

Report Number: 208-TRC-04-001
212-TRC-04-001
301-TRC-04-001

Safety Compliance Testing for FMVSS 208
Occupant Crash Protection

Saturn Corporation
2004 Saturn Ion
NHTSA Number: C40113
TRC Inc. Test Number: 040318-1

Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319



Test Date: March 18, 2004
Final Report: March 31, 2004

Prepared For:
U. S. Department of Transportation
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance (NVS-220)
400 Seventh Street, S.W., Room No. 6115
Washington, DC 20590

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.

Test Performed By: John Shultz, Supervisor

Report Approved By:



Walter Dudek, Project Manager
Transportation Research Center Inc.

Date

3/31/04

Final Report Acceptance By OVSC:

Date

Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Vehicle Safety Compliance

1. Report No. 208-TRC-04-001 212-TRC-04-001 301-TRC-04-001	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 208 Compliance Testing of a 2004 Saturn Ion NHTSA No. C40113		5. Report Date March 31, 2004	
		6. Performing Organization Code TRC	
7. Author(s) Walter Dudek, Project Manager Transportation Research Center Inc.		8. Performing Organization Report No. 040318-1	
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-03-D-01002	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Safety Assurance Office of Vehicle Safety Compliance (NVS-220) 400 Seventh Street, S.W., Room 6115 Washington, DC 20590		13. Type of Report and Period Covered Final Report March 2004	
		14. Sponsoring Agency Code NVS-220	
15. Supplemental Notes None			
16. Abstract Compliance tests were conducted on a 2004 Saturn Ion, NHTSA No. C40113, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208-12 for the determination of FMVSS 208 compliance. Possible test failures identified were as follows: None			
17. Key Words Compliance Testing Safety Engineering FMVSS 208		18. Distribution Statement Copies of this report are available from: NHTSA Technical Information Services (TIS) NPO-230 400 Seventh Street, S.W., Room 5108 Washington, DC 20590 Telephone: 202-366-4946	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. Number of Pages 306	22. Price

Table of Contents

<u>Section</u>	<u>Description</u>	<u>Page</u>
Section 1	Purpose of Compliance Test	1-1
Section 2	Tests Performed	2-1
Section 3	Injury Result Summary	3-1
Section 4	Discussion of Test	4-1
Section 5	Test Data Sheets	5-1
Section 6	Test Data (including acceleration and load plots)	6-1
Section 7	Photographs	7-1
Appendix A	Test Equipment List and Calibration Information	A-1
Appendix B	Manufacturer's Information	B-1

List of Data Sheets

<u>Number</u>	<u>Description</u>	<u>Page</u>
1	COTR Work Order	5-2
2	Report of Vehicle Condition	5-6
3	Certification Label and Tire Placard Information	5-8
4	Rear Outboard Seating Position Seat Belts	5-9
5	Air Bag Labels	5-10
6	FMVSS 208 Readiness Indicator	5-19
7	Passenger Manual Cut-Off Device	5-20
8	Lap Belt Lockability	5-23
9	FMVSS 208 Seat Belt Warning System Check (S7.3)	5-29
10	Belt Contact Force (S7.4.3)	5-31
11	Latchplate Access (S7.4.4)	5-37
12	Seat Belt Retraction (S7.4.5)	5-45
13	Seat Belt Guides and Hardware (S7.4.6)	5-51
30	Vehicle Weight, Fuel Tank and Attitude Data	5-54
31	Vehicle Accelerometer Locations	5-58
32	Photographic Targets	5-61
33	Camera Locations	5-67
34	Dummy Positioning Procedures for Test Dummy Conforming to Subpart E of Part 572	5-69
35	Dummy Positioning Measurements	5-77
36	Crash Test	5-83
38	Accident Investigation Measurements	5-84
39	Windshield Mounting (FMVSS 212)	5-86
40	Windshield Zone Intrusion (FMVSS 219)	5-88
41	Fuel System Integrity (FMVSS 301)	5-90

Section 1

Purpose of Compliance Test

PURPOSE

This Federal Motor Vehicle Safety Standard 208 compliance test is part of a program conducted for the National Highway Traffic Safety Administration by Transportation research Center (TRC Inc.) under contract DTNH22-03-D-01002. The purpose of the test was to determine whether the subject vehicle, a 2004 Saturn Ion, NHTSA No. C40113, meets certain performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; indicant FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity". The compliance test was conducted in accordance with OVSC Laboratory Test Procedure No. TP-208-12 dated January 14, 2003.

Section 2

Tests Performed

TESTS PERFORMED

The following checked items indicate the tests that were performed:

- ☒ 1. Rear outboard seating position seat belts (S4.1.4.2(b) & (S4.2.4)
- ☒ 2. Air bag labels (S4.5.1)
- ☒ 3. Readiness indicator (S4.5.2)
- ☒ 4. Passenger Air Bag Manual Cut-Off Device (S4.5.4)
- ☒ 5. Lap belt lockability (S7.1.1.5)
- ☒ 6. Seat belt warning system (S7.3)
- ☒ 7. Seat belt contact force (S7.4.3)
- ☒ 8. Seat belt latch plate access (S7.4.4)
- ☒ 9. Seat belt retraction (S7.4.5)
- ☒ 10. Seat belt guides and hardware (S7.4.6)
- ☐ 11. Suppression tests with 12-month-old CRABI dummy (Part 572, Subpart N)
- ☐ 12. Suppression tests with Newborn infant Subpart K dummy (Part 572, Subpart N)
- ☐ 13. Suppression tests with 3-year-old dummy (Part 572, Subpart P)
- ☐ 14. Suppression tests with 6-year-old dummy (Part 572, Subpart R)
- ☐ 15. Test of Reactivation of the passenger Air Bag system with an Unbelted 5th Percentile female dummy
- ☐ 16. Low risk deployment test with 12-month-old dummy (Part 572, Subpart N)
- ☐ 17. Low risk deployment test with 3-year-old dummy (Part 572, Subpart P)
- ☐ 18. Low risk deployment test with 6-year-old dummy (Part 572, Subpart R)
- ☐ 19. Low risk deployment test with 5th female dummy (Part 572, Subpart O)
- ☒ 20. Impact tests
 - ☐ Frontal Oblique
 - ☐ Belted 50th male dummy driver and passenger (0 to 48 km/h) (S5.1.1.(a))
 - ☐ Unbelted 50th male dummy driver and passenger (0 to 48 km/h) (S5.1.2(a)(1))
 - ☐ Unbelted 50th male dummy driver and passenger (32 to 40 km/h) (S5.1.2(a)(1) or S5.1.2(b))
 - ☒ Frontal 0°
 - ☐ Belted 50th male dummy driver (0 to 48 km/h) (S5.1.1(b)(1) or S5.1.1(a))
 - ☐ Belted 50th male dummy passenger (0 to 48 km/h) (S5.1.1(b)(1) or S5.1.1(a))
 - ☐ Belted 5th female dummy driver (0 to 48 km/h) (S16.1(a))
 - ☐ Belted 5th female dummy passenger (0 to 48 km/h) (S16.1(a))
 - ☐ Belted 50th male dummy driver and passenger (0 to 56 km/h) (S5.1.1(b)(2))
 - ☐ Unbelted 50th male dummy driver and passenger (0 to 48 km/h) (S5.1.2(a)(1))
 - ☒ Unbelted 50th male dummy driver (32 to 40 km/h) (S5.1.2(a)(2) or S5.1.2(b))
 - ☒ Unbelted 50th male dummy passenger (32 to 40 km/h) (S5.1.2(a)(2) or S5.1.2(b))
 - ☐ Unbelted 5th female dummy driver (32 to 40 km/h) (S16.1(b))

- _____ Unbelted 5th female dummy passenger (32 to 40 km/h) (S16.1(b))
- _____ 40% Offset 0° Belted 5th female dummy driver and passenger (0 to 40 km/h) (S18.1)
- _____ 21. Sled test: Unbelted 50th male dummy driver and passenger (S13)
- _____ 22. FMVSS 204 indicant test
- X 23. FMVSS 212 indicant test
- X 24. FMVSS 219 indicant test
- X 25. FMVSS 301 frontal test

For the crash tests, the vehicle was instrumented with 8 accelerometers. The accelerometer data from the vehicle and dummies were sampled at 12,500 samples per second and processed as specified in SAE J211/1 MAR95 and FMVSS 208, S4.13.

The dynamic tests were recorded using high speed film and digital motion picture cameras.

The vehicle appears to meet the performance requirements to which it was tested.

Section 3

Injury Result Summary

INJURY RESULT SUMMARY FOR CRASH TESTS AND/OR LOW RISK DEPLOYMENT TESTS

NHTSA No.: C40113

Test Date: 03/18/04

VIN: 1G8AF52F54Z155463

Frontal Crash ☒ Offset Crash ☐ Low Risk Deployment ☐

Impact Angle: 0

Belted Dummies: ☐ Yes ☒ No

Speed Range: ☒ 32 to 40 km/h ☐ 0 to 48 km/h ☐ 0 to 56 km/h

Test Speed: 40.0 km/h

Driver Dummy: ☐ 5th female ☒ 50th male

Passenger Dummy: ☐ 5th female ☒ 50th male

Test weight: 1426.0 kg

50th Percentile Male Frontal Crash Test
Vehicles certified to S5.1.1(b)(1), S5.1.1(b)(2), S5.1.2(a)(2), or S5.1.2(b)

Injury Criteria	Max. Allowable Injury Assessment Values	Driver	Passenger
HIC15	700	96	154
N _{te}	1.0	0.09	0.31
N _{tf}	1.0	0.28	0.19
N _{ce}	1.0	0.22	0.07
N _{cf}	1.0	0.09	0.06
Neck tension	4170 N	1202	1469
Neck compression	4000 N	1309	390
Chest g	60 g	39.3	34.6
Chest displacement	63 mm	20	9
Left femur	10,000 N	4157	6390
Right femur	10,000 N	5248	5789

Section 4

Discussion of Test

DISCUSSION OF TEST

The following data channels recorded an anomalous data spike at approximately 41 milliseconds:

Driver's Y-axis neck force channel, NEKYF1

Driver's Z-axis neck moment channel, NEKZM1

Driver's Z-axis right femur force channel, RFMZ1

Right front passenger's X-axis neck force channel, NEKXF2

Right front passenger's Y-axis neck force channel, NEKYF2

Right front passenger's Z-axis neck moment channel, NEKZM2

Right front passenger's Z-axis left femur force channel, LFMZF2

The right front passenger's neck moment occipital condyle about the Y-axis was also affected.

Section 5

Test Data Sheets

DATA SHEET 1
COTR Vehicle Work Order

Vehicle model year, make, and model: 2004 Saturn Ion

NHTSA No.: C40113

Test Date: 03/18/04

COTR signature: Charles R. Case

Tests to be performed for this vehicle are checked below.

- ☒ 1. Rear outboard seating position seat belts (S4.1.4.2(b) & (S4.2.4))
☒ 2. Air bag labels (S4.5.1)
☒ 3. Readiness indicator (S4.5.2)
☒ 4. Passenger air bag manual cut-off device (S4.5.4)
☒ 5. Lap belt lockability (S7.1.1.5)
☒ 6. Seat belt warning system (S7.3)
☒ 7. Seat belt contact force (S7.4.3)
☒ 8. Seat belt latch plate access (S7.4.4)
☒ 9. Seat belt retraction (S7.4.5)
☒ 10. Seat belt guides and hardware (S7.4.6)
☐ 11. Suppression tests with 12-month-old CRABI dummy (Part 572, Subpart R) using the following indicated child restraints.

Section B

☐ Britax Handle with Care 191	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Assura 4553	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Avanta SE 41530	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Smart Fit 4543	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Arriva 02727	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Opus 35 02603	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Discovery Adjust Right 212	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo First Choice 204	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo On My Way Position Right V 282	☐ Full rearward	☐ Mid position	☐ Full forward
☐ Graco Infant 8457	☐ Full rearward	☐ Midposition	☐ Full forward

Section C

☐ Britax Roundabout 161	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Encore 4612	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century STE 1000 4416	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Olympian 02803	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Touriva 02519	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Horizon V 425	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Medallion 254	☐ Full rearward	☐ Midposition	☐ Full forward

- ☐ 12. Suppression tests with Newborn infant (Part 572, Subpart K) using the following indicated child restraints.

Section A

☐ Cosco Dream Ride 02-719	☐ Full rearward	☐ Midposition	☐ Full forward
--	--	--------------------------------------	---------------------------------------

- ☐ 13. Suppression tests with 3-year-old dummy (Part 572, Subpart P) using the following indicated child restraints where a child restraint is required.

Section C

☐ Britax Roundabout 161	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Encore 4612	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century STE 1000 4416	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Olympian 02803	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Touriva 02519	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Horizon V 425	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Medallion 254	☐ Full rearward	☐ Midposition	☐ Full forward

Section D

☐ Britax Roadster 9004	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Next Step 4920	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco High Back Booster 02-442	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Right Fit 245	☐ Full rearward	☐ Midposition	☐ Full forward

- ☐ 14. Suppression tests with representative 3-year-old child using the following indicated child restraints where a child restraint is required. (TP-208-12 Appendix H, Data Sheet 16H and 17H)

Section C

☐ Britax Roundabout 161	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Encore 4612	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century STE 1000 4416	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Olympian 02803	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco Touriva 02519	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Horizon V 425	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Medallion 254	☐ Full rearward	☐ Midposition	☐ Full forward

Section D

☐ Britax Roadster 9004	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Next Step 4920	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco High Back Booster 02-442	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Right Fit 245	☐ Full rearward	☐ Midposition	☐ Full forward

- ☐ 15. Suppression tests with 3-year-old dummy (Part 572, Subpart P) in the following positions

- ☐ Sitting on seat with back against seat back (S22.2.2.1)
- ☐ Sitting on seat with back against reclined seat back (S22.2.2.2)
- ☐ Sitting on seat with back not against seat back (S22.2.2.3)
- ☐ Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)
- ☐ Standing on seat, facing forward (S22.2.2.5)
- ☐ Kneeling on seat facing forward (S22.2.2.6)
- ☐ Kneeling on seat facing rearward (S22.2.2.7)
- ☐ Lying on seat (S22.2.2.8)

- ☐ 16. Suppression tests with representative 3-year-old child in the following positions

- ☐ Sitting on seat with back against seat back (S22.2.2.1)
- ☐ Sitting on seat with back against reclined seat back (S22.2.2.2)
- ☐ Sitting on seat with back not against seat back (S22.2.2.3)
- ☐ Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)
- ☐ Standing on seat, facing forward (S22.2.2.5)
- ☐ Kneeling on seat facing forward (S22.2.2.6)
- ☐ Kneeling on seat facing rearward (S22.2.2.7)
- ☐ Lying on seat (S22.2.2.8)

- ☐ 17. Suppression tests with 6-year-old dummy (Part 572, Subpart N) using the following indicated child restraints where a child restraint is required.

Section D

☐ Britax Roadster 9004	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Next Step 4920	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco High Back Booster 02-442	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Right Fit 245	☐ Full rearward	☐ Midposition	☐ Full forward

- ☐ 18. Suppression tests with representative 6-year-old child using the following indicated child restraints where a child restraint is required.

Section D

☐ Britax Roadster 9004	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Century Next Step 4920	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Cosco High Back Booster 02-442	☐ Full rearward	☐ Midposition	☐ Full forward
☐ Evenflo Right Fit 245	☐ Full rearward	☐ Midposition	☐ Full forward

- ☐ 19. Suppression tests with 6-year-old dummy (Part 572, Subpart N) in the following positions

- ☐ Sitting on seat with back against seat back (S22.2.2.1)
- ☐ Sitting on seat with back against reclined seat back (S22.2.2.2)
- ☐ Sitting on seat edge, spine vertical, hands by the dummy's side (S22.2.2.4)
- ☐ Sitting back in the seat and leaning on the right front passenger door (S24.2.3)

- ____ 20. Suppression tests with representative 6-year-old child in the following positions
 ____ Sitting on seat with back against seat back (S22.2.2.1)
 ____ Sitting on seat with back against reclined seat back (S22.2.2.2)
 ____ Sitting on seat edge, spine vertical, hands by the dummy's side (S22.2.2.4)
 ____ Sitting back in the seat and leaning on the right front passenger door (S24.2.3)
- ____ 21. Test of Reactivation of the Passenger Air Bag System with an Unbelted 5th Percentile Female Dummy (S20.3, 22.3, S24.3) Perform this test after the following suppression test(s): _____

- ____ 22. Test of Reactivation of the Passenger Air Bag System with a representative 5th Percentile Female (S20.3, 22.3, S24.3) Perform this test after the following suppression test(s): _____

- ____ 23. Low risk deployment test with 12-month-old dummy (Part 572, Subpart R) using the following indicated child restraints.
- Section B
- | | | | |
|---|--------------------|-------------------|-------------------|
| ____ Britax Handle with Care 191 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Century Assura 4553 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Century Avanta SE 41530 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Century Smart Fit 4543 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Cosco Arriva 02727 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Cosco Opus 35 02603 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Evenflo Discovery Adjust Right 212 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Evenflo First Choice 204 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Evenflo On My Way Position Right V 282 | ____ Full rearward | ____ Mid position | ____ Full forward |
| ____ Graco Infant 8457 | ____ Full rearward | ____ Midposition | ____ Full forward |
- Section C
- | | | | |
|----------------------------|--------------------|------------------|-------------------|
| ____ Britax Roundabout 161 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Century Encore 4612 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Century STE 1000 4416 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Cosco Olympian 02803 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Cosco Touriva 02519 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Evenflo Horizon V 425 | ____ Full rearward | ____ Midposition | ____ Full forward |
| ____ Evenflo Medallion 254 | ____ Full rearward | ____ Midposition | ____ Full forward |
- ____ 24. Low risk deployment test with 3-year-old dummy (Part 572, Subpart P) in the following positions
 ____ Position 1
 ____ Position 2
- ____ 25. Low risk deployment test with 6-year-old dummy (Part 572, Subpart N) in the following positions
 ____ Position 1
 ____ Position 2
- ____ 26. Low risk deployment test with 5th female dummy (Part 572, Subpart O) in the following positions
 ____ Position 1
 ____ Position 2
- X 27. Impact tests
- ____ Frontal Oblique Test Speed _____
 ____ Belted 50th male dummy driver and passenger ((0 to 48 km/h) (S5.1.1.(a))
 ____ Unbelted 50th male dummy driver and passenger ((0 to 48 km/h) (S5.1.2(a)(1))
 ____ Unbelted 50th male dummy driver and passenger ((32 to 40 km/h) (S5.1.2(a)(1) or S5.1.2(b))
- X Frontal 0° Test Speed 40 km/h
 ____ Belted 50th male dummy driver ((0 to 48 km/h) (S5.1.1(b)(1) or S5.1.1(a))
 ____ Belted 50th male dummy passenger ((0 to 48 km/h) (S5.1.1(b)(1) or S5.1.1(a))
 ____ Belted 5th female dummy driver ((0 to 48 km/h) (S16.1(a))
 ____ Belted 5th female dummy passenger ((0 to 48 km/h) (S16.1(a))
 ____ Belted 50th male dummy driver and passenger ((0 to 56 km/h) (S5.1.1(b)(2))

- ☐ Unbelted 50th male dummy driver and passenger ((0 to 48 km/h) (S5.1.2(a)(1))
- ☒ Unbelted 50th male dummy driver ((32 to 40 km/h) (S5.1.2(a)(2) or S5.1.2(b))
- ☒ Unbelted 50th male dummy passenger (32 to 40 km/h) (S5.1.2(a)(2) or S5.1.2(b))
- ☐ Unbelted 5th female dummy driver (32 to 40 km/h) (S16.1(b))
- ☐ Unbelted 5th female dummy passenger (32 to 40 km/h) (S16.1(b))
- ☐ 40% Offset 0° Belted 5th female dummy driver and passenger (0 to 40 km/h) (S18.1)

Test Speed _____

- ☐ 28. Sled test: Unbelted 50th male dummy driver and passenger (S13)
- ☐ 29. FMVSS 204 indicant test
- ☒ 30. FMVSS 212 test
- ☒ 31. FMVSS 219 indicant test
- ☒ 32. FMVSS 301 frontal test

DATA SHEET 2

Page 1 of 2

REPORT OF VEHICLE CONDITION

CONTRACT NO. DTNH22-03-D-01002 Date: 03/18/04
FROM: Transportation Research Center Inc., Walter Dudek
Lab & rep name
TO: Charles R. Case OVSC, NSA-31
COTR Name
PURPOSE: () Initial Receipt () Received via Transfer (X) Present vehicle condition
MODEL YEAR/MAKE/MODEL/BODY STYLE: 2004/Saturn/Ion/4-door
MANUFACTURE DATE: 11/03 NHTSA NO.: C40113 BODY COLOR: Red
VIN: 1G8AF52F54Z155463 GVWR 1661 GAWR (Fr) 850 GAWR (Rr) 811
ODOMETER READINGS: ARRIVAL 81 miles DATE 2/24/2004
COMPLETION 81 miles DATE 03/18/04
PURCHASE PRICE: \$ 10,650 DEALER'S NAME: Saturn of Dayton North

- A. All options listed on "window sticker" are present on the test vehicle.
X Yes ___ No
- B. Tires and wheel rims are new and the same as listed.
X Yes ___ No
- C. There are no dents or other interior or exterior flaws.
X Yes ___ No
- D. The vehicle has been properly prepared and is in running condition.
X Yes ___ No
- E. Keyless remote is available and working.
X Yes ___ No
- F. The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys.
___ Yes X No
- G. Proper fuel filler cap is supplied on the test vehicle.
X Yes ___ No
- H. Using permanent marker, identify vehicle with NHTSA number and FMVSS test type(s) on roof line above driver door or for school buses, place a placard with NHTSA number inside the windshield and to the exterior front and rear side of bus.
X Yes ___ No
- I. Place vehicle in storage area.
X Yes ___ No
- J. Inspect the vehicle's interior and exterior, including all windows, seats, doors, etc., To confirm that each system is complete and functional per the manufacturer's specifications. Any damage, misadjustment, or other unusual condition that could influence the test program or test results shall be recorded. Report any abnormal condition to the NHTSA COTR before beginning any test.
X Vehicle OK ___ Conditions reported below in comment section

Identify the letter above to which any of the following comments apply.

Comments: F: Vehicle did not include an extra set of keys.

DATA SHEET 2

Page 2 of 2

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

LIST OF FMVSS TESTS PERFORMED BY THIS LAB:

208, 212, 219 Indicant, 301

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2004/Saturn/Ion/4-door

NHTSA NO. C40113

REMARKS: None

Equipment that is no longer on the test vehicle as noted on previous page: None

Explanation for equipment removal: _____

Test Vehicle Condition: Test vehicle crashed in front as part of FMVSS 208 test.

RECORDED BY: Robert Benavides

DATE: 03/19/04

APPROVED BY: Walter Dudek

DATE: 03/25/04

#####

RELEASE OF TEST VEHICLE

The vehicle described above is released from TRC Inc. to be delivered to _____
(Laboratory) (Laboratory)

Date: _____ Time: _____ Odometer: _____

Lab Representative: _____
Signature Title

Carrier/Customer Representative: _____
Signature Date

DATA SHEET 3
Certification Label and Tire Placard Information

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc.

Test Technician(s): Michael S. Postle

1. Certification Label

Manufacturer Saturn Corporation

Date of Manufacture 11/03

VIN 1G8AF52F54Z155463

Vehicle certified as: X Passenger car MPV Truck Bus

Front axle GAWR 850 kg/1874 lbs.

Rear axle GAWR 811 kg/1787 lbs.

Total GVWR 1661 kg/3661 lbs.

2. Tire Placard

 N/A – Vehicle is not a passenger car and does not have a tire placard.

 This is not a passenger car (see the item 1 above), but all or part of this information is still contained on a vehicle label and is reported here.

Vehicle Capacity Weight 408 kg/899 lbs.

Designated seating capacity front 2

Designated seating capacity rear 3

Total designated seating capacity 5

Recommended cold tire inflation pressure front 210 kPa/30 psi

Recommended cold tire inflation pressure rear 210 kPa/30 psi

Recommended tire size P185/70R14

DATA SHEET 4
REAR OUTBOARD SEATING POSITION SEAT BELTS

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

Do all rear outboard seating positions have type 2 seat belts? Yes X; No _____

If NO, describe the seat belt installed, the seat location, and any other information about the seat that would explain why a type 2 seat belt was not installed.

REMARKS:

DATA SHEET 5
AIR BAG LABELS (S4.5.1)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc.

Test Technician(s): Michael S. Postle

1. Air Bag Maintenance Label and Owner's Manual Instructions: (S4.5.1(a))
 - 1.1 Does the manufacturer recommend periodic maintenance or replacement of the air bag?
☐ Yes (Go to 1.2); ☒ No (Go to 2)
 - 1.2 Does the vehicle have a label specifying air bag maintenance or replacement?
☐ Yes-Pass; ☐ **No-FAIL**
 - 1.3 Does the label contain one of the following?
☐ Yes-Pass; ☐ **No-FAIL**
Check applicable schedule
☐ Schedule on label specifies month and year (Record date _____)
☐ Schedule on label specifies vehicle mileage (Record mileage _____)
☐ Schedule on label specifies interval measured from date on certification label
(Record interval _____)
 - 1.4 Is the label permanently affixed within the passenger compartment such that it cannot be removed without destroying or defacing the label or the sunvisor?
☐ Yes-Pass; ☐ **No-FAIL**
 - 1.5 Is the label lettered in English?
☐ Yes-Pass; ☐ **No-FAIL**
 - 1.6 Is the label in block capitals and numerals?
☐ Yes-Pass; ☐ **No-FAIL**
 - 1.7 Are the letters and numerals at least 3/32 inches high?
☐ height of letters and numerals
☐ Yes-Pass; ☐ **No-FAIL**
 - 1.8 Does the owner's manual set forth the recommended schedule for maintenance or replacement? ☐ Yes-Pass; ☐ **No-FAIL**
2. Does the owner's manual: (S4.5.1(f))
 - 2.1 Include a description of the vehicle's air bag system in an easily understandable format?
☒ Yes-Pass; ☐ **No-FAIL**
 - 2.2 Include a statement that the vehicle is equipped with an air bag and a lap/shoulder belt at the front outboard seating positions?
☒ Yes-Pass; ☐ **No-FAIL**
 - 2.3 Include a statement that the air bag is a supplemental restraint at the front outboard seating positions?
☒ Yes-Pass; ☐ **No-FAIL**
 - 2.4 Emphasize that all occupants, including the driver, should always wear their seat belts whether or not an air bag is also provided at their seating positions to minimize the risk of severe injury or death in the event of a crash?
☒ Yes-Pass; ☐ **No-FAIL**
 - 2.5 Provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to ensure maximum safety protection for those occupants?
☒ Yes-Pass; ☐ **No-FAIL**
 - 2.6 Explain that no objects should be placed over or near the air bag on the steering wheel or on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate?
☒ Yes-Pass; ☐ **No-FAIL**

- 2.7 Is the vehicle certified to meet the requirements of S14.5, S15, S17, S19, S21, S23, and S25? (Obtain the answer to this question from the COTR.) (S4.5.1(f)(2))
 ___ Yes (go to 2.7.1); X No (go to 3)
- 2.7.1 Explain the proper functioning of the advanced air bag system? (S4.5.1(f)(2))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.2 Provide a summary of the actions that may affect the proper functioning of the system? (S4.5.1(f)(2))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.3 Present and explain the main components of the advanced passenger air bag system? (S4.5.1(f)(2)(i))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.4 Explain how the components function together as part of the advanced passenger air bag system? (S4.5.1 (f)(2)(ii))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.5 Contain the basic requirements for proper operation, including an explanation of the actions that may affect the proper functioning of the system? (S4.5.1(f)(2)(iii))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.6 Is the vehicle certified to the requirements of S19.2, S21.2 or S23.2 (automatic suppression)?
 ___ Yes, continue with 2.7.6
 ___ No, go to 2.7.7
- 2.7.6.1 Contain a complete description of the passenger air bag suppression system installed in the vehicle, including a discussion of any suppression zone? (S4.5.1(f)(2)(iv))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.6.2 Discuss the telltale light, specifying its location in the vehicle and explaining when the light is illuminated?
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.7 Explain the interaction of the advanced passenger air bag system with other vehicle components, such as seat belts, seats or other components? (S4.5.1(f)(2)(v))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.8 Summarize the expected outcomes when child restraint systems, children and small teenagers or adults are both properly and improperly positioned in the passenger seat, including cautionary advice against improper placement of child restraint systems? (S4.5.1(f)(2)(vi))
 ___ Yes-Pass; ___ **No-FAIL**
- 2.7.9 Provide information on how to contact the vehicle manufacturer concerning modifications for persons with disabilities that may affect the advanced air bag system? (S4.5.1(f)(2)(vii))
 ___ Yes-Pass; ___ **No-FAIL**
3. Sun Visor Air Bag Warning Label (S4.5.1 (b)) Check only one of the following:
X The vehicle is not certified to meet the requirements of S19, S21 and S23. (Obtain the answer to this question from the COTR.) (S4.5.1(b)(1)) Go to 3.1 and skip 3.2 and 3.3
 ___ The vehicle is certified to meet the requirements of S19, S21 and S23 before 9/1/03. (Obtain the answer to this question from the COTR.) (S4.5.1(b)(2)) Go to 3.2 and skip 3.1 and 3.3
 ___ The vehicle is certified to meet the requirements of S19, S21 and S23 on 9/1/03 or later. (Obtain the answer to this question from the COTR.) (S4.5.1(b)(3)) Go to 3.3 and skip 3.1 and 3.2
- 3.1 Vehicles not certified to meet the requirements of S19, S21 and S23
- 3.1.1 Is the label permanently affixed (including permanent marking on the visor material or molding into the visor material) to either side of the sun visor at each front outboard seating position such that it cannot be removed without destroying or defacing the label or the sun visor? (S4.5.1 (b)(1))
 Driver side X Yes-Pass ___ **No-FAIL**
 Passenger side X Yes-Pass ___ **No-FAIL**

- 3.1.2 Does the label conform in content to the label shown in either Figure 6a or 6b (Figure 6b is for vehicles with passenger air bag on-off switches), as appropriate, at each front outboard seating position? (S4.5.1 (b)(1)) **(Vehicles without back seats may omit the statement: “The BACK SEAT is the SAFEST place for children.” (S4.5.1(b)(1)(iv)))**
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.1.3 Is the label heading area yellow with the word “WARNING” and the alert symbol in black? (S4.5.1 (b)(1)(i))
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.1.4 Is the message area white with black text? (S4.5.1(b)(1)(ii))
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.1.5 Is the message area at least 30 cm²? (S4.5.1(b)(1)(ii))
 Driver side: Length 10.0 cm, Width 3.0 cm
 Passenger side: Length 10.0 cm, Width 3.0 cm
 Driver actual message area 30 cm²
 Passenger actual message area 30 cm²
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.1.6 Is the pictogram black on a white background? (S4.5.1(b)(2)(iii))
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.1.7 Is the pictogram at least 30 mm in diameter? (S4.5.1(b)(2)(iii))
 Actual diameter 30 mm
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.2 Vehicles certified to meet the requirements of S19, S21, and S23 before 9/1/03. (S4.5.1(b)(2))
- 3.2.1 Is the label permanently affixed (including permanent marking on the visor material or molding into the visor material) to either side of the sun visor at each front outboard seating position such that it cannot be removed without destroying or defacing the label or the sun visor? (S4.5.1 (b)(2))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.2.2 Does the label conform in content to the label shown in Figure 8 or Figure 11 at each front outboard seating position? (S4.5.1(b)(2)) **(Vehicles without back seats may omit the statement: “The BACK SEAT is the SAFEST place for children.” (S4.5.1(b)(2)(1v)) Vehicles without back seats or the back seat is too small to accommodate a rear-facing child restraint may omit the statement “Never put a rear-facing child seat in the front.” (S4.5.1(b)(2)(v)))**
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.2.3 Is the label heading area yellow with the word “WARNING” and the alert symbol in black? (S4.5.1 (b)(2)(i))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.2.4 Is the message area white with black text? (S4.5.1 (b)(2)(ii))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**

- 3.2.5 Is the message area at least 30 cm²? (S4.5.1 (b)(2)(ii))
 Driver side: Length _____, Width _____
 Passenger side: Length _____, Width _____
 Driver actual message area _____ cm²
 Passenger actual message area _____ cm²
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.2.6 Is the pictogram black with a red circle and slash on a white background? (S4.5.1(b)(2)(iii))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.2.7 Is the pictogram at least 30 mm (1.2 in.) in length? (S4.5.1 (b)(2)(iii))
 Driver side: Length _____
 Passenger side: Length _____
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.3 Vehicles certified to meet the requirements of S19, S21, and S23 on 9/1/03 and later (S4.5.1(b)(3)).
- 3.3.1 Is the label permanently affixed (including permanent marking on the visor material or molding into the visor material) to either side of the sun visor at each front outboard seating position such that it cannot be removed without destroying or defacing the label or the sun visor? (S4.5.1 (b)(3))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.3.2 Does the label conform in content to the label shown in Figure 11 at each front outboard seating position? (S4.5.1 (b)(2)) (**Vehicles without back seats may omit the statement: “The BACK SEAT is the SAFEST place for children.” (S4.5.1(b)(3)(iv)) Vehicles without back seats or the back seat is too small to accommodate a rear-facing child restraint may omit the statement “Never put a rear-facing child seat in the front.” (S4.5.1(b)(3)(v))**)
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.3.3 Is the label heading area yellow with the word “WARNING” and the alert symbol in black? (S4.5.1 (b)(3)(i))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.3.4 Is the message area white with black text? (S4.5.1 (b)(3)(ii))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.3.5 Is the message area at least 30 cm²? (S4.5.1 (b)(3)(ii))
 Driver side: Length _____, Width _____
 Passenger side: Length _____, Width _____
 Driver actual message area _____ cm²
 Passenger actual message area _____ cm²
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.3.6 Is the pictogram black with a red circle and slash on a white background? (S4.5.1(b)(3)(iii))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 3.3.7 Is the pictogram at least 30 mm in length? (S4.5.1 (b)(3)(iii))
 Driver side: Length _____
 Passenger side: Length _____
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**

- 3.4 Is the same side of the sun visor that contains the air bag warning label free of other information with the exception of the air bag maintenance label and/or the rollover-warning label? (S4.5.1 (b)(5)(i))
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.5 Is the sun visor free of other information about air bags or the need to wear seat belts with the exception of the air bag alert label and/or the rollover-warning label? (S4.5.1 (b)(5)(i))
 Driver side ☒ Yes-Pass ☐ **No-FAIL**
 Passenger side ☒ Yes-Pass ☐ **No-FAIL**
- 3.6 Does the driver side visor contain a rollover-warning label on the same side of the visor as the air bag warning label?
☐ Yes (go to 3.6.1; ☒ No (go to 4., skipping 3.6.1 through 3.6.3)
- 3.6.1 Are both the rollover-warning label and the air bag warning label surrounded by a continuous solid-lined border?
☐ Yes (go to 3.6.2 and skip 3.6.3); ☐ No (go to 3.6.3 and skip 3.6.2.)
- 3.6.2 Is the shortest distance from the border of the rollover label to the border of the air bag warning label at least 1 cm? (575.105 (d)(1)(iv)(B))
 _____ actual distance
☐ Yes-Pass; ☐ **No-FAIL**
- 3.6.3 Is the shortest distance from any of the lettering or graphics on the rollover-warning label to any of the lettering or graphics of the air bag warning label at least 3 cm? (575.105 (d)(1)(iv)(A))
 _____ actual distance
☐ Yes-Pass; ☐ **No-FAIL**
4. Air Bag Alert Label (S4.5.1(c)) (A “Rollover Warning Label” or “Rollover Alert Label” may be on the same side of the driver’s sun visor as the “Air Bag Alert Label.” 575.105(d))
- 4.1 Is the Sun Visor Warning Label visible when the sun visor is in the stowed position?
 Driver side ☒ Yes ☐ No
 Passenger side ☒ Yes ☐ No
If yes for driver and passenger go to 5.
- 4.2 Is the air bag alert label permanently affixed (including permanent marking on the visor material or molding into the visor material) to the sun visor at each front outboard seating position such that it cannot be removed without destroying or defacing the label or the sun visor? (S4.5.1 (c))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 4.3 Is the air bag alert label visible when the visor is in the stowed position? (S4.5.1(c))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 4.4 Does the label conform in content to the label shown in Figure 6c? (S4.5.1(c))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 4.5 Is the message area black with yellow text? (S4.5.1(c)(1))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 4.6 Is the message area at least 20 cm²? (S4.5.1(c)(1))
 Driver side: Length _____, Width _____
 Passenger side: Length _____, Width _____
 Driver actual message area _____ cm²
 Passenger actual message area _____ cm²
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**

- 4.7 Is the pictogram black with a red circle and slash on a white background? (S4.5.1(c)(2))
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
- 4.8 Is the pictogram at least 20 mm in diameter? (S4.5.1(c)(2))
 Driver side: diameter _____ mm
 Passenger side: diameter _____ mm
 Driver side ☐ Yes-Pass ☐ **No-FAIL**
 Passenger side ☐ Yes-Pass ☐ **No-FAIL**
5. Label On the Dashboard
- 5.1 Is the vehicle certified to meet the requirements of S19, S21, and S23? **(Obtain the answer to this question from the COTR.)** (S4.5.1(e)(2))
☐ Yes (go to 5.1.1 and skip 5.2)
☒ No (go to 5.2, skipping 5.1.1 through 5.1.6)
- 5.1.1 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e)(2))
☐ Yes-Pass; ☐ **No-FAIL**
- 5.1.2 Is the label clearly visible from all front seating positions? (S4.5.1(e)(2))
☐ Yes-Pass; ☐ **No-FAIL**
- 5.1.3 Does the label conform in content to the label shown in Figure 9? (S4.5.1(e)(2)) **(Vehicles without back seats may omit the statement: “The back seat is the safest place for children.” (S4.5.1(e)(2)(iii)))**
☐ Yes-Pass; ☐ **No-FAIL**
- 5.1.4 Is the heading area yellow with black text? (S4.5.1(e)(2)(i))
☐ Yes-Pass; ☐ **No-FAIL**
- 5.1.5 Is the message white with black text? (S4.5.1(e)(2)(ii))
☐ Yes-Pass; ☐ **No-FAIL**
- 5.1.6 Is the message area at least 30 cm²? (S4.5.1(e)(2)(ii))
 Length _____ mm, Width _____ mm
 Actual message area _____ cm²
☐ Yes-Pass; ☐ **No-FAIL**
- 5.2 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e)(1))
☒ Yes-Pass; ☐ **No-FAIL**
- 5.2.1 Is the label clearly visible from all front seating positions? (S4.5.1(e)(1))
☒ Yes-Pass; ☐ **No-FAIL**
- 5.2.2 Does the label conform in content to the label shown in Figure 7? (S4.5.1 (e)(1)(iii))?
(Vehicles without back seats may omit the statement: “The back seat is the safest place for children 12 and under.” (S4.5.1(e)(2)(iii)))
☒ Yes-Pass; ☐ **No-FAIL**
- 5.2.3 Is the heading area yellow with the word “WARNING” and the alert symbol in black? (S4.5.1 (e)(1)(i))
☒ Yes-Pass; ☐ **No-FAIL**
- 5.2.4 Is the message white with black text? (S4.5.1(e)(1)(ii))
☒ Yes-Pass; ☐ **No-FAIL**
- 5.2.5 Is the message area at least 30 cm²? (S4.5.1(e)(1)(ii))
 Length 10.5 cm, Width 3.0 cm
 Actual message area 32 cm²
☒ Yes-Pass; ☐ **No-FAIL**



Figure 6a. Sun Visor Label Visible When Visor is in Down Position.



Figure 6b. Sun Visor Label Visible When Visor is in Down Position.



Figure 6c. Sun Visor Label Visible When Visor is in Up Position.

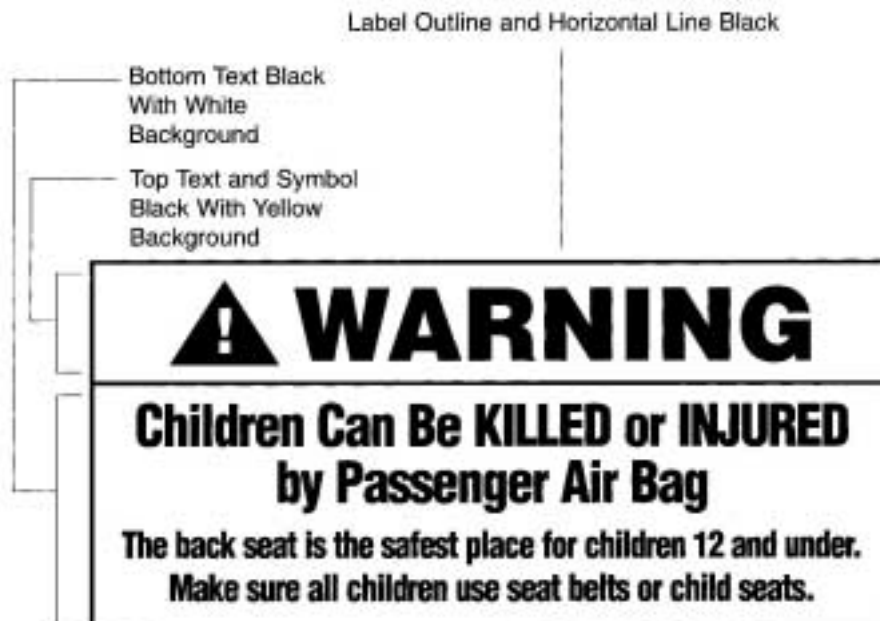


Figure 7. Removable Label on Dash.

Label Outline, Vertical and Horizontal Lines Black

Bottom Text and Artwork Black with
White Background

Top Text Black with
Yellow Background

! WARNING

EVEN WITH ADVANCED AIR BAGS



- Children can be killed or seriously injured by the air bag
- The back seat is the safest place for children
- Always use seat belts and child restraints
- See owner's manual for more information about air bags

Figure 8. Sun Visor Label Visible when Visor
is in Down Position.



Figure 9. Removable Label on Dash.



Figure 11. Sun Visor Label Visible when Visor is in Down Position.

DATA SHEET 6
FMVSS 208 READINESS INDICATOR (S4.5.2)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement. (11/8/94 legal interpretation to Lawrence F. Henneberger on behalf of Breed)

X 1. Is the system totally mechanical? Yes ____; No X
(If YES this Data Sheet is complete.)

X 2. Describe the location of the readiness indicator: Upper right of instrument panel
module

X 3. Is the readiness indicator clearly visible to the driver?
X Yes-Pass; ____ **No-FAIL**

X 4. Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided on a label or in the owner's manual?
X Yes-Pass; ____ **No-FAIL**

X 5. Does the vehicle have an on-off switch for the passenger air bag?
____ Yes (go to 6) X No (this form is complete)

____ 6. Is the air bag readiness indicator off when the passenger air bag switch is in the off position?
____ Yes-Pass; ____ **No-FAIL**

REMARKS:

DATA SHEET 7
Passenger Air Bag Manual Cut-Off Device (S4.5.4)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc.

Test Technician(s): Michael S. Postle

- ☒ 1. Is the vehicle equipped with an on-off switch that deactivates the air bag installed at the right front outboard seating position?
____ Yes, go to 2
☒ No, this sheet is complete
- ____ 2. Does the vehicle have any forward-facing rear designated seating positions? (S4.5.4(a))
____ Yes, go to 3
____ No, go to 4
- ____ 3. Verification of the lack of room for a child restraint in the rear seat behind the driver's seat. (S4.5.4(b))
- ____ 3.1 Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)
____ N/A – No lumbar adjustment
- ____ 3.2. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
____ N/A – No additional support adjustment
- ____ 3.3 If the seat cushion adjusts fore and aft, independent of the seat back, set this adjustment to the full rearward position. (S16.2.10.3.1)
____ N/A – No independent fore-aft seat cushion adjustment
- ____ 3.4. If the seat cushion height adjusts independent of the seat back, set this adjustment to the full down position. (S16.2.10.3.1)
____ N/A – No independent seat cushion height adjustment.
- ____ 3.5. Put the seat in its full rearward position. (S16.2.10.3.1)
____ N/A - the seat does not have a fore-aft adjustment
- ____ 3.6. If the seat height is adjustable, put it in the full down position. (S16.2.10.3.1)
____ N/A – No seat height adjustment
- ____ 3.7 Draw a horizontal reference line on the side of the seat cushion.
- ____ 3.8. Using only the controls that change the seat in the fore-aft direction, mark the fore-aft seat positions. Mark the side of the seat and a reference position directly below on a part of the vehicle that does not adjust. For manual seats, move the seat forward one detent at a time and mark each detent as was done for the full rearward position. For power seats, mark only the full rearward, middle, and full forward positions. Label three of the positions with the following: F for full forward, M for mid-position (if there is no mid position, label the closest adjustment position to the rear of the mid-point), and R for full rearward.
____ N/A - The seat does not have a fore-aft adjustment.
- ____ 3.9. Using only the controls that change the seat in the fore-aft direction, place the seat in the full rearward position and then place the seat in the middle fore-aft position. (S8.1.2)
____ N/A – The seat does not have fore-aft adjustment.
____ Mid position
If there is no mid position, put the seat in the closest adjustment position to the rear of the midpoint. Describe the location of the seat: _____
- ____ 3.10. If seat adjustments, other than fore-aft, are present and the horizontal reference line is no longer horizontal, use those adjustments to maintain the reference line as closely as possible to the horizontal.
____ N/A – No adjustments

- Angle of reference line as tested _____
- ___ 3.11. The seat back angle, if adjustable, is set at the manufacturer's nominal design riding position for a 50th percentile adult male in the manner specified by the manufacturer. (S4.5.4.1 (b) and S8.1.3)
 ___ N/A – No seat back angle adjustment
 Manufacturer's design seat back angle _____
 Tested seat back angle _____
- ___ 3.12 Is the driver seat a bucket seat?
 ___ Yes, go to 3.12.1 and skip 3.12.2.
 ___ No, go to 3.12.2 and skip 3.12.1.
- ___ 3.12.1 Bucket seats:
 ___ 3.12.1.1 Locate and mark a vertical Plane B through the longitudinal centerline of the seat driver's seat cushion. (S22.2.1.3) The longitudinal centerline of a bucket seat cushion is determined at the widest part of the seat cushion. Measure perpendicular to the longitudinal centerline of the vehicle.
 Record the width of the seat. _____ mm
 Record the distance from the edge of the seat to Plane B. _____ mm
 ___ 3.12.1.2 Locate the longitudinal horizontal line in plane B that is tangent to the highest point of the rear seat cushion behind the driver's seat. Measure along this line from the front of the seat back of the rear seat to the rear of the seat back of the driver's seat.
 _____ mm distance
 ___ less than 720 mm – Pass
 ___ more than 720 mm – **FAIL**
 Go to 4
- ___ 3.12.2 Bench seats (including split bench seats):
 ___ 3.12.2.1 Locate and mark a vertical Plane B through the center of the steering wheel parallel to the vehicle longitudinal centerline.
 ___ 3.12.2.2 Locate the longitudinal horizontal line in plane B that is tangent to the highest point of the rear seat cushion. Measure along this line from the front of the seat back of the rear seat to the rear of the seat back of the front seat.
 _____ mm distance
 ___ less than 720 mm – Pass
 ___ more than 720 mm – **FAIL**
 Go to 4
- ___ 4. Does the device turn the air bag on and off using the vehicle's ignition key? (S4.5.4.2)
 ___ Yes-Pass; ___ **No-FAIL**
- ___ 5. Is the on-off device separate from the ignition switch? (S4.5.4.2)
 ___ Yes-Pass; ___ **No-FAIL**
- ___ 6. Is there a telltale light that comes on when the passenger air bag is turned off? (S4.5.4.2)
 ___ Yes-Pass; ___ **No-FAIL**
- ___ 7. Telltale light (S4.5.4.3)
 ___ 7.1 Is the light yellow? S4.5.4.3(a)
 ___ Yes-Pass; ___ **No-FAIL**
- ___ 7.2 Are the words "PASSENGER AIR BAG OFF" (S4.5.4.3(b)) located:
 ___ 7.2.1 on the telltale?
 ___ Yes – Pass, go to 7.3
 ___ No – go to 7.2.2
- ___ 7.2.2 within 25 mm of the telltale? _____ mm from the edge of the telltale light
 ___ Yes-Pass; ___ **No-FAIL**

- ___ 7.3 Does the telltale remain illuminated while the air bag is turned off? (S4.5.4.3c)) (Leave the air bag off for 5 minutes.)
 ___ Yes-Pass; ___ **No-FAIL**
- ___ 7.4 Is the telltale illuminated while the air bag is turned on? (S4.5.4.3(d))
 ___ Yes-Pass; ___ **No-FAIL**
- ___ 7.5 Is the telltale combined with the air bag readiness indicator? (S4.5.3(e))
 ___ **Yes-FAIL**; ___ No-Pass
- ___ 8. Owner's manual
- ___ 8.1 Does the owner's manual contain complete instructions on the operation of the on-off switch? (S4.5.4.4(a))
 ___ Yes-Pass; ___ **No-FAIL**
- ___ 8.2 Does the owner's manual contain a statement that the on-off switch should only be used when a member of one of the following risk groups is occupying the right front passenger seating position? (S4.5.4.4(b))
- Infants: there is no back seat
 the rear seat is too small to accommodate a child restraint
 there is a medical condition that must be monitored constantly
- Children aged 1 to 12: there is no back seat
 space is not always available in the rear seat
 there is a medical condition that must be monitored constantly
- Medical condition: medical risk causes special risk for passenger
 greater risk for harm than with the air bag on
- ___ Yes-Pass; ___ **No-FAIL**
- ___ 8.3 Does the owner's manual contain a warning about the safety consequences of using the on-off switch at other times?
 ___ Yes-Pass; ___ **No-FAIL**

DATA SHEET 8
LAP BELT LOCKABILITY

Passenger cars, trucks, buses, and multipurpose passenger
vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Front Row Right

☐ N/A – No retractor is at this position

☐ N/A – The retractor is an automatic locking retractor ONLY

- ☒ 1. Record test fore-aft seat position. Full Rear (S7.1.1.5 (c)(1))
(Any position is acceptable.)
- ☒ 2. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5 (a))
☒ Yes-Pass; ☐ **No-FAIL**
- ☒ 3. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** require inverting, twisting or deforming of the belt webbing. (S7.1.1.5 (a))
☒ Yes-Pass; ☐ **No-FAIL**
- ☒ 4. Buckle the seat belt. (S7.1.1.5(c)(1))
- ☒ 5. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
- ☒ 6. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒ 7. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
☒ Yes; ☐ No (If yes, go to 7.1. If no, go to 8.)
- ☒ 7.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))
☒ Yes-Pass; ☐ **No-FAIL**
- ☒ 8. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1))
- ☒ 9. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
Measured distance between A and B 44.5 inches
- ☒ 10. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))

- X 11. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
Measured force application angle 10 (spec. 5 - 15 degrees)
- X 12. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
Measured distance between A and B 32.0 inches
- X 13. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
Record onset rate 25 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
Measured distance between A and B 32.2 inches (S7.1.1.5(c)(6))
- X 14. Subtract the measurement in 13 from the measurement in 12. Is the difference 2 inches or less? (S7.1.1.5(c)(7)) 13-12= -0.2 inches;
X Yes-Pass; **No-FAIL**
- X 15. Subtract the measurement in 9 from the measurement in 13. Is the difference 3 inches or more? (S7.1.1.5(c)(8)) 9-13= 12.3 inches;
X Yes-Pass; **No-FAIL**

REMARKS:

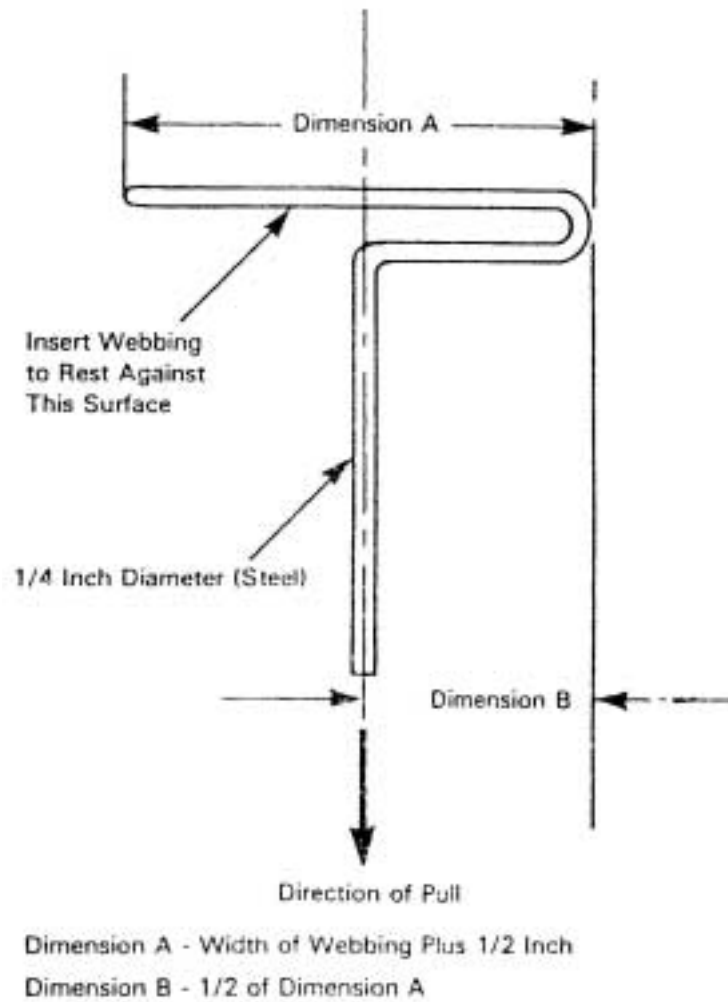


Figure 5. - Webbing Tension Pull Device

DATA SHEET 8
LAP BELT LOCKABILITY

Passenger cars, trucks, buses, and multipurpose passenger
vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Right

 N/A – No retractor is at this position

 N/A – The retractor is an automatic locking retractor ONLY

- X 1. Record test fore-aft seat position. Fixed (S7.1.1.5 (c)(1))
(Any position is acceptable.)
- X 2. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5 (a))
X Yes-Pass; **No-FAIL**
- X 3. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** require inverting, twisting or deforming of the belt webbing. (S7.1.1.5 (a))
X Yes-Pass; **No-FAIL**
- X 4. Buckle the seat belt. (S7.1.1.5(c)(1))
- X 5. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
- X 6. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- X 7. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
X Yes; No (If yes, go to 7.1. If no, go to 8.)
- X 7.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))
X Yes-Pass; **No-FAIL**
- X 8. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1))
- X 9. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
Measured distance between A and B 50.5 inches
- X 10. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))

- X 11. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
Measured force application angle 10 (spec. 5 - 15 degrees)
- X 12. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
Measured distance between A and B 40.5 inches
- X 13. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
Record onset rate 25 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
Measured distance between A and B 40.5 inches (S7.1.1.5(c)(6))
- X 14. Subtract the measurement in 13 from the measurement in 12. Is the difference 2 inches or less? (S7.1.1.5(c)(7)) 13-12= 0 inches;
X Yes-Pass; **No-FAIL**
- X 15. Subtract the measurement in 9 from the measurement in 13. Is the difference 3 inches or more? (S7.1.1.5(c)(8)) 9-13= 10 inches;
X Yes-Pass; **No-FAIL**

REMARKS:

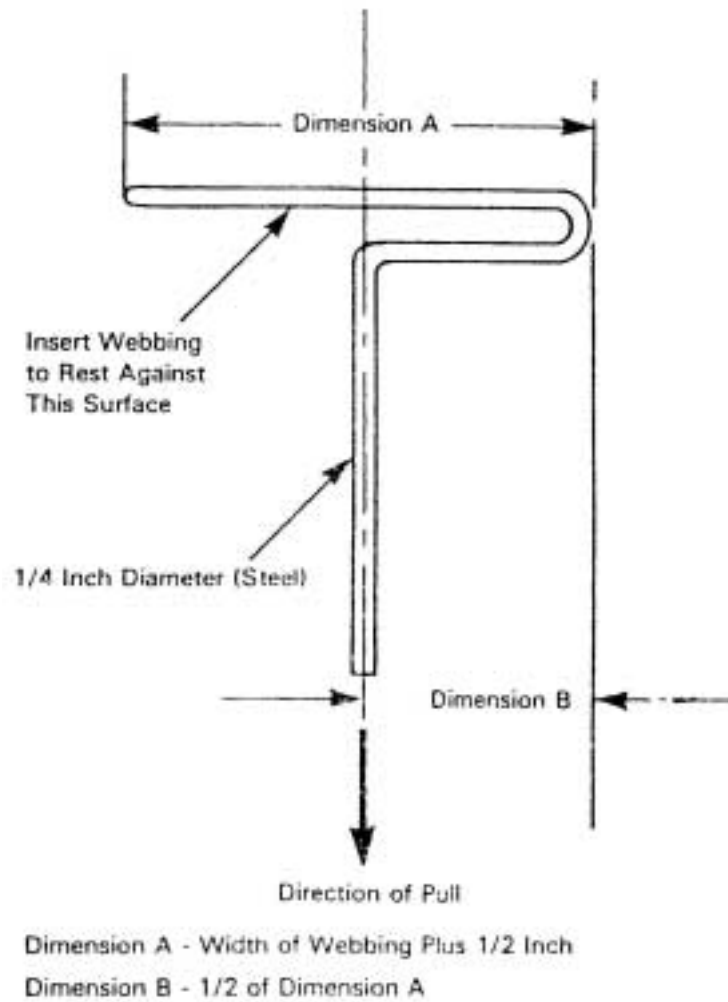


Figure 5. - Webbing Tension Pull Device

DATA SHEET 8

LAP BELT LOCKABILITY

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Center

 N/A – No retractor is at this position

 N/A – The retractor is an automatic locking retractor ONLY

- X 1. Record test fore-aft seat position. Fixed (S7.1.1.5 (c)(1))
(Any position is acceptable.)
- X 2. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5 (a))
X Yes-Pass; **No-FAIL**
- X 3. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** require inverting, twisting or deforming of the belt webbing. (S7.1.1.5 (a))
X Yes-Pass; **No-FAIL**
- X 4. Buckle the seat belt. (S7.1.1.5(c)(1))
- X 5. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
- X 6. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- X 7. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
X Yes; No (If yes, go to 7.1. If no, go to 8.)
- X 7.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))
X Yes-Pass; **No-FAIL**
- X 8. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1))
- X 9. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
Measured distance between A and B 56.5 inches
- X 10. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))

- X 11. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
Measured force application angle 10 (spec. 5 - 15 degrees)
- X 12. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
Measured distance between A and B 41.5 inches
- X 13. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
Record onset rate 25 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
Measured distance between A and B 42.0 inches (S7.1.1.5(c)(6))
- X 14. Subtract the measurement in 13 from the measurement in 12. Is the difference 2 inches or less? (S7.1.1.5(c)(7)) 13-12= -0.5 inches;
X Yes-Pass; **No-FAIL**
- X 15. Subtract the measurement in 9 from the measurement in 13. Is the difference 3 inches or more? (S7.1.1.5(c)(8)) 9-13= 14.5 inches;
X Yes-Pass; **No-FAIL**

REMARKS:

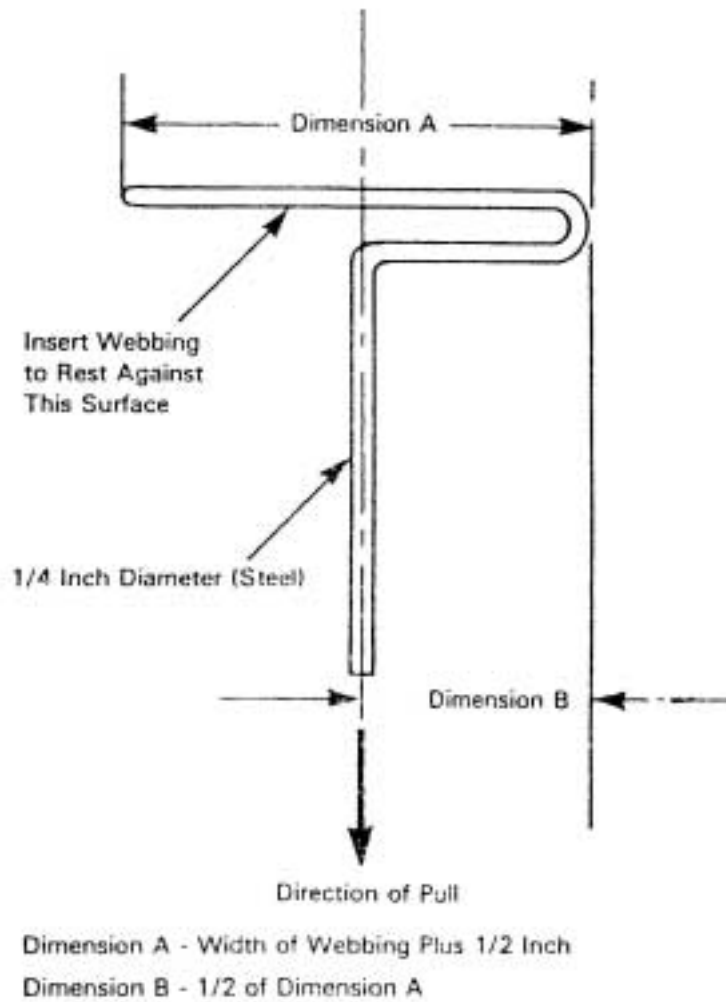


Figure 5. - Webbing Tension Pull Device

DATA SHEET 8

LAP BELT LOCKABILITY

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Left

 N/A – No retractor is at this position

 N/A – The retractor is an automatic locking retractor ONLY

- X 1. Record test fore-aft seat position. Fixed (S7.1.1.5 (c)(1))
(Any position is acceptable.)
- X 2. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5 (a))
X Yes-Pass; **No-FAIL**
- X 3. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does **NOT** require inverting, twisting or deforming of the belt webbing. (S7.1.1.5 (a))
X Yes-Pass; **No-FAIL**
- X 4. Buckle the seat belt. (S7.1.1.5(c)(1))
- X 5. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
- X 6. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- X 7. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
X Yes; No (If yes, go to 7.1. If no, go to 8.)
- X 7.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))
X Yes-Pass; **No-FAIL**
- X 8. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1))
- X 9. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
Measured distance between A and B 50.3 inches
- X 10. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))

- X 11. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
Measured force application angle 10 (spec. 5 - 15 degrees)
- X 12. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
Measured distance between A and B 38.2 inches
- X 13. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
Record onset rate 25 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
Measured distance between A and B 38.6 inches (S7.1.1.5(c)(6))
- X 14. Subtract the measurement in 13 from the measurement in 12. Is the difference 2 inches or less? (S7.1.1.5(c)(7)) 13-12= -0.4 inches;
X Yes-Pass; **No-FAIL**
- X 15. Subtract the measurement in 9 from the measurement in 13. Is the difference 3 inches or more? (S7.1.1.5(c)(8)) 9-13= 11.7 inches;
X Yes-Pass; **No-FAIL**

REMARKS:

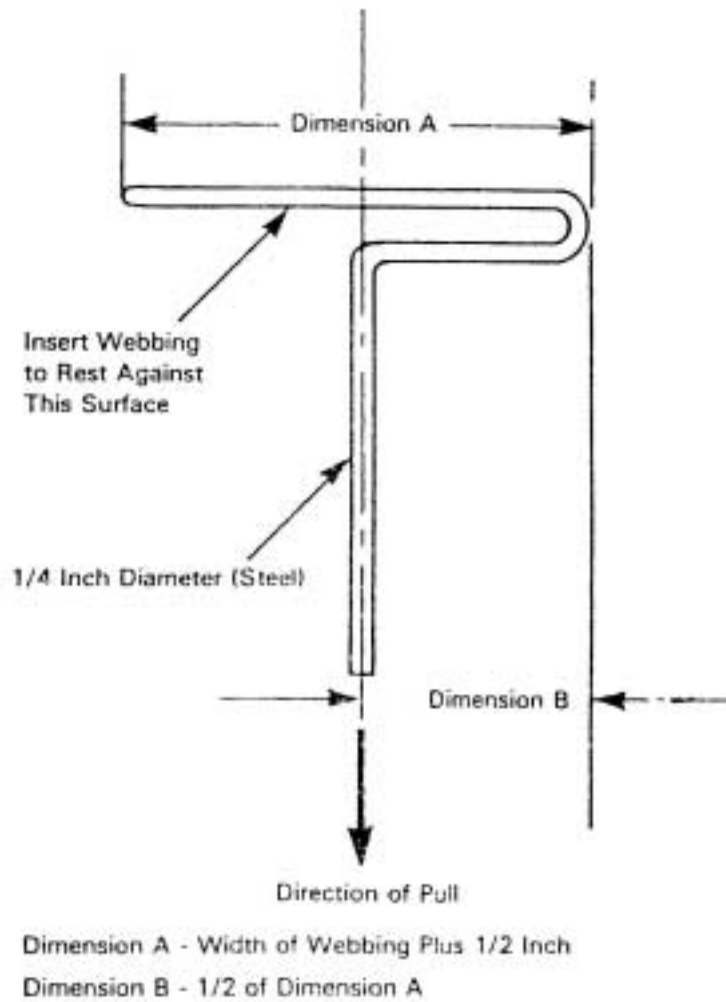


Figure 5. - Webbing Tension Pull Device

DATA SHEET 9
FMVSS 208 SEAT BELT WARNING SYSTEM CHECK (S7.3)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc.

Test Technician(s): Michael S. Postle

- X 1. The occupant is in the driver's seat.
X 2. The seat belt is in the stowed position.
X 3. The key is in the "on" or "start" position.
X 4. The time duration of the audible signal beginning with key "on" or "start" is 7.0 seconds.
X 5. The occupant is in the driver's seat.
X 6. The seat belt is in the stowed position.
X 7. The key is in the "on" or "start" position.
X 8. The time duration of the warning light beginning with key "on" or "start" is 72 seconds.
X 9. The occupant is in the driver's seat.
X 10. The seat belt is in the latched position and with at least 4 inches of belt webbing extended.
X 11. The key is in the "on" or "start" position.
X 12. The time duration of the audible signal beginning with key "on" or "start" is 0 seconds.
X 13. The occupant is in the driver's seat.
X 14. The seat belt is in the latched position and with at least 4 inches of belt webbing extended.
X 15. The key is in the "on" or "start" position.
X 16. The time duration of the warning light beginning with key "on" or "start" is 0 seconds.
X 17. Complete the following table with the data from 4, 8, 12 and 16 to determine which option is used

		Warning light	Warning light specification	Audible signal	Audible signal specification*
S7.3 (a)(1)	Belt latched & Key on or start	Item 16 <u>0</u>	0 seconds*	Item 12 <u>0</u>	0 seconds**
	Belt stowed & Key on or start	Item 8 <u>72</u>	60 seconds minimum	Item 4 <u>7.0</u>	4 to 8 seconds
S7.3 (a)(2)	Belt latched & Key on or start	Item 16 <u>0</u>	4 to 8 seconds	Item 12 <u>0</u>	0 seconds**
	Belt stowed & Key on or start	Item 8 <u>72</u>	4 to 8 seconds	Item 4 <u>7.0</u>	4 to 8 seconds

* 49 USCS @ 30124 does NOT allow an audible signal to operate for more than 8 seconds.

** 0 seconds means the light or audible signal are NOT permitted to operate under these conditions.
 See 7/12/00 interpretation to Patrick Raher of Hogan and Hartson

- ☒ 18. The seat belt warning system meets the requirements of (manufacturers may comply with either section)
- ☒ S7.3 (a)(1)
 - ☐ S7.3 (a)(2)
 - ☐ **FAIL** - Does NOT meet the requirements of either option
- ☒ 19. Note wording of visual warning: (S7.3(a)(1) and S7.3(a)(2))
- ☐ Fasten Seat Belts
 - ☐ Fasten Belts
 - ☒ Symbol 101
 - ☐ **FAIL** – Does not use any of the above wording or symbol

DATA SHEET 10
BELT CONTACT FORCE (S7.4.3)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc.

Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Right

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- X 1. Does the vehicle incorporate a webbing tension-relieving device?
 ___ Yes (this form is complete)
 X No (continue with this check sheet)
- X 2. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)
 X N/A – No lumbar adjustment
- X 3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
 X N/A – No additional support adjustment
- X 4. If the seat cushion adjusts fore and aft, independent of the seat back, set this adjustment to the full rearward position. (S16.2.10.3.1)
 X N/A – No independent fore-aft seat cushion adjustment
- X 5. If the seat cushion height adjusts independent of the seat back, set this adjustment to the full down position. (S16.2.10.3.1)
 X N/A – No independent seat cushion height adjustment.
- X 6. Put the seat in its full rearward position. (S16.2.10.3.1)
 X N/A - the seat does not have a fore-aft adjustment
- X 7. If the seat height is adjustable, put it in the full down position. (S16.2.10.3.1)
 X N/A – No seat height adjustment
- X 8 Draw a horizontal reference line on the side of the seat cushion.
- X 9. Using only the controls that change the seat in the fore-aft direction, mark the fore-aft seat positions. Mark the side of the seat and a reference position directly below on a part of the vehicle that does not adjust. For manual seats, move the seat forward one detent at a time and mark each detent as was done for the full rearward position. For power seats, mark only the full rearward, middle, and full forward positions. Label three of the positions with the following: F for full forward, M for mid position (if there is no mid position, label the closest adjustment position to the rear of the mid-point), and R for full rearward.
 X N/A - The seat does not have a fore-aft adjustment.
- X 10. Using only the controls that change the seat in the fore-aft direction, place the seat in the full rearward position and then place the seat in the middle fore-aft position for this test. (S8.1.2)
 ___ Mid position. If there is no mid position, put the seat in the closest adjustment position to the rear of the midpoint. Describe the location of the seat: _____
 X N/A - The seat does not have a fore-aft adjustment.
- X 11. If seat adjustments other than fore-aft are present and the horizontal reference line is no longer horizontal, use those adjustments to maintain the reference line as closely as possible to the horizontal. (S16.2.10.3.2.1)
 X N/A – No adjustments
 Reference line angle as tested _____

- X 12. The seat back angle, if adjustable, is set at the manufacturer's nominal design riding position for a 50th percentile adult male in the manner specified by the manufacturer. (S4.5.4.1 (b) and S8.1.3)
X N/A – No adjustments
Manufacturer's design seat back angle _____
Tested seat back angle _____
- X 13. Position the test dummies according to dummy position placement instructions in Appendix B and include the positioning check sheets.
- X 14. Fasten the seat belt latch.
- X 15. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest.
- X 16. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Using a force measuring gage with a full scale range of no more than 1.5 pounds, measure the contact force perpendicular to the dummy's chest exerted by the belt webbing.
Contact force 0.46 lb.
X 0.0 to 0.7 pounds - Pass
____ greater than 0.7 pounds - FAIL

DATA SHEET 10
BELT CONTACT FORCE (S7.4.3)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Center

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- X 1. Does the vehicle incorporate a webbing tension-relieving device?
 ___ Yes (this form is complete)
 X No (continue with this check sheet)
- X 2. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)
 X N/A – No lumbar adjustment
- X 3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
 X N/A – No additional support adjustment
- X 4. If the seat cushion adjusts fore and aft, independent of the seat back, set this adjustment to the full rearward position. (S16.2.10.3.1)
 X N/A – No independent fore-aft seat cushion adjustment
- X 5. If the seat cushion height adjusts independent of the seat back, set this adjustment to the full down position. (S16.2.10.3.1)
 X N/A – No independent seat cushion height adjustment.
- X 6. Put the seat in its full rearward position. (S16.2.10.3.1)
 X N/A - the seat does not have a fore-aft adjustment
- X 7. If the seat height is adjustable, put it in the full down position. (S16.2.10.3.1)
 X N/A – No seat height adjustment
- X 8 Draw a horizontal reference line on the side of the seat cushion.
- X 9. Using only the controls that change the seat in the fore-aft direction, mark the fore-aft seat positions. Mark the side of the seat and a reference position directly below on a part of the vehicle that does not adjust. For manual seats, move the seat forward one detent at a time and mark each detent as was done for the full rearward position. For power seats, mark only the full rearward, middle, and full forward positions. Label three of the positions with the following: F for full forward, M for mid position (if there is no mid position, label the closest adjustment position to the rear of the mid-point), and R for full rearward.
 X N/A - The seat does not have a fore-aft adjustment.
- X 10. Using only the controls that change the seat in the fore-aft direction, place the seat in the full rearward position and then place the seat in the middle fore-aft position for this test. (S8.1.2)
 ___ Mid position. If there is no mid position, put the seat in the closest adjustment position to the rear of the midpoint. Describe the location of the seat: _____
 X N/A - The seat does not have a fore-aft adjustment.
- X 11. If seat adjustments other than fore-aft are present and the horizontal reference line is no longer horizontal, use those adjustments to maintain the reference line as closely as possible to the horizontal. (S16.2.10.3.2.1)
 X N/A – No adjustments
 Reference line angle as tested _____

- X 12. The seat back angle, if adjustable, is set at the manufacturer's nominal design riding position for a 50th percentile adult male in the manner specified by the manufacturer. (S4.5.4.1 (b) and S8.1.3)
X N/A – No adjustments
Manufacturer's design seat back angle _____
Tested seat back angle _____
- X 13. Position the test dummies according to dummy position placement instructions in Appendix B and include the positioning check sheets.
- X 14. Fasten the seat belt latch.
- X 15. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest.
- X 16. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Using a force measuring gage with a full scale range of no more than 1.5 pounds, measure the contact force perpendicular to the dummy's chest exerted by the belt webbing.
Contact force 0.44 lb.
X 0.0 to 0.7 pounds - Pass
____ greater than 0.7 pounds - FAIL

DATA SHEET 10
BELT CONTACT FORCE (S7.4.3)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc.

Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Left

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- X 1. Does the vehicle incorporate a webbing tension-relieving device?
 ___ Yes (this form is complete)
 X No (continue with this check sheet)
- X 2. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)
 X N/A – No lumbar adjustment
- X 3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
 X N/A – No additional support adjustment
- X 4. If the seat cushion adjusts fore and aft, independent of the seat back, set this adjustment to the full rearward position. (S16.2.10.3.1)
 X N/A – No independent fore-aft seat cushion adjustment
- X 5. If the seat cushion height adjusts independent of the seat back, set this adjustment to the full down position. (S16.2.10.3.1)
 X N/A – No independent seat cushion height adjustment.
- X 6. Put the seat in its full rearward position. (S16.2.10.3.1)
 X N/A - the seat does not have a fore-aft adjustment
- X 7. If the seat height is adjustable, put it in the full down position. (S16.2.10.3.1)
 X N/A – No seat height adjustment
- X 8 Draw a horizontal reference line on the side of the seat cushion.
- X 9. Using only the controls that change the seat in the fore-aft direction, mark the fore-aft seat positions. Mark the side of the seat and a reference position directly below on a part of the vehicle that does not adjust. For manual seats, move the seat forward one detent at a time and mark each detent as was done for the full rearward position. For power seats, mark only the full rearward, middle, and full forward positions. Label three of the positions with the following: F for full forward, M for mid position (if there is no mid position, label the closest adjustment position to the rear of the mid-point), and R for full rearward.
 X N/A - The seat does not have a fore-aft adjustment.
- X 10. Using only the controls that change the seat in the fore-aft direction, place the seat in the full rearward position and then place the seat in the middle fore-aft position for this test. (S8.1.2)
 ___ Mid position. If there is no mid position, put the seat in the closest adjustment position to the rear of the midpoint. Describe the location of the seat: _____
 X N/A - The seat does not have a fore-aft adjustment.
- X 11. If seat adjustments other than fore-aft are present and the horizontal reference line is no longer horizontal, use those adjustments to maintain the reference line as closely as possible to the horizontal. (S16.2.10.3.2.1)
 X N/A – No adjustments
 Reference line angle as tested _____

- X 12. The seat back angle, if adjustable, is set at the manufacturer's nominal design riding position for a 50th percentile adult male in the manner specified by the manufacturer. (S4.5.4.1 (b) and S8.1.3)
X N/A – No adjustments
Manufacturer's design seat back angle _____
Tested seat back angle _____
- X 13. Position the test dummies according to dummy position placement instructions in Appendix B and include the positioning check sheets.
- X 14. Fasten the seat belt latch.
- X 15. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest.
- X 16. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Using a force measuring gage with a full scale range of no more than 1.5 pounds, measure the contact force perpendicular to the dummy's chest exerted by the belt webbing.
Contact force 0.46 lb.
X 0.0 to 0.7 pounds - Pass
____ greater than 0.7 pounds - FAIL

DATA SHEET 11
LATCHPLATE ACCESS (S7.4.4)

NHTSA No.: C40113

Test Date: _____

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: N/A - Passenger car

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- ☐ 1. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (8.1.3)
☐ N/A – No lumbar adjustment
- ☐ 2. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
☐ N/A – No additional support adjustment
- ☐ 3. If the seat cushion adjusts fore and aft, independent of the seat back, set this adjustment to the full rearward position. (S16.2.10.3.1)
☐ N/A – No independent fore-aft seat cushion adjustment
- ☐ 4. If the seat cushion height adjusts independent of the seat back, set this adjustment to the full down position. (S16.2.10.3.1)
☐ N/A – No independent seat cushion height adjustment.
- ☐ 5. Put the seat in its full rearward position. (S16.2.10.3.1)
☐ N/A - the seat does not have a fore-aft adjustment
- ☐ 6. If the seat height is adjustable, put it in the full down position. (S16.2.10.3.1)
☐ N/A – No seat height adjustment
- ☐ 7 Draw a horizontal reference line on the side of the seat cushion
- ☐ 8. Using only the controls that change the seat in the fore-aft direction, mark the fore-aft seat positions. Mark the side of the seat and a reference position directly below on a part of the vehicle that does not adjust. For manual seats, move the seat forward one detent at a time and mark each detent as was done for the full rearward position. For power seats, mark only the full rearward, middle, and full forward positions. Label three of the positions with the following: F for full forward, M for mid-position (if there is no mid position, label the closest adjustment position to the rear of the mid-point), and R for full rearward.
☐ N/A - The seat does not have a fore-aft adjustment.
- ☐ 9. Using only the controls that change the seat in the fore-aft direction, place the seat in the full rearward position and then place the seat in the forwardmost fore-aft position for this test. (S10.7)
- ☐ 10. If seat adjustments, other than fore-aft, are present and the horizontal reference line is no longer horizontal, use those adjustments to maintain the reference line as closely as possible to the horizontal.
☐ N/A – No adjustments
Reference line angle as tested _____

- ___ 11. The seat back angle, if adjustable, is set at the manufacturer's nominal design riding position for a 50th percentile adult male in the manner specified by the manufacturer. (S4.5.4.1 (b) and S8.1.3)
___ N/A – No seat back angle adjustment
Manufacturer's design seat back angle _____
Tested seat back angle _____
- ___ 12. Position the test dummy using the procedures in Appendix A. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position. Note on the Appendix A positioning check sheet any deviations necessary to position the Part 572, Subpart E dummy.) Include the positioning check sheet with this form.
- ___ 13. Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant.
- ___ 14. Attach the inboard reach string to the base of the head following the instructions on Figure 3.
- ___ 15. Attach the outboard reach string to the torso sheath following the instructions on Figure 3.
- ___ 16. Place the latch plate in the stowed position.
- ___ 17. Extend inboard reach string in front of the dummy and then backward and outboard to the latch plate to generate an arc of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?
___ Yes-Pass; ___ No
- ___ 18. Extend outboard reach string in front of the dummy and then backward and outboard to the latch plate to generate an arc of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?
___ Yes-Pass; ___ No
- ___ 19. Is the latch plate within the inboard (item 17) or outboard (item 18) reach envelope?
___ Yes-Pass; ___ **No-FAIL**
- ___ 20. Using the clearance test block, specified in Figure 4, is there sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latch plate or buckle?
___ Yes-Pass; ___ **No-FAIL**

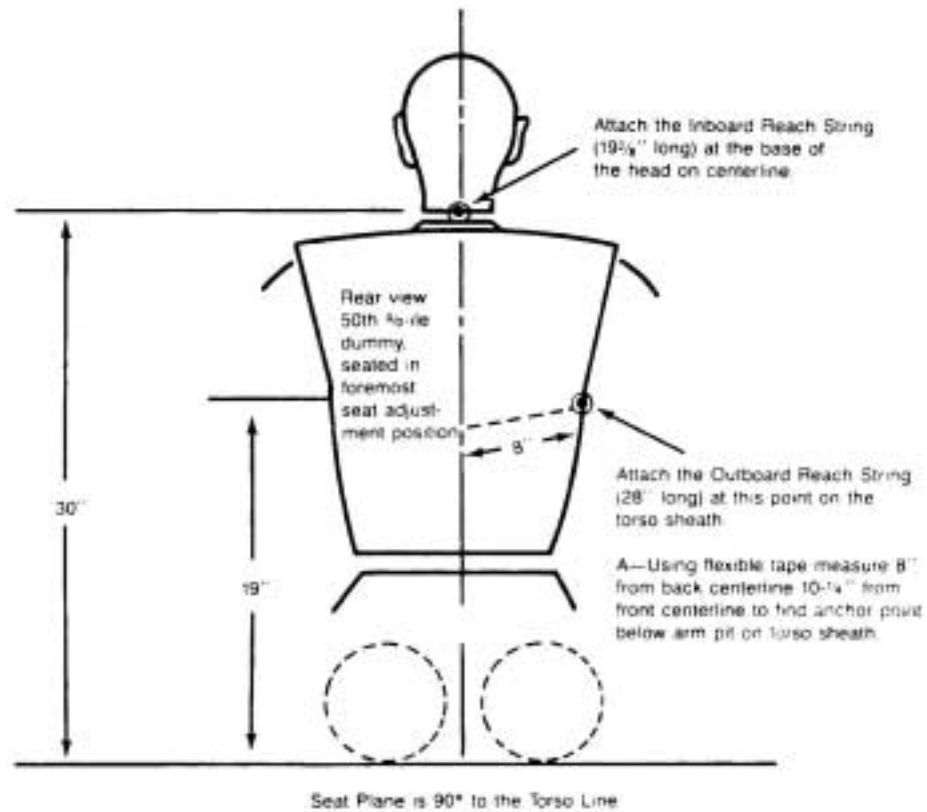


Figure 3. Location of Anchoring Points for Latchplate Reach Limiting Chains or Strings to Test for Latchplate Accessibility Using Subpart E Test Device

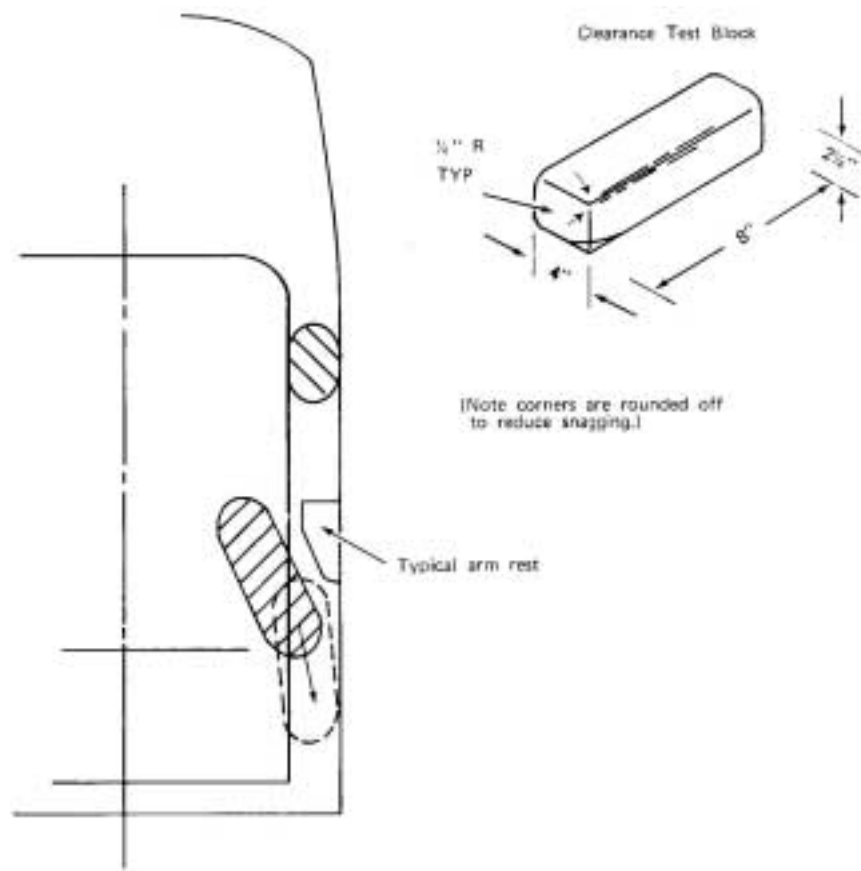


Figure 4—USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS

DATA SHEET 12
SEAT BELT RETRACTION (S7.4.5)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: N/A - Passenger car

GVWR: 1661 kg/3661 lbs.

