**REPORT NUMBER: 214P-CAL-10-5**

# SAFETY COMPLIANCE TESTING FOR FMVSS 214
# DYNAMIC SIDE IMPACT PROTECTION
# RIGID POLE SIDE IMPACT

**HONDA OF CANADA, MFG**
**2010 ACURA MDX**
**4-DOOR SUV**

**NHTSA NUMBER: CA5304**

**PREPARED BY:**
**CALSPAN CORPORATION**
**P.O. BOX 400**
**BUFFALO, NEW YORK 14225**

**Test Date: April 9, 2010**

**FINAL REPORT**

**PREPARED FOR:**
**U.S. DEPARTMENT OF TRANSPORTATION**
**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**
**ENFORCEMENT**
**OFFICE OF VEHICLE SAFETY COMPLIANCE**
**1200 NEW JERSEY AVENUE, SE**
**NVS-220, WEST BUILDING 4TH FLOOR**
**WASHINGTON, DC 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-07-D-00064.

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Prepared by: Vincent M. Paolini, Project Engineer — Date: August 5, 2010

Approved by: David J. Travale, Program Manager, Transportation Research Group — Date: August 5, 2010

FINAL REPORT ACCEPTANCE BY OVSC:

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| *4. Title and Subtitle*<br>Final Report of FMVSS 214P Compliance Side Impact Testing of a 2010 Acura MDX 4-Door SUV<br>NHTSA No.: CA5304 | *5. Report Date*<br>April 9, 2010 |
| | *6. Performing Organization Code*<br>CAL |
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15. *Supplementary Notes*

*16. Abstract*

A 32 km/h (20 mph) 75° oblique impact compliance test was conducted on the subject 2010 Acura MDX 4-Door SUV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP- 214P-01 for the determination of FMVSS 214 Side Impact Protection compliance. The test was conducted by the Calspan Corporation Transportation Research Group in Buffalo, New York, on April 9, 2010.

The impact velocity was 31.2 km/h, and the ambient temperature at the struck side (driver side) of the test vehicle was 21.7°C. The test vehicle's maximum post test static crush was 413 mm at level 3. The test vehicle's occupant performance is as follows:

| | DRIVER |
|---|---|
| HIC | 526.9 |
| Max. Rib Deflection (mm) | 37.8 |
| Sum of Abdomen Forces (N) | ** |
| Pubic Symphysis (N) | 1613.6 |

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

** The Anterior Abdominal Rib load cell sustained a damaged wire during impact therefore the sum of the abdominal forces could not calculated.

| *17. Key Words* | *18. Distribution Statement* |
|---|---|
| Compliance Testing<br>Side Impact Protection<br>Pole Test<br>ES-2re | Copies of this report are available from:<br>National Highway Traffic Safety Admin.<br>Technical Information Services<br>Room E12-100 East Bldg.<br>1200 New Jersey Avenue, SE<br>Washington, DC 20590<br>Phone : (202) 366-2588 |

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Form DOT F1700.7 (8-72)

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## SECTION 1

## PURPOSE AND TEST PROCEDURE

### PURPOSE

This side impact test is part of the FY 2010 FMVSS 214 Side Impact Protection Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-07-D-00064. The purpose of this test was to evaluate side impact protection in a 2010 Acura MDX 4-Door SUV. The side impact test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214P-01, dated January 2010).

### SUMMARY

A rigid pole impact test was conducted on a 2010 Acura MDX 4-Door SUV. The test was towed into a rigid pole at an angle of 75° and a velocity of 31.2 km/h. The test was conducted by the Calspan Corporation Transportation Sciences Group in Buffalo, New York on April 9, 2010. Pre-test and post-test photographs of the test vehicle and side impact dummy are included in Appendix A of this report.

One Part 572U dummy was placed in the left front outboard designated seating position according to instructions specified in TP-214P-01 dated January 2010. The side impact event was documented by 1 real-time and 9 high-speed cameras.

The ES2-re male dummy was instrumented with a tri-axial accelerometer pack located in the head, 3 rib displacement transducers located in the chest, 3 load cells located in the abdomen and a load cell in the pubic symphysis.

The summary of the test results follows:

| Driver ES-2re Male Dummy | | |
|---|---|---|
| HIC | 526.9 | |
| UPPER RIB DEFLECTION | 37.8 | mm |
| MIDDLE RIB DEFLECTION | 35.8 | mm |
| LOWER RIB DEFLECTION | 36.9 | mm |
| ABDOMEN (FRONT) | ** | N |
| ABDOMEN (MID) | 392.0 | N |
| ABDOMEN (REAR) | 625.2 | N |
| SUM OF ABDOMEN FORCES | ** | N |
| PUBIC SYMPHYSIS | 1613.6 | N |

** The Anterior Abdominal Rib load cell sustained a damaged wire during impact therefore the sum of the abdominal forces could not calculated.

# SECTION 2

**DATA SHEET NO. 1**
**TEST VEHICLE INFORMATION AND OPTIONS**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214P Side Impact | Test Date: | April 9, 2010 |

| Vehicle Information | |
|---|---|
| **Make** | Honda of Canada, Mfg. |
| **Model** | MDX |
| **Body Style** | 4-Door SUV |
| **VIN** | 2HNYD2H20AH502006 |
| **Body Color** | Red |
| **Engine Disp (liters)** | 3.7 |
| **# of Cylinders** | V6 |
| **Engine Placement** | Lateral |
| **Transmission Type** | Automatic |
| **Transmission Speeds** | 6 |
| **Overdrive** | Yes |
| **Final Drive** | All wheel |
| **Odometer Reading** | 5 miles |

| Options | |
|---|---|
| **ESC** | Yes |
| **All-Wheel Drive** | Yes |
| **Power Steering** | Yes |
| **Tilt Steering Wheel** | Yes |
| **Driver Side Curtain Airbag** | Yes |
| **Driver Side Torso Airbag** | Yes |
| **Driver Combo Bag** | No |
| **Driver Seat Belt Pretentioners** | Yes |
| **Driver Seat Belt Load Limiters** | Yes |
| **Driver Power Seats** | Yes |
| **Rear Pass. Curtain Airbag** | Yes |
| **Rear Pass. Side Torso Airbag** | Yes |
| **Rear Pass. Seat Belt Pretentioners** | No |
| **Rear Pass. Seat Belt Load Limiters** | No |
| **Rear Pass. Power Seats** | No |
| **Power Windows** | Yes |
| **Air Conditioning** | Yes |
| **AM/FM CD** | Yes |
| **Automatic Door Locks (ADL)** | Yes |
| **Does owner's manual provide instructions to disable ADLs?** | Yes |
| **Anti-Lock Brakes** | Yes |

**DATA FROM CERTIFICATION LABEL**

| | | | |
|---|---|---|---|
| Manufactured By | Honda of Canada, Mfg. | GVWR (kg) | 2700 |
| | | GAWR Front (kg) | 1310 |
| Date of Manufacture | 12/09 | GAWR Rear (kg) | 1440 |

**VEHICLE CAPACITY DATA**

| Measured Parameter | Front | Rear | Third | Total |
|---|---|---|---|---|
| Type of Seats | Bucket | Bench | Bench | |
| Number Of Occupants | 2 | 3 | 2 | 7 |
| Capacity Wt. (VCW) (kg) | | | | 525.0 |
| Cargo Wt. (RCLW) (kg) | | | | 48.7 |

**DATA SHEET NO. 2**
**GENERAL TEST AND VEHICLE PARAMETER DATA**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214P Side Impact | Test Date: | April 9, 2010 |

**TIRE PRESSURES**

| | Units | LF | RF | RR | LR |
|---|---|---|---|---|---|
| As Delivered | kpa | 220 | 220 | 220 | 220 |
| As Tested | kpa | 220 | 220 | 220 | 220 |

**TEST VEHICLE WEIGHTS**

| | Units | As Delivered (UVW) (Axle) | | | Fully Loaded (Axle) | | | As Tested (ATW) (Axle) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Front | Rear | Total | Front | Rear | Total | Front | Rear | Total |
| Left | kg | 593.0 | 461.0 | | 622.0 | 521.0 | | 628.5 | 489.5 | |
| Right | kg | 571.0 | 448.0 | | 569.0 | 489.0 | | 571.5 | 503.0 | |
| Ratio | % | 56.2 | 43.8 | | 54.1 | 45.9 | | 54.7 | 45.3 | |
| Totals | kg | 1164.0 | 909.0 | 2073.0 | 1191.0 | 1010.0 | 2201.0 | 1200.0 | 992.5 | 2192.5 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter | Units | Value |
|---|---|---|
| Total Delivered Weight (UVW) | kg | 2073.0 |
| Weight of 1 P572U ATD (78.0 kg each) | kg | 78.0 |
| Rated Cargo/Luggage Weight (RCLW) | kg | 48.7 |
| Calculated Vehicle Target Weight (TVTW) | kg | 2199.7 |

* Actual As Tested Weight (ATW) will be TVTW -4.5/-9.1 kg

Weight of Ballast (including instrumentation package and cameras): 41.5 kg

**WEIGHT of BALLAST and VEHICLE COMPONENTS REMOVED TO MEET TVTW**

| Description of Component | Weight (kg) |
|---|---|
| Ballast (if any) | 31.5 |
| | |
| | |
| | |
| | |

**TEST VEHICLE ATTITUDES**

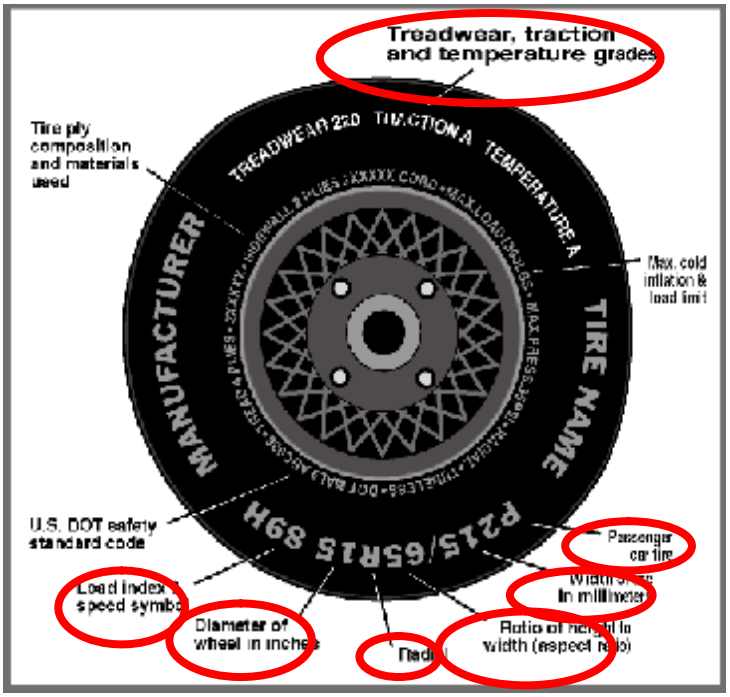
| | Units | LF | RF | LR | RR |
|---|---|---|---|---|---|
| Fully Loaded | mm | 821 | 824 | 839 | 839 |
| As Tested | mm | 825 | 825 | 835 | 827 |
| DIFF Δ | mm | -4 | -1 | 4 | 12 |

**CALCULATION OF THE VERTICAL IMPACT REFERENCE LINE**

| Measurement Description | Units | Value |
|---|---|---|
| Test Vehicle Wheel Base | mm | 2755 |
| Vertical Impact Reference Line Aft of Front Axle | mm | 1246 |

**DATA SHEET NO. 3**
**VEHICLE TIRE INFORMATION**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |




**DATA FROM TIRE PLACARD**

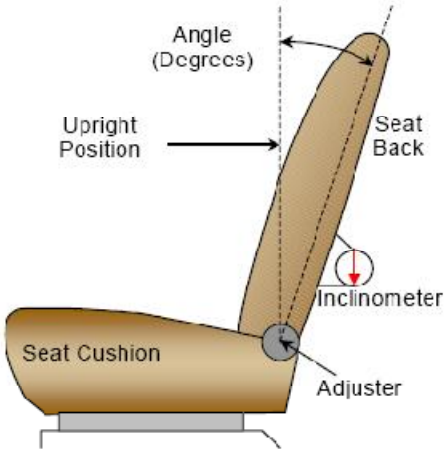
| Measured Parameter | Front | Rear |
|---|---|---|
| Maximum Tire Pressure (kPa) | 300 | 300 |
| Cold / Test Pressure (kPa) | 220 | 220 |
| Recommended Tire Size | P255/55R18 | P255/55R18 |
| Tire Size on Vehicle | P255/55R18 | P255/55R18 |
| Tire Manufacturer | Bridgestone | Bridgestone |
| Tire Name | Dueler H/L | Dueler H/L |
| Tire Type | Passenger | Passenger |
| Tire Width (mm) | 255 | 255 |
| Ratio of Height to Width (aspect ratio) | 55 | 55 |
| Radial | Yes | Yes |
| Wheel Diameter | 18 | 18 |
| Load Index & Speed Symbol | 104H | 104H |
| Treadwear | 400 | 400 |
| Traction Grade | B | B |
| Temperature Grade | B | B |

**DATA SHEET NO. 4**
**SEAT AND SEAT BELT ADJUSTMENT DATA**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |

## NORMAL DESIGN RIDING POSITION

An inclinometer was placed on the head restraint post and it measured a vertical angle of 11.1 degrees with the ATD not in seat. The sill pitch angle was 0.0 degrees (pitched down).



FRONT SEAT ASSEMBLY

## SEAT BACK ANGLES

| | Degrees |
|---|---|
| Driver w/ Seated Dummy | 11.1 |

## SEAT FORE/AFT POSITIONS

The seat was placed in the mid-travel position while maintaining the seat cushion mid-angle position.

## SEAT FORE/AFT POSITION

| | Driver Seat |
|---|---|
| Total Fore/Aft Travel (mm) | 240 |
| Test Position (mm) | 120 |
| Test Detent (forward-most detent | N/A |
| Total Number of Detents (including | N/A |

## SEAT BELT UPPER ANCHORAGES

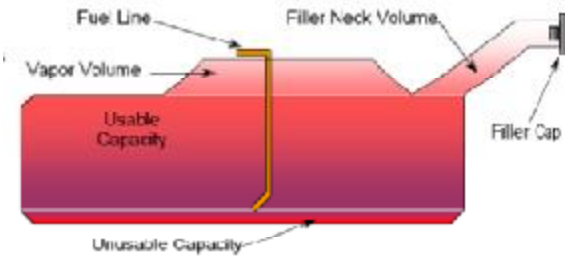
| | Total # of Positions | Placed in Position # |
|---|---|---|
| Driver Seat | 4 | 1 (uppermost) |

**DATA SHEET NO. 5**
**FUEL SYSTEMS AND STEERING WHEEL POSITION DATA**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |

## FUEL SYSTEM INFORMATION

The test vehicle is equipped with an electric fuel pump. The fuel pump operates continuously while the engine is running



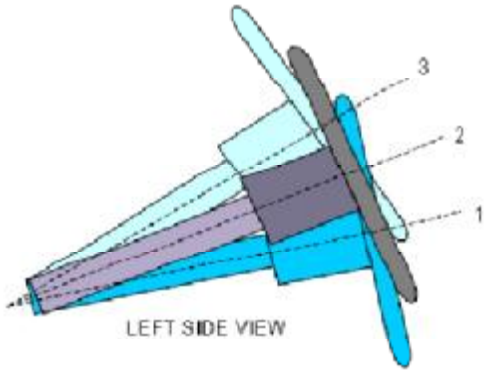

*VEHICLE FUEL TANK ASSEMBLY*

## FUEL TANK CAPACITY

| | Liters |
|---|---|
| Usable Capacity (Form 1) | 79.5 |
| Usable Capacity (Owner's Manual) | 79.5 |
| Usable Capacity of "Optional" Fuel Tank | - |
| Stoddard Used for Test (92%-94% of Fuel)Tank | 73.9 |

## STEERING COLUMN ADJUSTMENT

A flat plate was placed on the top and bottom of steering wheel. The inclinometer was placed on the flat plate to measure the angle.



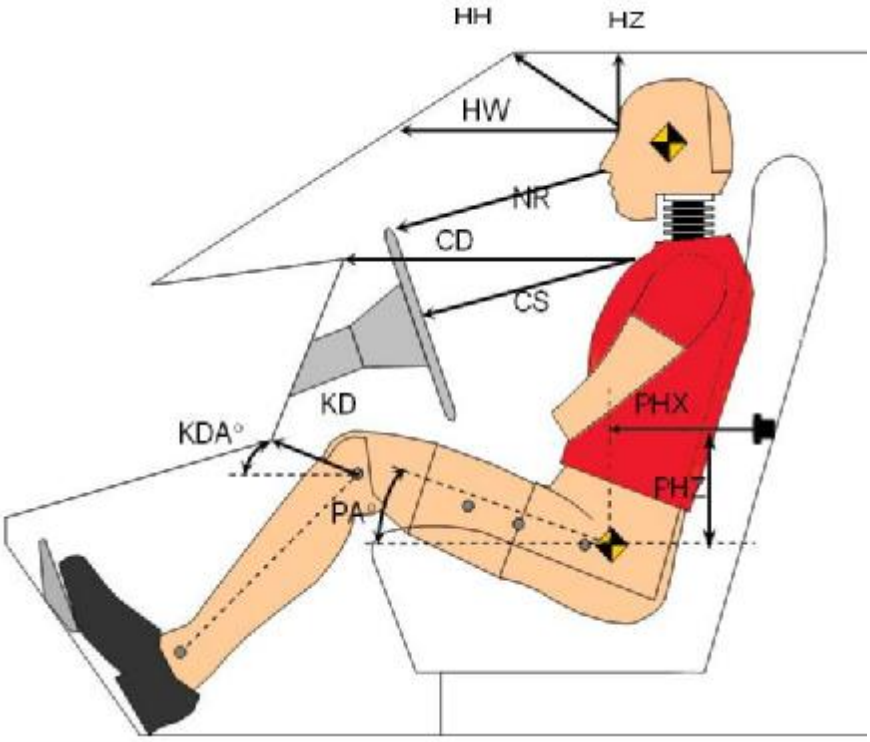

*STEERING COLUMN ASSEMBLY*

## STEERING COLUMN POSITIONING

| | Degrees | Fore/Aft Position (mm) |
|---|---|---|
| Lowermost - Position 1 | 20.8 | NA |
| Geometric Center – Position 2 | 23.3 | NA |
| Uppermost – Position 3 | 25.8 | NA |
| Telescoping Steering Wheel Travel | NA | 40 |
| Test Position | 23.3 | 20 |

**DATA SHEET NO. 6**
**DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

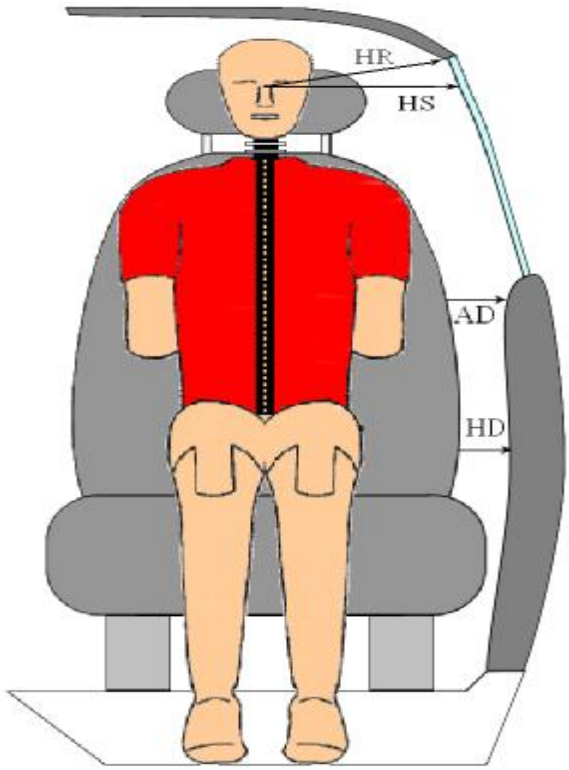
| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |




| Frt. Occupant Code | Measurement Description | 0037 ES2-re | |
|---|---|---|---|
| | | Length (mm) | Angle |
| HH | Header to Header | 424 | |
| HW | Header to Windshield | 643 | |
| HZ | Head to Roof | 175 | |
| NR | Nose to Rim/Seat Back | 466 | |
| CD | Chest to Dash/Seat Back | 606 | |
| CS | Chest to Steering Wheel | 352 | |
| KDL | Left Knee to Dash/Seat Back | 155 | 25.0 |
| KDR | Right Knee to Dash/Seat Back | 152 | 26.0 |
| PA | Pelvic Angle | | 20.3 |
| PHX | H-Point to Striker (X-Axis) | 207 | |
| PHZ | H-Point to Striker (Z-Axis) | 145 | |

**DATA SHEET NO. 7**
**DUMMY LATERAL CLEARANCE DIMENSIONS**

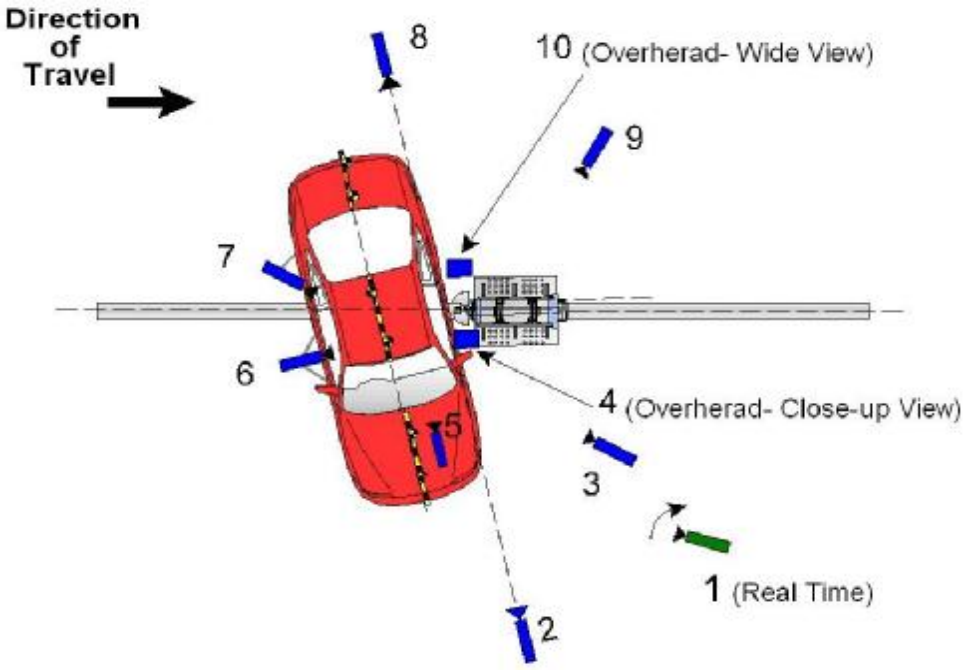
| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |




| Code | | Units | Front Occupant |
|---|---|---|---|
| HR | Head to Side Header | mm | 210 |
| HS | Head to Side Window | mm | 347 |
| AD | Arm to Door | mm | 123 |
| HD | H-point to Door | mm | 143 |

**DATA SHEET NO. 8**
**HIGH SPEED CAMERA LOCATIONS AND DATA**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214P Side Impact | Test Date: | April 9, 2010 |

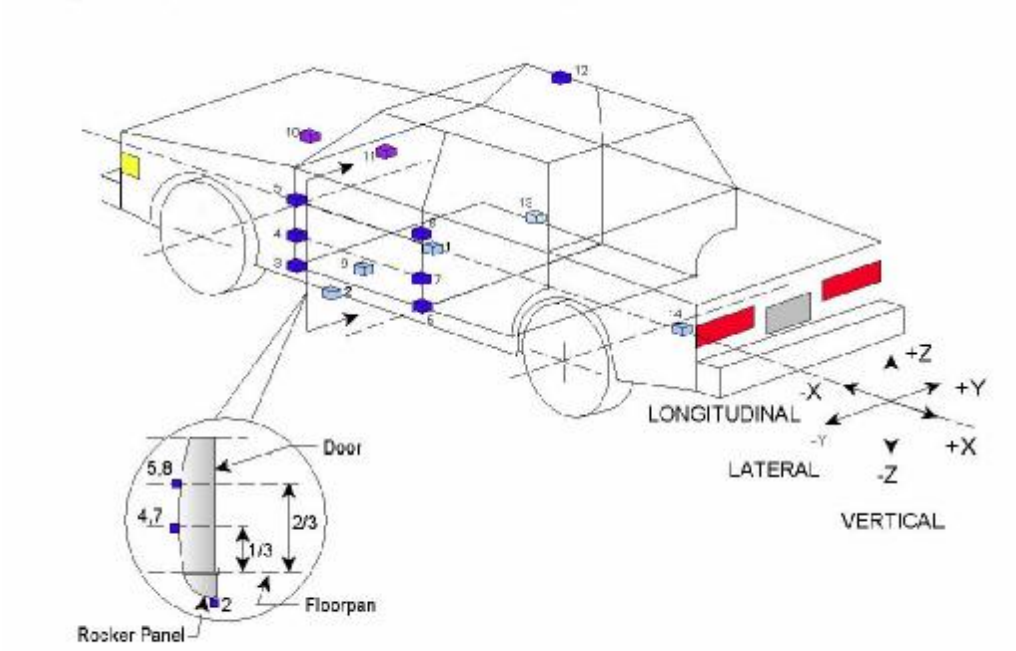



| No. | CAMERA VIEW | Location | | | LENS (mm) | FILM SPEED (fps) |
|---|---|---|---|---|---|---|
| | | X | Y | Z | | |
| 1 | Real time (24 fps) film coverage | - | - | - | - | 24 |
| 2 | Front ground level - impact view | -1890 | -4290 | 1035 | 28 | 1000 |
| 3 | Impact side 45* - forward pole view | -1670 | -1245 | 2270 | 24 | 1000 |
| 4 | Overhead Close-up view of impact | -40 | -210 | 4375 | 28 | 1000 |
| 5 | Onboard – dummy front view | | | | 25 | 500 |
| 6 | Onboard – dummy side view | | | | 12.5 | 500 |
| 7 | Onboard – dummy rear view | | | | 12.5 | 500 |
| 8 | Rear ground level – impact view | 1560 | 6480 | 1020 | 24 | 1000 |
| 9 | Impact side 45º - rearward pole view | -2950 | 2640 | 1510 | 24 | 1000 |
| 10 | Overhead wide-view of impact | 310 | -160 | 4375 | 14 | 1000 |

Reference: Impact Point projected to Ground
+X = To Front, +Y = To Right, +Z = Down
*All measurements accurate to ± 6 mm.

