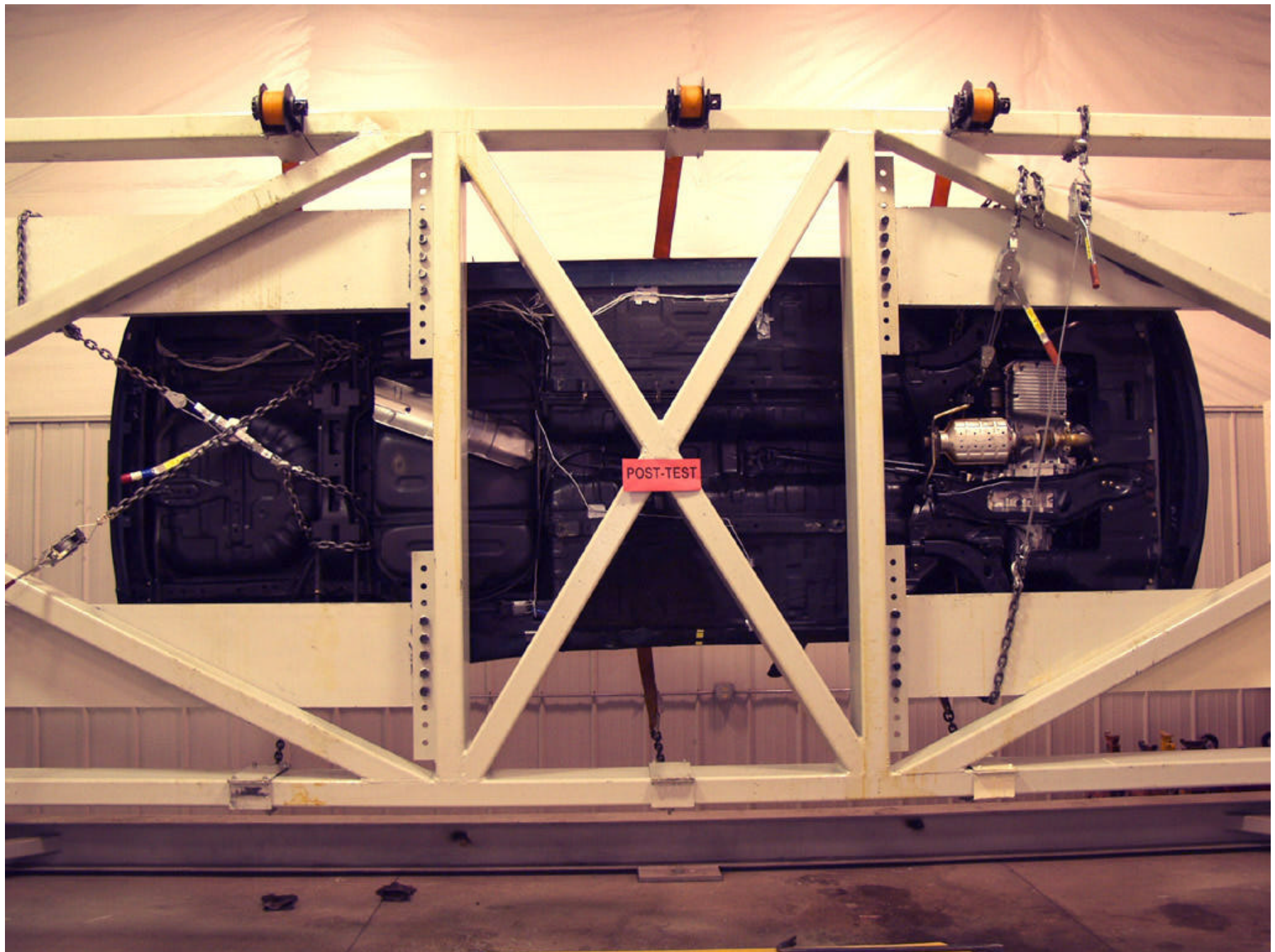


Figure A-41: ROLLOVER 90 DEGREES

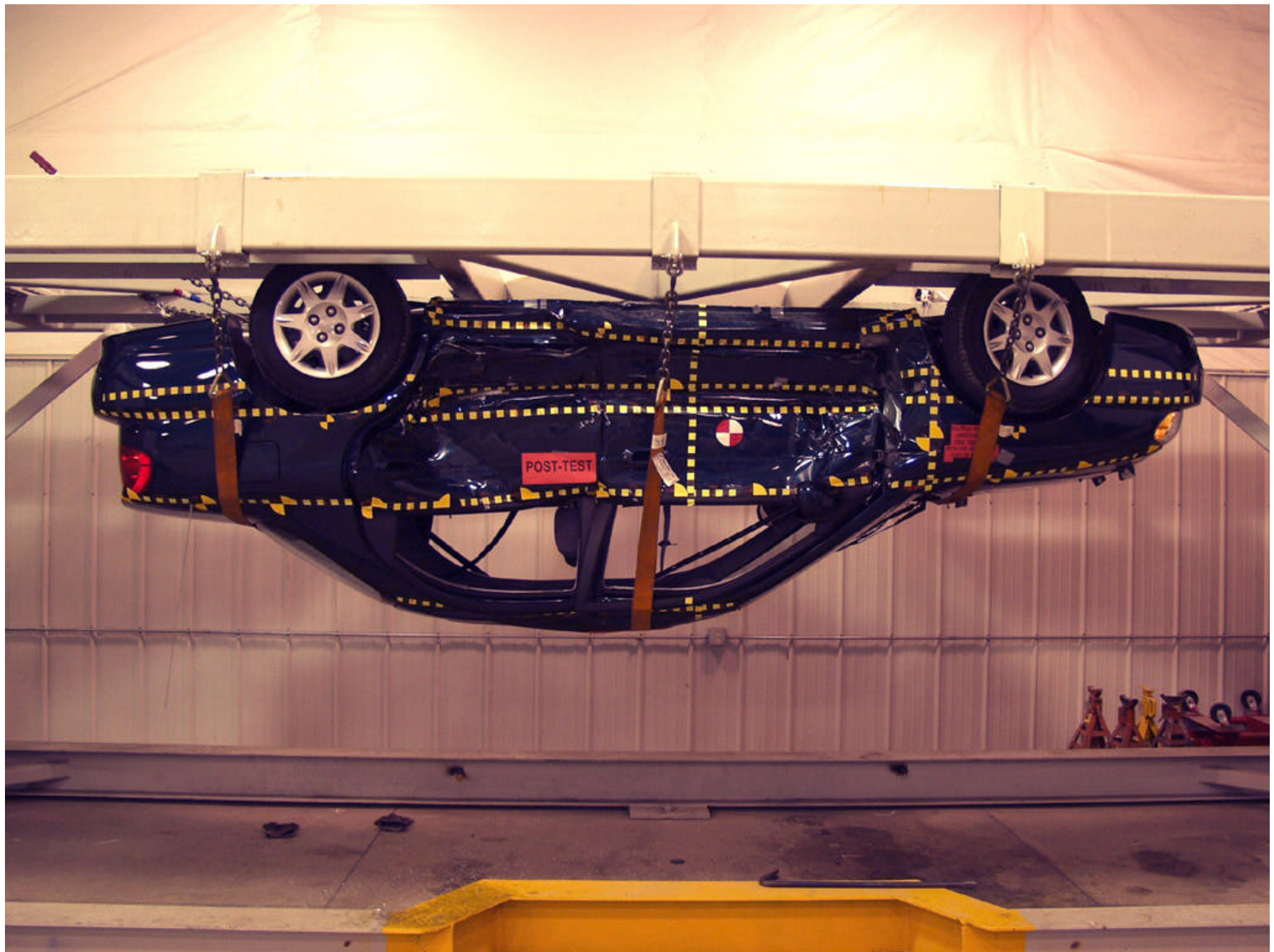


Figure A-42: ROLLOVER 180 DEGREES



Figure A-43: ROLLOVER 360 DEGREES



Figure A-44: PRE-TEST ALUMINUM BARRIER FRONT



Figure A-45: POST-TEST ALUMINUM BARRIER FRONT



Figure A-46: PRE-TEST ALUMINUM BARRIER LEFT SIDE



Figure A-47: POST-TEST ALUMINUM BARRIER LEFT SIDE



Figure A-48: PRE-TEST ALUMINUM BARRIER RIGHT SIDE



Figure A-49: POST-TEST ALUMINUM BARRIER RIGHT SIDE

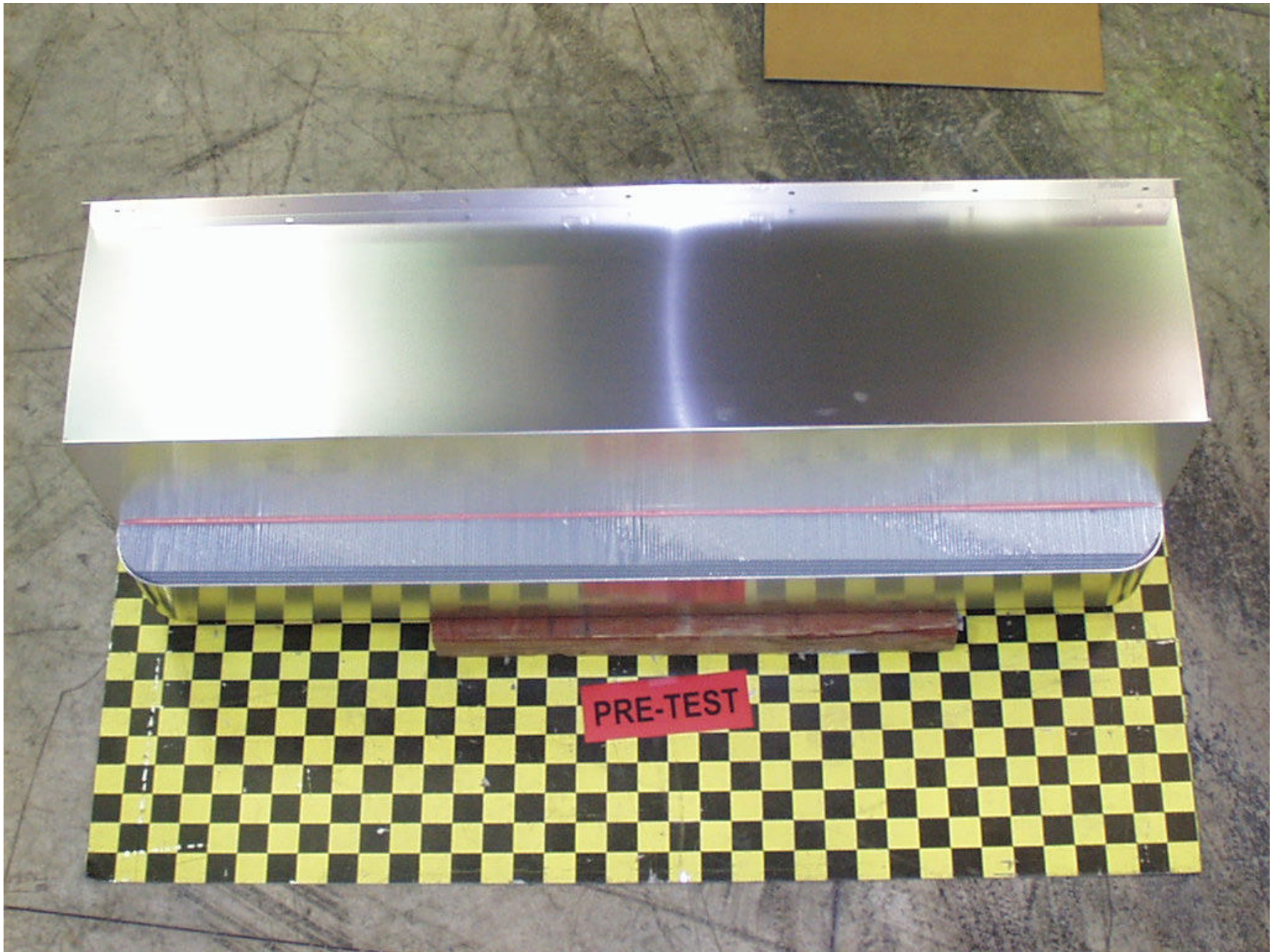


Figure A-50: PRE-TEST ALUMINUM BARRIER OVERHEAD



Figure A-51: POST-TEST ALUMINUM BARRIER OVERHEAD

APPENDIX B

VEHICLE, MDB, AND SID RESPONSE DATA

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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS ACCELERATION DATA – FIR FILTERED

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MDB INSTRUMENTATION PLOTS
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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)
ACCELERATION DATA – FILTER CLASS 1000, LOWER SPINE FILTER CLASS 180
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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOT (REDUNDANT)
ACCELERATION DATA – FIR FILTERED

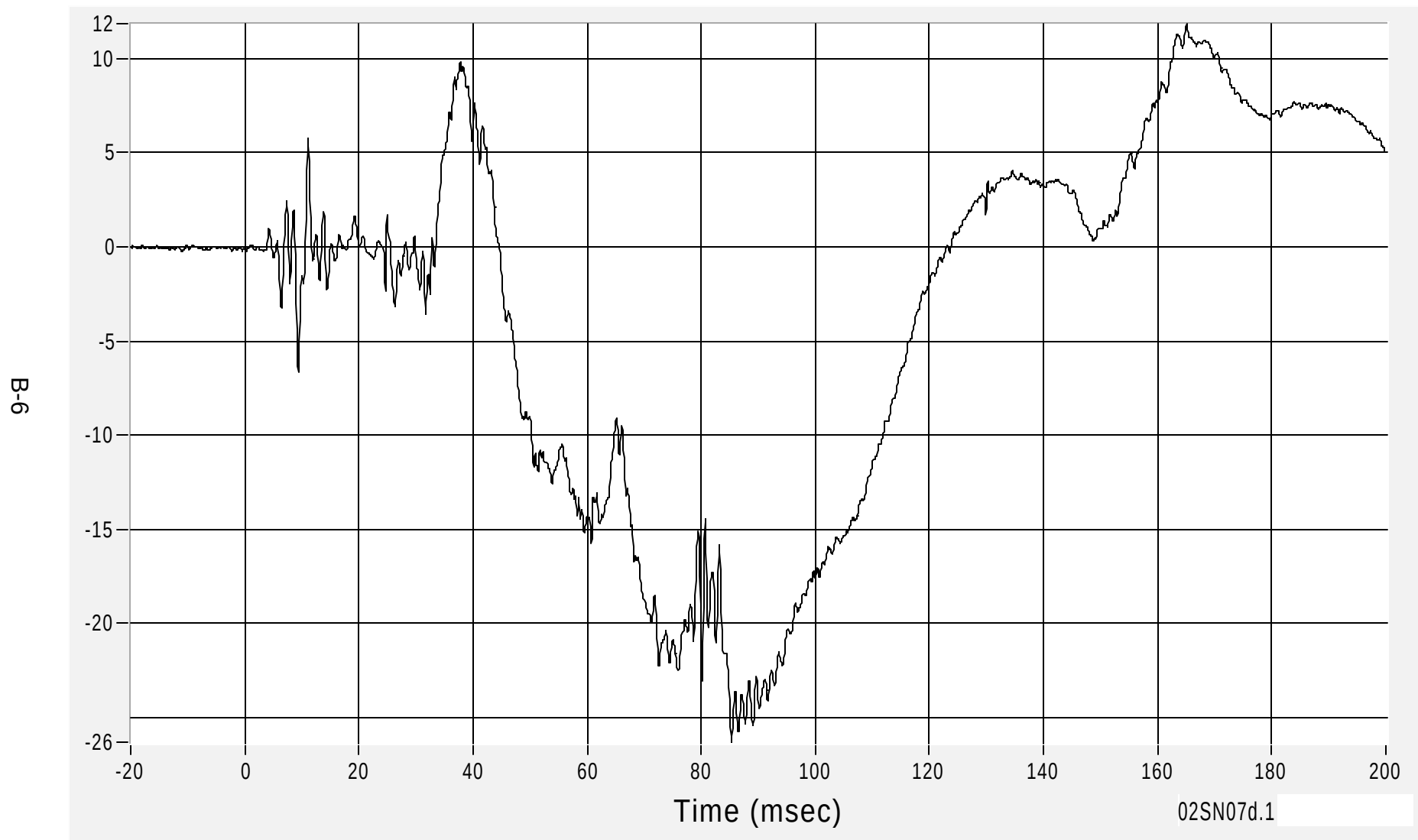
<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
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123	DRIVER LOWER RIB (Y) ACCELERATION-REDUNDANT	B-128
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125	DRIVER PELVIS (Y) ACCELERATION-REDUNDANT	B-130
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129	PASSENGER PELVIS (Y) ACCELERATION-REDUNDANT	B-134

Driver Head CG (X) Acceleration

Max 11.9 G's at 165.1 msec

Acceleration (G's) CFC1000

Min -26.3 G's at 85.3 msec



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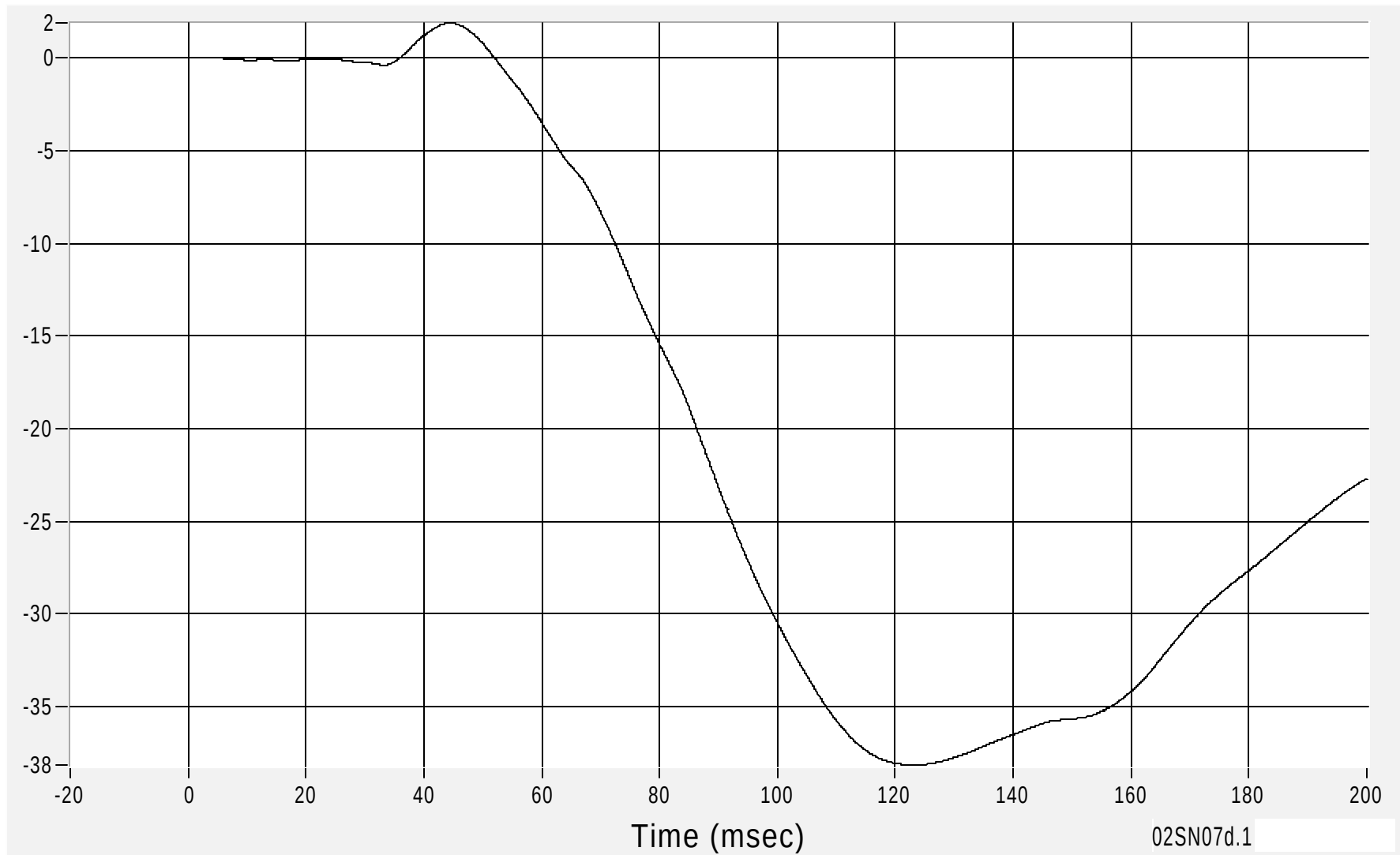
Driver Head CG (X) Velocity

Max 1.9 km/h at 44.4 msec

Velocity (km/h) CFC180

Min -38.2 km/h at 123.3 msec

B-7



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18 April 2002

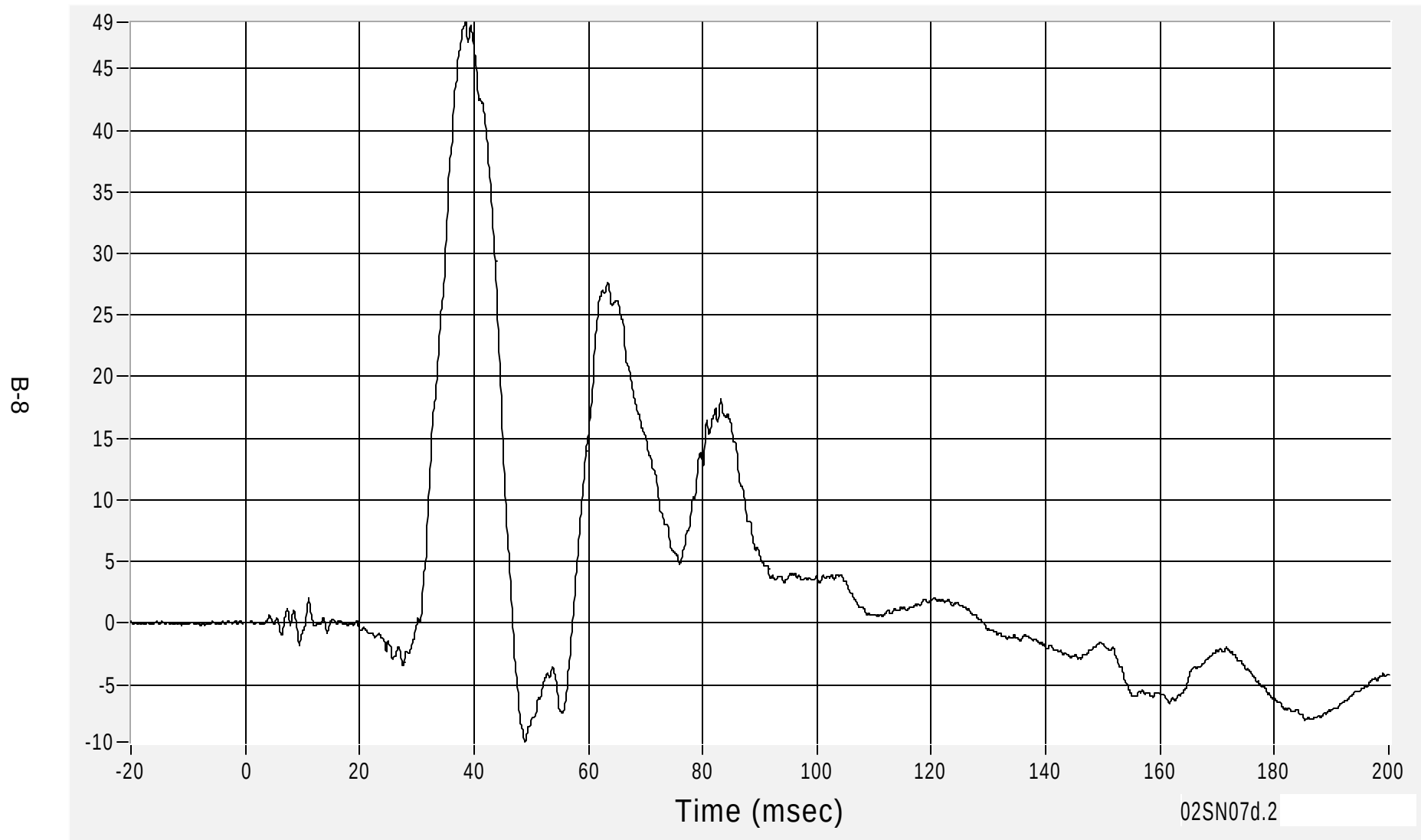
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Driver Head CG (Y) Acceleration

Max 48.8 G's at 38.6 msec

Acceleration (G's) CFC1000

Min -9.6 G's at 49.0 msec



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18 April 2002

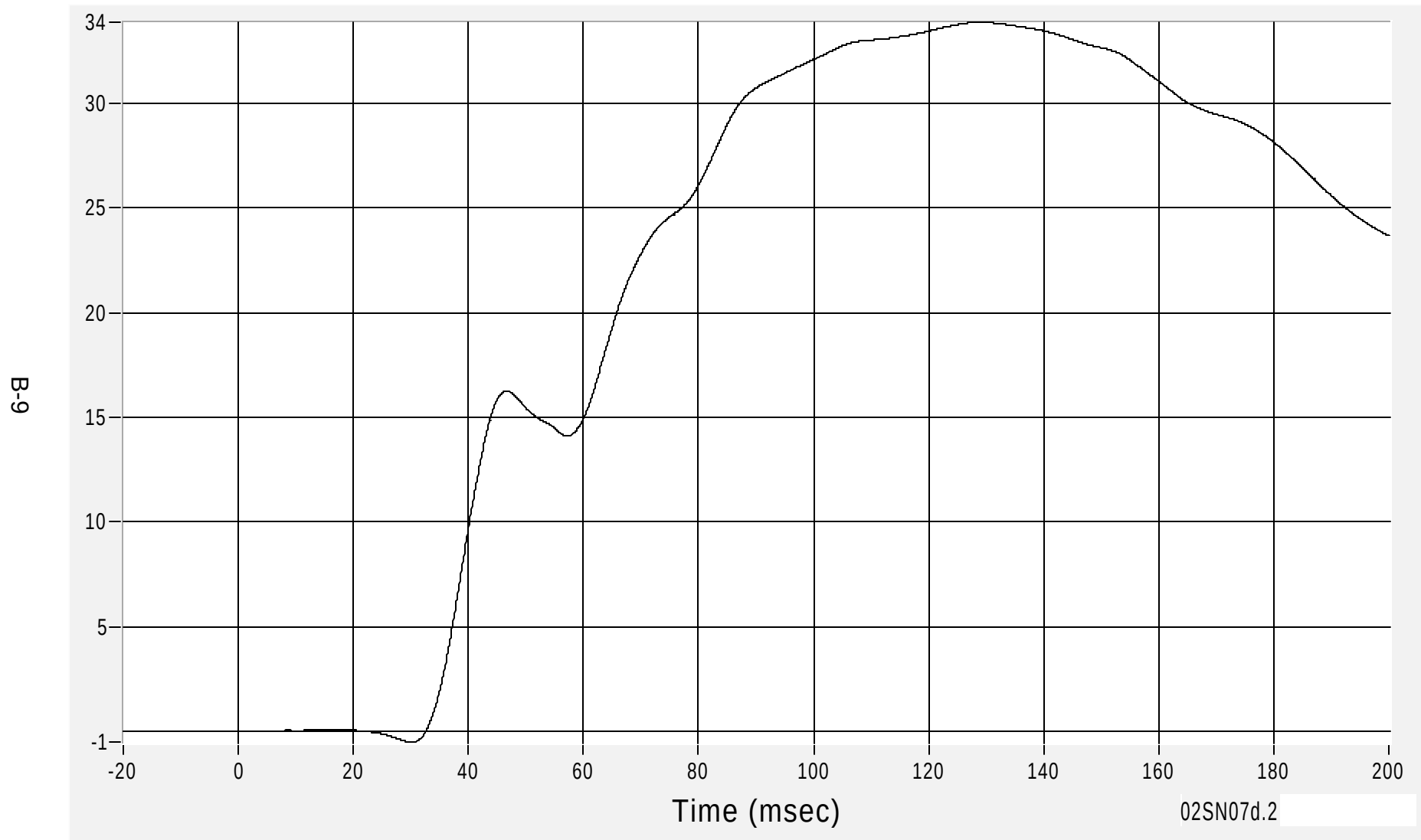
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Head CG (Y) Velocity

Max 33.9 km/h at 129.0 msec

Velocity (km/h) CFC180

Min -0.5 km/h at 30.2 msec



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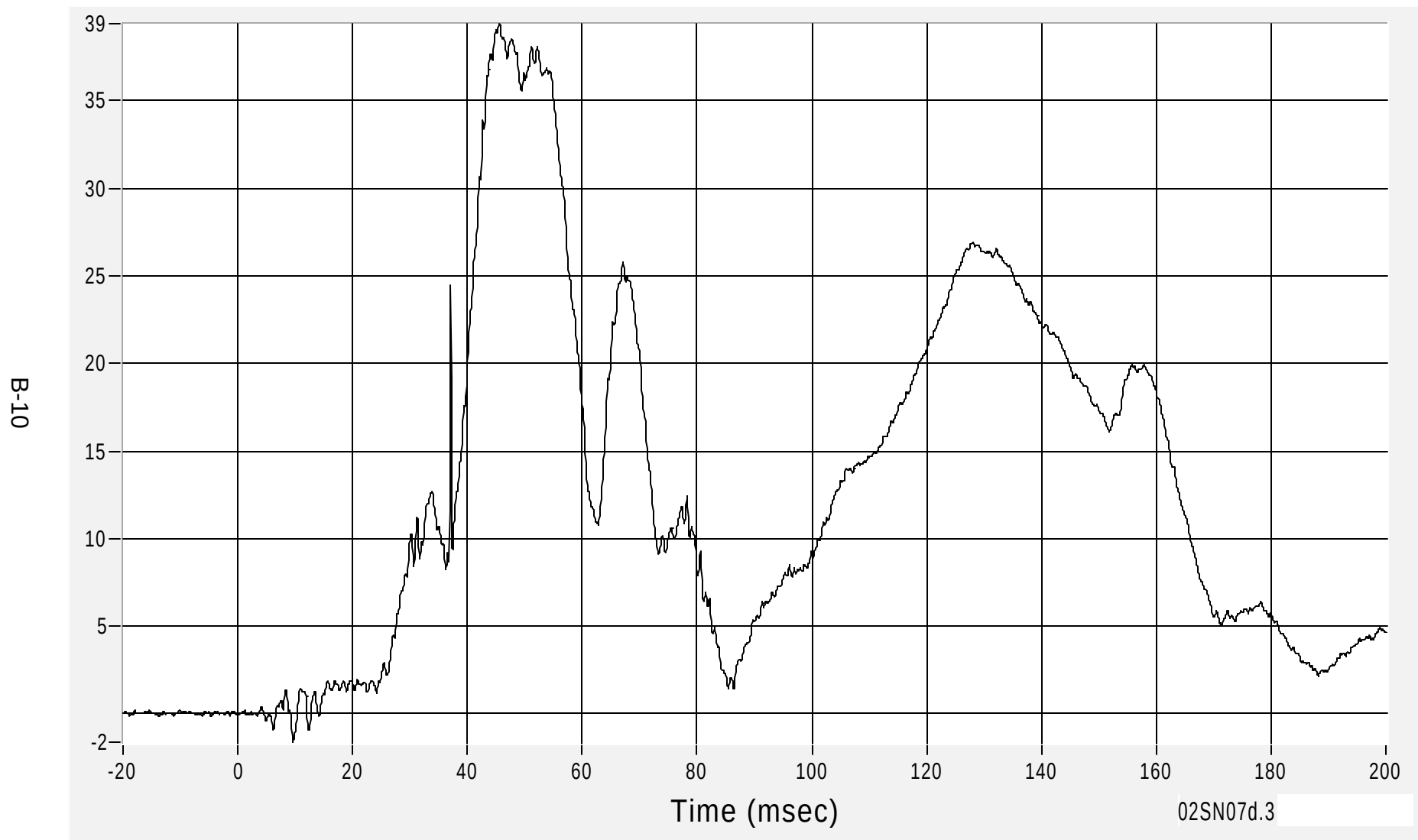
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Driver Head CG (Z) Acceleration

Max 39.4 G's at 45.5 msec

Acceleration (G's) CFC1000

Min -1.6 G's at 9.6 msec



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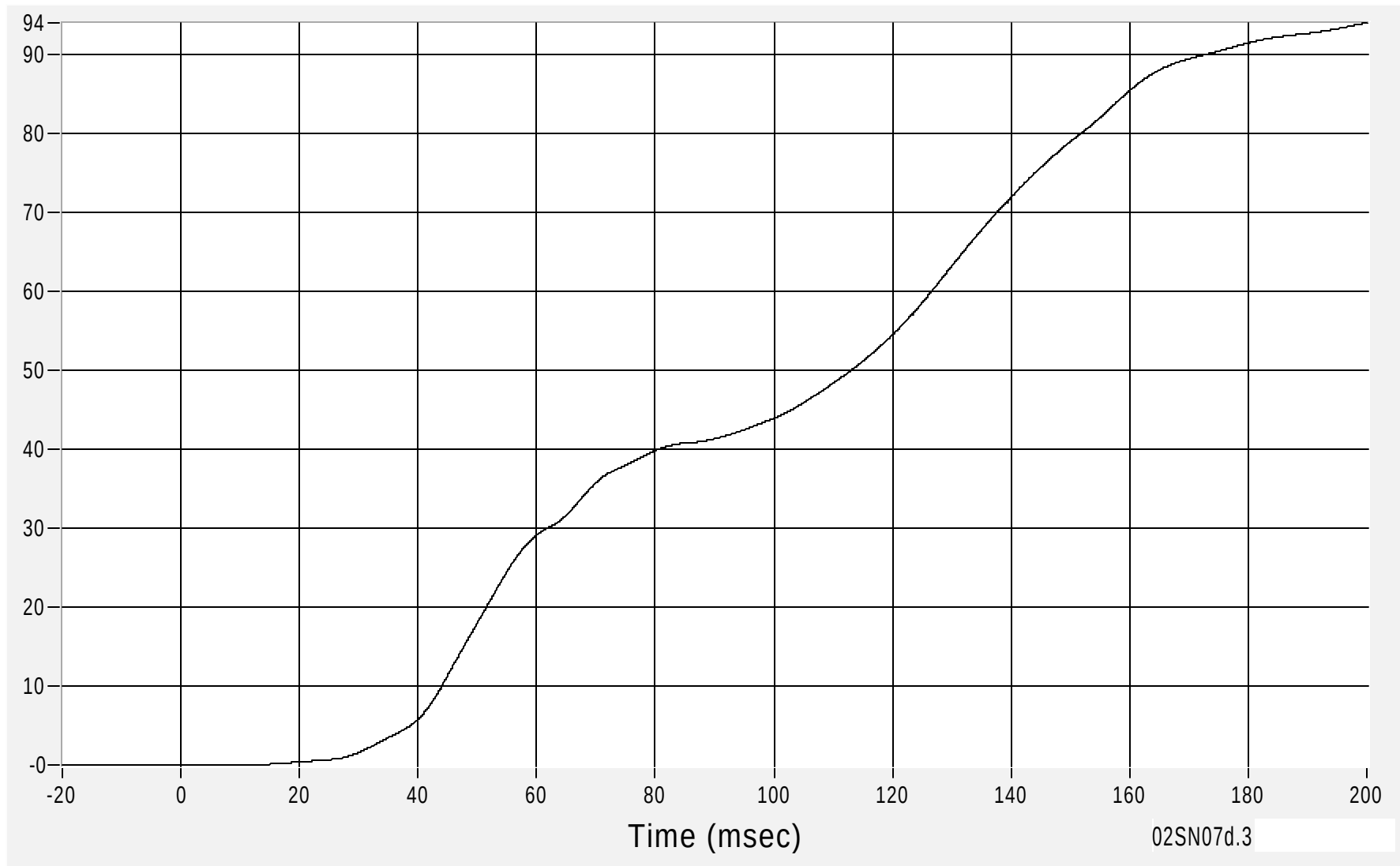
Driver Head CG (Z) Velocity

Max 94.0 km/h at 199.9 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 6.6 msec

B-11



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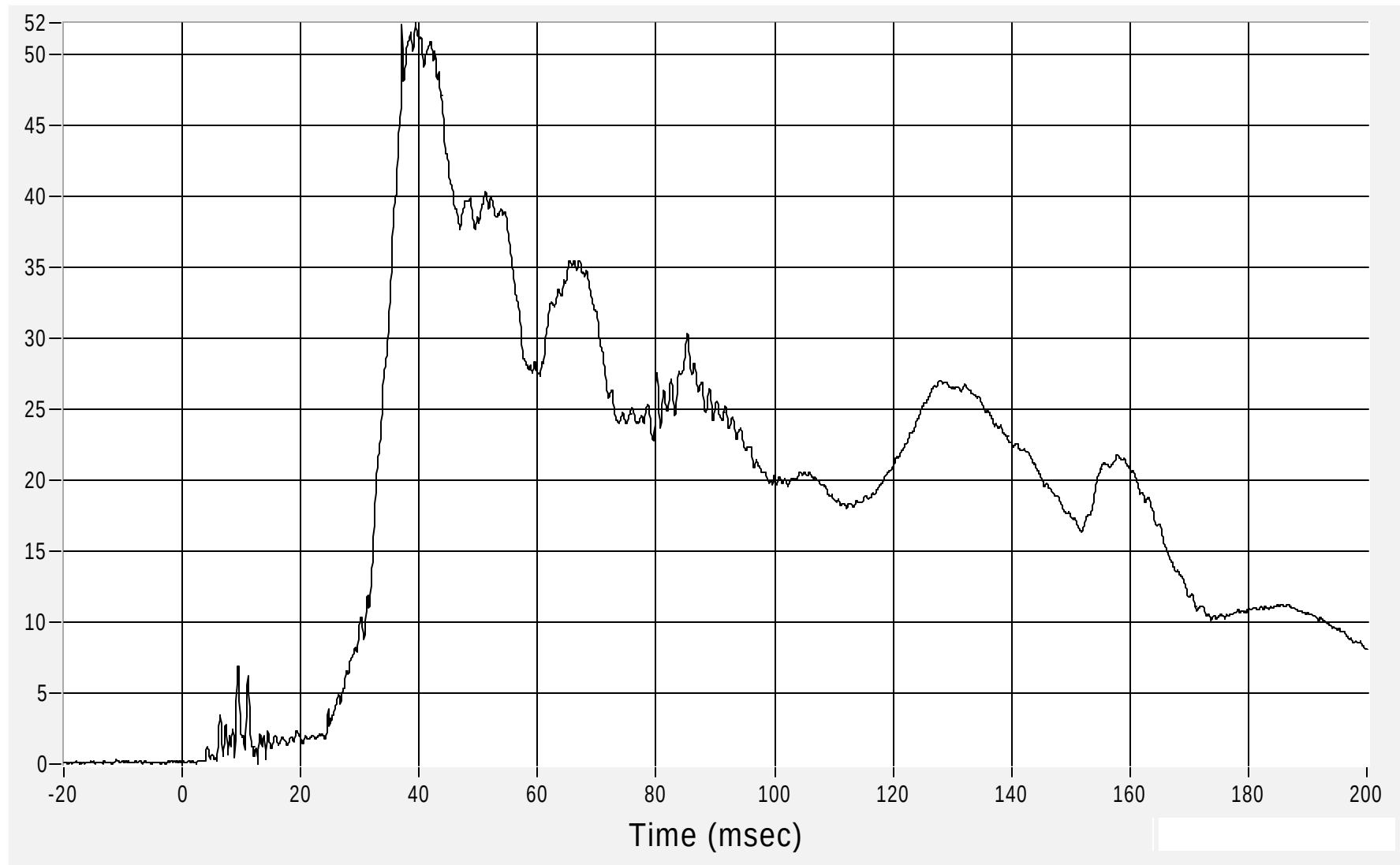
Driver Head Resultant Acceleration

Max 52.2 G's at 39.4 msec

Acceleration (G's) CFC1000

Min 0.0 G's at 12.7 msec

B-12



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18 April 2002

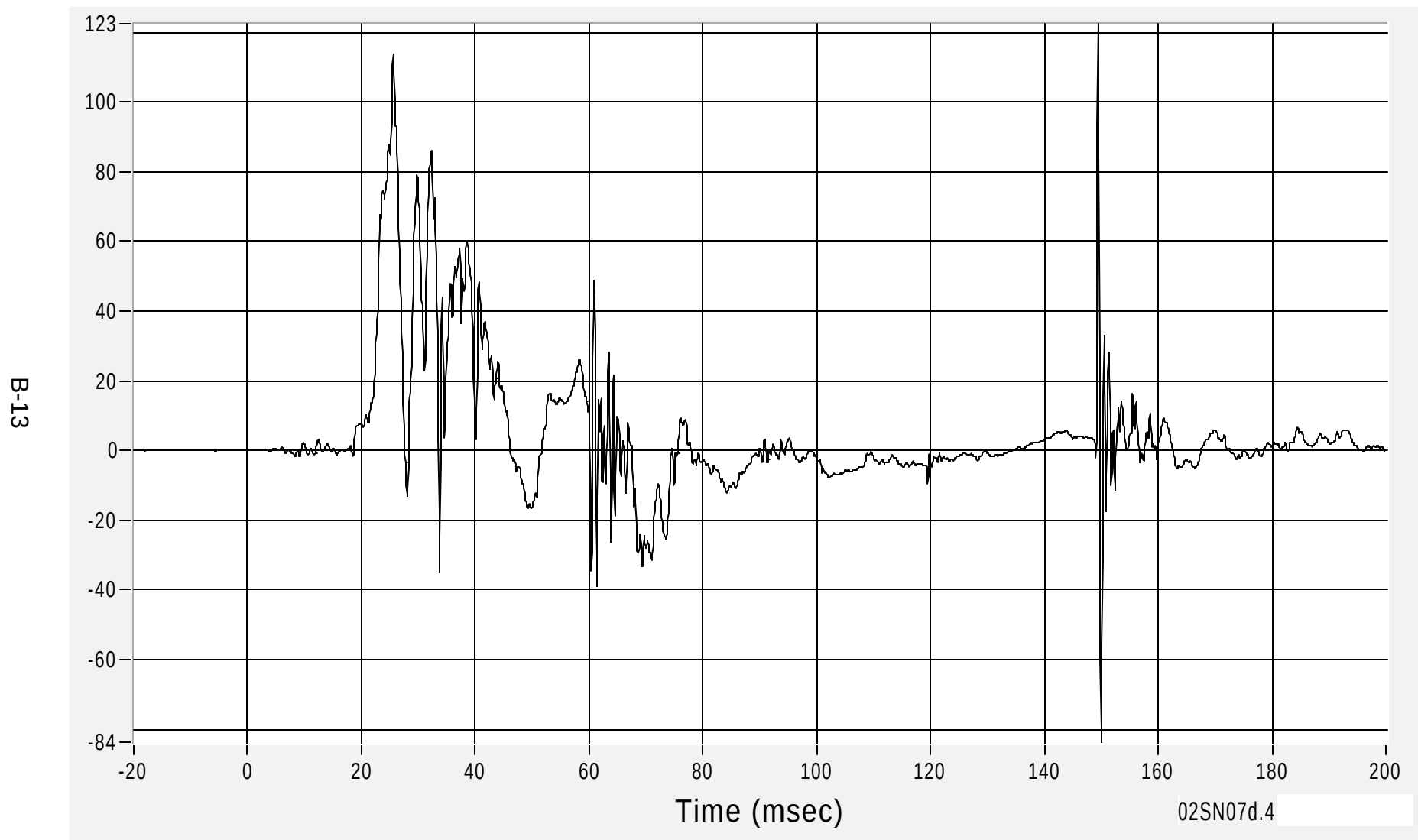
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Driver Upper Rib (Y) Acceleration

Max 122.5 G's at 149.4 msec

Acceleration (G's) CFC1000

Min -83.7 G's at 150.0 msec



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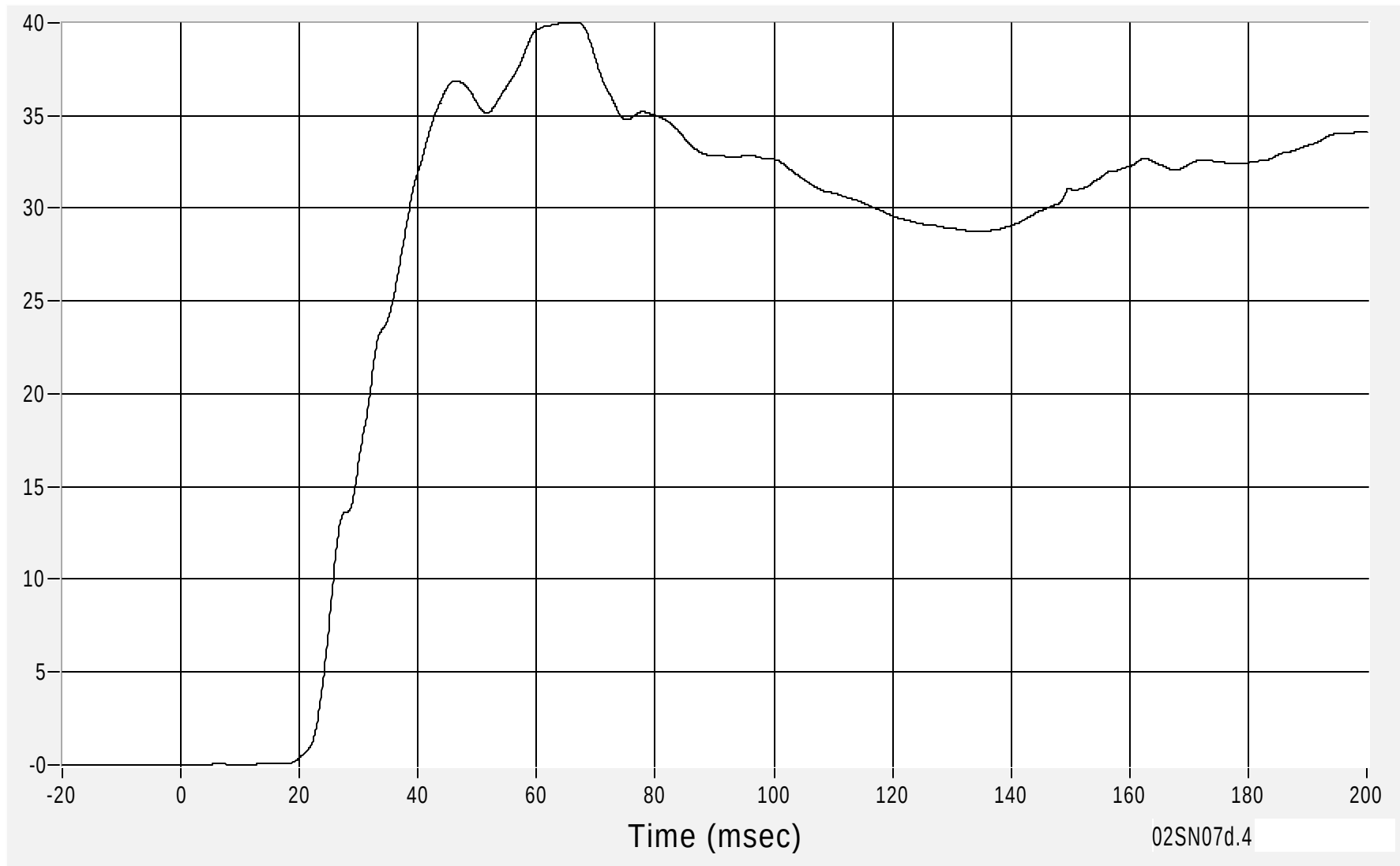
Driver Upper Rib (Y) Velocity

Velocity (km/h) CFC180

Max 40.0 km/h at 65.7 msec

Min 0.0 km/h at 9.2 msec

B-14



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18 April 2002

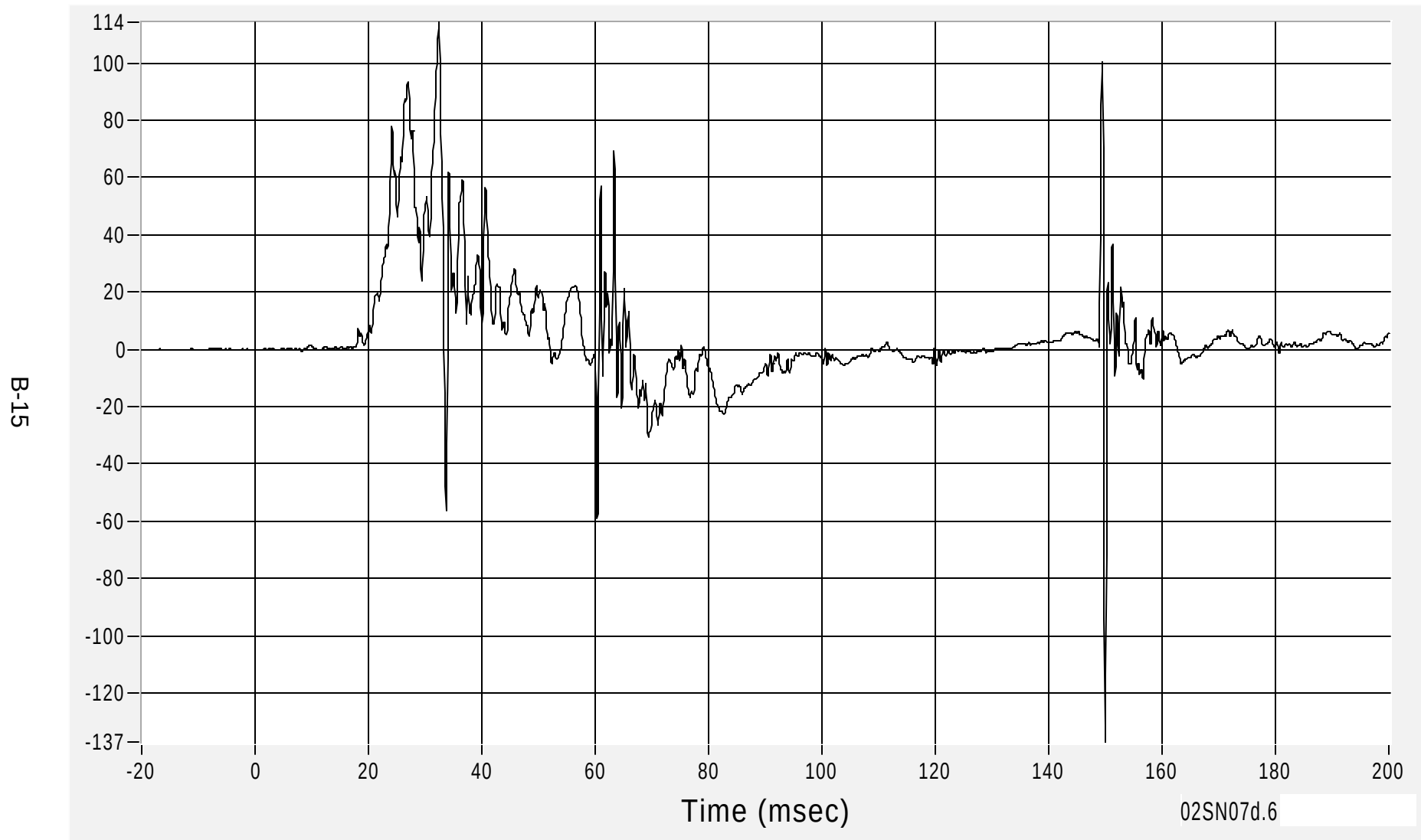
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Driver Lower Rib (Y) Acceleration

Max 114.3 G's at 32.4 msec

Min -137.2 G's at 150.0 msec

Acceleration (G's) CFC1000



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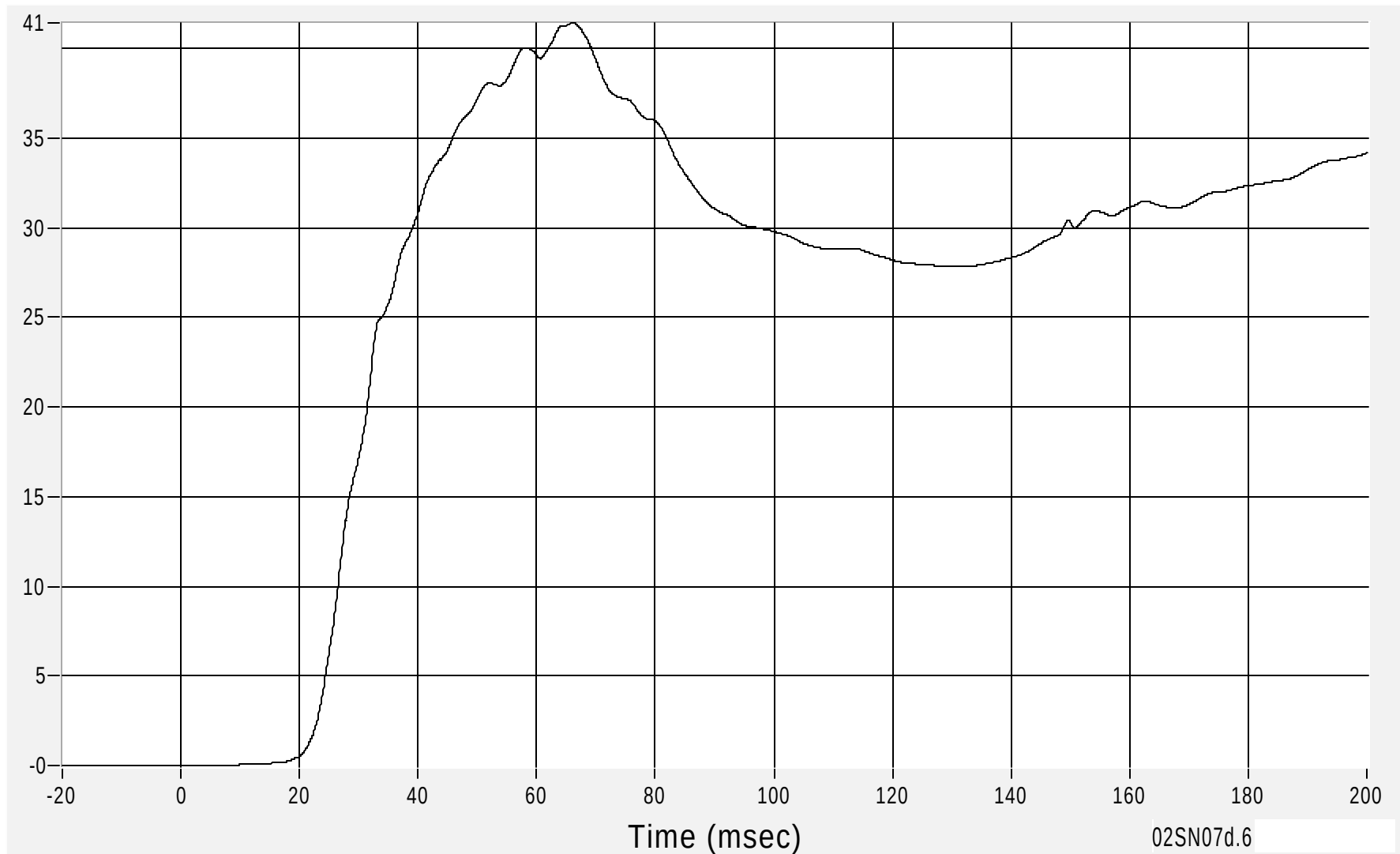
Driver Lower Rib (Y) Velocity

Max 41.4 km/h at 66.1 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 1.4 msec

B-16



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Vehicle Crashworthiness Lab

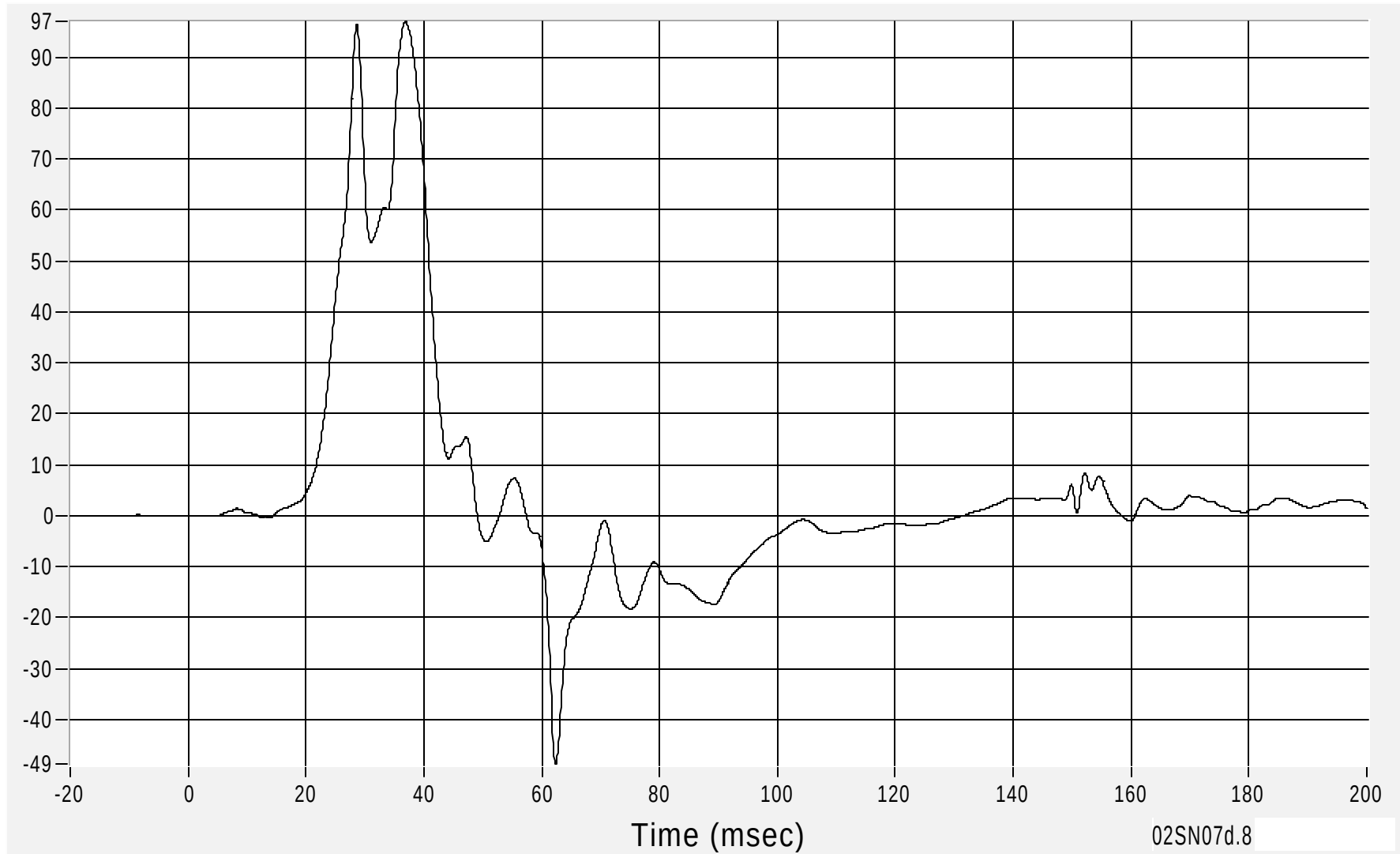
Driver Lower Spine (Y) Acceleration

Max 97.0 G's at 36.9 msec

Acceleration (G's) CFC180

Min -48.7 G's at 62.3 msec

B-17



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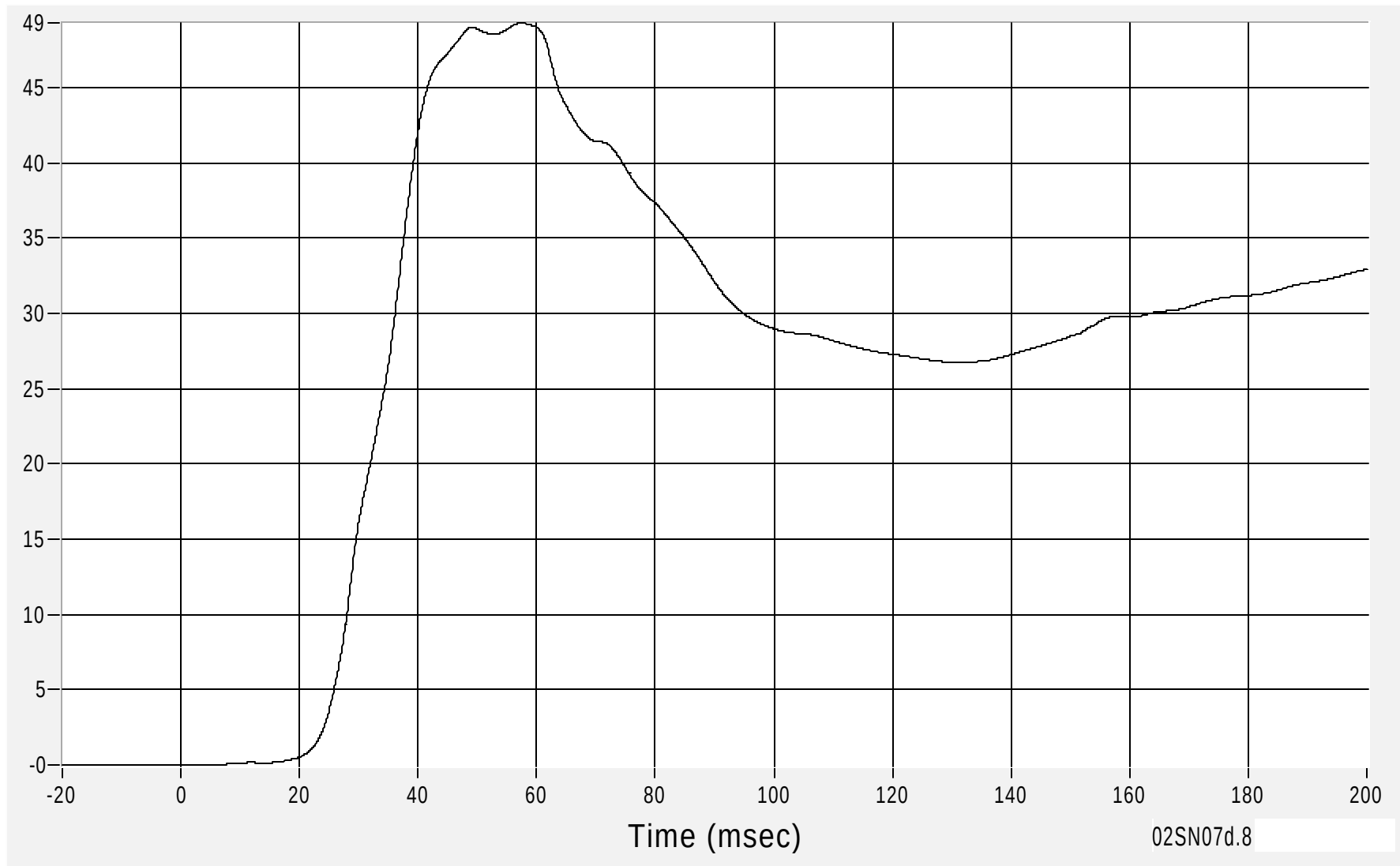
Driver Lower Spine (Y) Velocity

Velocity (km/h) CFC180

Max 49.3 km/h at 57.4 msec

Min 0.0 km/h at 5.1 msec

B-18



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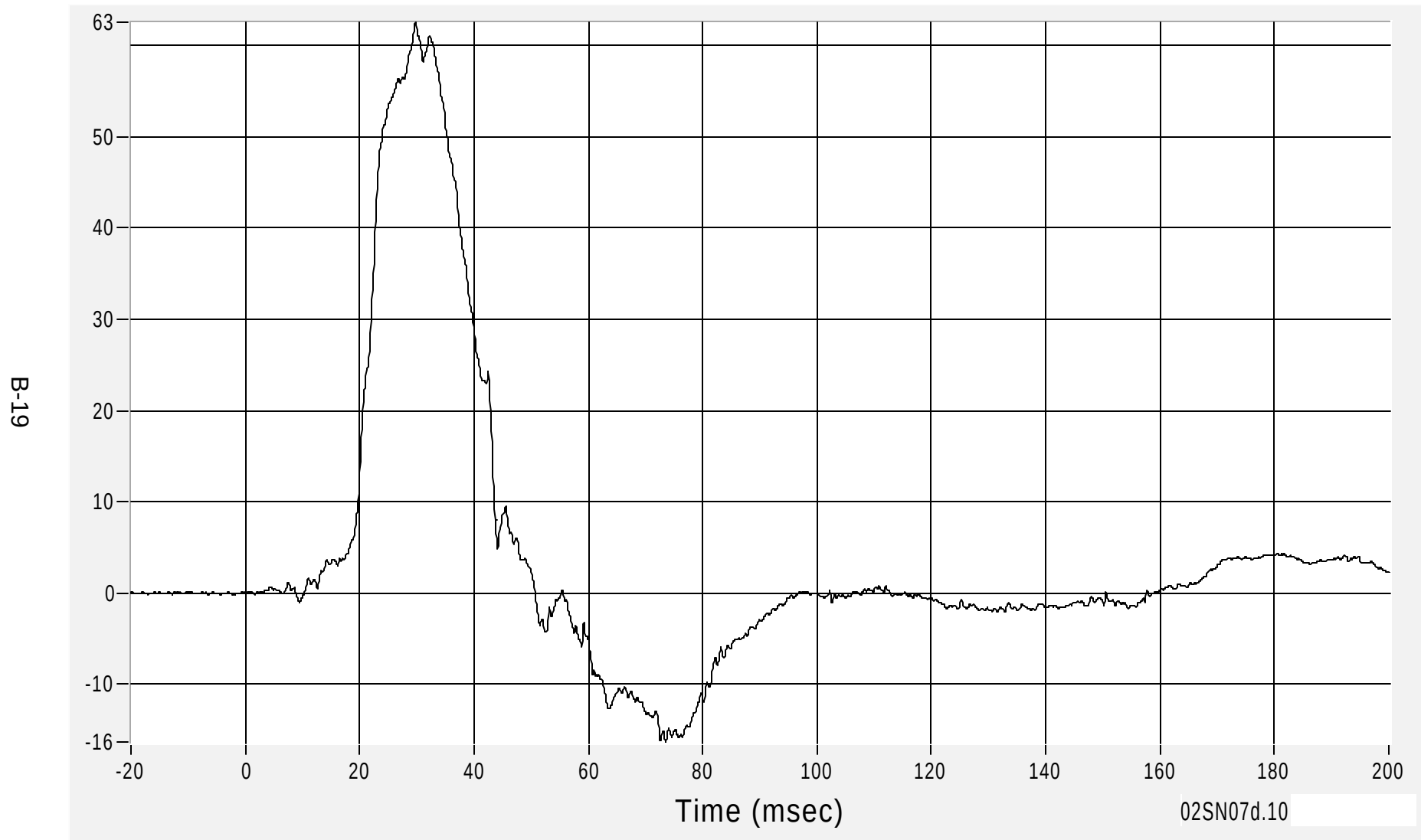
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Driver Pelvic (Y) Acceleration