Test all front outboard seat belts, except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- ☒ 1. Is the vehicle a passenger car or walk-in van-type vehicle?
 ☒ Yes, this form is complete
 ___ No
- ___ 2. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)
 ___ N/A – No lumbar adjustment
- ___ 3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
 ___ N/A – No additional support adjustment
- ___ 4. If the seat cushion adjusts fore and aft, independent of the seat back, set this adjustment to the full rearward position. (S16.2.10.3.1)
 ___ N/A – No independent fore-aft seat cushion adjustment
- ___ 5. If the seat cushion height adjusts independent of the seat back, set this adjustment to the full down position. (S16.2.10.3.1)
 ___ N/A – No independent seat cushion height adjustment.
- ___ 6. Put the seat in its full rearward position.
 ___ N/A - the seat does not have a fore-aft adjustment
- ___ 7. If the seat height is adjustable, put it in the full down position. (S8.1.2)
 ___ N/A – No seat height adjustment
- ___ 7 Draw a horizontal line on the side of the seat cushion.
- ___ 8. Using only the controls that change the seat in the fore-aft direction, mark the fore-aft seat positions. Mark the side of the seat and a reference position directly below on a part of the vehicle that does not adjust. For manual seats, move the seat forward one detent at a time and mark each detent as was done for the full rearward position. For power seats, mark only the full rearward, middle, and full forward positions. Label three of the positions with the following: F for full forward, M for mid-position (if there is no mid position, label the closest adjustment position to the rear of the mid-point), and R for full rearward.
 ___ N/A - The seat does not have a fore-aft adjustment.
- ___ 9. Using only the controls that change the seat in the fore-aft direction, place the seat in the middle fore-aft position. (S8.1.2)
 If there is no mid position, put the seat in the closest adjustment position to the rear of the midpoint. Describe the location of the seat: _____
- ___ 10. If seat adjustments, other than fore-aft, are present and the reference line is no longer horizontal, use those adjustments to maintain the reference line as closely as possible to the horizontal. (S16.2.10.3.2)
 ___ N/A – No seat adjustments
 Reference angle as tested _____

- ___ 11. The seat back angle, if adjustable, is set at the manufacturer's nominal design riding position for a 50th percentile adult male in the manner specified by the manufacturer. (S8.1.3)
 ___ N/A – No seat back angle adjustment
 Manufacturer's design seat back angle _____
 Tested seat back angle _____
- ___ 12. If adjustable, set the head restraint at the full up and full forward position. (S8.1.3) Any adjustment of the head restraint shall be used to position it full forward. For example, if it rotates, rotate it such that the head restraint extends as far forward as possible.
 ___ N/A – No head restraint adjustment
- ___ 13. Place any adjustable seat belt anchorages at the vehicle manufacturer's nominal design position for a 50th percentile adult male occupant (S8.1.3)
 ___ N/A – No adjustable upper seat belt anchorage
 Manufacturer's specified anchorage position. _____
 Tested anchorage position _____
- ___ 14. Is the driver seat a bucket seat?
 ___ Yes, go to 14.1 and skip 14.2.
 ___ No, go to 14.2 and skip 14.1.
- ___ 14.1 Bucket seats:
 Locate and mark a vertical Plane B through the longitudinal centerline of the seat. The longitudinal centerline of a bucket seat cushion is determined at the widest part of the seat cushion. Measure perpendicular to the longitudinal centerline of the vehicle.
 Record the width of the seat. _____ mm
 Record the distance from the edge of the seat to Plane B. _____ mm
- ___ 14.2 Bench seats (including split bench seats):
 ___ Driver seat: Locate and mark a vertical Plane B through the center of the steering wheel parallel to the vehicle longitudinal centerline.
 ___ Passenger seat: Locate and mark a vertical longitudinal Plane B on the seat that is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel.
 Distance from the vehicle centerline to the center of the steering wheel _____
 Distance from the vehicle centerline to Plane B _____
- ___ 15. Stow outboard armrests that are capable of being stowed. (S7.4.5)
- ___ 16. Remove the arms of a Subpart E dummy and place it in the seat such that the midsagittal plane is coincident with Plane B and the upper torso rests against the seat back. (S10.4.1.1 & S10.4.1.2)
- ___ 17. Rest the thighs on the seat cushion.
- ___ 18. Position the H-point of the dummy within 0.5 inch of the vertical dimension and 0.5 inch of the horizontal dimension of a point 0.25 inch below the H-point determined by using the equipment and procedures specified in SAE J826 (APR 1980). (S10.4.2.1) Then measure the pelvic angle with respect to the horizontal using the pelvic angle gage. Adjust the dummy position until these three measurements are within the specifications. (S10.4.2.1 and S10.4.2.2) _____
 ___ horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1) _____
 ___ vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1) _____
 ___ pelvic angle (20° to 25°) (S10.4.2.2) _____
- ___ 19. Set the distance between the outboard knee clevis flange surfaces at 10.6 inches.
 ___ measured distance (10.6 inches) (S10.5)

- ___ 20. To the extent practicable keep the thighs and the legs in a vertical plane (S10.5) and rest the thighs on the seat cushion while resting the feet on the floorpan or toe board.
- ___ 21. Fasten the seat belt around the dummy.
- ___ 22. Remove all slack from the lap belt portion. (S10.9)
- ___ 23. Pull the upper torso webbing out of the retractor and allow it to retract; repeat this four times. (S10.9)
- ___ 24. Apply a 2 to 4 pound tension load to the lap belt. (S10.9)
___ pound load applied
- ___ 25. Is the belt system equipped with a tension relieving device?
___ Yes, continue
___ No, go to 26
- ___ 25.1 Introduce the maximum amount of slack into the upper torso belt that is recommended by the vehicle manufacturer in the vehicle owner's manual. (S10.9). Go to 26.
- ___ 26. Check the statement that applies to this test vehicle:
- ___ 26.1 The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released. ___ Pass
- ___ 26.2 The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released. ___ Pass
- ___ 26.3 Neither A or B apply. ___ **FAIL**
- ___ 27. With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
___ Yes-Pass; ___ **No-FAIL**
- ___ 28. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated?
___ N/A
___ Yes-Pass; ___ **No-FAIL**

DATA SHEET 13
SEAT BELT GUIDES AND HARDWARE (S7.4.6)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Right

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- X 1. Is the seat cushion movable so that the seat back serves a function other than seating? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 2
- X 2. Is the seat removable? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 3
- X 3. Is the seat movable so that the space formerly occupied by the seat can be used for a secondary function? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 4
- X 4. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back? (S7.4.6.1(a))
X Yes; go to 5.
____ No; this form is complete.
- X 5. Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)? (S7.4.6.1(a))
X Yes-Pass; ____ **No-FAIL**
Identify the part(s) on top or above the seat.
X seat belt latch plate; X buckle; X seat belt webbing
- X 6. Are the remaining two seat belt parts accessible under normal conditions?
X Yes-Pass; ____ **No-FAIL**
- X 7. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 8. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat is moved to any position to which it is designed to be adjusted. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 9. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat back, if foldable, is folded forward as far as possible and then moved backward into position. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 10. Is the inboard receptacle end of the seat belt assembly, installed in the front outboard designated seating position, accessible with the center armrest in any position to which it can be adjusted (without moving the armrest)? (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**

DATA SHEET 13
SEAT BELT GUIDES AND HARDWARE (S7.4.6)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc.

Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Center

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- X 1. Is the seat cushion movable so that the seat back serves a function other than seating? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 2
- X 2. Is the seat removable? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 3
- X 3. Is the seat movable so that the space formerly occupied by the seat can be used for a secondary function? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 4
- X 4. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back? (S7.4.6.1(a))
X Yes; go to 5.
____ No; this form is complete.
- X 5. Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)? (S7.4.6.1(a))
X Yes-Pass; ____ **No-FAIL**
Identify the part(s) on top or above the seat.
X seat belt latch plate; X buckle; X seat belt webbing
- X 6. Are the remaining two seat belt parts accessible under normal conditions?
X Yes-Pass; ____ **No-FAIL**
- X 7. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 8. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat is moved to any position to which it is designed to be adjusted. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 9. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat back, if foldable, is folded forward as far as possible and then moved backward into position. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 10. Is the inboard receptacle end of the seat belt assembly, installed in the front outboard designated seating position, accessible with the center armrest in any position to which it can be adjusted (without moving the armrest)? (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**

DATA SHEET 13
SEAT BELT GUIDES AND HARDWARE (S7.4.6)

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): Michael S. Postle

DESIGNATED SEATING POSITION: Second Row Left

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- X 1. Is the seat cushion movable so that the seat back serves a function other than seating? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 2
- X 2. Is the seat removable? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 3
- X 3. Is the seat movable so that the space formerly occupied by the seat can be used for a secondary function? (S7.4.6.1(b))
____ Yes; this form is complete
X No; go to 4
- X 4. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back? (S7.4.6.1(a))
X Yes; go to 5.
____ No; this form is complete.
- X 5. Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)? (S7.4.6.1(a))
X Yes-Pass; ____ **No-FAIL**
Identify the part(s) on top or above the seat.
X seat belt latch plate; X buckle; X seat belt webbing
- X 6. Are the remaining two seat belt parts accessible under normal conditions?
X Yes-Pass; ____ **No-FAIL**
- X 7. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 8. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat is moved to any position to which it is designed to be adjusted. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 9. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat back, if foldable, is folded forward as far as possible and then moved backward into position. (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**
- X 10. Is the inboard receptacle end of the seat belt assembly, installed in the front outboard designated seating position, accessible with the center armrest in any position to which it can be adjusted (without moving the armrest)? (S7.4.6.2)
X Yes-Pass; ____ **No-FAIL**

DATA SHEET 30

VEHICLE WEIGHT, FUEL TANK, AND ATTITUDE DATA

NHTSA No.: C40113

Test Date: 03/16-17/04

Laboratory: TRC Inc. Test Technician(s): R. Benavides, D. Schmitt, B. Miller

Impact Angle: 0° Belted Dummies: Yes X No

Test Speed: X 32 to 40 km/h 0 to 48 km/h 0 to 56 km/h

Driver Dummy: 5th female X 50th male Passenger Dummy: 5th female X 50th male

- X 1. Fill the transmission with transmission fluid to the satisfactory range.
- X 2. Drain fuel from vehicle
- X 3. Run the engine until fuel remaining in the fuel delivery system is used and the engine stops.
- X 4. Record the useable fuel tank capacity supplied by the COTR. 13.6 gallons (51.5 l)
- X 5. Record the fuel tank capacity supplied in the owner's manual. 13.5 gallons
- X 6. Using purple dyed Stoddard solvent having the physical and chemical properties of Type 1 solvent or cleaning fluid, Table 1, ASTM Standard D484-71, "Standard Specifications for Hydrocarbon Dry-cleaning Solvents", or gasoline, fill the fuel tank.
Amount added 12.6 gallons
- X 7. Fill the coolant system to capacity.
- X 8. Fill the engine with motor oil to the max. mark on the dip stick.
- X 9. Fill the brake reservoir with brake fluid to its normal level.
- X 10. Fill the windshield washer reservoir to capacity.
- X 11. Inflate the tires to the tire pressure on the tire placard. If no tire placard is available, inflate the tires to the recommended pressure in the owner's manual.
Tire placard pressure RF 30; LF 30; RR 30; LR 30
Owner's manual pressure RF 30; LF 30; RR 30; LR 30
Actual inflated pressure RF 30; LF 30; RR 30; LR 30
- X 12. Record the vehicle weight at each wheel to determine the unloaded vehicle weight (UVW), i.e. "as delivered" weight).

Right Front = 374.5 kg Right Rear = 249.0 kg

Left Front = 361.0 kg Left Rear = 248.0 kg

TOTAL FRONT = 735.5 kg TOTAL REAR = 497.0 kg

% Total Weight = 59.7 % % Total Weight = 40.3 %

UVW = TOTAL FRONT PLUS TOTAL REAR = 1232.5 kg

- X 13. UVW Test Vehicle Attitude: (all dimensions in millimeters)

- X 13.1 Mark a point on the vehicle above the center of each wheel.

- X 13.2 Place the vehicle on a level surface.

- X 13.3 Measure perpendicular to the level surface to the 4 points marked on the body and record the measurements

RF 709; LF 705; RR 700; LR 698

- X 14. Calculate the Rated Cargo and Luggage Weight (RCLW).
- X 14.1 Does the vehicle have the vehicle capacity weight (VCW) on the certification label or tire placard?
X Yes, go to 14.3.
 ___ No, go to 14.2.
- ___ 14.2 $VCW = \text{Gross Vehicle Weight} - UVW$
 $VCW = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ kg}$
- X 14.3 $VCW = \underline{408} \text{ kg}$
- X 14.4 Does the certification or tire placard contain the Designated Seating Capacity (DSC)?
X Yes, go to 14.6.
 ___ No, go to 14.5 and skip 14.6.
- ___ 14.5 $DSC = \text{Total number of seat belt assemblies} = \underline{\hspace{2cm}}$
- X 14.6 $DSC = \underline{5}$
- X 14.7 $RCLW = VCW - (68 \text{ kg} \times DSC) = \underline{408} - (68 \text{ kg} \times \underline{5}) = \underline{68} \text{ kg}$
- X 14.8 Is the vehicle certified as a truck, MPV or bus (see the certification label on the door jamb)?
 ___ Yes, If the calculated RCLW is greater than 136 kg, use 136 kg as the RCLW (S8.1.1).
X No, use the RCLW calculated in 14.7.
- X 15. Fully Loaded Weight (100% fuel fill)
- X 15.1 Place the appropriate test dummy in both front outboard seating positions.
 Driver: ___ 5th female X 50th male
 Passenger: ___ 5th female X 50th male
- X 15.2 Load the vehicle with the RCLW from 14.7 or 14.8 whichever is applicable.
- X 15.3 Place the RCLW in the cargo area. Center the load over the longitudinal centerline of the vehicle. (S8.1.1 (d))
- X 15.4 Record the vehicle weight at each wheel to determine the Fully Loaded Weight.
- | | |
|--------------------------------|--------------------------------|
| Right Front = <u>416.0</u> kg | Right Rear = <u>328.0</u> kg |
| Left Front = <u>398.0</u> kg | Left Rear = <u>328.5</u> kg |
| TOTAL FRONT = <u>814.0</u> kg | TOTAL REAR = <u>656.5</u> kg |
| % Total Weight = <u>55.4</u> % | % Total Weight = <u>44.6</u> % |
| % GVW = <u>95.8</u> % | % GVW = <u>80.9</u> % |
- FULLY LOADED WEIGHT = TOTAL FRONT + TOTAL REAR = 1470.5 kg
- X 16. Fully Loaded Test Vehicle Attitude: (all dimensions in millimeters)
- X 16.1 Place the vehicle on a level surface.
- X 16.2 Measure perpendicular to the level surface to the 4 points marked on the body (see 13.1 above) and record the measurements
 RF 689; LF 685; RR 660; LR 663
- X 17. Drain the fuel system.
- X 18. Using purple dyed Stoddard solvent having the physical and chemical properties of Type 1 solvent or cleaning fluid, Table 1, ASTM Standard D484-71, "Standard Specifications for Hydrocarbon Dry-cleaning Solvents", fill the fuel tank to 94% of useable capacity.
 Fuel tank capacity x .94 = 12.8 gallons
 Amount added 12.6 gallons

- X 19. Crank the engine to fill the fuel delivery system with Stoddard solvent.
- X 20. Calculate the test weight range.
- X 20.1 Calculated Test Weight = UVW (see 12 above) + RCLW (see 14 above) + 2 x (dummy weight)
- 1452.5 = 1232.5 + 68.0 + 152.0
- X 20.2 Test Weight Range = Calculated Weight (- 4.5 kg, - 9 kg.)
- Max. Test Weight = Calculated Test Weight – 4.5 kg = 1448.0
- Min. Test Weight = Calculated Test Weight – 9 kg = 1443.5
- X 21. Remove the RCLW from the cargo area.
- X 22. Drain transmission fluid, engine coolant, motor oil, and windshield washer fluid from the test vehicle so that Stoddard solvent leakage from the fuel system will be evident.
- X 23. Vehicle Components Removed For Weight Reduction:
- None
-
-
-
-
- X 24. Secure the equipment and ballast in the load carrying area and distribute it, as nearly as possible, to obtain the proportion of axle weight indicated by the gross axle weight ratings and center it over the longitudinal centerline of the vehicle.
- X 25. If necessary, add ballast to achieve the actual test weight.
- N/A
- Weight of ballast 4 kg
- X 26. Ballast, including test equipment, must be contained so that it will not shift during the impact event or interfere with data collection or interfere with high-speed film recordings or affect the structural integrity of the vehicle or do anything else to affect test results. Care must be taken to assure that any attachment hardware added to the vehicle is not in the vicinity of the fuel tank or lines.
- X 27. Record the vehicle weight at each wheel to determine the actual test weight.
- | | | | | | |
|----------------|---|-----------------|----------------|---|-----------------|
| Right Front | = | <u>397.4</u> kg | Right Rear | = | <u>321.2</u> kg |
| Left Front | = | <u>401.2</u> kg | Left Rear | = | <u>324.2</u> kg |
| TOTAL FRONT | = | <u>798.6</u> kg | TOTAL REAR | = | <u>645.4</u> kg |
| % Total Weight | = | <u>55.3</u> % | % Total Weight | = | <u>44.7</u> % |
| % GVW | = | <u>94.0</u> % | % GVW | = | <u>80.0</u> % |
- (%GVW = Axle GVW ÷ Vehicle GVW)
- TOTAL FRONT PLUS TOTAL REAR = 1444.0 kg
- X 28. Is the test weight between the Max. Weight and the Min. Weight (See 20.2)?
- X Yes
- No, explain why not. _____
-
- X 29. Test Weight Vehicle Attitude: (all dimensions in millimeters)
- X 29.1 Place the vehicle on a level surface.
- X 29.2 Measure perpendicular to the level surface to the 4 points marked on the body (see 13.1 above) and record the measurements
- RF 694; LF 692; RR 660; LR 664

X 30. Summary of test attitude

X 30.1

AS DELIVERED: RF 709 ; LF 705 ; RR 700 ; LR 698

AS TESTED: RF 694 ; LF 692 ; RR 660 ; LR 664

FULLY LOADED: RF 689 ; LF 685 ; RR 660 ; LR 663

X 30.2 Is the “as tested” test attitude equal to or between the “fully loaded” and “as delivered” attitude?

X Yes

____ No, explain why not. _____

DATA SHEET 31
Vehicle Accelerometer Location

NHTSA No.: C40113

Test Date: 03/17/04

Laboratory: TRC Inc. Test Technician(s): D. Thomas

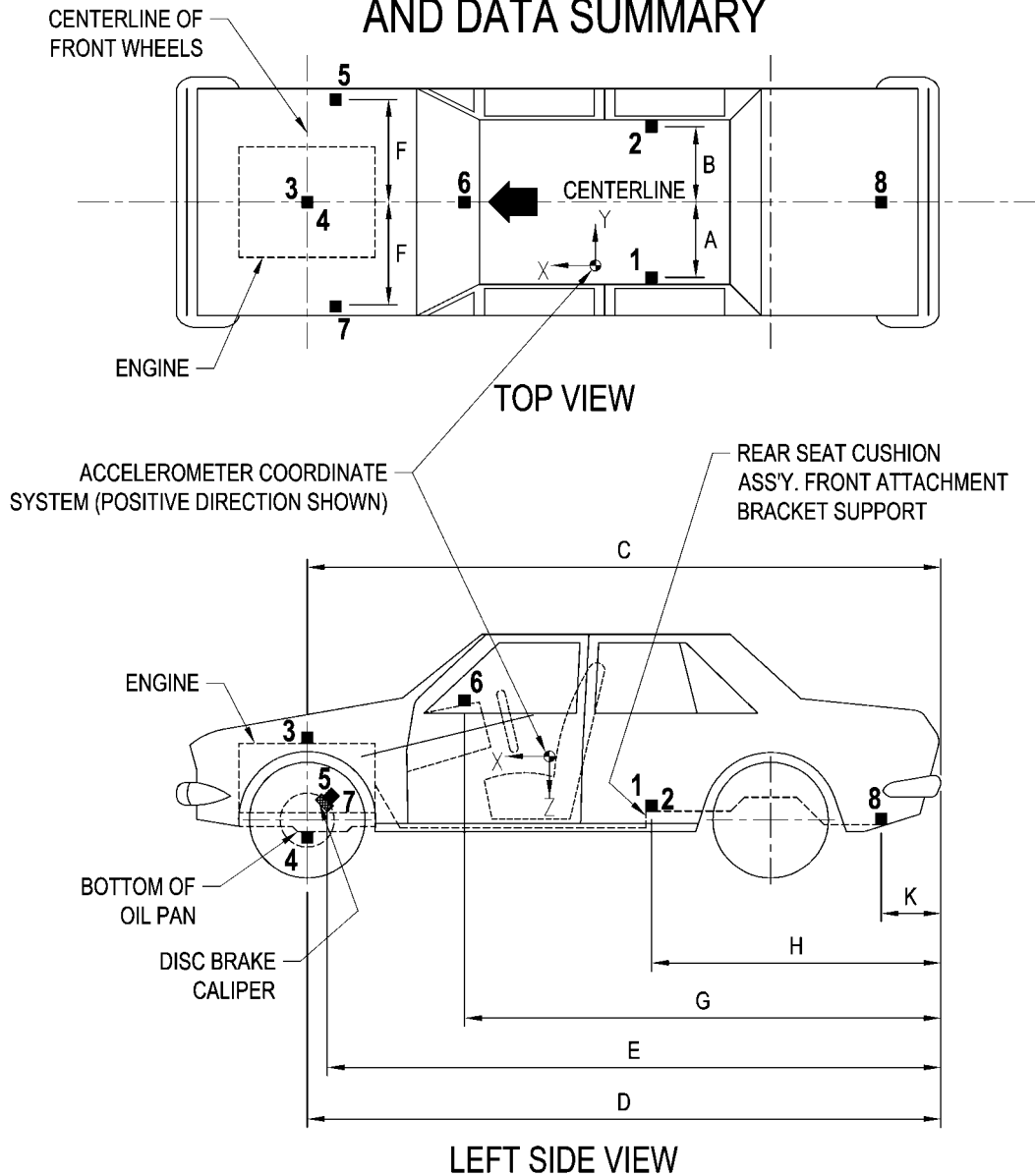
Impact Angle: 0° Belted Dummies: Yes X No

Test Speed: X 32 to 40 km/h 0 to 48 km/h 0 to 56 km/h

Driver Dummy: 5th female X 50th male Passenger Dummy: 5th female X 50th male

- X 1. Find the location where the vertical plane parallel to the longitudinal centerline of the vehicle and through the center of the left front outboard seating position intersects the left rear seat cross member. Install an accelerometer at this intersection on the rear seat cross member to record x-direction accelerations. Record the location on the following chart.
- X 2. Find the location where the vertical plane parallel to the longitudinal centerline of the vehicle and through the center of the right front outboard seating position intersects the right rear seat cross member. Install an accelerometer at this intersection on the rear seat cross member to record x-direction accelerations. Record the location on the following chart.
- X 3. Find the location where a vertical plane through the longitudinal centerline of the vehicle and a vertical transverse plane through the center of the two wheels on opposite sides of the engine intersect at the top of the engine. Install an accelerometer at this intersection to record x-direction accelerations. Record the location on the following chart.
- X 4. Find the location where a vertical plane through the longitudinal centerline of the vehicle and a vertical transverse plane through the center of the two wheels on opposite sides of the engine intersect the bottom of the engine. Install an accelerometer at this intersection to record x-direction accelerations. Record the location on the following chart.
- X 5. Install an accelerometer on the right front brake caliper to record x-direction accelerations. Record the location on the following chart.
- X 6. Find the location where a vertical plane through the longitudinal centerline of the vehicle intersects the top of the instrument panel. Install an accelerometer at this intersection to record x-direction accelerations. Record the location on the following chart.
- X 7. Install an accelerometer on the left front brake caliper to record x-direction accelerations. Record the location on the following chart.
- X 8. Find the location where a vertical plane through the longitudinal centerline of the vehicle intersects the floor of the trunk. Install an accelerometer on the trunk floor at this intersection to record z-direction accelerations. Record the location on the following chart.

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



DIMENSION CORRESPONDING TO THE LETTERS "A" THROUGH "K" ARE RECORDED IN THE TABLE ON THE FOLLOWING PAGE.
ACCELEROMETERS CORRESPONDING TO THE NUMBERS 1 THROUGH 8 ARE SPECIFIED ON THE PRECEDING PAGE.

Dimensions corresponding to the letters "A" through "K" are recorded in the table on the following page.

Accelerometers corresponding to the numbers 1 through 8 are specified on the preceding page.

DATA SHEET 31
VEHICLE ACCELEROMETER LOCATION MEASUREMENTS

<u>DIMENSION</u>	<u>LENGTH (mm)</u>	
<u>PRE-TEST VALUES</u>		
<u>A</u>	330	
<u>B</u>	330	
<u>C</u>	3938	
<u>D</u>	3798	
<u>E</u>	3288 Right Side	3288 Left Side
<u>F</u>	640 Right Side	640 Left Side
<u>G</u>	2990	
<u>H</u>	1858 Right Side	1858 Left Side
<u>K</u>	274	
<u>POST-TEST VALUES</u>		
<u>A</u>	337	
<u>B</u>	327	
<u>C</u>	3738	
<u>D</u>	3678	
<u>E</u>	3631 Right Side	3689 Left Side
<u>F</u>	620 Right Side	690 Left Side
<u>G</u>	2973	
<u>H</u>	1851 Right Side	1829 Left Side
<u>K</u>	274	

REMARKS:

DATA SHEET 32
Photographic Targets

NHTSA No.: C40113

Test Date: 03/18/04

Laboratory: TRC Inc. Test Technician(s): D. Thomas, R. Benavides, B. Miller

Impact Angle: 0° Offset percentage: 0 Belted Dummies: Yes X No

Test Speed: X 32 to 40 km/h 0 to 48 km/h 0 to 56 km/h

Driver Dummy: 5th female X 50th male Passenger Dummy: 5th female X 50th male

1. FMVSS 208 vehicle targeting requirements (See Figures 32A and 32B)
 - X 1.1 Targets A1 and A2 are on flat rectangular panels.
 - X 1.2 Three circular targets at least 90 mm in diameter and with black and yellow quadrants are mounted at the front on the outboard sides of A1 and A2. The center of each circular target is 100 mm from the one next to it. Distance between targets 127 mm
 - X 1.3 Three circular targets at least 90 mm in diameter and with black and yellow quadrants are mounted at the back on the outboard sides of on A1 and A2. The center of each circular target is 100 mm from the one next to it. Distance between targets 127 mm
 - X 1.4 The distance between the first circular target at the front of A1 and A2 and the last circular target at the back of A1 and A2 is at least 915 mm.
Distance between the first and last circular targets 864 mm
 - X 1.5 Firmly fix target A1 on the vehicle roof in the vertical longitudinal plane that is coincident with the midsagittal plane of the driver dummy.
 - X 1.6 Firmly fix target A2 on the vehicle roof in the vertical longitudinal plane that is coincident with the midsagittal plane of the passenger dummy.
 - X 1.7 Two circular targets (C1 and C2) at least 90 mm in diameter and with black and yellow quadrants are mounted on the outside of the driver door. The centers of each circular target are at least 610 mm apart. Distance between targets 610 mm
 - X 1.8 Two circular targets (C1 and C2) at least 90 mm in diameter and with black and yellow quadrants are mounted on the outside of the passenger door. The centers of each circular target are at least 610 mm apart. Distance between targets 610 mm
 - 1.9 Place tape with squares having alternating colors on the top portion of the steering wheel.
 - X 1.10 Chalk the bottom portion of the steering wheel.
 - X 1.11 Is this an offset test?
 - Yes, continue with this section
 - X No, go to 2.
 - 1.12 Measure the width of the vehicle. Vehicle width mm
 - 1.13 Find the centerline of the vehicle. ($\frac{1}{2}$ of the vehicle width)
 - 1.14 Find the line parallel to the centerline of the vehicle and 0.1 x vehicle width from the centerline of the vehicle.
 - 1.15 Apply 25 mm wide tape with alternating black and yellow squares parallel to and on each side of the line found in 1.14. The edge of each tape shall be 50 mm from the line found in 1.14. The tape shall extend from the bottom of the bumper to the front edge of the windshield. (Figure 32D)

2. Barrier targeting
 - ☒ 2.1 Fix two stationary targets D1 and D2 to the barrier as shown in the Figure 32A. One target is in the vertical longitudinal plane that is coincident with the midsagittal plane of the driver dummy. The other is in the vertical longitudinal plane that is coincident with the midsagittal plane of the passenger dummy.
 - ☒ 2.2 Targets D1 and D2 are on a rectangular panel.
 - ☒ 2.3 Three circular targets at least 90 mm in diameter and with black and yellow quadrants are mounted on the sides of the rectangular panel away from the longitudinal centerline of the vehicle. The center of each circular target is 100 mm from the one next to it.
 Distance between circular targets on D1 127 mm
 Distance between circular targets on D2 N/A¹ mm
3. FMVSS 208 dummy targeting requirements
 - ☒ 3.1 Place a circular target with black and yellow quadrants on both sides of the driver dummy head as close as possible to the center of gravity of the head in the x and z direction (relative to the measuring directions of the accelerometers).
 - ☒ 3.2 Place a circular target with black and yellow quadrants on both sides of the passenger dummy head as close as possible to the center of gravity of the head in the x and z direction (relative to the measuring directions of the accelerometers).
 - ☒ 3.3 Place a circular target with black and yellow quadrants on the outboard shoulder of the driver dummy. Place the target as high up on the arm as possible at the intersection of the arm and shoulder. The sleeve of the shirt on the dummy may be cut to make the target visible, but do not remove any material.
 - ☒ 3.4 Place a circular target with black and yellow quadrants on the outboard shoulder of the passenger dummy. Place the target as high up on the arm as possible at the intersection of the arm and shoulder. The sleeve of the shirt on the dummy may be cut to make the target visible, but do not remove any material.
4. FMVSS 204 targeting requirements
 - ☒ 4.1 Is an FMVSS 204 indicant test ordered on the "COTR Vehicle Work Order?"
☐ Yes, continue with this form.
☒ No, this form is complete
 - ☐ 4.2 Resection panel (Figure 32C)
 - ☐ 4.2.1 The panel deviates no more than 6 mm from perfect flatness when suspended vertically.
 - ☐ 4.2.2 The 8 targets on the panel are circular targets at least 90 mm in diameter and with black and yellow quadrants.
 - ☐ 4.2.3 The center of each of the 4 outer targets are placed within 1 mm of the corners of a square measuring 914 mm on each side.
 - ☐ 4.2.4 Locate another square with 228 mm sides and with the center of this square coincident with the center of the 914 mm square.
 - ☐ 4.2.5 The center of the 4 inner targets are placed at the midpoints of each of the 228 mm sides.
 - ☐ 4.3 Place a circular target at least 90 mm in diameter and with black and yellow quadrants on a material (cardboard, metal, etc.) that can be taped to the top of the steering column.
 - ☐ 4.4 Tape the target from 4.3 to the top of the steering column in a manner that does not interfere with the movement of the steering column in a crash.

¹ Fixed stationary target D2 was omitted from this test in error.

REFERENCE PHOTO TARGETS

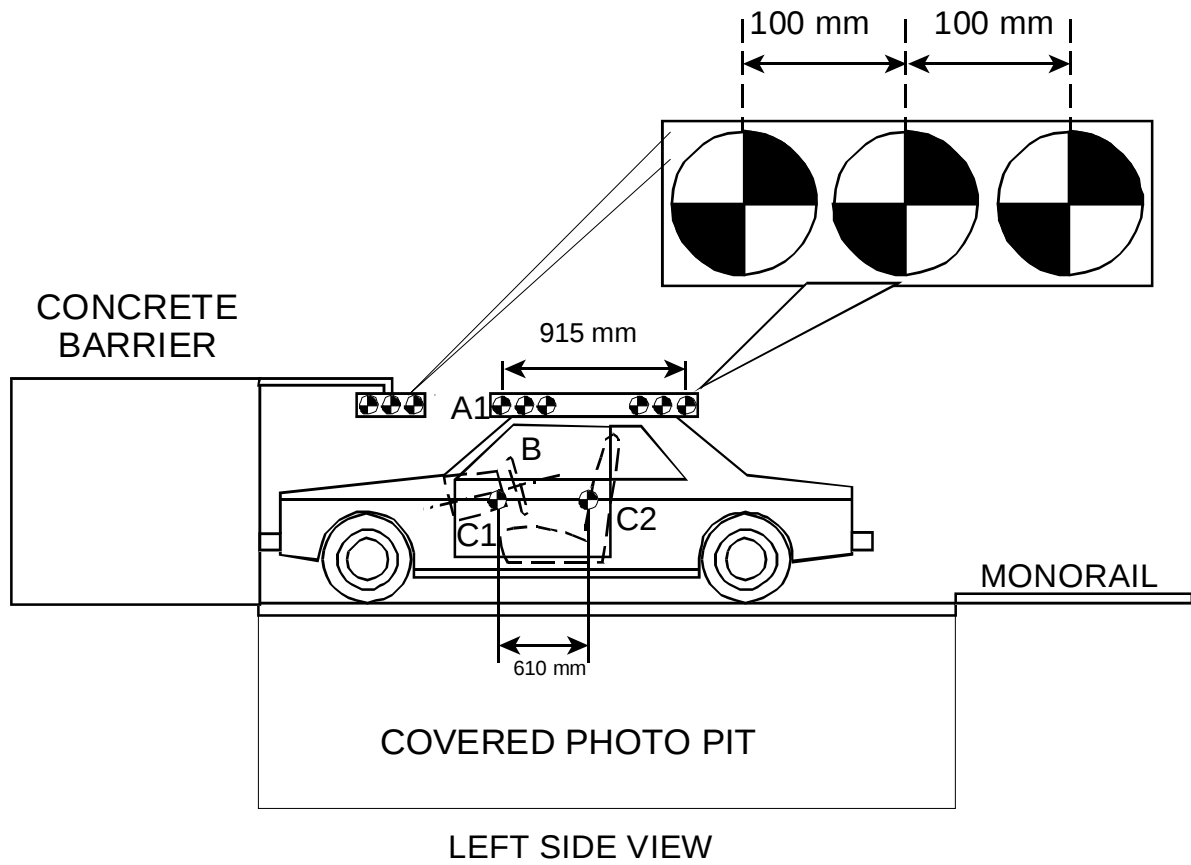
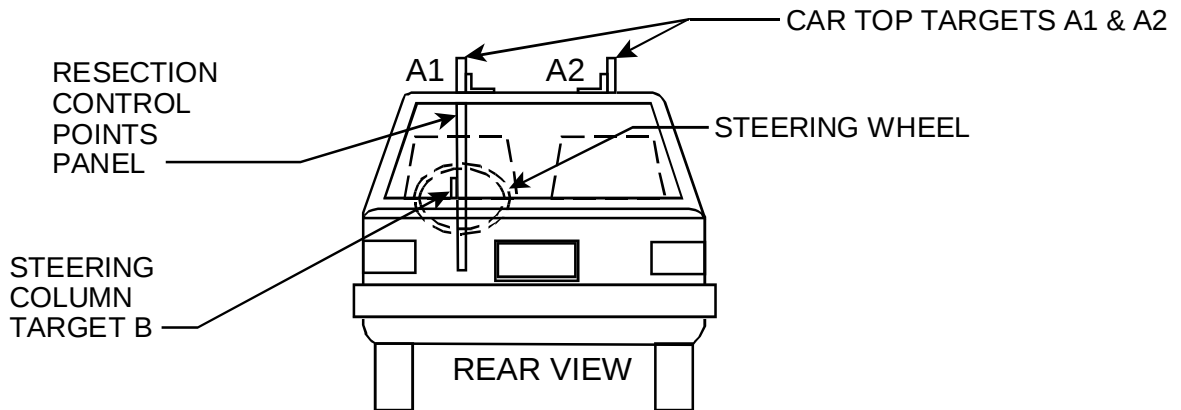


FIGURE 32A

RESECTION PANEL TARGETING ALIGNMENT



TEST RUN STEERING COLUMN CAMERA VIEW OF TYPICAL TIME ZERO VEHICLE POSITION

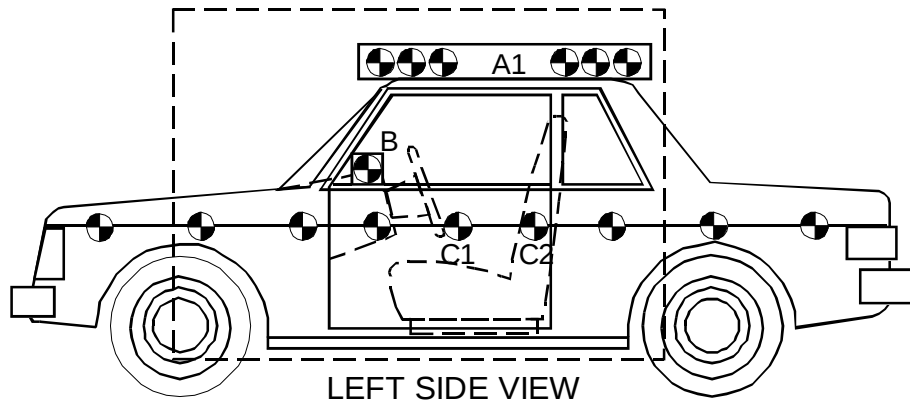
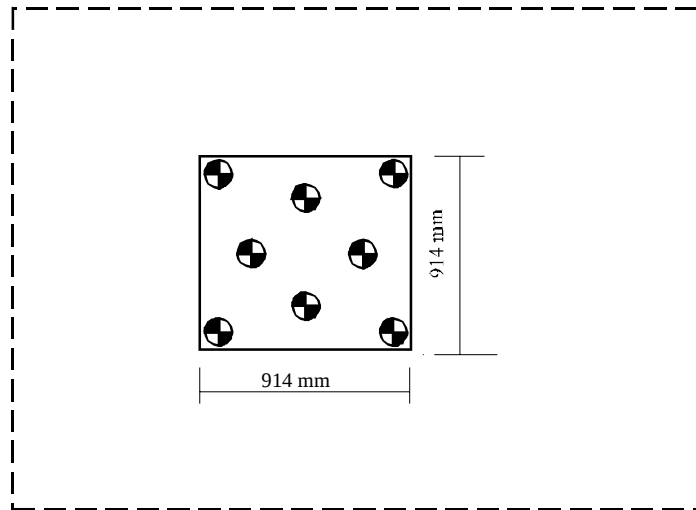


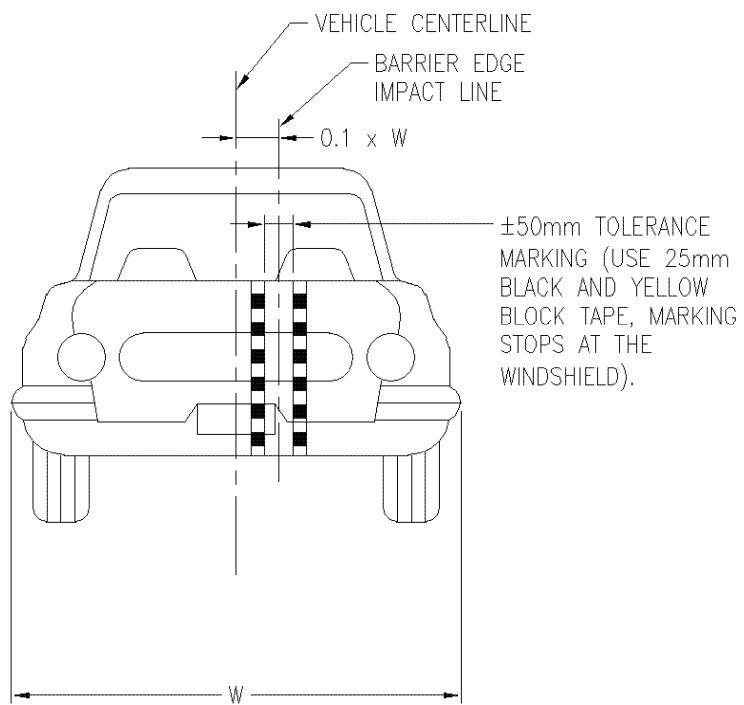
FIGURE 32B

PRE-RUN STEERING COLUMN HIGH SPEED CAMERA VIEW



LEFT SIDE VIEW

FIGURE 32C



OFFSET DEFORMABLE BARRIER
ADDITIONAL VEHICLE TARGETING

FIGURE 32D

DATA SHEET 33
CAMERA LOCATIONS

VEH. NHTSA No.: C40113 ; TEST DATE: 03/18/04 ; TIME: 10:29

VEH. YEAR/MAKE/MODEL/BODY STYLE: 2004/Saturn/Ion/4-door

CAMERA NO.	VIEW	CAMERA POSITIONS (mm) *			ANGLE (deg.)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Left Side View ²							24
2	Left Side View (barrier face to front seat backs) ²	1810	-7350	-950	-2.3	NA ¹	50	1000
3	Left Side View (A-post) ²	1380	-8850	-950	2.1	NA ¹	75	1000
4	Left Side View (B-post aimed toward center of steering wheel) ²	N/A ¹	N/A ¹	N/A ¹	-10	NA ¹	50	1000
5	Left Side View (B-post) ²	1950	-7950	-2260	-14.3	NA ¹	25	1000
6	Left Side View (front door under camera 5) ²	1950	7340	-960	-5.6	NA ¹	Zoom	1000
7	Right Side View (overall) ²	2050	7340	-960	-2.1	NA ¹	20	1000
8	Right Side View (A-post) ²	1030	7060	-940	1.9	NA ¹	75	1000
9	Right Side View (B-post) ²	N/A ¹	N/A ¹	N/A ¹	-9.6	NA ¹	50	1000
10	Right Side View (front door) ²	1530	7800	-1000	-2.0	NA ¹	Zoom	1000
11	Front View Windshield ²	740	0	-5650	-85.4	NA ¹	25	1000
12	Front View Driver ²	0	-350	-2260	-46.9	NA ¹	13	1000
13	Front View Passenger ²	0	350	-2260	-46.3	NA ¹	13	1000
14	Overhead Barrier Impact View ²	340	0	-5650	-88.5	NA ¹	35	1000
15	Pit Camera Engine View	500	0	560	88.8	NA ¹	17	1022
16	Pit Camera Fuel Tank View	2440	100	520	89	NA ¹	17	1010

* +X - film plane forward (downstream) from barrier impact surface

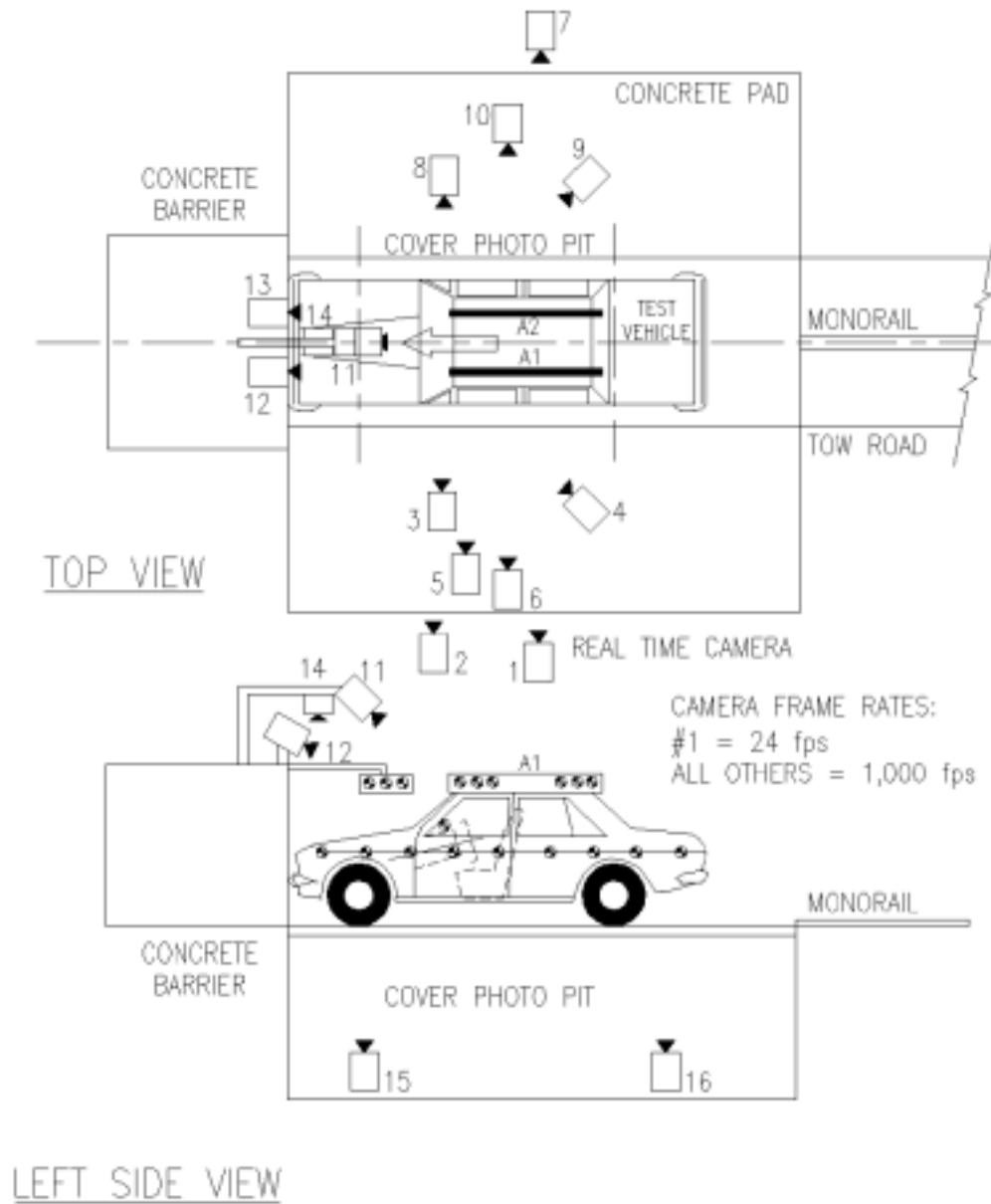
+Y - film plane to right of monorail centerline from driver's perspective

+Z - film plane below ground level

¹ Not recorded

² Digital camera

CAMERA POSITIONS FOR FRONTAL IMPACTS



- X horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.)
(S10.4.2.1) measurement not recorded
- X vertical inches from the point 0.25 below the determined H-point (0.5 inch max.)
(S10.4.2.1) measurement not recorded
- X pelvic angle (20° to 25°) 22.5°
- X 13. Is the head level within $\pm 0.5^\circ$? (S10.1)
- X Yes, go to 14
- No, go to 13.1
- 13.1 Adjust the position of the H-point. (S10.1)
- 13.2 Is the head level within $\pm 0.5^\circ$? (S10.1)
- Yes, record the following, then go to 15. No, go to 13.3
- horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- ° pelvic angle (20° to 25°) (S10.4.2.2)
- 13.3 Adjust the pelvic angle. (S10.1)
- 13.4 Is the head level within $\pm 0.5^\circ$? (S10.1)
- Yes, record the following, then go to 14. No, go to 13.5
- horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- pelvic angle (20° to 25°) (S10.4.2.2)
- 13.5 Adjust the neck bracket of the dummy the minimum amount necessary from the non-adjusted “0” setting until the head is level within $\pm 0.5^\circ$. (S10.1)
- Record the following, then go to 14
- horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- pelvic angle (20° to 25°) (S10.4.2.2)
- X 14. Set the distance between the outboard knee clevis flange surfaces at 10.6 inches.
10.6 measured distance (10.6 inches) (S10.5)
- X 15. Can the right foot be placed on the accelerator?
- X Yes, go to 15.1 and skip 15.2
- No, go to 15.2
- X 15.1 To the extent practicable keep the right thigh and the leg in a vertical plane (S10.5) while resting the foot on the undepressed accelerator pedal with the rearmost point of the heel on the floor pan in the plane of the pedal. (S10.6.1.1)
- 15.2 Initially set the foot perpendicular to the leg and then place it as far forward as possible in the direction of the pedal centerline with the rearmost point of the heel resting on the floor pan. (S10.6.1.1)
- 15.2.1 Move the adjustable pedal to its most rearward position or until the right foot is flat on the pedal, whichever occurs first. (S10.6.1.1)
- N/A – the accelerator pedal is not adjustable
- X 16. Does the vehicle have a foot rest?
- Yes, go to 16.1
- X No, go to 16.1.2
- 16.1 With the left thigh and leg in a vertical plane, place the foot on the foot rest. (S10.6.1.2)
- 16.1.1 Is the left foot elevated above the right foot?

- ☐ Yes, go to 16.1.2 and position the foot off the foot rest
- ☐ No, go to 17
- ☒ 16.1.2 Check the ONLY one of the following that applies
 - ☒ The foot reaches the toeboard without adjusting the foot or leg. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5) and place the foot on the toeboard, skip 16.1.3 (S10.6.1.2)
 - ☐ The foot reaches the toeboard but contacts the brake or clutch pedal and must be rotated to avoid pedal contact. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5) and place the foot on the toeboard. The foot was rotated about the leg to avoid pedal contact, skip 16.1.3 (S10.6.1.2)
 - ☐ The foot reaches the toeboard but contacts the brake or clutch pedal and the foot and leg must be rotated to avoid pedal contact. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5) and place the foot on the toeboard. The foot was rotated about the leg and the leg was rotated outboard about the hip the minimum distance necessary to avoid pedal contact, skip 16.1.3 (S10.6.1.2)
 - ☐ N/A - the foot does not reach the toeboard, go to 16.1.3
- ☐ 16.1.3 Check the ONLY one of the following that applies
 - ☐ The foot did not contact the brake or clutch pedal. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5). Set the foot perpendicular to the leg and place it as far forward as possible with the heel resting on the floor pan. (S10.6.1.2)
 - ☐ The foot did contact the brake or clutch pedal and the foot was rotated to avoid contact. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5). Set the foot perpendicular to the leg and place it as far forward as possible with the heel resting on the floor pan and rotate the foot the minimum amount to avoid pedal contact. (S10.6.1.2)
 - ☐ The foot did contact the brake or clutch pedal and the foot was rotated about the leg and the leg was rotated outboard about the hip the minimum distance necessary to avoid pedal contact. Set the foot perpendicular to the leg and place it as far forward as possible with the heel resting on the floor pan and rotate the foot about the leg and the thigh and leg outboard about the hip the minimum distance necessary to avoid pedal contact. (S10.6.1.2)
- ☒ 17. Place the right upper arm adjacent to the torso with the centerline as close to a vertical plane as possible. (S10.2.1)
- ☒ 18. Is the driver seat belt used for this test?
 - ☐ Yes, continue
 - ☒ No, go to 19
 - ☐ 18.1 Fasten the seat belt around the dummy.
 - ☐ 18.2 Remove all slack from the lap belt portion. (S10.9)
 - ☐ 18.3 Pull the upper torso webbing out of the retractor and allow it to retract; repeat this four times. (S10.9)
 - ☐ 18.4 Apply a 2 to 4 pound tension load to the lap belt. (S10.9)
 - ☐ pound load applied
 - ☐ 18.5 Is the belt system equipped with a tension relieving device?
 - ☐ Yes, continue
 - ☐ No, go to 19
 - ☐ 18.6 Introduce the maximum amount of slack into the upper torso bet that is recommended by the vehicle manufacturer in the vehicle owner's manual. (S10.9).
- ☒ 19. Place the left upper arm adjacent to the torso with the centerline as close to a vertical plane as possible. (S10.2.1)

- X 20. Place the right hand with the palm in contact with the steering wheel at the rim's horizontal centerline and with the thumb over the steering wheel. (S10.3.1)
- X 21. Place the left hand with the palm in contact with the steering wheel at the rim's horizontal centerline and with the thumb over the steering wheel. (S10.3.1)
- X 22. Tape the thumb of each hand to the steering wheel by using masking tape with a width of 0.25 inch. The length of the tape shall only be enough to go around the thumb and steering wheel one time.

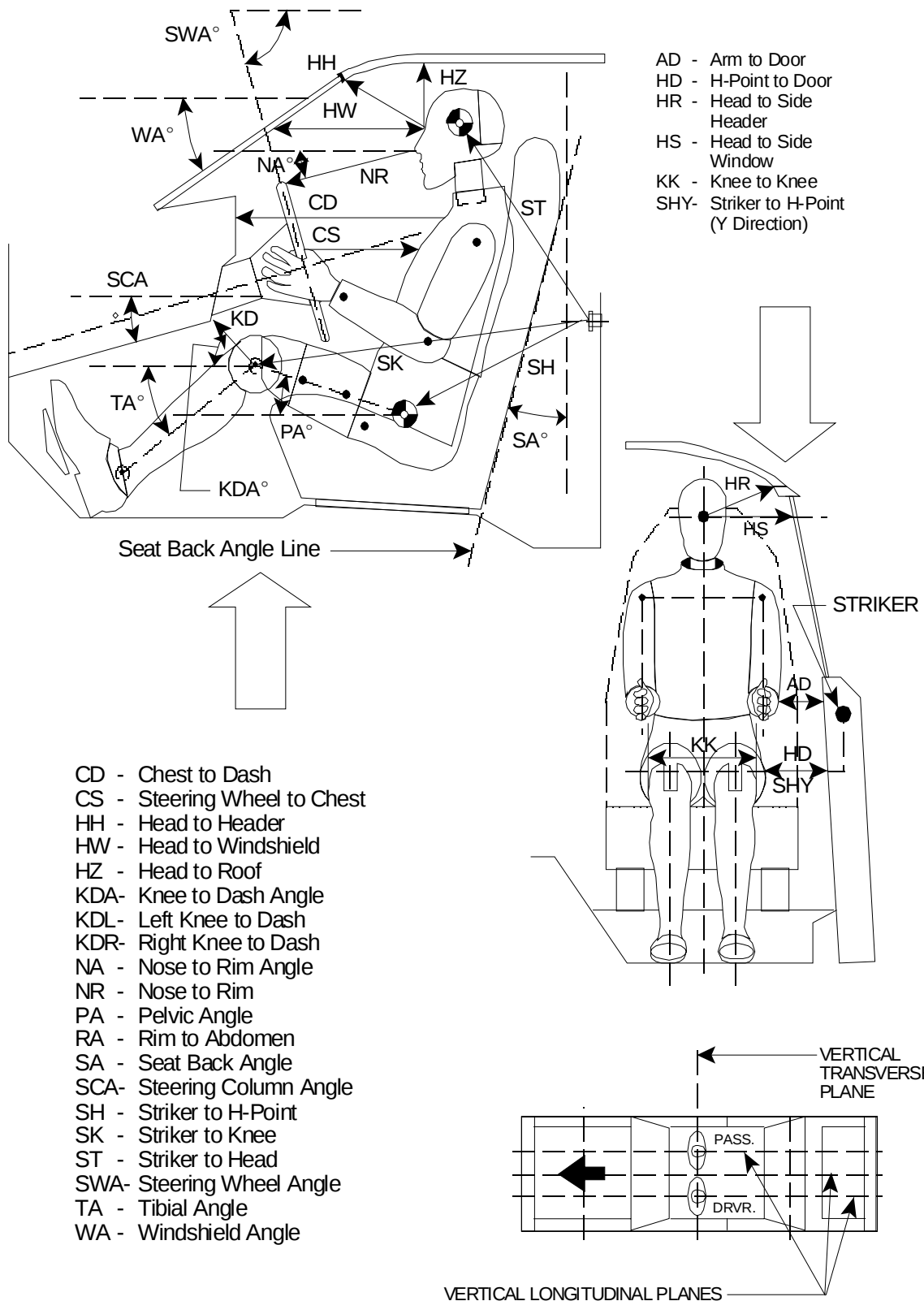
- _____ horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ 24.0° pelvic angle (20° to 25°) (S10.4.2.2)
- X 12. Is the head level within $\pm 0.5^\circ$? (S10.1)
- X Yes, go to 13
- _____ No, go to 12.1
- _____ 12.1 Adjust the position of the H-point. (S10.1 and S10.4.2.1)
- _____ 12.2 Is the head level within $\pm 0.5^\circ$? (S10.1)
- _____ Yes, record the following, then go to 13. _____ No, go to 12.3
- _____ horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ pelvic angle (20° to 25°) (S10.4.2.2)
- _____ 12.3 Adjust the pelvic angle. (S10.1)
- _____ 12.4 Is the head level within $\pm 0.5^\circ$? (S10.1)
- _____ Yes, record the following, then go to 13. _____ No, go to 12.5
- _____ horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ pelvic angle (20° to 25°) (S10.4.2.2)
- _____ 12.5 Adjust the neck bracket of the dummy the minimum amount necessary from the non-adjusted "0" setting until the head is level within $\pm 0.5^\circ$. (S10.1)
- Record the following, then go to 13
- _____ horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)
- _____ pelvic angle (20° to 25°) (S10.4.2.2)
- X 13. Set the distance between the outboard knee clevis flange surfaces at 10.6 inches.
- 10.6 measured distance (10.6 inches) (S10.5)
- X 14. Check the only one of the following that applies:
- X To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, place the feet on the toeboard with the heels resting on the floor pan as close as possible to the intersection of the floor pan and toeboard.
- _____ The feet cannot be placed flat on the toeboard. To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, set the feet perpendicular to the legs and place them as far forward as possible with the heels resting on the floor pan.
- _____ The vehicle has a wheelhouse projection. To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, set the feet perpendicular to the legs and place them as far forward as possible with the heels resting on the floor pan. Do not set the feet on the wheelhouse projection.
- _____ The vehicle has a wheelhouse projection and the feet cannot be placed on the toeboard. To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, set the feet perpendicular to the legs and place them as far forward as possible with the heel resting on the floor pan. . Do not set the feet on the wheelhouse projection.

- X 15. Place the left upper arm in contact with the seat back and side of the torso. (S10.2.2)
- X 16. Is the passenger seat belt used for this test?
 - ☐ Yes, continue
 - X ☒ No, go to 17
- ☐ 16.1 Fasten the seat belt around the dummy.
- ☐ 16.2 Remove all slack from the lap belt portion. (S10.9)
- ☐ 16.3 Pull the upper torso webbing out of the retractor and allow it to retract; repeat this four times. (S10.9)
- ☐ 16.4 Apply a 2 to 4 pound tension load to the lap belt. (S10.9)
 - ☐ pound load applied
- ☐ 16.5 Is the belt system equipped with a tension relieving device?
 - ☐ Yes, continue
 - ☐ No, go to 17
- ☐ 16.6 Introduce the maximum amount of slack into the upper torso bet that is recommended by the vehicle manufacturer in the vehicle owner's manual. (S10.9).
Go to 17.
- X 17. Place the right upper arm in contact with the seat back and side of the torso. (S10.2.2)
- X 18. Place the left hand palm in contact with the outside of the left thigh and the little finger in contact with the seat cushion. (S10.3.2)
- X 19. Place the right hand palm in contact with the outside of the right thigh and the little finger in contact with the seat cushion. (S10.3.2)

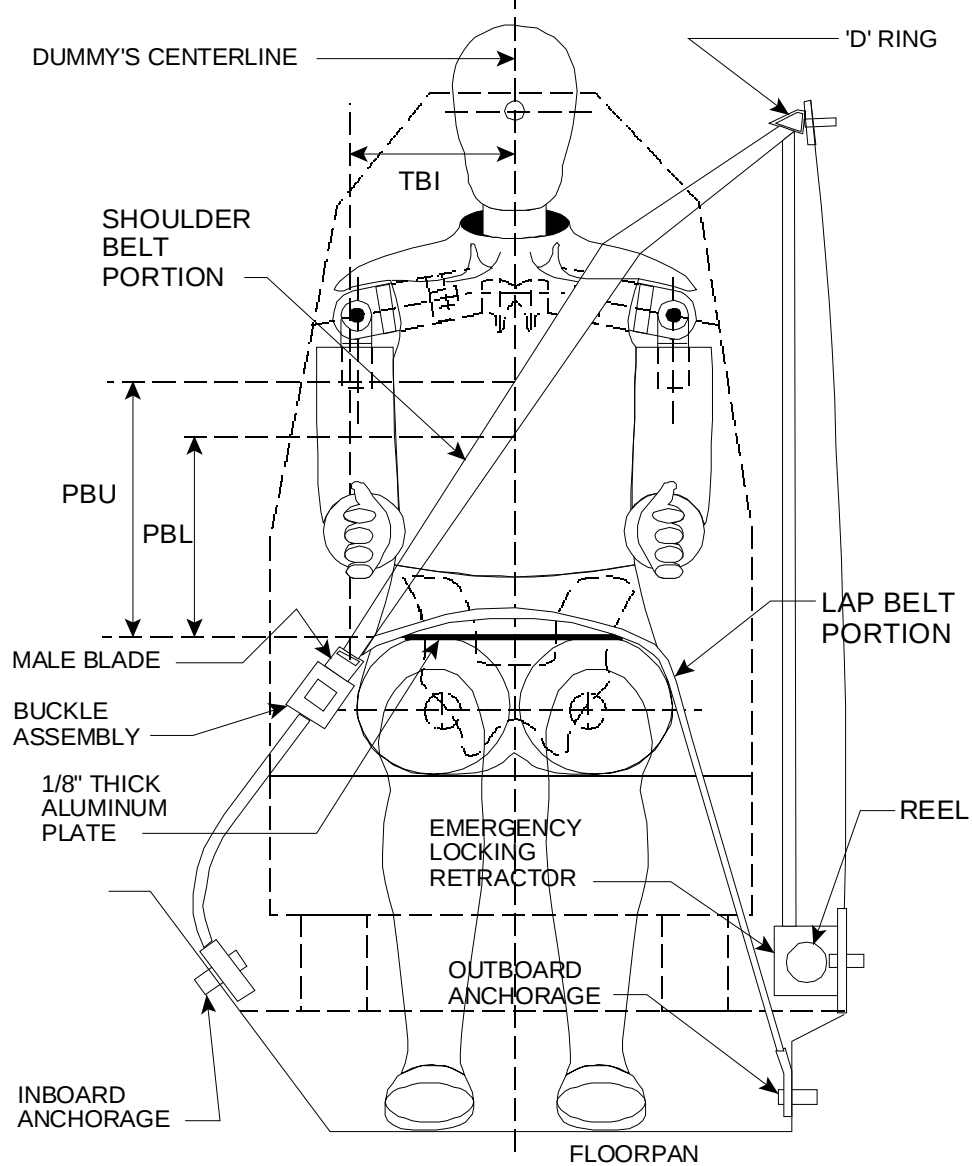
DATA SHEET 35
DUMMY POSITIONING MEASUREMENTS

	DRIVER (Serial No. <u>229</u>)	PASSENGER (Serial No. <u>230</u>)
WA°	23.0	
SWA°	17.9	NA
SCA°	71.6	NA
SA°	9.4	9.5
HZ	235	220
HH	390	391
HW	739	720
HR	195	200
NR	396 ANGLE 12.1°	NA
CD	710	531
CS	312	NA
RA	222	NA
KDL	143 ANGLE 39.6°	150
KDR	142	142 ANGLE 30.3°
PA°	22.5	24
TA°	45.4	44.1
KK	317	270
ST	525 ANGLE -86.2°	540 ANGLE -81.0°
SK	582 ANGLE 0.7°	576 ANGLE 1.0°
SH	243 ANGLE 37.2°	227 ANGLE 34.1°
SHY	230	199
HS	337	333
HD	105	104
AD	111	94

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

DESCRIPTIONS OF DUMMY MEASUREMENTS

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

The following measurements are to be made within a vertical longitudinal plane.

- * HH Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header.
- * HW Head to Windshield, taken from the point where the dummy's nose meets his forehead (between his eyes) to a point on the windshield. Use a level.
- HZ Head to Roof, taken from the point where the dummy's nose meets his forehead (between his eyes) to the point on the roof directly above it. Use a level.
- * CS Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level.
- * CD Chest to Dash, place a tape measure on the tip of the dummy's chin and rotate five inches of it downward toward the dummy to the point of contact on the transverse center of the dummy's chest. Measure from this point to the closest point on the dashboard either between the upper part of the steering wheel between the hub and the rim, or measure to the dashboard placing the tape measure above the rim, whichever is a shorter measurement. See photograph.
- RA Steering Wheel Rim to Abdomen, taken from the bottommost point of the steering wheel rim horizontally rearward to the dummy. Use a level.
- NR Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA).
- *¹ KDL, KDR Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard. Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA). See photograph.
- SH, SK, ST Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z plane measured from the forward most center point on the striker to the center of the H-point, outer knee bolt, and head target. When taking this measurement a firm device that can be rigidly connected to the striker should be used. Use a level. The angles of these measurements with respect to the

* Measurement used in Data Tape Reference Guide

¹ Only outboard measurement is referenced in Data Tape Reference Guide

horizontal should also be recorded. The measurement in the Y (transverse) direction from the striker to the H-point should also be taken (SHY). See photograph.

The following measurements are to be made within a vertical transverse plane.

- HS Head to Side Window, taken from the point where the dummy's nose meets his forehead (between his eyes) to the outside of the side window. In order to make this measurement, roll the window down to the exact height that allows a level measurement. Use a level. See photograph.
- * AD Arm to Door, taken from the outer surface of the elbow pivot bolt on a Hybrid II dummy to the first point it hits on the door. In the case of a Hybrid III dummy, measure from the bolt on the outer biceps. When a SID is used make the measurement from the center of the bottom of the arm segment where it meets the dummy's torso.
- * HD H-point to Door, taken from the H-point on the dummy to the closest point on the door. Use a level.
- * HR Head to Side Header, measure the shortest distance from the point where the dummy's nose meets his forehead (between his eyes) to the side edge of the header just above the window frame, directly adjacent to the dummy.
- SHY Striker to H-point, taken from a rod rigidly connected to the forward most center point on the striker to the H-point. Use a level. See photograph.
- KK Knee to Knee, for Hybrid II dummies measure the distance between knee pivot bolt head outer surfaces. For Hybrid III dummies measure the distance between the outboard knee clevis flange surfaces. (This measurement may not be exactly transverse)

ANGLES

- SA Seat Back Angle, find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR.
- PA Pelvic or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the H-point hole and the outer knee pivot bolt hole on a Hybrid II dummy with respect to the horizontal, to find the femur angle.
- SWA Steering Wheel Angle, find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.

* Measurement used in Data Tape Reference Guide

¹ Only outboard measurement is referenced in Data Tape Reference Guide

SCA	Steering Column Angle, measured with respect to the horizontal by placing an inclinometer on the center of the underside of the steering column.
NA	Measure the angle made when taking the measurement NR with respect to the horizontal.
KDA	Knee to Dash Angle, the angle that the measurement KD is taken at with respect to the horizontal. Only get this angle for the outboard knee. See photograph.
WA	Windshield Angle, place an inclinometer along the transverse center of the windshield exterior (measurement is made with respect to horizontal).
TA	Tibia Angle, use a straight edge to connect the dummy's knee and ankle bolts. Then place an inclinometer on the straight edge and measure the angle with respect to the horizontal.

DATA SHEET 36
CRASH TEST

NHTSA No.: C40113

Test Date: 03/18/04

Laboratory: TRC Inc. Test Technician(s): John Shultz

Impact Angle: 0° Belted Dummies: Yes X No

Test Speed: X 32 to 40 km/h 0 to 48 km/h 0 to 56 km/h

Driver Dummy: 5th female X 50th male Passenger Dummy: 5th female X 50th male

- X 1. Vehicle underbody painted
- X 2. The speed measuring devices are in place and functioning.
- X 3. The speed measuring devices are 1.5 m from the barrier (spec. 1.5m) and 30 cm from the barrier (spec. is 30 cm)
- X 4. Convertible top is in the closed position.
 N/A – Not a convertible
- X 5. Instrumentation and wires are placed so the motion of the dummies during impact is not affected.
- X 6. Tires inflated to pressure on tire placard or if it does not have a tire placard because it is not a passenger car, then inflated to the tire pressure specified in the owner information.
 210 kPa front left tire 210 kPa specified on tire placard or in owner information
 210 kPa front right tire 210 kPa specified on tire placard or in owner information
 210 kPa rear left tire 210 kPa specified on tire placard or in owner information
 210 kPa rear right tire 210 kPa specified on tire placard or in owner information
- X 7. Time zero markers and switches in-place.
- X 8. Pre-test zero and shunt calibration adjustments performed and recorded
- X 9. Dummy temperature meets requirements of section 12.2 of the test procedure.
- X 10. Vehicle hood closed and latched
- X 11. Transmission placed in neutral
- X 12. Parking brake off
- X 13. Ignition in the ON position
- X 14. Doors closed and latched but not locked.
- X 15. Post-test zero and shunt calibration checks performed and recorded
- X 16. Actual test speed 40.0 km/h
- X 17. Vehicle rebound from the barrier N/A¹ mm
- X 18. Describe whether the doors open after the test and what method is used to open the doors.
Left front door Easy
Right front door Easy
Left rear door Easy
Right rear door Easy
- X 19. Describe the contact points of the dummy with the interior of the vehicle.
Driver dummy Head contacted header and airbag. Chest contacted airbag.
 both knees contacted the knee bolster.
Passenger dummy Head contacted sun visor, header, A-pillar and airbag. Chest
 contacted airbag. Both knees contacted the glove box.

¹ Measurement not recorded.

DATA SHEET 38
ACCIDENT INVESTIGATION MEASUREMENTS

NHTSA No.: C40113 Test Date: 03/18/04

Laboratory: TRC Inc. Test Technician(s): John Shultz

Impact Angle: 0° Belted Dummies: Yes X No

Test Speed: X 32 to 40 km/h 0 to 48 km/h 0 to 56 km/h

Driver Dummy: 5th female X 50th male Passenger Dummy: 5th female X 50th male

Vehicle Year/Make/Model/Body Style: 2004/Saturn/Ion/4-door

VIN: 1G8AF52F54Z155463

Wheelbase: 2615 mm; Build Date: 11/03

Veh. Size Category: 3 ; Test Weight: 1426 kg

Front Overhang: 975 mm; Overall Width: 1695 mm

Veh. Impact Speed: 40.0 km/h; Vel. Change: 46.0 km/h

Collision Deformation Classification (CDC) Code: 12FDEW2

Impact Mode: 0° Front

Crush Depth Dimensions¹:

C1 = 253 mm

C2 = 323 mm

C3 = 371 mm

C4 = 358 mm

C5 = 314 mm

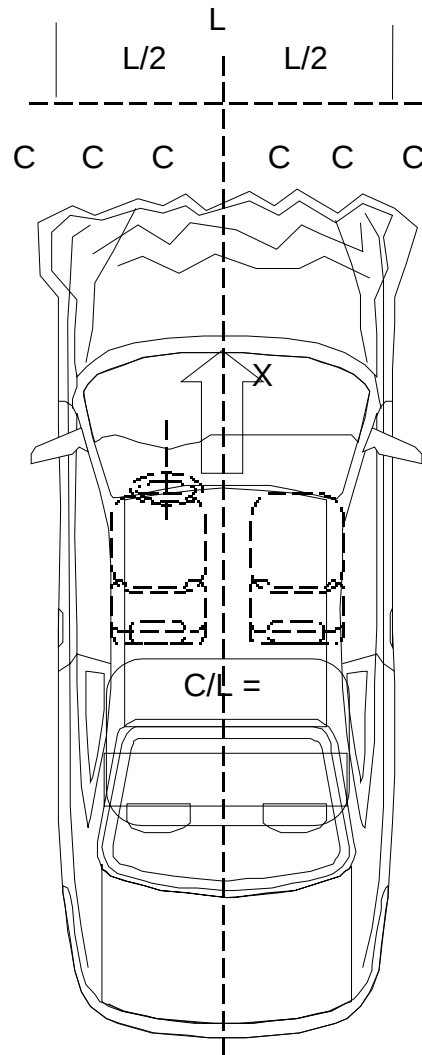
C6 = 235 mm

Midpoint of Damage: D= 0 mm
(Left of Vehicle Longitudinal
Centerline)

Length of Damage Region:

L = 1505 mm

REMARKS:



¹ Numbered from left to right of vehicle.

DATA SHEET 39
WINDSHIELD MOUNTING (FMVSS 212)

NHTSA No.: C40113

Test Date: 03/18/04

Laboratory: TRC Inc. Test Technician(s): D. Thomas, R. Benavides

Impact Angle: 0° Belted Dummies: Yes X No

Test Speed: X 32 to 40 km/h 0 to 48 km/h 0 to 56 km/h

Driver Dummy: 5th female X 50th male Passenger Dummy: 5th female X 50th male

Most vehicle windshields are either bonded in place and covered with chrome or plastic strips or they are held to the body by a rubber retainer. It is difficult to determine the exact periphery of the windshield because the glazing edge is hidden from view. The test engineer will measure the perimeter inside the retainer or molding at several locations. After the impact test the covering over the glazing edge may be removed for exact measurement of the windshield periphery. Do not disturb the molding or retainer in the event of a noncompliance.

1. Pre crash

 X 1.1 Describe from visual inspection how the windshield is mounted and describe any trim material.

 Adhesive, plastic trim

 X 1.2 Mark the longitudinal centerline of the windshield.

 X 1.3 Measure pre-crash A, B, and C for the left side and record in the chart below.

 X 1.4 Measure pre-crash C, D, and E for the right side and record in the chart below.

 X 1.5 Measure from the edge of the retainer or molding to the edge of the windshield.
Dimension G: 24 mm

2. Post Crash

 X 2.1. Can a single thickness of copier type paper (as small a piece as necessary) slide between the windshield and the vehicle body?

 X No, pass. Skip to the table of measurements, complete it by repeating the pre-crash measurements in the post crash column, and calculate the retention percentage, which will be 100%.

 Yes, go to 2.2.

 2.2. Visibly mark the beginning and end of the portions of the periphery where the paper slides between the windshield and the vehicle body.

 2.3. Measure and record post-crash A, B, C, D, E, and F such that the measurements do not include any of the parts of the windshield where the paper slides between the windshield and the vehicle body.

 2.4. Calculate and record the percent retention for the right and left side of the windshield.

 2.5. Is total right side percent retention less than 75%?

 Yes, **FAIL**

 No, Pass

 2.6. Is total left side percent retention less than 75%?

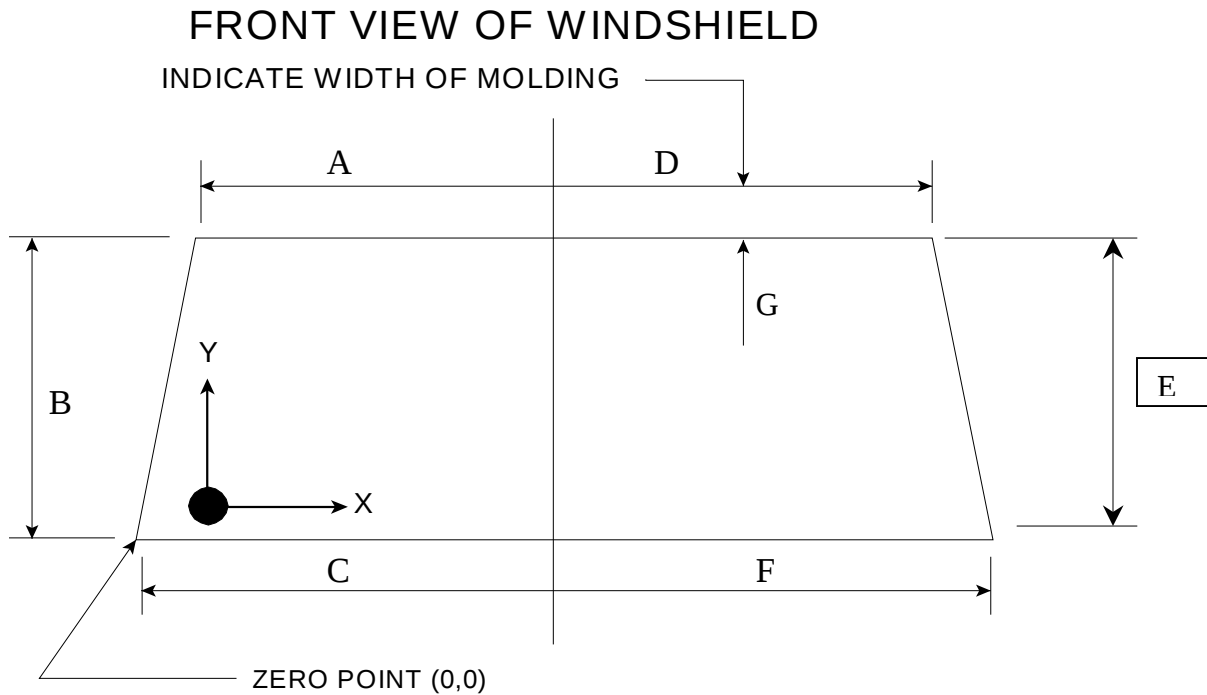
 Yes, **FAIL**

 No, Pass

WINDSHIELD PERIPHERY MEASUREMENT

	Dimension	Pre-crash mm	Post-crash mm	Percent Retention (Post-crash ÷ Pre-crash)
Left side	A	594	594	
	B	851	851	
	C	742	742	
	Total	2187	2187	100%
Right side	D	594	594	
	E	851	851	
	F	742	742	
	Total	2187	2187	100%
Width of Molding	G	24		

Indicate area of mounting failure.



DATA SHEET 40 **WINDSHIELD ZONE INTRUSION (FMVSS 219)**

NHTSA No.: C40113 Test Date: 03/18/04

Laboratory: TRC Inc. Test Technician(s): D. Thomas, R. Benavides

Impact Angle: 0° Belted Dummies: Yes X No

Test Speed: X 32 to 40 km/h 0 to 48 km/h 0 to 56 km/h

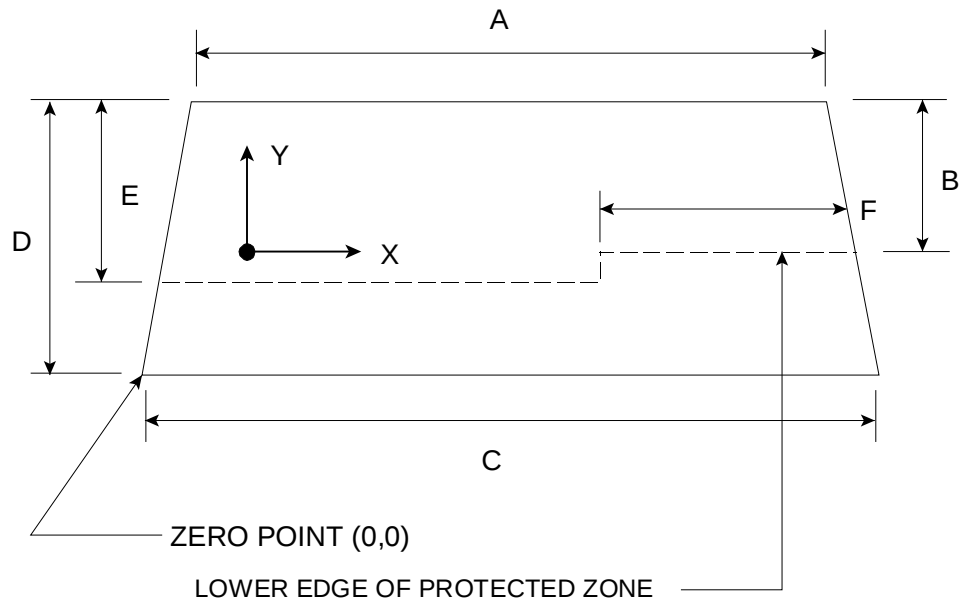
Driver Dummy: 5th female X 50th male Passenger Dummy: 5th female X 50th male

- X 1. Place a 165 mm diameter rigid sphere, with a mass of 6.8 kg on the instrument panel so that it is simultaneously touching the instrument panel and the windshield. (571.219 S6.1(a))
- X 2. Roll the sphere from one side of the windshield to the other while marking on the windshield where the sphere contacts the windshield. (571.219 S6.1(b))
- X 3. From the outermost contactable points on the windshield draw a horizontal line to the edges of the windshield. (571.219 S6.1(b))
- X 4. Draw a line on the inner surface of the windshield that is 13 mm below the line determined in items 2 and 3.
- X 5. After the crash test, record any points where a part of the exterior of the vehicle has marked, penetrated, or broken the windshield.

SKETCH OF FRONT VIEW OF WINDSHIELD:

Provide all dimensions necessary to reproduce the protected area.

FRONT VIEW OF WINDSHIELD



A. Windshield Dimensions

A	B	C	D	E	F
1188	585	1485	851	578	418

AREA OF PROTECTED ZONE FAILURES:

- B. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one which is normally in contact with the windshield.

X	Y
No penetration	No penetration

- C. Provide coordinates of the area beneath the protected zone template that the inner surface of the windshield was penetrated by a vehicle component

X	Y
No penetration	No penetration

REMARKS:

No penetration into or beneath the protected zone.

DATA SHEET 41
FUEL SYSTEM INTEGRITY (FMVSS 301)

TEST VEHICLE NHTSA NO.: C40113; TEST DATE: 03/18/04

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 2004/Saturn/Ion/4-door

TYPE OF IMPACT: 0° Flat Frontal

STODDARD SOLVENT SPILLAGE MEASUREMENT:

A. From impact until vehicle motion ceases —

Actual = 0.0 grams. (Maximum Allowable = 28 grams)

B. For 5 minute period after vehicle motion ceases —

Actual = 0.0 grams. (Maximum Allowable = 142 grams)

C. For next 25 minutes —

Actual = 0.0 grams . (Maximum Allowable = 28 grams/minute)

D. Provide Spillage Details: None

REMARKS:

No spillage occurred during the interval between test time and the start of the rollover.

