

Report Number: 214-TRC-03-006

Safety Compliance Testing For FMVSS 214

Side Impact Protection

Indicant

Saturn Corporation

2003 Saturn Ion 4-door sedan

NHTSA Number: C30111

Transportation Research Center Inc.

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P. O. Box B-67

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Test Date: April 8, 2003

Final Report: April 22, 2003

U. S. Department Of Transportation

National Highway Traffic Safety Administration

Office of Enforcement

Office of Vehicle Safety Compliance

400 Seventh Street, S. W.

Room No. 6111 (NVS-220)

Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-02-D-11114. This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

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FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

1. Report No. 214-TRC-03-006	2. Government Accession No.	3. Recipient's Catalog No.																															
4. Title and Subtitle Final Report of FMVSS 214 Indicant Compliance Side Impact Testing of a 2003 Saturn Ion 4-door sedan NHTSA No.: C30111		5. Report Date April 21, 2003																															
		6. Performing Organization Code TRC Inc.																															
7. Author(s) Virginia L. Watters, Project Manager Transportation Research Center Inc.		8. Performing Organization Report No. 030408-1																															
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No. (TRAIS)																															
		11. Contract or Grant No. DTNH22-02-D-11114																															
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (NVS-220) 400 Seventh Street, S.W., Room 6111 Washington, DC 20590		13. Type of Report and Period Covered Final Report April 2003																															
		14. Sponsoring Agency Code NVS-220																															
15. Supplemental Notes																																	
16. Abstract This 56/28 km/h 90° Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject vehicle, a 2003 Saturn Ion 4-door sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-214D-06 (except the test was conducted 8 km/h (5 mph) faster than the standard specifies) to determine FMVSS 214 Side Impact Protection compliance. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on April 4, 2003. The impact velocity of the Moving Deformable Barrier (MDB) was 62.0 km/h, and the ambient temperature at the struck (driver's side) side of the target vehicle at the time of impact was 21° C. The target vehicle's post-test maximum crush was 335 mm at Level 2. The test or target vehicle's performance is given below (with FIR filter): <table border="0"> <thead> <tr> <th></th> <th><u>Front SID-HIII</u></th> <th></th> <th><u>Rear SID-HIII</u></th> <th></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration:</td> <td><u>78.5</u></td> <td>g's</td> <td><u>80.8</u></td> <td>g's</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td><u>91.4</u></td> <td>g's</td> <td><u>86.0</u></td> <td>g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td><u>102.0</u></td> <td>g's</td> <td><u>77.9</u></td> <td>g's</td> </tr> <tr> <td>Thoracic Trauma Index, (TTI):</td> <td><u>96.7</u></td> <td>g's</td> <td><u>81.9</u></td> <td>g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td><u>103.4</u></td> <td>g's</td> <td><u>63.8</u></td> <td>g's</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during side impact event. The rear door on the struck side became unlatched, but remained jammed shut.					<u>Front SID-HIII</u>		<u>Rear SID-HIII</u>		Left Upper Rib Acceleration:	<u>78.5</u>	g's	<u>80.8</u>	g's	Left Lower Rib Acceleration:	<u>91.4</u>	g's	<u>86.0</u>	g's	Lower Spine Acceleration:	<u>102.0</u>	g's	<u>77.9</u>	g's	Thoracic Trauma Index, (TTI):	<u>96.7</u>	g's	<u>81.9</u>	g's	Pelvis Acceleration (PEV):	<u>103.4</u>	g's	<u>63.8</u>	g's
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17. Key Words Compliance Testing Side Impact Protection FMVSS 214 Side Impact Dummy (SID-HIII)		18. Distribution Statement <u>Copies of this report are available from:</u> NHTSA Technical Reference Division Room 5108 (NAD-52), 400 Seventh Street, S.W. Washington, DC 20590 Telephone No. (202) 366-4946 Attn: Robert Hornicle																															
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. Number of Pages 424	22. Price																														

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Section 1

Purpose and Test Procedure

This side impact test is part of the FMVSS 214 Side Impact Protection Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-02-D-11114. The purpose of this test was to evaluate side impact protection in a 2003 Saturn Ion 4-door sedan. The test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-06, dated July 2001) with the exception of test speed, which was at the NCAP High-Speed Lateral Impact level (61.2 km/h).

Section 2

Summary of Side Impact Test

A 2003 Saturn Ion 4-door sedan was impacted on the driver's left side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 62.0 km/h (38.5 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on April 8, 2003. Pre-test and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SID-HIIIs) are included in Appendix A.

Two restrained Side Impact Dummies (SID-HIIIs) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to the instructions specified in the OVSC Side Impact Laboratory Test Procedure (TP-214D-06, dated July 2001). Both SID-HIIIs were certified prior to this test. The side impact test was documented by one real-time camera and 9 high-speed cameras. Camera locations and other pertinent camera information are included in this report.

The SID-HIIIs were instrumented with the following accelerometers:

1. Head (HED) triaxial and redundant accelerometers (X, Y, and Z-directions)
2. Neck (NEK) triaxial force and moment load cells (X, Y, and Z-directions)
3. Left Upper Rib (LUR) uniaxial and redundant accelerometer (Y-direction)
4. Left Lower Rib (LLR) uniaxial and redundant accelerometer (Y-direction)
5. Lower Thoracic Spine (T₁₂) uniaxial and redundant accelerometer (Y-direction)
6. Pelvic (PEV) section uniaxial and redundant accelerometer (Y-direction)

A summary of the side impact dummy (SID-HIII) configuration and verification test data can be found in Appendix C. A total of 69 channels of data were recorded. Appendix B contains the vehicle, MDB, and dummy response data traces.

The following tables summarize the results of the test:

Injury Criteria	Front SID-HIII	Rear SID-HIII
TTI (g)	96.7	81.9
PEV (g)	103.4	63.8

Head Injury Criteria (HIC)

Injury Criteria	Front SID-HIII	Rear SID-HIII
HIC ¹	683	405
t ₁ (ms)	44.6	49.8
t ₂ (ms)	80.6	63.7
Average Acceleration t ₁ - t ₂ (g)	51.3	61.8

HIC is as defined in FMVSS 208. The maximum time interval t₁ to t₂ is 36 ms.

Neck Injury Criteria

Maximum Values	Front SID-HIII	Rear SID-HIII
Neck X-axis Force (N)	-1078	279
Neck Y-axis Force (N)	1030	468
Neck Z-axis Force (N)	2761	-1665
Moment About X-axis (Nm) ²	109	-151
Moment About Y-axis (Nm)	40	-49
Moment About Z-axis (Nm)	32	24

¹ See Data Acquisition Explanations

² Calculated about the occipital condyle with the following formula: $M_{occ} = M_x + 0.01778F_y$.

Data Acquisition Explanations

The driver's head Y-axis acceleration channel, HEDYG1, recorded a questionable data spike at approximately 33 ms. This affected the driver's head Y-axis velocity and head resultant acceleration calculations. The Head Injury Criteria (HIC) calculation was not affected because the HIC time interval did not include this spike.

The driver's redundant head X-axis acceleration channel, HEDXR1, recorded a questionable data spike at approximately 33 ms. This affected the driver's redundant head X-axis velocity and redundant head resultant acceleration calculations. The redundant Head Injury Criteria (HIC) calculation was not affected.

The driver's redundant head Y-axis acceleration channel, HEDYR1, recorded a questionable data spike at approximately 33 ms. This affected the driver's redundant head Y-axis velocity and redundant head resultant acceleration calculations. The redundant Head Injury Criteria (HIC) calculation was not affected.

The driver's redundant head Z-axis acceleration channel, HEDZR1, recorded a questionable data spike at 33 ms. This affected the driver's redundant head Z-axis velocity and redundant head resultant acceleration calculations. The redundant Head Injury Criteria (HIC) calculation was not affected.

The driver's redundant left upper rib Y-axis acceleration channel, LURYR1, exceeded full-scale at approximately 47 ms and recorded no valid data after that. This affected the driver's redundant left upper rib Y-axis velocity calculation.

The vehicle's left rear seat track Y-axis acceleration channel, LRTYG1, recorded questionable data after approximately 43 ms and recorded no valid data after exceeding full-scale at approximately 59 ms. This affected the driver's left rear seat track Y-axis velocity measurement.

The vehicle's left lower A-post Y-axis acceleration channel, LLAYG1, recorded no valid data after approximately 44 ms. This affected the driver's lower left A-post Y-axis velocity measurement.

The vehicle's left middle B-post Y-axis acceleration channel, LMBYG1, exceeded full-scale at approximately 22 ms and recorded no valid data after that. This affected the driver's left middle B-post Y-axis velocity measurement.

Section 3

Summary of Test Results

Data Sheet 1

General Test Vehicle Parameter Data

Test Vehicle Information:

Vehicle Year/Make/Model: 2003 Saturn Ion
Vehicle Body Style/Color: 4-door sedan/Silver VIN: 1G8AF52F43Z145425
Vehicle NHTSA No.: C30111 Build Date: 01/03
Engine Data: 4 Cylinders; CID; 2.2 Liters; cc
Placement: - Longitudinal; or X Lateral; or - Horizontal
Transmission: 5 Speed; X Manual; - Automatic; - Overdrive
Final Drive: - RWD; X FWD; - Four-Wheel Drive
Odometer Reading: 127 km
Options: X A/C; X Power steering; X Pwr. brakes; - Power windows

Data From Vehicle's Tire Placard:

Tire Pressure (at capacity)* 210 kPa Front; 210 kPa Rear

Recommended Tire Size: P185/70 R14

Tires on Test Vehicle: P185/70 R14 Manufacturer: Firestone FR690

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; 0 3rd seat; 5 Total
Type of Front Seats: X Bucket; - Bench; - Split bench
Type of Front Seat Back: - Fixed; X Adjustable with X Lever or - Knob
Vehicle Max. Capacity Loading = 408.0 kg (A)
No. of Occupants x 68.04 kg. = 340.0 kg (B)
Vehicle Cargo Capacity (A-B) = 68 kg

Test Vehicle Delivered Weight With Maximum Fluids:

Left Front	=	<u>346.5</u> kg	Left Rear	=	<u>275.5</u> kg
Right Front	=	<u>382.5</u> kg	Right Rear	=	<u>235</u> kg
Total Front	=	<u>729</u> kg	Total Rear	=	<u>510.5</u> kg
Front % of Total Weight	=	<u>58.8</u> %	Rear % of Total Weight	=	<u>41.2</u> %
Total Weight	=	<u>1239.5</u> kg			

* Tire pressure used in test.

Data Sheet 1 (continued)

General Test Vehicle Parameter Data

Calculation Of Vehicle's Target Test Weight:

Total Test Vehicle Delivered Weight With Max. Fluids = 1239.5 kg (A)
Maximum Cargo Carrying Capacity of Test Vehicle = 68.0 kg (B)
Weight of Instrumented Side Impact Dummies (2 X 84.0 kg) = 168.0 kg (C)
Test Vehicle Target Weight: = 1475.5 kg (A+B+C)

Fully Loaded Test Vehicle (UDW + 2 SID-HIII(s) + Cargo):

Left Front	=	<u>383.5</u> kg	Left Rear	=	<u>355.5</u> kg
Right Front	=	<u>421.5</u> kg	Right Rear	=	<u>315.0</u> kg
Total Front	=	<u>805.0</u> kg	Total Rear	=	<u>670.5</u> kg
Front % of Total Weight	=	<u>54.6</u> %	Rear % of Total Weight	=	<u>45.4</u> %
Total Weight	=	<u>1475.5</u> kg			

As Tested Weight of Test Vehicle (2 SID-HIII(s) + Cargo + Equipment & Instrumentation):

Left Front	=	<u>423.4</u> kg	Left Rear	=	<u>328.0</u> kg
Right Front	=	<u>403.2</u> kg	Right Rear	=	<u>314.8</u> kg
Total Front	=	<u>826.6</u> kg	Total Rear	=	<u>642.8</u> kg
Front % of Total Weight	=	<u>56.3</u> %	Rear % of Total Weight	=	<u>43.7</u> %
Total Weight	=	<u>1469.4</u> kg			

Test Vehicle Attitude (all dimensions in millimeters):

As Delivered	Fully Loaded	Ready For Test
Right Front <u>703</u>	Right Front <u>678</u>	Right Front <u>677</u>
Left Front <u>706</u>	Left Front <u>675</u>	Left Front <u>675</u>
Right Rear <u>694</u>	Right Rear <u>653</u>	Right Rear <u>657</u>
Left Rear <u>691</u>	Left Rear <u>644</u>	Left Rear <u>660</u>

Test Vehicle Wheelbase: 2617 mm

C.G. = 1144 mm rearward of front wheel centerline

Total Vehicle Length:

Right Side = 4457 mm
Left Side = 4466 mm
Centerline = 4648 mm

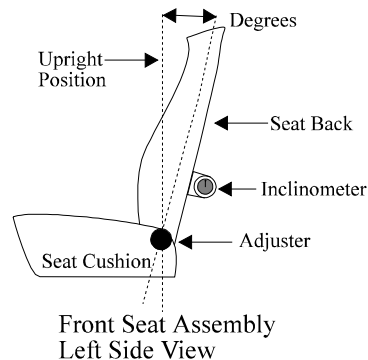
Data Sheet 1 (continued)

General Test Vehicle Parameter Data

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

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



Front Seat Cushion Placement: Mid

Total Length of Fore/Aft Adjustment Travel: 260 mm

Total Number of Adjustment Positions or Detents: 27

Front Seat Back Adjustment Position: The back was adjusted to 9.1° measured on the headrest post

Seat Back Torso Angle: N/A degrees

Second Position Seat Placement: N/A, not adjustable

Total Length Of Fore/Aft Adjustment Travel: None

Seat Back Adjustment Position: N/A, not adjustable

Adjustable Steering Column Position: 17.9°

Window Positions:

Right Front: Open

Right Rear: Open

Left Front: Closed

Left Rear: Closed

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

Amount of Stoddard Solvent In Fuel Tank:

51.5 liters (fuel tank usable capacity)

48.1 liters used in test (92% - 94% of fuel tank usable capacity)

Location of Impact Point On Test Vehicle Side To Be Impacted:

Wheelbase = 2617 millimeters

Intended impact point is 368 millimeters rearward of front axle centerline
(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 391 millimeters rearward of front axle centerline

Data Sheet 2

Test Vehicle Summary of Results

Vehicle Year/Make/Model: 2003/Saturn /Ion

Body Style: 4-door sedan

VIN: 1G8AF52F43Z145425

NHTSA No.: C30111

Build Date: January, 2003

Test Date: 04/08/03

Vehicle Overall Length = 4648 mm

Overall Width = 1708 mm

Vehicle Test Weight (Pre-Test):

Left Front = 423.4 kg Left Rear = 328.0 kg

Right Front = 403.2 kg Right Rear = 314.8 kg

Total Front = 826.6 kg Total Rear = 642.8 kg

Total Weight = 1469.4 kg

Wheelbase = 2617 mm

Longitudinal C.G. From Center Of Front Axle = 1144 mm

Impact Angle With Respect To Impactor = 90 degrees

Impact Point:

Actual Impact Point is 23 mm Right of nominal impact ref. line (Lateral)

Actual Impact Point is 5 mm Up from nominal impact point (Vertical)

Maximum Exterior Static Crush:

1. Level 1 (250 mm above ground) = 136 mm

2. Level 2 (513 mm above ground) = 335 mm

3. Level 3 (630 mm above ground) = 287 mm

4. Level 4 (870 mm above ground) = 232 mm

5. Level 5 (1384 mm above ground) = 45 mm

Maximum Post-Test Intrusion = 335 mm

Occupants:

Front Passenger

Rear Passenger

Dummy Identification 028

066

Restraints Used Seatbelt, front airbag

Seatbelt

Instrumentation:

Number of Vehicle Data Channels: = 22

Number of Cameras: Onboard = 3 Offboard = 8 Total = 11

Data Sheet 3

Moving Deformable Barrier(MDB) Summary

MDB Face Manufacturer And Serial Number:

Plascore, 004A0203-2, 046B0103

Position Of Impactor (MDB) On Monorail:

Crabbed 27° to the left

MDB Specifications:

Overall Width of Framework Carriage = 1251 mm

Overall Length of MDB (Incl. honeycomb impact face) = 4014 mm

Wheelbase of Framework Carriage = 2591 mm

Track of Framework Carriage (Front & Rear) = 1881 mm

C.G. Location Rearward of Front Axle = 1115 mm

MDB Weight:

Left Front = 382 kg Left Rear = 301.6 kg

Right Front = 393.6 kg Right Rear = 284.2 kg

Total Front = 775.6 kg Total Rear = 585.8 kg

Total MDB Weight = 1361.4 kg

Impact Angle (MDB C/L to Target Vehicle C/L) = 90 degrees

Impact Speed = 62.0 km/h

Maximum Static Crush of Honeycomb Impact Face:

1. Row A at Center of Bumper Level = 174 millimeters

2. Row B at Top of Bumper Level = 98 millimeters

3. Row C at Mid Level = 126 millimeters

4. Row D at Top of Stack Level = 159 millimeters

Instrumentation:

Number of MDB Data Channels = 5

Data Sheet 4

Post-Test Observations

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Visible Dummy Contact Points:

	<u>Left Front SID-HIII</u>	<u>Left Rear SID-HIII</u>
Head:	<u>Upper edge of door panel,</u> <u>right side of driver head</u> <u>restraint, left shoulder</u>	<u>Side header</u>
Upper Torso:	<u>Door panel</u>	<u>Door panel</u>
Lower Torso:	<u>Door panel</u>	<u>Door panel</u>
Left Knee:	<u>Door panel</u>	<u>Door panel</u>
Right Knee:	<u>None</u>	<u>None</u>

Door Opening:

	<u>Left Side</u>	<u>Right Side</u>
Front:	<u>Latched and jammed shut</u>	<u>Easy</u>
Rear:	<u>Unlatched and jammed shut</u> <u>(no separation)</u>	<u>Easy</u>

MDB Distance From Target Impact Point:

Vertical: 5 mm up from target
Horizontal: 23 mm right from target

Arm Rest Locations:

Front: 282 mm below the bottom of the window
Rear: 288 mm below the bottom of the window

Seat Movement:

Front: Pushed inboard
Rear: None

Glazing Damage:

Windshield: Cracked at upper A-pillar
Window: Both side windows shattered

Pillar Separation: No

Sill Separation: No

Other Notable Impact Effects:

The driver and passenger frontal airbags deployed.

Section 4

Occupant and Vehicle Information

Data Sheet 5

SID-HIII Instrumentation Data

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

TEST NUMBER: 030408-1

DRIVER DUMMY SERIAL NUMBER: 028

POSITIVE
DIRECTION

NEGATIVE
DIRECTION

HEAD ACCELERATION

LONGITUDINAL	9.1 g	@	196.4 ms	33.2 g	@	71.8
LATERAL ¹	---- g	@	---- ms	---- g	@	----
VERTICAL	66.8 g	@	45.2 ms	11.0 g	@	35.8
RESULTANT ¹	---- g	@	---- ms			
HIC	683 from 40.2 to 76.2 ms					

HEAD REDUNDANT ACCELERATION

LONGITUDINAL ¹	---- g	@	---- ms	---- g	@	----
LATERAL ¹	---- g	@	---- ms	---- g	@	----
VERTICAL ¹	---- g	@	---- ms	---- g	@	----
RESULTANT ¹	---- g	@	---- ms			
HIC	748 from 40.4 to 76.4 ms					

NECK FORCE

X-AXIS SHEAR	209.7 N	@	198.1 ms	1078.0 N	@	67.9
Y-AXIS SHEAR	1030.2 N	@	73.2 ms	304.0 N	@	29.1
Z-AXIS AXIAL	2760.6 N	@	49.3 ms	423.6 N	@	36.2

NECK MOMENT

ABOUT X-AXIS	95.2 N-m	@	67.4 ms	106.4 N-m	@	38.3
ABOUT Y-AXIS	40.4 N-m	@	77.9 ms	33.4 N-m	@	43.8
ABOUT Z-AXIS	32.2 N-m	@	68.6 ms	16.8 N-m	@	33.9
OCCIPITAL COND	109.0 N-m	@	67.3 ms	95.6 N-m	@	37.8

LEFT UPPER RIB ACCELERATION

LATERAL (P) ¹	78.5 g	@	29.4 ms	25.5 g	@	66.3
LATERAL (R) ¹	---- g	@	---- ms	---- g	@	----

LEFT LOWER RIB ACCELERATION

LATERAL (P)	91.4 g	@	28.7 ms	23.0 g	@	62.5
LATERAL (R)	92.6 g	@	28.7 ms	23.6 g	@	62.5
TTI d (P)	76.2					
TTI d (R)	76.0					

LOWER SPINE ACCELERATION

LATERAL (P)	102.0 g	@	29.4 ms	17.2 g	@	77.5
LATERAL (R)	103.2 g	@	29.4 ms	21.9 g	@	58.8

PELVIS ACCELERATION

LATERAL (P)	103.4 g	@	23.1 ms	8.8 g	@	44.4
LATERAL (R)	103.7 g	@	23.1 ms	8.9 g	@	44.4

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

¹ See DATA ACQUISITION EXPLANATION

Data Sheet 5 (Continued)

SID-HIII Instrumentation Data

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

TEST NUMBER: 030408-1

PASSENGER DUMMY SERIAL NUMBER: 066

POSITIVE
DIRECTION

NEGATIVE
DIRECTION

HEAD ACCELERATION

LONGITUDINAL	10.8 g	@	180.2 ms	16.2 g	@	61.8
LATERAL	78.3 g	@	51.8 ms	13.9 g	@	181.3
VERTICAL	14.3 g	@	42.3 ms	33.3 g	@	58.0
RESULTANT	80.0 g	@	51.8 ms			
HIC	405	from	44.7 to 62.7 ms			

HEAD REDUNDANT ACCELERATION

LONGITUDINAL	10.7 g	@	180.9 ms	15.7 g	@	61.6
LATERAL	77.7 g	@	51.8 ms	13.6 g	@	181.4
VERTICAL	13.9 g	@	42.8 ms	33.4 g	@	58.0
RESULTANT	79.4 g	@	51.8 ms			
HIC	402	from	44.8 to 62.7 ms			

NECK FORCE

X-AXIS SHEAR	278.8 N	@	66.2 ms	159.5 N	@	98.0
Y-AXIS SHEAR	468.1 N	@	51.8 ms	425.9 N	@	75.8
Z-AXIS AXIAL	432.0 N	@	35.7 ms	1665.2 N	@	58.3

NECK MOMENT

ABOUT X-AXIS	16.8 N-m	@	184.7 ms	156.7 N-m	@	53.2
ABOUT Y-AXIS	22.2 N-m	@	115.7 ms	49.4 N-m	@	57.0
ABOUT Z-AXIS	23.7 N-m	@	77.1 ms	6.7 N-m	@	52.3
OCCIPITAL COND	15.0 N-m	@	124.2 ms	150.9 N-m	@	53.3

LEFT UPPER RIB ACCELERATION

LATERAL (P)	80.8 g	@	33.7 ms	9.5 g	@	55.6
LATERAL (R)	80.1 g	@	33.7 ms	8.6 g	@	55.6

LEFT LOWER RIB ACCELERATION

LATERAL (P)	86.0 g	@	33.7 ms	10.6 g	@	88.8
LATERAL (R)	85.7 g	@	33.7 ms	10.7 g	@	89.4
TTI d (P)	72.6					
TTI d (R)	70.7					

LOWER SPINE ACCELERATION

LATERAL (P)	77.9 g	@	37.5 ms	29.2 g	@	69.4
LATERAL (R)	77.1 g	@	37.5 ms	29.1 g	@	69.4

PELVIS ACCELERATION

LATERAL (P)	63.8 g	@	34.4 ms	11.3 g	@	72.5
LATERAL (R)	63.8 g	@	34.4 ms	11.3 g	@	71.9

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

NEGATIVE DIRECTION

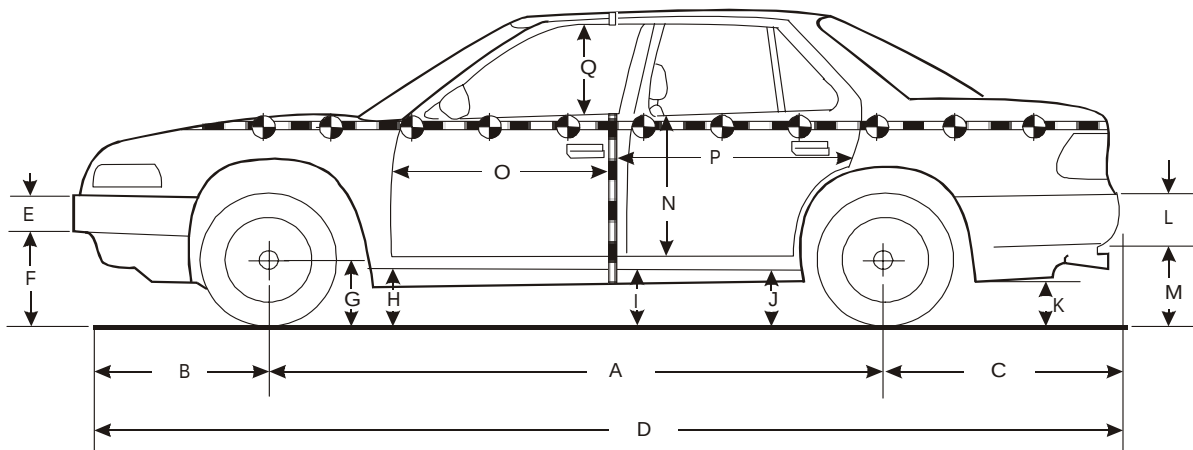
LONGITUDINAL: REARWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

Data Sheet 6

Vehicle Pre-Test And Post-Test Measurements

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



Left Side View

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

	Pre-Test (as delivered)	Pre-Test (as tested)	Post-Test (as tested)	Change
A	2617	2617	2605	12
B	985	985	995	-10
C	1046	1046	1046	0
D	4648	4648	4640	8
E	171	171	171	0
F	400	385	402	-17
G	287	283	289	-6
H	250	245	237	8
I	257	250	370	-120
J1	210	170	195	-25
J2	250	245	307	-62
K	298	262	270	-8
L	315	315	315	0
M	348	310	318	-8
N	717	717	670	47
O	735	735	740	-5
P	1276	1276	1010	266
Q	415	415	359	56
R	4457	4457	4465	-8
S	4466	4466	4475	-9
T	1275	1275	1055	220

D = Length at centerline
T = Width at B-pillar

E&L = Bumper Thickness
J1 = To Pinch Weld

R = Right Side Length
J2 = To Sill

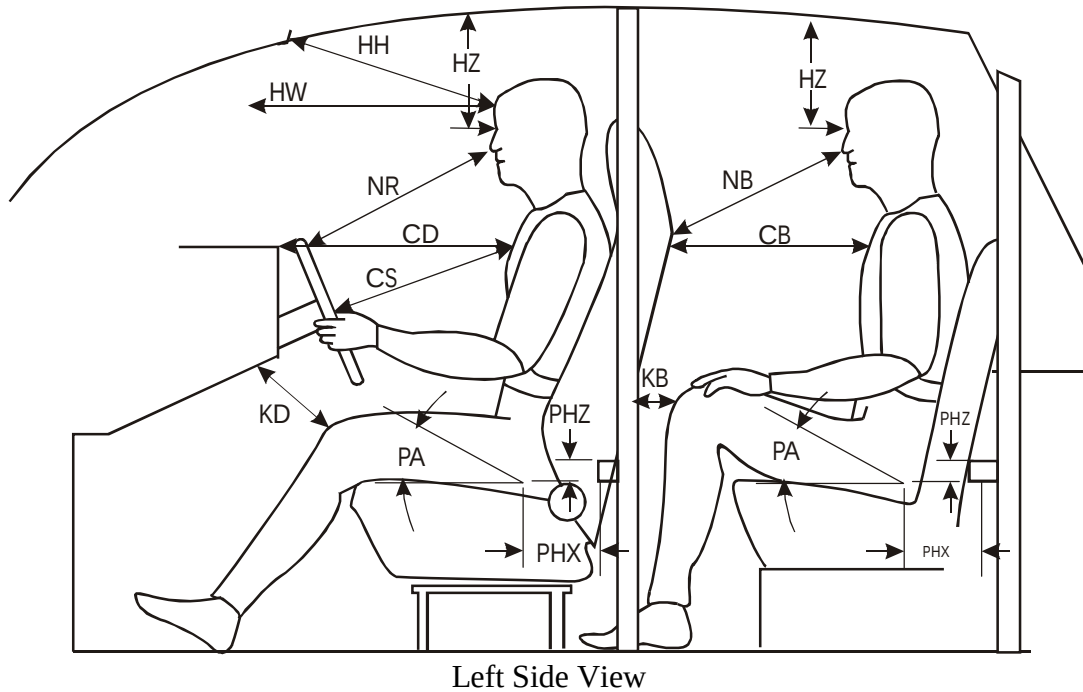
S = Left Side Length

Data Sheet 7

SID-HIII Longitudinal Clearance Dimensions

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



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

Measurement	Driver SID-HIII # 28	Left Rear Pass. SID-HIII # 66
HH	429	N/A
HW	726	N/A
HZ	210	164
NR/NB	450	550
CD/CB	760	481
CS	381	N/A
KDL(KDA°)/KBL(KBA°)	94/33°	96/23.8°
KDR(KDA°)/KBR(KBA°)	95/35°	103/24.6°
PA°	24.5°	23.9°
PHX	187	228
PHZ	120	300

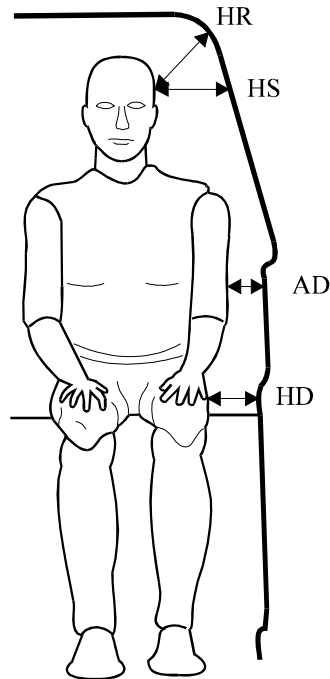
Note: 2-door vehicle shown. Rear dummy PHX and PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

Data Sheet 8

SID-HIII Lateral Clearance Dimensions

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



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

Measurement	Driver SID-HIII # 28	Left Rear Pass. SID-HIII # 66
HR	203	186
HS	353	351
AD*	Lower: 88 Upper: 99	Lower: 81 Upper: 87
HD	112	126

* Lower measurement is taken laterally at center of the lower rib accelerometer height from the SID-HIII arm segment to the closest part of the vehicle side.

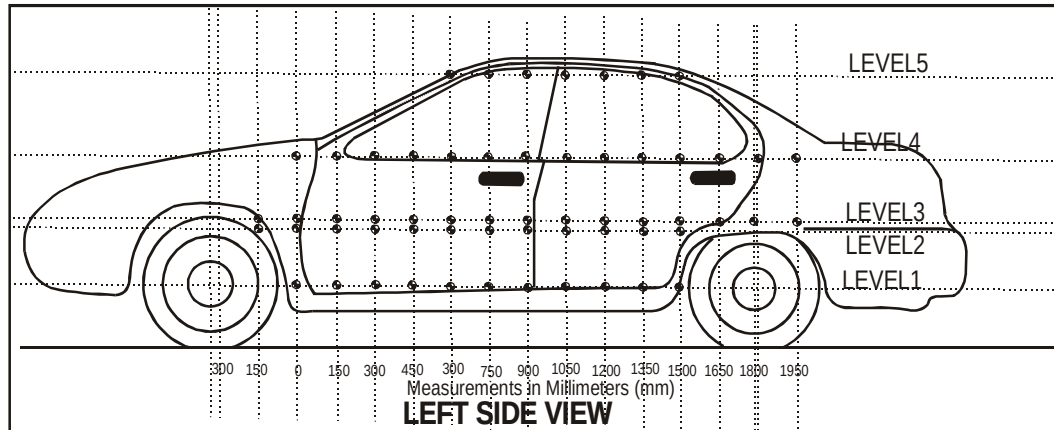
Upper measurement is taken laterally at center of the upper rib accelerometer height from the SID-HIII arm segment to the closest part of the vehicle side.

Data Sheet 9

Vehicle Side Measurements

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



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 shown above:

Level 5 @ Window Top	=	<u>1384</u>	mm
Level 4 @ Window Sill	=	<u>870</u>	mm
Level 3 @ Mid Door	=	<u>630</u>	mm
Level 2 @ Occupant H-Point	=	<u>513</u>	mm
Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>250</u>	mm

Data Sheet 10

Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Location	Height		(mm) From Impact Point													
			-1200	-1050	-900	-750	-600	-450	-300	-150	0	150	300	450	600	750
Level 1 Side Sill	250	Pre	---	765	718	---	---	---	---	---	---	700	700	696	700	696
		Post	---	768	726	---	---	---	---	---	---	716	733	755	776	795
		Crush	---	3	8	---	---	---	---	---	---	16	33	59	76	99
Level 2 H-Point	513	Pre	---	734	691	662	---	---	---	---	650	656	653	650	649	645
		Post	---	741	699	676	---	---	---	---	691	921	935	944	947	950
		Crush	---	7	8	14	---	---	---	---	41	265	282	294	298	305
Level 3 Mid-Door	630	Pre	---	745	704	768	646	---	---	---	653	656	651	646	645	642
		Post	---	754	709	689	659	---	---	---	696	880	894	914	907	911
		Crush	---	9	5	-79	13	---	---	---	43	224	243	268	262	269
Level 4 Window Sill	870	Pre	---	---	794	756	735	721	714	702	691	689	682	681	767	675
		Post	---	---	800	767	749	740	735	730	730	798	830	861	866	872
		Crush	---	---	6	11	14	19	21	28	39	109	148	180	99	197
Level 5 Window Top	1384	Pre	---	---	---	---	---	---	---	---	---	---	---	---	---	909
		Post	---	---	---	---	---	---	---	---	---	---	---	---	---	934
		Crush	---	---	---	---	---	---	---	---	---	---	---	---	---	25

Data Sheet 10 (Continued)

Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Location	Height		(mm) From Impact Point												
			900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700
Level 1 Side Sill	250	Pre	696	696	695	697	703	702	700	---	---	---	---	---	---
		Post	822	830	831	820	763	741	713	---	---	---	---	---	---
		Crush	126	134	136	123	60	39	13	---	---	---	---	---	---
Level 2 H-Point	513	Pre	647	649	649	647	649	650	650	---	---	---	---	---	677
		Post	979	956	942	982	871	878	---	---	---	---	---	---	680
		Crush	332	307	293	335	222	228	---	---	---	---	---	---	3
Level 3 Mid-Door	630	Pre	647	653	647	648	648	647	650	640	---	---	---	650	680
		Post	922	940	917	875	869	874	752	714	---	---	---	660	686
		Crush	275	287	270	227	221	227	102	74	---	---	---	10	6
Level 4 Window Sill	870	Pre	675	677	670	668	670	672	675	675	680	683	689	698	710
		Post	879	891	902	885	894	865	857	739	667	717	713	719	727
		Crush	204	214	232	217	224	193	182	64	-13	34	24	21	17
Level 5 Window Top	1384	Pre	908	906	896	895	895	899	910	923	---	---	---	---	---
		Post	931	937	941	935	933	935	937	953	---	---	---	---	---
		Crush	23	31	45	40	38	36	27	30	---	---	---	---	---

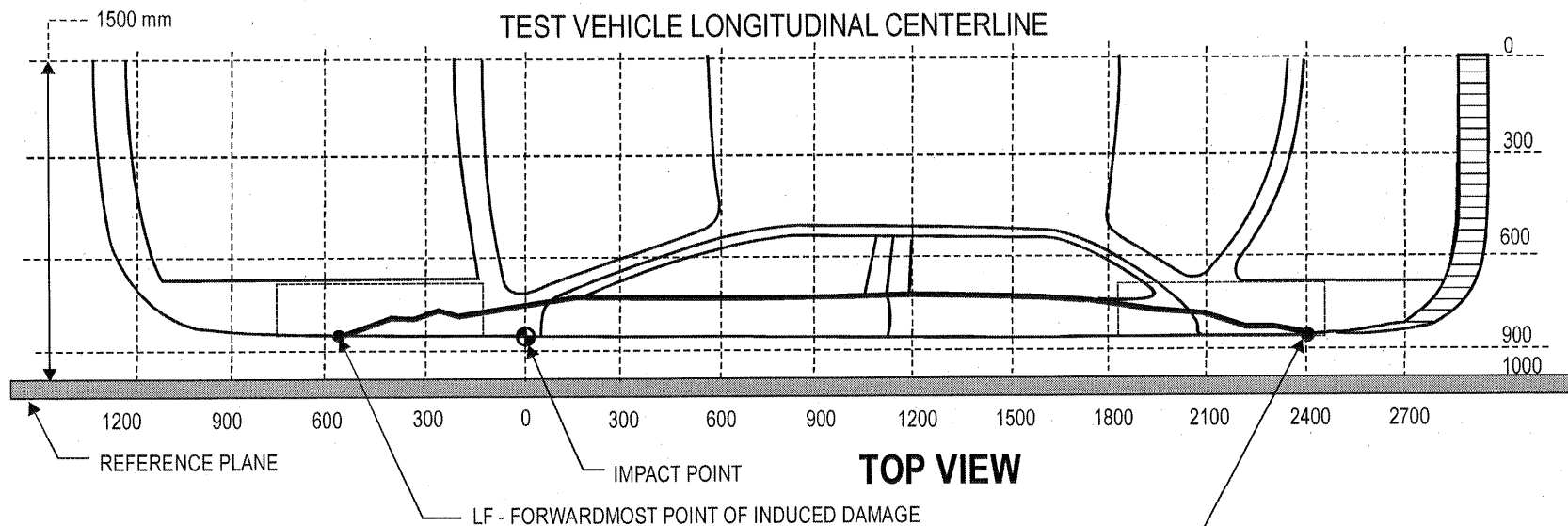
Data Sheet 11

Vehicle Damage Profile Distances

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

NOTE: All measurements are in millimeters (mm) and should be accurate to plus or minus 3mm.



MEASUREMENT CONVENTIONS:

Forward of the impact point (towards front of vehicle) is considered negative (-)

Rearward of the impact point (towards rear end of vehicle) is considered positive (+)

DPD Measurements	Post-Test (mm)	Pre-Test (mm)	Static Crush (mm)
6: LF = 0 mm (Level 3)	696	653	43
5: 450 mm (Level 2)	944	650	294
4: 750 mm (Level 2)	950	645	305
3: 1050 mm (Level 2)	956	649	307
2: 1500 mm (Level 2)	871	649	222
1: LR = 1950 mm (Level 3)	714	640	74

Full length of induced damage was 0 to 1950 mm.

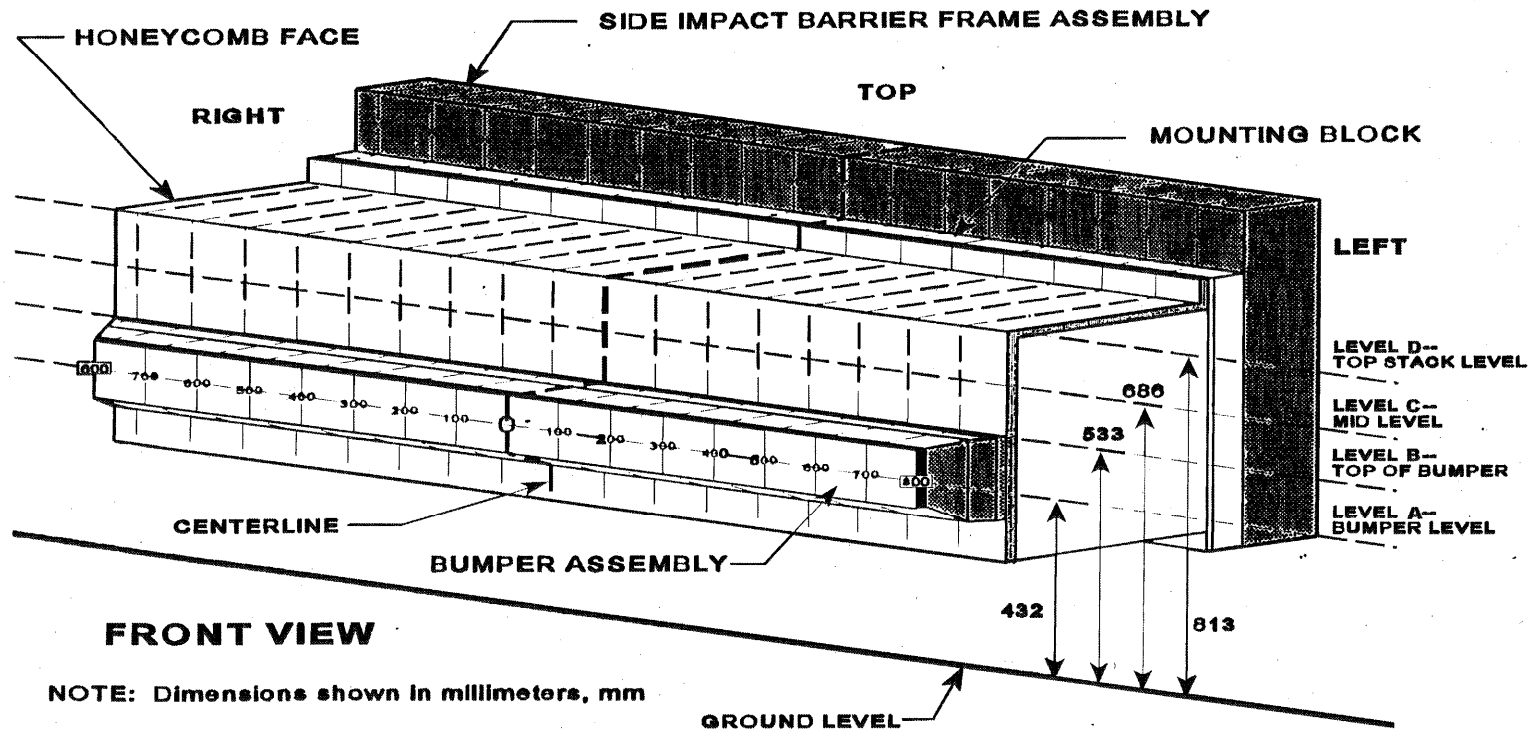
Data Sheet 12

Exterior Static Crush For Impactor Face

(Grid as looking at MDB from front)

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Location	Height At CL	Distance Right of Center (mm)									Distance Left of Center (mm)							
		800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
Top Stack Level - Level D	814	-74	-26	-5	4	3	-1	-19	-24	-24	-19	-17	-18	-23	-37	-65	-113	-159
Mid Level Level C	684	-26	-13	-3	-2	-4	-7	-18	-12	-10	-9	-10	-13	-16	-19	-28	-59	-126
Top Bumper Level - Level B	559	-98	-78	-49	-29	-27	-30	-30	-22	-23	-22	-23	-28	-27	-33	-39	-48	-64
Mid Bumper Level - Level A	432	-174	-140	-103	-83	-80	-88	-89	-84	-82	-81	-79	-83	-86	-90	-100	-118	-138

All measurements are in millimeters and have a tolerance of ± 3 mm.

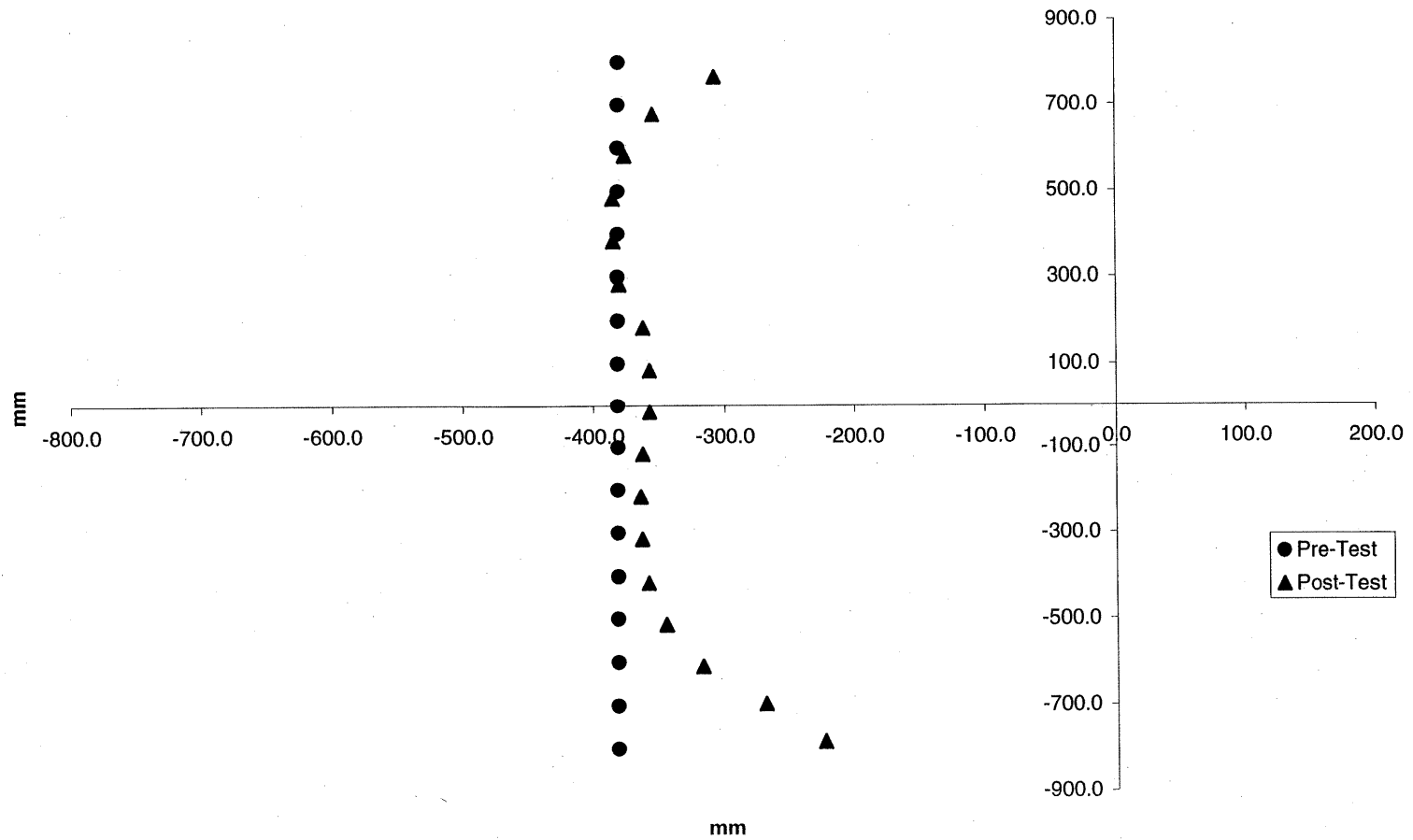
Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Level D - Deformable Barrier Face Profile 1-17



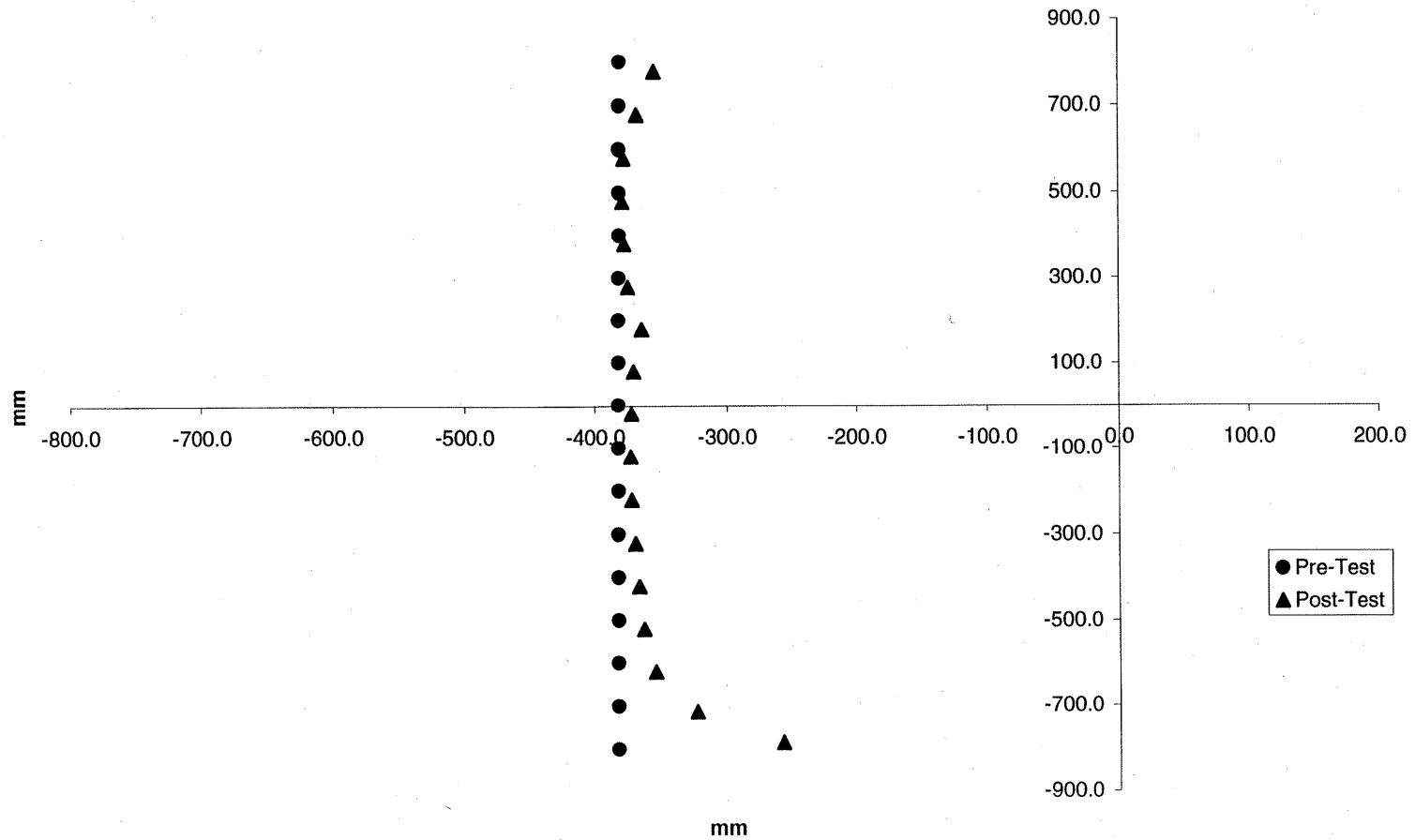
Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Level C - Deformable Barrier Face Profile 18-34

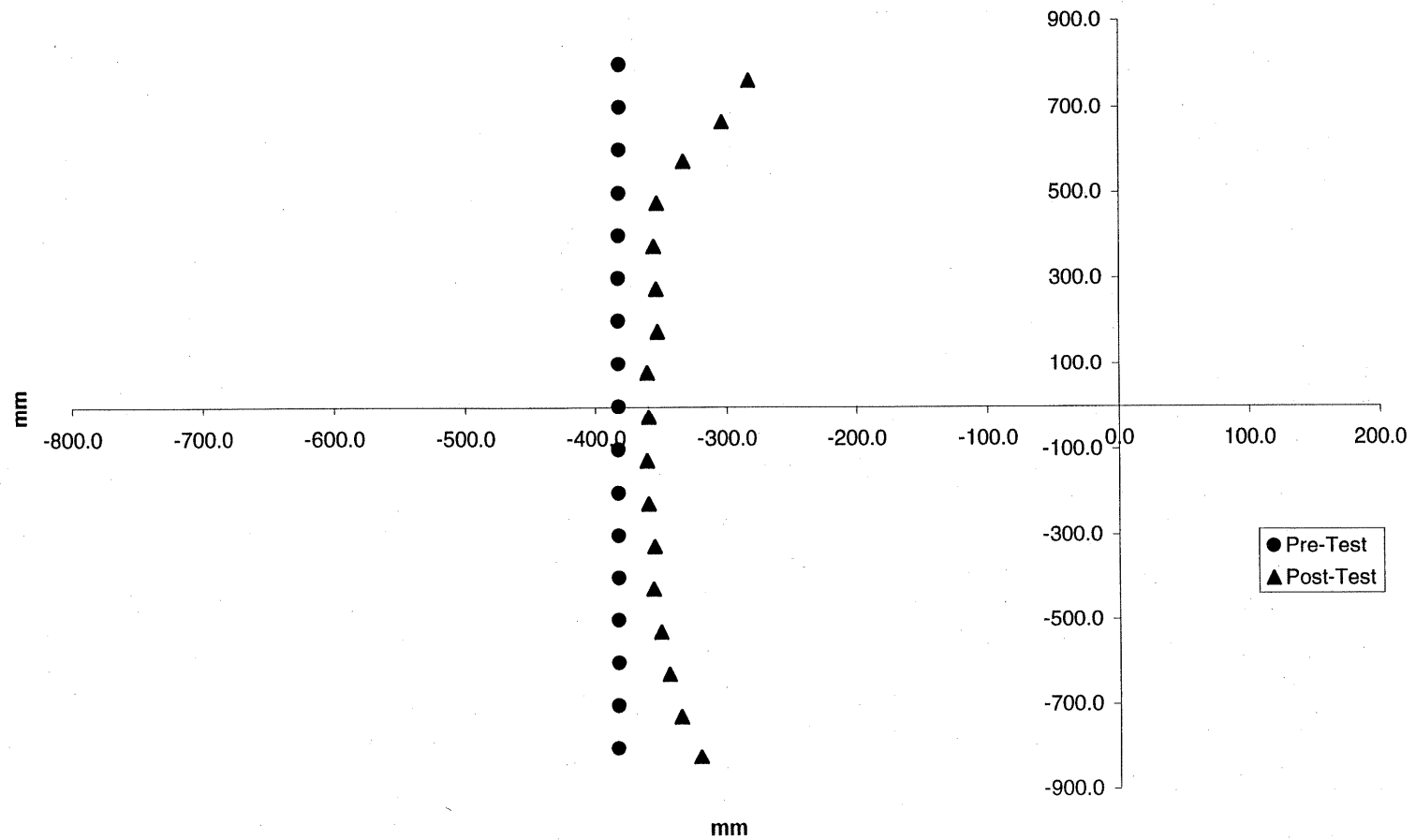


Data Sheet 12 (Continued)
Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Level B - Deformable Barrier Face Profile 35-51

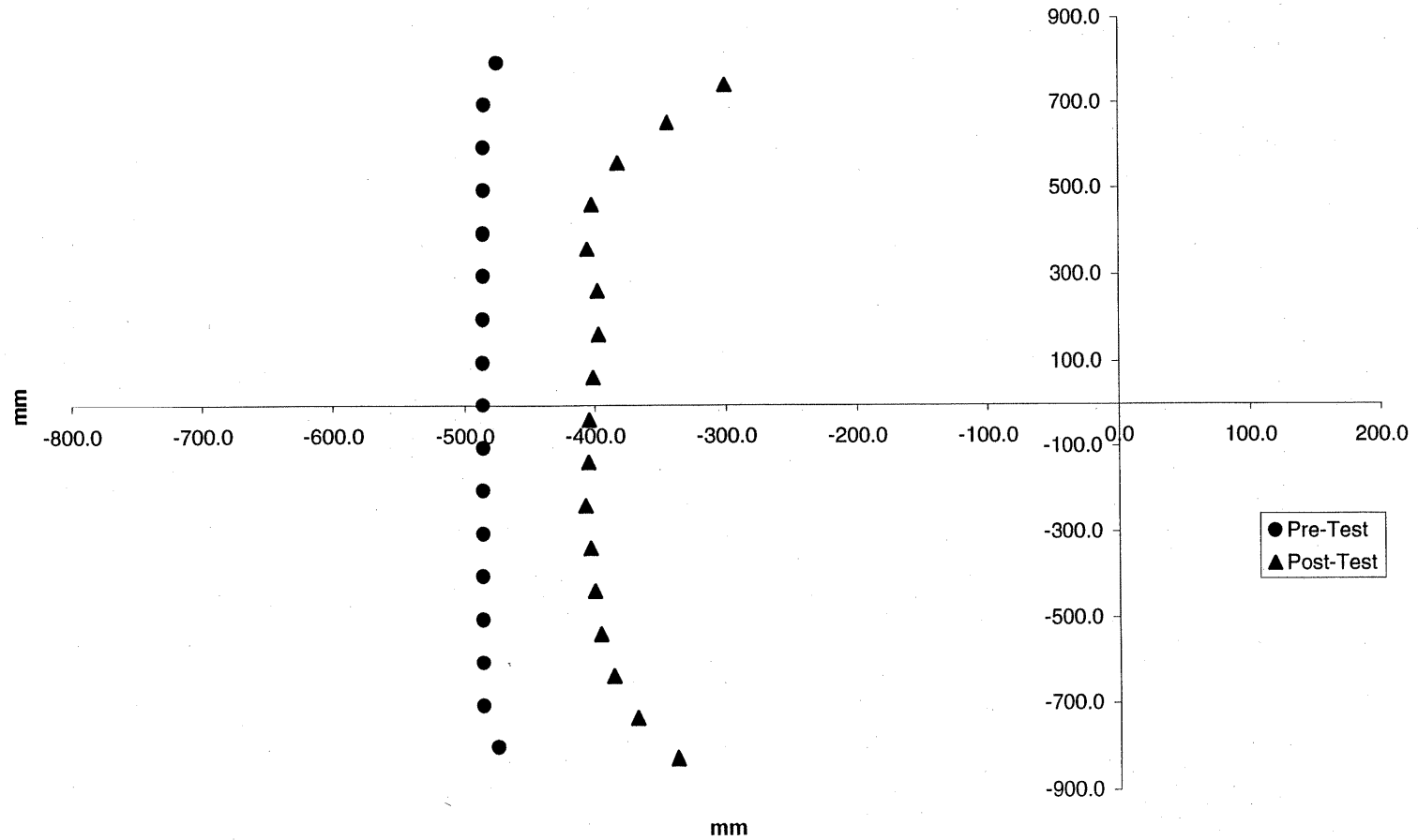


Data Sheet 12 (Continued)
Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Level A - Deformable Barrier Face Profile 52-68



Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

Deformable Barrier Face Profile

Level D - Top Stack

Pre-Test

Index	Xmm	Ymm	Zmm
1	-380.1	798.7	-40.1
2	-380.2	698.5	-40.6
3	-380.6	598.8	-40.7
4	-380.8	498.1	-41.3
5	-381.1	398.6	-41.6
6	-381.2	299.3	-41.7
7	-381.5	199.3	-41.9
8	-381.6	99.5	-42.4
9	-381.7	-0.6	-42.1
10	-381.8	-101.0	-43.0
11	-382.0	-201.2	-43.9
12	-382.1	-300.7	-44.3
13	-382.1	-400.9	-44.7
14	-382.4	-500.8	-44.7
15	-382.4	-600.2	-44.7
16	-382.6	-701.1	-45.2
17	-382.8	-801.3	-45.2

Post-Test

Index	Xmm	Ymm	Zmm
1	-306.6	763.6	-99.6
2	-354.2	676.5	-87.9
3	-375.9	580.2	-83.5
4	-384.9	480.3	-81.4
5	-384.4	381.0	-79.1
6	-380.4	281.8	-75.5
7	-362.5	183.0	-72.1
8	-357.8	83.6	-69.1
9	-357.5	-16.3	-65.6
10	-363.1	-116.3	-62.0
11	-364.7	-216.3	-58.5
12	-363.7	-315.6	-54.4
13	-358.9	-415.7	-51.0
14	-345.5	-514.3	-47.8
15	-317.7	-609.5	-48.3
16	-269.7	-697.0	-57.4
17	-223.9	-785.3	-70.0

Difference

Index	Xmm	Ymm	Zmm
1	-73.5	35.1	59.5
2	-26.0	22.0	47.3
3	-4.7	18.6	42.8
4	4.0	17.8	40.1
5	3.3	17.5	37.6
6	-0.8	17.5	33.8
7	-19.0	16.3	30.2
8	-23.9	15.9	26.7
9	-24.2	15.7	23.4
10	-18.7	15.2	19.0
11	-17.3	15.1	14.6
12	-18.4	14.9	10.2
13	-23.2	14.8	6.3
14	-36.8	13.5	3.1
15	-64.8	9.3	3.6
16	-112.9	-4.1	12.1
17	-158.9	-16.0	24.8

Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

Deformable Barrier Face Profile Cont'd.

NHTSA No.: C30111

Level C - Mid Level

Pre-Test

Index	Xmm	Ymm	Zmm
18	-380.3	799.3	-169.4
19	-380.5	699.0	-170.1
20	-380.9	599.2	-170.6
21	-380.9	499.1	-170.8
22	-381.1	399.3	-170.8
23	-381.5	299.3	-170.5
24	-381.8	199.7	-171.6
25	-381.7	100.2	-172.1
26	-381.9	0.3	-172.1
27	-382.1	-100.1	-172.5
28	-382.1	-200.2	-172.8
29	-382.3	-300.0	-173.1
30	-382.4	-399.4	-173.8
31	-382.4	-499.5	-173.8
32	-382.7	-599.8	-174.0
33	-382.8	-700.3	-174.4
34	-382.9	-800.5	-175.0

Post-Test

Index	Xmm	Ymm	Zmm
18	-354.7	776.7	-215.9
19	-367.7	677.2	-214.5
20	-377.5	577.9	-212.7
21	-378.6	477.8	-210.0
22	-377.3	377.9	-207.1
23	-374.4	278.0	-203.6
24	-364.3	178.8	-201.9
25	-370.2	79.8	-197.9
26	-372.0	-20.3	-194.7
27	-372.7	-120.6	-190.2
28	-372.0	-220.8	-186.8
29	-369.3	-320.6	-182.8
30	-366.5	-420.3	-179.4
31	-363.0	-520.6	-175.3
32	-354.4	-620.2	-171.6
33	-323.4	-714.7	-173.8
34	-257.2	-786.2	-193.1

Difference

Index	Xmm	Ymm	Zmm
18	-25.6	22.6	46.4
19	-12.8	21.8	44.3
20	-3.4	21.3	42.1
21	-2.3	21.3	39.1
22	-3.8	21.3	36.3
23	-7.1	21.3	33.1
24	-17.5	20.9	30.3
25	-11.5	20.4	25.8
26	-9.8	20.6	22.7
27	-9.4	20.5	17.8
28	-10.2	20.6	14.1
29	-13.0	20.6	9.7
30	-15.9	20.8	5.6
31	-19.4	21.1	1.5
32	-28.3	20.4	-2.5
33	-59.4	14.4	-0.5
34	-125.6	-14.3	18.1

Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

Deformable Barrier Face Profile Cont'd.

NHTSA No.: C30111

Level B - Top of Bumper

Pre-Test

Index	Xmm	Ymm	Zmm
35	-380.9	800.2	-294.3
36	-381.0	700.4	-294.8
37	-381.3	600.1	-295.6
38	-381.6	499.4	-295.8
39	-382.0	400.1	-296.0
40	-382.5	299.6	-296.5
41	-382.2	201.0	-296.8
42	-382.3	100.6	-296.9
43	-382.4	0.3	-297.1
44	-382.6	-100.0	-297.4
45	-382.6	-200.0	-297.8
46	-382.7	-300.3	-298.1
47	-382.8	-399.7	-298.5
48	-383.0	-499.7	-298.7
49	-383.2	-599.9	-298.7
50	-383.5	-700.0	-299.7
51	-383.9	-800.5	-299.3

Post-Test

Index	Xmm	Ymm	Zmm
35	-282.6	762.6	-316.1
36	-303.2	666.4	-317.3
37	-332.2	572.8	-328.3
38	-352.6	475.8	-330.8
39	-354.9	374.5	-325.9
40	-353.0	274.6	-322.1
41	-352.3	175.6	-318.6
42	-359.9	79.8	-317.6
43	-359.1	-24.7	-314.5
44	-360.3	-125.2	-311.1
45	-359.2	-225.1	-307.2
46	-354.8	-325.8	-305.2
47	-355.8	-426.2	-299.0
48	-350.3	-527.9	-295.6
49	-344.2	-626.7	-291.8
50	-335.2	-725.6	-286.0
51	-320.4	-823.0	-289.7

Difference

Index	Xmm	Ymm	Zmm
35	-98.3	37.6	21.8
36	-77.8	34.1	22.5
37	-49.0	27.3	32.8
38	-29.0	23.6	35.0
39	-27.1	25.5	29.9
40	-29.5	25.0	25.5
41	-29.9	25.3	21.7
42	-22.4	20.9	20.6
43	-23.4	25.0	17.4
44	-22.3	25.2	13.7
45	-23.4	25.1	9.3
46	-27.9	25.5	7.1
47	-27.0	26.5	0.4
48	-32.7	28.3	-3.1
49	-38.9	26.9	-7.0
50	-48.3	25.6	-13.7
51	-63.5	22.6	-9.6

Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2003 Saturn Ion 4-door sedan

Deformable Barrier Face Profile Cont'd.

NHTSA No.: C30111

Level A - Mid Bumper

Pre-Test

Index	Xmm	Ymm	Zmm
52	-474.1	796.6	-421.3
53	-484.4	697.4	-421.5
54	-484.7	597.6	-421.9
55	-484.9	497.7	-422.2
56	-485.1	397.6	-422.7
57	-485.4	298.4	-423.3
58	-485.6	198.7	-423.5
59	-485.8	99.1	-423.9
60	-486.0	-0.7	-424.3
61	-486.1	-101.4	-424.7
62	-486.2	-201.3	-424.9
63	-486.4	-301.7	-425.5
64	-486.5	-401.7	-426.0
65	-486.5	-501.3	-426.2
66	-486.5	-601.4	-426.1
67	-486.6	-701.6	-426.1
68	-475.1	-798.9	-426.8

Post-Test

Index	Xmm	Ymm	Zmm
52	-300.2	742.9	-451.0
53	-344.2	654.0	-462.5
54	-382.1	560.8	-469.2
55	-402.0	463.4	-472.2
56	-405.5	362.4	-469.4
57	-397.5	263.7	-464.4
58	-396.7	164.4	-460.8
59	-401.4	64.8	-458.0
60	-404.4	-36.1	-455.1
61	-405.2	-135.6	-453.7
62	-407.5	-236.4	-450.3
63	-403.8	-335.8	-446.9
64	-400.8	-435.7	-442.7
65	-396.2	-535.1	-437.9
66	-386.4	-634.7	-431.4
67	-368.5	-731.6	-422.2
68	-337.6	-824.8	-409.6

Difference

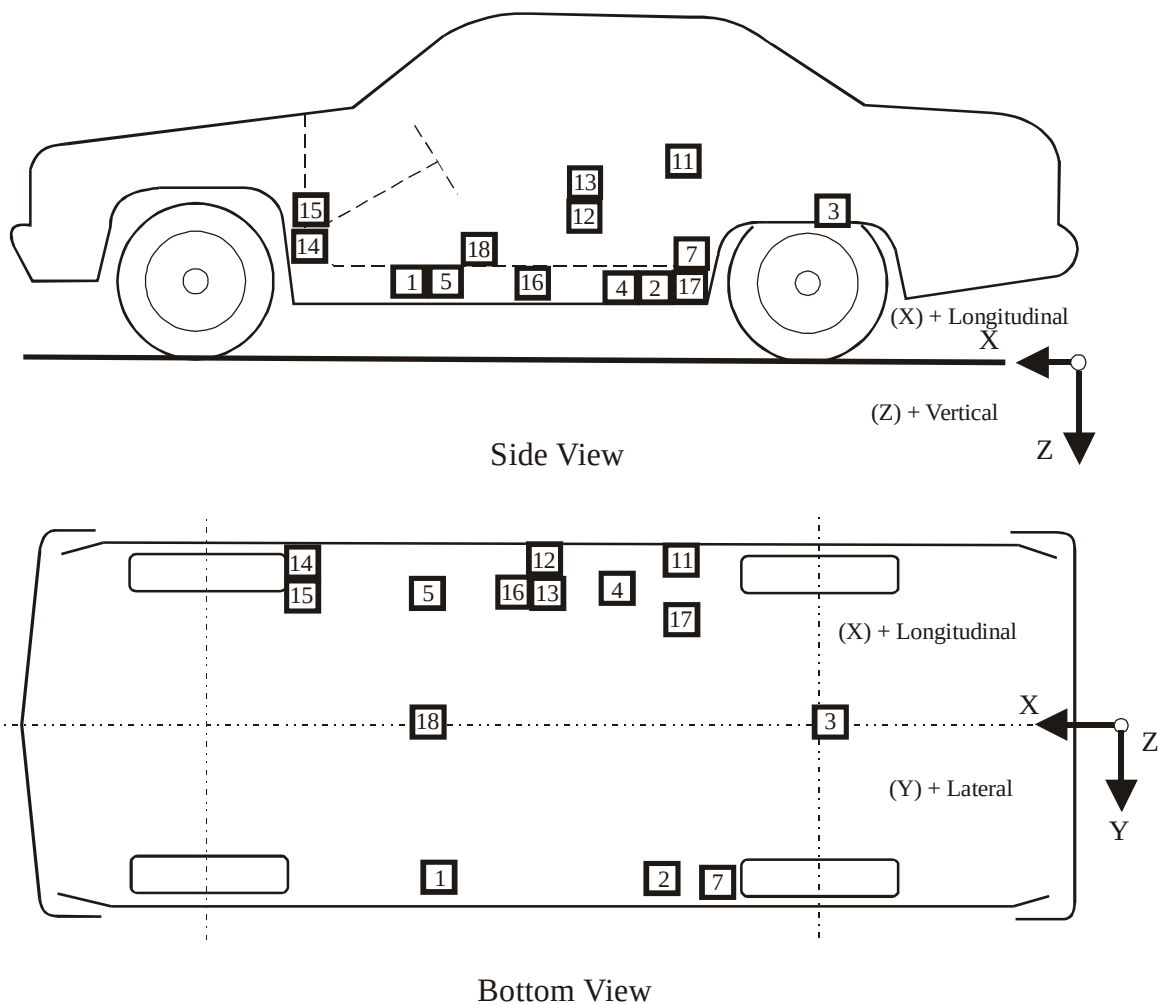
Index	Xmm	Ymm	Zmm
52	-173.9	53.7	29.7
53	-140.2	43.4	41.0
54	-102.6	36.8	47.3
55	-83.0	34.3	50.0
56	-79.7	35.3	46.8
57	-87.9	34.7	41.1
58	-88.9	34.3	37.3
59	-84.4	34.3	34.1
60	-81.5	35.4	30.8
61	-80.9	34.2	29.0
62	-78.7	35.1	25.4
63	-82.5	34.1	21.4
64	-85.7	33.9	16.8
65	-90.3	33.8	11.8
66	-100.1	33.2	5.3
67	-118.1	30.0	-3.9
68	-137.6	25.9	-17.2

Data Sheet 13

Test Vehicle Accelerometer Locations and Data Summary

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



1-Right Front Side Sill	10-Left Rear Door Mid Rear (Omitted)
2-Right Side Sill at Rear Seat	11-Left Rear Door Upper Centerline
3-Rear Floorpan above Axle	12-Left Side Lower B-pillar
4-Left Side Sill at Rear Seat	13-Left Side Middle B-pillar
5-Left Front Side Sill	14-Left Side Lower A-pillar
6-Left Front Door on Centerline (Omitted)	15-Left Side Middle A-pillar
7-Right Rear Occupant Compartment	16-Left Side Front Seat Track at H-point
8-Left Front Door Mid Rear (Omitted)	17-Left Rear Seat Track at H-point
9-Left Front Door Upper Centerline (Omitted)	18-Vehicle Center of Gravity

Data Sheet 13 (Continued)

Test Vehicle Accelerometer Locations and Data SummaryVehicle: 2003 Saturn Ion 4-door sedanNHTSA No.: C30111

TEST NUMBER: 030408-1

No. LOCATION

X

Y

Z

POSITIVE
DIRECTIONNEGATIVE
DIRECTION

1 RIGHT SIDE SILL AT FRONT SEAT	2977 mm	653 mm	-269 mm				
LONGITUDINAL				3.1 g	@ 66.0 ms	6.3 g	@ 13.3 ms
LATERAL				32.8 g	@ 6.9 ms	2.9 g	@ 142.2 ms
VERTICAL				4.9 g	@ 15.9 ms	5.8 g	@ 7.6 ms
RESULTANT				33.2 g	@ 6.9 ms		
2 RIGHT SIDE SILL AT REAR SEAT	1987 mm	657 mm	-232 mm				
LONGITUDINAL				3.6 g	@ 33.0 ms	5.8 g	@ 13.3 ms
LATERAL				34.4 g	@ 31.4 ms	2.6 g	@ 138.1 ms
VERTICAL				10.4 g	@ 31.8 ms	6.6 g	@ 10.3 ms
RESULTANT				36.0 g	@ 31.4 ms		
3 REAR FLOORPAN ABOVE AXLE	1174 mm	0 mm	-459 mm				
LONGITUDINAL				5.7 g	@ 61.7 ms	11.4 g	@ 12.5 ms
LATERAL				28.8 g	@ 7.8 ms	2.2 g	@ 2.2 ms
VERTICAL				15.5 g	@ 27.8 ms	11.2 g	@ 7.0 ms
RESULTANT				31.6 g	@ 7.6 ms		
4 LEFT SIDE SILL AT REAR SEAT	2007 mm	-657 mm	-197 mm				
LATERAL				80.4 g	@ 5.3 ms	18.3 g	@ 27.7 ms

Data Sheet 13 (Continued)

Test Vehicle Accelerometer Locations and Data SummaryVehicle: 2003 Saturn Ion 4-door sedanNHTSA No.: C30111TEST NUMBER: 030408-1
No. LOCATION

X

Y

Z

POSITIVE
DIRECTIONNEGATIVE
DIRECTION

5 LEFT SIDE SILL AT FRONT SEAT LATERAL	2972 mm	-653 mm	-270 mm	87.1 g	@	3.4 ms	21.2 g	@	18.9 ms
7 RIGHT REAR OCCUPANT COMPARTMENT LATERAL	1747 mm	673 mm	-340 mm	26.7 g	@	8.1 ms	2.5 g	@	137.8 ms
11 LEFT REAR DOOR UPPER CENTERLINE LATERAL	1719 mm	-704 mm	-928 mm	128.3 g	@	21.0 ms	142.0 g	@	29.6 ms
12 LEFT LOWER B-POST LATERAL	2157 mm	-665 mm	-540 mm	297.5 g	@	4.7 ms	80.0 g	@	11.6 ms
13 LEFT MIDDLE B-POST LATERAL ¹	2127 mm	-677 mm	-831 mm	---- g	@	---- ms	---- g	@	---- ms
14 LEFT LOWER A-POST LATERAL ¹	3162 mm	-738 mm	-482 mm	---- g	@	---- ms	---- g	@	---- ms
15 LEFT MIDDLE A-POST LATERAL	3152 mm	-715 mm	-821 mm	56.3 g	@	12.3 ms	15.9 g	@	27.8 ms
16 LEFT FRONT SEAT TRACK LATERAL	2372 mm	-588 mm	-290 mm	84.7 g	@	13.1 ms	18.3 g	@	19.4 ms

Data Sheet 13 (Continued)

Test Vehicle Accelerometer Locations and Data Summary

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

TEST NUMBER: 030408-1

No. LOCATION

X

Y

Z

POSITIVE
DIRECTION

NEGATIVE
DIRECTION

17	LEFT REAR SEAT TRACK LATERAL ¹	1482 mm	-635 mm	-320 mm	----	g	@	----	ms	----	g	@	----	ms
18	VEHICLE CENTER OF GRAVITY	2617 mm	0 mm	-367 mm										
	LONGITUDINAL				5.6	g	@	5.1	ms	7.5	g	@	11.4	ms
	LATERAL				26.4	g	@	17.4	ms	1.8	g	@	143.3	ms
	VERTICAL				9.3	g	@	8.4	ms	8.7	g	@	17.5	ms
	RESULTANT				27.8	g	@	17.5	ms					

REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + RIGHTWARD FROM VEHICLE CENTERLINE
Z: + DOWNWARD FROM GROUND LEVEL

For acceleration data sign convention
see Report Sign Convention in Appendix D.

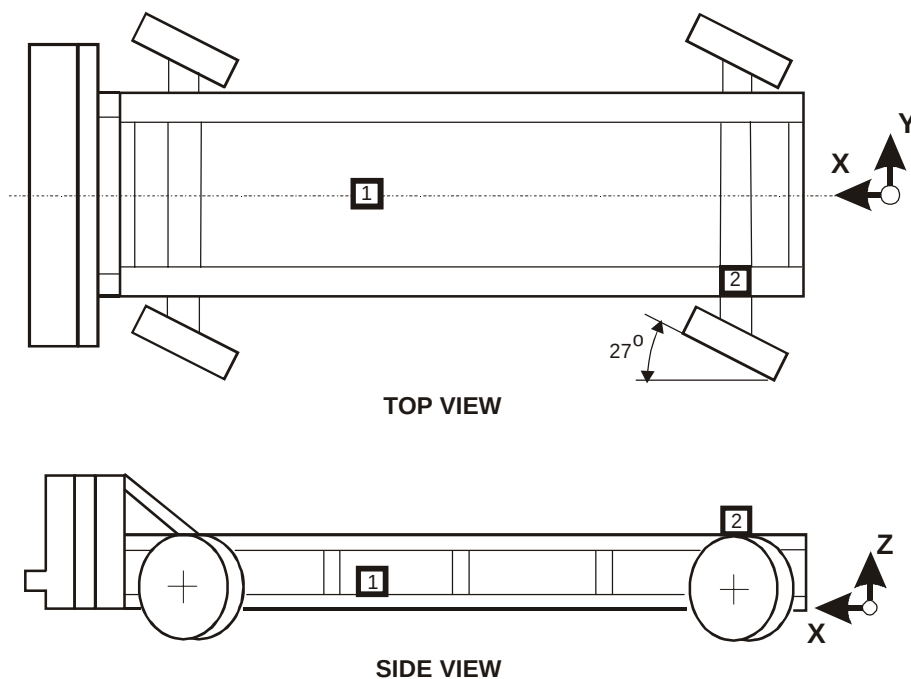
¹ See DATA ACQUISITION EXPLANATIONS

Data Sheet 14

MDB Accelerometer Locations and Data Summary

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



Accel. No.	Location	Coordinates (millimeters)			Positive Direction		Negative Direction	
		X*	Y*	Z*	Max. (g)	Time (ms)	Max. (g)	Time (ms)
1	MDB Center of Gravity	1855	0	-520				
	Longitudinal X				2.7	125.3	25.6	36.9
	Lateral Y				6.3	60.9	10.6	29.8
	Vertical Z				6.5	12.2	5.9	21.3
	Resultant R				26.1	36.7		
2	Rear Frame Member	412	-677	-625				
	Longitudinal X				2.5	100.3	22.8	30.3
	Lateral Y				3.0	28.7	2.4	58.3

*Reference: X = Rear Bumper (+ Forward)

Y = Vehicle Centerline (+ To Right)

Z = Ground Level (+ Down)

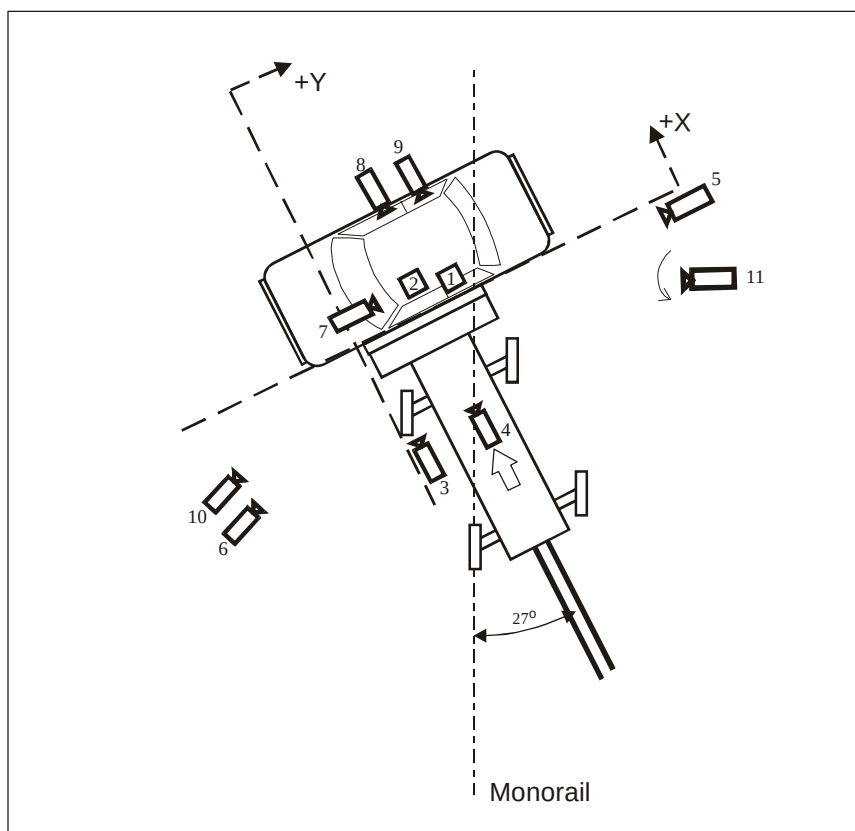
All measurements accurate to within ± 3 mm.

Data Sheet 15

High-Speed Camera Locations and Data Summary

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111



Impact
Area

Camera Number	Location	Location, mm			Angle (deg)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	Overhead wide	250	2150	-5750	74.0	8.5	300
2	Overhead tight	370	1800	-5750	86.6	17	N/A ¹
3	Onboard MDB left side	-1750	-40	-720	-6.8	13	1020
4	Onboard MDB center	-2480	830	-1353	-0.3	25	N/A ¹
5	Right side of MDB	70	11,632	-1185	-1.1	13	1020
6	Left side of MDB	-2116	-5,119	-1096	-2.0	13	1000
7	Onboard vehicle front	555	-557	-1209	-1.9	8	1000
8	Onboard side front door	1578	670	1015	-7.5	8	1000
9	Onboard side rear door	1590	1615	1052	-2.4	8	405
10	Digital overall event	-1759	-5405	-990	-0.3	13	1000
11	Real-time Panning-Video	N/A	N/A	N/A	N/A	Zoom	30

+X: Forward (referenced to MDB) from impact point

+Y: Rightward (referenced to MDB) from impact point

+Z: Downward from ground level

¹ Unable to determine actual speed, no LEDs in view.

Section 5

Vehicle Fuel System Integrity

Data Sheet 16

FMVSS 301 Fuel System Integrity Data

NHTSA No.: C30111

Test Date: 04/08/03

Vehicle Year/Make/Model/Body Style: 2003 Saturn Ion 4-door sedan

Test Vehicle Impact Type : _____ Frontal (48.28 km/h)
 _____ Oblique (48.28 km/h) with _____° barrier
 face first contacting the (driver/passenger) side
 _____ Rear Moving Barrier (48.28 km/h)
 _____ Lateral Moving Barrier (32.19 km/h)
 X Side Impact Moving Deformable Barrier
 (38.5 mph) contacting the driver's side

Fuel Spillage Measurement:

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

Actual	Maximum Allowed
0 g	28 g
0 g	142 g
0 g	28 g/1 minute

Solvent Spillage Details :

N/A

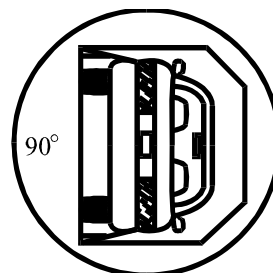
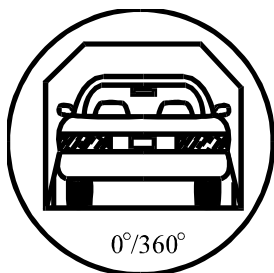
Data Sheet 17

FMVSS 301 Rollover Data

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

0 - 90 Degrees



1. Determination of Solvent Collection Time Period:

Rollover Fixture 90° Rotation Time 1 minutes 30 seconds
(Spec. Range = 1 to 3 minutes)
FMVSS 301 Position Hold Time + 5 minutes 0 seconds
Total 6 minutes 30 seconds
Next whole minute interval 7 minutes

2. FMVSS 301 Requirements:

(1) Time Period

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g

3. Actual Test Vehicle Solvent Spillage:

0 g	0 g	0 g	N/A

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

4. Solvent Spillage Location(s):

None

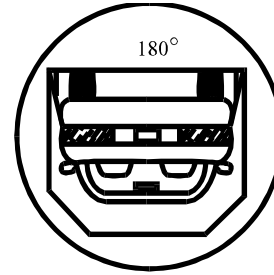
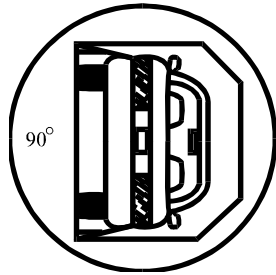
Data Sheet 17 (Continued)

FMVSS 301 Rollover Data

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

90 - 180 Degrees



1. Determination of Solvent Collection Time Period:

Rollover Fixture 90° Rotation Time	<u>1</u>	minutes	<u>30</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>30</u>	seconds
Next whole minute interval	<u>7</u>	minutes		

2. FMVSS 301 Requirements:

(1) Time Period

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g

3. Actual Test Vehicle Solvent Spillage:

0 g	0 g	0 g	N/A

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

4. Solvent Spillage Location(s):

None

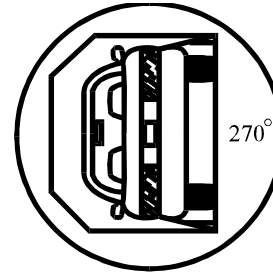
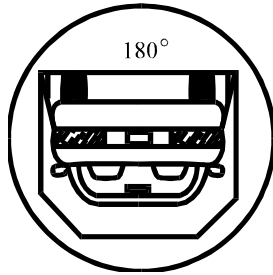
Data Sheet 17 (Continued)

FMVSS 301 Rollover Data

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

180 - 270 Degrees



1. Determination of Solvent Collection Time Period:

Rollover Fixture 90° Rotation Time	<u>1</u>	minutes	<u>30</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>30</u>	seconds
Next whole minute interval	<u>7</u>	minutes		

2. FMVSS 301 Requirements:

(1) Time Period

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g

3. Actual Test Vehicle Solvent Spillage:

0 g	0 g	0 g	N/A

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

4. Solvent Spillage Location(s):

None

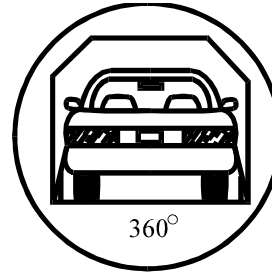
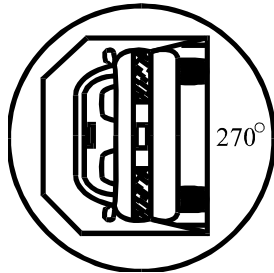
Data Sheet 17 (Continued)

FMVSS 301 Rollover Data

Vehicle: 2003 Saturn Ion 4-door sedan

NHTSA No.: C30111

270 - 360 Degrees



1. Determination Of Solvent Collection Time Period:

Rollover Fixture 90° Rotation Time	<u>1</u>	minutes	<u>30</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>30</u>	seconds
Next whole minute interval	<u>7</u>	minutes		

2. FMVSS 301 Requirements:

(1) Time Period

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)

(2) Maximum Allowable Solvent Spillage

142 g	28 g	28 g	28 g

3. Actual Test Vehicle Solvent Spillage:

0 g	0 g	0 g	N/A

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

4. Solvent Spillage Location(s):

None

Appendix A

Photographs

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Figure A-1 Pre-Test Front View of Test Vehicle



Figure A-2 Post-Test Front View of Test Vehicle



Figure A-3 Pre-Test Impacted Side View of Test Vehicle



Figure A-4 Post-Test Impacted Side View of Test Vehicle



Figure A-5 Pre-Test Rear View of Test Vehicle



Figure A-6 Post-Test Rear View of Test Vehicle



Figure A-7 Pre-Test Frontal View of Impactor Face



Figure A-8 Post-Test Frontal View of Impactor Face



Figure A-9 Pre-Test Left Side View of Impactor Face



Figure A-10 Post-Test Left Side View of Impactor Face



Figure A-11 Pre-Test Right Side View of Impactor Face



Figure A-12 Post-Test Right Side View of Impactor Face

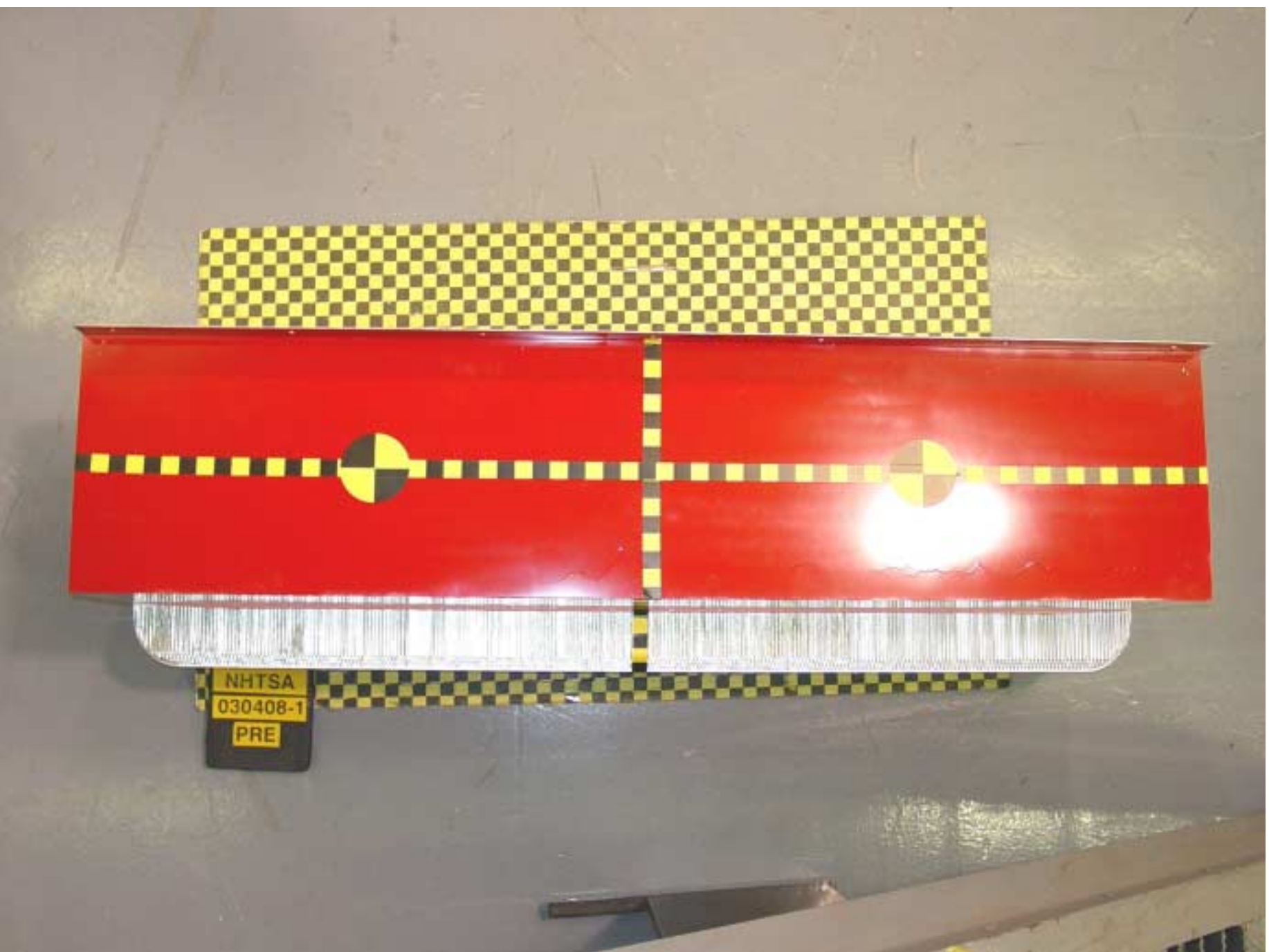


Figure A-13 Pre-Test Top View of Impactor Face



Figure A-14 Post-Test Top View of Impactor Face



Figure A-15 Pre-Test View of MDB Showing Contact Switches in Place



Figure A-16 Post-Test Overhead View of MDB and Vehicle - View 1



Figure A-17 Post-Test Overhead View of MDB and Vehicle - View 2



Figure A-18 Pre-Test Right Occupant Compartment View of Front SID



Figure A-19 Post-Test Right Occupant Compartment View of Front SID



Figure A-20 Pre-Test Right Occupant Compartment View of Rear SID



Figure A-21 Post-Test Right Occupant Compartment View of Rear SID



Figure A-22 Pre-Test Left View of Front SID



Figure A-23 Post-Test Left View of Front SID



Figure A-24 Pre-Test Left View of Front SID and Belt Position



Figure A-25 Pre-Test Left View of Front SID and Door Clearance



Figure A-26 Post-Test Left View of Front SID and Door Clearance

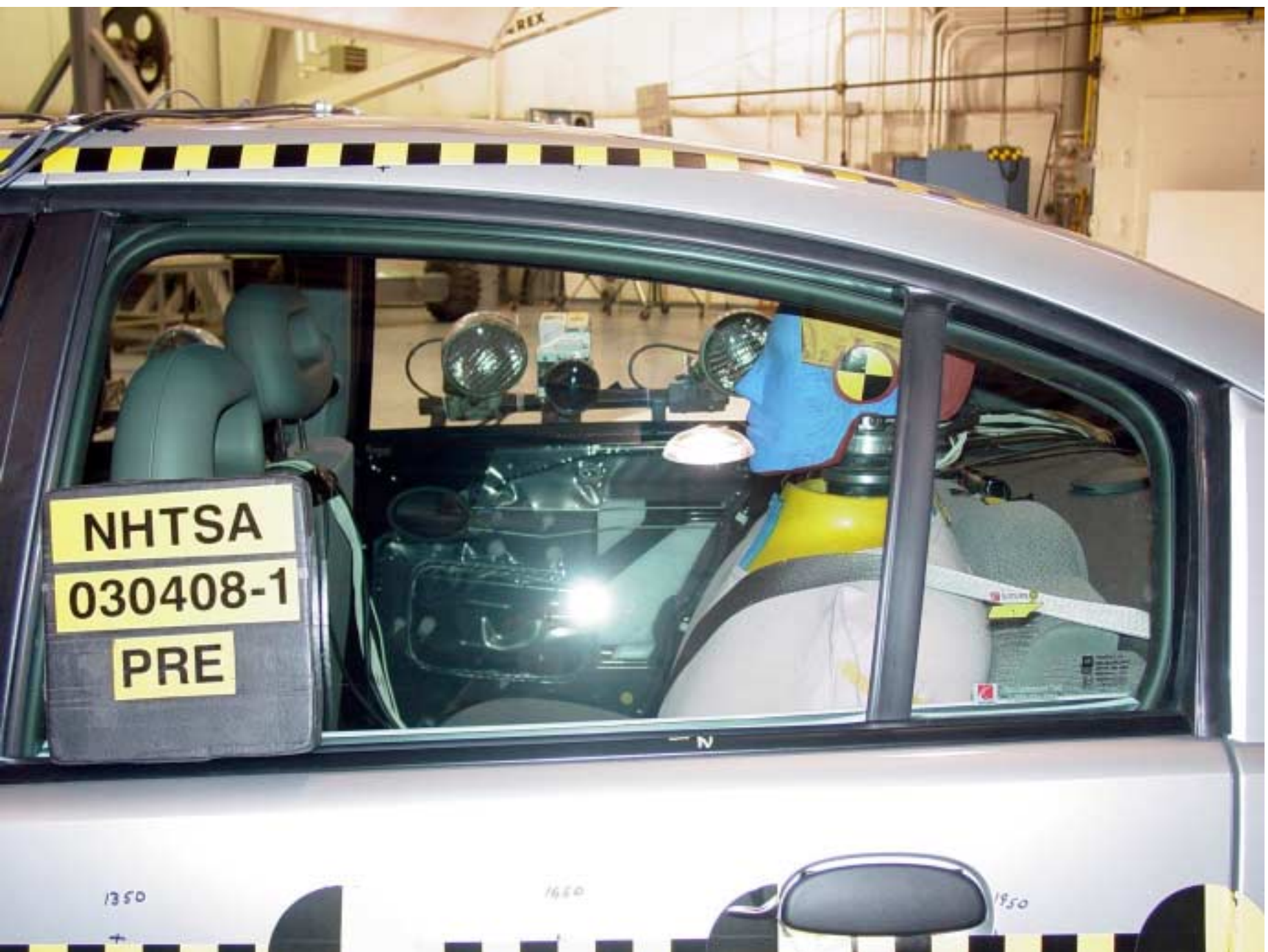


Figure A-27 Pre-Test Left View of Rear SID



Figure A-28 Post-Test Left View of Rear SID



Figure A-29 Pre-Test Left of Rear SID and Belt Position



Figure A-30 Pre-Test Left View of Rear SID and Door Clearance



Figure A-31 Post-Test Left View of Rear SID and Door Clearance



Figure A-32 Pre-Test Interior of Front Door



Figure A-33 Post-Test Interior of Front Door Showing SID Impact Locations



Figure A-34 Post-Test Front SID Contact - View 1



Figure A-35 Post-Test Front SID Contact - View 2



Figure A-36 Post-Test Front SID Contact - View 3



Figure A-37 Pre-Test Interior of Rear Door



Figure A-38 Post-Test Interior of Rear Door Showing SID Impact Locations



Figure A-39 Post-Test Rear SID Contact - View 1



Figure A-40 Post-Test Rear SID Contact - View 2



Figure A-41 Post-Test Rear SID Contact - View 3



Figure A-42 Pre-Test Left Side View of MDB With Impactor Face in Position



Figure A-43 Pre-Test Primary Impact Point View

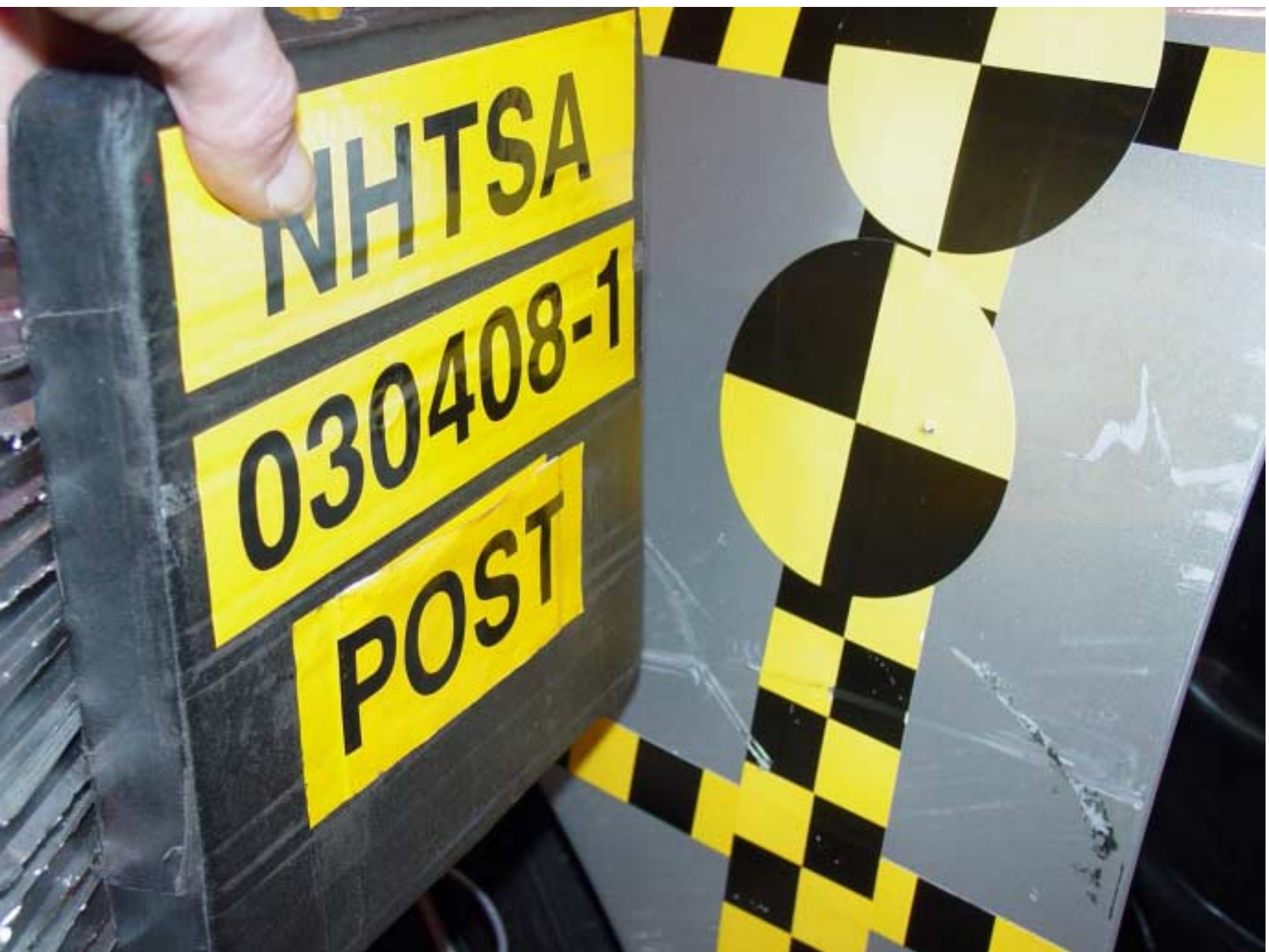


Figure A-44 Post-Test Primary Impact Point View



Figure A-45 Pre-Test Right Side View of MDB With Impactor Face in Position



Figure A-46 Pre-Test Secondary Impact Point View



Figure A-47 Post-Test Secondary Impact Point View



MFD BY SATURN CORPORATION

DATE	GVWR	GAWR FRT	GAWR RR
01/03	3655LB 1658KG	1863LB 0845KG	1792LB 0813KG

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

1G8AF52F43Z145425 PASS CAR



C30111

Figure A-48 Pre-Test Vehicle Certification Label View



Figure A-49 Pre-Test Vehicle Recommended Tire Pressure Label View



Figure A-50 Impact Event



Figure A-51 Pre-Test Fuel Cap



Figure A-52 Post-Test Fuel Cap

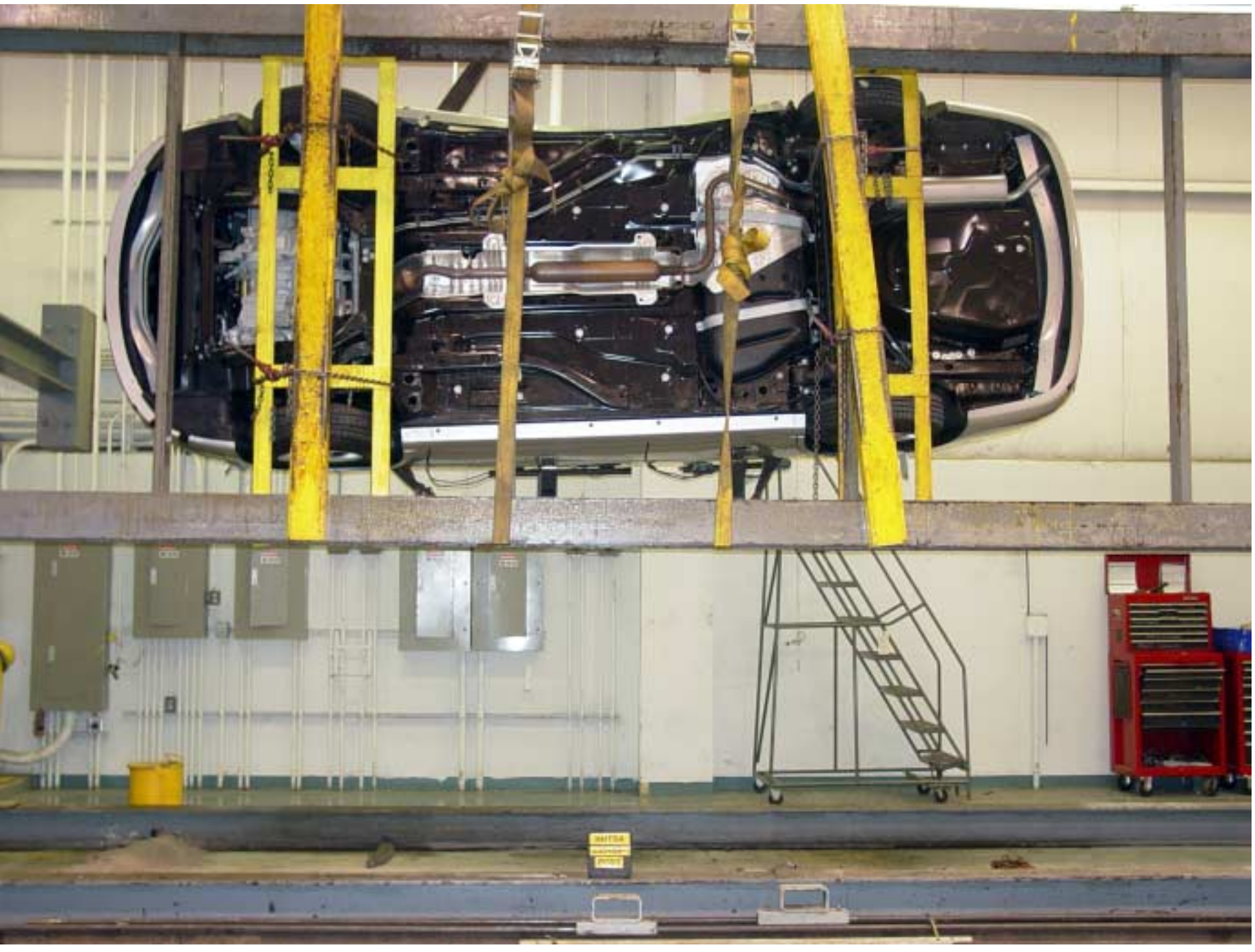


Figure A-53 FMVSS 301 Rollover View at 90°

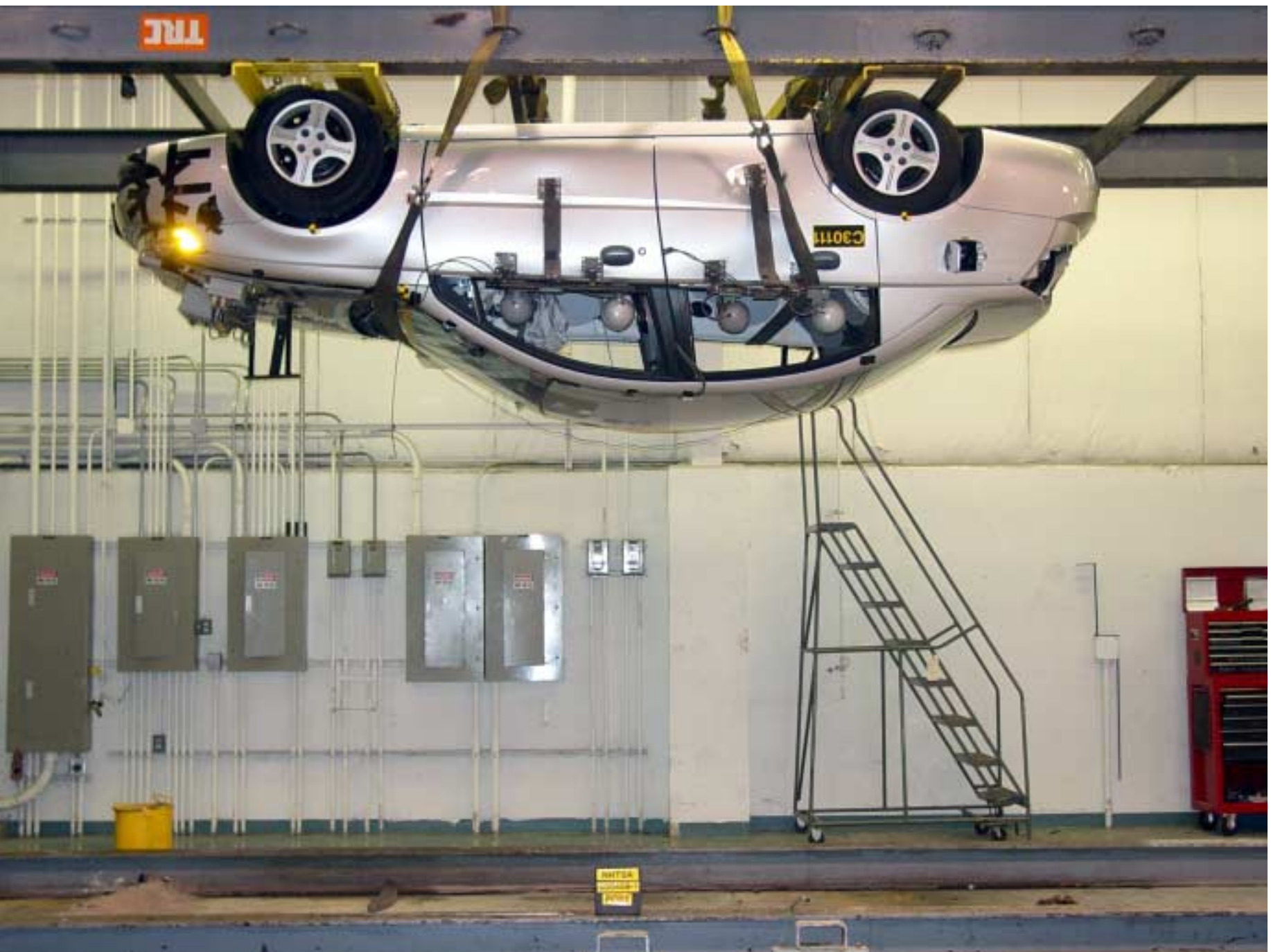


Figure A-54 FMVSS 301 Rollover View at 180°



Figure A-55 FMVSS 301 Rollover View at 270°



Figure A-56 FMVSS 301 Rollover View at 360°

Appendix B

Data Plots

Table of Data Plots

Driver and Passenger Dummy Instrumentation Plots

Acceleration Data - Filter Class 1000

Integration Data - Filter Class 180

Force Data - Filter Class 1000

Moment Data - Filter Class 600

Contact Data - Filter Class 1000

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5	Driver Head Z-Axis Acceleration	B-14
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8	Driver Neck X-Axis Shear Force	B-17
9	Driver Neck Y-Axis Shear Force	B-18
10	Driver Neck Z-Axis Axial Force	B-19
11	Driver Neck Moment about X Axis	B-20
12	Driver Neck Moment about Y Axis	B-21
13	Driver Neck Moment about Z Axis	B-22
14	Driver Neck Occipital Condyle Moment about X Axis	B-23
15	Driver Upper Rib Y-Axis Acceleration	B-24
16	Driver Upper Rib Y-Axis Velocity	B-25
17	Driver Lower Rib Y-Axis Acceleration	B-26
18	Driver Lower Rib Y-Axis Velocity	B-27
19	Driver Lower Spine Y-Axis Acceleration	B-28
20	Driver Lower Spine Y-Axis Velocity	B-29
21	Driver Pelvis Y-Axis Acceleration	B-30
22	Driver Pelvis Y-Axis Velocity	B-31
23	Left Rear Passenger Head X-Axis Acceleration	B-32
24	Left Rear Passenger Head X-Axis Velocity	B-33
25	Left Rear Passenger Head Y-Axis Acceleration	B-34
26	Left Rear Passenger Head Y-Axis Velocity	B-35
27	Left Rear Passenger Head Z-Axis Acceleration	B-36

Table of Data Plots (Continued)

Driver and Passenger Dummy Instrumentation Plots (Continued)

Acceleration Data - Filter Class 1000

Integration Data - Filter Class 180

Force Data - Filter Class 1000

Moment Data - Filter Class 600

Contact Data - Filter Class 1000

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
28	Left Rear Passenger Head Z-Axis Velocity	B-37
29	Left Rear Passenger Head Resultant Acceleration	B-38
30	Left Rear Passenger Neck X-Axis Shear Force	B-39
31	Left Rear Passenger Neck Y-Axis Shear Force	B-40
32	Left Rear Passenger Neck Z-Axis Axial Force	B-41
33	Left Rear Passenger Neck Moment about X Axis	B-42
34	Left Rear Passenger Neck Moment about Y Axis	B-43
35	Left Rear Passenger Neck Moment about Z Axis	B-44
36	Left Rear Passenger Neck Occipital Condyle Moment about X Axis	B-45
37	Left Rear Passenger Upper Rib Y-Axis Acceleration	B-46
38	Left Rear Passenger Upper Rib Y-Axis Velocity	B-47
39	Left Rear Passenger Lower Rib Y-Axis Acceleration	B-48
40	Left Rear Passenger Lower Rib Y-Axis Velocity	B-49
41	Left Rear Passenger Lower Spine Y-Axis Acceleration	B-50
42	Left Rear Passenger Lower Spine Y-Axis Velocity	B-51
43	Left Rear Passenger Pelvis Y-Axis Acceleration	B-52
44	Left Rear Passenger Pelvis Y-Axis Velocity	B-53

Driver and Passenger Dummy Instrumentation Plots

Acceleration Data - Filter Class 1000 - Redundant

Integration Data - Filter Class 180 - Redundant

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
45	Driver Head X-Axis Redundant Acceleration	B-55
46	Driver Head X-Axis Redundant Velocity	B-56
47	Driver Head Y-Axis Redundant Acceleration	B-57
48	Driver Head Y-Axis Redundant Velocity	B-58

Table of Data Plots (Continued)

Driver and Passenger Dummy Instrumentation Plots (Continued)

Acceleration Data - Filter Class 1000 - Redundant

Integration Data - Filter Class 180 - Redundant

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
49	Driver Head Z-Axis Redundant Acceleration	B-59
50	Driver Head Z-Axis Redundant Velocity	B-60
51	Driver Head Resultant Redundant Acceleration	B-61
52	Driver Upper Rib Y-Axis Redundant Acceleration	B-62
53	Driver Upper Rib Y-Axis Redundant Velocity	B-63
54	Driver Lower Rib Y-Axis Redundant Acceleration	B-64
55	Driver Lower Rib Y-Axis Redundant Velocity	B-65
56	Driver Lower Spine Y-Axis Redundant Acceleration	B-66
57	Driver Lower Spine Y-Axis Redundant Velocity	B-67
58	Driver Pelvis Y-Axis Redundant Acceleration	B-68
59	Driver Pelvis Y-Axis Redundant Velocity	B-69
60	Left Rear Passenger Head X-Axis Redundant Acceleration	B-70
61	Left Rear Passenger Head X-Axis Redundant Velocity	B-71
62	Left Rear Passenger Head Y-Axis Redundant Acceleration	B-72
63	Left Rear Passenger Head Y-Axis Redundant Velocity	B-73
64	Left Rear Passenger Head Z-Axis Redundant Acceleration	B-74
65	Left Rear Passenger Head Z-Axis Redundant Velocity	B-75
66	Left Rear Passenger Head Resultant Redundant Acceleration	B-76
67	Left Rear Passenger Upper Rib Y-Axis Redundant Acceleration	B-77
68	Left Rear Passenger Upper Rib Y-Axis Redundant Velocity	B-78
69	Left Rear Passenger Lower Rib Y-Axis Redundant Acceleration	B-79
70	Left Rear Passenger Lower Rib Y-Axis Redundant Velocity	B-80
71	Left Rear Passenger Lower Spine Y-Axis Redundant Acceleration	B-81
72	Left Rear Passenger Lower Spine Y-Axis Redundant Velocity	B-82
73	Left Rear Passenger Pelvis Y-Axis Redundant Acceleration	B-83
74	Left Rear Passenger Pelvis Y-Axis Redundant Velocity	B-84

Table of Data Plots (Continued)
Test Vehicle Instrumentation Plots
Acceleration Data - Filter Class 60
Integration Data - Filter Class 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
75	Right Side Sill at Front Seat X-Axis Acceleration	B-86
76	Right Side Sill at Front Seat X-Axis Velocity	B-87
77	Right Side Sill at Front Seat Y-Axis Acceleration	B-88
78	Right Side Sill at Front Seat Y-Axis Velocity	B-89
79	Right Side Sill at Front Seat Z-Axis Acceleration	B-90
80	Right Side Sill at Front Seat Z-Axis Velocity	B-91
81	Right Side Sill at Front Seat Resultant Acceleration	B-92
82	Right Side Sill at Rear Seat X-Axis Acceleration	B-93
83	Right Side Sill at Rear Seat X-Axis Velocity	B-94
84	Right Side Sill at Rear Seat Y-Axis Acceleration	B-95
85	Right Side Sill at Rear Seat Y-Axis Velocity	B-96
86	Right Side Sill at Rear Seat Z-Axis Acceleration	B-97
87	Right Side Sill at Rear Seat Z-Axis Velocity	B-98
88	Right Side Sill at Rear Seat Resultant Acceleration	B-99
89	Rear Floorpan Above Axle X-Axis Acceleration	B-100
90	Rear Floorpan Above Axle X-Axis Velocity	B-101
91	Rear Floorpan Above Axle Y-Axis Acceleration	B-102
92	Rear Floorpan Above Axle Y-Axis Velocity	B-103
93	Rear Floorpan Above Axle Z-Axis Acceleration	B-104
94	Rear Floorpan Above Axle Z-Axis Velocity	B-105
95	Rear Floorpan Above Axle Resultant Acceleration	B-106
96	Left Side Sill at Front Seat Y-Axis Acceleration	B-107
97	Left Side Sill at Front Seat Y-Axis Velocity	B-108
98	Left Side Sill at Front Seat Y-Axis Displacement	B-109
99	Left Side Sill at Rear Seat Y-Axis Acceleration	B-110
100	Left Side Sill at Rear Seat Y-Axis Velocity	B-111
101	Left Side Sill at Rear Seat Y-Axis Displacement	B-112
102	Right Rear Occupant Compartment Y Axis Acceleration	B-113
103	Right Rear Occupant Compartment Y Axis Velocity	B-114

Table of Data Plots (Continued)
Test Vehicle Instrumentation Plots (Continued)
Acceleration Data - Filter Class 60
Integration Data - Filter Class 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
104	Right Rear Occupant Compartment Y Axis Displacement	B-115
105	Left Rear Door Upper Centerline Y-Axis Acceleration	B-116
106	Left Rear Door Upper Centerline Y-Axis Velocity	B-117
107	Left Rear Door Upper Centerline Y-Axis Displacement	B-118
108	Left Lower A-Post Y-Axis Acceleration	B-119
109	Left Lower A-Post Y-Axis Velocity	B-120
110	Left Middle A-Post Y-Axis Acceleration	B-121
111	Left Middle A-Post Y-Axis Velocity	B-122
112	Left Lower B-Post Y-Axis Acceleration	B-123
113	Left Lower B-Post Y-Axis Velocity	B-124
114	Left Middle B-Post Y-Axis Acceleration	B-125
115	Left Middle B-Post Y-Axis Velocity	B-126
116	Left Front Seat Track Y-Axis Acceleration	B-127
117	Left Front Seat Track Y-Axis Velocity	B-128
118	Left Rear Seat Track Y-Axis Acceleration	B-129
119	Left Rear Seat Track Y-Axis Velocity	B-130
120	Vehicle Center of Gravity X-Axis Acceleration	B-131
121	Vehicle Center of Gravity X-Axis Velocity	B-132
122	Vehicle Center of Gravity Y-Axis Acceleration	B-133
123	Vehicle Center of Gravity Y-Axis Velocity	B-134
124	Vehicle Center of Gravity Z-Axis Acceleration	B-135
125	Vehicle Center of Gravity Z-Axis Velocity	B-136
126	Vehicle Center of Gravity Resultant Acceleration	B-137

MDB Instrumentation Plots
Acceleration Data - Filter Class 60
Integration Data - Filter Class 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
127	MDB Center of Gravity X-Axis Acceleration	B-139
128	MDB Center of Gravity X-Axis Velocity	B-140
129	MDB Center of Gravity Y-Axis Acceleration	B-141
130	MDB Center of Gravity Y-Axis Velocity	B-142
131	MDB Center of Gravity Z-Axis Acceleration	B-143
132	MDB Center of Gravity Z-Axis Velocity	B-144
133	MDB Center of Gravity Resultant Acceleration	B-145
134	MDB Left Rear X-Axis Acceleration	B-146
135	MDB Left Rear X-Axis Velocity	B-147
136	MDB Left Rear Y-Axis Acceleration	B-148
137	MDB Left Rear Y-Axis Velocity	B-149
138	MDB Right Side Contact Switch	B-150
139	MDB Left Side Contact Switch	B-151

Driver and Passenger Dummy Instrumentation Plots
Acceleration Data - FIR Filtered

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
140	Driver Upper Rib Y-Axis Acceleration	B-153
141	Driver Lower Rib Y-Axis Acceleration	B-154
142	Driver Lower Spine Y-Axis Acceleration	B-155
143	Driver Pelvis Y-Axis Acceleration	B-156
144	Left Rear Passenger Upper Rib Y-Axis Acceleration	B-157
145	Left Rear Passenger Lower Rib Y-Axis Acceleration	B-158
146	Left Rear Passenger Lower Spine Y-Axis Acceleration	B-159
147	Left Rear Passenger Pelvis Y-Axis Acceleration	B-160

Driver and Passenger Dummy Instrumentation Plots
Acceleration Data - FIR Filtered - Redundant

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
148	Driver Upper Rib Y-Axis Redundant Acceleration	B-162
149	Driver Lower Rib Y-Axis Redundant Acceleration	B-163
150	Driver Lower Spine Y-Axis Redundant Acceleration	B-164
151	Driver Pelvis Y-Axis Redundant Acceleration	B-165
152	Left Rear Passenger Upper Rib Y-Axis Redundant Acceleration	B-166
153	Left Rear Passenger Lower Rib Y-Axis Redundant Acceleration	B-167
154	Left Rear Passenger Lower Spine Y-Axis Redundant Acceleration	B-168
155	Left Rear Passenger Pelvis Y-Axis Redundant Acceleration	B-169

Driver and Passenger Dummy Instrumentation Plots

Acceleration Data - Filter Class 1000

Integration Data - Filter Class 180

Force Data - Filter Class 1000

Moment Data - Filter Class 600

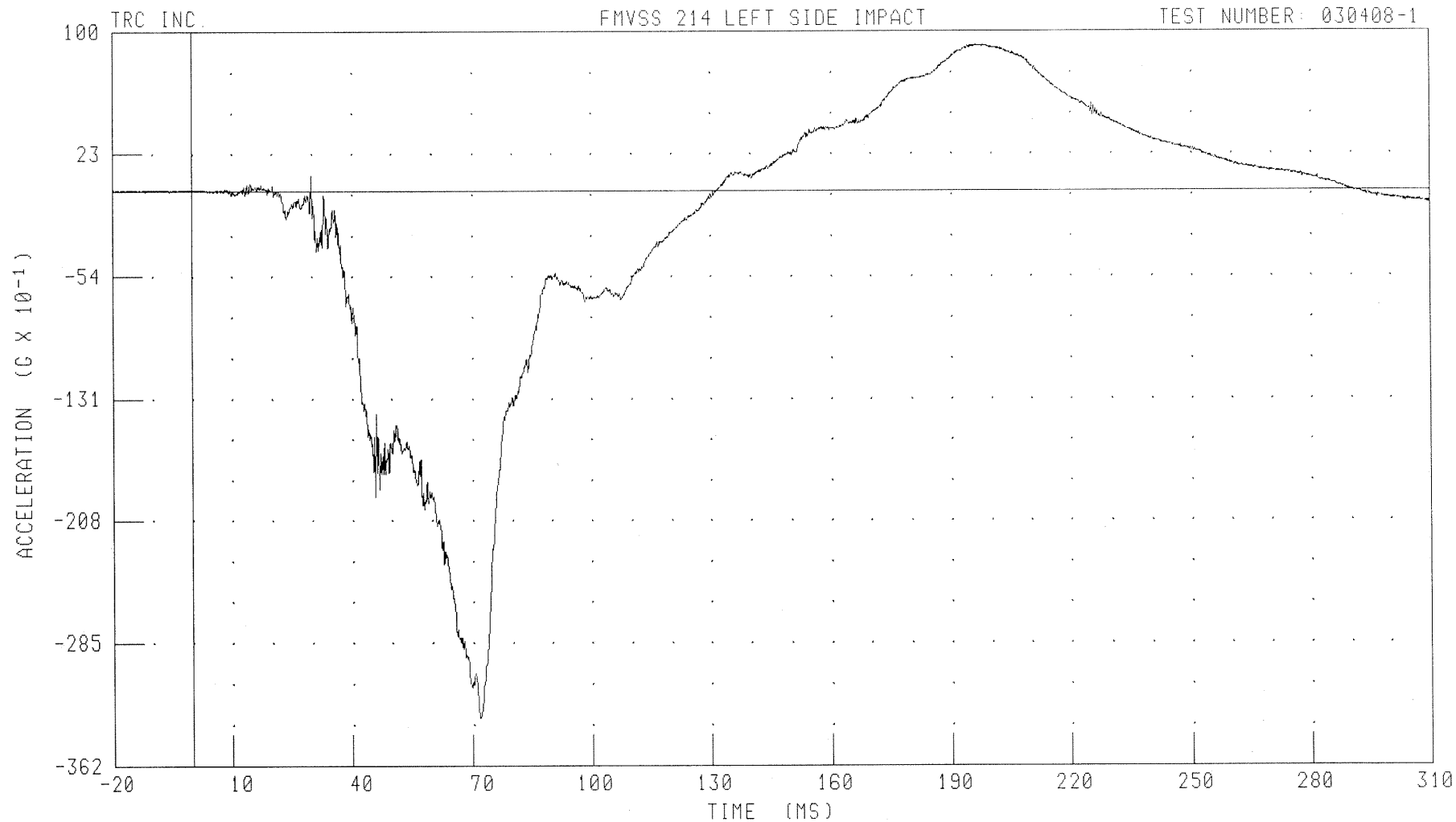
Contact Data - Filter Class 1000

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDXG1

FILTER: CH. CLASS 1000

PEAK DATA: 9.15 G @ 196.40 MS; -33.22 G @ 71.84 MS

B-10

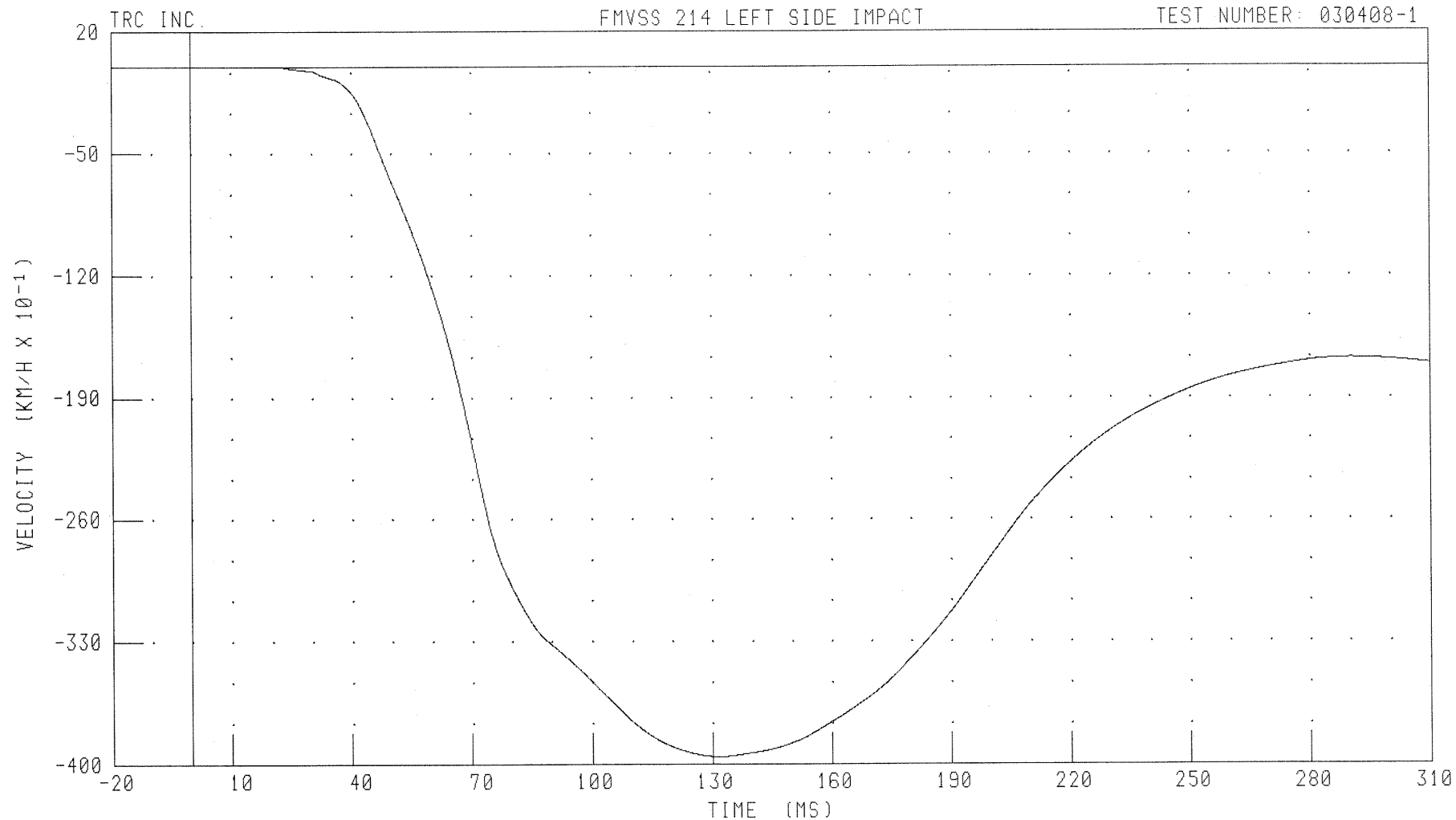
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDXV1 FILTER: CH. CLASS 180

PEAK DATA: 0.01 KM/H @ 20.24 MS; -39.58 KM/H @ 131.84 MS

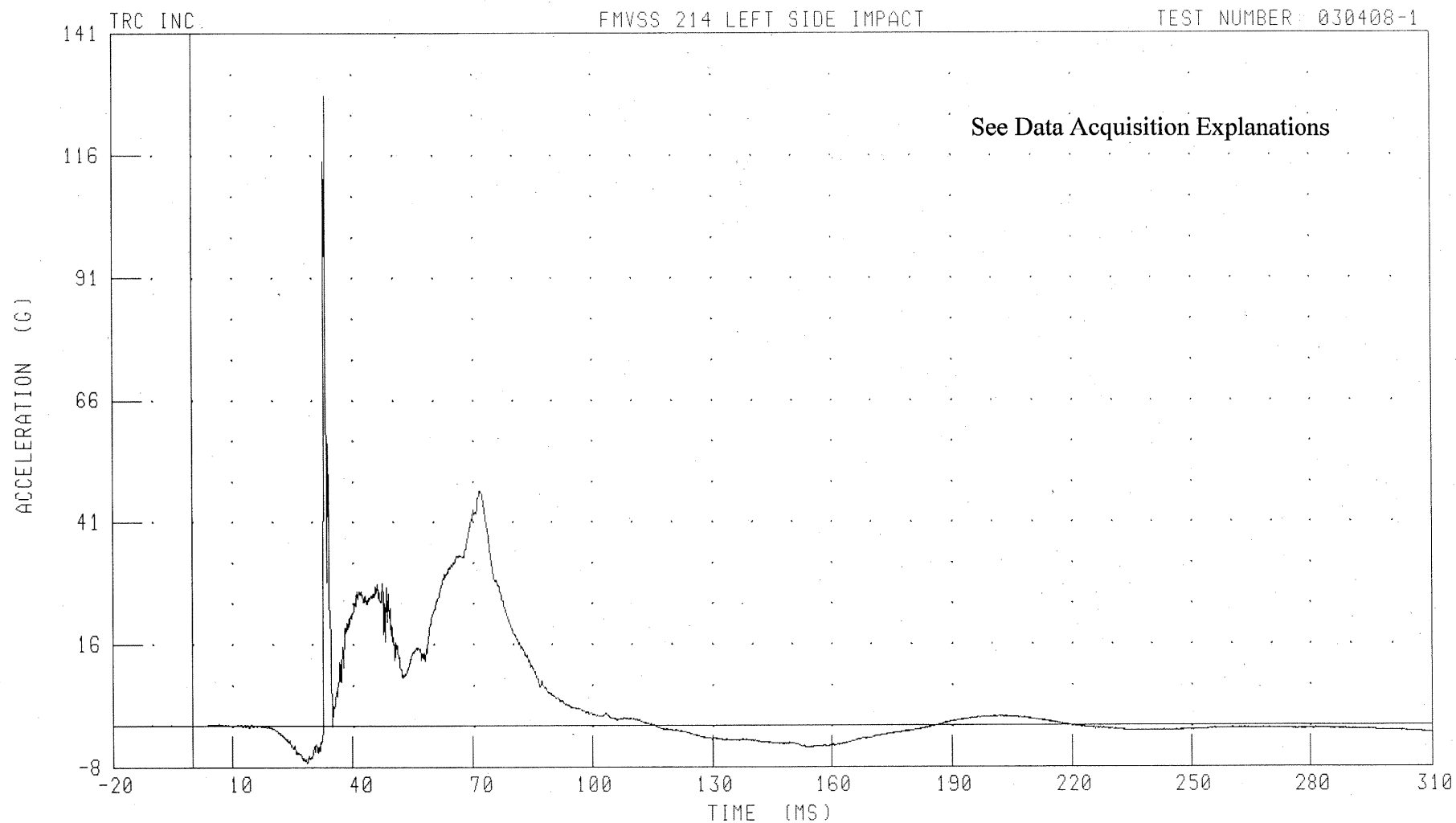
B-11

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER HEAD Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

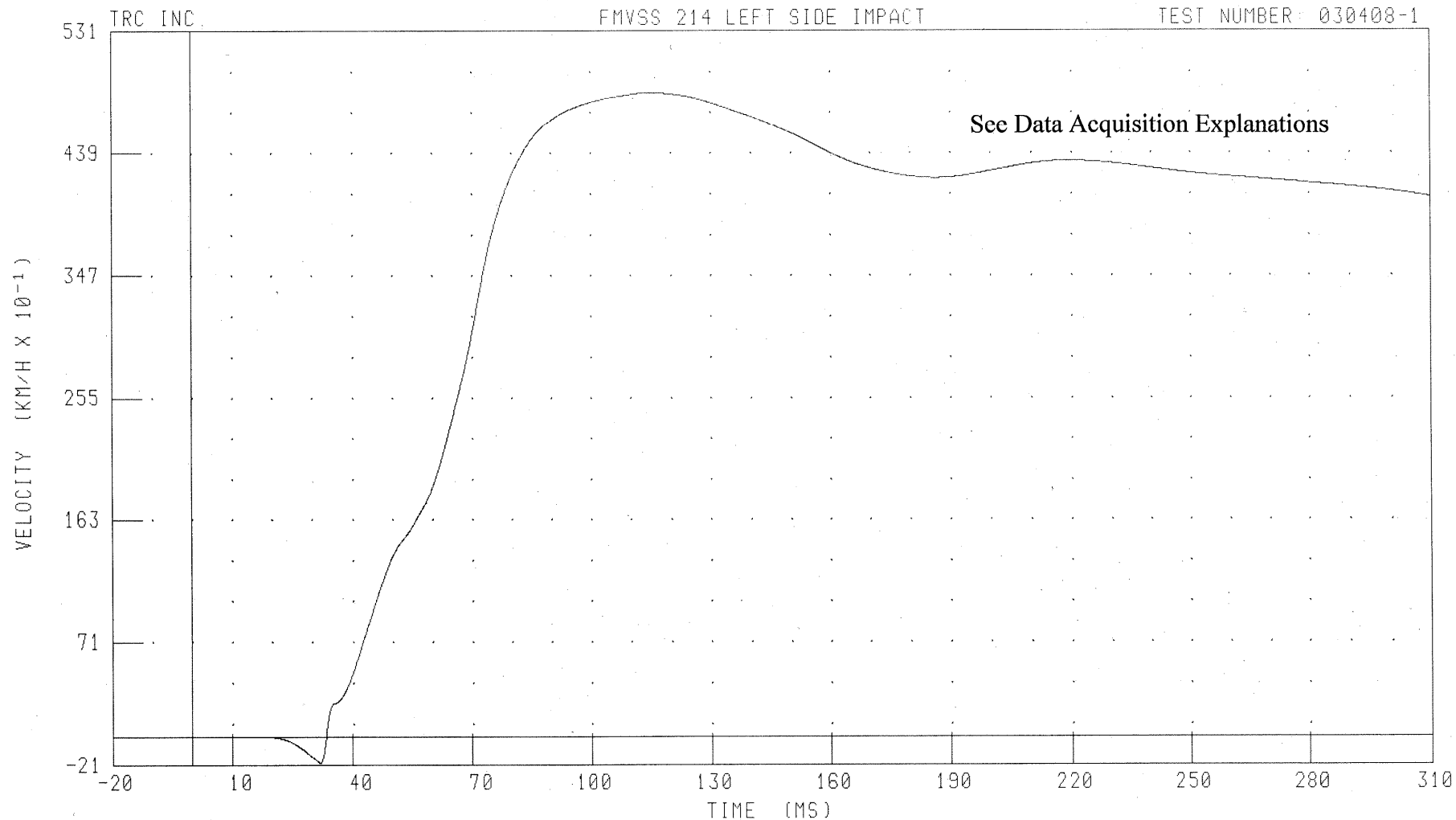
PEAK DATA: 128.75 G @ 33.52 MS; -7.73 G @ 28.72 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDYV1 FILTER: CH. CLASS 180

PEAK DATA: 48.46 KM/H @ 115.68 MS; -1.94 KM/H @ 32.08 MS

B-13

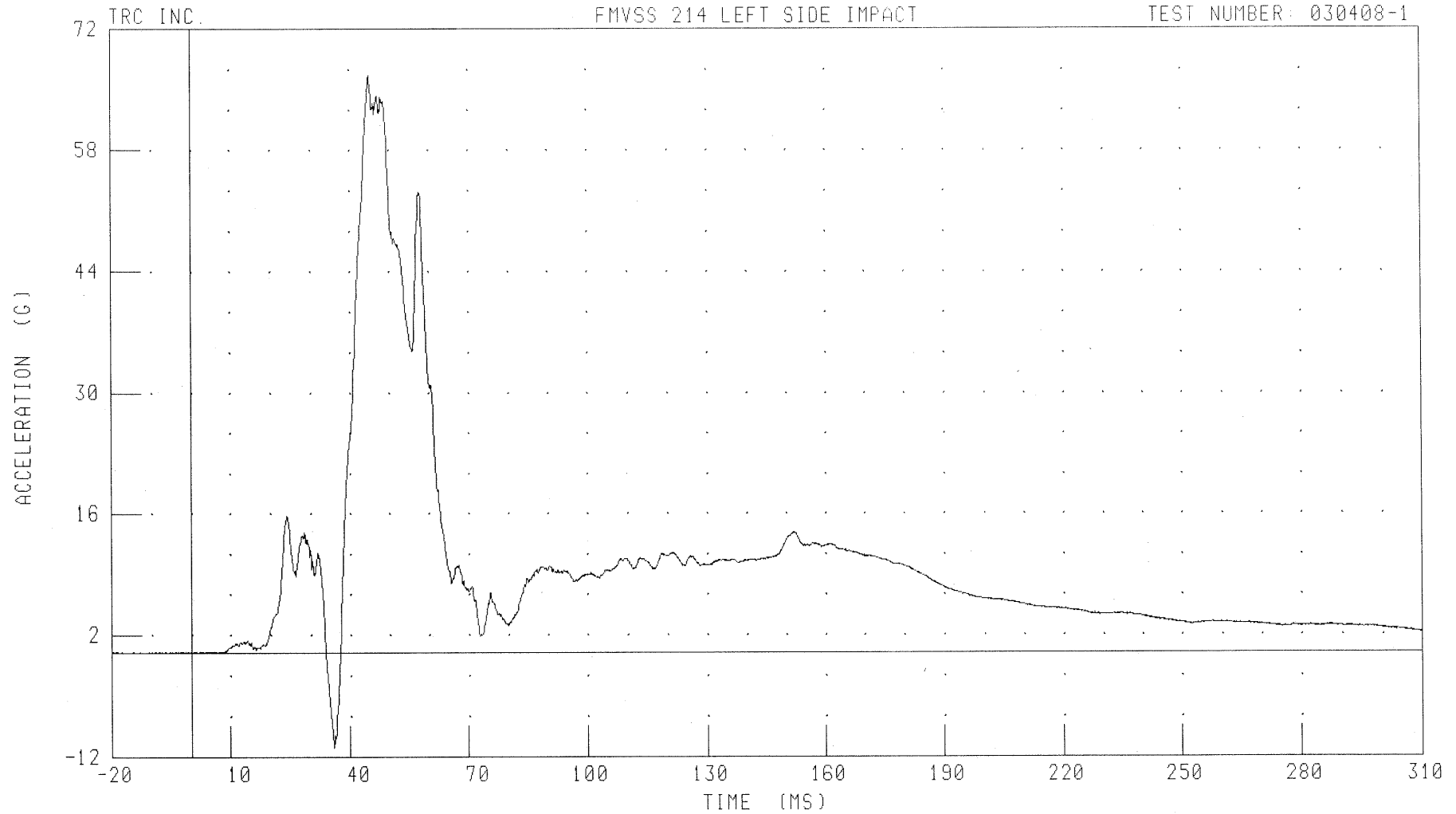
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD Z-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

PEAK DATA: 66.75 G @ 45.20 MS; -10.96 G @ 35.84 MS

B-14

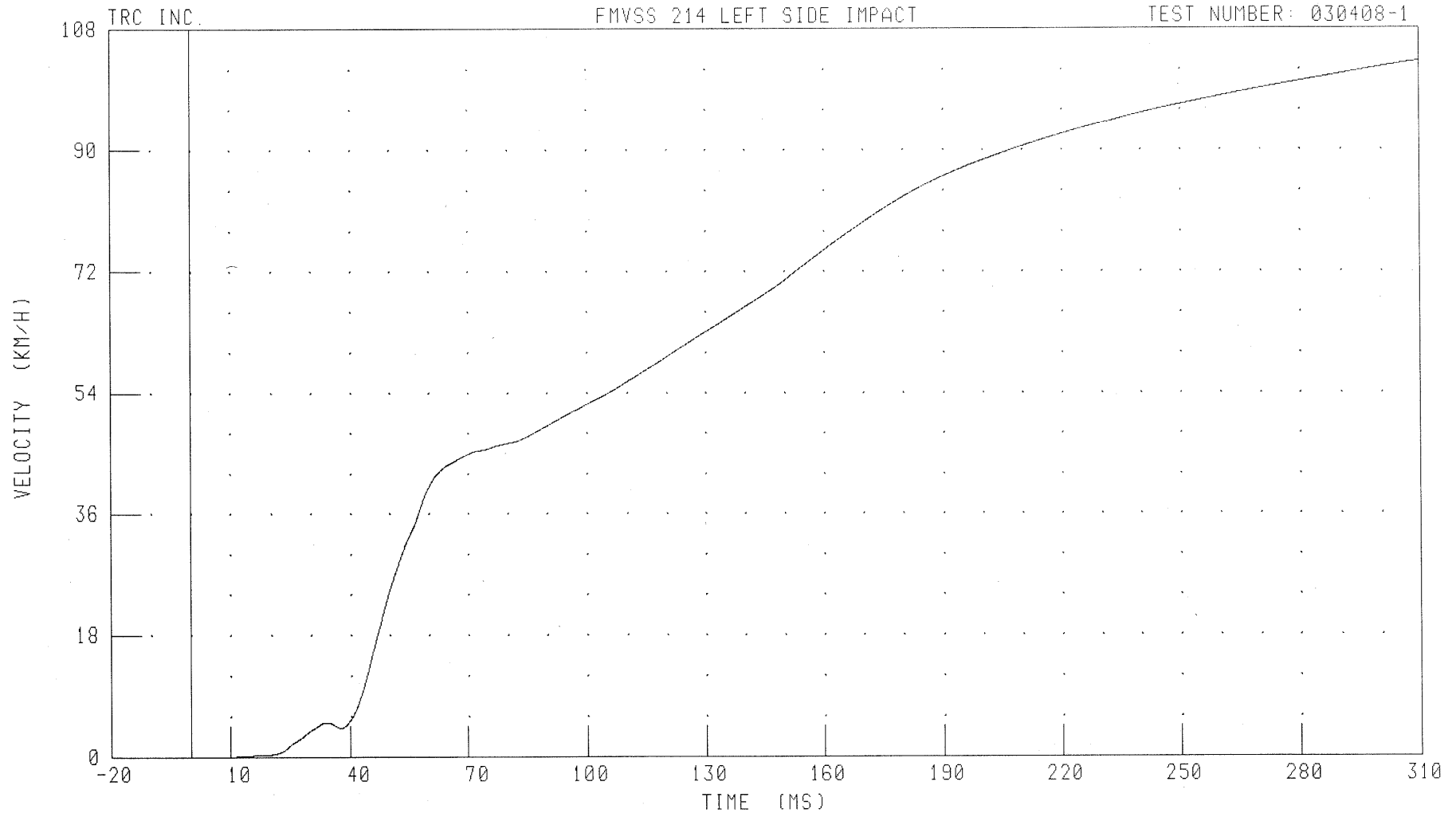
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD Z-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDZV1 FILTER: CH. CLASS 180