**DATA SHEET NO. 9**
**TEST VEHICLE ACCELEROMETER LOCATIONS**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |




| Loc. No. | Accelerometer Location | Coordinates (mm) | | |
|---|---|---|---|---|
| | | X | Y | Z |
| 1 | Vehicle C.G. | 2886 | 95 | 707 |
| 2 | Left Floor Sill | 3111 | -686 | 452 |
| 3 | Left A-Pillar Sill | 3367 | -702 | 532 |
| 4 | Left A-Pillar Low | 3328 | -679 | 768 |
| 5 | Left A-Pillar Mid | 3336 | -707 | 1176 |
| 6 | Left B-Pillar Sill | 2378 | -705 | 516 |
| 7 | Left B-Pillar Low | 2346 | -723 | 832 |
| 8 | Left B-Pillar Mid | 2300 | -729 | 1139 |
| 9 | Left Seat Track | 2447 | -587 | 496 |
| 10 | Engine Top | 4119 | -88 | 902 |
| 11 | Firewall | 3894 | 13 | 1044 |
| 12 | Right Roof | 2448 | 697 | 1641 |
| 13 | Right Floor Sill | 3135 | 721 | 457 |
| 14 | Rear Deck | 1127 | 61 | 585 |

X – Test Vehicle Rear Bumper (+ forward)
Y – Test Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

**DATA SHEET NO. 10**
**TEST VEHICLE ACCELEROMETER DATA SUMMARY**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |

| Loc. No | Description | Peak Values (g's) | | | |
|---|---|---|---|---|---|
| | | Max | Time (ms) | Min | Time (ms) |
| 1 | Vehicle CG (X) | 17.3 | 41.4 | -11.2 | 54.9 |
| | Vehicle CG (Y) | 55.1 | 40.8 | -20.4 | 56.2 |
| | Vehicle CG (Z) | 40.3 | 45.3 | -19.9 | 39.6 |
| | Vehicle CG Resultant | 26.5 | 29.4 | -2.1 | 21.3 |
| 2 | Left Floor Sill (Y) | 22.7 | 20.7 | -8.1 | 16.8 |
| 3 | Left A-Pillar Sill (Y) | 27.6 | 43.8 | -9.8 | 17.1 |
| 4 | Left A-Pillar Low (Y) | 129.4 | 94.2 | -34.5 | 33 |
| 5 | Left A-Pillar Mid (Y) | 163.7 | 29.5 | -135.8 | 25.5 |
| 6 | Left B-Pillar Sill (Y) | 119.9 | 19.2 | -104.5 | 23.4 |
| 7 | Left B-Pillar Low (Y) | 155.7 | 22.9 | -147.8 | 28.3 |
| 8 | Left B-Pillar Mid (Y) | 71.8 | 36 | -11.4 | 62.8 |
| 9 | Seat Track (Y) | 10.2 | 113.7 | -12 | 65.2 |
| 10 | Engine Top (X) | 17.8 | 63.4 | -1.3 | 200.2 |
| | Engine Top (Y) | 11.6 | 60.3 | -1.3 | 19.2 |
| 11 | Firewall (Y) | 14.2 | 45 | -1.4 | 299.9 |
| 12 | Right Roof (Y) | 16.6 | 57.6 | -0.5 | 299.9 |
| 13 | Right Floor Sill (Y) | 1.3 | 174.1 | -4.2 | 39.4 |
| 14 | Rear Deck (X) | 18.4 | 59 | -0.8 | 183.1 |
| | Rear Deck (Y) | 17.3 | 41.4 | -11.2 | 54.9 |

**DATA SHEET NO. 11**
**DUMMY INJURY RESPONSE DATA FOR ES-2re**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |

| | Positive | | Negative | |
|---|---|---|---|---|
| | **MAX** | **TIME (ms)** | **MAX** | **TIME (ms)** |
| **HEAD ACCELERATION (g)** | | | | |
| Longitudinal (X) * | 3.6 | 237.7 | -14.8 | 62.6 |
| Lateral (Y) | 69.5 | 60.5 | -18.2 | 98.0 |
| Vertical (Z) * | 12.5 | 47.5 | -6.8 | 66.4 |
| Resultant (R) | 70.7 | 60.4 | 0.0 | -55.4 |
| HIC36 (t1, t2) * | 526.9 | | t1 = 48.6 | t2 = 71.4 |
| * The Primary Head X and Z accelerometers sustained damage during impact. The redundant Head X and Z accelerometers are the published results in the above table. The HIC was calculated from the resultant of the redundant Head X and Z and the primary Head Y accelerometers. | | | | |
| **THORAX DEFLECTION (mm)** | | | | |
| Upper Rib | 37.8 | 61.4 | 0.0 | -81.9 |
| Middle Rib | 35.8 | 61.0 | -0.8 | 92.8 |
| Lower Rib | 36.9 | 57.2 | -0.3 | 175.5 |
| **ABDOMINAL FORCES (N)** | | | | |
| Front | § | | | |
| Middle | 392.0 | 28.6 | -14.0 | 279.0 |
| Rear | 625.2 | 41.0 | -12.8 | 286.5 |
| SUM | § | | | |
| § The Anterior Abdominal Rib load cell sustained a damaged wire during impact therefore the sum of the abdominal forces could not be calculated. | | | | |
| **PELVIS FORCE (N)** | | | | |
| Pubic Symphysis (Y) | 15.4 | 24.6 | -1613.6 | 62.9 |

Reference:

Positive direction:

| | |
|---|---|
| Longitudinal | (x) = forward |
| Lateral | (y) = to right |
| Vertical | (z) = down |

**DATA SHEET NO. 12**
**POST TEST OBSERVATIONS**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |

**TEST DUMMY INFORMATION AND CONTACT**

| Description | Front Occupant |
|---|---|
| Head Contact | Side of Head – Side curtain airbag |
| Upper Torso Contact | Side Torso airbag |
| Lower Torso Contact | Side Torso airbag |
| Hip | No Contact |
| Left Knee Contact | No Contact |
| Right Knee Contact | No contact |

**POST TEST DOOR OPENING AND SEAT TRACK INFORMATION**

| Description | Front | Rear |
|---|---|---|
| Left Side Doors | Jammed Shut | Jammed Shut |
| Right Side Doors | Closed and operational | Closed and operational |
| Hatch and Other Doors | NA | Closed and operational |
| Seat Movement | None | None |
| Seat Back Failure | None | None |

**POST TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions |
|---|---|
| Pillar Performance | B-Pillar Intrusion caused by pole impact |
| Sill Separation | No separation |
| Windshield Damage | Severe cracking on left side of windshield |
| Window Damage | Sever cracking on left front window |
| Other Notable Effects | None |

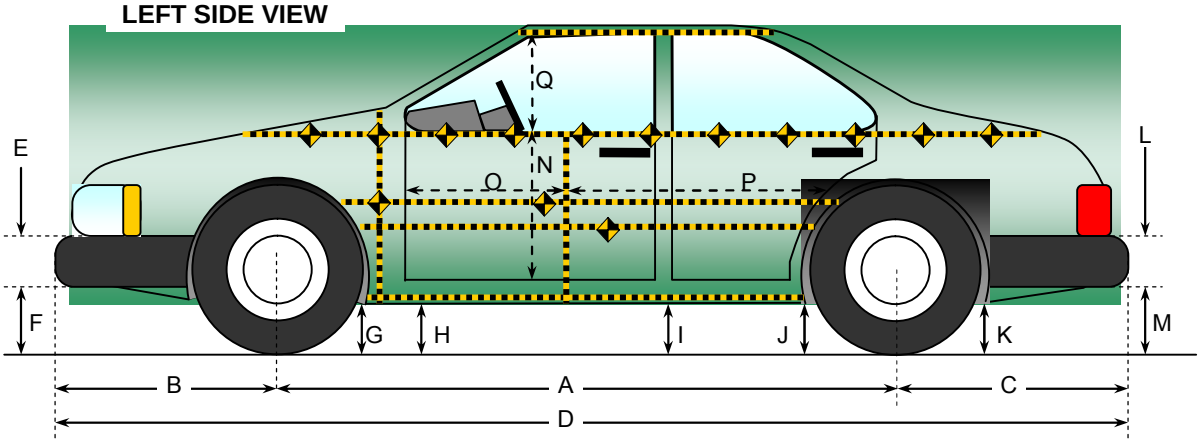
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type | Front Occupant | |
|---|---|---|
| | Installed | Operated |
| Front Airbag | Yes | No |
| Side Torso Airbag | Yes | Yes |
| Head Airbag | No | NA |
| Curtain Airbag | Yes | Yes |
| Seat Belt Pretensioner | Yes | Yes |
| Seat Belt Load Limiter | Yes | Yes |

**DATA SHEET NO. 13**
**VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |

**LEFT SIDE VIEW**

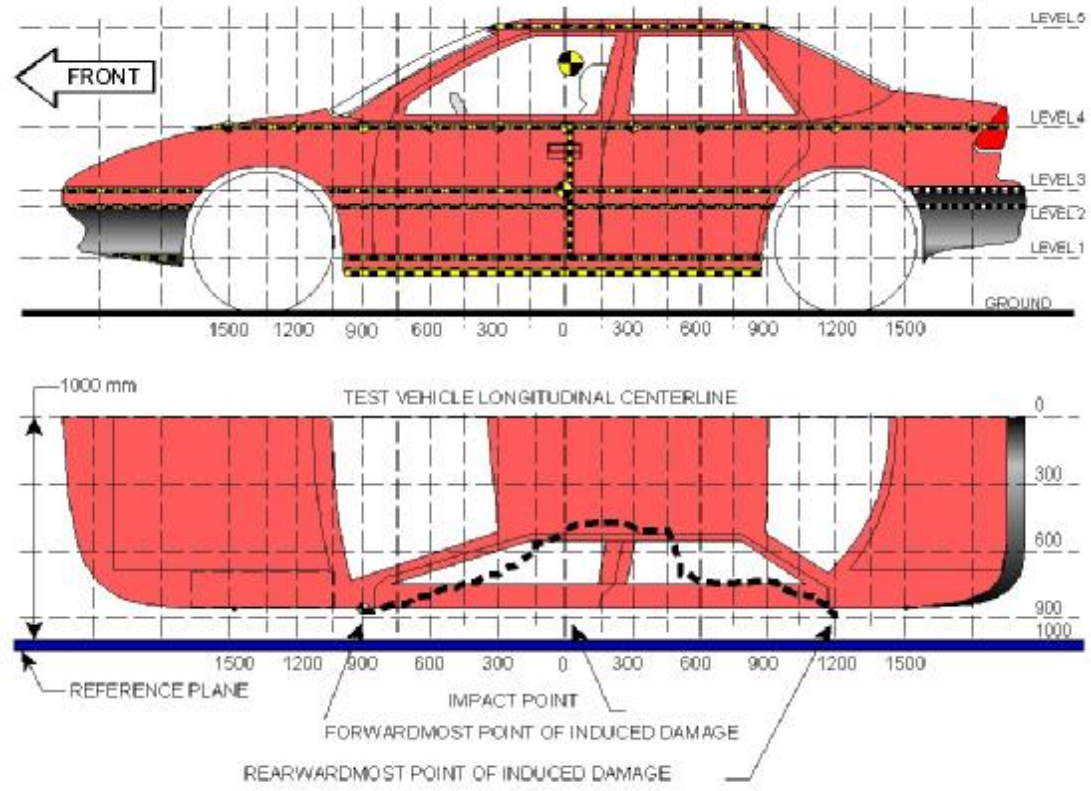



| Code | Description | Pre-Test | Post-Test | Diff Δ |
|---|---|---|---|---|
| A | Wheelbase | 2755 | 2692 | 63 |
| B | Front Axle to FSOV | 1009 | 1020 | -11 |
| C | Rear Axle to RSOV | 1100 | 1129 | -29 |
| D | Total Length at Centerline | 4863 | 4840 | 23 |
| E | Front Bumper Thickness | 208 | 208 | 0 |
| F | Front Bumper Bottom to Ground | 464 | 515 | -51 |
| G | Sill Height at Front Wheel Well | 197 | 225 | -28 |
| H | Sill Height at Front Door Leading Edge | 339 | 360 | -21 |
| I | Sill Height at B Pillar | 311 | 329 | -18 |
| J1 | Sill Height at Rear Wheel Well | 308 | 335 | -27 |
| J2 | Pinch Weld Height at Rear Wheel Well | 328 | 358 | -30 |
| K | Sill Height Aft of Rear Wheel Well | 282 | 325 | -43 |
| L | Rear Bumper Thickness | 150 | 150 | 0 |
| M | Rear Bumper Bottom to Ground | 477 | 488 | -11 |
| N | Sill Height to Window Bottom Sill | 804 | 813 | -9 |
| O | Front Door Leading Edge to Impact CL | 776 | 772 | 4 |
| P | Rear Door Trailing Edge to Impact CL | 1198 | 1154 | 44 |
| Q | Front Window Opening | 504 | 478 | 26 |
| R* | Right Side Length | 4672 | 4659 | 13 |
| S* | Left Side Length | 4663 | 4611 | 52 |
| T* | Vehicle Width at B Post | 1987 | 1659 | 328 |

* - not shown in schematic above

**DATA SHEET NO. 14**
**EXTERIOR CRUSH MEASUREMENTS**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |



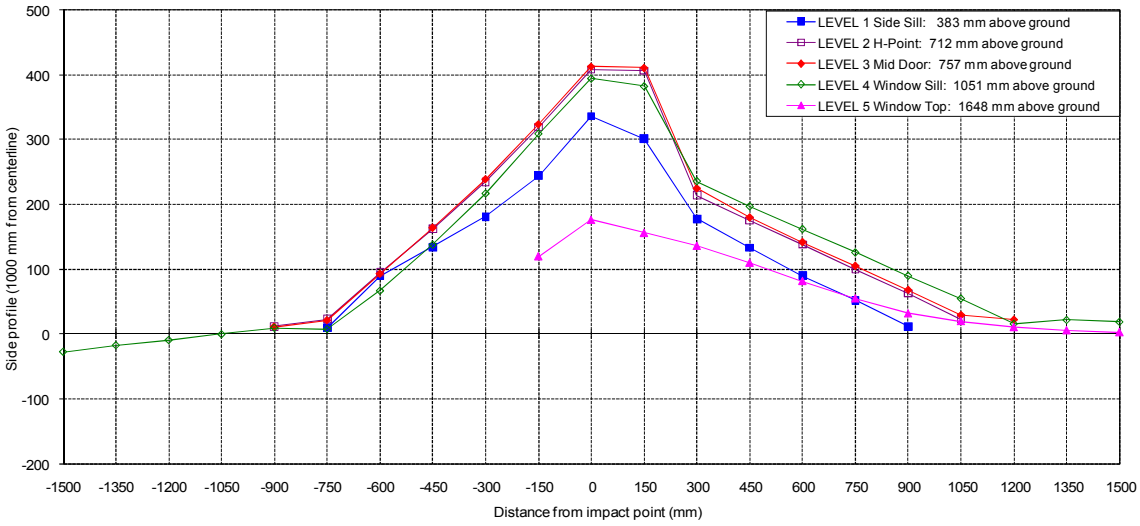

NOTE: All measurements are in millimeters (mm)

**Maximum Exterior Crush Measurements**

| Level | Measurement Description | Maximum Exterior Static Crush | Distance from Impact | Height Above Ground |
|---|---|---|---|---|
| 1 | Sill Top | 336 | 0 | 383 |
| 2 | Occupant H-Point | 408 | 0 | 712 |
| 3 | Mid-Door | 413 | 0 | 757 |
| 4 | Window Sill | 394 | 0 | 1051 |
| 5 | Window Top | 176 | 0 | 1648 |

**DATA SHEET NO. 15**
**VEHICLE EXTERIOR CRUSH PROFILES**

| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |




| | Pre-Test | | | | | Post-Test | | | | | Diff Δ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **-1500** | -- | -- | -- | 810 | -- | -- | -- | -- | 837 | -- | -- | -- | -- | -27 | -- |
| **-1350** | -- | -- | -- | 833 | -- | -- | -- | -- | 850 | -- | -- | -- | -- | -17 | -- |
| **-1200** | -- | -- | -- | 858 | -- | -- | -- | -- | 867 | -- | -- | -- | -- | -9 | -- |
| **-1050** | -- | -- | -- | 877 | -- | -- | -- | -- | 877 | -- | -- | -- | -- | 0 | -- |
| **-900** | -- | 985 | 983 | 891 | -- | -- | 973 | 972 | 881 | -- | -- | 12 | 11 | 10 | -- |
| **-750** | 931 | 970 | 969 | 902 | -- | 921 | 947 | 948 | 894 | -- | 10 | 23 | 21 | 8 | -- |
| **-600** | 909 | 972 | 973 | 910 | -- | 819 | 877 | 880 | 843 | -- | 90 | 95 | 93 | 67 | -- |
| **-450** | 904 | 974 | 976 | 918 | -- | 770 | 812 | 812 | 780 | -- | 134 | 162 | 164 | 138 | -- |
| **-300** | 904 | 976 | 979 | 924 | -- | 723 | 741 | 740 | 707 | -- | 181 | 235 | 239 | 217 | -- |
| **-150** | 904 | 978 | 980 | 929 | 655 | 660 | 659 | 656 | 620 | 535 | 244 | 319 | 324 | 309 | 120 |
| **0** | 903 | 979 | 981 | 934 | 667 | 567 | 571 | 568 | 540 | 491 | 336 | 408 | 413 | 394 | 176 |
| **150** | 904 | 979 | 981 | 937 | 672 | 603 | 573 | 570 | 555 | 516 | 301 | 406 | 411 | 382 | 156 |
| **300** | 903 | 978 | 981 | 940 | 674 | 725 | 764 | 756 | 704 | 538 | 178 | 214 | 225 | 236 | 136 |
| **450** | 899 | 976 | 979 | 940 | 675 | 766 | 801 | 799 | 743 | 565 | 133 | 175 | 180 | 197 | 110 |
| **600** | 898 | 975 | 977 | 940 | 674 | 808 | 837 | 835 | 778 | 592 | 90 | 138 | 142 | 162 | 82 |
| **750** | 899 | 972 | 975 | 940 | 670 | 847 | 872 | 870 | 814 | 615 | 52 | 100 | 105 | 126 | 55 |
| **900** | 912 | 970 | 973 | 939 | 663 | 900 | 907 | 905 | 849 | 631 | 12 | 63 | 68 | 90 | 32 |
| **1050** | -- | 981 | 980 | 947 | 655 | -- | 958 | 951 | 892 | 635 | -- | 23 | 29 | 55 | 20 |
| **1200** | -- | -- | 992 | 935 | 644 | -- | -- | 970 | 919 | 633 | -- | -- | 22 | 16 | 11 |
| **1350** | -- | -- | -- | 934 | 632 | -- | -- | -- | 912 | 626 | -- | -- | -- | 22 | 6 |
| **1500** | -- | -- | -- | 934 | 617 | -- | -- | -- | 915 | 614 | -- | -- | -- | 19 | 3 |

**DATA SHEET NO. 16**
**SUMMARY OF FMVSS 301 FUEL SYSTEM DATA**

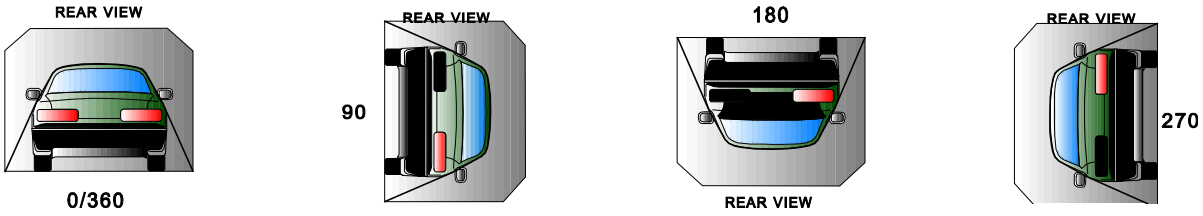
| | | | |
|---|---|---|---|
| Test Vehicle: | 2010 Acura MDX | NHTSA No. | CA5304 |
| Test Program: | FMVSS 214 Indicant Side Impact | Test Date: | April 9, 2010 |

**FUEL SYSTEM INTEGRITY POST IMPACT DATA**

| Time Interval | FMVSS 301 Maximum Allowable Spillage | Spillage (g) |
|---|---|---|
| Impact Until Motion Ceases | 28 g | 0 |
| First Five Minutes Following Impact | 142 g | 0 |
| Next 25 Minutes | 28 g / 1 minute | 0 |

| | |
|---|---|
| Spillage Location(s) | None |

**STATIC ROLLOVER DATA**

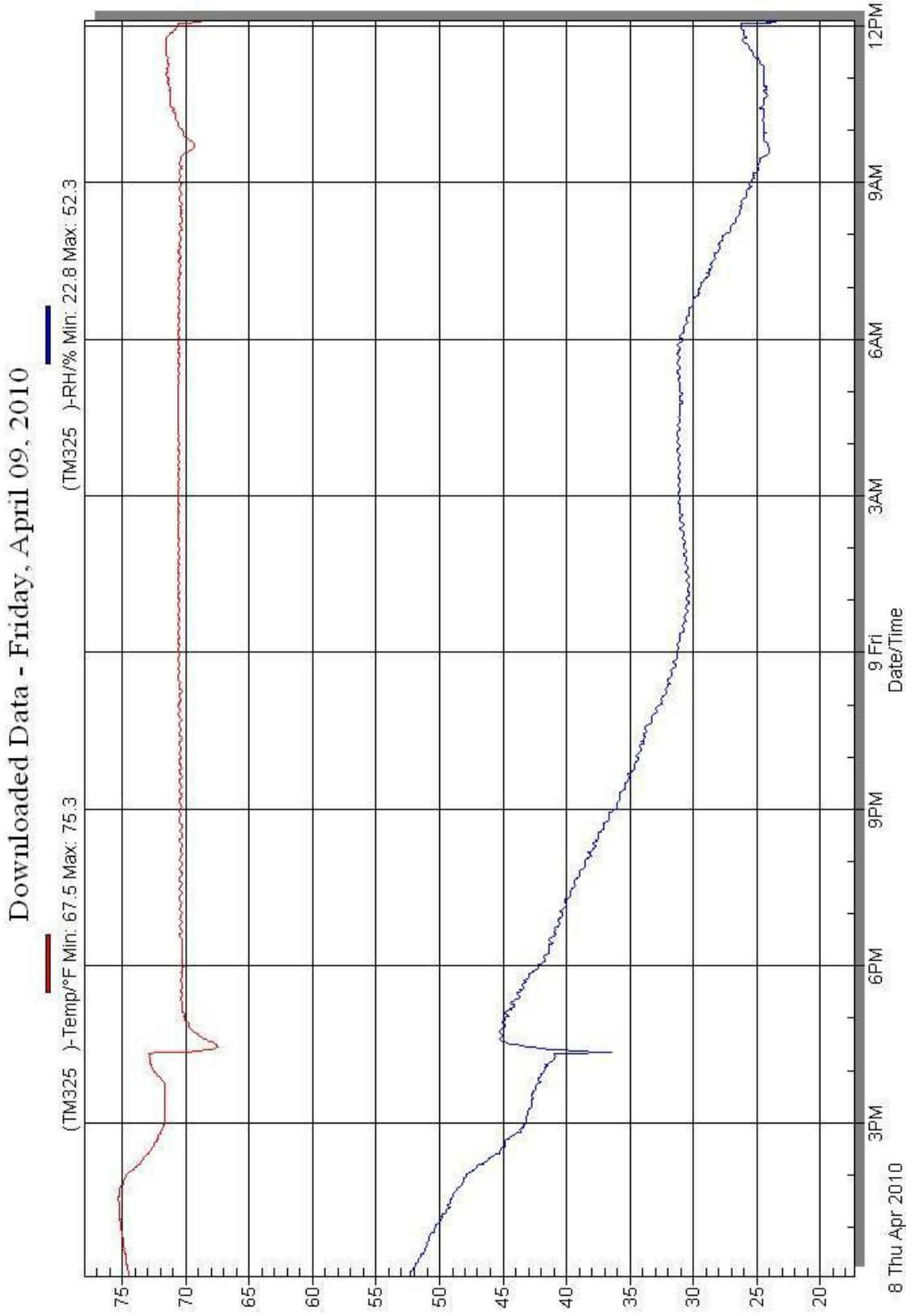



| Rollover Stage | Rotation Time (spec. 1 -3 min) | | | | FMVSS 301 Hold Time | | Total Time | | | | Next Whole Minute Interval | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0º - 90º | 1 | minutes | 05 | seconds | 5 | minutes | 6 | minutes | 5 | seconds | 7 | minutes |
| 90º - 180º | 1 | minutes | 06 | seconds | 5 | minutes | 6 | minutes | 6 | seconds | 7 | minutes |
| 180º-270º | 1 | minutes | 07 | seconds | 5 | minutes | 6 | minutes | 7 | seconds | 7 | minutes |
| 270º-360º | 1 | minutes | 09 | seconds | 5 | minutes | 6 | minutes | 9 | seconds | 7 | minutes |

| Rollover Stage | Spillage (g) | | | |
|---|---|---|---|---|
| | First 5 min. from onset of rotation | 6th min. | 7th min. | 8th min. (if required) |
| 0º - 90º | 0 | 0 | 0 | 0 |
| 90º - 180º | 0 | 0 | 0 | 0 |
| 180º-270º | 0 | 0 | 0 | 0 |
| 270º-360º | 0 | 0 | 0 | 0 |
| FMVSS 301 Maximum Allowable (for each 90º stage) | 142 | 28 | 28 | 28 |

| Rollover Stage | Spillage Location(s) |
|---|---|
| 0º - 90º | None |
| 90º - 180º | None |
| 180º-270º | None |
| 270º-360º | None |

