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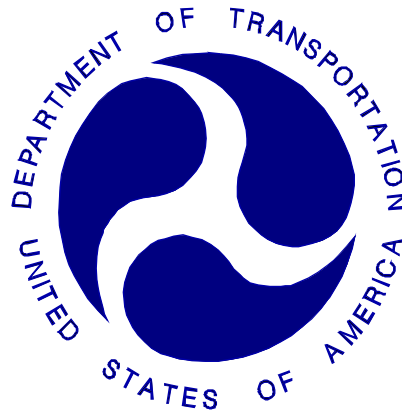
**NEW CAR ASSESSMENT PROGRAM  
SIDE IMPACT TEST**

SATURN CORPORATION  
2005 SATURN ION 1  
FOUR DOOR SEDAN

NHTSA NUMBER: M50115

GENERAL DYNAMICS TEST NUMBER: 8765-SNCAP-07

ADVANCED INFORMATION ENGINEERING SERVICES  
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December 6, 2004

**FINAL REPORT**

U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Rulemaking  
Office of Crashworthiness Standards  
Mail Code: NVS-111  
400 Seventh Street, SW, Room No. 5313  
Washington, DC 20590

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|---|---|--|--------------------|--|---------------------|--|--------------------|------------------------------|------|-----|------|------------------------------|------|-----|------|---------------------------|------|-----|------|------------------------------|----|-----|----|----------------------------|----|-----|----|
| 4. Title and Subtitle<br>Final Report of new Car Assessment Program Side Impact Testing of a 2005 Saturn Ion 1 Four Door Sedan<br>NHTSA No.: M50115   |   | 5. Report Date<br>December 6, 2004   |                    |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
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| 15. Supplementary Notes   |   |  |                    |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
| 16. Abstract<br>A 55/28 kph 90 <sup>0</sup> Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2005 Saturn Ion 1 Four Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at the General Dynamics Advanced Information Engineering Services Crash Test Facility in Buffalo, New York, on December 6, 2004.<br>The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 kph, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21 <sup>0</sup> C. The target vehicle post-test maximum crush was 312 mm at level 2.<br>The test or target vehicle's performance is given below:<br><table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 20%; text-align: center;"><u>Front SID H3</u></th> <th style="width: 20%;"></th> <th style="width: 20%; text-align: center;"><u>Rear SID H3</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration:</td> <td style="text-align: center;">60.1</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">58.9</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td style="text-align: center;">70.2</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">57.5</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td style="text-align: center;">92.3</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">69.1</td> </tr> <tr> <td>Thoracic Trauma Index (TTI):</td> <td style="text-align: center;">81</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">64</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td style="text-align: center;">81</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">55</td> </tr> </tbody> </table><br>The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event. |   |  |                    |  | <u>Front SID H3</u> |  | <u>Rear SID H3</u> | Left Upper Rib Acceleration: | 60.1 | g's | 58.9 | Left Lower Rib Acceleration: | 70.2 | g's | 57.5 | Lower Spine Acceleration: | 92.3 | g's | 69.1 | Thoracic Trauma Index (TTI): | 81 | g's | 64 | Pelvis Acceleration (PEV): | 81 | g's | 55 |
|   | <u>Front SID H3</u>                                 |  | <u>Rear SID H3</u> |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
| Left Upper Rib Acceleration:  | 60.1  | g's  | 58.9               |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
| Left Lower Rib Acceleration:  | 70.2  | g's  | 57.5               |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
| Lower Spine Acceleration:   | 92.3  | g's  | 69.1               |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
| Thoracic Trauma Index (TTI):  | 81  | g's  | 64                 |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
| Pelvis Acceleration (PEV):  | 81  | g's  | 55                 |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
| 17. Key Words<br>New Car Assessment Program (NCAP)<br>Side Impact<br>MDB<br>Side Impact Dummy Hybrid III (SID H3)   |   | 18. Distribution Statement<br><u>Copies of this report are available from:</u><br>National Highway Traffic Safety Administration<br>Technical Reference Division<br>Room 5111 (NAD-52)<br>400 Seventh St., S.W.<br>Washington, D.C. 20590<br>Telephone No. (202) 366-4946<br>ATTN: Robert Hornicle |                    |  |                     |  |                    |                              |      |     |      |                              |      |     |      |                           |      |     |      |                              |    |     |    |                            |    |     |    |
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## **SECTION 1**

### **PURPOSE AND TEST PROCEDURE**

This side impact test is part of the FY2004 New Car Assessment Program Side Impact Protection sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-03-D-22005. The purpose of this test was to generate comparative side impact performance in a 2005 Saturn Ion 1 Four Door Sedan. The test was conducted in accordance with the Office of Crashworthiness Standards' Laboratory Test Procedure dated July 1997.

## SECTION 2

### SUMMARY OF SIDE IMPACT TEST

A 2005 Saturn Ion 1 Four Door Sedan was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 61.8 kph (38.4 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the General Dynamics Advanced Information Engineering Services in Buffalo, New York on December 6, 2004. Pre- and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the Side Impact Hybrid III Dummies (SID H3s) are included in Appendix A.

Two restrained Side Impact Hybrid III Dummies (SID H3s) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to the instructions specified in the OCWS Side Impact Laboratory Test Procedure which is dated July, 1997. The side impact test was documented by one real-time camera and 10 high-speed cameras. Camera locations and other pertinent camera information are included in this report.

The SID H3s were instrumented with the following accelerometers:

1. Left Upper Rib (LUR) uniaxial and redundant accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial and redundant accelerometer (Y-direction)
3. Lower Thoracic Spine (T<sub>12</sub>) uniaxial and redundant accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial and redundant accelerometer (Y-direction)
5. Head triaxial accelerometers (X-, Y- and Z-direction)
6. Upper neck force and moment (X-, Y and Z-direction) load cells

A summary of the Side Impact Hybrid III Dummy (SID H3) configuration and verification test data can be found in Appendix C. A total of 65 channels of data were recorded. Appendix B contains the vehicle, MDB and dummy response data traces.

The following table summarizes the results of the test.

| Injury Criteria | Front SID H3 | Rear SID H3 |
|-----------------|--------------|-------------|
| TTI (g)         | 81           | 64          |
| PEV (g)         | 81           | 55          |

#### AIR BAG DEPLOYMENT STATUS

|                  | DRIVER | FRONT PASSENGER | REAR PASSENGER |
|------------------|--------|-----------------|----------------|
| Front Air Bag    | Yes    | Yes             | N/A            |
| Knee Bolster Bag | N/A    | N/A             | N/A            |
| Side Air Bag     | N/A    | N/A             | N/A            |
| Side Curtain Bag | N/A    | N/A             | N/A            |

#### AUTOMATIC DOOR LOCK SUMMARY

|                                  |          |
|----------------------------------|----------|
| ADL Equipped Test Vehicle:       | No       |
| ADL Activation Status:           | N/A      |
| Struck Side Door Lock Condition: | Unlocked |

**SECTION 3**

**SUMMARY OF TEST RESULTS**

# DATA SHEET 1

## GENERAL TEST AND VEHICLE PARAMETER DATA

### TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2005 Saturn Ion 1 Four Door Sedan  
Vehicle Body Color: Silver VIN: 1G8AF52F45Z123878  
Vehicle NHTSA No.: M50115 Month & Year of Manufacture: \_\_\_\_\_  
Engine Data: 4 Cylinders; - CID; 2.2 Liters; - cc  
Engine Placement: - Longitudinal; or X Lateral  
Transmission: 5 Speed; X Manual; - Automatic; X Overdrive  
Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive  
Odometer Reading 32 km  
Supplemental Airbag Restraints:  
Front Occupant: X Frontal; - Knee; - Side; - Curtain  
Rear Occupant: X Frontal; - Knee; - Side; - Curtain  
Options:  
- ADL; - A/C; X Power Steering; X Power Brakes; X Power Windows

### DATA FROM TIRE PLACARD

Recommended Tire Size: P185/70R14  
\*Recommended Cold Tire Pressure: 210 kPa FRONT; 210 kPa REAR

### DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P185/70R14 87S; Manufacturer: Firestone  
Tire Pressure with Maximum Capacity Vehicle Load: Front: 300 kPa; Rear: 300 kPa  
Treadwear: 440; Traction: A; Temperature: B

### VEHICLE CAPACITY DATA:

Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 Total  
Type of Front Seats: X Bucket; - Bench; - Split Bench  
Type of Front Seat Back: - Fixed; X Adjustable with X Lever or - Knob  
Vehicle Max Capacity Loading = 408.0 kg (A)  
No. of Occupants x 68.04 kg. = 340.2 kg (B)  
Vehicle Cargo Capacity = 67.8 kg (A-B)

### TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front = 363.0 kg Left Rear = 254.0 kg  
Right Front = 368.0 kg Right Rear = 242.0 kg  
TOTAL FRONT = 731.0 kg TOTAL REAR = 496.0 kg  
% of Total Weight = 59.6% % % of Total Weight = 40.4 %  
TOTAL WEIGHT = 1227.0 kg

\* Tire pressure used in test.

**DATA SHEET 1 (continued)**

**GENERAL TEST VEHICLE PARAMETER DATA**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Max. Fluids = 1227.0 kg (A)  
Maximum Cargo Carrying Capacity of Test Vehicle = 67.8 kg (B)  
Weight of instrumented SID H3 Dummies ( 2 X 81.2 kg) = 162.4 kg (C)  
TEST VEHICLE TARGET WEIGHT: = 1457.2 kg (A+B+C)

FULLY LOADED TEST VEHICLE (UDVW + 2 SID H3(s) + CARGO):

Left Front = 405.0 kg      Left Rear = 366.0 kg  
Right Front = 371.0 kg      Right Rear = 316.0 kg  
TOTAL FRONT = 776.0 kg      TOTAL REAR = 682.0 kg  
% of Total Weight = 53.2% %      % of Total Weight = 46.8% %  
TOTAL TEST WEIGHT = 1458.0 kg

AS TESTED WEIGHT OF TEST VEHICLE (2 SID H3(s) + CARGO + EQUIPMENT & INSTRUMENTATION):

Left Front = 412.0 kg      Left Rear = 345.5 kg  
Right Front = 376.0 kg      Right Rear = 315.0 kg  
TOTAL FRONT = 788.0 kg      TOTAL REAR = 660.5 kg  
% of Total Weight = 54.4% %      % of Total Weight = 45.6% %  
TOTAL TEST WEIGHT = 1448.5 kg

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

AS DELIVERED:

Left Front 707      Right Front 711      Left Rear 721      Right Rear 720

FULLY LOADED:

Left Front 689      Right Front 701      Left Rear 673      Right Rear 681

READY FOR TEST:

Left Front 691      Right Front 701      Left Rear 674      Right Rear 684

Test Vehicle Wheelbase: 2615 millimeters

C.G. = 1192.41 millimeters rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4547 millimeters  
Left Side = 4543 millimeters  
Centerline = 4685 millimeters

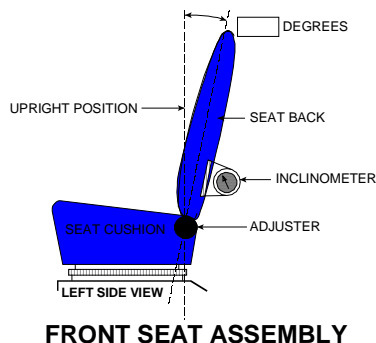
**DATA SHEET 1 (continued)**

**GENERAL TEST VEHICLE PARAMETER DATA**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115

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



**FRONT SEAT CUSHION PLACEMENT:** Placed in mid-position (130 mm) of 260 mm travel

Total Length of Adjustment Travel: 260 millimeters

Total Number of Adjustment Positions or Detents: 0-26 placed in detent 13

**FRONT SEAT BACK ADJUSTMENT POSITION:** Placed to achieve 9.5° on head restraint post with SID in position

Seat Back Torso Angle: 25 degrees

**SECOND POSITION SEAT:**

Total Length of Fore/Aft Adjustment Travel: 0 millimeters

Seat Back Adjustment Position: Fixed

**ADJUSTABLE STEERING COLUMN POSITION:** Placed in Mid-Tilt Position (17.9°)

**WINDOW POSITIONS:** Left Front: Closed Left Rear: Closed

Right Front: Open Right Rear: Removed

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

**AUTOMATIC DOOR LOCKS:** Is test vehicle equipped with ADLs? - Yes X No

Does vehicle owner's manual describe how to deactivate ADLs? - Yes - No X N/A

Comments: None

**AMOUNT OF STODDARD SOLVENT IN FUEL TANK:**

49.85 liters (Fuel Tank Usable Capacity)

46.93 liters used for test (92%-94% of Fuel Tank Usable Capacity)

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

Wheelbase = 2615 millimeters

Impact Point is 367.5 millimeters rearward of front axle centerline

(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 367.5 millimeters rearward of front axle centerline

**DATA SHEET 2**

**TEST VEHICLE SUMMARY OF RESULTS**

VEHICLE IDENTIFICATION:

Vehicle Year/Make/Model: 2005 Saturn Ion 1

Body Style: Four Door Sedan

VIN: 1G8AF52F45Z123878

NHTSA No.: M50115

Test Date: December 6, 2004

Overall Length = 4685 millimeters; Overall Width = 1706 millimeters

VEHICLE TEST WEIGHT (Pre-Test):

Left Front = 412.0 kg      Left Rear = 345.5 kg

Right Front = 376.0 kg      Right Rear = 315.0 kg

TOTAL FRONT = 788.0 kg      TOTAL REAR = 660.5 kg

TOTAL VEHICLE WEIGHT 1448.5 kg

Wheelbase = 2615 millimeters

Longitudinal C.G. from Center of Front Axle = 1192.41 millimeters

Impact Angle with Respect to Impactor = 90 degrees

ACTUAL IMPACT POINT

Actual Impact Point is 0 mm - On the nominal impact ref. line (Lateral)

Actual Impact Point is 1 mm above nominal impact point (Vertical)

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 ( 239 mm above ground) = 142 millimeters

2. LEVEL 2 ( 474 mm above ground) = 312 millimeters

3. LEVEL 3 ( 599 mm above ground) = 269 millimeters

4. LEVEL 4 ( 815 mm above ground) = 235 millimeters

5. LEVEL 5 ( 1362 mm above ground) = 15 millimeters

Maximum Post-Test Intrusion = 312 millimeters

OCCUPANTS:

Front Passenger:

Rear Passenger:

Dummy Identification

SID H3/269

SID H3/270

Restraints Used

Three-Point Safety Belt with  
Shoulder Belt Pretensioner and  
Load Limiter

Three-Point Safety Belt

INSTRUMENTATION:

Number of Vehicle Data Channels: = 26

Number of Cameras:      Onboard = 3

                                 Offboard = 8

                                 TOTAL = 11

**DATA SHEET 3**

**MOVING DEFORMABLE BARRIER (MDB) SUMMARY**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115

MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore, Inc. 047A0504 059B0604-4

---

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

|   |   |             |             |
|---|---|-------------|-------------|
| Overall Width of Framework Carriage                 | = | <u>1250</u> | millimeters |
| Overall Length of MDB (incl. honeycomb impact face) | = | <u>4120</u> | millimeters |
| Wheelbase of Framework Carriage                     | = | <u>2590</u> | millimeters |
| Tread of Framework Carriage (Front & Rear)          | = | <u>1875</u> | millimeters |
| C.G. Location Rearward of Front Axle                | = | <u>1104</u> | millimeters |

MDB WEIGHT:

|  |   |               |         |            |   |              |    |
|--|---|---------------|---------|------------|---|--------------|----|
| Left Front                                   | = | <u>409.5</u>  | kg      | Left Rear  | = | <u>281.5</u> | kg |
| Right Front                                  | = | <u>372.5</u>  | kg      | Right Rear | = | <u>299.0</u> | kg |
| TOTAL FRONT                                  | = | <u>782.0</u>  | kg      | TOTAL REAR | = | <u>580.5</u> | kg |
| TOTAL MDB WEIGHT                             | = | <u>1362.5</u> | kg      |            |   |              |    |
| Impact Angle (MDB C/L to Target Vehicle C/L) | = | <u>90</u>     | degrees |            |   |              |    |
| Impact Speed                                 | = | <u>61.8</u>   | kph     |            |   |              |    |

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

|                                    |   |            |             |
|------------------------------------|---|------------|-------------|
| 1. Row A at Center of Bumper Level | = | <u>129</u> | millimeters |
| 2. Row B at Top of Bumper Level    | = | <u>135</u> | millimeters |
| 3. Row C at Mid Level              | = | <u>97</u>  | millimeters |
| 4. Row D at Top of Stack Level     | = | <u>143</u> | millimeters |

INSTRUMENTATION:

|                             |   |          |
|-----------------------------|---|----------|
| Number of MDB Data Channels | = | <u>5</u> |
|-----------------------------|---|----------|

**DATA SHEET 4**

**POST-TEST OBSERVATIONS**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115

TEST DUMMY INFORMATION AND CONTACT POINTS:

| DESCRIPTION          | FRONT SEAT  | REAR SEAT  |
|----------------------|---|--|
| ATD Type/Serial No.  | SID H3/269  | SID H3/270   |
| Head Contact:        | The left side of the face to the left shoulder, the back of the head to the seatbelt D-ring | The side and top of the head to the C-pillar and side header |
| Upper Torso Contact: | Door Trim Panel   | Door Trim Panel  |
| Lower Torso Contact: | Door Trim Panel   | Door Trim Panel  |
| Left Knee Contact:   | Door Trim Panel   | Door Trim Panel  |
| Right Knee Contact:  | Left Knee   | Left Knee  |

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

| DESCRIPTION        | FRONT  | REAR   |
|--------------------|--|--|
| Left Side Doors    | Closed, latched and inoperable without tools | Closed, latched and inoperable without tools |
| Right Side Doors   | Closed, latched and operable without tools   | Closed, latched and operable without tools   |
| Hatch/Other Door   | N/A  | N/A  |
| Seat Movement (mm) | 0  | 0  |
| Seat Back Failure  | None   | None   |

POST TEST STRUCTURAL OBSERVATIONS

| CRITICAL AREAS OF PERFORMANCE |  |
|-------------------------------|--|
| Pillar Performance            | The A- and B- Pillars were moved inboard during the event with no visible tears or separations |
| Sill Separation               | There were no visible tears or separations   |
| Windshield Damage             | Cracked along the A-Pillar after the event   |
| Window Damage                 | The left front and rear passenger side windows shattered during the event.                     |
| Other Notable Effects         | The secondary impact point was 7 mm forward and 10 mm below the target line                    |

AIR BAG DEPLOYMENT STATUS:

|                  | DRIVER | FRONT PASSENGER | REAR PASSENGER |
|------------------|--------|-----------------|----------------|
| Front Air Bag    | Yes    | Yes             | N/A            |
| Knee Bolster Bag | N/A    | N/A             | N/A            |
| Side Air Bag     | N/A    | N/A             | N/A            |
| Side Curtain Bag | N/A    | N/A             | N/A            |

MDB LEFT EDGE IMPACT DATA

| Measured Parameter | Units | Requirement | Value     |
|--------------------|-------|-------------|-----------|
| Horizontal Offset  | mm    | ± 50 mm     | 0         |
| Vertical Offset    | mm    | ± 20 mm     | +1 (above |

**SECTION 4**

**OCCUPANT AND VEHICLE INFORMATION**

**DATA SHEET 5**

**SID H3 INSTRUMENTATION DATA**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115

|                              | Front Dummy ID# 269 |             |                |             | Rear Dummy ID# 270 |             |                |             |       |
|------------------------------|---------------------|-------------|----------------|-------------|--------------------|-------------|----------------|-------------|-------|
|                              | Pos. Direction      |             | Neg. Direction |             | Pos. Direction     |             | Neg. Direction |             |       |
|                              | Max (g)             | Time (msec) | Max (g)        | Time (msec) | Max (g)            | Time (msec) | Max (g)        | Time (msec) |       |
| <b>HEAD ACCELERATIONS:</b>   |                     |             |                |             |                    |             |                |             |       |
| Longitudinal                 | X                   | 11.5        | 37.9           | -25.5       | 67.1               | 16.6        | 164.0          | -13.6       | 65.0  |
| Lateral                      | Y                   | 47.1        | 39.6           | -6.1        | 27.0               | 54.0        | 44.8           | -20.9       | 165.4 |
| Vertical                     | Z                   | 51.5        | 46.3           | -5.5        | 33.4               | 24.1        | 44.3           | -46.2       | 57.3  |
| Resultant                    | R                   | 57.4        | 46.3           | 0.0         | -6.9               | 59.0        | 44.4           | 0.0         | -11.8 |
| HIC                          |                     | 302.0       |                |             |                    | 385.1       |                |             |       |
| <b>NECK FORCES:</b>          |                     |             |                |             |                    |             |                |             |       |
| Longitudinal                 | X                   | 179.4       | 199.9          | -1000.1     | 67.4               | §           | §              | §           | §     |
| Lateral                      | Y                   | 496.6       | 36.2           | -229.4      | 28.3               | §           | §              | §           | §     |
| Vertical                     | Z                   | 2153.5      | 46.6           | -268.8      | 34.1               | §           | §              | §           | §     |
| Resultant                    | R                   | 2371.3      | 46.6           | 0.1         | -14.1              | §           | §              | §           | §     |
| <b>NECK MOMENTS:</b>         |                     |             |                |             |                    |             |                |             |       |
| X                            |                     | 50.9        | 68.1           | -84.3       | 35.2               | 30.3        | 168.6          | -153.3      | 54.4  |
| Y                            |                     | 52.7        | 80.5           | -44.7       | 44.5               | 31.6        | 121.4          | -76.0       | 62.4  |
| Z                            |                     | 42.2        | 70.6           | -18.9       | 35.1               | 15.0        | 73.1           | -21.0       | 51.8  |
| Resultant                    | R                   | 87.3        | 35.2           | 0.0         | -11.0              | 158.3       | 54.5           | 0.0         | -9.9  |
| <b>RIB ACCELERATIONS:</b>    |                     |             |                |             |                    |             |                |             |       |
| Upper Rib Lateral            | Y                   | 60.1        | 23.1           | -23.2       | 68.1               | 58.9        | 35.0           | -8.9        | 73.7  |
| Upper Rib Lateral            | Y(R)                | 62.1        | 23.1           | -23.1       | 68.8               | 58.3        | 35.0           | -9.9        | 73.7  |
| Lower Rib Lateral            | Y                   | 70.2        | 24.4           | -18.2       | 67.5               | 57.5        | 33.7           | -10.8       | 72.5  |
| Lower Rib Lateral            | Y(R)                | 70.9        | 24.3           | -17.9       | 67.5               | 56.5        | 33.7           | -10.8       | 72.5  |
| <b>SPINE ACCELERATIONS:</b>  |                     |             |                |             |                    |             |                |             |       |
| Lower Lateral                | Y                   | 92.3        | 26.2           | -29.5       | 60.0               | 69.1        | 40.0           | -20.0       | 66.9  |
| Lower Lateral                | Y(R)                | 93.4        | 26.9           | -32.1       | 60.0               | 68.9        | 40.0           | -21.8       | 67.5  |
| <b>PELVIC ACCELERATIONS:</b> |                     |             |                |             |                    |             |                |             |       |
| Lateral                      | Y                   | 81.2        | 24.3           | -17.4       | 46.9               | 55.2        | 32.5           | -11.4       | 70.6  |
| Lateral                      | Y(R)                | 80.0        | 24.3           | -16.9       | 46.9               | 56.5        | 38.1           | -11.8       | 70.6  |

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

Note: Rib, Spine and Pelvis data has been FIR filtered, Y(R) denotes redundant Y direction accelerometer.

Head Accelerations and Neck Forces are filtered at SAE Class 1000, Neck Moments are filtered at SAE Class 600.

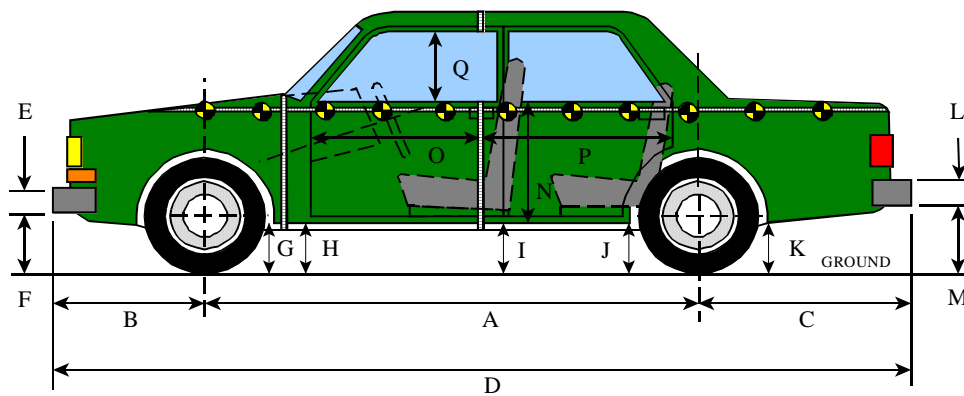
§ - Spikes in Data

## DATA SHEET 6

### VEHICLE SIDE MEASUREMENTS

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



#### LEFT SIDE VIEW

NOTE: all dimensions are in millimeters with tolerance of  $\pm 3$  mm

|    | PRE-TEST<br>(as delivered) | PRE-TEST<br>(as tested) | POST-TEST<br>(as tested) | $\Delta$ CHANGE |
|----|----------------------------|-------------------------|--------------------------|-----------------|
| A  | 2625                       | 2615                    | 2605                     | -10             |
| B  | 1010                       | -                       | 1017                     | 7               |
| C  | 1050                       | -                       | 1052                     | 2               |
| D  | 4685                       | -                       | 4674                     | -11             |
| E  | 465                        | -                       | 465                      | 0               |
| F  | 258                        | 255                     | 282                      | 27              |
| G  | 210                        | 188                     | 281                      | 93              |
| H  | 211                        | 188                     | 281                      | 93              |
| I  | 220                        | 185                     | 232                      | 47              |
| J1 | 215                        | 172                     | 175                      | 3               |
| J2 | 223                        | 181                     | 185                      | 4               |
| K  | 274                        | 220                     | 229                      | 9               |
| L  | 334                        | -                       | 334                      | 0               |
| M  | 346                        | 292                     | 293                      | 1               |
| N  | 665                        | -                       | 663                      | -2              |
| O  | 730                        | -                       | 784                      | 54              |
| P  | 1134                       | -                       | 1049                     | -85             |
| Q  | 444                        | -                       | 413                      | -31             |
| R  | 4547                       | -                       | 4545                     | -2              |
| S  | 4543                       | -                       | 4524                     | -19             |
| T  | 1706                       | -                       | 1558                     | -148            |

D = Length at Centerline

E&L = Bumper Thickness

R = Right Side Length

S = Left Side Length

T = Width at B-Pillar

J1 = To Pinch Weld

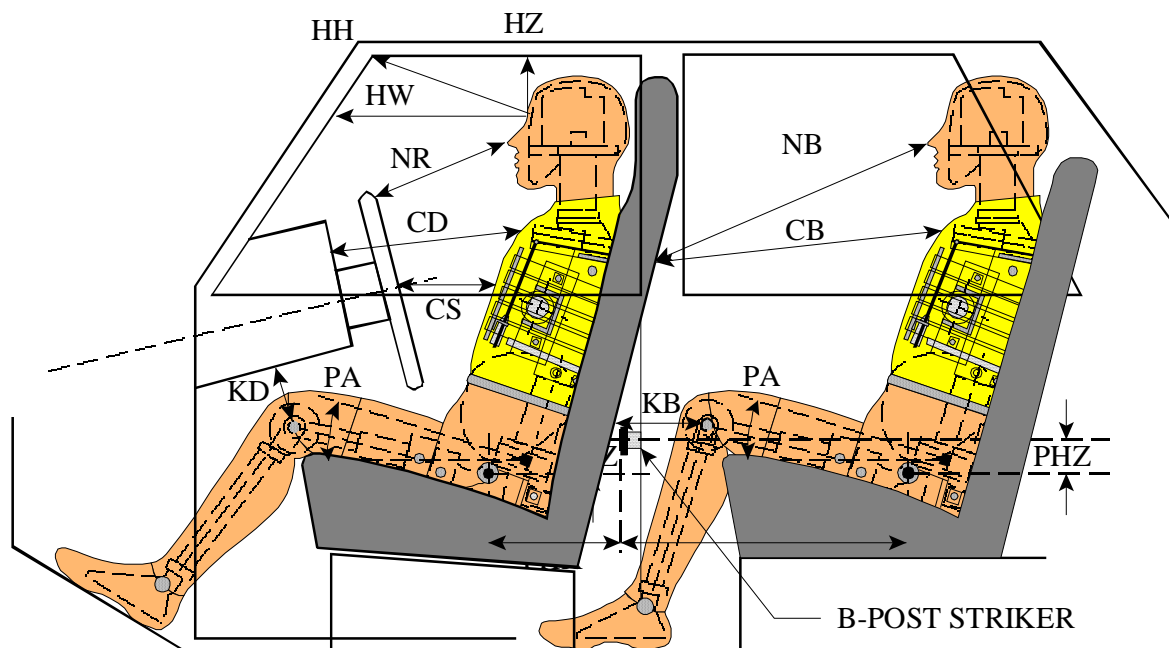
J2 = To Sill

## DATA SHEET 7

### SID H3 LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



### LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.  
REAR DUMMY PHX & PHZ  
MEASUREMENTS FOR A 4-DOOR  
VEHICLE WOULD USE THE C-POST  
STRIKER AS A REFERENCE POINT

NOTE: All dimensions are in millimeters with tolerance of  $\pm 3$  mm

|                     | DRIVER ID# 269 | LEFT REAR PASS. ID# 270 |
|---------------------|----------------|-------------------------|
| HH                  | 500            | N/A                     |
| HW                  | 765            | N/A                     |
| HZ                  | 189            | 154                     |
| NR/NB               | 515            | 550                     |
| CD/CB               | 710            | 471                     |
| CS                  | 344            | N/A                     |
| KDL(KDA°)/KBL(KDA°) | 180 / ( 26 °)  | 158 / ( 26 °)           |
| KDR(KBA°)/KBR(KBA°) | 185 / ( 29 °)  | 158 / ( 23 °)           |
| PA°                 | 23.2°          | 24.4°                   |
| PHX                 | 184            | 213                     |
| PHZ                 | 112            | 254                     |

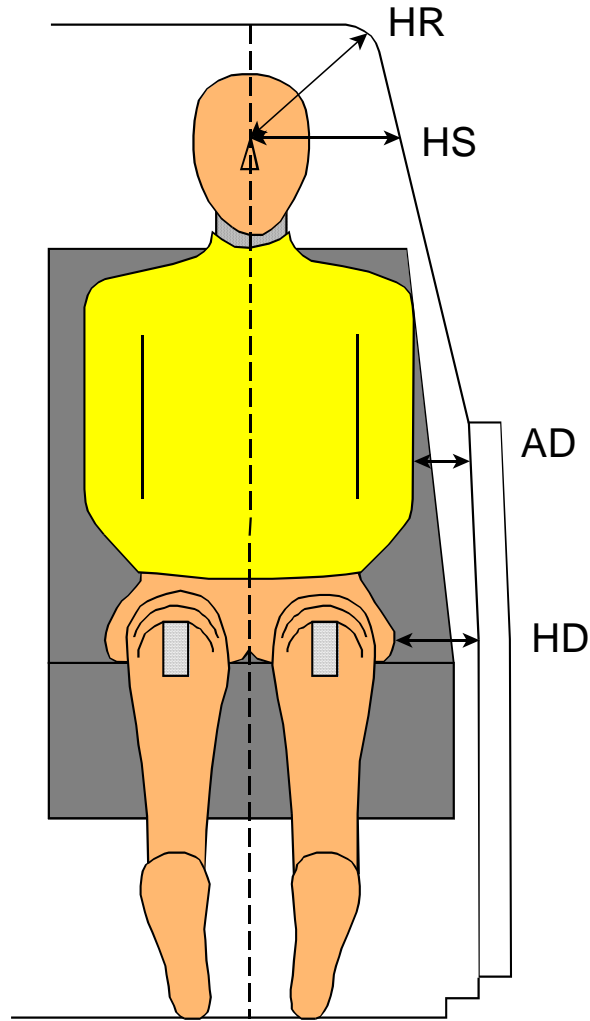
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

DATA SHEET 8

SID H3 LATERAL CLEARANCE DIMENSIONS

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



NOTE: All dimensions are in millimeters with tolerance of  $\pm 3$  mm

|     | DRIVER ID # 269 |            | LEFT REAR PASS. ID # 270 |           |
|-----|-----------------|------------|--------------------------|-----------|
| HR  | 181             |            | 138                      |           |
| HS  | 341             |            | 297                      |           |
| AD* | LOWER: 95       | UPPER: 113 | LOWER: 77                | UPPER: 90 |
| HD  | 113             |            | 120                      |           |

\* Lower measurement is taken laterally at the center of the lower rib accelerometer height from the SID H3 arm segment to the closest part of the vehicle side.

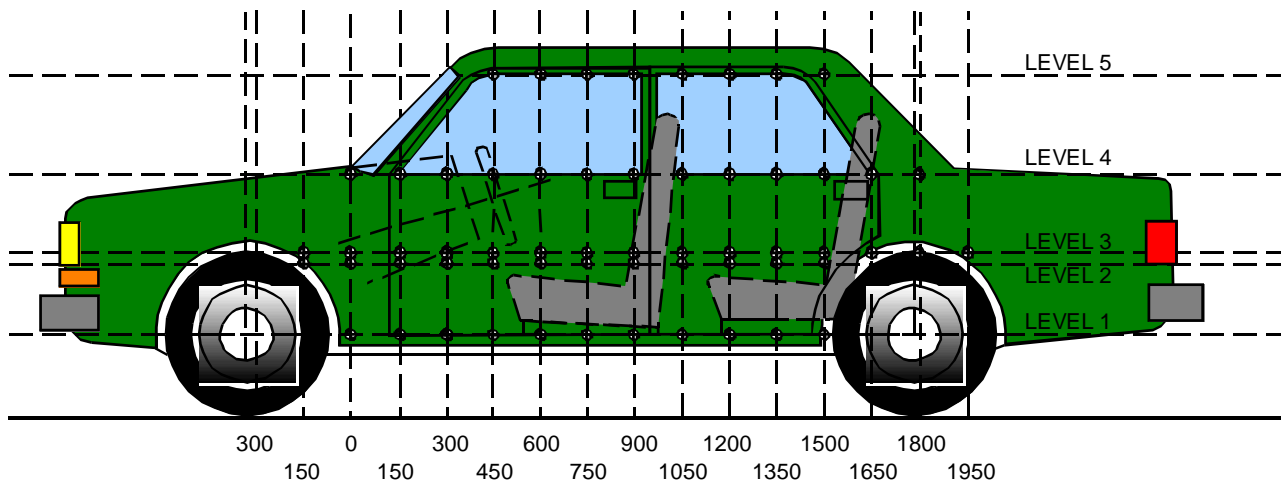
Upper measurement is taken laterally at the center of the upper rib accelerometer height from the SID H3 arm segment to the closest part of the vehicle side.

**DATA SHEET 9**

**VEHICLE SIDE MEASUREMENTS**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



**LEFT SIDE VIEW**

**NOTE: All measurements are in millimeters (mm)**

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

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION.

Measurements Along the Vertical 750 mm Line Shown Above:

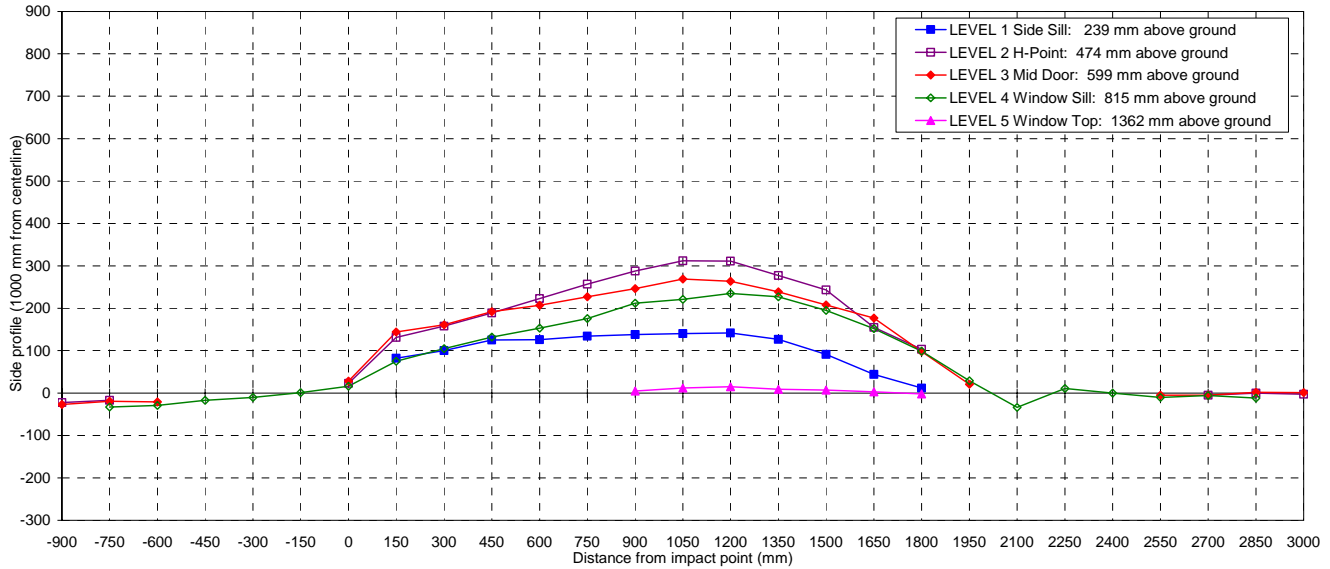
|  |   |             |             |
|--|---|-------------|-------------|
| Level 5 @ Window Top                                     | = | <u>1362</u> | millimeters |
| Level 4 @ Window Sill                                    | = | <u>815</u>  | millimeters |
| Level 3 @ Mid Door                                       | = | <u>599</u>  | millimeters |
| Level 2 @ Occupant H-Point                               | = | <u>474</u>  | millimeters |
| Level 1 @ Axle Centerline Height<br>(or Sill Top Height) | = | <u>239</u>  | millimeters |

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



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

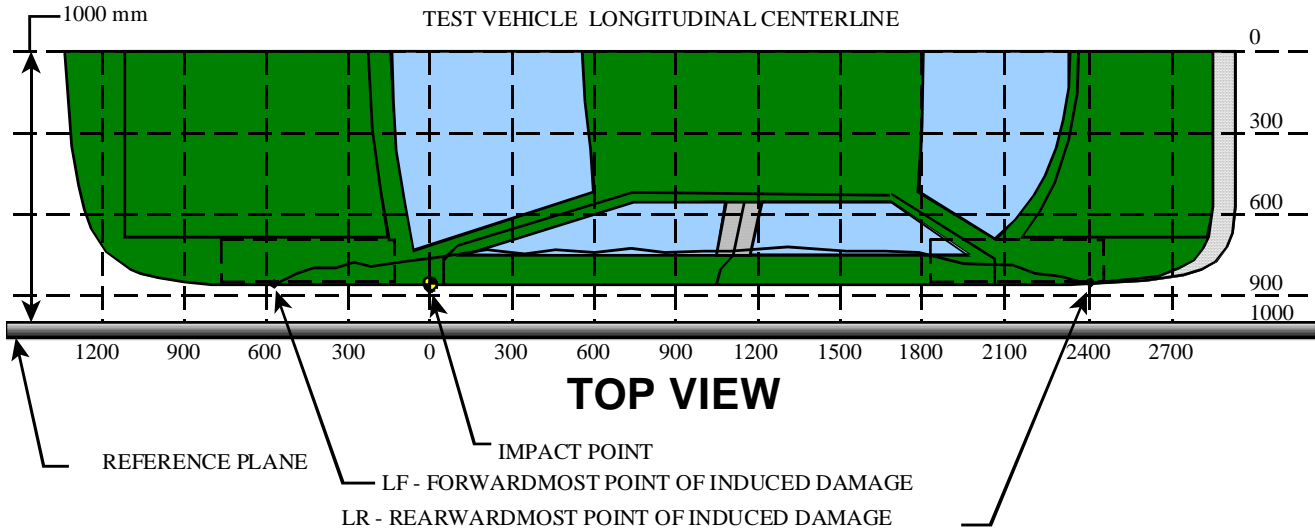
| LEVEL                     | HEIGHT (mm) |       | DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT |      |      |      |      |      |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |
|---------------------------|-------------|-------|--|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----|
|                           |             |       | -900   | -750 | -600 | -450 | -300 | -150 | 0   | 150 | 300 | 450 | 600 | 750 | 900 | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2550 | 2700 | 2850 | 3000 |    |
| LEVEL 1<br>SIDE<br>SILL   | 239         | PRE   | --   | --   | --   | --   | --   | --   | 217 | 215 | 206 | 205 | 202 | 202 | 201 | 200  | 202  | 201  | 205  | 195  | --   | --   | --   | --   | --   | --   | --   | --   | --   |    |
|                           |             | POST  | --   | --   | --   | --   | --   | --   | 299 | 315 | 331 | 331 | 336 | 340 | 341 | 342  | 329  | 292  | 249  | 207  | --   | --   | --   | --   | --   | --   | --   | --   | --   |    |
|                           |             | CRUSH | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | 82  | 100 | 125 | 126 | 134 | 138 | 140 | 142  | 127  | 91   | 44   | 12   | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  |    |
| LEVEL 2<br>H<br>POINT     | 474         | PRE   | 219  | 190  | --   | --   | --   | 172  | 173 | 168 | 166 | 158 | 159 | 157 | 159 | 158  | 158  | 158  | 159  | 157  | --   | --   | --   | --   | --   | --   | 187  | 208  | 238  |    |
|                           |             | POST  | 197  | 173  | --   | --   | --   | 195  | 304 | 326 | 355 | 381 | 416 | 445 | 471 | 469  | 435  | 401  | 314  | 260  | --   | --   | --   | --   | --   | --   | 182  | 208  | 235  |    |
|                           |             | CRUSH | -22  | -17  | N/A  | N/A  | N/A  | N/A  | 23  | 131 | 158 | 189 | 223 | 257 | 288 | 312  | 311  | 277  | 243  | 155  | 103  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | -5   | 0    | -3 |
| LEVEL 3<br>MID<br>DOOR    | 599         | PRE   | 232  | 202  | 171  | --   | --   | 171  | 168 | 166 | 160 | 159 | 155 | 156 | 159 | 157  | 160  | 157  | 156  | 158  | 149  | --   | --   | --   | --   | 161  | 186  | 207  | 235  |    |
|                           |             | POST  | 205  | 183  | 150  | --   | --   | 199  | 312 | 327 | 352 | 366 | 382 | 402 | 428 | 421  | 399  | 365  | 333  | 256  | 170  | --   | --   | --   | --   | 156  | 181  | 209  | 236  |    |
|                           |             | CRUSH | -27  | -19  | -21  | N/A  | N/A  | N/A  | 28  | 144 | 161 | 192 | 207 | 227 | 246 | 269  | 264  | 239  | 208  | 177  | 98   | 21   | N/A  | N/A  | N/A  | -5   | -5   | 2    | 1    |    |
| LEVEL 4<br>WINDOW<br>SILL | 815         | PRE   | --   | 308  | 263  | 244  | 229  | 216  | 203 | 197 | 188 | 185 | 182 | 180 | 172 | 176  | 175  | 175  | 175  | 177  | 179  | 178  | 181  | 189  | 203  | 216  | 240  | --   |      |    |
|                           |             | POST  | --   | 275  | 234  | 227  | 219  | 217  | 219 | 272 | 293 | 317 | 335 | 356 | 384 | 397  | 410  | 402  | 370  | 329  | 276  | 208  | 144  | 192  | 189  | 193  | 210  | 228  | --   |    |
|                           |             | CRUSH | N/A  | -33  | -29  | -17  | -10  | 1    | 16  | 75  | 105 | 132 | 153 | 176 | 212 | 221  | 235  | 227  | 195  | 152  | 99   | 29   | -34  | 11   | 0    | -10  | -6   | -12  | N/A  |    |
| LEVEL 5<br>WINDOW<br>TOP  | 1362        | PRE   | --   | --   | --   | --   | --   | --   | --  | --  | --  | --  | --  | 428 | 416 | 414  | 413  | 410  | 413  | 426  | --   | --   | --   | --   | --   | --   | --   | --   |      |    |
|                           |             | POST  | --   | --   | --   | --   | --   | --   | --  | --  | --  | --  | --  | --  | 433 | 428  | 429  | 422  | 417  | 416  | 424  | --   | --   | --   | --   | --   | --   | --   | --   |    |
|                           |             | CRUSH | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A | N/A | N/A | N/A | N/A | N/A | 5   | 12   | 15   | 9    | 7    | 3    | -2   | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  |    |

**DATA SHEET 11**

**VEHICLE DAMAGE PROFILE DISTANCES**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



MEASUREMENT CONVENTIONS:  
 Forward of the impact point (towards front of vehicle) is considered negative (-).  
 Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

NOTE: All dimensions are in millimeters with tolerance of  $\pm 3$  mm.

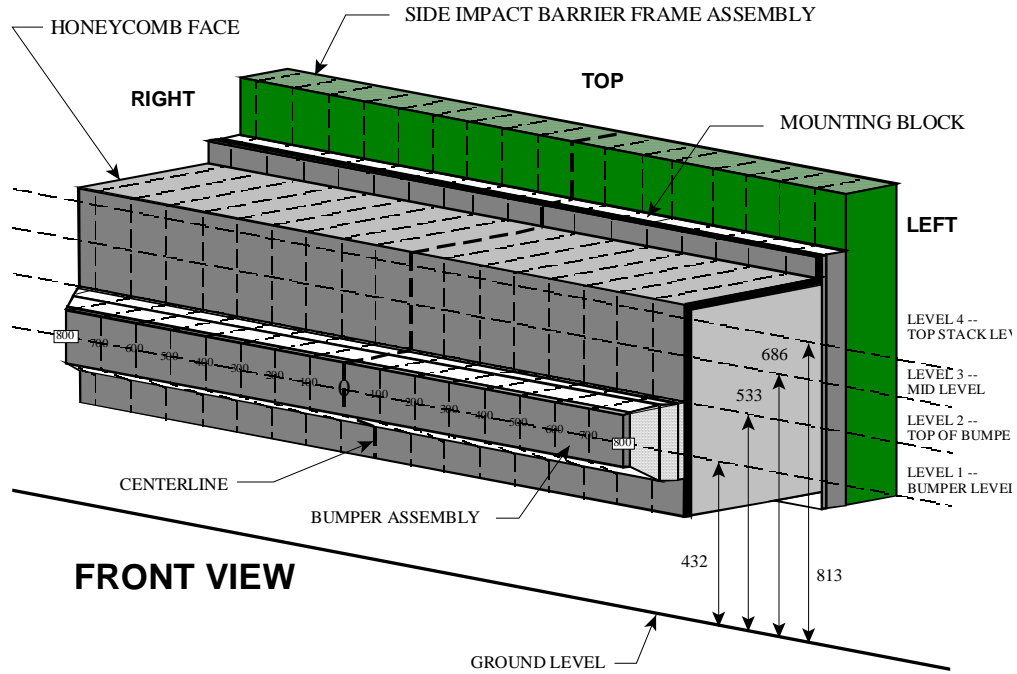
| DPD MEASUREMENTS (mm) | POST TEST (mm) | PRETEST (mm) | STATIC CRUSH (mm) |     |
|-----------------------|----------------|--------------|-------------------|-----|
| 1 (LR)                | 2400           | 189          | 189               | 0   |
| 2                     | 1890           | 235          | 178               | 57  |
| 3                     | 1380           | 428          | 158               | 270 |
| 4                     | 870            | 439          | 157               | 282 |
| 5                     | 360            | 337          | 164               | 173 |
| 6 (LF)                | -150           | 217          | 216               | 1   |

DATA SHEET 12

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



NOTE: Dimensions are shown in millimeters, mm

NOTE: All dimensions are in millimeters with a tolerance of  $\pm 3$  mm

| LEVEL                    | HEIGHT AT CL (mm)* |       | DISTANCE RIGHT OF CENTER (mm) |     |     |     |     |     |     |     |     | DISTANCE LEFT OF CENTER (mm) |     |     |     |     |     |     |     |
|--------------------------|--------------------|-------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|
|                          |                    |       | 800                           | 700 | 600 | 500 | 400 | 300 | 200 | 100 | 0   | 100                          | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| LEVEL 4<br>TOP<br>STACK  | 813                | PRE   | 619                           | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619                          | 619 | 619 | 619 | 619 | 619 | 619 | 619 |
|                          |                    | POST  | 700                           | 656 | 629 | 608 | 614 | 629 | 642 | 638 | 632 | 631                          | 633 | 638 | 646 | 660 | 690 | 735 | 762 |
|                          |                    | CRUSH | 81                            | 37  | 10  | -11 | -5  | 10  | 23  | 19  | 13  | 12                           | 14  | 19  | 27  | 41  | 71  | 116 | 143 |
| LEVEL 3<br>MID<br>LEVEL  | 686                | PRE   | 619                           | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619                          | 619 | 619 | 619 | 619 | 619 | 619 | 619 |
|                          |                    | POST  | 666                           | 637 | 622 | 617 | 617 | 625 | 627 | 623 | 622 | 622                          | 626 | 628 | 632 | 640 | 646 | 691 | 716 |
|                          |                    | CRUSH | 47                            | 18  | 3   | -2  | -2  | 6   | 8   | 4   | 3   | 3                            | 7   | 9   | 13  | 21  | 27  | 72  | 97  |
| LEVEL 2<br>TOP<br>BUMPER | 533                | PRE   | 619                           | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619                          | 619 | 619 | 619 | 619 | 619 | 619 | 619 |
|                          |                    | POST  | 754                           | 722 | 686 | 660 | 659 | 659 | 659 | 660 | 660 | 664                          | 665 | 669 | 671 | 675 | 679 | 682 | 695 |
|                          |                    | CRUSH | 135                           | 103 | 67  | 41  | 40  | 40  | 40  | 41  | 41  | 45                           | 46  | 50  | 52  | 56  | 60  | 63  | 76  |
| LEVEL 1<br>MID<br>BUMPER | 432                | PRE   | 535                           | 519 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518                          | 518 | 518 | 518 | 518 | 518 | 519 | 535 |
|                          |                    | POST  | 664                           | 629 | 605 | 593 | 596 | 602 | 597 | 599 | 600 | 598                          | 602 | 603 | 606 | 608 | 617 | 632 | 644 |
|                          |                    | CRUSH | 129                           | 110 | 87  | 75  | 78  | 84  | 79  | 81  | 82  | 80                           | 84  | 85  | 88  | 90  | 99  | 113 | 109 |

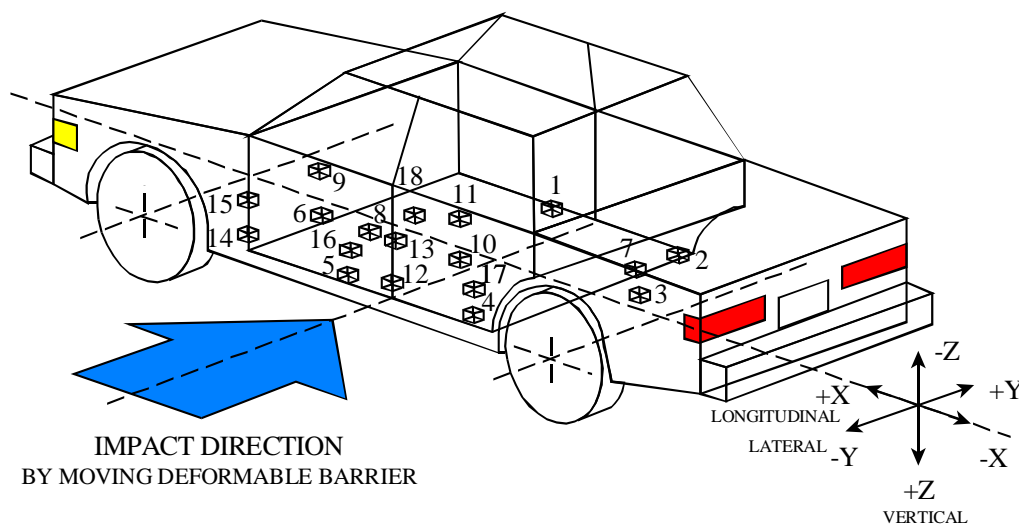
\*Heights measured above ground level.

## DATA SHEET 13

### TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



- 1-Right Side Sill @ Front Seat
- 2-Right Side Sill @ Rear Seat
- 3-Rear Floorpan Above Axle
- 4-Left Side Sill @ Rear Seat
- 5-Left Side Sill @ Front Seat
- 6-Left Front Door on Centerline
- 7-Right Rear Occupant Compartment
- 8-Midrear of Left Front Door
- 9-Left Front Door Upper Centerline

- 10-Midrear of Left Rear Door
- 11-Left Rear Door Upper Centerline
- 12-Left Lower B-Pillar
- 13-Left Middle B-Pillar
- 14-Left Lower A-Pillar
- 15-Left Middle A-Pillar
- 16-Front Seat Track
- 17-Rear Seat Track
- 18-Vehicle CG

**DATA SHEET 13 (continued)**

**VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115

| Accel. No. | Location                         | Coordinates (mm)±3 mm |      |      |      | Long. (x) |             | Lat. (y) |             | Vert. (z) |             | Resultant |             |
|------------|----------------------------------|-----------------------|------|------|------|-----------|-------------|----------|-------------|-----------|-------------|-----------|-------------|
|            |                                  | X*                    | Y*   | Z*   |      | Max (g)   | Time (msec) | Max (g)  | Time (msec) | Max (g)   | Time (msec) | Max (g)   | Time (msec) |
|            |                                  |                       |      |      |      | pos.      | neg.        | pos.     | neg.        | pos.      | neg.        | pos.      | neg.        |
| 1          | Right Side Sill at Front Seat    | 2812                  | 676  | -211 | pos. | 3.3       | 58.0        | 26.4     | 6.7         | 5.5       | 74.3        | 27.1      | 6.9         |
|            |                                  |                       |      |      | neg. | -5.6      | 21.0        | -2.1     | 157.5       | -8.7      | 8.4         | 0.0       | -14.0       |
| 2          | Right Side Sill at Rear Seat     | 2056                  | 649  | -205 | pos. | 3.9       | 58.1        | 33.3     | 33.1        | 9.1       | 32.4        | 34.3      | 33.1        |
|            |                                  |                       |      |      | neg. | -5.0      | 9.6         | -3.2     | 127.8       | -7.5      | 10.2        | 0.0       | -7.8        |
| 3          | Rear Floorpan Above Axle         | 1235                  | 47   | -413 | pos. | 4.7       | 29.5        | 27.8     | 23.8        | 9.6       | 26.9        | 28.9      | 23.8        |
|            |                                  |                       |      |      | neg. | -9.3      | 11.2        | -2.0     | 90.5        | -11.5     | 6.6         | 0.0       | -20.0       |
| 4          | Left Side Sill at Rear Seat      | 2000                  | -659 | -226 | pos. | -         | -           | 76.5     | 4.3         | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -19.7    | 21.6        | -         | -           | -         | -           |
| 5          | Left Side Sill at Front Seat     | 2859                  | -638 | -329 | pos. | -         | -           | 200.4    | 24.0        | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -325.6   | 18.5        | -         | -           | -         | -           |
| 6          | Left Front Door on Centerline    | 2691                  | -670 | -587 | pos. | -         | -           | 105.9    | 12.2        | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -67.0    | 25.5        | -         | -           | -         | -           |
| 7          | Right Rear Occupant Compartment  | 2080                  | 386  | -146 | pos. | -         | -           | 24.3     | 34.3        | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -6.8     | 69.7        | -         | -           | -         | -           |
| 8          | Midrear of Left Front Door       | 2269                  | -677 | -673 | pos. | -         | -           | 128.0    | 15.9        | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -112.6   | 22.6        | -         | -           | -         | -           |
| 9          | Left Front Door Upper Centerline | 2692                  | -679 | -866 | pos. | -         | -           | 121.5    | 13.2        | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -76.6    | 26.6        | -         | -           | -         | -           |
| 10         | Midrear of Left Rear Door        | 1322                  | -660 | -889 | Pos. | -         | -           | 202.5    | 16.1        | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -165.3   | 28.1        | -         | -           | -         | -           |
| 11         | Left Rear Door Upper Centerline  | 1712                  | -672 | -890 | pos. | -         | -           | 136.3    | 18.6        | -         | -           | -         | -           |
|            |                                  |                       |      |      | neg. | -         | -           | -55.8    | 27.8        | -         | -           | -         | -           |

\*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right) Z - Ground Level (+ Down)

\*\*Accelerometer was not requested by COTR.

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8765-SNCAP-07

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115

| Accel. No. | Location             | Coordinates (mm)±3 mm |      |      |      | Long. (x) |             | Lat. (y) |             | Vert. (z) |             | Resultant |             |
|------------|----------------------|-----------------------|------|------|------|-----------|-------------|----------|-------------|-----------|-------------|-----------|-------------|
|            |                      | X*                    | Y*   | Z*   |      | Max (g)   | Time (msec) | Max (g)  | Time (msec) | Max (g)   | Time (msec) | Max (g)   | Time (msec) |
|            |                      |                       |      |      |      |           |             |          |             |           |             |           |             |
| 12         | Left Lower B-Pillar  | 2175                  | -627 | -472 | pos. | -         | -           | 417.5    | 5.4         | -         | -           | -         | -           |
|            |                      |                       |      |      | neg. | -         | -           | -383.6   | 15.8        | -         | -           | -         | -           |
| 13         | Left Middle B-Pillar | 2118                  | -632 | -914 | pos. | -         | -           | 180.7    | 4.7         | -         | -           | -         | -           |
|            |                      |                       |      |      | neg. | -         | -           | -166.5   | 30.7        | -         | -           | -         | -           |
| 14         | Left Lower A-Pillar  | 3182                  | -602 | -289 | pos. | -         | -           | 221.1†   | 6.7†        | -         | -           | -         | -           |
|            |                      |                       |      |      | neg. | -         | -           | -367.5†  | 12.7†       | -         | -           | -         | -           |
| 15         | Left Middle A-Pillar | 3151                  | -609 | -934 | pos. | -         | -           | 26.7     | 19.7        | -         | -           | -         | -           |
|            |                      |                       |      |      | neg. | -         | -           | -4.5     | 35.4        | -         | -           | -         | -           |
| 16         | Front Seat Track     | 2298                  | -522 | -270 | pos. | -         | -           | 90.8     | 12.4        | -         | -           | -         | -           |
|            |                      |                       |      |      | neg. | -         | -           | -53.9    | 18.5        | -         | -           | -         | -           |
| 17         | Rear Seat Track      | 1178                  | -529 | -436 | pos. | -         | -           | 23.4     | 24.3        | -         | -           | -         | -           |
|            |                      |                       |      |      | neg. | -         | -           | -2.9     | 149.5       | -         | -           | -         | -           |
| 18         | Vehicle CG           | 2480                  | 13   | -383 | pos. | 5.6       | 5.4         | 124.8    | 17.6        | 17.0      | 11.5        | 126.1     | 17.6        |
|            |                      |                       |      |      | neg. | -28.4     | 28.0        | -61.8    | 24.4        | -20.6     | 16.7        | 0.0       | -16.2       |

\*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right) Z - Ground Level (+ Down)

† - Trim Broke during event – data is questionable

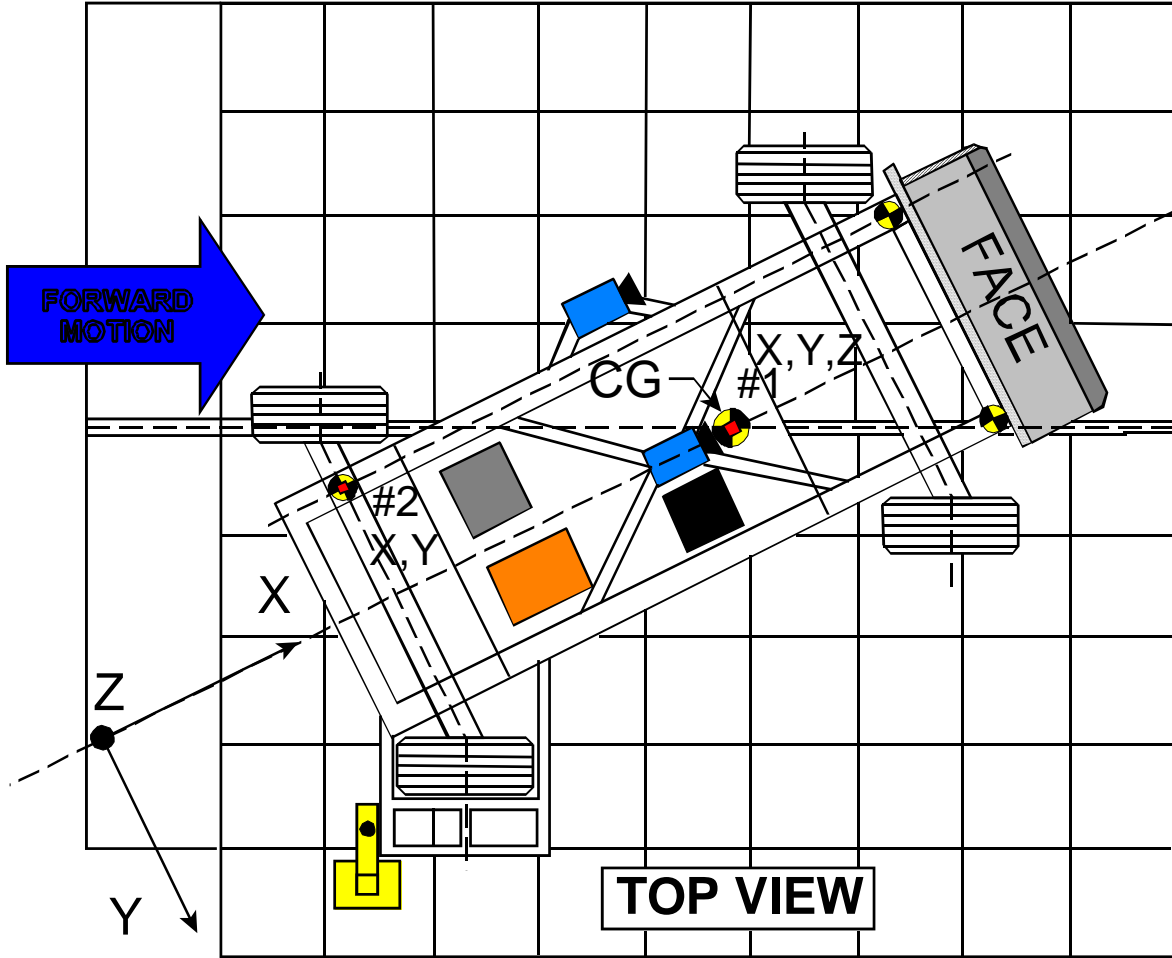
4-12

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



| Accel. No. | Location              | Coordinates (millimeters) |      |      | Pos. Direct. |             | Neg. Direct. |             |
|------------|-----------------------|---------------------------|------|------|--------------|-------------|--------------|-------------|
|            |                       | X*                        | Y*   | Z*   | Max (g)      | Time (msec) | Max (g)      | Time (msec) |
|            |                       |                           |      |      |              |             |              |             |
| 1          | MDB Center of Gravity |                           |      |      |              |             |              |             |
|            | Longitudinal... X     | 1859                      | 0    | -330 | 0.9          | 120.8       | -21.6        | 41.2        |
|            | Lateral..... Y        |                           |      |      | 2.5          | 55.9        | -6.1         | 27.1        |
|            | Vertical..... Z       |                           |      |      | 16.2         | 53.6        | -14.0        | 47.7        |
|            | Resultant..... R      |                           |      |      | 23.5         | 33.6        | 0.1          | -12.0       |
| 2          | Rear Frame Member     |                           |      |      |              |             |              |             |
|            | Longitudinal... X     | 386                       | -660 | -660 | 1.5          | 168.1       | -20.7        | 42.0        |
|            | Lateral..... Y        |                           |      |      | 3.9          | 21.0        | -2.5         | 59.6        |

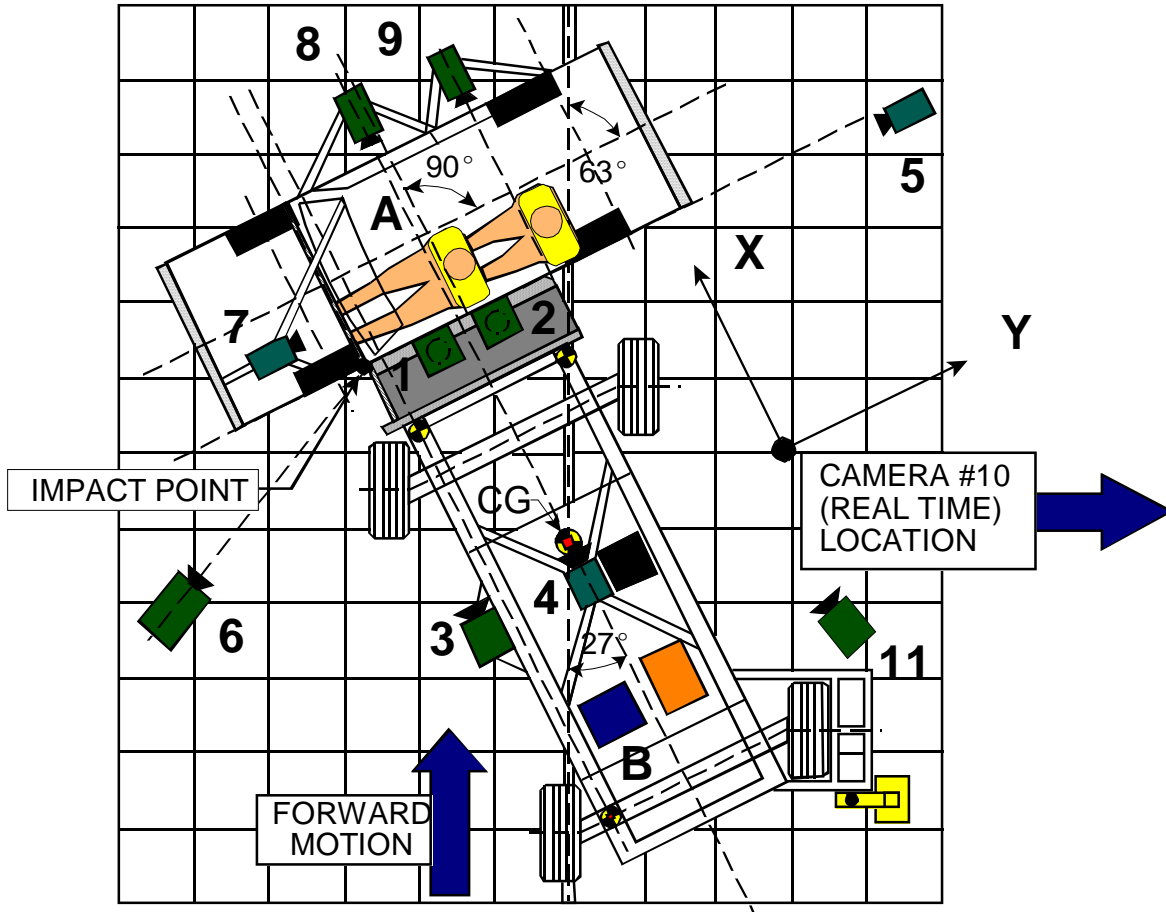
\*Reference: X = Rear Bumper (+ Forward)  
 Y = Vehicle Centerline (+ To Right)  
 Z = Ground Level (+ Down)  
 All measurements accurate to within ±3 mm.

DATA SHEET 15

HIGH SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No. M50115



| Camera No. | View                                     | Coordinates (millimeters) |       |       | Angle (deg.) | Lens (mm) | Film Speed (fps) |
|------------|--|---------------------------|-------|-------|--------------|-----------|------------------|
|            |  | X*                        | Y*    | Z*    |              |           |                  |
| 1          | Overhead view of test vehicle            | 72                        | 812   | -4880 | -90          | 8         | 500              |
| 2          | Overhead closeup view of impact plane    | 195                       | 855   | -4880 | -90          | 12.5      | 500              |
| 3          | MDB onboard closeup view of impact point | -1470                     | 0     | -847  | 0            | 13        | 500              |
| 4          | MDB onboard view of driver dummy         | -1140                     | 838   | -1586 | -17          | 7.5       | 500              |
| 5          | Right side ground level overall view     | -42                       | 9020  | -1028 | -2           | 25        | 500              |
| 6          | Left side ground level overall view      | -1884                     | -1650 | -930  | -5           | 28        | 500              |
| 7          | Test vehicle onboard driver front view   | 490                       | -447  | -1236 | -8           | 28        | 1000             |
| 8          | Test vehicle onboard driver side view    | 1563                      | 730   | -1045 | -10          | 12.5      | 1000             |
| 9          | Test vehicle onboard passenger side view | 1540                      | 1625  | -1065 | -9           | 12.5      | 1000             |
| 10         | Real time film coverage of test          | -                         | -     | -     | -            | -         | 30               |
| 11         | Secondary impact point view              | -4496                     | 2400  | -1108 | -10          | 25        | 500              |

\* Reference (from point of impact); all measurements accurate to within  $\pm 6$  mm.

X = (Impact Point) + Forward  
 Y = (Impact Point) + To Right  
 Z = (Ground Level) + Down

**SECTION 5**

**FUEL SYSTEM INTEGRITY**

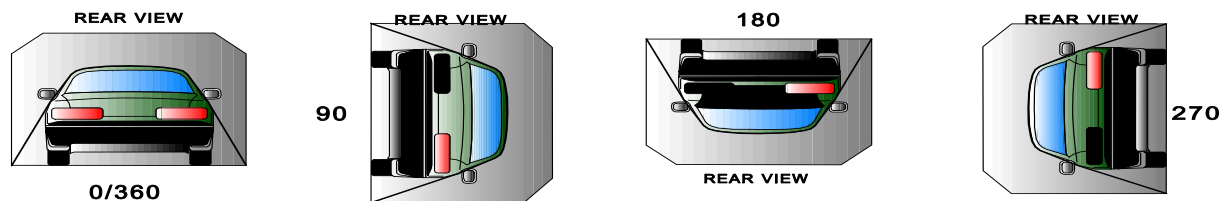


## DATA SHEET 17

### ROLLOVER DATA

Vehicle: 2005 Saturn Ion 1 Four Door Sedan

NHTSA No.: M50115



#### I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| Rollover Stage | Rotation Time (spec. 1 -3 min) |         |         |         | FMVSS 301 Hold Time |         | Total Time |         |         |         | Next Whole Minute Interval |         |
|----------------|--------------------------------|---------|---------|---------|---------------------|---------|------------|---------|---------|---------|----------------------------|---------|
|                | minutes                        | seconds | minutes | seconds | minutes             | seconds | minutes    | seconds | minutes | seconds | minutes                    | seconds |
| 0° - 90°       | 1                              | 13      | 5       | 5       | 6                   | 13      | 7          | 13      | 6       | 1       | 7                          | 13      |
| 90° - 180°     | 1                              | 01      | 5       | 5       | 6                   | 1       | 7          | 1       | 6       | 1       | 7                          | 1       |
| 180°-270°      | 1                              | 03      | 5       | 5       | 6                   | 3       | 7          | 3       | 6       | 3       | 7                          | 3       |
| 270°-360°      | 1                              | 13      | 5       | 5       | 6                   | 13      | 7          | 13      | 6       | 13      | 7                          | 13      |

#### II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

| First 5 minutes from onset of rotation | 6th min. | 7th min. | 8th min. (if required) |
|--|----------|----------|------------------------|
| 142 g                                  | 28 g     | 28 g     | 28 g                   |

#### III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

| Rollover Stage | First 5 minutes from onset of rotation (g) | 6th min. (g) | 7th min. (g) | 8th min. (if required) (g) |
|----------------|--|--------------|--------------|----------------------------|
| 0° - 90°       | 0  | 0            | 0            | N/A                        |
| 90° - 180°     | 0  | 0            | 0            | N/A                        |
| 180°-270°      | 0  | 0            | 0            | N/A                        |
| 270°-360°      | 0  | 0            | 0            | N/A                        |

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

#### IV. SOLVENT SPILLAGE LOCATION(S):

| Rollover Stage | Spillage Location |
|----------------|-------------------|
| 0° - 90°       | None              |
| 90° - 180°     | None              |
| 180°-270°      | None              |
| 270°-360°      | None              |

**APPENDIX A**

**PHOTOGRAPHS**

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



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



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



Figure A-4 POST-TEST REAR VIEW OF TEST VEHICLE



Figure A-5 PRE-TEST IMPACTED SIDE VIEW OF TEST VEHICLE

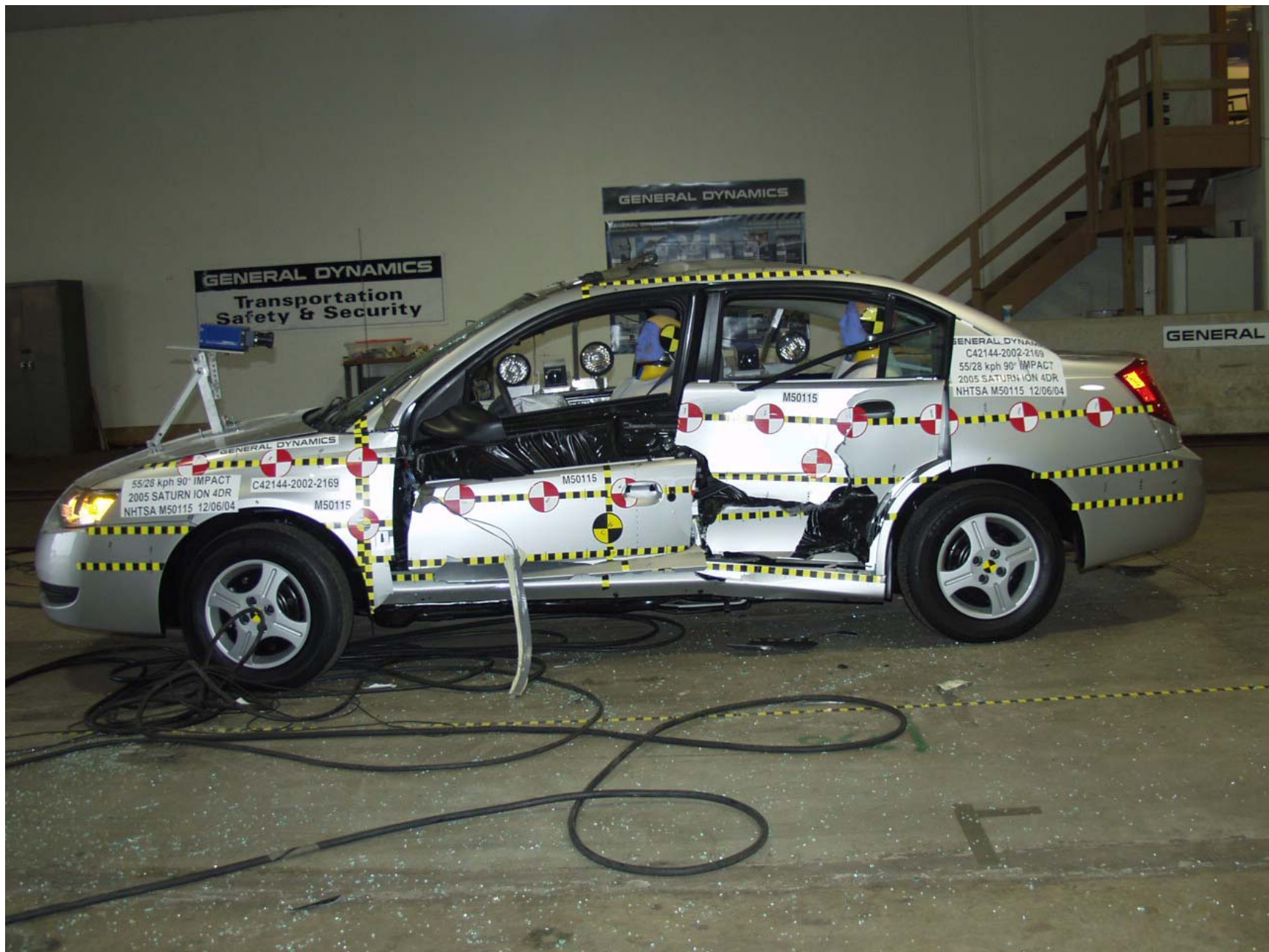


Figure A-6 POST-TEST IMPACTED SIDE VIEW OF TEST VEHICLE



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



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



Figure A-9 PRE-TEST LEFT REAR VIEW OF TEST VEHICLE



Figure A-10 POST-TEST LEFT REAR VIEW OF TEST VEHICLE



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



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



Figure A-13 PRE-TEST RIGHT REAR VIEW OF TEST VEHICLE



Figure A-14 POST-TEST RIGHT REAR VIEW OF TEST VEHICLE

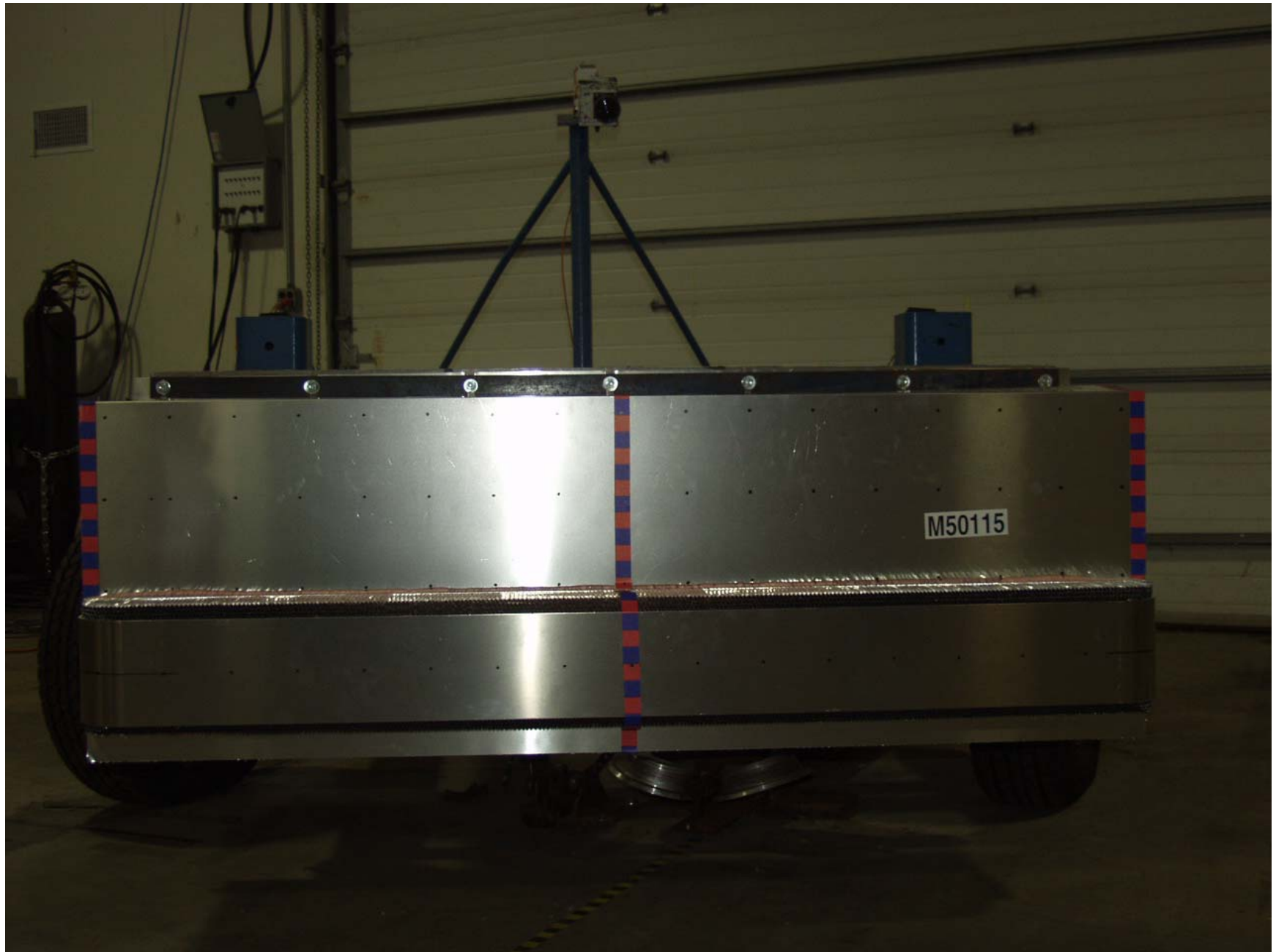


Figure A-15 PRE-TEST FRONTAL VIEW OF IMPACTOR FACE



Figure A-16 POST-TEST FRONTAL VIEW OF IMPACTOR FACE

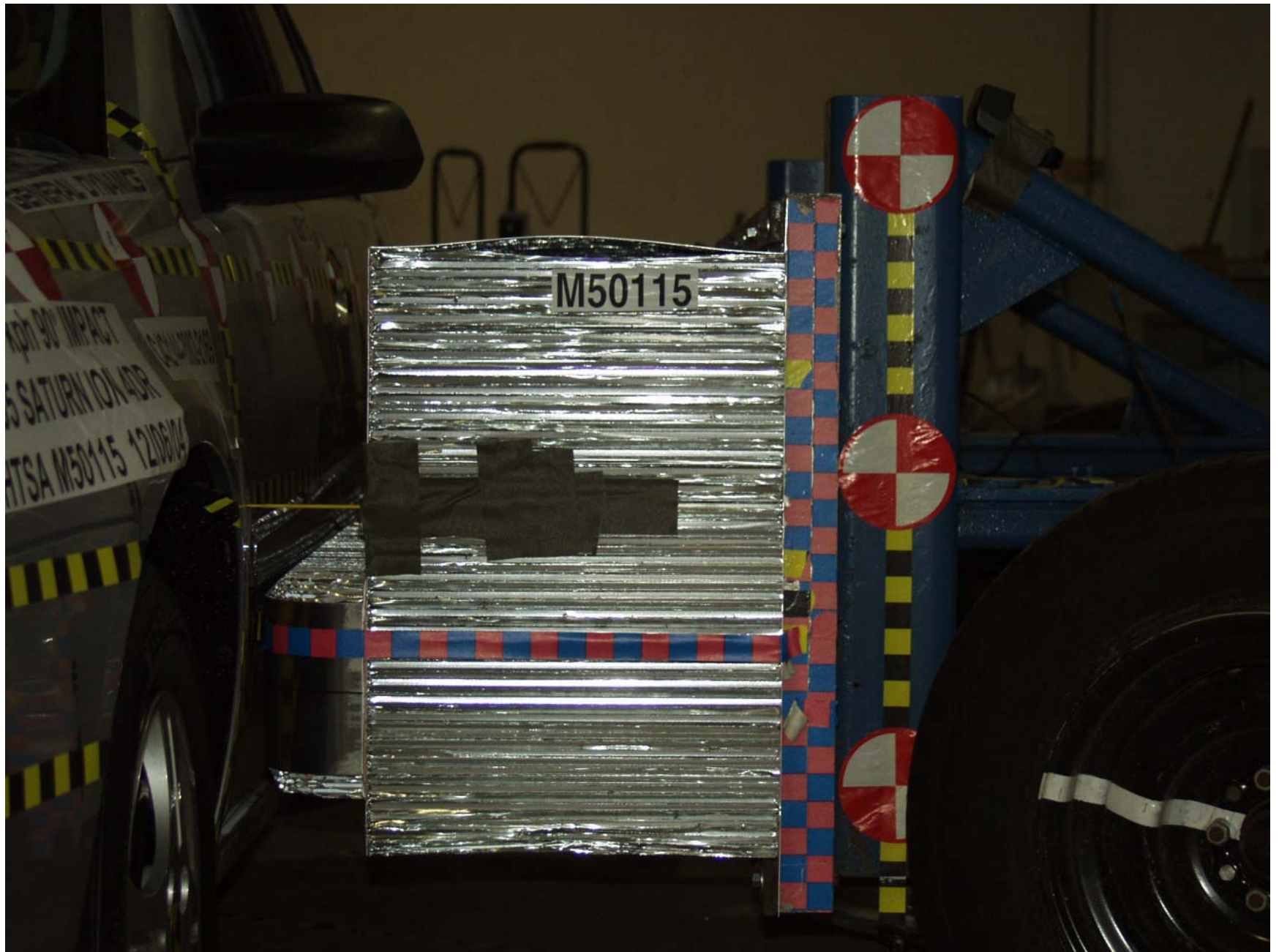


Figure A-17 PRE-TEST LEFT SIDE VIEW OF IMPACTOR FACE



Figure A-18 POST-TEST LEFT SIDE VIEW OF IMPACTOR FACE



Figure A-19 PRE-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



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Figure A-20 POST-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



Figure A-21 PRE-TEST TOP VIEW OF IMPACTOR FACE

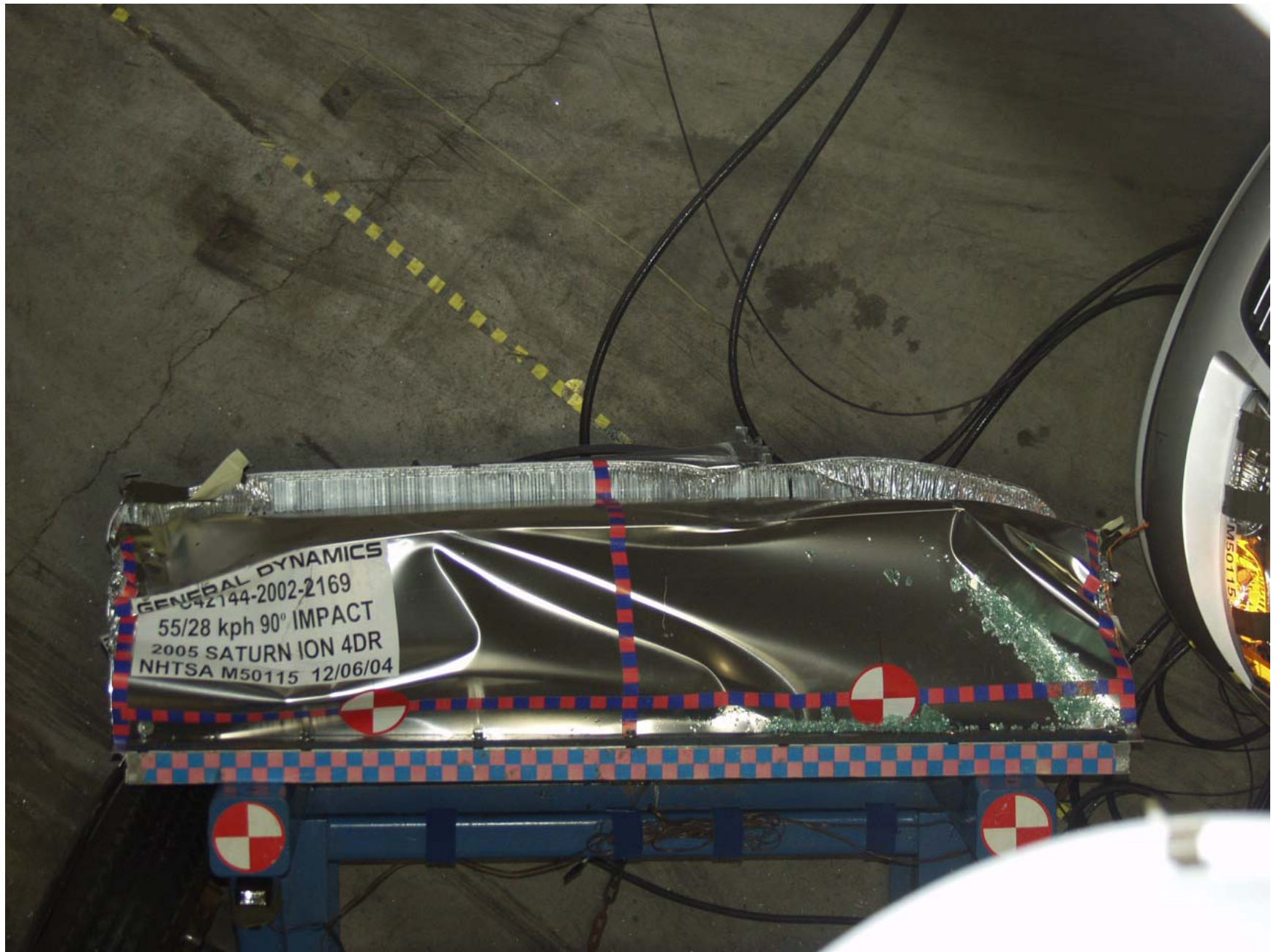


Figure A-22 POST-TEST TOP VIEW OF IMPACTOR FACE



Figure A-23 PRE-TEST OVERHEAD VIEW OF ALIGNED MDB AND VEHICLE



Figure A-24 POST-TEST OVERHEAD VIEW OF MDB AND VEHICLE



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Figure A-25 PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



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Figure A-26 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3

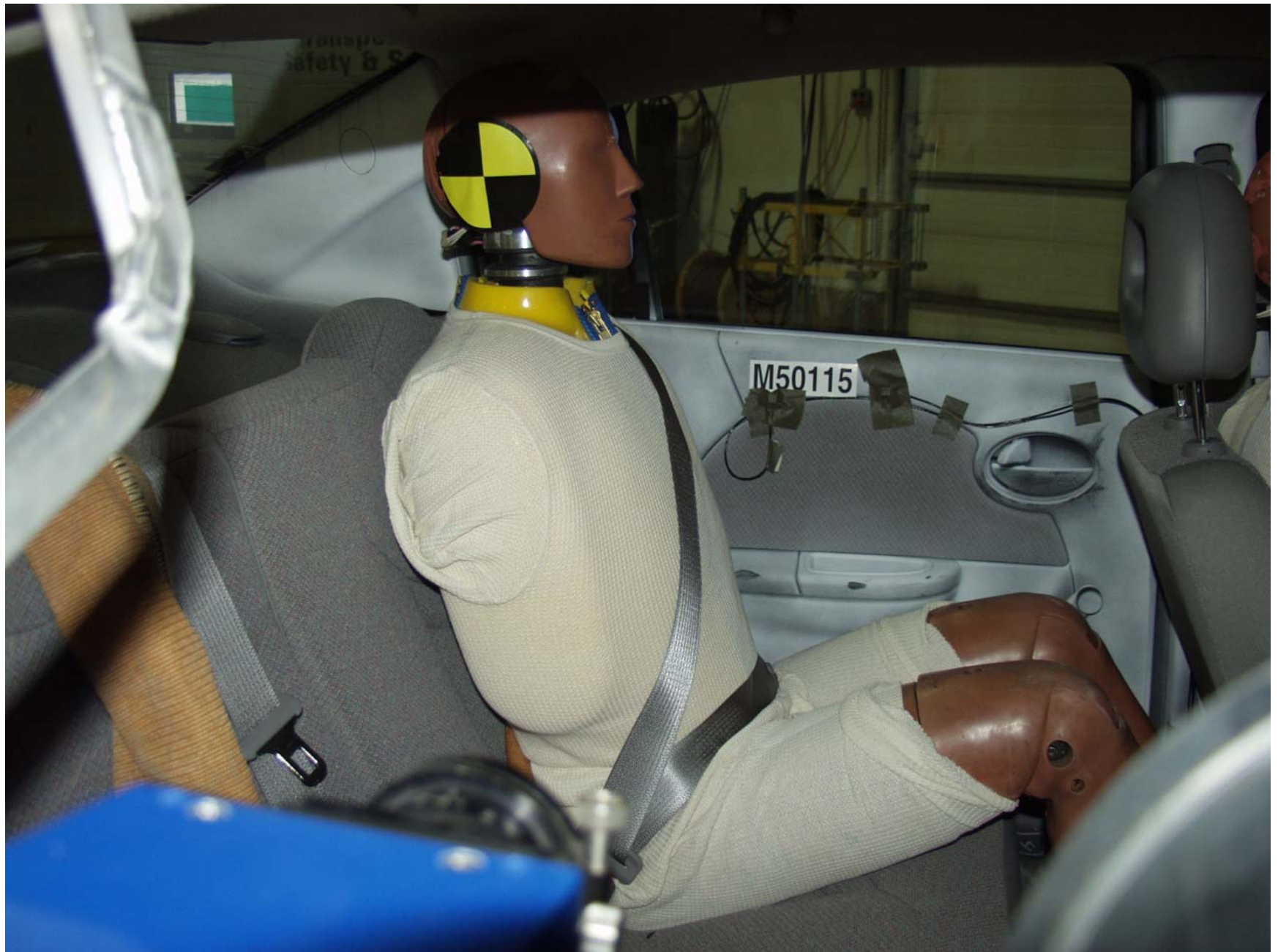


Figure A-27 PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



Figure A-28 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



Figure A-29 PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



Figure A-30 POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



Figure A-31 PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



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Figure A-32 POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



Figure A-33 PRE-TEST INTERIOR OF FRONT DOOR



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8765-SNCA-P-07

Figure A-34 POST-TEST INTERIOR OF FRONT DOOR SHOWING SID H3 IMPACT LOCATIONS



Figure A-35 PRE-TEST INTERIOR OF REAR DOOR

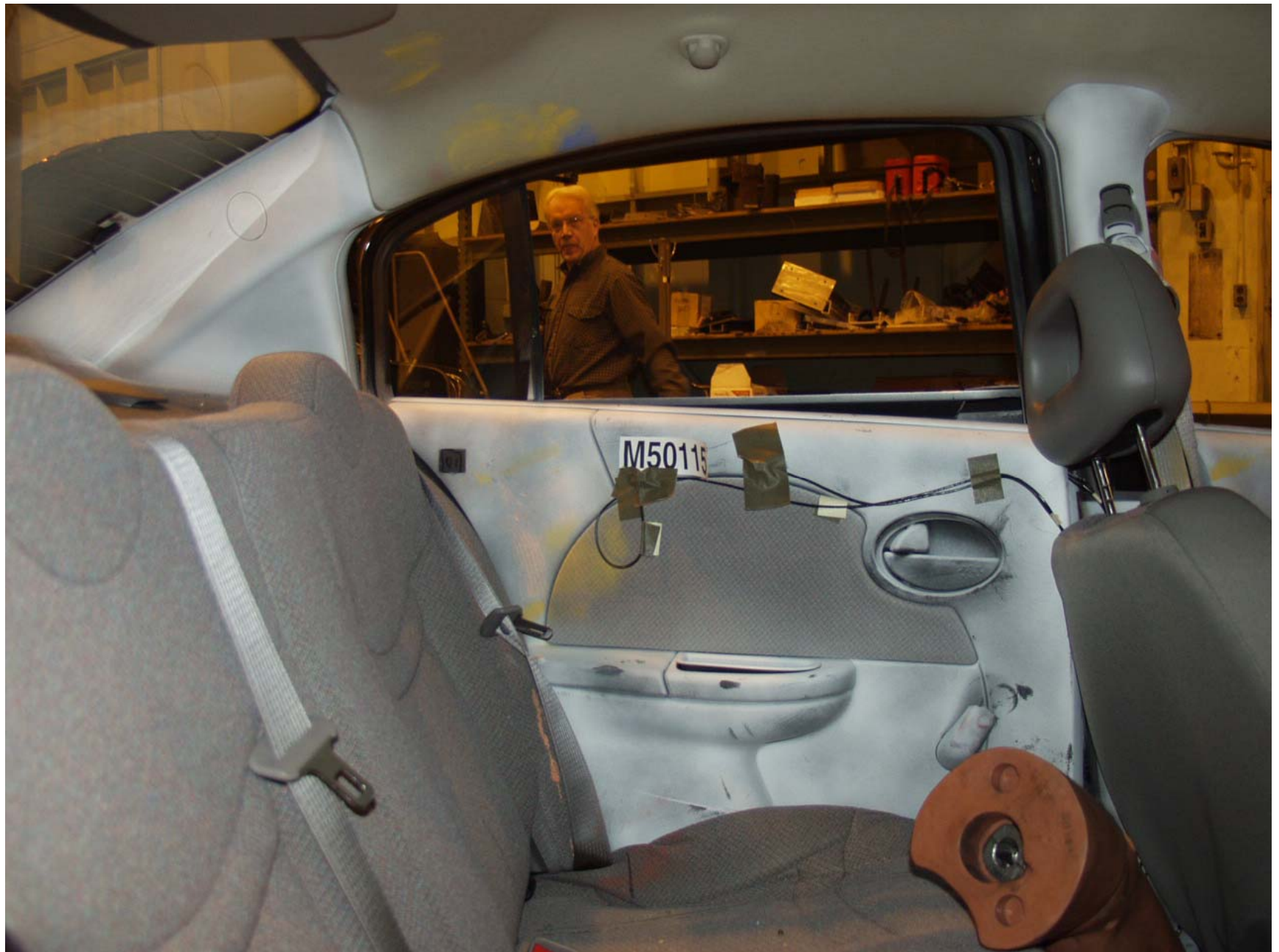


Figure A-36 POST-TEST INTERIOR OF REAR DOOR SHOWING SID H3 IMPACT LOCATIONS



Figure A-37 PRE-TEST LEFT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION



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Figure A-38 PRE-TEST RIGHT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION



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Figure A-39 POST-TEST CLOSE-UP VIEW OF IMPACT POINT TARGET



Figure A-40 CLOSE-UP VIEW OF VEHICLE'S CERTIFICATION LABEL



Figure A-41 CLOSE-UP VIEW OF VEHICLE'S TIRE PLACARD LABEL



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Figure A-42 IMPACT PHOTO



Figure A-43 ROLLOVER 90 DEGREES



Figure A-44 ROLLOVER 180 DEGREES



Figure A-45 ROLLOVER 270 DEGREES



Figure A-46 ROLLOVER 360 DEGREES

**APPENDIX B**

**VEHICLE, MDB AND SID HYBRID III RESPONSE DATA**

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INTEGRATION DATA - FILTER CLASS 180

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| 11              | DRIVER UPPER NECK RESULTANT FORCE VS TIME      | B- 16       |
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| 24              | PASSENGER HEAD (X) ACCELERATION VS TIME        | B- 29       |
| 25              | PASSENGER HEAD (X) VELOCITY VS TIME            | B- 30       |
| 26              | PASSENGER HEAD (Y) ACCELERATION VS TIME        | B- 31       |
| 27              | PASSENGER HEAD (Y) VELOCITY VS TIME            | B- 32       |
| 28              | PASSENGER HEAD (Z) ACCELERATION VS TIME        | B- 33       |
| 29              | PASSENGER HEAD (Z) VELOCITY VS TIME            | B- 34       |
| 30              | PASSENGER HEAD RESULTANT ACCELERATION VS TIME  | B- 35       |
| 31              | PASSENGER UPPER NECK (X) FORCE VS TIME         | B- 36       |
| 32              | PASSENGER UPPER NECK (Y) FORCE VS TIME         | B- 37       |
| 33              | PASSENGER UPPER NECK (Z) FORCE VS TIME         | B- 38       |
| 34              | PASSENGER UPPER NECK RESULTANT FORCE VS TIME   | B- 39       |
| 35              | PASSENGER UPPER NECK (X) MOMENT VS TIME        | B- 40       |
| 36              | PASSENGER UPPER NECK (Y) MOMENT VS TIME        | B- 41       |
| 37              | PASSENGER UPPER NECK (Z) MOMENT VS TIME        | B- 42       |
| 38              | PASSENGER UPPER NECK RESULTANT MOMENT VS TIME  | B- 43       |
| 39              | PASSENGER UPPER RIB (Y) ACCELERATION VS TIME   | B- 44       |
| 40              | PASSENGER UPPER RIB (Y) VELOCITY VS TIME       | B- 45       |
| 41              | PASSENGER LOWER RIB (Y) ACCELERATION VS TIME   | B- 46       |
| 42              | PASSENGER LOWER RIB (Y) VELOCITY VS TIME       | B- 47       |
| 43              | PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME | B- 48       |
| 44              | PASSENGER LOWER SPINE (Y) VELOCITY VS TIME     | B- 49       |
| 45              | PASSENGER PELVIC (Y) ACCELERATION VS TIME      | B- 50       |
| 46              | PASSENGER PELVIC (Y) VELOCITY VS TIME          | B- 51       |

### DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS

ACCELERATION DATA - FIR FILTERED

| <u>Plot No.</u> | <u>Data Plot Title</u>                         | <u>Page</u> |
|-----------------|--|-------------|
| 47              | DRIVER UPPER RIB (Y) ACCELERATION VS TIME      | B- 52       |
| 48              | DRIVER LOWER RIB (Y) ACCELERATION VS TIME      | B- 53       |
| 49              | DRIVER LOWER SPINE (Y) ACCELERATION VS TIME    | B- 54       |
| 50              | DRIVER PELVIC (Y) ACCELERATION VS TIME         | B- 55       |
| 51              | PASSENGER UPPER RIB (Y) ACCELERATION VS TIME   | B- 56       |
| 52              | PASSENGER LOWER RIB (Y) ACCELERATION VS TIME   | B- 57       |
| 53              | PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME | B- 58       |
| 54              | PASSENGER PELVIC (Y) ACCELERATION VS TIME      | B- 59       |

**TEST VEHICLE INSTRUMENTATION PLOTS**  
**ACCELERATION DATA - FILTER CLASS 60**  
**INTEGRATION DATA - FILTER CLASS 180**

| <u>Plot No.</u> | <u>Data Plot Title</u>                                       | <u>Page</u> |
|-----------------|--|-------------|
| 55              | RIGHT SIDE SILL AT FRONT SEAT (X) ACCELERATION VS TIME       | B- 60       |
| 56              | RIGHT SIDE SILL AT FRONT SEAT (X) VELOCITY VS TIME           | B- 61       |
| 57              | RIGHT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME       | B- 62       |
| 58              | RIGHT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME           | B- 63       |
| 59              | RIGHT SIDE SILL AT FRONT SEAT (Z) ACCELERATION VS TIME       | B- 64       |
| 60              | RIGHT SIDE SILL AT FRONT SEAT (Z) VELOCITY VS TIME           | B- 65       |
| 61              | RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION VS TIME | B- 66       |
| 62              | RIGHT SIDE SILL AT REAR SEAT (X) ACCELERATION VS TIME        | B- 67       |
| 63              | RIGHT SIDE SILL AT REAR SEAT (X) VELOCITY VS TIME            | B- 68       |
| 64              | RIGHT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME        | B- 69       |
| 65              | RIGHT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME            | B- 70       |
| 66              | RIGHT SIDE SILL AT REAR SEAT (Z) ACCELERATION VS TIME        | B- 71       |
| 67              | RIGHT SIDE SILL AT REAR SEAT (Z) VELOCITY VS TIME            | B- 72       |
| 68              | RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION VS TIME  | B- 73       |
| 69              | REAR FLOORPAN ABOVE AXLE (X) ACCELERATION VS TIME            | B- 74       |
| 70              | REAR FLOORPAN ABOVE AXLE (X) VELOCITY VS TIME                | B- 75       |
| 71              | REAR FLOORPAN ABOVE AXLE (Y) ACCELERATION VS TIME            | B- 76       |
| 72              | REAR FLOORPAN ABOVE AXLE (Y) VELOCITY VS TIME                | B- 77       |
| 73              | REAR FLOORPAN ABOVE AXLE (Z) ACCELERATION VS TIME            | B- 78       |
| 74              | REAR FLOORPAN ABOVE AXLE (Z) VELOCITY VS TIME                | B- 79       |
| 75              | REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION VS TIME      | B- 80       |
| 76              | LEFT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME         | B- 81       |
| 77              | LEFT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME             | B- 82       |
| 78              | LEFT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME        | B- 83       |
| 79              | LEFT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME            | B- 84       |
| 80              | LEFT FRONT DOOR ON CENTERLINE (Y) ACCELERATION VS TIME       | B- 85       |
| 81              | LEFT FRONT DOOR ON CENTERLINE (Y) VELOCITY VS TIME           | B- 86       |
| 82              | RIGHT REAR OCCUPANT COMPARTMENT (Y) ACCELERATION VS TIME     | B- 87       |
| 83              | RIGHT REAR OCCUPANT COMPARTMENT (Y) VELOCITY VS TIME         | B- 88       |
| 84              | MID REAR OF LEFT FRONT DOOR (Y) ACCELERATION VS TIME         | B- 89       |
| 85              | MID REAR OF LEFT FRONT DOOR (Y) VELOCITY VS TIME             | B- 90       |
| 86              | LEFT FRONT DOOR UPPER CENTERLINE (Y) ACCELERATION VS TIME    | B- 91       |
| 87              | LEFT FRONT DOOR UPPER CENTERLINE (Y) VELOCITY VS TIME        | B- 92       |
| 88              | MID REAR OF LEFT REAR DOOR (Y) ACCELERATION VS TIME          | B- 93       |
| 89              | MID REAR OF LEFT REAR DOOR (Y) VELOCITY VS TIME              | B- 94       |
| 90              | LEFT REAR DOOR UPPER CENTERLINE (Y) ACCELERATION VS TIME     | B- 95       |
| 91              | LEFT REAR DOOR UPPER CENTERLINE (Y) VELOCITY VS TIME         | B- 96       |
| 92              | LOWER B-POST (Y) ACCELERATION VS TIME                        | B- 97       |
| 93              | LOWER B-POST (Y) VELOCITY VS TIME                            | B- 98       |
| 94              | UPPER B-POST (Y) ACCELERATION VS TIME                        | B- 99       |
| 95              | UPPER B-POST (Y) VELOCITY VS TIME                            | B- 100      |
| 96              | LOWER A-POST (Y) ACCELERATION VS TIME                        | B- 101      |

**TEST VEHICLE INSTRUMENTATION PLOTS**  
 ACCELERATION DATA - FILTER CLASS 60  
 INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u>                                      | <u>Page</u> |
|-----------------|---|-------------|
| 97              | LOWER A-POST (Y) VELOCITY VS TIME                           | B- 102      |
| 98              | UPPER A-POST (Y) ACCELERATION VS TIME                       | B- 103      |
| 99              | UPPER A-POST (Y) VELOCITY VS TIME                           | B- 104      |
| 100             | FRONT SEAT TRACK (Y) ACCELERATION VS TIME                   | B- 105      |
| 101             | FRONT SEAT TRACK (Y) VELOCITY VS TIME                       | B- 106      |
| 102             | REAR SEAT TRACK (Y) ACCELERATION VS TIME                    | B- 107      |
| 103             | REAR SEAT TRACK (Y) VELOCITY VS TIME                        | B- 108      |
| 104             | VEHICLE CENTER OF GRAVITY (X) ACCELERATION VS TIME          | B- 109      |
| 105             | VEHICLE CENTER OF GRAVITY (X) VELOCITY VS TIME              | B- 110      |
| 106             | VEHICLE CENTER OF GRAVITY (Y) ACCELERATION VS TIME          | B- 111      |
| 107             | VEHICLE CENTER OF GRAVITY (Y) VELOCITY ACCELERATION VS TIME | B- 112      |
| 108             | VEHICLE CENTER OF GRAVITY (Z) ACCELERATION VS TIME          | B- 113      |
| 109             | VEHICLE CENTER OF GRAVITY (Z) VELOCITY VS TIME              | B- 114      |
| 110             | VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME    | B- 115      |

**MDB INSTRUMENTATION PLOTS**  
 ACCELERATION DATA - FILTER CLASS 60  
 INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u>                               | <u>Page</u> |
|-----------------|--|-------------|
| 111             | MDB CENTER OF GRAVITY (X) ACCELERATION VS TIME       | B- 116      |
| 112             | MDB CENTER OF GRAVITY (X) VELOCITY VS TIME           | B- 117      |
| 113             | MDB CENTER OF GRAVITY (Y) ACCELERATION VS TIME       | B- 118      |
| 114             | MDB CENTER OF GRAVITY (Y) VELOCITY VS TIME           | B- 119      |
| 115             | MDB CENTER OF GRAVITY (Z) ACCELERATION VS TIME       | B- 120      |
| 116             | MDB CENTER OF GRAVITY (Z) VELOCITY VS TIME           | B- 121      |
| 117             | MDB CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME | B- 122      |
| 118             | MDB REAR (X) ACCELERATION VS TIME                    | B- 123      |
| 119             | MDB REAR (X) VELOCITY VS TIME                        | B- 124      |
| 120             | MDB REAR (Y) ACCELERATION VS TIME                    | B- 125      |
| 121             | MDB REAR (Y) VELOCITY VS TIME                        | B- 126      |

**DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)**  
 ACCELERATION DATA - FILTER CLASS 1000, LOWER SPINE - FILTER CLASS 180  
 INTEGRATION DATA - FILTER CLASS 180

| <u>Plot No.</u> | <u>Data Plot Title</u>                         | <u>Page</u> |
|-----------------|--|-------------|
| 122             | DRIVER UPPER RIB (Y) ACCELERATION VS TIME      | B- 127      |
| 123             | DRIVER UPPER RIB (Y) VELOCITY VS TIME          | B- 128      |
| 124             | DRIVER LOWER RIB (Y) ACCELERATION VS TIME      | B- 129      |
| 125             | DRIVER LOWER RIB (Y) VELOCITY VS TIME          | B- 130      |
| 126             | DRIVER LOWER SPINE (Y) ACCELERATION VS TIME    | B- 131      |
| 127             | DRIVER LOWER SPINE (Y) VELOCITY VS TIME        | B- 132      |
| 128             | DRIVER PELVIC (Y) ACCELERATION VS TIME         | B- 133      |
| 129             | DRIVER PELVIC (Y) VELOCITY VS TIME             | B- 134      |
| 130             | PASSENGER UPPER RIB (Y) ACCELERATION VS TIME   | B- 135      |
| 131             | PASSENGER UPPER RIB (Y) VELOCITY VS TIME       | B- 136      |
| 132             | PASSENGER LOWER RIB (Y) ACCELERATION VS TIME   | B- 137      |
| 133             | PASSENGER LOWER RIB (Y) VELOCITY VS TIME       | B- 138      |
| 134             | PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME | B- 139      |
| 135             | PASSENGER LOWER SPINE (Y) VELOCITY VS TIME     | B- 140      |
| 136             | PASSENGER PELVIC (Y) ACCELERATION VS TIME      | B- 141      |
| 137             | PASSENGER PELVIC (Y) VELOCITY VS TIME          | B- 142      |

**DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)**  
 ACCELERATION DATA - FIR FILTERED

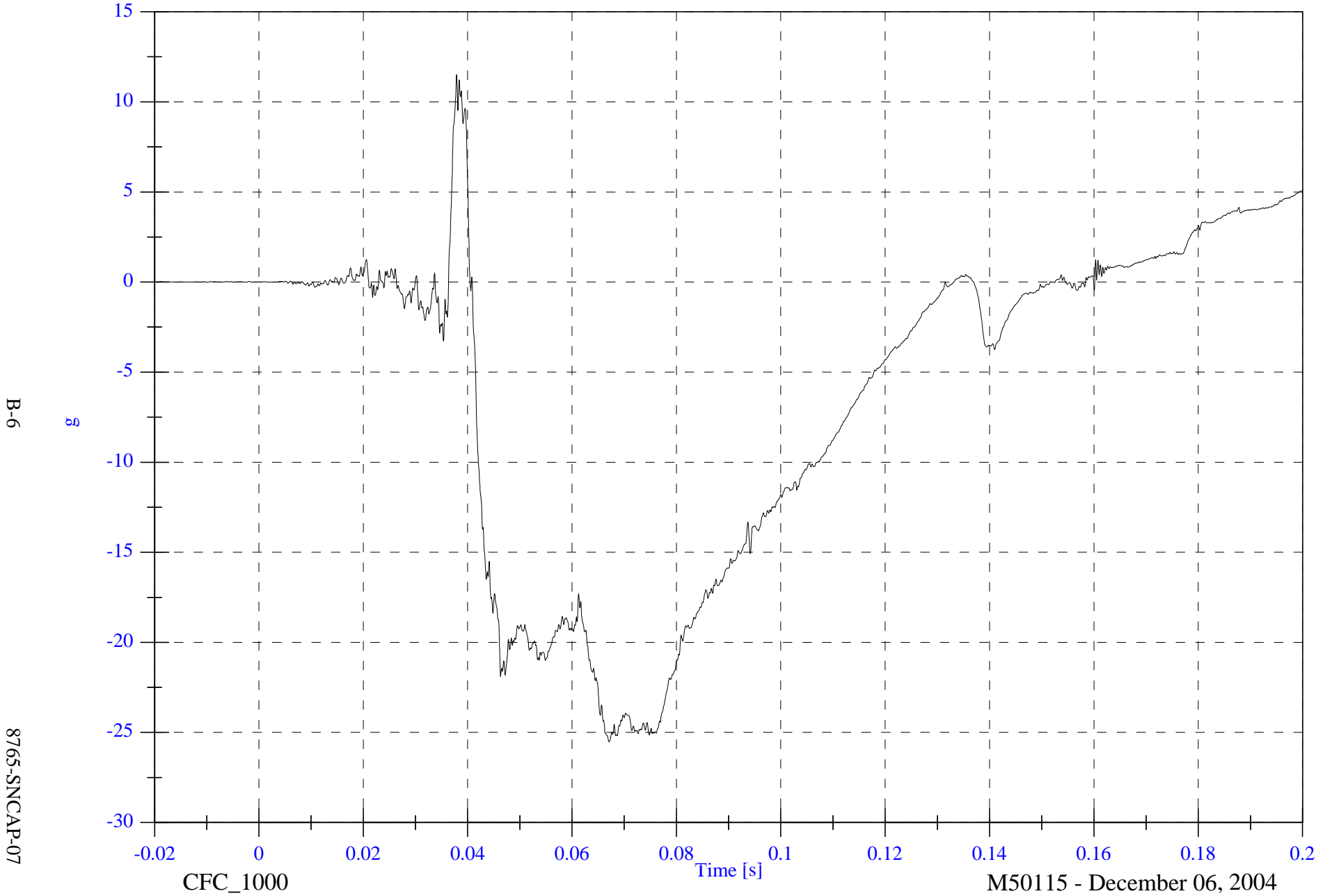
| <u>Plot No.</u> | <u>Data Plot Title</u>                         | <u>Page</u> |
|-----------------|--|-------------|
| 138             | DRIVER UPPER RIB (Y) ACCELERATION VS TIME      | B- 143      |
| 139             | DRIVER LOWER RIB (Y) ACCELERATION VS TIME      | B- 144      |
| 140             | DRIVER LOWER SPINE (Y) ACCELERATION VS TIME    | B- 145      |
| 141             | DRIVER PELVIC (Y) ACCELERATION VS TIME         | B- 146      |
| 142             | PASSENGER UPPER RIB (Y) ACCELERATION VS TIME   | B- 147      |
| 143             | PASSENGER LOWER RIB (Y) ACCELERATION VS TIME   | B- 148      |
| 144             | PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME | B- 149      |
| 145             | PASSENGER PELVIC (Y) ACCELERATION VS TIME      | B- 150      |

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Head x

Max: 11.5 [g] at 0.038 [s]

Min: -25.5 [g] at 0.067 [s]

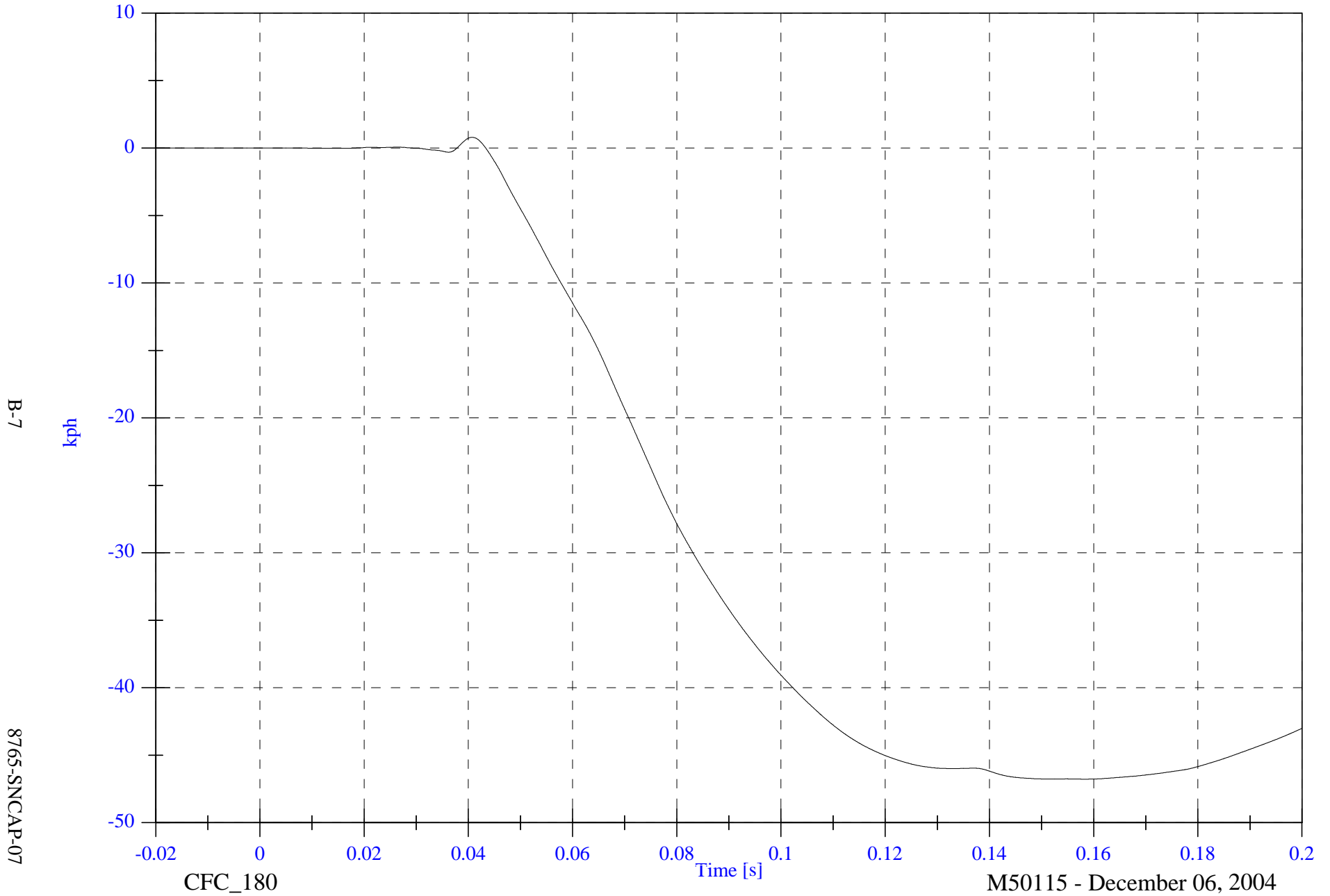


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Head x Velocity

Max: 0.8 [kph] at 0.041 [s]

Min: -46.8 [kph] at 0.158 [s]



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8765-SNCAP-07

CFC\_180

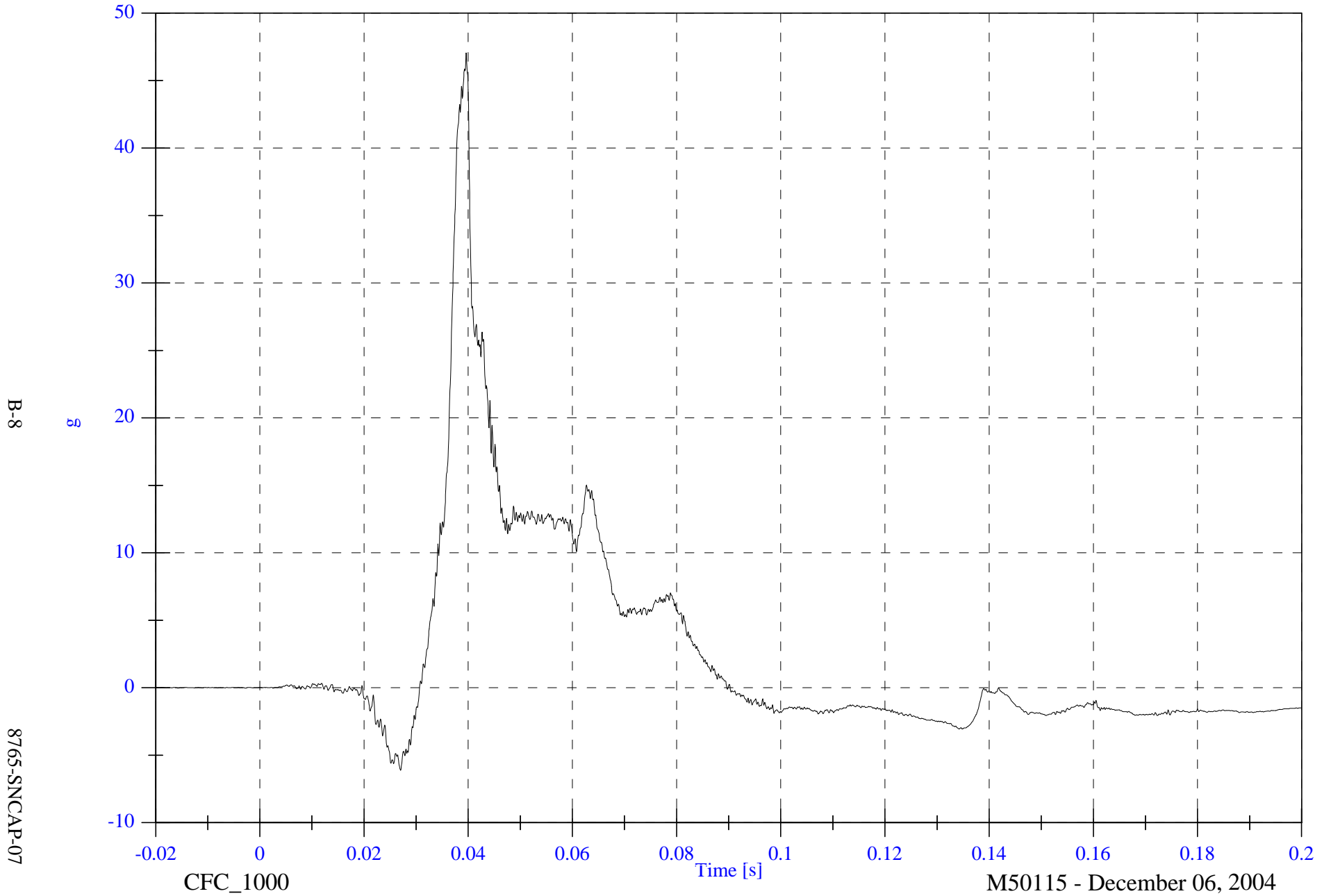
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Head y

Max: 47.1 [g] at 0.040 [s]

Min: -6.1 [g] at 0.027 [s]

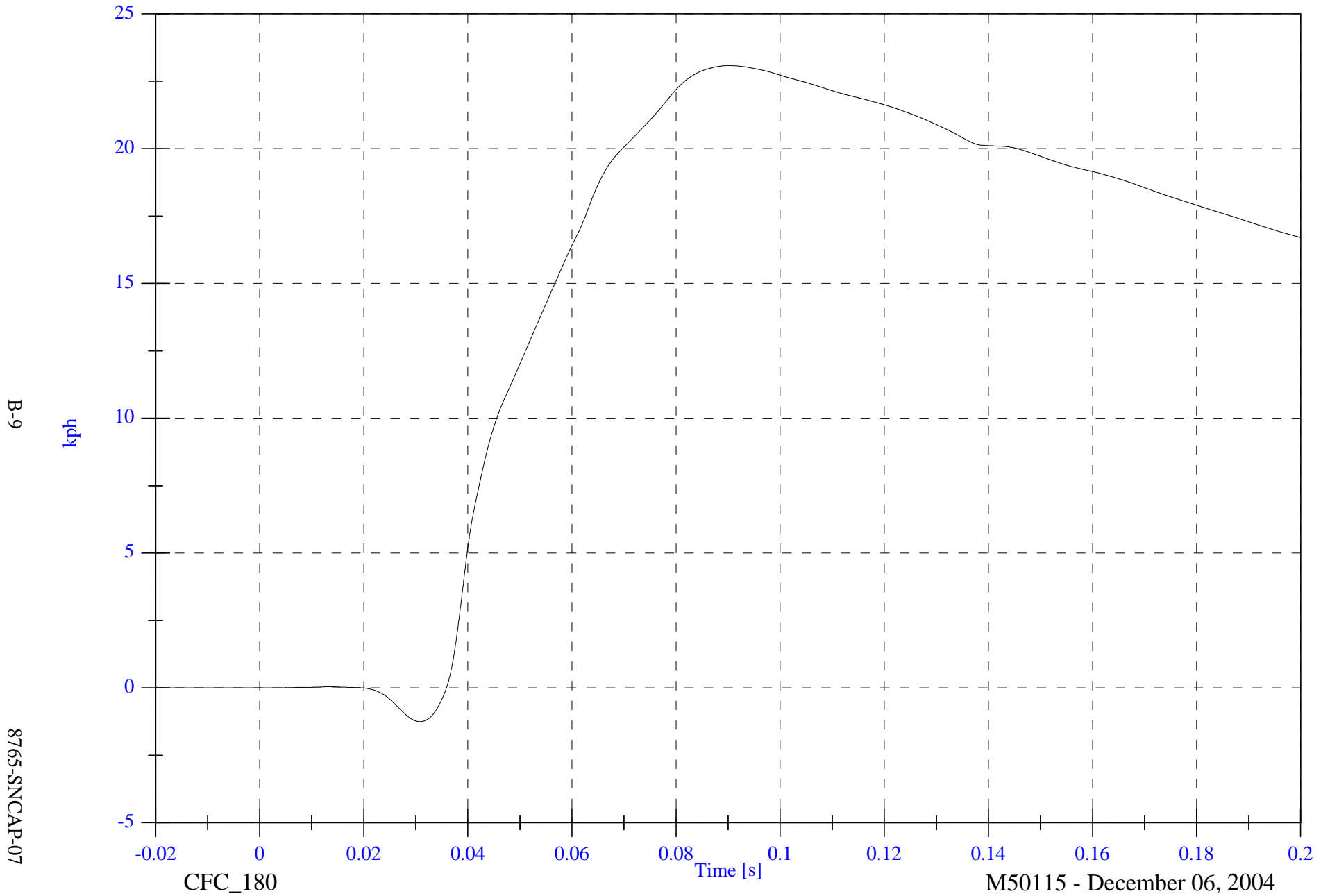


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Head y Velocity

Max: 23.1 [kph] at 0.090 [s]

Min: -1.3 [kph] at 0.031 [s]



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8765-SNCAP-07

CFC\_180

Time [s]

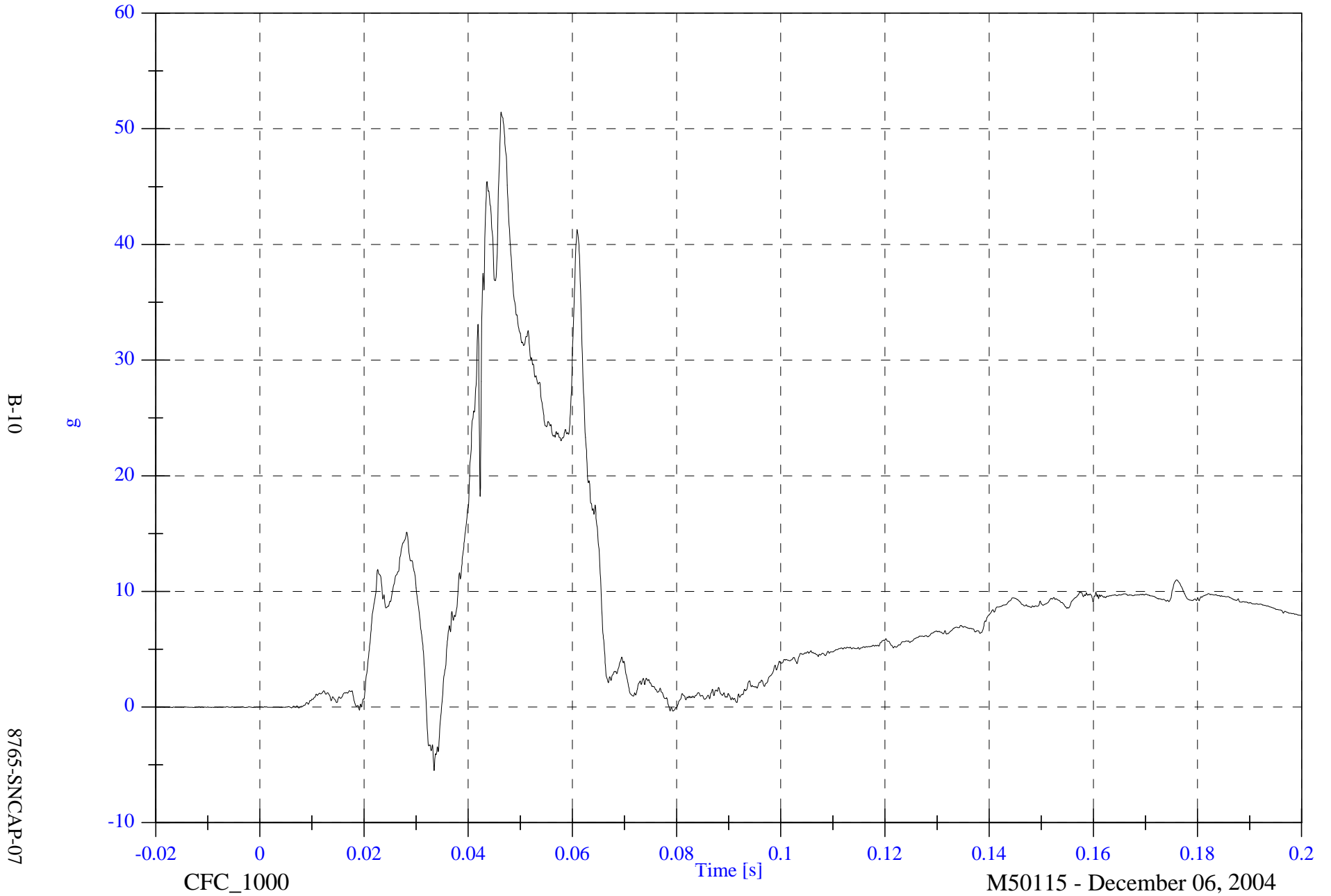
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Head z

Max: 51.5 [g] at 0.046 [s]

Min: -5.5 [g] at 0.033 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

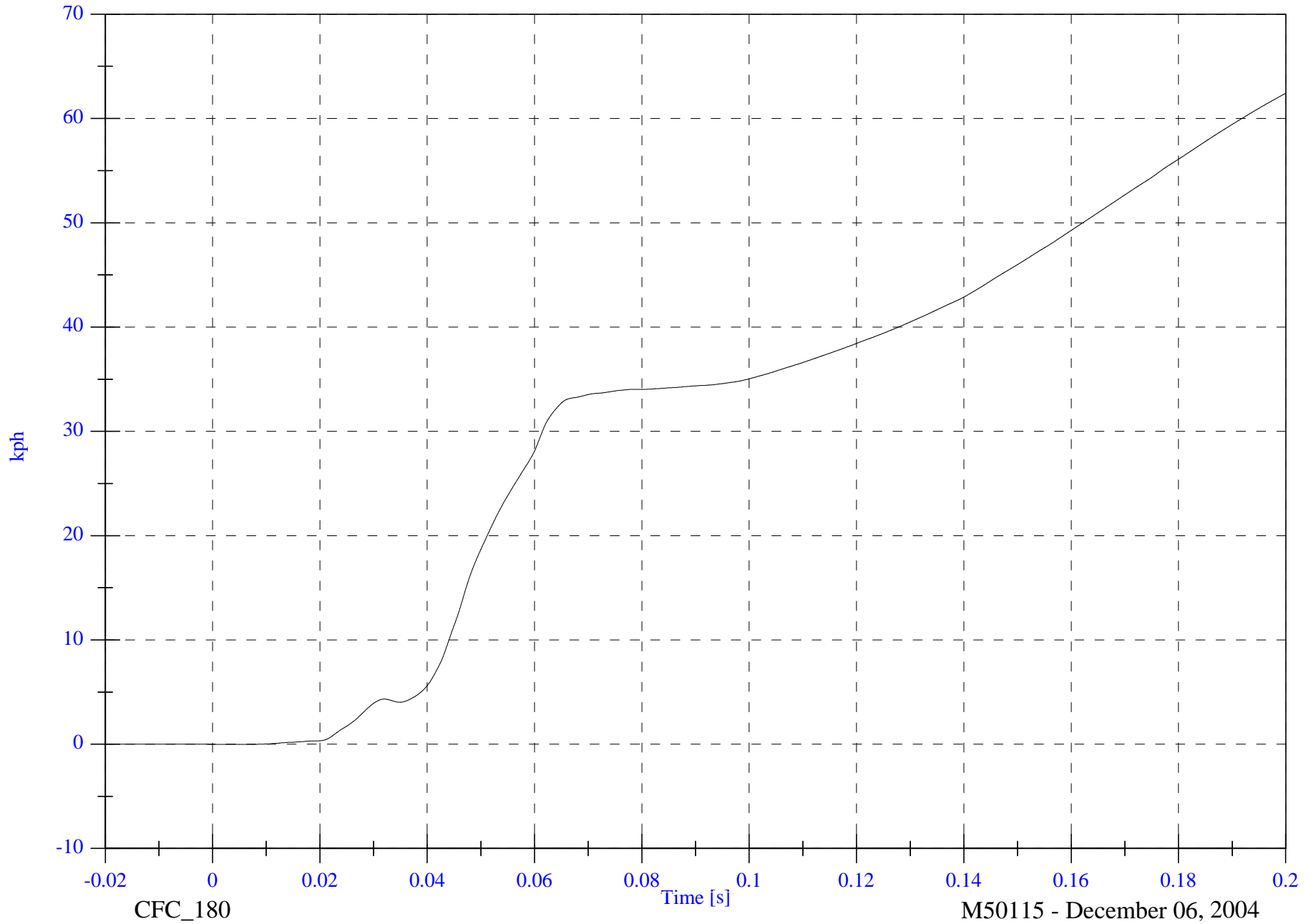
V2P1 Head z Velocity

Max: 62.4 [kph] at 0.200 [s]

Min: -0.0 [kph] at 0.005 [s]

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CFC\_180

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

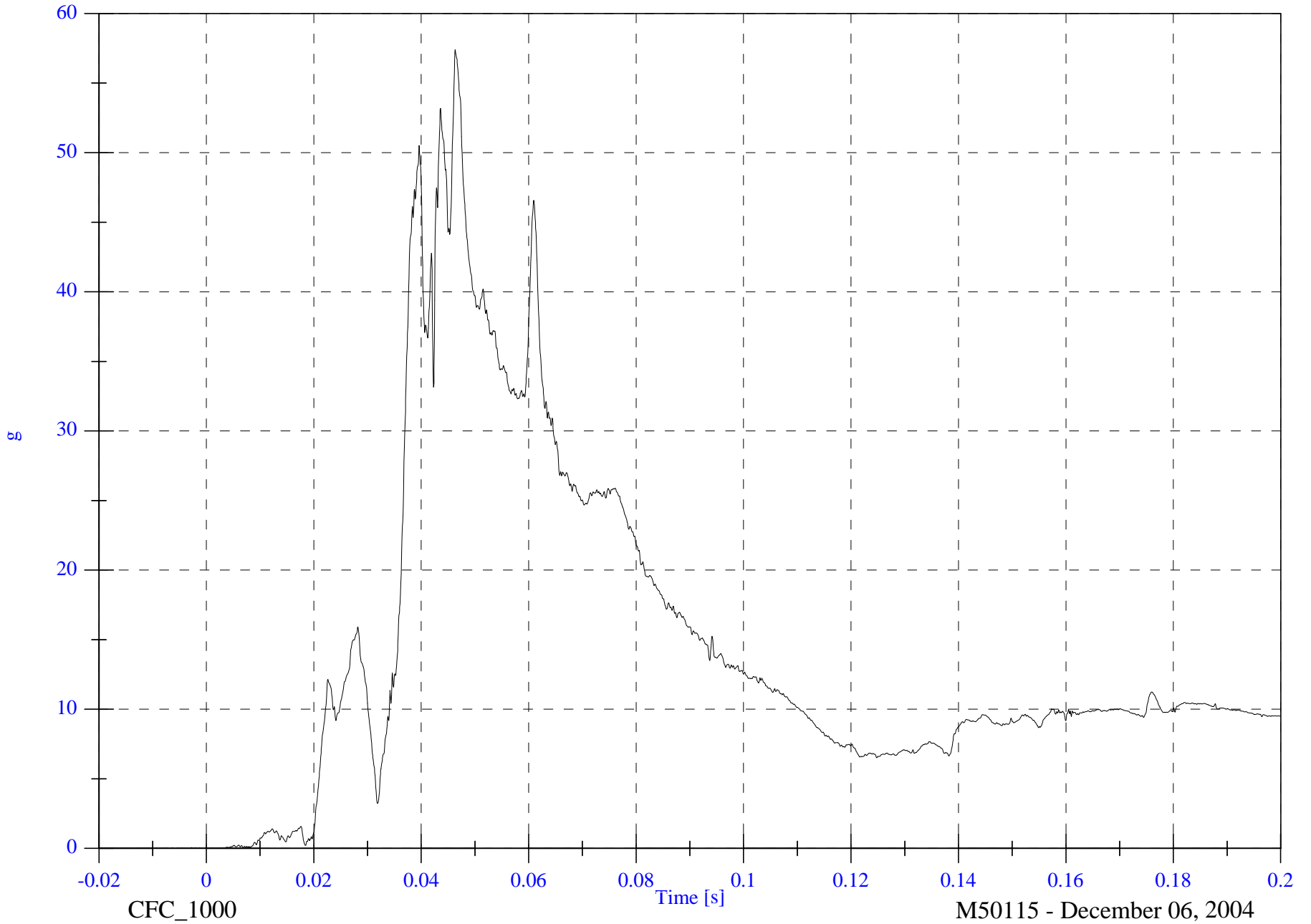
V2P1 Head Resultant

Max: 57.4 [g] at 0.046 [s]

Min: 0.0 [g] at -0.007 [s]

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8765-SNCAP-07

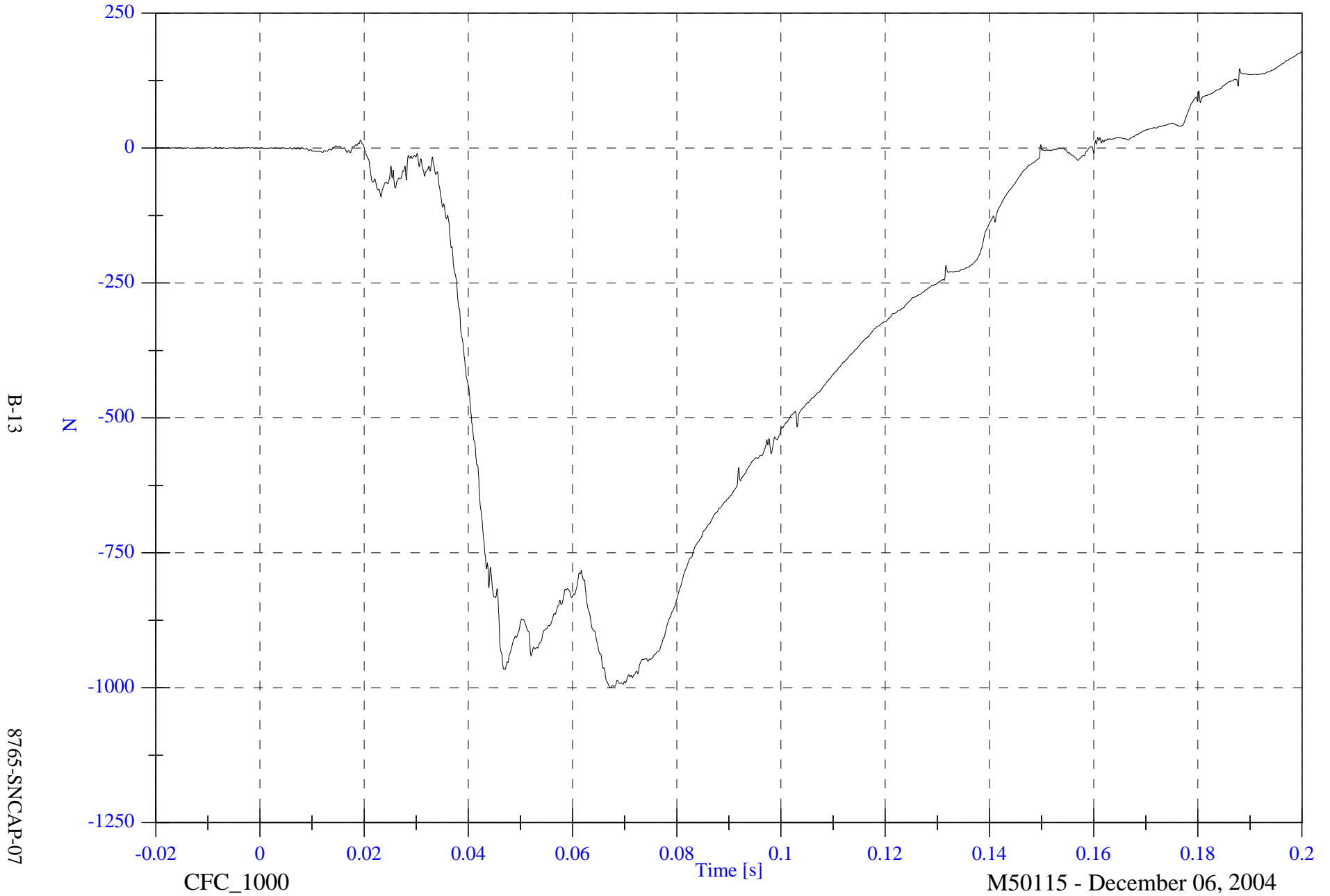


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Neck Fx

Max: 179.4 [N] at 0.200 [s]

Min: -1000.1 [N] at 0.067 [s]



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8765-SNCAP-07

CFC\_1000

Time [s]

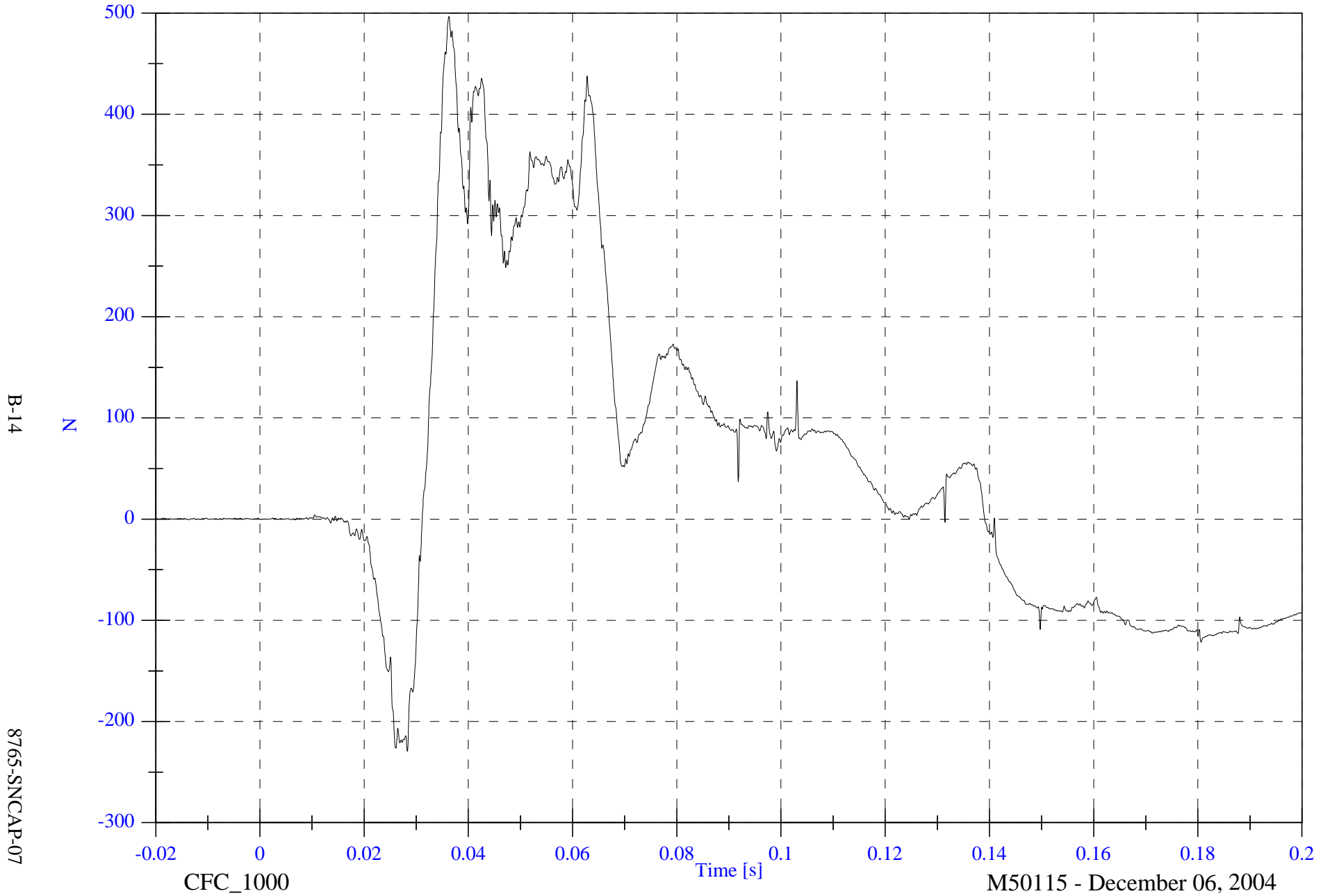
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

Max: 496.6 [N] at 0.036 [s]

V2P1 Upper Neck Fy

Min: -229.4 [N] at 0.028 [s]



B-14

8765-SNCAP-07

CFC\_1000

Time [s]

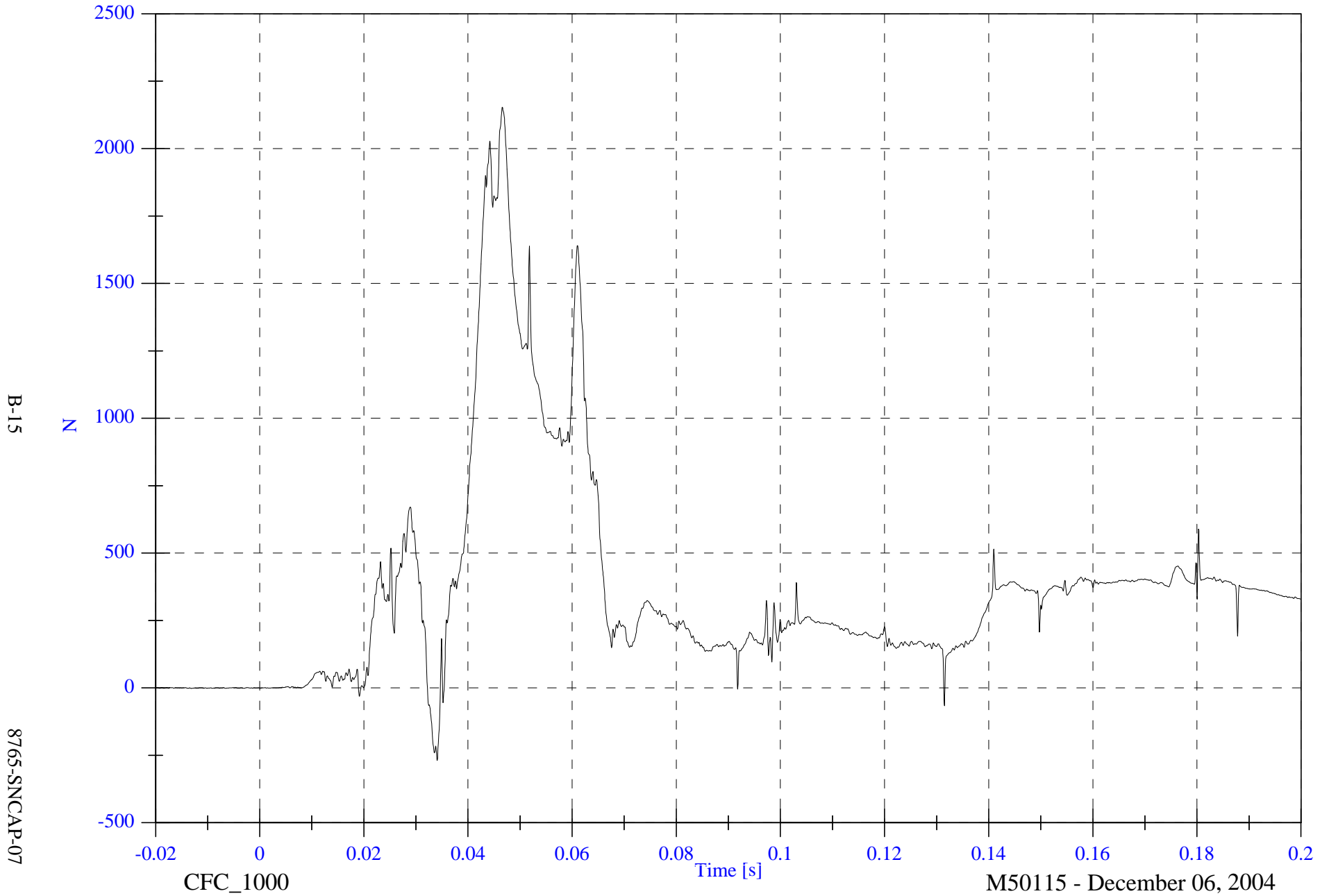
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Neck Fz

Max: 2153.5 [N] at 0.047 [s]

Min: -268.8 [N] at 0.034 [s]

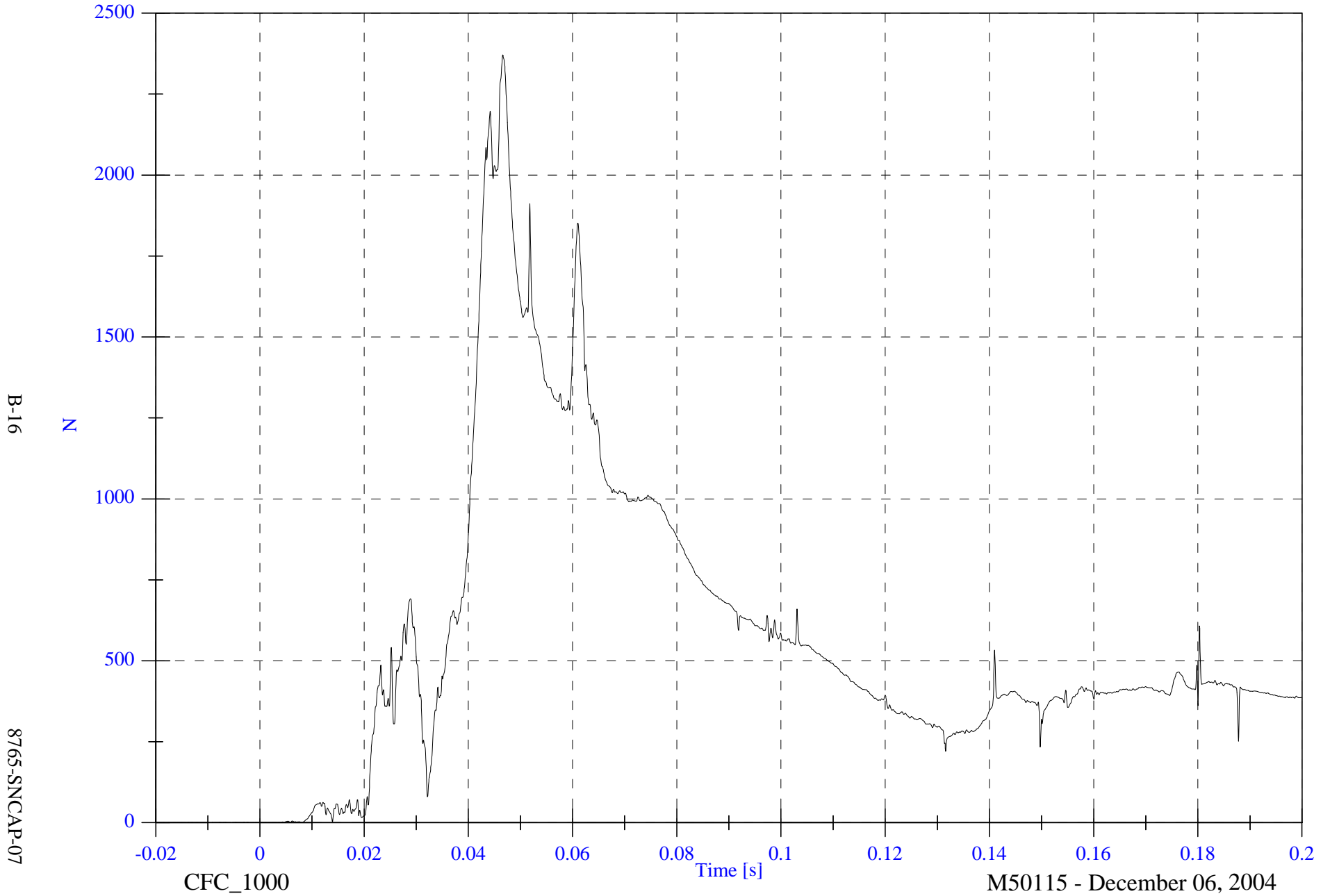


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Neck F Resultant

Max: 2371.3 [N] at 0.047 [s]

Min: 0.1 [N] at -0.014 [s]



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8765-SNCAP-07

CFC\_1000

Time [s]

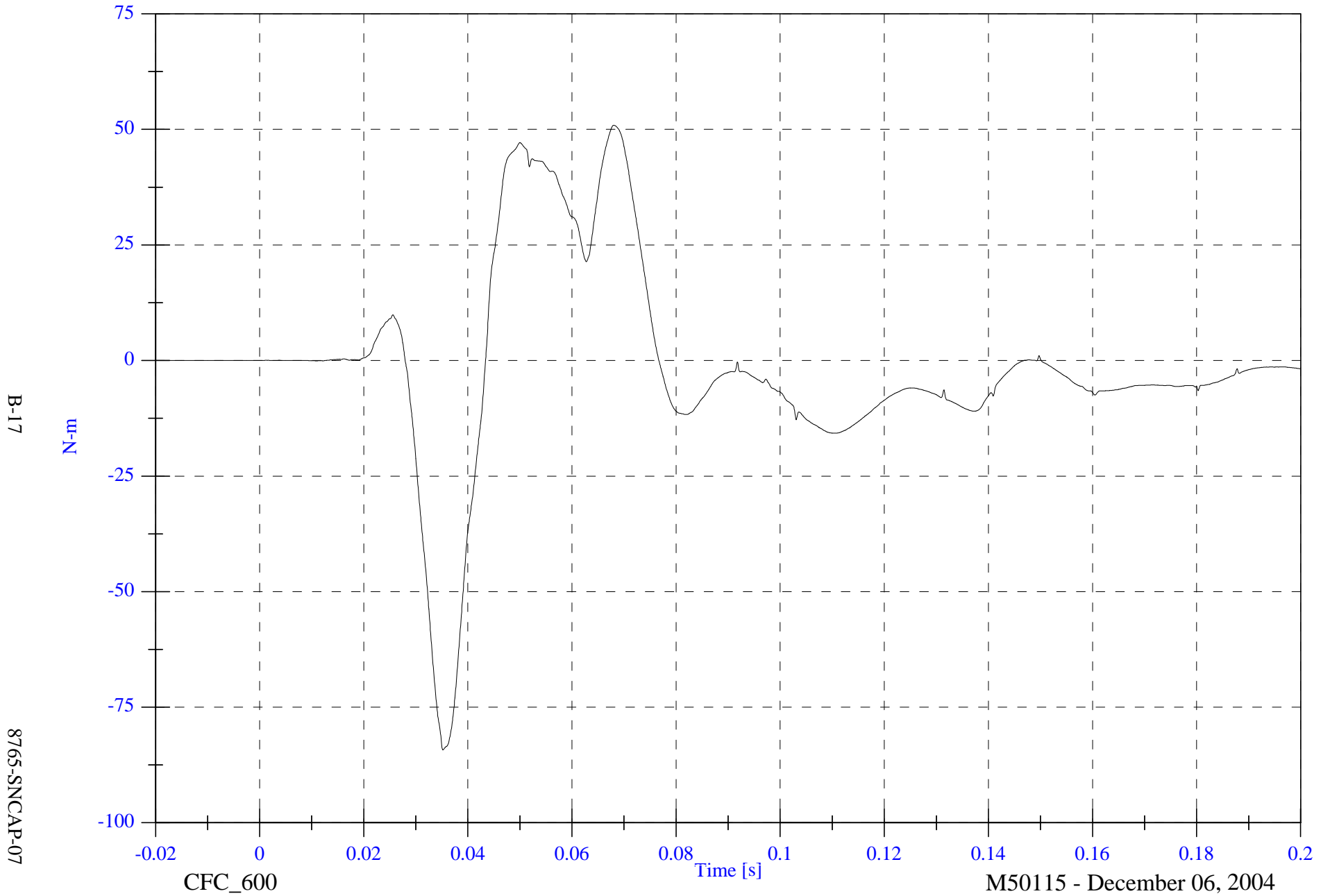
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Neck Mx

Max: 50.9 [N-m] at 0.068 [s]

Min: -84.3 [N-m] at 0.035 [s]

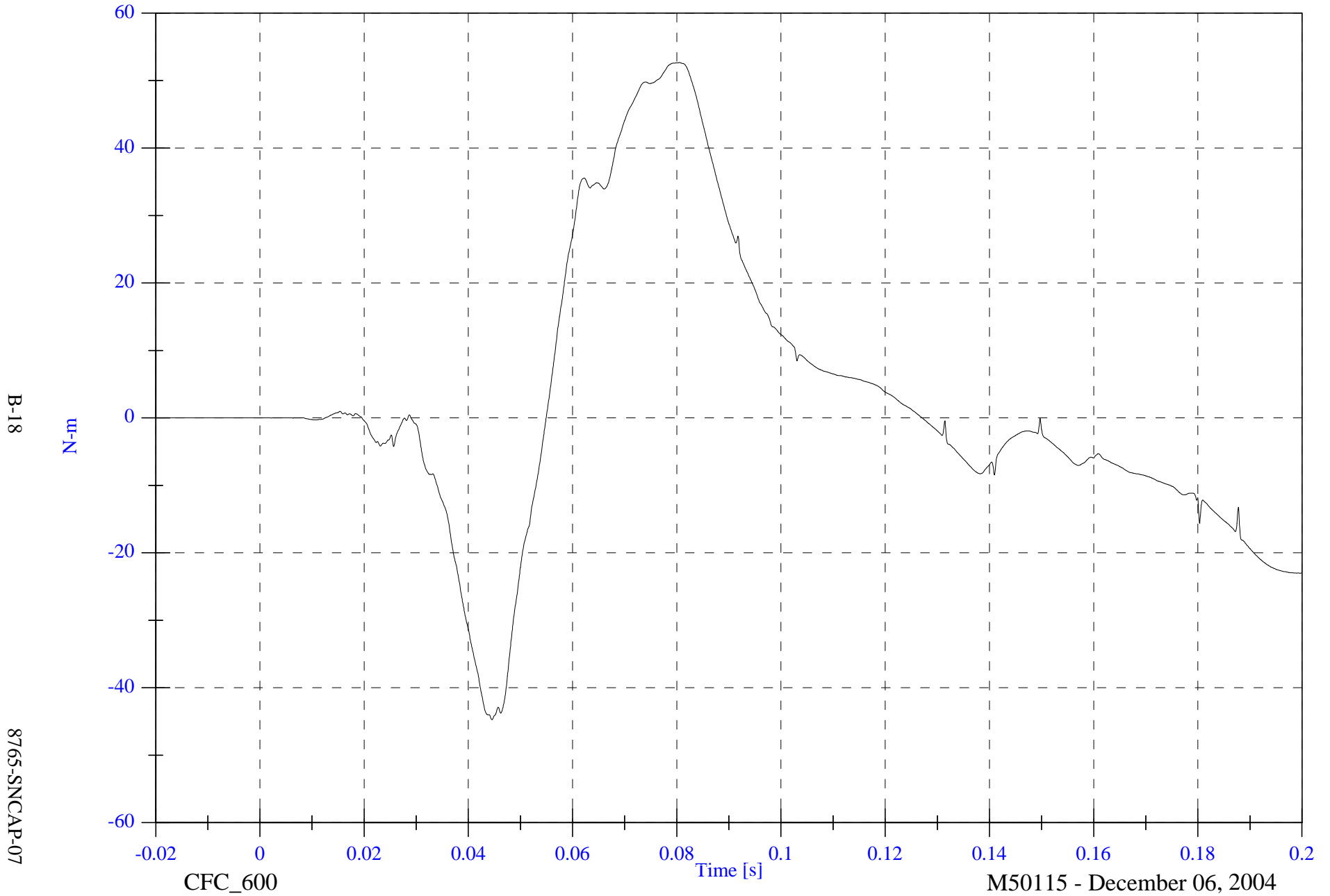


2005 SNCAP Test 2 - 2005 Saturn Ion

Max: 52.7 [N-m] at 0.080 [s]

Min: -44.7 [N-m] at 0.045 [s]

V2P1 Upper Neck My



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8765-SNCAP-07

CFC\_600

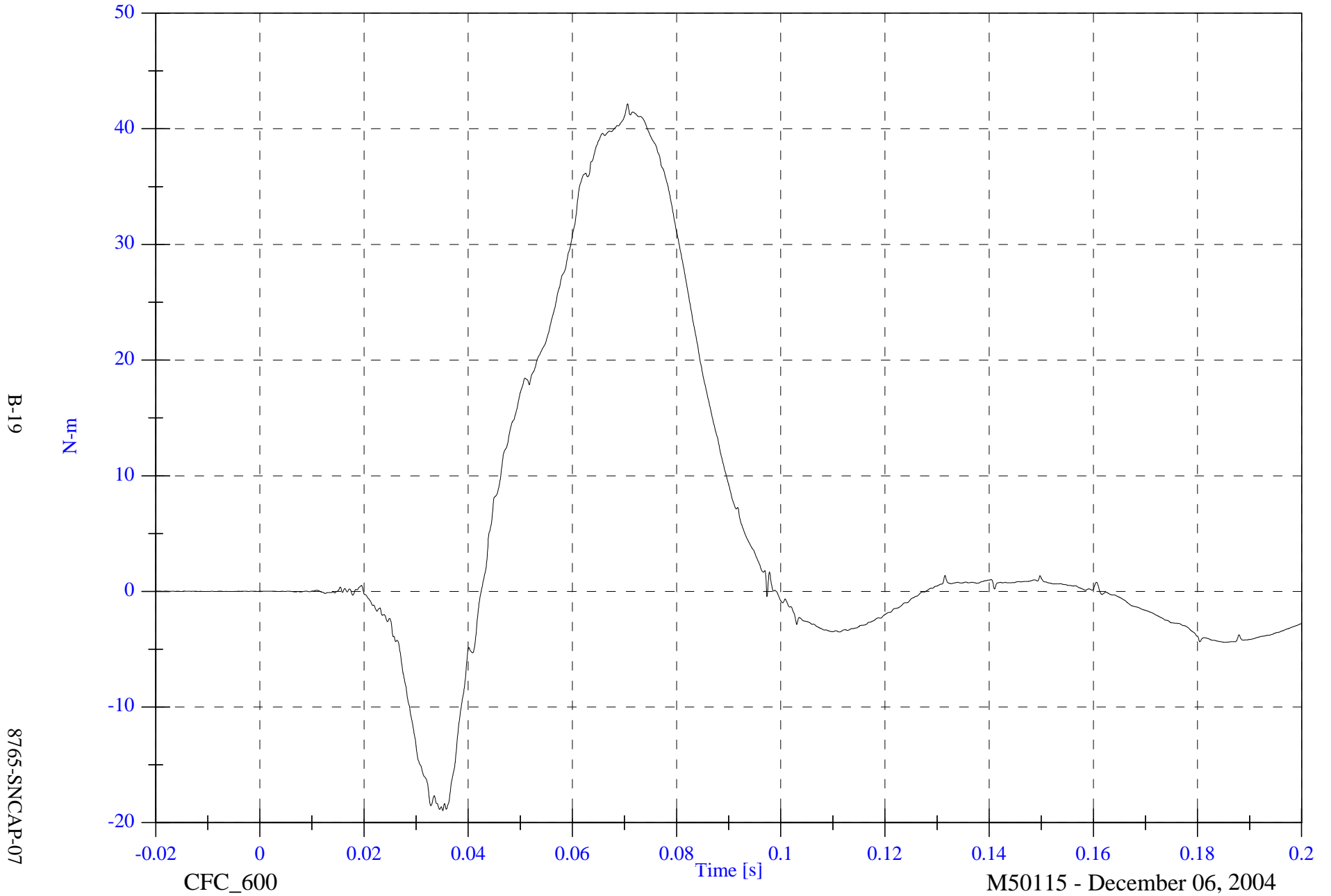
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

Max: 42.2 [N-m] at 0.071 [s]

V2P1 Upper Neck Mz

Min: -18.9 [N-m] at 0.035 [s]



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2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Neck M Resultant

Max: 87.3 [N-m] at 0.035 [s]

Min: 0.0 [N-m] at -0.011 [s]



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M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

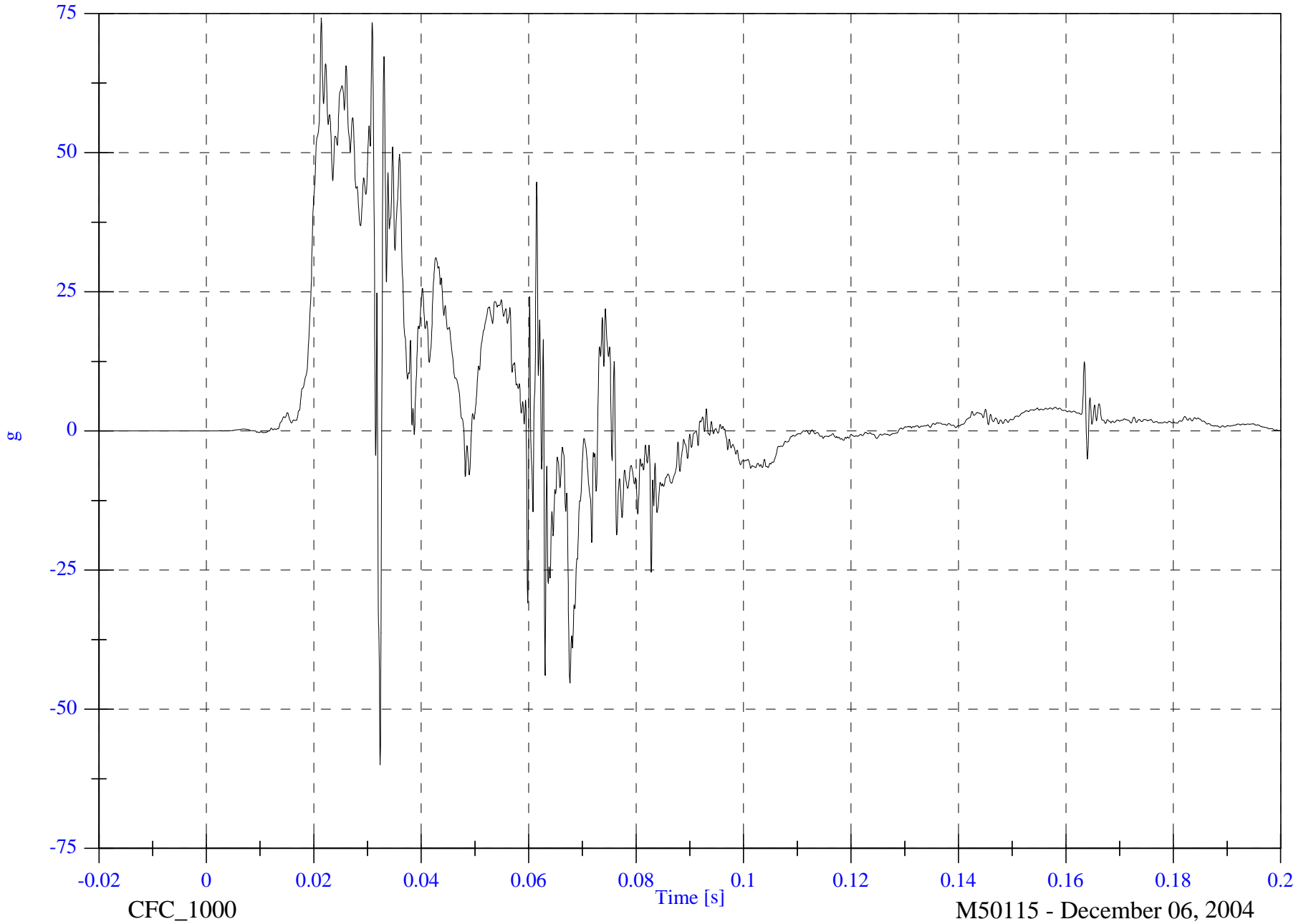
V2P1 Upper Rib y

Max: 74.2 [g] at 0.021 [s]

Min: -60.0 [g] at 0.032 [s]

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8765-SNCAP-07



CFC\_1000

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

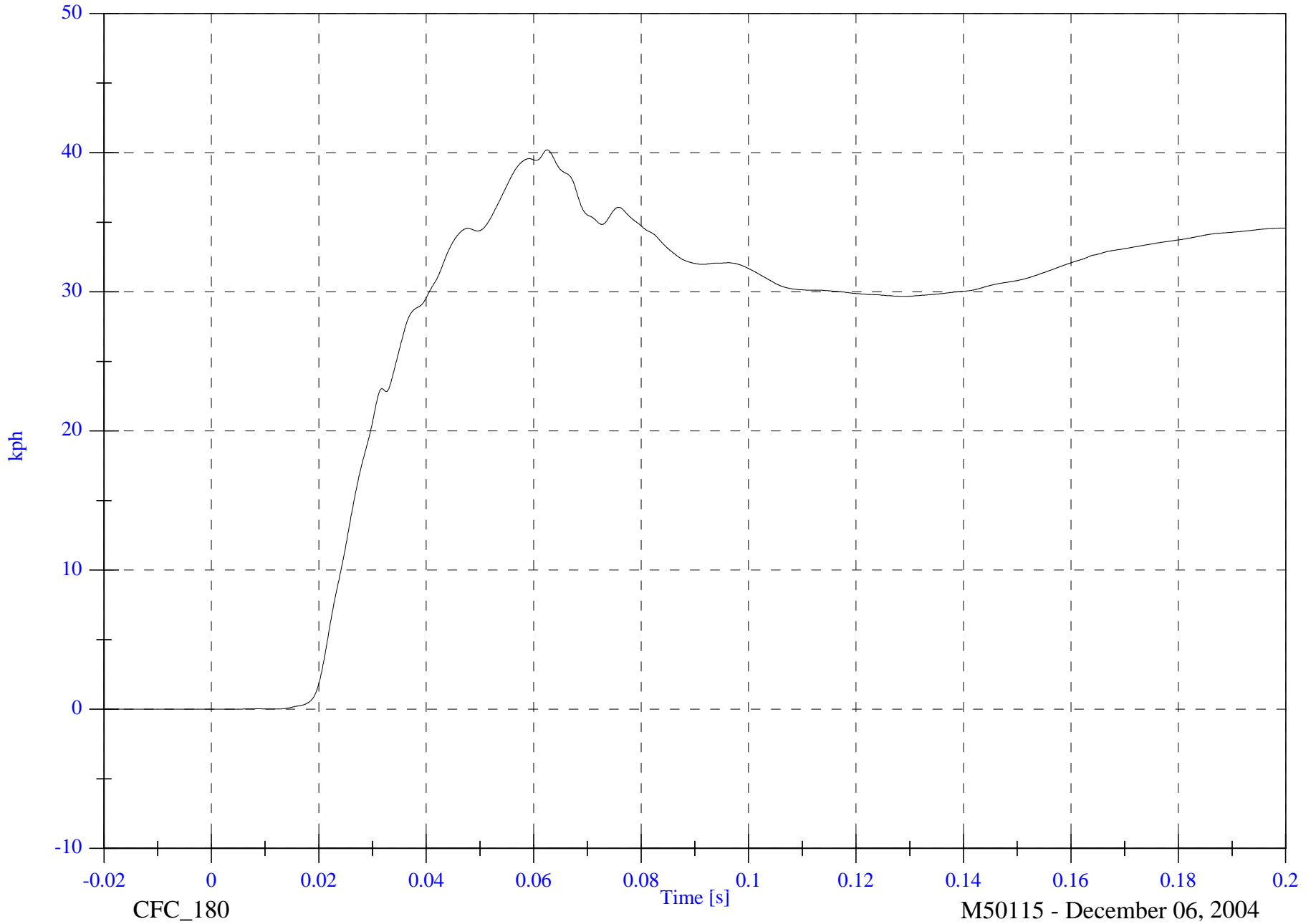
V2P1 Upper Rib y Velocity

Max: 40.2 [kph] at 0.063 [s]

Min: -0.0 [kph] at -0.020 [s]

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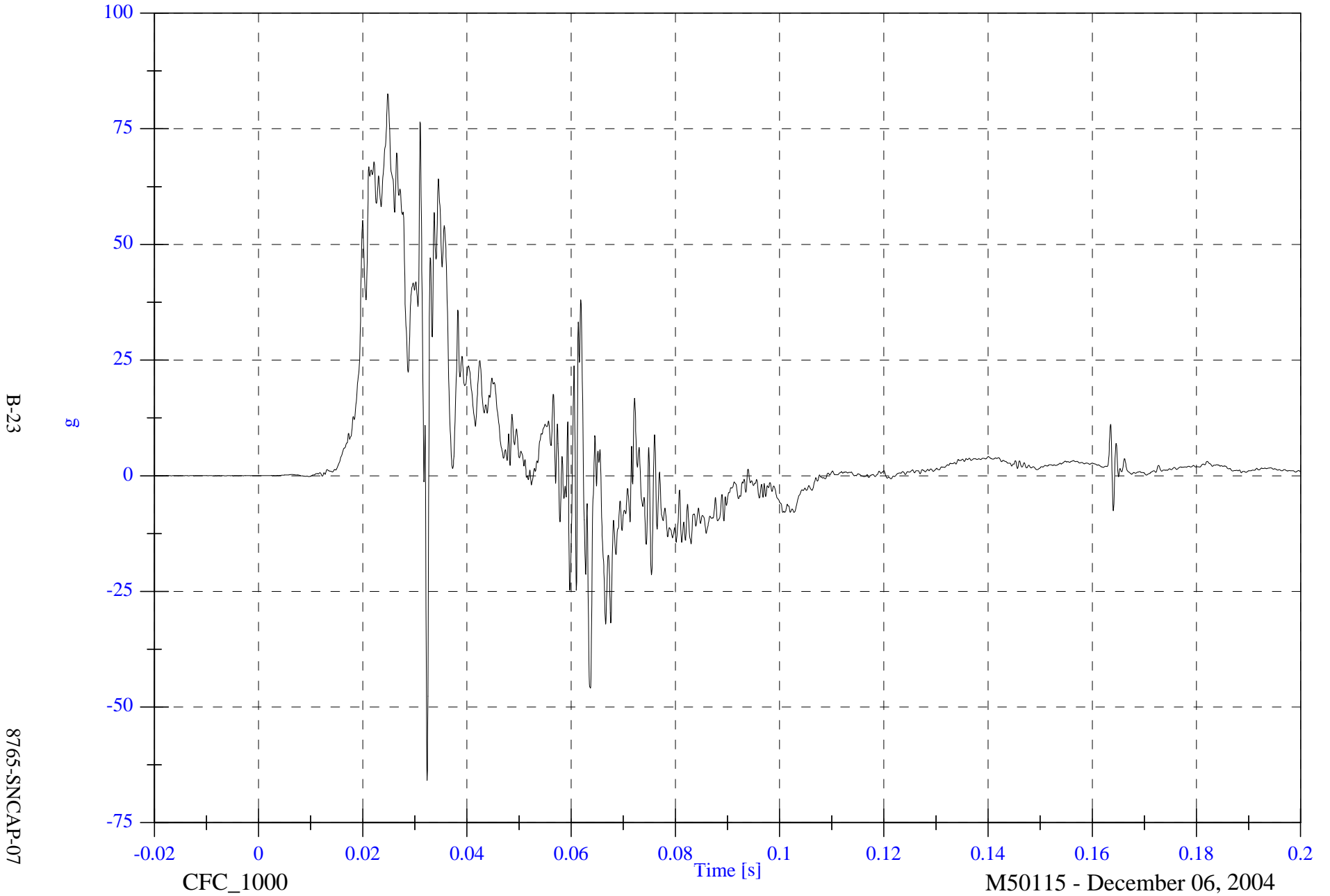


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Rib y

Max: 82.6 [g] at 0.025 [s]

Min: -65.9 [g] at 0.032 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

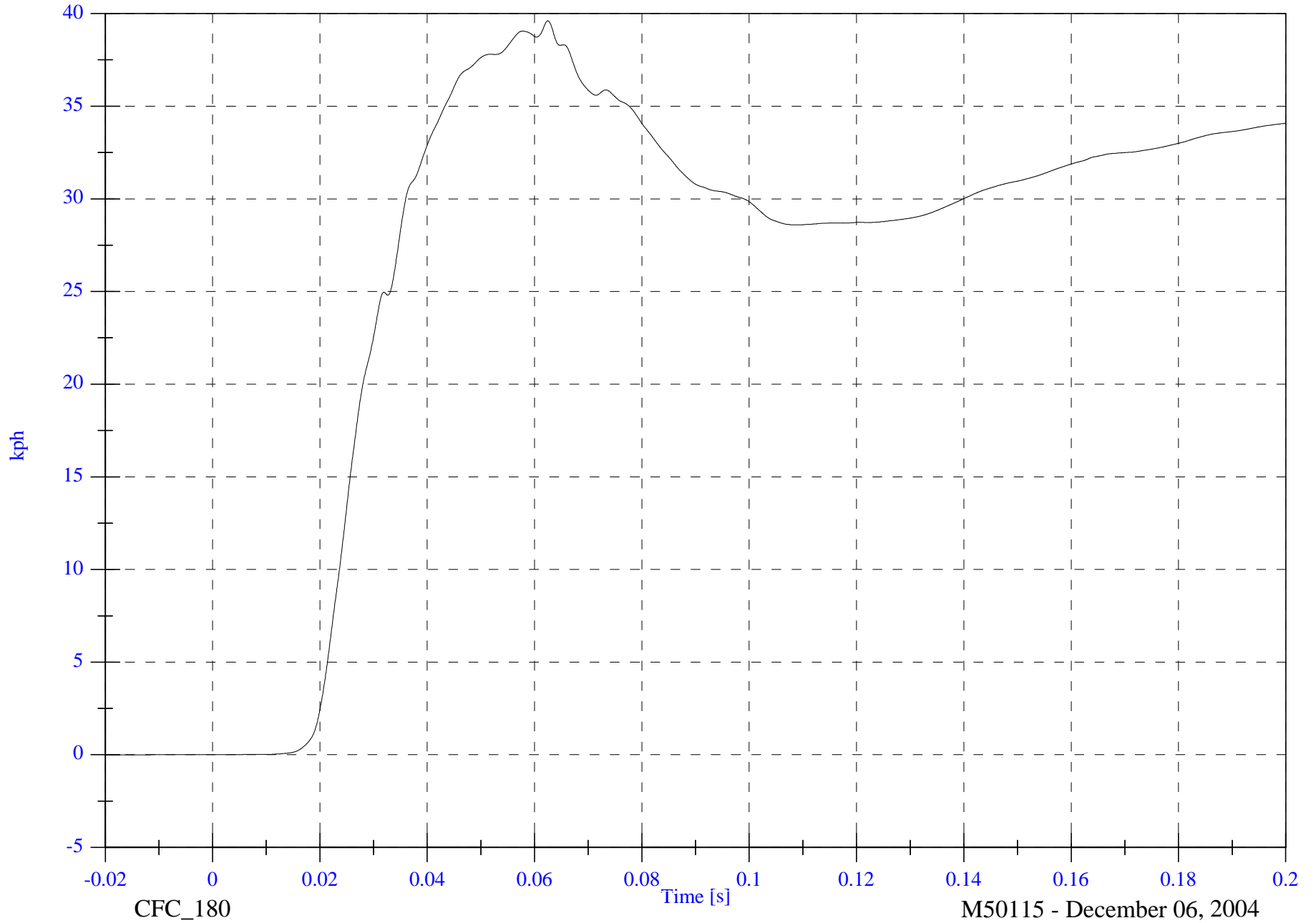
V2P1 Lower Rib y Velocity

Max: 39.6 [kph] at 0.062 [s]

Min: -0.0 [kph] at -0.020 [s]

B-24

8765-SNCAP-07



CFC\_180

Time [s]

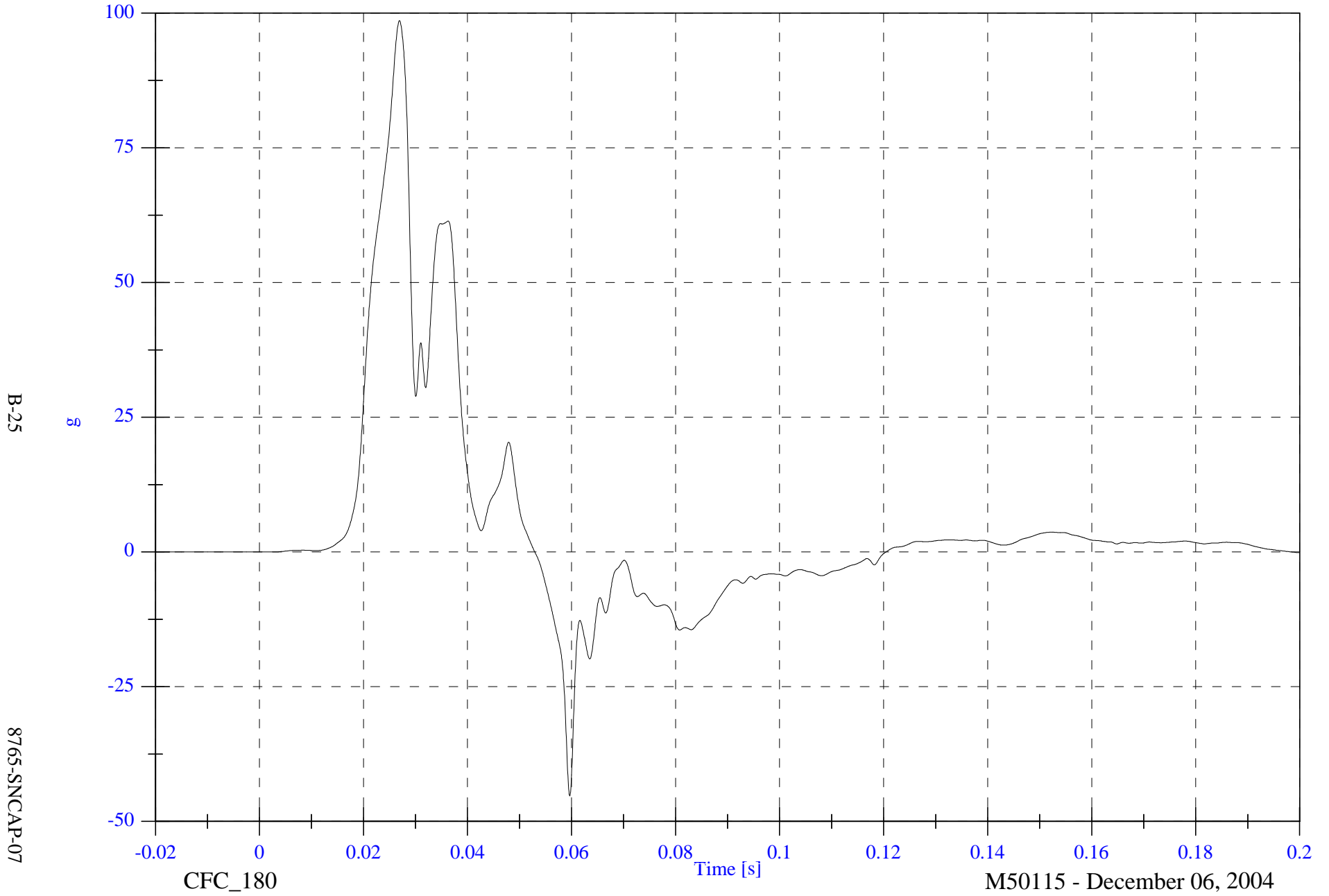
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Spine y

Max: 98.6 [g] at 0.027 [s]

Min: -45.3 [g] at 0.060 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

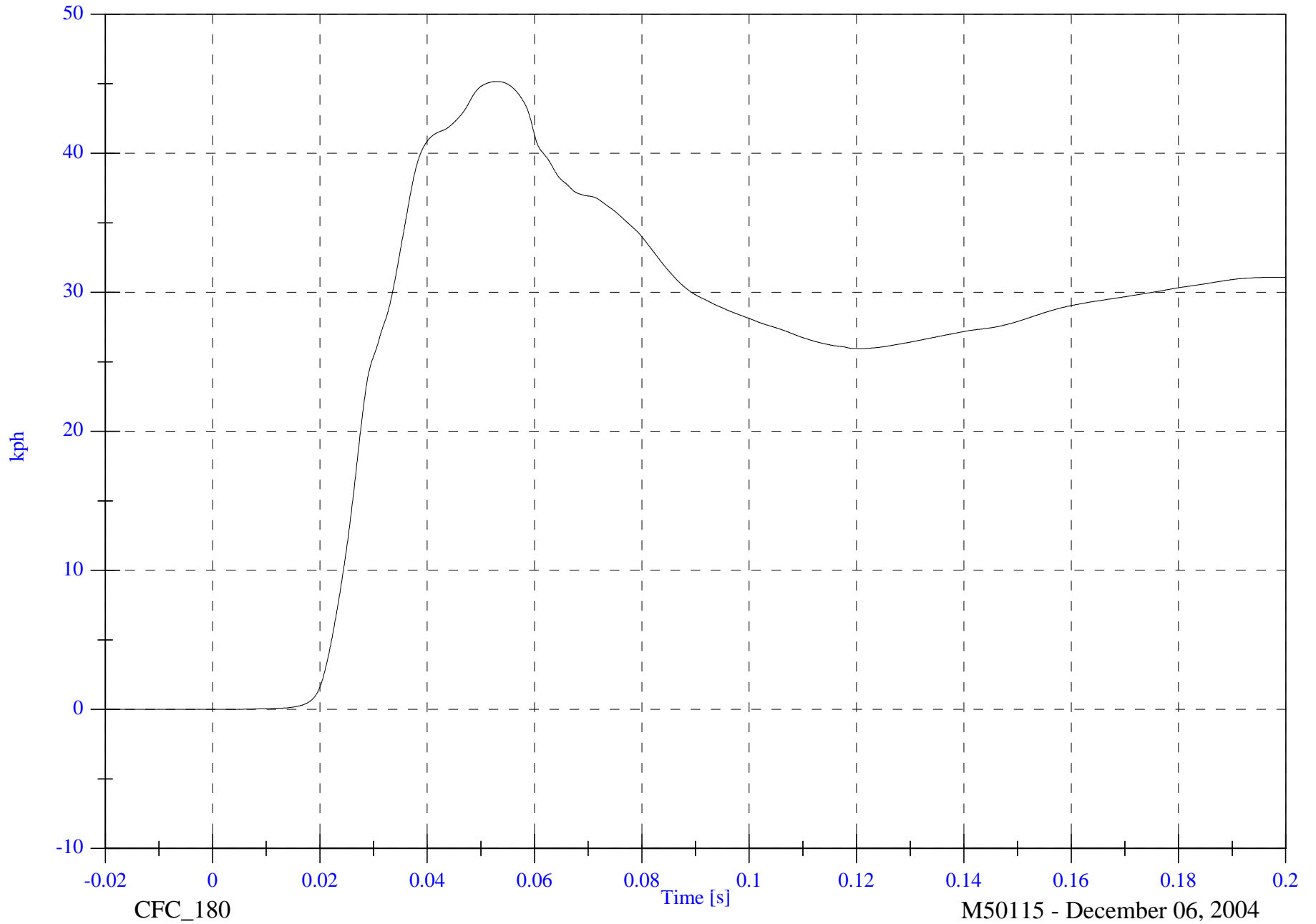
V2P1 Lower Spine y Velocity

Max: 45.2 [kph] at 0.053 [s]

Min: -0.0 [kph] at -0.020 [s]

B-26

8765-SNCAP-07



CFC\_180

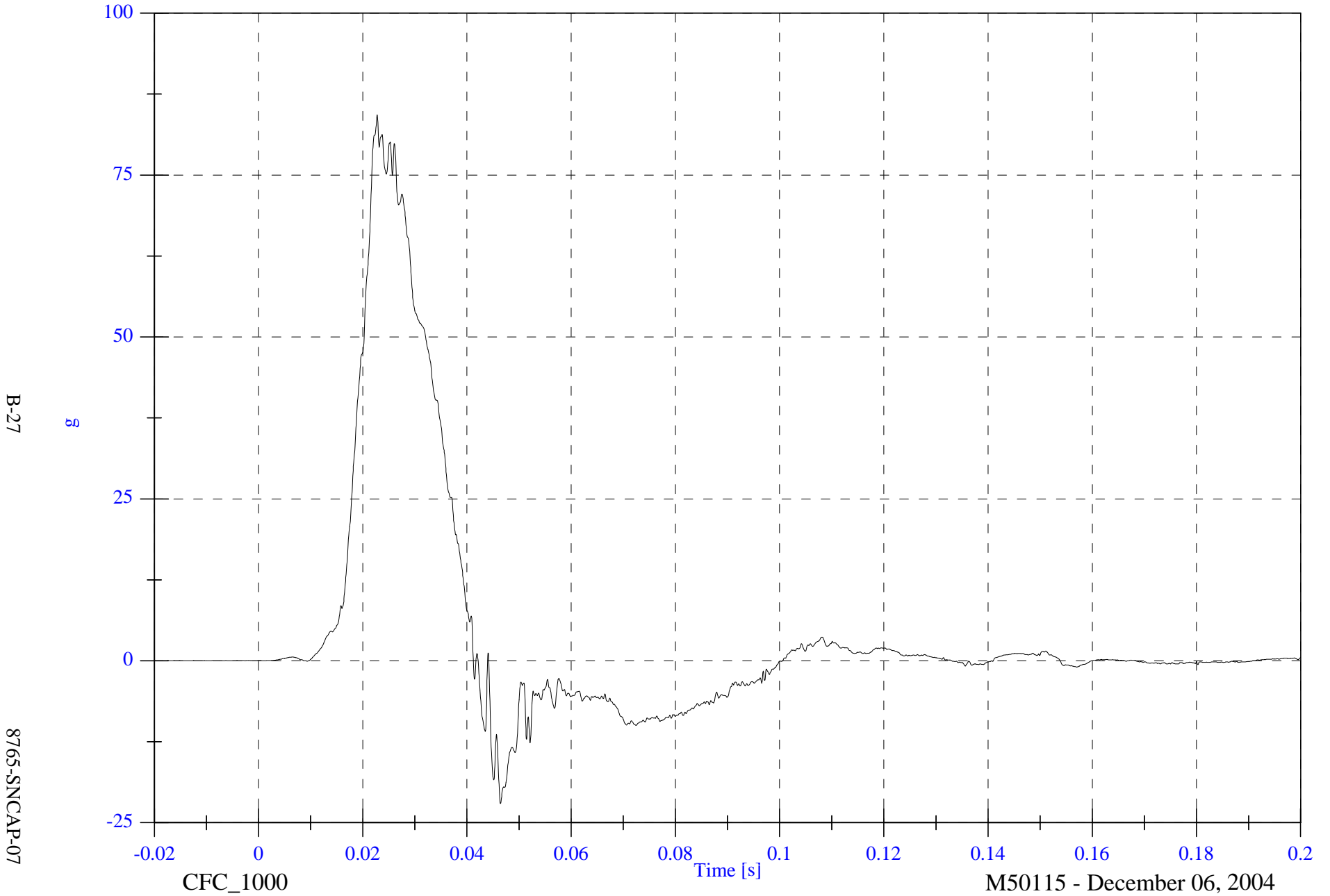
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Pelvic y

Max: 84.3 [g] at 0.023 [s]

Min: -22.1 [g] at 0.046 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

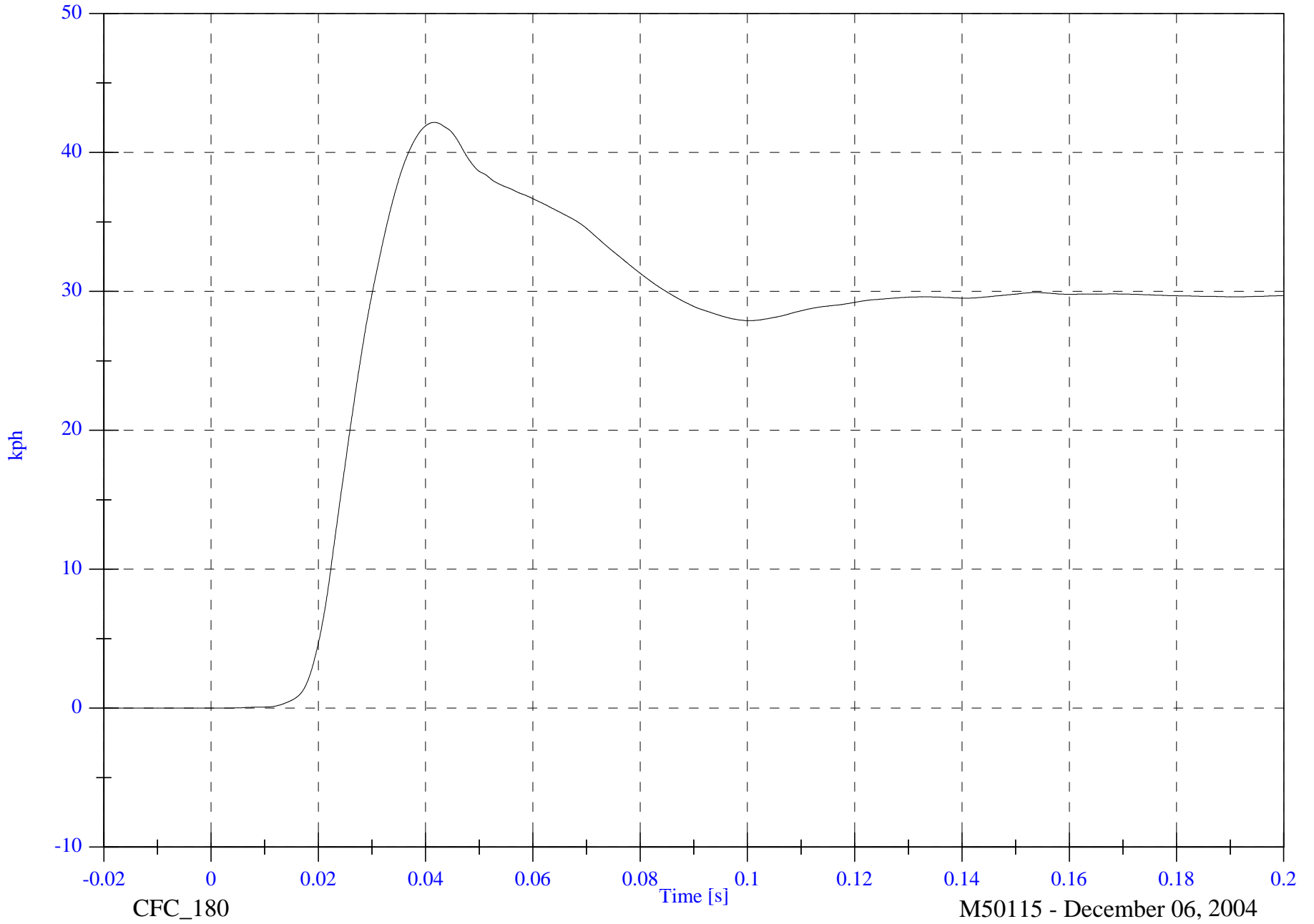
V2P1 Pelvic y Velocity

Max: 42.2 [kph] at 0.042 [s]

Min: -0.0 [kph] at -0.020 [s]

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8765-SNCAP-07

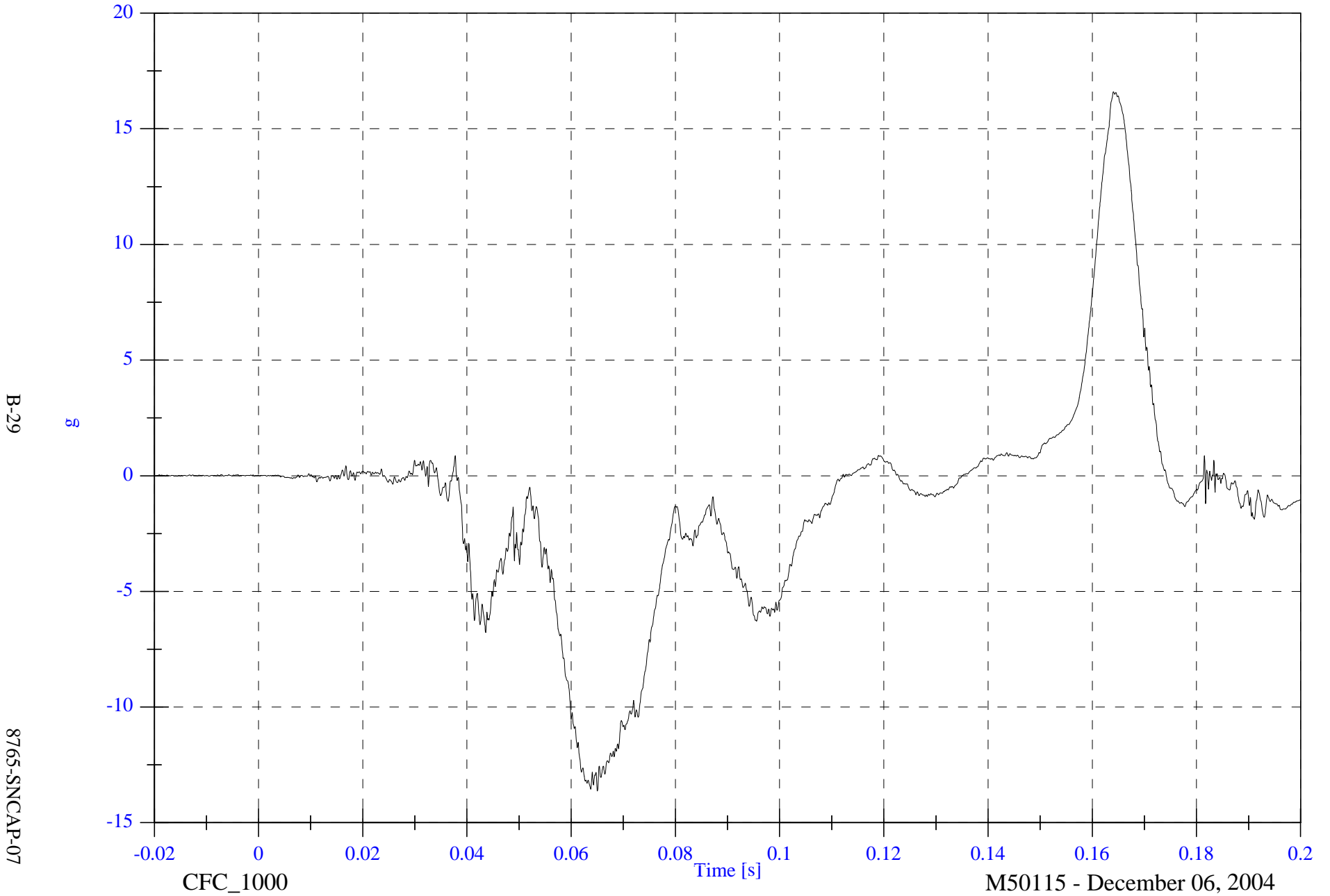


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Head x

Max: 16.6 [g] at 0.164 [s]

Min: -13.6 [g] at 0.065 [s]