PEAK DATA: 103.19 KM/H @ 310.00 MS; 0.00 KM/H @ 0.40 MS

B-15

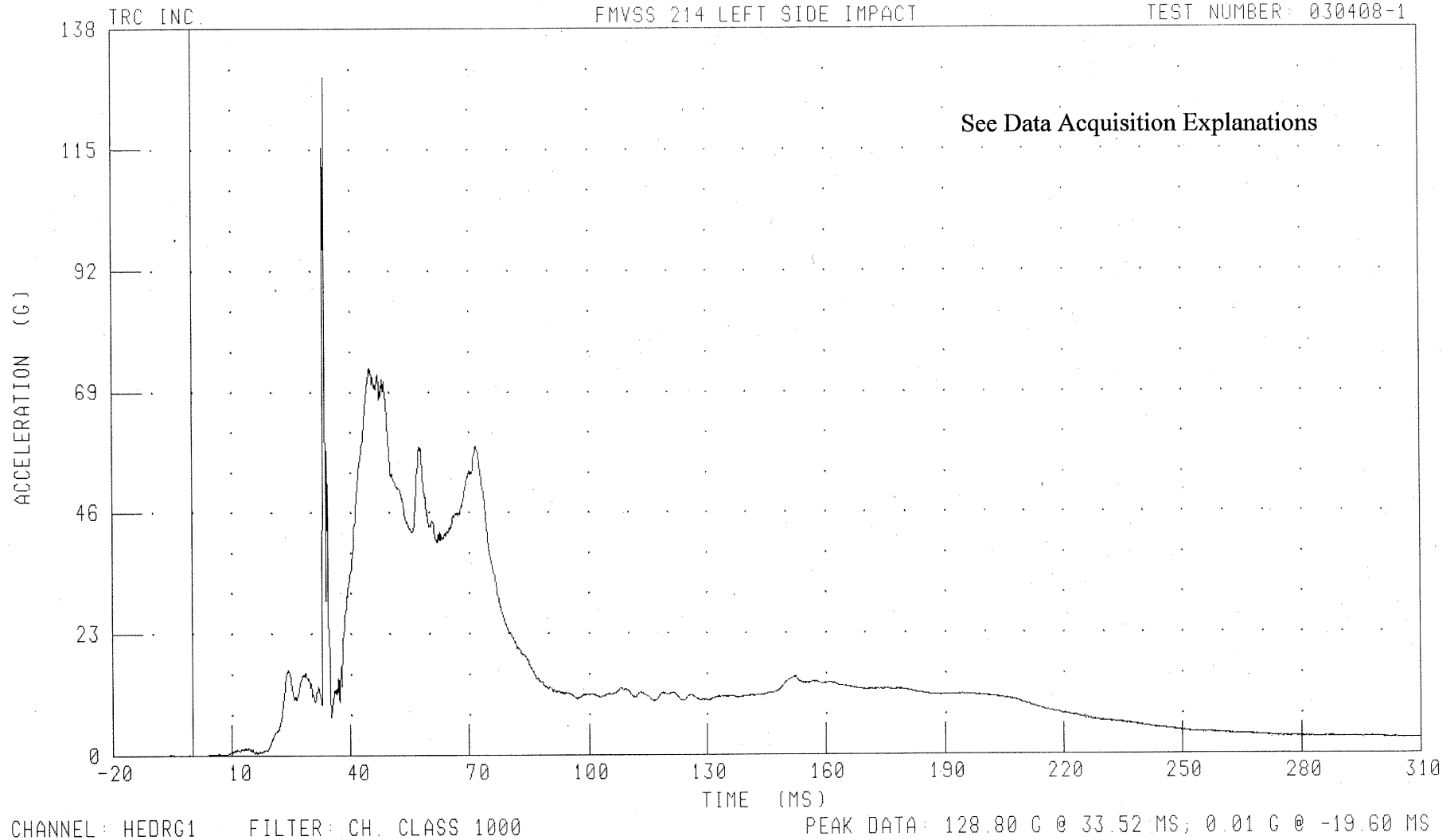
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD RESULTANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



B-16

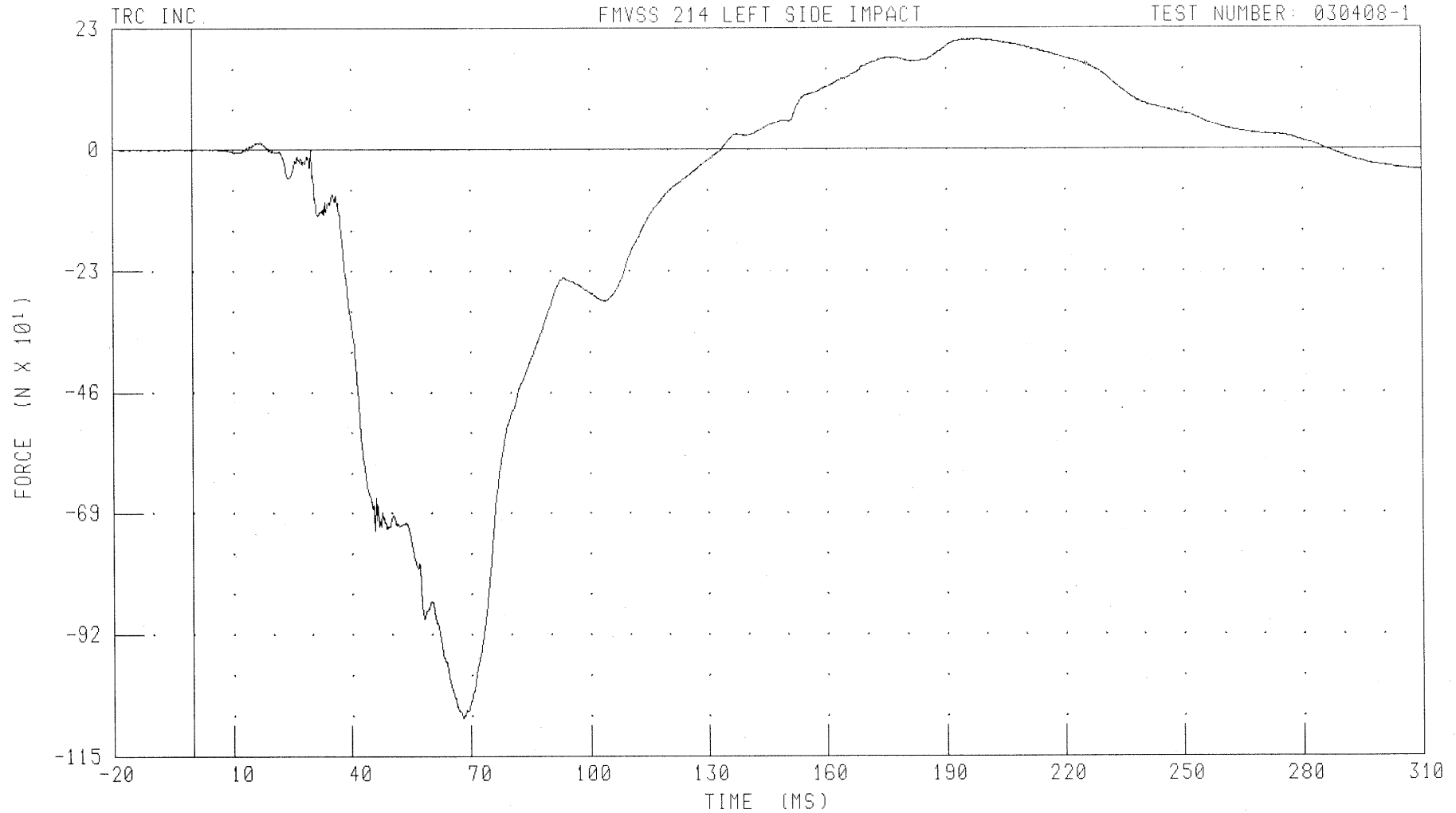
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER NECK X-AXIS SHEAR FORCE

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 20.66 N @ 198.08 MS; -107.96 N @ 67.92 MS

B-17

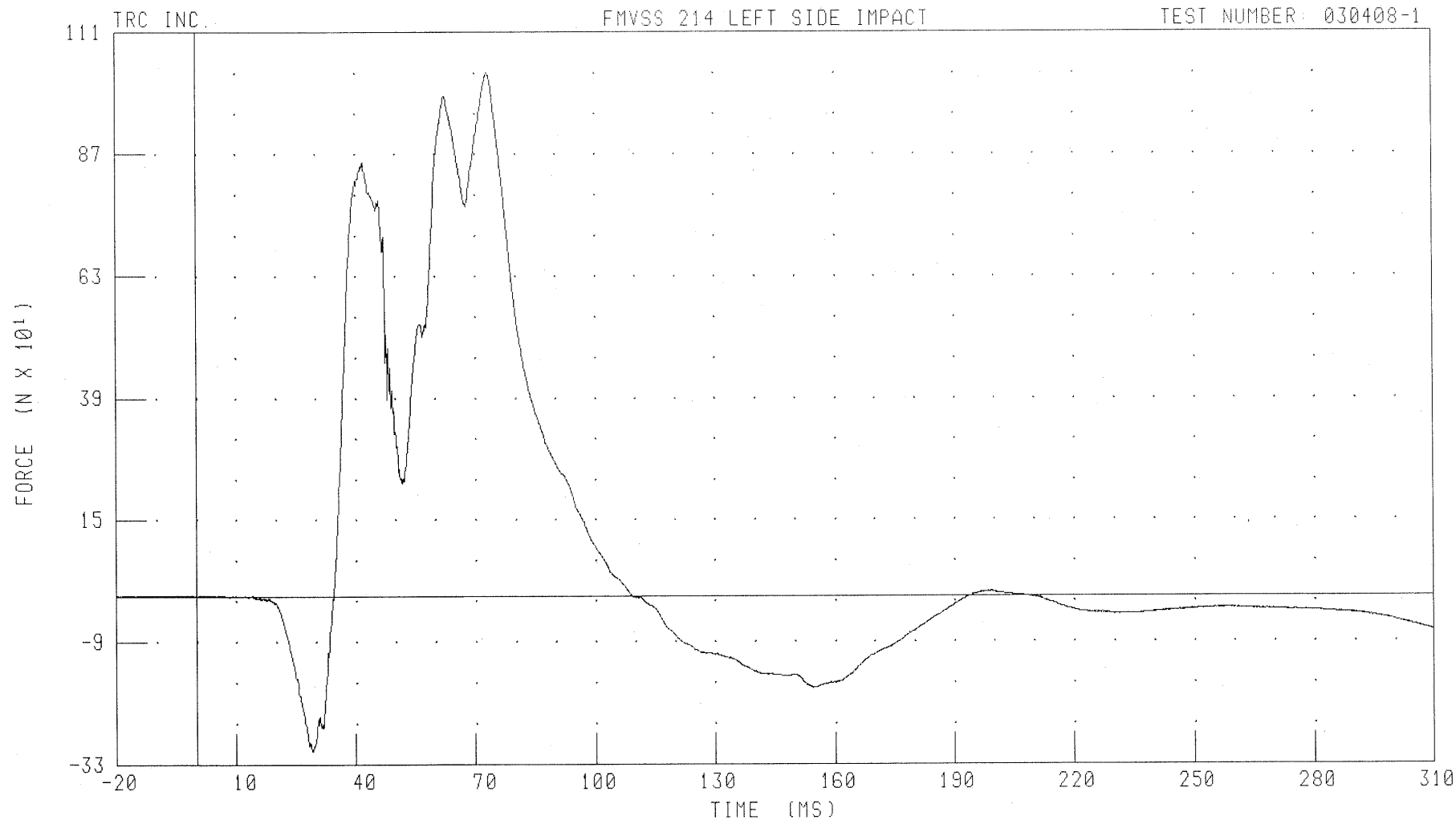
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER NECK Y-AXIS SHEAR FORCE

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

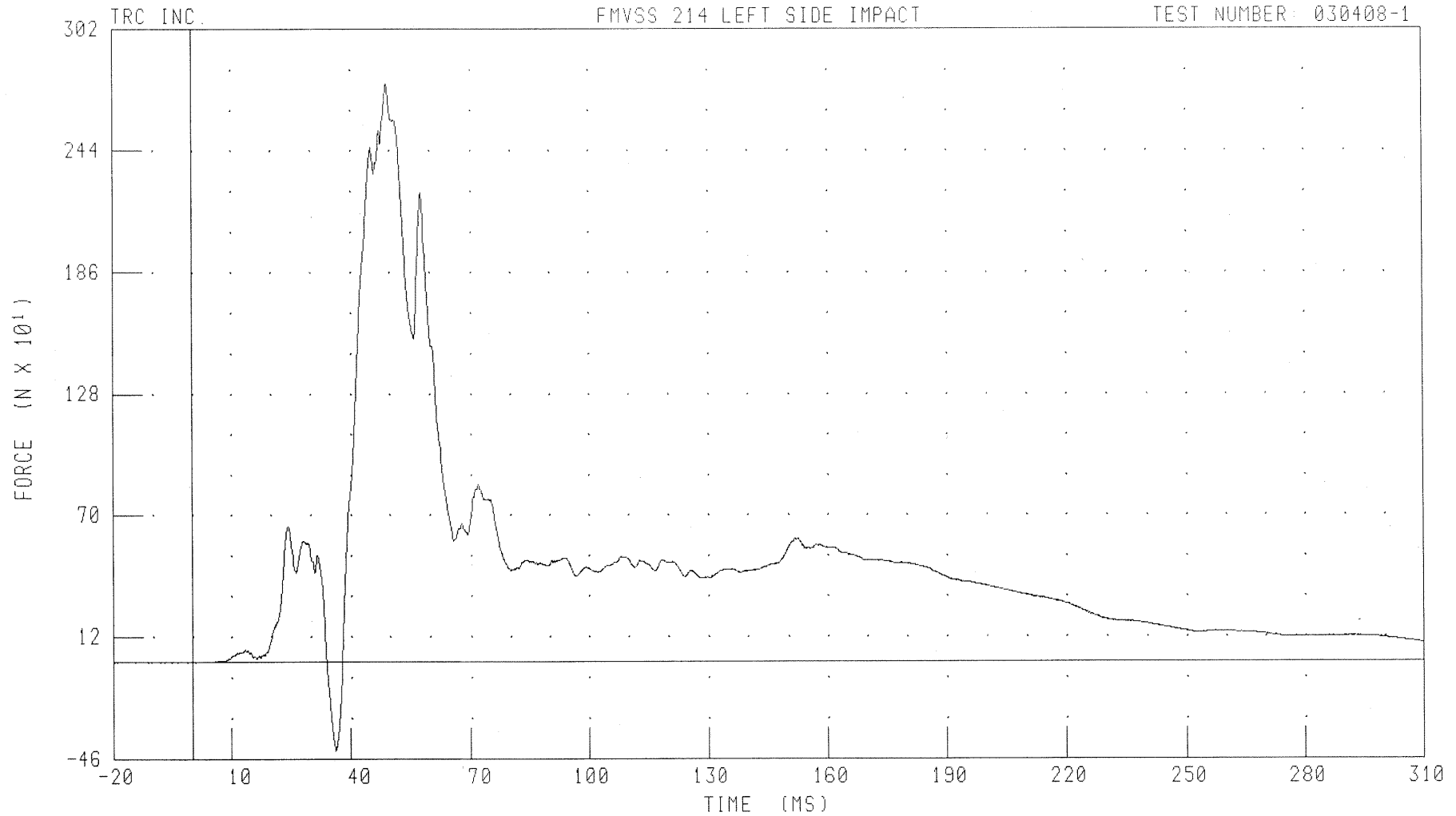
PEAK DATA: 1030.22 N @ 73.20 MS; -304.01 N @ 29.12 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER NECK Z-AXIS AXIAL FORCE

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

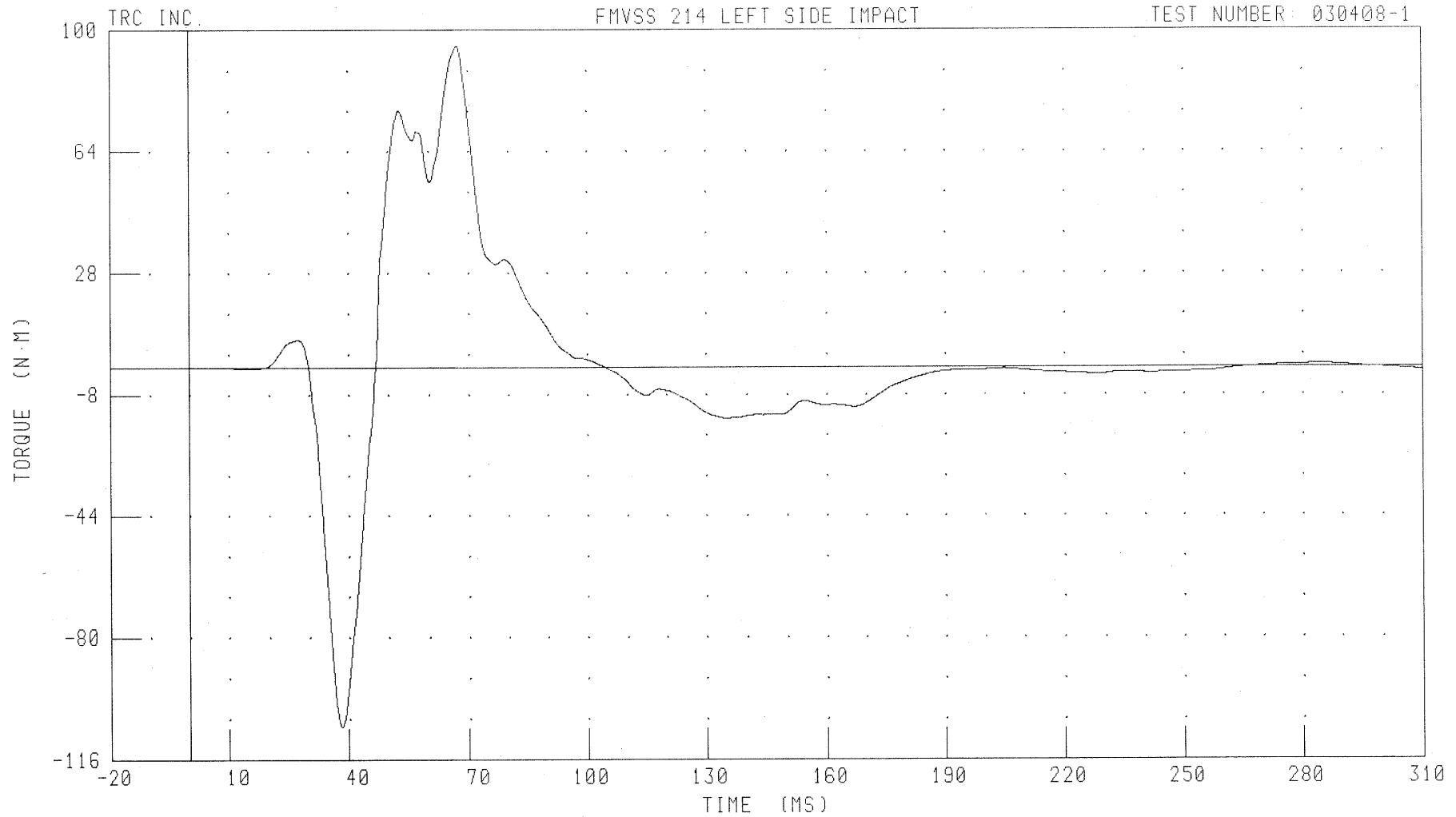
PEAK DATA: 2760.63 N @ 49.28 MS; -423.63 N @ 36.16 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER NECK MOMENT ABOUT X AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKXM1 FILTER: CH. CLASS 600

PEAK DATA: 95.20 N·M @ 67.36 MS; -106.38 N·M @ 38.32 MS

B-20

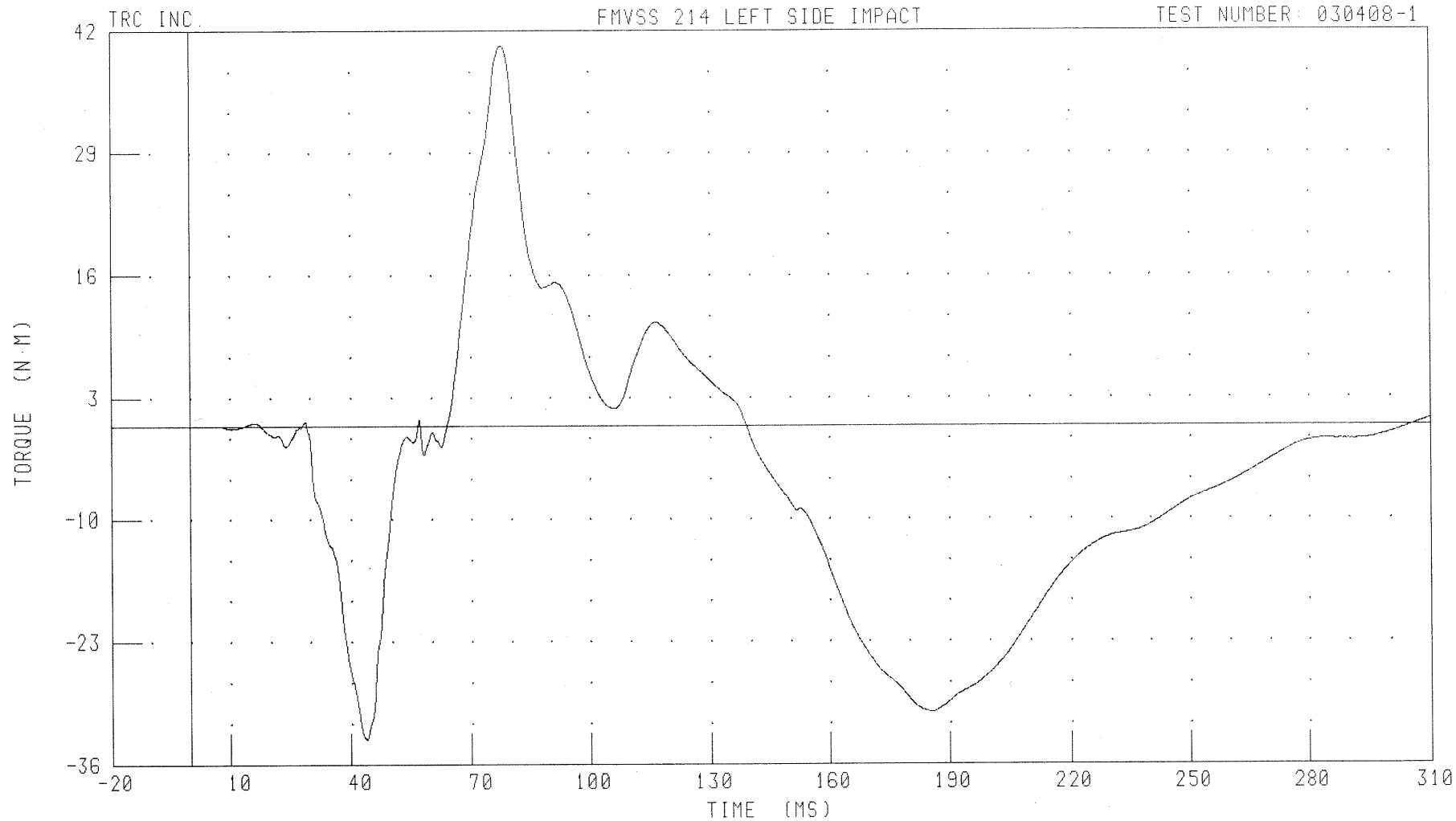
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER NECK MOMENT ABOUT Y AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 40.41 N·M @ 77.92 MS; -33.36 N·M @ 43.84 MS

B-21

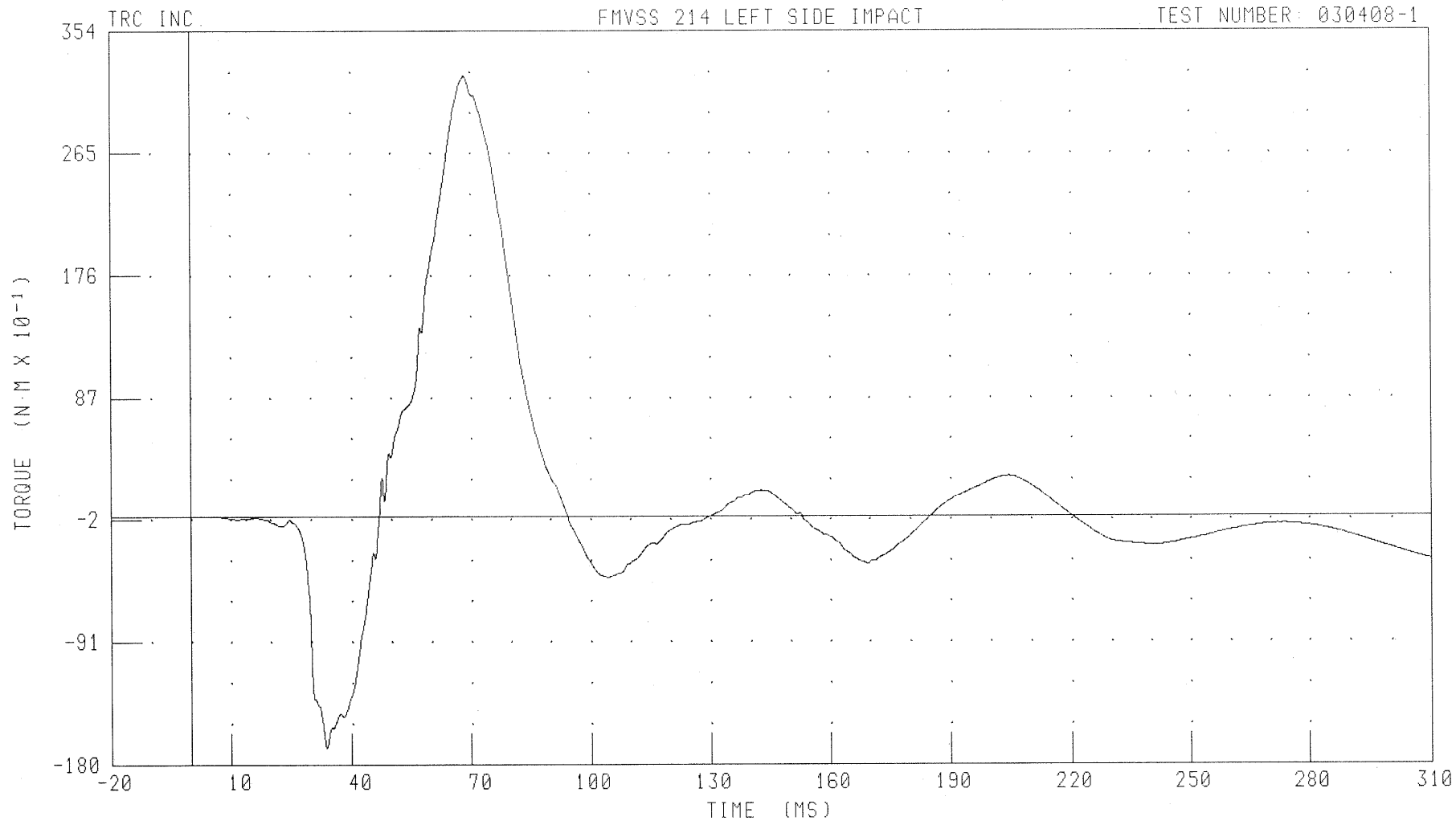
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER NECK MOMENT ABOUT Z AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKZM1 FILTER: CH. CLASS 600

PEAK DATA: 32.15 N·M @ 68.56 MS; -16.79 N·M @ 33.92 MS

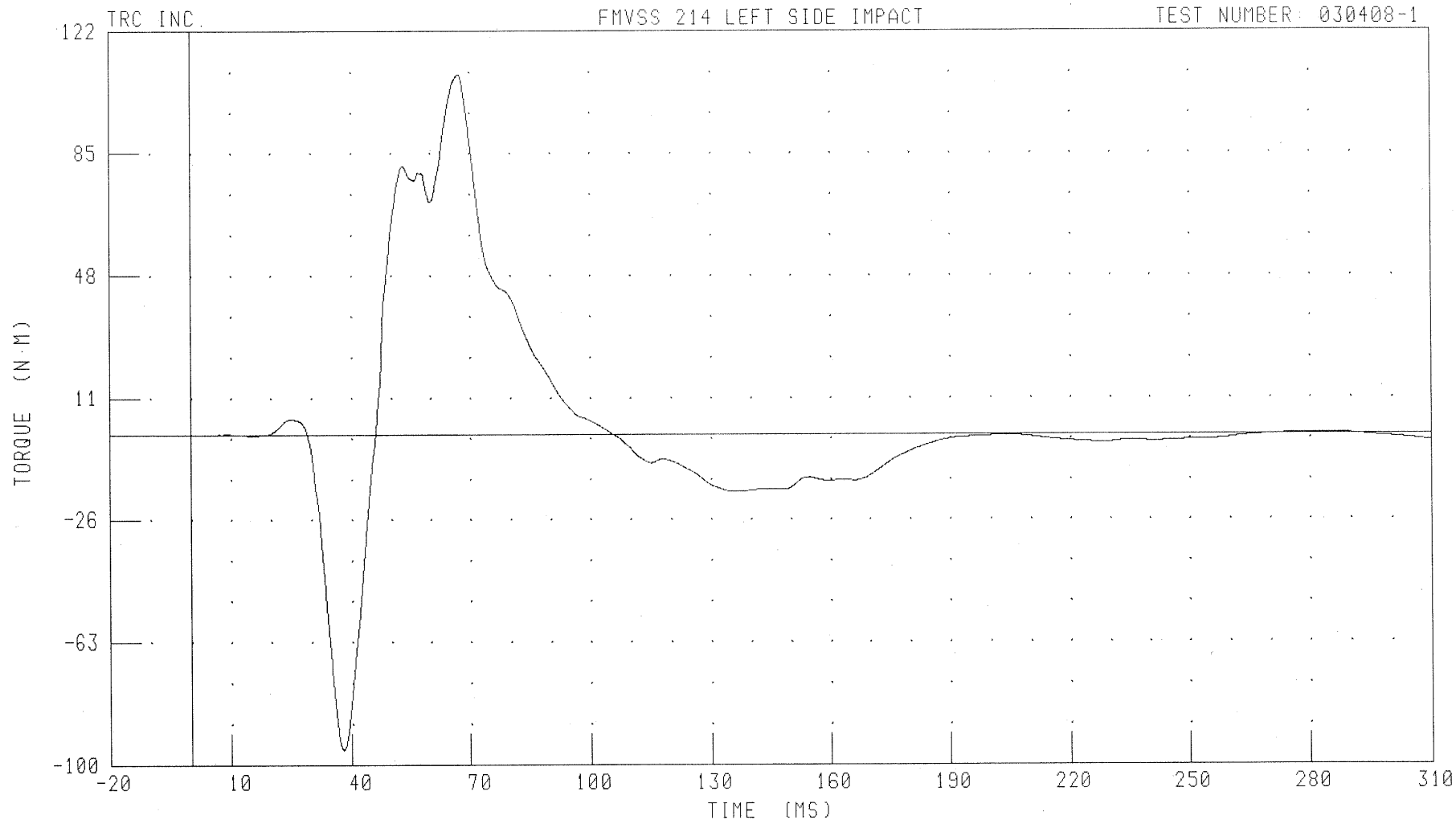
B-22

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER NECK OCCIPITAL CONDYLE MOMENT ABOUT X AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NK0XM1 FILTER: CH. CLASS 600

PEAK DATA: 109.03 N·M @ 67.28 MS; -95.57 N·M @ 37.84 MS

B-23

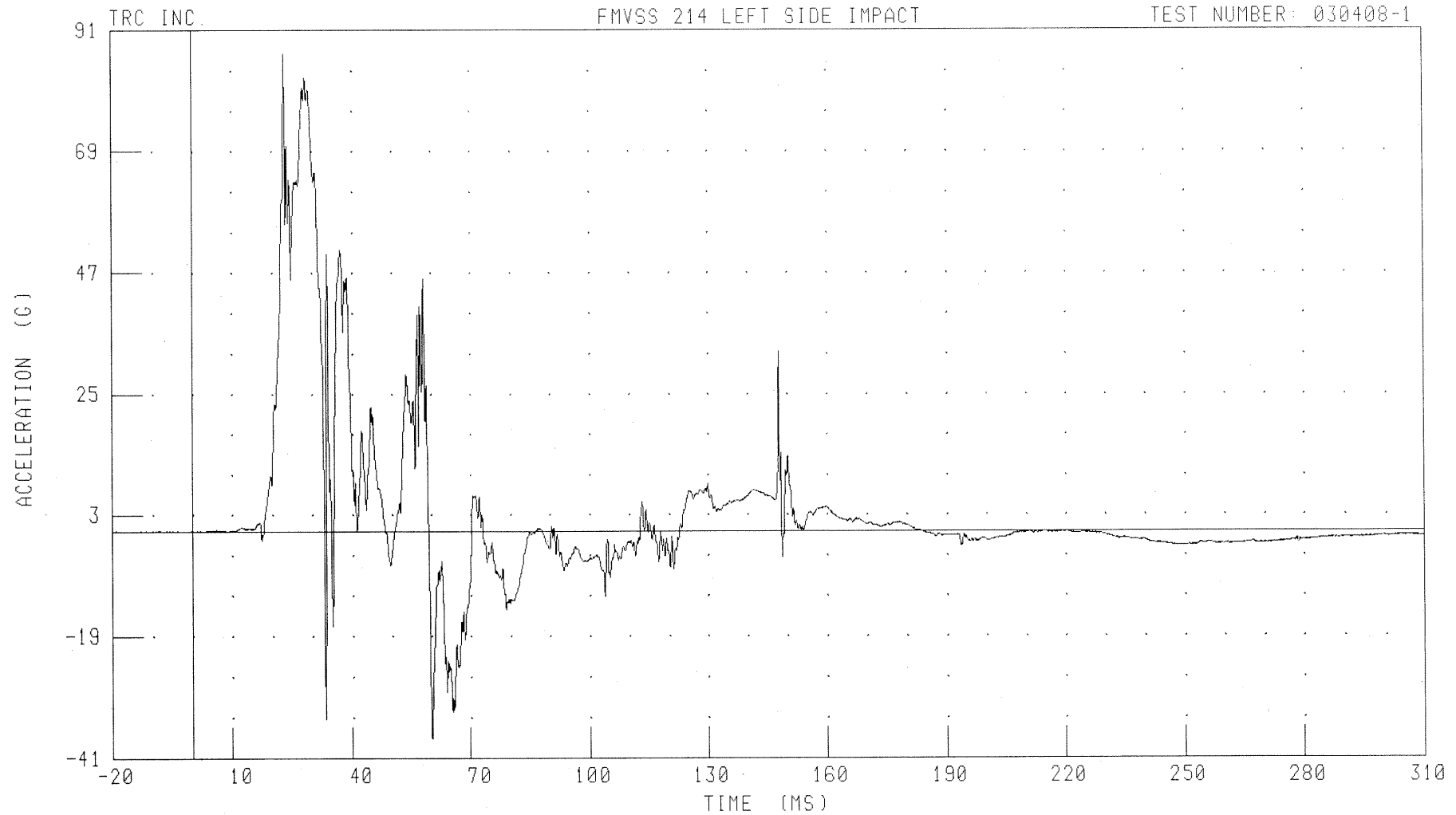
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER UPPER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LURYG1 FILTER: CH. CLASS 1000

PEAK DATA: 86.79 G @ 23.12 MS; -37.39 G @ 60.16 MS

B-24

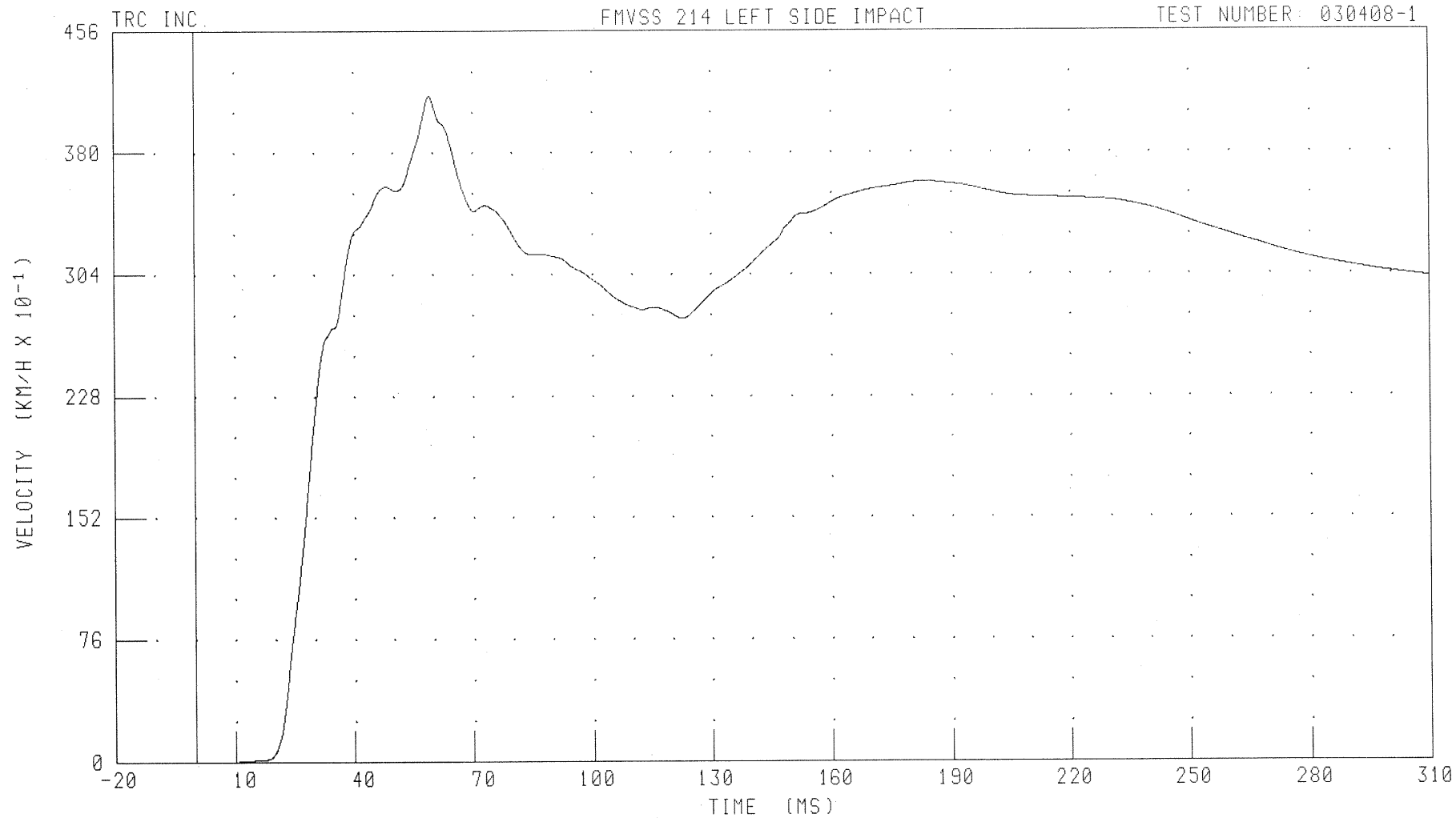
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER UPPER RIB Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LURYV1

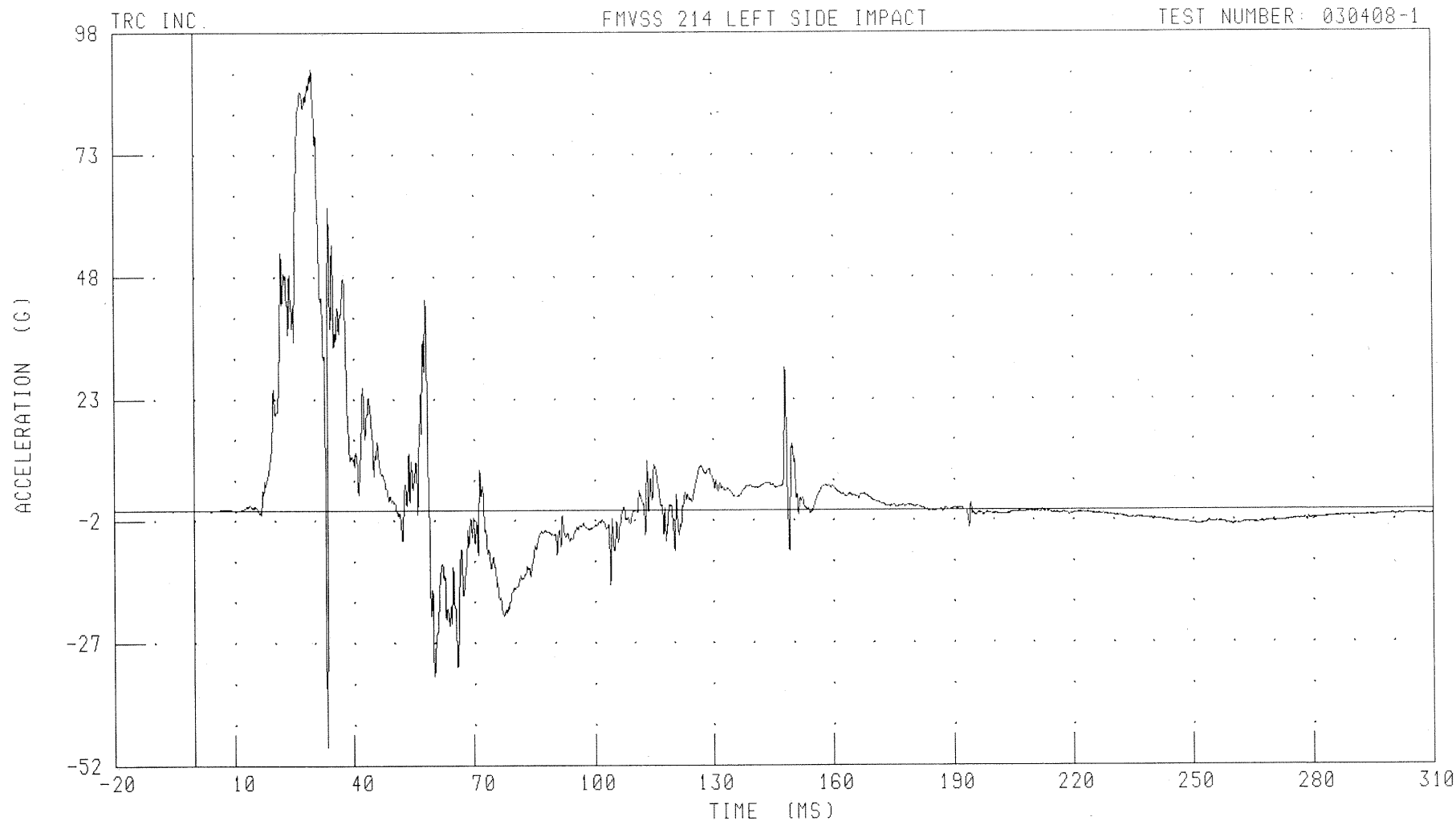
FILTER: CH. CLASS 180

PEAK DATA: 41.58 KM/H @ 59.28 MS; 0.00 KM/H @ 0.16 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYG1 FILTER: CH. CLASS 1000

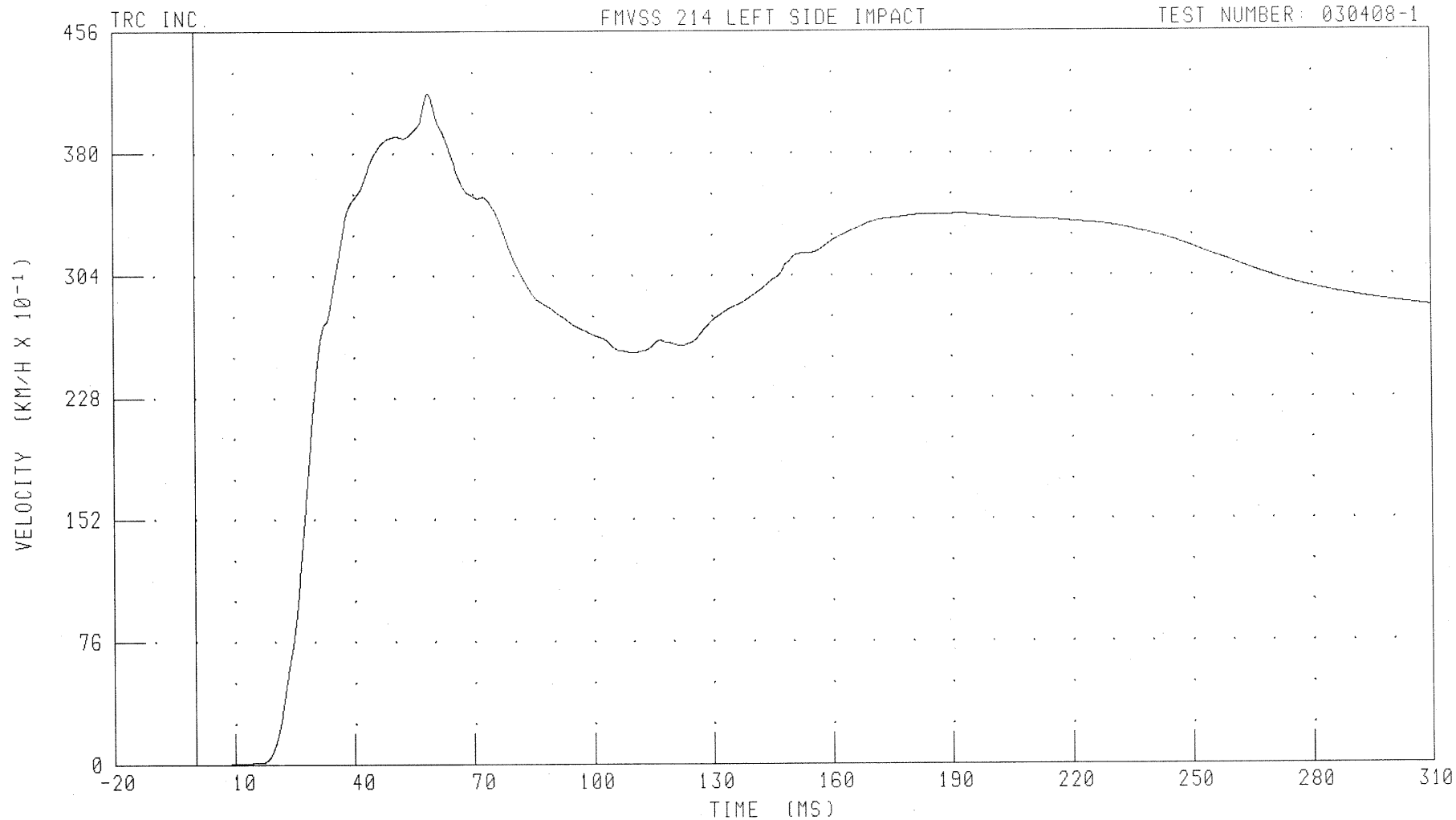
PEAK DATA: 90.65 G @ 29.60 MS; -48.12 G @ 33.28 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER LOWER RIB Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYV1 FILTER: CH. CLASS 180

PEAK DATA: 41.76 KM/H @ 58.80 MS; 0.00 KM/H @ 4.80 MS

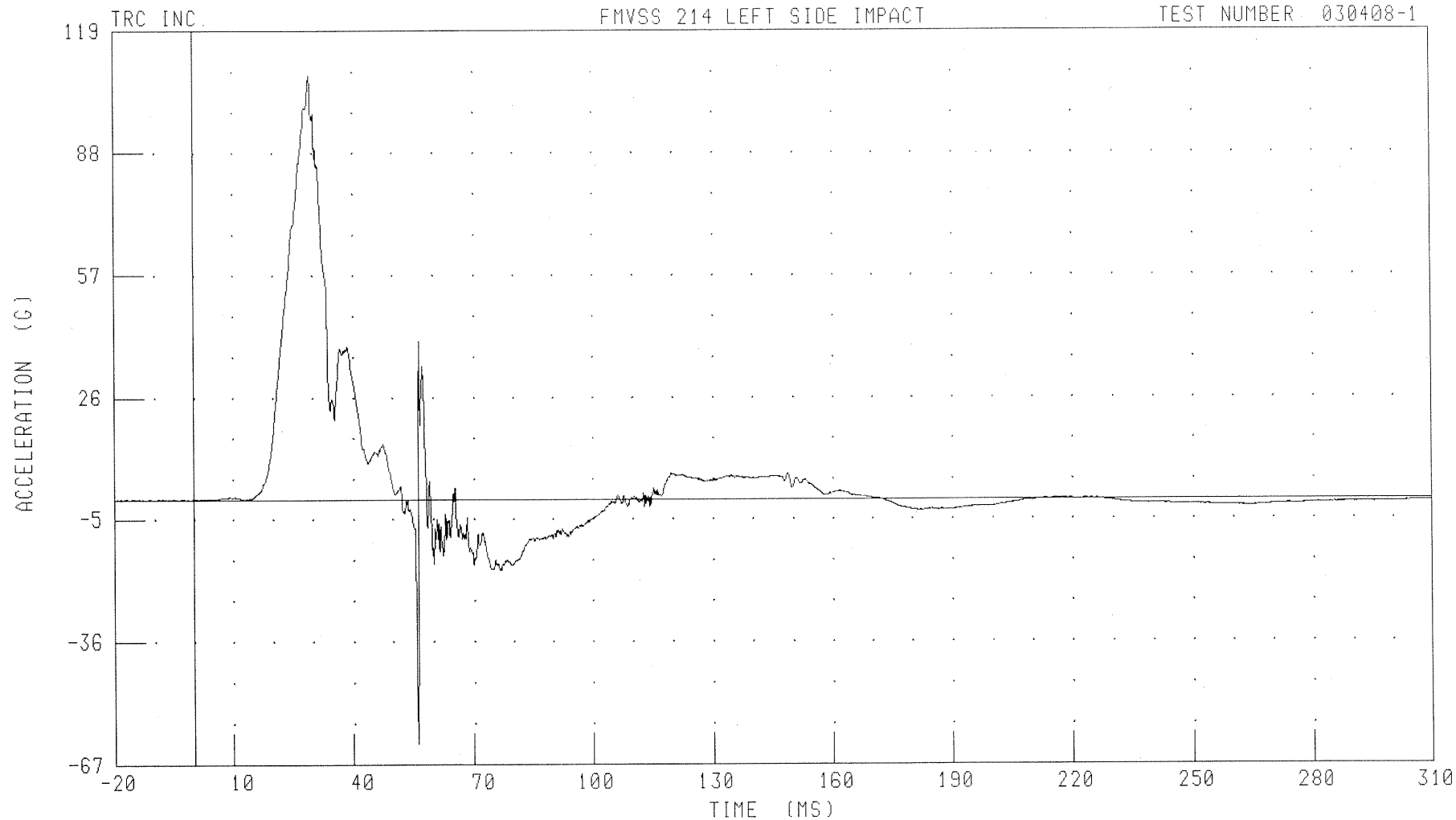
B-27

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER SPINE Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: T12YG1 FILTER: CH. CLASS 1000

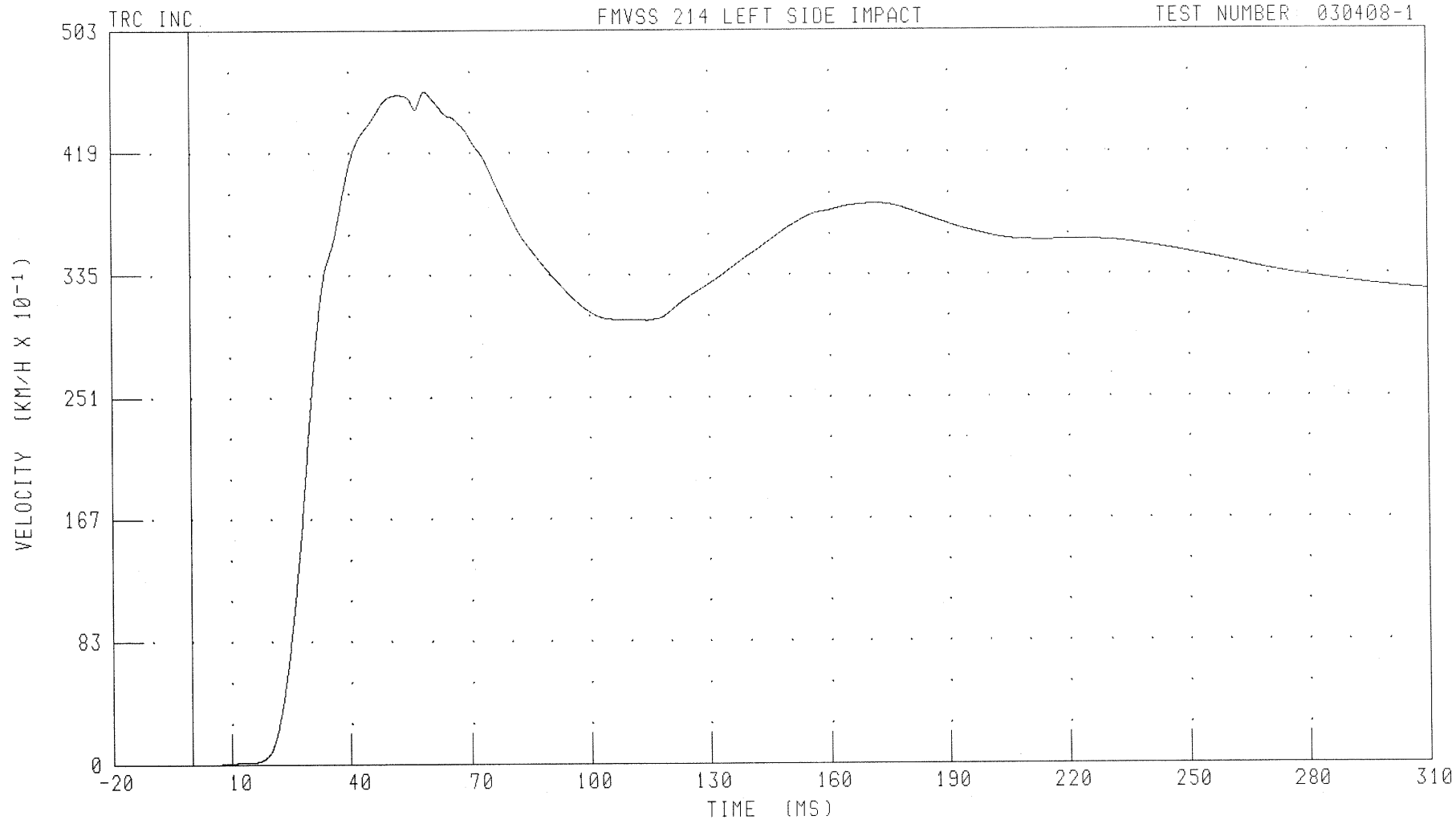
B-28

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER SPINE Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: T12YV1 FILTER: CH. CLASS 180

PEAK DATA: 46.20 KM/H @ 58.80 MS; 0.00 KM/H @ 0.00 MS

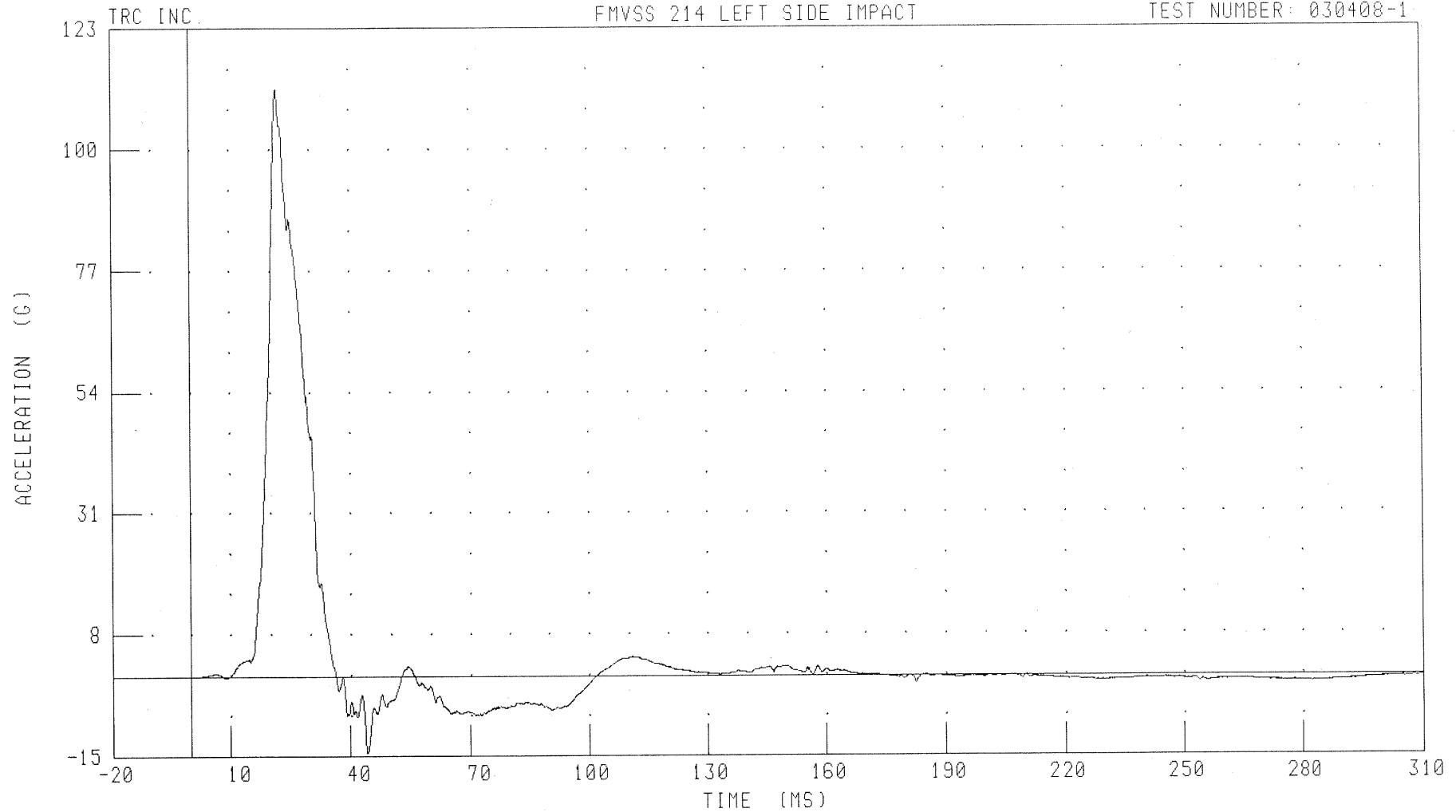
B-29

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER PELVIS Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



B-30

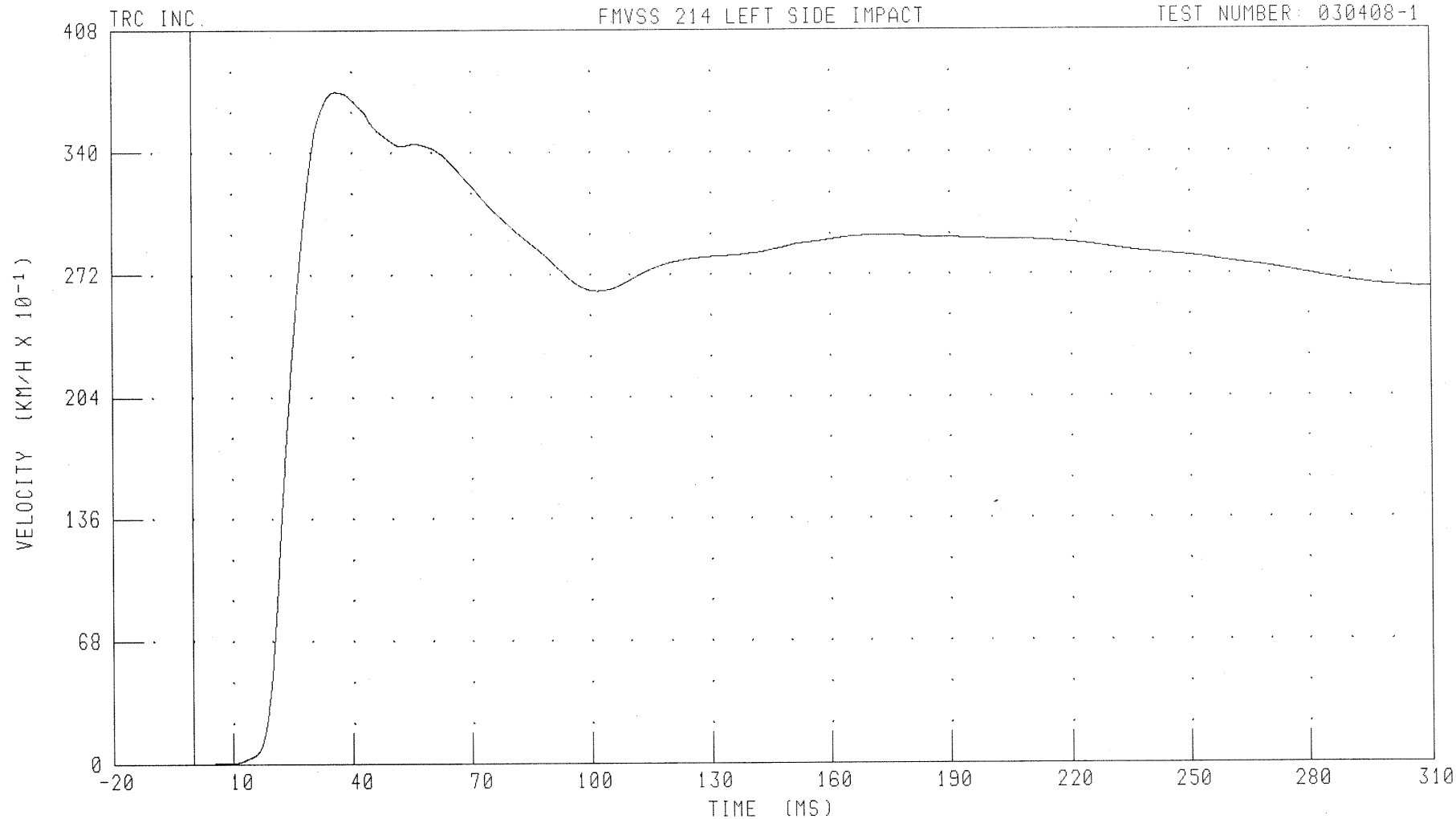
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER PELVIS Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYV1

FILTER: CH. CLASS 180

PEAK DATA: 37.39 KM/H @ 36.32 MS; 0.00 KM/H @ 0.00 MS

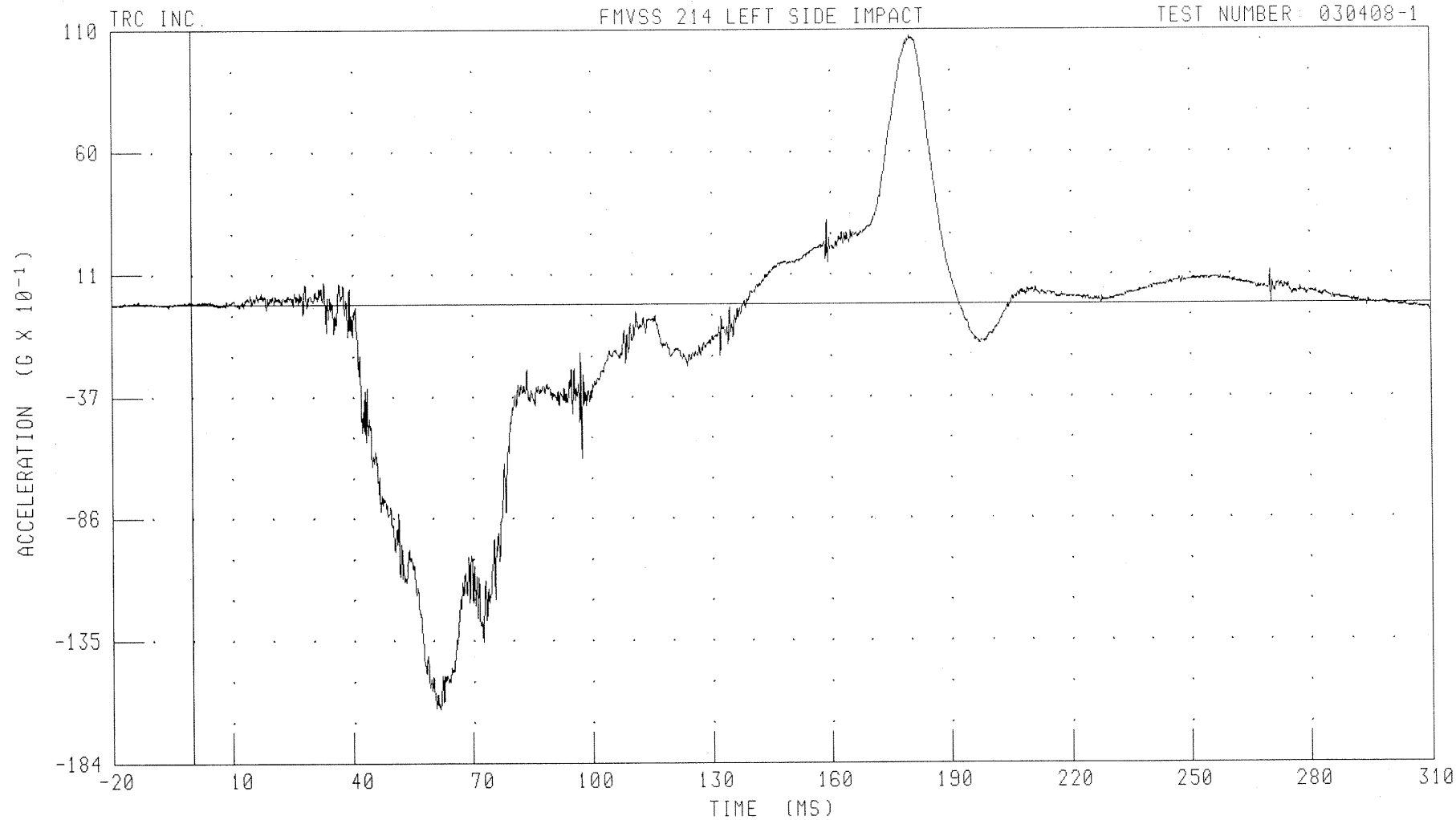
B-31

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDXC4 FILTER: CH. CLASS 1000

B-32

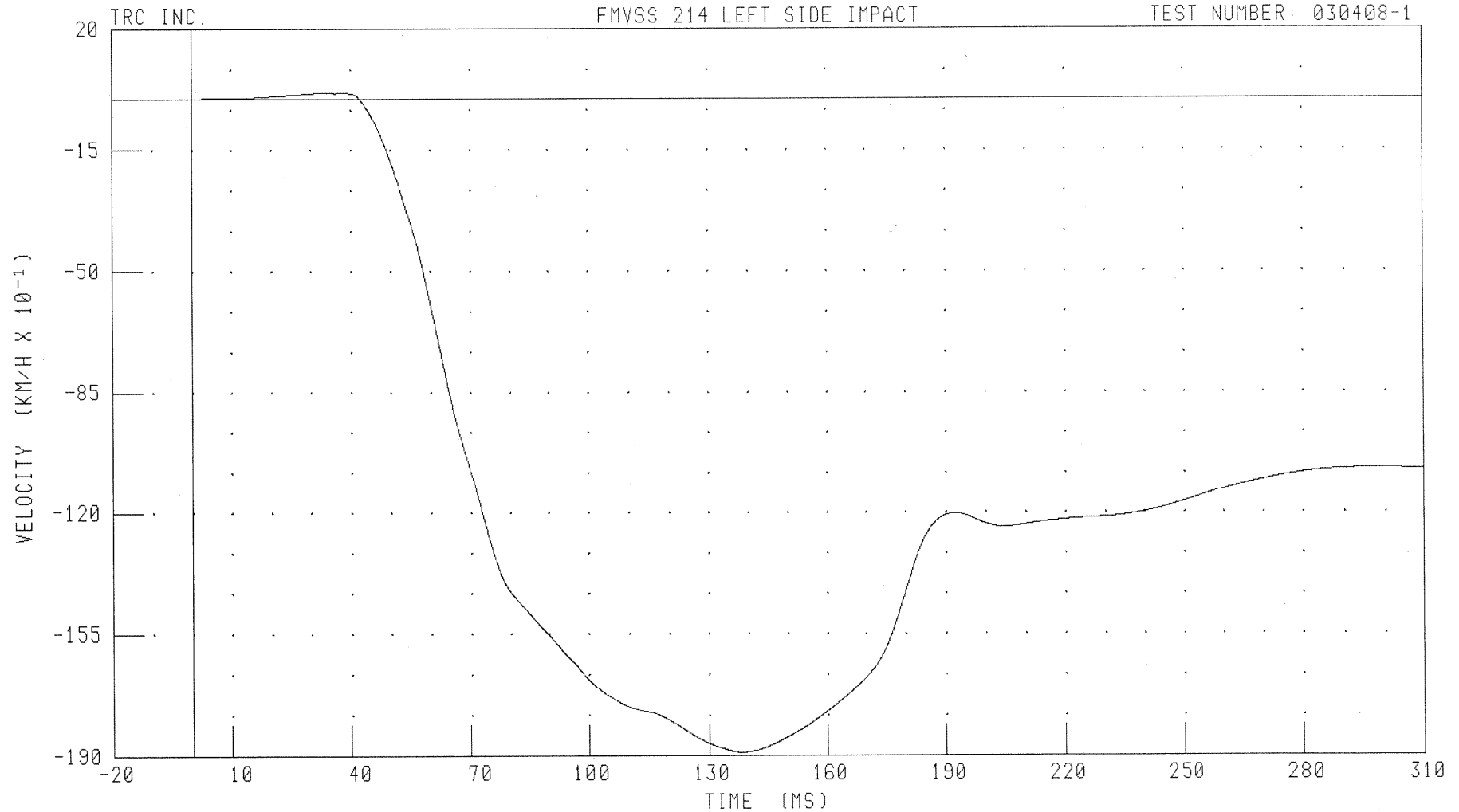
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT REAR PASSENGER HEAD X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDXV4 FILTER: CH. CLASS 180

PEAK DATA: 0.18 KM/H @ 33.20 MS; -18.90 KM/H @ 138.32 MS

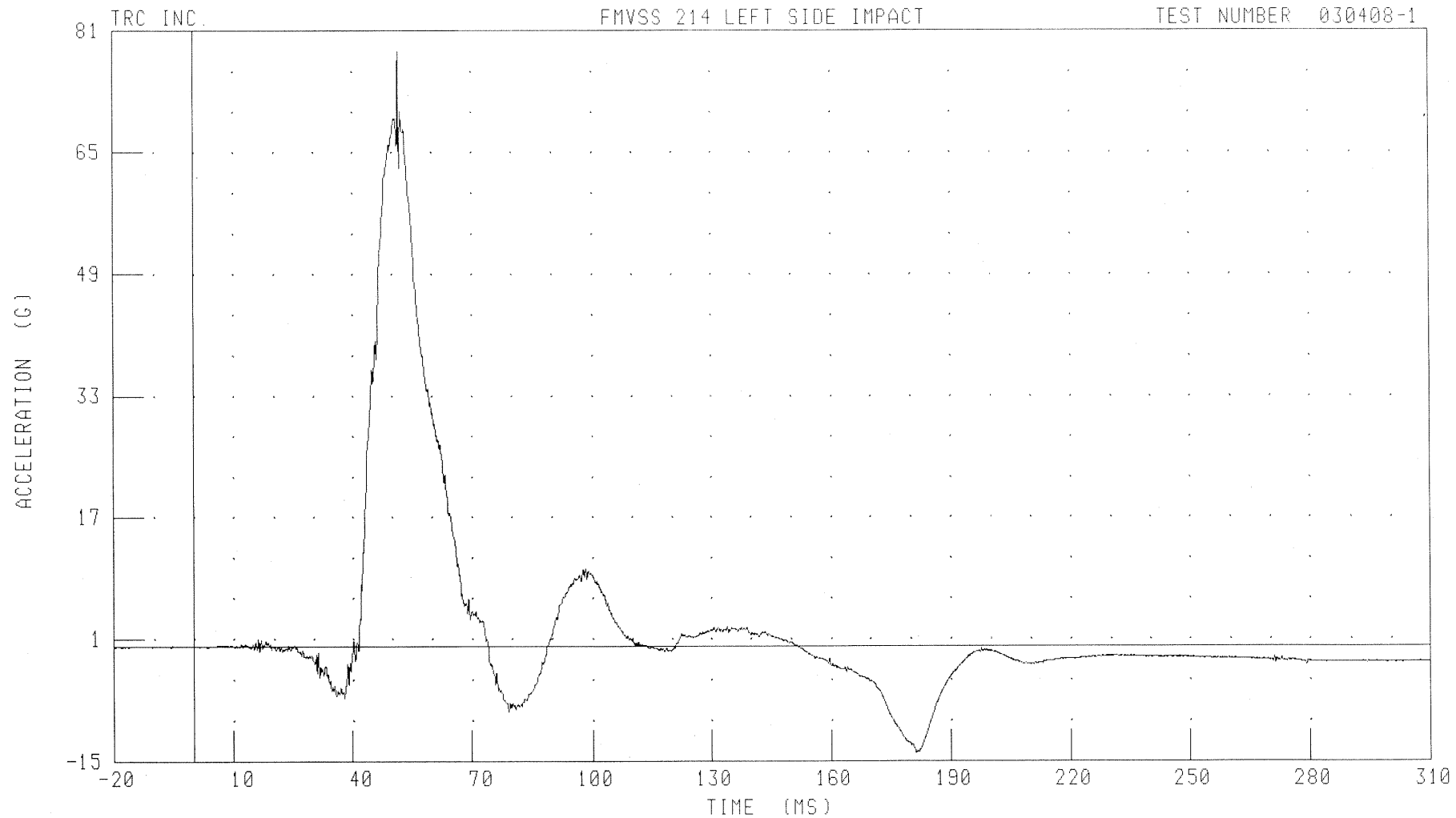
B-33

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: HEDYG4 FILTER: CH. CLASS 1000

PEAK DATA: 78.34 G @ 51.76 MS; -13.92 G @ 181.28 MS

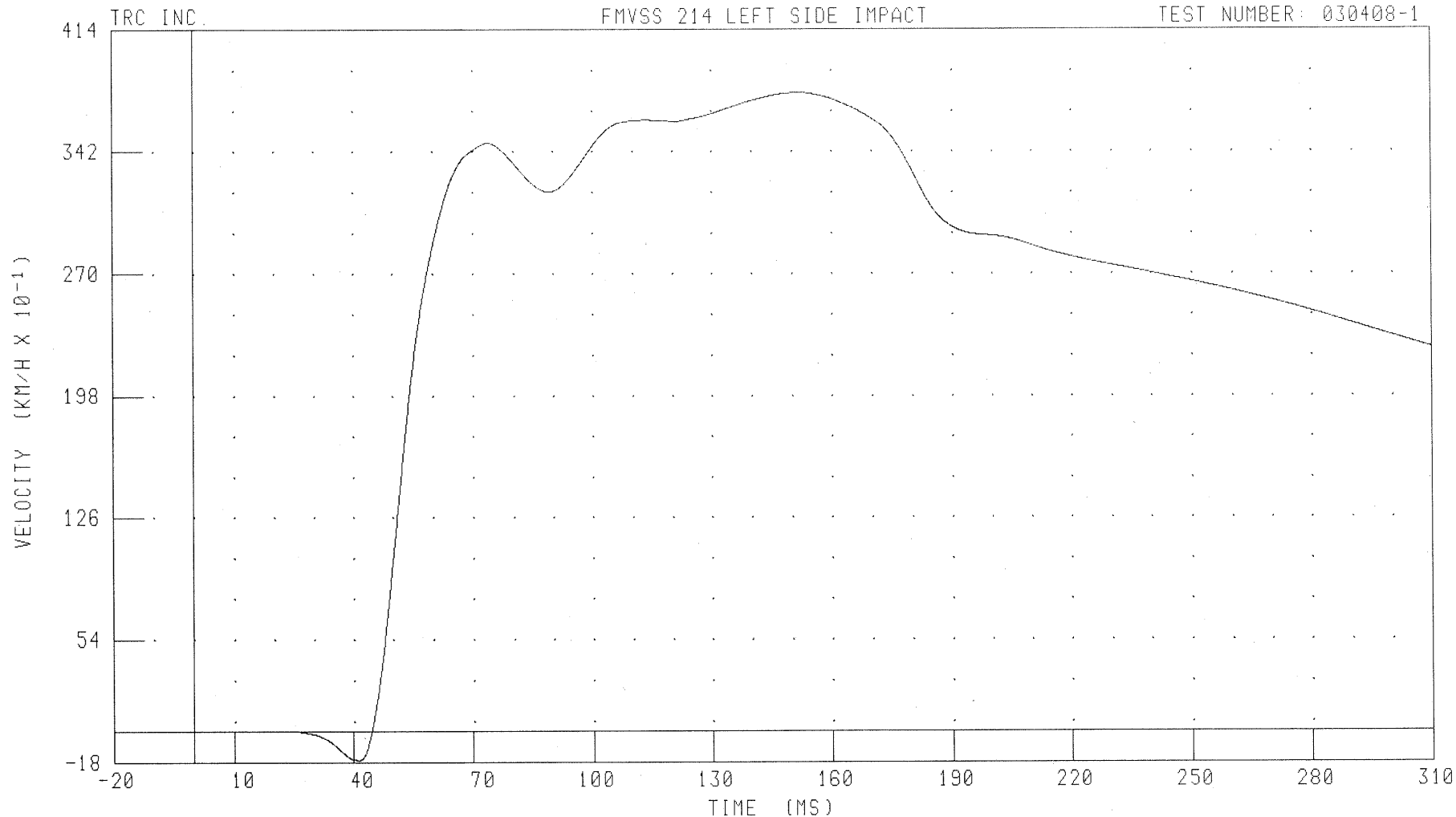
B-34

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDYV4 FILTER: CH. CLASS 180

PEAK DATA: 37.69 KM/H @ 151.84 MS; -1.66 KM/H @ 41.20 MS

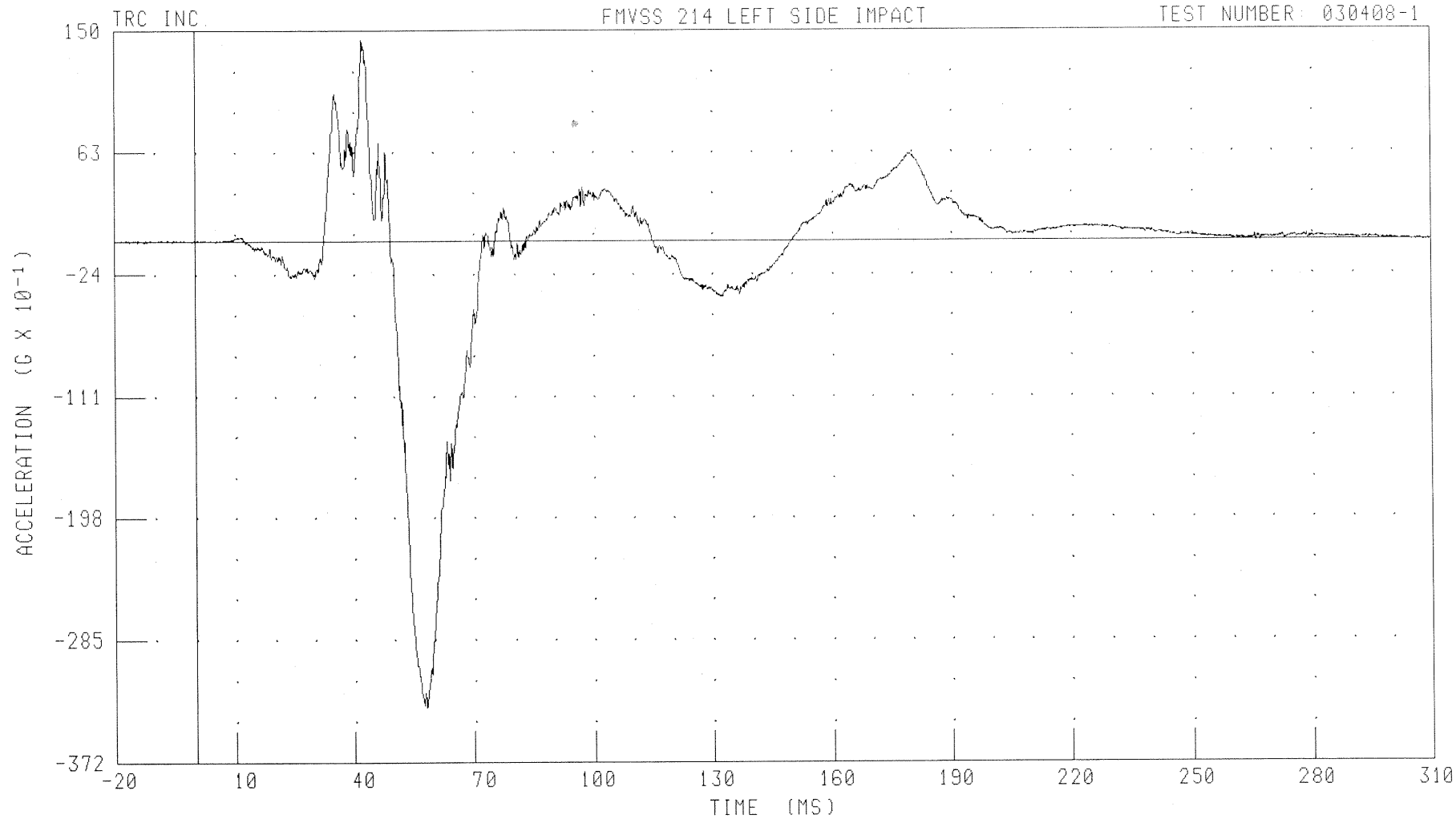
B-35

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Z-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDZG4 FILTER: CH. CLASS 1000

PEAK DATA: 14.32 G @ 42.32 MS, -33.27 G @ 58.00 MS

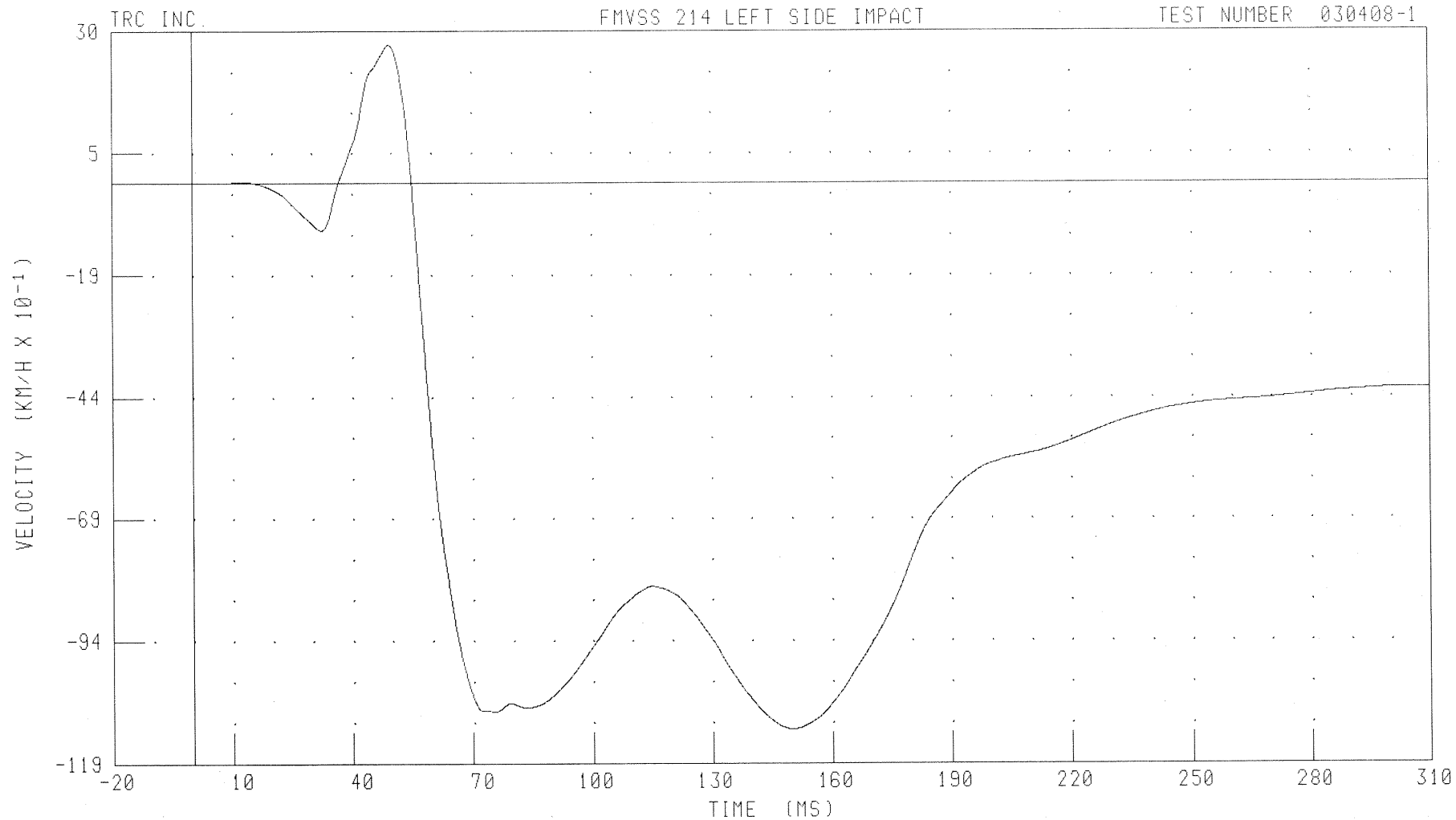
B-36

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Z-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: HEDZV4 FILTER: CH. CLASS 180

PEAK DATA: 2.82 KM/H @ 49.52 MS; -11.20 KM/H @ 150.00 MS

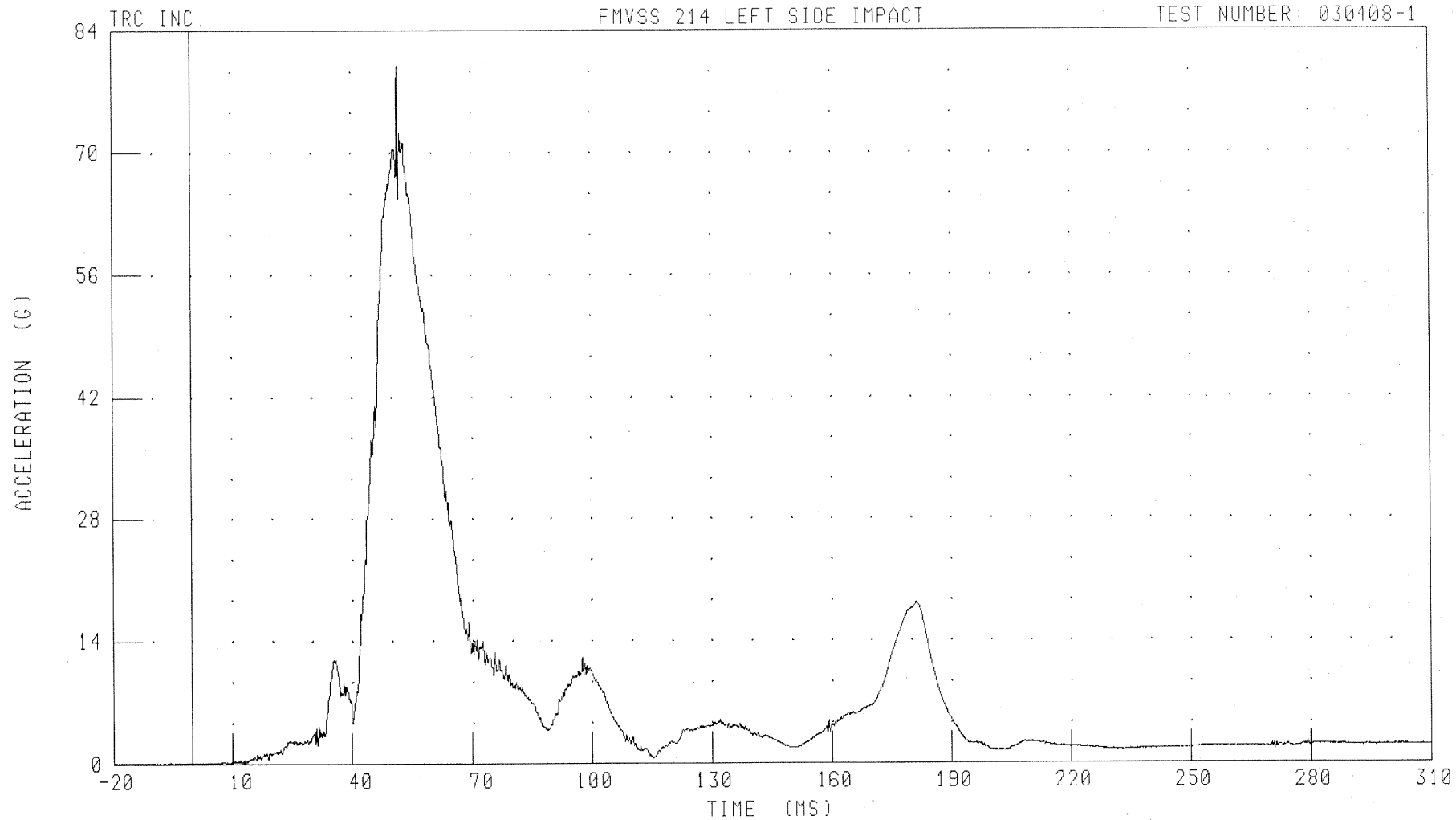
B-37

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD RESULTANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDRG4 FILTER: CH. CLASS 1000

PEAK DATA: 79.98 G @ 51.76 MS; 0.00 G @ -7.04 MS

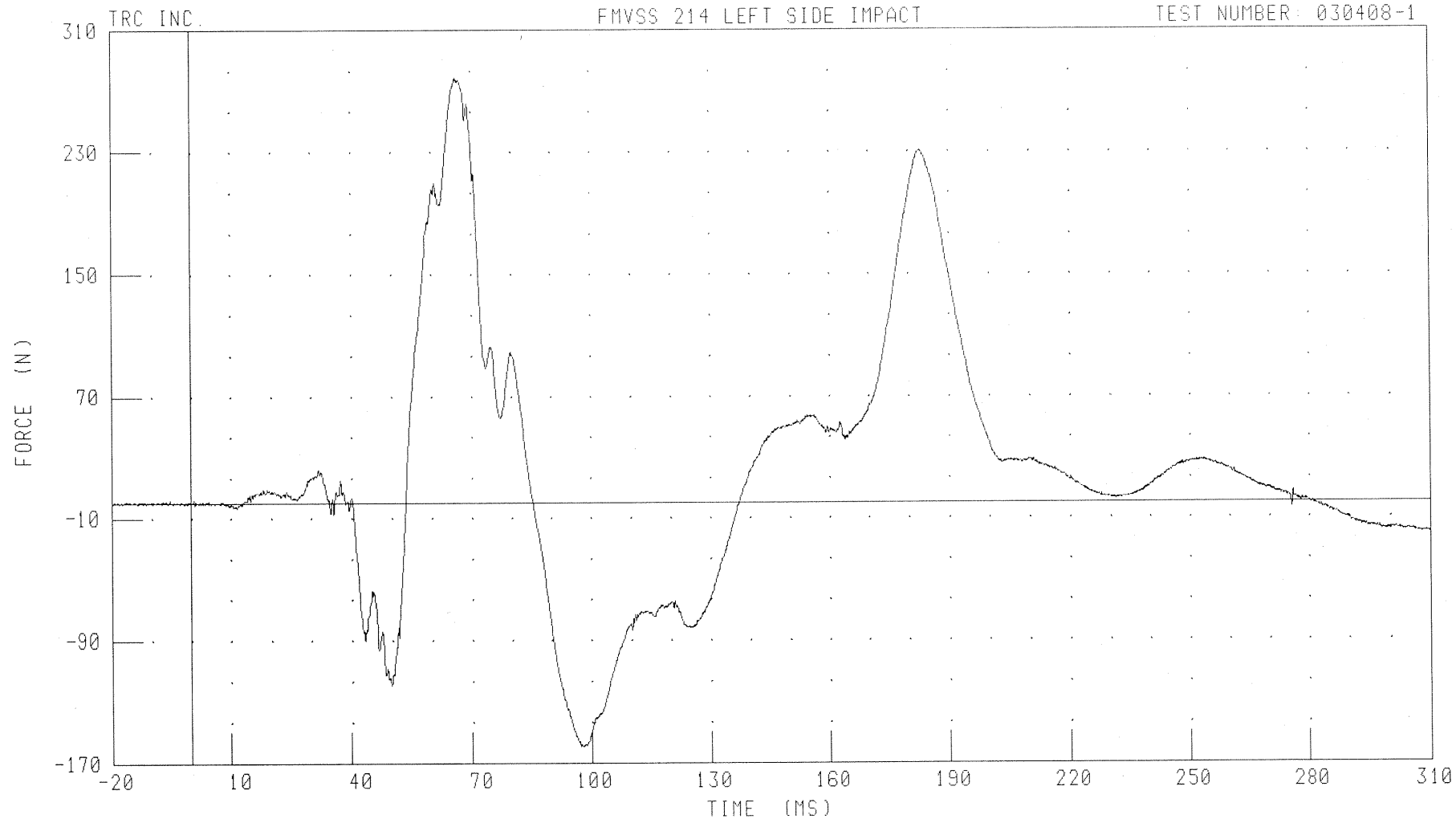
B-38

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER NECK X-AXIS SHEAR FORCE

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKXF4 FILTER: CH. CLASS 1000

PEAK DATA: 278.77 N @ 66.24 MS; -159.51 N @ 98.00 MS

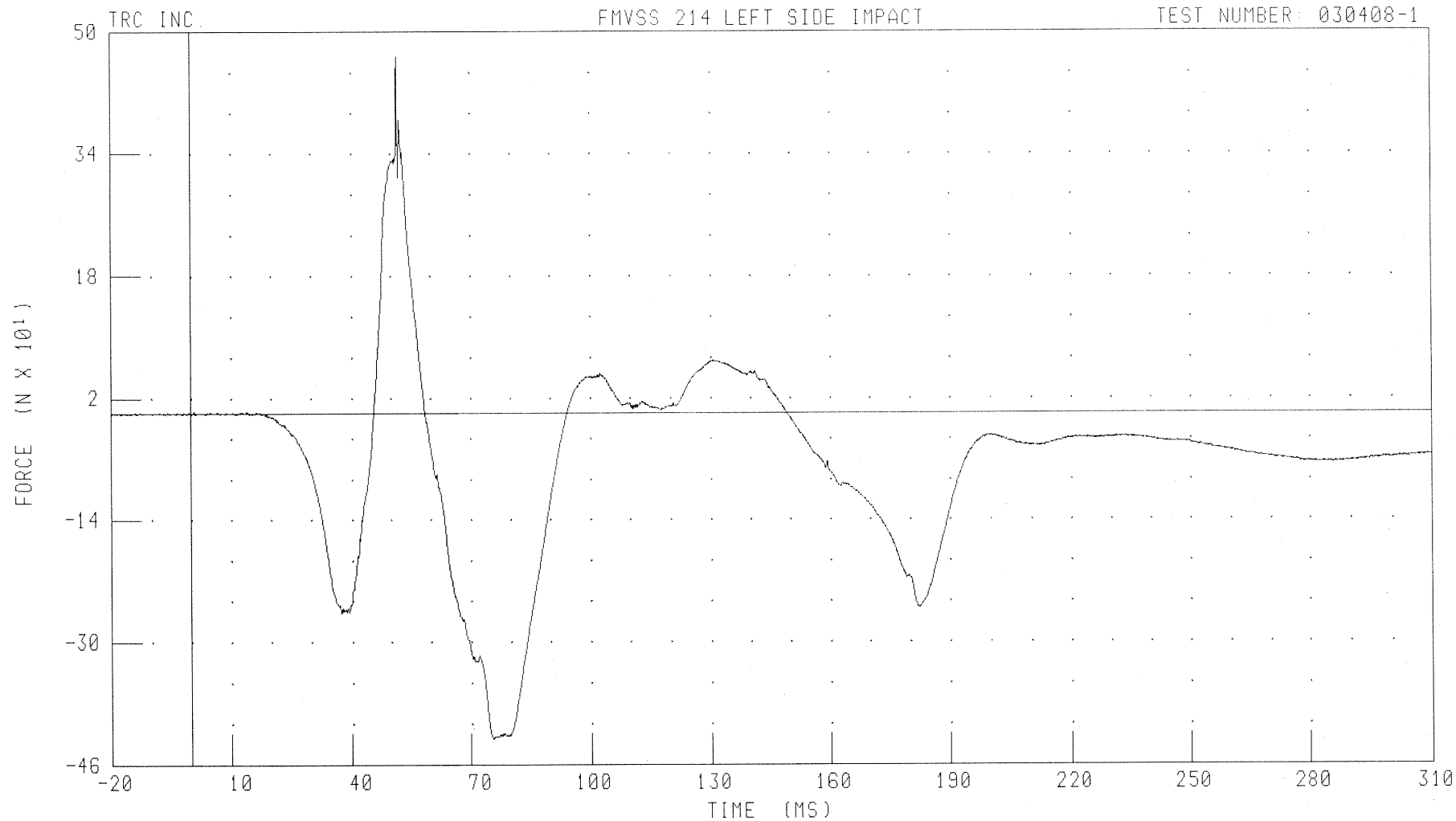
B-39

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER NECK Y-AXIS SHEAR FORCE

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKYF4 FILTER: CH. CLASS 1000

PEAK DATA: 468.06 N @ 51.76 MS; -425.90 N @ 75.76 MS

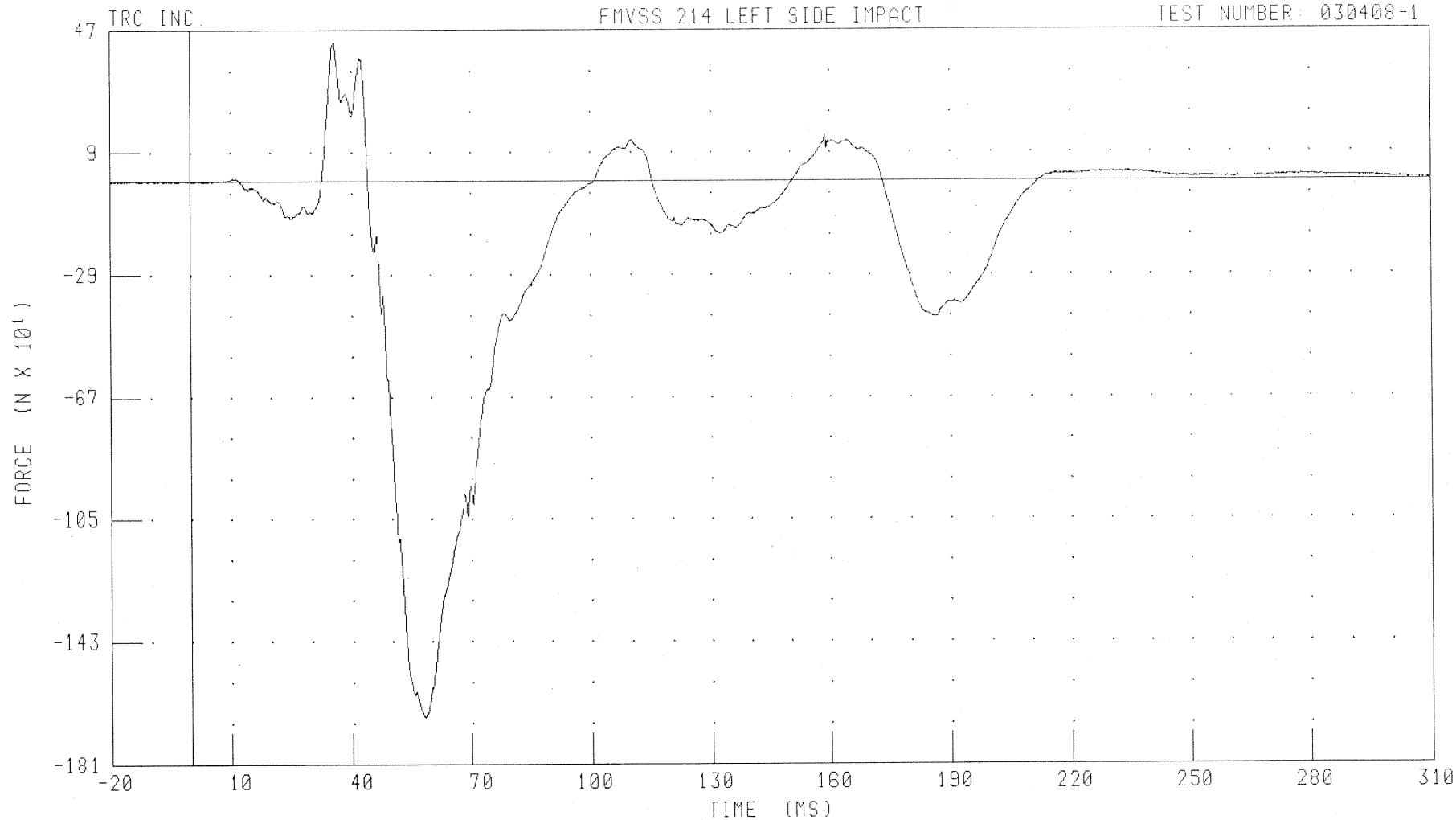
B-40

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER NECK Z-AXIS AXIAL FORCE

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKZF4 FILTER: CH. CLASS 1000

PEAK DATA: 432.03 N @ 35.68 MS; -1665.19 N @ 58.32 MS

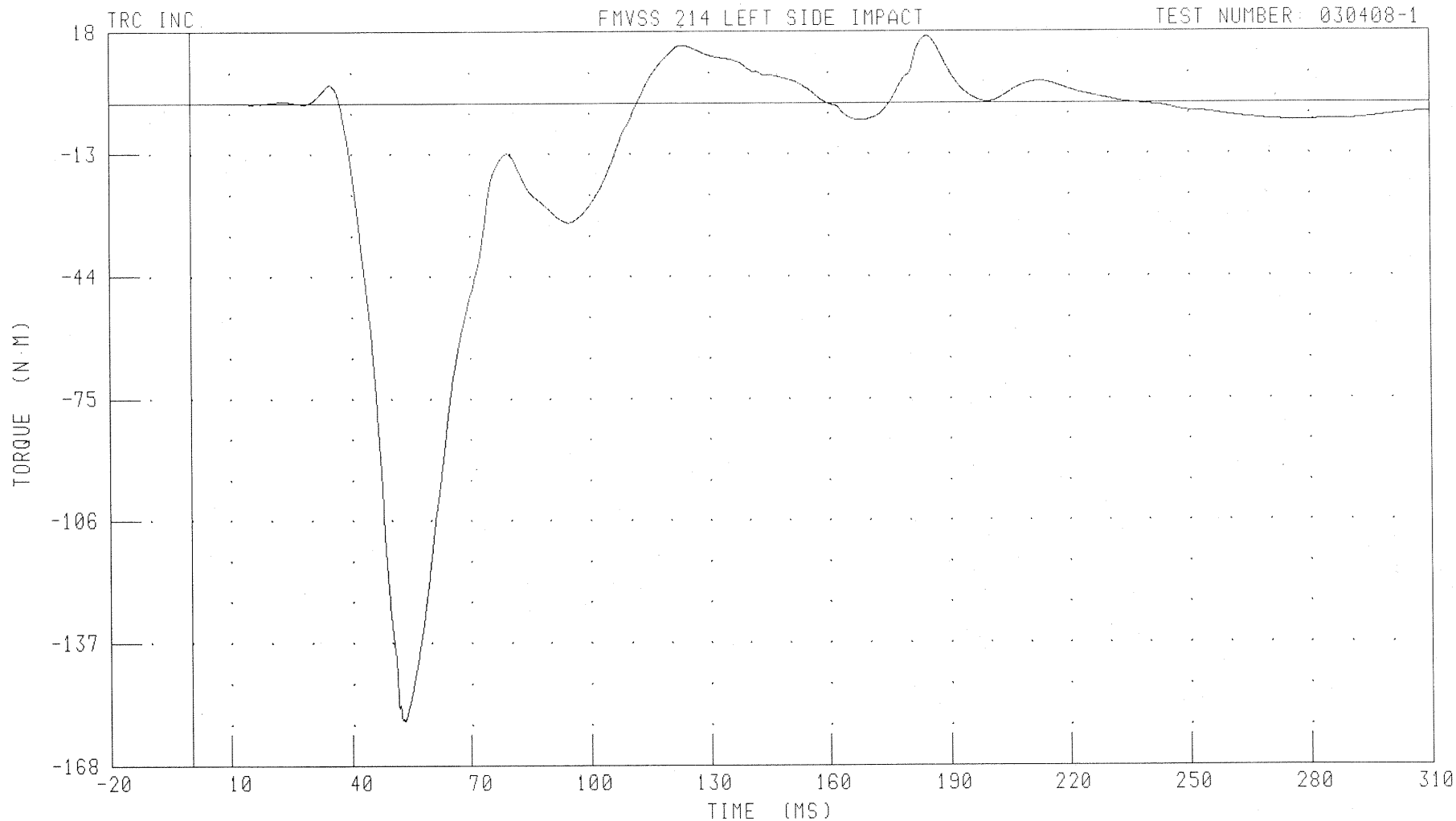
B-41

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER NECK MOMENT ABOUT X AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



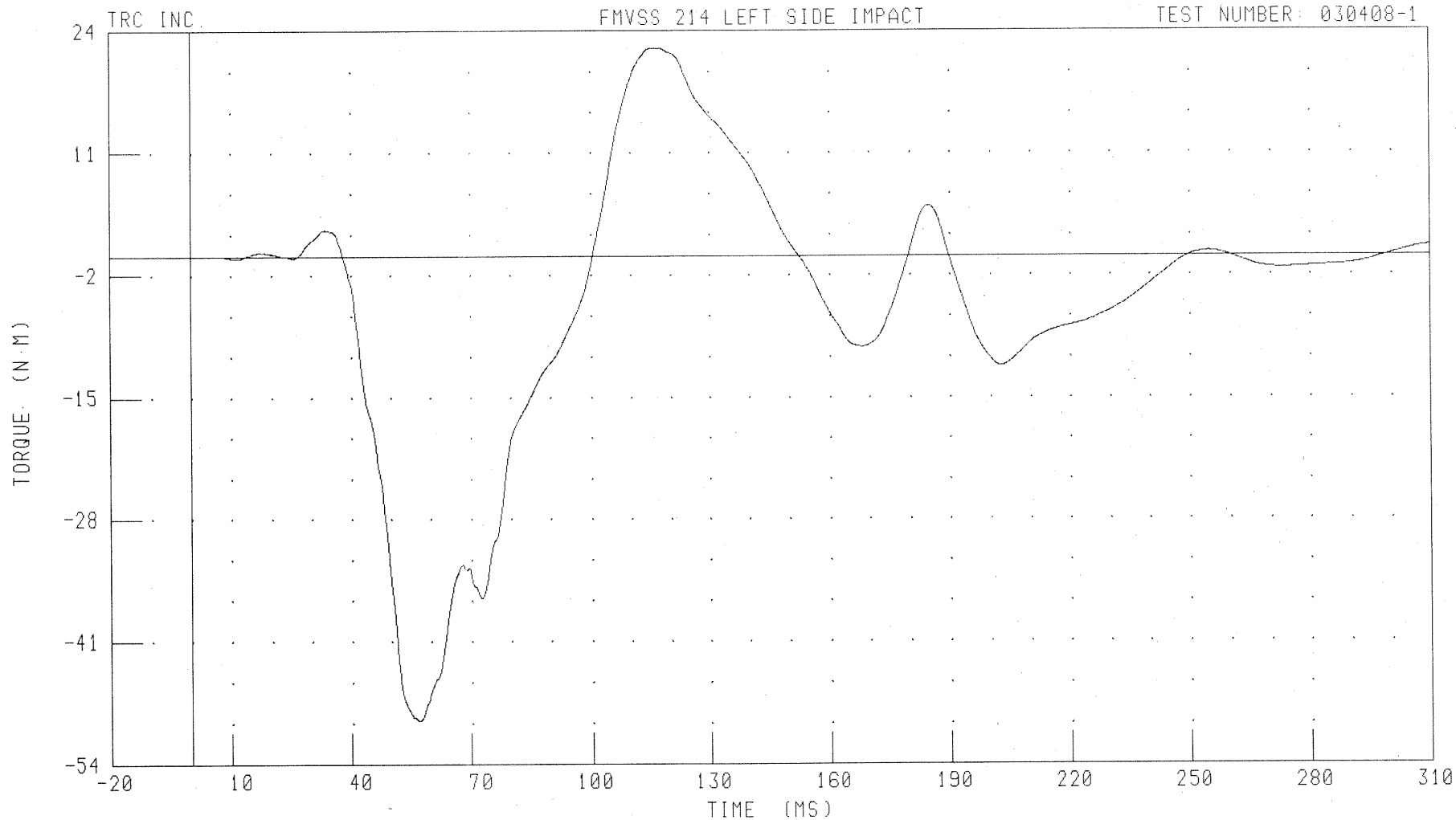
CHANNEL: NEKXM4 FILTER: CH. CLASS 600

PEAK DATA: 16.80 N·m @ 184.72 MS; -156.66 N·m @ 53.20 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER NECK MOMENT ABOUT Y AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NEKYM4 FILTER: CH. CLASS 600

PEAK DATA: 22.18 N·m @ 115.68 ms; -49.43 N·m @ 57.04 ms

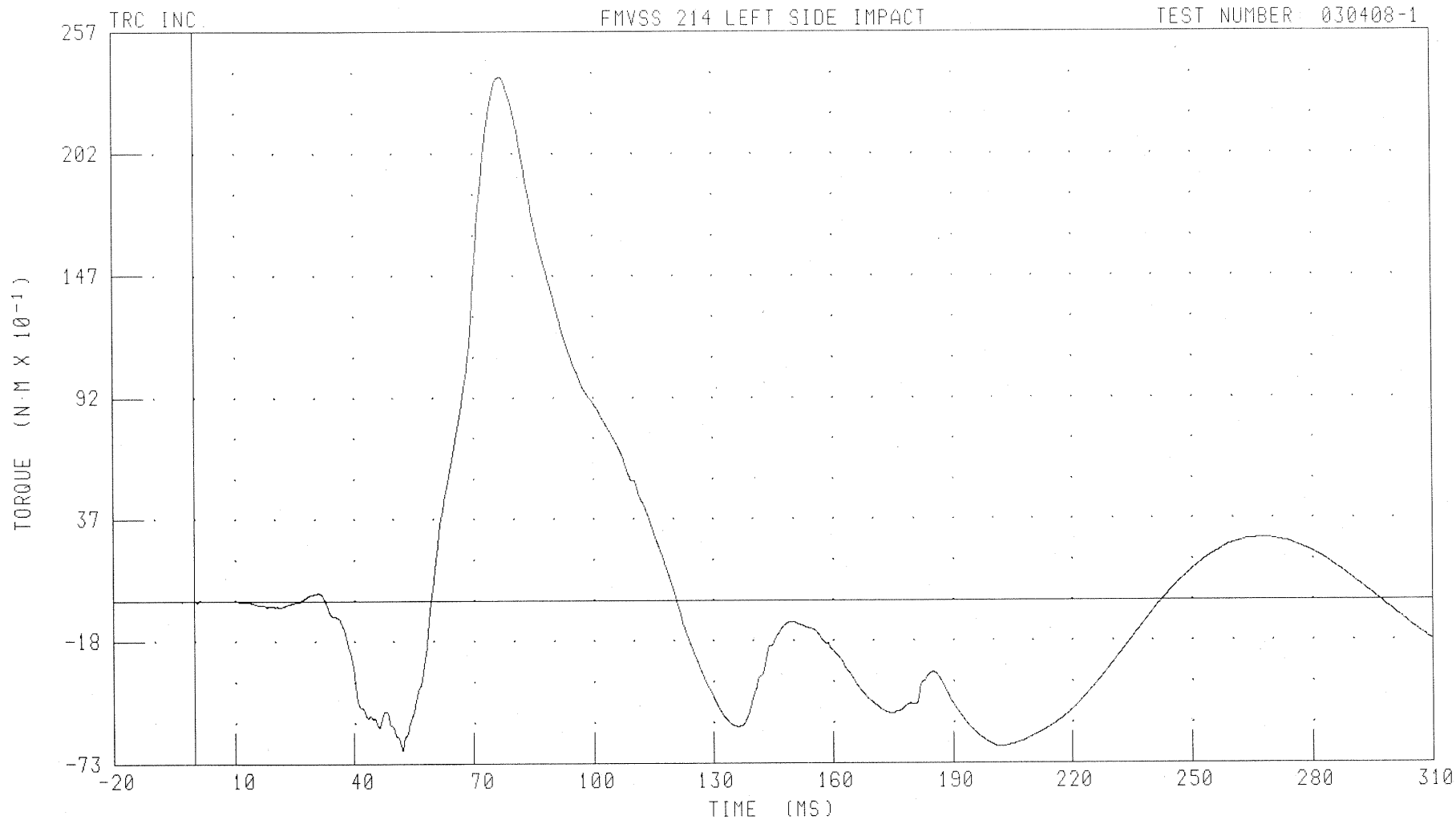
B-43

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER NECK MOMENT ABOUT Z AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



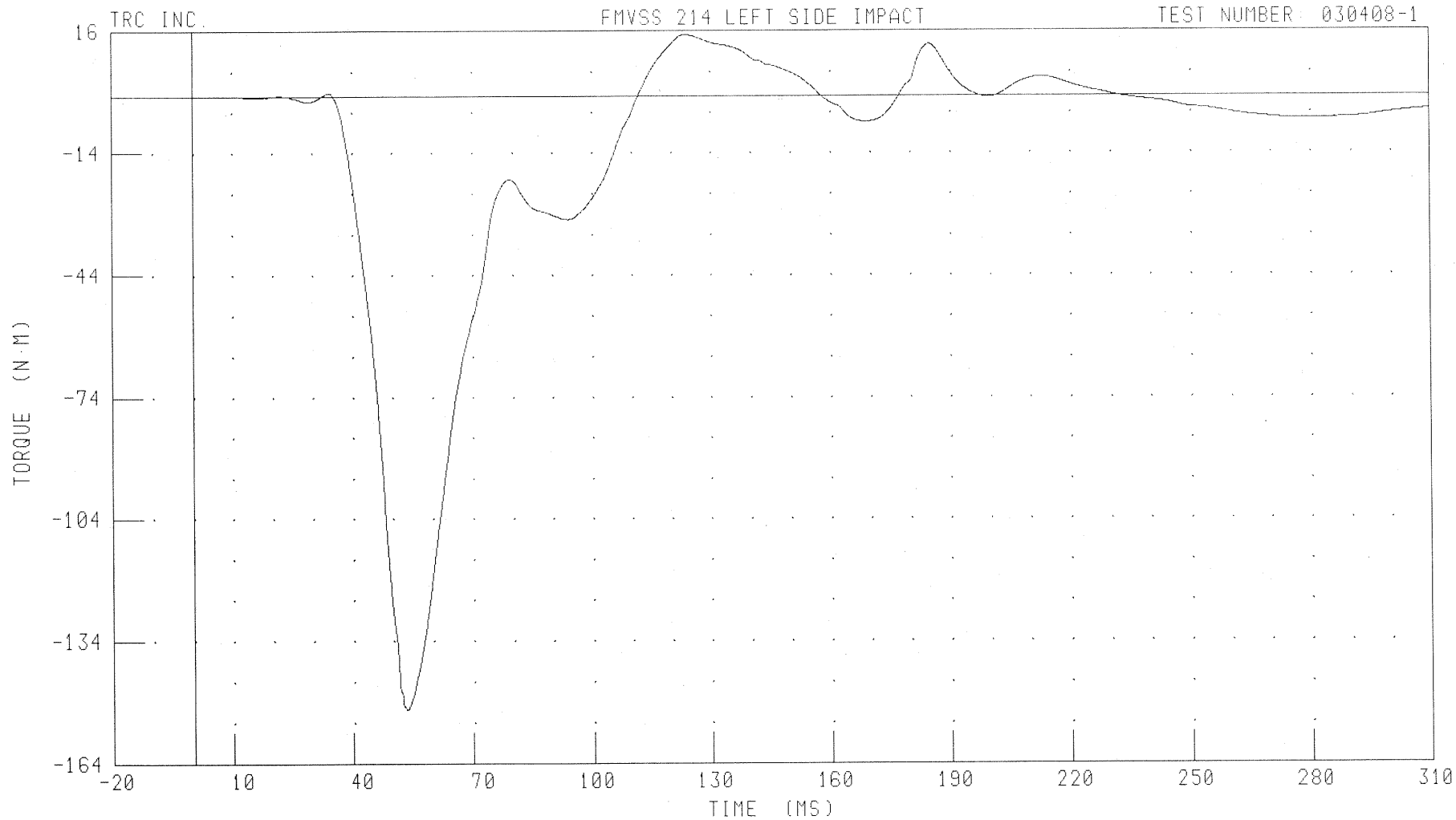
CHANNEL: NEKZM4 FILTER: CH. CLASS 600

PEAK DATA: 23.68 N·M @ 77.12 MS; -6.72 N·M @ 52.32 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER NECK OCCIPITAL CONDYLE MOMENT ABOUT X AXIS

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: NK0XM4 FILTER: CH. CLASS 600

PEAK DATA: 15.02 N·M @ 124.24 MS; -150.86 N·M @ 53.28 MS

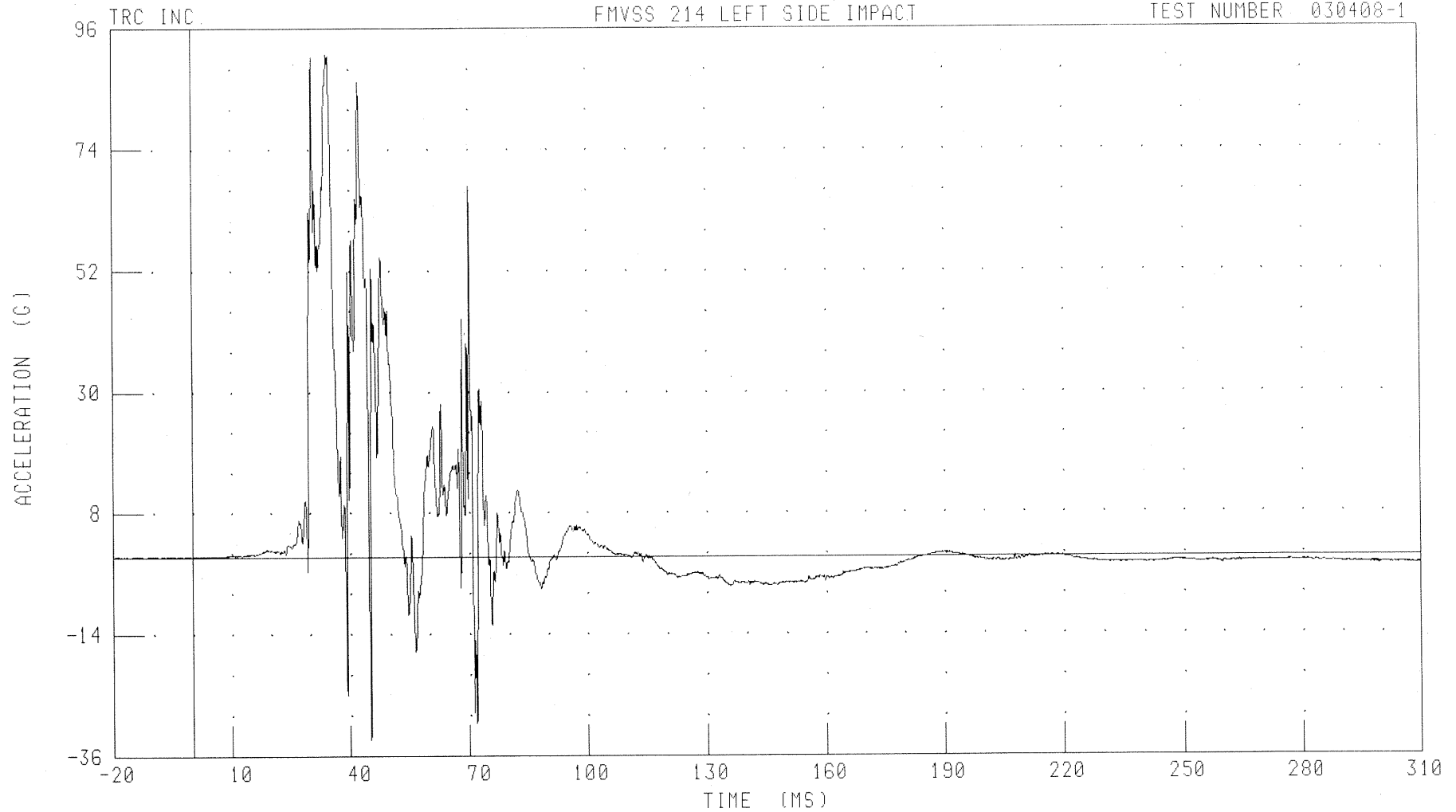
B-45

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER UPPER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



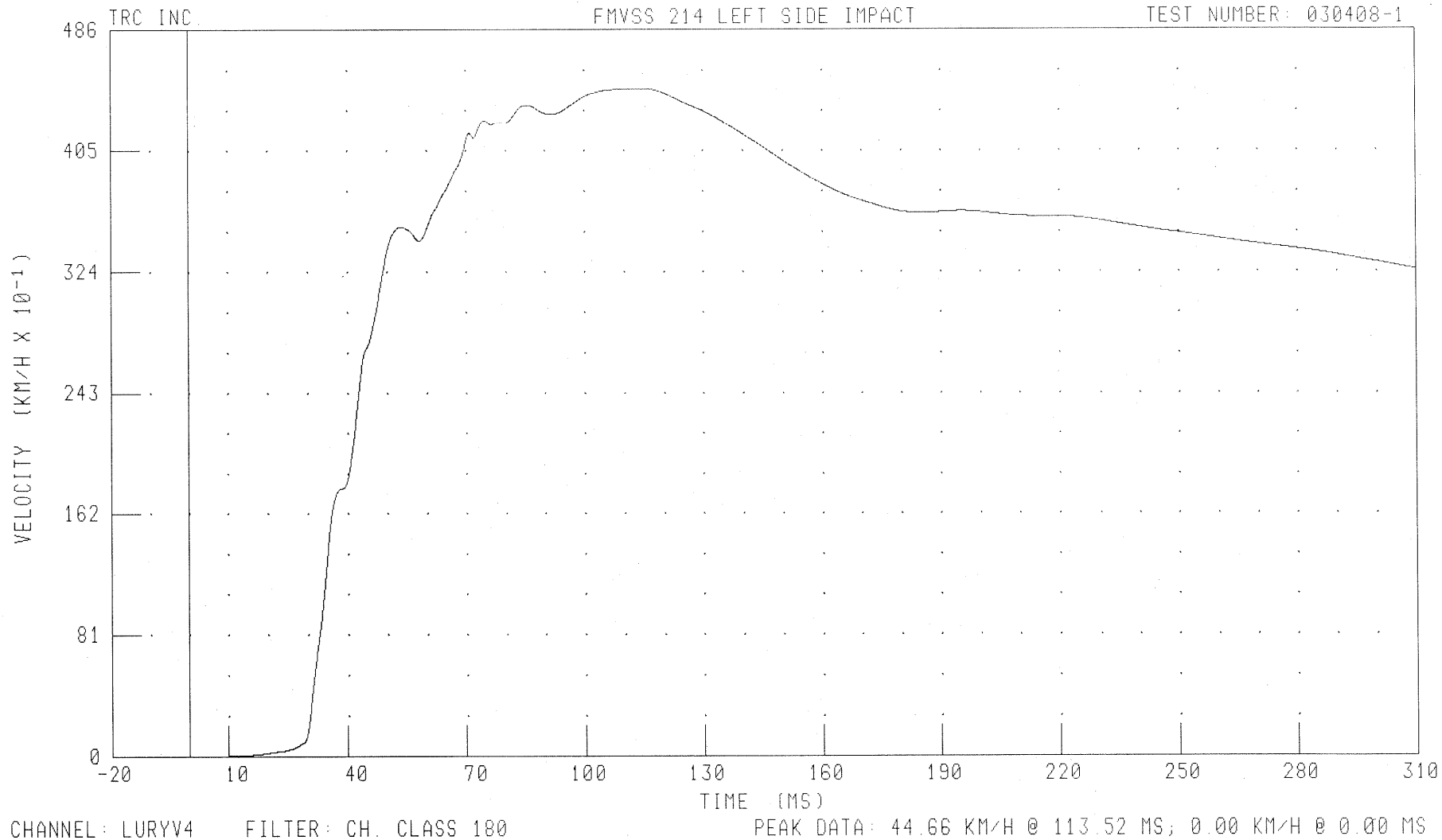
CHANNEL: LURYG4 FILTER: CH. CLASS 1000

PEAK DATA: 91.37 G @ 34.64 MS, -33.07 G @ 45.04 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER UPPER RIB Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



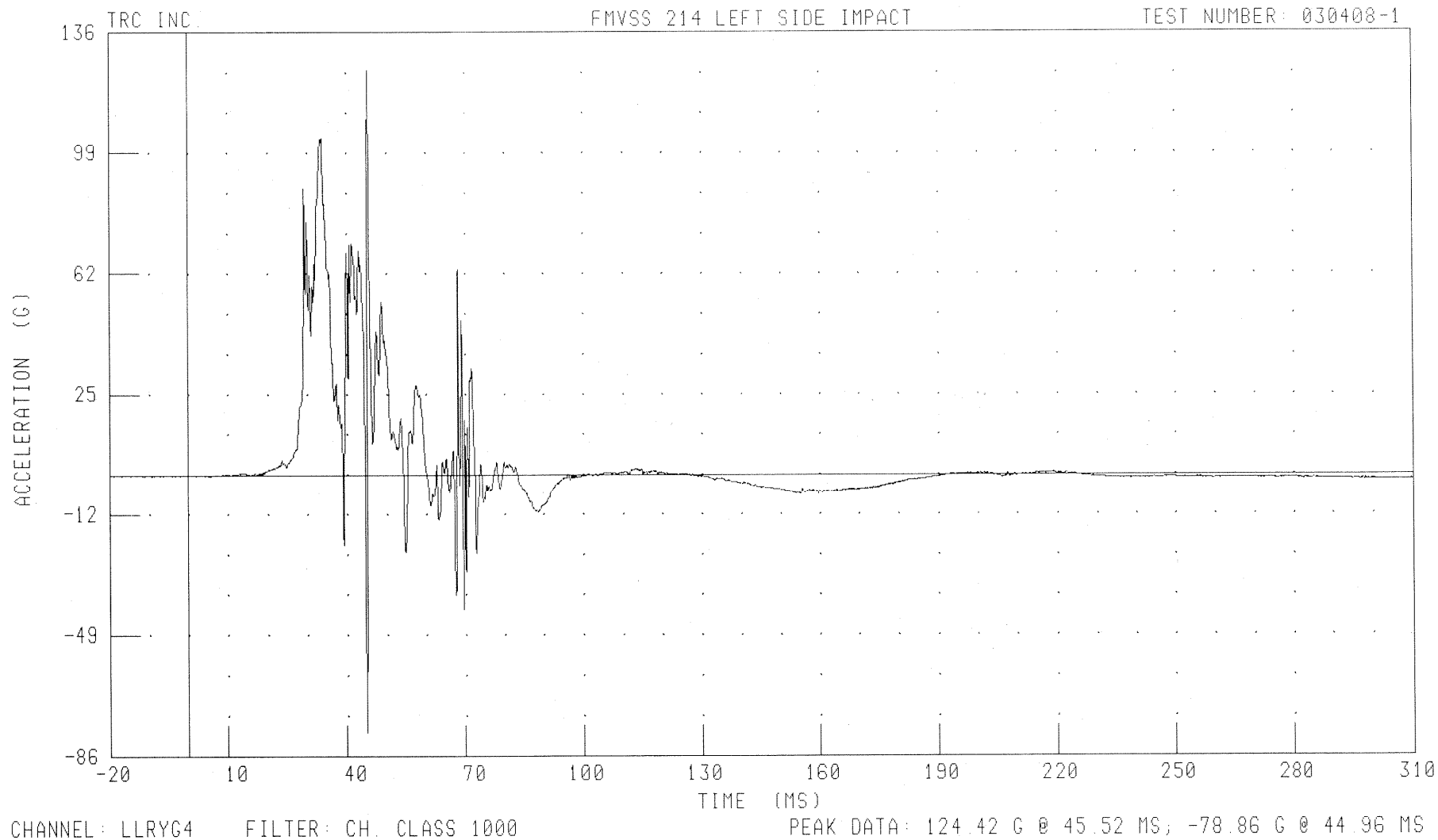
B-47

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



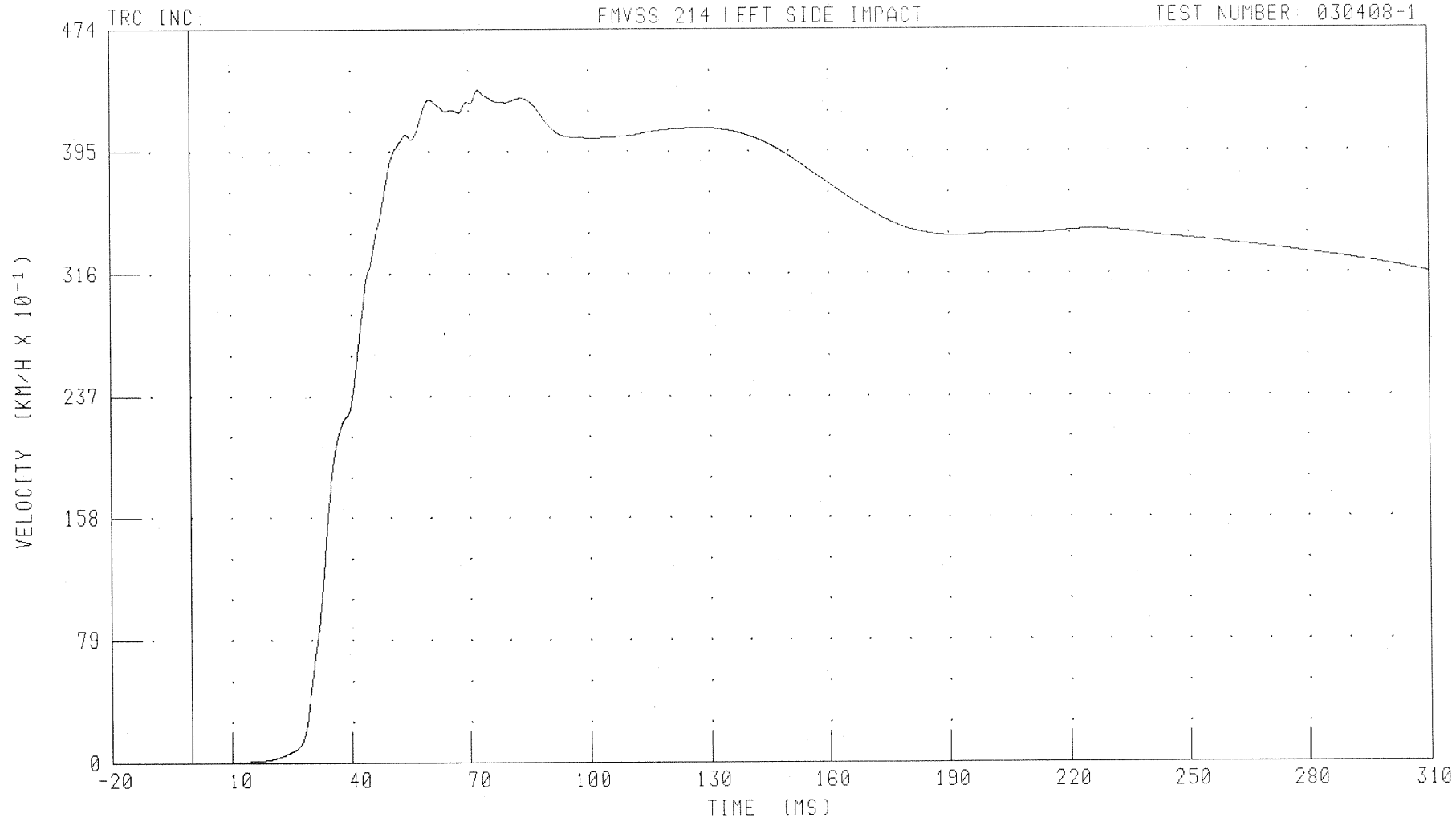
B-48

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER RIB Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYV4 FILTER: CH. CLASS 180

PEAK DATA: 43.51 KM/H @ 72.56 MS; 0.00 KM/H @ 0.00 MS

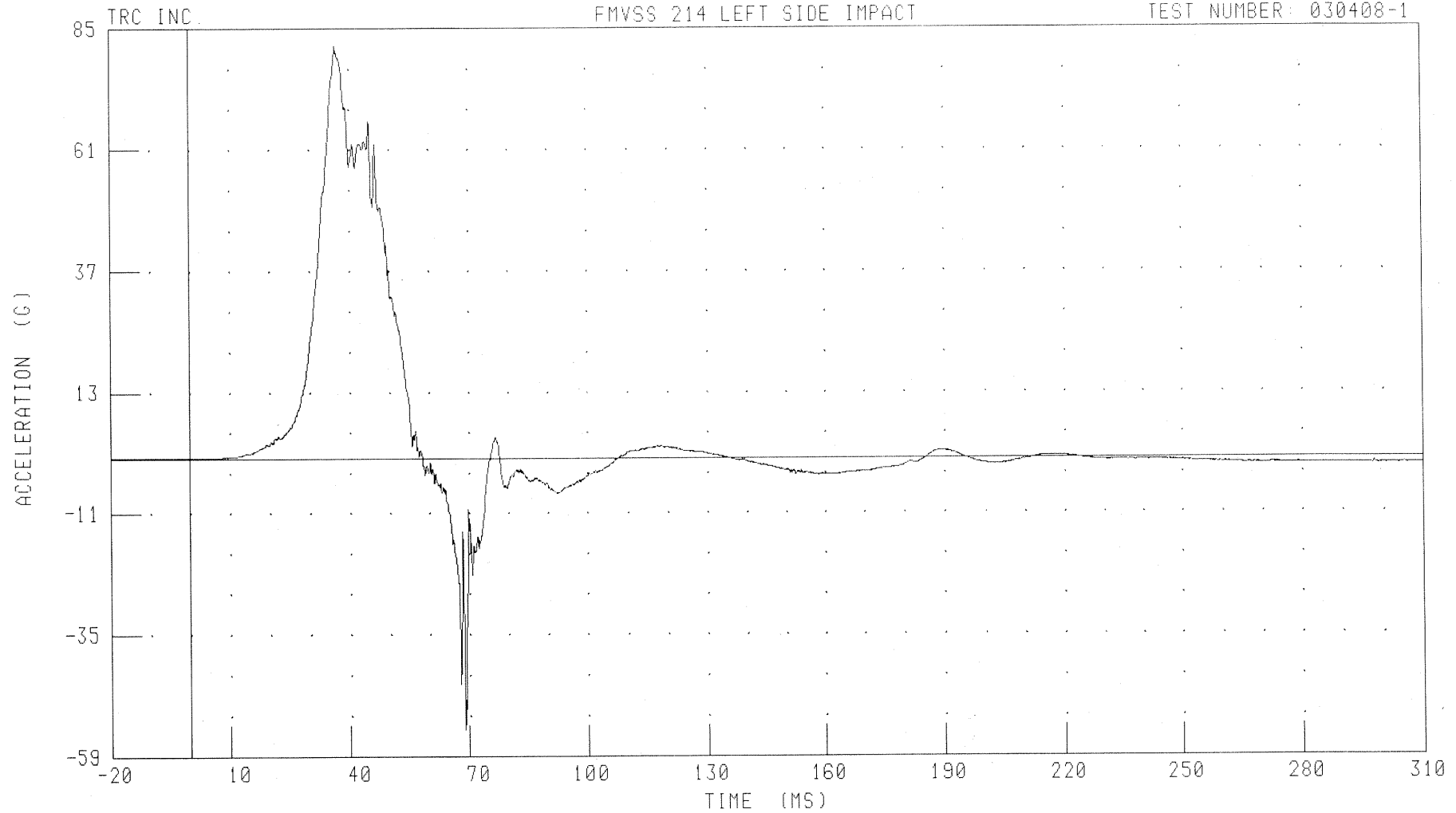
B-49

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YG4 FILTER: CH. CLASS 1000

PEAK DATA: 81.59 G @ 36.64 MS; -53.69 G @ 68.96 MS

B-50

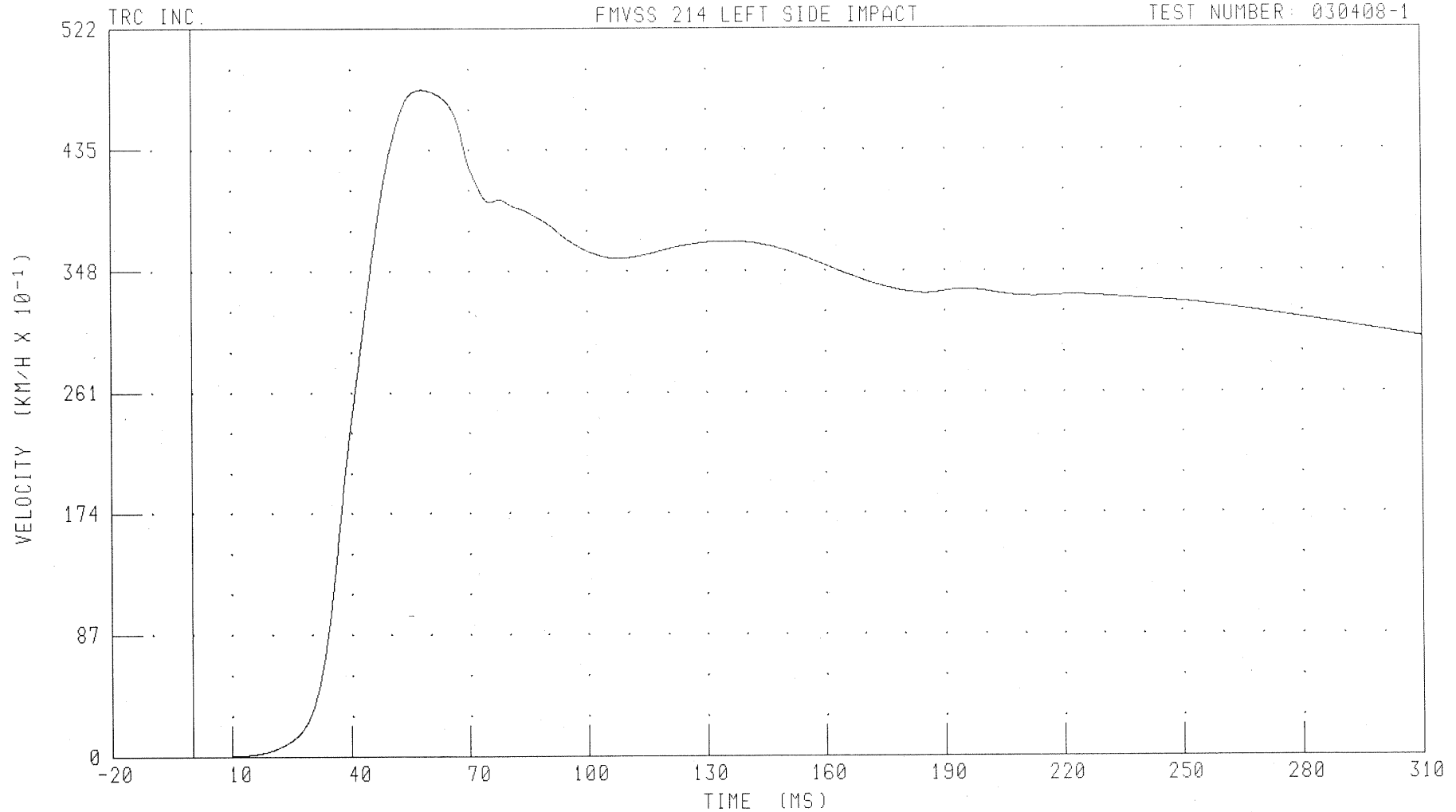
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT REAR PASSENGER LOWER SPINE Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YV4 FILTER: CH. CLASS 180

PEAK DATA: 47.84 KM/H @ 58.16 MS; 0.00 KM/H @ 0.00 MS

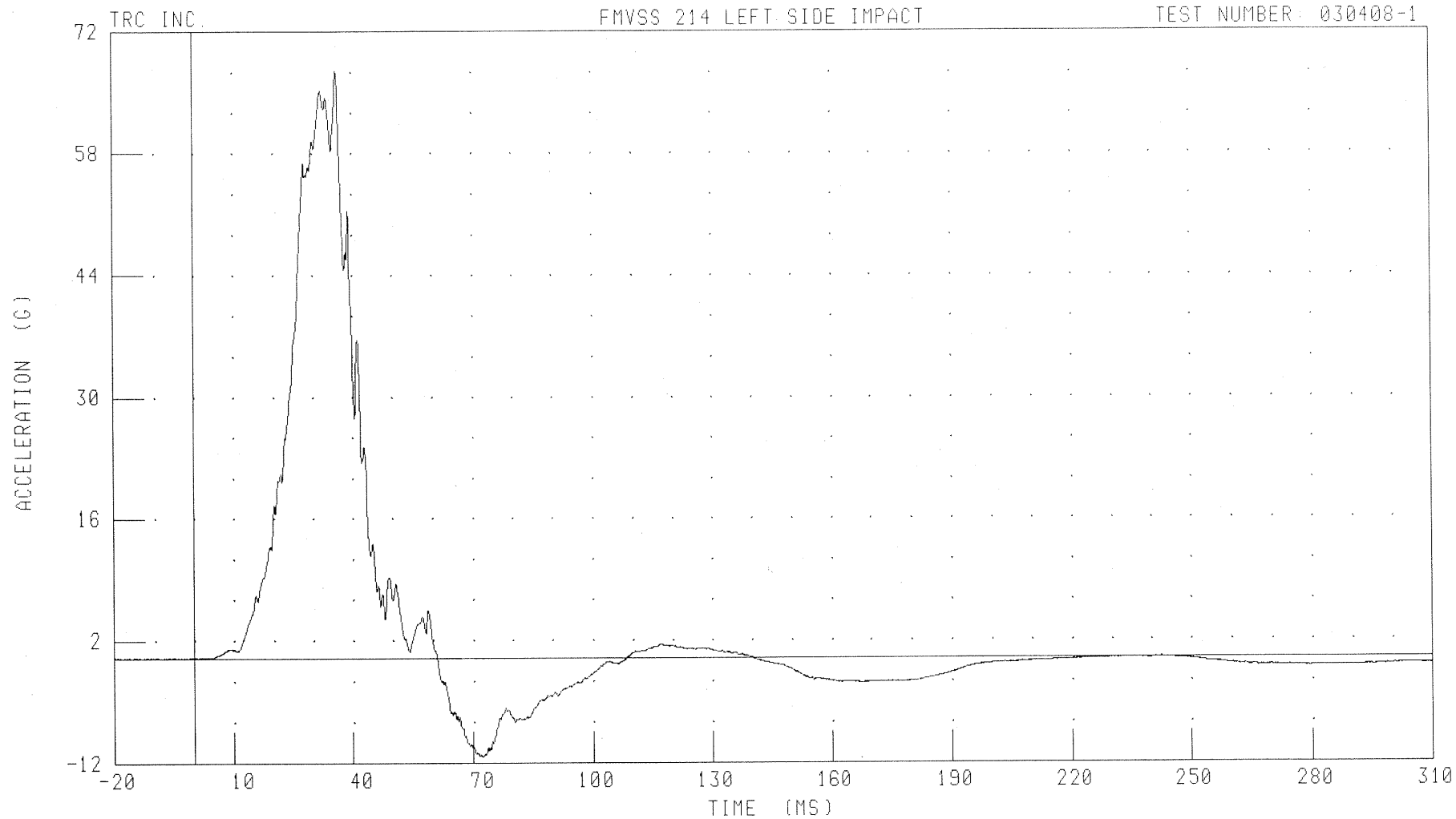
B-51

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER PELVIS Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYG4 FILTER: CH. CLASS 1000