**DATA SHEET NO. 17**
**TEMPERATURE AND HUMIDITY TRACE**



# APPENDIX A

# PHOTOGRAPHS

**TABLE OF PHOTOGRAPHS**


FIGURE A-1 : Pre-Test Front View of Test Vehicle


FIGURE A-2 : Post-Test Front View of Test Vehicle


FIGURE A-3 : Pre-Test 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 ¾ Front View of Vehicle and Pole

FIGURE A-8 : Pre-Test Left ¾ Rear View of Vehicle and Pole


FIGURE A-9 : Pre-Test Overhead View of Aligned Vehicle and Pole


FIGURE A-10 : Post-Test Overhead View of Aligned Vehicle and Pole


FIGURE A-11 : Pre-Test Dummy Thru Opposite Window

FIGURE A-12 : Post-Test Dummy Thru Opposite Window

FIGURE A-13 : Pre-Test Close-up of Dummy w/Door Closed (Impact Side)

FIGURE A-14 : Post-Test Dummy w/Door Closed (Impact Side)


FIGURE A-15 : Pre-Test Dummy Door Open

FIGURE A-16 : Pre-Test Dummy Shoulder and Door Top View

FIGURE A-17 : Post-Test Dummy Shoulder and Door Top View


FIGURE A-18 : Pre-Test Interior of Front Door Closed (thru opposite door)

FIGURE A-19 : Post-Test Interior of Front Door Showing Dummy Impact Locations

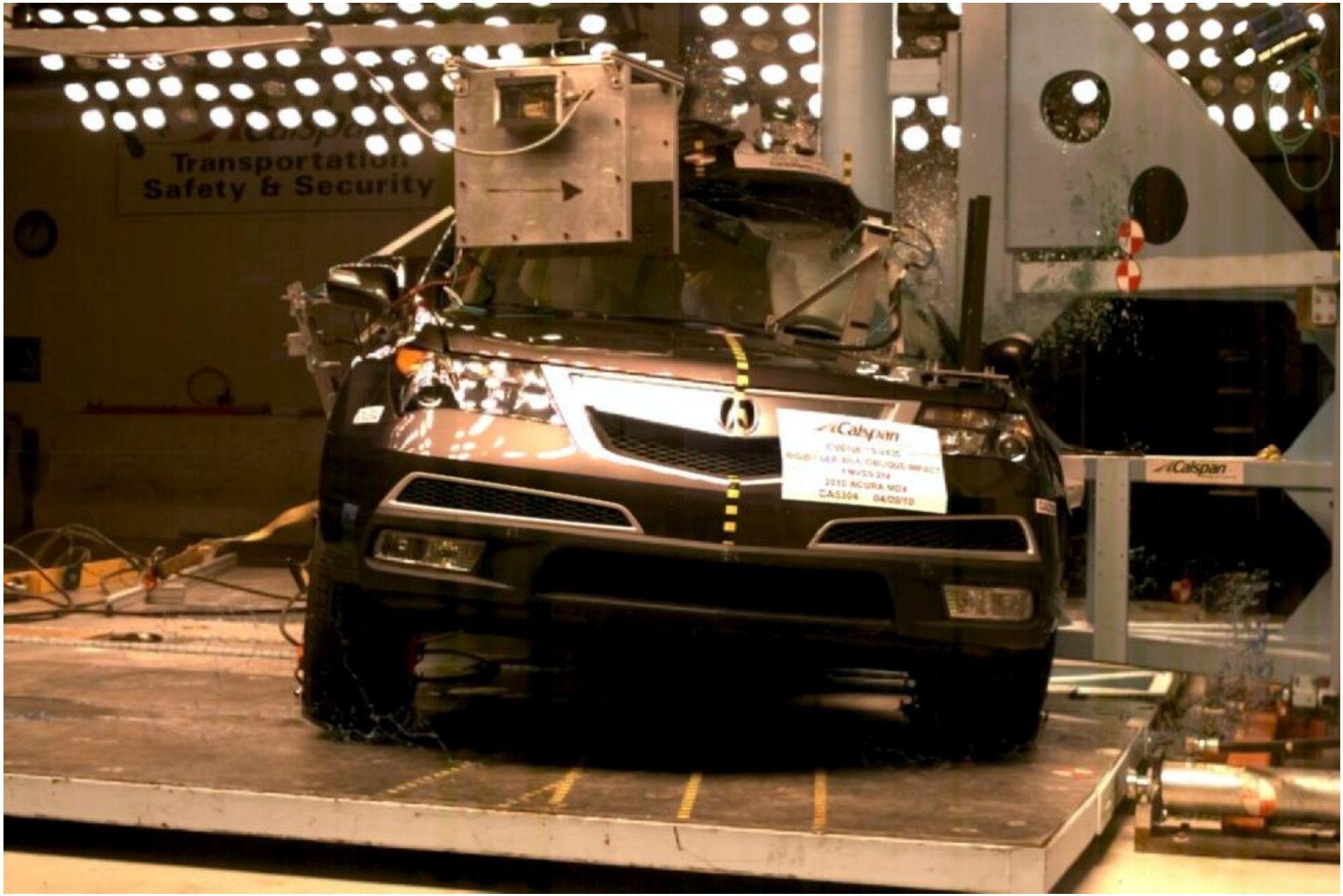



FIGURE A-20 : Impact Event


FIGURE A-21 : Post-Test Impact Zone Close-up View


FIGURE A-22 : Post-Test ¾ Front View of Impact Zone


FIGURE A-23 : Post-Test ¾ Rear View of Impact Zone

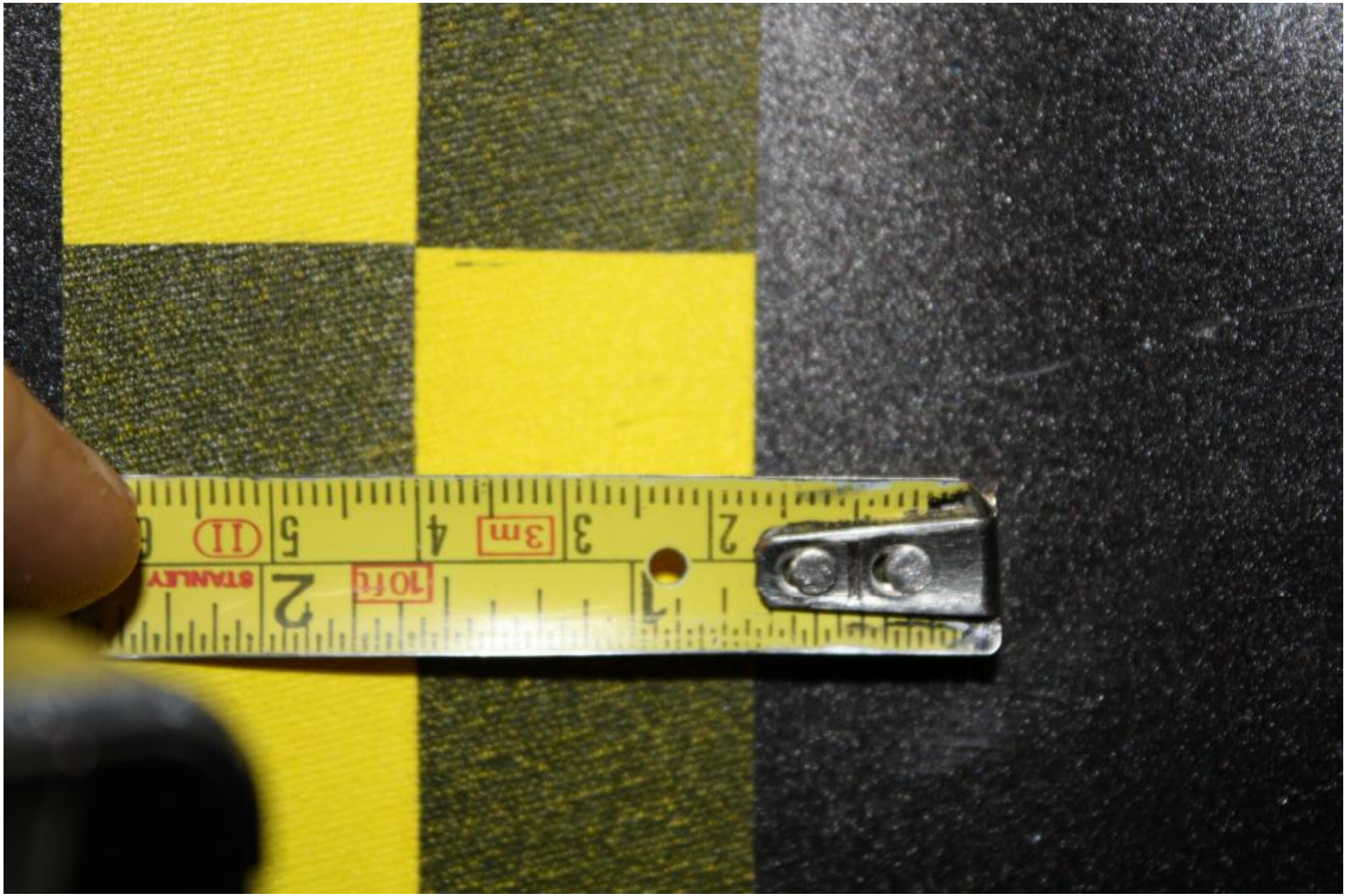



FIGURE A-24 : Post-Test Close-Up View of Impact Point Target


FIGURE A-25 : Close-up View of Vehicle's Certification Label


FIGURE A-26 : Close-up View of Vehicle's Tire Placard Label


FIGURE A-27 : Rollover 90 Degrees

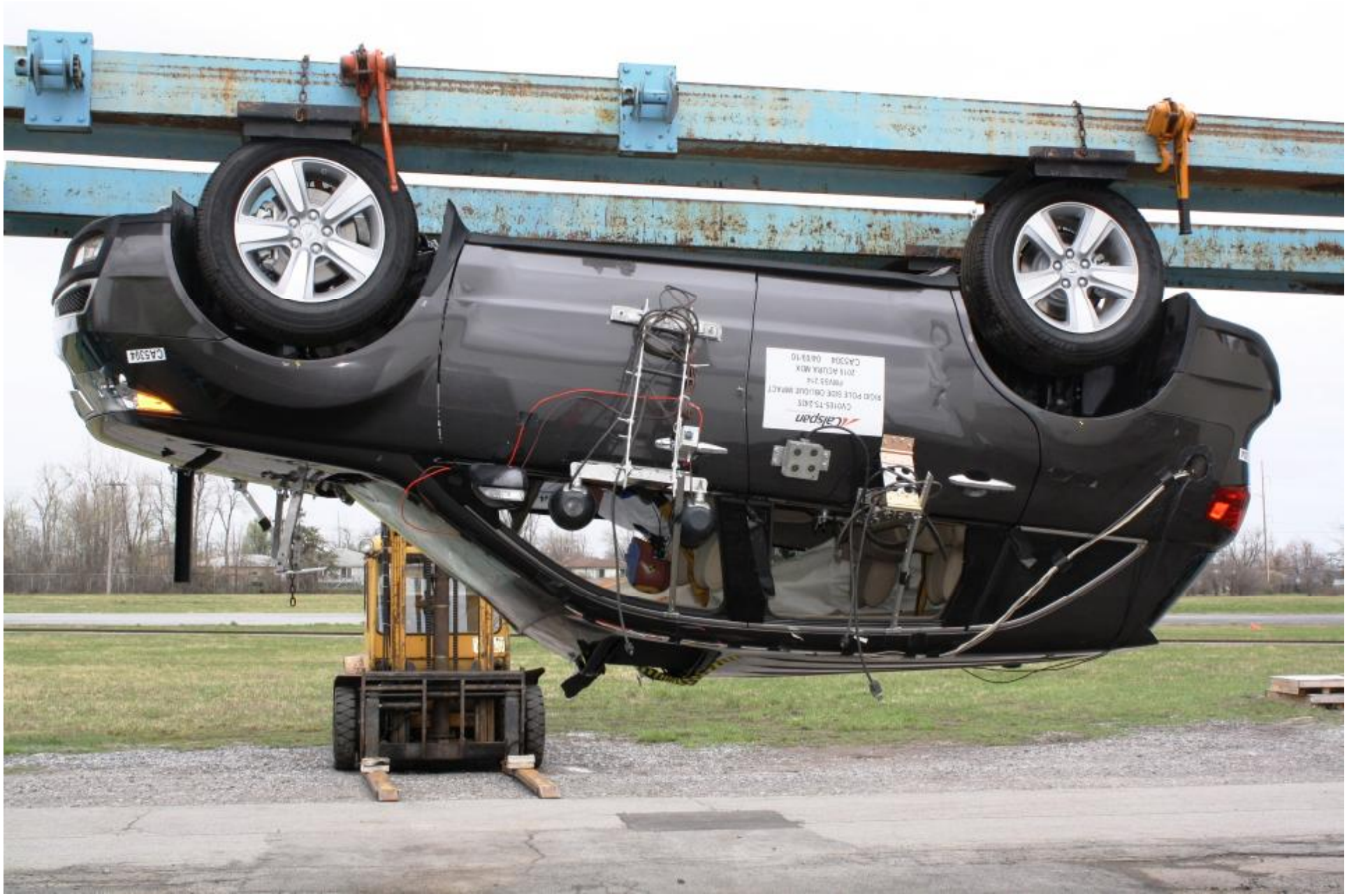


FIGURE A-28 : Rollover 180 Degrees

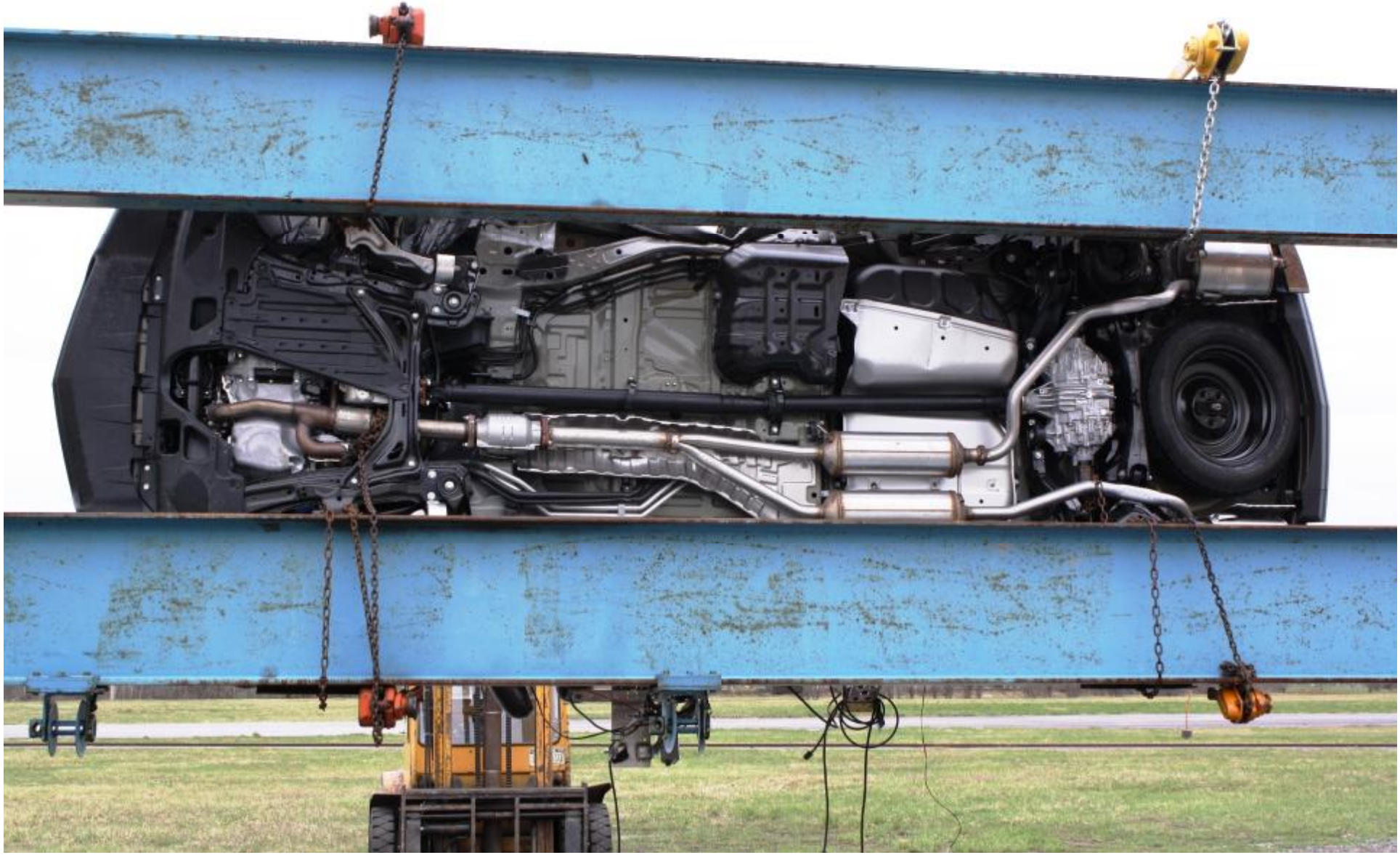


FIGURE A-29 : Rollover 270 Degrees


FIGURE A-30 : Rollover 360 Degrees

# APPENDIX B

## DUMMY, VEHICLE AND MDB RESPONSE DATA

## (SAE sign convention)

**ES-2re DATA CHANNEL FILTER CLASS SUMMARY**

| Data Type | SAE Filter Class | Cut-off Frequency |
|---|---|---|
| Dummy Head Acceleration | 1000 | 1650 |
| Chest Deflection | 180 | 300 |
| Spine Acceleration | 60 | 100 |
| Abdomen Force | 600 | 1000 |
| Pubic Force | 600 | 1000 |

**DATA CHANNEL TITLE KEY**

| Prefix | Suffix |
|---|---|
| V1 = Vehicle 1 (Test Vehicle) | Ax = Acceleration, X-direction |
| | Ay = Acceleration, Y-direction |
| P1 = Left Front Seating Position (Driver) | Az = Acceleration, Z-direction |
| | Fx = Force, X-direction |
| A1-A18 = Accelerometer Location Number | Fy = Force, Y-direction |
| | Fz = Force, Z-direction |
| | Dx = Deflection, X-direction |
| | Dy = Deflection, Y-direction |
| | Dz = Deflection, Z-direction |

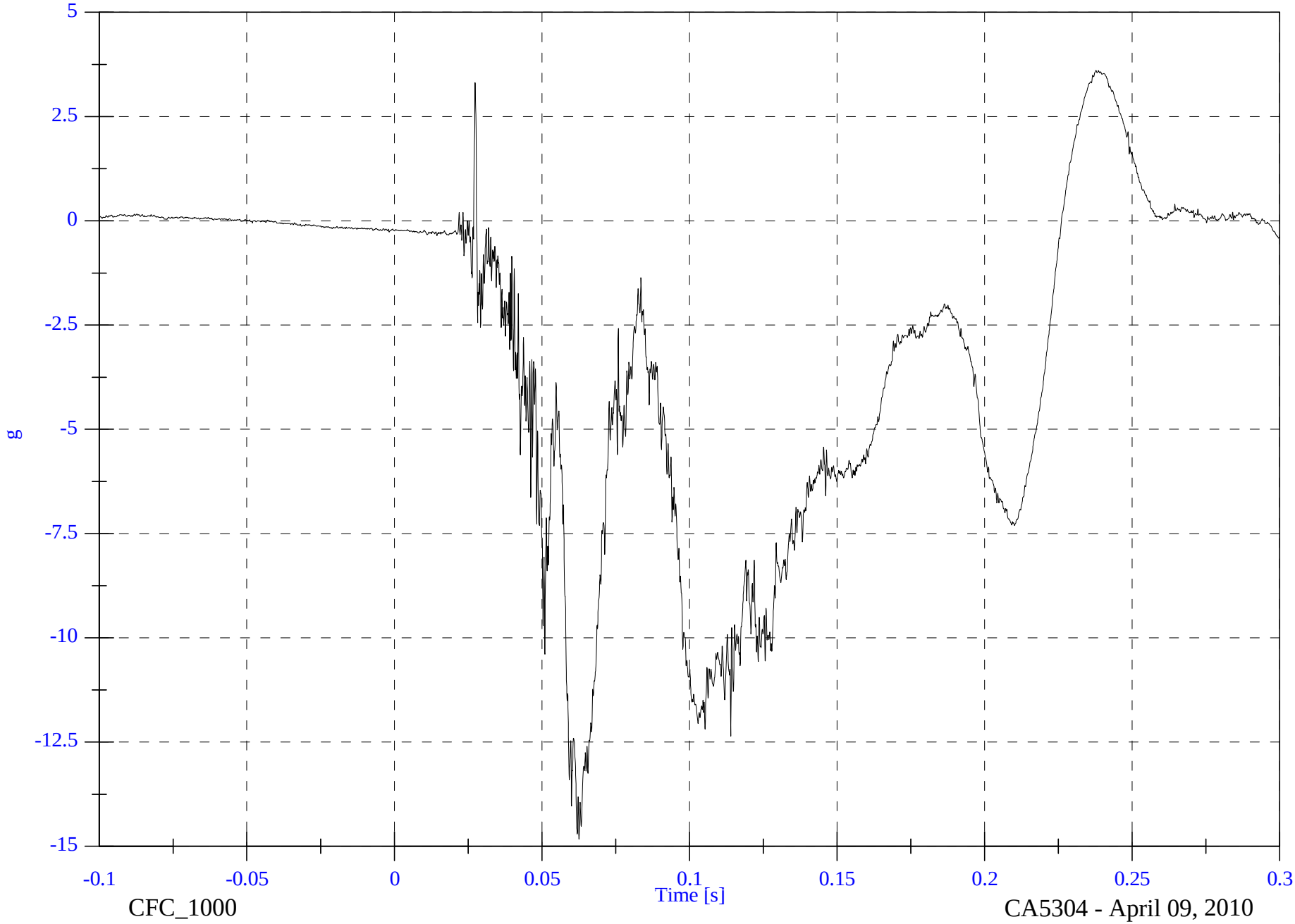
**TABLE OF DATA PLOTS for ES-2RE**

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Head x (Redundant)

Max: 3.6 [g] at 0.238 [s]

Min: -14.8 [g] at 0.063 [s]