Max 62.6 G's at 29.8 msec

Acceleration (G's) CFC1000

Min -16.3 G's at 73.5 msec



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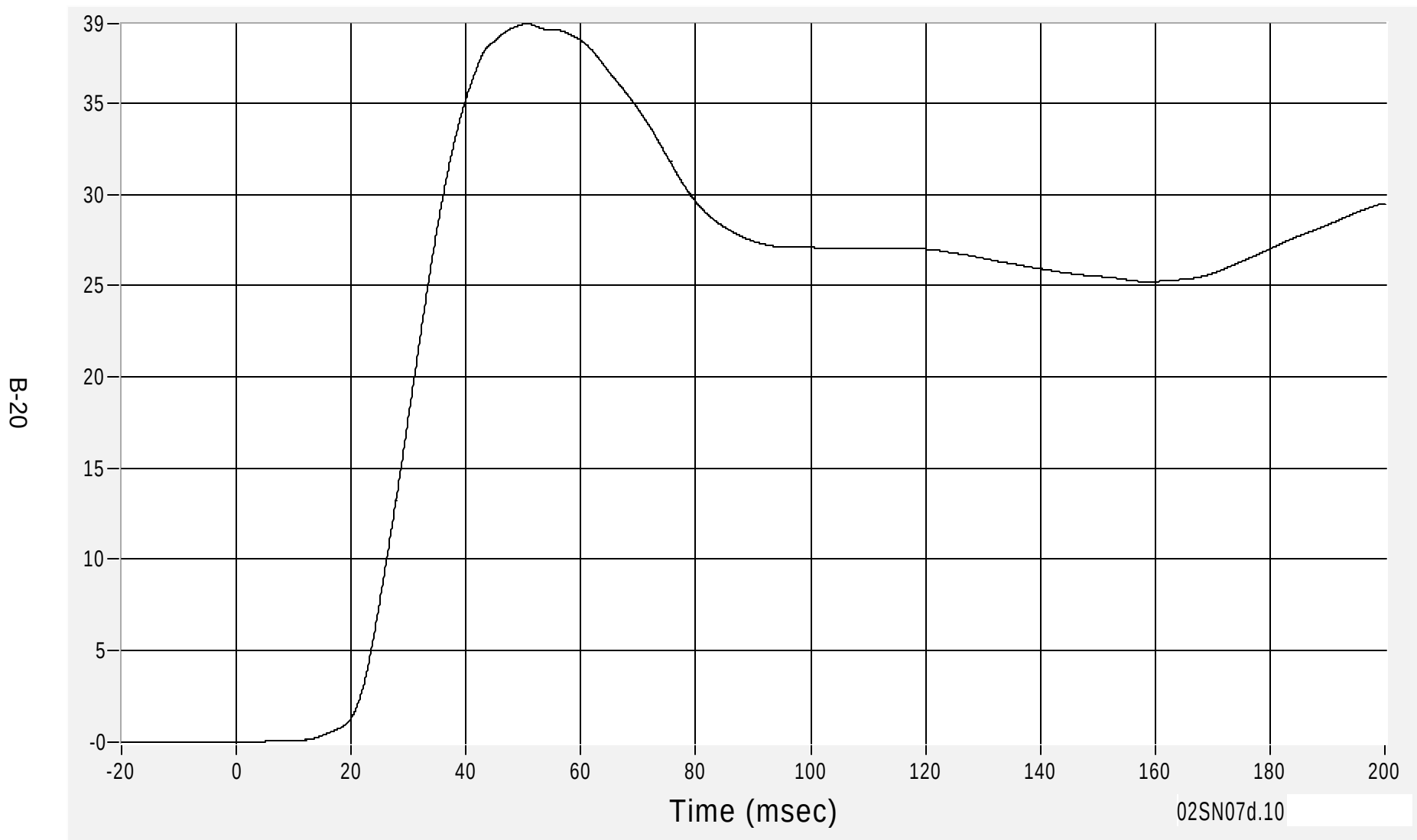
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Driver Pelvic (Y) Velocity

Velocity (km/h) CFC180

Max 39.3 km/h at 50.6 msec

Min 0.0 km/h at 0.0 msec



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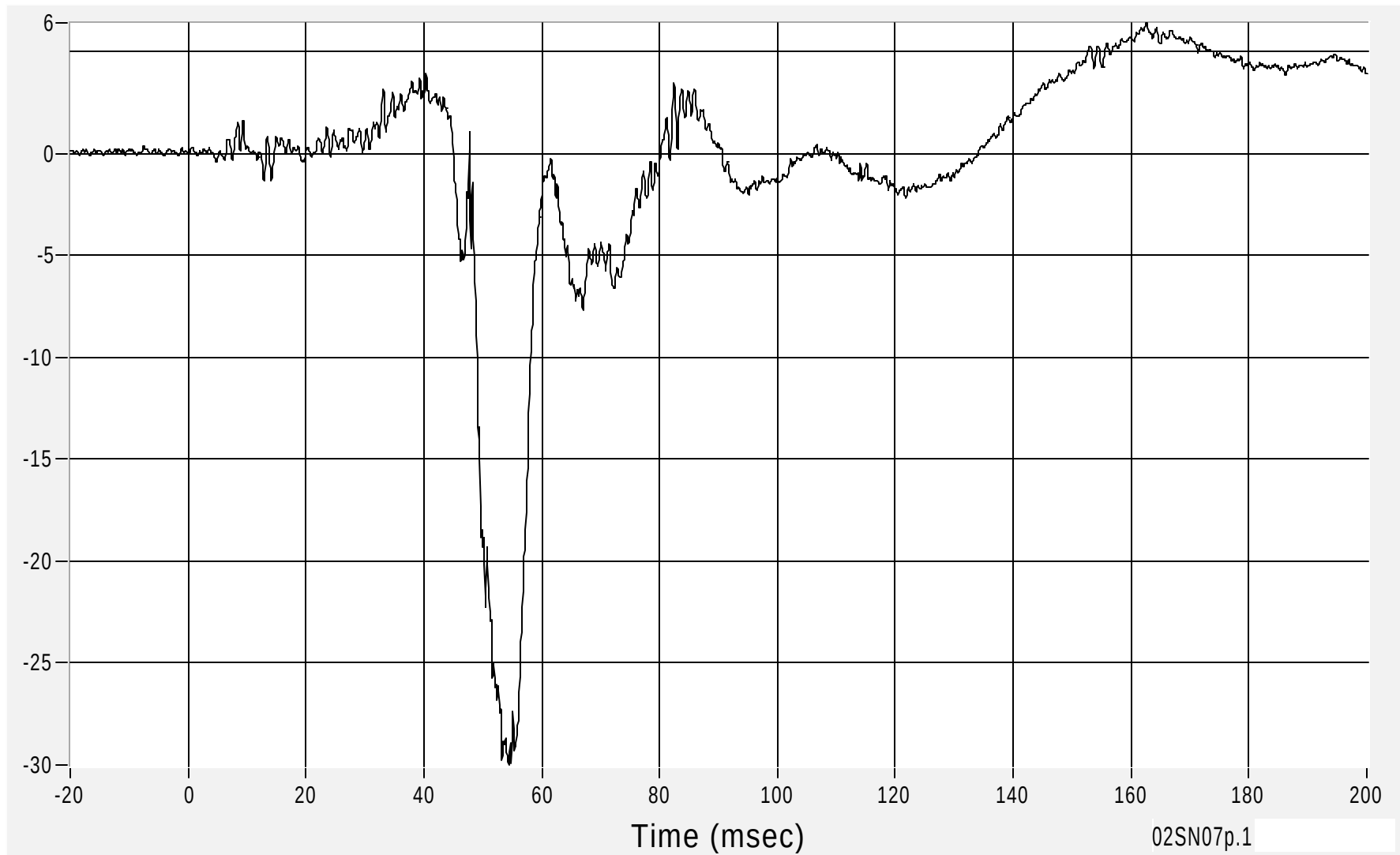
Passenger Head CG (X) Acceleration

Acceleration (G's) CFC1000

Max 6.4 G's at 162.6 msec

Min -30.0 G's at 54.4 msec

B-21



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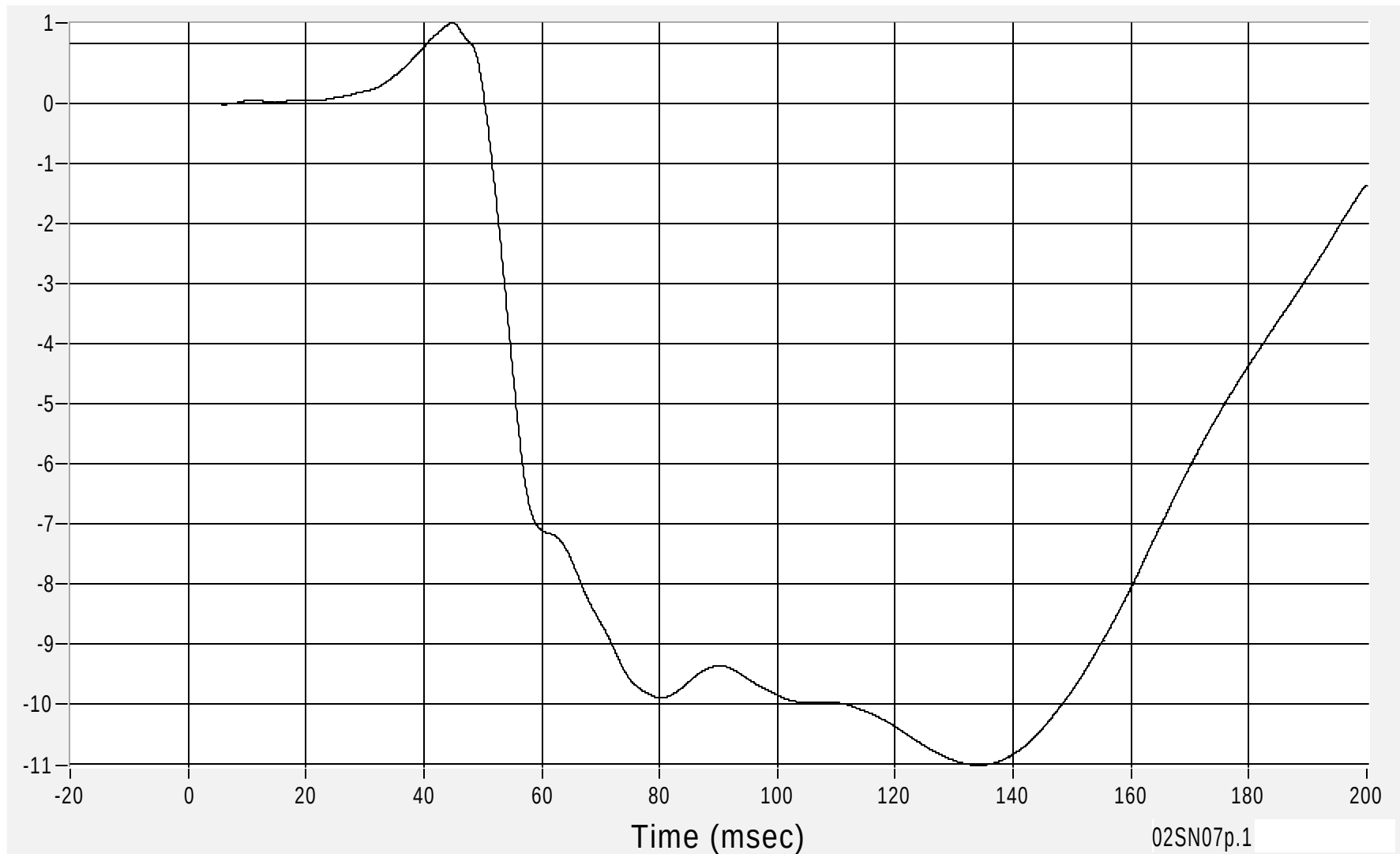
Passenger Head CG (X) Velocity

Max 1.3 km/h at 44.8 msec

Velocity (km/h) CFC180

Min -11.0 km/h at 134.1 msec

B-22



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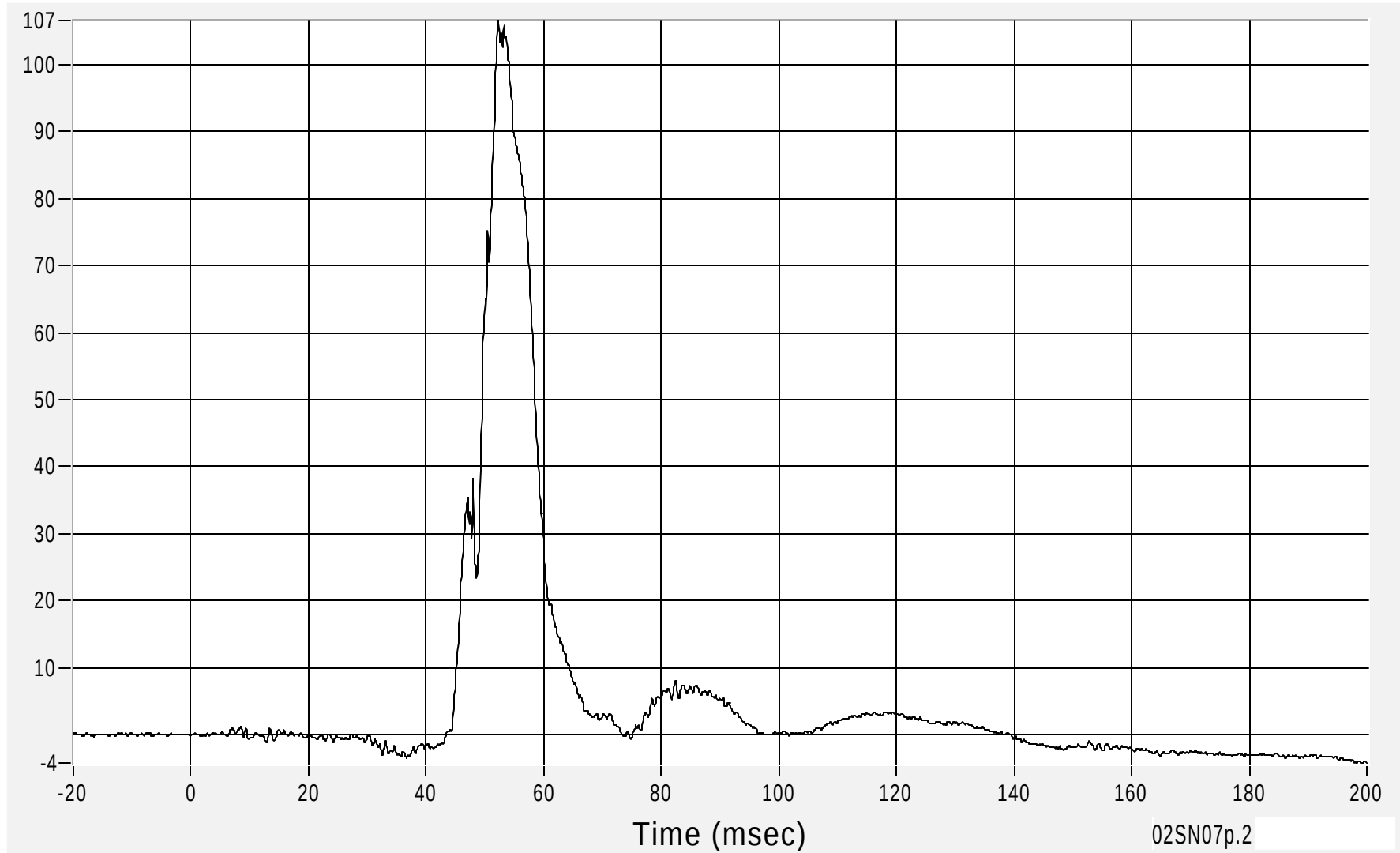
Passenger Head CG (Y) Acceleration

Max 106.6 G's at 52.2 msec

Acceleration (G's) CFC1000

Min -4.2 G's at 199.1 msec

B-23



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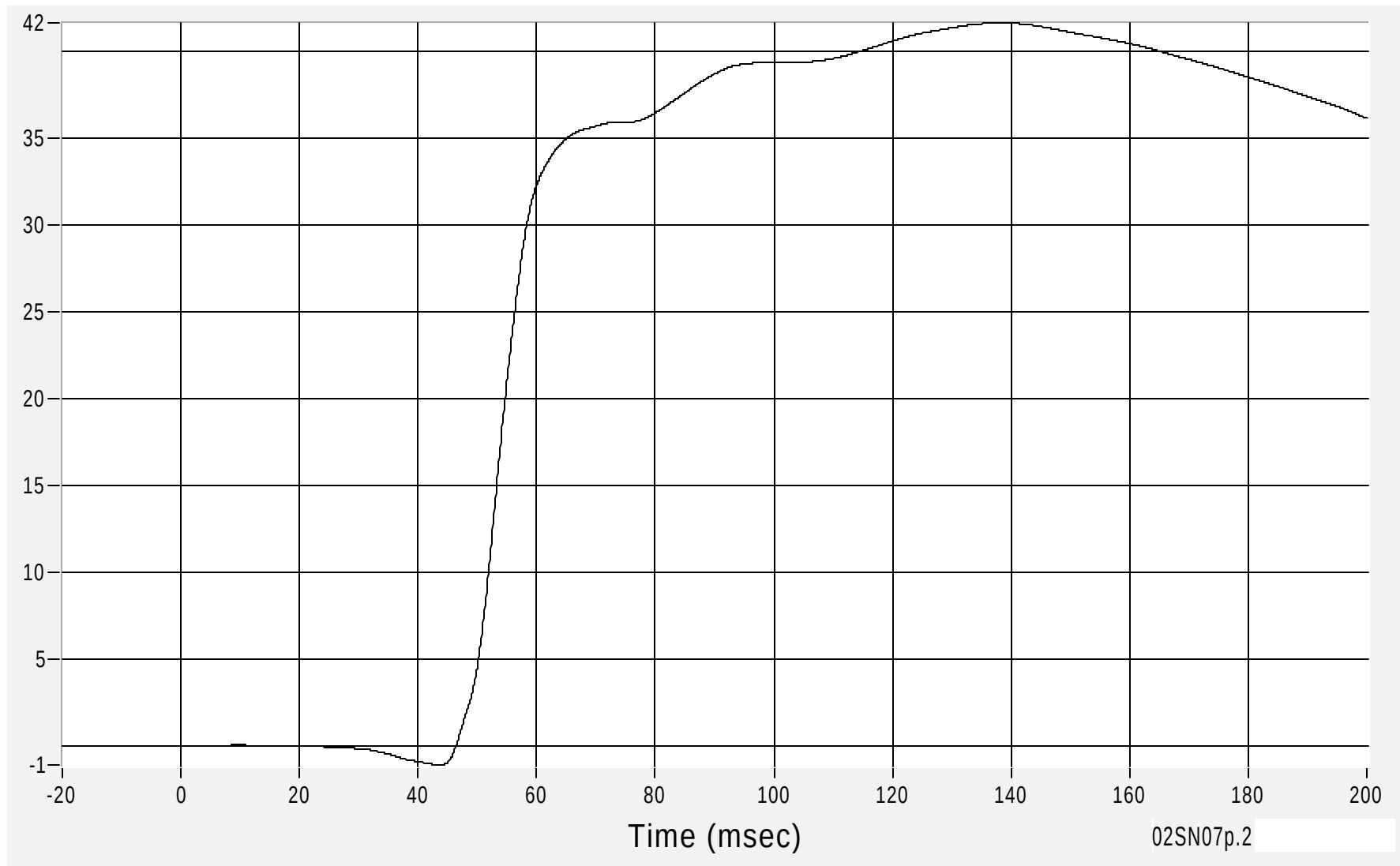
Passenger Head CG (Y) Velocity

Max 41.7 km/h at 139.1 msec

Velocity (km/h) CFC180

Min -1.1 km/h at 43.7 msec

B-24



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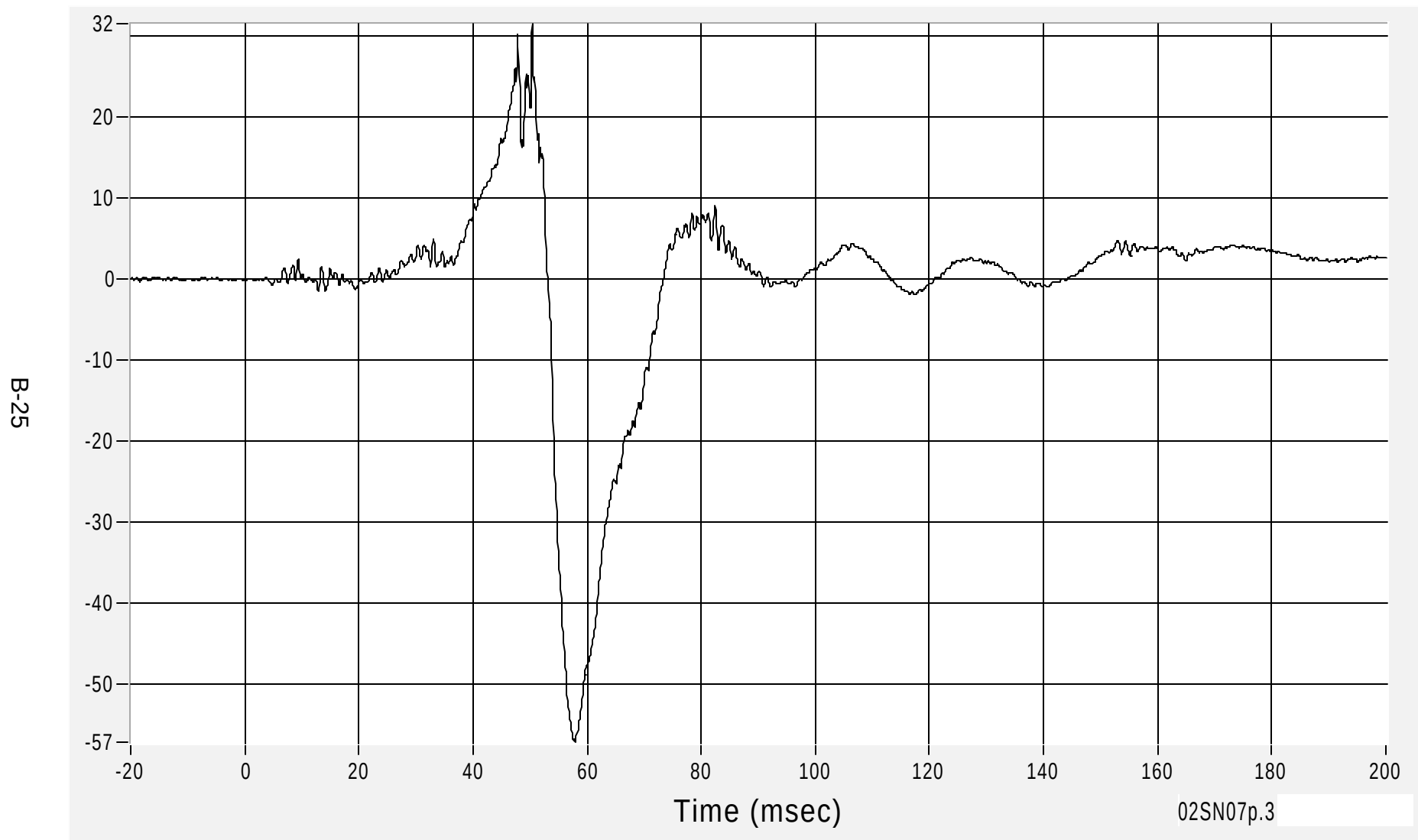
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Passenger Head CG (Z) Acceleration

Max 31.5 G's at 50.4 msec

Acceleration (G's) CFC1000

Min -57.1 G's at 57.9 msec



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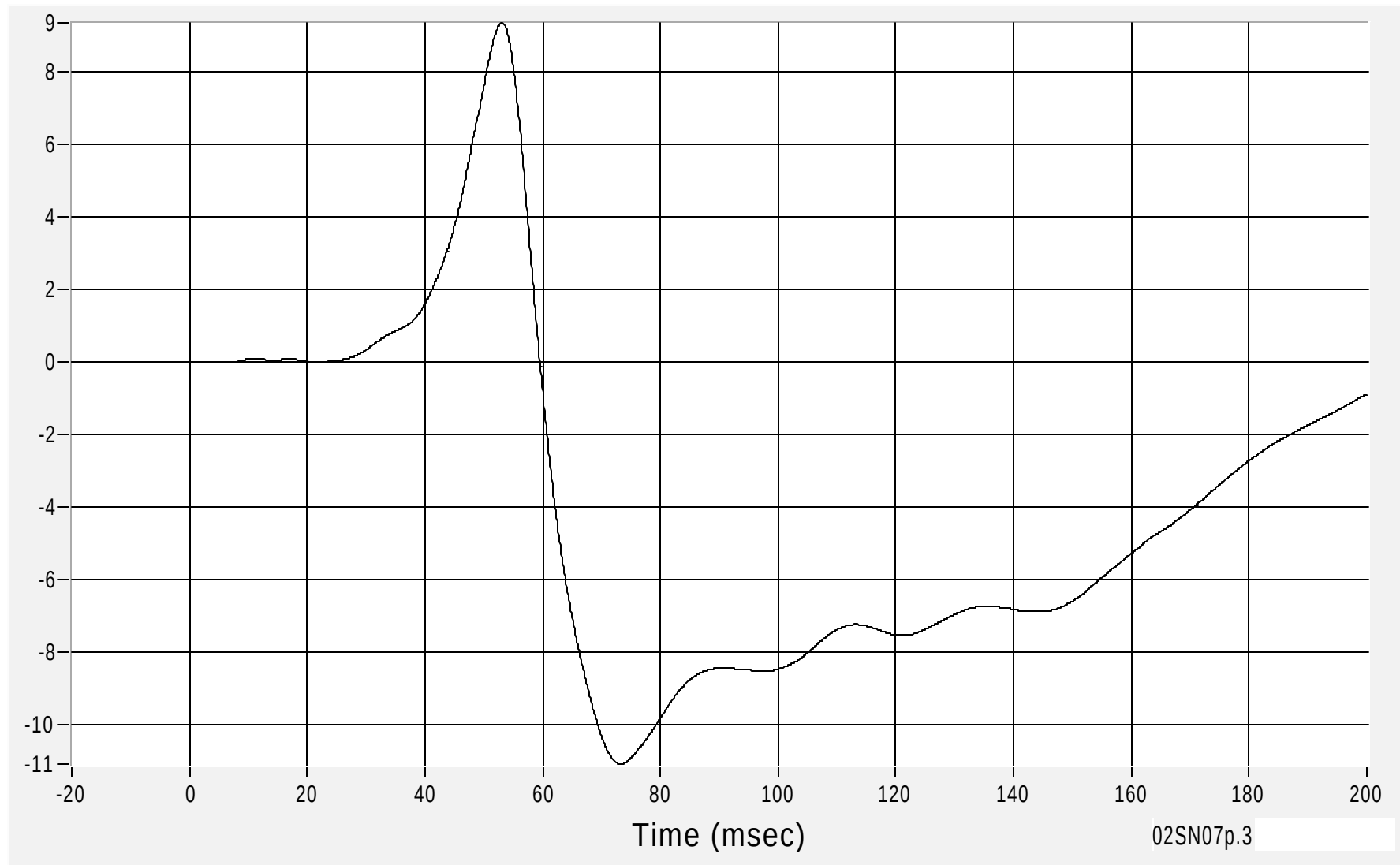
Passenger Head CG (Z) Velocity

Max 9.3 km/h at 53.0 msec

Velocity (km/h) CFC180

Min -11.1 km/h at 73.3 msec

B-26



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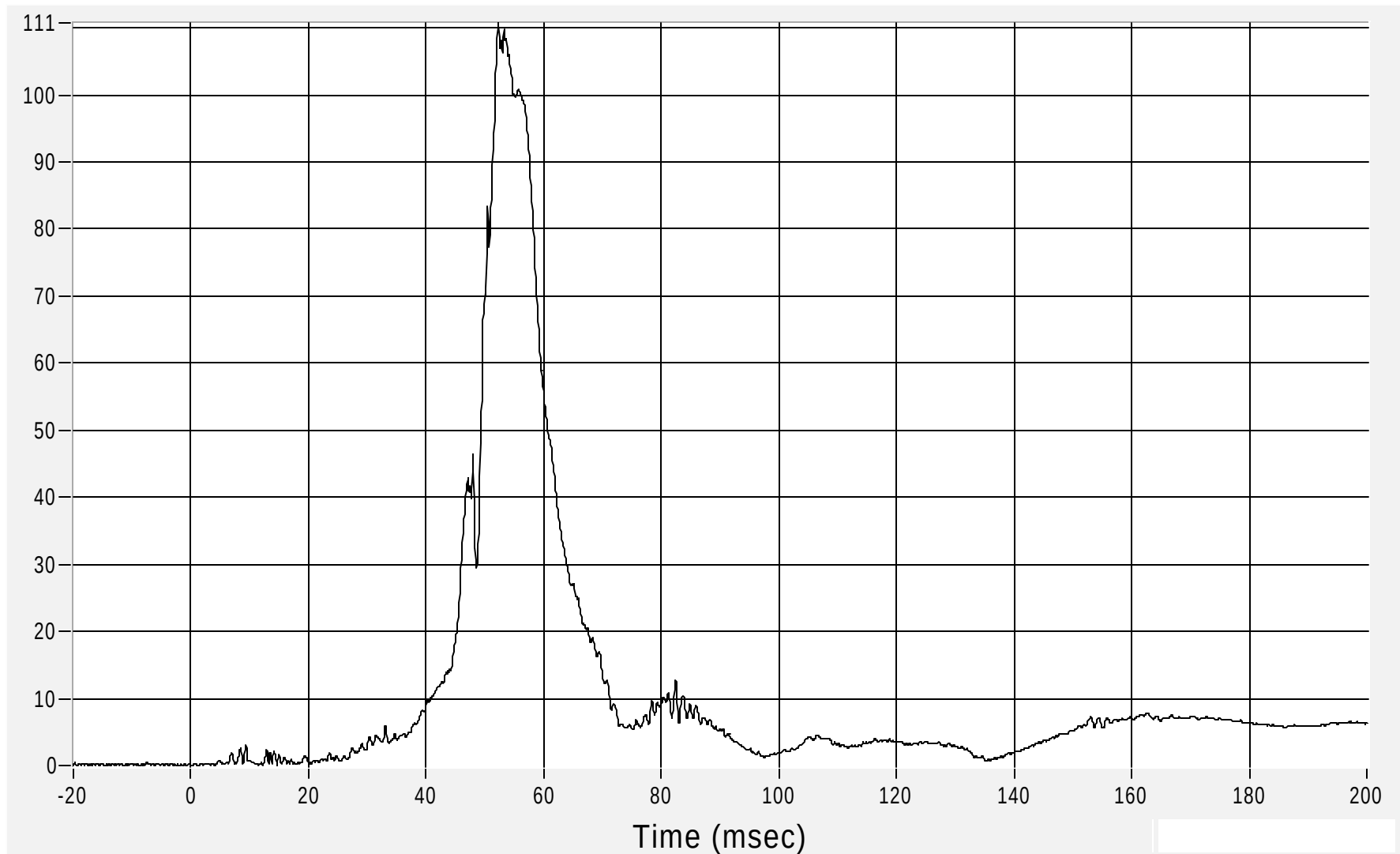
Passenger Head Resultant Acceleration

Max 110.7 G's at 52.2 msec

Acceleration (G's) CFC1000

Min 0.1 G's at 1.3 msec

B-27



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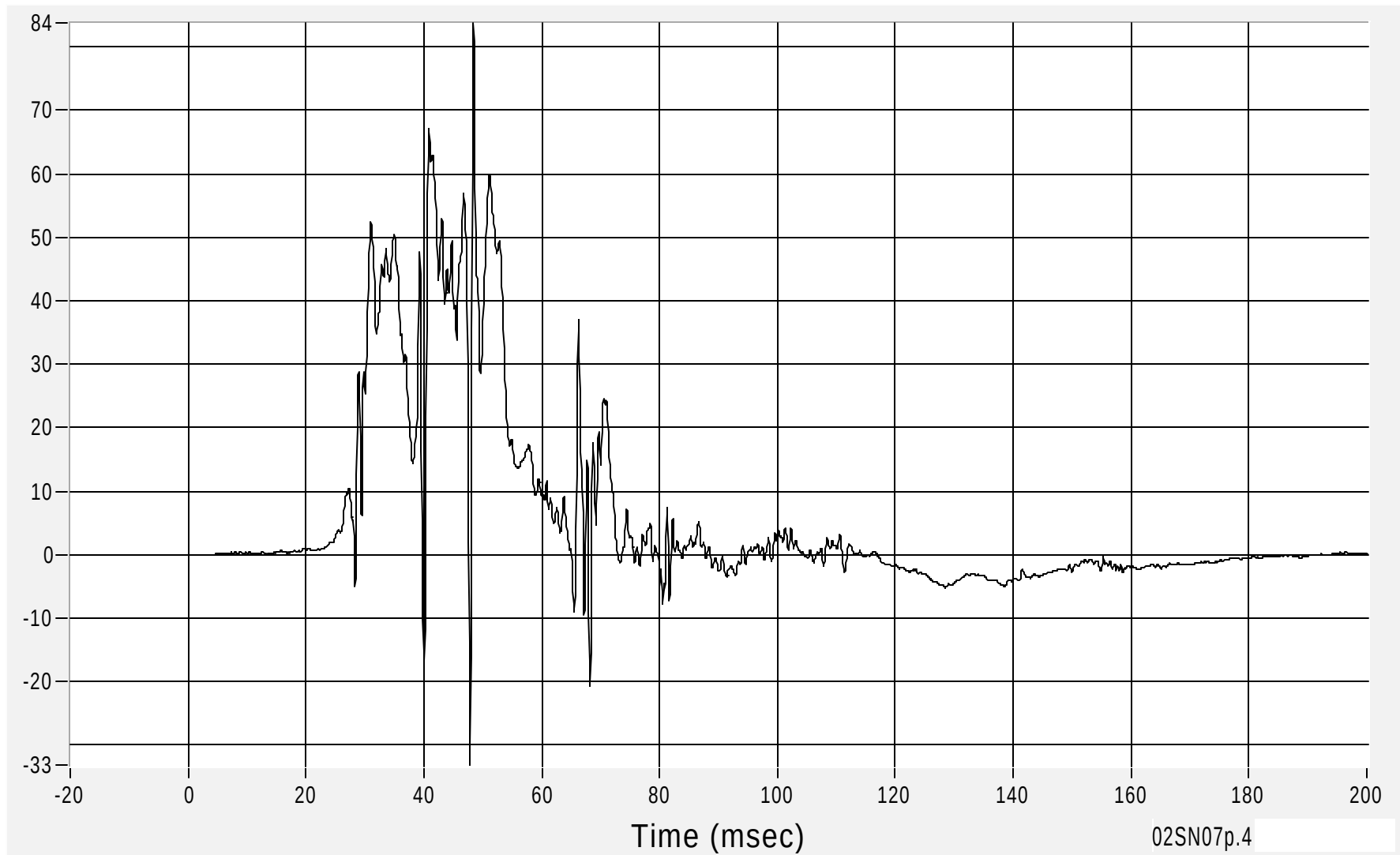
Passenger Upper Rib (Y) Acceleration

Max 83.8 G's at 48.4 msec

Acceleration (G's) CFC1000

Min -33.1 G's at 47.8 msec

B-28



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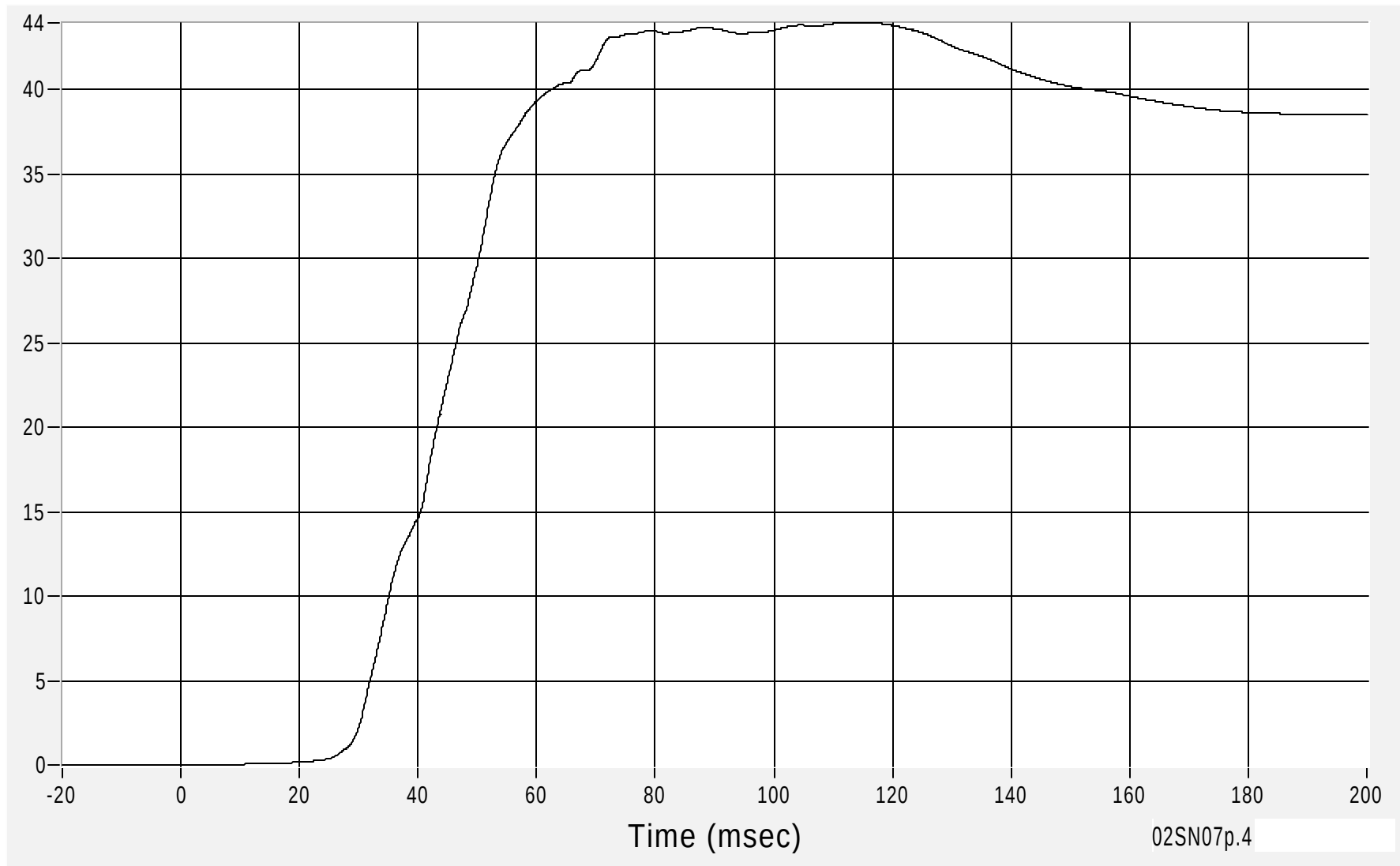
Passenger Upper Rib (Y) Velocity

Velocity (km/h) CFC180

Max 44.0 km/h at 114.1 msec

Min 0.0 km/h at 0.0 msec

B-29



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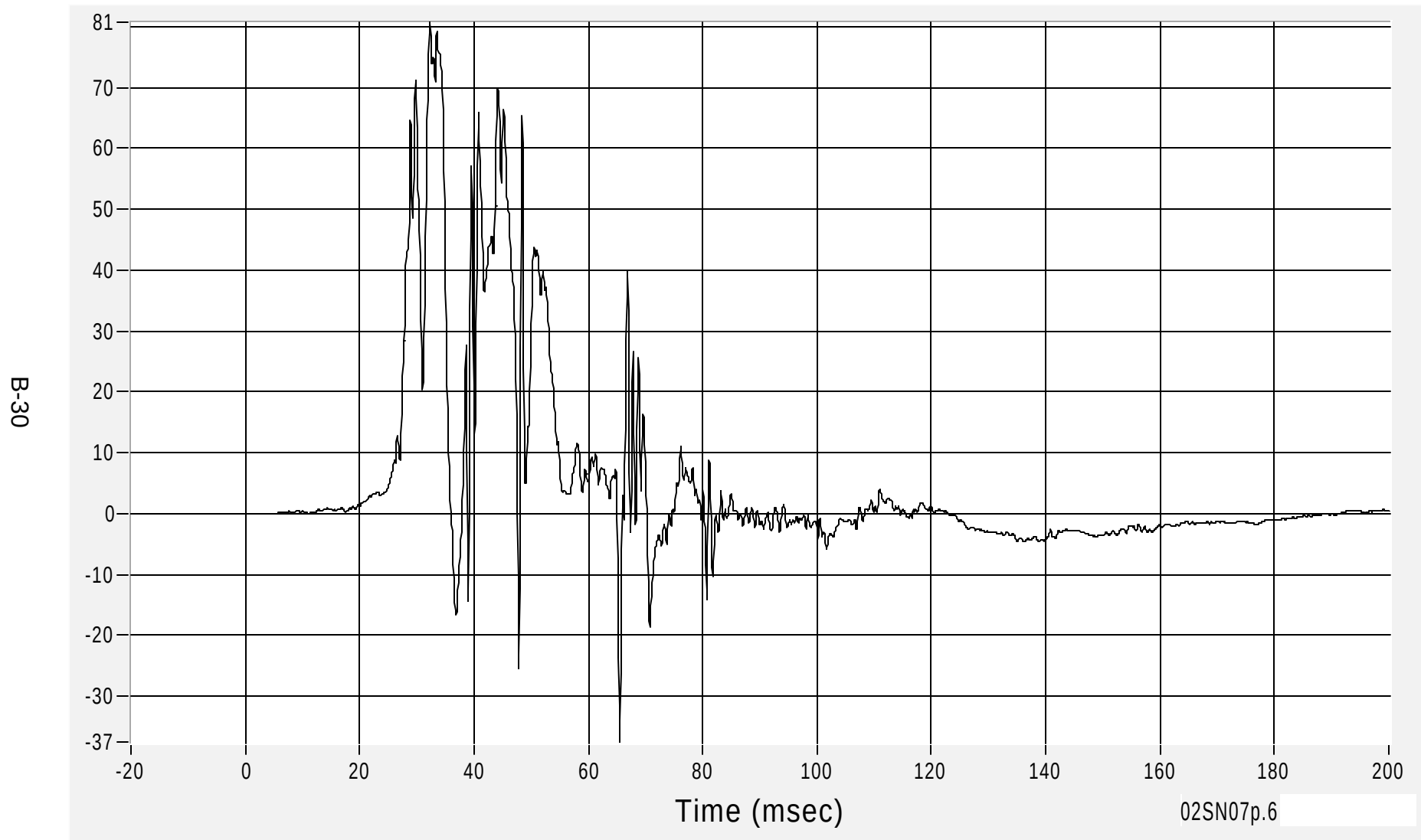
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Passenger Lower Rib (Y) Acceleration

Max 80.7 G's at 32.2 msec

Acceleration (G's) CFC1000

Min -37.5 G's at 65.5 msec



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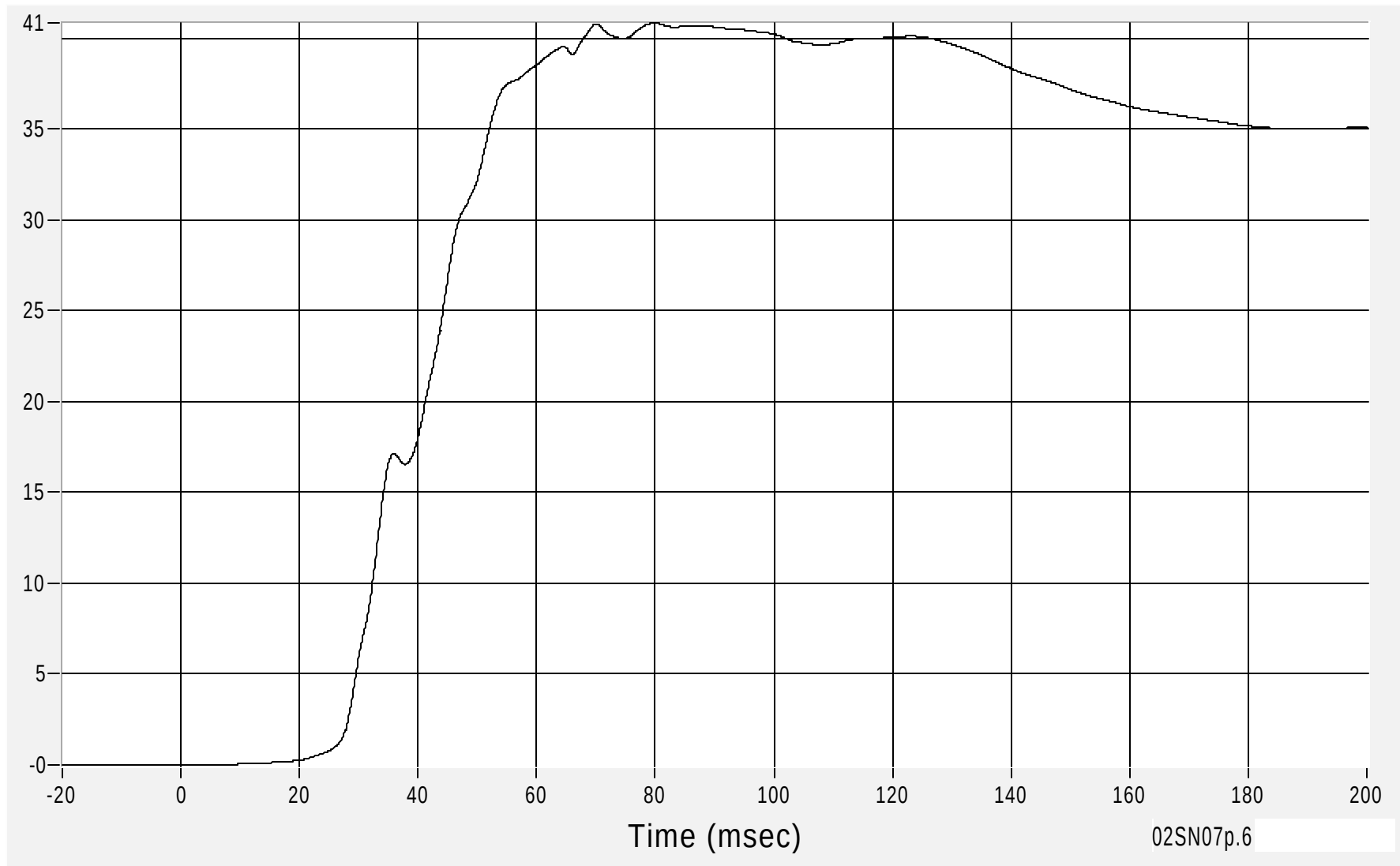
Passenger Lower Rib (Y) Velocity

Velocity (km/h) CFC180

Max 40.8 km/h at 79.8 msec

Min 0.0 km/h at 4.3 msec

B-31



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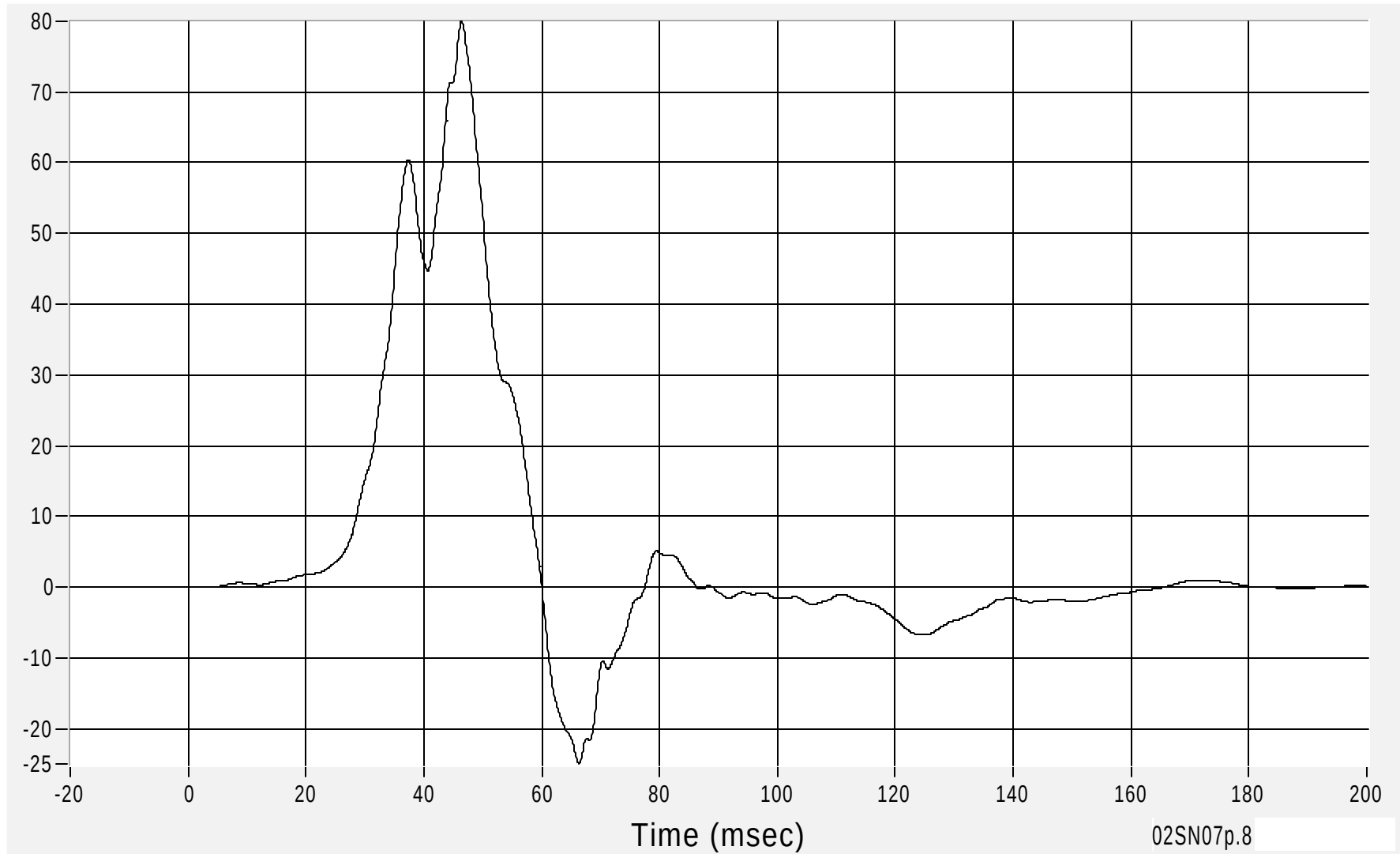
Passenger Lower Spine (Y) Acceleration

Max 80.0 G's at 46.4 msec

Acceleration (G's) CFC180

Min -25.0 G's at 66.3 msec

B-32



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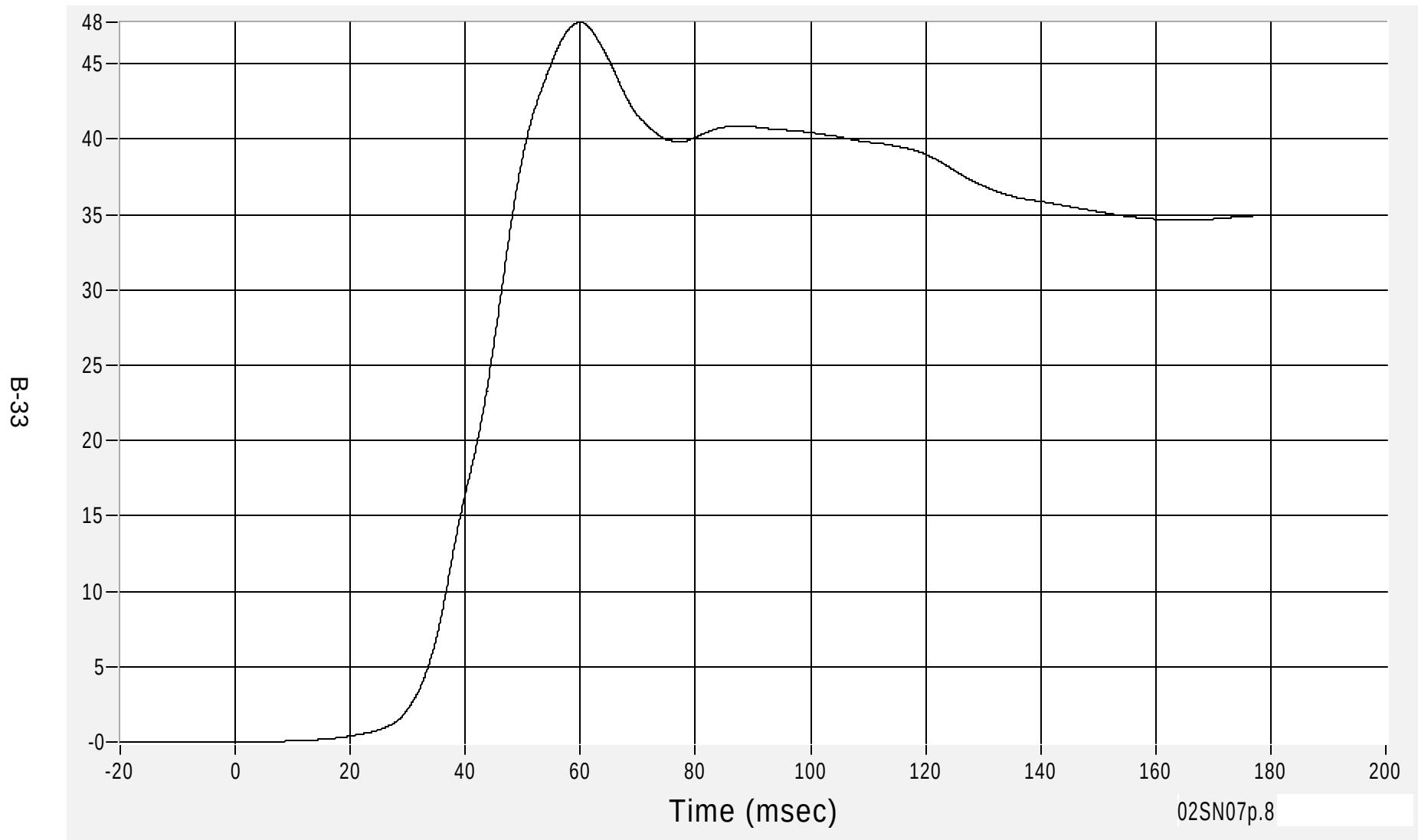
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Passenger Lower Spine (Y) Velocity

Max 47.8 km/h at 60.0 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 1.3 msec



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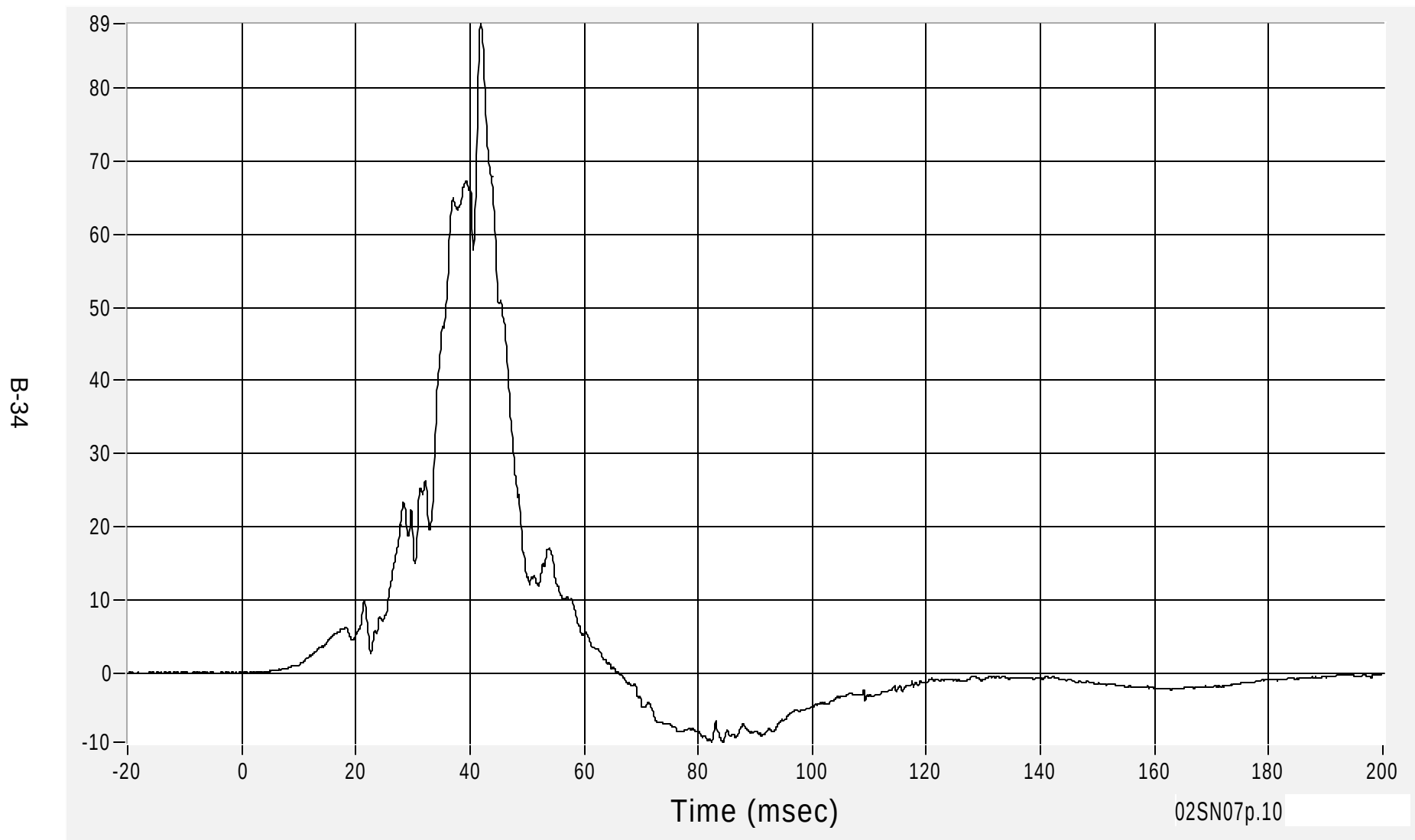
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Passenger Pelvic (Y) Acceleration

Max 88.9 G's at 41.9 msec

Acceleration (G's) CFC1000

Min -9.5 G's at 84.3 msec



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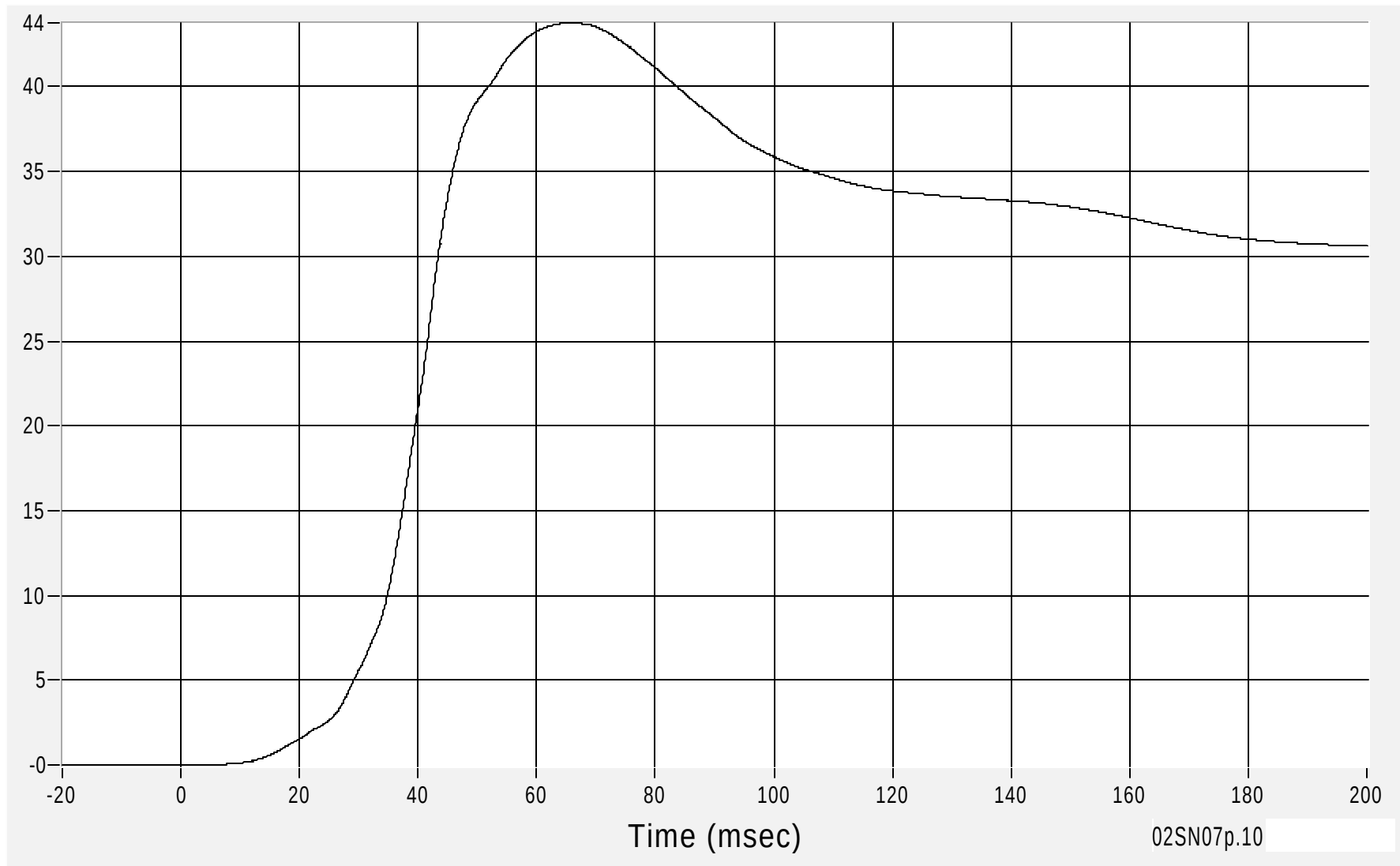
Passenger Pelvic (Y) Velocity

Velocity (km/h) CFC180

Max 43.8 km/h at 65.8 msec

Min 0.0 km/h at 0.0 msec

B-35



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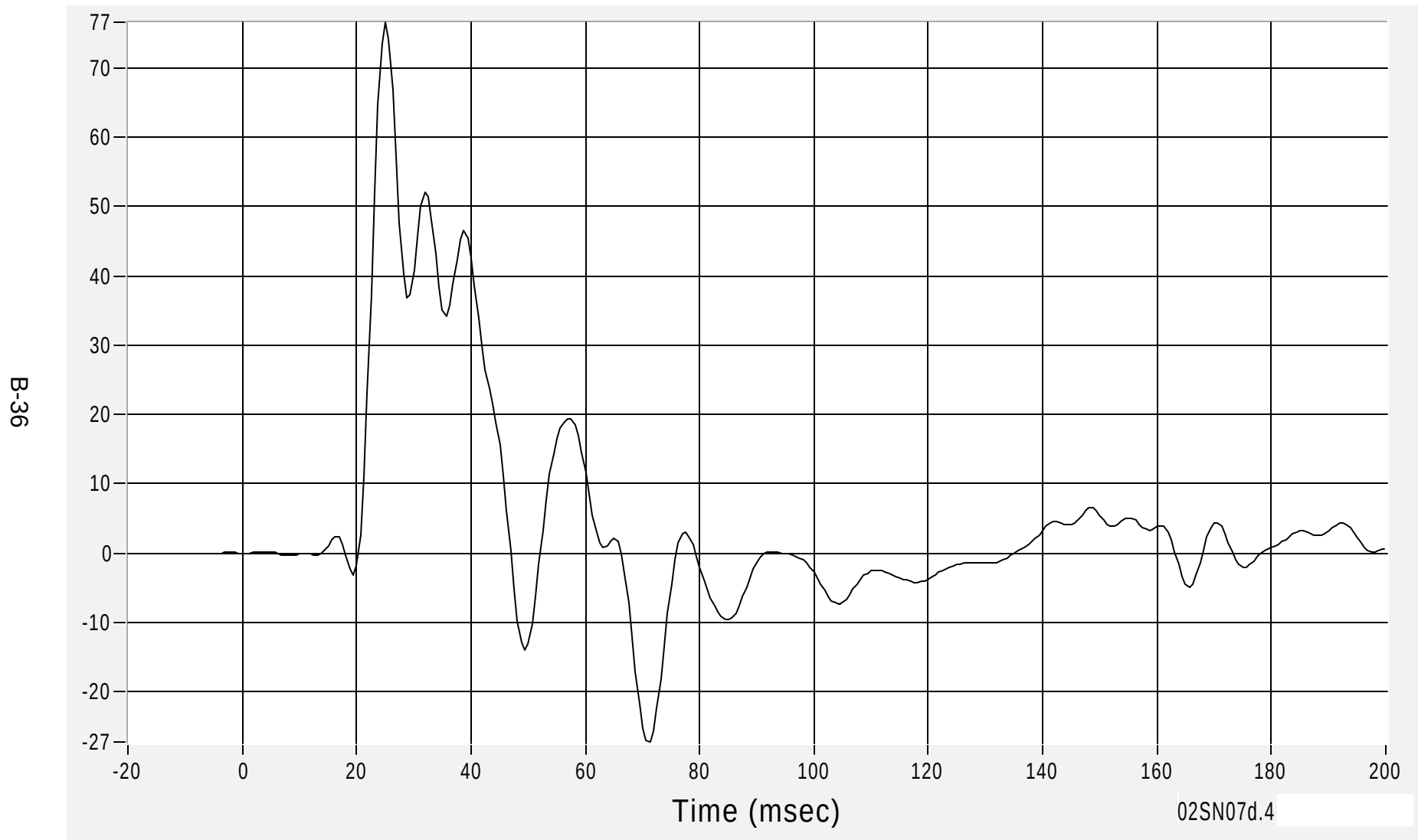
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Driver Upper Rib (Y) Acceleration