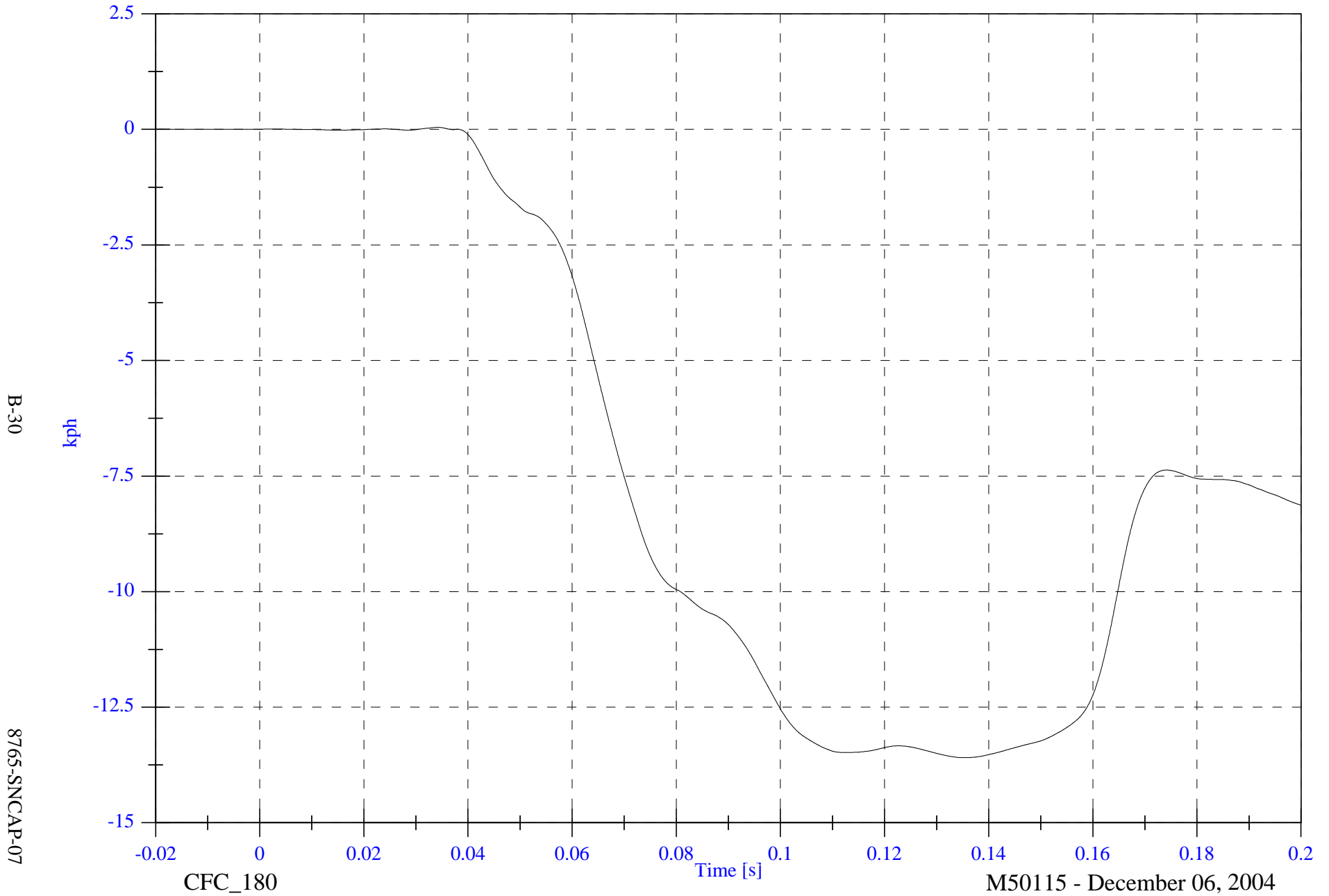


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Head x Velocity

Max: 0.0 [kph] at 0.034 [s]

Min: -13.6 [kph] at 0.135 [s]



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8765-SNCAP-07

CFC\_180

Time [s]

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

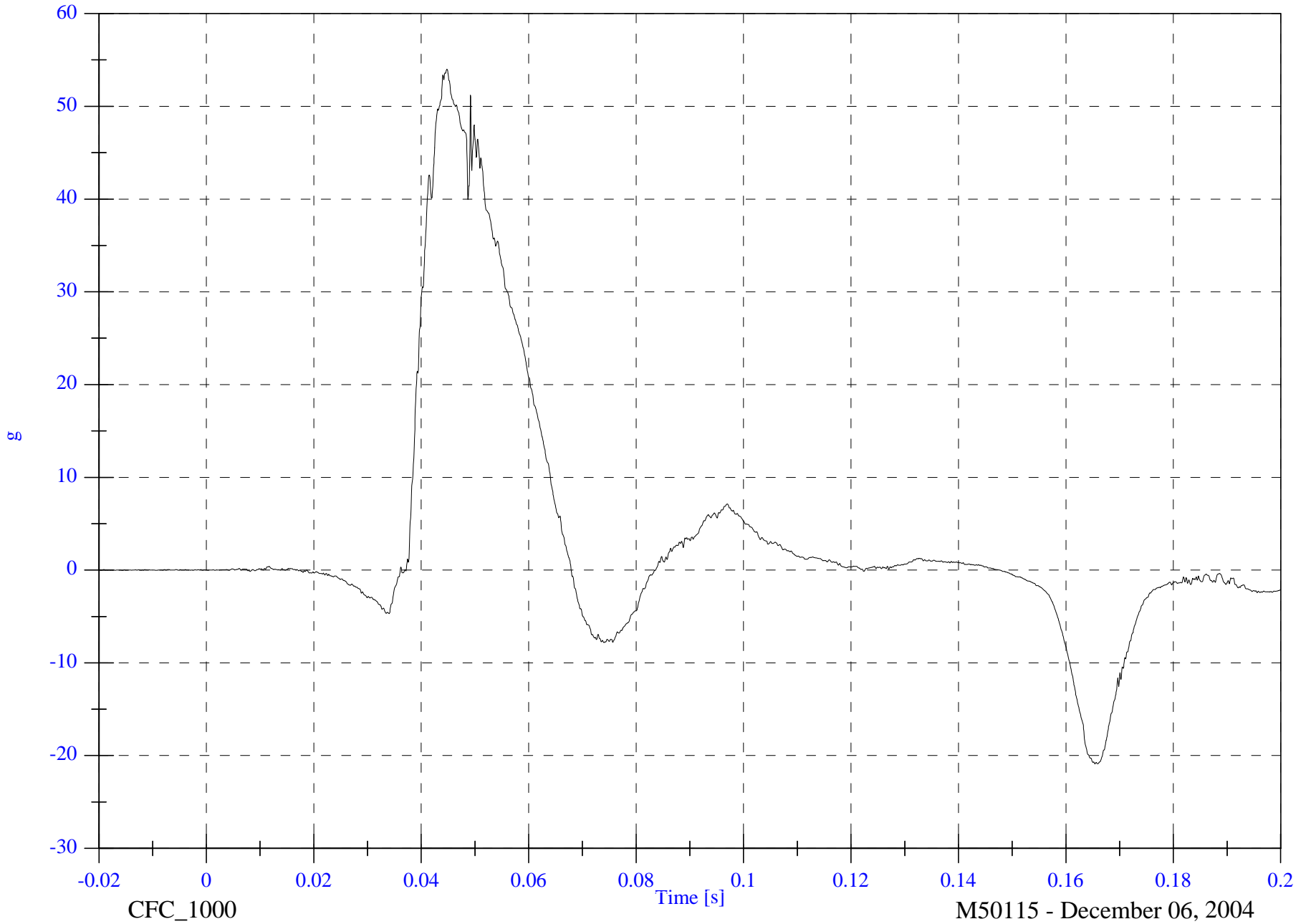
V2P4 Head y

Max: 54.0 [g] at 0.045 [s]

Min: -20.9 [g] at 0.165 [s]

B-31

8765-SNCAP-07



CFC\_1000

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

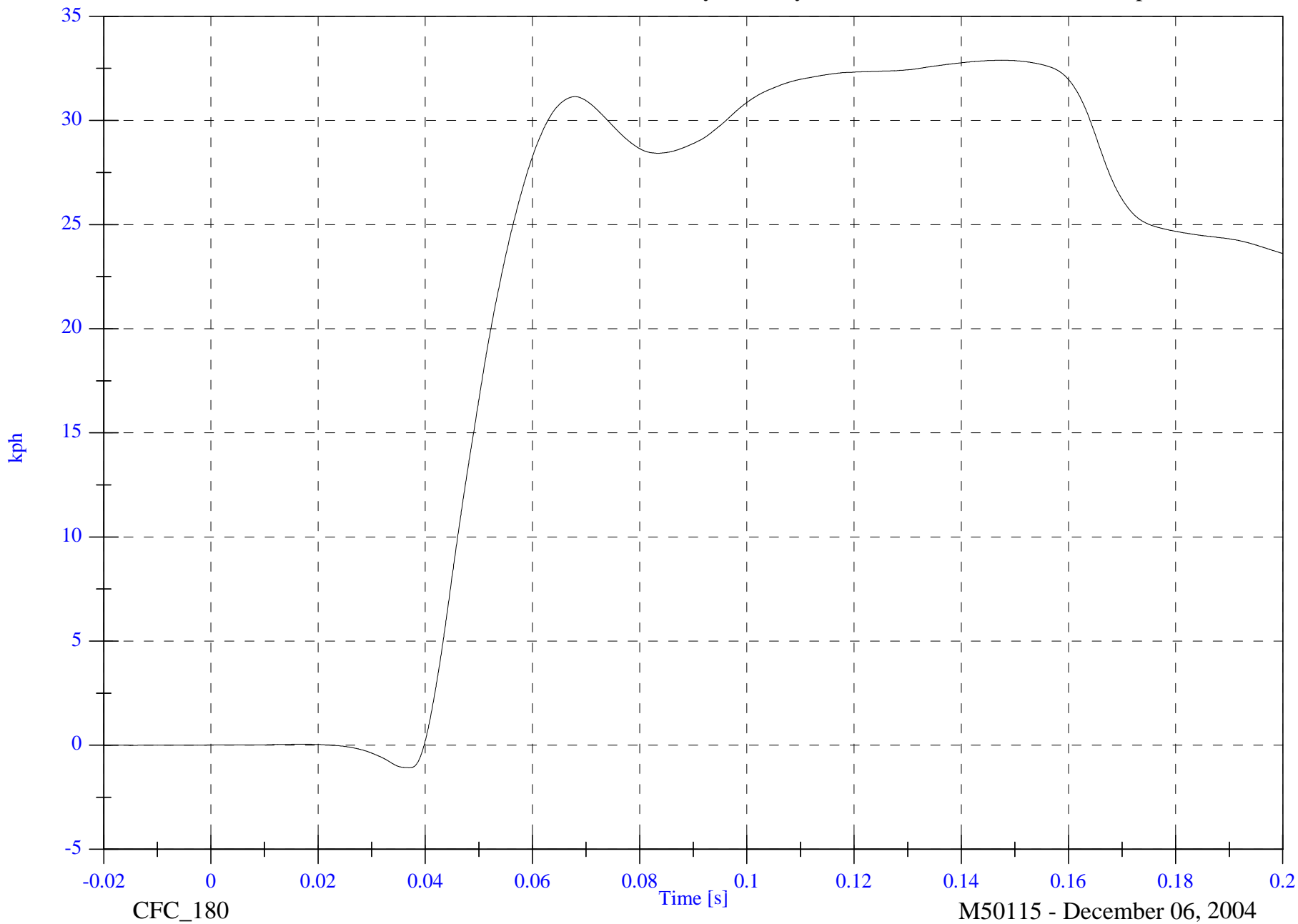
V2P4 Head y Velocity

Max: 32.9 [kph] at 0.148 [s]

Min: -1.1 [kph] at 0.037 [s]

B-32

8765-SNCAP-07



CFC\_180

Time [s]

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

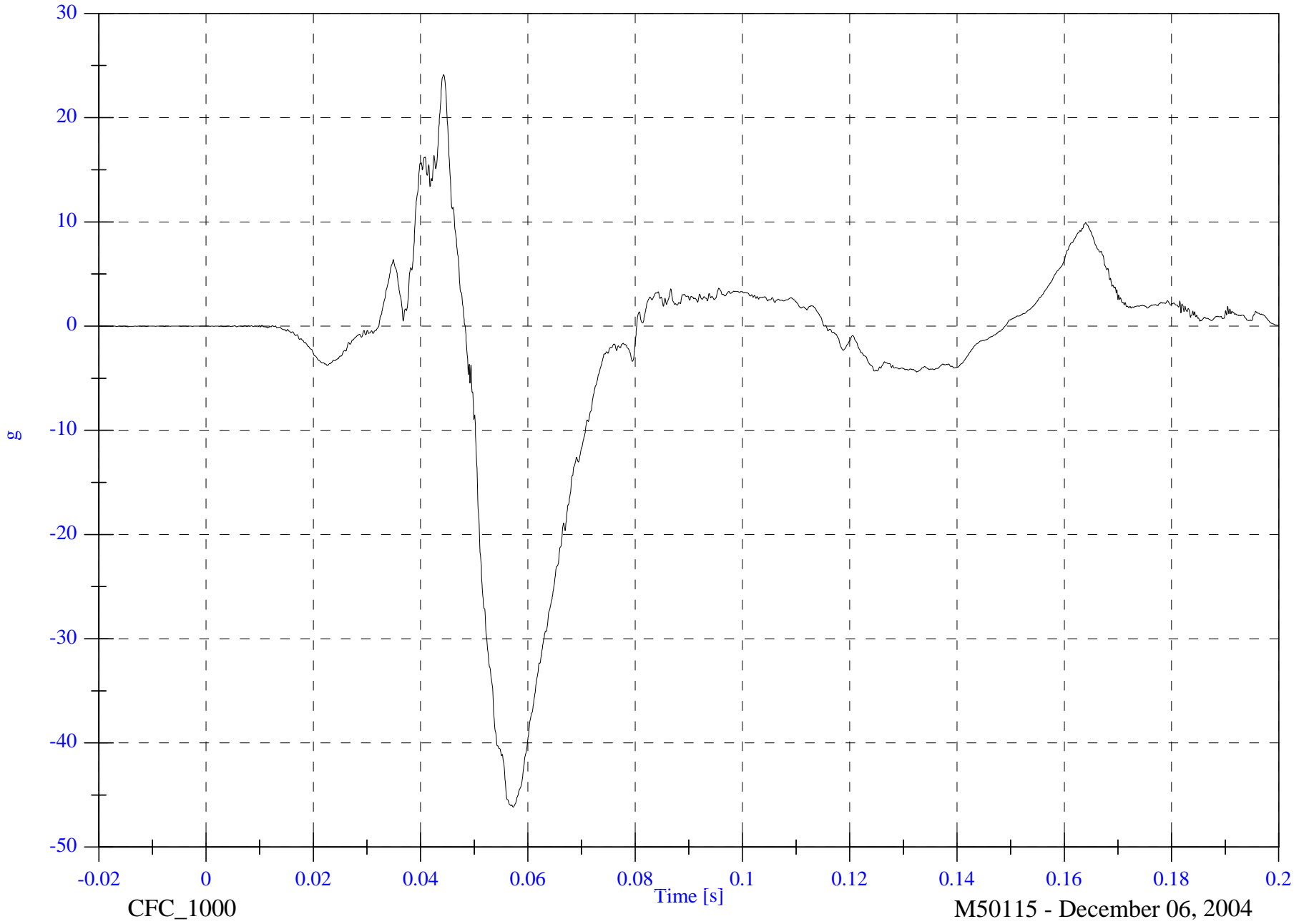
V2P4 Head z

Max: 24.1 [g] at 0.044 [s]

Min: -46.2 [g] at 0.057 [s]

B-33

8765-SNCAP-07



CFC\_1000

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

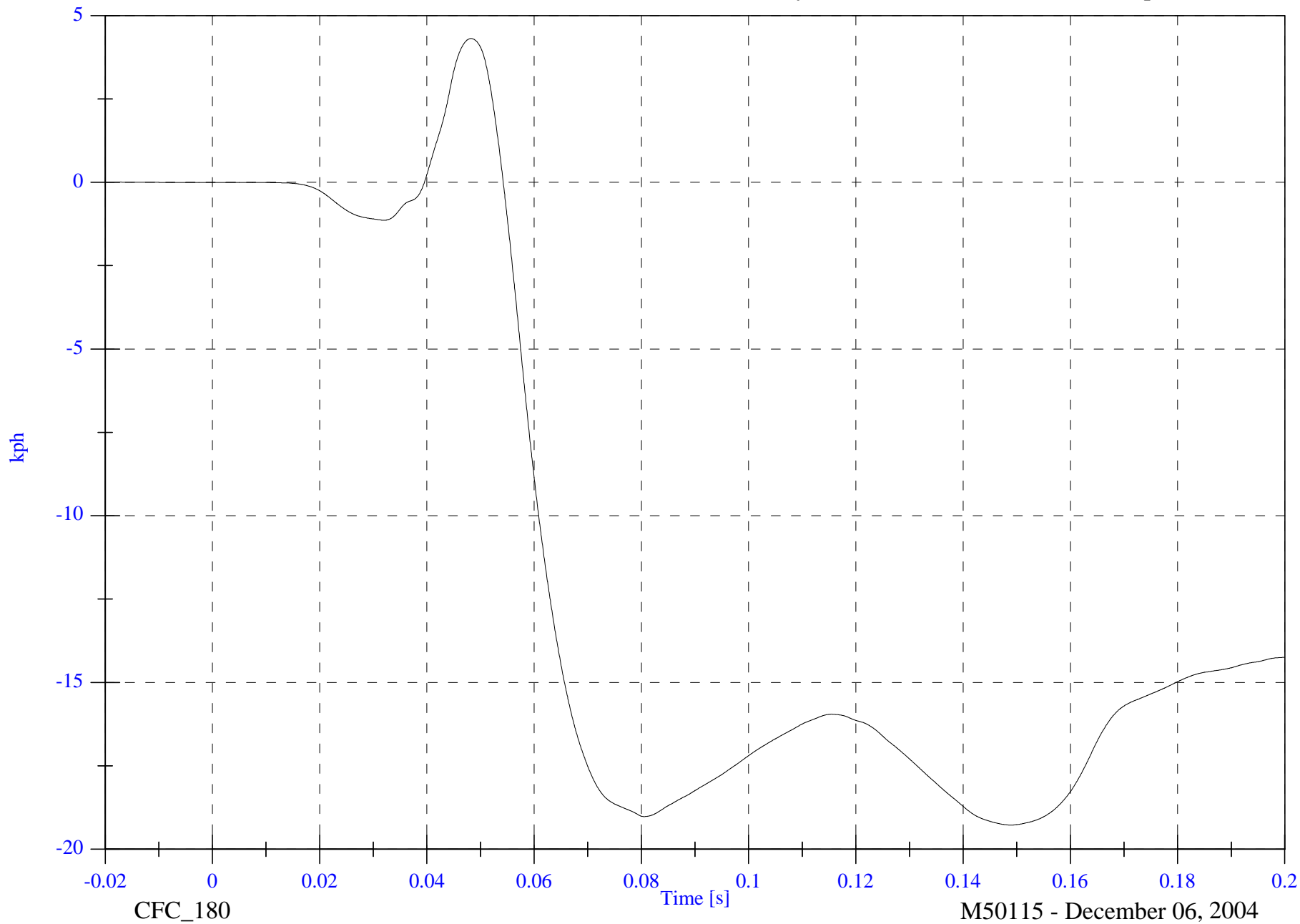
V2P4 Head z Velocity

Max: 4.3 [kph] at 0.048 [s]

Min: -19.3 [kph] at 0.149 [s]

B-34

8765-SNCAP-07



2005 SNCAP Test 2 - 2005 Saturn Ion

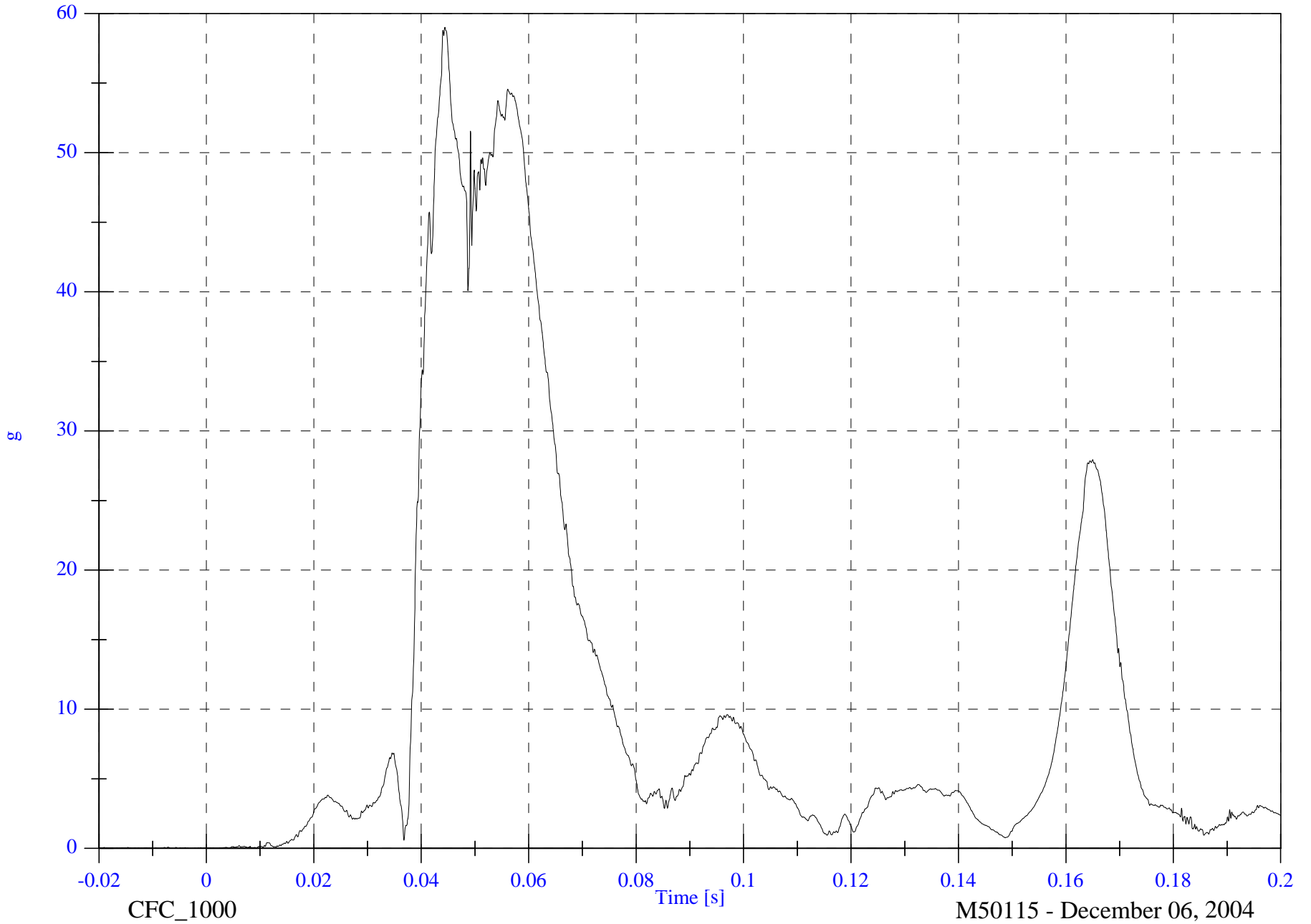
V2P4 Head Resultant

Max: 59.0 [g] at 0.044 [s]

Min: 0.0 [g] at -0.012 [s]

B-35

8765-SNCAP-07

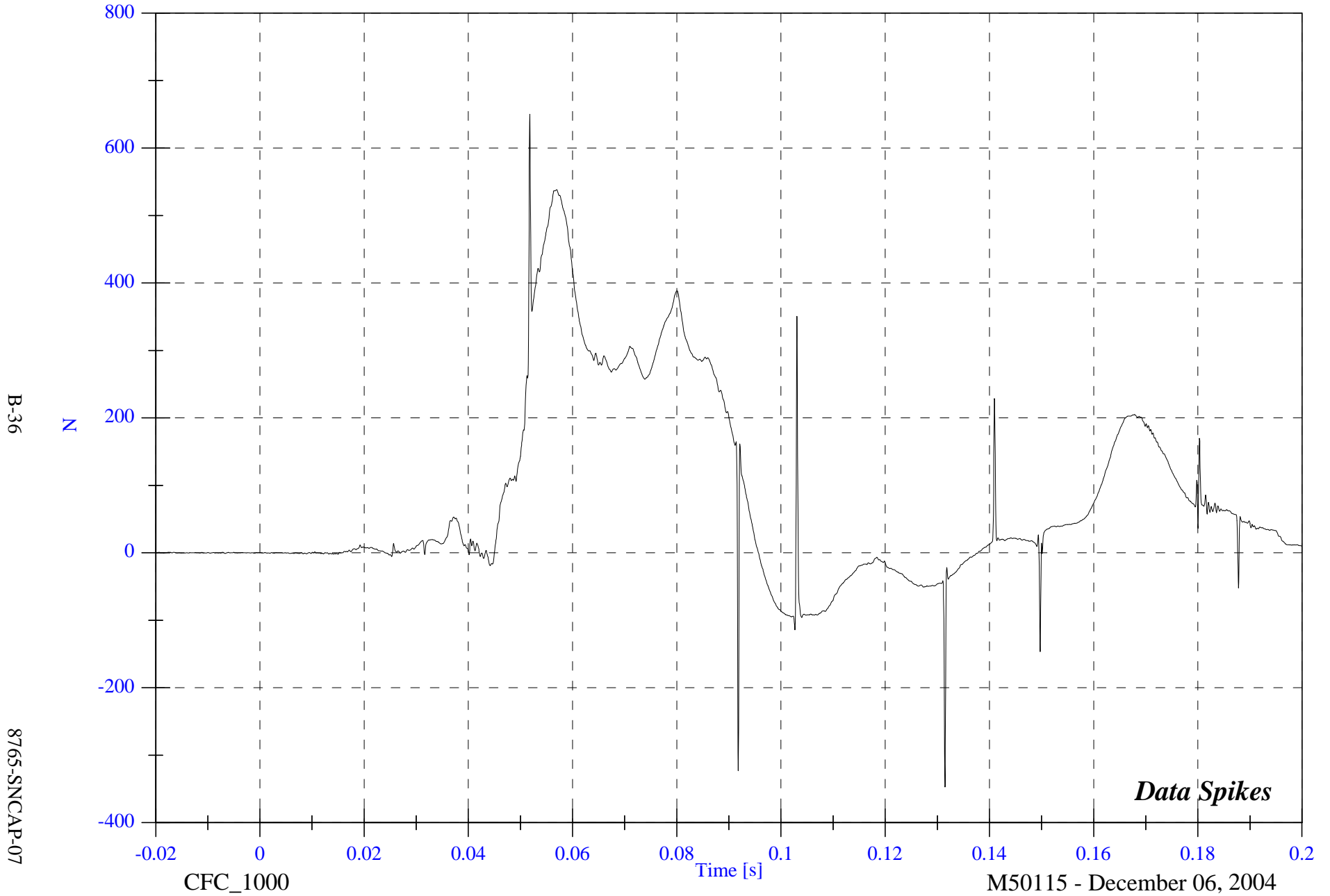


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Neck Fx

Max: 650.1 [N] at 0.052 [s]

Min: -347.4 [N] at 0.131 [s]



B-36

8765-SNCAP-07

CFC\_1000

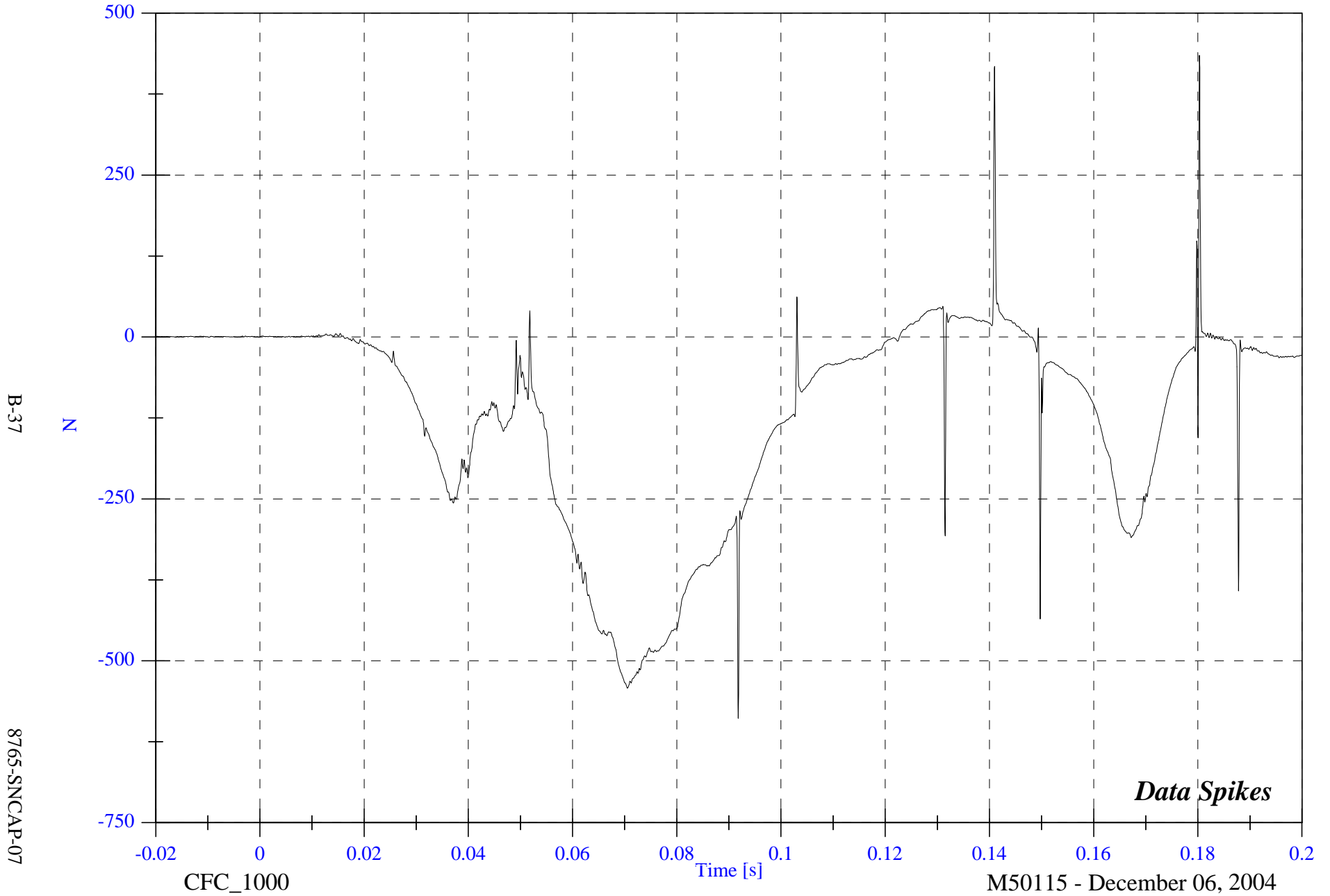
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Neck Fy

Max: 434.7 [N] at 0.180 [s]

Min: -588.8 [N] at 0.092 [s]

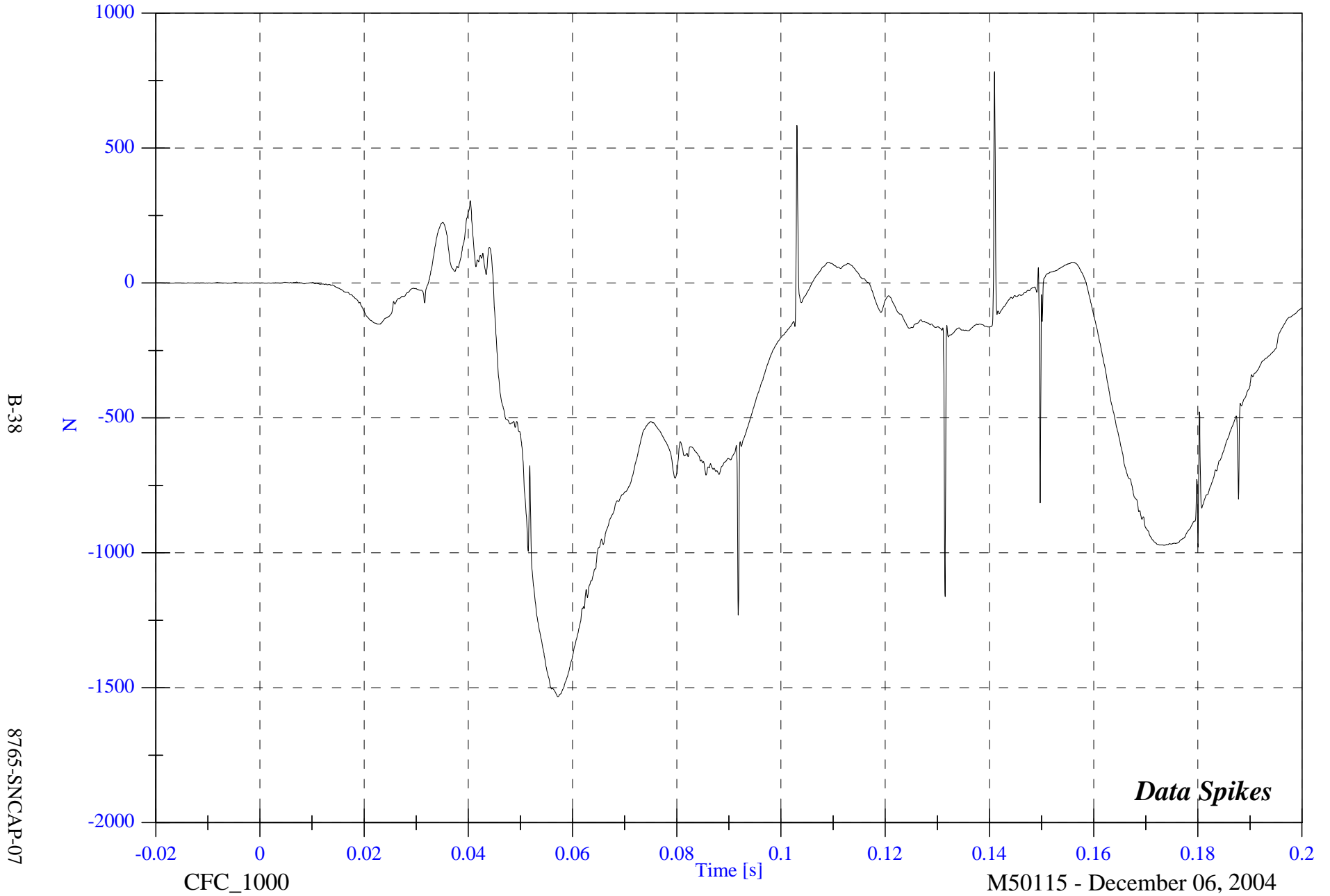


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Neck Fz

Max: 782.9 [N] at 0.141 [s]

Min: -1533.0 [N] at 0.057 [s]

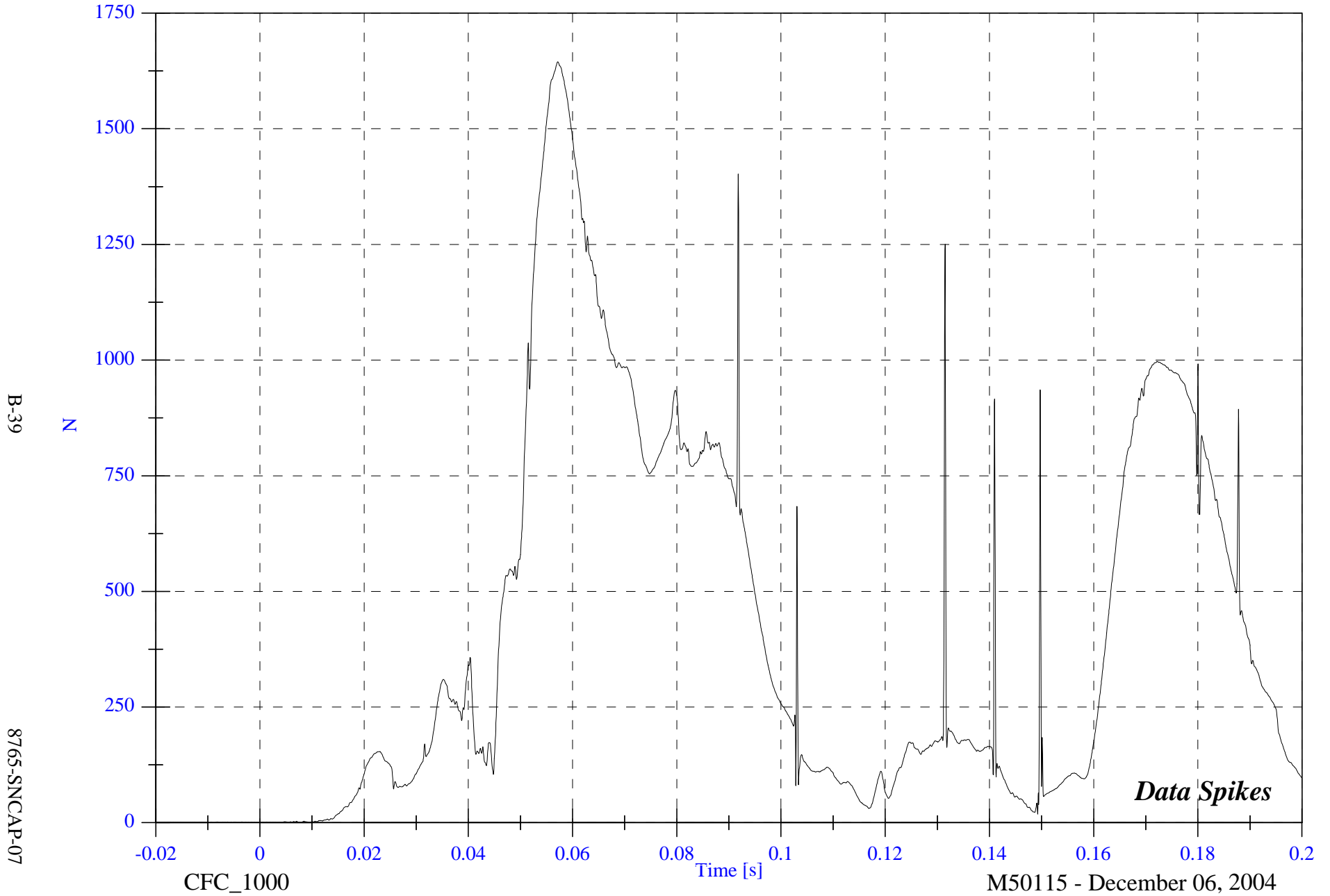


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Neck F Resultant

Max: 1644.5 [N] at 0.057 [s]

Min: 0.1 [N] at 0.004 [s]

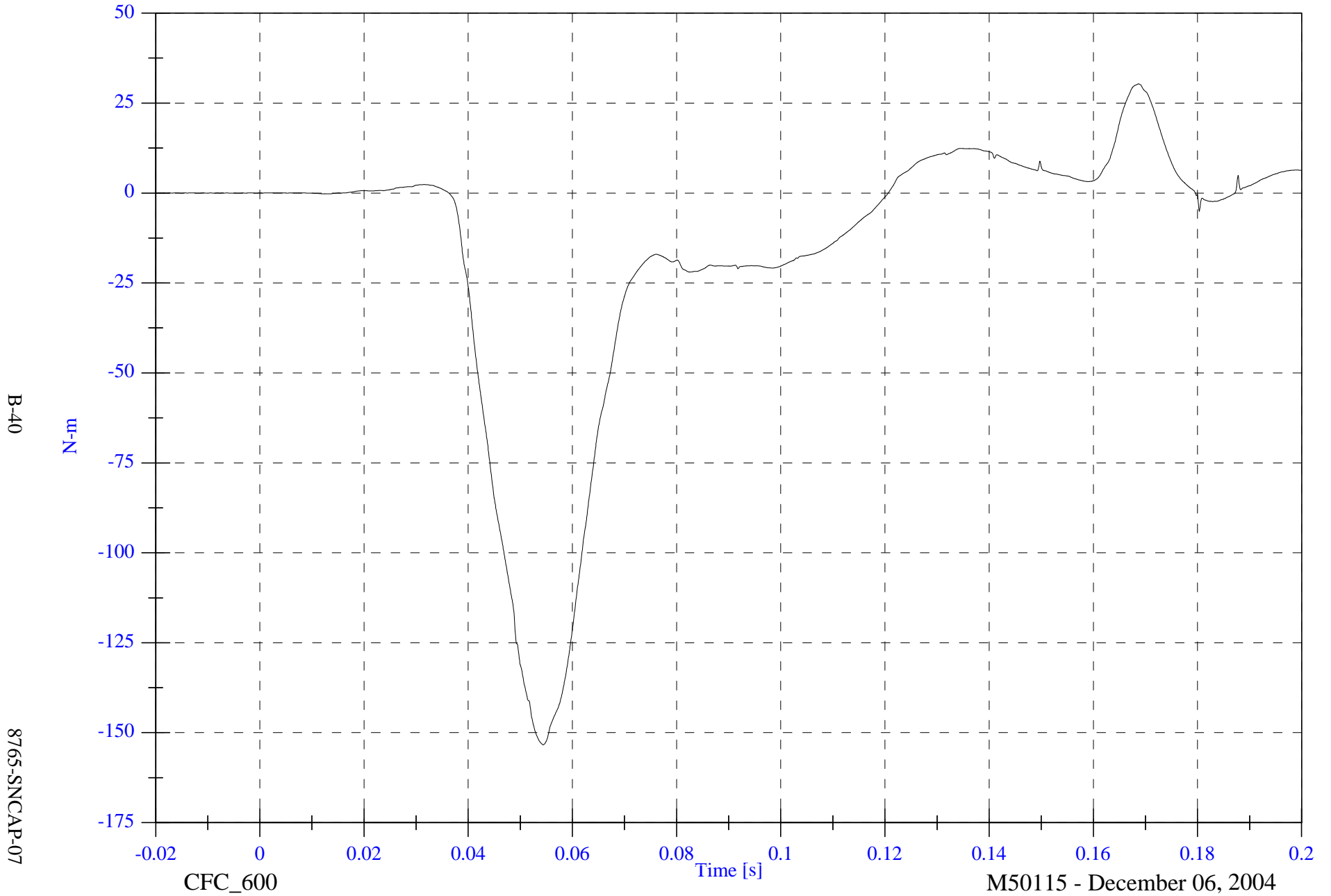


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Neck Mx

Max: 30.3 [N-m] at 0.169 [s]

Min: -153.3 [N-m] at 0.054 [s]



B-40

8765-SNCAP-07

CFC\_600

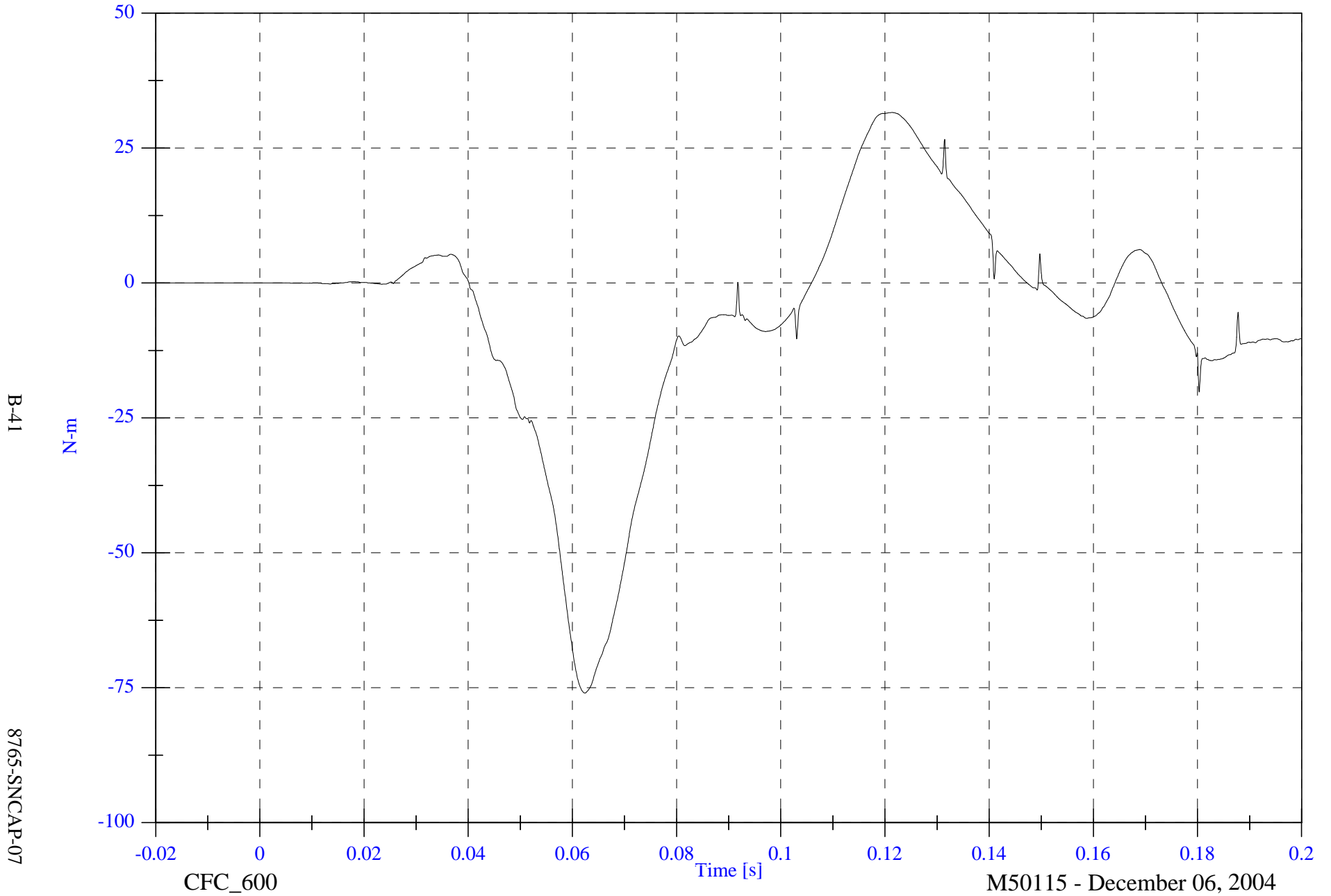
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Neck My

Max: 31.6 [N-m] at 0.121 [s]

Min: -76.0 [N-m] at 0.062 [s]

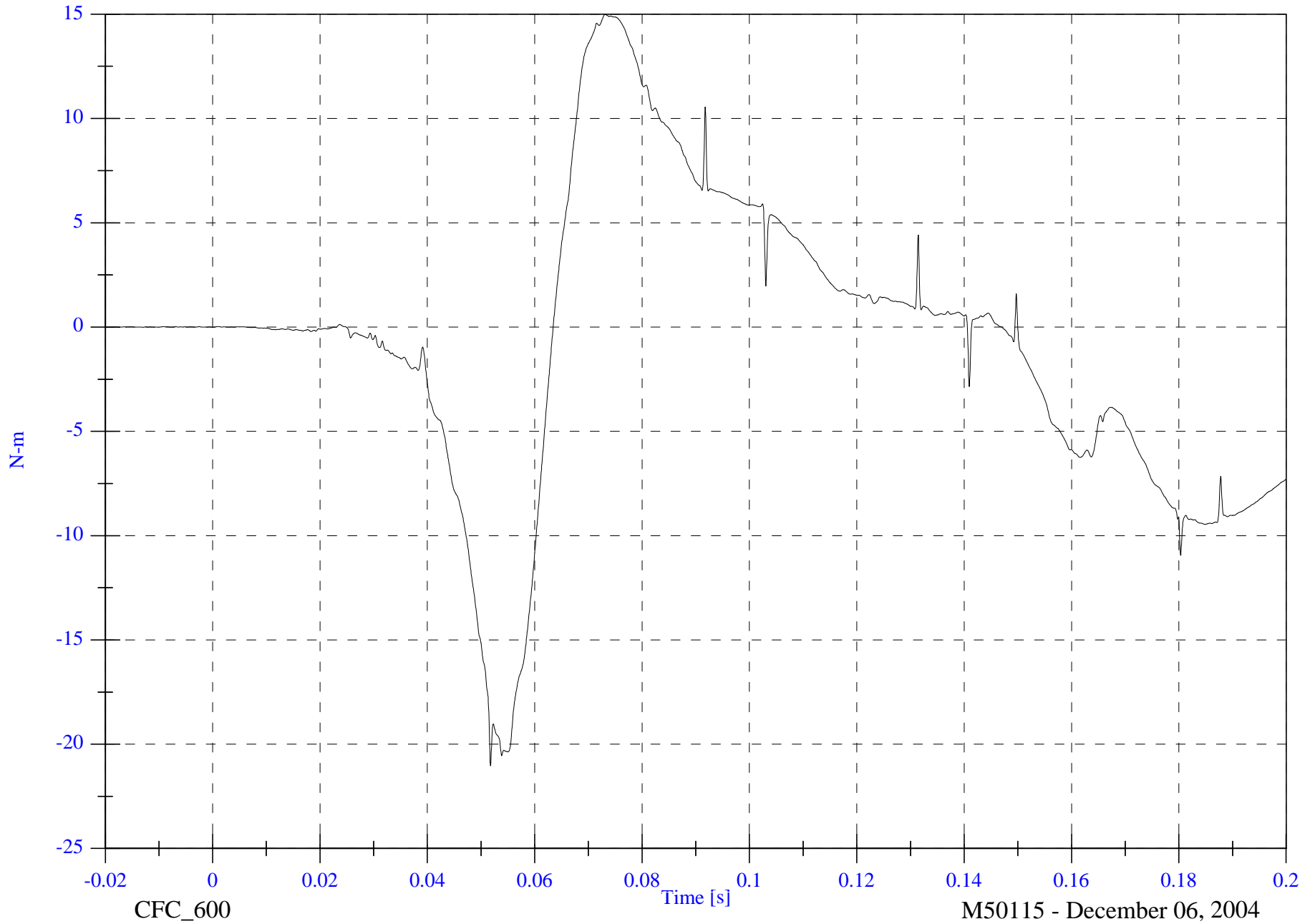


2005 SNCAP Test 2 - 2005 Saturn Ion

Max: 15.0 [N-m] at 0.073 [s]

Min: -21.0 [N-m] at 0.052 [s]

V2P4 Upper Neck Mz



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8765-SNCAP-07

CFC\_600

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

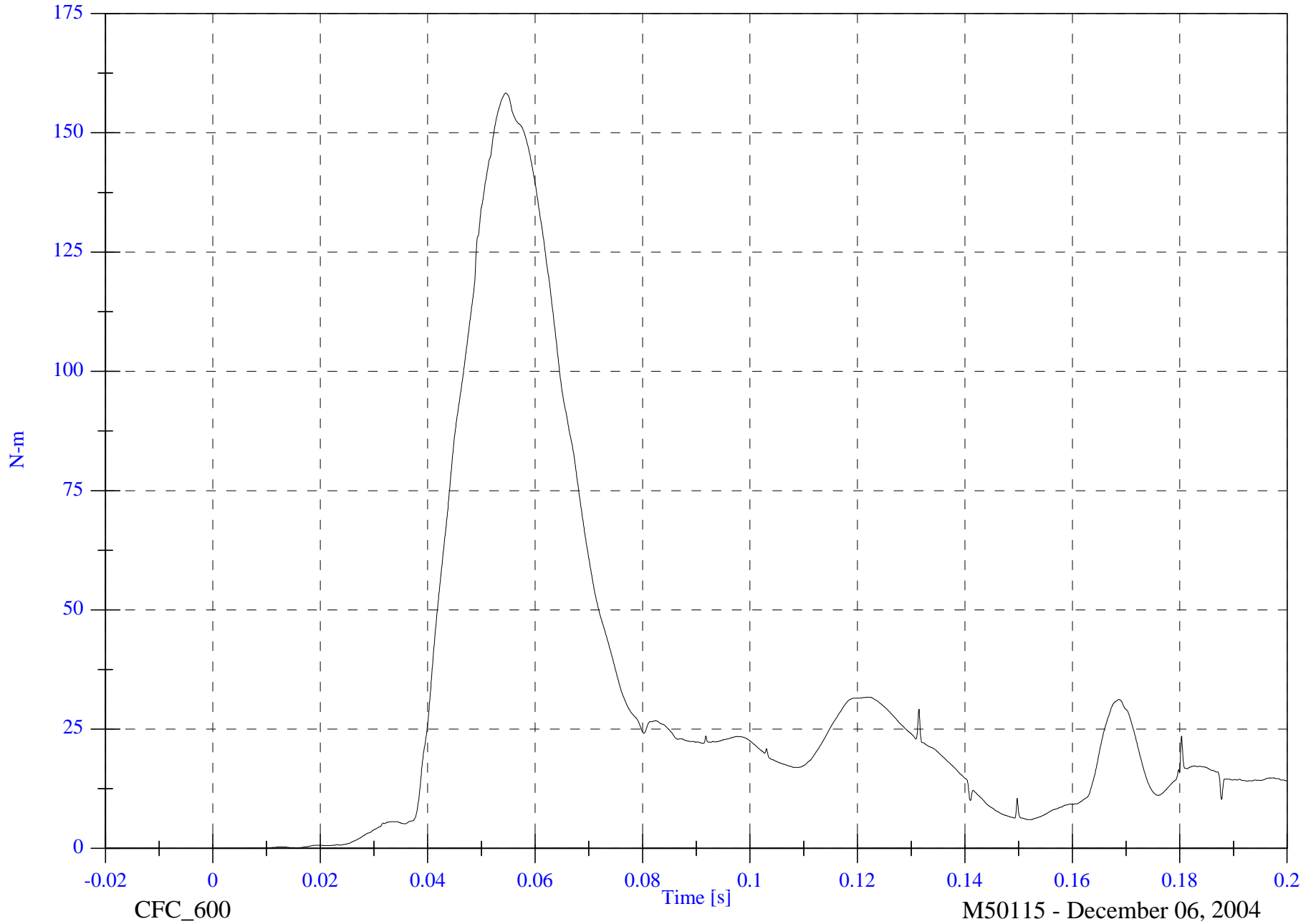
V2P4 Upper Neck M Resultant

Max: 158.3 [N-m] at 0.054 [s]

Min: 0.0 [N-m] at -0.010 [s]

B-43

8765-SNCAP-07



CFC\_600

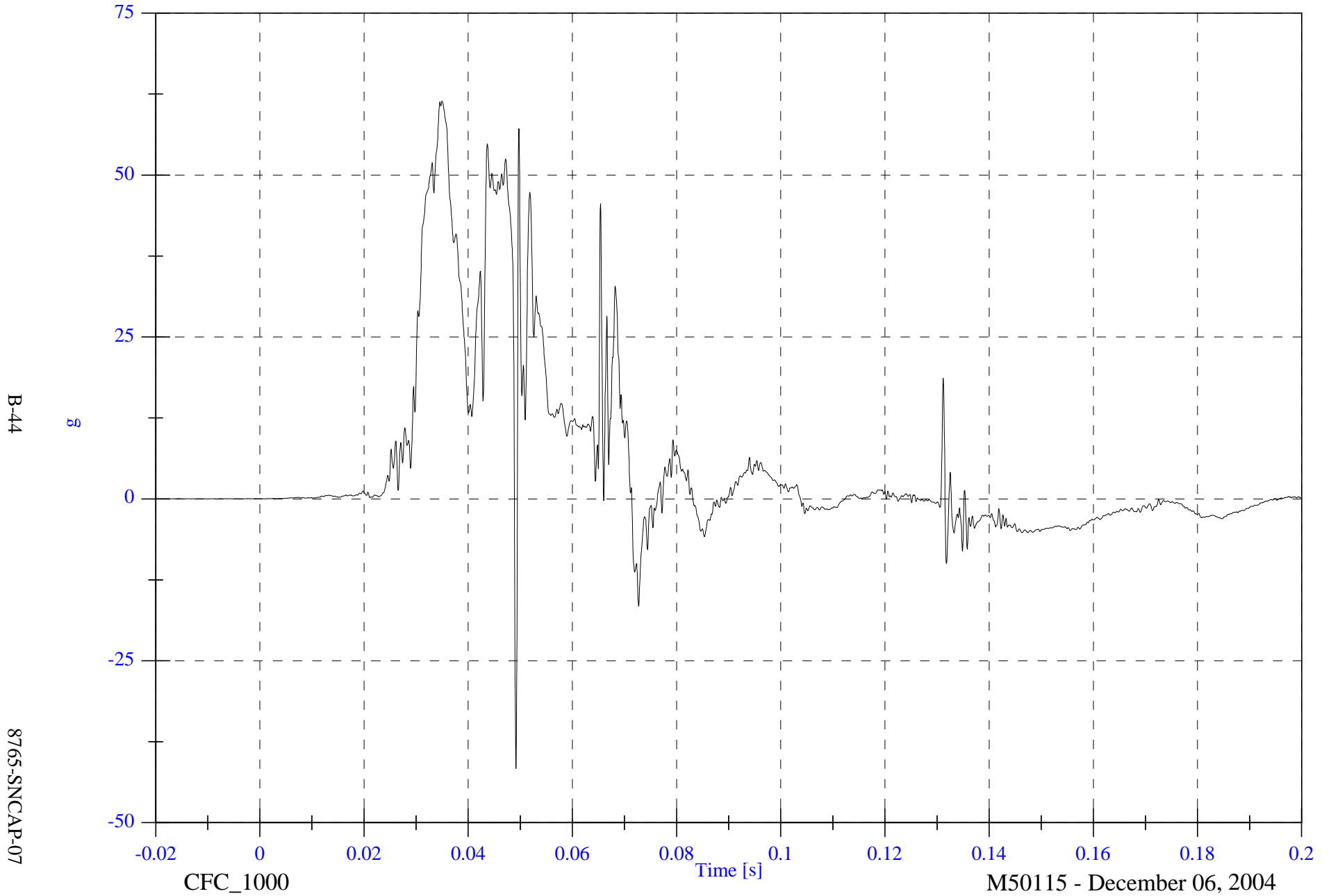
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Rib y

Max: 61.4 [g] at 0.035 [s]

Min: -41.6 [g] at 0.049 [s]



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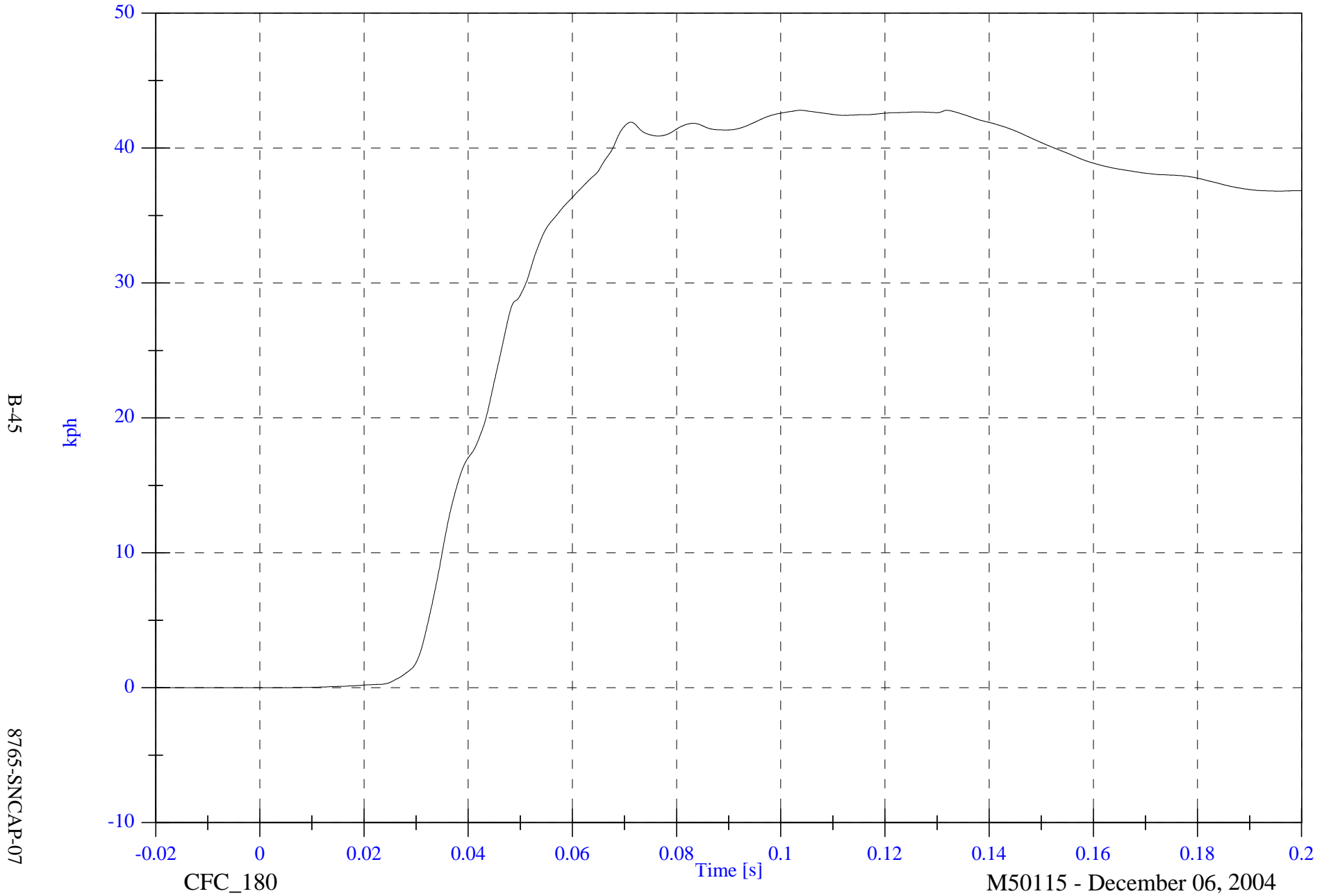
8765-SNCAP-07

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Rib y Velocity

Max: 42.8 [kph] at 0.104 [s]

Min: -0.0 [kph] at -0.020 [s]



B-45

8765-SNCAP-07

CFC\_180

Time [s]

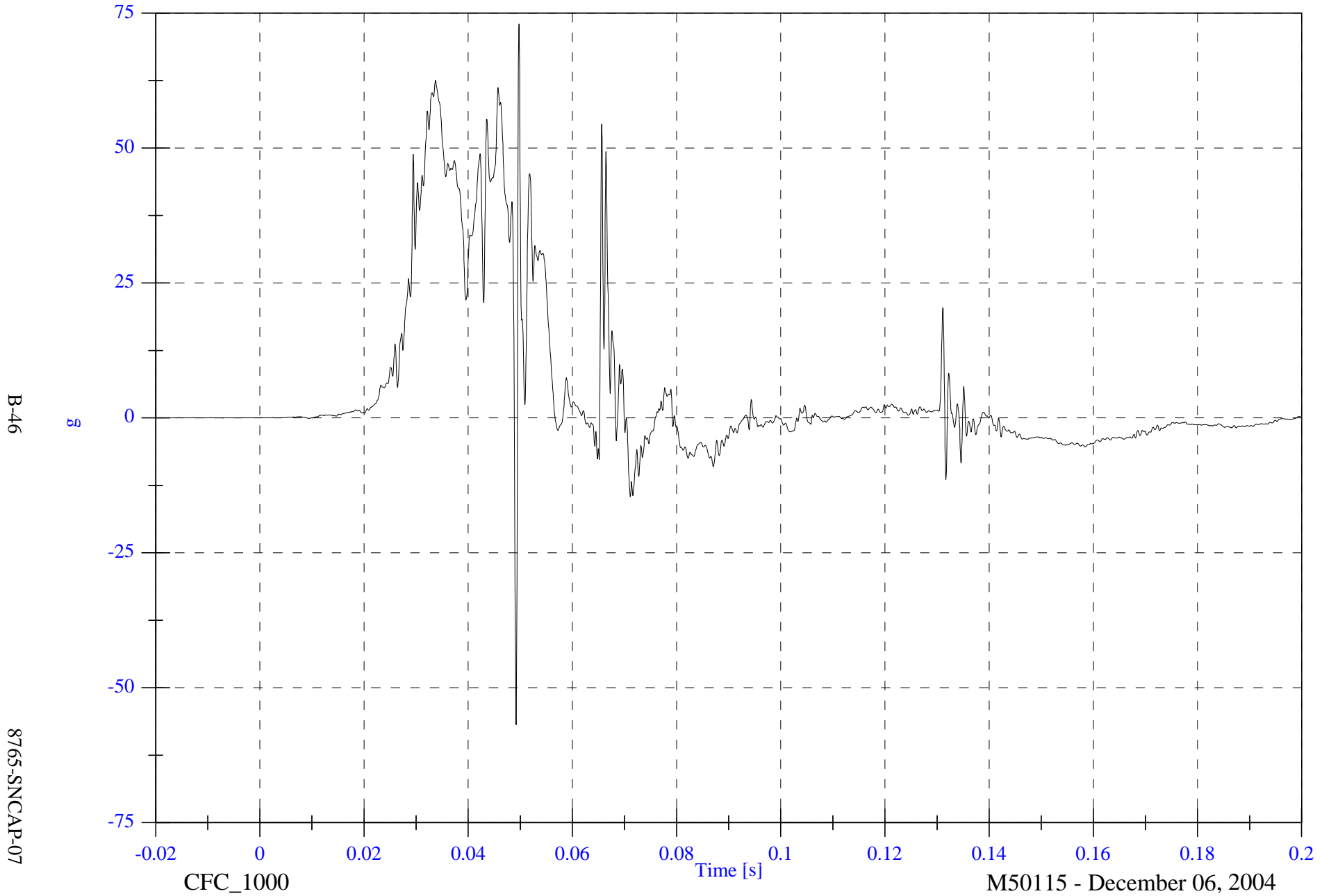
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Rib y

Max: 73.0 [g] at 0.050 [s]

Min: -56.9 [g] at 0.049 [s]

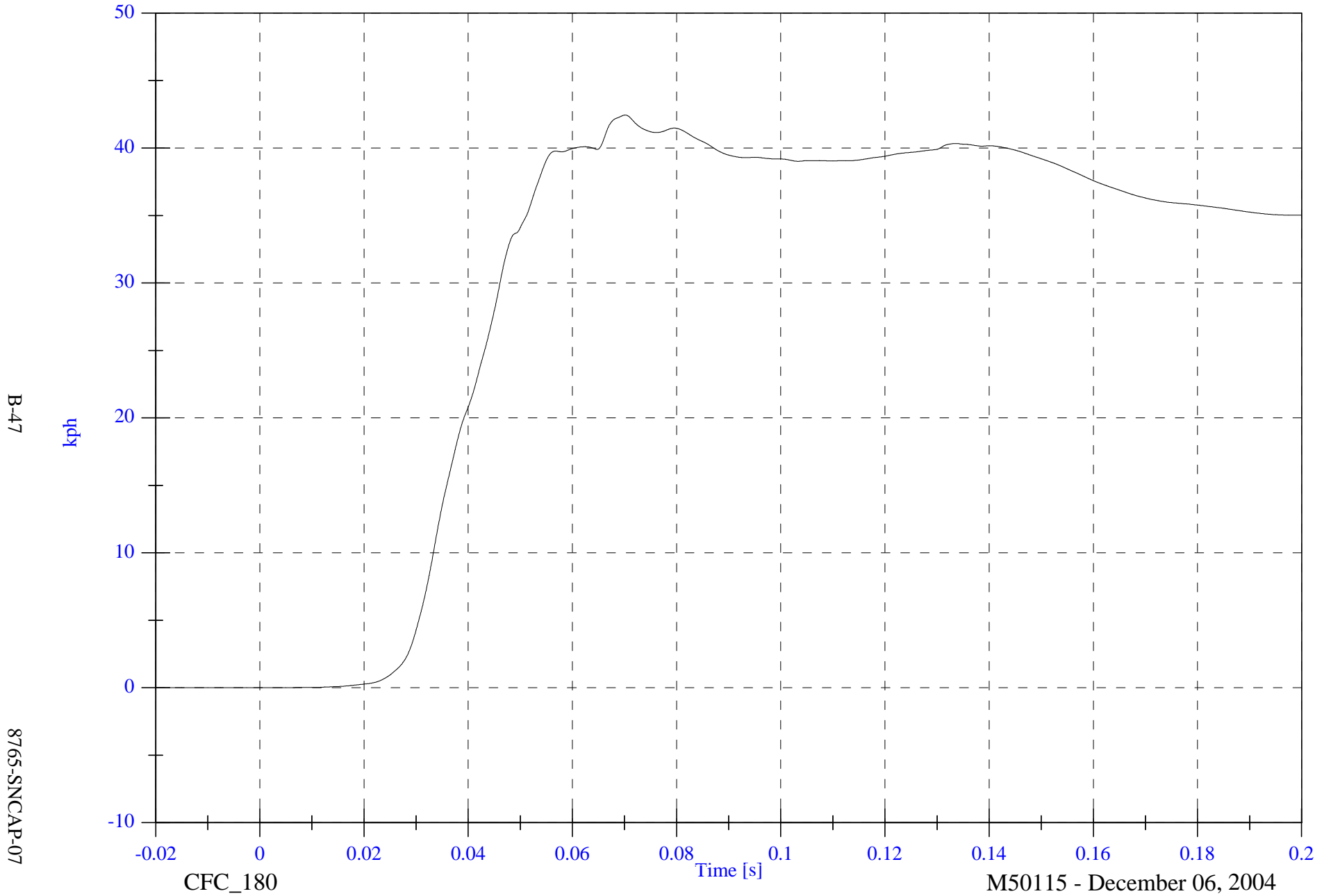


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Rib y Velocity

Max: 42.4 [kph] at 0.070 [s]

Min: -0.0 [kph] at -0.020 [s]



B-47

8765-SNCAP-07

CFC\_180

Time [s]

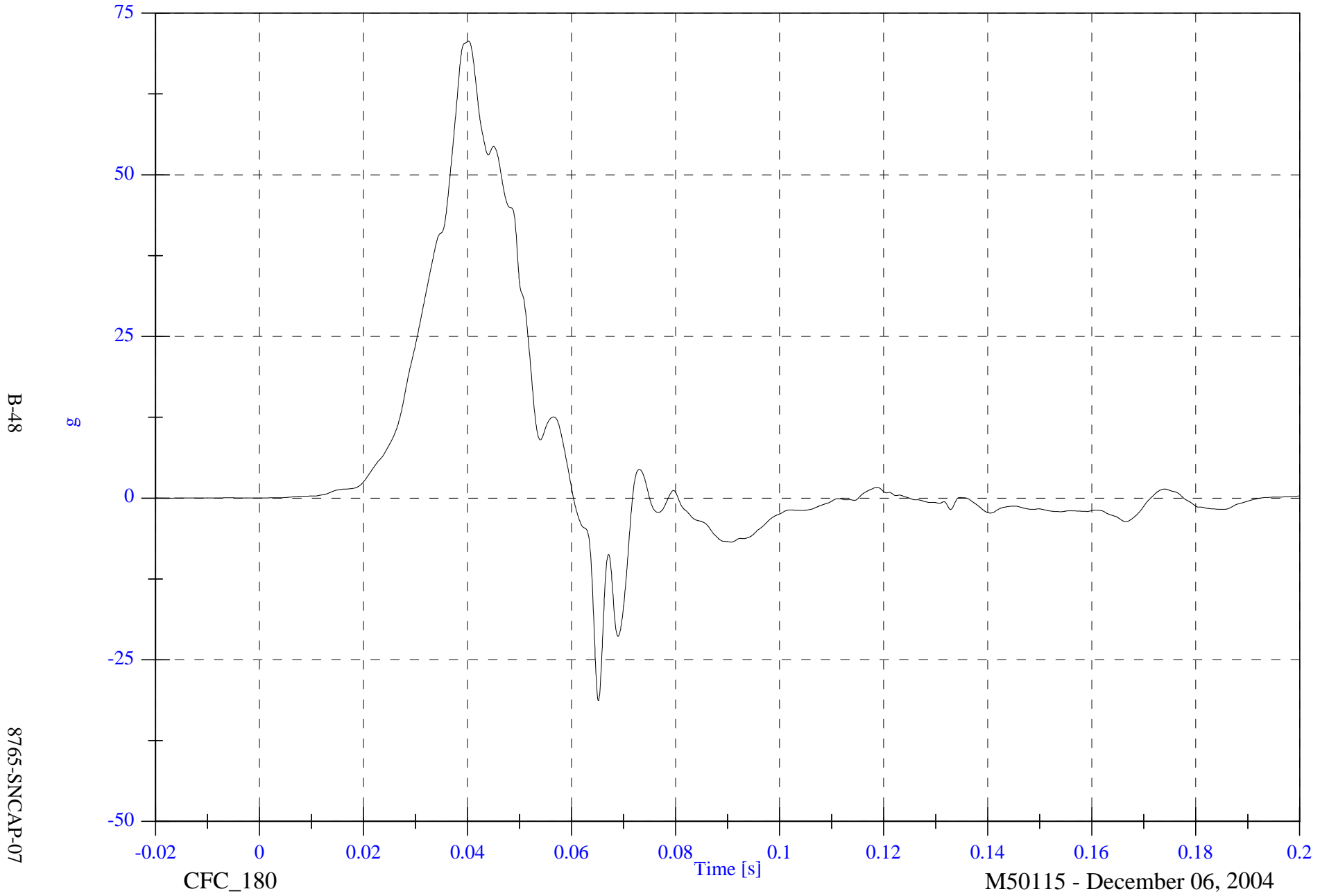
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Spine y

Max: 70.7 [g] at 0.040 [s]

Min: -31.3 [g] at 0.065 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

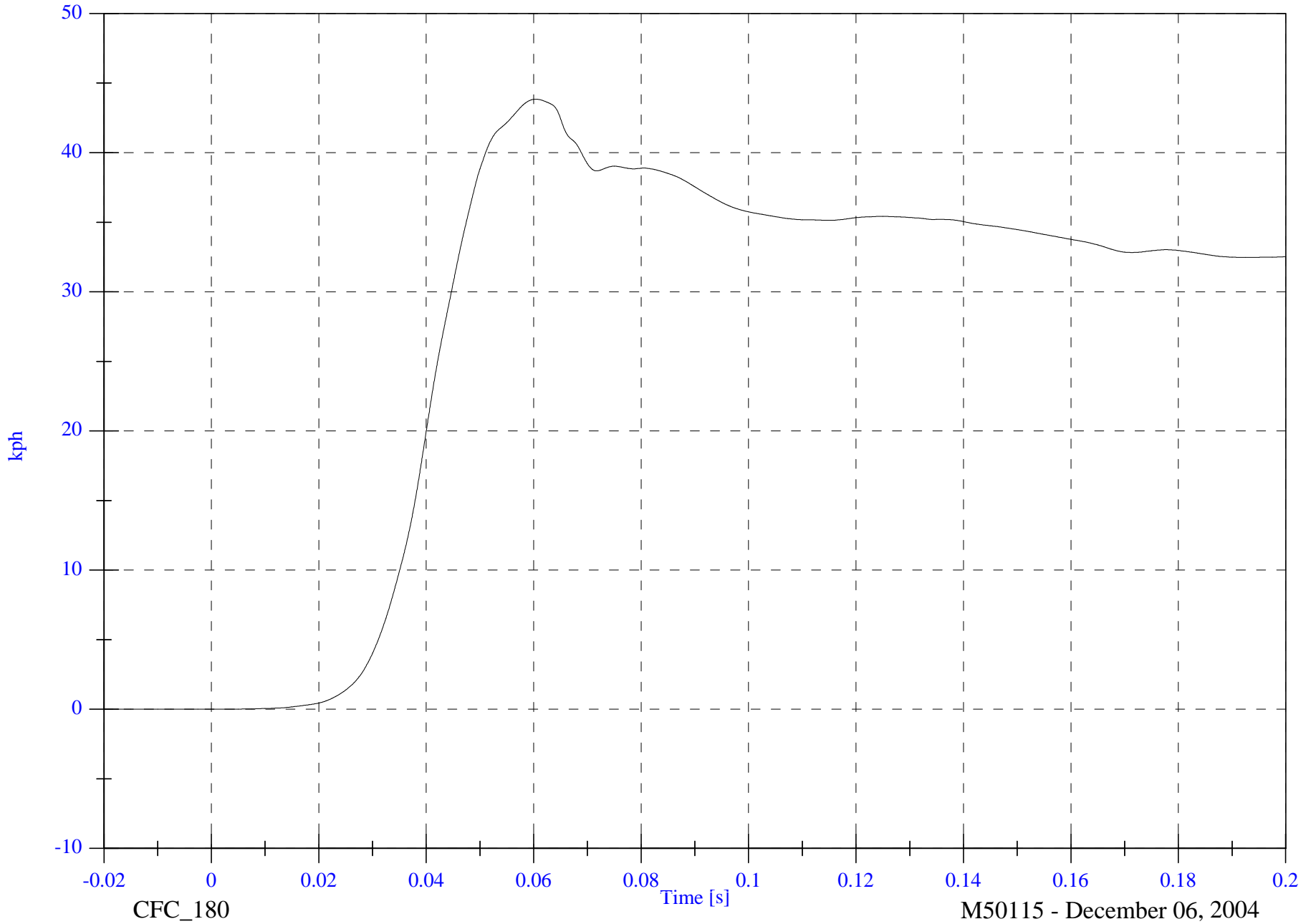
V2P4 Lower Spine y Velocity

Max: 43.8 [kph] at 0.060 [s]

Min: -0.0 [kph] at -0.016 [s]

B-49

8765-SNCAP-07

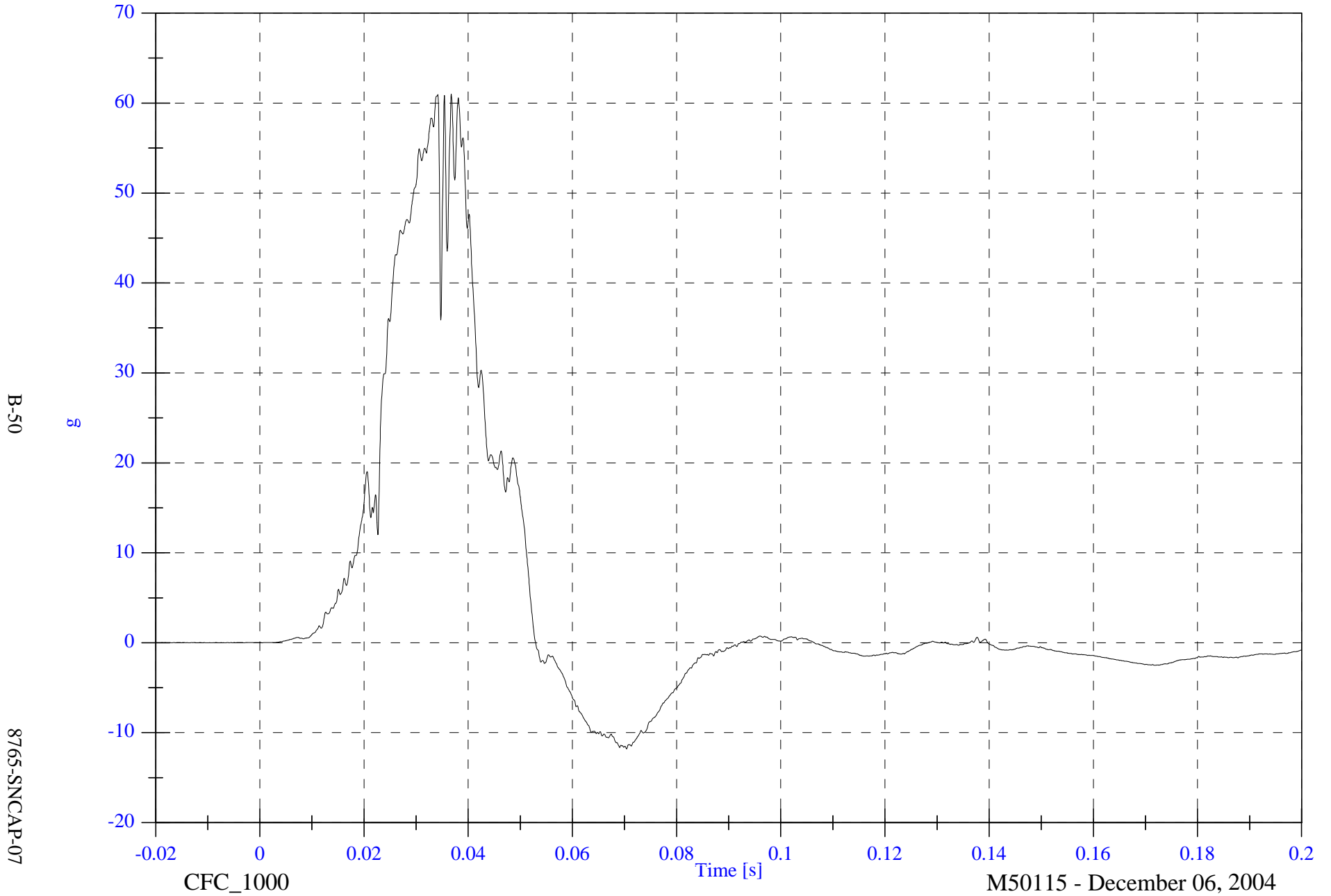


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Pelvic y

Max: 61.0 [g] at 0.037 [s]

Min: -11.8 [g] at 0.070 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

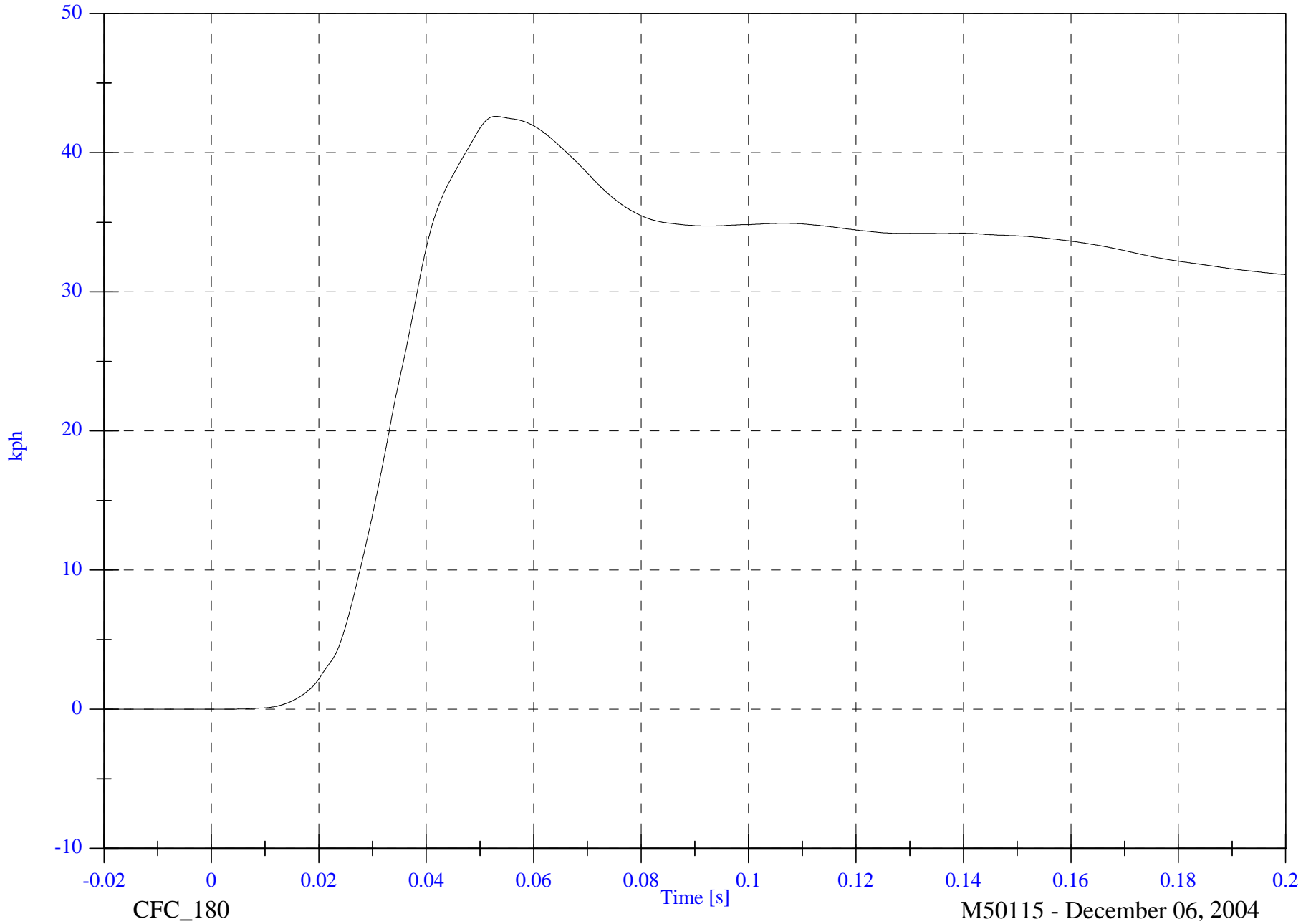
V2P4 Pelvic y Velocity

Max: 42.6 [kph] at 0.053 [s]

Min: -0.0 [kph] at -0.020 [s]

B-51

8765-SNCAP-07

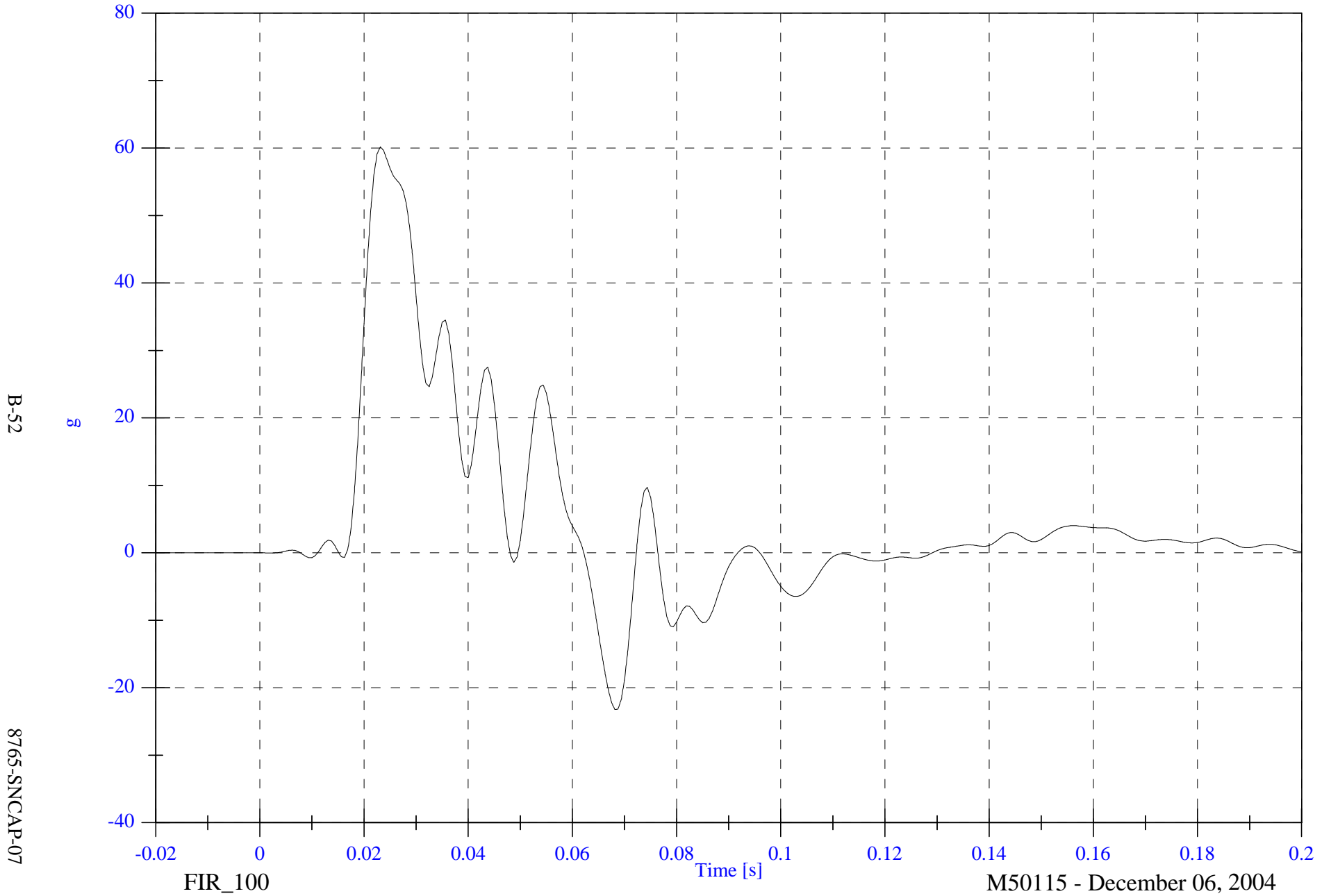


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Rib y

Max: 60.1 [g] at 0.023 [s]

Min: -23.2 [g] at 0.068 [s]

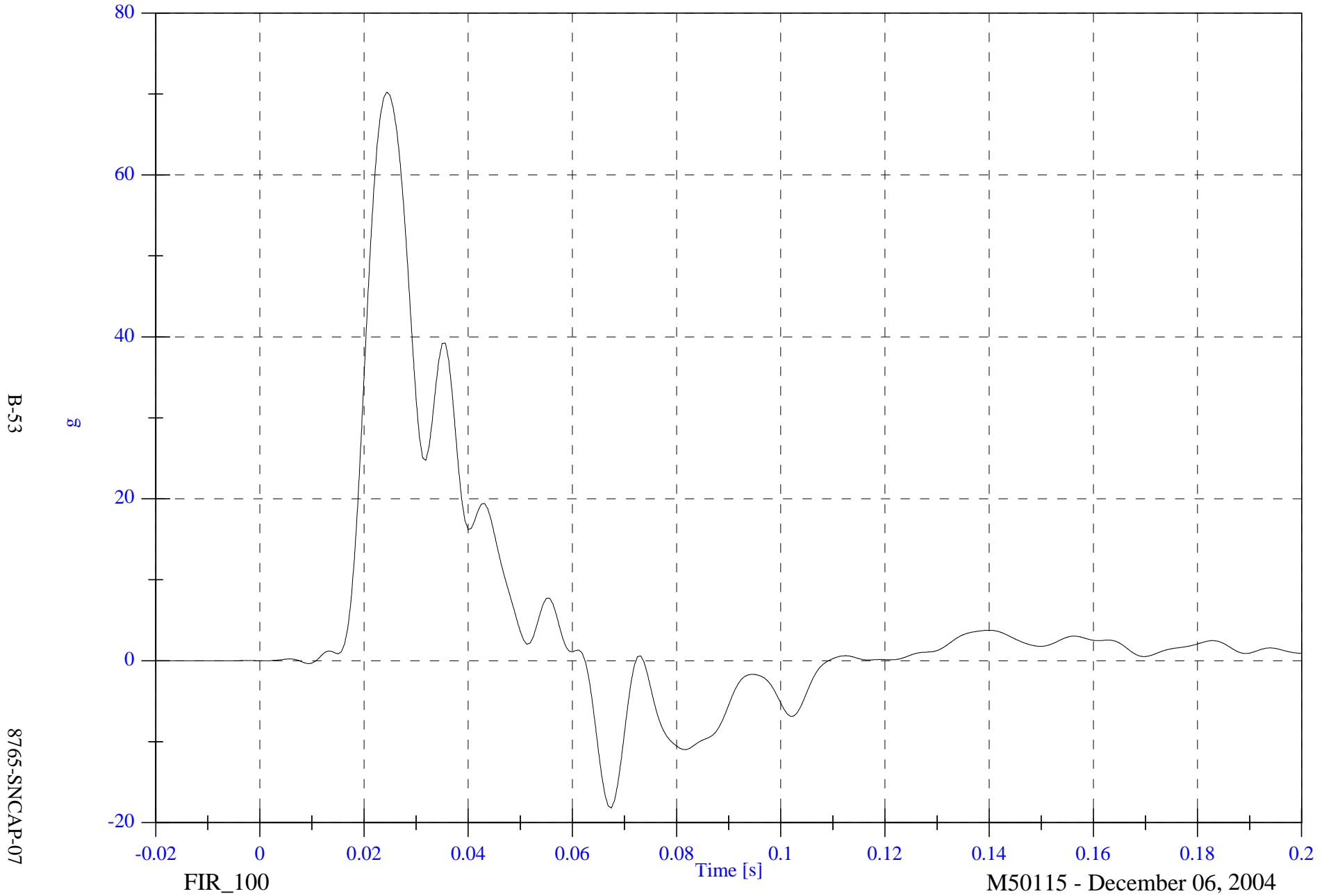


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Rib y

Max: 70.2 [g] at 0.024 [s]

Min: -18.2 [g] at 0.068 [s]

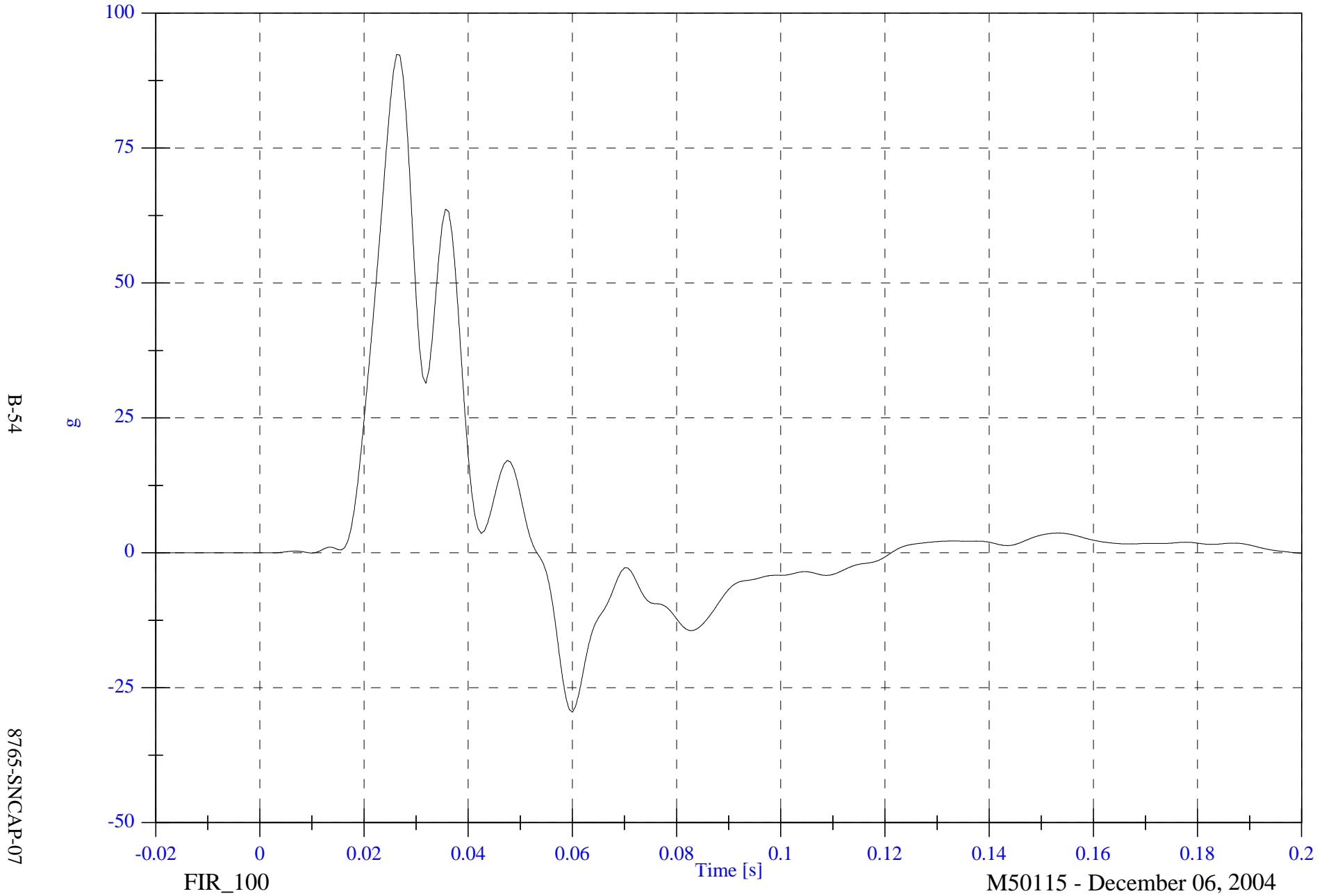


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Spine y

Max: 92.3 [g] at 0.026 [s]

Min: -29.5 [g] at 0.060 [s]

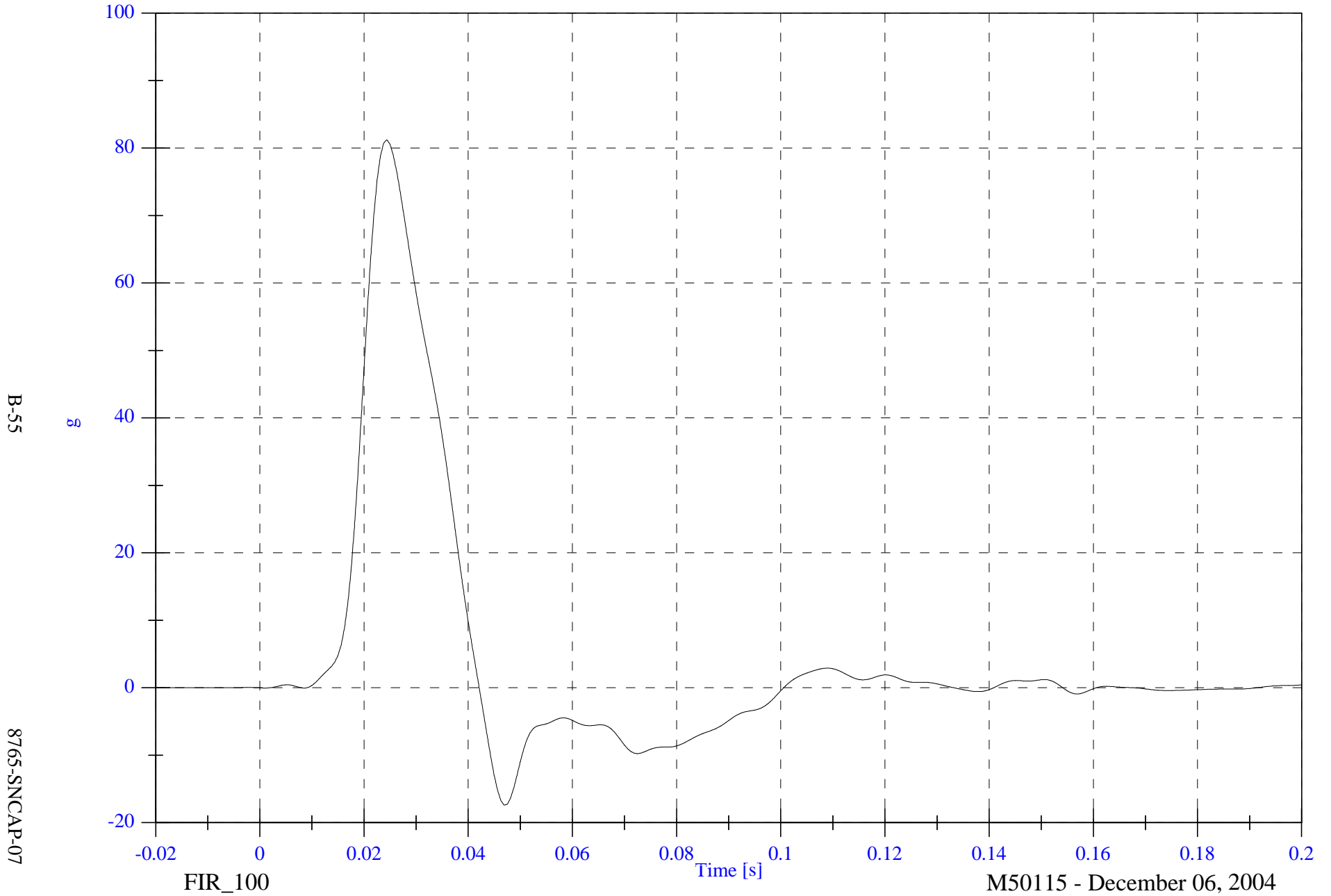


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Pelvic y

Max: 81.2 [g] at 0.024 [s]

Min: -17.4 [g] at 0.047 [s]