PEAK DATA: 67.56 G @ 36.08 MS; -11.32 G @ 72.40 MS

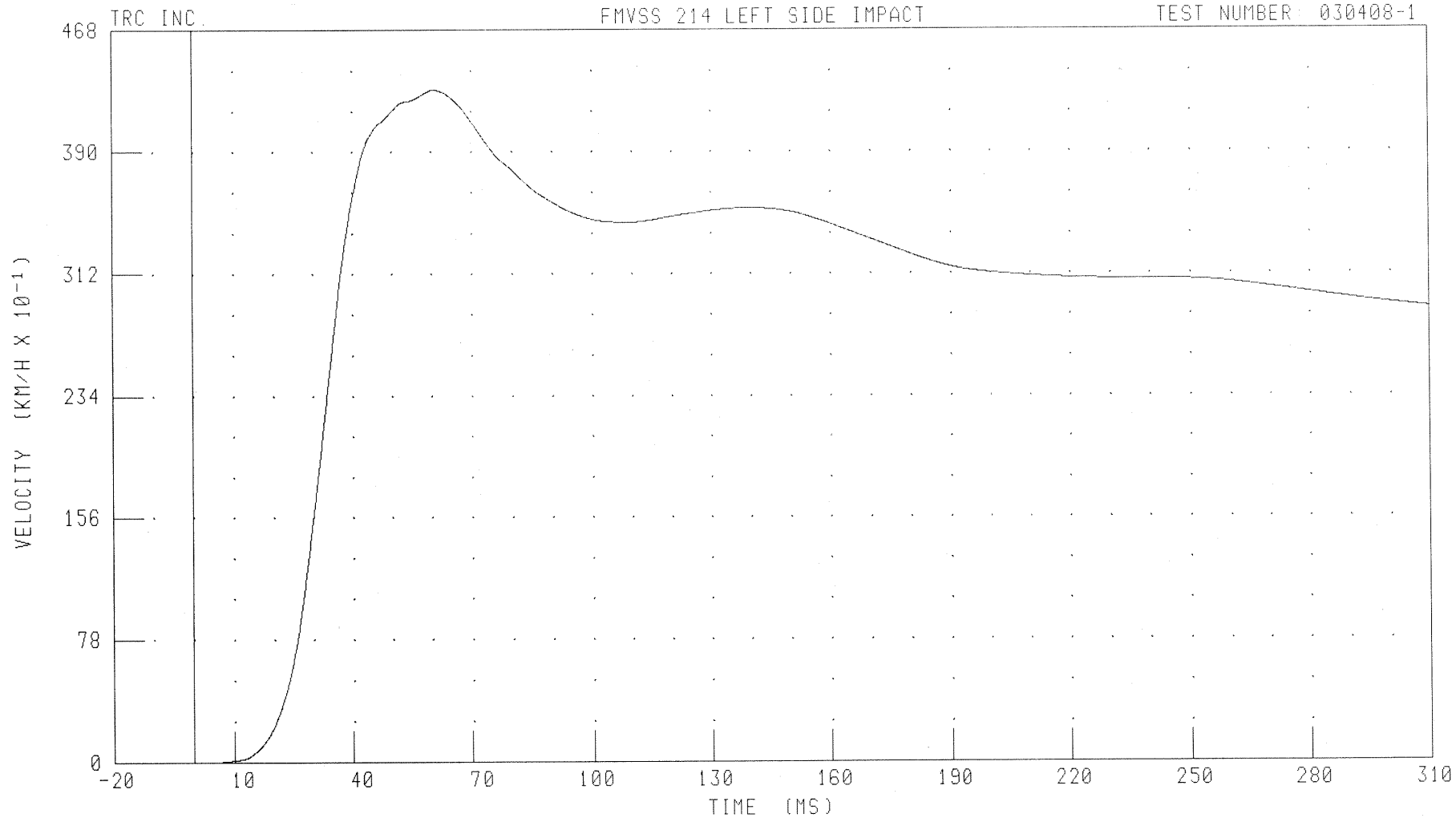
B-52

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER PELVIS Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYV4 FILTER: CH. CLASS 180

PEAK DATA: 42.98 KM/H @ 60.88 MS; 0.00 KM/H @ 0.00 MS

B-53

030408-1

Driver and Passenger Dummy Instrumentation Plots

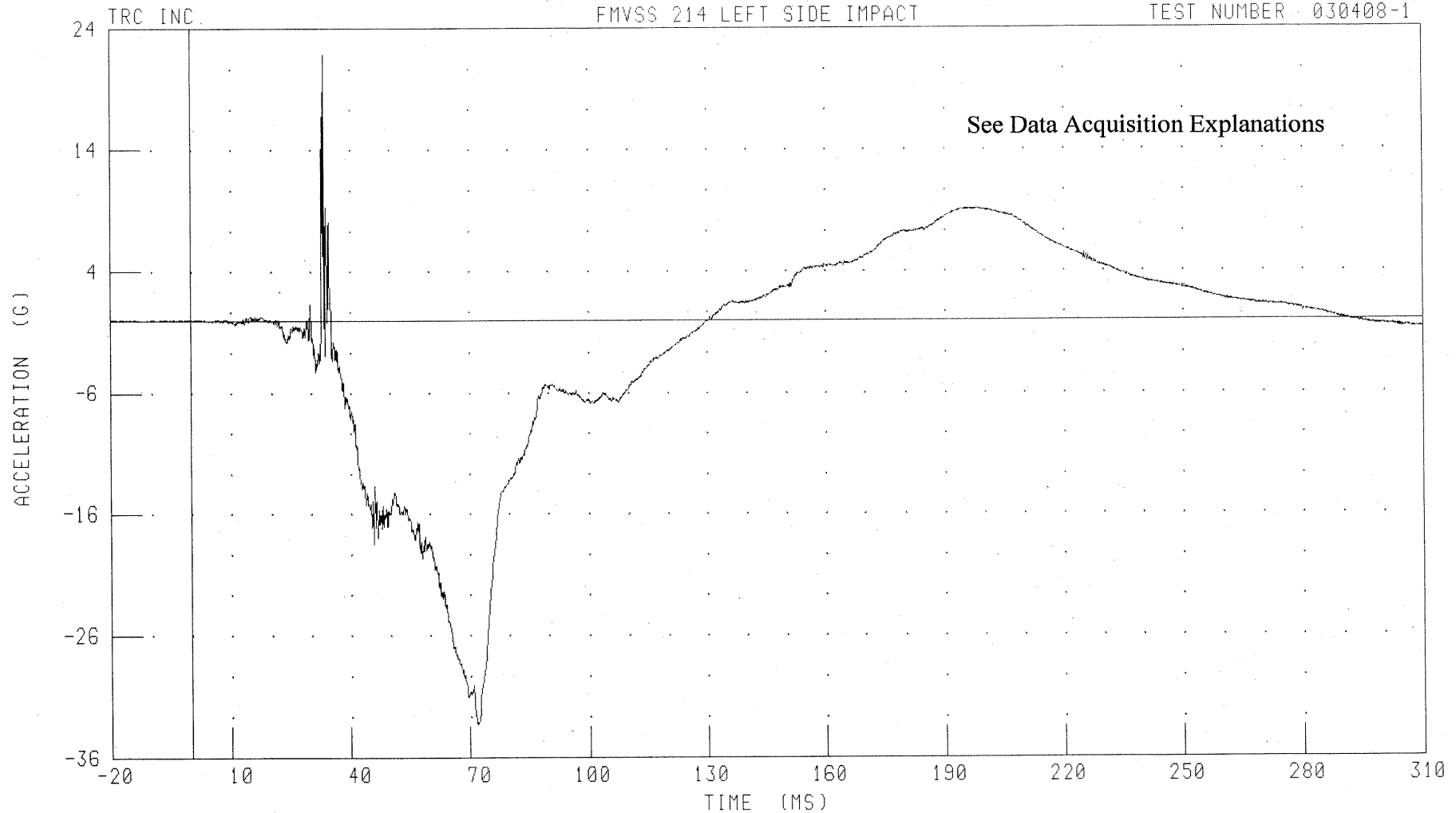
Acceleration Data - Filter Class 1000 - Redundant

Integration Data - Filter Class 180 - Redundant

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER HEAD X-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: HEDXR1 FILTER: CH. CLASS 1000

PEAK DATA: 21.94 G @ 33.44 MS; -33.30 G @ 71.84 MS

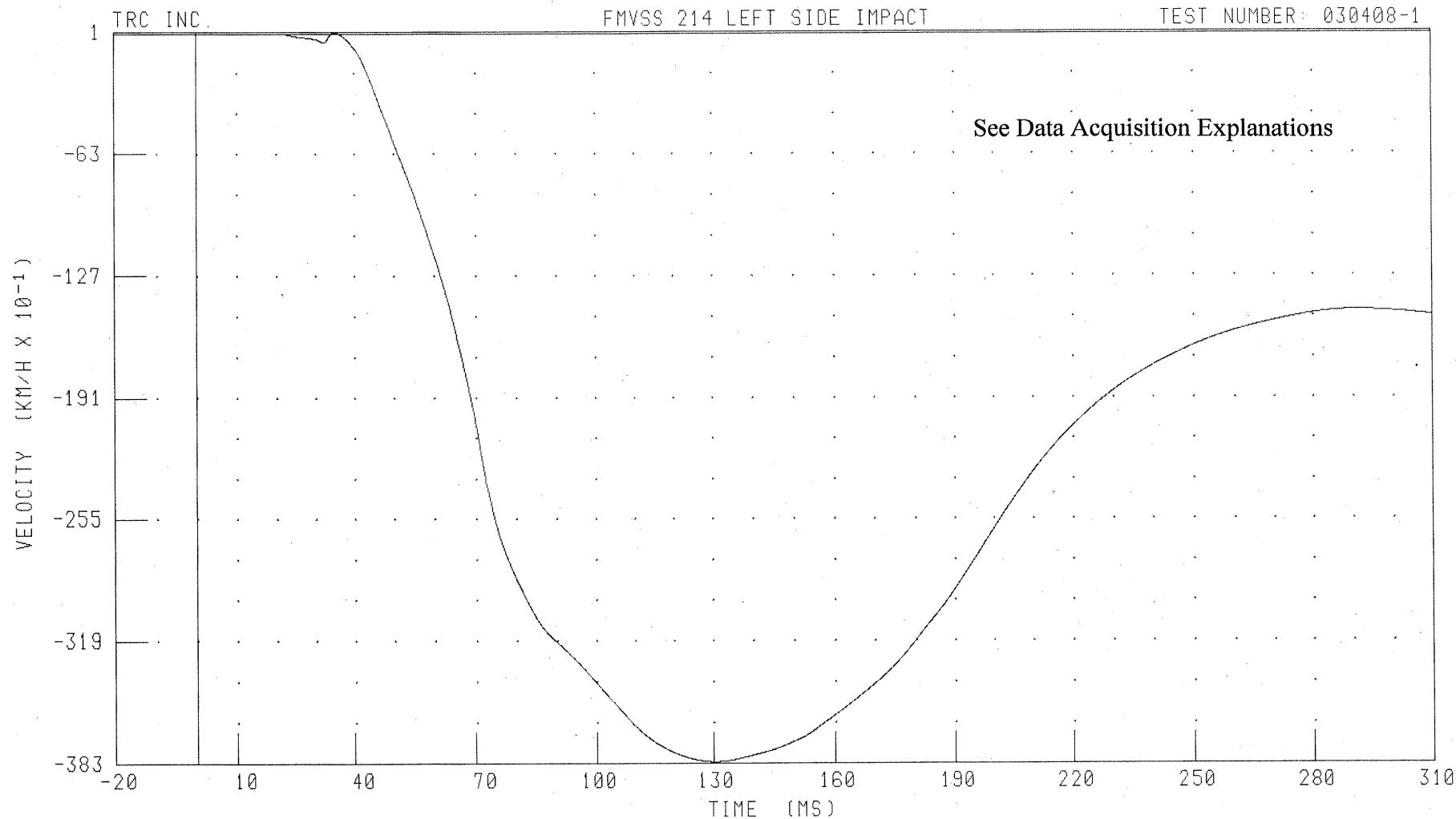
B-55

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER HEAD X-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



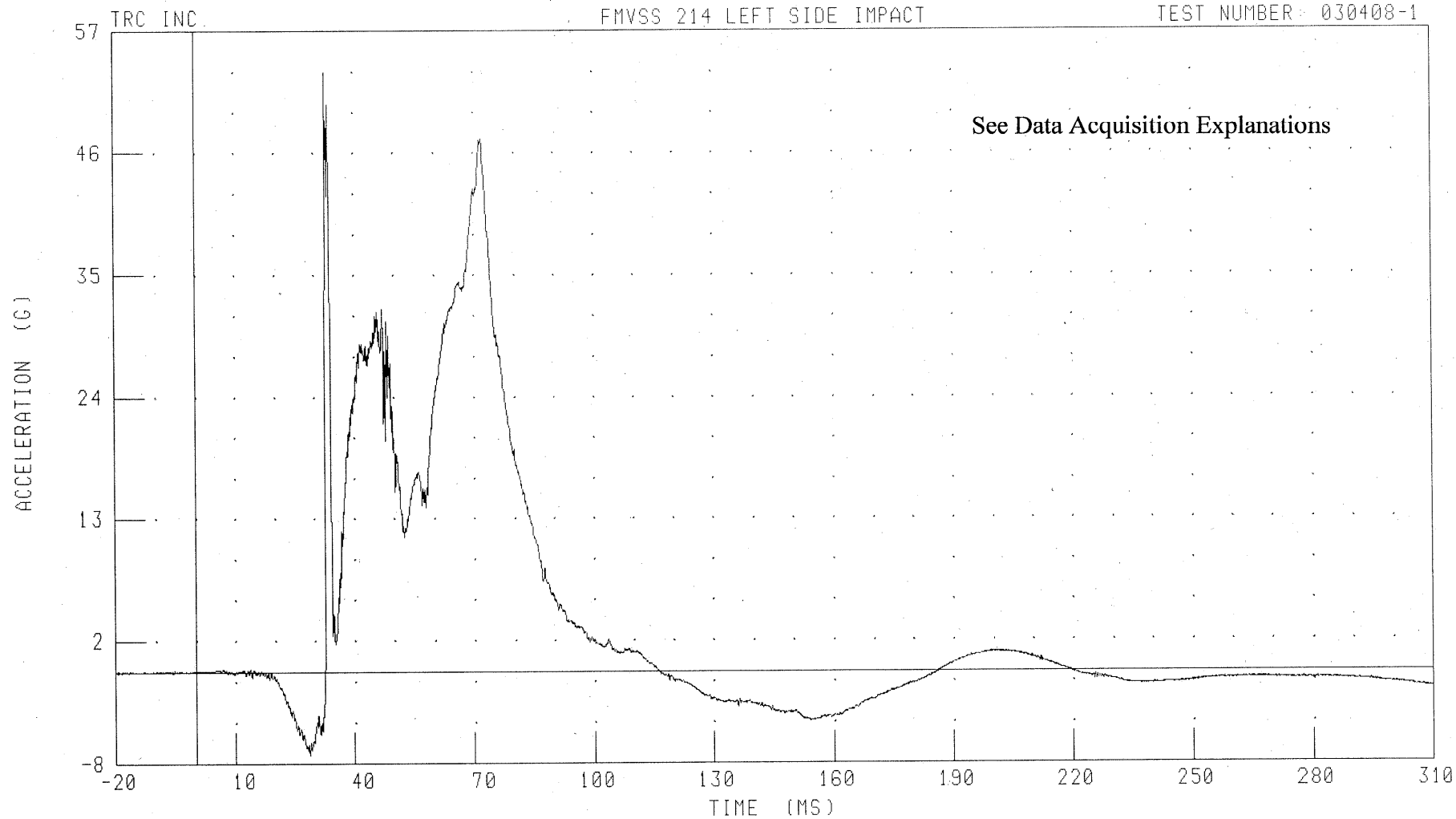
CHANNEL: HEDXVI FILTER: CH. CLASS 180

PEAK DATA: 0.08 KM/H @ 35.36 MS; -38.23 KM/H @ 130.48 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER HEAD Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



PEAK DATA: 54.08 G @ 33.04 MS; -7.51 G @ 28.72 MS

B-57

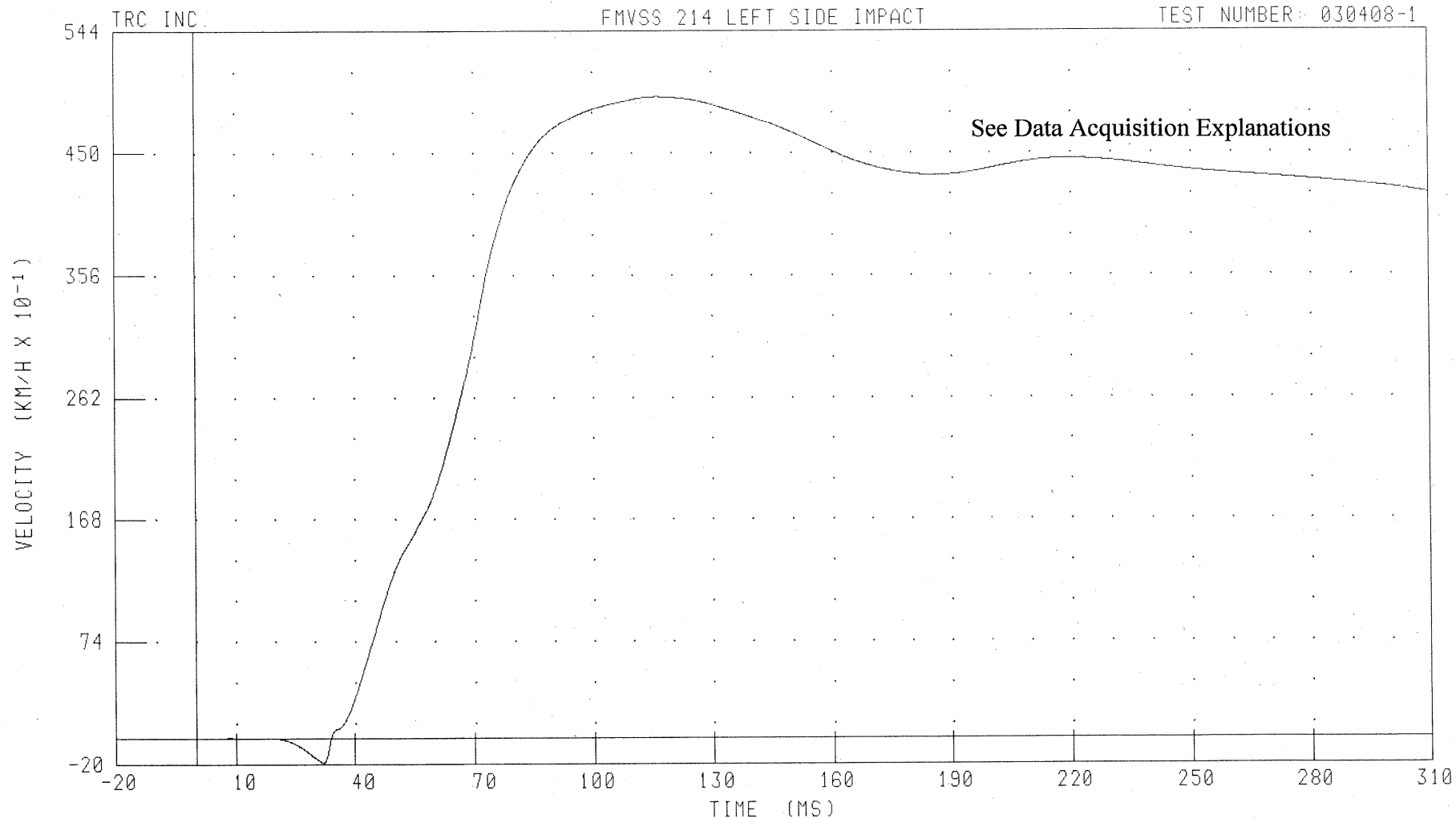
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDYVI FILTER: CH. CLASS 180

PEAK DATA: 49.37 KM/H @ 116.48 MS; -1.91 KM/H @ 32.16 MS

B-58

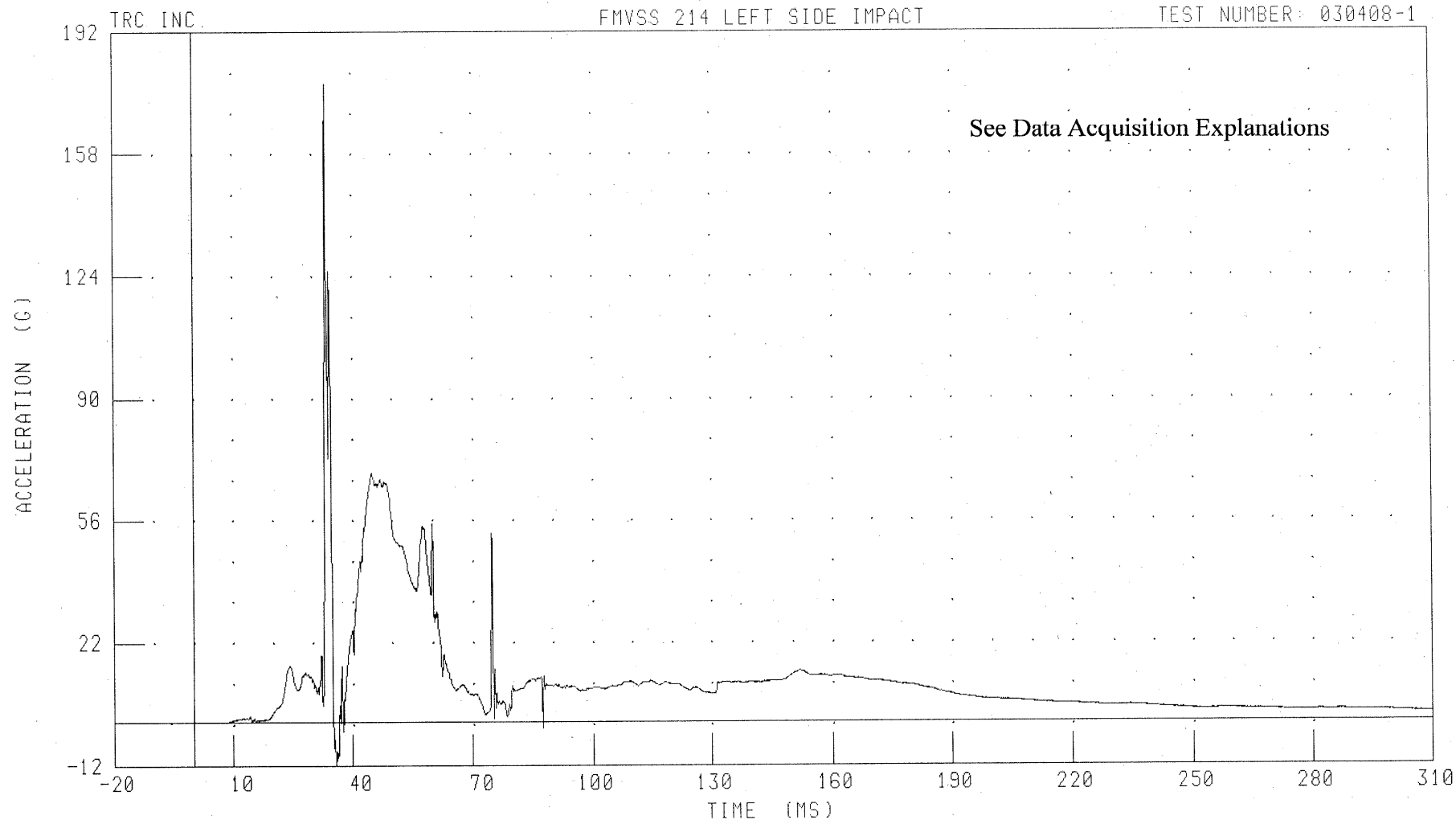
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER HEAD Z-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDZR1 FILTER: CH. CLASS 1000

PEAK DATA: 177.76 G @ 33.44 MS; -11.61 G @ 35.92 MS

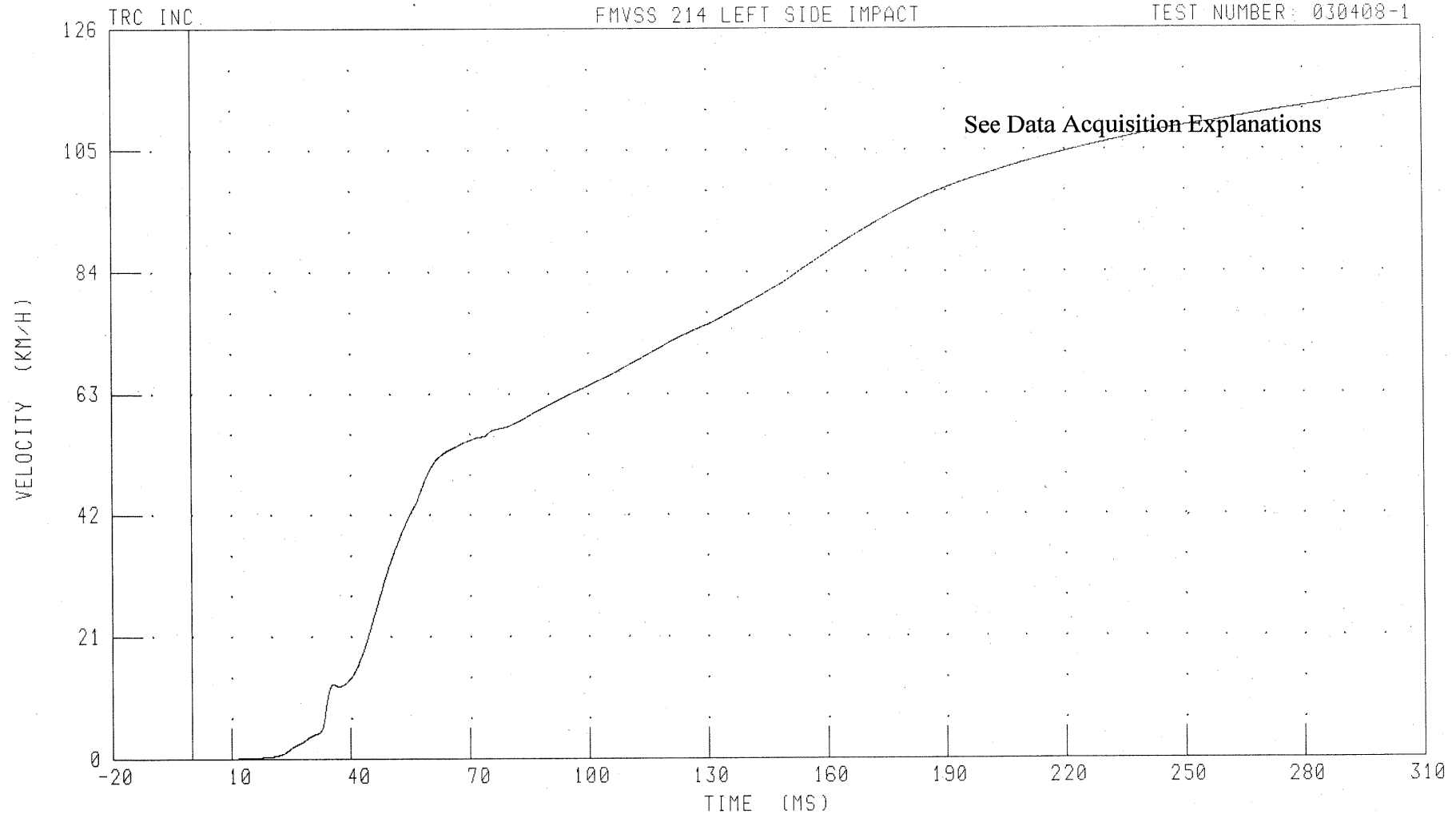
B-59

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER HEAD Z-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDZVI FILTER: CH. CLASS 180

PEAK DATA: 115.48 KM/H @ 310.00 MS; 0.00 KM/H @ 4.08 MS

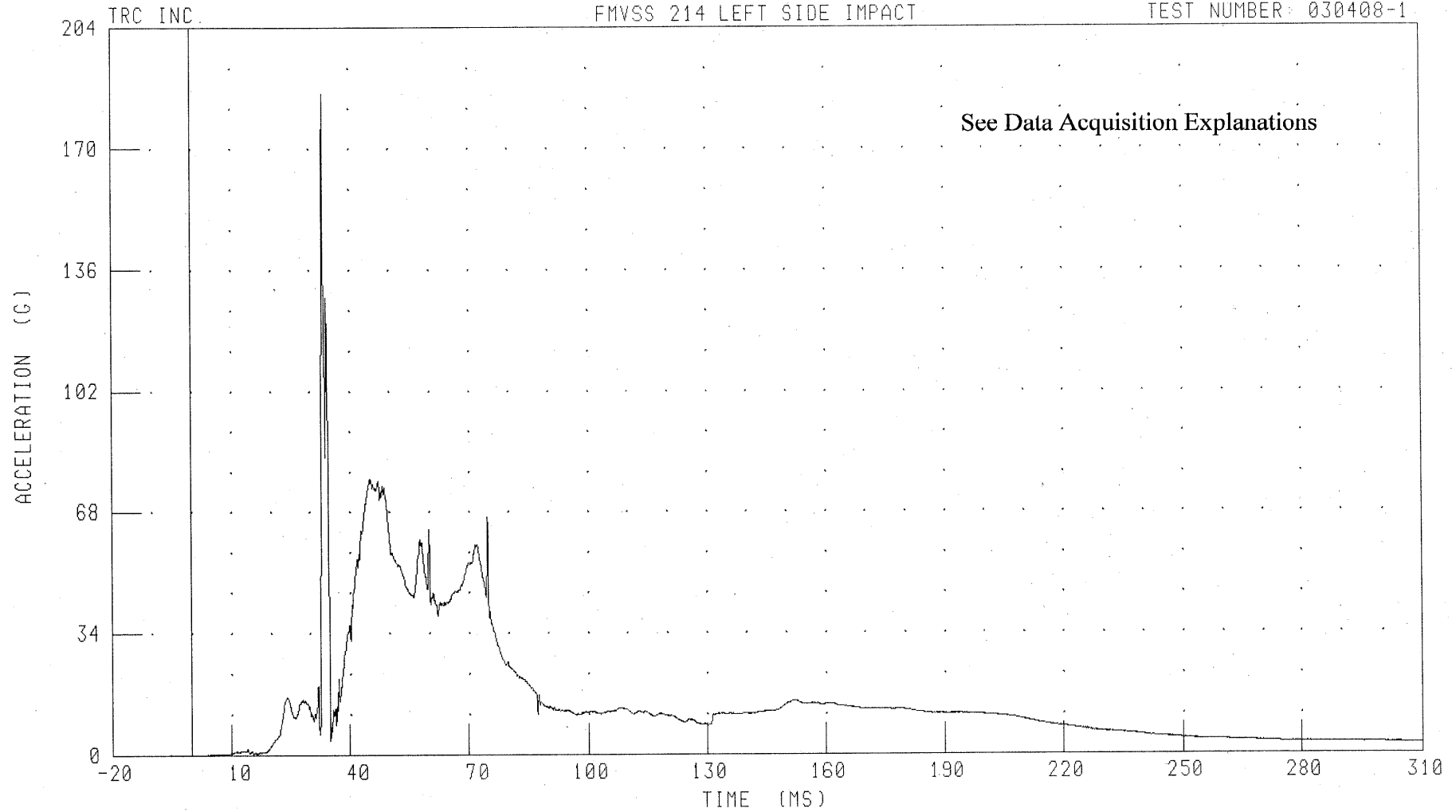
B-60

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER HEAD RESULTANT REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDRR1 FILTER: CH. CLASS 1000

PEAK DATA: 185.71 G @ 33.44 MS; 0.01 G @ -18.32 MS

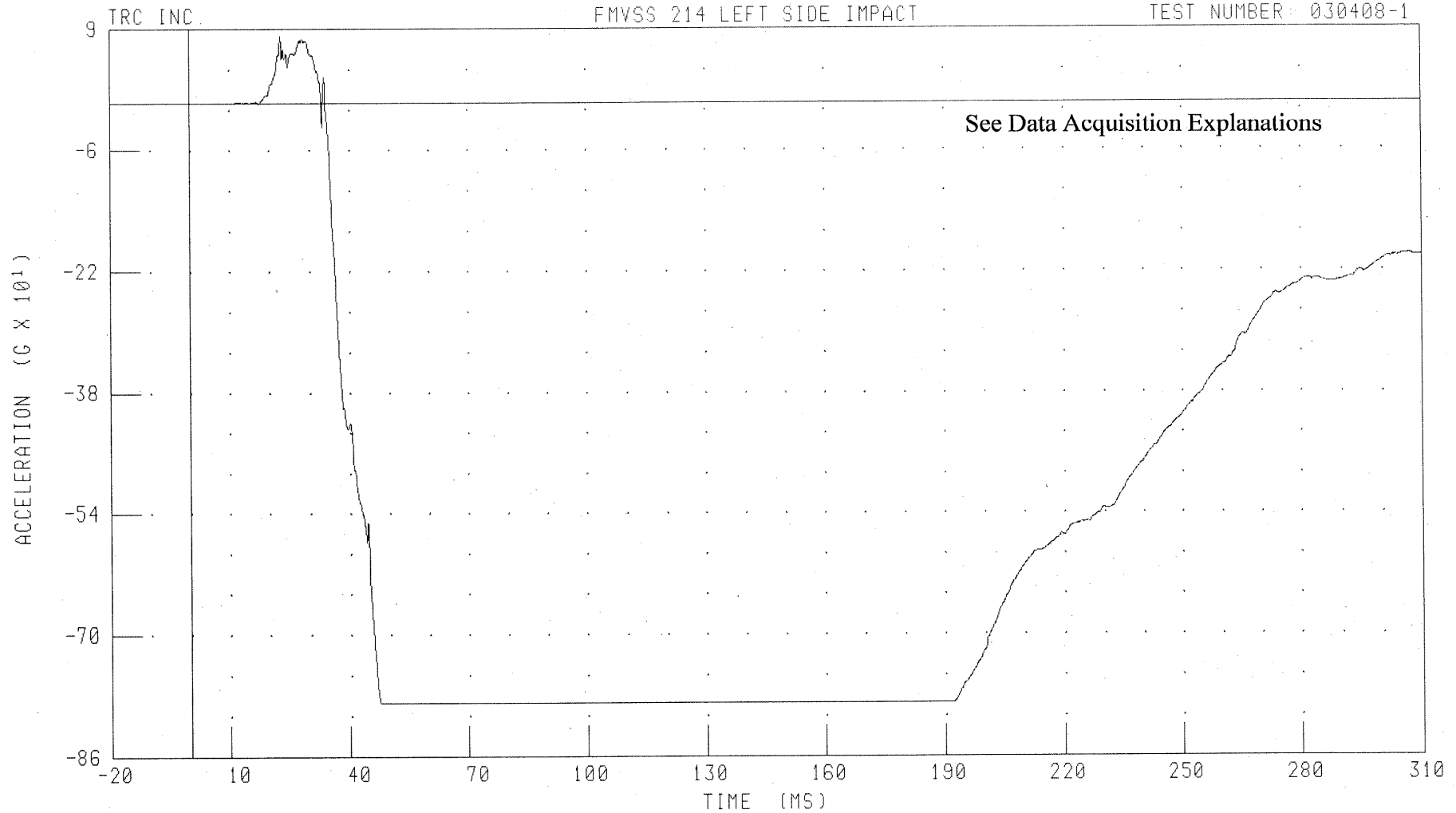
B-61

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER UPPER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LURYR1 FILTER: CH. CLASS 1000

PEAK DATA: 88.45 G @ 23.12 MS; -792.21 G @ 47.44 MS

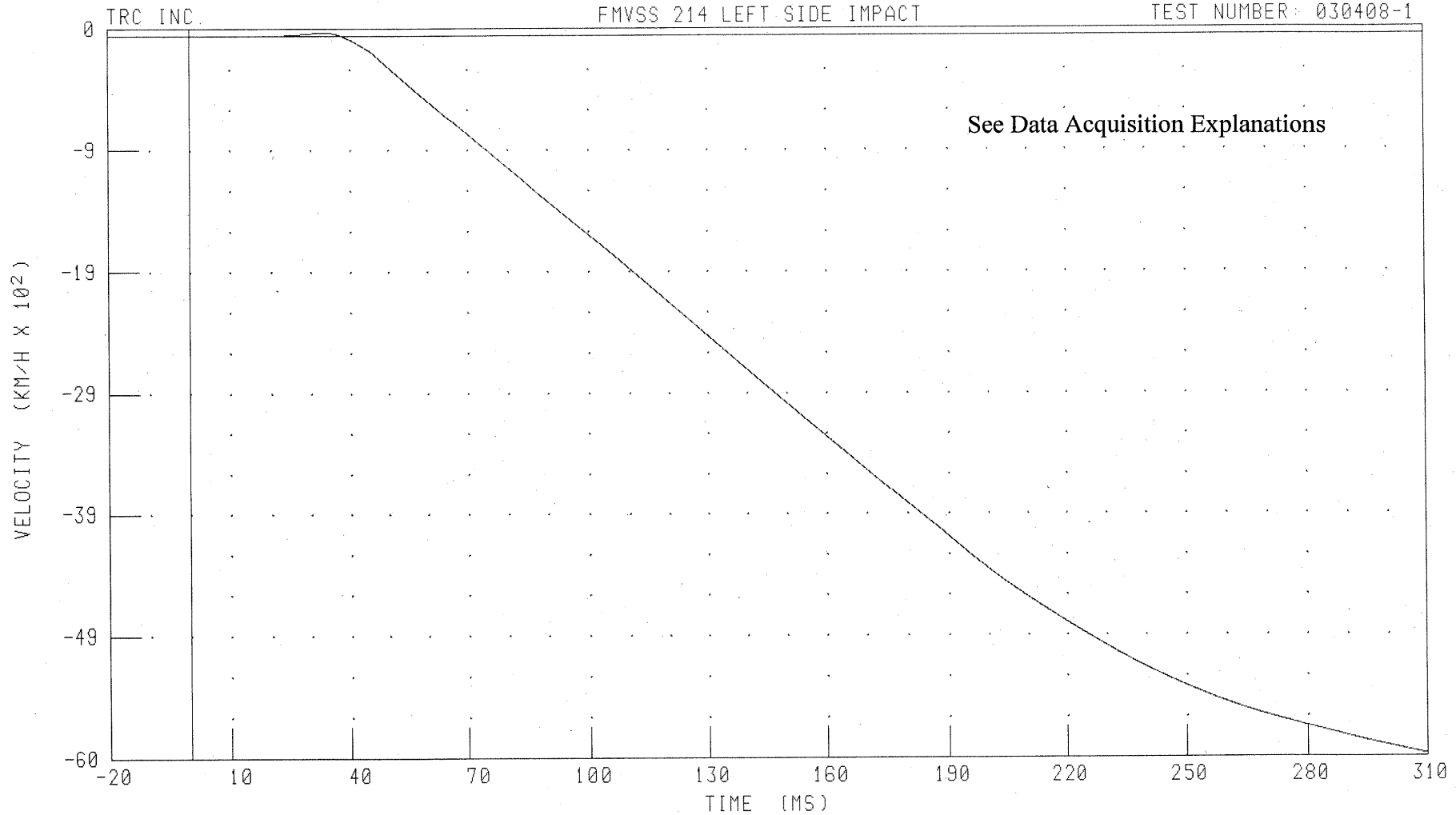
B-62

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER UPPER RIB Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



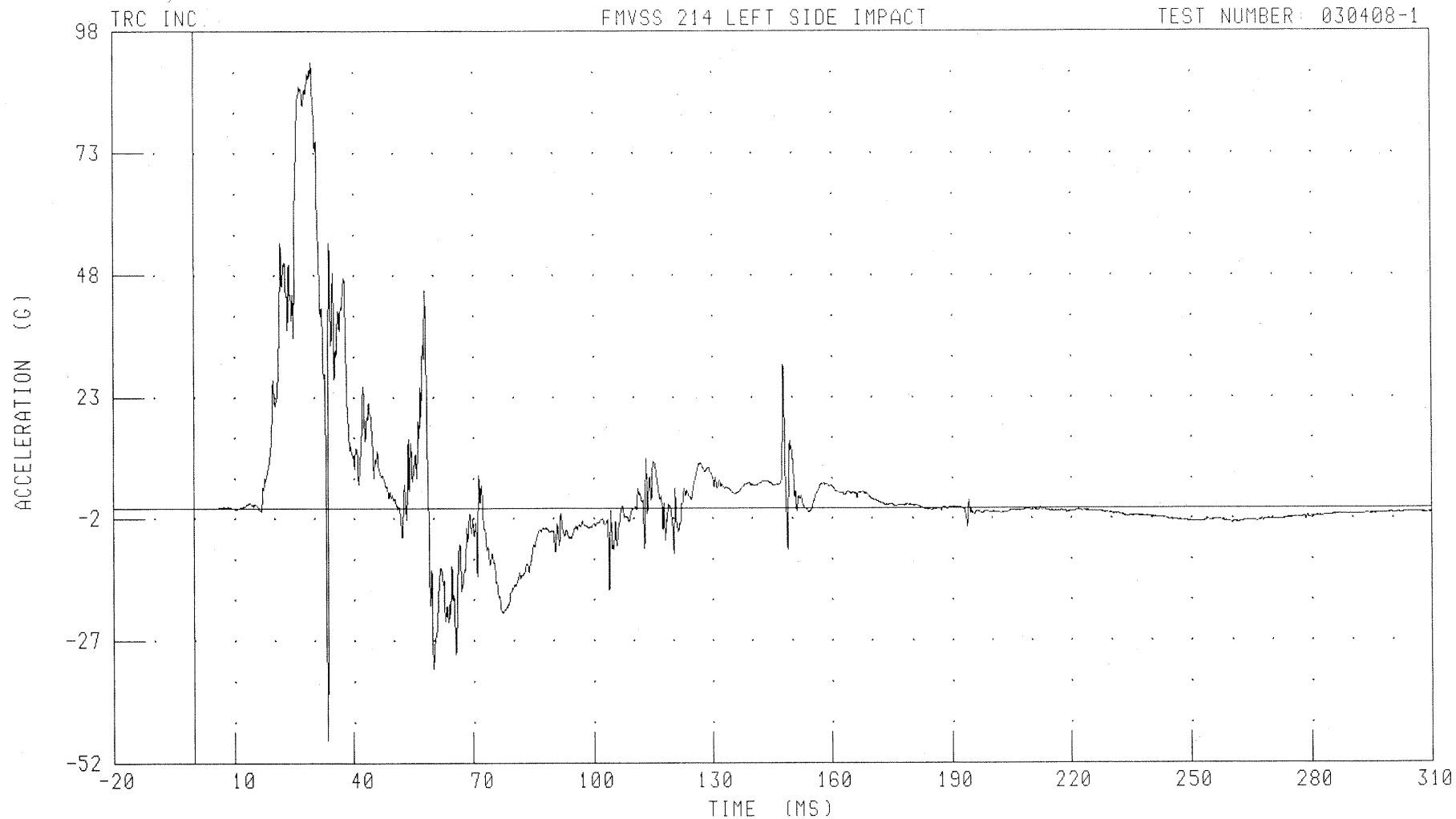
CHANNEL: LURYVI FILTER: CH. CLASS 180

PEAK DATA: 27.19 KM/H @ 34.00 MS; -5981.20 KM/H @ 310.00 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYR1 FILTER: CH. CLASS 1000

PEAK DATA: 91.74 G @ 29.60 MS; -47.41 G @ 33.28 MS

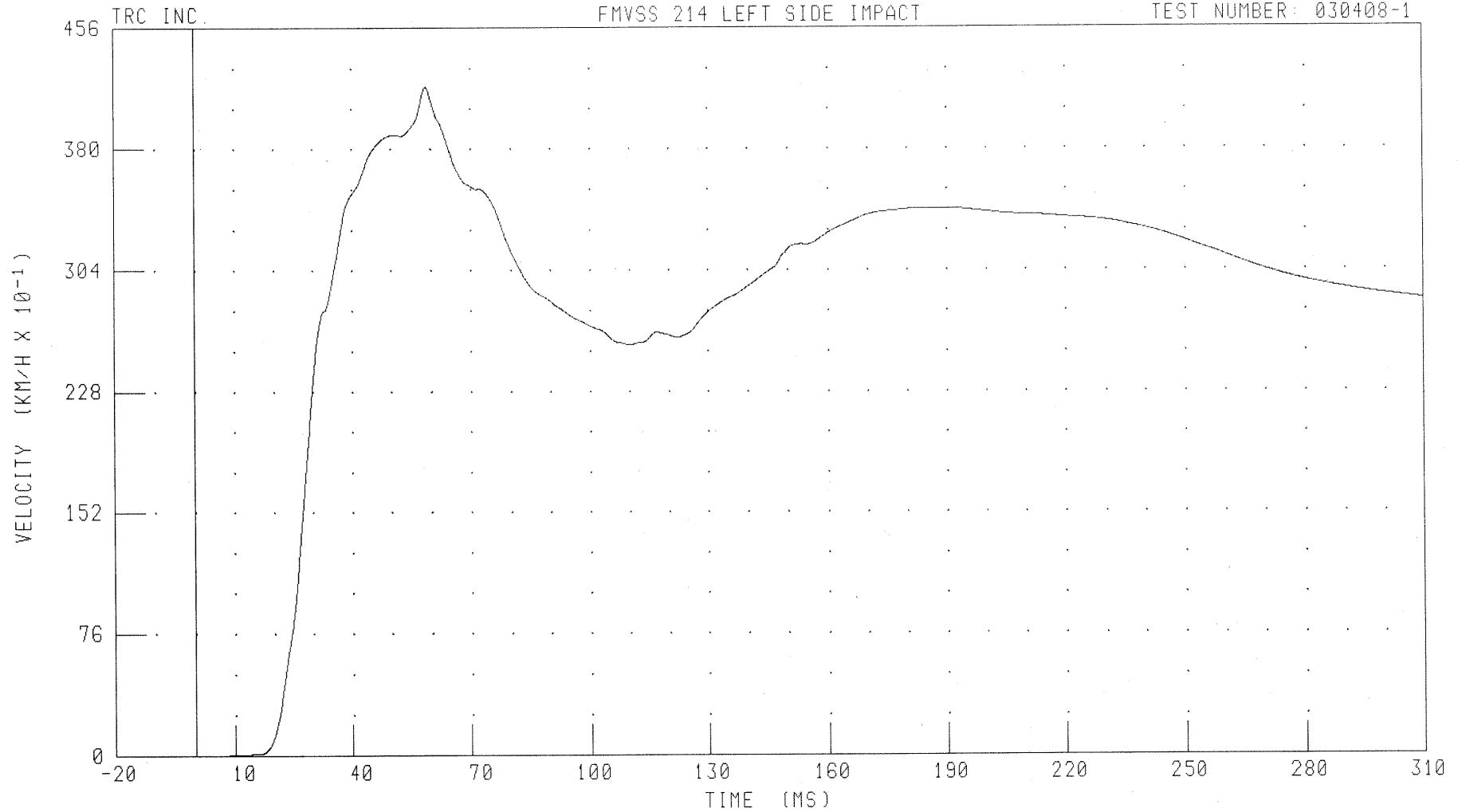
B-64

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER RIB Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYVI FILTER: CH. CLASS 180

PEAK DATA: 41.92 KM/H @ 58.88 MS; 0.00 KM/H @ 4.72 MS

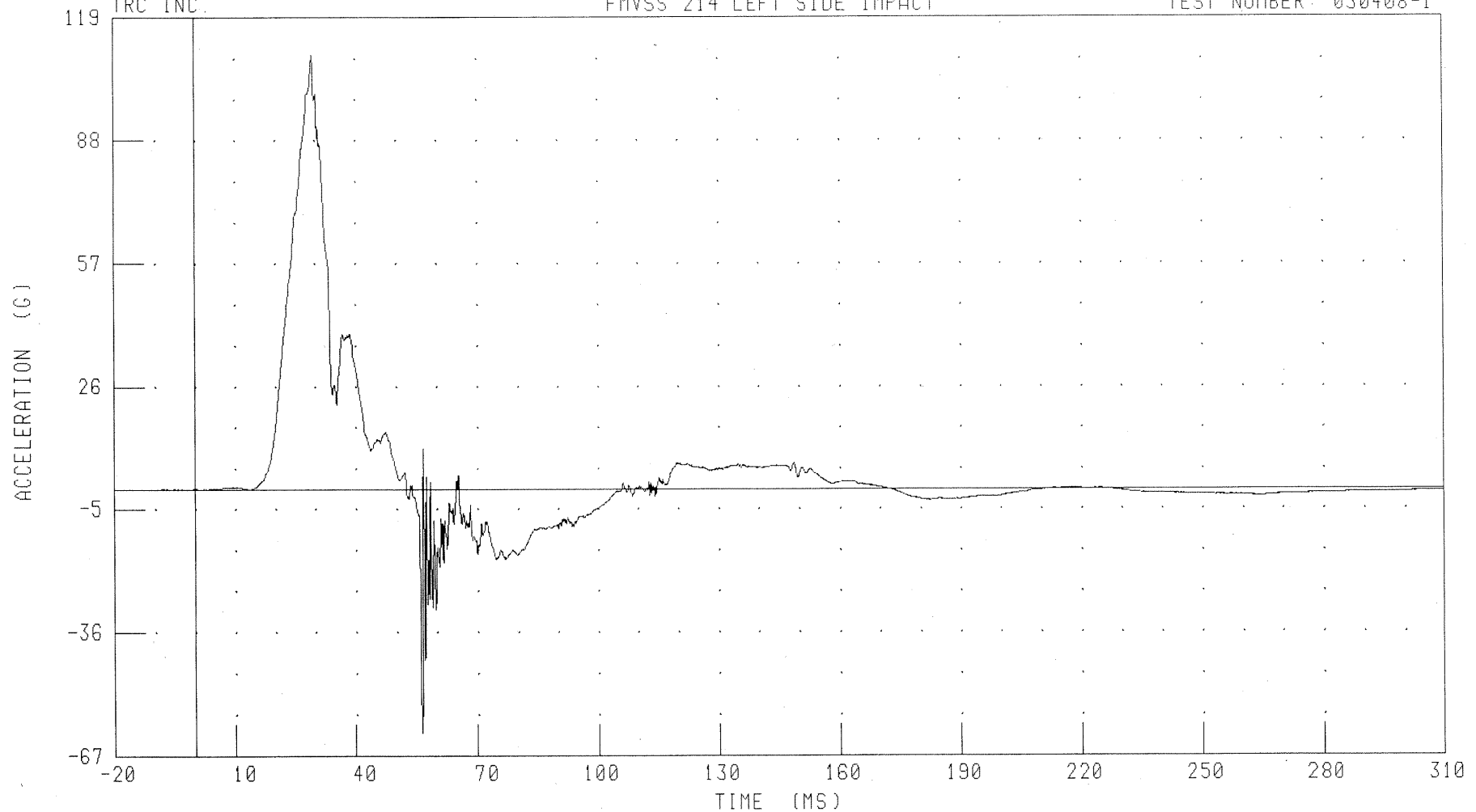
B-65

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YR1 FILTER: CH. CLASS 1000

PEAK DATA: 109.48 G @ 29.52 MS; -61.27 G @ 56.24 MS

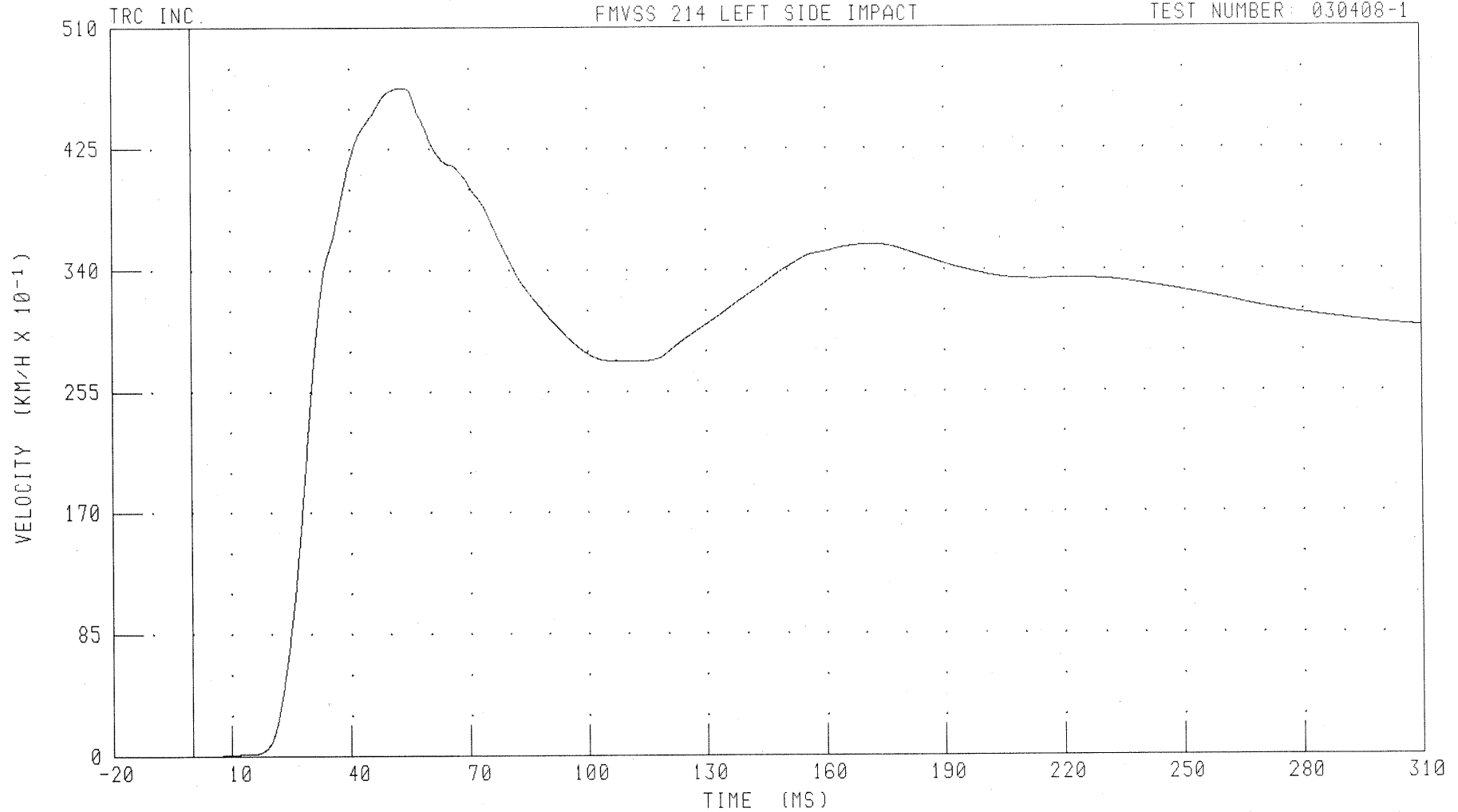
B-66

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER SPINE Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YVI FILTER: CH. CLASS 180

PEAK DATA: 46.78 KM/H @ 52.56 MS; 0.00 KM/H @ 0.00 MS

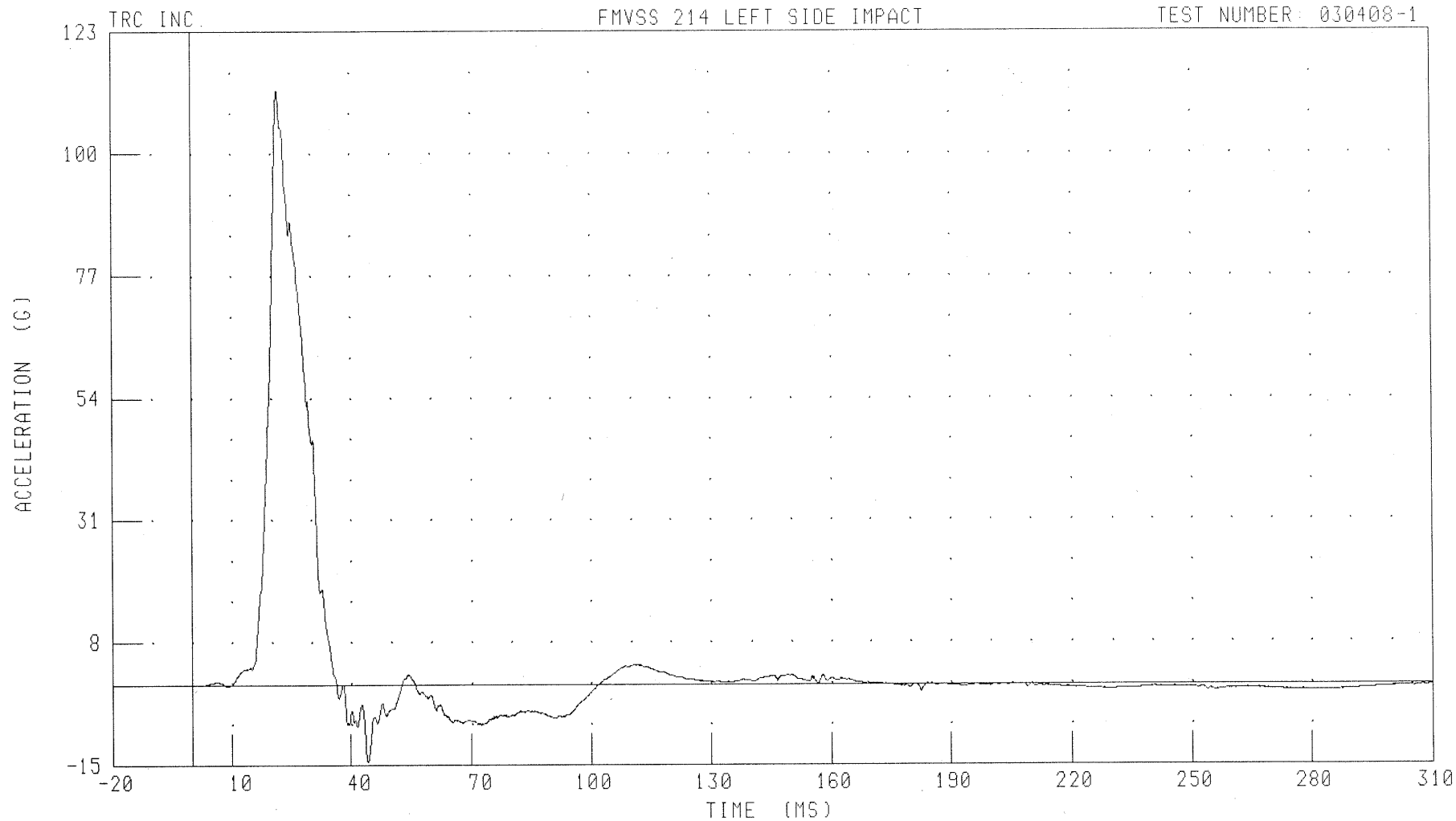
B-67

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER PELVIS Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYR1 FILTER: CH. CLASS 1000

B-68

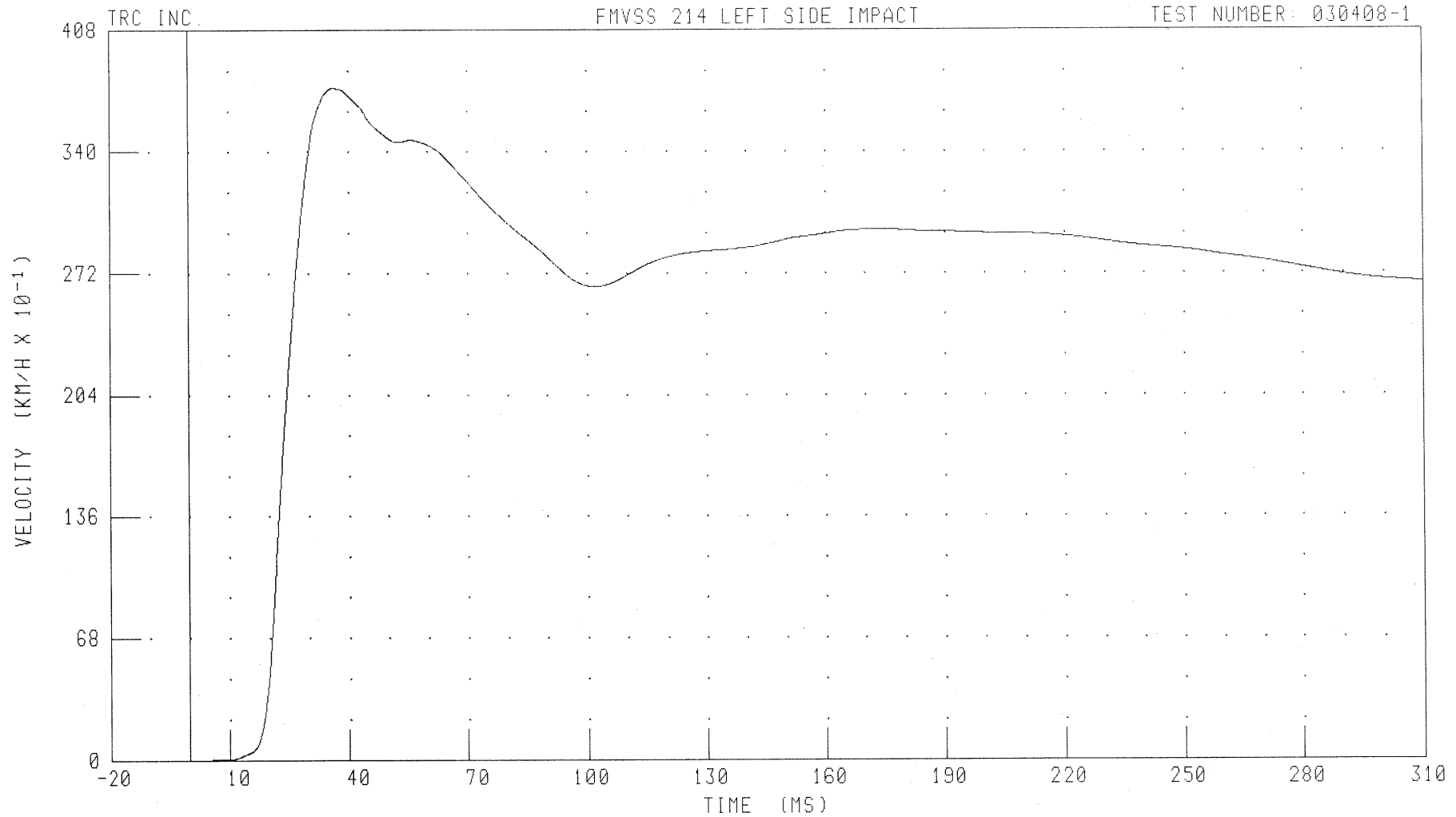
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER PELVIS Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



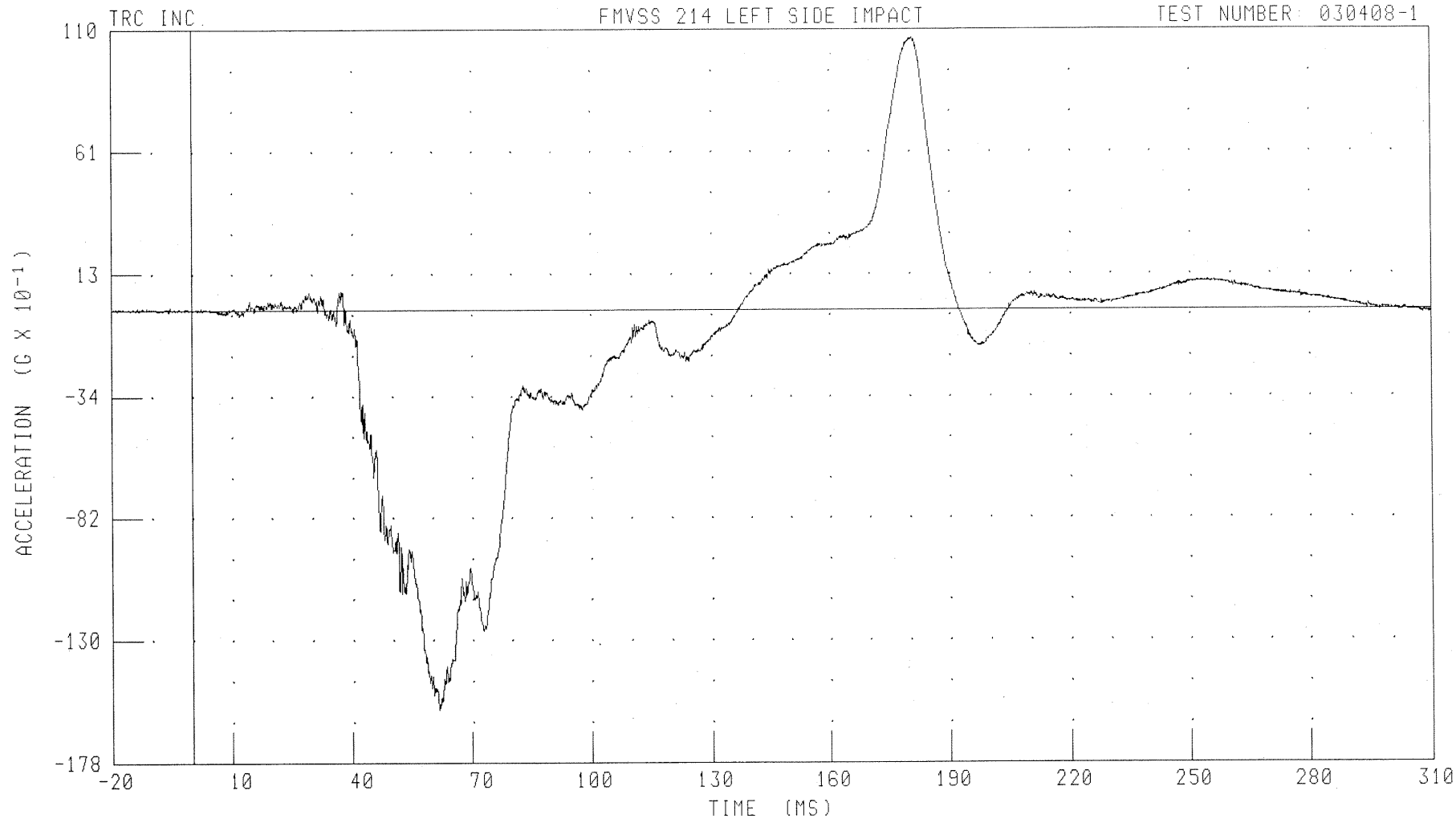
CHANNEL: PEVYVI FILTER: CH. CLASS 180

PEAK DATA: 37.58 KM/H @ 36.40 MS; 0.00 KM/H @ 0.00 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD X-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDXR4 FILTER: CH. CLASS 1000

PEAK DATA: 10.68 G @ 180.88 MS; -15.71 G @ 61.60 MS

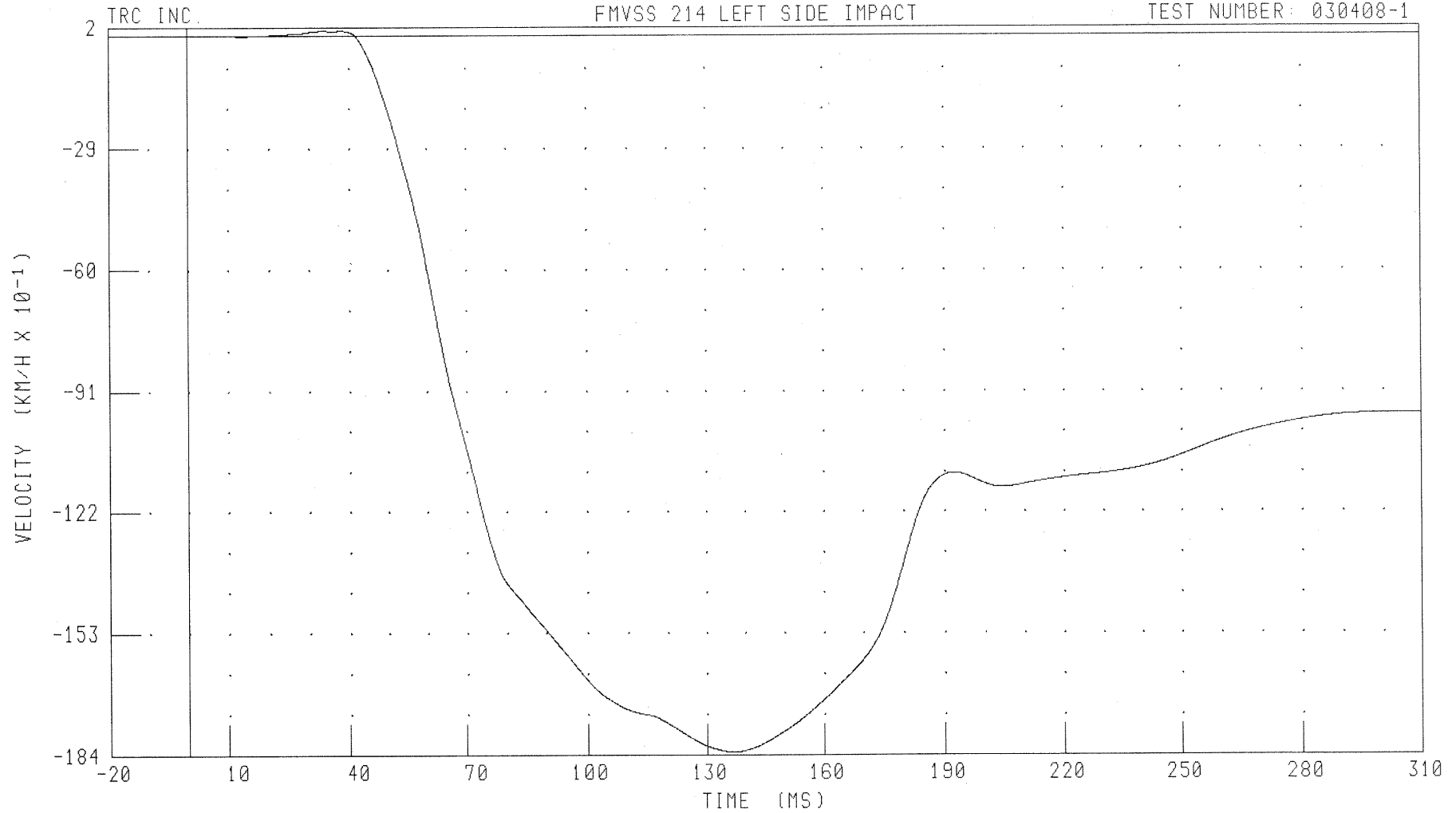
B-70

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD X-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDXVJ FILTER: CH. CLASS 180

PEAK DATA: 0.12 KM/H @ 38.24 MS; -18.33 KM/H @ 136.88 MS

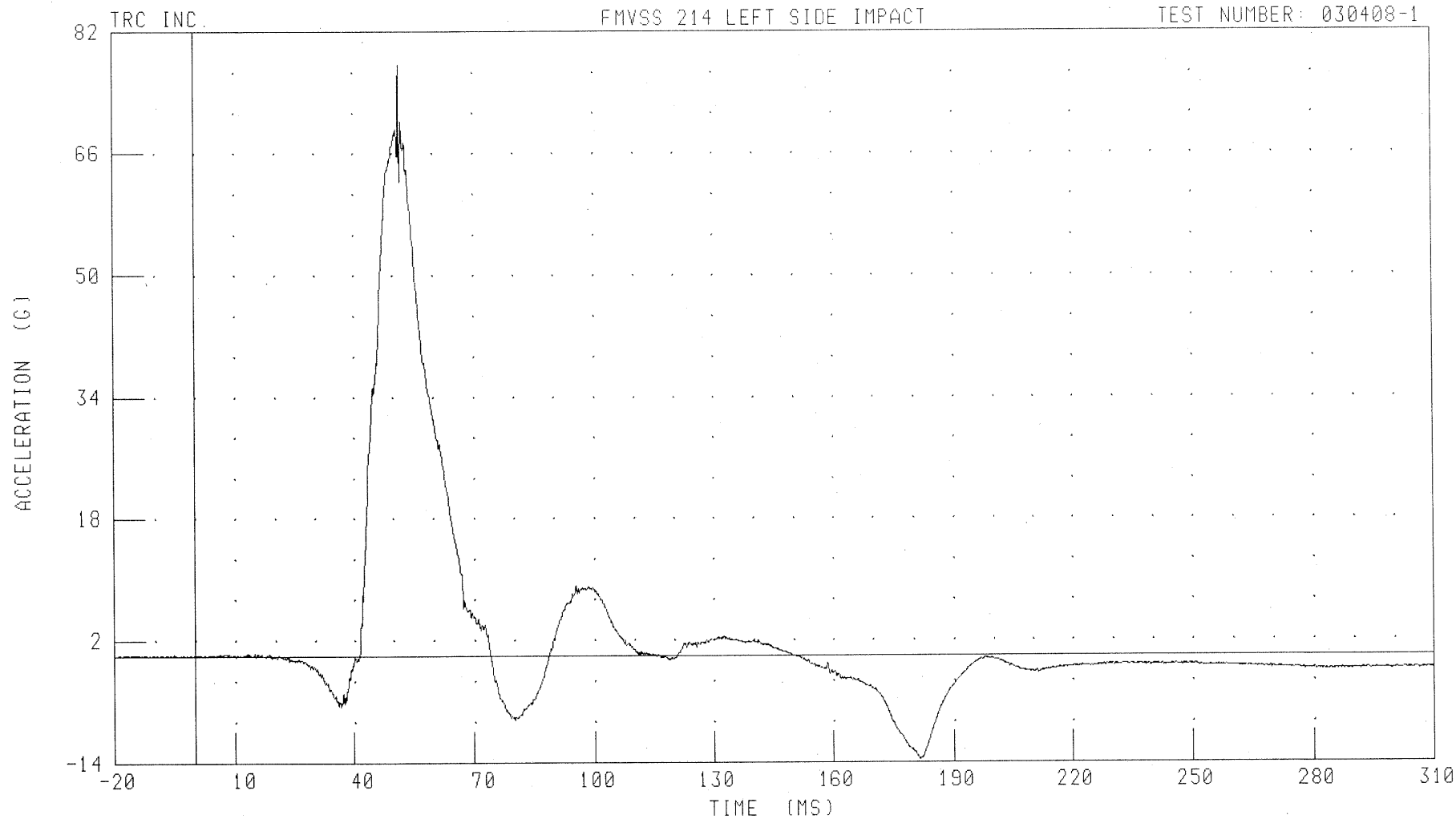
B-71

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDYR4 FILTER: CH. CLASS 1000

PEAK DATA: 77.67 G @ 51.76 MS; -13.62 G @ 181.44 MS

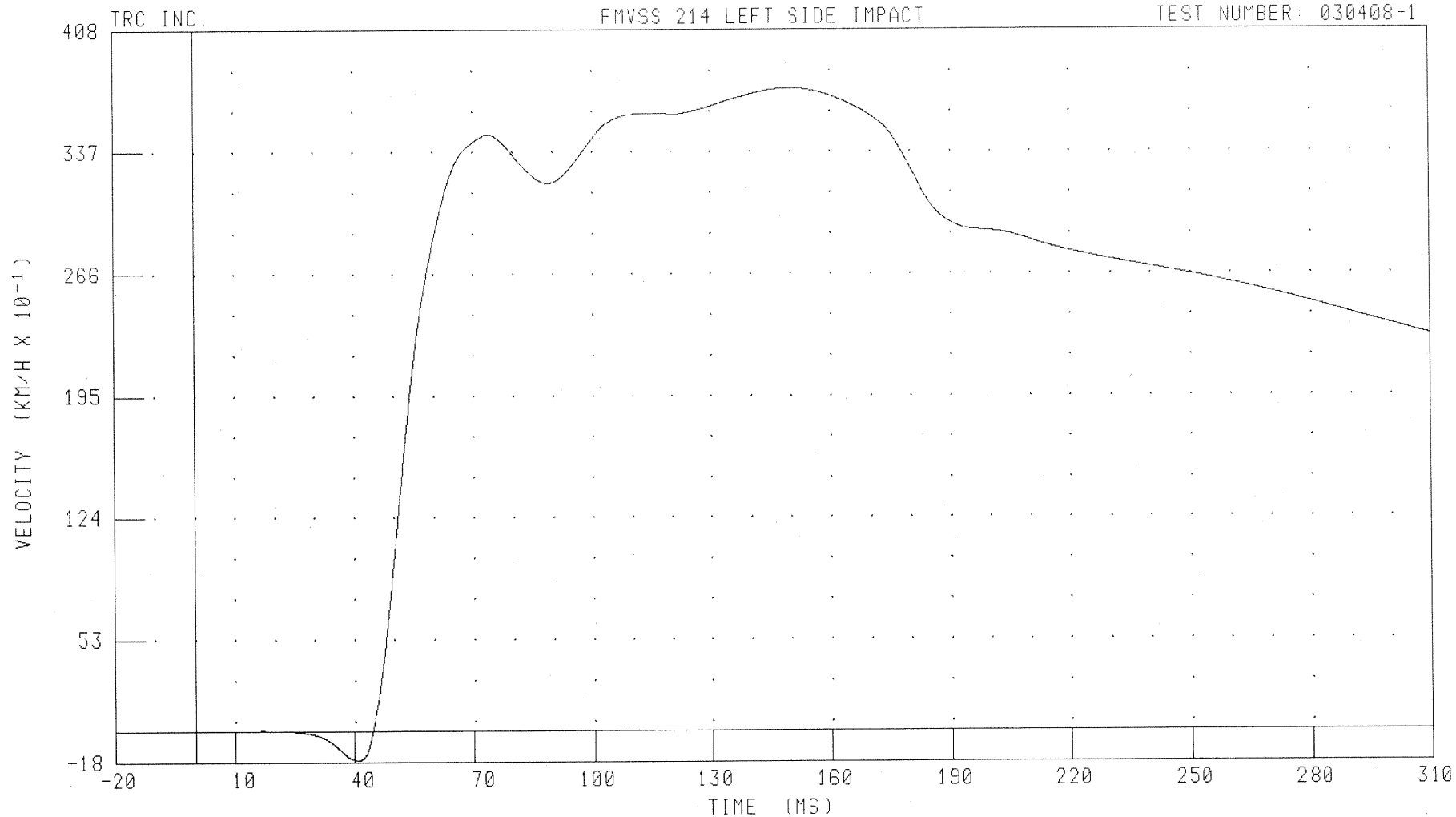
B-72

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDYVJ FILTER: CH. CLASS 180

PEAK DATA: 37.40 KM/H @ 149.92 MS; -1.67 KM/H @ 41.20 MS

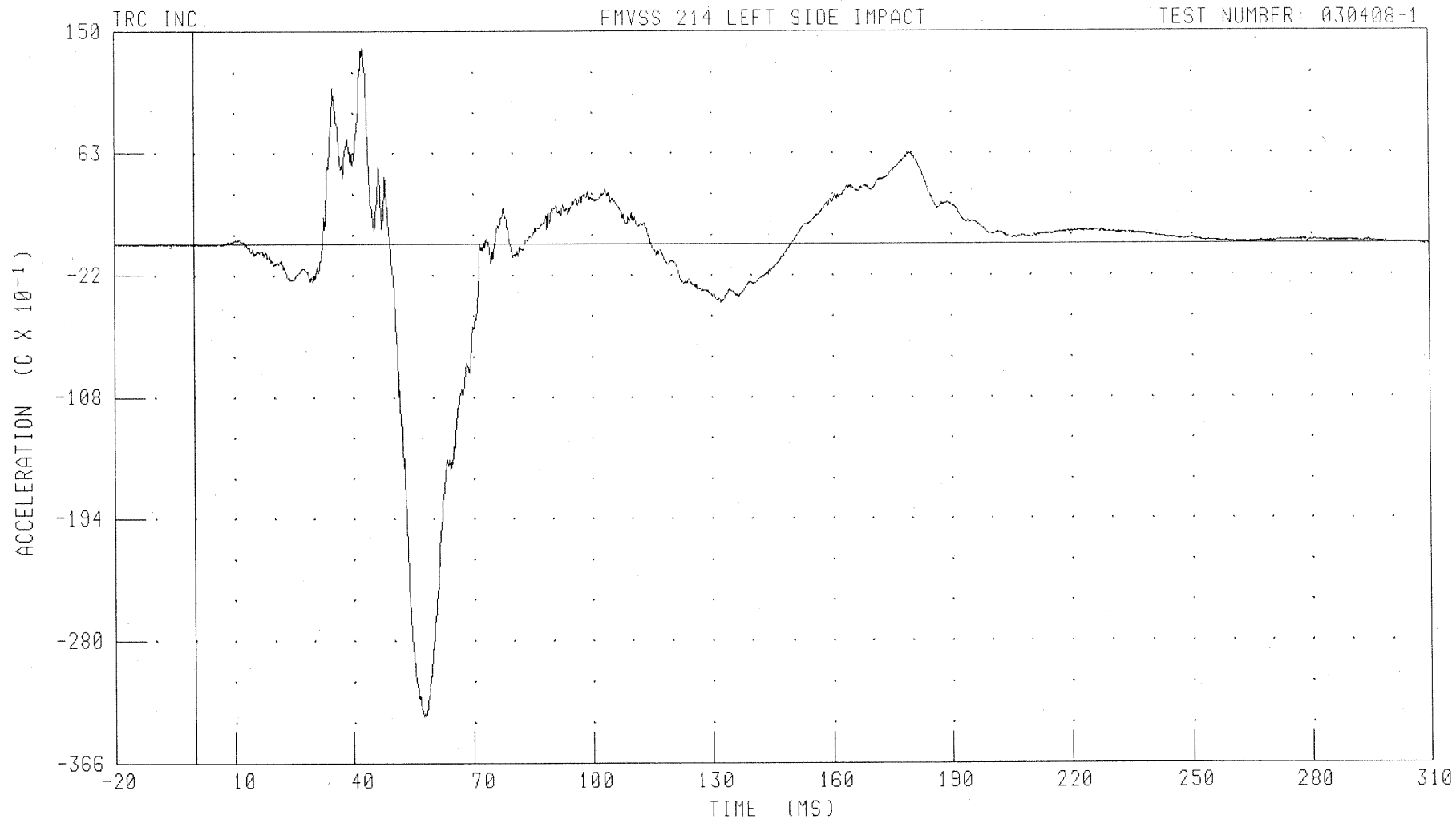
B-73

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Z-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDZR4 FILTER: CH. CLASS 1000

PEAK DATA: 13.88 G @ 42.80 MS; -33.36 G @ 58.00 MS

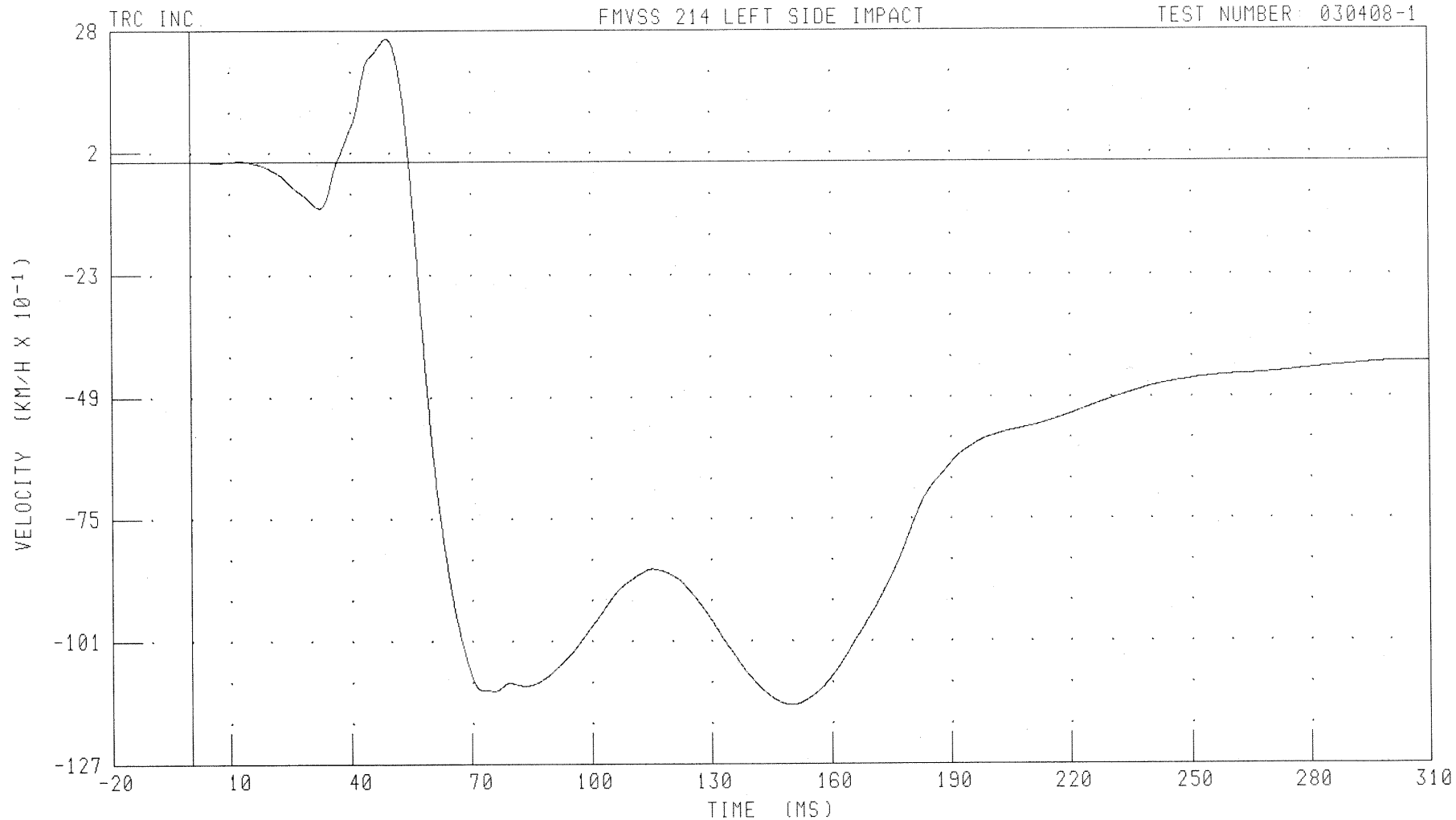
B-74

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD Z-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDZVJ FILTER: CH. CLASS 180

PEAK DATA: 2.63 KM/H @ 49.36 MS; -11.55 KM/H @ 149.84 MS

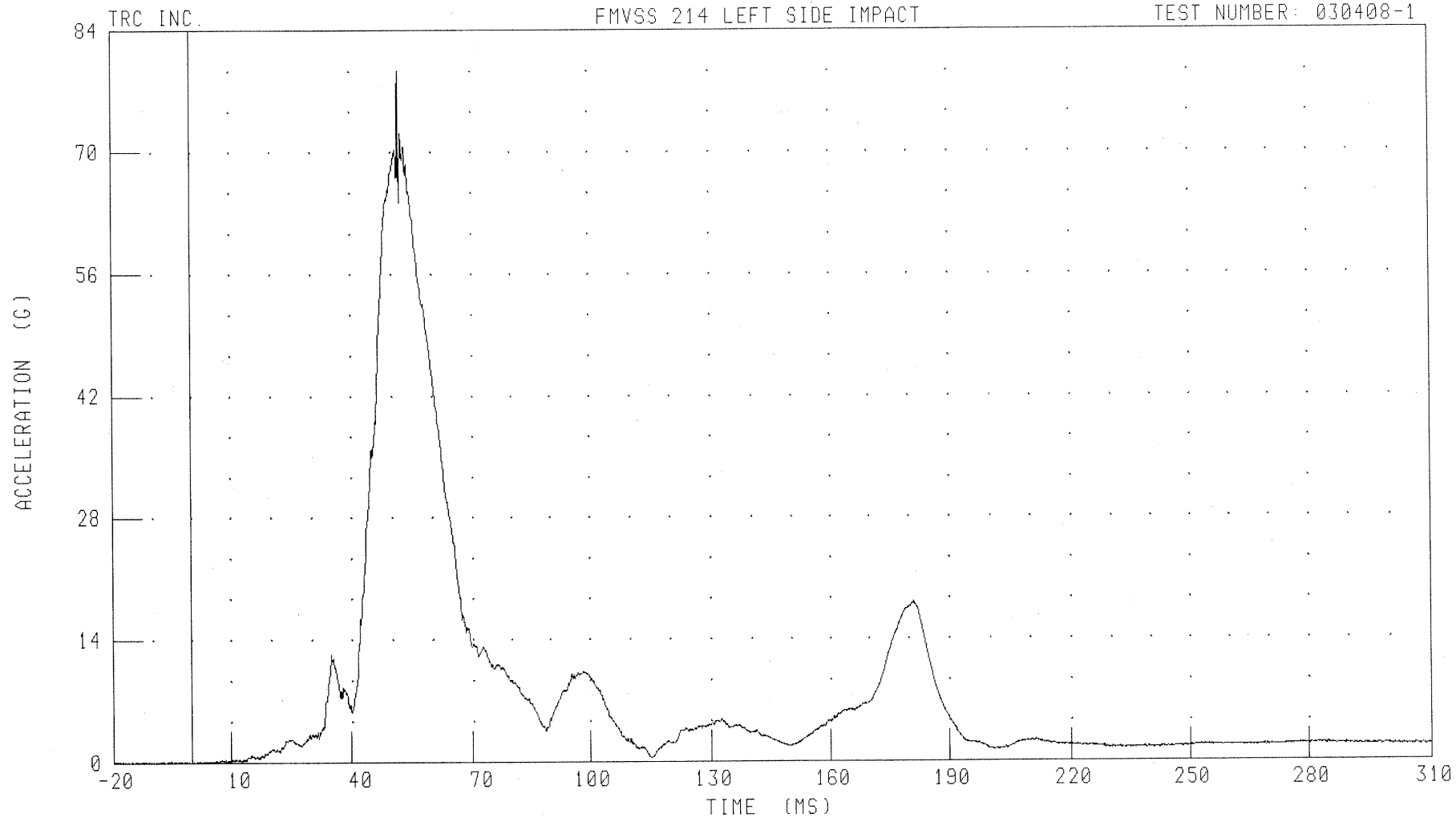
B-75

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER HEAD RESULTANT REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: HEDRR4 FILTER: CH. CLASS 1000

PEAK DATA: 79.45 G @ 51.76 MS; 0.01 G @ -17.12 MS

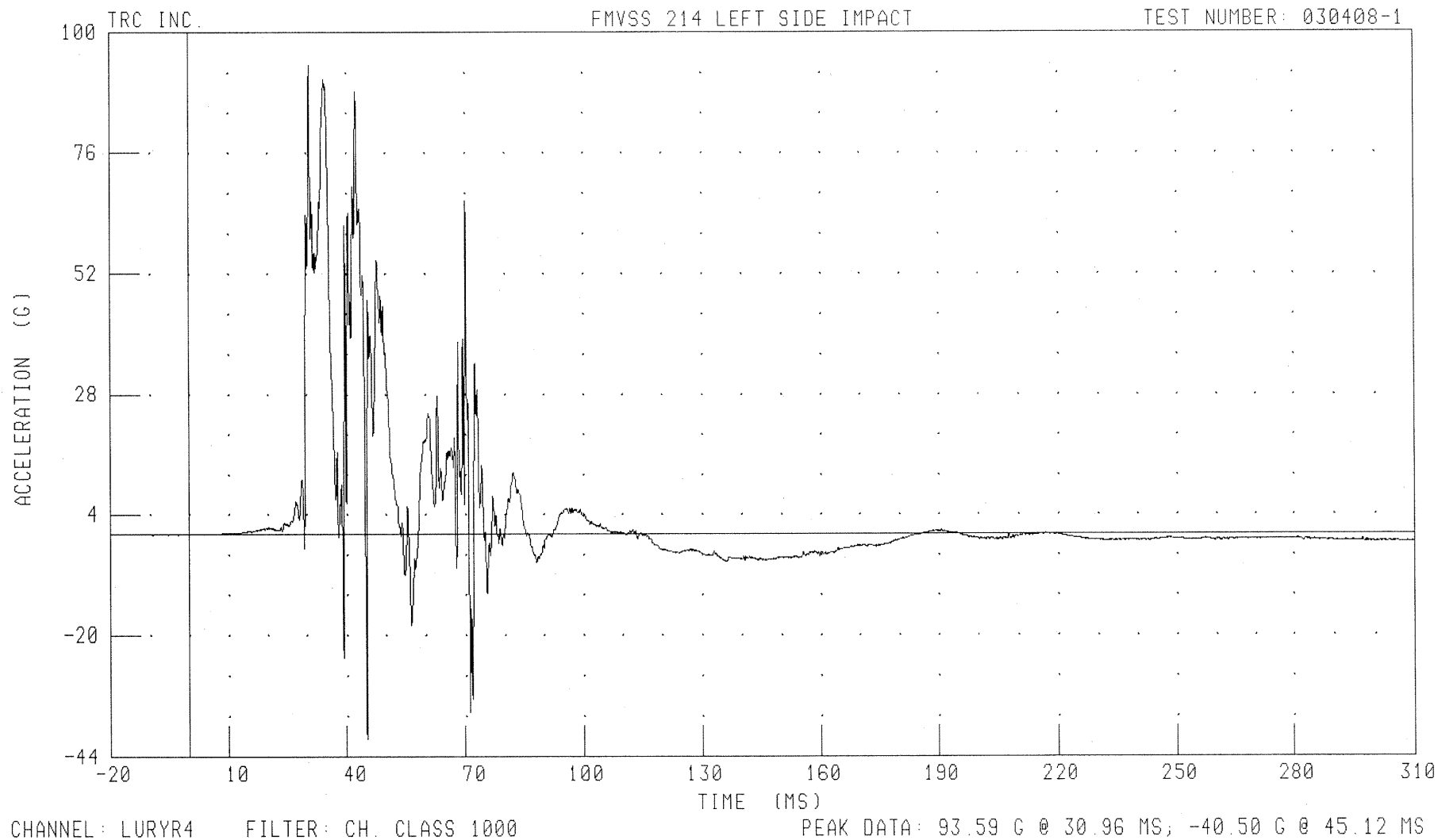
B-76

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



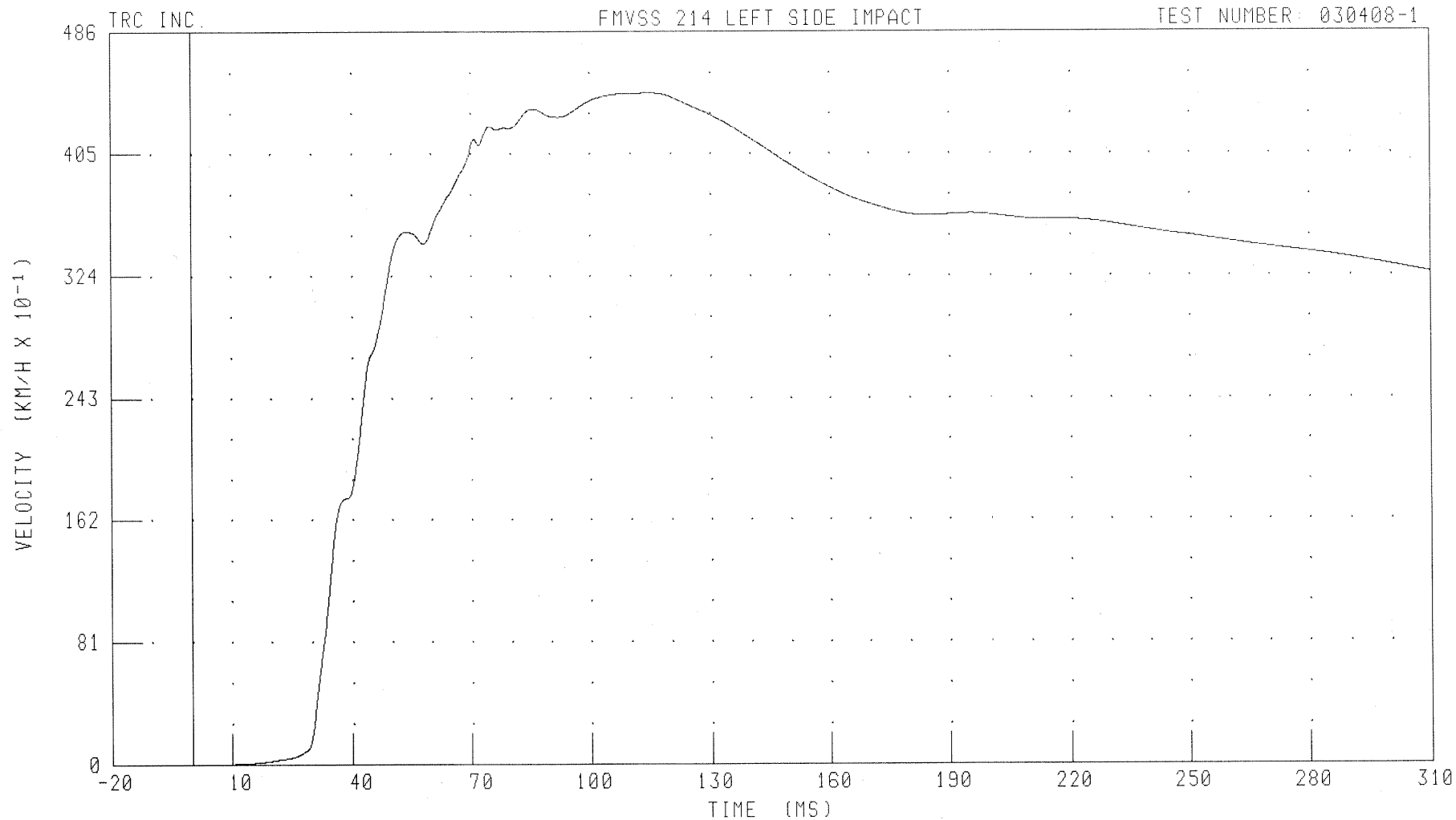
B-77

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LURYVJ FILTER: CH. CLASS 180

PEAK DATA: 44.55 KM/H @ 113.76 MS; 0.00 KM/H @ 0.00 MS

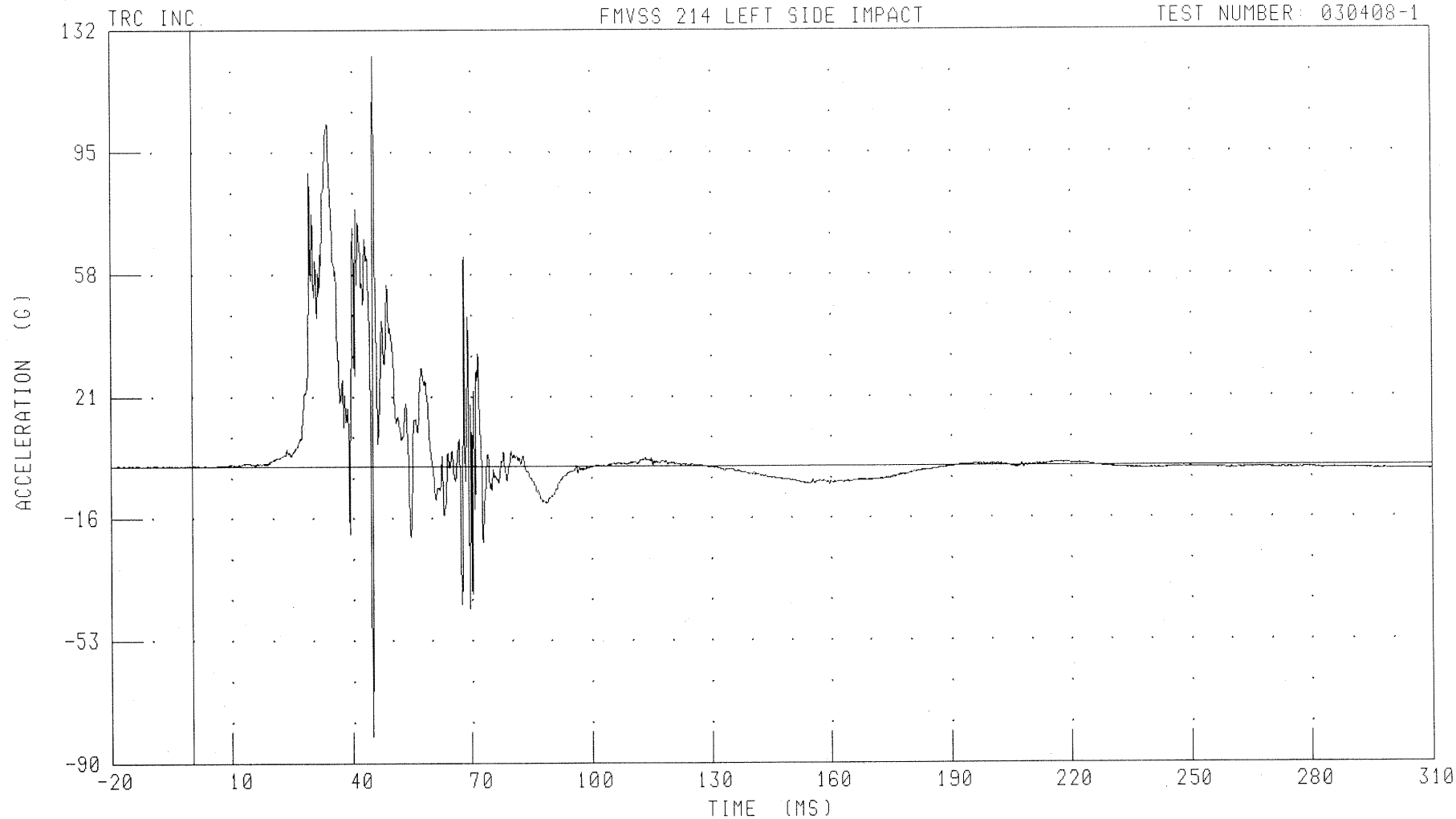
B-78

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



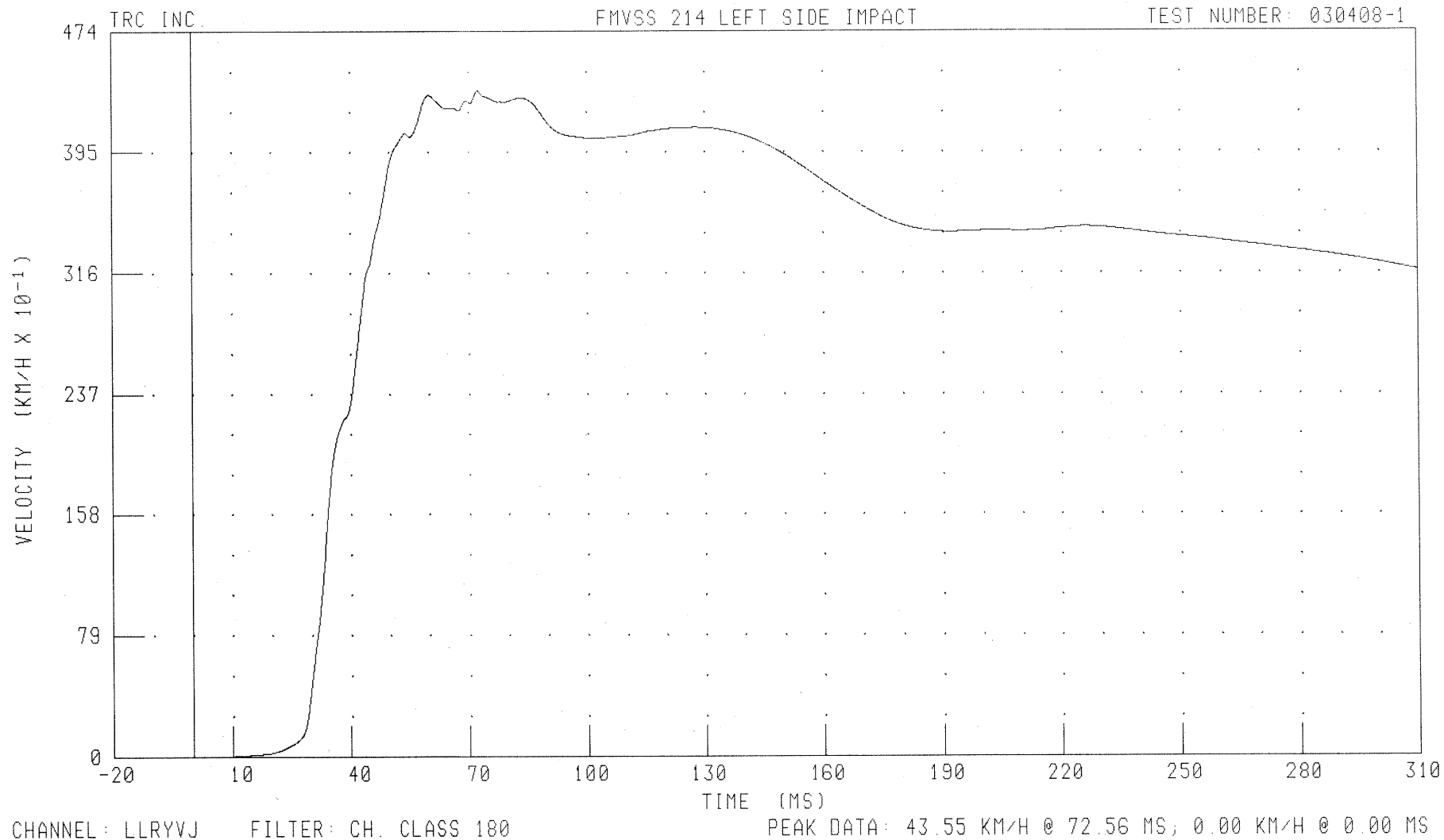
B-79

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



B-80

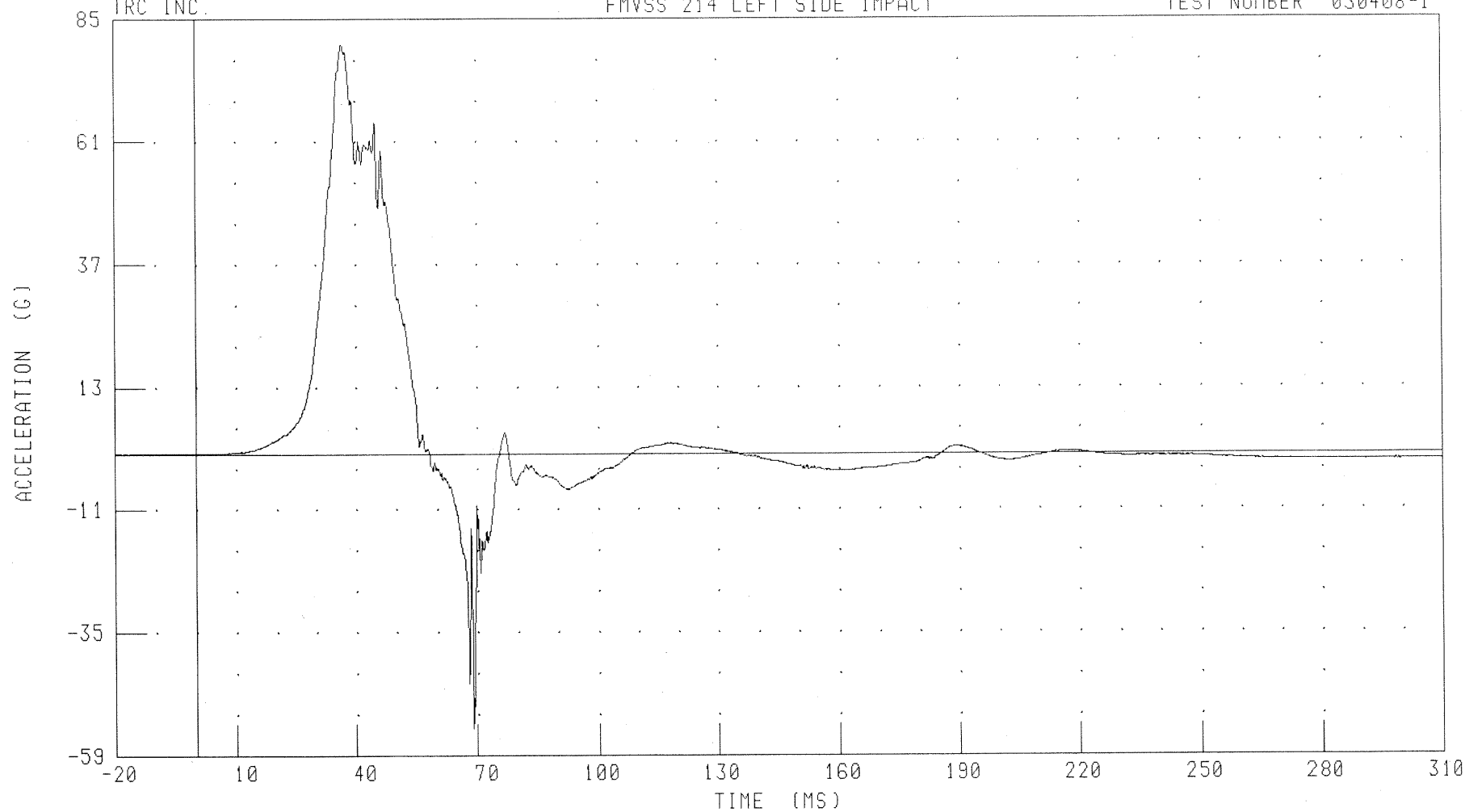
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

TRC INC.

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: T12YR4 FILTER: CH. CLASS 1000

PEAK DATA: 80.03 G @ 36.80 MS; -53.82 G @ 68.96 MS

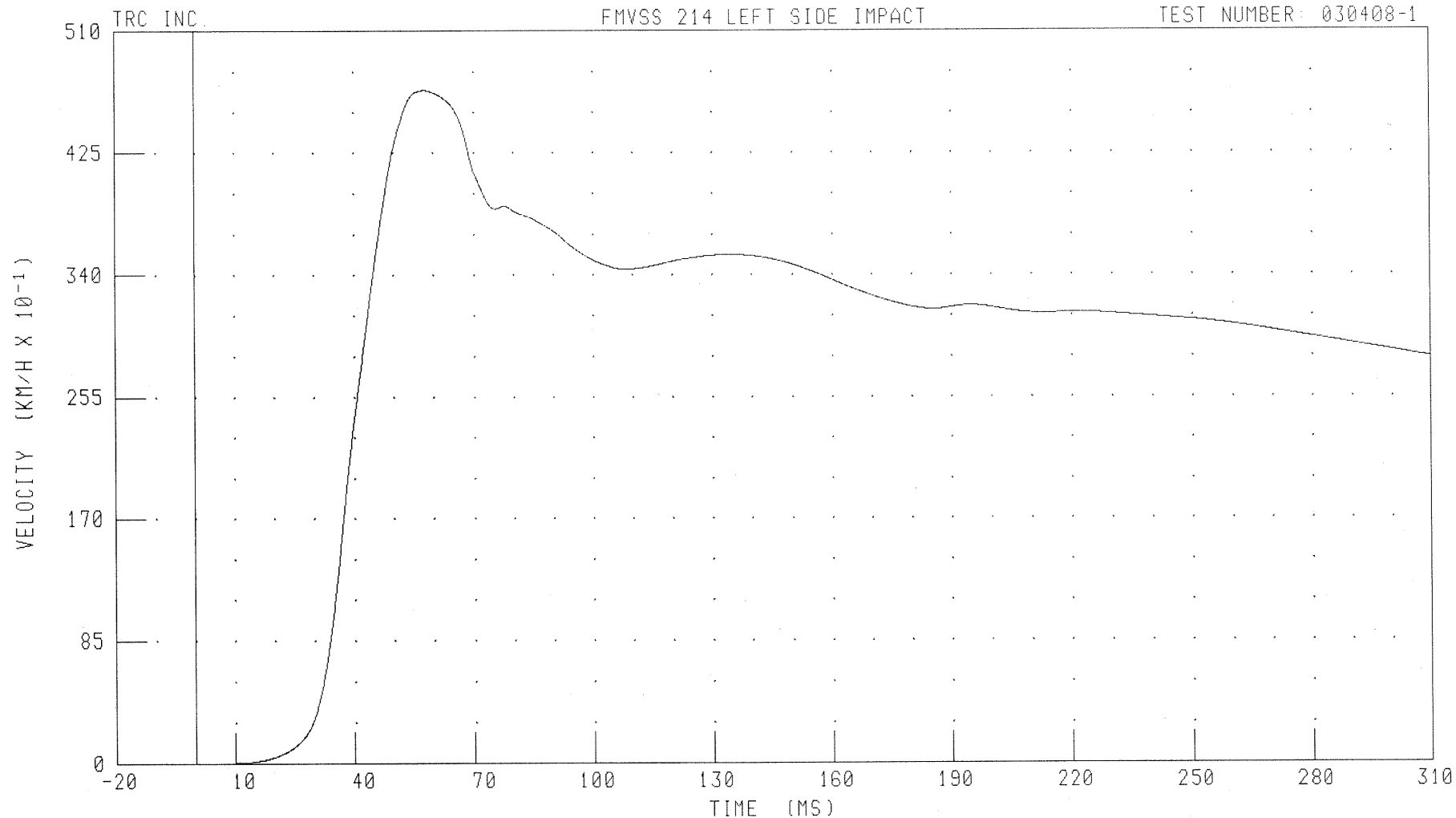
B-81

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YVJ FILTER: CH. CLASS 180

PEAK DATA: 46.89 KM/H @ 58.00 MS; 0.00 KM/H @ 0.00 MS

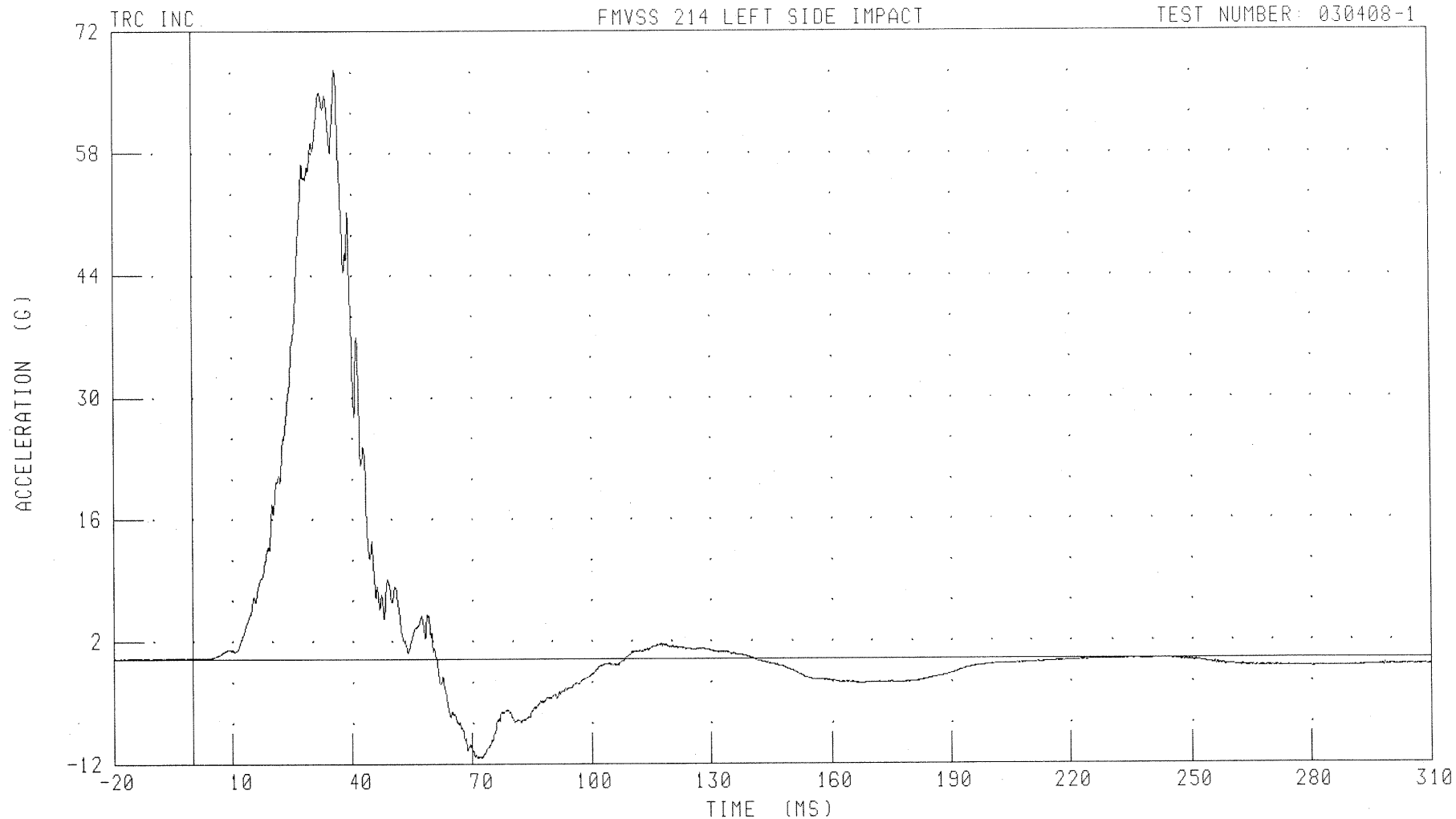
B-82

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER PELVIS Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYR4 FILTER: CH. CLASS 1000

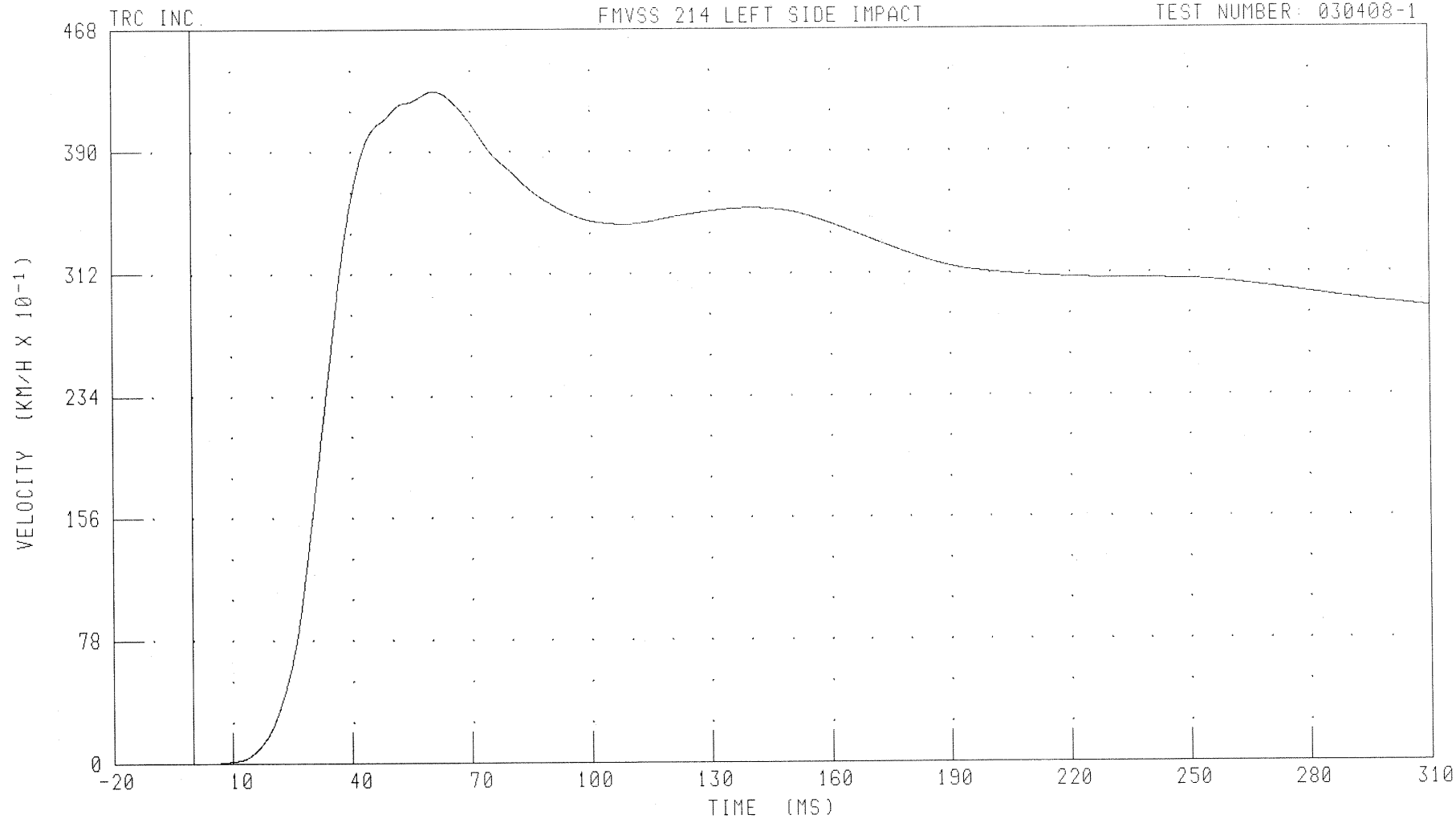
B-83

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER PELVIS Y-AXIS REDUNDANT VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYVJ FILTER: CH. CLASS 180

PEAK DATA: 42.87 KM/H @ 60.96 MS; 0.00 KM/H @ 0.00 MS

B-84

030408-1

Test Vehicle Instrumentation Plots

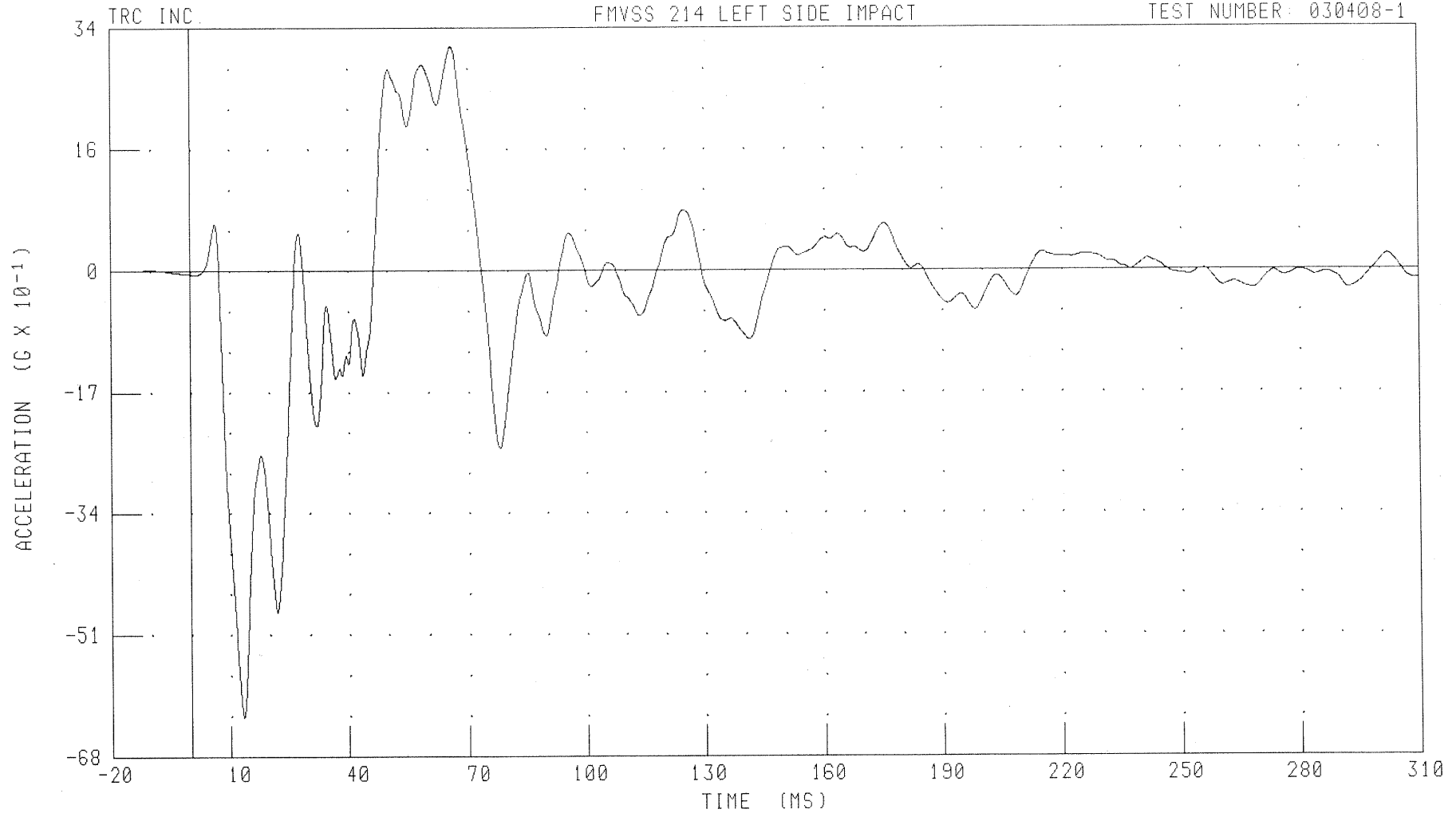
Acceleration Data - Filter Class 60

Integration Data - Filter Class 180

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT FRONT SEAT X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RFSXG1 FILTER: CH. CLASS 60

PEAK DATA: 3.14 G @ 66.00 MS; -6.26 G @ 13.28 MS

B-86

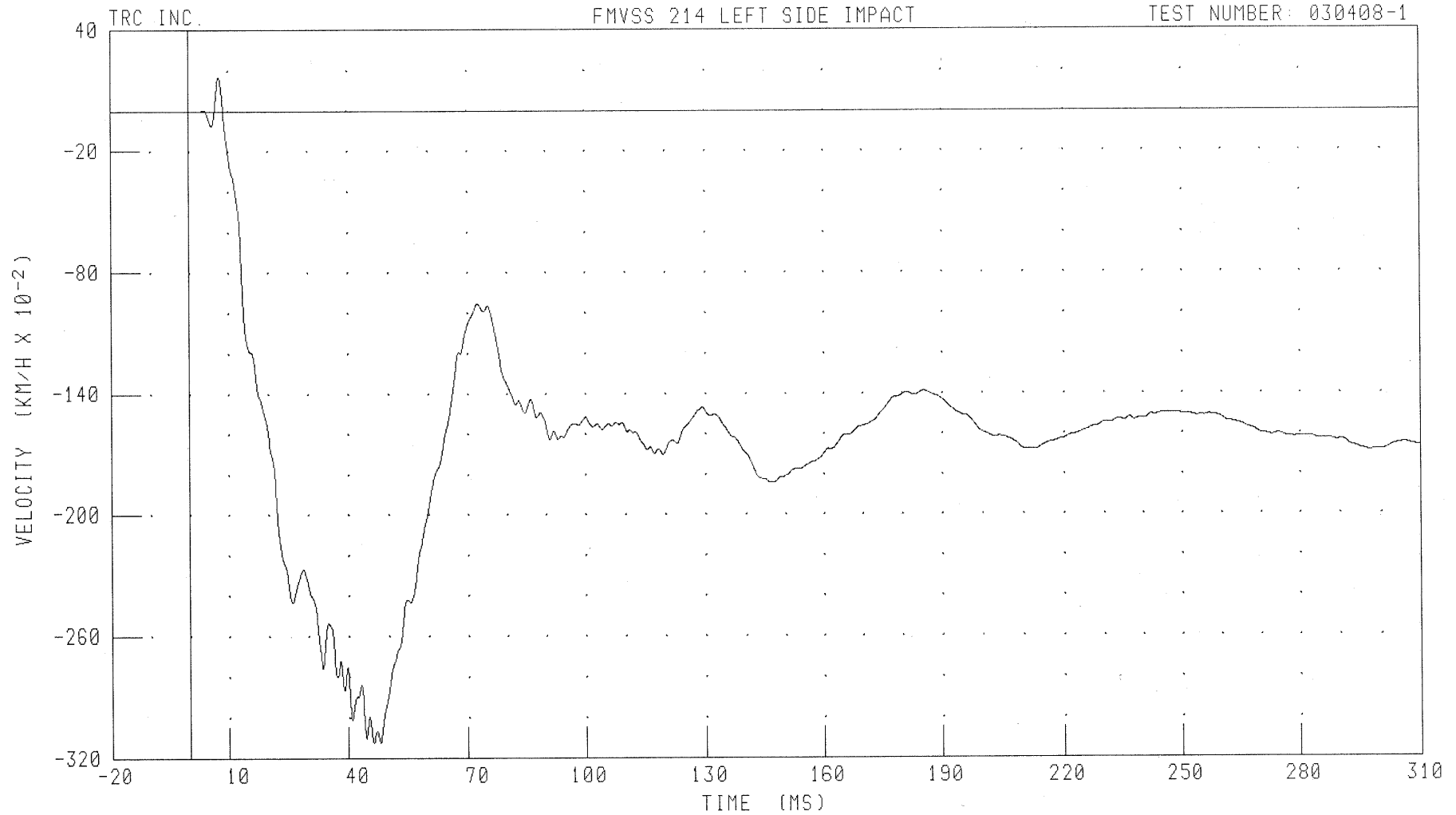
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

RIGHT SIDE SILL AT FRONT SEAT X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RFSXV1 FILTER: CH. CLASS 180

PEAK DATA: 0.17 KM/H @ 7.84 MS; -3.13 KM/H @ 46.24 MS

B-87

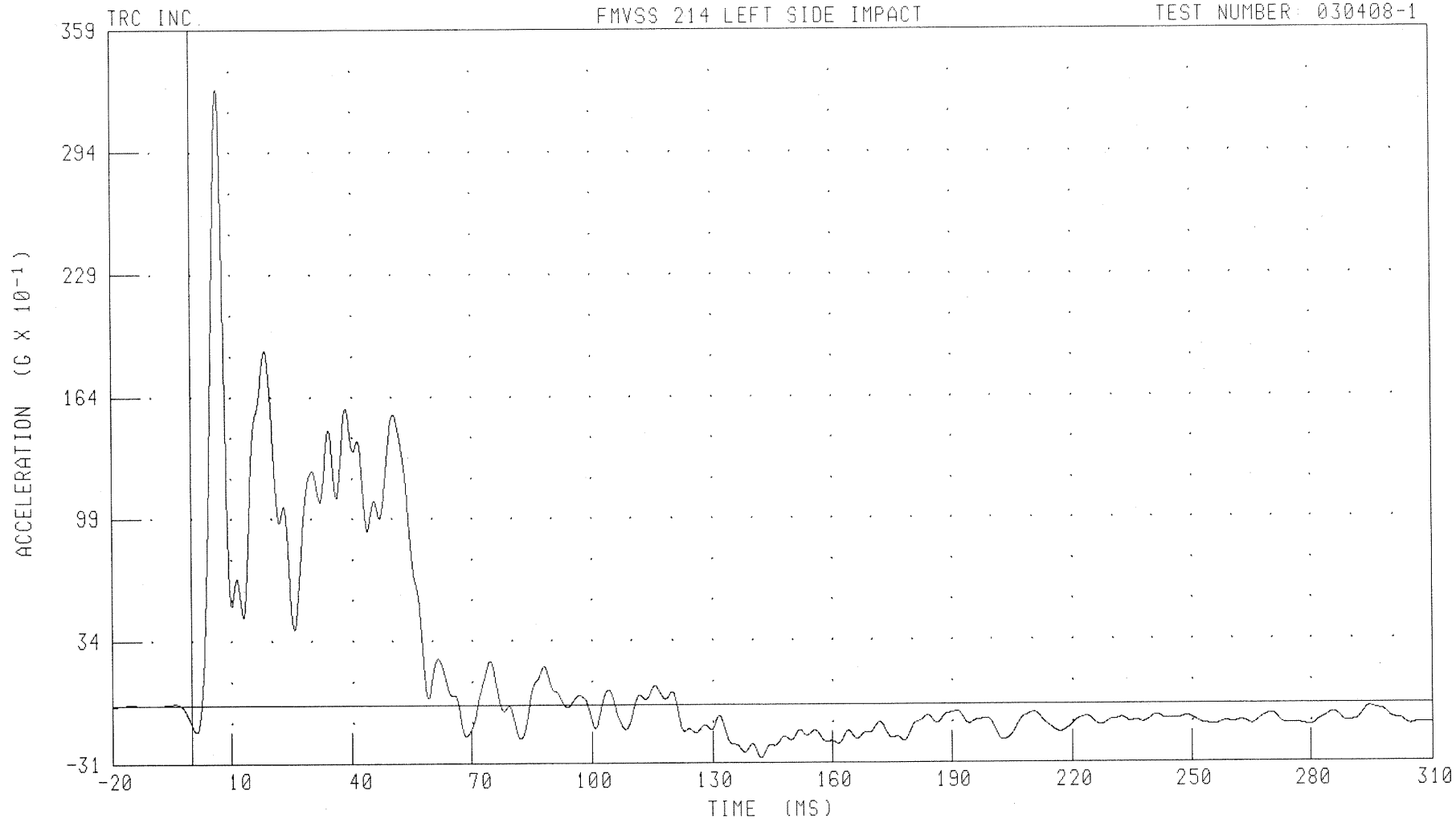
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

RIGHT SIDE SILL AT FRONT SEAT Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RFSYG1 FILTER: CH. CLASS 60

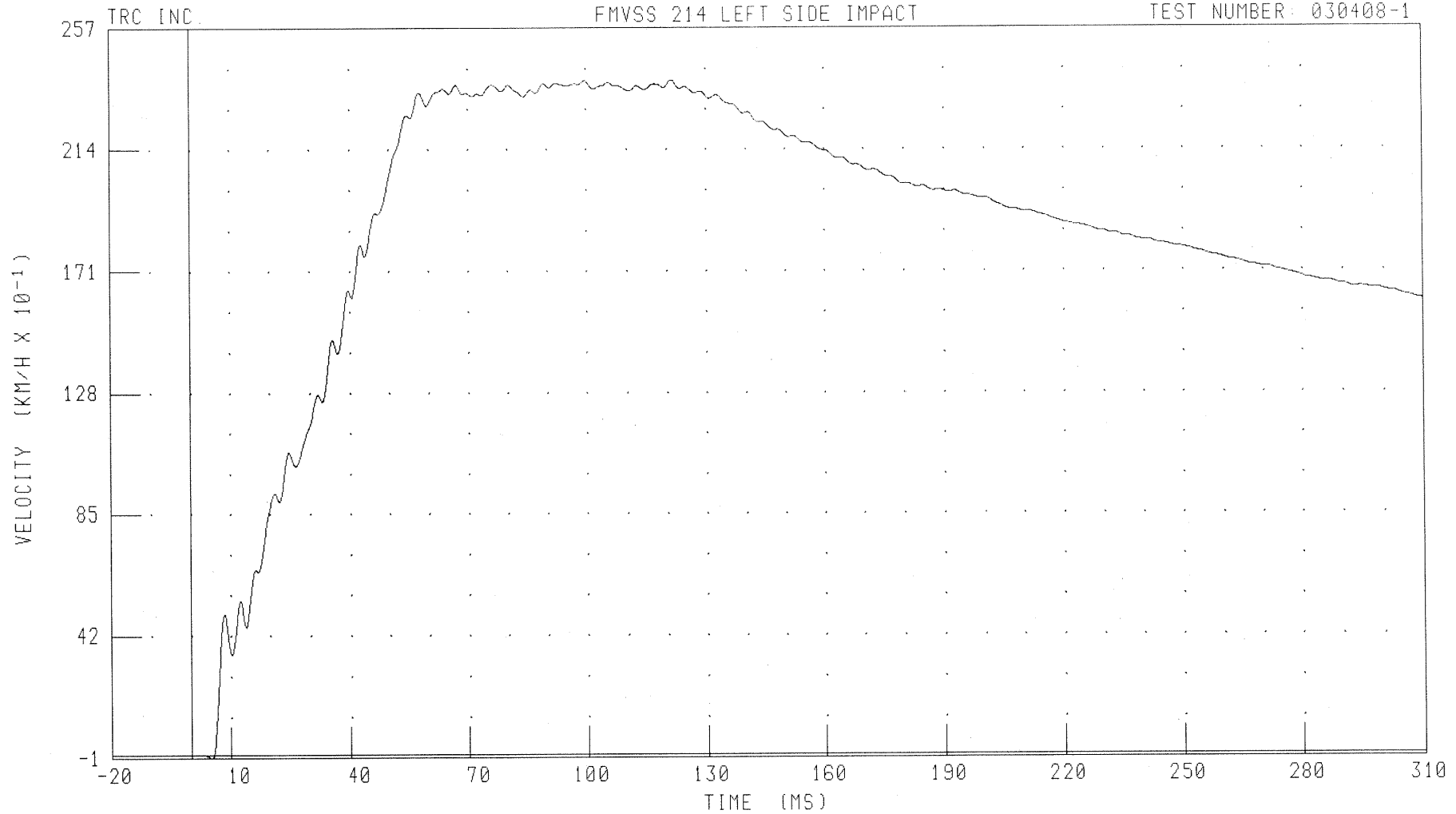
B-88

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT FRONT SEAT Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RFSYV1 FILTER: CH. CLASS 180

PEAK DATA: 23.86 KM/H @ 121.44 MS; -0.13 KM/H @ 5.12 MS

B-89

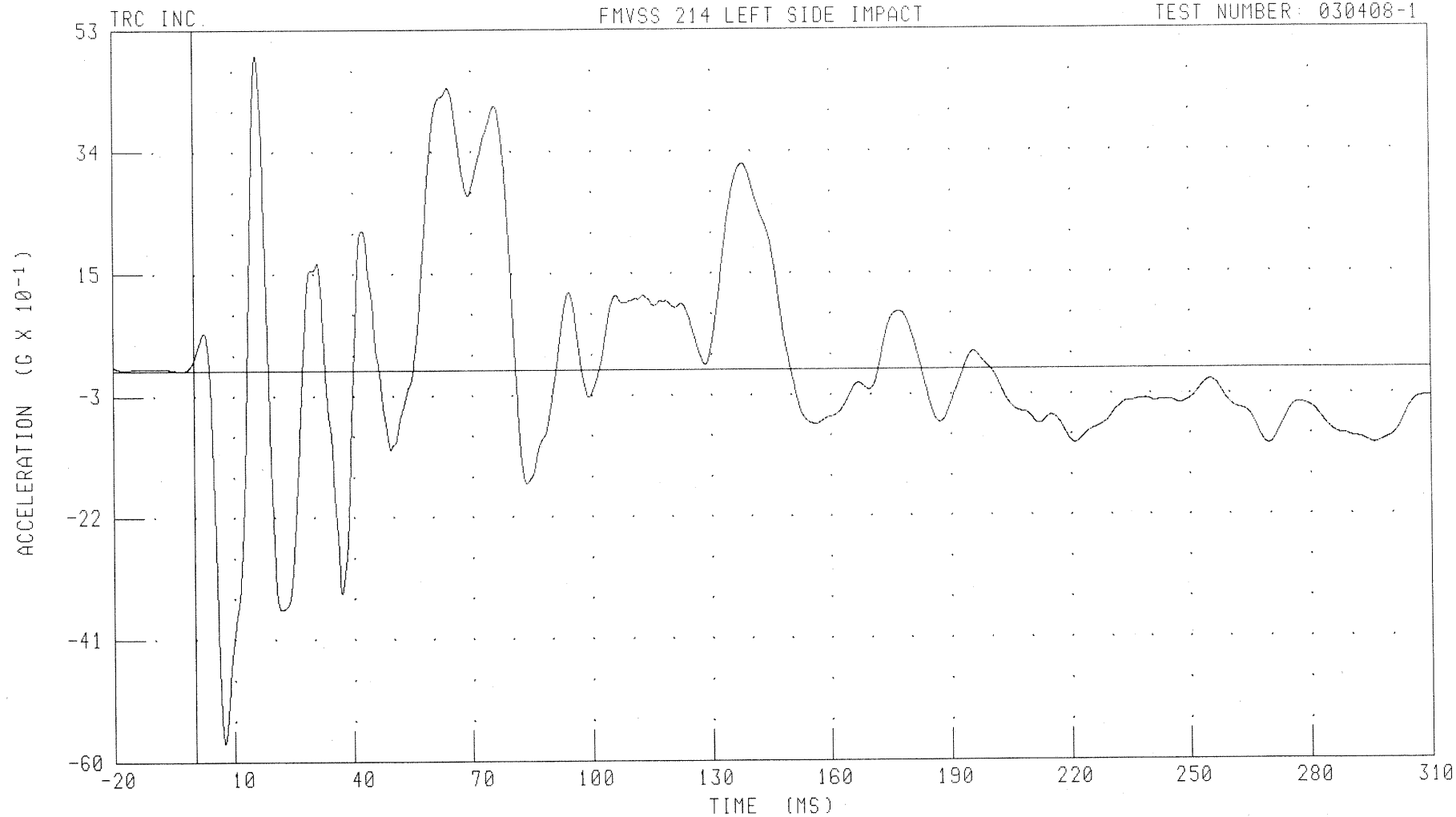
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

RIGHT SIDE SILL AT FRONT SEAT Z-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RFSZG1 FILTER: CH. CLASS 60

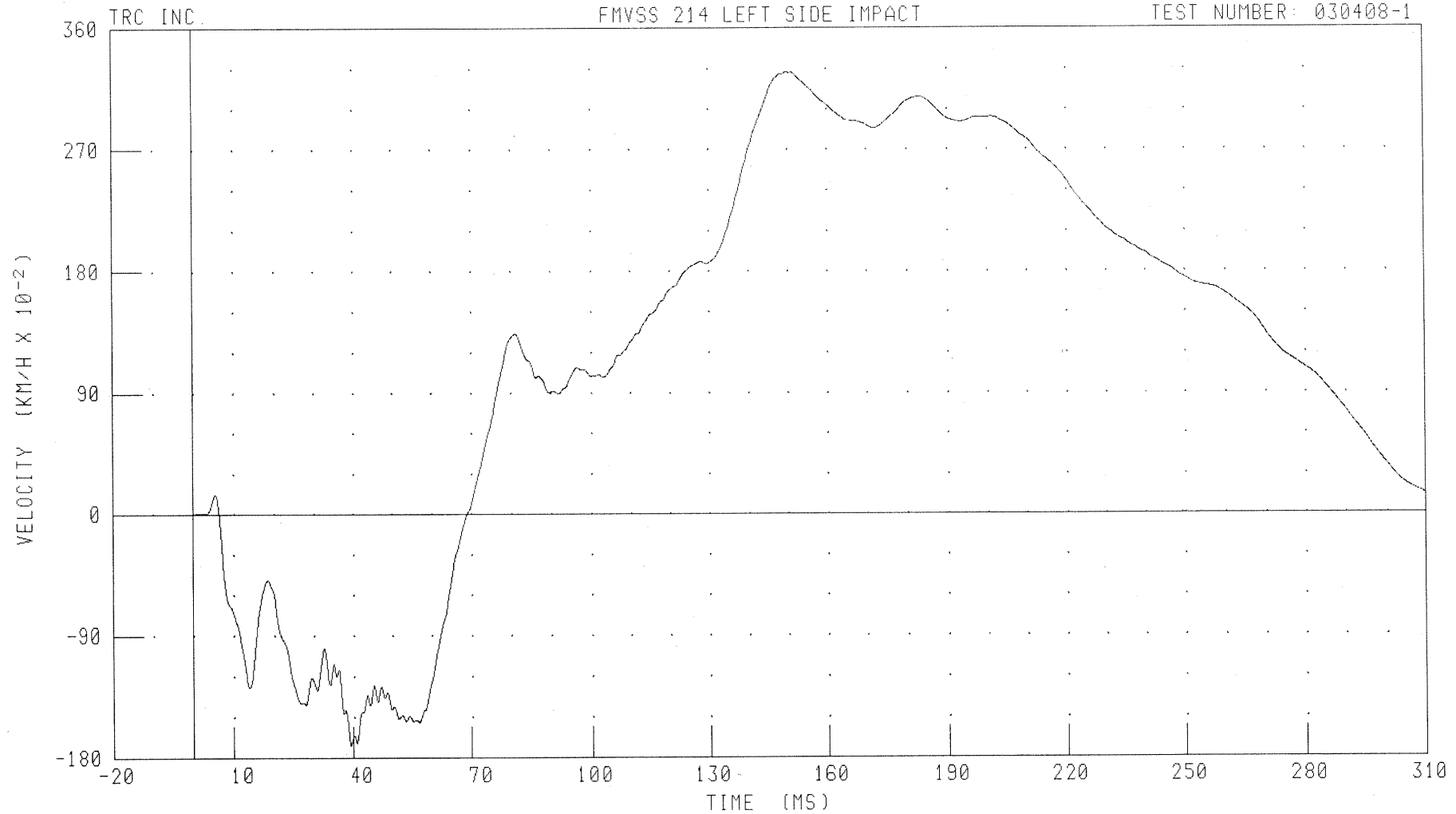
B-90

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT FRONT SEAT Z-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RFSZV1 FILTER: CH. CLASS 180