B-4

tr2435

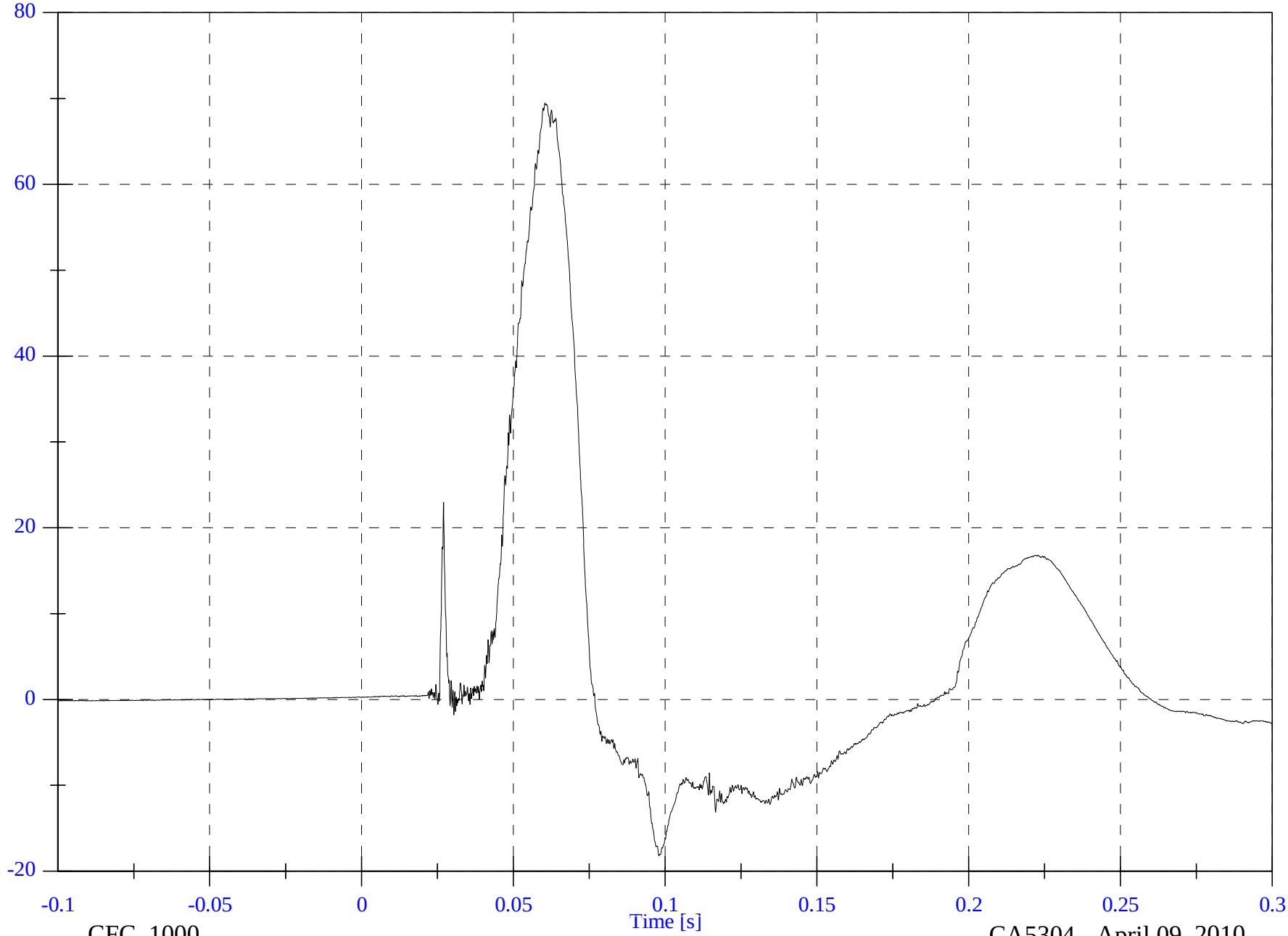
CFC_1000

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Head y

Max: 69.5 [g] at 0.060 [s]
Min: -18.2 [g] at 0.098 [s]




B-5

tr2435

CFC_1000

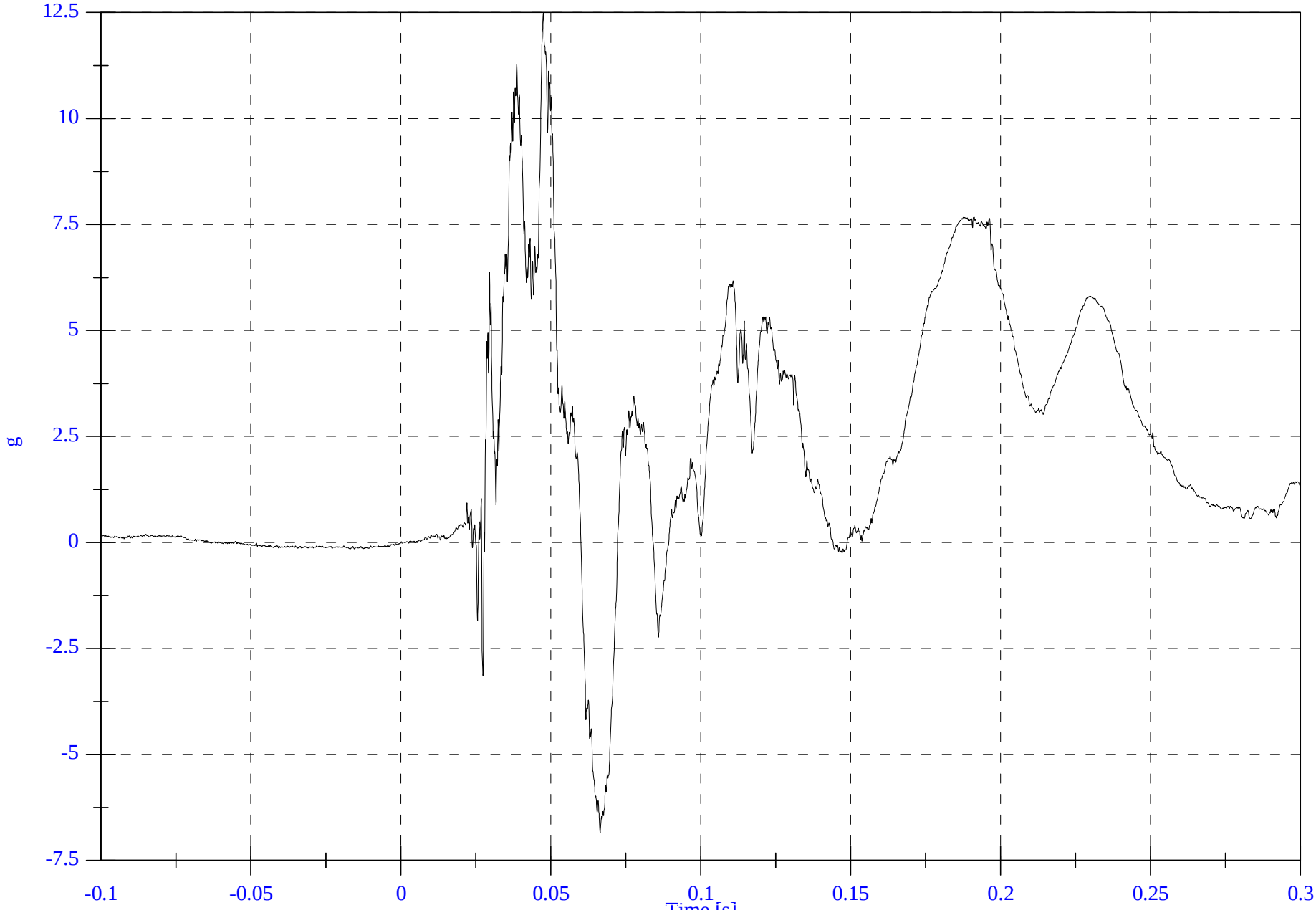
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Head z (Redundant)

Max: 12.5 [g] at 0.048 [s]

Min: -6.8 [g] at 0.066 [s]




B-6

tr2435

CFC_1000

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Head Resultant

Max: 70.7 [g] at 0.060 [s]
Min: 0.0 [g] at -0.055 [s]


CFC_1000

CA5304 - April 09, 2010

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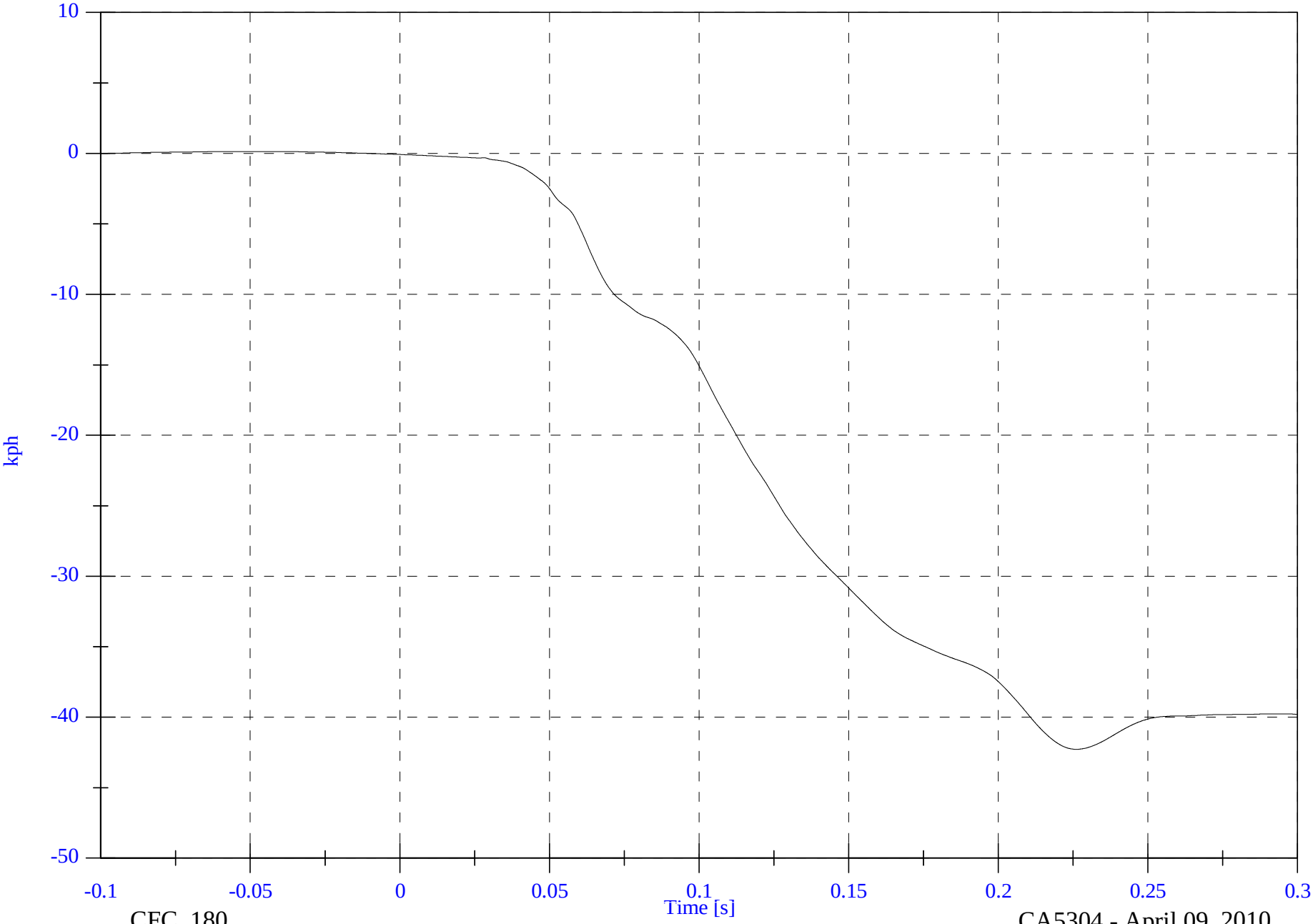
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Head x (Redundant) Velocity

Max: 0.1 [kph] at -0.049 [s]

Min: -42.3 [kph] at 0.226 [s]




CFC_180

CA5304 - April 09, 2010

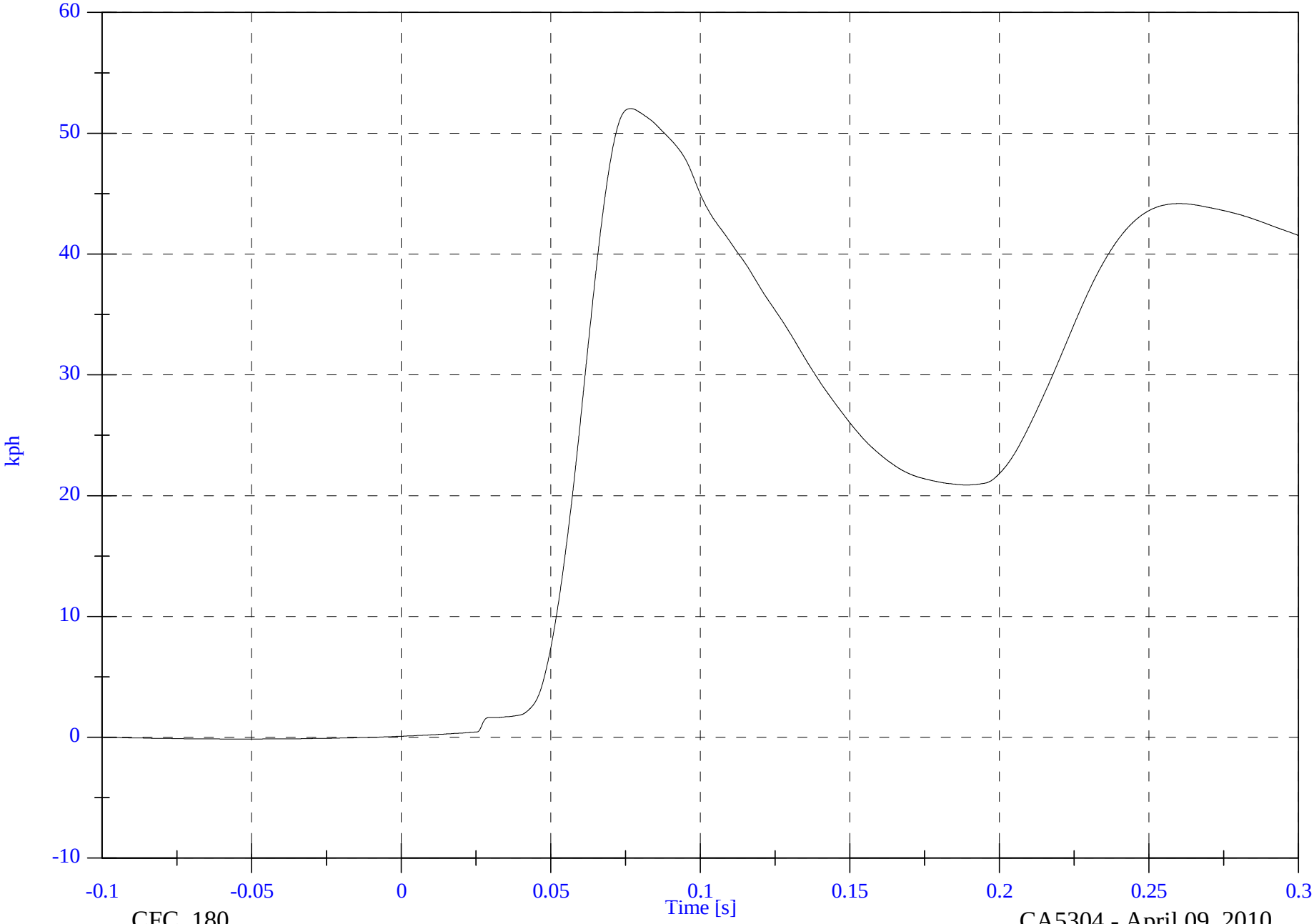
B-8

tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Head y Velocity

Max: 52.1 [kph] at 0.077 [s]
Min: -0.1 [kph] at -0.054 [s]




CFC_180

CA5304 - April 09, 2010

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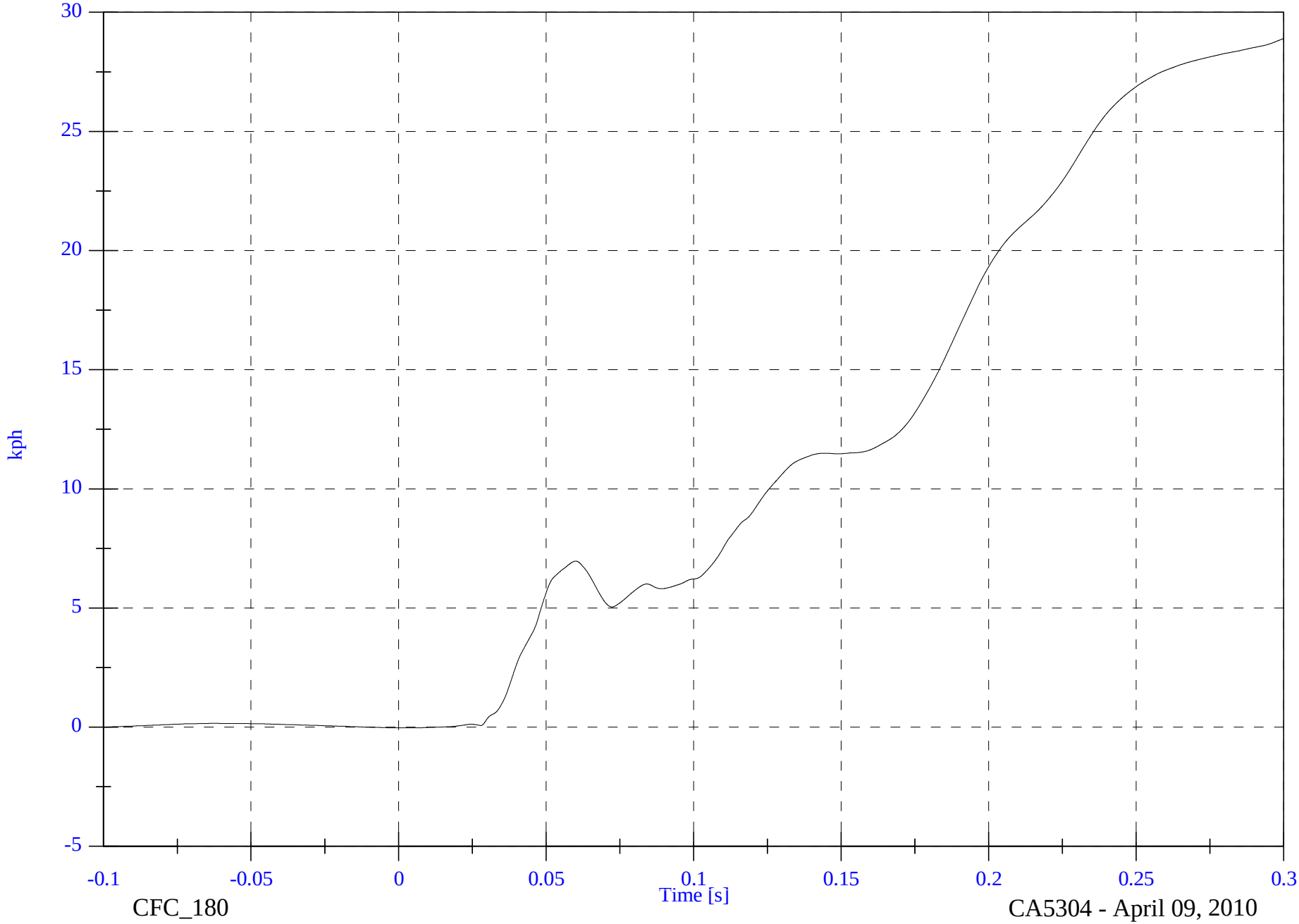
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Head z (Redundant) Velocity

Max: 28.9 [kph] at 0.300 [s]

Min: -0.0 [kph] at 0.001 [s]




CFC_180

CA5304 - April 09, 2010

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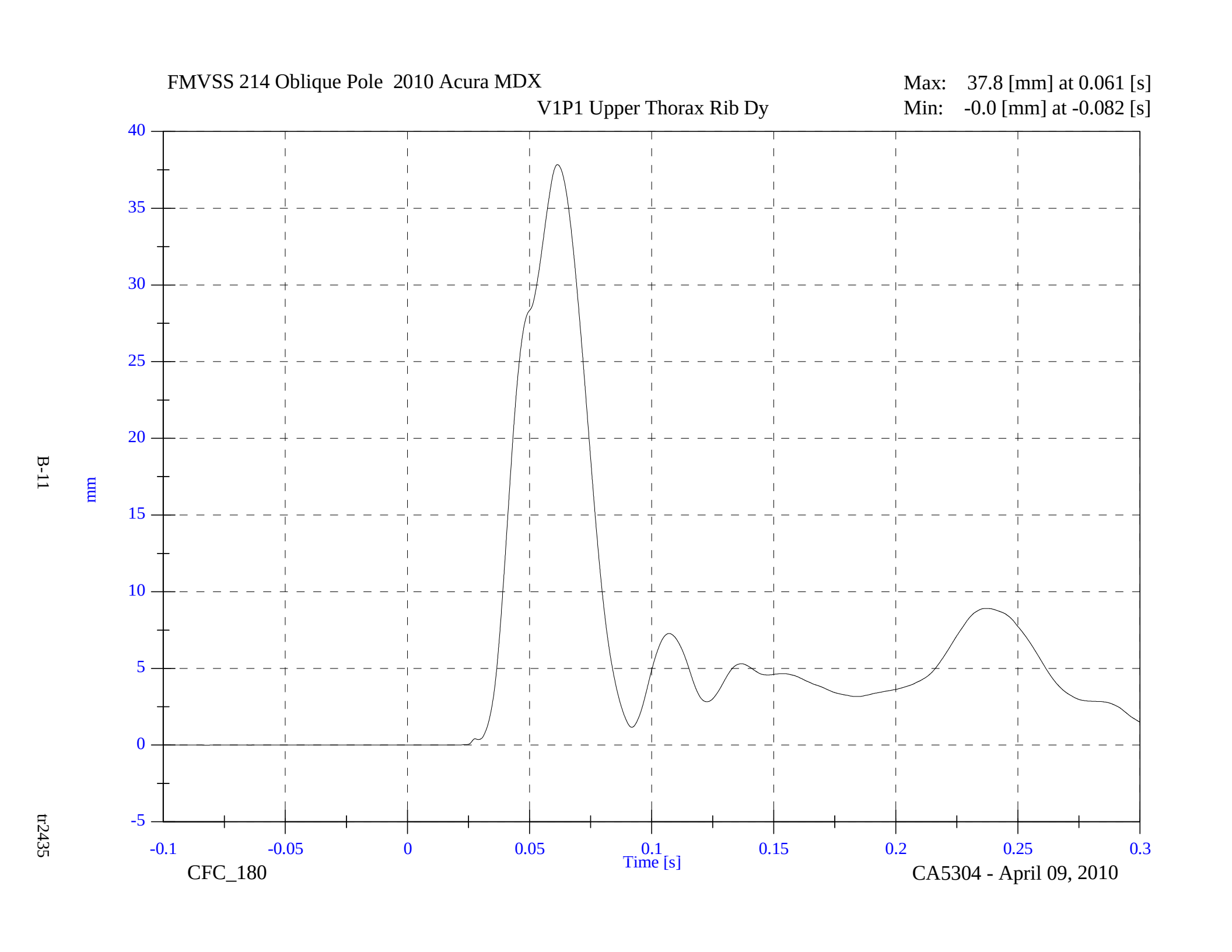
tr2435

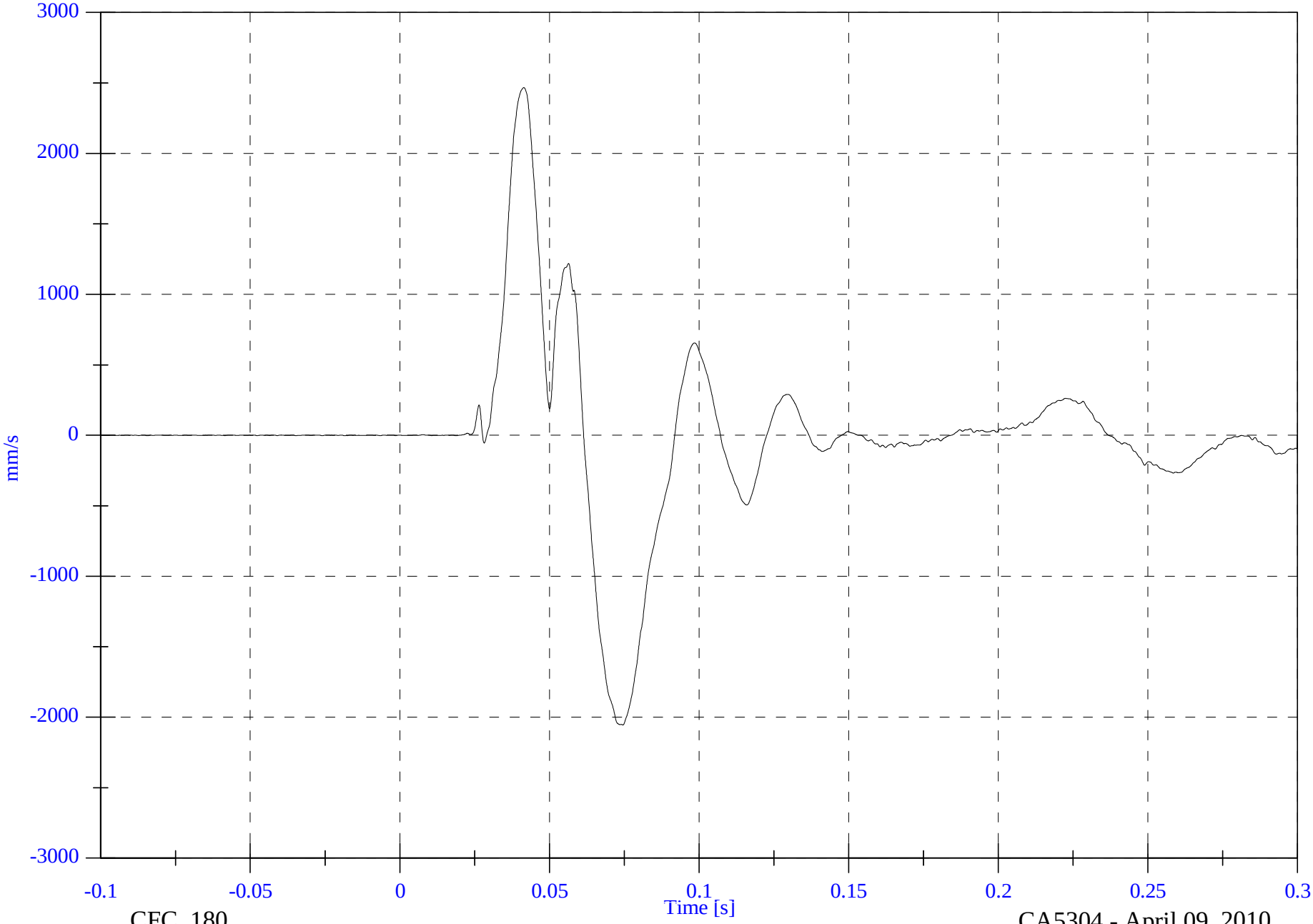

FMVSS 214 Oblique Pole 2010 Acura MDX
V1P1 Upper Thorax Rib Dy
Max: 37.8 [mm] at 0.061 [s]
Min: -0.0 [mm] at -0.082 [s]
mm
40
35
30
25
20
15
10
5
0
-5
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
CA5304 - April 09, 2010
B-11
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Upper Thorax Rib Dy Rate