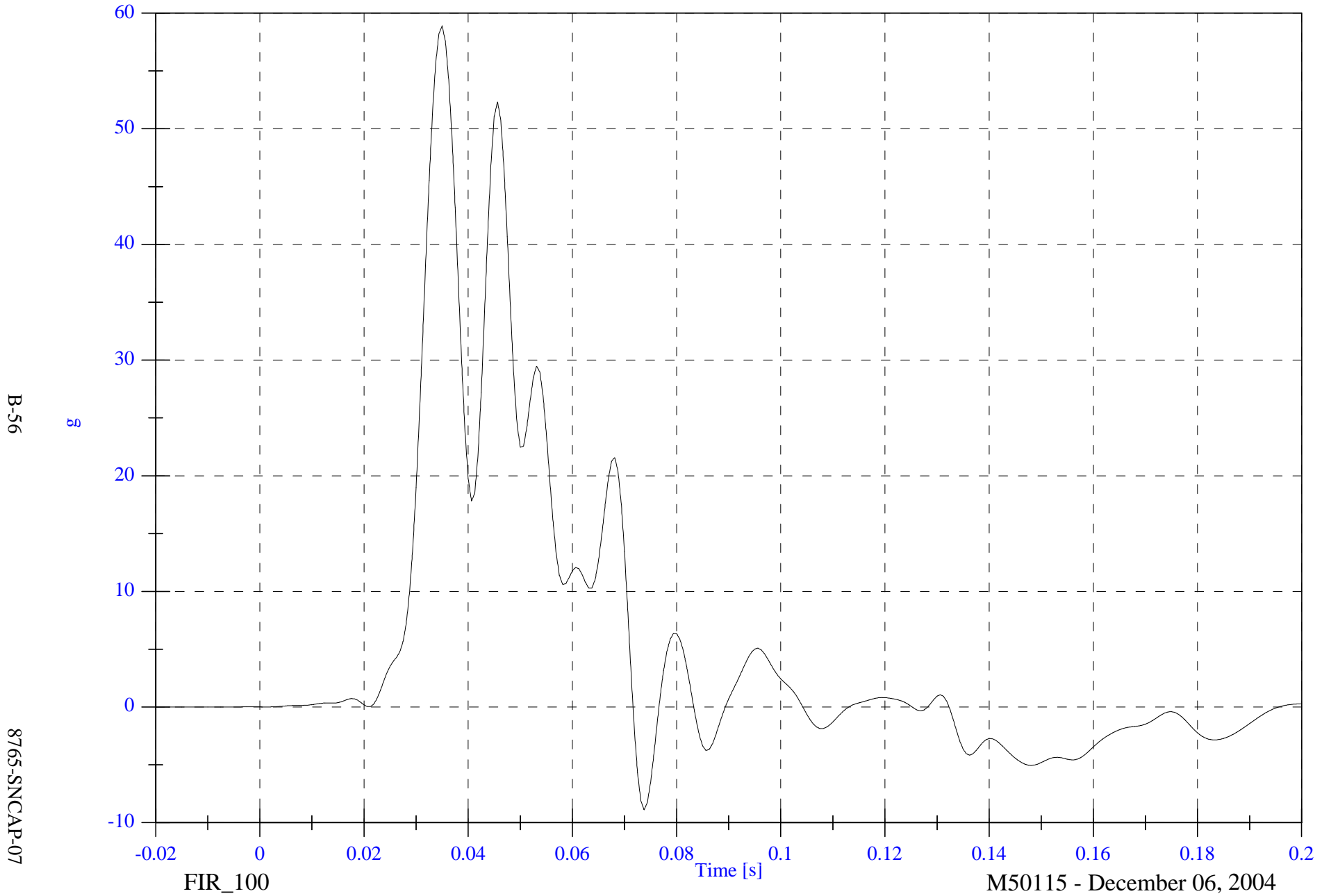


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Rib y

Max: 58.9 [g] at 0.035 [s]

Min: -8.9 [g] at 0.074 [s]

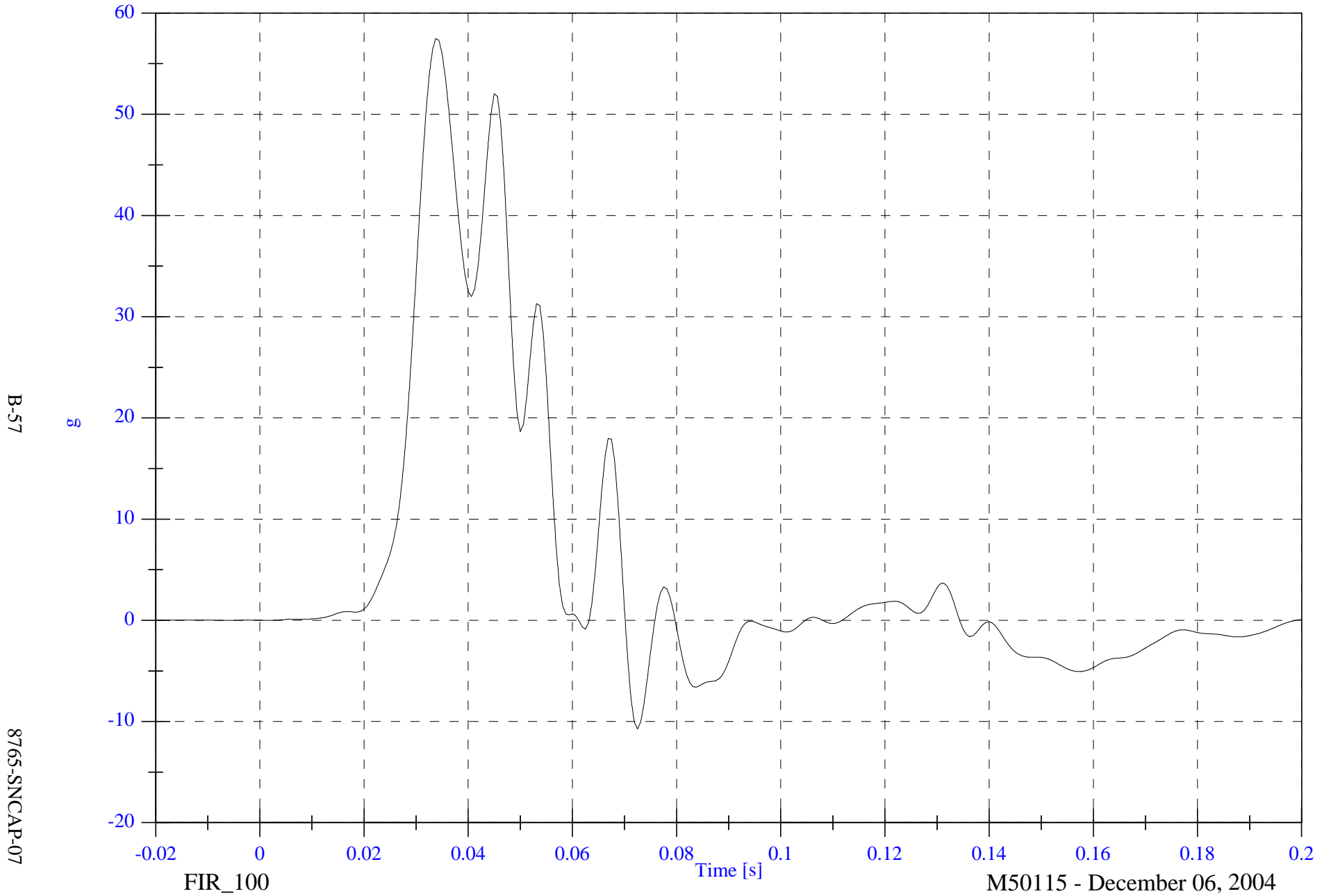


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Rib y

Max: 57.5 [g] at 0.034 [s]

Min: -10.8 [g] at 0.072 [s]



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FIR\_100

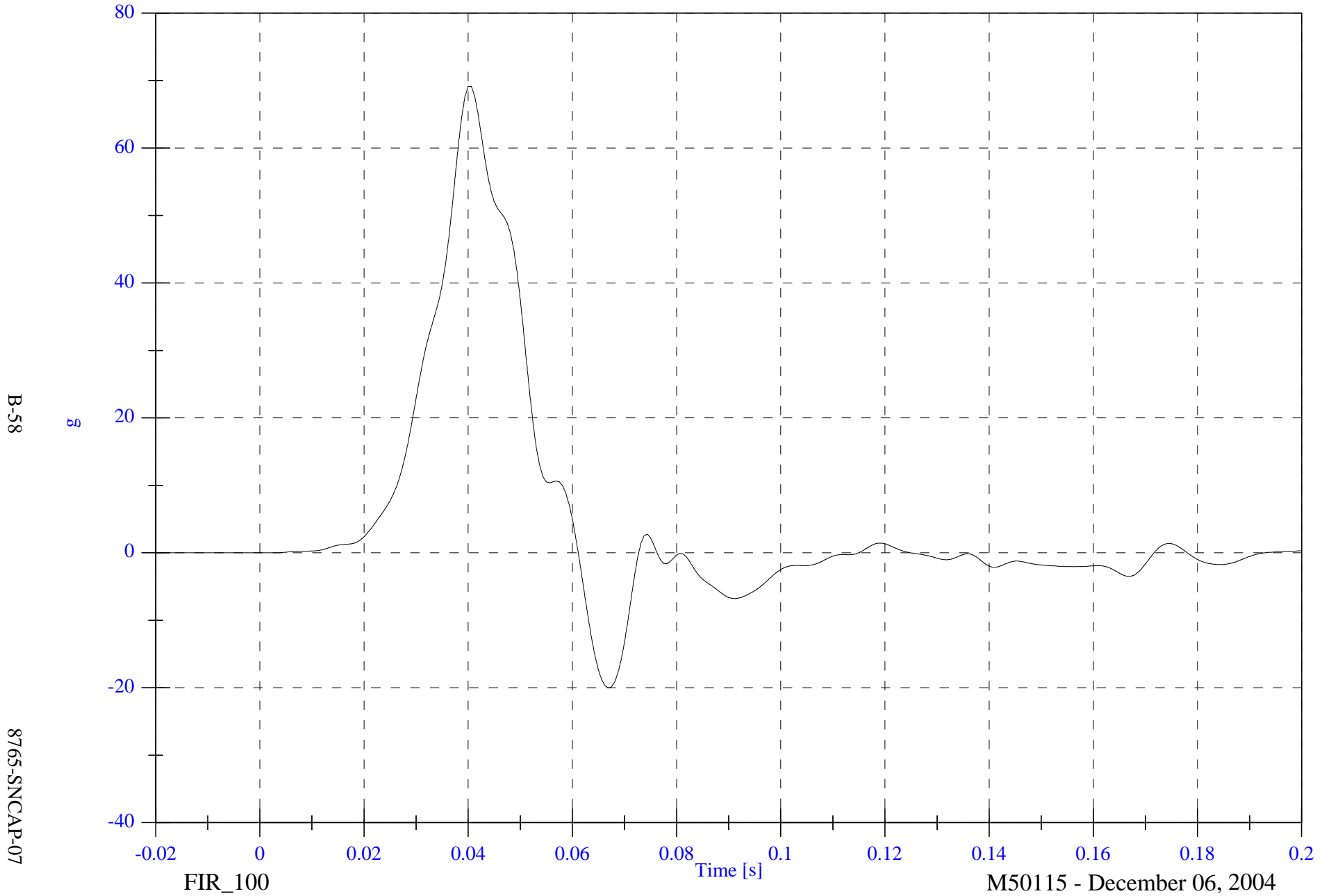
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Spine y

Max: 69.1 [g] at 0.040 [s]

Min: -20.0 [g] at 0.067 [s]

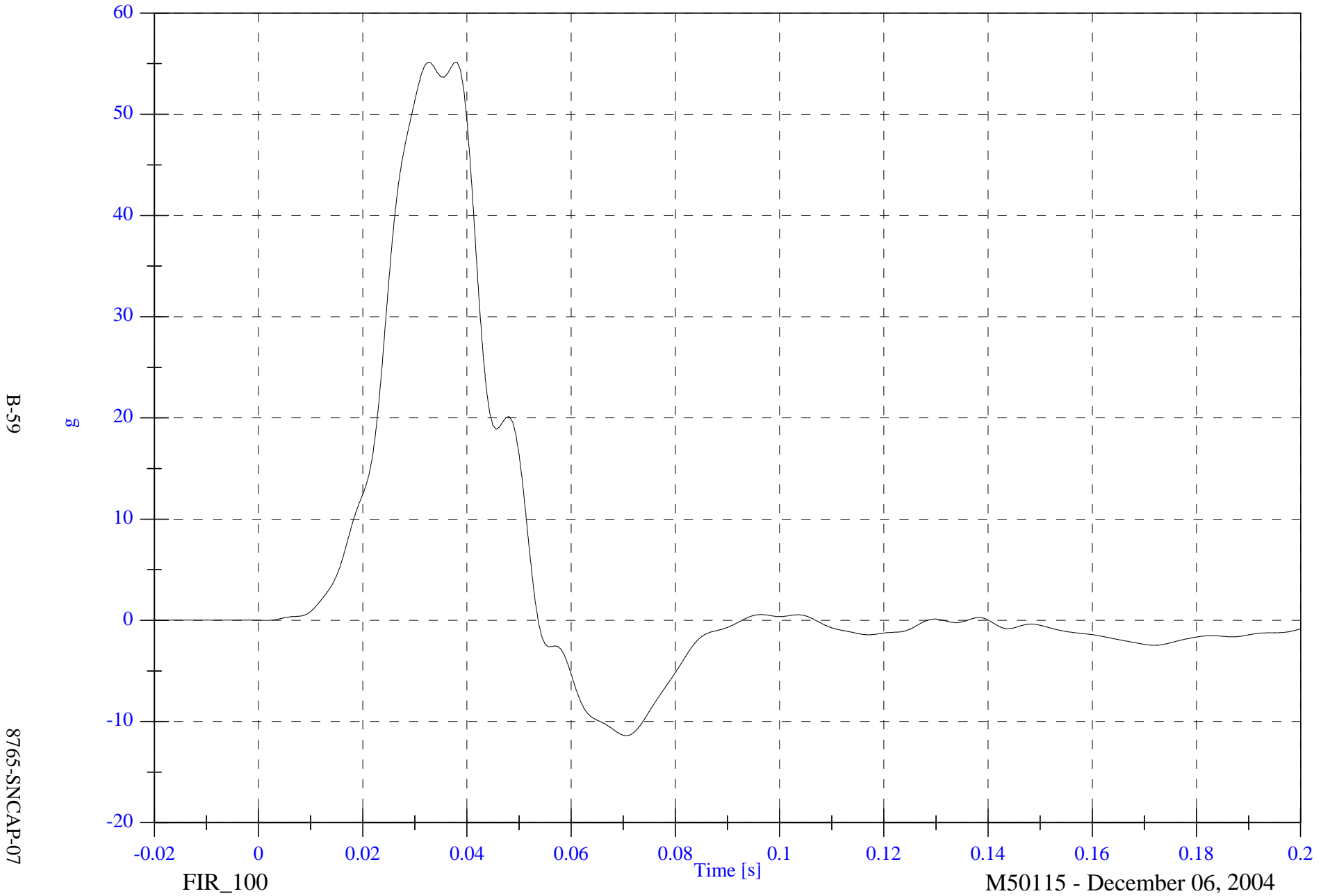


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Pelvic y

Max: 55.2 [g] at 0.032 [s]

Min: -11.4 [g] at 0.071 [s]



B-59

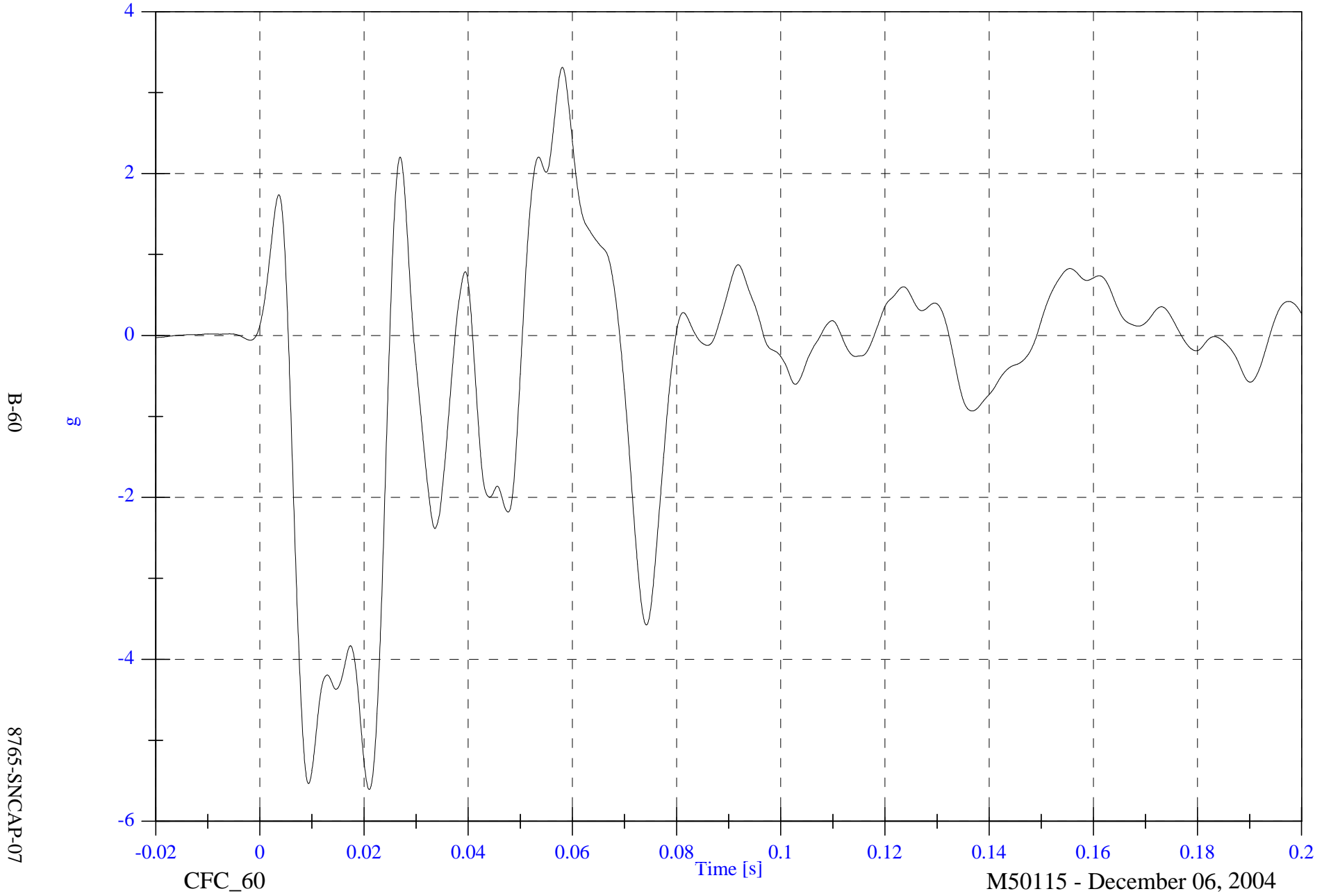
8765-SNCAP-07

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A1 Right Front Sill X

Max: 3.3 [g] at 0.058 [s]

Min: -5.6 [g] at 0.021 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A1 Right Front Sill X Velocity

Max: 0.3 [kph] at 0.006 [s]

Min: -3.3 [kph] at 0.050 [s]

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CFC\_180

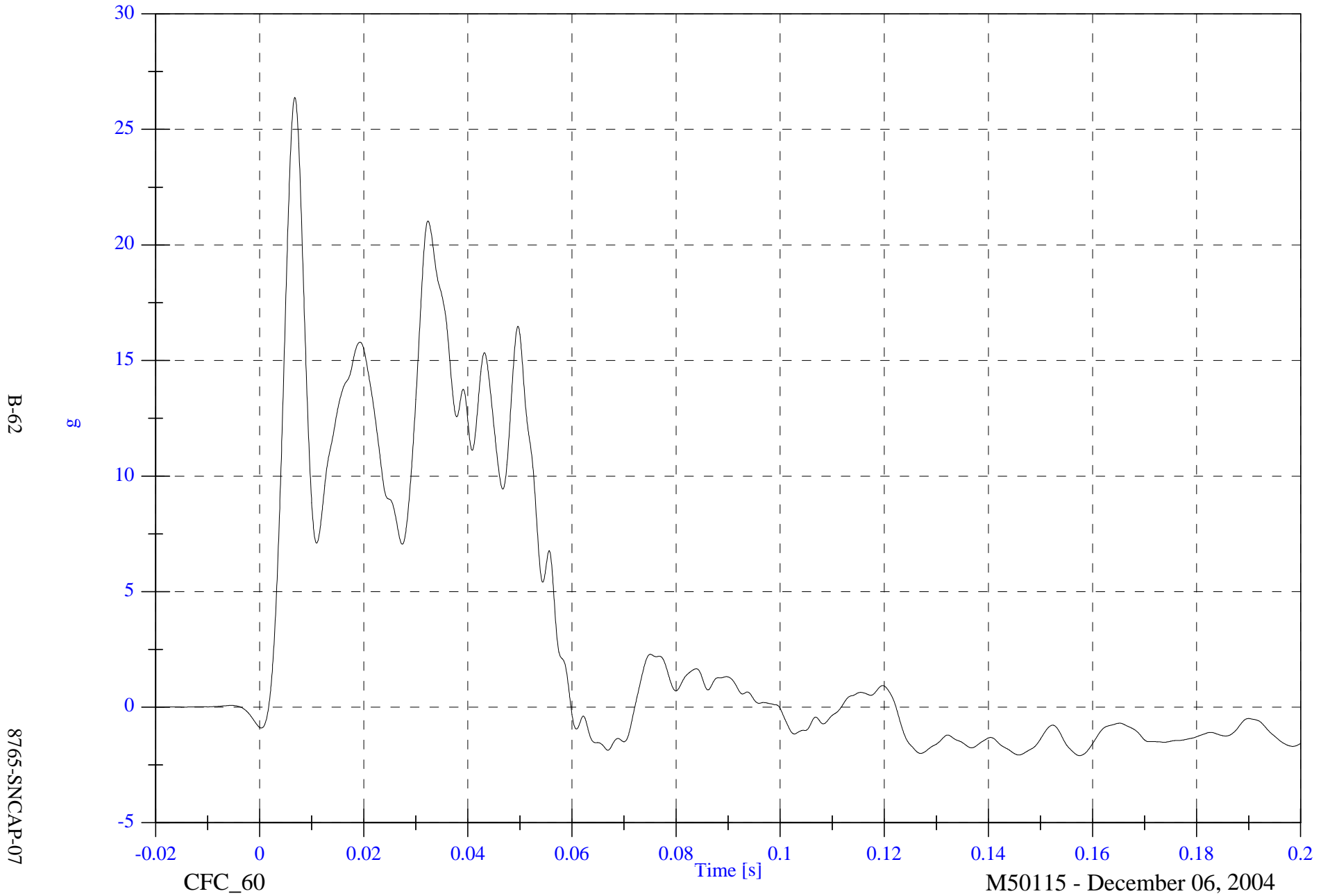
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A1 Right Front Sill Y

Max: 26.4 [g] at 0.007 [s]

Min: -2.1 [g] at 0.158 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

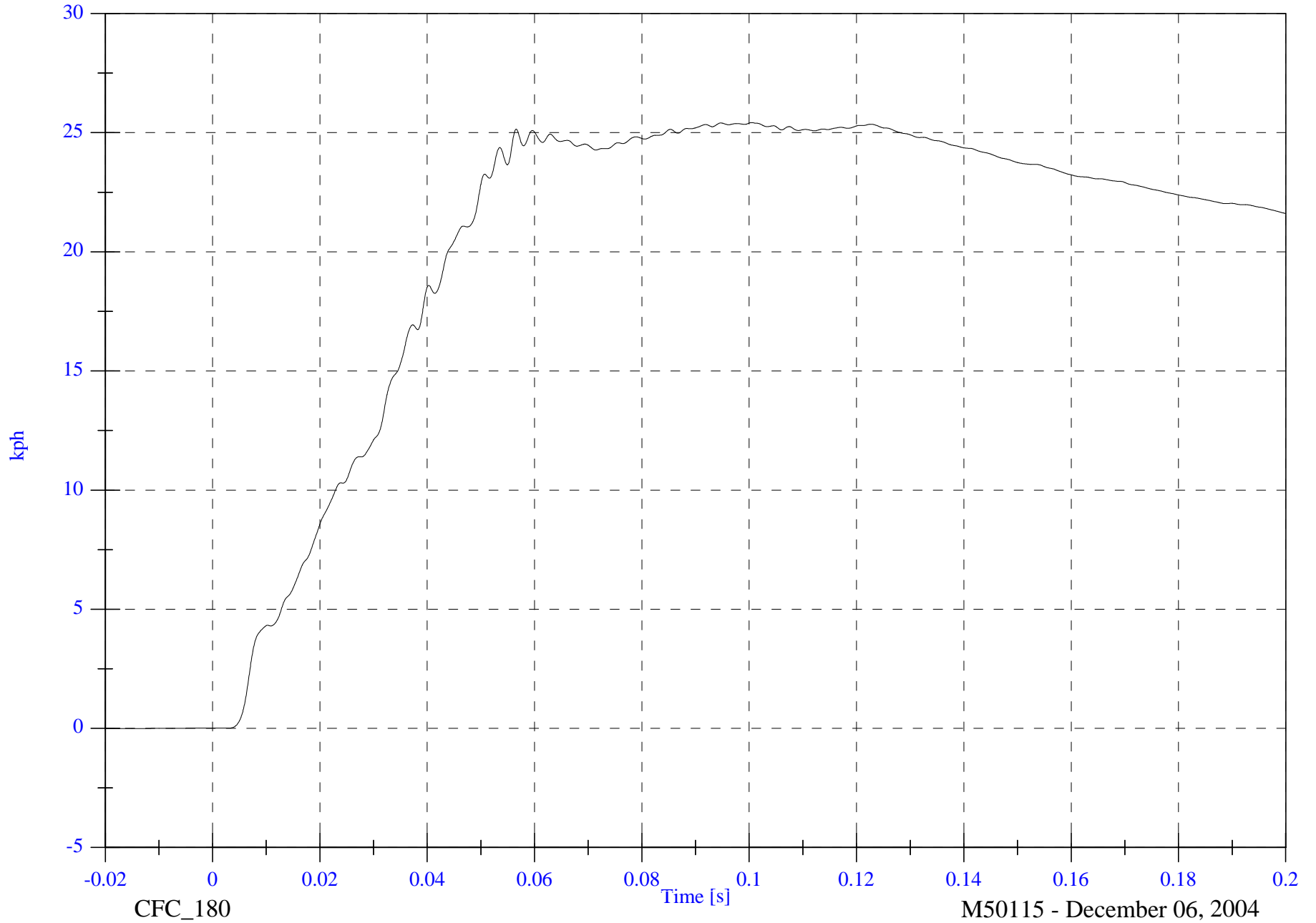
V2 A1 Right Front Sill Y Velocity

Max: 25.4 [kph] at 0.100 [s]

Min: -0.0 [kph] at -0.020 [s]

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8765-SNCAP-07

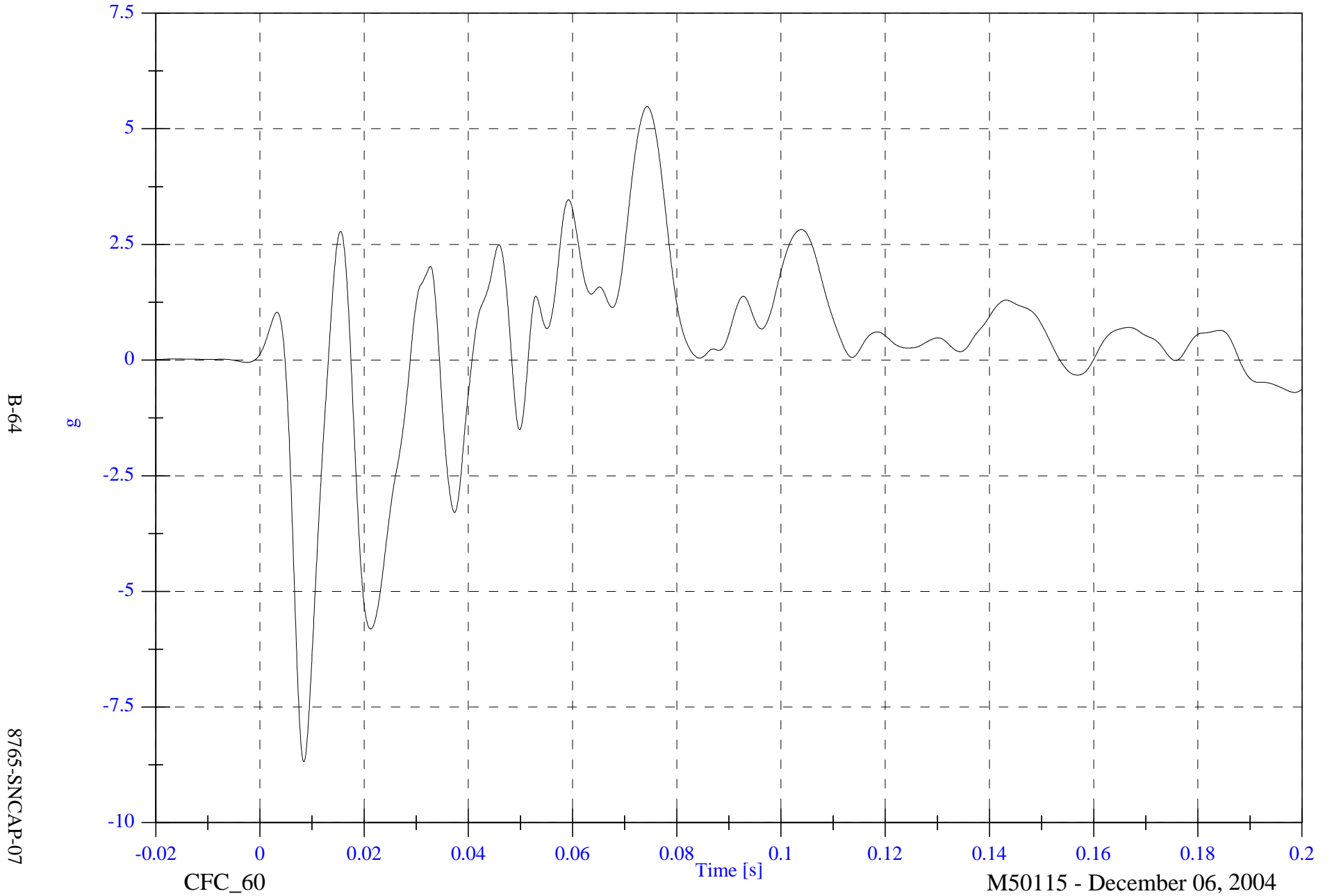


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A1 Right Front Sill Z

Max: 5.5 [g] at 0.074 [s]

Min: -8.7 [g] at 0.008 [s]



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CFC\_60

Time [s]

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A1 Right Front Sill Z Velocity

Max: 2.8 [kph] at 0.188 [s]

Min: -2.6 [kph] at 0.039 [s]

B-65

8765-SNCAP-07



CFC\_180

Time [s]

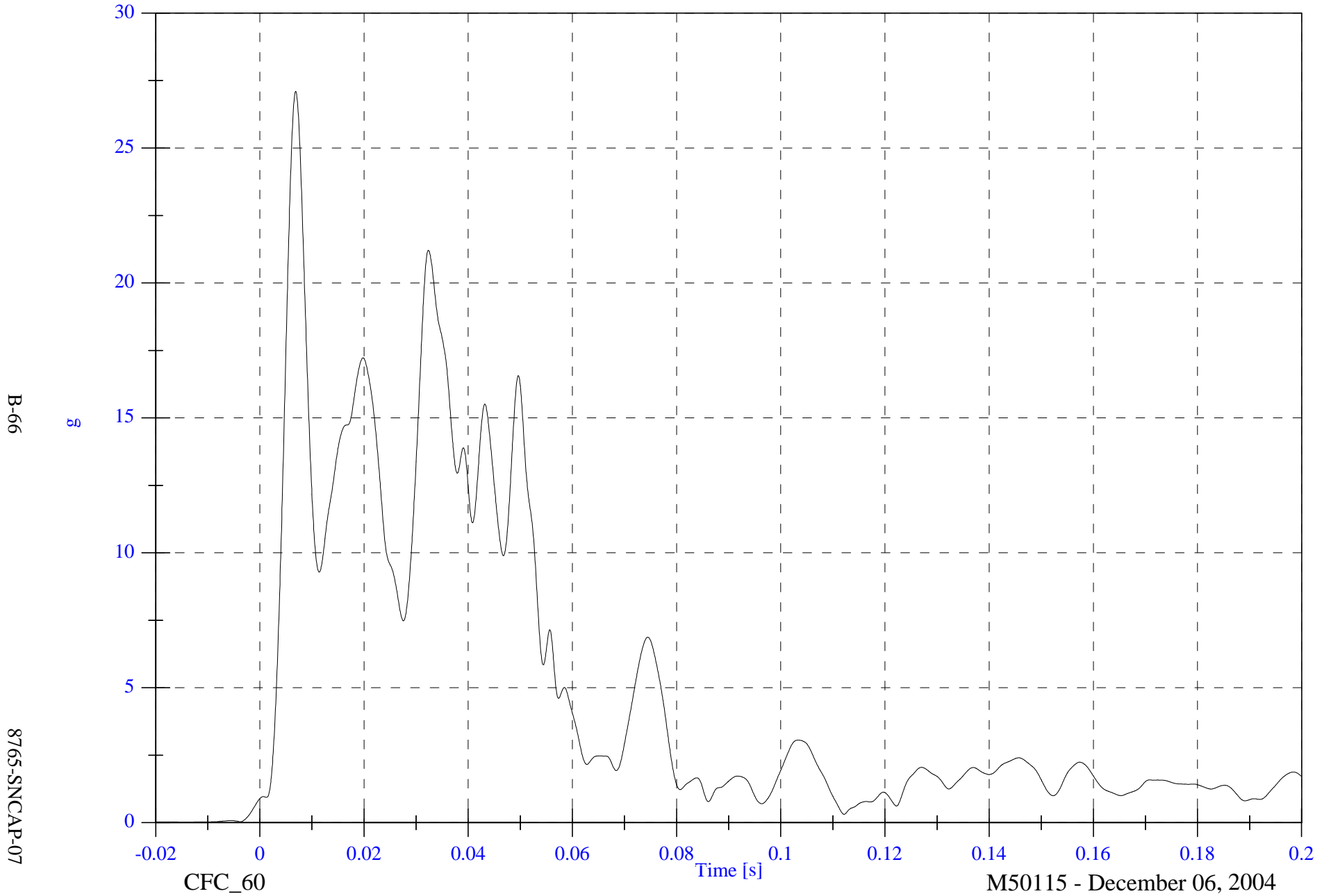
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A1 Right Front Sill Resultant

Max: 27.1 [g] at 0.007 [s]

Min: 0.0 [g] at -0.014 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A2 Right Rear Sill X

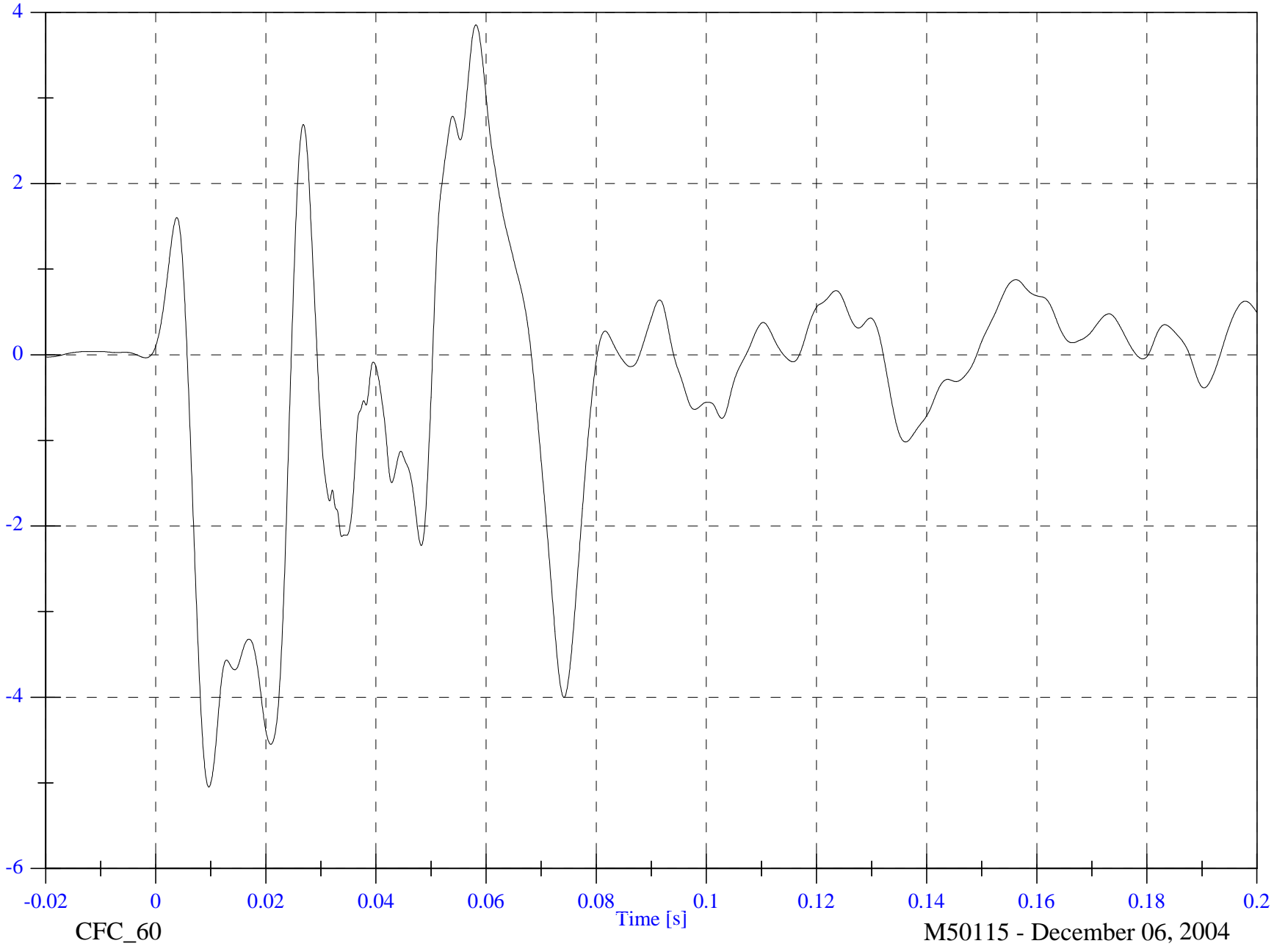
Max: 3.9 [g] at 0.058 [s]

Min: -5.0 [g] at 0.010 [s]

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g



CFC\_60

Time [s]

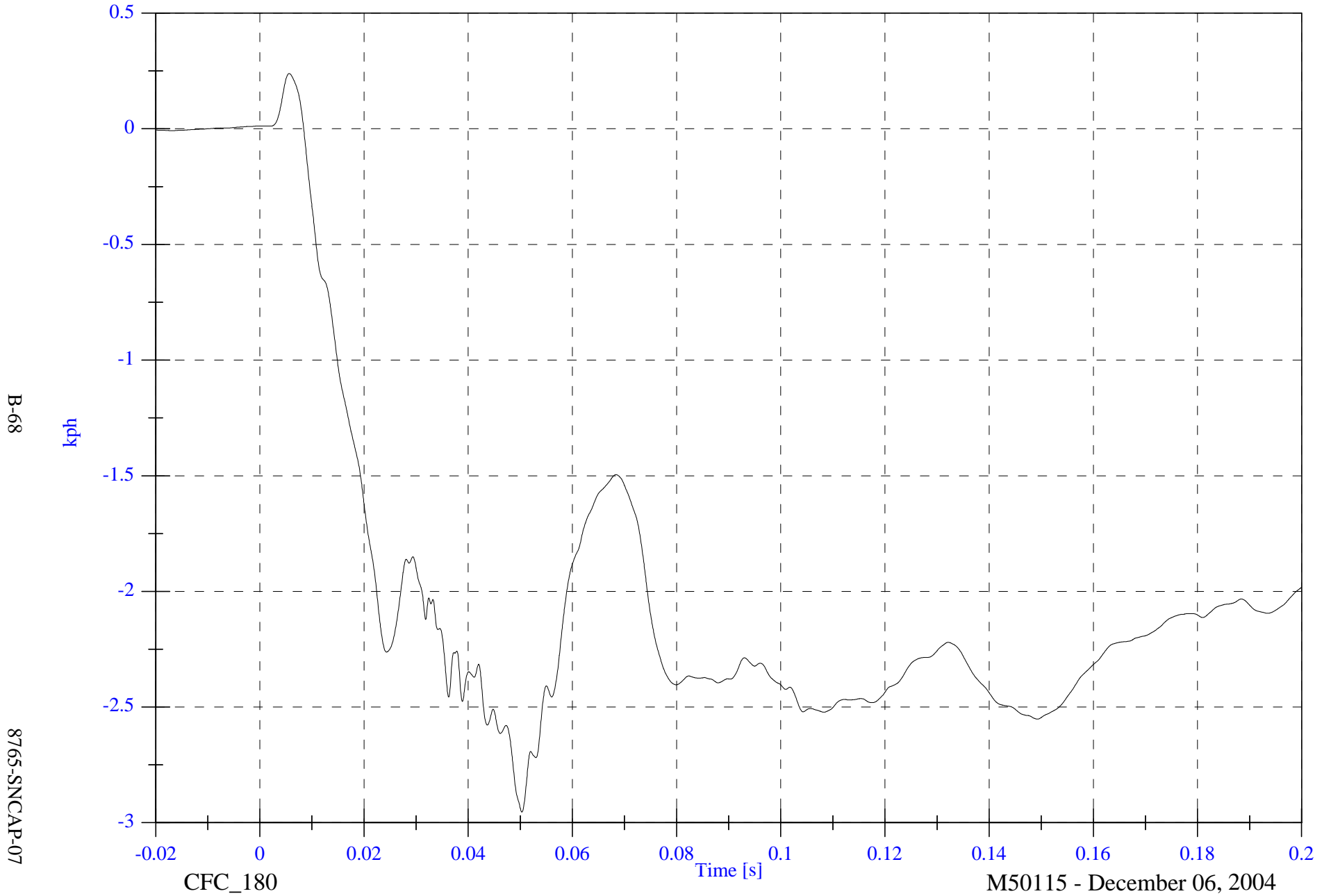
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A2 Right Rear Sill X Velocity

Max: 0.2 [kph] at 0.006 [s]

Min: -3.0 [kph] at 0.050 [s]



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8765-SNCAP-07

CFC\_180

Time [s]

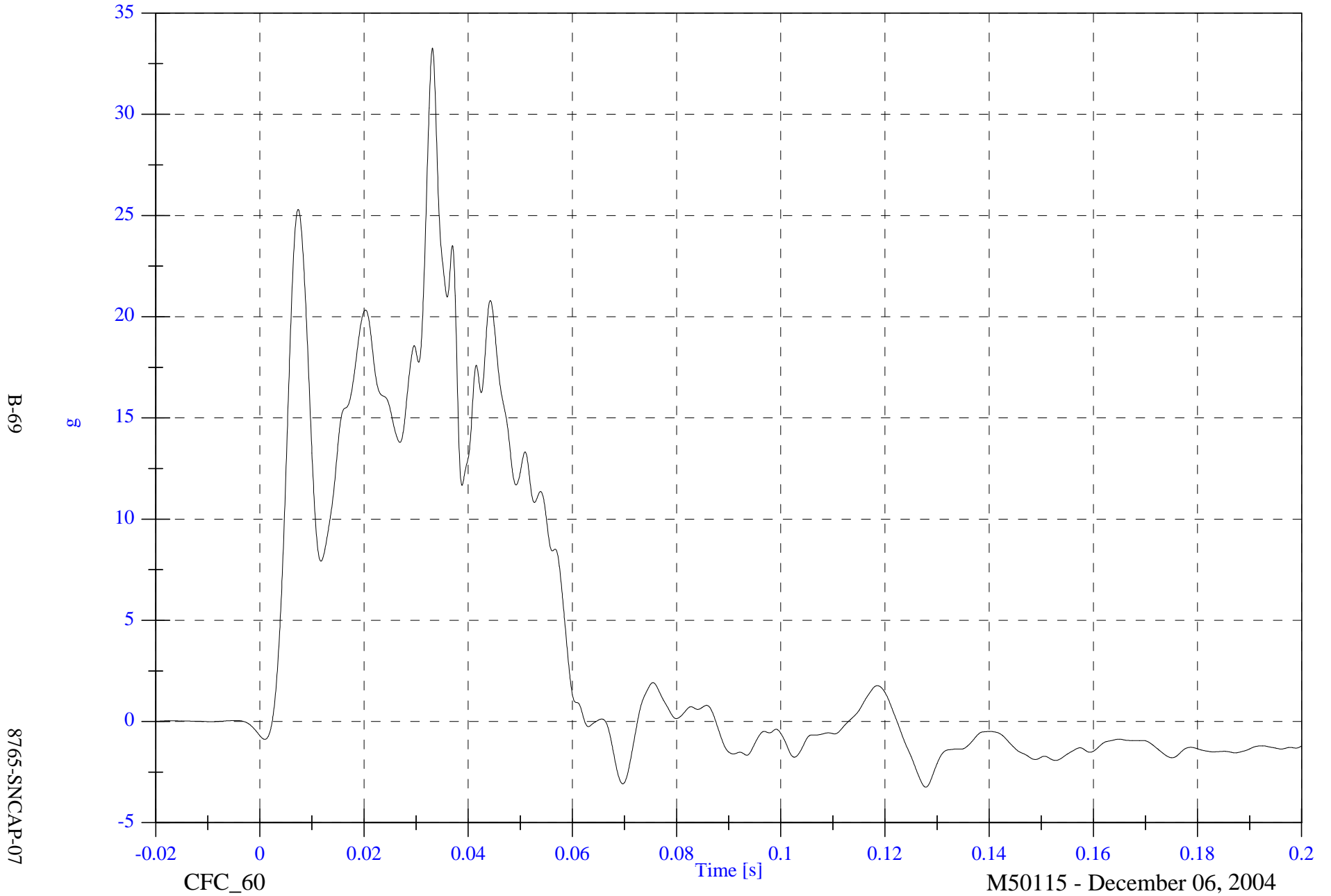
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A2 Right Rear Sill Y

Max: 33.3 [g] at 0.033 [s]

Min: -3.2 [g] at 0.128 [s]



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2005 SNCAP Test 2 - 2005 Saturn Ion

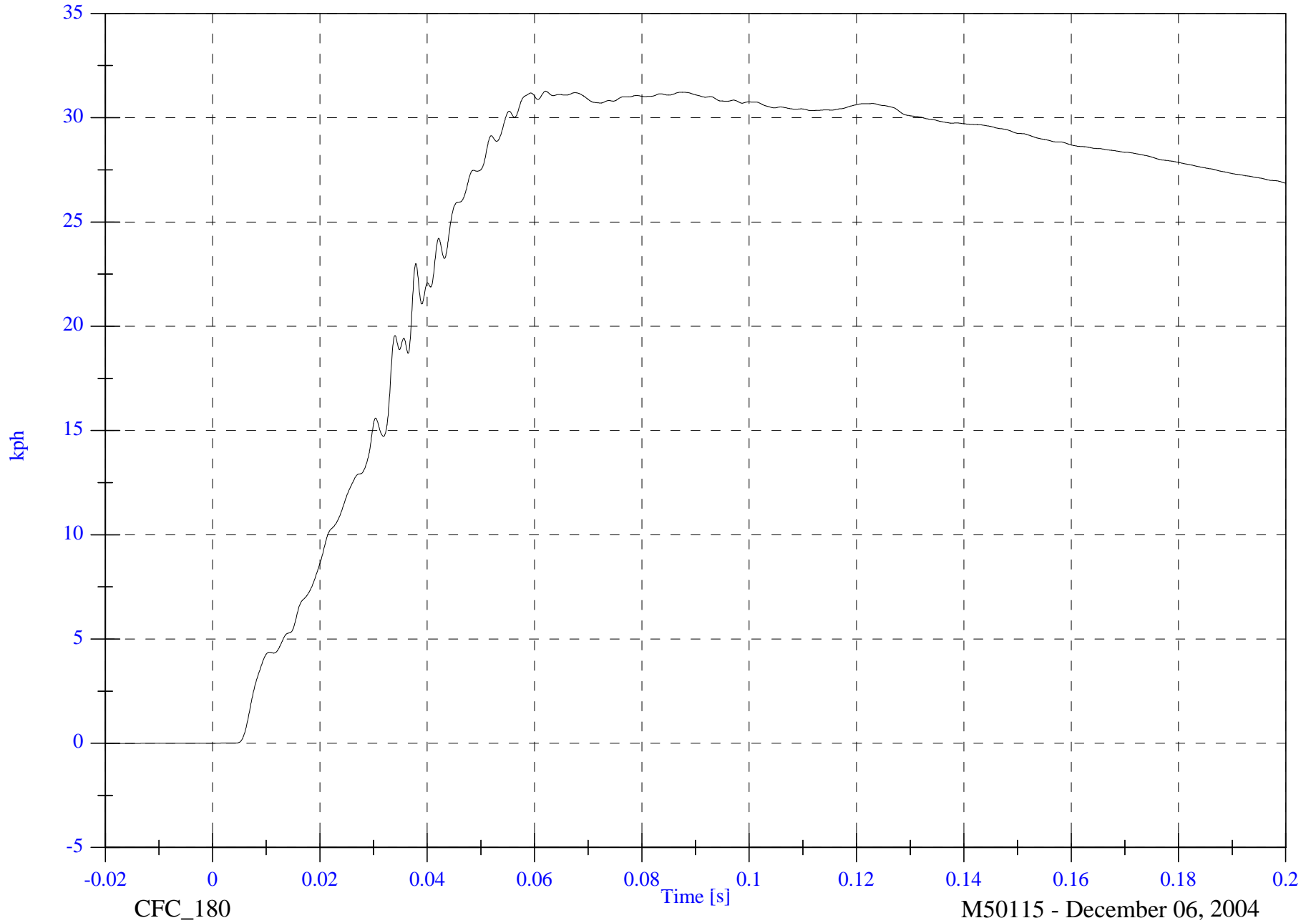
V2 A2 Right Rear Sill Y Velocity

Max: 31.3 [kph] at 0.062 [s]

Min: -0.0 [kph] at -0.020 [s]

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CFC\_180

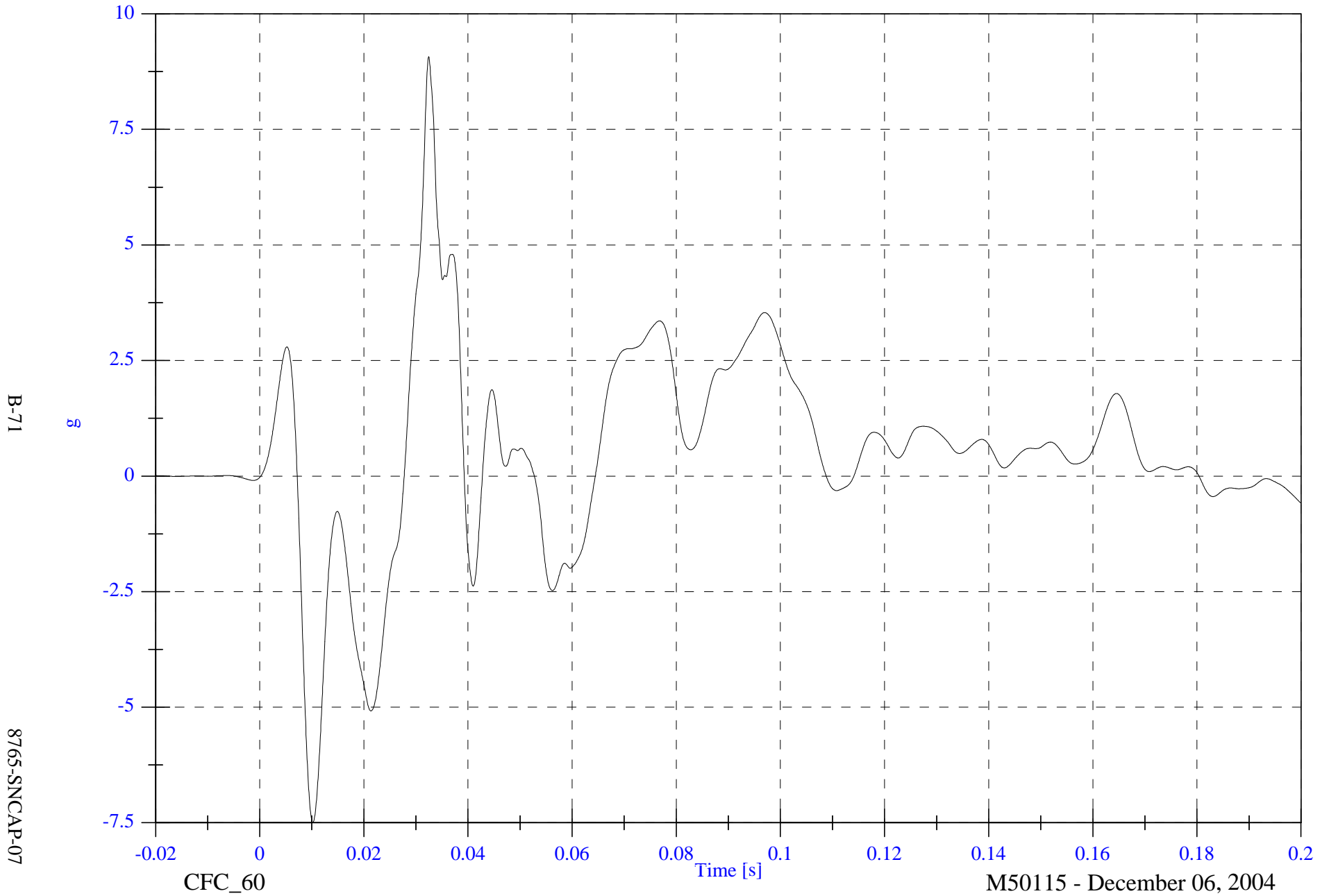
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A2 Right Rear Sill Z

Max: 9.1 [g] at 0.032 [s]

Min: -7.5 [g] at 0.010 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A2 Right Rear Sill Z Velocity

Max: 4.1 [kph] at 0.181 [s]

Min: -2.2 [kph] at 0.028 [s]

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8765-SNCAP-07



CFC\_180

Time [s]

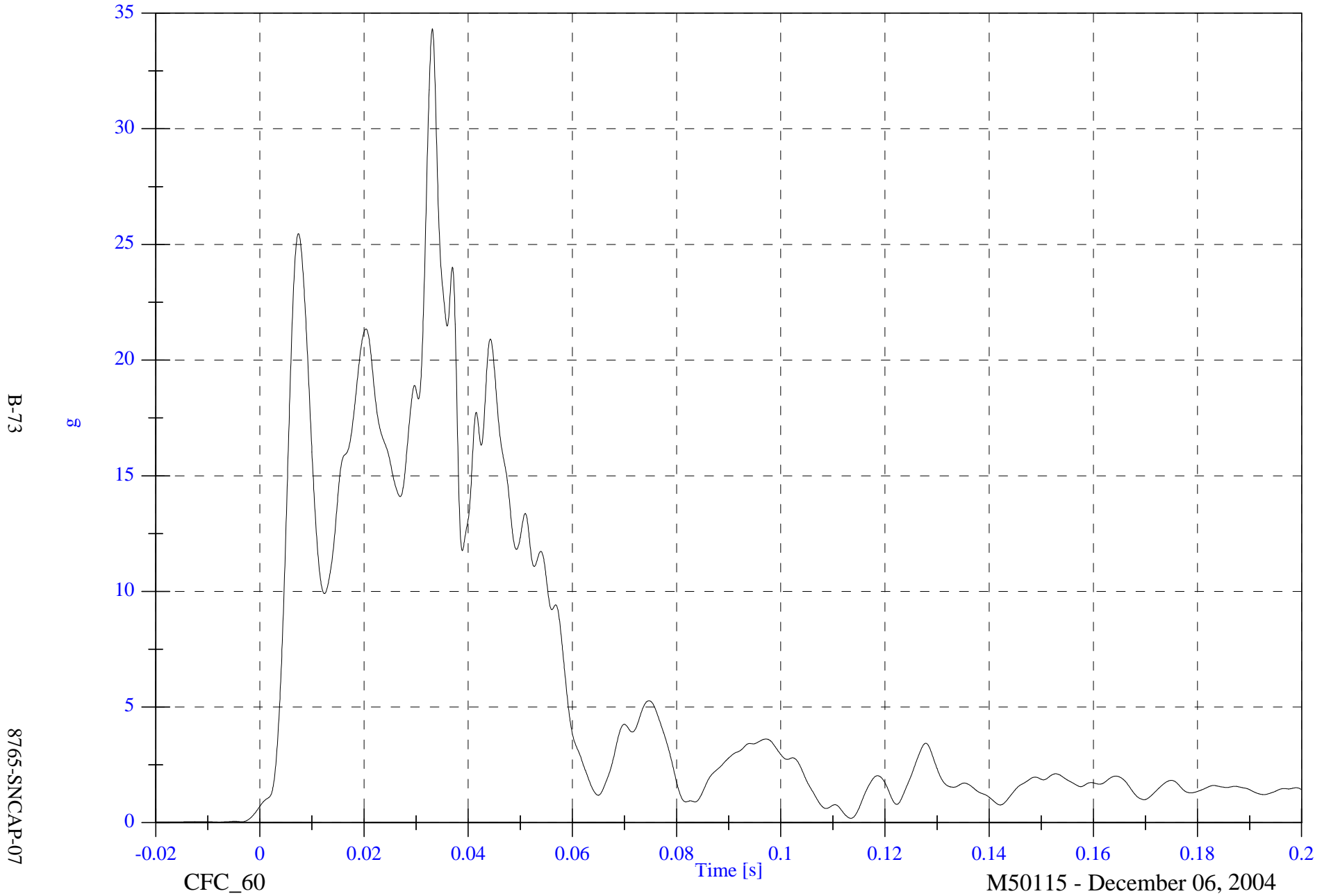
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A2 Right Rear Sill Resultant

Max: 34.3 [g] at 0.033 [s]

Min: 0.0 [g] at -0.008 [s]



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CFC\_60

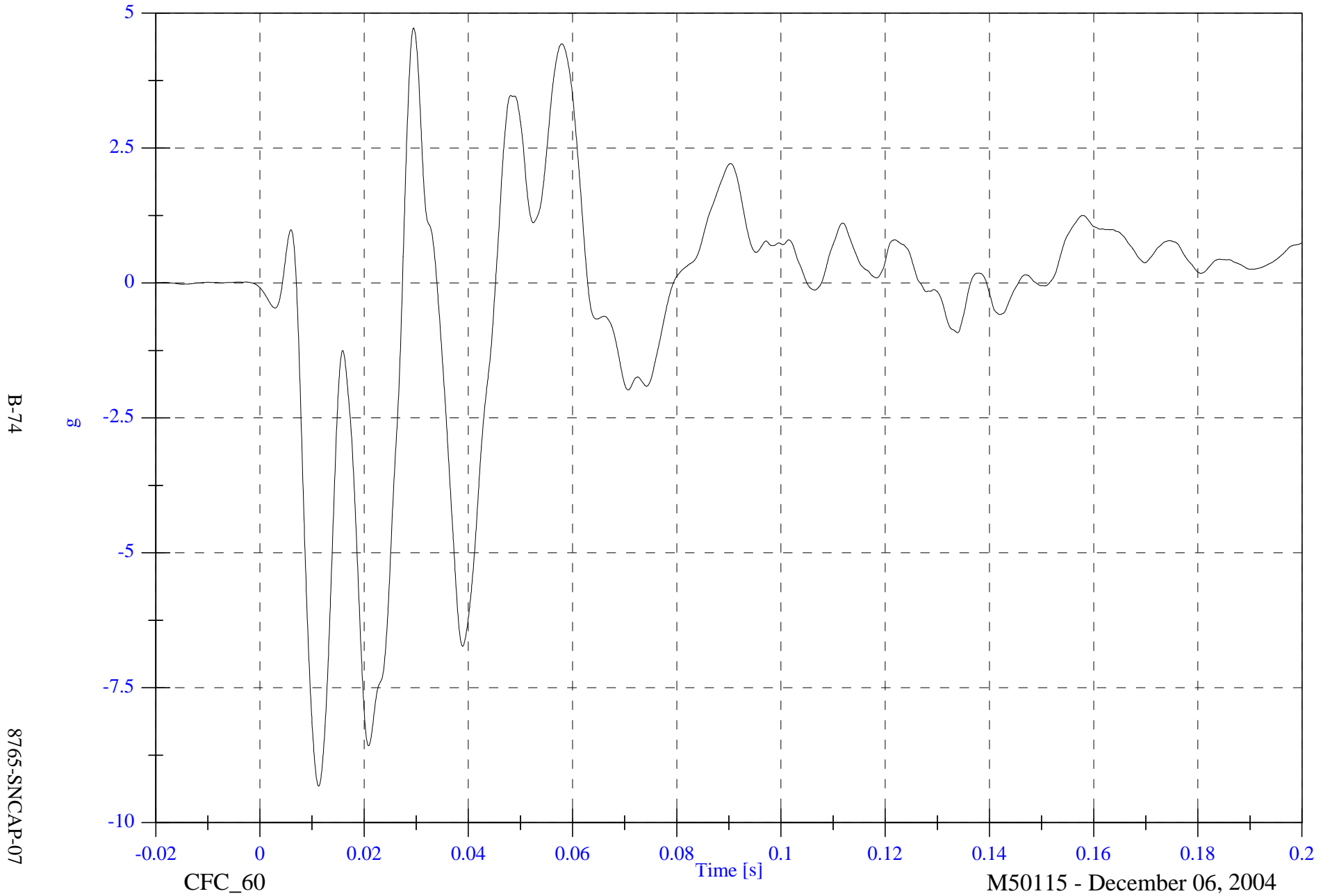
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A3 Rear Floorpan X

Max: 4.7 [g] at 0.029 [s]

Min: -9.3 [g] at 0.011 [s]

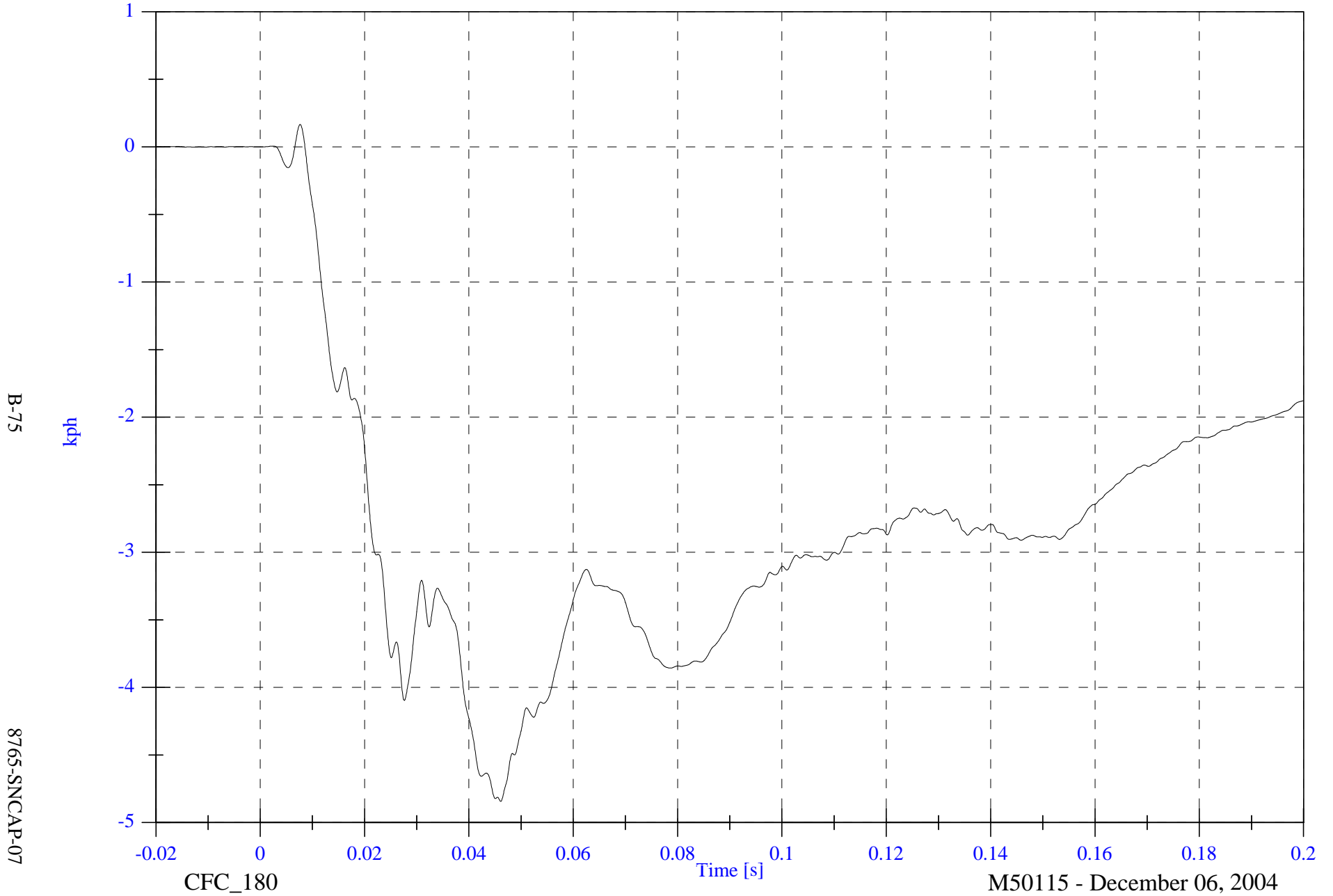


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A3 Rear Floorpan X Velocity

Max: 0.2 [kph] at 0.008 [s]

Min: -4.8 [kph] at 0.046 [s]

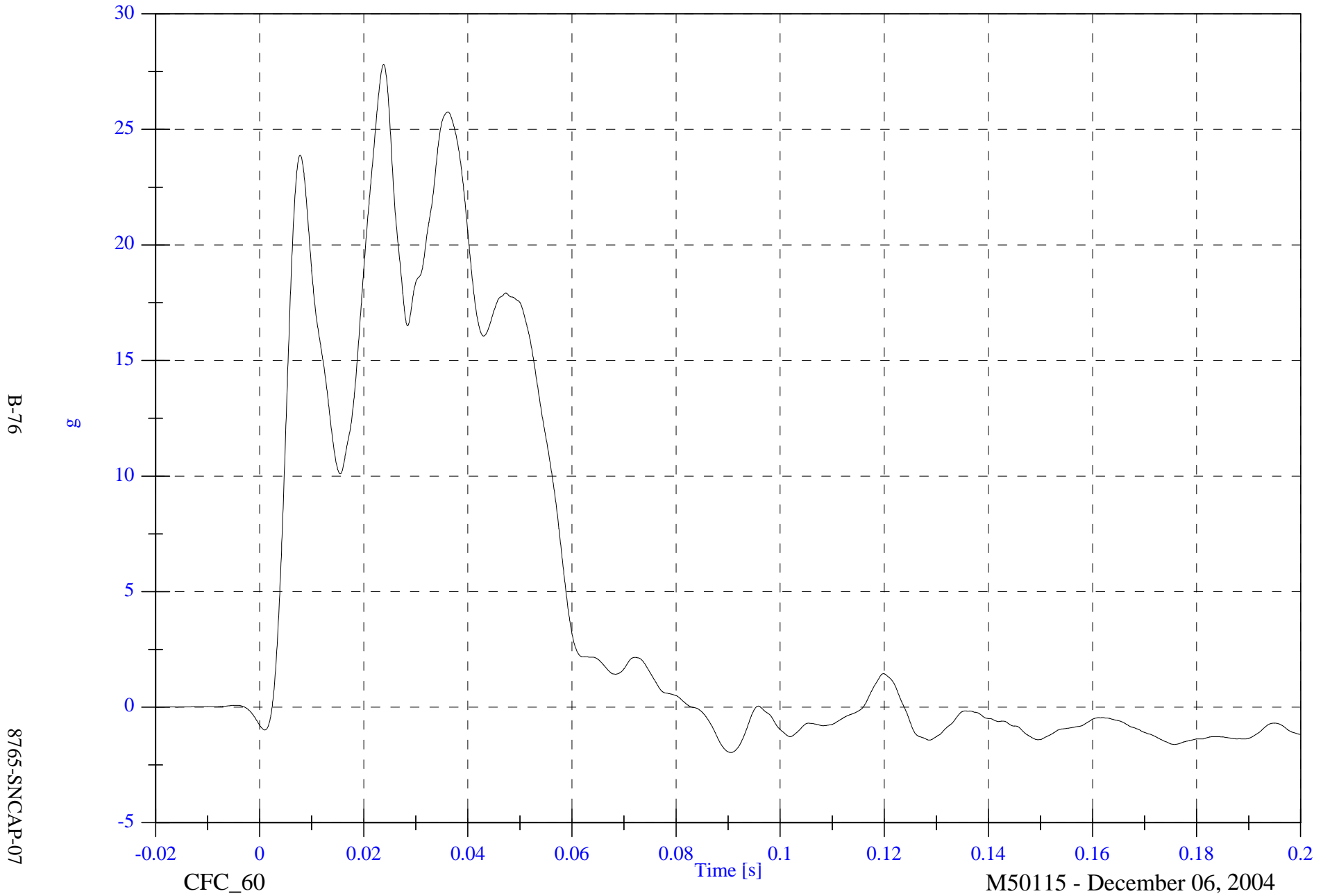


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A3 Rear Floorpan Y

Max: 27.8 [g] at 0.024 [s]

Min: -2.0 [g] at 0.091 [s]



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g

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CFC\_60

Time [s]

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

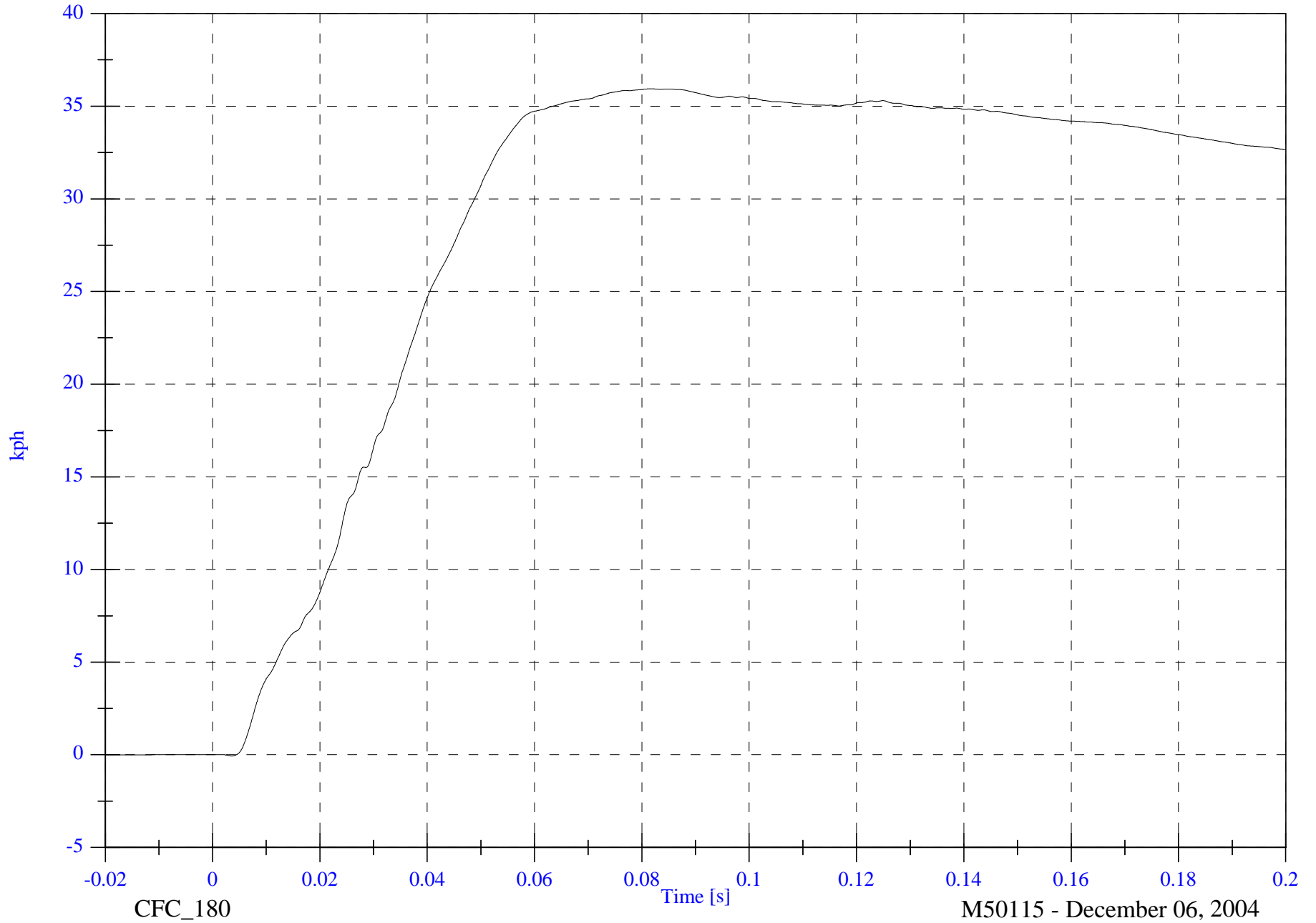
V2 A3 Rear Floorpan Y Velocity

Max: 35.9 [kph] at 0.082 [s]

Min: -0.1 [kph] at 0.004 [s]

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CFC\_180

Time [s]

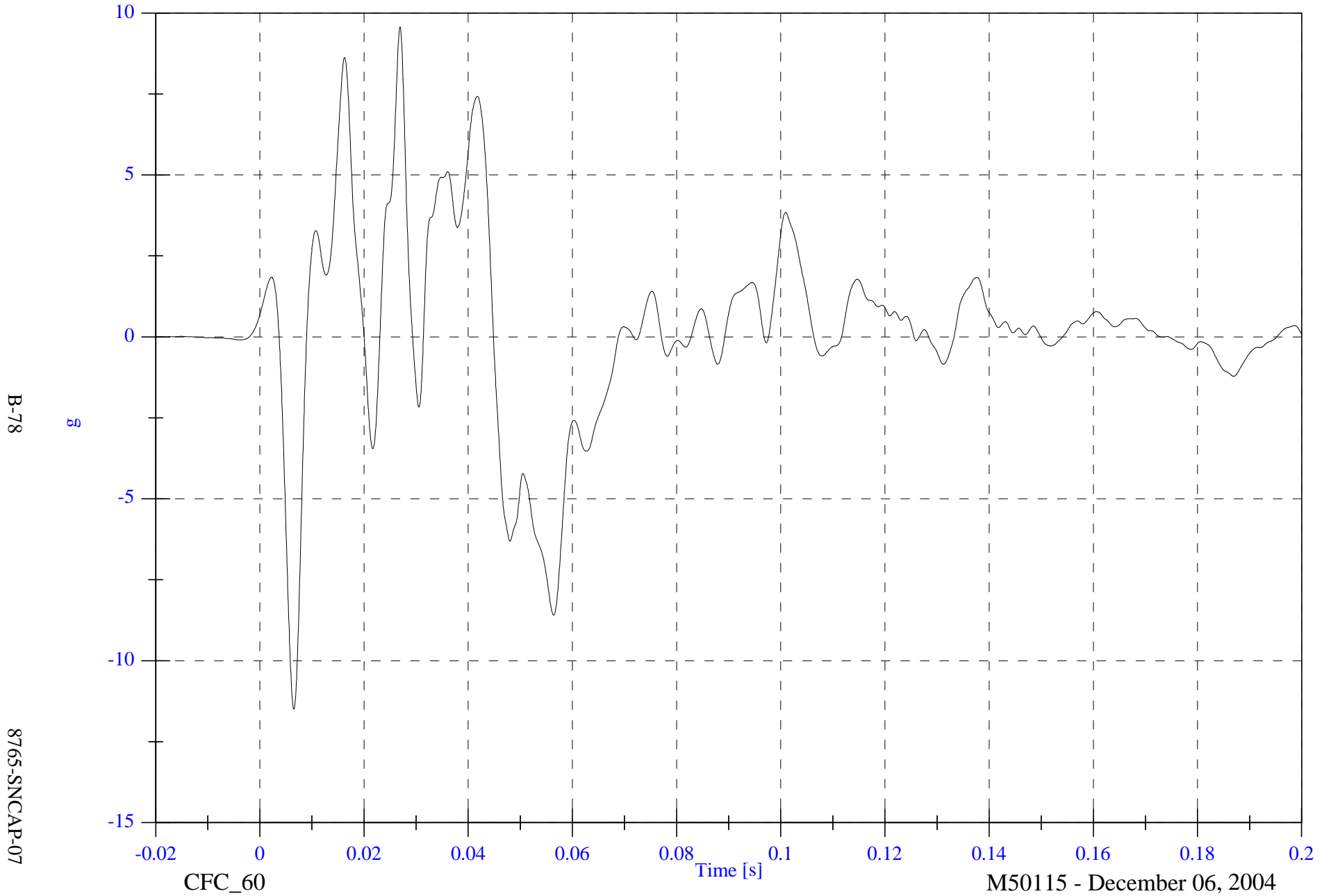
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A3 Rear Floorplan Z

Max: 9.6 [g] at 0.027 [s]

Min: -11.5 [g] at 0.007 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A3 Rear Floorplan Z Velocity

Max: 3.6 [kph] at 0.044 [s]

Min: -1.5 [kph] at 0.008 [s]

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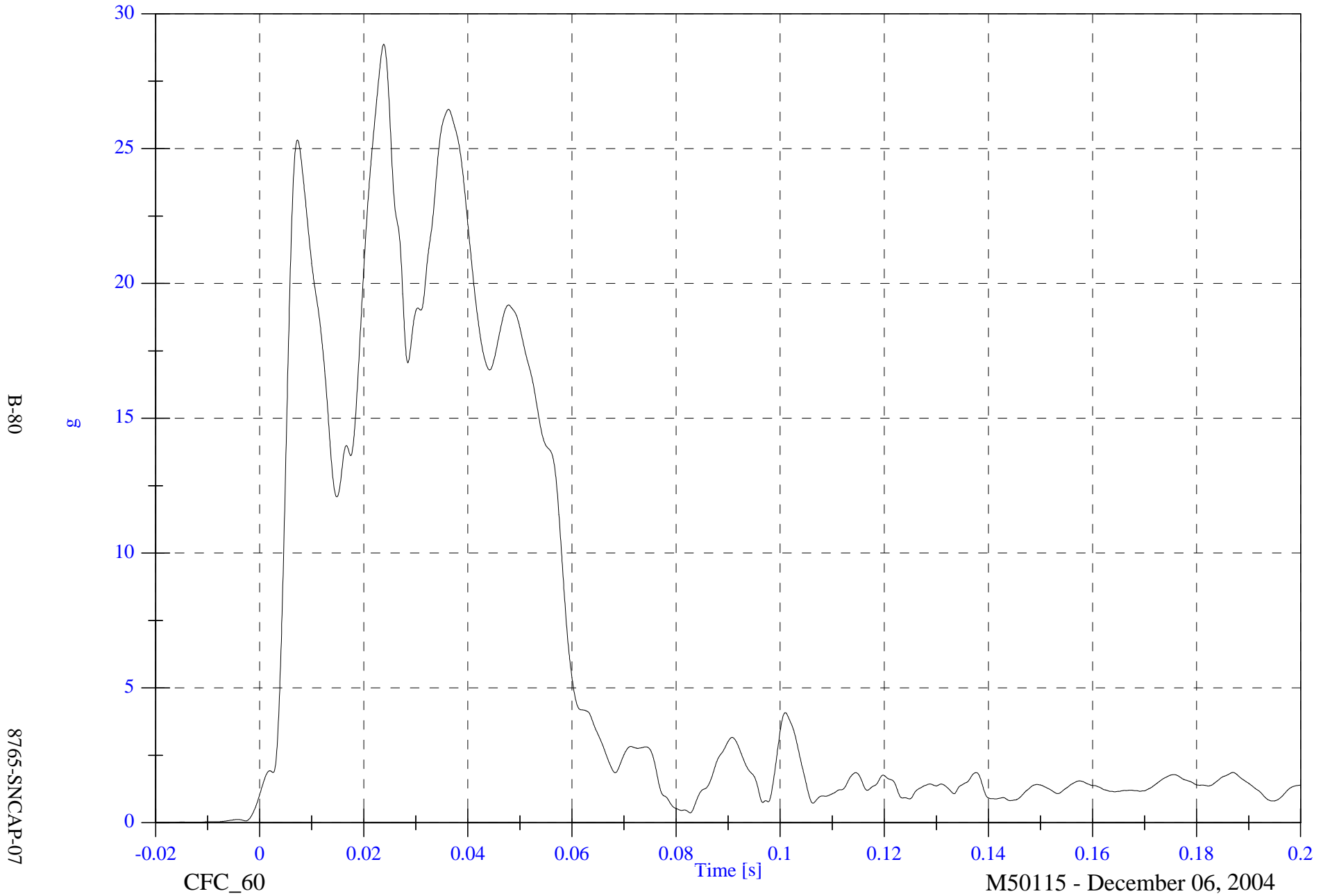


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A3 Rear Floorpan Resultant

Max: 28.9 [g] at 0.024 [s]

Min: 0.0 [g] at -0.020 [s]



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CFC\_60

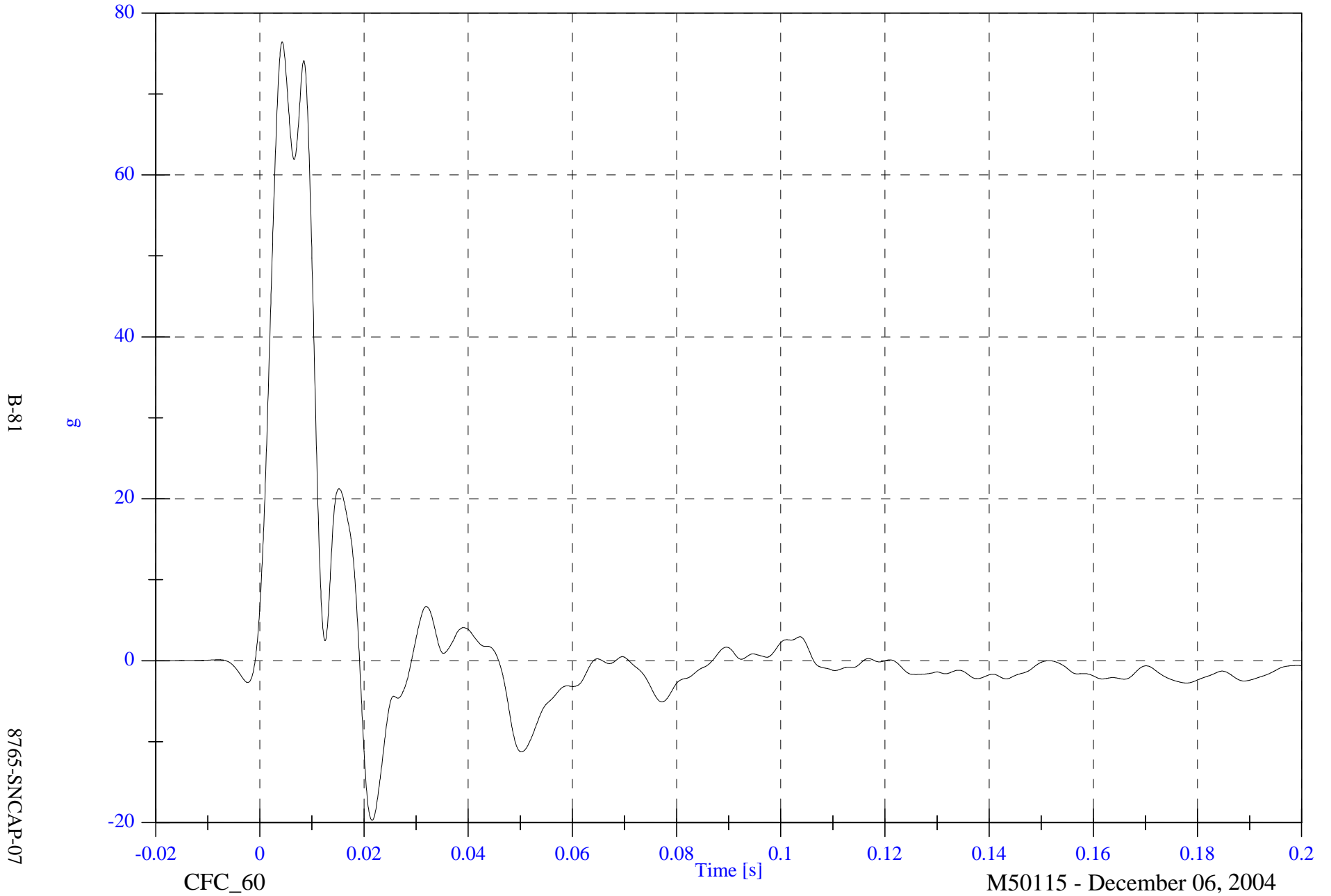
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A4 Left Rear Sill Y

Max: 76.5 [g] at 0.004 [s]

Min: -19.7 [g] at 0.022 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

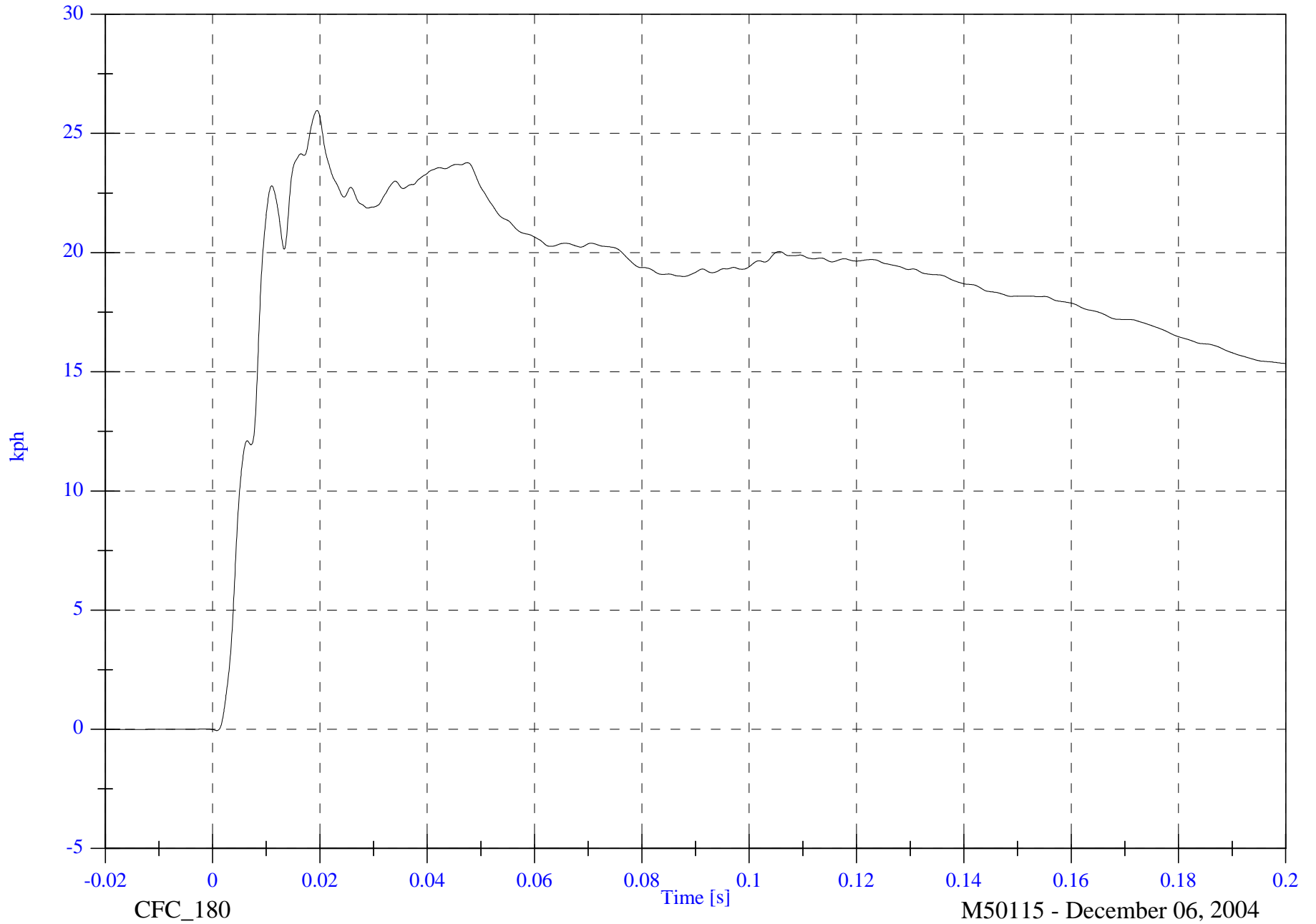
V2 A4 Left Rear Sill Y Velocity

Max: 26.0 [kph] at 0.019 [s]

Min: -0.1 [kph] at 0.001 [s]

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8765-SNCAP-07

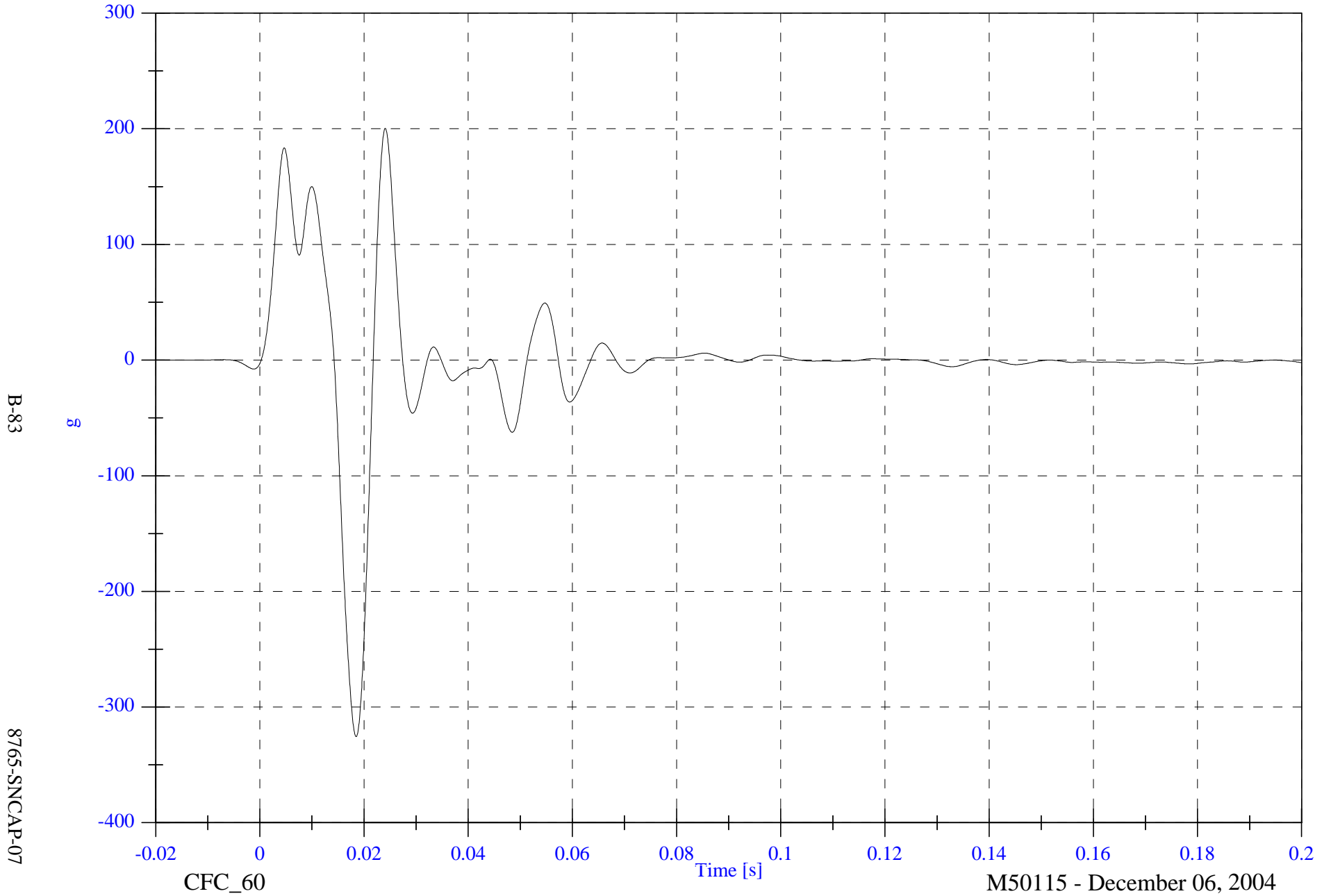


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A5 Left Front Sill Y

Max: 200.4 [g] at 0.024 [s]

Min: -325.6 [g] at 0.018 [s]

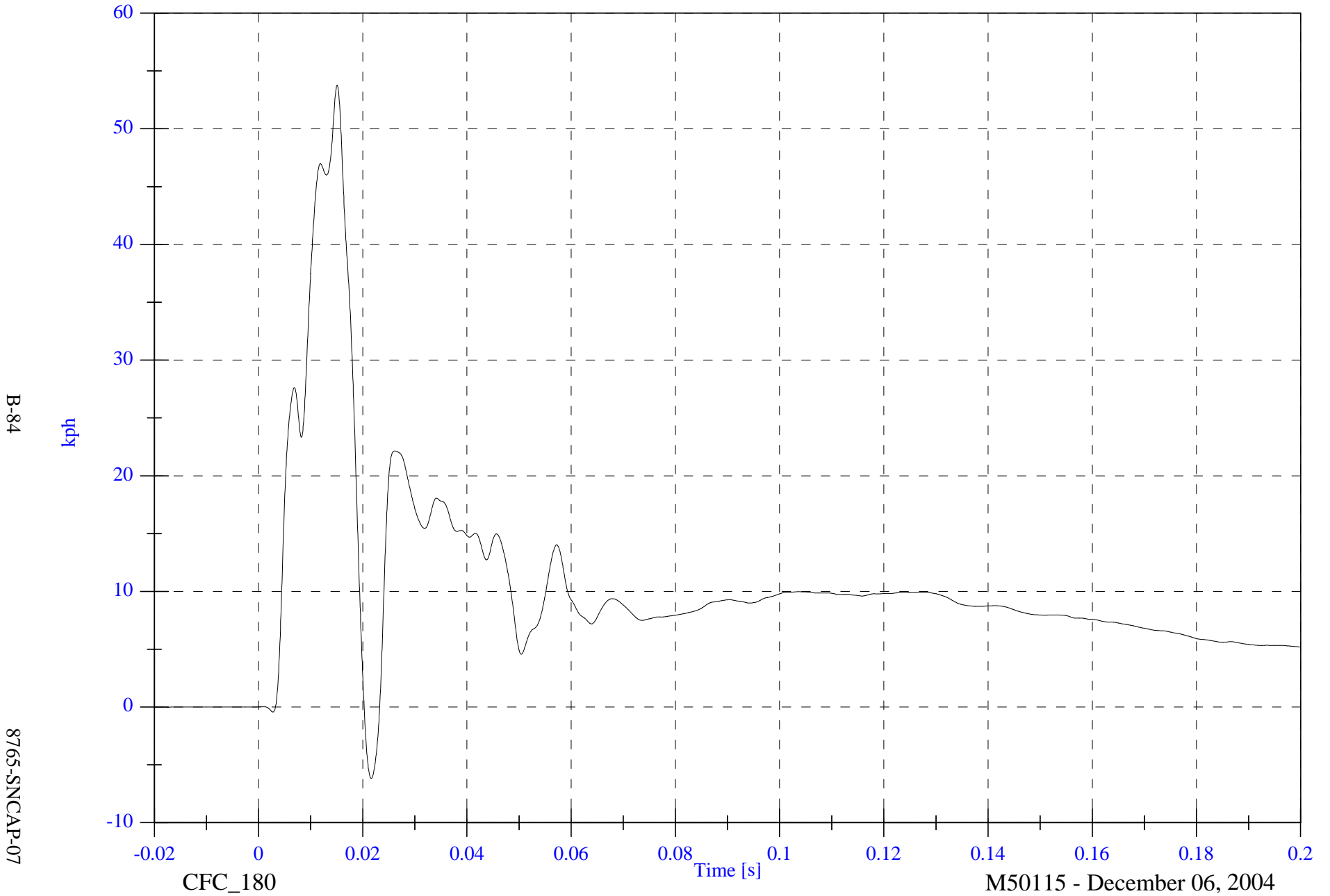


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A5 Left Front Sill Y Velocity

Max: 53.8 [kph] at 0.015 [s]

Min: -6.2 [kph] at 0.022 [s]



B-84

8765-SNCAP-07

CFC\_180

Time [s]

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A6 Left Front Door C/L Y

Max: 105.9 [g] at 0.012 [s]

Min: -67.0 [g] at 0.026 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

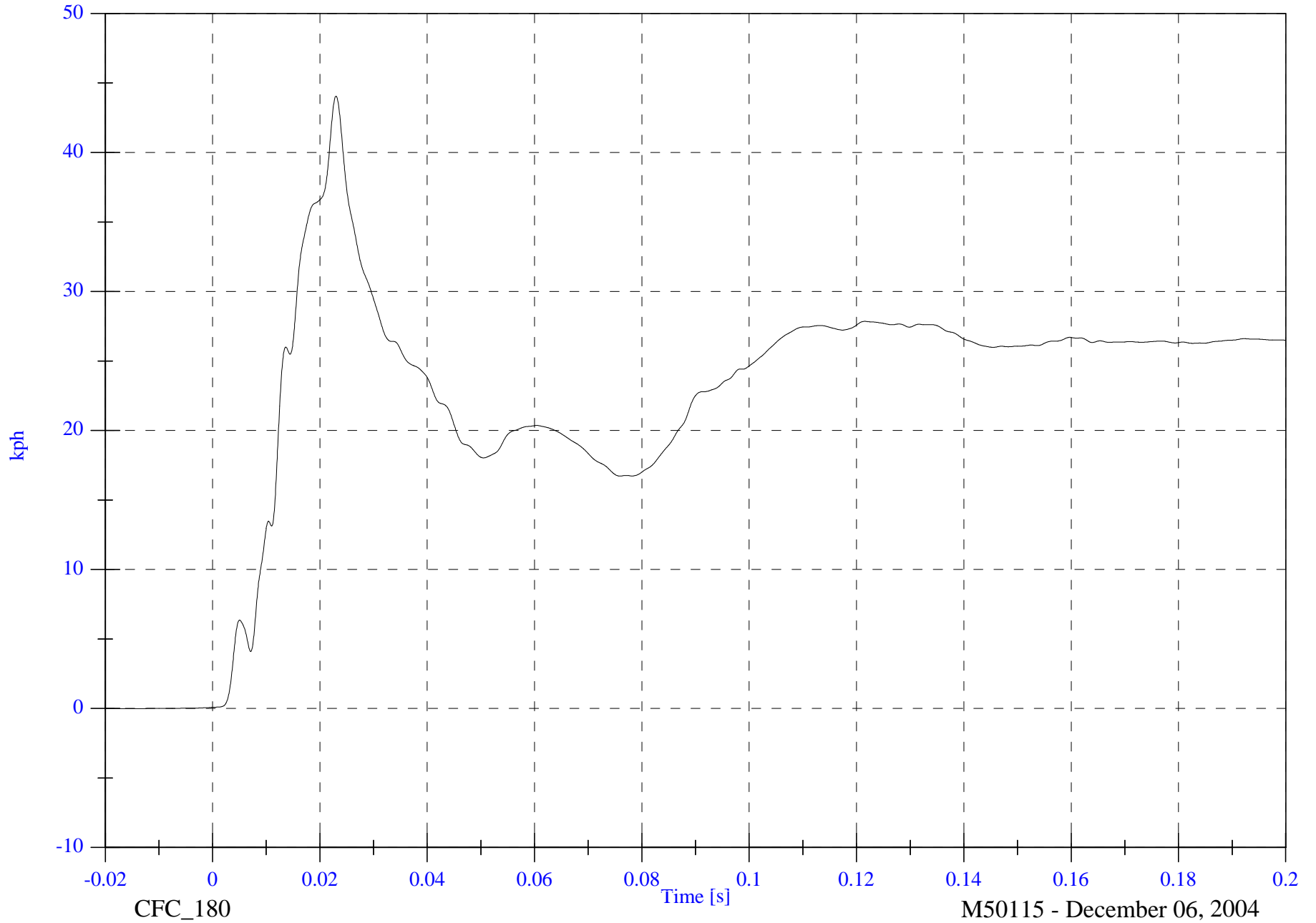
V2 A6 Left Front Door C/L Y Velocity

Max: 44.1 [kph] at 0.023 [s]

Min: -0.0 [kph] at -0.016 [s]