Max 76.6 G's at 25.0 msec

Acceleration (G's) FIR100

Min -27.2 G's at 71.2 msec



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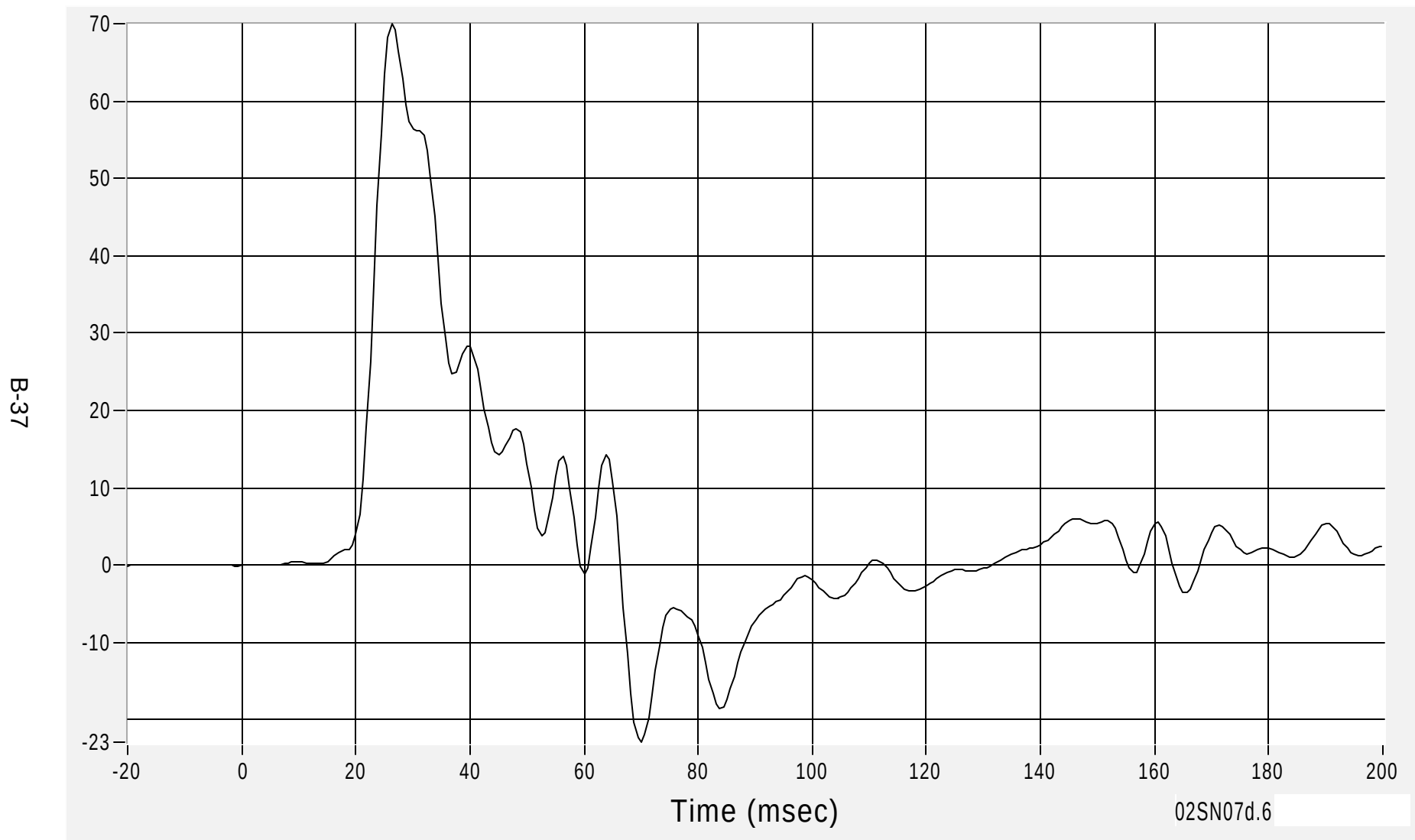
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Driver Lower Rib (Y) Acceleration

Max 70.0 G's at 26.2 msec

Acceleration (G's) FIR100

Min -22.9 G's at 70.0 msec



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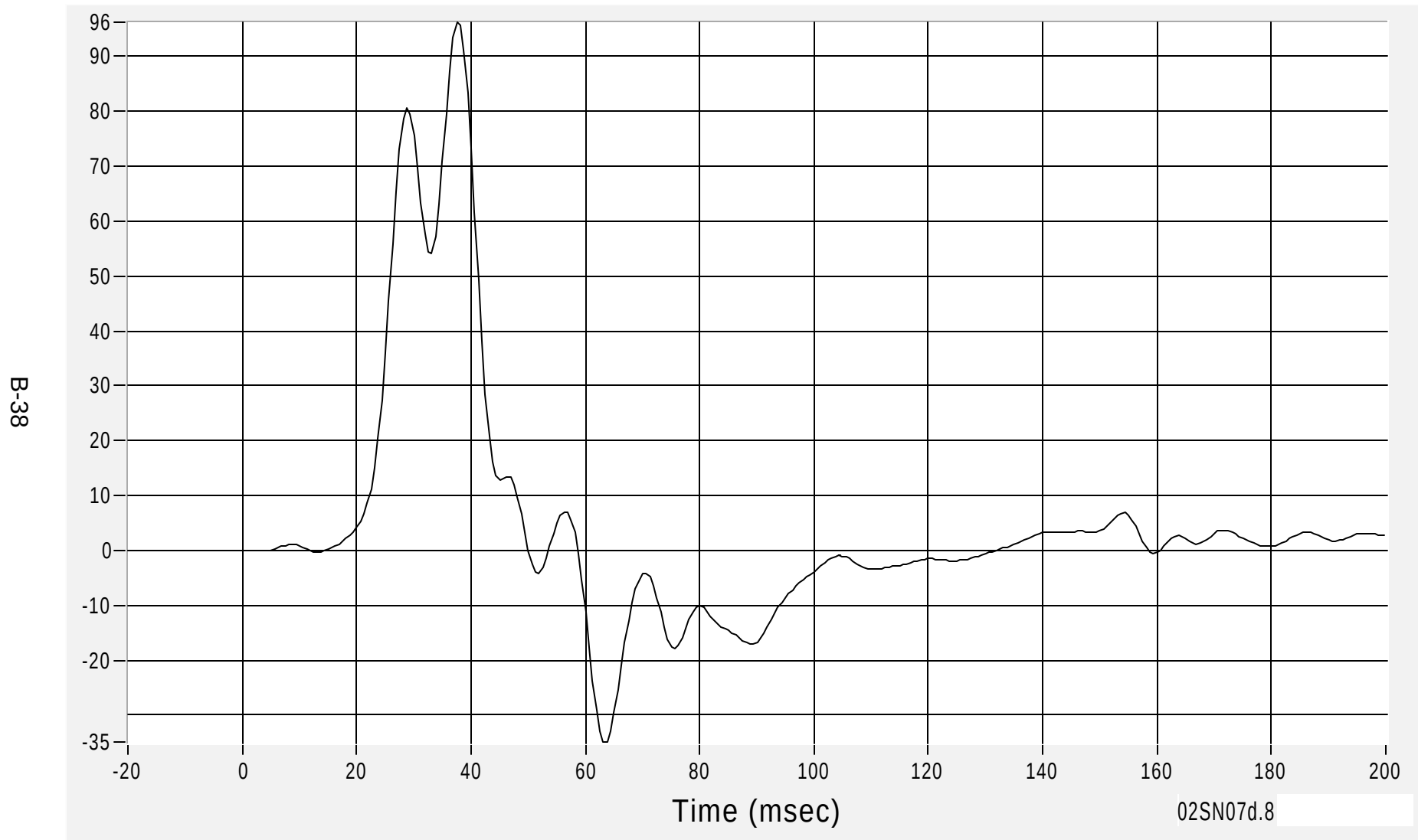
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Driver Lower Spine (Y) Acceleration

Max 96.3 G's at 37.5 msec

Acceleration (G's) FIR100

Min -34.9 G's at 63.1 msec



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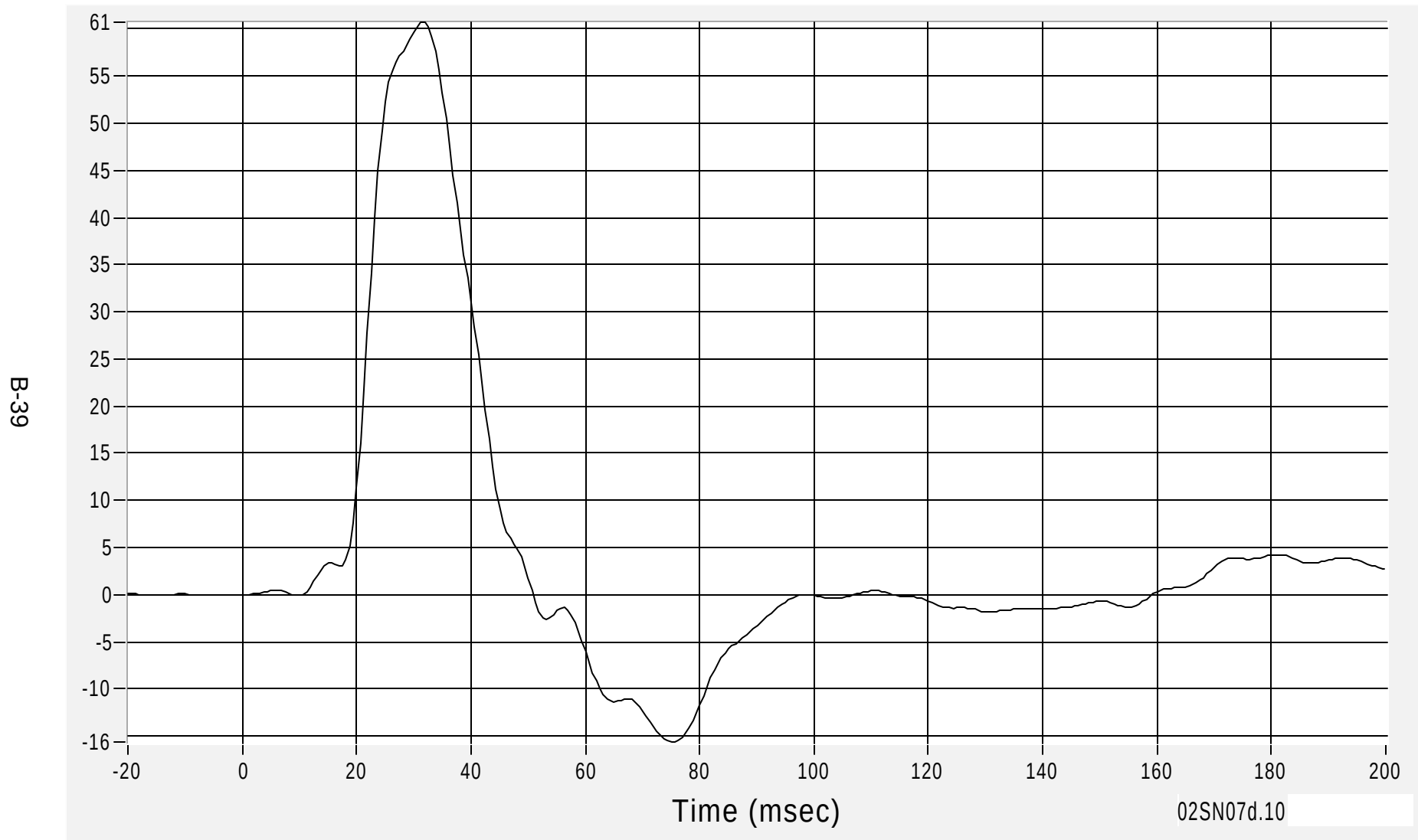
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Driver Pelvic (Y) Acceleration

Max 60.7 G's at 31.9 msec

Acceleration (G's) FIR100

Min -15.6 G's at 75.0 msec



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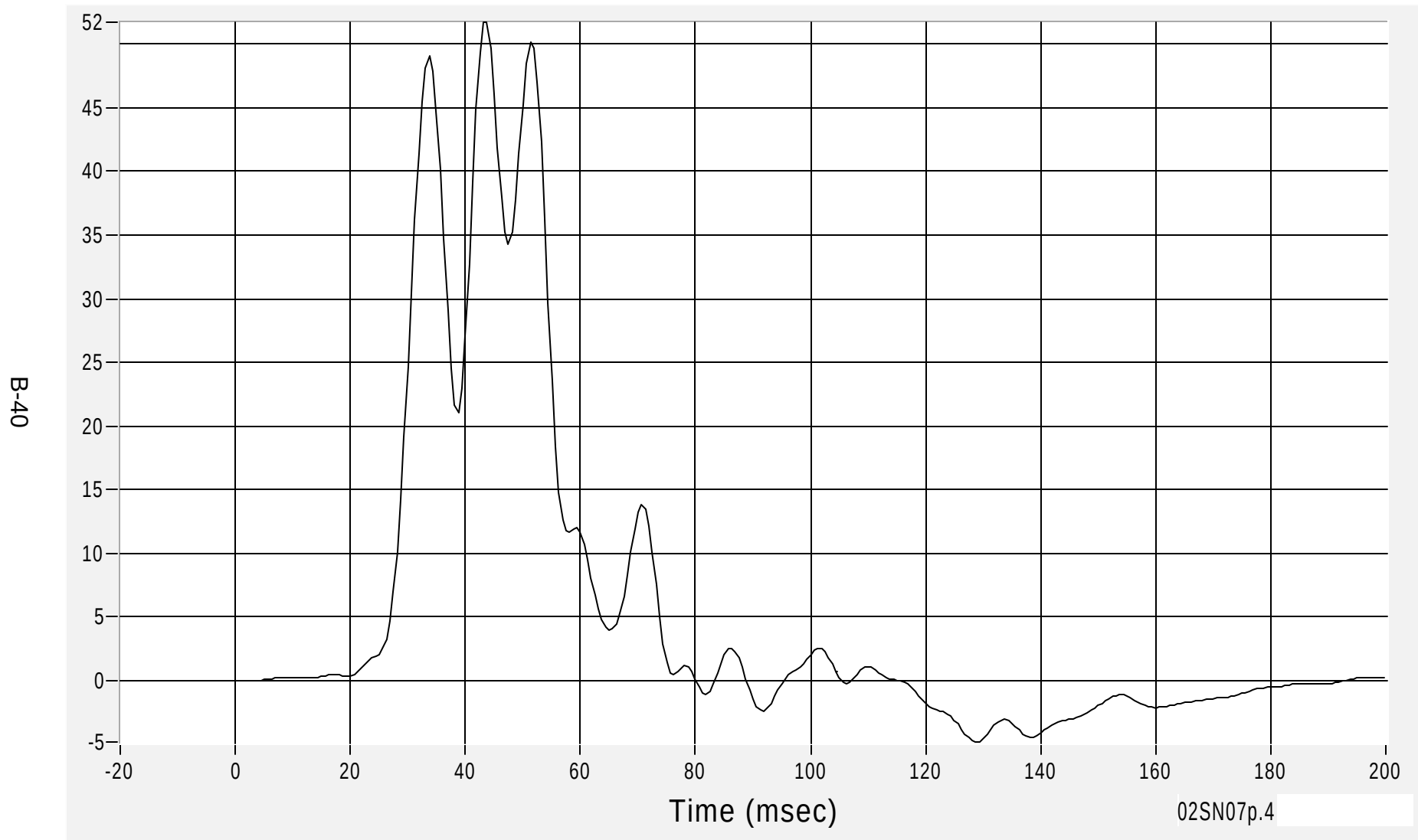
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Passenger Upper Rib (Y) Acceleration

Max 51.7 G's at 43.8 msec

Acceleration (G's) FIR100

Min -4.9 G's at 128.8 msec



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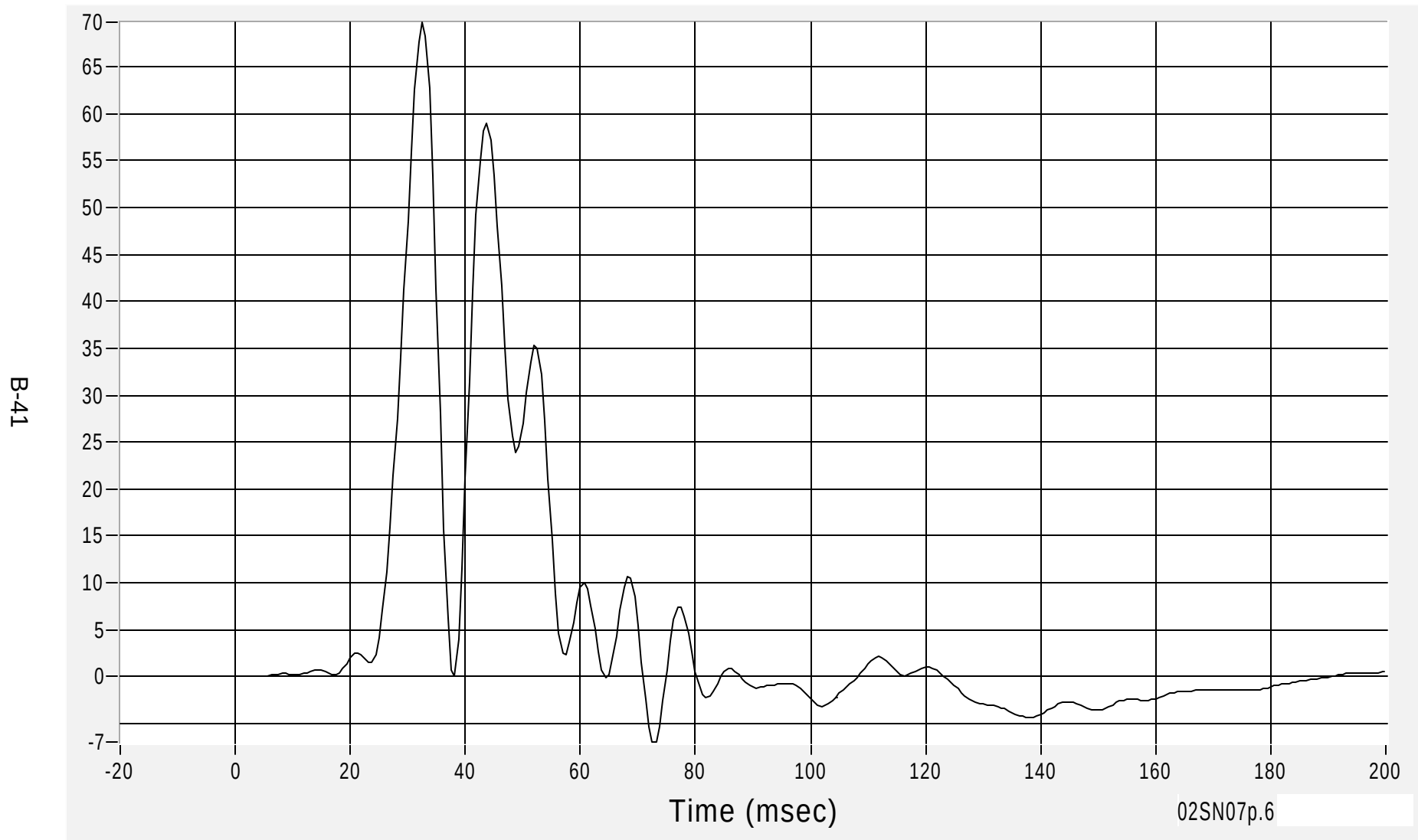
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Passenger Lower Rib (Y) Acceleration

Max 69.8 G's at 32.5 msec

Min -7.0 G's at 72.5 msec

Acceleration (G's) FIR100



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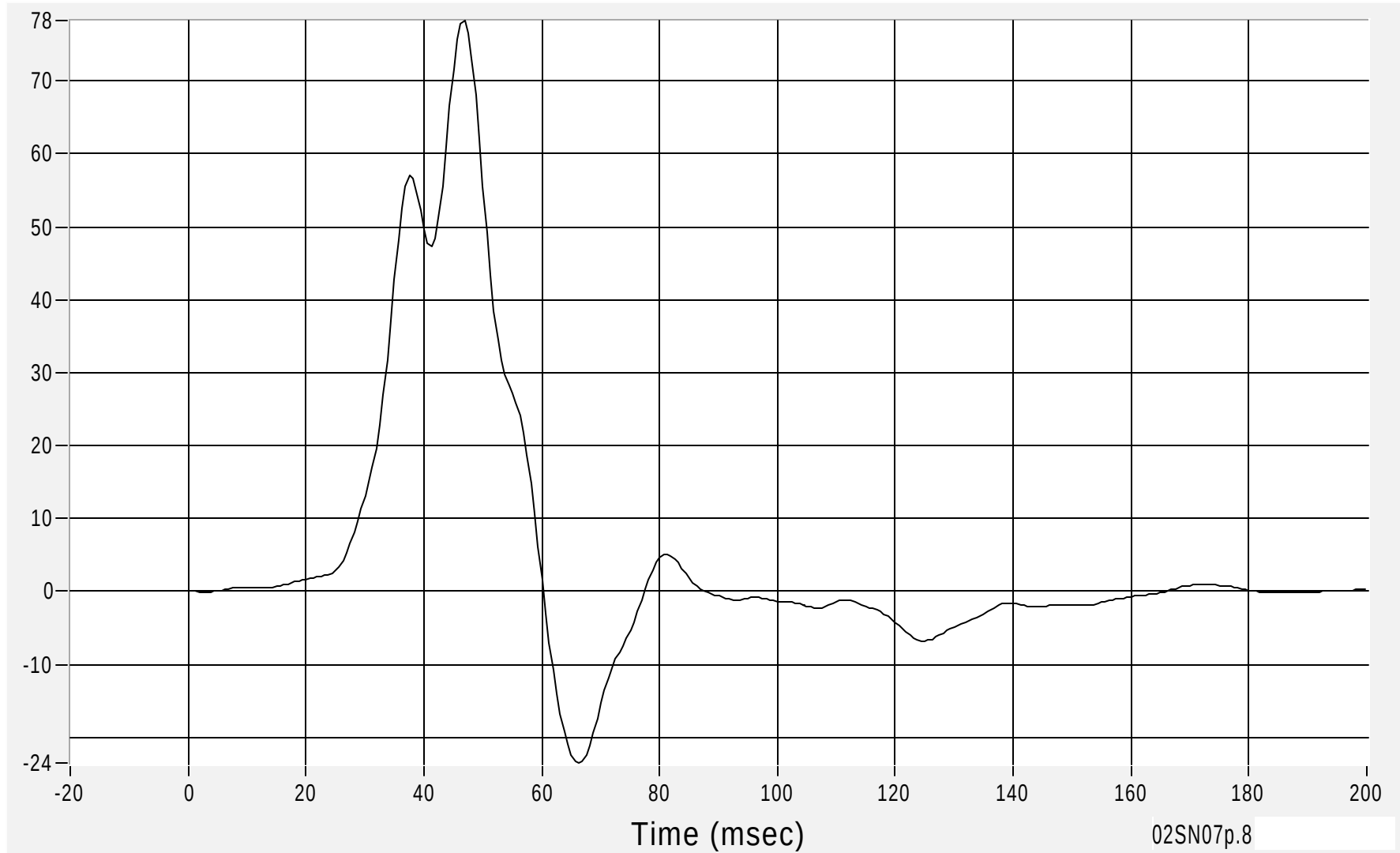
Passenger Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 78.3 G's at 46.9 msec

Min -23.5 G's at 66.2 msec

B-42



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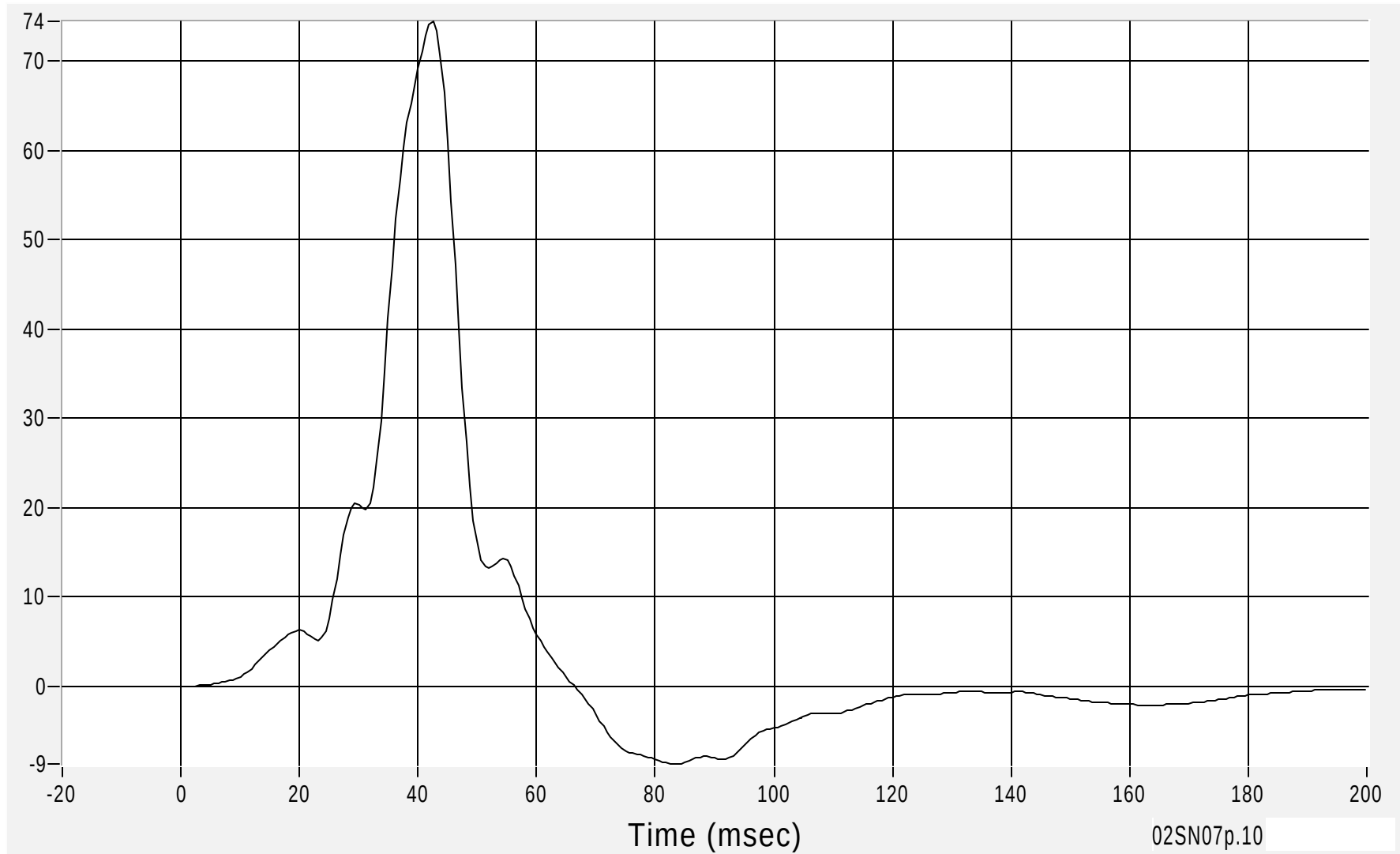
Passenger Pelvic (Y) Acceleration

Max 74.5 G's at 42.5 msec

Acceleration (G's) FIR100

Min -8.7 G's at 83.1 msec

B-43



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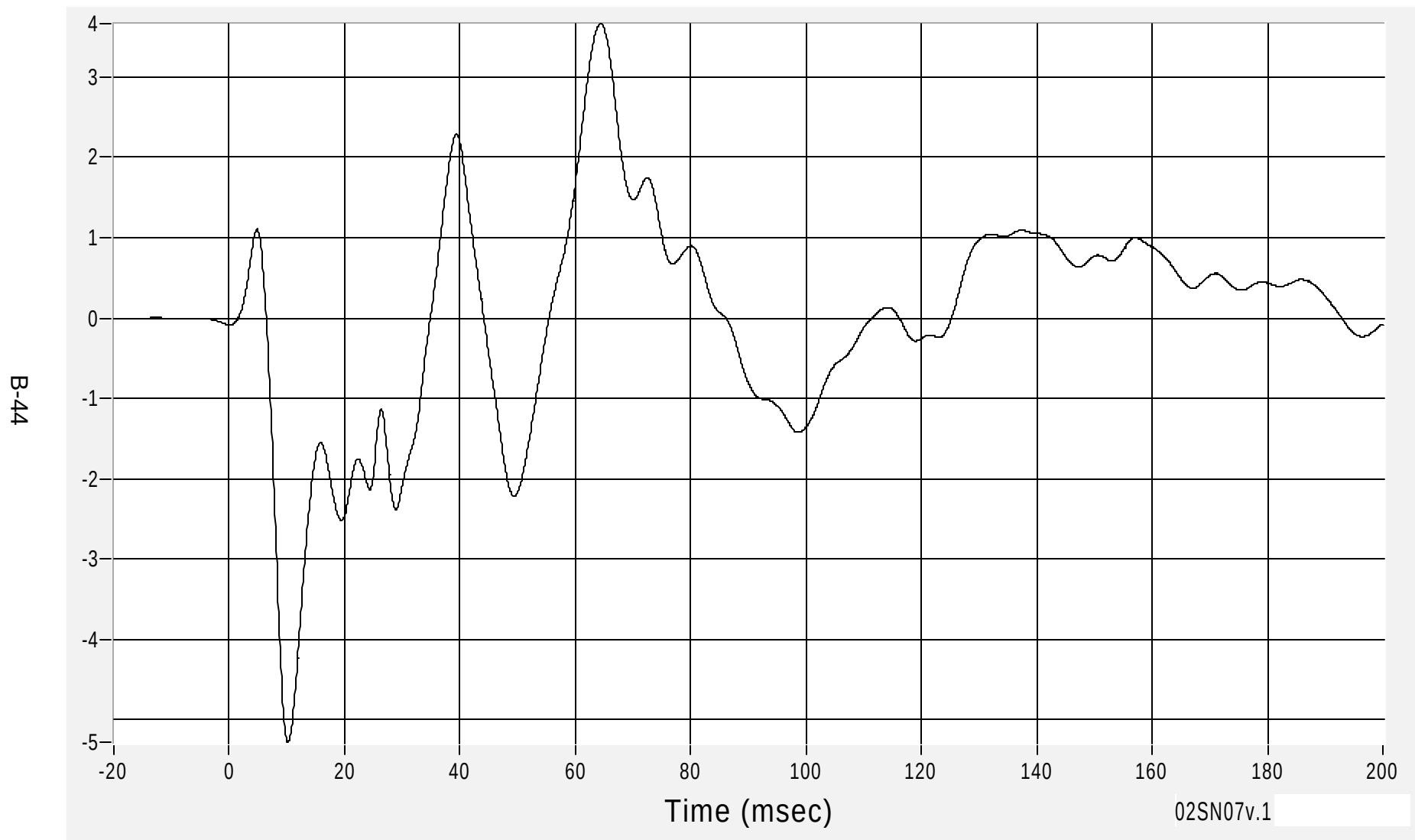
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Right Side Sill at Front Seat (X) Acceleration

Max 3.7 G's at 64.4 msec

Min -5.3 G's at 10.2 msec

Acceleration (G's) CFC60



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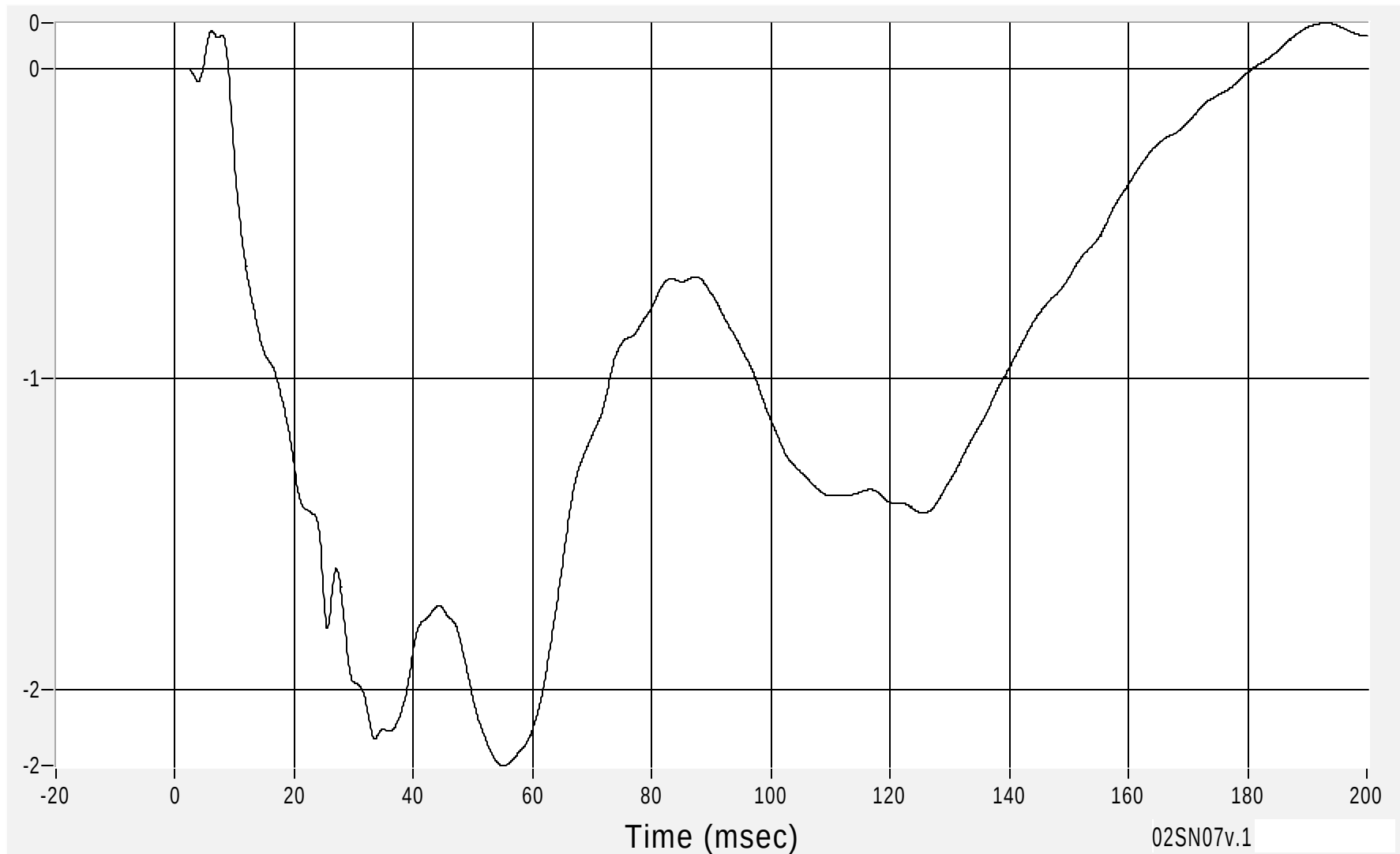
Right Side Sill at Front Seat (X) Velocity

Max 0.1 km/h at 193.0 msec

Velocity (km/h) CFC180

Min -2.2 km/h at 55.0 msec

B-45



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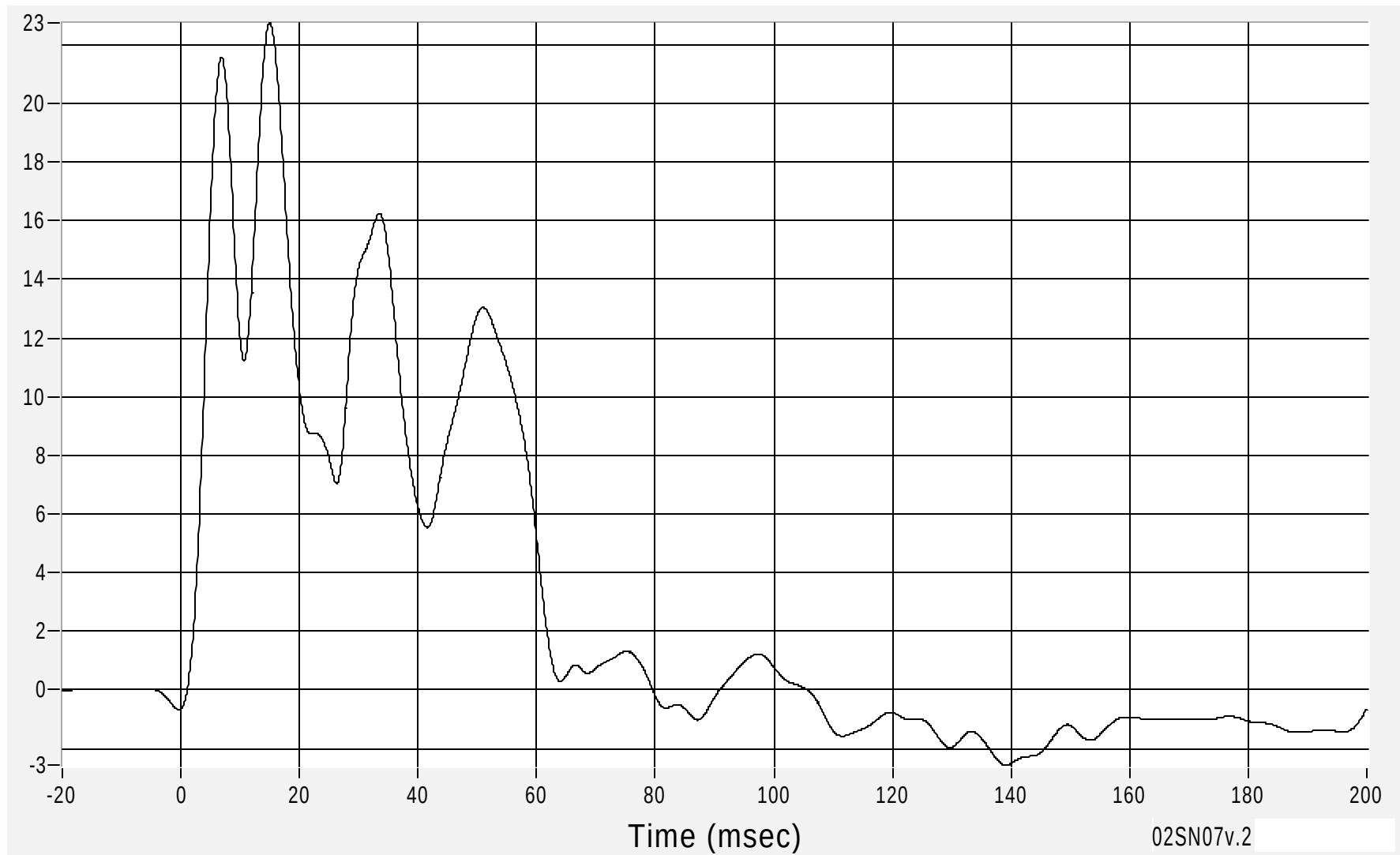
Right Side Sill at Front Seat (Y) Acceleration

Max 22.7 G's at 15.0 msec

Min -2.6 G's at 139.1 msec

Acceleration (G's) CFC60

B-46



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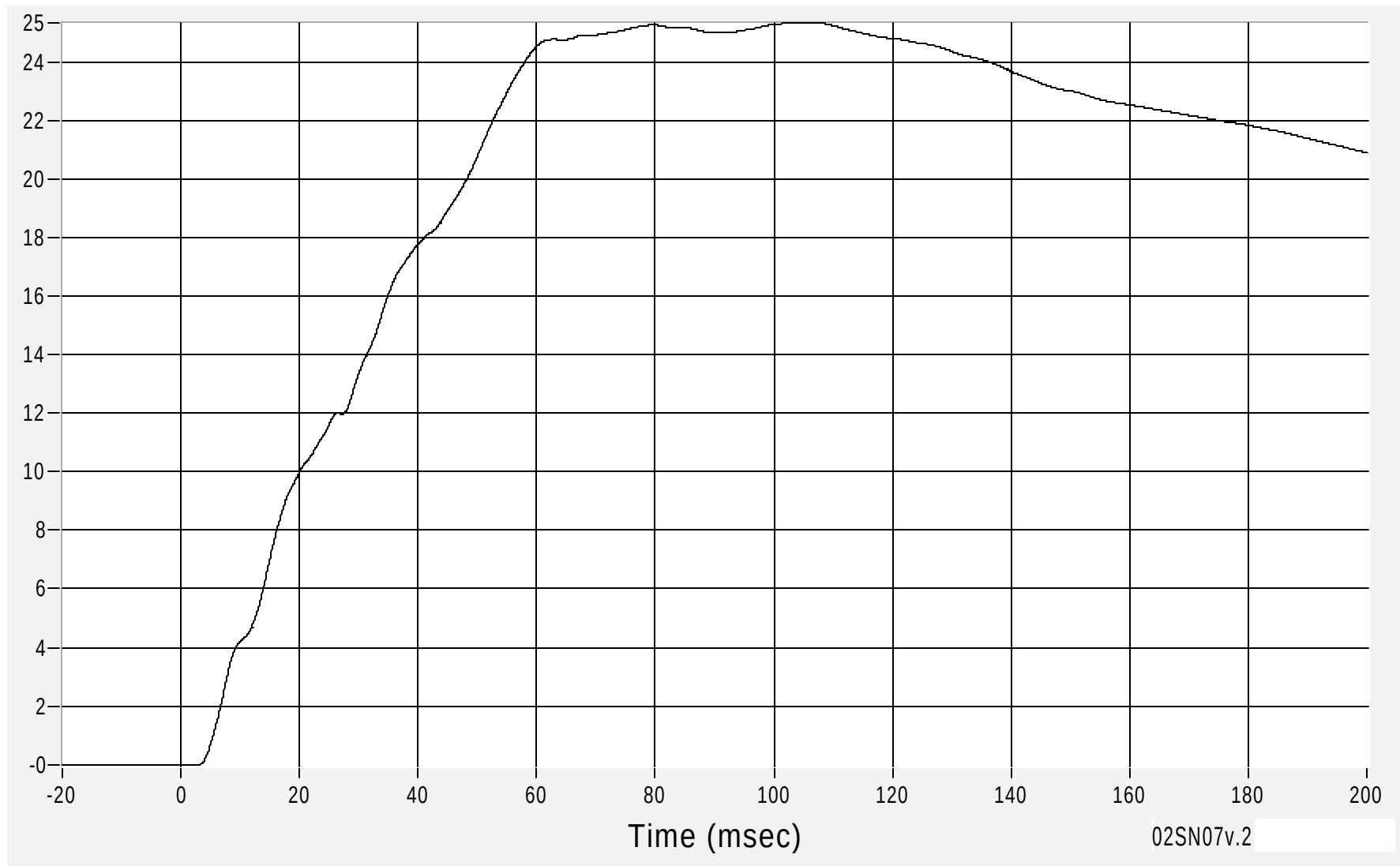
Right Side Sill at Front Seat (Y) Velocity

Max 25.3 km/h at 107.1 msec

Min 0.0 km/h at 2.6 msec

Velocity (km/h) CFC180

B-47



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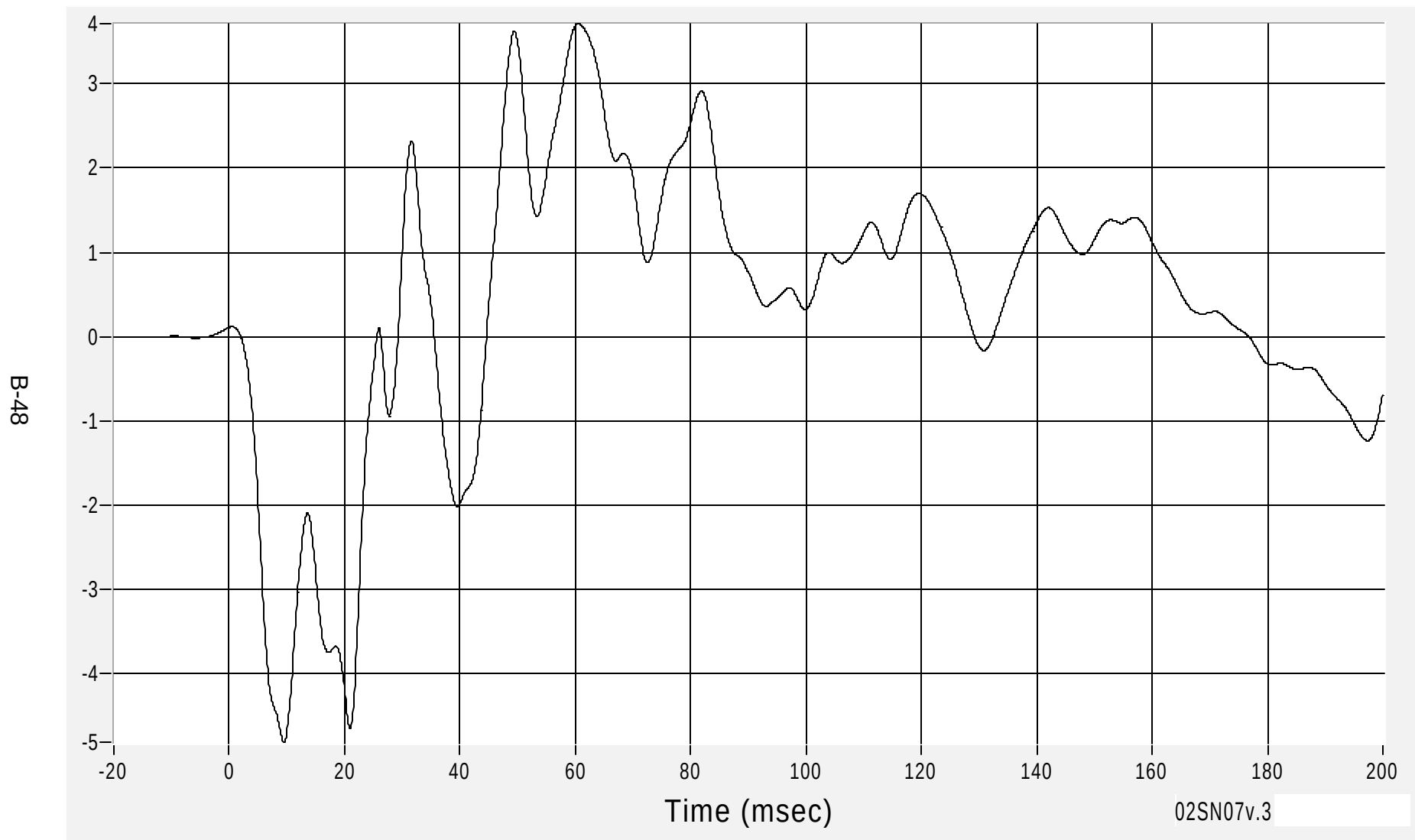
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Right Side Sill at Front Seat (Z) Acceleration

Max 3.7 G's at 60.5 msec

Acceleration (G's) CFC60

Min -4.8 G's at 9.4 msec



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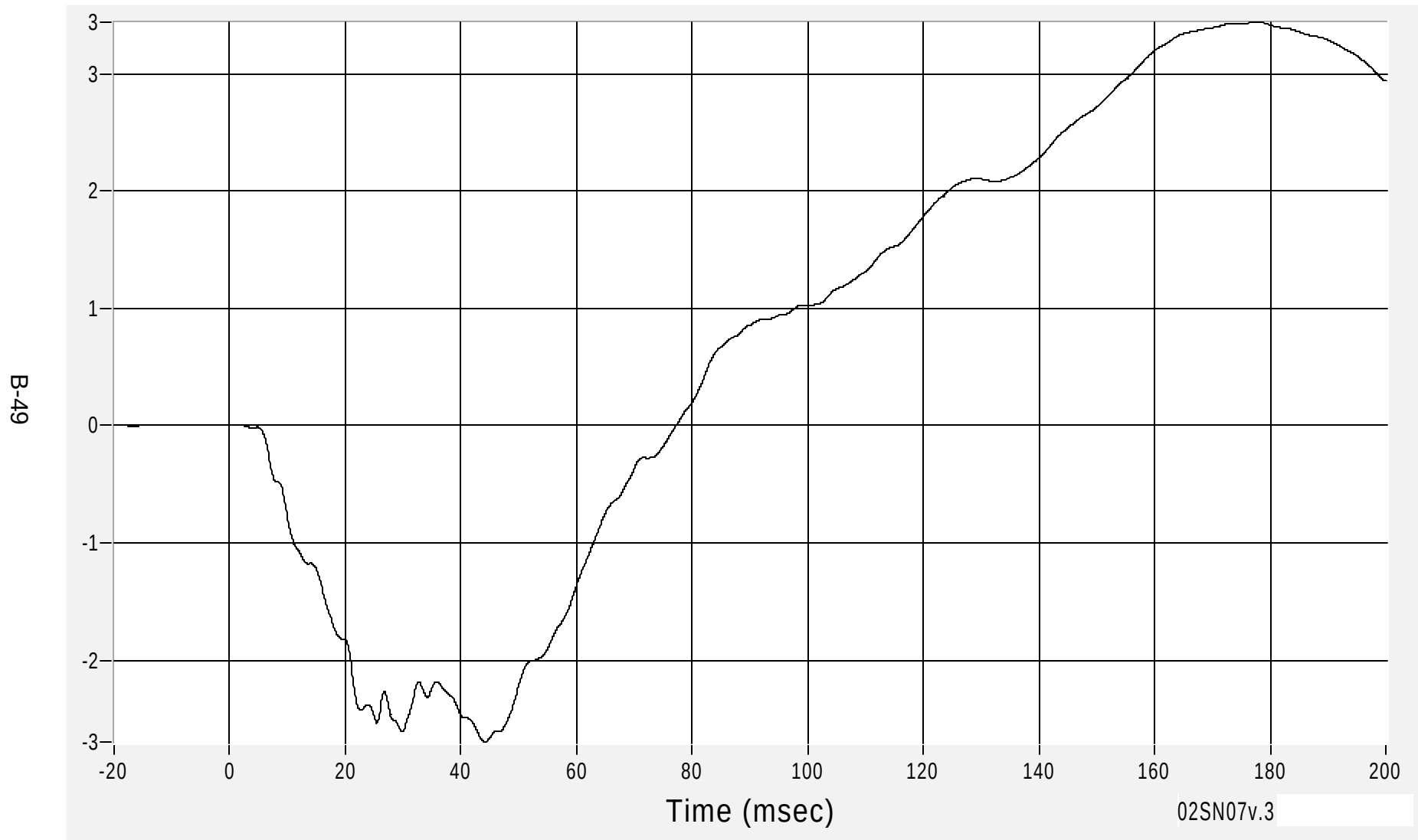
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Right Side Sill at Front Seat (Z) Velocity

Max 3.4 km/h at 177.7 msec

Min -2.7 km/h at 44.2 msec

Velocity (km/h) CFC180



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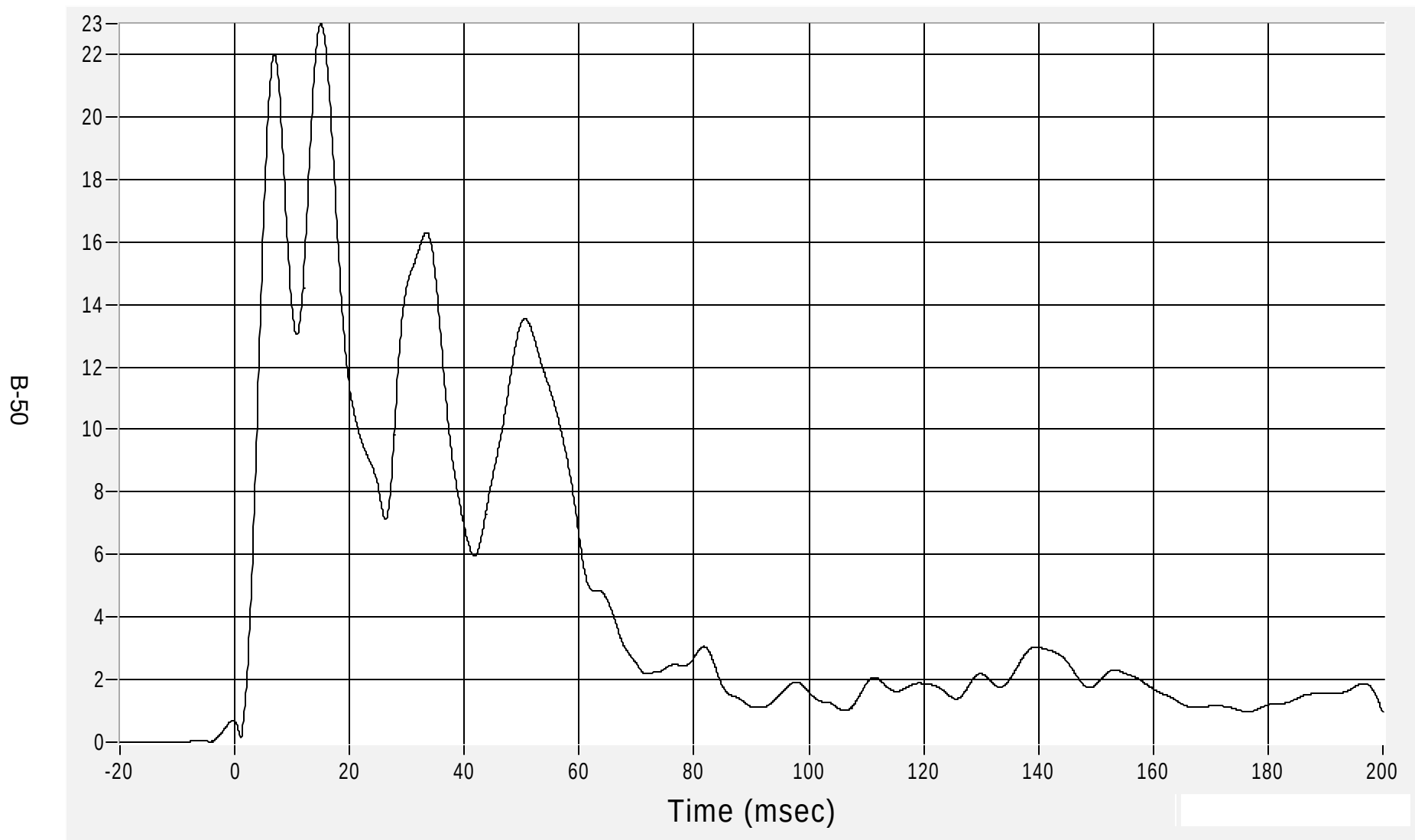
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Right Side Sill at Front Seat Resultant Acceleration

Max 23.0 G's at 15.0 msec

Acceleration (G's) CFC60

Min 0.1 G's at 1.0 msec



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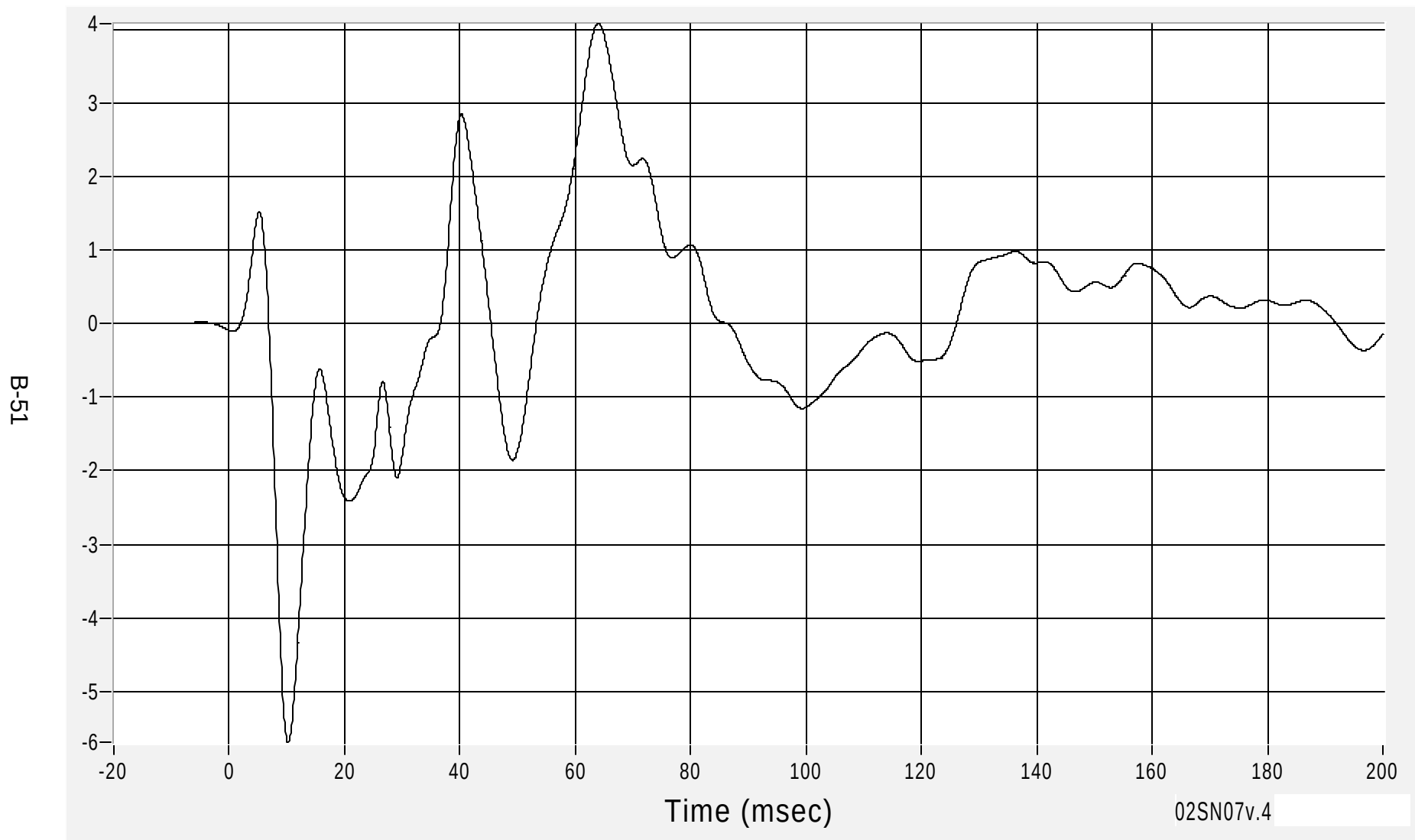
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Right Side Sill at Rear Seat (X) Acceleration

Max 4.1 G's at 64.0 msec

Acceleration (G's) CFC60

Min -5.7 G's at 10.2 msec



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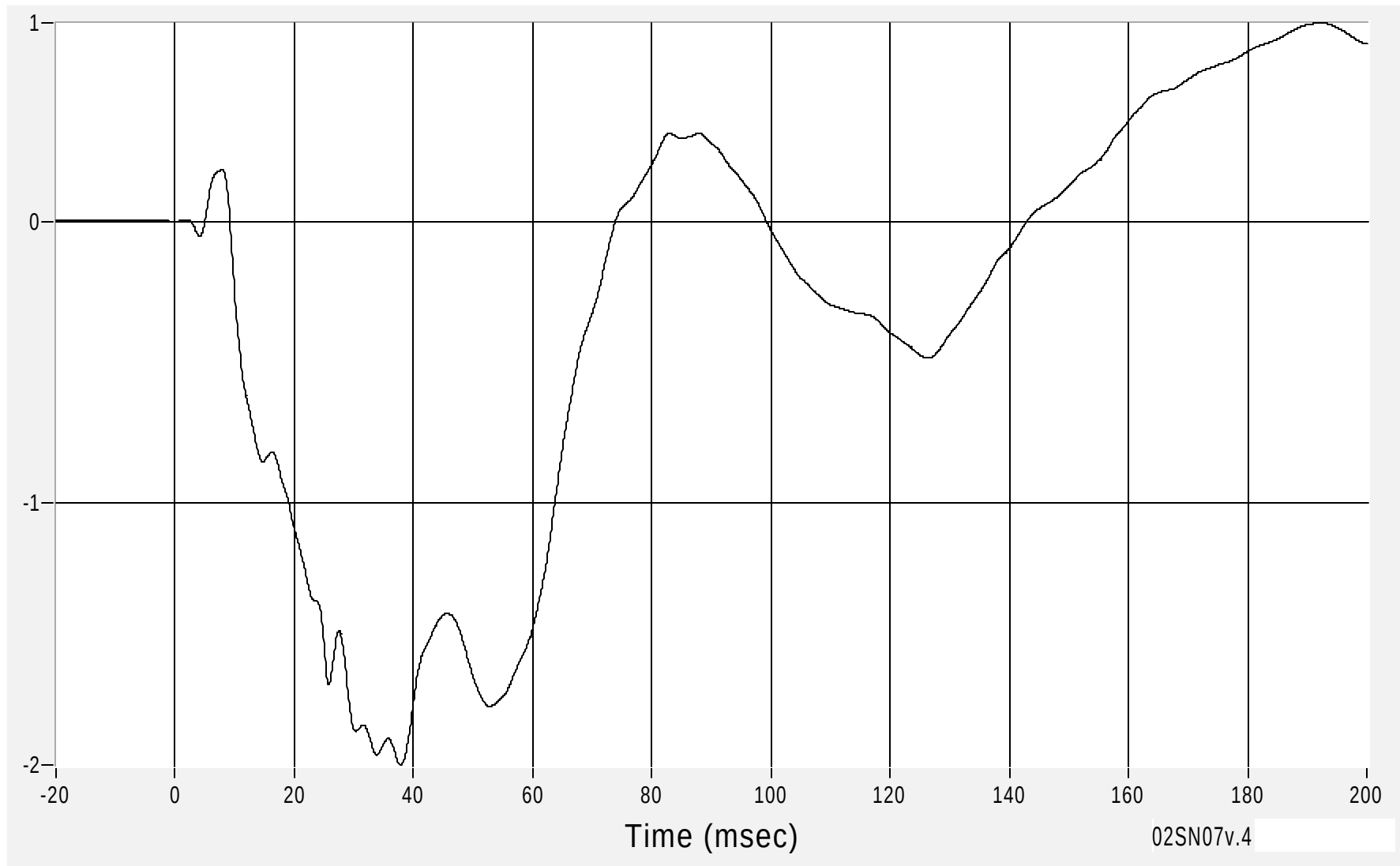
Right Side Sill at Rear Seat (X) Velocity

Max 0.7 km/h at 192.3 msec

Min -1.9 km/h at 37.8 msec

Velocity (km/h) CFC180

B-52



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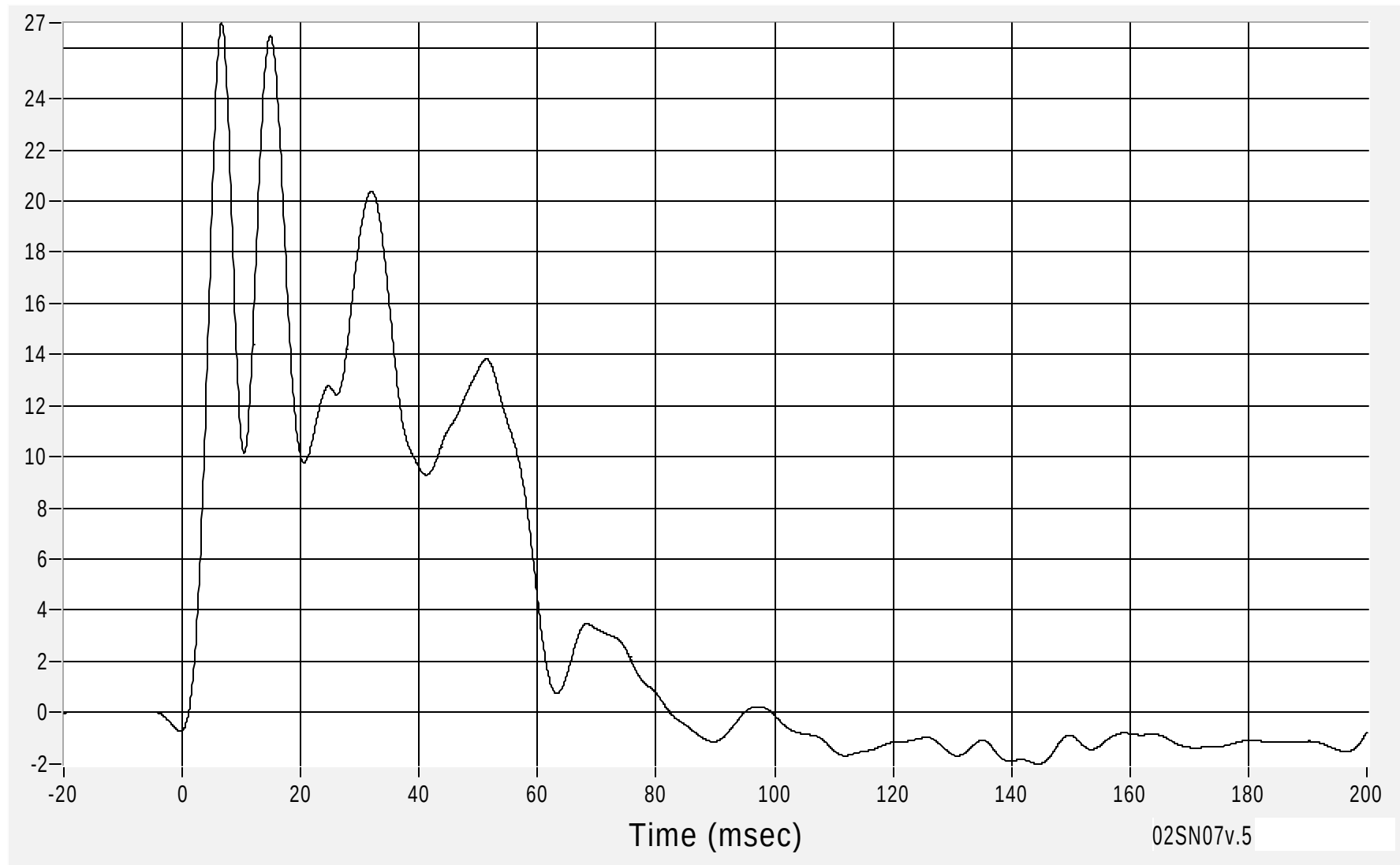
Right Side Sill at Rear Seat (Y) Acceleration