FMVSS 301 STATIC ROLLOVER DATA SHEET

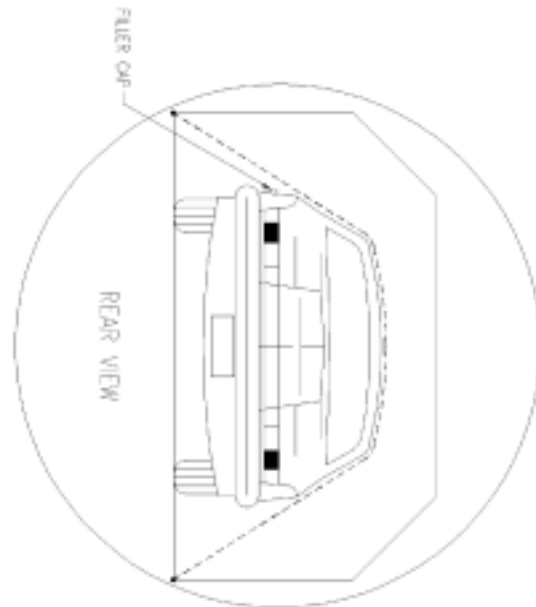
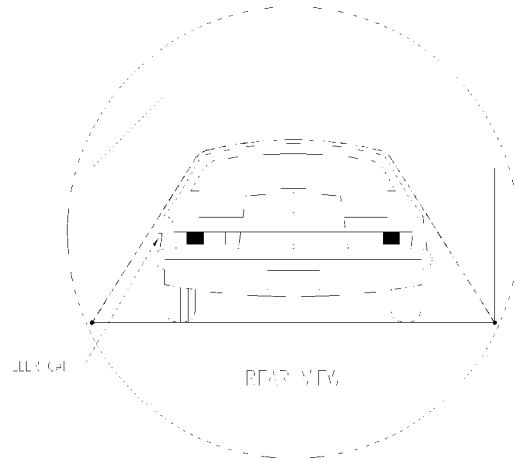
A. TEST PHASE = 0° TO 90°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90° Rotation Time =
1 minutes, 30 seconds
(Specified Range is 1 to 3 minutes)
2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds
3. TOTAL = 6 minutes, 30 seconds
4. NEXT WHOLE MINUTE INTERVAL =
7 minutes

Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of
rotation = 0.0 grams
(142 grams allowed)
2. 6th minute = 0.0 grams
(28 grams allowed)
3. 7th minute = 0.0 grams
(28 grams allowed)
4. 8th minute (if required) = NA grams
(28 grams allowed)



Provide Details of Stoddard Solvent Spillage Locations - None

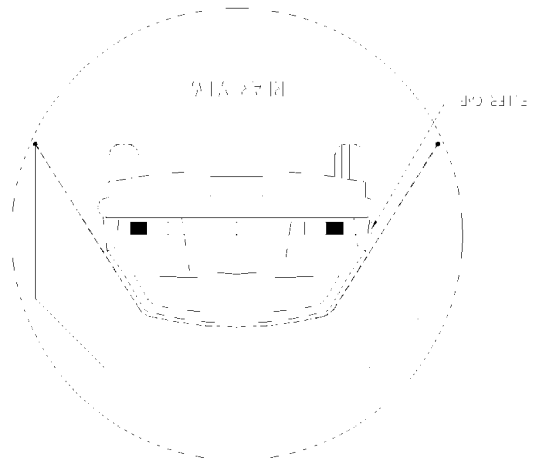
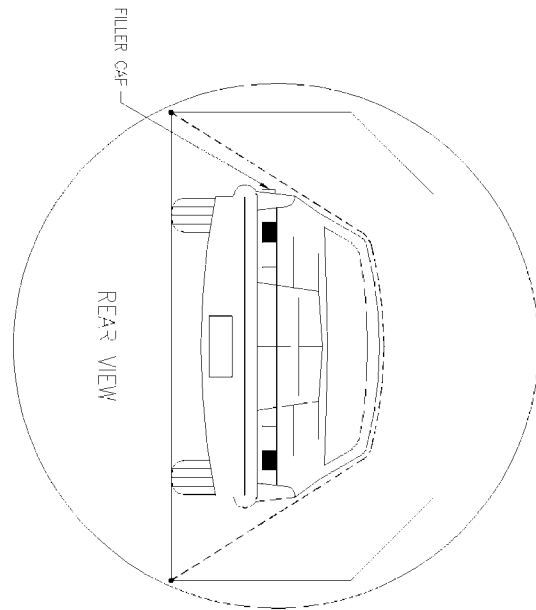
B. TEST PHASE = 90° TO 180°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90° Rotation Time =
1 minutes, 30 seconds
(Specified Range is 1 to 3 minutes)
2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds
3. TOTAL = 6 minutes, 30 seconds
4. NEXT WHOLE MINUTE INTERVAL =
7 minutes

Actual Test Vehicle Stoddard
Solvent Spillage:

1. First 5 minutes from onset of
rotation = 0.0 grams
(142 grams allowed)
2. 6th minute = 0.0 grams
(28 grams allowed)
3. 7th minute = 0.0 grams
(28 grams allowed)
4. 8th minute (if required) = NA grams
(28 grams allowed)



Provide Details of Stoddard Solvent Spillage Locations - None

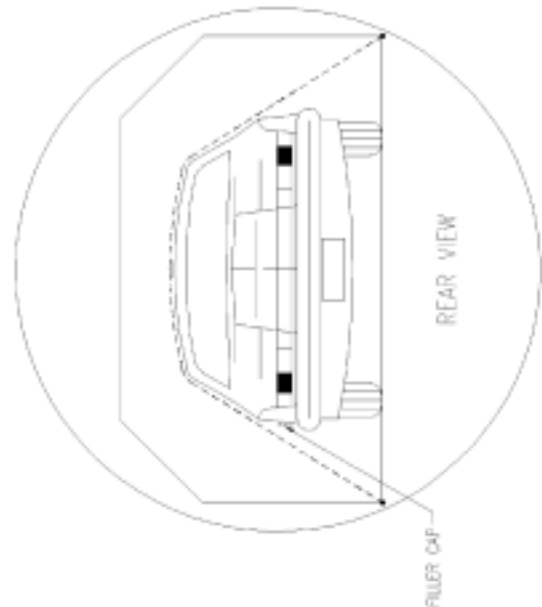
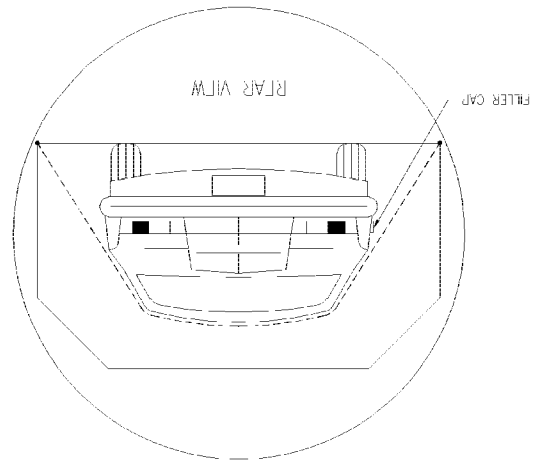
C. TEST PHASE = 180° TO 270°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90° Rotation Time =
1 minutes, 30 seconds
(Specified Range is 1 to 3 minutes)
2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds
3. TOTAL = 6 minutes, 30 seconds
4. NEXT WHOLE MINUTE INTERVAL =
7 minutes

Actual Test Vehicle Stoddard
Solvent Spillage:

1. First 5 minutes from onset of
rotation = 0.0 grams
(142 grams allowed)
2. 6th minute = 0.0 grams
(28 grams allowed)
3. 7th minute = 0.0 grams
(28 grams allowed)
4. 8th minute (if required) = NA grams
(28 grams allowed)



Provide Details of Stoddard Solvent Spillage Locations - None

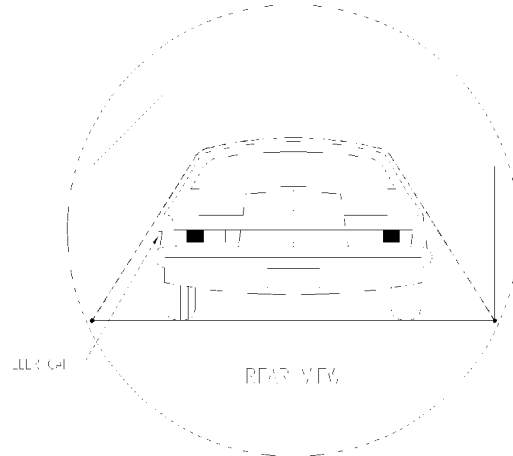
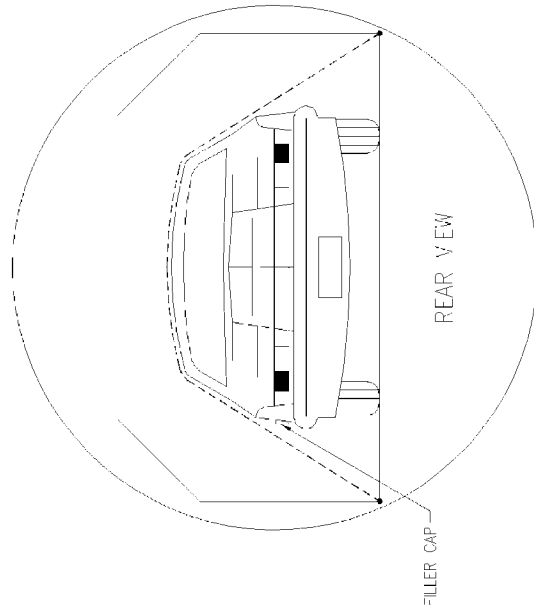
D. TEST PHASE = 270° TO 360°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90° Rotation Time =
1 minutes, 30 seconds
(Specified Range is 1 to 3 minutes)
2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds
3. TOTAL = 6 minutes, 30 seconds
4. NEXT WHOLE MINUTE INTERVAL =
7 minutes

Actual Test Vehicle Stoddard
Solvent Spillage:

1. First 5 minutes from onset of
rotation = 0.0 grams
(142 grams allowed)
2. 6th minute = 0.0 grams
(28 grams allowed)
3. 7th minute = 0.0 grams
(28 grams allowed)
4. 8th minute (if required) = NA grams
(28 grams allowed)



Provide Details of Stoddard Solvent Spillage Locations - None

Section 6

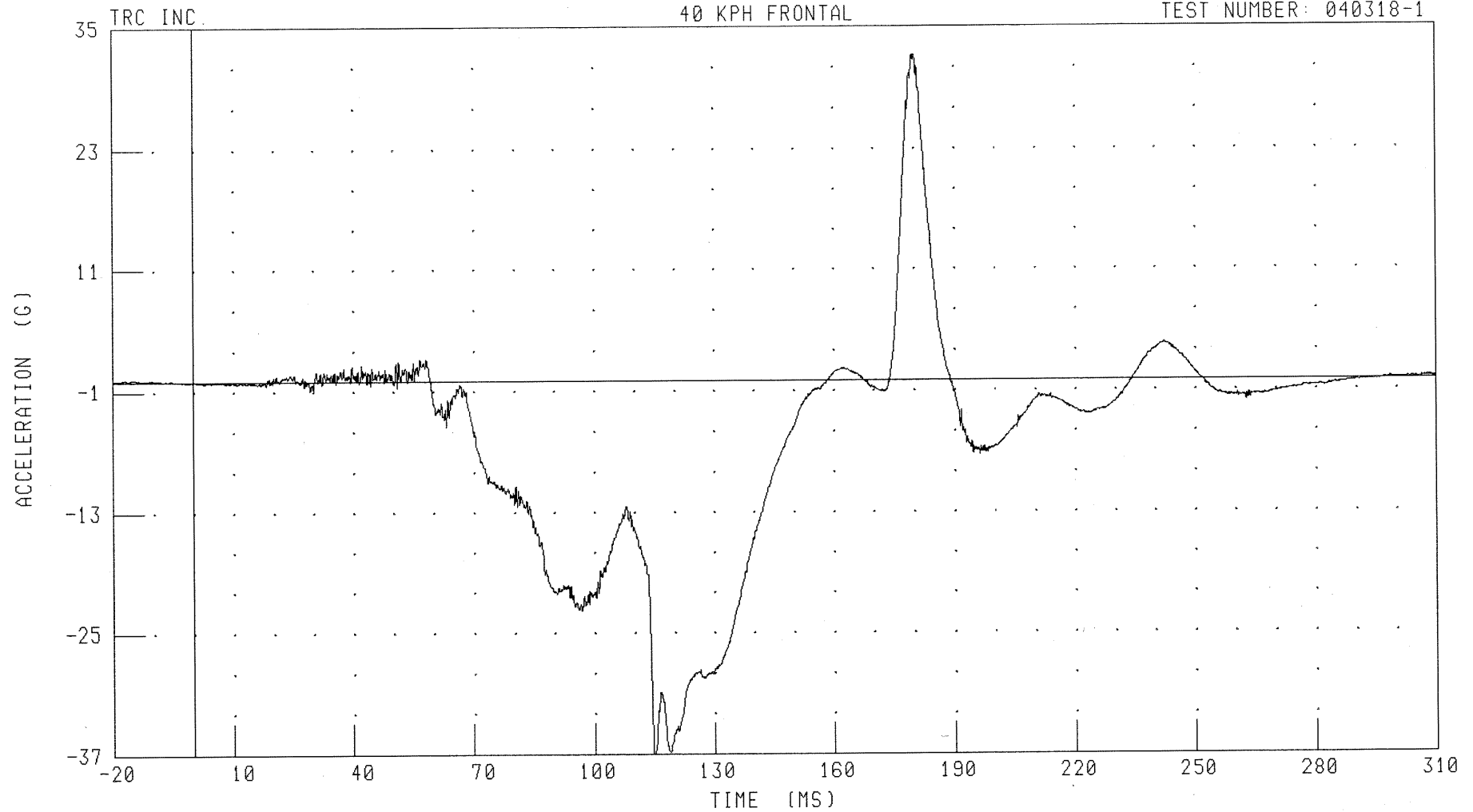
Test Data

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER HEAD X-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

6-2

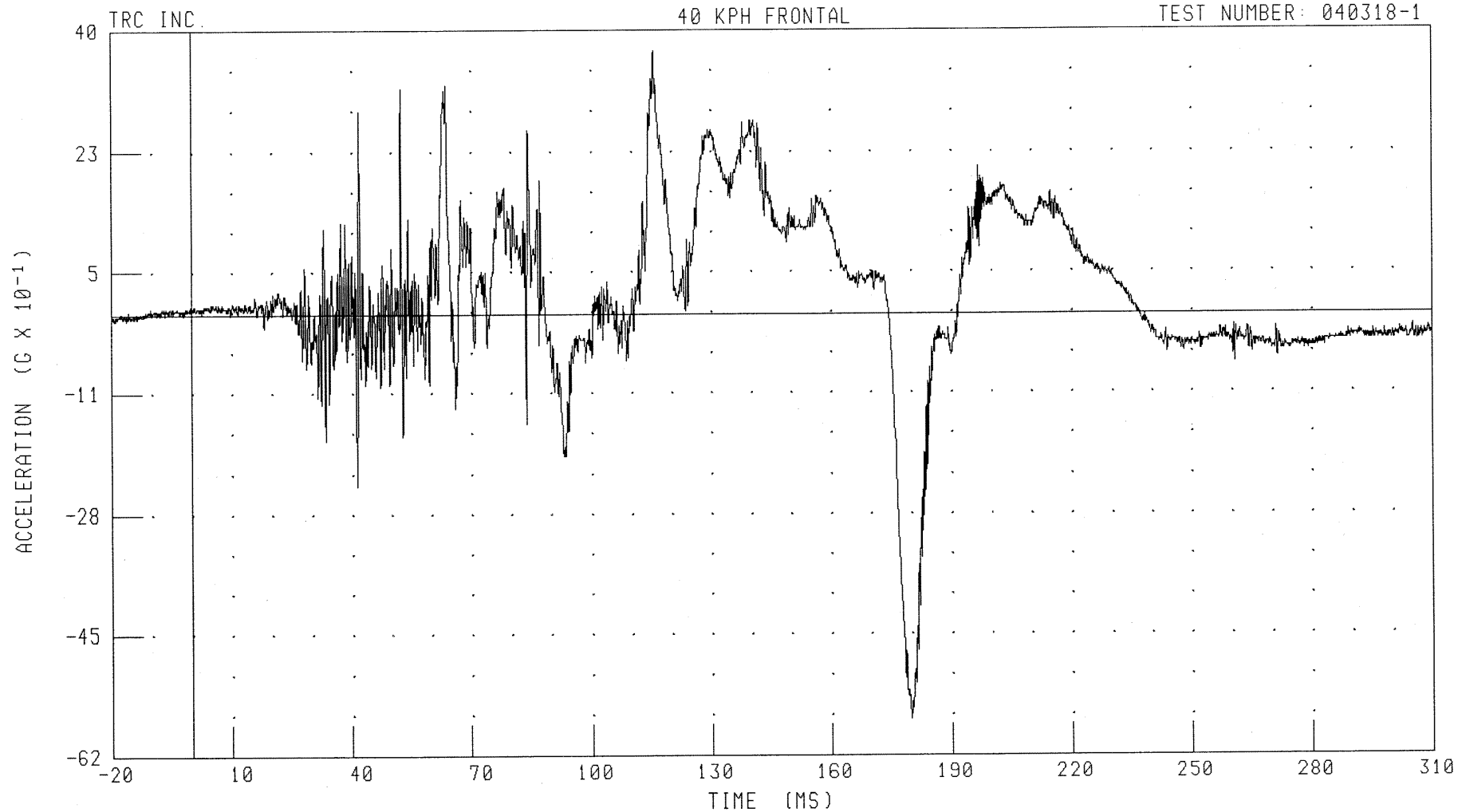
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER HEAD Y-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: HEDYG1

FILTER: CH. CLASS 1000

PEAK DATA: 3.70 G @ 115.76 MS, -5.69 G @ 179.84 MS

6-3

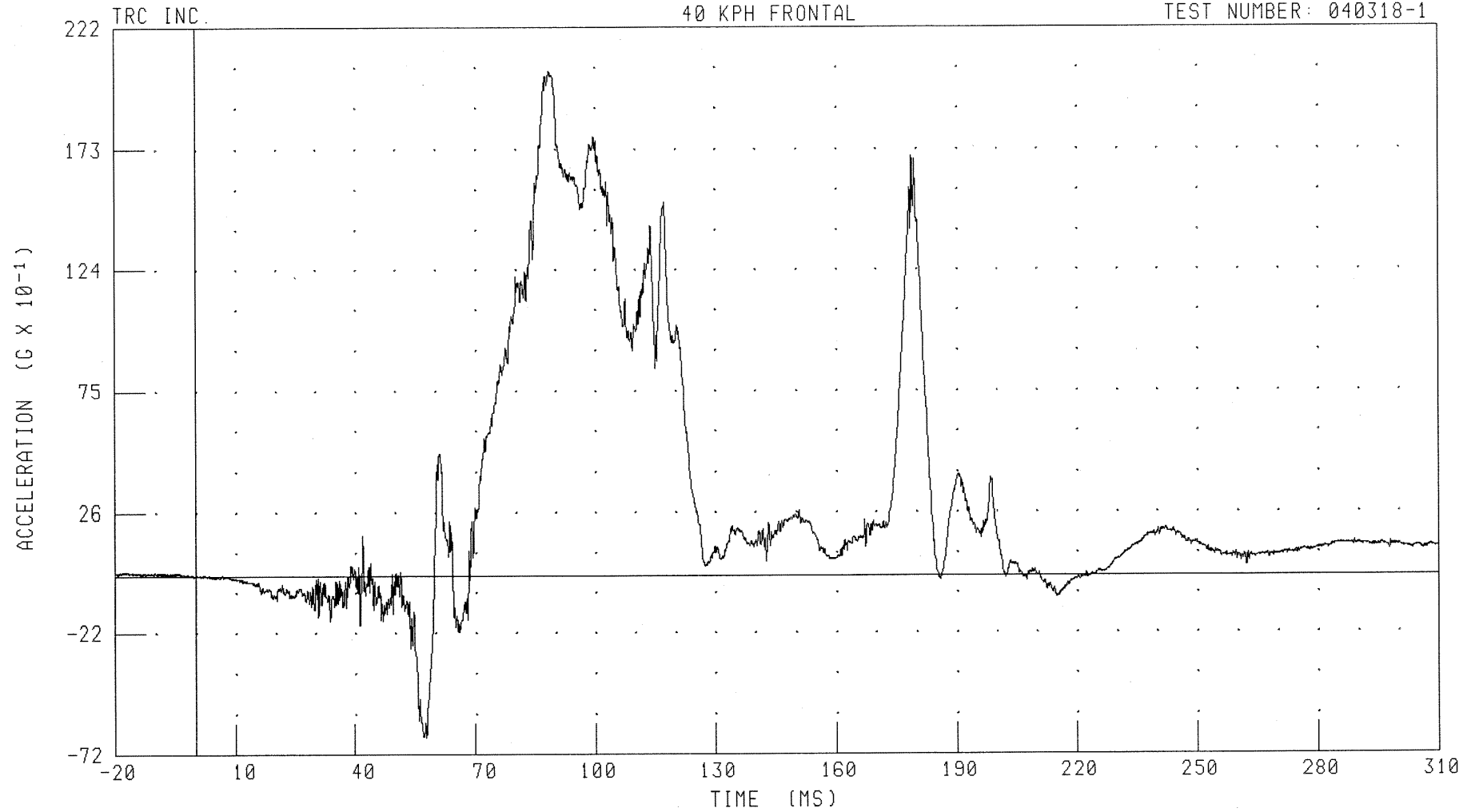
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER HEAD Z-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



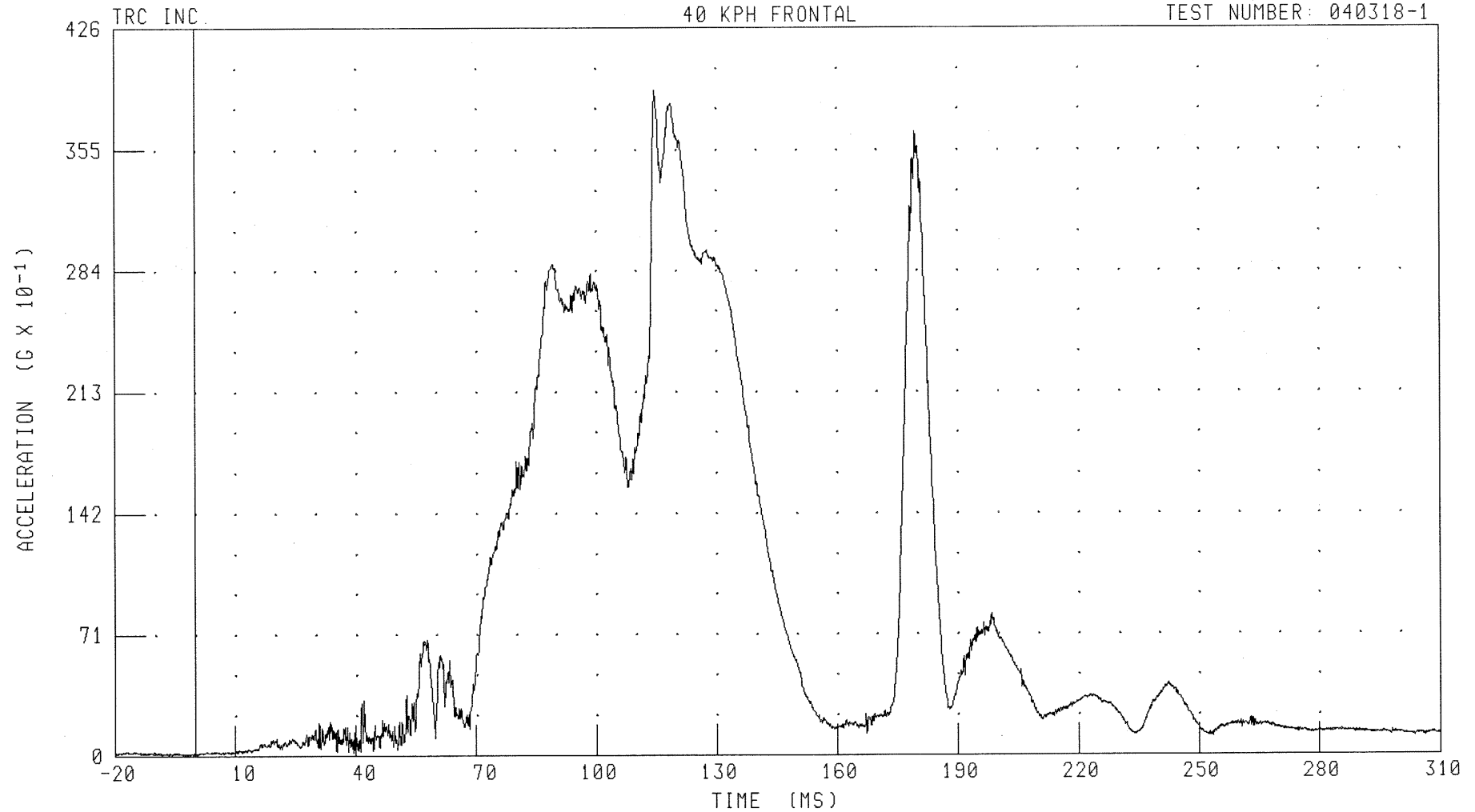
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

PEAK DATA: 20.43 G @ 88.48 MS; -6.56 G @ 57.76 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
DRIVER HEAD RESULTANT ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA: 38.94 G @ 114.88 MS; 0.07 G @ -2.16 MS

6-5

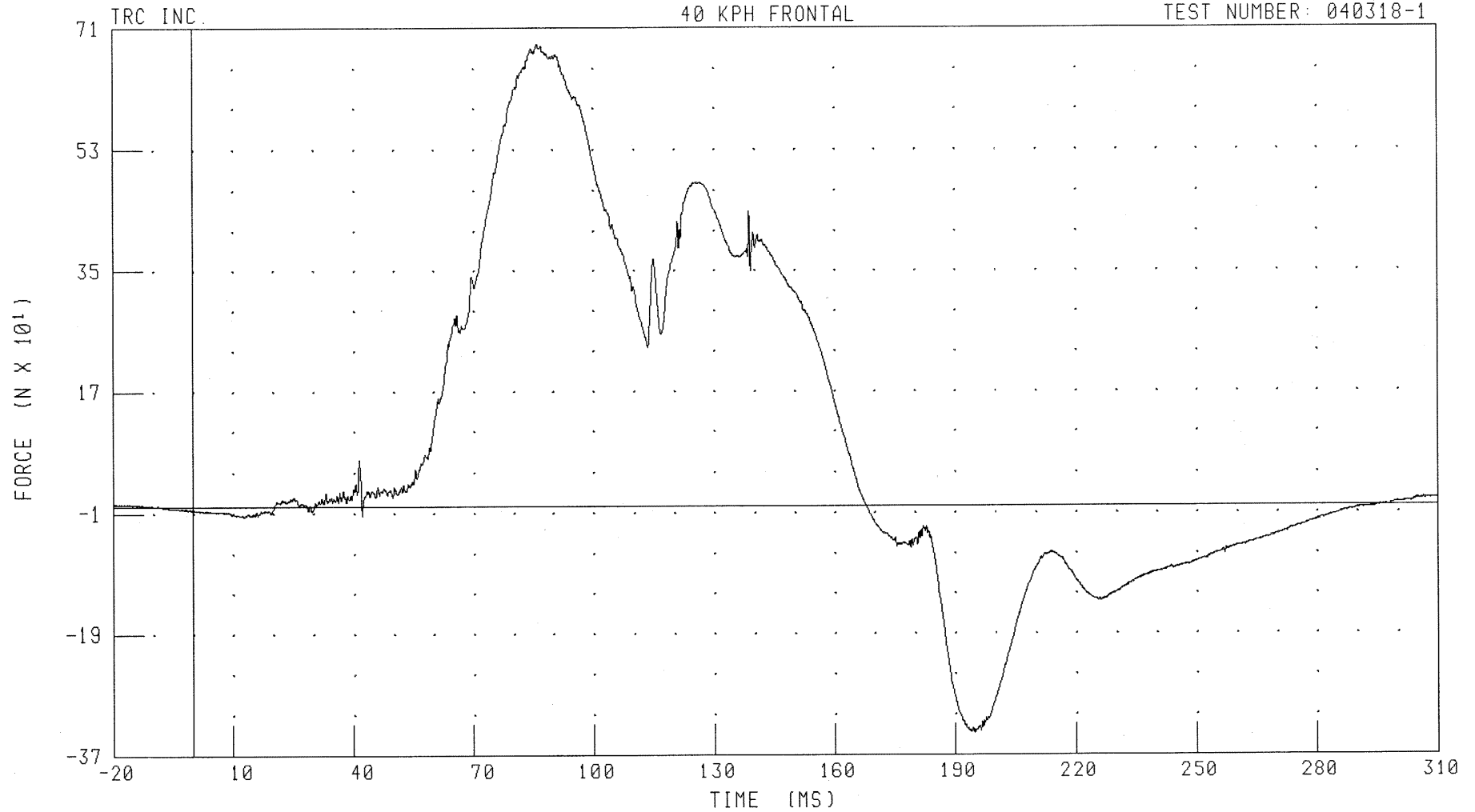
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NECK X-AXIS SHEAR FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

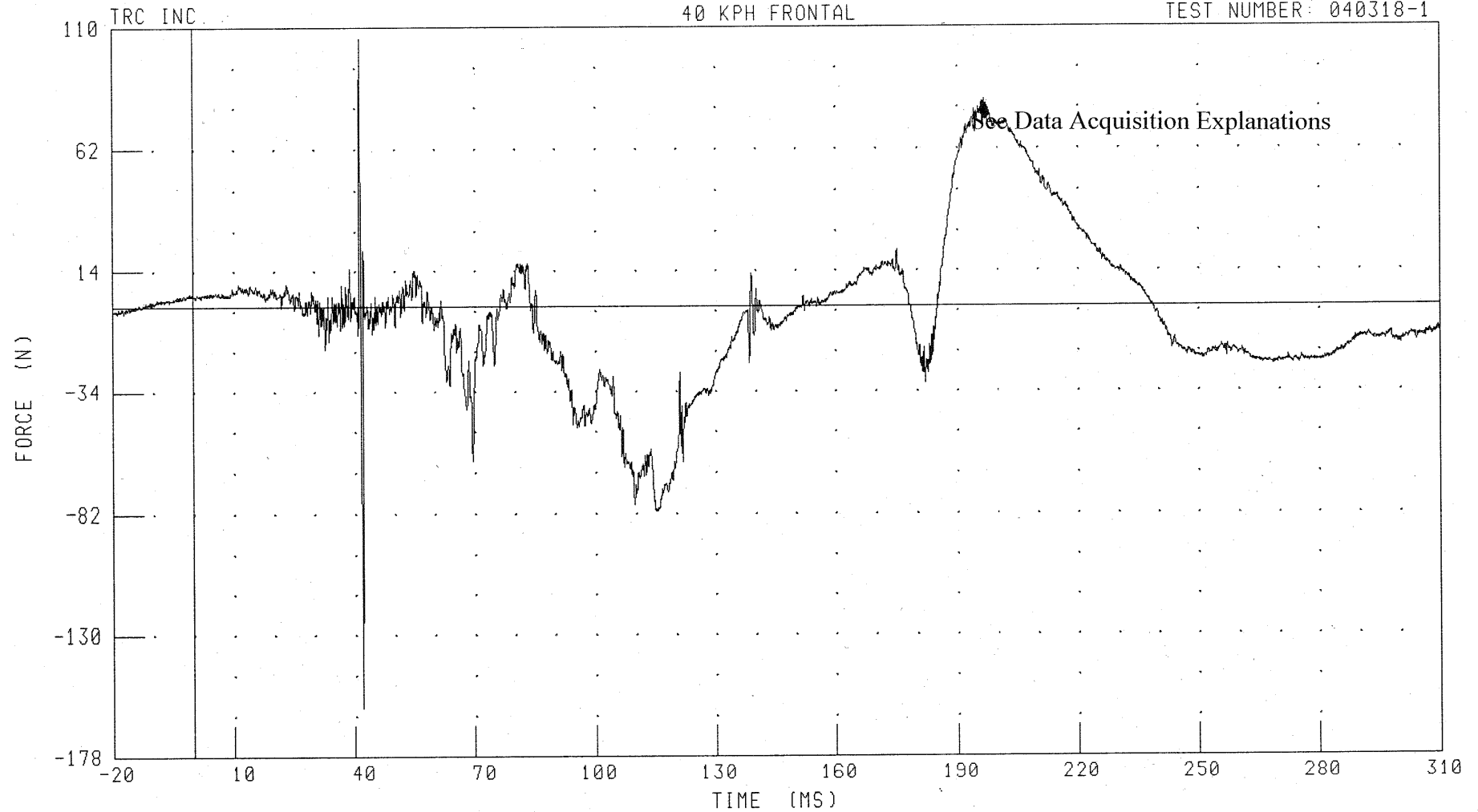
PEAK DATA: 686.61 N @ 86.24 MS; -337.94 N @ 194.72 MS

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NECK Y-AXIS SHEAR FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

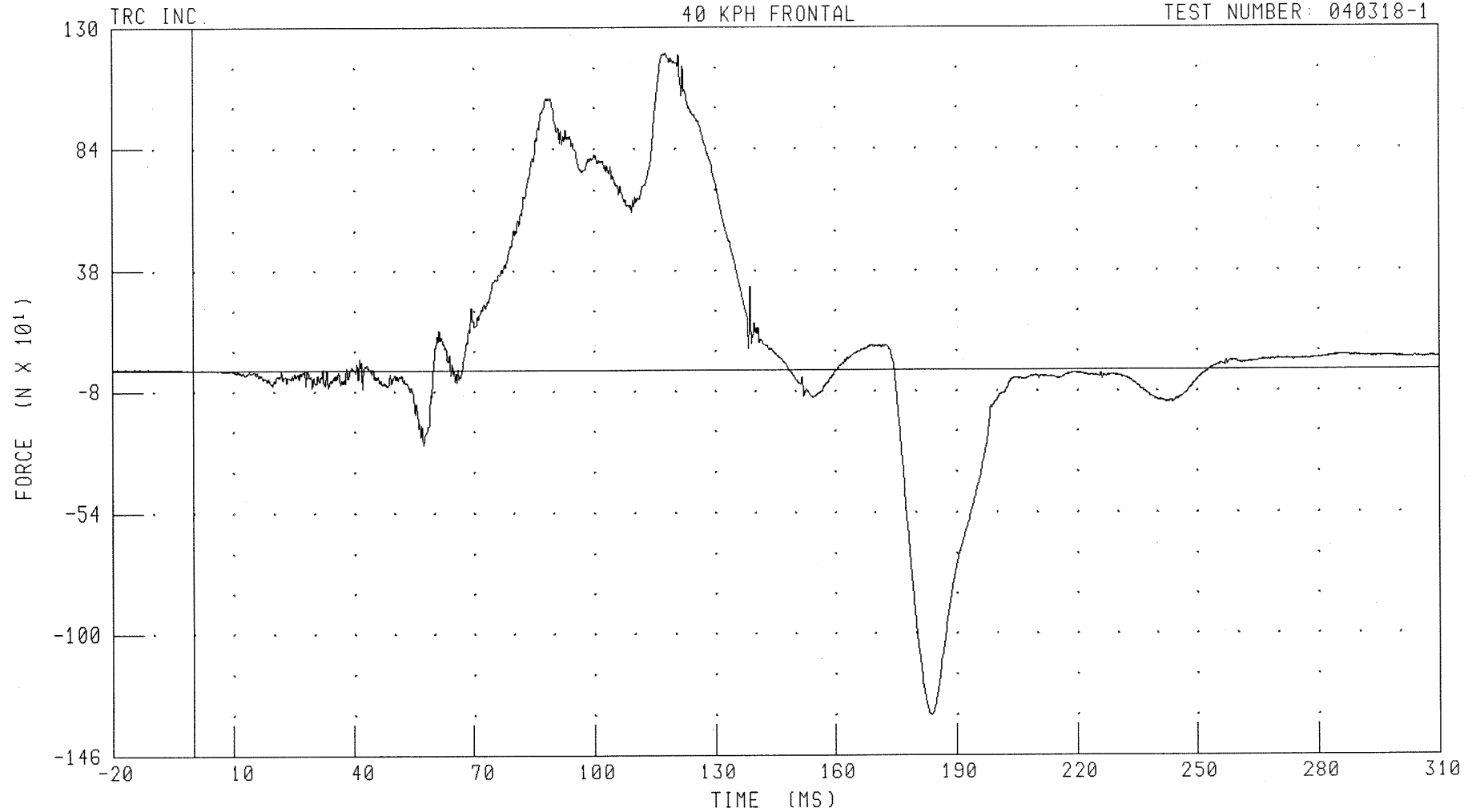
PEAK DATA: 105.60 N @ 41.36 MS; -158.81 N @ 41.92 MS

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NECK Z-AXIS AXIAL FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

6-8

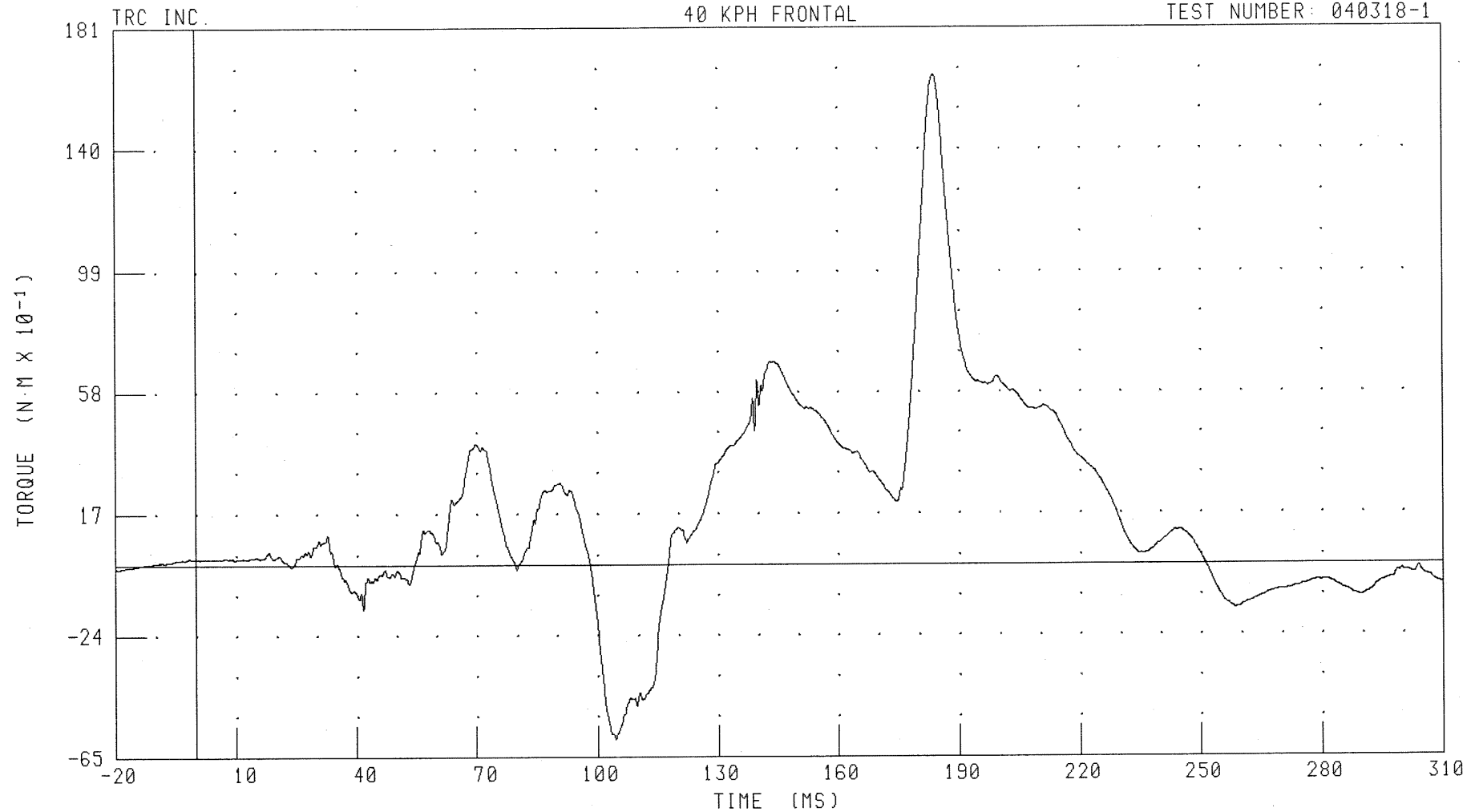
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NECK MOMENT ABOUT X AXIS

40 KPH FRONTAL

TEST NUMBER: 040318-1

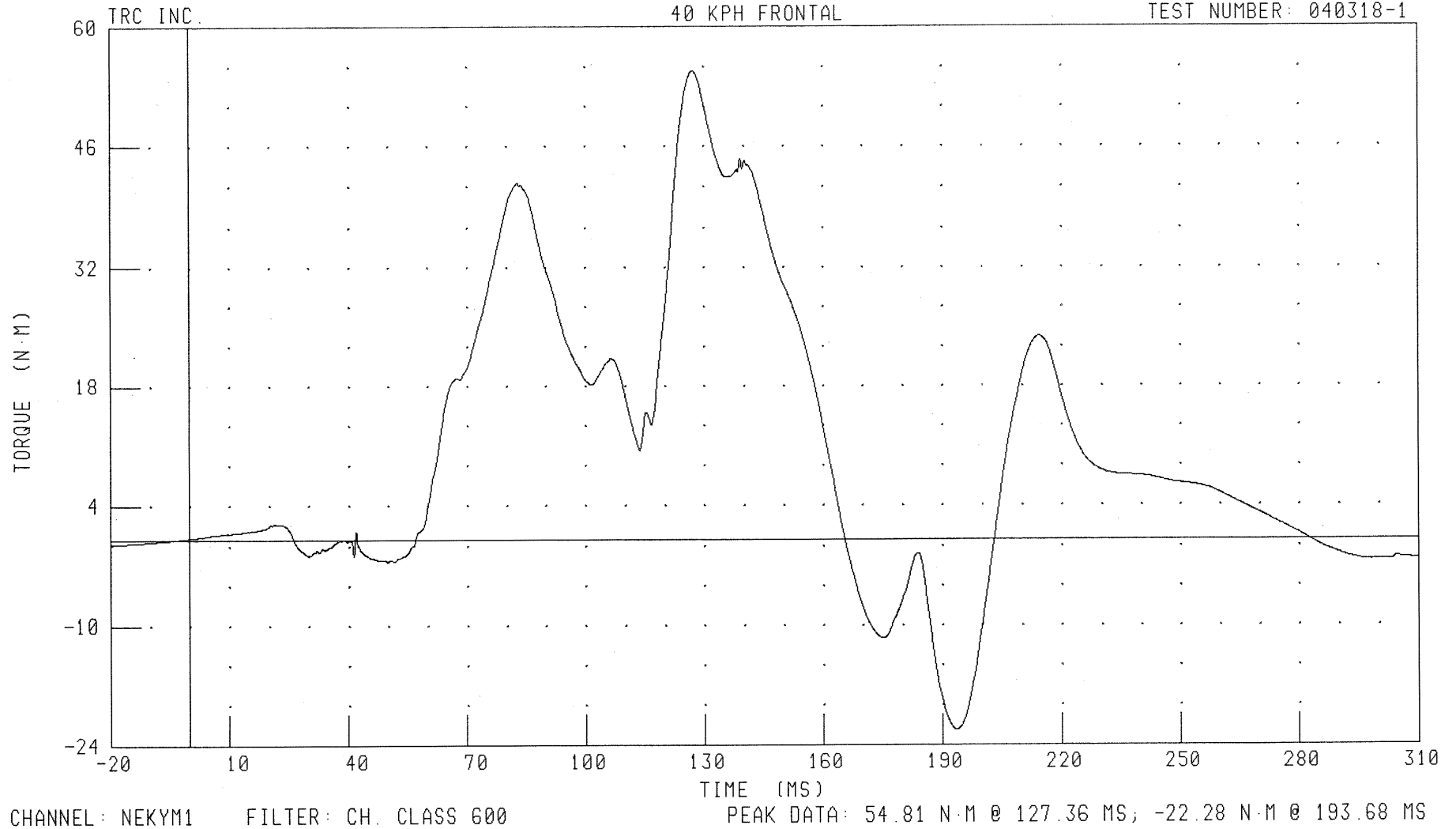


CHANNEL: NEKXM1 FILTER: CH. CLASS 600

PEAK DATA: 16.50 N·M @ 184.00 MS; -5.91 N·M @ 104.40 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 040318-1



6-10

040318-1

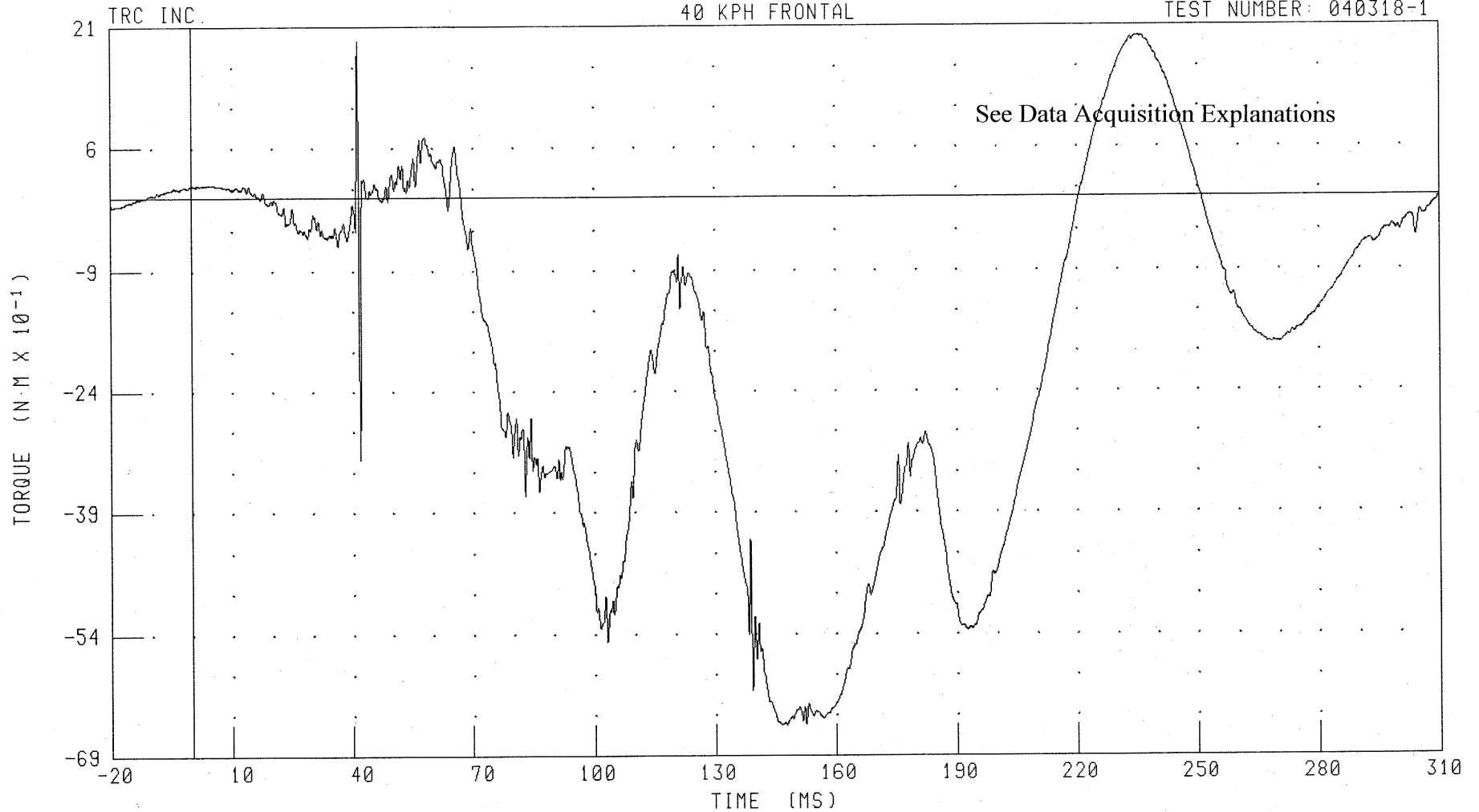
40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NECK MOMENT ABOUT Z AXIS

40 KPH FRONTAL

TEST NUMBER: 040318-1

See Data Acquisition Explanations

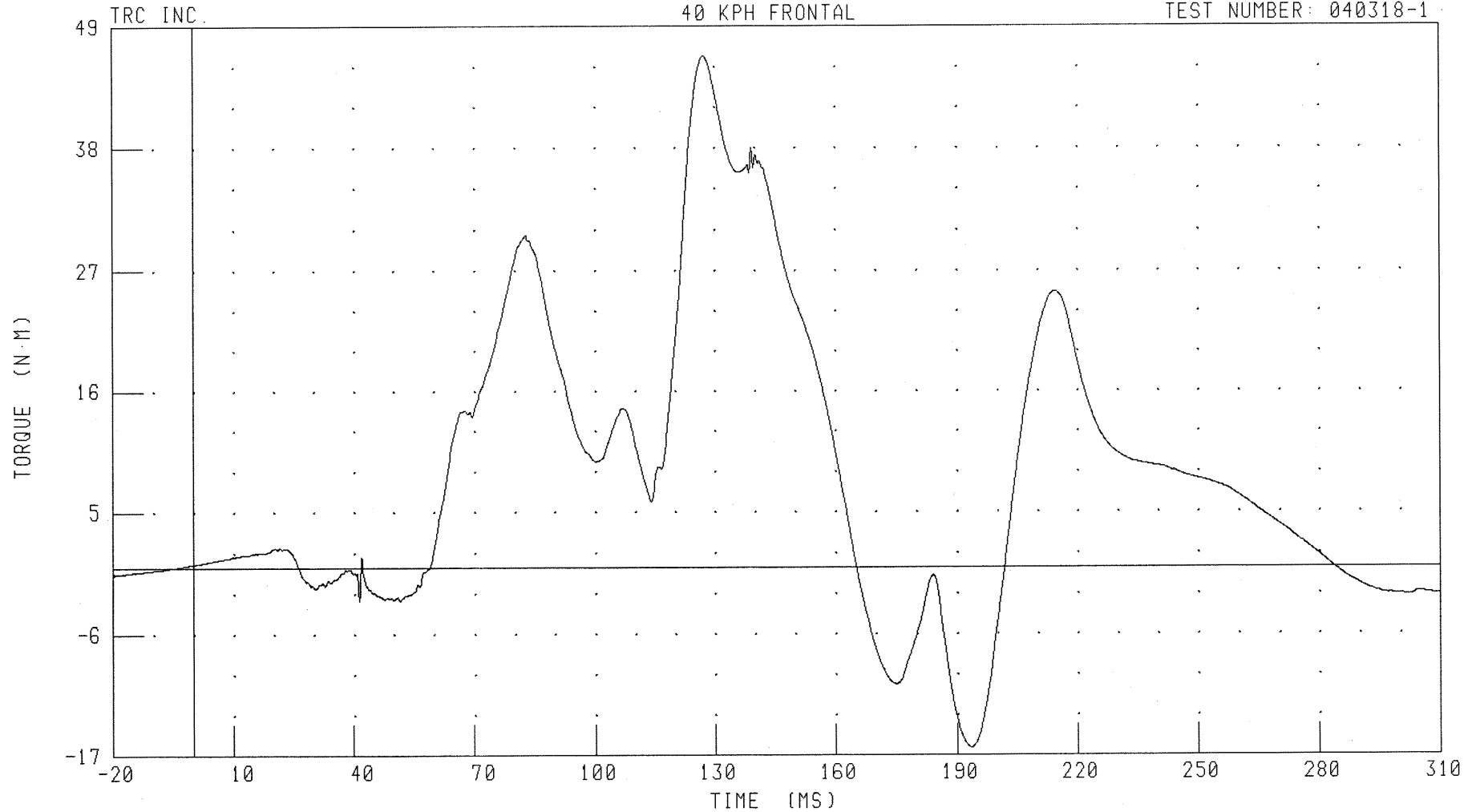


CHANNEL: NEKZM1 FILTER: CH. CLASS 600

PEAK DATA: 1.97 N·M @ 235.44 MS; -6.53 N·M @ 146.48 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
DRIVER NECK MOMENT OCCIPITAL CONDYLE ABOUT Y AXIS
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKOM1

FILTER: CH. CLASS 600

PEAK DATA: 46.30 N·M @ 127.36 MS; -16.33 N·M @ 193.52 MS

6-12

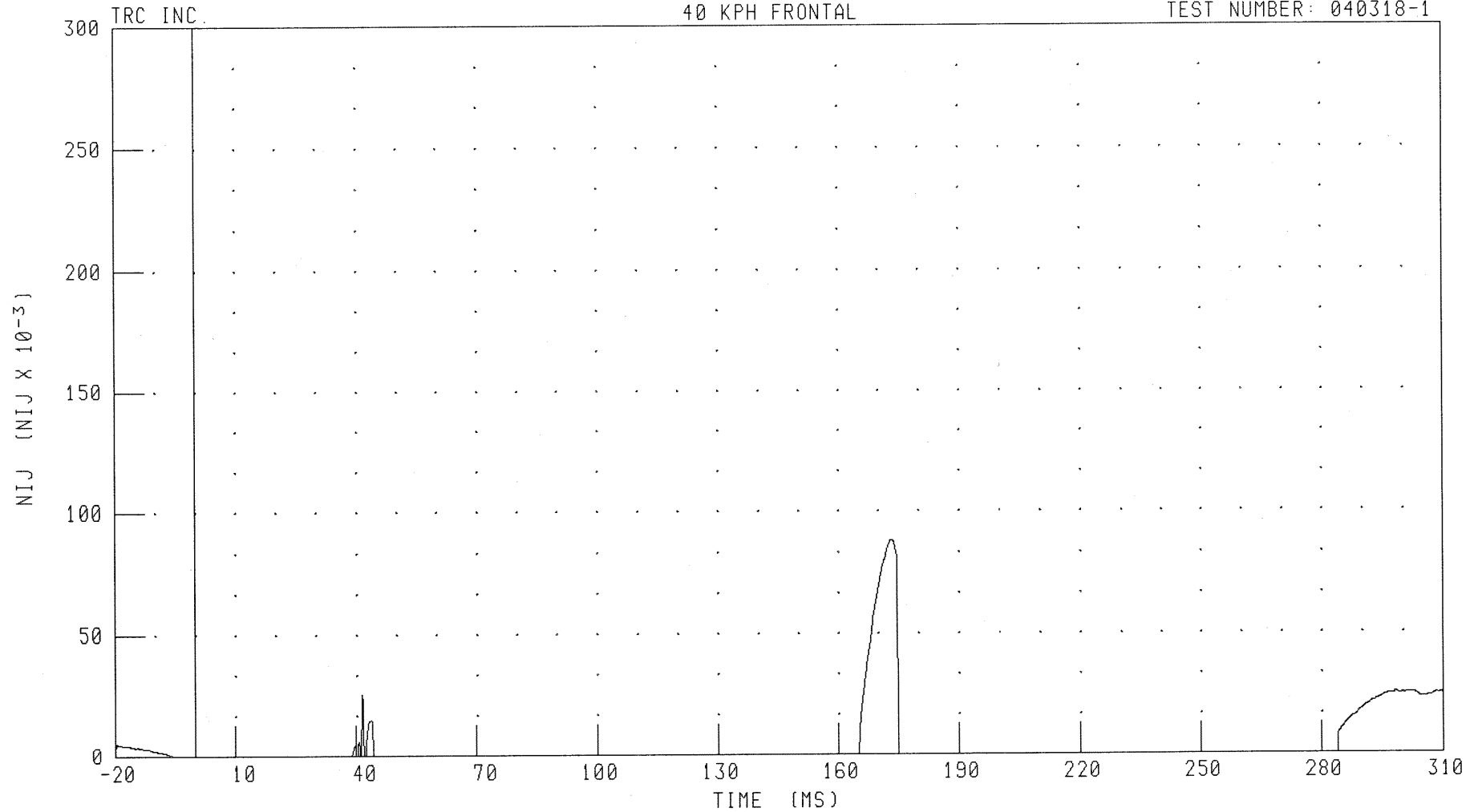
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NIJ TENSION/EXTENSION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NTE1

FILTER: CH. CLASS 600

PEAK DATA: 0.09 NIJ @ 173.28 MS; 0.00 NIJ @ -5.84 MS

6-13

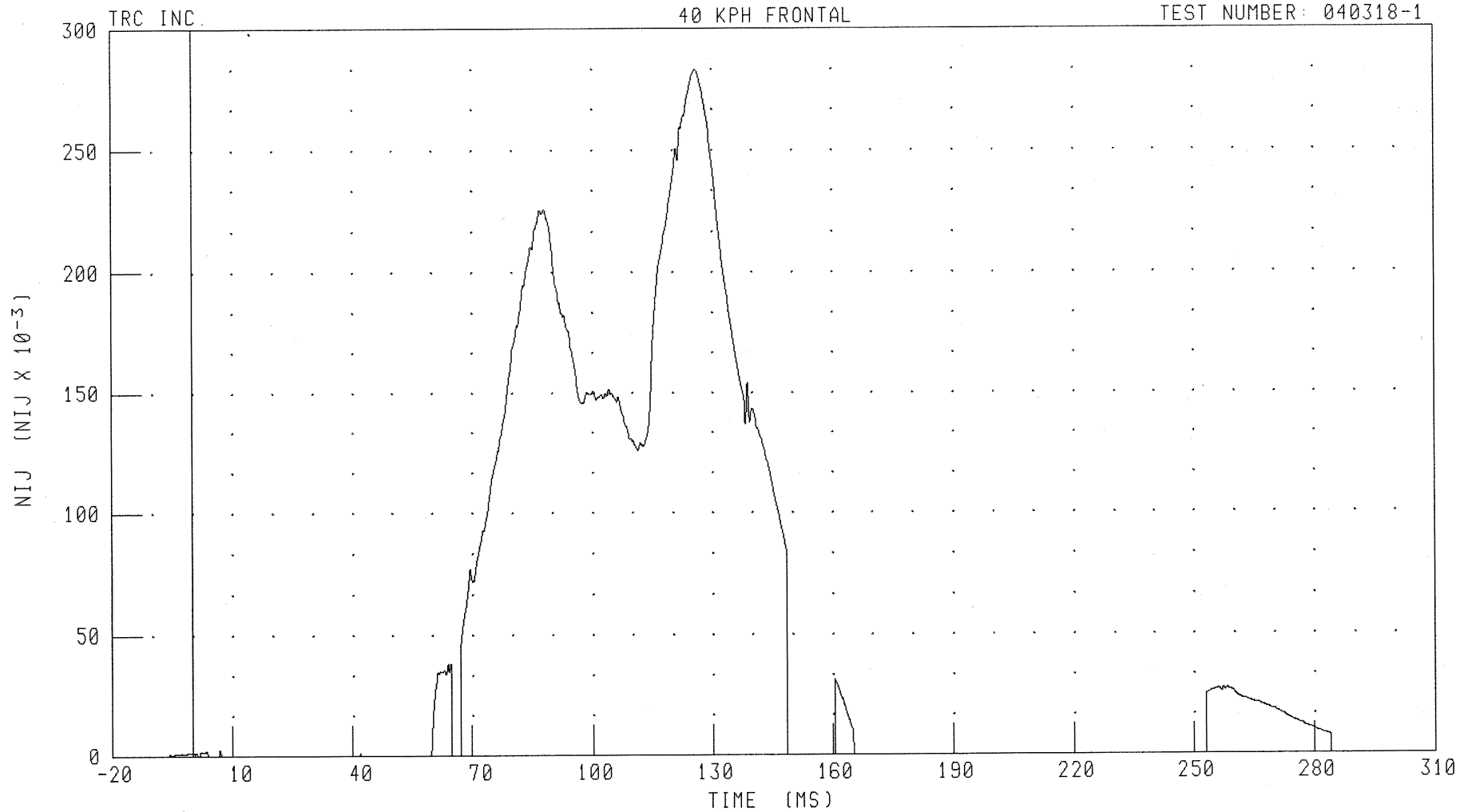
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NIJ TENSION/FLEXION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NTF1

FILTER: CH. CLASS 600

PEAK DATA: 0.28 NIJ @ 126.00 MS; 0.00 NIJ @ -20.00 MS

6-14

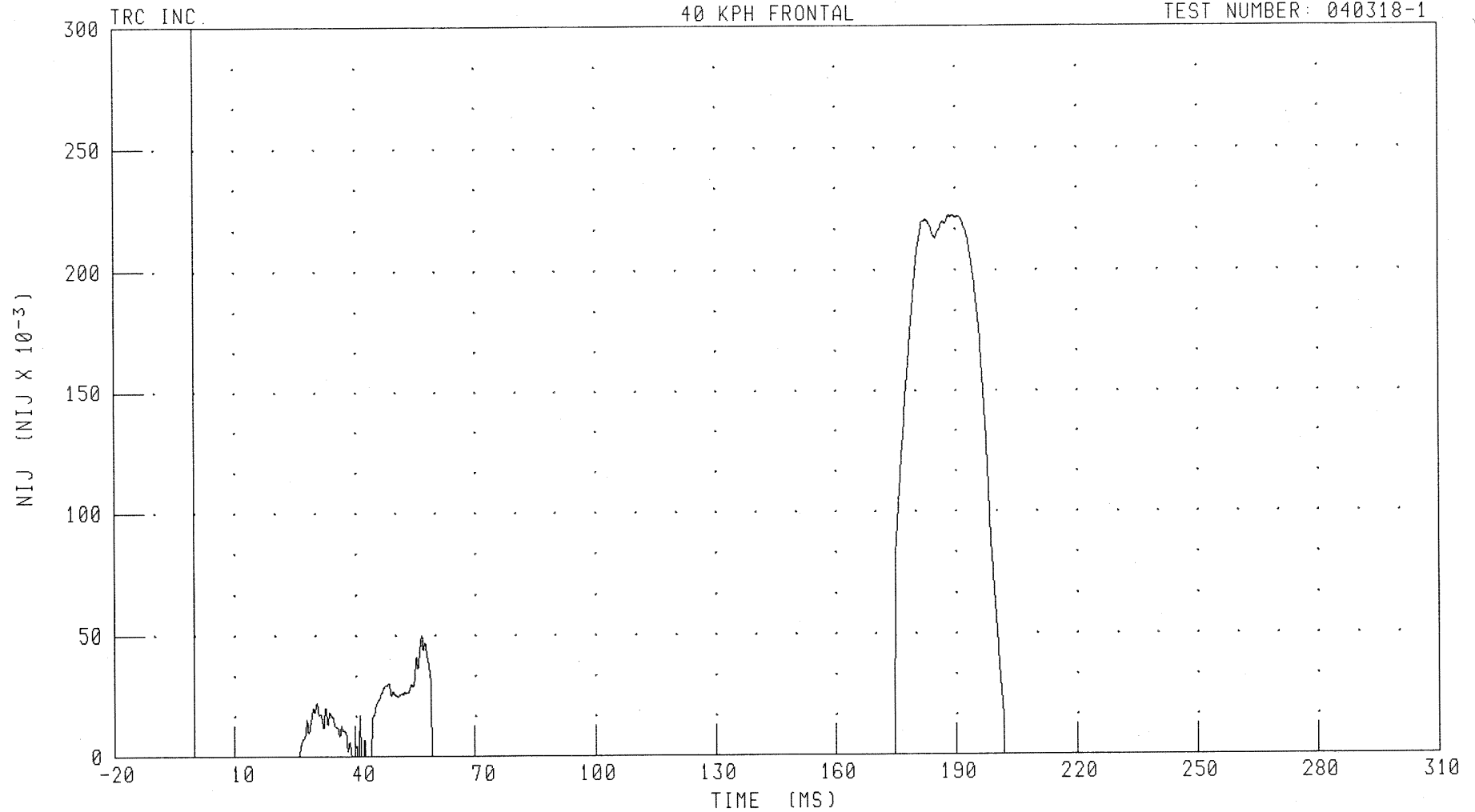
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NIJ COMPRESSION/EXTENSION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NCE1

FILTER: CH. CLASS 600

PEAK DATA: 0.22 NIJ @ 189.52 MS; 0.00 NIJ @ -20.00 MS

6-15

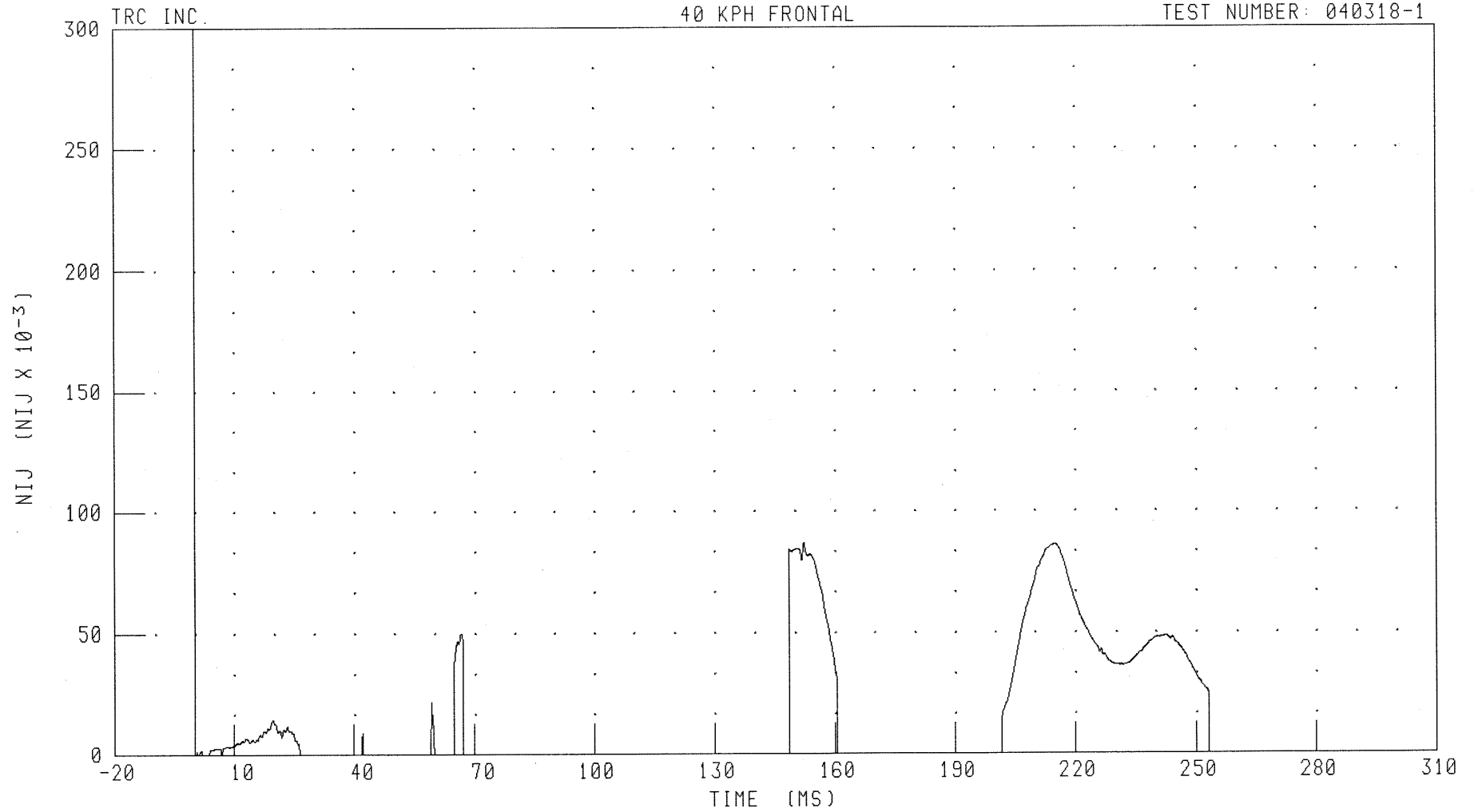
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER NIJ COMPRESSION/FLEXION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NCF1

FILTER: CH. CLASS 600

PEAK DATA: 0.09 NIJ @ 152.32 MS; 0.00 NIJ @ -20.00 MS

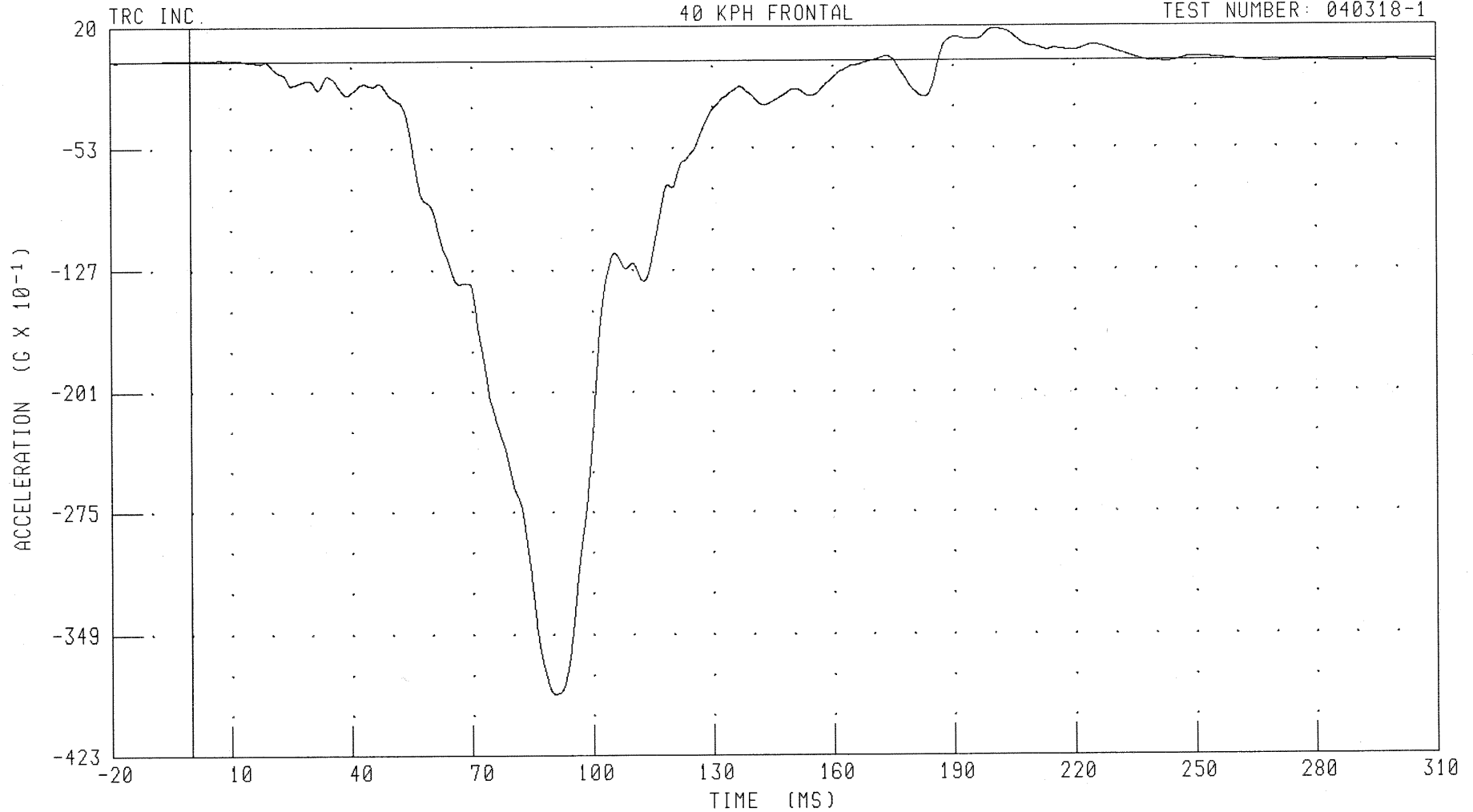
6-16

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
DRIVER CHEST X-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 1.96 G @ 200.80 MS; -38.54 G @ 90.48 MS

6-17

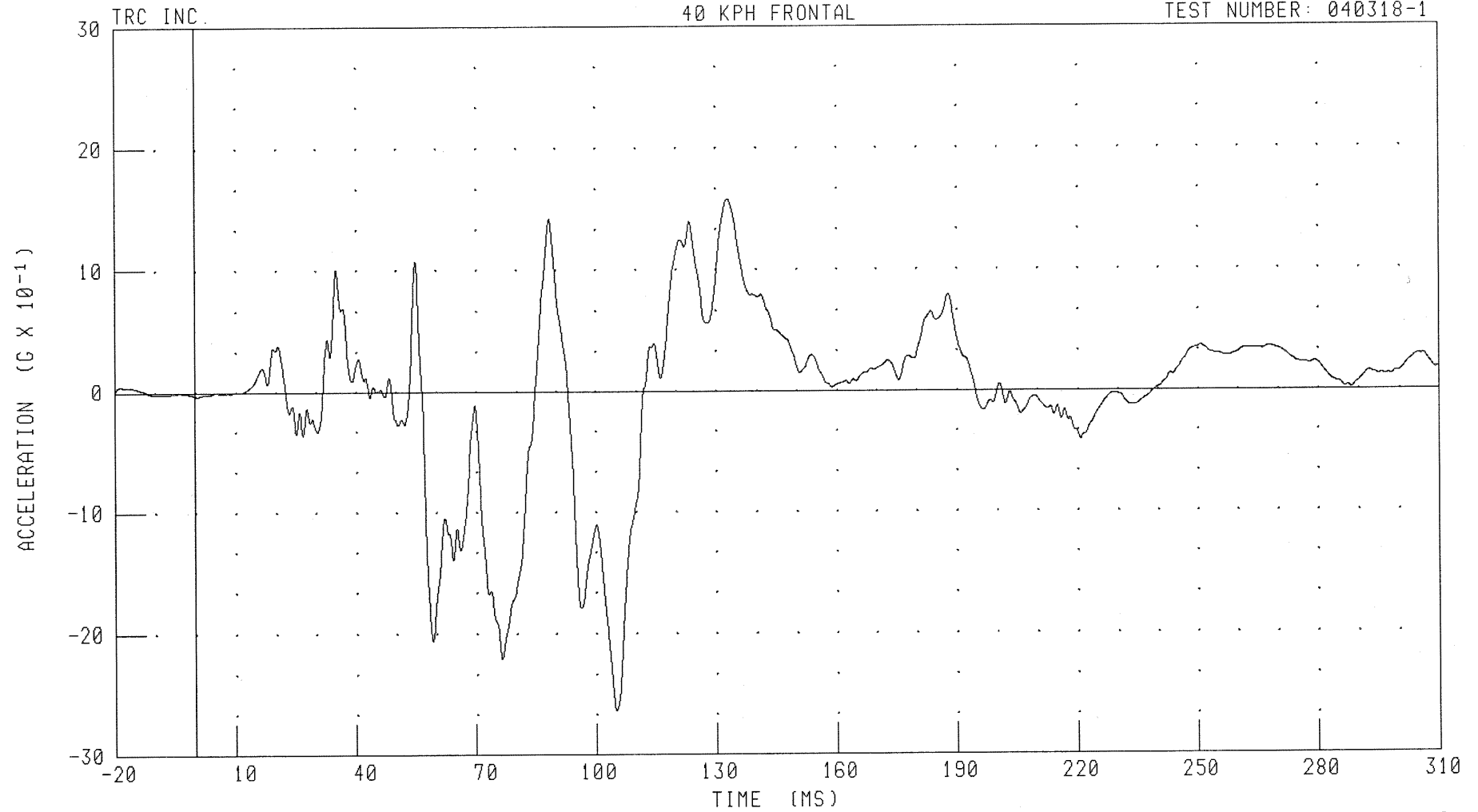
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER CHEST Y-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

PEAK DATA: 1.58 G @ 133.04 MS; -2.64 G @ 105.12 MS

6-18

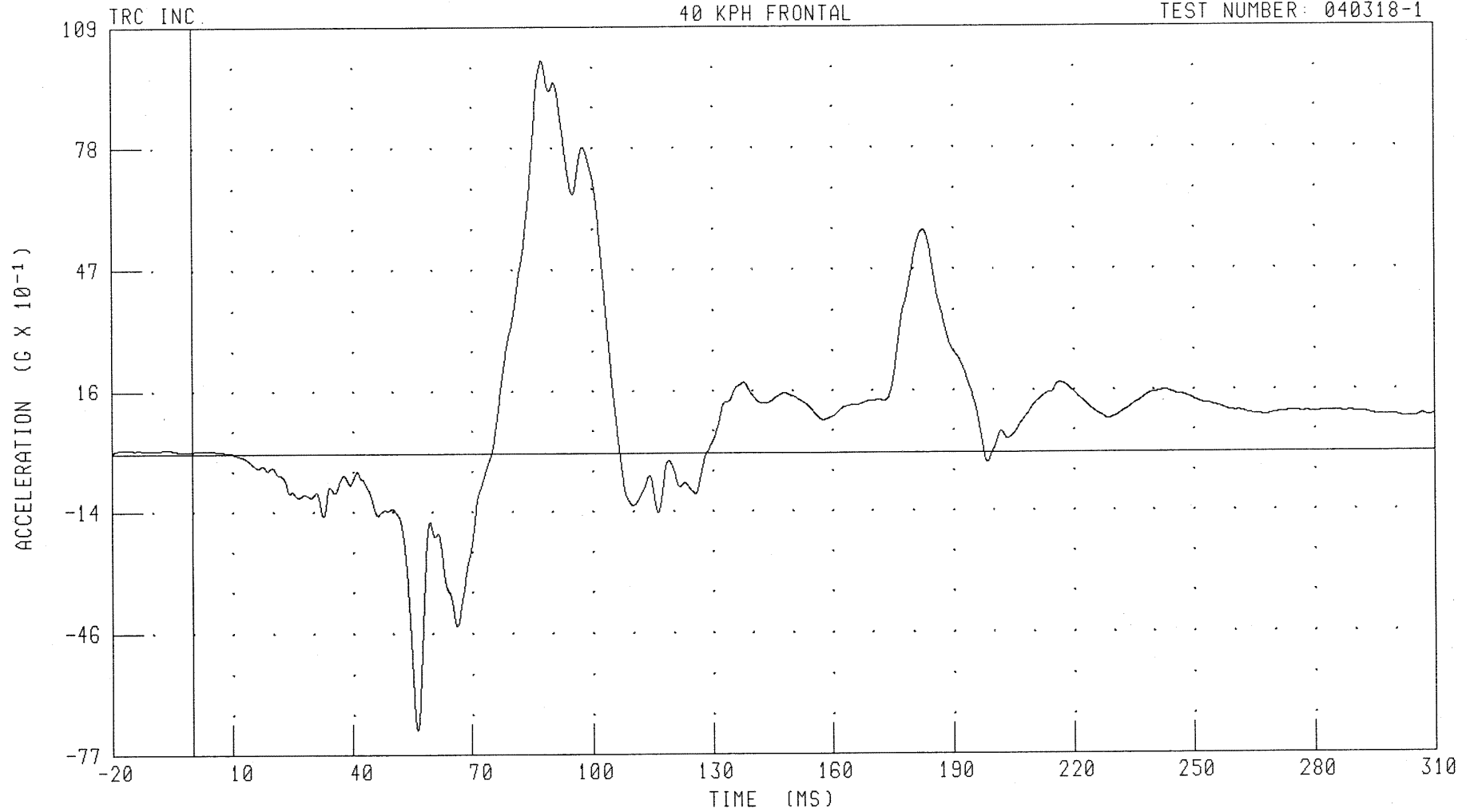
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER CHEST Z-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 10.04 G @ 87.68 MS; -7.08 G @ 56.24 MS

6-19

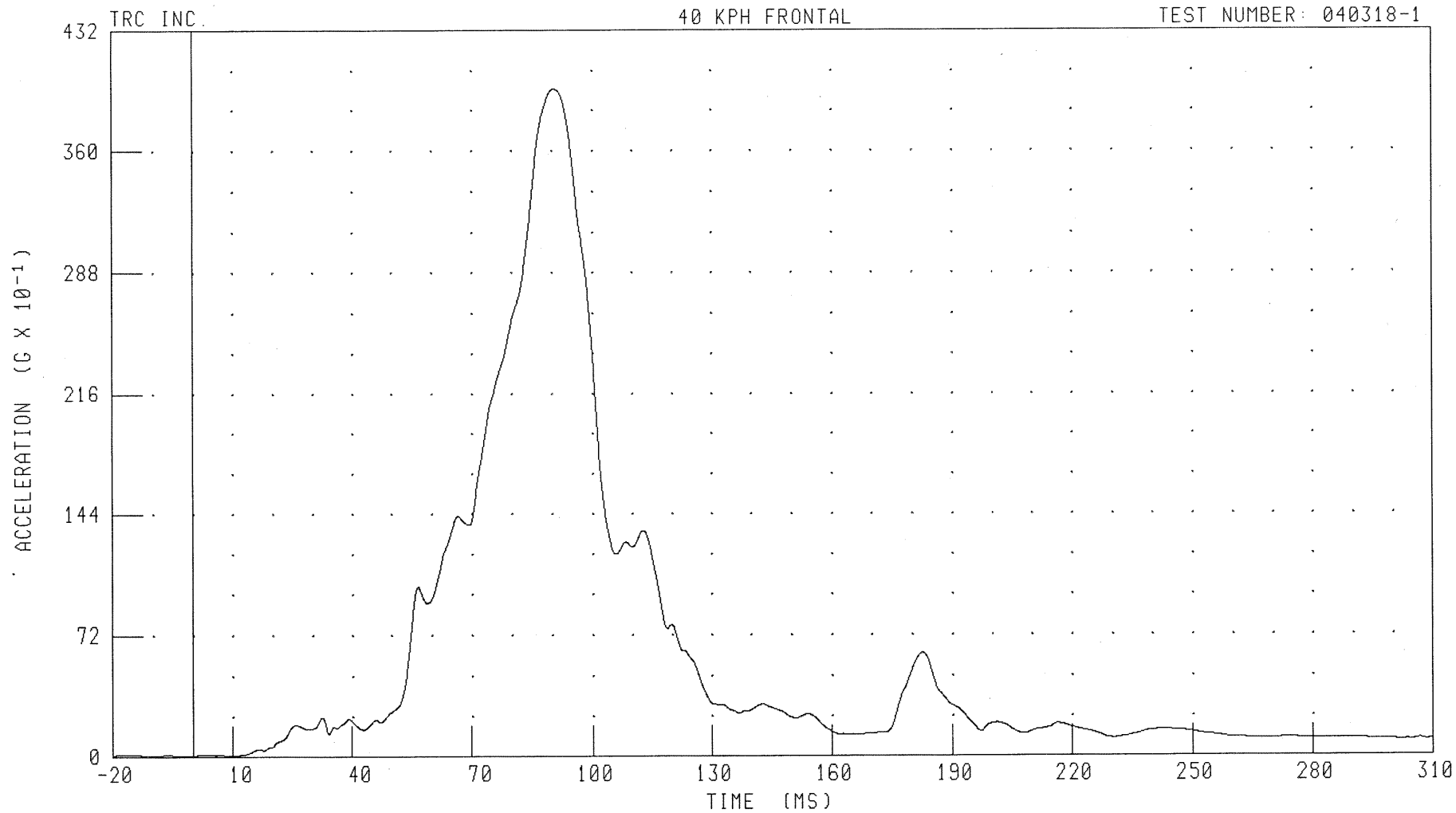
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER CHEST RESULTANT ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTRG1

FILTER: CH. CLASS 180

PEAK DATA: 39.69 G @ 90.56 MS; 0.01 G @ -20.00 MS

6-20

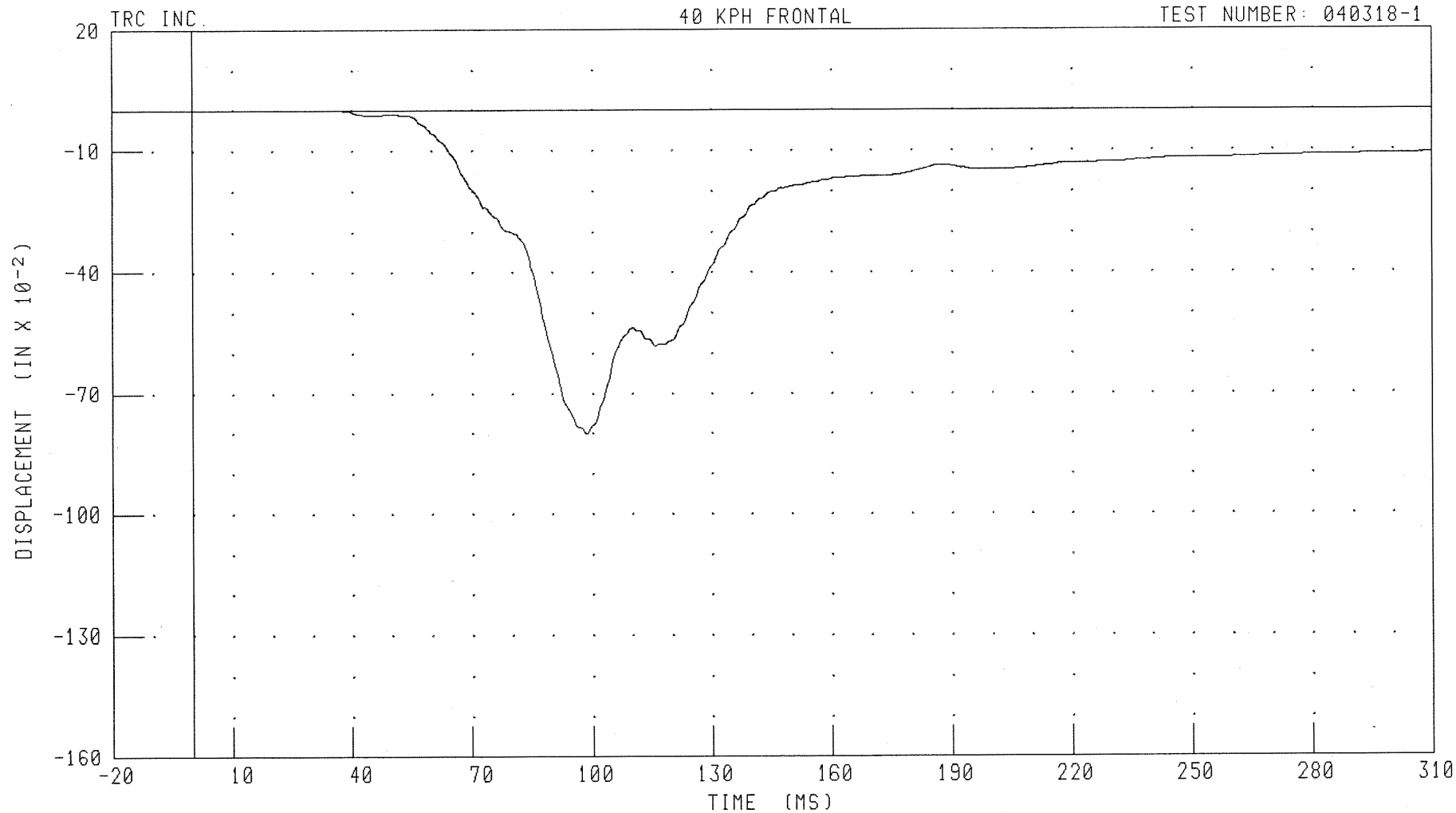
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER CHEST DEFLECTION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTXD1 FILTER: CH. CLASS 600

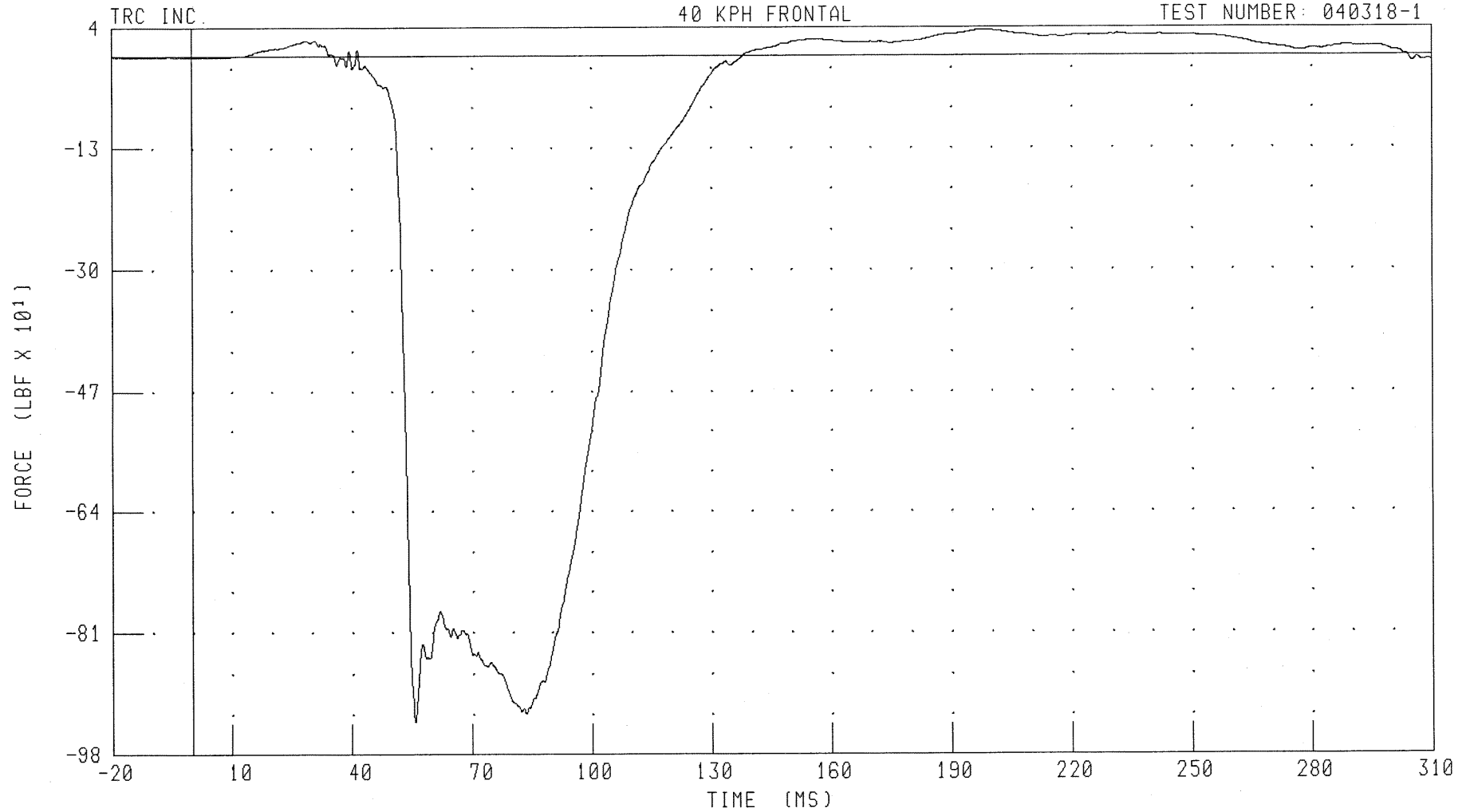
PEAK DATA: 0.00 IN @ 23.68 MS; -0.80 IN @ 98.72 MS