B-86

8765-SNCAP-07



CFC\_180

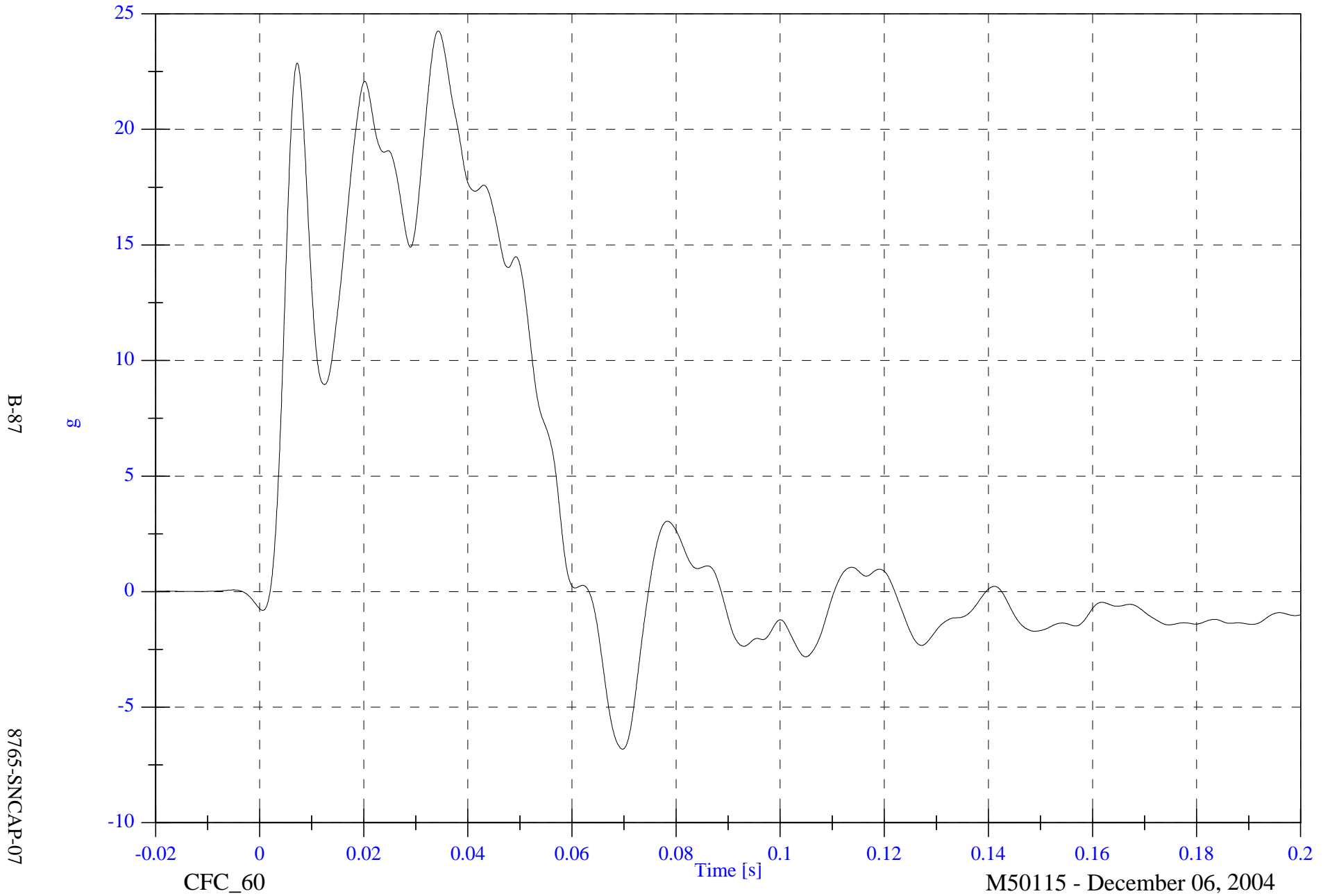
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A7 Right Rear Compartment Y

Max: 24.3 [g] at 0.034 [s]

Min: -6.8 [g] at 0.070 [s]



B-87

8765-SNCAP-07

CFC\_60

Time [s]

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

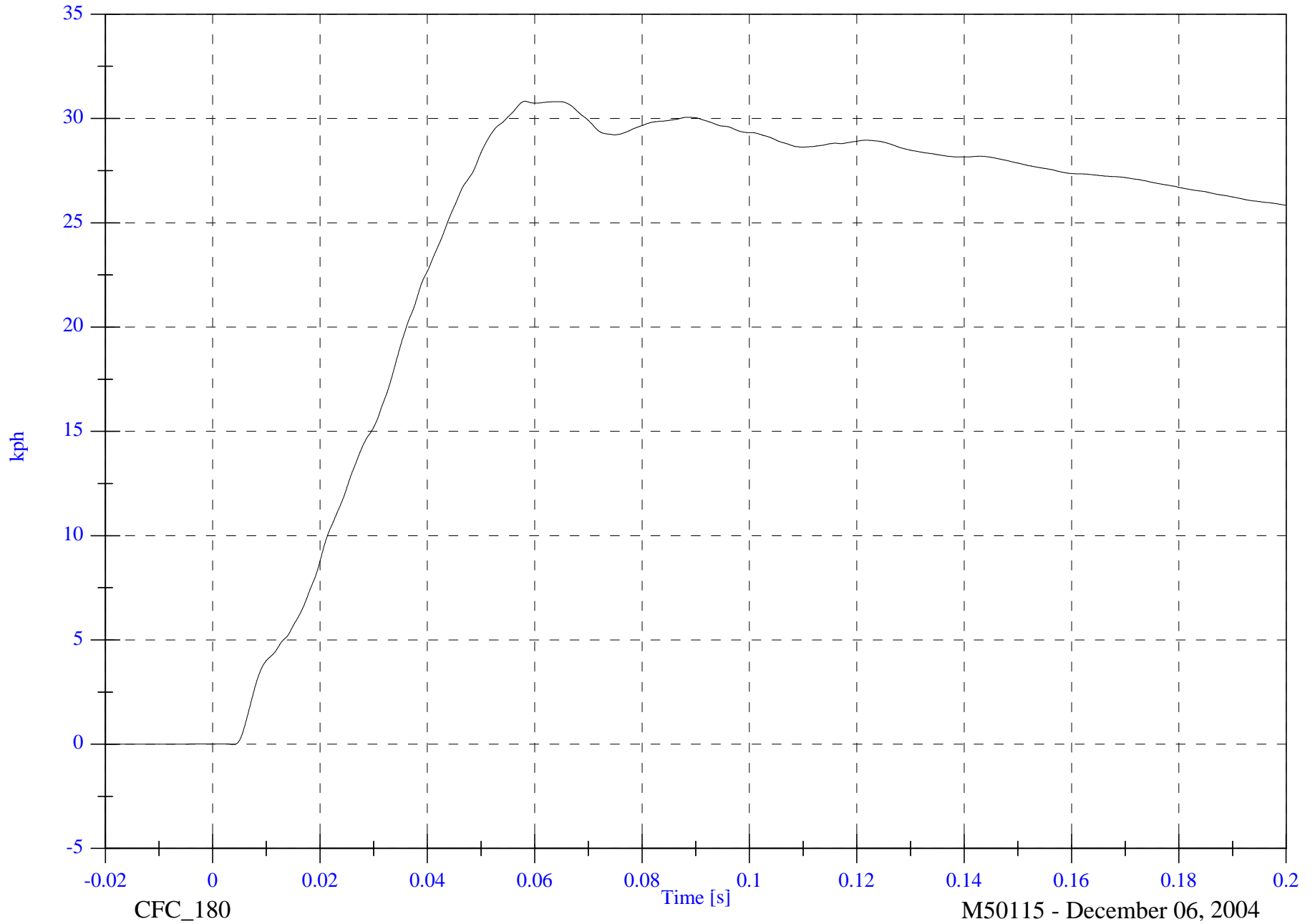
V2 A7 Right Rear Compartment Y Velocity

Max: 30.8 [kph] at 0.058 [s]

Min: -0.0 [kph] at 0.004 [s]

B-88

8765-SNCAP-07

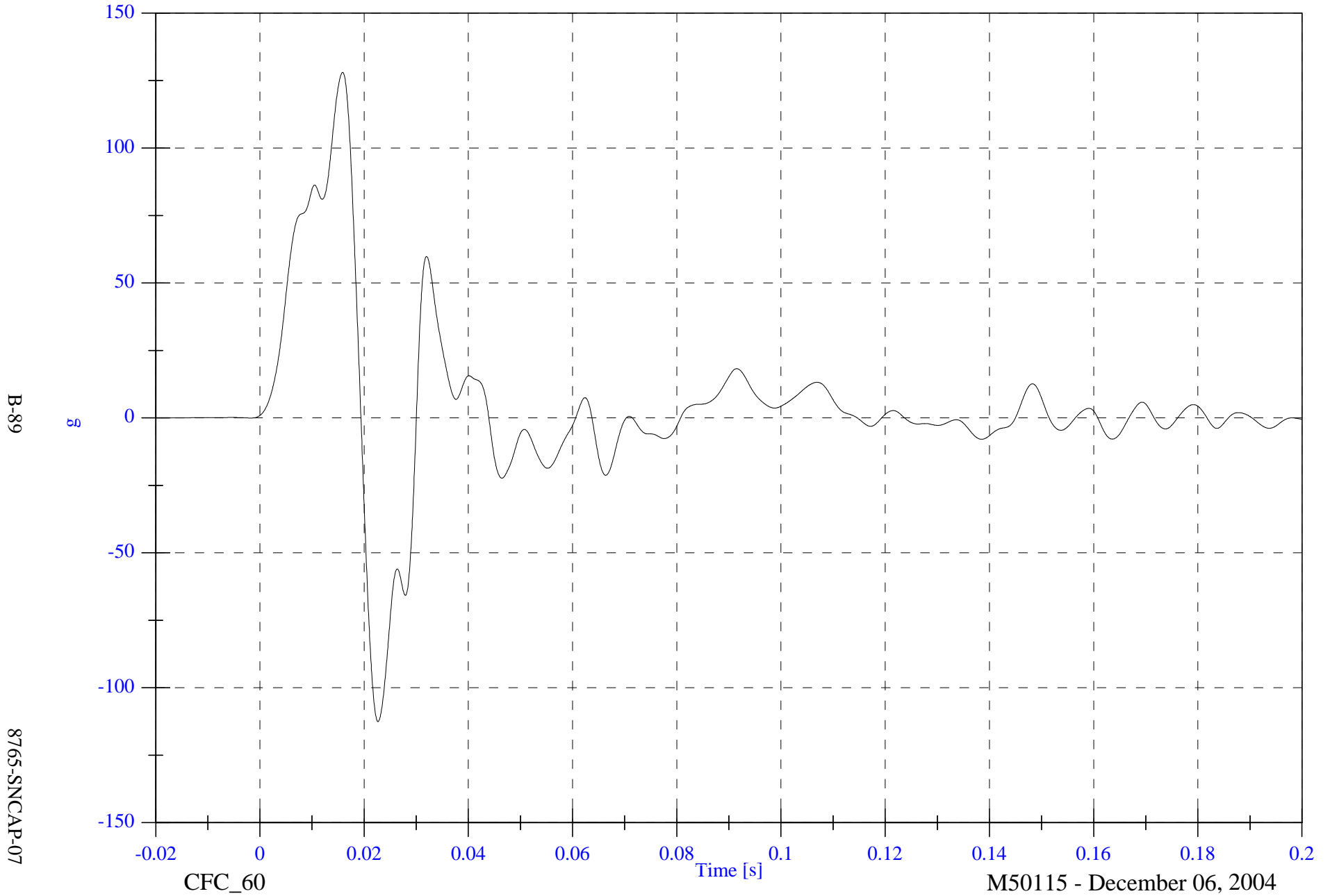


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A8 Left Front Door Midrear Y

Max: 128.0 [g] at 0.016 [s]

Min: -112.6 [g] at 0.023 [s]



B-89

8765-SNCAP-07

CFC\_60

Time [s]

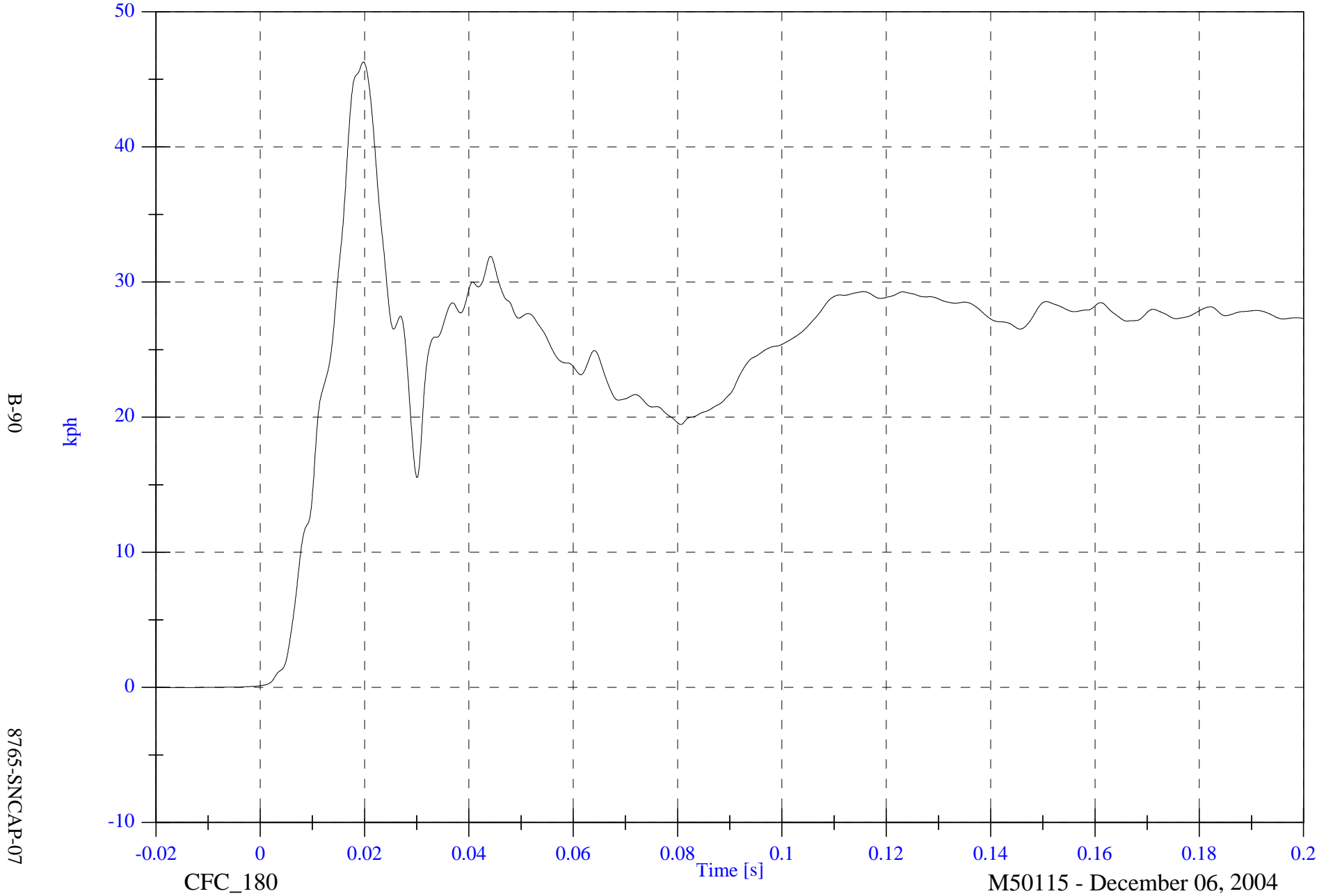
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A8 Left Front Door Midrear Y Velocity

Max: 46.3 [kph] at 0.020 [s]

Min: -0.0 [kph] at -0.015 [s]



B-90

8765-SNCAP-07

CFC\_180

Time [s]

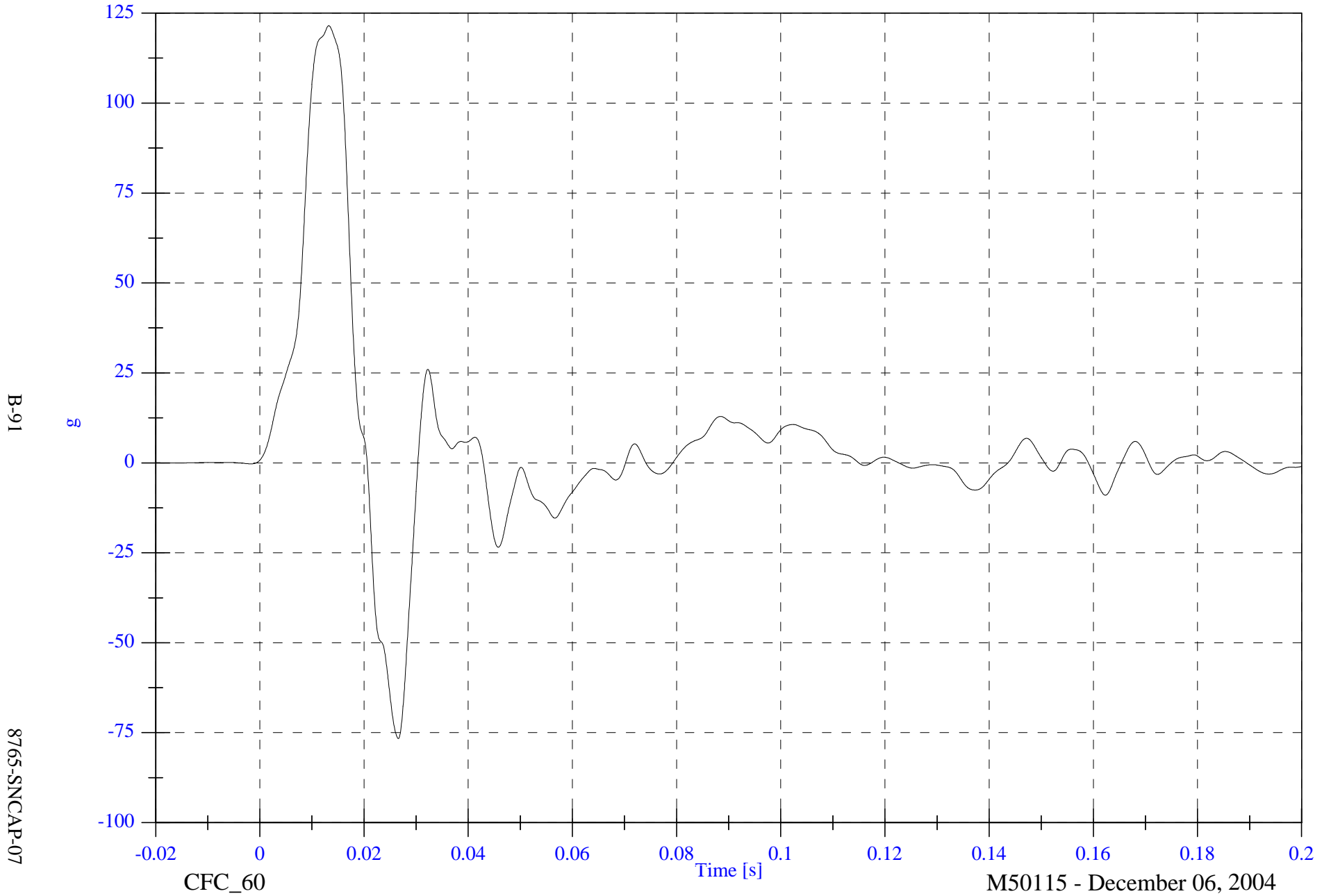
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A9 Left Front Door Upper C/L Y

Max: 121.5 [g] at 0.013 [s]

Min: -76.6 [g] at 0.027 [s]

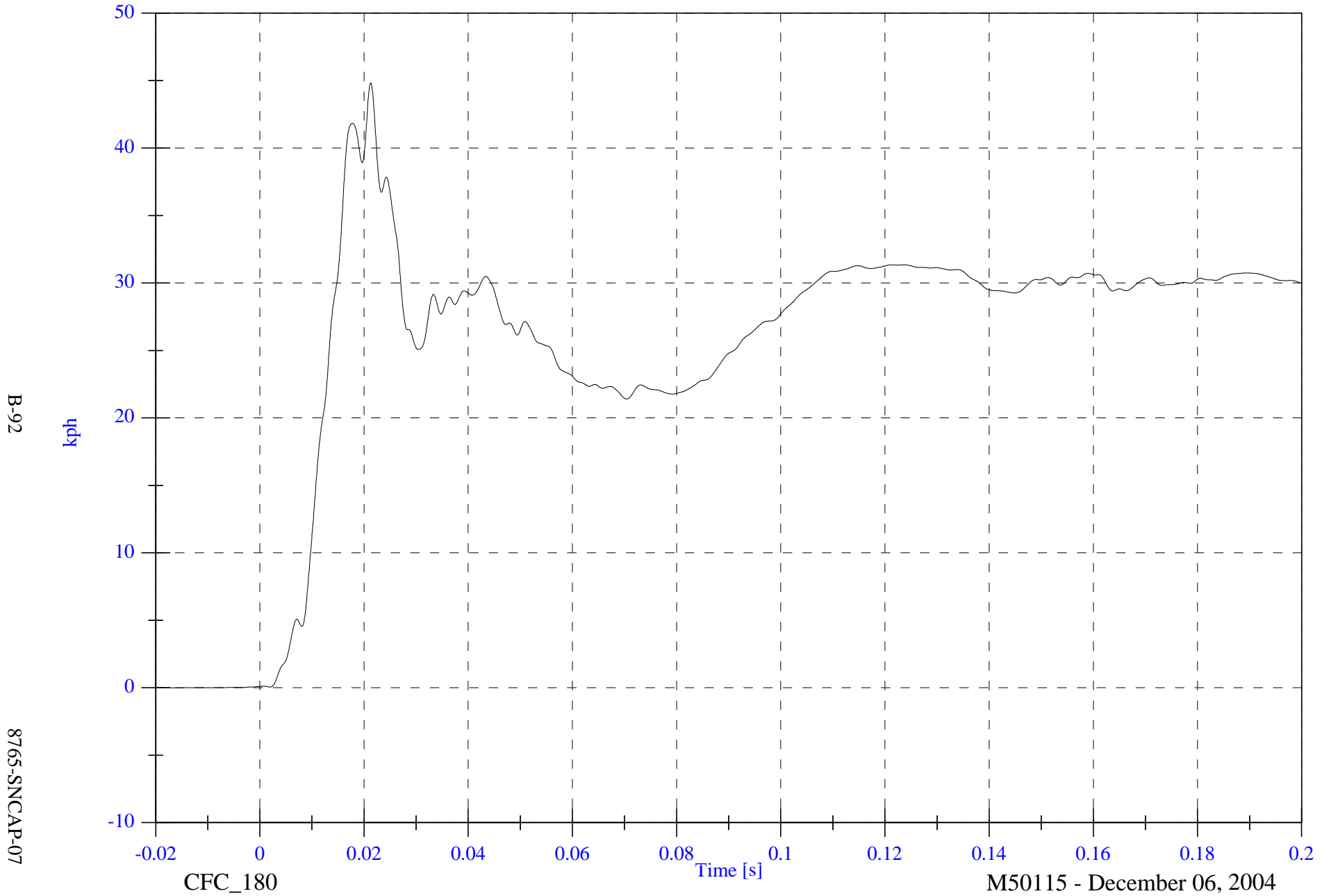


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A9 Left Front Door Upper C/L Y Velocity

Max: 44.8 [kph] at 0.021 [s]

Min: -0.0 [kph] at -0.016 [s]



B-92

8765-SNCAP-07

CFC\_180

Time [s]

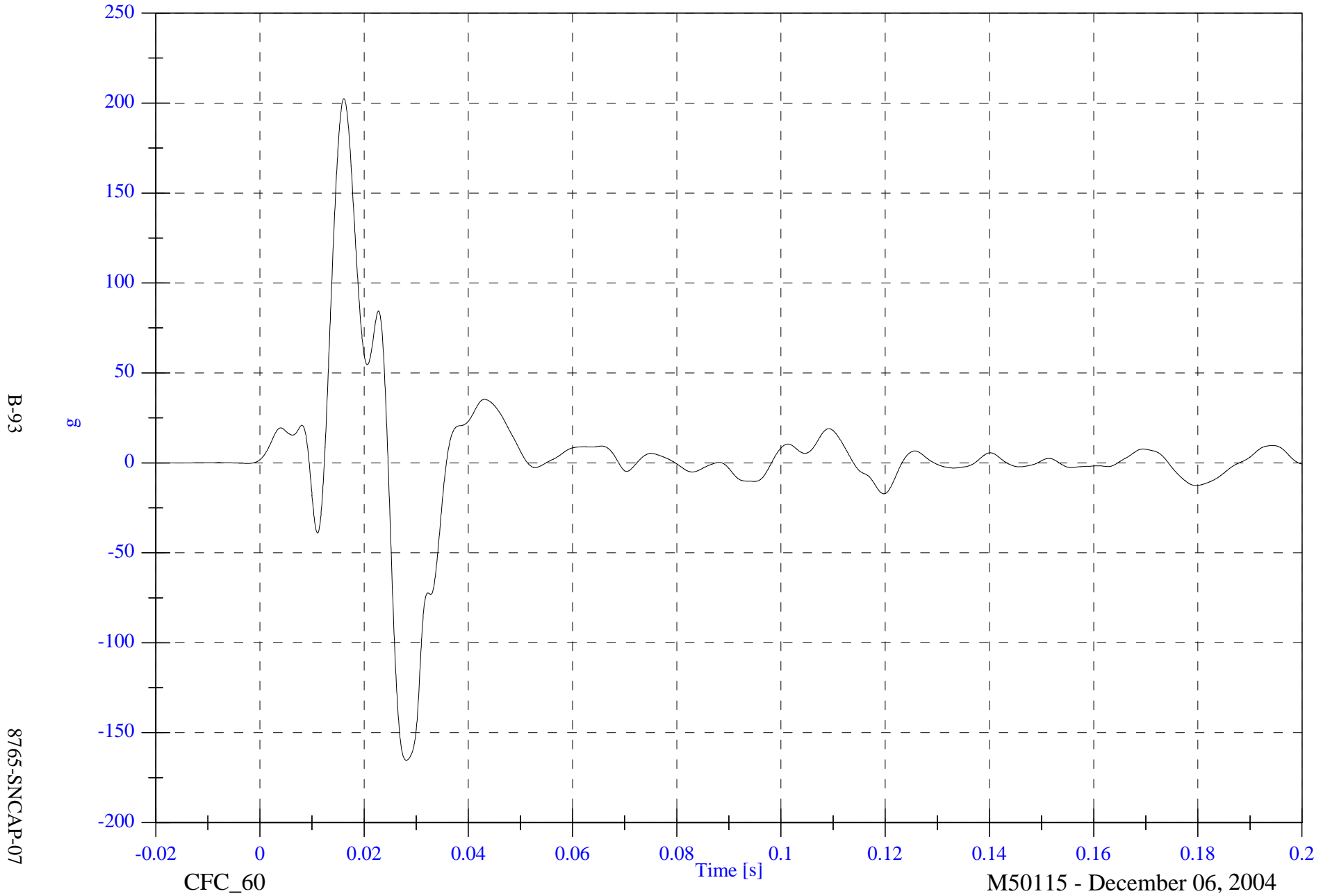
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A10 Left Rear Door Midrear Y

Max: 202.5 [g] at 0.016 [s]

Min: -165.3 [g] at 0.028 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A10 Left Rear Door Midrear Y Velocity

Max: 51.1 [kph] at 0.025 [s]

Min: -0.6 [kph] at 0.013 [s]

B-94

8765-SNCAP-07

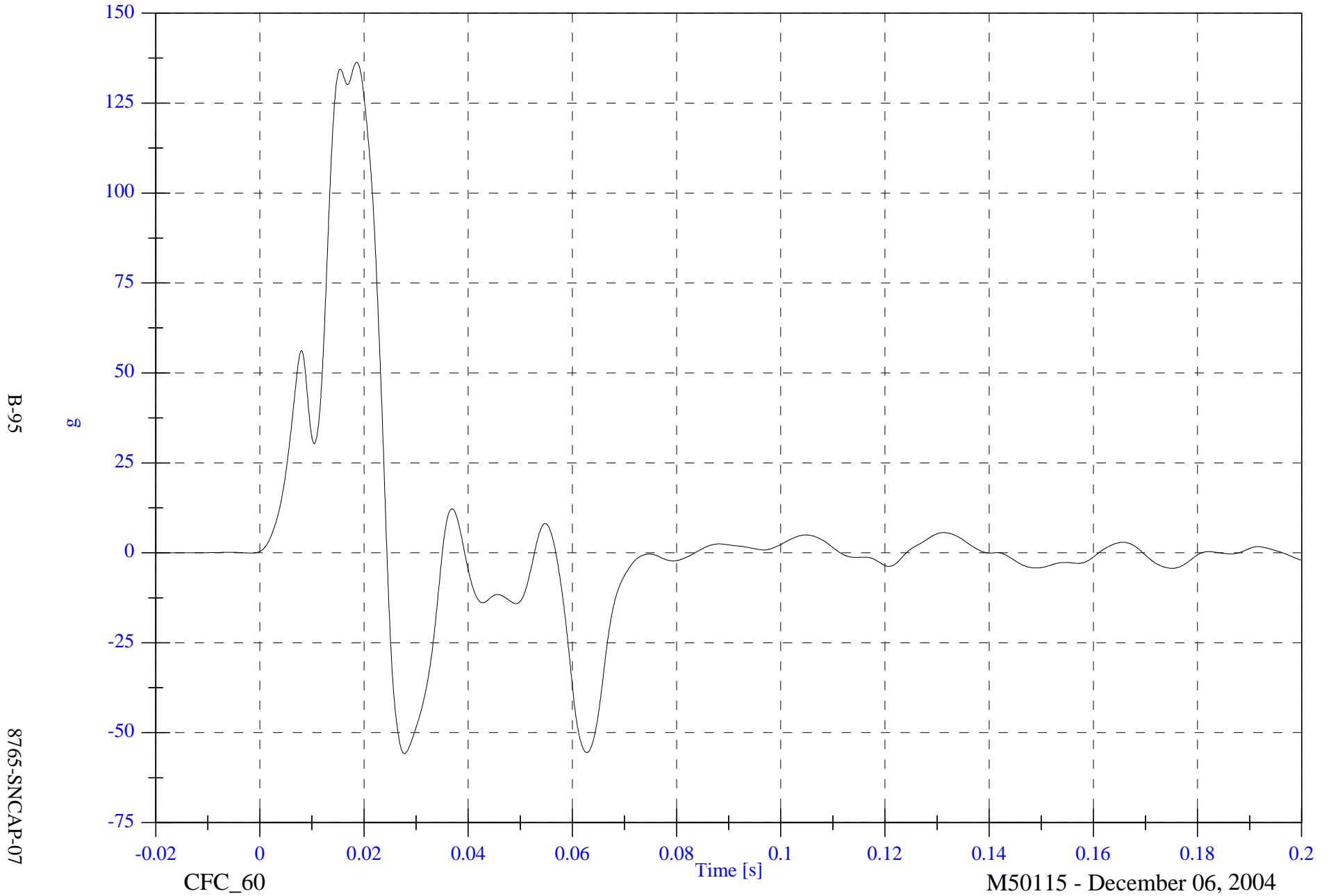


2005 SNCAP Test 2 - 2005 Saturn Ion

Max: 136.3 [g] at 0.019 [s]

V2 A11 Left Rear Door Upper C/L Y

Min: -55.8 [g] at 0.028 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

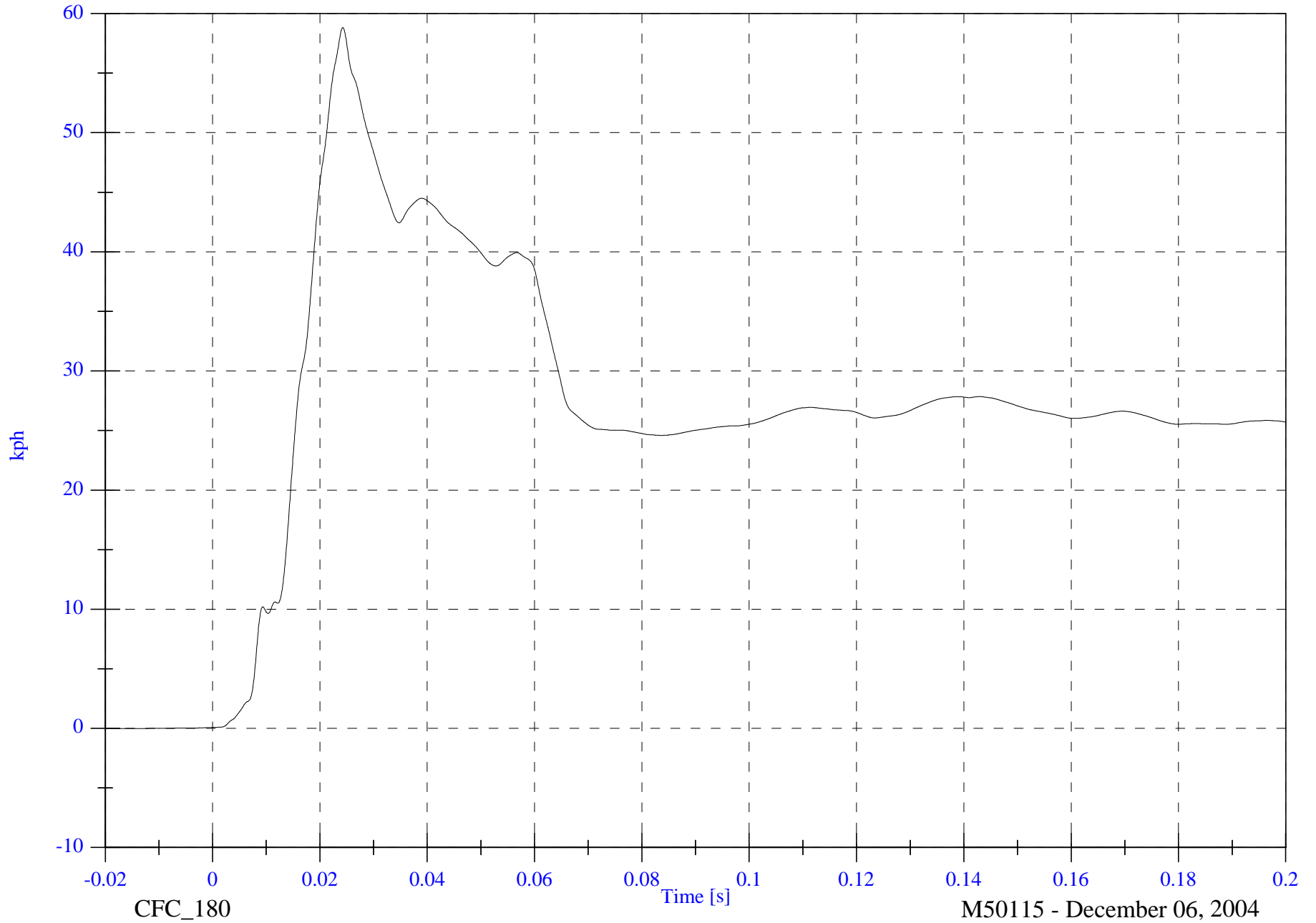
V2 A11 Left Rear Door Upper C/L Y Velocity

Max: 58.8 [kph] at 0.024 [s]

Min: -0.0 [kph] at -0.020 [s]

B-96

8765-SNCAP-07



CFC\_180

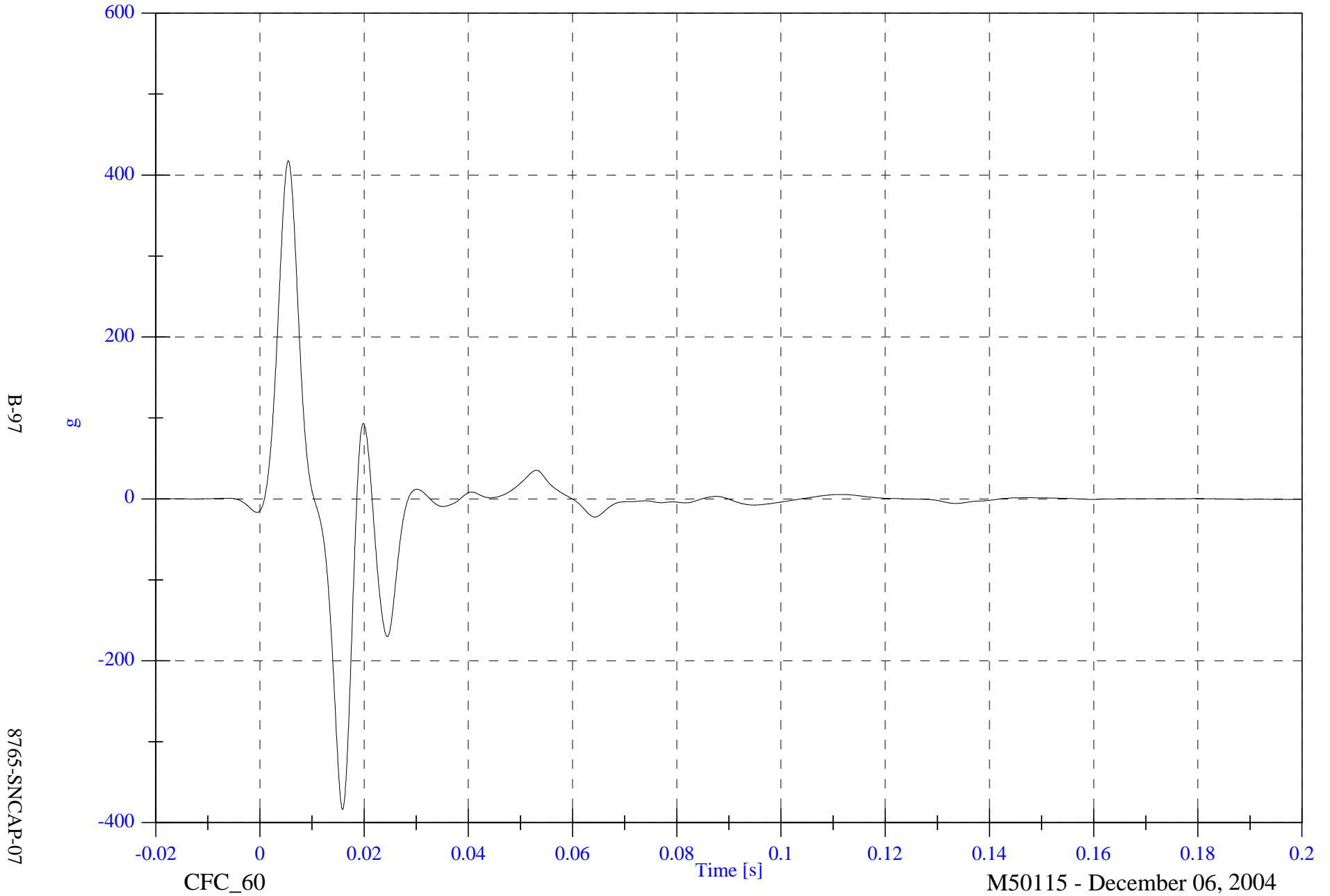
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A12 Left Lower B Post Y

Max: 417.5 [g] at 0.005 [s]

Min: -383.6 [g] at 0.016 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

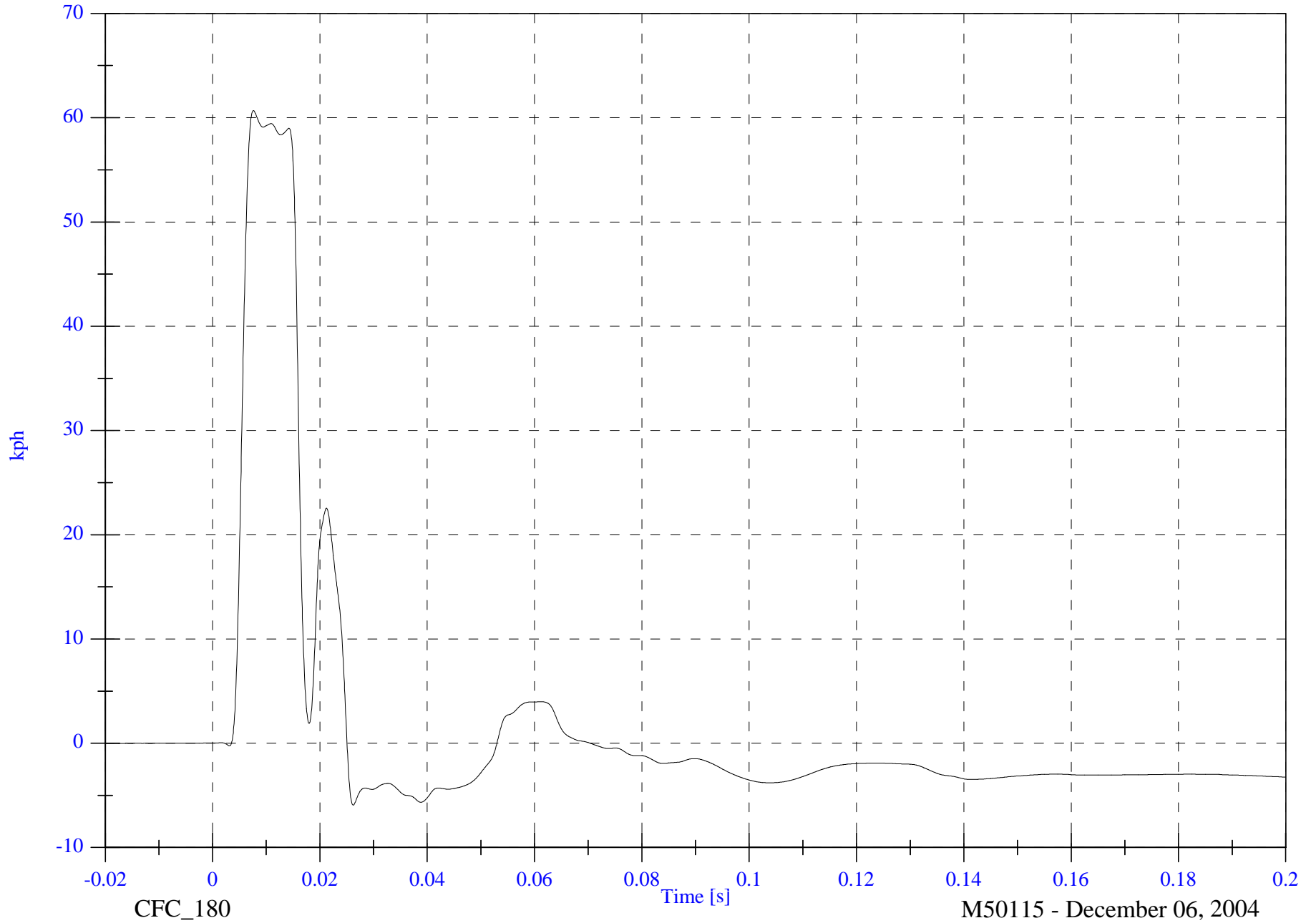
V2 A12 Left Lower B Post Y Velocity

Max: 60.7 [kph] at 0.008 [s]

Min: -5.9 [kph] at 0.026 [s]

B-98

8765-SNCAP-07

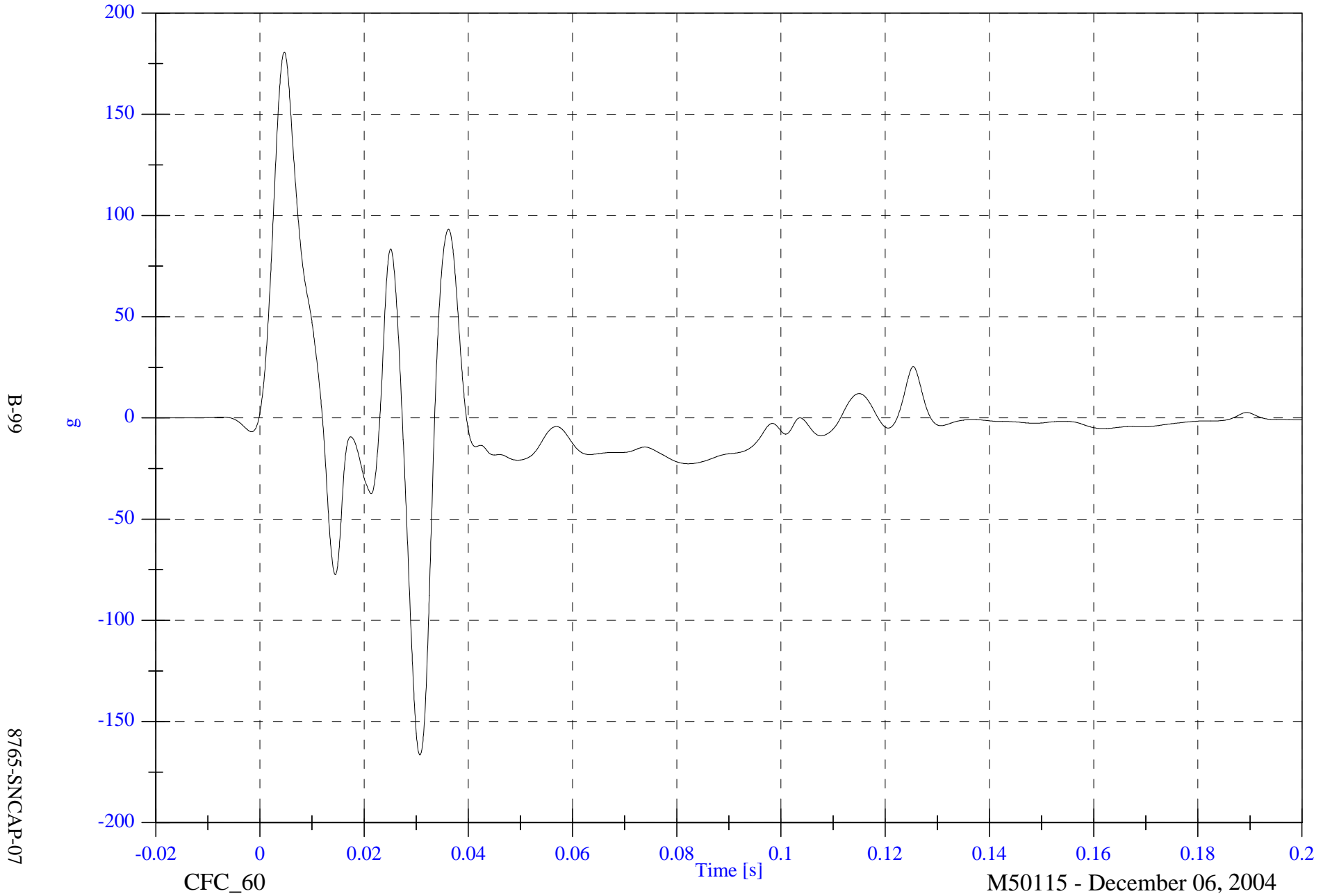


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A13 Left Mid B Post Y

Max: 180.7 [g] at 0.005 [s]

Min: -166.5 [g] at 0.031 [s]



B-99

8765-SNCAP-07

CFC\_60

Time [s]

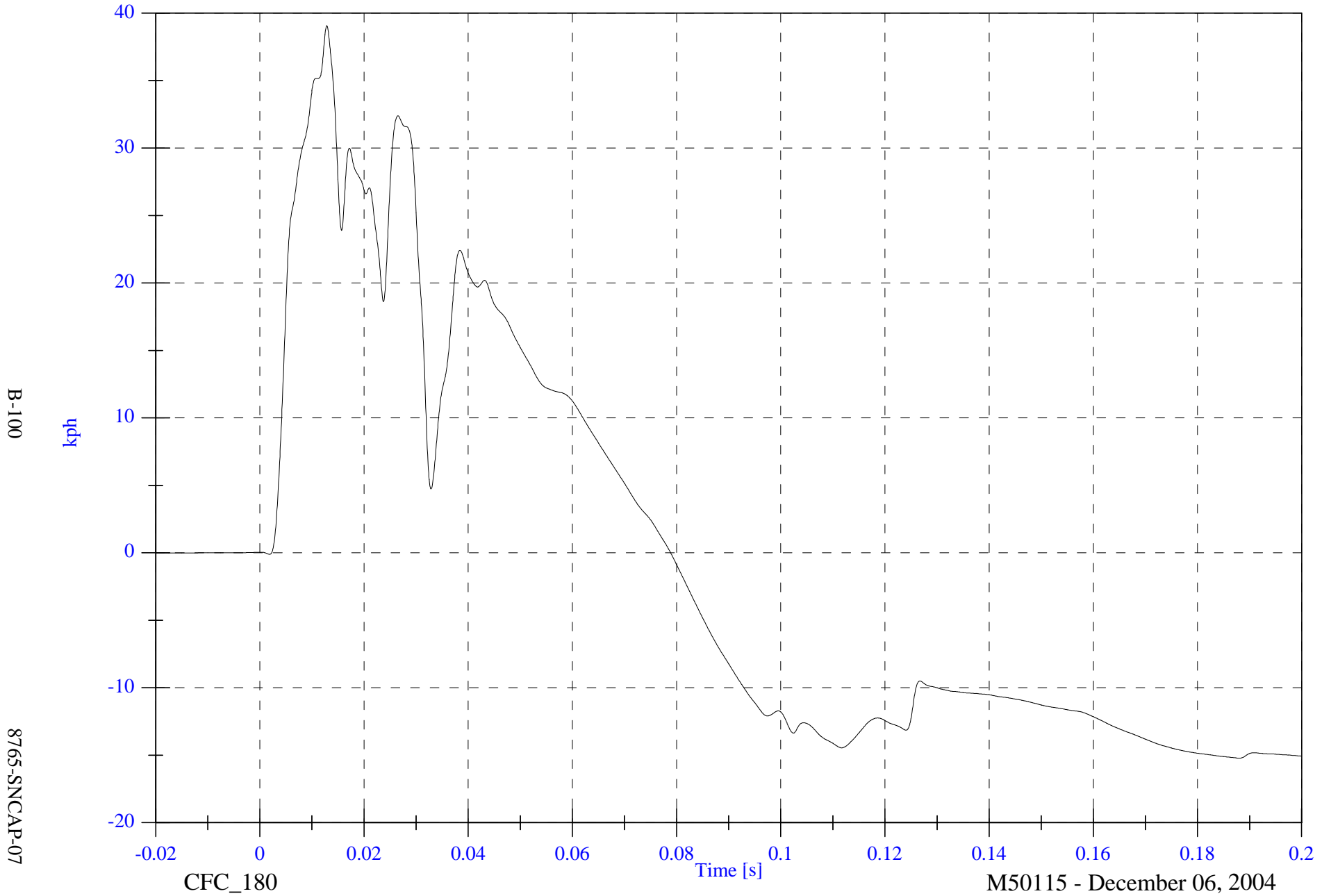
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A13 Left Mid B Post Y Velocity

Max: 39.1 [kph] at 0.013 [s]

Min: -15.2 [kph] at 0.188 [s]



B-100

8765-SNCAP-07

CFC\_180

Time [s]

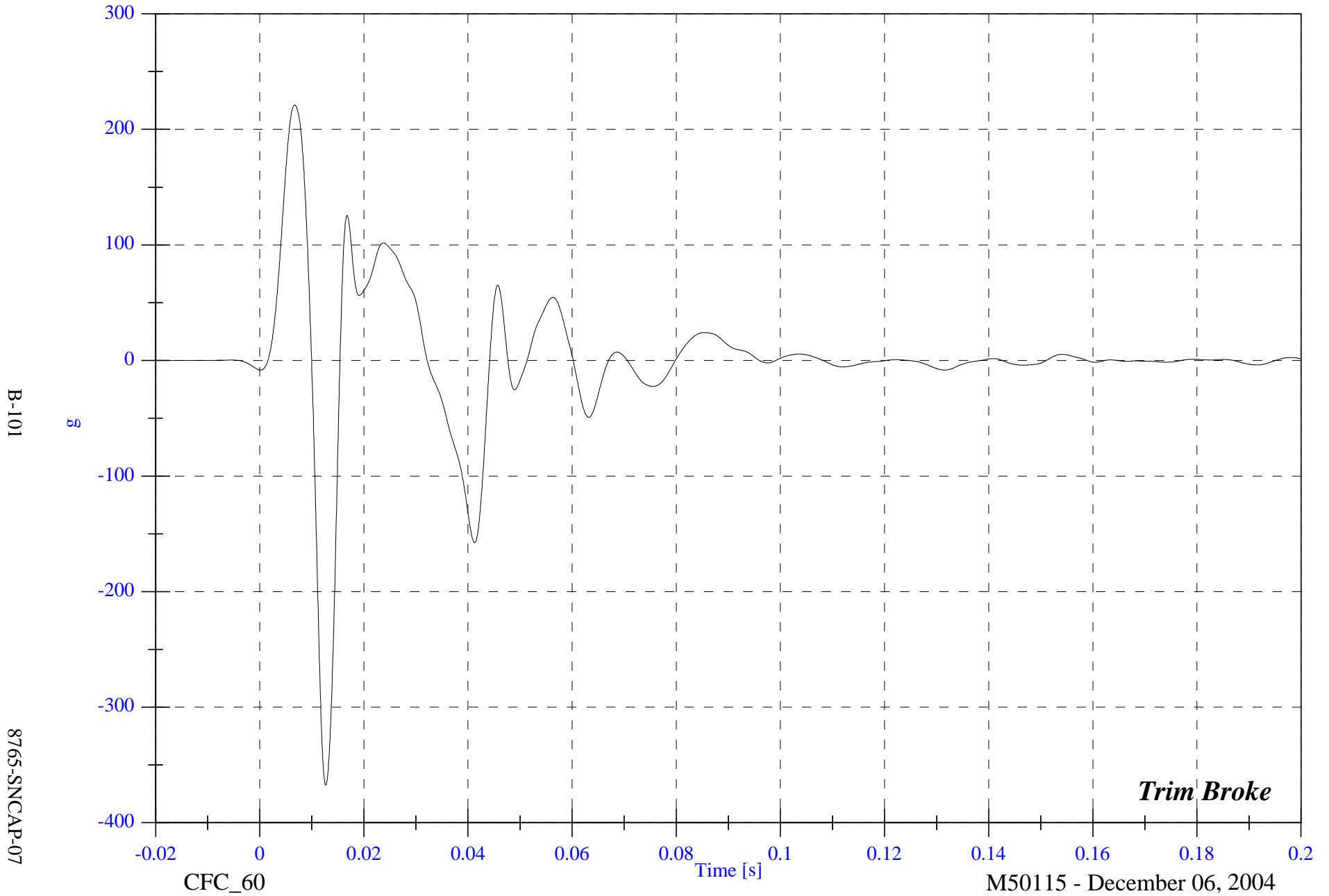
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A14 Left Lower A Post Y

Max: 221.1 [g] at 0.007 [s]

Min: -367.5 [g] at 0.013 [s]



B-101

8765-SNCAP-07

CFC\_60

Time [s]

M50115 - December 06, 2004

*Trim Broke*

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A14 Left Lower A Post Y Velocity

Max: 45.1 [kph] at 0.011 [s]

Min: -19.6 [kph] at 0.015 [s]

B-102

8765-SNCAP-07



CFC\_180

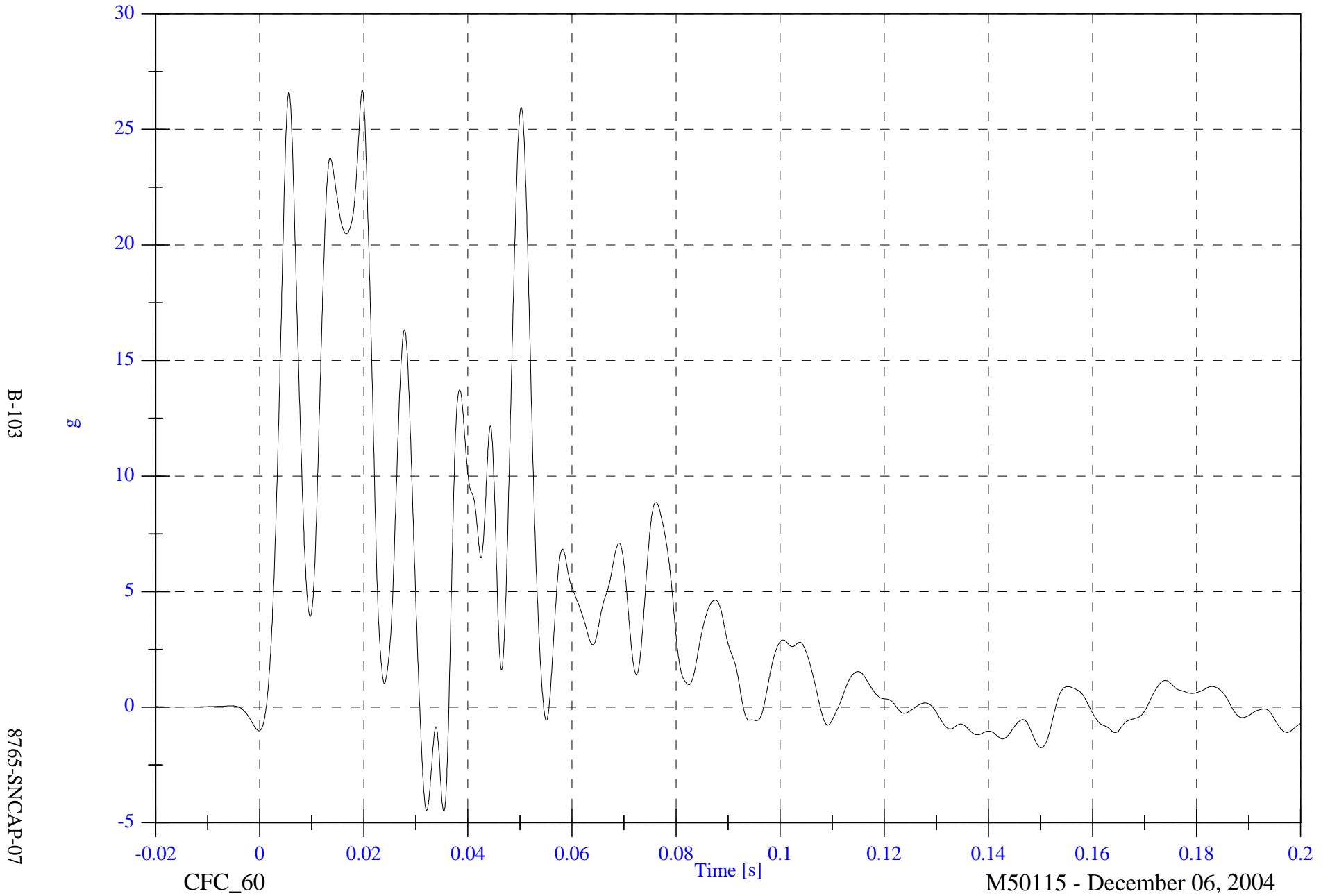
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A15 Left Mid A Post Y

Max: 26.7 [g] at 0.020 [s]

Min: -4.5 [g] at 0.035 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

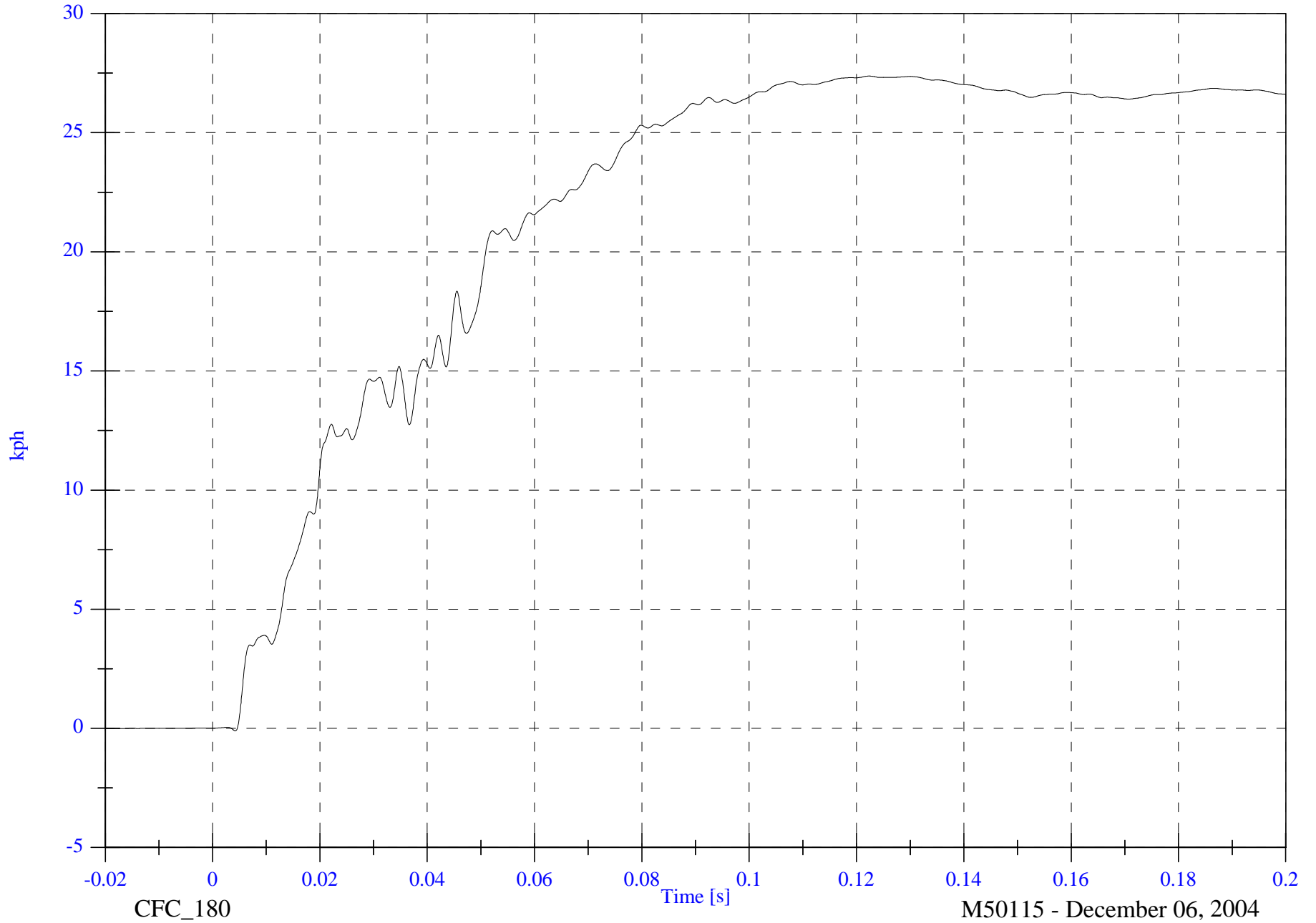
V2 A15 Left Mid A Post Y Velocity

Max: 27.4 [kph] at 0.122 [s]

Min: -0.1 [kph] at 0.004 [s]

B-104

8765-SNCAP-07



CFC\_180

Time [s]

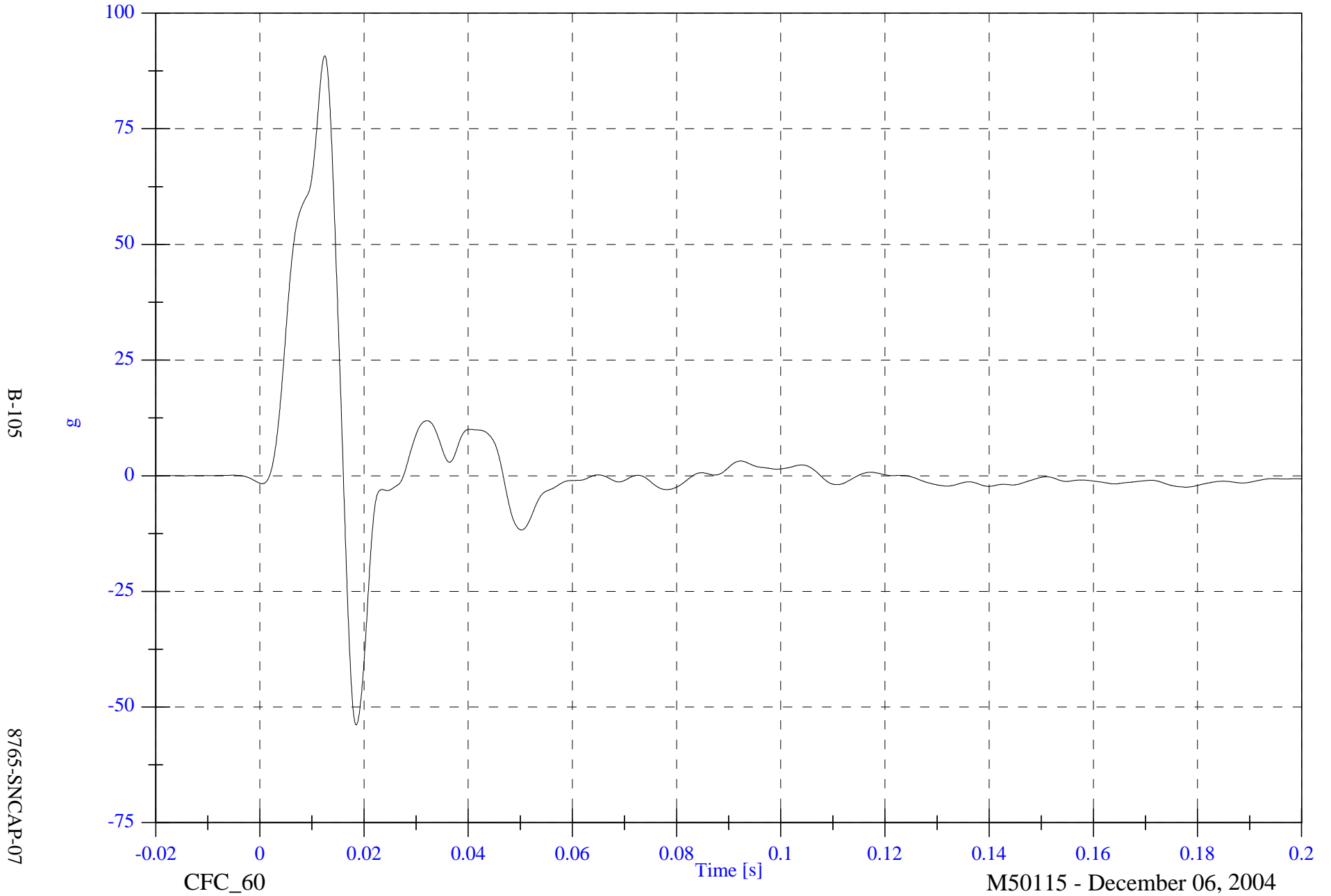
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A16 Front Seat Track Y

Max: 90.8 [g] at 0.012 [s]

Min: -53.9 [g] at 0.018 [s]

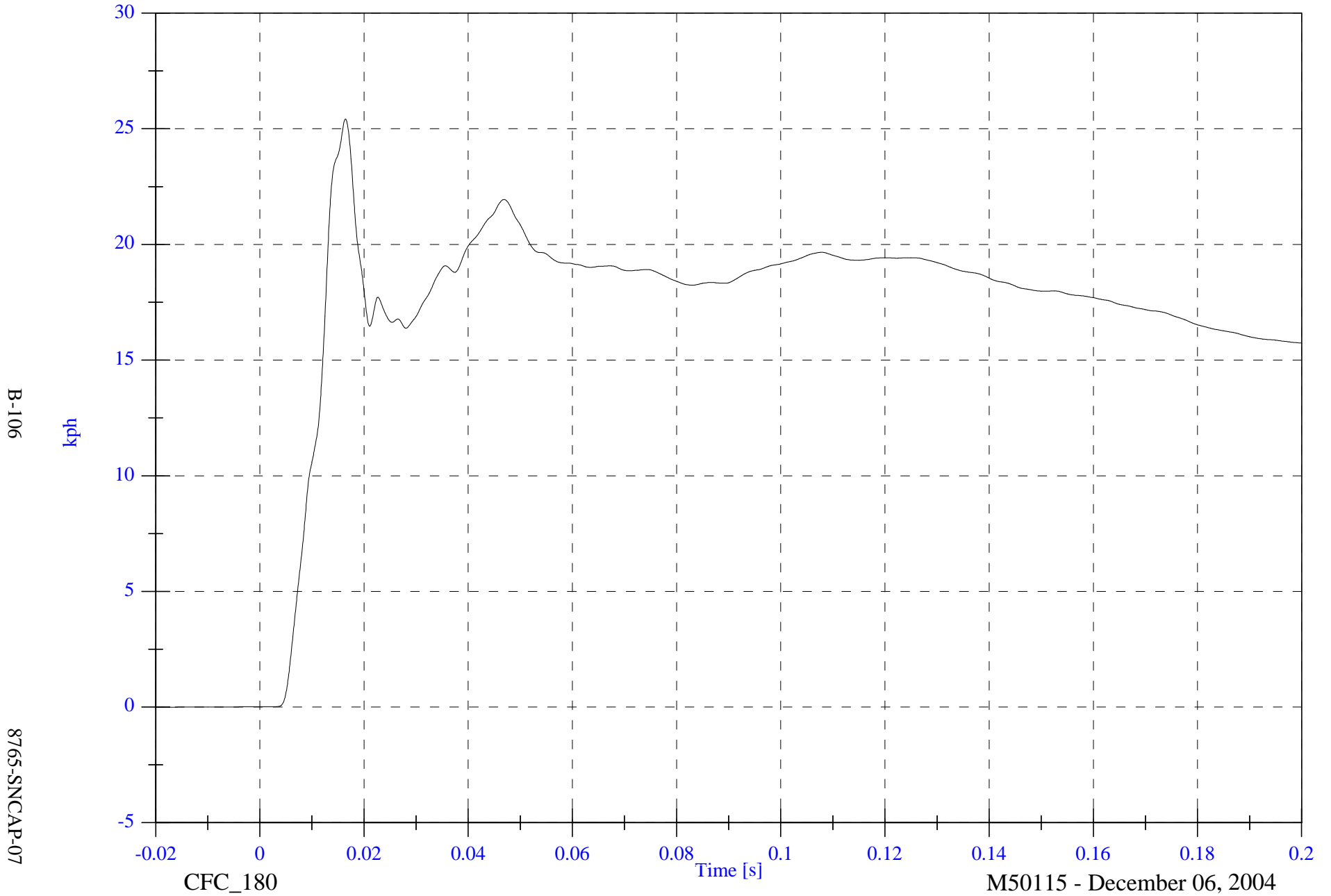


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A16 Front Seat Track Y Velocity

Max: 25.4 [kph] at 0.016 [s]

Min: -0.0 [kph] at -0.018 [s]



B-106

8765-SNCAP-07

CFC\_180

Time [s]

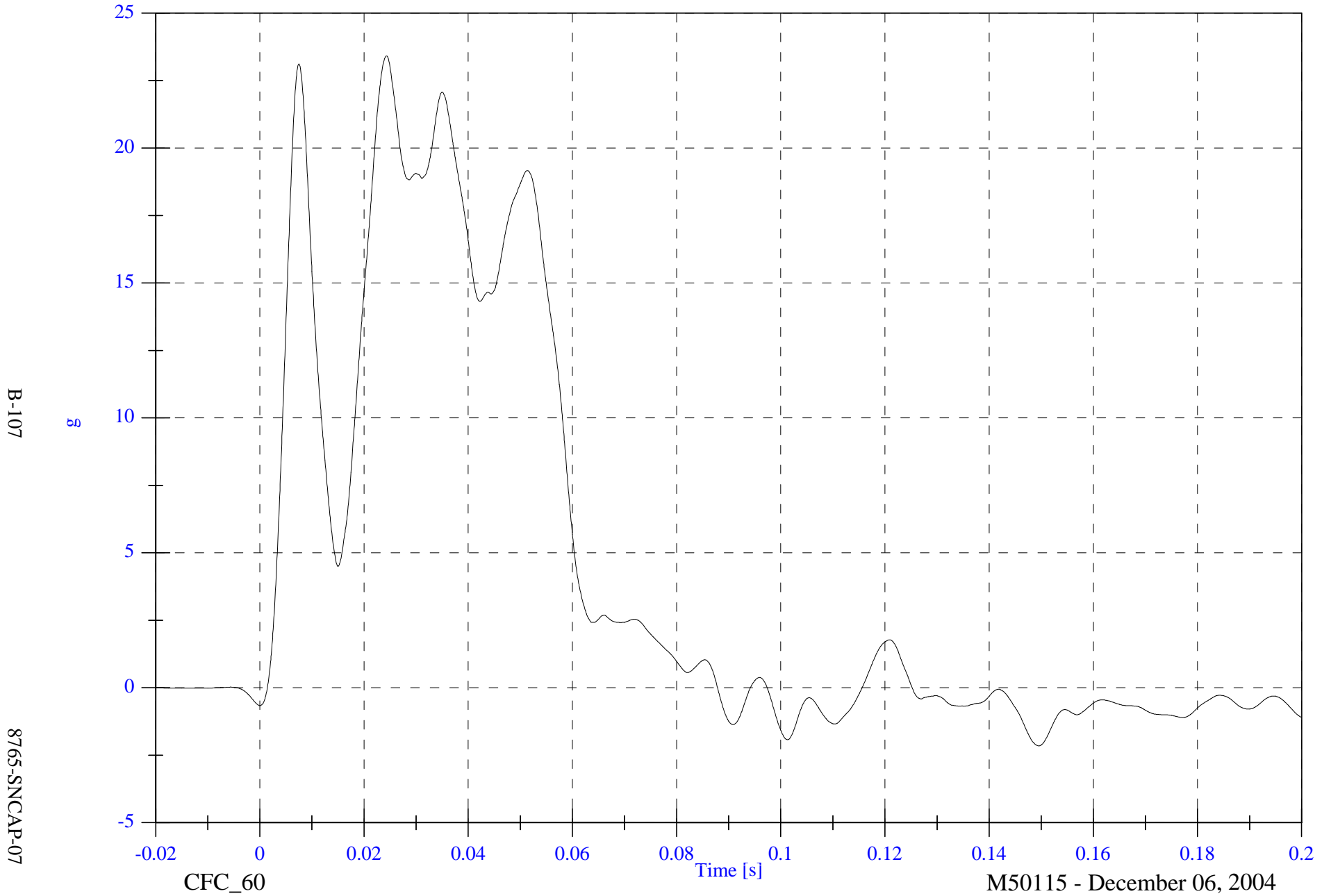
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A17 Rear Seat Track Y

Max: 23.4 [g] at 0.024 [s]

Min: -2.2 [g] at 0.150 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

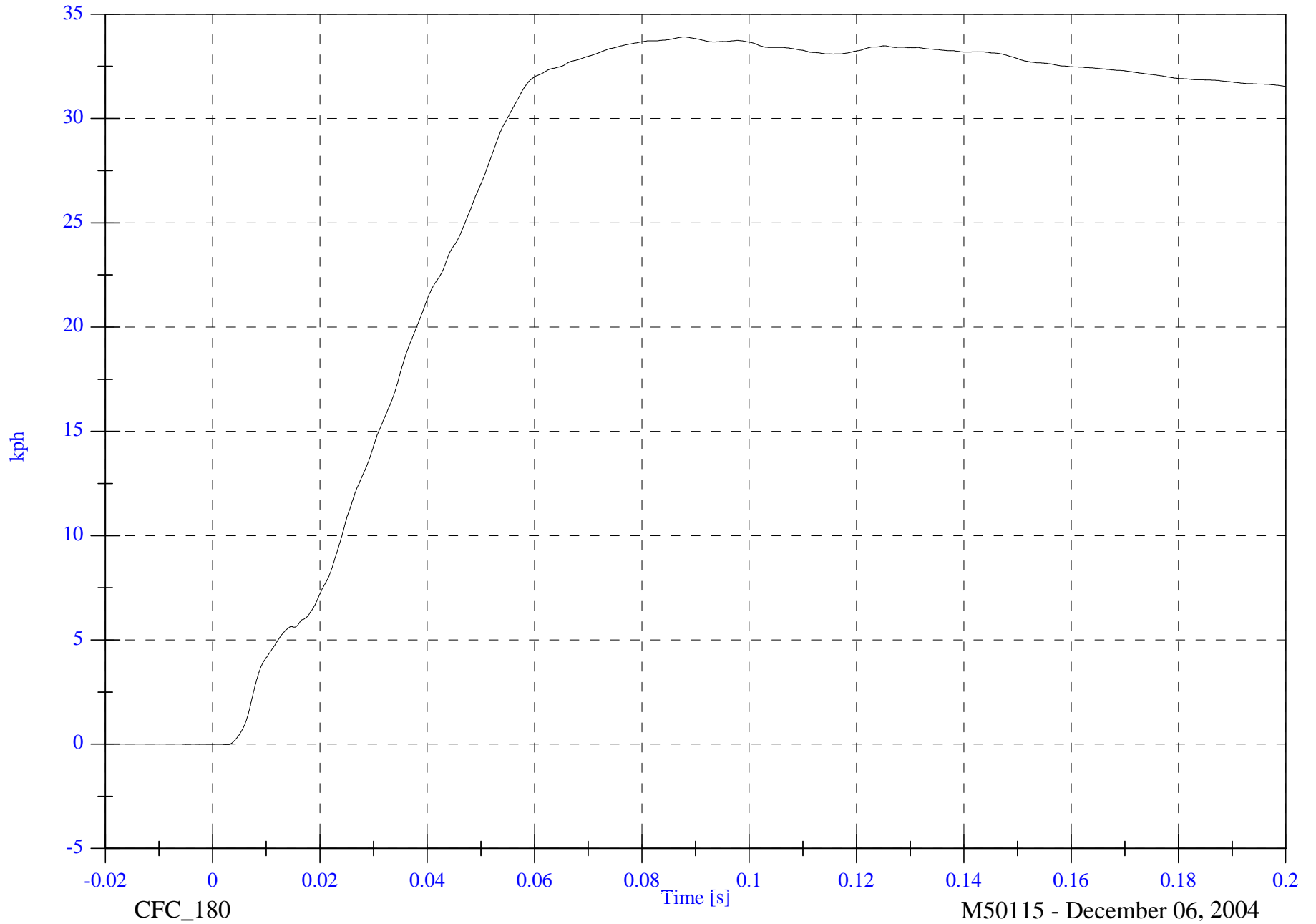
V2 A17 Rear Seat Track Y Velocity

Max: 33.9 [kph] at 0.088 [s]

Min: -0.0 [kph] at 0.003 [s]

B-108

8765-SNCAP-07



CFC\_180

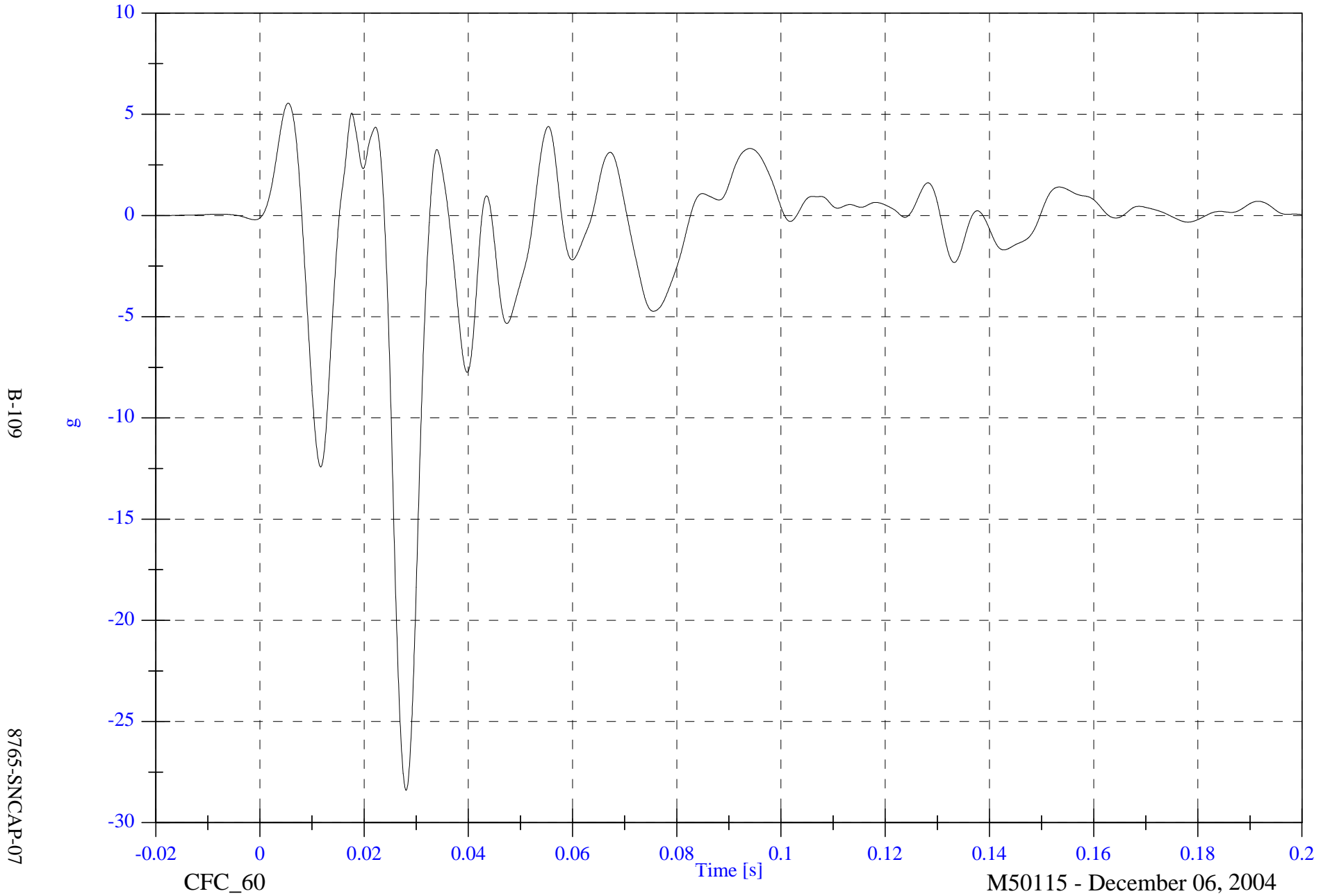
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A18 Target CG X

Max: 5.6 [g] at 0.005 [s]

Min: -28.4 [g] at 0.028 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A18 Target CG X Velocity

Max: 0.9 [kph] at 0.008 [s]

Min: -7.1 [kph] at 0.082 [s]

B-110

8765-SNCAP-07

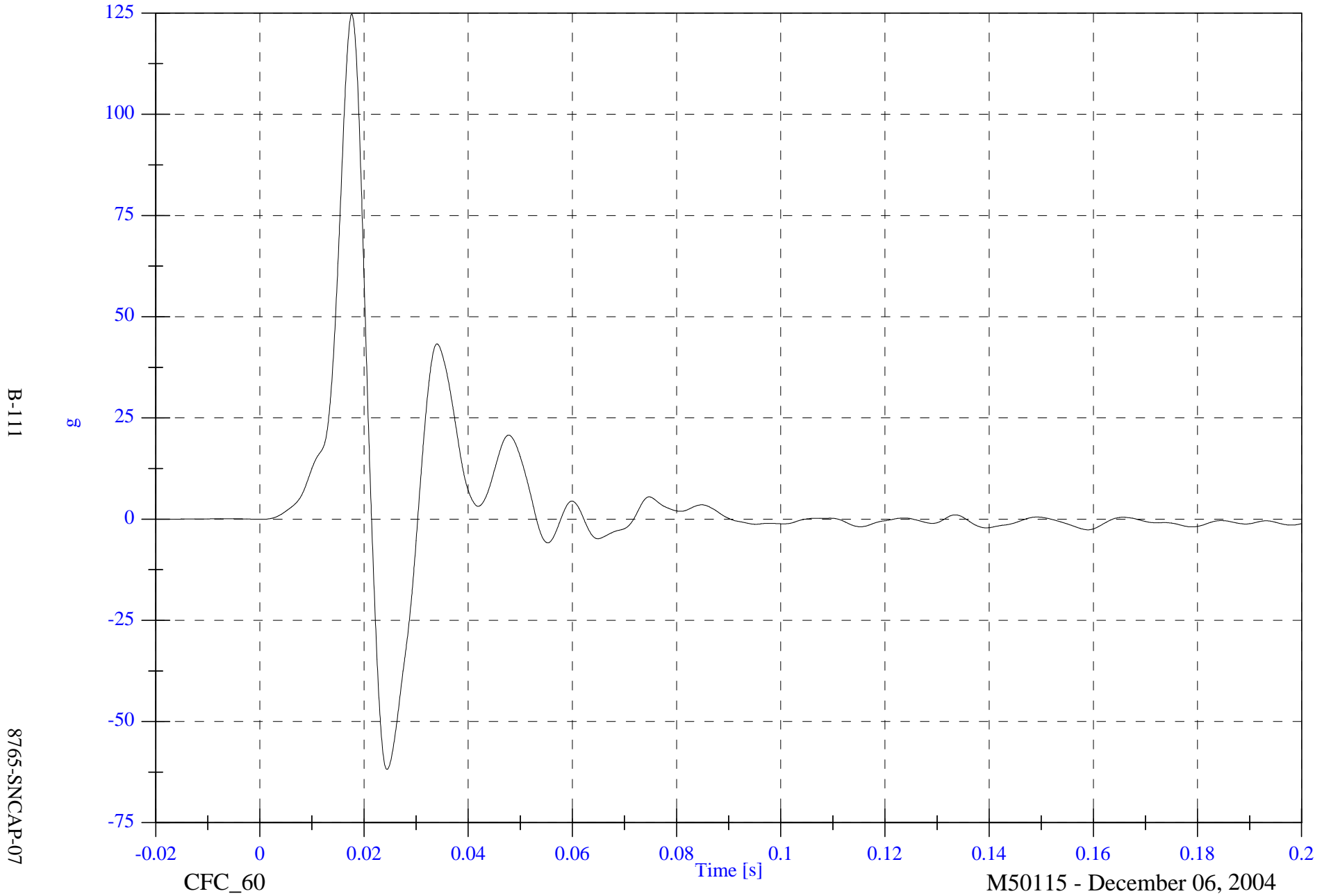


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A18 Target CG Y

Max: 124.8 [g] at 0.018 [s]

Min: -61.8 [g] at 0.024 [s]

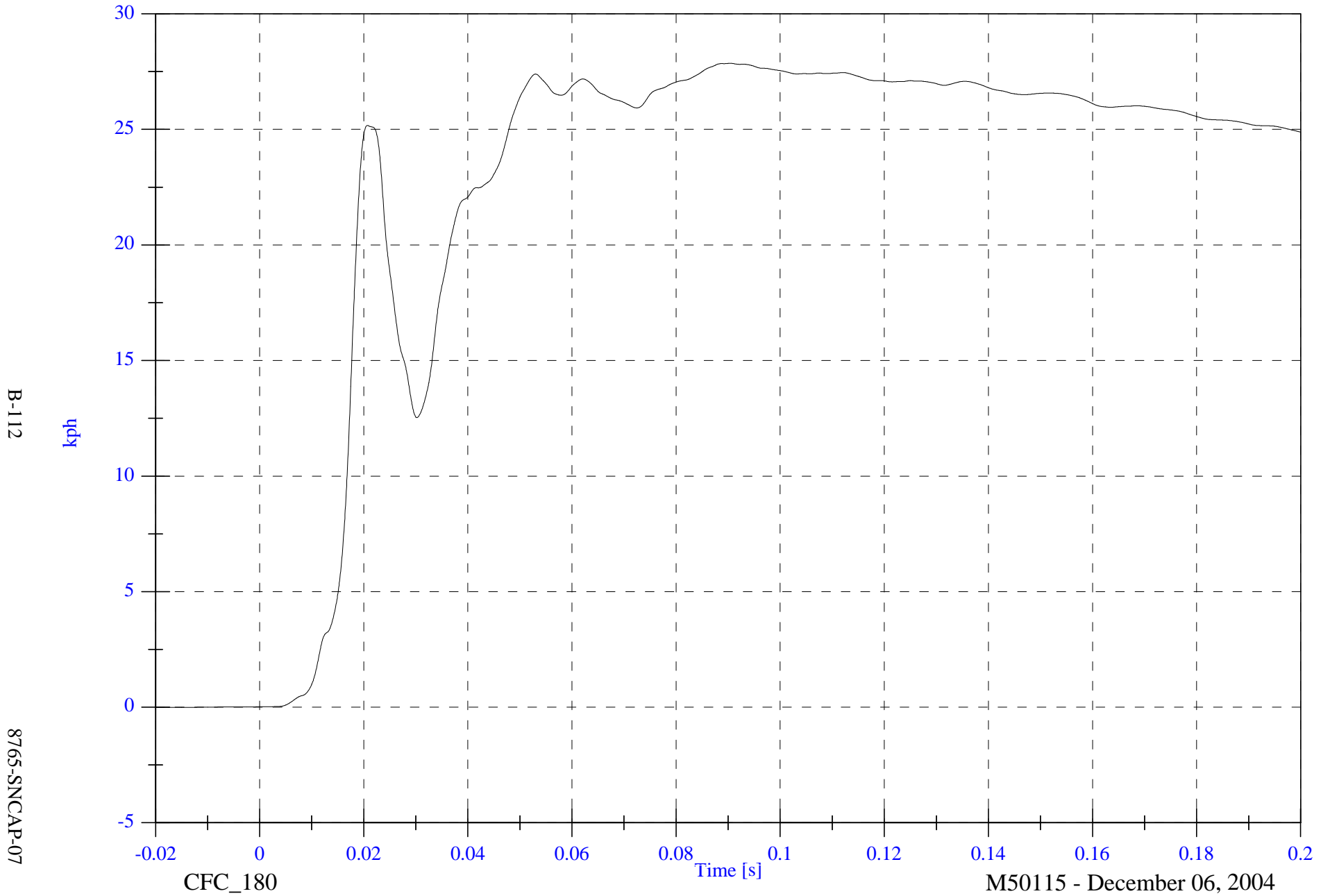


2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A18 Target CG Y Velocity

Max: 27.9 [kph] at 0.090 [s]

Min: -0.0 [kph] at -0.016 [s]



B-112

8765-SNCAP-07

CFC\_180

Time [s]

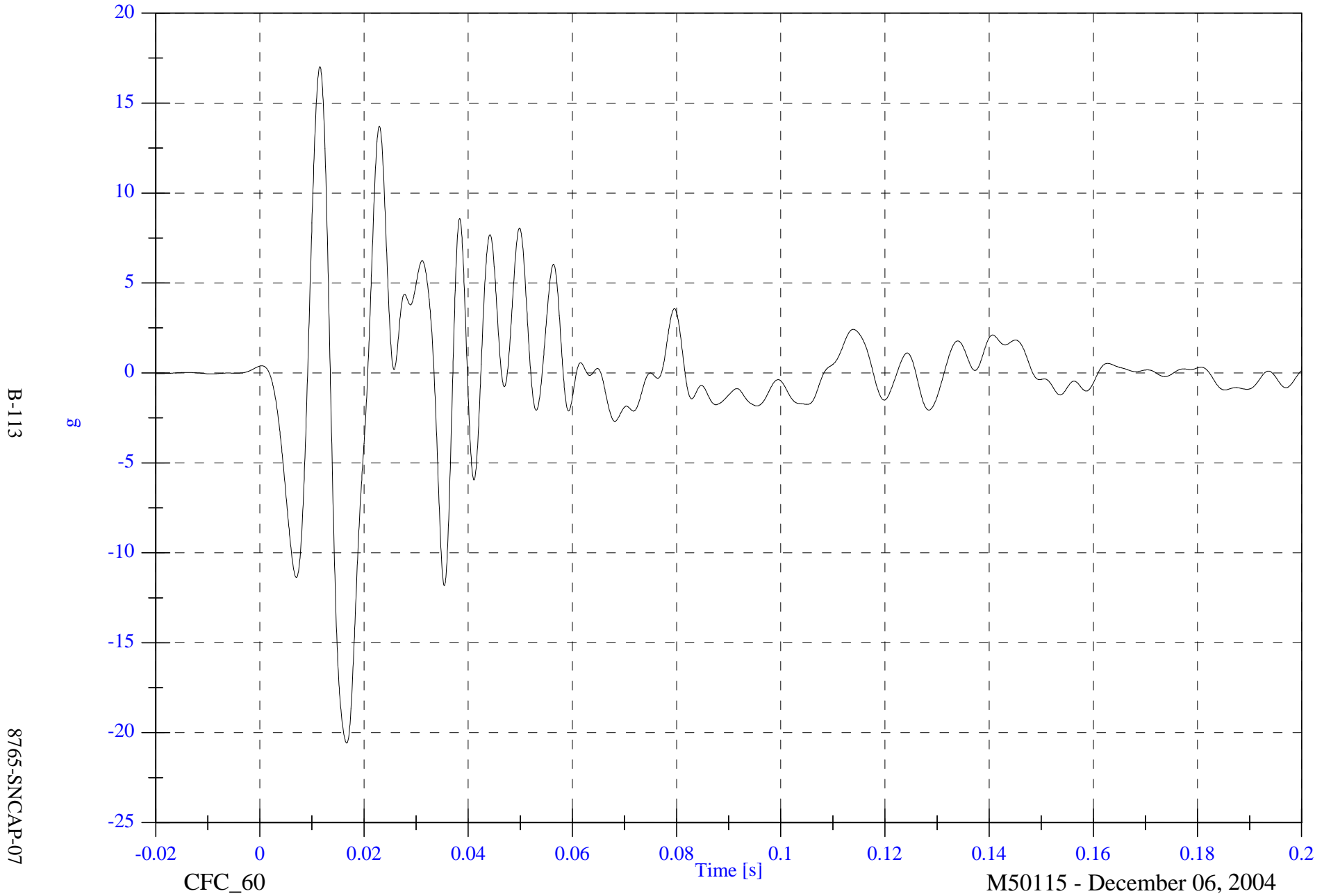
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A18 Target CG Z

Max: 17.0 [g] at 0.012 [s]

Min: -20.6 [g] at 0.017 [s]



B-113

8765-SNCAP-07

CFC\_60

Time [s]

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

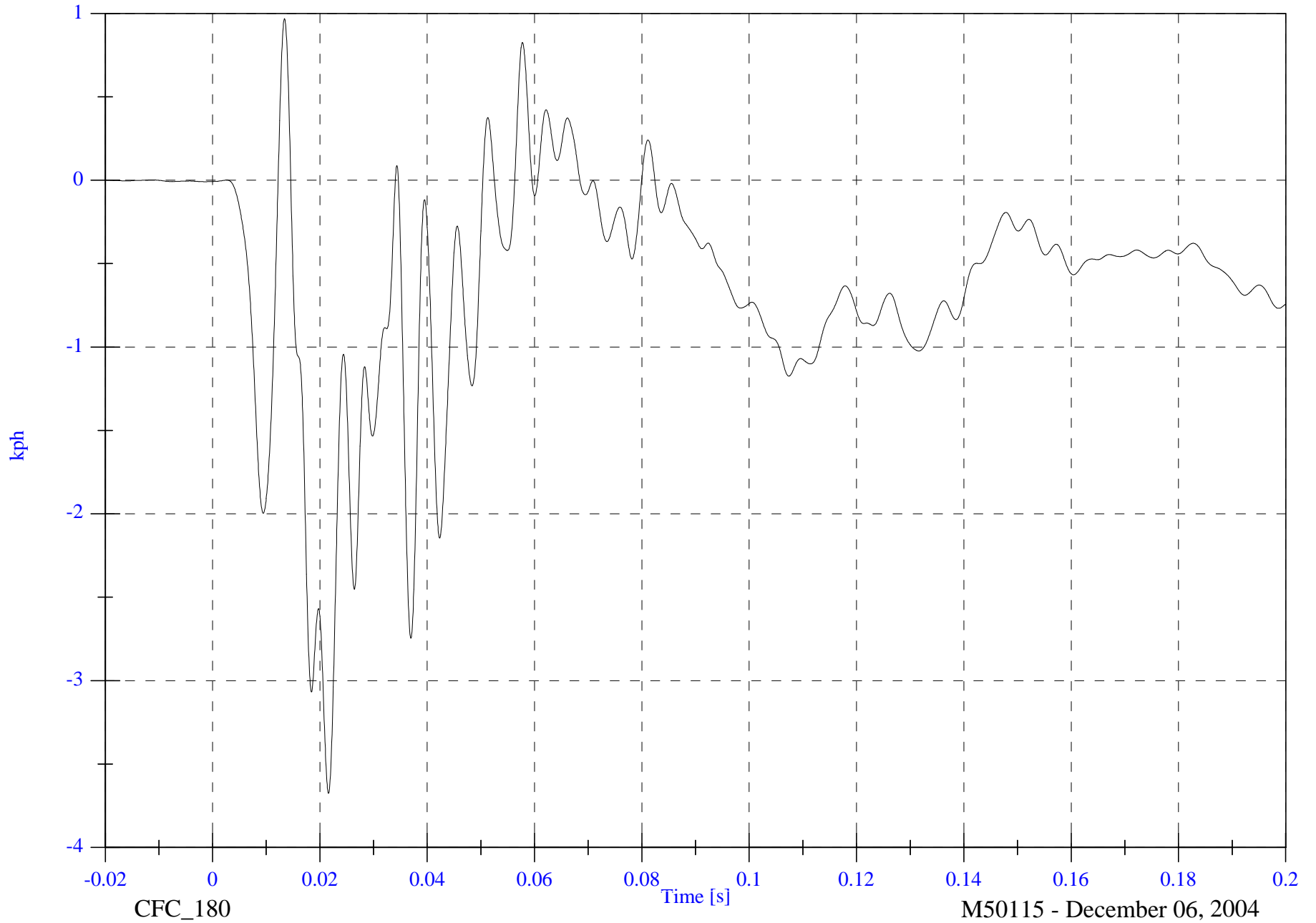
V2 A18 Target CG Z Velocity

Max: 1.0 [kph] at 0.013 [s]

Min: -3.7 [kph] at 0.022 [s]

B-114

8765-SNCAP-07



CFC\_180

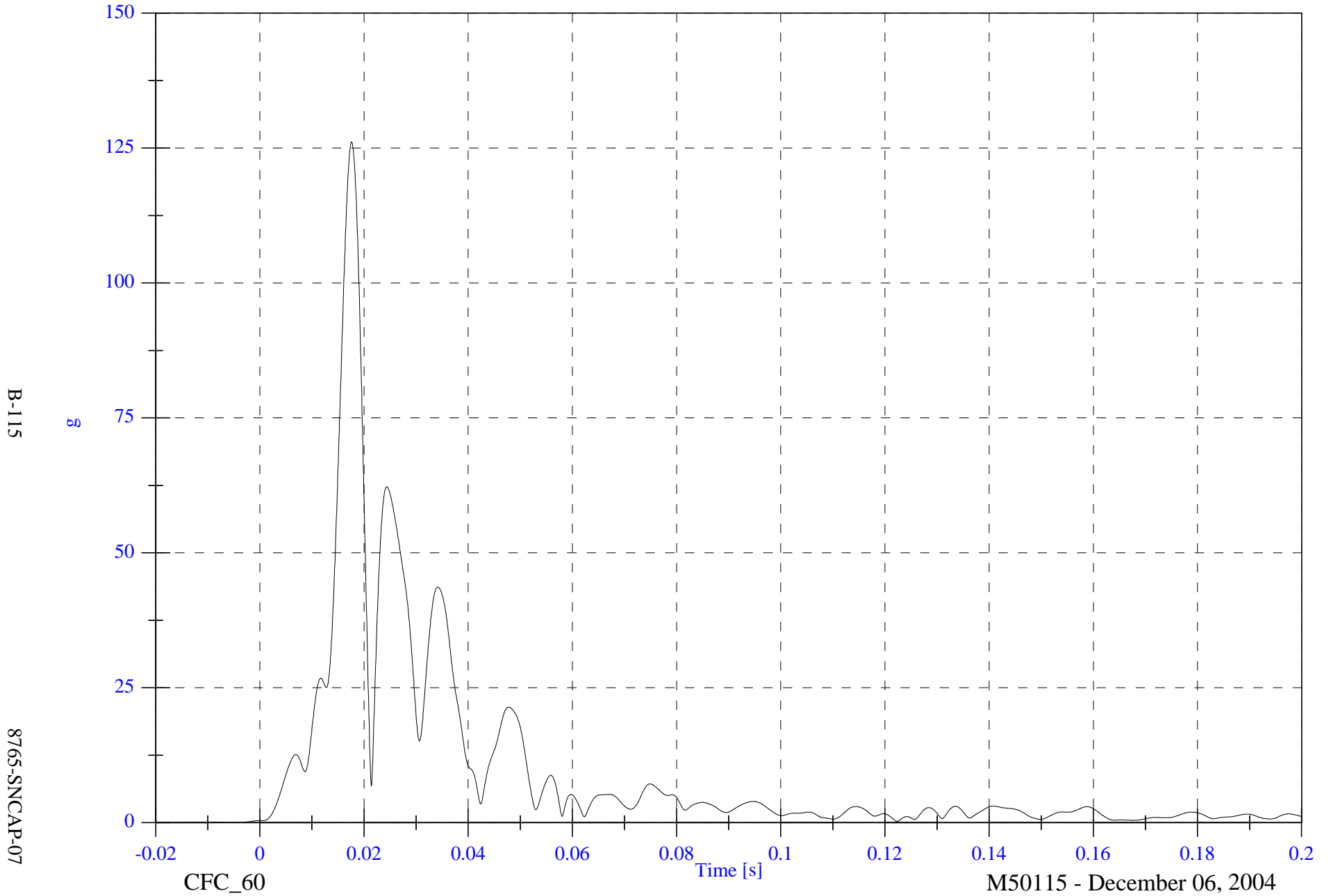
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2 A18 Target CG Resultant