PEAK DATA: 3.27 KM/H @ 150.08 MS; -1.71 KM/H @ 39.28 MS

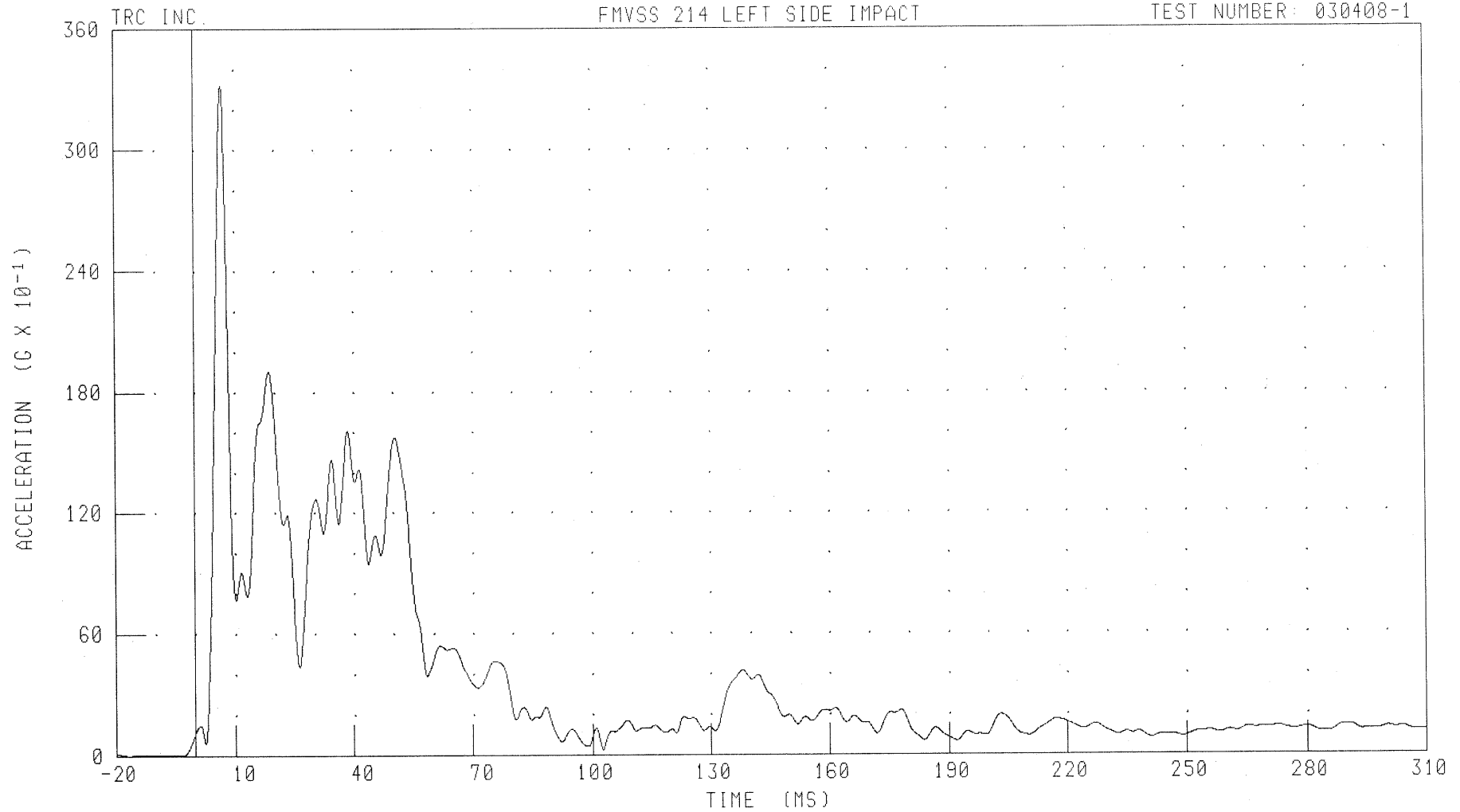
B-91

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RFSRG1 FILTER: CH. CLASS 60

PEAK DATA: 33.22 G @ 6.88 MS; 0.01 G @ -16.88 MS

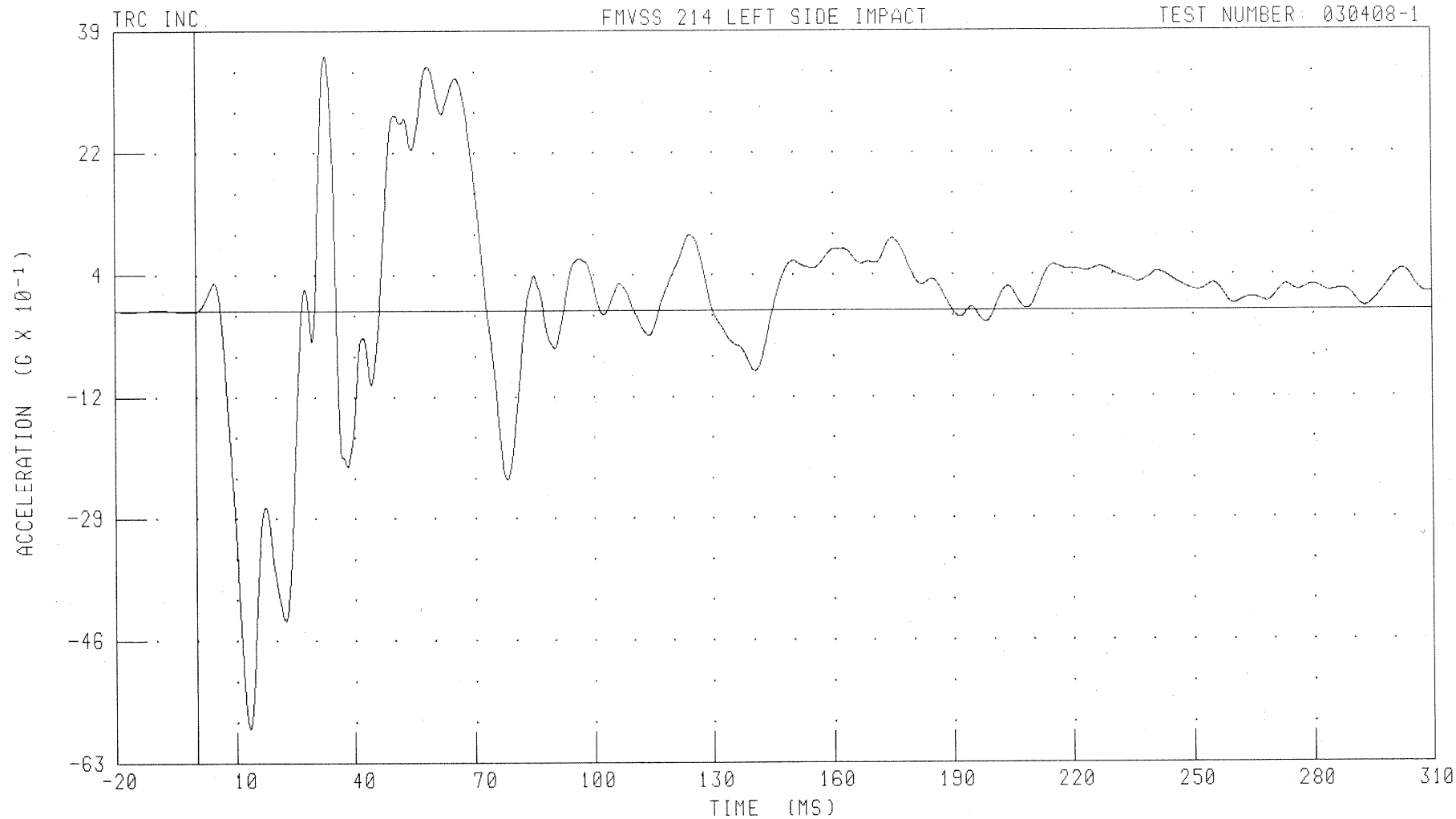
B-92

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT REAR SEAT X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RRSXG1 FILTER: CH. CLASS 60

PEAK DATA: 3.56 G @ 33.04 MS; -5.83 G @ 13.28 MS

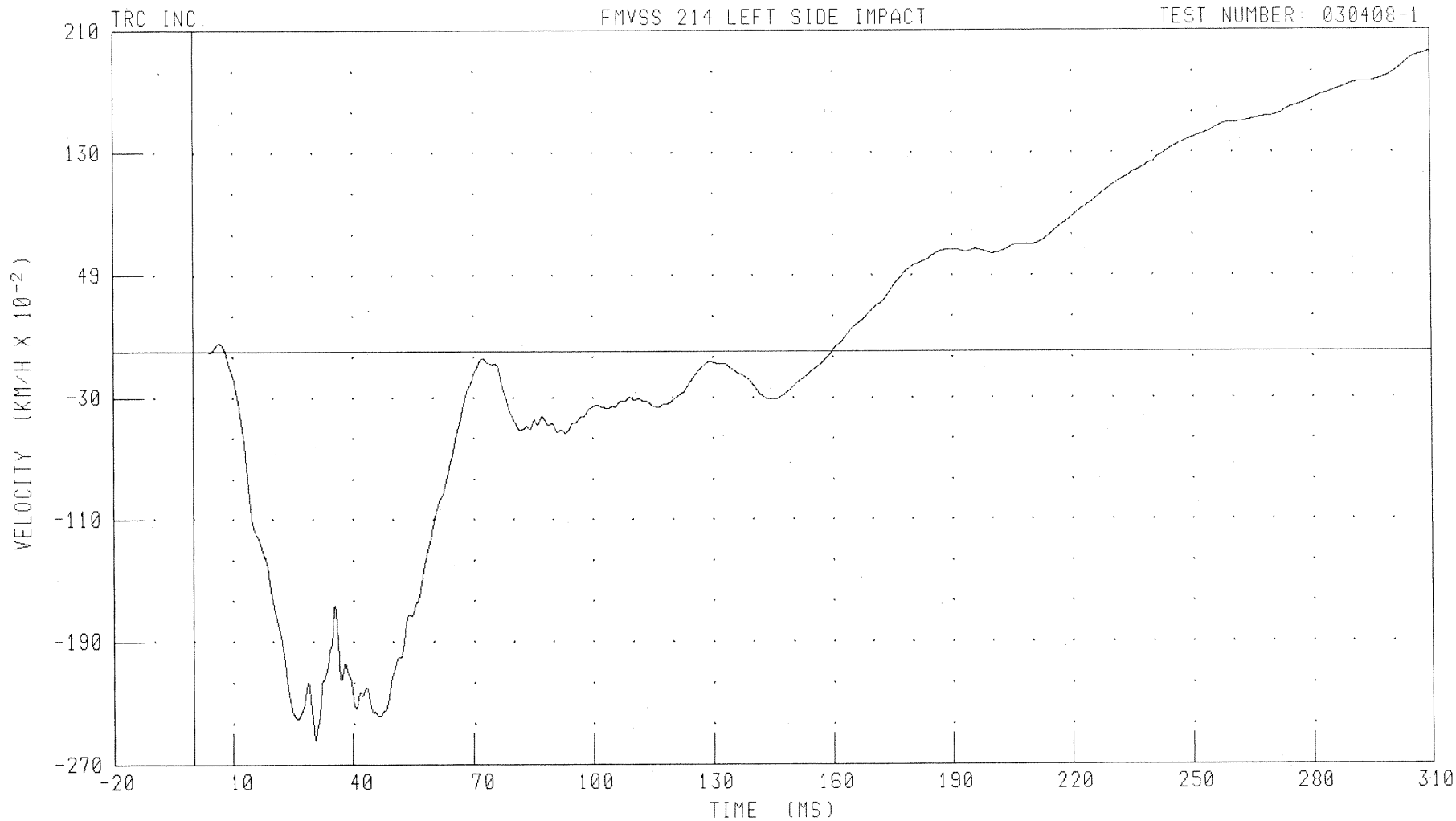
B-93

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT REAR SEAT X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RRSXV1 FILTER: CH. CLASS 180

PEAK DATA: 1.96 KM/H @ 310.00 MS, -2.55 KM/H @ 30.64 MS

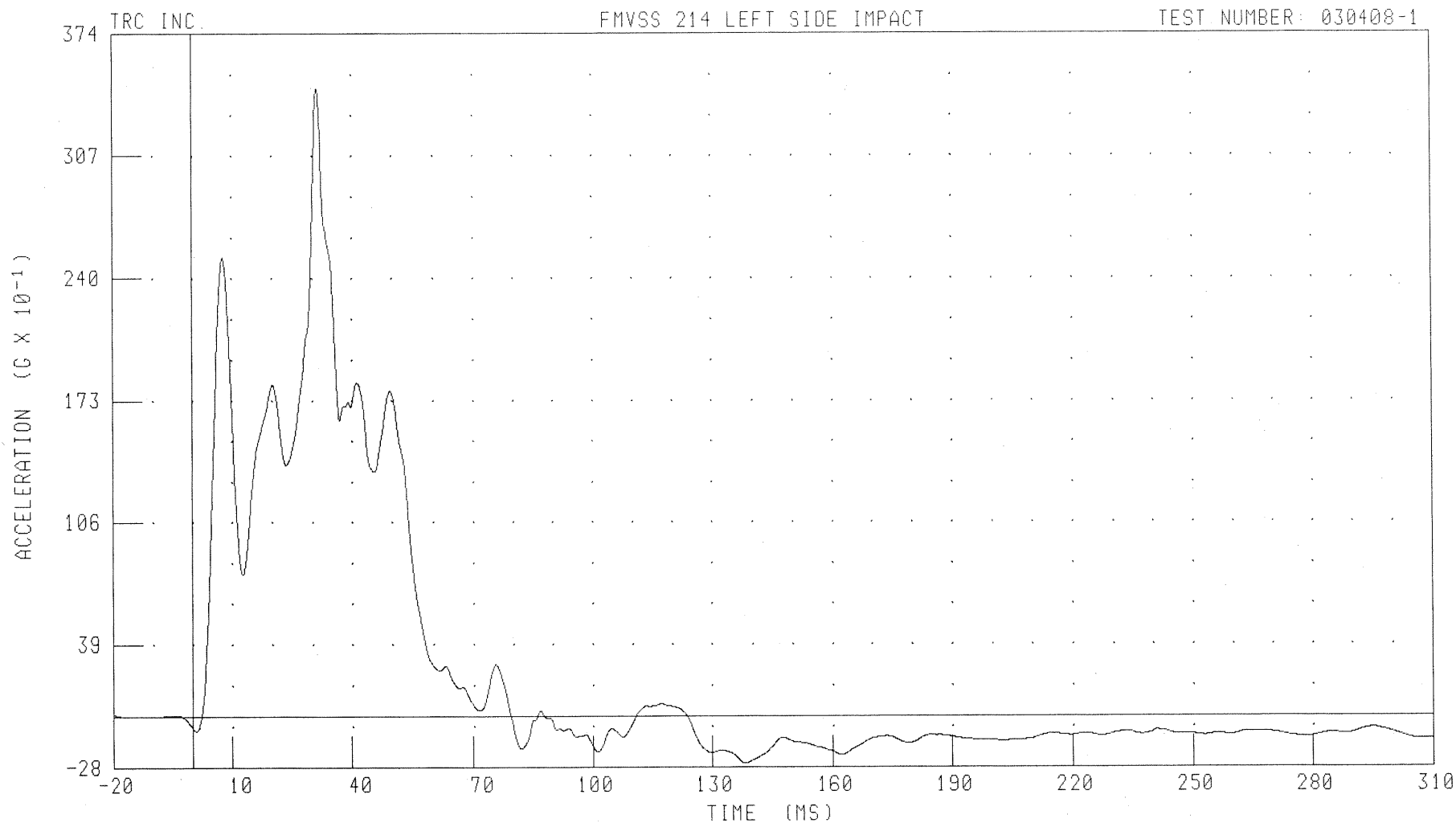
B-94

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT REAR SEAT Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



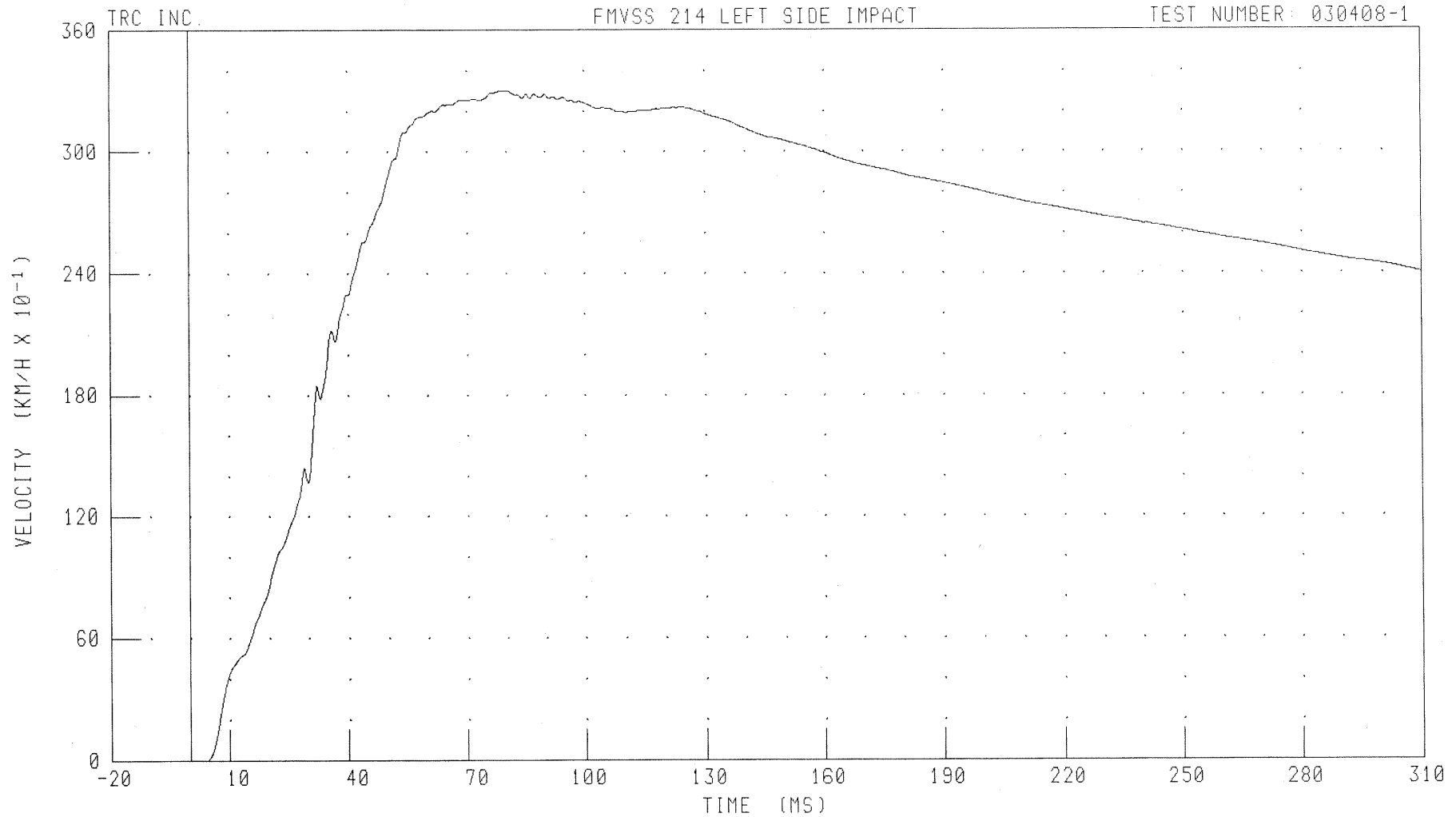
CHANNEL: RRSYG1 FILTER: CH. CLASS 60

PEAK DATA: 34.43 G @ 31.44 MS; -2.60 G @ 138.08 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT REAR SEAT Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



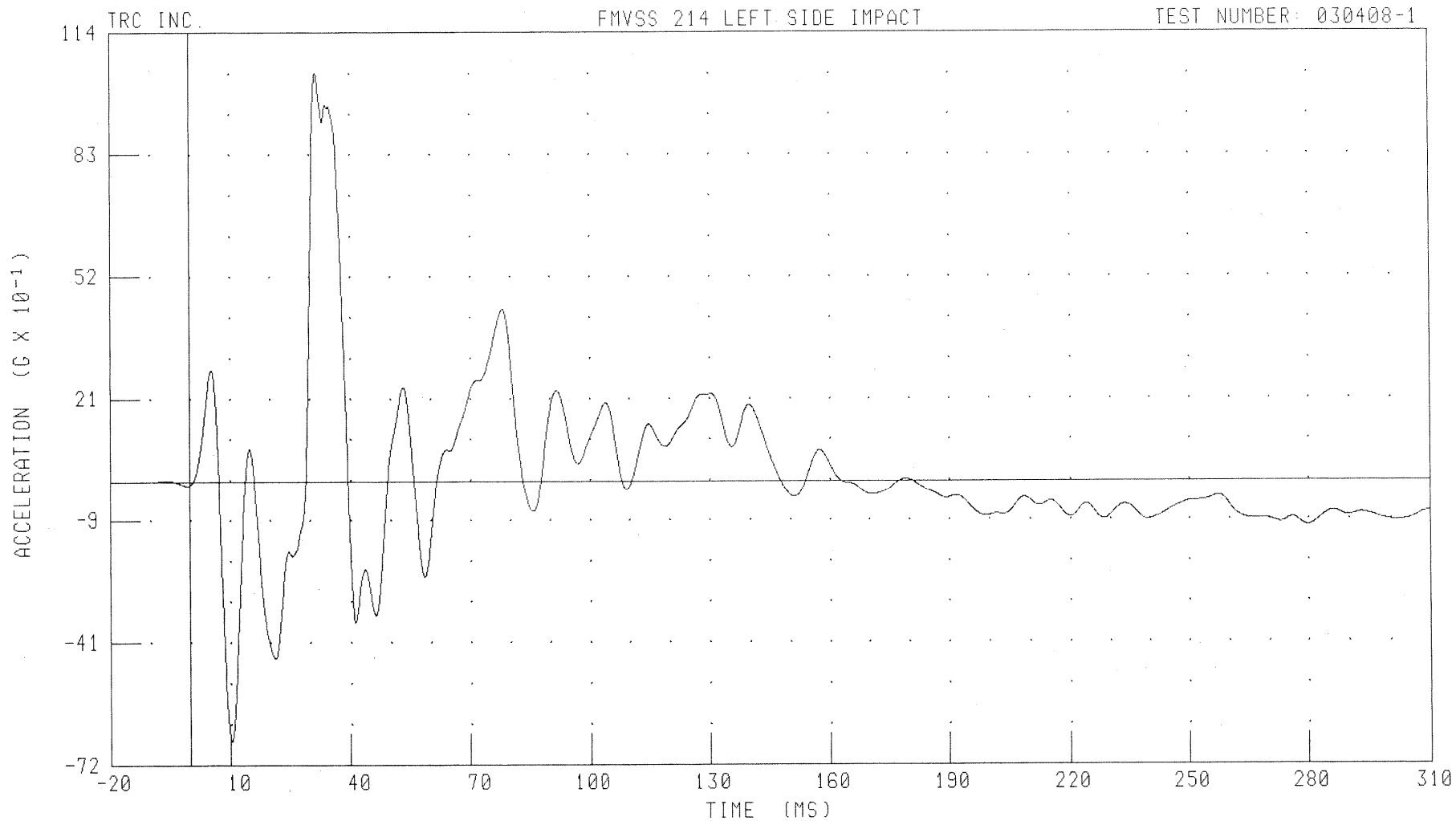
CHANNEL: RRSYV1 FILTER: CH. CLASS 180

PEAK DATA: 33.03 KM/H @ 80.40 MS; -0.01 KM/H @ 3.76 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT REAR SEAT Z-AXIS ACCELERATION

FMVSS 214 LEFT-SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RRSZG1 FILTER: CH. CLASS 60

PEAK DATA: 10.38 G @ 31.76 MS; -6.61 G @ 10.32 MS

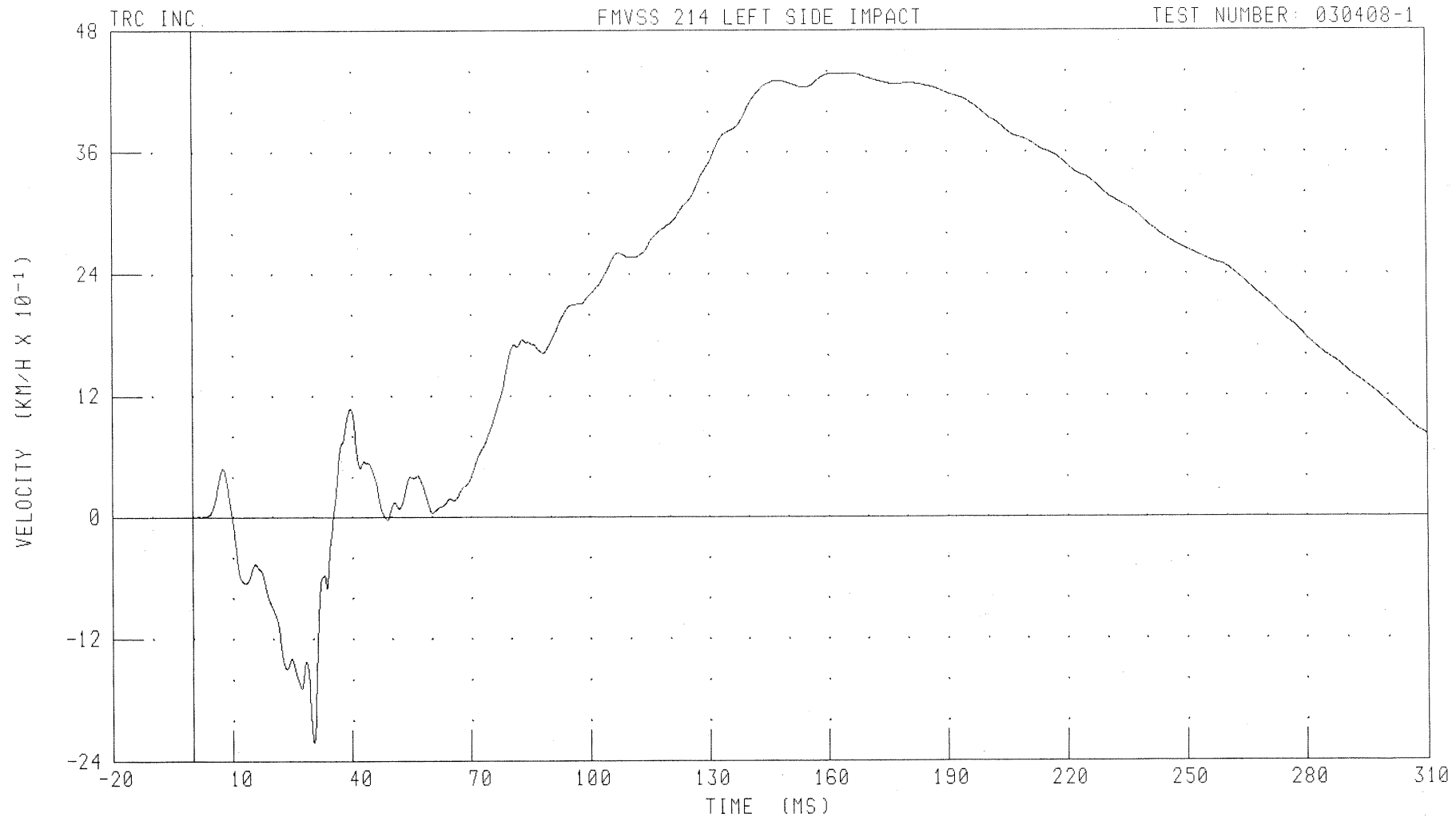
B-97

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT REAR SEAT Z-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



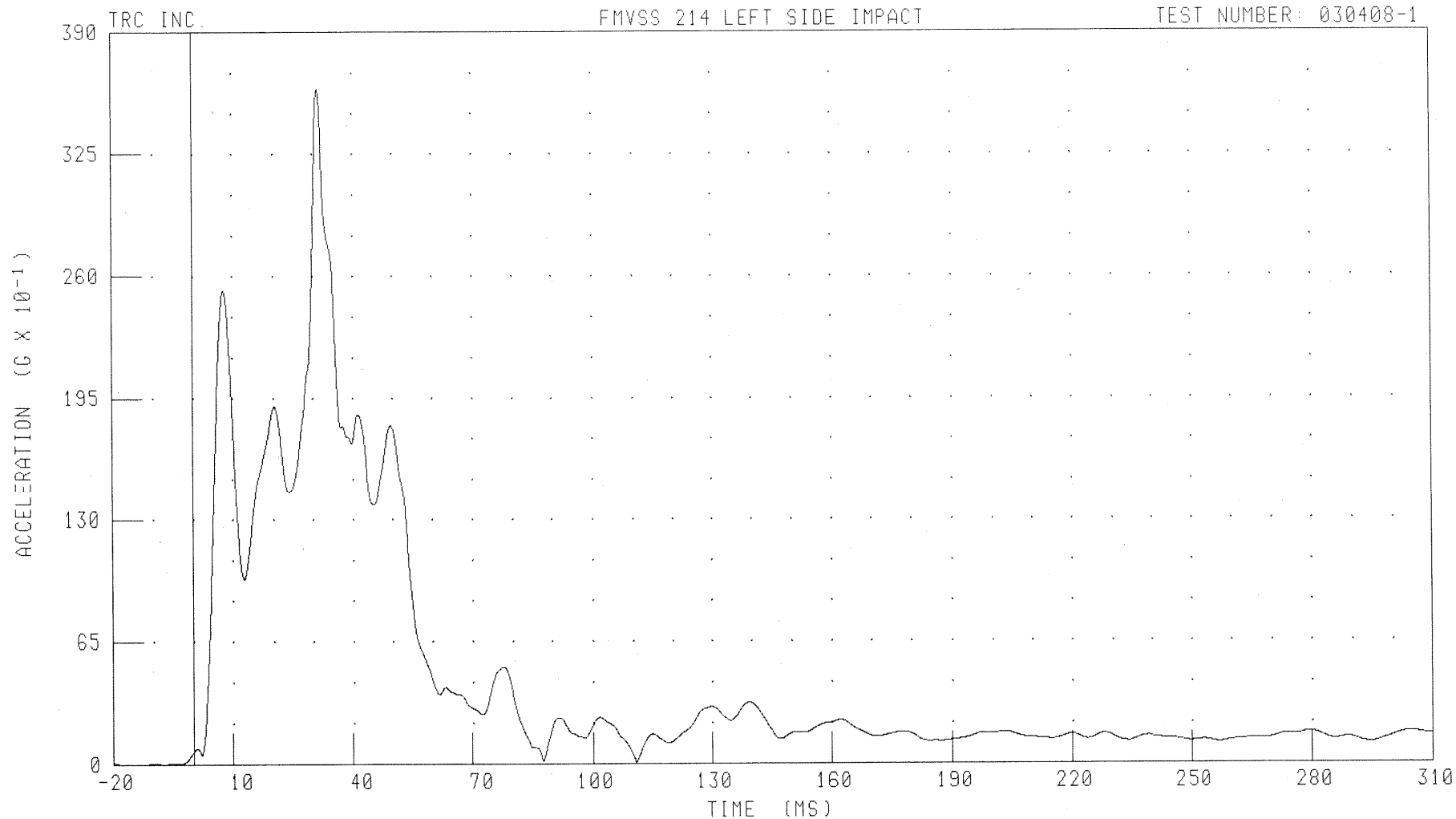
CHANNEL: RRSZV1 FILTER: CH. CLASS 180

PEAK DATA: 4.38 KM/H @ 161.92 MS; -2.22 KM/H @ 30.24 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RRSRG1 FILTER: CH. CLASS 60

PEAK DATA: 35.98 G @ 31.44 MS; 0.01 G @ -18.08 MS

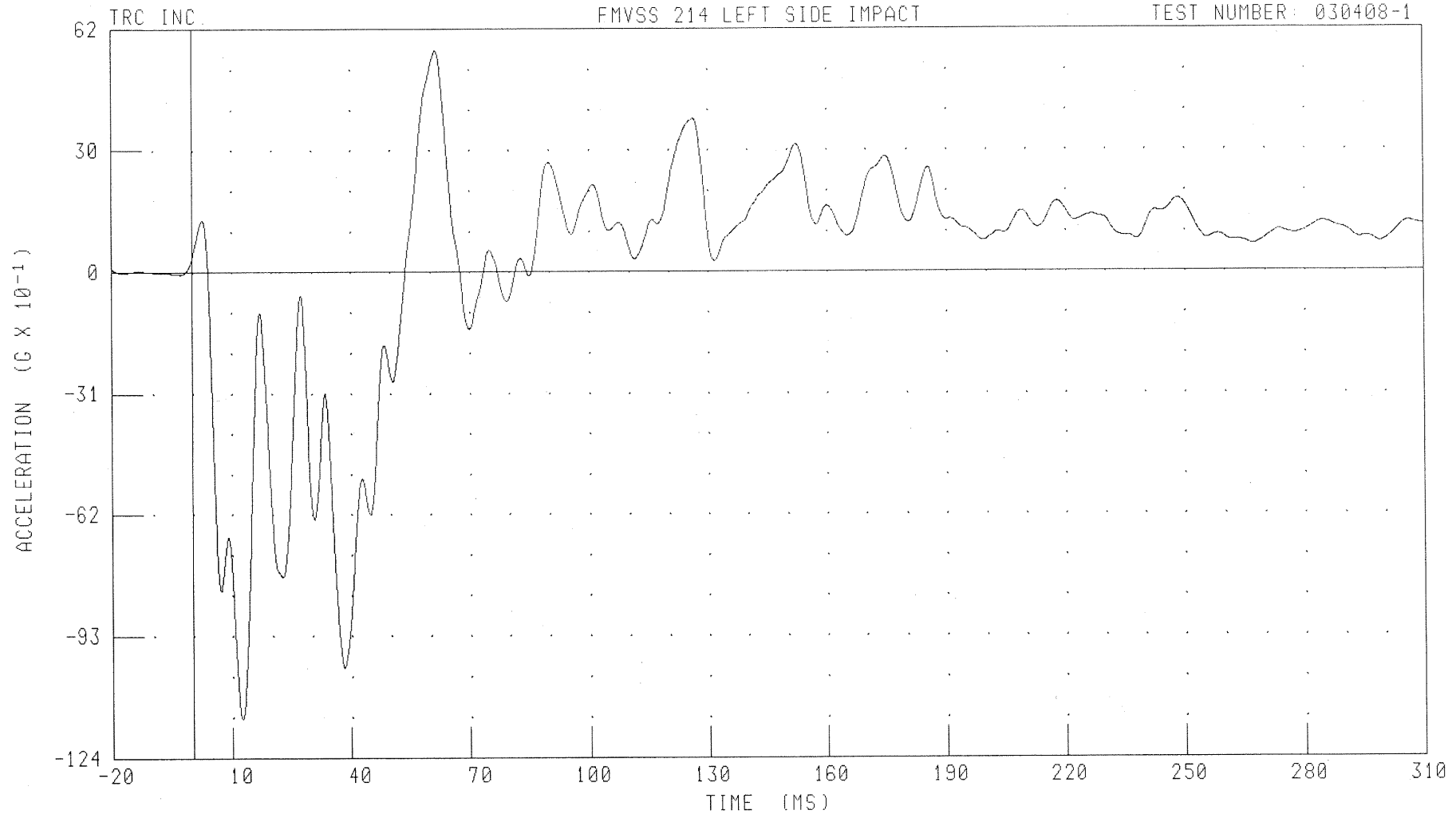
B-99

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
REAR FLOORPAN ABOVE AXLE X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RDKXG1 FILTER: CH. CLASS 60

PEAK DATA: 5.65 G @ 61.68 MS; -11.41 G @ 12.48 MS

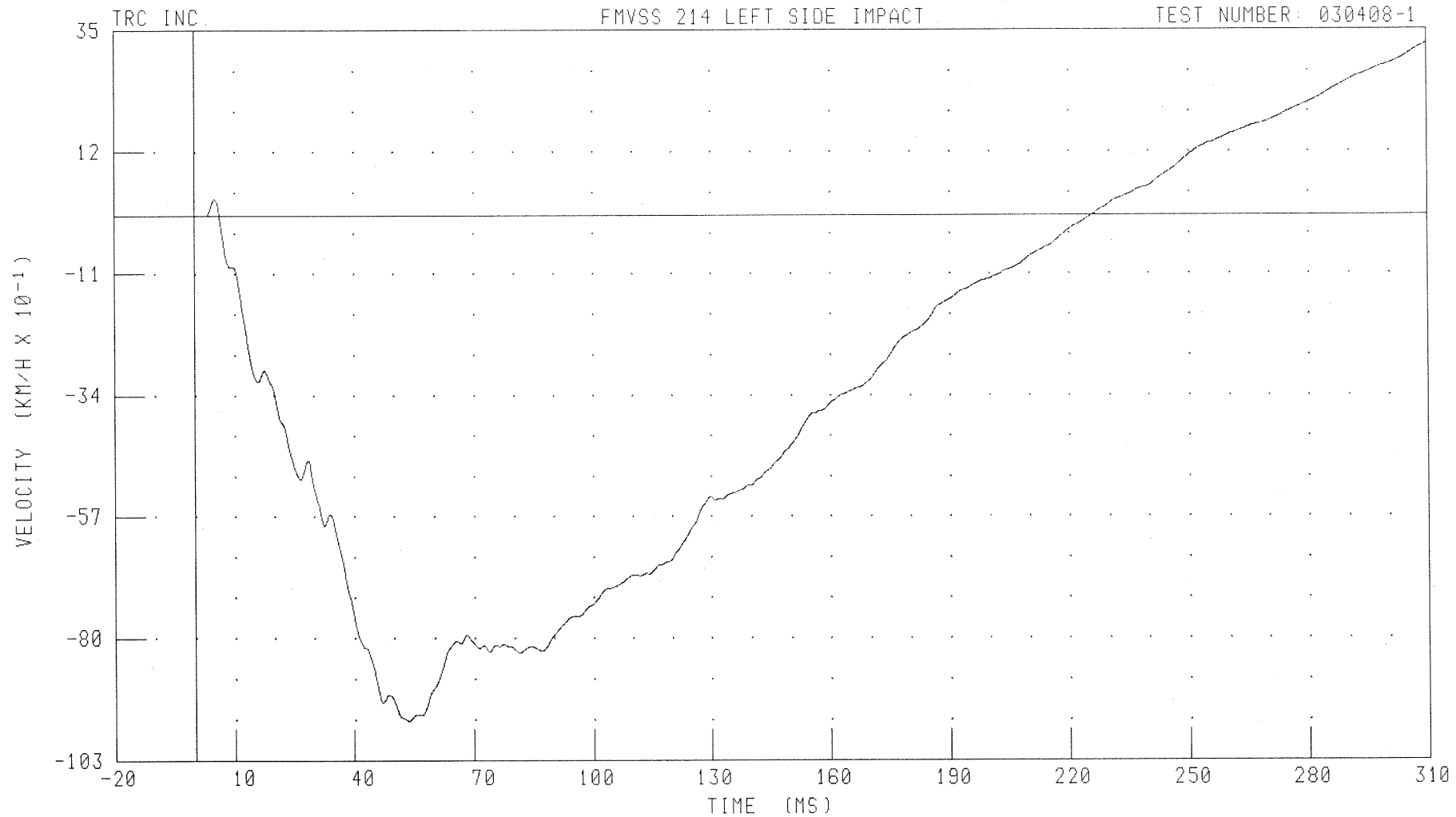
B-100

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
REAR FLOORPAN ABOVE AXLE X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RDKXV1 FILTER: CH. CLASS 180

PEAK DATA: 3.24 KM/H @ 310.00 MS; -9.56 KM/H @ 53.60 MS

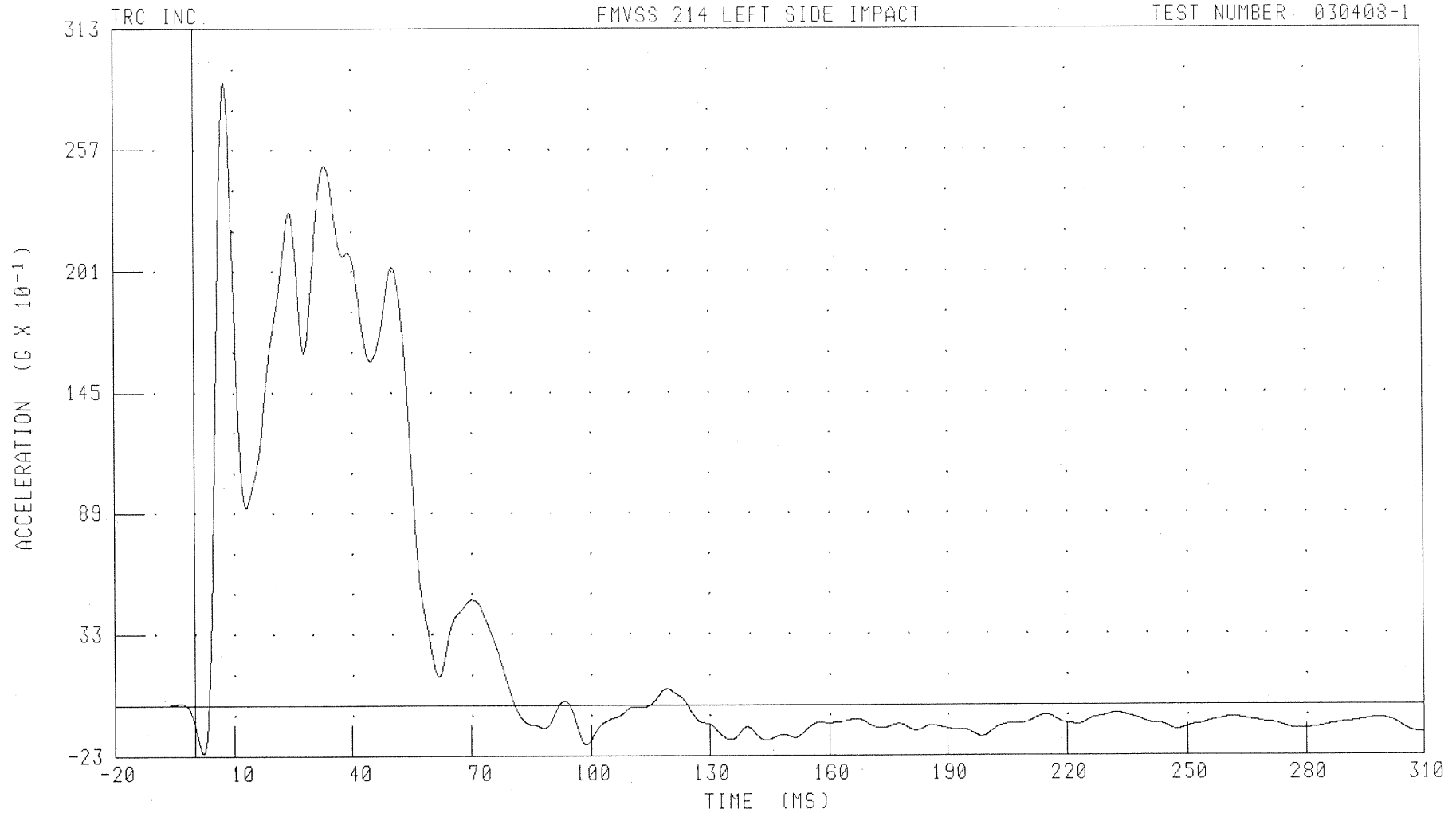
B-101

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
REAR FLOORPAN ABOVE AXLE Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RDKYG1 FILTER: CH. CLASS 60

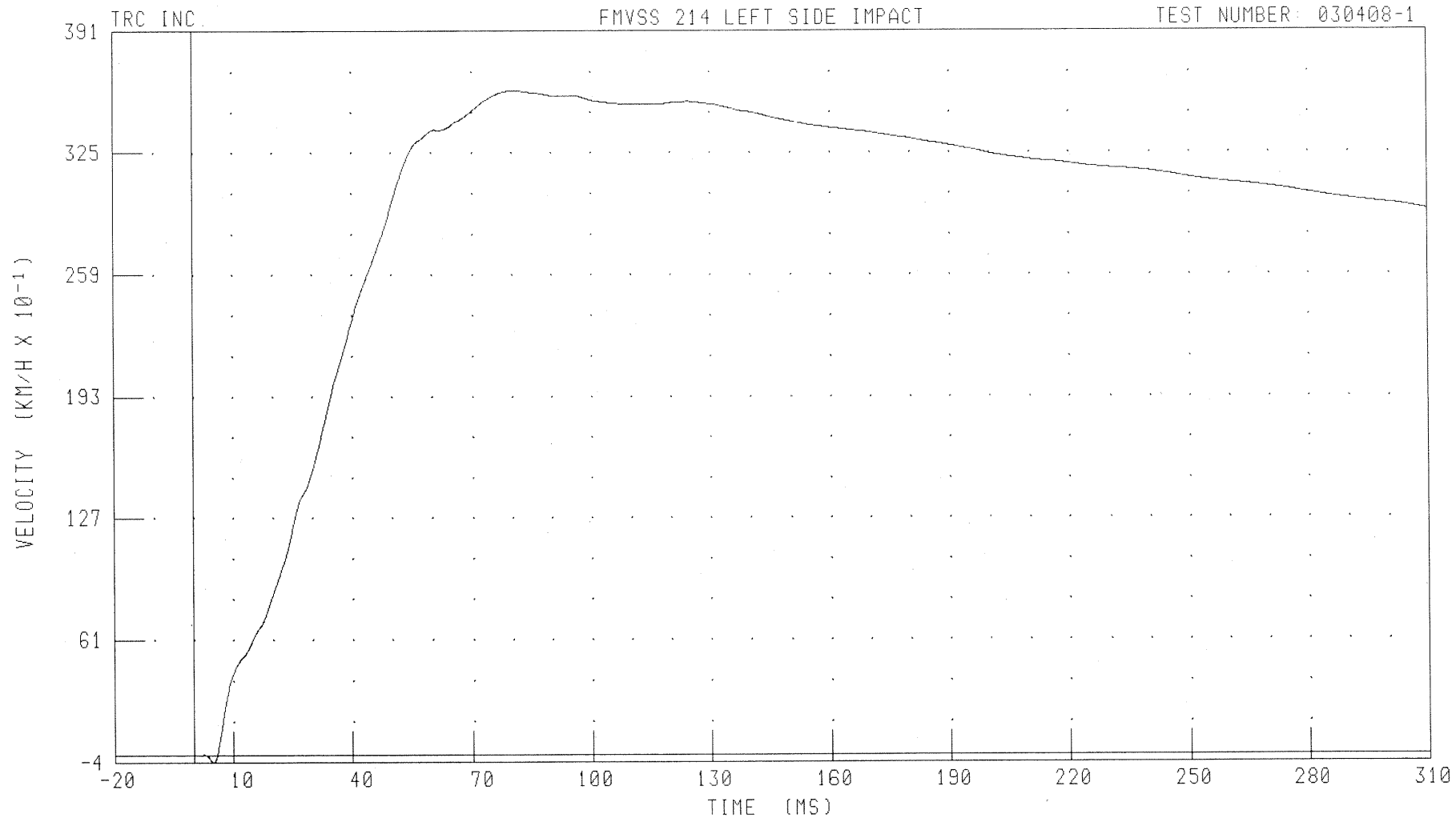
B-102

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
REAR FLOORPAN ABOVE AXLE Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RDKYV1 FILTER: CH. CLASS 180

PEAK DATA: 35.97 KM/H @ 80.32 MS; -0.40 KM/H @ 4.88 MS

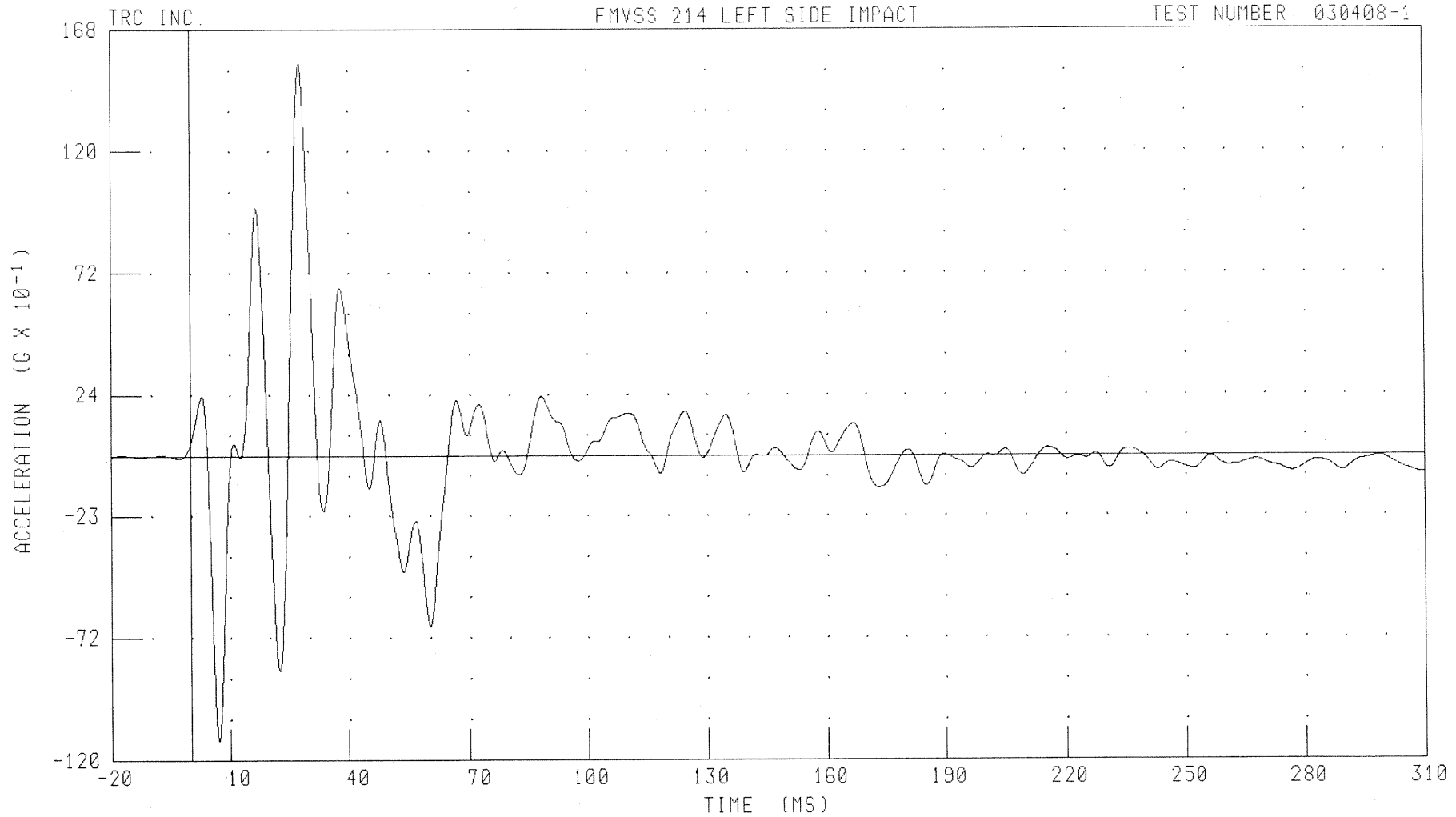
B-103

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
REAR FLOORPAN ABOVE AXLE Z-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RDKZG1 FILTER: CH. CLASS 60

PEAK DATA: 15.46 G @ 27.76 MS; -11.24 G @ 7.04 MS

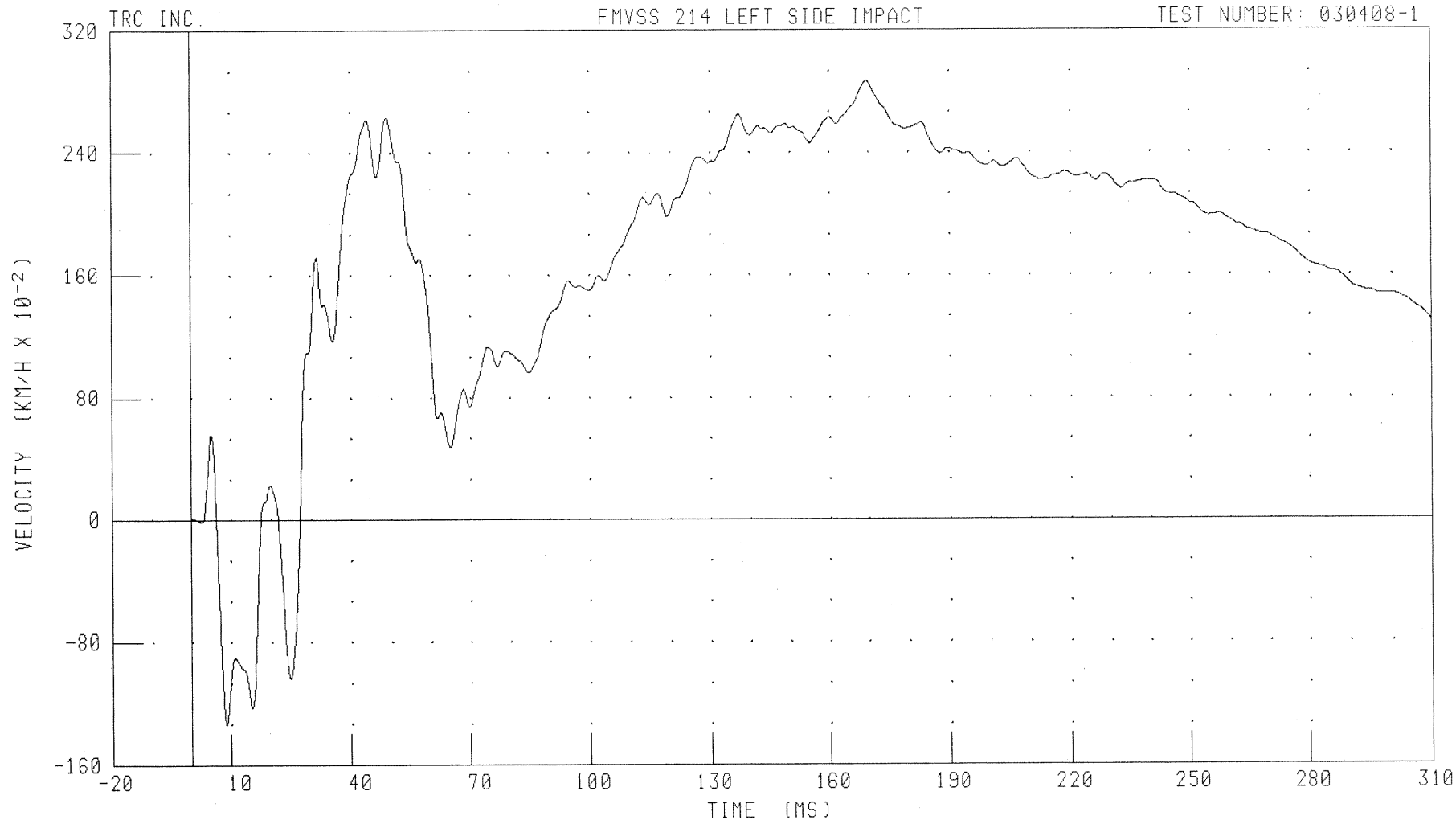
B-104

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
REAR FLOORPAN ABOVE AXLE Z-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RDKZV1 FILTER: CH. CLASS 180

PEAK DATA: 2.87 KM/H @ 169.76 MS; -1.34 KM/H @ 8.80 MS

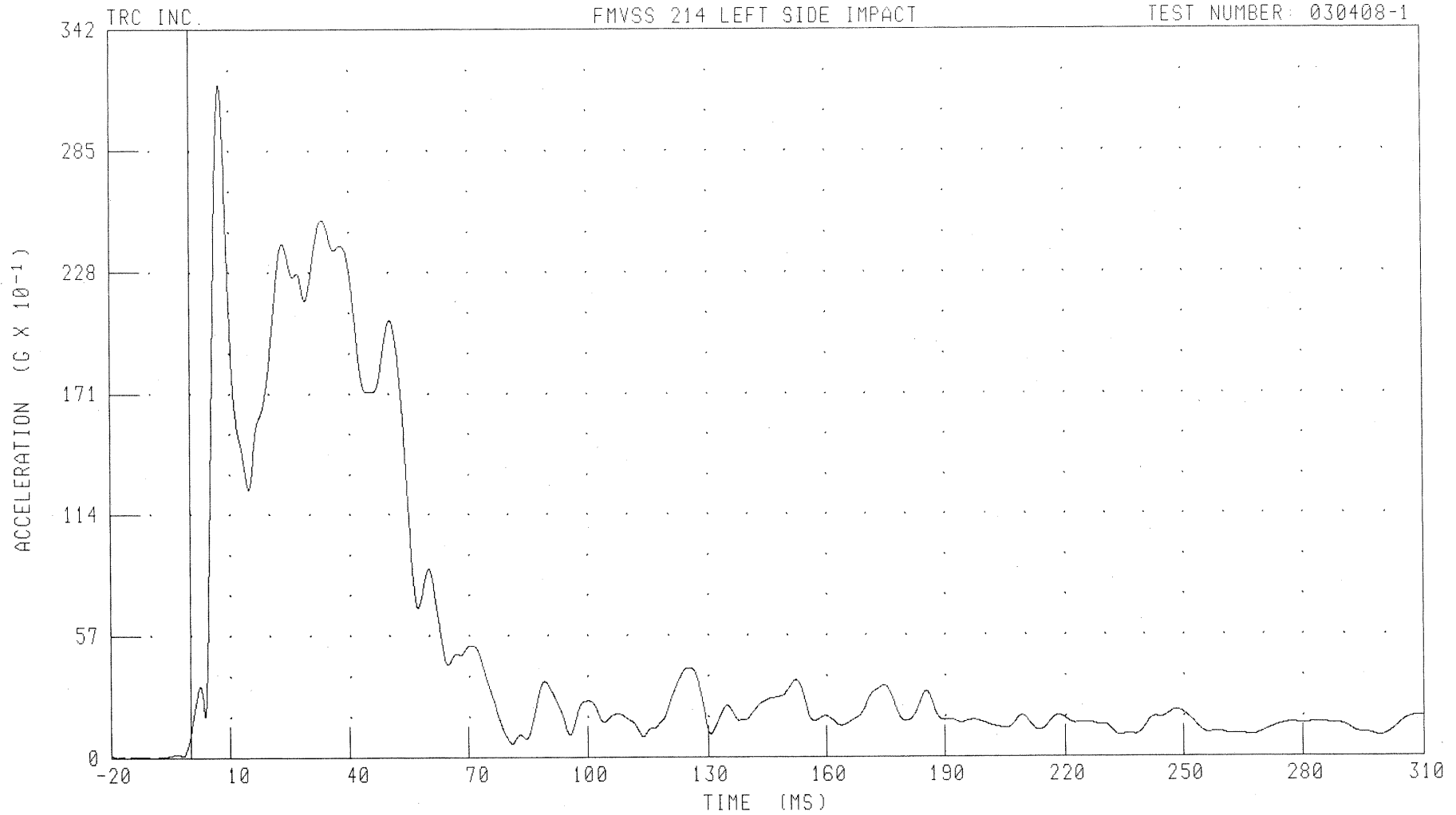
B-105

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



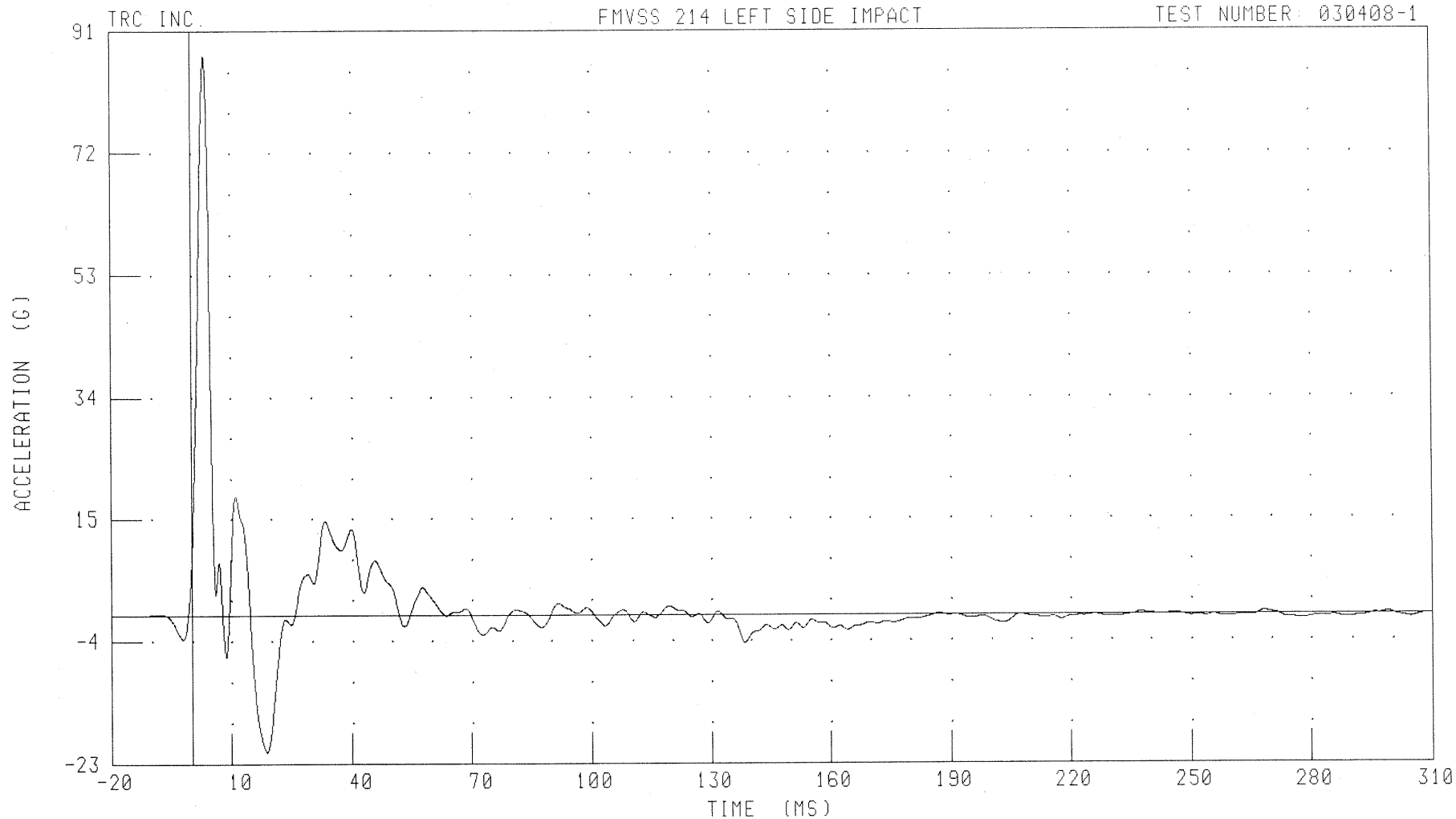
B-106

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT SIDE SILL AT FRONT SEAT Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LFSYG1 FILTER: CH. CLASS 60

PEAK DATA: 87.10 G @ 3.44 MS; -21.18 G @ 18.88 MS

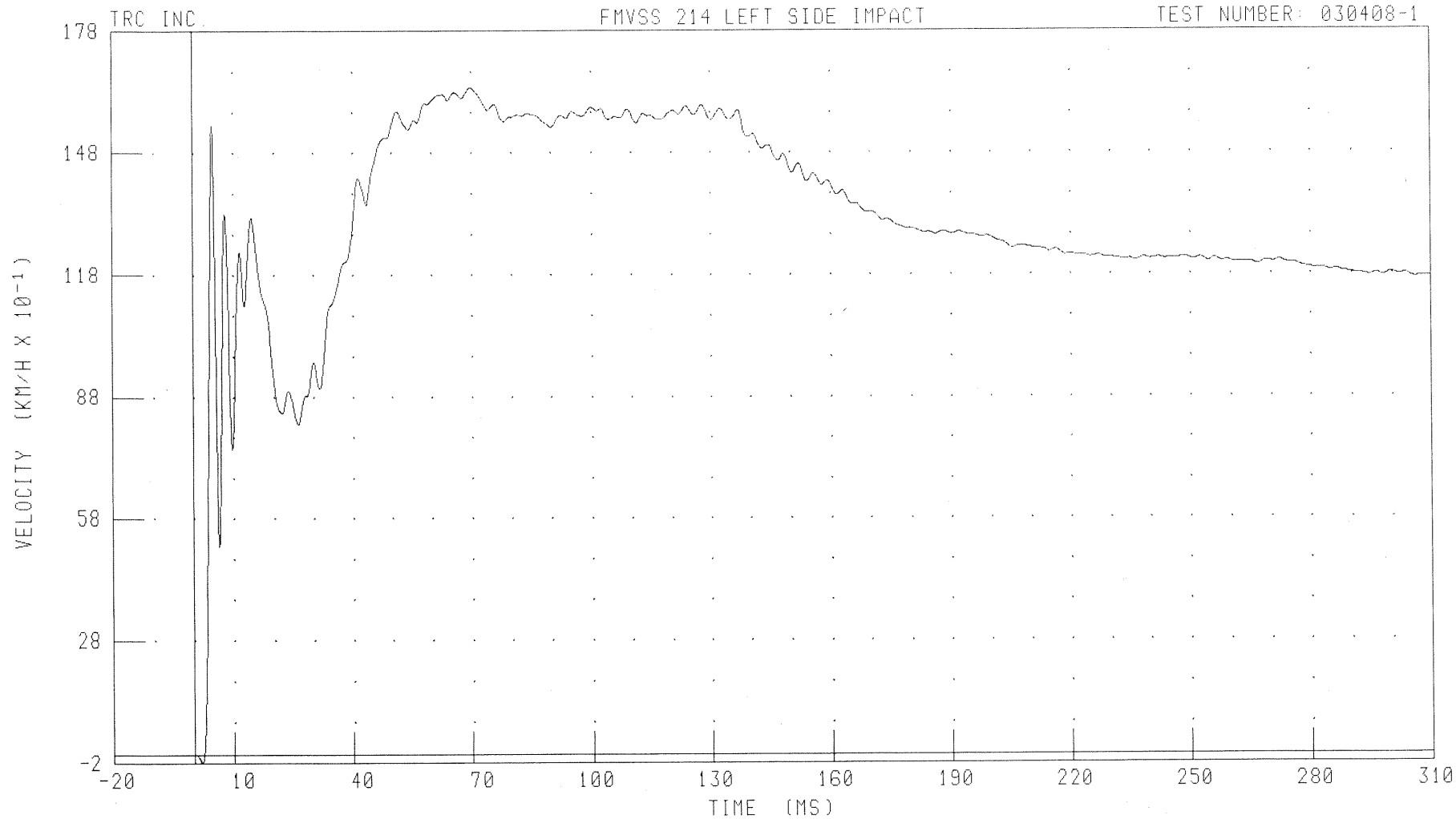
B-107

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT SIDE SILL AT FRONT SEAT Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LFSYV1 FILTER: CH. CLASS 180

PEAK DATA: 16.42 KM/H @ 70.00 MS; -0.22 KM/H @ 1.92 MS

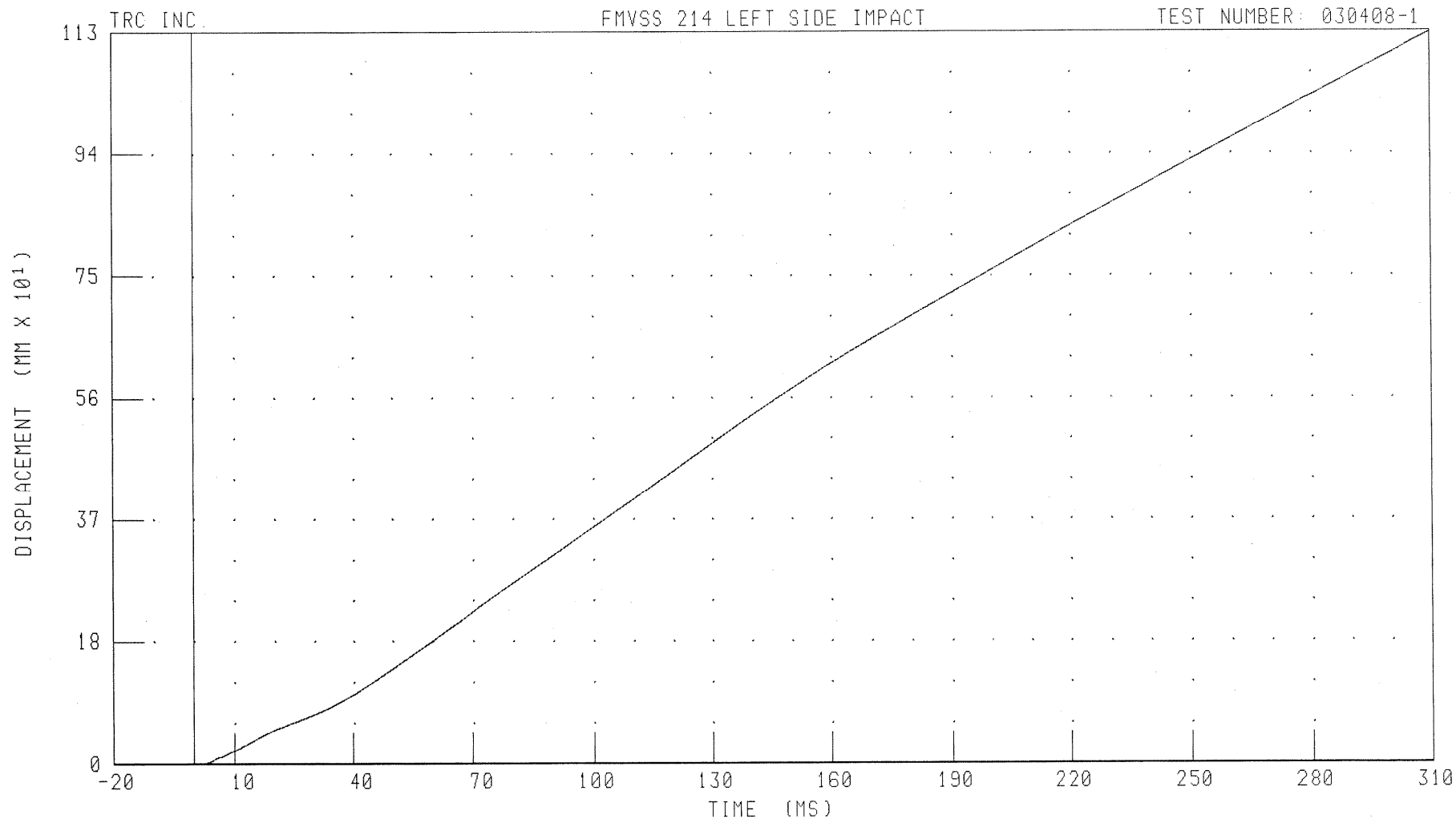
B-108

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT SIDE SILL AT FRONT SEAT Y-AXIS DISPLACEMENT

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LFSYD1 FILTER: CH. CLASS 180

PEAK DATA: 1136.57 MM @ 310.00 MS; -0.06 MM @ 2.40 MS

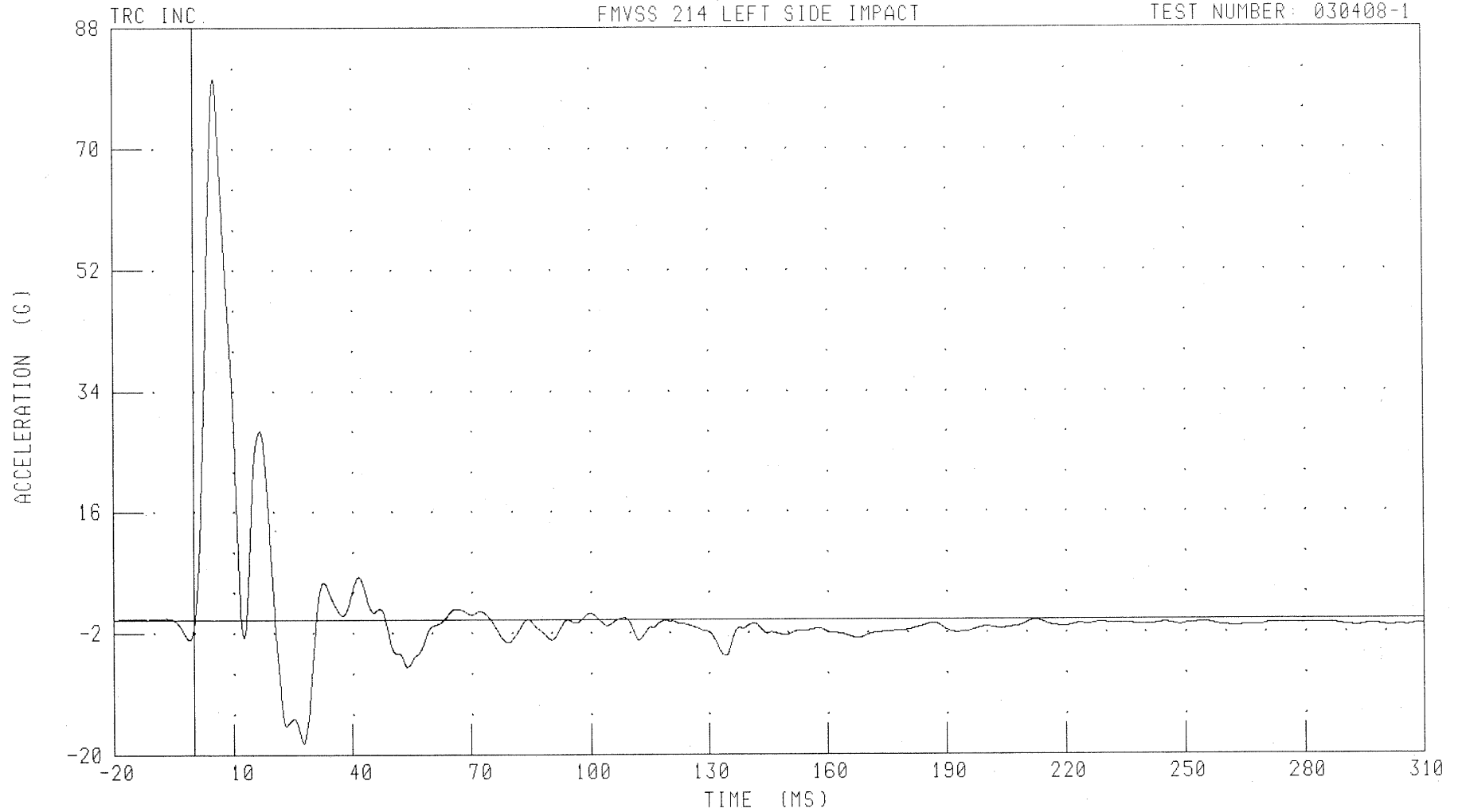
B-109

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT SIDE SILL AT REAR SEAT Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRSYG1 FILTER: CH. CLASS 60

PEAK DATA: 80.43 G @ 5.28 MS; -18.32 G @ 27.68 MS

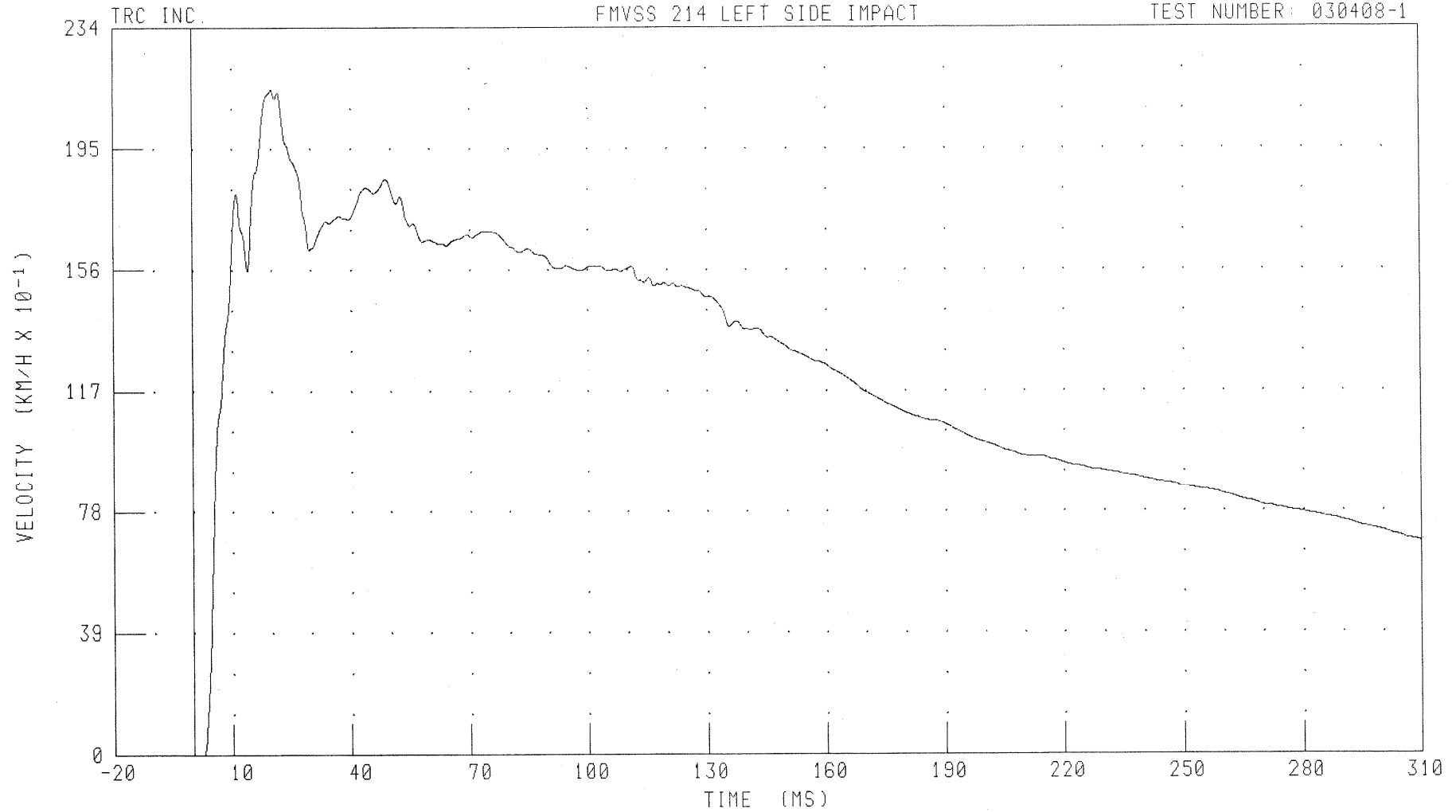
B-110

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT SIDE SILL AT REAR SEAT Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRSYV1 FILTER: CH. CLASS 180

PEAK DATA: 21.41 KM/H @ 20.24 MS; -0.07 KM/H @ 2.24 MS

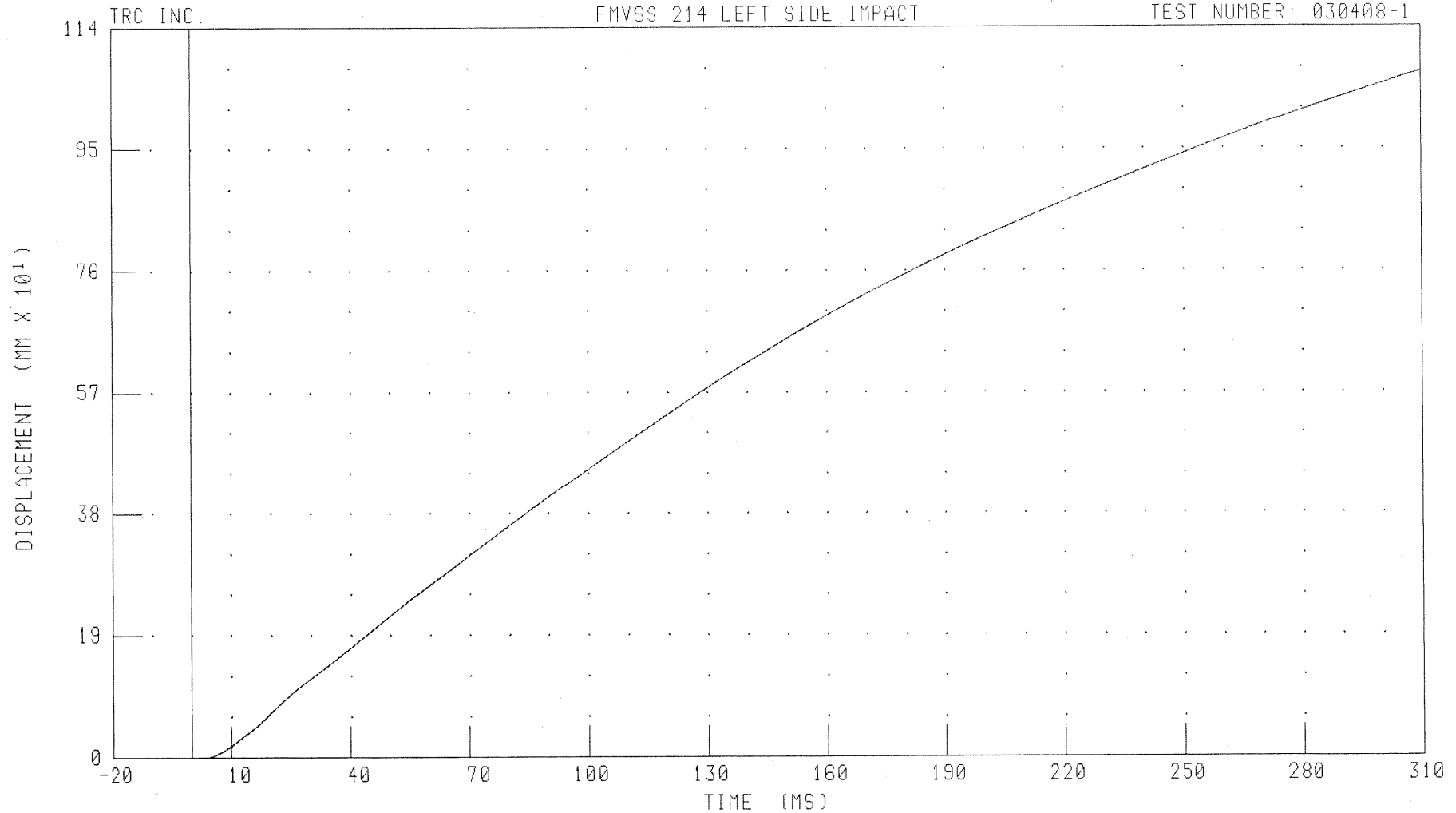
B-111

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT SIDE SILL AT REAR SEAT Y-AXIS DISPLACEMENT

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRSYD1 FILTER: CH. CLASS 180

PEAK DATA: 1070.06 MM @ 310.00 MS; -0.02 MM @ 2.72 MS

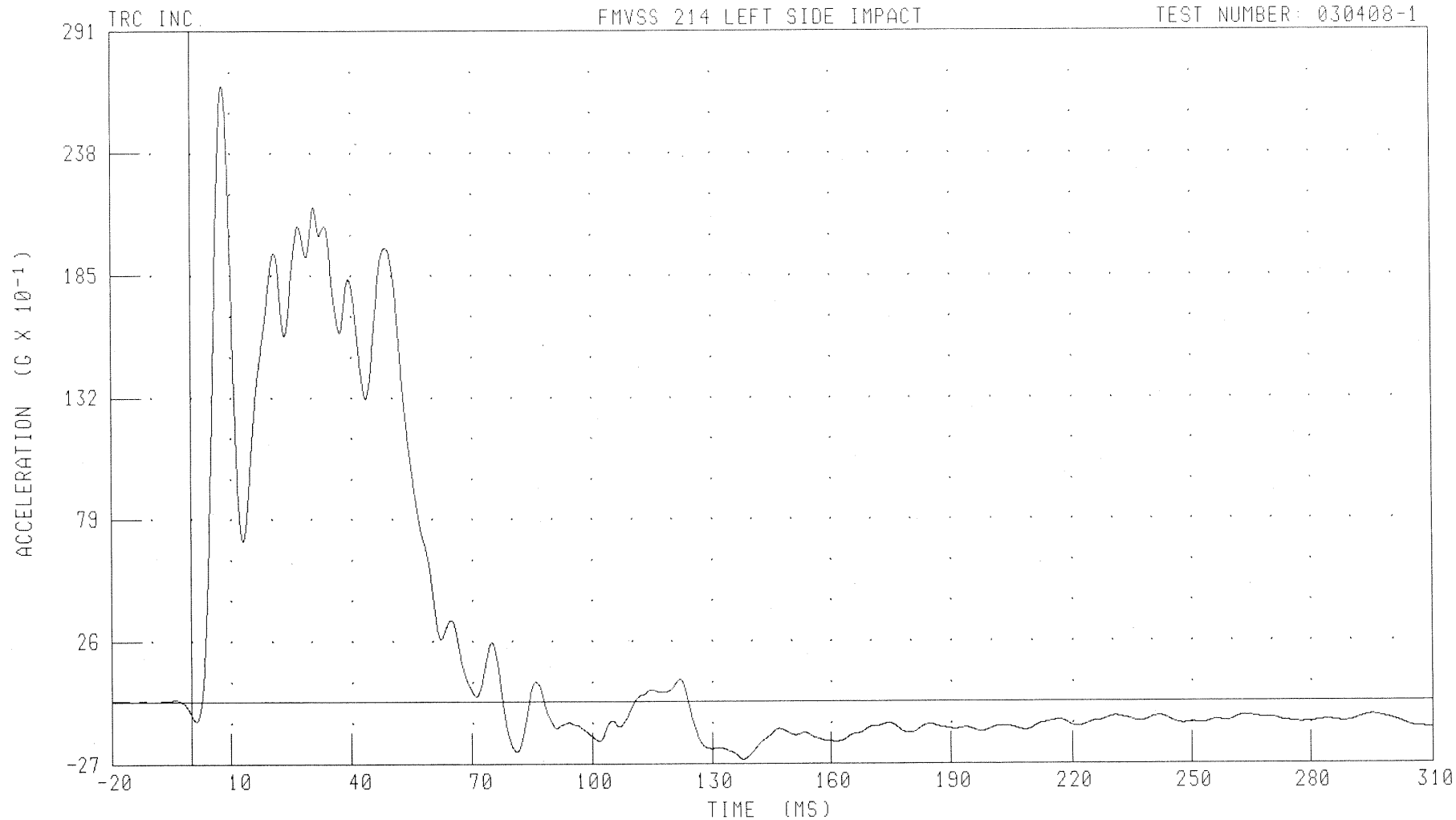
B-112

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT REAR OCCUPANT COMPARTMENT Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RRTYG1 FILTER: CH. CLASS 60

PEAK DATA: 26.75 G @ 8.08 MS; -2.51 G @ 137.84 MS

B-113

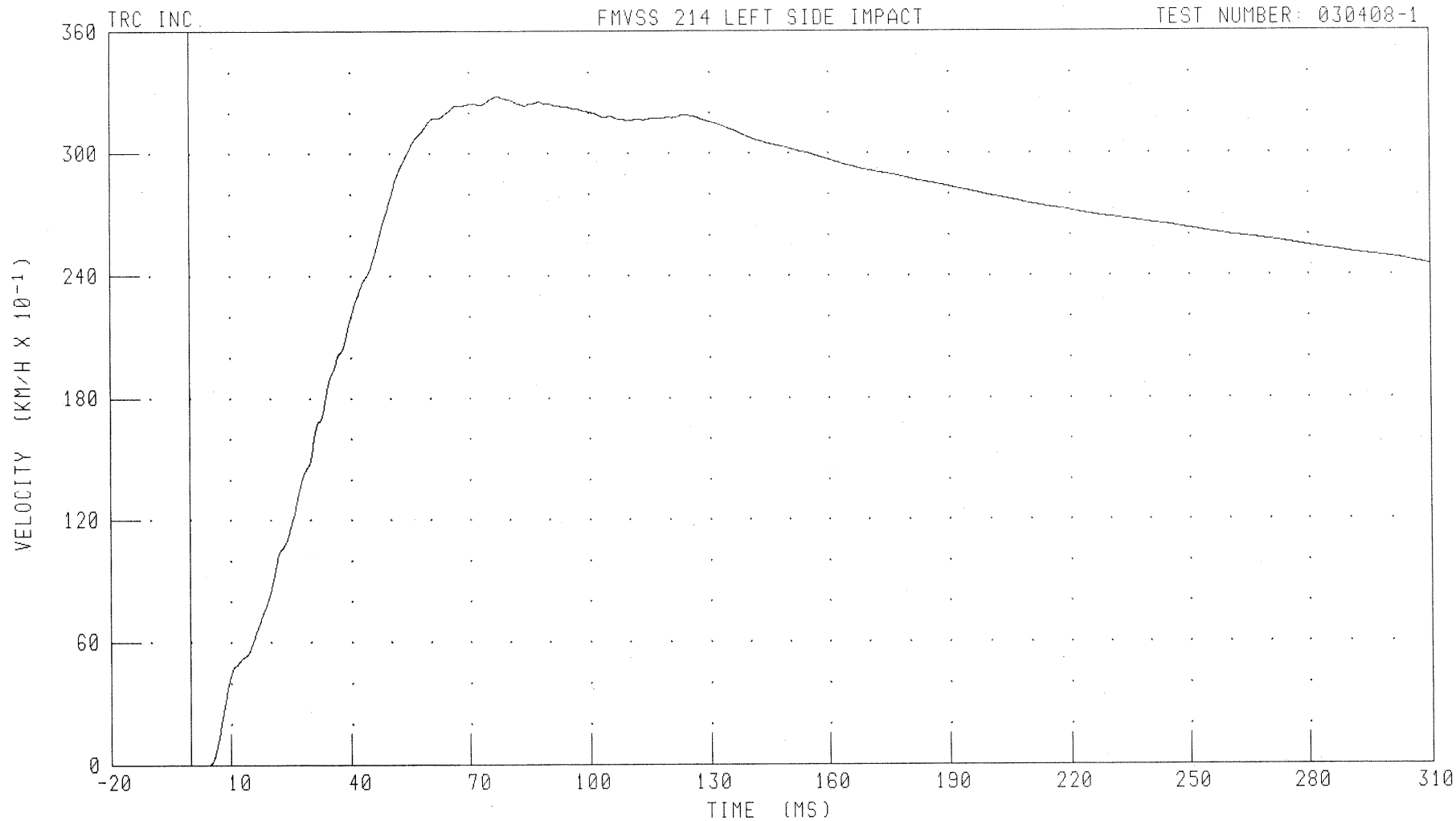
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

RIGHT REAR OCCUPANT COMPARTMENT Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RRTYV1 FILTER: CH. CLASS 180

PEAK DATA: 32.82 KM/H @ 77.36 MS; 0.00 KM/H @ 4.16 MS

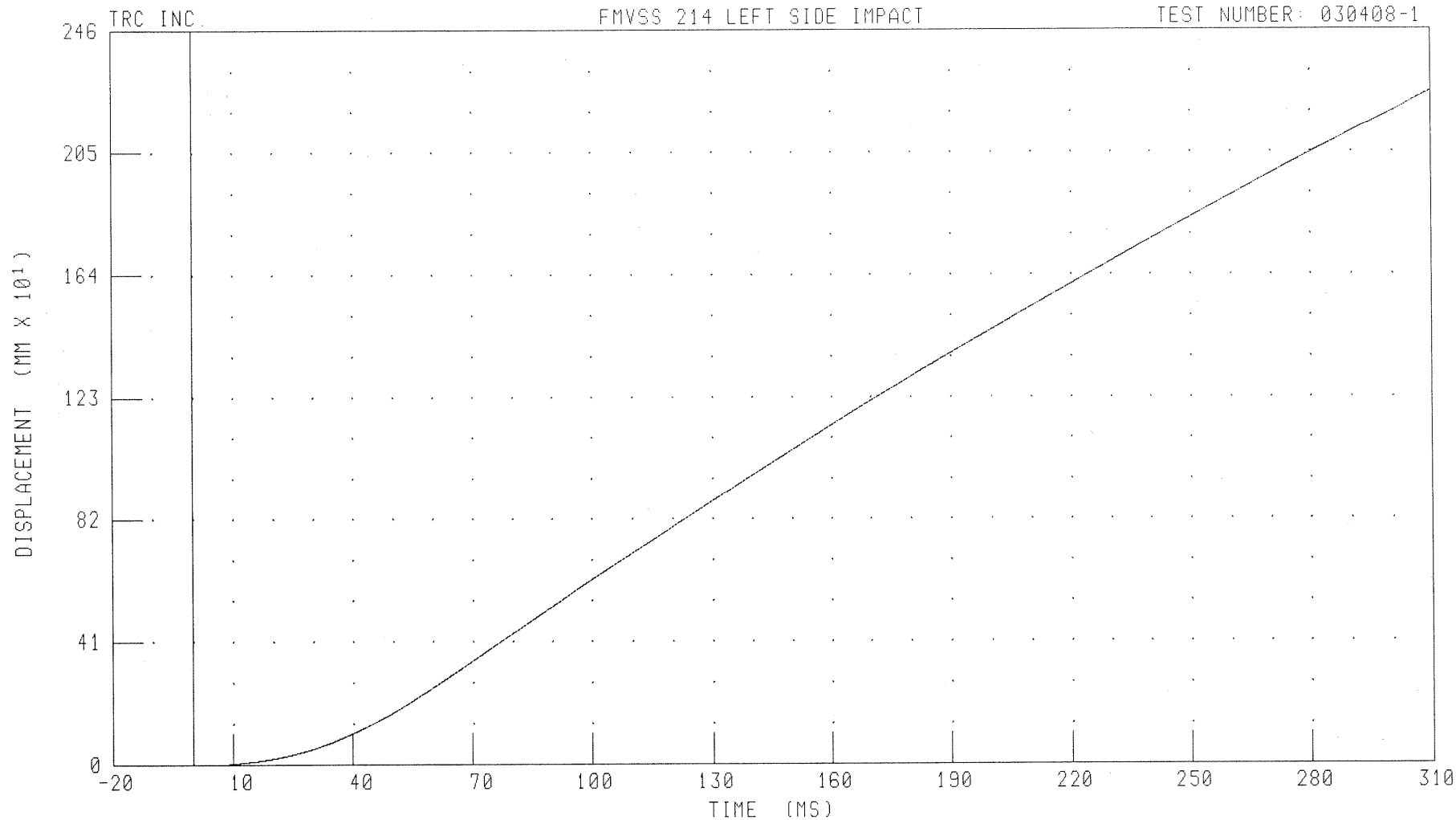
B-114

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
RIGHT REAR OCCUPANT COMPARTMENT Y-AXIS DISPLACEMENT

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: RRTYD1 FILTER: CH. CLASS 180

PEAK DATA: 2254.18 MM @ 310.00 MS; 0.00 MM @ 0.72 MS

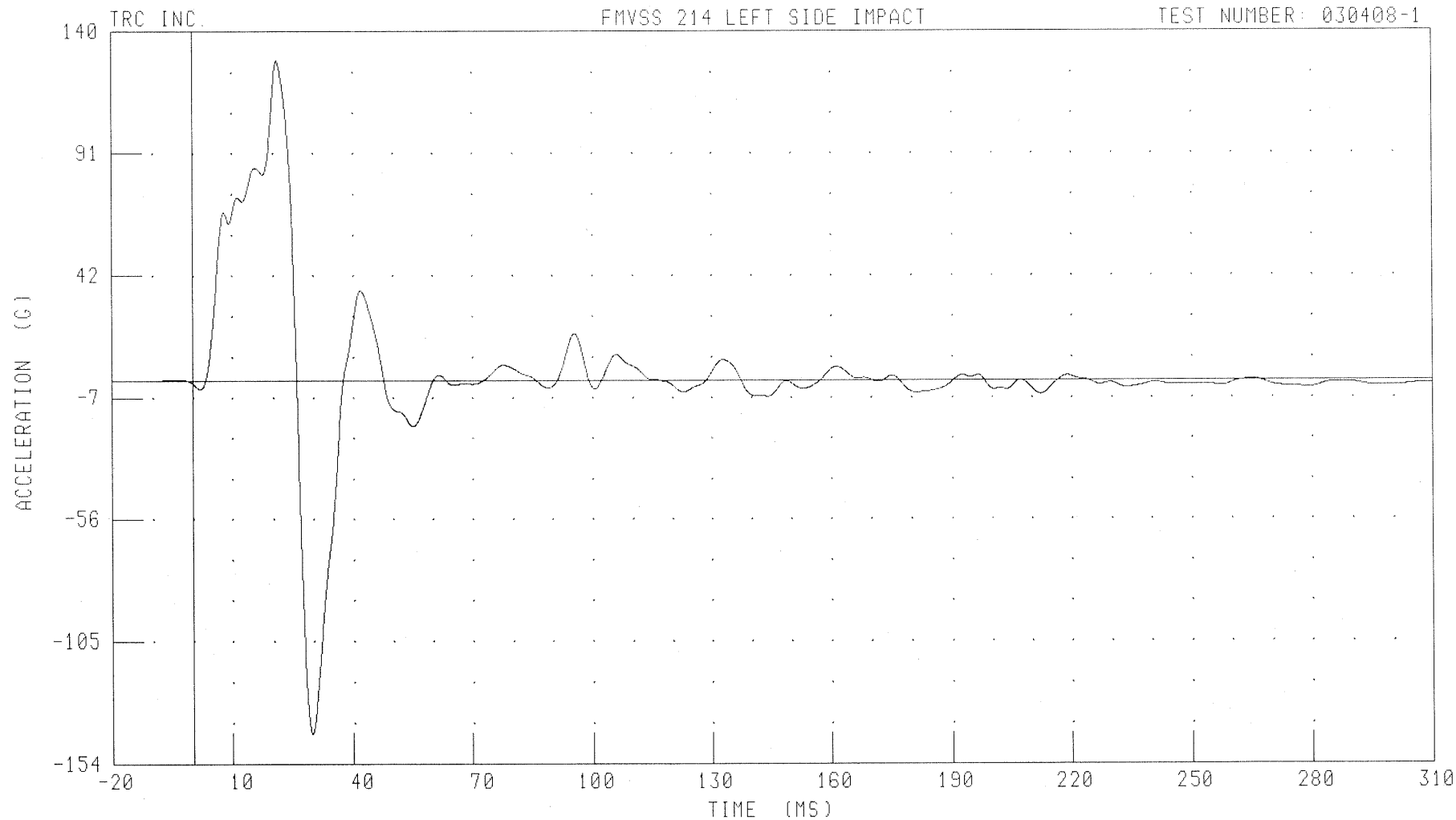
B-115

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR DOOR UPPER CENTERLINE Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRUYG1 FILTER: CH. CLASS 60

PEAK DATA: 128.29 G @ 21.04 MS; -141.96 G @ 29.60 MS

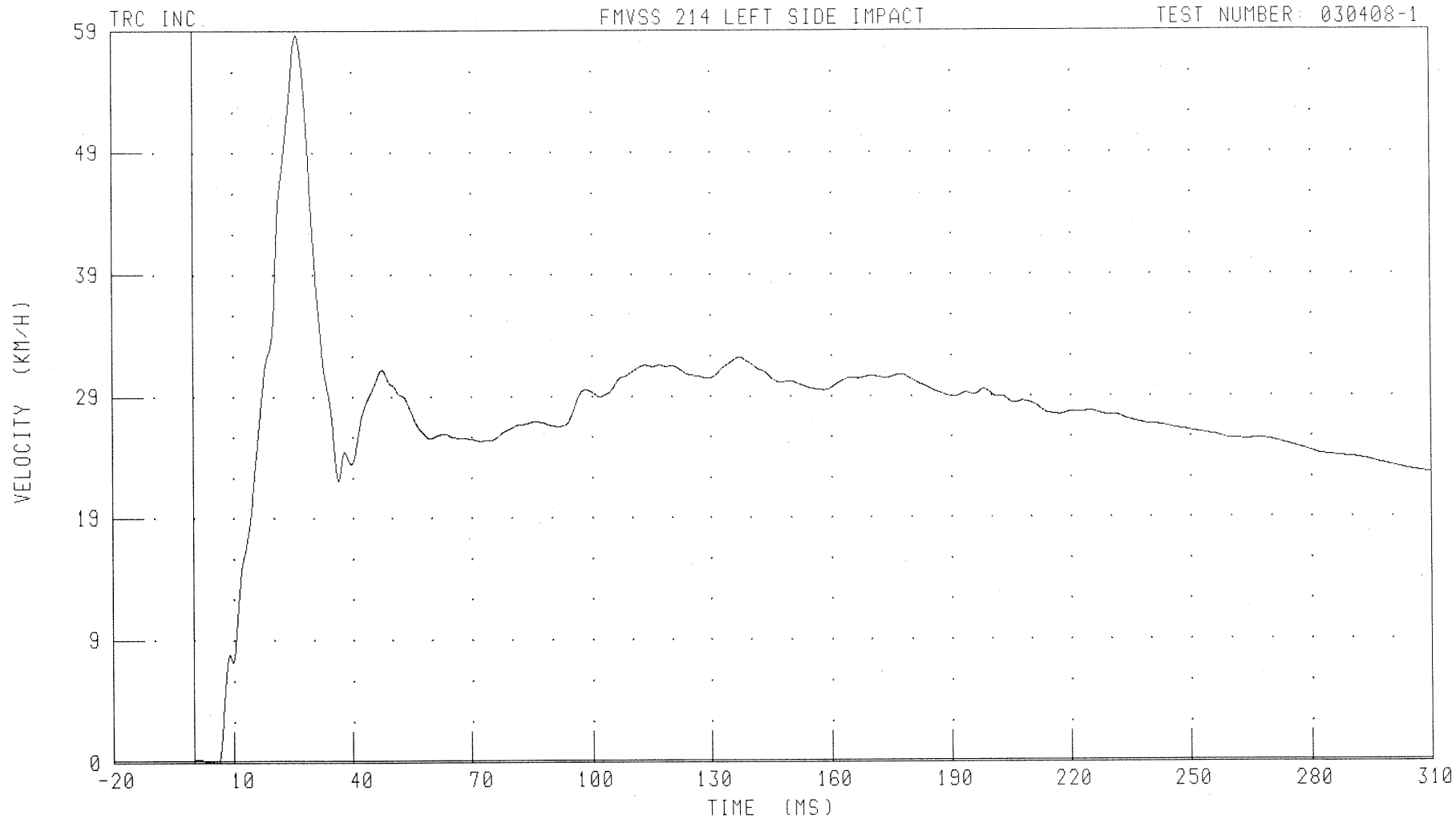
B-116

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR DOOR UPPER CENTERLINE Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRUYV1 FILTER: CH. CLASS 180

PEAK DATA: 59.45 KM/H @ 26.00 MS; -0.24 KM/H @ 6.08 MS

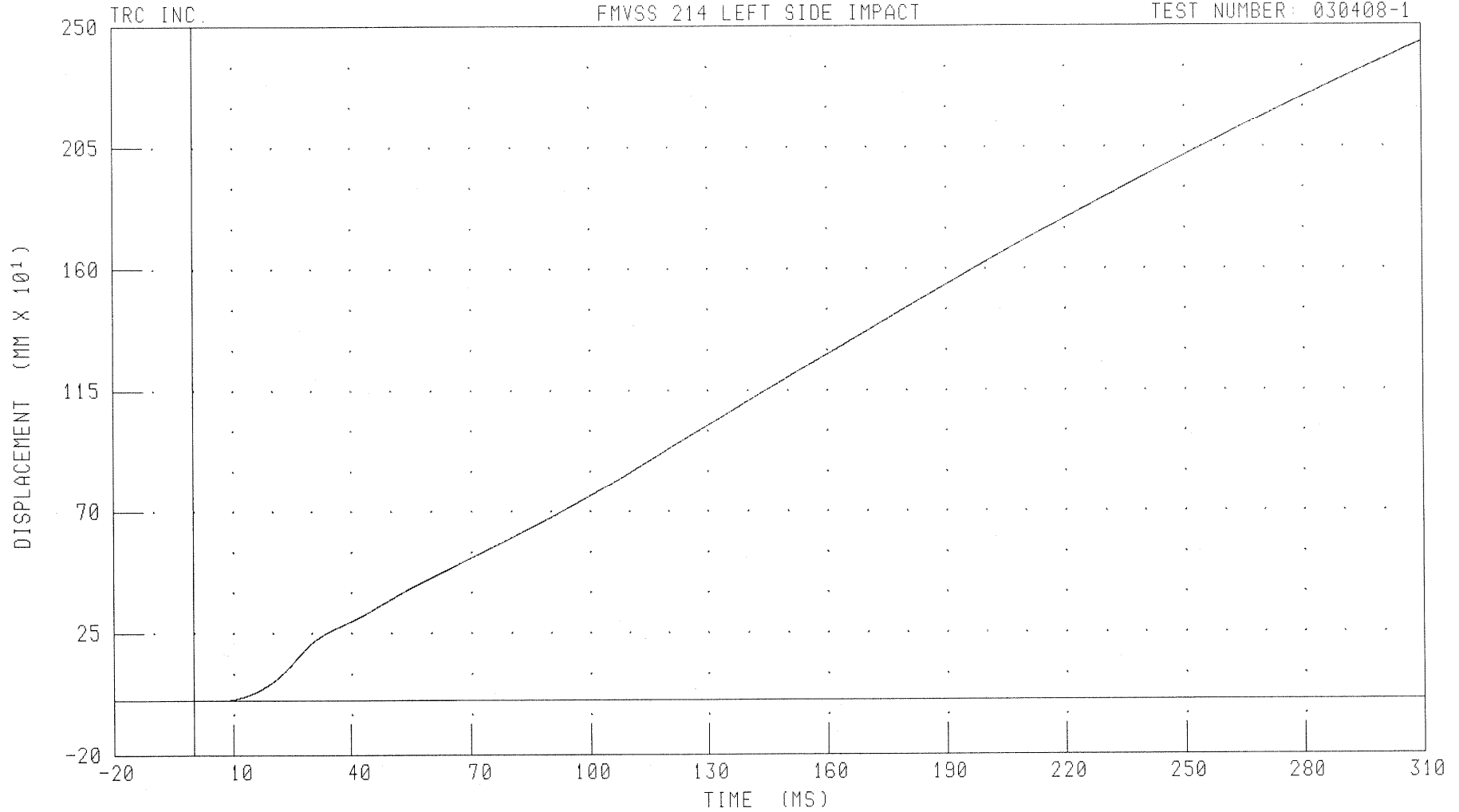
B-117

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR DOOR UPPER CENTERLINE Y-AXIS DISPLACEMENT

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRUYD1 FILTER: CH. CLASS 180

PEAK DATA: 2438.17 MM @ 310.00 MS; -0.13 MM @ 6.40 MS

B-118

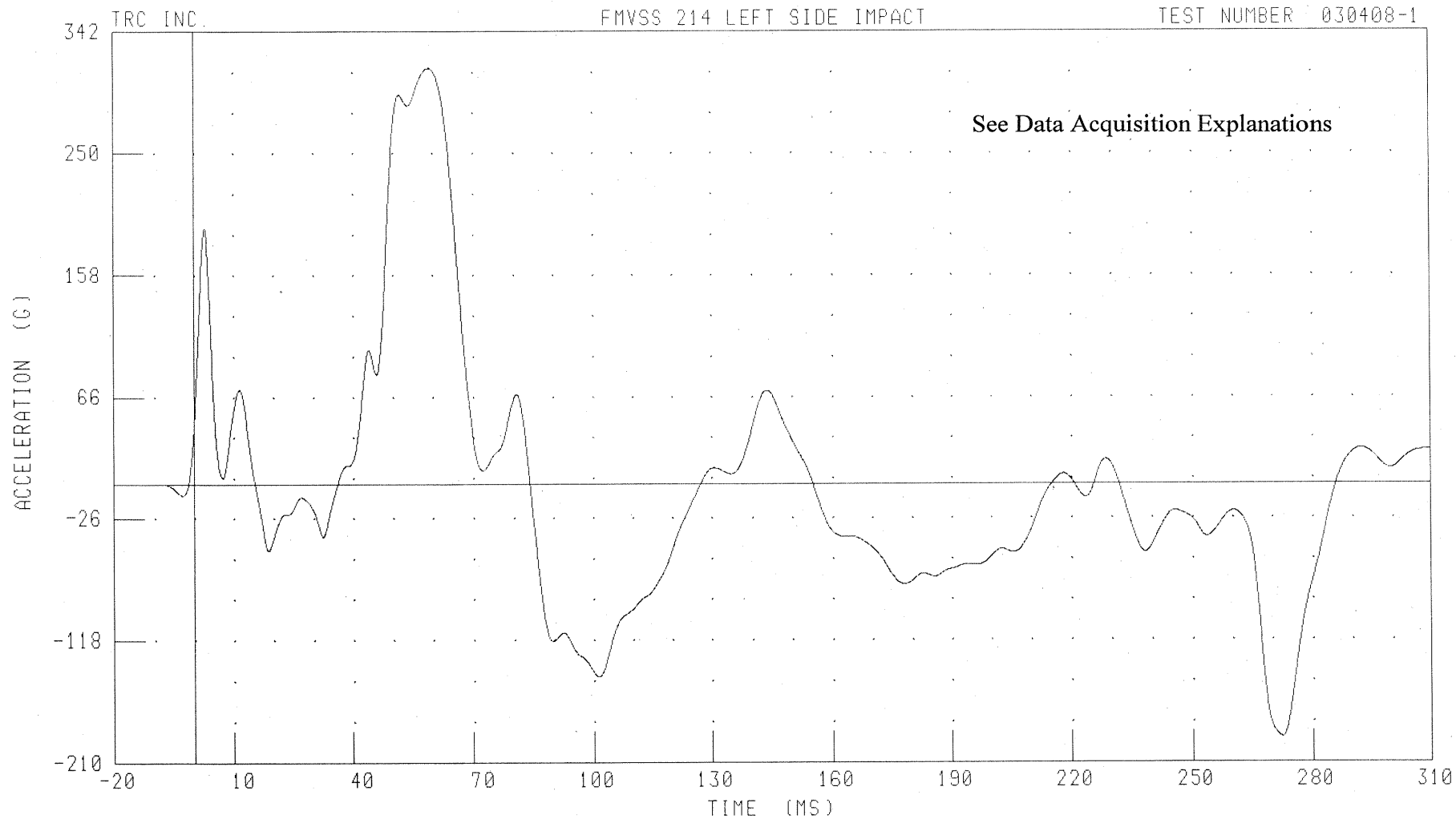
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT LOWER A-POST Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: LLAGC1 FILTER: CH. CLASS 60

PEAK DATA: 314.57 G @ 59.28 MS; -191.12 G @ 272.48 MS

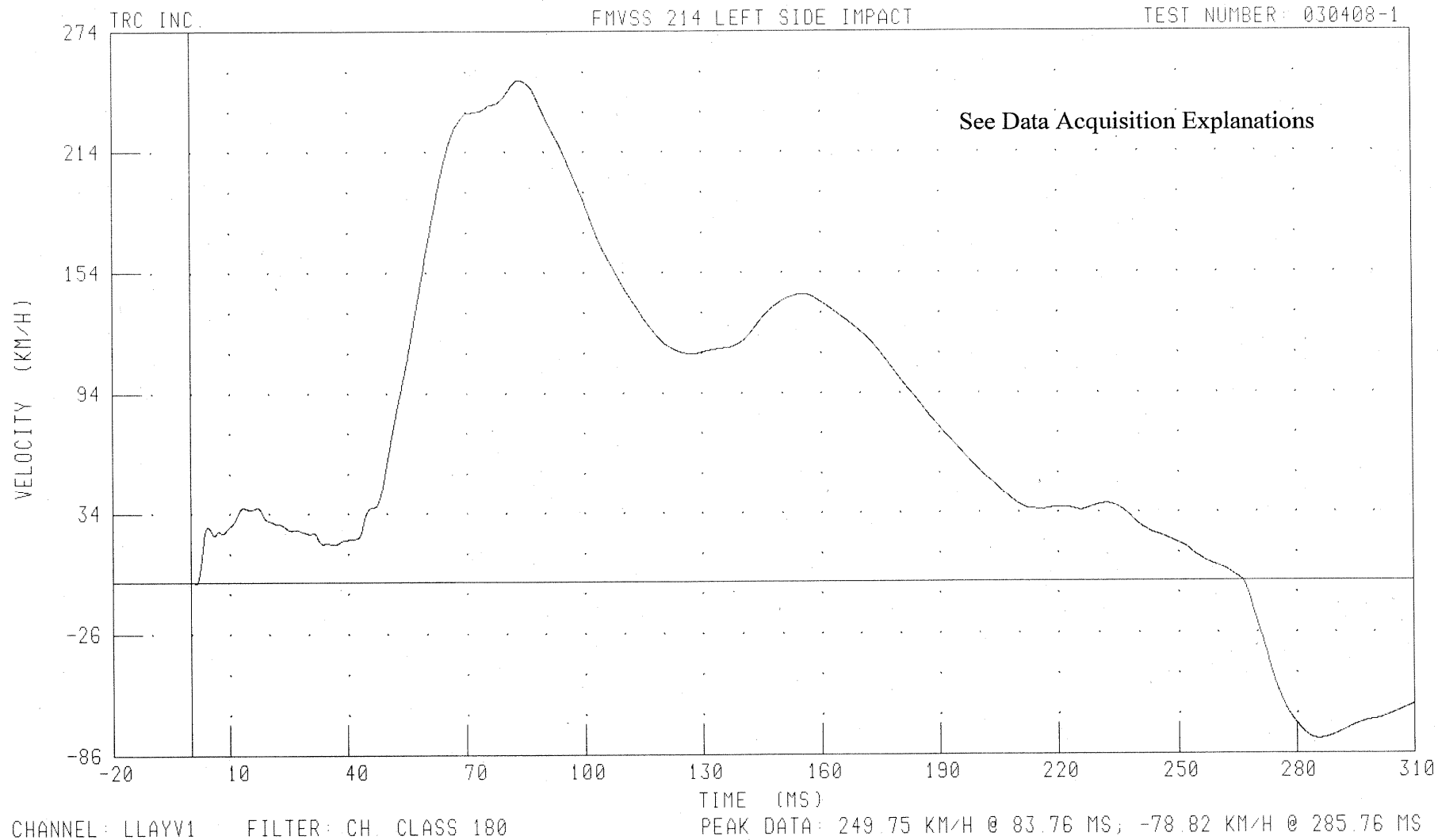
B-119

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT LOWER A-POST Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



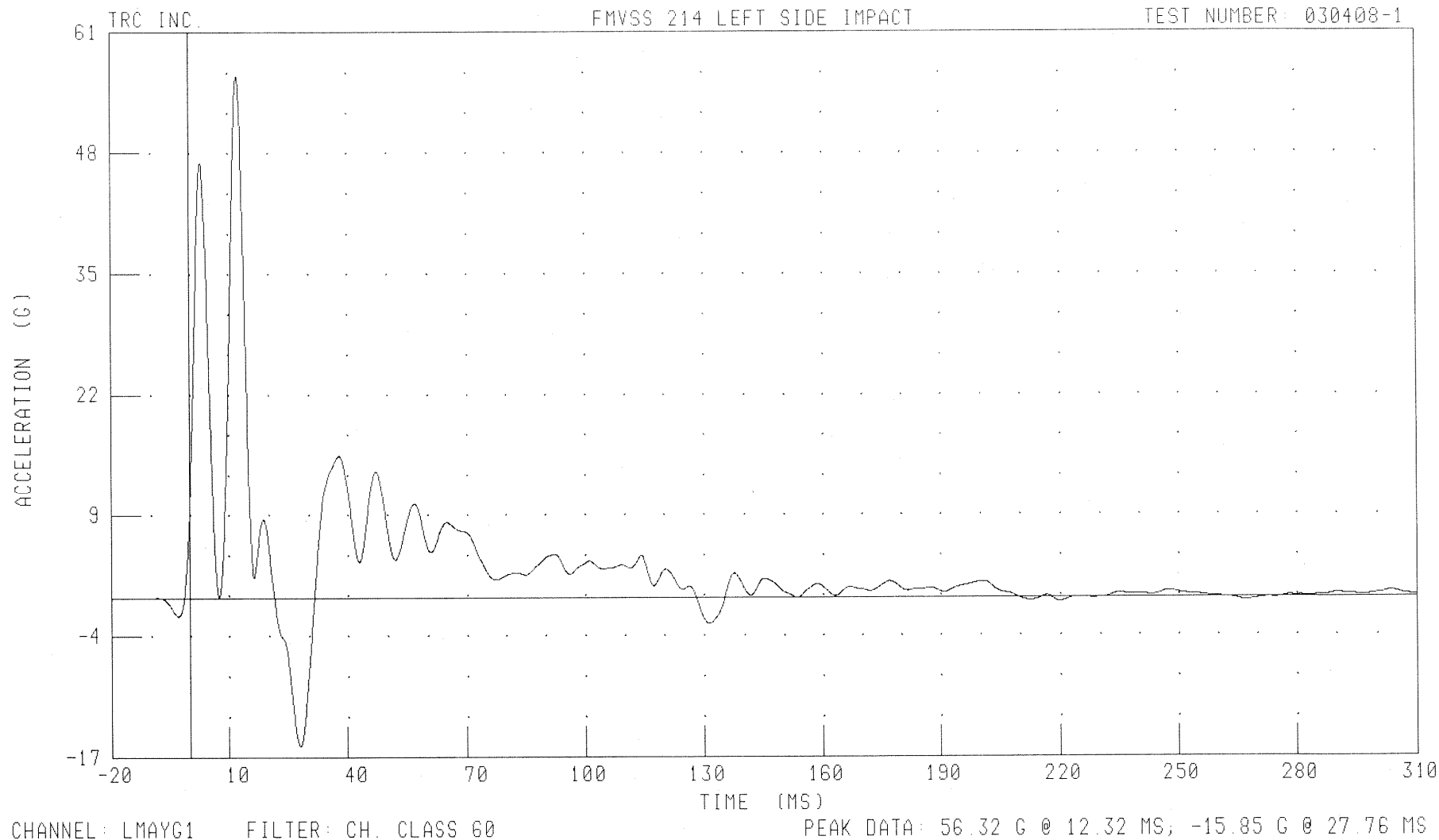
B-120

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT MIDDLE A-POST Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



B-121

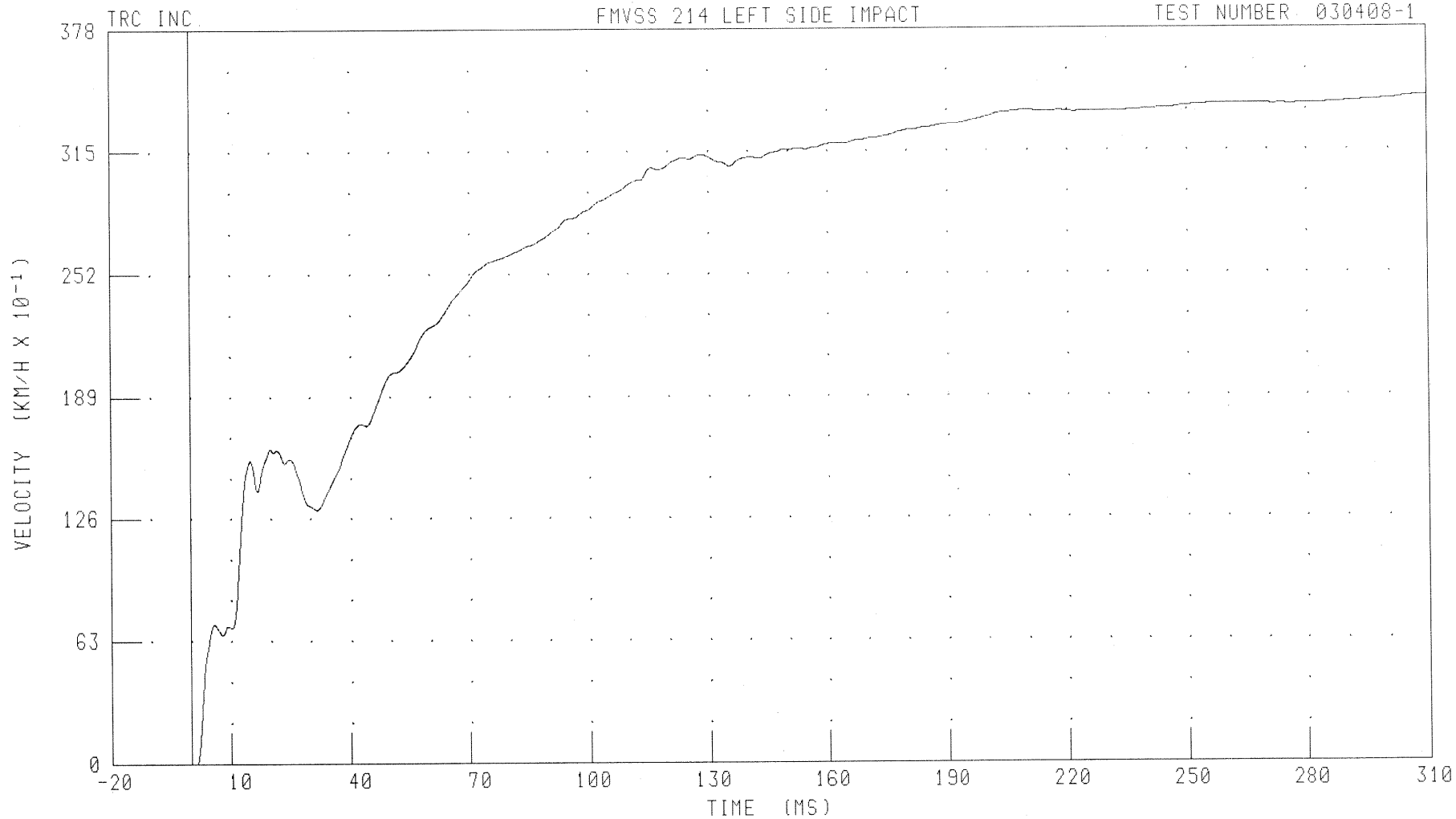
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT MIDDLE A-POST Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: LMAYV1 FILTER: CH. CLASS 180

PEAK DATA: 34.31 KM/H @ 310.00 MS; -0.07 KM/H @ 1.04 MS

B-122

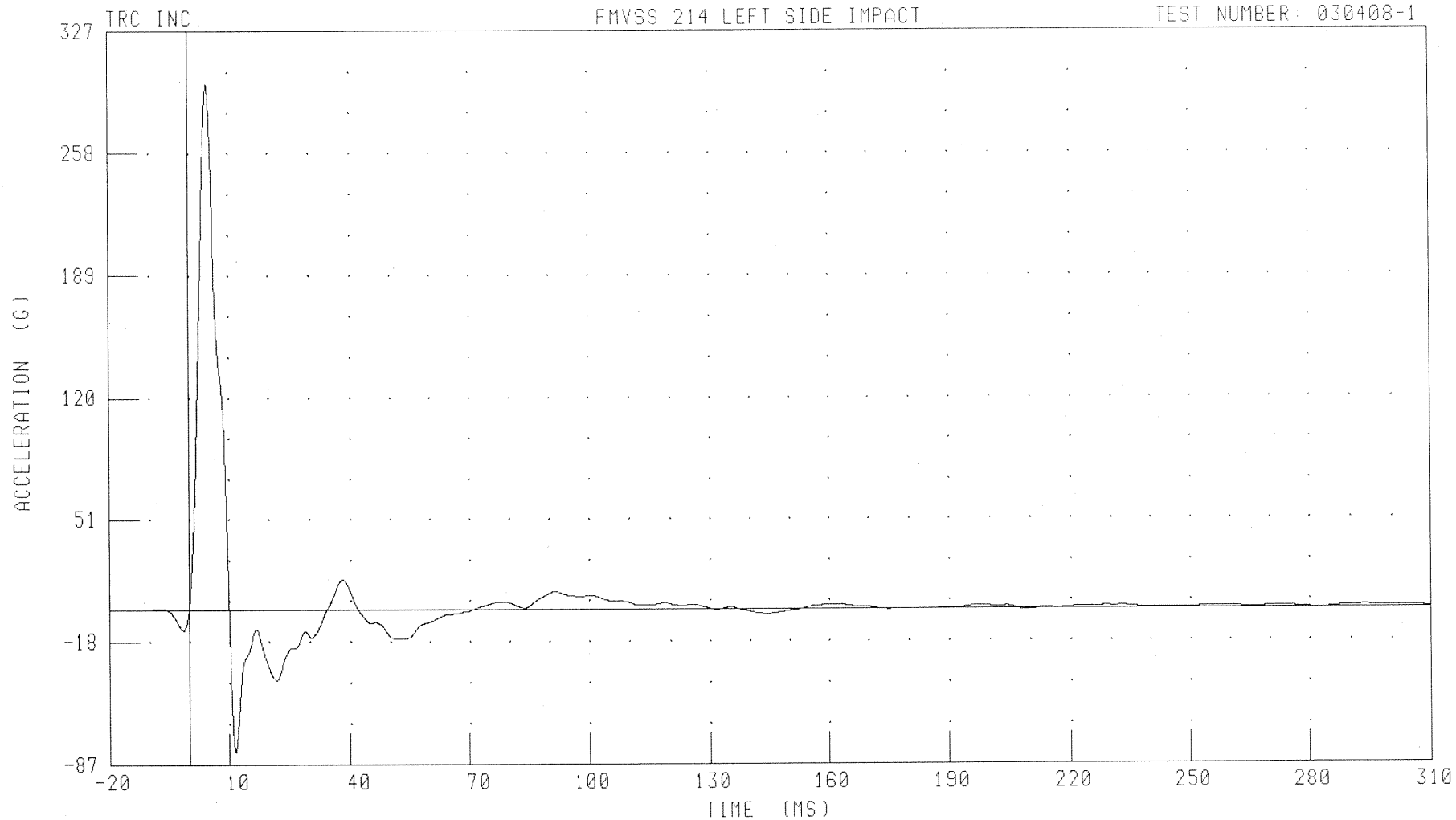
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT LOWER B-POST Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLBYG1 FILTER: CH. CLASS 60

PEAK DATA: 297.48 G @ 4.72 MS; -79.97 G @ 11.60 MS

B-123

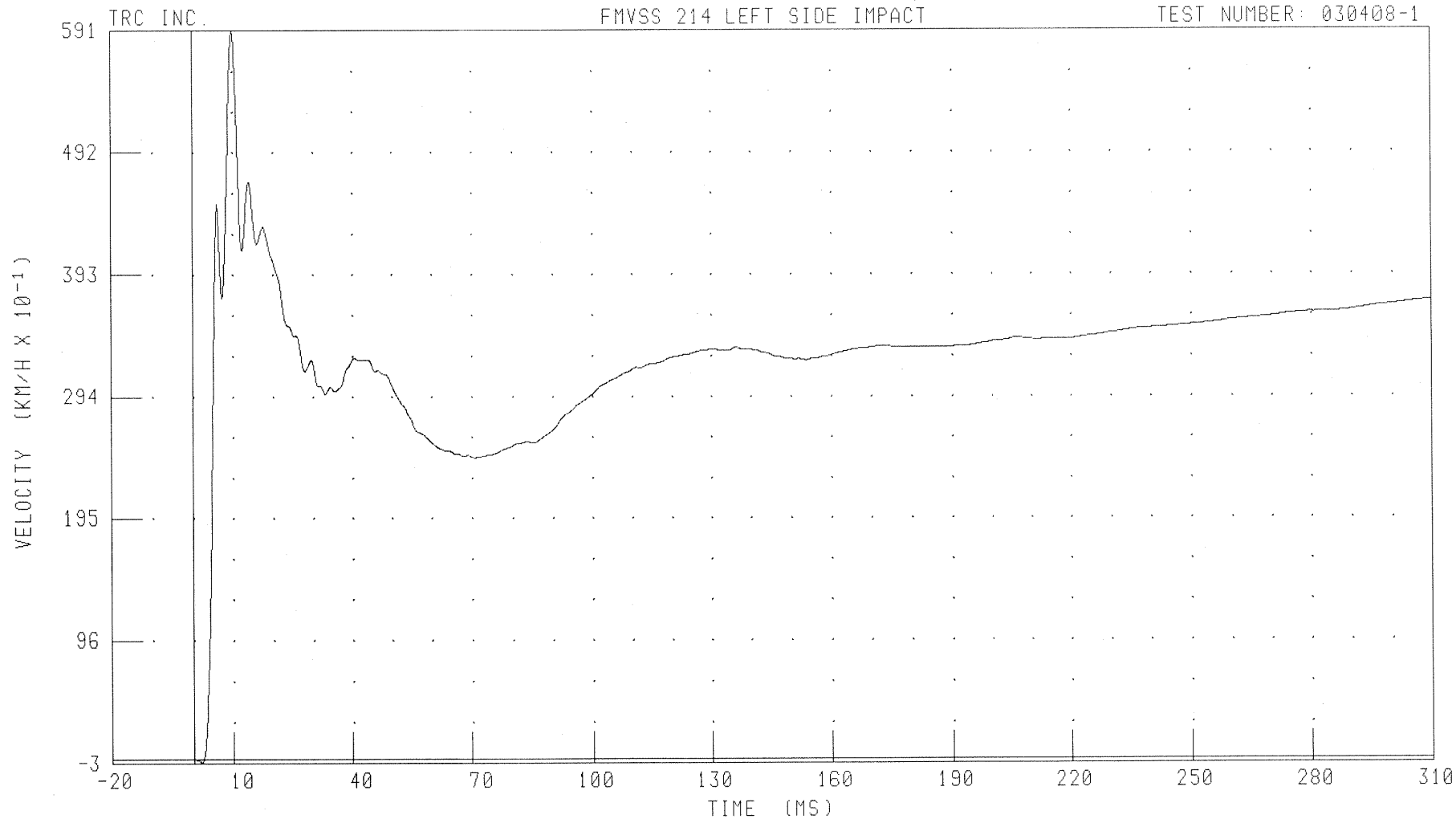
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT LOWER B-POST Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLBYV1 FILTER: CH. CLASS 180

PEAK DATA: 59.01 KM/H @ 9.92 MS; -0.24 KM/H @ 1.84 MS

B-124

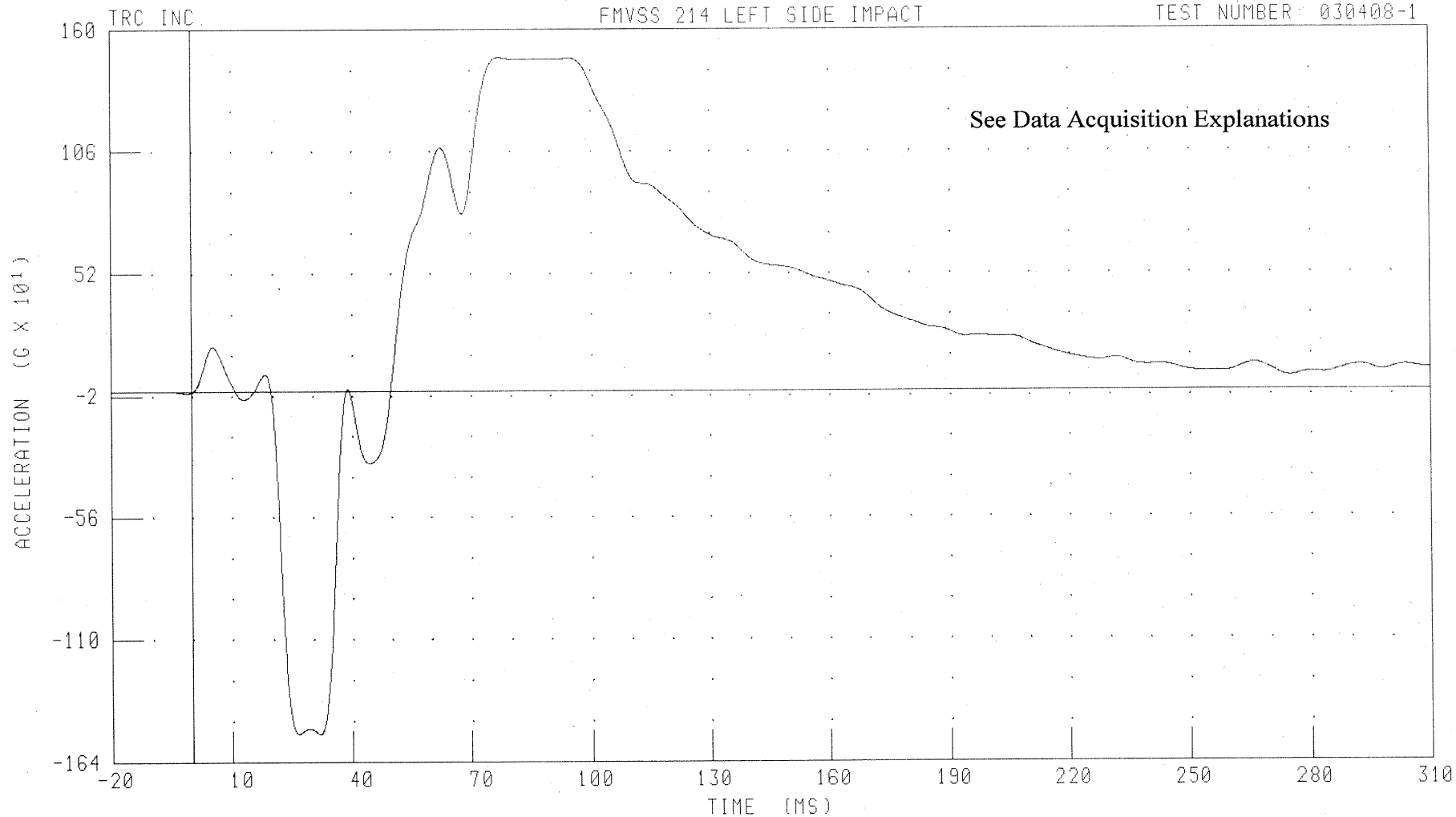
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT MIDDLE B-POST Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: LM BYG1 FILTER: CH. CLASS 60

PEAK DATA: 1476.11 G @ 77.28 MS; -1516.71 G @ 31.60 MS

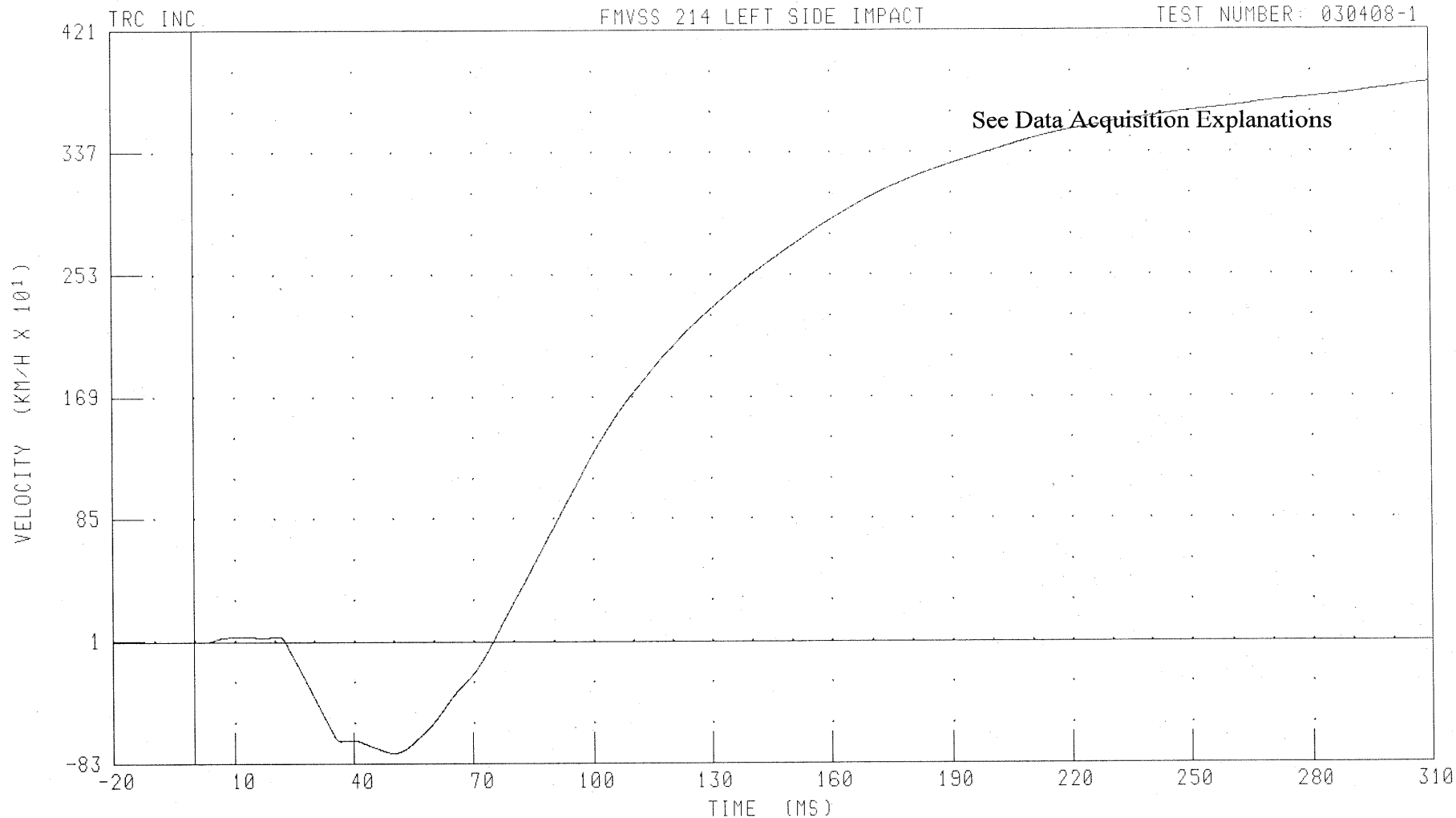
B-125

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT MIDDLE B-POST Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LM BYV1 FILTER: CH. CLASS 180

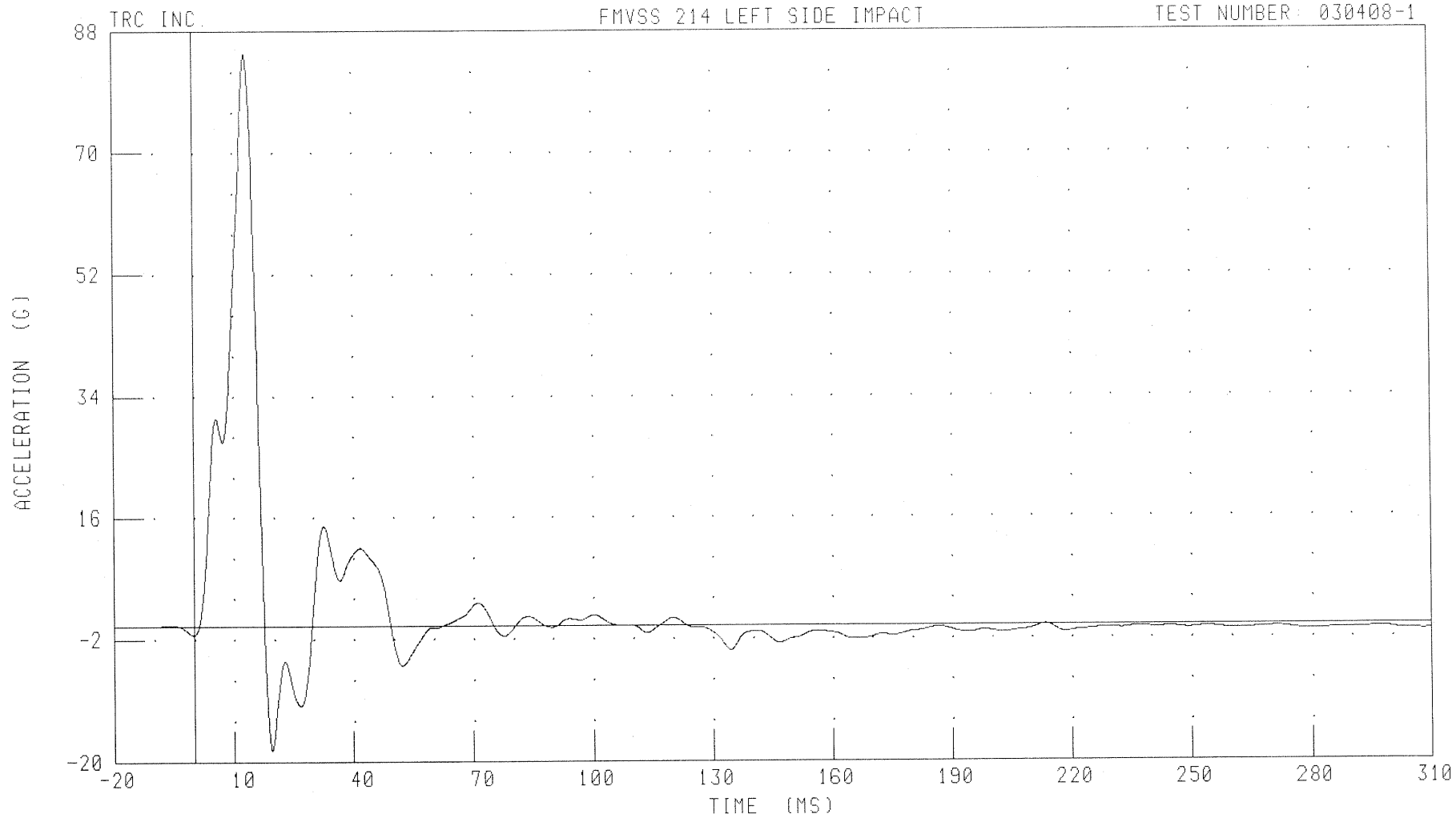
PEAK DATA: 3847.67 KM/H @ 310.00 MS, -760.76 KM/H @ 50.00 MS

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT FRONT SEAT TRACK Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LFTYG1 FILTER: CH. CLASS 60