6-21

040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
DRIVER LEFT FEMUR FORCE

TEST NUMBER: 040318-1



CHANNEL: LFMZF1 FILTER: CH. CLASS 600

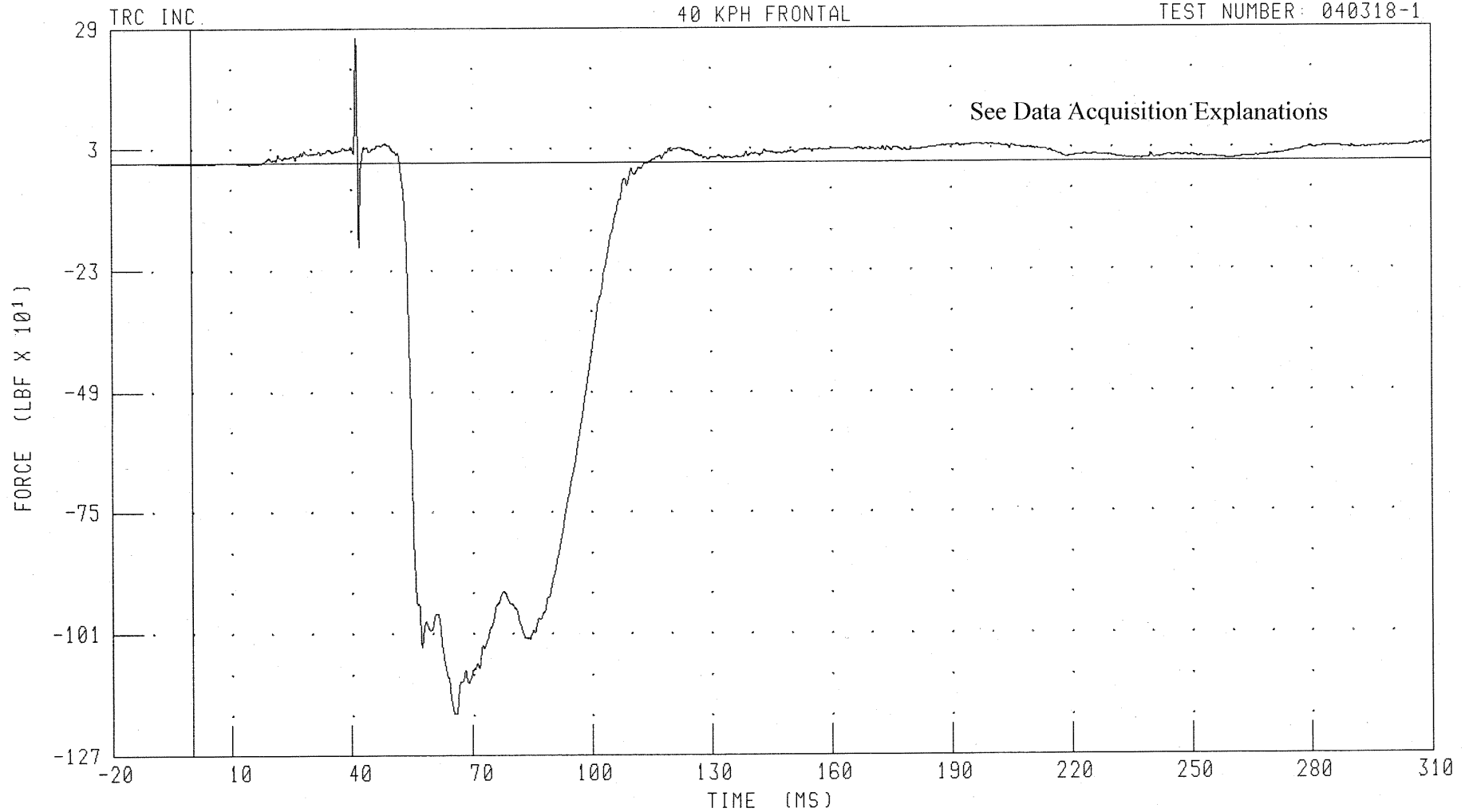
PEAK DATA: 36.53 LBF @ 198.72 MS; -934.44 LBF @ 55.76 MS

40 KMPH FRONTAL 2004 SATURN ION C40113

DRIVER RIGHT FEMUR FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1

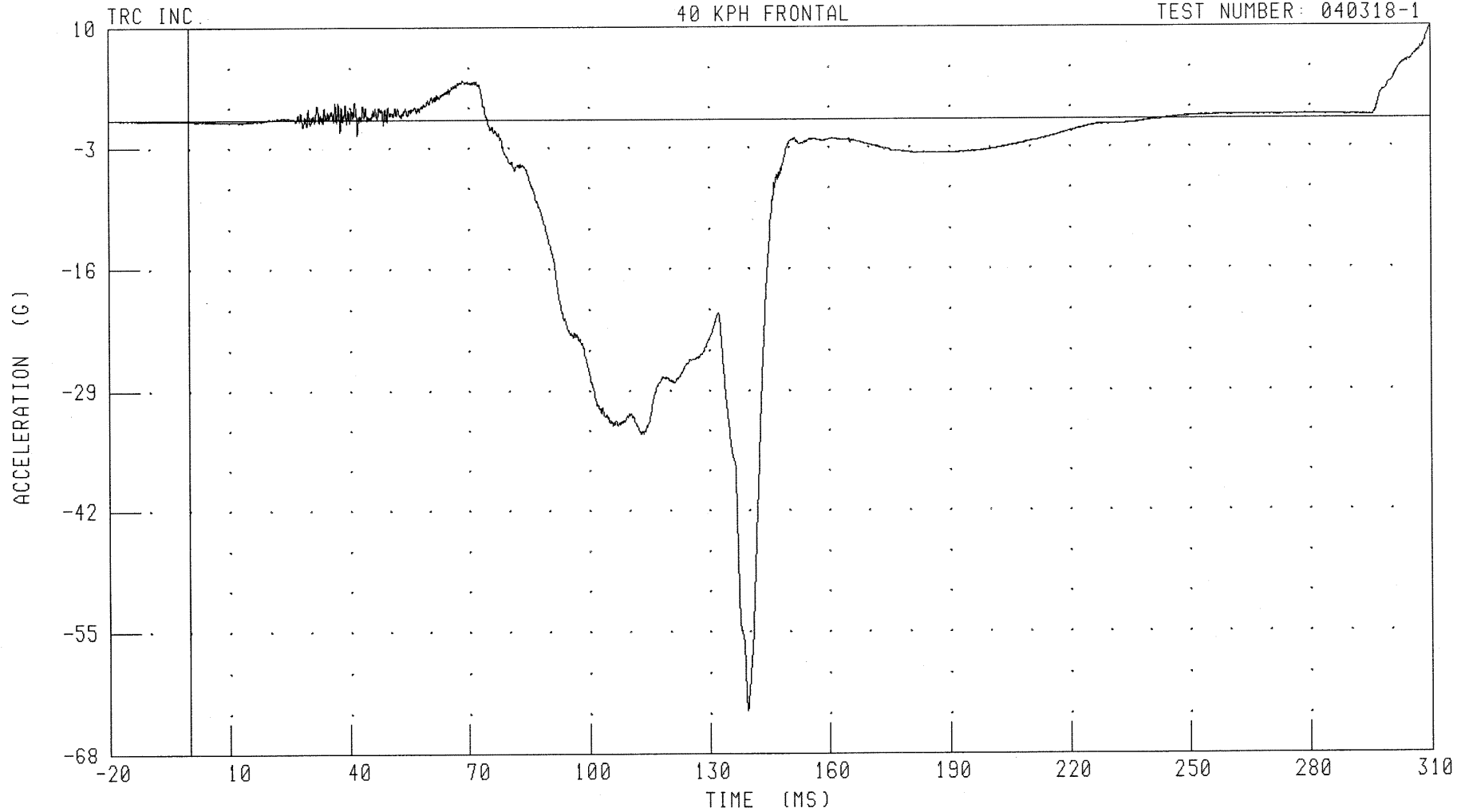


CHANNEL: RFMZFI FILTER: CH. CLASS 600

PEAK DATA: 270.42 LBF @ 41.52 MS; -1179.86 LBF @ 65.92 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

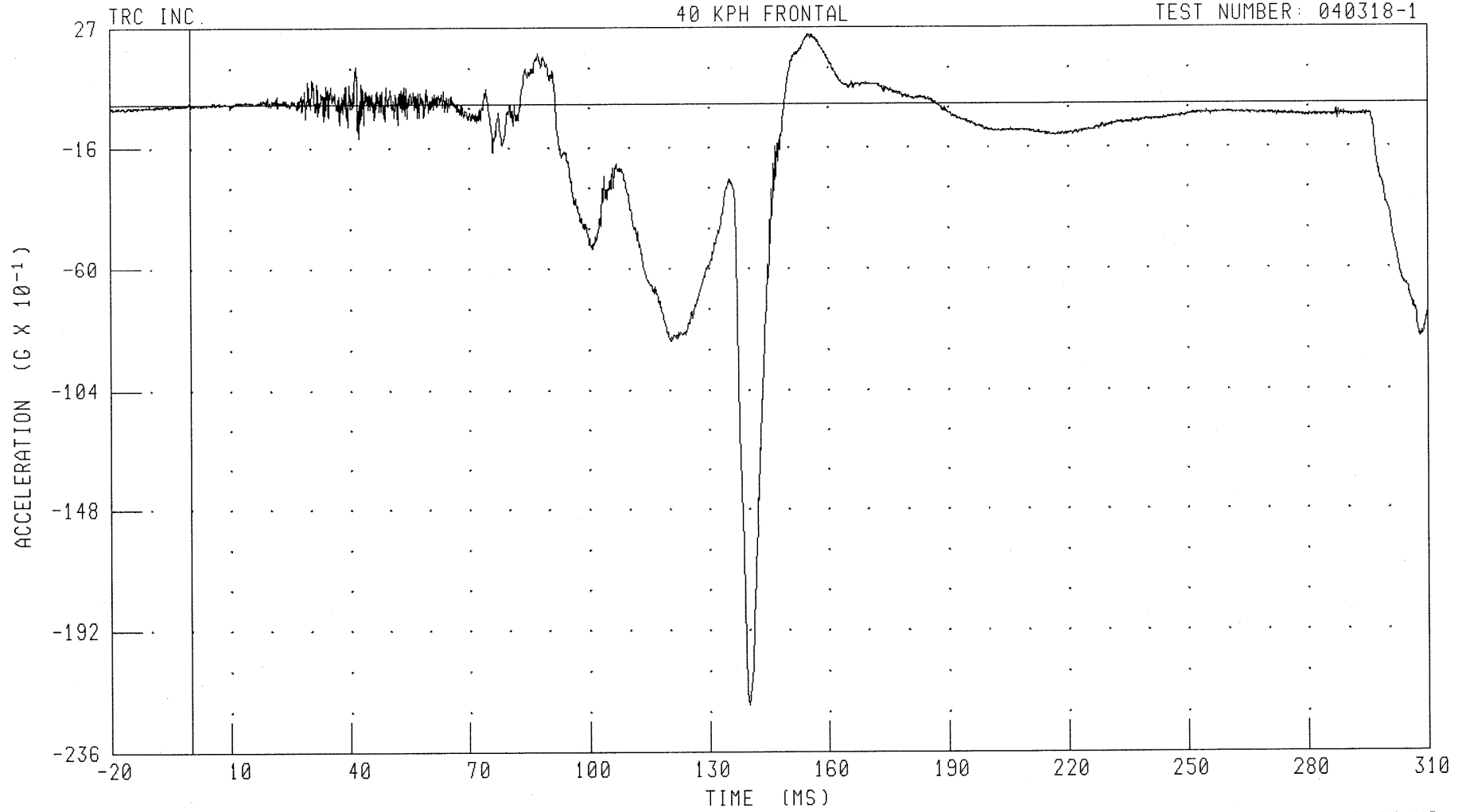
PEAK DATA: 9.96 G @ 310.00 MS; -63.35 G @ 139.52 MS

6-24

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



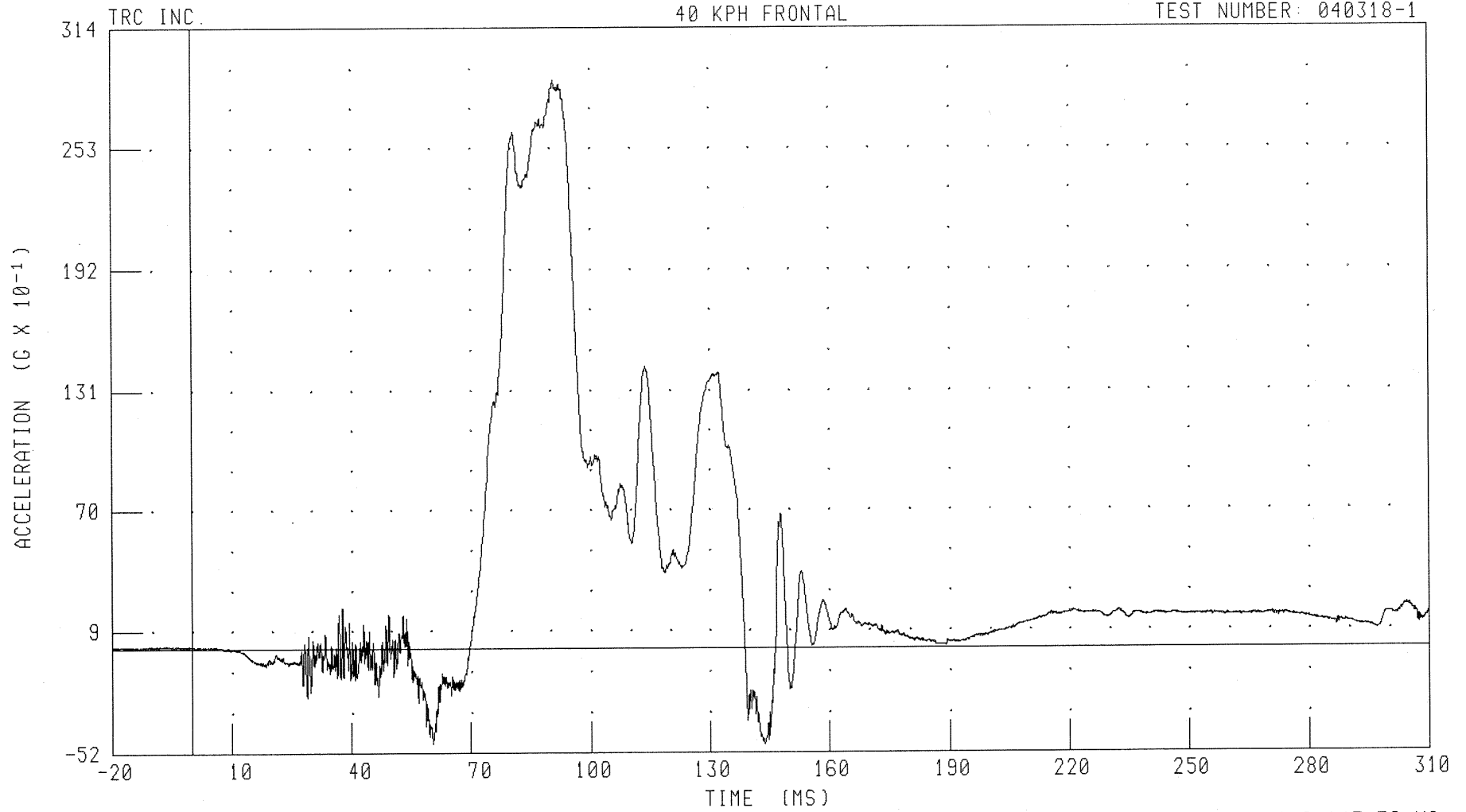
CHANNEL: HEDYC2 FILTER: CH. CLASS 1000

6-25

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



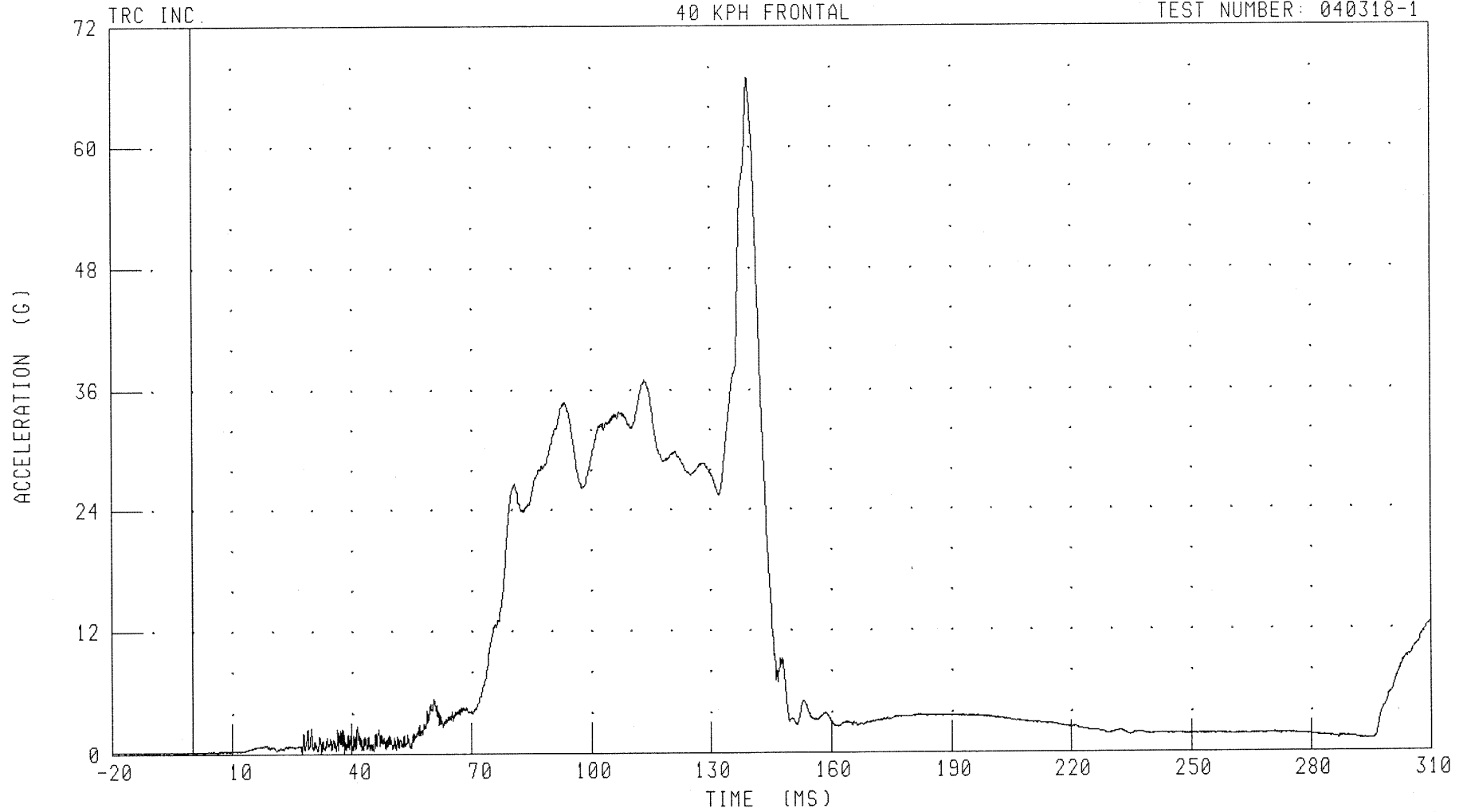
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

6-26

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



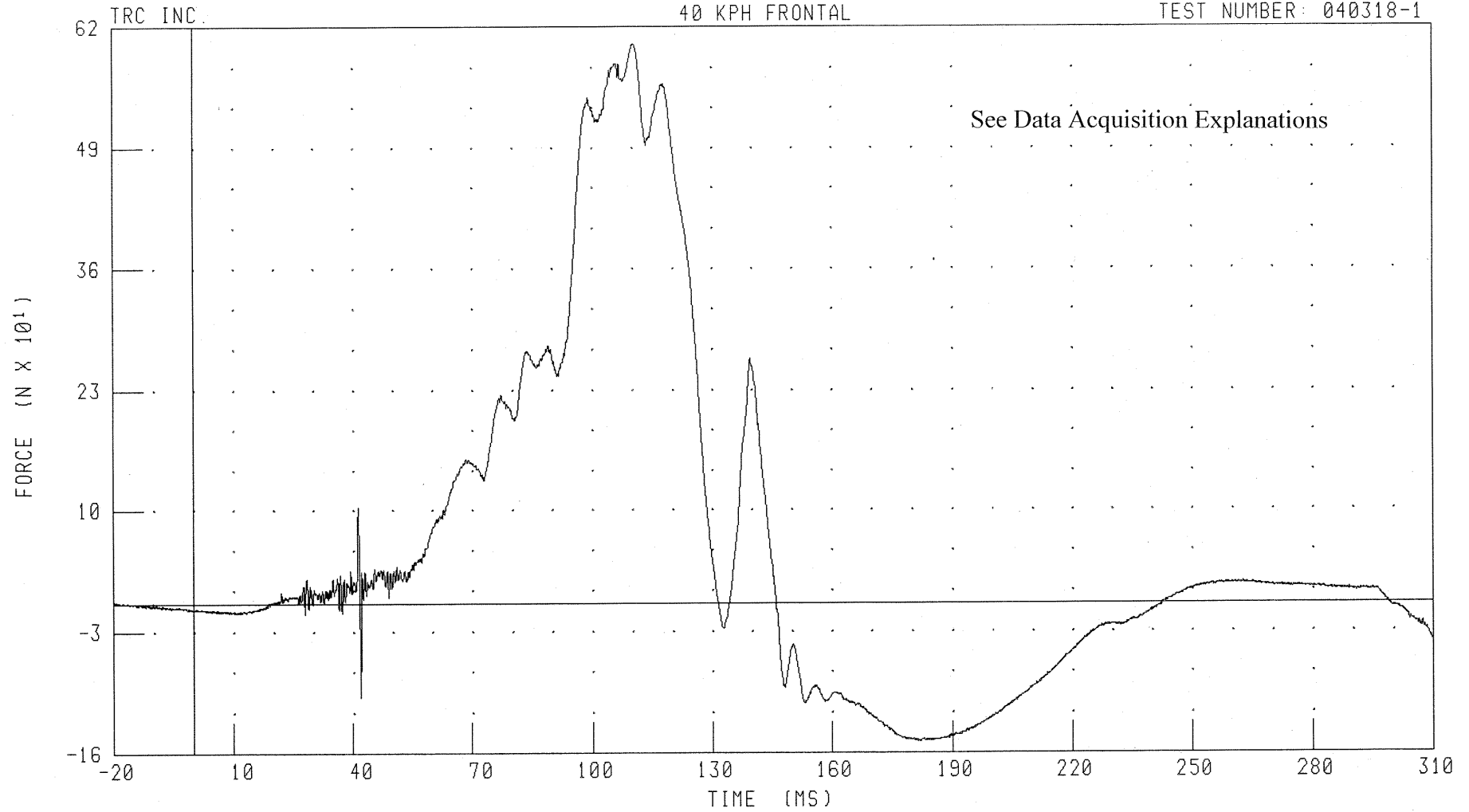
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

PEAK DATA: 66.99 G @ 139.52 MS; 0.06 G @ 38.24 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
40 KPH FRONTAL

TEST NUMBER: 040318-1

See Data Acquisition Explanations

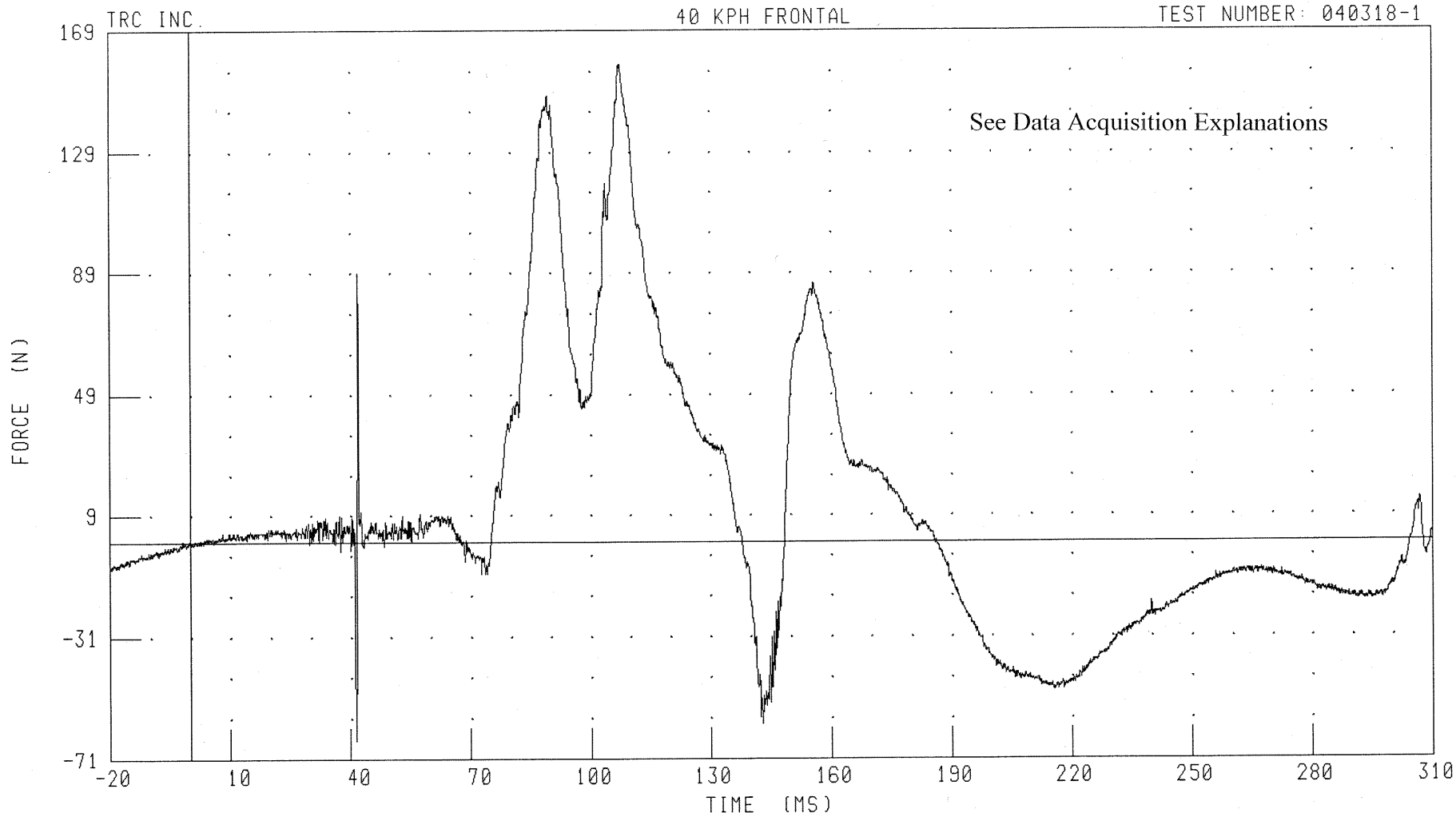


CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

PEAK DATA: 601.61 N @ 110.61 MS; -147.88 N @ 181.44 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

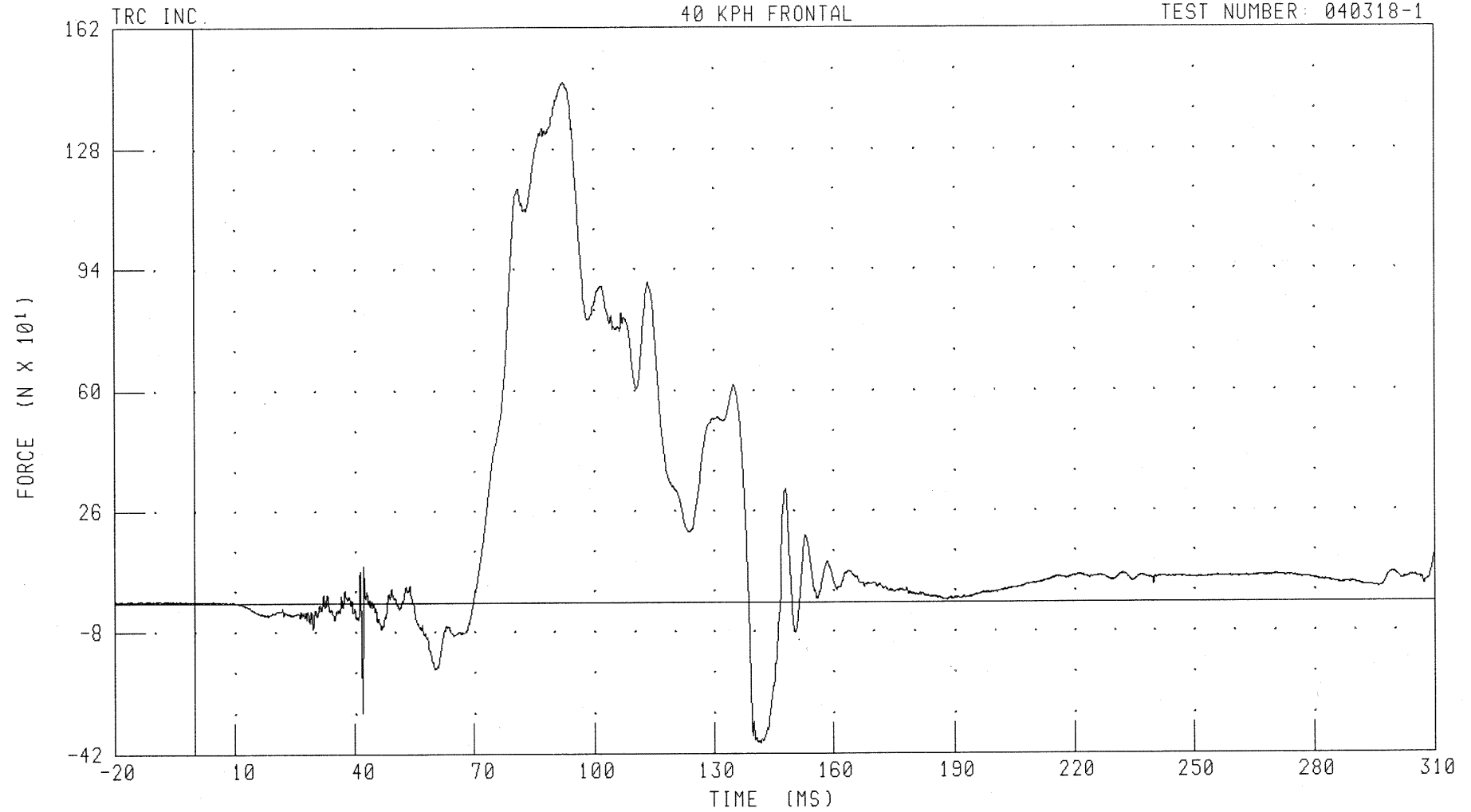
PEAK DATA: 158.05 N @ 107.36 MS; -64.92 N @ 41.44 MS

6-29

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

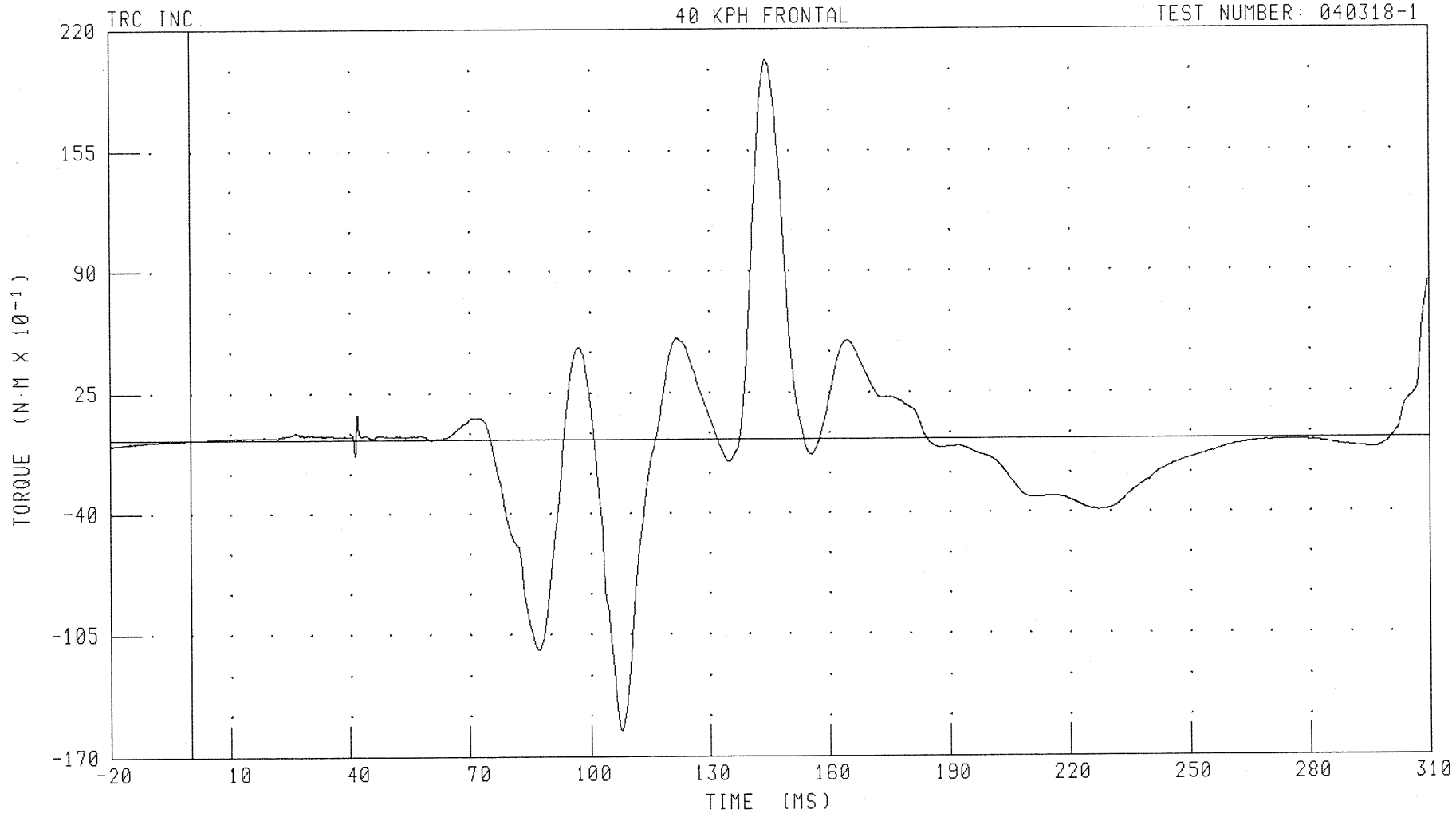
PEAK DATA: 1468.56 N @ 92.48 MS; -390.34 N @ 141.68 MS

6-30

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 040318-1



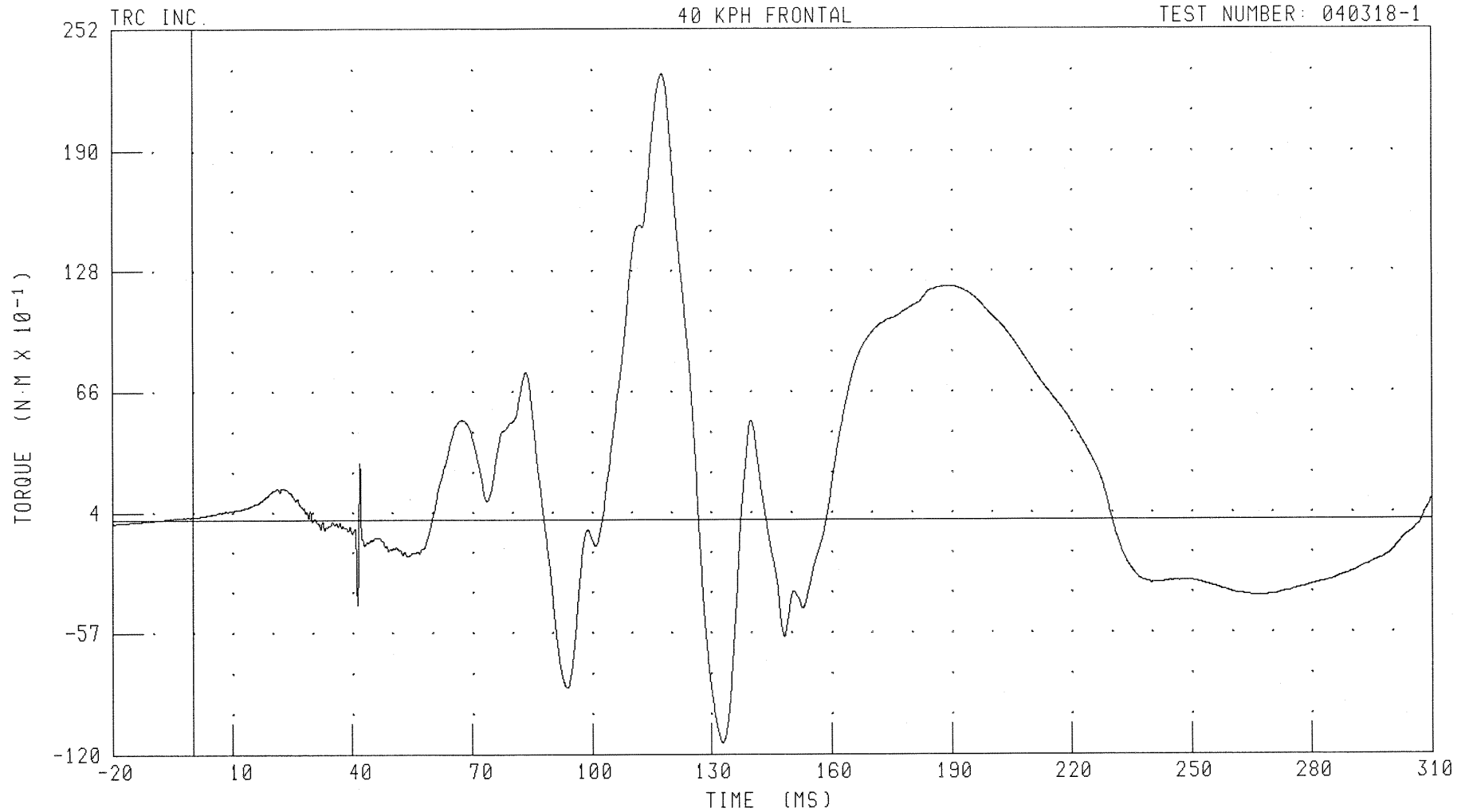
CHANNEL: NEKXM2 FILTER: CH. CLASS 600

6-31

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

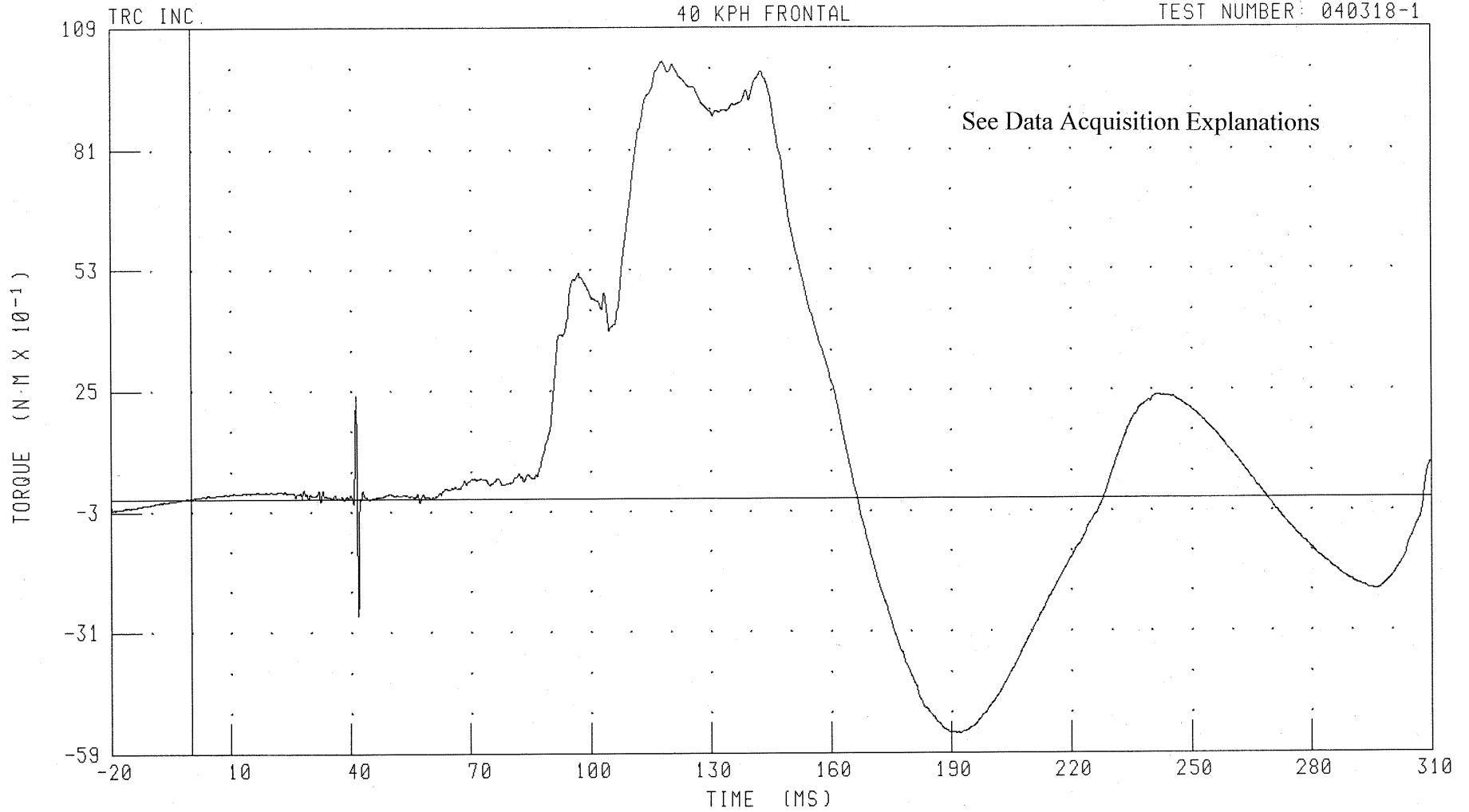
PEAK DATA: 22.93 N·M @ 117.92 MS; -11.42 N·M @ 132.96 MS

6-32

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS
40 KPH FRONTAL

TEST NUMBER: 040318-1



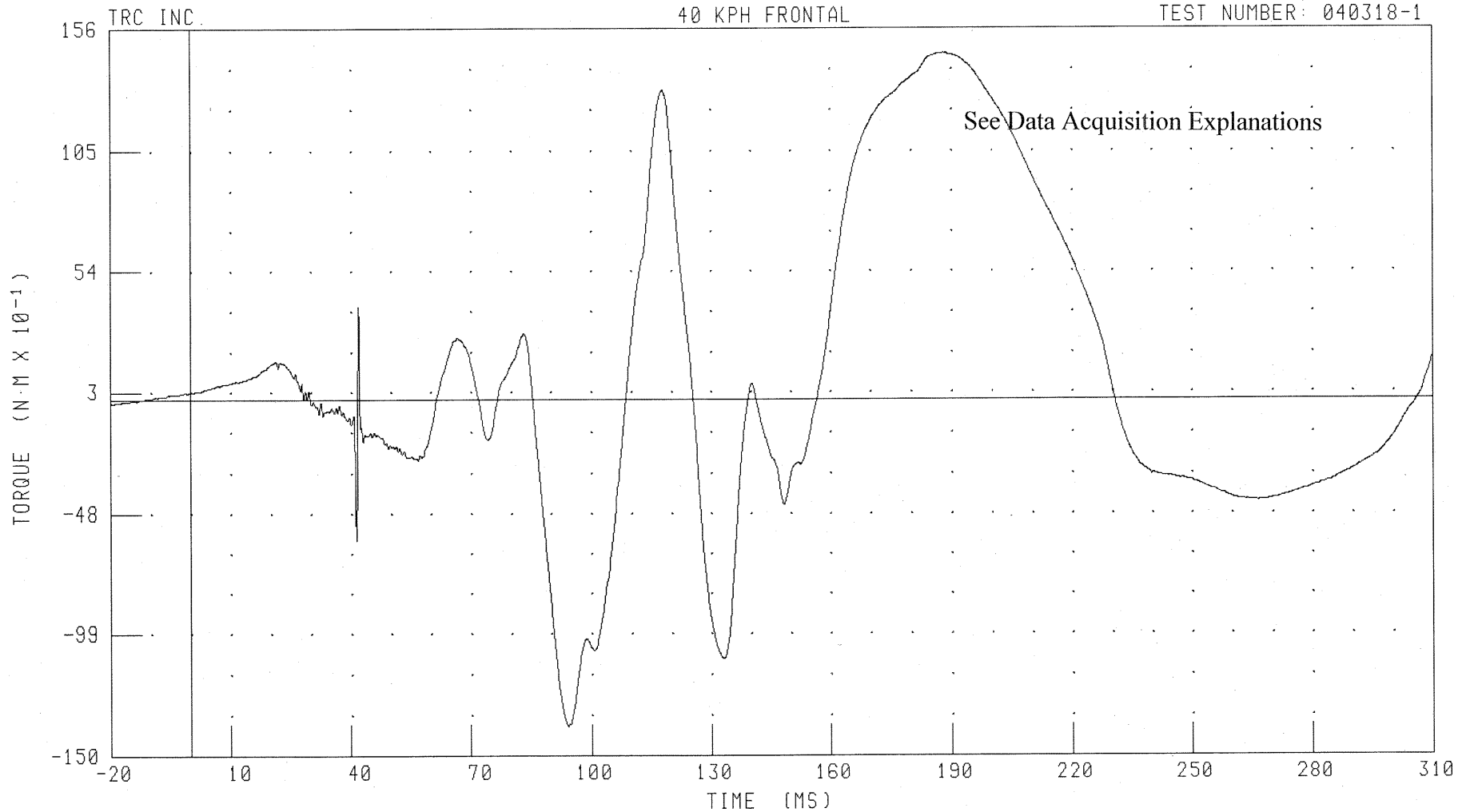
CHANNEL: NEKZM2 FILTER: CH. CLASS 600

PEAK DATA: 10.11 N·M @ 118.32 MS; -5.44 N·M @ 192.48 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NECK MOMENT OCCIPITAL CONDYLE ABOUT Y AXIS

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NEKOM2

FILTER: CH. CLASS 600

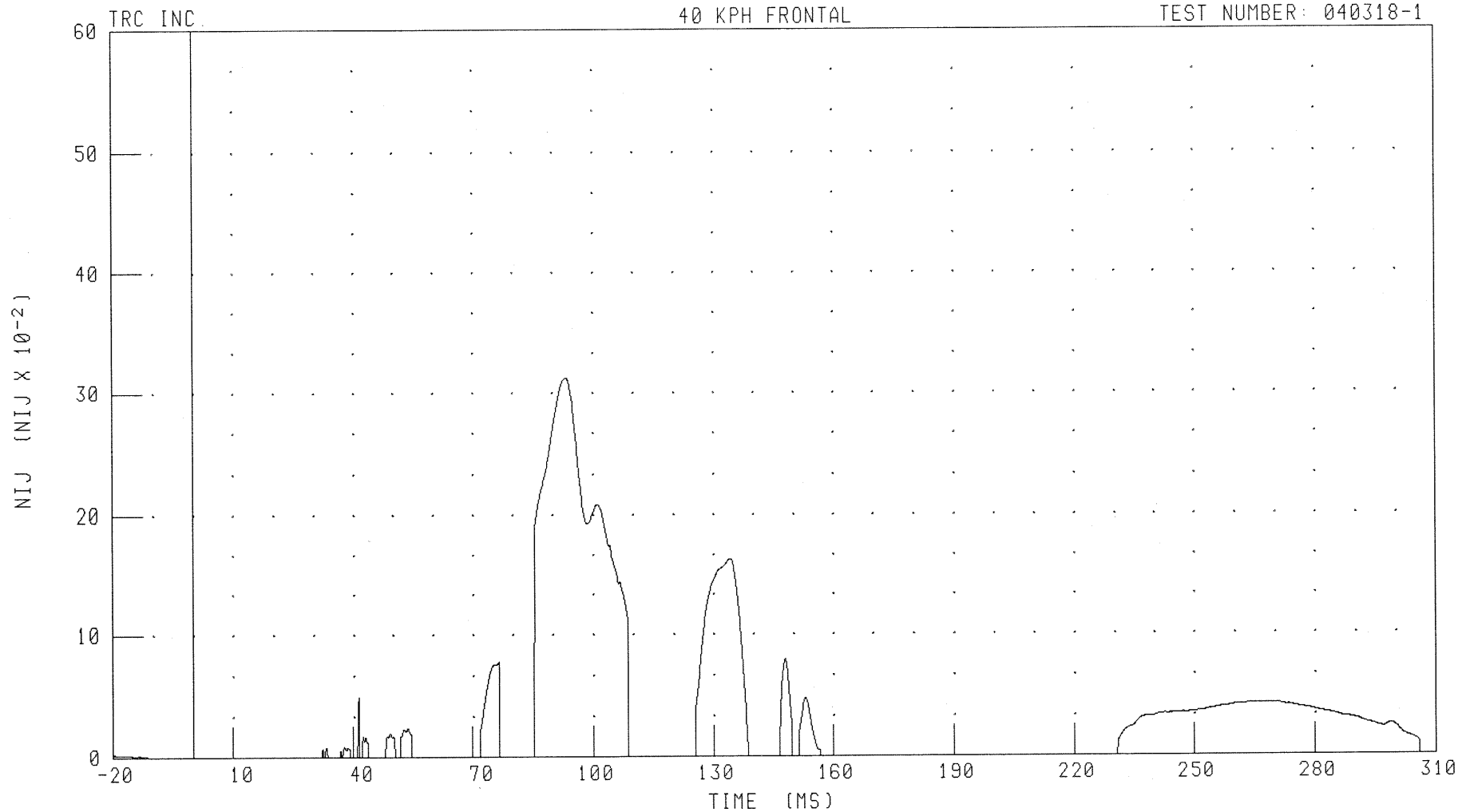
PEAK DATA: 14.56 N·M @ 188.96 MS; -13.78 N·M @ 94.16 MS

B-634

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NIJ TENSION/EXTENSION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NTE2

FILTER: CH. CLASS 600

PEAK DATA: 0.31 NIJ @ 93.52 MS; 0.00 NIJ @ -11.36 MS

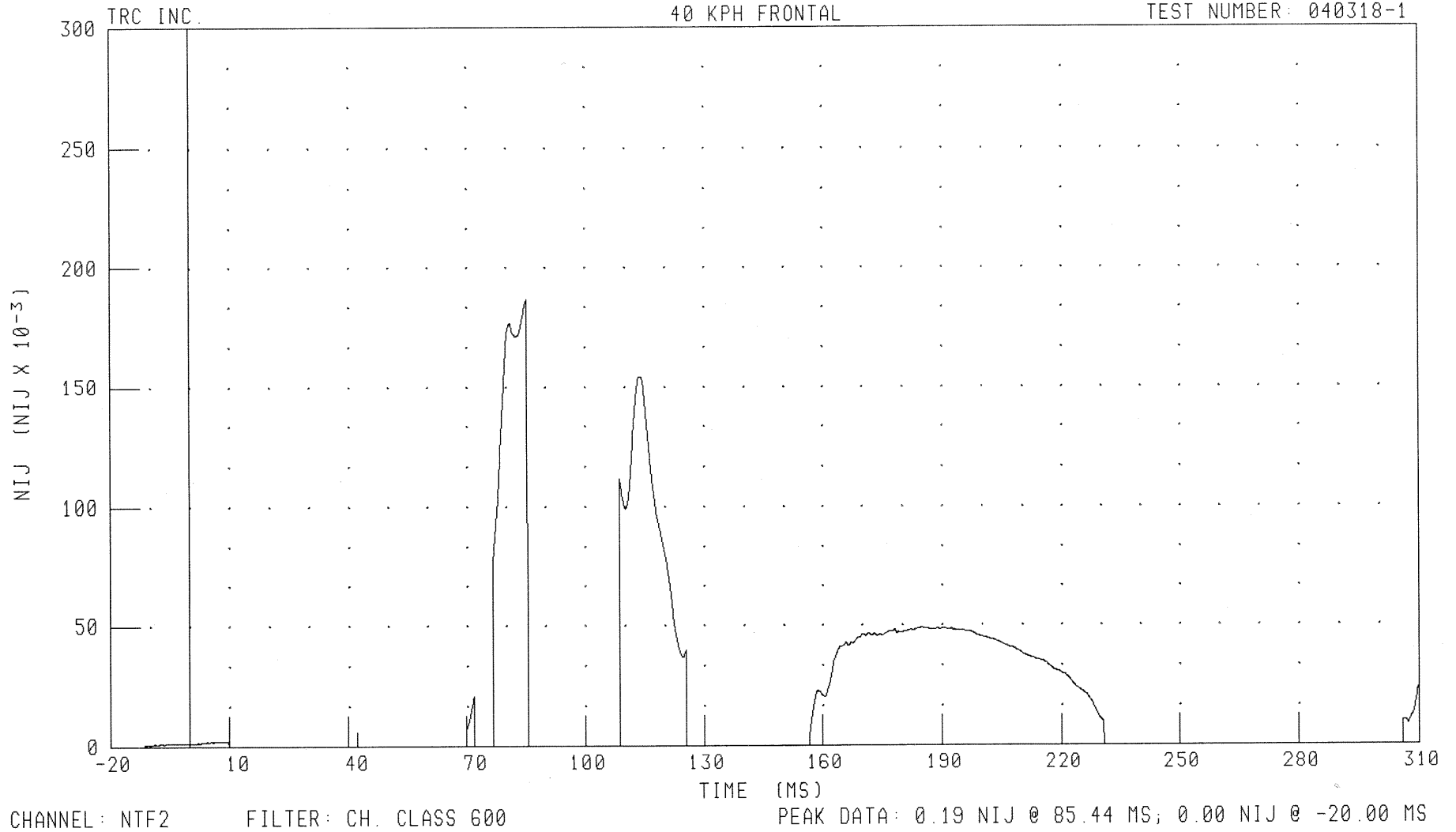
6-35

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NIJ TENSION/FLEXION

40 KPH FRONTAL

TEST NUMBER: 040318-1

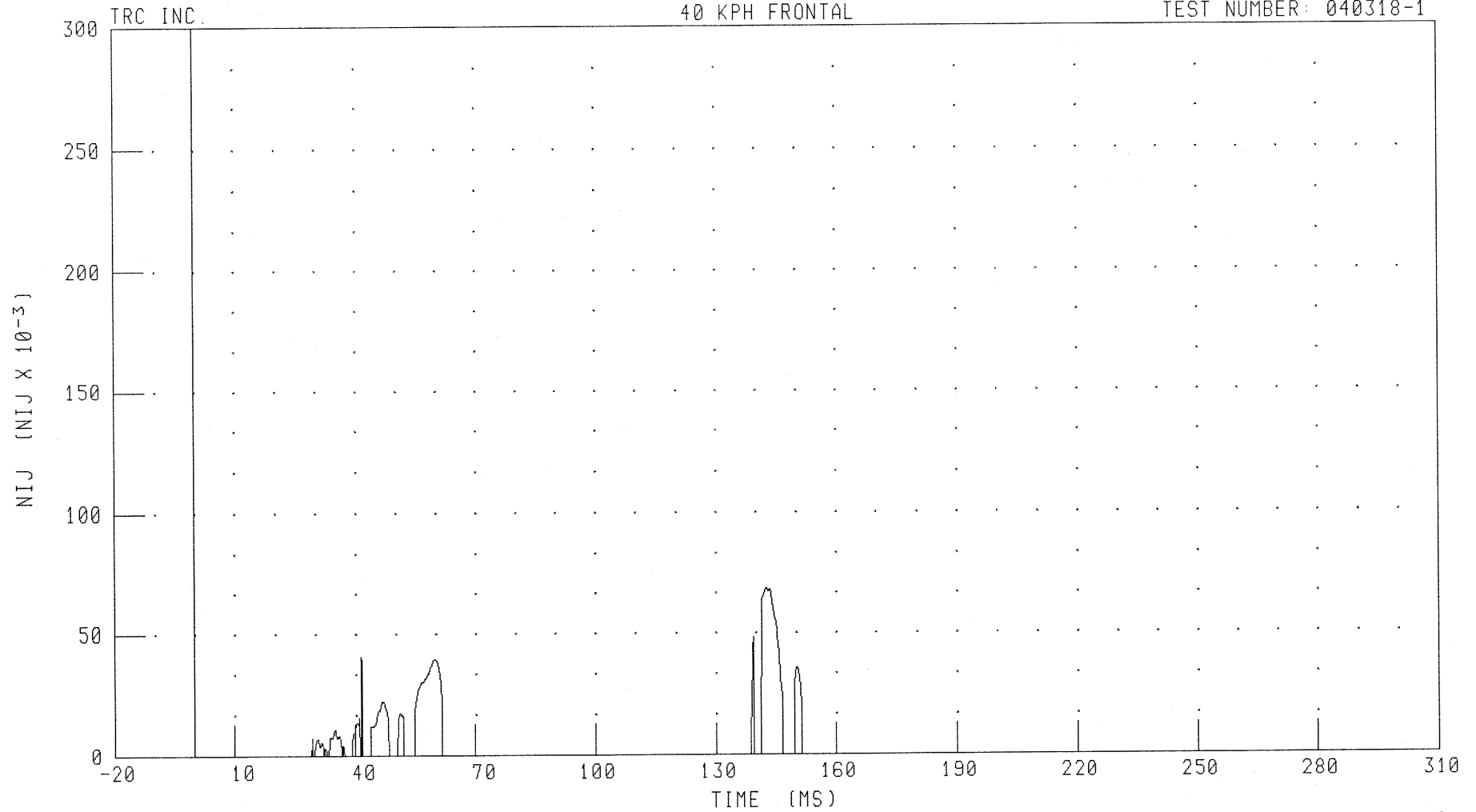


6-36

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NIJ COMPRESSION/EXTENSION

TEST NUMBER: 040318-1



CHANNEL: NCE2

FILTER: CH. CLASS 600

PEAK DATA: 0.07 NIJ @ 142.64 MS; 0.00 NIJ @ -20.00 MS

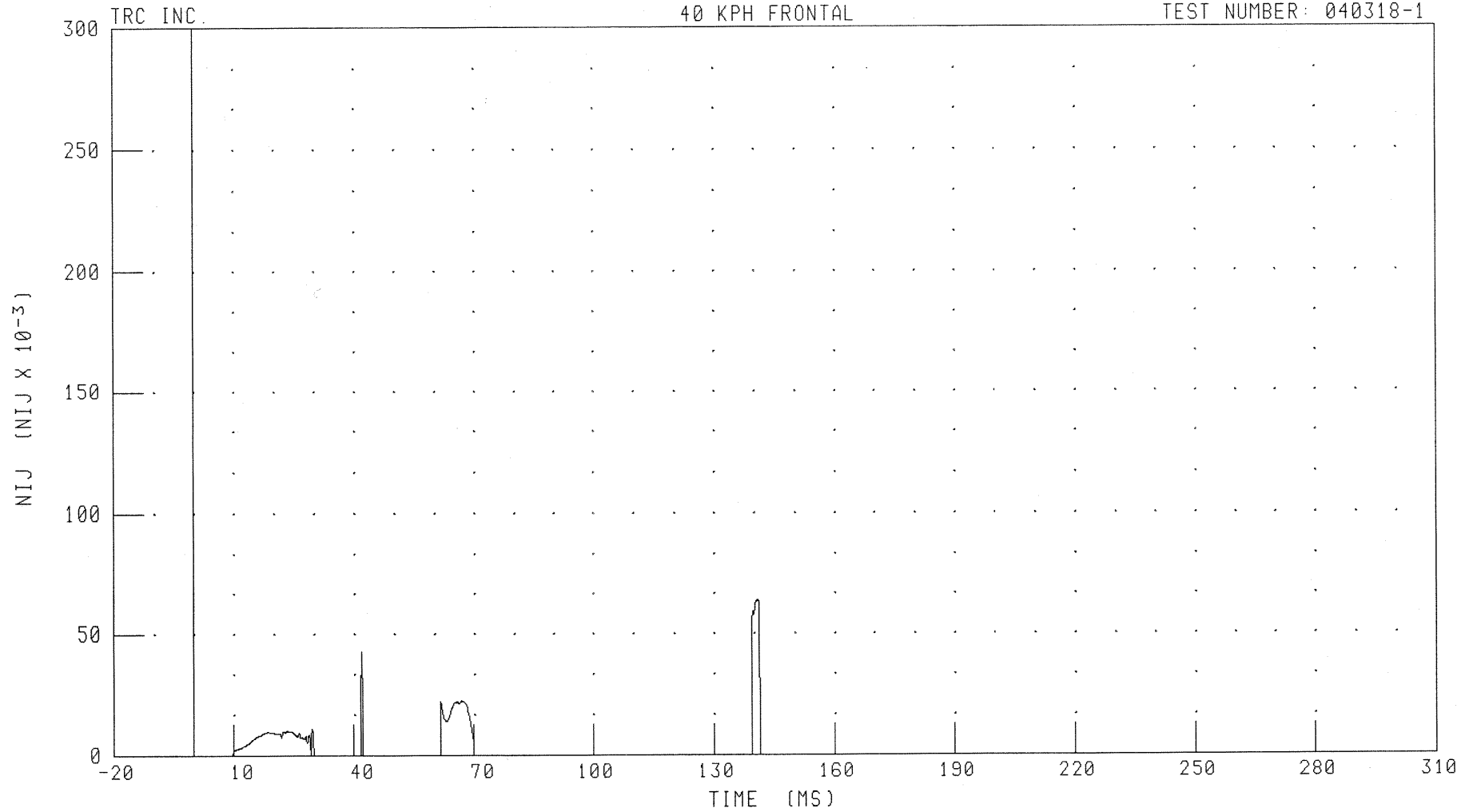
6-37

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER NIJ COMPRESSION/FLEXION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: NCF2

FILTER: CH. CLASS 600

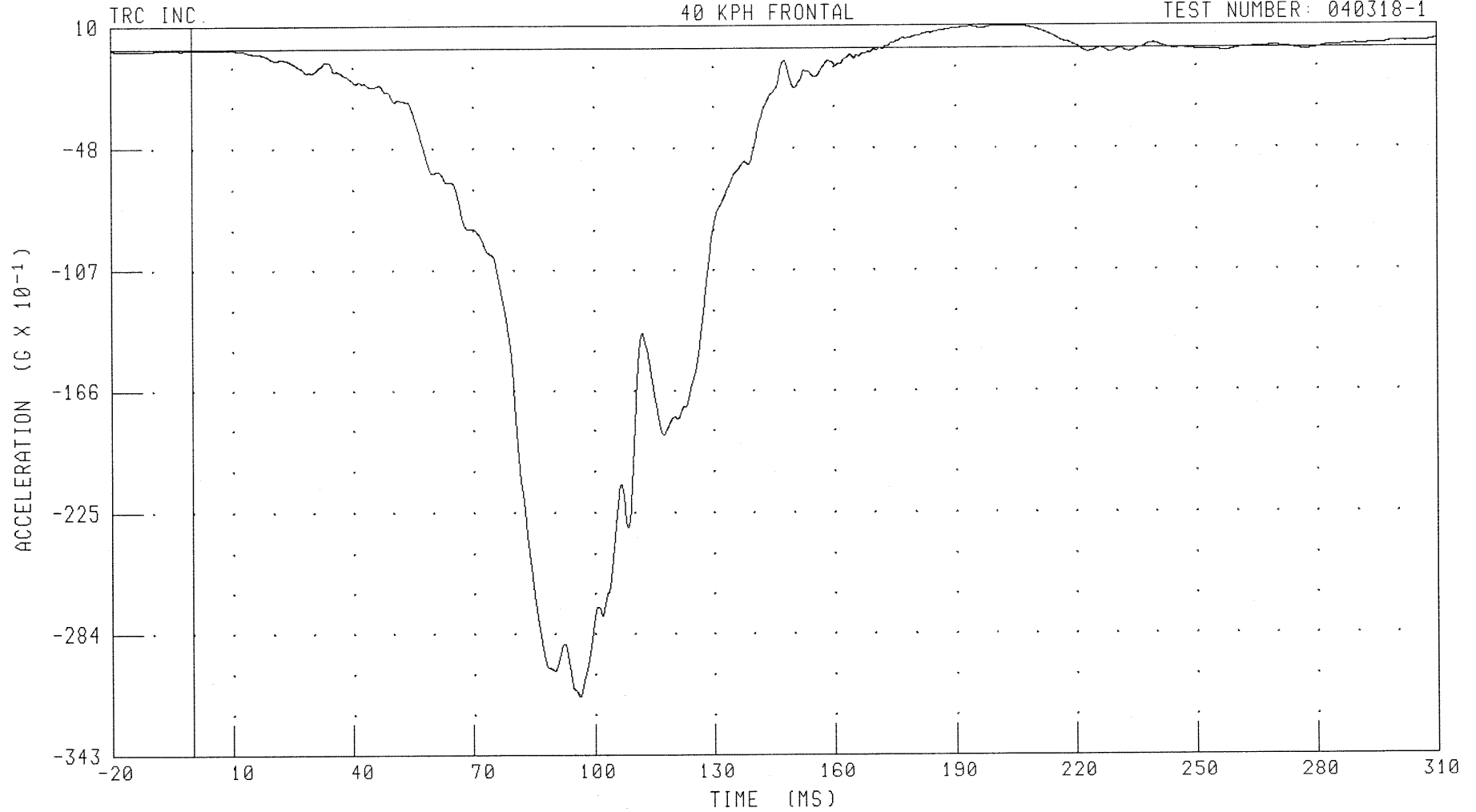
PEAK DATA: 0.06 NIJ @ 140.88 MS; 0.00 NIJ @ -20.00 MS

6-38

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 040318-1



CHANNEL: CSTXG2

FILTER: CH. CLASS 180

PEAK DATA: 1.08 G @ 200.64 MS; -31.48 G @ 96.24 MS

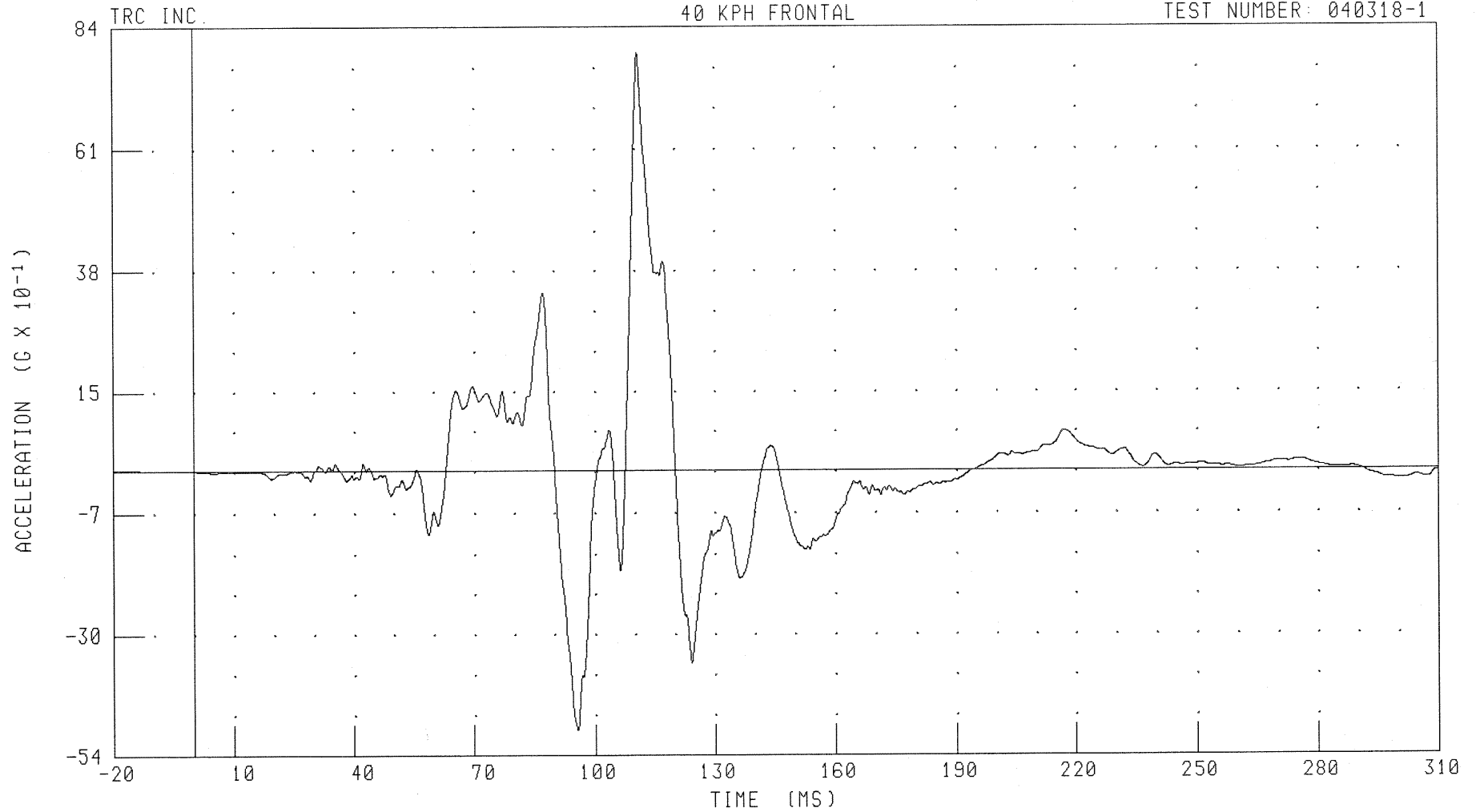
6-39

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTYG2

FILTER: CH. CLASS 180

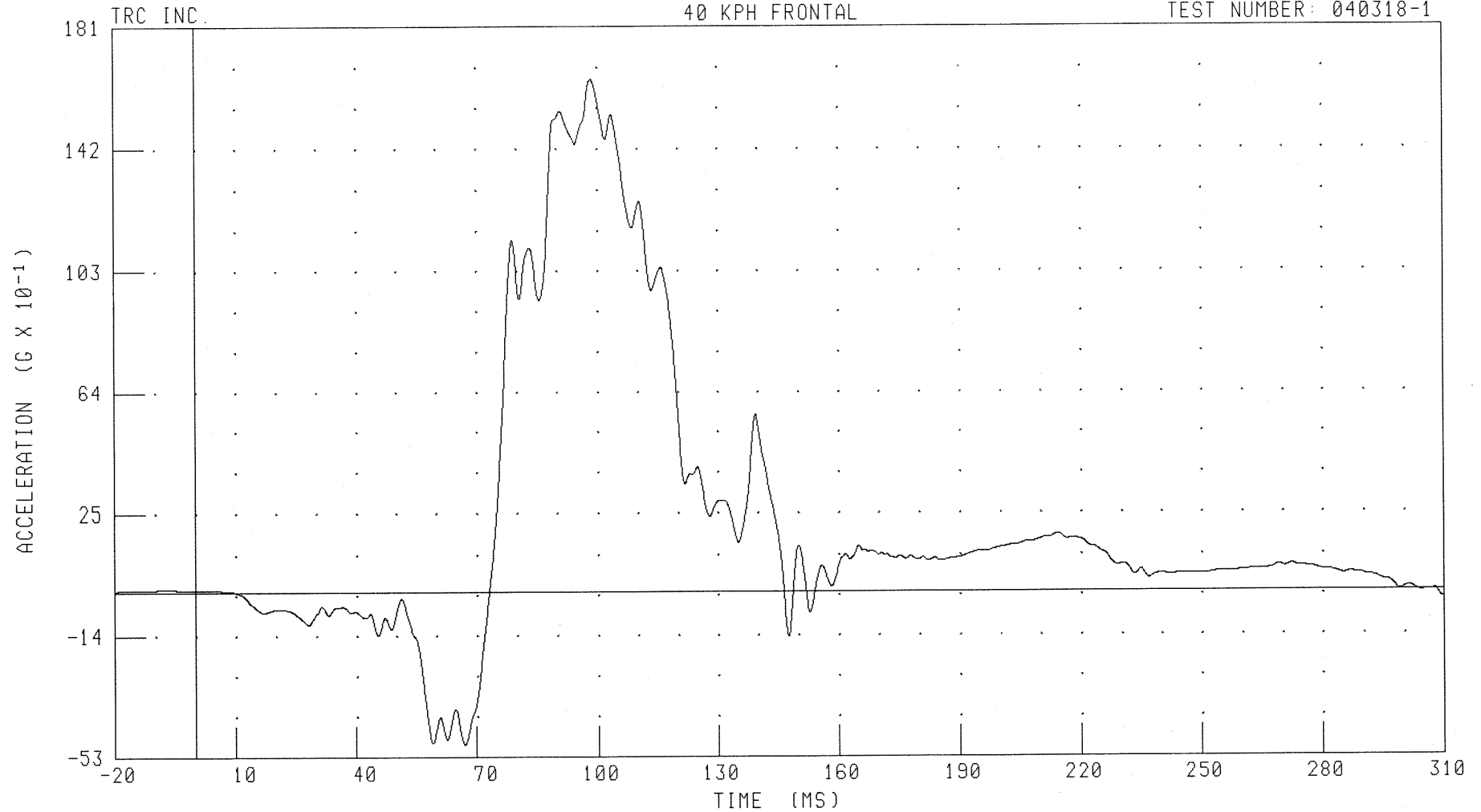
PEAK DATA: 7.91 G @ 110.88 MS; -4.92 G @ 95.68 MS

6-40

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTZG2 FILTER: CH. CLASS 180

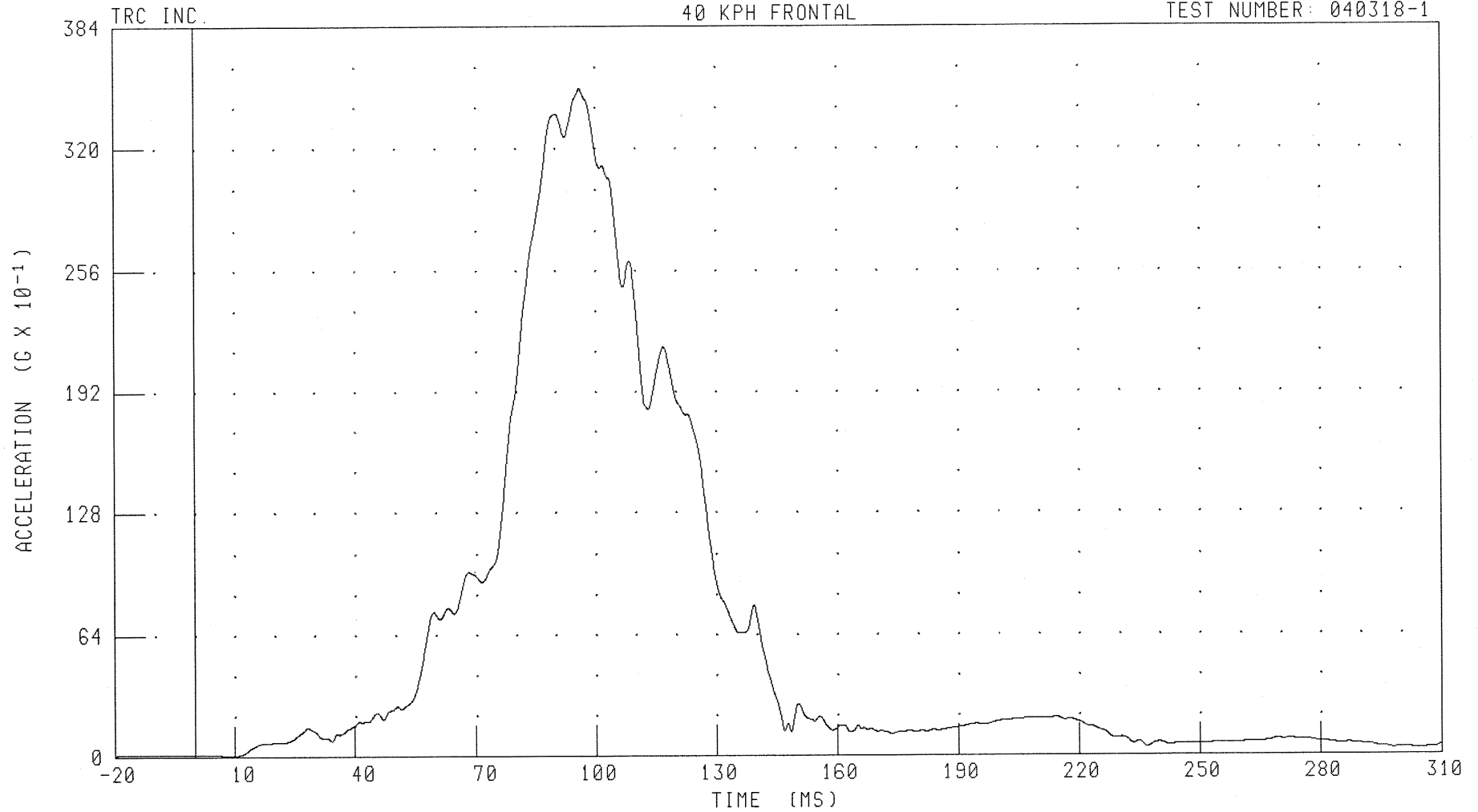
PEAK DATA: 16.41 G @ 98.56 MS; -4.90 G @ 67.04 MS

6-41

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA: 35.15 G @ 96.24 MS; 0.01 G @ -20.00 MS

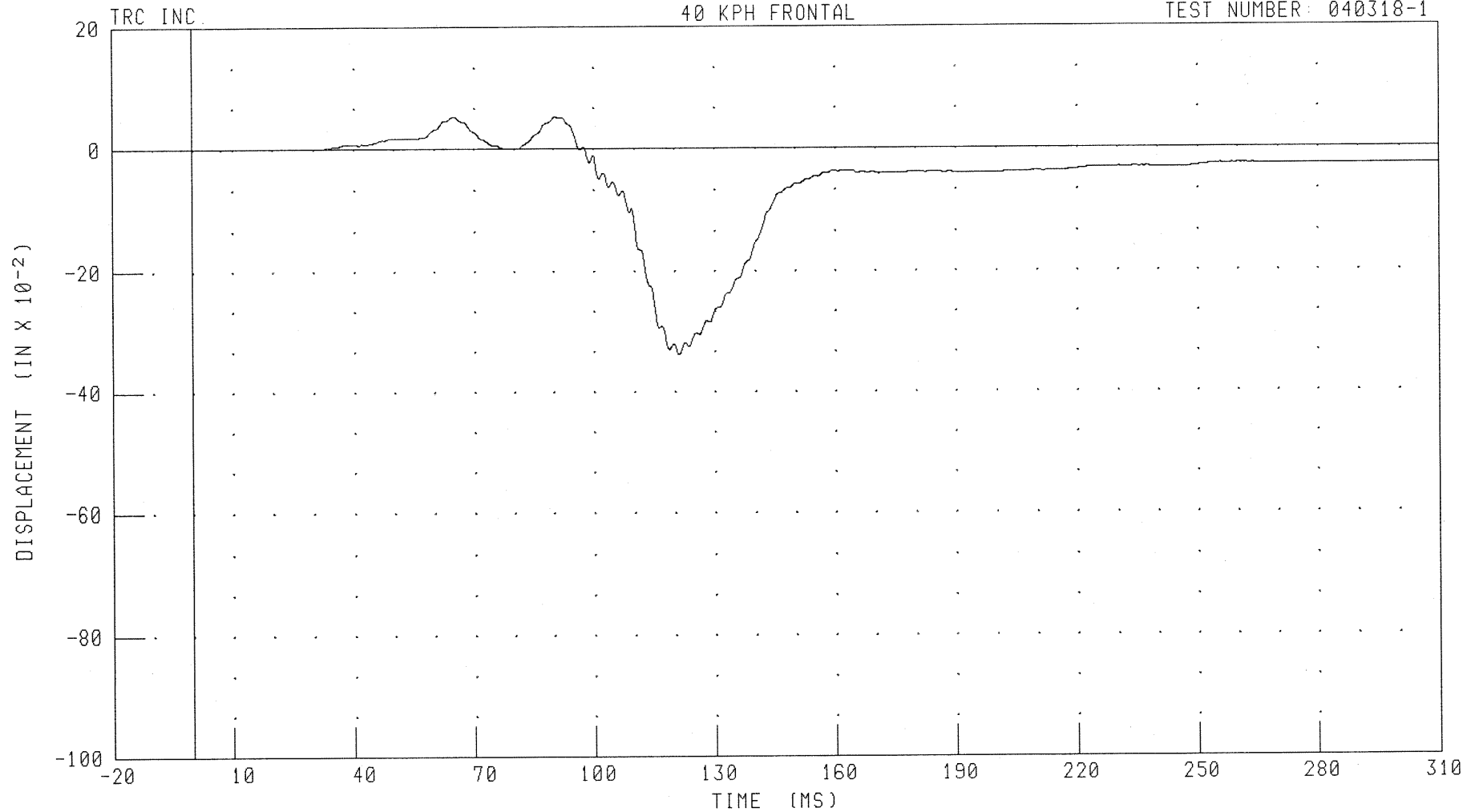
6-42

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER CHEST DEFLECTION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTXD2

FILTER: CH. CLASS 600

PEAK DATA: 0.05 IN @ 65.12 MS; -0.34 IN @ 121.20 MS

6-43

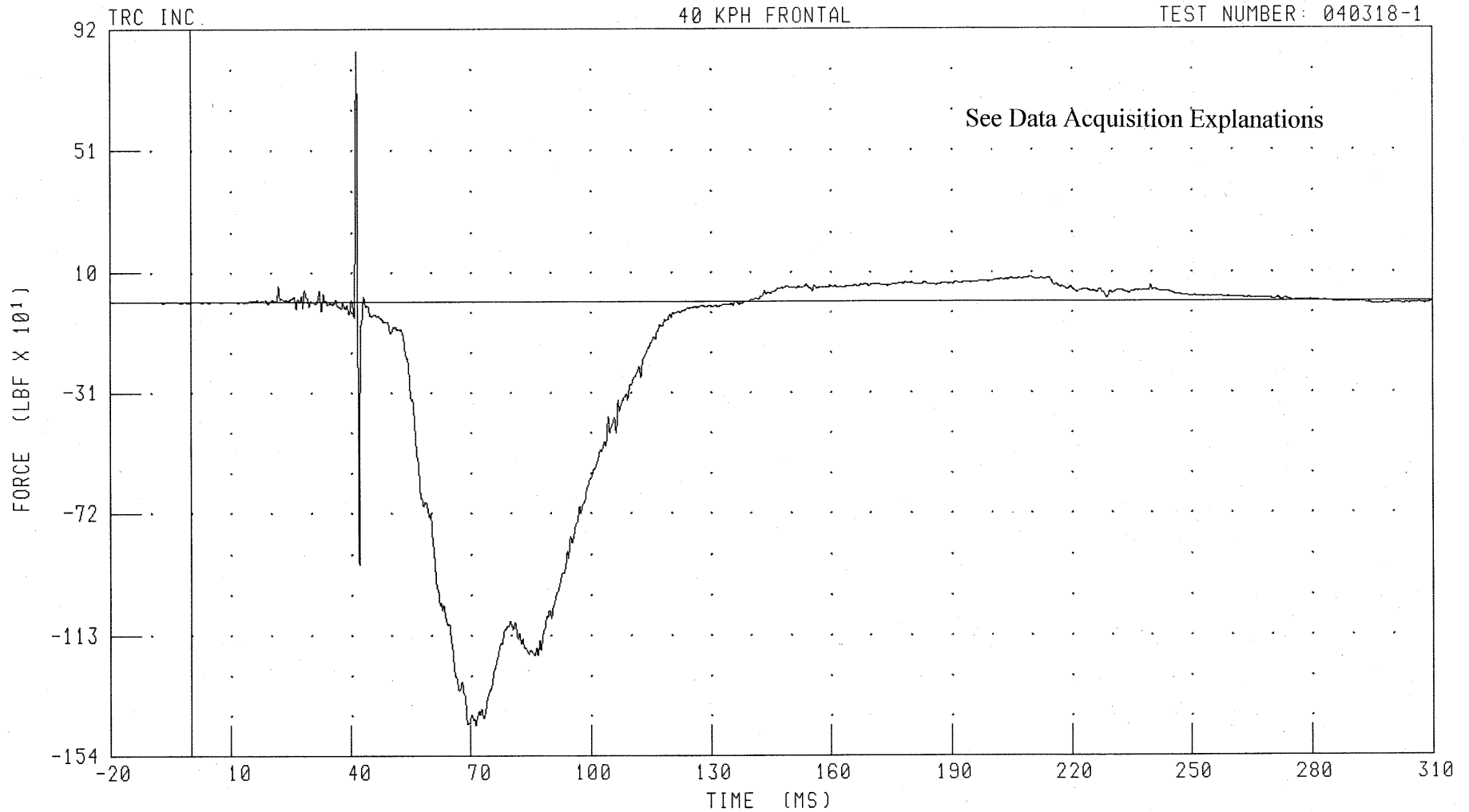
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