Max: 126.1 [g] at 0.018 [s]

Min: 0.0 [g] at -0.016 [s]



B-115

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CFC\_60

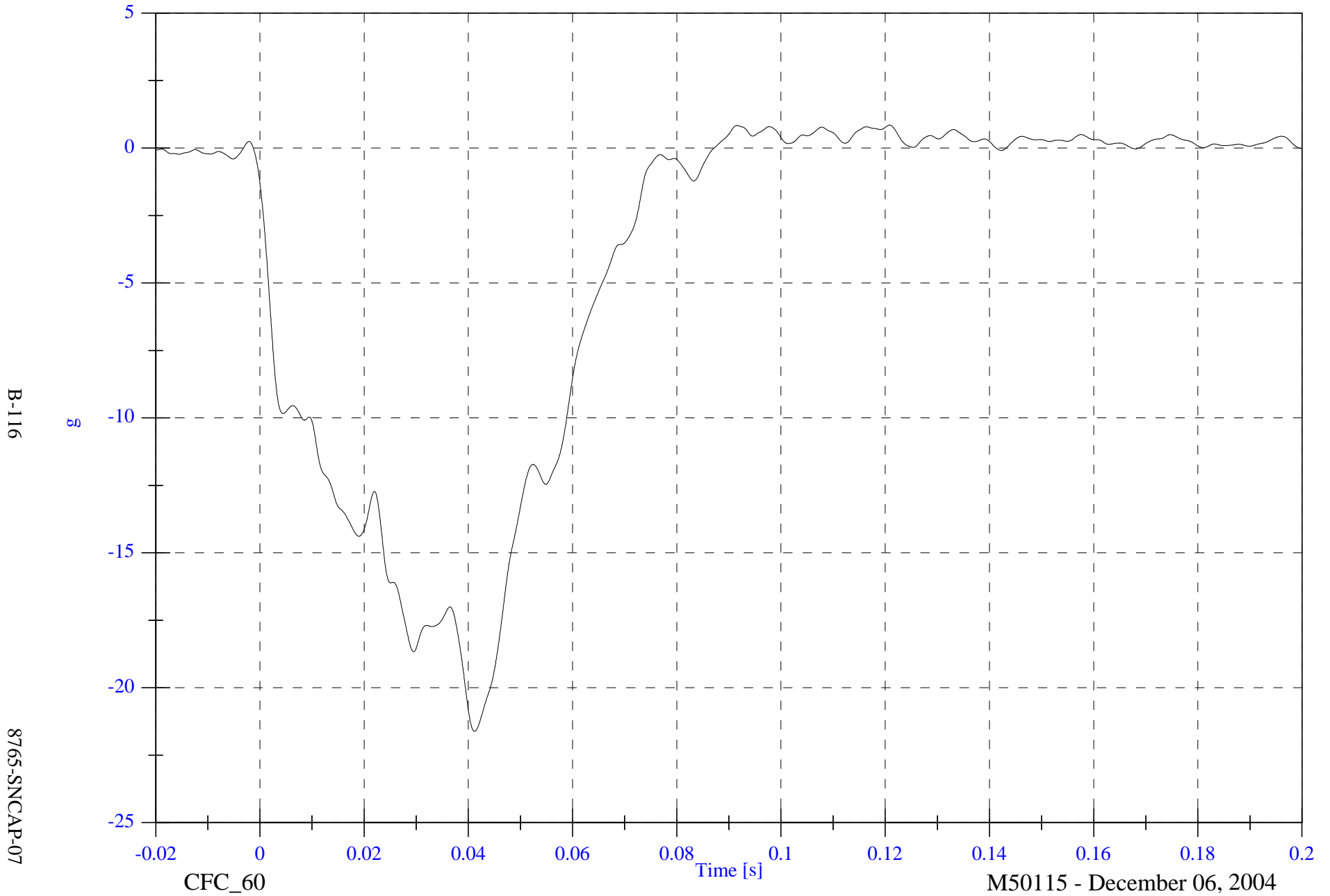
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V1 Moving Barrier CG X

Max: 0.9 [g] at 0.121 [s]

Min: -21.6 [g] at 0.041 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

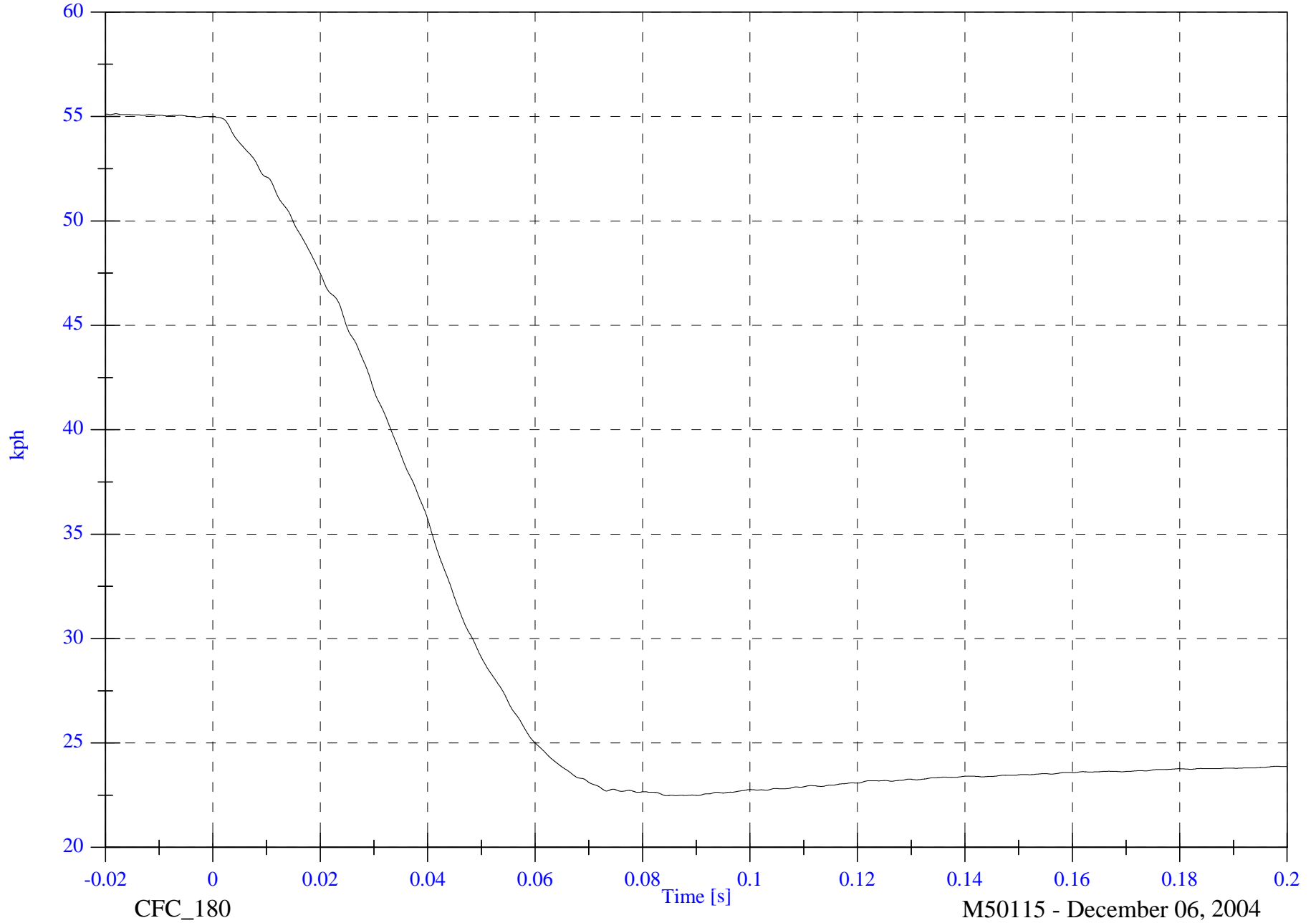
V1 Moving Barrier CG X Velocity

Max: 55.1 [kph] at -0.018 [s]

Min: 22.5 [kph] at 0.084 [s]

B-117

8765-SNCAP-07



CFC\_180

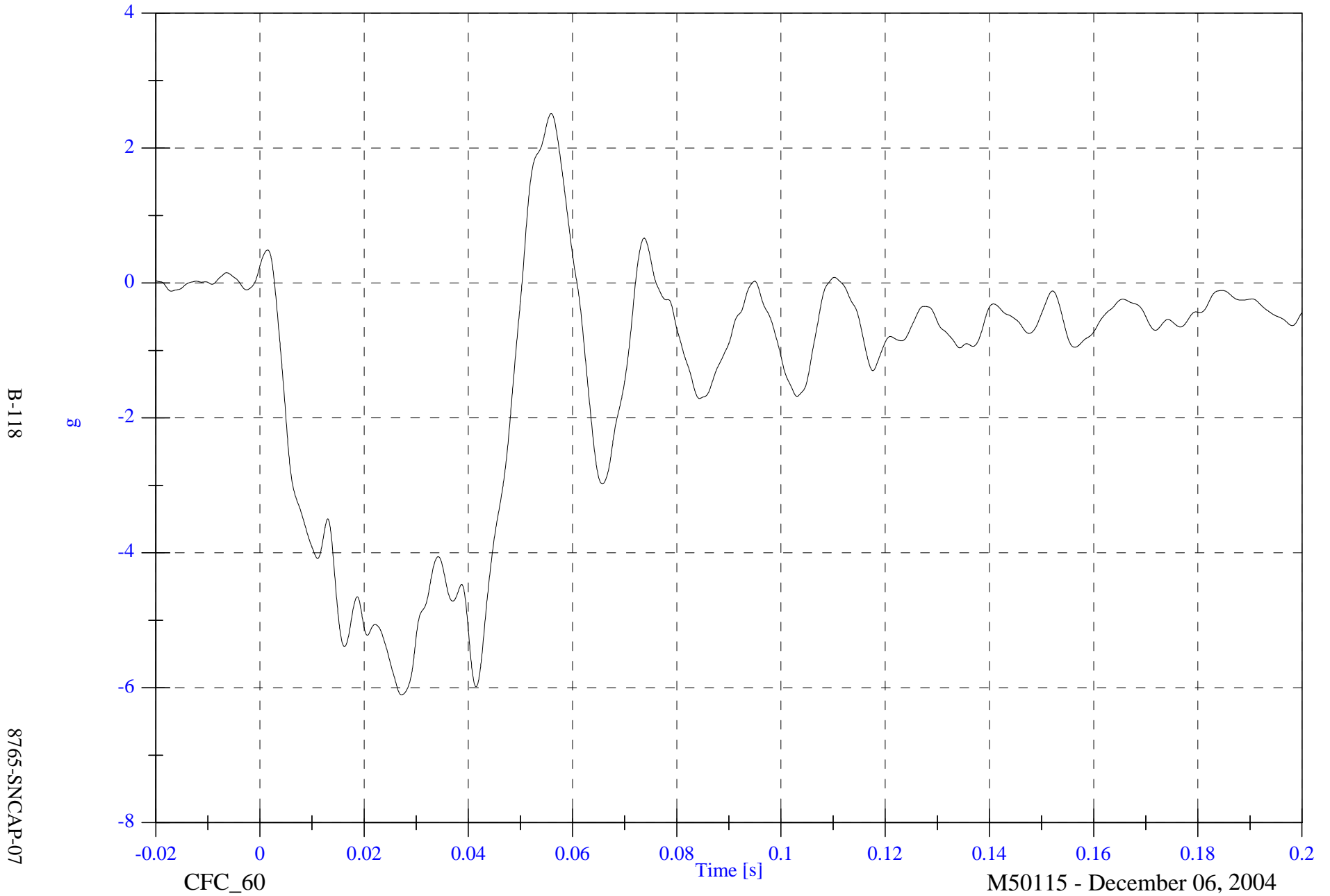
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V1 Moving Barrier CG Y

Max: 2.5 [g] at 0.056 [s]

Min: -6.1 [g] at 0.027 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

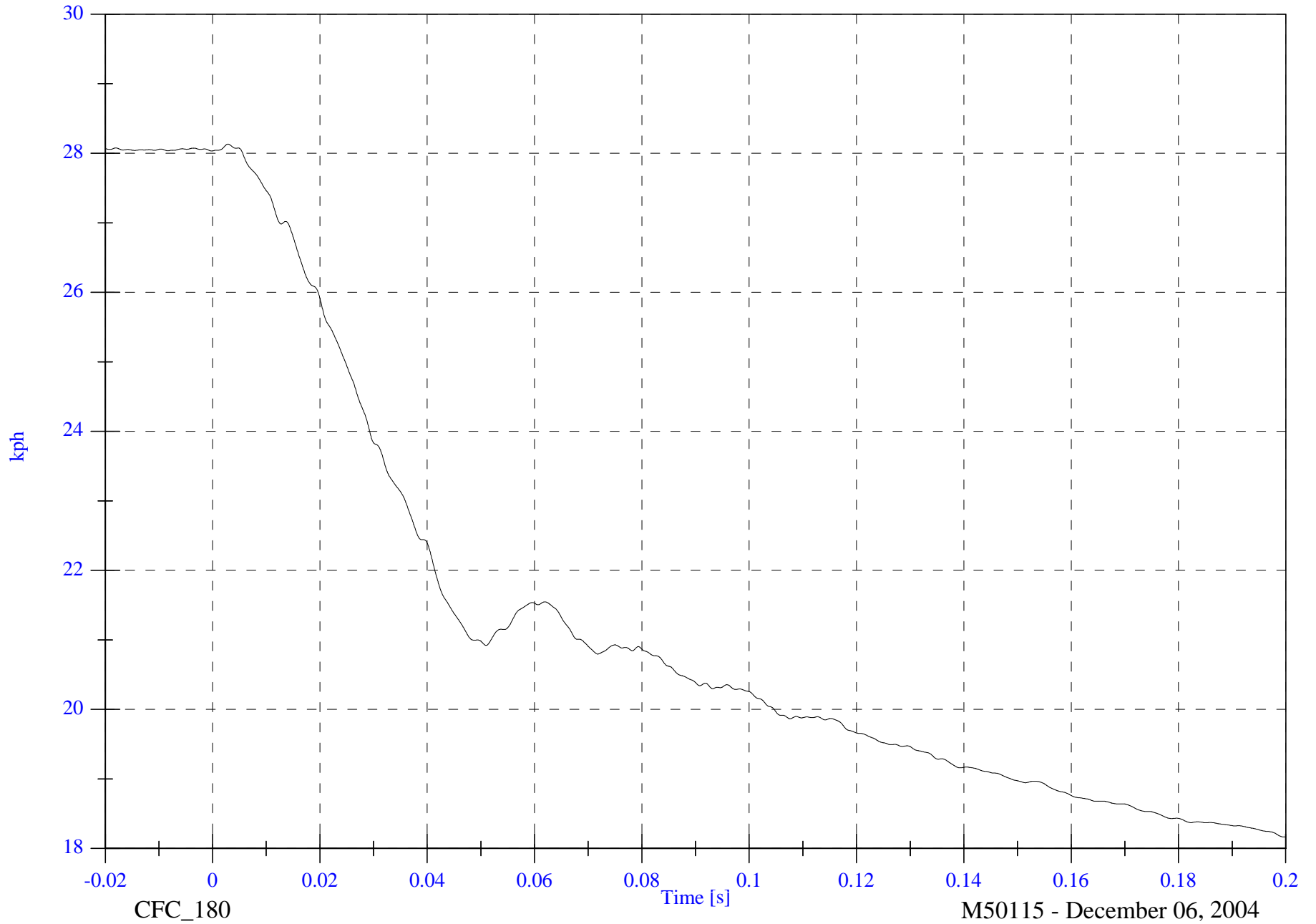
V1 Moving Barrier CG Y Velocity

Max: 28.1 [kph] at 0.003 [s]

Min: 18.2 [kph] at 0.200 [s]

B-119

8765-SNCAP-07



CFC\_180

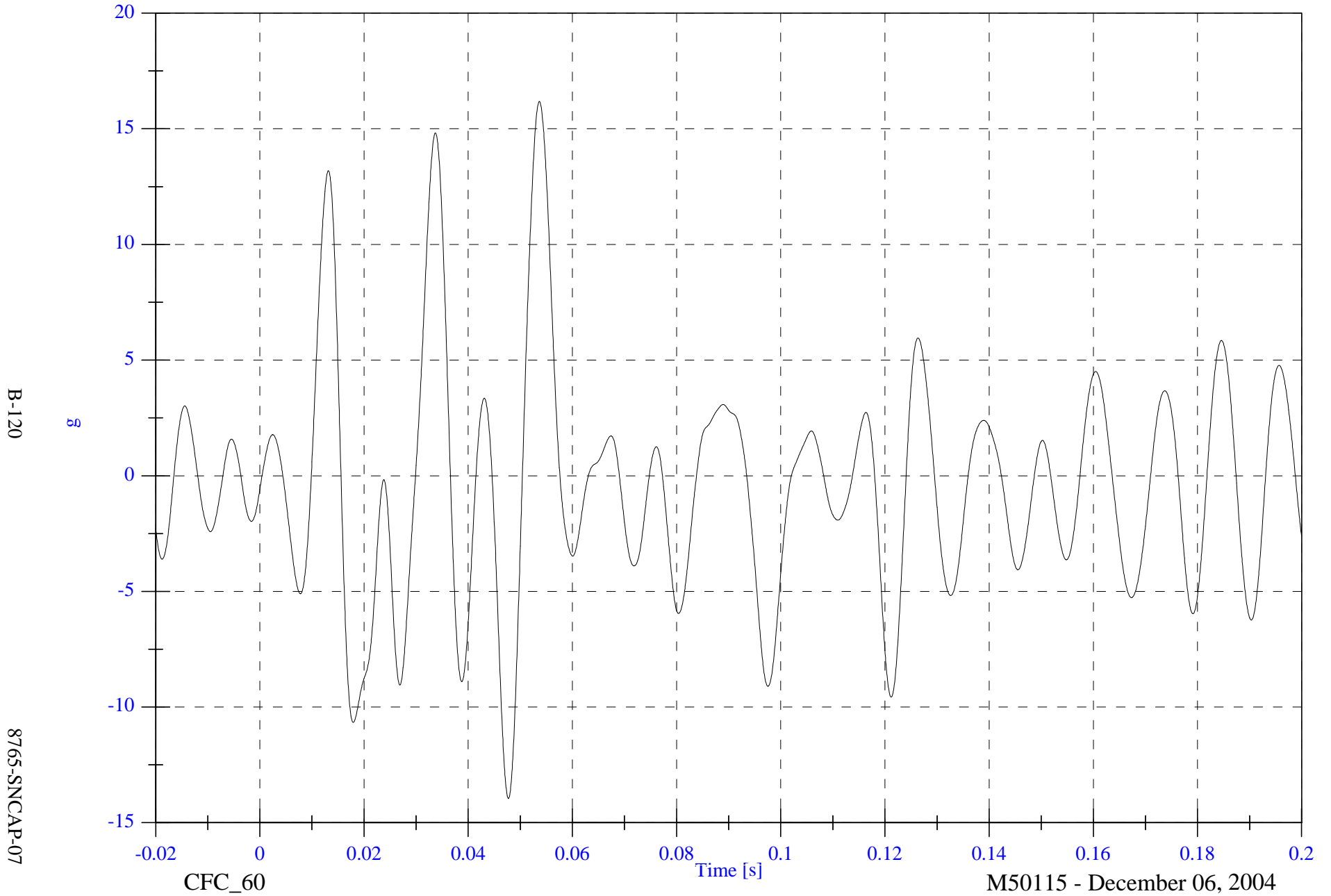
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V1 Moving Barrier CG Z

Max: 16.2 [g] at 0.054 [s]

Min: -14.0 [g] at 0.048 [s]



B-120

8765-SNCAP-07

CFC\_60

M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

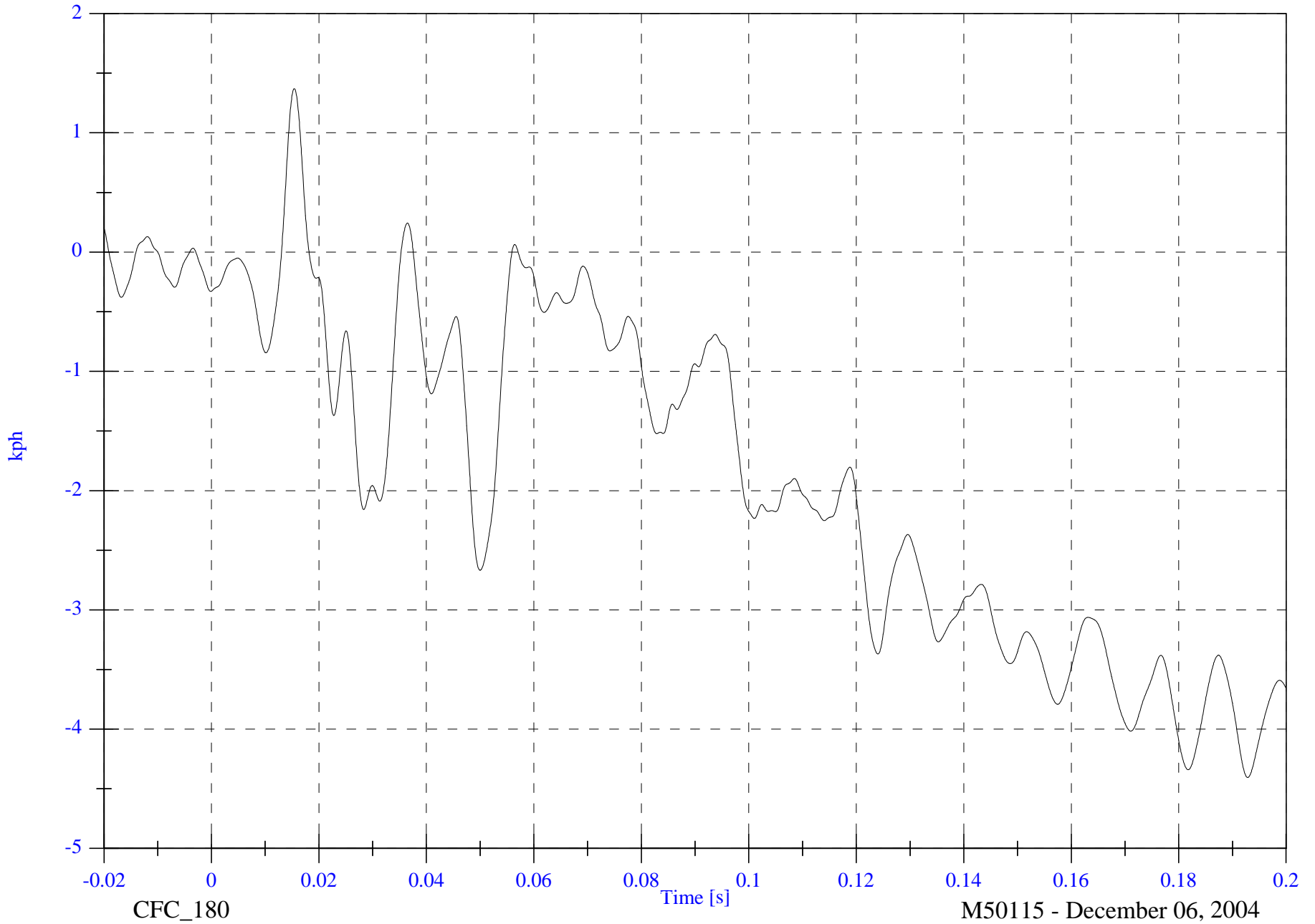
V1 Moving Barrier CG Z Velocity

Max: 1.4 [kph] at 0.015 [s]

Min: -4.4 [kph] at 0.193 [s]

B-121

8765-SNCAP-07



2005 SNCAP Test 2 - 2005 Saturn Ion

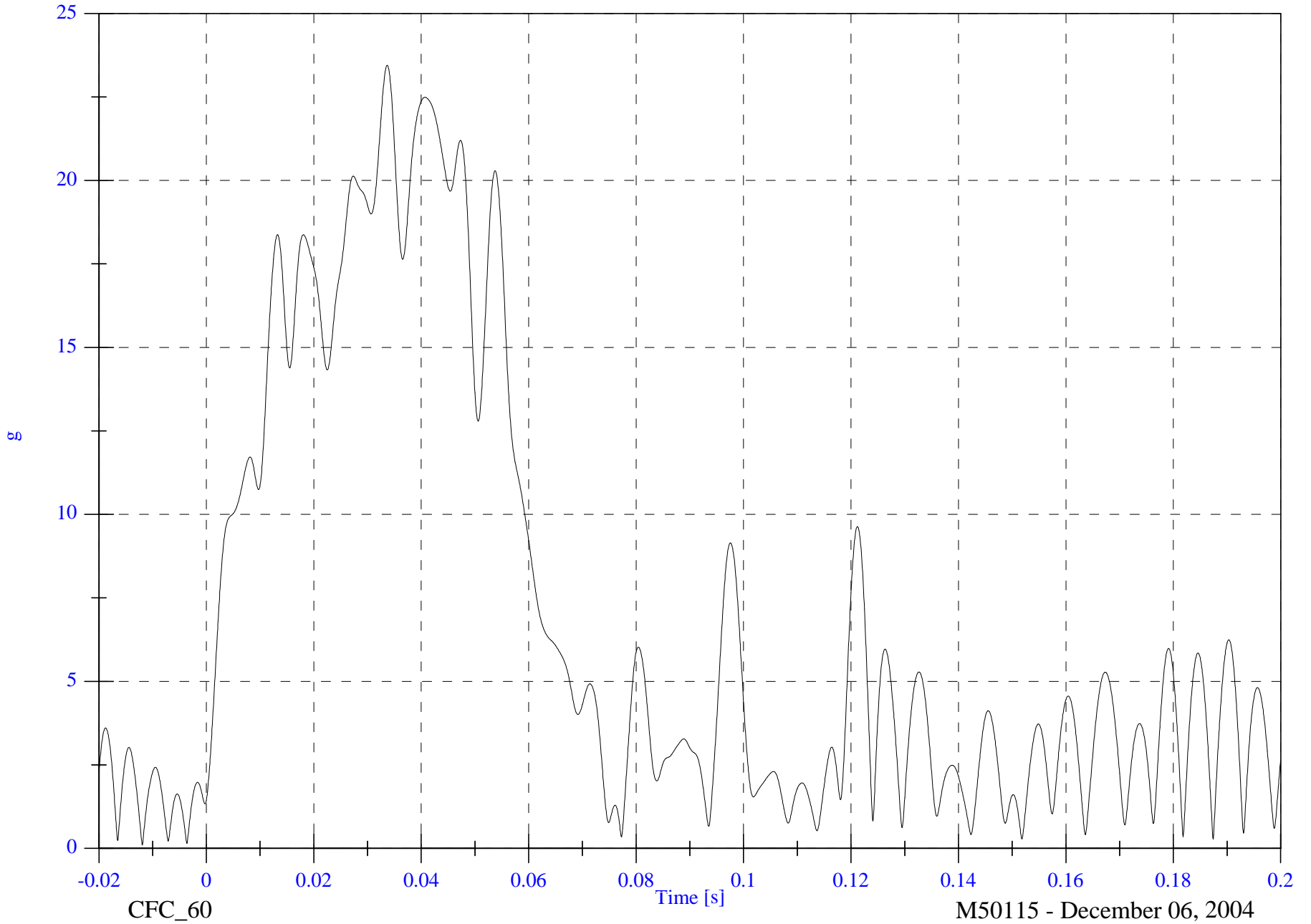
V1 Moving Barrier CG Resultant

Max: 23.5 [g] at 0.034 [s]

Min: 0.1 [g] at -0.012 [s]

B-122

8765-SNCAP-07

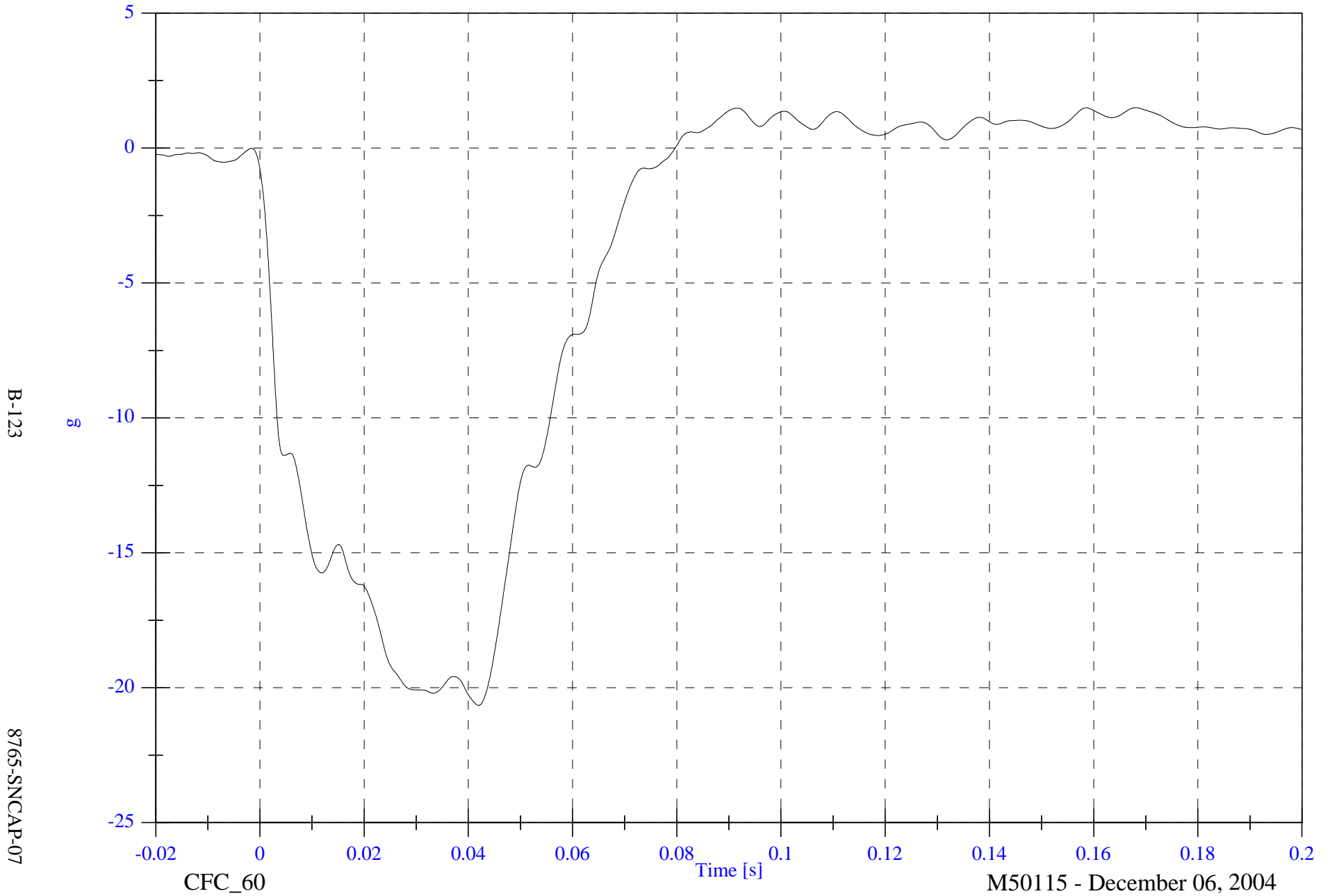


2005 SNCAP Test 2 - 2005 Saturn Ion

V1 Moving Barrier Left Rail X

Max: 1.5 [g] at 0.168 [s]

Min: -20.7 [g] at 0.042 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

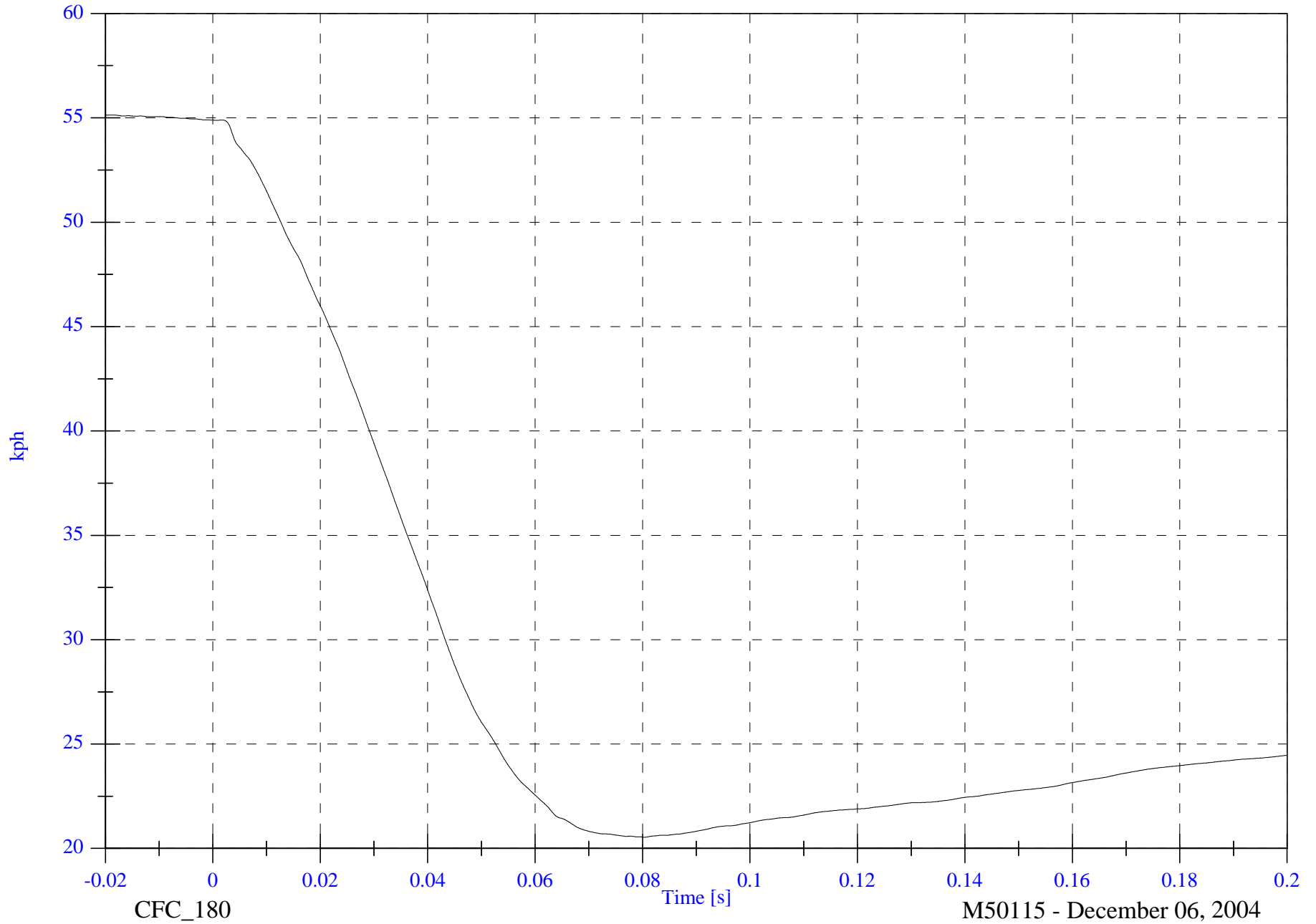
V1 Moving Barrier Left Rail X Velocity

Max: 55.1 [kph] at -0.020 [s]

Min: 20.5 [kph] at 0.080 [s]

B-124

8765-SNCAP-07



CFC\_180

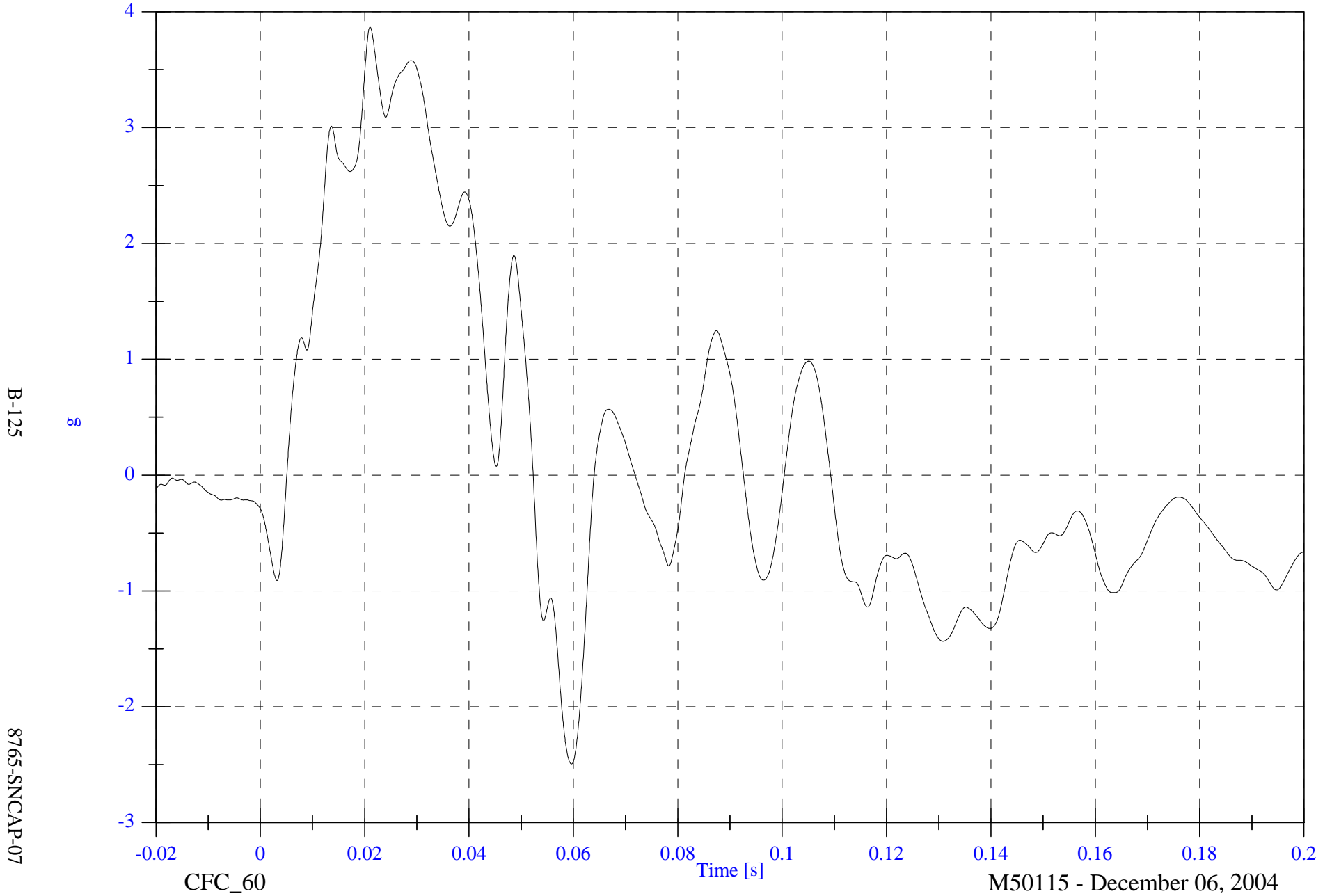
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V1 Moving Barrier Left Rail Y

Max: 3.9 [g] at 0.021 [s]

Min: -2.5 [g] at 0.060 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

Max: 31.7 [kph] at 0.053 [s]

V1 Moving Barrier Left Rail Y Velocity

Min: 27.8 [kph] at 0.005 [s]



B-126

8765-SNCAP-07

CFC\_180

Time [s]

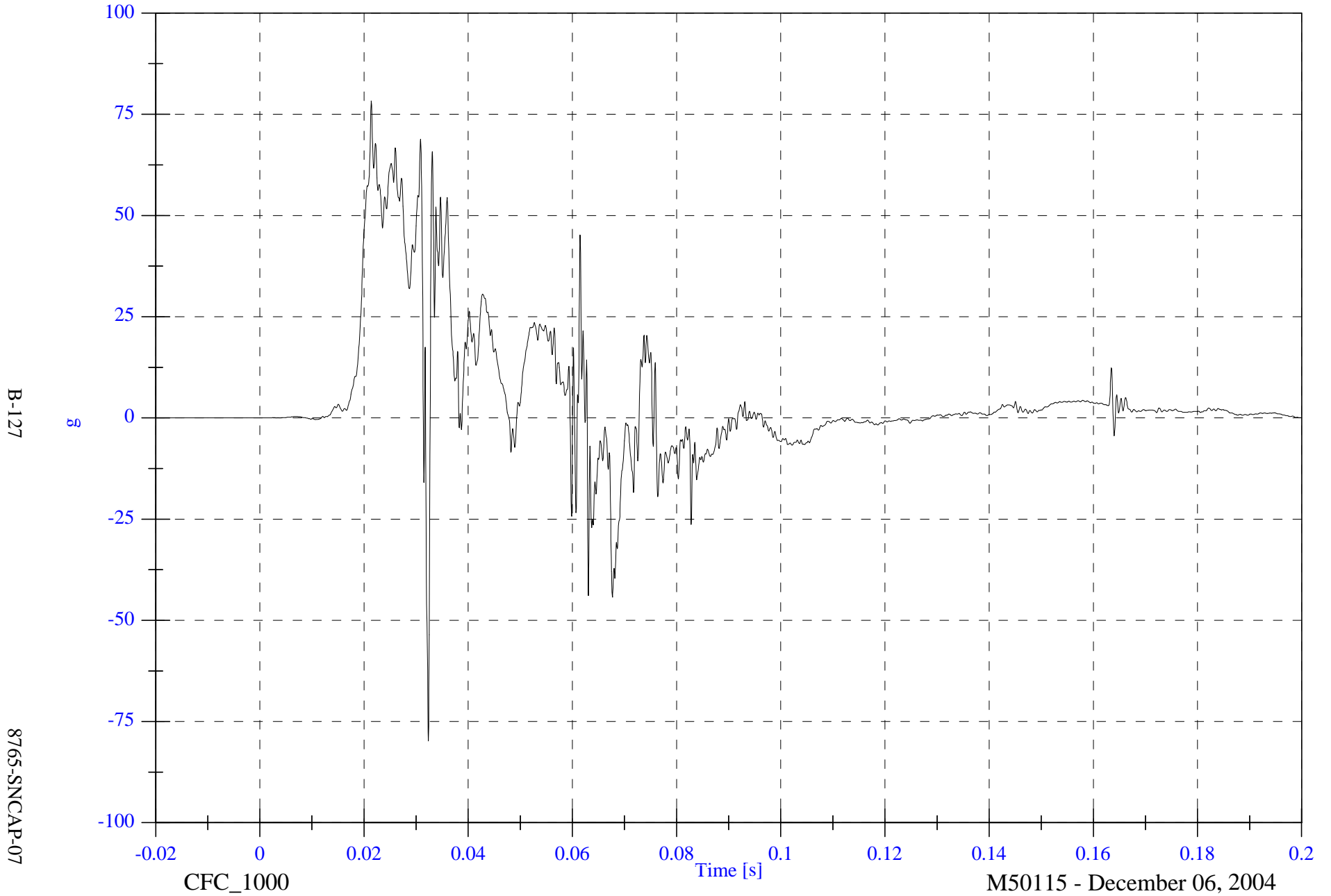
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Rib Ry

Max: 78.3 [g] at 0.021 [s]

Min: -79.8 [g] at 0.032 [s]



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8765-SNCAP-07

2005 SNCAP Test 2 - 2005 Saturn Ion

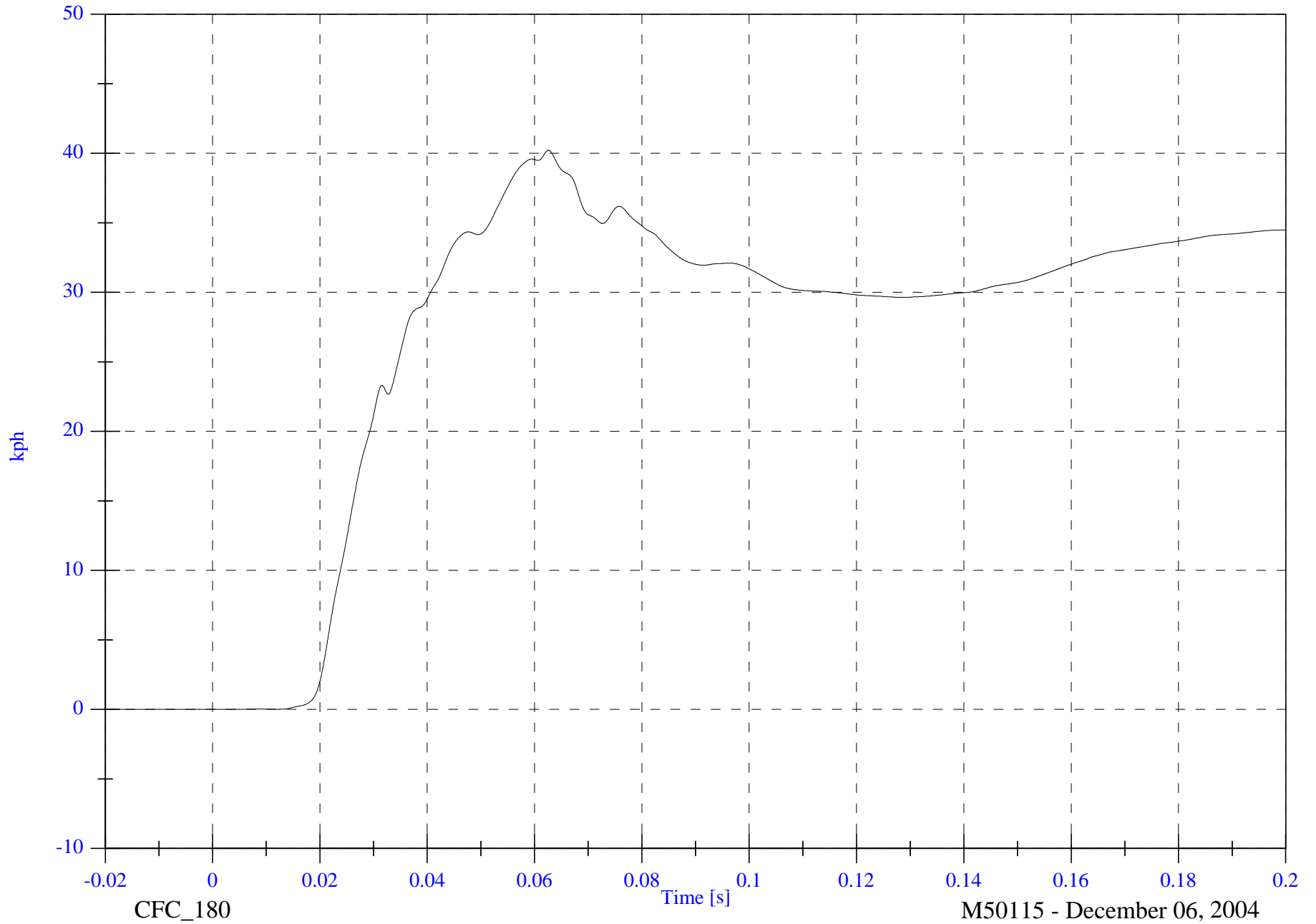
V2P1 Upper Rib Ry Velocity

Max: 40.2 [kph] at 0.063 [s]

Min: -0.0 [kph] at -0.019 [s]

B-128

8765-SNCAP-07

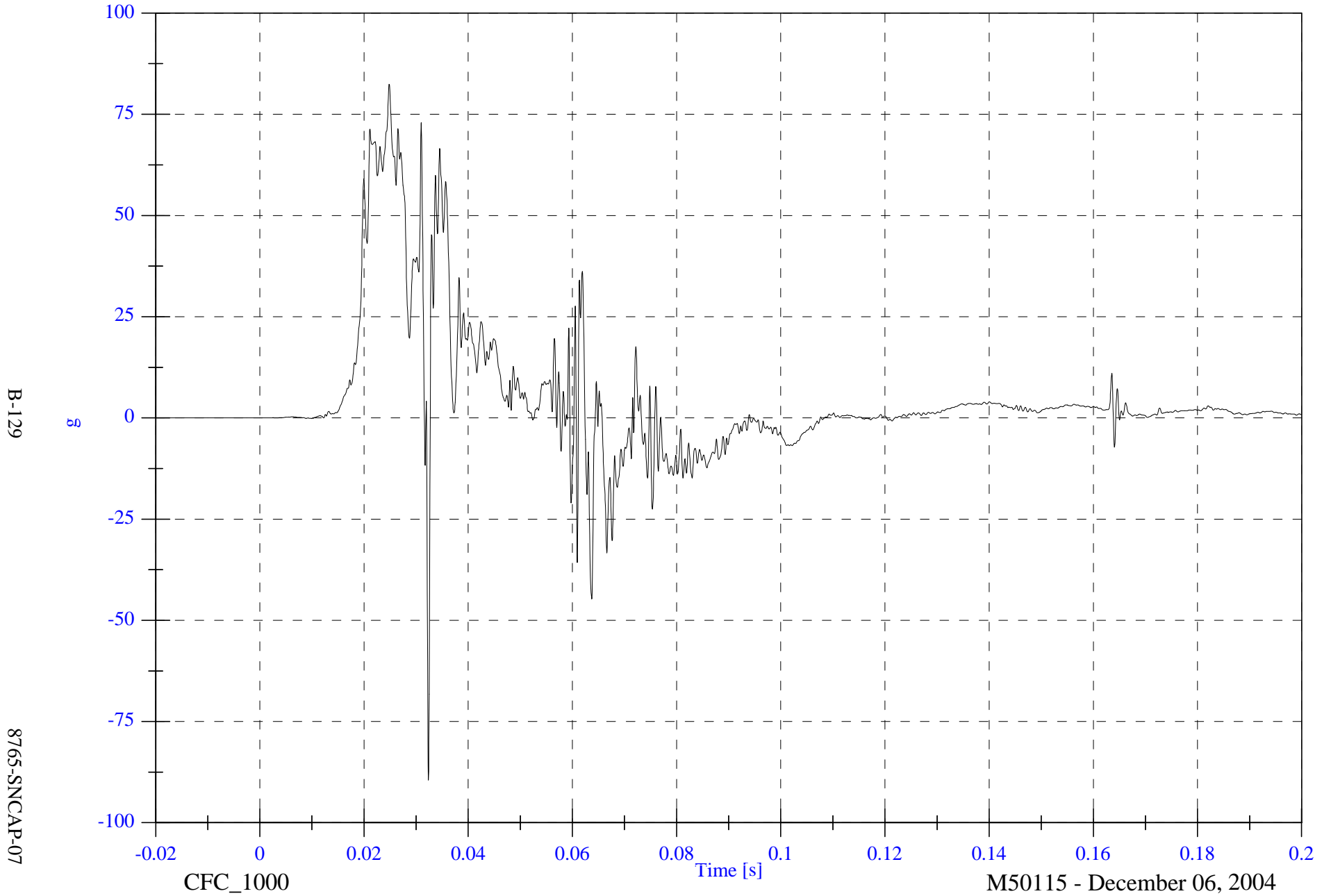


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Rib Ry

Max: 82.4 [g] at 0.025 [s]

Min: -89.5 [g] at 0.032 [s]



B-129

8765-SNCAP-07

CFC\_1000

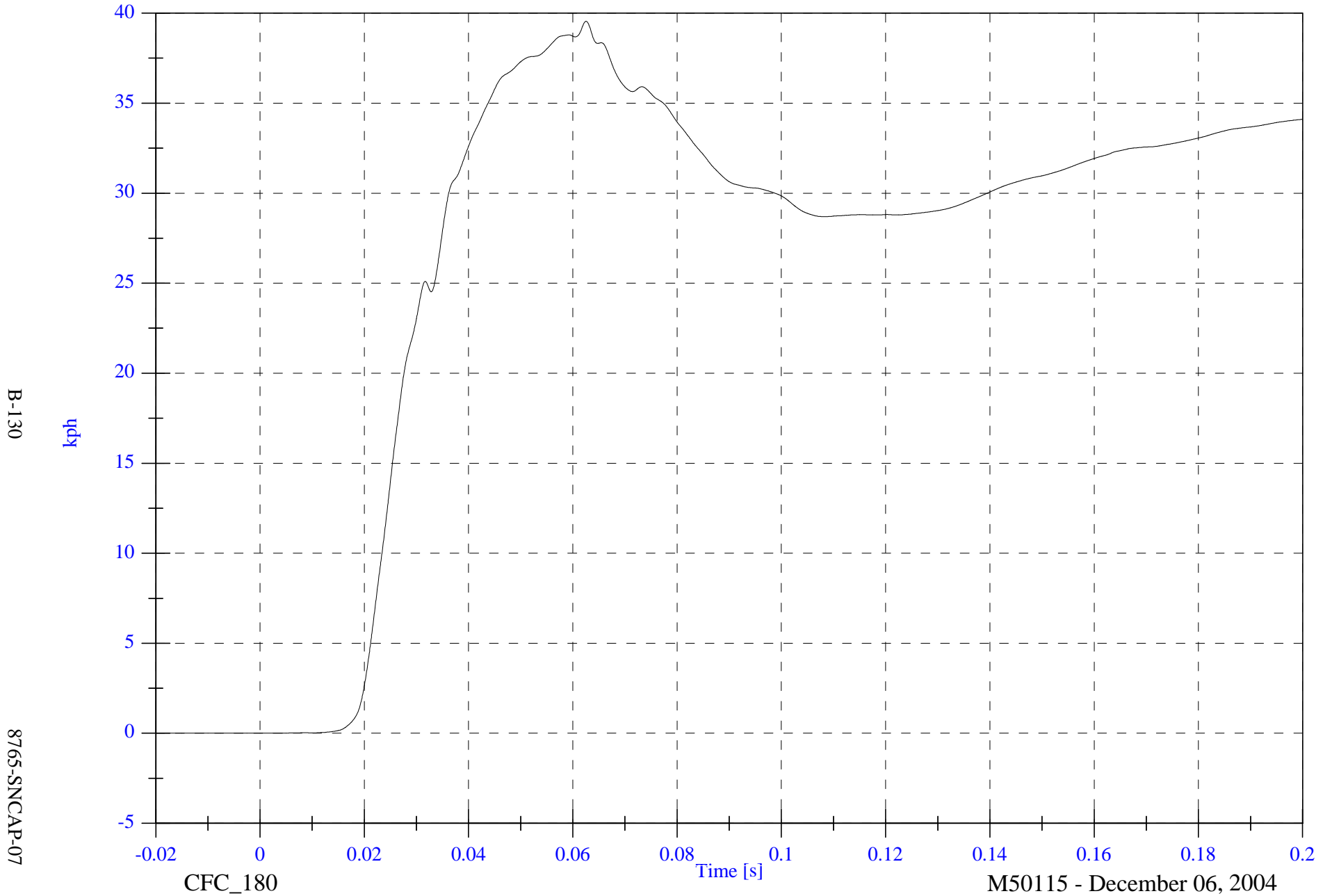
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Rib Ry Velocity

Max: 39.5 [kph] at 0.063 [s]

Min: -0.0 [kph] at -0.019 [s]



B-130

8765-SNCAP-07

CFC\_180

Time [s]

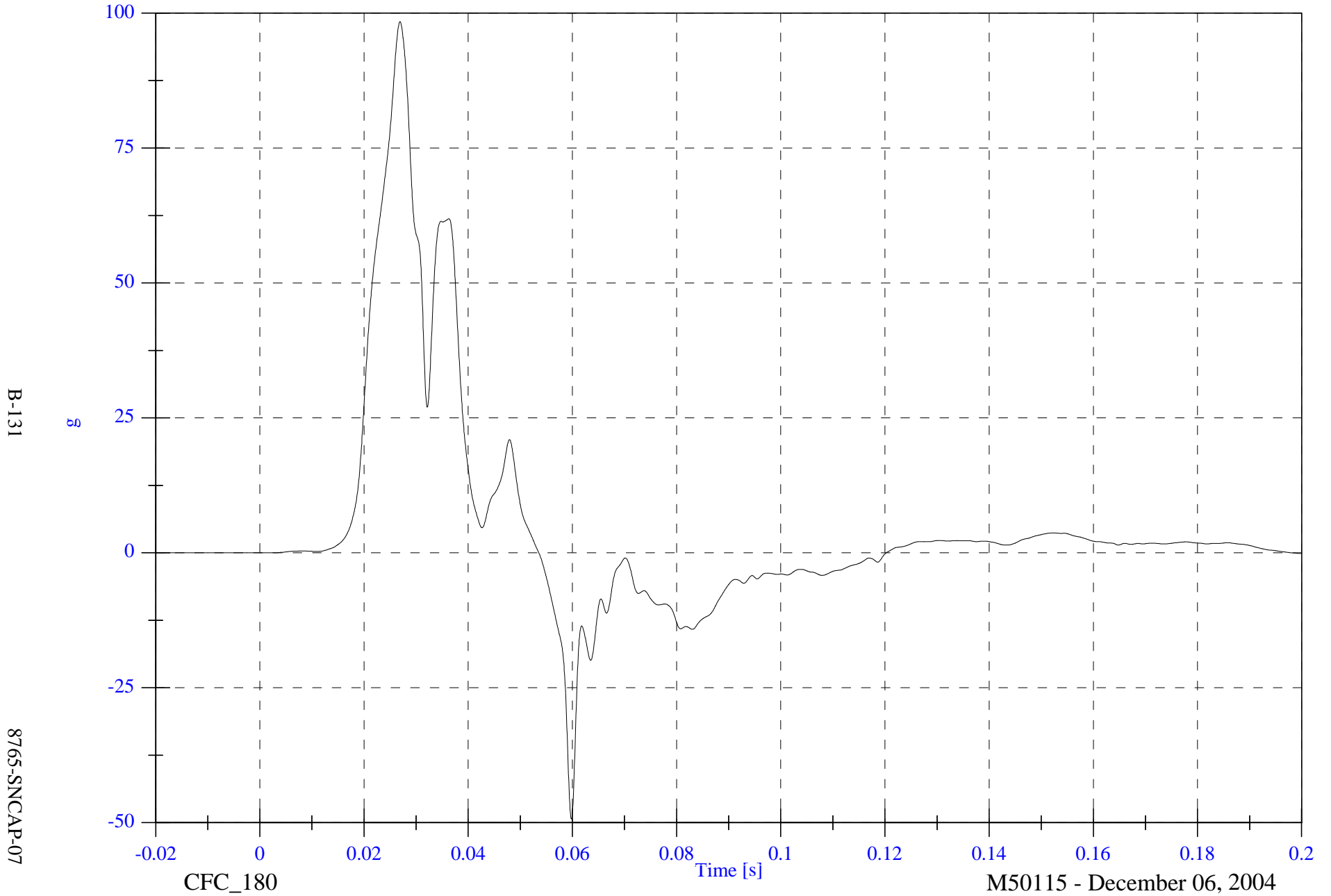
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Spine Ry

Max: 98.4 [g] at 0.027 [s]

Min: -49.3 [g] at 0.060 [s]



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8765-SNCAP-07

2005 SNCAP Test 2 - 2005 Saturn Ion

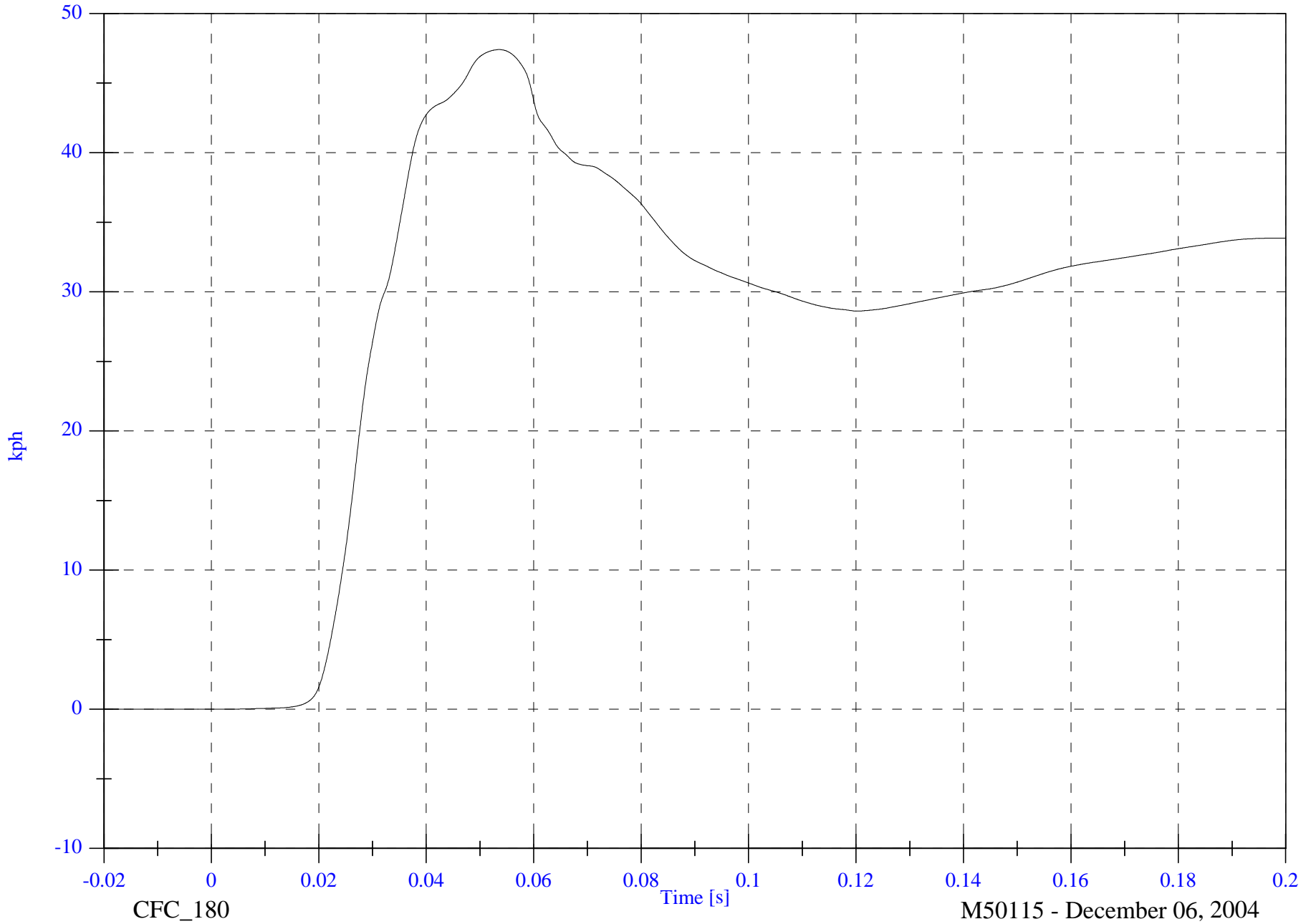
V2P1 Lower Spine Ry Velocity

Max: 47.4 [kph] at 0.054 [s]

Min: -0.0 [kph] at -0.018 [s]

B-132

8765-SNCAP-07

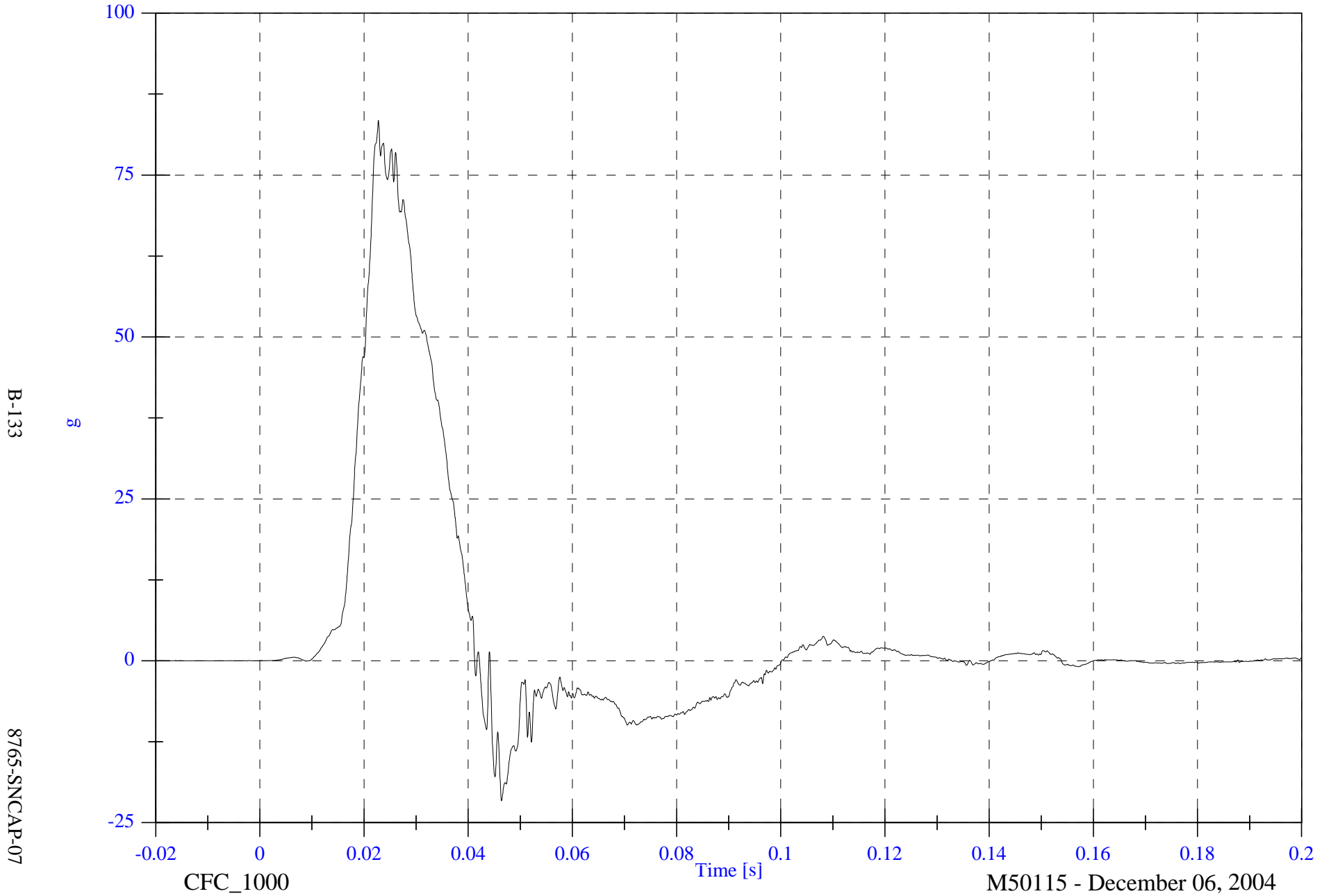


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Pelvic Ry

Max: 83.4 [g] at 0.023 [s]

Min: -21.6 [g] at 0.046 [s]

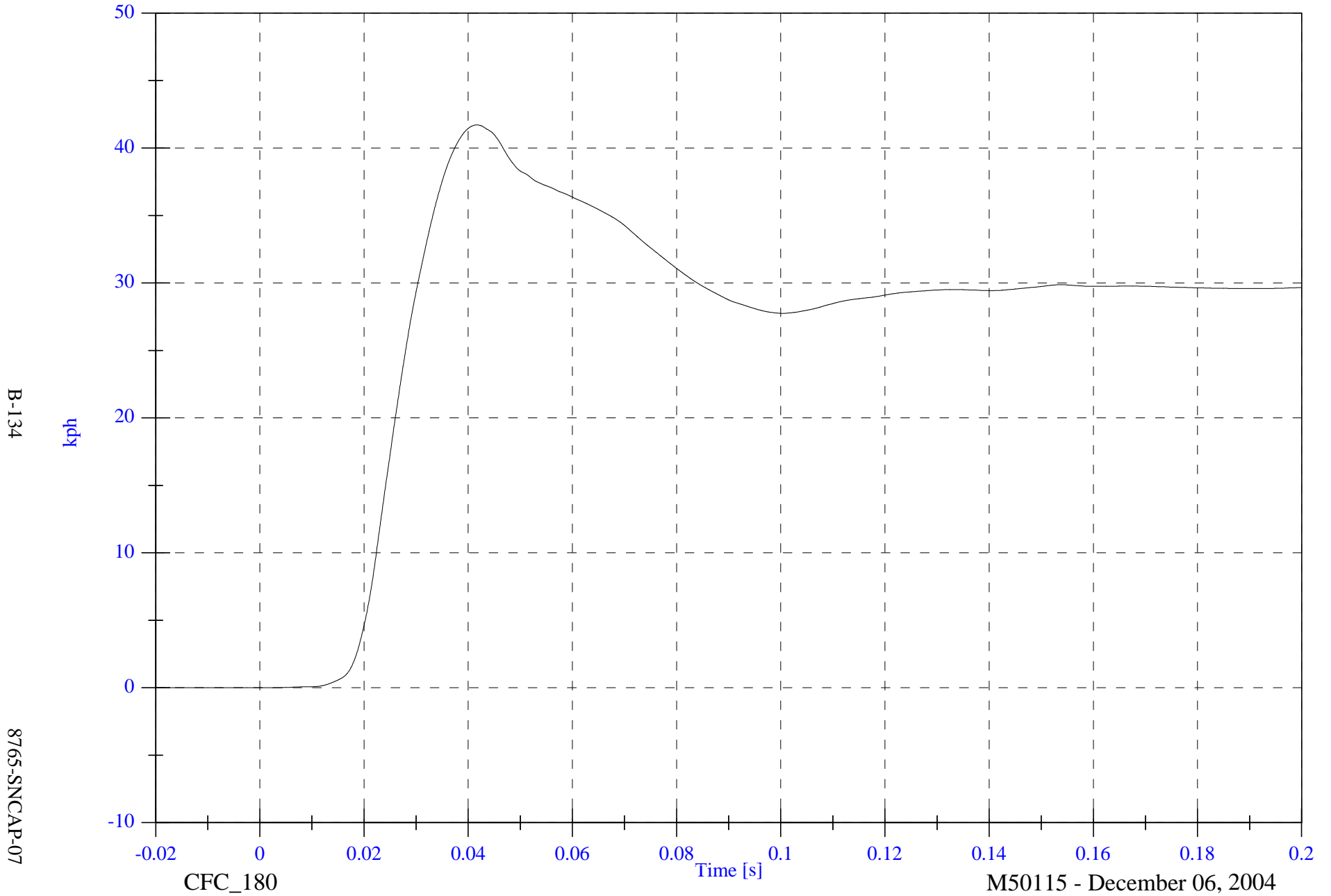


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Pelvic Ry Velocity

Max: 41.7 [kph] at 0.042 [s]

Min: -0.0 [kph] at -0.020 [s]



B-134

8765-SNCAP-07

CFC\_180

Time [s]

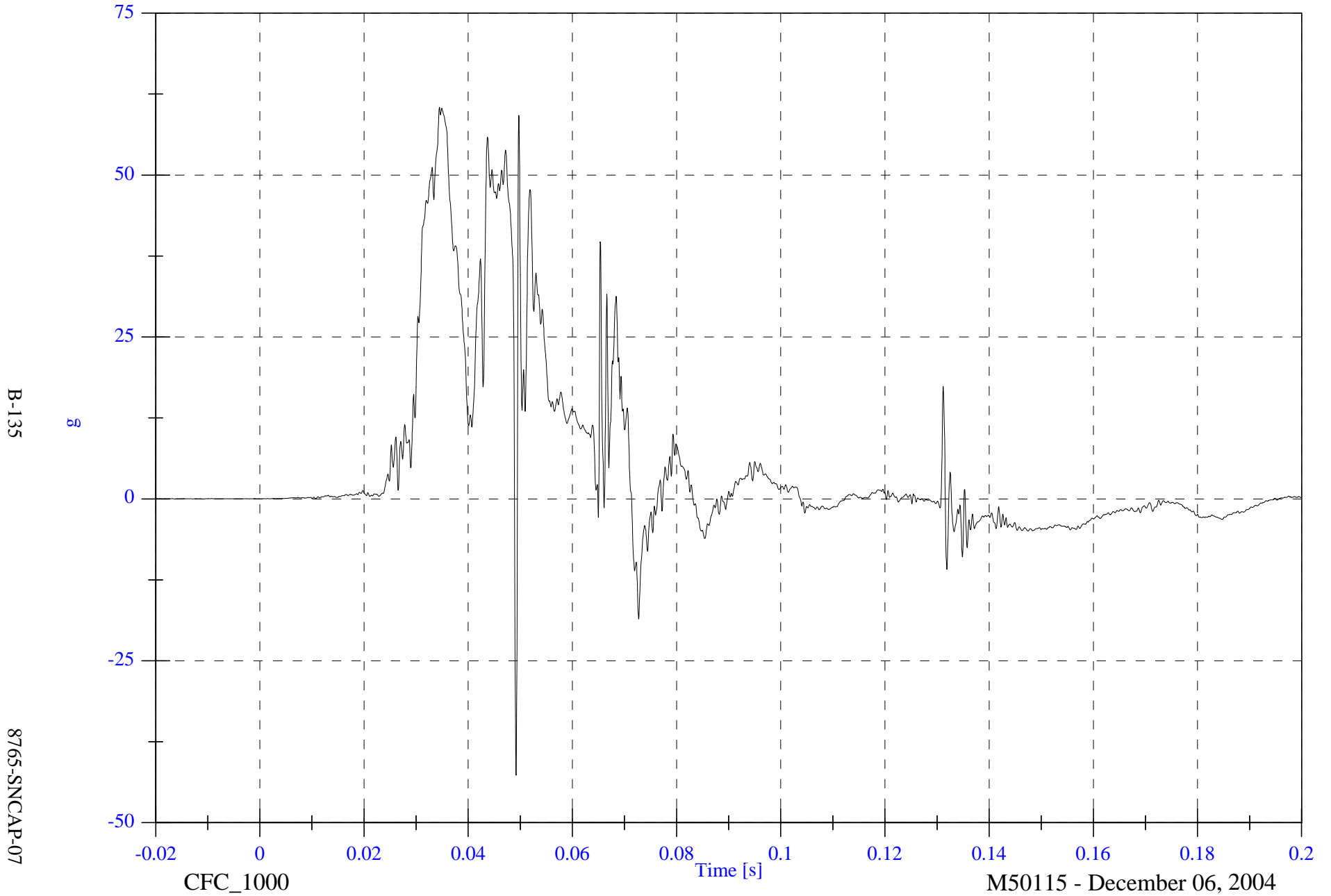
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Rib Ry

Max: 60.4 [g] at 0.034 [s]

Min: -42.7 [g] at 0.049 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

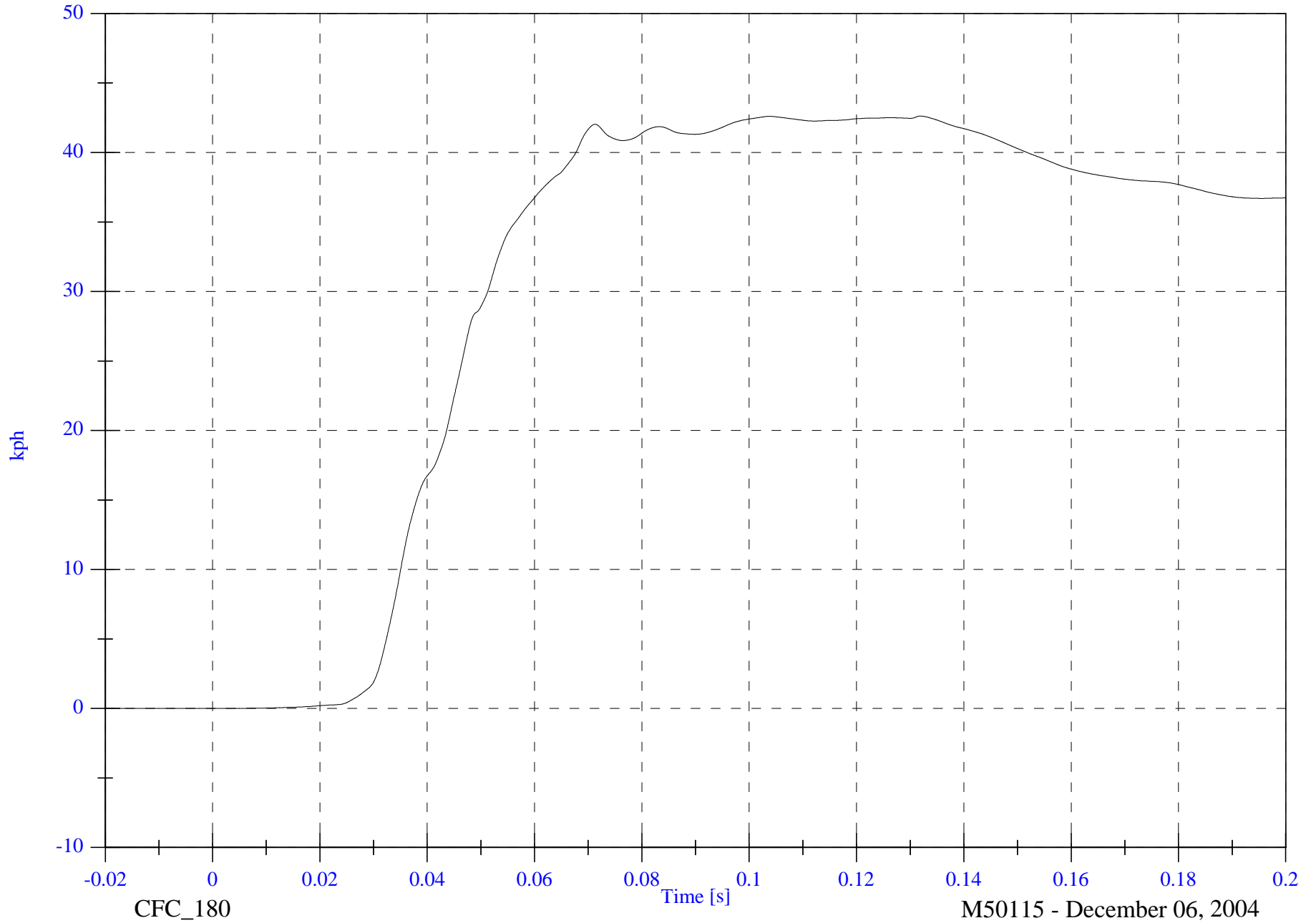
V2P4 Upper Rib Ry Velocity

Max: 42.6 [kph] at 0.132 [s]

Min: -0.0 [kph] at -0.020 [s]

B-136

8765-SNCAP-07

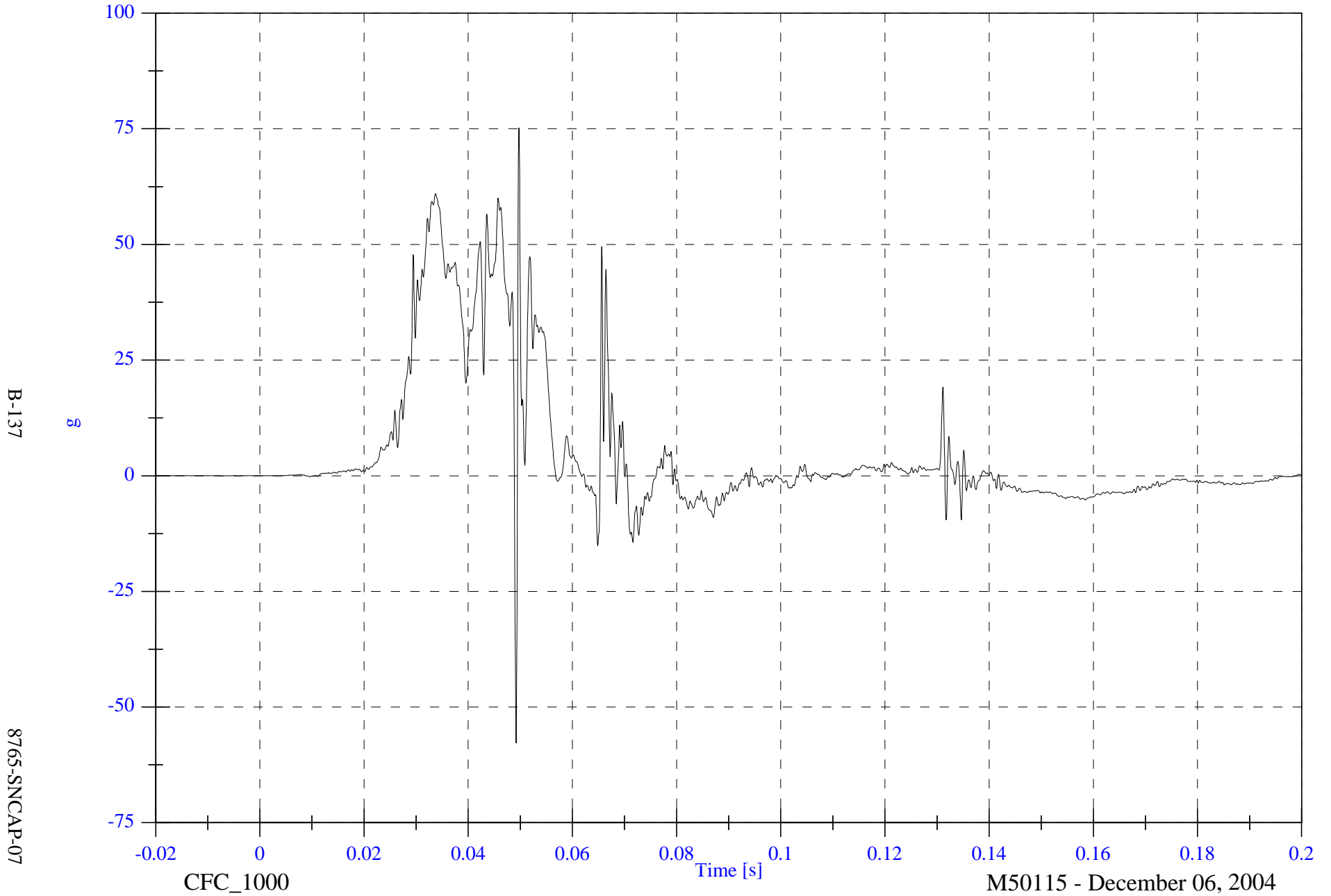


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Rib Ry

Max: 75.2 [g] at 0.050 [s]

Min: -57.8 [g] at 0.049 [s]



2005 SNCAP Test 2 - 2005 Saturn Ion

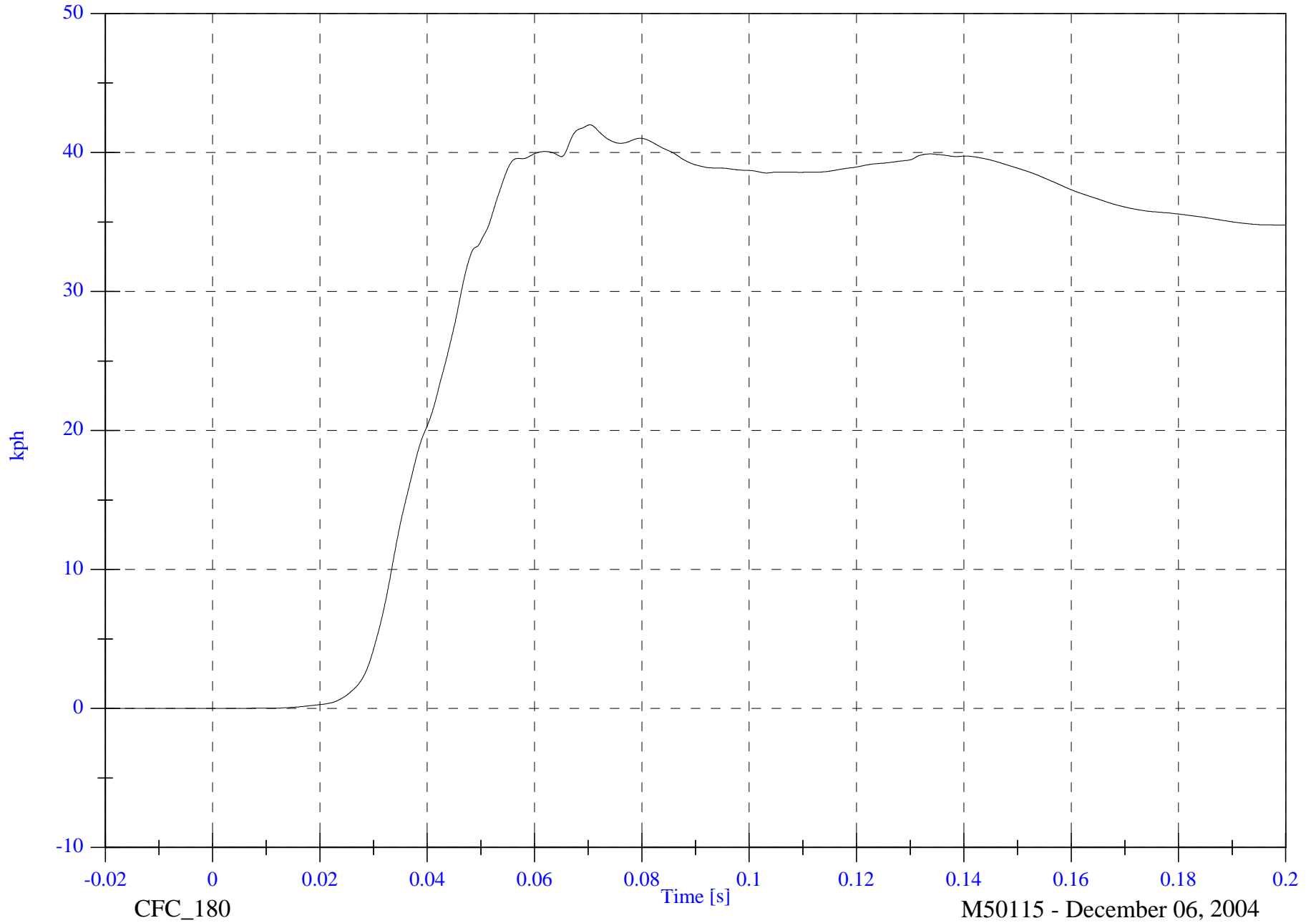
V2P4 Lower Rib Ry Velocity

Max: 42.0 [kph] at 0.070 [s]

Min: -0.0 [kph] at -0.018 [s]

B-138

8765-SNCAP-07



CFC\_180

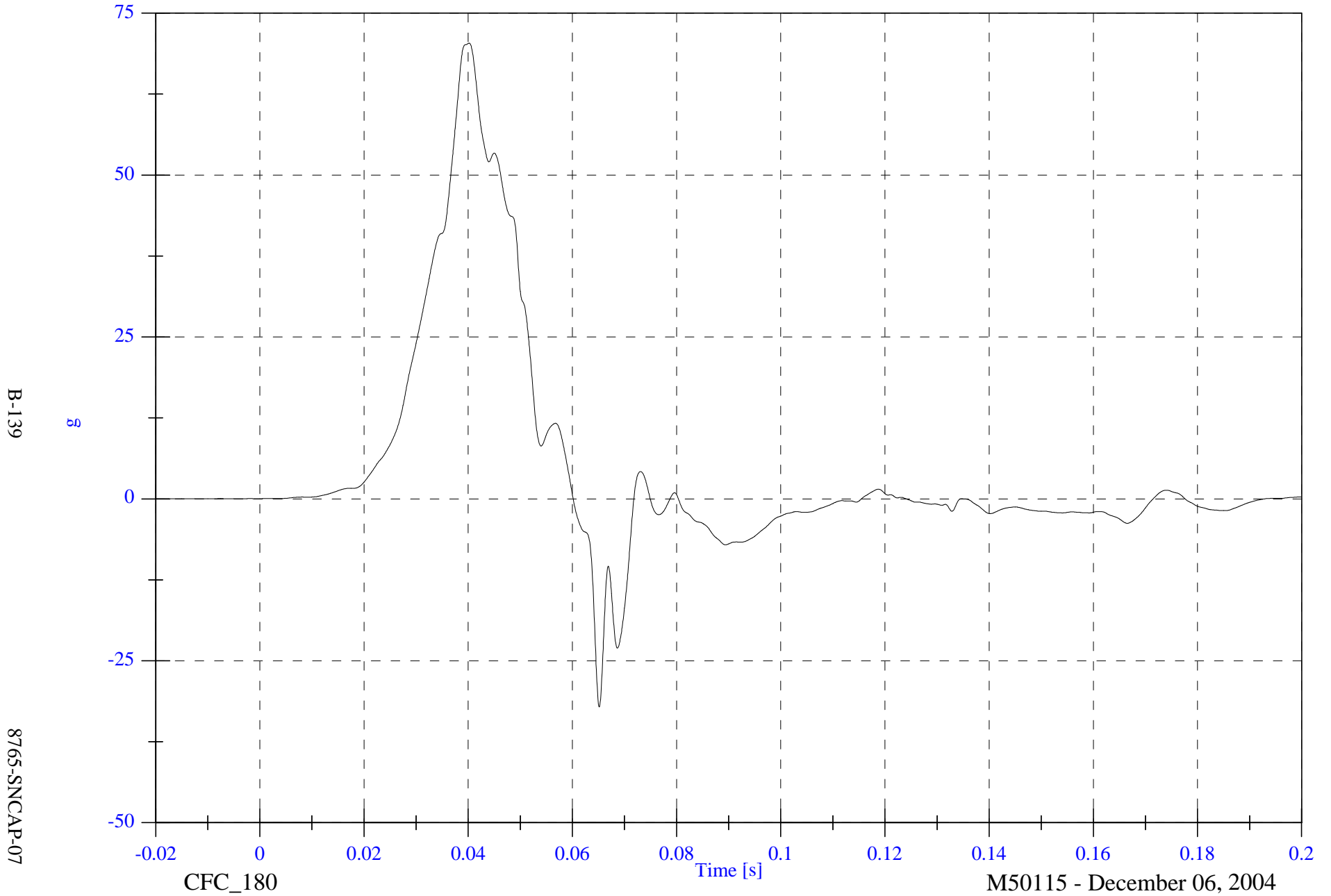
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Spine Ry

Max: 70.4 [g] at 0.040 [s]

Min: -32.1 [g] at 0.065 [s]

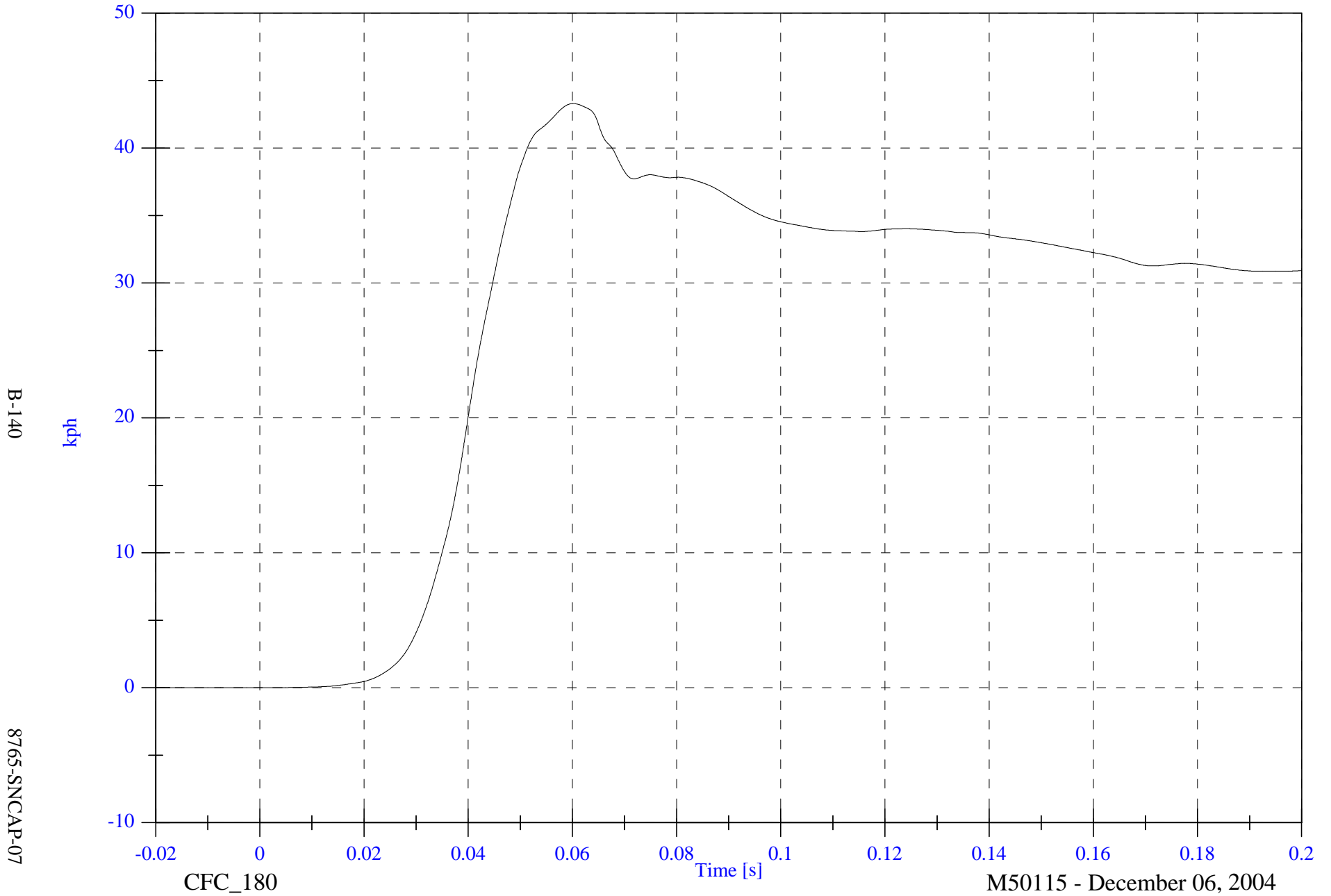


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Spine Ry Velocity

Max: 43.3 [kph] at 0.060 [s]

Min: -0.0 [kph] at -0.020 [s]



B-140

8765-SNCAP-07

CFC\_180

Time [s]

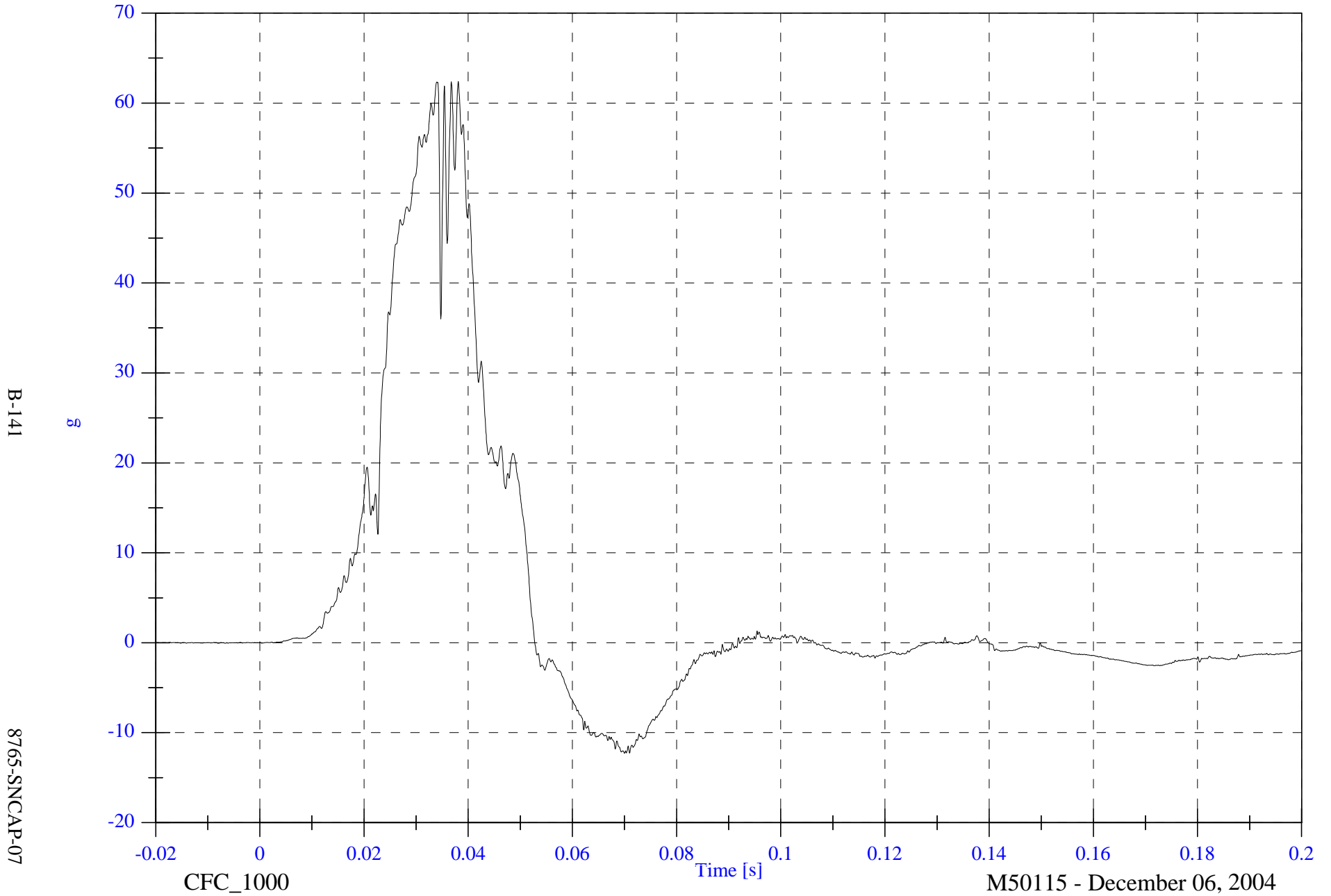
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Pelvic Ry

Max: 62.4 [g] at 0.038 [s]

Min: -12.3 [g] at 0.070 [s]



B-141

8765-SNCAP-07

2005 SNCAP Test 2 - 2005 Saturn Ion

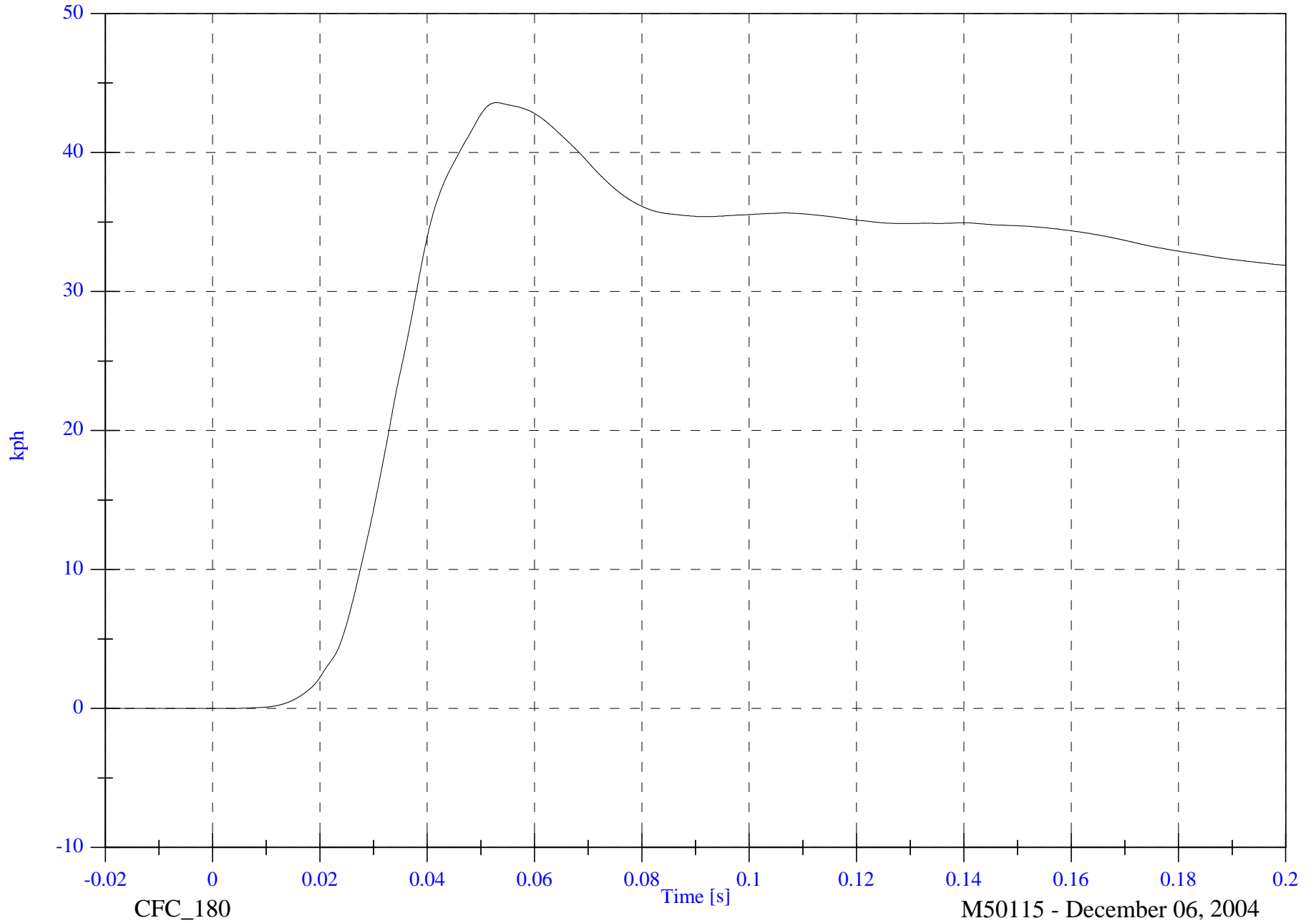
V2P4 Pelvic Ry Velocity

Max: 43.6 [kph] at 0.053 [s]