Max 27.0 G's at 6.6 msec

Min -2.0 G's at 144.6 msec

Acceleration (G's) CFC60

B-53



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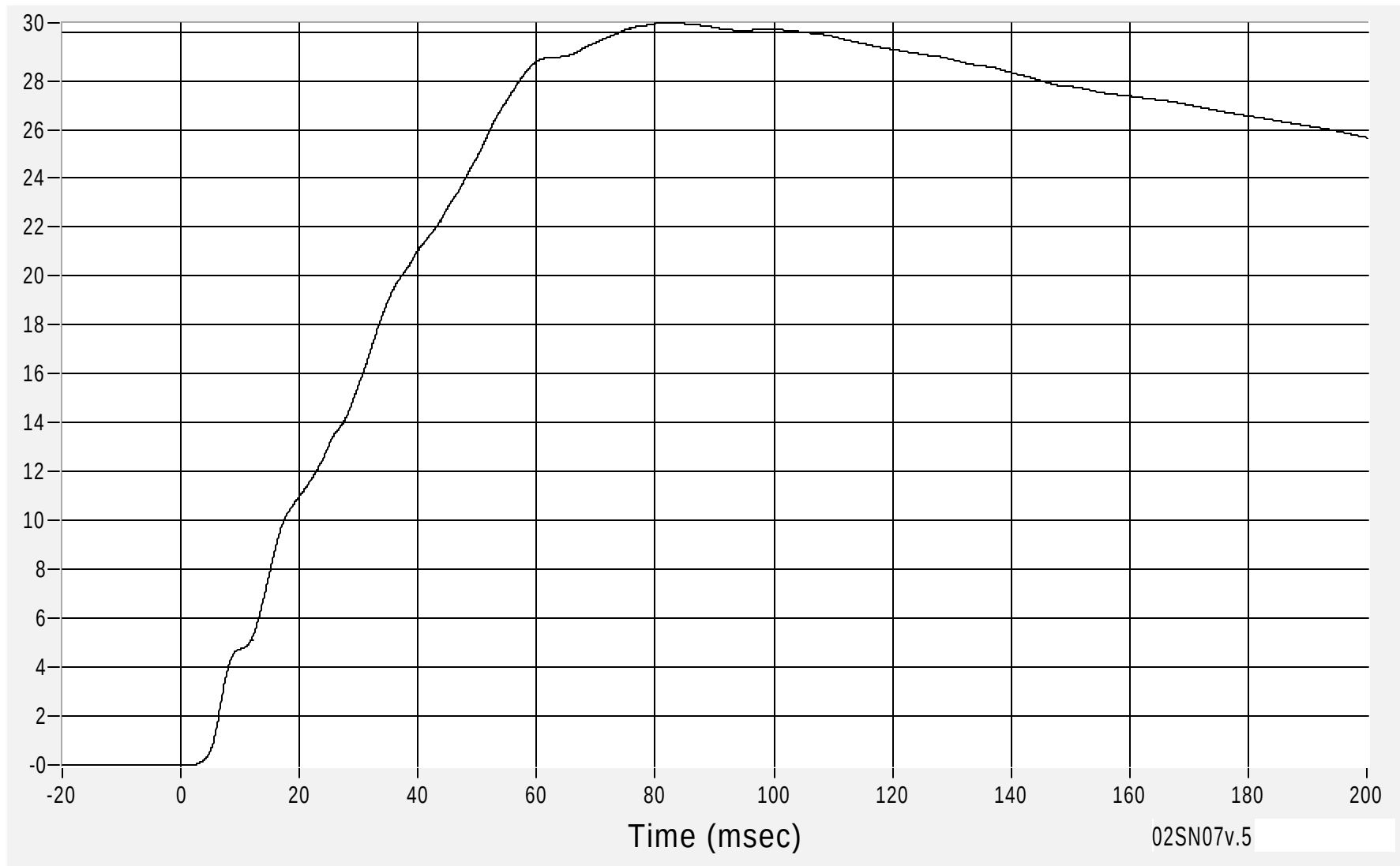
Right Side Sill at Rear Seat (Y) Velocity

Max 30.4 km/h at 81.7 msec

Min 0.0 km/h at 1.5 msec

Velocity (km/h) CFC180

B-54



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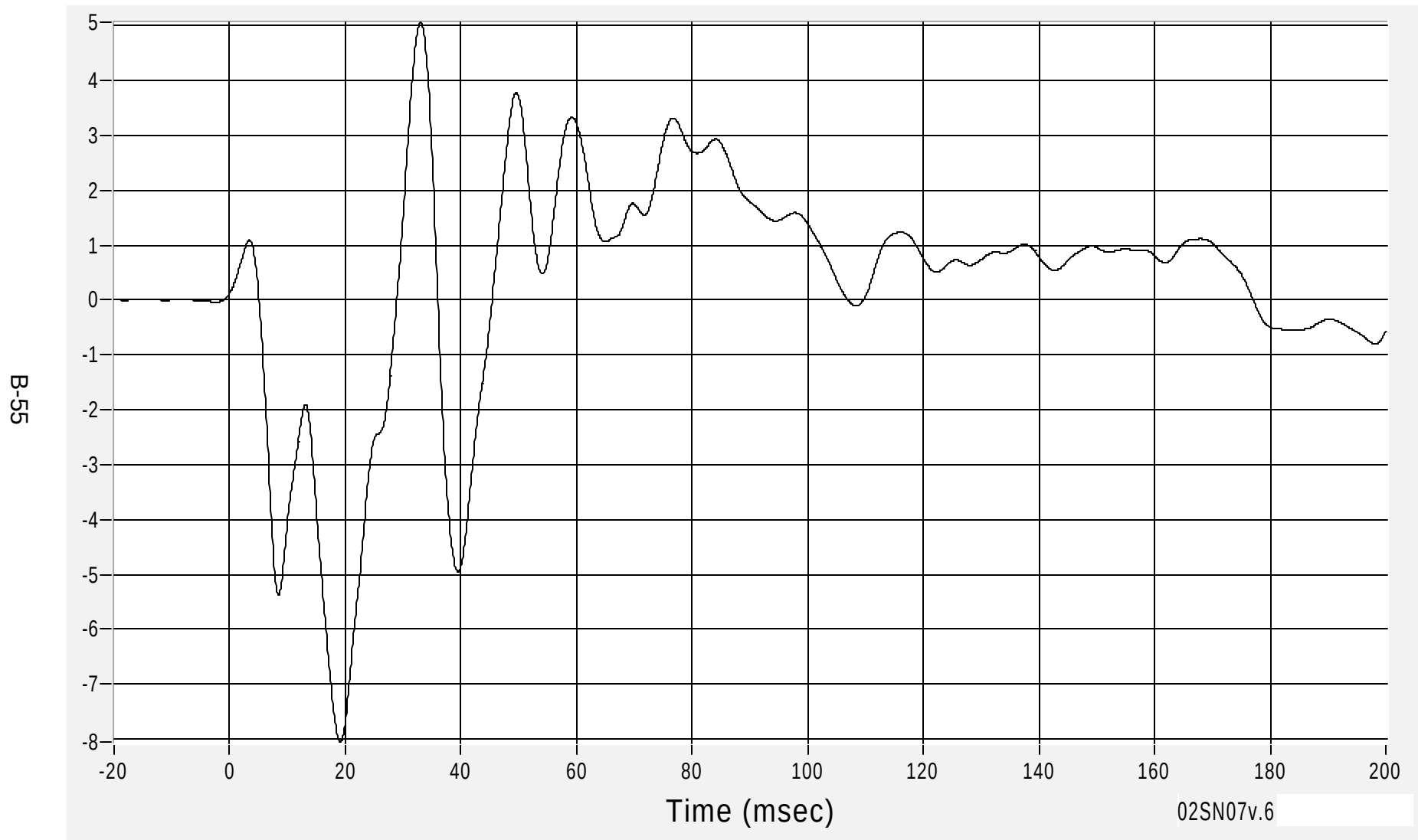
Medical College of Wisconsin
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Right Side Sill at Rear Seat (Z) Acceleration

Max 5.1 G's at 33.0 msec

Acceleration (G's) CFC60

Min -8.1 G's at 19.1 msec



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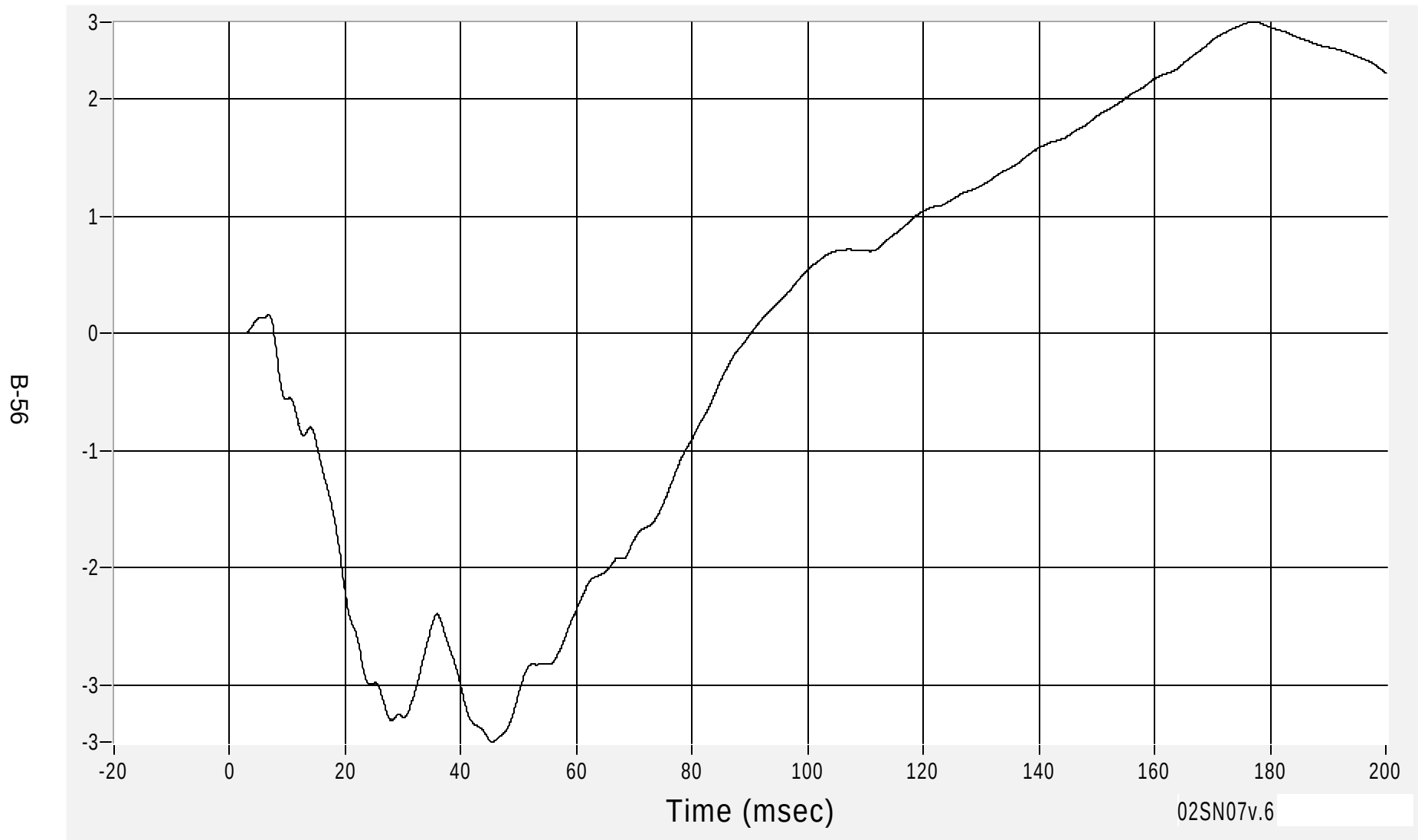
Medical College of Wisconsin
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Right Side Sill at Rear Seat (Z) Velocity

Max 2.7 km/h at 177.2 msec

Min -3.5 km/h at 45.4 msec

Velocity (km/h) CFC180



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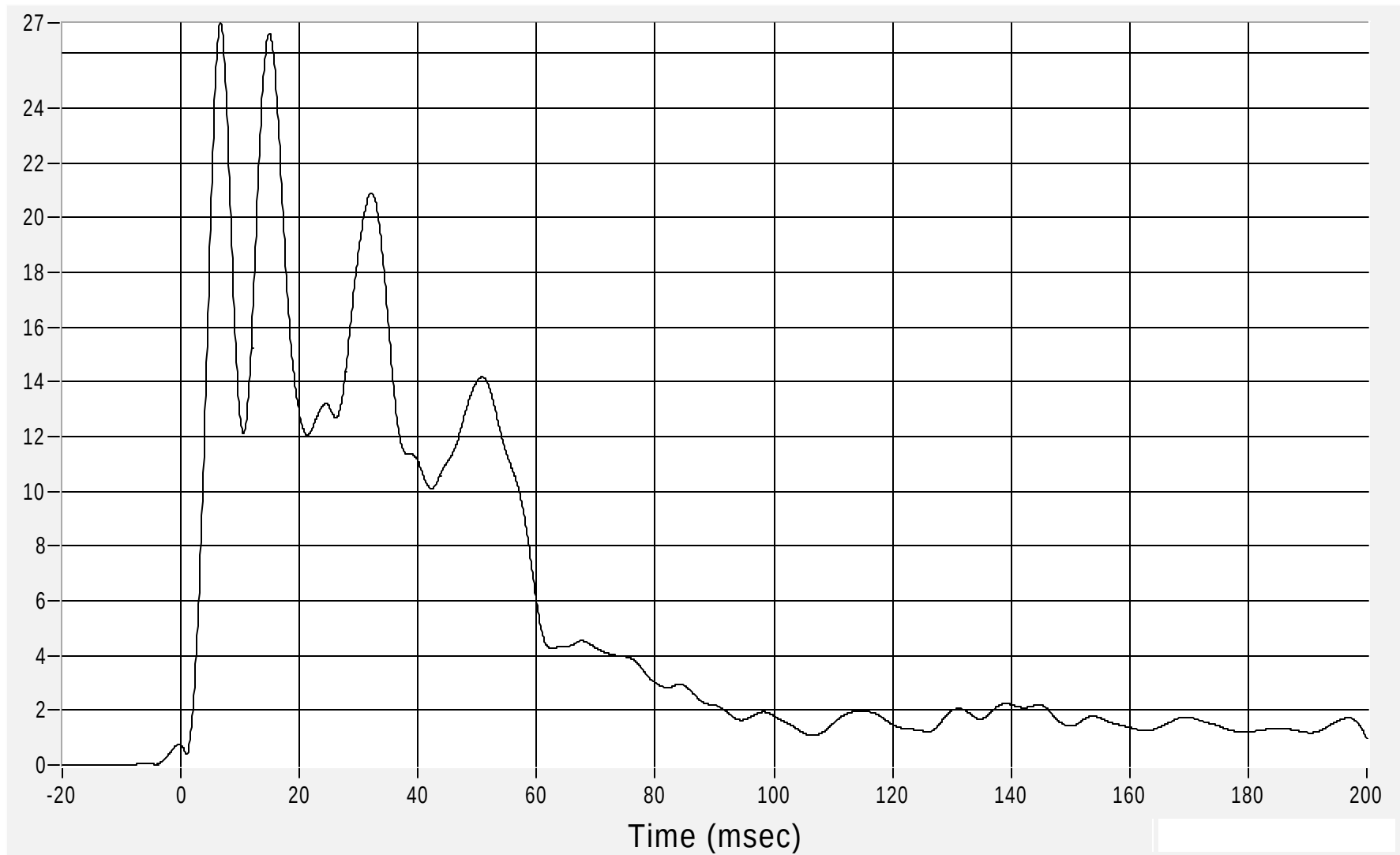
Right Side Sill at Rear Seat Resultant Acceleration

Max 27.1 G's at 6.6 msec

Min 0.4 G's at 1.0 msec

Acceleration (G's) CFC60

B-57



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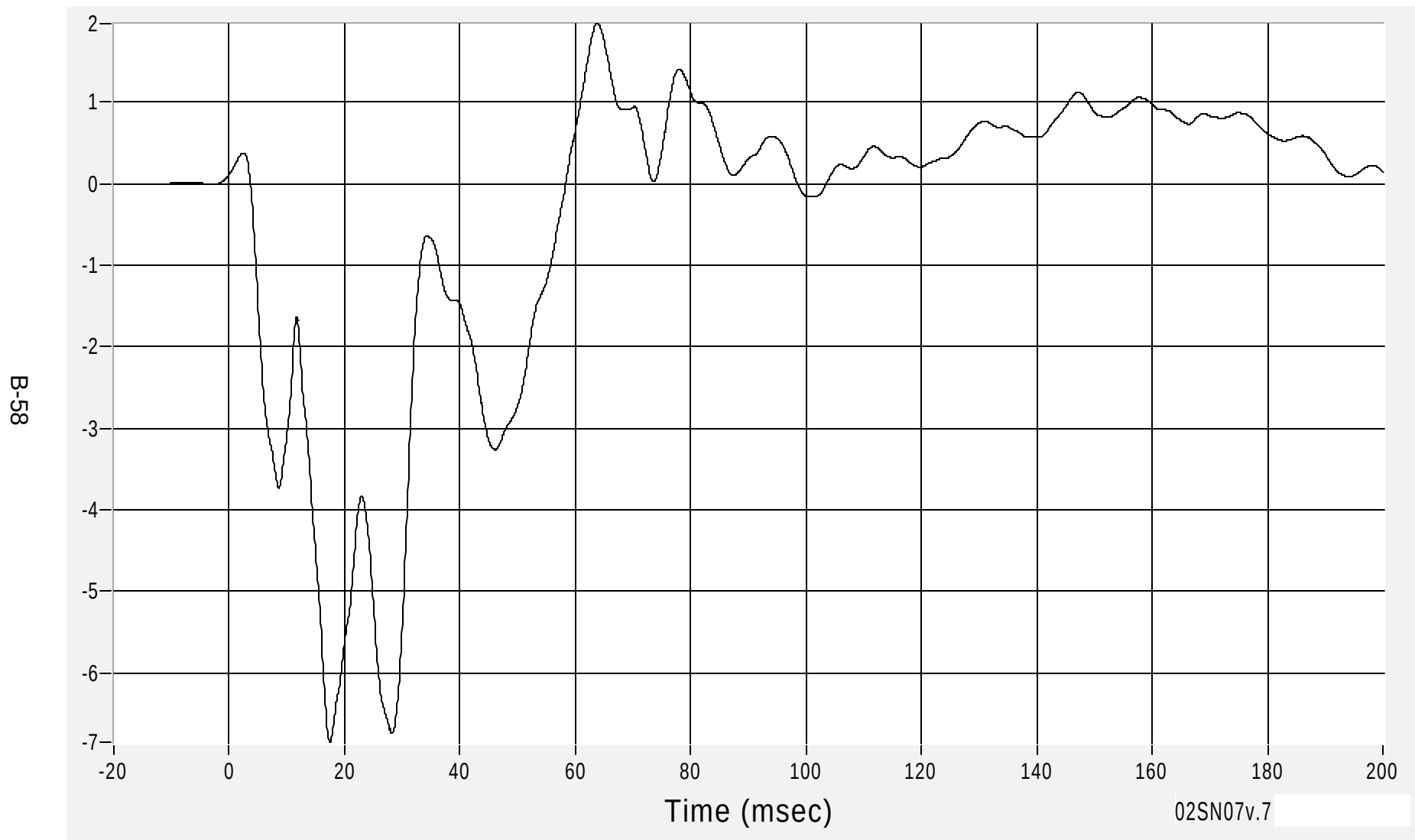
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Rear Floorpan Above Axle (X) Acceleration

Max 2.0 G's at 63.8 msec

Acceleration (G's) CFC60

Min -6.9 G's at 17.4 msec



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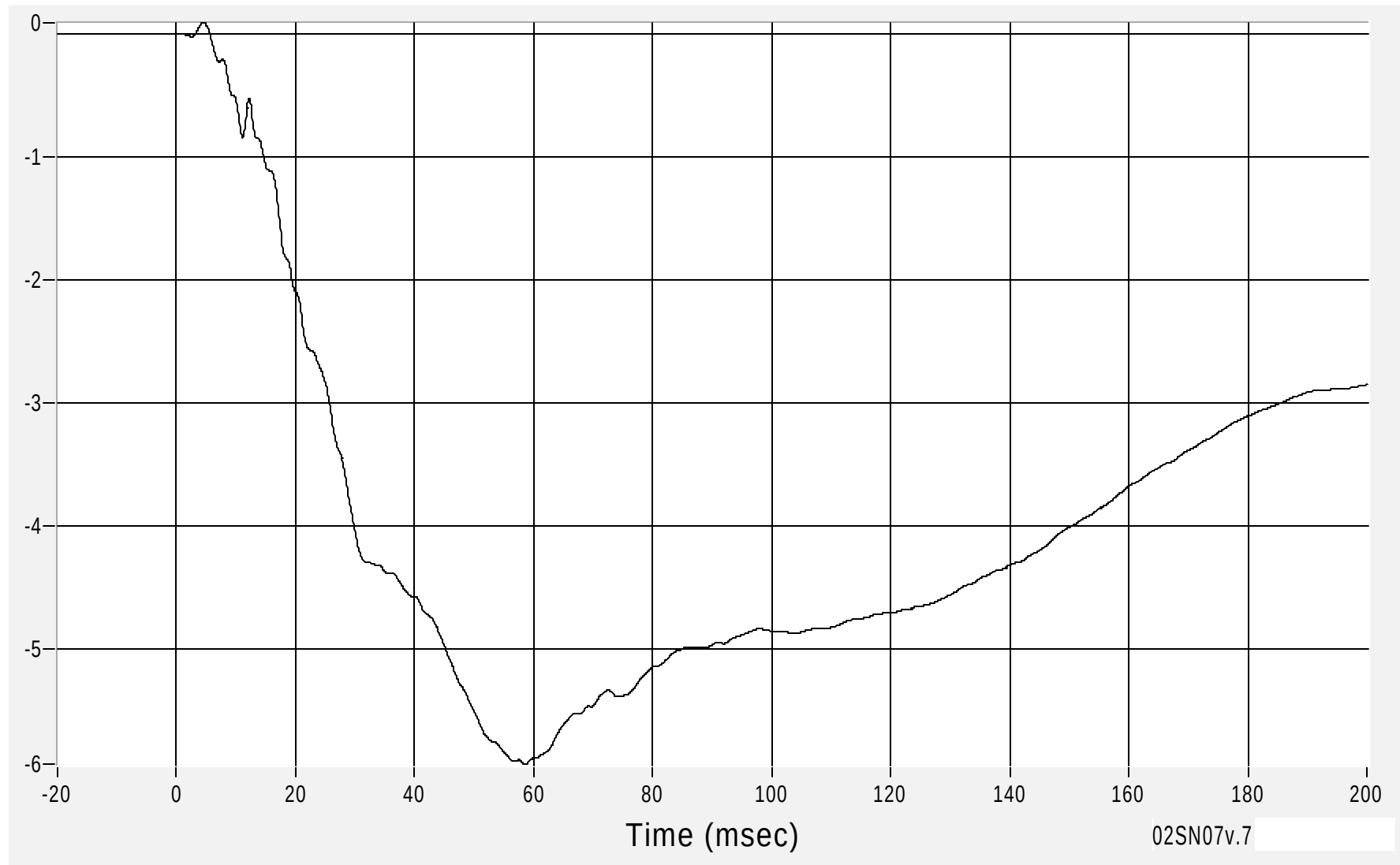
Rear Floorpan Above Axle (X) Velocity

Max 0.1 km/h at 4.5 msec

Velocity (km/h) CFC180

Min -5.9 km/h at 58.6 msec

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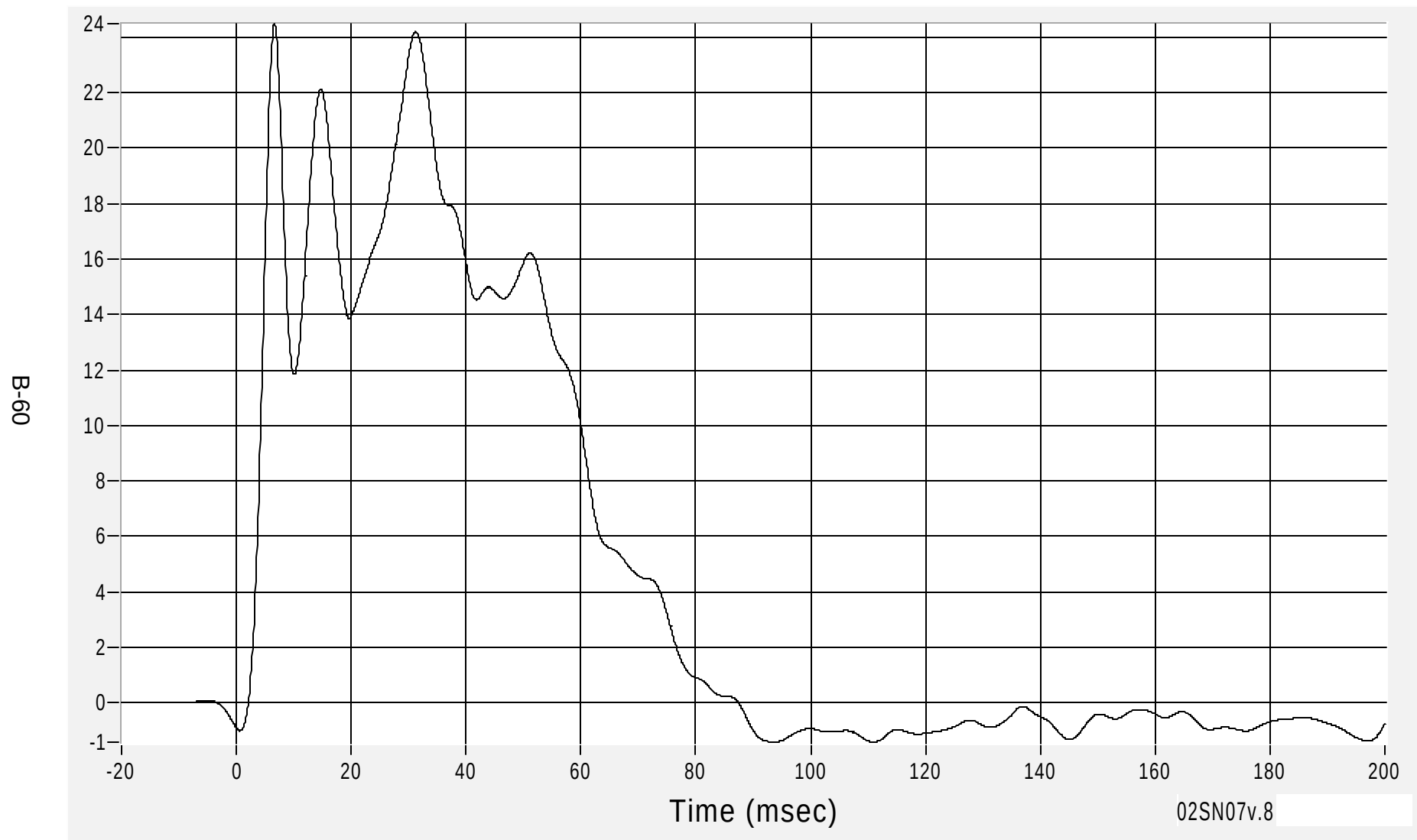
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Rear Floorpan Above Axle (Y) Acceleration

Max 24.5 G's at 6.6 msec

Min -1.4 G's at 110.9 msec

Acceleration (G's) CFC60



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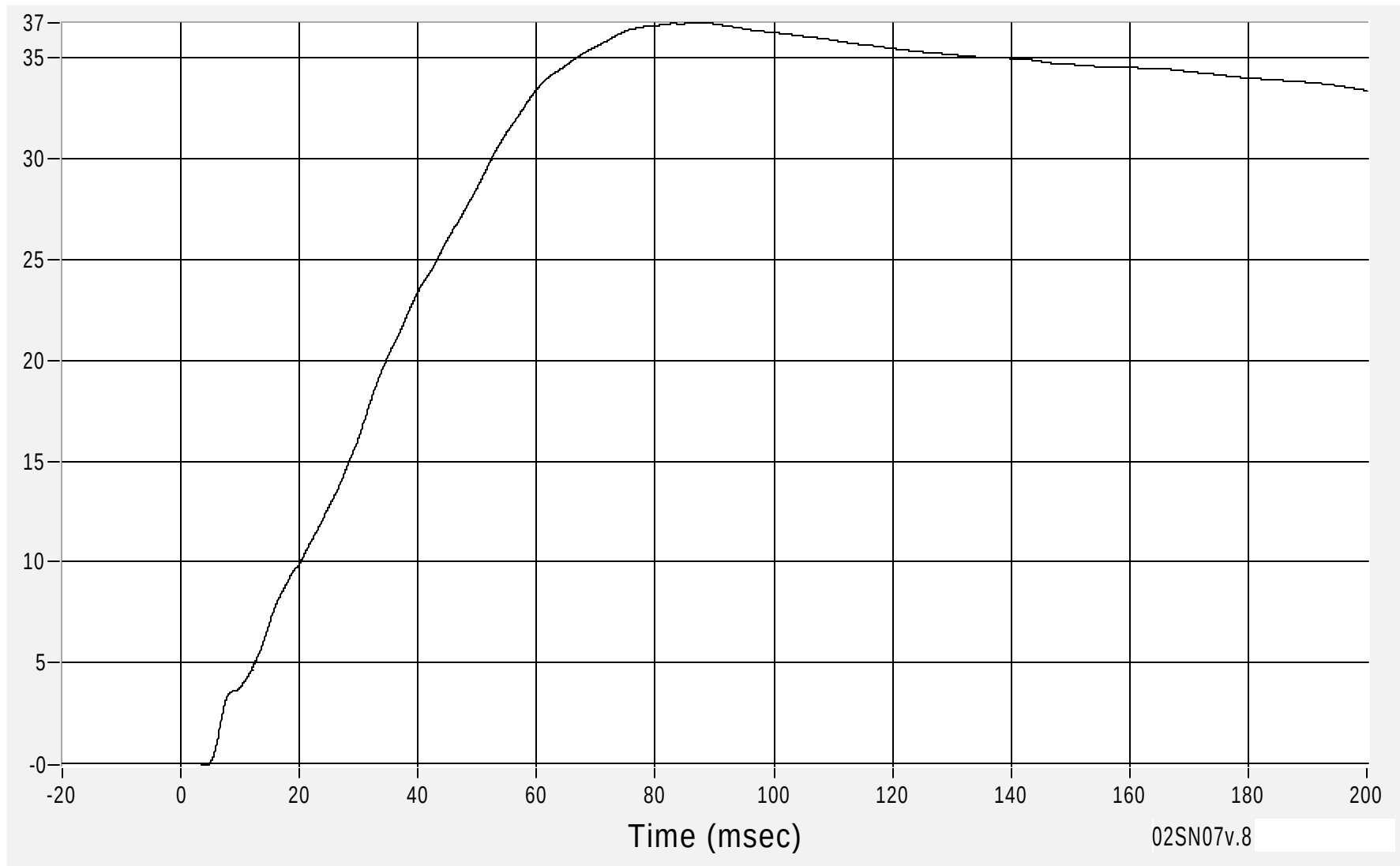
Rear Floorpan Above Axle (Y) Velocity

Velocity (km/h) CFC180

Max 36.7 km/h at 88.2 msec

Min 0.0 km/h at 4.2 msec

B-61



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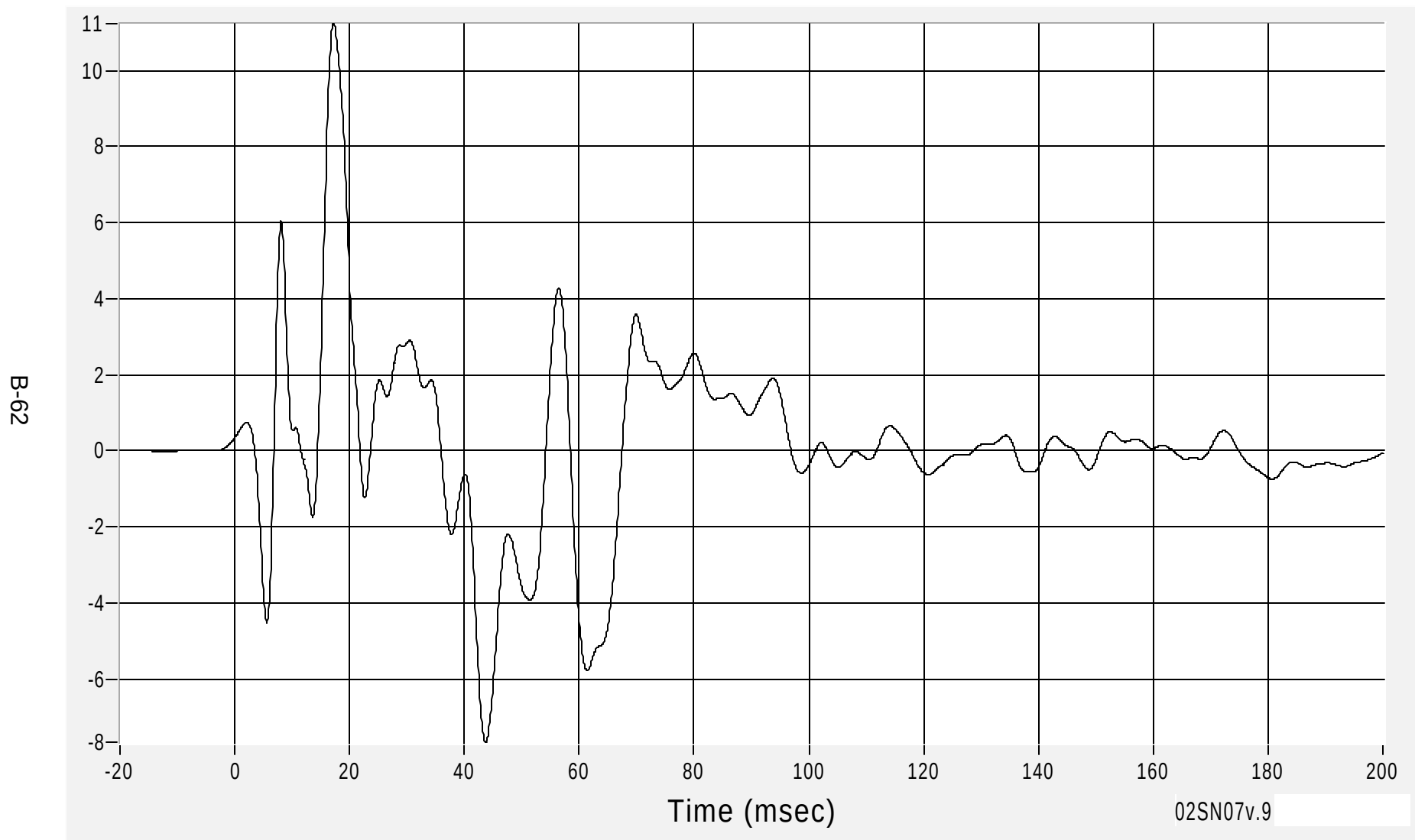
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Rear Floorpan Above Axle (Z) Acceleration

Max 11.2 G's at 17.2 msec

Acceleration (G's) CFC60

Min -7.7 G's at 43.7 msec



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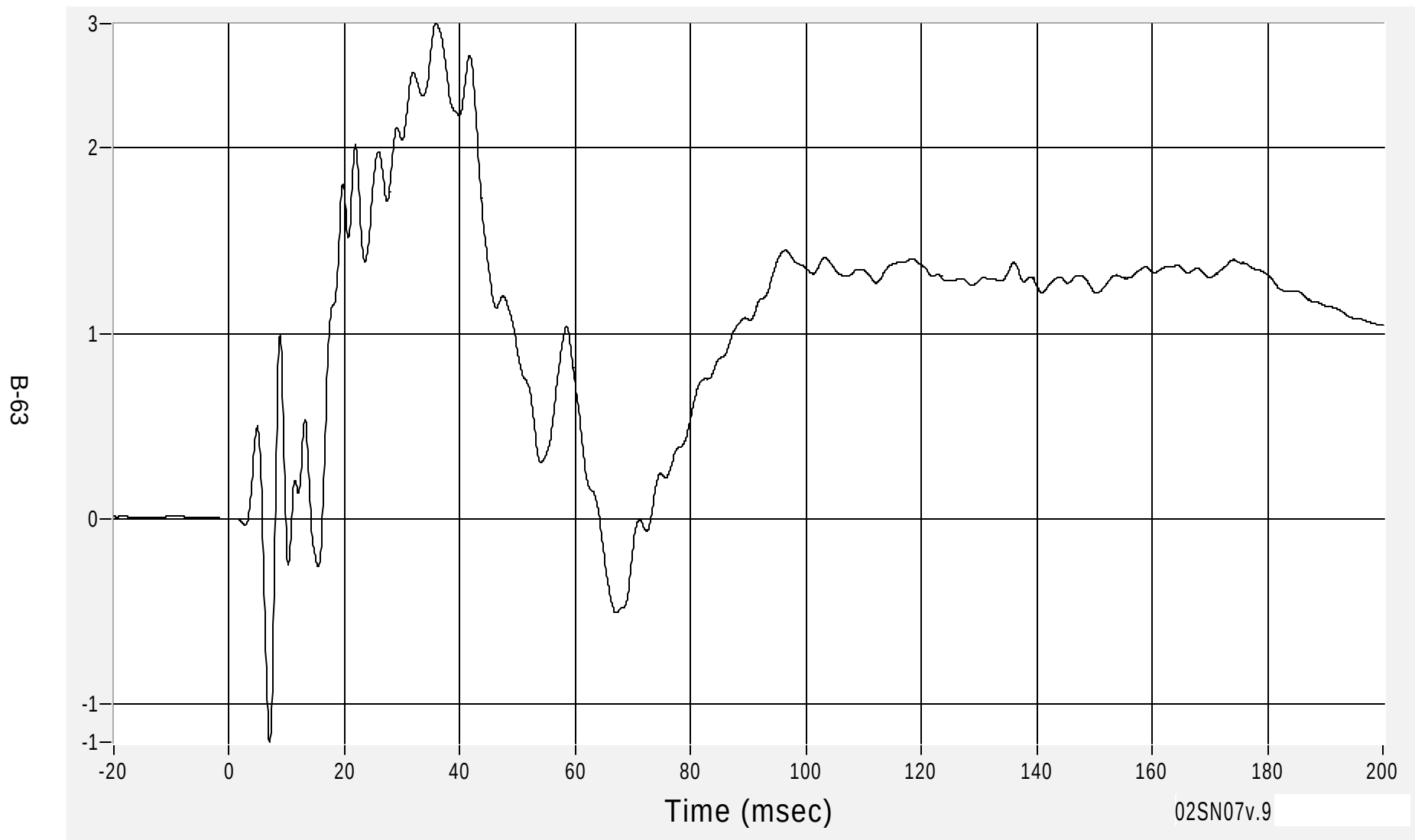
Medical College of Wisconsin
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Rear Floorpan Above Axle (Z) Velocity

Max 2.7 km/h at 35.8 msec

Velocity (km/h) CFC180

Min -1.2 km/h at 7.0 msec



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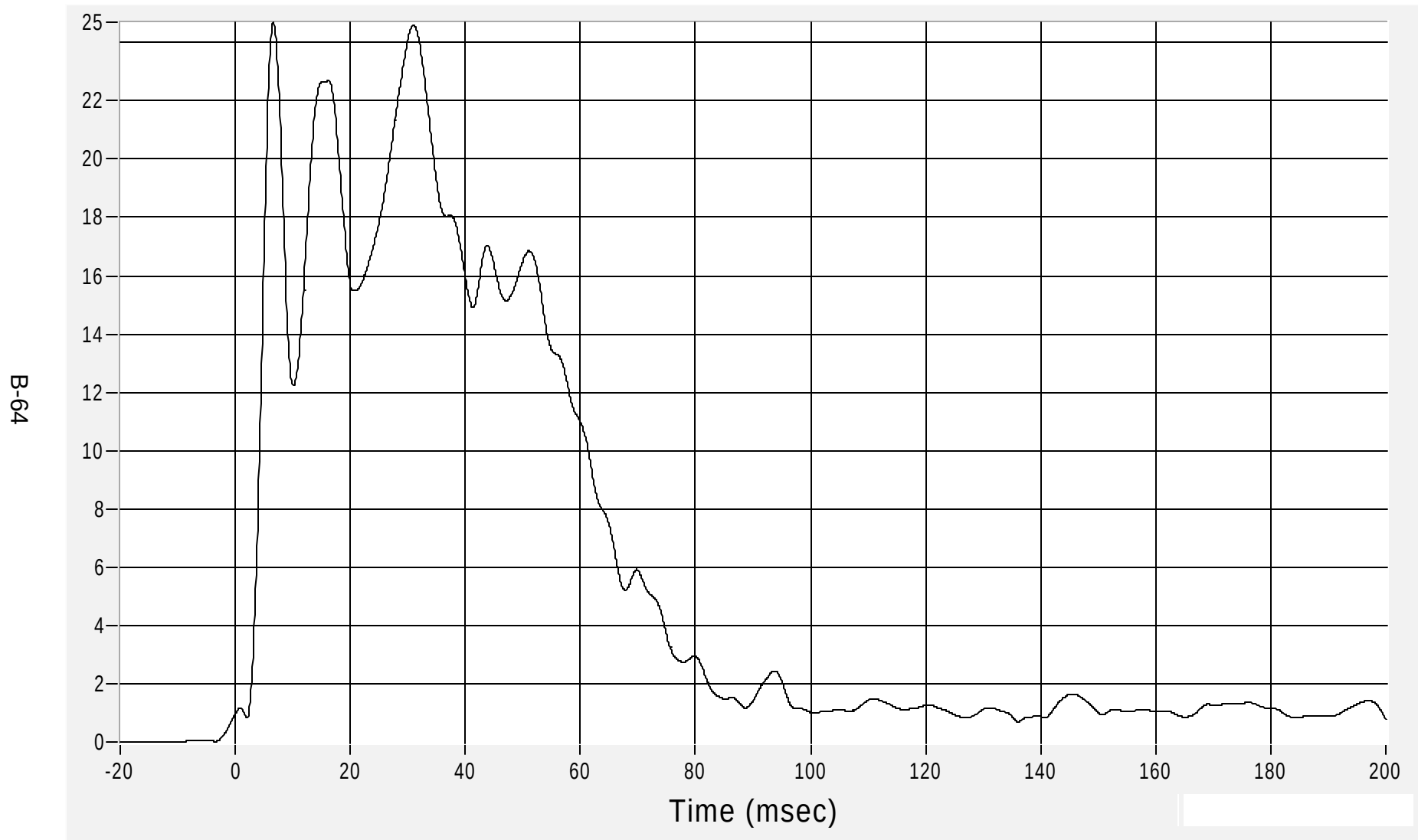
Medical College of Wisconsin
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Rear Floorpan Above Axle Resultant Acceleration

Max 24.7 G's at 6.6 msec

Min 0.7 G's at 136.1 msec

Acceleration (G's) CFC60



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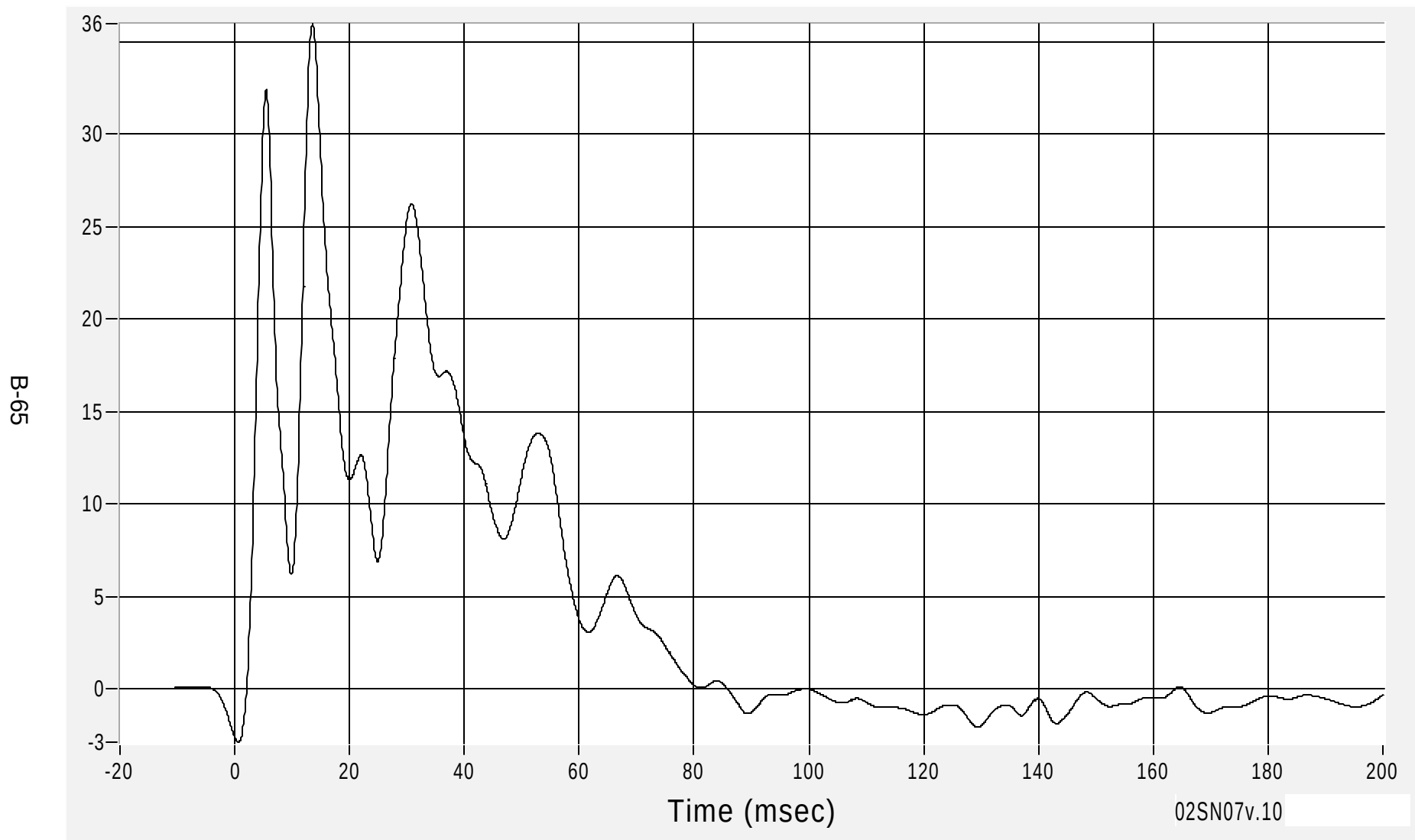
Medical College of Wisconsin
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Left Side Sill at Rear Seat (Y) Acceleration

Max 36.0 G's at 13.5 msec

Acceleration (G's) CFC60

Min -2.9 G's at 0.6 msec



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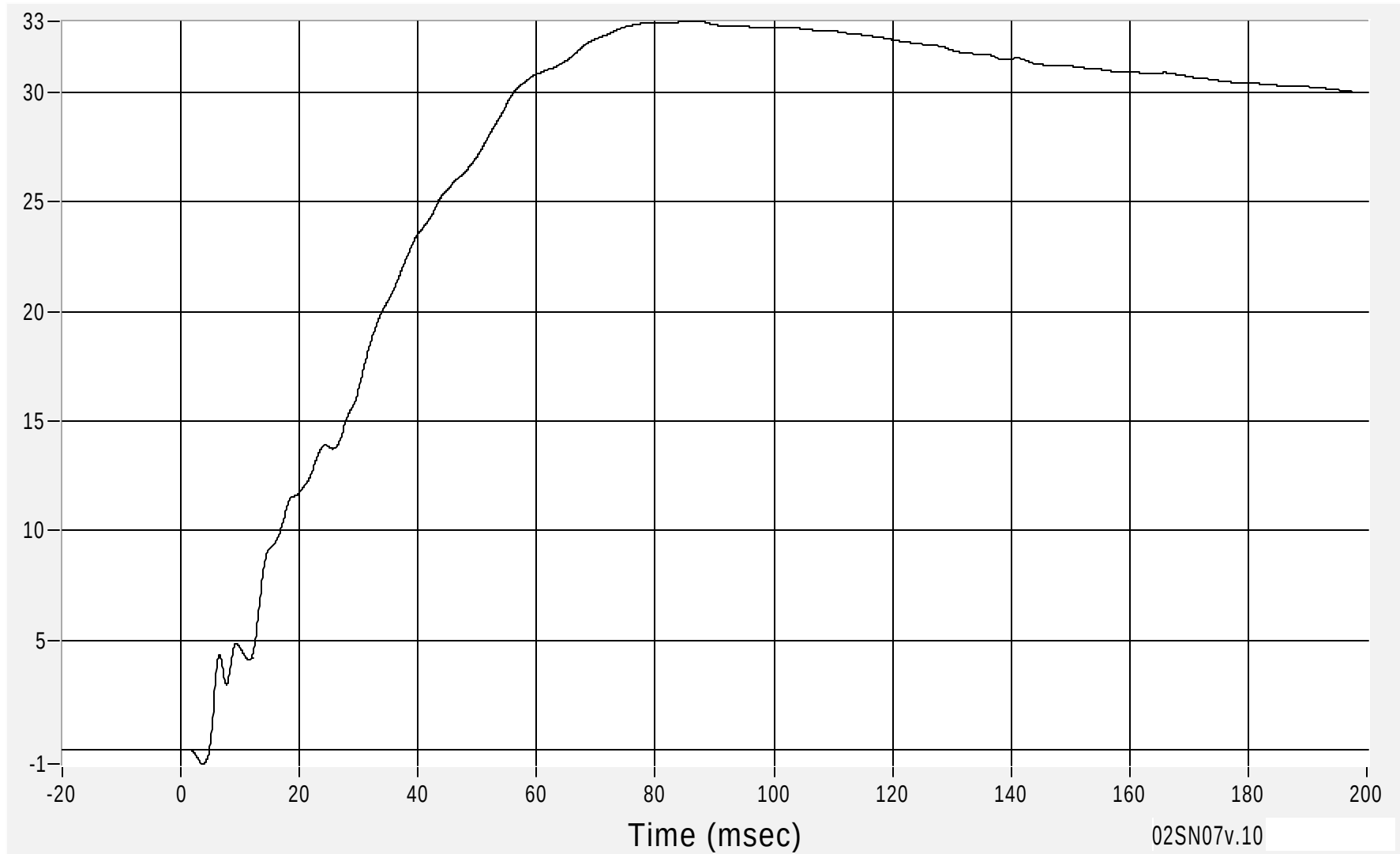
Left Side Sill at Rear Seat (Y) Velocity

Max 33.2 km/h at 85.4 msec

Min -0.7 km/h at 3.7 msec

Velocity (km/h) CFC180

B-66



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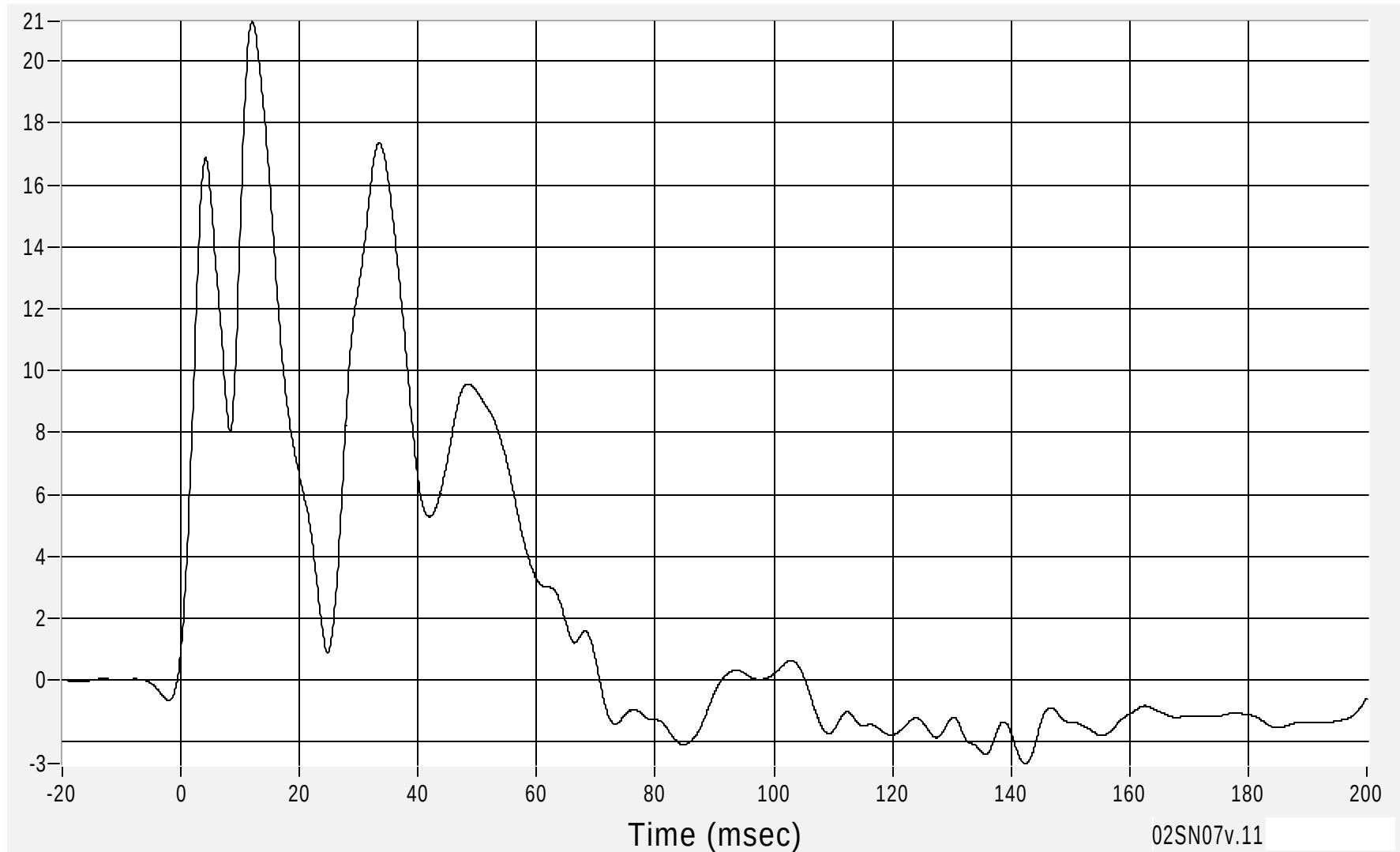
Left Side Sill at Front Seat (Y) Acceleration

Max 21.3 G's at 12.0 msec

Acceleration (G's) CFC60

Min -2.7 G's at 142.4 msec

B-67



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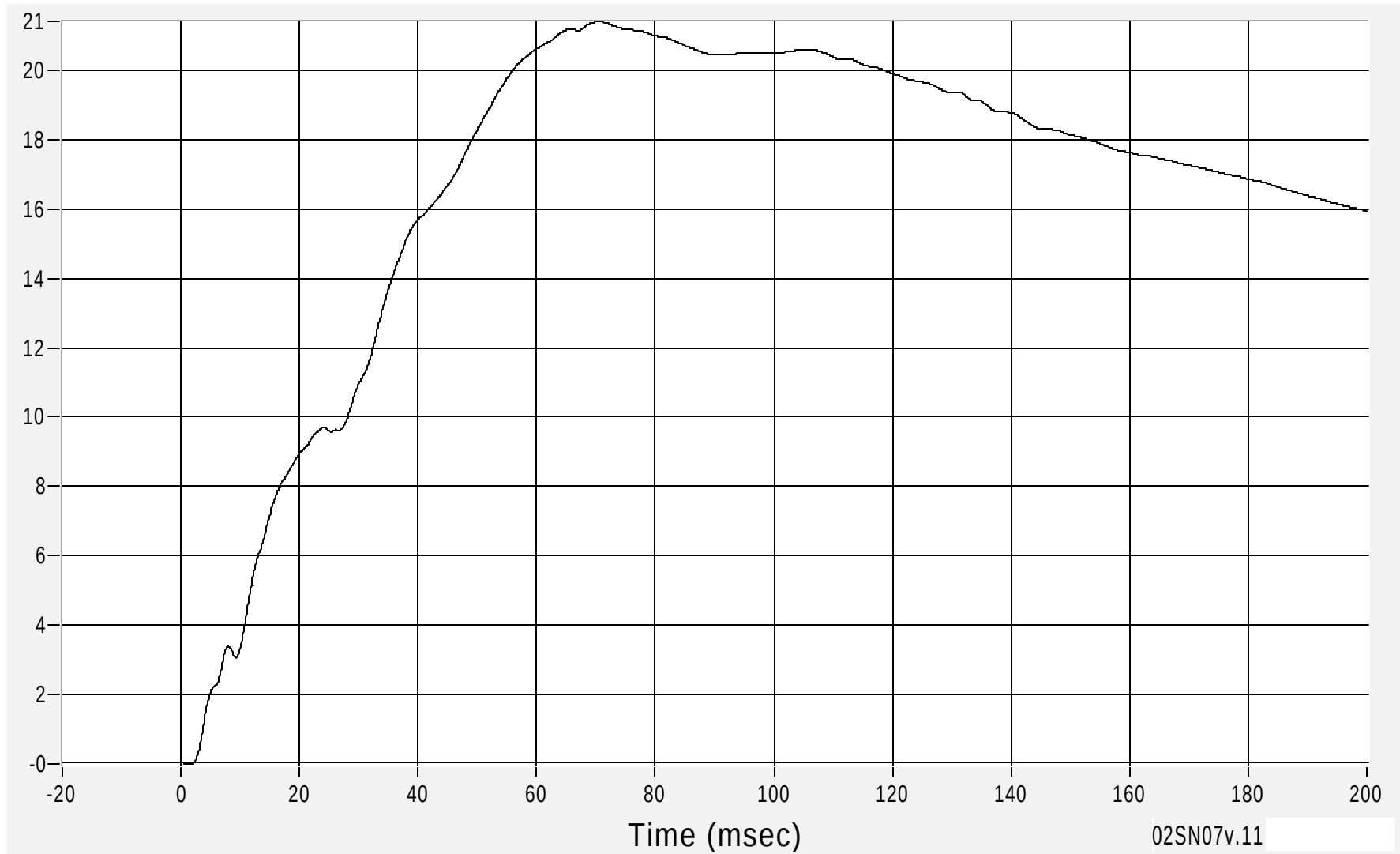
Left Side Sill at Front Seat (Y) Velocity

Max 21.4 km/h at 70.5 msec

Min 0.0 km/h at 1.5 msec

Velocity (km/h) CFC180

B-68



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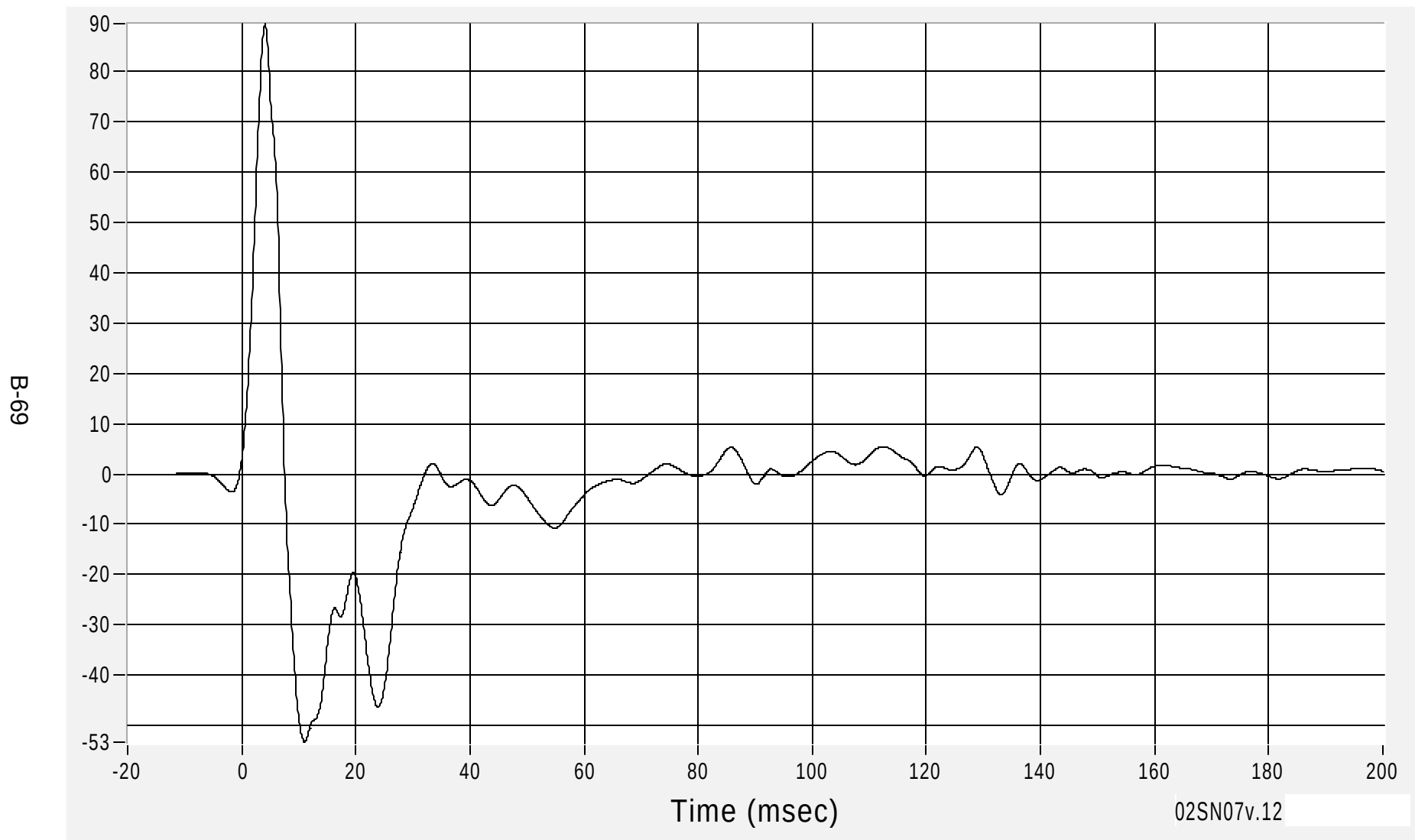
Medical College of Wisconsin
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Left Front Door on Centerline (Y) Acceleration