RIGHT FRONT PASSENGER LEFT FEMUR FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: LFMZF2 FILTER: CH. CLASS 600

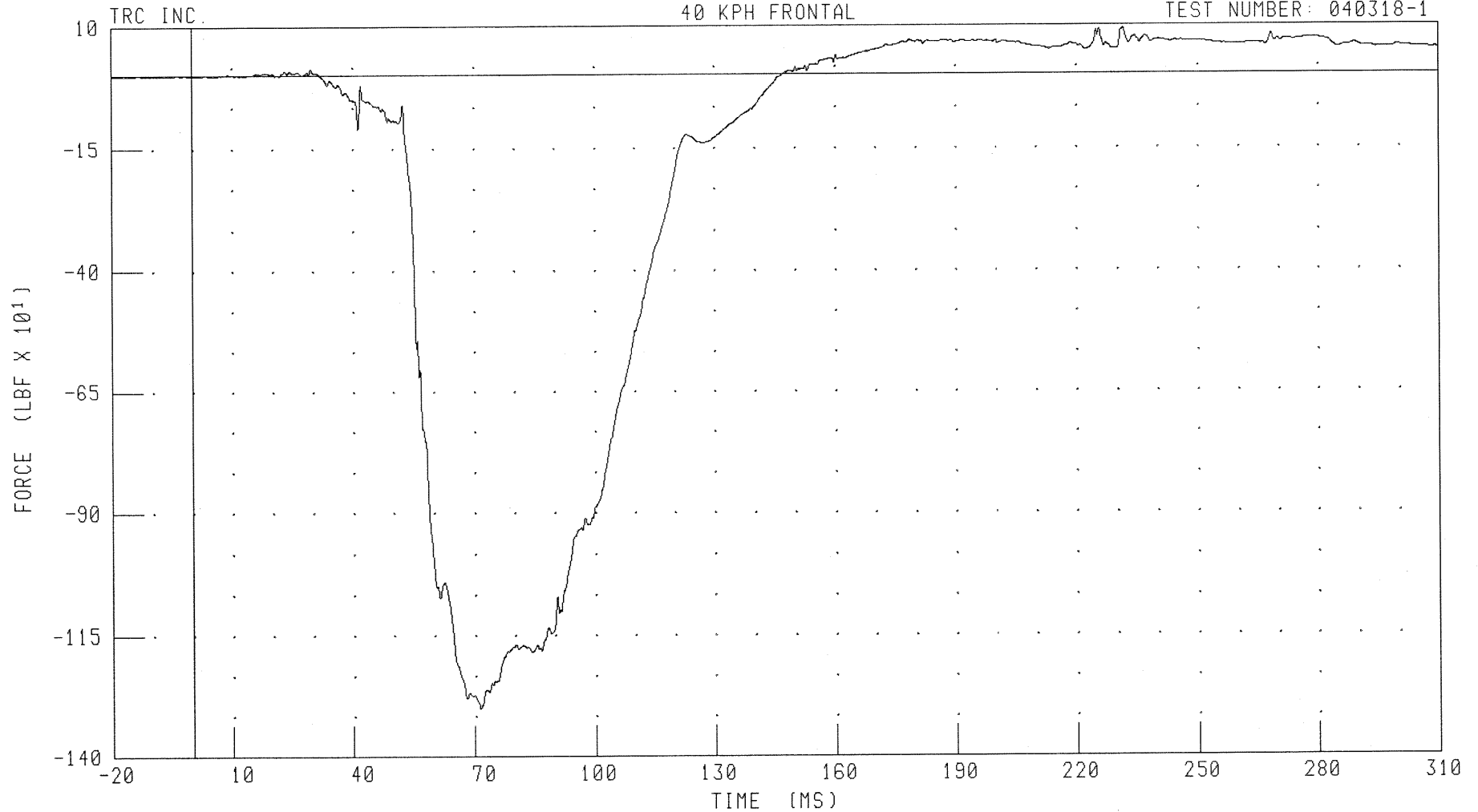
PEAK DATA: 845.31 LBF @ 41.44 MS; -1436.69 LBF @ 71.28 MS

6-44

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 040318-1



CHANNEL: RFMZ F2 FILTER: CH. CLASS 600

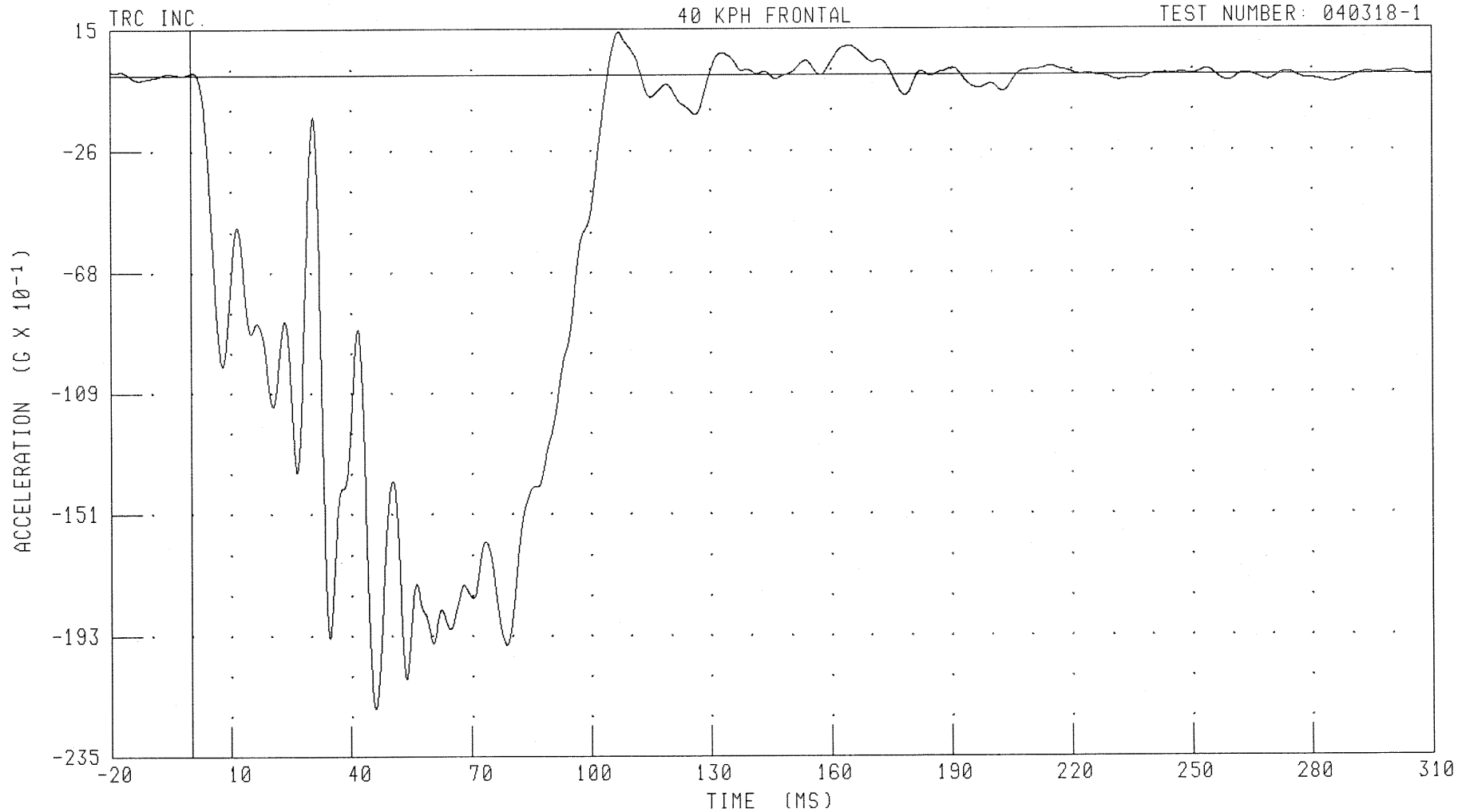
PEAK DATA: 93.38 LBF @ 231.68 MS; -1301.44 LBF @ 71.36 MS

6-45

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LEFT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TEST NUMBER: 040318-1



CHANNEL: LSXXG

FILTER: CH. CLASS 60

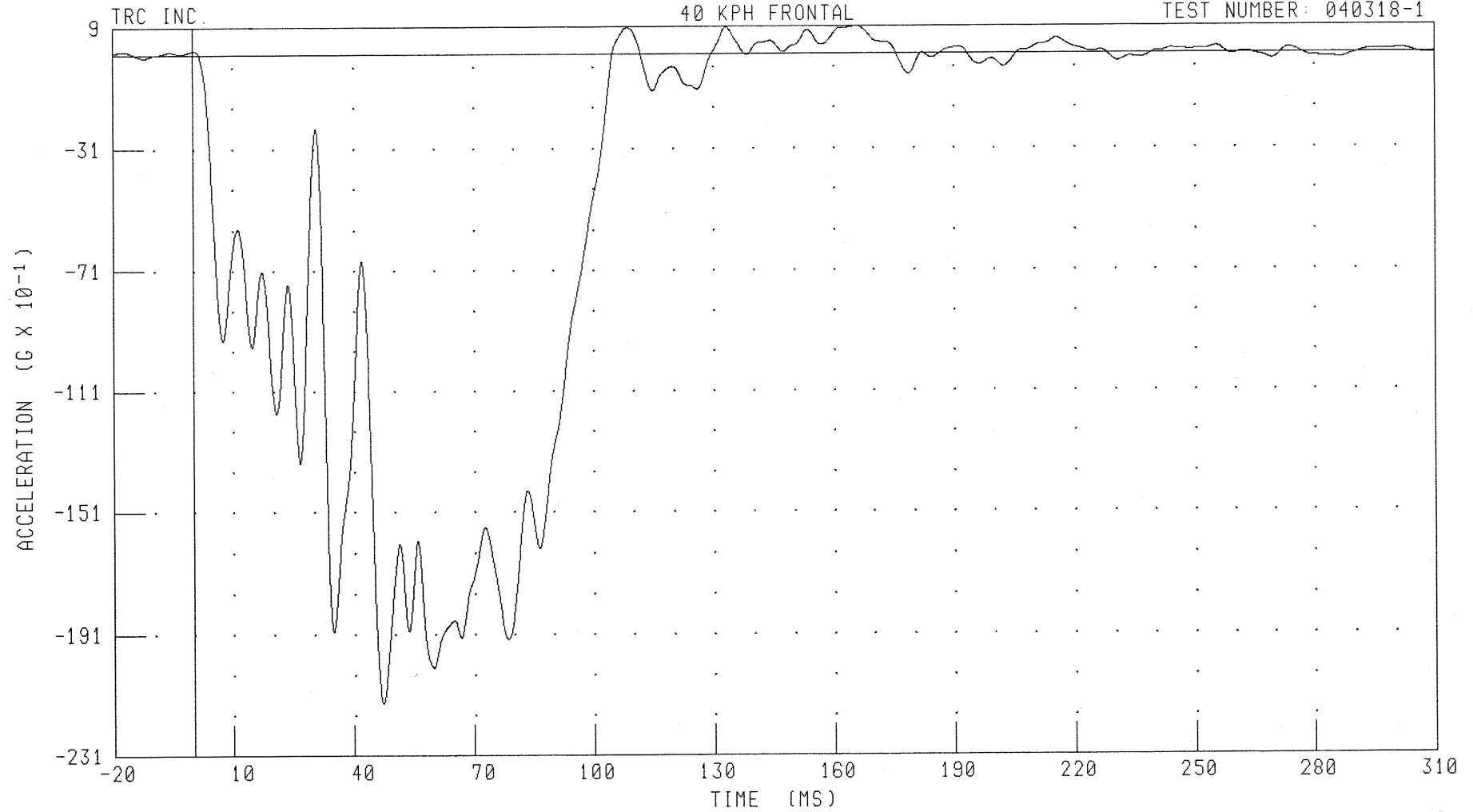
PEAK DATA: 1.49 G @ 107.28 MS; -21.94 G @ 46.08 MS

6-46

040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
RIGHT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TEST NUMBER: 040318-1



CHANNEL: RSXXG

FILTER: CH. CLASS 60

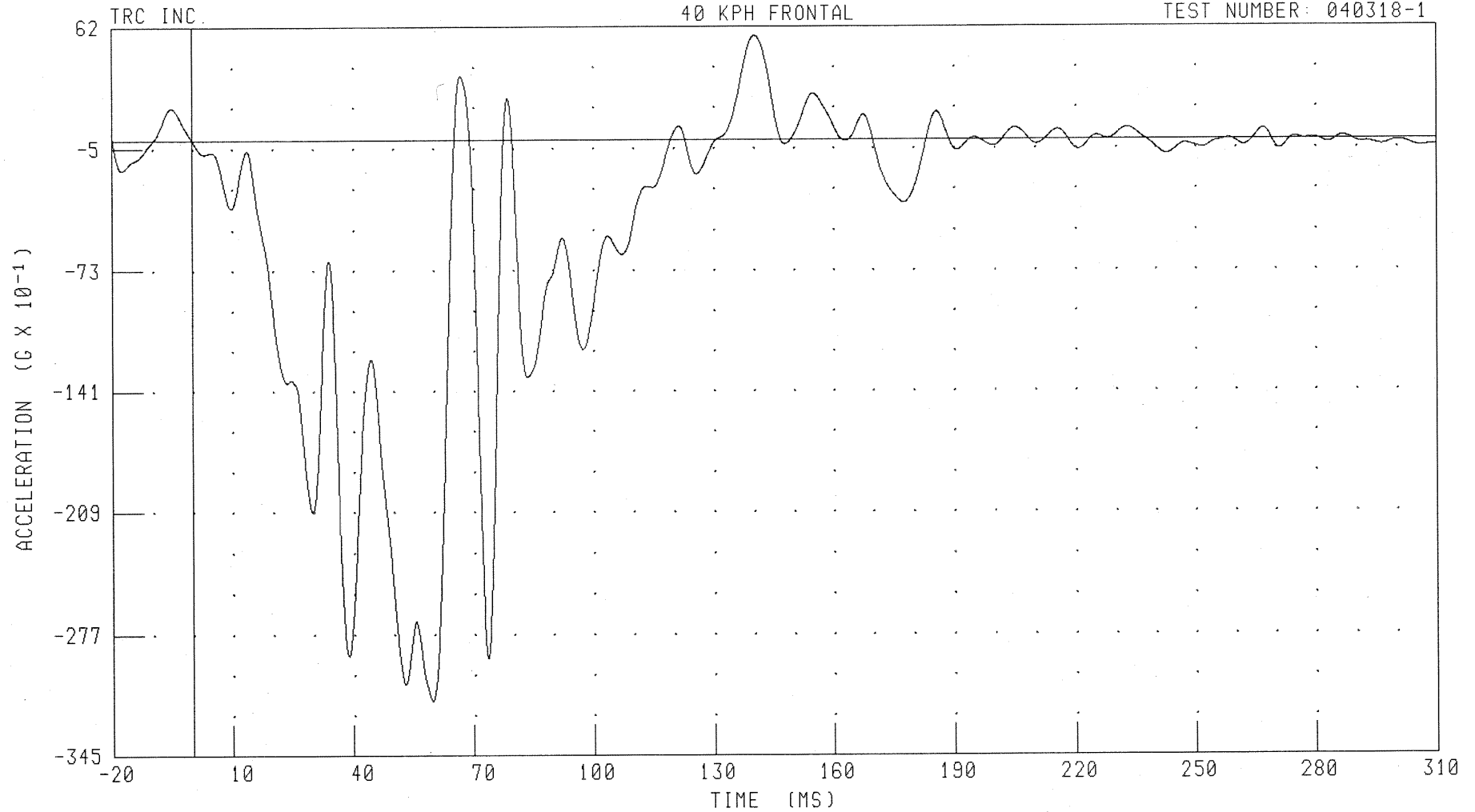
PEAK DATA: 0.90 G @ 166.08 MS; -21.38 G @ 47.20 MS

6-47

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LEFT FRONT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 040318-1



CHANNEL: LFCXC

FILTER: CH. CLASS 60

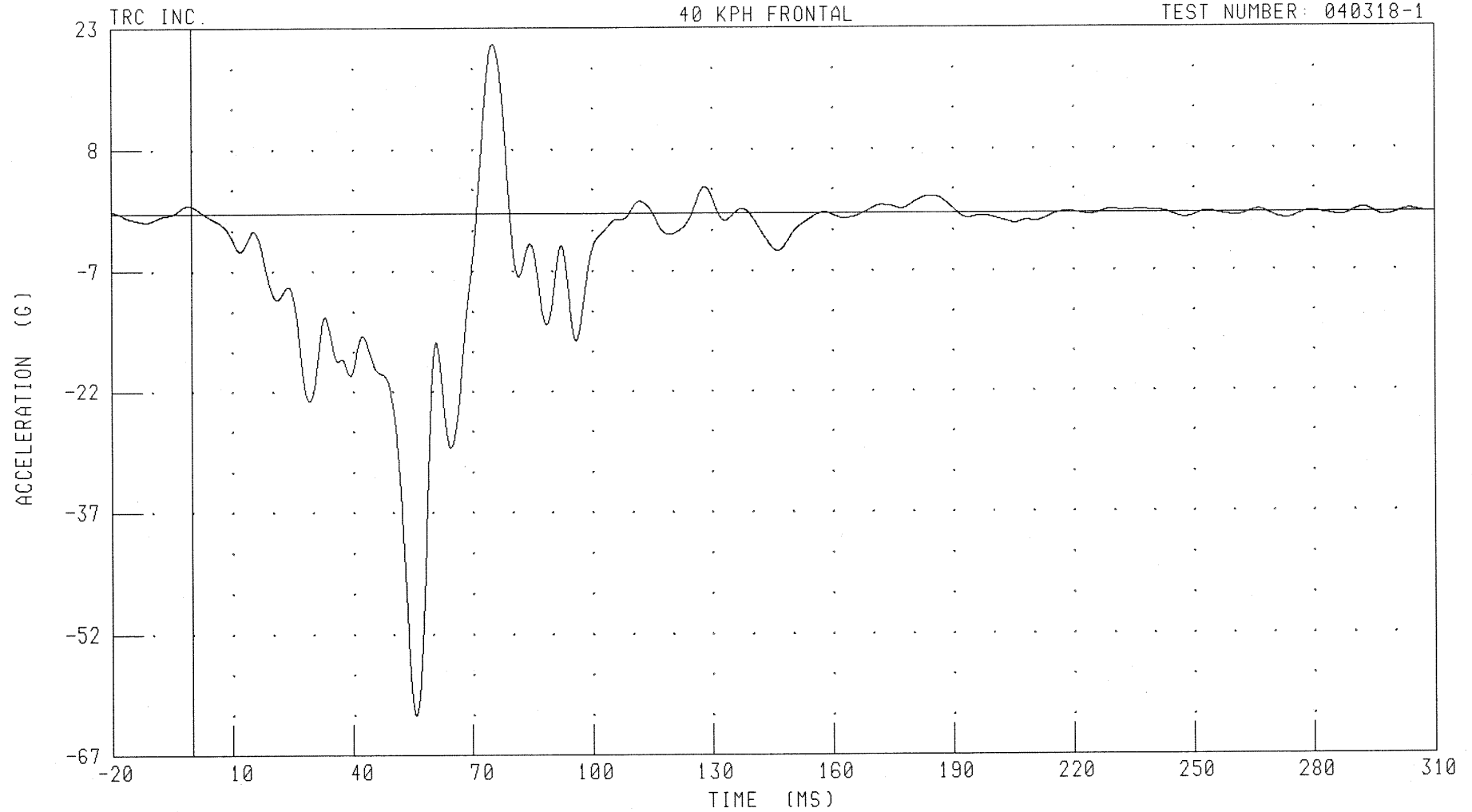
PEAK DATA: 5.78 G @ 140.32 MS; -31.45 G @ 59.60 MS

6-48

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT BRAKE CALIPER X-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: RFCXC

FILTER: CH. CLASS 60

PEAK DATA: 20.98 G @ 75.28 MS; -62.05 G @ 55.76 MS

6-49

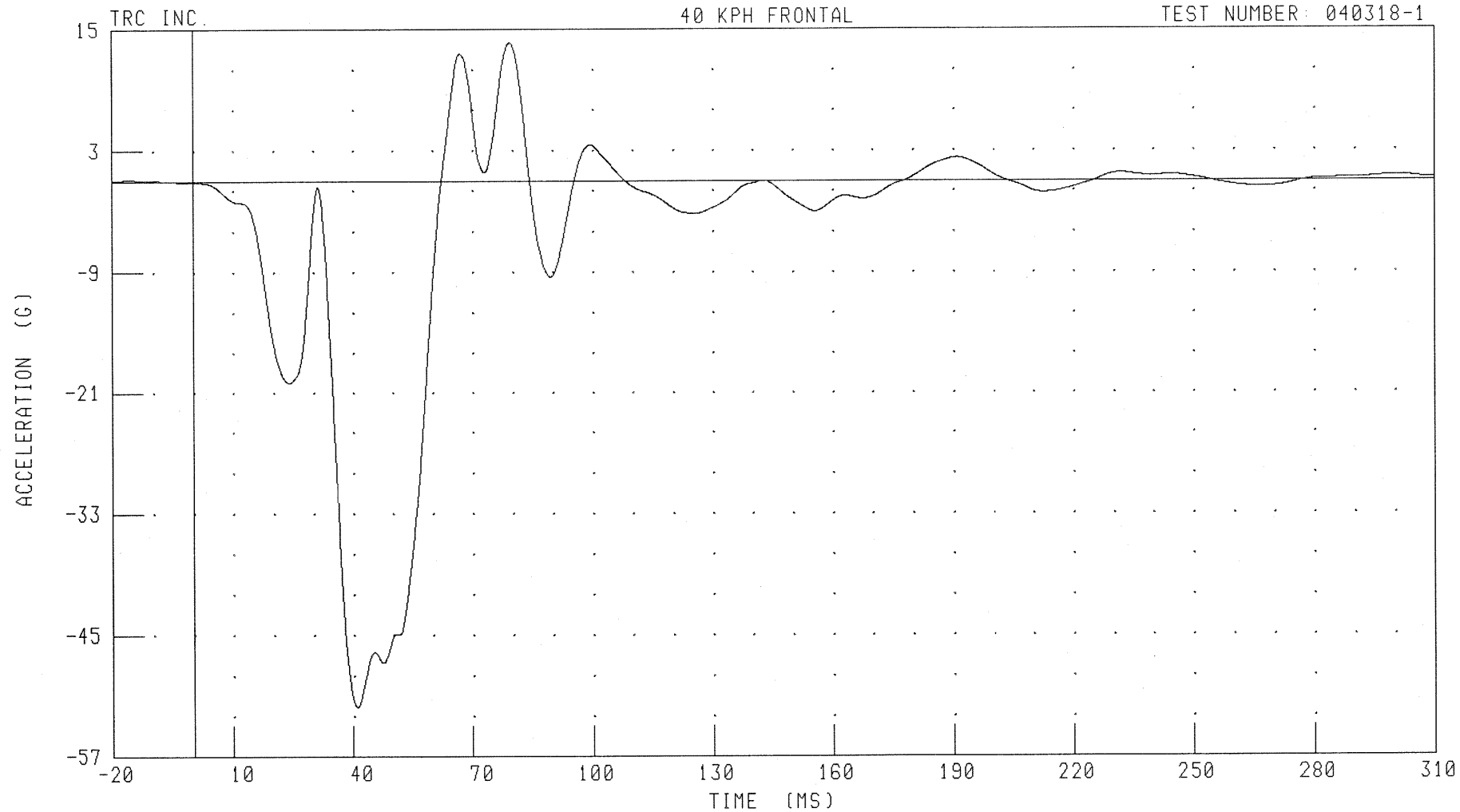
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

ENGINE TOP X-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: TENXC

FILTER: CH. CLASS 60

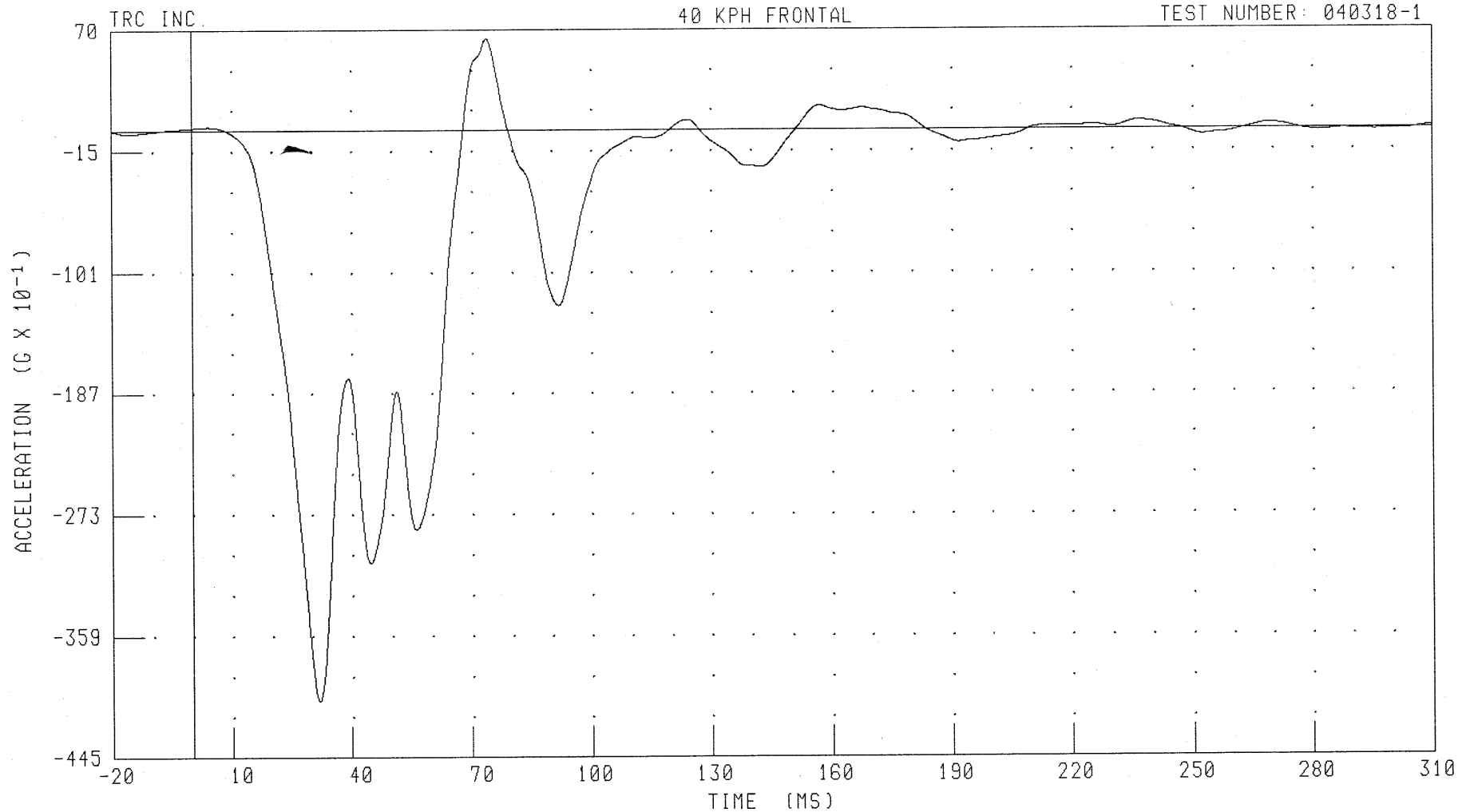
PEAK DATA: 13.66 G @ 79.44 MS; -52.12 G @ 40.96 MS

6-50

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
ENGINE BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 040318-1



CHANNEL: BENXC

FILTER: CH. CLASS 60

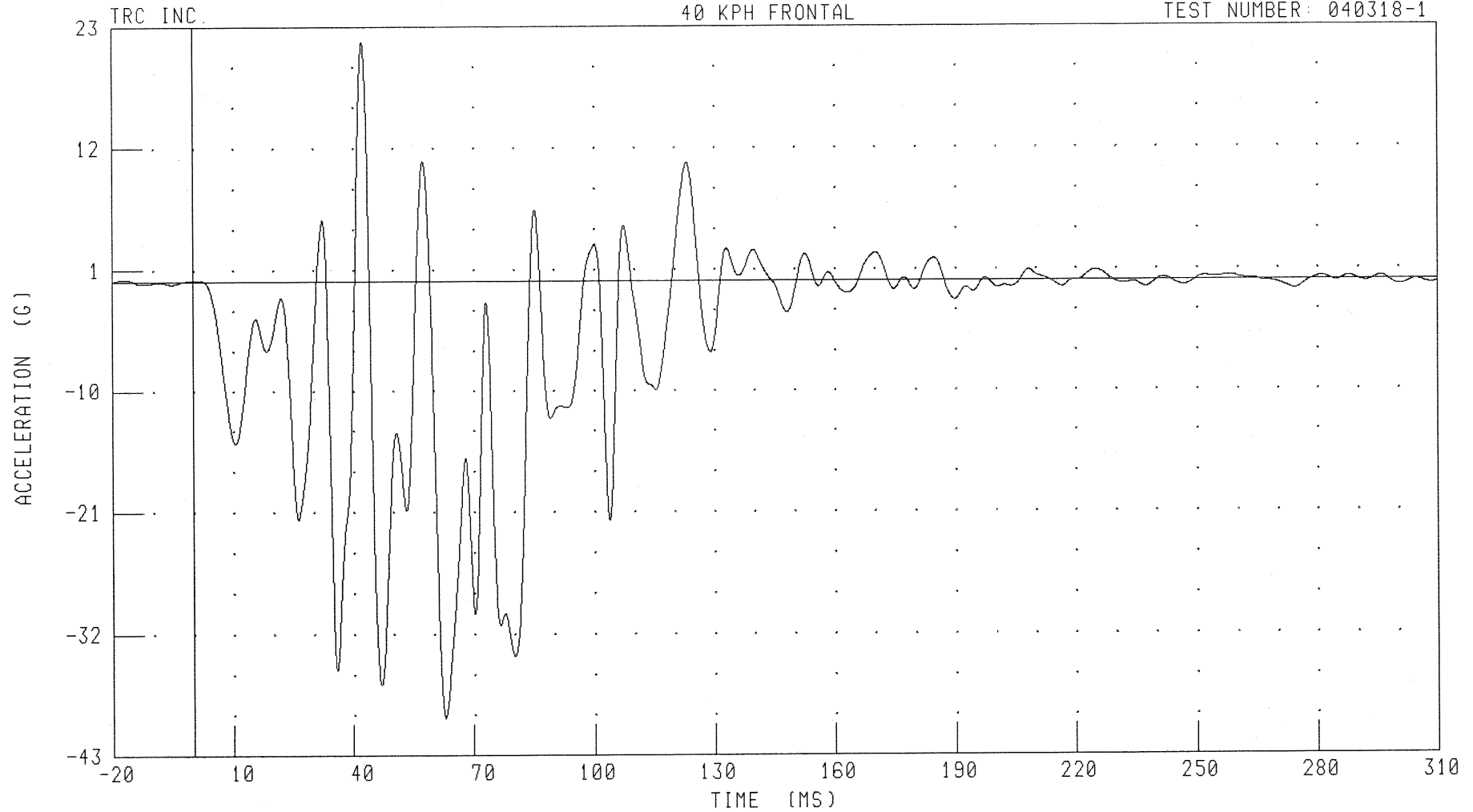
PEAK DATA: 6.48 G @ 73.84 MS, -40.54 G @ 31.92 MS

6-51

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
INSTRUMENT PANEL CENTERLINE X-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: DPCXG

FILTER: CH. CLASS 60

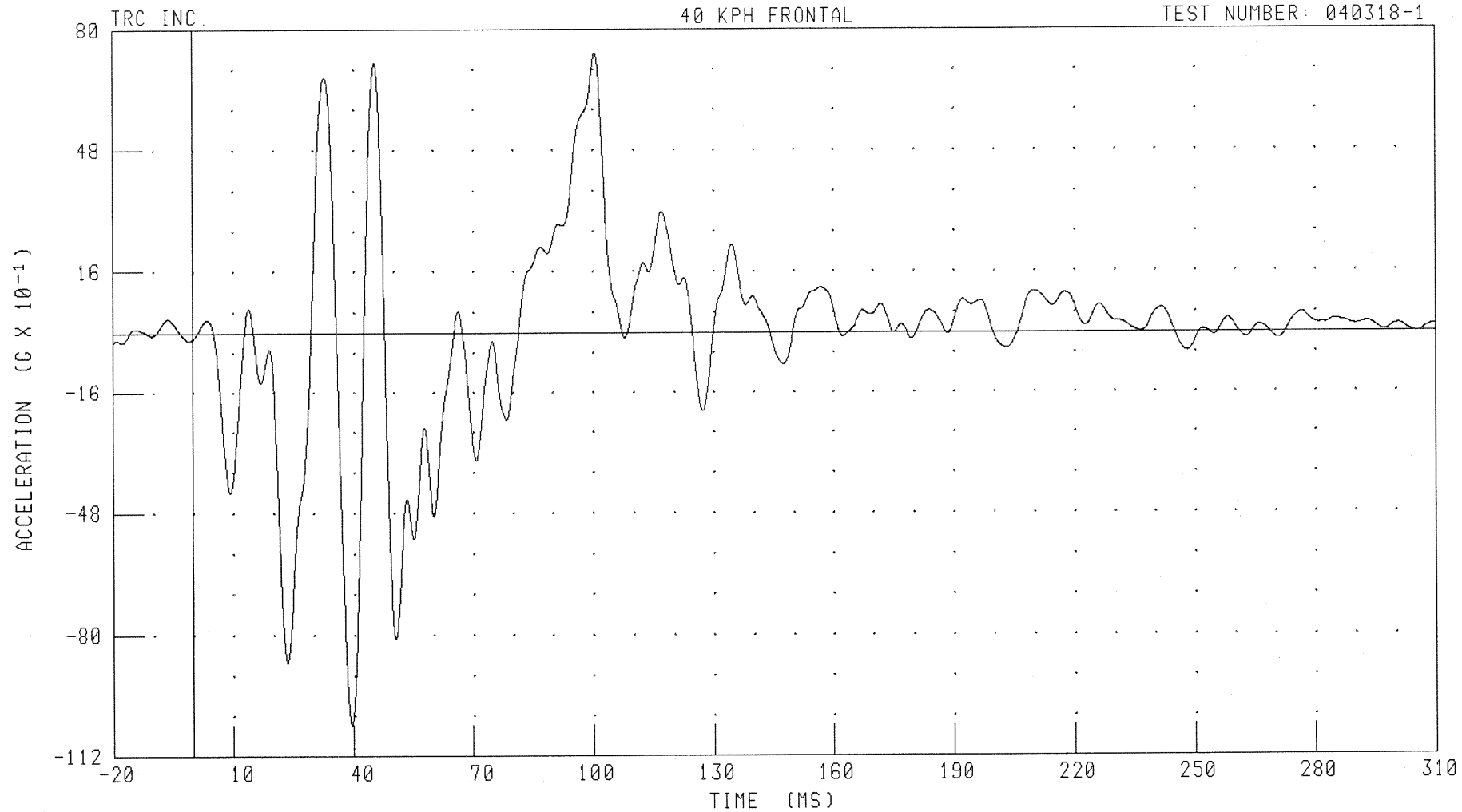
PEAK DATA: 21.65 G @ 42.40 MS; -39.63 G @ 62.88 MS

6-52

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
REAR TRUNK CENTERLINE Z-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: RDKZG

FILTER: CH. CLASS 60

PEAK DATA: 7.35 G @ 100.64 MS; -10.41 G @ 39.52 MS

6-53

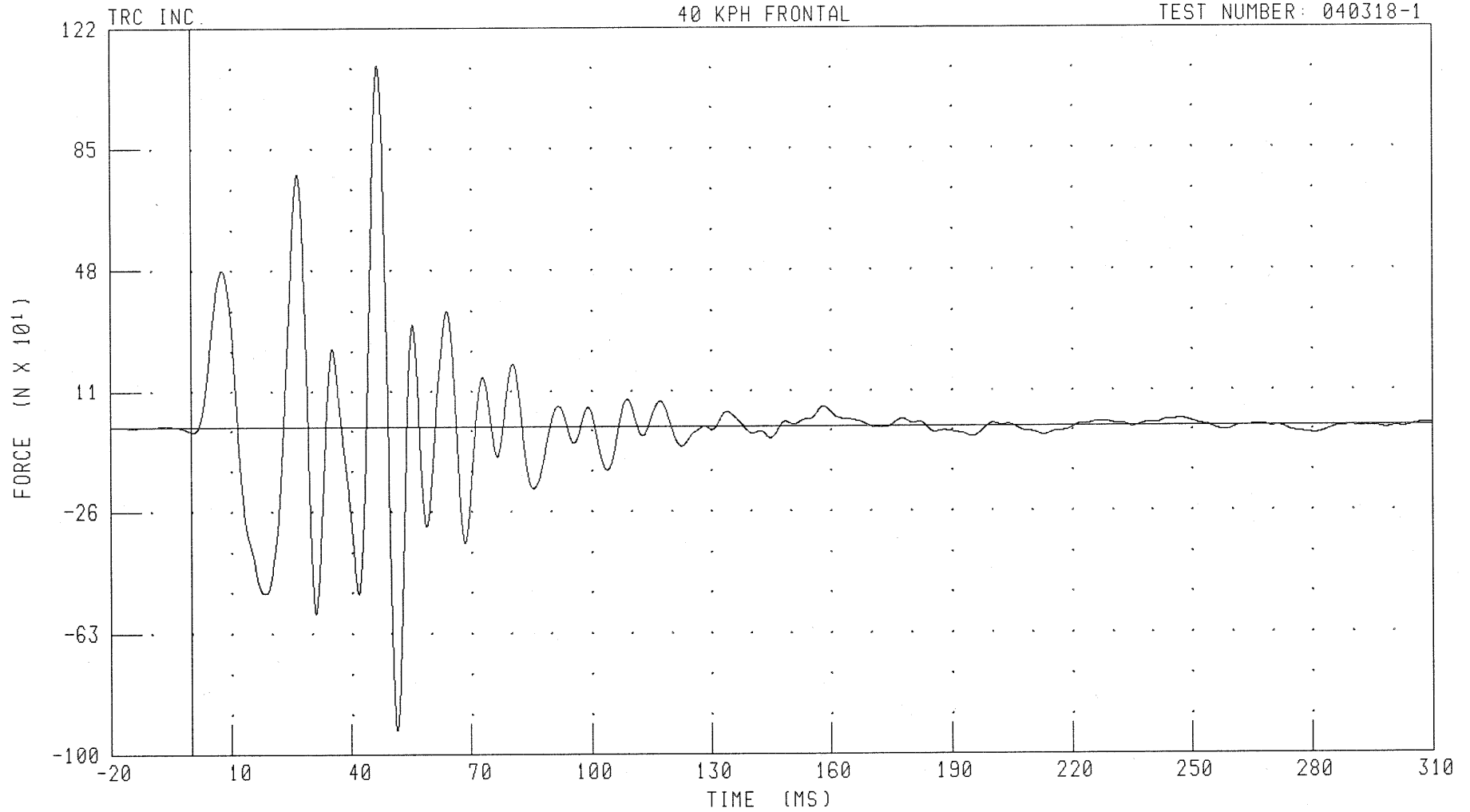
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A1 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA1F

FILTER: CH. CLASS 60

PEAK DATA: 1103.37 N @ 46.80 MS; -925.30 N @ 51.52 MS

6-54

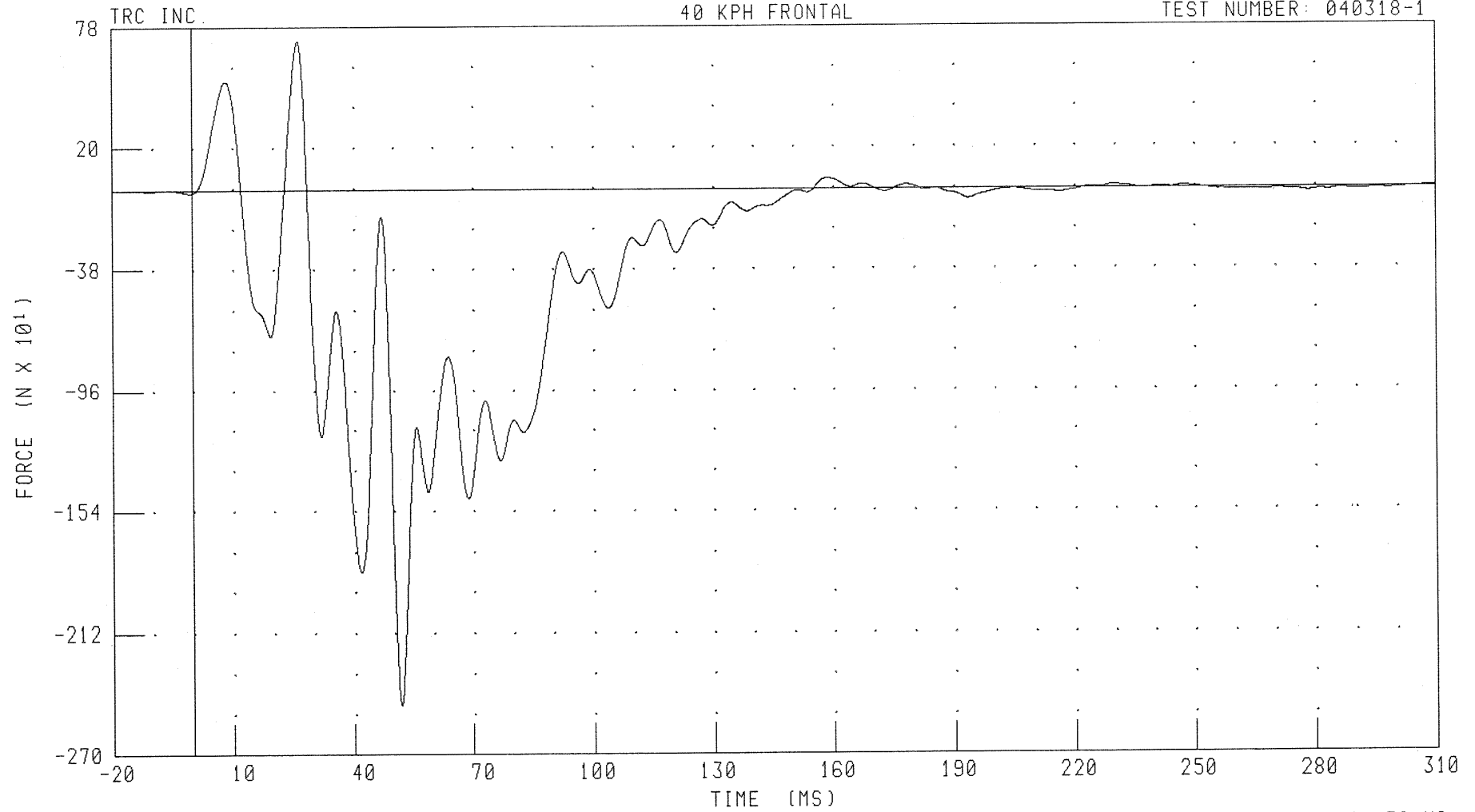
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A2 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA2F

FILTER: CH. CLASS 60

PEAK DATA: 714.80 N @ 26.24 MS; -2462.35 N @ 51.76 MS

6-55

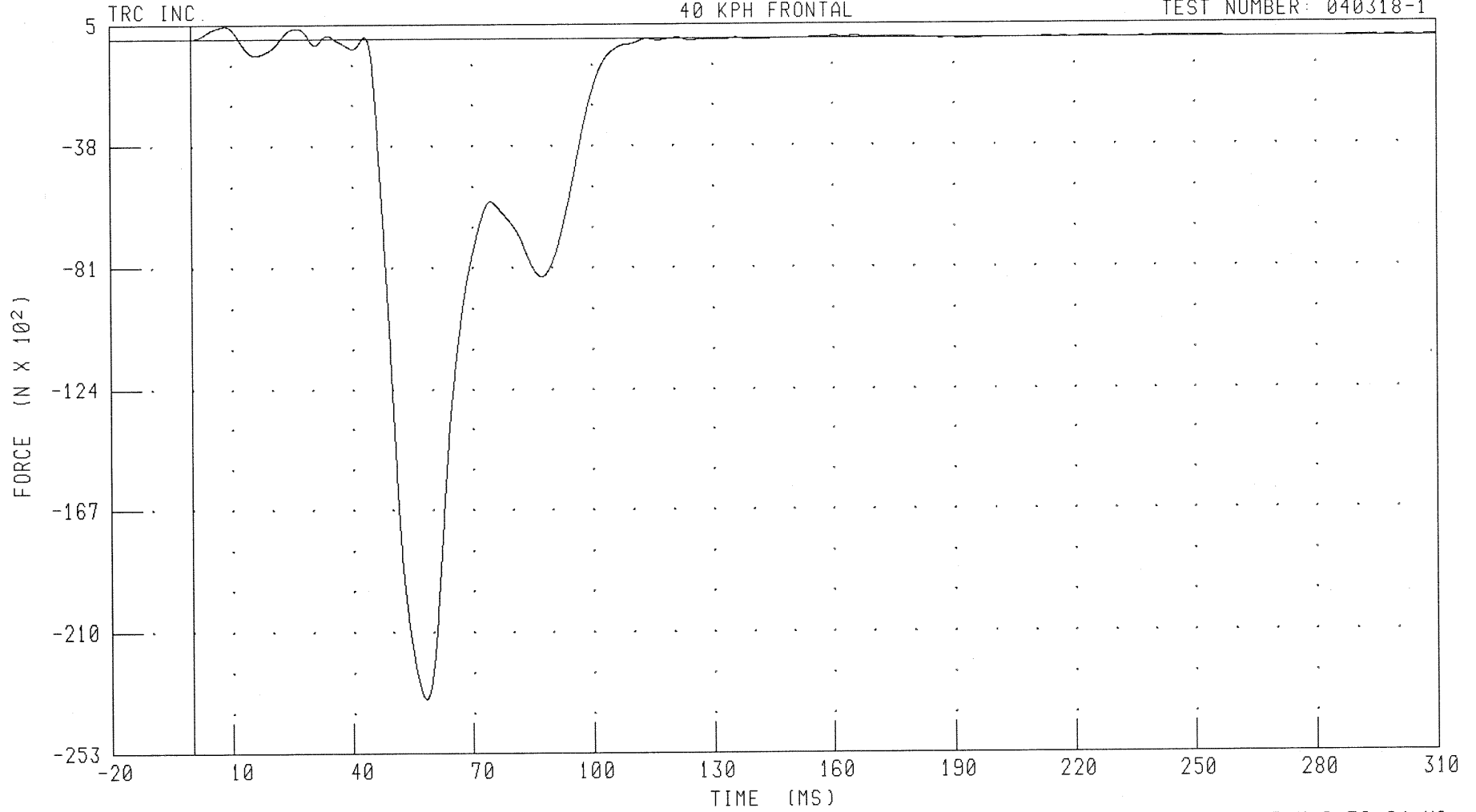
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A3 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA3F

FILTER: CH. CLASS 60

PEAK DATA: 458.40 N @ 8.56 MS; -2336.97 N @ 58.24 MS

6-56

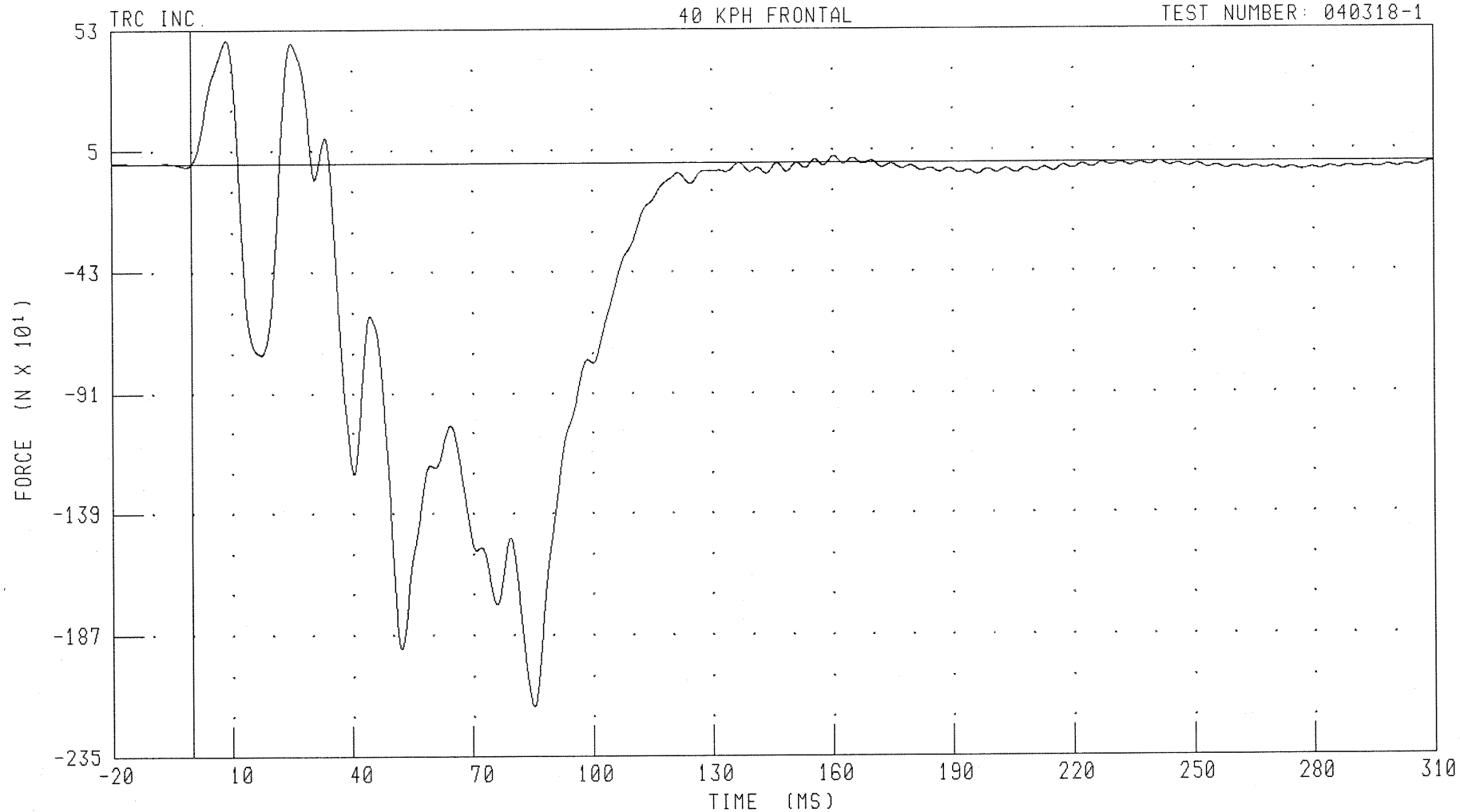
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A4 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA4F

FILTER: CH. CLASS 60

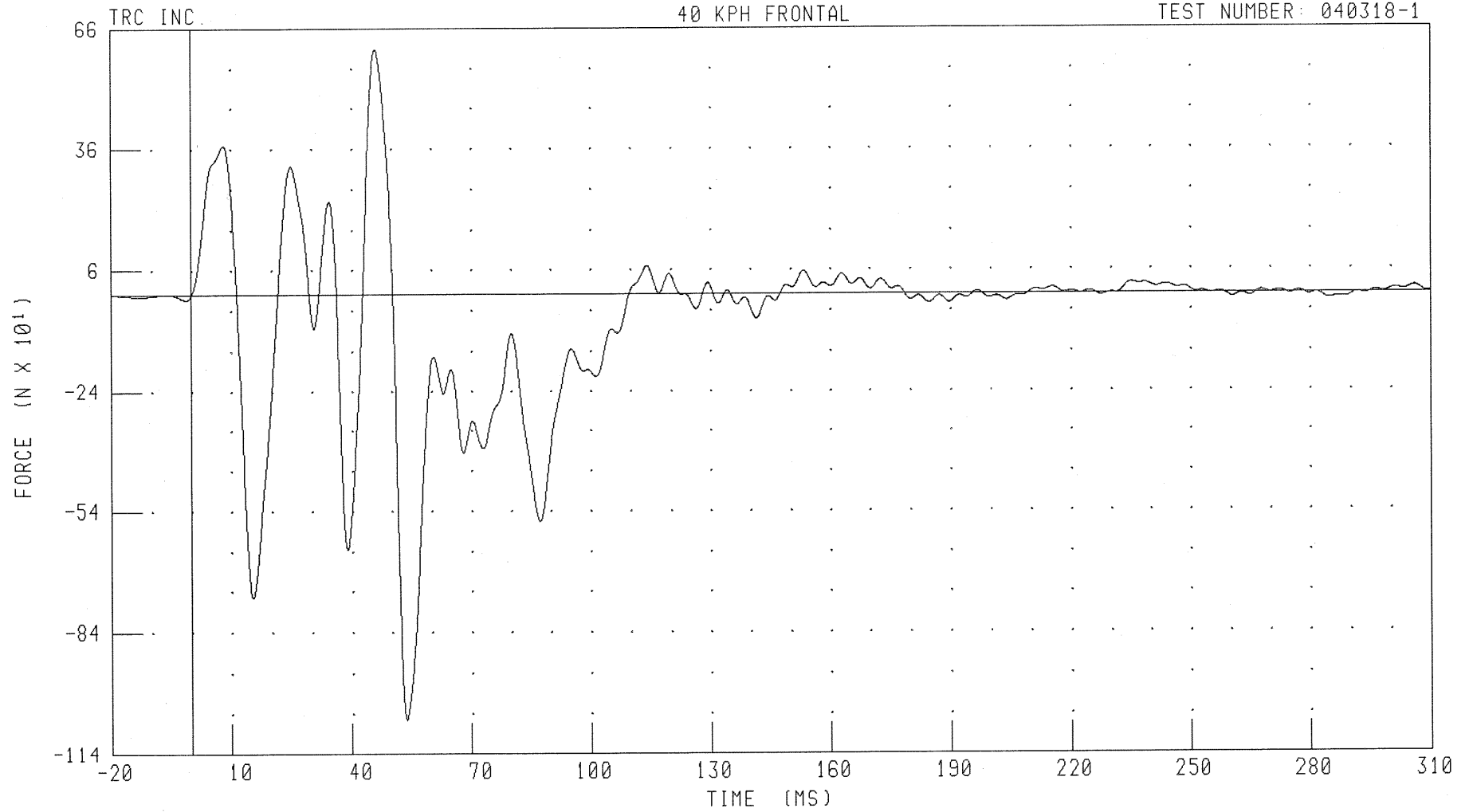
PEAK DATA: 490.22 N @ 8.88 MS; -2152.65 N @ 85.20 MS

6-57

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION A5 FORCE

TEST NUMBER: 040318-1



CHANNEL: BA5F

FILTER: CH. CLASS 60

PEAK DATA: 607.02 N @ 46.08 MS; -1055.18 N @ 53.60 MS

6-58

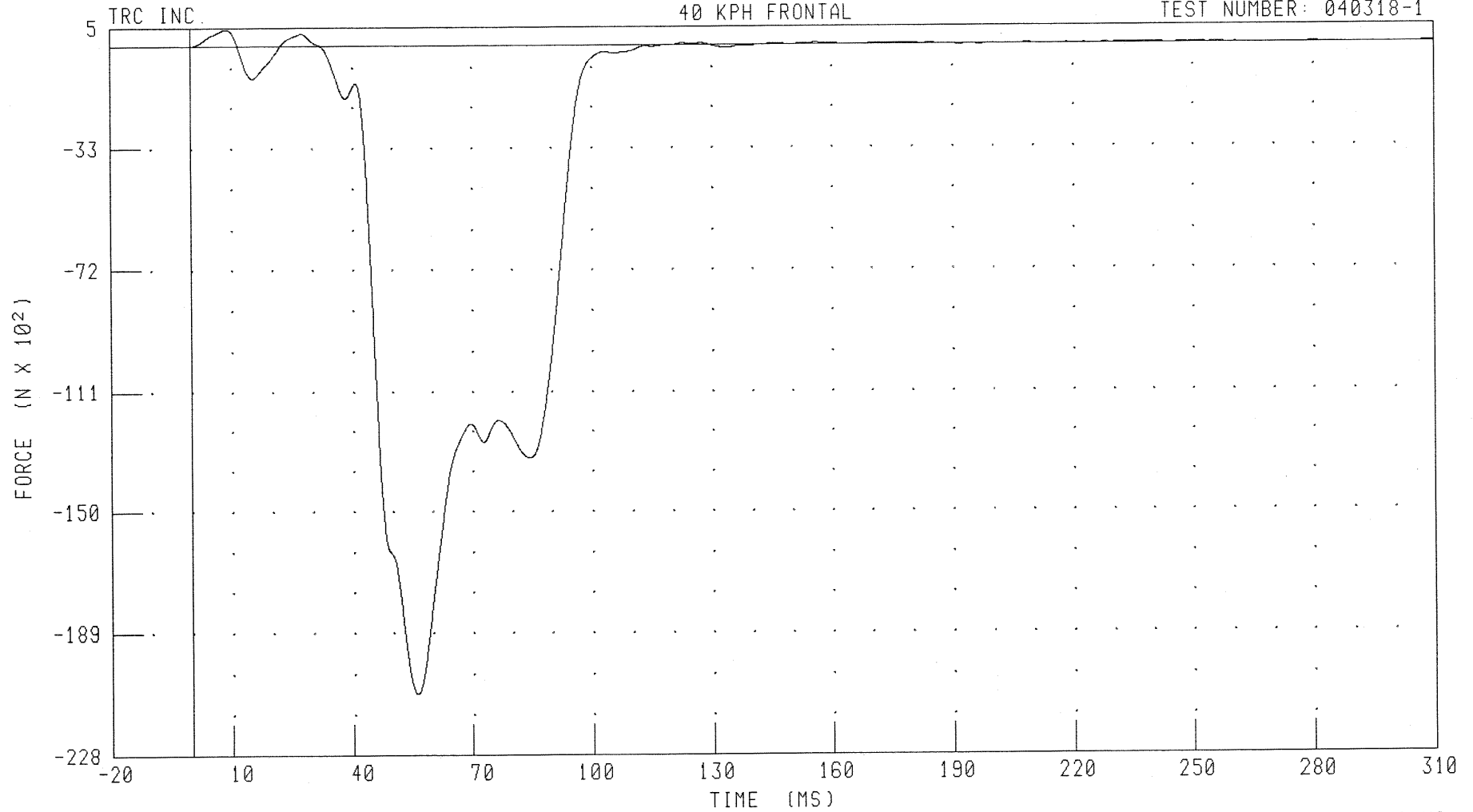
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A6 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA6F

FILTER: CH. CLASS 60

PEAK DATA: 532.01 N @ 8.80 MS; -2085.14 N @ 56.08 MS

6-59

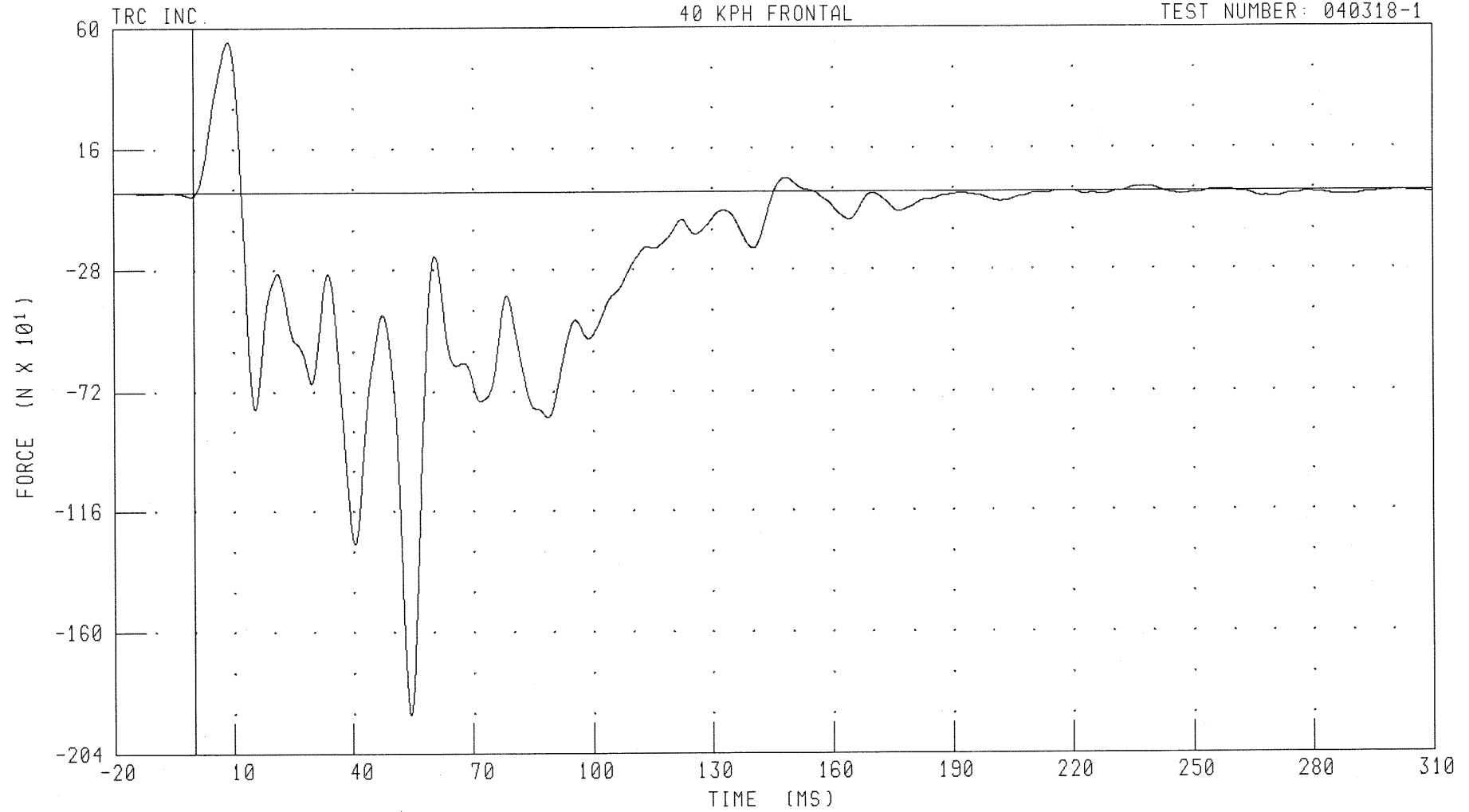
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A7 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA7F

FILTER: CH. CLASS 60

PEAK DATA: 551.74 N @ 8.72 MS; -1900.68 N @ 54.24 MS

6-60

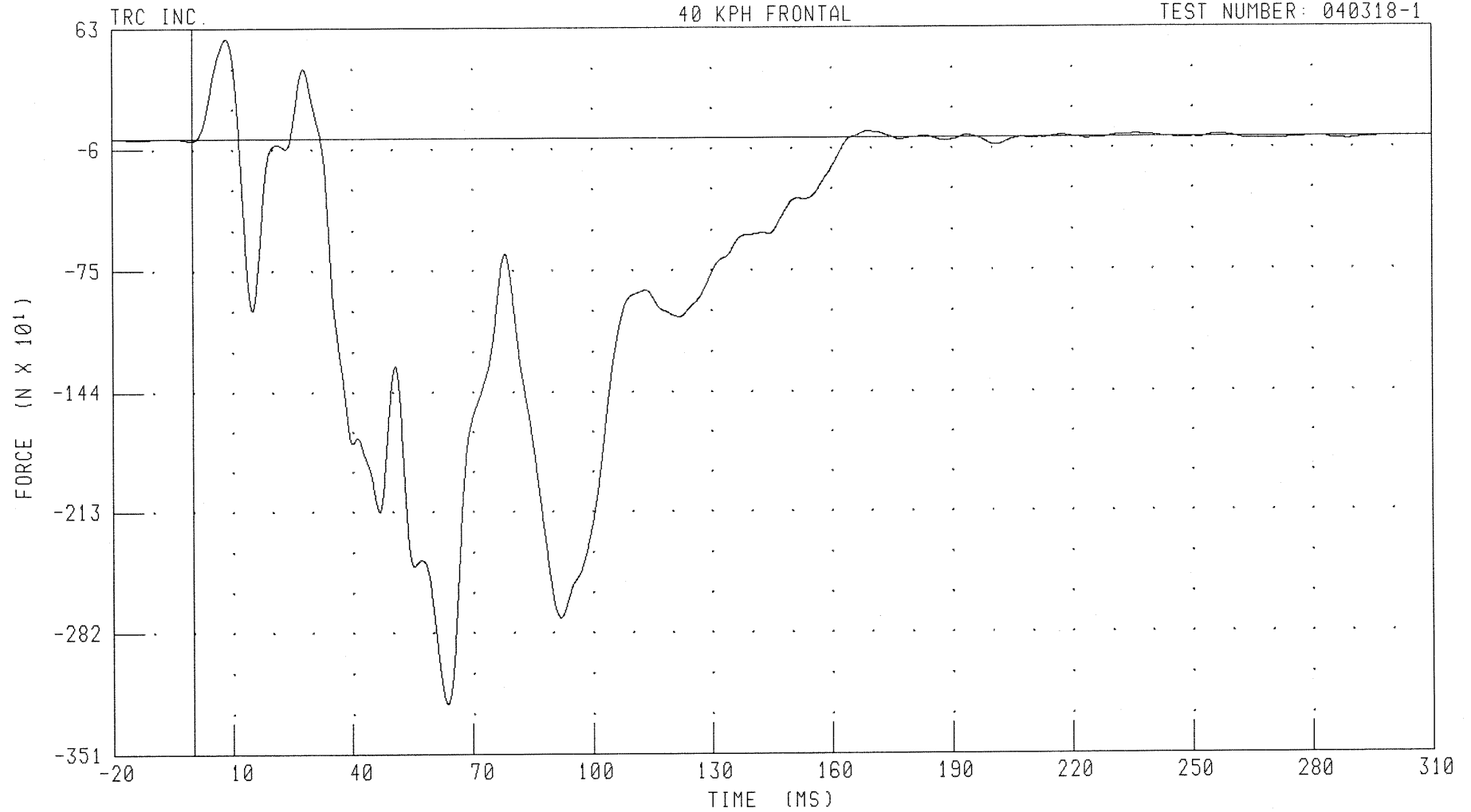
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A8 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA8F

FILTER: CH. CLASS 60

PEAK DATA: 574.38 N @ 8.48 MS; -3223.13 N @ 63.68 MS

6-61

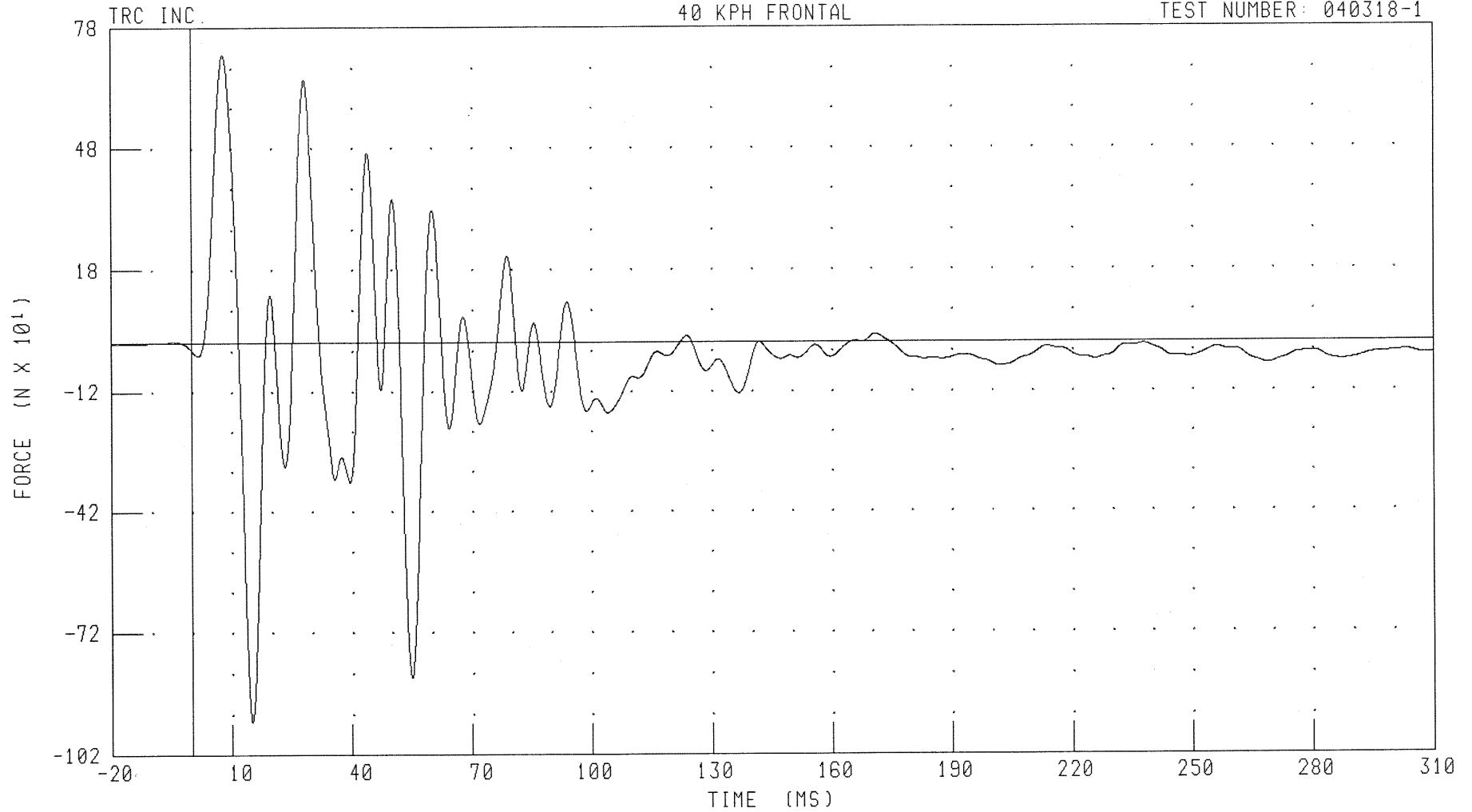
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A9 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA9F

FILTER: CH. CLASS 60

PEAK DATA: 714.23 N @ 7.92 MS; -938.29 N @ 15.04 MS

6-62

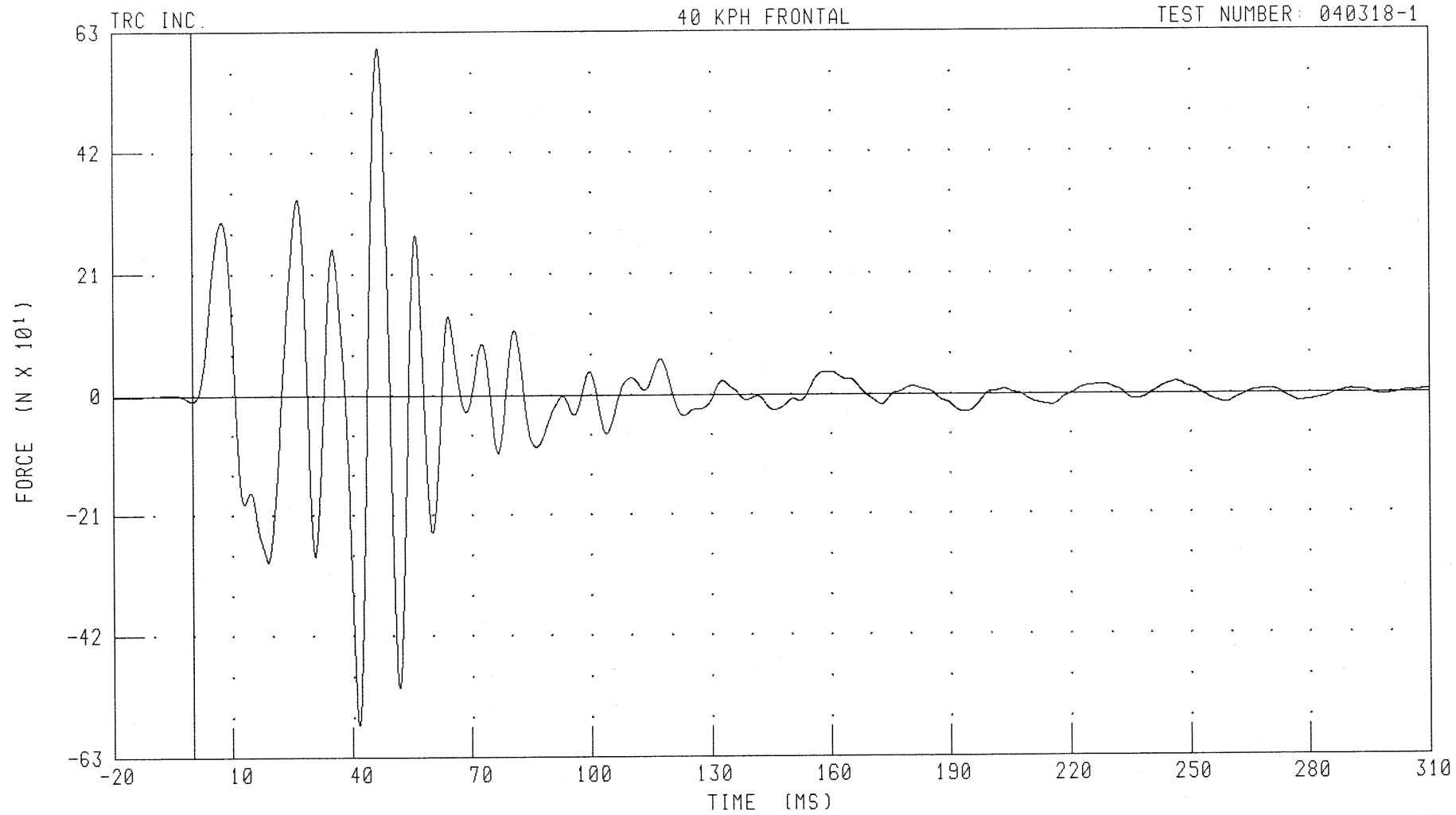
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B1 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB1F

FILTER: CH. CLASS 60

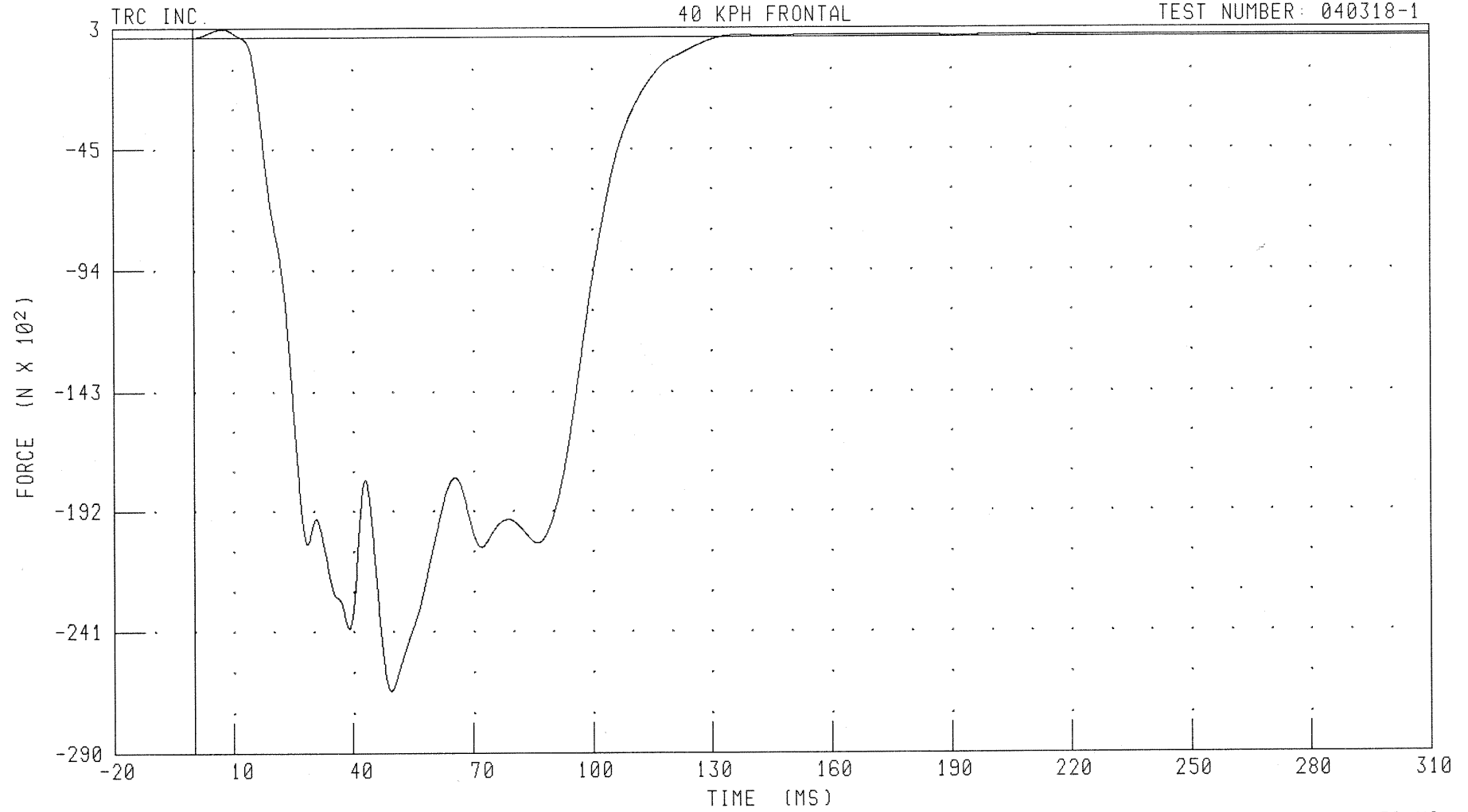
PEAK DATA: 602.59 N @ 46.56 MS; -573.55 N @ 41.52 MS

6-63

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION B2 FORCE

TEST NUMBER: 040318-1



CHANNEL: BB2F

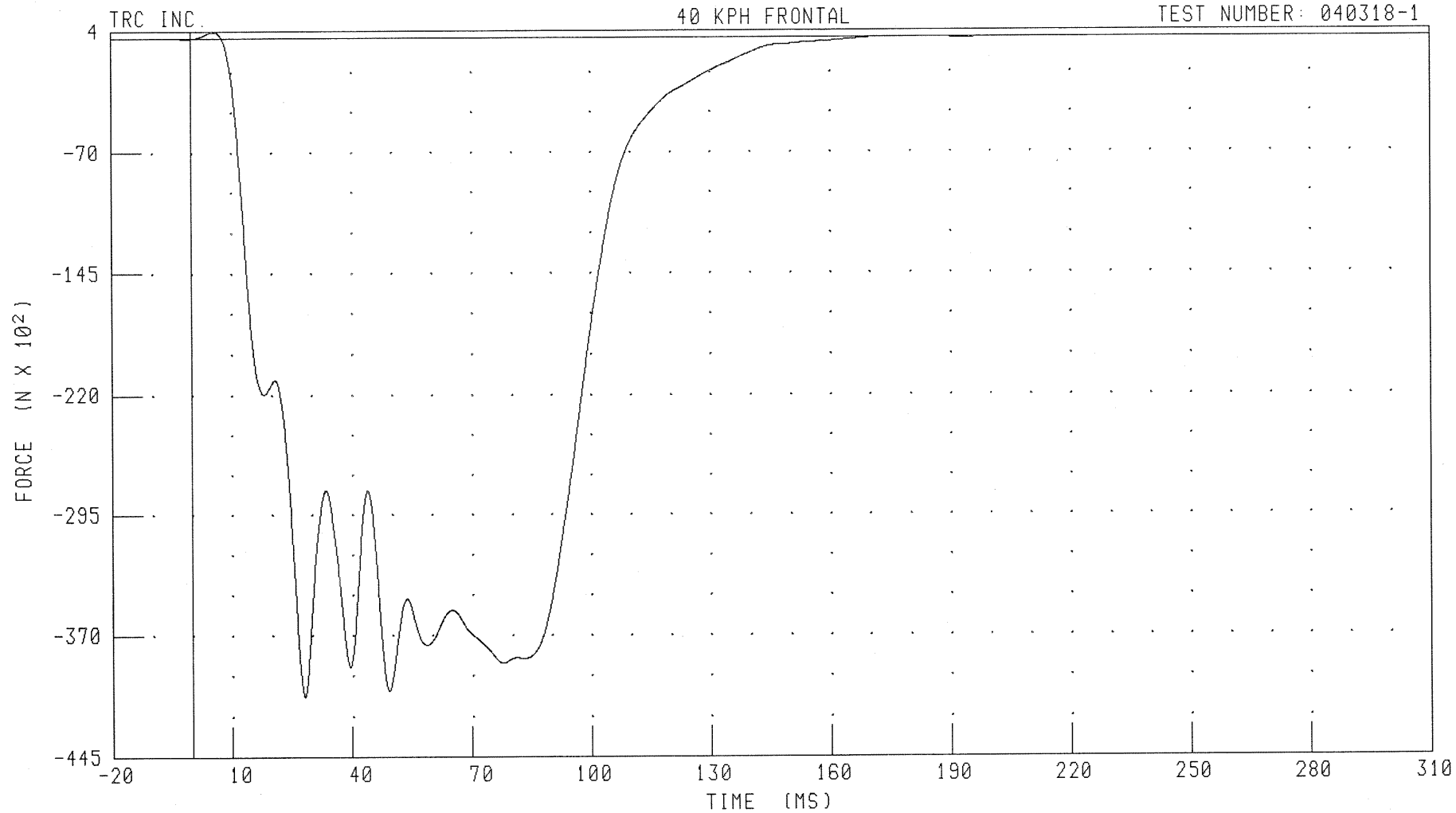
FILTER: CH. CLASS 60

6-64

040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION B3 FORCE

TEST NUMBER: 040318-1



CHANNEL: BB3F

FILTER: CH. CLASS 60

PEAK DATA: 413.62 N @ 5.76 MS; -4085.43 N @ 28.24 MS

6-65

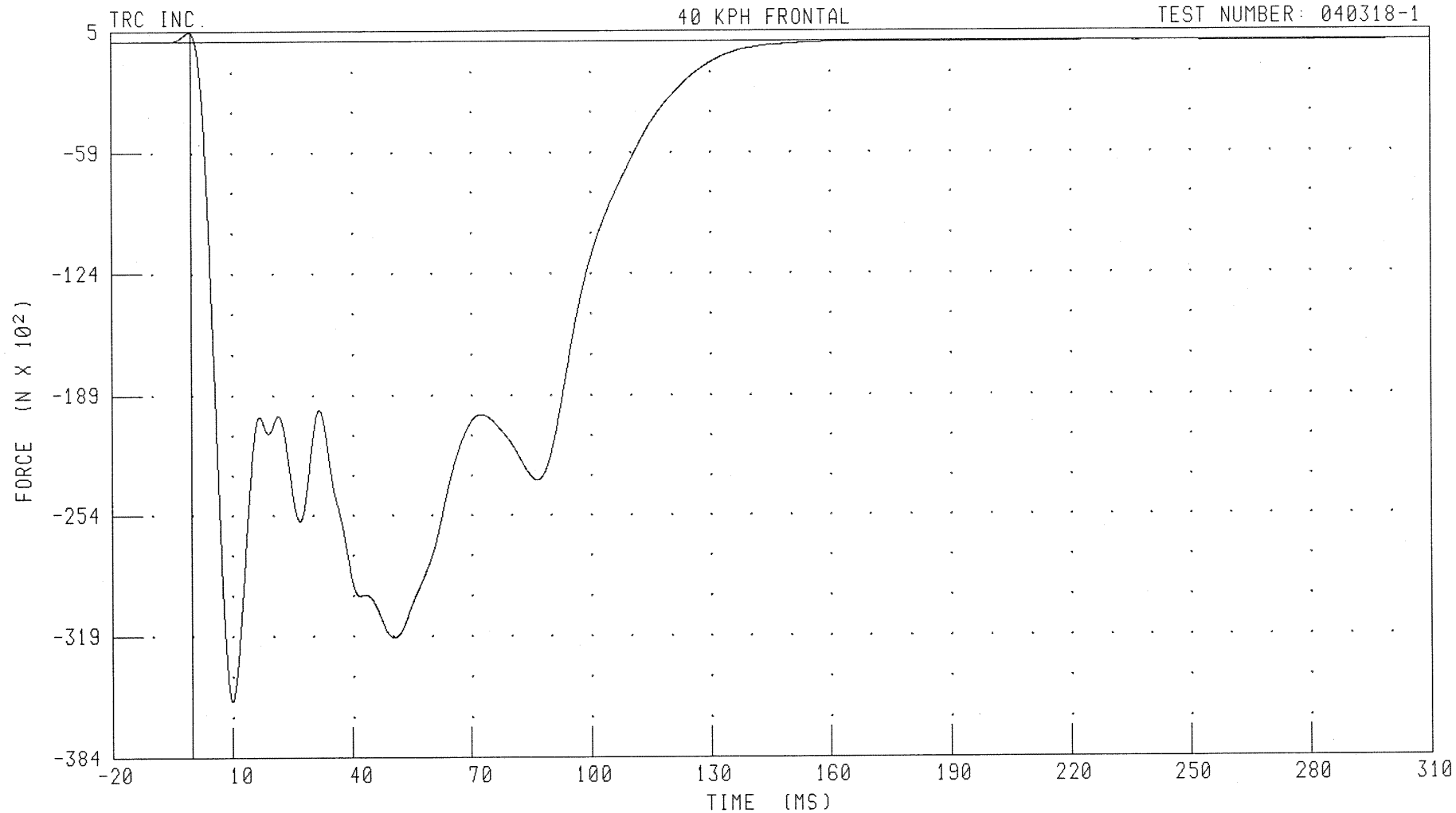
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B4 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB4F