PEAK DATA: 84.71 G @ 13.12 MS, -18.30 G @ 19.36 MS

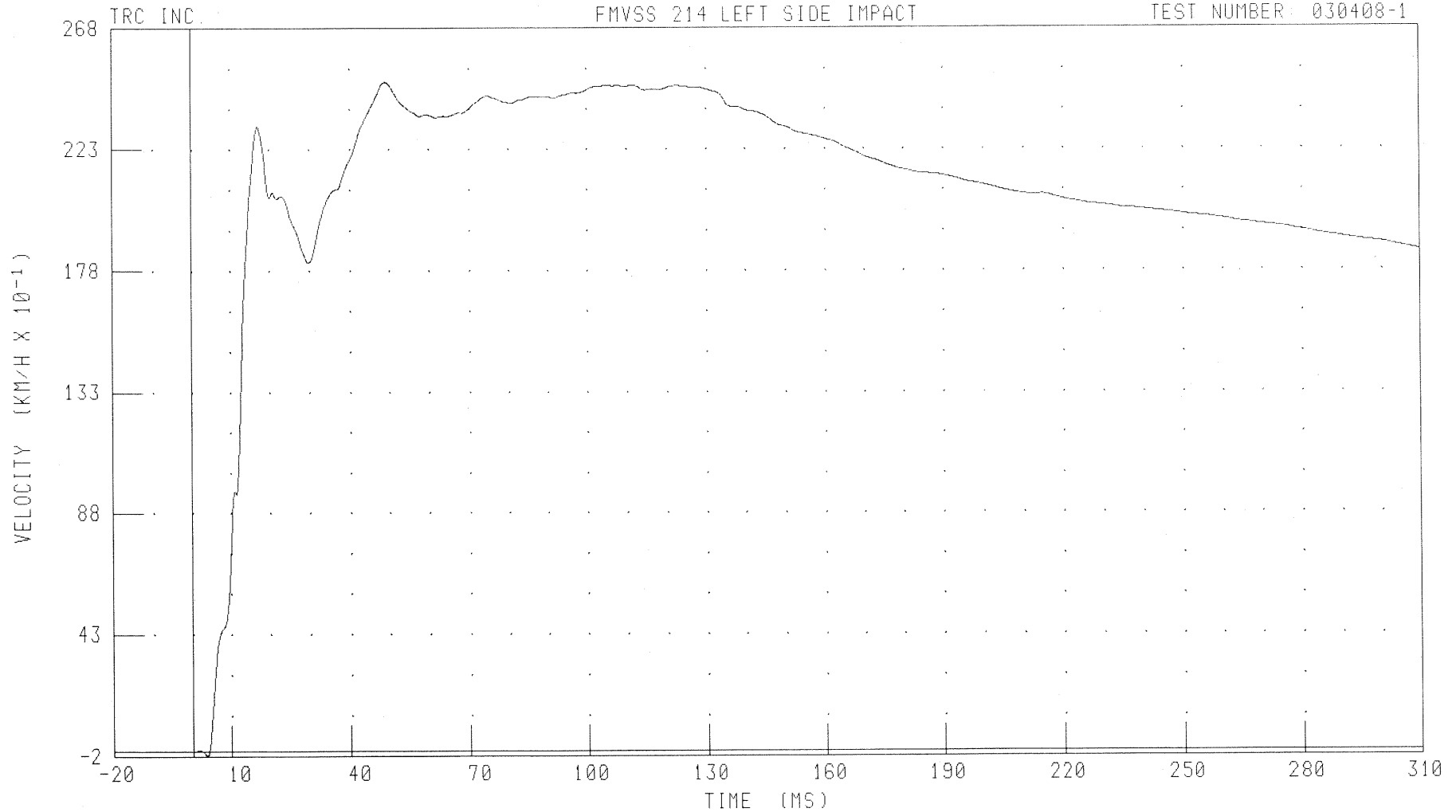
B-127

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT FRONT SEAT TRACK Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LFTYV1 FILTER: CH: CLASS 180

PEAK DATA: 24.81 KM/H @ 49.20 MS; -0.19 KM/H @ 3.60 MS

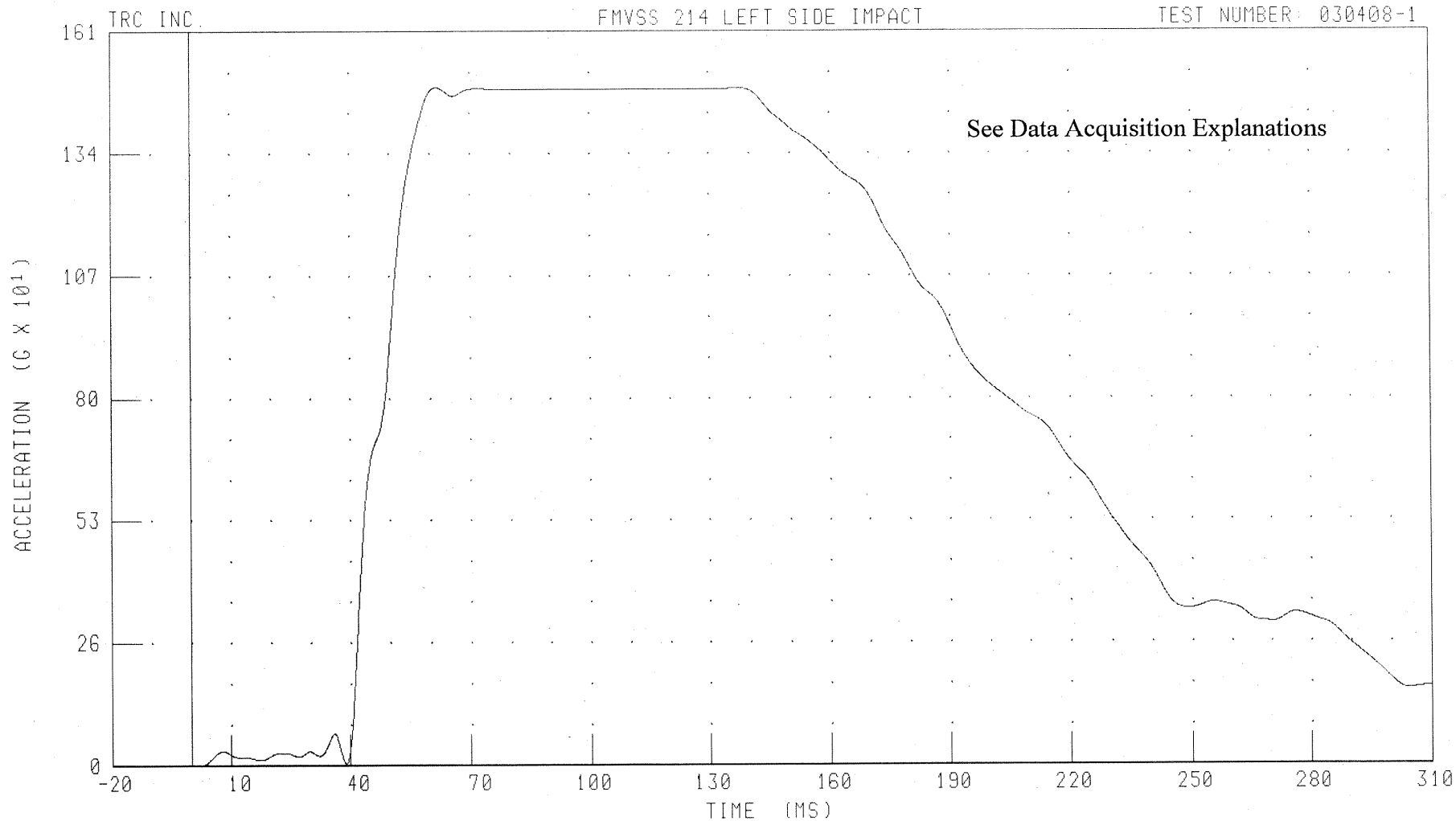
B-128

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR SEAT TRACK Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRTYG1 FILTER: CH. CLASS 60

PEAK DATA: 1494.75 G @ 61.68 MS; -1.61 G @ 1.52 MS

B-129

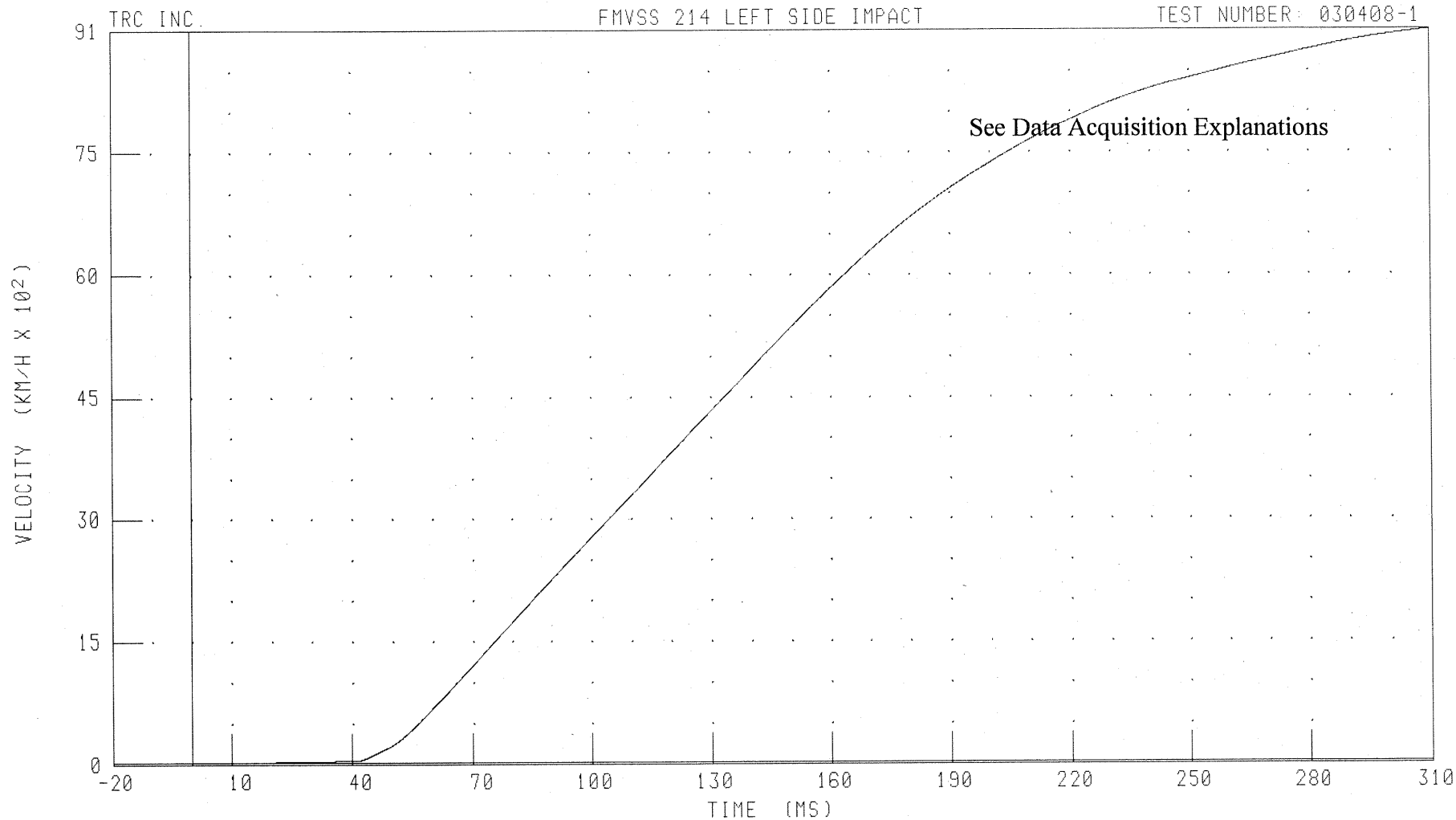
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT REAR SEAT TRACK Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRTYV1 FILTER: CH. CLASS 180

PEAK DATA: 9097.41 KM/H @ 310.00 MS; -0.24 KM/H @ 4.48 MS

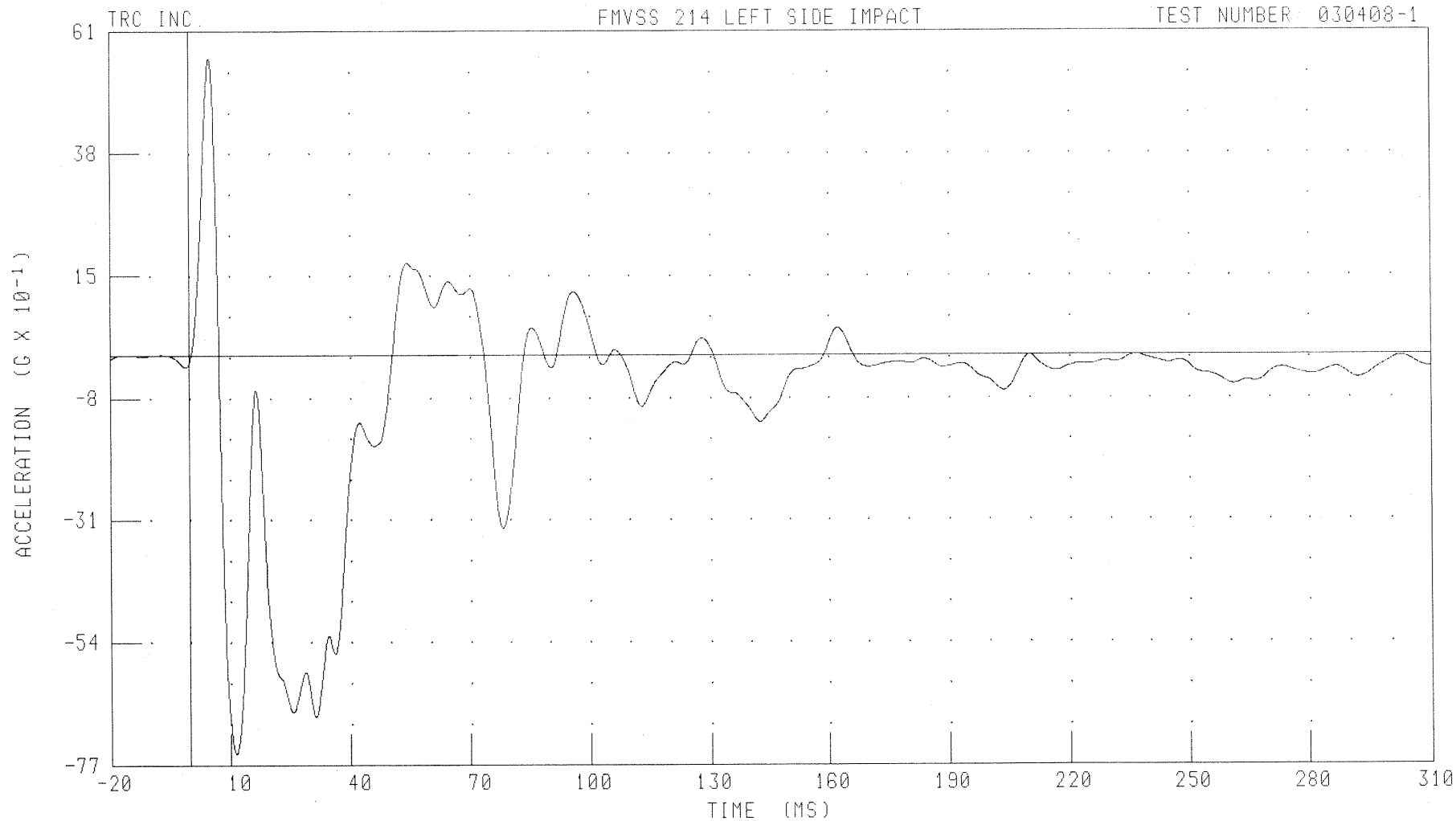
B-130

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: VCGXG1 FILTER: CH. CLASS 60

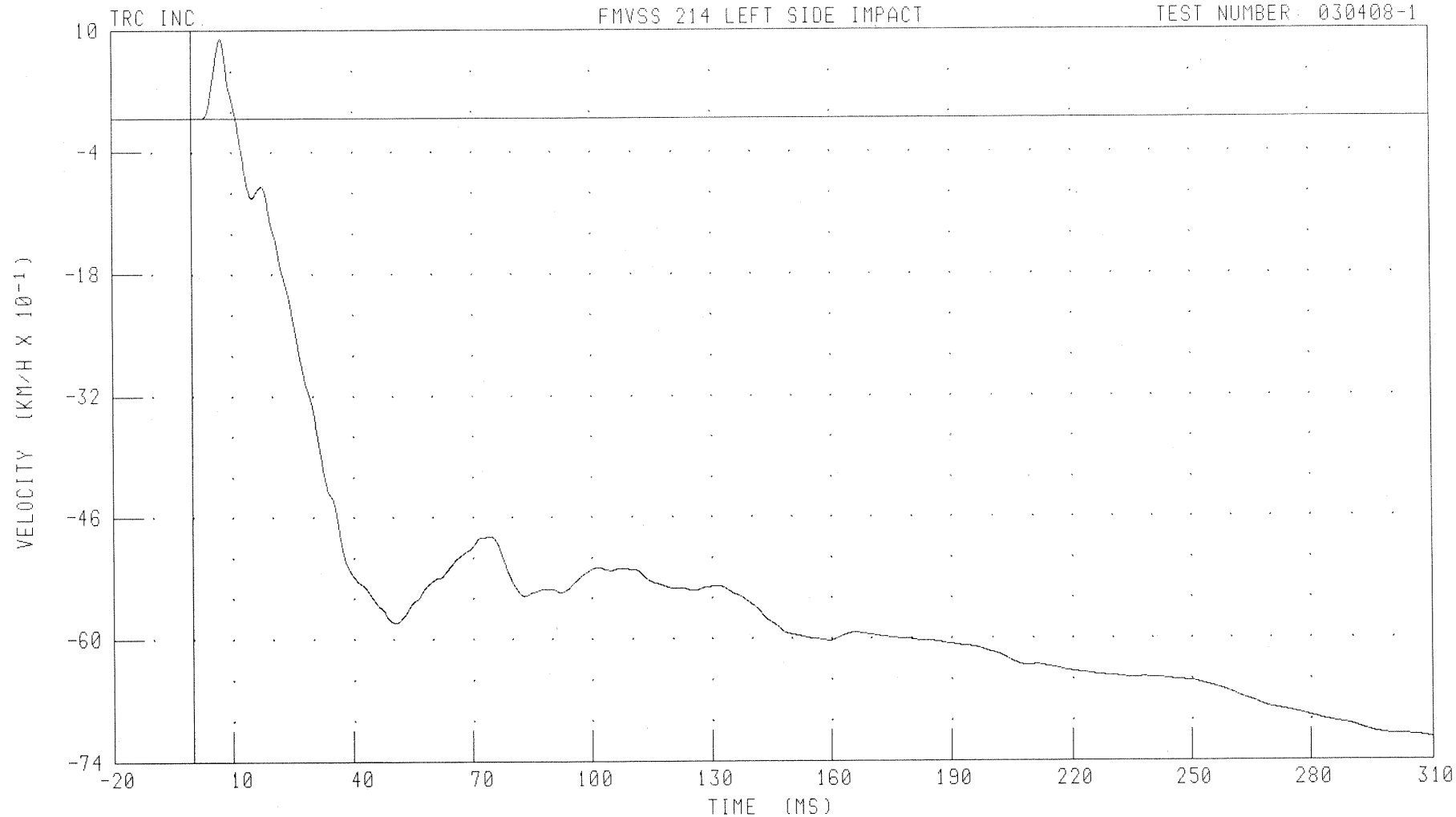
B-131

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
VEHICLE CENTER OF GRAVITY X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: VCGXV1 FILTER: CH. CLASS 180

PEAK DATA: 0.91 KM/H @ 7.44 MS; -7.15 KM/H @ 310.00 MS

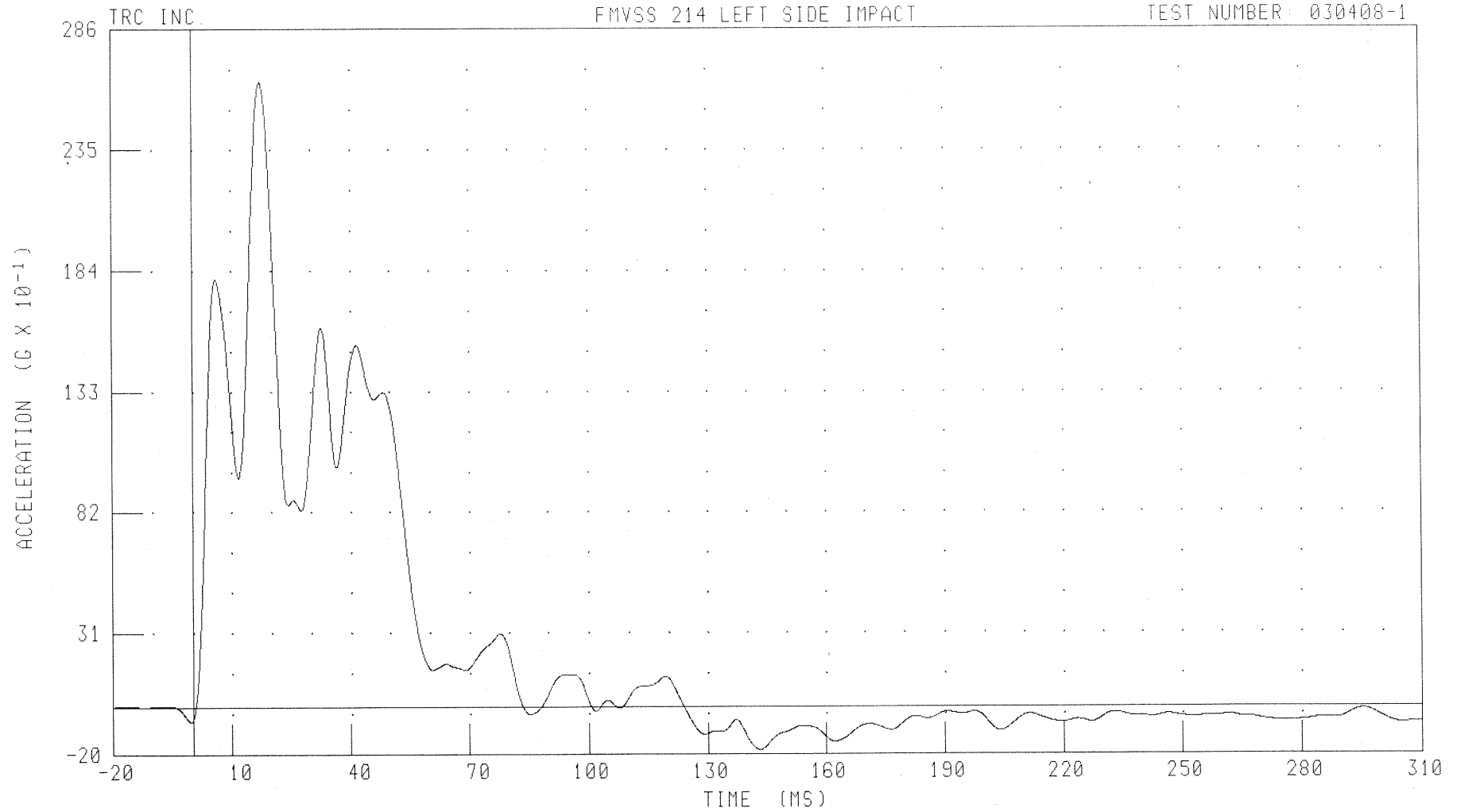
B-132

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: VCGYG1 FILTER: CH. CLASS 60

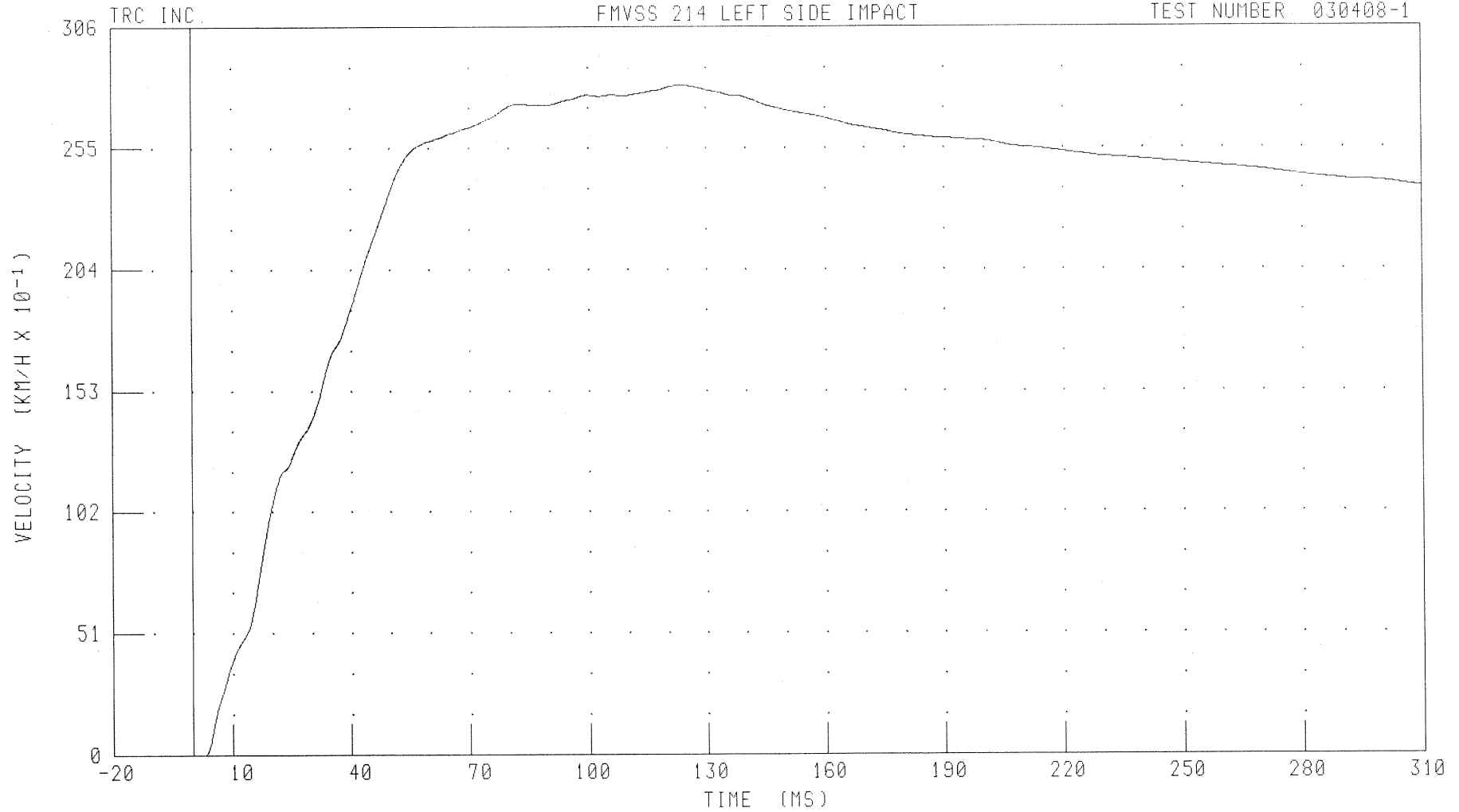
B-133

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER 030408-1



CHANNEL: VCGYV1 FILTER: CH. CLASS 180

PEAK DATA: 28.14 KM/H @ 124.16 MS; -0.02 KM/H @ 2.72 MS

B-134

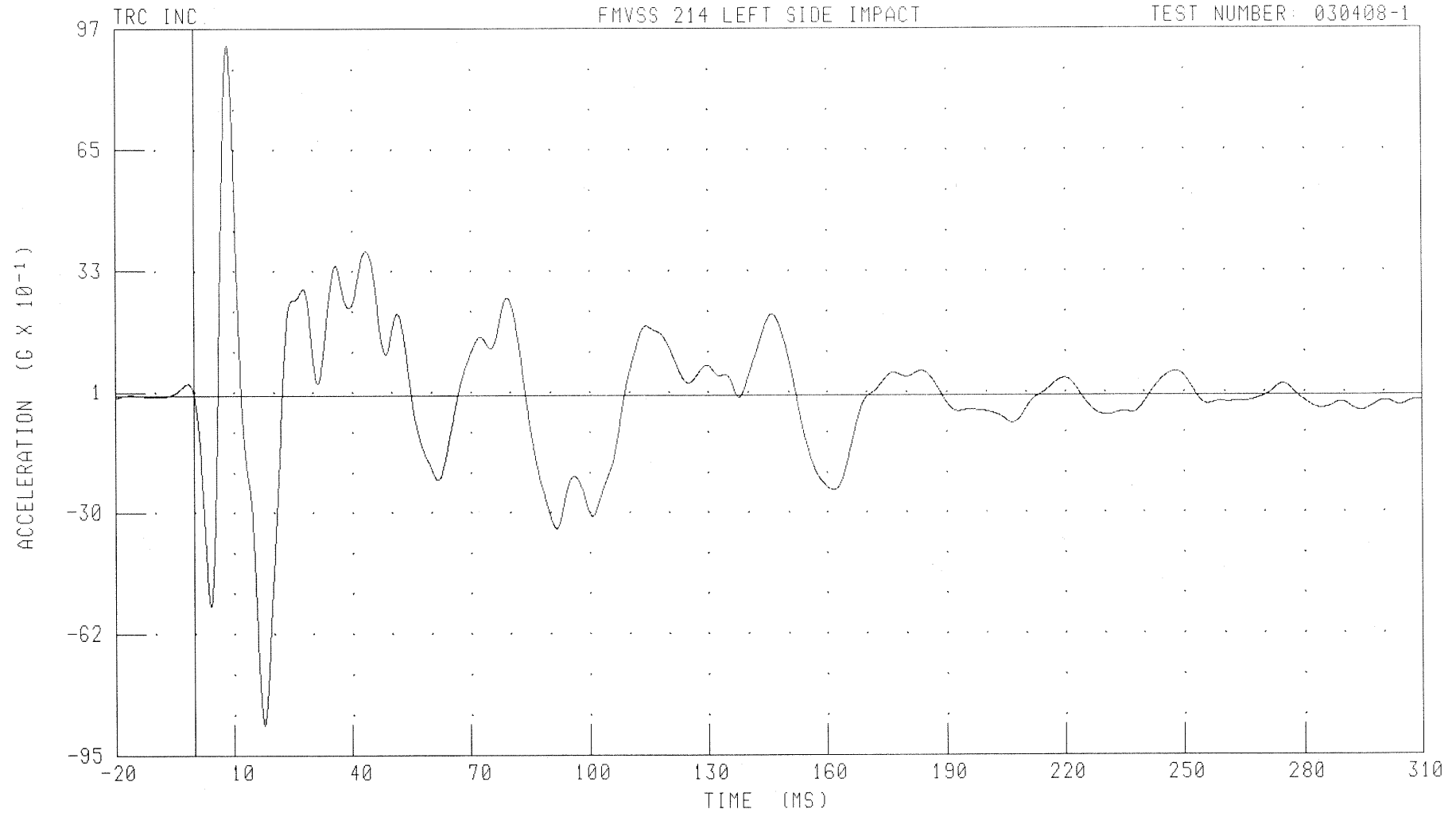
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

VEHICLE CENTER OF GRAVITY Z-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: VCGZG1 FILTER: CH. CLASS 60

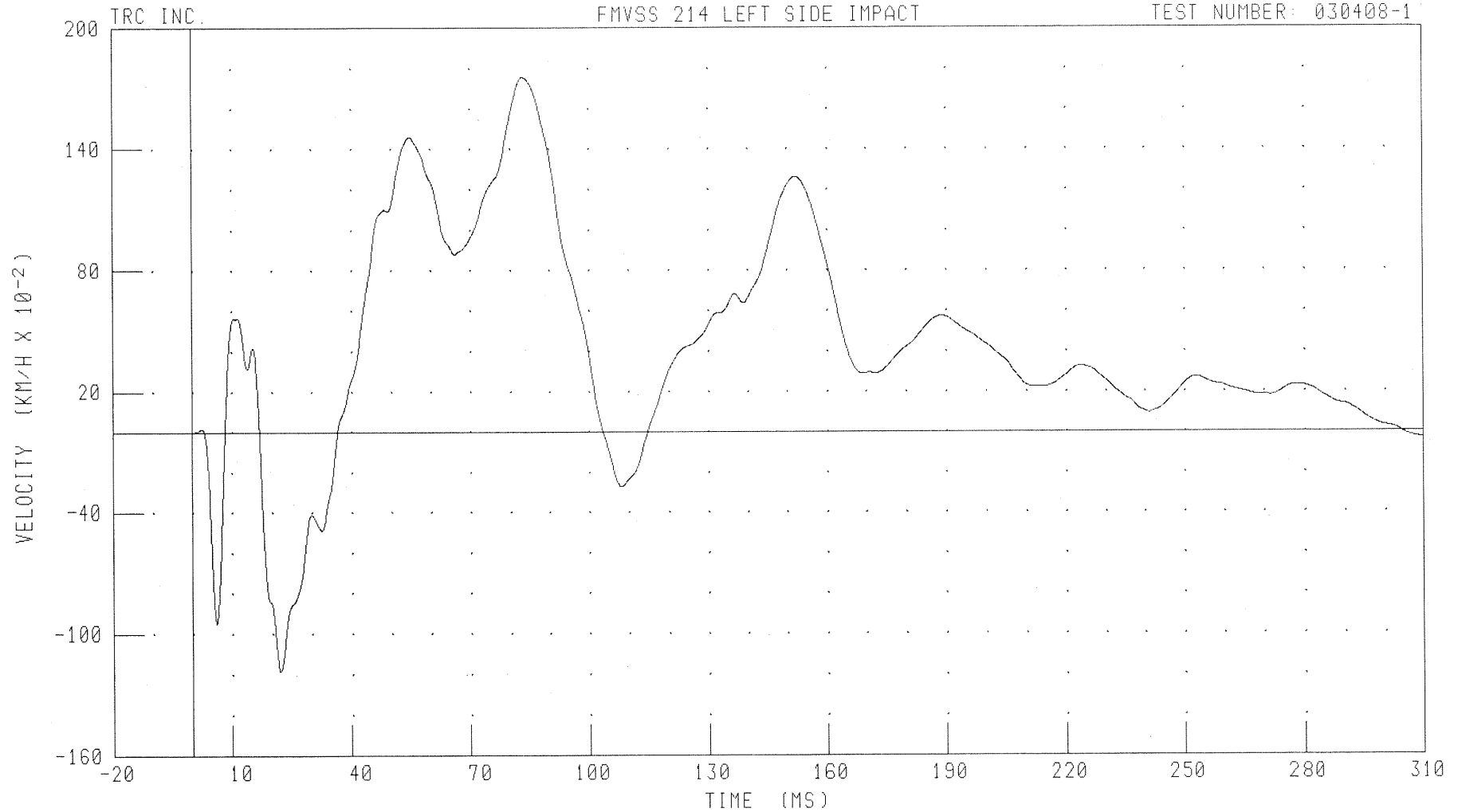
B-135

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
VEHICLE CENTER OF GRAVITY Z-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: VCGZV1 FILTER: CH. CLASS 180

PEAK DATA: 1.76 KM/H @ 83.44 MS; -1.18 KM/H @ 22.16 MS

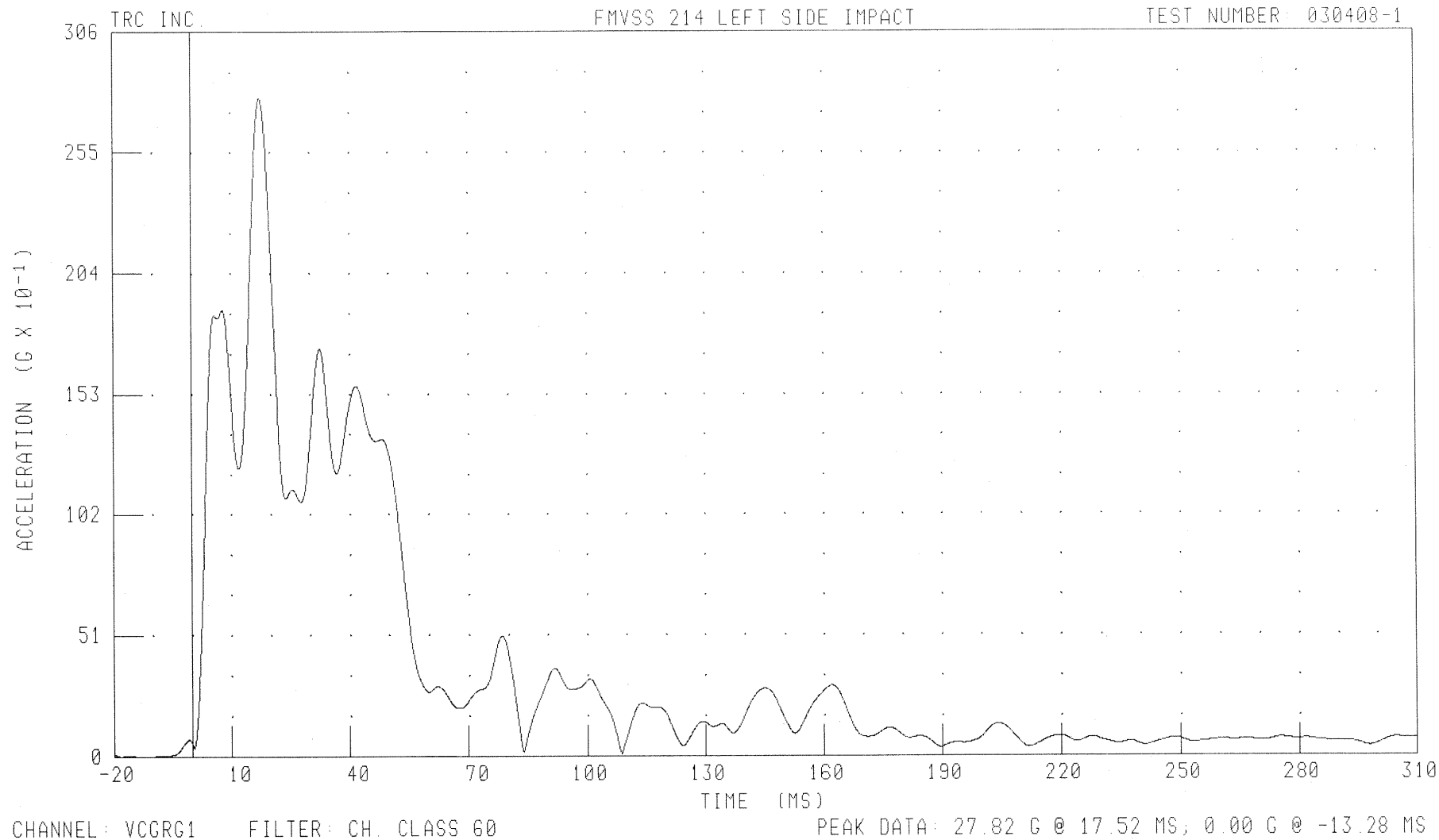
B-136

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



B-137

030408-1

MDB Instrumentation Plots

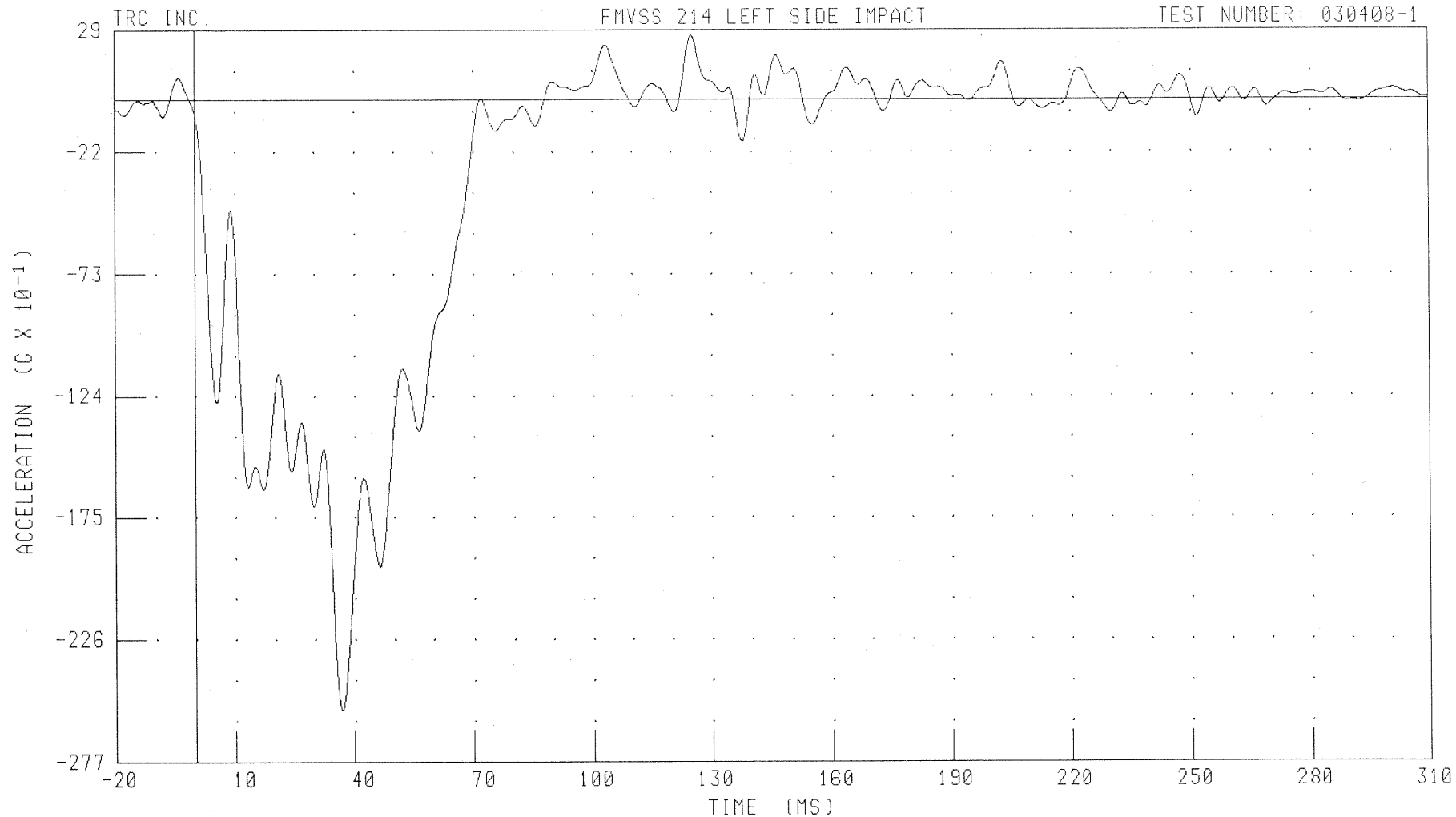
Acceleration Data - Filter Class 60

Integration Data - Filter Class 180

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
MDB CENTER OF GRAVITY X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: BCGXG1

FILTER: CH. CLASS 60

PEAK DATA: 2.68 G @ 125.28 MS; -25.56 G @ 36.88 MS

B-139

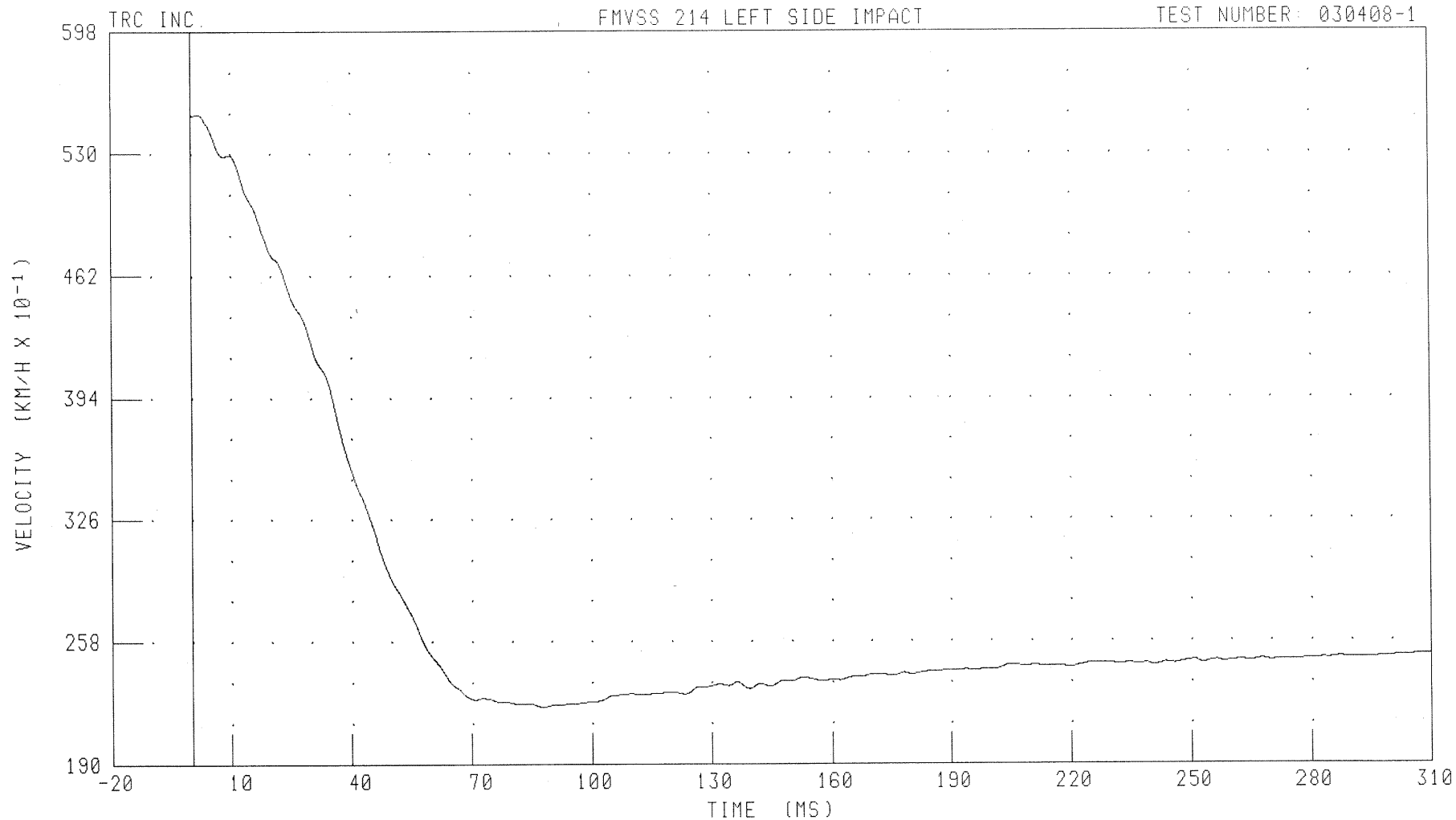
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

MOB CENTER OF GRAVITY X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: BCGXV1 FILTER: CH. CLASS 180

PEAK DATA: 55.21 KM/H @ 1.84 MS; 22.17 KM/H @ 88.08 MS

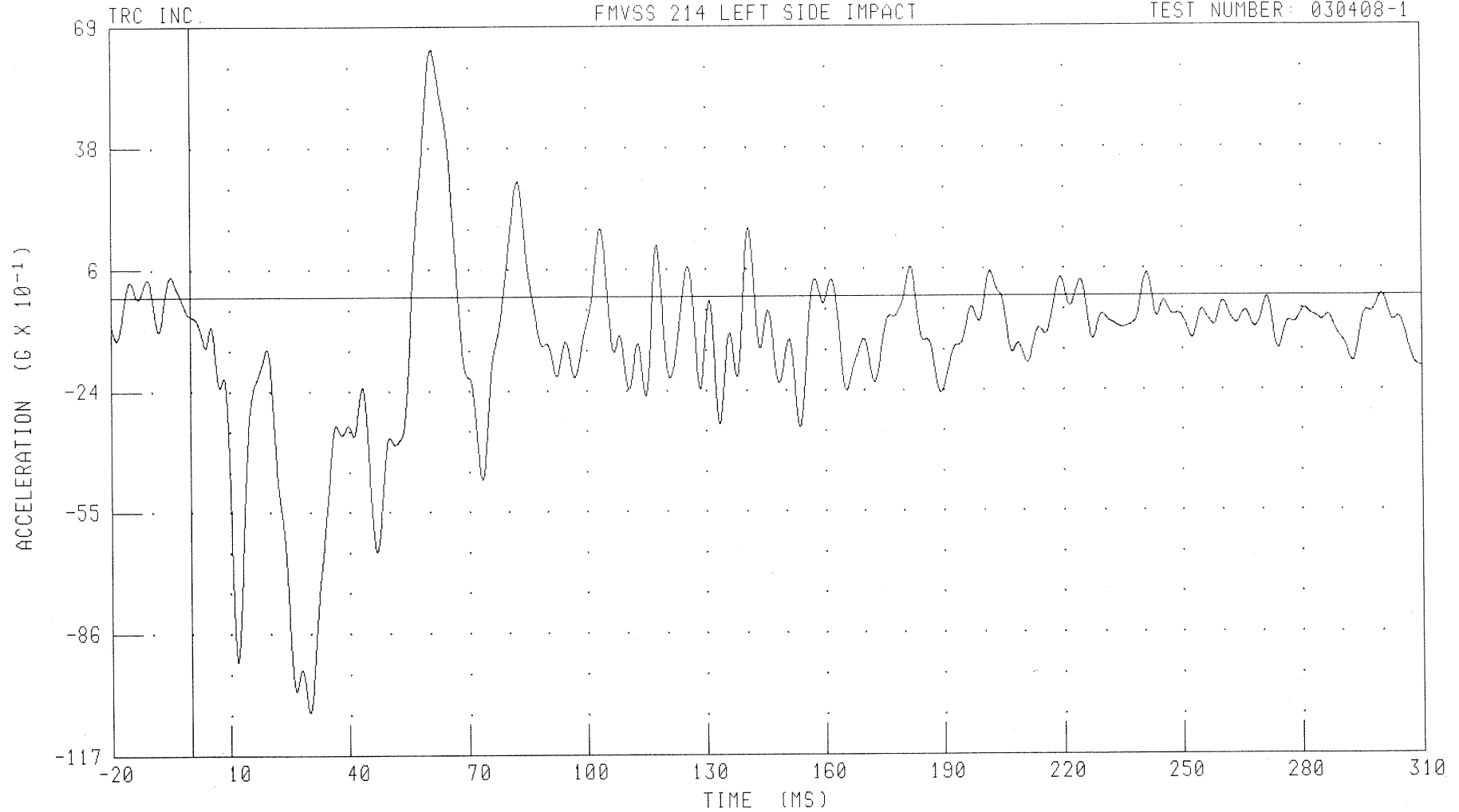
B-140

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
MDB CENTER OF GRAVITY Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: BCGYG1 FILTER: CH. CLASS 60

PEAK DATA: 6.32 G @ 60.88 MS; -10.60 G @ 29.84 MS

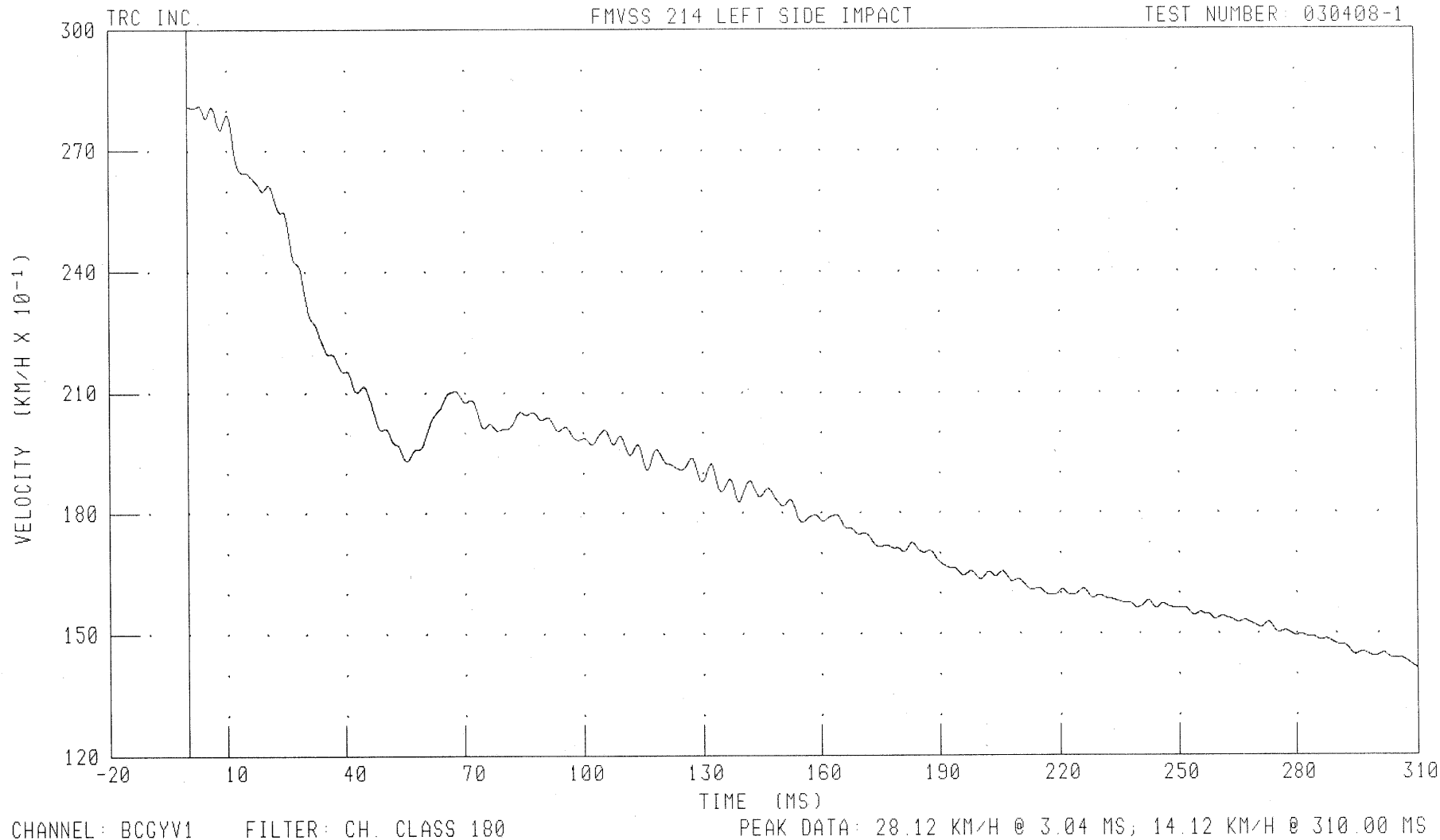
B-141

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
MDB CENTER OF GRAVITY Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



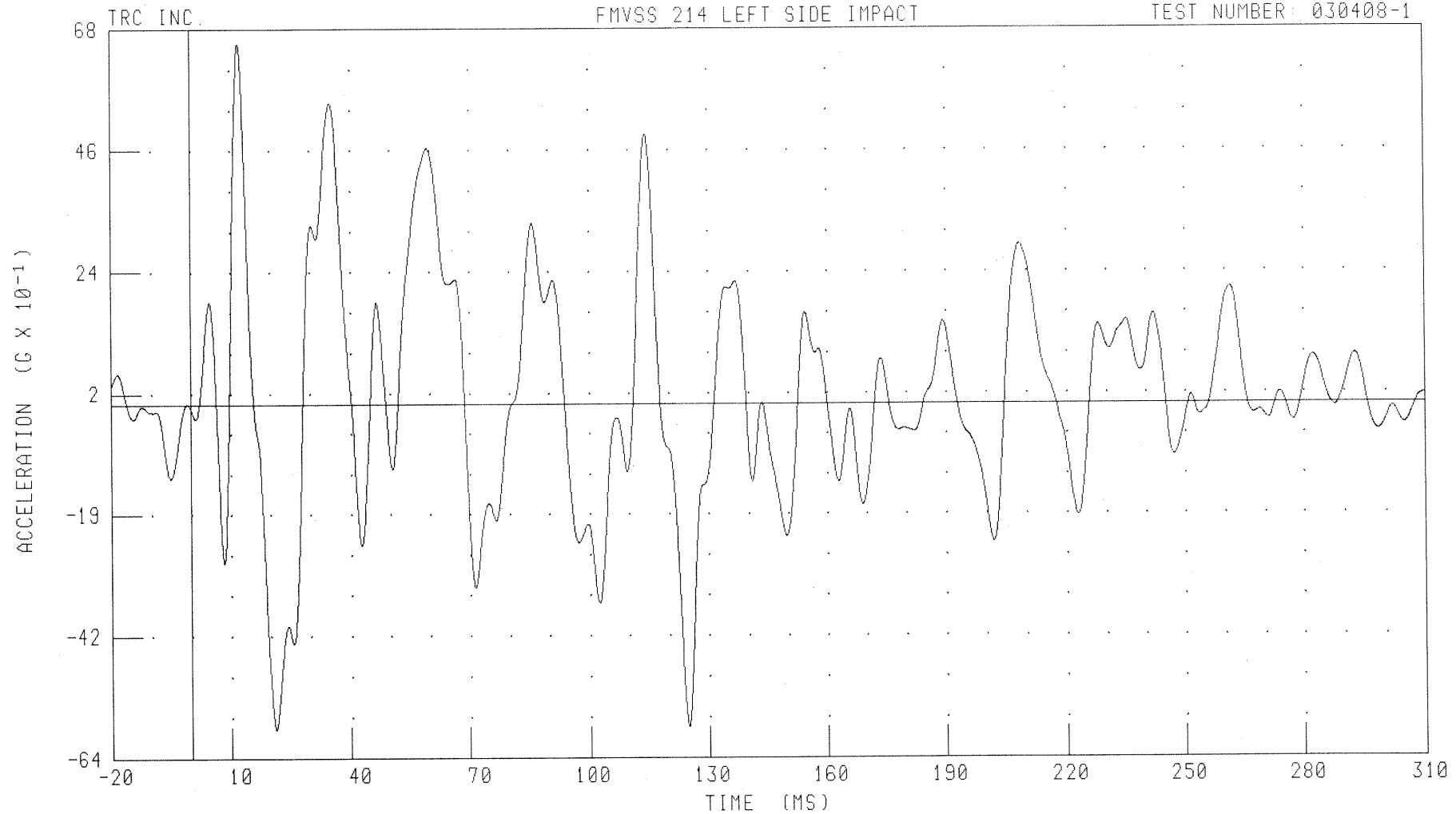
B-142

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
MDB CENTER OF GRAVITY Z-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: BCGZG1

FILTER: CH. CLASS 60

PEAK DATA: 6.55 G @ 12.24 MS; -5.88 G @ 21.28 MS

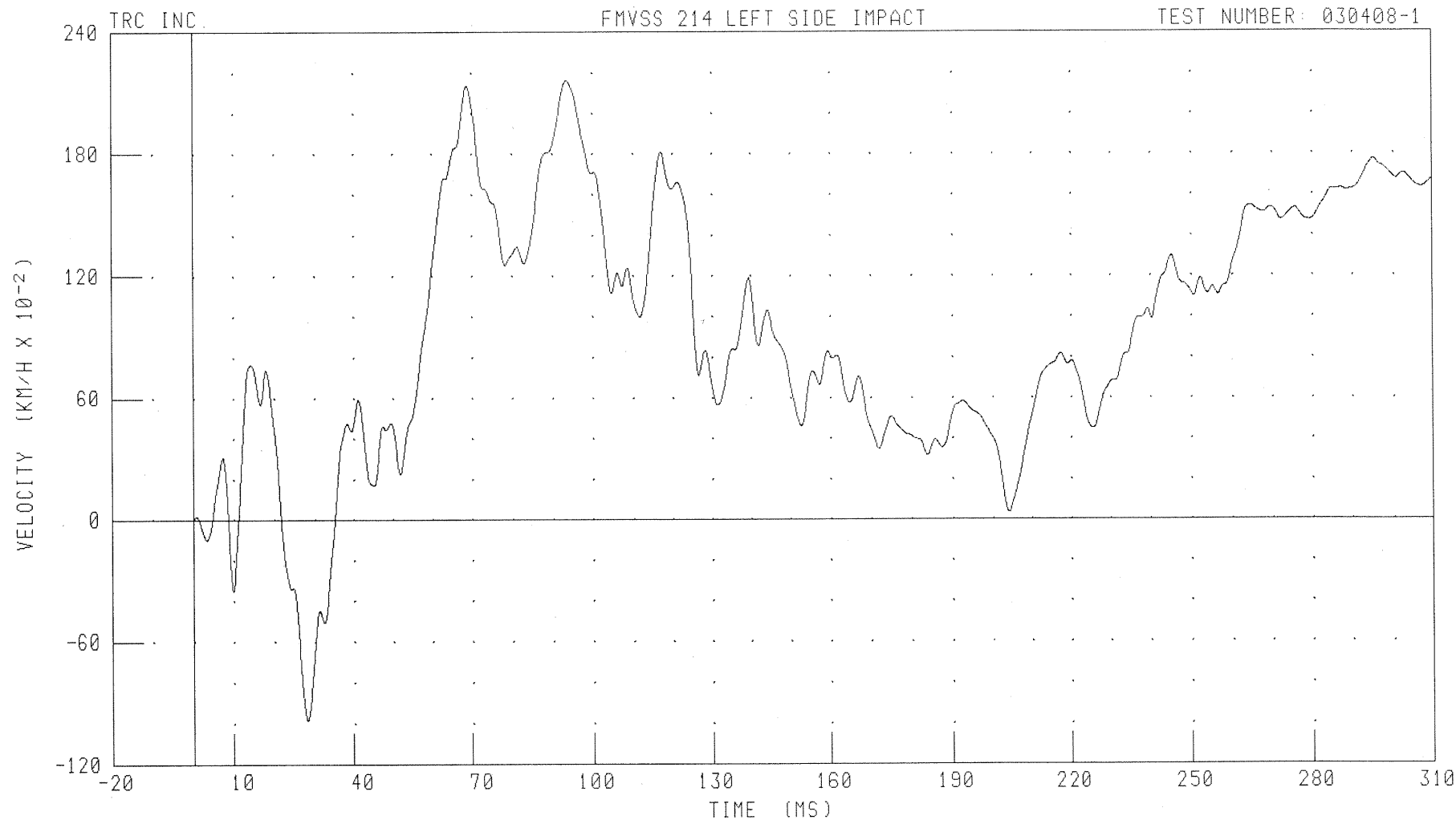
B-143

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
MDB CENTER OF GRAVITY Z-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: BCGZV1 FILTER: CH. CLASS 180

PEAK DATA: 2.16 KM/H @ 93.84 MS; -0.98 KM/H @ 28.24 MS

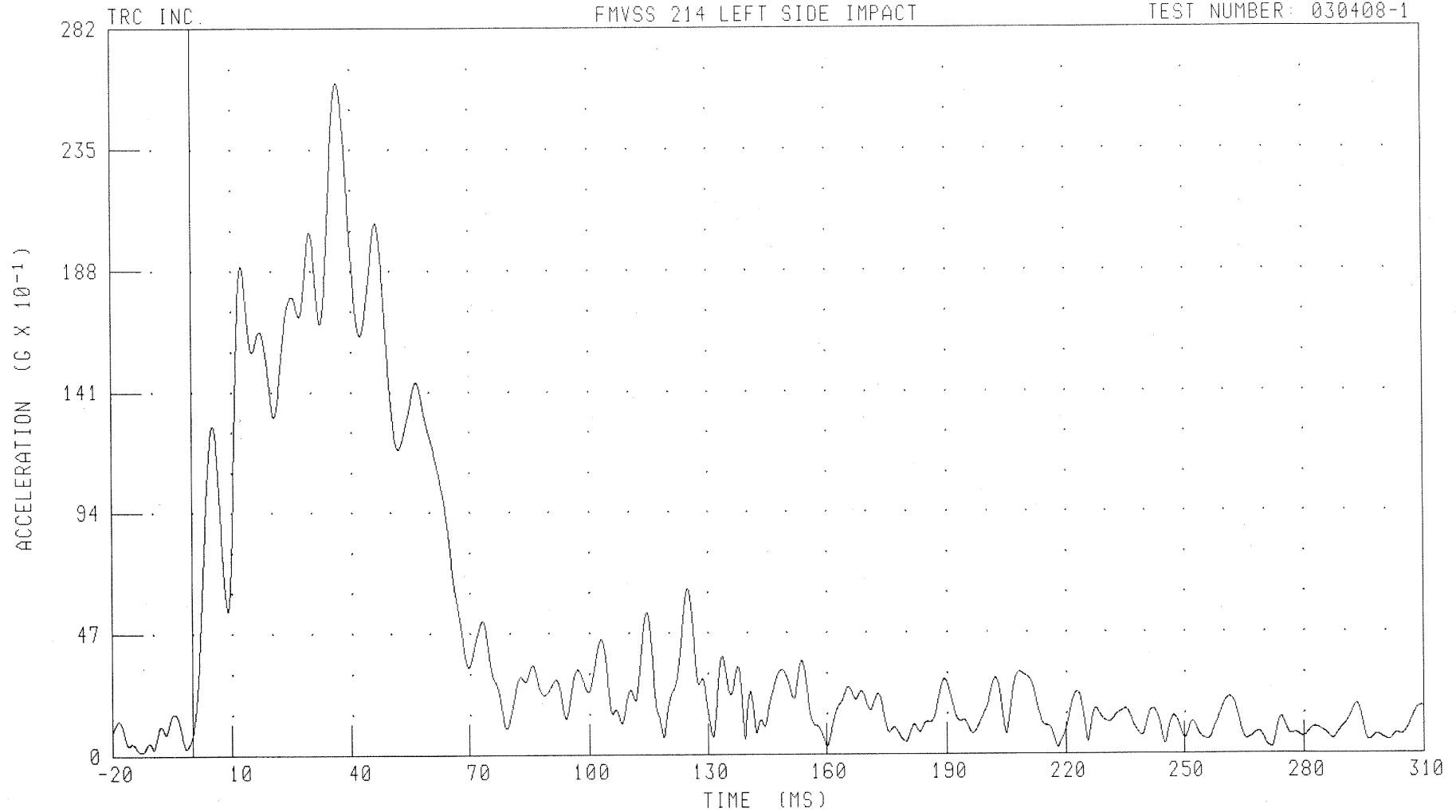
B-144

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
MOB CENTER OF GRAVITY RESULTANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: BCGRG1 FILTER: CH. CLASS 60

PEAK DATA: 26.12 G @ 36.72 MS; 0.15 G @ -12.64 MS

B-145

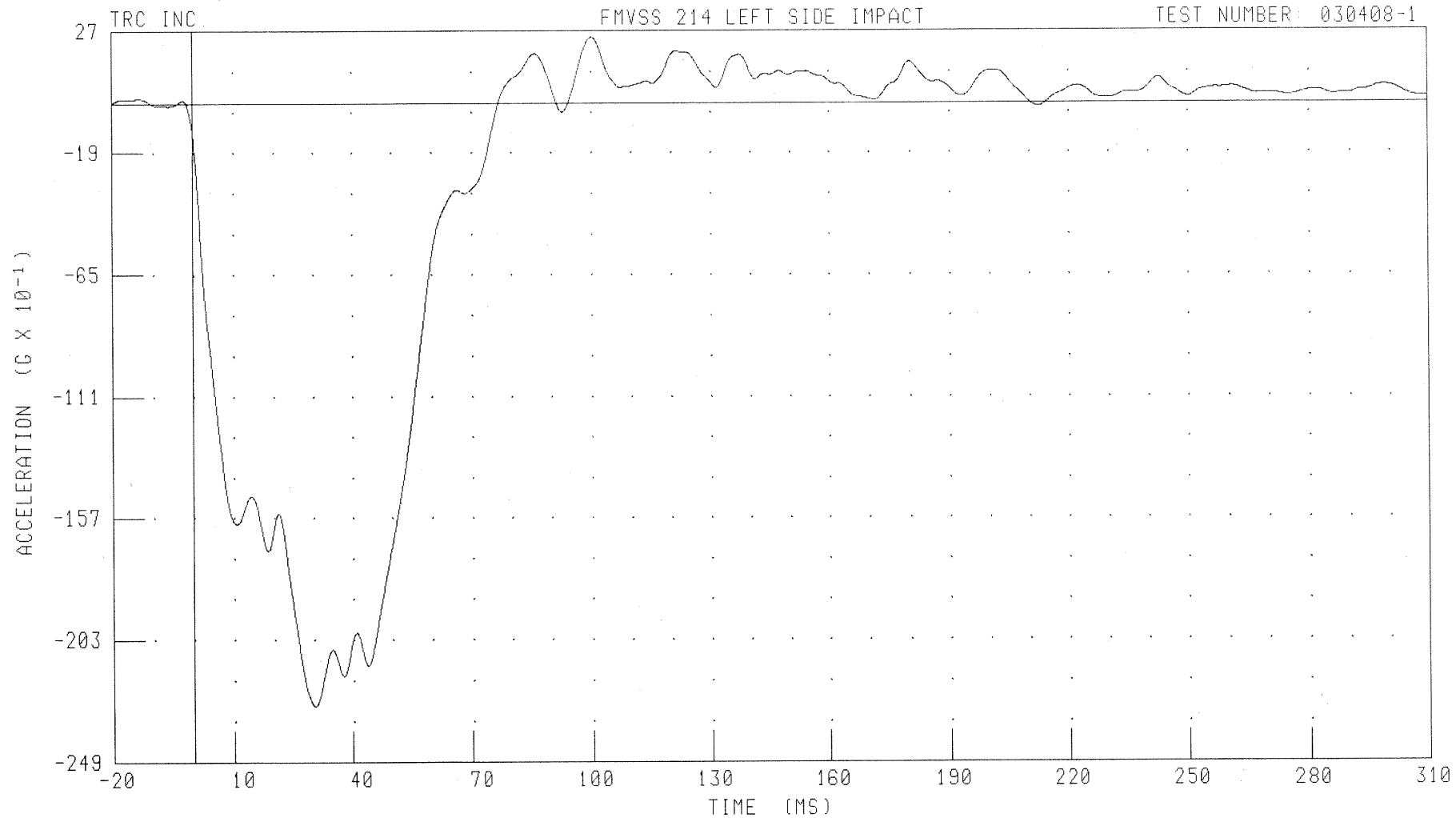
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

MOB LEFT REAR X-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRRXG1 FILTER: CH. CLASS 60

PEAK DATA: 2.46 G @ 100.32 MS; -22.80 G @ 30.32 MS

B-146

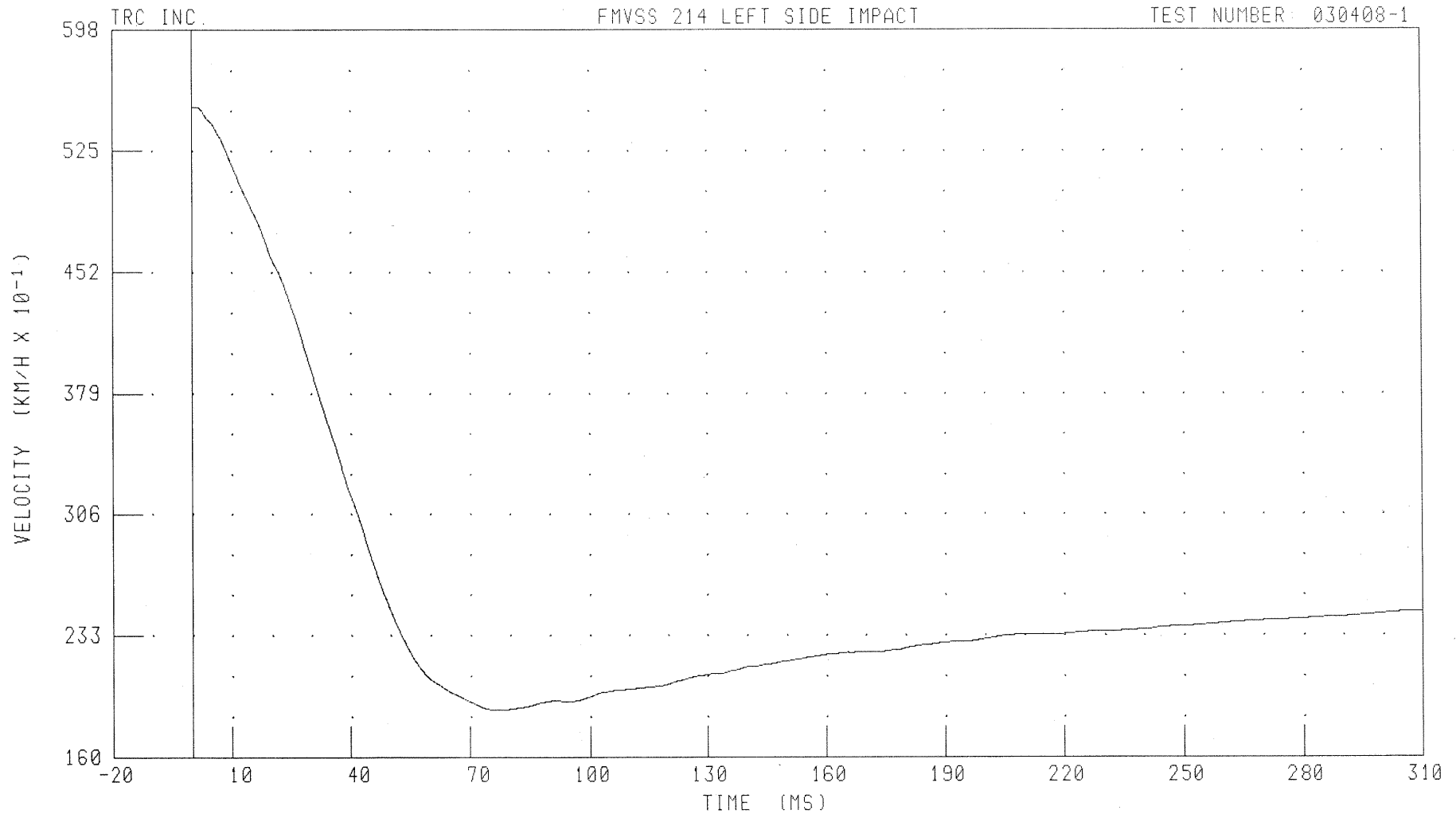
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

MDB LEFT REAR X-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRRXV1 FILTER: CH. CLASS 180

PEAK DATA: 55.20 KM/H @ 0.00 MS; 18.81 KM/H @ 76.80 MS

B-147

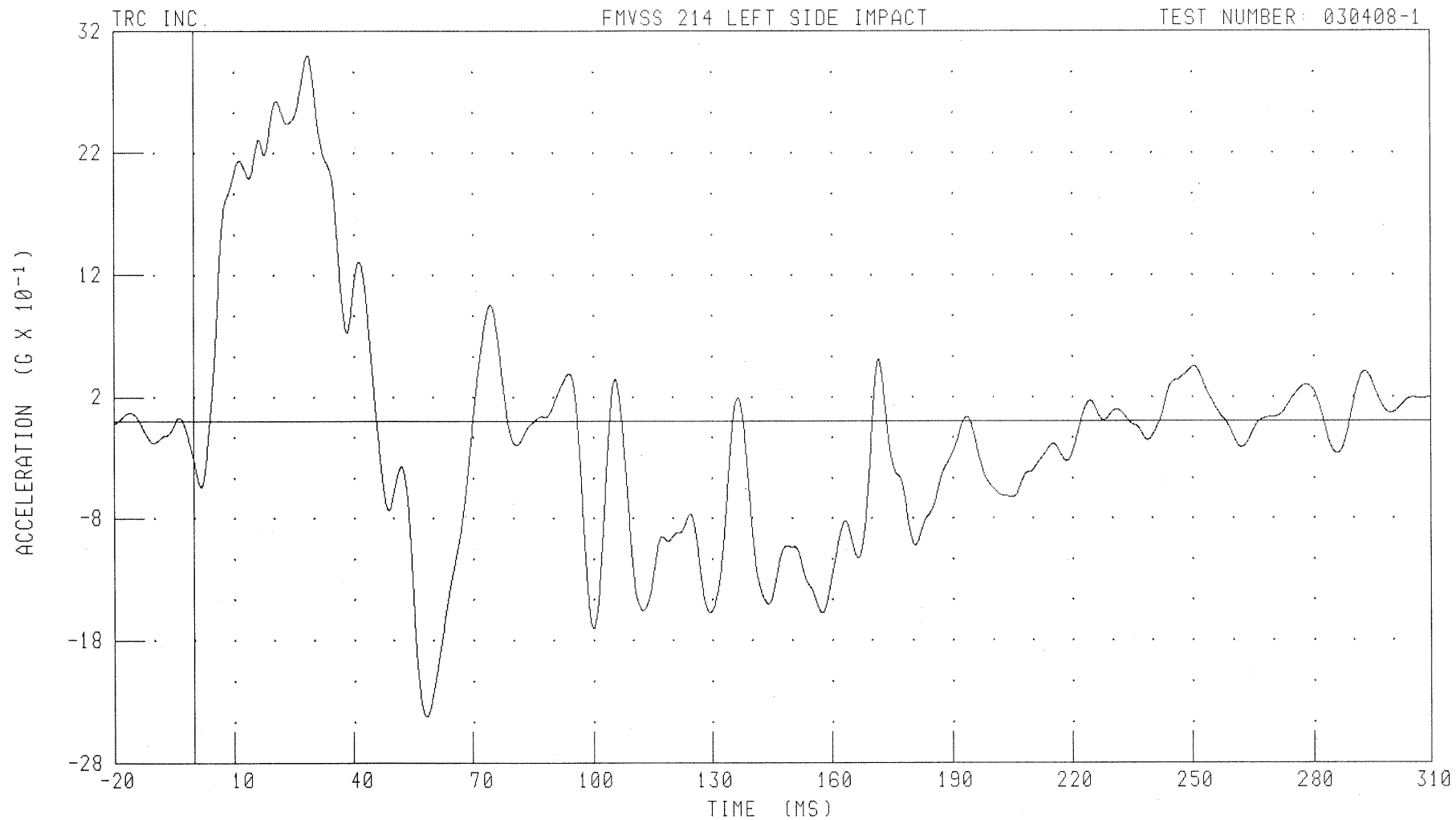
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

MDB LEFT REAR Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



B-148

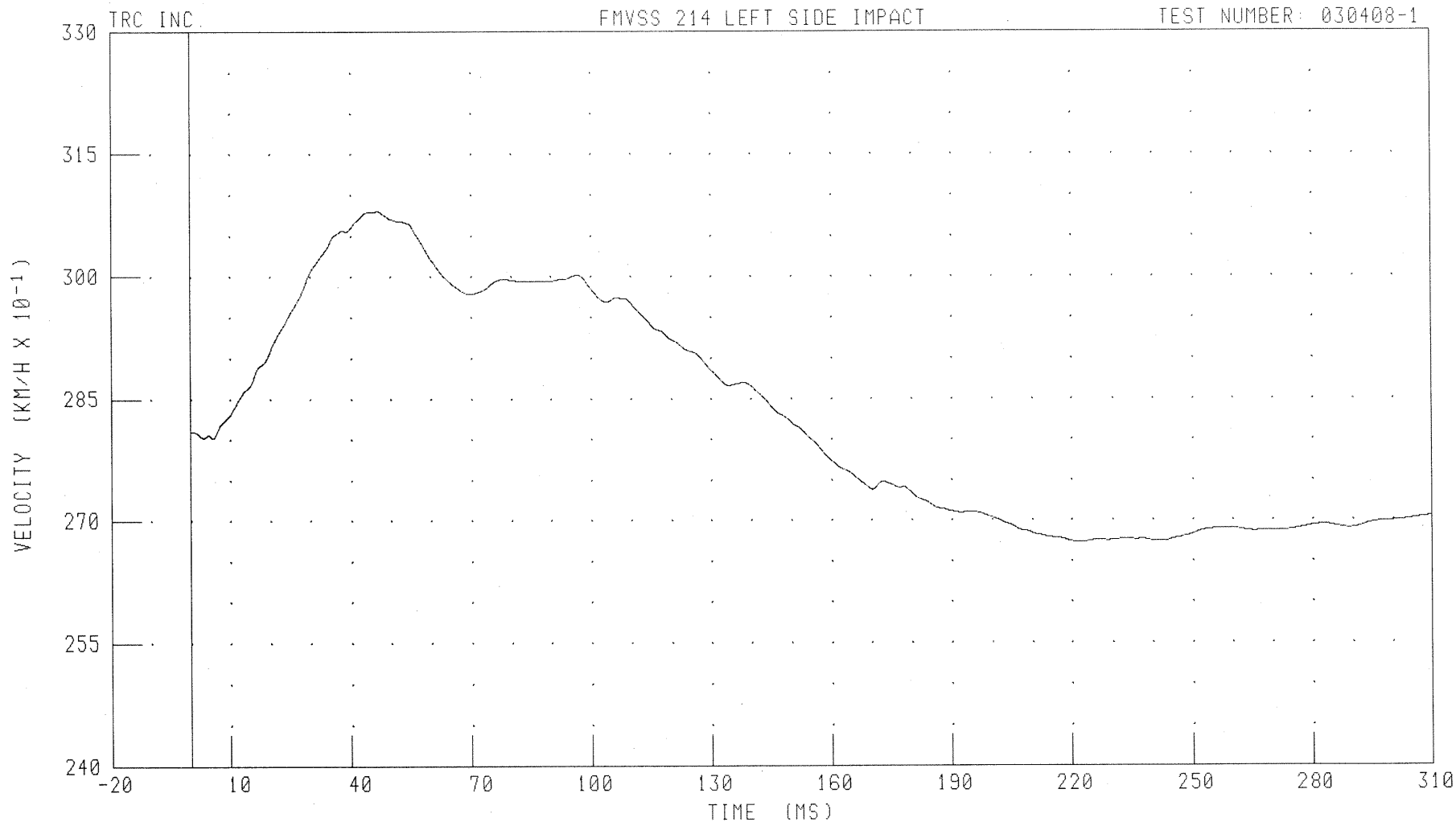
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

MOB LEFT REAR Y-AXIS VELOCITY

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LRRYV1 FILTER: CH. CLASS 180

PEAK DATA: 30.80 KM/H @ 46.96 MS; 26.73 KM/H @ 222.16 MS

B-149

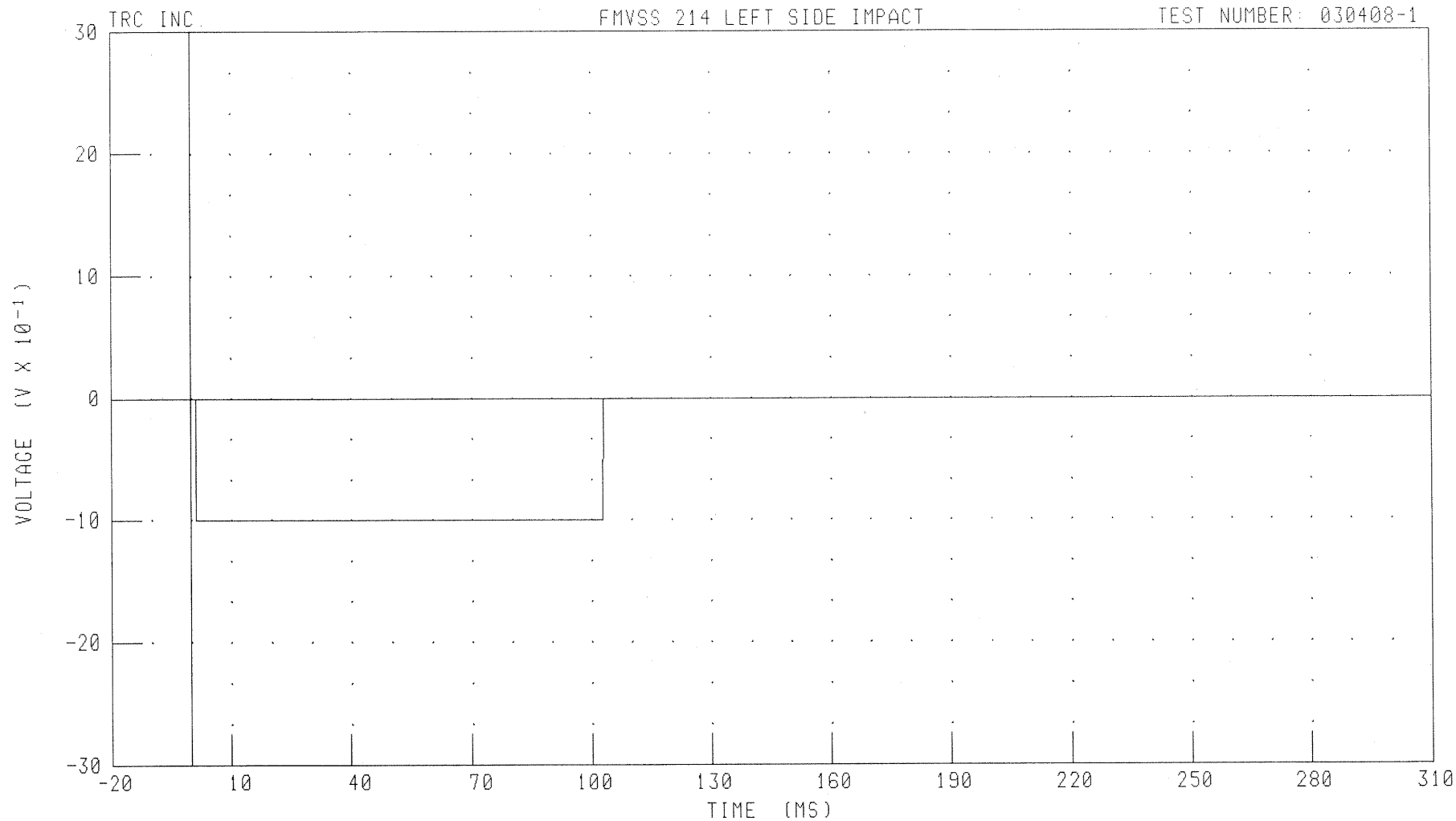
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

MOB RIGHT SIDE CONTACT SWITCH

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: MDBR1

FILTER: CH. CLASS 1000

PEAK DATA: 0.00 V @ 310.00 MS; -1.00 V @ 1.28 MS

B-150

030408-1

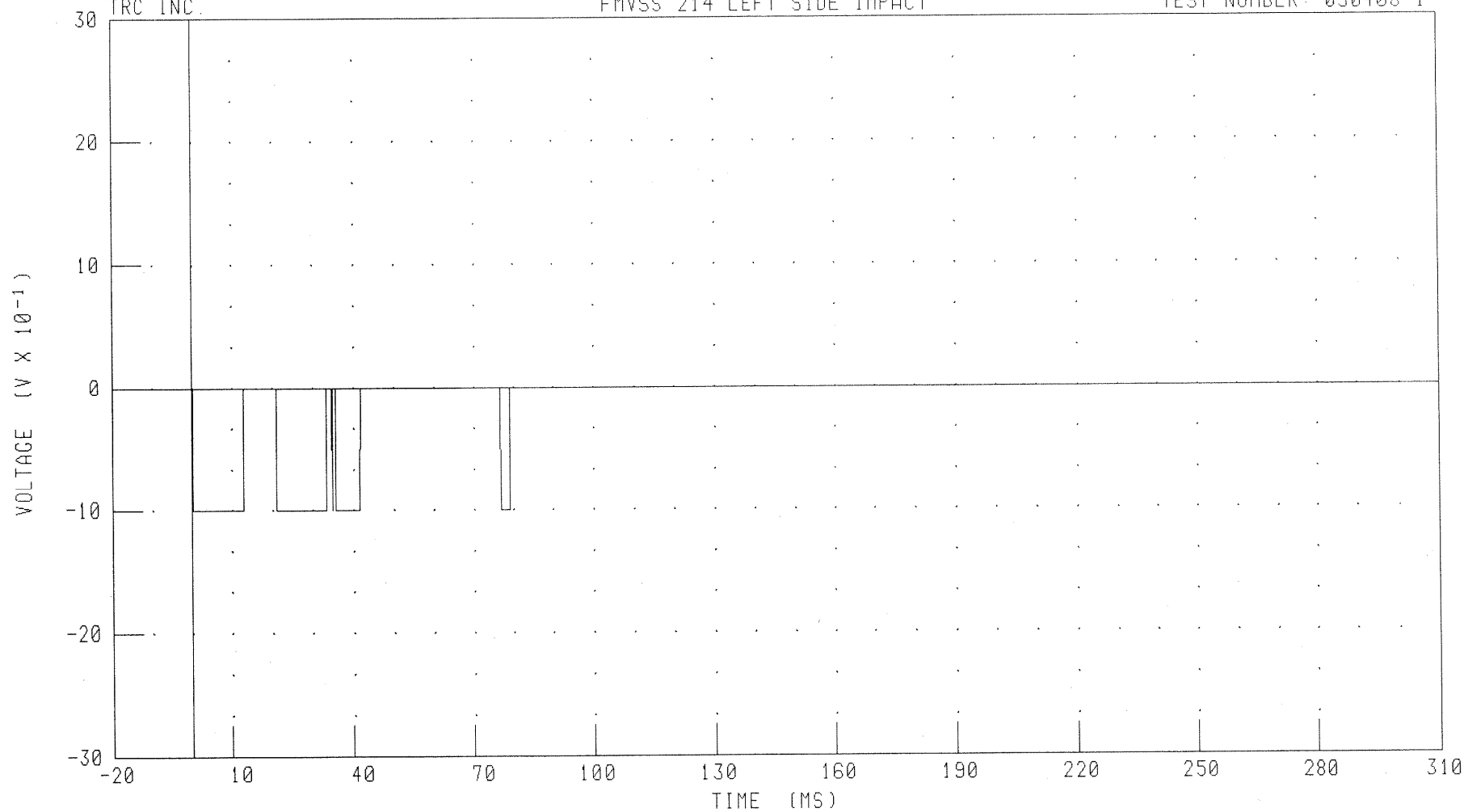
55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

MOB LEFT SIDE CONTACT SWITCH

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1

TRC INC.



CHANNEL: MDBL1

FILTER: CH. CLASS 1000

PEAK DATA: 0.00 V @ 310.00 MS; -1.00 V @ 0.40 MS

B-151

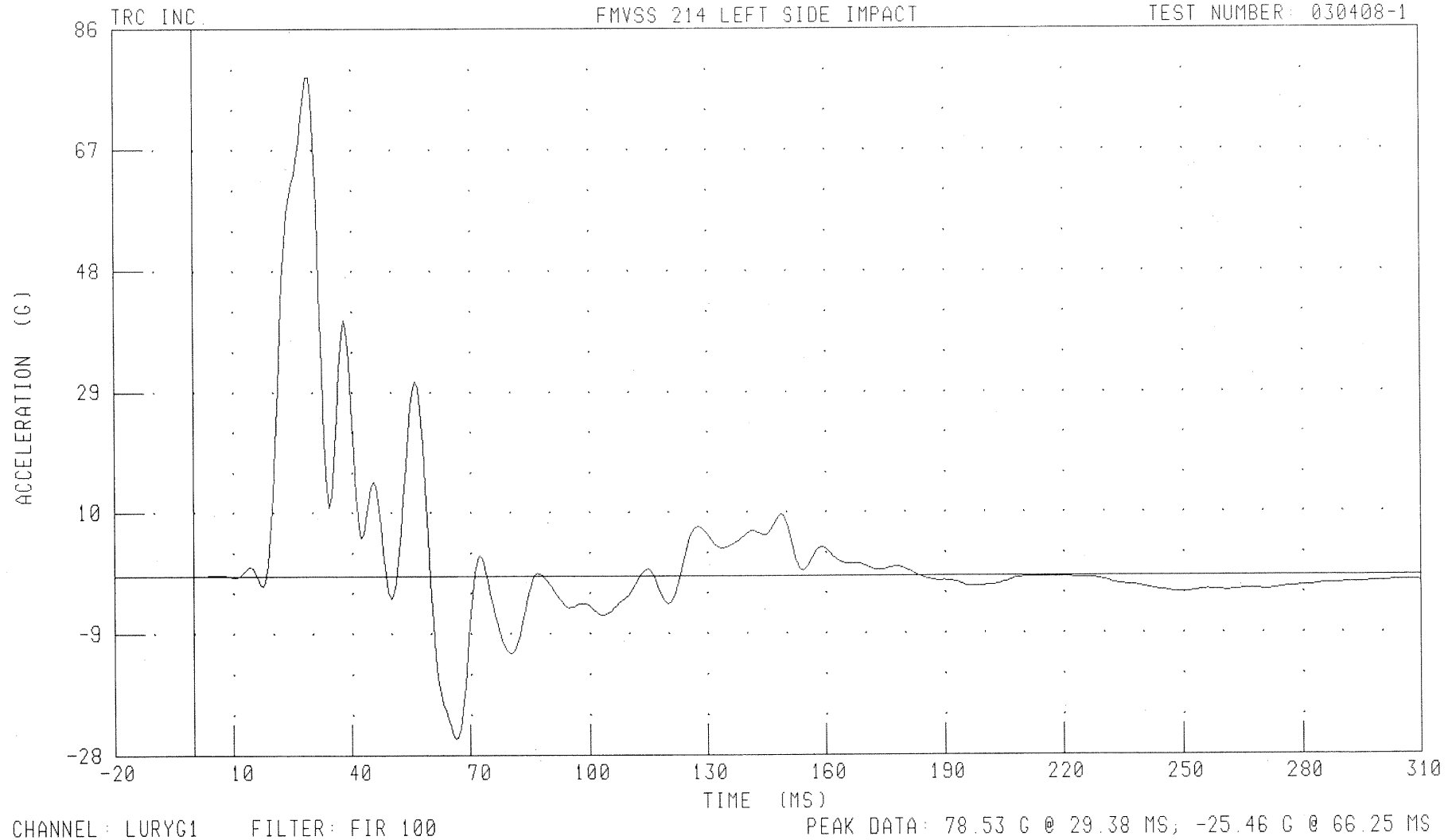
030408-1

Driver and Passenger Dummy Instrumentation Plots
Acceleration Data - FIR Filtered

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER UPPER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



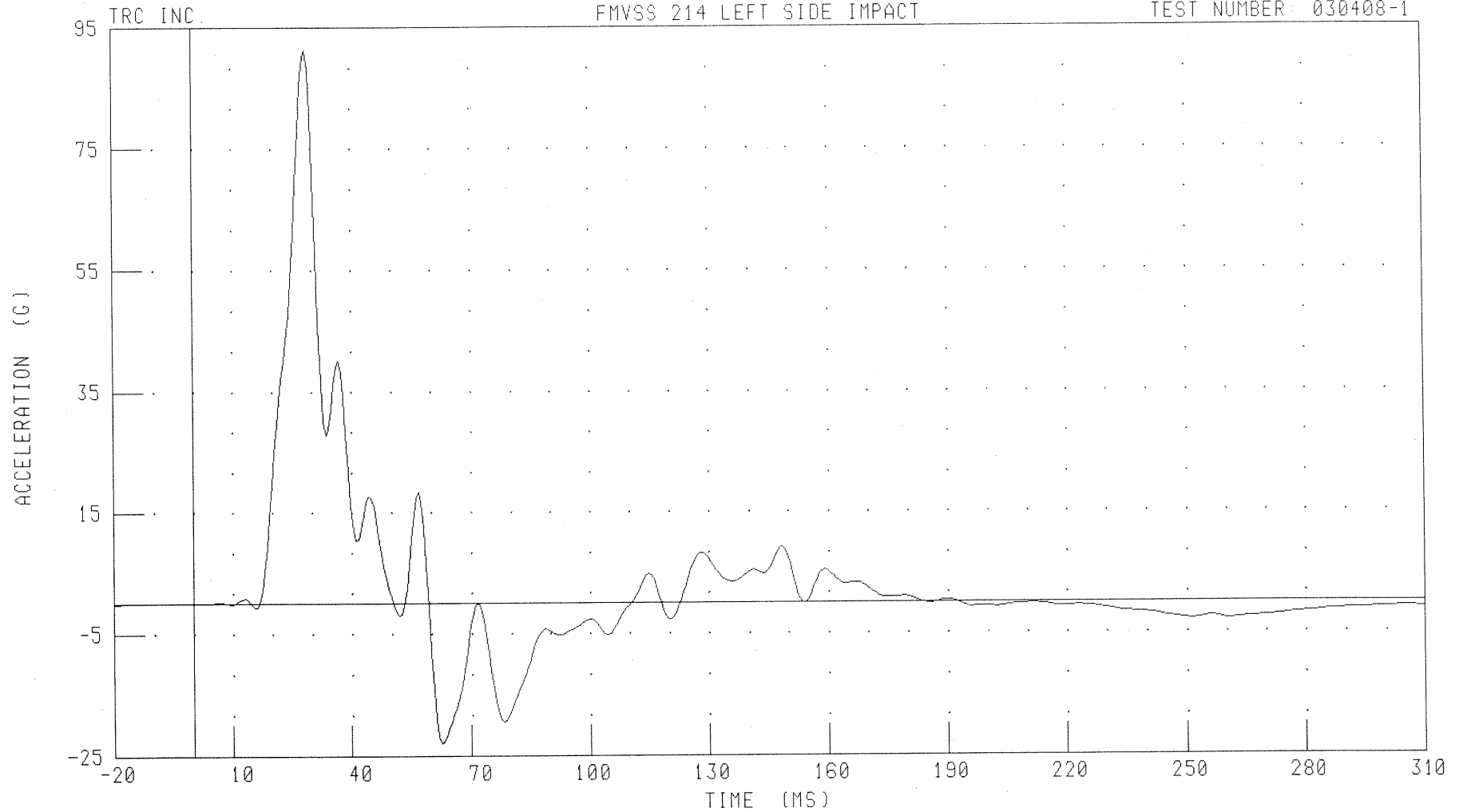
B-153

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYG1 FILTER: FIR 100

PEAK DATA: 91.36 G @ 28.75 MS; -23.03 G @ 62.50 MS

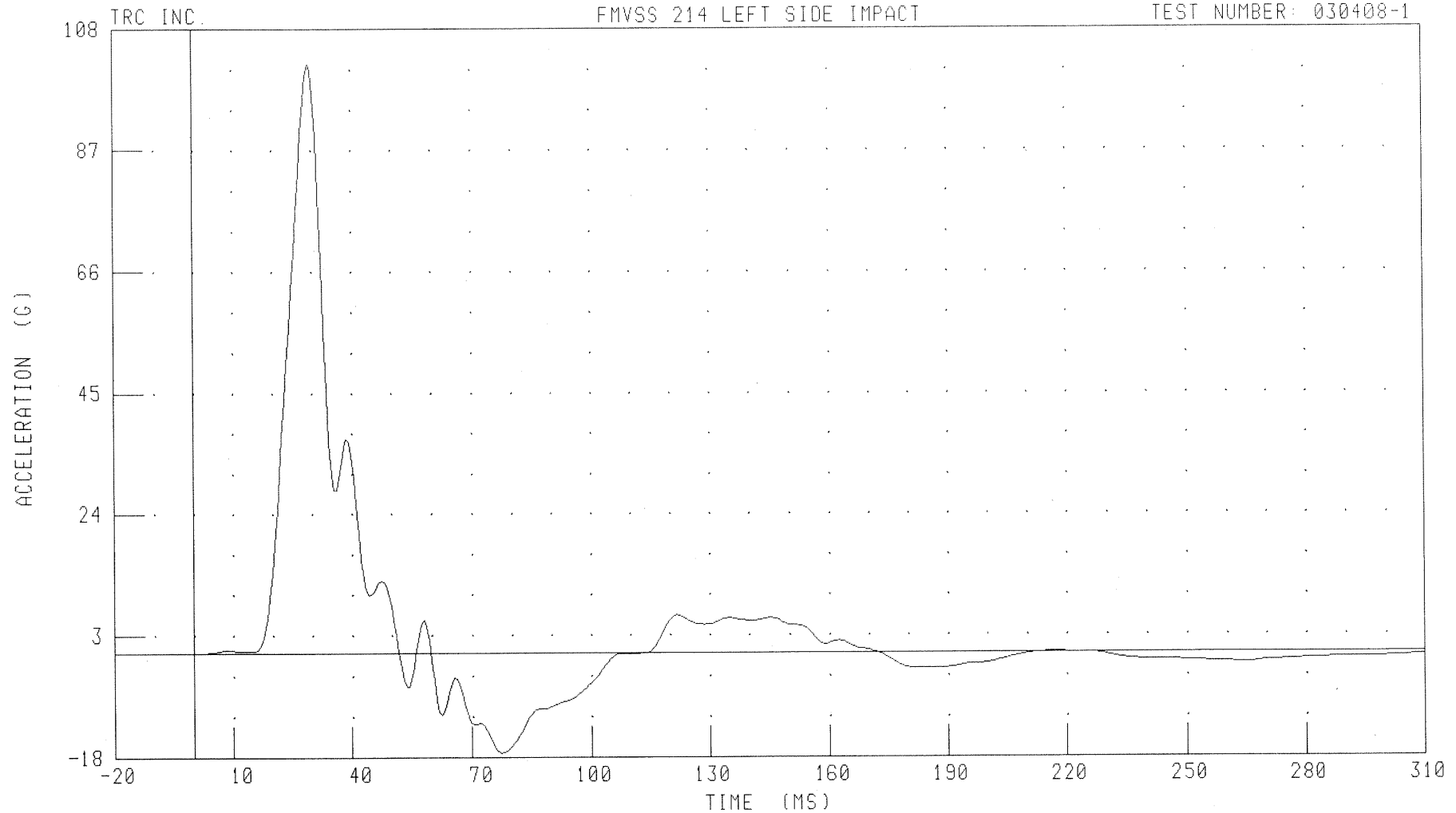
B-154

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER SPINE Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YG1 FILTER: FIR 100

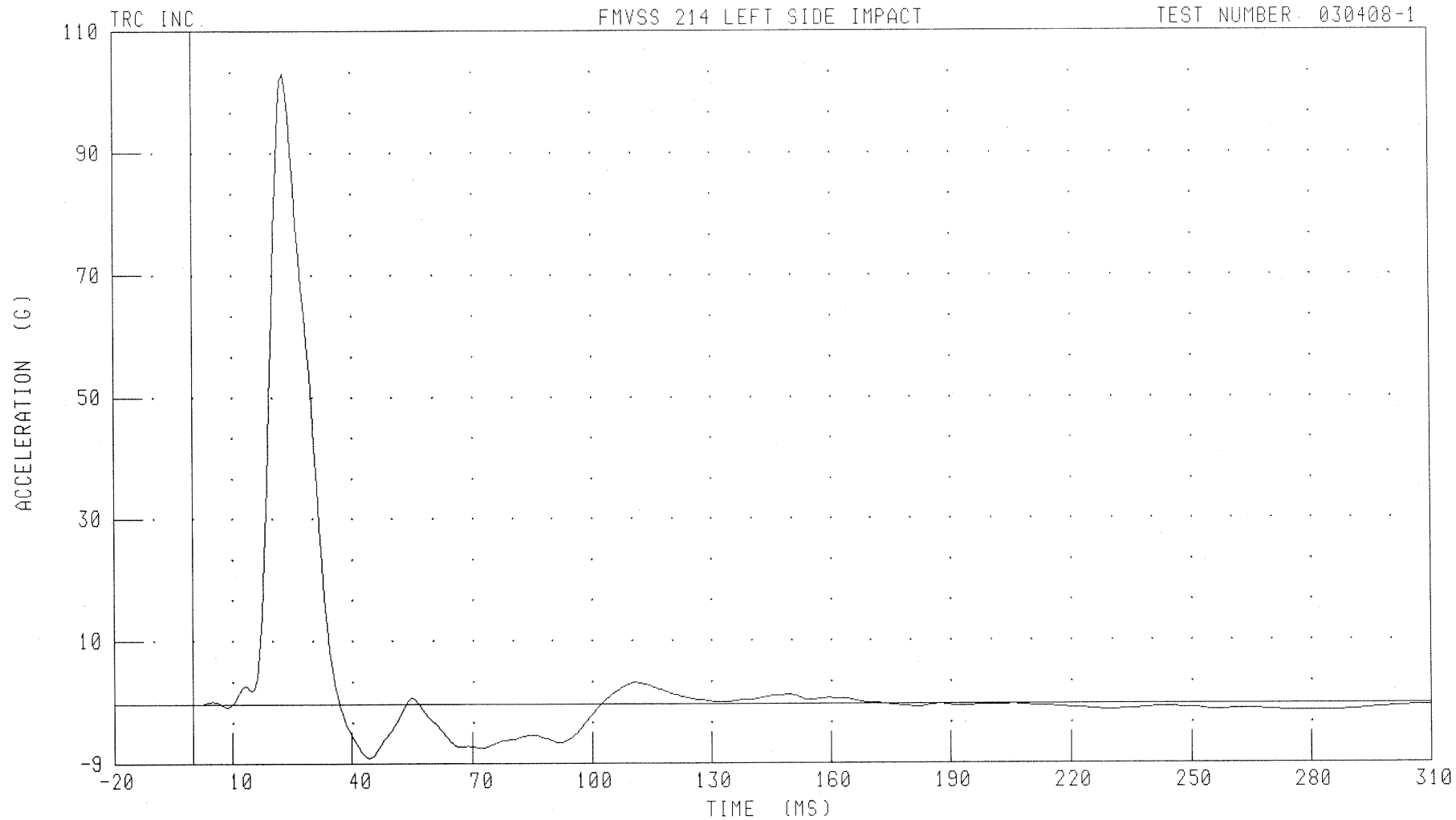
B-155

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER PELVIS Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYG1 FILTER: FIR 100

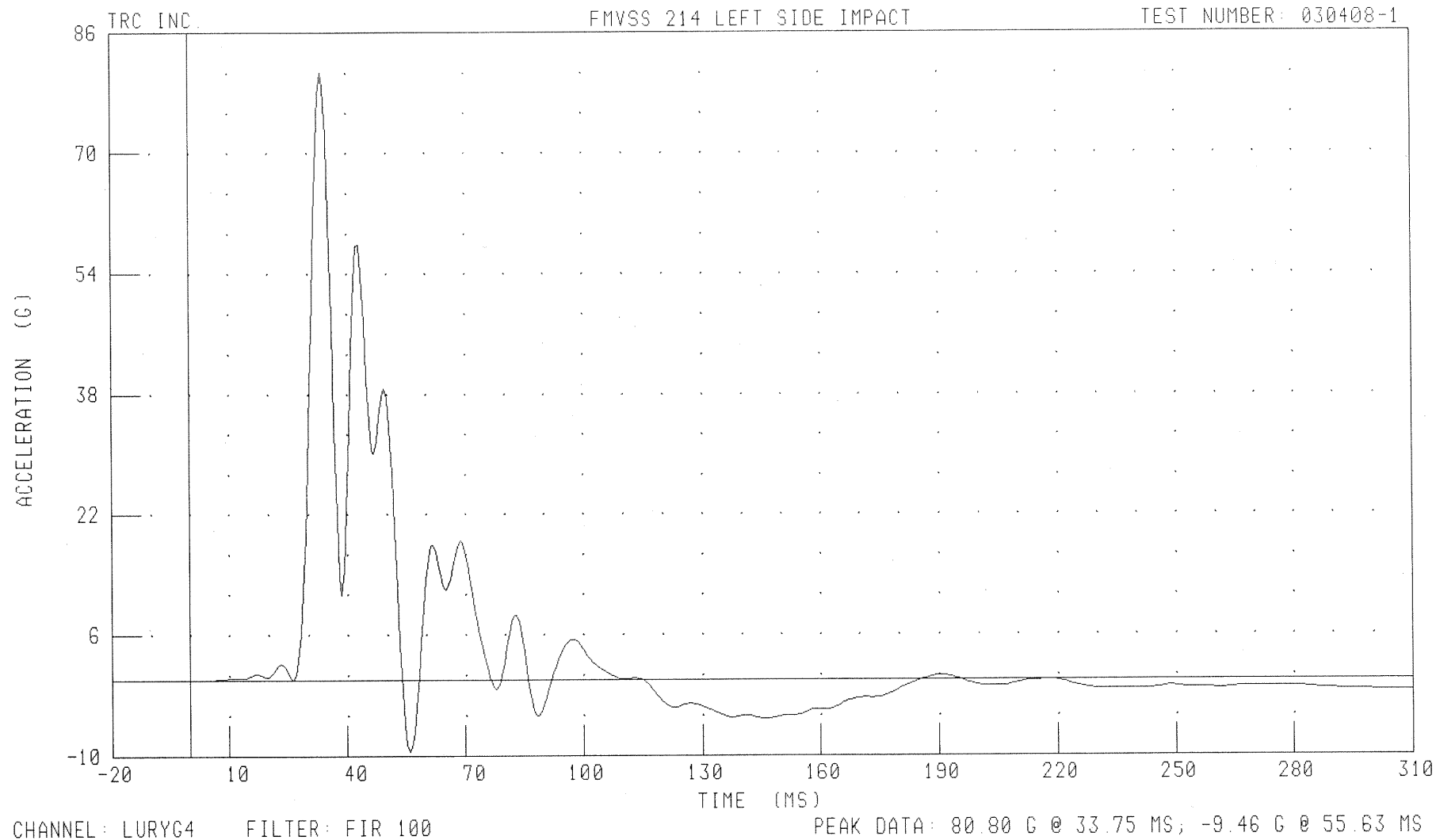
B-156

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER UPPER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



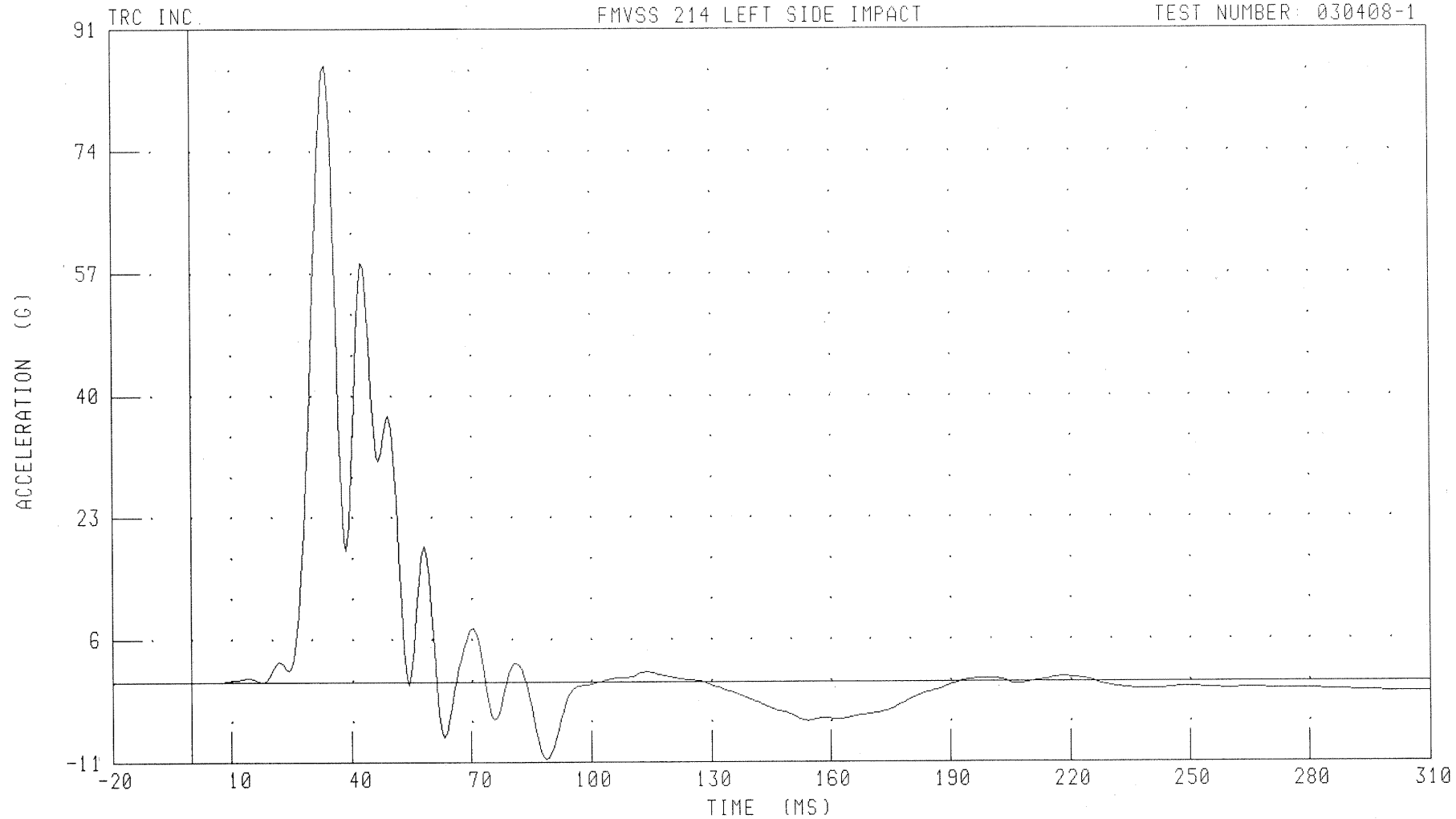
B-157

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER RIB Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYG4 FILTER: FIR 100

PEAK DATA: 85.98 G @ 33.75 MS; -10.65 G @ 88.75 MS

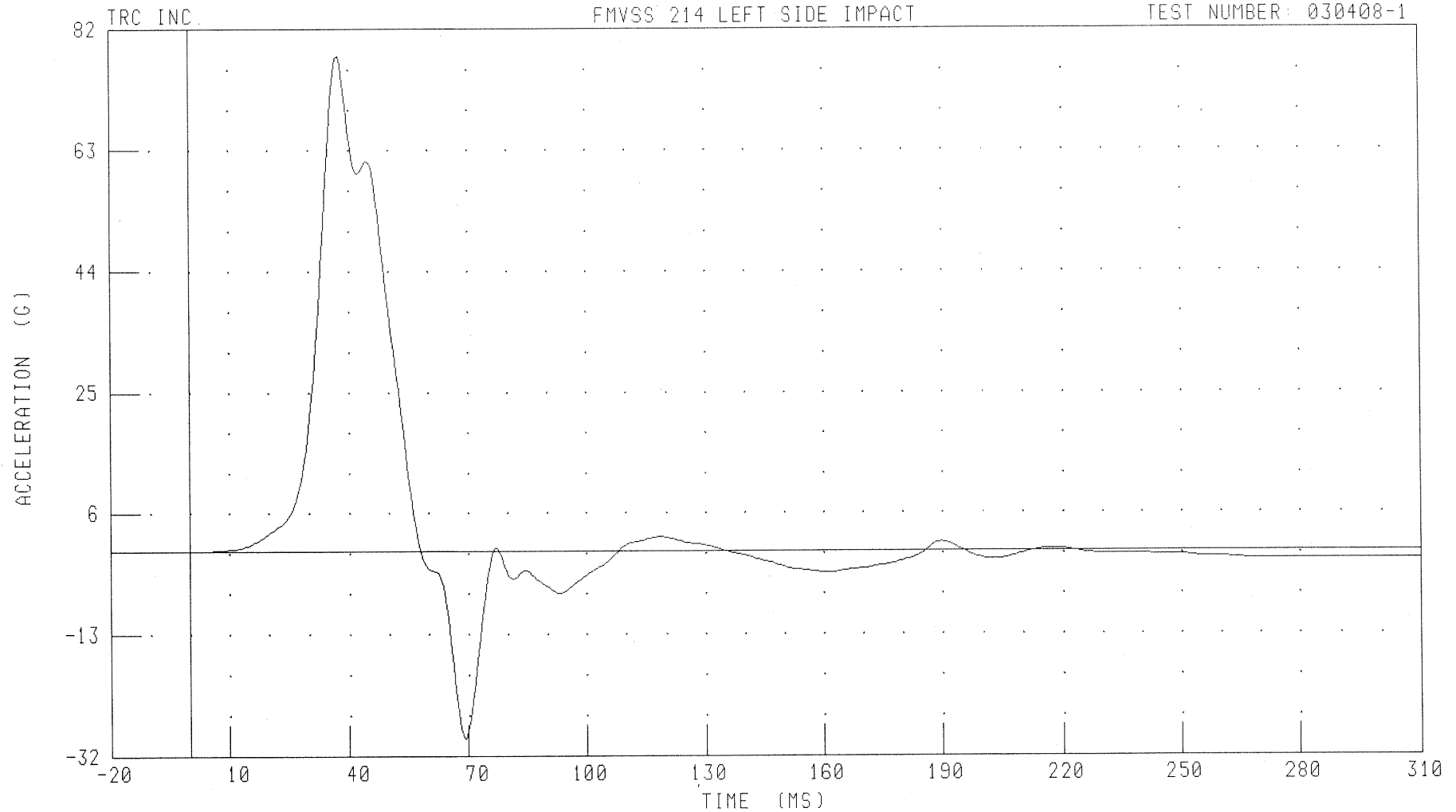
B-158

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YG4 FILTER: FIR 100

PEAK DATA: 77.87 G @ 37.50 MS; -29.22 G @ 69.38 MS

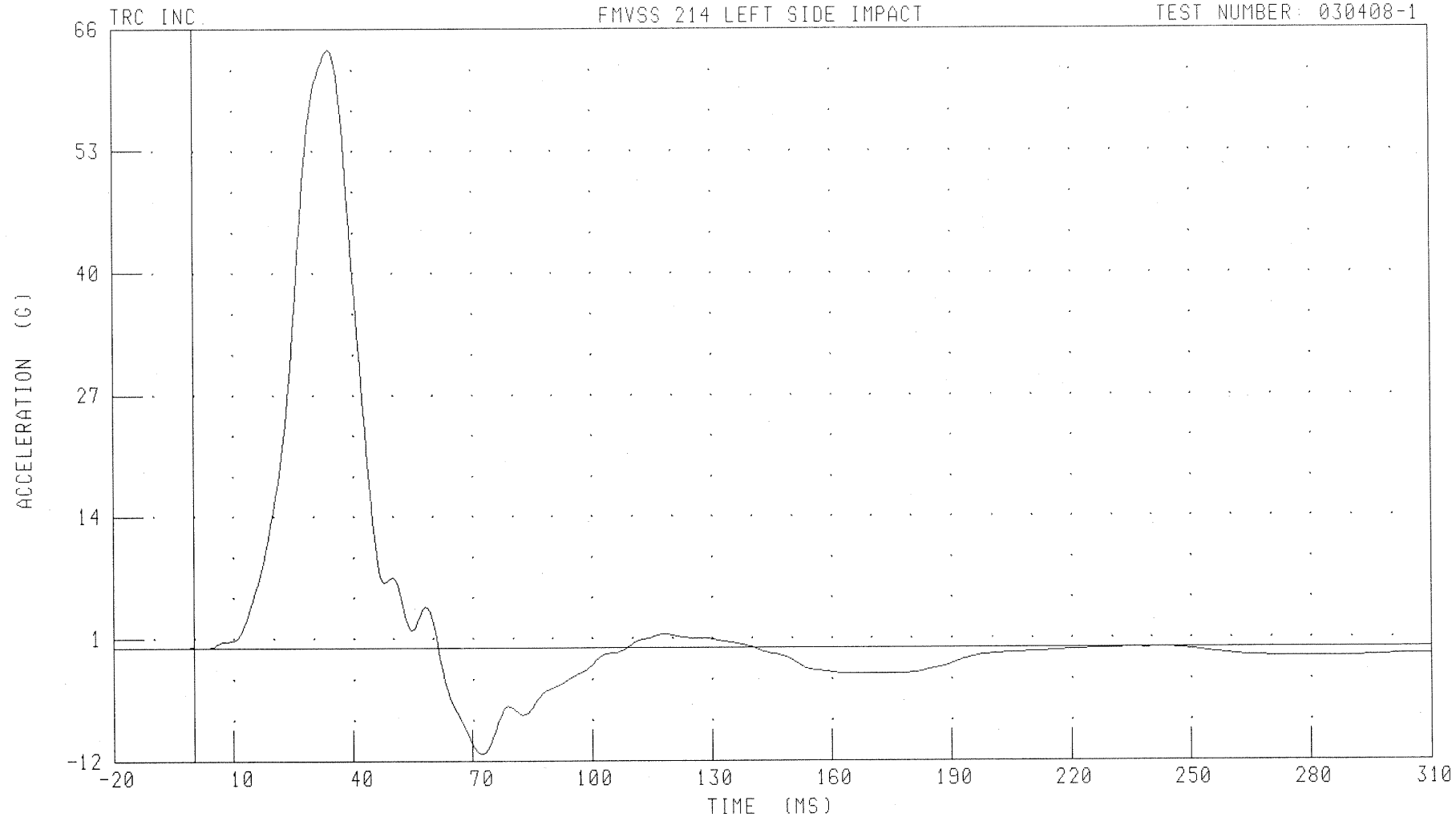
B-159

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER PELVIS Y-AXIS ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYG4 FILTER: FIR 100

B-160

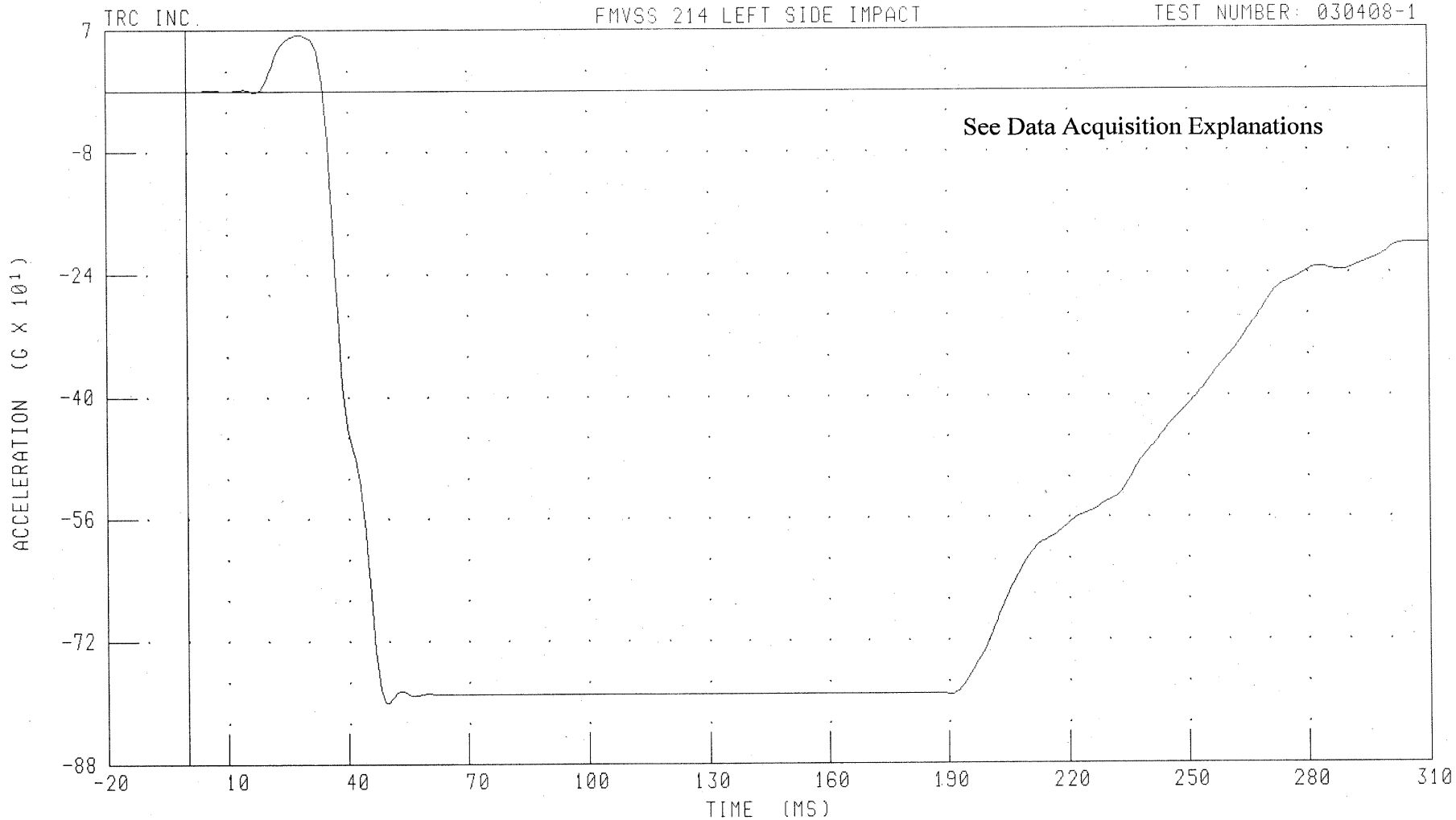
030408-1

Driver and Passenger Dummy Instrumentation Plots
Acceleration Data - FIR Filtered - Redundant

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER UPPER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LURYR1 FILTER: FIR 100

PEAK DATA: 72.18 G @ 28.13 MS; -801.23 G @ 49.37 MS

B-162

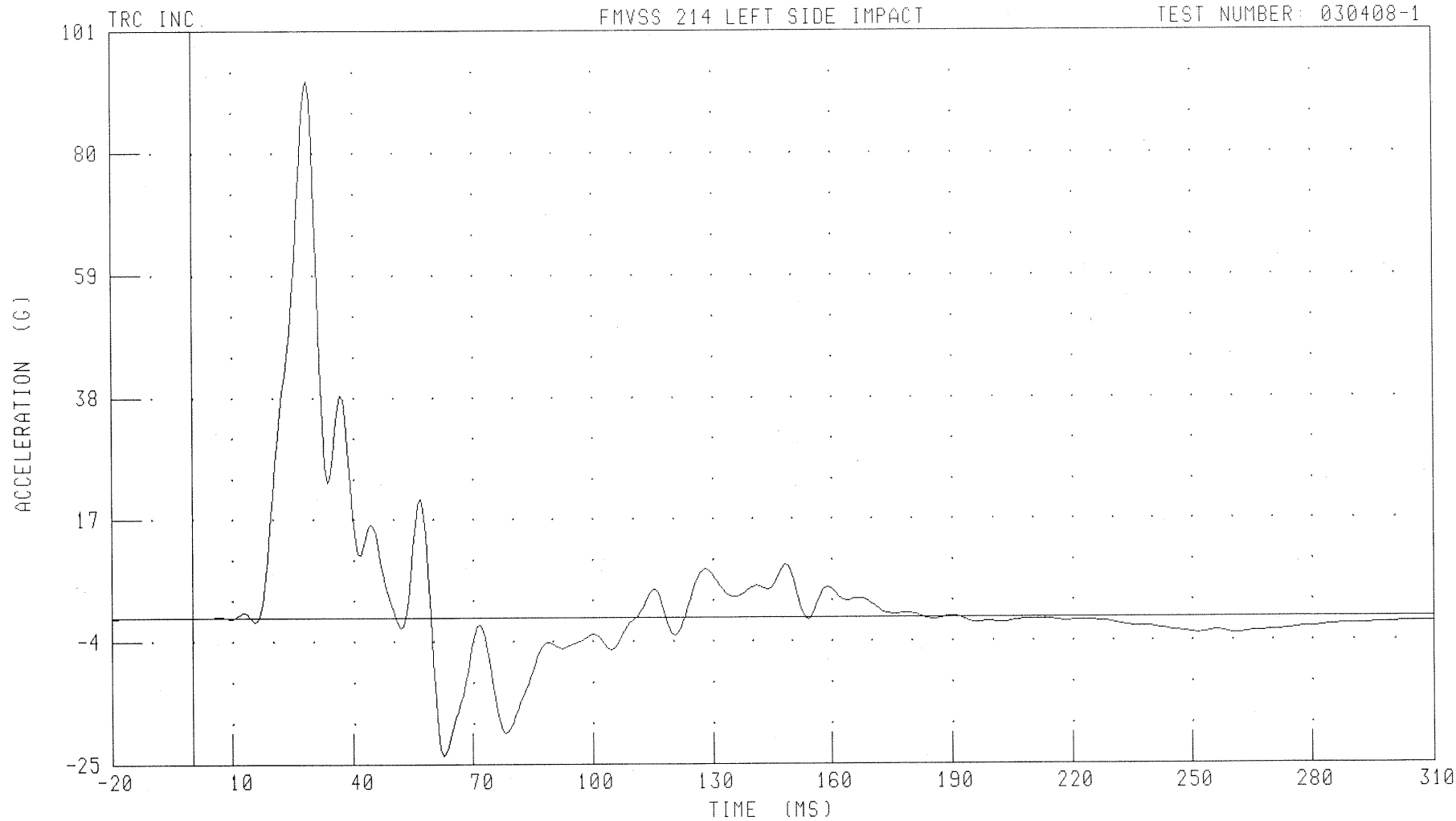
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

DRIVER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LLRYR1 FILTER: FIR 100

PEAK DATA: 92.55 G @ 28.75 MS; -23.59 G @ 62.50 MS

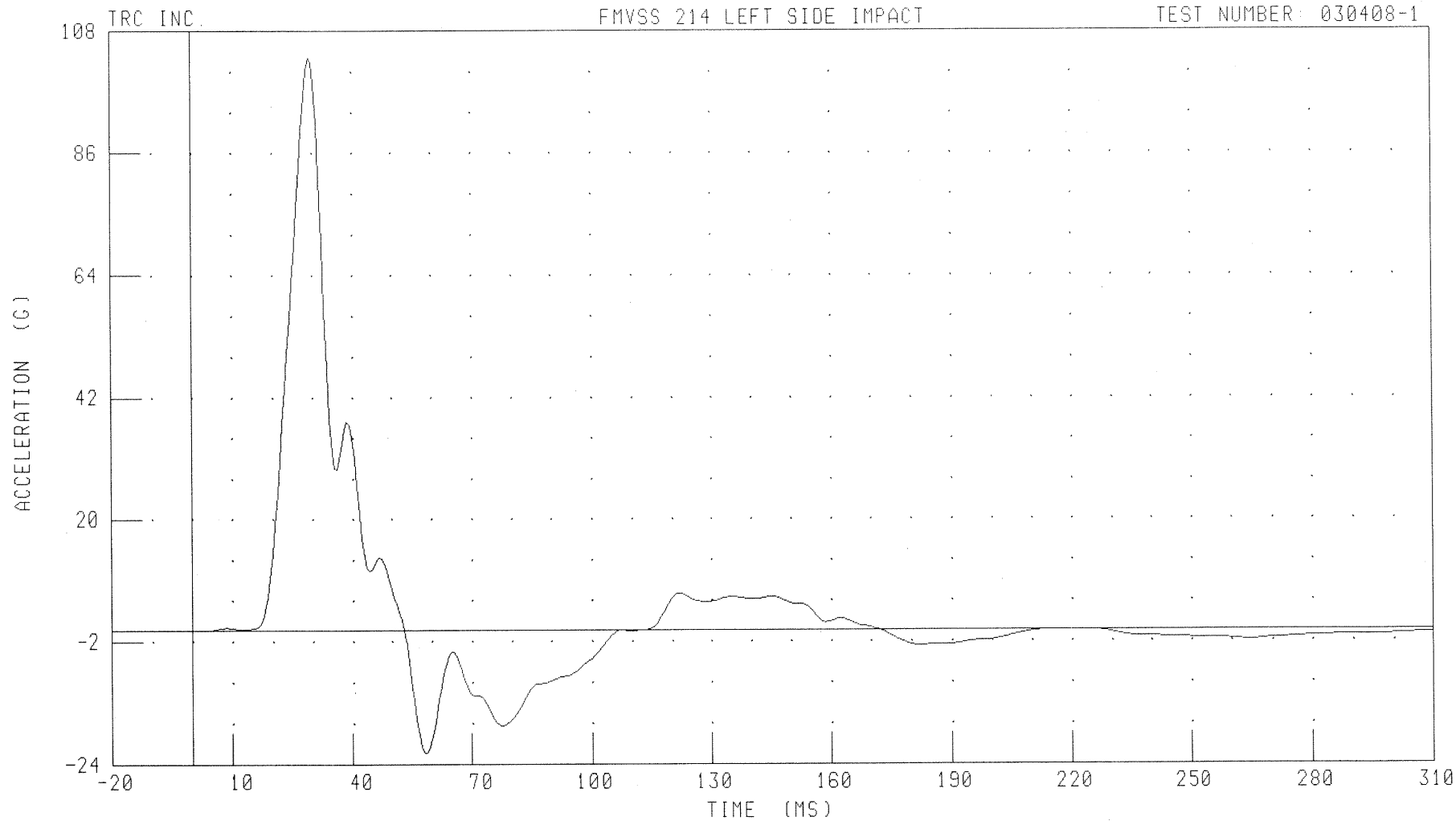
B-163

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YR1 FILTER: FIR 100

PEAK DATA: 103.21 G @ 29.38 MS; -21.95 G @ 58.75 MS

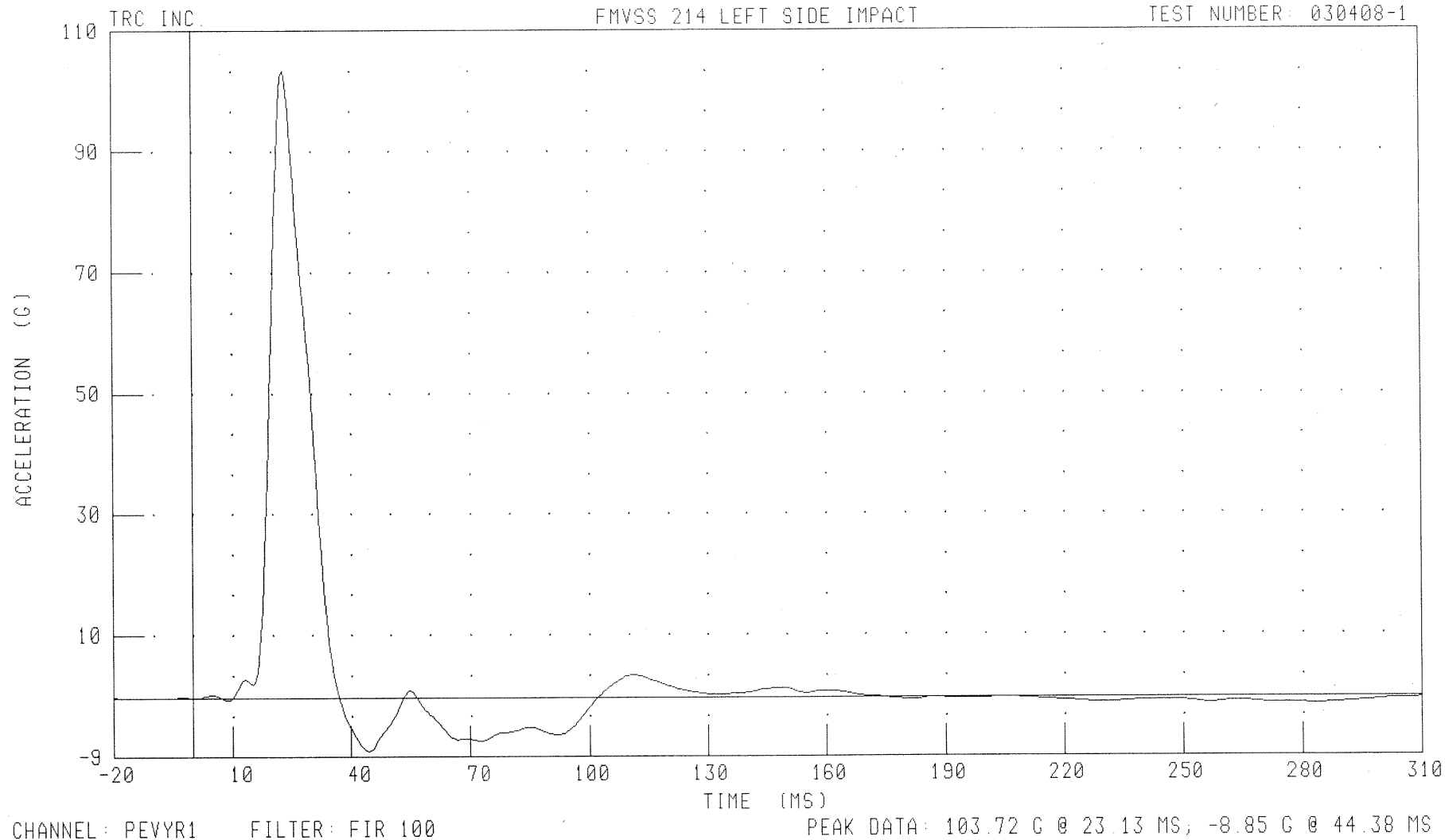
B-164

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
DRIVER PELVIS Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



B-165

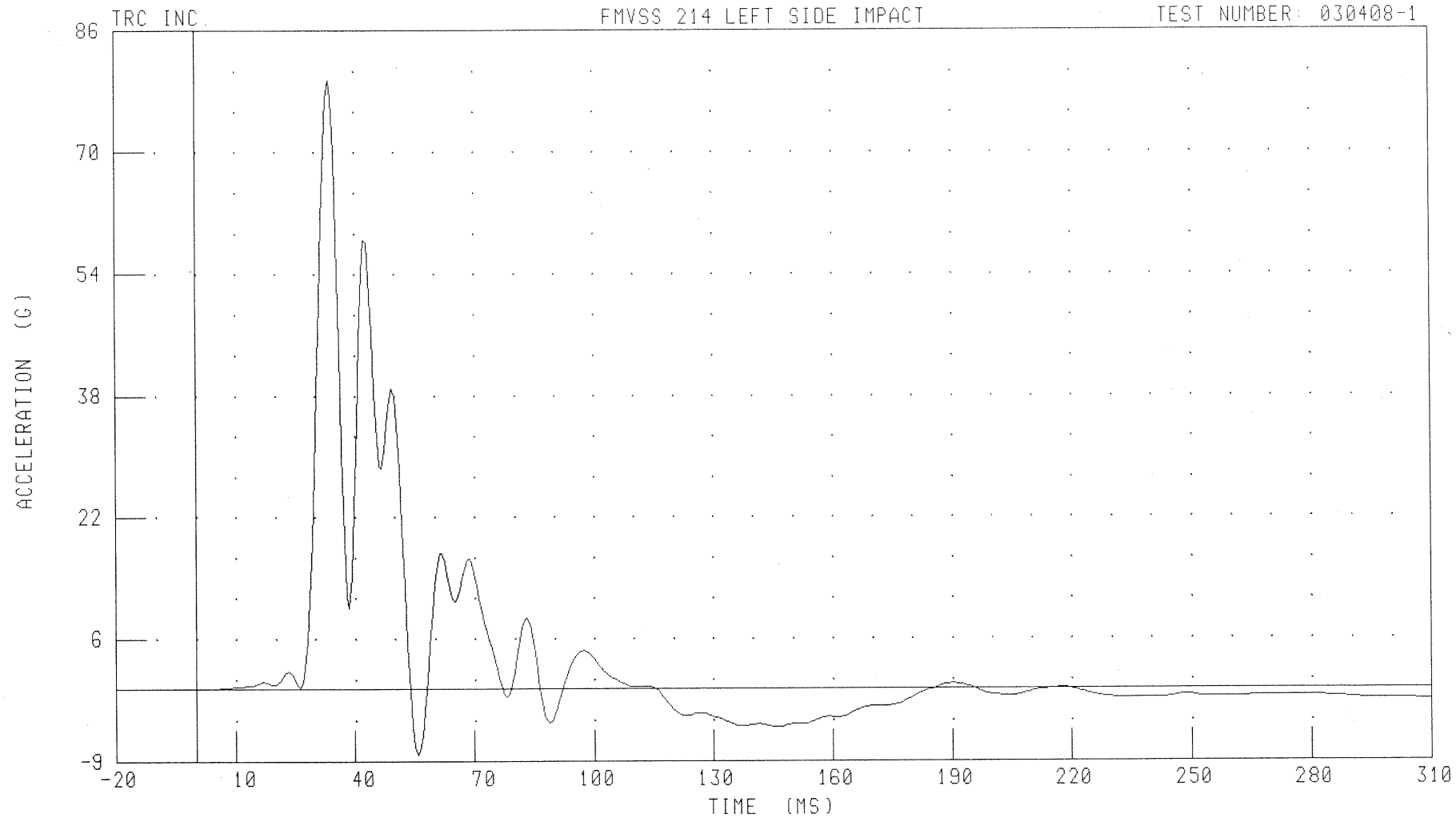
030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION

LEFT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: LURYR4

FILTER: FIR 100

PEAK DATA: 80.08 G @ 33.75 MS; -8.64 G @ 55.63 MS

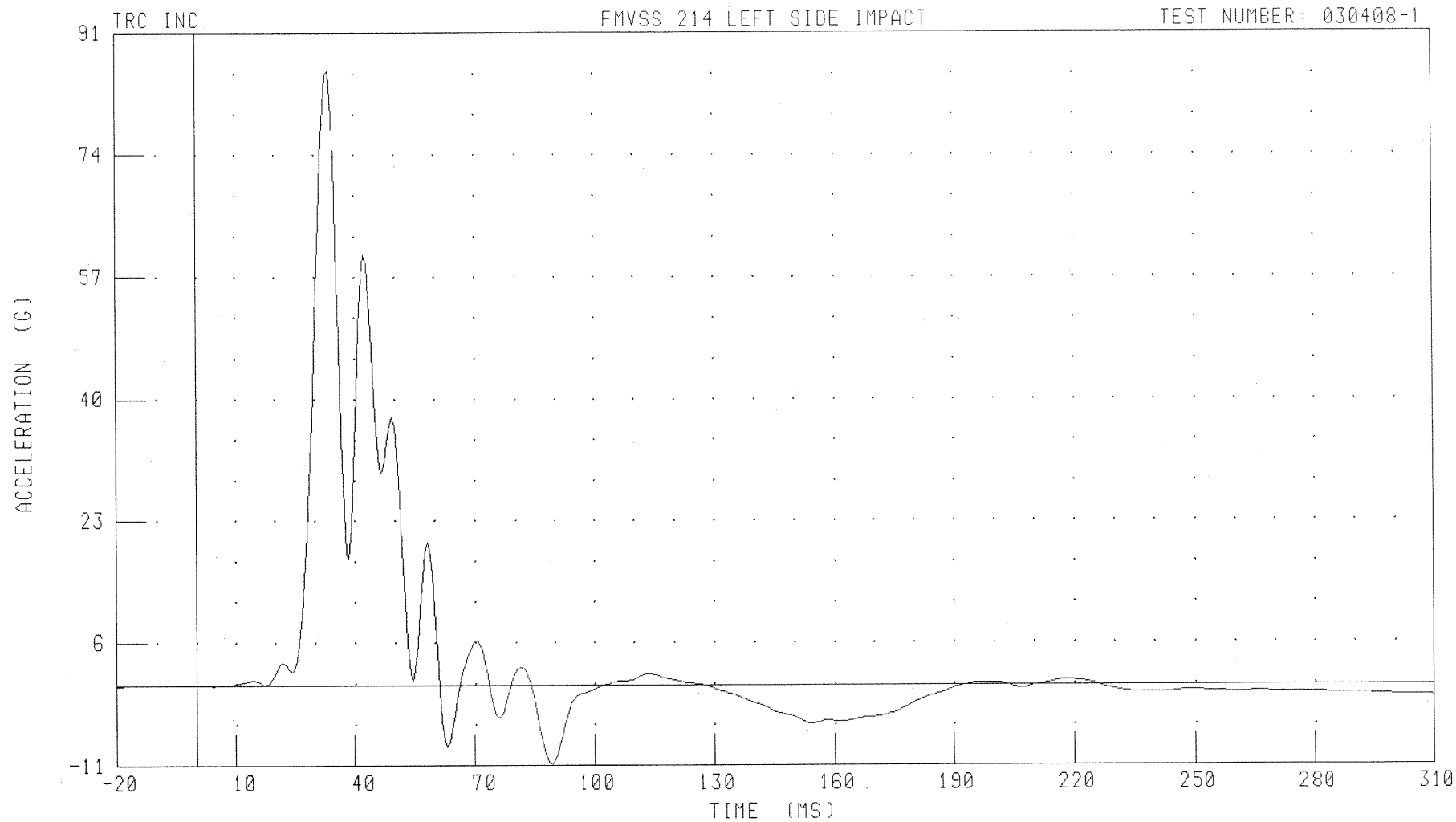
B-166

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



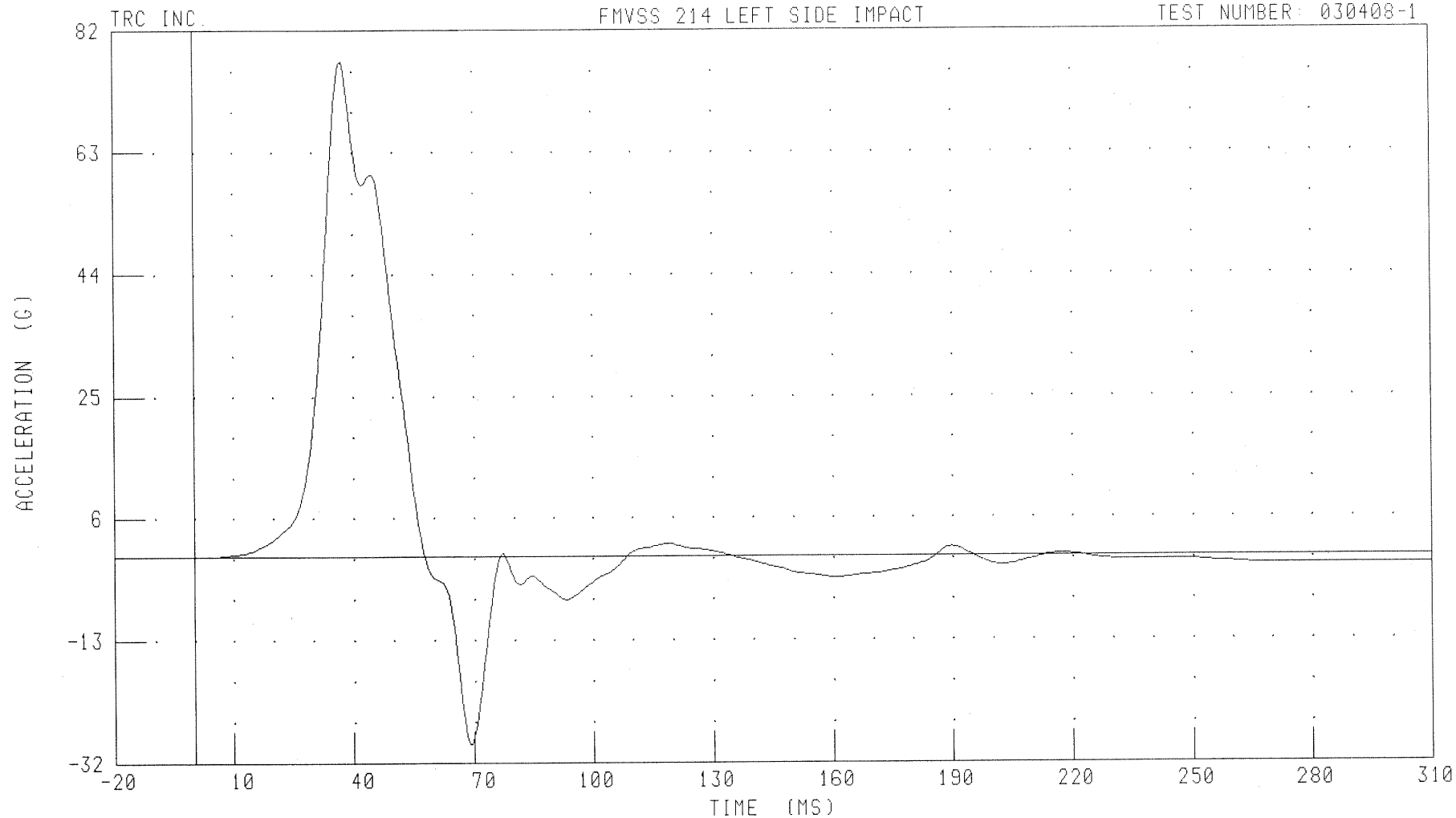
B-167

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: T12YR4 FILTER: FIR 100

PEAK DATA: 77.15 G @ 37.50 MS; -29.10 G @ 69.38 MS

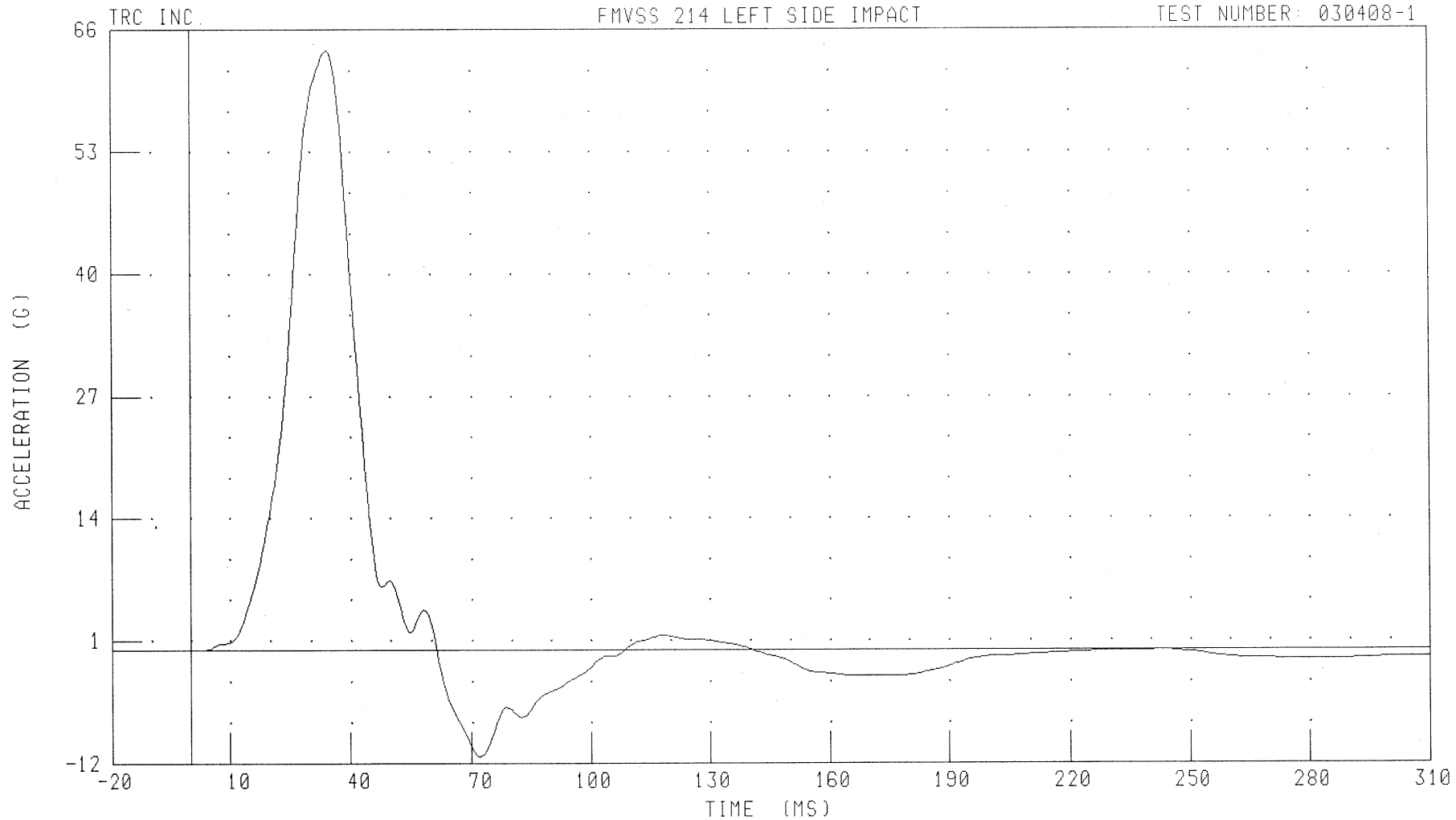
B-168

030408-1

55/28 KPH 90 DEGREE SIDE IMPACT (MOVING DEFORMABLE BARRIER) INTO LEFT SIDE OF 2003 SATURN ION
LEFT REAR PASSENGER PELVIS Y-AXIS REDUNDANT ACCELERATION

FMVSS 214 LEFT SIDE IMPACT

TEST NUMBER: 030408-1



CHANNEL: PEVYR4 FILTER: FIR 100

PEAK DATA: 63.80 G @ 34.38 MS; -11.30 G @ 71.88 MS

B-169

030408-1

Appendix C

SID-HIII Configuration And Performance Verification Data

Summary
SID-HIII Pre-Test And Post-Test Calibration

Configured For Left Side Impact

Date: March 21 – April 14, 2003 TRC Inc. Test Number: 028C03/C04 & 066C06/C07

Laboratory Technician: Jack Willeke, Chris Roberts

Test Parameter	Specification	SID-HIII 028		SID-HIII 066	
		Pre-Test	Post-Test	Pre-Test	Post-Test
SH - seated height (mm)	889-909	898	896	901	903
RH - Rib Height (mm)	502-520	506	504	507	508
HP - Hip Pivot Height (mm)	99 ref	99.1	99.1	99.1	99.1
RD - Rib from Back Line (mm)	229-241	235	233	236	237
KH - Knee Pivot from Back Line (mm)	511-526	513	514	518	519
KV - Knee Pivot to Floor (mm)	490-505	499	498	499	498
HW - Hip Width (mm)	356-391	374	373	387	388
Thorax Impacts					
Temperature (°C)	18.9-25.5	21.7	21.7	21.7	21.7
Relative Humidity (%)	10-70	46	40	44	38
Probe Speed (m/s)	4.27-4.33	4.27	4.30	4.26	4.26
Upper Rib (g's)	37-46	39.2	39.6	40.6	39.9
Lower Rib (g's)	37-46	38.5	39.1	42.9	40.6
Lower Spine (g's)	15-22	17.4	16.4	20.2	18.7
Pelvis Impacts					
Temperature (°C)	18.9-25.5	21.7	21.7	21.7	21.7
Relative Humidity (%)	10-70	46	38	44	38
Probe Speed (m/s)	4.27-4.33	4.28	4.26	4.28	4.26
Pelvis (g's)	40-60	45.5	47.0	53.2	42.6

Calibration Test Results

Pre-Test

SID-HIII: 028

Configured for Left Side Impact

External Dimensions:	The dummy passed all external dimension requirements.
Lateral Head Drop Test:	The head passed all lateral drop test requirements.
Lateral Neck Test:	The neck passed all impact test requirements.
Lateral Thorax Impact Test:	The thorax passed all impact test requirements.
Thoracic Shock Absorber Test:	The thorax passed all shock absorber requirements (tested on February 3, 2003, for a previous calibration series).
Lumbar Flexion Test:	The dummy met the lumbar flexion test requirements.
Abdominal Compression Test:	The abdomen met the compression test requirements.
Pelvis Impact Test:	The lateral pelvis passed all impact test requirements.