Max 89.5 G's at 4.1 msec

Min -53.3 G's at 11.0 msec

Acceleration (G's) CFC60



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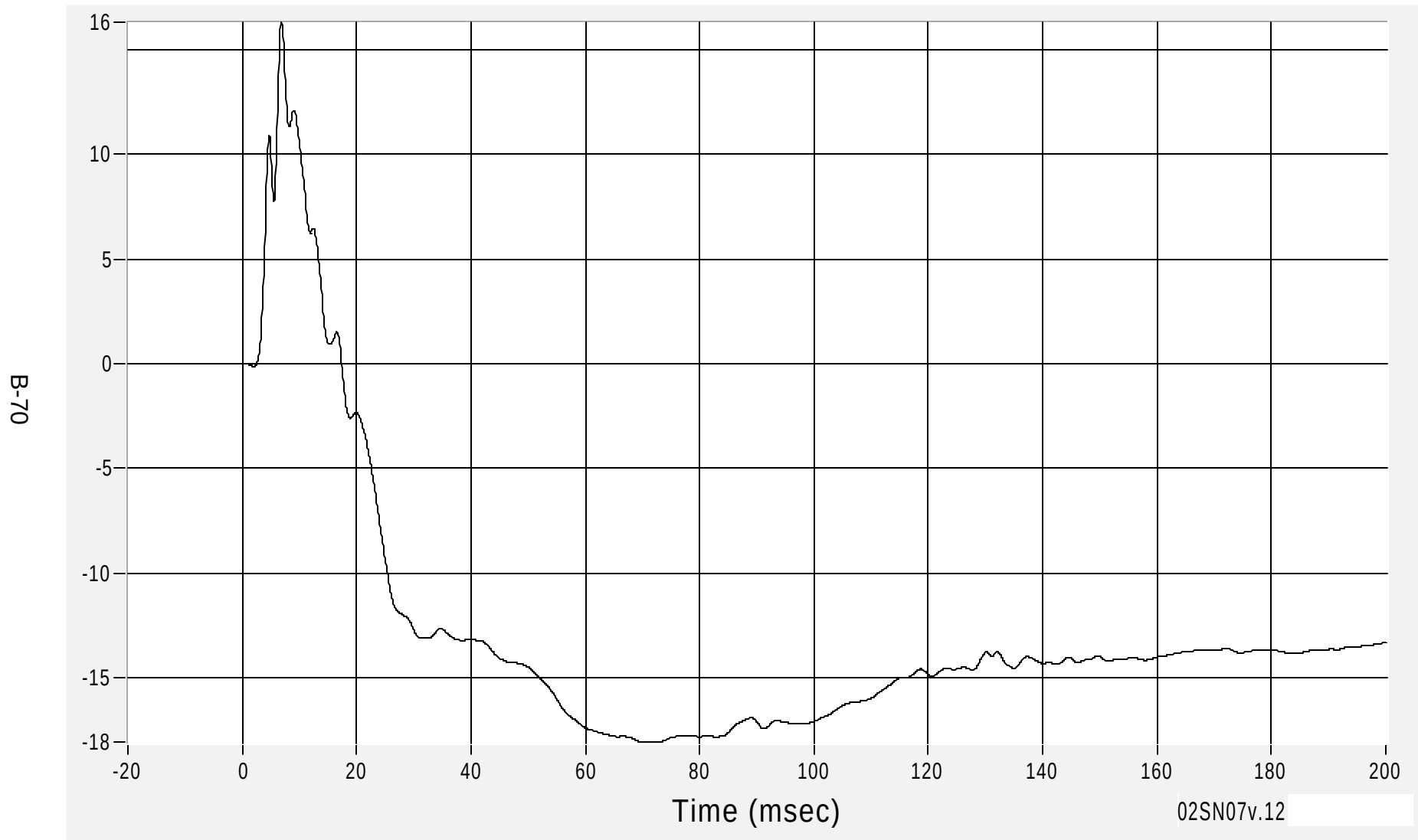
Medical College of Wisconsin
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Left Front Door on Centerline (Y) Velocity

Max 16.3 km/h at 6.8 msec

Min -18.1 km/h at 70.4 msec

Velocity (km/h) CFC180



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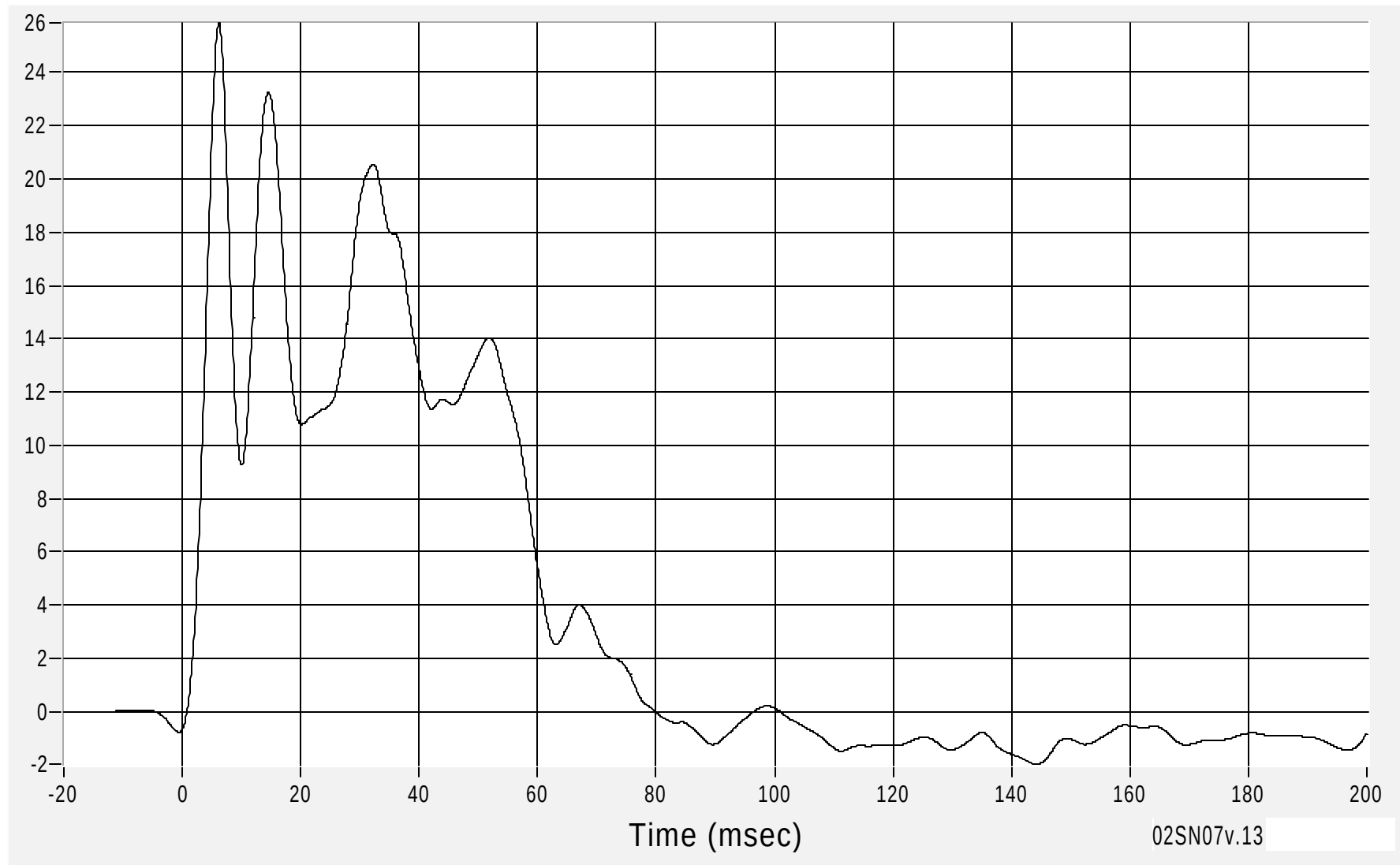
Right Rear Occupant Compartment (Y) Acceleration

Max 25.9 G's at 6.2 msec

Acceleration (G's) CFC60

Min -2.0 G's at 144.2 msec

B-71



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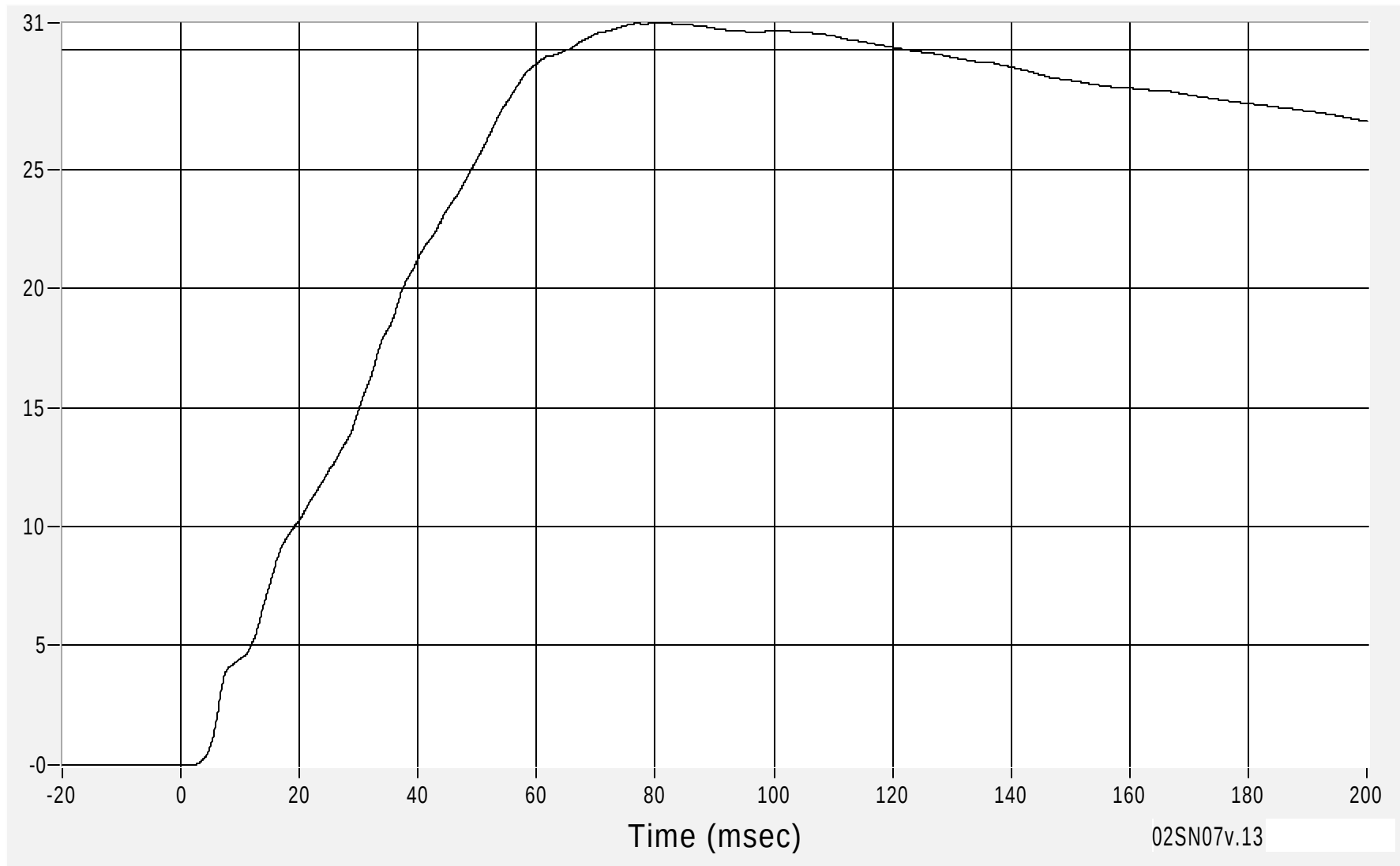
Right Rear Occupant Compartment (Y) Velocity

Max 31.1 km/h at 79.8 msec

Min 0.0 km/h at 1.4 msec

Velocity (km/h) CFC180

B-72



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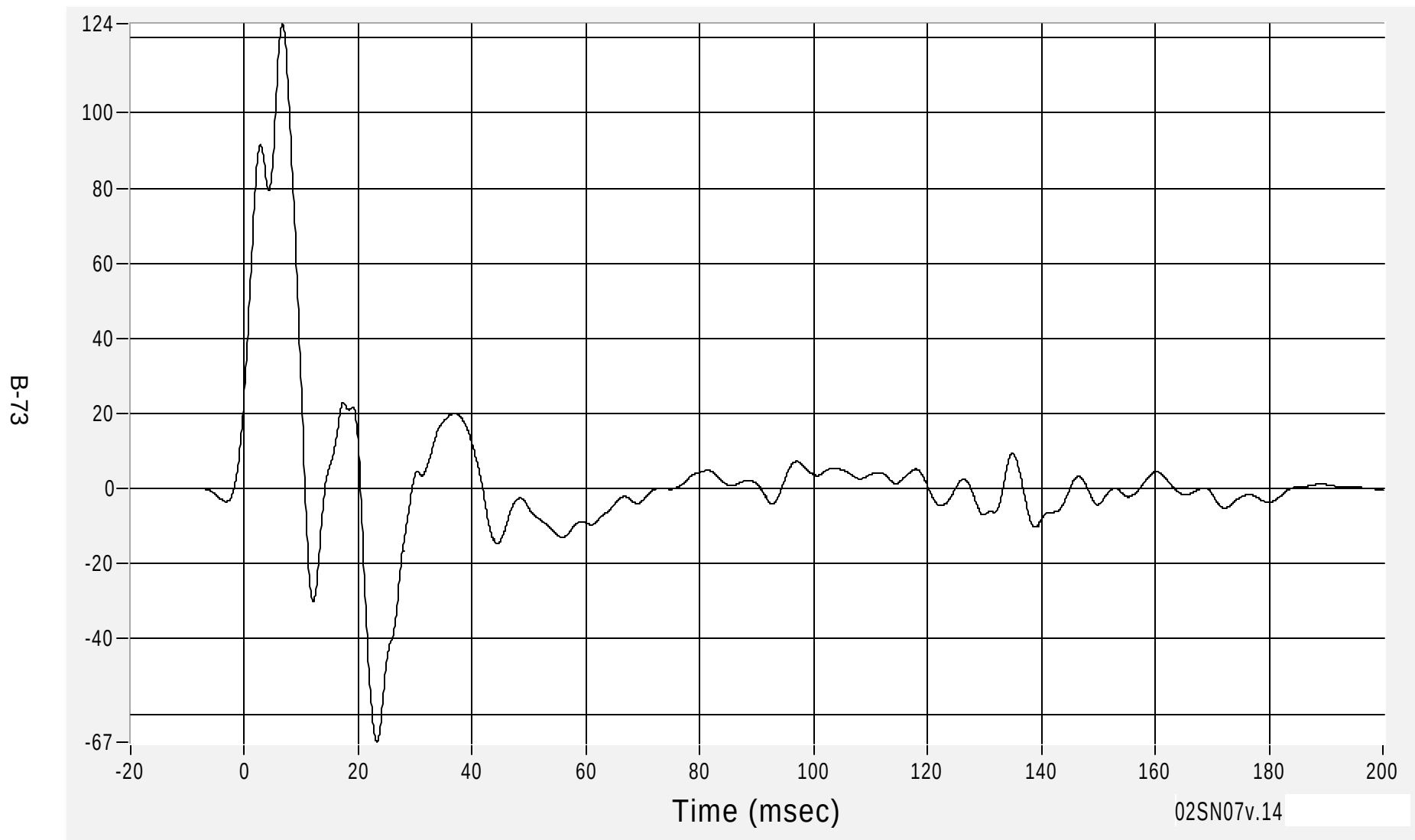
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Mid-Rear of Left Front Door (Y) Acceleration

Max 123.7 G's at 6.6 msec

Acceleration (G's) CFC60

Min -67.5 G's at 23.3 msec



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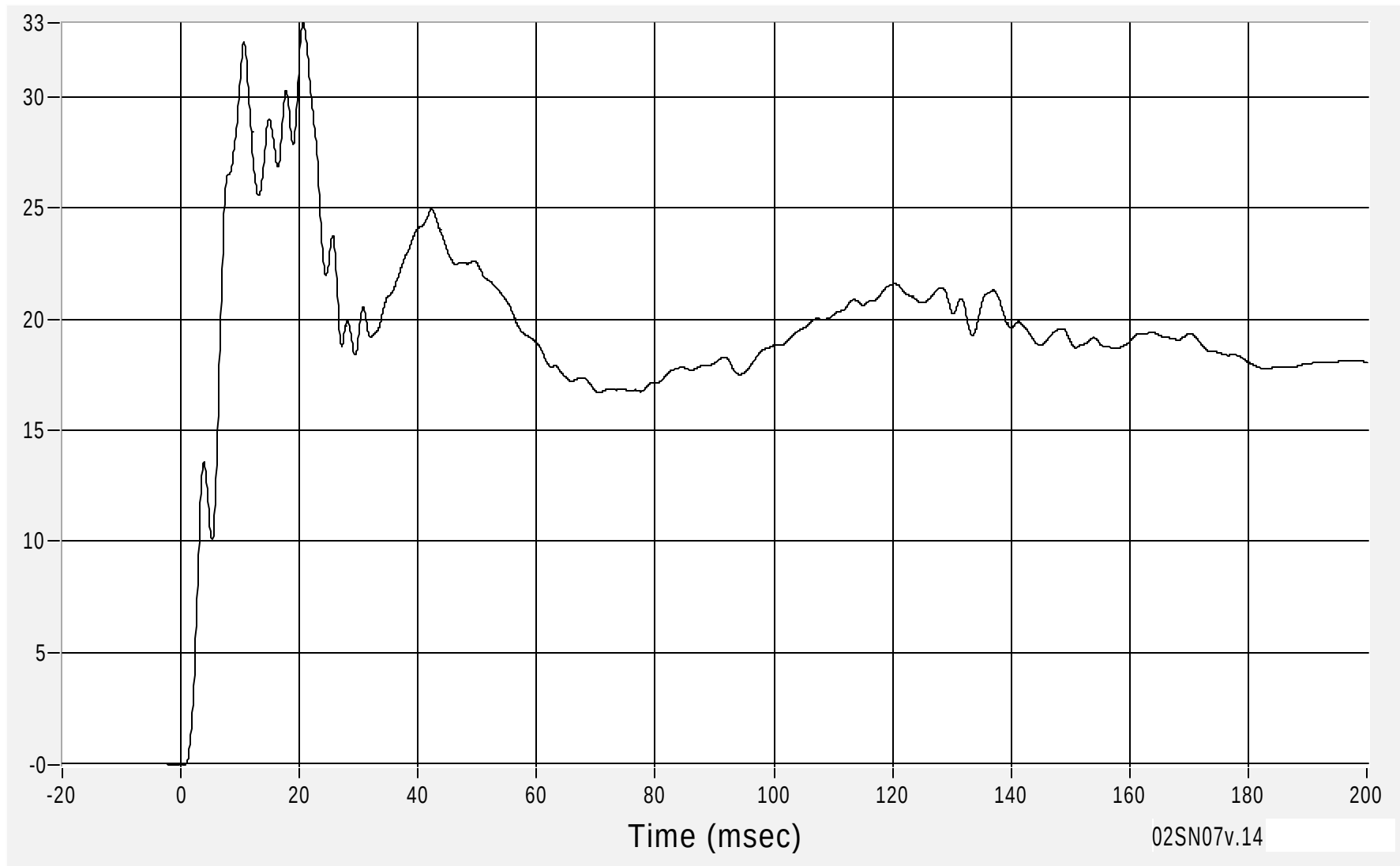
Mid-Rear of Left Front Door (Y) Velocity

Max 33.3 km/h at 20.6 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.6 msec

B-74



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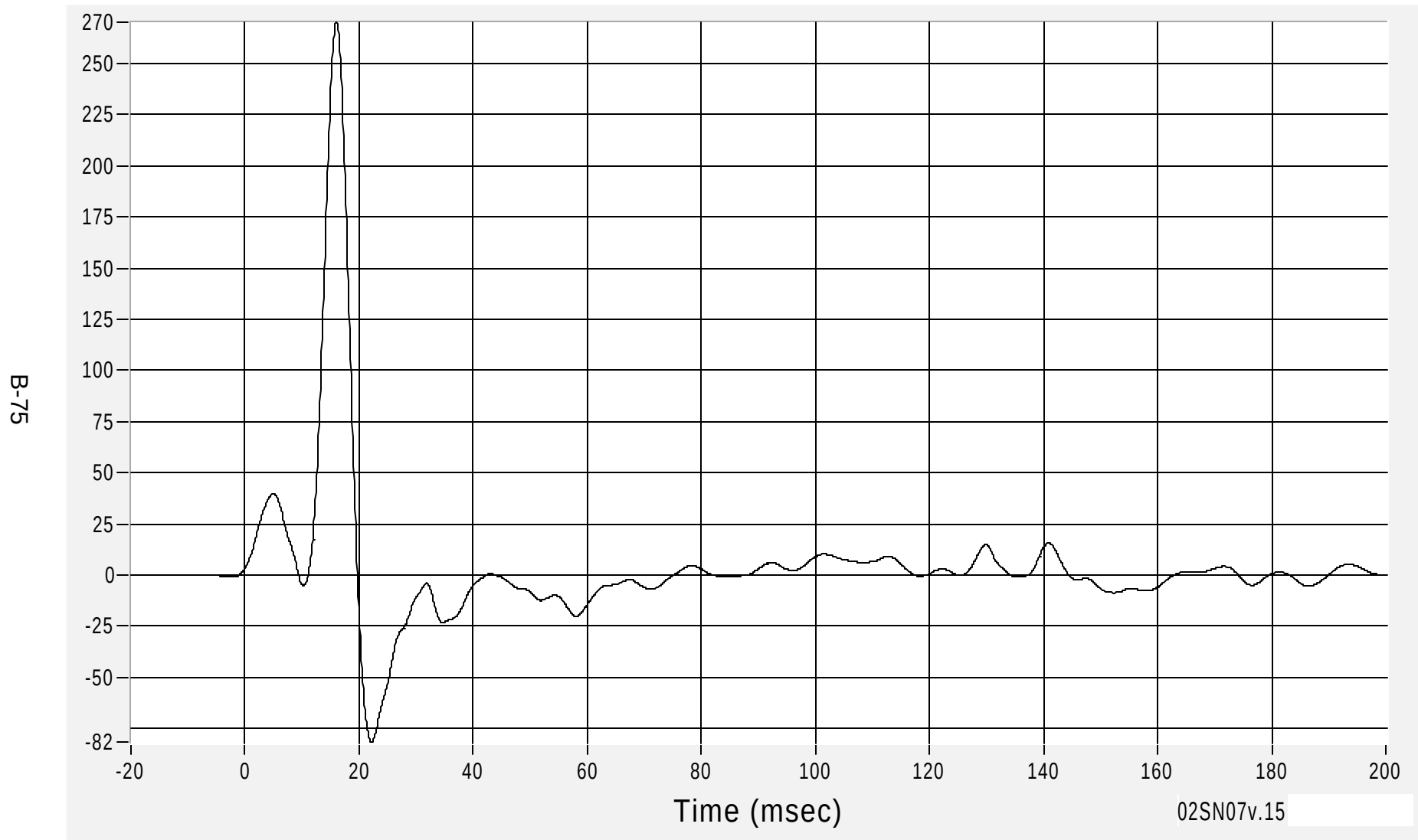
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Left Front Door Upper Centerline (Y) Acceleration

Max 270.3 G's at 16.0 msec

Acceleration (G's) CFC60

Min -81.7 G's at 22.2 msec



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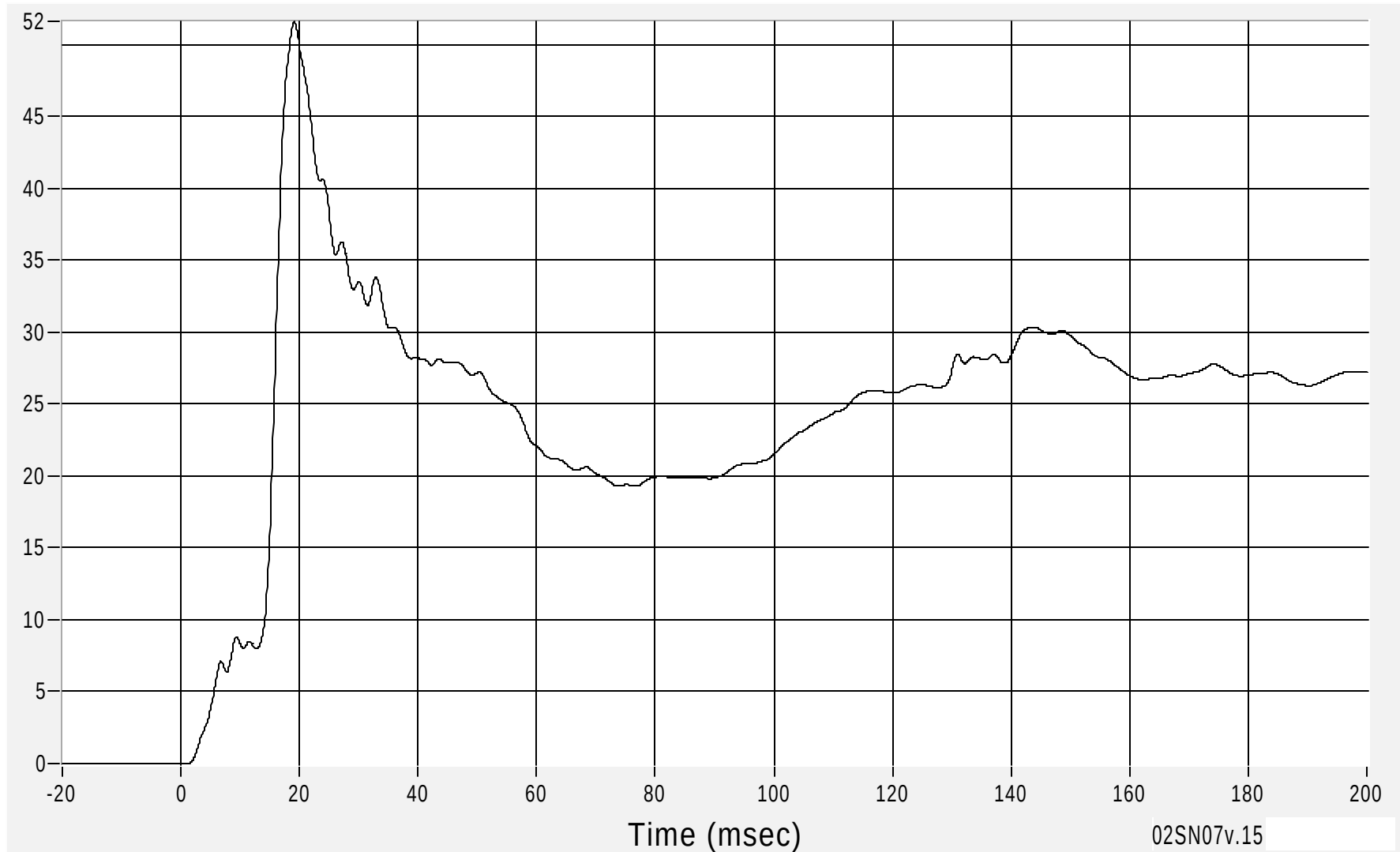
Left Front Door Upper Centerline (Y) Velocity

Max 51.6 km/h at 19.1 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.0 msec

B-76



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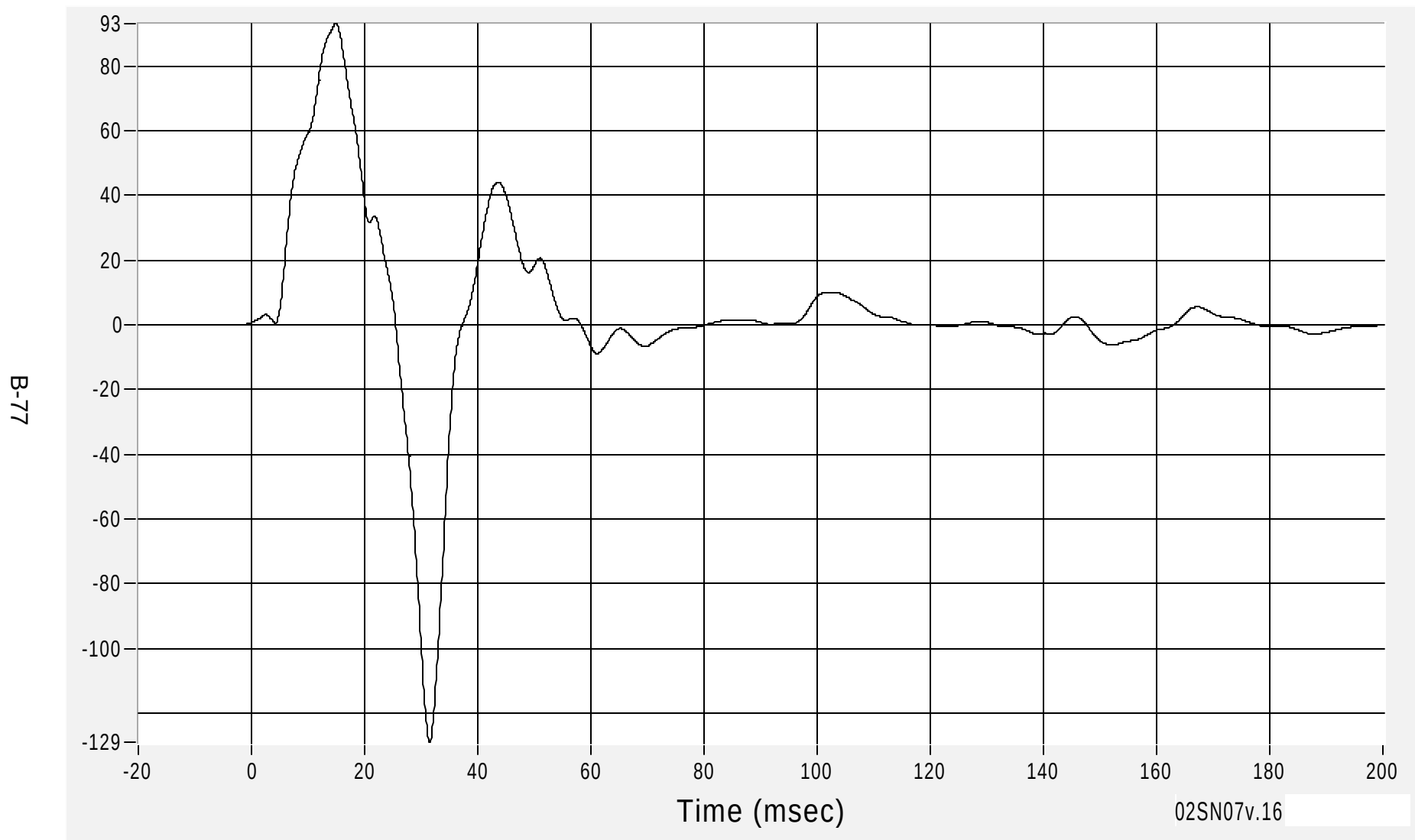
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Mid-Rear of Left Rear Door (Y) Acceleration

Max 93.1 G's at 15.0 msec

Acceleration (G's) CFC60

Min -129.0 G's at 31.5 msec



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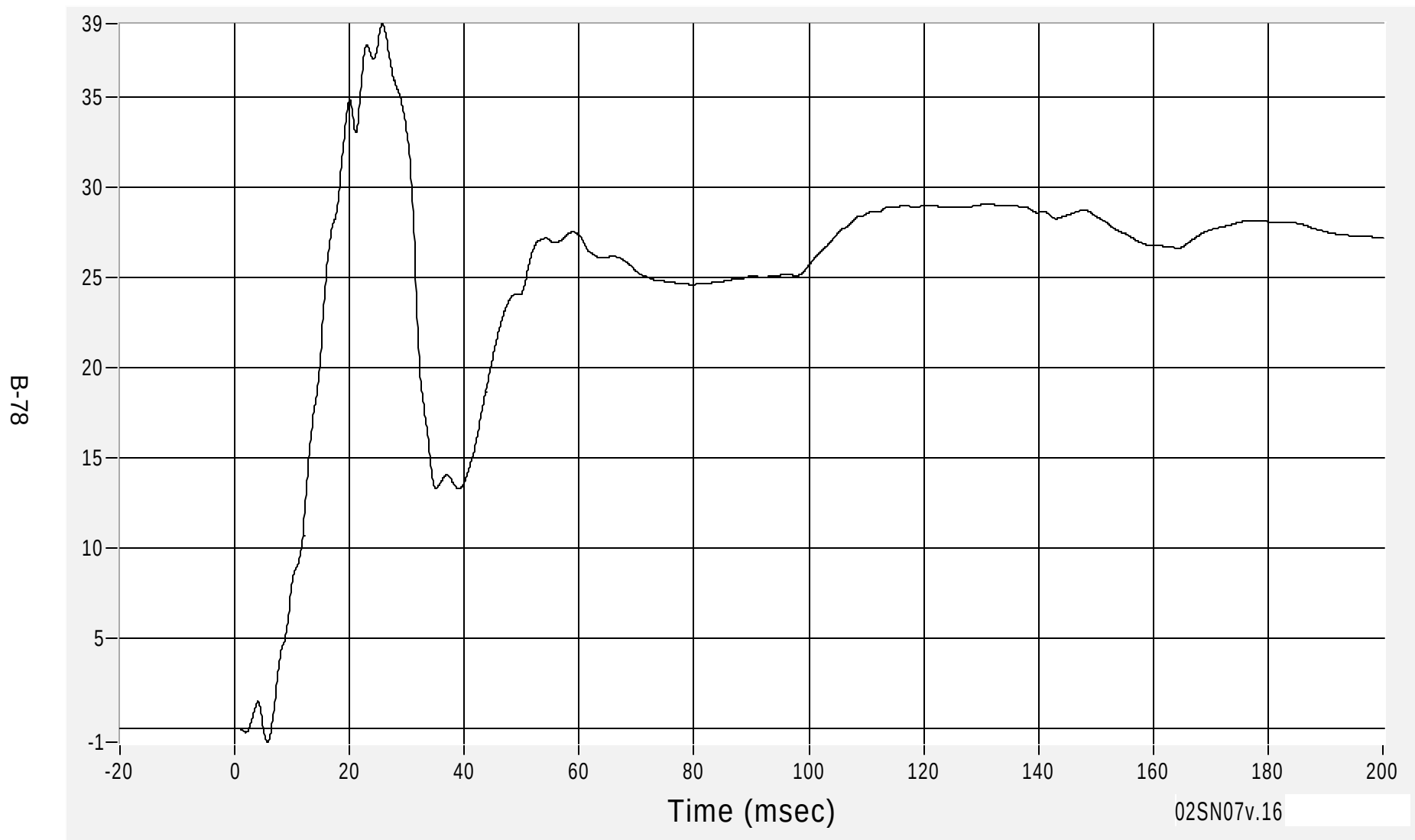
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Mid-Rear of Left Rear Door (Y) Velocity

Max 39.0 km/h at 25.8 msec

Velocity (km/h) CFC180

Min -0.8 km/h at 5.7 msec



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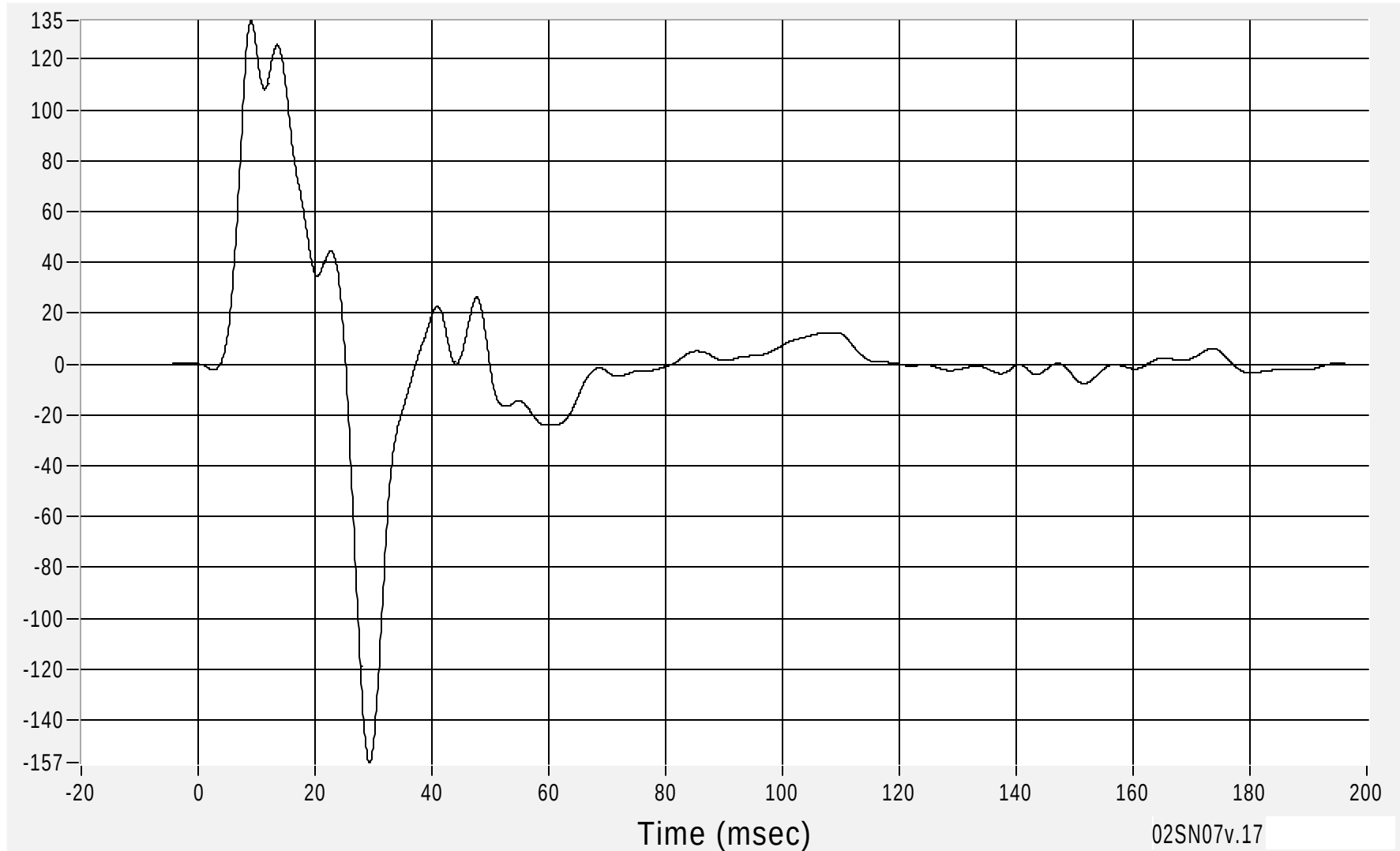
Left Rear Door Upper Centerline (Y) Acceleration

Max 135.2 G's at 9.0 msec

Min -156.8 G's at 29.4 msec

Acceleration (G's) CFC60

B-79



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18 April 2002

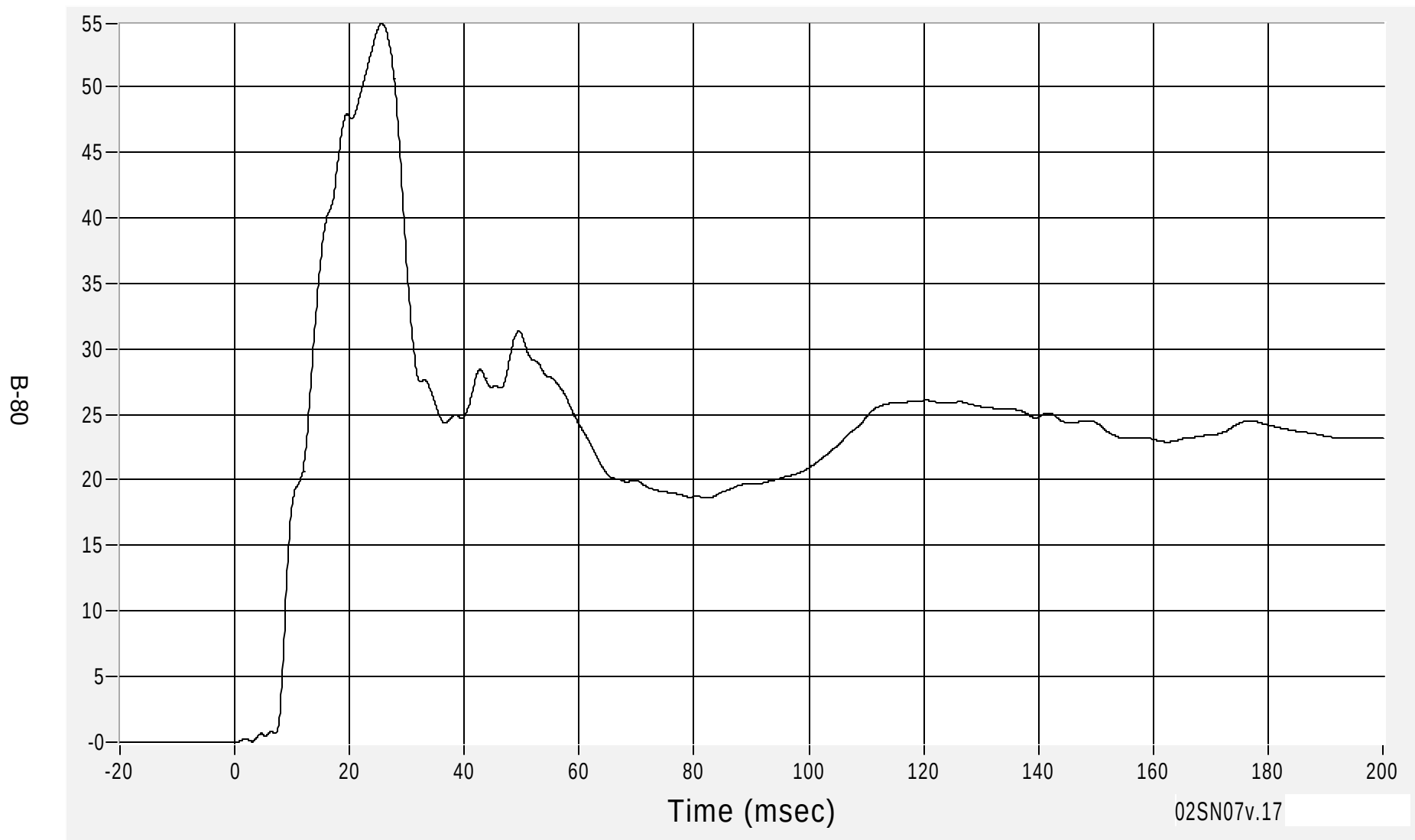
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Left Rear Door Upper Centerline (Y) Velocity

Max 54.8 km/h at 25.6 msec

Min 0.0 km/h at 0.0 msec

Velocity (km/h) CFC180



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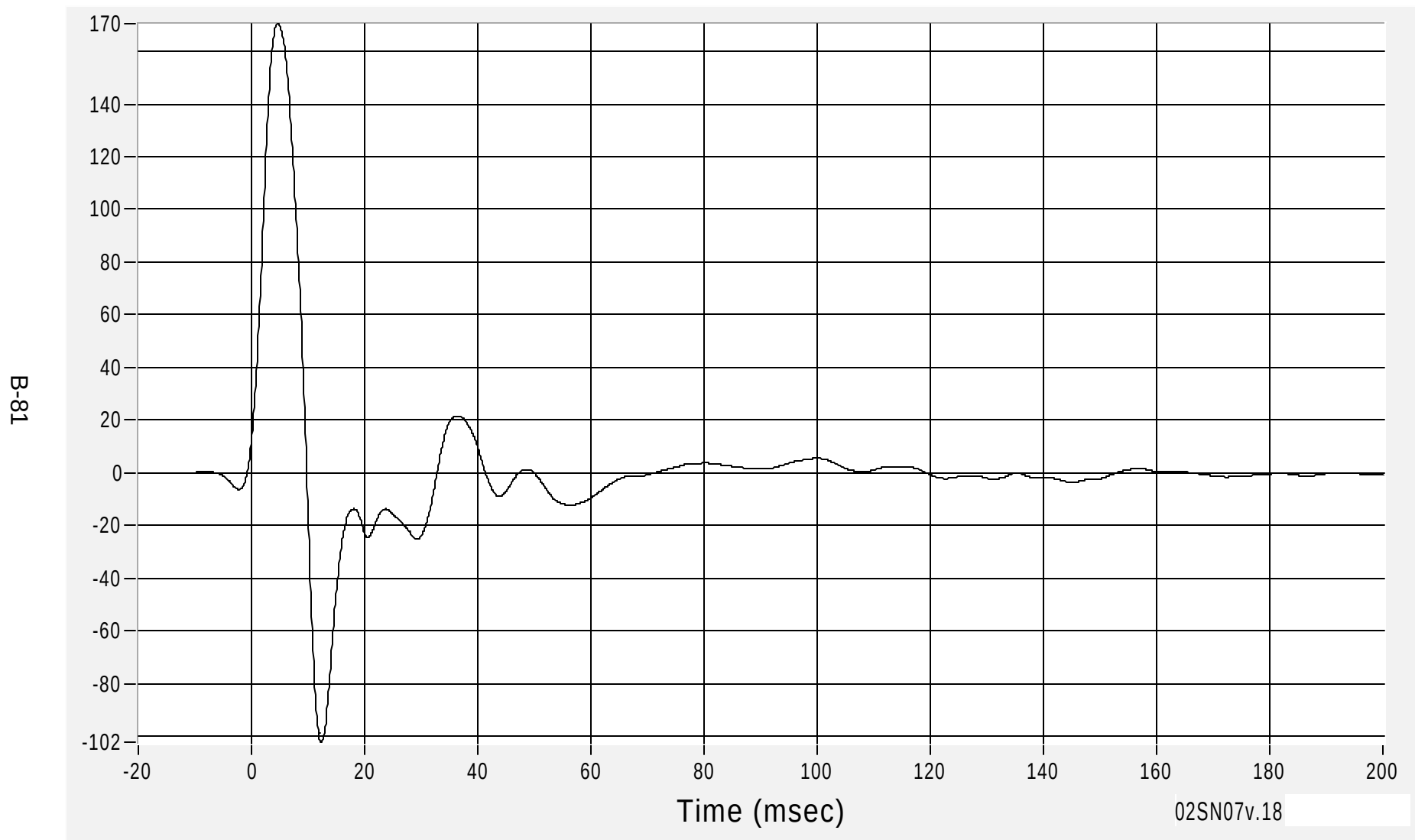
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Left Lower B-Pillar (Y) Acceleration

Max 170.5 G's at 4.6 msec

Acceleration (G's) CFC60

Min -102.3 G's at 12.3 msec



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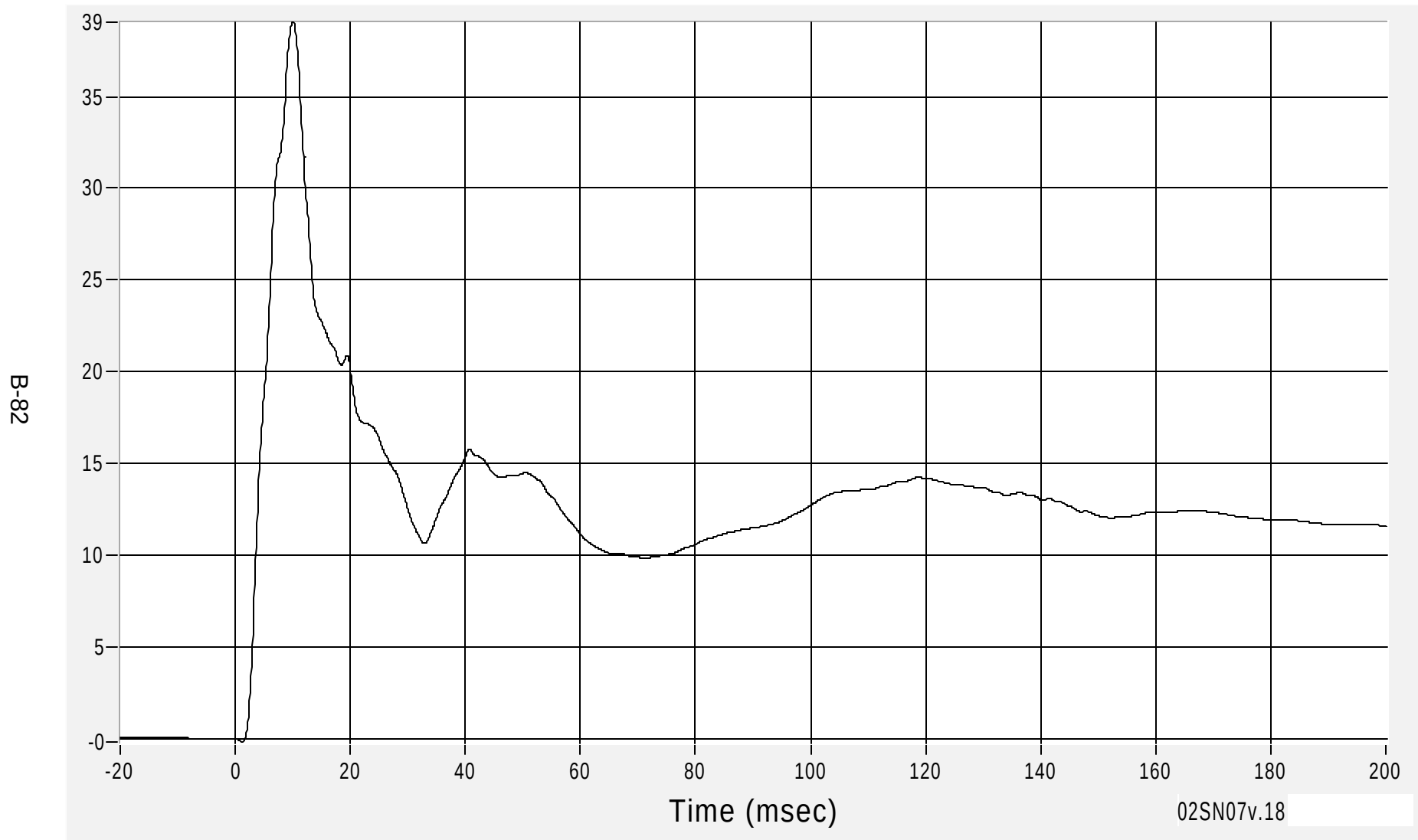
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Left Lower B-Pillar (Y) Velocity

Max 39.1 km/h at 10.1 msec

Min -0.2 km/h at 1.2 msec

Velocity (km/h) CFC180



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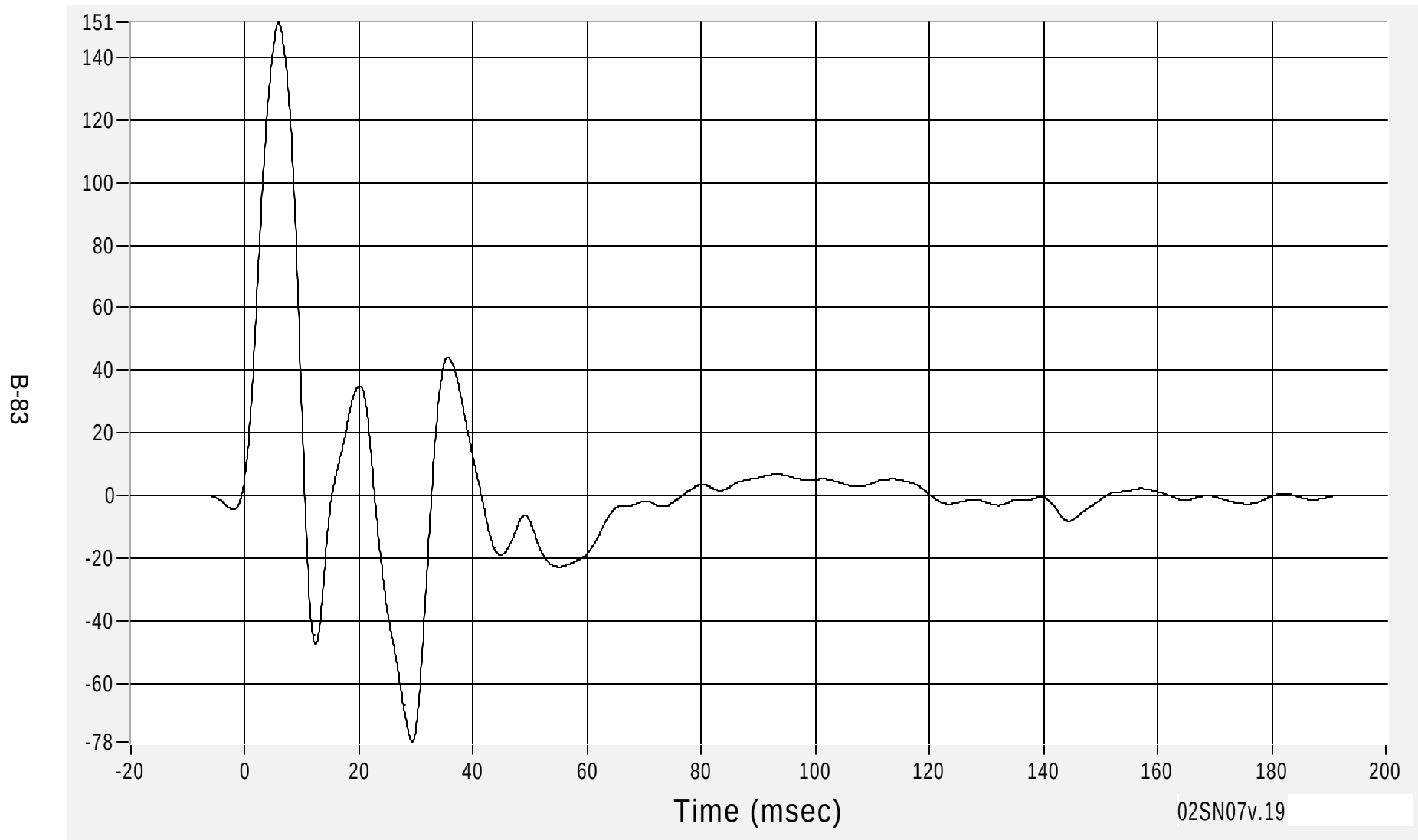
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Left Middle B-Pillar (Y) Acceleration

Max 151.1 G's at 5.9 msec

Min -78.4 G's at 29.3 msec

Acceleration (G's) CFC60



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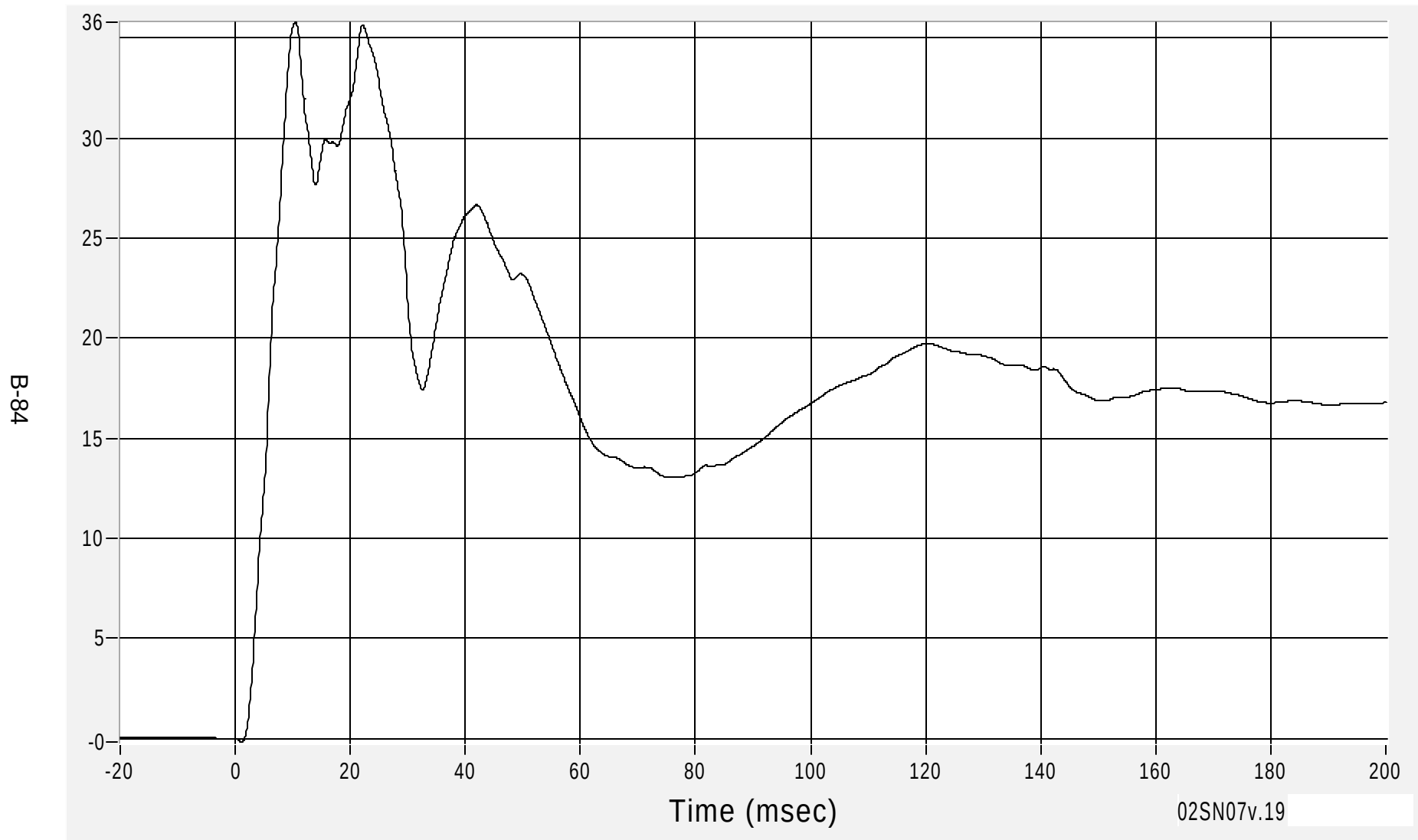
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Left Middle B-Pillar (Y) Velocity

Max 35.8 km/h at 10.5 msec

Min -0.2 km/h at 1.1 msec

Velocity (km/h) CFC180



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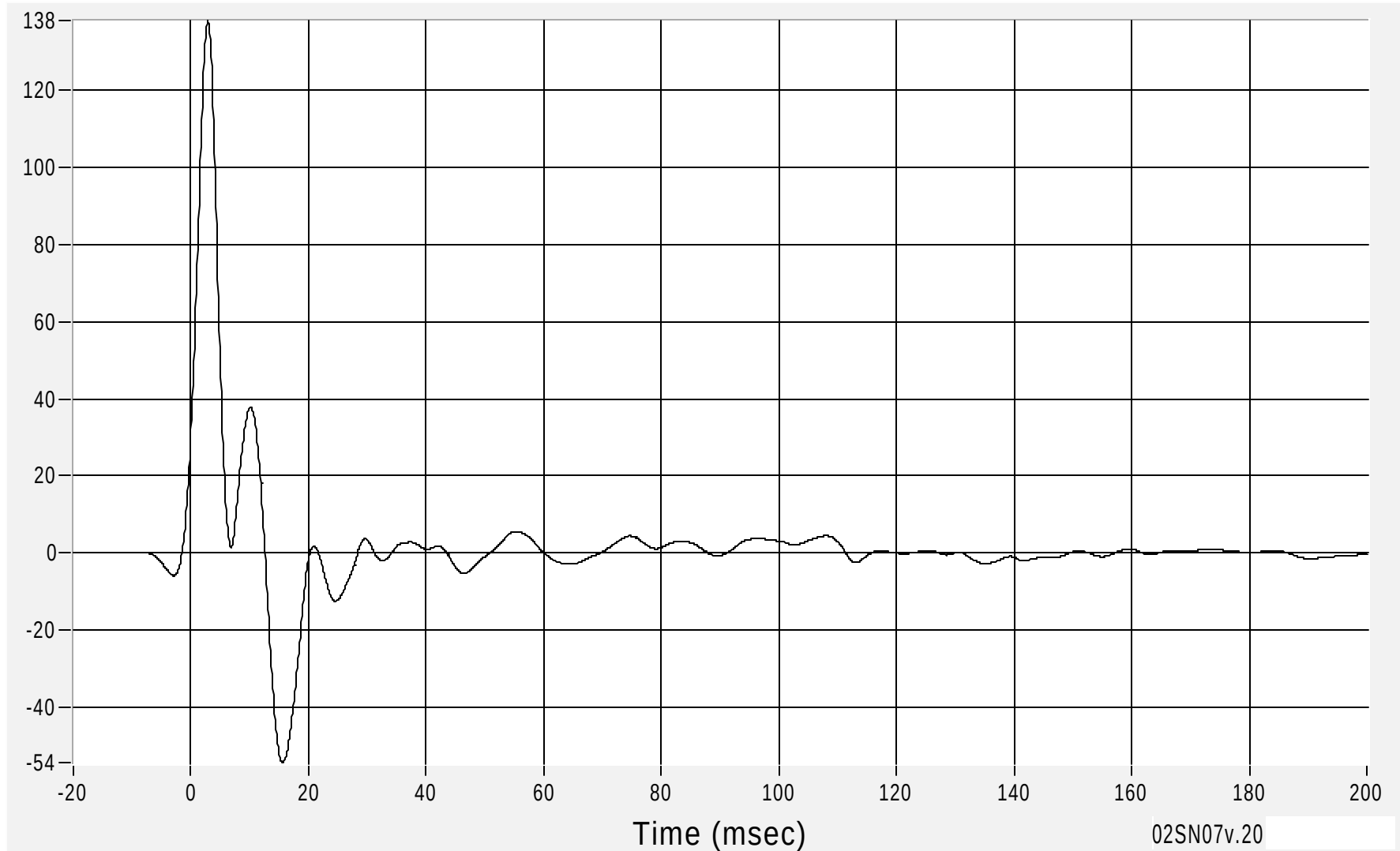
Left Lower A-Pillar (Y) Acceleration

Max 138.1 G's at 2.9 msec

Min -54.4 G's at 15.6 msec

Acceleration (G's) CFC60

B-85



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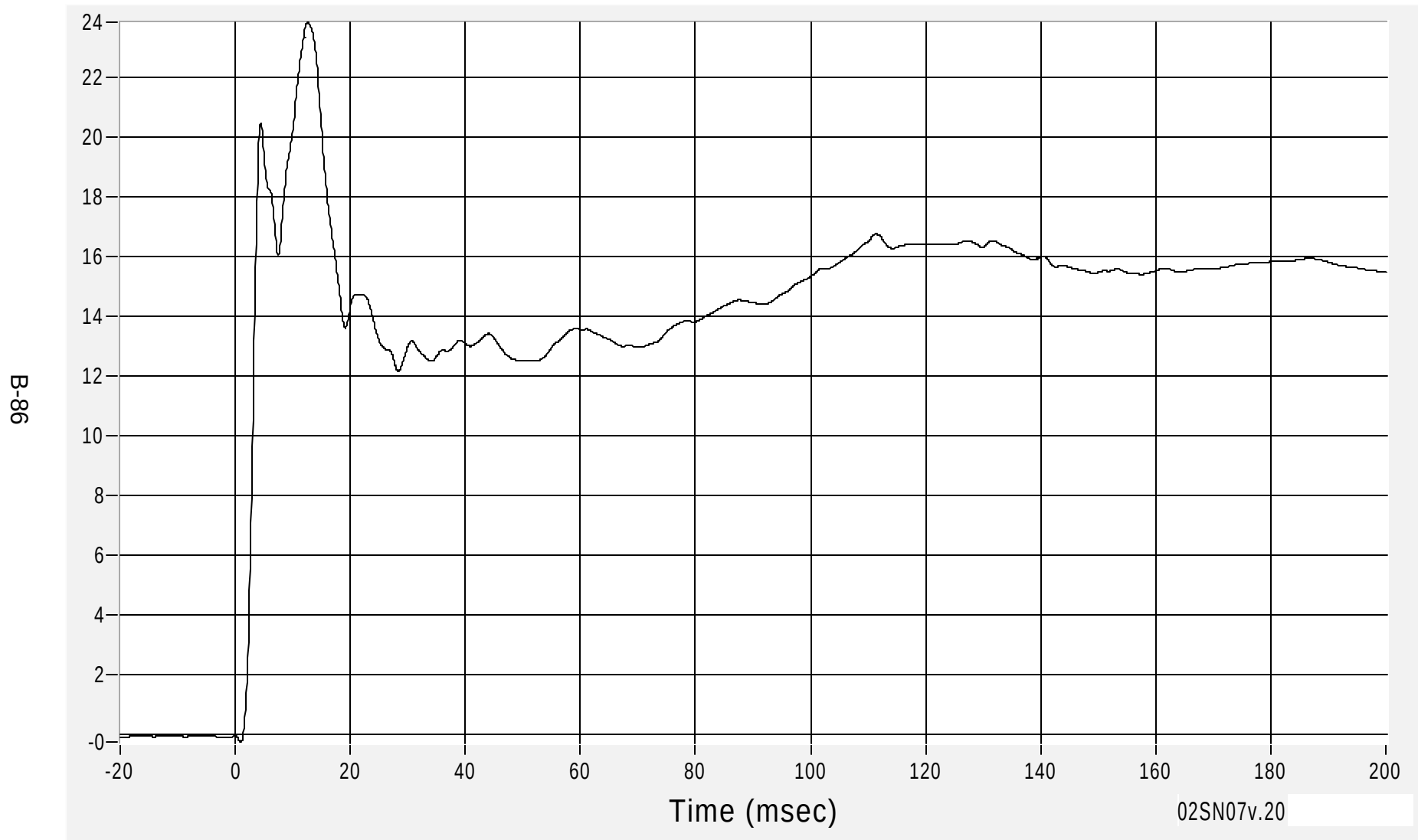
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Left Lower A-Pillar (Y) Velocity