FILTER: CH. CLASS 60

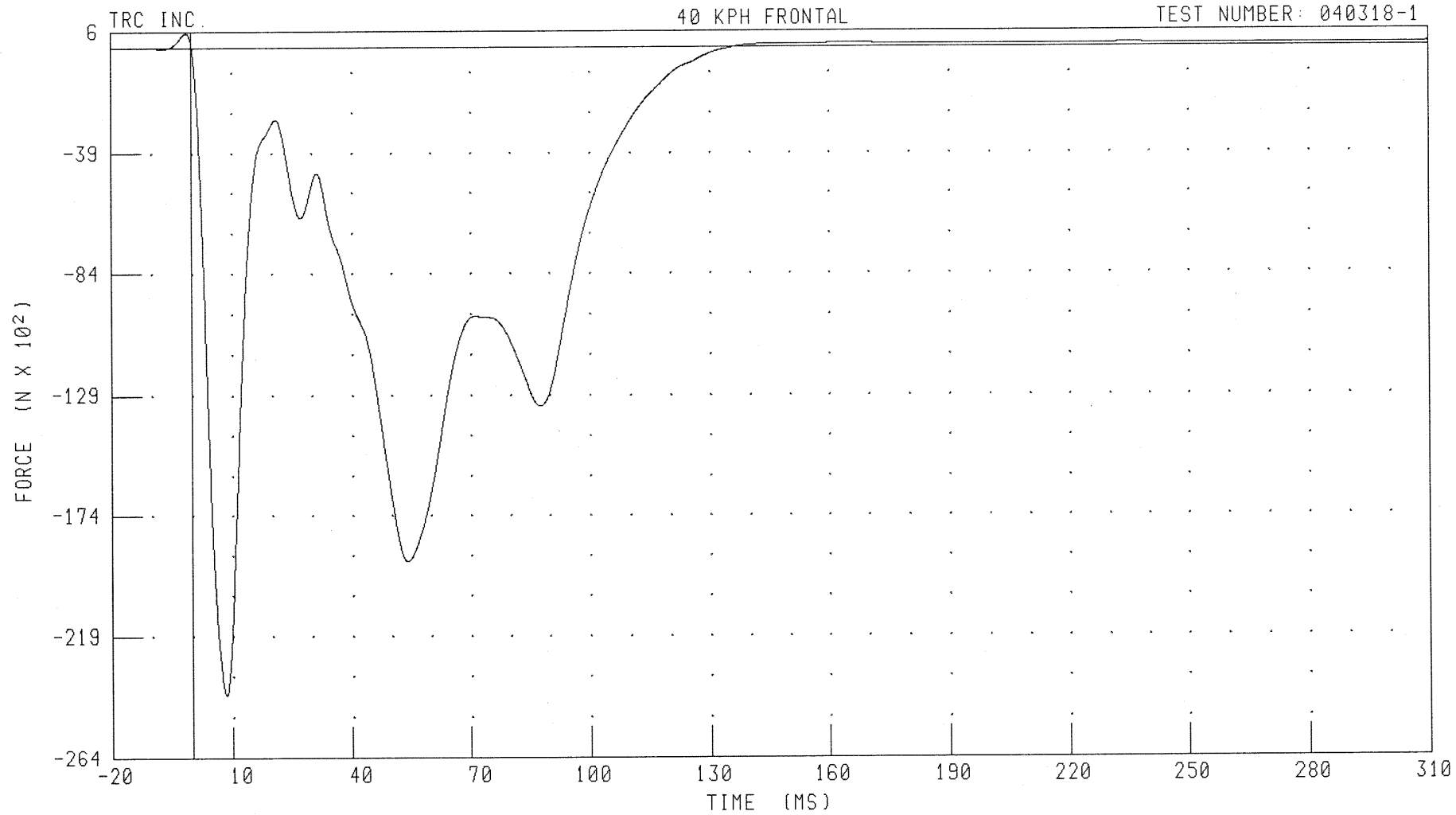
PEAK DATA: 490.86 N @ -0.40 MS; -35464.84 N @ 9.92 MS

6-66

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION B5 FORCE

TEST NUMBER: 040318-1



6-67

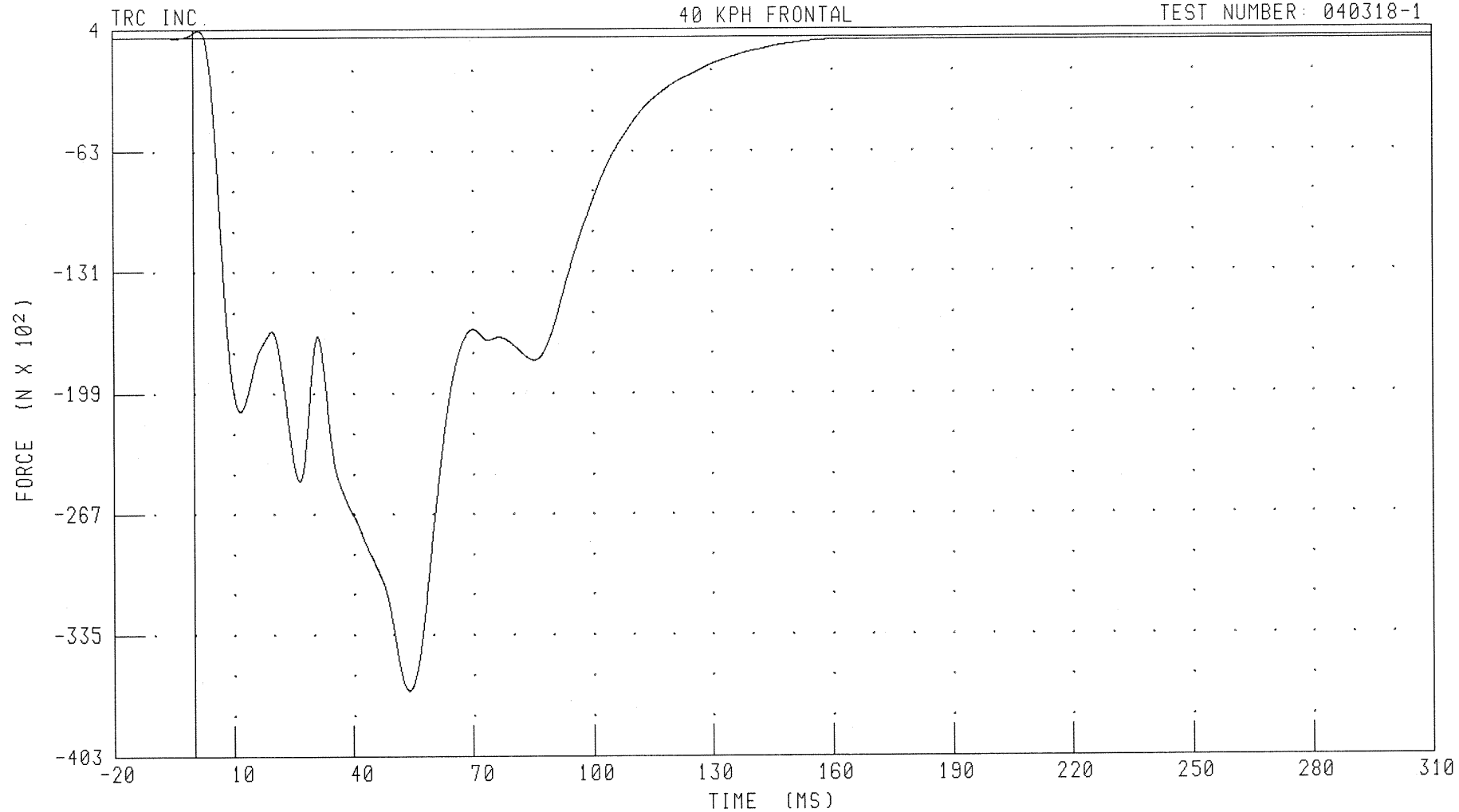
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B6 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB6F

FILTER: CH. CLASS 60

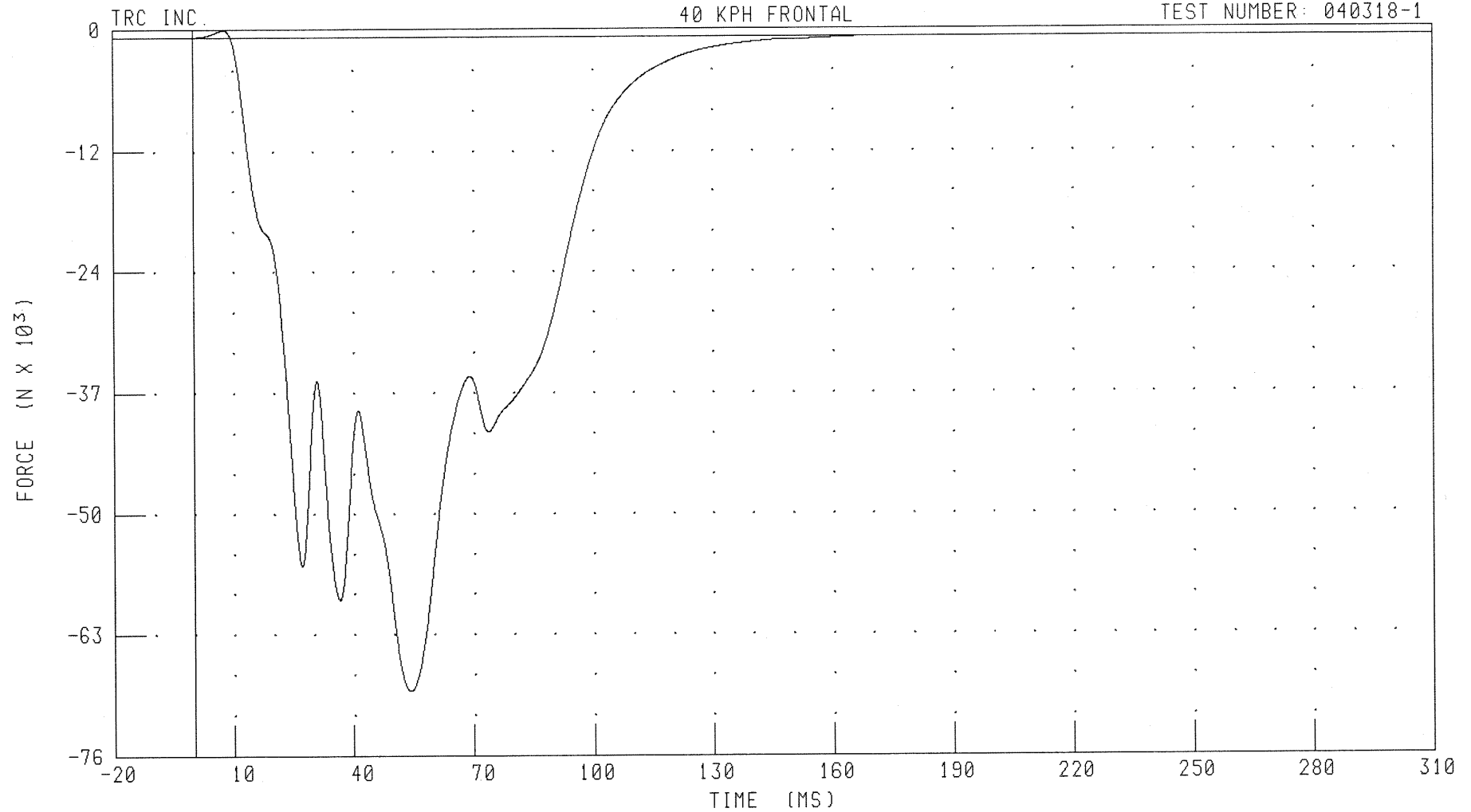
PEAK DATA: 423.16 N @ 1.36 MS; -3669.97 N @ 54.00 MS

6-68

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION B7 FORCE

TEST NUMBER: 040318-1



CHANNEL: BB7F

FILTER: CH. CLASS 60

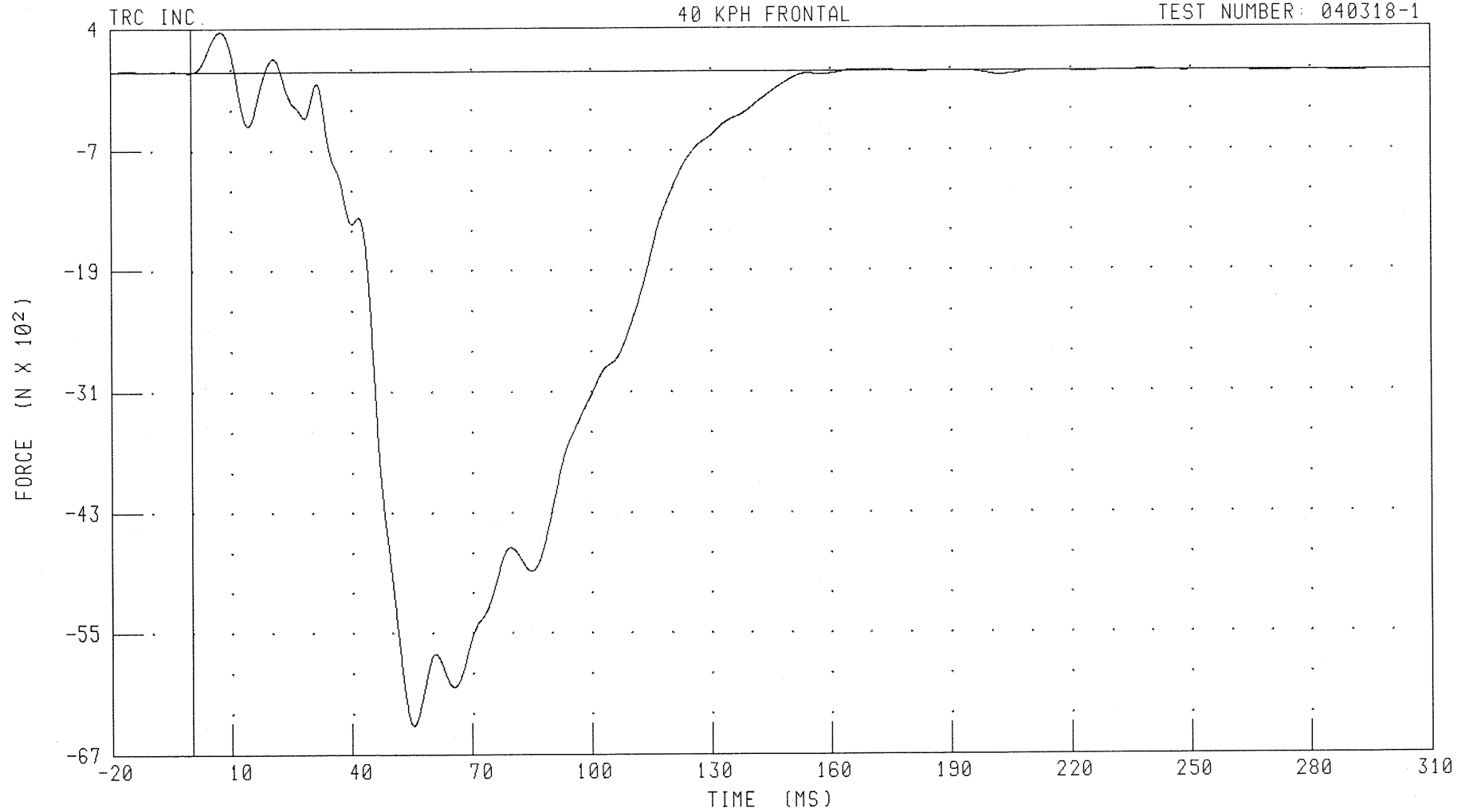
PEAK DATA: 724.43 N @ 7.68 MS; -69238.60 N @ 54.16 MS

6-69

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION B8 FORCE

TEST NUMBER: 040318-1



CHANNEL: BB8F

FILTER: CH. CLASS 60

PEAK DATA: 390.22 N @ 7.52 MS; -6502.34 N @ 55.36 MS

6-70

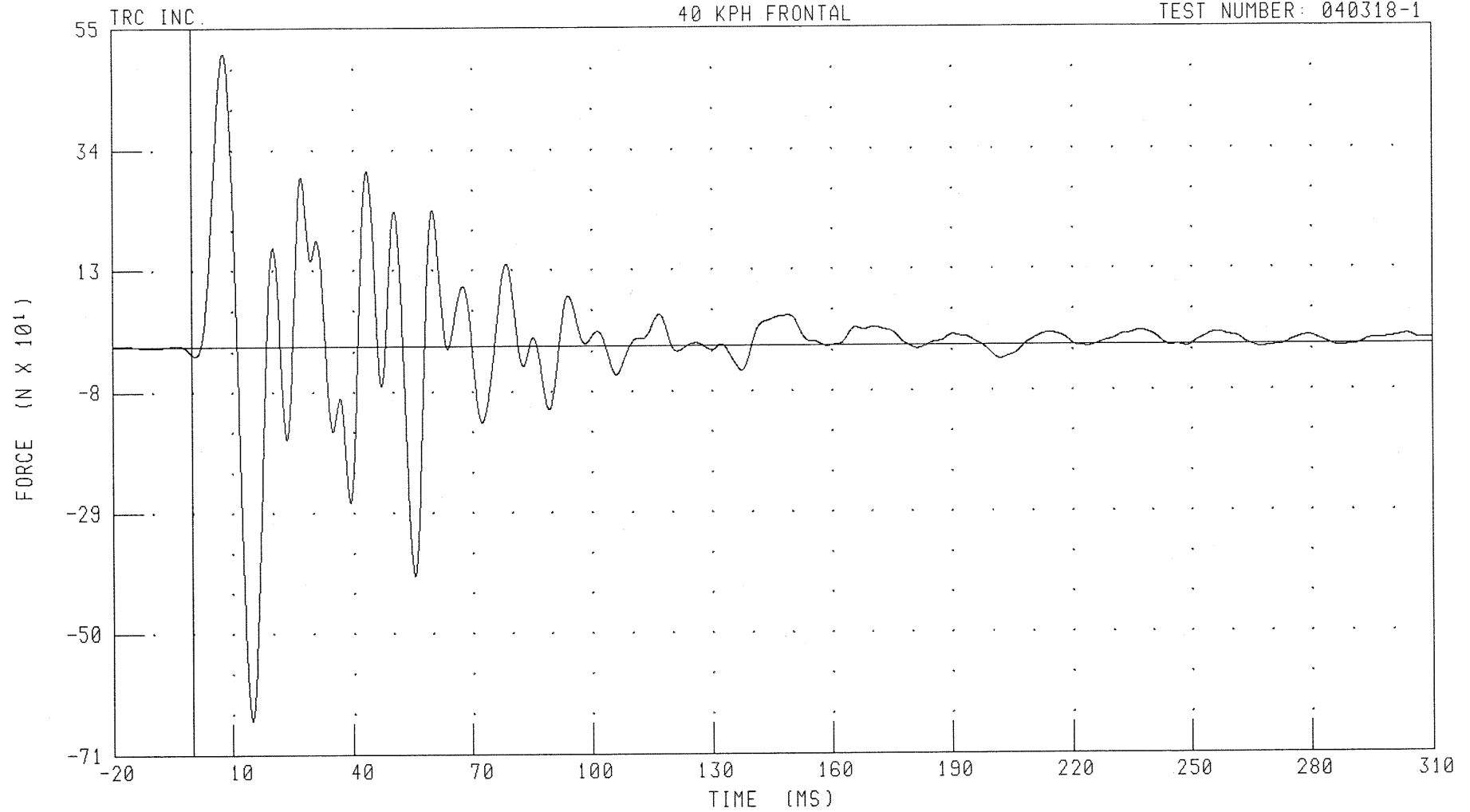
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B9 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB9F

FILTER: CH. CLASS 60

PEAK DATA: 506.48 N @ 8.00 MS; -650.65 N @ 14.88 MS

6-71

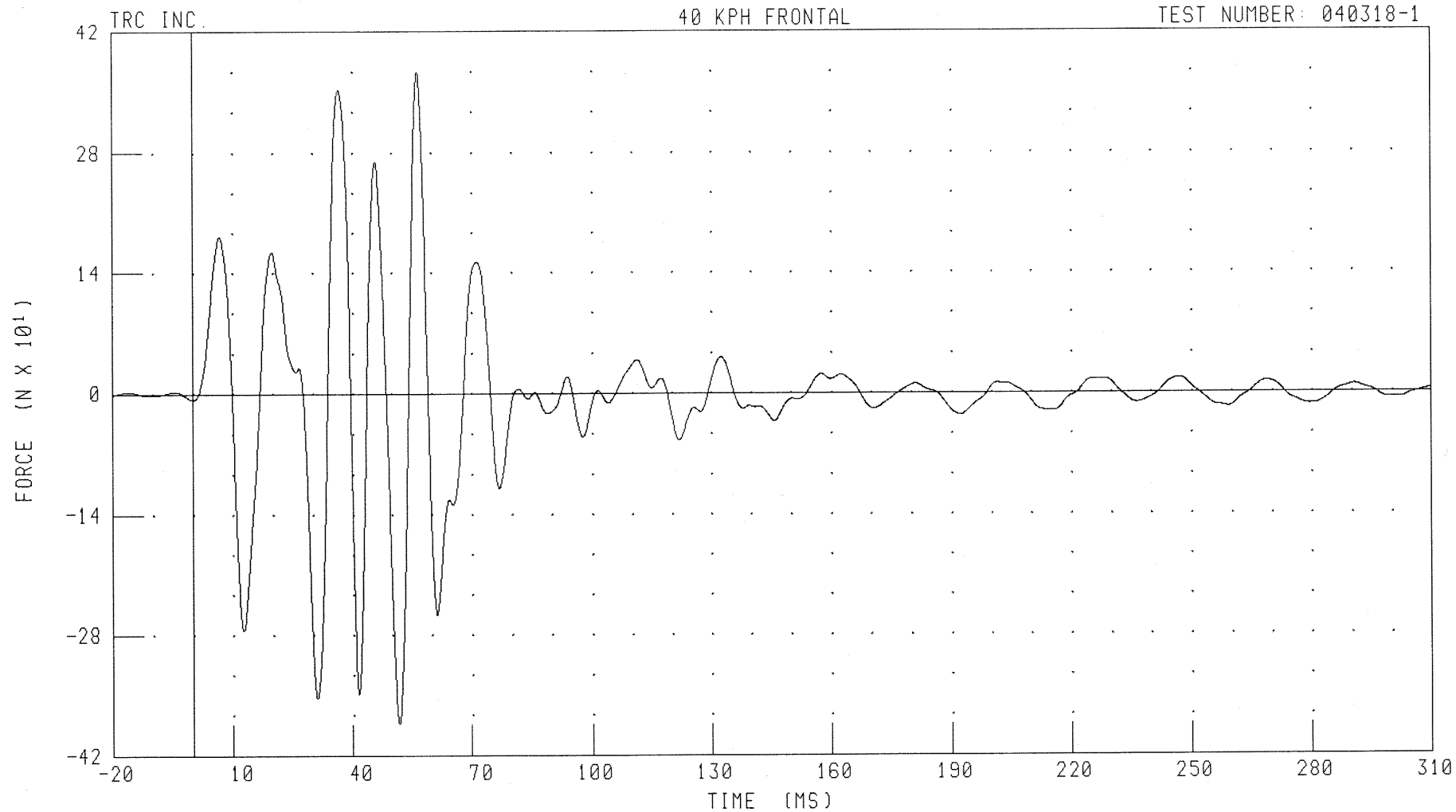
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C1 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC1F

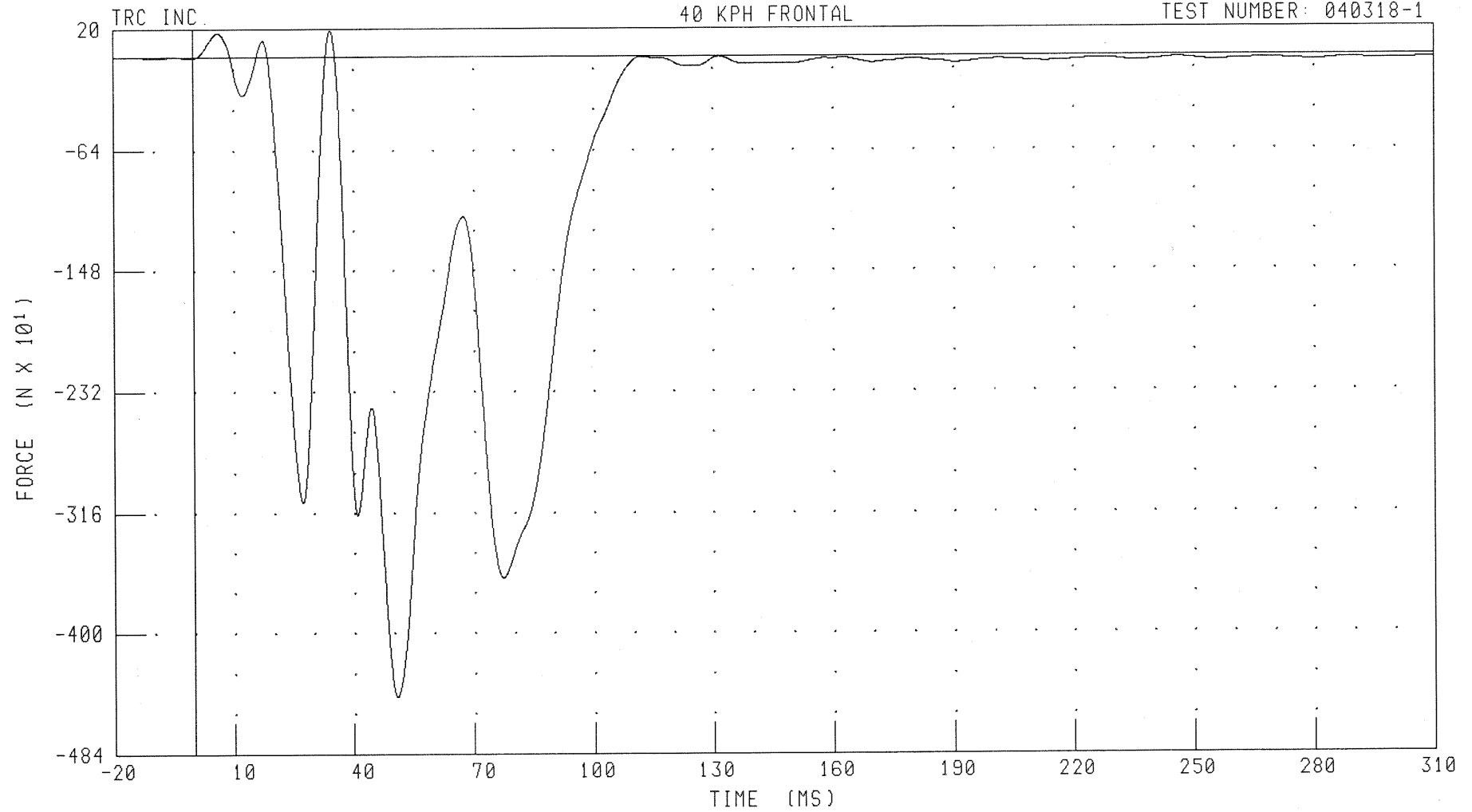
FILTER: CH. CLASS 60

6-72

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C2 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC2F

FILTER: CH. CLASS 60

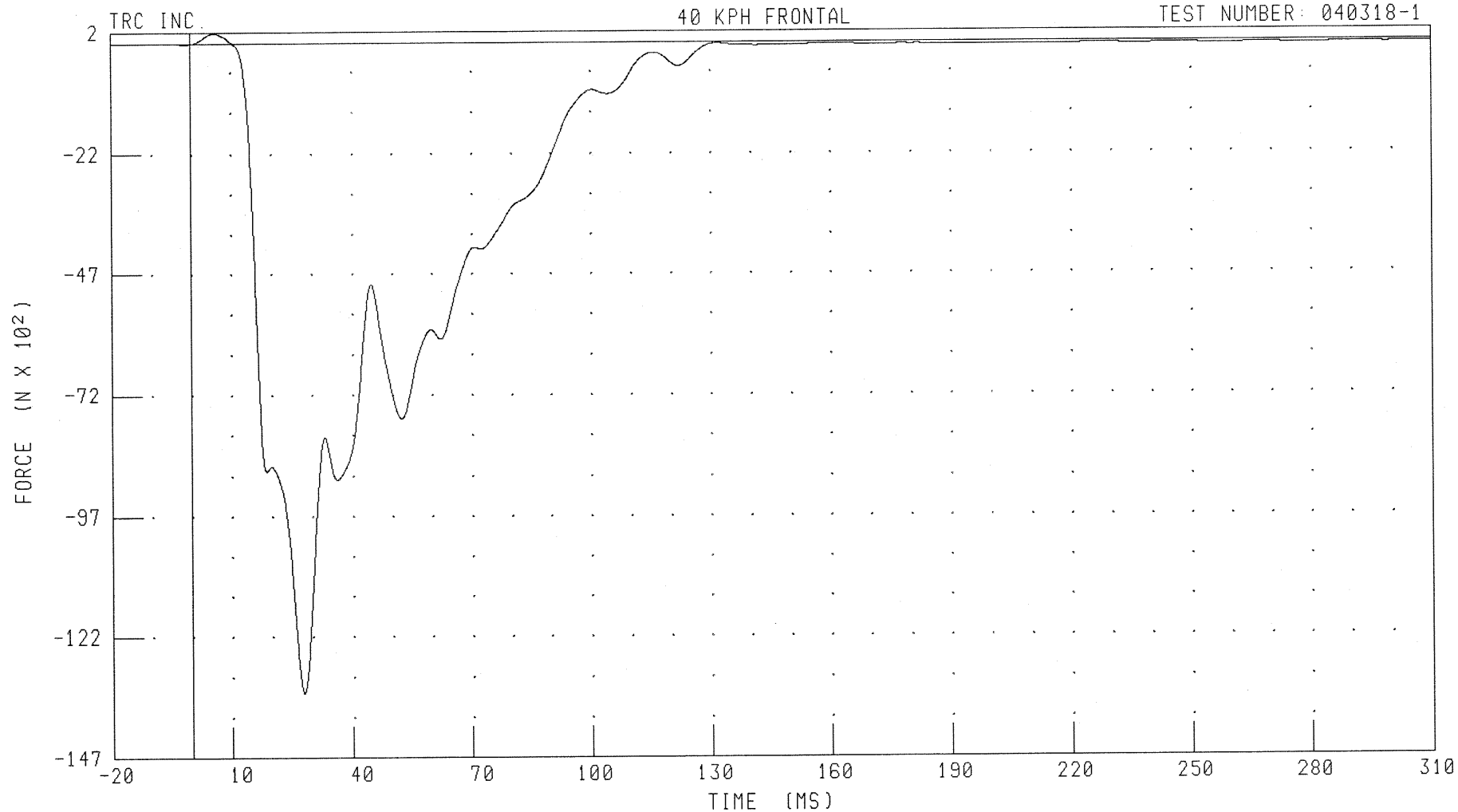
PEAK DATA: 186.63 N @ 34.48 MS; -4441.95 N @ 50.80 MS

6-73

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C3 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC3F

FILTER: CH. CLASS 60

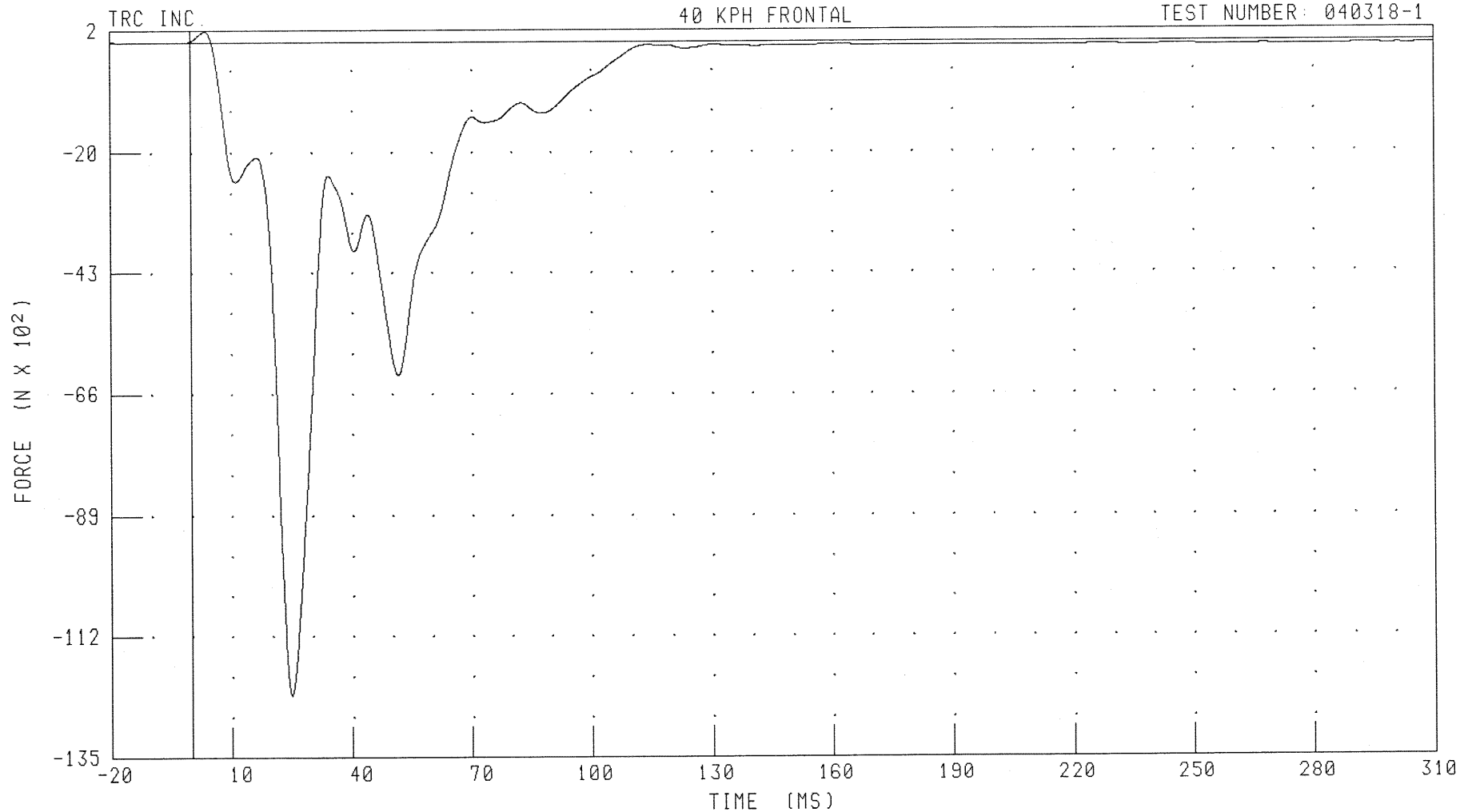
PEAK DATA: 216.63 N @ 5.84 MS; -13439.48 N @ 27.92 MS

6-74

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C4 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC4F

FILTER: CH. CLASS 60

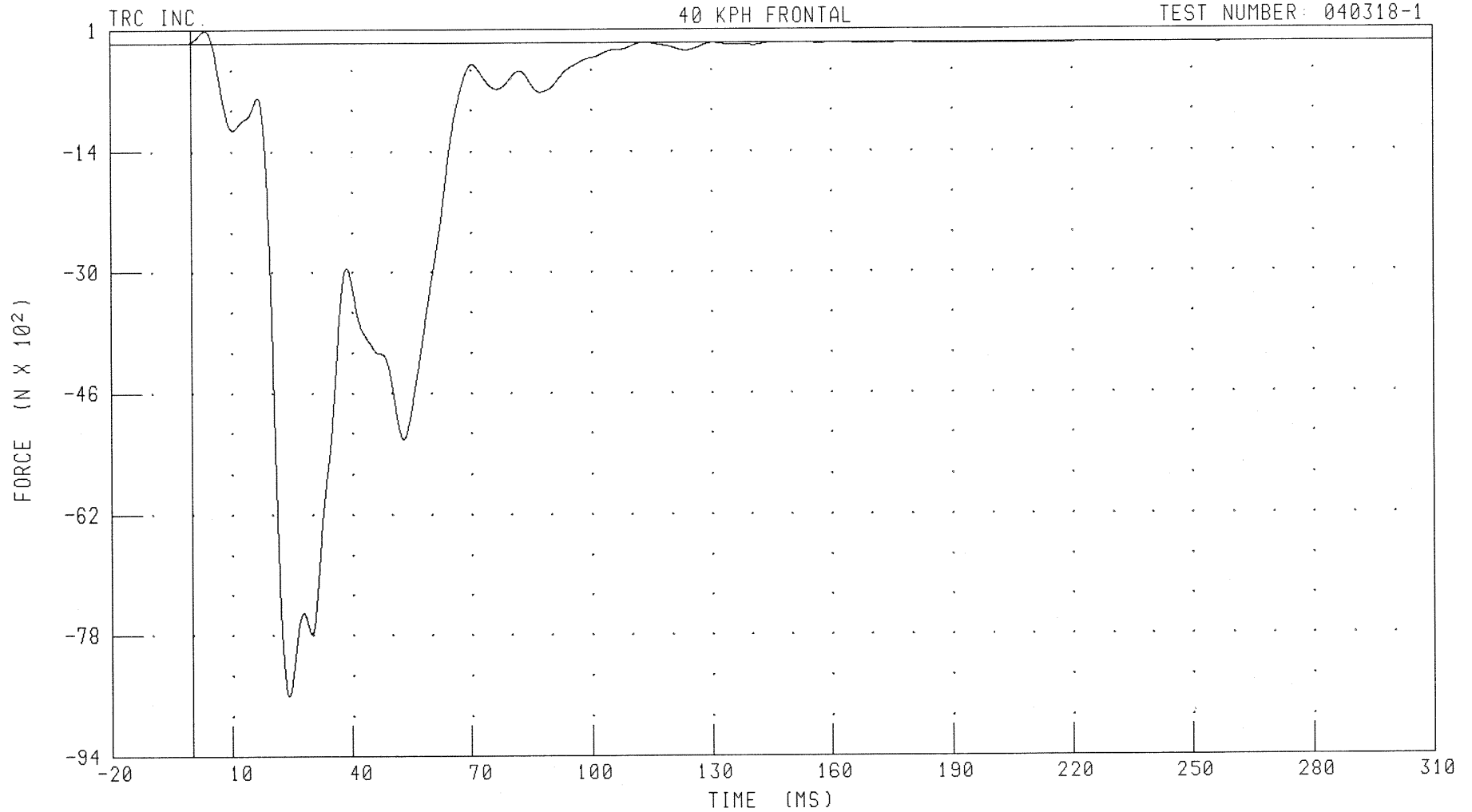
PEAK DATA: 203.32 N @ 3.52 MS; -12406.27 N @ 24.80 MS

6-75

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C5 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC5F

FILTER: CH. CLASS 60

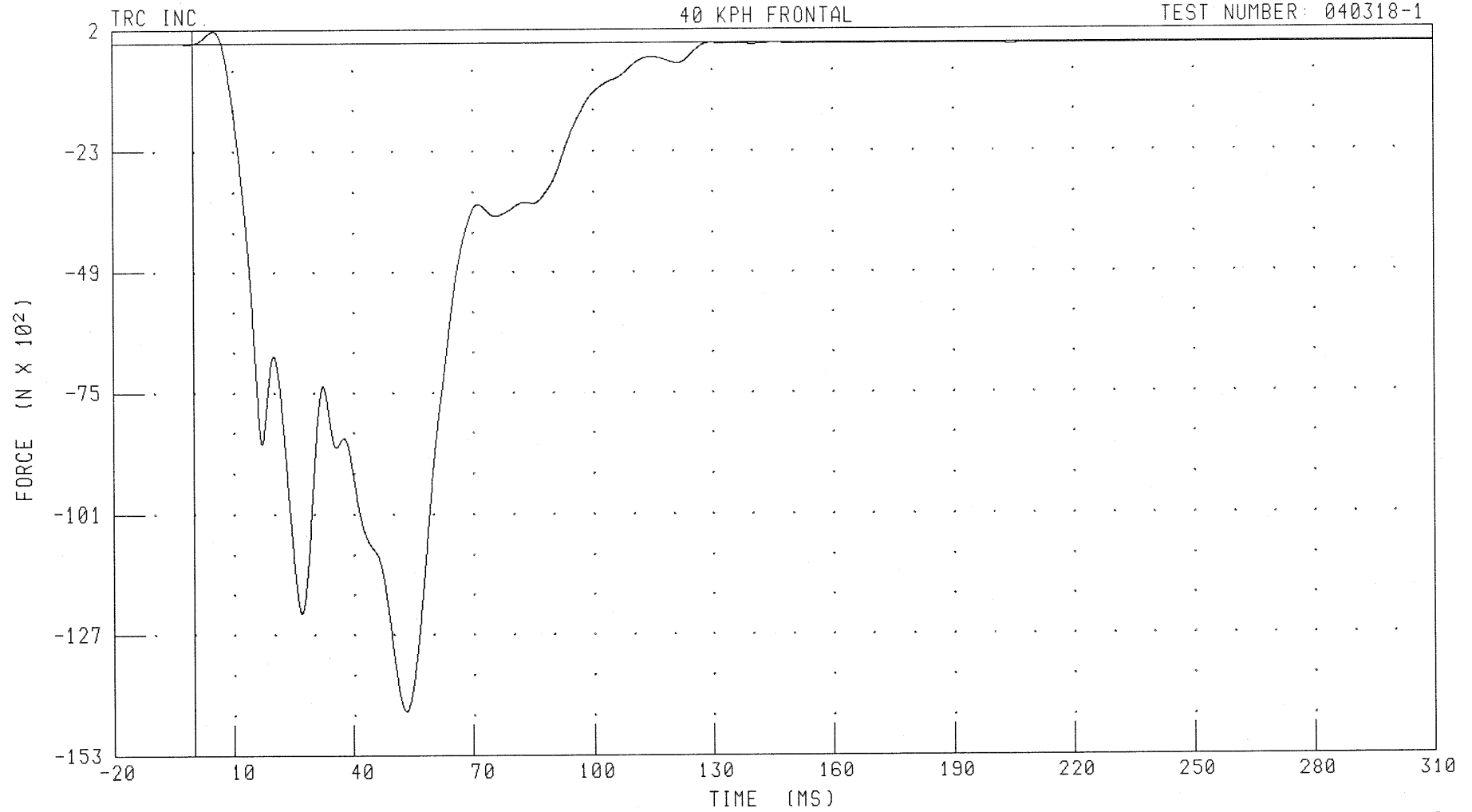
PEAK DATA: 160.88 N @ 3.52 MS; -8635.05 N @ 24.16 MS

6-76

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C6 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC6F

FILTER: CH. CLASS 60

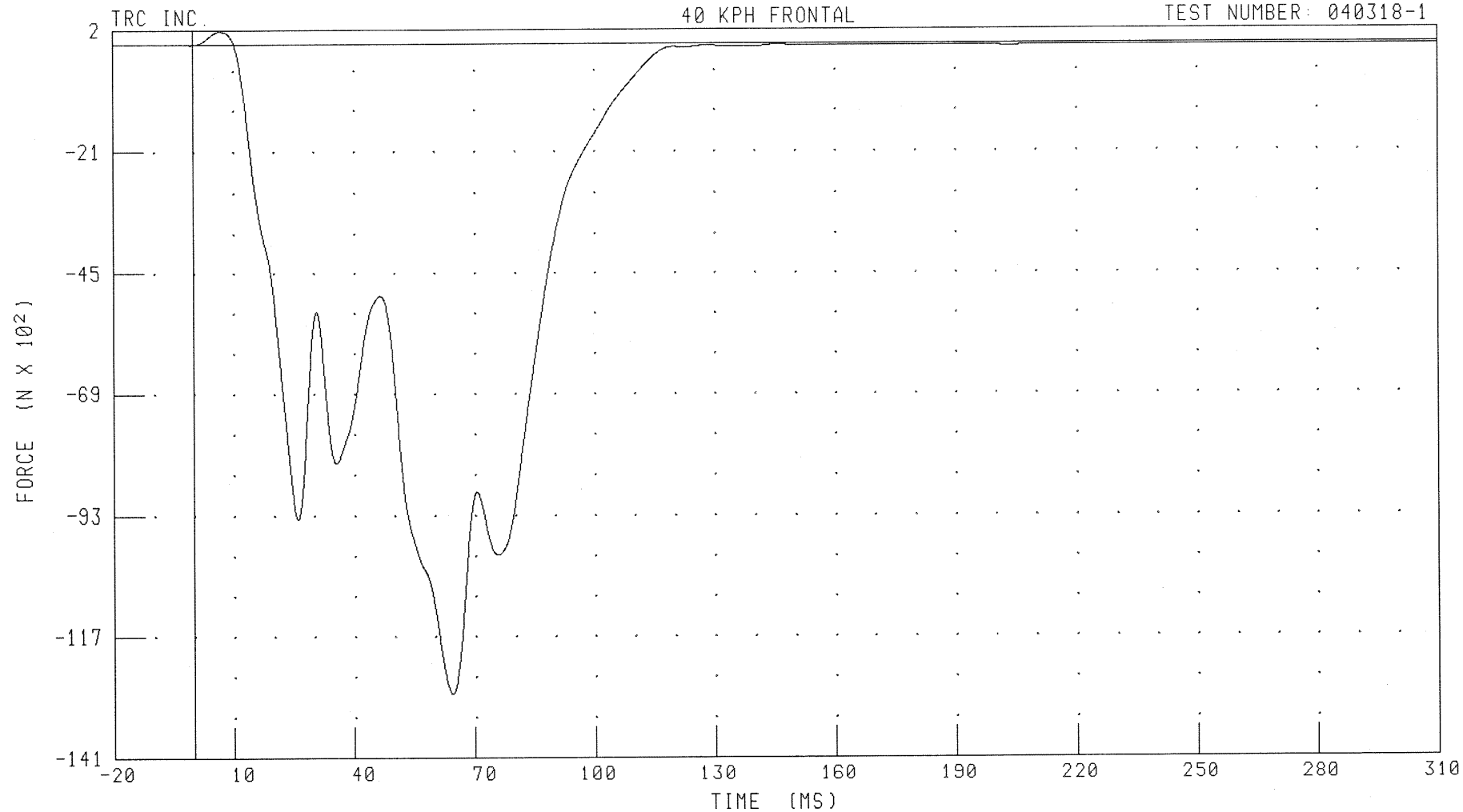
PEAK DATA: 257.01 N @ 5.20 MS; -14369.38 N @ 53.12 MS

6-77

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C7 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC7F

FILTER: CH. CLASS 60

PEAK DATA: 258.02 N @ 6.88 MS; -12869.00 N @ 64.40 MS

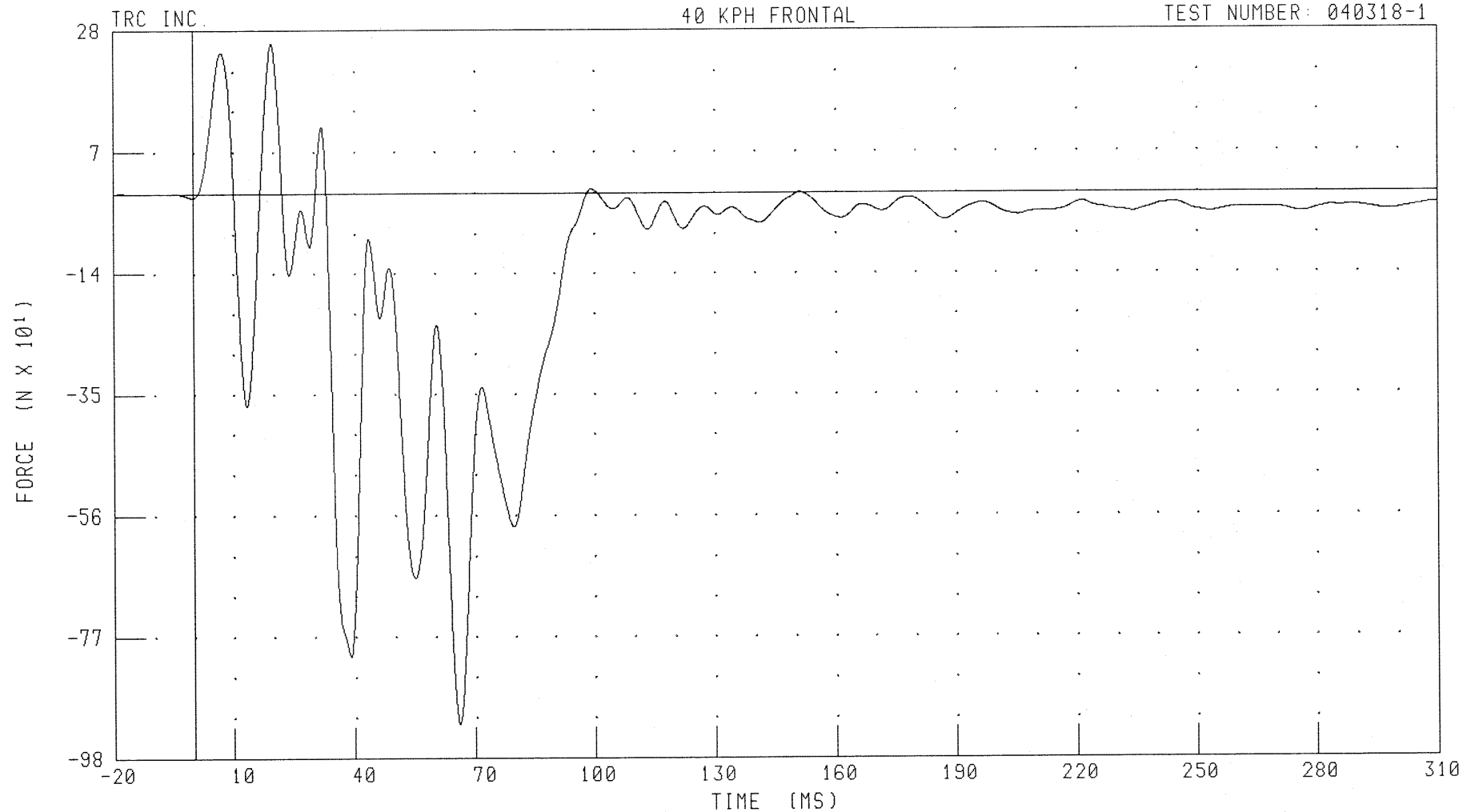
6-78

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C8 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC8F

FILTER: CH. CLASS 60

PEAK DATA: 256.59 N @ 19.76 MS; -921.66 N @ 65.92 MS

6-79

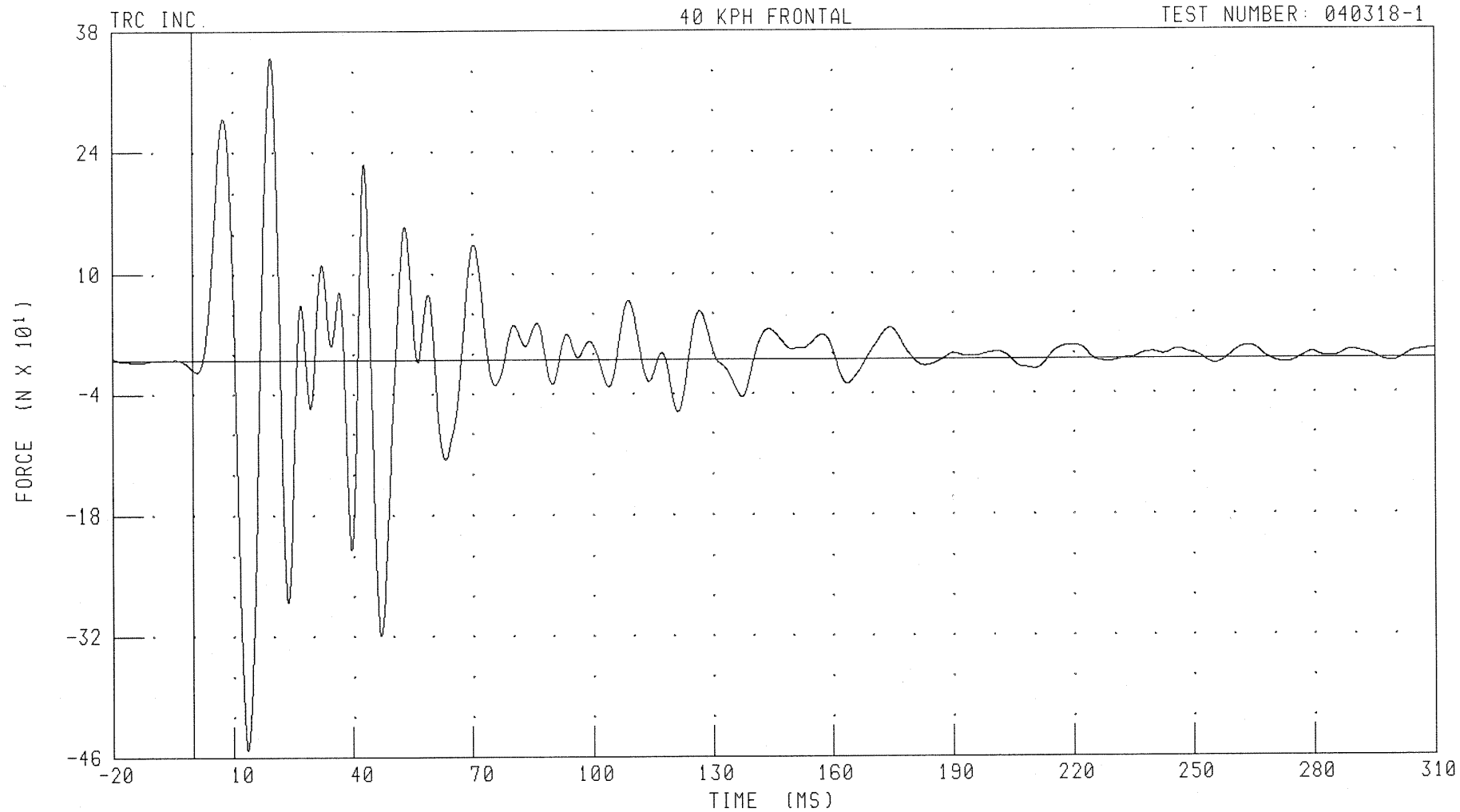
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C9 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC9F

FILTER: CH. CLASS 60

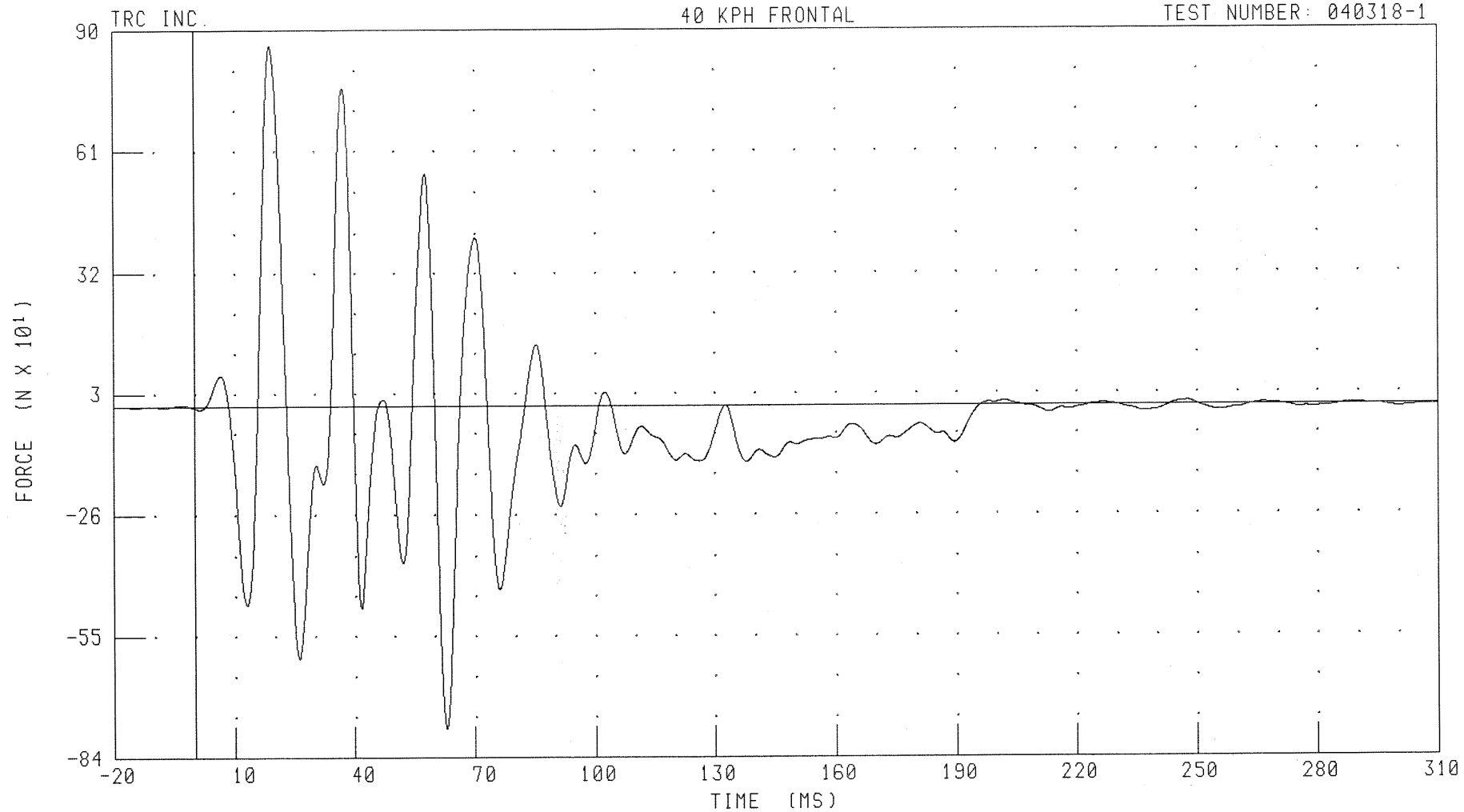
PEAK DATA: 349.56 N @ 19.60 MS; -451.56 N @ 13.52 MS

6-80

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION D1 FORCE

TEST NUMBER: 040318-1



CHANNEL: BD1F

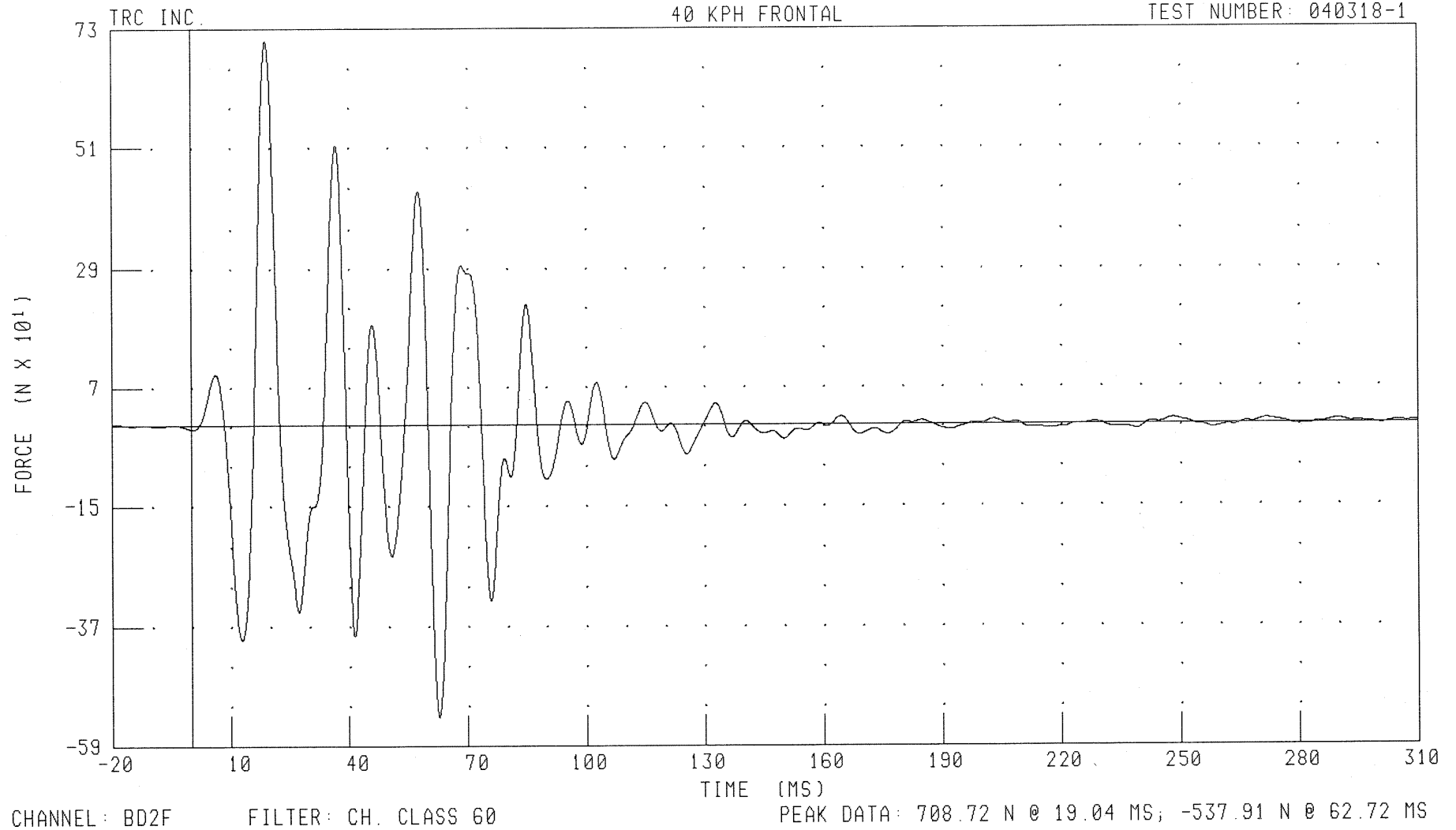
FILTER: CH. CLASS 60

PEAK DATA: 863.62 N @ 19.04 MS; -772.52 N @ 62.96 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION D2 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



6-82

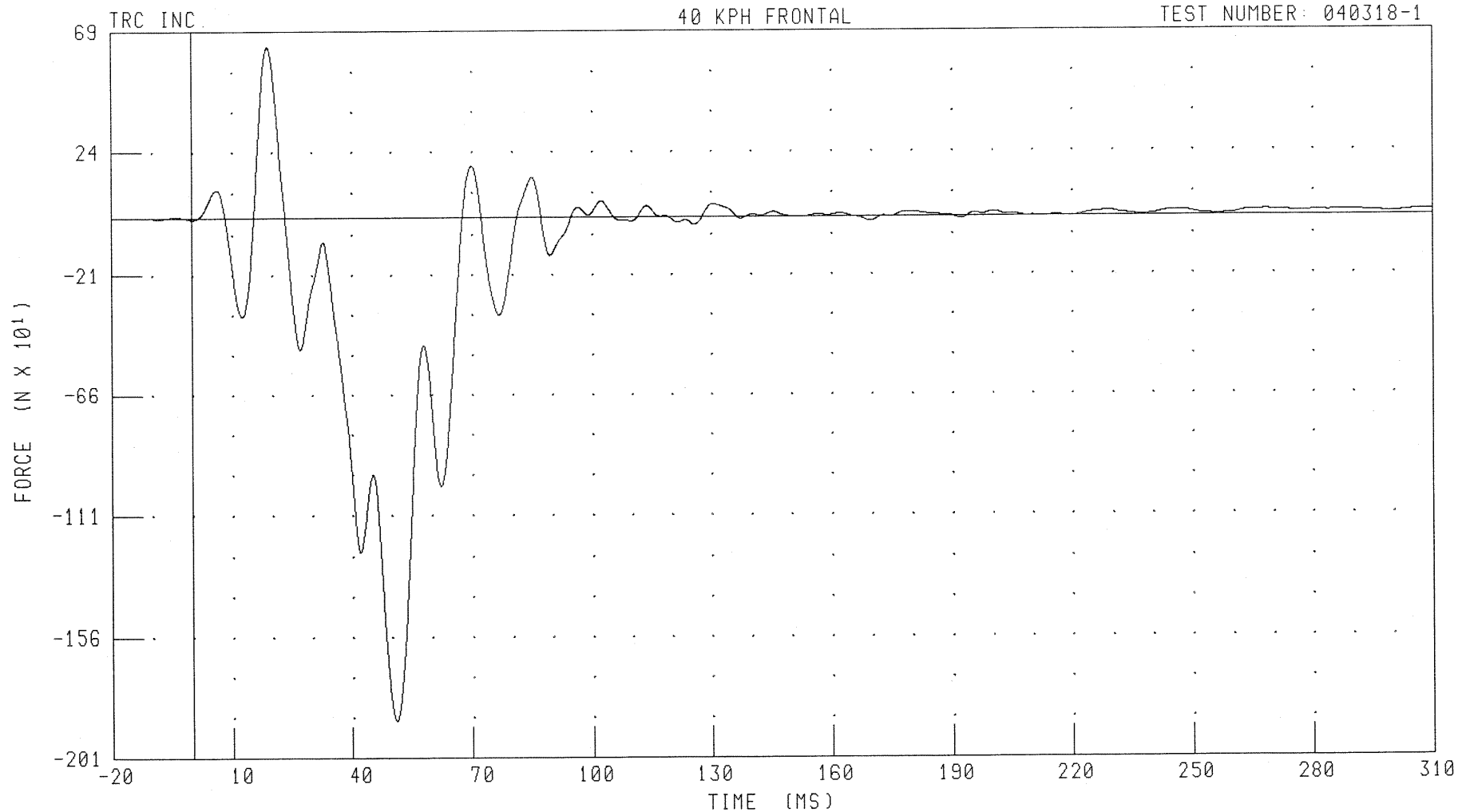
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D3 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD3F

FILTER: CH. CLASS 60

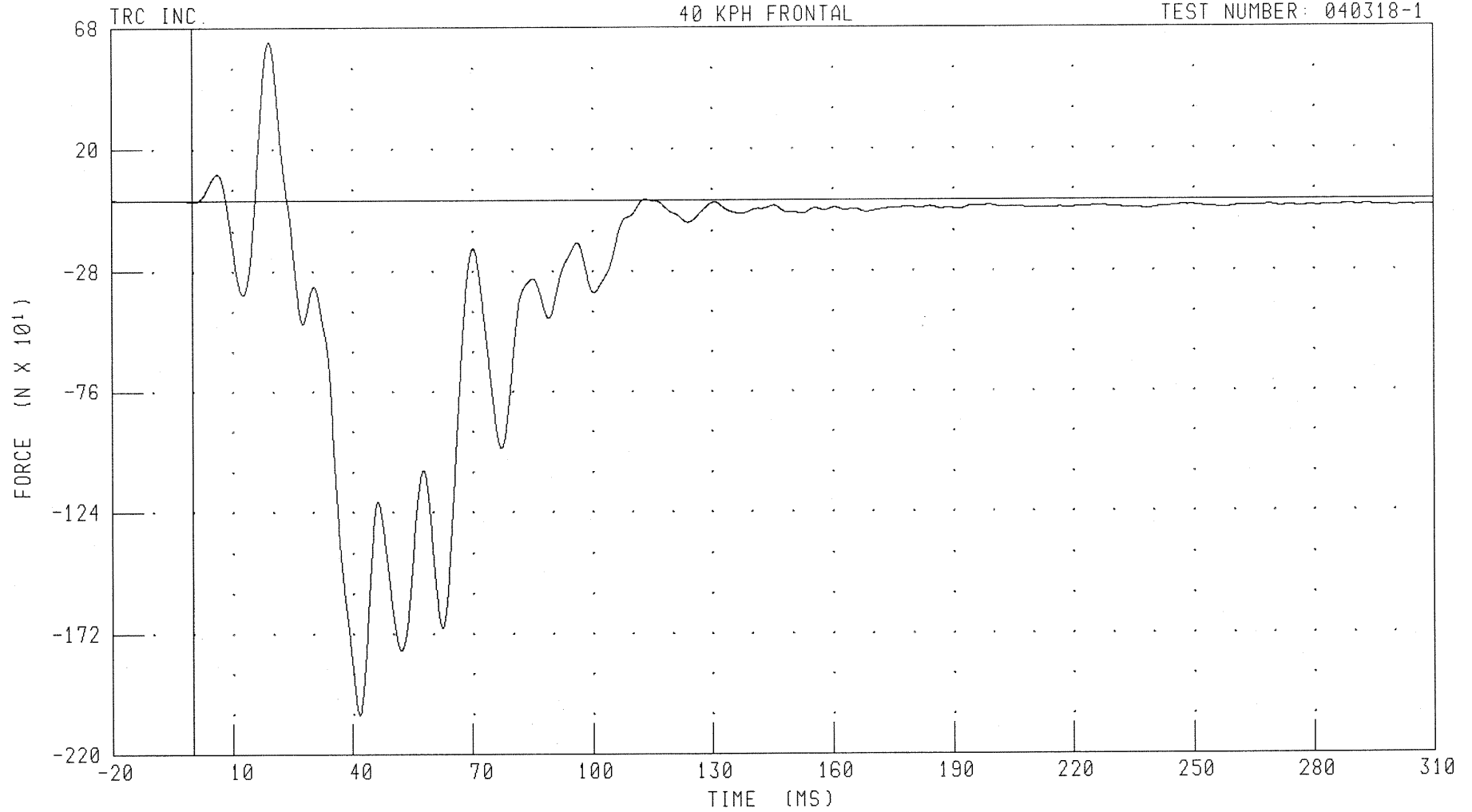
PEAK DATA: 632.80 N @ 19.04 MS; -1874.81 N @ 51.12 MS

6-83

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION D4 FORCE

TEST NUMBER: 040318-1



CHANNEL: BD4F

FILTER: CH. CLASS 60

PEAK DATA: 624.31 N @ 19.20 MS; -2044.15 N @ 41.76 MS

6-84

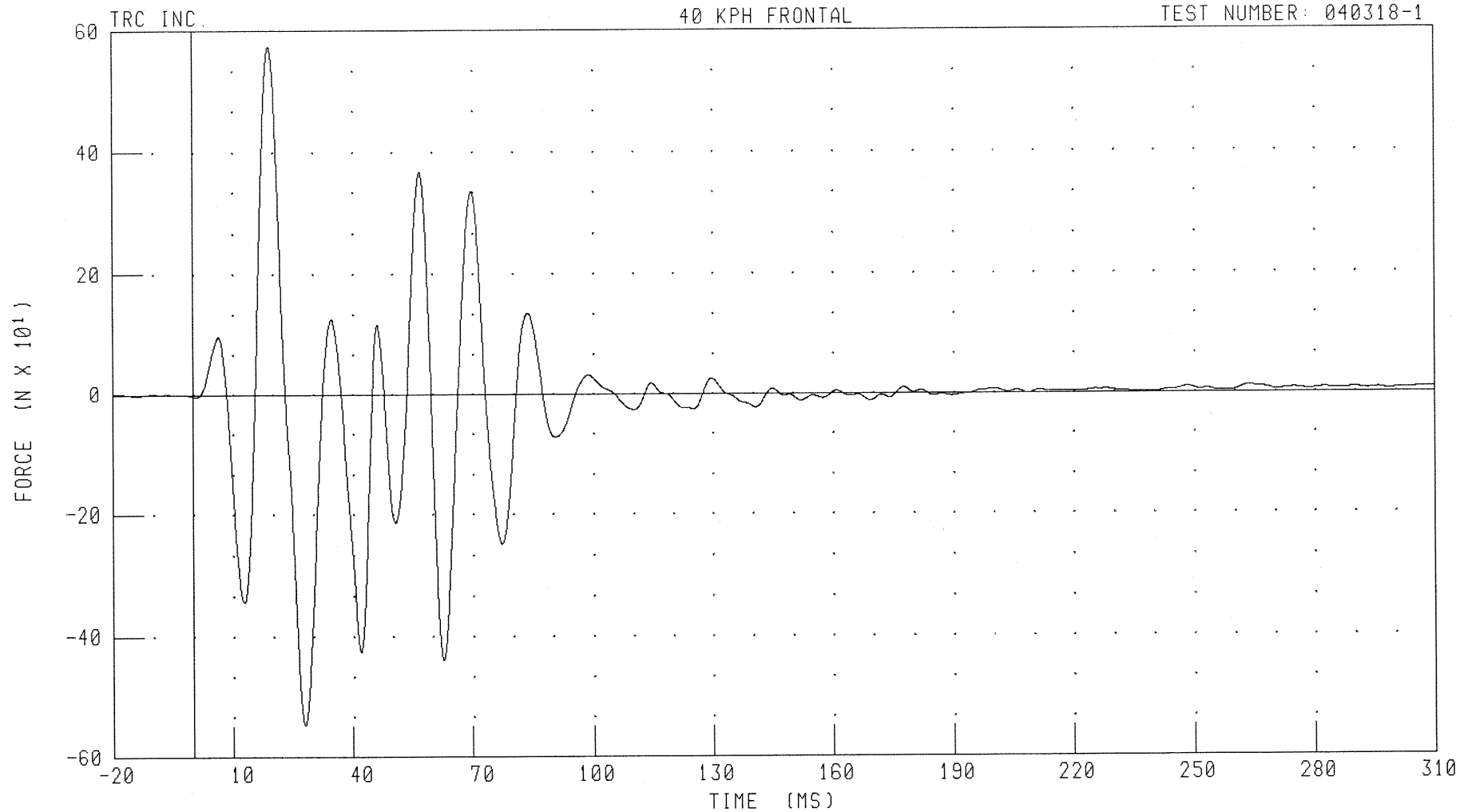
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D5 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD5F

FILTER: CH. CLASS 60

PEAK DATA: 573.90 N @ 19.12 MS; -547.95 N @ 27.92 MS

6-85

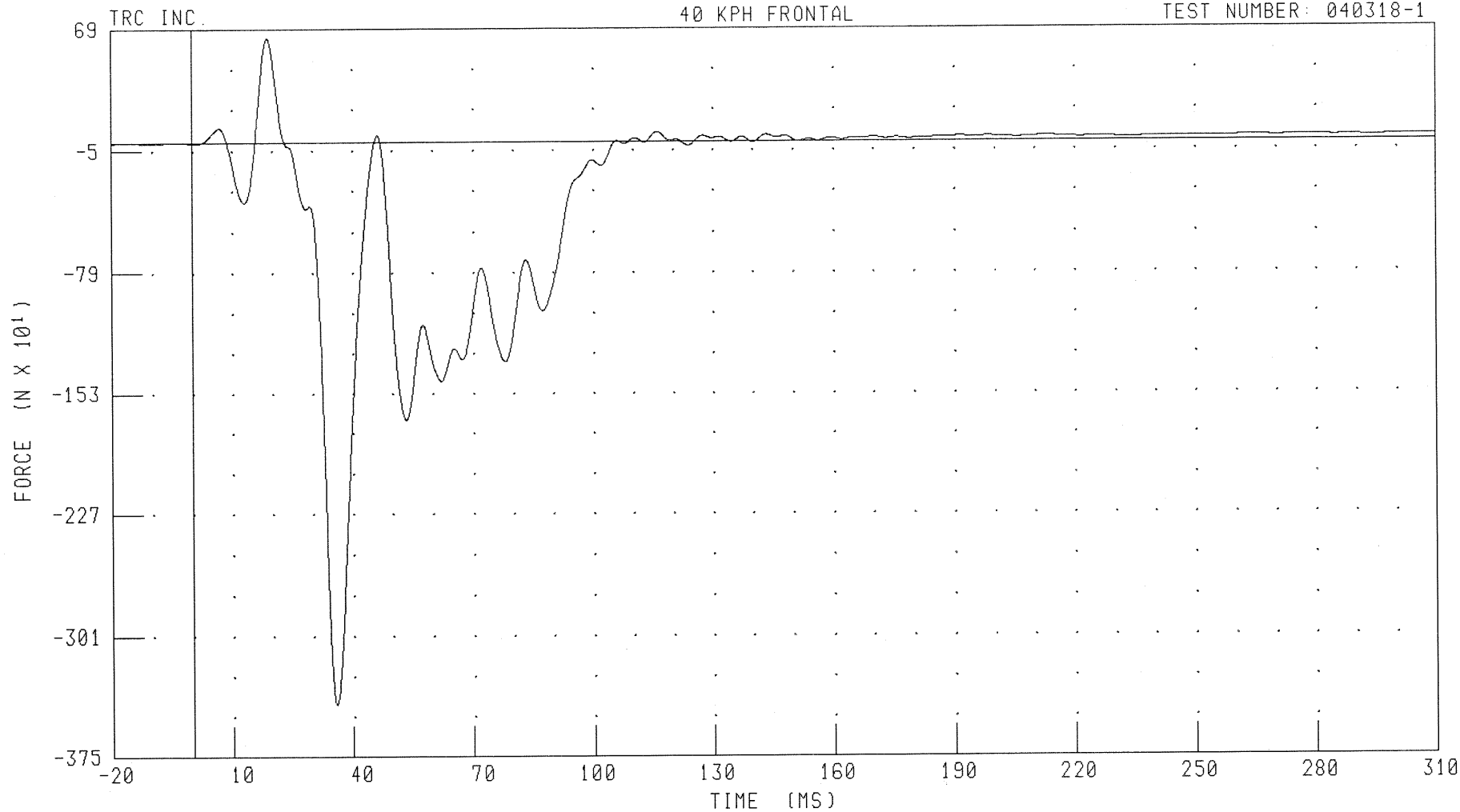
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D6 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD6F

FILTER: CH. CLASS 60

6-86

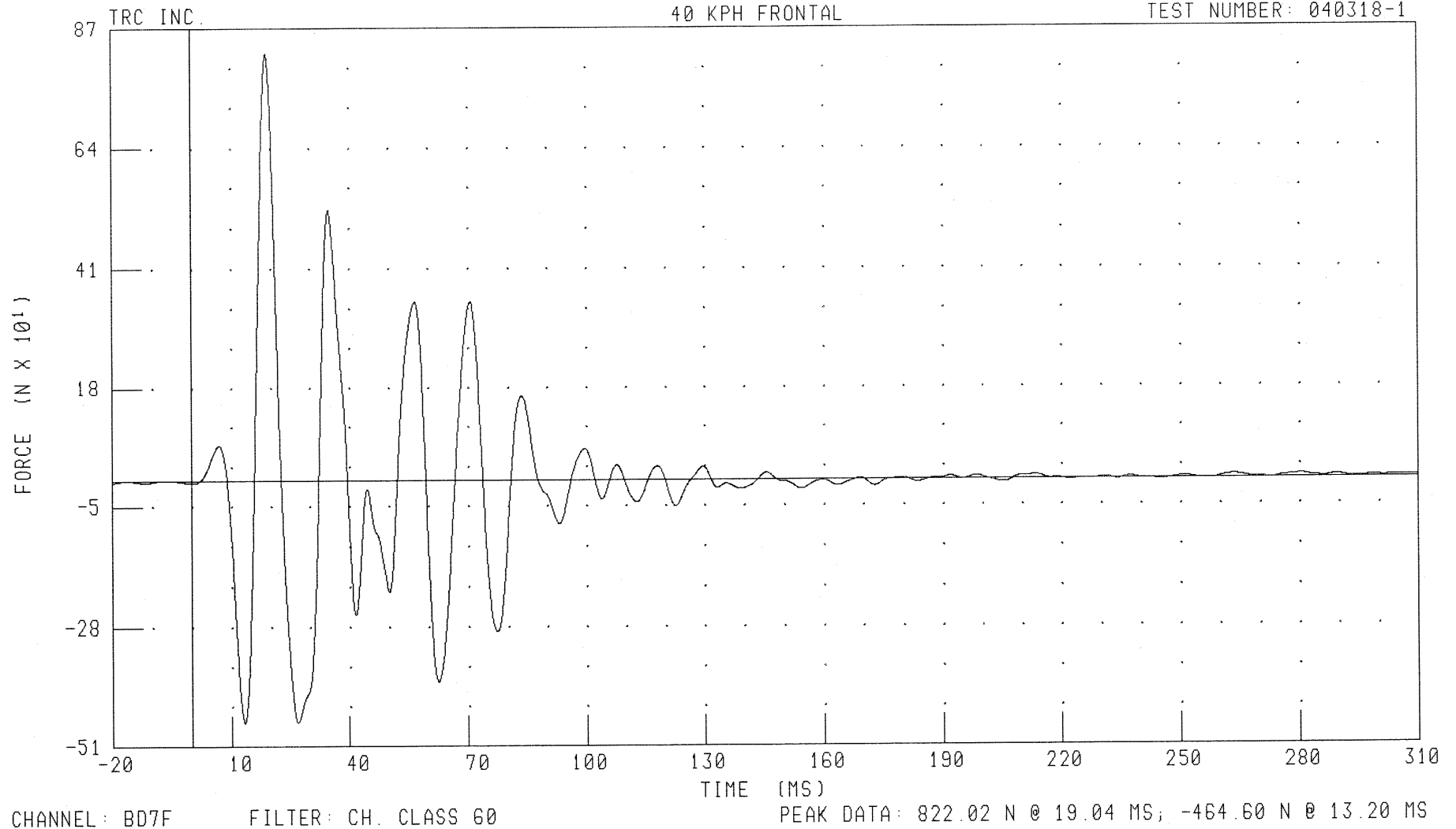
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D7 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



6-87

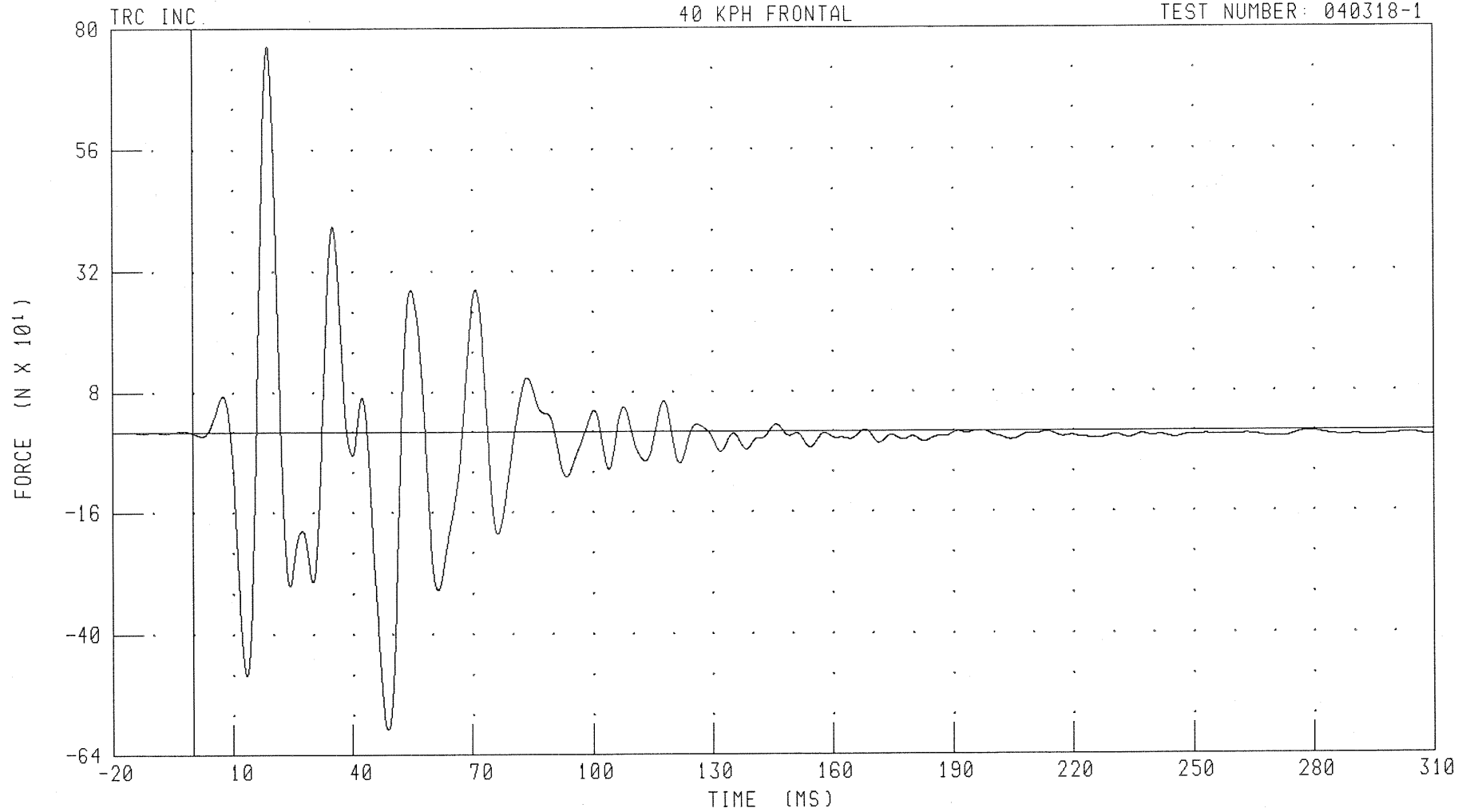
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D8 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD8F