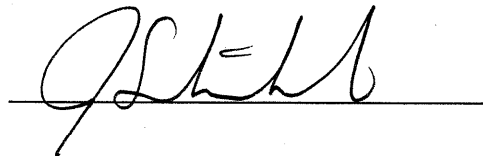
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 028 Calibration No. 03

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	898 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	506 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Rib From Backline	RD	228.6 - 241.3 mm	235 mm	Yes
Knee Pivot From Backline	KH	510.5 - 525.8 mm	513 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	499 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	374 mm	Yes
Top Rib Width From CVL	RW-1	165.1 - 180.3 mm	173 mm	Yes
Bottom Rib Width From CVL	RW-2	165.1 - 180.3 mm	172 mm	Yes
Difference Between Top & Bottom Rib Width from CVL		<= 2.5 mm	1.0 mm	Yes

Technician



Approved




TRANSPORTATION RESEARCH CENTER INC.

LATERAL HEAD DROP TEST

HYBRIDI III SID DUMMY

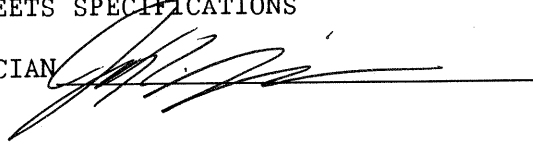
24-MAR-03

LEFT SIDE CONFIGURATION

TRC INC. TEST NO. HDL02803 572M SID/HIII SN028 HEAD CAL03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.6 deg. C	21.67 deg. C
RELATIVE HUMIDITY	10 - 70 %	44.00 %
PEAK RESULTANT ACCELERATION	120 - 150 G	147.14 G
PEAK LONGITUDINAL ACCELERATION	15 G MAX	-7.01 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 042103.1026;2

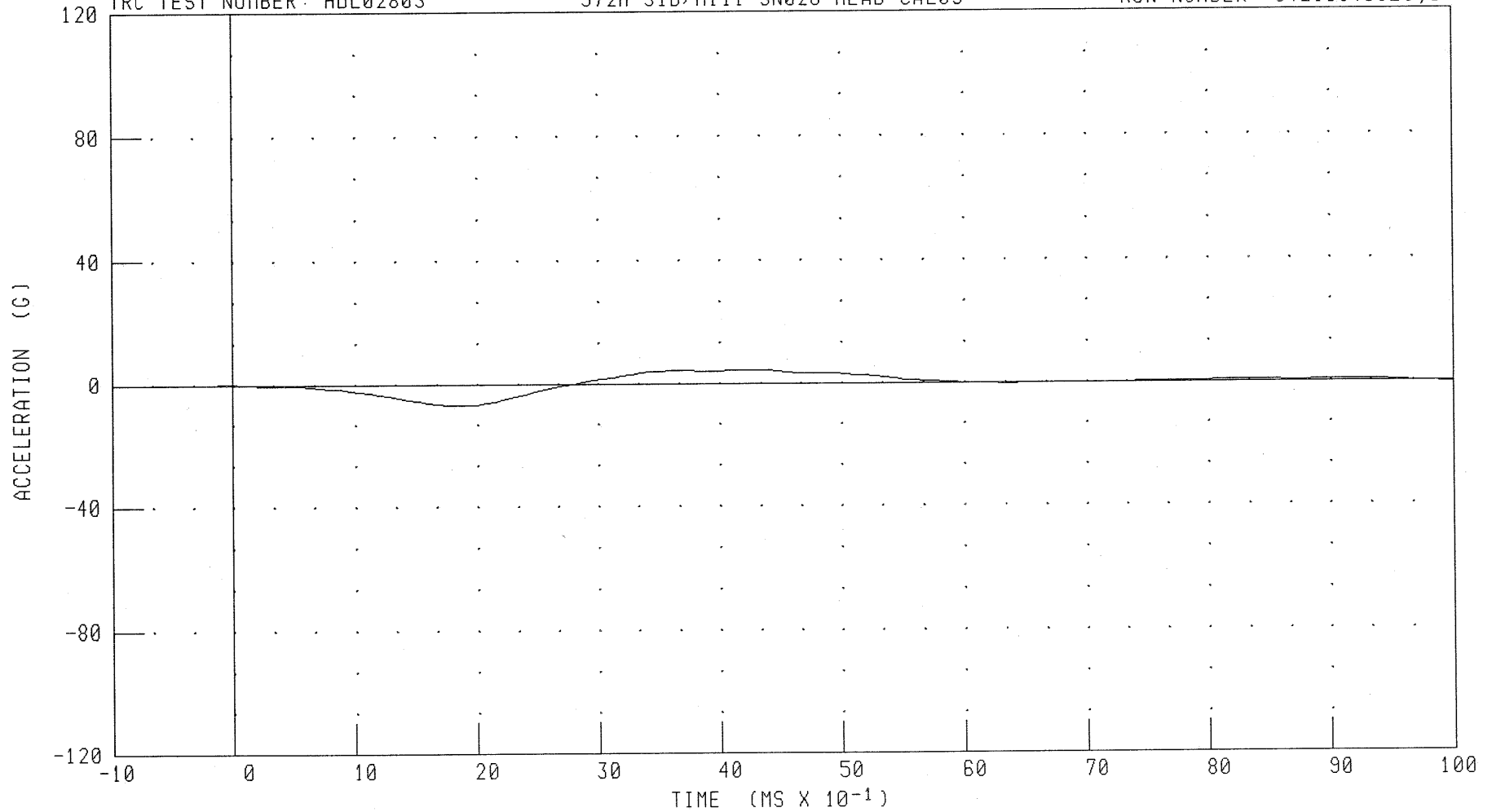
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: HDL02803

572M SID/HIII SN028 HEAD CAL03

RUN NUMBER: 042103.1026;1



CHANNEL: HEDXC

FILTER: CH. CLASS 1000

PEAK DATA: 4.39 G @ 4.32 MS; -7.01 G @ 1.84 MS

030408-1

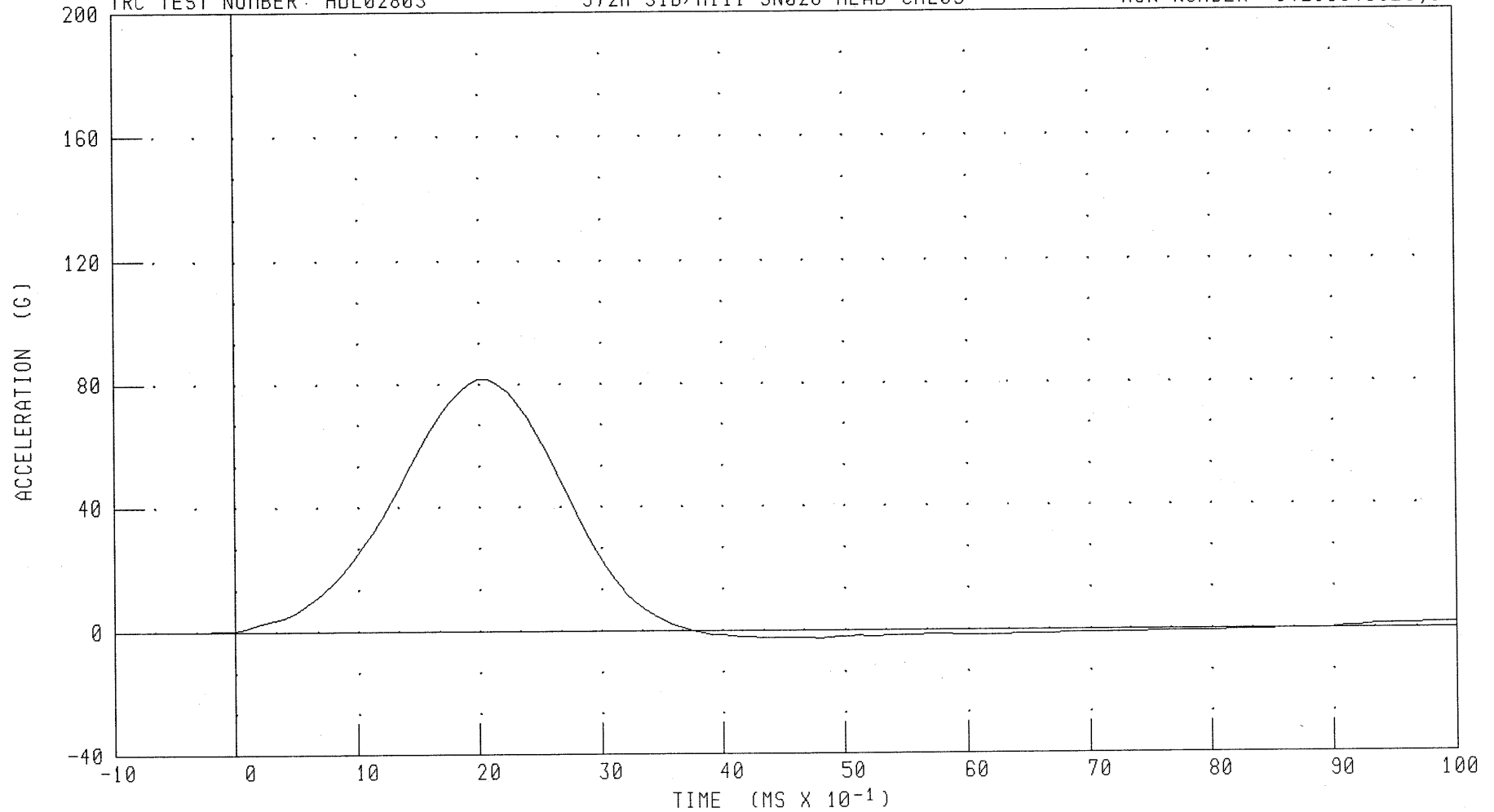
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: HDL02803

572M SID/HIII SN028 HEAD CAL03

RUN NUMBER: 042103.1026;1



CHANNEL: HEDYG

FILTER: CH. CLASS 1000

PEAK DATA: 81.49 G @ 2.00 MS; -2.70 G @ 4.80 MS

030408-1

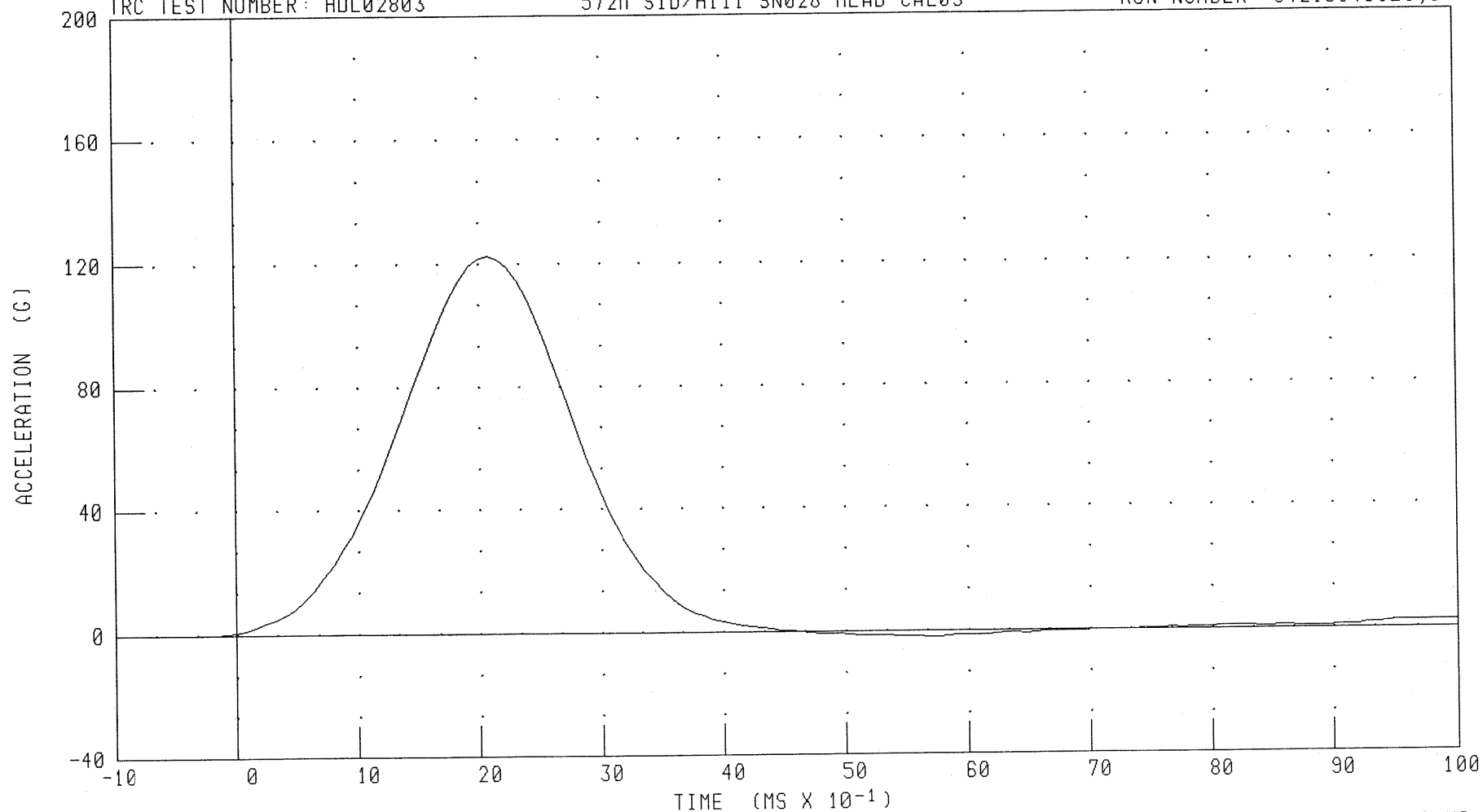
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: HDL02803

572M SID/HIII SN028 HEAD CAL03

RUN NUMBER: 042103.1026;1



CHANNEL: HEDZG

FILTER: CH. CLASS 1000

PEAK DATA: 122.41 G @ 2.08 MS; -2.10 G @ 5.76 MS

030408-1

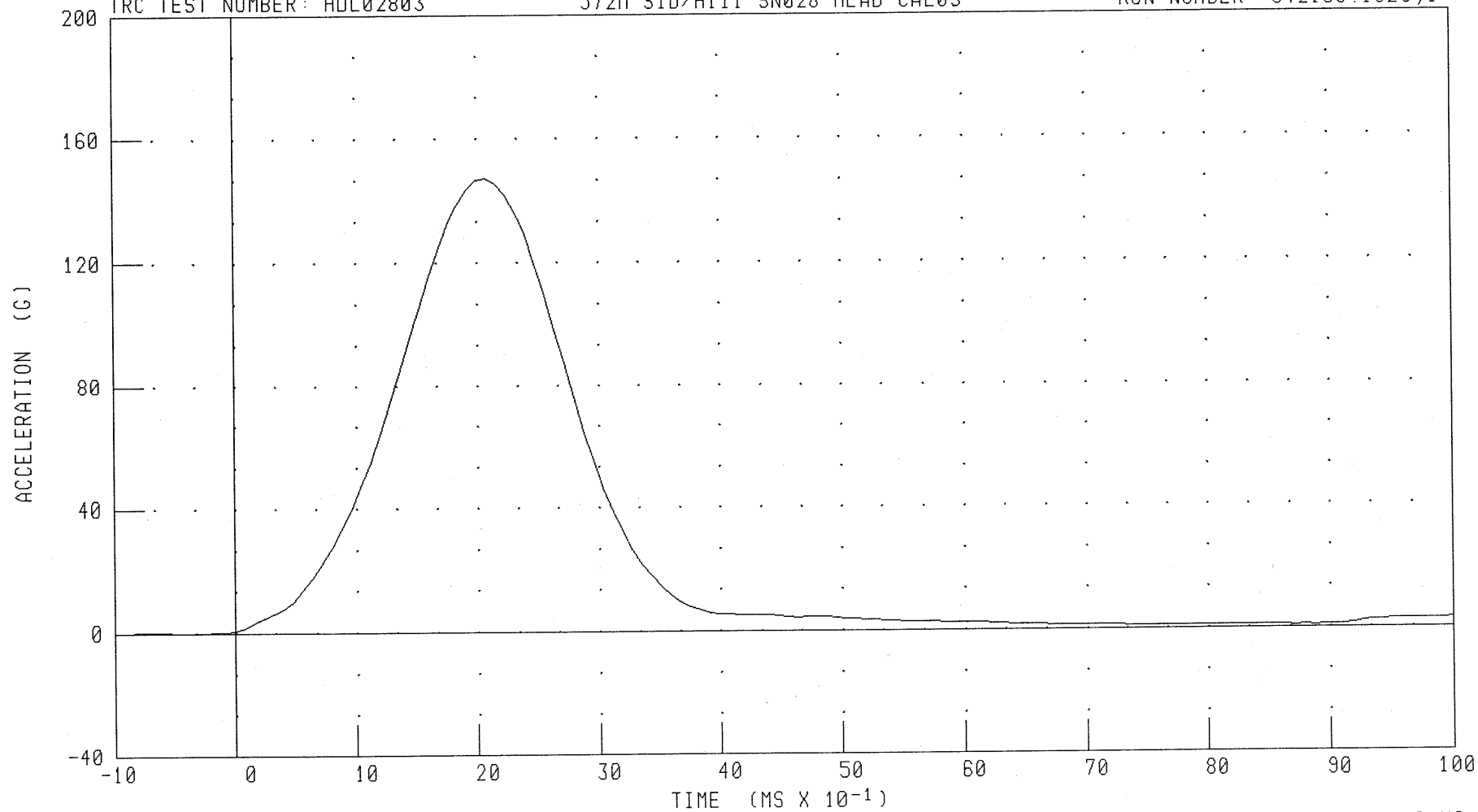
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: HDL02803

572M SID/HIII SN028 HEAD CAL03

RUN NUMBER: 042103.1026;1



CHANNEL: HEDRG

FILTER: CH. CLASS 1000

PEAK DATA: 147.14 G @ 2.08 MS; 0.03 G @ -0.40 MS

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL NECK TEST

HYBRIDI III SID DUMMY

25-MAR-03

LEFT SIDE CONFIGURATION

TRC INC. TEST NO. NFL02803 572M SID/HIII SN028 NECK LEFT CAL03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 deg. C	21.67 deg. C
RELATIVE HUMIDITY		10 - 70 %	43.00 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
INTEGRATED VELOCITY	10 MS	1.96 - 2.55 M/S	2.32 M/S
	20 MS	4.12 - 5.10 M/S	4.55 M/S
	30 MS	5.73 - 7.01 M/S	6.43 M/S
	40 - 70 MS	6.27 - 7.64 M/S	7.16- 7.29 M/S
MAXIMUM MIDSAGGITAL PLANE ROTATION		66 - 82 deg.	69.00 deg.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO		58 - 67 MS	59.20 MS
MAXIMUM MOMENT ABOUT OCCIPITAL CONDYLE		73 - 88 NM	83.15 NM
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO		49 - 64 MS	52.56 MS
TIME OF MAXIMUM ROTATION AFTER MAXIMUM MOMENT		2 - 16 MS	9.04 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 042103.1008;1

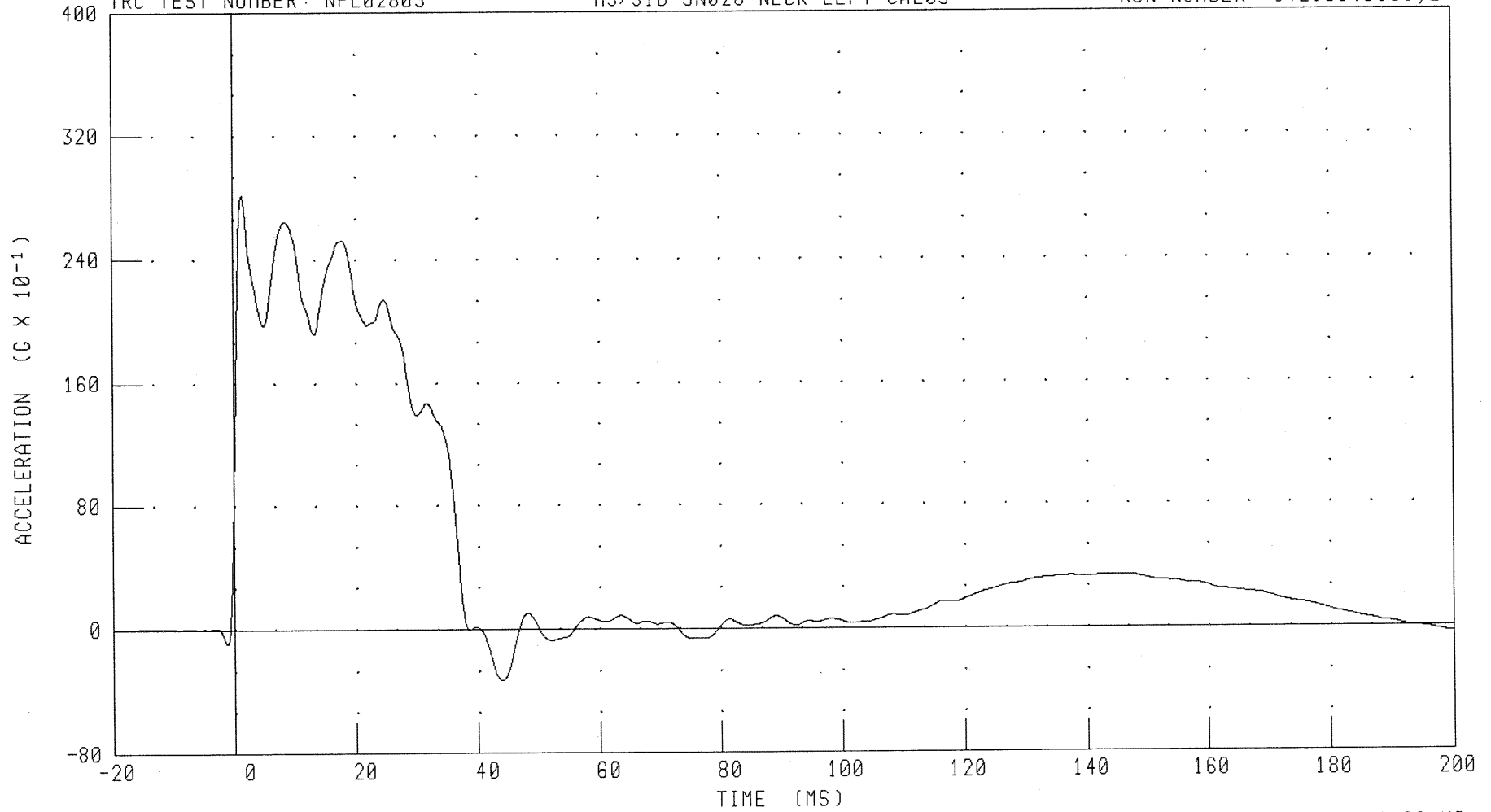
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

PENDULUM DECELERATION

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: PENXG

FILTER: CH. CLASS 100

PEAK DATA: 28.13 G @ 1.44 MS; -3.29 G @ 44.00 MS

030408-1

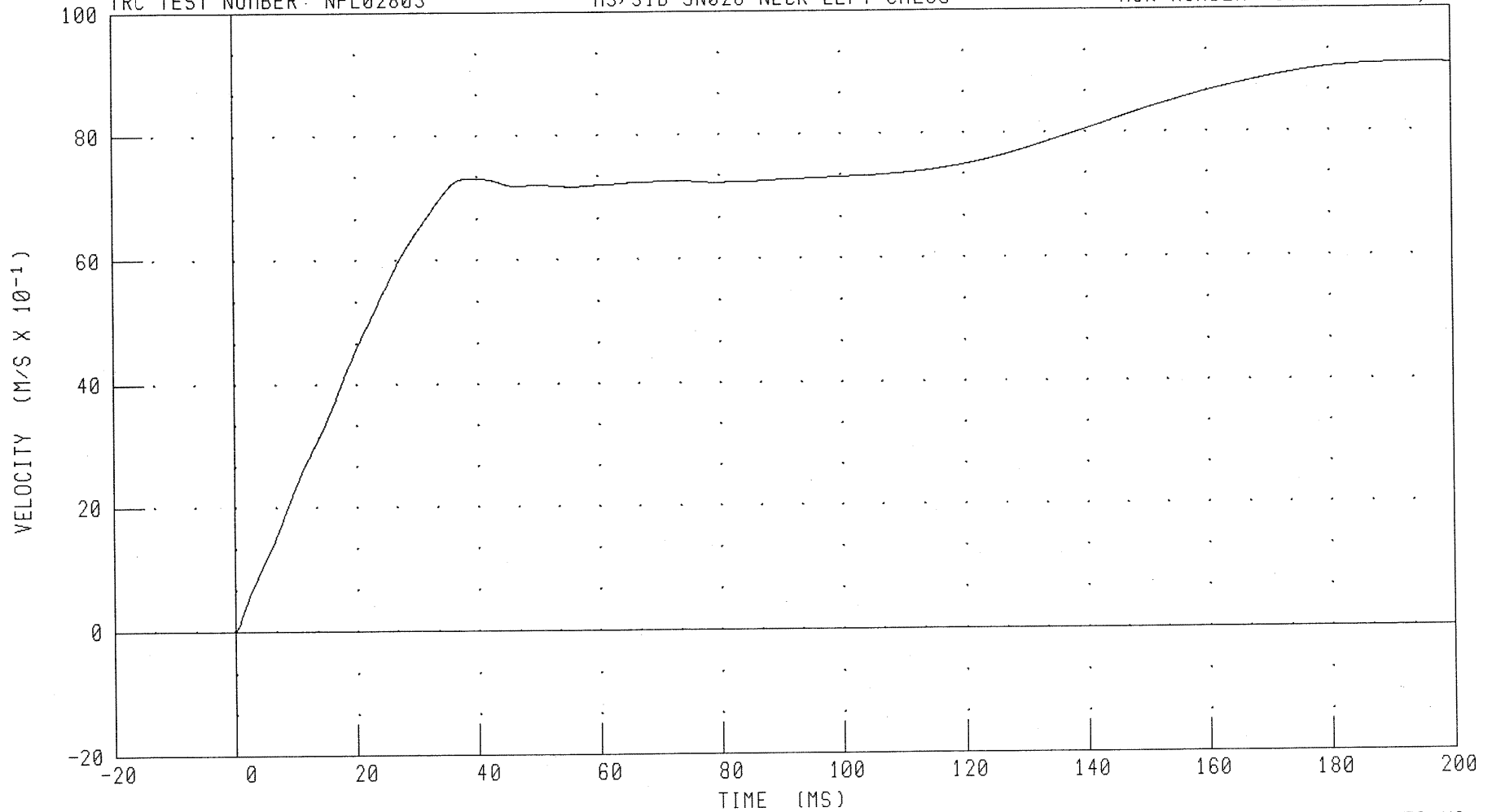
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

INTEGRATED PENDULUM VELOCITY

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: PENXVI FILTER: CH. CLASS 100

PEAK DATA: 9.11 M/S @ 193.44 MS; -0.01 M/S @ -0.72 MS

030408-1

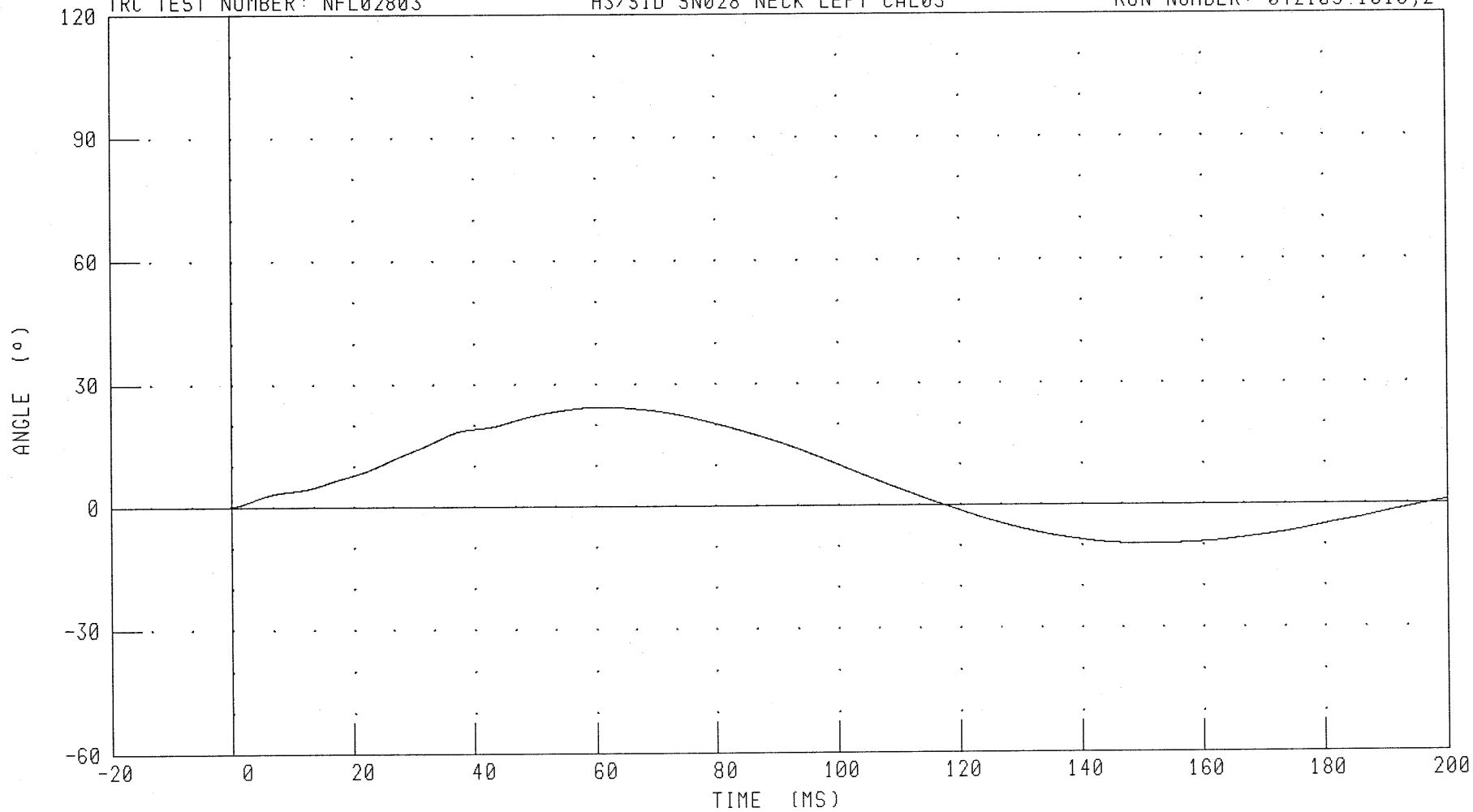
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 24.39 ° @ 61.36 MS; -9.84 ° @ 150.80 MS

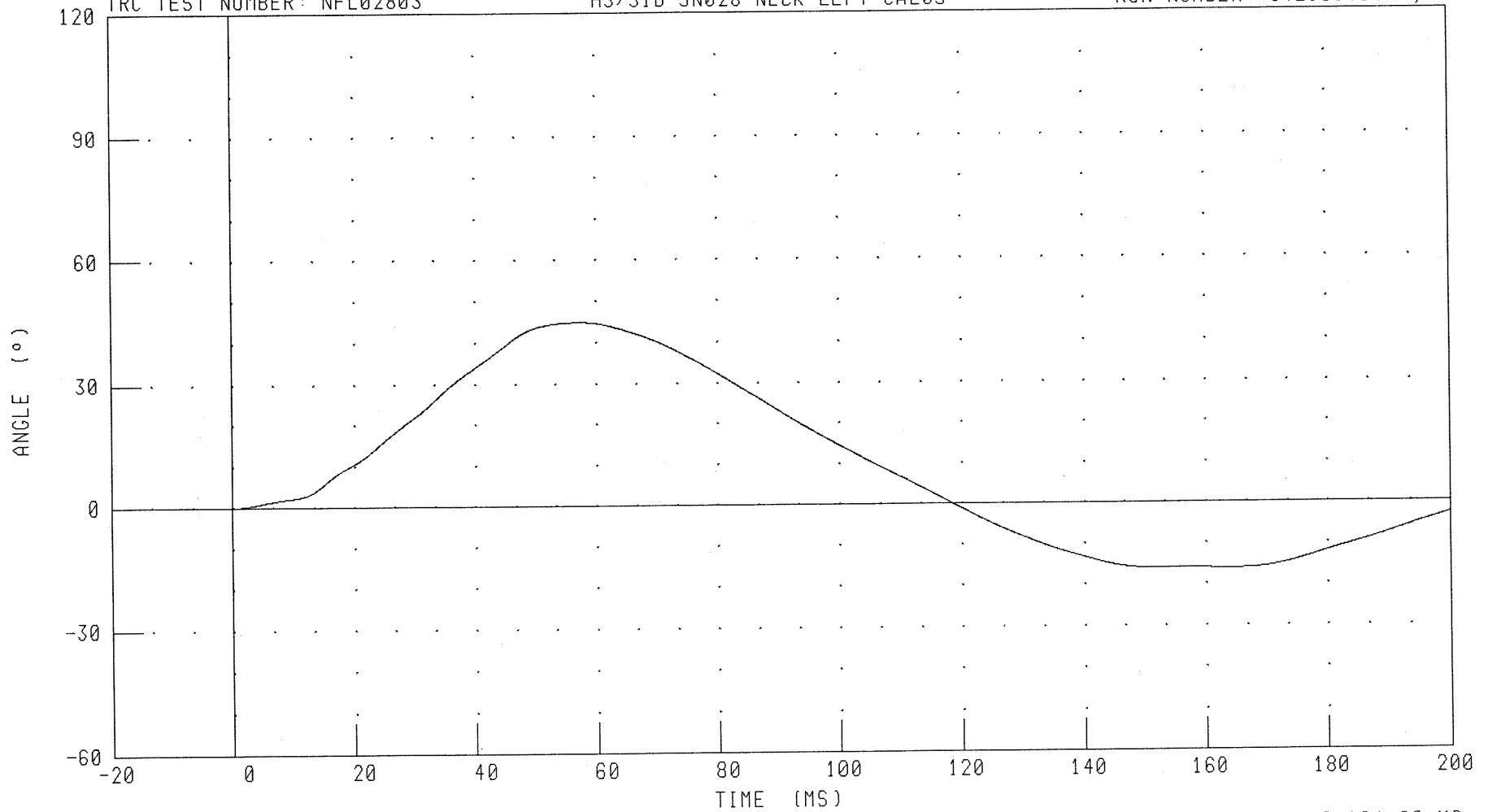
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: THETA

FILTER: CH. CLASS 60

PEAK DATA: 44.79 ° @ 57.44 MS; -16.22 ° @ 164.88 MS

030408-1

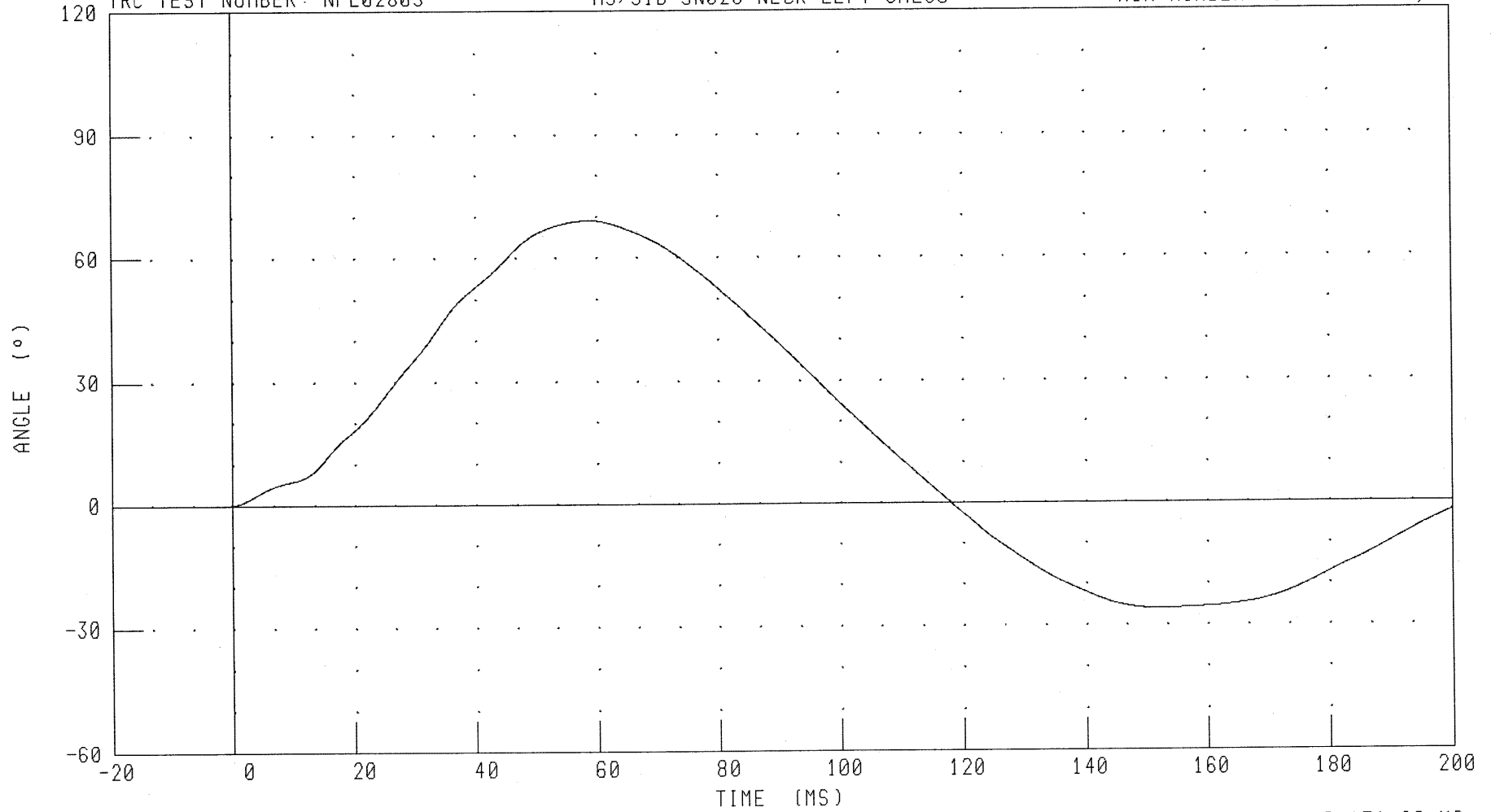
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

TOTAL ROTATION

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: TOTAN

FILTER: CH. CLASS 60

PEAK DATA: 69.00 ° @ 58.80 MS; -26.00 ° @ 151.60 MS

030408-1

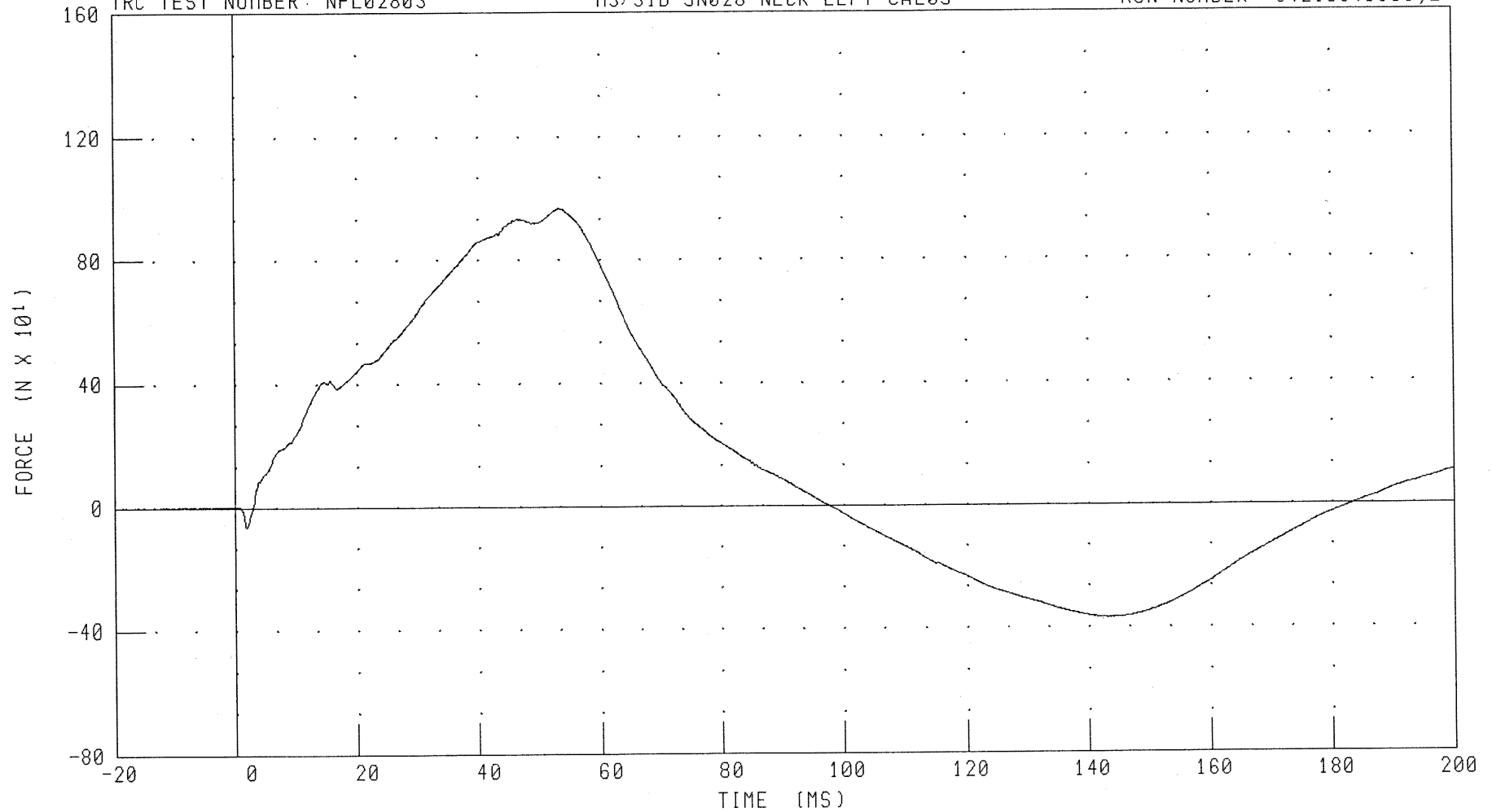
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

NECK FORCE Y AXIS

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: NEKYF

FILTER: CH. CLASS 1000

PEAK DATA: 966.31 N @ 53.52 MS; -369.27 N @ 143.04 MS

C-16

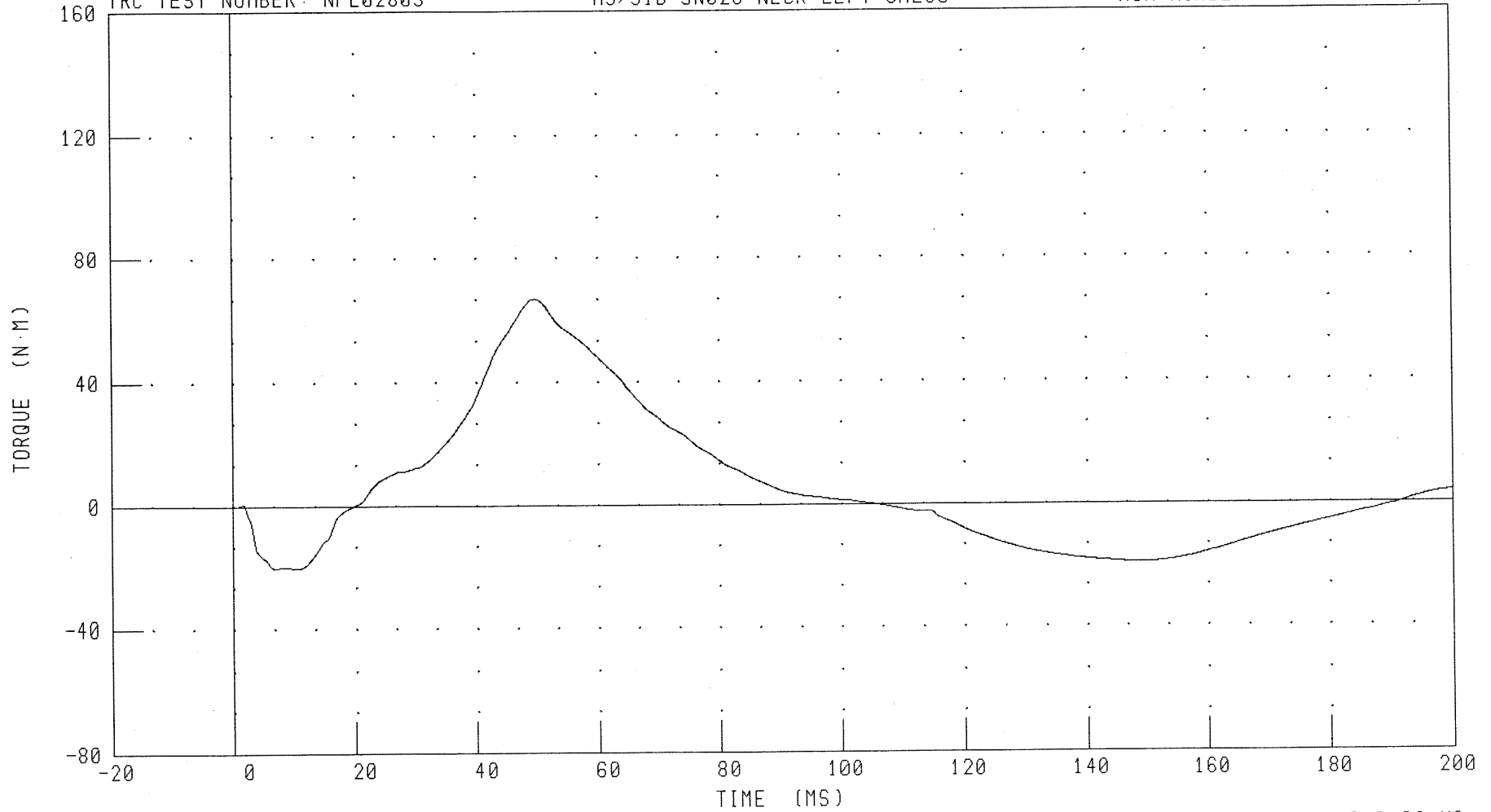
030408-1

572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST
NECK MOMENT X AXIS

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: NEKXM

FILTER: CH. CLASS 600

PEAK DATA: 66.78 N·M @ 49.76 MS; -20.52 N·M @ 6.96 MS

C-17

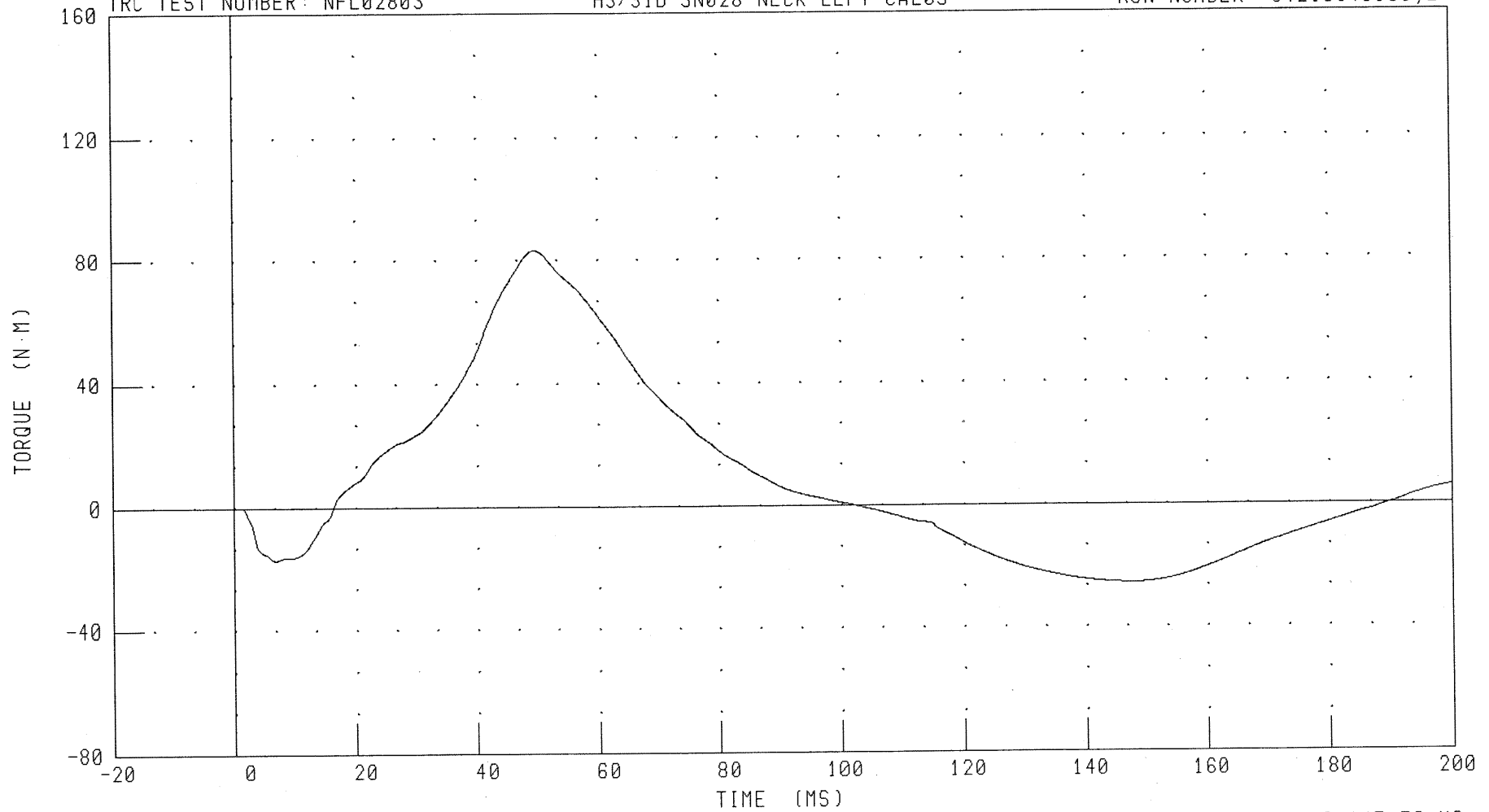
030408-1

572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL02803

H3/SID SN028 NECK LEFT CAL03

RUN NUMBER: 042103.1010;2



CHANNEL: NEKOM

FILTER: CH. CLASS 600

PEAK DATA: 83.15 N·M @ 49.76 MS; -25.83 N·M @ 147.52 MS

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL THORAX IMPACT TEST

SIDE IMPACT DUMMY

21-MAR-03

LEFT SIDE CONFIGURATION

TRC INC.

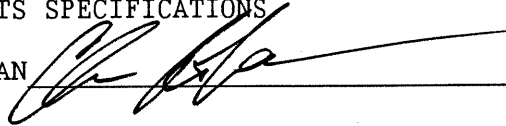
TEST NO: STL02803A

572F SID SN028 L.THORAX CAL03

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	46.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.27 M/S
PEAK ACCELERATION: UPPER RIB BAR	37 - 46 G	39.2 G
PEAK ACCELERATION: LOWER RIB BAR	37 - 46 G	38.5 G
PEAK ACCELERATION: LOWER THORACIC SPINE	15 - 22 G	17.4 G

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 032103.1310;1

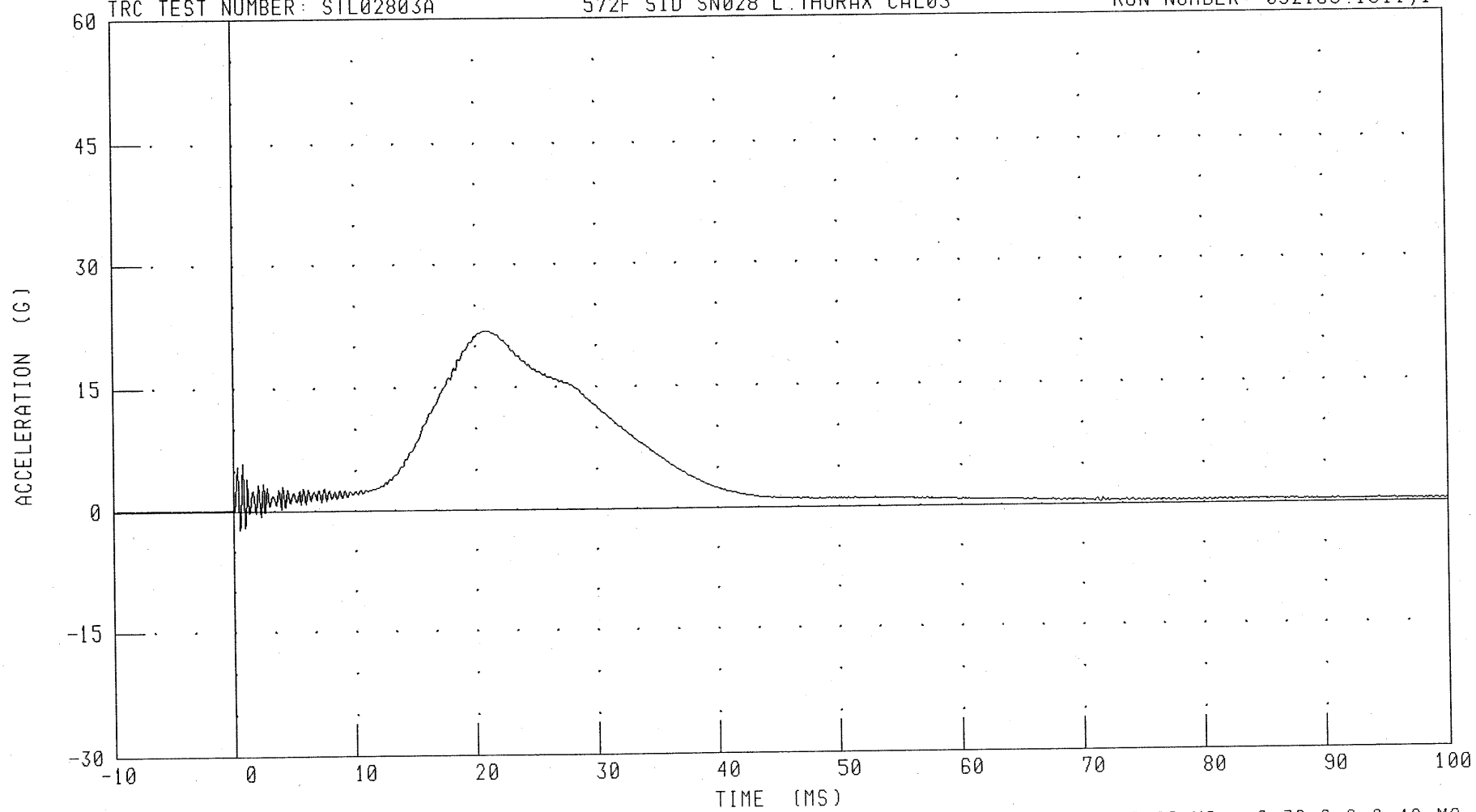
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

PENDULUM DECELERATION

TRC TEST NUMBER: STL02803A

572F SID SN028 L THORAX CAL03

RUN NUMBER: 032103.1311;1



CHANNEL: PENXC

FILTER: CH. CLASS 1000

PEAK DATA: 21.79 G @ 20.80 MS; -2.30 G @ 0.48 MS

030408-1

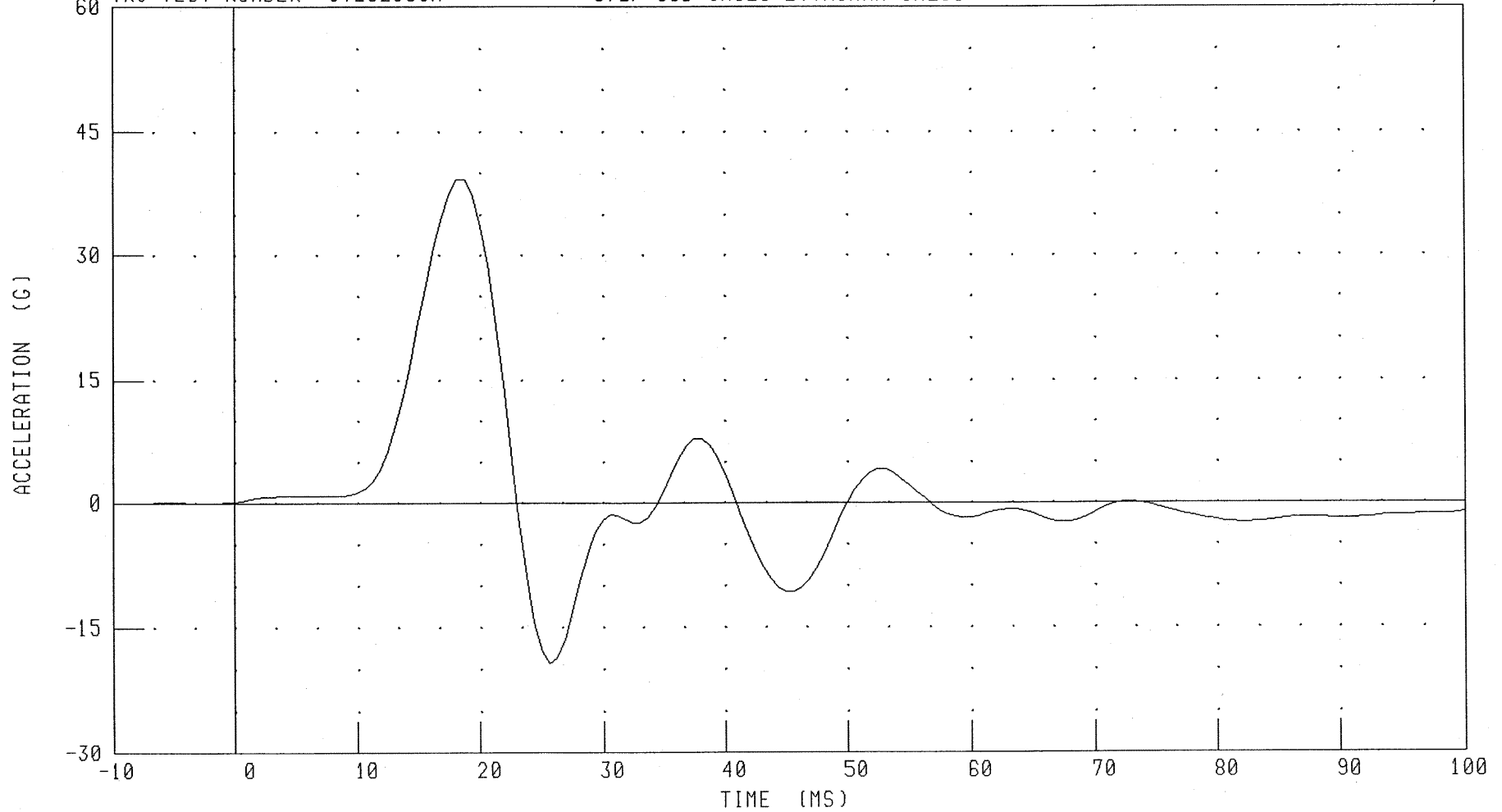
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LEFT UPPER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL02803A

572F SID SN028 L THORAX CAL03

RUN NUMBER: 032103.1311;1



CHANNEL: LURYG

FILTER: FIR 100

PEAK DATA: 39.23 G @ 18.75 MS; -19.33 G @ 25.63 MS

030408-1

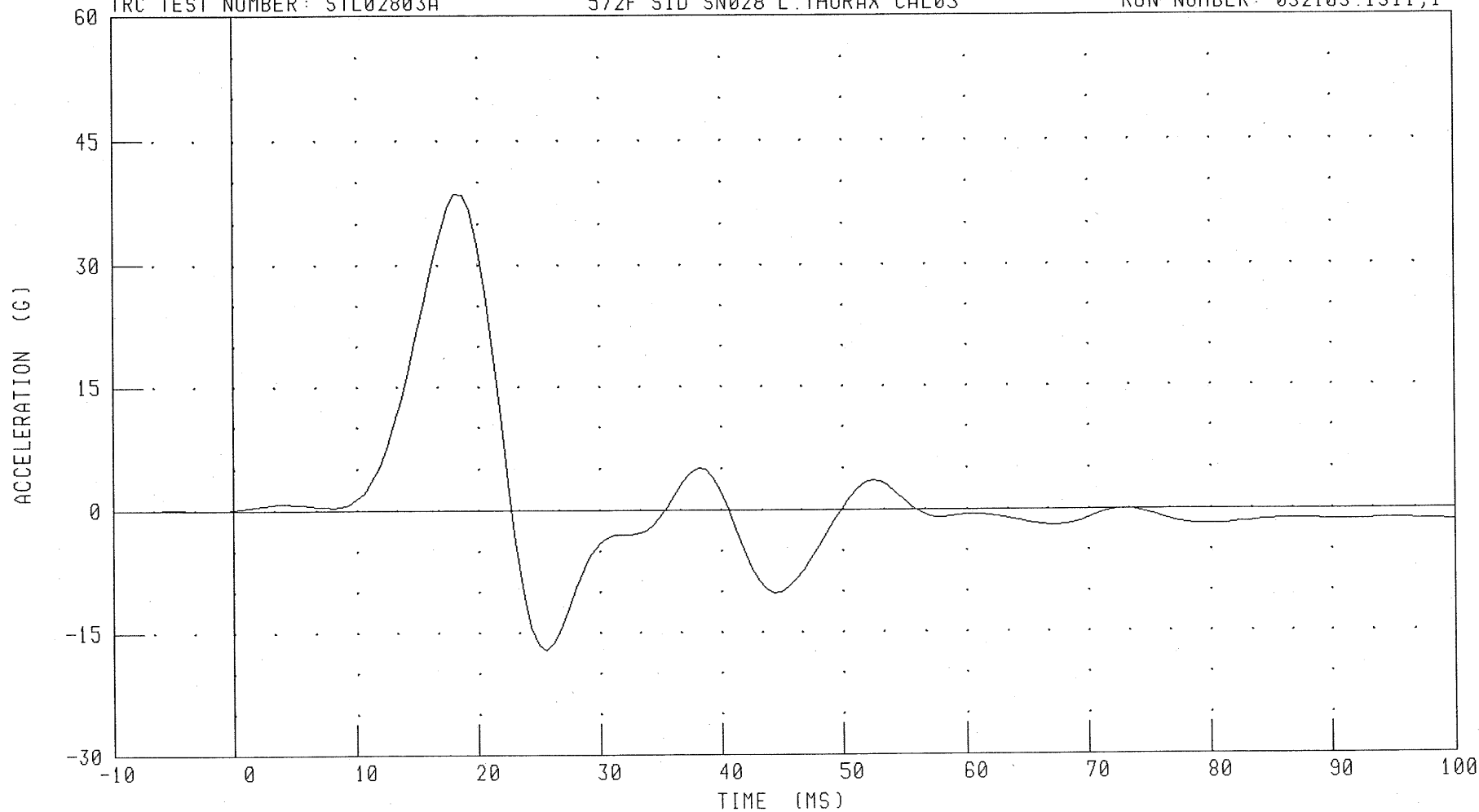
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LEFT LOWER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL02803A

572F SID SN028 L THORAX CAL03

RUN NUMBER: 032103.1311;1



CHANNEL: LLRYG

FILTER: FIR 100

PEAK DATA: 38.51 G @ 18.13 MS; -17.15 G @ 25.63 MS

030408-1

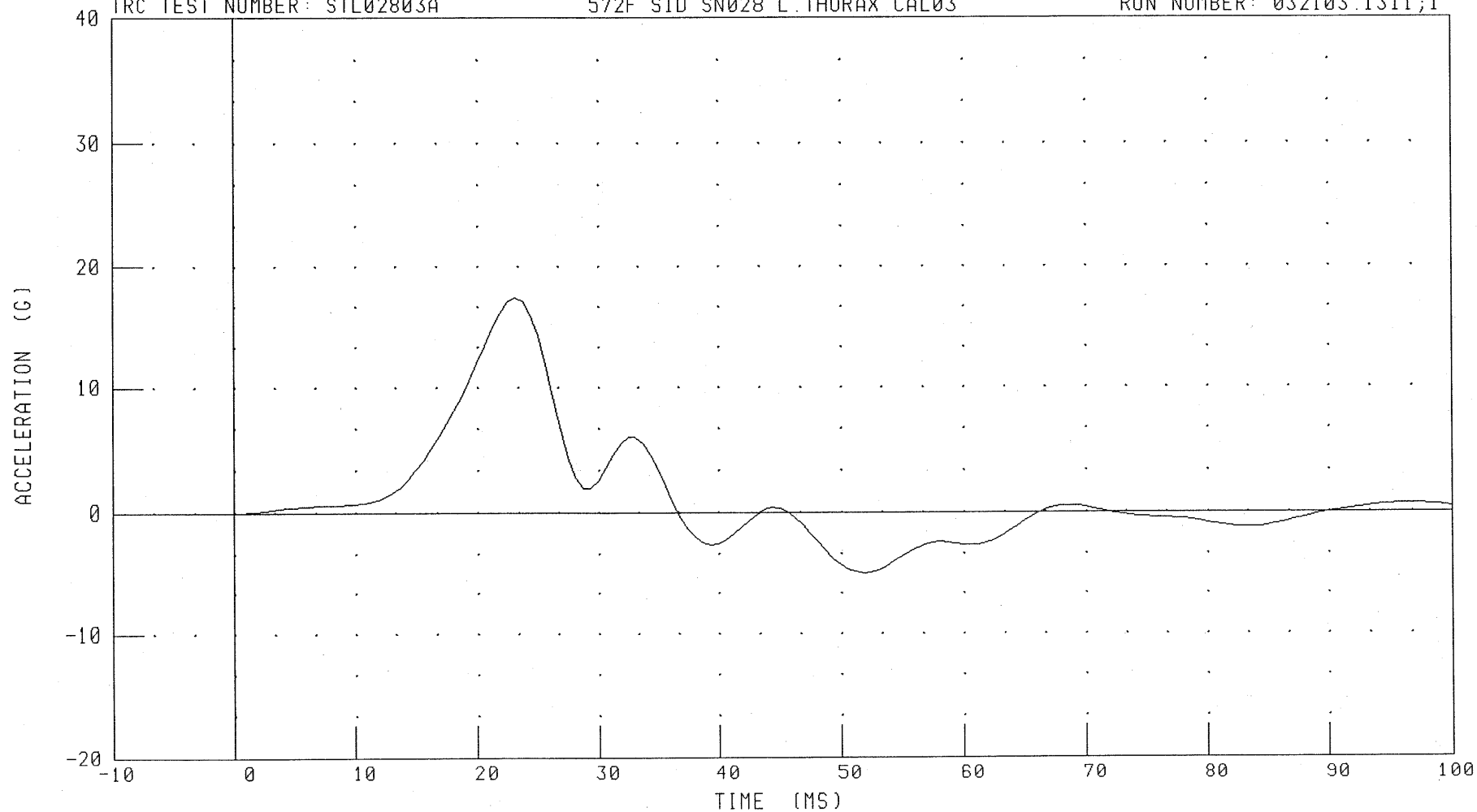
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LOWER SPINE ACCELERATION Y AXIS

TRC TEST NUMBER: STL02803A

572F SID SN028 L THORAX CAL03

RUN NUMBER: 032103.1311;1



CHANNEL: T12YG

FILTER: FIR 100

PEAK DATA: 17.43 G @ 23.13 MS; -4.99 G @ 51.88 MS

030408-1

Transportation Research Center Inc.

572B Abdomen Compression Test

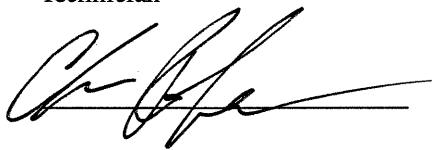
HIH SID Serial No. 028 Calibration No. 03 - 1

Test Date 03/24/2003

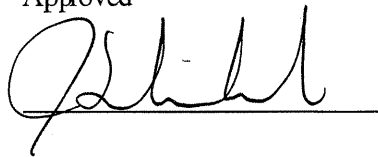
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Displacement Rate	6.35 - 8.89 mm/s	6.7 - 8.7 mm/s	Yes
Data Within Required Corridor	Yes	Yes	Yes

Comments:

Technician



Approved



03.24.2003 10:47:49 183

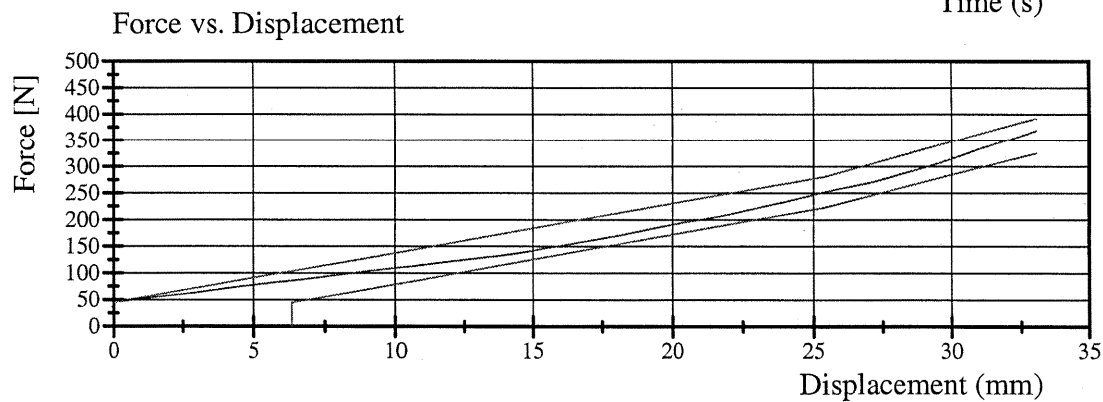
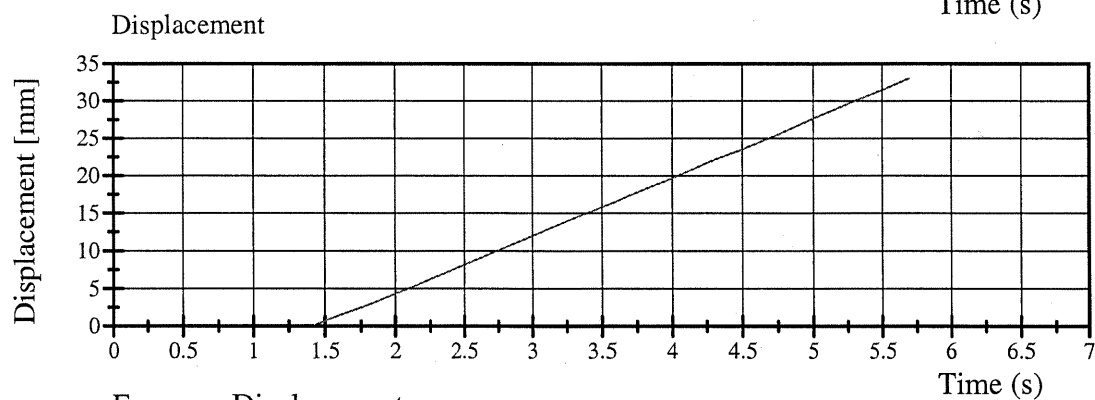
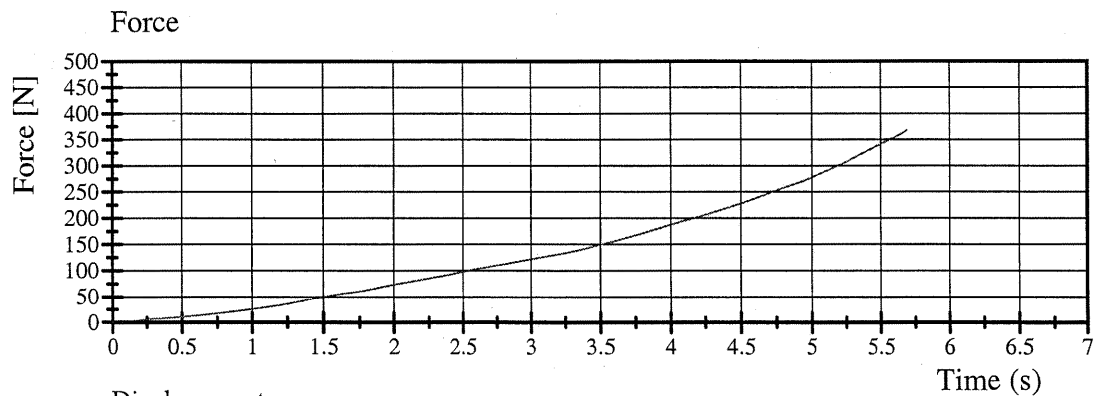


Transportation Research Center Inc.

572B Abdomen Compression Test

HIH SID Serial No. 028 Calibration No. 03 - 1

Test Date 03/24/2003



TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 24-Mar-03

TRC, INC.

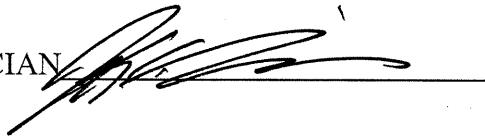
TEST NO: 028C03LF1

572B SN 028 TORSO FLEX CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	44 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	120.1 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	173.5 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	235.8 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	7 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER INC.

LATERAL PELVIS IMPACT TEST

SIDE IMPACT DUMMY

21-MAR-03

LEFT SIDE CONFIGURATION

TRC INC.

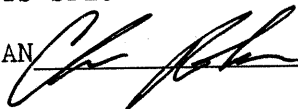
TEST NO: SPL02803

572F SN028 LEFT PELVIS CAL

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	46.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.28 M/S
PEAK PELVIC ACCELERATION	40 - 60 G	45.5 G
TIME ABOVE 20 G LEVEL	3 - 7 MS	6.2 MS
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 032103.1445;1

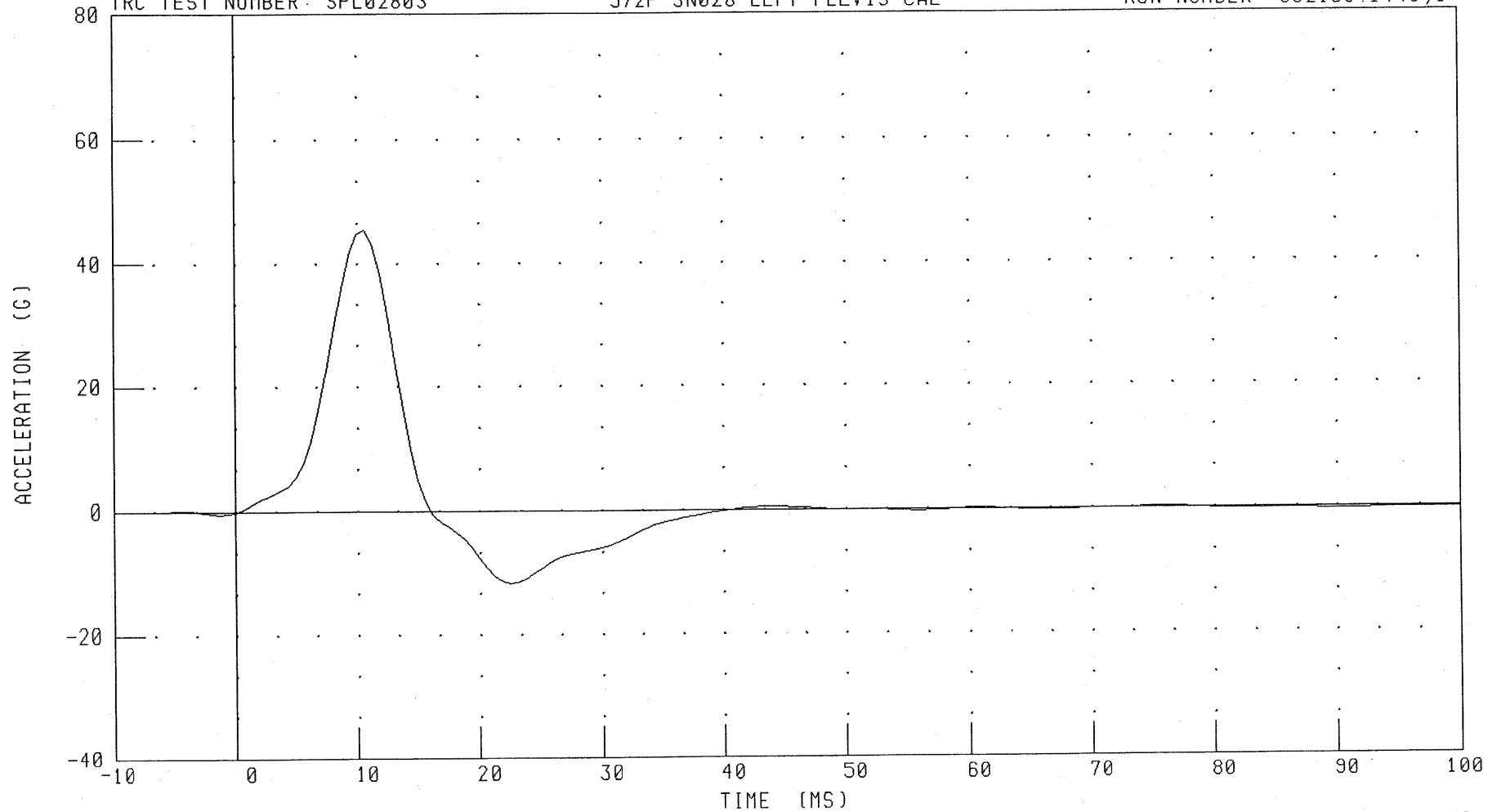
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PELVIS ACCELERATION Y AXIS

572F SN028 LEFT PELVIS CAL

RUN NUMBER: 032103.1445;1

TRC TEST NUMBER: SPL02803



CHANNEL: PEVYG

FILTER: FIR 100

PEAK DATA: 45.50 G @ 10.63 MS; -11.72 G @ 22.50 MS

C-28

030408-1

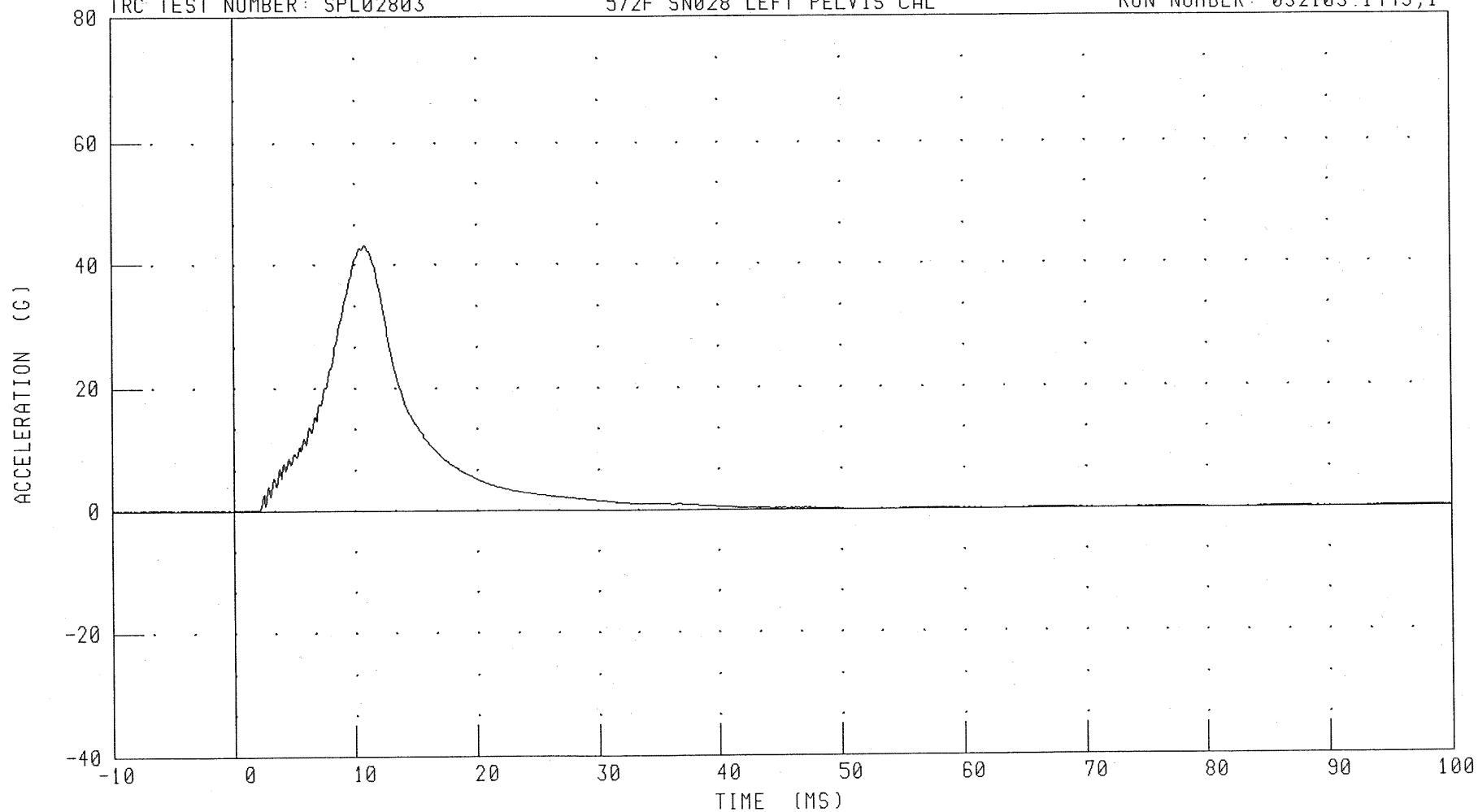
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PENDULUM DECELERATION

TRC TEST NUMBER: SPL02803

572F SN028 LEFT PELVIS CAL

RUN NUMBER: 032103.1445;1



CHANNEL: PENXG

FILTER: CH. CLASS 1000

PEAK DATA: 43.35 G @ 10.88 MS; -0.13 G @ 61.68 MS

C-29

030408-1

TRANSPORTATION RESEARCH CENTER INC.

THORACIC SHOCK ABSORBER TESTS

SIDE IMPACT DUMMY

03-FEB-03

TRC INC.

572F SN028 DAMPER TEST CAL01

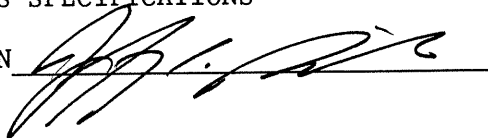
TEST NUMBERS: DP02801A,DP02801B,DP02801C

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	46.0 %
VELOCITY	FORCE	667 - 925 N	750 N
2.69 M/S	DISPLACEMENT	29.7 - 34.5 MM	29.9 MM
VELOCITY	FORCE	1733 - 2100 N	1791 N
4.26 M/S	DISPLACEMENT	31.6 - 37.2 MM	34.9 MM
VELOCITY	FORCE	3784 - 4495 N	4259 N
6.12 M/S	DISPLACEMENT	33.3 - 39.6 MM	37.8 MM

DAMPER SETTING = 5.6

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 020303.1116;2

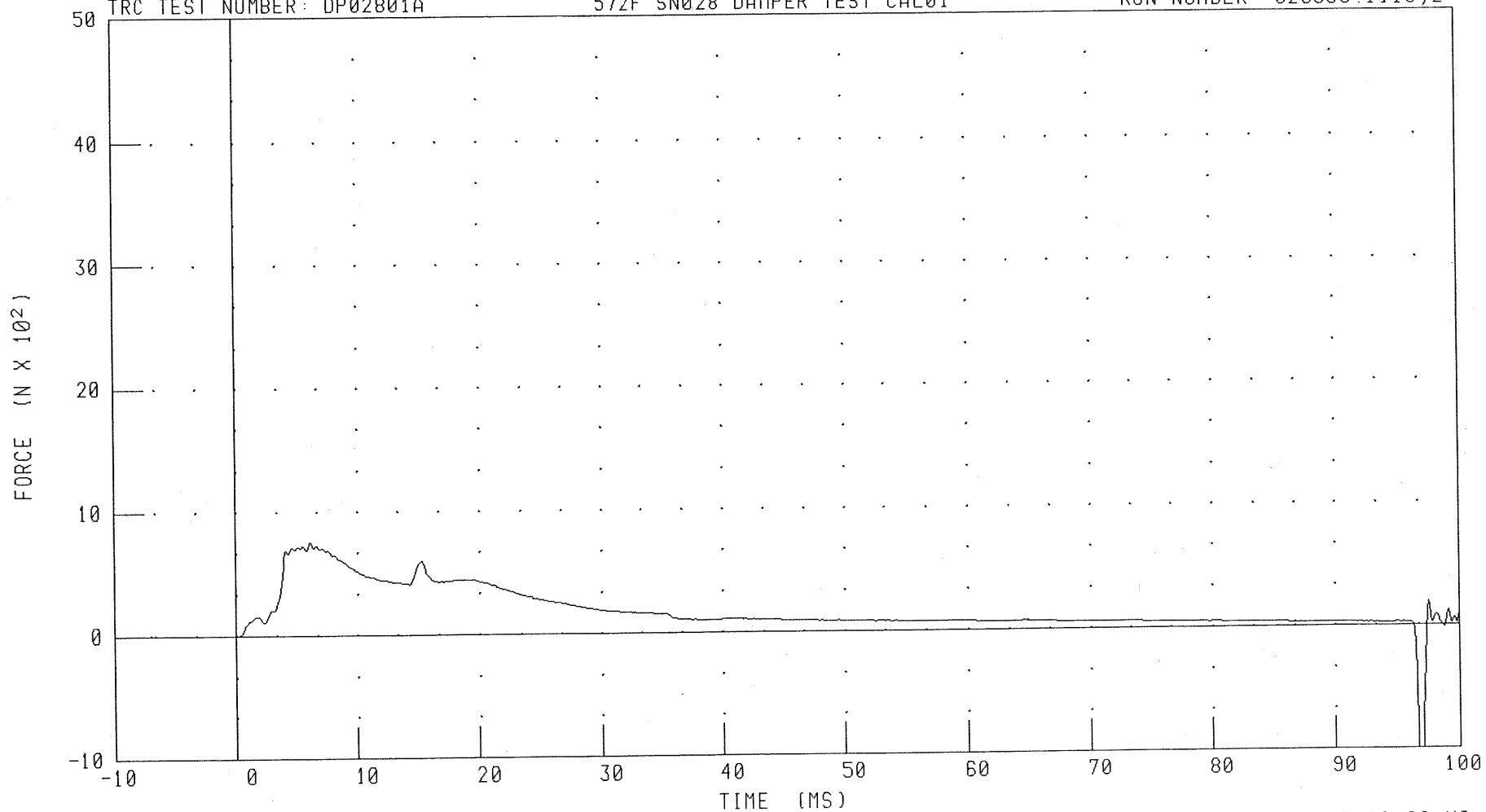
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (3.0 M/SEC)

SHOCK ABSORBER RESISTIVE FORCE

TRC TEST NUMBER: DP02801A

572F SN028 DAMPER TEST CAL01

RUN NUMBER: 020303.1116;2



CHANNEL: DAMPF

FILTER: CH. CLASS 1000

PEAK DATA: 749.74 N @ 6.16 MS; -1712.81 N @ 96.80 MS

C-31

030408-1

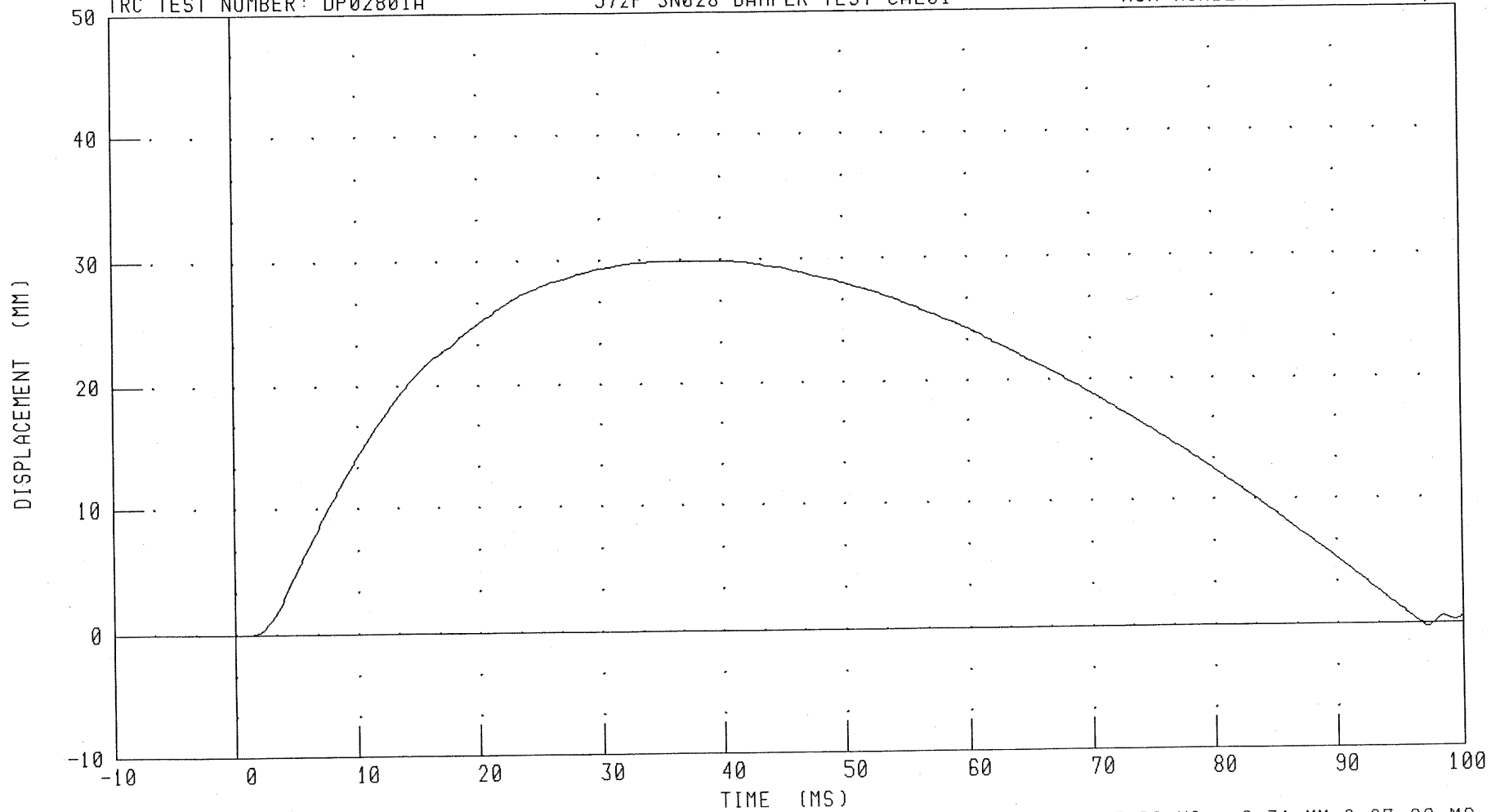
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (3.0 M/SEC)

SHOCK ABSORBER DISPLACEMENT

TRC TEST NUMBER: DP02801A

572F SN028 DAMPER TEST CAL01

RUN NUMBER: 020303.1116;2



CHANNEL: CSTYD

FILTER: CH. CLASS 1000

PEAK DATA: 29.87 MM @ 35.20 MS; -0.31 MM @ 97.20 MS

C-32

030408-1

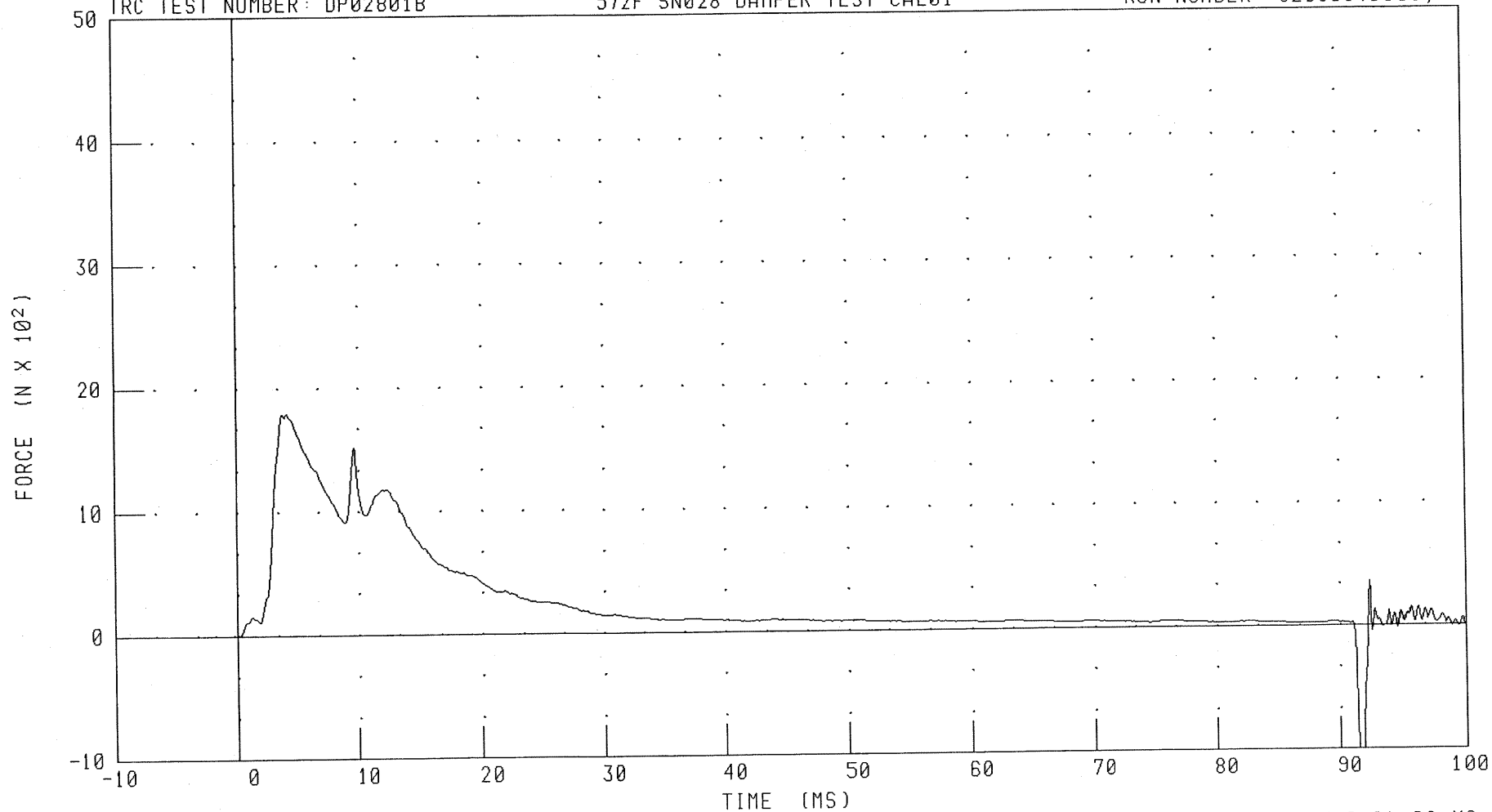
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (4.3 M/SEC)

SHOCK ABSORBER RESISTIVE FORCE

TRC TEST NUMBER: DP02801B

572F SN028 DAMPER TEST CAL01

RUN NUMBER: 020303.1116;2



CHANNEL: DAMPF

FILTER: CH. CLASS 1000

PEAK DATA: 1791.40 N @ 4.16 MS; -2164.23 N @ 91.68 MS

030408-1

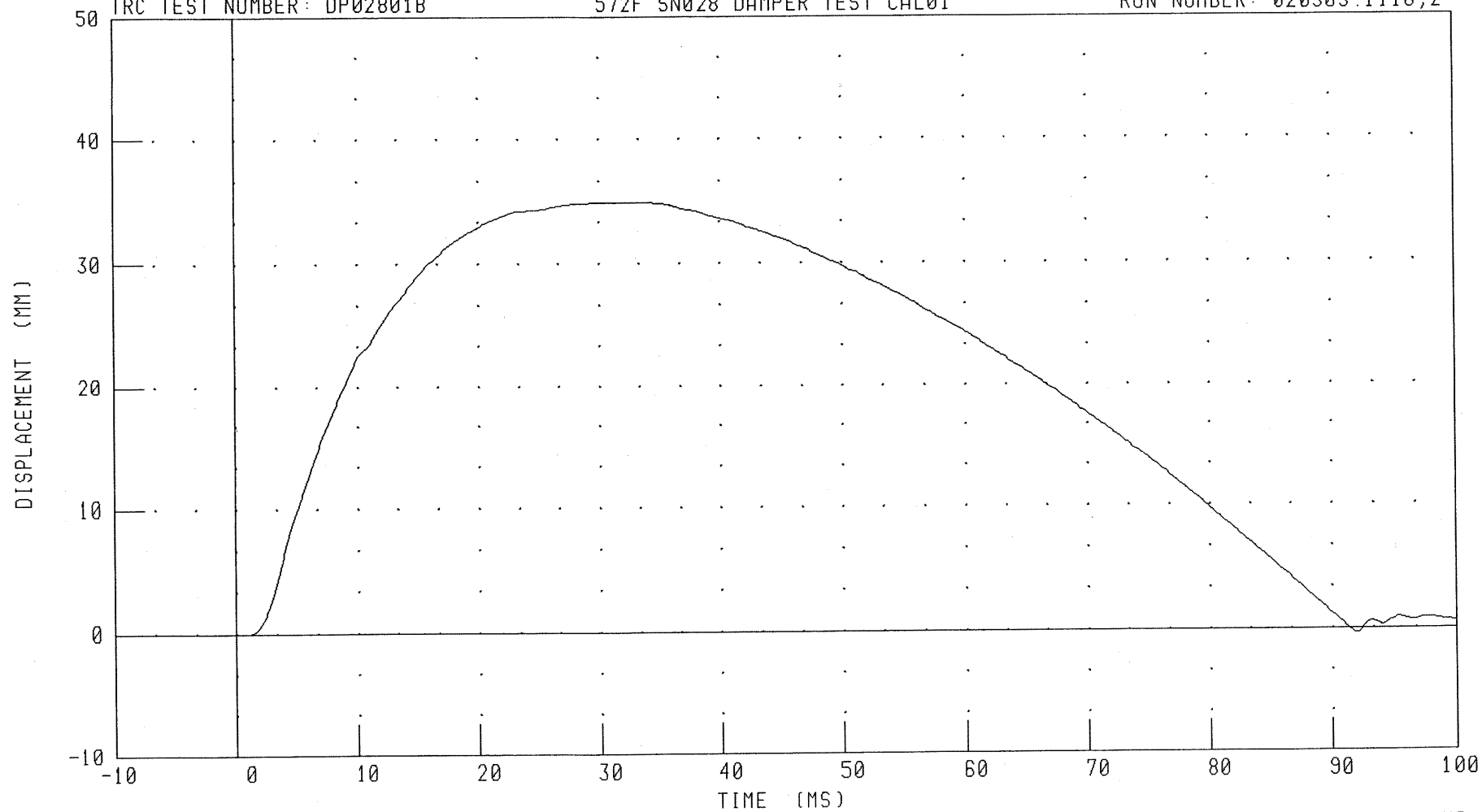
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (4.3 M/SEC)

SHOCK ABSORBER DISPLACEMENT

572F SN028 DAMPER TEST CAL01

RUN NUMBER: 020303.1116;2

TRC TEST NUMBER: DP02801B



CHANNEL: CSTYD

FILTER: CH. CLASS 1000

PEAK DATA: 34.90 MM @ 30.64 MS; -0.40 MM @ 92.00 MS

C-34

030408-1

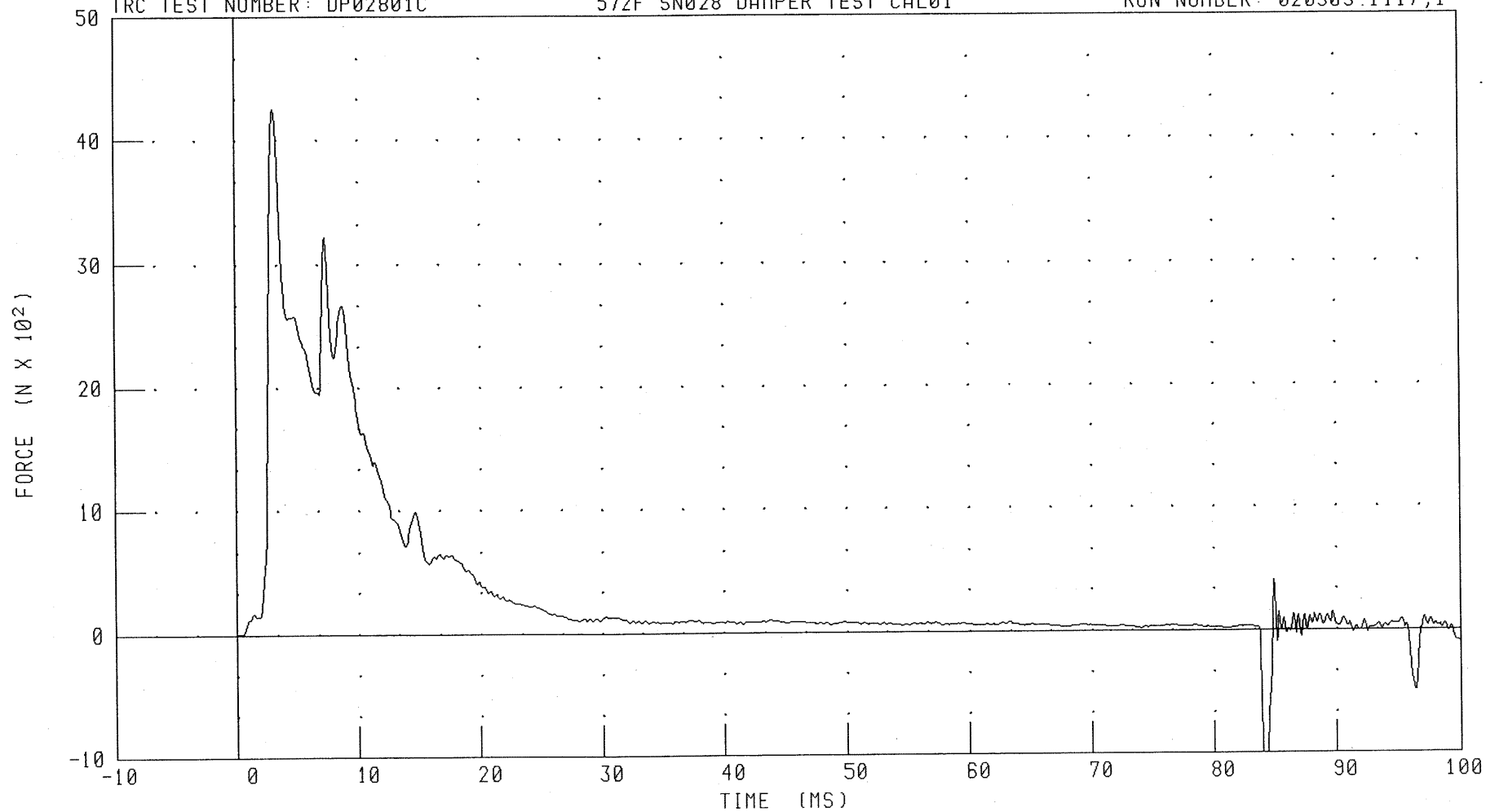
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (6.1 M/SEC)

SHOCK ABSORBER RESISTIVE FORCE

TRC TEST NUMBER: DP02801C

572F SN028 DAMPER TEST CAL01

RUN NUMBER: 020303.1117;1



CHANNEL: DAMPF

FILTER: CH. CLASS 1000

PEAK DATA: 4259.31 N @ 3.12 MS; -2213.42 N @ 84.24 MS

C-35

030408-1

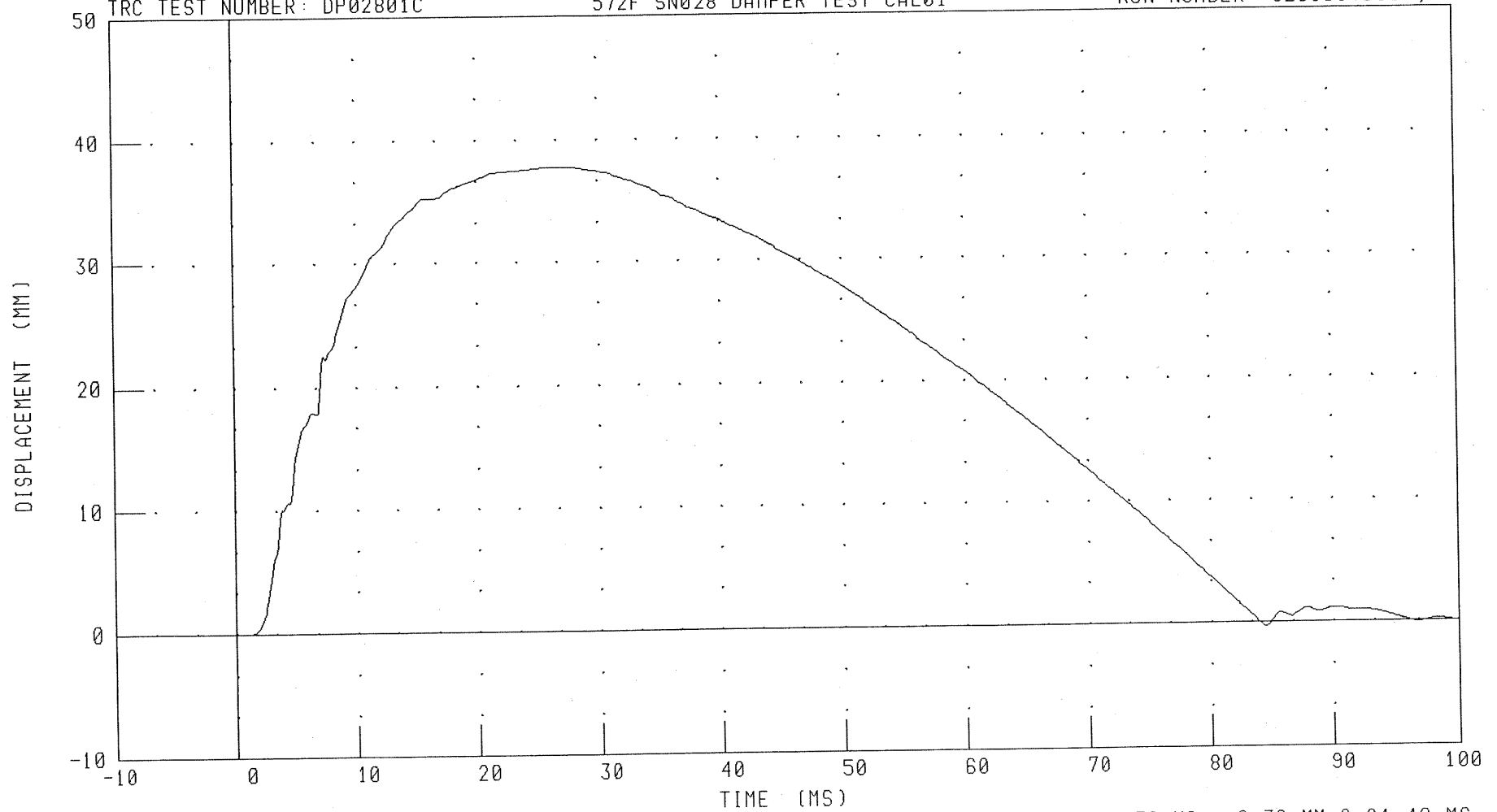
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (6.1 M/SEC)

SHOCK ABSORBER DISPLACEMENT

TRC TEST NUMBER: DP02801C

572F SN028 DAMPER TEST CAL01

RUN NUMBER: 020303.1117;1



CHANNEL: CSTYD FILTER: CH. CLASS 1000

PEAK DATA: 37.75 MM @ 26.56 MS; -0.36 MM @ 84.48 MS

C-36

030408-1

Calibration Test Results

Pre-Test

SID-HIII: 066

Configured for Left Side Impact

External Dimensions:	The dummy passed all external dimension requirements.
Lateral Head Drop Test:	The head passed all lateral drop test requirements.
Lateral Neck Test:	The neck passed all impact test requirements.
Lateral Thorax Impact Test:	The thorax passed all impact test requirements.
Thoracic Shock Absorber Test:	The thorax passed all shock absorber requirements (tested on February 3, 2003, for a previous calibration series).
Lumbar Flexion Test:	The dummy met the lumbar flexion test requirements.
Abdominal Compression Test:	The abdomen met the compression test requirements.
Pelvis Impact Test:	The lateral pelvis passed all impact test requirements.

Transportation Research Center Inc.

572F SID Dummy

External Dimensions

Serial No. 066 Calibration No. 06

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	901 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	507 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Rib From Backline	RD	228.6 - 241.3 mm	236 mm	Yes
Knee Pivot From Backline	KH	510.5 - 525.8 mm	518 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	499 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	387 mm	Yes
Top Rib Width From CL	RW-1	165.1 - 180.3 mm	170 mm	Yes
Bottom Rib Width From CL	RW-2	165.1 - 180.3 mm	170 mm	Yes
Difference Between Top & Bottom Rib Width from CL		<= 2.5 mm	0.0 mm	Yes

Technician



Approved



TRANSPORTATION RESEARCH CENTER INC.

LATERAL HEAD DROP TEST

HYBRIDI III SID DUMMY

03-APR-03

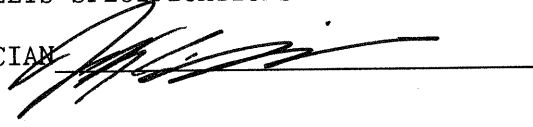
LEFT SIDE CONFIGURATION

TRC INC. TEST NO. HDL06606 572M SID/HIII SN066 HEAD CAL06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.6 deg. C	21.67 deg. C
RELATIVE HUMIDITY	10 - 70 %	44.00 %
PEAK RESULTANT ACCELERATION	120 - 150 G	135.92 G
PEAK LONGITUDINAL ACCELERATION	15 G MAX	-8.38 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 042103.1033;1

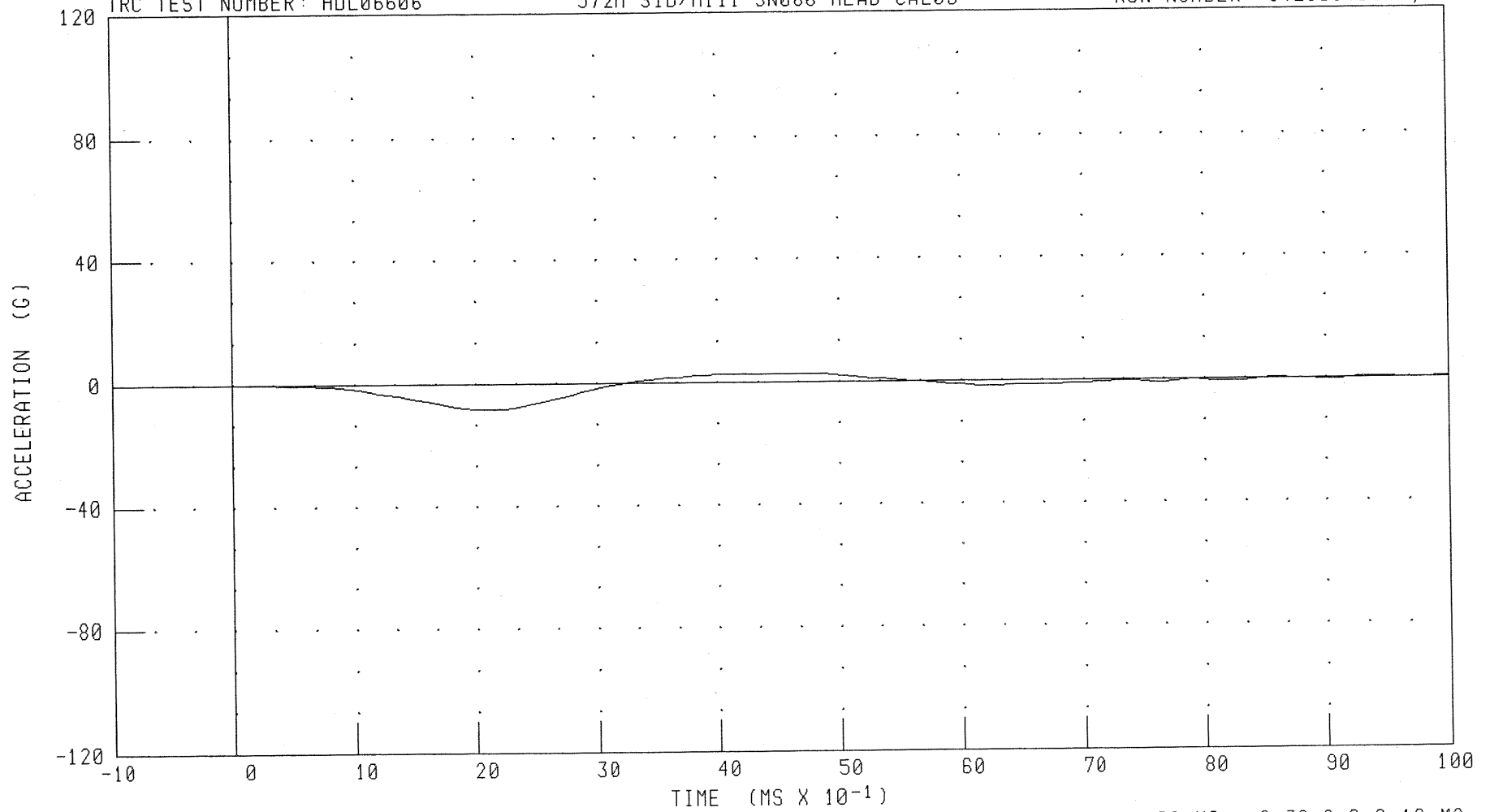
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: HDL06606

572M SID/HIII SN066 HEAD CAL06

RUN NUMBER: 042103.1022;1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 2.68 G @ 4.08 MS; -8.38 G @ 2.16 MS

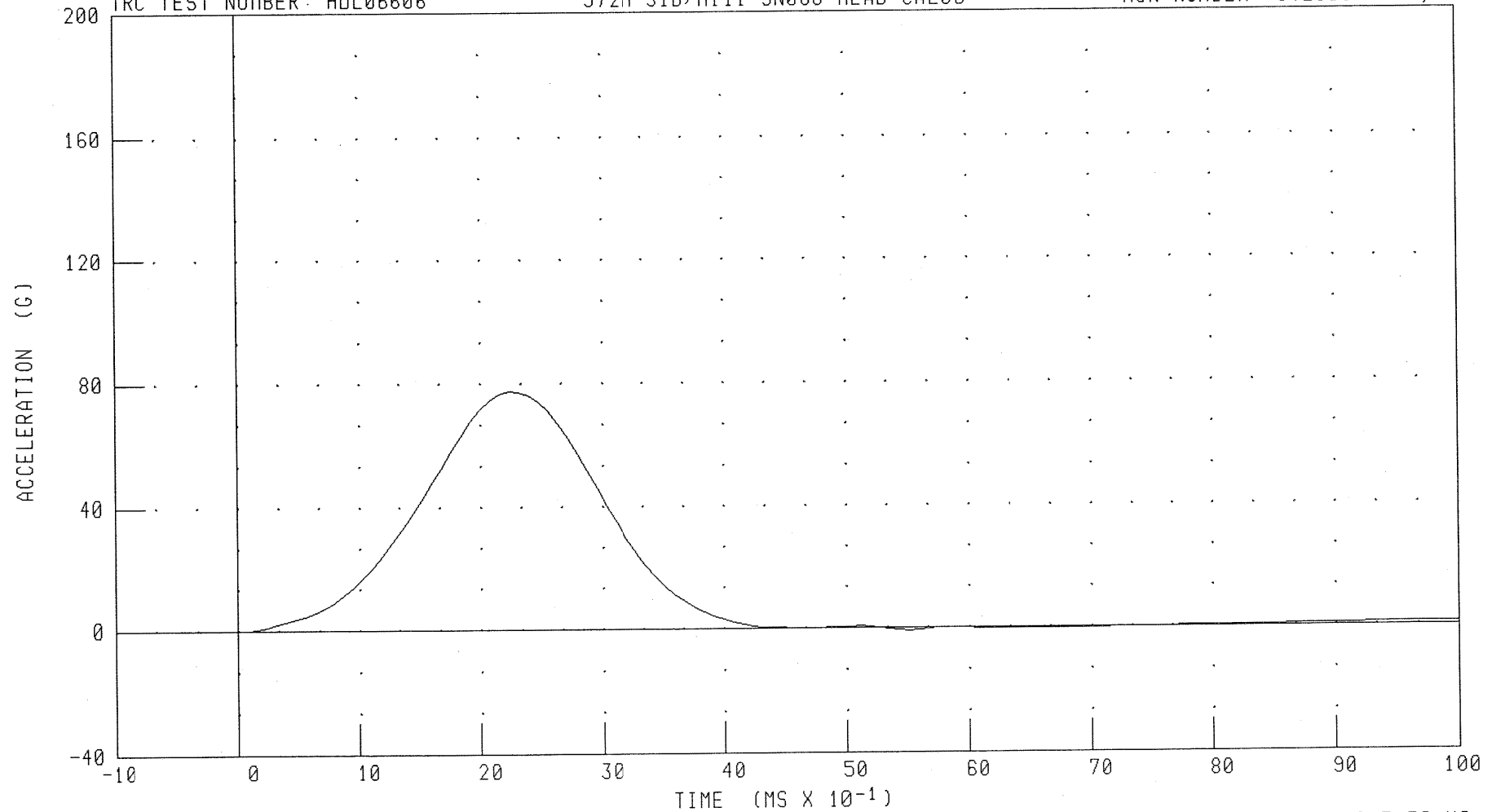
030408-1

572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP
HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: HDL06606

572M SID/HIII SN066 HEAD CAL06

RUN NUMBER: 042103.1022;1



CHANNEL: HEDYC

FILTER: CH. CLASS 1000

PEAK DATA: 77.31 G @ 2.24 MS; -0.98 G @ 5.52 MS

030408-1

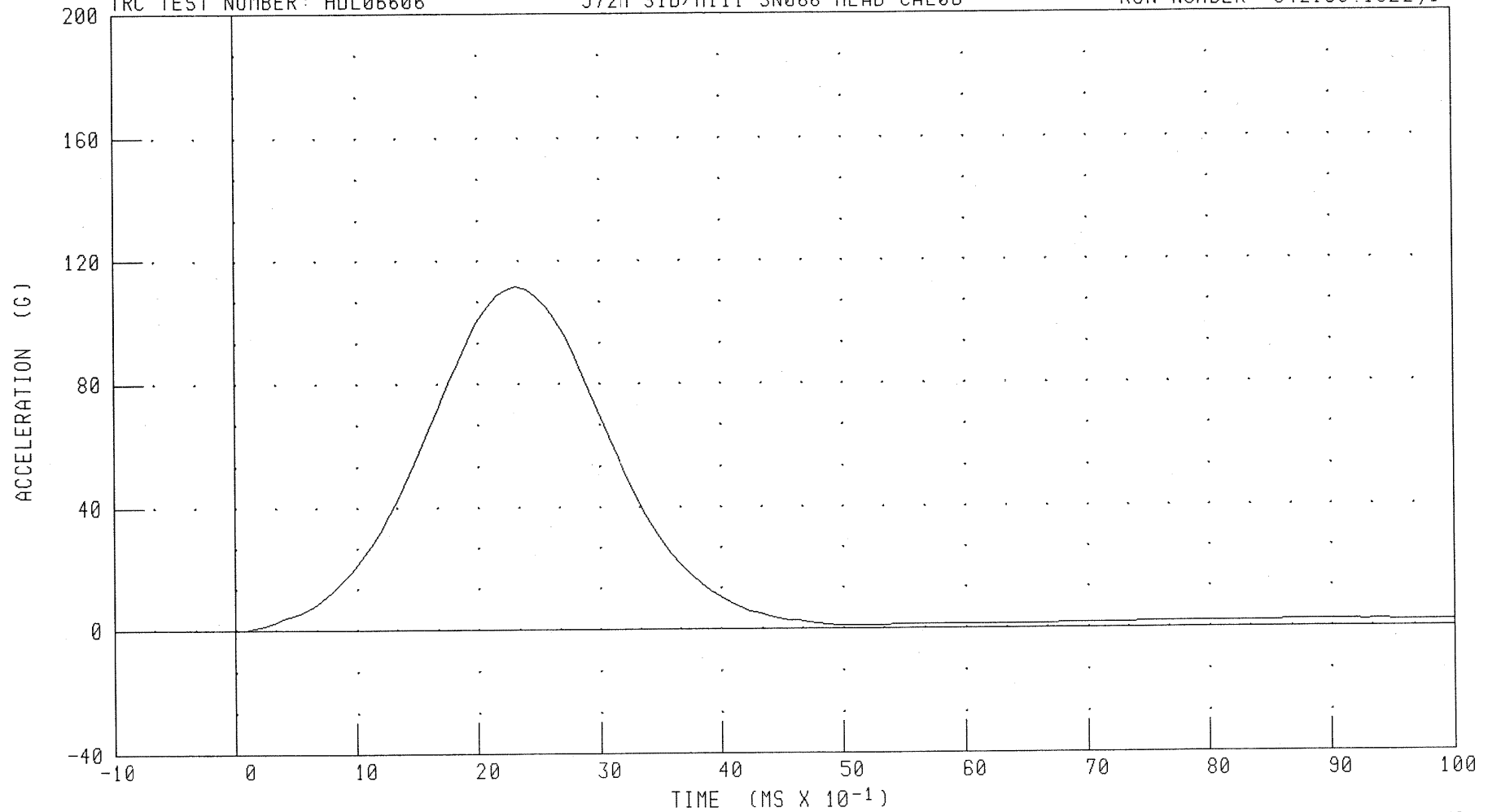
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: HDL06606

572M SID/HIII SN066 HEAD CAL06

RUN NUMBER: 042103.1022;1



CHANNEL: HEDZG

FILTER: CH. CLASS 1000

PEAK DATA: 111.63 G @ 2.32 MS; -0.03 G @ -0.96 MS

C-42

030408-1

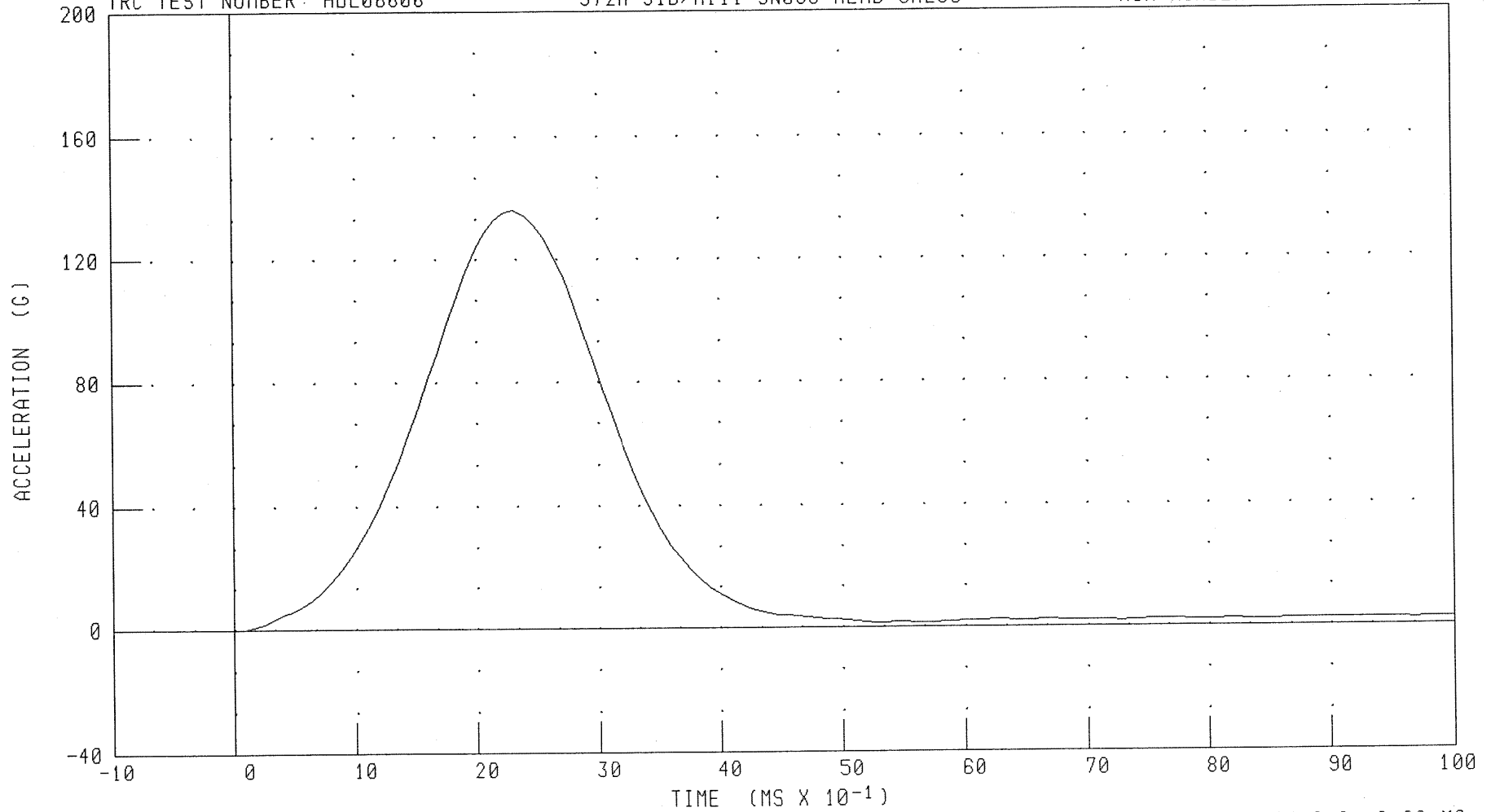
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: HDL06606

572M SID/HIII SN066 HEAD CAL06

RUN NUMBER: 042103.1022;1



CHANNEL: HEDRG

FILTER: CH. CLASS 1000

PEAK DATA: 135.92 G @ 2.32 MS; 0.04 G @ -0.88 MS

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL NECK TEST

HYBRIDIII SID DUMMY

03-APR-03

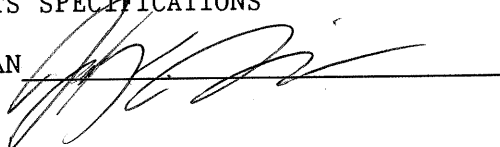
LEFT SIDE CONFIGURATION

TRC INC. TEST NO. NFL06606A 572M SID/HIII SN066 NECK CAL06

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 deg. C	21.67 deg. C
RELATIVE HUMIDITY		10 - 70 %	48.00 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
INTEGRATED VELOCITY	10 MS	1.96 - 2.55 M/S	2.36 M/S
	20 MS	4.12 - 5.10 M/S	4.80 M/S
	30 MS	5.73 - 7.01 M/S	6.78 M/S
	40 - 70 MS	6.27 - 7.64 M/S	7.07 - 7.16 M/S
MAXIMUM MIDSAGGITAL PLANE ROTATION		66 - 82 deg.	73.54 deg.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO		58 - 67 MS	62.64 MS
MAXIMUM MOMENT ABOUT OCCIPITAL CONDYLE		73 - 88 NM	76.04 NM
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO		49 - 64 MS	58.80 MS
TIME OF MAXIMUM ROTATION AFTER MAXIMUM MOMENT		2 - 16 MS	10.96 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



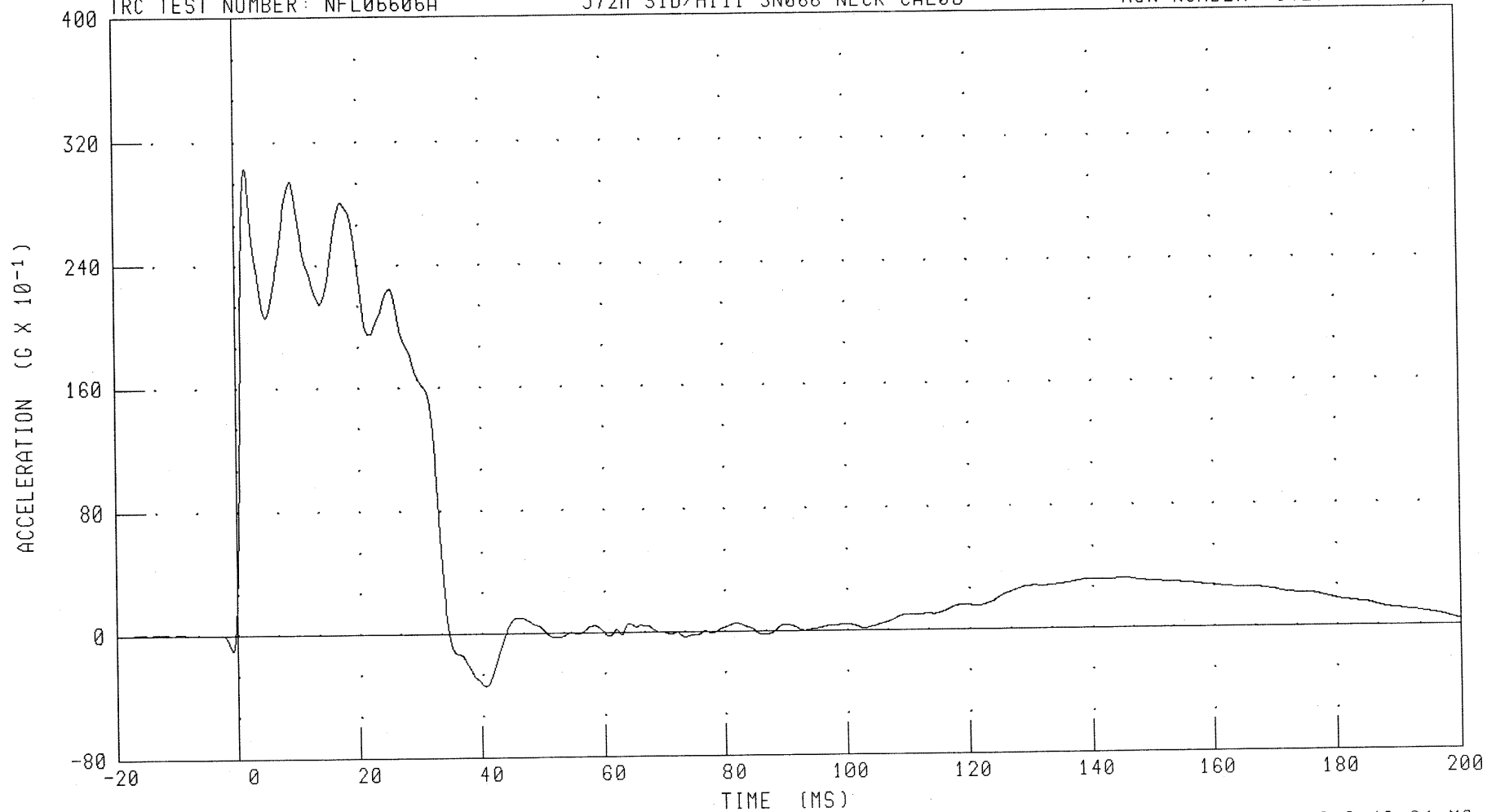
RUN NUMBER: 042103.1020;1

572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST
PENDULUM DECELERATION

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021;1



CHANNEL: PENXC

FILTER: CH. CLASS 180

PEAK DATA: 30.30 G @ 1.76 MS; -3.44 G @ 40.64 MS

030408-1

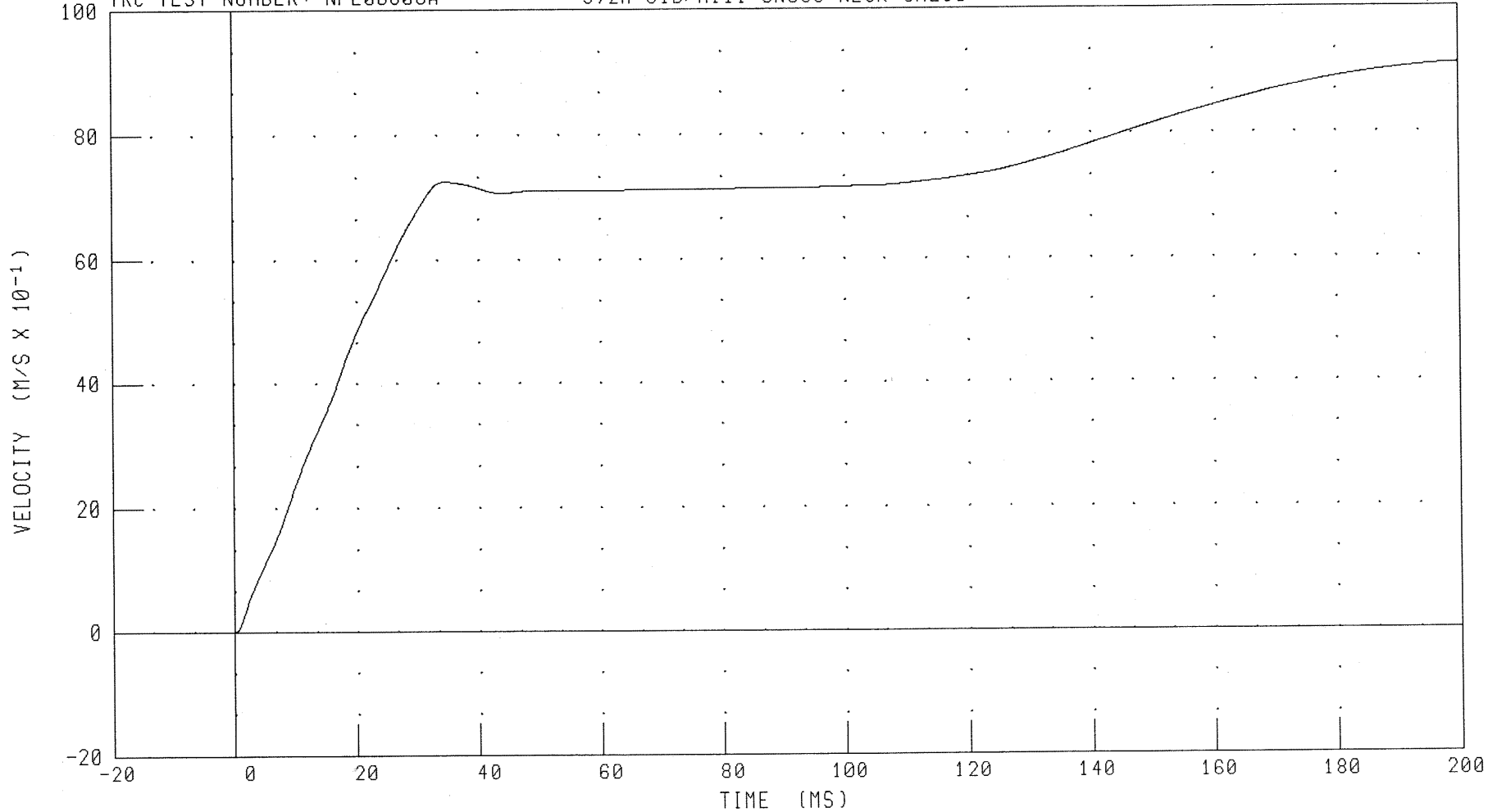
572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