Max: 2467.7 [mm/s] at 0.041 [s]

Min: -2055.7 [mm/s] at 0.075 [s]




CFC_180

CA5304 - April 09, 2010

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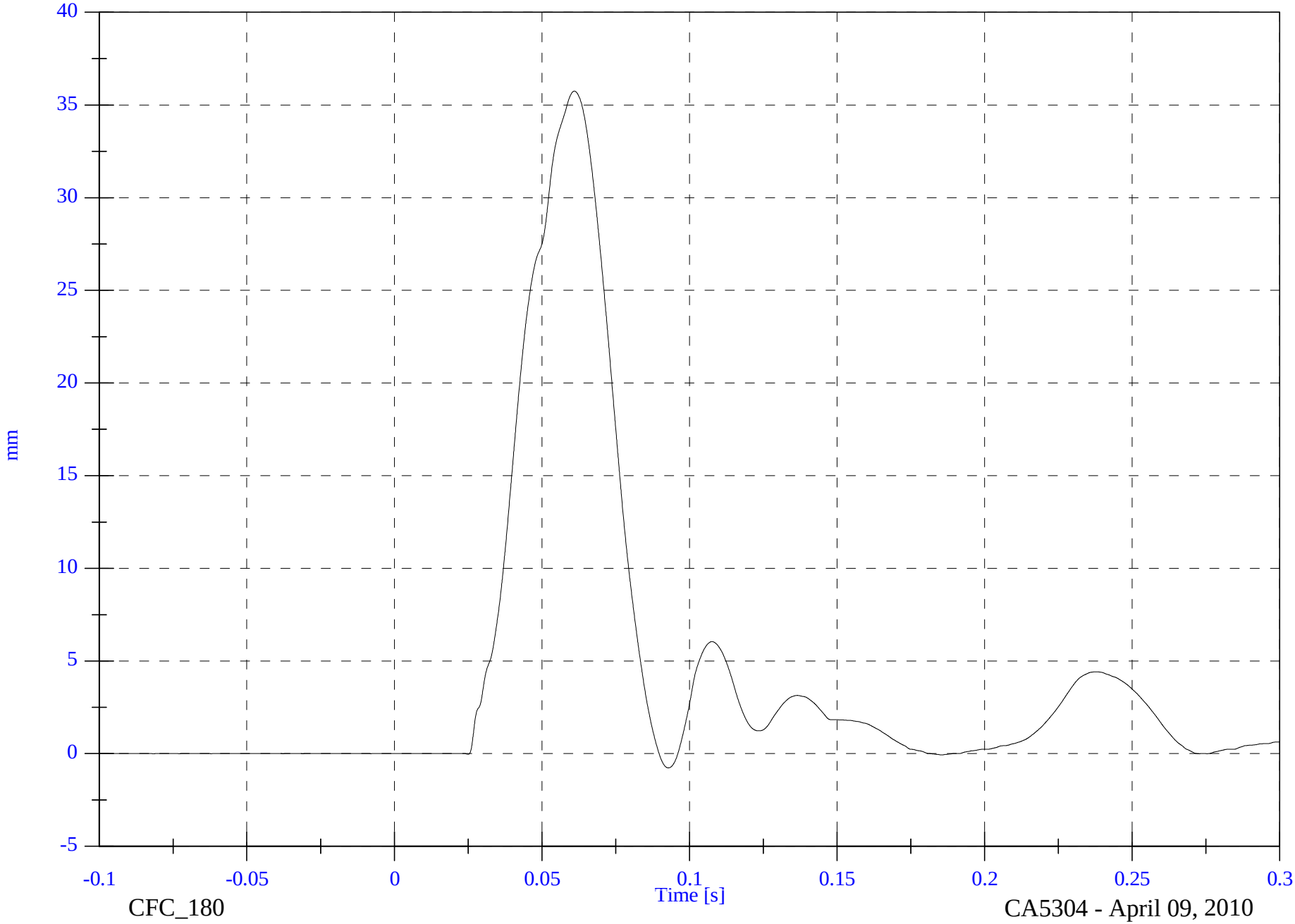
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Middle Thorax Rib Dy

Max: 35.8 [mm] at 0.061 [s]

Min: -0.8 [mm] at 0.093 [s]




CFC_180

CA5304 - April 09, 2010

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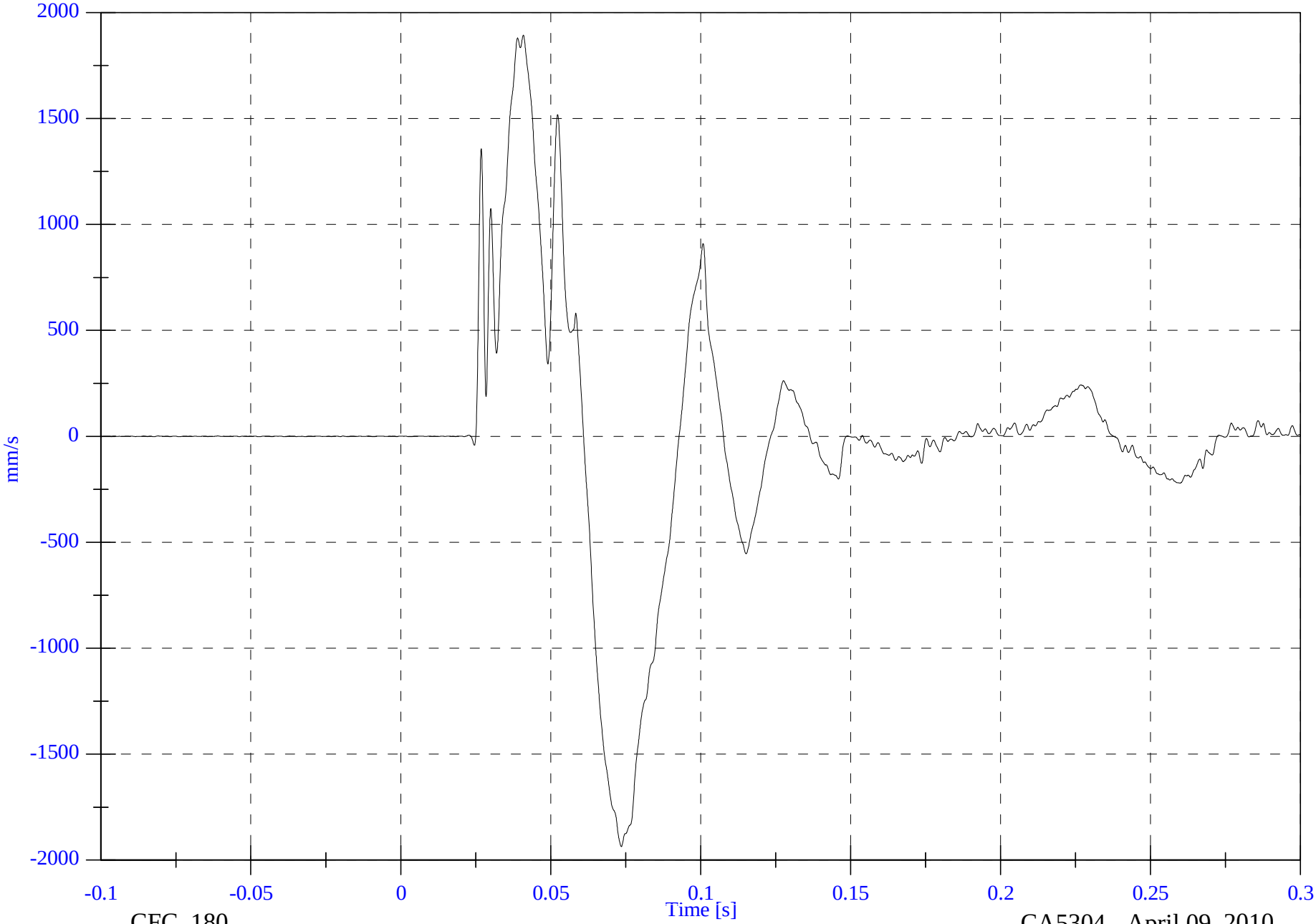
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Middle Thorax Rib Dy Rate

Max: 1893.5 [mm/s] at 0.041 [s]

Min: -1936.5 [mm/s] at 0.074 [s]




CFC_180

CA5304 - April 09, 2010

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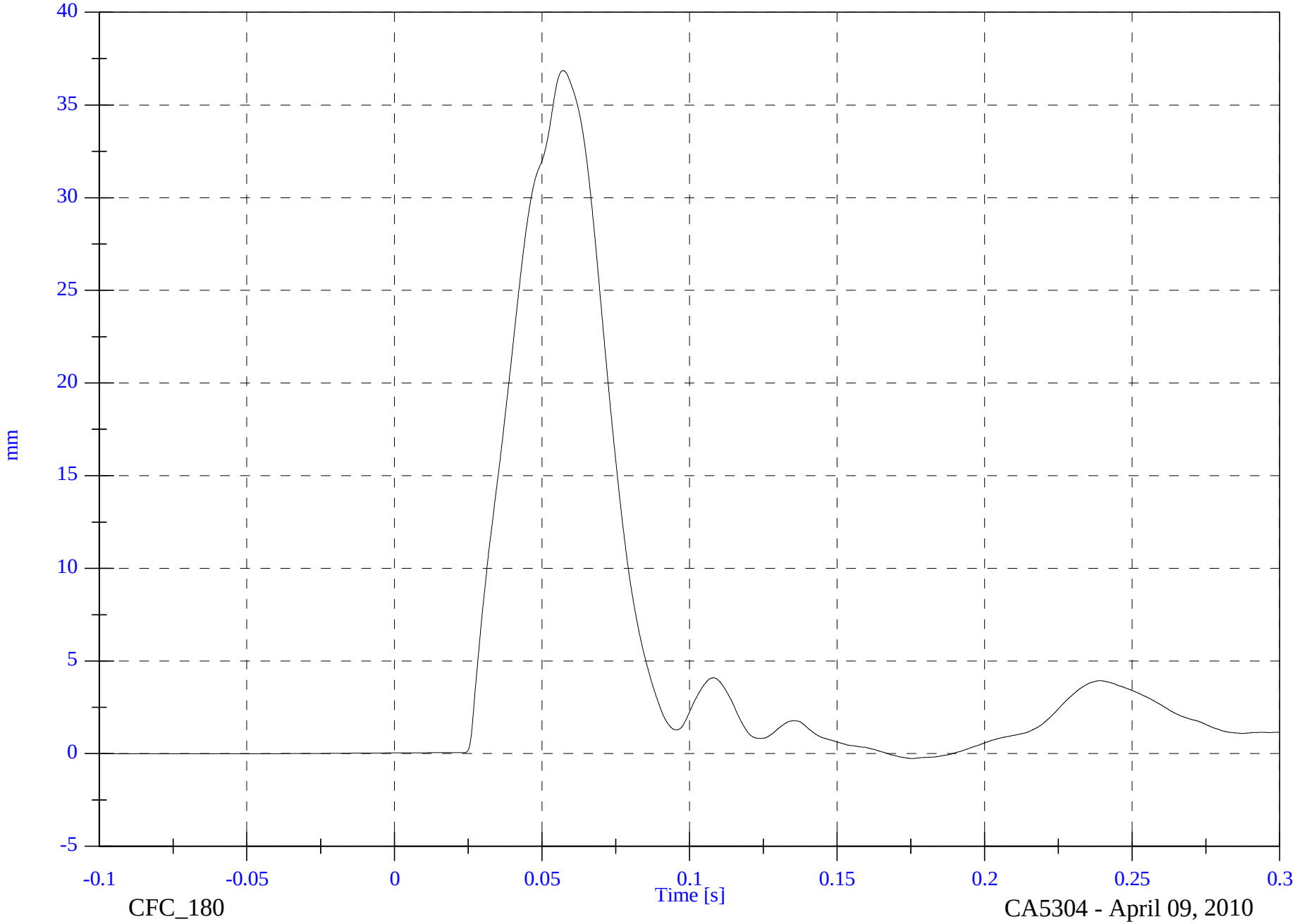
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Lower Thorax Rib Dy

Max: 36.9 [mm] at 0.057 [s]

Min: -0.3 [mm] at 0.176 [s]




CFC_180

CA5304 - April 09, 2010

B-15

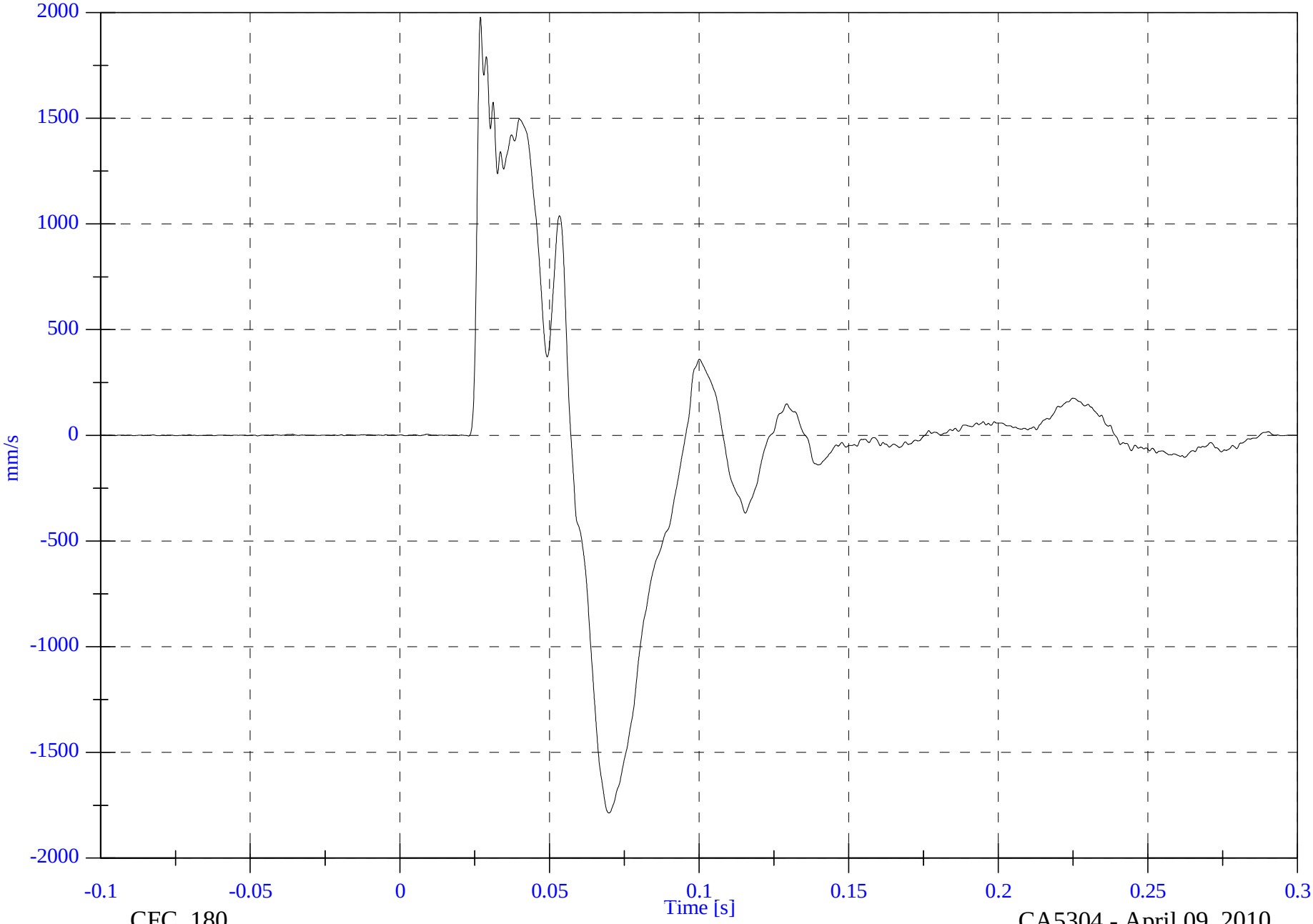
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Lower Thorax Rib Dy Rate

Max: 1978.4 [mm/s] at 0.027 [s]

Min: -1786.1 [mm/s] at 0.070 [s]




CFC_180

CA5304 - April 09, 2010

B-16

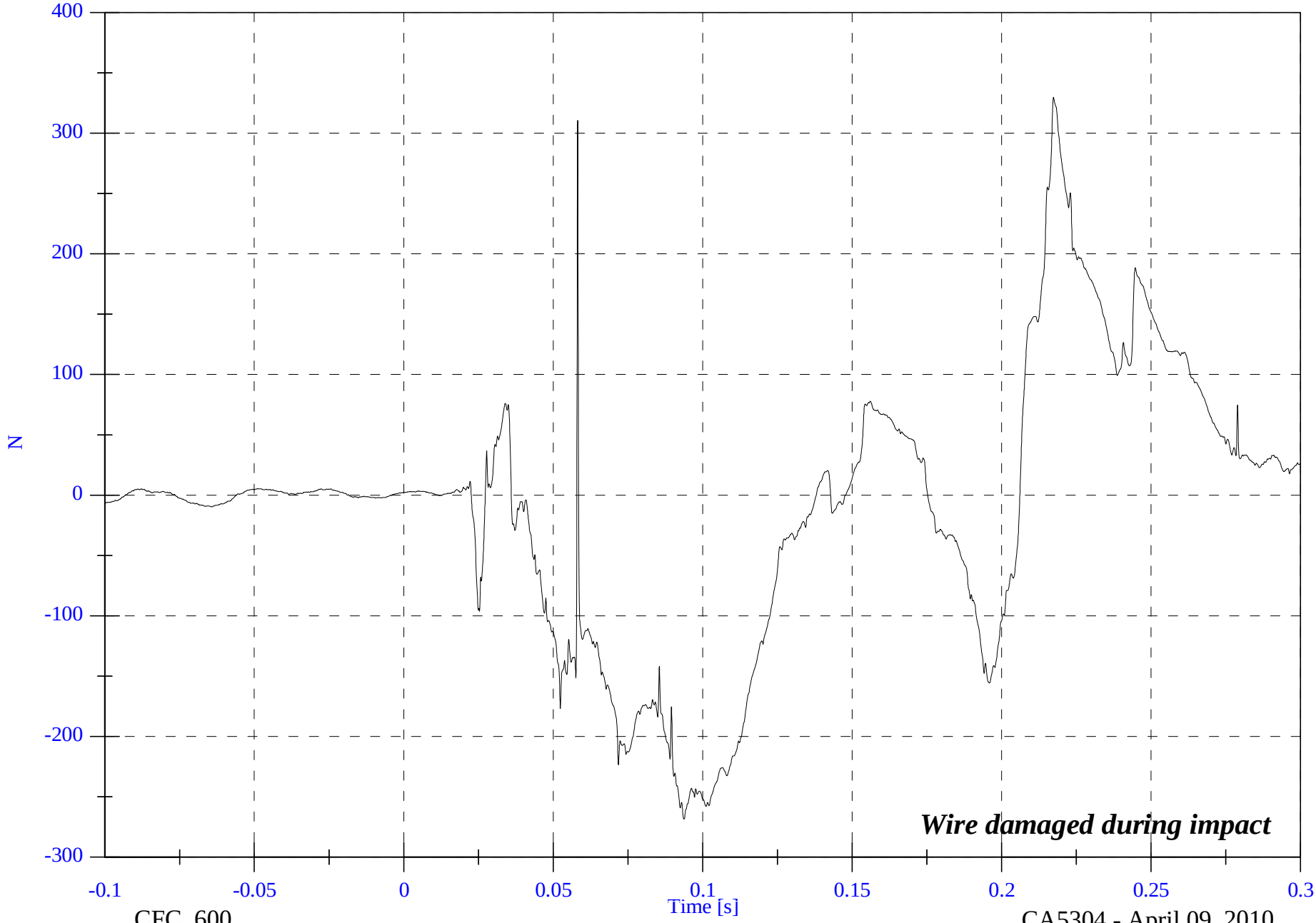
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Front Abdominal Fy

Max: 329.7 [N] at 0.217 [s]

Min: -268.4 [N] at 0.094 [s]




B-17

tr2435

CFC_600

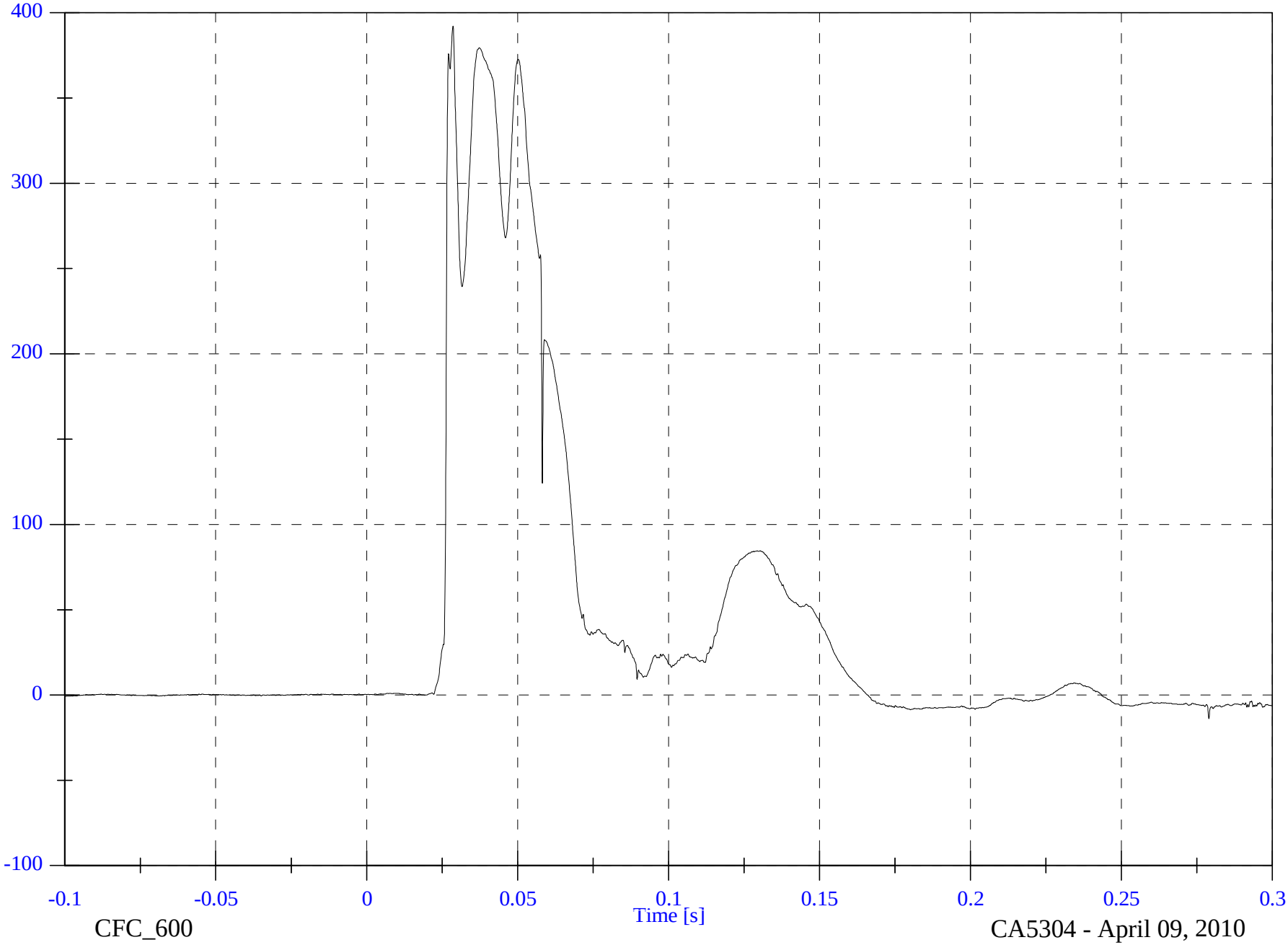
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Middle Abdominal Fy

Max: 392.0 [N] at 0.029 [s]

Min: -14.0 [N] at 0.279 [s]