Max 23.8 km/h at 12.6 msec

Velocity (km/h) CFC180

Min -0.2 km/h at 1.0 msec



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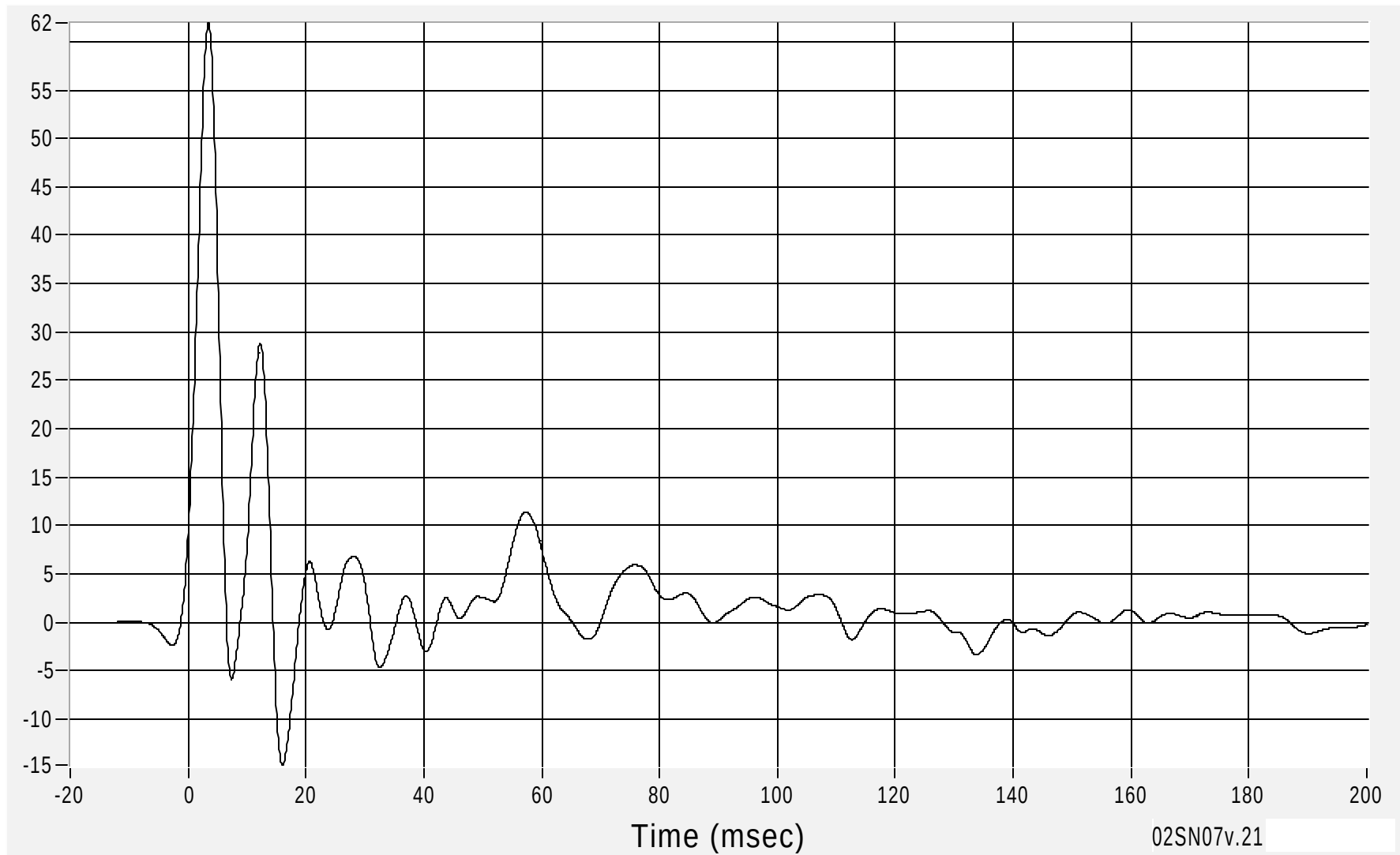
Left Middle A-Pillar (Y) Acceleration

Max 61.9 G's at 3.4 msec

Acceleration (G's) CFC60

Min -14.7 G's at 16.0 msec

B-87



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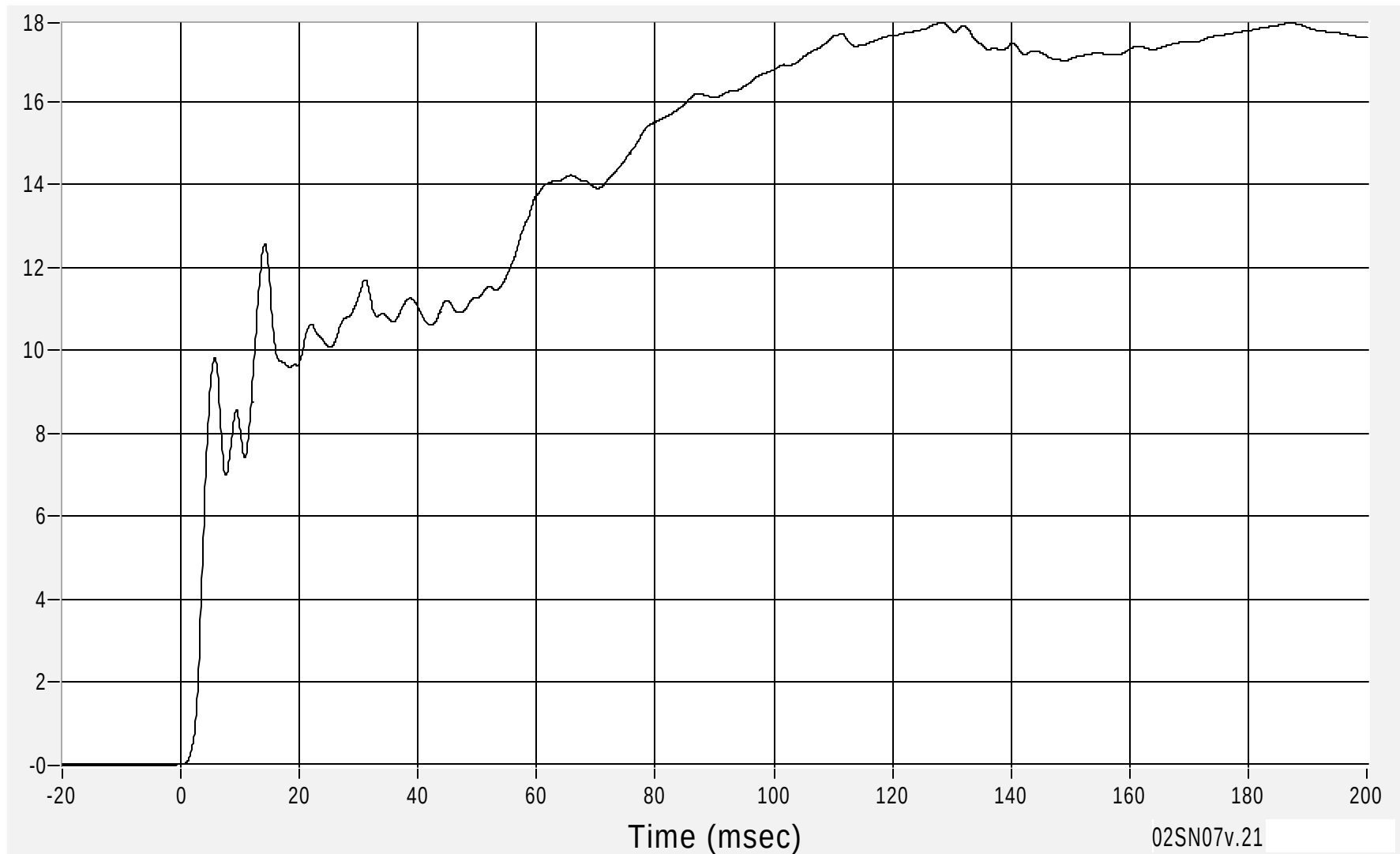
Left Middle A-Pillar (Y) Velocity

Max 17.9 km/h at 187.0 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.0 msec

B-88



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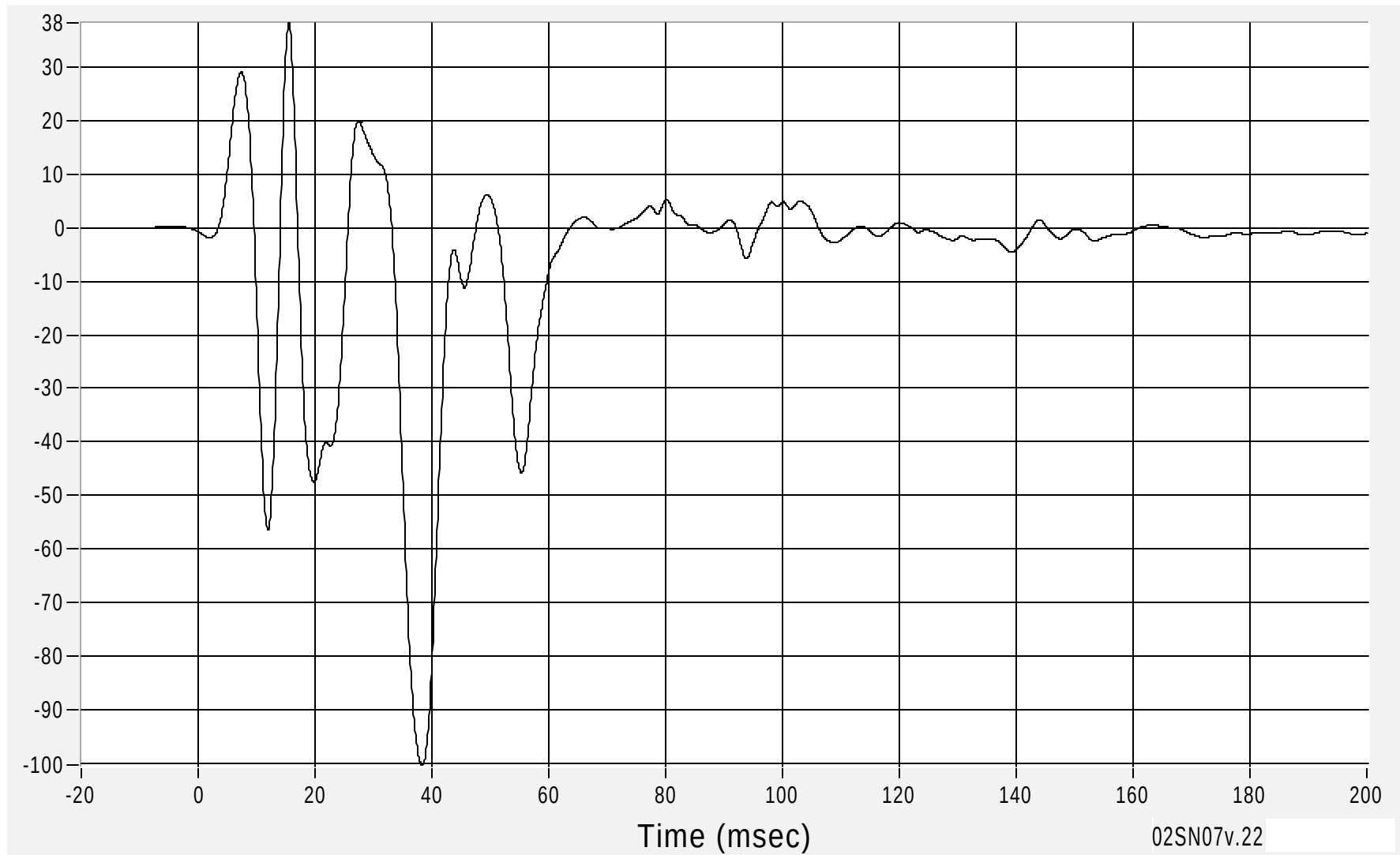
Front Seat Track (Y) Acceleration

Max 38.1 G's at 15.5 msec

Acceleration (G's) CFC60

Min -100.2 G's at 38.3 msec

B-89



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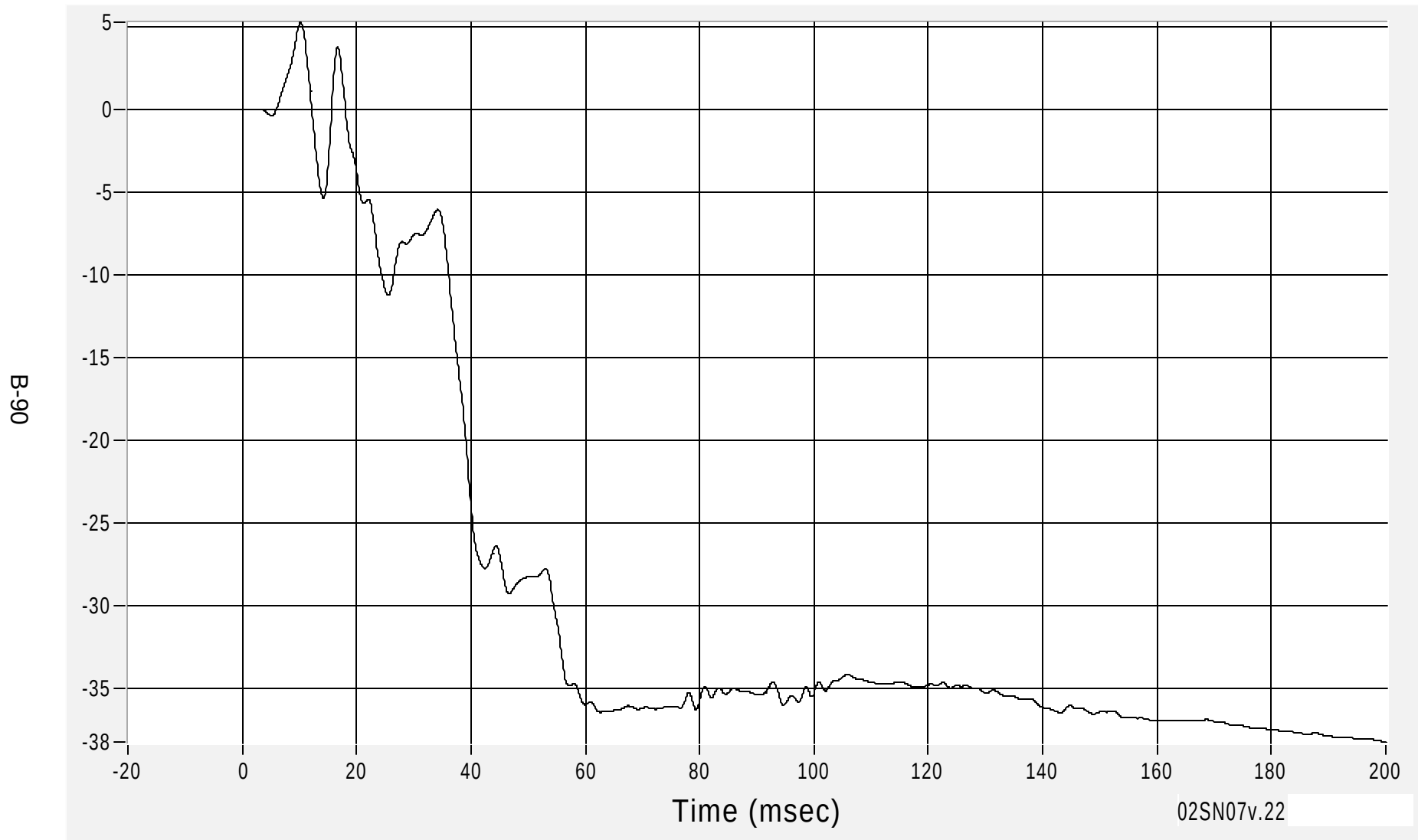
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Front Seat Track (Y) Velocity

Max 5.3 km/h at 10.2 msec

Velocity (km/h) CFC180

Min -38.2 km/h at 199.9 msec



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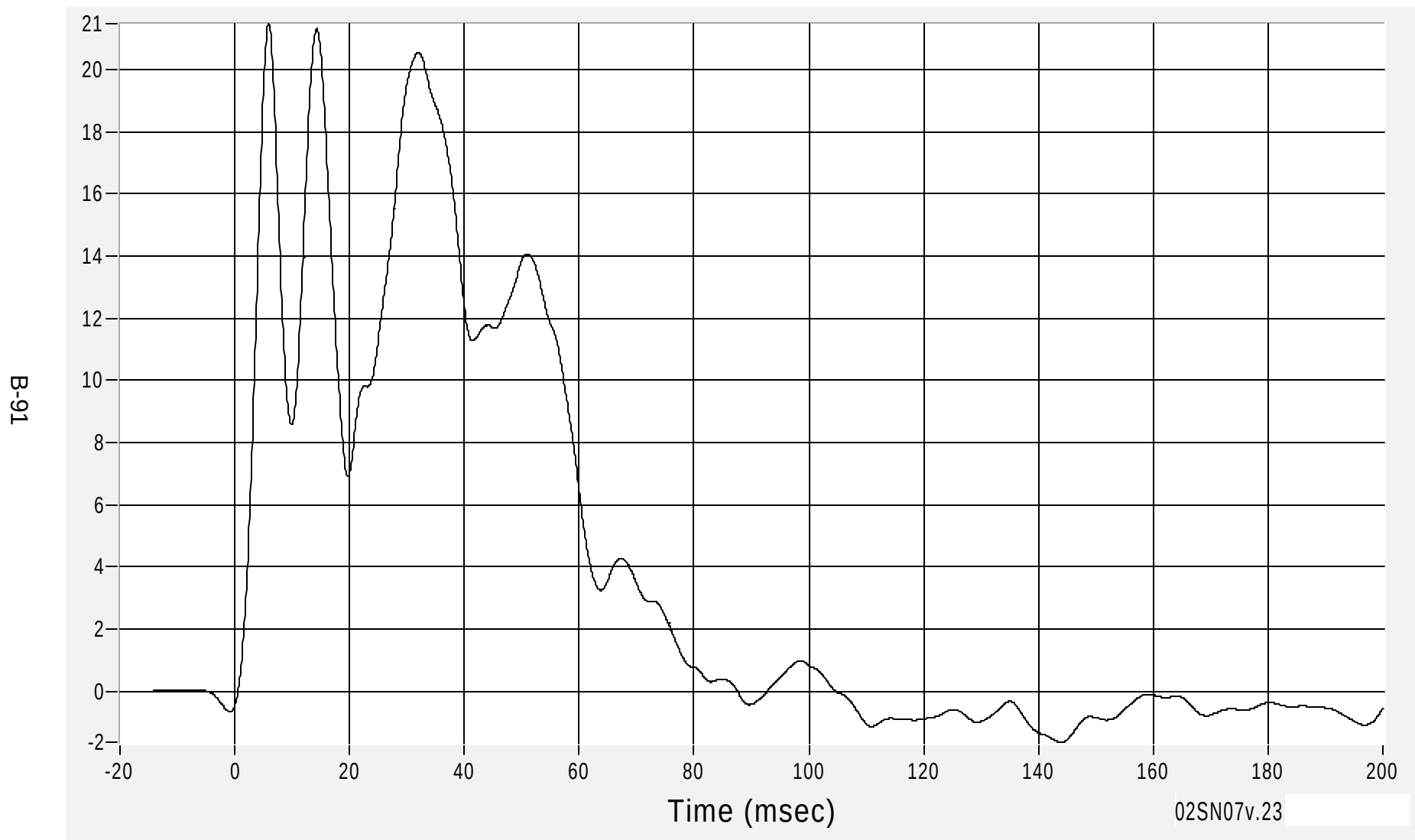
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Rear Seat Track (Y) Acceleration

Max 21.5 G's at 5.9 msec

Acceleration (G's) CFC60

Min -1.6 G's at 143.9 msec



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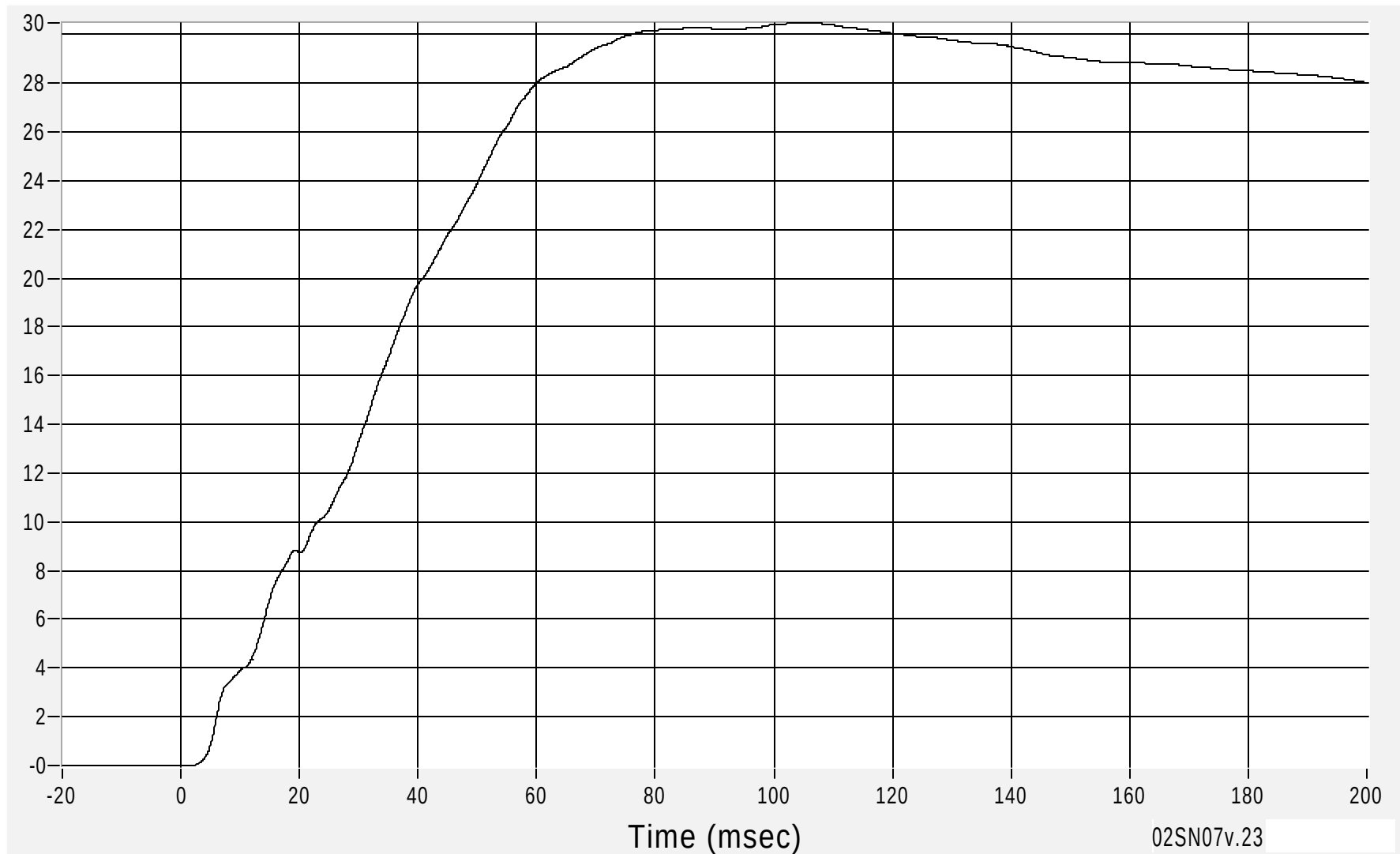
Rear Seat Track (Y) Velocity

Velocity (km/h) CFC180

Max 30.5 km/h at 103.6 msec

Min 0.0 km/h at 1.5 msec

B-92



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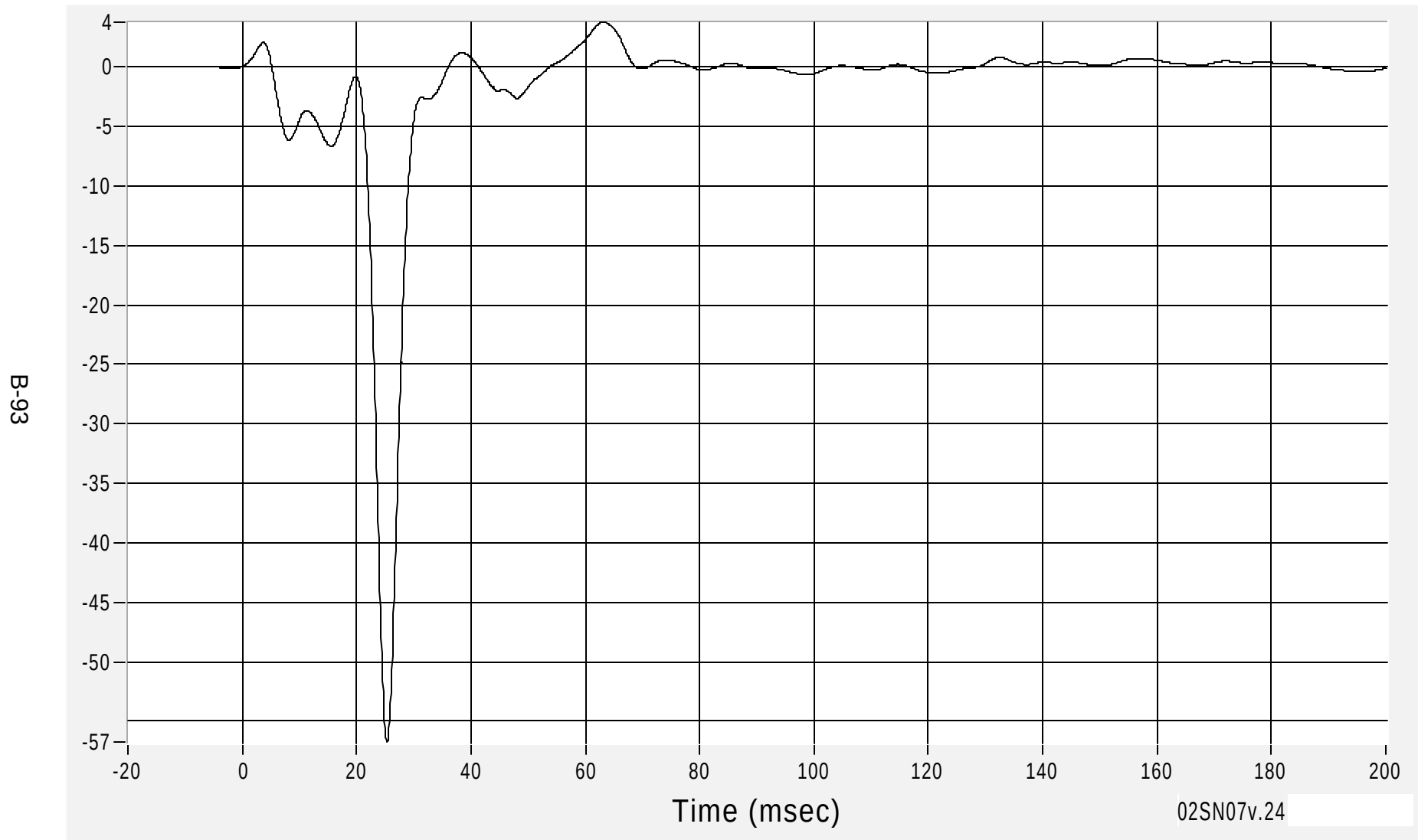
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Vehicle Center of Gravity (X) Acceleration

Max 3.8 G's at 63.1 msec

Acceleration (G's) CFC60

Min -56.7 G's at 25.3 msec



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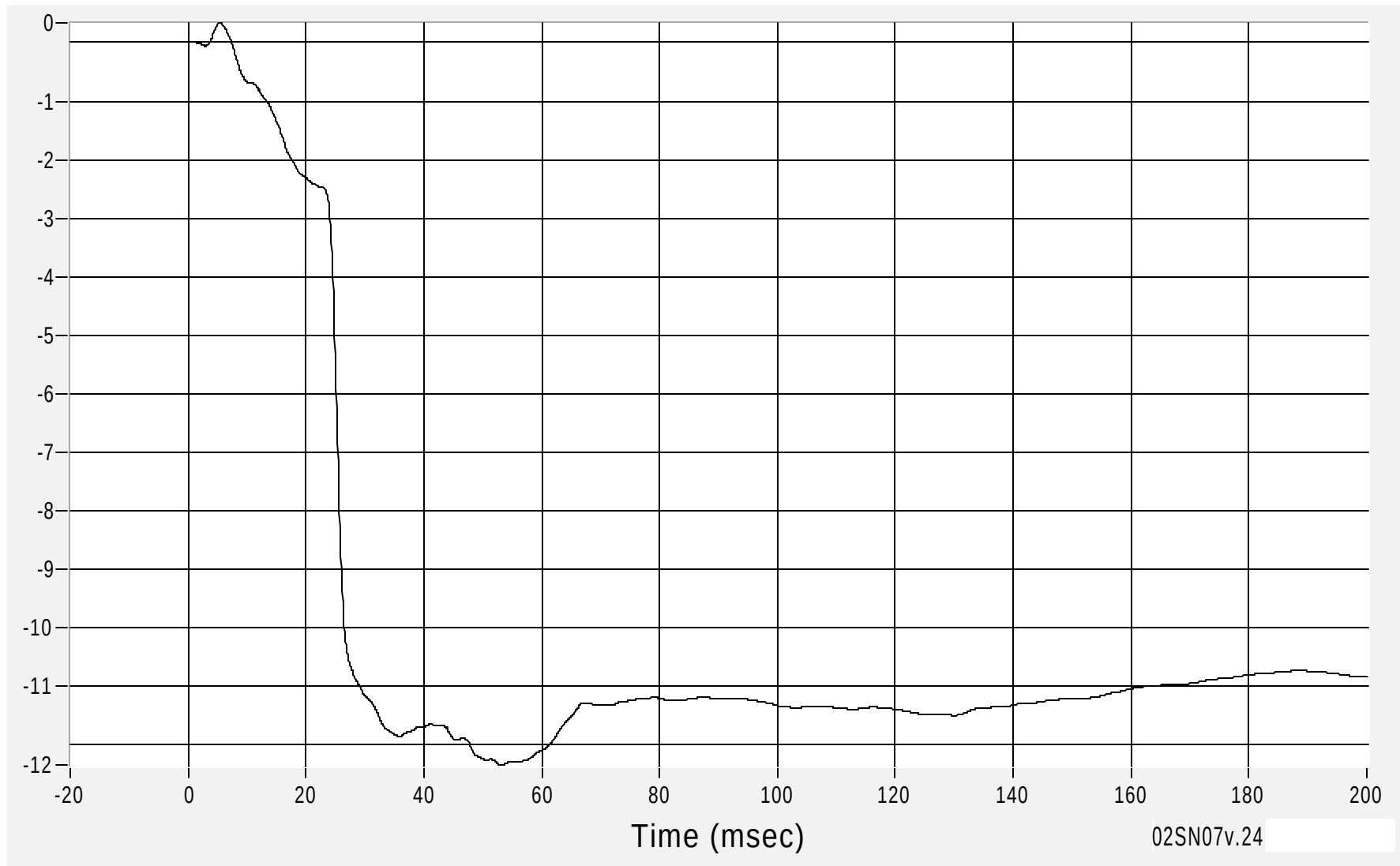
Vehicle Center of Gravity (X) Velocity

Max 0.3 km/h at 5.4 msec

Min -12.3 km/h at 53.1 msec

Velocity (km/h) CFC180

B-94



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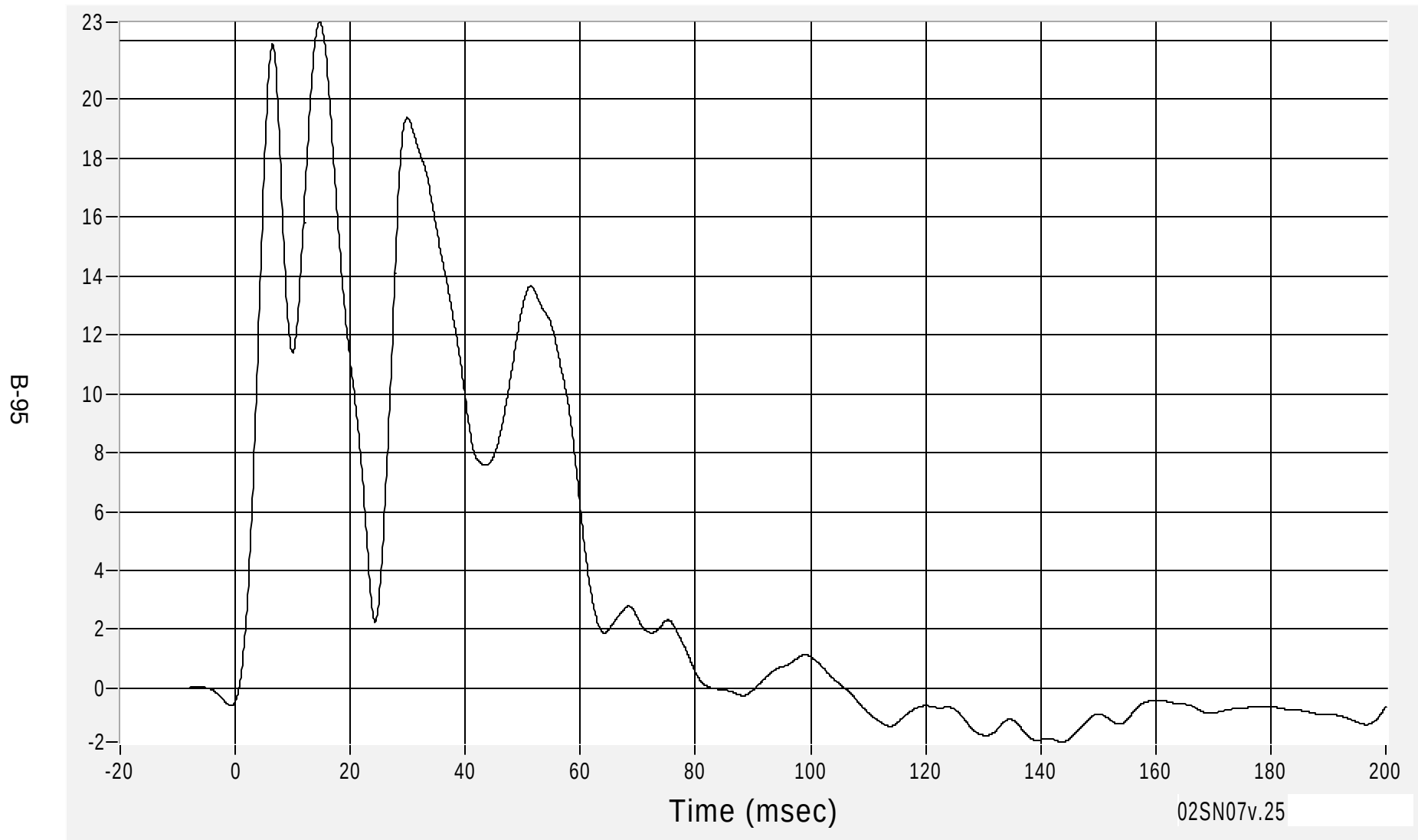
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Vehicle Center of Gravity (Y) Acceleration

Max 22.6 G's at 14.6 msec

Acceleration (G's) CFC60

Min -1.8 G's at 143.8 msec



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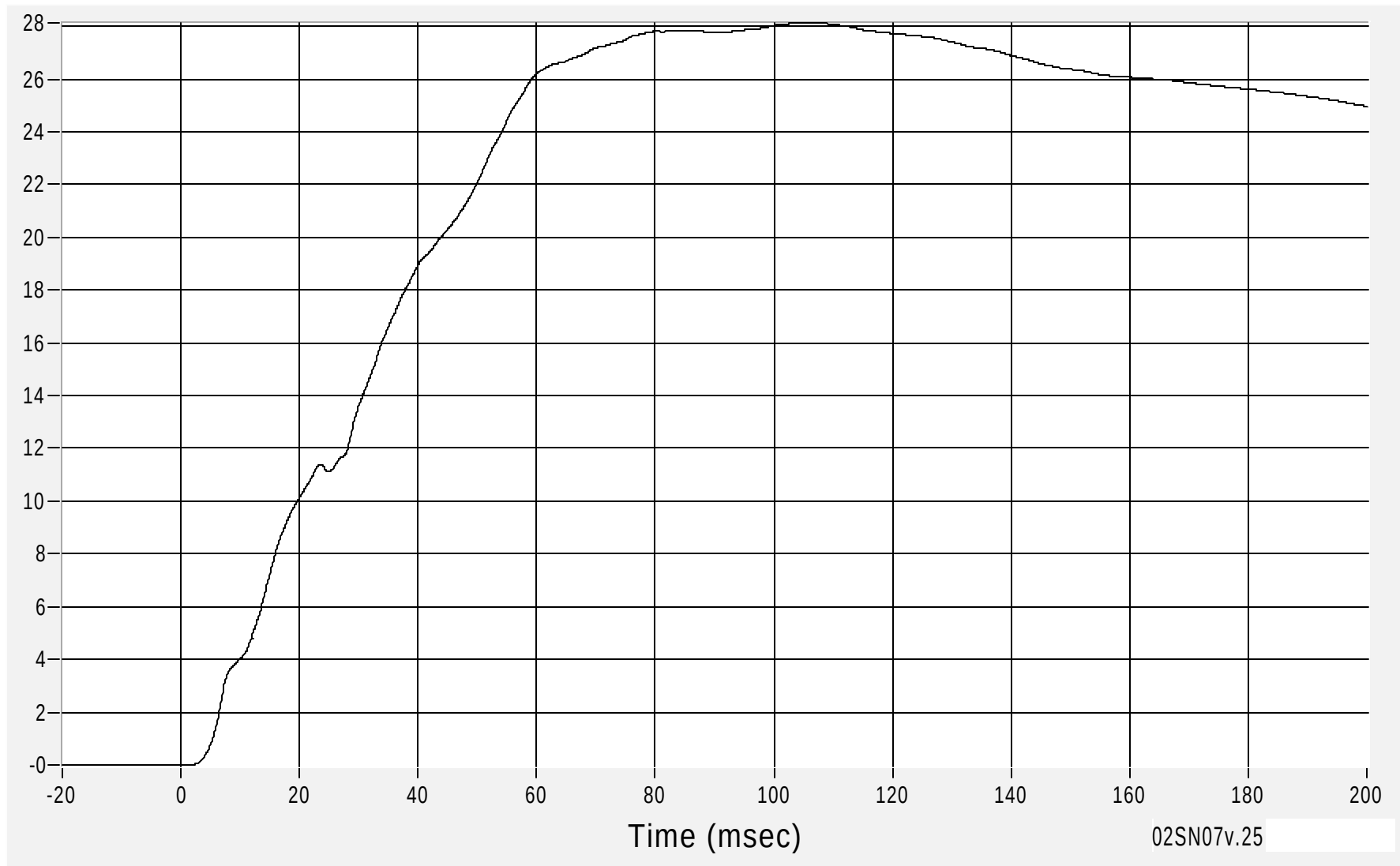
Vehicle Center of Gravity (Y) Velocity

Max 28.1 km/h at 105.5 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 1.4 msec

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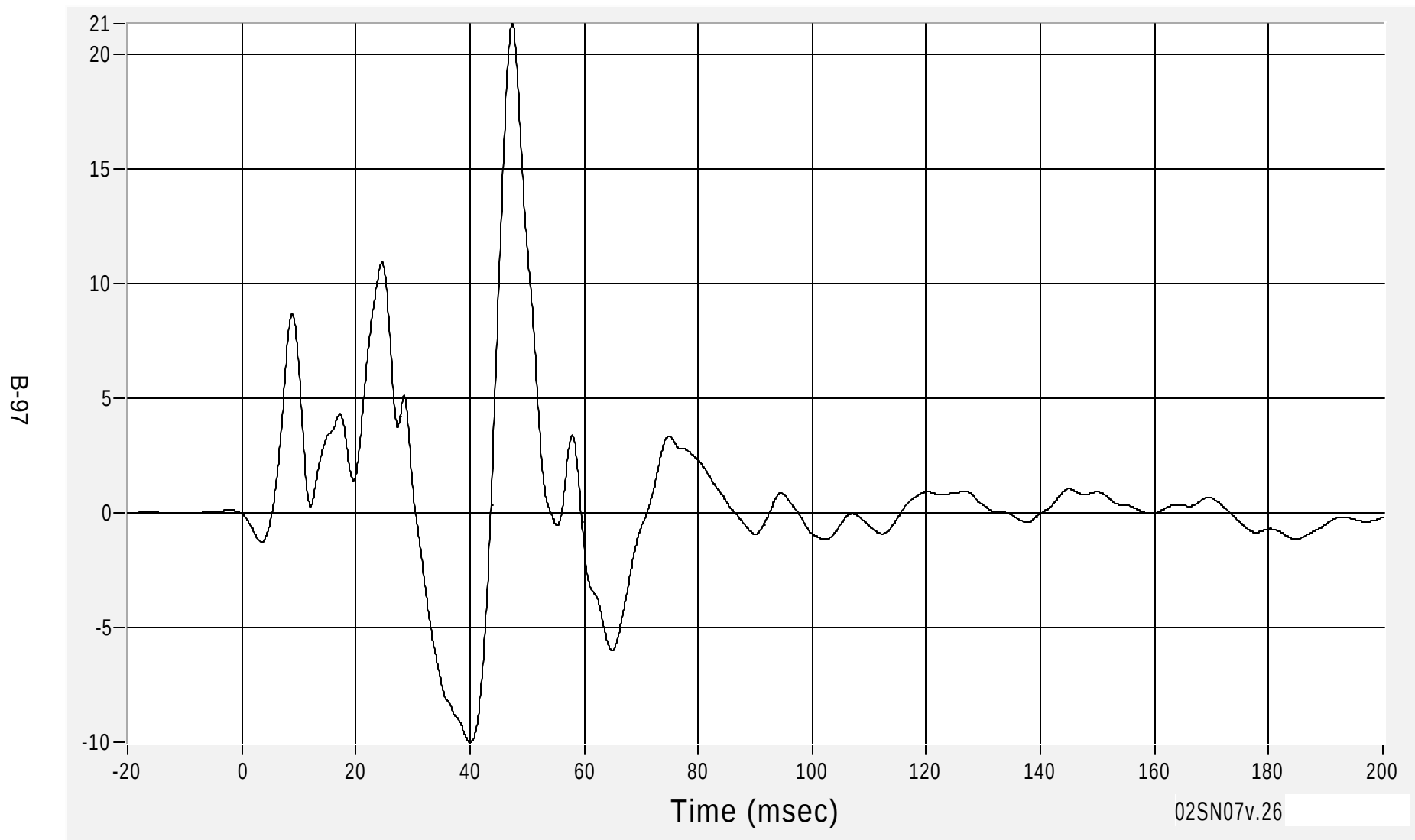
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Vehicle Center of Gravity (Z) Acceleration

Max 21.3 G's at 47.4 msec

Acceleration (G's) CFC60

Min -10.0 G's at 40.1 msec



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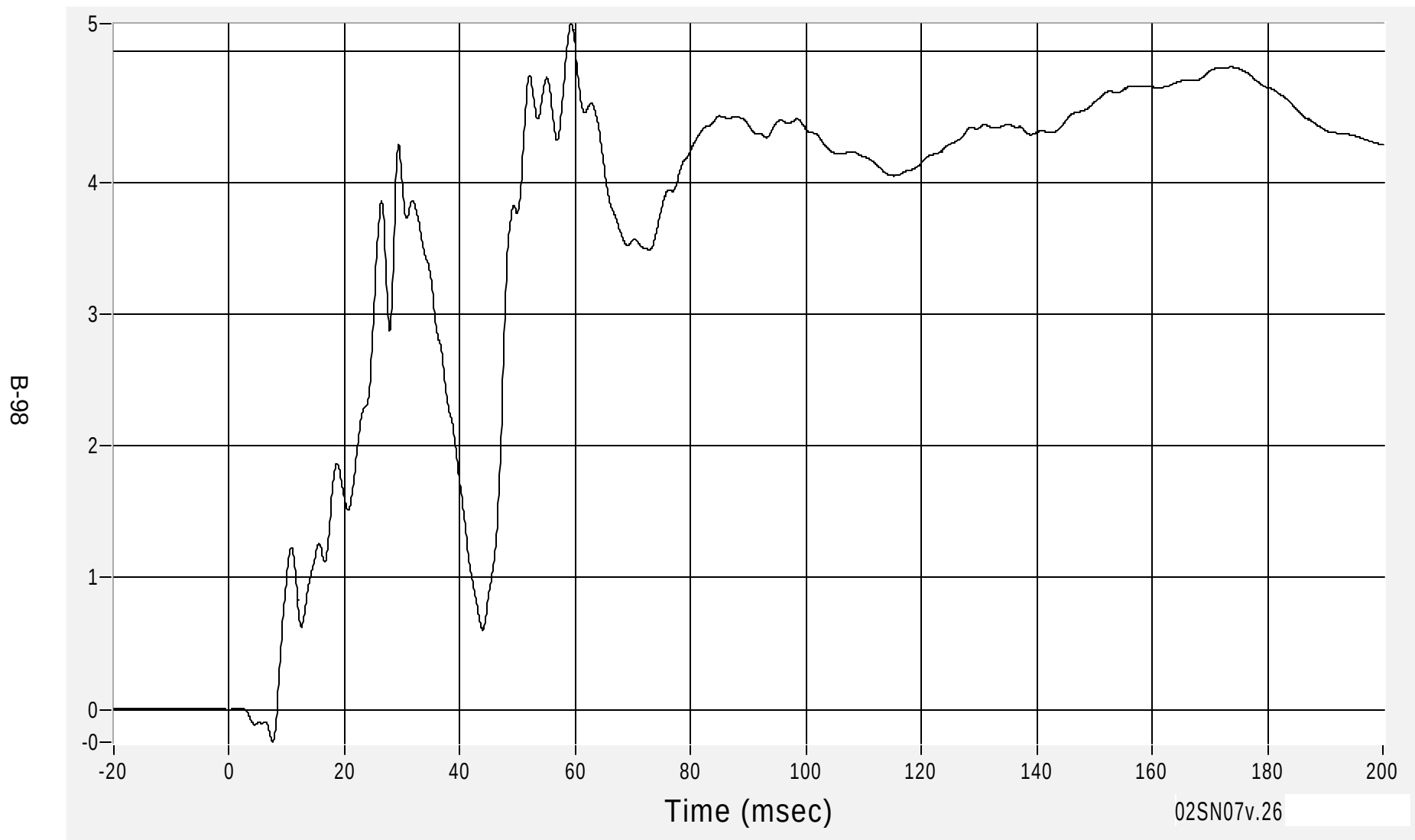
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Vehicle Center of Gravity (Z) Velocity

Max 5.2 km/h at 59.3 msec

Velocity (km/h) CFC180

Min -0.2 km/h at 7.5 msec



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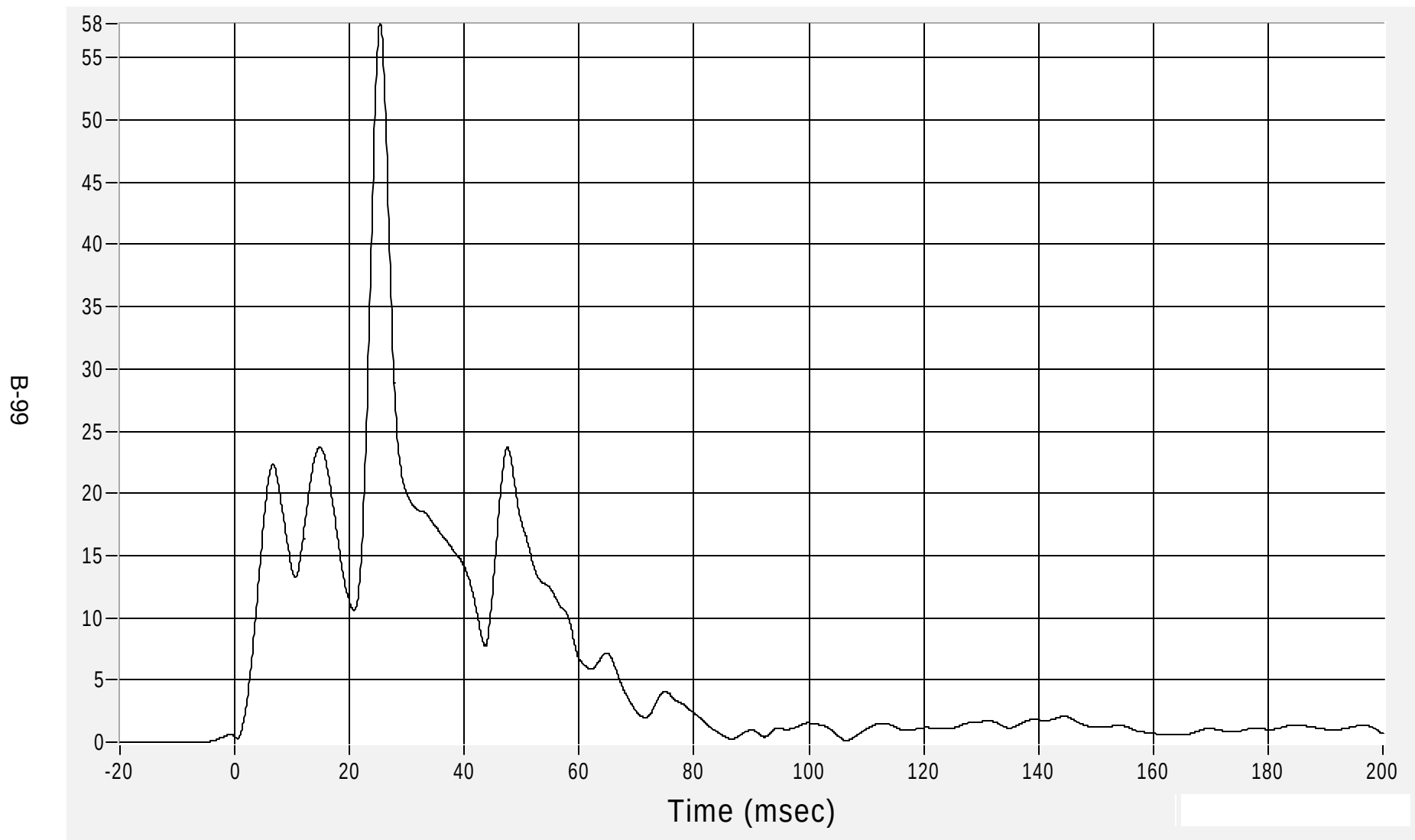
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Vehicle Center of Gravity Resultant Acceleration

Max 57.8 G's at 25.3 msec

Acceleration (G's) CFC60

Min 0.1 G's at 106.5 msec



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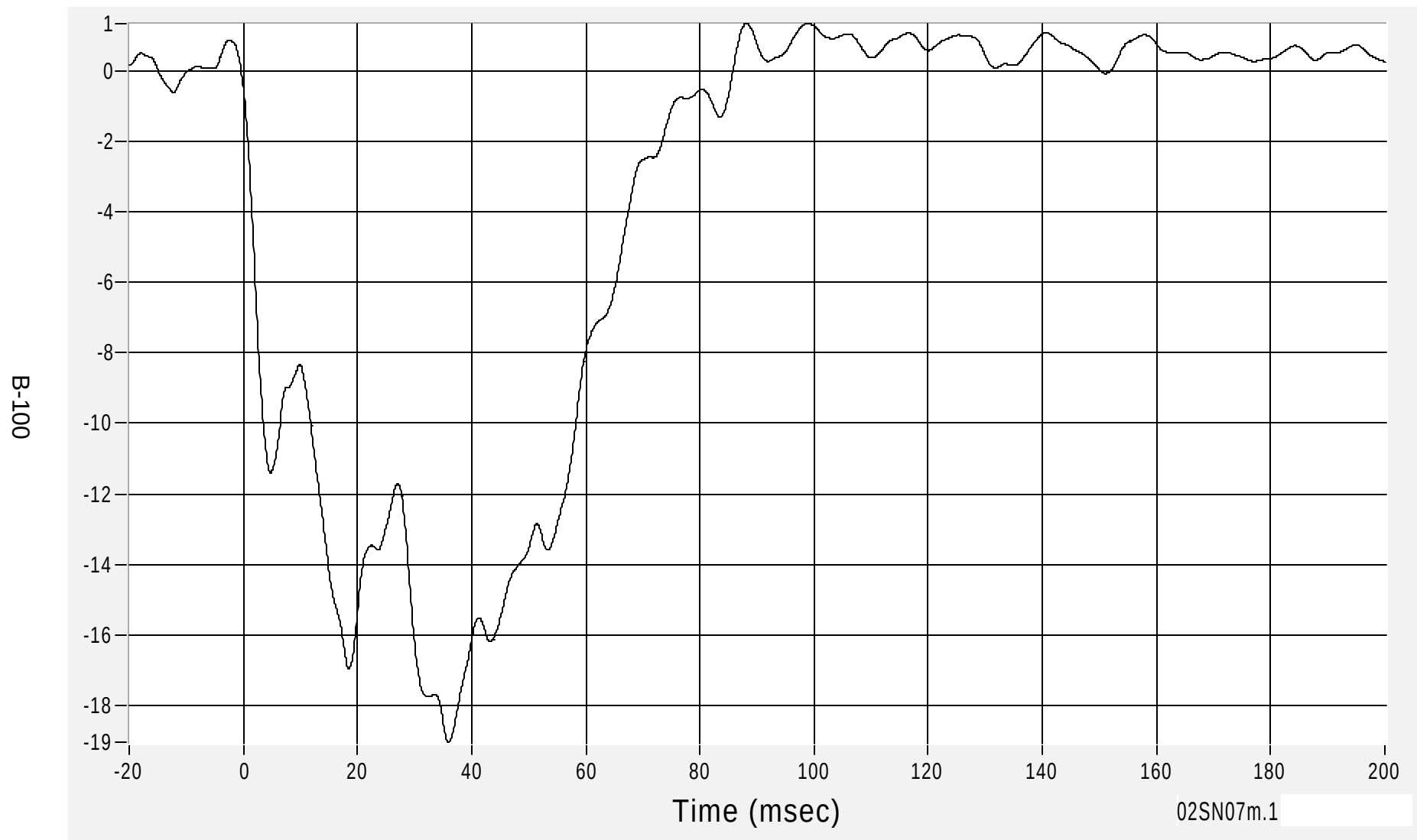
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MDB Center of Gravity (X) Acceleration

Max 1.3 G's at 88.2 msec

Acceleration (G's) CFC60

Min -19.0 G's at 36.0 msec



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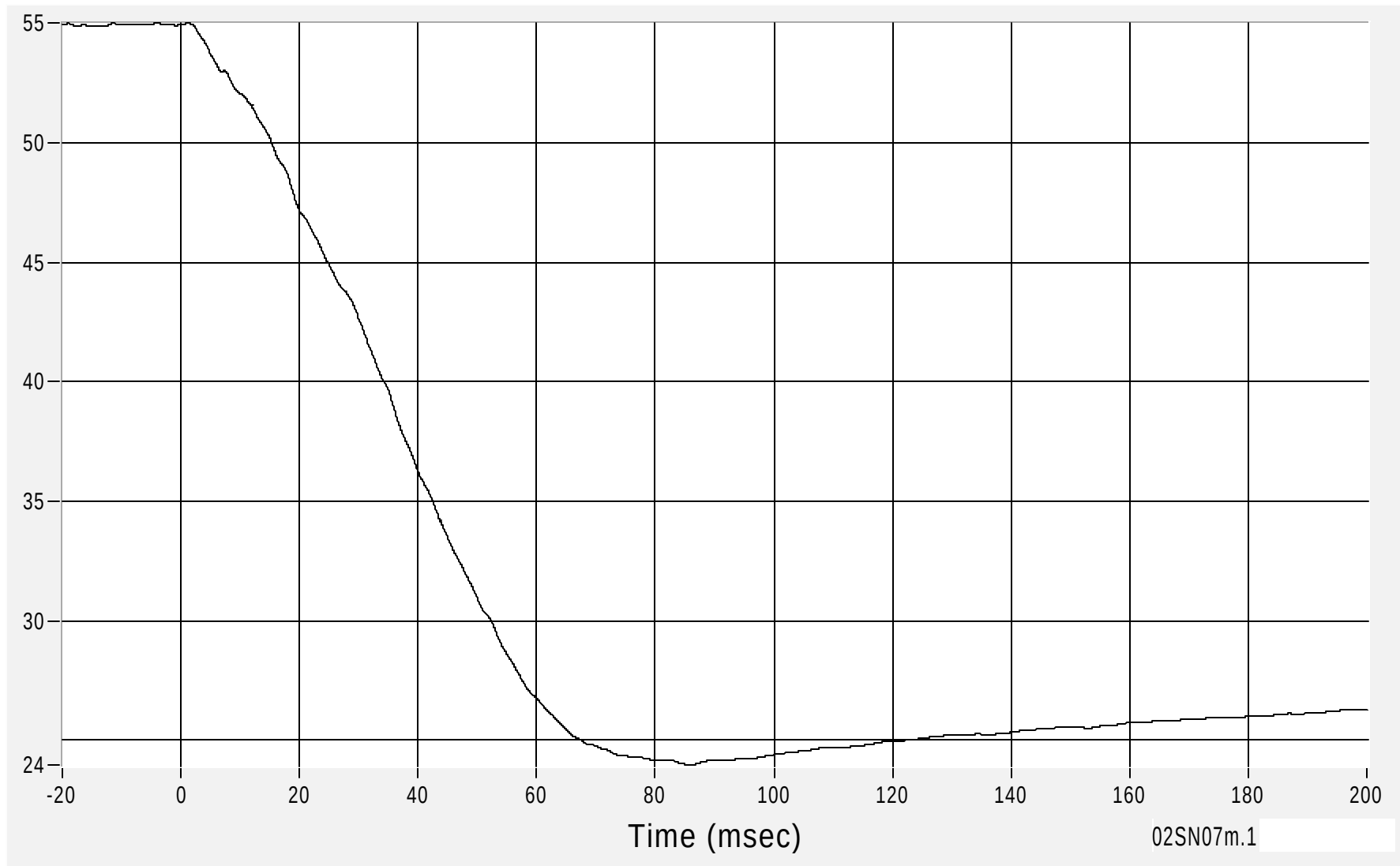
MDB Center of Gravity (X) Velocity

Max 55.0 km/h at 1.2 msec

Velocity (km/h) CFC180

Min 24.0 km/h at 85.9 msec

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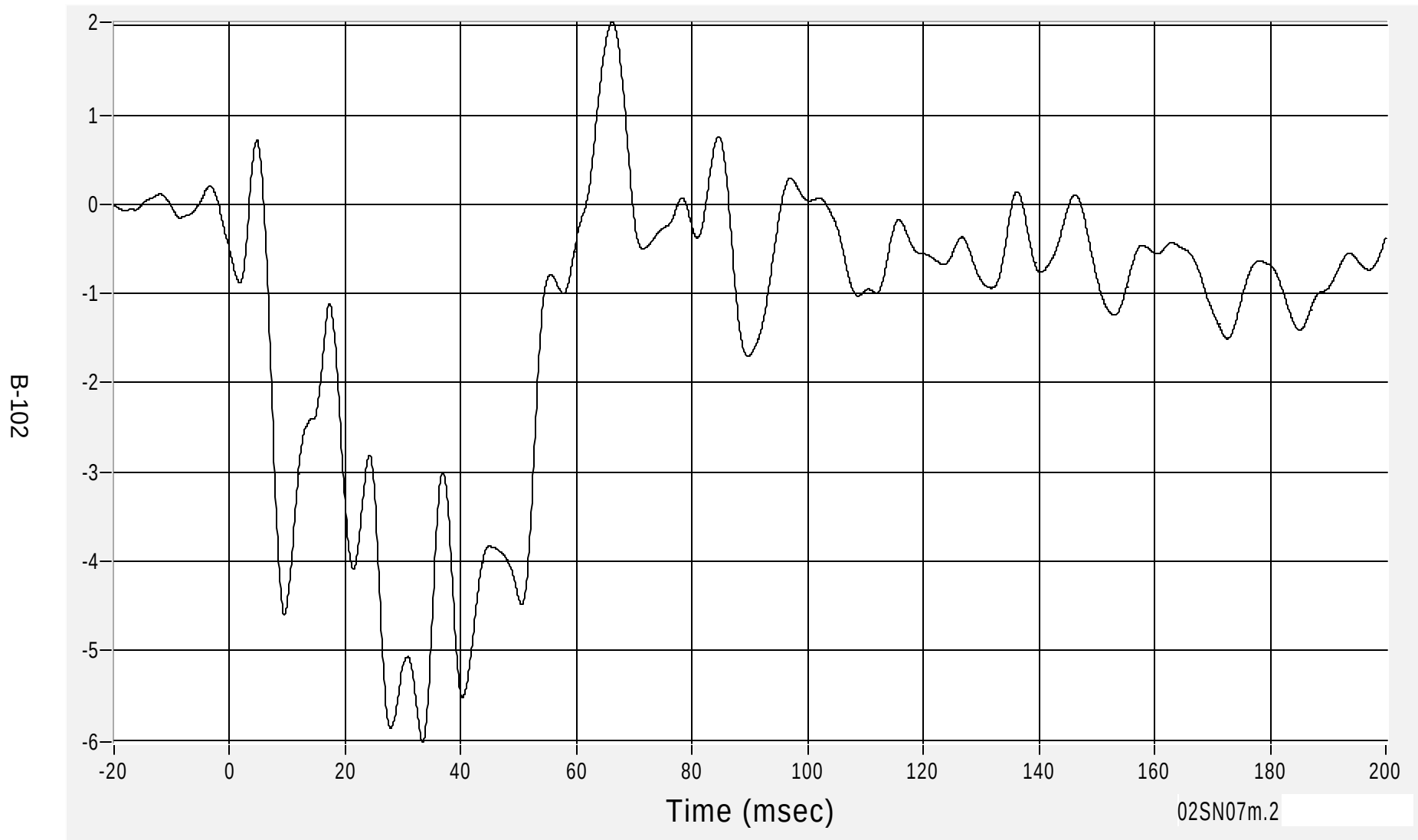
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MDB Center of Gravity (Y) Acceleration

Max 2.0 G's at 66.2 msec

Acceleration (G's) CFC60

Min -6.0 G's at 33.4 msec



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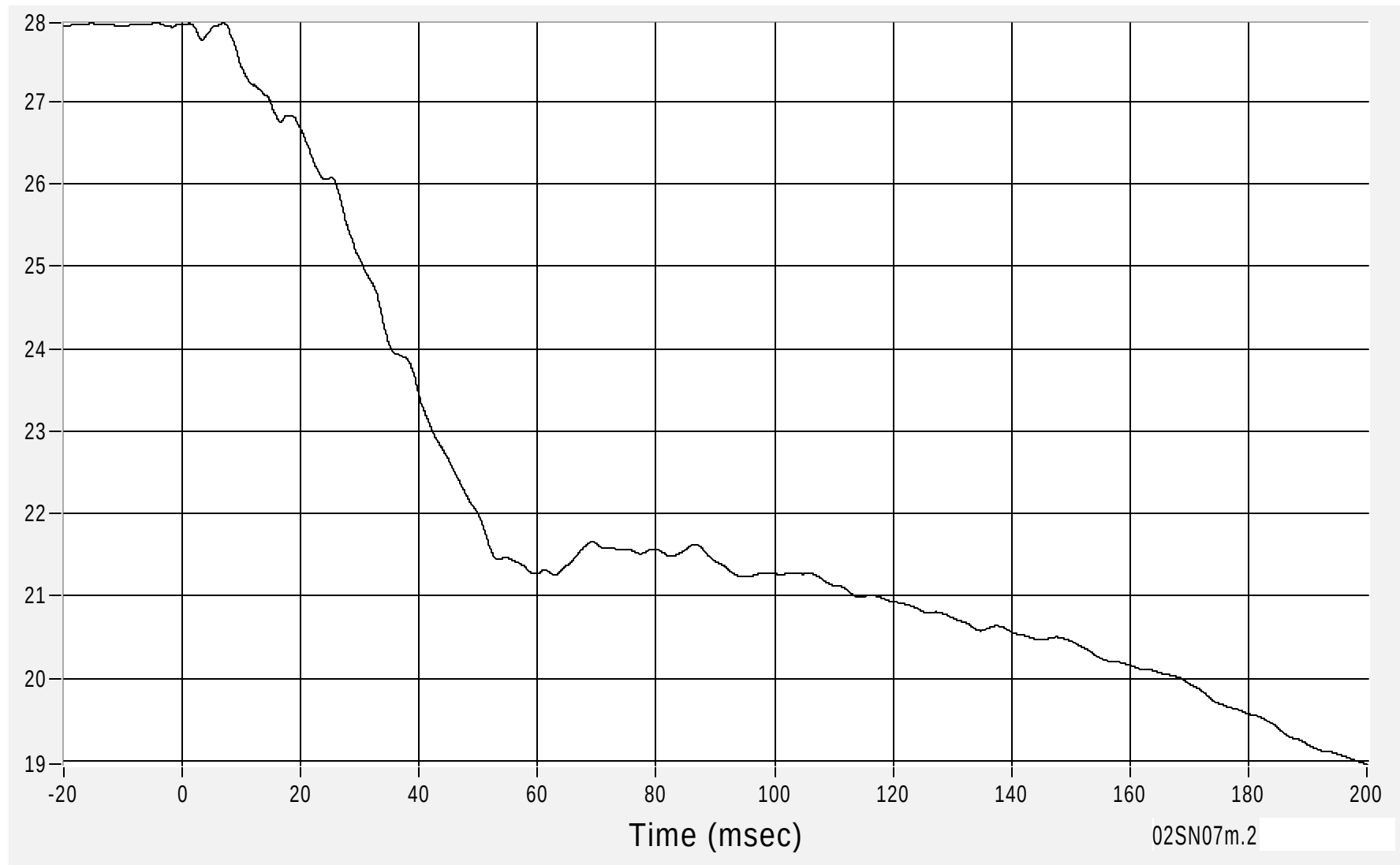
MDB Center of Gravity (Y) Velocity