INTEGRATED PENDULUM VELOCITY

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021,1



CHANNEL: PENXVI

FILTER: CH. CLASS 180

PEAK DATA: 9.10 M/S @ 200.00 MS; -0.01 M/S @ -0.32 MS

030408-1

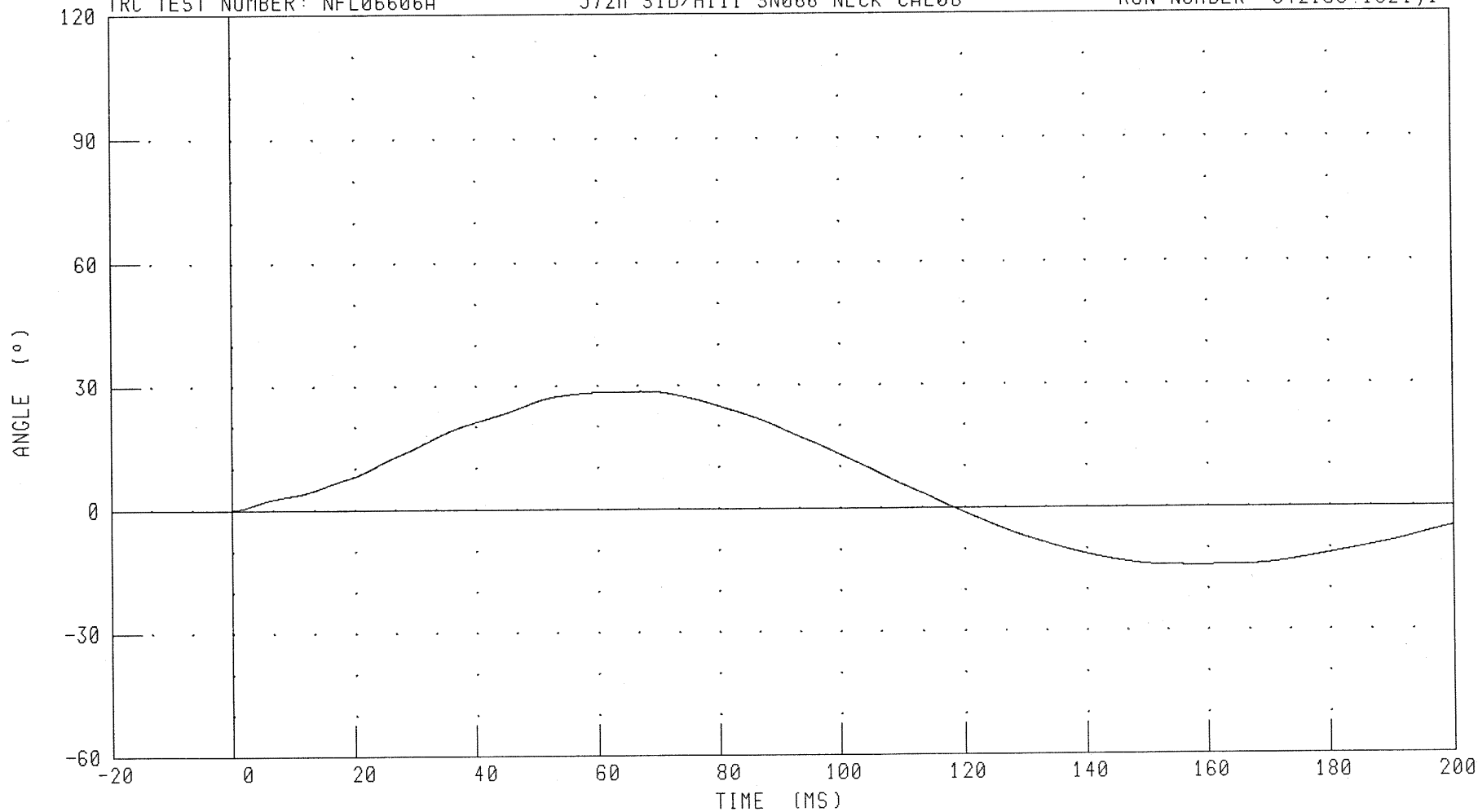
572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021;1



CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 28.49 ° @ 67.28 MS; -14.30 ° @ 158.48 MS

C-47

030408-1

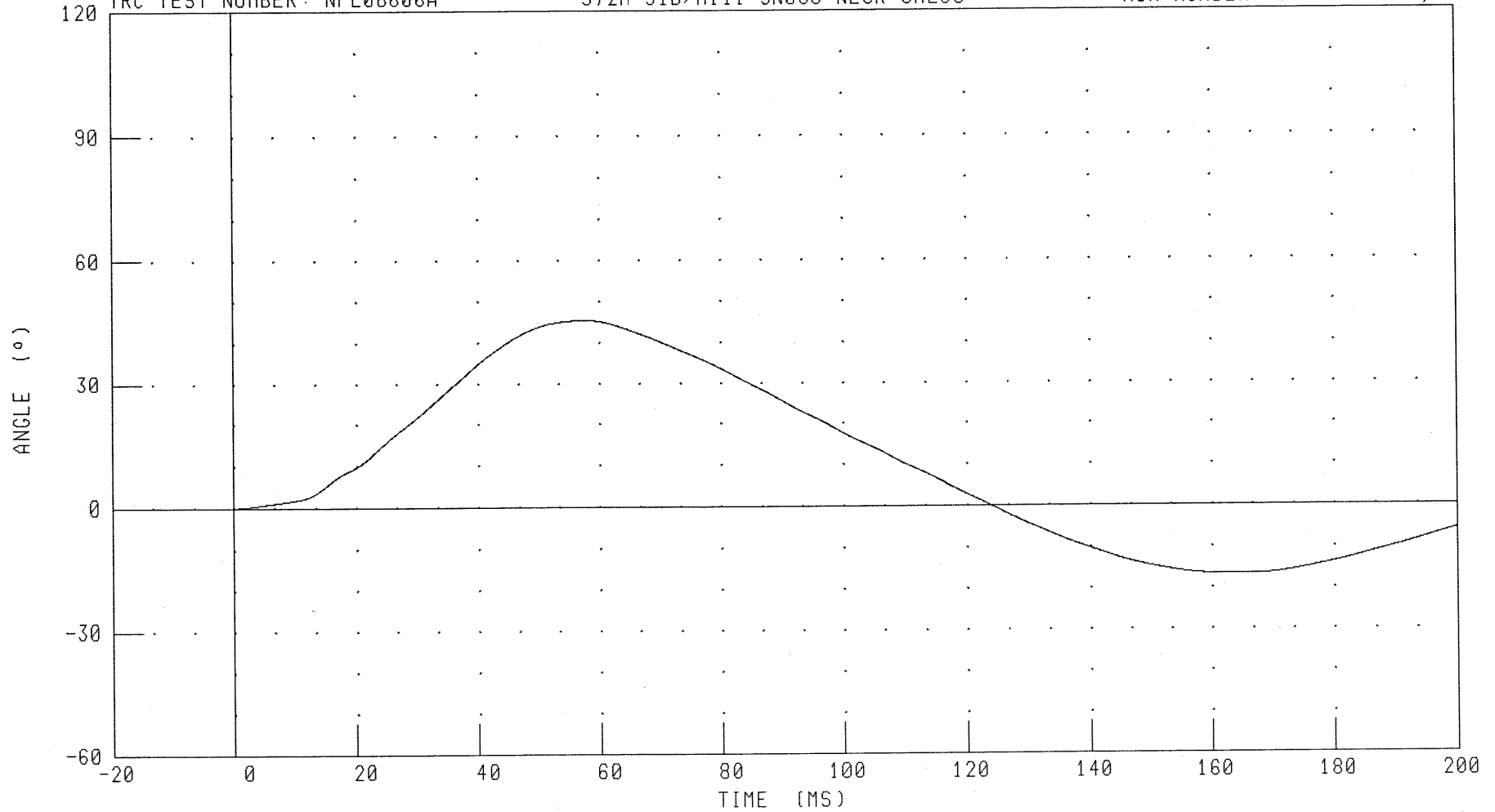
572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021;1



CHANNEL: THETA

FILTER: CH. CLASS 60

PEAK DATA: 45.42 ° @ 57.52 MS, -16.69 ° @ 165.36 MS

C-48

030408-1

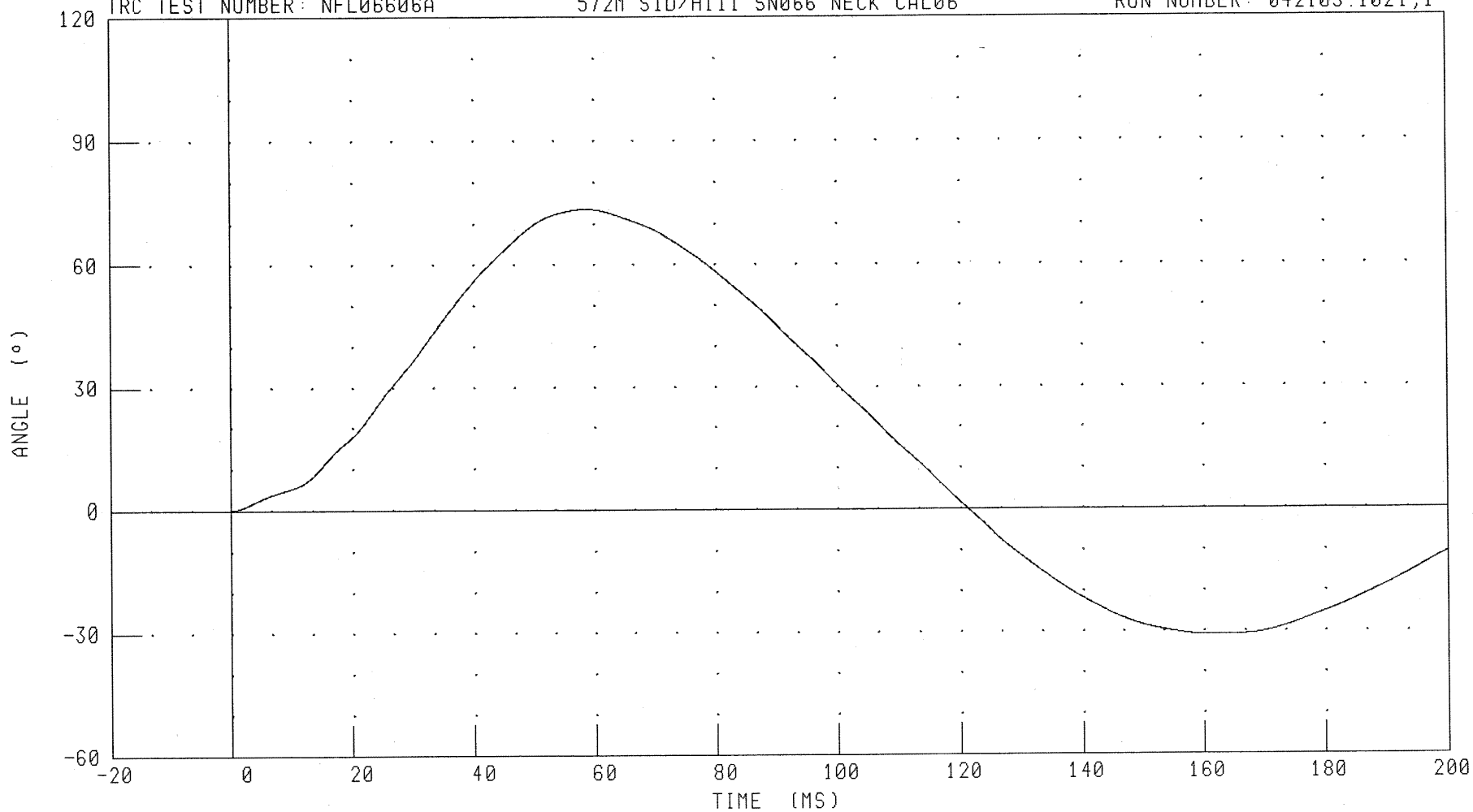
572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

TOTAL ROTATION

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021;1



CHANNEL: TOTAN

FILTER: CH. CLASS 60

PEAK DATA: 73.54 ° @ 58.64 MS; -30.82 ° @ 159.84 MS

C-49

030408-1

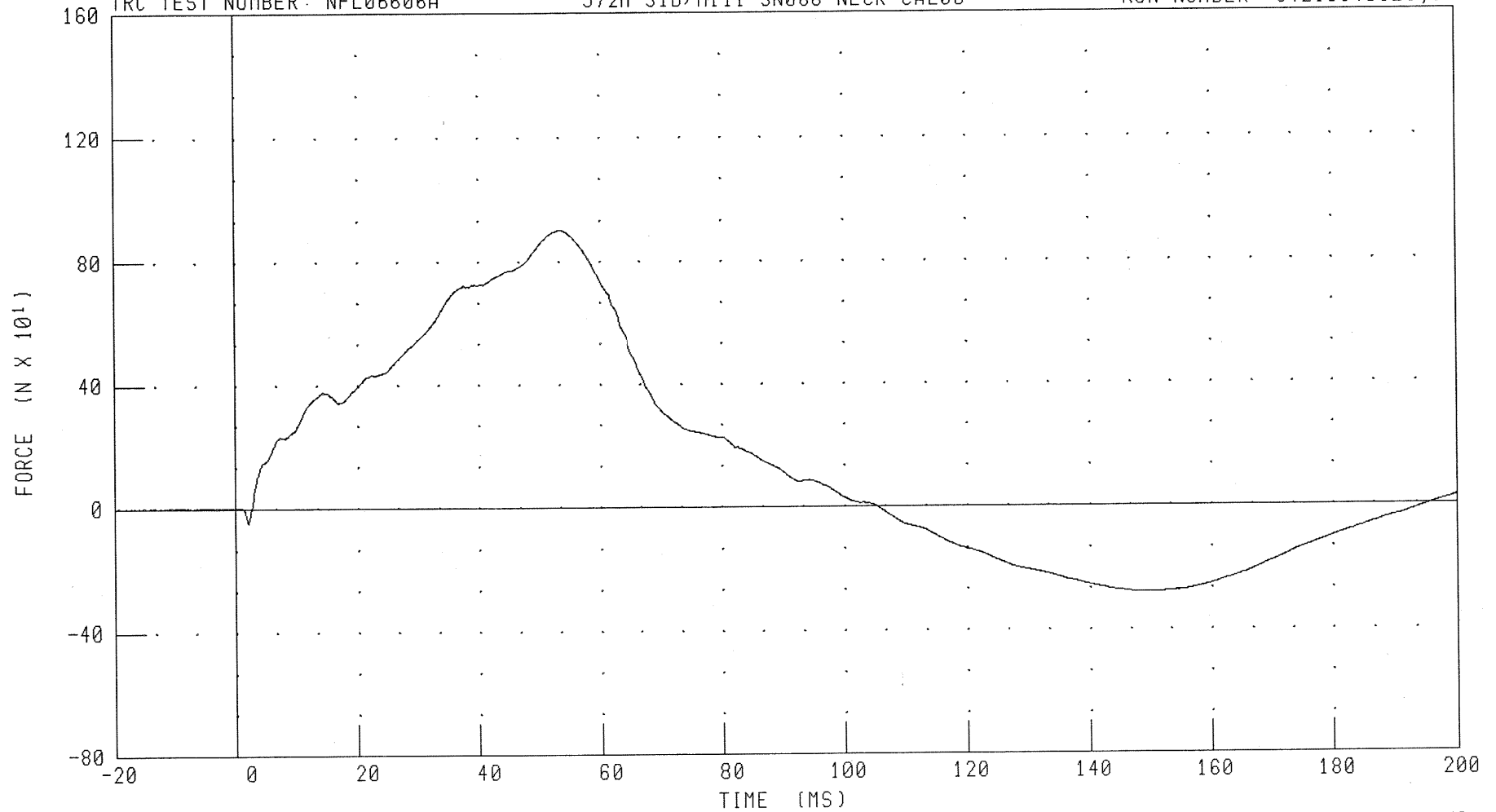
572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

NECK FORCE Y AXIS

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021;1



CHANNEL: NEKYF

FILTER: CH. CLASS 1000

PEAK DATA: 902.73 N @ 53.44 MS; -279.97 N @ 149.52 MS

030408-1

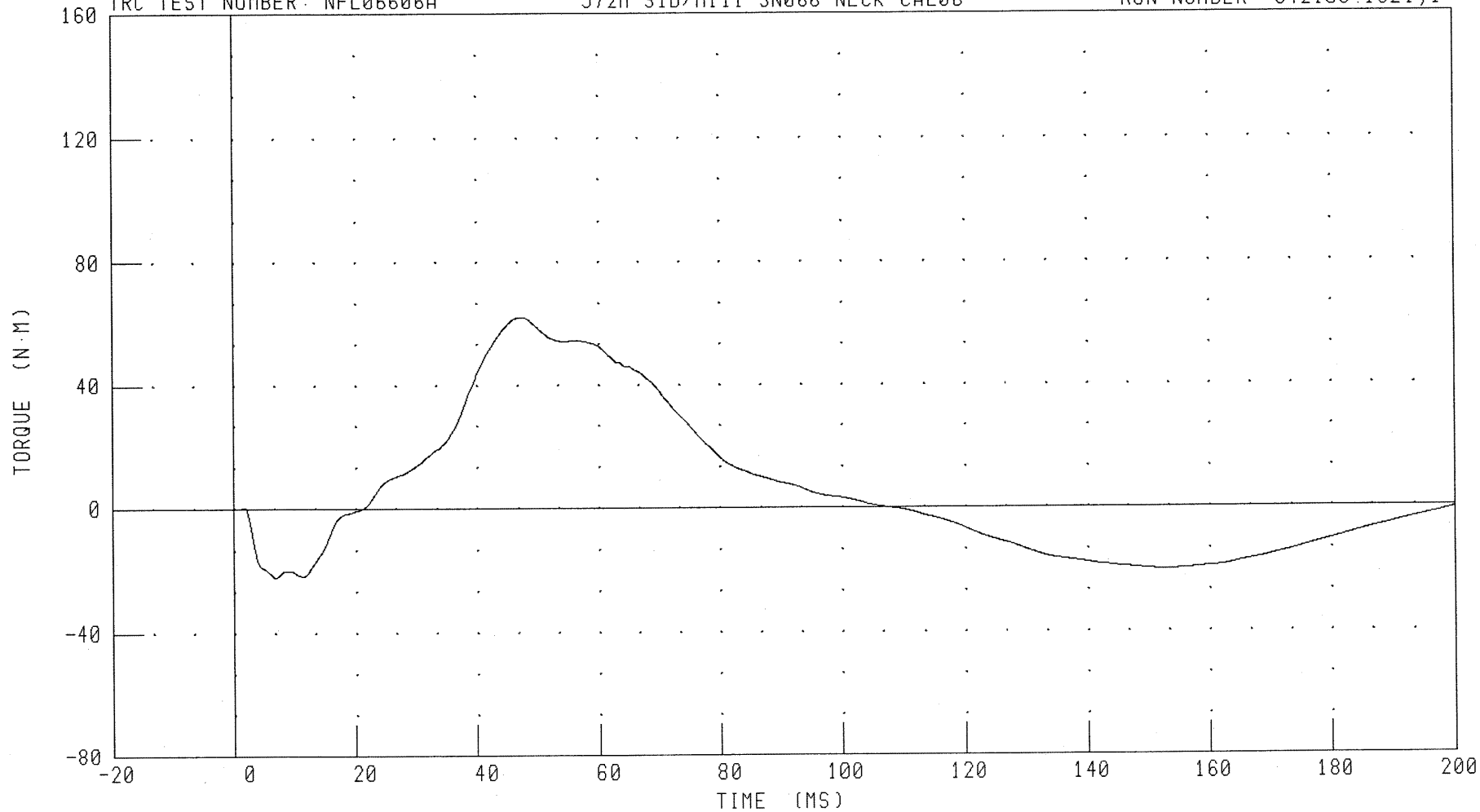
572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

NECK MOMENT X AXIS

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021;1



CHANNEL: NEKXM

FILTER: CH. CLASS 600

030408-1

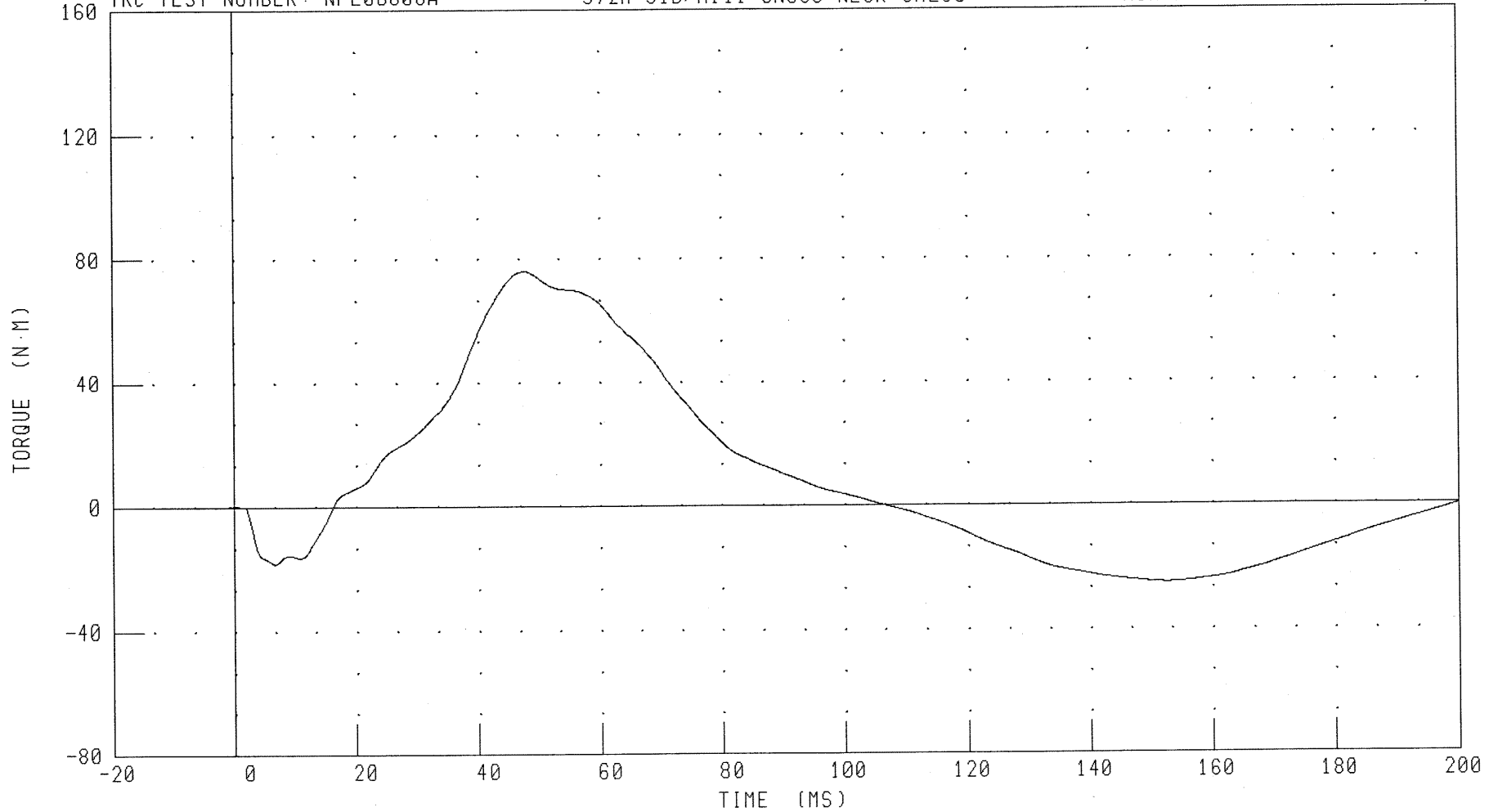
572M H3/SID DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL06606A

572M SID/HIII SN066 NECK CAL06

RUN NUMBER: 042103.1021;1



CHANNEL: NEKOM

FILTER: CH. CLASS 600

PEAK DATA: 76.04 N·M @ 47.68 MS; -25.02 N·M @ 152.88 MS

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL THORAX IMPACT TEST

SIDE IMPACT DUMMY

02-APR-03

LEFT SIDE CONFIGURATION

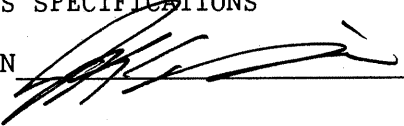
TRC INC.

TEST NO: STL06606

572F SID SN066 L.THORAX CAL06

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.26 M/S
PEAK ACCELERATION: UPPER RIB BAR	37 - 46 G	40.6 G
PEAK ACCELERATION: LOWER RIB BAR	37 - 46 G	42.9 G
PEAK ACCELERATION: LOWER THORACIC SPINE	15 - 22 G	20.2 G

TEST MEETS SPECIFICATIONS

TECHNICIAN 

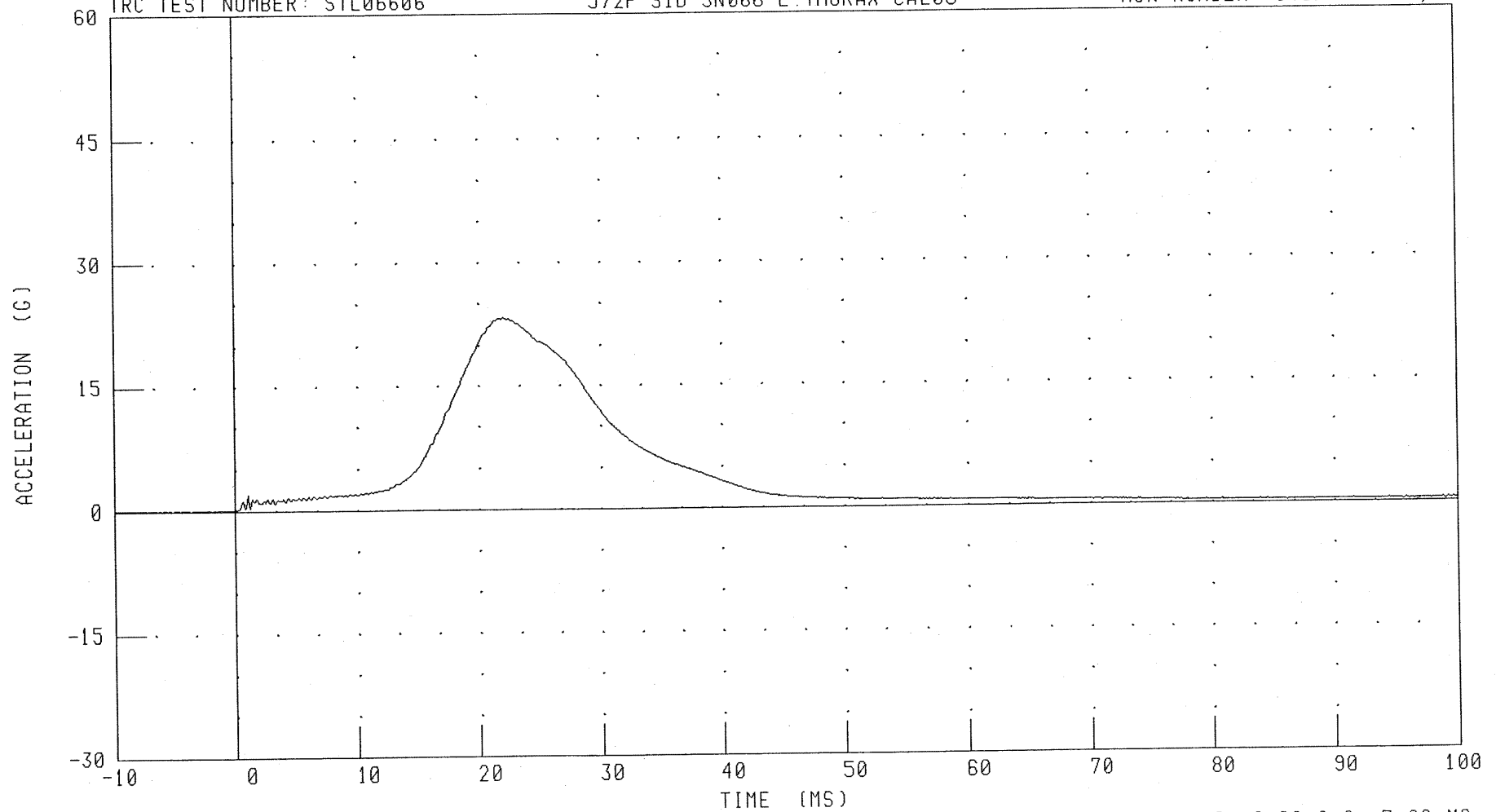
RUN NUMBER: 040203.1515;1

PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)
PENDULUM DECELERATION

TRC TEST NUMBER: STL06606

572F SID SN066 L THORAX CAL06

RUN NUMBER: 040203.1515;1



CHANNEL: PENXG FILTER: CH. CLASS 1000

PEAK DATA: 23.28 G @ 22.08 MS; 0.00 G @ -7.60 MS

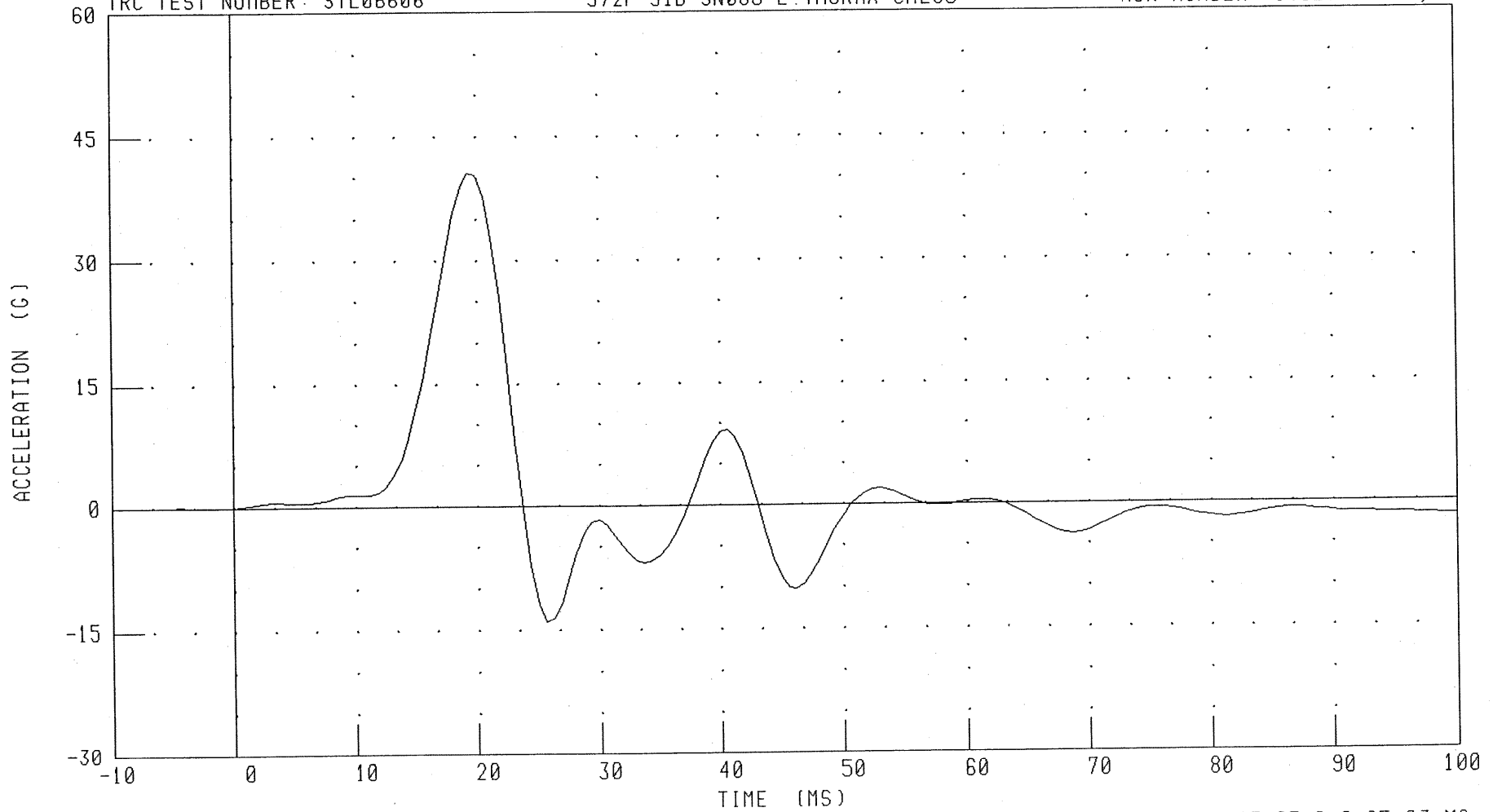
030408-1

PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)
LEFT UPPER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL06606

572F SID SN066 L THORAX CAL06

RUN NUMBER: 040203.1515;1



CHANNEL: LURYG

FILTER: FIR 100

PEAK DATA: 40.63 G @ 19.38 MS; -13.95 G @ 25.63 MS

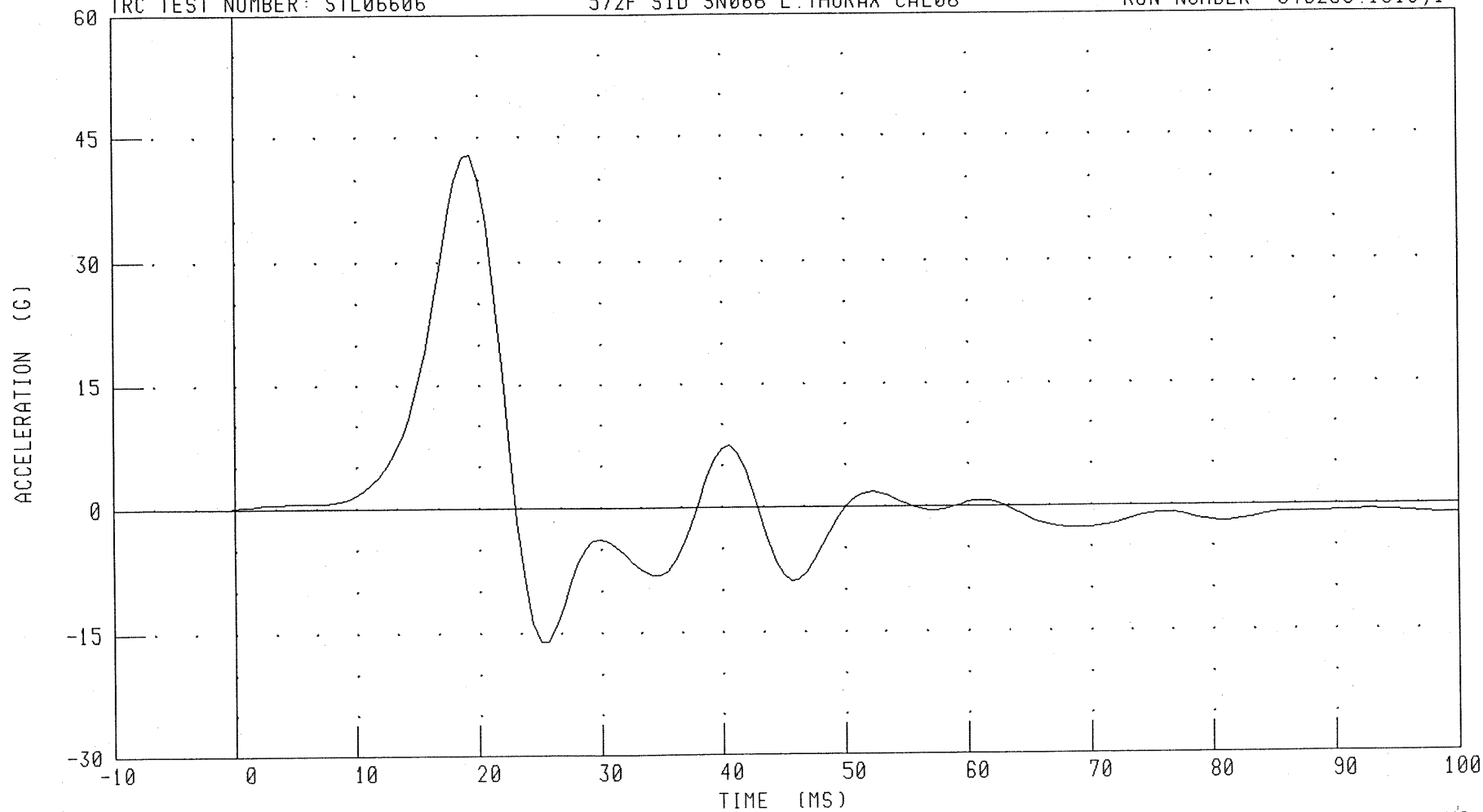
030408-1

PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)
LEFT LOWER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL06606

572F SID SN066 L THORAX CAL06

RUN NUMBER: 040203.1515;1



CHANNEL: LLRYG

FILTER: FIR 100

PEAK DATA: 42.92 G @ 19.38 MS; -16.10 G @ 25.63 MS

030408-1

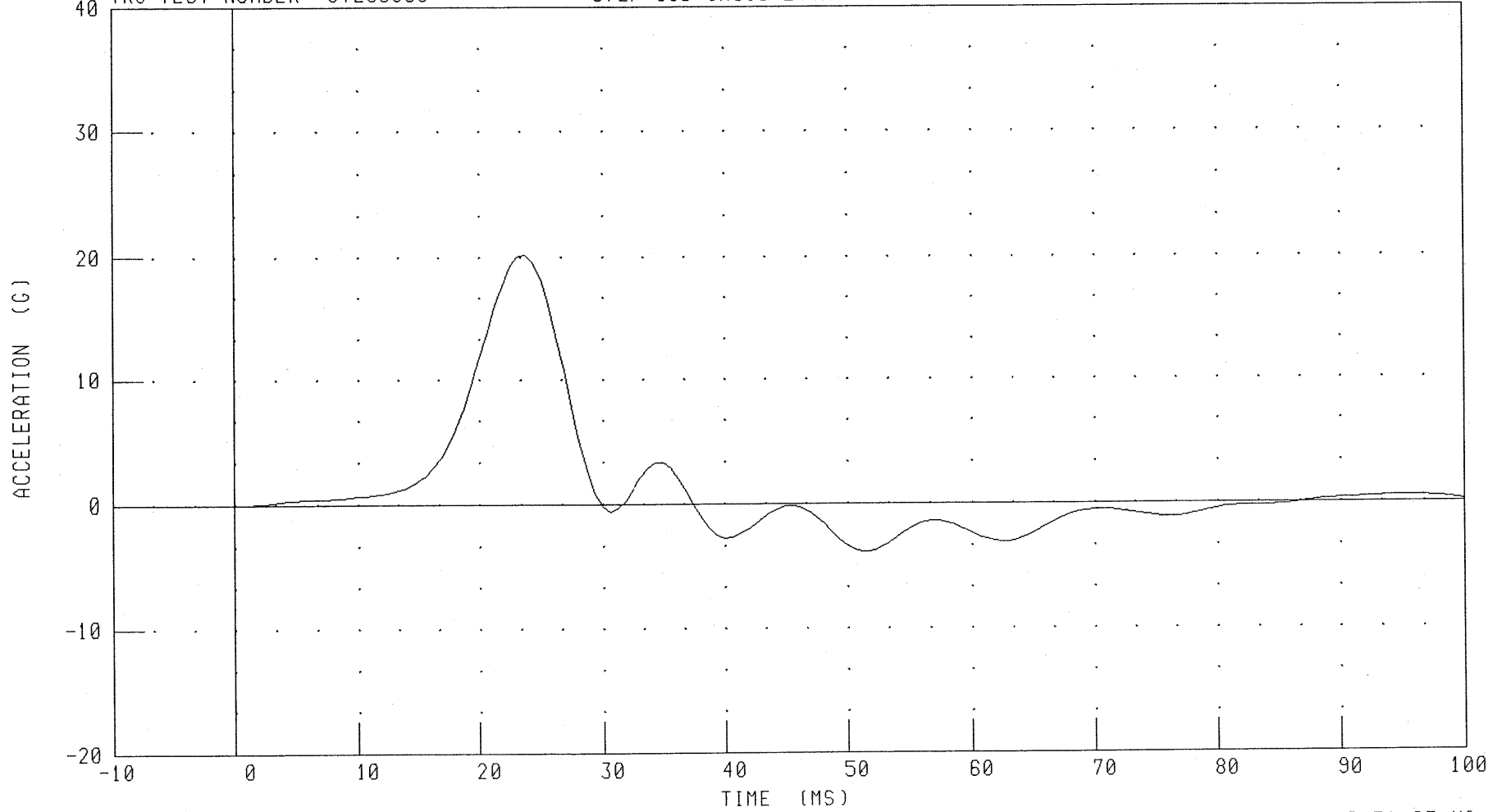
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LOWER SPINE ACCELERATION Y AXIS

TRC TEST NUMBER: STL06606

572F SID SN066 L THORAX CAL06

RUN NUMBER: 040203.1515;1



CHANNEL: T12YG

FILTER: FIR 100

PEAK DATA: 20.23 G @ 23.75 MS; -3.85 G @ 51.25 MS

030408-1

Transportation Research Center Inc.

572B Abdomen Compression Test

HIII SID Serial No. 066 Calibration No. 06 - 1

Test Date 04/03/2003

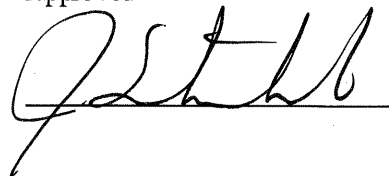
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Displacement Rate	6.35 - 8.89 mm/s	6.9 - 8.0 mm/s	Yes
Data Within Required Corridor	Yes	Yes	Yes

Comments:

Technician



Approved



04.03.2003 12:42:46 5

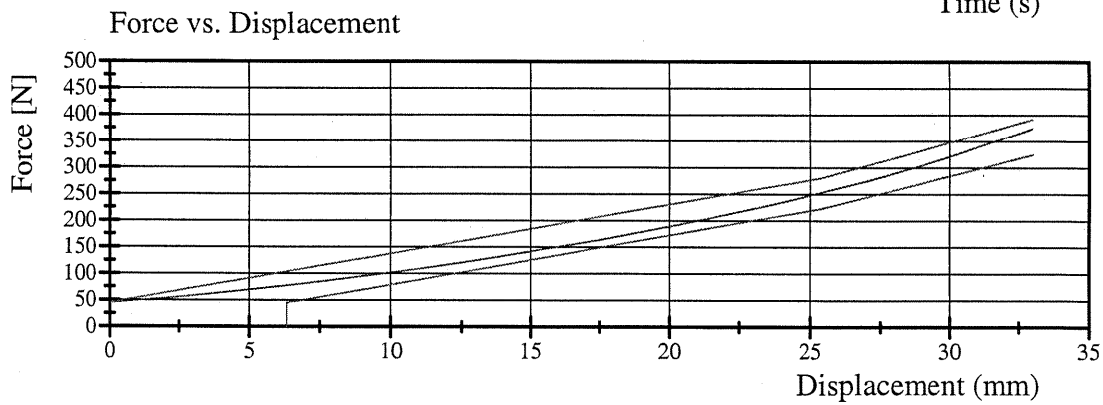
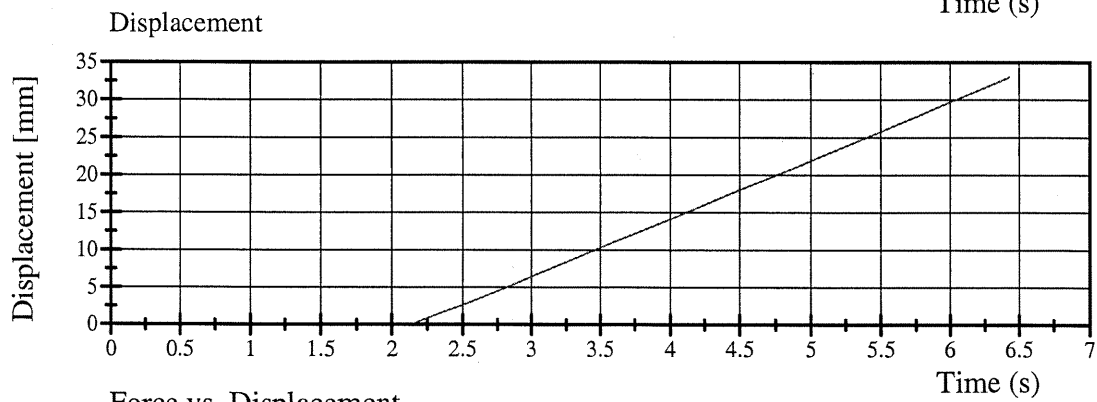
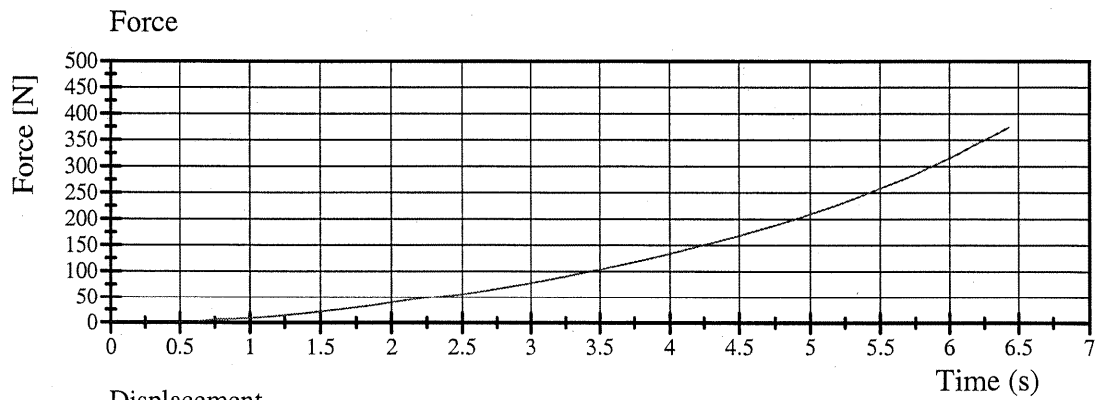


Transportation Research Center Inc.

572B Abdomen Compression Test

HIH SID Serial No. 066 Calibration No. 06 - 1

Test Date 04/03/2003



04.03.2003 12:42:47 5



TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 03-Apr-03

TRC, INC.

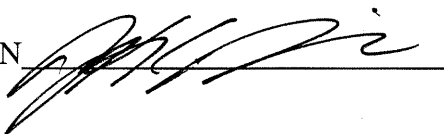
TEST NO: 066C06TF1

572B SN 066 TORSO FLEX CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	49 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	124.6 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	173.5 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	222.4 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	7 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER INC.

LATERAL PELVIS IMPACT TEST

SIDE IMPACT DUMMY

02-APR-03

LEFT SIDE CONFIGURATION

TRC INC.

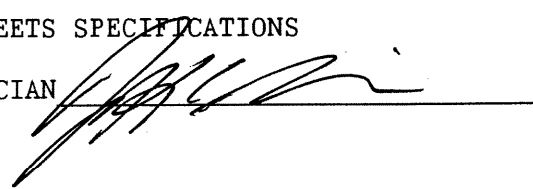
TEST NO: SPL06606

572F SN066 LEFT PELVIS CAL06

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.28 M/S
PEAK PELVIC ACCELERATION	40 - 60 G	53.2 G
TIME ABOVE 20 G LEVEL	3 - 7 MS	6.1 MS
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 040203.1508;1

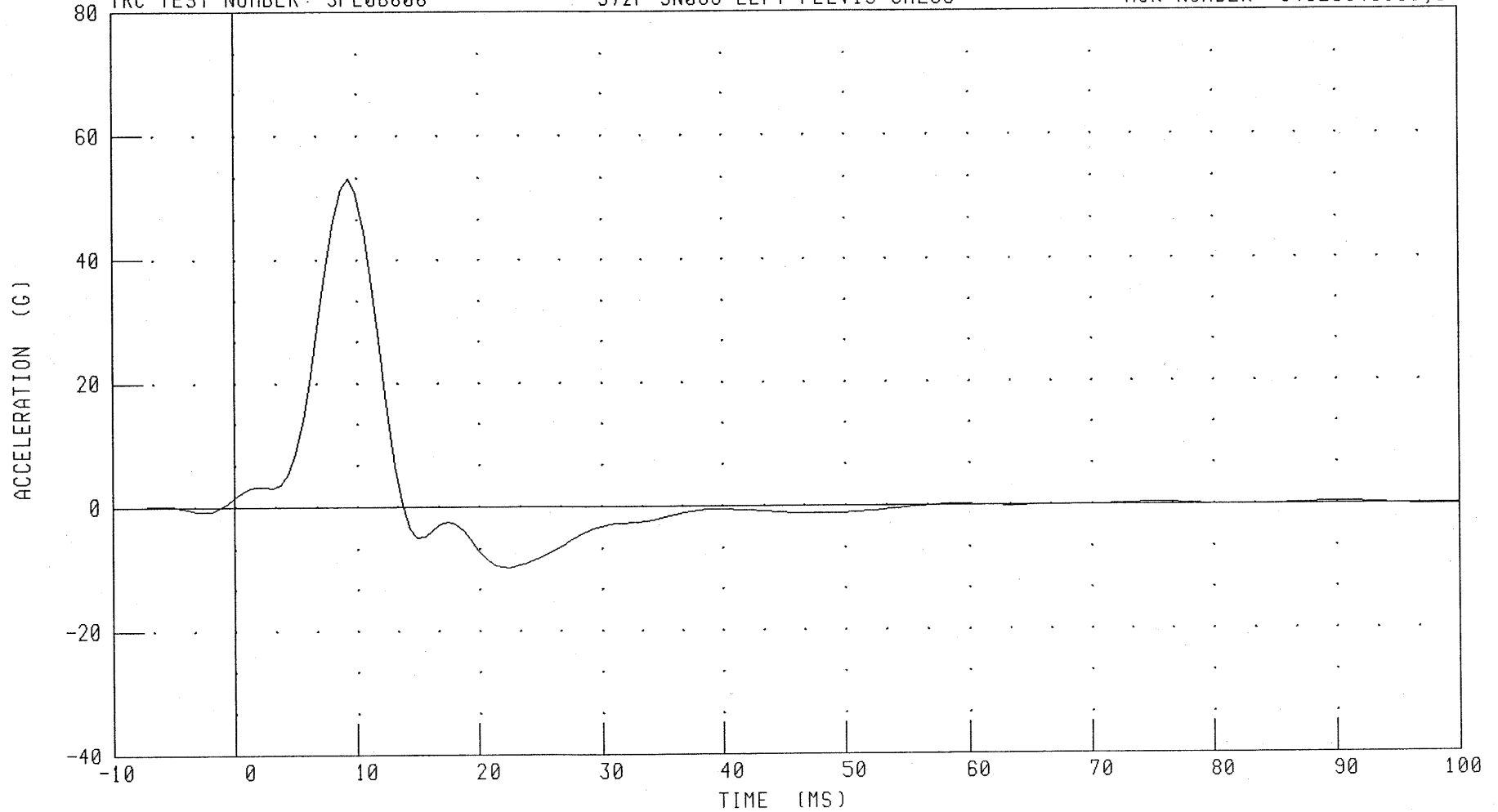
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PELVIS ACCELERATION Y AXIS

TRC TEST NUMBER: SPL06606

572F SN066 LEFT PELVIS CAL06

RUN NUMBER: 040203.1509;1



CHANNEL: PEVYG

FILTER: FIR 100

PEAK DATA: 53.23 G @ 9.37 MS; -9.82 G @ 22.50 MS

C-62

030408-1

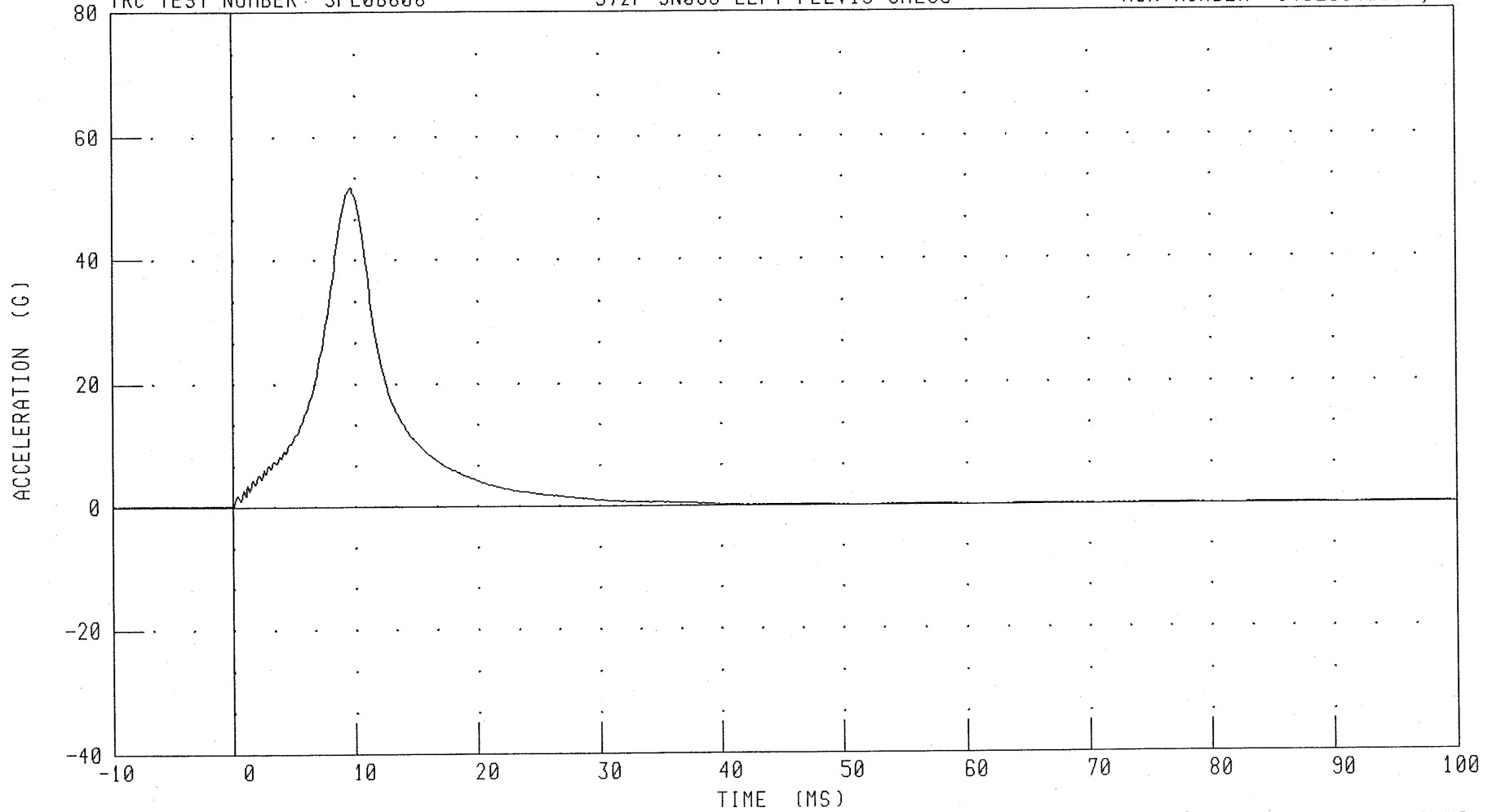
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PENDULUM DECELERATION

TRC TEST NUMBER: SPL06606

572F SN066 LEFT PELVIS CAL06

RUN NUMBER: 040203.1509;1



CHANNEL: PENXG

FILTER: CH. CLASS 1000

PEAK DATA: 51.70 G @ 9.68 MS, -0.12 G @ 70.16 MS

030408-1

TRANSPORTATION RESEARCH CENTER INC.

THORACIC SHOCK ABSORBER TESTS

SIDE IMPACT DUMMY

03-FEB-03

TRC INC.

572F SN066 DAMPER TEST CAL02

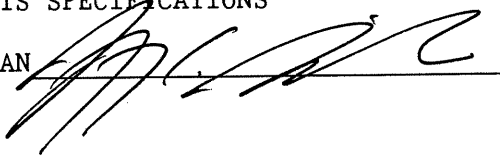
TEST NUMBERS: DP06602A,DP06602B,DP06602C

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	46.0 %
VELOCITY	FORCE	667 - 925 N	797 N
2.70 M/S	DISPLACEMENT	29.7 - 34.5 MM	29.9 MM
VELOCITY	FORCE	1733 - 2100 N	1877 N
4.26 M/S	DISPLACEMENT	31.6 - 37.2 MM	35.9 MM
VELOCITY	FORCE	3703 - 4402 N	4387 N
6.07 M/S	DISPLACEMENT	33.3 - 39.5 MM	37.8 MM

DAMPER SETTING = 5.0

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 020303.0731;1

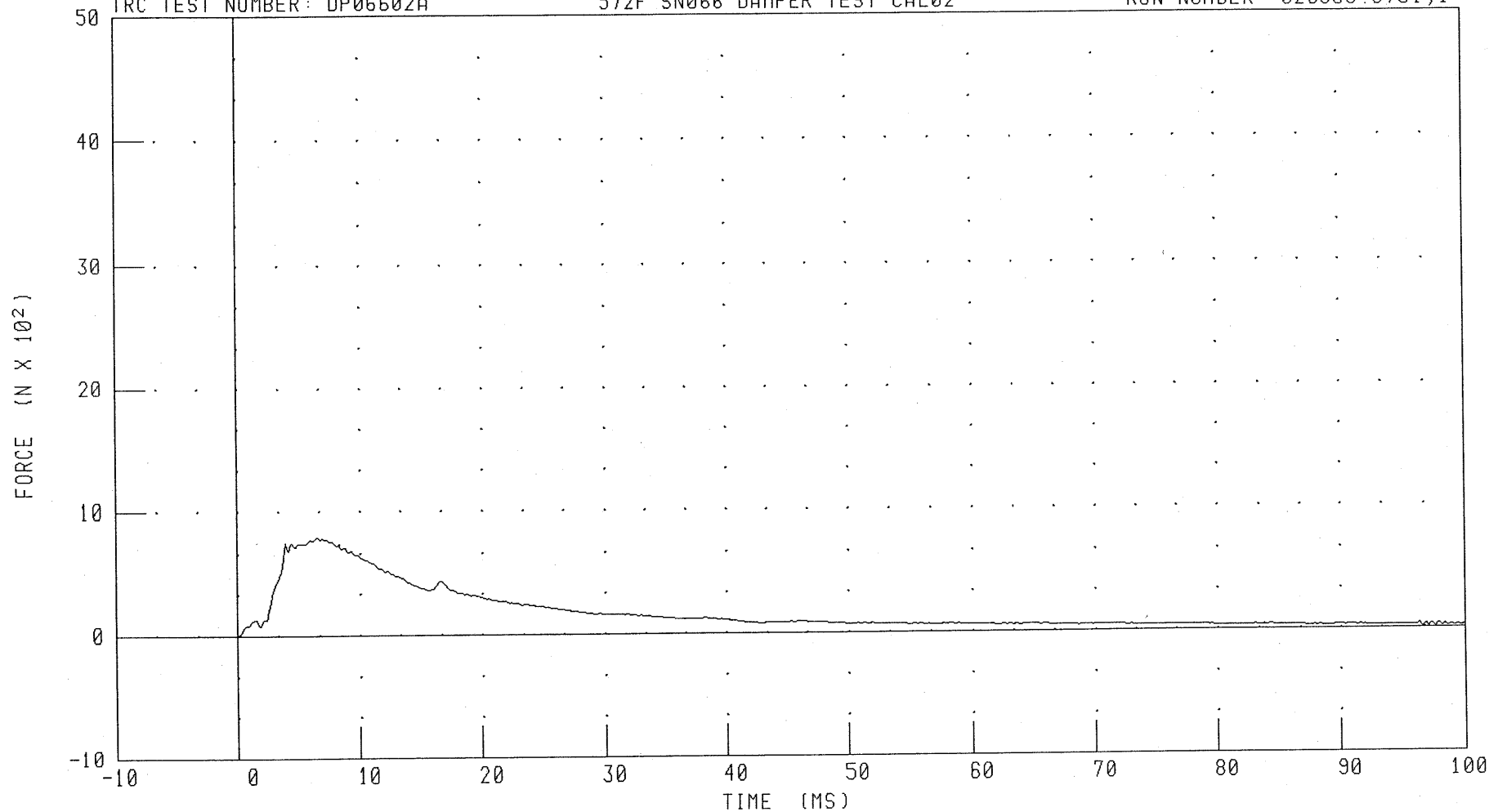
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (3.0 M/SEC)

SHOCK ABSORBER RESISTIVE FORCE

TRC TEST NUMBER: DP06602A

572F SN066 DAMPER TEST CAL02

RUN NUMBER: 020303.0731;1



CHANNEL: DAMPF

FILTER: CH. CLASS 1000

PEAK DATA: 796.77 N @ 6.48 MS; -2.09 N @ -10.00 MS

C-65

030408-1

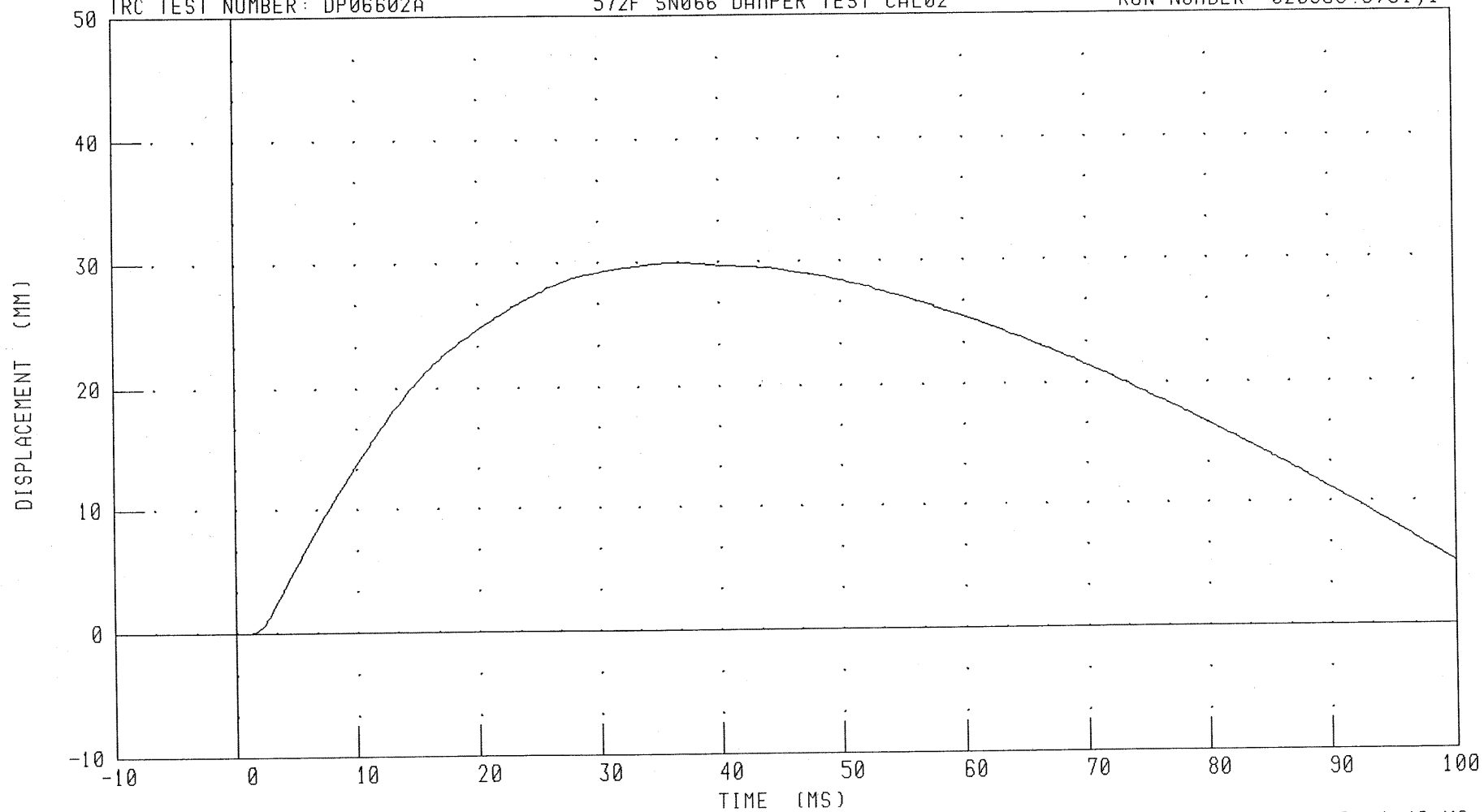
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (3.0 M/SEC)

SHOCK ABSORBER DISPLACEMENT

TRC TEST NUMBER: DP06602A

572F SN066 DAMPER TEST CAL02

RUN NUMBER: 020303.0731;1



CHANNEL: CSTYD

FILTER: CH. CLASS 1000

PEAK DATA: 29.94 MM @ 36.24 MS; 0.00 MM @ -4.40 MS

C-66

030408-1

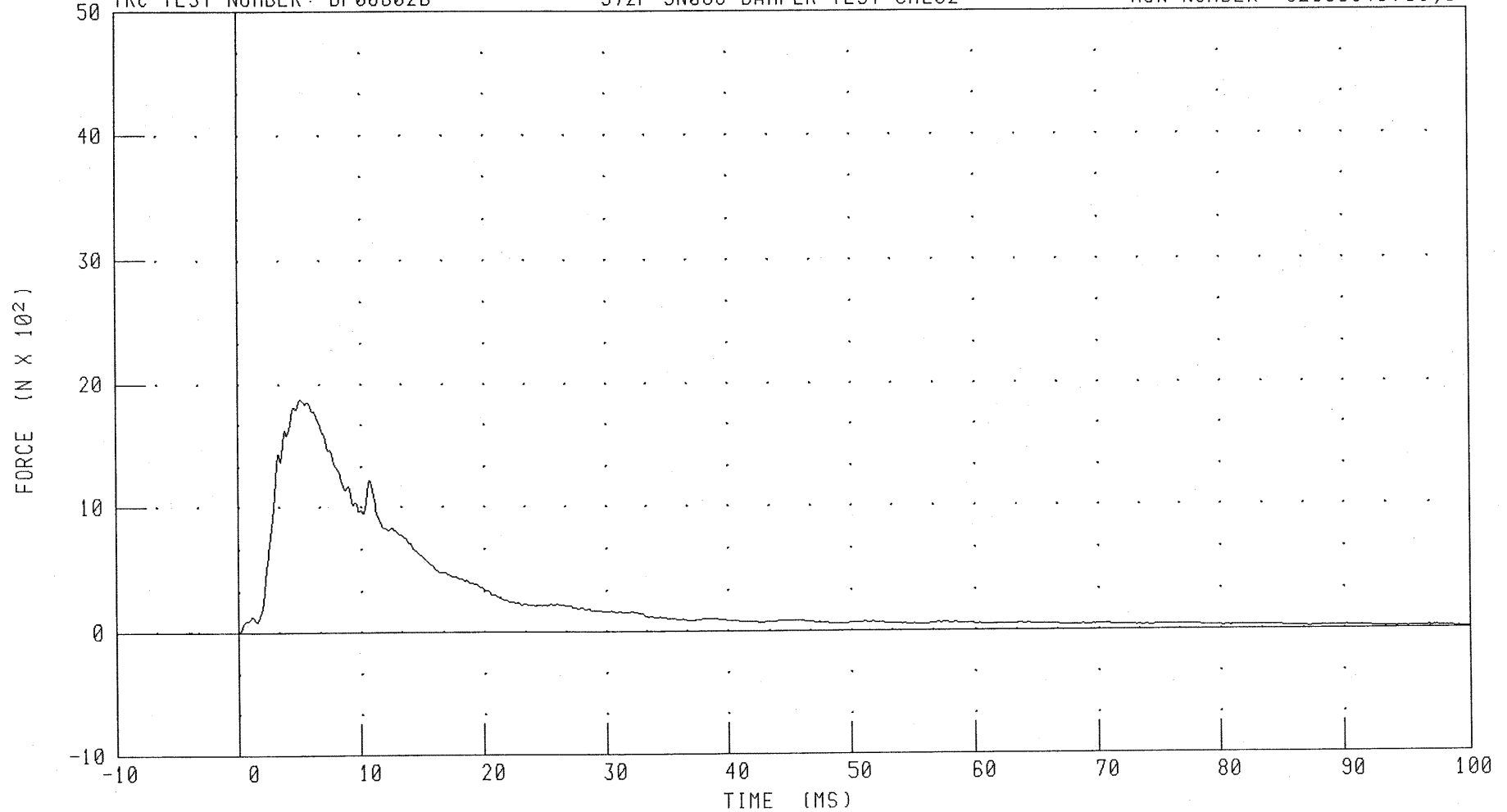
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (4.3 M/SEC)

SHOCK ABSORBER RESISTIVE FORCE

TRC TEST NUMBER: DP06602B

572F SN066 DAMPER TEST CAL02

RUN NUMBER: 020303.0731;1



CHANNEL: DAMPF

FILTER: CH. CLASS 1000

PEAK DATA: 1876.76 N @ 5.12 MS; -2.32 N @ -8.96 MS

030408-1

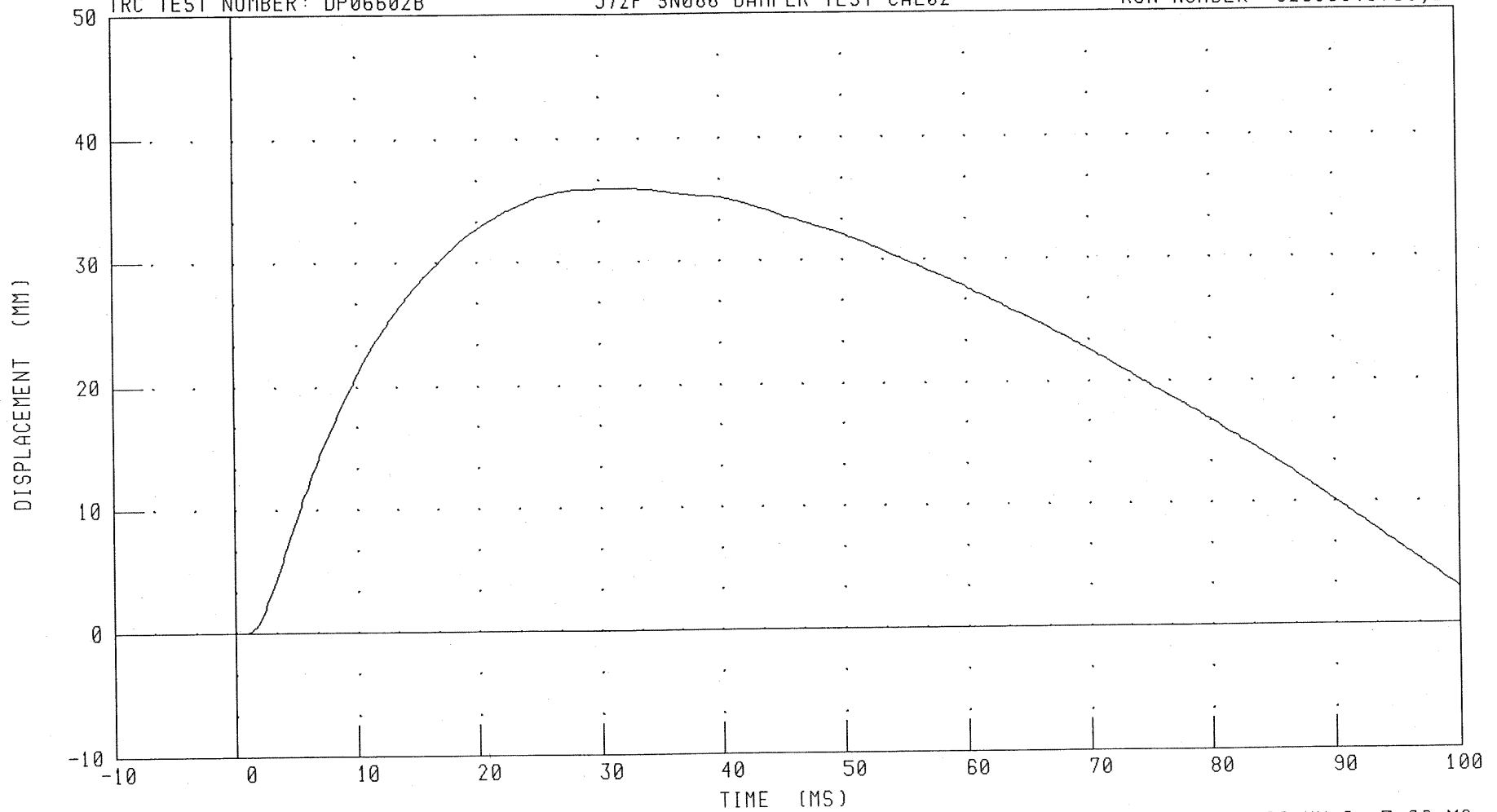
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (4.3 M/SEC)

SHOCK ABSORBER DISPLACEMENT

TRC TEST NUMBER: DP06602B

572F SN066 DAMPER TEST CAL02

RUN NUMBER: 020303.0731;1



CHANNEL: CSTYD

FILTER: CH. CLASS 1000

PEAK DATA: 35.94 MM @ 31.12 MS; 0.00 MM @ -7.68 MS

C-68

030408-1

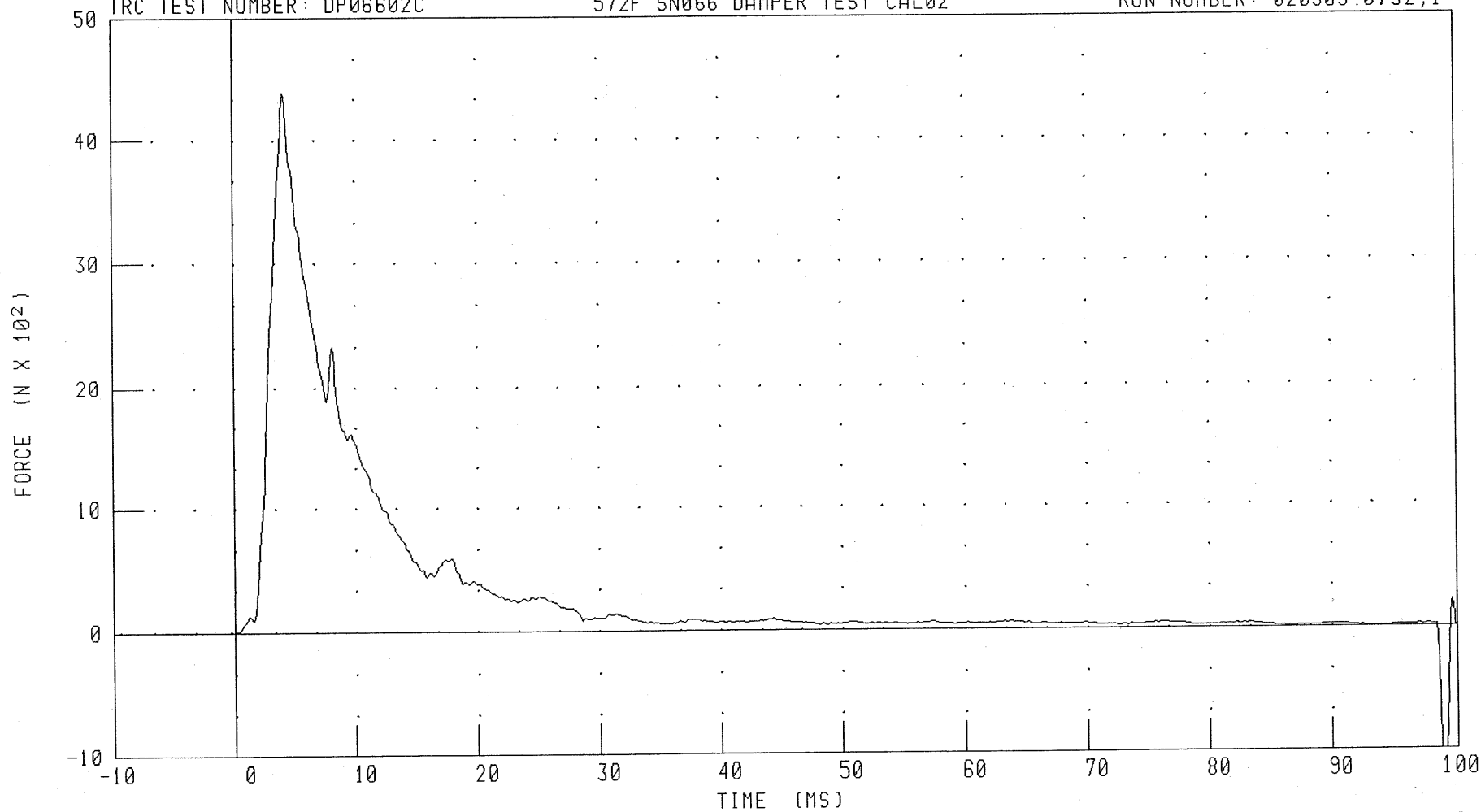
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (6.1 M/SEC)

SHOCK ABSORBER RESISTIVE FORCE

TRC TEST NUMBER: DP06602C

572F SN066 DAMPER TEST CAL02

RUN NUMBER: 020303.0732;1



CHANNEL: DAMPF

FILTER: CH. CLASS 1000

PEAK DATA: 4387.36 N @ 4.16 MS; -1635.86 N @ 98.88 MS

030408-1

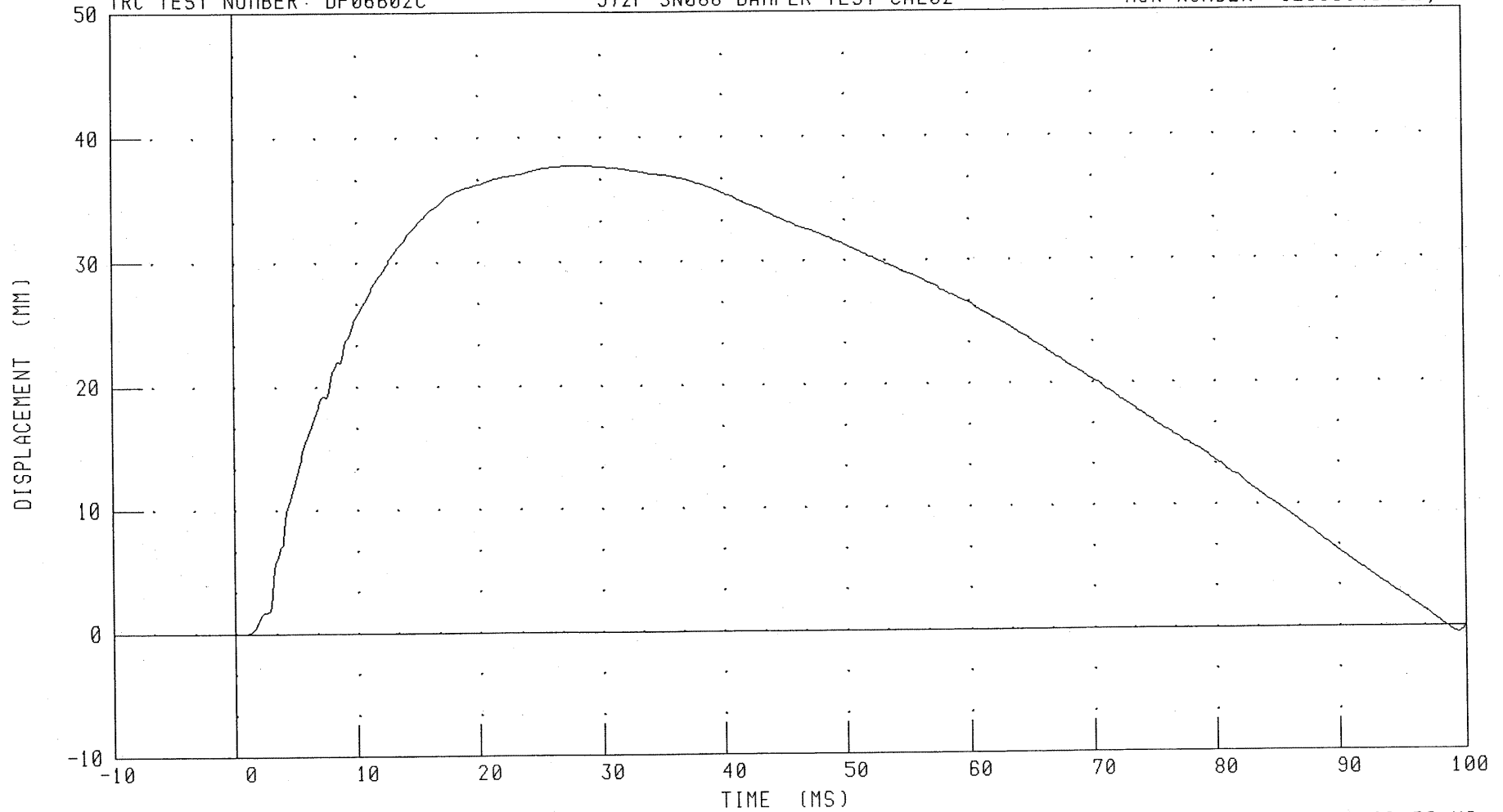
PART 572-F S.I.D. THORACIC SHOCK ABSORBER CALIBRATION (6.1 M/SEC)

SHOCK ABSORBER DISPLACEMENT

TRC TEST NUMBER: DP06602C

572F SN066 DAMPER TEST CAL02

RUN NUMBER: 020303.0732;1



CHANNEL: CSTYD

FILTER: CH. CLASS 1000

PEAK DATA: 37.76 MM @ 27.76 MS; -0.52 MM @ 99.36 MS

030408-1

Calibration Test Results

Post-Test

SID-HIII: 028

Configured for Left Side Impact

External Dimensions:	The dummy passed all external dimension requirements.
Lateral Head Drop Test:	The head passed all lateral drop test requirements.
Lateral Neck Test:	The neck passed all impact test requirements.
Lateral Thorax Impact Test:	The thorax passed all impact test requirements.
Thoracic Shock Absorber Test:	The thoracic shock absorber was not tested at this time.
Lumbar Flexion Test:	The dummy met the lumbar flexion test requirements.
Abdominal Compression Test:	The abdomen met the compression test requirements.
Pelvis Impact Test:	The lateral pelvis passed all impact test requirements.

Transportation Research Center Inc.

572F SID Dummy

External Dimensions

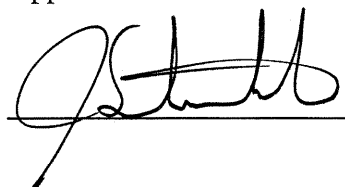
Serial No. 028 Calibration No. 04

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	896 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	504 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Rib From Backline	RD	228.6 - 241.3 mm	233 mm	Yes
Knee Pivot From Backline	KH	510.5 - 525.8 mm	514 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	498 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	373 mm	Yes
Top Rib Width From CVL	RW-1	165.1 - 180.3 mm	172 mm	Yes
Bottom Rib Width From CVL	RW-2	165.1 - 180.3 mm	170 mm	Yes
Difference Between Top & Bottom Rib Width from CVL		<= 2.5 mm	2.0 mm	Yes

Technician



Approved





TRANSPORTATION RESEARCH CENTER INC.

LATERAL HEAD DROP TEST

HYBRIDI III SID DUMMY

14-APR-03

LEFT SIDE CONFIGURATION

TRC INC. TEST NO. HDL02804 572M SID/HIII SN028 HEAD CAL04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.6 deg. C	21.67 deg. C
RELATIVE HUMIDITY	10 - 70 %	38.00 %
PEAK RESULTANT ACCELERATION	120 - 150 G	143.81 G
PEAK LONGITUDINAL ACCELERATION	15 G MAX	-8.93 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 042103.0934;1

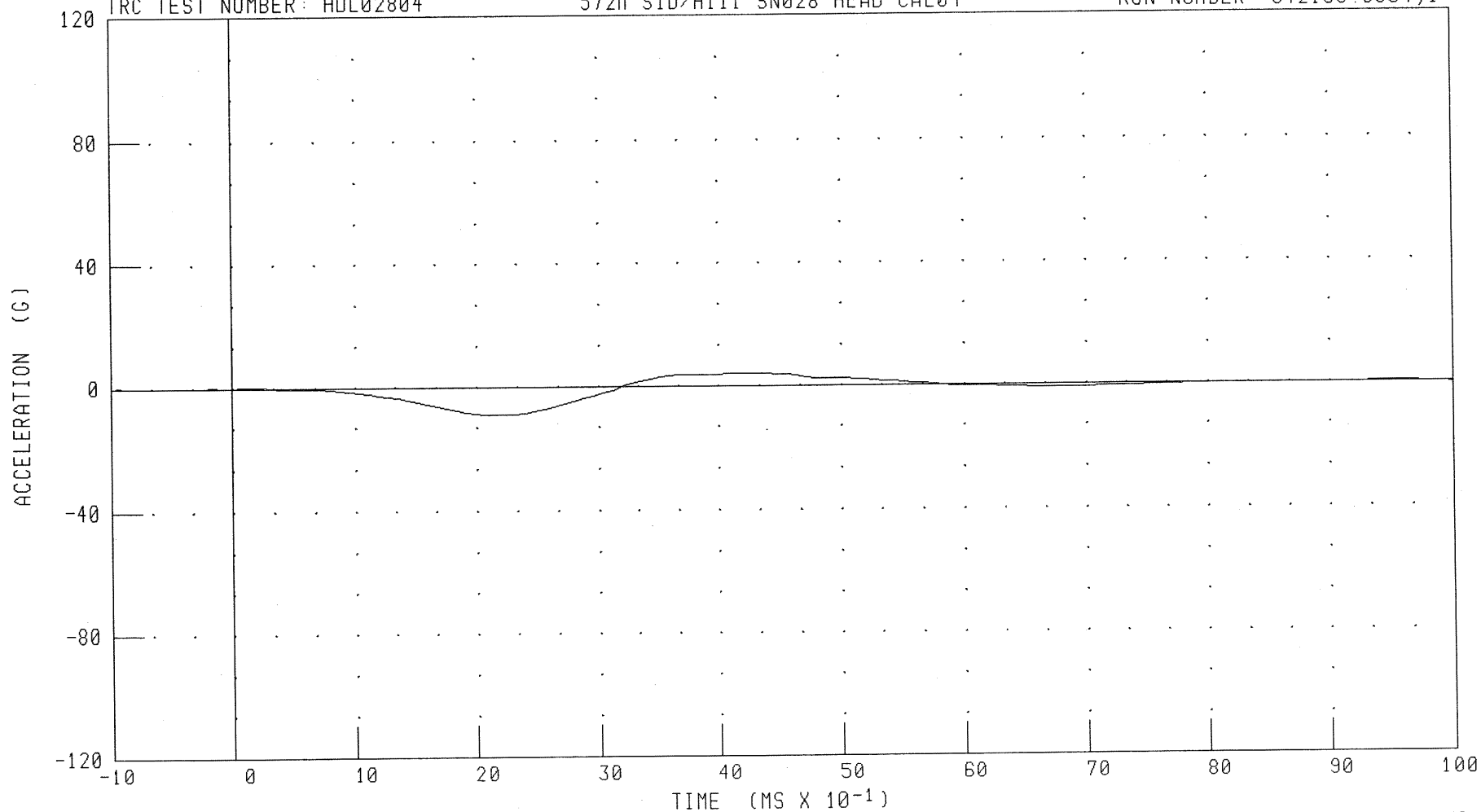
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: HDL02804

572M SID/HIII SN028 HEAD CAL04

RUN NUMBER: 042103.0934;1



CHANNEL: HEDXC

FILTER: CH. CLASS 1000

PEAK DATA: 3.86 G @ 4.24 MS; -8.93 G @ 2.24 MS

C-74

030408-1

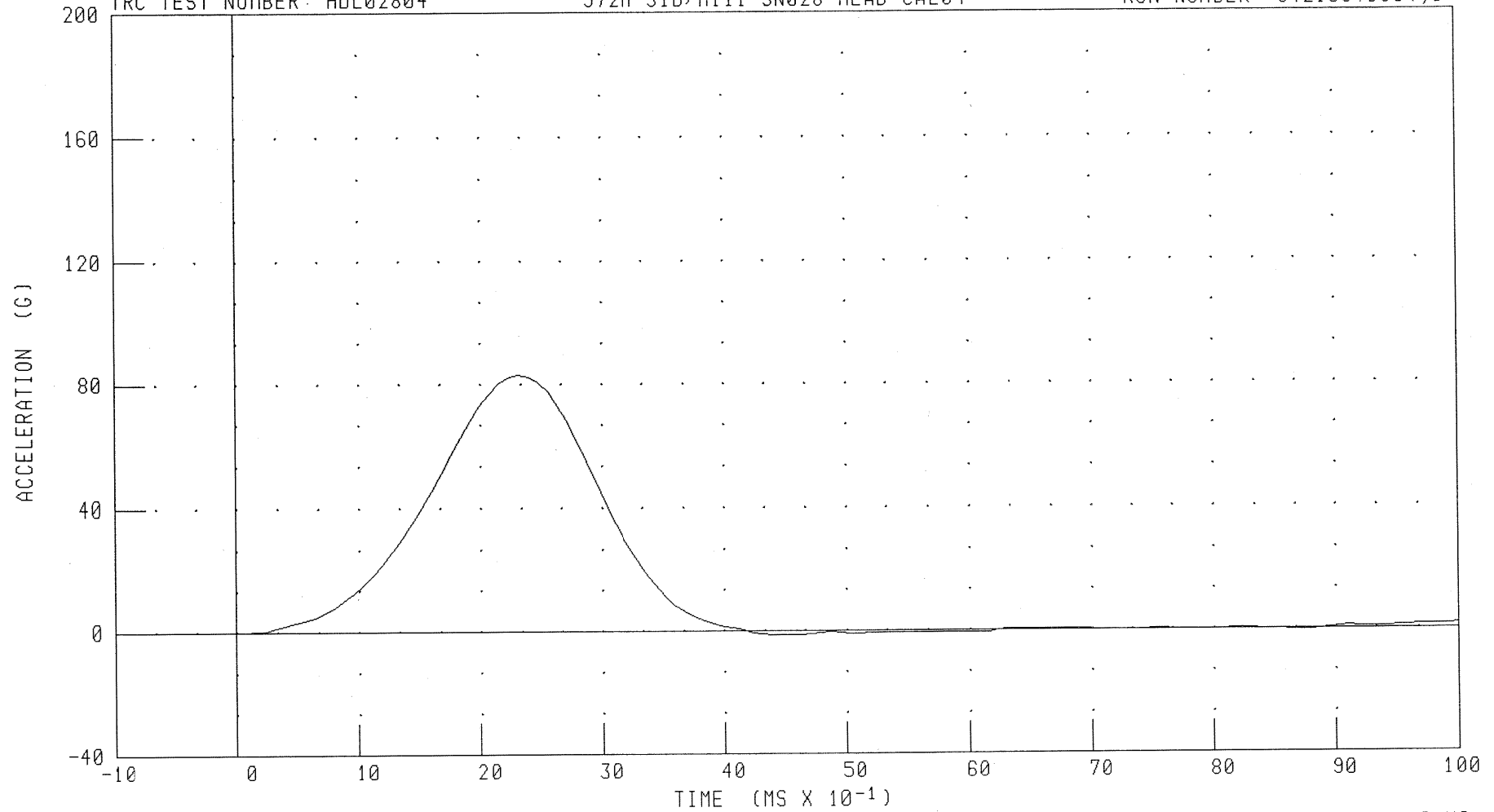
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: HDL02804

572M SID/HIII SN028 HEAD CAL04

RUN NUMBER: 042103.0934;1



CHANNEL: HEDYC

FILTER: CH. CLASS 1000

PEAK DATA: 83.05 G @ 2.32 MS; -1.58 G @ 4.48 MS

C-75

030408-1

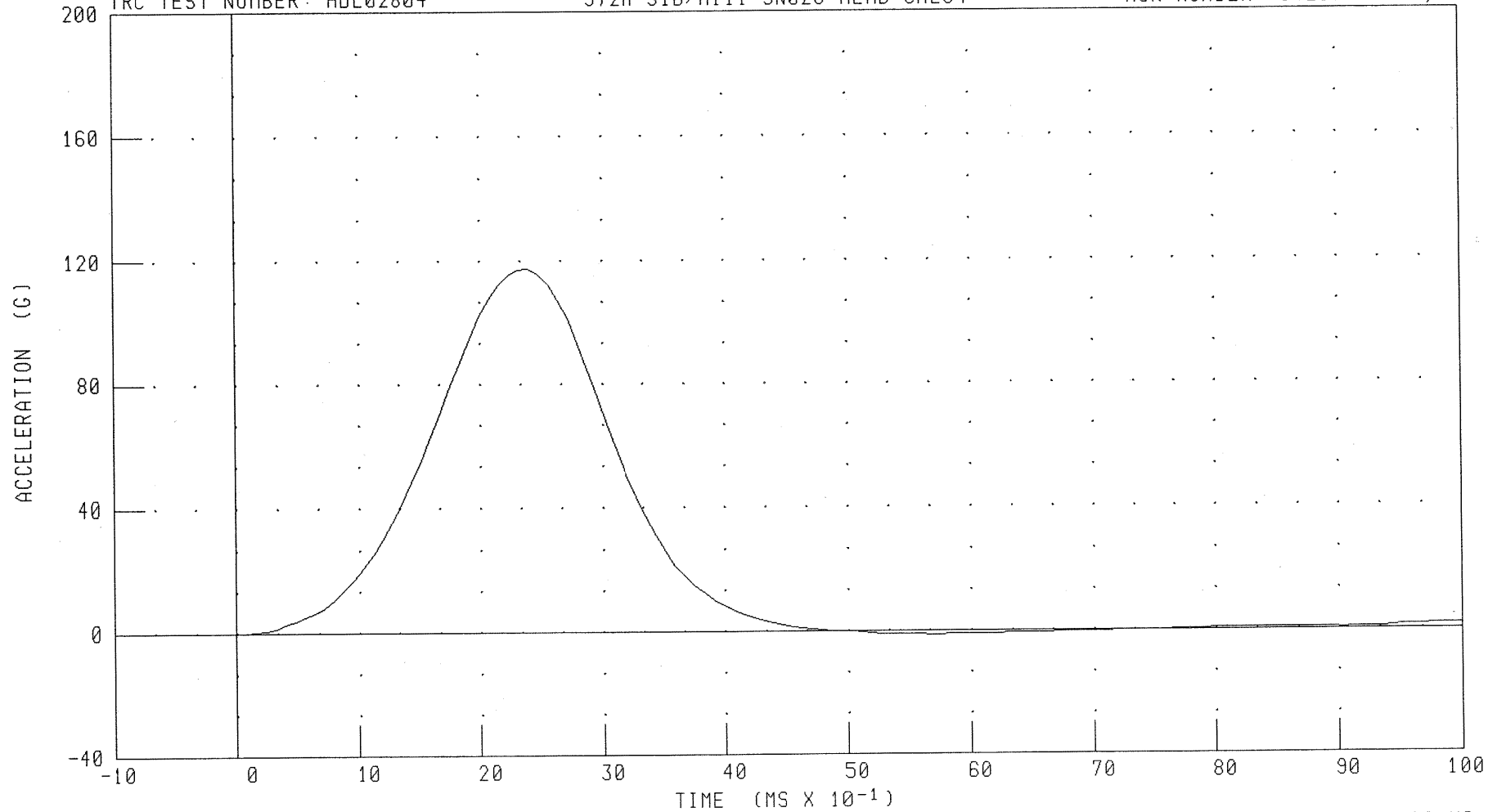
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: HDL02804

572M SID/HIII SN028 HEAD CAL04

RUN NUMBER: 042103.0934;1



CHANNEL: HEDZG

FILTER: CH. CLASS 1000

PEAK DATA: 117.44 G @ 2.40 MS; -1.39 G @ 5.68 MS

C-76

030408-1

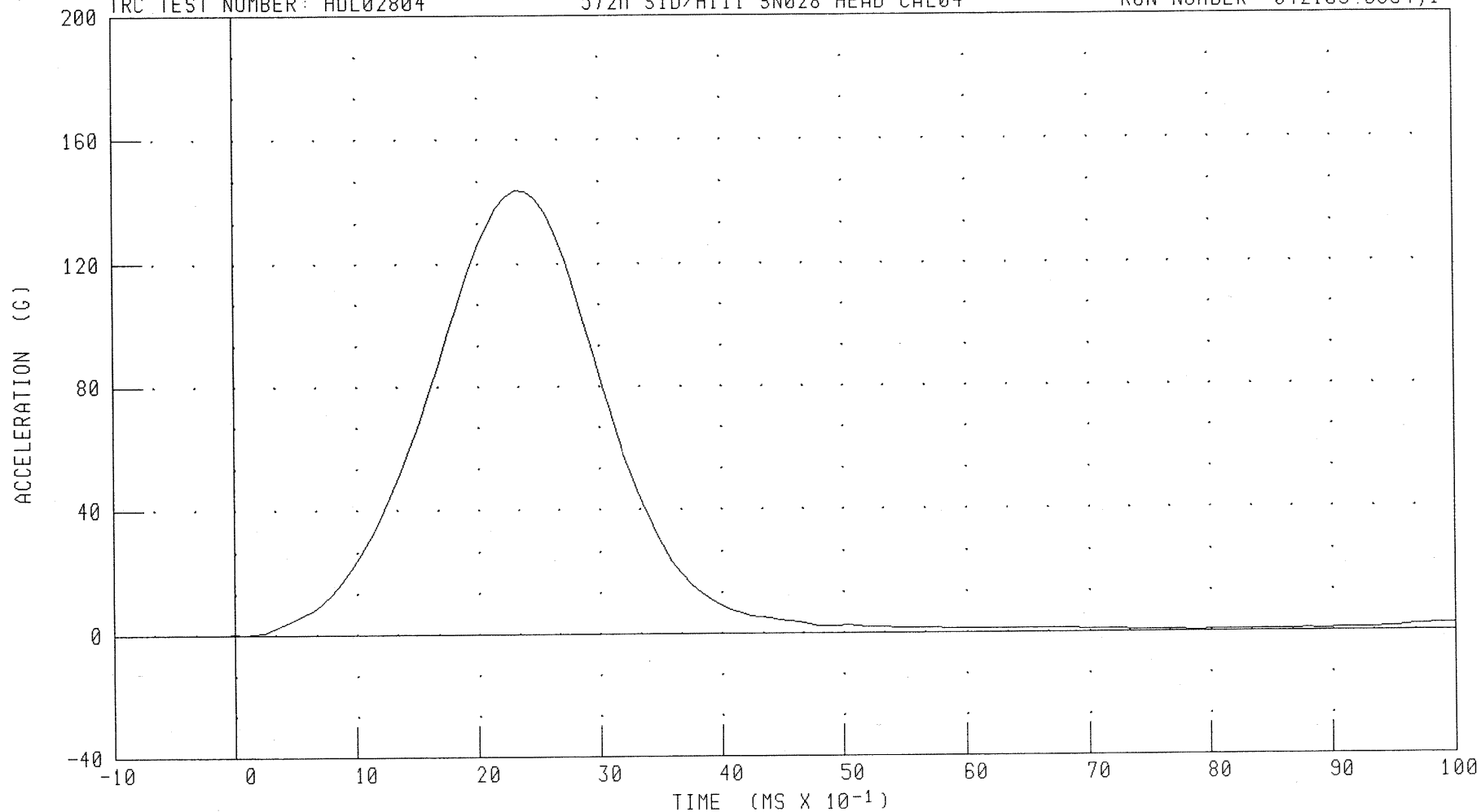
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: HDL02804

572M SID/HIII SN028 HEAD CAL04

RUN NUMBER: 042103.0934;1



CHANNEL: HEDRG

FILTER: CH. CLASS 1000

PEAK DATA: 143.81 G @ 2.32 MS; 0.02 G @ -0.24 MS

C-77

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL NECK TEST

HYBRIDI III SID DUMMY

14-APR-03

LEFT SIDE CONFIGURATION

TRC INC.

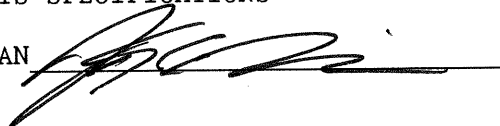
TEST NO. NFL02804

572M SID/HIII SN028 NECK CAL04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 deg. C	21.67 deg. C
RELATIVE HUMIDITY		10 - 70 %	35.00 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
INTEGRATED VELOCITY	10 MS	1.96 - 2.55 M/S	2.43 M/S
	20 MS	4.12 - 5.10 M/S	4.84 M/S
	30 MS	5.73 - 7.01 M/S	6.71 M/S
	40 - 70 MS	6.27 - 7.64 M/S	7.12- 7.23 M/S
MAXIMUM MIDSAGGITAL PLANE ROTATION		66 - 82 deg.	71.91 deg.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO		58 - 67 MS	59.44 MS
MAXIMUM MOMENT ABOUT OCCIPITAL CONDYLE		73 - 88 NM	83.95 NM
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO		49 - 64 MS	52.56 MS
TIME OF MAXIMUM ROTATION AFTER MAXIMUM MOMENT		2 - 16 MS	8.48 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 042103.1004;1

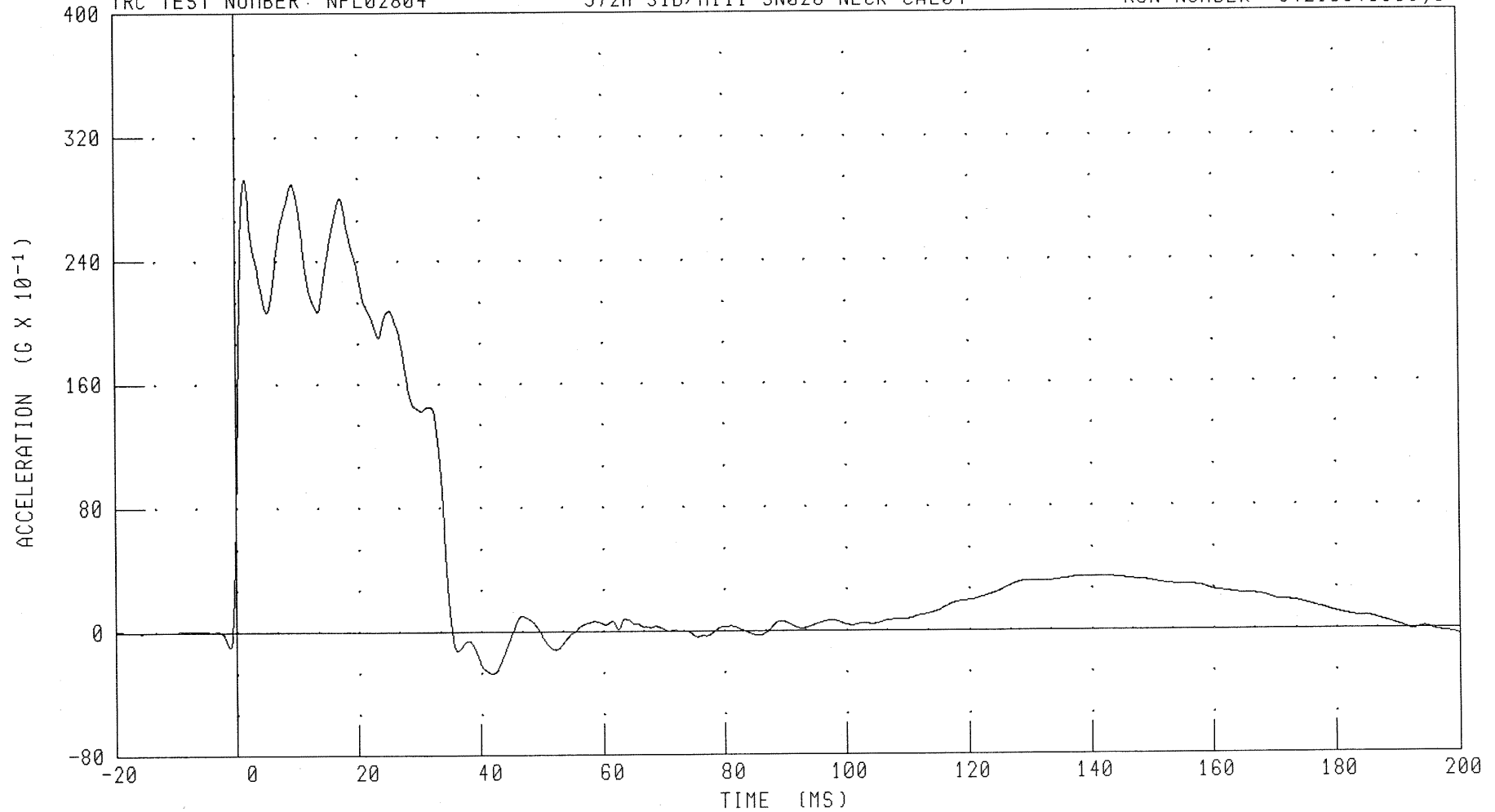
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

PENDULUM DECELERATION

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: PENXG

FILTER: CH. CLASS 180

PEAK DATA: 29.23 G @ 1.60 MS; -2.71 G @ 41.84 MS

030408-1

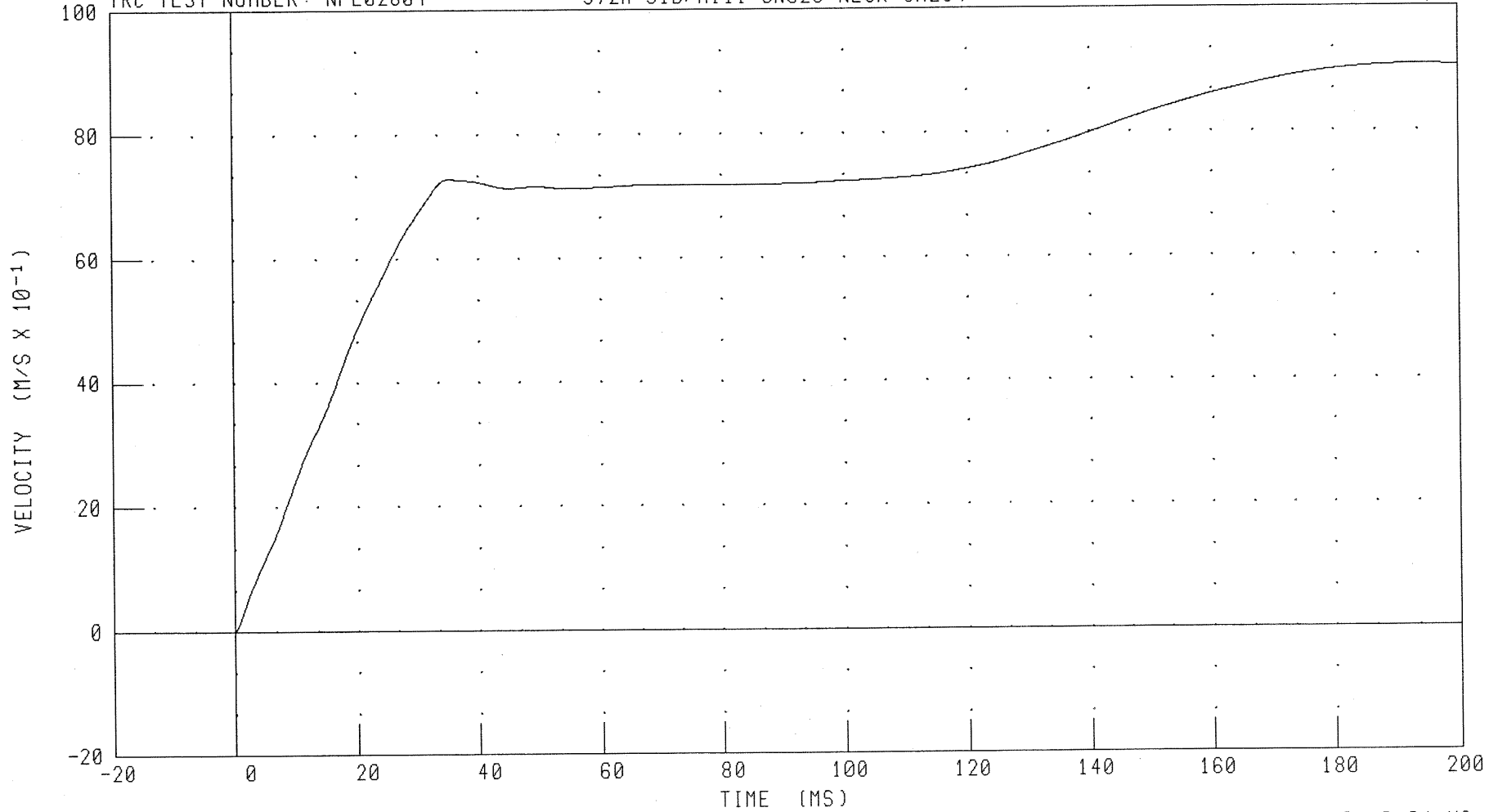
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

INTEGRATED PENDULUM VELOCITY

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: PENXVI

FILTER: CH. CLASS 180

PEAK DATA: 9.05 M/S @ 195.20 MS; -0.01 M/S @ -0.64 MS

030408-1

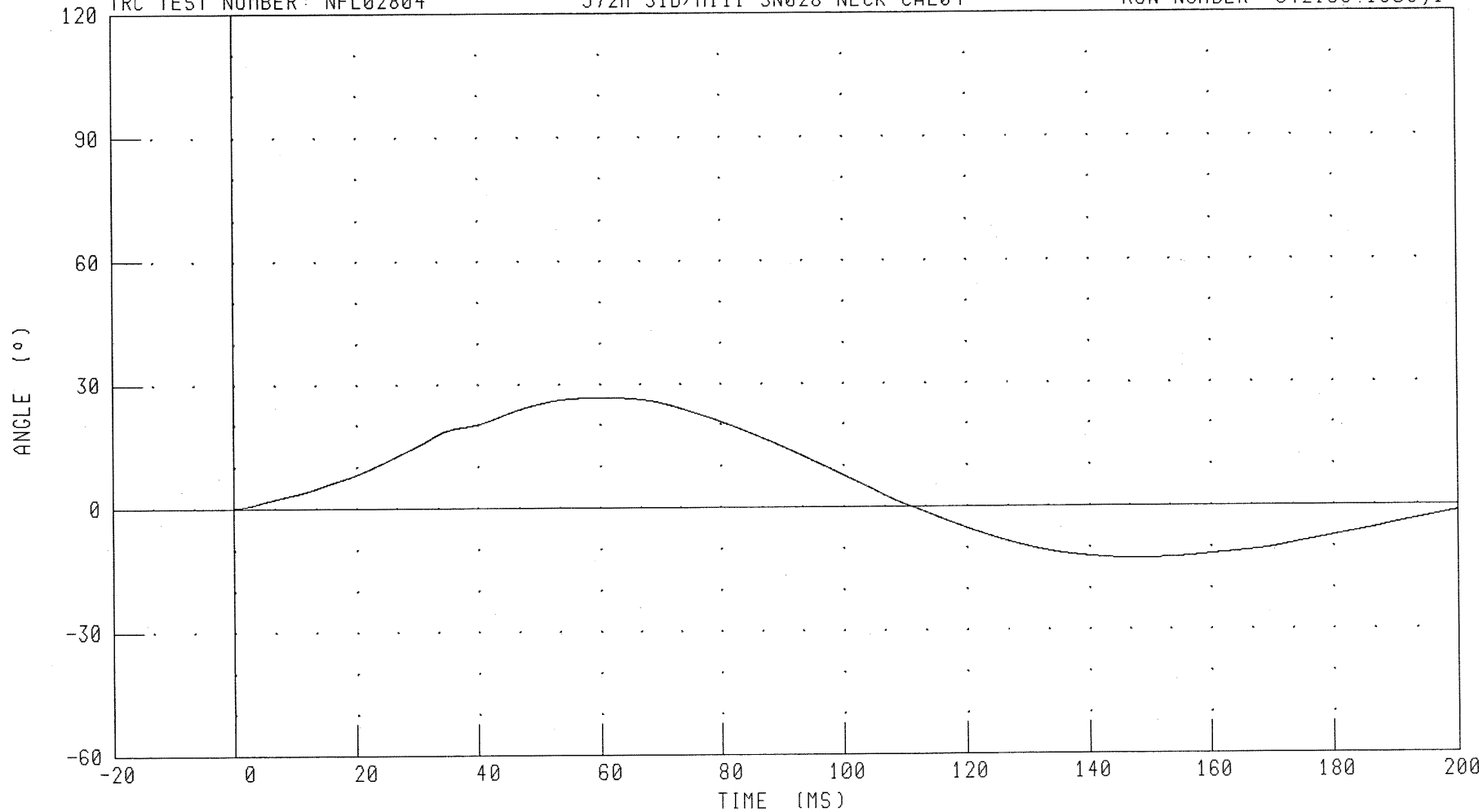
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 26.65 ° @ 60.40 MS; -12.76 ° @ 147.52 MS

C-81

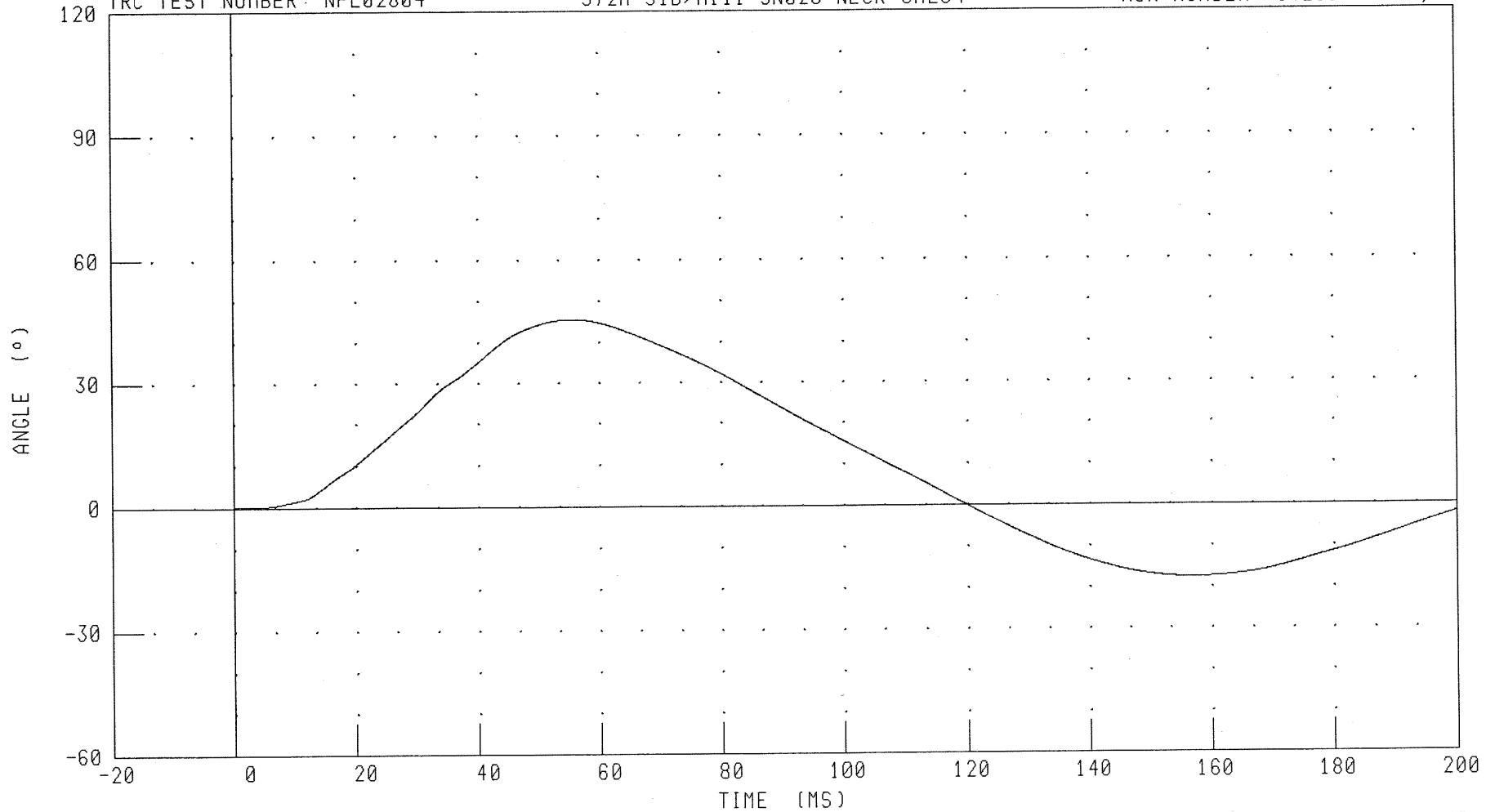
030408-1

572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: THETA

FILTER: CH. CLASS 60

PEAK DATA: 45.48 ° @ 55.60 MS; -17.58 ° @ 156.80 MS

030408-1

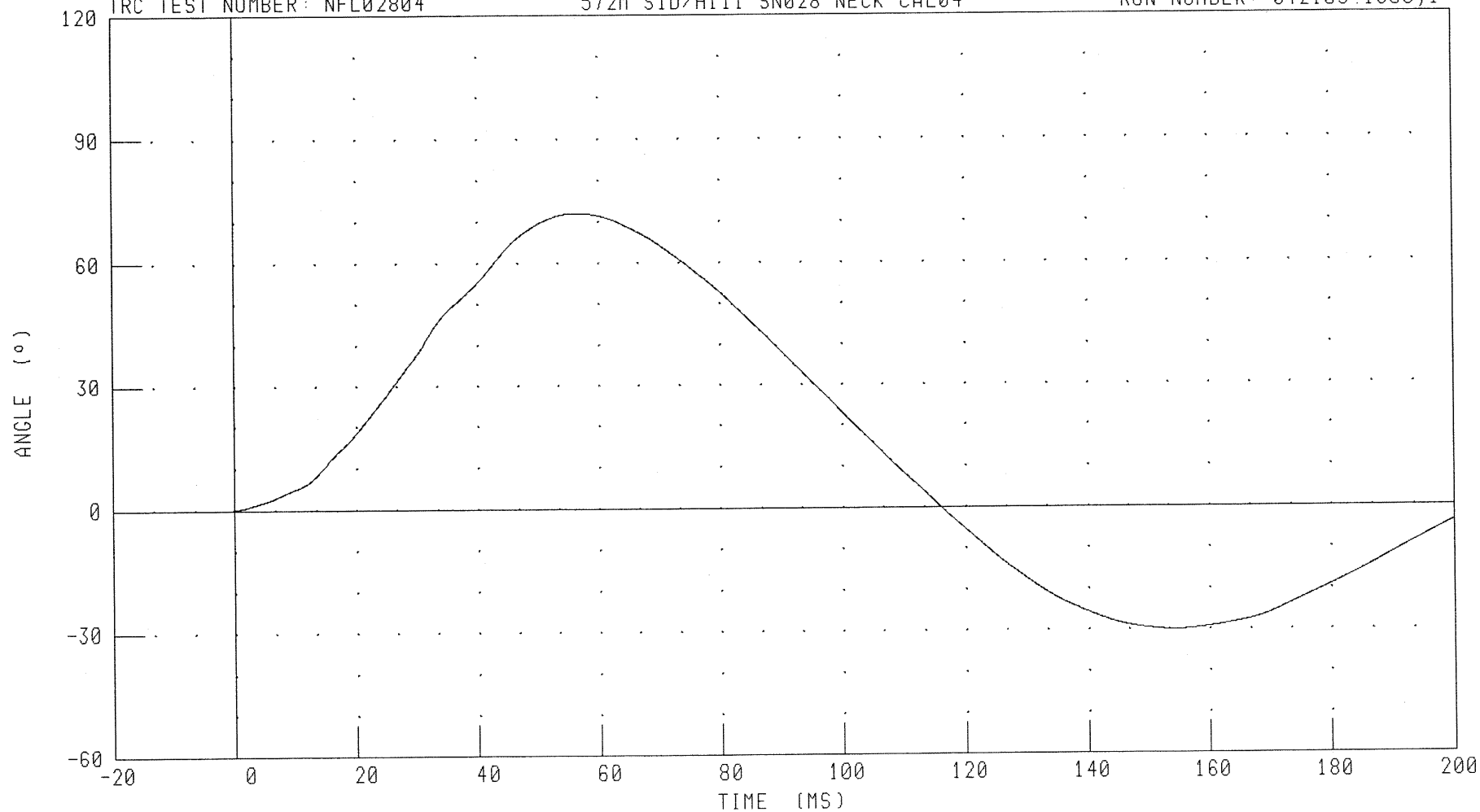
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

TOTAL ROTATION

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: TOTAN

FILTER: CH. CLASS 60

PEAK DATA: 71.91 ° @ 56.64 MS; -30.01 ° @ 154.32 MS

C-83

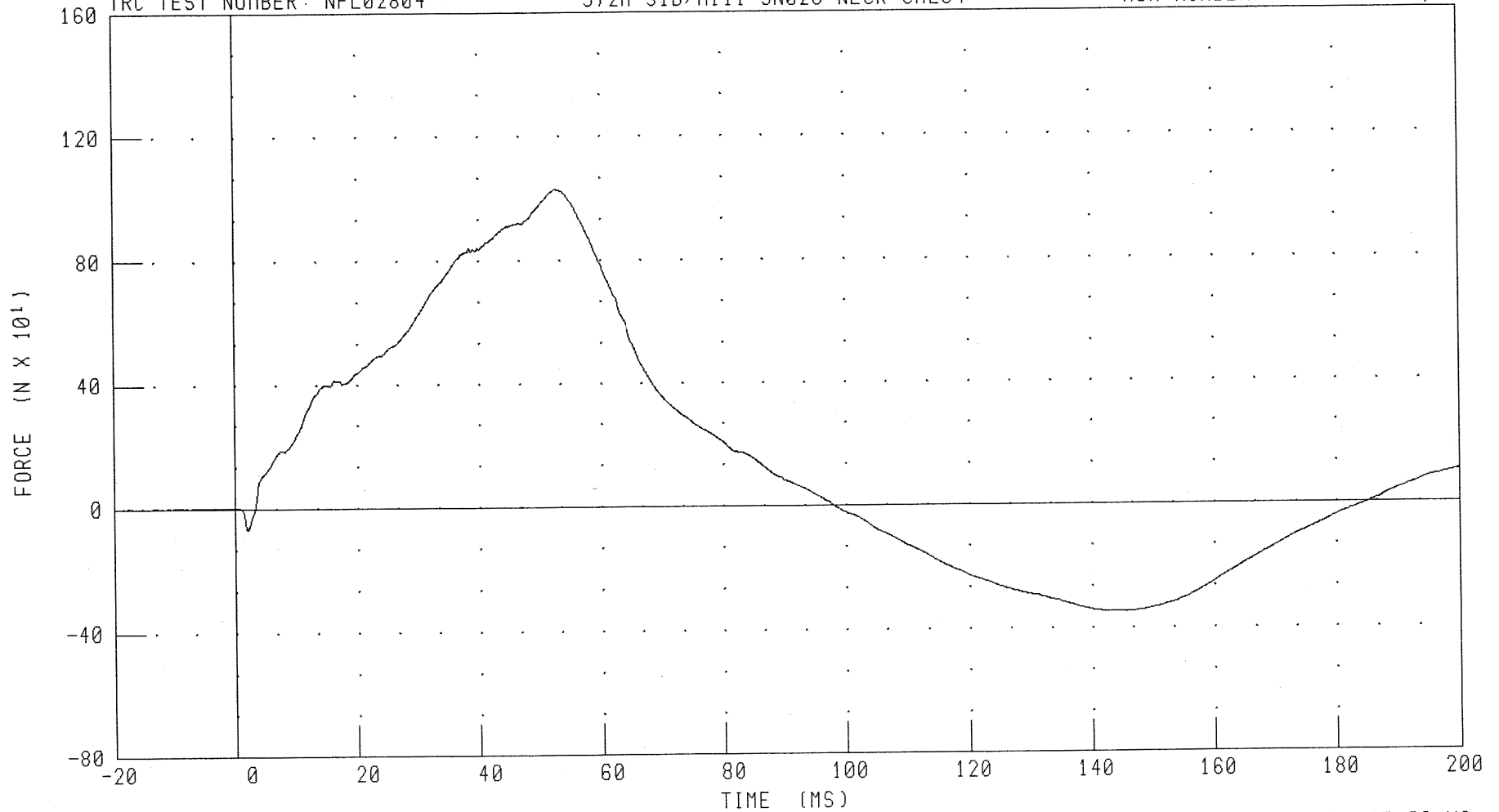
030408-1

572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST
NECK FORCE Y AXIS

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: NEKYF

FILTER: CH. CLASS 1000

PEAK DATA: 1027.94 N @ 52.64 MS; -348.36 N @ 145.68 MS

030408-1

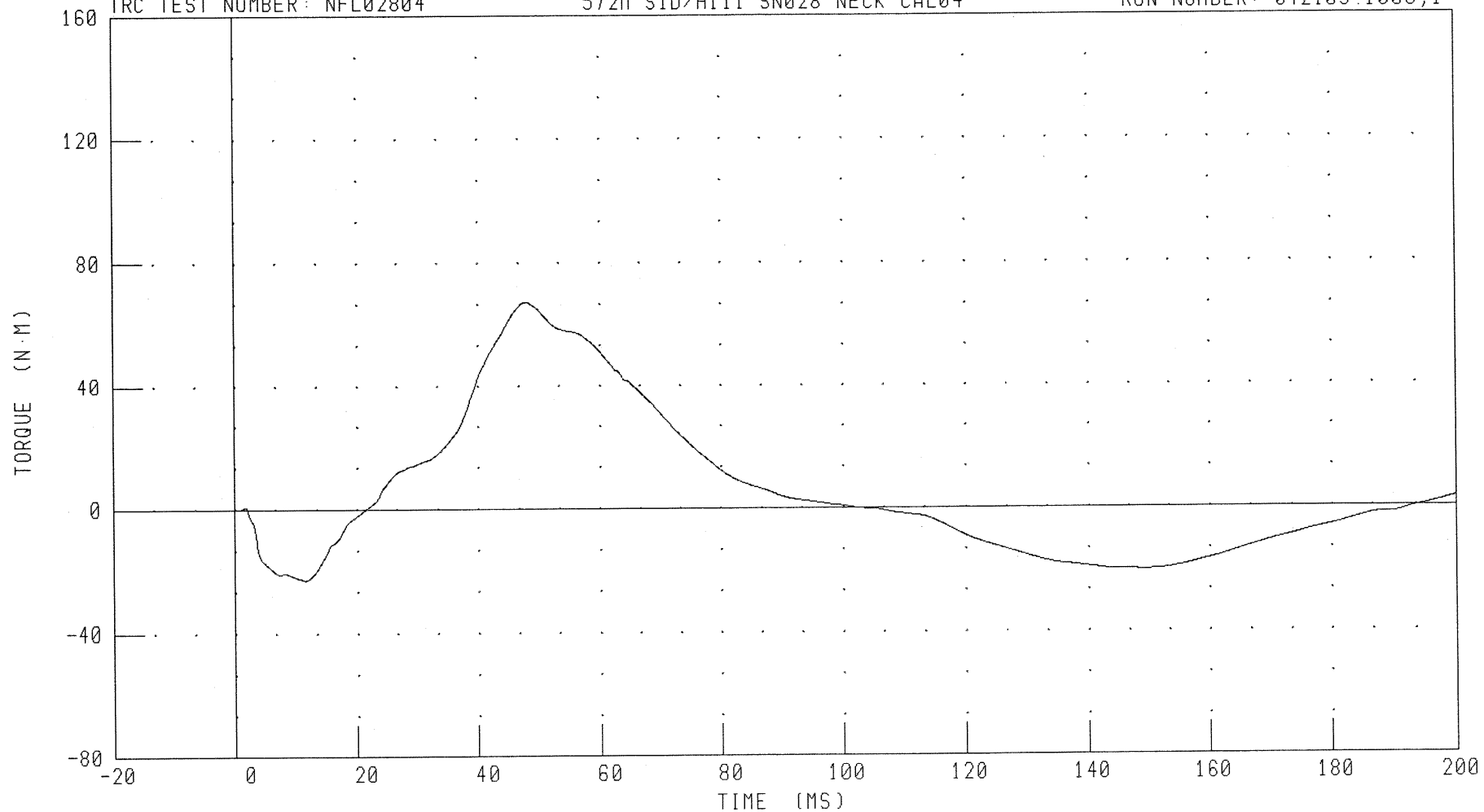
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

NECK MOMENT X AXIS

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: NEKXM

FILTER: CH. CLASS 600

PEAK DATA: 67.41 N·M @ 48.00 MS; -23.00 N·M @ 11.52 MS

C-85

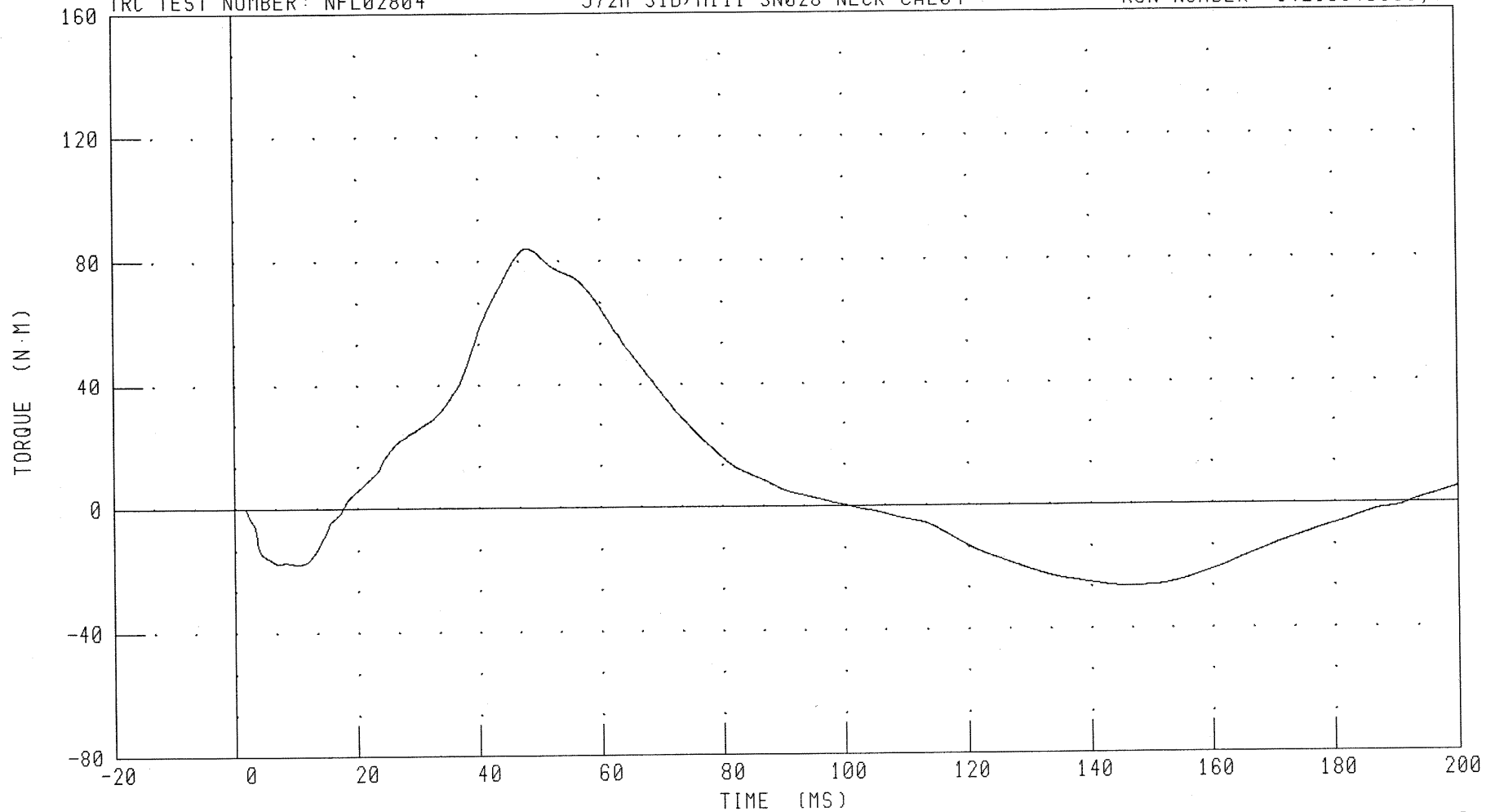
030408-1

572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL02804

572M SID/HIII SN028 NECK CAL04

RUN NUMBER: 042103.1006;1



CHANNEL: NEKOM

FILTER: CH. CLASS 600

PEAK DATA: 83.95 N·M @ 48.16 MS; -26.41 N·M @ 145.92 MS

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL THORAX IMPACT TEST

SIDE IMPACT DUMMY

11-APR-03

LEFT SIDE CONFIGURATION

TRC INC.

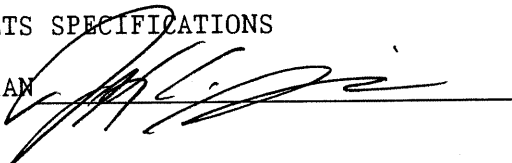
TEST NO: STL02804

572F SID SN028 L.THORAX CAL04

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.30 M/S
PEAK ACCELERATION: UPPER RIB BAR	37 - 46 G	39.6 G
PEAK ACCELERATION: LOWER RIB BAR	37 - 46 G	39.1 G
PEAK ACCELERATION: LOWER THORACIC SPINE	15 - 22 G	16.4 G

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 041103.1311;1

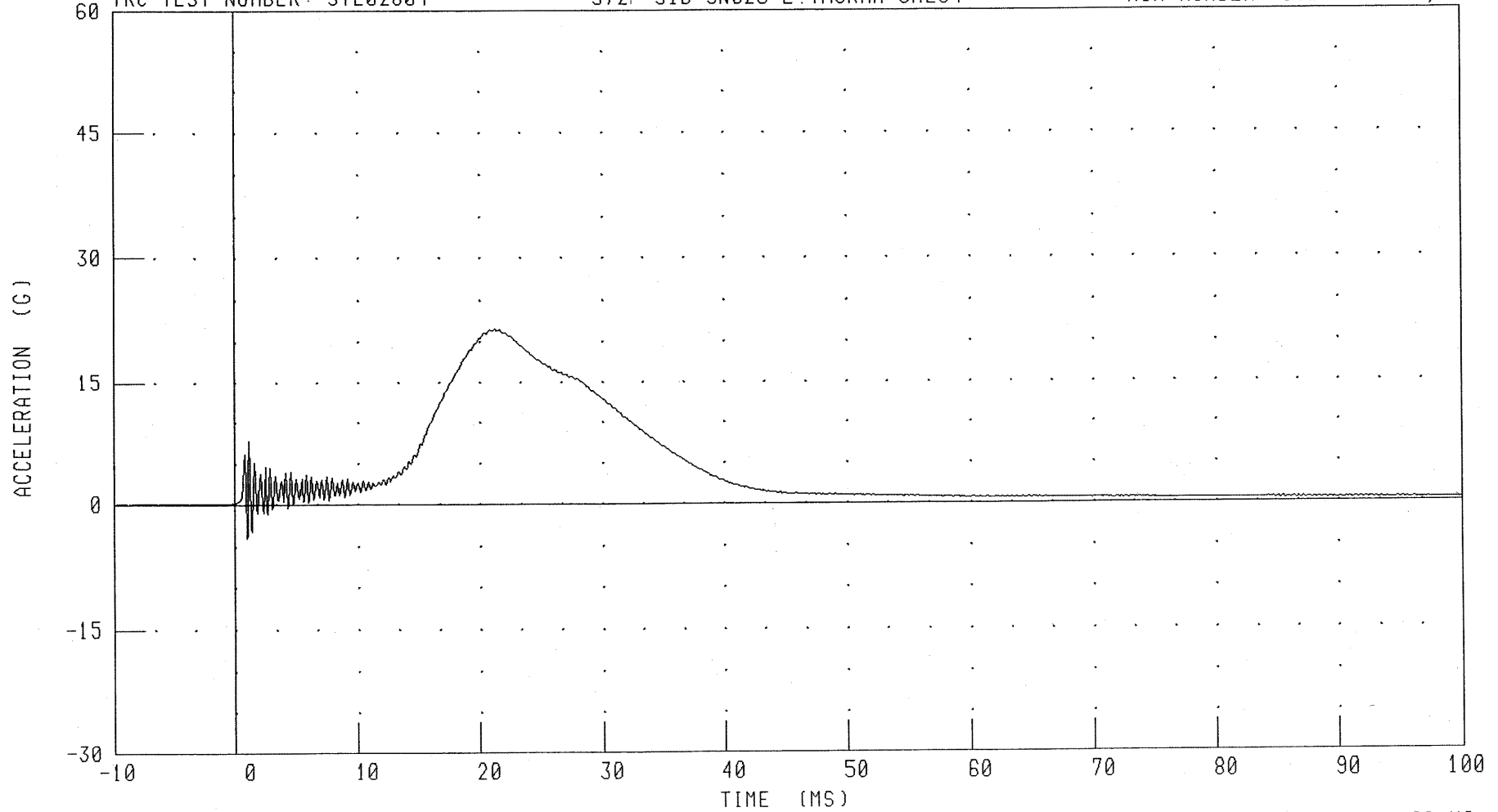
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

PENDULUM DECELERATION

TRC TEST NUMBER: STL02804

572F SID SN028 L THORAX CAL04

RUN NUMBER: 041103.1312;1



CHANNEL: PENXG

FILTER: CH. CLASS 1000

PEAK DATA: 21.49 G @ 21.28 MS; -3.99 G @ 0.96 MS

C-88

030408-1

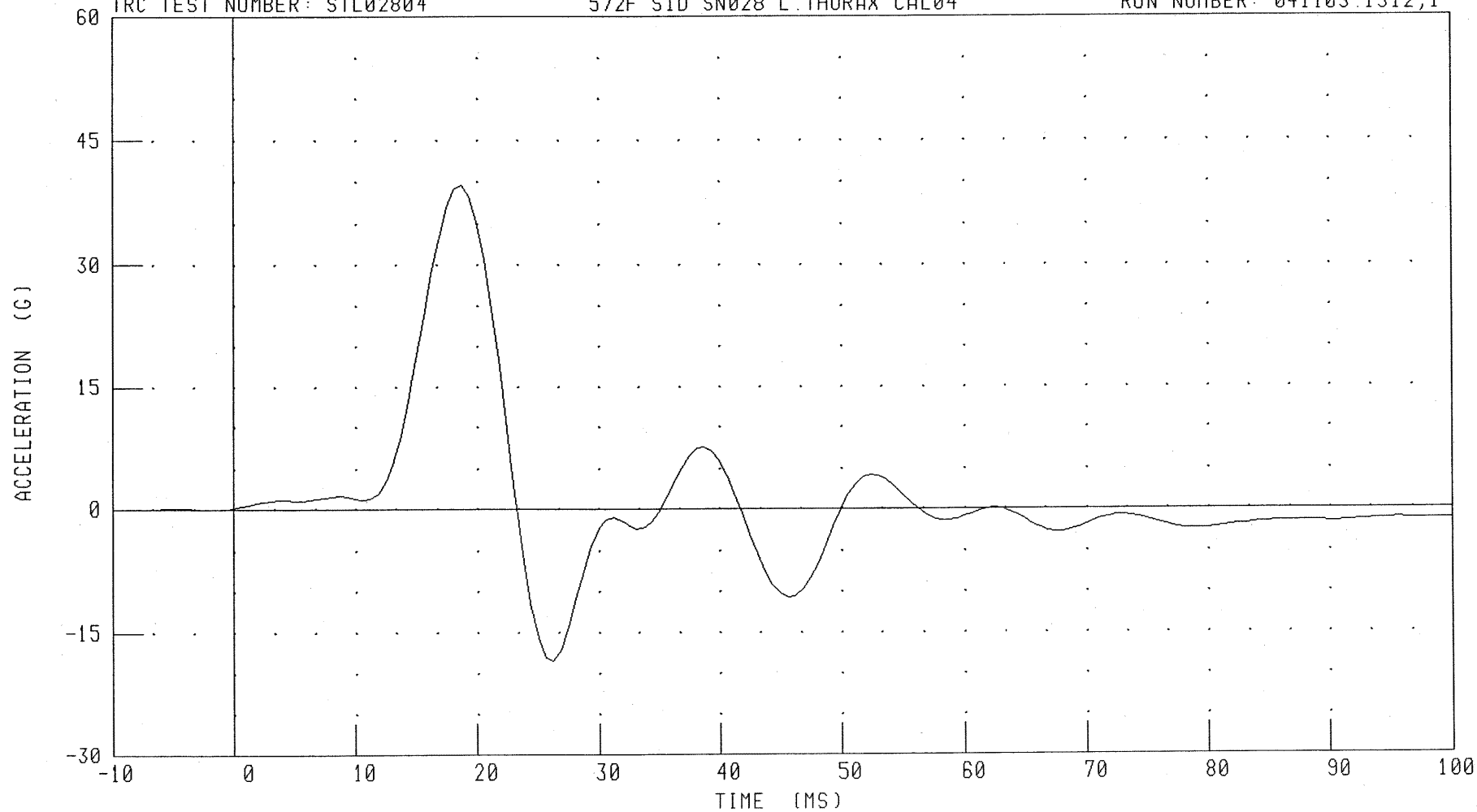
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LEFT UPPER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL02804

572F SID SN028 L THORAX CAL04

RUN NUMBER: 041103.1312;1



CHANNEL: LURYG

FILTER: FIR 100

PEAK DATA: 39.58 G @ 18.75 MS; -18.46 G @ 26.25 MS

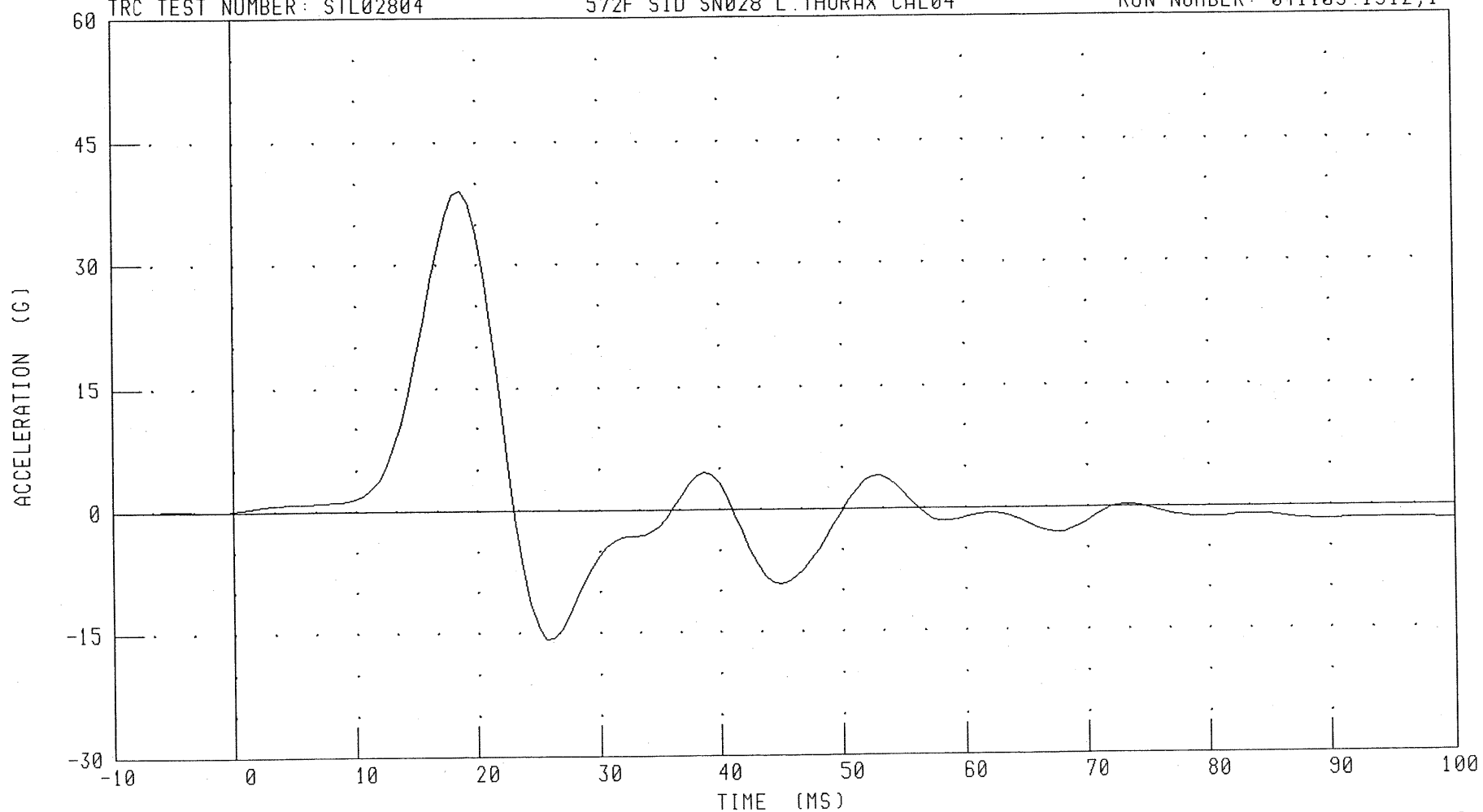
030408-1

PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)
LEFT LOWER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL02804

572F SID SN028 L THORAX CAL04

RUN NUMBER: 041103.1312;1



CHANNEL: LLRYG

FILTER: FIR 100

PEAK DATA: 39.13 G @ 18.75 MS; -15.74 G @ 25.63 MS

C-90

030408-1

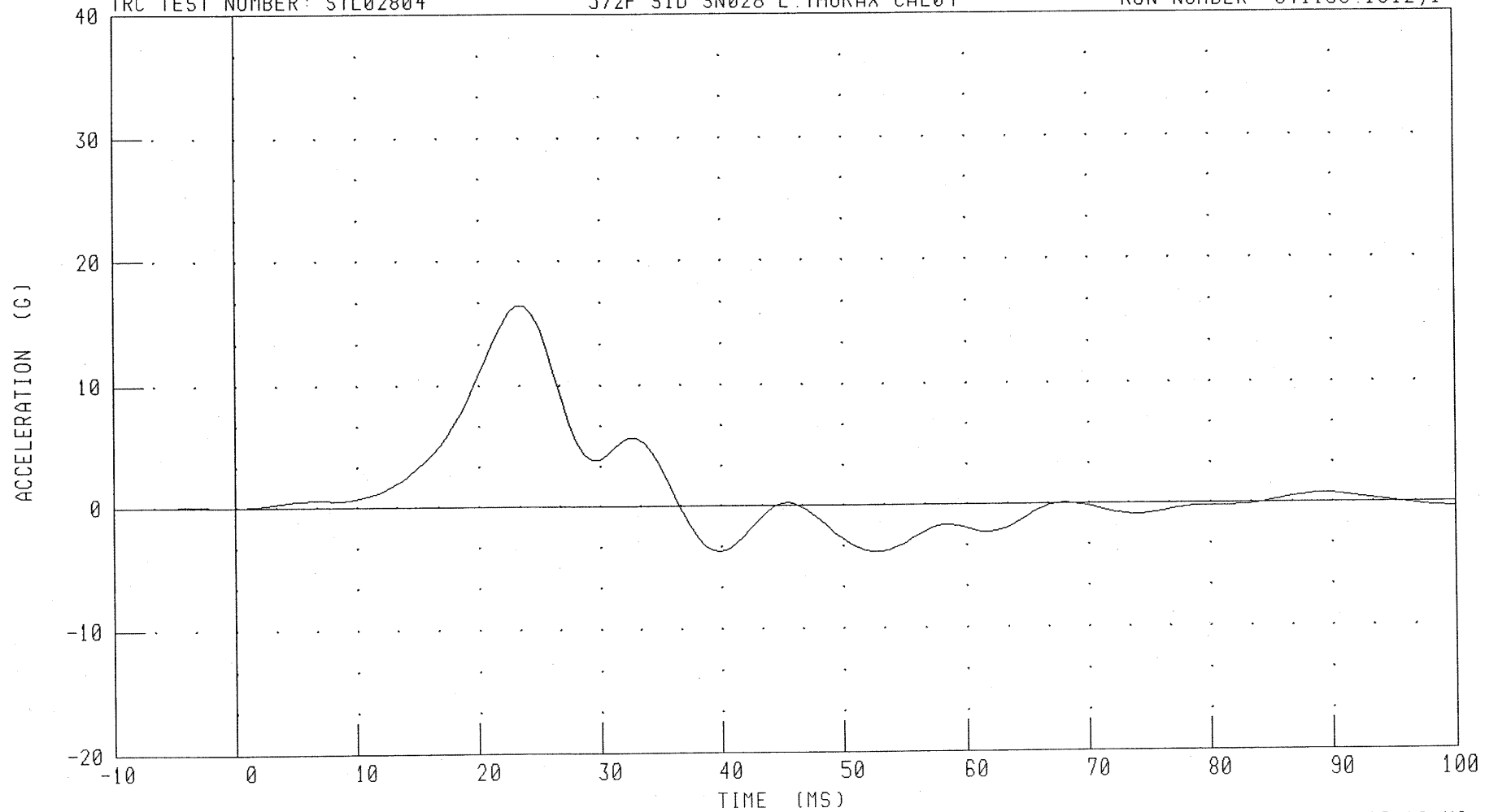
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LOWER SPINE ACCELERATION Y AXIS

TRC TEST NUMBER: STL02804

572F SID SN028 L THORAX CAL04

RUN NUMBER: 041103.1312;1



CHANNEL: T12YG

FILTER: FIR 100

PEAK DATA: 16.44 G @ 23.75 MS; -3.87 G @ 53.12 MS

030408-1

Transportation Research Center Inc.