CFC_600

CA5304 - April 09, 2010

B-18

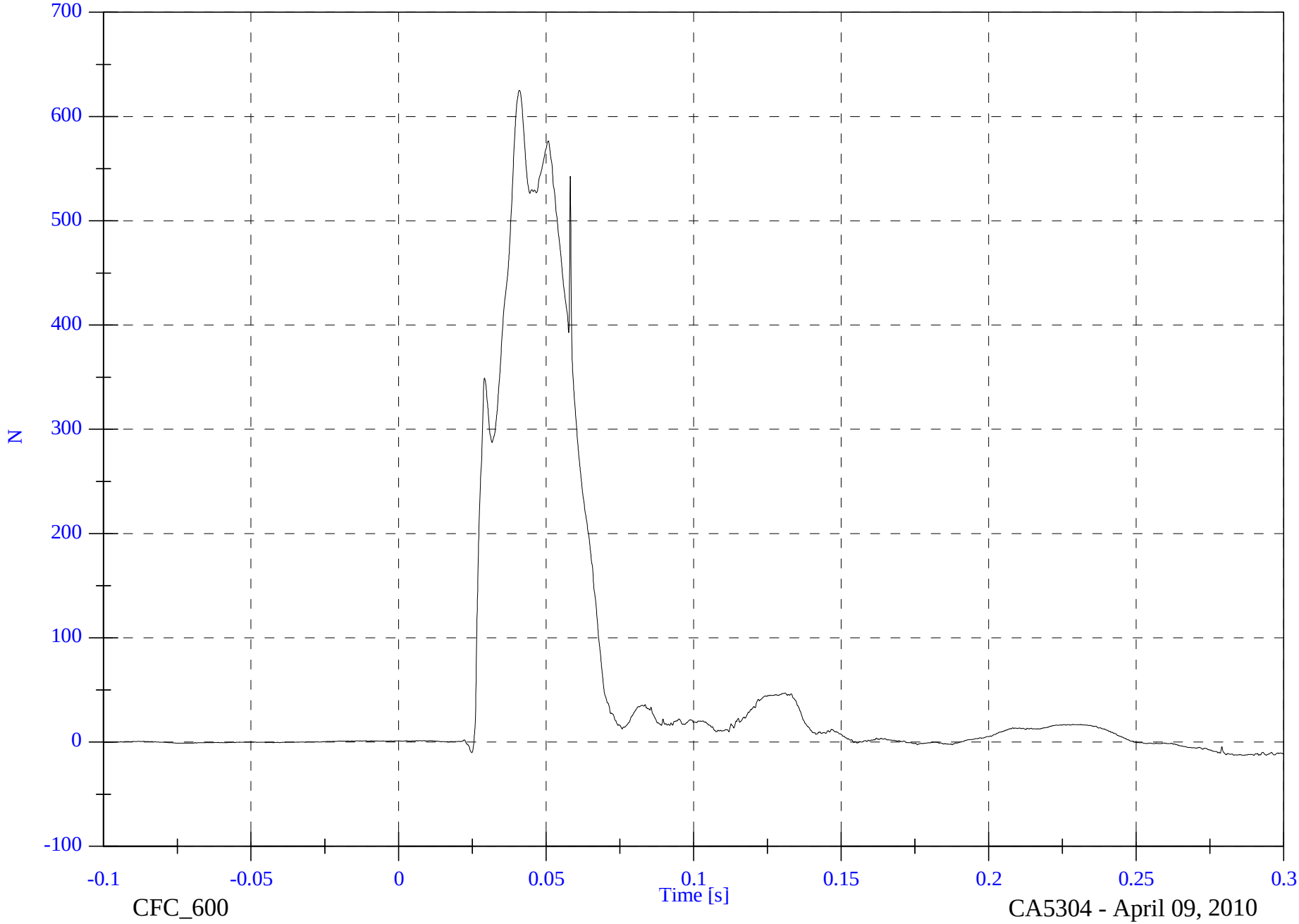
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Rear Abdominal Fy

Max: 625.2 [N] at 0.041 [s]

Min: -12.8 [N] at 0.286 [s]




CFC_600

CA5304 - April 09, 2010

B-19

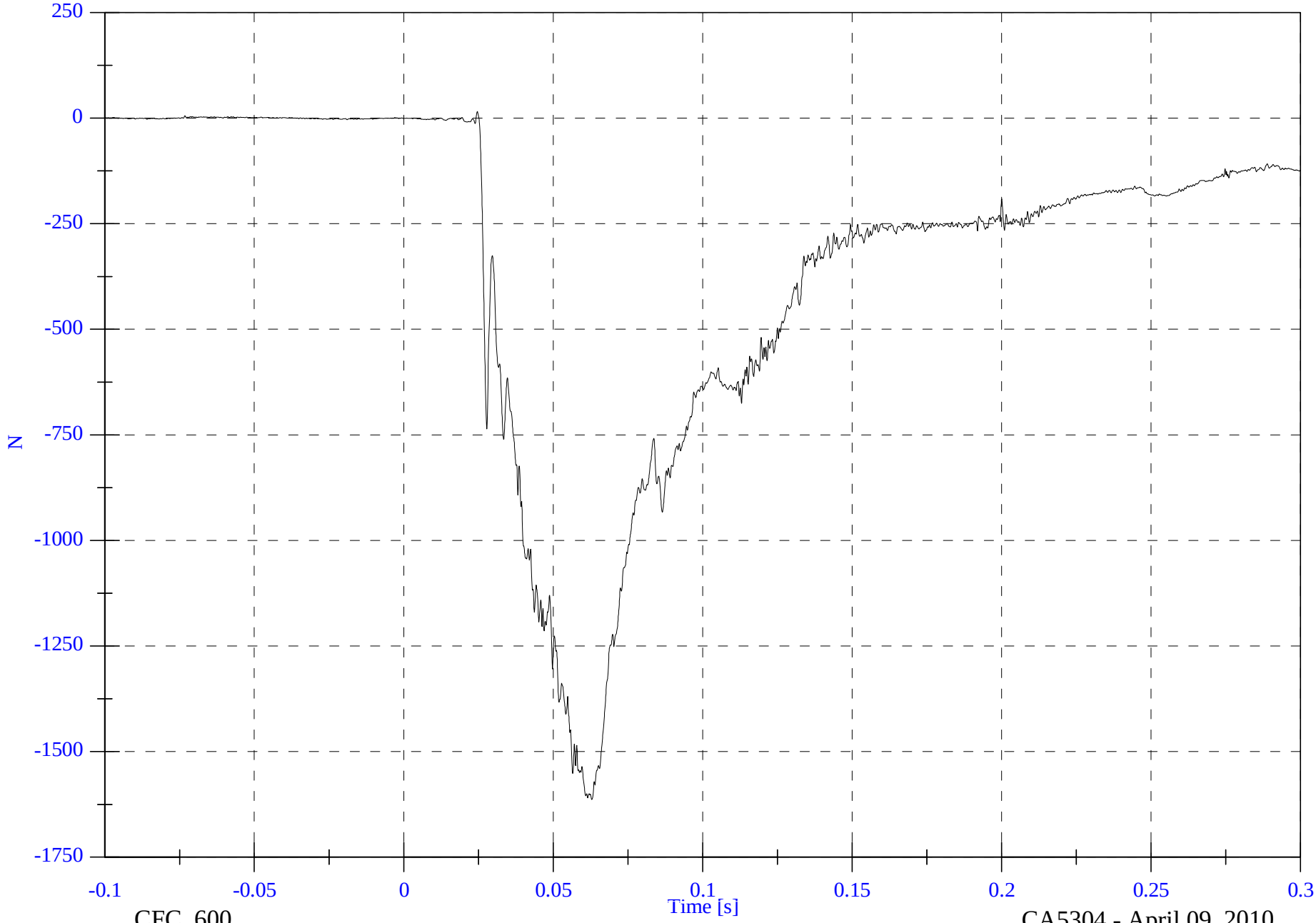
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1P1 Pubic Symphysis Fy

Max: 15.4 [N] at 0.025 [s]

Min: -1613.6 [N] at 0.063 [s]




CFC_600

CA5304 - April 09, 2010

B-20

tr2435

# APPENDIX C

## VEHICLE ACCELEROMETER RESPONSE DATA

## (SAE sign convention)

**DATA CHANNEL TITLE KEY**

| Prefix | Suffix |
|---|---|
| V1 = Vehicle 1 (Test Vehicle) | Ax = Acceleration, X-direction |
| | Ay = Acceleration, Y-direction |
| P1 = Left Front Seating Position (Driver) | Az = Acceleration, Z-direction |
| | Fx = Force, X-direction |
| A1-A18 = Accelerometer Location Number | Fy = Force, Y-direction |
| | Fz = Force, Z-direction |
| | Dx = Deflection, X-direction |
| | Dy = Deflection, Y-direction |
| | Dz = Deflection, Z-direction |

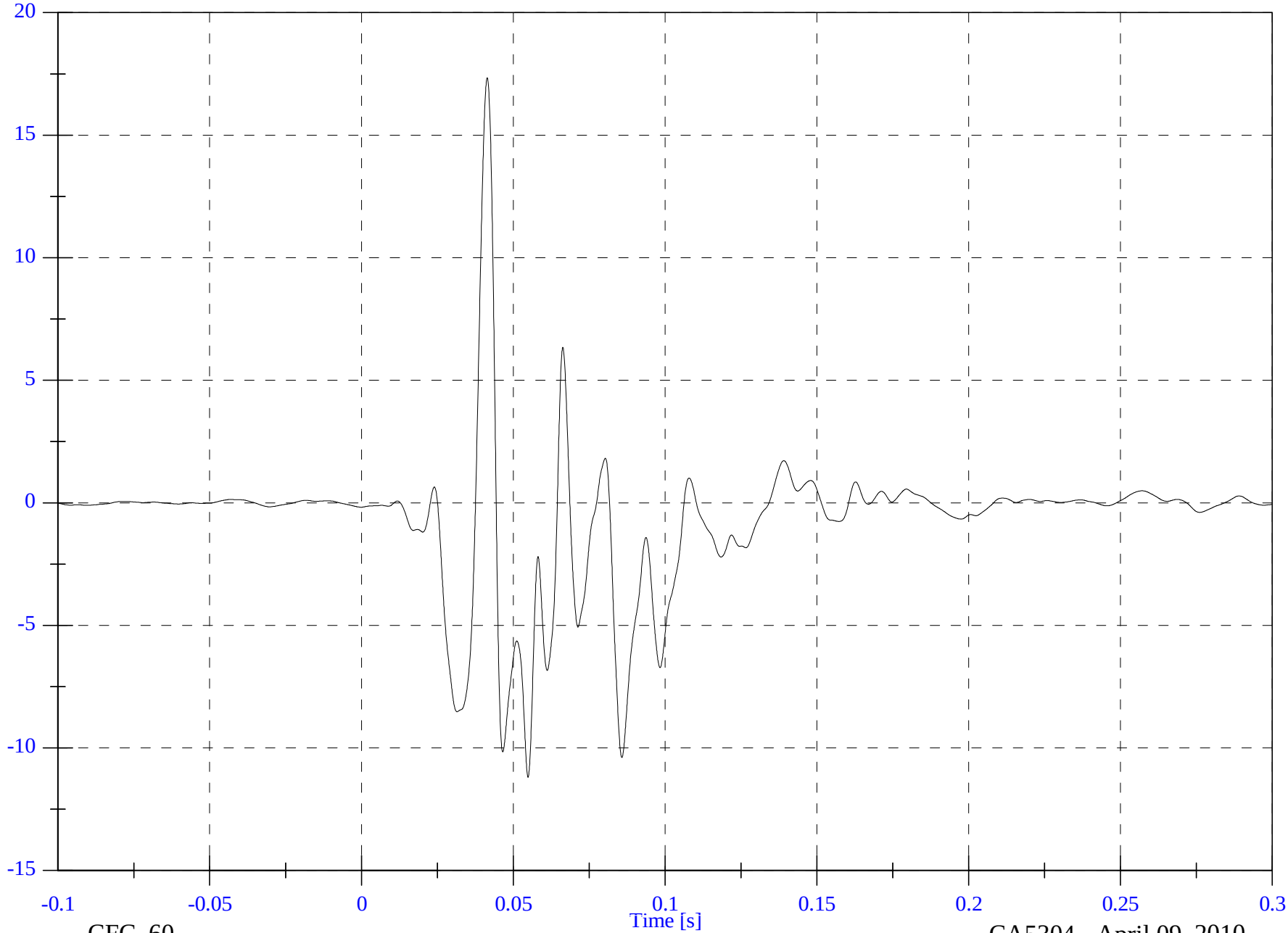
**TABLE OF DATA PLOTS for VEHICLE**

**TABLE OF DATA PLOTS for VEHICLE**

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Vehicle CG x

Max: 17.3 [g] at 0.041 [s]
Min: -11.2 [g] at 0.055 [s]




C-5

tr2435

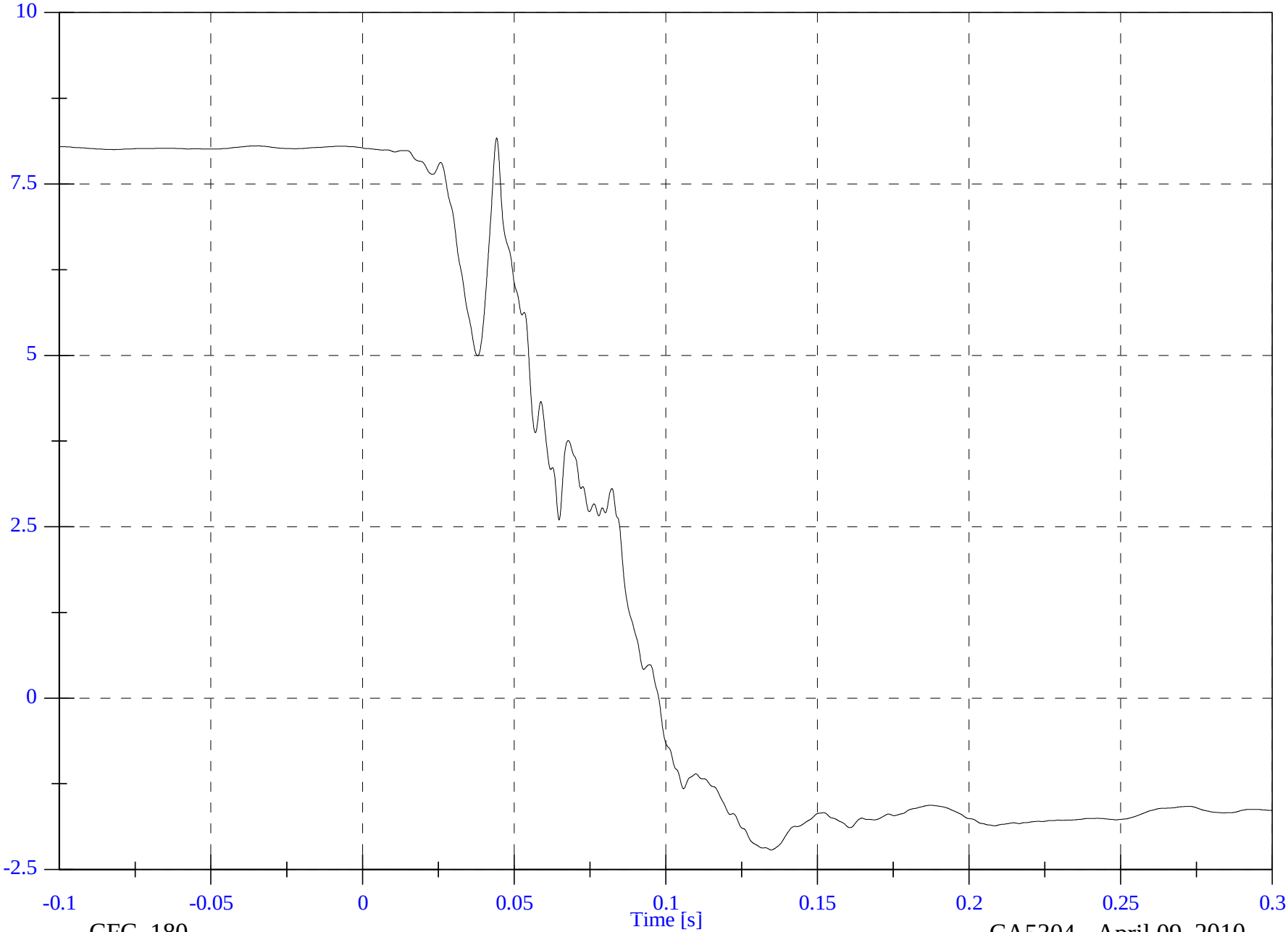
CFC_60

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Vehicle CG x Velocity

Max: 8.2 [kph] at 0.044 [s]
Min: -2.2 [kph] at 0.135 [s]




C-6

tr2435

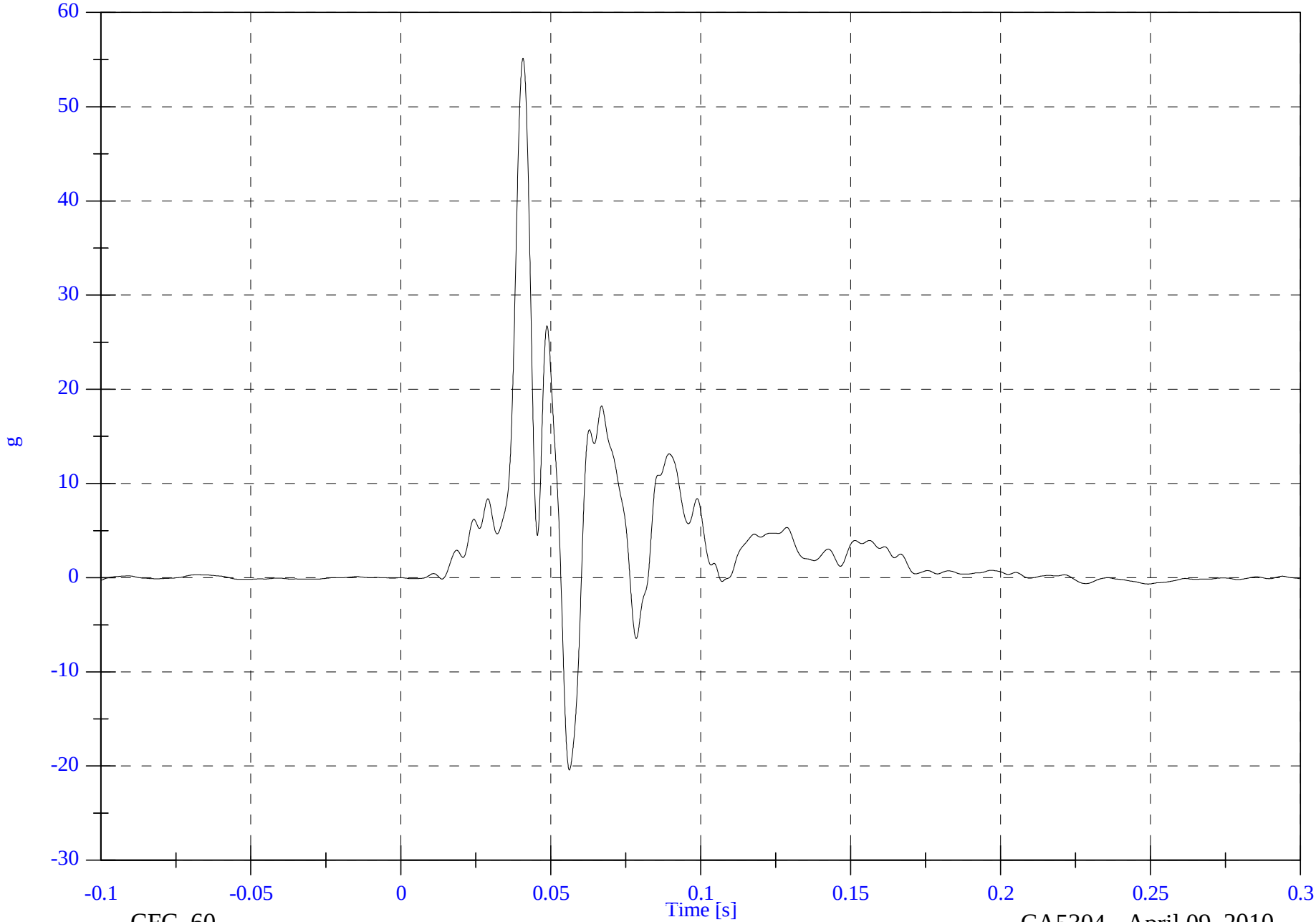
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Vehicle CG y

Max: 55.1 [g] at 0.041 [s]
Min: -20.4 [g] at 0.056 [s]




C-7

tr2435

CFC_60

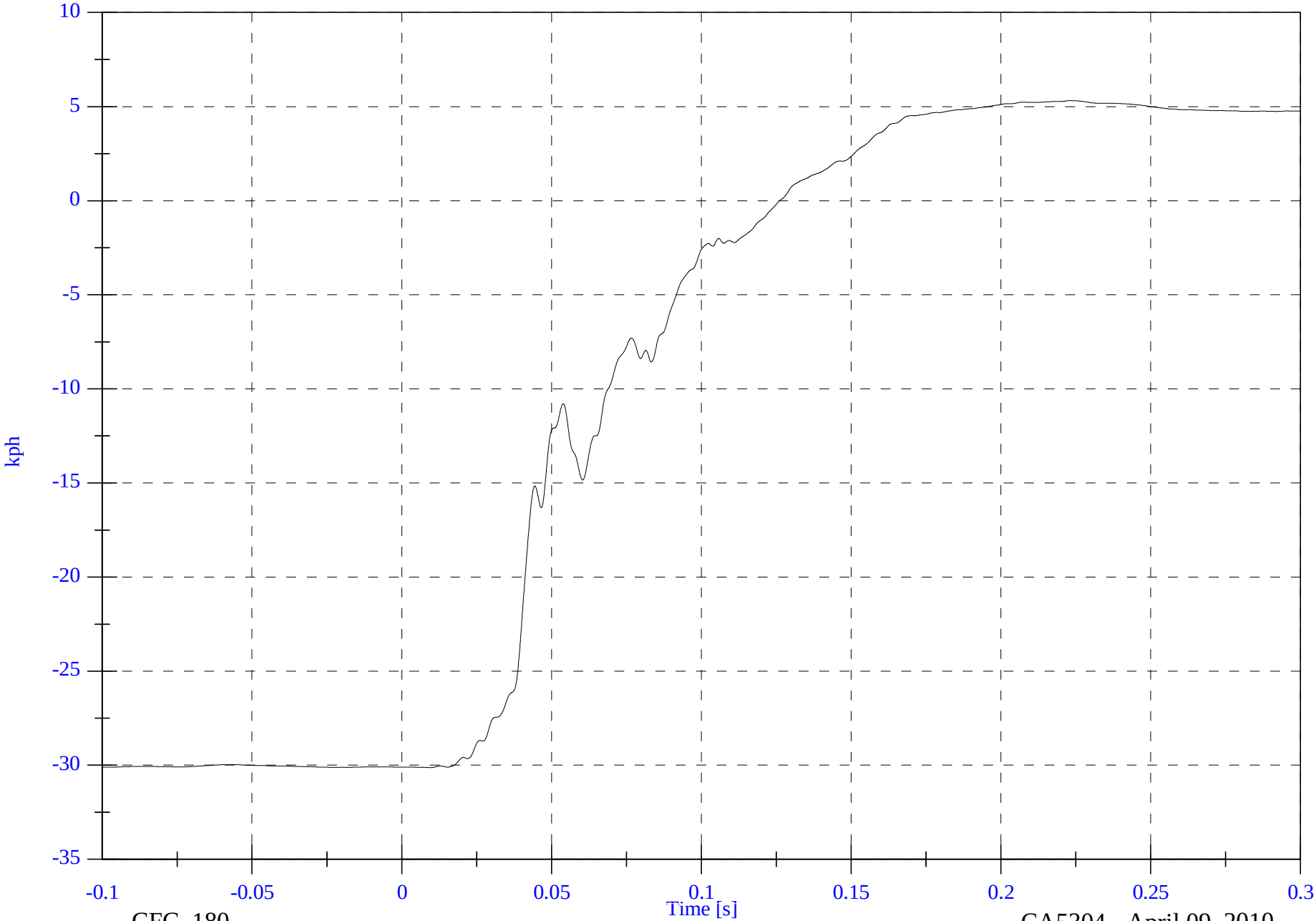
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Vehicle CG y Velocity

Max: 5.3 [kph] at 0.223 [s]

Min: -30.1 [kph] at 0.010 [s]