Max 27.9 km/h at 7.1 msec

Velocity (km/h) CFC180

Min 19.0 km/h at 199.9 msec

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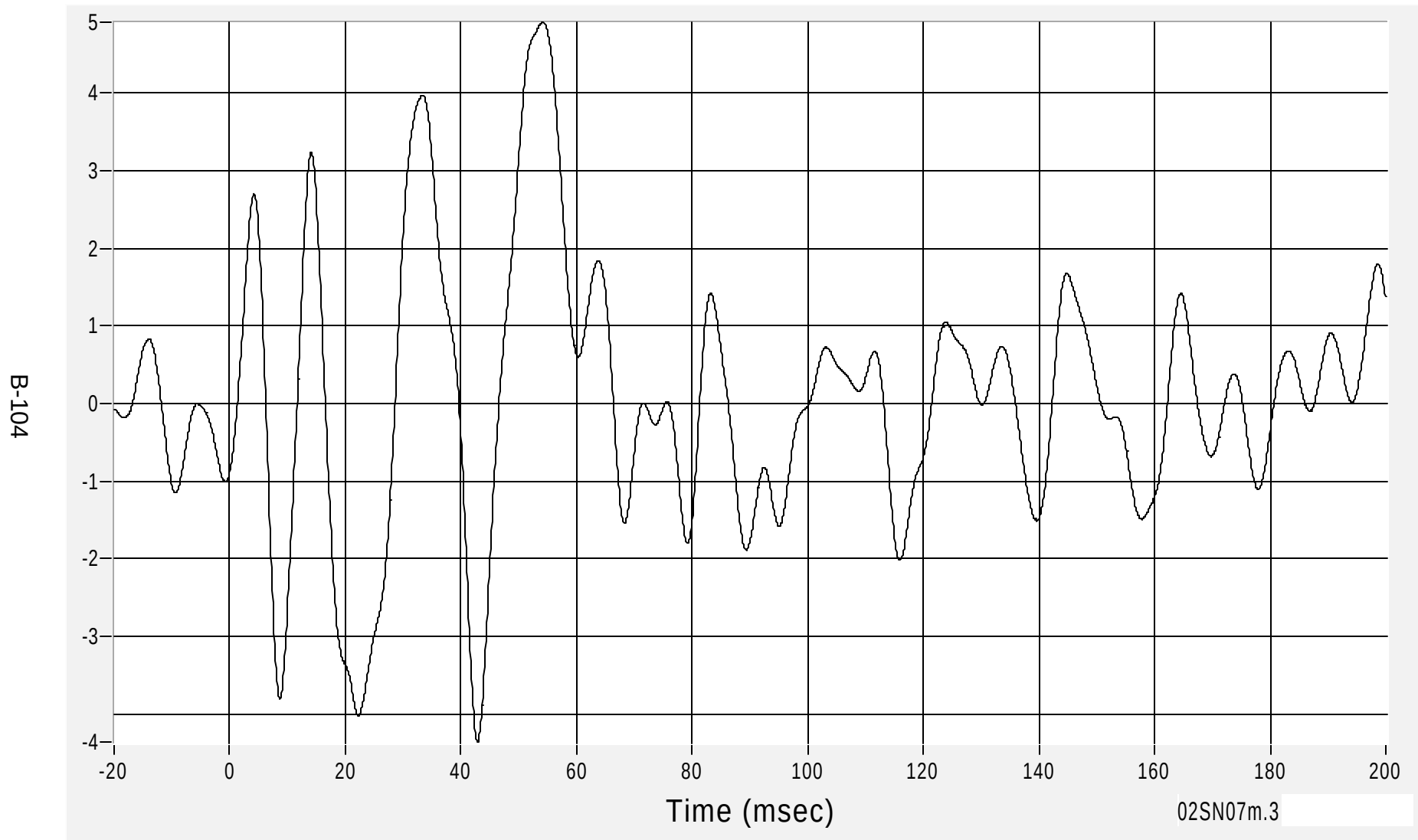
*Medical College of Wisconsin
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MDB Center of Gravity (Z) Acceleration

Max 4.9 G's at 54.2 msec

Acceleration (G's) CFC60

Min -4.4 G's at 42.9 msec



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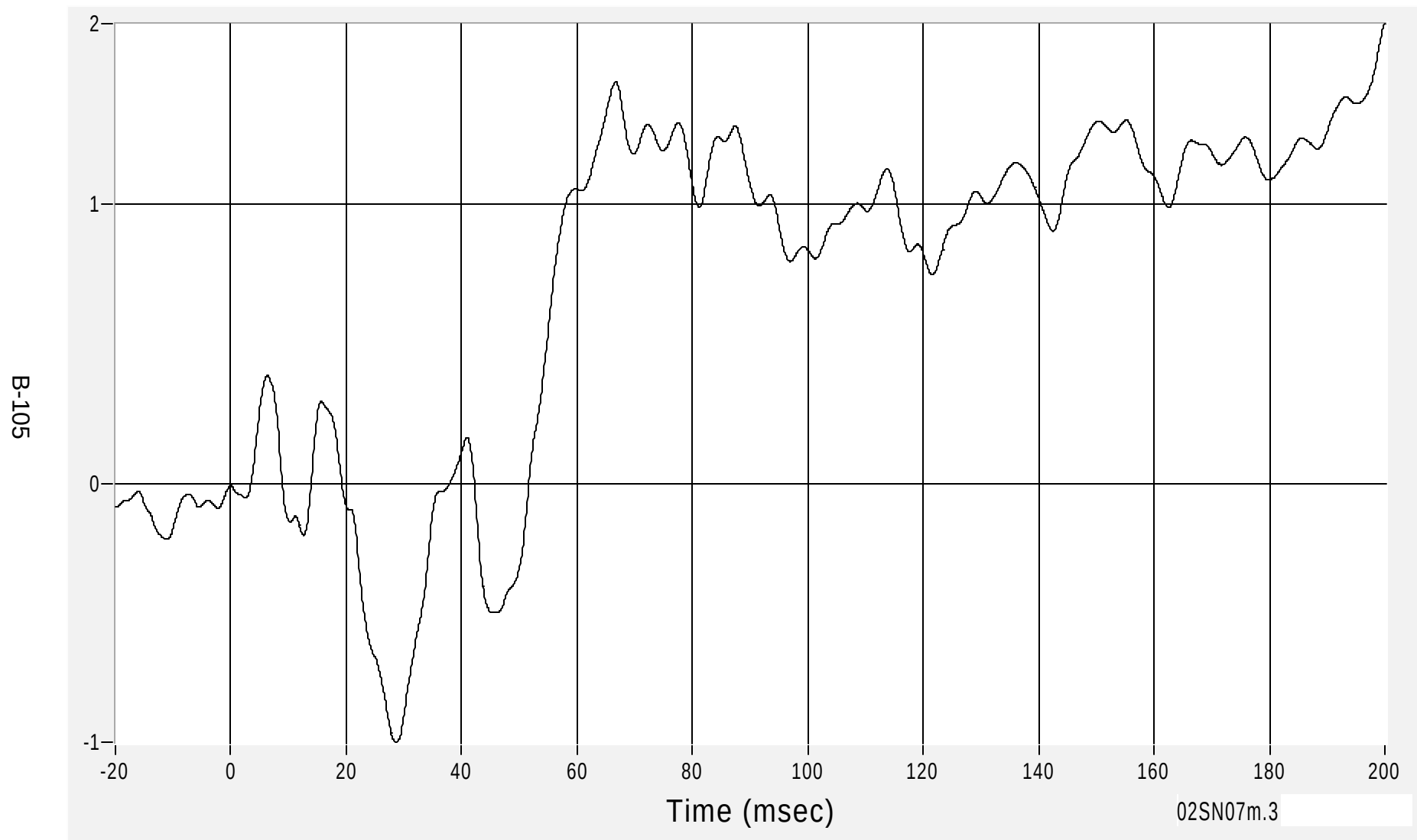
Medical College of Wisconsin
Vehicle Crashworthiness Lab

MDB Center of Gravity (Z) Velocity

Max 1.6 km/h at 199.9 msec

Velocity (km/h) CFC180

Min -0.9 km/h at 28.6 msec



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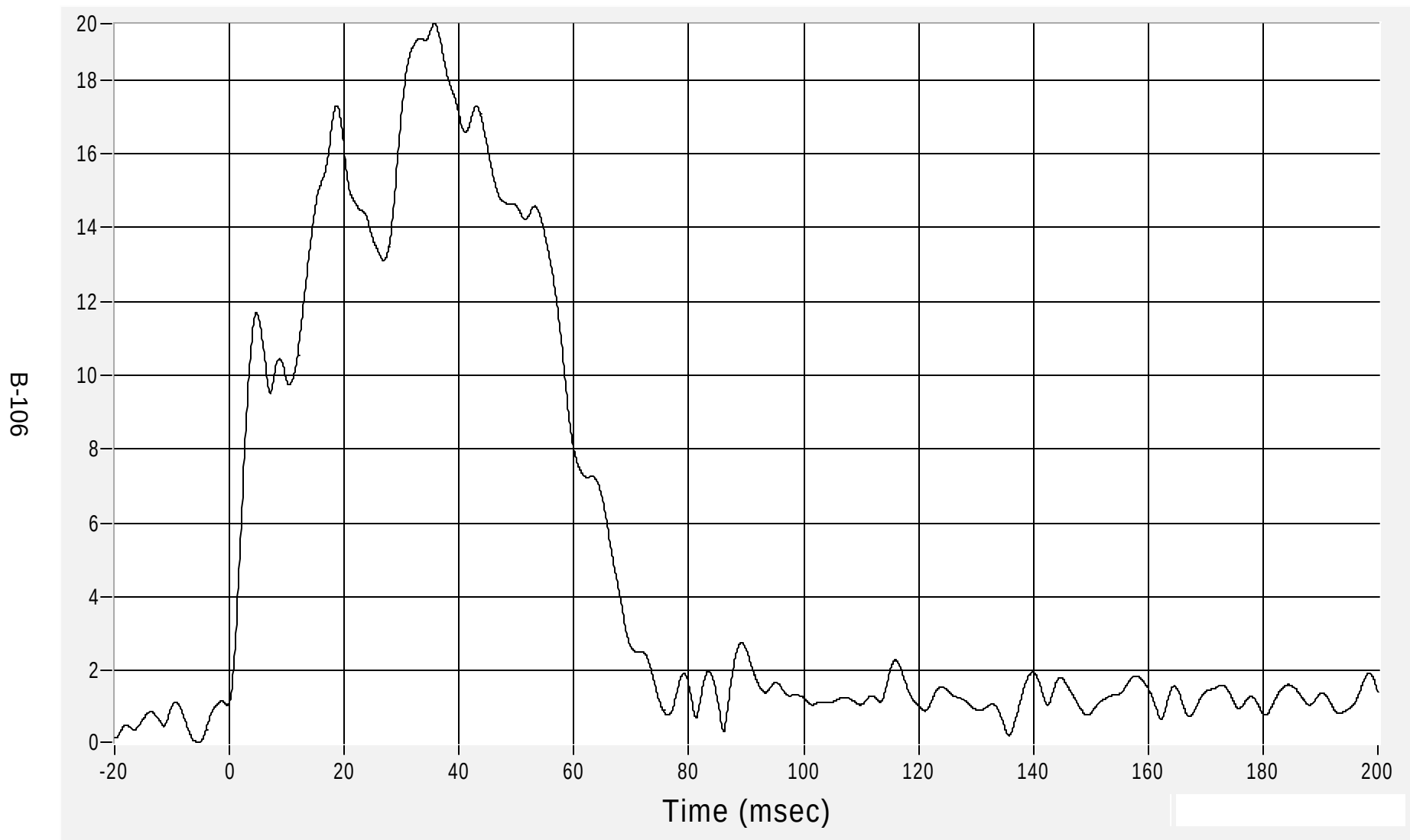
Medical College of Wisconsin
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MDB Center of Gravity Resultant Acceleration

Max 19.5 G's at 35.7 msec

Acceleration (G's) CFC60

Min 0.2 G's at 135.8 msec



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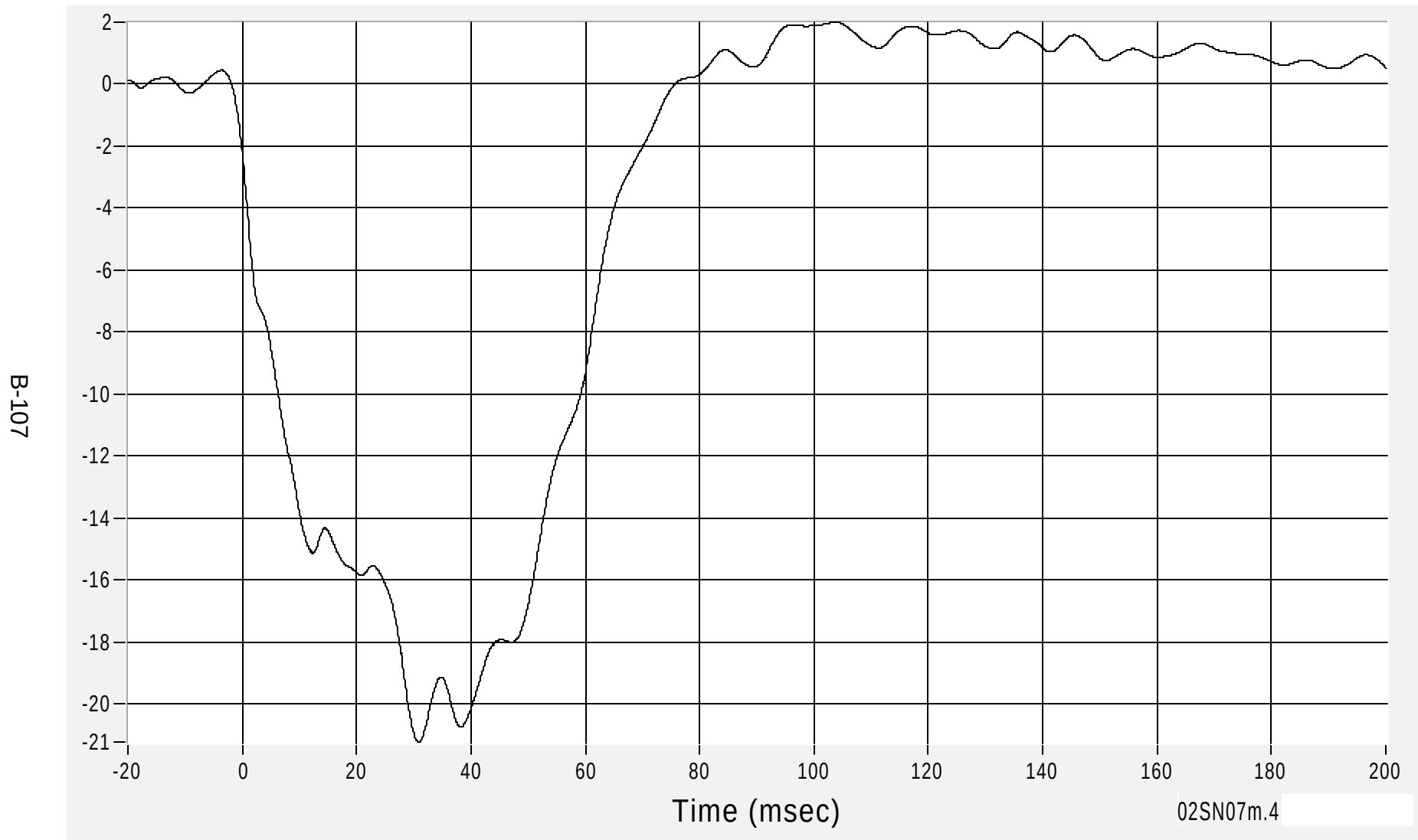
Medical College of Wisconsin
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MDB Rear (X) Acceleration

Max 2.0 G's at 103.7 msec

Acceleration (G's) CFC60

Min -21.2 G's at 30.9 msec



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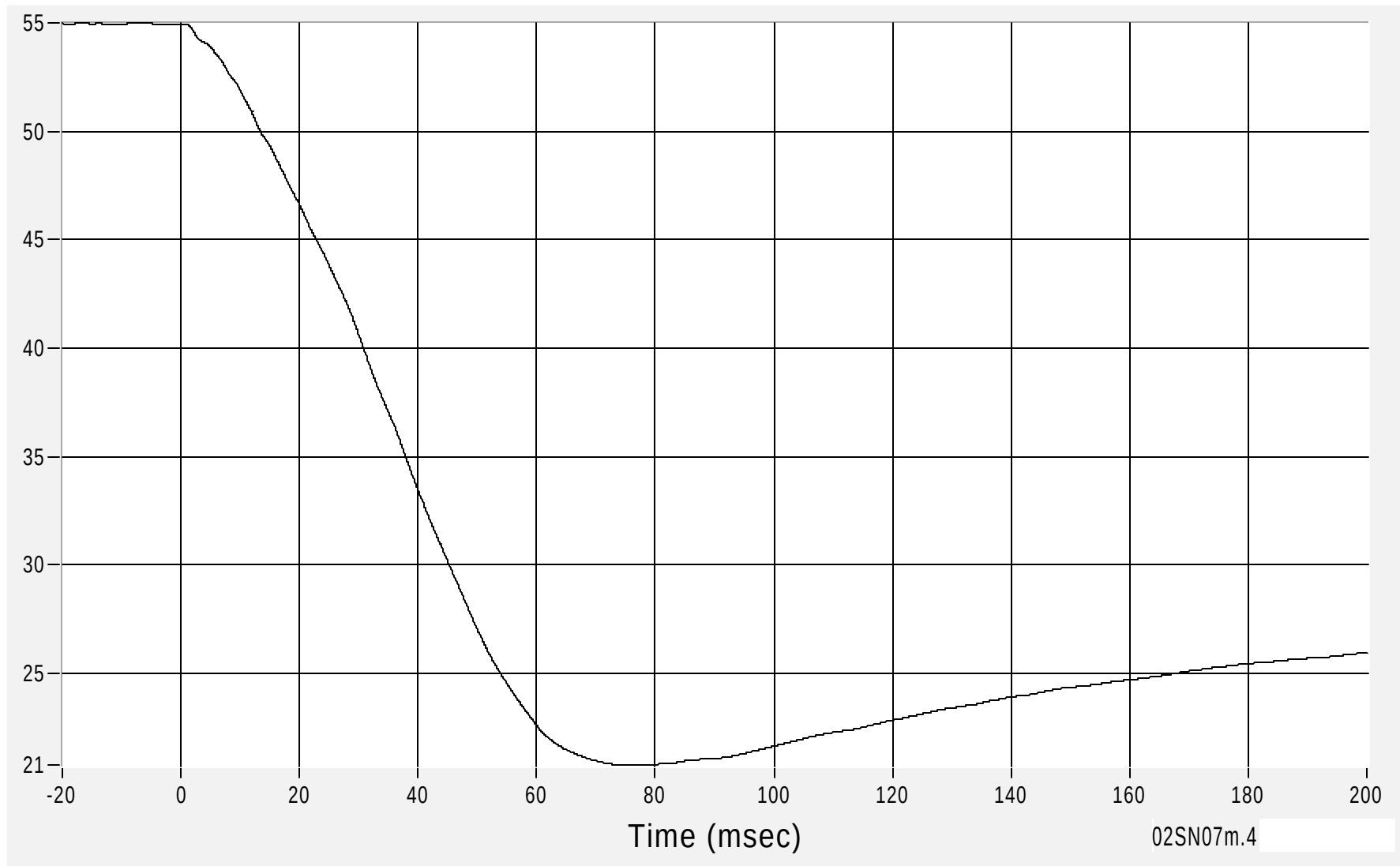
MDB Rear (X) Velocity

Velocity (km/h) CFC180

Max 54.9 km/h at 0.3 msec

Min 20.8 km/h at 75.0 msec

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18 April 2002

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Vehicle Crashworthiness Lab

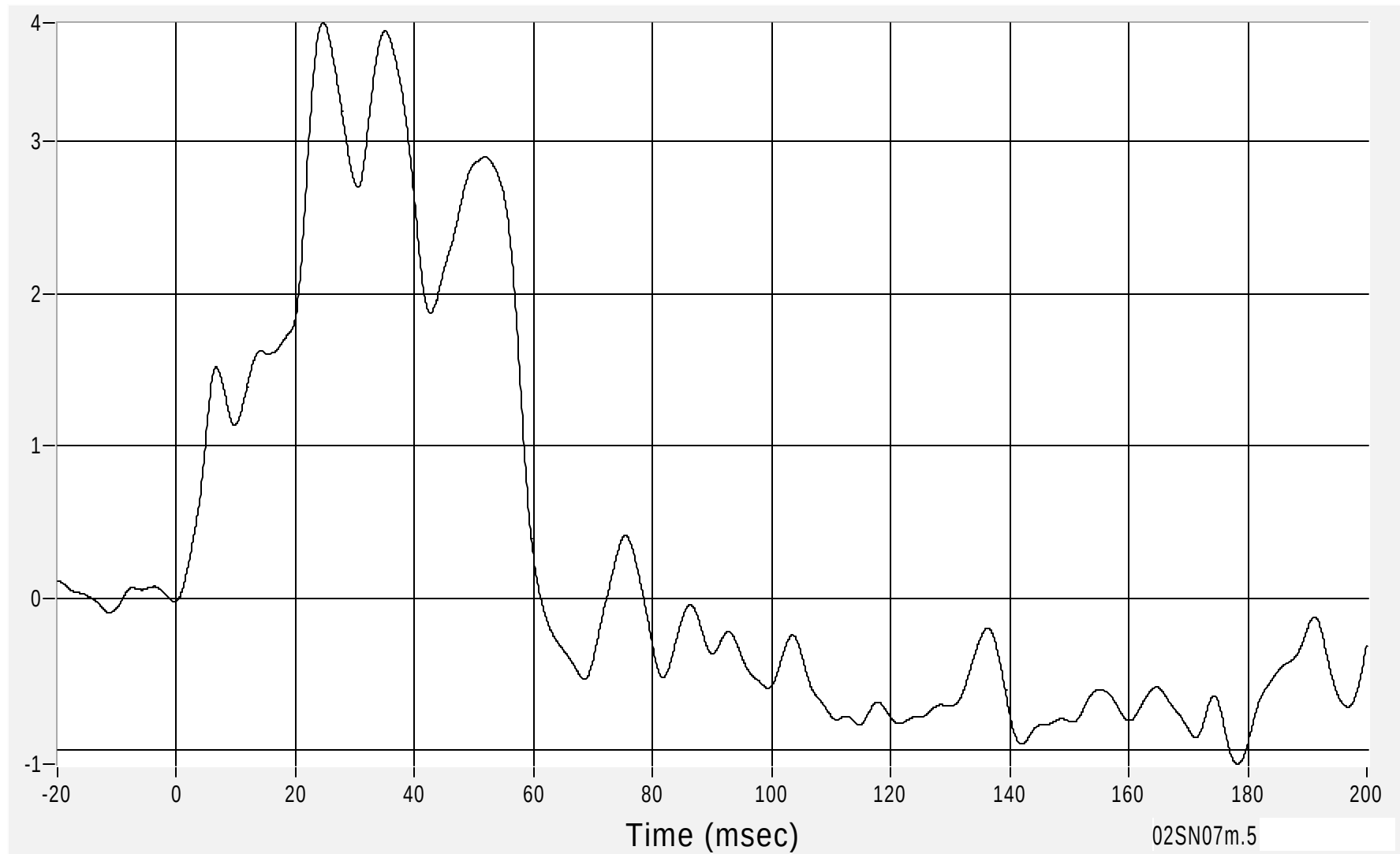
MDB Rear (Y) Acceleration

Max 3.8 G's at 24.6 msec

Acceleration (G's) CFC60

Min -1.1 G's at 178.2 msec

B-109



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18 April 2002

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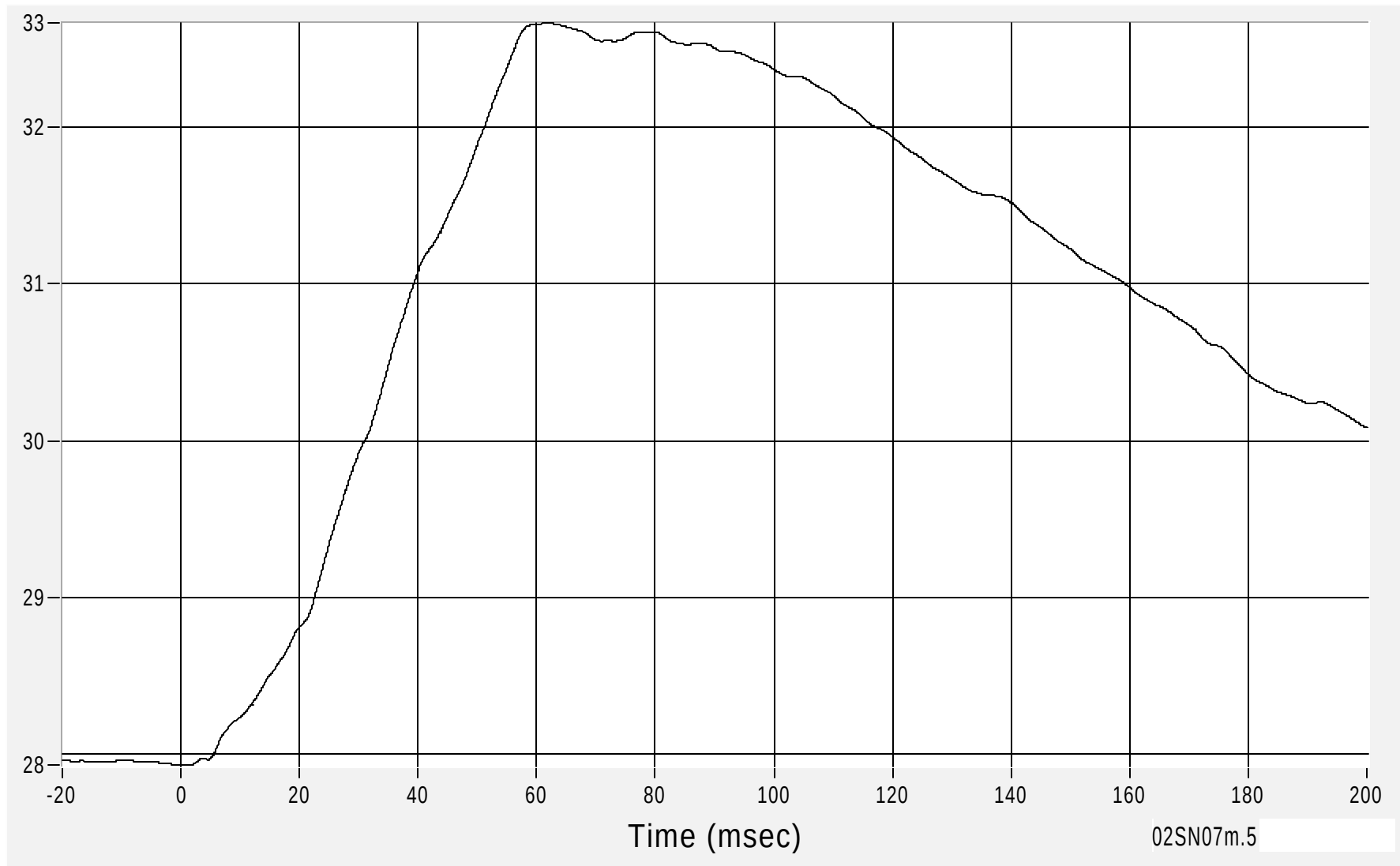
MDB Rear (Y) Velocity

Max 32.7 km/h at 61.8 msec

Velocity (km/h) CFC180

Min 27.9 km/h at 1.3 msec

B-110



02SN07 - 2002 KIA SPECTRA 4 DOOR SEDAN

18 April 2002

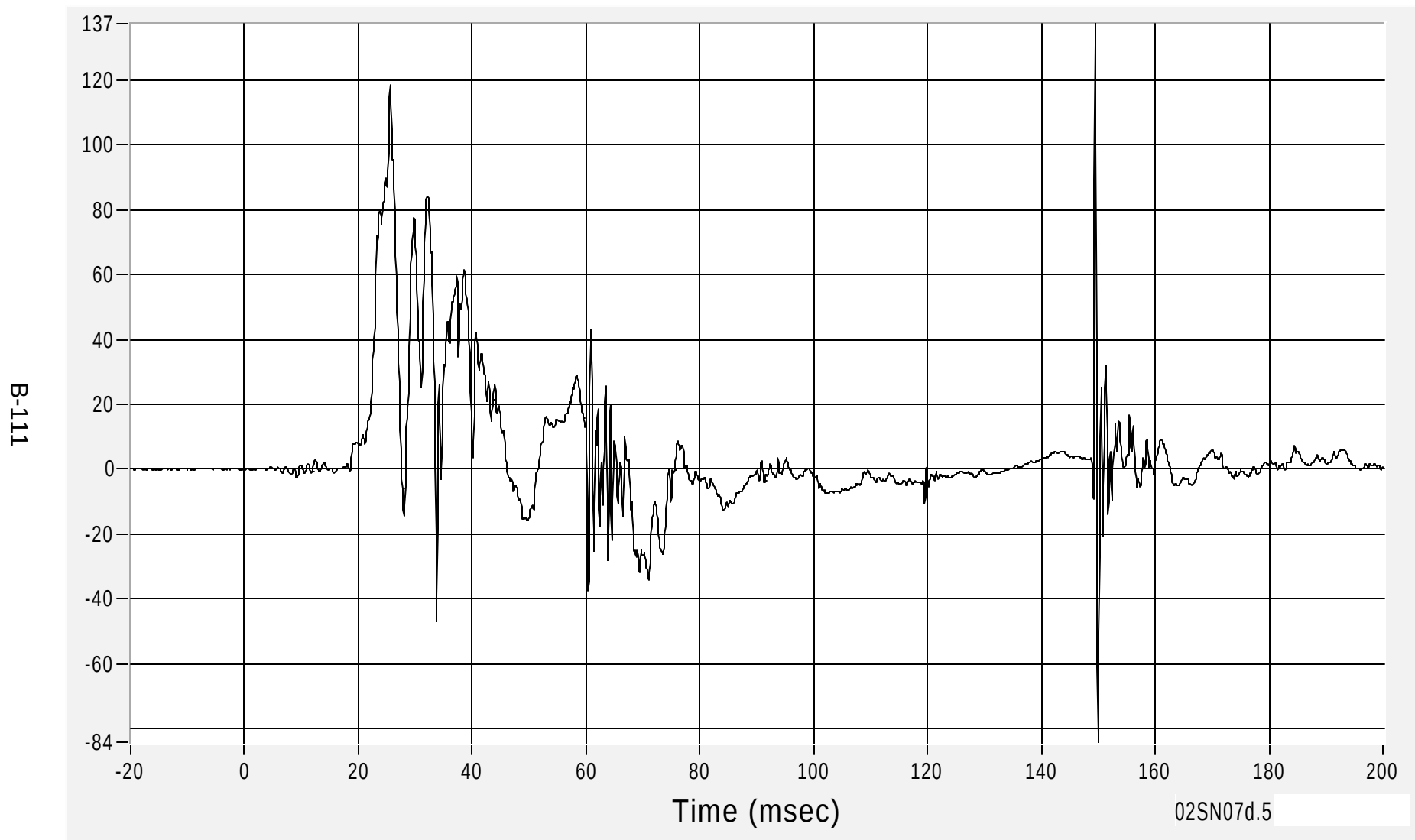
Medical College of Wisconsin
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Driver Upper Rib (Y) Acceleration - Redundant

Max 137.4 G's at 149.5 msec

Acceleration (G's) CFC1000

Min -84.2 G's at 150.0 msec



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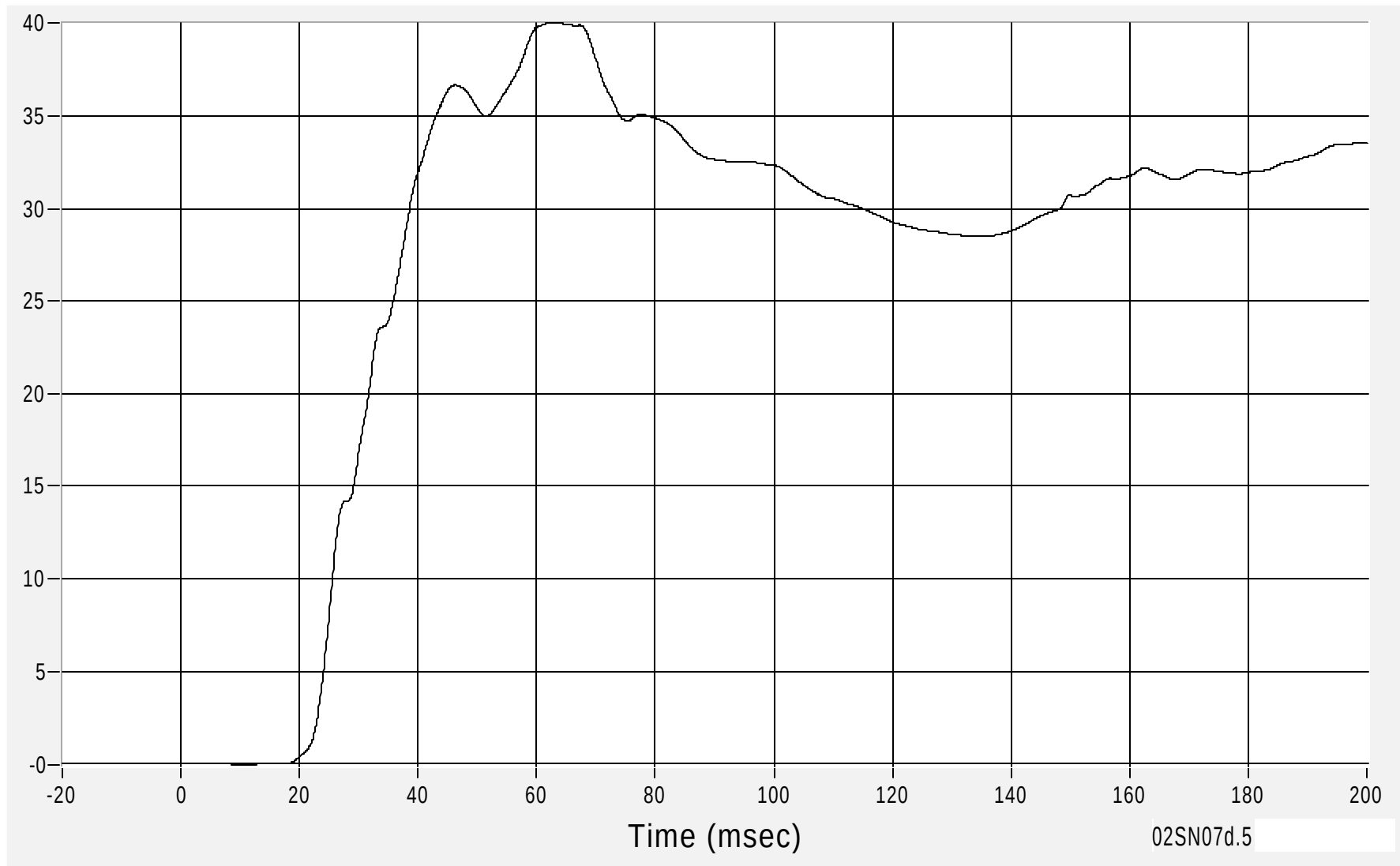
Driver Upper Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 40.0 km/h at 63.5 msec

Min 0.0 km/h at 10.5 msec

B-112



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18 April 2002

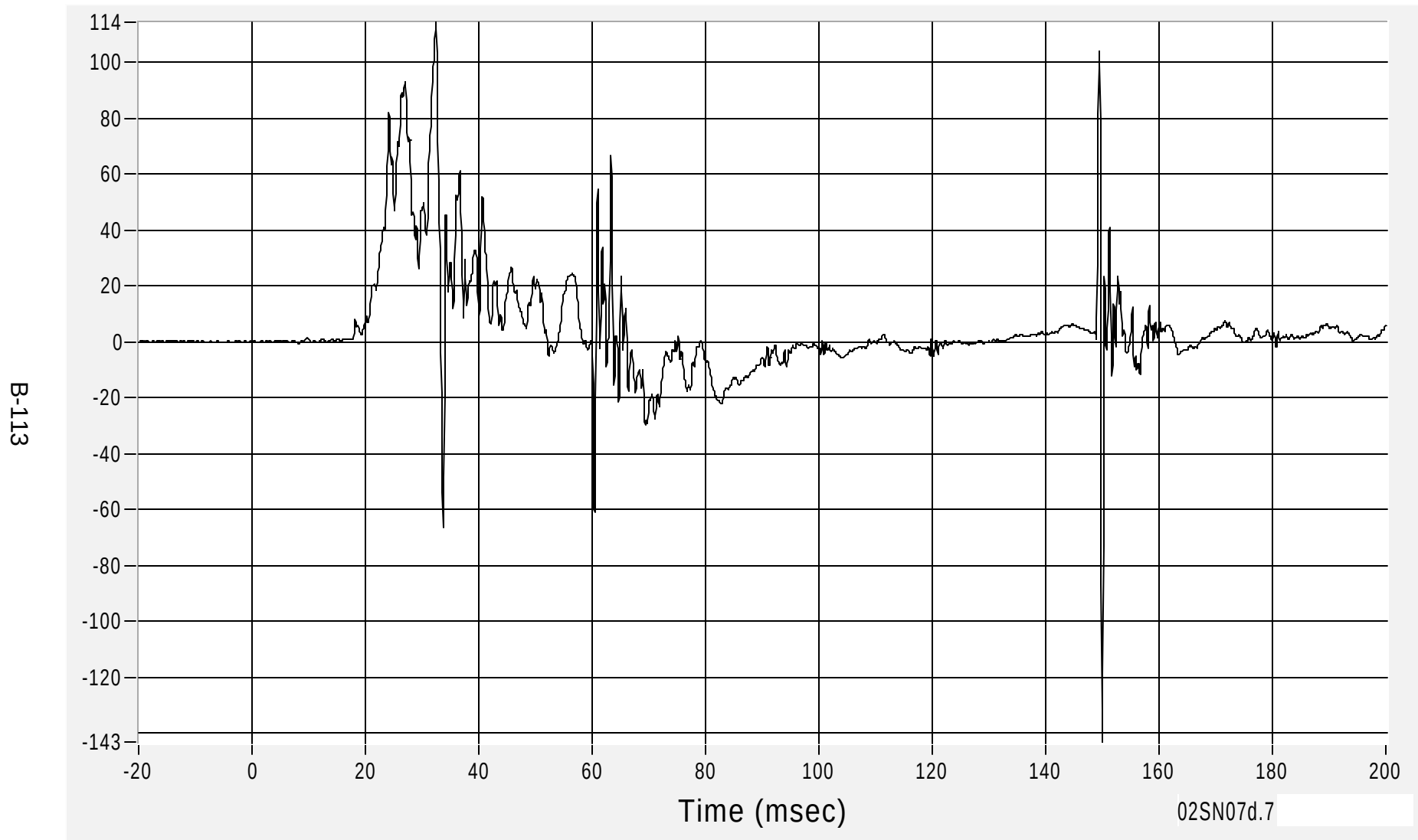
Medical College of Wisconsin
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Driver Lower Rib (Y) Acceleration - Redundant

Max 114.3 G's at 32.5 msec

Min -143.2 G's at 150.0 msec

Acceleration (G's) CFC1000



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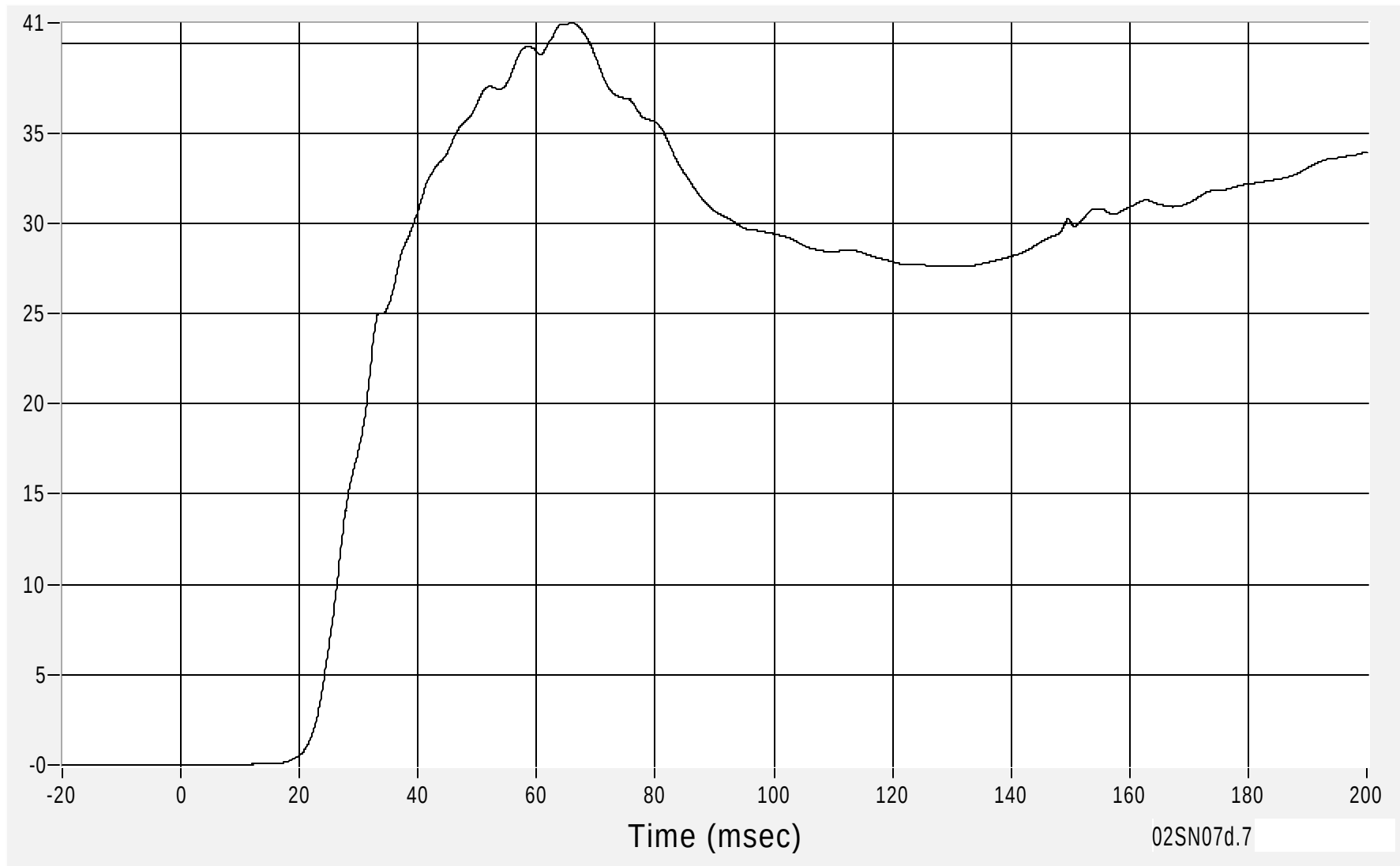
Driver Lower Rib (Y) Velocity - Redundant

Max 41.1 km/h at 66.0 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 8.7 msec

B-114



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18 April 2002

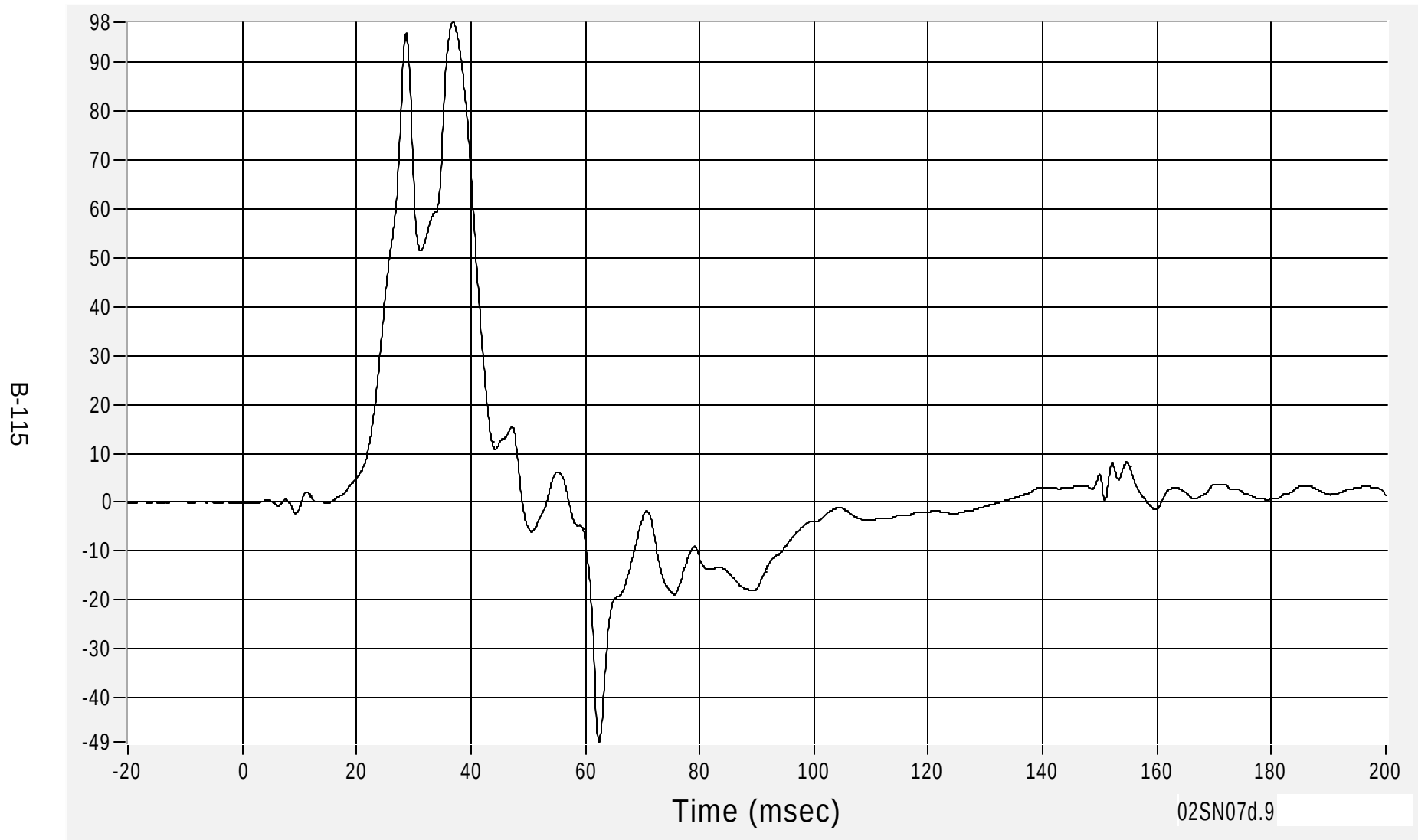
Medical College of Wisconsin
Vehicle Crashworthiness Lab

Driver Lower Spine (Y) Acceleration - Redundant

Max 98.3 G's at 36.9 msec

Acceleration (G's) CFC180

Min -49.1 G's at 62.4 msec



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18 April 2002

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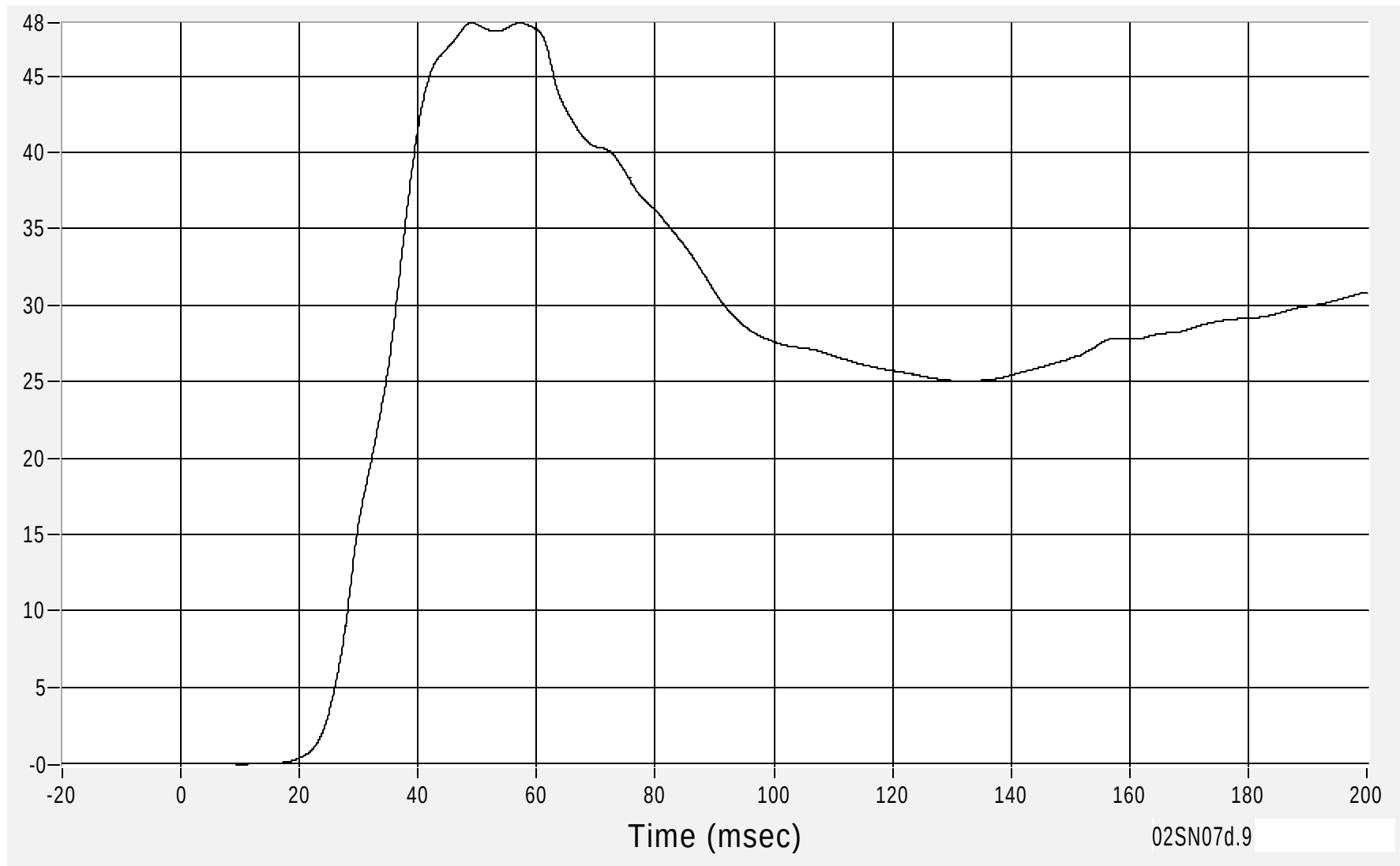
Driver Lower Spine (Y) Velocity - Redundant

Max 48.5 km/h at 49.0 msec

Velocity (km/h) CFC180

Min -0.1 km/h at 10.3 msec

B-116



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18 April 2002

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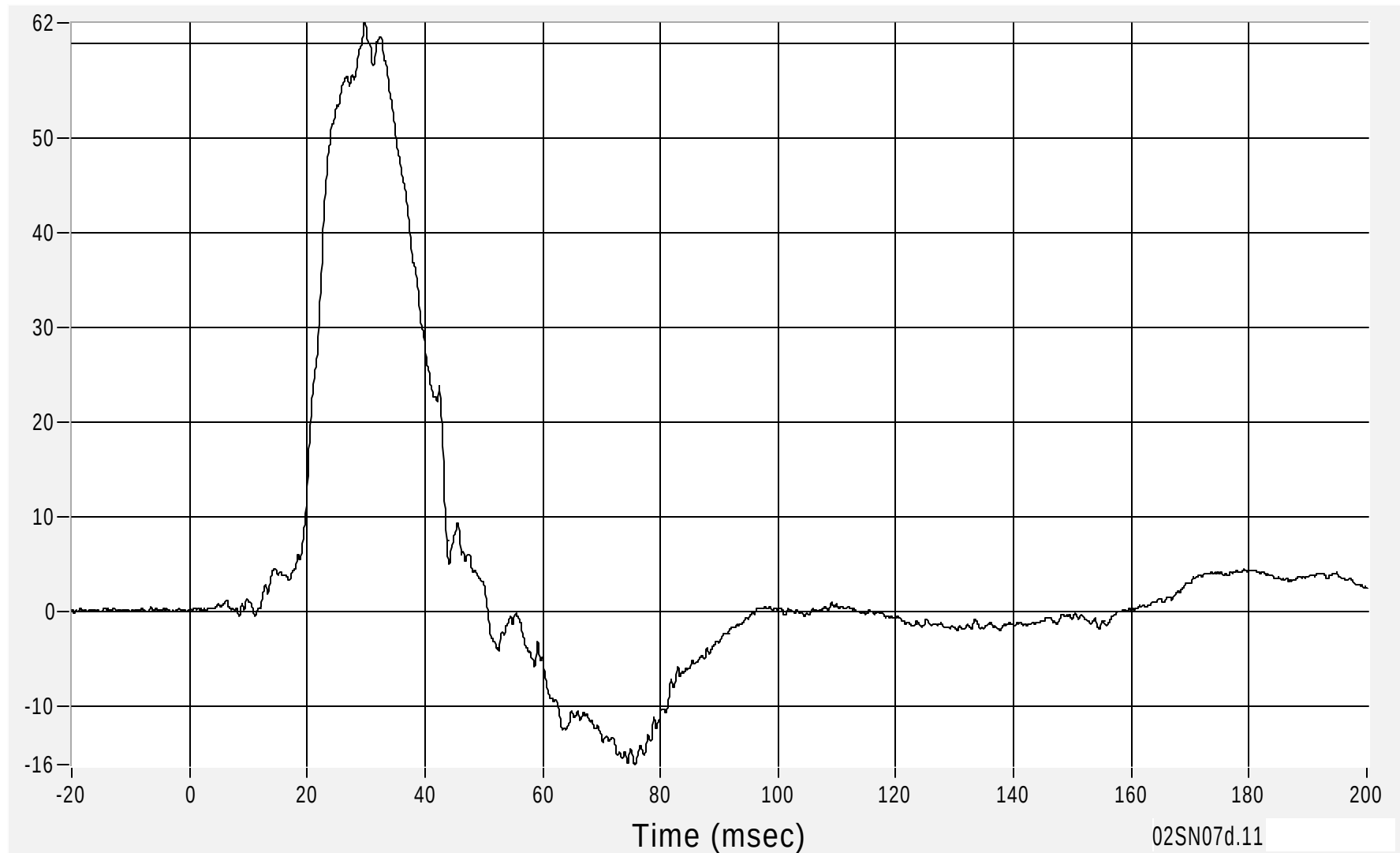
Driver Pelvic (Y) Acceleration - Redundant

Max 62.1 G's at 29.8 msec

Acceleration (G's) CFC1000

Min -16.1 G's at 75.8 msec

B-117



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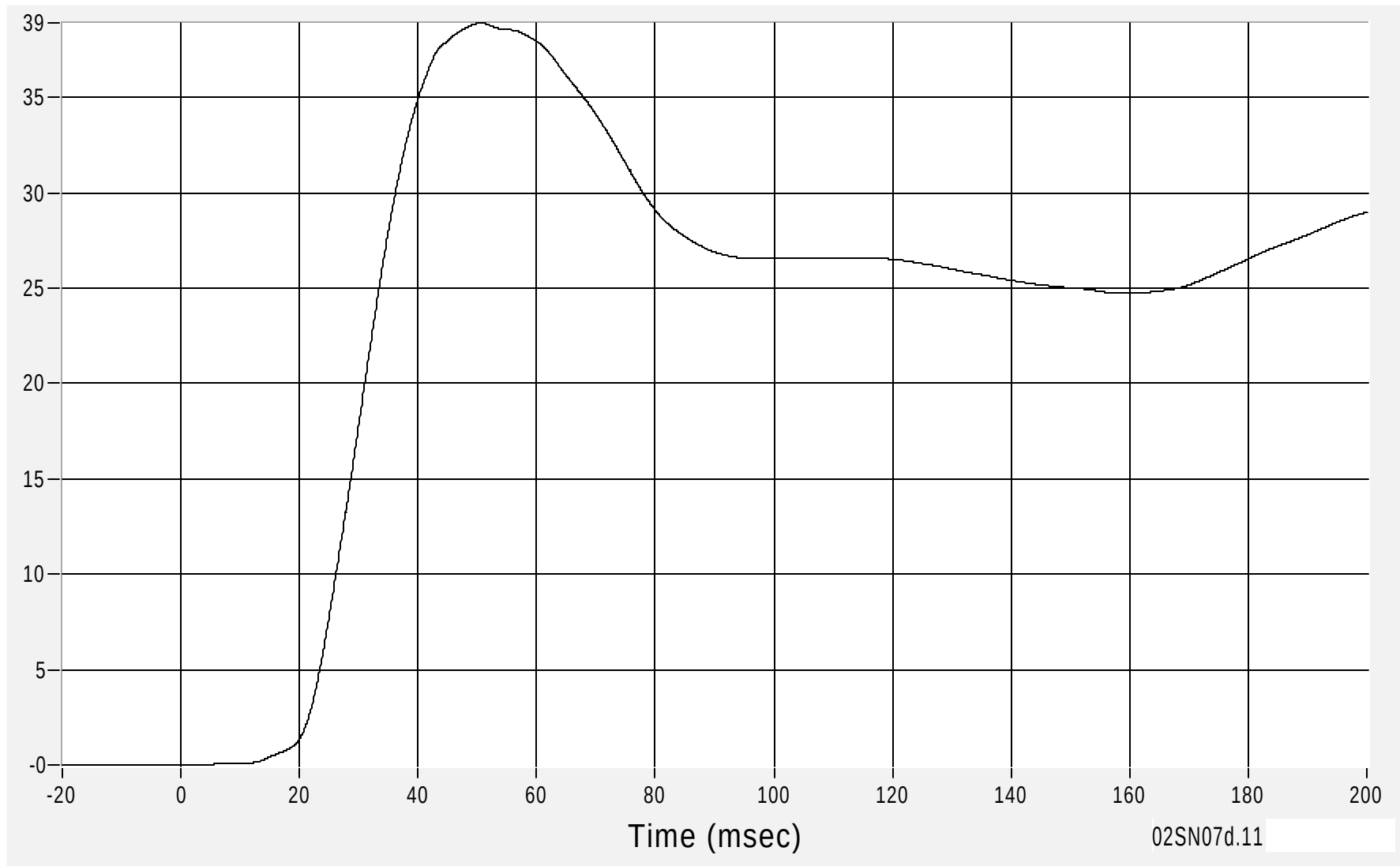
Driver Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 38.9 km/h at 50.6 msec

Min 0.0 km/h at 0.0 msec

B-118



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18 April 2002

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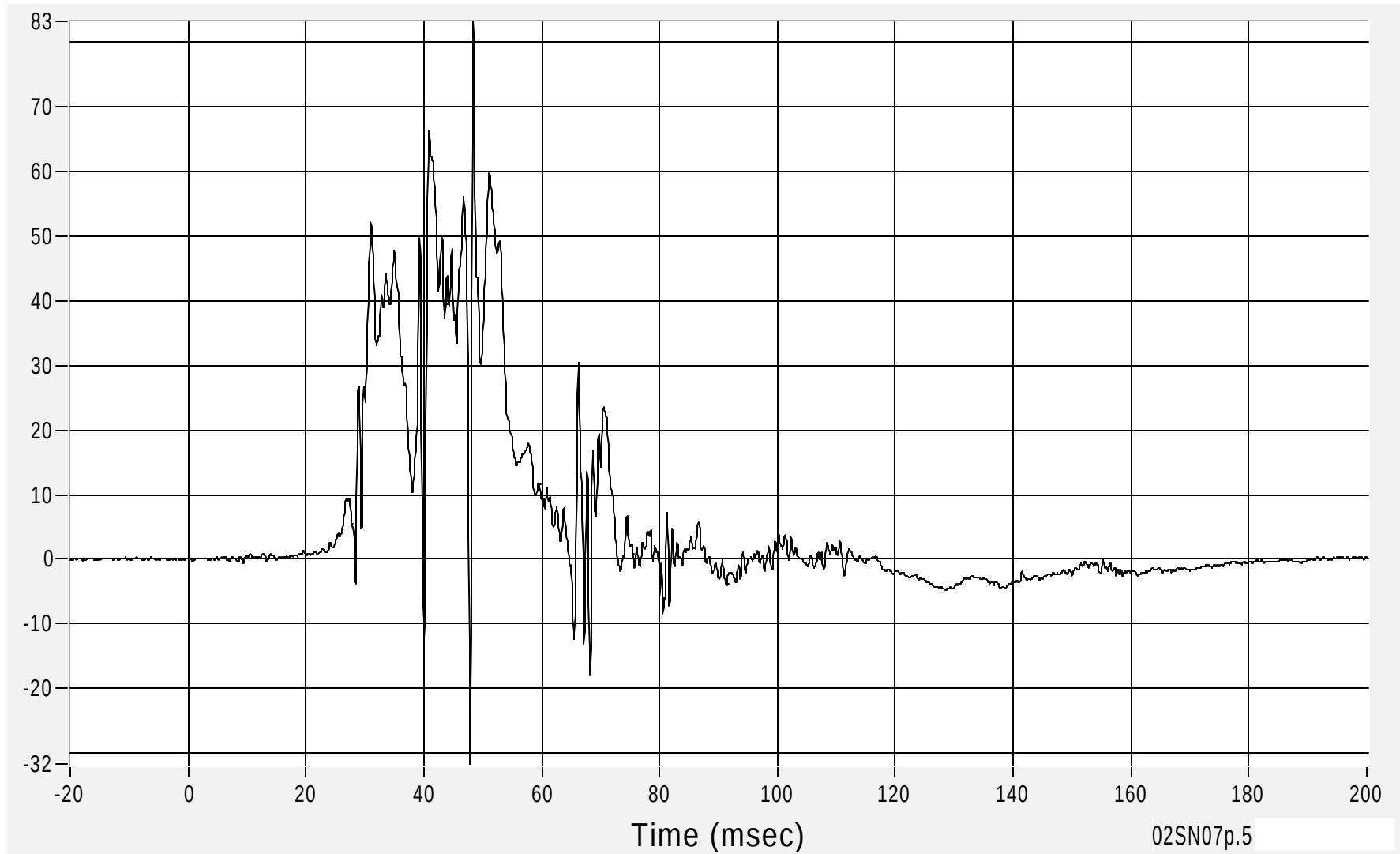
Passenger Upper Rib (Y) Acceleration - Redundant

Max 83.1 G's at 48.4 msec

Acceleration (G's) CFC1000

Min -31.6 G's at 47.8 msec

B-119



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18 April 2002

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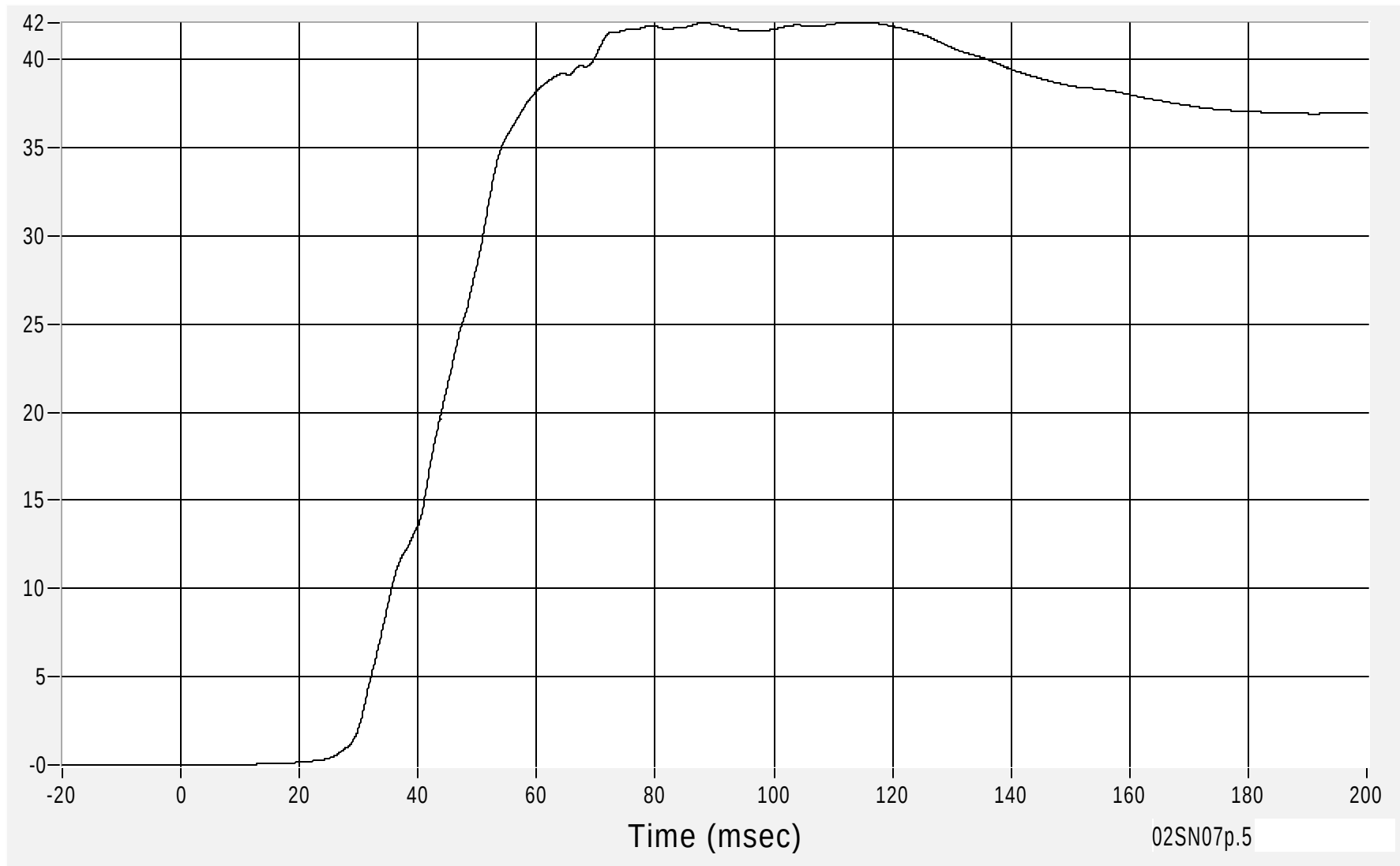
Passenger Upper Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 42.1 km/h at 88.1 msec