Min: -0.0 [kph] at -0.020 [s]

B-142

8765-SNCAP-07

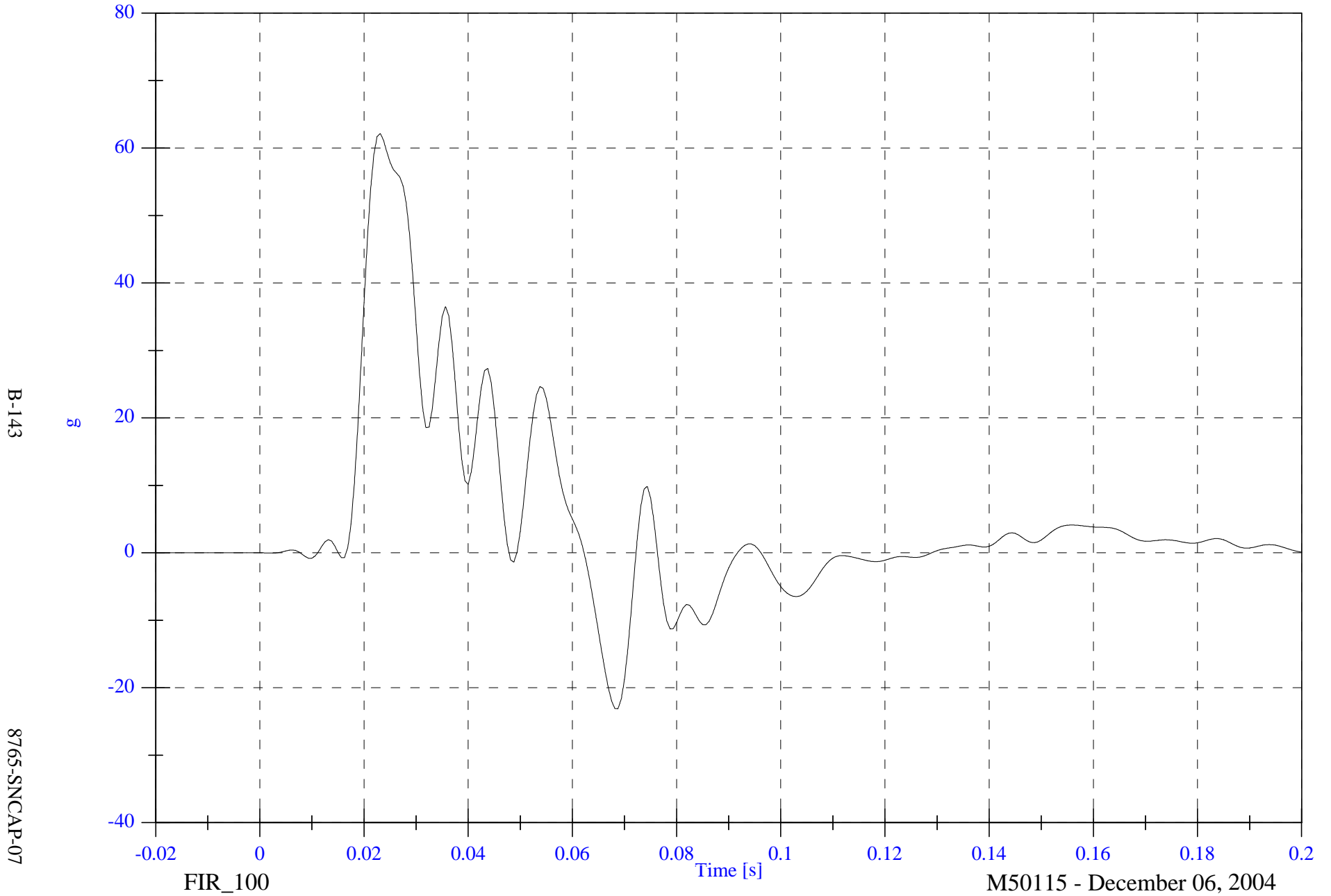


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Upper Rib Ry

Max: 62.1 [g] at 0.023 [s]

Min: -23.1 [g] at 0.069 [s]

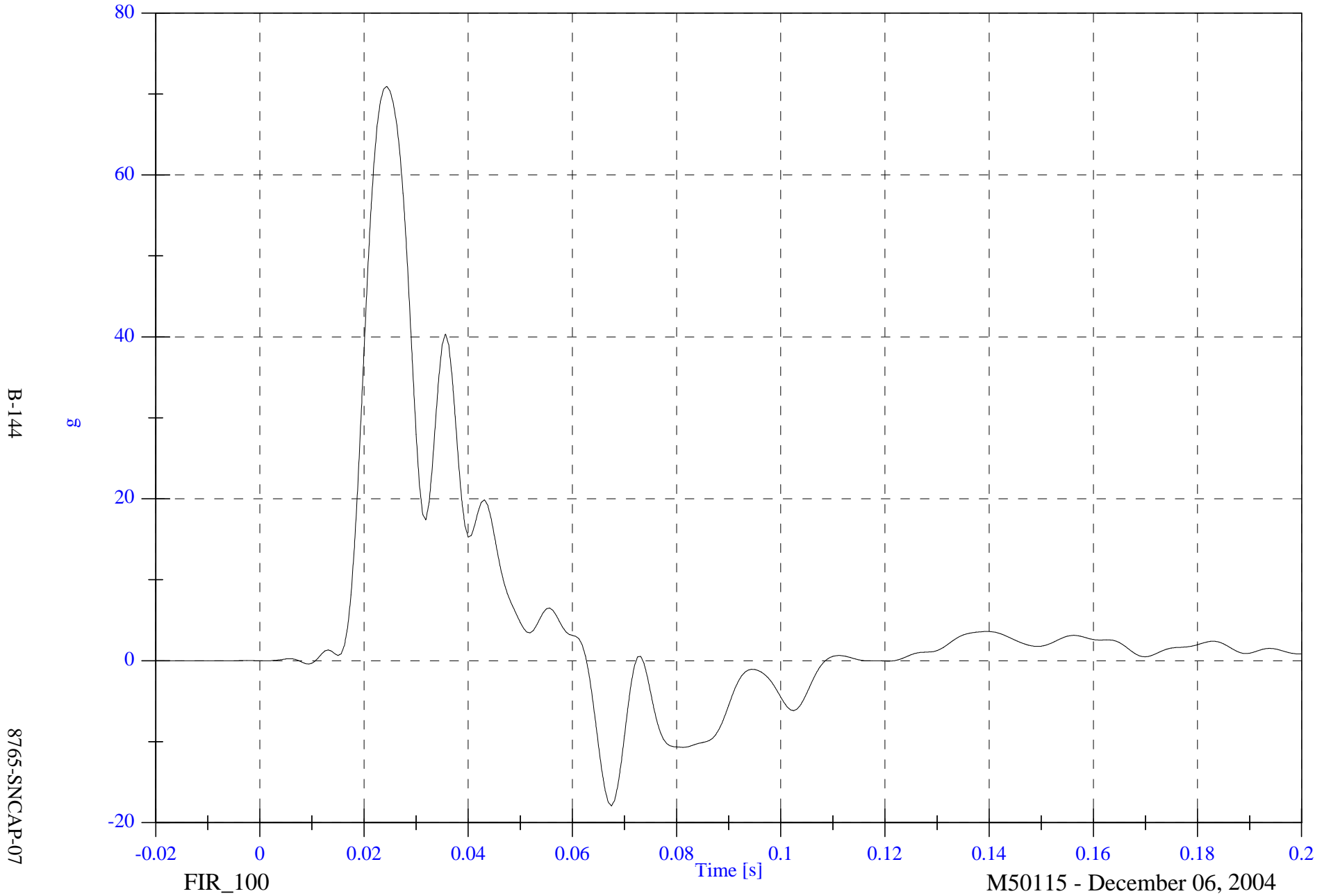


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Rib Ry

Max: 70.9 [g] at 0.024 [s]

Min: -17.9 [g] at 0.068 [s]



B-144

8765-SNCAP-07

FIR\_100

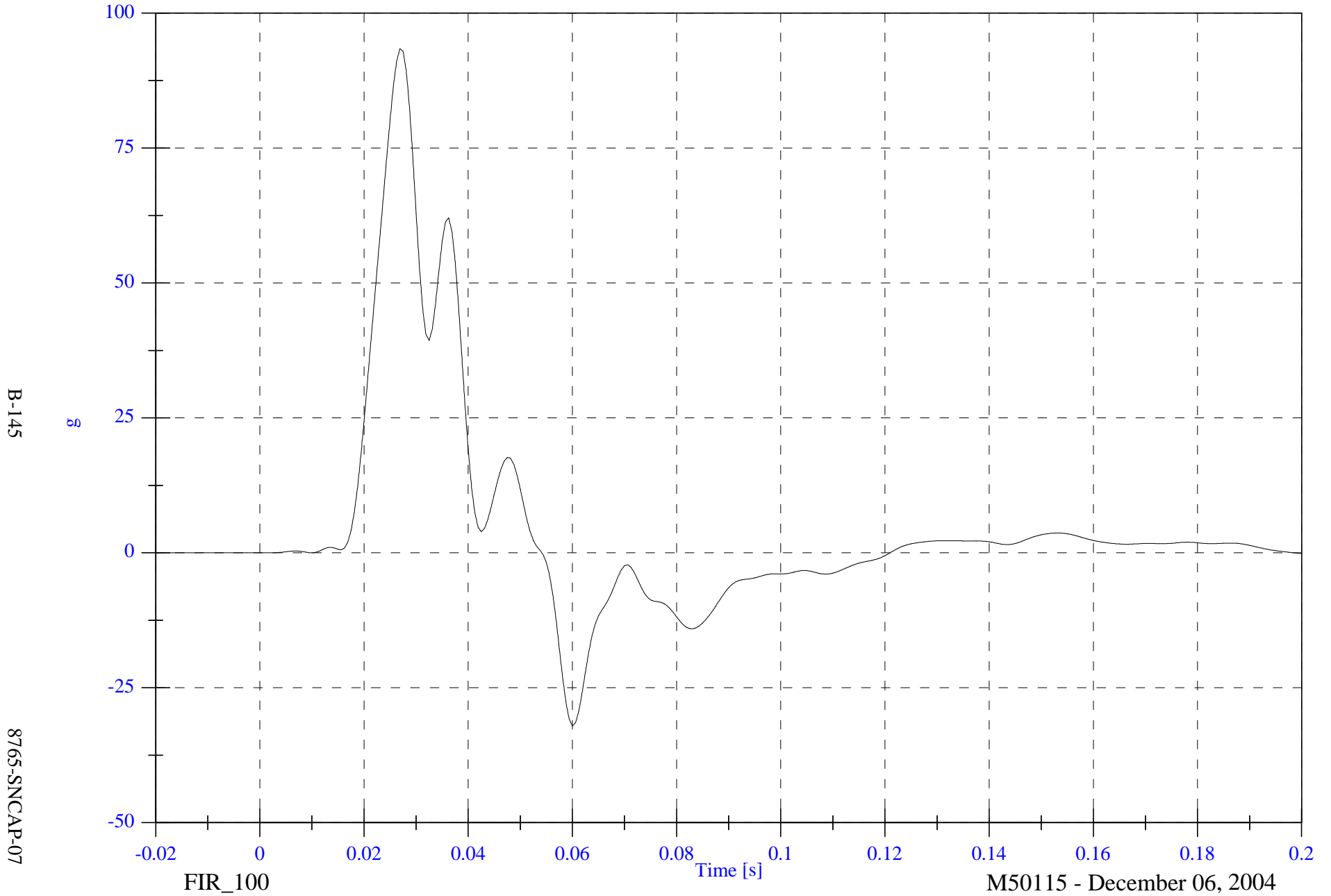
M50115 - December 06, 2004

2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Lower Spine Ry

Max: 93.4 [g] at 0.027 [s]

Min: -32.1 [g] at 0.060 [s]

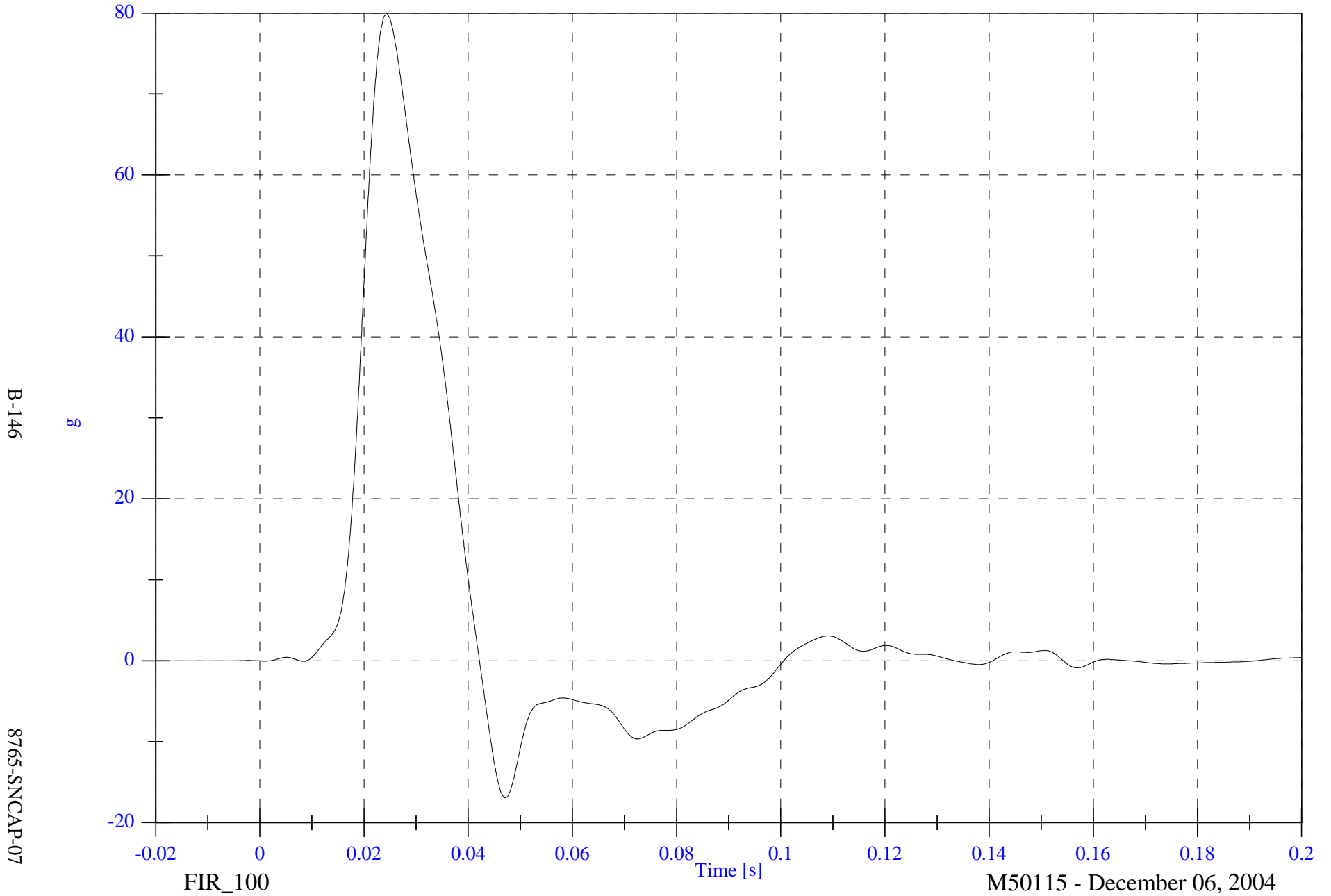


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P1 Pelvic Ry

Max: 80.0 [g] at 0.024 [s]

Min: -16.9 [g] at 0.047 [s]

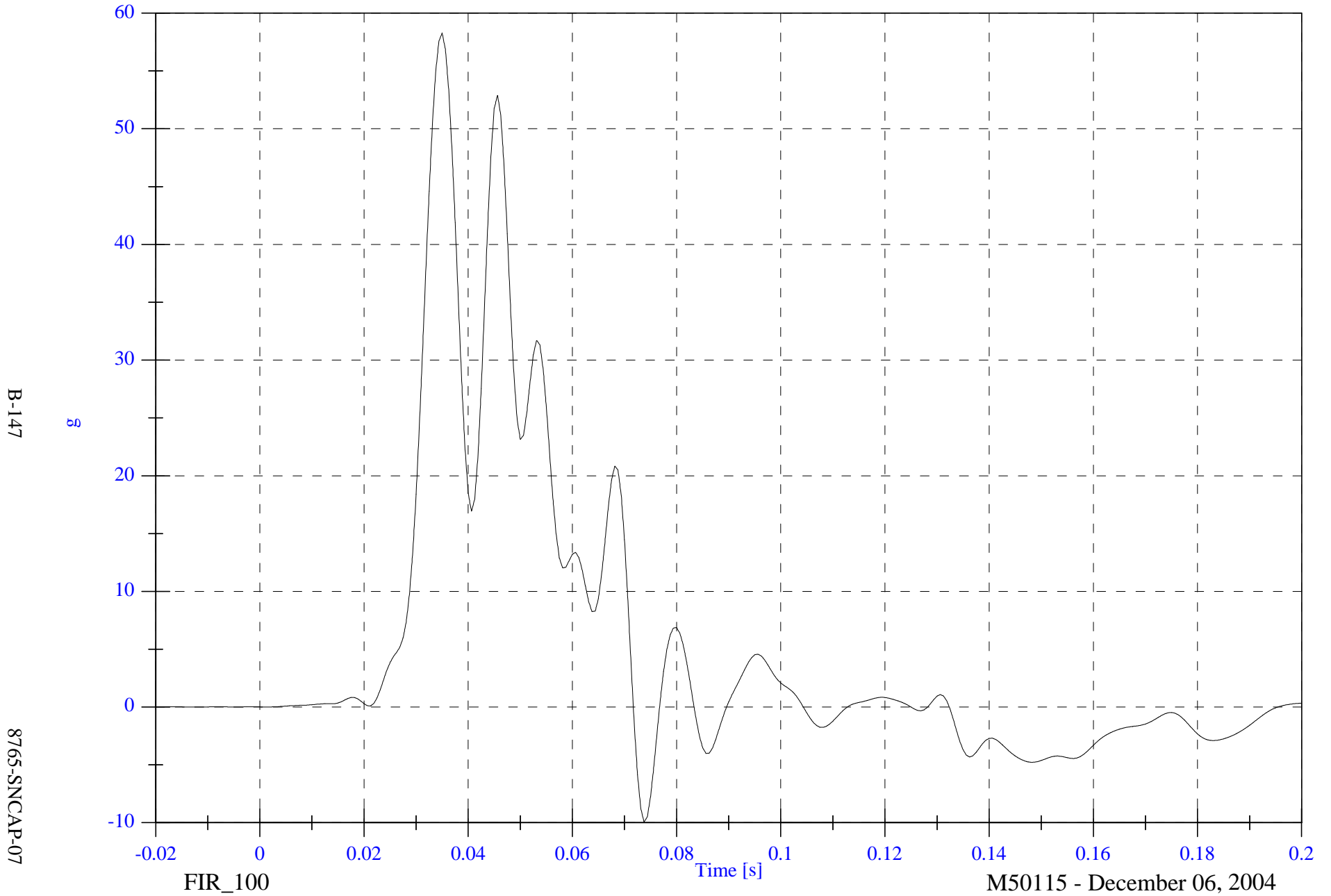


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Upper Rib Ry

Max: 58.3 [g] at 0.035 [s]

Min: -9.9 [g] at 0.074 [s]

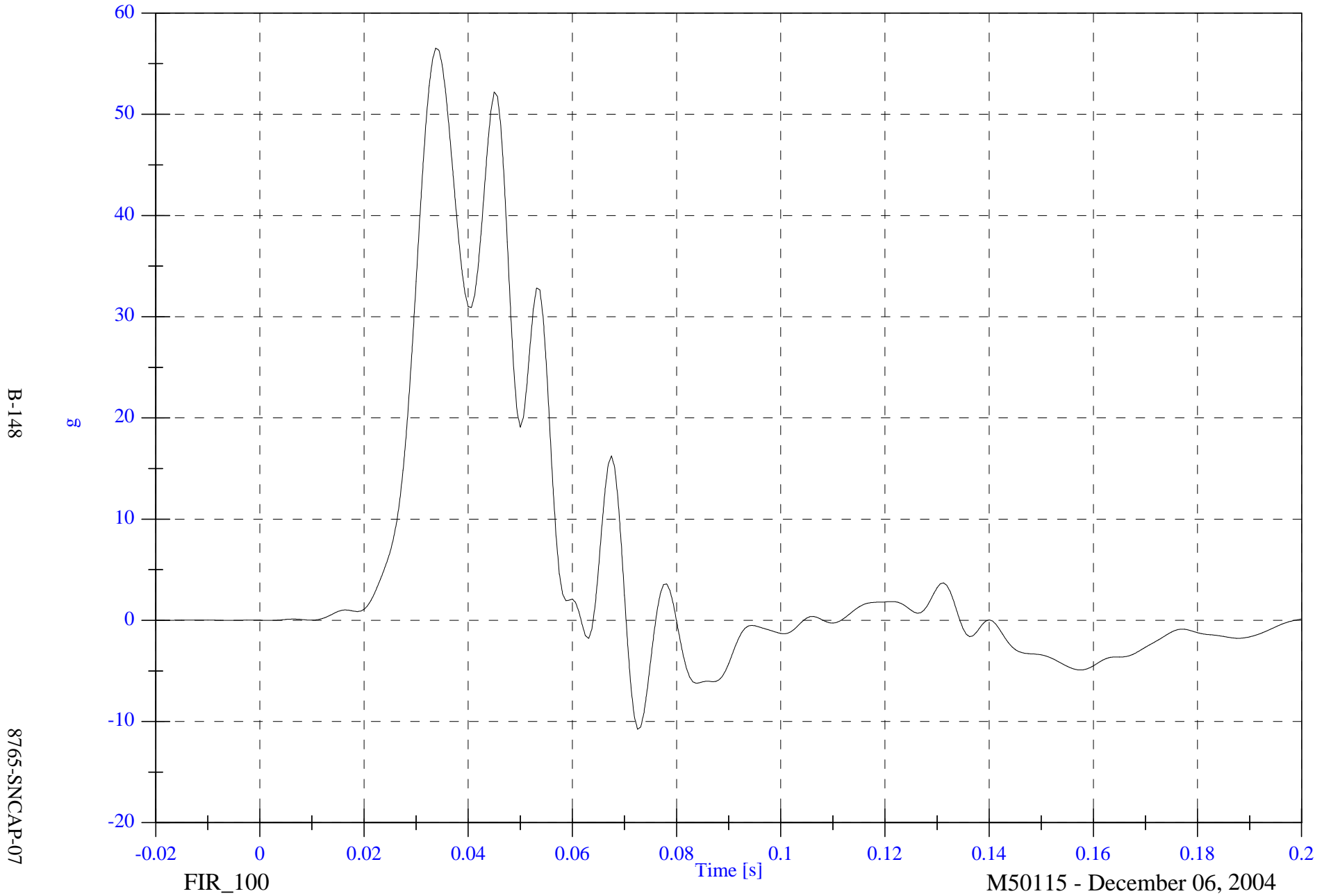


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Rib Ry

Max: 56.5 [g] at 0.034 [s]

Min: -10.8 [g] at 0.072 [s]

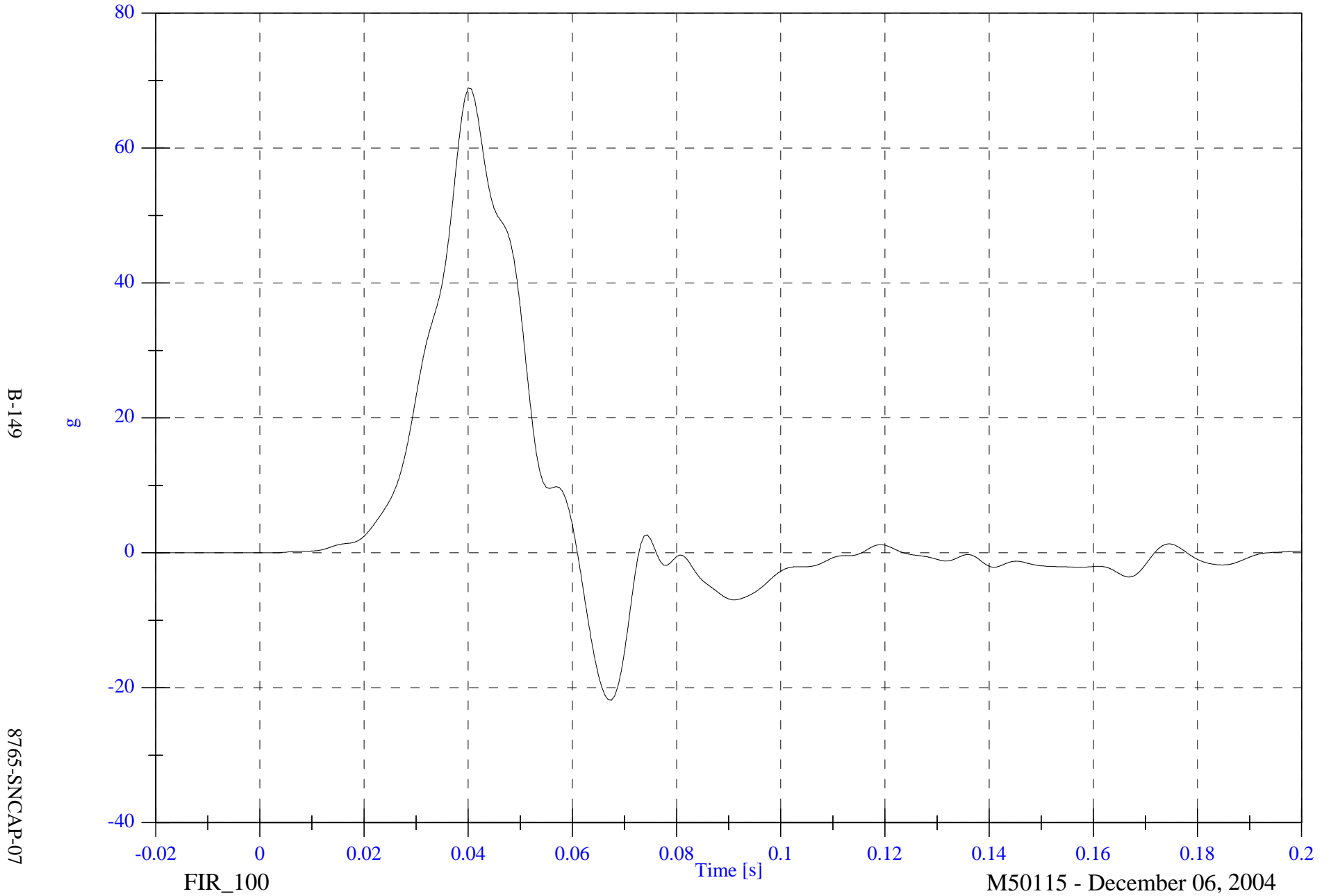


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Lower Spine Ry

Max: 68.9 [g] at 0.040 [s]

Min: -21.8 [g] at 0.068 [s]

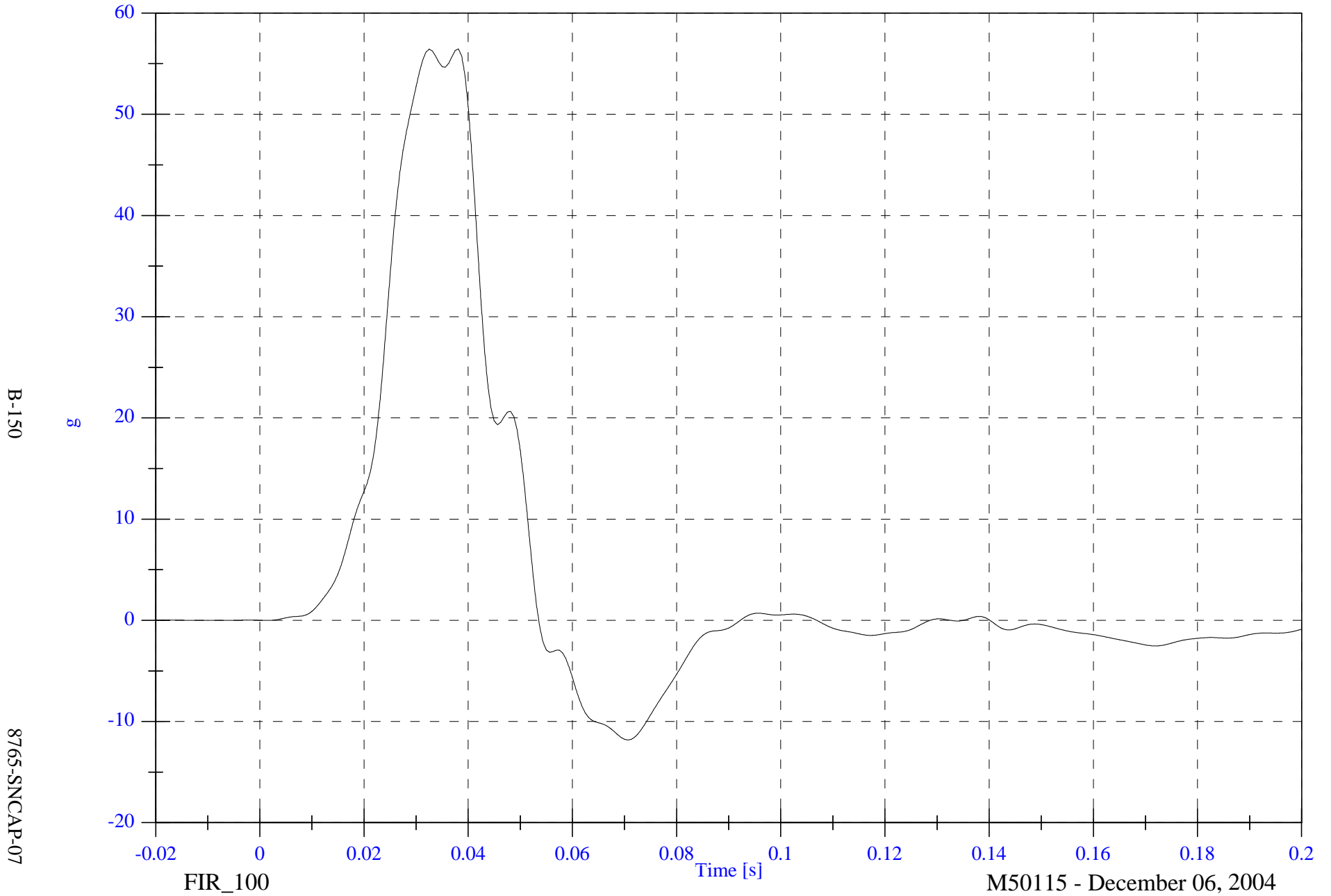


2005 SNCAP Test 2 - 2005 Saturn Ion

V2P4 Pelvic Ry

Max: 56.5 [g] at 0.038 [s]

Min: -11.8 [g] at 0.071 [s]



B-150

8765-SNCAP-07

FIR\_100

M50115 - December 06, 2004

**APPENDIX C**

**SID HYBRID III CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**SUMMARY**  
**SID H3 PRE & POST TEST CALIBRATION**  
**CONFIGURED FOR LEFT SIDE IMPACT**

Date: December 3, 2004; December 9, 2004 Sequential Test Number: 4; 5  
Laboratory Technician: B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | SID H3 269          |              | SID H3 270          |              |
|------------------------------------|---------------|---------------------|--------------|---------------------|--------------|
|                                    |               | NO.:<br>PRE<br>TEST | POST<br>TEST | NO.:<br>PRE<br>TEST | POST<br>TEST |
| SH- Seated Height (mm)             | 889 - 909     | 902                 | 902          | 902                 | 902          |
| RH- Rib Height (mm)                | 501 - 521     | 503                 | 503          | 503                 | 503          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99                  | 99           | 99                  | 99           |
| RD- Rib from Back Line (mm)        | 229 - 241     | 234                 | 234          | 234                 | 234          |
| KV- Knee Pivot from Back Line (mm) | 511 - 526     | 518                 | 518          | 513                 | 513          |
| SW- Knee Pivot to Floor (mm)       | 490 - 505     | 495                 | 495          | 495                 | 495          |
| HW- Hip Width (mm)                 | 356 - 391     | 379                 | 379          | 384                 | 384          |
| <b>THORAX IMPACTS</b>              |               |                     |              |                     |              |
| TEMPERATURE (°C)                   | 18.9 - 25.5   | 21.1                | 21.1         | 21.1                | 21.1         |
| RELATIVE HUMIDITY (%)              | 10 - 70       | 33.00               | 35.0         | 33.00               | 36.00        |
| PROBE SPEED (m/s)                  | 4.27 - 4.33   | 4.27                | 4.30         | 4.29                | 4.29         |
| UPPER RIB (g's)                    | 37 - 46       | 38.72               | 40.60        | 42.20               | 43.49        |
| LOWER RIB (g's)                    | 37 - 46       | 40.23               | 40.92        | 41.58               | 42.25        |
| LOWER SPINE (g's)                  | 15 - 22       | 19.30               | 20.09        | 21.64               | 21.50        |
| <b>PELVIS IMPACT</b>               |               |                     |              |                     |              |
| TEMPERATURE (°C)                   | 18.9 - 25.5   | 21.1                | 21.1         | 21.1                | 21.1         |
| RELATIVE HUMIDITY (%)              | 10 - 70       | 33.00               | 34.0         | 33.00               | 35.00        |
| PROBE SPEED (m/s)                  | 4.27 - 4.33   | 4.28                | 4.28         | 4.31                | 4.29         |
| PELVIS (g's)                       | 40 - 60       | 46.53               | 42.45        | 54.52               | 47.49        |

**REMARKS:** None

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID H3 NO.: 269**

**CONFIGURED FOR LEFT SIDE IMPACT**

**CALIBRATION TEST RESULTS SUMMARY  
PRE-TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 269 Sequential Test Number: 4  
Date: December 3, 2004 Laboratory Technician: B. Swiecicki

| TEST                         | COMMENTS                 |
|------------------------------|--------------------------|
| EXTERNAL DIMENSIONS          | Passed all requirements. |
| THORACIC SHOCK ABSORBER TEST | Passed all requirements. |
| LATERAL THORAX IMPACT TEST   | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST   | Passed all requirements. |
| HEAD DROP TEST*              | Passed all requirements. |
| LATERAL NECK BEND TEST*      | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST*  | Passed all requirements. |
| LUMBAR FLEXION TEST*         | Passed all requirements. |

\* Test not required for SID certification.

**REMARKS:** None

**EXTERNAL DIMENSIONS  
PRE-TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 269 Sequential Test Number: 4  
Date: December 3, 2004 Laboratory Technician: B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 – 909     | 902          |
| RH- Rib Height (mm)                | 502 – 520     | 503          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 – 241     | 234          |
| KH- Knee Pivot from Back Line (mm) | 511 – 526     | 518          |
| KV- Knee Pivot to Floor (mm)       | 490 – 505     | 495          |
| HW- Hip Width (mm)                 | 356 - 391     | 379          |

**REMARKS:** None

# Shock Impact - Low ( 3.05 m/s )

## PRE TEST

### CONFIGURED FOR LEFT SIDE IMPACT

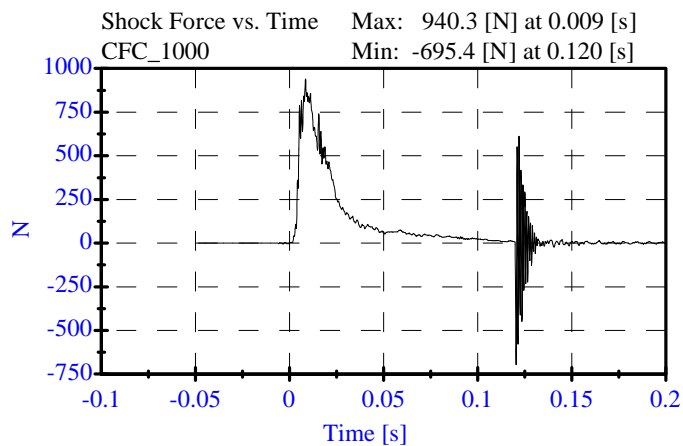
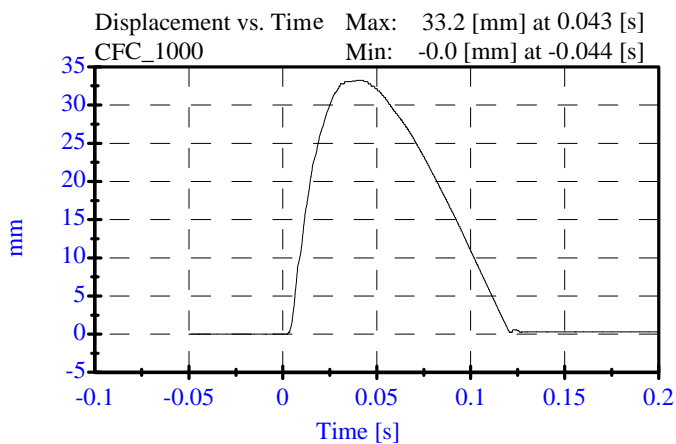
ATD Serial No: 269

Date: July 23, 2004

Sequential Test Number: 1 File: 269SL 07-23-04

Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 40.00 %             | Passed        |
| Displacement:          | 30.00-35.00 mm       | 33.24 mm            | Passed        |
| Maximum Force:         | 836.00-1125.00 N     | 940.32 N            | Passed        |
| Impact Test Velocity:  | 3.05 m/s             |                     |               |
| Damper Identification: | 269                  |                     |               |
| Damper Setting:        | 5                    |                     |               |



Shock Impact - Med ( 4.27 m/s )

PRE TEST

CONFIGURED FOR LEFT SIDE IMPACT

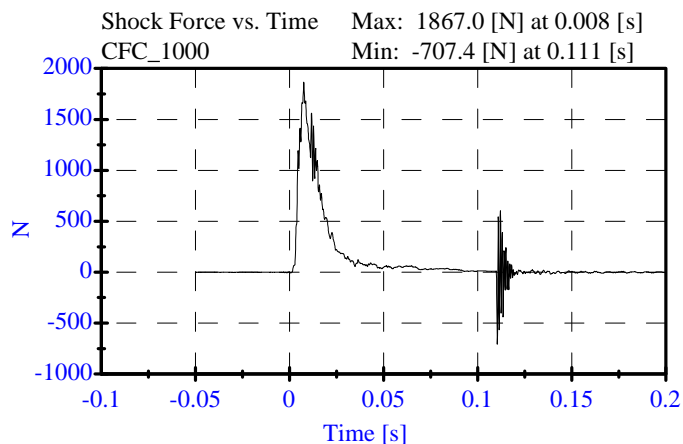
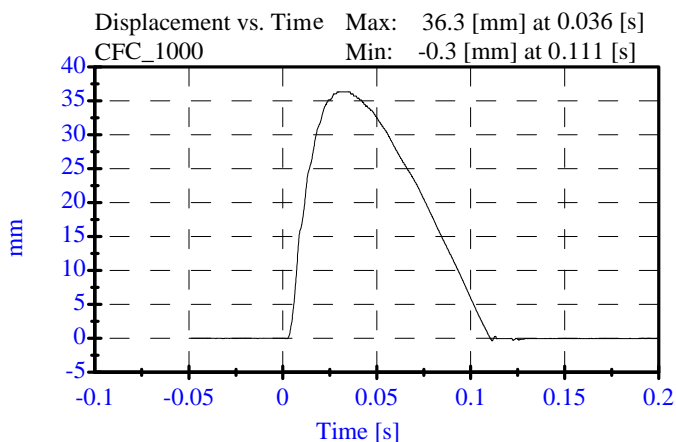
ATD Serial No: 269

Date: July 23, 2004

Sequential Test Number: 1 File: 269SM 07-23-04

Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 40.00 %             | Passed        |
| Displacement:          | 32.00-37.00 mm       | 36.33 mm            | Passed        |
| Maximum Force:         | 1730.00-2099.00 N    | 1866.97 N           | Passed        |
| Impact Test Velocity:  | 4.27 m/s             |                     |               |
| Damper Identification: | 269                  |                     |               |
| Damper Setting:        | 5                    |                     |               |



Shock Impact - High ( 6.10 m/s )

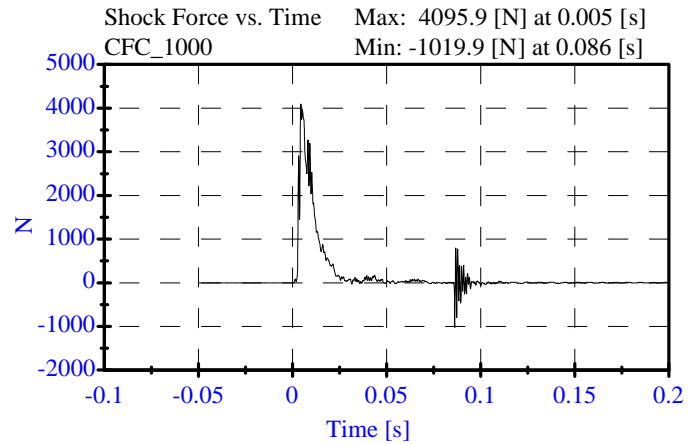
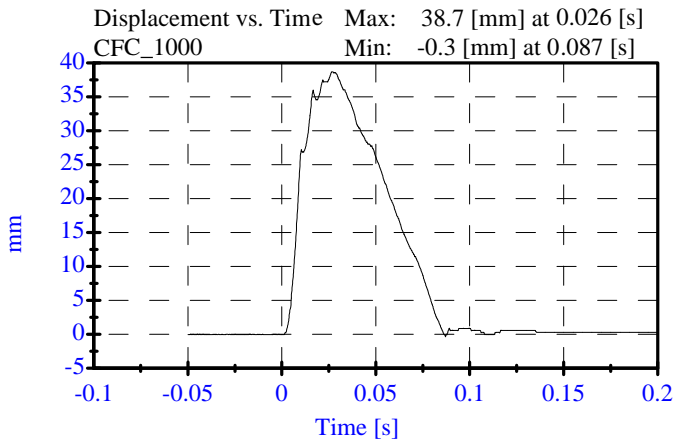
PRE TEST

CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 269  
Date: July 23, 2004

Sequential Test Number: 1 File: 269SH6 07-23-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 40.00 %             | Passed        |
| Displacement:          | 33.00-40.00 mm       | 38.71 mm            | Passed        |
| Maximum Force:         | 3741.00-4448.00 N    | 4095.92 N           | Passed        |
| Impact Test Velocity:  | 6.10 m/s             |                     |               |
| Damper Identification: | 269                  |                     |               |
| Damper Setting:        | 5                    |                     |               |



# Thorax Impact

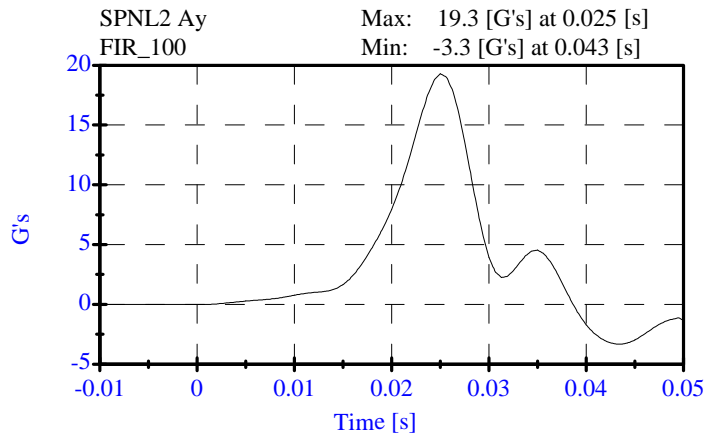
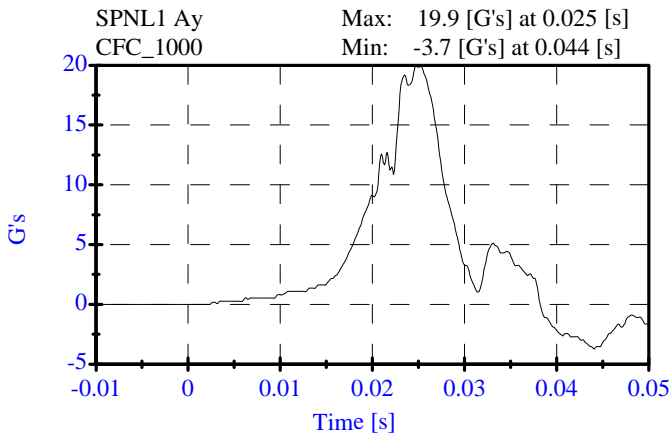
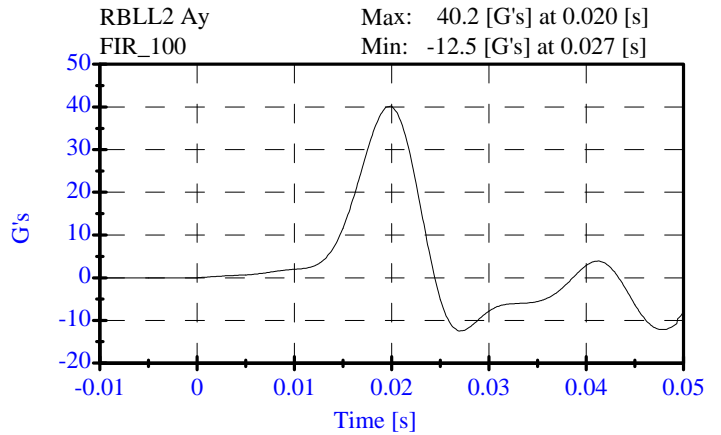
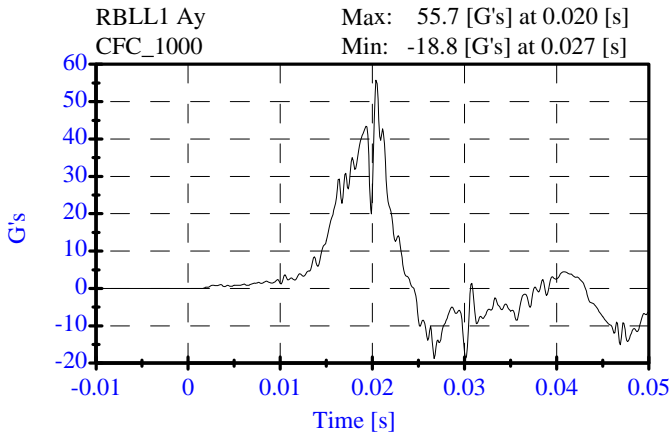
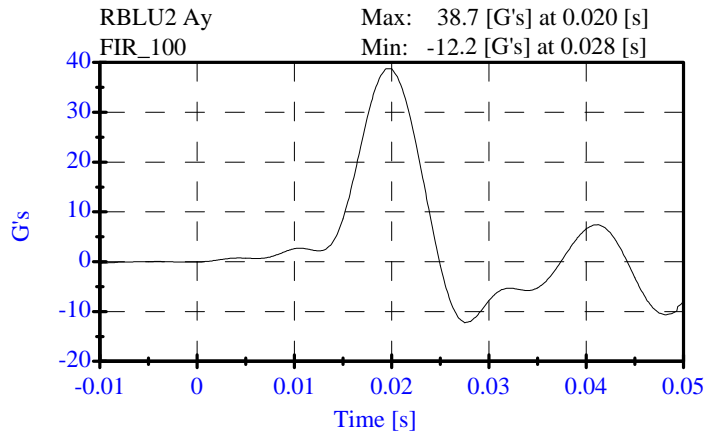
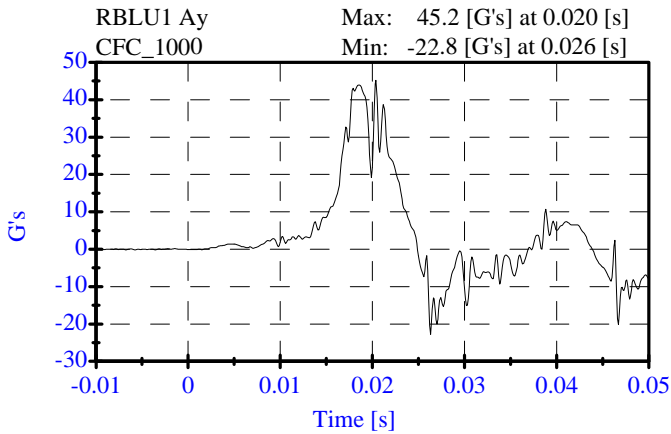
## Pre-Test

### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 269  
Date: December 3, 2004

Sequential Test Number: 1 File: 269T 12-03-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>     | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|---------------------------|----------------------|---------------------|---------------|
| Lab Temperature:          | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:             | 10-70 %              | 33.00 %             | Passed        |
| Probe Velocity:           | 4.27- 4.33 m/s       | 4.27 m/s            | Passed        |
| Upper Rib Acceleration:   | 37.00-46.00 G's      | 38.72 G's           | Passed        |
| Lower Rib Acceleration:   | 37.00-46.00 G's      | 40.23 G's           | Passed        |
| Lower Spine Acceleration: | 15.00-22.00 G's      | 19.30 G's           | Passed        |



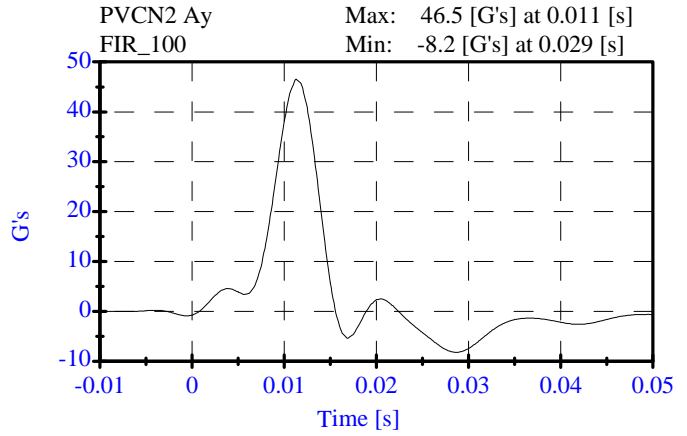
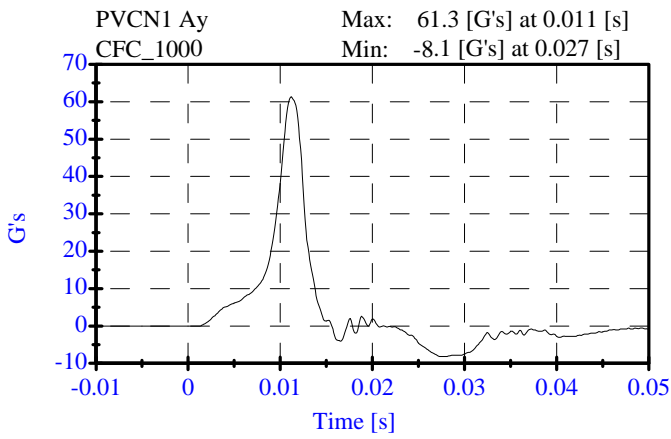
**Pelvic Test  
Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
Date: December 3, 2004

Sequential Test Number: 1 File: 269P 12-03-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 33.00 %             | Passed        |
| Probe Velocity:        | 4.27- 4.33 m/s       | 4.28 m/s            | Passed        |
| Pelvis Y Acceleration: | 40.00-60.00 G's      | 46.53 G's           | Passed        |
| Time Above 20 Gs       | 3.0-7.0 ms           | 5.4 ms              | Passed        |



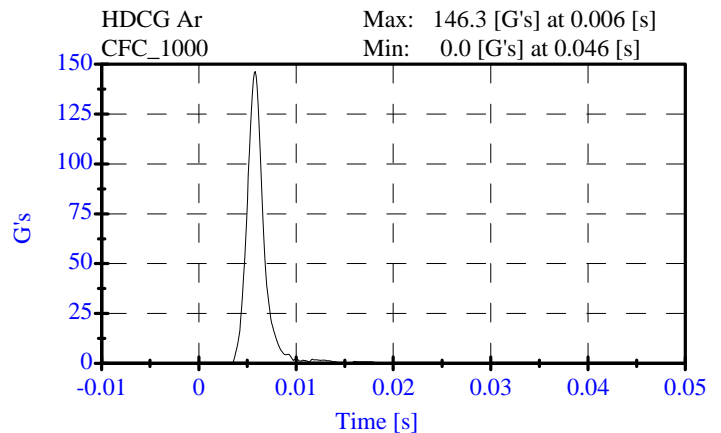
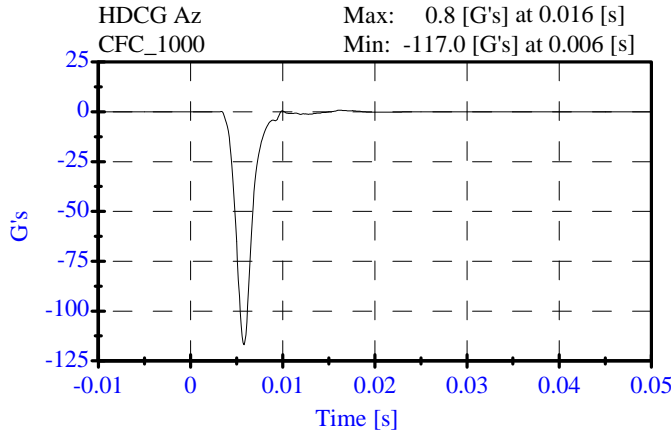
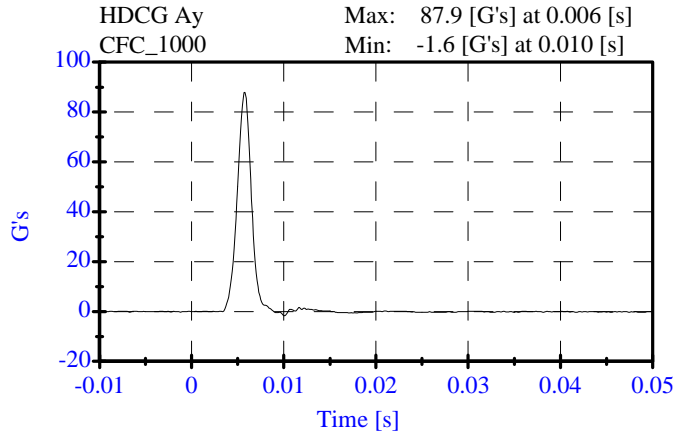
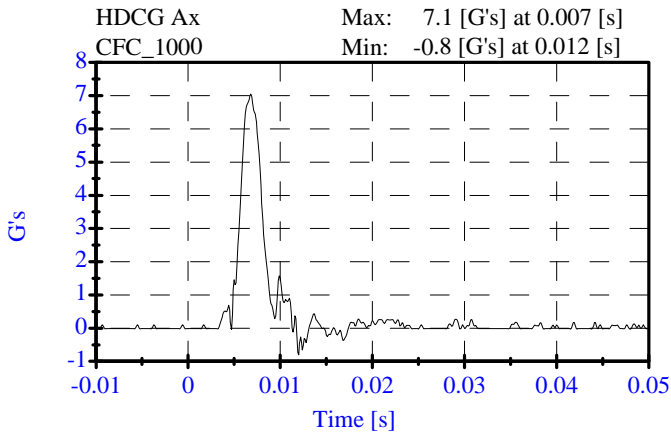
**Head Drop  
Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
Date: December 1, 2004

Sequential Test Number: 1 File: 269H 12-01-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>   | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-------------------------|----------------------|---------------------|---------------|
| Lab Temperature:        | 18.9-25.6 C          | 21.1 C              | Passed        |
| Lab Humidity:           | 10-70 %              | 31.00 %             | Passed        |
| Peak Resultant Accel.:  | 120-150 Gs           | 146.33 Gs           | Passed        |
| Peak Lateral Accel.:    | 15 Gs Max            | 7.05 Gs             | Passed        |
| Curve PerCent NonModal: | < 15%                | 3.14 %              | Passed        |



**Neck Test  
Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
Date: December 2, 2004

Sequential Test Number: 1 File: 269N 12-02-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|--|----------------------|---------------------|---------------|
| Lab Temperature:   | 20.6-22.2 C          | 21.1 C              | Passed        |
| Lab Humidity:  | 10-70 %              | 33.00 %             | Passed        |
| Impact Velocity:   | 6.89- 7.13 m/s       | 6.92 m/s            | Passed        |
| <b>PENDULUM DELTA V</b>  |                      |                     |               |
| Delta V at 10 ms:  | 1.96- 2.55 m/s       | 2.10 m/s            | Passed        |
| Delta V at 20 ms:  | 4.12- 5.10 m/s       | 4.25 m/s            | Passed        |
| Delta V at 30 ms:  | 5.73- 7.01 m/s       | 6.15 m/s            | Passed        |
| Delta V between 40-70 ms:  | 6.27- 7.64 m/s       | 7.21 m/s            | Passed        |
| <b>D PLANE ROTATION</b>  |                      |                     |               |
| Maximum Rotation:  | 66.0-82.0 Deg        | 73.79 Deg           | Passed        |
| Rotation Angle Decay:  | 58.0-67.0 ms         | 58.30 ms            | Passed        |
| <b>MOMENT ABOUT THE OCCIPITAL CONDYLE</b>                              |                      |                     |               |
| Max Occipital Moment:  | 73.00- 88.00 N-m     | 85.62 N-m           | Passed        |
| Occipital Moment Decay:  | 49.0-64.0 ms         | 52.30 ms            | Passed        |
| <b>HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT</b> |                      |                     |               |
| Moment to Rotation Peak:   | 2.0-16.0 ms          | 9.80 ms             | Passed        |

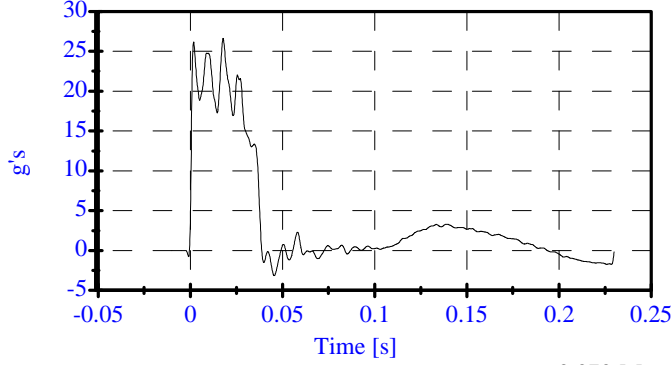
Neck Test  
Pre-Test

CONFIGURED FOR LEFT SIDE IMPACT

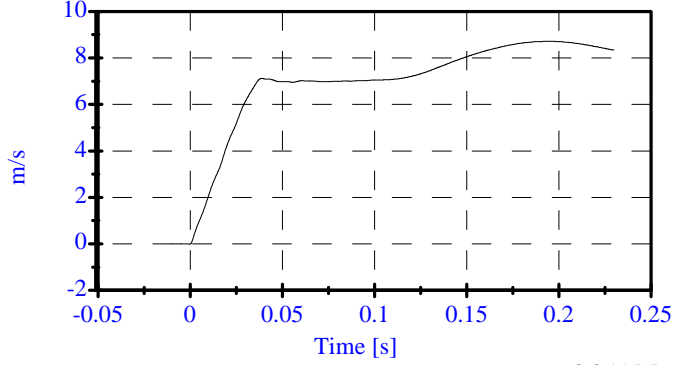
ATD Serial No: 269  
Date: December 2, 2004

Sequential Test Number: 1 File: 269N 12-02-04  
Laboratory Technician: B. Swiecicki

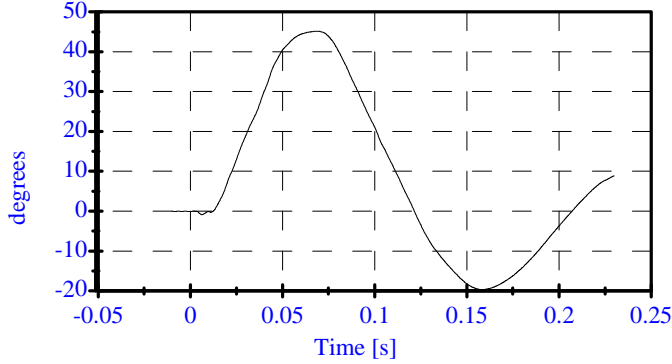
Pend Ax CFC\_180 Max: 26.6 [g/s] at 0.018 [s]  
Min: -3.1 [g/s] at 0.045 [s]



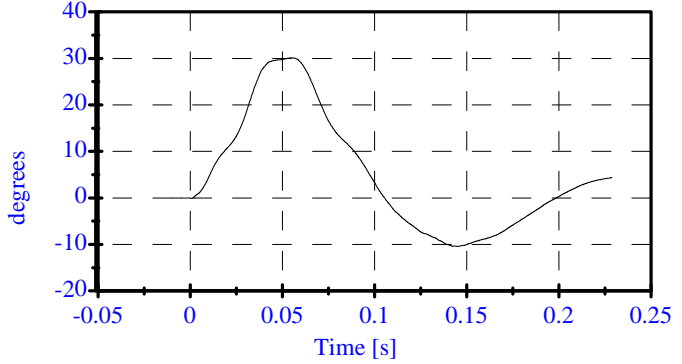
Pend Vx CFC\_180 Max: 8.7 [m/s] at 0.194 [s]  
Min: -0.0 [m/s] at -0.000 [s]



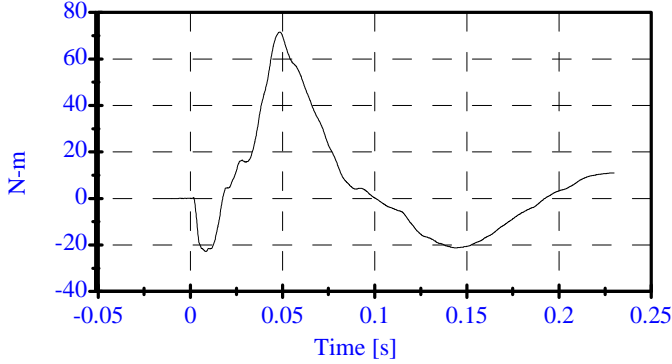
Head Rot CFC\_180 Max: 45.1 [degrees] at 0.070 [s]  
Min: -19.6 [degrees] at 0.158 [s]



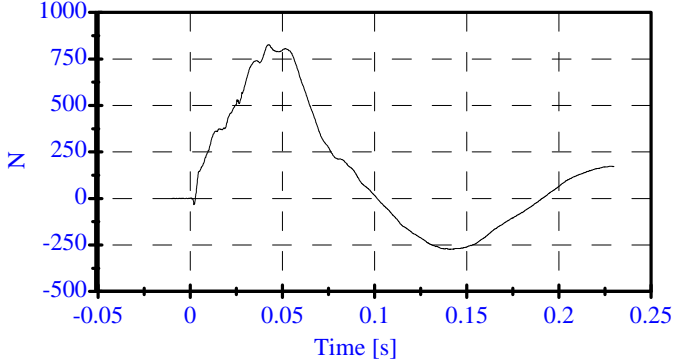
Arm Rot CFC\_180 Max: 30.1 [degrees] at 0.055 [s]  
Min: -10.4 [degrees] at 0.145 [s]



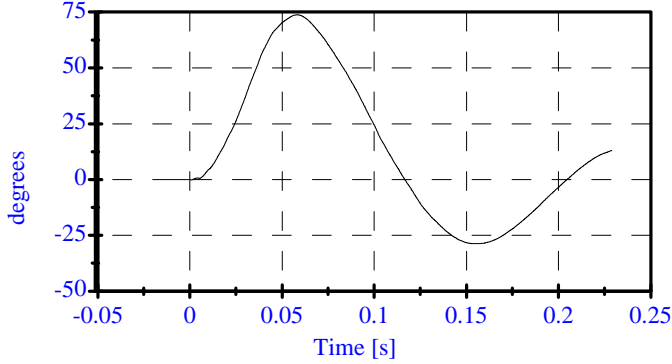
Neck Mx CFC\_600 Max: 71.6 [N-m] at 0.048 [s]  
Min: -22.8 [N-m] at 0.008 [s]



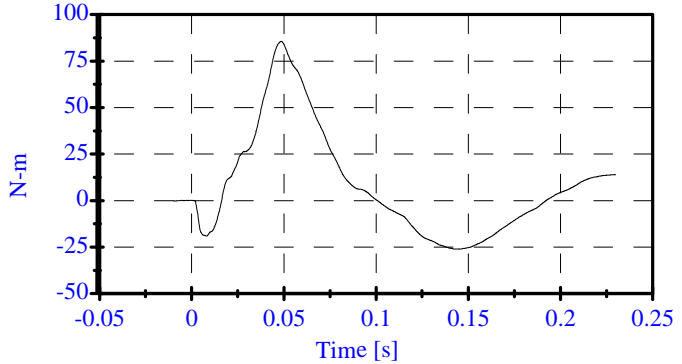
Neck Fy CFC\_1000 Max: 826.0 [N] at 0.043 [s]  
Min: -274.2 [N] at 0.141 [s]



Tot Rot CFC\_180 Max: 73.8 [degrees] at 0.058 [s]  
Min: -28.8 [degrees] at 0.156 [s]



MOCX Max: 85.6 [N-m] at 0.048 [s]  
Min: -26.1 [N-m] at 0.144 [s]



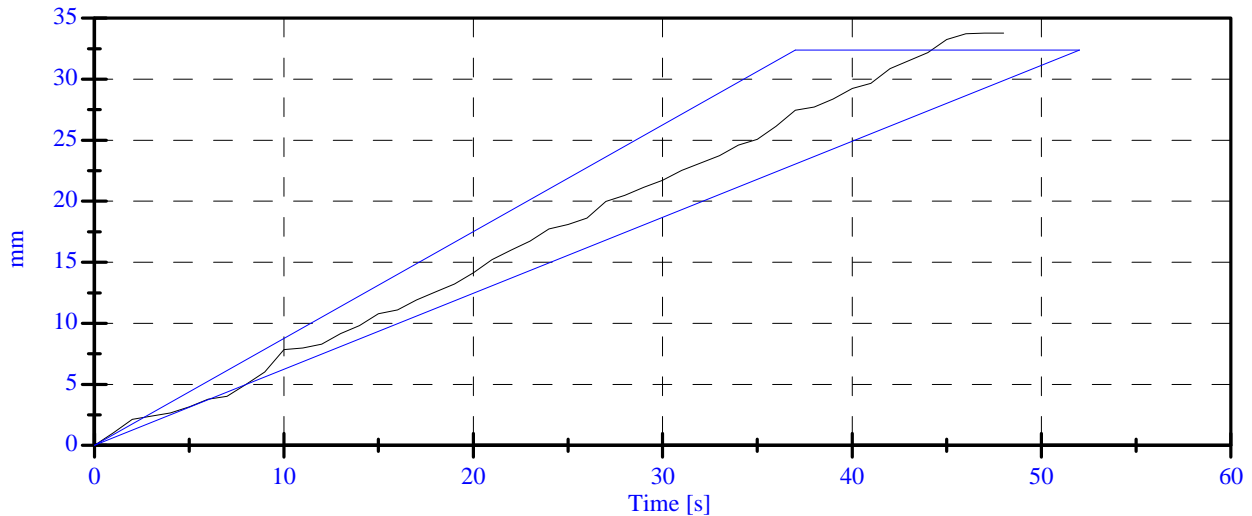
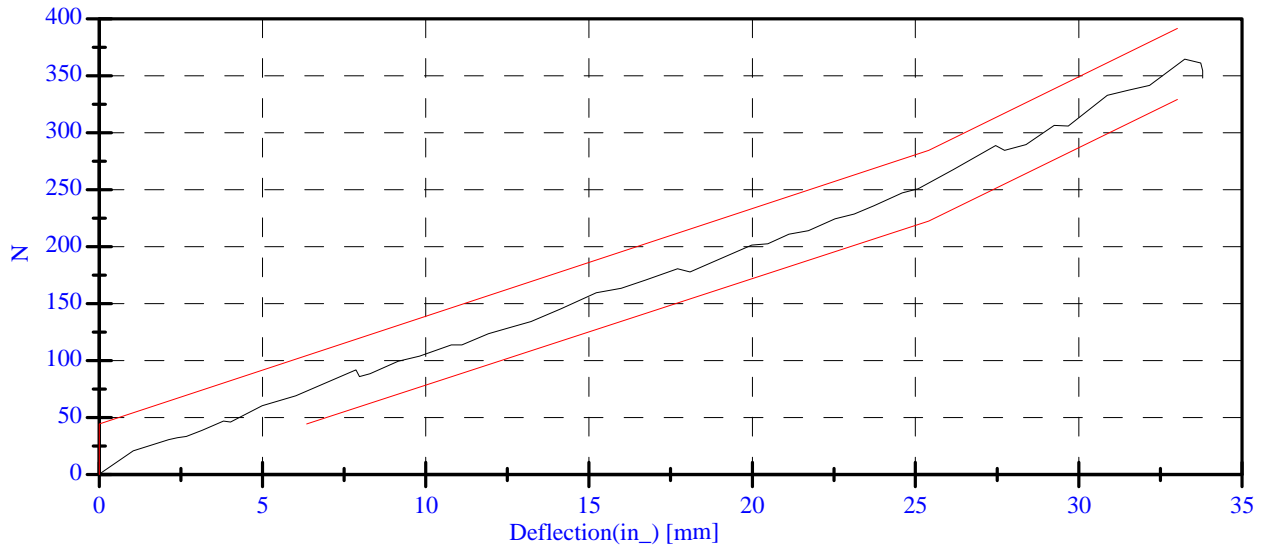
**Abdomen Test**  
**PRE TEST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
 Date: December 3, 2004

Sequential Test Number: 1 File: 269AB 12-03-04  
 Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 33.00 %             | Passed        |
| Force at 12.95 mm :   | 104.00-162.00 N      | 134.22 N            | Passed        |
| Force at 19.05 mm :   | 162.98-220.99 N      | 184.67 N            | Passed        |
| Force at 25.40 mm :   | 221.97-280.02 N      | 250.83 N            | Passed        |
| Force at 33.02 mm :   | 324.99-391.00 N      | 364.51 N            | Passed        |

**ABDOMINAL COMPRESSION TEST**



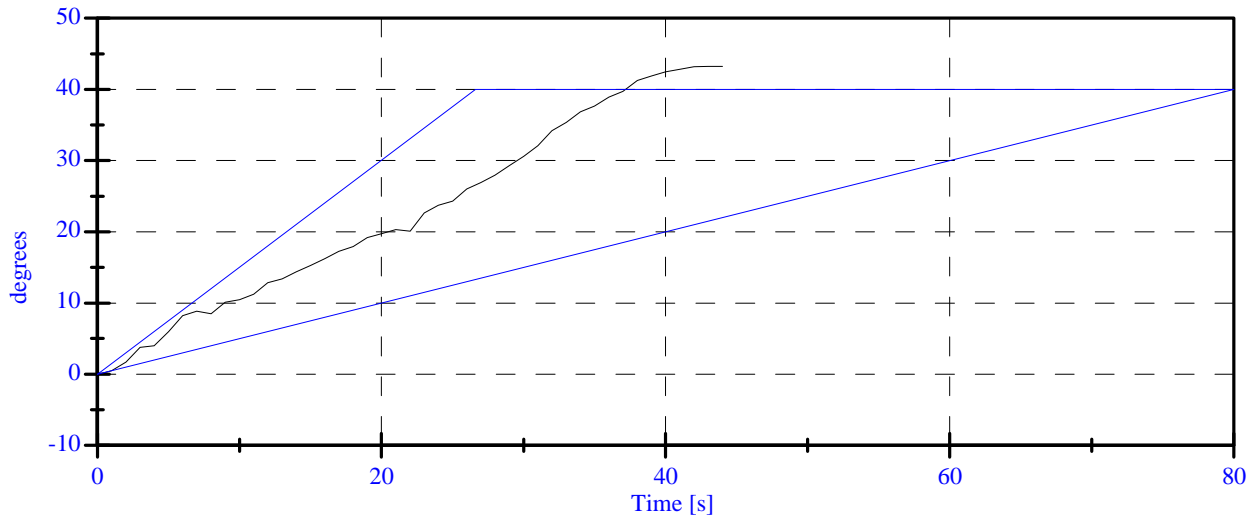
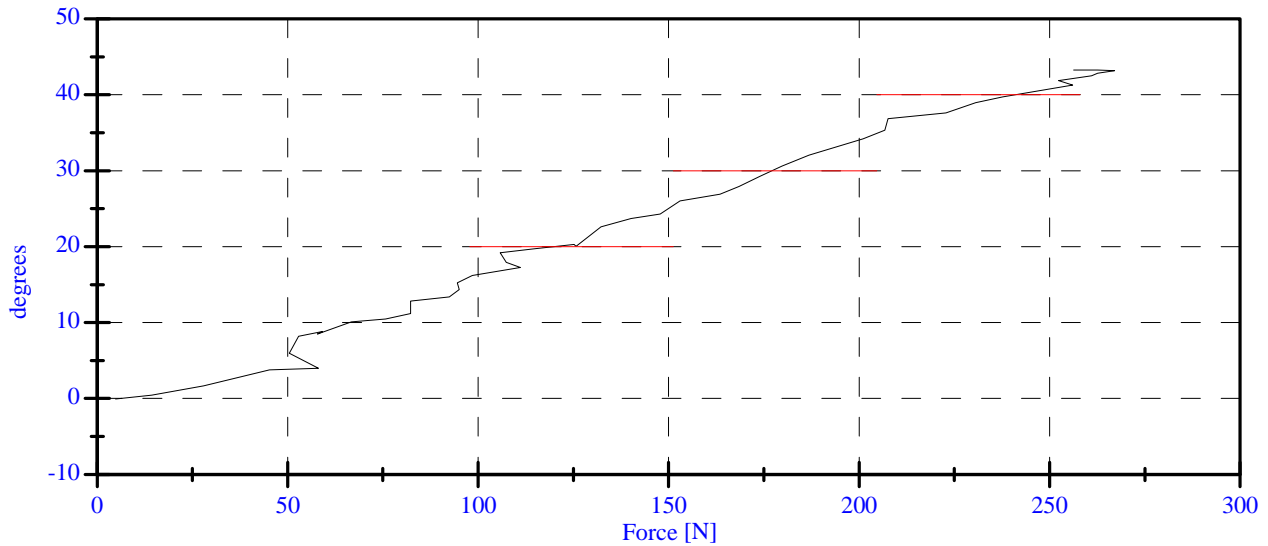
**Lumbar Spine Test**  
**PRE TEST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
 Date: December 3, 2004

Sequential Test Number: 1 File: 269Spine 12-03-04  
 Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 33.00 %             | Passed        |
| Force at 0 Deg:       | 0.00-26.69 N         | 4.86 N              | Passed        |
| Force at 20 Deg:      | 97.86-151.24 N       | 125.74 N            | Passed        |
| Force at 30 Deg:      | 151.24-204.62 N      | 179.75 N            | Passed        |
| Force at 40 Deg:      | 204.62-258.00 N      | 237.70 N            | Passed        |
| Return Angle          | 12 Deg Max           | 4.35 deg            | Passed        |

**LUMBAR SPINE FLEXION TEST**



**PRE-TEST DUMMY INSPECTION LIST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 269 Sequential Test Number: 4  
 Date: December 3, 2004 Laboratory Technician: B. Swiecicki

| PART         | ITEMS CHECKED                                     | COMMENTS |
|--------------|---|----------|
| SKIN         | VISUAL INSPECTION                                 | OK       |
| HEAD         | VISUAL, BALLAST,<br>ACCELEROMETER MOUNT           | OK       |
| NECK         | VISUAL, CABLE TORQUE                              | OK       |
| SPINE BOX    | VISUAL, BALLAST, WELDMENT,<br>ACCELEROMETER MOUNT | OK       |
| RIB CAGE     | VISUAL, MEASURE, STIFFENERS                       | OK       |
| STERNUM      | VISUAL  | OK       |
| LUMBAR SPINE | VISUAL  | OK       |
| ABDOMEN      | VISUAL  | OK       |
| PELVIS       | VISUAL, PALPATE,<br>ACCELEROMETER MOUNT           | OK       |
| UPPER LEGS   | VISUAL  | OK       |
| KNEES        | VISUAL, STOPS, INSERTS                            | OK       |
| LOWER LEGS   | VISUAL, RANGE OF MOTION                           | OK       |
| ANKLES       | VISUAL, RANGE OF MOTION                           | OK       |
| FEET         | VISUAL, RANGE OF MOTION                           | OK       |
| JOINTS       | 1 TO 2 g RANGE                                    | OK       |
| OTHER        | NONE  | -        |

**REMARKS:** None

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID H3 NO.: 270**

**CONFIGURED FOR LEFT SIDE IMPACT**

**CALIBRATION TEST RESULTS SUMMARY  
PRE-TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 4  
Date: December 3, 2004 Laboratory Technician: B. Swiecicki

| TEST                         | COMMENTS                 |
|------------------------------|--------------------------|
| EXTERNAL DIMENSIONS          | Passed all requirements. |
| THORACIC SHOCK ABSORBER TEST | Passed all requirements. |
| LATERAL THORAX IMPACT TEST   | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST   | Passed all requirements. |
| HEAD DROP TEST*              | Passed all requirements. |
| LATERAL NECK BEND TEST*      | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST*  | Passed all requirements. |
| LUMBAR FLEXION TEST*         | Passed all requirements. |

\* Test not required for SID certification.

**REMARKS:** None

**EXTERNAL DIMENSIONS  
PRE-TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 4  
Date: December 3, 2004 Laboratory Technician: B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 - 909     | 902          |
| RH- Rib Height (mm)                | 502 - 520     | 503          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 - 241     | 234          |
| KH- Knee Pivot from Back Line (mm) | 511 - 526     | 513          |
| KV- Knee Pivot to Floor (mm)       | 490 - 505     | 495          |
| HW- Hip Width (mm)                 | 356 - 391     | 384          |

**REMARKS:** None

# Shock Impact - Low ( 3.05 m/s )

## PRE TEST

### CONFIGURED FOR LEFT SIDE IMPACT

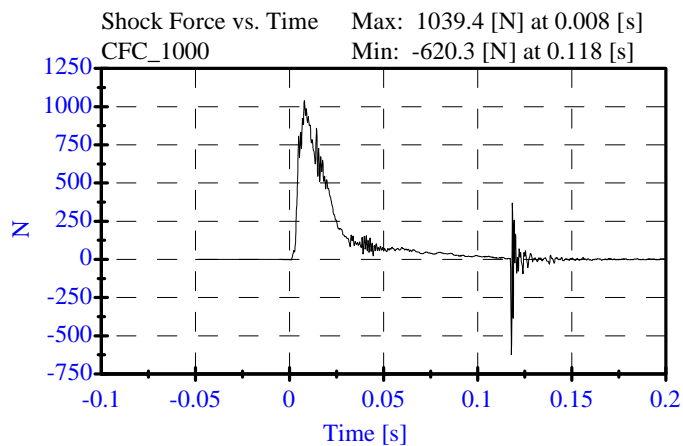
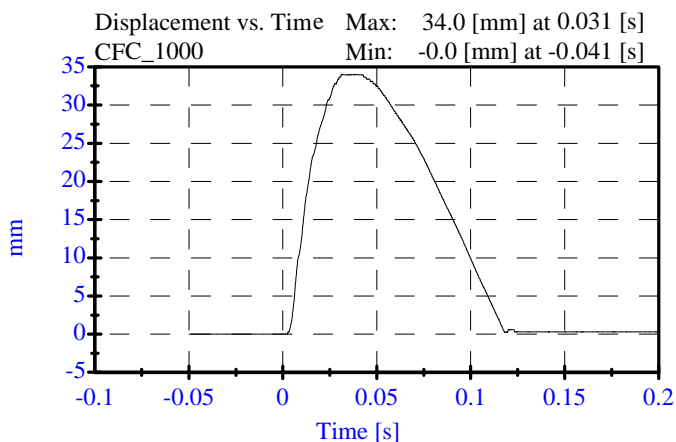
ATD Serial No: 270

Date: July 23, 2004

Sequential Test Number: 1 File: 270SL 07-23-04

Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 40.00 %             | Passed        |
| Displacement:          | 30.00-35.00 mm       | 34.00 mm            | Passed        |
| Maximum Force:         | 836.00-1125.00 N     | 1039.45 N           | Passed        |
| Impact Test Velocity:  | 3.05 m/s             |                     |               |
| Damper Identification: | 270                  |                     |               |
| Damper Setting:        | 5                    |                     |               |



**Shock Impact - Med ( 4.27 m/s )**

**PRE TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270

Date: July 23, 2004

Sequential Test Number: 1 File: 270SM 07-23-04

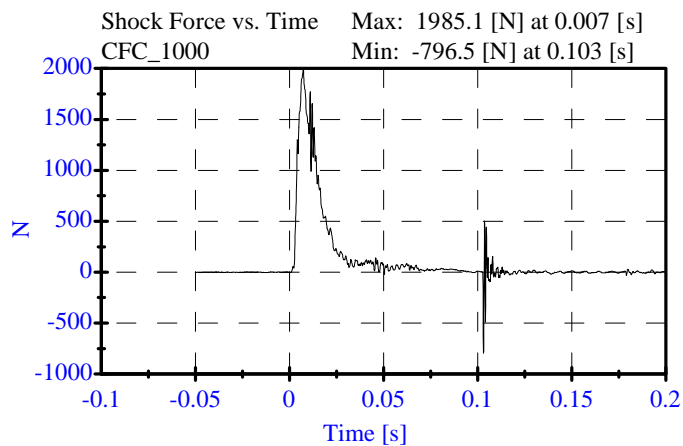
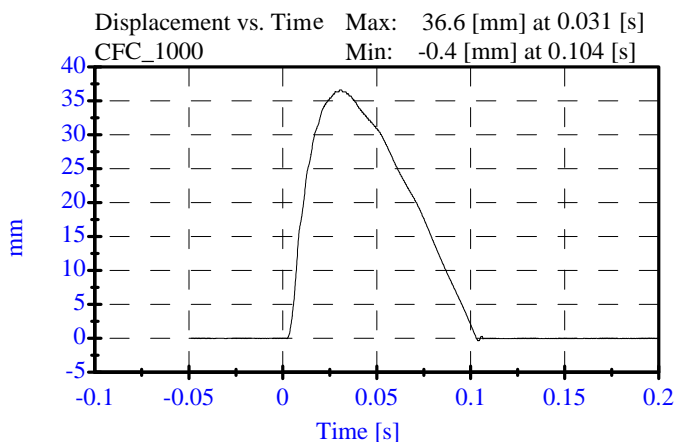
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 40.00 %             | Passed        |
| Displacement:         | 32.00-37.00 mm       | 36.64 mm            | Passed        |
| Maximum Force:        | 1730.00-2099.00 N    | 1985.06 N           | Passed        |

Impact Test Velocity: 4.27 m/s

Damper Identification: 270

Damper Setting: 5



# Shock Impact - High ( 6.10 m/s )

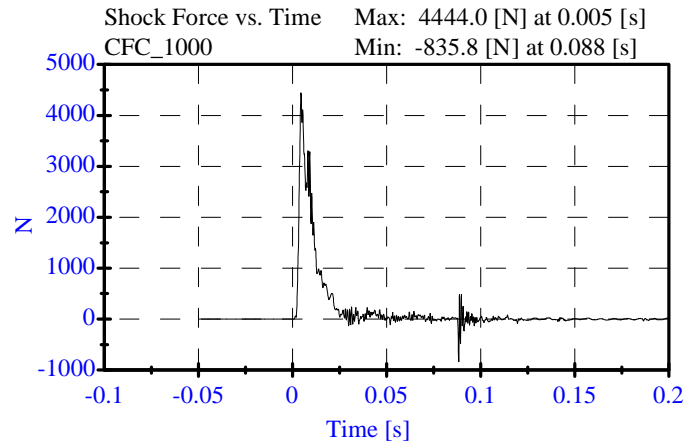
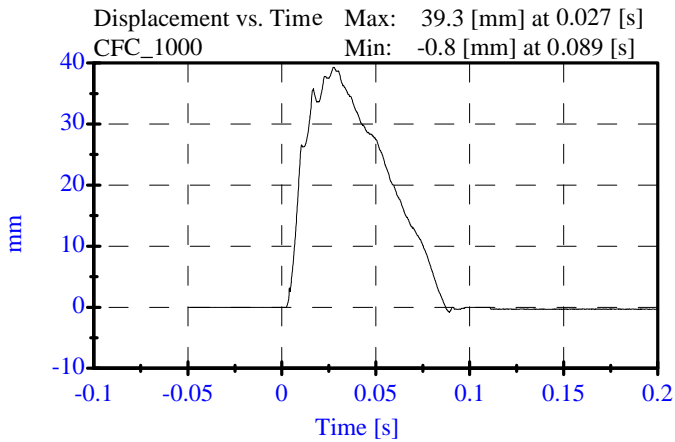
## PRE TEST

### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 270  
Date: July 23, 2004

Sequential Test Number: 1 File: 270SH 07-23-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 40.00 %             | Passed        |
| Displacement:          | 33.00-40.00 mm       | 39.29 mm            | Passed        |
| Maximum Force:         | 3741.00-4448.00 N    | 4444.01 N           | Passed        |
| Impact Test Velocity:  | 6.10 m/s             |                     |               |
| Damper Identification: | 270                  |                     |               |
| Damper Setting:        | 5                    |                     |               |



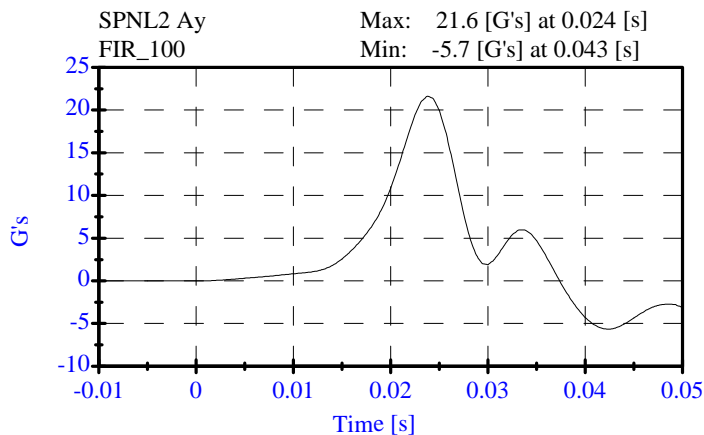
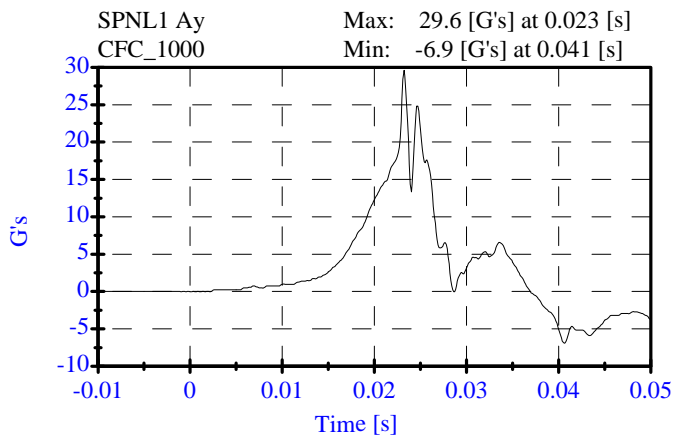
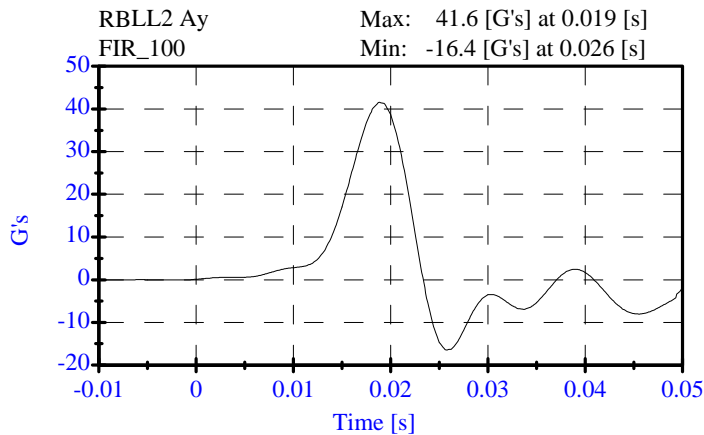
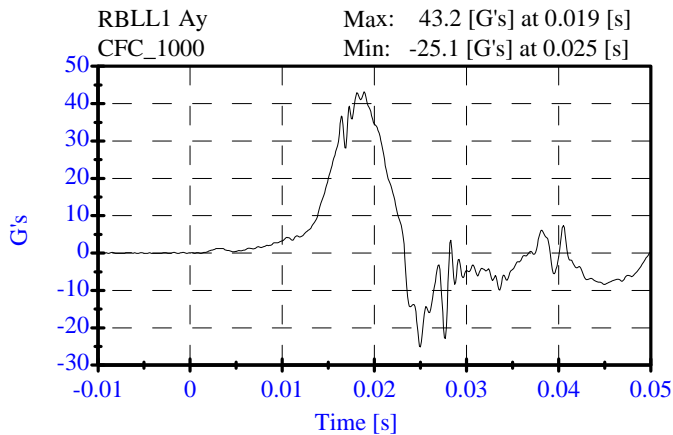
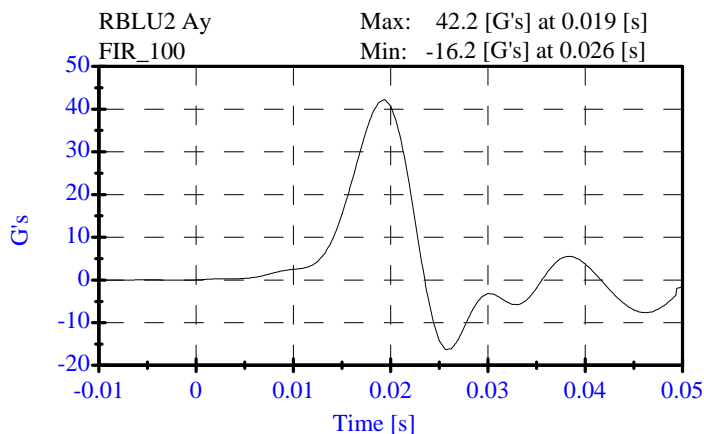
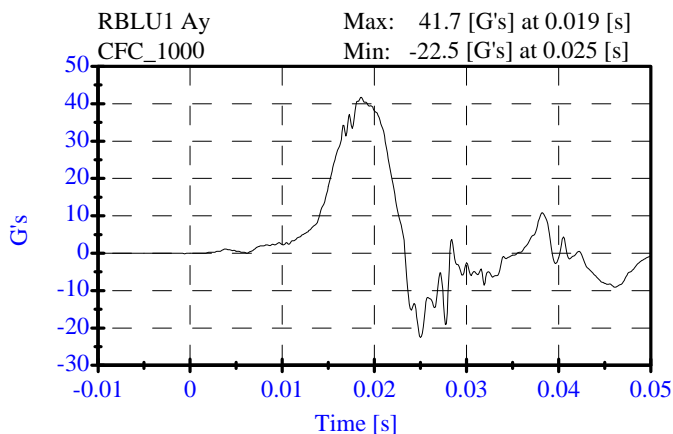
**Thorax Impact  
Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 3, 2004

Sequential Test Number: 1 File: 270T 12-03-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>     | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|---------------------------|----------------------|---------------------|---------------|
| Lab Temperature:          | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:             | 10-70 %              | 33.00 %             | Passed        |
| Probe Velocity:           | 4.27- 4.33 m/s       | 4.29 m/s            | Passed        |
| Upper Rib Acceleration:   | 37.00-46.00 G's      | 42.20 G's           | Passed        |
| Lower Rib Acceleration:   | 37.00-46.00 G's      | 41.58 G's           | Passed        |
| Lower Spine Acceleration: | 15.00-22.00 G's      | 21.64 G's           | Passed        |



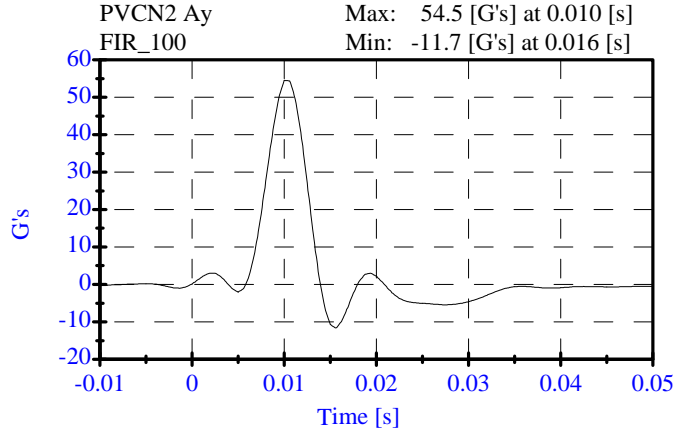
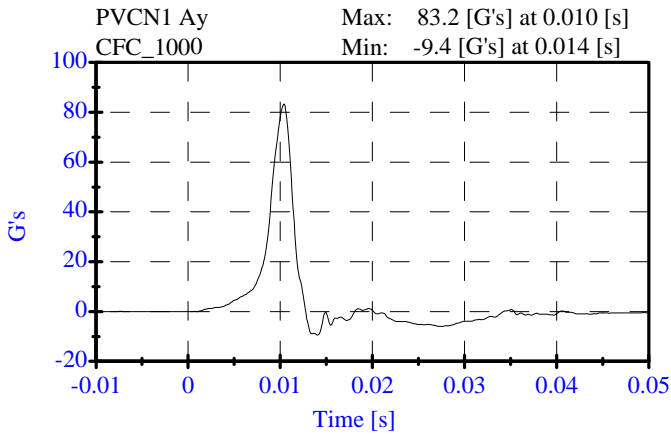
**Pelvic Impact  
Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 3, 2004

Sequential Test Number: 1 File: 270P 12-03-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 33.00 %             | Passed        |
| Probe Velocity:        | 4.27- 4.33 m/s       | 4.31 m/s            | Passed        |
| Pelvis Y Acceleration: | 40.00-60.00 G's      | 54.52 G's           | Passed        |
| Time Above 20 Gs       | 3.0-7.0 ms           | 5.3 ms              | Passed        |



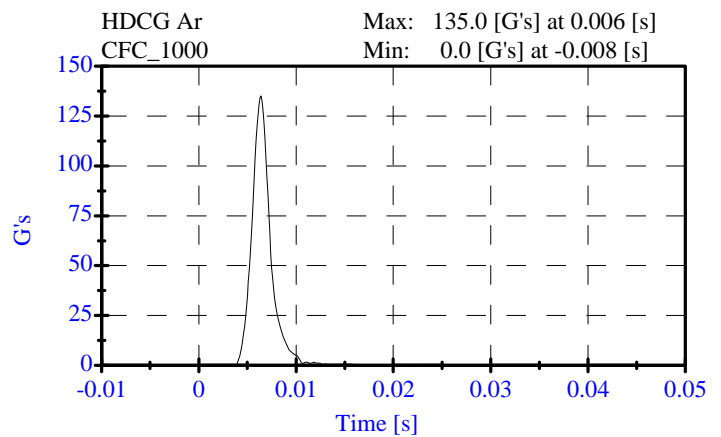
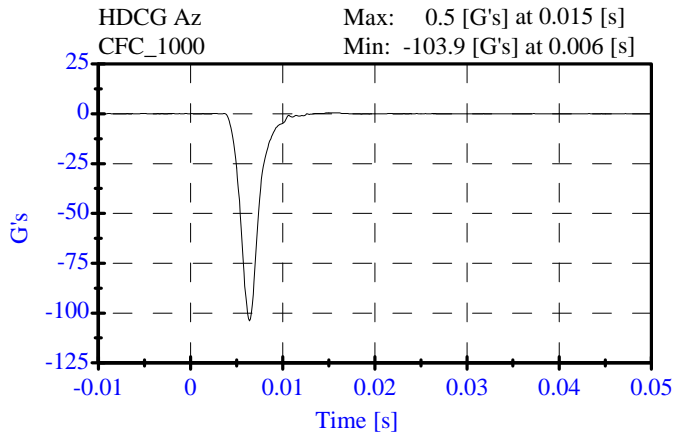
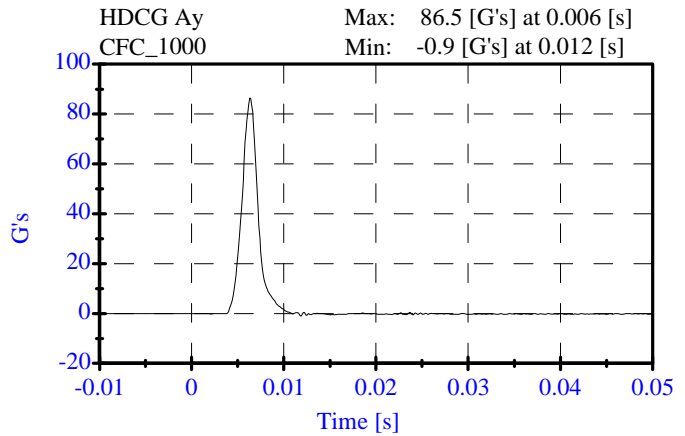
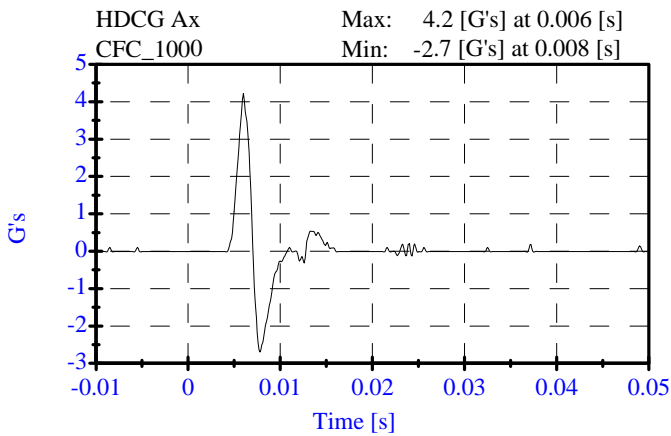
**Head Drop  
Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 1, 2004

Sequential Test Number: 1 File: 270H1 12-01-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>   | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-------------------------|----------------------|---------------------|---------------|
| Lab Temperature:        | 18.9-25.6 C          | 21.1 C              | Passed        |
| Lab Humidity:           | 10-70 %              | 31.00 %             | Passed        |
| Peak Resultant Accel.:  | 120-150 Gs           | 135.01 Gs           | Passed        |
| Peak Lateral Accel.:    | 15 Gs Max            | 4.23 Gs             | Passed        |
| Curve PerCent NonModal: | < 15%                | 1.22 %              | Passed        |



**Neck Test  
Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 2, 2004

Sequential Test Number: 1 File: 270N5 12-02-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|--|----------------------|---------------------|---------------|
| Lab Temperature:   | 20.6-22.2 C          | 21.1 C              | Passed        |
| Lab Humidity:  | 10-70 %              | 31.00 %             | Passed        |
| Impact Velocity:   | 6.89- 7.13 m/s       | 6.90 m/s            | Passed        |
| <b>PENDULUM DELTA V</b>  |                      |                     |               |
| Delta V at 10 ms:  | 1.96- 2.55 m/s       | 2.25 m/s            | Passed        |
| Delta V at 20 ms:  | 4.12- 5.10 m/s       | 4.54 m/s            | Passed        |
| Delta V at 30 ms:  | 5.73- 7.01 m/s       | 6.49 m/s            | Passed        |
| Delta V between 40-70 ms:  | 6.27- 7.64 m/s       | 7.18 m/s            | Passed        |
| <b>D PLANE ROTATION</b>  |                      |                     |               |
| Maximum Rotation:  | 66.0-82.0 Deg        | 68.34 Deg           | Passed        |
| Rotation Angle Decay:  | 58.0-67.0 ms         | 58.50 ms            | Passed        |
| <b>MOMENT ABOUT THE OCCIPITAL CONDYLE</b>                              |                      |                     |               |
| Max Occipital Moment:  | 73.00- 88.00 N-m     | 86.65 N-m           | Passed        |
| Occipital Moment Decay:  | 49.0-64.0 ms         | 51.90 ms            | Passed        |
| <b>HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT</b> |                      |                     |               |
| Moment to Rotation Peak:   | 2.0-16.0 ms          | 12.20 ms            | Passed        |