CFC_180

CA5304 - April 09, 2010

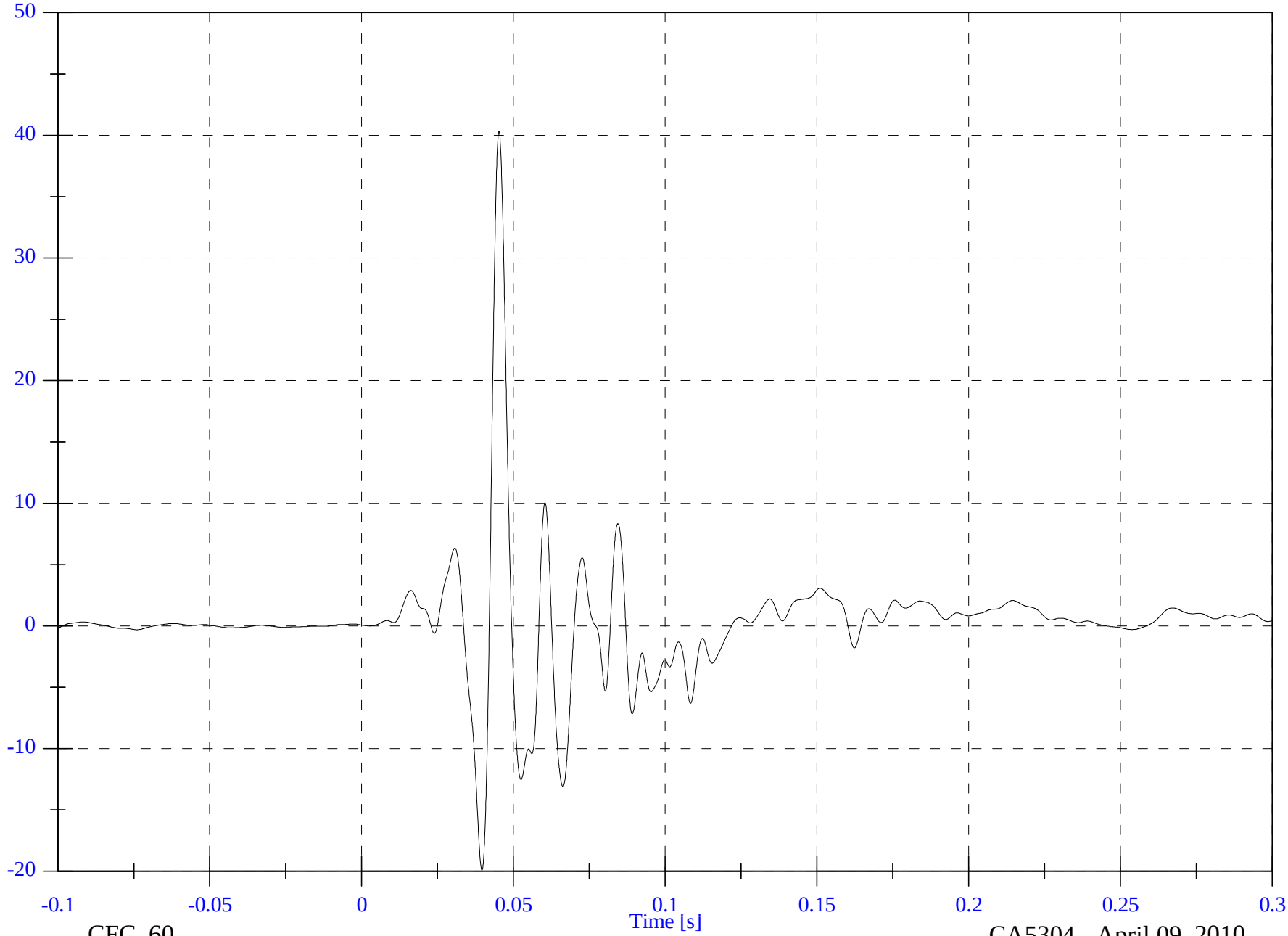
C-8

tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Vehicle CG z

Max: 40.3 [g] at 0.045 [s]
Min: -19.9 [g] at 0.040 [s]




C-9

tr2435

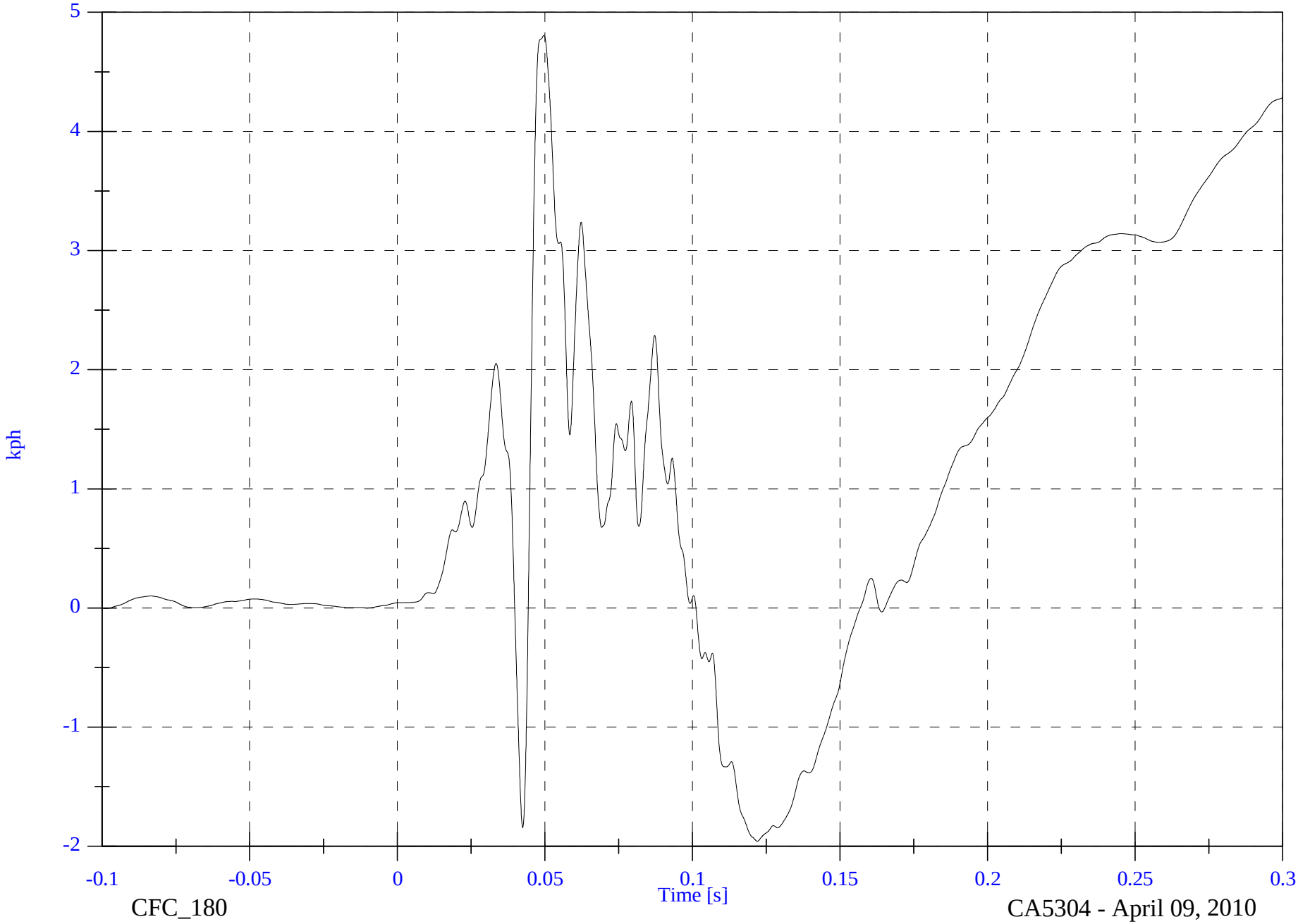
CFC_60

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Vehicle CG z Velocity

Max: 4.8 [kph] at 0.050 [s]
Min: -2.0 [kph] at 0.122 [s]




C-10

tr2435

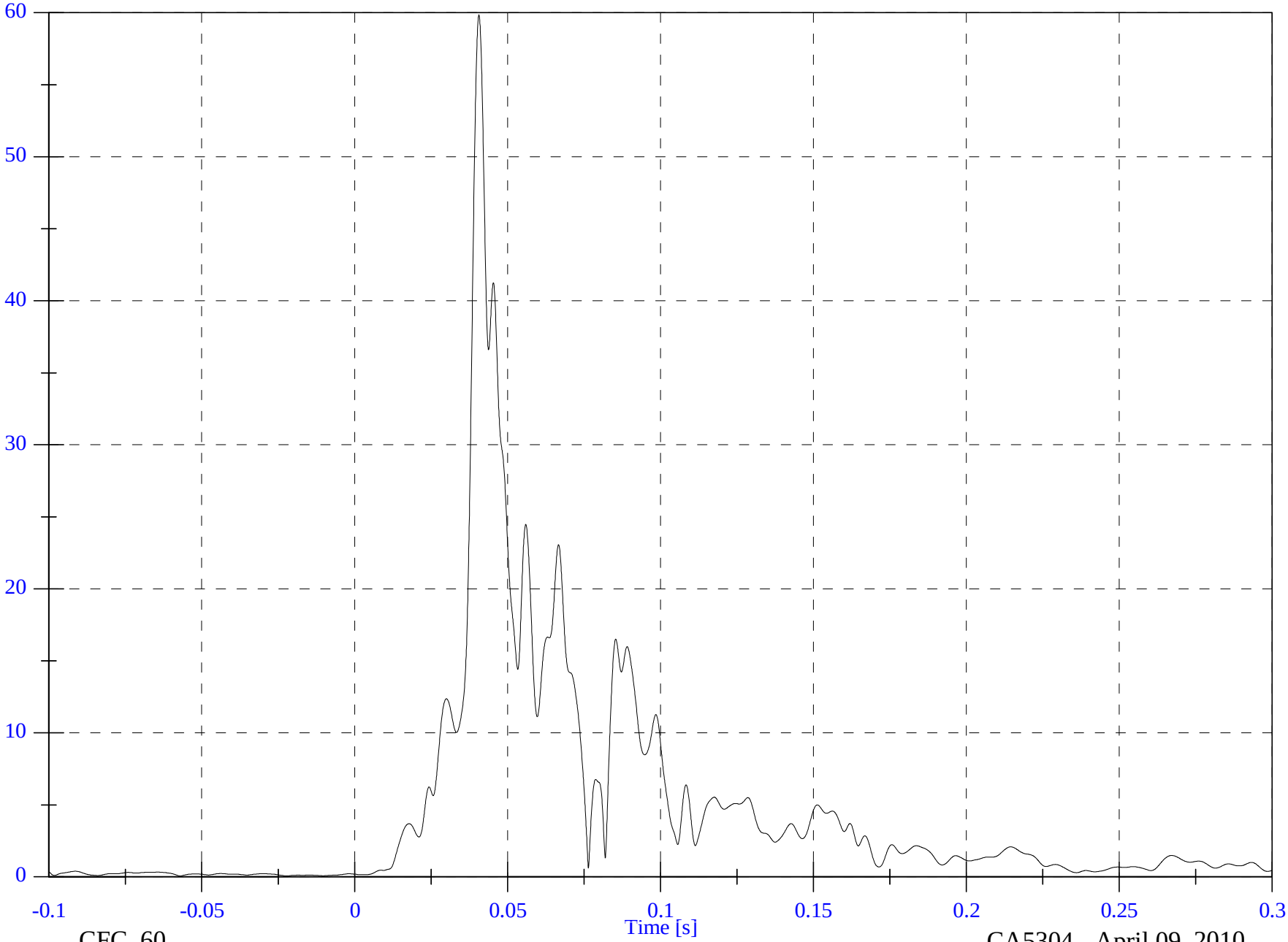
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Vehicle CG Resultant

Max: 59.9 [g] at 0.041 [s]
Min: 0.1 [g] at -0.057 [s]




C-11

tr2435

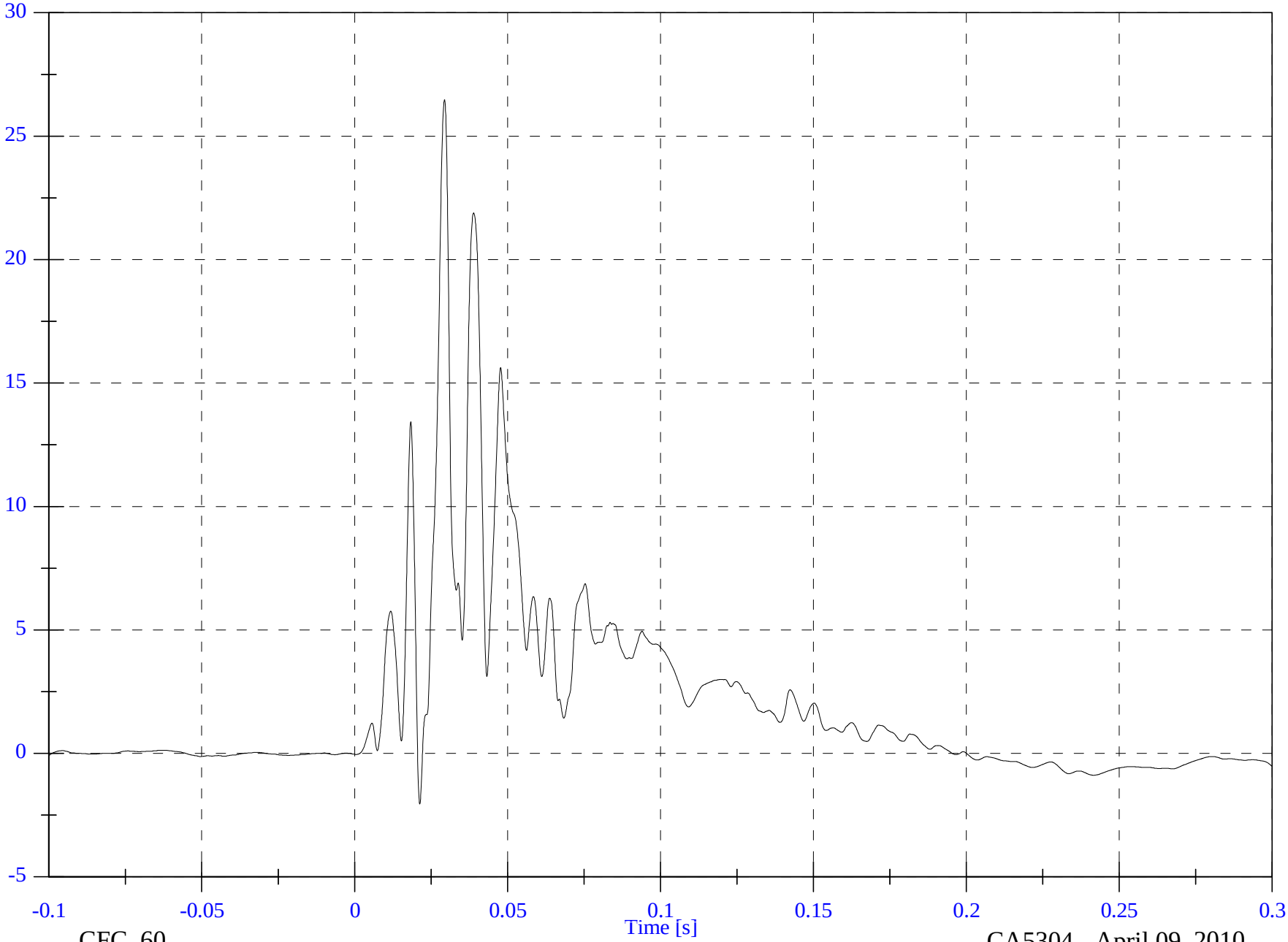
CFC_60

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left Front Sill y

Max: 26.5 [g] at 0.029 [s]
Min: -2.1 [g] at 0.021 [s]




C-12

tr2435

CFC_60

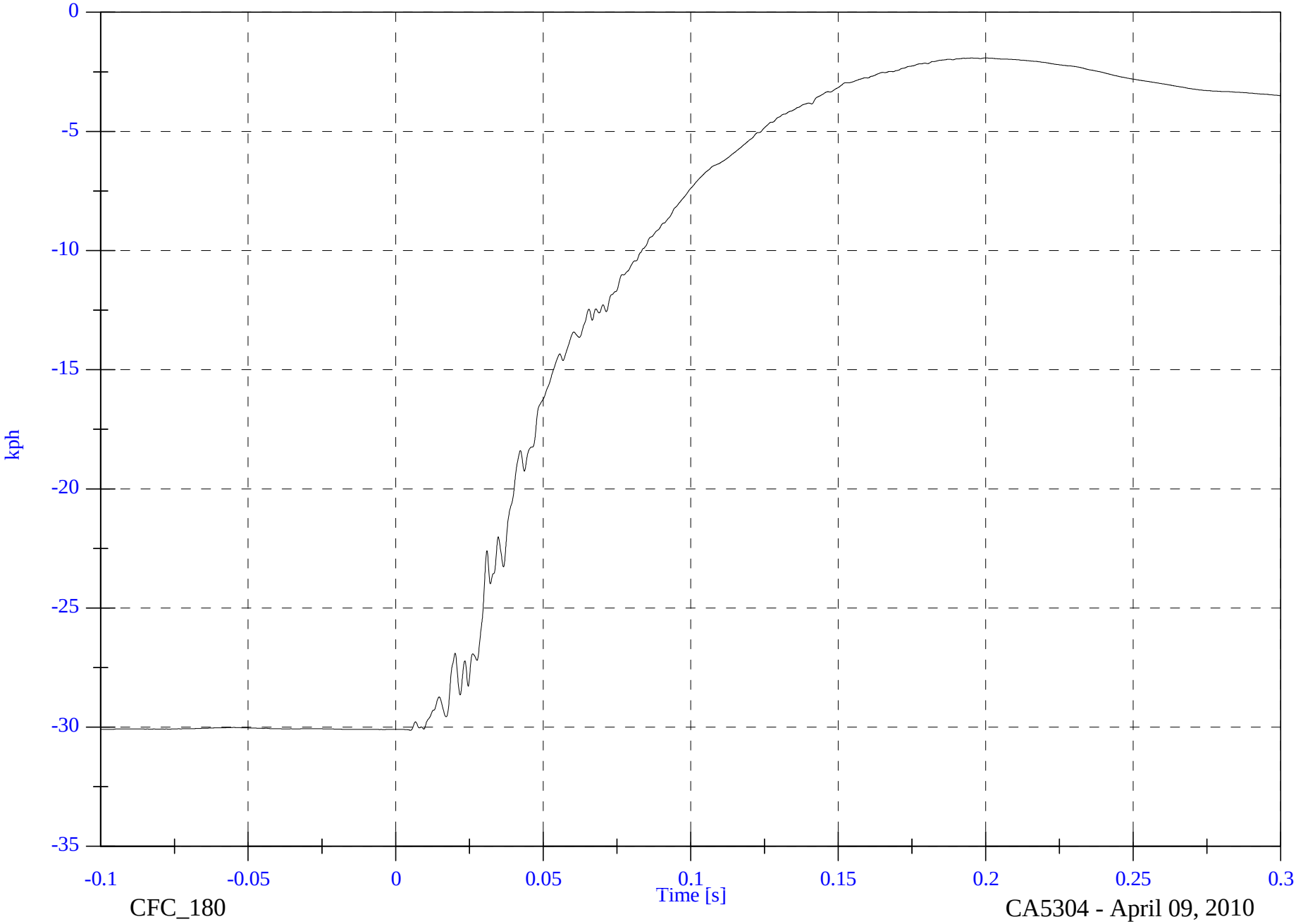
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left Front Sill y Velocity

Max: -1.9 [kph] at 0.200 [s]

Min: -30.1 [kph] at 0.005 [s]




C-13

tr2435

CFC_180

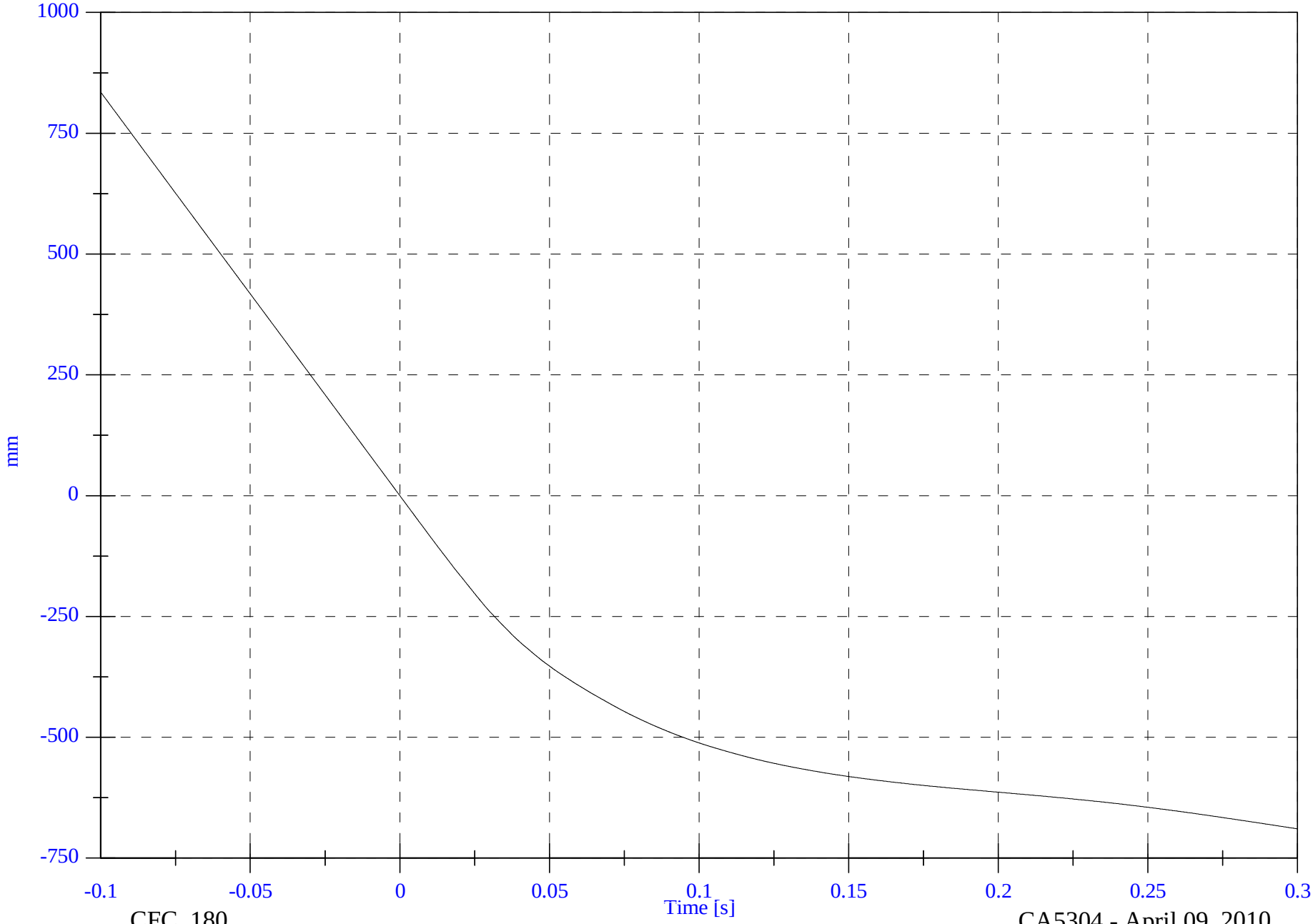
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left Front Sill y Displacement

Max: 834.8 [mm] at -0.100 [s]

Min: -689.4 [mm] at 0.300 [s]




CFC_180

CA5304 - April 09, 2010

C-14

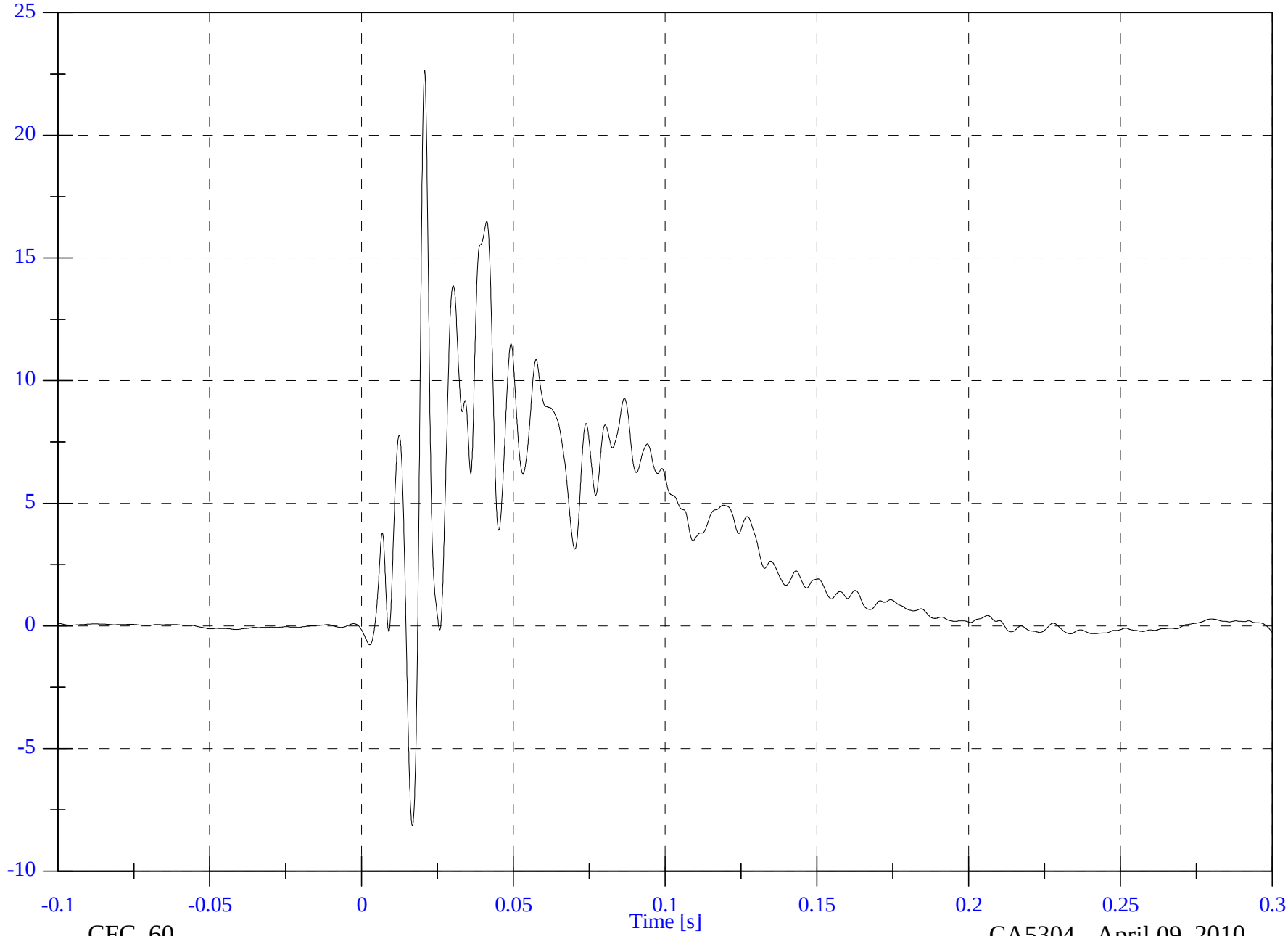
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left Lower A-Pillar Sill