FILTER: CH. CLASS 60

PEAK DATA: 764.53 N @ 18.80 MS; -590.13 N @ 48.96 MS

6-88

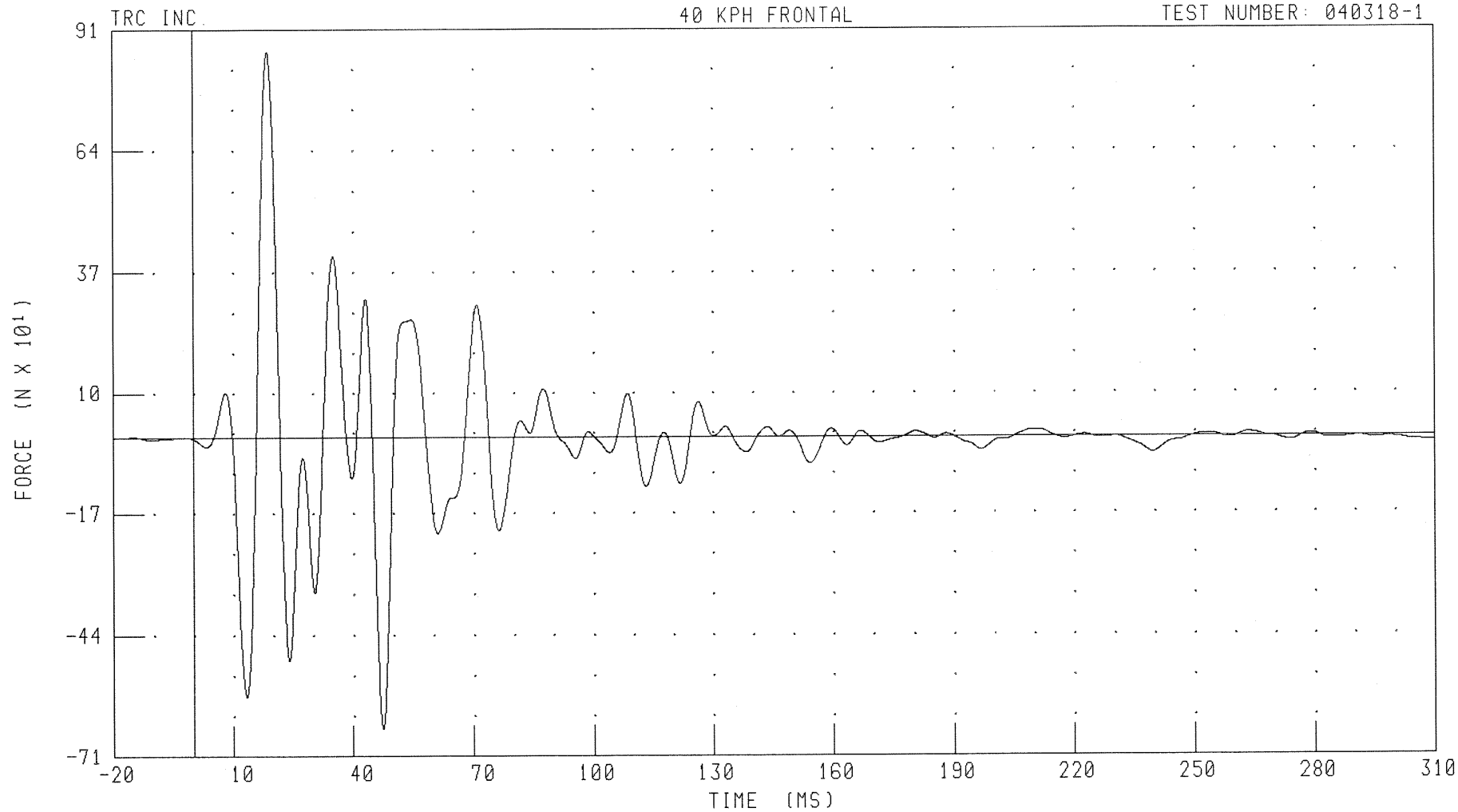
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D9 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD9F

FILTER: CH. CLASS 60

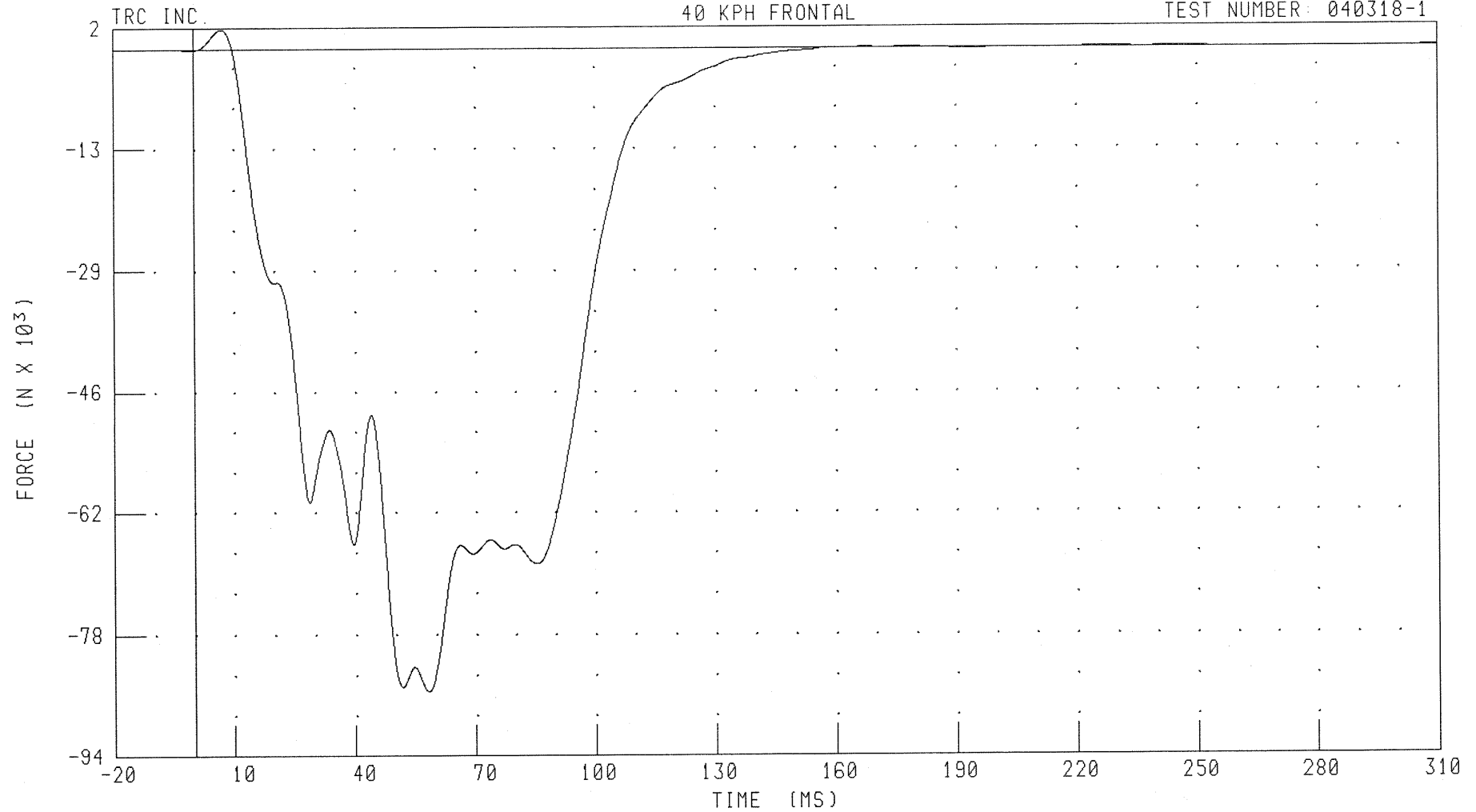
PEAK DATA: 860.19 N @ 18.80 MS; -648.30 N @ 47.36 MS

6-89

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG1F FILTER: CH. CLASS 60

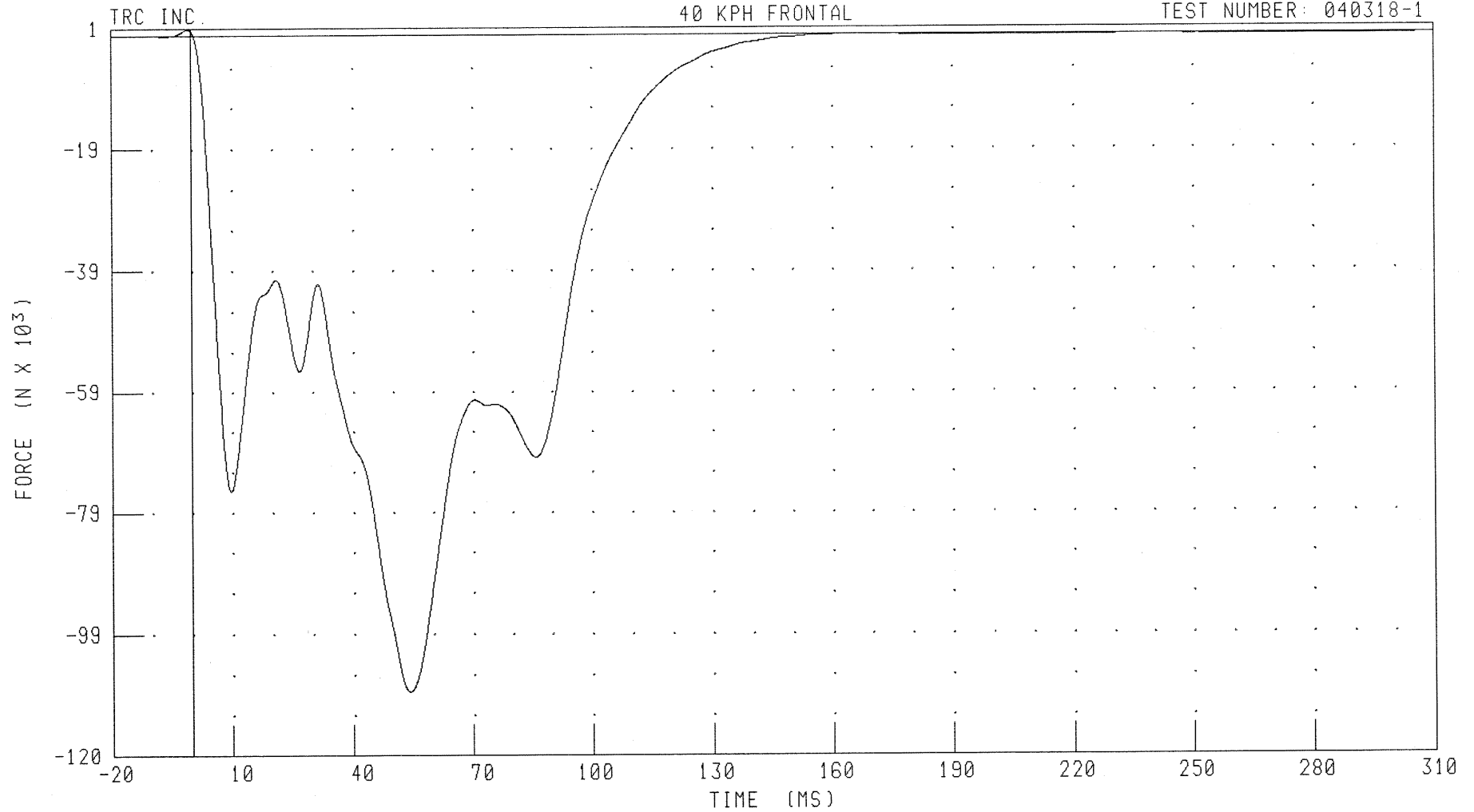
PEAK DATA: 2719.33 N @ 7.04 MS; -86226.06 N @ 58.16 MS

6-90

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG2F FILTER: CH. CLASS 60

PEAK DATA: 1106.99 N @ -0.72 MS; -109350.68 N @ 54.08 MS

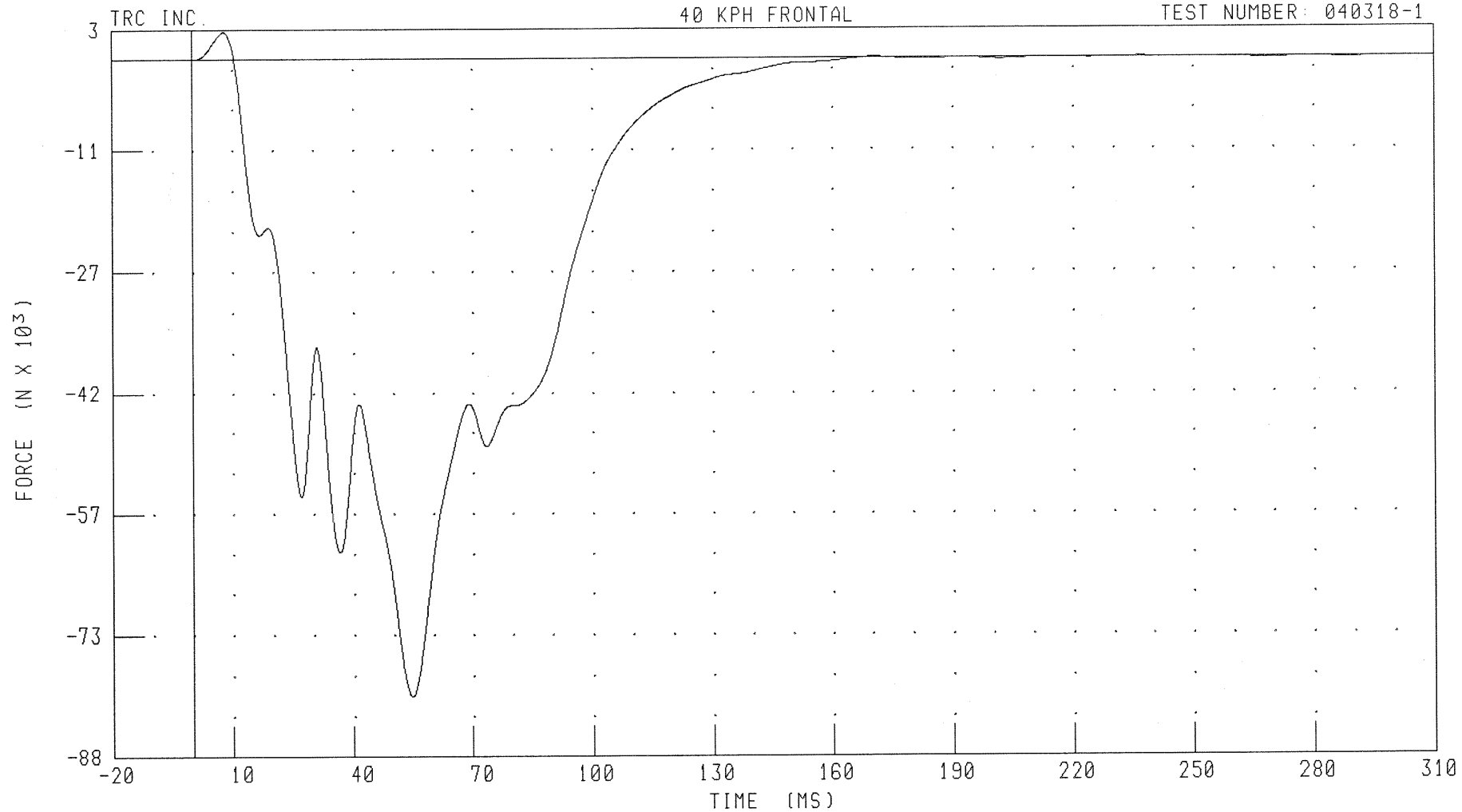
6-91

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 3 FORCE TOTAL

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG3F FILTER: CH. CLASS 60

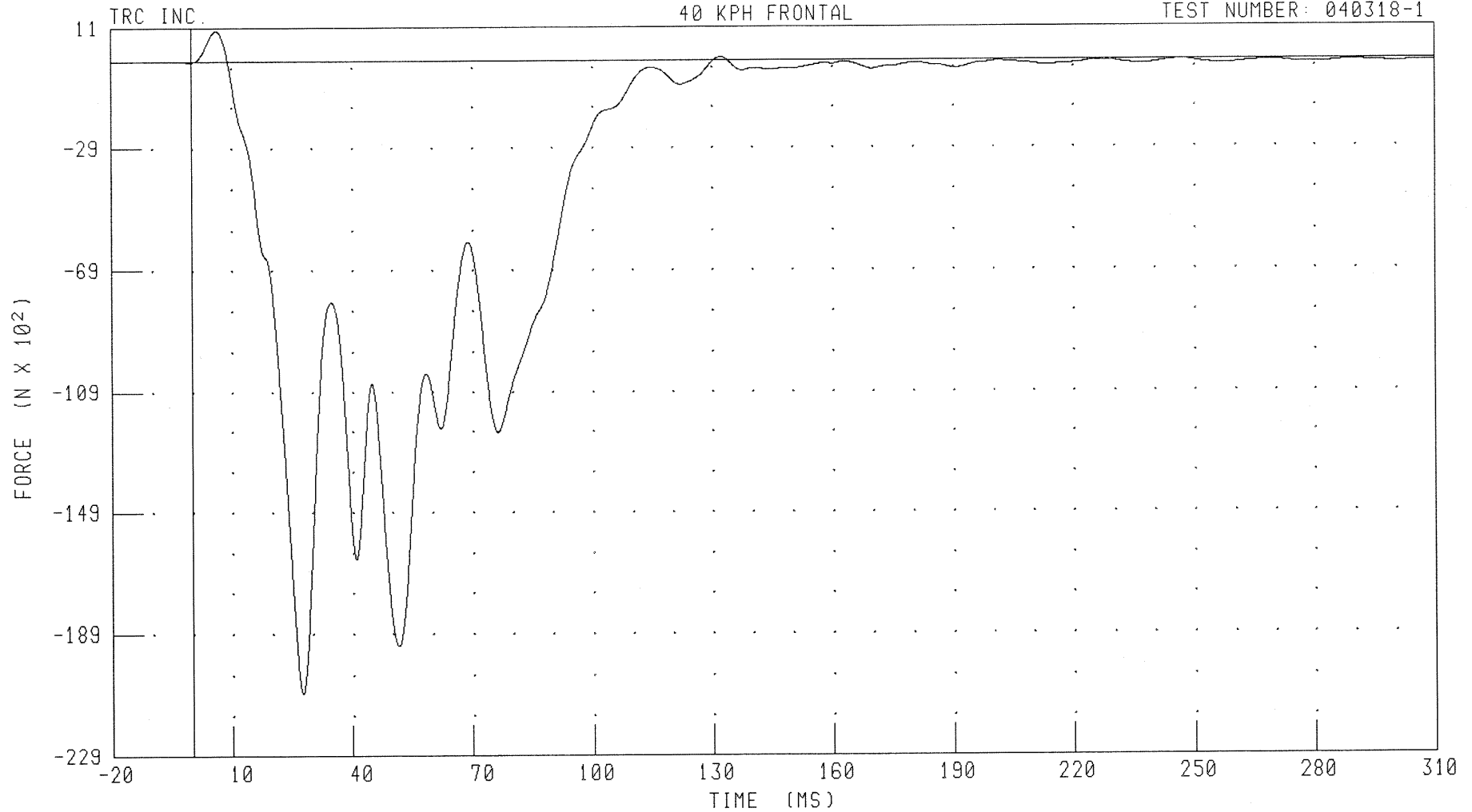
PEAK DATA: 3418.24 N @ 7.92 MS; -81043.38 N @ 54.56 MS

6-92

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 4 FORCE TOTAL
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG4F FILTER: CH. CLASS 60

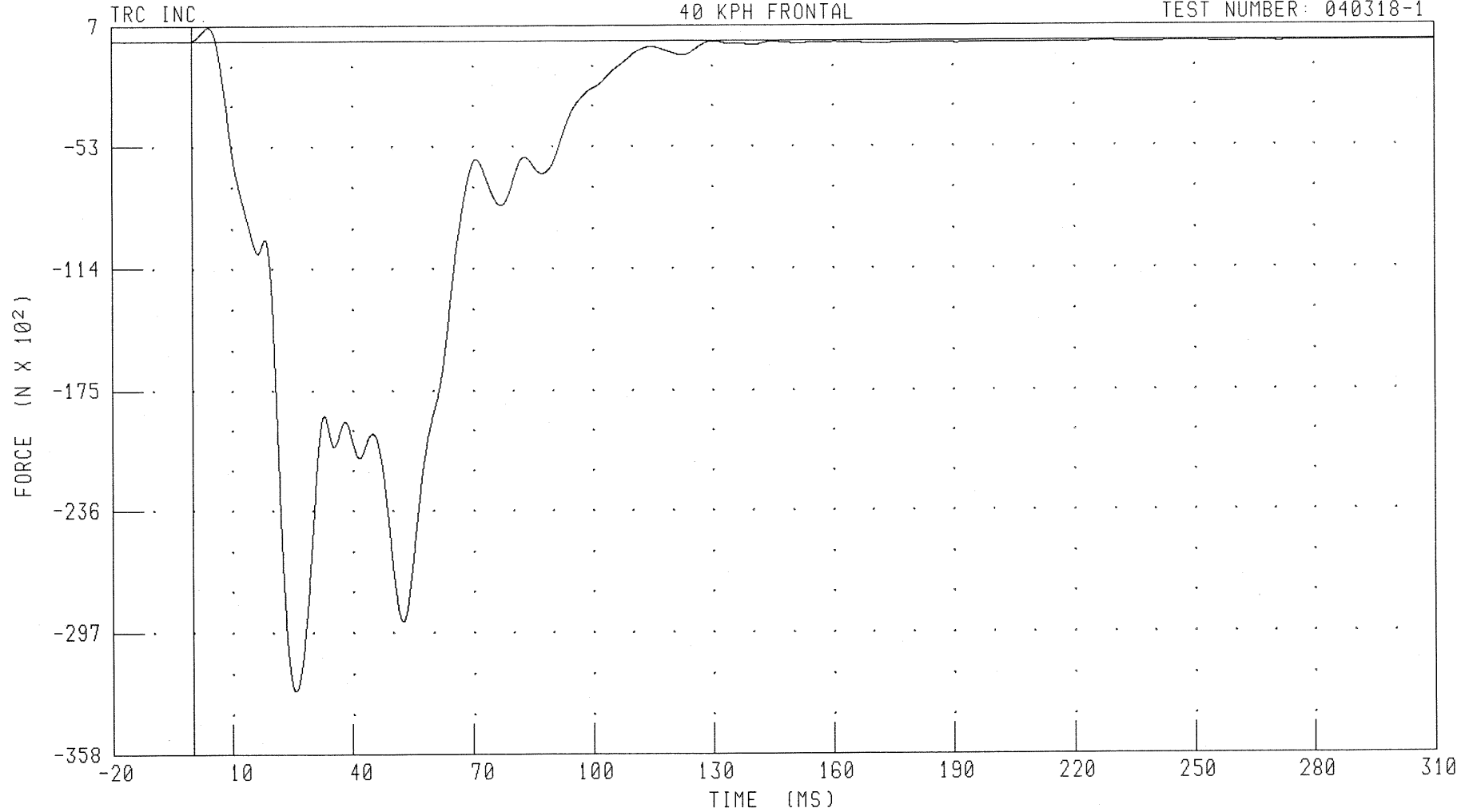
PEAK DATA: 1008.38 N @ 6.24 MS; -20830.74 N @ 27.60 MS

6-93

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 5 FORCE TOTAL
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG5F FILTER: CH. CLASS 60

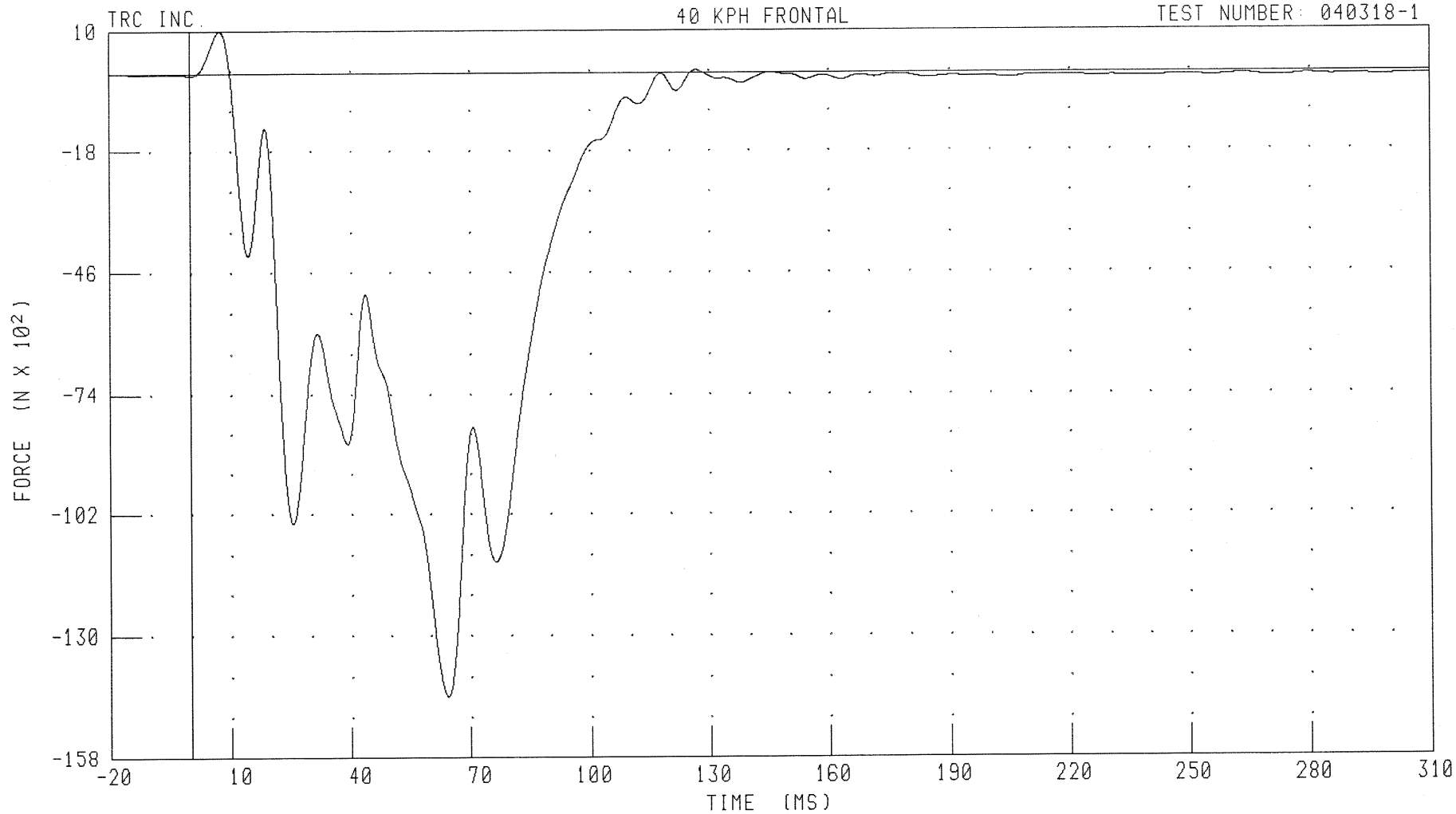
PEAK DATA: 679.43 N @ 4.16 MS; -32670.44 N @ 25.76 MS

6-94

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG6F FILTER: CH. CLASS 60

PEAK DATA: 998.77 N @ 7.44 MS; -14391.79 N @ 64.32 MS

6-95

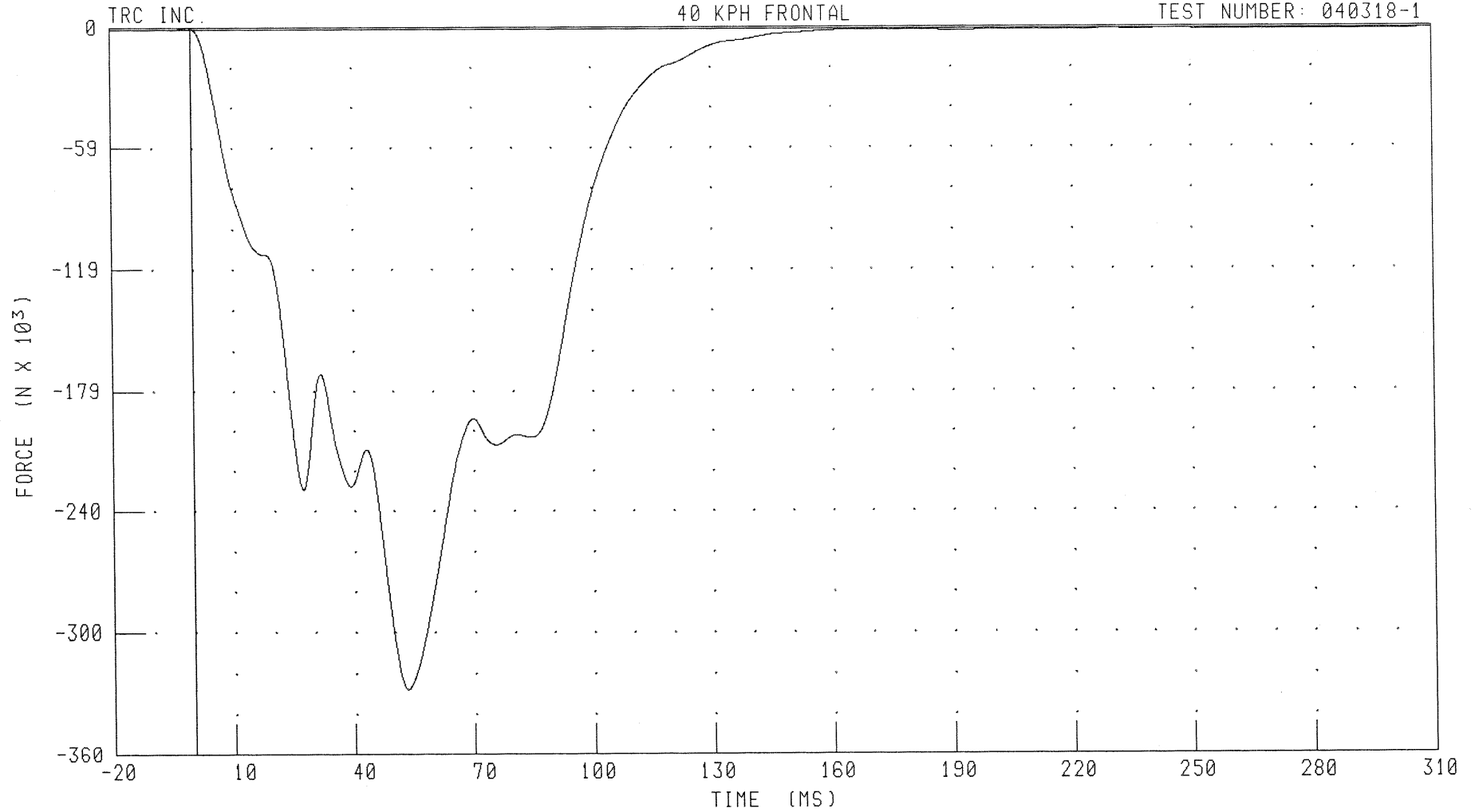
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

TOTAL LOAD CELL BARRIER FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: LCBGT

FILTER: CH. CLASS 60

PEAK DATA: 870.15 N @ -0.72 MS; -3285.65 N @ 53.28 MS

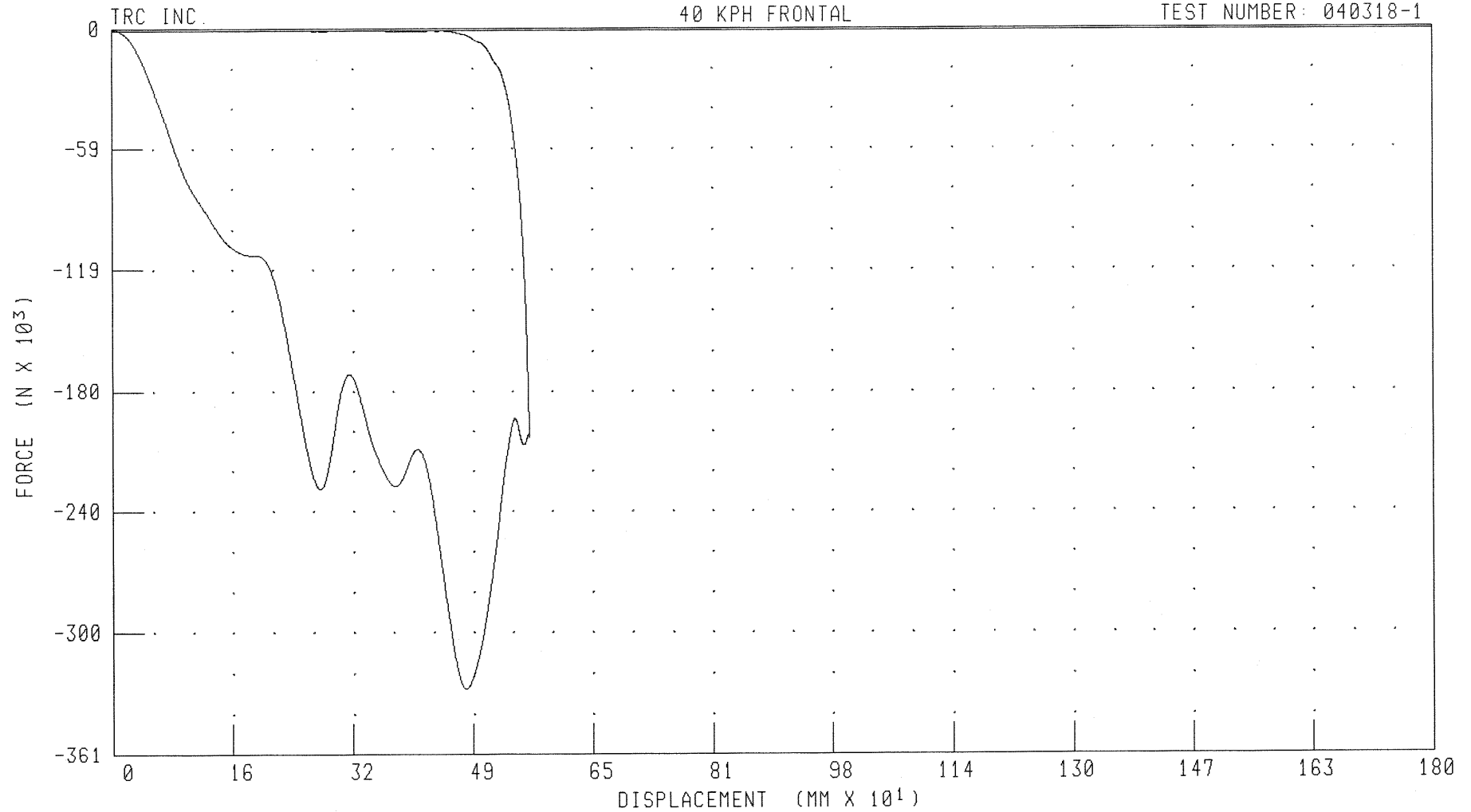
6-96

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
 TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: AVGXD
 LCBGT

FILTER: CH. CLASS 180
 CH. CLASS 60

PEAK DATA: 569.31 MM @ 85.68 MS; 0.00 MM @ 0.00 MS
 666.55 N @ 0.00 MS; -328565.22 N @ 53.28 MS

6-97

040318-1

Section 7

Photographs

List of Photographs

<u>Image</u>	<u>Image Title</u>	<u>Page</u>
1	Pre-Test Front View	7-5
2	Post-Test Front View	7-6
3	Pre-Test Left Side View	7-7
4	Post-Test Left Side View	7-8
5	Pre-Test Right Side View	7-9
6	Post-Test Right Side View	7-10
7	Pre-Test Left Front Three-Quarter View	7-11
8	Post-Test Left Front Three-Quarter View	7-12
9	Pre-Test Right Rear Three-Quarter View	7-13
10	Post-Test Right Rear Three-Quarter View	7-14
11	Pre-Test Windshield View	7-15
12	Post-Test Windshield View	7-16
13	Pre-Test Engine Compartment View	7-17
14	Post-Test Engine Compartment View	7-18
15	Pre-Test Front Underbody View	7-19
16	Post-Test Front Underbody View	7-20
17	Pre-Test Front Mid Underbody View	7-21
18	Post-Test Front Mid Underbody View	7-22
19	Pre-Test Mid Underbody View	7-23
20	Post-Test Mid Underbody View	7-24
21	Pre-Test Rear Mid Underbody View	7-25
22	Post-Test Rear Mid Underbody View	7-26
23	Pre-Test Rear Underbody View	7-27
24	Post-Test Rear Underbody View	7-28
25	Pre-Test Fuel Tank View	7-29
26	Post-Test Fuel Tank View	7-30
27	Pre-Test Fuel Filler Cap View	7-31
28	Post-Test Fuel Filler Cap View	7-32

List of Photographs, Continued

<u>Image</u>	<u>Image Title</u>	<u>Page</u>
29	Pre-Test Driver Dummy Front View	7-33
30	Post-Test Driver Dummy Front View	7-34
31	Pre-Test Driver Dummy Position View	7-35
32	Post-Test Driver Dummy Position View	7-36
33	Pre-Test Driver Dummy & Vehicle Intrusion View	7-37
34	Post-Test Driver Dummy & Vehicle Intrusion View	7-38
35	Pre-Test Passenger Dummy Front View	7-39
36	Post-Test Passenger Dummy Front View	7-40
37	Pre-Test Passenger Dummy Position View	7-41
38	Post-Test Passenger Dummy Position View	7-42
39	Pre-Test Passenger Dummy & Vehicle Intrusion View	7-43
40	Post-Test Passenger Dummy & Vehicle Intrusion View	7-44
41	Post-Test Driver Dummy View	7-45
42	Post-Test Driver Dummy Head Contact - View 1	7-46
43	Post-Test Driver Dummy Head Contact - View 2	7-47
44	Post-Test Driver Dummy Head Contact - View 3	7-48
45	Pre-Test Driver Dummy Knee Bolster View	7-49
46	Post-Test Driver Dummy Knee Contact - View 1	7-50
47	Post-Test Driver Dummy Knee Contact - View 2	7-51
48	Post-Test Passenger Dummy View	7-52
49	Post-Test Passenger Dummy Head Contact - View 1	7-53
50	Post-Test Passenger Dummy Head Contact - View 2	7-54
51	Post-Test Passenger Dummy Head Contact - View 3	7-55
52	Pre-Test Passenger Dummy Knee Bolster View	7-56
53	Post-Test Passenger Dummy Knee Contact - View 1	7-57
54	Post-Test Passenger Dummy Knee Contact - View 2	7-58
55	Post-Test Vehicle on Static Rollover Device - 90° View	7-59
56	Post-Test Vehicle on Static Rollover Device - 180° View	7-60

List of Photographs, Continued

<u>Image</u>	<u>Image Title</u>	<u>Page</u>
57	Post-Test Vehicle on Static Rollover Device - 270° View	7-61
58	Post-Test Vehicle on Static Rollover Device - 360° View	7-62
59	Pre-Test Vehicle Certification Label View	7-63
60	Pre-Test Recommended tire Pressure Label View	7-64
61	Pre-Test Vehicle Window Sticker	7-65



Figure A-1 Pre-Test Front View
7-5

040318-1



Figure A-2 Post-Test Front View
7-6

040318-1



Figure A-3 Pre-Test Left Side View
7-7

040318-1



Figure A-4 Post-Test Left Side View
7-8

040318-1



Figure A-5 Pre-Test Right Side View
7-9

040318-1



Figure A-6 Post-Test Right Side View
7-10

040318-1



Figure A-7 Pre-Test Left Front Three-Quarter View
7-11

040318-1



Figure A-8 Post-Test Left Front Three-Quarter View
7-12



Figure A-9 Pre-Test Right Rear Three-Quarter View
7-13

040318-1



Figure A-10 Post-Test Right Rear Three-Quarter View
7-14



Figure A-11 Pre-Test Windshield View
7-15

040318-1



Figure A-12 Post-Test Windshield View
7-16

040318-1



Figure A-13 Pre-Test Engine Compartment View
7-17

040318-1



Figure A-14 Post-Test Engine Compartment View
7-18

040318-1



Figure A-15 Pre-Test Front Underbody View
7-19

040318-1



Figure A-16 Post-Test Front Underbody View
7-20

040318-1

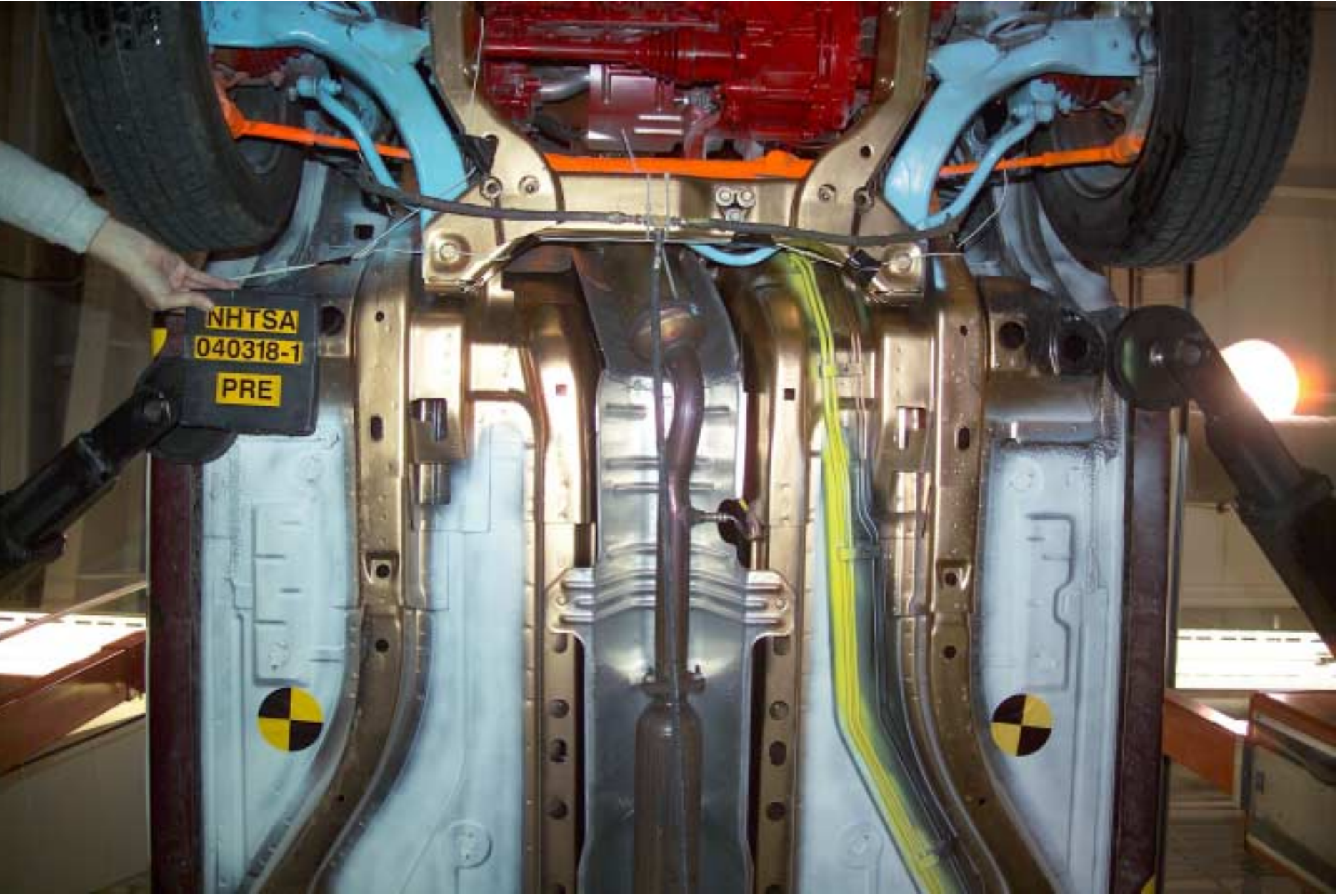


Figure A-17 Pre-Test Front Mid Underbody View
7-21

040318-1

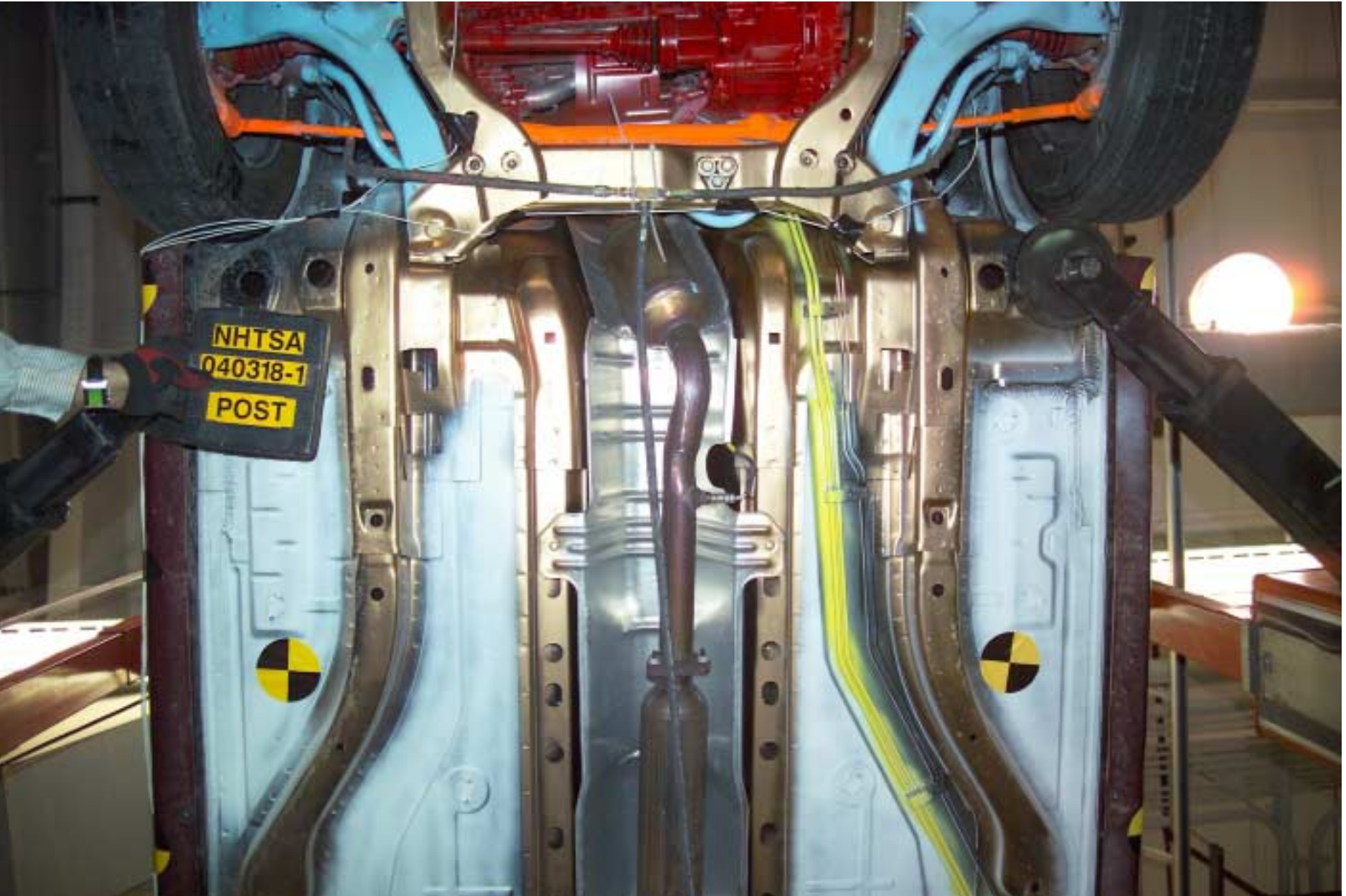


Figure A-18 Post-Test Front Mid Underbody View
7-22

040318-1



Figure A-19 Pre-Test Mid Underbody View
7-23

040318-1



Figure A-20 Post-Test Mid Underbody View
7-24

040318-1

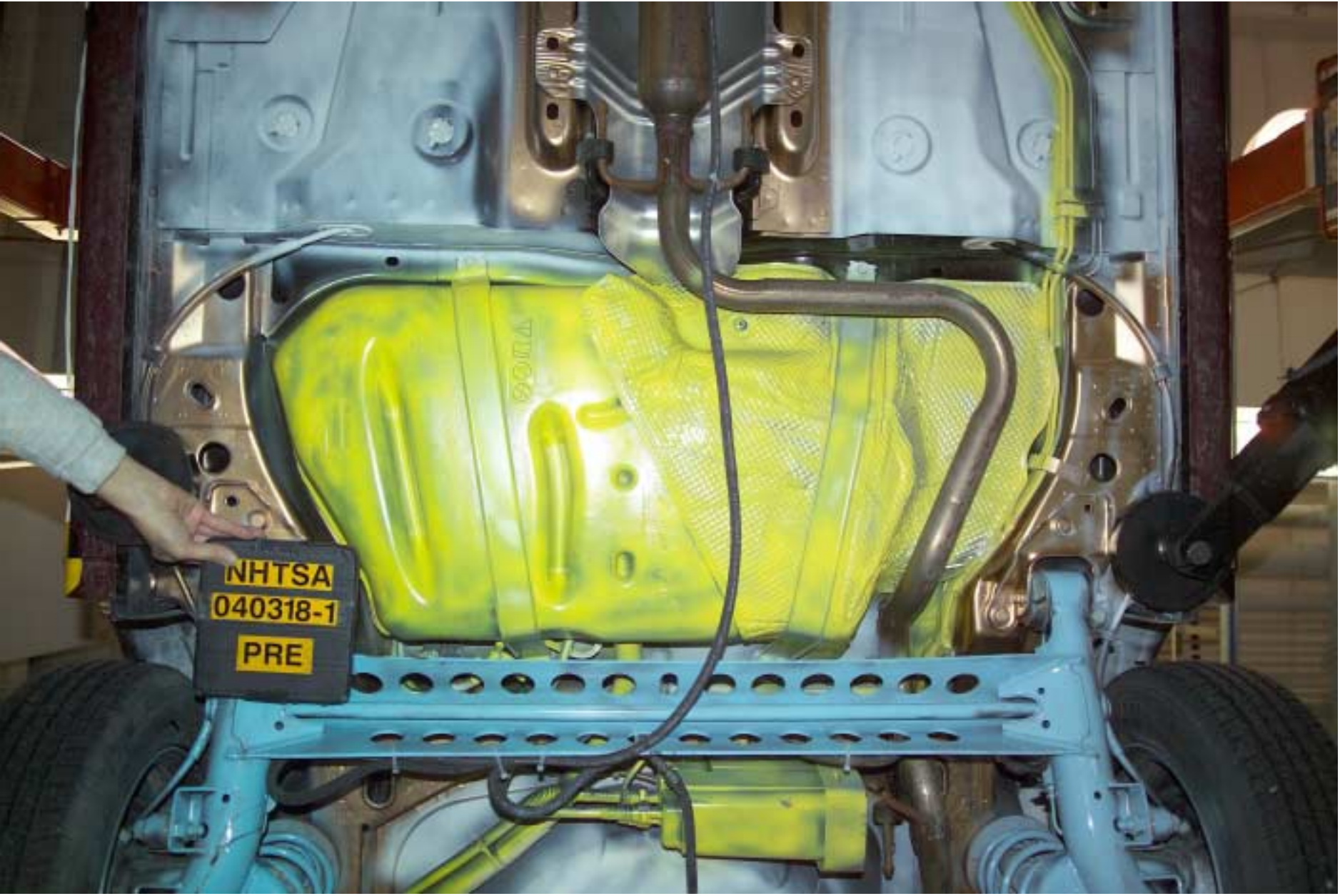


Figure A-21 Pre-Test Rear Mid Underbody View
7-25

040318-1

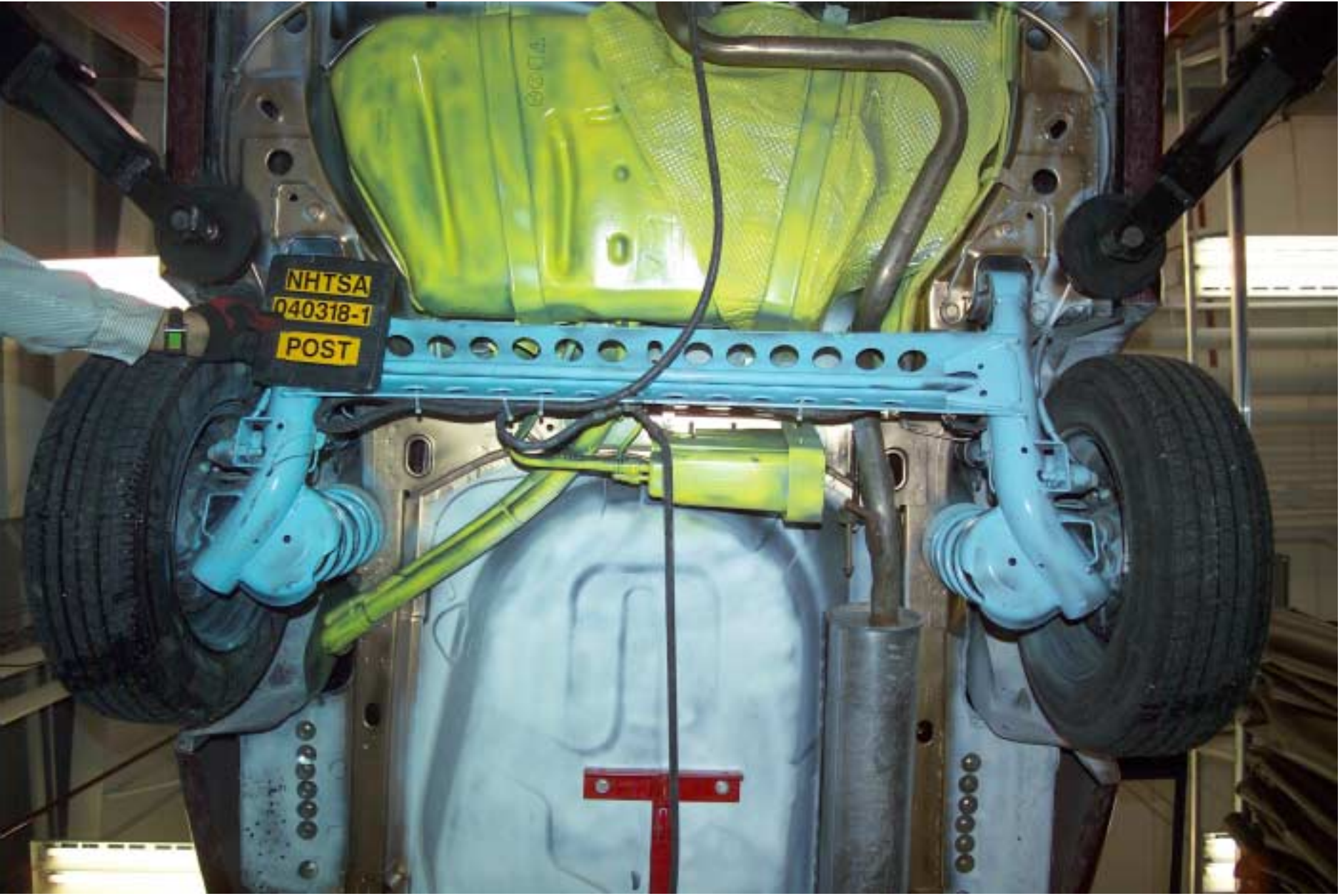


Figure A-22 Post-Test Rear Mid Underbody View

7-26

040318-1

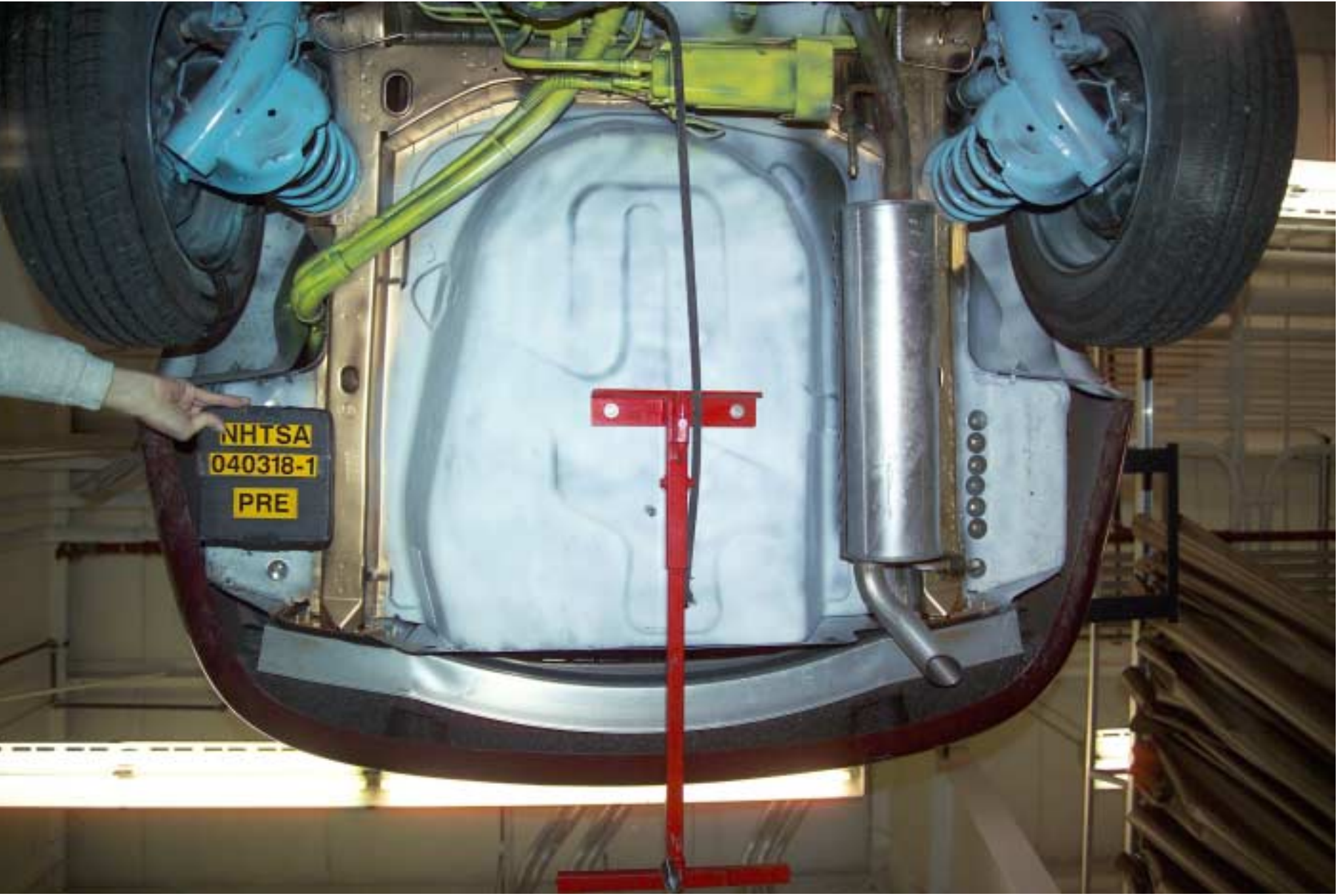


Figure A-23 Pre-Test Rear Underbody View
7-27

040318-1

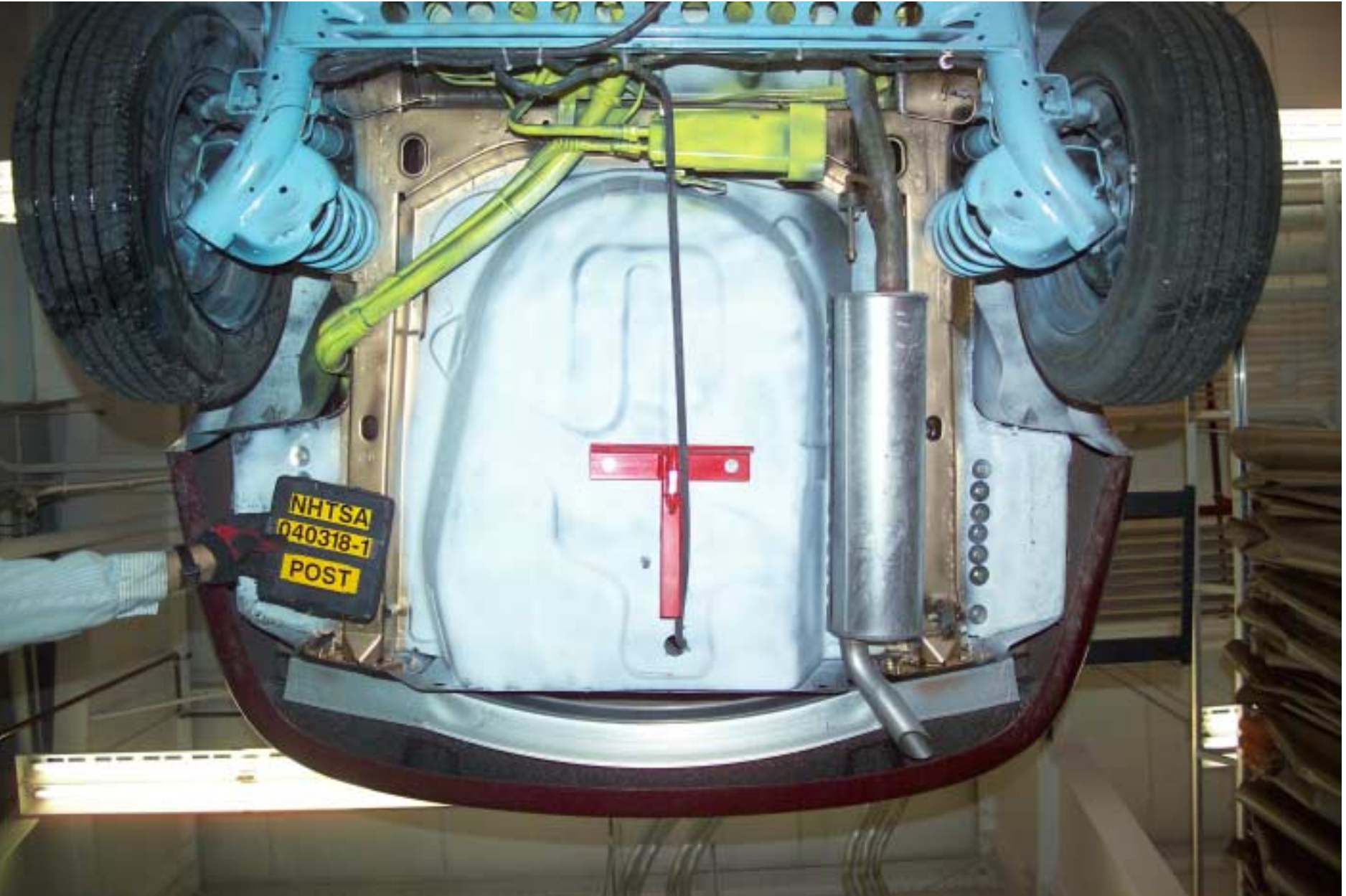


Figure A-24 Post-Test Rear Underbody View
7-28

040318-1

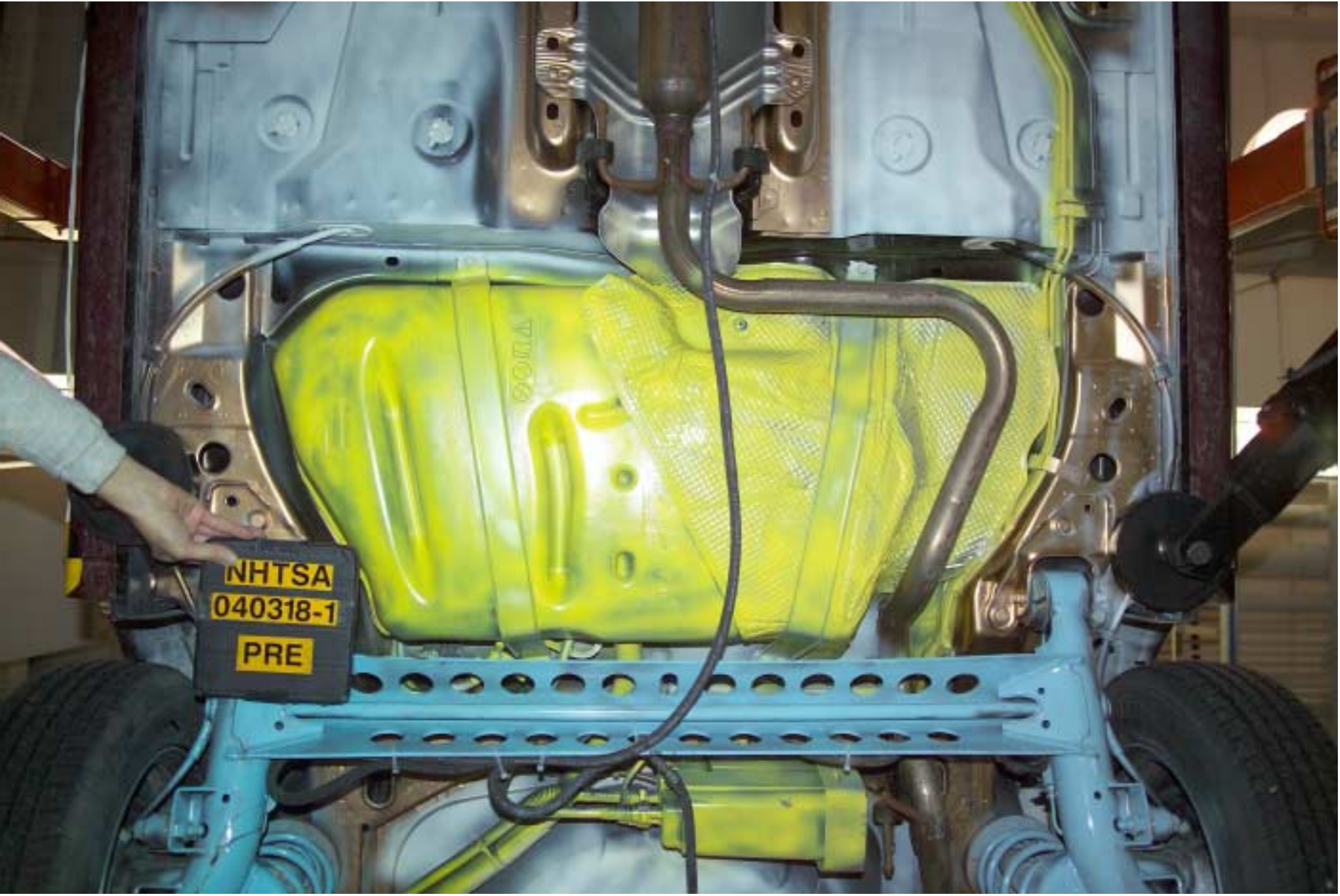


Figure A-25 Pre-Test Fuel Tank View
7-29

040318-1

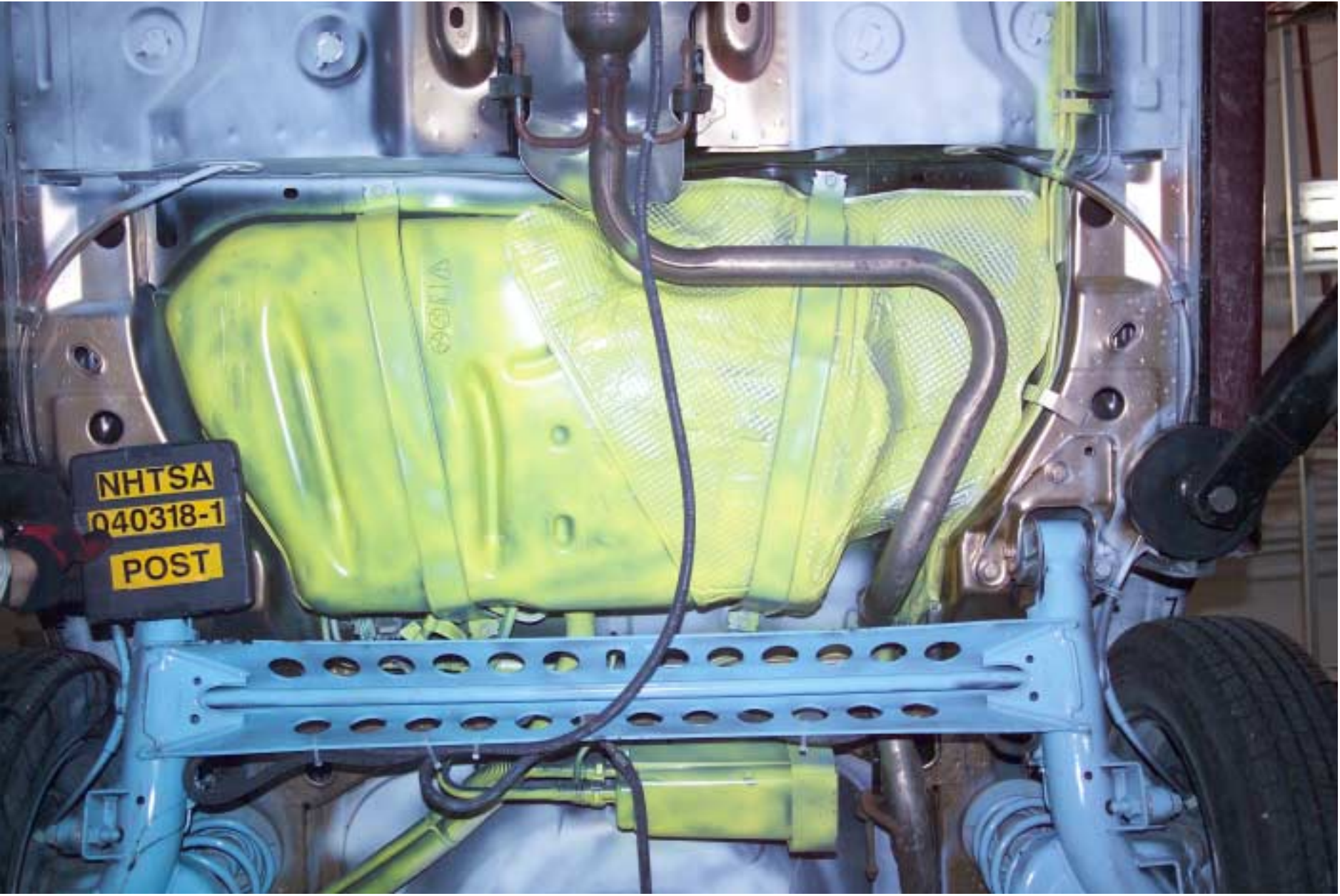


Figure A-26 Post-Test Fuel Tank View
7-30

040318-1



Figure A-27 Pre-Test Fuel Filler Cap View
7-31

040318-1



Figure A-28 Post-Test Fuel Filler Cap View
7-32

040318-1

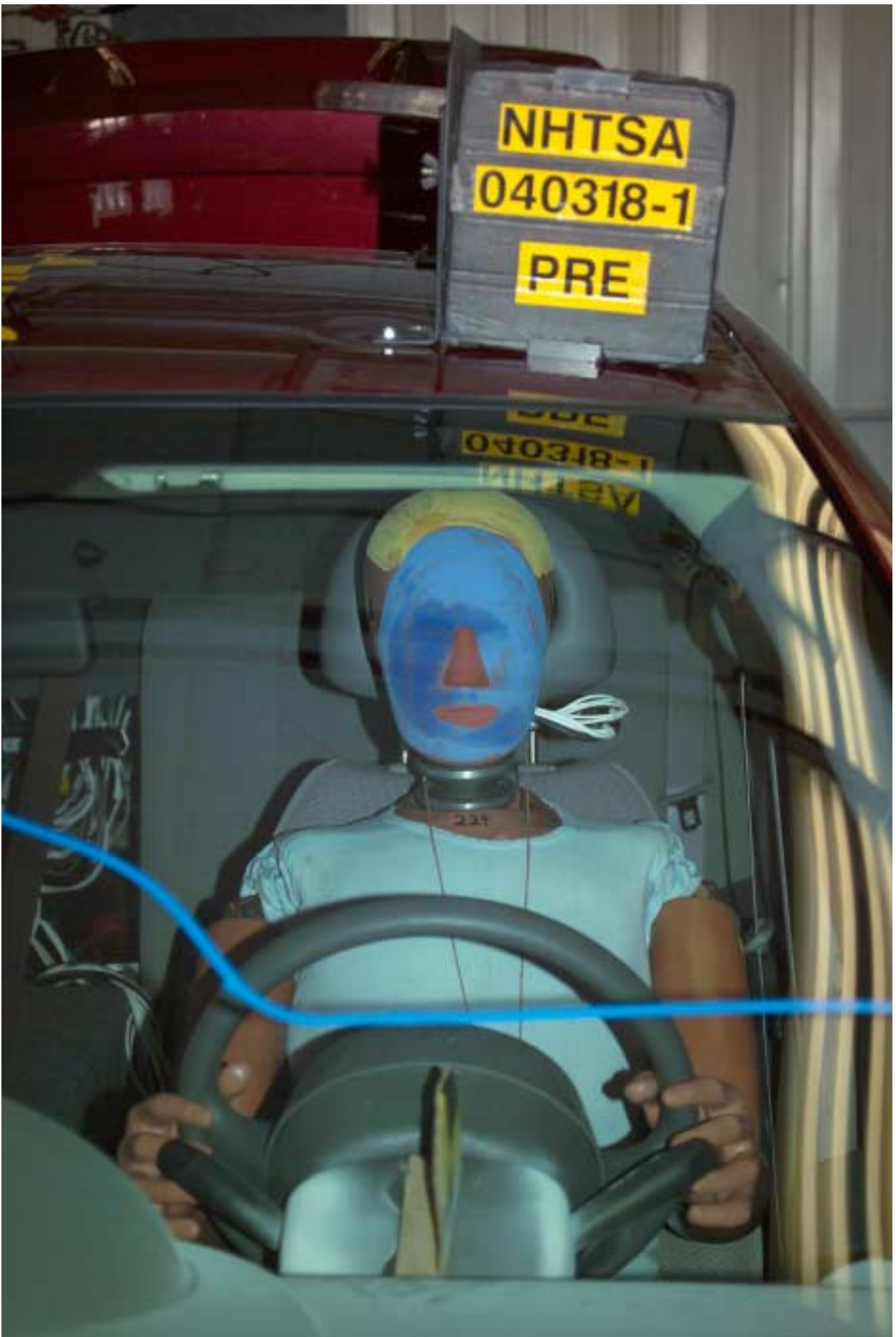


Figure A-29 Pre-Test Driver Dummy Front View



Figure A-30 Post-Test Driver Dummy Front View
7-34

040318-1



Figure A-31 Pre-Test Driver Dummy Position View
7-35

040318-1



Figure A-32 Post-Test Driver Dummy Position View
7-36

040318-1



Figure A-33 Pre-Test Driver Dummy & Vehicle Intrusion View
7-37

040318-1



Figure A-34 Post-Test Driver Dummy & Vehicle Intrusion View
7-38

040318-1

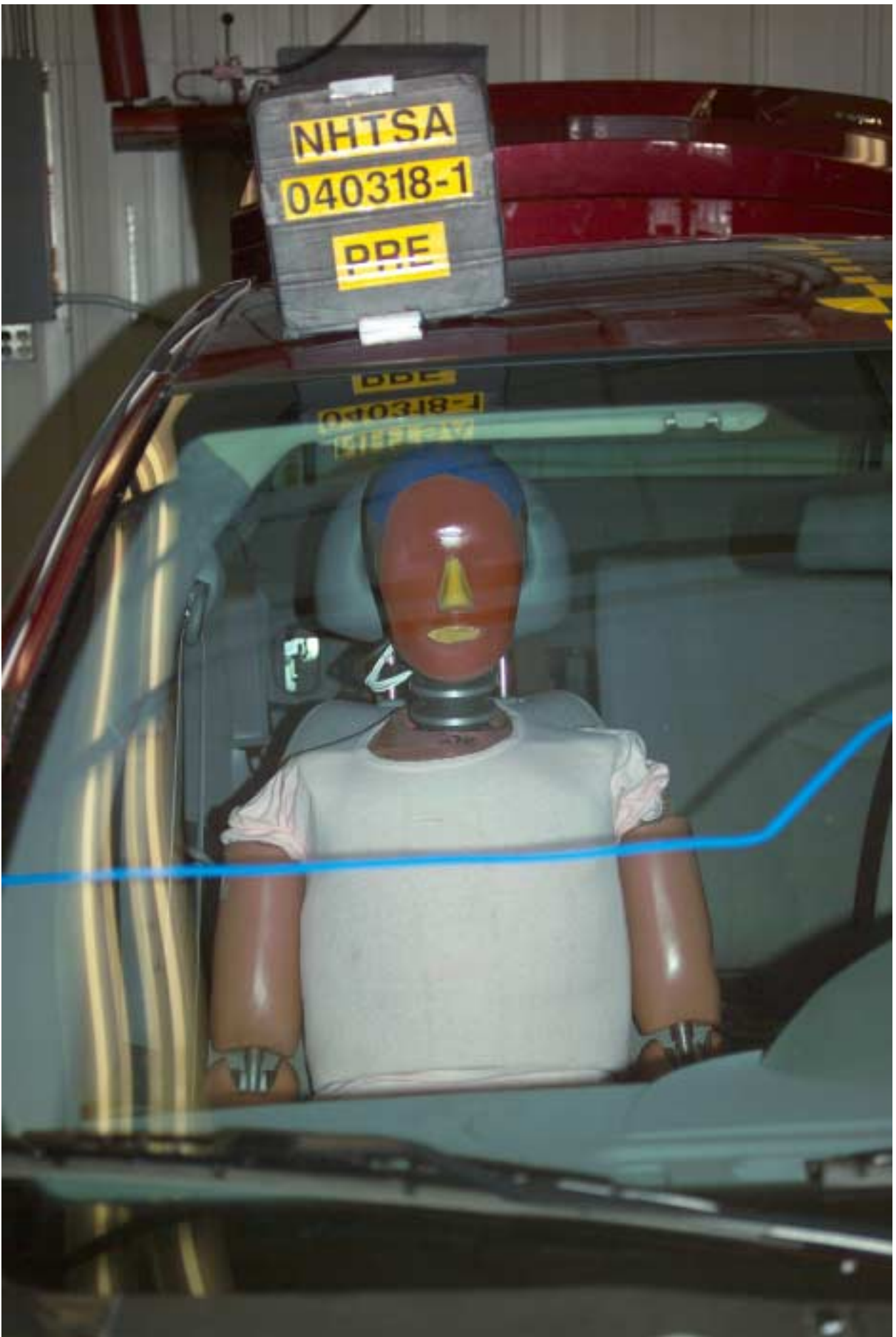


Figure A-35 Pre-Test Passenger Dummy Front View



Figure A-36 Post-Test Passenger Dummy Front View



Figure A-37 Pre-Test Passenger Dummy Position View
7-41

040318-1



Figure A-38 Post-Test Passenger Dummy Position View
7-42

040318-1



Figure A-39 Pre-Test Passenger Dummy & Vehicle Intrusion View
7-43

040318-1



Figure A-40 Post-Test Passenger Dummy & Vehicle Intrusion View
7-44

040318-1



Figure A-41 Post-Test Driver Dummy View



Figure A-42 Post-Test Driver Dummy Head Contact - View 1
7-46

040318-1



Figure A-43 Post-Test Driver Dummy Head Contact - View 2
7-47

040318-1



Figure A-44 Post-Test Driver Dummy Head Contact - View 3
7-48

040318-1

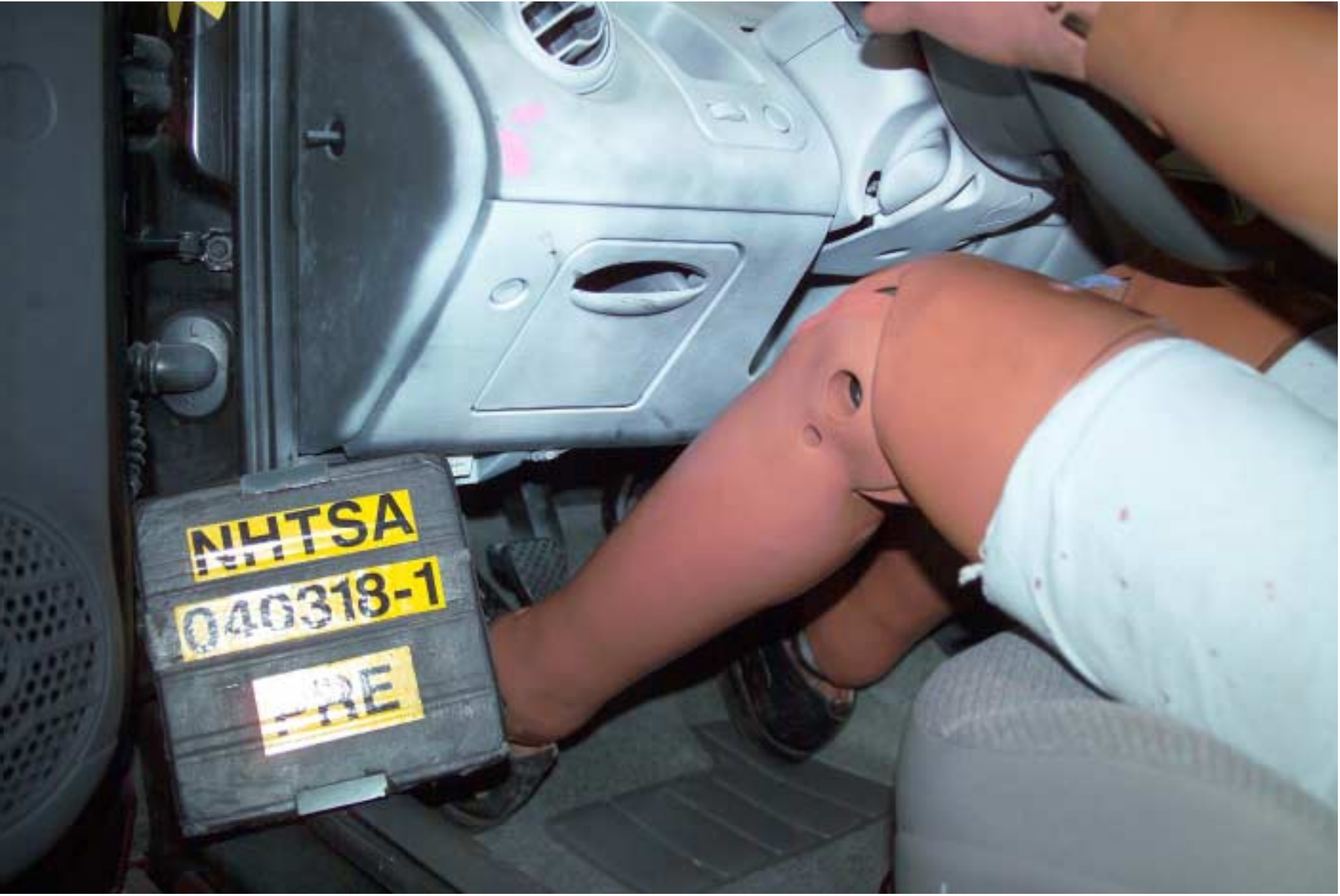


Figure A-45 Pre-Test Driver Dummy Knee Bolster View
7-49

040318-1



Figure A-46 Post-Test Driver Dummy Knee Contact - View 1



Figure A-47 Post-Test Driver Dummy Knee Contact - View 2
7-51

040318-1

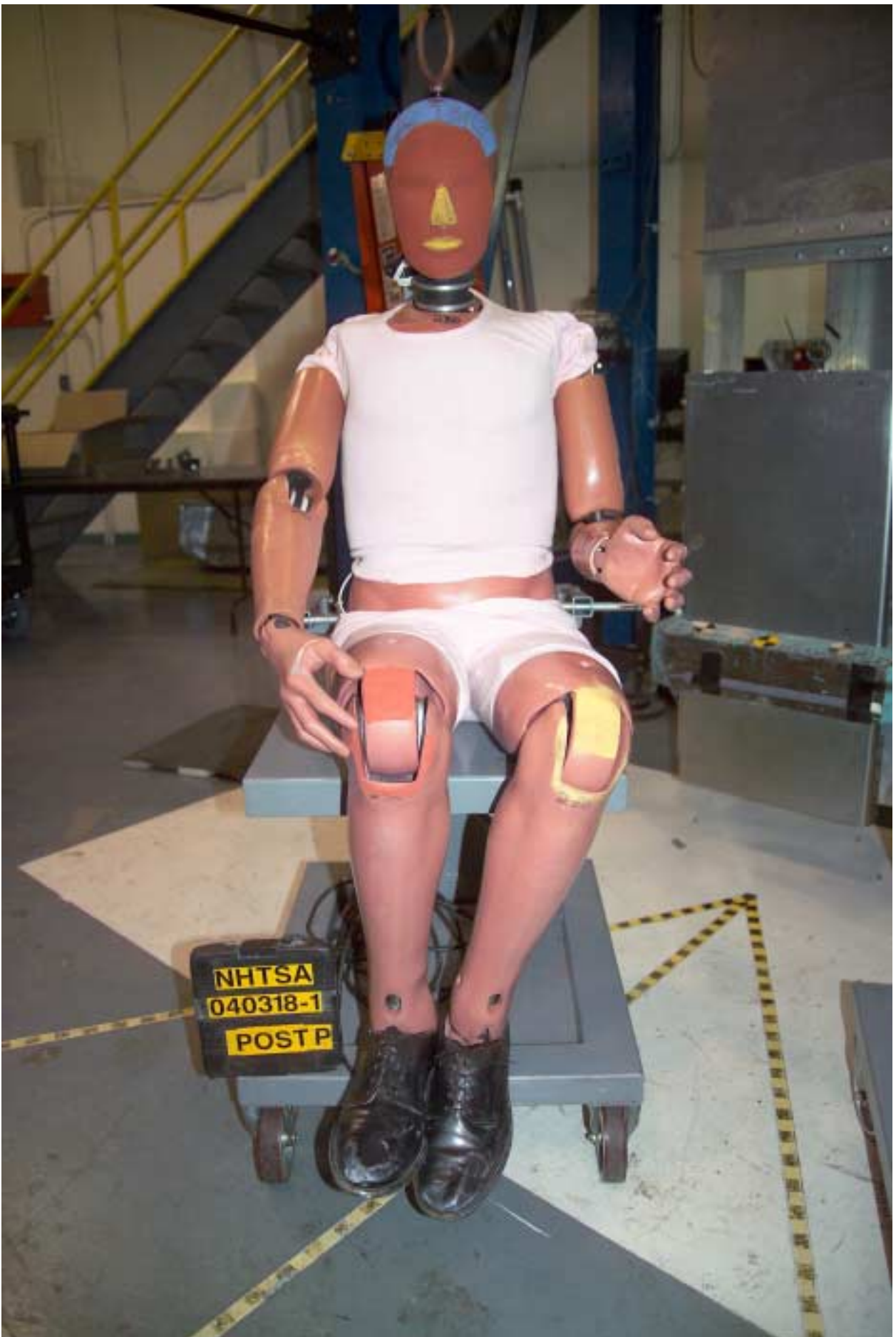


Figure A-48 Post-Test Passenger Dummy View



Figure A-49 Post-Test Passenger Dummy Head Contact - View 1
7-53

040318-1



Figure A-50 Post-Test Passenger Dummy Head Contact - View 2
7-54



Figure A-51 Post-Test Passenger Dummy Head Contact - View 3
7-55

040318-1



Figure A-52 Pre-Test Passenger Dummy Knee Bolster View
7-56

040318-1



Figure A-53 Post-Test Passenger Dummy Knee Contact - View 1
7-57

040318-1



Figure A-54 Post-Test Passenger Dummy Knee Contact - View 2
7-58

040318-1



Figure A-55 Post-Test Vehicle on Static Rollover Device - 90° View
7-59

040318-1



Figure A-56 Post-Test Vehicle on Static Rollover Device - 180° View
7-60

040318-1

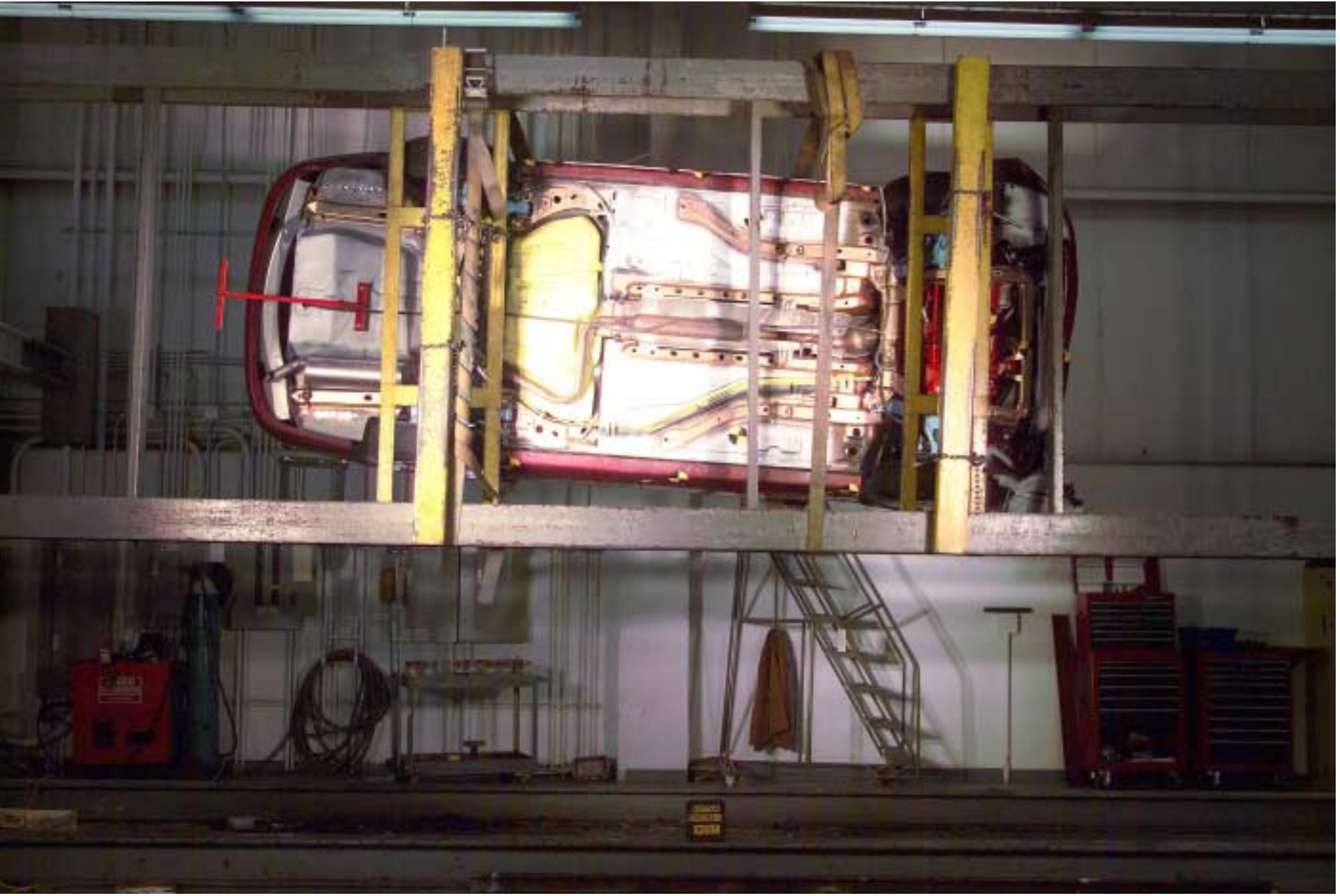


Figure A-57 Post-Test Vehicle on Static Rollover Device - 270° View
7-61



Figure A-58 Post-Test Vehicle on Static Rollover Device - 360° View
7-62

040318-1



MFD BY SATURN CORPORATION

DATE	GVWR	GVWR FRT	GVWR RR
11/03	3661LB	1874LB	1787LB
	1661KG	850KG	813KG

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

1G8AF52F54Z155463 PASS CAR



Figure A-59 Pre-Test Vehicle Certification Label View



TIRE AND LOADING INFORMATION

SEATING CAPACITY TOTAL 5 FRONT 2 CENTER 0 REAR 3

The combined weight of occupants and cargo should never exceed 408 kg or 899 lbs.