Min 0.0 km/h at 4.6 msec

B-120



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18 April 2002

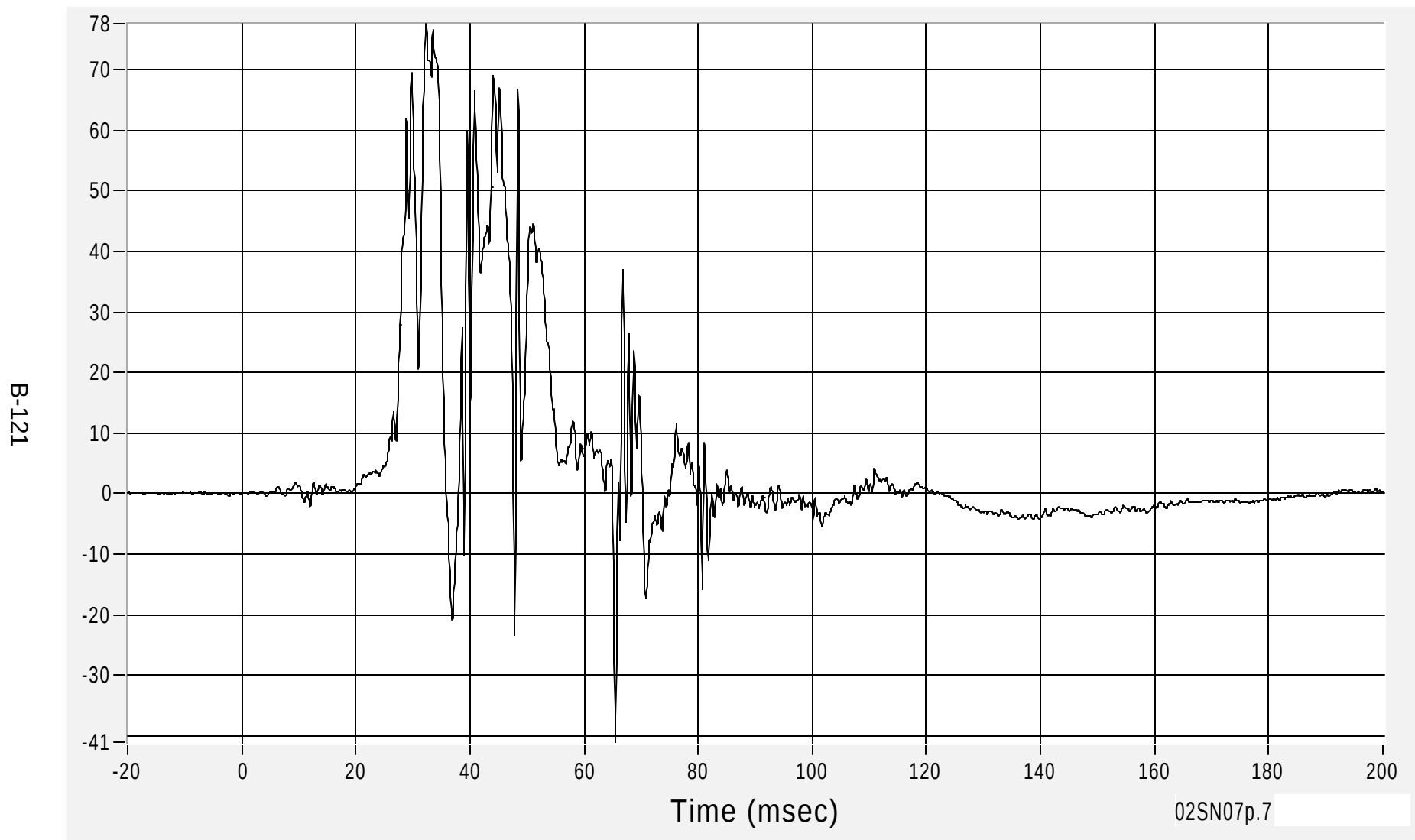
Medical College of Wisconsin
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Passenger Lower Rib (Y) Acceleration - Redundant

Max 77.6 G's at 32.3 msec

Acceleration (G's) CFC1000

Min -41.1 G's at 65.5 msec



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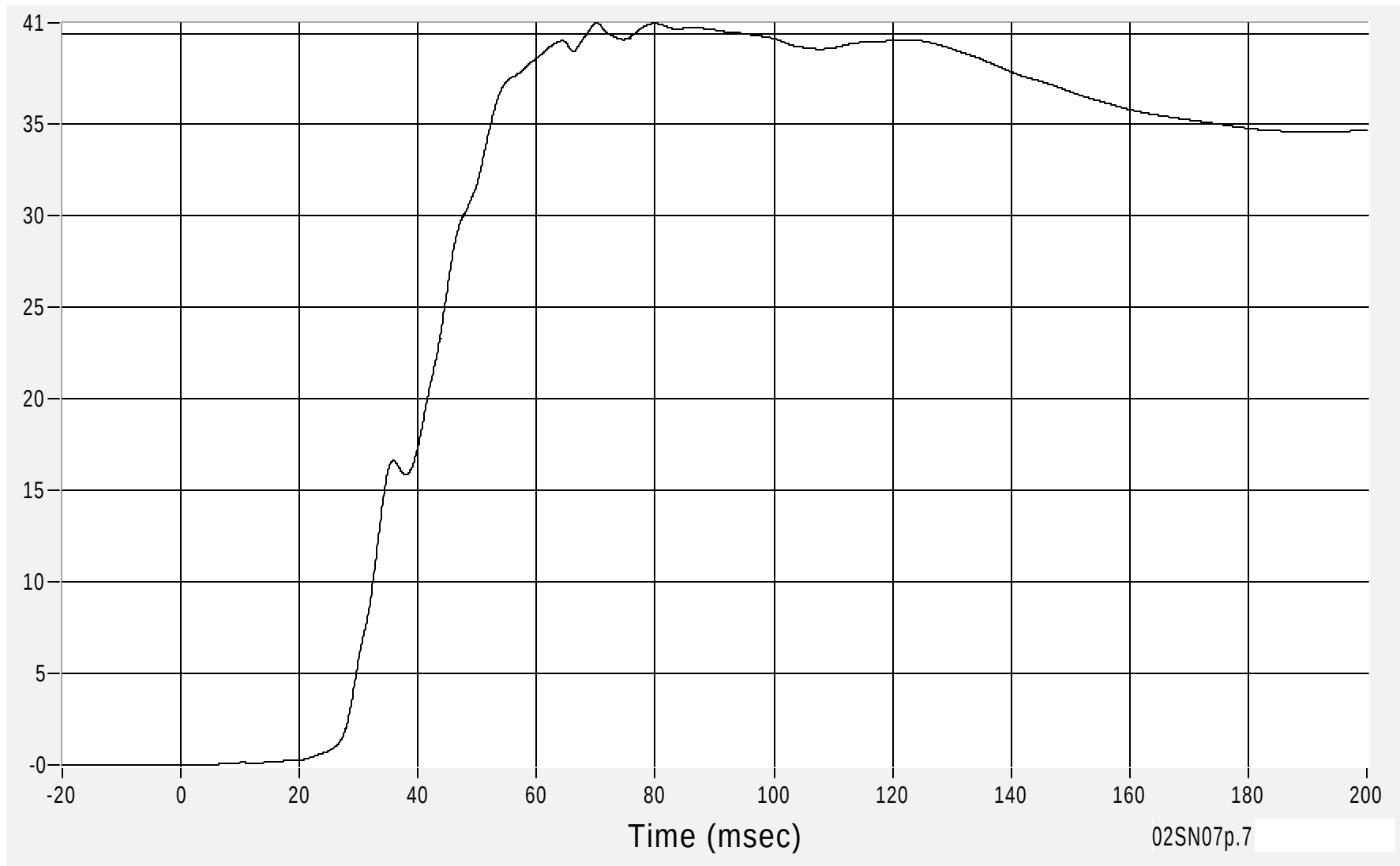
Passenger Lower Rib (Y) Velocity - Redundant

Max 40.6 km/h at 70.1 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.5 msec

B-122



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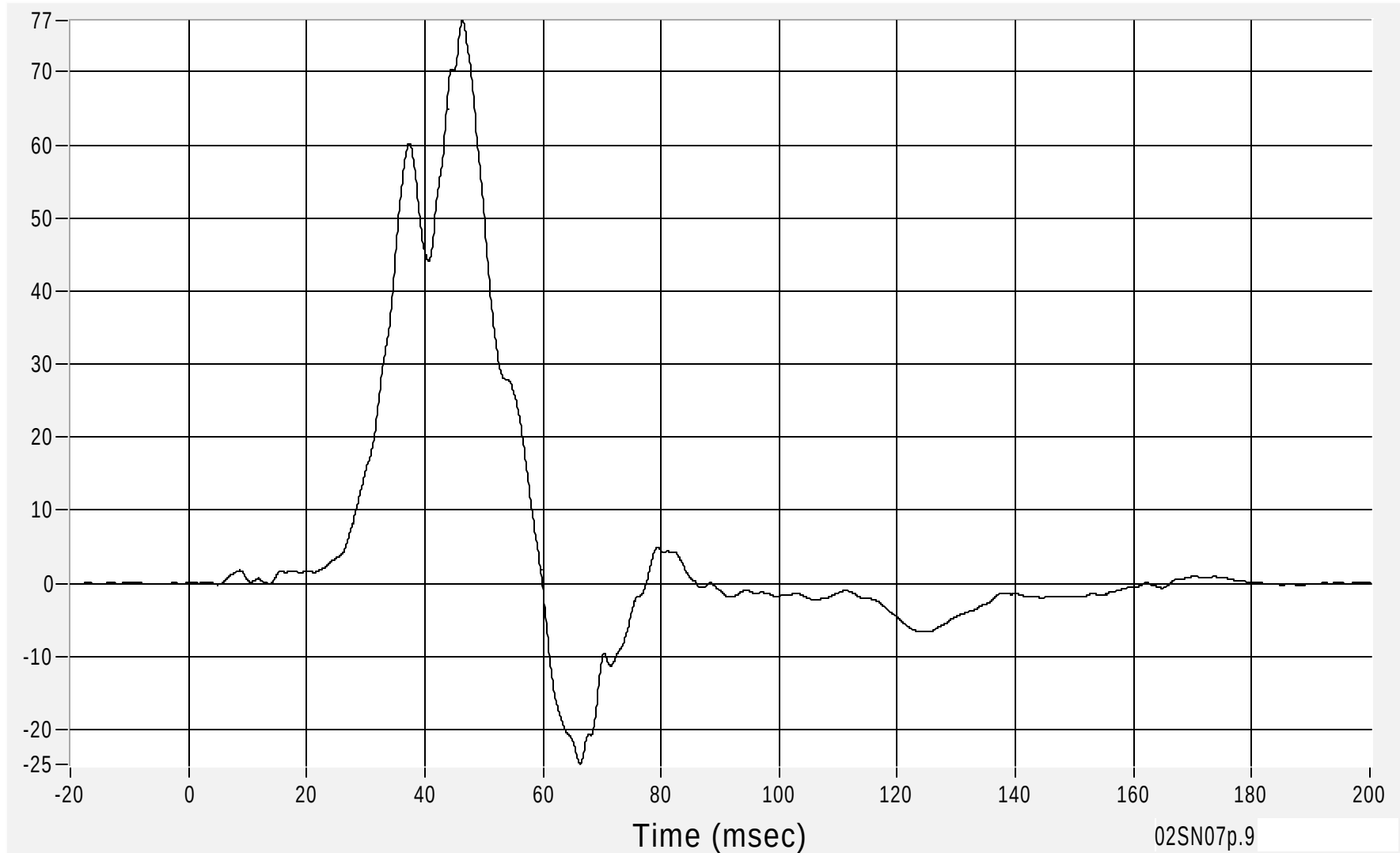
Passenger Lower Spine (Y) Acceleration - Redundant

Max 77.0 G's at 46.4 msec

Acceleration (G's) CFC180

Min -24.8 G's at 66.3 msec

B-123



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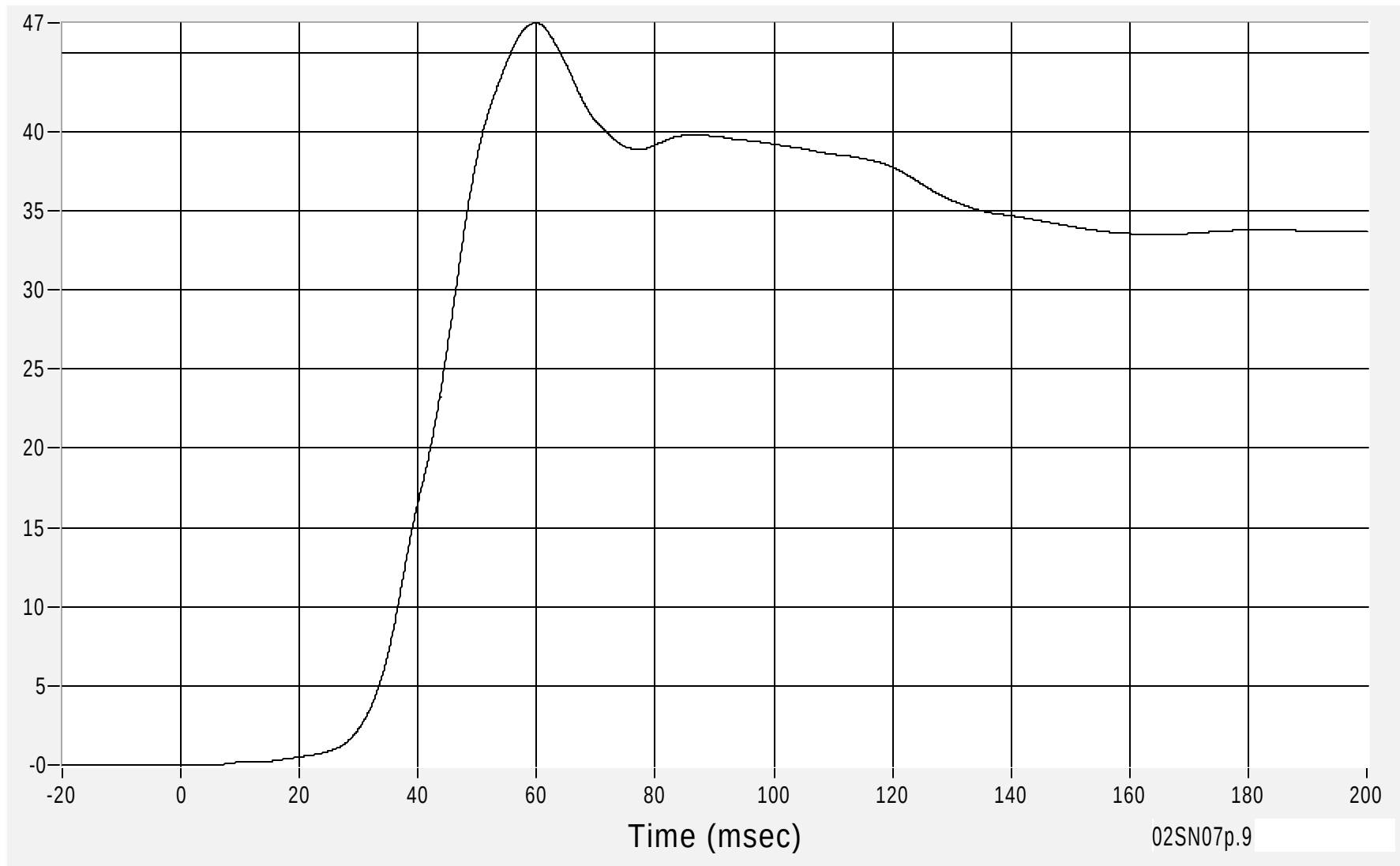
Passenger Lower Spine (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 46.9 km/h at 59.8 msec

Min 0.0 km/h at 5.8 msec

B-124



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18 April 2002

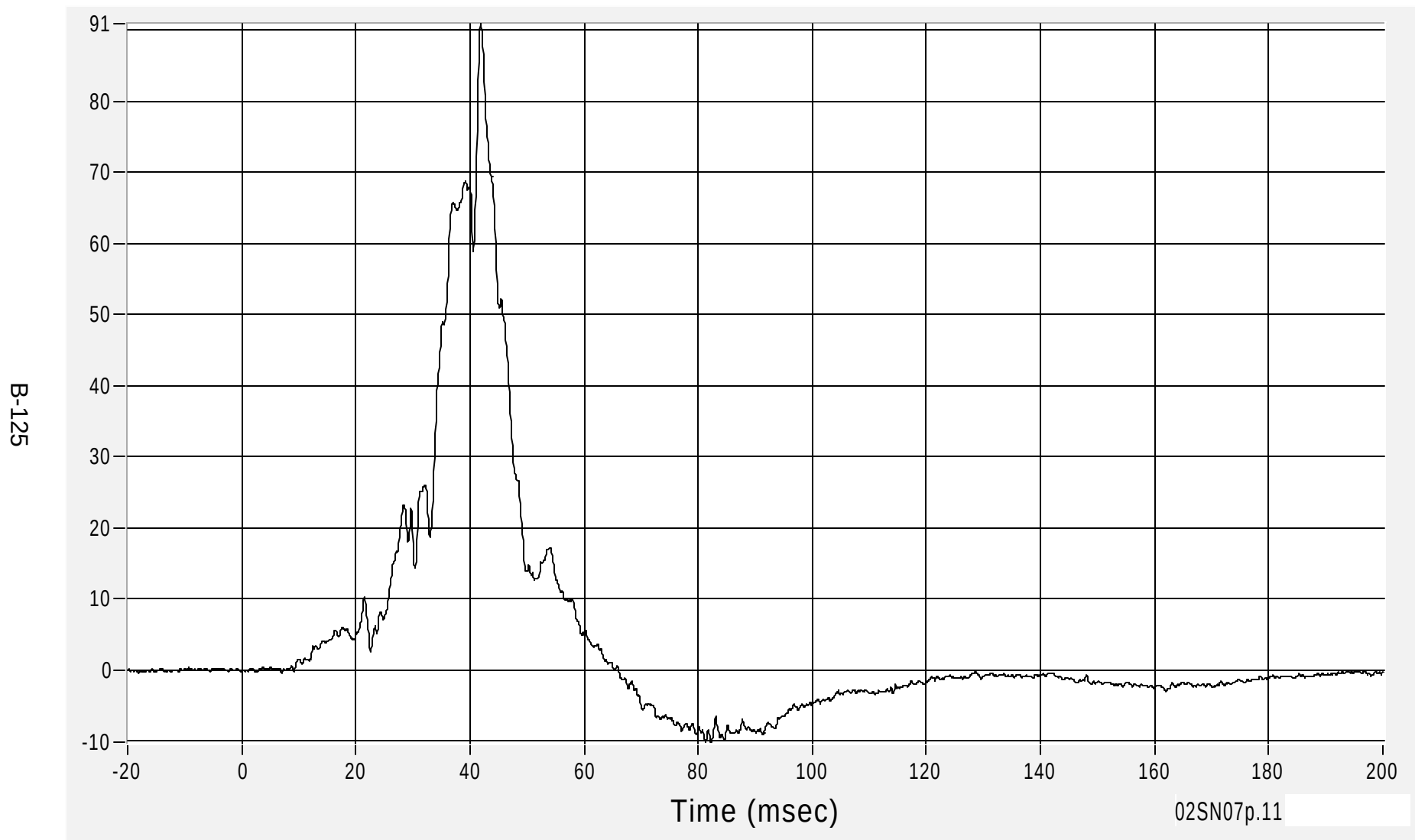
Medical College of Wisconsin
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Passenger Pelvic (Y) Acceleration - Redundant

Max 91.0 G's at 41.9 msec

Acceleration (G's) CFC1000

Min -10.1 G's at 82.2 msec



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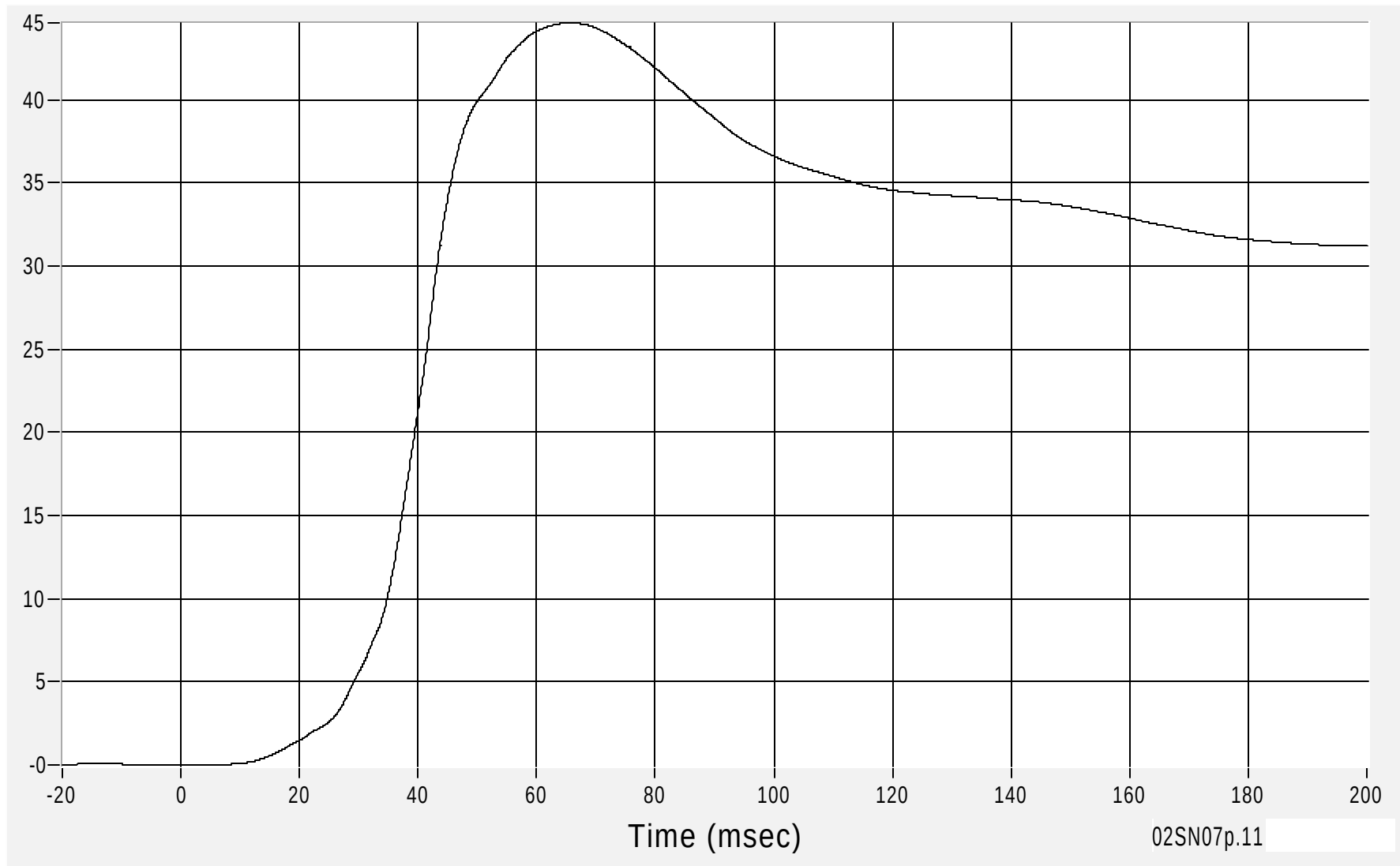
Passenger Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 44.6 km/h at 65.8 msec

Min 0.0 km/h at 0.3 msec

B-126



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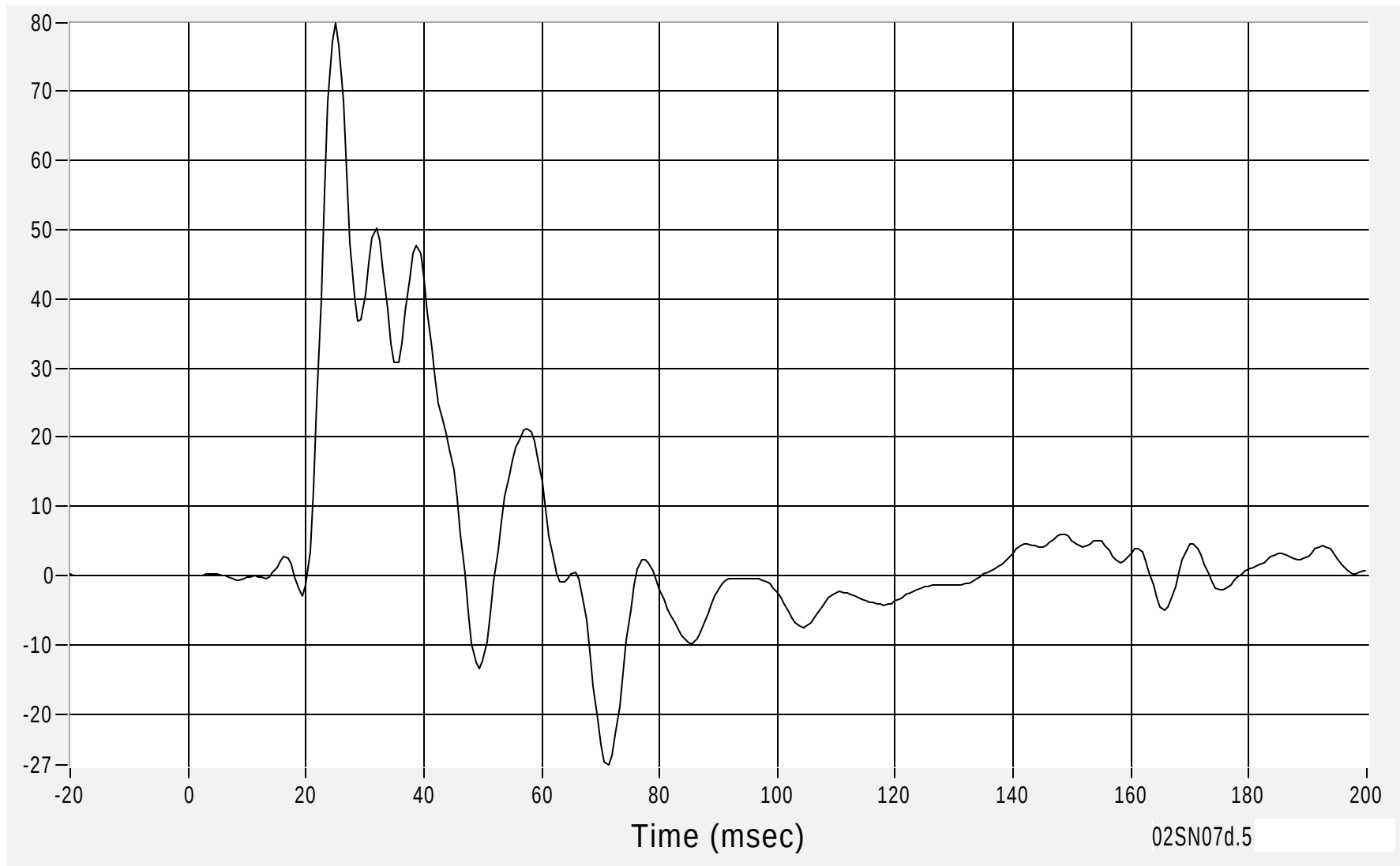
Driver Upper Rib (Y) Acceleration - Redundant

Max 79.9 G's at 25.0 msec

Acceleration (G's) FIR100

Min -27.4 G's at 71.2 msec

B-127



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18 April 2002

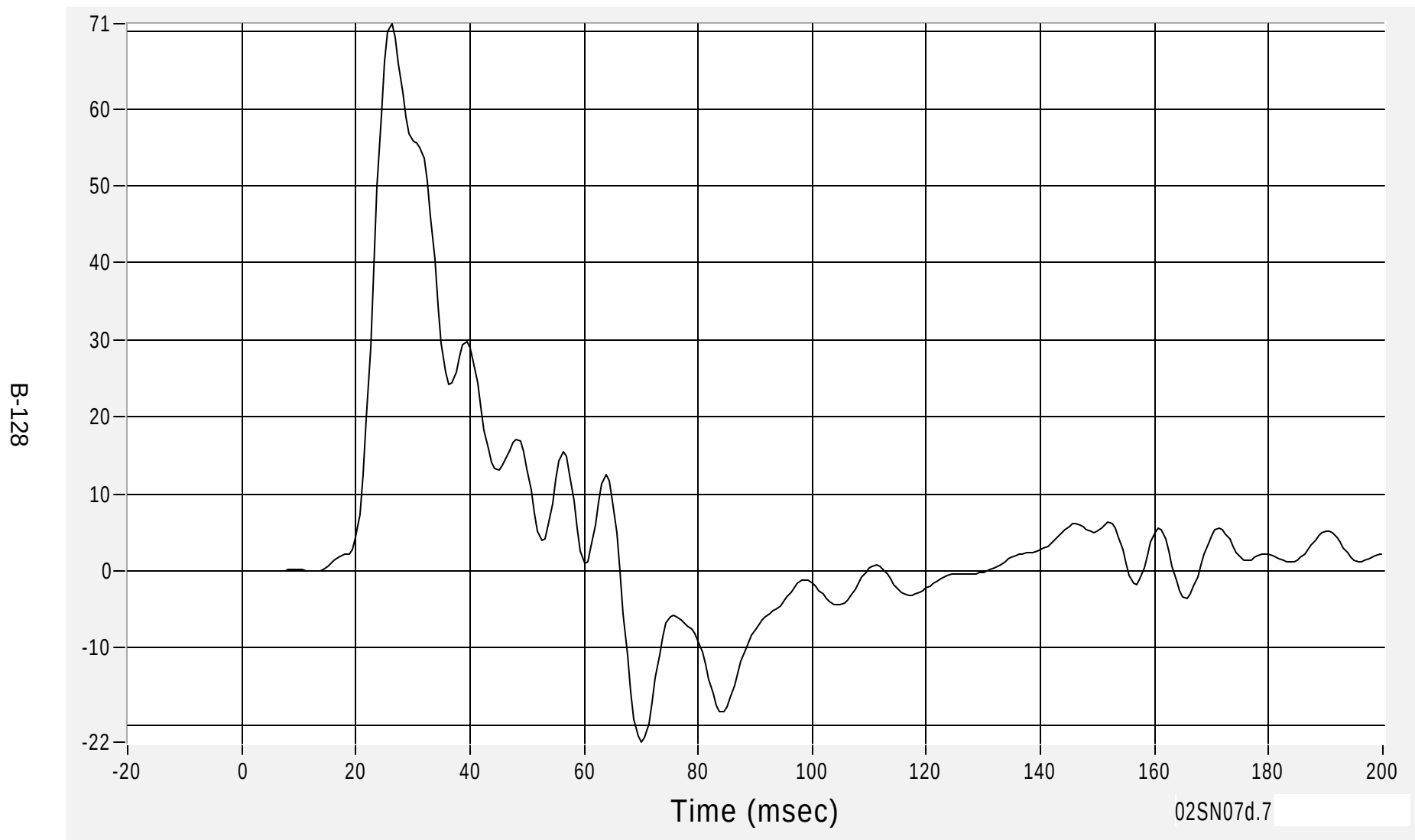
Medical College of Wisconsin
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Driver Lower Rib (Y) Acceleration - Redundant

Max 71.1 G's at 26.2 msec

Acceleration (G's) FIR100

Min -22.2 G's at 70.0 msec



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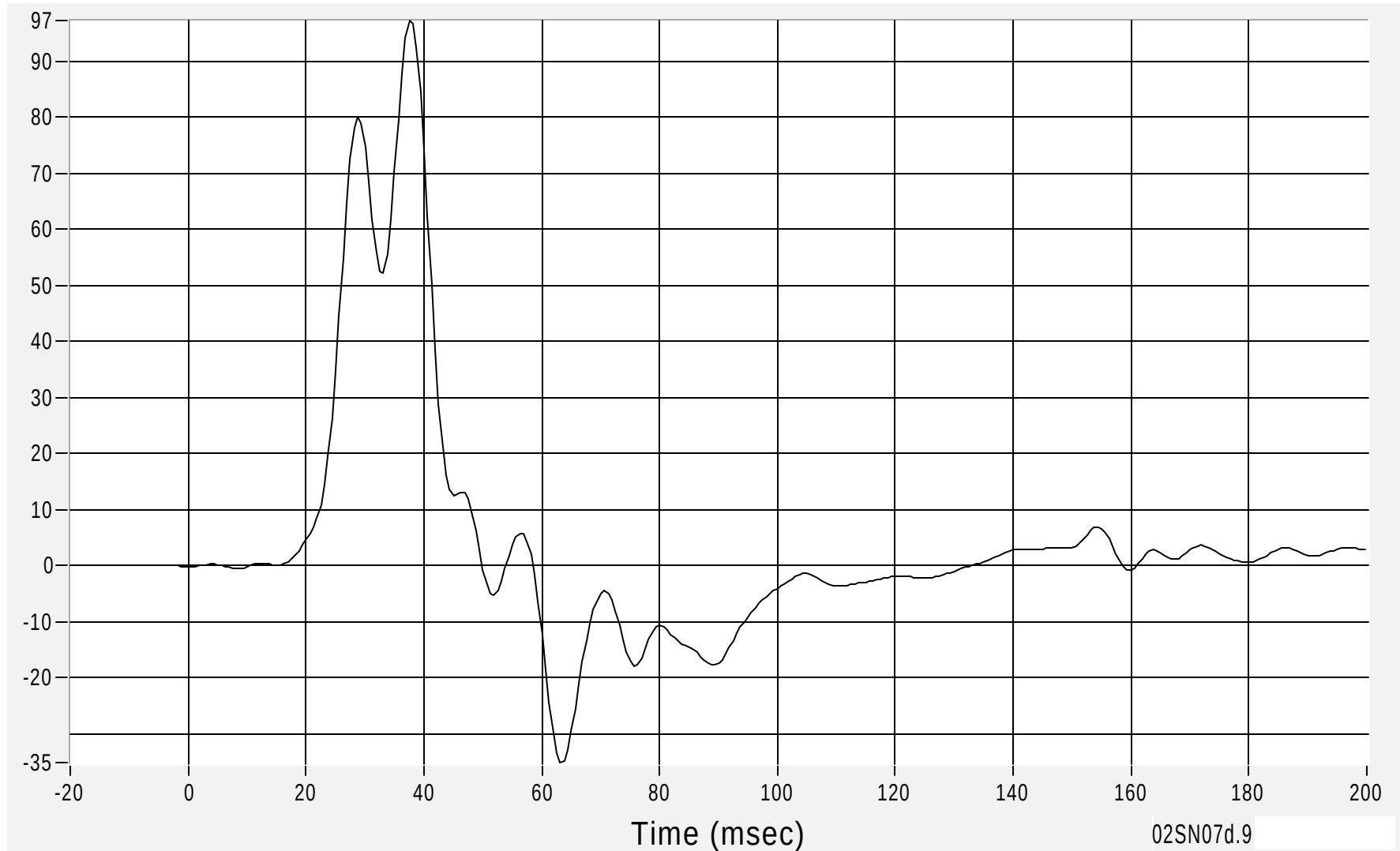
Driver Lower Spine (Y) Acceleration - Redundant

Max 97.3 G's at 37.5 msec

Min -35.1 G's at 63.1 msec

Acceleration (G's) FIR100

B-129



02SN07 - 2002 KIA SPECTRA 4 DOOR SEDAN

18 April 2002

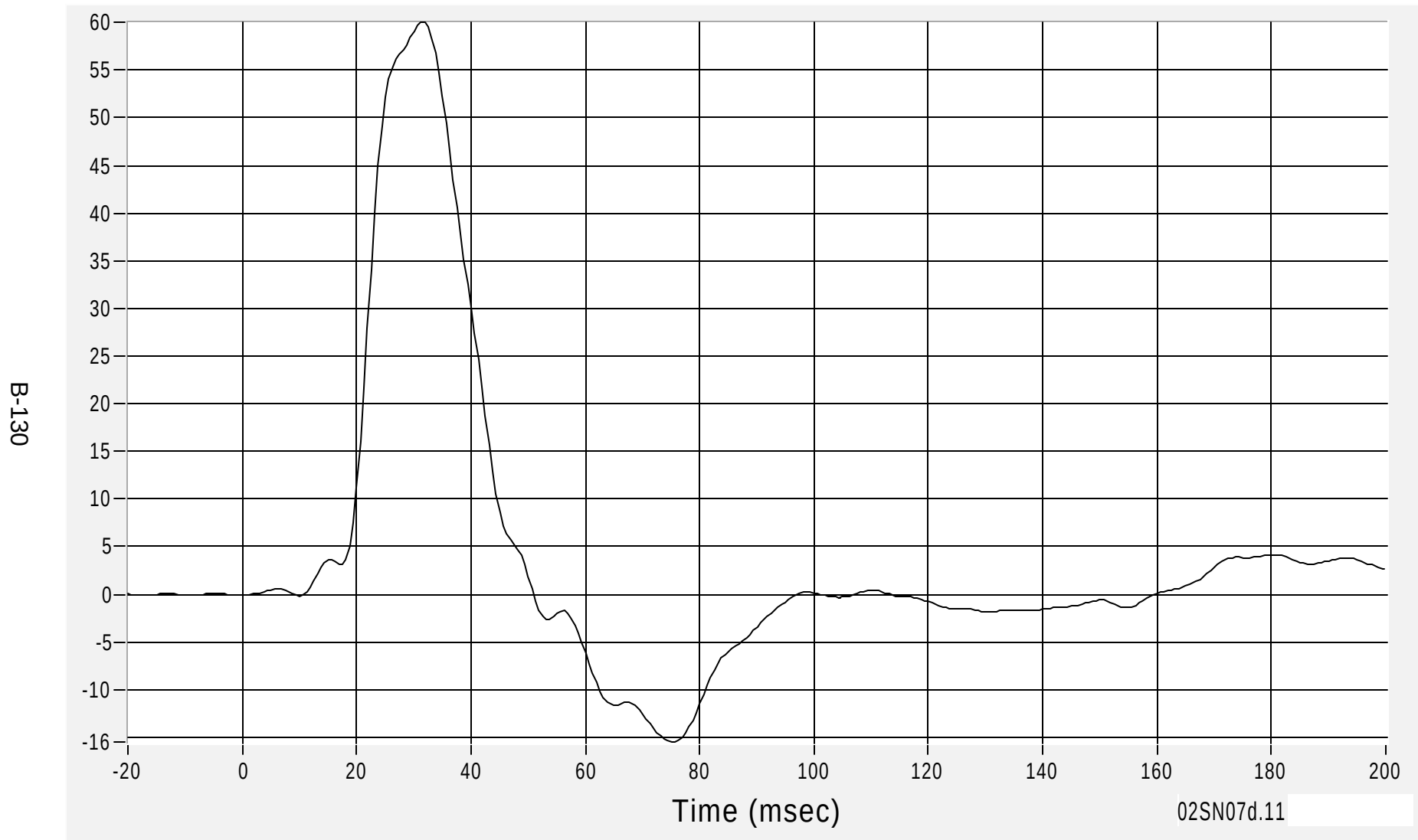
Medical College of Wisconsin
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Driver Pelvic (Y) Acceleration - Redundant

Max 60.0 G's at 31.2 msec

Acceleration (G's) FIR100

Min -15.5 G's at 75.0 msec



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18 April 2002

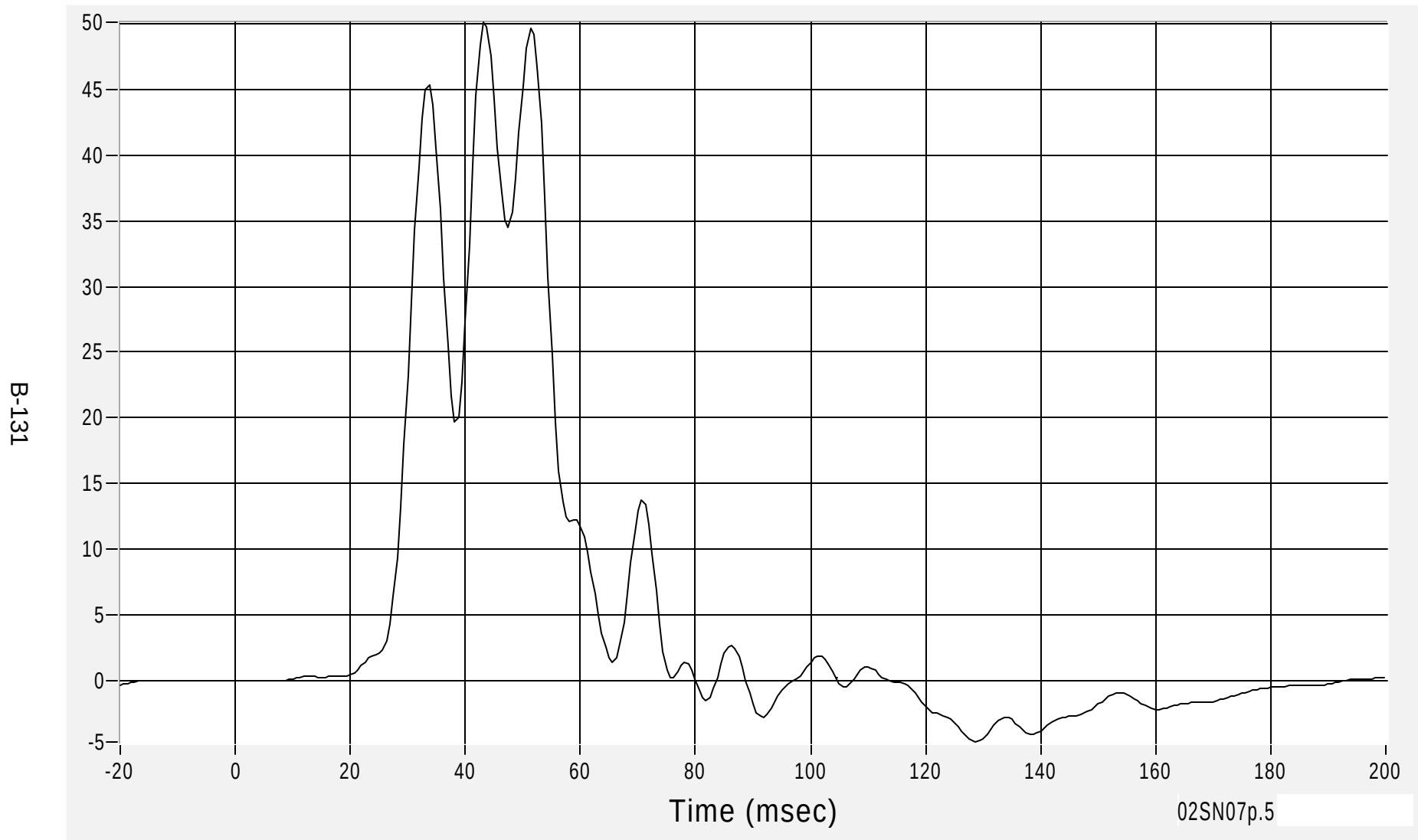
Medical College of Wisconsin
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Passenger Upper Rib (Y) Acceleration - Redundant

Max 50.1 G's at 43.1 msec

Acceleration (G's) FIR100

Min -4.6 G's at 128.8 msec



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18 April 2002

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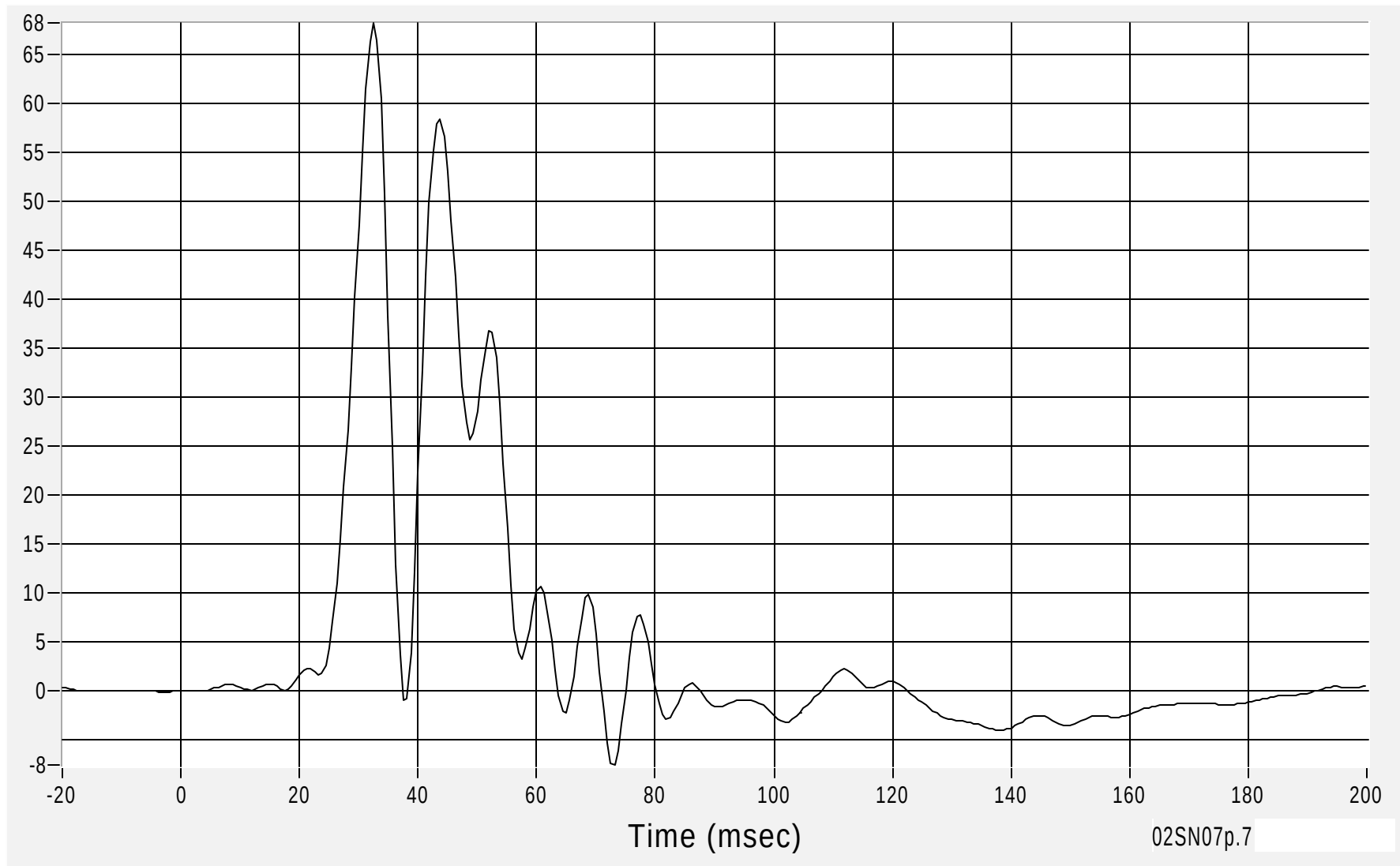
Passenger Lower Rib (Y) Acceleration - Redundant

Max 68.2 G's at 32.5 msec

Min -7.6 G's at 73.1 msec

Acceleration (G's) FIR100

B-132



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18 April 2002

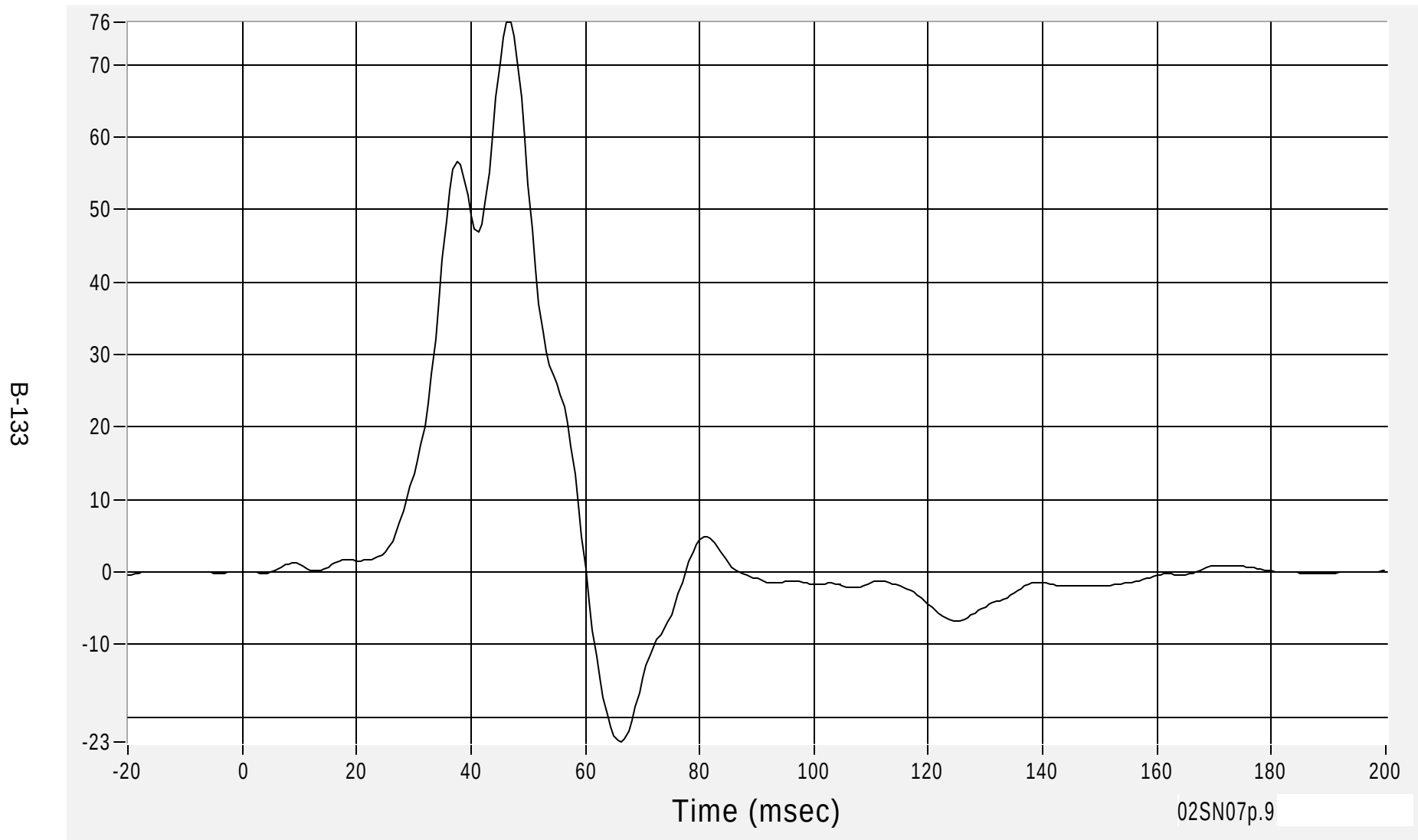
Medical College of Wisconsin
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Passenger Lower Spine (Y) Acceleration - Redundant

Max 75.9 G's at 46.9 msec

Acceleration (G's) FIR100

Min -23.5 G's at 66.2 msec



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18 April 2002

Medical College of Wisconsin
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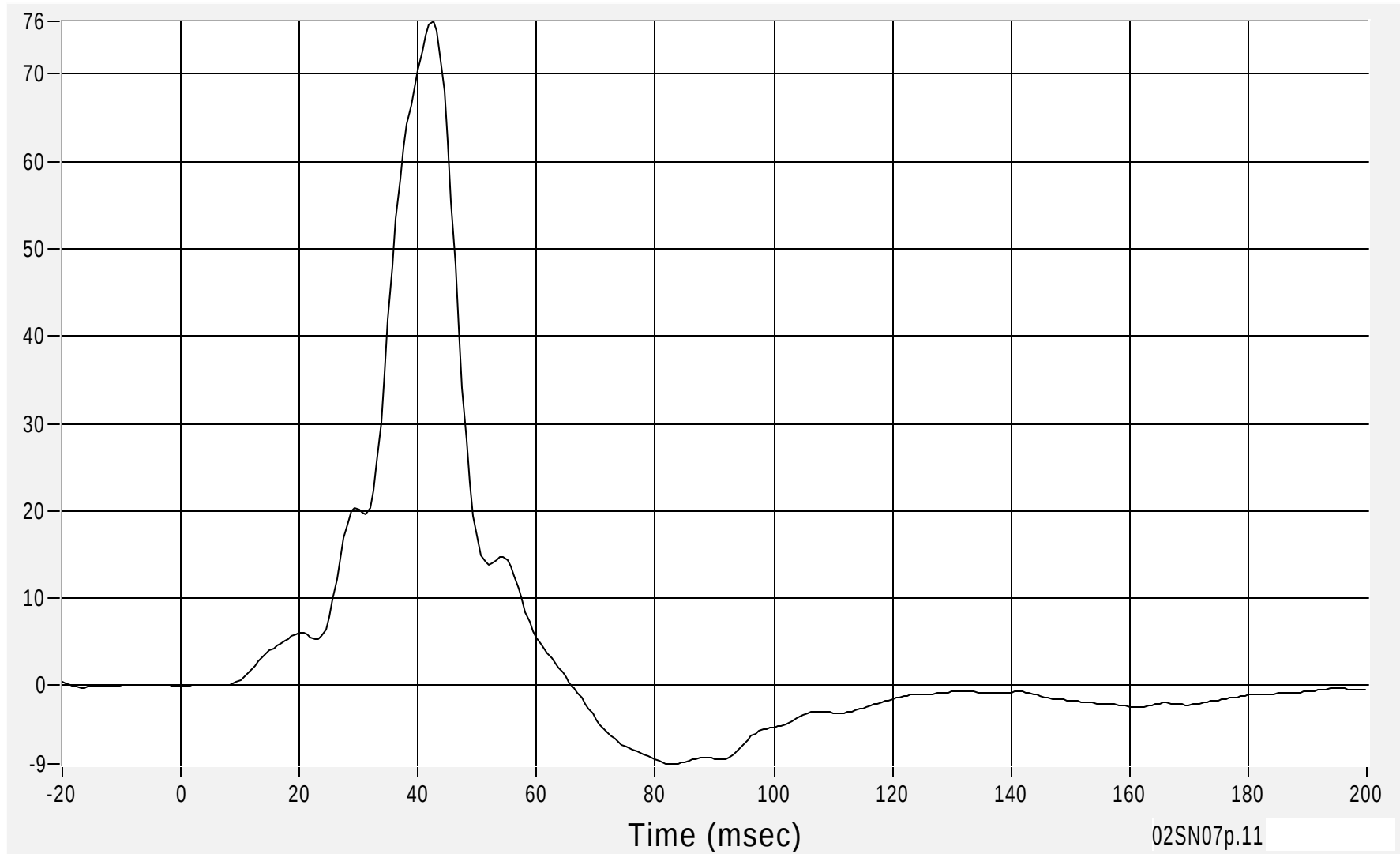
Passenger Pelvic (Y) Acceleration - Redundant

Max 76.1 G's at 42.5 msec

Acceleration (G's) FIR100

Min -9.0 G's at 83.1 msec

B-134



02SN07 - 2002 KIA SPECTRA 4 DOOR SEDAN

18 April 2002

Medical College of Wisconsin
Vehicle Crashworthiness Lab

APPENDIX C

SID CONFIGURATION AND VERIFICATION RESULTS

TABLE OF CONTENTS

	Page No.
VERIFICATION TEST RESULTS SUMMARY PRE AND POST TEST	C-3
SUMMARY SID PRE AND POST VERIFICATION	C-4
DUMMY INSPECTION LIST PRE AND POST TEST	C-5

**VERIFICATION TEST RESULTS SUMMARY
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number 056 Test Sequences 06 and 07

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mark Meyer		
LATERAL THORAX IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
ABDOMINAL COMPRESSION	Pass all requirements	Mark Meyer		
LUMBAR FLEXION	Pass all requirements	Mark Meyer		

SID Serial Number 058 Test Sequences 07 and 08

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mark Meyer		
LATERAL THORAX IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
ABDOMINAL COMPRESSION	Pass all requirements	Mark Meyer		
LUMBAR FLEXION	Pass all requirements	Mark Meyer		

SUMMARY
SID PRE AND POST VERIFICATION

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number	056 and 058	Test Sequences	06 and 07 (056) 07 and 08 (058)
-------------------	-------------	----------------	------------------------------------

TEST PARAMETER	SPECIFICATION	056		058	
		PRE	POST	PRE	POST
MEASUREMENTS					
Date	-	12Apr02	22Apr02	12Apr02	22Apr02
Sequential Test Number	-	06	07	07	08
Temperature (°C)	18.9-25.5	23.0	22.3	23.0	22.3
Relative Humidity (%)	10-70	29	33	29	33
SH – Seated Height (mm)	889-909	901	898	901	900
RH – Rib Height (mm)	501-521	510	511	511	511
HP – Hip Pivot Height (mm)	99	99/99	99/99	99/99	99/99
RD – Rib From Back Line (mm)	229-241	229	229	229	232
KH – Knee Pivot from Back Line (mm)	511-526	516/516	515/521	521/517	520/515
KV – Knee Pivot to Floor (mm)	490-505	499/499	505/500	496/496	500/499
HW – Hip Width (mm)	356-391	365	365	357	357
THORAX IMPACTS					
Date	-	12Apr02	22Apr02	12Apr02	22Apr02
Sequential Test Number	-	06	07	07	08
Temperature (°C)	18.9-25.5	23.0	22.3	23.0	22.3
Relative Humidity (%)	10-70	29	33	29	33
Probe Speed (m/s)	4.21-4.33	4.28	4.27	4.28	4.27
Upper Rib Acceleration (G)	37-46	42.0	43.2	41.8	40.3
Lower Rib Acceleration (G)	37-46	40.3	40.3	39.3	39.3
Lower Spine Acceleration (G)	15-22	20.0	19.7	18.9	18.1
PELVIS IMPACTS					
Date	-	12Apr02	22Apr02	12Apr02	22Apr02
Sequential Test Number	-	06	07	07	08
Temperature (°C)	18.9-25.5	23.0	22.3	23.0	22.3
Relative Humidity (%)	10-70	29	33	29	33
Probe Speed (m/s)	4.21-4.33	4.28	4.27	4.28	4.27
Pelvis Acceleration (G)	40-60	45.5	43.8	43.0	44.6
THORACIC SHOCK ABSORBER					
Shock Absorber ID Number	-	486	-	03130164	-
Damper Setting	1-10	6	-	5	-
Date	-	14Feb02	-	14Feb02	-
Sequential Test Number	-	02	-	02	-
Temperature	18.9-25.5	22.5	-	22.5	-
Relative Humidity	10-70	30	-	30	-
Probe Speed (m/s) Low	3.05	3.05	-	3.05	-
Force (N)	836 – 1125	1065	-	850	-
Displacement (mm)	30 – 35	30.0	-	30.4	-
Probe Speed (m/s) Middle	4.27	4.27	-	4.27	-
Force (N)	1730 – 2099	1747	-	1739	-
Displacement (mm)	32 – 37	33.7	-	36.3	-
Probe Speed (m/s) High	6.10	6.10	-	6.10	-
Force (N)	3741 – 4448	4216	-	3928	-
Displacement (mm)	33 - 40	36.3	-	37.4	-

TEST PARAMETER	SPECIFICATION	056		058	
		PRE	POST	PRE	POST
ABDOMINAL COMPRESSION					
Date	-	22Feb02	-	22Feb02	-
Sequential Test Number	-	02	-	02	-
Temperature (°C)	18.9-25.5	20.8	-	20.8	-
Relative Humidity (%)	10-70	20	-	20	-
Force at 13 mm (N)	104-162	133	-	143	-
Force at 19 mm (N)	163-221	191	-	190	-
Force at 25 mm (N)	222-280	260	-	248	-
Force at 33 mm (N)	325-391	389	-	363	-
LUMBAR FLEXION					
Date	-	22Feb02	-	22Feb02	-
Sequential Test Number	-	02	-	02	-
Temperature (°C)	18.9-25.5	20.8	-	20.8	-
Relative Humidity (%)	10-70	20	-	20	-
Force at 0° (N)	0-26.7	10	-	0	-
Force at 0° (N)	97.8-151.2	154	-	140	-
Force at 0° (N)	151.2-204.6	180	-	183	-
Force at 0° (N)	204.6-258	230	-	240	-
Return Angle	12° Maximum	3.5	-	3.1	-

DUMMY INSPECTION LIST**PRE AND POST TEST****CONFIGURED FOR LEFT SIDE IMPACT**

SID Serial Number 056 and 058

Test Sequences

06 and 07 (056)

07 and 08 (058)

		SID 056		SID 058	
		PRE	POST	PRE	POST
	Date	12Apr02	22Apr02	12Apr02	22Apr02
	Performed By	Mark Meyer	Mark Meyer	Mark Meyer	Mark Meyer
PART	INSPECTION	Pass	Pass	Pass	Pass
Skin	Visual	Pass	Pass	Pass	Pass
Head	Visual, Ballast, Accelerometer Mount	Pass	Pass	Pass	Pass
Neck	Visual and Palpated, Cable Torque	Pass	Pass	Pass	Pass
Spine Box	Visual, Ballast, Weldment, Accelerometer Mount	Pass	Pass	Pass	Pass
Rib Cage	Visual, Palpated, Measured, Stiffness	Pass	Pass	Pass	Pass
Sternum	Visual	Pass	Pass	Pass	Pass
Lumbar Spine	Visual	Pass	Pass	Pass	Pass
Abdomen	Visual	Pass	Pass	Pass	Pass
Pelvis	Visual, Palpated, Accelerometer Mount	Pass	Pass	Pass	Pass
Upper Legs	Visual	Pass	Pass	Pass	Pass
Knees	Visual, Stops, Inserts	Pass	Pass	Pass	Pass
Lower Legs	Visual, Range of Motion	Pass	Pass	Pass	Pass
Ankles	Visual, Range of Motion	Pass	Pass	Pass	Pass
Feet	Visual, Range of Motion	Pass	Pass	Pass	Pass
Joints	1 to 2 G Range	Pass	Pass	Pass	Pass
Other		None	None	None	None

APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TABLE OF CONTENTS

Section	Page No.
SID INSTRUMENTATION	D-3
VEHICLE INSTRUMENTATION	D-4
MDB INSTRUMENTATION	D-4

SID INSTRUMENTATION**FRONT SID NO. 058**

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD X	J35932	ENDEVCO	14Nov01
HEAD Y	J36031	ENDEVCO	14Nov01
HEAD Z	J35641	ENDEVCO	14Nov01
UPPER RIB	J35839	ENDEVCO	14Nov01
LOWER RIB	J32665	ENDEVCO	14Nov01
LOWER SPINE	J35937	ENDEVCO	14Nov01
PELVIS	J36603	ENDEVCO	14Nov01
UPPER RIB REDUNDANT	J36617	ENDEVCO	14Nov01
LOWER RIB REDUNDANT	J32662	ENDEVCO	14Nov01
LOWER SPINE REDUNDANT	J36614	ENDEVCO	14Nov01
PELVIS REDUNDANT	J34364	ENDEVCO	14Nov01

REAR SID NO. 056

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD X	P22539	ENDEVCO	14Nov01
HEAD Y	P22318	ENDEVCO	14Nov01
HEAD Z	P22323	ENDEVCO	14Nov01
UPPER RIB	P13819	ENDEVCO	14Nov01
LOWER RIB	P13868	ENDEVCO	14Nov01
LOWER SPINE	P12746	ENDEVCO	14Nov01
PELVIS	P13598	ENDEVCO	14Nov01
UPPER RIB REDUNDANT	P23579	ENDEVCO	14Nov01
LOWER RIB REDUNDANT	P13835	ENDEVCO	14Nov01
LOWER SPINE REDUNDANT	P14274	ENDEVCO	14Nov01
PELVIS REDUNDANT	P13837	ENDEVCO	14Nov01

VEHICLE INSTRUMENTATION

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
RIGHT FRONT SILL X	P13869	ENDEVCO	14Nov01
RIGHT FRONT SILL Y	P12931	ENDEVCO	14Nov01
RIGHT FRONT SILL Z	P22993	ENDEVCO	14Nov01
RIGHT REAR SILL X	P13869	ENDEVCO	14Nov01
RIGHT REAR SILL Y	P23573	ENDEVCO	14Nov01
RIGHT REAR SILL Z	P14233	ENDEVCO	14Nov01
REAR FLOORPAN ABOVE AXLE X	P22230	ENDEVCO	14Nov01
REAR FLOORPAN ABOVE AXLE Y	P22239	ENDEVCO	14Nov01
REAR FLOORPAN ABOVE AXLE Z	P23570	ENDEVCO	14Nov01
LEFT REAR SILL Y	J35768	ENDEVCO	14Nov01
LEFT FRONT SILL Y	P22998	ENDEVCO	14Nov01
LEFT FRONT DOOR CENTERLINE Y	J32565	ENDEVCO	14Nov01
RIGHT REAR OCCUPANT COMP Y	98G98D22-Z04	ENTRAN	14Nov01
MID-REAR OF LEFT FRONT DOOR Y	P12825	ENDEVCO	14Nov01
LEFT FRONT DOOR UPPER C/L Y	P22366	ENDEVCO	14Nov01
MID-REAR OF LEFT REAR DOOR Y	P21820	ENDEVCO	14Nov01
LEFT REAR DOOR UPPER C/L Y	P22298	ENDEVCO	14Nov01
LEFT LOWER B-PILLAR Y	P22322	ENDEVCO	14Nov01
LEFT MIDDLE B-PILLAR Y	P22951	ENDEVCO	14Nov01
LEFT LOWER A-PILLAR Y	P22315	ENDEVCO	14Nov01
LEFT UPPER A-PILLAR	P13838	ENDEVCO	14Nov01
FRONT SEAT TRACK Y	P13854	ENDEVCO	14Nov01
REAR SEAT TRACK Y	P21898	ENDEVCO	14Nov01
VEHICLE CG X	P13846	ENDEVCO	14Nov01
VEHICLE CG Y	P22577	ENDEVCO	14Nov01
VEHICLE CG Z	P22912	ENDEVCO	14Nov01

MDB INSTRUMENTATION

MDB CG X	P19211	ENDEVCO	14Nov01
MDB CG Y	P23595	ENDEVCO	14Nov01
MDB CG Z	P19145	ENDEVCO	14Nov01
MDB REAR FRAME MEMBER X	P21151	ENDEVCO	14Nov01
MDB REAR FRAME MEMBER Y	P22978	ENDEVCO	14Nov01