572B Abdomen Compression Test

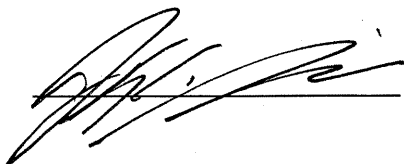
HIH SID Serial No. 028 Calibration No. 04 - 8

Test Date 04/14/2003

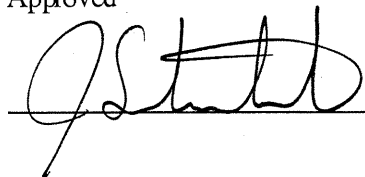
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Displacement Rate	6.35 - 8.89 mm/s	6.8 - 8.0 mm/s	Yes
Data Within Required Corridor	Yes	Yes	Yes

Comments:

Technician



Approved



04.14.2003 12:37:56 11

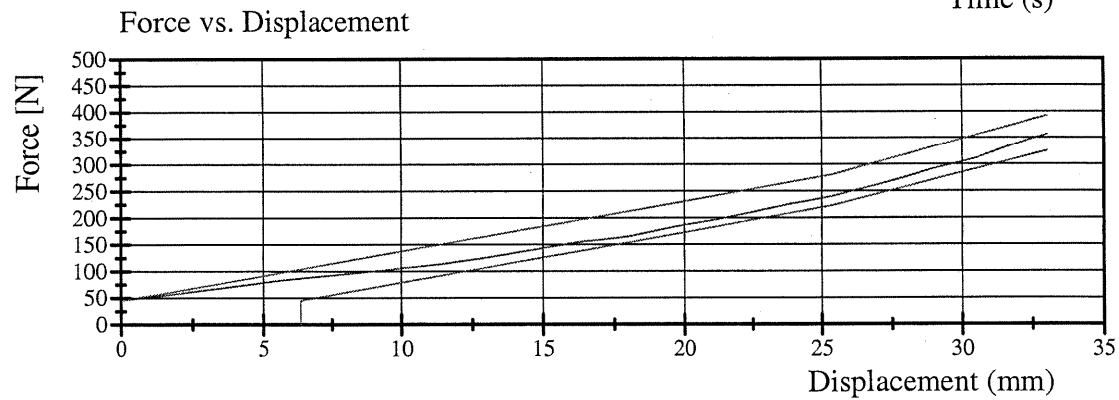
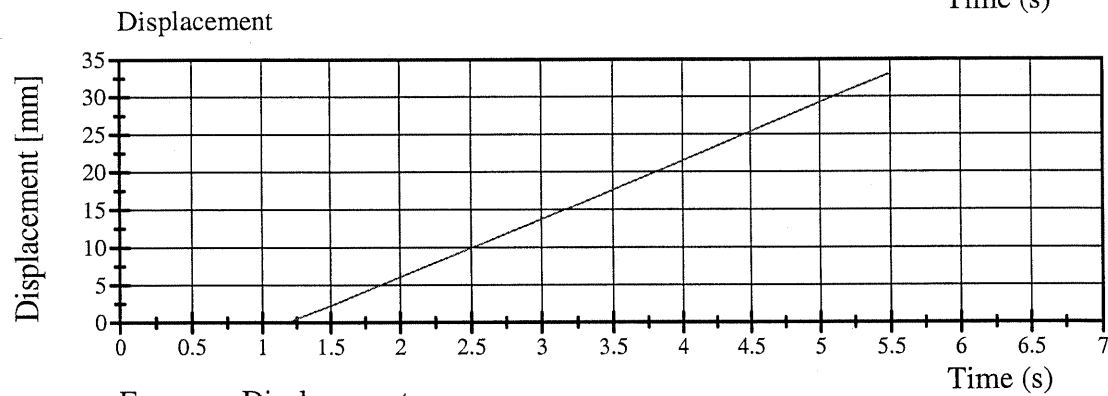
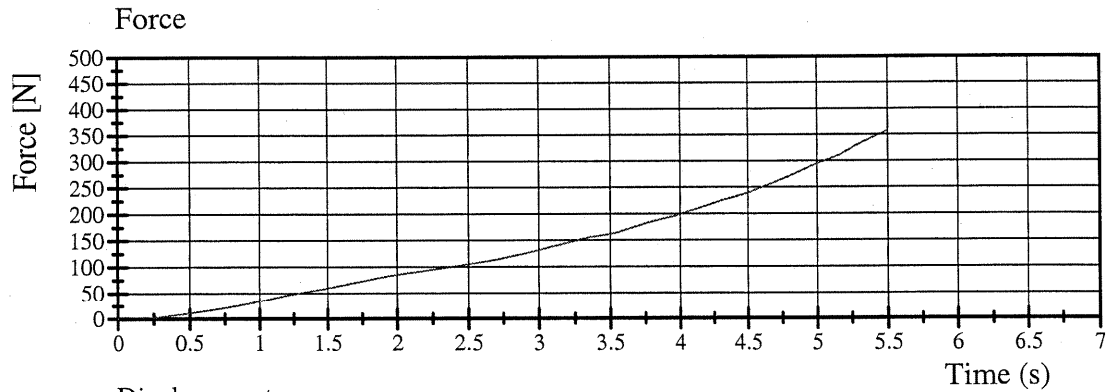


Transportation Research Center Inc.

572B Abdomen Compression Test

HIH SID Serial No. 028 Calibration No. 04 - 8

Test Date 04/14/2003



04.14.2003 12:37:57 11



TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 14-Apr-03

TRC, INC.

TEST NO: 028C04LF1

572B SN 028 TORSO FLEX CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	39 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	124.6 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	182.4 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	226.9 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	8.0 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER INC.

LATERAL PELVIS IMPACT TEST

SIDE IMPACT DUMMY

11-APR-03

LEFT SIDE CONFIGURATION

TRC INC.

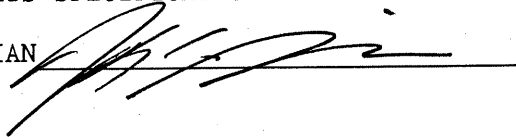
TEST NO: SPL02804

572F SN028 LEFT PELVIS CAL04

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	38.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.26 M/S
PEAK PELVIC ACCELERATION	40 - 60 G	47.0 G
TIME ABOVE 20 G LEVEL	3 - 7 MS	6.3 MS
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 041103.1318;1

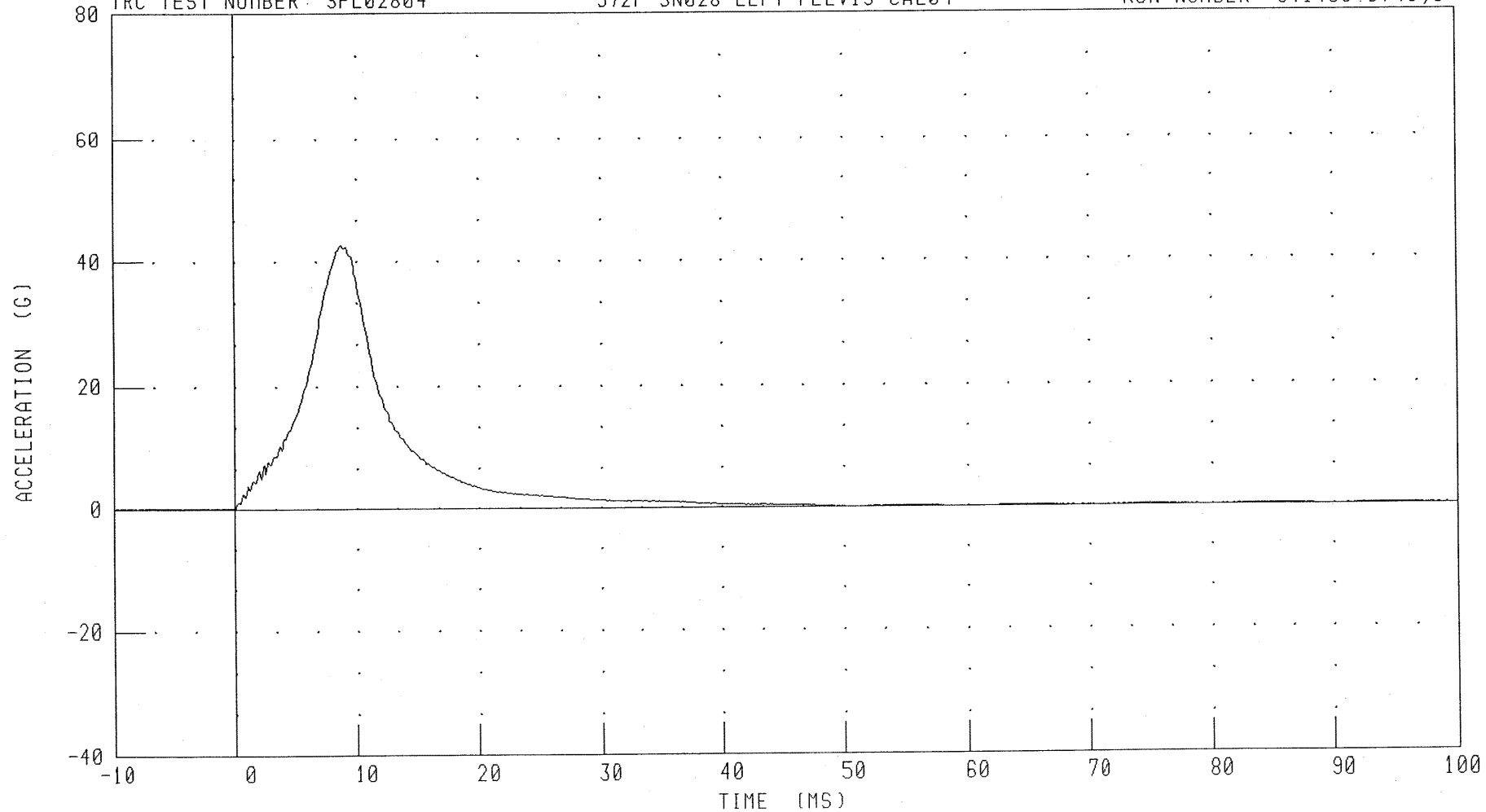
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PENDULUM DECELERATION

TRC TEST NUMBER: SPL02804

572F SN028 LEFT PELVIS CAL04

RUN NUMBER: 041403.0746;1



CHANNEL: PENXC

FILTER: CH. CLASS 1000

PEAK DATA: 42.65 G @ 8.80 MS; -0.10 G @ 68.88 MS

C-96

030408-1

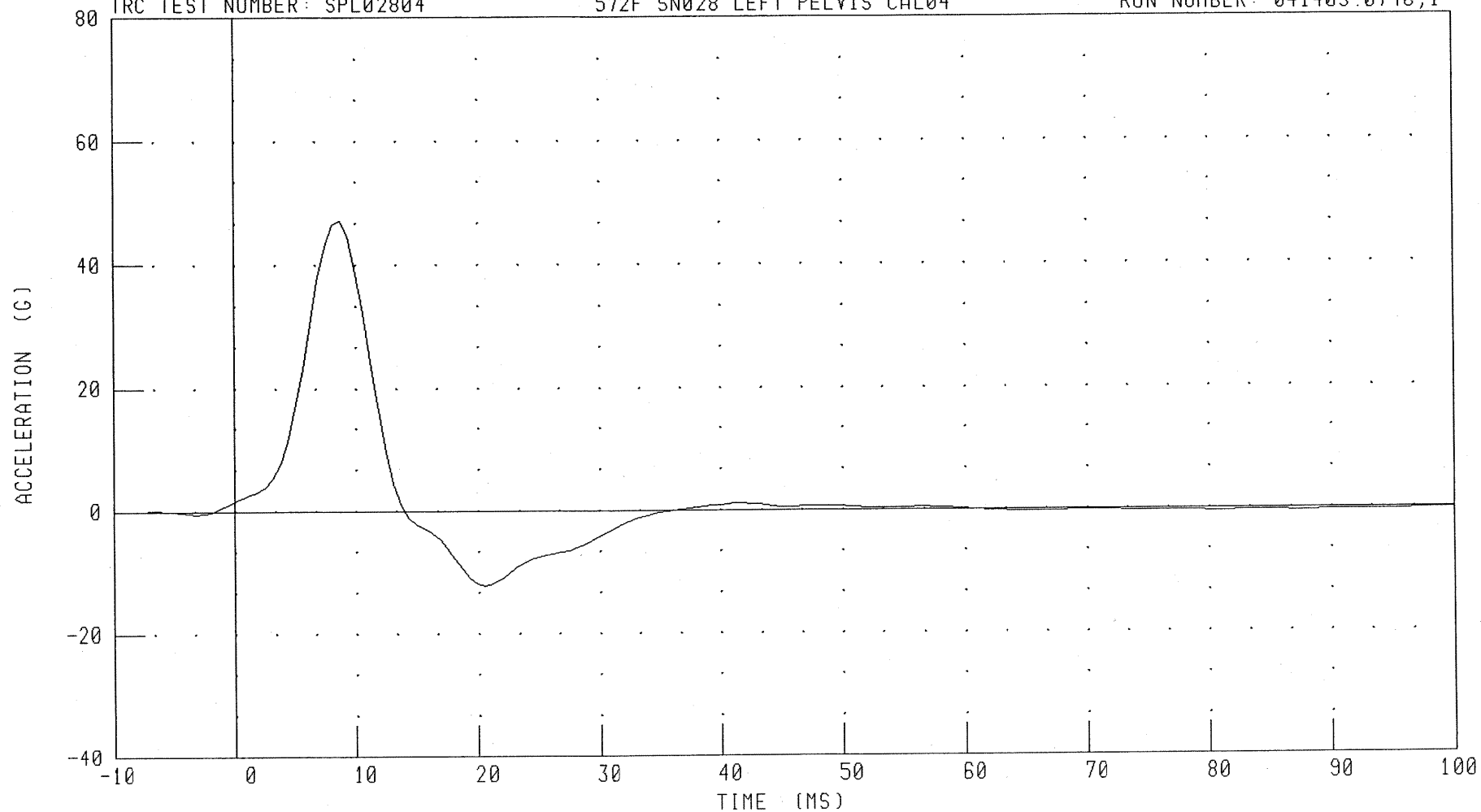
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PELVIS ACCELERATION Y AXIS

TRC TEST NUMBER: SPL02804

572F SN028 LEFT PELVIS CAL04

RUN NUMBER: 041403.0746;1



CHANNEL: PEVYG

FILTER: FIR 100

PEAK DATA: 47.01 G @ 8.75 MS; -12.17 G @ 20.62 MS

C-97

030408-1

Calibration Test Results

Post-Test

SID-HIII: 066

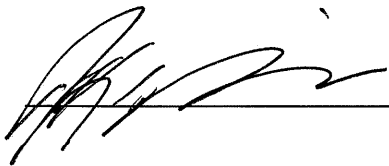
Configured for Left Side Impact

External Dimensions:	The dummy passed all external dimension requirements.
Lateral Head Drop Test:	The head passed all lateral drop test requirements.
Lateral Neck Test:	The neck passed all impact test requirements.
Lateral Thorax Impact Test:	The thorax passed all impact test requirements.
Thoracic Shock Absorber Test:	The thoracic shock absorber was not tested at this time.
Lumbar Flexion Test:	The dummy met the lumbar flexion test requirements.
Abdominal Compression Test:	The abdomen met the compression test requirements.
Pelvis Impact Test:	The lateral pelvis passed all impact test requirements.

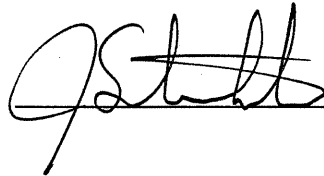
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 066 Calibration No. 07

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	903 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	508 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Rib From Backline	RD	228.6 - 241.3 mm	237 mm	Yes
Knee Pivot From Backline	KH	510.5 - 525.8 mm	519 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	498 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	388 mm	Yes
Top Rib Width From CVL	RW-1	165.1 - 180.3 mm	171 mm	Yes
Bottom Rib Width From CVL	RW-2	165.1 - 180.3 mm	170 mm	Yes
Difference Between Top & Bottom Rib Width from CVL		<= 2.5 mm	1.0 mm	Yes

Technician



Approved




TRANSPORTATION RESEARCH CENTER INC.

LATERAL HEAD DROP TEST

HYBRIDI III SID DUMMY

14-APR-03

LEFT SIDE CONFIGURATION

TRC INC.

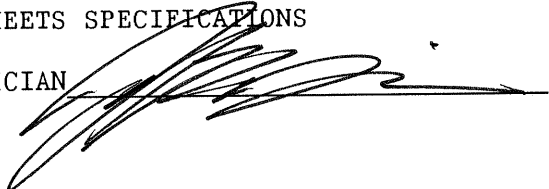
TEST NO. HDL06607

572M SID/HIII SN066 HEAD CAL07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.6 deg. C	21.67 deg. C
RELATIVE HUMIDITY	10 - 70 %	38.00 %
PEAK RESULTANT ACCELERATION	120 - 150 G	147.32 G
PEAK LONGITUDINAL ACCELERATION	15 G MAX	-5.50 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 042103.0959;1

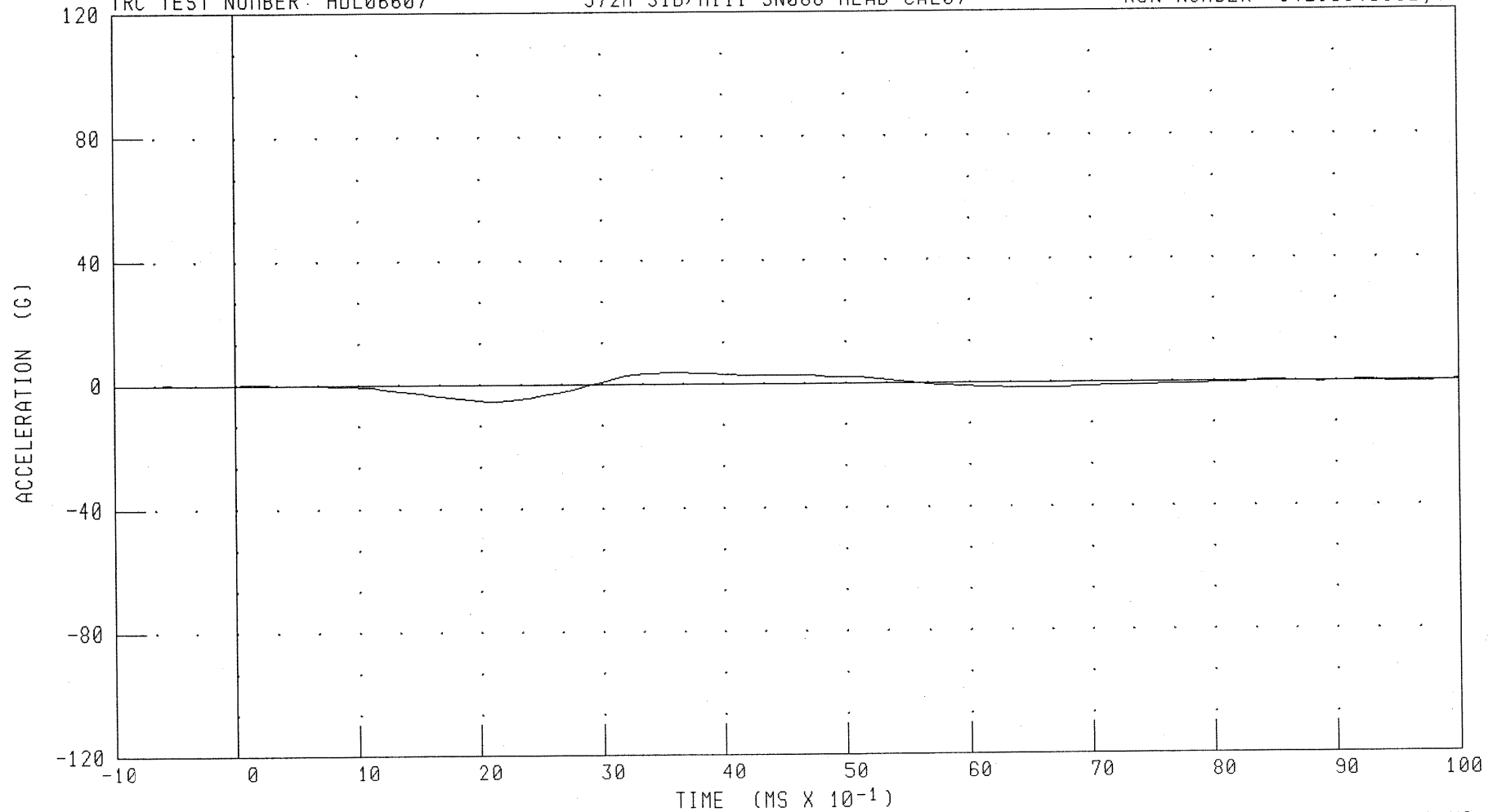
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: HDL06607

572M SID/HIII SN066 HEAD CAL07

RUN NUMBER: 042103.1002;1



CHANNEL: HEDXC

FILTER: CH. CLASS 1000

PEAK DATA: 3.63 G @ 3.60 MS; -5.50 G @ 2.16 MS

C-101

030408-1

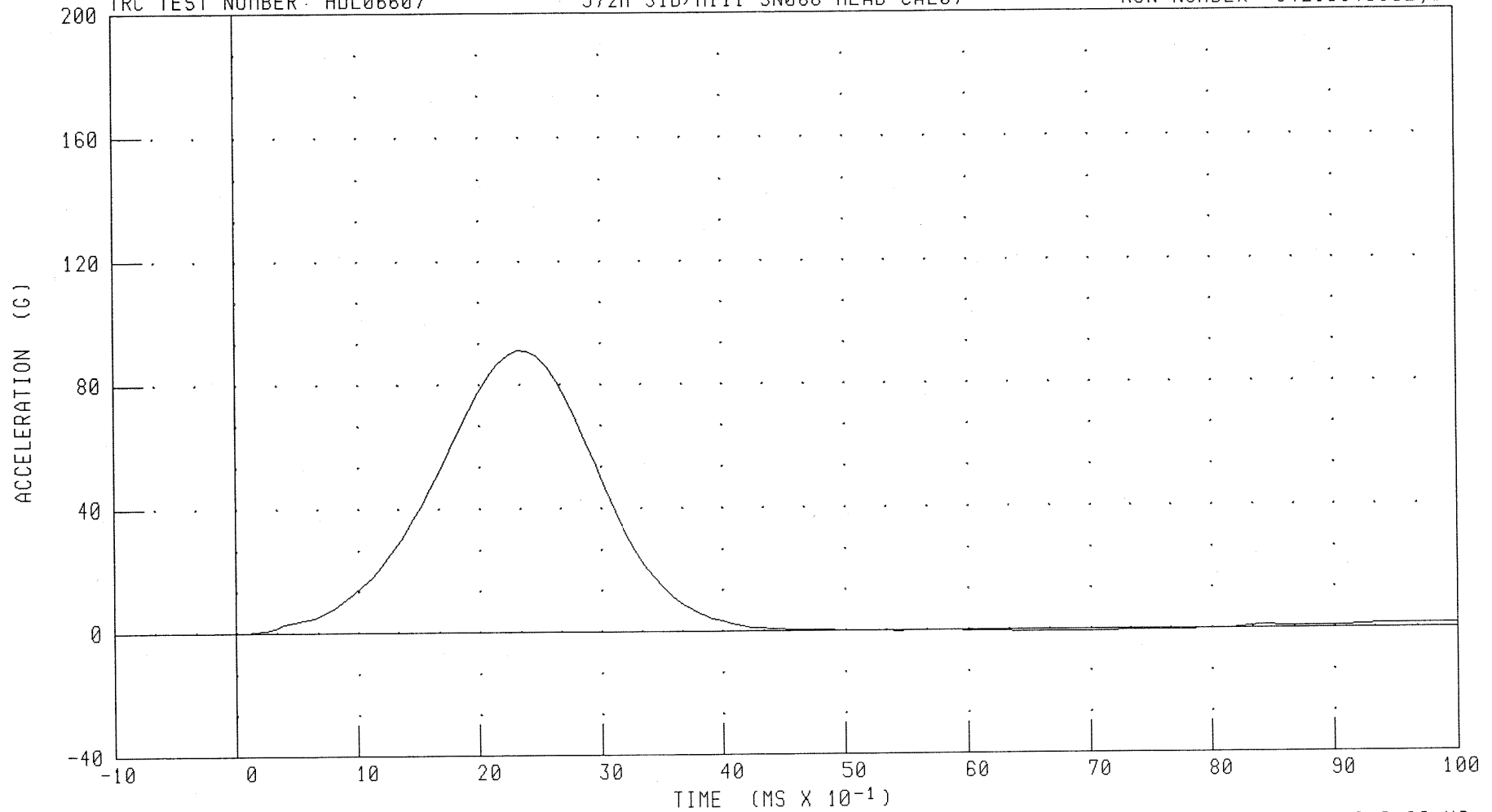
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: HDL06607

572M SID/HIII SN066 HEAD CAL07

RUN NUMBER: 042103.1002;1



CHANNEL: HEDYG

FILTER: CH. CLASS 1000

PEAK DATA: 90.92 G @ 2.32 MS; -0.86 G @ 6.96 MS

C-102

030408-1

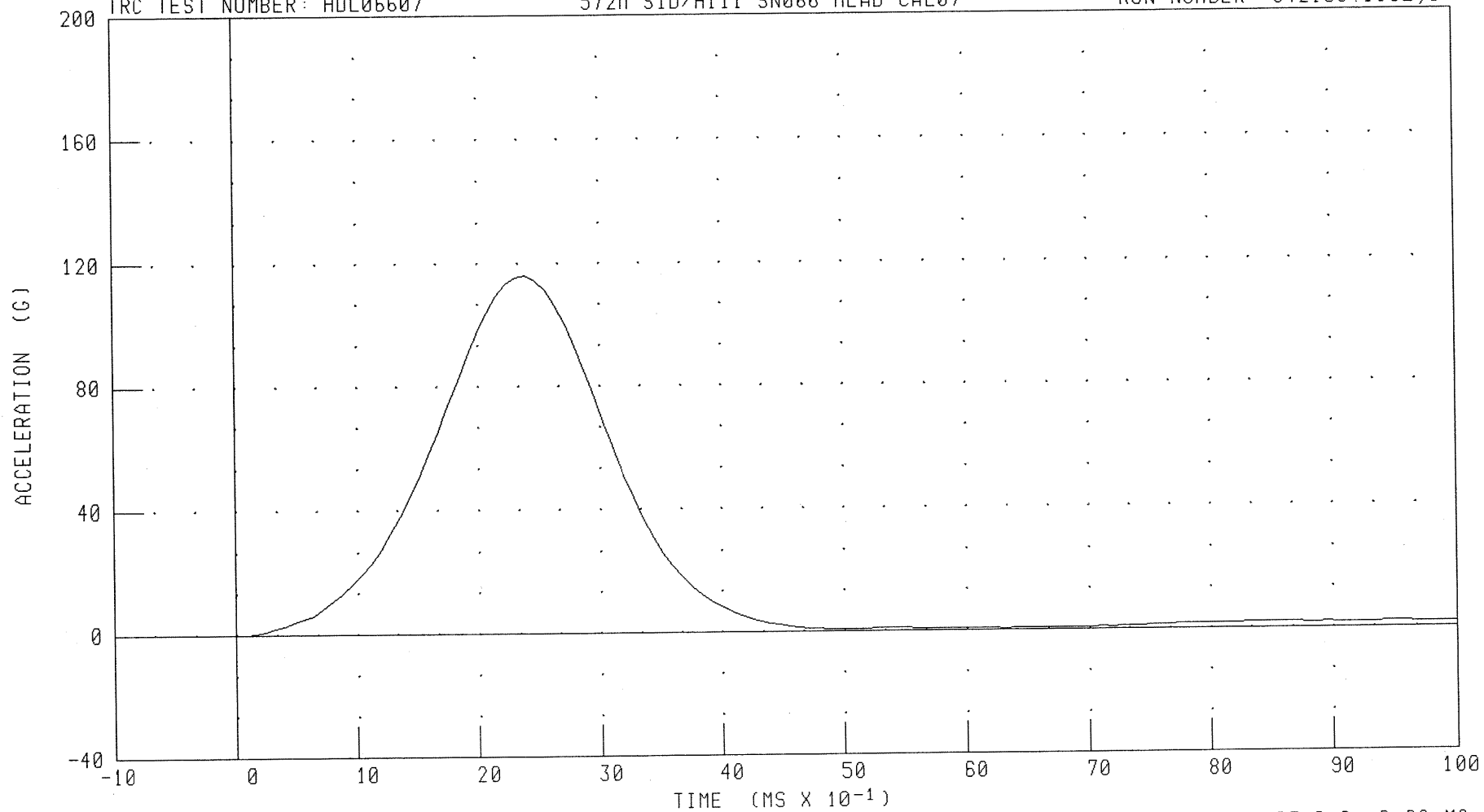
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: HDL06607

572M SID/HIII SN066 HEAD CAL07

RUN NUMBER: 042103.1002;1



CHANNEL: HEDZG

FILTER: CH. CLASS 1000

PEAK DATA: 115.98 G @ 2.40 MS; -0.03 G @ -0.96 MS

030408-1

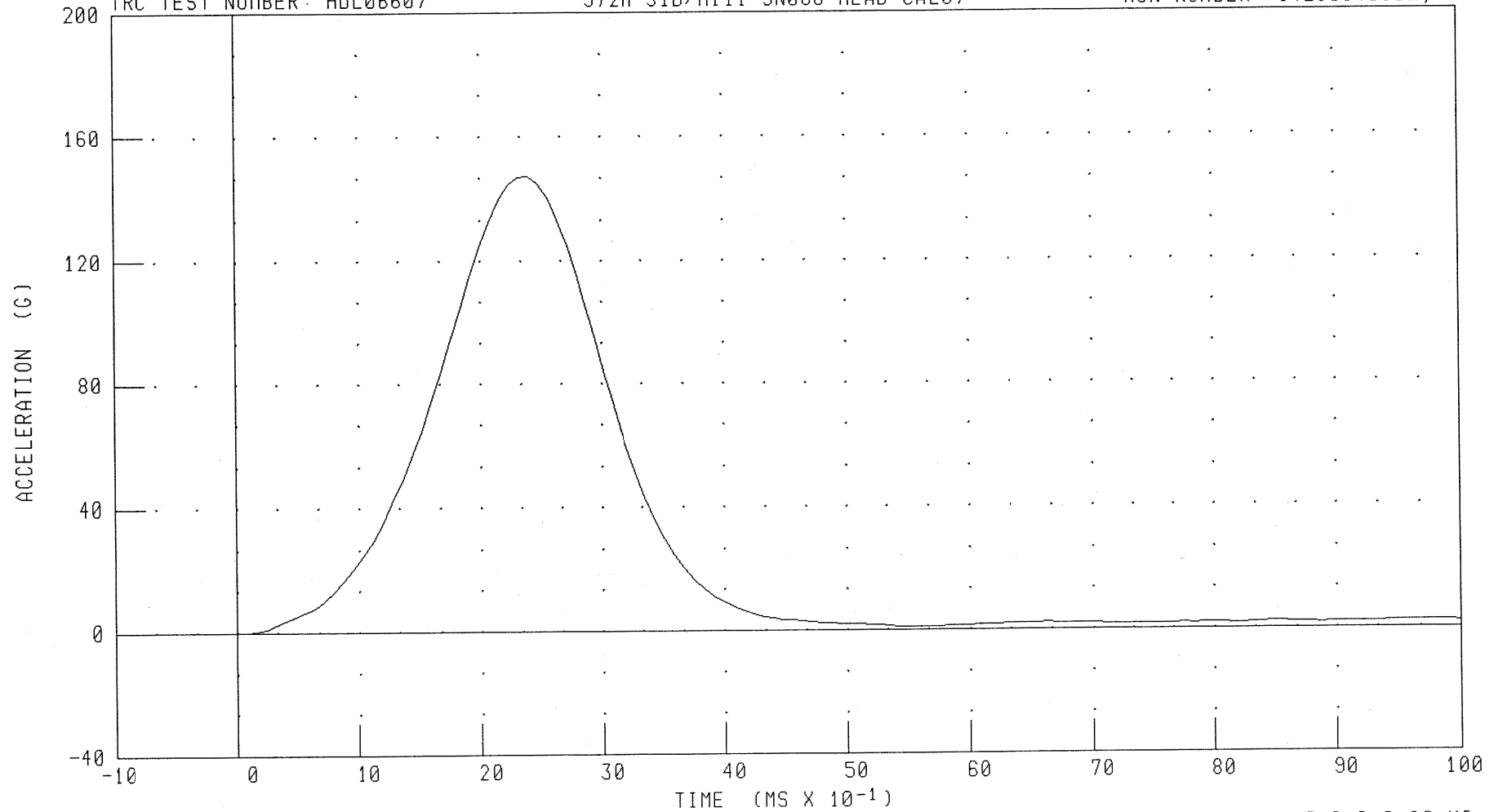
572M SID/HIII DUMMY CALIBRATION -- 35 DEGREE LEFT LATERAL HEAD DROP

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: HDL06607

572M SID/HIII SN066 HEAD CAL07

RUN NUMBER: 042103.1002;1



CHANNEL: HEDRG

FILTER: CH. CLASS 1000

PEAK DATA: 147.32 G @ 2.40 MS; 0.03 G @ 0.00 MS

C-104

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL NECK TEST

HYBRIDI III SID DUMMY

14-APR-03

LEFT SIDE CONFIGURATION

TRC INC.

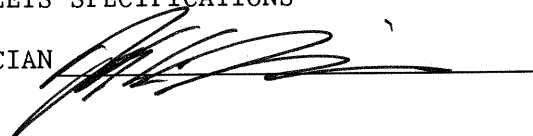
TEST NO. NFL06607

572M SID/HIII SN066 NECK CAL07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 deg. C	21.67 deg. C
RELATIVE HUMIDITY		10 - 70 %	37.00 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
INTEGRATED VELOCITY	10 MS	1.96 - 2.55 M/S	2.44 M/S
	20 MS	4.12 - 5.10 M/S	4.86 M/S
	30 MS	5.73 - 7.01 M/S	6.78 M/S
	40 - 70 MS	6.27 - 7.64 M/S	7.11- 7.19 M/S
MAXIMUM MIDSAGGITAL PLANE ROTATION		66 - 82 deg.	71.63 deg.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO		58 - 67 MS	61.68 MS
MAXIMUM MOMENT ABOUT OCCIPITAL CONDYLE		73 - 88 NM	77.82 NM
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO		49 - 64 MS	57.68 MS
TIME OF MAXIMUM ROTATION AFTER MAXIMUM MOMENT		2 - 16 MS	8.40 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 042103.1001;1

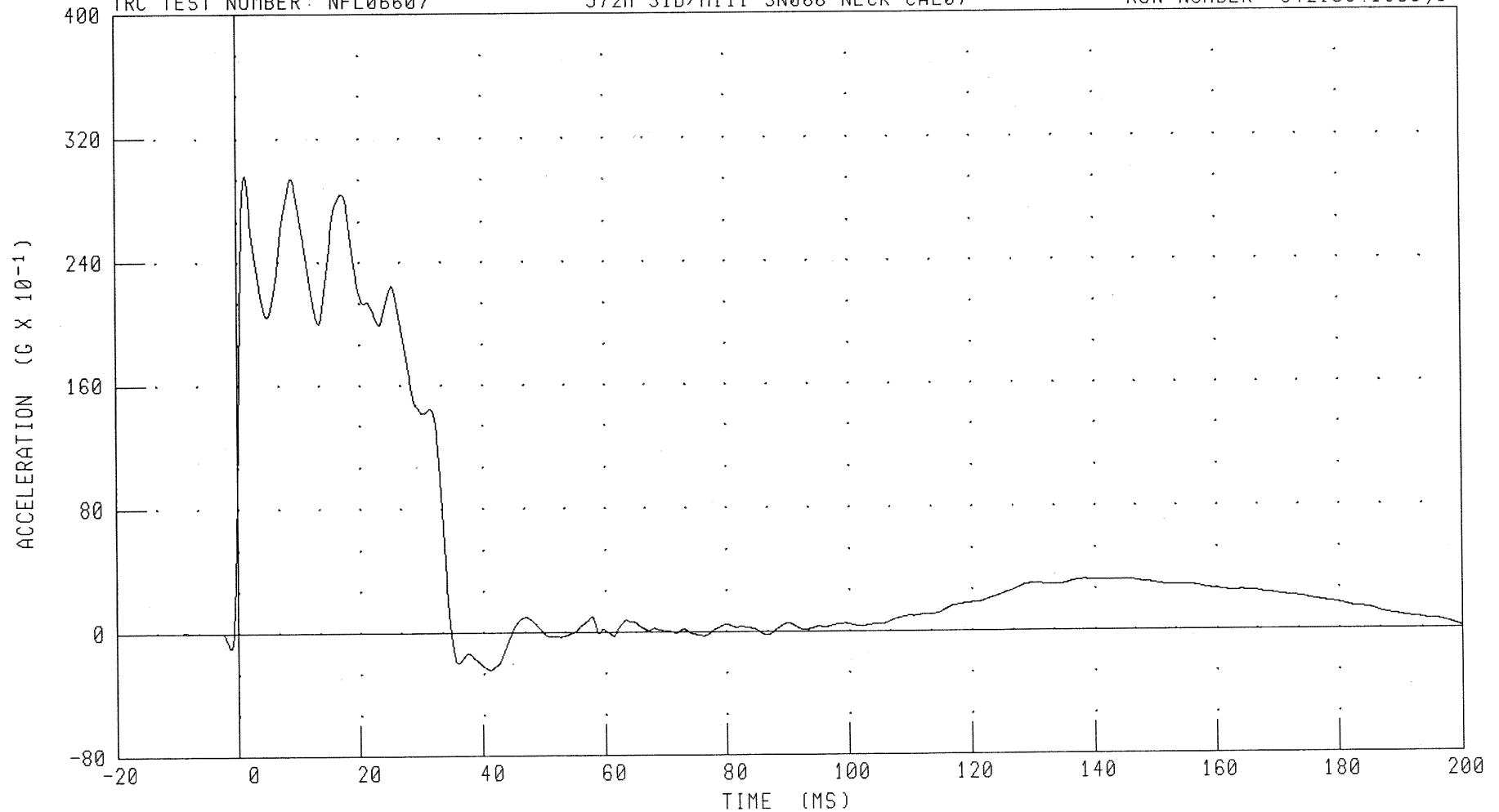
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

PENDULUM DECELERATION

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: PENXC

FILTER: CH. CLASS 180

PEAK DATA: 29.56 G @ 1.44 MS; -2.44 G @ 41.12 MS

C-106

030408-1

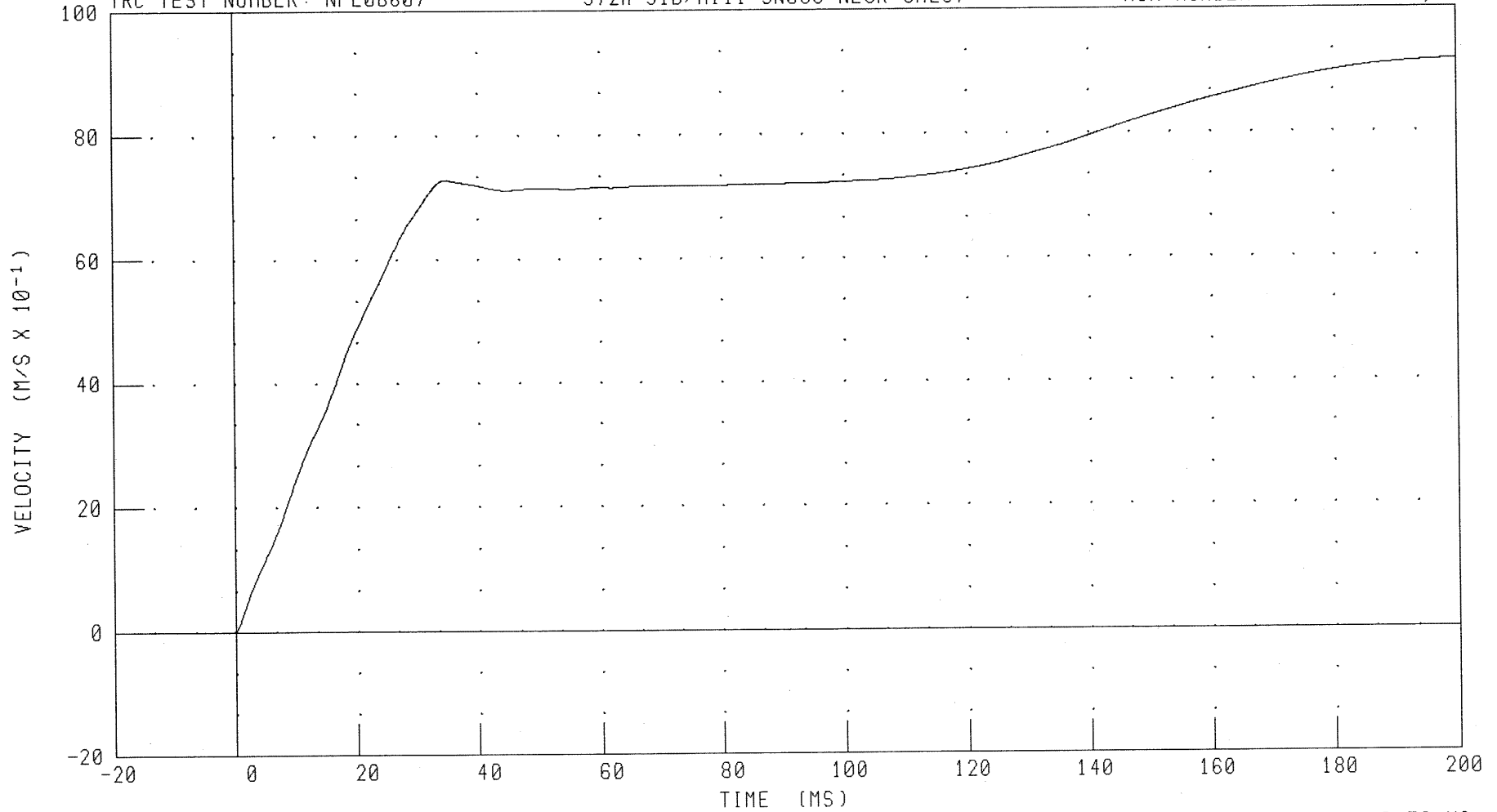
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

INTEGRATED PENDULUM VELOCITY

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: PENXVI FILTER: CH. CLASS 180

PEAK DATA: 9.16 M/S @ 200.00 MS; -0.01 M/S @ -0.72 MS

030408-1

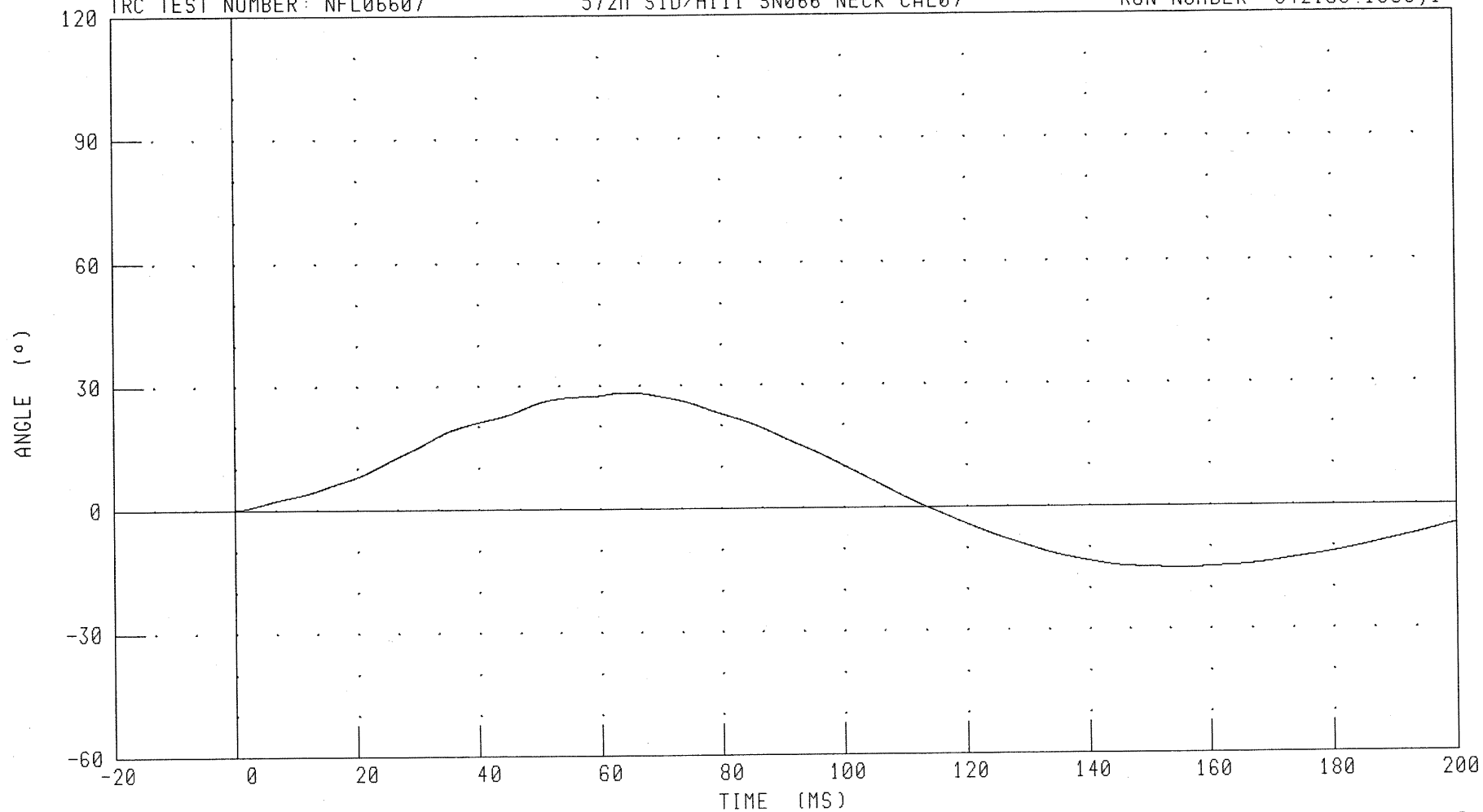
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 28.23 ° @ 64.72 MS; -15.00 ° @ 155.76 MS

C-108

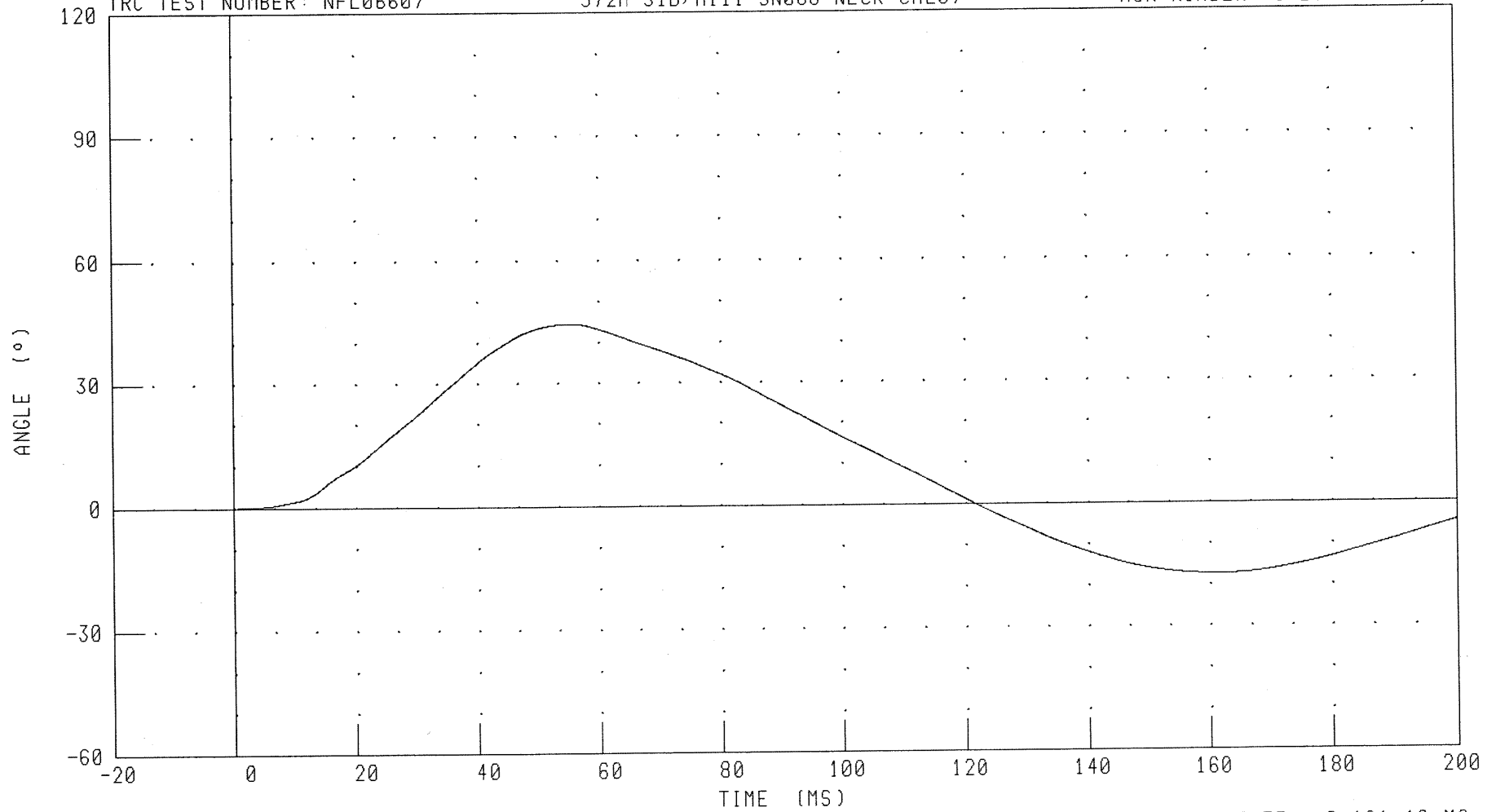
030408-1

572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: THETA

FILTER: CH. CLASS 60

PEAK DATA: 44.46 ° @ 55.52 MS; -17.33 ° @ 161.12 MS

030408-1

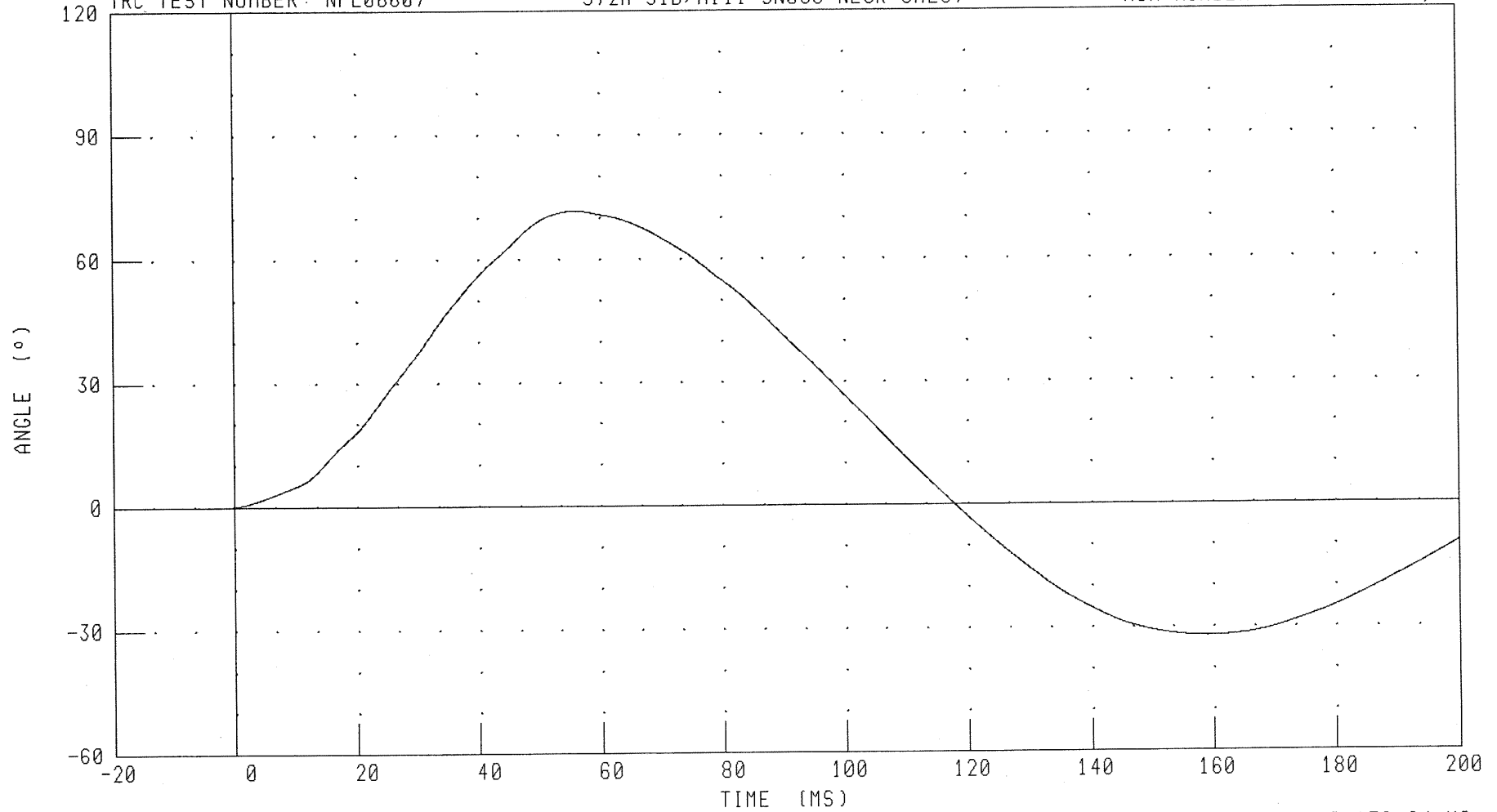
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

TOTAL ROTATION

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: TOTAN

FILTER: CH. CLASS 60

PEAK DATA: 71.63 ° @ 56.16 MS; -32.21 ° @ 159.04 MS

C-110

030408-1

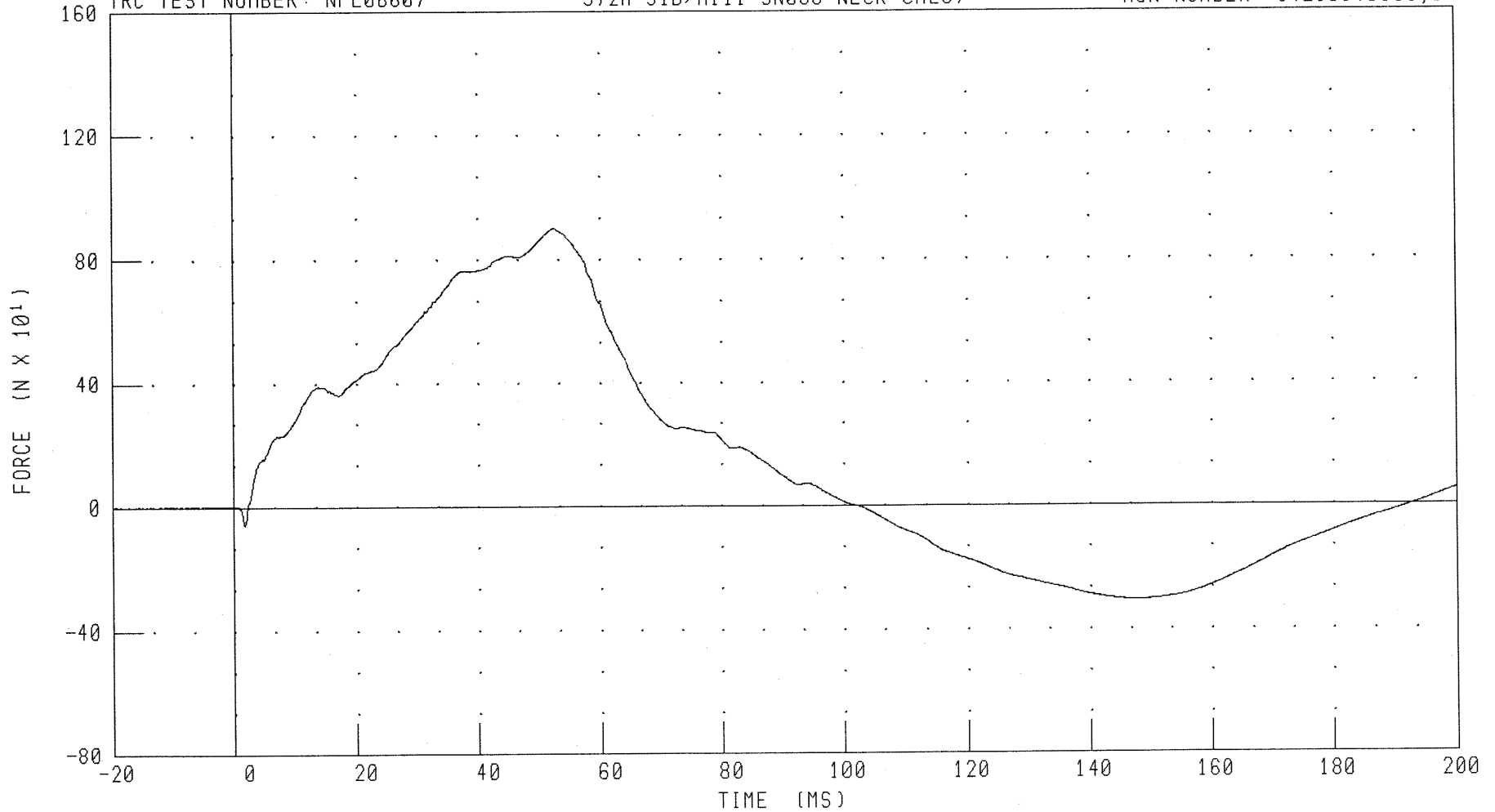
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

NECK FORCE Y AXIS

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: NEKYF

FILTER: CH. CLASS 1000

PEAK DATA: 899.83 N @ 52.48 MS; -306.53 N @ 147.36 MS

030408-1

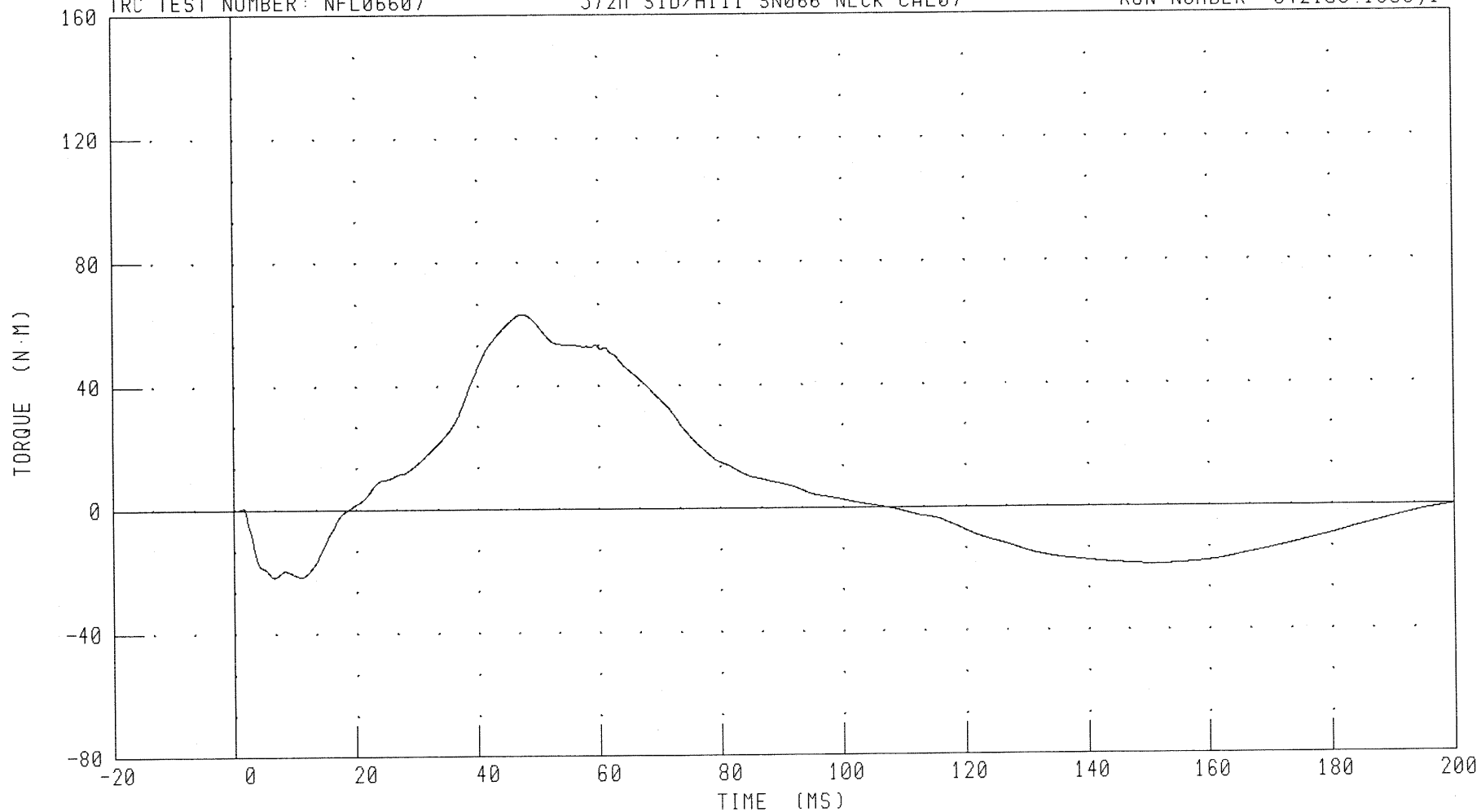
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

NECK MOMENT X AXIS

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: NEKXM

FILTER: CH. CLASS 600

PEAK DATA: 63.36 N·M @ 47.52 MS; -21.97 N·M @ 6.56 MS

C-112

030408-1

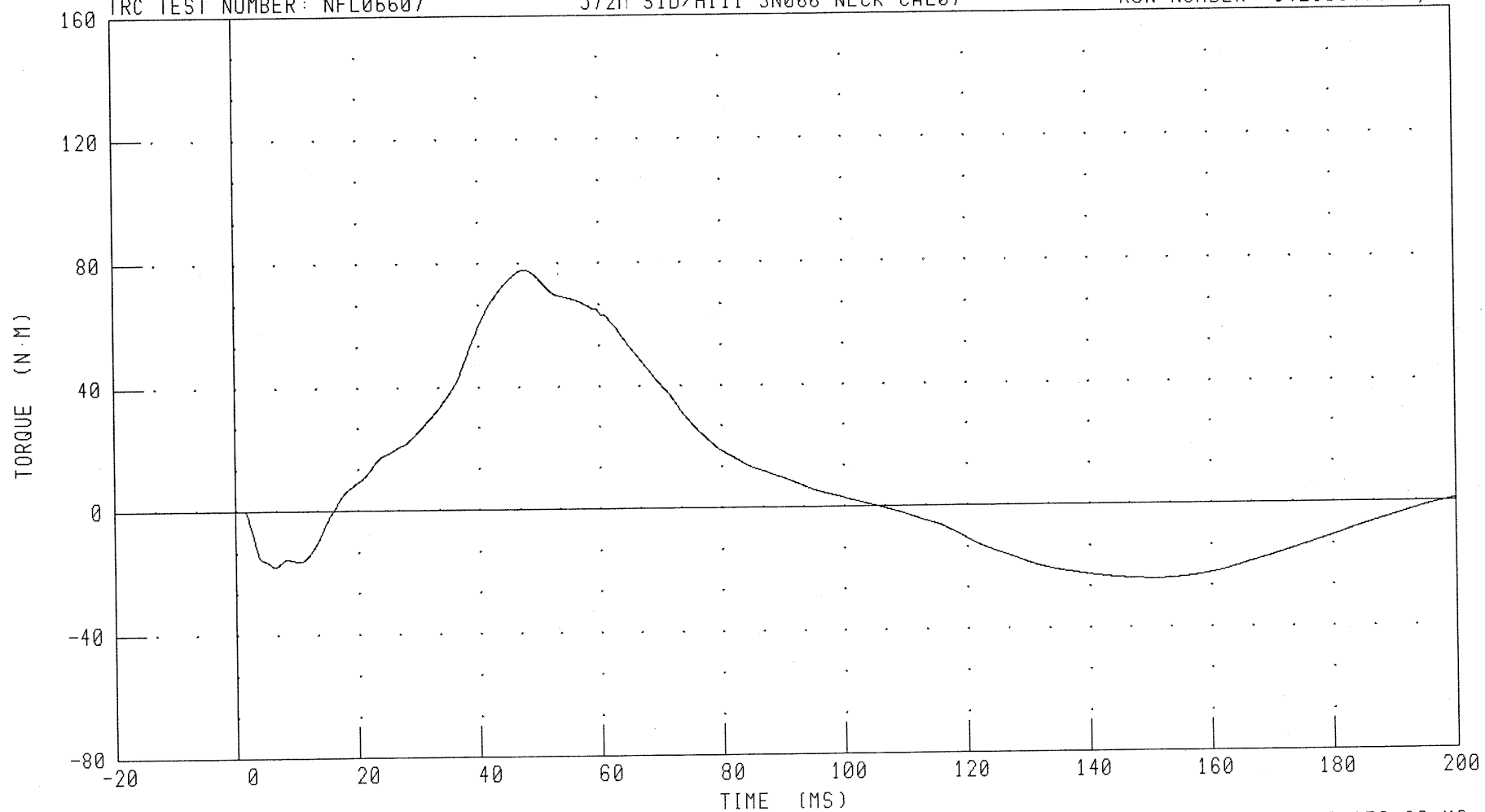
572M SID/HIII DUMMY CALIBRATION -- LEFT LATERAL NECK TEST

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: NFL06607

572M SID/HIII SN066 NECK CAL07

RUN NUMBER: 042103.1006;1



CHANNEL: NEKOM

FILTER: CH. CLASS 600

PEAK DATA: 77.82 N·M @ 47.76 MS; -24.41 N·M @ 150.88 MS

030408-1

TRANSPORTATION RESEARCH CENTER INC.

LATERAL THORAX IMPACT TEST

SIDE IMPACT DUMMY

14-APR-03

LEFT SIDE CONFIGURATION

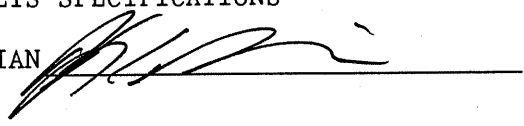
TRC INC.

TEST NO: STL06607

572F SID SN066 L.THORAX CAL07

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	38.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.26 M/S
PEAK ACCELERATION: UPPER RIB BAR	37 - 46 G	39.9 G
PEAK ACCELERATION: LOWER RIB BAR	37 - 46 G	40.6 G
PEAK ACCELERATION: LOWER THORACIC SPINE	15 - 22 G	18.7 G

TEST MEETS SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 041403.0757;1

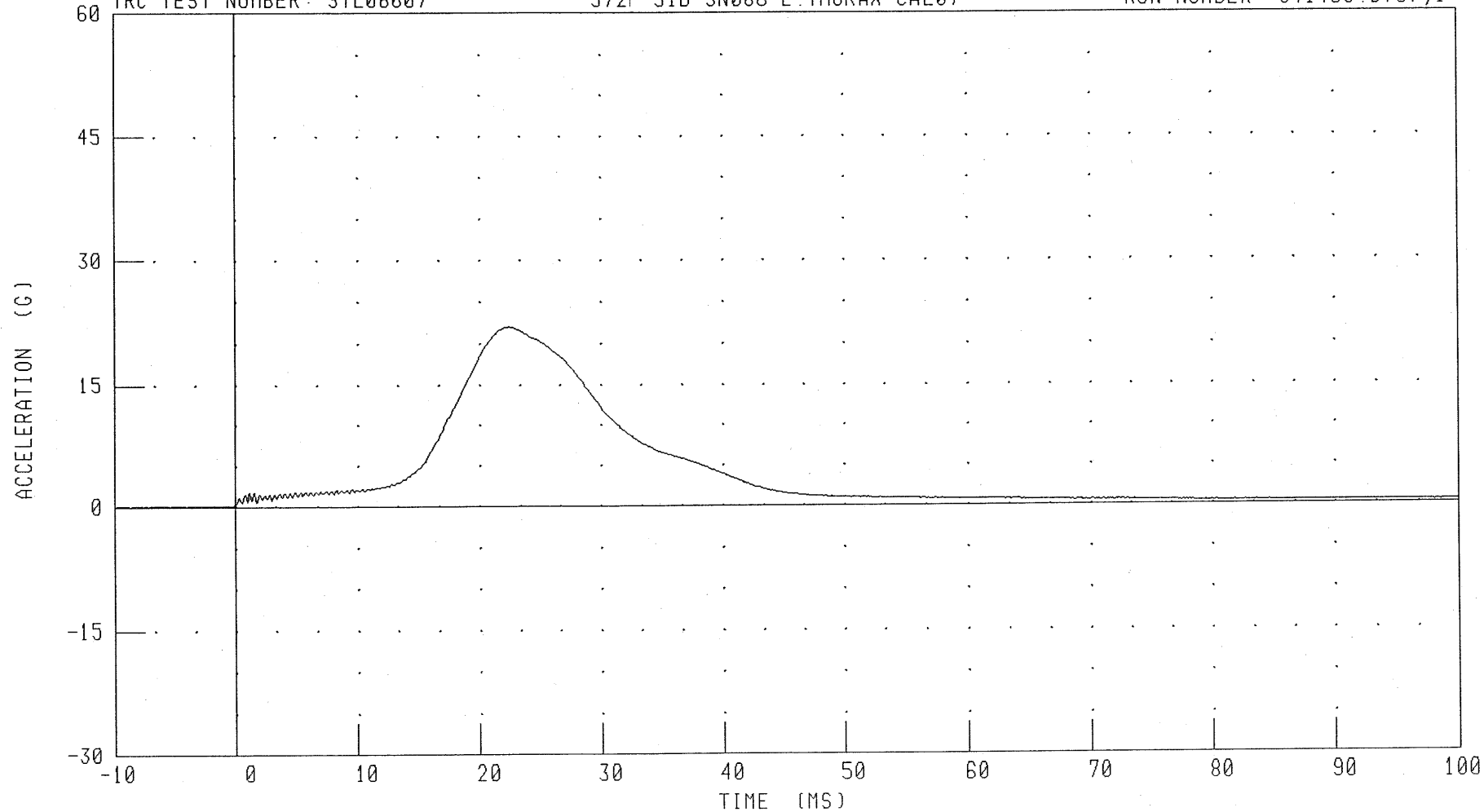
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

PENDULUM DECELERATION

TRC TEST NUMBER: STL06607

572F SID SN066 L THORAX CAL07

RUN NUMBER: 041403.0757;1



CHANNEL: PENXC FILTER: CH. CLASS 1000

PEAK DATA: 22.00 G @ 22.48 MS; 0.02 G @ -9.92 MS

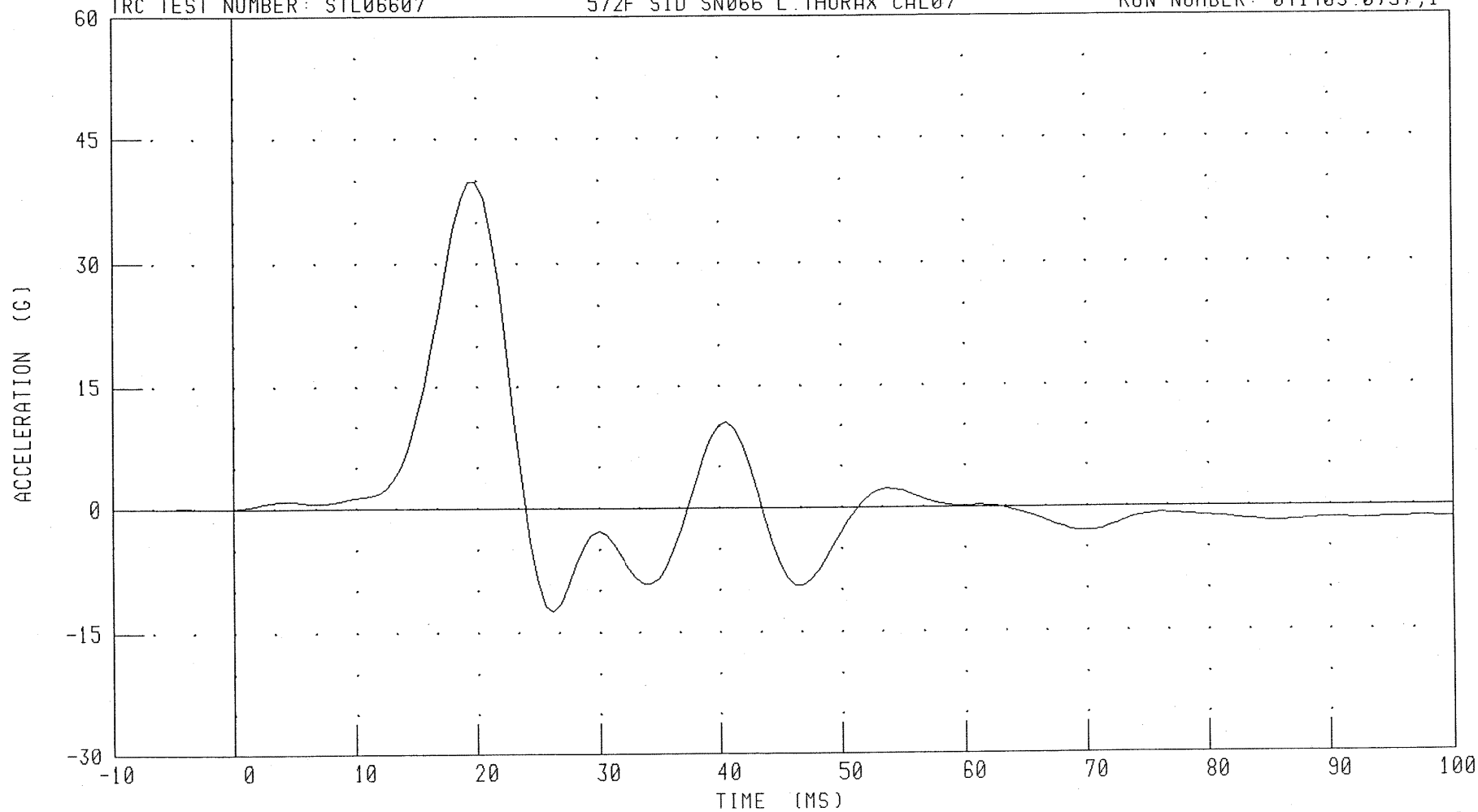
030408-1

PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)
LEFT UPPER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL06607

572F SID SN066 L THORAX CAL07

RUN NUMBER: 041403.0757;1



CHANNEL: LURYG FILTER: FIR 100

PEAK DATA: 39.89 G @ 20.00 MS; -12.52 G @ 26.25 MS

030408-1

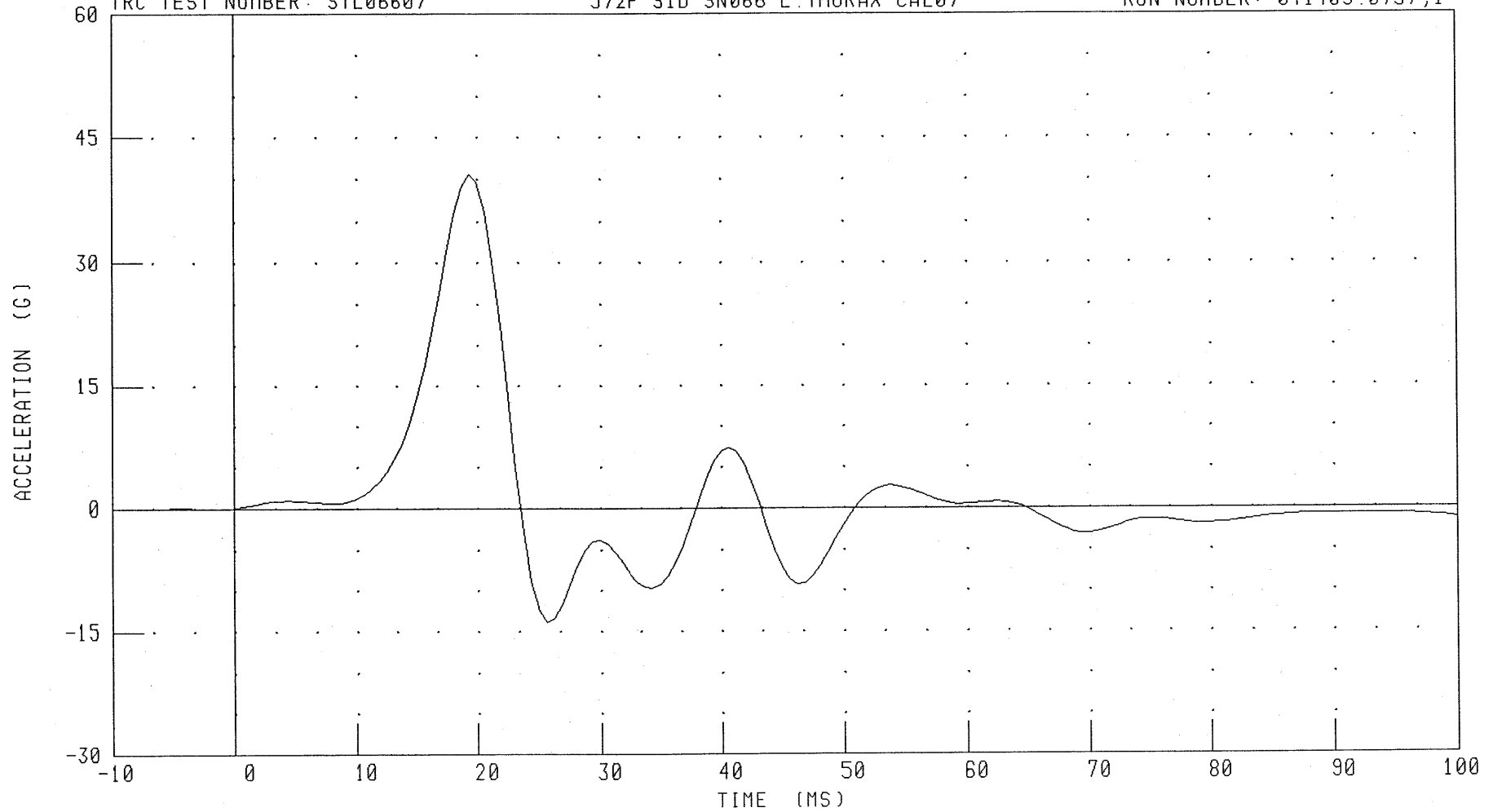
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LEFT LOWER RIB ACCELERATION Y AXIS

TRC TEST NUMBER: STL06607

572F SID SN066 L THORAX CAL07

RUN NUMBER: 041403.0757;1



CHANNEL: LLRYG

FILTER: FIR 100

PEAK DATA: 40.61 G @ 19.38 MS; -13.90 G @ 25.63 MS

030408-1

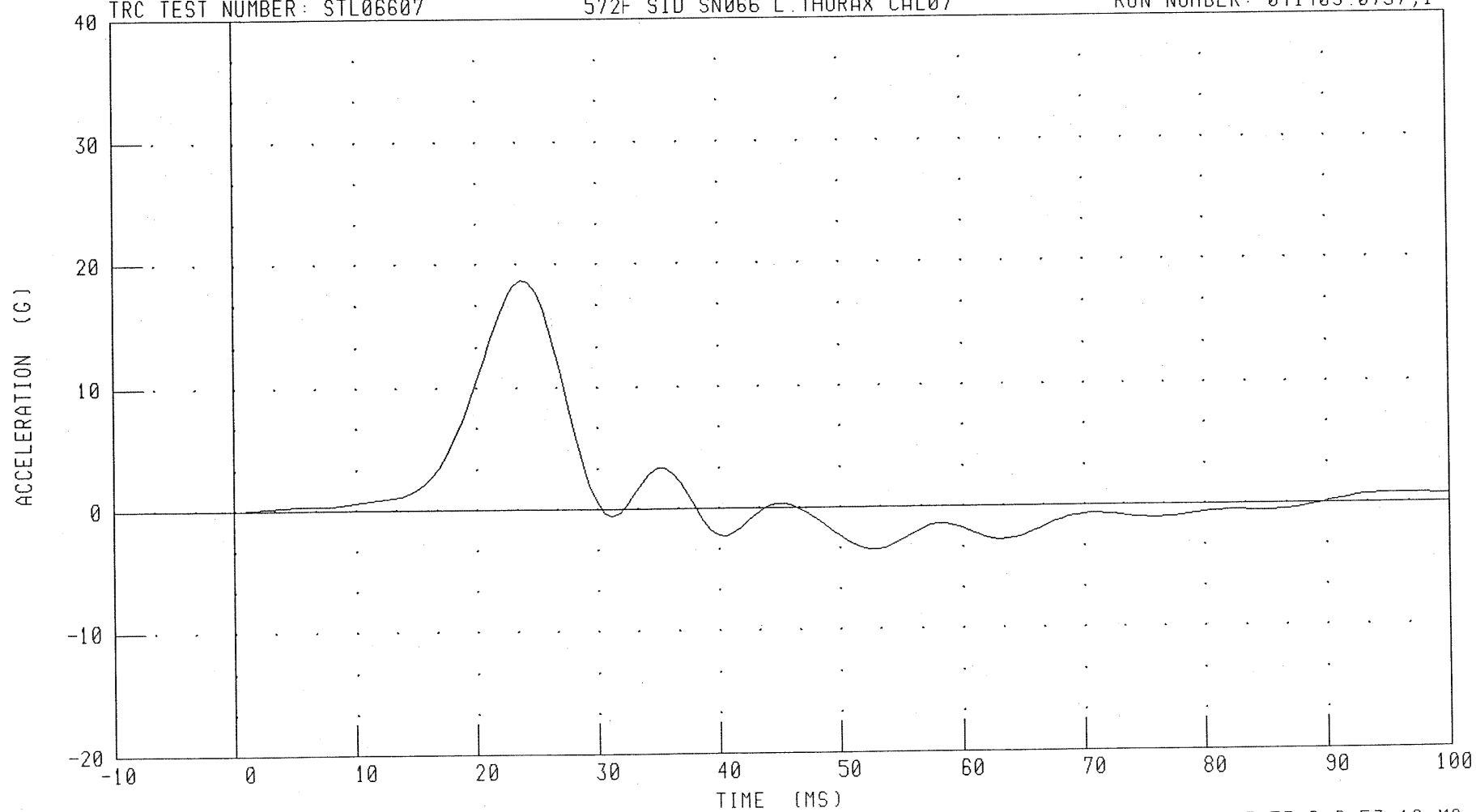
PART 572-F S.I.D. THORAX CALIBRATION - (LEFT SIDE IMPACT)

LOWER SPINE ACCELERATION Y AXIS

TRC TEST NUMBER: STL06607

572F SID SN066 L THORAX CAL07

RUN NUMBER: 041403.0757;1



CHANNEL: T12YG

FILTER: FIR 100

PEAK DATA: 18.70 G @ 23.75 MS; -3.53 G @ 53.12 MS

030408-1

Transportation Research Center Inc.

572B Abdomen Compression Test

HIII SID Serial No. 066 Calibration No. 07 - 1

Test Date 04/14/2003

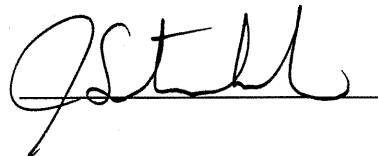
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Displacement Rate	6.35 - 8.89 mm/s	7.1 - 8.9 mm/s	Yes
Data Within Required Corridor	Yes	Yes	Yes

Comments:

Technician



Approved



04.14.2003 09:18:50 11

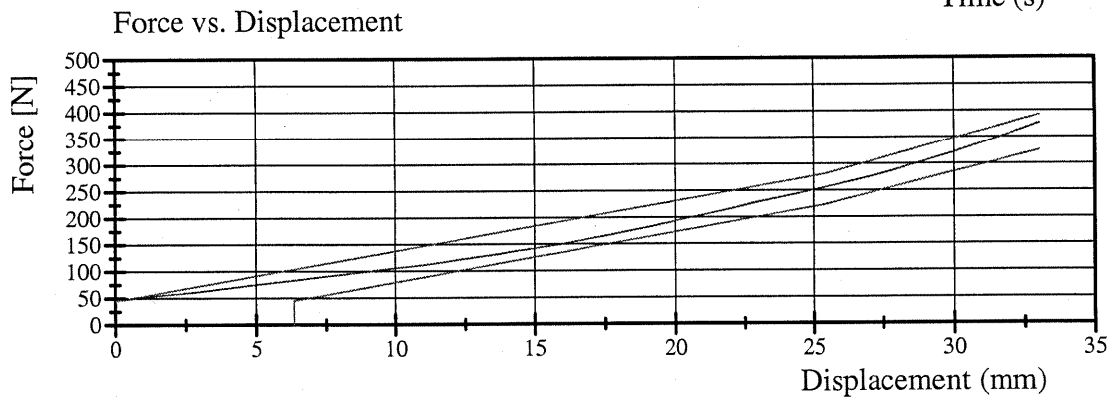
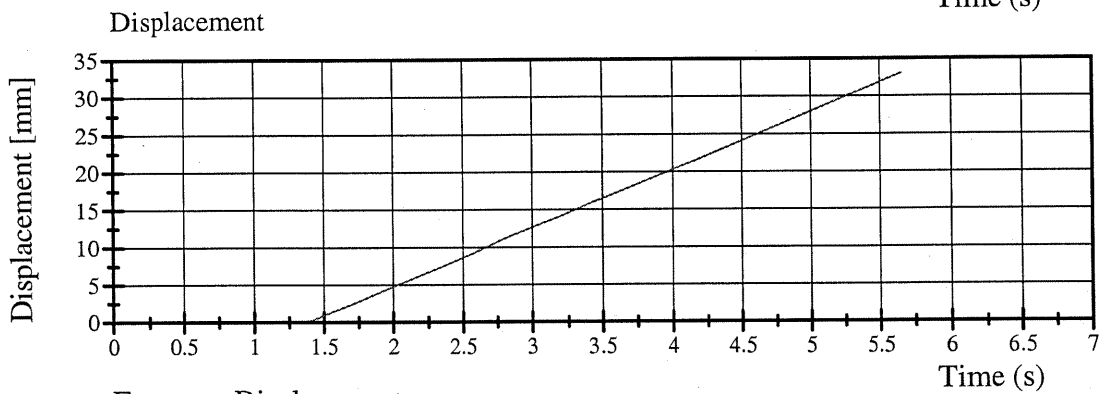
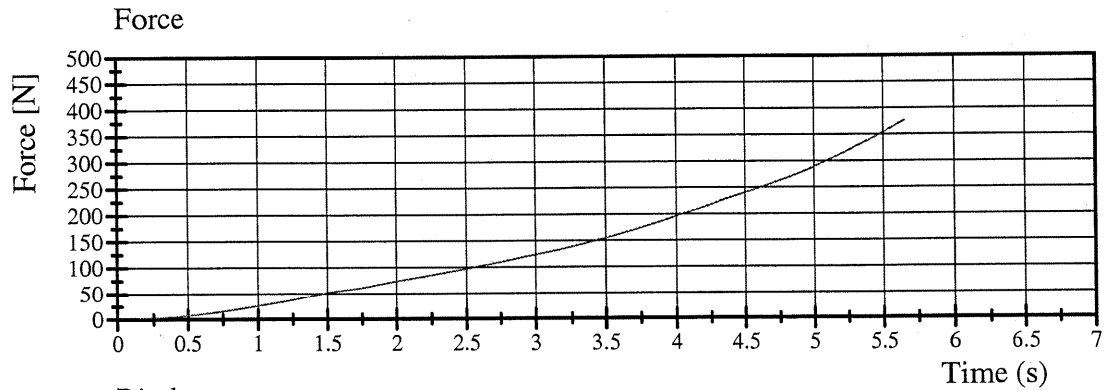


Transportation Research Center Inc.

572B Abdomen Compression Test

HIH SID Serial No. 066 Calibration No. 07 - 1

Test Date 04/14/2003



TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 14-Apr-03

TRC, INC.

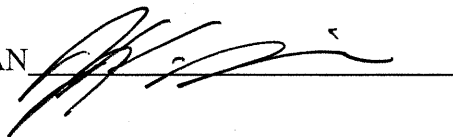
TEST NO: 066C07TF1

572B SN 066 TORSO FLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	49 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	115.7 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	169.0 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	231.3 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	6 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER INC.

LATERAL PELVIS IMPACT TEST

SIDE IMPACT DUMMY

14-APR-03

LEFT SIDE CONFIGURATION

TRC INC.

TEST NO: SPL06607

572F SN066 LEFT PELVIS CAL07

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	38.0 %
PENDULUM VELOCITY	4.21 - 4.33 M/S	4.26 M/S
PEAK PELVIC ACCELERATION	40 - 60 G	42.6 G
TIME ABOVE 20 G LEVEL	3 - 7 MS	6.2 MS
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 041403.0753;1

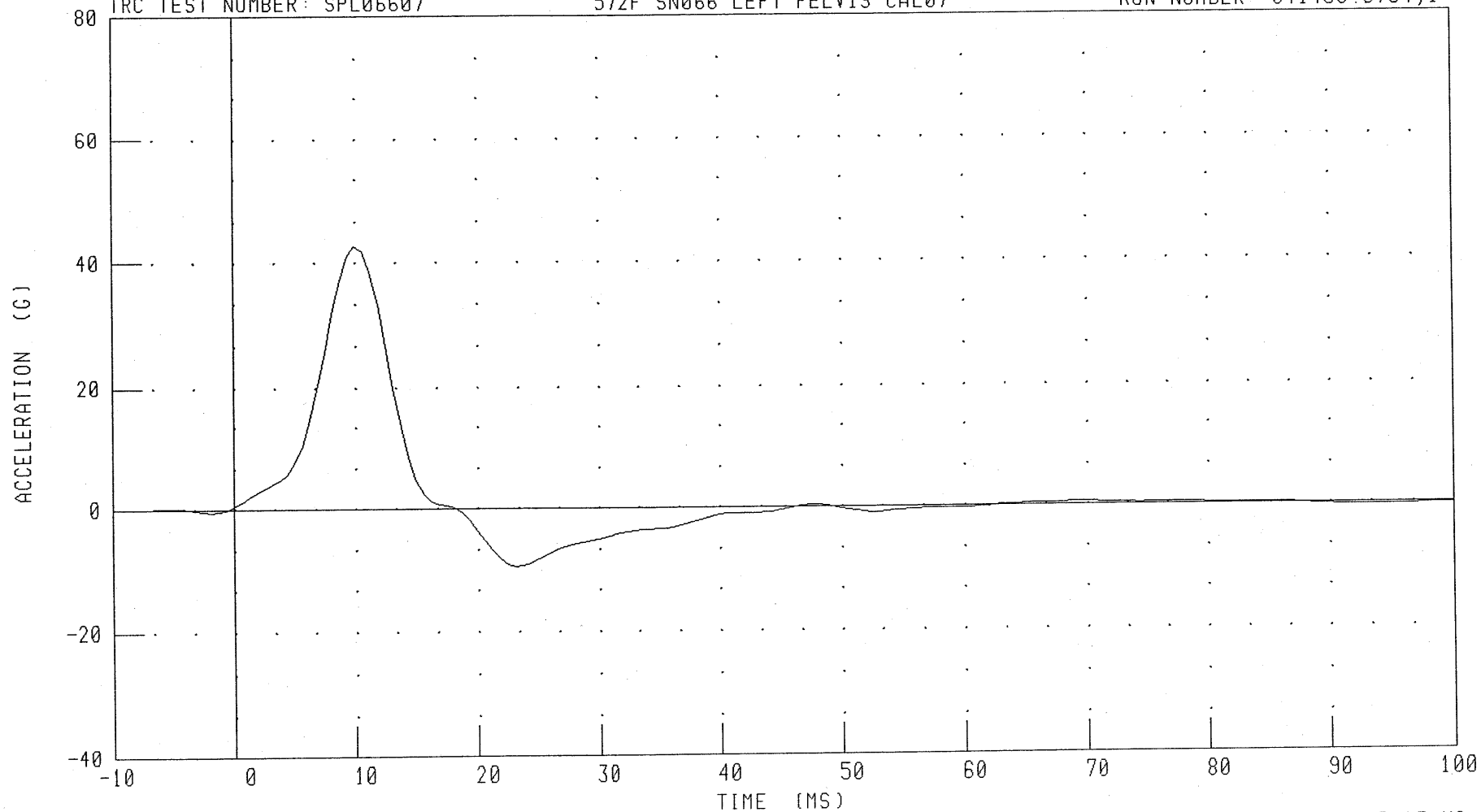
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PELVIS ACCELERATION Y AXIS

TRC TEST NUMBER: SPL06607

572F SN066 LEFT PELVIS CAL07

RUN NUMBER: 041403.0754;1



CHANNEL: PEVYG

FILTER: FIR 100

PEAK DATA: 42.63 G @ 10.00 MS; -9.33 G @ 23.13 MS

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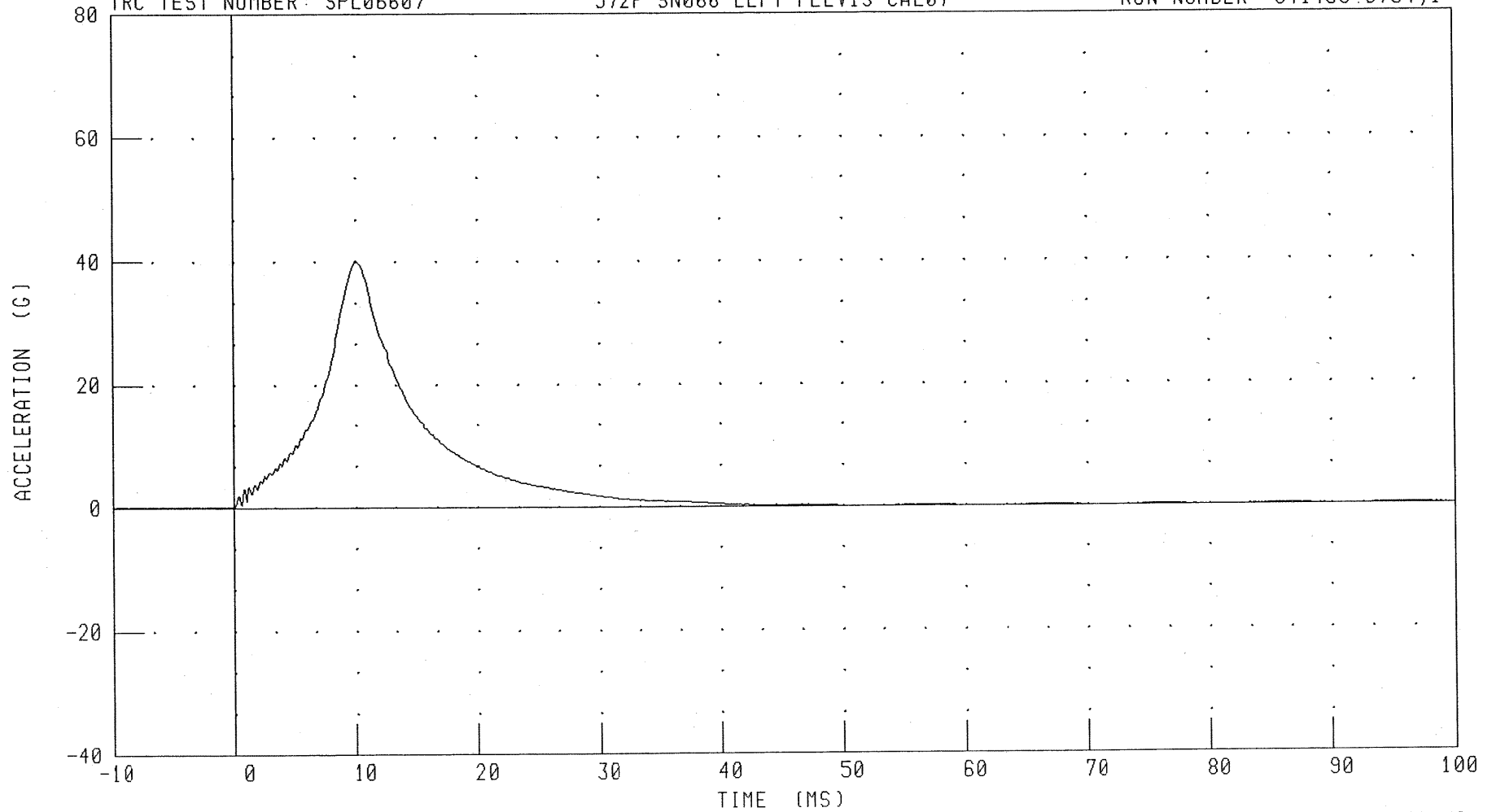
PART 572-F S.I.D. PELVIS CALIBRATION - (LEFT SIDE IMPACT)

PENDULUM DECELERATION

TRC TEST NUMBER: SPL06607

572F SN066 LEFT PELVIS CAL07

RUN NUMBER: 041403.0754;1



CHANNEL: PENXG

FILTER: CH. CLASS 1000

PEAK DATA: 40.19 G @ 10.08 MS; -0.11 G @ 52.32 MS

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Transportation Research Center Inc.

SID Pre-Use Inspection

Type: HIH SID S/N: 028 Mfr: Vector Test Date: 04/08/03

Proj./Seg. No.: 20020455-1120 Test Eng.: G. Watters

ITEM	PRE-USE	
HEAD:		
Head Ballast Condition	X	
Accel. Mount Bolts and Cables	X	
Skull Cap Bolts	X	
Head Skin Condition	X	
Accel. Cable Exit (left or right)	(Left)	(Right)
NECK:		
Rubber Condition and Separation From End Caps	X	
THORAX: Left Side Configuration		
Stacked Shoulder Foams and Bolts	X	
* Rib Cage Spring and Support Assembly	X	
* Rib Cage Bolts	X	
* Damper Rear Attachment Ring, Pivot Pins, and Bracket	X	
* Location and Adjustment of Chest Pot Bracket and Collars Left	X	
* Chest Pot Rod End Nuts and Eyebolt	X	
Arm Foam Orientation	X	
Thorax/Lumbar Spine Bolts	X	
PELVIS:		
Tightness and Alignment of H-Point Tool Insert	X	
* Hips Range of Motion and 1-2g Adjustment (before calibration only)	X	
Upper Femur Bolt Adjustment and Position	X	
Check Spine Kits (Yellow tape = Kits/No tape = No kits)	(With) X	(Without)
LEGS AND FEET:		
Femur Load Cell Bolts (40 ft/lbs)	X	
Breakaway Femur Bolts (5-6 ft/lbs)	X	
Knee Joint Function and Range of Motion	X	
Leg Skin Condition and Position	X	
Ankle Range of Motion	X	
Foot Condition	X	
OTHER:		
Cleanliness	X	
Target Position	X	
Clothes	X	
Shoes	X	
Knee & Ankle One G Joint Adjustments	X	

Inspection Completed By: J. Clarridge Date: 04/07/03

Transportation Research Center Inc.

SID Pre-Use Inspection

Type: HIH SID S/N: 066 Mfr: Denton Test Date: 04/08/03

Proj./Seg. No.: 20020455-1120 Test Eng.: G. Watters

ITEM	PRE-USE	
HEAD:		
Head Ballast Condition	X	
Accel. Mount Bolts and Cables	X	
Skull Cap Bolts	X	
Head Skin Condition	X	
Accel. Cable Exit (left or right)	(Left)	(Right)
NECK:		
Rubber Condition and Separation From End Caps	X	
THORAX: Left Side Configuration		
Stacked Shoulder Foams and Bolts	X	
* Rib Cage Spring and Support Assembly	X	
* Rib Cage Bolts	X	
* Damper Rear Attachment Ring, Pivot Pins, and Bracket	X	
* Location and Adjustment of Chest Pot Bracket and Collars Left	N/A	
* Chest Pot Rod End Nuts and Eyebolt	X	
Arm Foam Orientation	X	
Thorax/Lumbar Spine Bolts	X	
PELVIS:		
Tightness and Alignment of H-Point Tool Insert	X	
* Hips Range of Motion and 1-2g Adjustment (before calibration only)	X	
Upper Femur Bolt Adjustment and Position	X	
Check Spine Kits (Yellow tape = Kits/No tape = No kits)	(With) X	(Without)
LEGS AND FEET:		
Femur Load Cell Bolts (40 ft/lbs)	X	
Breakaway Femur Bolts (5-6 ft/lbs)	X	
Knee Joint Function and Range of Motion	X	
Leg Skin Condition and Position	X	
Ankle Range of Motion	X	
Foot Condition	X	
OTHER:		
Cleanliness	X	
Target Position	X	
Clothes	X	
Shoes	X	
Knee & Ankle One G Joint Adjustments	X	

Inspection Completed By: J. Clarridge Date: 04/07/03

Transportation Research Center Inc.

SID Post-Use Inspection

Type: HIII SID S/N: 028 Mfr: Vector Test Date: 04/08/03

Proj./Seg. No.: 20020455-1120 Test Eng.: G. Watters

ITEM	POST-USE
HEAD:	
Head Skin Condition	X
Head Ballast Condition	X
NECK:	
Rubber Condition and Separation From End Caps	X
THORAX: Left Side Configuration	
Jacket Condition	X
Arm Foam Condition	X
Damper and Chest Pot Movement and Condition	X
Rib Cage Spring and Support Assembly Condition	X
Rib Wrap Condition	X
Abdomen condition	X
Thorax/Lumbar Spine Bolts	X
Lumbar Spine Condition and Separation From End Caps	X
PELVIS:	
Illioc Crest bone	X
Flesh Condition	X
Hip Range of Motion	X
LEGS AND FEET:	
Knee Skins and Castings Condition	X
Leg Skin Condition	X
Foot Condition	X
Knee Joint Range of Motion	X
Ankle Range of Motion	X

NOTES: No damage to report.

Inspection Completed By: J. Clarridge

Date: 04/09/03

Transportation Research Center Inc.

SID Post-Use Inspection

Type: HIH SID S/N: 066 Mfr: Denton Test Date: 04/08/03

Proj./Seg. No.: 2002455-1120 Test Eng.: G. Watters

ITEM	POST-USE
HEAD:	
Head Skin Condition	X
Head Ballast Condition	X
NECK:	
Rubber Condition and Separation From End Caps	X
THORAX: Left Side Configuration	
Jacket Condition	X
Arm Foam Condition	X
Damper and Chest Pot Movement and Condition	X
Rib Cage Spring and Support Assembly Condition	X
Rib Wrap Condition	X
Abdomen condition	X
Thorax/Lumbar Spine Bolts	X
Lumbar Spine Condition and Separation From End Caps	X
PELVIS:	
Iliac Crest bone	X
Flesh Condition	X
Hip Range of Motion	X
LEGS AND FEET:	
Knee Skins and Castings Condition	X
Leg Skin Condition	X
Foot Condition	X
Knee Joint Range of Motion	X
Ankle Range of Motion	X

NOTES: No damage to report.

Inspection Completed By: J. Clarridge

Date: 04/09/03

Appendix D

Test Equipment List and Calibration Information

Sign Convention
SAE J211 MAR95

Accelerometers:

+X: Forward
+Y: Rightward
+Z: Downward

Potentiometers:

+Chest longitudinal deflection: Outward
+Chest lateral deflection: Rightward
+Seat belt displacement: Outward
+Seat belt extension: Elongation
+Knee slider displacement: Distance between femur and tibia
increased (in relation to a seated
dummy)

Rotation potentiometers:

+About the X-axis: Left foot-eversion
Right foot-inversion
+About the Y-axis: Left/right foot-dorsiflexion
+About the Z-axis: Left foot-internal
Right foot-external

Load cells:

+Femur force: Tension
+Seat belt force: Tension
+Barrier force: Tension

Neck load cells:

+X force: Head pushed rearward
+Y force: Head pushed leftward
+Z force: Head pulled upward (tension on neck)
+X moment: Left ear rotating toward left shoulder
+Y moment: Chin rotating toward chest
+Z moment: Chin rotating toward left shoulder

Tibia load cells:

+X force: Ankle forward, knee rearward
+Y force: Ankle rightward, knee leftward
+Z force: Tension
+X moment: Bottom of tibia moving leftward
+Y moment: Bottom of tibia moving rearward

Sign Convention, Cont'd.
SAE J211 MAR95

Lumbar load cells:

+X force:	Chest rearward, pelvis forward
+Y force:	Chest leftward, pelvis rightward
+Z force:	Chest upward, pelvis downward
+X moment:	Left shoulder toward left hip
+Y moment:	Sternum toward front of legs
+Z moment:	Right shoulder forward, left shoulder rearward

Frequency Response Classes
SAE J211 MAR95

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Vehicle Structural Accelerations for use in:	
Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	600
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Head form Accelerations	1000

The direction column on the following sheets describes the transducer output as mounted and wired in the test location. The polarity column indicates whether a polarity change occurred during data acquisition to conform to J211 MAR95. See Report Sign Convention sheet for description of data output as presented in the report: occasionally channels have been adjusted in post-acquisition processing to conform to J211 MAR95.

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Dummy	028nlr	Type	SID/H3	Description	NHTSA - 028n SID-LEFT IMP. CONFIG. w/RED ACCELS CAL DUE 6-19-03(DKS 2-21-03)J21					
Chsname	Location	Model	Name	Manufacturer	Sens./mV/V/U	Fullscale	Caldate	Pos Output	Flip	
HEDXG	Head Accel X	7264C-2K-2-18	P25307	Endevco	0.01808 g	2000	1/22/03	Rwd	1	
HEDYG	Head Accel Y	7264C-2K-2-18	P25326	Endevco	0.0211 g	2000	1/22/03	Lft	1	
HEDZG	Head Accel Z	7264C-2K-2-18	P25298	Endevco	0.02186 g	2000	1/22/03	Up	1	
HEDXR	Head Accel X Red	7264C-2K-2-18	P25318	Endevco	0.01914 g	2000	1/22/03	Rwd	1	
HEDYR	Head Accel Y Red	7264C-2K-2-18	P25301	Endevco	0.01993 g	2000	1/22/03	Lt	1	
HEDZR	Head Accel Z Red	7264C-2K-2-18	P25305	Endevco	0.02046 g	2000	1/21/03	Up	1	
NEKXF	Neck Force X	1716A	1716A-1532-FX	Denton	0.000197066 N	8896.4	8/29/02	Hd Fd,Cst Rr	1	
NEKYF	Neck Force Y	1716A	1716A-1532-FY	Denton	0.000187489 N	8896.4	8/29/02	Hd Lt,Cst Rt	0	
NEKZF	Neck Force Z	1716A	1716A-1532-FZ	Denton	9.73546E-05 N	13344.6	8/29/02	Hd Up,Cst Dn	0	
NEKXM	Neck Moment X	1716A	1716A-1532-MX	Denton	0.005922124 N·m	282.5	8/29/02	Rt Ear to Rt Shld	1	
NEKYM	Neck Moment Y	1716A	1716A-1532-MY	Denton	0.005901239 N·m	282.5	8/29/02	Chn to Strnm	0	
NEKZM	Neck Moment Z	1716A	1716A-1532-MZ	Denton	0.008294159 N·m	282.5	8/29/02	Chn to Lt Shld	0	
LURYG	Left Upper Rib Y	7264C-2K-2-18	P25231	Endevco	0.01764 g	2000	12/13/02	Rgt	0	
LURYR	Left Upper Rib Red Y	7264C-2K-2-18	P25371	Endevco	0.02155 g	2000	12/19/02	Rgt	0	
LLRYG	Left Lower Rib Y	7264C-2K-2-18	P25075	Endevco	0.01775 g	2000	12/19/02	Rgt	0	
LLRYR	Left Lower Rib Red Y	7264C-2K-2-18	P25076	Endevco	0.01566 g	2000	12/19/02	Rgt	0	
T12YG	Lower Spine Y	7264C-2K-2-18	P25261	Endevco	0.017 g	2000	11/21/02	Lft	1	
T12YR	Lower Spine Red Y	7264C-2K-2-18	P25374	Endevco	0.02186 g	2000	12/19/02	Lft	1	
PEVYG	Pelvis Accel Y	7264C-2K-2-18	P25063	Endevco	0.01801 g	2000	12/19/02	Lft	1	
PEVYR	Pelvis Accel Red Y	7264C-2K-2-18	P25074	Endevco	0.01764 g	2000	12/19/02	Lft	1	

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030408-1

Dummy	066nlr	Type	SID	Description	NHTSA - 066n SID-LEFT IMP.W/ RED ACCELS CAL DUE 5-21-03(DKS 3-12-03)J211					
Chsname	Location	Model	Name	Manufacturer	Sens./mV/V/U	Fullscale	Caldate	Pos Output	Flip	
HEDXG	Head Accel X	7264-2000TZ	J26980	Endevco	0.03084 g	2000	3/11/2003	Rwd	1	
HEDYG	Head Accel Y	7264-2000TZ	J27048	Endevco	0.02666 g	2000	3/11/2003	Lft	1	
HEDZG	Head Accel Z	7264-2000TZ	J26896	Endevco	0.02405 g	2000	3/11/2003	Up	1	
HEDXR	Head Accel X Red	7264C-2K-2-18	P22890	Endevco	0.02217 g	2000	3/11/2003	Rwd	1	
HEDYR	Head Accel Y Red	7264C-2K-2-18	P16213	Endevco	0.0163 g	2000	3/11/2003	Lt	1	
HEDZR	Head Accel Z Red	7264C-2K-2-18	P18941	Endevco	0.02043 g	2000	3/11/2003	Up	1	
NEKXF	Neck Force X	1716A	1716A-1220-FX	Denton	0.000194393 N	8896.4	3/10/2003	Hd Fd,Cst Rr	1	
NEKYF	Neck Force Y	1716A	1716A-1220-FY	Denton	0.000189043 N	8896.4	3/10/2003	Hd Lt,Cst Rt	0	
NEKZF	Neck Force Z	1716A	1716A-1220-FZ	Denton	0.000098459 N	13344.6	3/10/2003	Hd Up,Cst Dn	0	
NEKXM	Neck Moment X	1716A	1716A-1220-MX	Denton	0.006002832 N·m	282.5	3/10/2003	Rt Ear to Rt Shld	1	
NEKYM	Neck Moment Y	1716A	1716A-1220-MY	Denton	0.005908673 N·m	282.5	3/10/2003	Chn to Strnm	0	
NEKZM	Neck Moment Z	1716A	1716A-1220-MZ	Denton	0.008456991 N·m	282.5	3/10/2003	Chn to Lt Shld	0	
LURYG	Left Upper Rib Y	7264C-2K-2-18	P24511	Endevco	0.0173 g	2000	11/21/2002	Rgt	0	
LURYR	Left Upper Rib Red Y	7264C-2K-2-18	P21652	Endevco	0.02198 g	2000	11/21/2002	Rgt	0	
LLRYG	Left Lower Rib Y	7264C-2K-2-18	P24508	Endevco	0.01723 g	2000	11/21/2002	Rgt	0	
LLRYR	Left Lower Rib Red Y	7264C-2K-2-18	P24627	Endevco	0.01825 g	2000	11/21/2002	Rgt	0	
T12YG	Lower Spine Y	7264C-2K-2-18	P21635	Endevco	0.01873 g	2000	11/21/2002	Lft	1	
T12YR	Lower Spine Red Y	7264C-2K-2-18	P24564	Endevco	0.01875 g	2000	11/21/2002	Lft	1	
PEVYG	Pelvis Accel Y	7264C-2K-2-18	P24393	Endevco	0.01963 g	2000	11/21/2002	Lft	1	
PEVYR	Pelvis Accel Red Y	7264C-2K-2-18	P24559	Endevco	0.0172 g	2000	11/21/2002	Lft	1	

Channel Report

4/21/2003 2:39:29 PM

Name of Test 030408-1

System MINIDAU

Name of DAU DAU6

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
6001	P25307	HEDXG1	Head Accel X	Rwd	809.10240	g	- 1/22/2003	OK 028nlr	Endevco	7264C-2K-2-180
6002	P25326	HEDYG1	Head Accel Y	Lft	808.84676	g	- 1/22/2003	OK 028nlr	Endevco	7264C-2K-2-180
6003	P25298	HEDZG1	Head Accel Z	Up	807.64741	g	- 1/22/2003	OK 028nlr	Endevco	7264C-2K-2-180
6004	P25318	HEDXR1	Head Accel X Red	Rwd	810.61397	g	- 1/22/2003	OK 028nlr	Endevco	7264C-2K-2-180
6005	P25301	HEDYR1	Head Accel Y Red	Lt	802.80983	g	- 1/22/2003	OK 028nlr	Endevco	7264C-2K-2-180
6006	P25305	HEDZR1	Head Accel Z Red	Up	807.23993	g	- 1/21/2003	OK 028nlr	Endevco	7264C-2K-2-180
6007	1716A-1532-FX	NEKXF1	Neck Force X	Hd	8897.6474	N	- 8/29/2002	--- 028nlr	Denton	1716A
6008	1716A-1532-FY	NEKYF1	Neck Force Y	Hd	8895.2129	N	+ 8/29/2002	--- 028nlr	Denton	1716A
6009	1716A-1532-FZ	NEKZF1	Neck Force Z	Hd	13348.030	N	+ 8/29/2002	--- 028nlr	Denton	1716A
6010	1716A-1532-MX	NEKXM1	Neck Moment X	Rt Ear	282.53421	N·m	- 8/29/2002	--- 028nlr	Denton	1716A
6011	1716A-1532-MY	NEKYM1	Neck Moment Y	Chn	282.61056	N·m	+ 8/29/2002	--- 028nlr	Denton	1716A
6012	1716A-1532-MZ	NEKZM1	Neck Moment Z	Chn	281.87299	N·m	+ 8/29/2002	--- 028nlr	Denton	1716A
6013	P25231	LURYG1	Left Upper Rib Y	Rgt	806.24842	g	+ 12/13/2002	OK 028nlr	Endevco	7264C-2K-2-180
6014	P25371	LURYR1	Left Upper Rib Red Y	Rgt	791.95668	g	+ 12/19/2002	OK 028nlr	Endevco	7264C-2K-2-180
6015	P25075	LLRYG1	Left Lower Rib Y	Rgt	801.25195	g	+ 12/19/2002	OK 028nlr	Endevco	7264C-2K-2-180
6016	P25076	LLRYR1	Left Lower Rib Red Y	Rgt	797.43326	g	+ 12/19/2002	OK 028nlr	Endevco	7264C-2K-2-180
6017	P25261	T12YG1	Lower Spine Y	Lft	401.56862	g	- 11/21/2002	OK 028nlr	Endevco	7264C-2K-2-180
6018	P25374	T12YR1	Lower Spine Red Y	Lft	396.97923	g	- 12/19/2002	OK 028nlr	Endevco	7264C-2K-2-180
6019	P25063	PEVYG1	Pelvis Accel Y	Lft	400.40353	g	- 12/19/2002	OK 028nlr	Endevco	7264C-2K-2-180
6020	P25074	PEVYR1	Pelvis Accel Red Y	Lft	397.60196	g	- 12/19/2002	OK 028nlr	Endevco	7264C-2K-2-180
6021	J26980	HEDXG4	Head Accel X	Rwd	790.56265	g	- 3/11/2003	OK 066nlr	Endevco	7264-2000TZ
6022	J27048	HEDYG4	Head Accel Y	Lft	800.20005	g	- 3/11/2003	OK 066nlr	Endevco	7264-2000TZ
6024	J26896	HEDZG4	Head Accel Z	Up	788.48078	g	- 3/11/2003	OK 066nlr	Endevco	7264-2000TZ
6025	P22890	HEDXR4	Head Accel X Red	Rwd	796.35419	g	- 3/11/2003	OK 066nlr	Endevco	7264C-2K-2-180
6026	P16213	HEDYR4	Head Accel Y Red	Lt	805.41135	g	- 3/11/2003	OK 066nlr	Endevco	7264C-2K-2-180
6027	P18941	HEDZR4	Head Accel Z Red	Up	808.42530	g	- 3/11/2003	OK 066nlr	Endevco	7264C-2K-2-180
6028	1716A-1220-FX	NEKXF4	Neck Force X	Hd	8898.1070	N	- 3/10/2003	OK 066nlr	Denton	1716A
6029	1716A-1220-FY	NEKYF4	Neck Force Y	Hd	8909.1398	N	+ 3/10/2003	OK 066nlr	Denton	1716A
6030	1716A-1220-FZ	NEKZF4	Neck Force Z	Hd	13333.677	N	+ 3/10/2003	OK 066nlr	Denton	1716A
6031	1716A-1220-MX	NEKXM4	Neck Moment X	Rt Ear	282.42740	N·m	- 3/10/2003	OK 066nlr	Denton	1716A
6032	1716A-1220-MY	NEKYM4	Neck Moment Y	Chn	282.25499	N·m	+ 3/10/2003	OK 066nlr	Denton	1716A

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030408-1

Channel Report

4/21/2003 2:39:29 PM

Name of Test 030408-1

System MINIDAU

Name of DAU DAU8

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range		Pol.	Cal.		Group	Mfg.	Model
8001	1716A-1220-MZ	NEKZM4	Neck Moment Z	Chn	282.90480	N·m	+	3/10/2003	OK	066nlr	Denton	1716A
8002	P24511	LURYG4	Left Upper Rib Y	Rgt	799.87501	g	+	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8003	P21652	LURYR4	Left Upper Rib Red Y	Rgt	803.23805	g	+	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8004	P24508	LLRYG4	Left Lower Rib Y	Rgt	803.12465	g	+	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8005	P24627	LLRYR4	Left Lower Rib Red Y	Rgt	801.56555	g	+	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8006	P21635	T12YG4	Lower Spine Y	Lft	401.99742	g	-	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8007	P24564	T12YR4	Lower Spine Red Y	Lft	401.56862	g	-	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8008	P24393	PEVYG4	Pelvis Accel Y	Lft	401.26964	g	-	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8009	P24559	PEVYR4	Pelvis Accel Red Y	Lft	402.26272	g	-	11/21/2002	OK	066nlr	Endevco	7264C-2K-2-180
8010	03C03C14-F01	RFSXG1	RGT SIDE SILL FRNT ST X	FWD	400.34404	g	+	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8011	03C03C14-F24	RFSYG1	RGT SIDE SILL FRNT ST Y	LT	1020.7336	g	-	3/31/2003	OK	-1	Entran	EGE-73B6Q-200
8012	03C03C14-F13	RFSZG1	RGT SIDE SILL FRNT ST Z	UP	401.00250	g	-	3/27/2003	OK	-1	Entran	EGE-73B6Q-200
8013	03C03C14-F06	RRSXG1	RGT SIDE SILL RR ST X	FWD	396.89922	g	+	3/31/2003	OK	-1	Entran	EGE-73B6Q-200
8014	03C03C14-F21	RRSYG1	RGT SIDE SILL RR ST Y	LT	1015.8730	g	-	3/27/2003	OK	-1	Entran	EGE-73B6Q-200
8015	03C03C14-F08	RRSZG1	RGT SIDE SILL RR ST Z	UP	398.07183	g	-	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8016	03C03C14-N15	RDKXG1	RR FLRPAN ABV AXLE X	FWD	1003.9215	g	+	3/21/2003	OK	-1	Entran	EGE-73B6Q-200
8017	03C03C14-F12	RDKYG1	RR FLRPAN ABV AXLE Y	LT	980.65504	g	-	3/27/2003	OK	-1	Entran	EGE-73B6Q-200
8018	03C03C14-F14	RDKZG1	RR FLRPAN ABV AXLE Z	UP	1016.2763	g	-	3/27/2003	OK	-1	Entran	EGE-73B6Q-200
8019	03C03C14-F04	LRSYG1	LFT SIDE SILL RR ST Y	RT	999.02439	g	+	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8020	03C03C14-F05	LFSYG1	LFT SIDE SILL FRNT ST Y	RT	992.24806	g	+	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8022	03C03C14-F22	RRTYG1	RGT RR OCP COMP Y	LT	1545.8937	g	-	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8026	03C03C14-F10	LRUYG1	LT RR DR UPPER CL Y	RT	1543.0982	g	+	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8027	03C03C14-F09	LLBYG1	LFT LOWER B-POST Y	RT	1509.4339	g	+	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8028	03C03C14-F19	LUBYG1	LFT MID B-POST Y	RT	1467.8899	g	+	3/27/2003	OK	-1	Entran	EGE-73B6Q-200
8029	03C03C14-F17	LLAYG1	LFT LOWER A-POST Y	LT	1530.6427	g	-	3/27/2003	OK	-1	Entran	EGE-73B6Q-200
8030	03C03C14-N17	LUAYG1	LFT MID A-POST Y	LT	1502.3474	g	-	3/28/2003	OK	-1	Entran	EGE-73B6Q-200
8031	03C03C14-N28	LFTYG1	LFT FRNT ST TRK Y	LT	1488.3720	g	-	3/24/2003	OK	-1	Entran	EGE-73B6Q-200
8032	03C03C14-F03	LRTYG1	LFT RR ST TR Y	LT	1488.3720	g	-	3/31/2003	OK	-1	Entran	EGE-73B6Q-200

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030408-1

Channel Report

4/21/2003 2:39:29 PM

Name of Test 030408-1

System MINIDAU

Name of DAU DAU9

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
9001	03C03C14-F02	VCGXG1	VEH C/G X	FWD	999.02439 g	+	3/31/2003	OK -1	Entran	EGE-73B6Q-200
9002	03C03C14-F18	VCGYG1	VEH C/G Y	LT	1007.2791 g	-	3/27/2003	OK -1	Entran	EGE-73B6Q-200
9003	03C03C14-F20	VCGZG1	VEH C/G Z	UP	1011.0584 g	-	3/27/2003	OK -1	Entran	EGE-73B6Q-200

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030408-1

Channel Report

4/21/2003 2:39:30 PM

Name of Test 030408-1

System MINIDAU

Name of DAU DAUD

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0002	EVENT	EVENT	EVENT		5.12	V	+ 10/15/2002	OK -1	TRC	Event
0003	J34118	BCGXG1	MDB CENTER OF GRAVITY	FWD	599.77742	g	+ 3/4/2003	OK -1	Endevco	7264-2000TZ
0004	J35750	BCGYG1	MDB CENTER OF GRAVITY	RT	606.39079	g	+ 3/13/2003	OK -1	Endevco	7264-2000TZ
0005	J12272	BCGZG1	MDB CENTER OF GRAVITY	UP	596.11130	g	- 3/4/2003	OK -1	Endevco	7264-2000T
0006	P23380	LRRXG1	MDB LEFT REAR X-AXIS	FWD	603.49603	g	+ 3/3/2003	OK -1	Endevco	7264C-2K-2-180
0007	P23188	LRRYG1	MDB LEFT REAR Y-AXIS	LT	599.46142	g	- 3/3/2003	OK -1	Endevco	7264C-2K-2-180

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030408-1

Digital and System Channel Report

2003-04-21 14:39:16

Name of Test 030408-1

System MINIDAU

Name of DAU DAUD descriptio

enable Channel Short Name
d
Yes 0501 DIGD

Type
dig0

Data File Module Type
DATD0501 KM3710 Controller

bit position	bit	short	long	descriptio
MSB = bit 15	1	MDBR1	MDB RIGHT SIDE CONTACT SWITCH	R
bit 14	1	MDBL1	MDB LEFT SIDE CONTACT SWITCH	L
bit 13	0			
bit 12	0			
bit 11	0			
bit 10	0			
bit 09	0			
bit 08	0			
bit 07	0			
bit 06	0			
bit 05	0			
bit 04	0			
bit 03	0			
bit 02	0			
bit 01	0			
LSB = bit 00	0			

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030408-1

SIDE IMPACTOR BARRIER CERTIFICATION

Date: March 11, 2003

To: Transportation Research
Ship & Rec Bldg 50
10820 St. Route 347
East Liberty, OH 43319-0367

PURCHASE ORDER INFORMATION

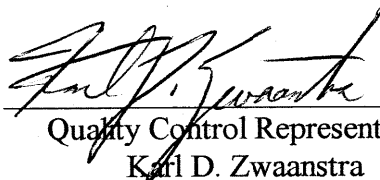
Customer P.O. Number: 022451
Work Order Number: 16059
Quantity: 01 piece

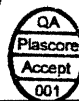
CORE INFORMATION

Core Type: PCGA-1/4-5.2-P-3003-T
Measured Cell Size: 0.250 inches
Measured Density: 5.2 pcf

Unit Number: 046B0103

This is to certify that the aluminum honeycomb core supplied, under the unit number provided, meets the crush requirements of 232 – 250 psi as per DWG# DSL-1285.


Quality Control Representative
Karl D. Zwaanstra

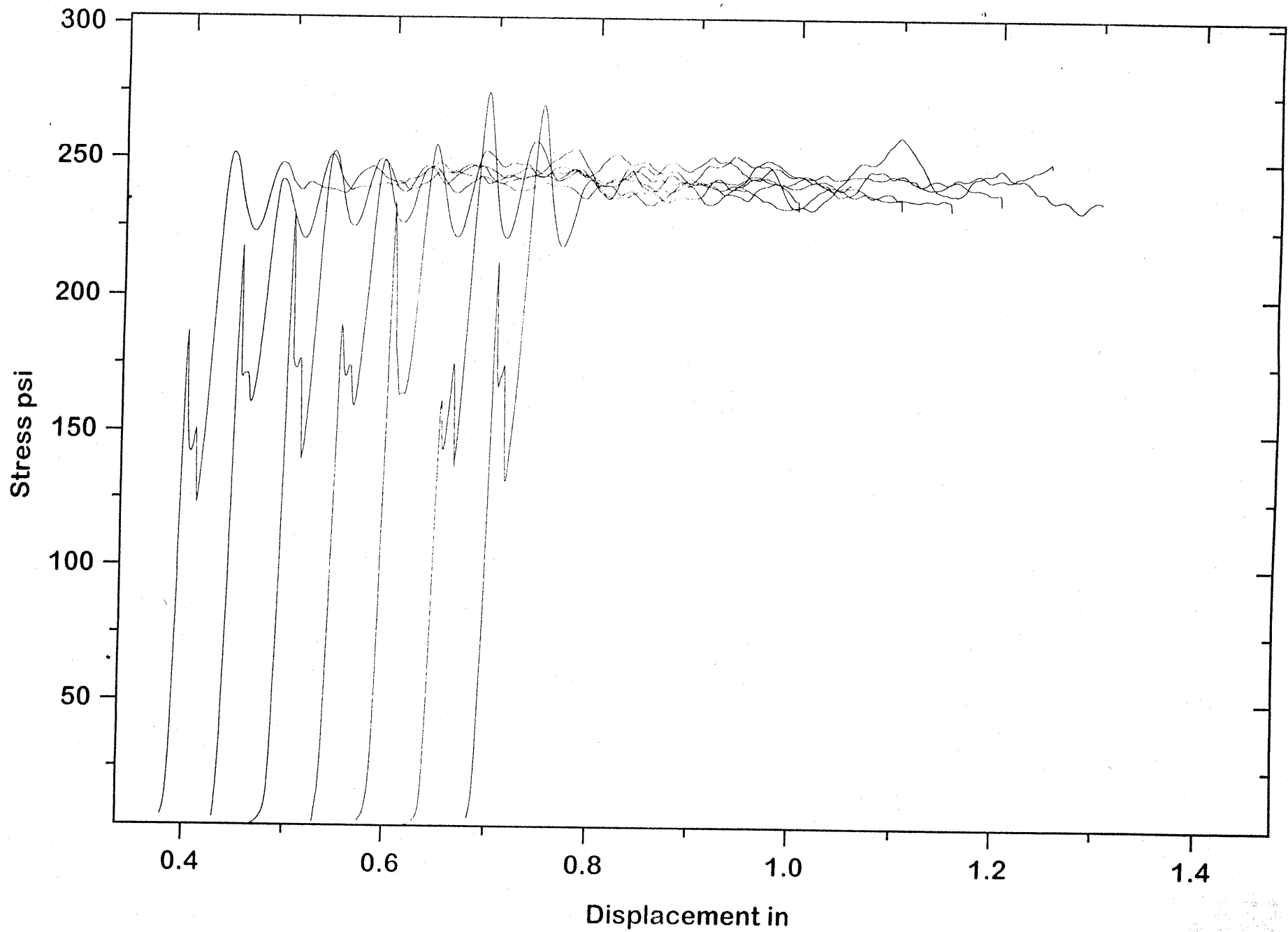


Crush Data
232 - 250 psi per DWG # DSL-1285

Block Number: 046B0103

<u>Specimen Number</u>	<u>Zone 1</u>	<u>Zone 2</u>	<u>Zone 3</u>
1	241.78	238.32	238.98
2	244.12	237.80	235.41
3	246.33	246.94	239.45
4	242.25	240.86	236.53
5	241.20	243.39	240.85
6	247.03	242.20	243.97
7	241.00	246.36	237.47

BLOCK # 046B0103 Sample ID: IN226387



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030408-1

SIDE IMPACTOR BARRIER CERTIFICATION

Date: March 11, 2003
To: Transportation Research
Ship & Rec Bldg 50
10820 St. Route 347
East Liberty, OH 43319-0367

PURCHASE ORDER INFORMATION

Customer P.O. Number: 02245
Work Order Number: 16059
Quantity: 01 piece

CORE INFORMATION

Core Type: PAMG-3/8-1.6-001-P-5052-T
Measured Cell Size: 0.375 inches
Measured Density: 1.6 pcf

Unit Number: 004A0203

This is to certify that the aluminum honeycomb core supplied, under the unit number provided, meets the crush requirements of 45 psi +/- 2.5 psi as per DWG# DSL-1285.


Quality Control Representative
Karl D. Zwaanstra



Crush Data
45 psi +/- 2.5 psi per DWG # DSL-1285

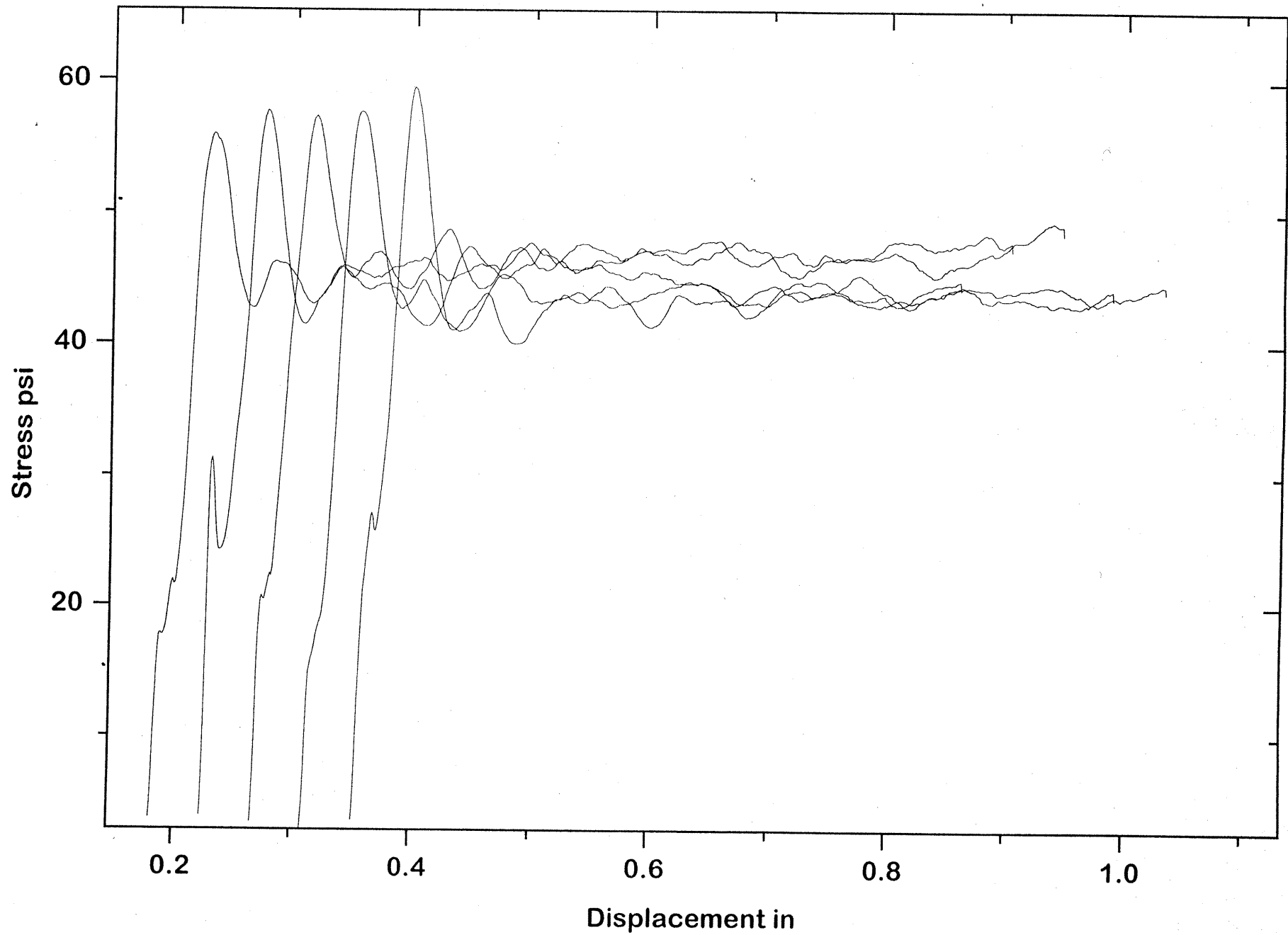
Block Number: 004A0203

<u>Specimen Number</u>	<u>Zone 1</u>	<u>Zone 2</u>	<u>Zone 3</u>
1	45.94	44.51	43.78
2	46.56	46.60	47.13
3	47.12	46.74	46.23
4	43.84	43.54	43.78
5	43.26	44.20	44.25
6	44.02	43.28	42.51
7	44.74	44.90	44.94

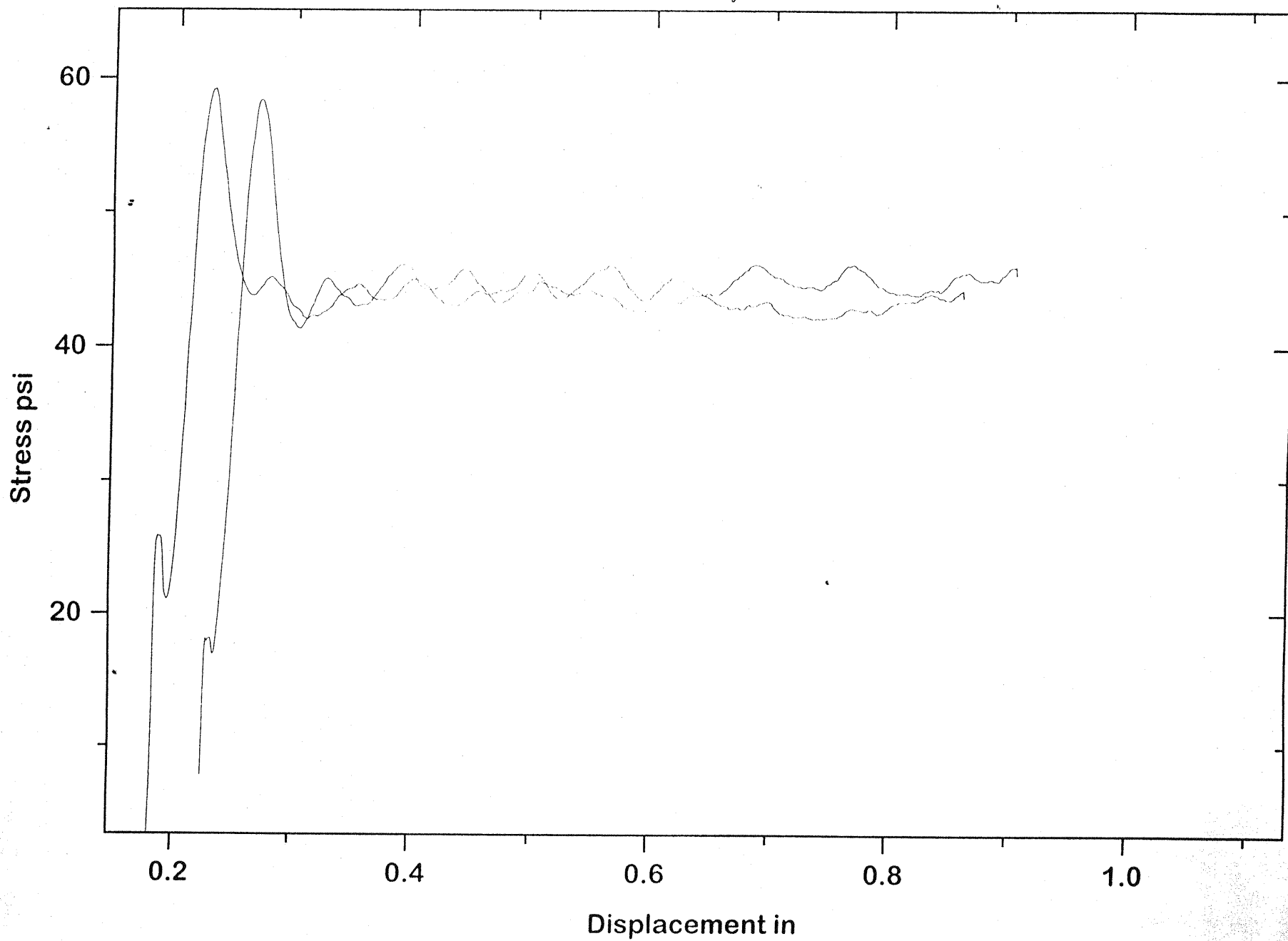
BLOCK # 004A0203 Sample ID: IN226630

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030408-1



BLOCK # 004A0203 Sample ID: IN226631



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030408-1

C30111 / 2003 SATURN ION