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE	
P185/70R14	FRONT	210 kPa, 30 PSI
P185/70R14	REAR	210 kPa, 30 PSI
T115/70R14	SPARE	420 kPa, 60 PSI

**SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION**

Figure A-60 Pre-Test Recommended tire Pressure Label View



Appendix A

Test Equipment List and Calibration Information

Channel Report

3/18/2004 7:46:47 AM

Name of Test 040318-1

System MINIDAU

Name of DAU DAUE

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	EVENT	EVENT	EVENT		5.12	V	+ 11/8/2003	OK -1	TRC	Event
0002	62467	BA1F	ROW A CELL 1		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0003	122042A	BA2F	ROW A CELL 2		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220BZY-50K
0004	68054	BA3F	ROW A CELL 3		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0005	68061	BA4F	ROW A CELL 4		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0006	68058	BA5F	ROW A CELL 5		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0007	68042	BA6F	ROW A CELL 6		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0008	68032	BA7F	ROW A CELL 7		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0009	68026	BA8F	ROW A CELL 8		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0010	68045	BA9F	ROW A CELL 9		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0011	68027	BB1F	ROW B CELL 1		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0012	68055	BB2F	ROW B CELL 2		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0013	68046	BB3F	ROW B CELL 3		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
A-2 0014	68068	BB4F	ROW B CELL 4		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0015	68024	BB5F	ROW B CELL 5		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0016	68044	BB6F	ROW B CELL 6		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0017	68069	BB7F	ROW B CELL 7		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0018	68034	BB8F	ROW B CELL 8		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0019	68047	BB9F	ROW B CELL 9		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0020	62466	BC1F	ROW C CELL 1		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0021	62510	BC2F	ROW C CELL 2		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0022	68052	BC3F	ROW C CELL 3		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0023	68028	BC4F	ROW C CELL 4		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0024	68064	BC5F	ROW C CELL 5		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0025	68012	BC6F	ROW C CELL 6		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0026	68063	BC7F	ROW C CELL 7		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0027	68015	BC8F	ROW C CELL 8		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0028	62453	BC9F	ROW C CELL 9		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0029	68050	BD1F	ROW D CELL 1		221731.41	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
040318-1 0030	68021	BD2F	ROW D CELL 2		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0031	68039	BD3F	ROW D CELL 3		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K
0032	68018	BD4F	ROW D CELL 4		222977.09	N	+ 12/19/2003	OK TRC	Interface	1220TX-50K

Channel Report

3/18/2004 7:46:48 AM

0033	68067	BD5F	ROW D CELL 5	222977.09	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0034	62456	BD6F	ROW D CELL 6	221731.41	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0035	68014	BD7F	ROW D CELL 7	221731.41	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0036	68051	BD8F	ROW D CELL 8	222977.09	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0037	68033	BD9F	ROW D CELL 9	222977.09	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K

Channel Report

3/18/2004 7:46:48 AM

Name of Test 040318-1

System MINIDAU

Name of DAU DAUG

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range		Pol.	Cal.		Group	Mfg.	Model
0001	GB86	HEDXG1	Head Accel X	Rwd	791.99344	g	-	3/15/2004	OK	229n	Endevco	7231C
0002	GB77	HEDYG1	Head Accel Y	Lft	810.19067	g	-	3/15/2004	OK	229n	Endevco	7231C
0003	A54F	HEDZG1	Head Accel Z	Up	810.53698	g	-	3/15/2004	OK	229n	Endevco	7231C
0004	1716A-1222-FX	NEKXF1	Neck Force X	Hd	13375.549	N	-	3/15/2004	OK	229n	Denton	1716A
0005	1716A-1222-FY	NEKYF1	Neck Force Y	Hd	13350.438	N	+	3/15/2004	OK	229n	Denton	1716A
0006	1716A-1222-FZ	NEKZF1	Neck Force Z	Hd	20040.080	N	+	3/15/2004	OK	229n	Denton	1716A
0007	1716A-1222-MX	NEKXM1	Neck Moment X	Rt Ear	425.01209	N·m	-	3/15/2004	OK	229n	Denton	1716A
0008	1716A-1222-MY	NEKYM1	Neck Moment Y	Chn	425.26598	N·m	+	3/15/2004	OK	229n	Denton	1716A
0009	1716A-1222-MZ	NEKZM1	Neck Moment Z	Chn	424.05252	N·m	+	3/15/2004	OK	229n	Denton	1716A
0010	C14135	CSTXG1	Chest Accel X	Fwd	397.28727	g	+	3/15/2004	OK	229n	Endevco	7231C
0011	A35D	CSTYG1	Chest Accel Y	Lft	399.67526	g	-	3/15/2004	OK	229n	Endevco	7231C
0012	AH5G8	CSTZG1	Chest Accel Z	Down	399.66902	g	+	3/15/2004	OK	229n	Endevco	7231C
0013	14CB1-2847-229	CSTXD1	Chest Deflection X	Strnm	119.88175	mm	+	3/16/2004	OK	229n	Servo	14CB1-2847
A-4 0014	2430-901	LFMZFI	Left Femur Force Z 603	Knee	33325.522	N	+	3/15/2004	OK	229n	GSE	2430
0015	2430-902	RFMZFI	Right Femur Force Z 744	Knee	33389.852	N	+	3/15/2004	OK	229n	GSE	2430
0016	AD4H9	HEDXG2	Head Accel X	Rear	807.67289	g	-	3/15/2004	OK	230n	Endevco	7231C
0017	AD4J7	HEDYG2	Head Accel Y	Left	791.18569	g	-	3/15/2004	OK	230n	Endevco	7231C
0018	AD4J8	HEDZG2	Head Accel Z	Up	803.89386	g	-	3/15/2004	OK	230n	Endevco	7231C
0019	1716-0235-FX	NEKXF2	Neck Force X	Hd	13340.281	N	-	3/15/2004	OK	230n	Denton	1716
0020	1716-0235-FY	NEKYF2	Neck Force Y	Hd	13357.125	N	+	3/15/2004	OK	230n	Denton	1716
0021	1716-0235-FZ	NEKZF2	Neck Force Z	Hd	20036.943	N	+	3/15/2004	OK	230n	Denton	1716
0022	1716-0235-MX	NEKXM2	Neck Moment X	Rt Ear	425.71519	N·m	-	3/15/2004	OK	230n	Denton	1716
0023	1716-0235-MY	NEKYM2	Neck Moment Y	Chn	424.50656	N·m	+	3/15/2004	OK	230n	Denton	1716
0024	1716-0235-MZ	NEKZM2	Neck Moment Z	Chn	424.26040	N·m	+	3/15/2004	OK	230n	Denton	1716
0025	ACTR4	CSTXG2	Chest Accel X	Fwd	400.04688	g	+	3/15/2004	OK	230n	Endevco	7231C
0026	ACTT4	CSTYG2	Chest Accel Y	Left	402.15530	g	-	3/15/2004	OK	230n	Endevco	7231C
0027	ACTW0	CSTZG2	Chest Accel Z	Down	399.23583	g	+	3/15/2004	OK	230n	Endevco	7231C
0028	85427-1	CSTXD2	Chest Deflection X	Strnm	119.73457	mm	+	3/16/2004	OK	230n	Servo	14CB1-2847
0029	2430-984	LFMZFI	Left Femur Force Z 60	Knee	33385.498	N	+	3/15/2004	OK	230n	GSE	2430
0030	2430-985	RFMZFI	Right Femur Force Z S1511	Knee	33334.418	N	+	3/15/2004	OK	230n	GSE	2430
0031	P27172	LSXXG	LT RR SEAT X-MEMBER	RR	1009.2647	g	-	1/23/2004	OK	-1	Endevco	7264C-2K-2-180
0032	P28339	RSXXG	RT RR SEAT X-MEMBER	FWD	1010.4797	g	+	12/12/2003	OK	-1	Endevco	7264C-2K-2-180

A-4

040318-1

Channel Report

3/18/2004 7:46:48 AM

Name of Test 040318-1

System MINIDAU

Name of DAU DAUH

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	P33074	TENXG	TOP OF ENGINE X-AXIS	FWD	1557.3197	g	+ 2/27/2004	OK -1	Endevco	7264C-2K-2-180
0002	P33049	BENXG	BOTTOM OF ENIGNE X-AXIS	RR	1547.2952	g	- 2/27/2004	OK -1	Endevco	7264C-2K-2-180
0003	P33028	RFCXG	RT FR BRAKE CALIPER	RR	1012.0177	g	- 2/27/2004	OK -1	Endevco	7264C-2K-2-180
0004	P33151	LFCXG	LT FR BRAKE CALIPER	FWD	1015.8327	g	+ 2/27/2004	OK -1	Endevco	7264C-2K-2-180
0005	P29888	DPCXG	INSTRUMENT PANEL TOP	RR	999.68759	g	- 1/23/2004	OK -1	Endevco	7264C-2K-2-180
0006	P28337	RDKZG	RR DECK Z-AXIS	UP	996.88473	g	- 12/26/2003	OK -1	Endevco	7264C-2K-2-180

Dummy 229n Type HYBRID III 50TH Descriptio NHTSA - 229n HYBRID III 50TH. CAL DUE 9-15-04 (DKS 3-15-04)J211

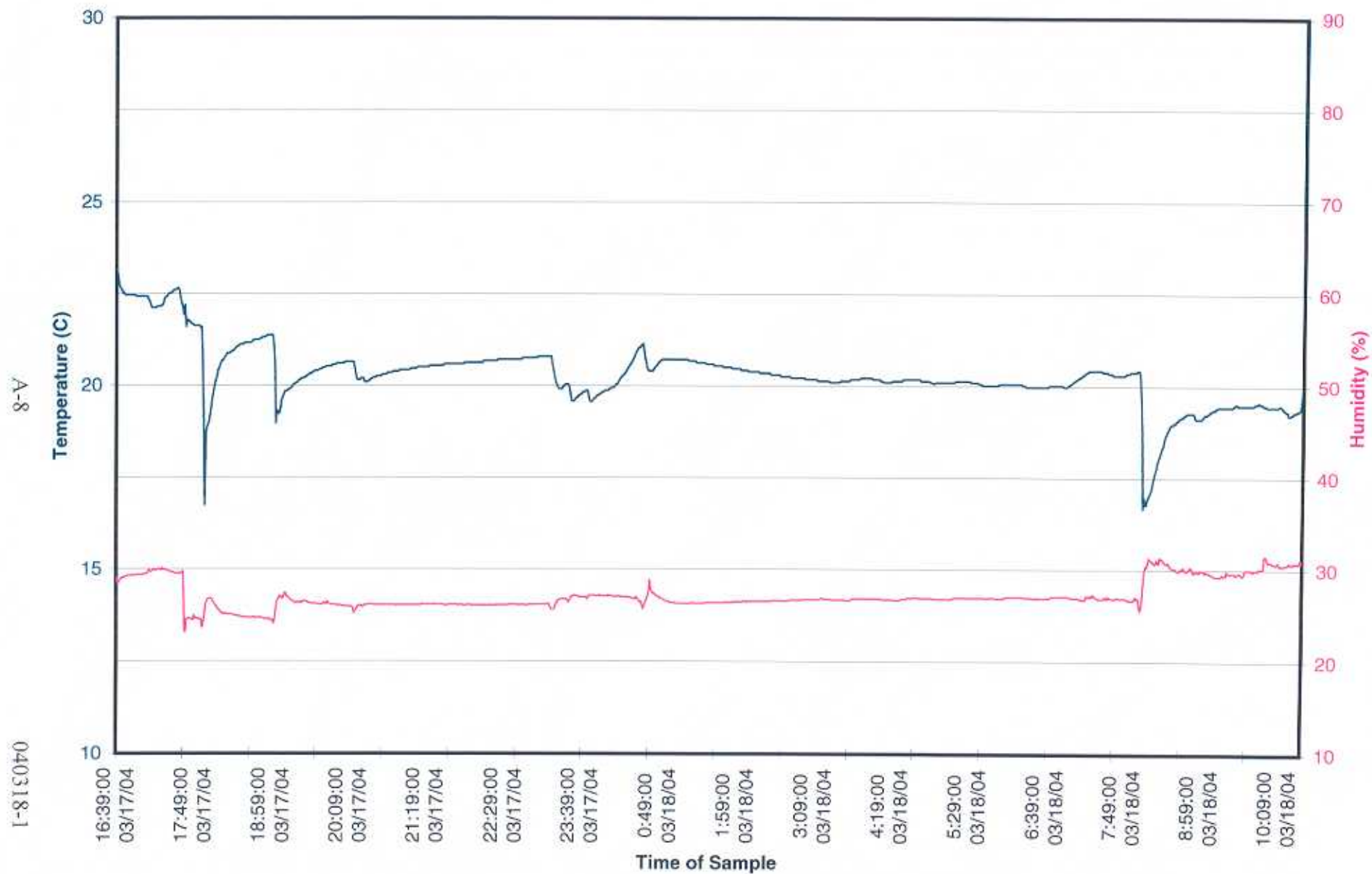
Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
HEDXG	Head Accel X	7231C	GB86	Endevco	0.01959 g	750	3/15/2004	Rwd	1
HEDYG	Head Accel Y	7231C	GB77	Endevco	0.01915 g	750	3/15/2004	Lft	1
HEDZG	Head Accel Z	7231C	A54F	Endevco	0.01974 g	750	3/15/2004	Up	1
NEKXF	Neck Force X	1716A	1716A-1222-FX	Denton	0.0001953 N	8896.4	3/15/2004	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716A	1716A-1222-FY	Denton	0.0001908 N	8896.4	3/15/2004	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716A	1716A-1222-FZ	Denton	0.0000998 N	13344.6	3/15/2004	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716A	1716A-1222-MX	Denton	0.0060842 N	282.5	3/15/2004	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716A	1716A-1222-MY	Denton	0.0059308 N	282.5	3/15/2004	Chn to Strnm	0
NEKZM	Neck Moment Z	1716A	1716A-1222-MZ	Denton	0.0085028 N	282.5	3/15/2004	Chn to Lt Shld	0
CSTXG	Chest Accel X	7231C	C14135	Endevco	0.02742 g	750	3/15/2004	Fwd	0
CSTYG	Chest Accel Y	7231C	A35D	Endevco	0.01912 g	750	3/15/2004	Lft	1
CSTZG	Chest Accel Z	7231C	AH5G8	Endevco	0.01941 g	750	3/15/2004	Down	0
CSTXD	Chest Deflection X	14CB1-2847	14CB1-2847-229	Servo	1.1389 m	100	3/16/2004	Strnm Away Frm Spn	0
LFMZ	Left Femur Force Z 603	2430	2430-901	GSE	0.0000708 N	13344.7	3/15/2004	Knee Fd,Pel Rr	0
RFMZ	Right Femur Force Z 744	2430	2430-902	GSE	0.0000697 N	13344.7	3/15/2004	Knee Fd,Pel Rr	0

A-6

Dummy	230n	Type	HYBRID III 50TH	Description	NHTSA - 230n HYBRID III 50TH. CAL DUE 9-15-04 (DKS 3-16-04)J211					
Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/		Fullscal	Caldat	Pos Output	Flip
HEDXG	Head Accel X	7231C	AD4H9	Endevco	0.01981	g	750	3/15/2004	Rear	1
HEDYG	Head Accel Y	7231C	AD4J7	Endevco	0.01961	g	750	3/15/2004	Left	1
HEDZG	Head Accel Z	7231C	AD4J8	Endevco	0.0193	g	750	3/15/2004	Up	1
NEKXF	Neck Force X	1716	1716-0235-FX	Denton	0.0001919	N	8896.4	3/15/2004	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716	1716-0235-FY	Denton	0.0001879	N	8896.4	3/15/2004	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716	1716-0235-FZ	Denton	0.0000936	N	13344.6	3/15/2004	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716	1716-0235-MX	Denton	0.0058955	N	282.5	3/15/2004	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716	1716-0235-MY	Denton	0.0058266	N	282.5	3/15/2004	Chn to Strnm	0
NEKZM	Neck Moment Z	1716	1716-0235-MZ	Denton	0.0083228	N	282.5	3/15/2004	Chn to Lt Shld	0
CSTXG	Chest Accel X	7231C	ACTR4	Endevco	0.01969	g	750	3/15/2004	Fwd	0
CSTYG	Chest Accel Y	7231C	ACTT4	Endevco	0.01929	g	750	3/15/2004	Left	1
CSTZG	Chest Accel Z	7231C	ACTW0	Endevco	0.01973	g	750	3/15/2004	Down	0
CSTXD	Chest Deflection X	14CB1-2847	85427-1	Servo	1.1403	m	100	3/16/2004	Strnm Away Frm Spn	0
LFMZP	Left Femur Force Z 60	2430	2430-984	GSE	0.000071	N	13344.7	3/15/2004	Knee Fd,Pel Rr	0
RFMZP	Right Femur Force Z S1511	2430	2430-985	GSE	0.0000695	N	13344.7	3/15/2004	Knee Fd,Pel Rr	0

A-7

40 KM/H FRONTAL C40113 / 040318-1



Appendix B

Manufacturer's Information

 CAUTION:

If the seatback is not locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always pull forward on the top of the seatback at the area of the latch to be sure it is locked.

 CAUTION:

A safety belt that is improperly routed, not properly attached, or twisted won't provide the protection needed in a crash. The person wearing the belt could be seriously injured. After raising the rear seatback, always check to be sure that the safety belts are properly routed and attached, and are not twisted.

Safety Belts

Safety Belts: They Are for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

 CAUTION:

Don't let anyone ride where he or she can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be, if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.

⚠ CAUTION:

It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed. Do not allow people to ride in any area of your vehicle that is not equipped with seats and safety belts. Be sure everyone in your vehicle is in a seat and using a safety belt properly.



Your vehicle has a light that comes on as a reminder to buckle up. See *Safety Belt Reminder Light* on page 3-31.

In most states and in all Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

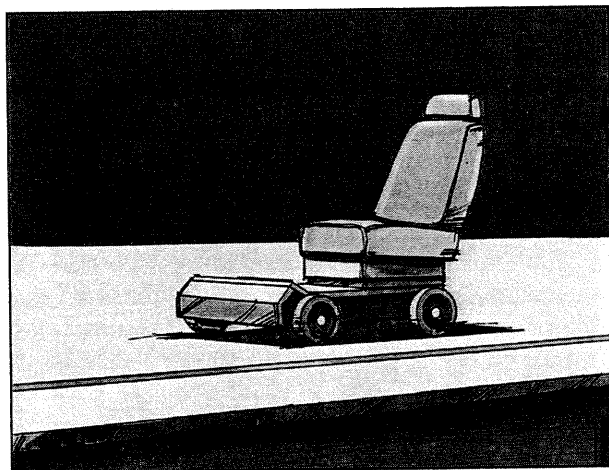
A few crashes are mild, and some crashes can be so serious that even buckled up, a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

After more than 30 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter... a lot!

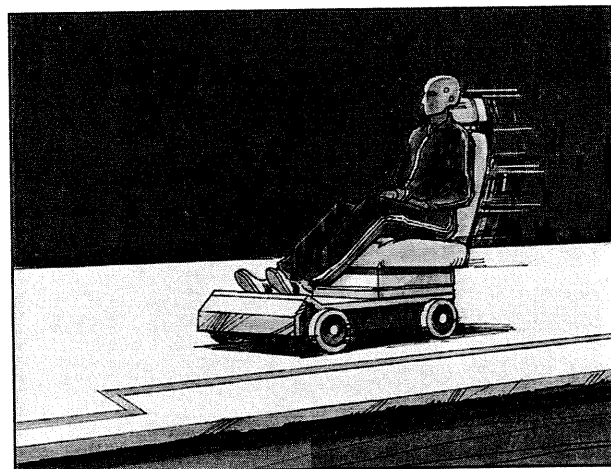
1-12

Why Safety Belts Work

When you ride in or on anything, you go as fast as it goes.

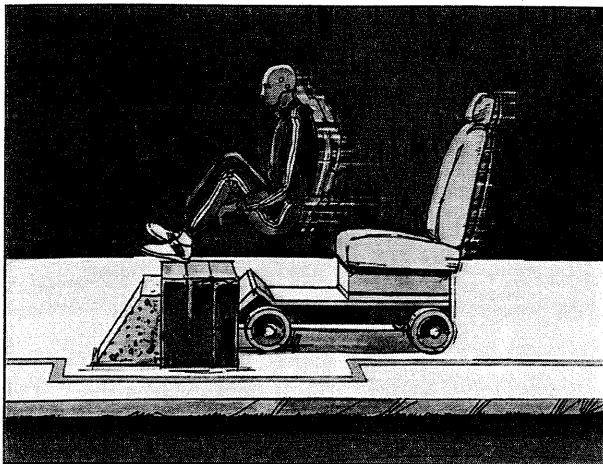


Take the simplest vehicle. Suppose it's just a seat on wheels.



Put someone on it.

1-13

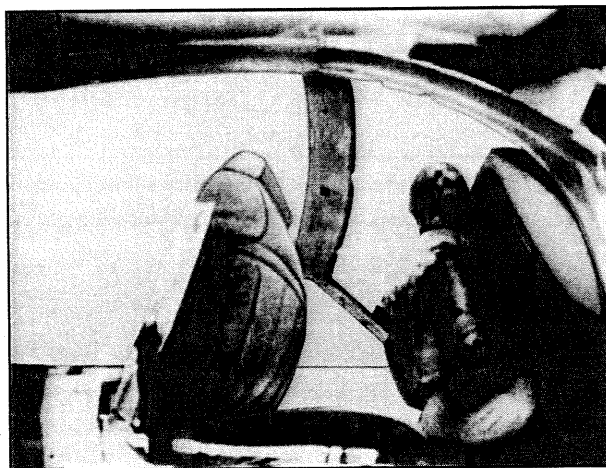


Get it up to speed. Then stop the vehicle. The rider doesn't stop.

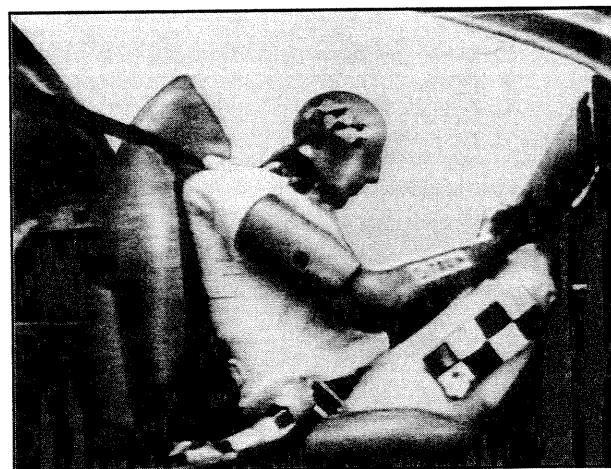


The person keeps going until stopped by something. In a real vehicle, it could be the windshield...

1-14



or the instrument panel...



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Questions and Answers About Safety Belts

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You *could* be – whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: If my vehicle has air bags, why should I have to wear safety belts?

A: Air bags are in many vehicles today and will be in most of them in the future. But they are supplemental systems only; so they work *with* safety belts – not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident – even one that isn't your fault – you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How to Wear Safety Belts Properly

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see *Older Children* on page 1-32 or *Infants and Young Children* on page 1-34. Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

1-16

Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here is how to wear it properly.

1. Close and lock the door.
2. Adjust the seat so you can sit up straight. To see how, see "Seats" in the Index.



3. Pick up the latch plate and pull the belt across you. Do not let it get twisted.

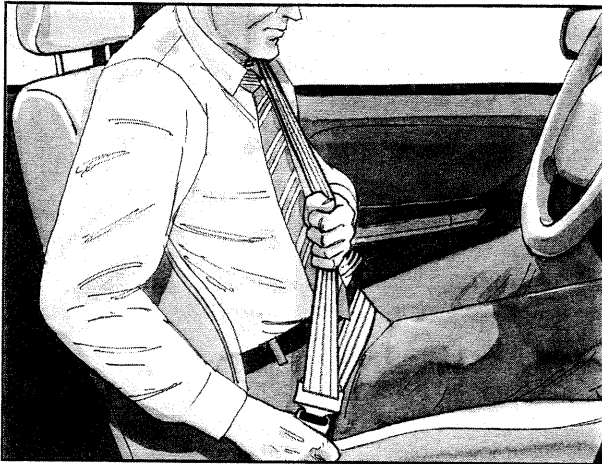
The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

4. Push the latch plate into the buckle until it clicks. If the belt stops before it reaches the buckle, let it go back all the way and start again.

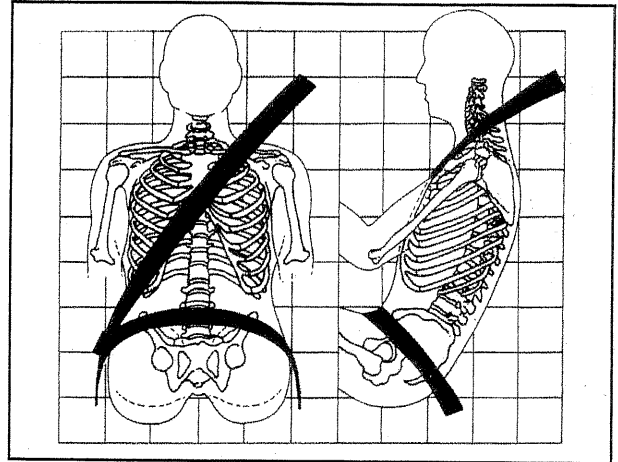
Pull up on the latch plate to make sure it is secure. If the belt is not long enough, see *Safety Belt Extender* on page 1-31.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

1-17



5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.



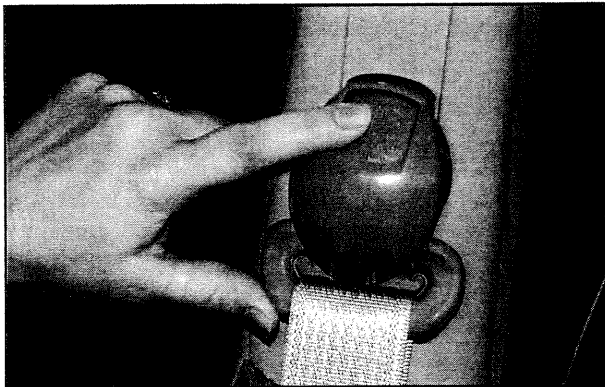
The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you would be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there is a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

1-18

Shoulder Belt Height Adjuster (Sedan)

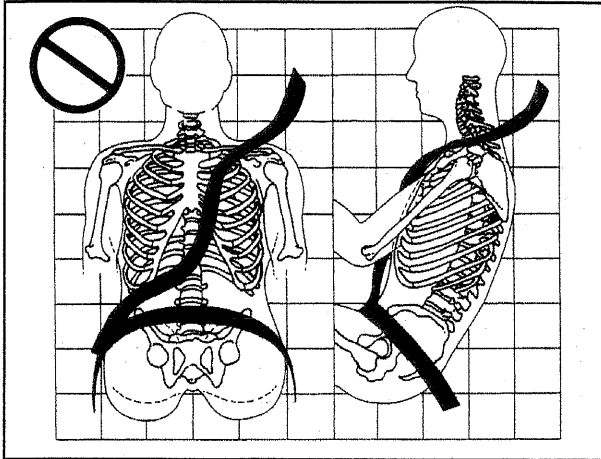
Before you begin to drive, move the shoulder belt adjuster to the height that is right for you. Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.



To move it up or down, press the square button in the center of the height adjuster knob and move the height adjuster to the desired position. After you move the adjuster to where you want it, release the button. Try to move the adjuster up and down without touching the square button to make sure it has locked into position.

1-19

Q: What's wrong with this?



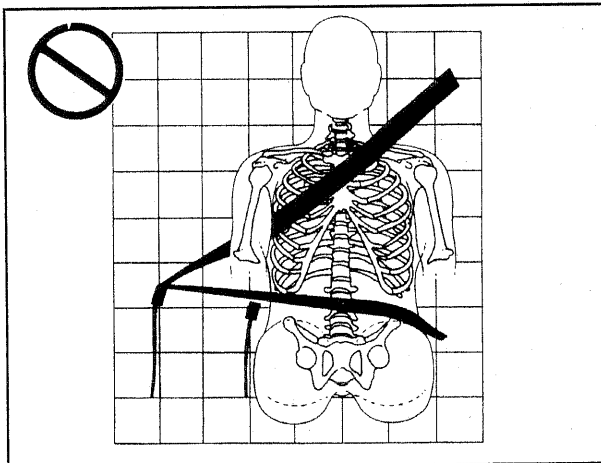
⚠ CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

A: The shoulder belt is too loose. It will not give nearly as much protection this way.

1-20

Q: What's wrong with this?



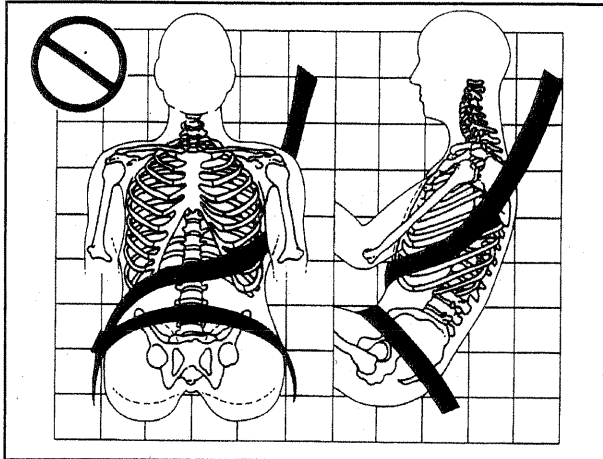
⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

A: The belt is buckled in the wrong place.

1-21

Q: What's wrong with this?



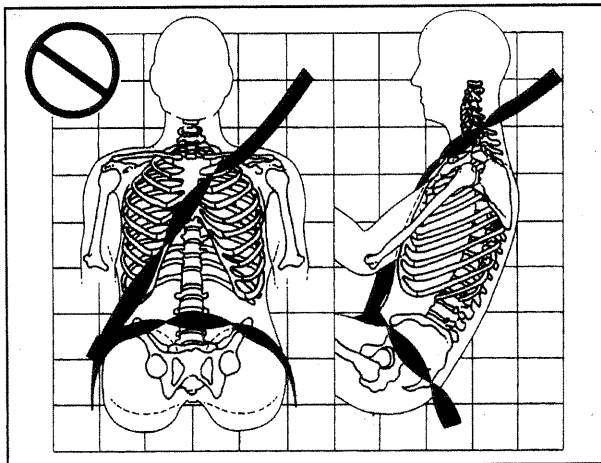
⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

1-22

Q: What's wrong with this?

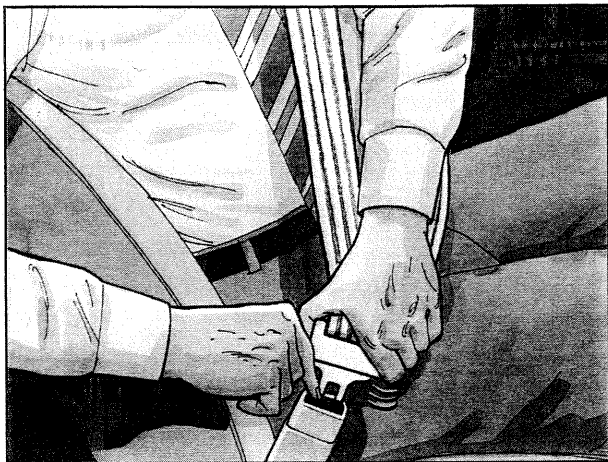


⚠ CAUTION:

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your retailer to fix it.

A: The belt is twisted across the body.

1-23

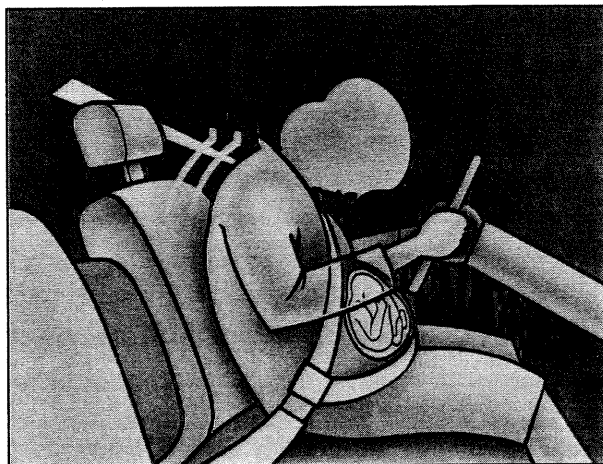


To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.



A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

1-24

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

Right Front Passenger Position

To learn how to wear the right front passenger's safety belt properly, see *Driver Position* on page 1-17.

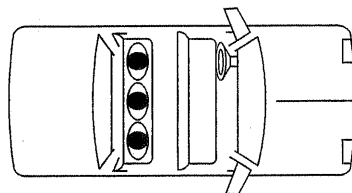
The right front passenger's safety belt works the same way as the driver's safety belt — except for one thing. If you ever pull the shoulder portion of the belt out all the way, you will engage the child restraint locking feature. If this happens, just let the belt go back all the way and start again.

Rear Seat Passengers

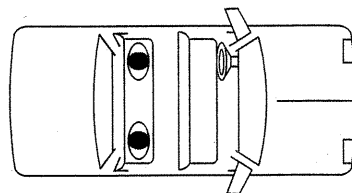
It is very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who are not safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Rear Seat Passenger Positions



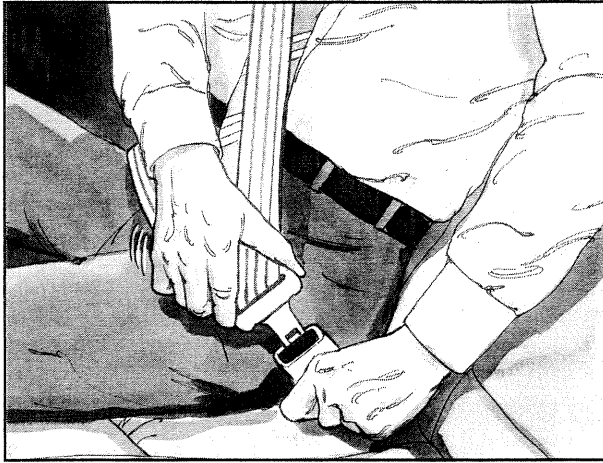
Sedan



Coupe

Lap-Shoulder Belt

All rear seating positions have lap-shoulder belts. Here is how to wear one properly.



1. Pick up the latch plate and pull the belt across you. Do not let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

2. Push the latch plate into the buckle until it clicks. If your vehicle has a center passenger position, be sure to use the correct buckle when buckling your lap-shoulder belt. If you find that the latch plate will not go fully into the buckle, see if you are using the buckle for the center passenger position.

Pull up on the latch plate to make sure it is secure.

When the shoulder belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.

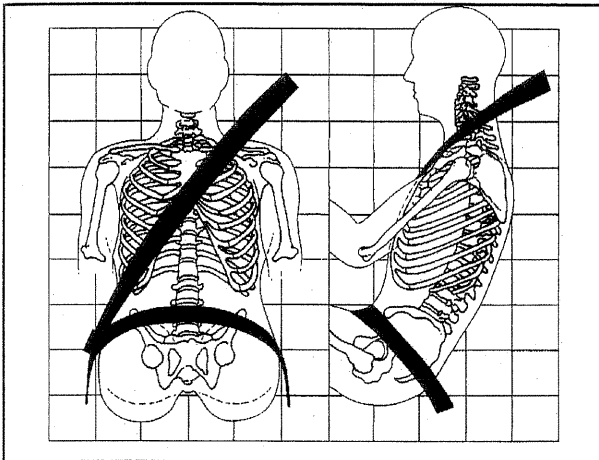
Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

1-26



3. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder part.

1-27

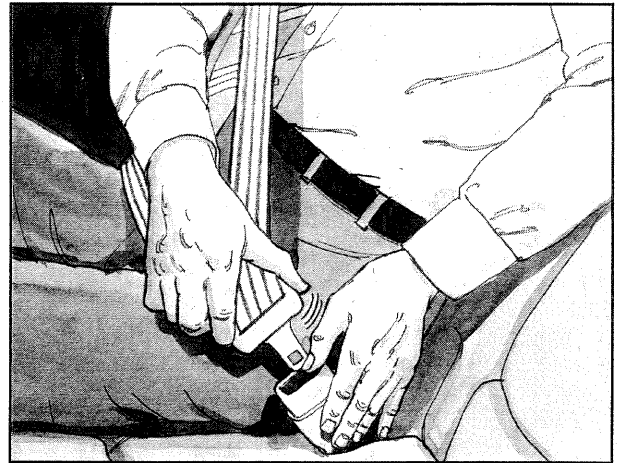


The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash this applies force to the strong pelvic bones. And you would be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there is a sudden stop or a crash, or if you pull the belt very quickly out of the retractor.

CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.



To unlatch the belt, just push the button on the buckle.

1-28

Rear Safety Belt Comfort Guides for Children and Small Adults

Rear shoulder belt comfort guides will provide added safety belt comfort for older children who have outgrown booster seats and for small adults. When installed on a shoulder belt, the comfort guide better positions the belt away from the neck and head.

There is one guide available for each outside passenger position in the rear seat. To provide added safety belt comfort for children who have outgrown child restraints and booster seats and for smaller adults, the comfort guides may be installed on the shoulder belts. Here is how to install a comfort guide and use the safety belt:

1. Fold down the rear seatback of the desired seating position. See *Split Folding Rear Seat* on page 1-9 for instructions about how to fold the rear seatback.

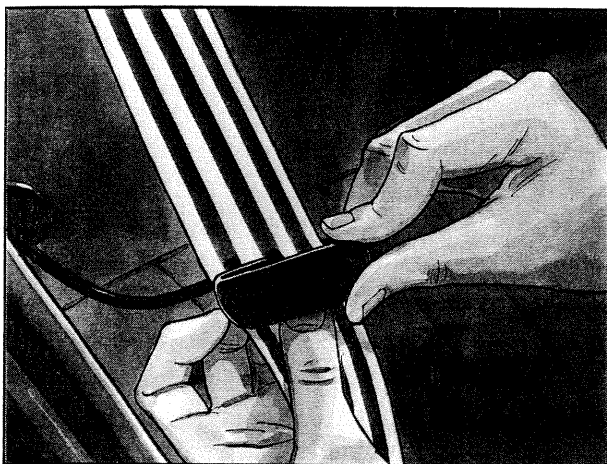


2. Remove the guide located on the trim behind the seatback from its storage clip. Pull the guide around the rear seatback.

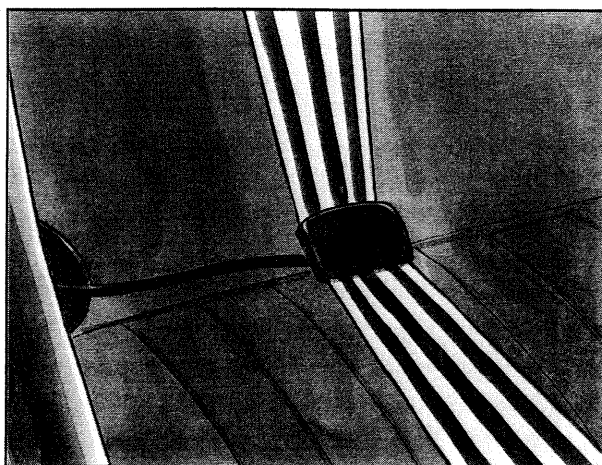
CAUTION:

If the seatback isn't locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always press rearward on the seatback to be sure it is locked.

3. Return the rear seatback to its upright position and make sure it is latched into place.



4. Slide the guide under and past the belt. The elastic cord must be under the belt. Then, place the guide over the belt, and insert the two edges of the belt into the slots of the guide.



5. Be sure that the belt is not twisted and it lies flat. The elastic cord must be under the belt and the guide on top.

1-30



6. Buckle, position and release the safety belt as described in *Rear Seat Passengers* on page 1-25. Make sure that the shoulder belt crosses the shoulder.

To remove and store the comfort guides, squeeze the belt edges together so that you can take them out of the guides. Fold down the rear seatbacks. Store the guides on their storage clips. Lift the rear seatbacks to their original seating positions.

Safety Belt Pretensioners

Your vehicle has safety belt pretensioners. You'll find them on the retractor portion of the safety belts for the driver and right front passenger. They help the safety belts reduce a person's forward movement in a moderate to severe crash in which the front of the vehicle hits something.

Pretensioners work only once. If they activate in a crash, you'll need to get new pretensioners and may need other new parts for your safety belt system. See *Replacing Restraint System Parts After a Crash* on page 1-63 for more information.

Safety Belt Extender

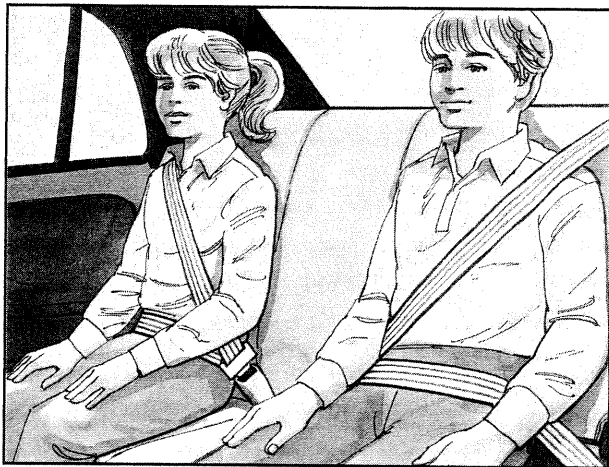
If the vehicle's safety belt will fasten around you, you should use it.

But if a safety belt is not long enough to fasten, your retailer will order you an extender. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Do not let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.

1-31

Child Restraints

Older Children



Older children who have outgrown booster seats should wear the vehicle's safety belts.

Q: What is the proper way to wear safety belts?

A: If possible, an older child should wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide. The shoulder belt should not cross the face or neck. The lap belt should fit snugly below the hips, just touching the top of the thighs. It should never be worn over the abdomen, which could cause severe or even fatal internal injuries in a crash.

Accident statistics show that children are safer if they are restrained in the rear seat.

In a crash, children who are not buckled up can strike other people who are buckled up, or can be thrown out of the vehicle. Older children need to use safety belts properly.

1-32



⚠ CAUTION:

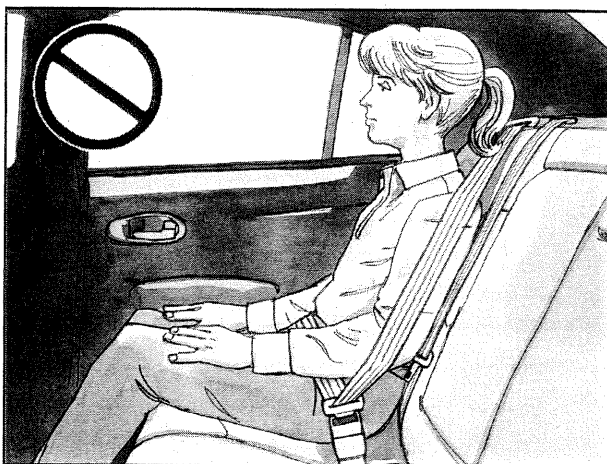
Never do this.

Here two children are wearing the same belt. The belt can't properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

Q: What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?

A: If the child is sitting in a seat next to a window, move the child toward the center of the vehicle. See *Rear Safety Belt Comfort Guides for Children and Small Adults* on page 1-29. If the child is sitting in the center rear seat passenger position, move the child toward the safety belt buckle. In either case, be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that belts provide.

1-33



⚠ CAUTION:

Never do this.

Here a child is sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low and snug on the hips, just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

Infants and Young Children

Everyone in a vehicle needs protection! This includes infants and all other children. Neither the distance traveled nor the age and size of the traveler changes the need, for everyone, to use safety restraints. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

1-34

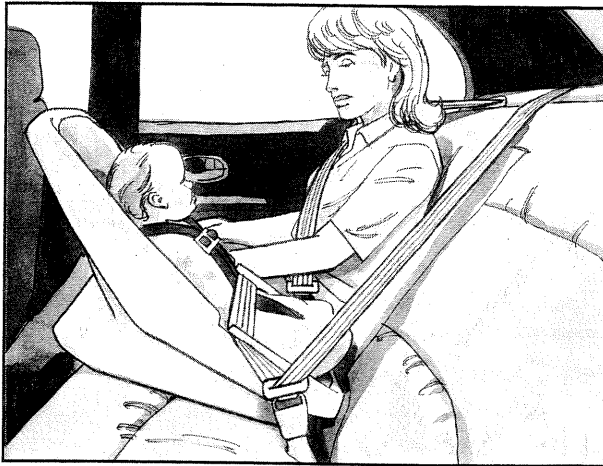
Every time infants and young children ride in vehicles, they should have the protection provided by appropriate restraints. Young children should not use the vehicle's adult safety belts alone, unless there is no other choice. Instead, they need to use a child restraint.



⚠ CAUTION:

People should never hold a baby in their arms while riding in a vehicle. A baby doesn't weigh much -- until a crash. During a crash a baby will become so heavy it is not possible to hold it. For example, in a crash at only 25 mph (40 km/h), a 12-lb. (5.5 kg) baby will suddenly become a 240-lb. (110 kg) force on a person's arms. A baby should be secured in an appropriate restraint.

1-35



⚠ CAUTION:

Children who are up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer outstanding protection for adults and older children, but not for young children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide.

Q: What are the different types of add-on child restraints?

A: Add-on child restraints, which are purchased by the vehicle's owner, are available in four basic types. Selection of a particular restraint should take into consideration not only the child's weight, height and age but also whether or not the restraint will be compatible with the motor vehicle in which it will be used.

1-36

For most basic types of child restraints, there are many different models available. When purchasing a child restraint, be sure it is designed to be used in a motor vehicle. If it is, the restraint will have a label saying that it meets federal motor vehicle safety standards.

The restraint manufacturer's instructions that come with the restraint, state the weight and height limitations for a particular child restraint. In addition, there are many kinds of restraints available for children with special needs.

⚠ CAUTION:

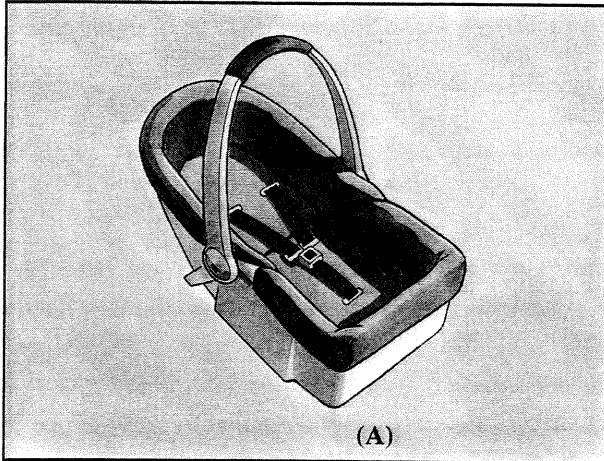
Newborn infants need complete support, including support for the head and neck. This is necessary because a newborn infant's neck is weak and its head weighs so much compared with the rest of its body. In a crash, an infant in a rear-facing seat settles into the restraint, so the crash forces can be distributed across the strongest part of an infant's body, the back and shoulders. Infants always should be secured in appropriate infant restraints.

⚠ CAUTION:

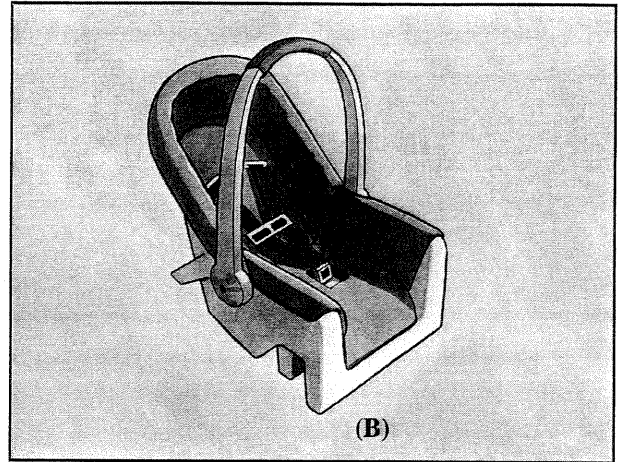
The body structure of a young child is quite unlike that of an adult or older child, for whom the safety belts are designed. A young child's hip bones are still so small that the vehicle's regular safety belt may not remain low on the hip bones, as it should. Instead, it may settle up around the child's abdomen. In a crash, the belt would apply force on a body area that's unprotected by any bony structure. This alone could cause serious or fatal injuries. Young children always should be secured in appropriate child restraints.

1-37

Child Restraint Systems

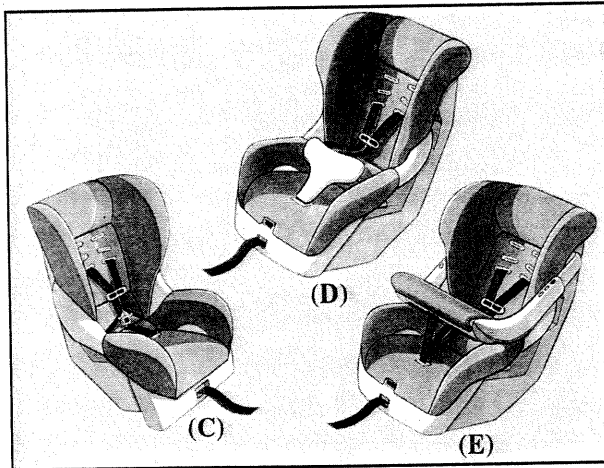


An infant car bed (A), a special bed made for use in a motor vehicle, is an infant restraint system designed to restrain or position a child on a continuous flat surface. Make sure that the infant's head rests toward the center of the vehicle.

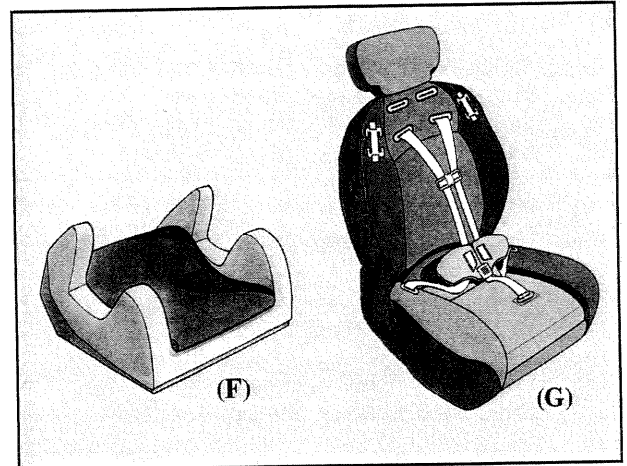


A rear-facing infant seat (B) provides restraint with the seating surface against the back of the infant. The harness system holds the infant in place and, in a crash, acts to keep the infant positioned in the restraint.

1-38



A forward-facing child seat (C-E) provides restraint for the child's body with the harness and also sometimes with surfaces such as T-shaped or shelf-like shields.



A booster seat (F-G) is a child restraint designed to improve the fit of the vehicle's safety belt system. Some booster seats have a shoulder belt positioner, and some high-back booster seats have a five-point harness. A booster seat can also help a child to see out the window.

1-39

Q: How do child restraints work?

A: A child restraint system is any device designed for use in a motor vehicle to restrain, seat, or position children. A built-in child restraint system is a permanent part of the motor vehicle. An add-on child restraint system is a portable one, which is purchased by the vehicle's owner.

For many years, add-on child restraints have used the adult belt system in the vehicle. To help reduce the chance of injury, the child also has to be secured within the restraint. The vehicle's belt system secures the add-on child restraint in the vehicle, and the add-on child restraint's harness system holds the child in place within the restraint.

One system, the three-point harness, has straps that come down over each of the infant's shoulders and buckle together at the crotch. The five-point harness system has two shoulder straps, two hip straps and a crotch strap. A shield may take the place of hip straps. A T-shaped shield has shoulder straps that are attached to a flat pad which rests low against the child's body. A shelf- or armrest-type shield has straps that are attached to a wide, shelf-like shield that swings up or to the side.

When choosing a child restraint, be sure the child restraint is designed to be used in a vehicle. If it is, it will have a label saying that it meets federal motor vehicle safety standards.

Then follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both. These restraints use the belt system or the LATCH system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. When securing an add-on child restraint, refer to the instructions that come with the restraint which may be on the restraint itself or in a booklet, or both, and to this manual. The child restraint instructions are important, so if they are not available, obtain a replacement copy from the manufacturer.

1-40

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We, therefore, recommend that child restraints be secured in a rear seat, including an infant riding in a rear-facing infant seat, a child riding in a forward-facing child seat and an older child riding in a booster seat. *Never* put a rear-facing child restraint in the front passenger seat. Here's why:

CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's air bag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating air bag. Always secure a rear-facing child restraint in a rear seat.

If you secure a forward-facing child restraint in the right front seat, always move the front passenger seat as far back as it will go. It is better to secure the child restraint in a rear seat.

Wherever you install it, be sure to secure the child restraint properly.

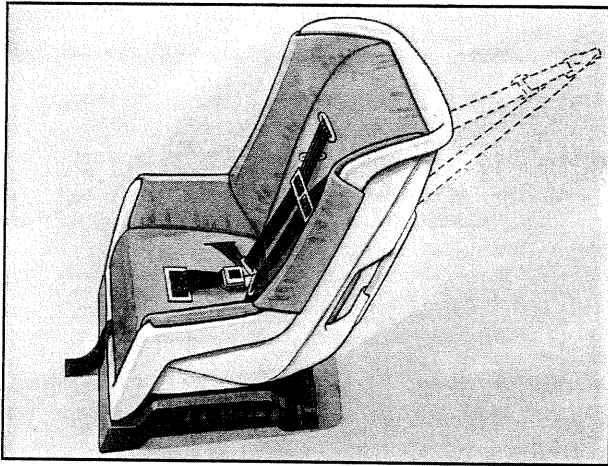
Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle – even when no child is in it.

Top Strap

Some child restraints have a top strap, or "top tether." It can help restrain the child restraint during a collision. For it to work, a top strap must be properly anchored to the vehicle. Some top strap-equipped child restraints are designed for use with or without the top strap being anchored. Others require the top strap always to be anchored. Be sure to read and follow the instructions for your child restraint. If yours requires that the top strap be anchored, don't use the restraint unless it is anchored properly.

If the child restraint does not have a top strap, one can be obtained, in kit form, for many child restraints. Ask the child restraint manufacturer whether or not a kit is available.

1-41



⚠ CAUTION:

Each top tether bracket is designed to anchor only one child restraint. Attaching more than one child restraint to a single bracket could cause the anchor to come loose or even break during a crash. A child or others could be injured if this happens. To help prevent injury to people and damage to your vehicle, attach only one child restraint per bracket.

Once you have the top strap anchored, you'll be ready to secure the child restraint itself. Tighten the top strap when and as the child restraint manufacturer's instructions say.

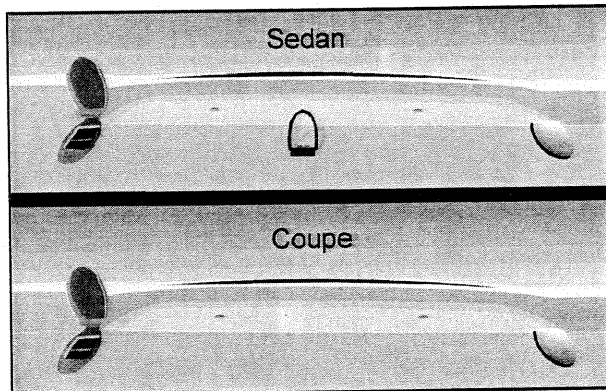
In Canada, the law requires that forward-facing child restraints have a top strap, and that the strap be anchored. In the United States, some child restraints also have a top strap. If your child restraint has a top strap, it should be anchored.

Anchor the top strap to an anchor point specified in *Top Strap Anchor Location* on page 1-43. Be sure to use an anchor point located on the same side of the vehicle as the seating position where the child restraint will be placed.

1-42

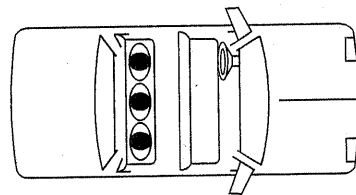
Top Strap Anchor Location

Your vehicle has top strap anchors installed for the rear seating positions only. Do not use a child restraint with a top strap in the right front passenger seat, because there is no place to anchor the top strap.



The coupe (B) has two top tether anchors located behind the rear seat on the filler panel. The sedan (A) has three top tether anchors located at the left, right and center positions on the rear window trim. In order to access the anchors, you'll have to open the covers if the anchor has one.

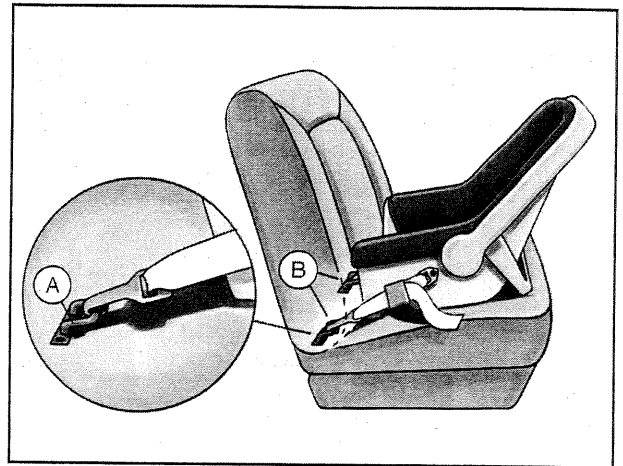
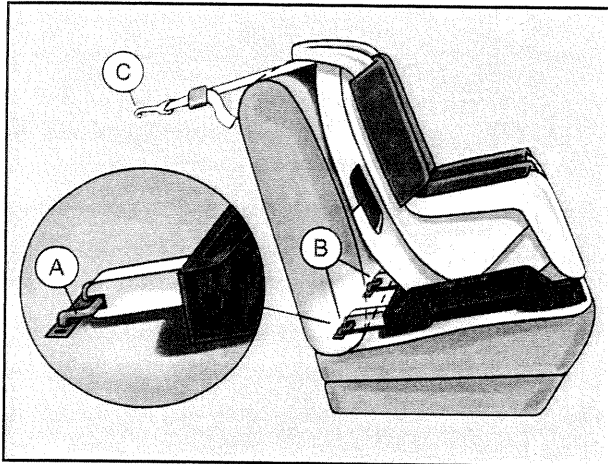
Lower Anchorages and Top Tethers for Children (LATCH System)



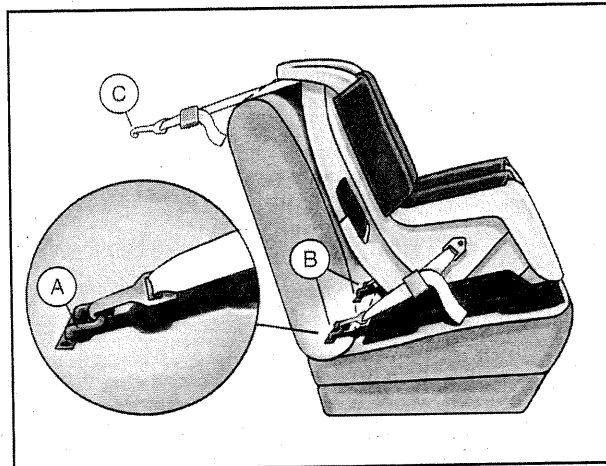
Your vehicle has the LATCH system. You will find anchors (A) for all three rear seating positions on the sedan and both rear seat outside passenger positions on the coupe.

1-43

This system, designed to make installation of child restraints easier, does not use the vehicle's safety belts. Instead, it uses vehicle anchors (A, B) and child restraint attachments to secure the restraints. Some restraints also use another vehicle anchor to secure a top tether strap (C).



1-44



In order to use the LATCH system in your vehicle, you need a child restraint designed for that system.



To assist you in locating the lower anchors for this child restraint system, each seating position with the LATCH system has a label on the seatback at each lower anchor position.

The labels are located where the seatback meets the seat cushion.

⚠ CAUTION:

If a LATCH-type child restraint is not attached to its anchorage points, the restraint will not be able to protect the child correctly. In a crash, the child could be seriously injured or killed. Make sure that a LATCH-type child restraint is properly installed using the anchorage points, or use the vehicle's safety belts to secure the restraint, following the instructions that came with that restraint, and also the instructions in this manual.

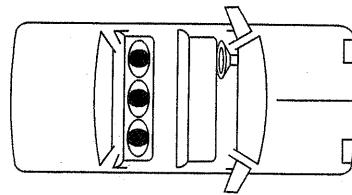
1-45

Securing a Child Restraint Designed for the LATCH System

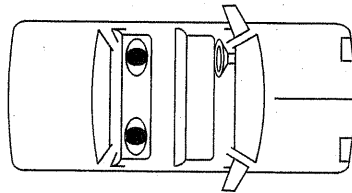
1. Find the LATCH anchorages for the seating position you want to use, where the bottom of the seatback meets the back of the seat cushion. See *Lower Anchorages and Top Tethers for Children (LATCH System)* on page 1-43.
2. Put the child restraint on the seat.
3. Attach and tighten the LATCH attachments on the child restraint to the LATCH anchorages in the vehicle. The child restraint instructions will show you how.
4. If the child restraint is forward-facing, attach and tighten the top tether to the top tether anchorage. The child restraint instructions will show you how. Also see *Top Strap* on page 1-41.
5. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, simply unhook the top tether from the top tether anchorage and then disconnect the LATCH attachments from the LATCH anchorages.

Securing a Child Restraint in a Rear Seat Position



Sedan



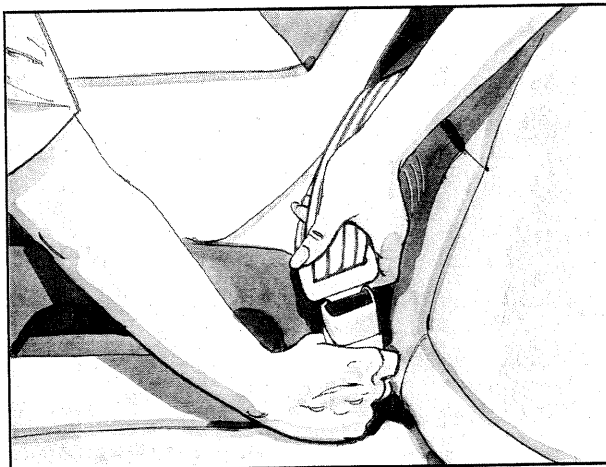
Coupe

If your child restraint is equipped with the LATCH system, see *Lower Anchorages and Top Tethers for Children (LATCH System)* on page 1-43. See *Top Strap* on page 1-41 if the child restraint has one.

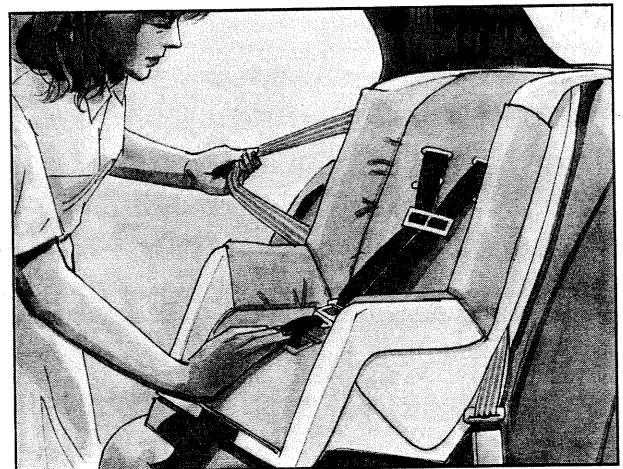
1-46

If your child restraint does not have the LATCH system, you will be using the lap-shoulder belt. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

1. Put the restraint on the seat.
2. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



3. Buckle the belt. Be sure the latch plate clicks when you put it into the buckle. This means you are using the correct buckle. Also, make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



4. Pull the rest of shoulder belt all the way out of the retractor to set the lock.

1-47

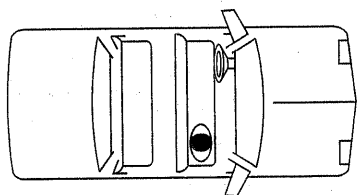


5. To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt and feed the shoulder belt back into the retractor. If you are using a forward-facing child restraint, you may find it helpful to use your knee to push down on the child restraint as you tighten the belt.
6. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

1-48

Securing a Child Restraint in the Right Front Seat Position



If your child restraint is equipped with the LATCH system, see *Lower Anchorages and Top Tethers for Children (LATCH System)* on page 1-43. See *Top Strap* on page 1-41 if the child restraint has one.

Your vehicle has a right front passenger air bag. *Never* put a rear-facing child restraint in this seat. Here is why:

CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's air bag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating air bag. Always secure a rear-facing child restraint in a rear seat.

A rear seat is a safer place to secure a forward-facing child restraint. If you need to secure a forward-facing child restraint in the right front seat, you will be using the lap-shoulder belt to secure the child restraint. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

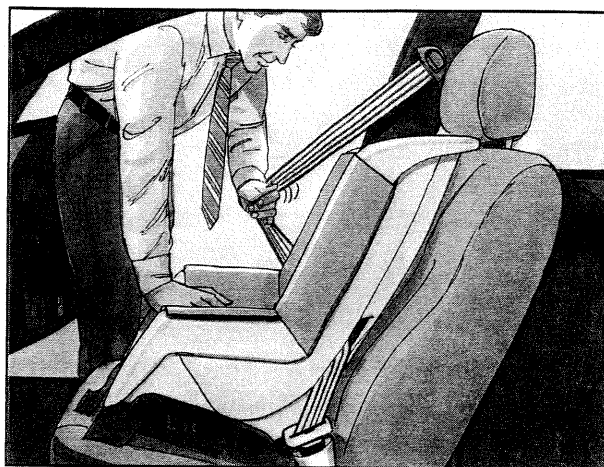
1. Because your vehicle has a right front passenger air bag, always move the seat as far back as it will go before securing a forward-facing child restraint. See *Manual Seats* on page 1-2.
2. Put the restraint on the seat.

1-49

3. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



4. Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



5. Pull the rest of the shoulder belt all the way out of the retractor to set the lock.

1-50



6. To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt and feed the shoulder belt back into the retractor. You may find it helpful to use your knee to push down on the child restraint as you tighten the belt.
7. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

1-51

Air Bag Systems

This part explains the frontal and side impact air bag systems.

Your vehicle has air bags – a frontal air bag for the driver and another frontal air bag for the right front passenger. Your vehicle may also have roof mounted side impact air bags. Roof mounted side impact air bags are available for the driver and the passenger seated directly behind the driver and for the right front passenger and the passenger seated directly behind that passenger.

If your vehicle has side impact air bags, the words AIR BAG will appear on the air bag covering on the ceiling near the driver's and right front passenger's window.

Frontal air bags are designed to help reduce the risk of injury from the force of an inflating frontal air bag. But these air bags must inflate very quickly to do their job and comply with federal regulations.

Here are the most important things to know about the air bag systems:

CAUTION:

You can be severely injured or killed in a crash if you are not wearing your safety belt – even if you have air bags. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Air bags are designed to work with safety belts but do not replace them.

Frontal air bags for the driver and right front passenger are designed to deploy only in moderate to severe frontal and near frontal crashes. They are not designed to inflate in rollover, rear or low-speed frontal crashes, or in many side crashes. And, for some unrestrained occupants, frontal air bags may provide less protection in frontal crashes than more forceful air bags have provided in the past.

CAUTION: (Continued)

1-52

CAUTION: (Continued)

The side impact air bags are designed to inflate only in moderate to severe crashes where something hits the side of your vehicle. They are not designed to inflate in frontal, in rollover or in rear crashes.

Everyone in your vehicle should wear a safety belt properly – whether or not there is an air bag for that person.

CAUTION:

Both frontal and side impact air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, as you would be if you were leaning forward, it could seriously injure you. Safety belts help keep you in position for air bag inflation before and during a crash. Always wear your safety belt even with frontal air bags. The driver should sit as far back as possible while still maintaining control of the vehicle. Occupants should not lean on or sleep against the door.

1-53

⚠ CAUTION:

Anyone who is up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer the best protection for adults, but not for young children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide. Always secure children properly in your vehicle. To read how, see the part of this manual called "Older Children" or "Infants and Young Children."



AIR BAG

There is an air bag readiness light on the instrument panel cluster, which shows the air bag symbol.

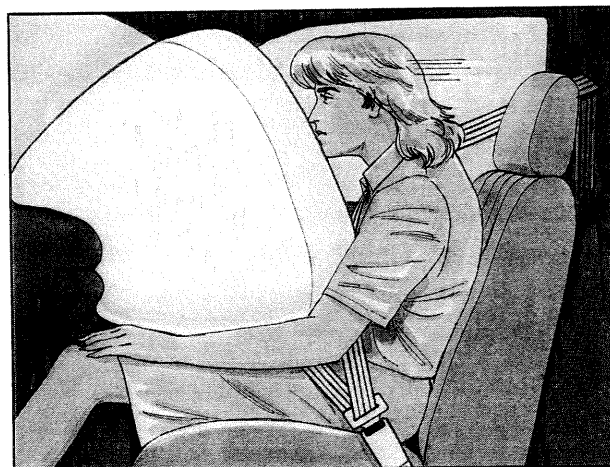
The system checks the air bag electrical system for malfunctions. The light tells you if there is an electrical problem. See *Air Bag Readiness Light* on page 3-32 for more information.

1-54

Where Are the Air Bags?

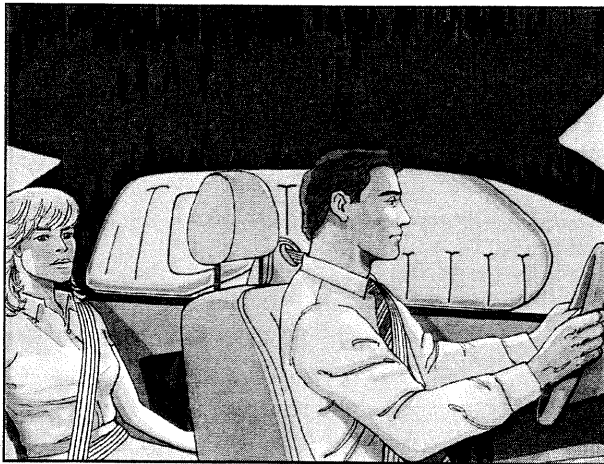


The driver's frontal air bag is in the middle of the steering wheel.



The right front passenger's frontal air bag is in the instrument panel on the passenger's side.

1-55



The side impact air bag for the driver and the person seated directly behind the driver is in the ceiling above the side windows.



The side impact air bag for the right front passenger and the person seated directly behind that passenger is in the ceiling above the side windows.

1-56

CAUTION:

If something is between an occupant and an air bag, the bag might not inflate properly or it might force the object into that person causing severe injury or even death. The path of an inflating air bag must be kept clear. Don't put anything between an occupant and an air bag, and don't attach or put anything on the steering wheel hub or on or near any other air bag covering. And, because your vehicle has side impact air bags, never secure anything to the roof of your vehicle by routing the rope or tiedown through any door or window opening. If you do, the path of an inflating side impact air bag will be blocked. The path of an inflating air bag must be kept clear.

When Should an Air Bag Inflate?

The driver's and right front passenger's frontal air bags are designed to inflate in moderate to severe frontal or near-frontal crashes. But they are designed to inflate only if the impact speed is above the system's designed "threshold level."

In addition, your vehicle has "dual stage" frontal air bags, which adjust the amount of restraint according to crash severity. For moderate frontal impacts, these air bags inflate at a level less than full deployment. For more severe frontal impacts, full deployment occurs.

If the front of your vehicle goes straight into a wall that does not move or deform, the threshold level for the reduced deployment is about 16 to 20 mph (26 to 32 km/h), and the threshold level for a full deployment is 25 to 30 mph (40 to 48 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range. If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher.

The driver's and right front passenger's frontal air bags are not designed to inflate in rollovers, rear impacts, or in many side impacts because inflation would not help the occupant.

1-57

The side impact air bags are designed to inflate in moderate to severe side crashes. A side impact air bag will inflate if the crash severity is above the system's designed "threshold level." The threshold level can vary with specific vehicle design. Side impact air bags are not designed to inflate in frontal or near-frontal impacts, rollovers or rear impacts, because inflation would not help the occupant. A side impact air bag will only deploy on the side of the vehicle that is struck.

It is possible that, in a crash involving the front of your vehicle, only one of the two frontal air bags in your vehicle will deploy. This is rare, but it can happen in a crash just severe enough to make a frontal air bag inflate.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. For frontal air bags, inflation is determined by the angle of the impact and how quickly the vehicle slows down in frontal and near-frontal impacts. For side impact air bags, inflation is determined by the location and severity of the impact.

What Makes an Air Bag Inflate?

In an impact of sufficient severity, the air bag sensing system detects that the vehicle is in a crash. For both frontal and side impact air bags, the sensing system triggers a release of gas from the inflator, which inflates the air bag. The inflator, air bag, and related hardware are all part of the air bag modules inside the steering wheel and in the instrument panel in front of the right front passenger and in the ceiling of the vehicle, near the side windows.

How Does an Air Bag Restrain?

In moderate to severe frontal or near frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. In moderate to severe side collisions, even belted occupants can contact the inside of the vehicle. The air bag supplements the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But the frontal air bags would not help you in many types of collisions, including rollovers, rear impacts, and many side impacts, primarily because an occupant's motion is not toward the air bag. Side impact air bags would not help you in many types of collisions, including frontal or near frontal collisions, rollovers, and rear impacts, primarily because an occupant's motion is not toward those air bags. Air bags should never be regarded

1-58

as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions for the driver's and right front passenger's frontal air bags, and only in moderate to severe side collisions for vehicles with a driver's and right front passenger's side impact air bag.

What Will You See After an Air Bag Inflates?

After an air bag inflates, it quickly deflates, so quickly that some people may not even realize the air bag inflated. Some components of the air bag module — the steering wheel hub for the driver's air bag, the instrument panel for the right front passenger's bag or the ceiling of your vehicle near the side windows — will be hot for a short time. The parts of the bag that come into contact with you may be warm, but not too hot to touch. There will be some smoke and dust coming from the vents in the deflated air bags. Air bag inflation doesn't prevent the driver from seeing or being able to steer the vehicle, nor does it stop people from leaving the vehicle.

CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or a door. If you experience breathing problems following an air bag deployment, you should seek medical attention.

In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the right front passenger air bag.

- Air bags are designed to inflate only once. After an air bag inflates, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.
- Your vehicle is equipped with a crash sensing and diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the system commands air bag inflation and driver's safety belt usage at deployment.

- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

Notice: If you damage the covering for the driver's or the right front passenger's air bag, or the side impact air bag covering on the ceiling near the side windows, the bag may not work properly. You may have to replace the air bag module in the steering wheel, both the air bag module and the instrument panel for the right front passenger's air bag, or side impact air bag module and ceiling covering for the roof-mounted side impact air bag. Do not open or break the air bag coverings.

1-60

Servicing Your Air Bag-Equipped Vehicle

Air bags affect how your vehicle should be serviced. There are air bag system parts in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your retailer and the Saturn Service Manual have information about servicing your vehicle and the air bag systems. To purchase a service manual, see *Service Publications Ordering Information* on page 7-9.

CAUTION:

For up to one minute after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid wires wrapped with yellow tape, yellow coverings, or yellow connectors. They are probably part of the air bag systems. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

Air bag systems do not need regular maintenance.

1-61

Adding Equipment to Your Air Bag-Equipped Vehicle

Q: If I add a luggage carrier or sunroof to the roof of my vehicle, will it keep the roof-mounted side impact air bags from working properly?

A: As long as the luggage carrier or sunroof is properly installed so that the vehicle's basic structure isn't changed, it's not likely to keep the roof-mounted side impact air bags from working properly in a crash.

Restraint System Check

Checking Your Restraint Systems

Now and then, make sure the safety belt reminder light and all your belts, buckles, latch plates, retractors and anchorages are working properly. Look for any other loose or damaged safety belt system parts. If you see anything that might keep a safety belt system from doing its job, have it repaired.

Torn or frayed safety belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

Also look for any opened or broken air bag covers, and have them repaired or replaced. (The air bag system does not need regular maintenance.)

1-62

Replacing Restraint System Parts After a Crash

CAUTION:

A crash can damage the restraint systems in your vehicle. A damaged restraint system may not properly protect the person using it, resulting in serious injury or even death in a crash. To help make sure your restraint systems are working properly after a crash, have them inspected and any necessary replacements made as soon as possible.

If you have had a crash, do you need new belts or LATCH system parts?

After a very minor collision, nothing may be necessary. But if the belts were stretched, as they would be if worn during a more severe crash, then you need new parts.

If the LATCH system was being used during a more severe crash, you may need new LATCH system parts.

If belts are cut or damaged, replace them. Collision damage also may mean you will need to have LATCH system, safety belt or seat parts repaired or replaced. New parts and repairs may be necessary even if the belt or LATCH system was not being used at the time of the collision.

If your seat adjuster will not work after a crash, the special part of the safety belt that goes through the seat to the adjuster may need to be replaced.

If the frontal air bags inflate you will need to replace the driver's and right front passengers safety belt retractor assembly. Be sure to do so. Then the new retractor assembly will be there to help protect you in a collision.

If an air bag inflates, you will need to replace air bag system parts. See the part about the air bag system earlier in this manual.

1-63