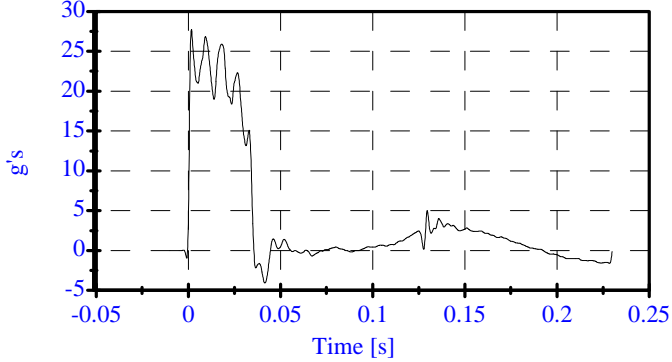
Neck Test  
Pre-Test

CONFIGURED FOR LEFT SIDE IMPACT

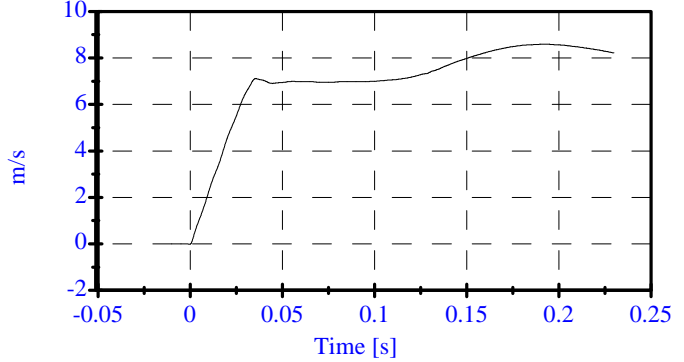
ATD Serial No: 270  
Date: December 2, 2004

Sequential Test Number: 1 File: 270N5 12-02-04  
Laboratory Technician: B. Swiecicki

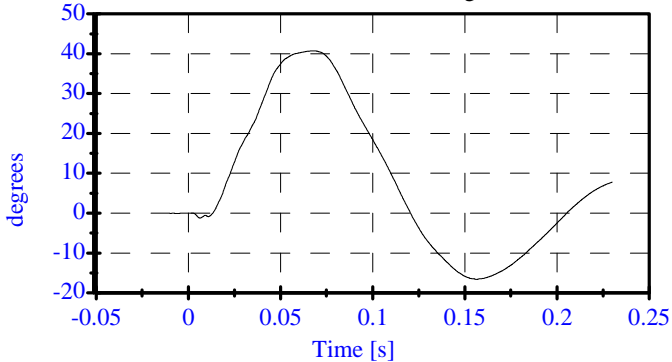
Pend Ax CFC\_180 Max: 27.7 [g's] at 0.002 [s]  
Min: -4.1 [g's] at 0.042 [s]



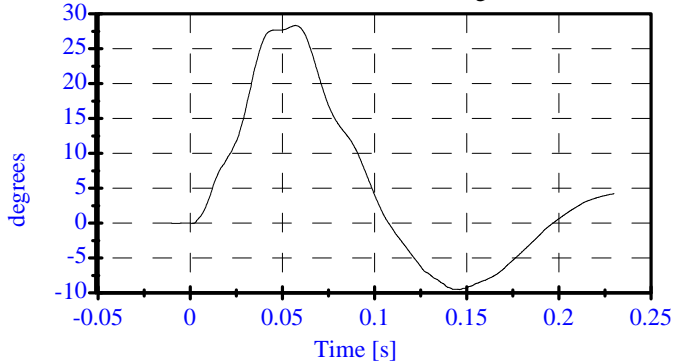
Pend Vx CFC\_180 Max: 8.6 [m/s] at 0.193 [s]  
Min: -0.0 [m/s] at -0.000 [s]



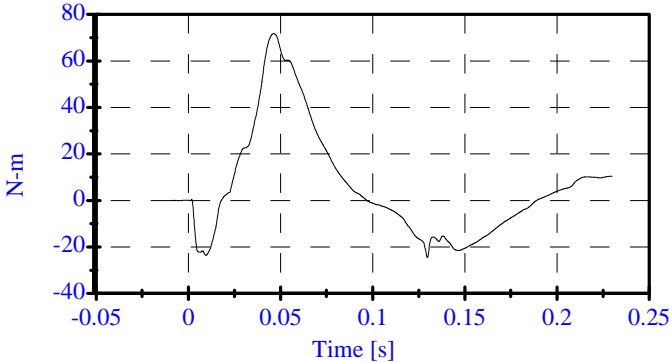
Head Rot CFC\_180 Max: 40.7 [degrees] at 0.068 [s]  
Min: -16.6 [degrees] at 0.156 [s]



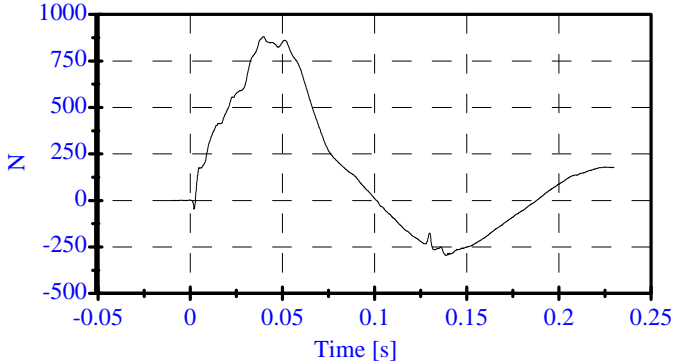
Arm Rot CFC\_180 Max: 28.3 [degrees] at 0.057 [s]  
Min: -9.5 [degrees] at 0.146 [s]



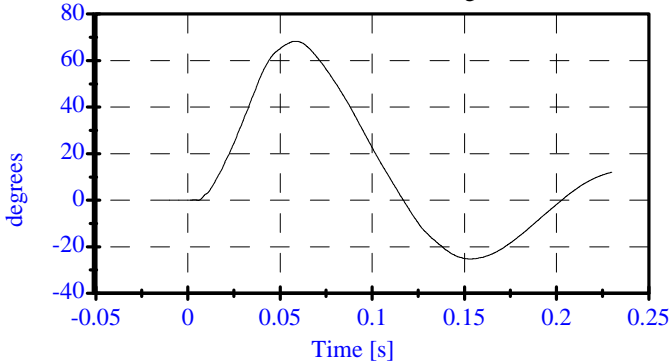
Neck Mx CFC\_600 Max: 71.7 [N-m] at 0.046 [s]  
Min: -24.6 [N-m] at 0.130 [s]



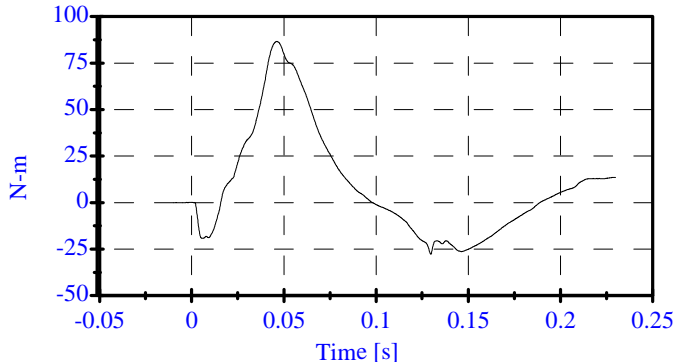
Neck Fy CFC\_1000 Max: 880.3 [N] at 0.040 [s]  
Min: -296.0 [N] at 0.139 [s]



Tot Rot CFC\_180 Max: 68.3 [degrees] at 0.058 [s]  
Min: -25.3 [degrees] at 0.153 [s]



MOCX Max: 86.7 [N-m] at 0.046 [s]  
Min: -27.8 [N-m] at 0.130 [s]



# Abdomen Test

## PRE TEST

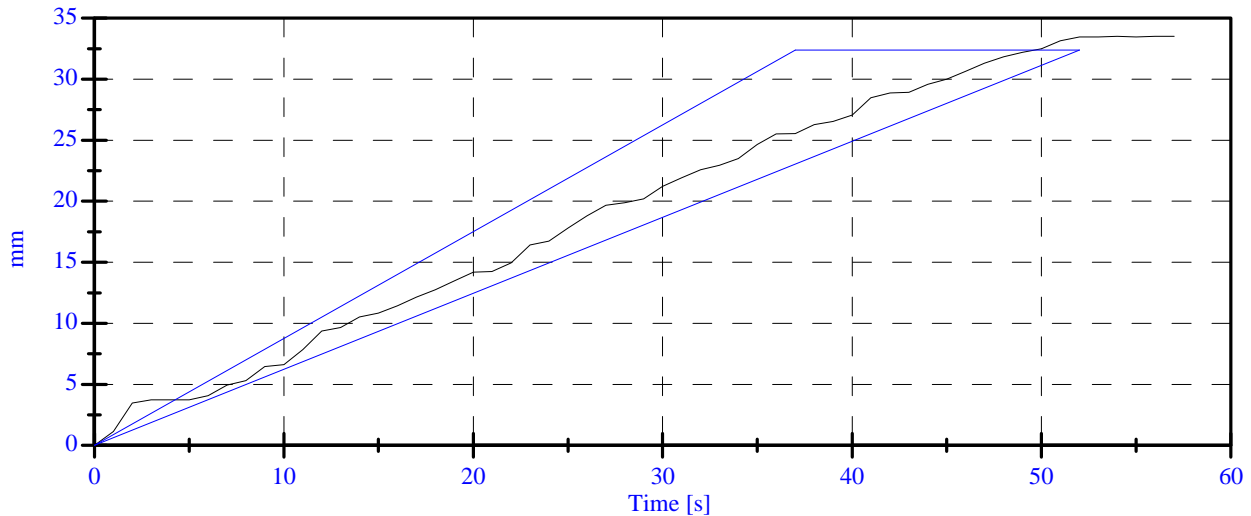
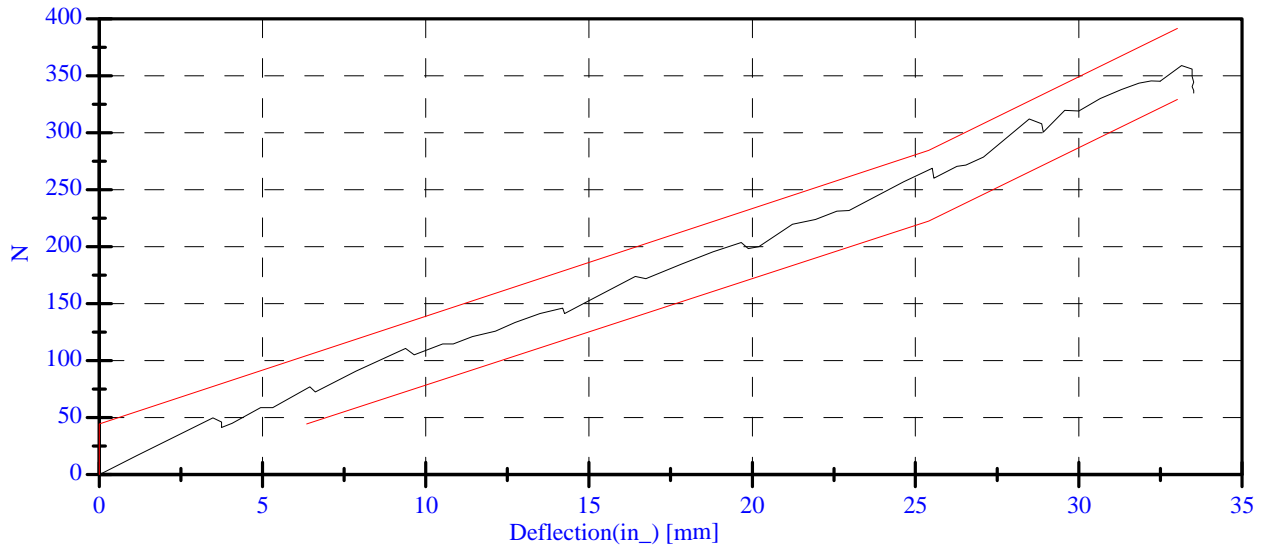
### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 270  
Date: December 3, 2004

Sequential Test Number: 1 File: 270AB 12-03-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 33.00 %             | Passed        |
| Force at 12.95 mm :   | 104.00-162.00 N      | 133.49 N            | Passed        |
| Force at 19.05 mm :   | 162.98-220.99 N      | 195.63 N            | Passed        |
| Force at 25.40 mm :   | 221.97-280.02 N      | 268.74 N            | Passed        |
| Force at 33.02 mm :   | 324.99-391.00 N      | 359.02 N            | Passed        |

### ABDOMINAL COMPRESSION TEST



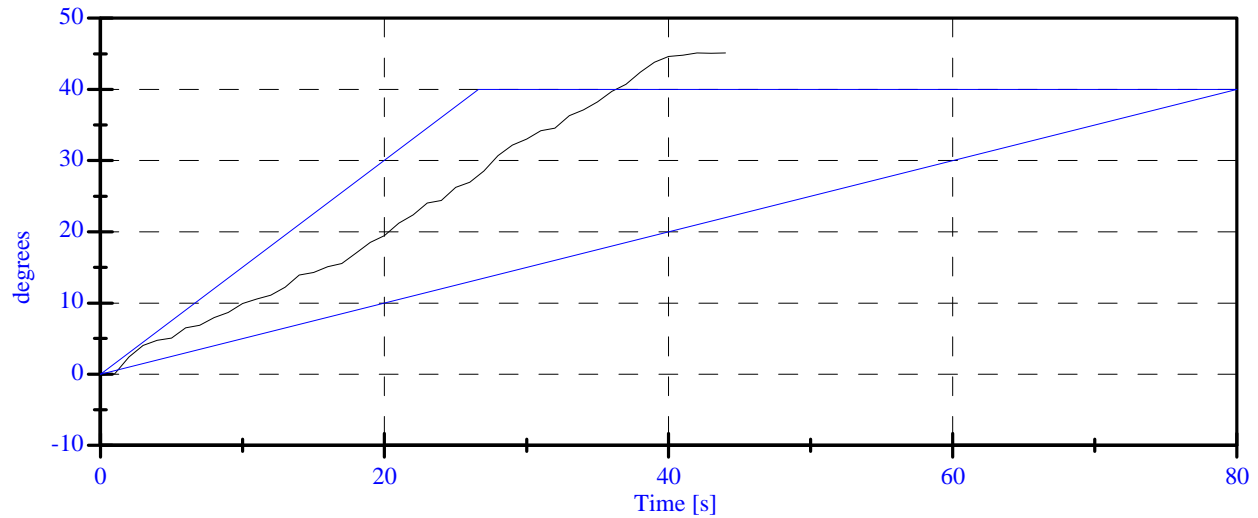
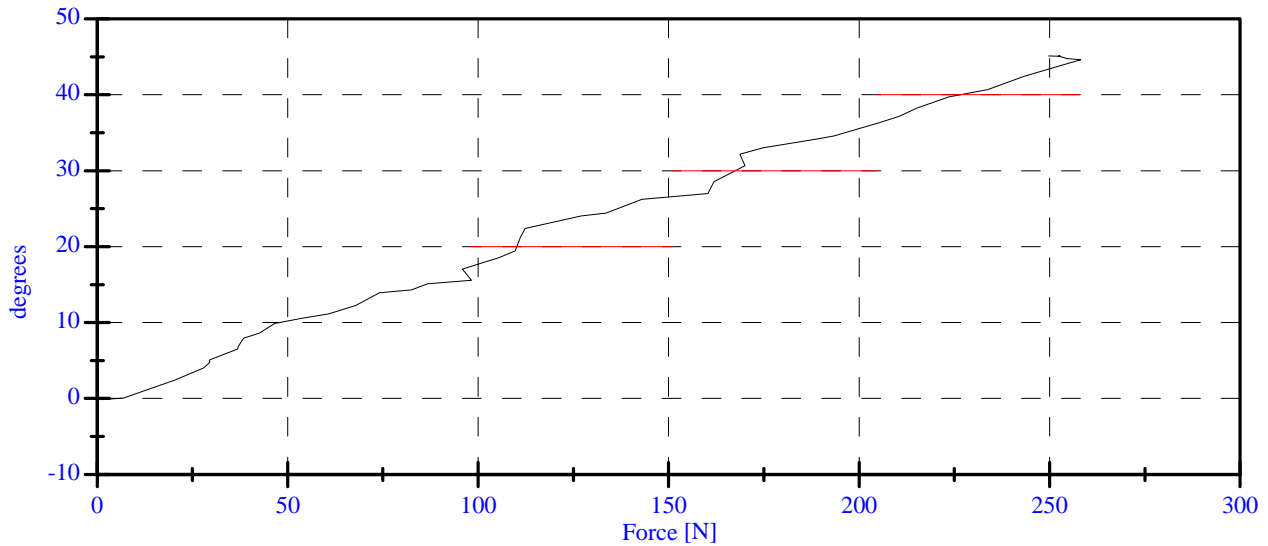
**Lumbar Spine Test**  
**PRE TEST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
 Date: December 3, 2004

Sequential Test Number: 1 File: 270Spine 12-03-04  
 Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 33.00 %             | Passed        |
| Force at 0 Deg:       | 0.00-26.69 N         | 6.95 N              | Passed        |
| Force at 20 Deg:      | 97.86-151.24 N       | 109.74 N            | Passed        |
| Force at 30 Deg:      | 151.24-204.62 N      | 170.05 N            | Passed        |
| Force at 40 Deg:      | 204.62-258.00 N      | 223.54 N            | Passed        |
| Return Angle          | 12 Deg Max           | 4.66 deg            | Passed        |

**LUMBAR SPINE FLEXION TEST**



**PRE-TEST DUMMY INSPECTION LIST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 4  
 Date: December 3, 2004 Laboratory Technician: B. Swiecicki

| PART         | ITEMS CHECKED                                     | COMMENTS |
|--------------|---|----------|
| SKIN         | VISUAL INSPECTION                                 | OK       |
| HEAD         | VISUAL, BALLAST,<br>ACCELEROMETER MOUNT           | OK       |
| NECK         | VISUAL, CABLE TORQUE                              | OK       |
| SPINE BOX    | VISUAL, BALLAST, WELDMENT,<br>ACCELEROMETER MOUNT | OK       |
| RIB CAGE     | VISUAL, MEASURE, STIFFENERS                       | OK       |
| STERNUM      | VISUAL  | OK       |
| LUMBAR SPINE | VISUAL  | OK       |
| ABDOMEN      | VISUAL  | OK       |
| PELVIS       | VISUAL, PALPATE,<br>ACCELEROMETER MOUNT           | OK       |
| UPPER LEGS   | VISUAL  | OK       |
| KNEES        | VISUAL, STOPS, INSERTS                            | OK       |
| LOWER LEGS   | VISUAL, RANGE OF MOTION                           | OK       |
| ANKLES       | VISUAL, RANGE OF MOTION                           | OK       |
| FEET         | VISUAL, RANGE OF MOTION                           | OK       |
| JOINTS       | 1 TO 2 g RANGE                                    | OK       |
| OTHER        | NONE  | -        |

**REMARKS:** None

**CALIBRATION TEST RESULTS**

**POST TEST**

**SID H3 NO.: 269**

**CONFIGURED FOR LEFT SIDE IMPACT**

**CALIBRATION TEST RESULTS SUMMARY  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 269 Sequential Test Number: 5  
Date: December 9, 2004 Laboratory Technician: B. Swiecicki

| TEST                        | COMMENTS                 |
|-----------------------------|--------------------------|
| EXTERNAL DIMENSIONS         | Passed all requirements. |
| LATERAL THORAX IMPACT TEST  | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST  | Passed all requirements. |
| HEAD DROP TEST*             | Passed all requirements. |
| LATERAL NECK BEND TEST*     | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST* | Passed all requirements. |
| LUMBAR FLEXION TEST*        | Passed all requirements. |

\* Test not required for SID certification.

**REMARKS:** None

**EXTERNAL DIMENSIONS  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 269 Sequential Test Number: 5  
Date: December 9, 2004 Laboratory Technician: B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 - 909     | 902          |
| RH- Rib Height (mm)                | 502 - 520     | 503          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 - 241     | 234          |
| KH- Knee Pivot from Back Line (mm) | 511 - 526     | 518          |
| KV- Knee Pivot to Floor (mm)       | 490 - 505     | 495          |
| HW- Hip Width (mm)                 | 356 - 391     | 379          |

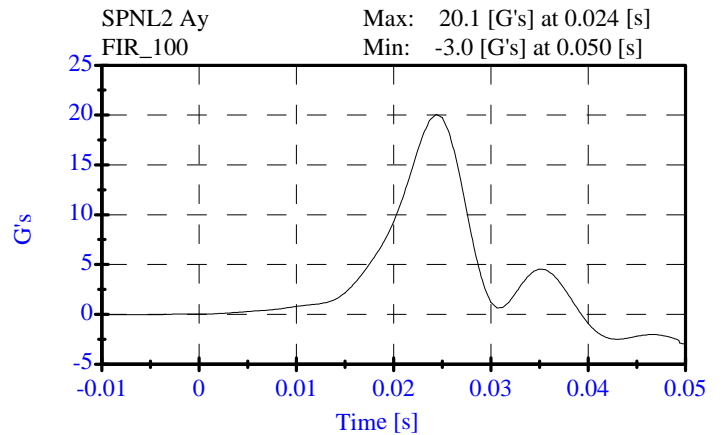
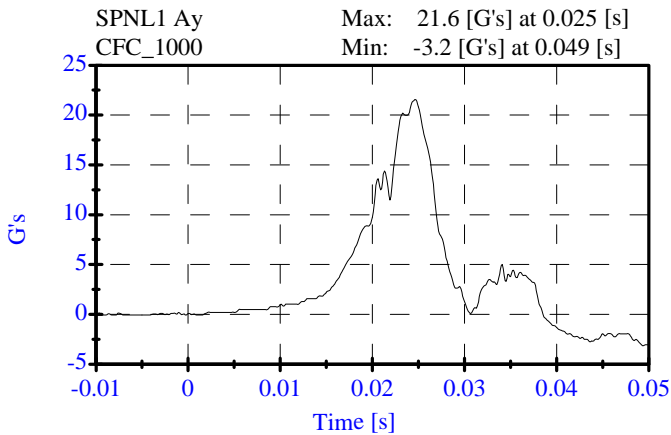
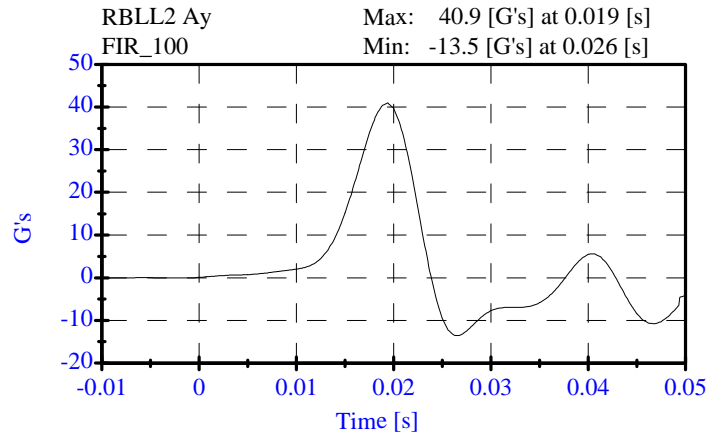
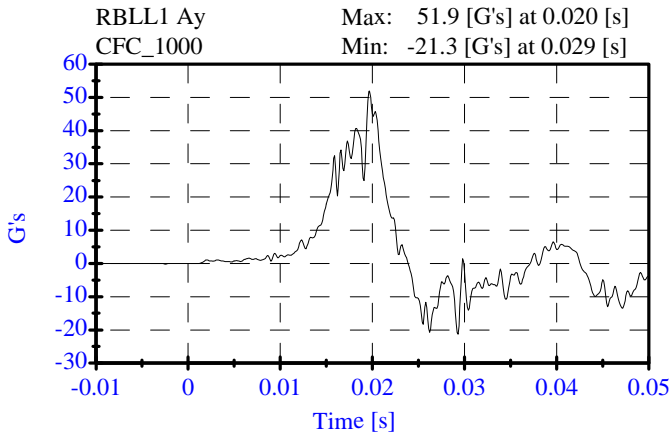
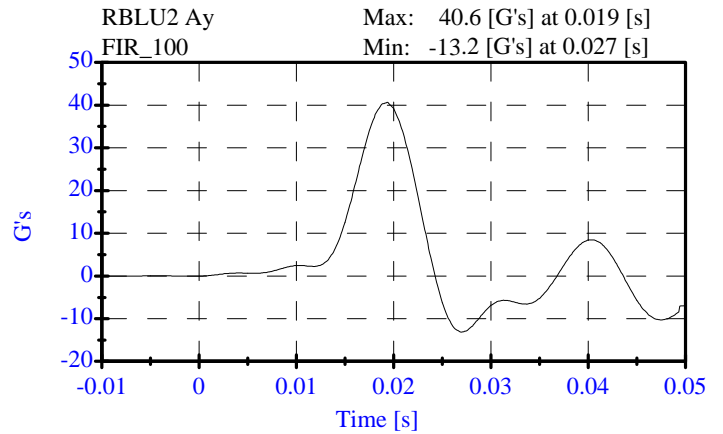
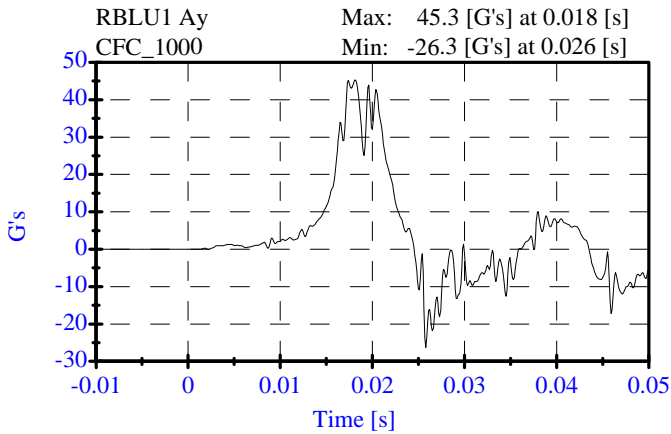
**REMARKS:** None

**Thorax Impact Test**  
**Post-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
 Date: December 8, 2004

Sequential Test Number: 1 File: 269T 12-08-04  
 Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>     | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|---------------------------|----------------------|---------------------|---------------|
| Lab Temperature:          | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:             | 10-70 %              | 35.00 %             | Passed        |
| Probe Velocity:           | 4.27- 4.33 m/s       | 4.30 m/s            | Passed        |
| Upper Rib Acceleration:   | 37.00-46.00 G's      | 40.60 G's           | Passed        |
| Lower Rib Acceleration:   | 37.00-46.00 G's      | 40.92 G's           | Passed        |
| Lower Spine Acceleration: | 15.00-22.00 G's      | 20.09 G's           | Passed        |



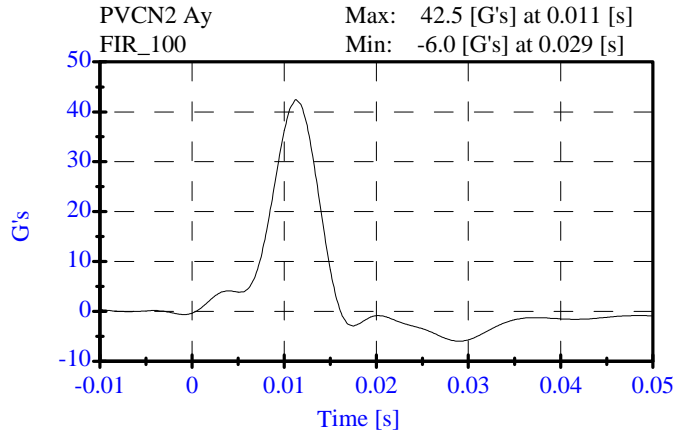
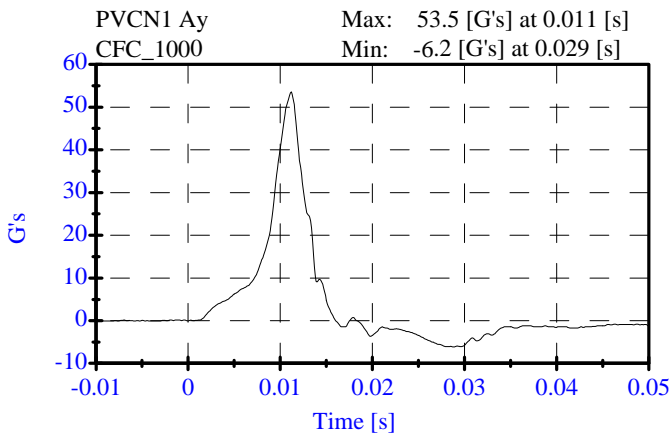
**Pelvic Test  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
Date: Decmeber 8, 2004

Sequential Test Number: 1 File: 269P2 12-08-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 34.00 %             | Passed        |
| Probe Velocity:        | 4.27- 4.33 m/s       | 4.28 m/s            | Passed        |
| Pelvis Y Acceleration: | 40.00-60.00 G's      | 42.45 G's           | Passed        |
| Time Above 20 Gs       | 3.0-7.0 ms           | 5.5 ms              | Passed        |



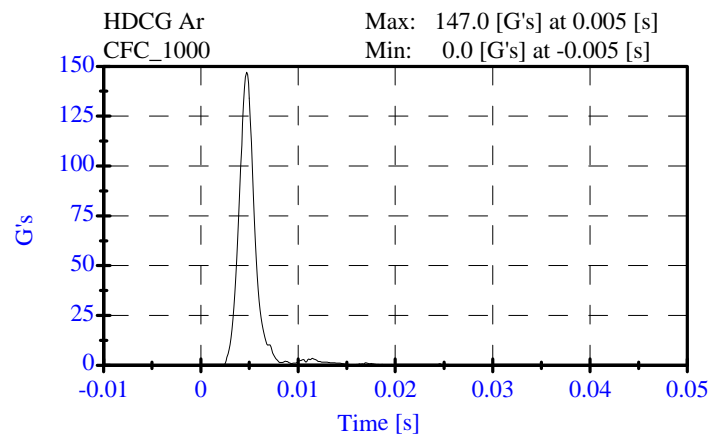
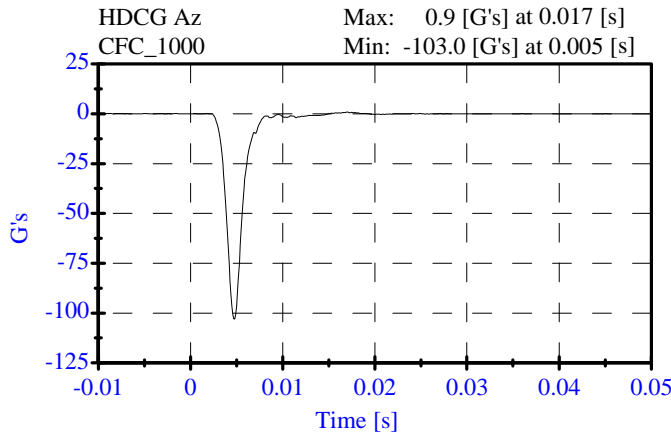
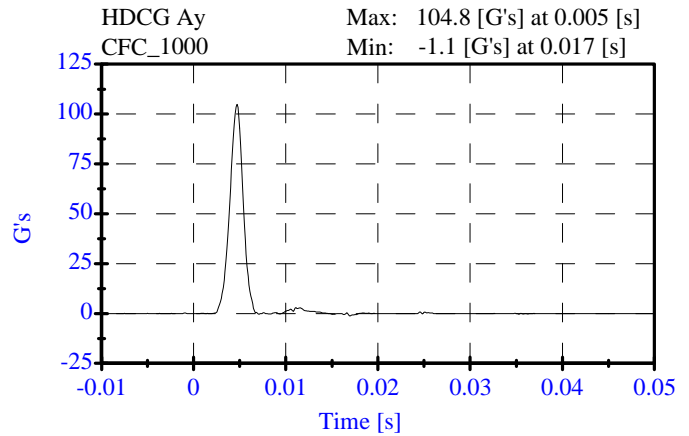
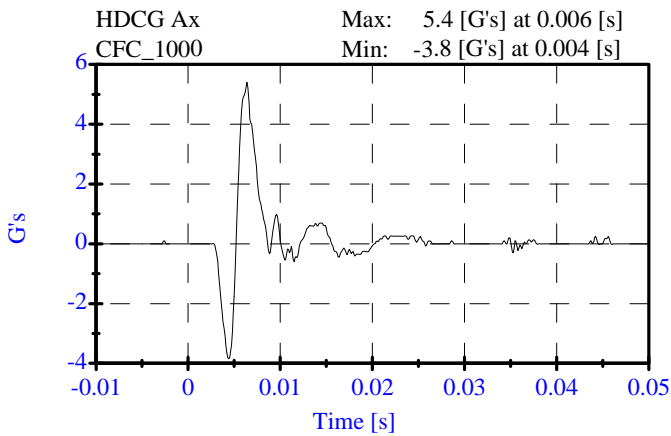
**Head Drop  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
Date: December 7, 2004

Sequential Test Number: 1 File: 269H 12-07-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>   | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-------------------------|----------------------|---------------------|---------------|
| Lab Temperature:        | 18.9-25.6 C          | 21.1 C              | Passed        |
| Lab Humidity:           | 10-70 %              | 35.00 %             | Passed        |
| Peak Resultant Accel.:  | 120-150 Gs           | 147.01 Gs           | Passed        |
| Peak Lateral Accel.:    | 15 Gs Max            | 5.40 Gs             | Passed        |
| Curve PerCent NonModal: | < 15%                | 7.06 %              | Passed        |



**Neck Test  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 269  
Date: December 8, 2004

Sequential Test Number: 1 File: 269N1 12-08-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|--|----------------------|---------------------|---------------|
| Lab Temperature:   | 20.6-22.2 C          | 21.1 C              | Passed        |
| Lab Humidity:  | 10-70 %              | 36.00 %             | Passed        |
| Impact Velocity:   | 6.89- 7.13 m/s       | 6.95 m/s            | Passed        |
| <b>PENDULUM DELTA V</b>  |                      |                     |               |
| Delta V at 10 ms:  | 1.96- 2.55 m/s       | 2.04 m/s            | Passed        |
| Delta V at 20 ms:  | 4.12- 5.10 m/s       | 4.21 m/s            | Passed        |
| Delta V at 30 ms:  | 5.73- 7.01 m/s       | 6.08 m/s            | Passed        |
| Delta V between 40-70 ms:  | 6.27- 7.64 m/s       | 7.21 m/s            | Passed        |
| <b>D PLANE ROTATION</b>  |                      |                     |               |
| Maximum Rotation:  | 66.0-82.0 Deg        | 68.37 Deg           | Passed        |
| Rotation Angle Decay:  | 58.0-67.0 ms         | 60.20 ms            | Passed        |
| <b>MOMENT ABOUT THE OCCIPITAL CONDYLE</b>                              |                      |                     |               |
| Max Occipital Moment:  | 73.00- 88.00 N-m     | 87.04 N-m           | Passed        |
| Occipital Moment Decay:  | 49.0-64.0 ms         | 52.90 ms            | Passed        |
| <b>HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT</b> |                      |                     |               |
| Moment to Rotation Peak:   | 2.0-16.0 ms          | 9.50 ms             | Passed        |

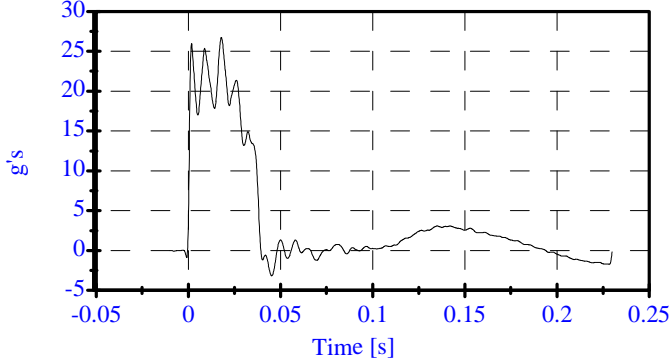
Neck Test  
Post-Test

CONFIGURED FOR LEFT SIDE IMPACT

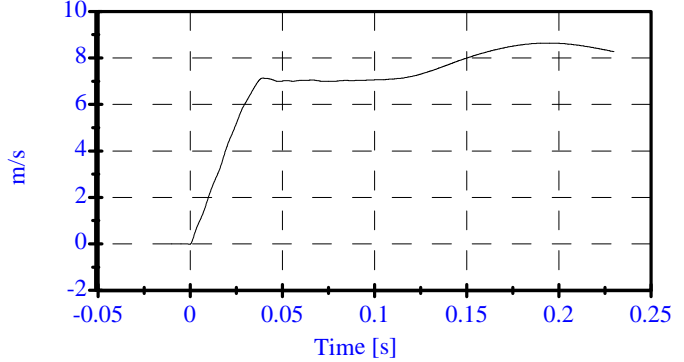
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Date: December 8, 2004

Sequential Test Number: 1 File: 269N1 12-08-04  
Laboratory Technician: B. Swiecicki

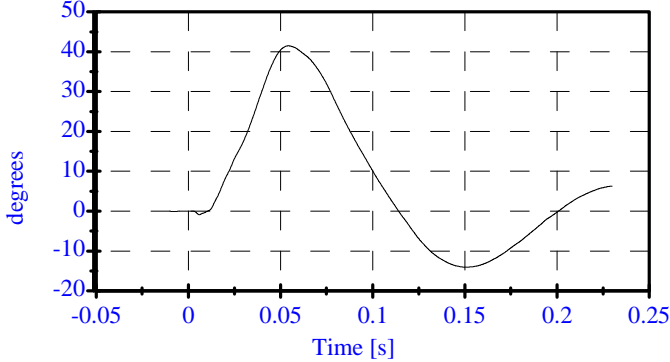
Pend Ax CFC\_180 Max: 26.8 [g's] at 0.018 [s]  
Min: -3.2 [g's] at 0.045 [s]



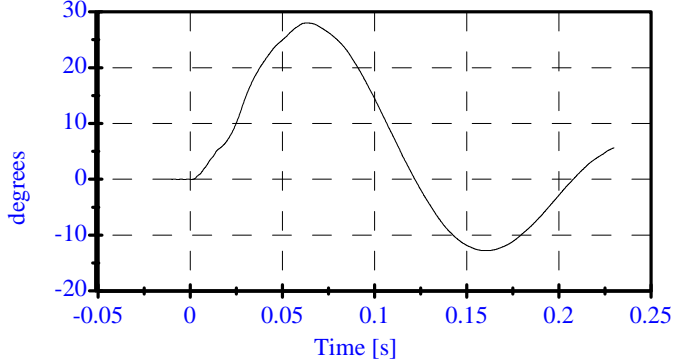
Pend Vx CFC\_180 Max: 8.6 [m/s] at 0.194 [s]  
Min: -0.0 [m/s] at -0.000 [s]



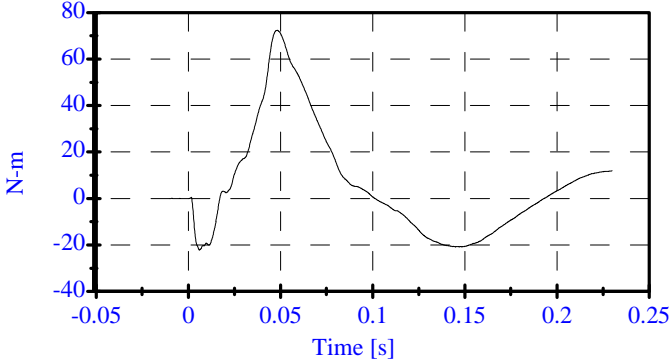
Head Rot CFC\_180 Max: 41.5 [degrees] at 0.054 [s]  
Min: -14.0 [degrees] at 0.151 [s]



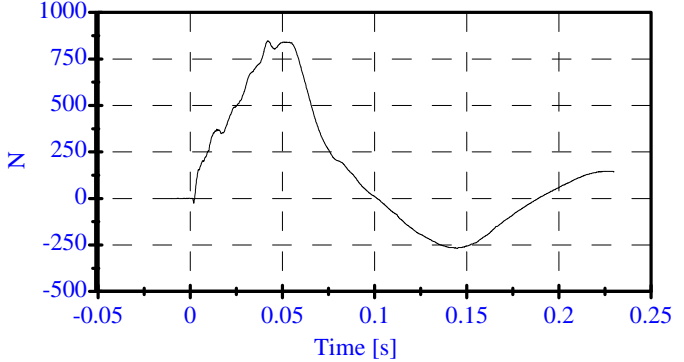
Arm Rot CFC\_180 Max: 28.0 [degrees] at 0.064 [s]  
Min: -12.8 [degrees] at 0.160 [s]



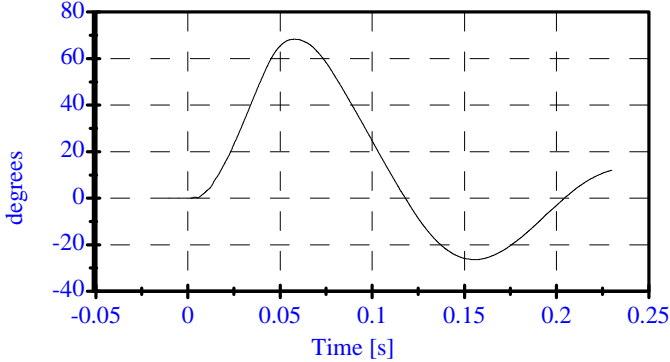
Neck Mx CFC\_600 Max: 72.3 [N-m] at 0.048 [s]  
Min: -22.2 [N-m] at 0.006 [s]



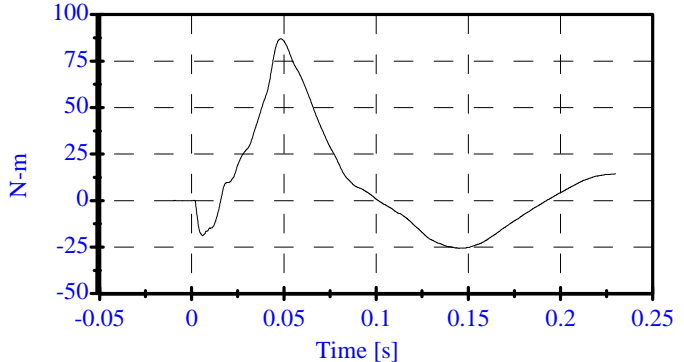
Neck Fy CFC\_1000 Max: 847.6 [N] at 0.042 [s]  
Min: -270.7 [N] at 0.145 [s]



Tot Rot CFC\_180 Max: 68.4 [degrees] at 0.058 [s]  
Min: -26.4 [degrees] at 0.156 [s]



MOCX Max: 87.0 [N-m] at 0.048 [s]  
Min: -25.6 [N-m] at 0.145 [s]



# Abdomen Test

## Post-Test

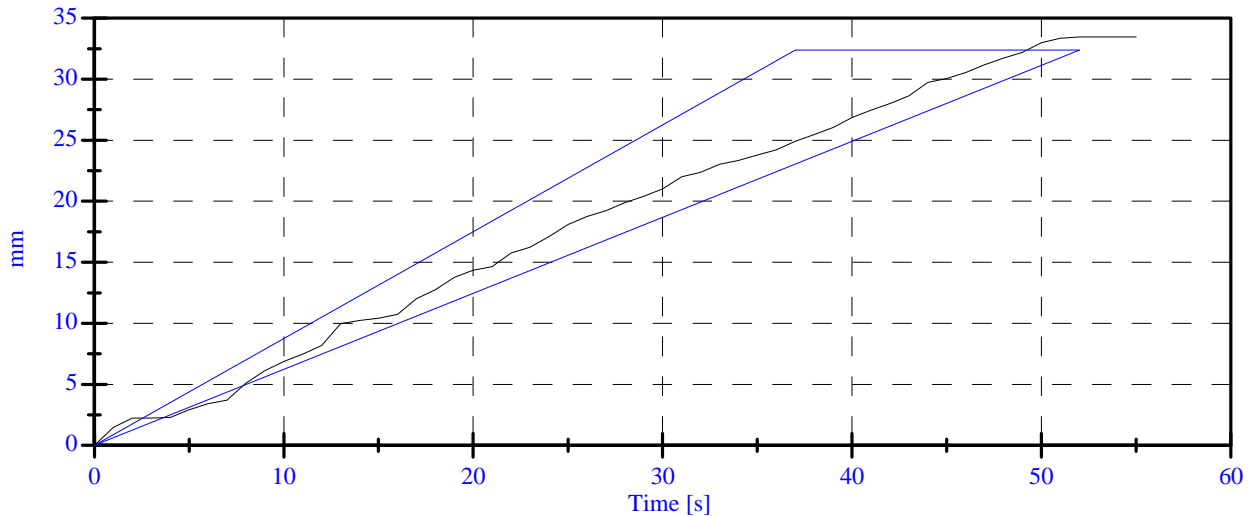
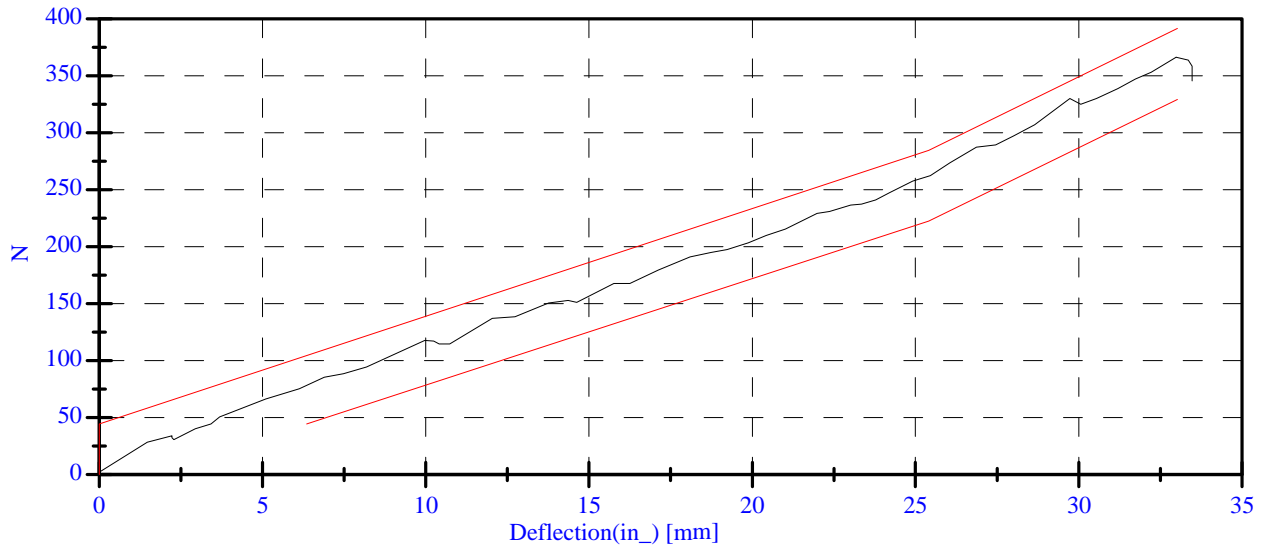
### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 269  
Date: December 9, 2004

Sequential Test Number: 1 File: 269 Ab 12-09-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 32.00 %             | Passed        |
| Force at 12.95 mm :   | 104.00-162.00 N      | 138.61 N            | Passed        |
| Force at 19.05 mm :   | 162.98-220.99 N      | 197.46 N            | Passed        |
| Force at 25.40 mm :   | 221.97-280.02 N      | 262.52 N            | Passed        |
| Force at 33.02 mm :   | 324.99-391.00 N      | 366.33 N            | Passed        |

### ABDOMINAL COMPRESSION TEST



# Lumbar Spine Test

## Post-Test

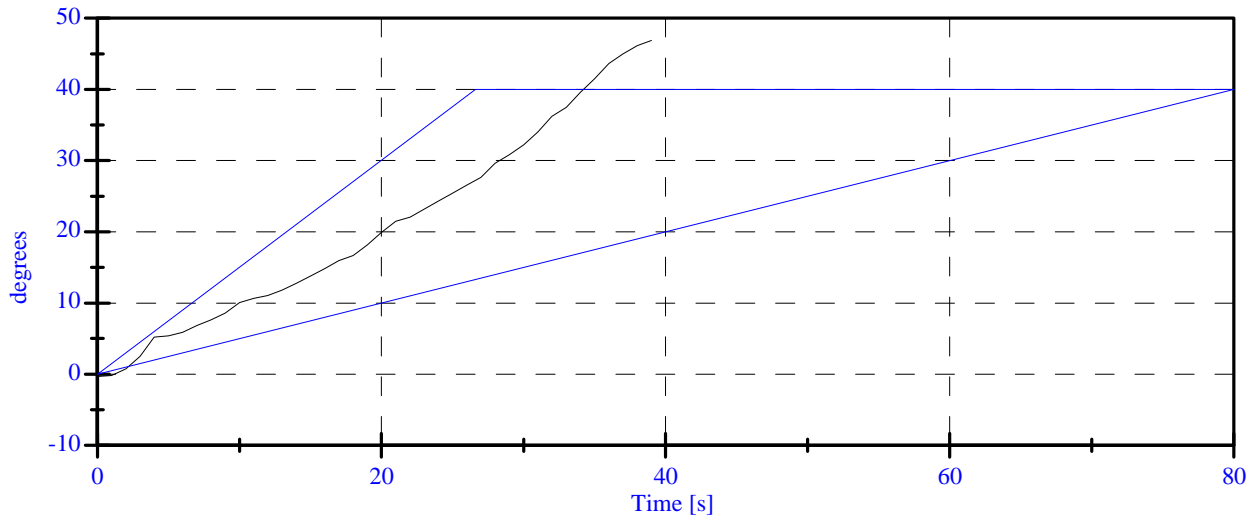
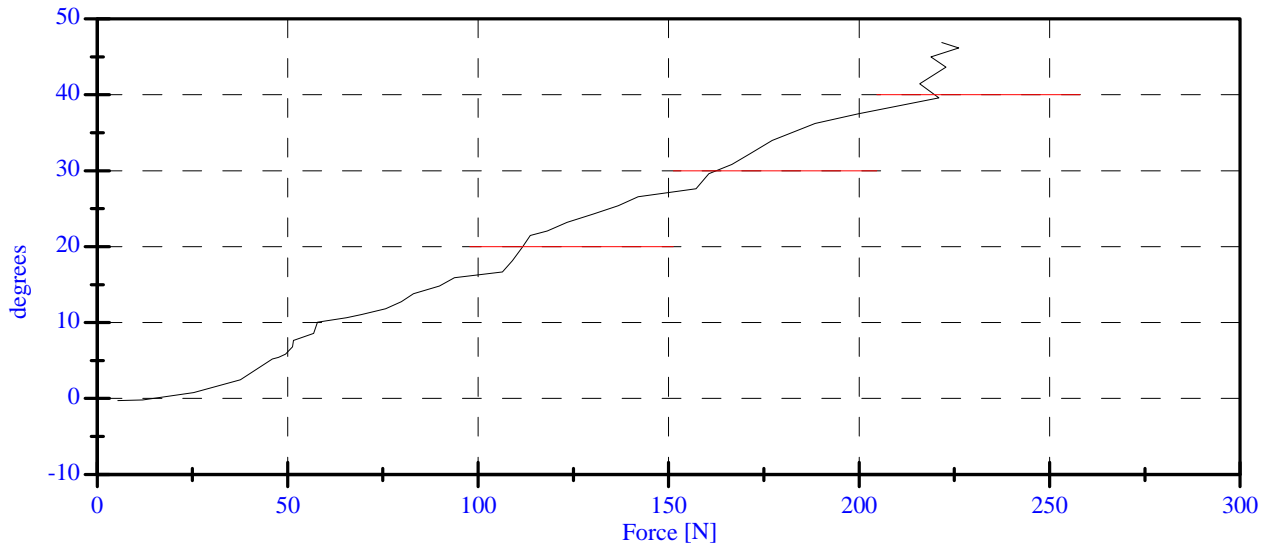
### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 269  
Date: December 9, 2004

Sequential Test Number: 1 File: 269 Spine 12-09-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 32.00 %             | Passed        |
| Force at 0 Deg:       | 0.00-26.69 N         | 11.94 N             | Passed        |
| Force at 20 Deg:      | 97.86-151.24 N       | 111.58 N            | Passed        |
| Force at 30 Deg:      | 151.24-204.62 N      | 160.61 N            | Passed        |
| Force at 40 Deg:      | 204.62-258.00 N      | 220.92 N            | Passed        |
| Return Angle          | 12 Deg Max           | 7.89 deg            | Passed        |

### LUMBAR SPINE FLEXION TEST



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

SID H3 Serial No.: 269 Sequential Test Number: 5  
 Date: December 9, 2004 Laboratory Technician: B. Swiecicki

| PART         | ITEMS CHECKED                                     | COMMENTS |
|--------------|---|----------|
| SKIN         | VISUAL INSPECTION                                 | OK       |
| HEAD         | VISUAL, BALLAST,<br>ACCELEROMETER MOUNT           | OK       |
| NECK         | VISUAL, CABLE TORQUE                              | OK       |
| SPINE BOX    | VISUAL, BALLAST, WELDMENT,<br>ACCELEROMETER MOUNT | OK       |
| RIB CAGE     | VISUAL, MEASURE, STIFFENERS                       | OK       |
| STERNUM      | VISUAL  | OK       |
| LUMBAR SPINE | VISUAL  | OK       |
| ABDOMEN      | VISUAL  | OK       |
| PELVIS       | VISUAL, PALPATE,<br>ACCELEROMETER MOUNT           | OK       |
| UPPER LEGS   | VISUAL  | OK       |
| KNEES        | VISUAL, STOPS, INSERTS                            | OK       |
| LOWER LEGS   | VISUAL, RANGE OF MOTION                           | OK       |
| ANKLES       | VISUAL, RANGE OF MOTION                           | OK       |
| FEET         | VISUAL, RANGE OF MOTION                           | OK       |
| JOINTS       | 1 TO 2 g RANGE                                    | OK       |
| OTHER        | NONE  | -        |

**REMARKS:** None

**CALIBRATION TEST RESULTS**

**POST TEST**

**SID H3 NO.: 270**

**CONFIGURED FOR LEFT SIDE IMPACT**

**CALIBRATION TEST RESULTS SUMMARY  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 5  
Date: December 9, 2004 Laboratory Technician: B. Swiecicki

| TEST                        | COMMENTS                 |
|-----------------------------|--------------------------|
| EXTERNAL DIMENSIONS         | Passed all requirements. |
| LATERAL THORAX IMPACT TEST  | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST  | Passed all requirements. |
| HEAD DROP TEST*             | Passed all requirements. |
| LATERAL NECK BEND TEST*     | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST* | Passed all requirements. |
| LUMBAR FLEXION TEST*        | Passed all requirements. |

\* Test not required for SID certification.

**REMARKS:** None

**EXTERNAL DIMENSIONS  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 5  
Date: December 9, 2004 Laboratory Technician: B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 - 909     | 902          |
| RH- Rib Height (mm)                | 502 - 520     | 503          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 - 241     | 234          |
| KH- Knee Pivot from Back Line (mm) | 511 - 526     | 513          |
| KV- Knee Pivot to Floor (mm)       | 490 - 505     | 495          |
| HW- Hip Width (mm)                 | 356 - 391     | 384          |

**REMARKS:** None

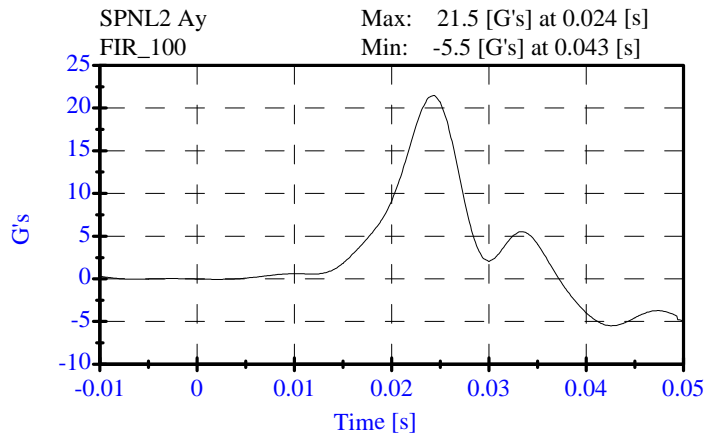
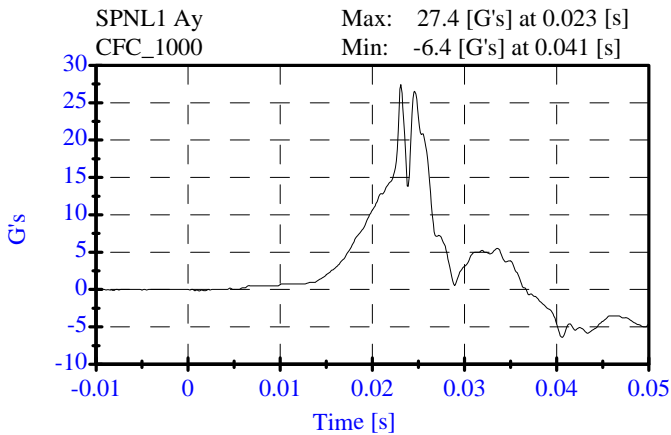
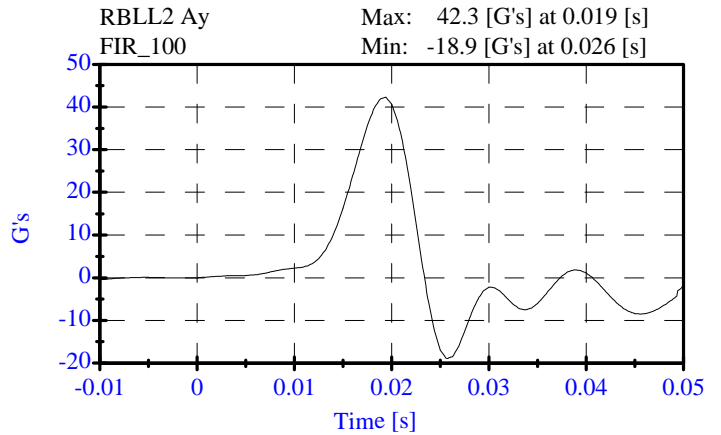
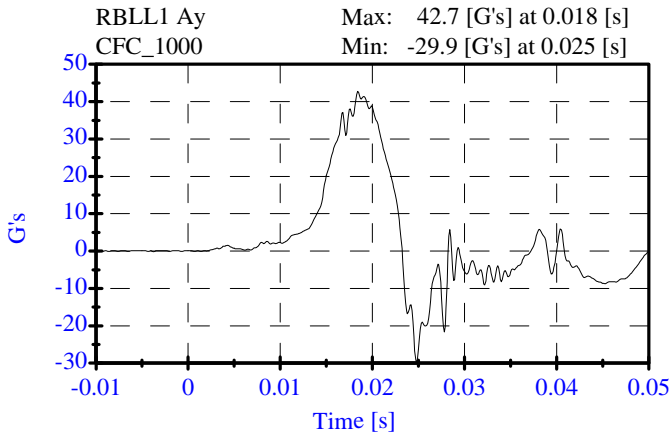
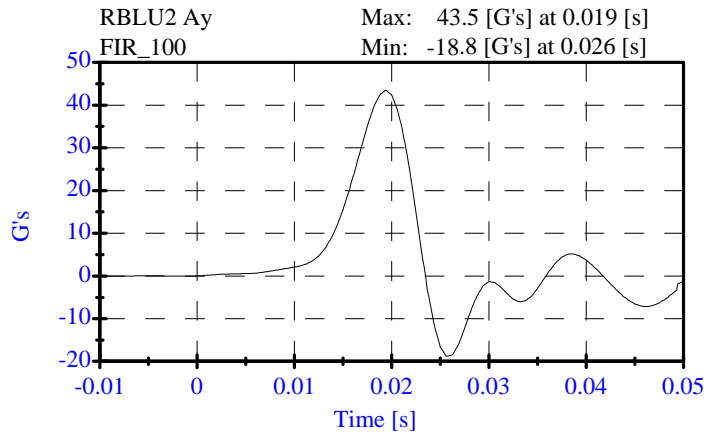
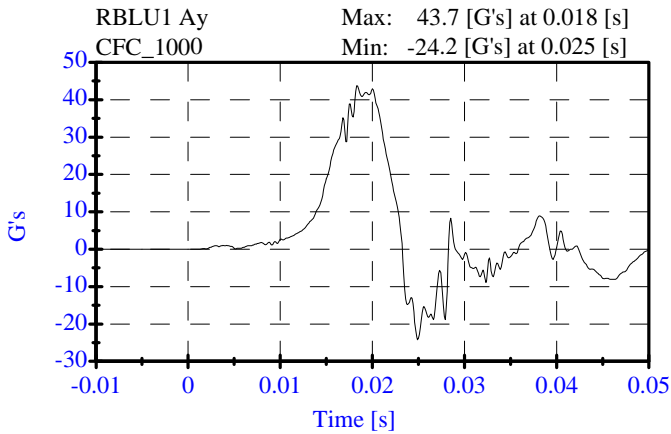
**Thorax Impact  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 8, 2004

Sequential Test Number: 1 File: 270T 12-08-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>     | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|---------------------------|----------------------|---------------------|---------------|
| Lab Temperature:          | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:             | 10-70 %              | 36.00 %             | Passed        |
| Probe Velocity:           | 4.27- 4.33 m/s       | 4.29 m/s            | Passed        |
| Upper Rib Acceleration:   | 37.00-46.00 G's      | 43.49 G's           | Passed        |
| Lower Rib Acceleration:   | 37.00-46.00 G's      | 42.25 G's           | Passed        |
| Lower Spine Acceleration: | 15.00-22.00 G's      | 21.50 G's           | Passed        |



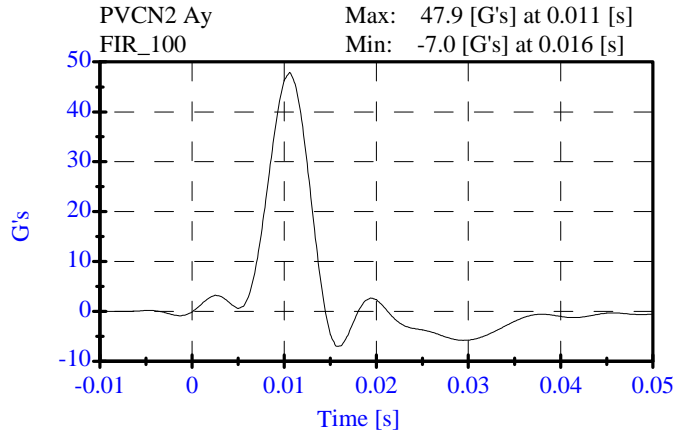
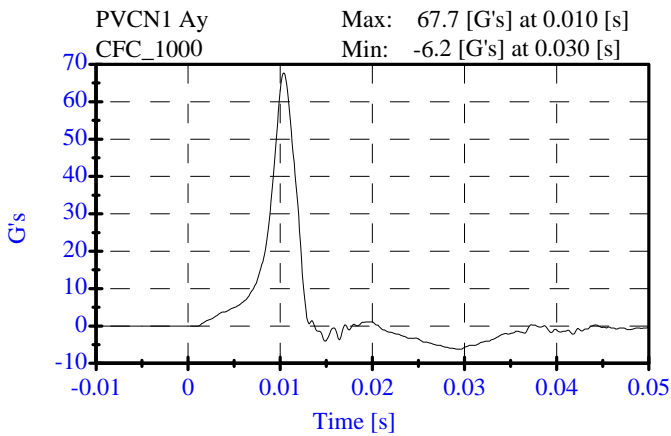
**Pelvic Impact  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 8, 2004

Sequential Test Number: 1 File: 270P 12-08-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 35.00 %             | Passed        |
| Probe Velocity:        | 4.27- 4.33 m/s       | 4.29 m/s            | Passed        |
| Pelvis Y Acceleration: | 40.00-60.00 G's      | 47.94 G's           | Passed        |
| Time Above 20 Gs       | 3.0-7.0 ms           | 5.2 ms              | Passed        |



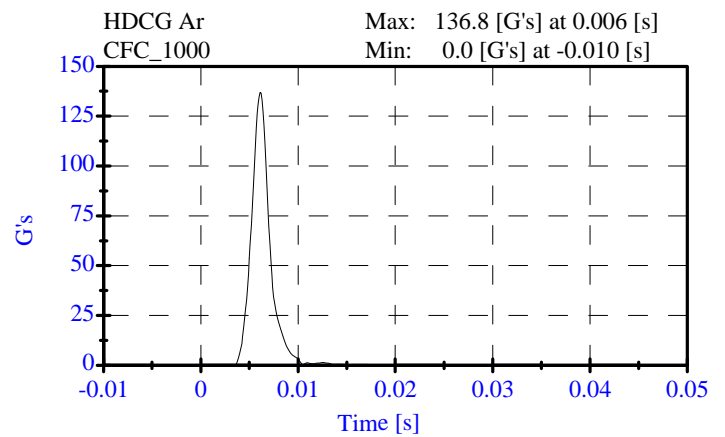
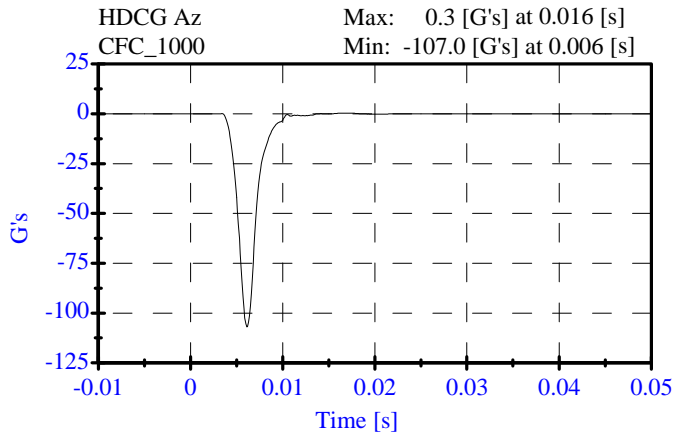
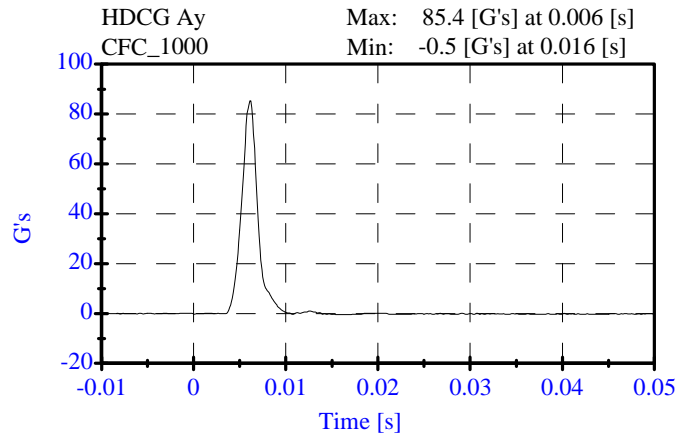
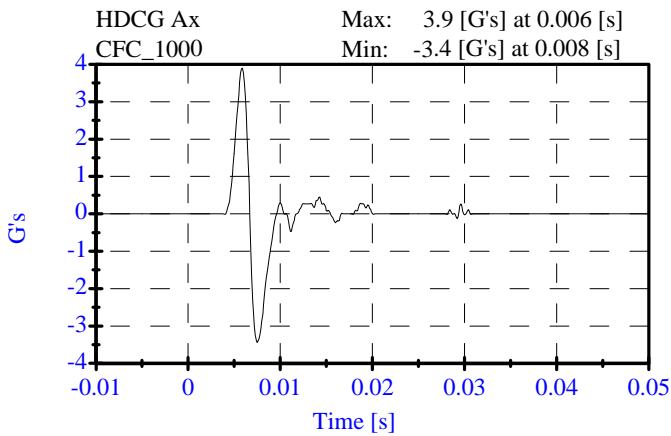
**Head Drop  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 7, 2004

Sequential Test Number: 1 File: 270H1 12-07-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>   | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-------------------------|----------------------|---------------------|---------------|
| Lab Temperature:        | 18.9-25.6 C          | 21.1 C              | Passed        |
| Lab Humidity:           | 10-70 %              | 35.00 %             | Passed        |
| Peak Resultant Accel.:  | 120-150 Gs           | 136.84 Gs           | Passed        |
| Peak Lateral Accel.:    | 15 Gs Max            | 3.90 Gs             | Passed        |
| Curve PerCent NonModal: | < 15%                | 1.06 %              | Passed        |



**Neck Test  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: December 7, 2004

Sequential Test Number: 1 File: 270N 12-07-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|--|----------------------|---------------------|---------------|
| Lab Temperature:   | 20.6-22.2 C          | 21.1 C              | Passed        |
| Lab Humidity:  | 10-70 %              | 35.00 %             | Passed        |
| Impact Velocity:   | 6.89- 7.13 m/s       | 6.99 m/s            | Passed        |
| <b>PENDULUM DELTA V</b>  |                      |                     |               |
| Delta V at 10 ms:  | 1.96- 2.55 m/s       | 2.33 m/s            | Passed        |
| Delta V at 20 ms:  | 4.12- 5.10 m/s       | 4.72 m/s            | Passed        |
| Delta V at 30 ms:  | 5.73- 7.01 m/s       | 6.77 m/s            | Passed        |
| Delta V between 40-70 ms:  | 6.27- 7.64 m/s       | 7.22 m/s            | Passed        |
| <b>D PLANE ROTATION</b>  |                      |                     |               |
| Maximum Rotation:  | 66.0-82.0 Deg        | 71.07 Deg           | Passed        |
| Rotation Angle Decay:  | 58.0-67.0 ms         | 60.70 ms            | Passed        |
| <b>MOMENT ABOUT THE OCCIPITAL CONDYLE</b>                              |                      |                     |               |
| Max Occipital Moment:  | 73.00- 88.00 N-m     | 86.83 N-m           | Passed        |
| Occipital Moment Decay:  | 49.0-64.0 ms         | 56.10 ms            | Passed        |
| <b>HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT</b> |                      |                     |               |
| Moment to Rotation Peak:   | 2.0-16.0 ms          | 10.20 ms            | Passed        |

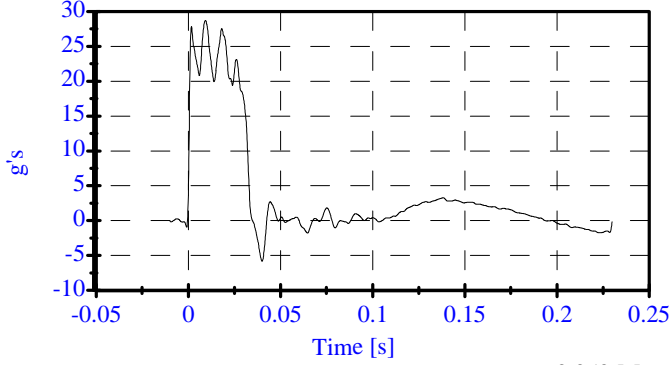
Neck Test  
Post-Test

CONFIGURED FOR LEFT SIDE IMPACT

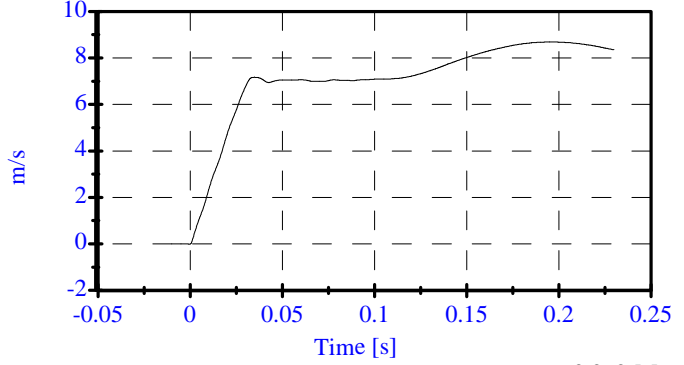
ATD Serial No: 270  
Date: December 7, 2004

Sequential Test Number: 1 File: 270N 12-07-04  
Laboratory Technician: B. Swiecicki

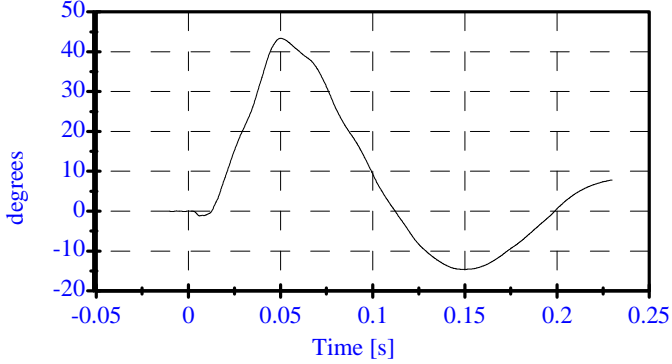
Pend Ax CFC\_180 Max: 28.7 [g/s] at 0.009 [s]  
Min: -5.8 [g/s] at 0.040 [s]



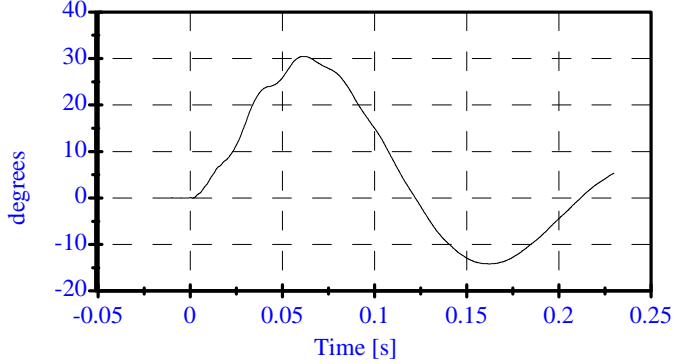
Pend Vx CFC\_180 Max: 8.7 [m/s] at 0.194 [s]  
Min: -0.0 [m/s] at -0.000 [s]



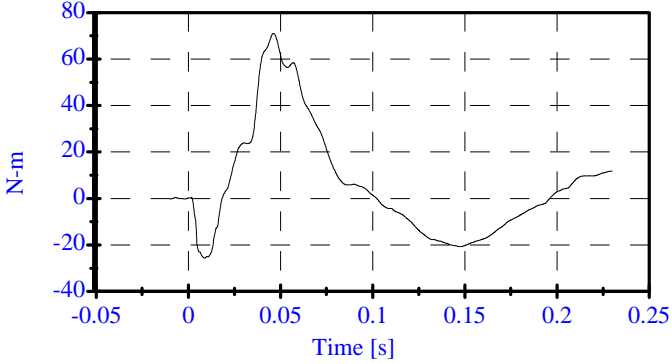
Head Rot CFC\_180 Max: 43.4 [degrees] at 0.050 [s]  
Min: -14.6 [degrees] at 0.149 [s]



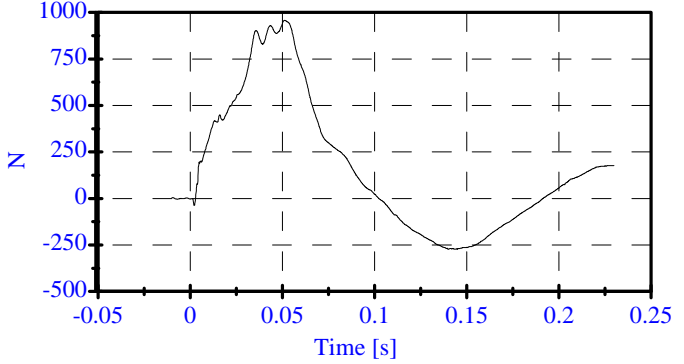
Arm Rot CFC\_180 Max: 30.4 [degrees] at 0.062 [s]  
Min: -14.2 [degrees] at 0.162 [s]



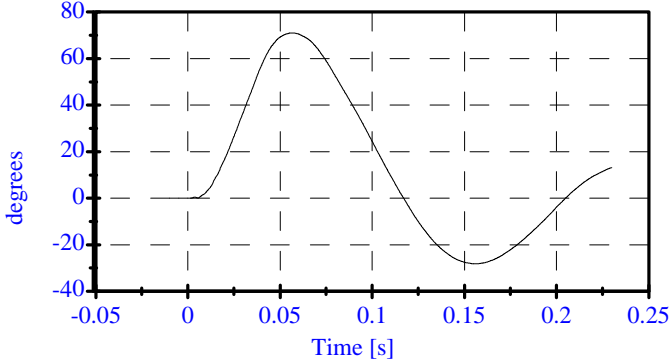
Neck Mx CFC\_600 Max: 71.0 [N-m] at 0.046 [s]  
Min: -25.7 [N-m] at 0.009 [s]



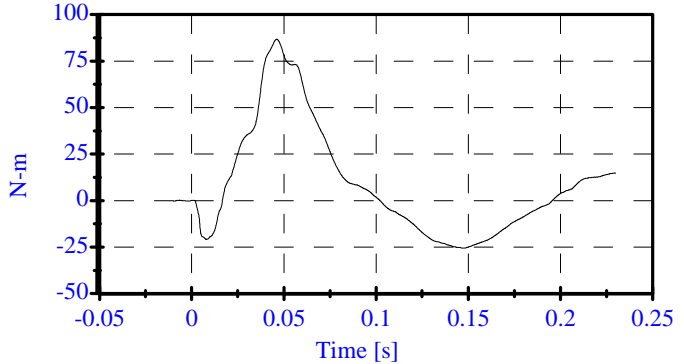
Neck Fy CFC\_1000 Max: 958.2 [N] at 0.051 [s]  
Min: -273.1 [N] at 0.143 [s]



Tot Rot CFC\_180 Max: 71.1 [degrees] at 0.056 [s]  
Min: -28.2 [degrees] at 0.155 [s]



MOCX Max: 86.8 [N-m] at 0.046 [s]  
Min: -25.5 [N-m] at 0.147 [s]



# Abdomen Test

## Post-Test

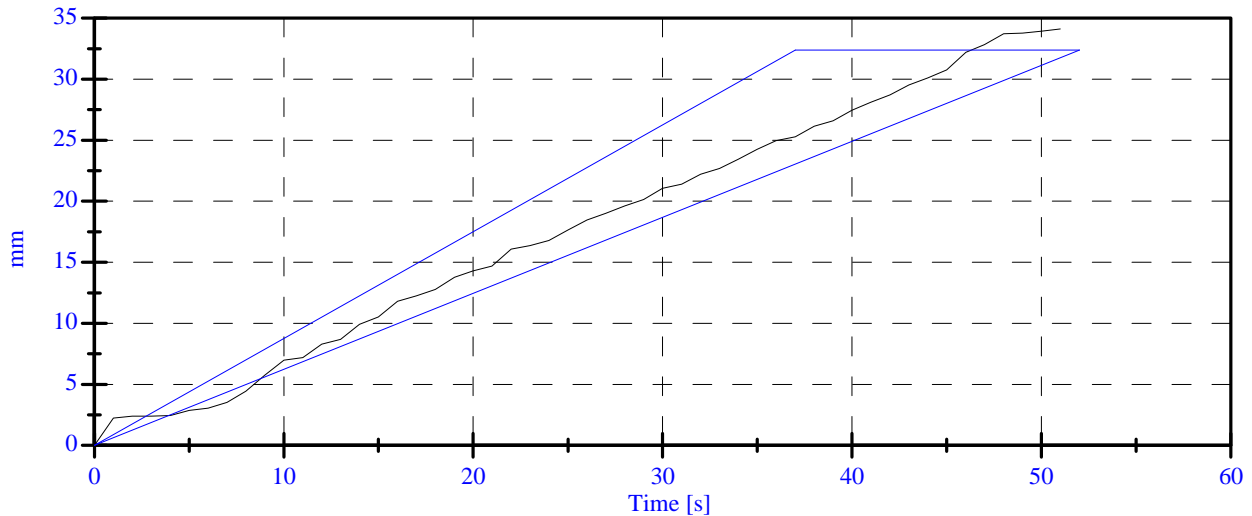
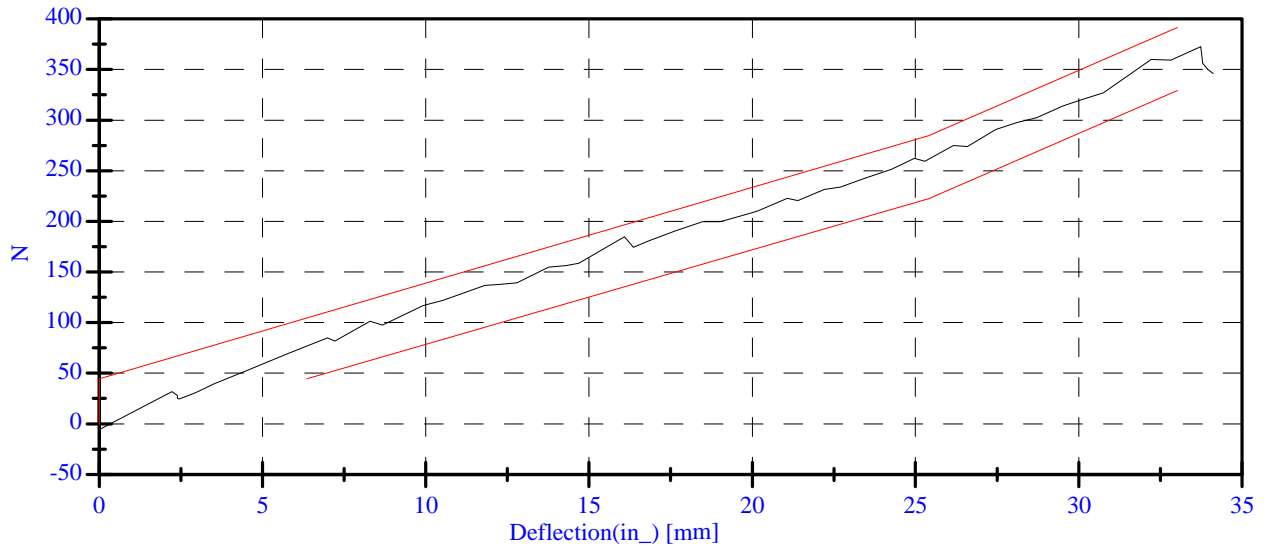
### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 270  
Date: December 9, 2004

Sequential Test Number: 1 File: 270 Ab 12-09-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 32.00 %             | Passed        |
| Force at 12.95 mm :   | 104.00-162.00 N      | 139.34 N            | Passed        |
| Force at 19.05 mm :   | 162.98-220.99 N      | 199.65 N            | Passed        |
| Force at 25.40 mm :   | 221.97-280.02 N      | 259.23 N            | Passed        |
| Force at 33.02 mm :   | 324.99-391.00 N      | 359.39 N            | Passed        |

### ABDOMINAL COMPRESSION TEST



# Lumbar Spine Test

## Post-Test

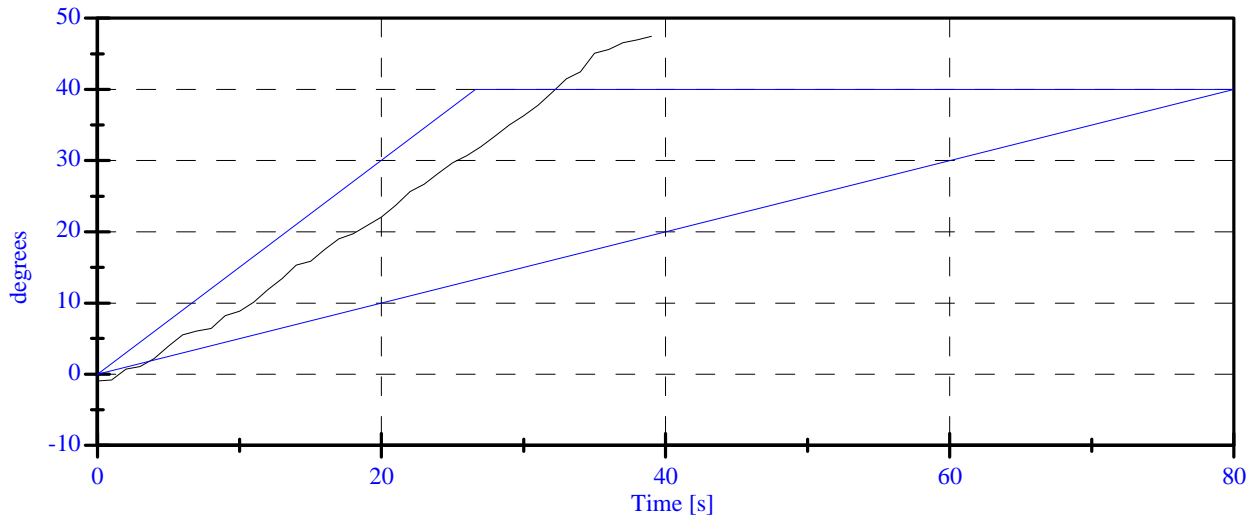
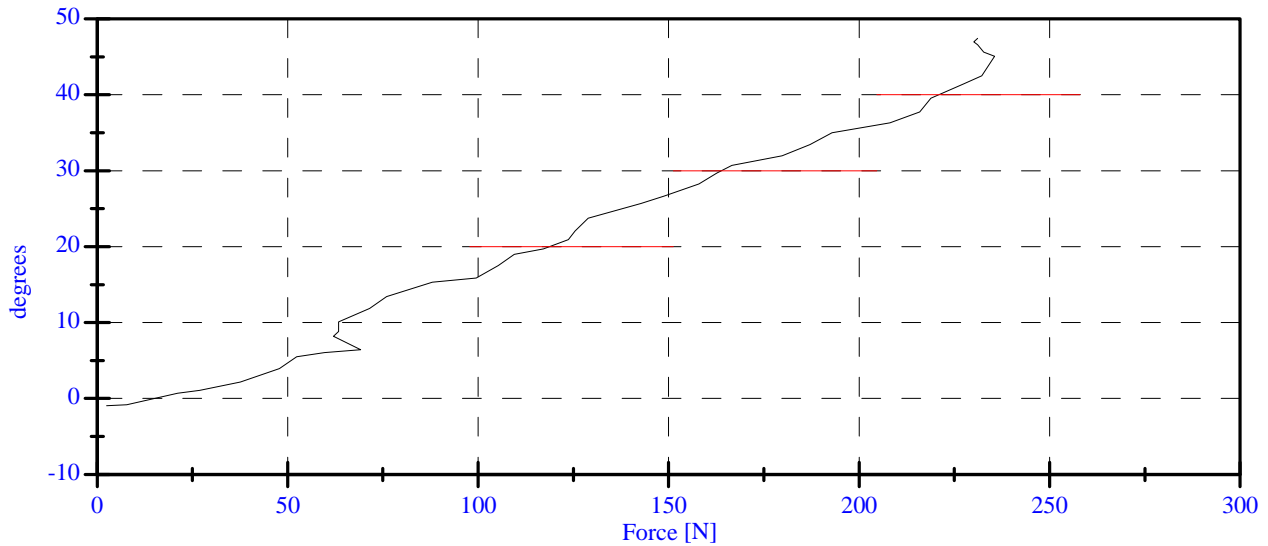
### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 270  
Date: December 9, 2004

Sequential Test Number: 1 File: 270 Spine 12-09-04  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u> | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------|----------------------|---------------------|---------------|
| Lab Temperature:      | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:         | 10-70 %              | 32.00 %             | Passed        |
| Force at 0 Deg:       | 0.00-26.69 N         | 21.11 N             | Passed        |
| Force at 20 Deg:      | 97.86-151.24 N       | 117.08 N            | Passed        |
| Force at 30 Deg:      | 151.24-204.62 N      | 162.71 N            | Passed        |
| Force at 40 Deg:      | 204.62-258.00 N      | 218.82 N            | Passed        |
| Return Angle          | 12 Deg Max           | 4.96 deg            | Passed        |

### LUMBAR SPINE FLEXION TEST



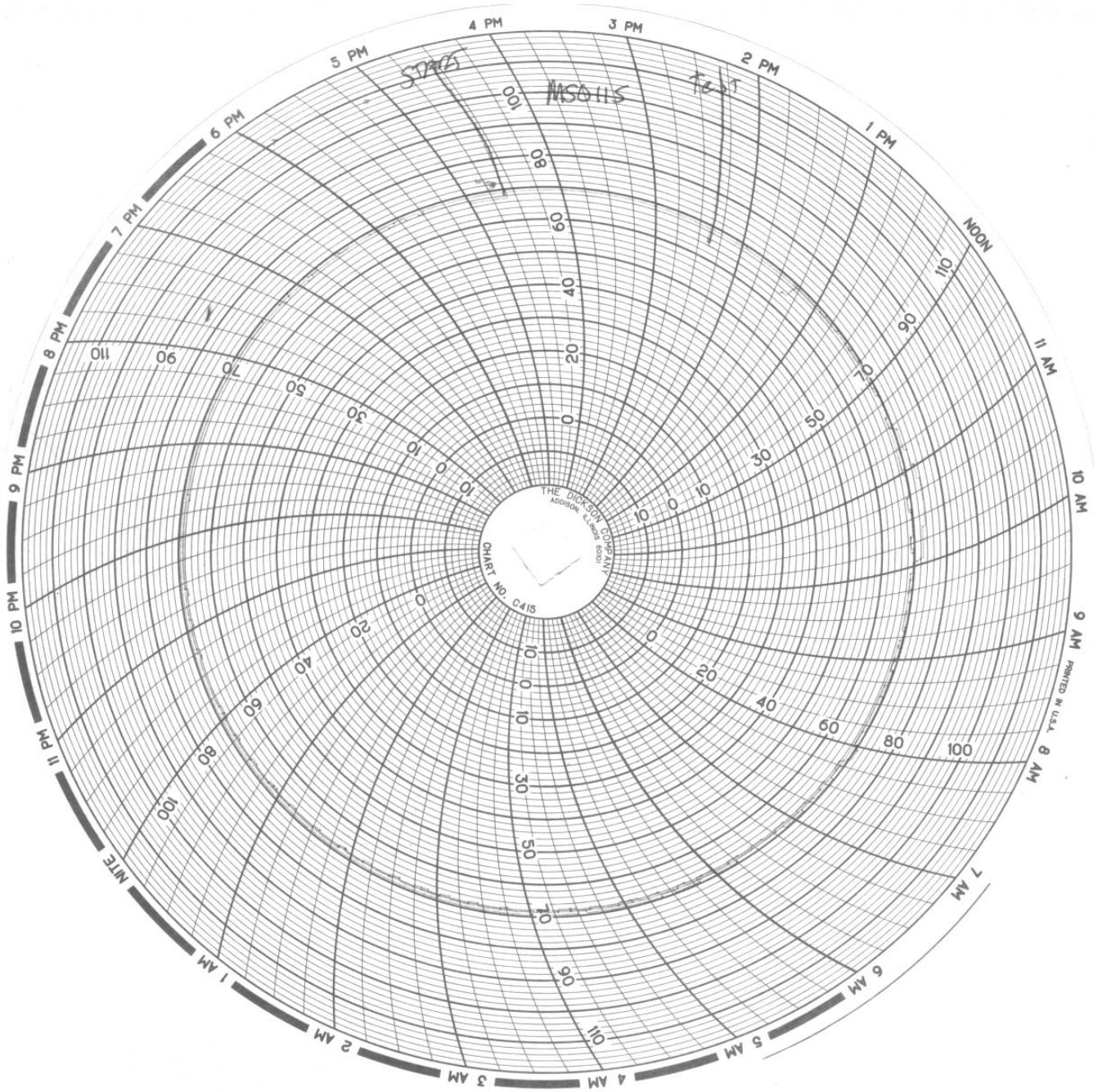
**POST TEST DUMMY INSPECTION LIST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 5  
 Date: December 9, 2004 Laboratory Technician: B. Swiecicki

| PART         | ITEMS CHECKED                                     | COMMENTS |
|--------------|---|----------|
| SKIN         | VISUAL INSPECTION                                 | OK       |
| HEAD         | VISUAL, BALLAST,<br>ACCELEROMETER MOUNT           | OK       |
| NECK         | VISUAL, CABLE TORQUE                              | OK       |
| SPINE BOX    | VISUAL, BALLAST, WELDMENT,<br>ACCELEROMETER MOUNT | OK       |
| RIB CAGE     | VISUAL, MEASURE, STIFFENERS                       | OK       |
| STERNUM      | VISUAL  | OK       |
| LUMBAR SPINE | VISUAL  | OK       |
| ABDOMEN      | VISUAL  | OK       |
| PELVIS       | VISUAL, PALPATE,<br>ACCELEROMETER MOUNT           | OK       |
| UPPER LEGS   | VISUAL  | OK       |
| KNEES        | VISUAL, STOPS, INSERTS                            | OK       |
| LOWER LEGS   | VISUAL, RANGE OF MOTION                           | OK       |
| ANKLES       | VISUAL, RANGE OF MOTION                           | OK       |
| FEET         | VISUAL, RANGE OF MOTION                           | OK       |
| JOINTS       | 1 TO 2 g RANGE                                    | OK       |
| OTHER        | NONE  | -        |

**REMARKS:** None

# TEMPERATURE TRACE



**APPENDIX D**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**SID INSTRUMENTATION**

| FRONT SID NO.: 269    |               |              |                  |
|-----------------------|---------------|--------------|------------------|
|                       | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| HEAD AX               | AC-P18738     | ENDEVCO      | 13-Jul-04        |
| HEAD AY               | AC-P18739     | ENDEVCO      | 13-Jul-04        |
| HEAD AZ               | AC-P19212     | ENDEVCO      | 13-Jul-04        |
| UPPER NECK FX         | LC-440Fx      | DENTON       | 06-Nov-04        |
| UPPER NECK FY         | LC-440Fy      | DENTON       | 06-Nov-04        |
| UPPER NECK FZ         | LC-440Fz      | DENTON       | 06-Nov-04        |
| UPPER NECK MX         | LC-440Mx      | DENTON       | 06-Nov-04        |
| UPPER NECK MY         | LC-440My      | DENTON       | 06-Nov-04        |
| UPPER NECK MZ         | LC-440Mz      | DENTON       | 06-Nov-04        |
| UPPER RIB             | AC-P16862     | ENDEVCO      | 07-Oct-04        |
| LOWER RIB             | AC-P23156     | ENDEVCO      | 07-Oct-04        |
| LOWER SPINE           | AC-P16645     | ENDEVCO      | 07-Oct-04        |
| PELVIS                | AC-P16843     | ENDEVCO      | 07-Oct-04        |
| UPPER RIB REDUNDANT   | AC-P16866     | ENDEVCO      | 07-Oct-04        |
| LOWER RIB REDUNDANT   | AC-P16656     | ENDEVCO      | 07-Oct-04        |
| LOWER SPINE REDUNDANT | AC-P19343     | ENDEVCO      | 07-Oct-04        |
| PELVIS REDUNDANT      | AC-P16676     | ENDEVCO      | 07-Oct-04        |

| REAR SID NO.: 270     |               |              |                  |
|-----------------------|---------------|--------------|------------------|
|                       | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| HEAD AX               | AC-P16845     | ENDEVCO      | 18-Aug-04        |
| HEAD AY               | AC-P23788     | ENDEVCO      | 18-Aug-04        |
| HEAD AZ               | AC-P21393     | ENDEVCO      | 18-Aug-04        |
| UPPER NECK FX         | LC-205Fx      | DENTON       | 06-Nov-04        |
| UPPER NECK FY         | LC-205Fy      | DENTON       | 06-Nov-04        |
| UPPER NECK FZ         | LC-205Fz      | DENTON       | 06-Nov-04        |
| UPPER NECK MX         | LC-205Mx      | DENTON       | 06-Nov-04        |
| UPPER NECK MY         | LC-205My      | DENTON       | 06-Nov-04        |
| UPPER NECK MZ         | LC-205Mz      | DENTON       | 06-Nov-04        |
| UPPER RIB             | AC-P15736     | ENDEVCO      | 12-Jul-04        |
| LOWER RIB             | AC-P16289     | ENDEVCO      | 12-Jul-04        |
| LOWER SPINE           | AC-P16761     | ENDEVCO      | 13-Jul-04        |
| PELVIS                | AC-P32221     | ENDEVCO      | 12-Jul-04        |
| UPPER RIB REDUNDANT   | AC-P16593     | ENDEVCO      | 12-Jul-04        |
| LOWER RIB REDUNDANT   | AC-P23142     | ENDEVCO      | 12-Jul-04        |
| LOWER SPINE REDUNDANT | AC-P21516     | ENDEVCO      | 12-Nov-04        |
| PELVIS REDUNDANT      | AC-P23960     | ENDEVCO      | 12-Jul-04        |

**REMARKS:** None

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**VEHICLE AND MDB INSTRUMENTATION**

|                                    | VEHICLE AND MDB INSTRUMENTS |              |                  |
|------------------------------------|-----------------------------|--------------|------------------|
|                                    | SERIAL NUMBER               | MANUFACTURER | CALIBRATION DATE |
| RIGHT FRONT SILL (X)               | AC-J30491                   | ENDEVCO      | 20-Jul-04        |
| RIGHT FRONT SILL (Y)               | AC-J33071                   | ENDEVCO      | 29-Jun-04        |
| RIGHT FRONT SILL (Z)               | AC-J31011                   | ENDEVCO      | 04-Nov-04        |
| RIGHT REAR SILL (X)                | AC-J30041                   | ENDEVCO      | 01-Dec-04        |
| RIGHT REAR SILL (Y)                | AC-J32185                   | ENDEVCO      | 04-Nov-04        |
| RIGHT REAR SILL (Z)                | AC-J33843                   | ENDEVCO      | 08-Sep-04        |
| REAR FLOORPAN ABOVE AXLE (X)       | AC-P23873                   | ENDEVCO      | 28-Jul-04        |
| REAR FLOORPAN ABOVE AXLE (Y)       | AC-P19246                   | ENDEVCO      | 28-Jul-04        |
| REAR FLOORPAN ABOVE AXLE (Z)       | AC-J31034                   | ENDEVCO      | 28-Jul-04        |
| LEFT REAR SILL (Y)                 | AC-FGP32                    | ICS          | 20-Aug-04        |
| LEFT FRONT SILL (Y)                | AC-FGP12                    | ICS          | 27-Aug-04        |
| LEFT FRONT DOOR CENTERLINE (Y)     | AC-FGP20                    | ICS          | 27-Aug-04        |
| RIGHT REAR SEAT OCCUPANT COMP. (Y) | AC-9440-045                 | GS SENSORS   | 01-Dec-04        |
| MID REAR OF LEFT FRONT DOOR (Y)    | AC-FGP46                    | ICS          | 24-Aug-04        |
| LEFT FRONT DOOR UPPER C\L (Y)      | AC-FGP39                    | ICS          | 27-Aug-04        |
| MID REAR OF LEFT REAR DOOR (Y)     | AC-FGP18                    | ICS          | 20-Aug-04        |
| LEFT REAR DOOR UPPER C\L (Y)       | AC-FGP35                    | ICS          | 20-Aug-04        |
| LOWER LEFT B- PILLAR (Y)           | AC-FGP40                    | ICS          | 24-Aug-04        |
| MIDDLE LEFT B-PILLAR (Y)           | AC-FGP28                    | ICS          | 20-Aug-04        |
| LOWER LEFT A-PILLAR (Y)            | AC-FGP25                    | ICS          | 24-Aug-04        |
| UPPER LEFT A-PILLAR (Y)            | AC-FGP37                    | ICS          | 27-Aug-04        |
| FRONT SEAT TRACK (Y)               | AC-FGP42                    | ICS          | 20-Aug-04        |
| REAR SEAT TRACK (Y)                | AC-FGP49                    | ICS          | 24-Aug-04        |
| VEHICLE CG (X)                     | AC-J37854                   | ENDEVCO      | 07-Oct-04        |
| VEHICLE CG (Y)                     | AC-J37980                   | ENDEVCO      | 07-Oct-04        |
| VEHICLE CG (Z)                     | AC-J38127                   | ENDEVCO      | 07-Oct-04        |
| MDB CG (X)                         | AC-C16433                   | ENDEVCO      | 31-Aug-04        |
| MDB CG (Y)                         | AC-C16416                   | ENDEVCO      | 31-Aug-04        |
| MDB CG (Z)                         | AC-C16499                   | ENDEVCO      | 31-Aug-04        |
| MDB REAR FRAME MEMBER (X)          | AC-C14948                   | ENDEVCO      | 31-Aug-04        |
| MDB REAR FRAME MEMBER (Y)          | AC-C16680                   | ENDEVCO      | 31-Aug-04        |

**REMARKS:** None