Max: 22.7 [g] at 0.021 [s]

Min: -8.1 [g] at 0.017 [s]




C-15

tr2435

CFC_60

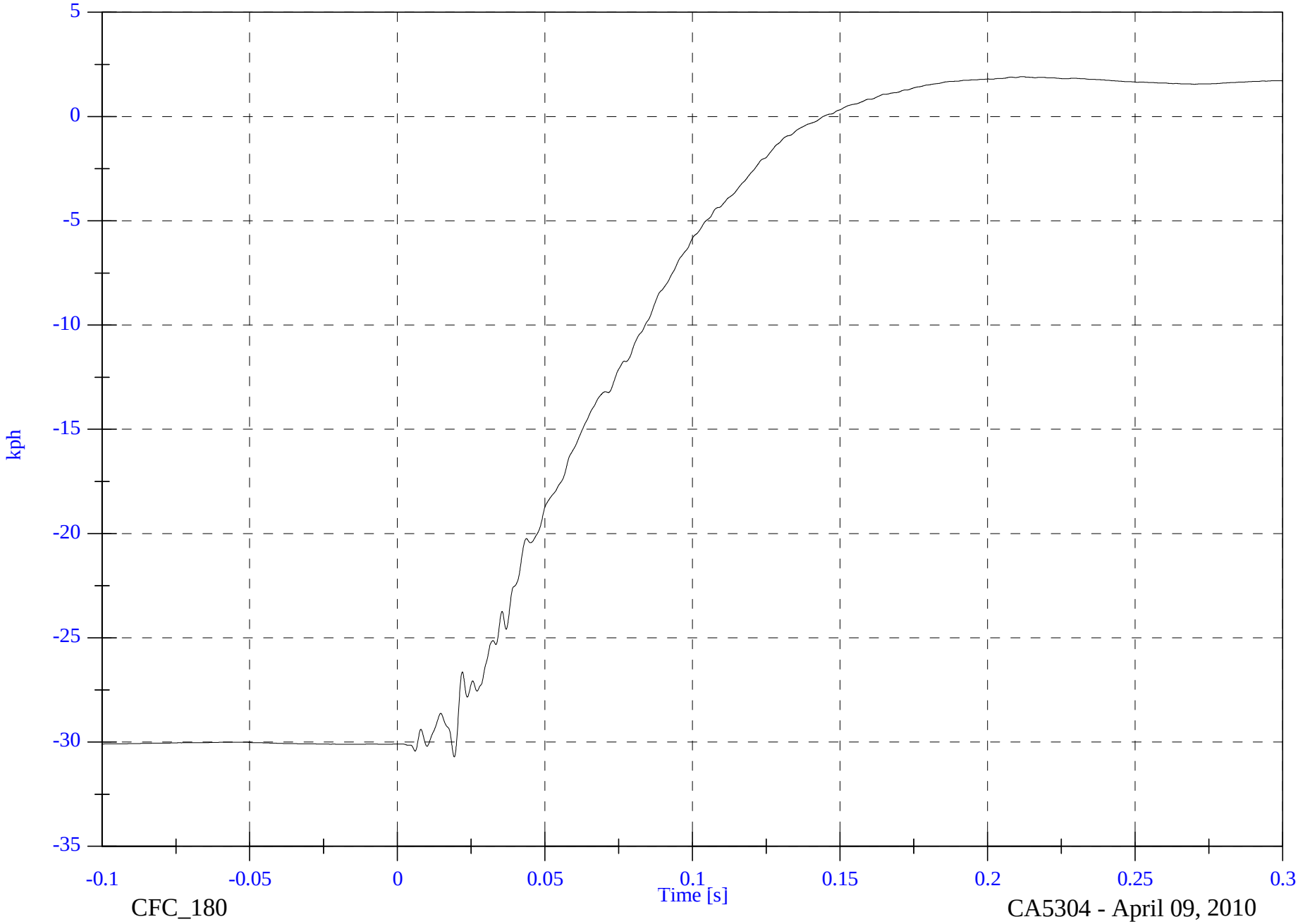
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left Lower A-Pillar Sill Velocity

Max: 1.9 [kph] at 0.212 [s]

Min: -30.7 [kph] at 0.019 [s]




CFC_180

CA5304 - April 09, 2010

C-16

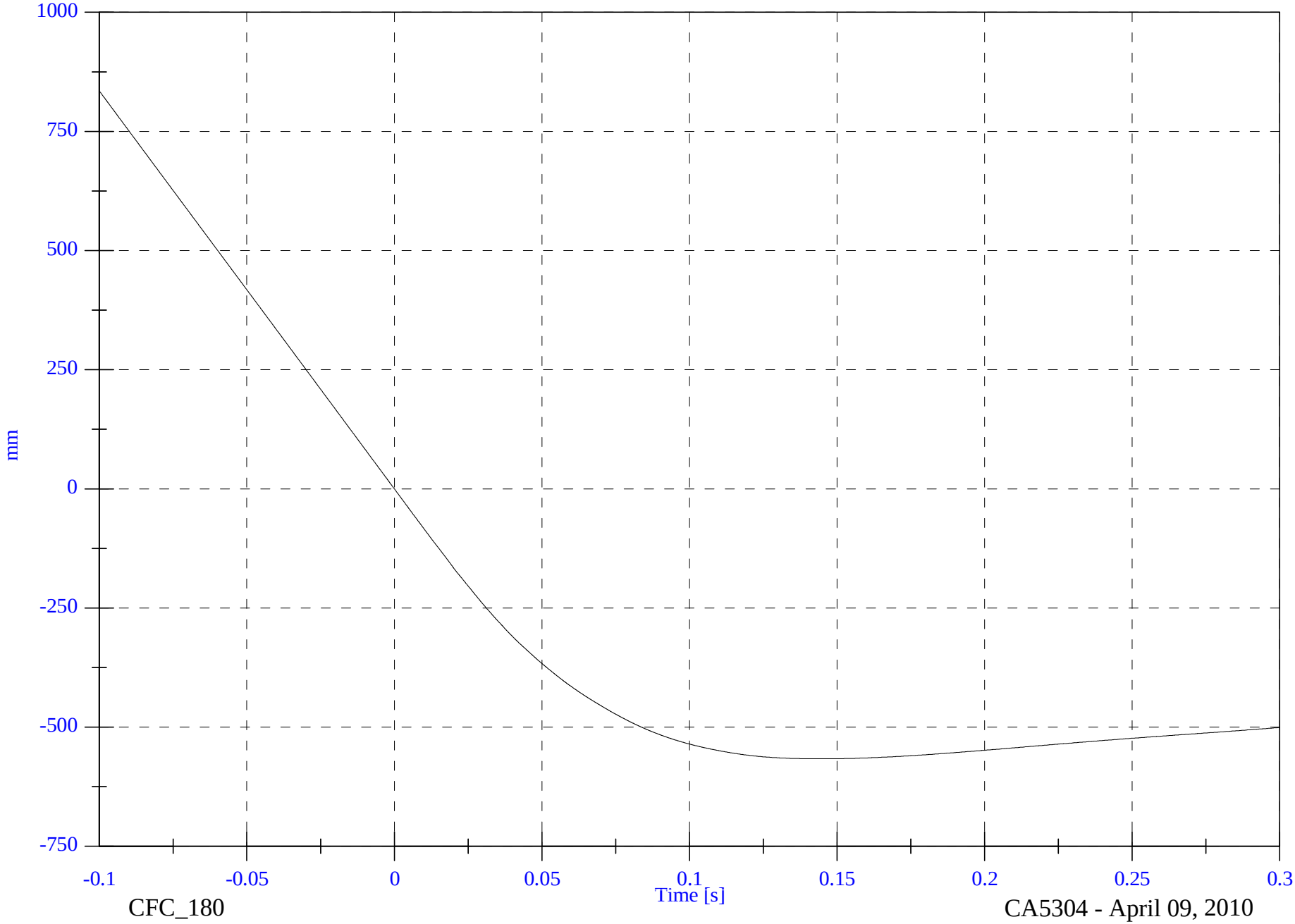
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left Lower A-Pillar Sill Displacement

Max: 834.7 [mm] at -0.100 [s]

Min: -566.4 [mm] at 0.144 [s]




C-17

tr2435

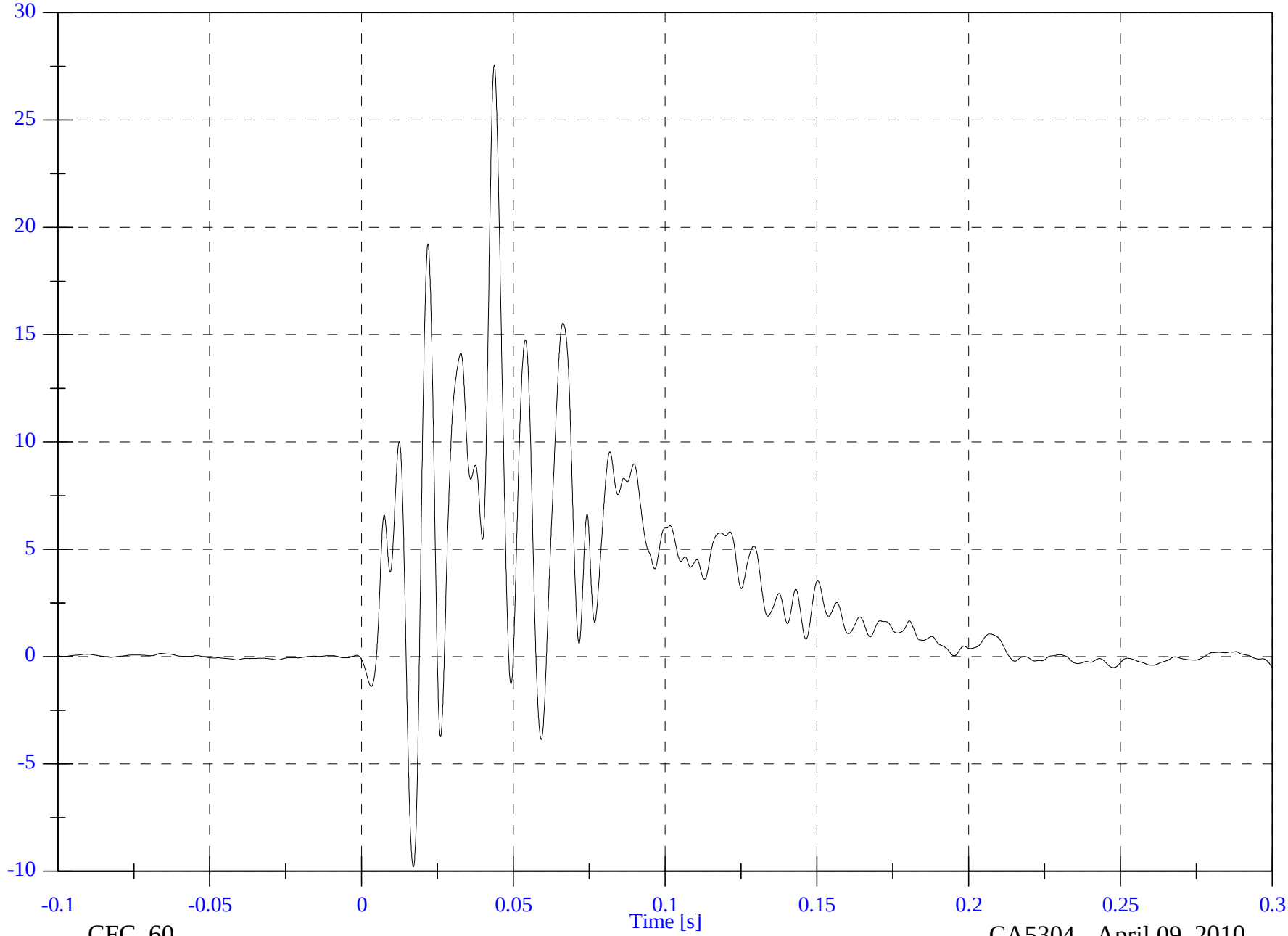
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left A-Pillar Mid y

Max: 27.6 [g] at 0.044 [s]
Min: -9.8 [g] at 0.017 [s]




CFC_60

CA5304 - April 09, 2010

C-18

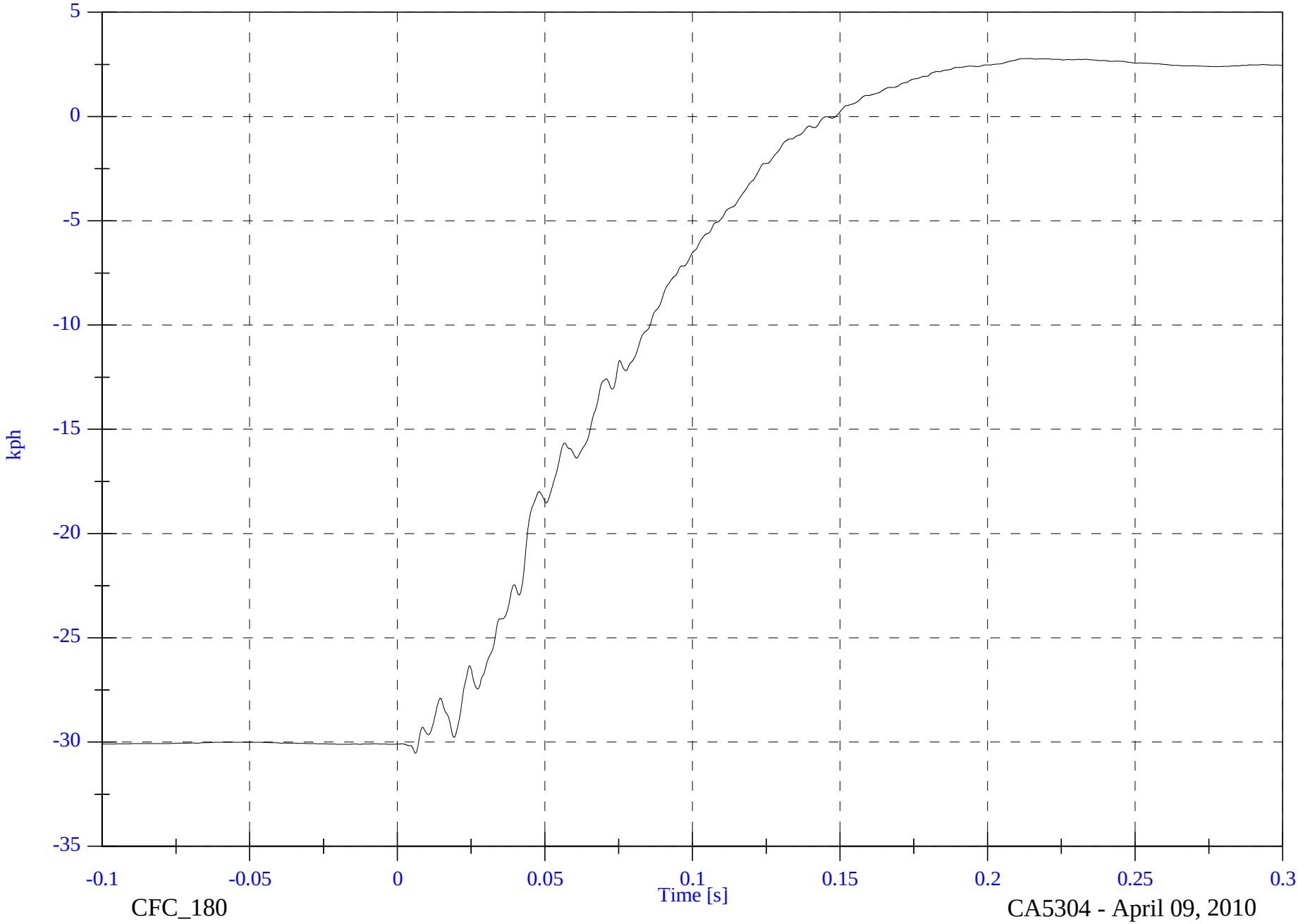
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left A-Pillar Mid y Velocity

Max: 2.8 [kph] at 0.214 [s]

Min: -30.5 [kph] at 0.006 [s]




CFC_180

CA5304 - April 09, 2010

C-19

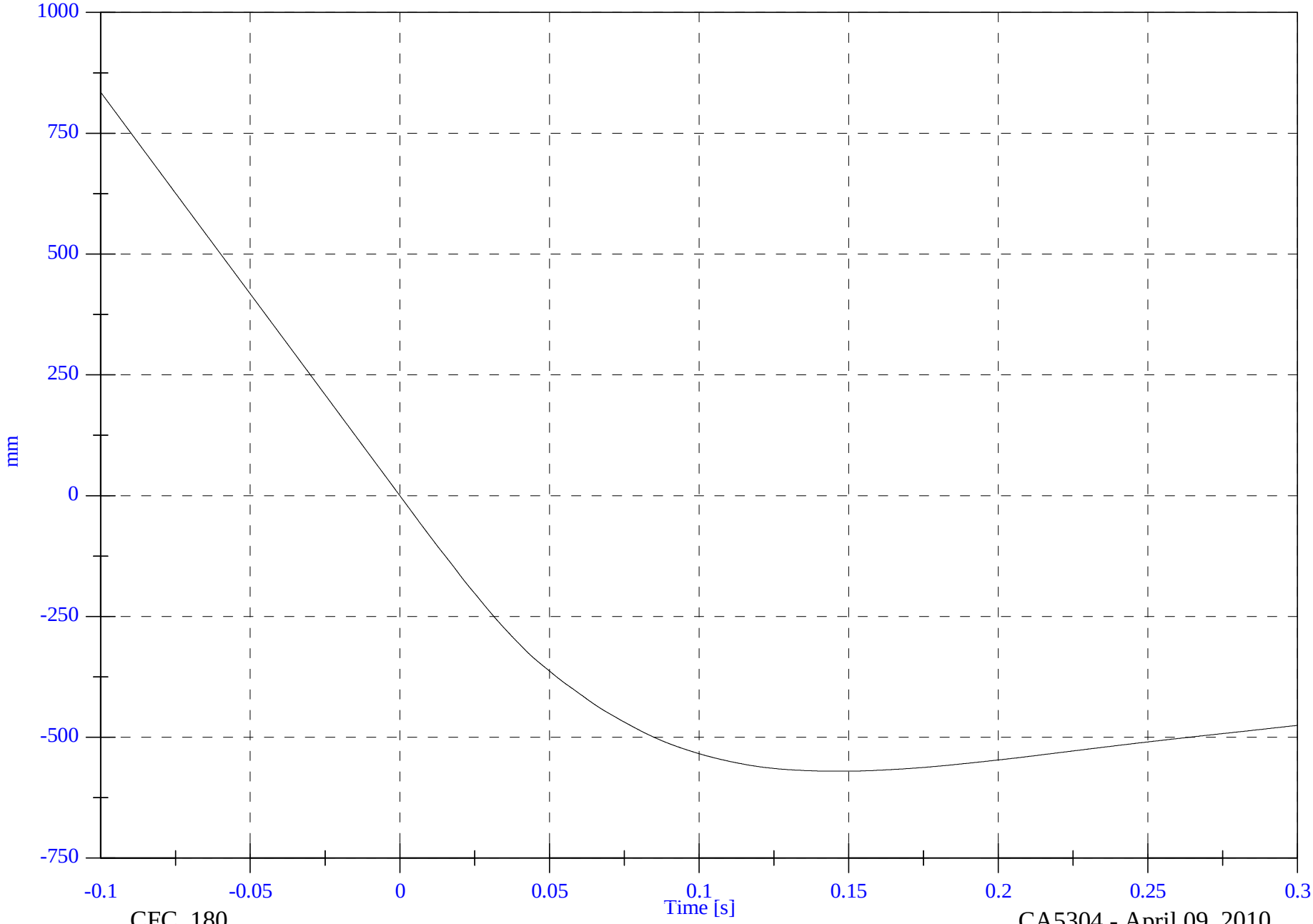
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left A-Pillar Mid y Displacement

Max: 834.6 [mm] at -0.100 [s]

Min: -570.1 [mm] at 0.149 [s]




C-20

tr2435

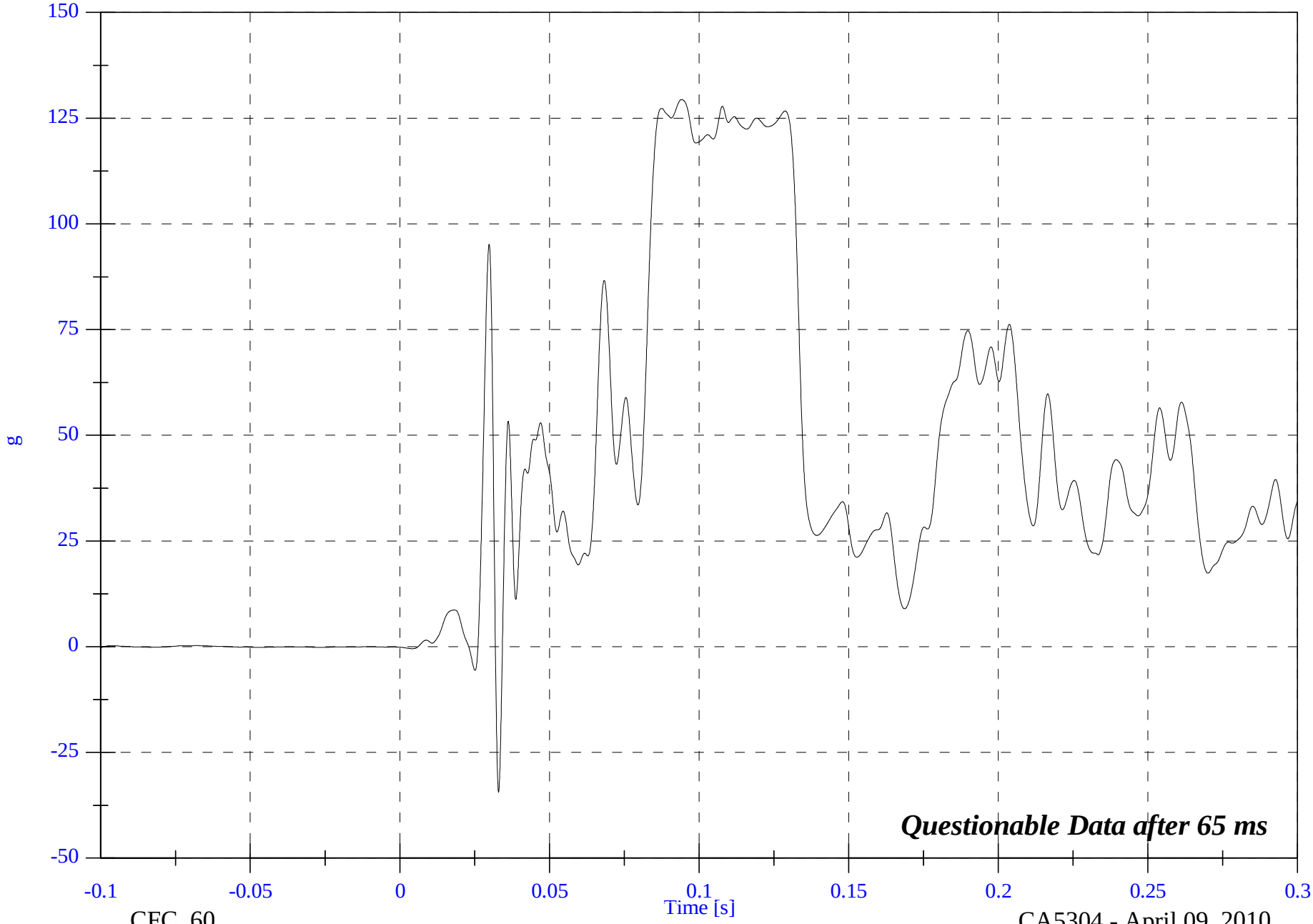
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left A-Pillar Top y

Max: 129.4 [g] at 0.094 [s]
Min: -34.5 [g] at 0.033 [s]




C-21

tr2435

CFC_60

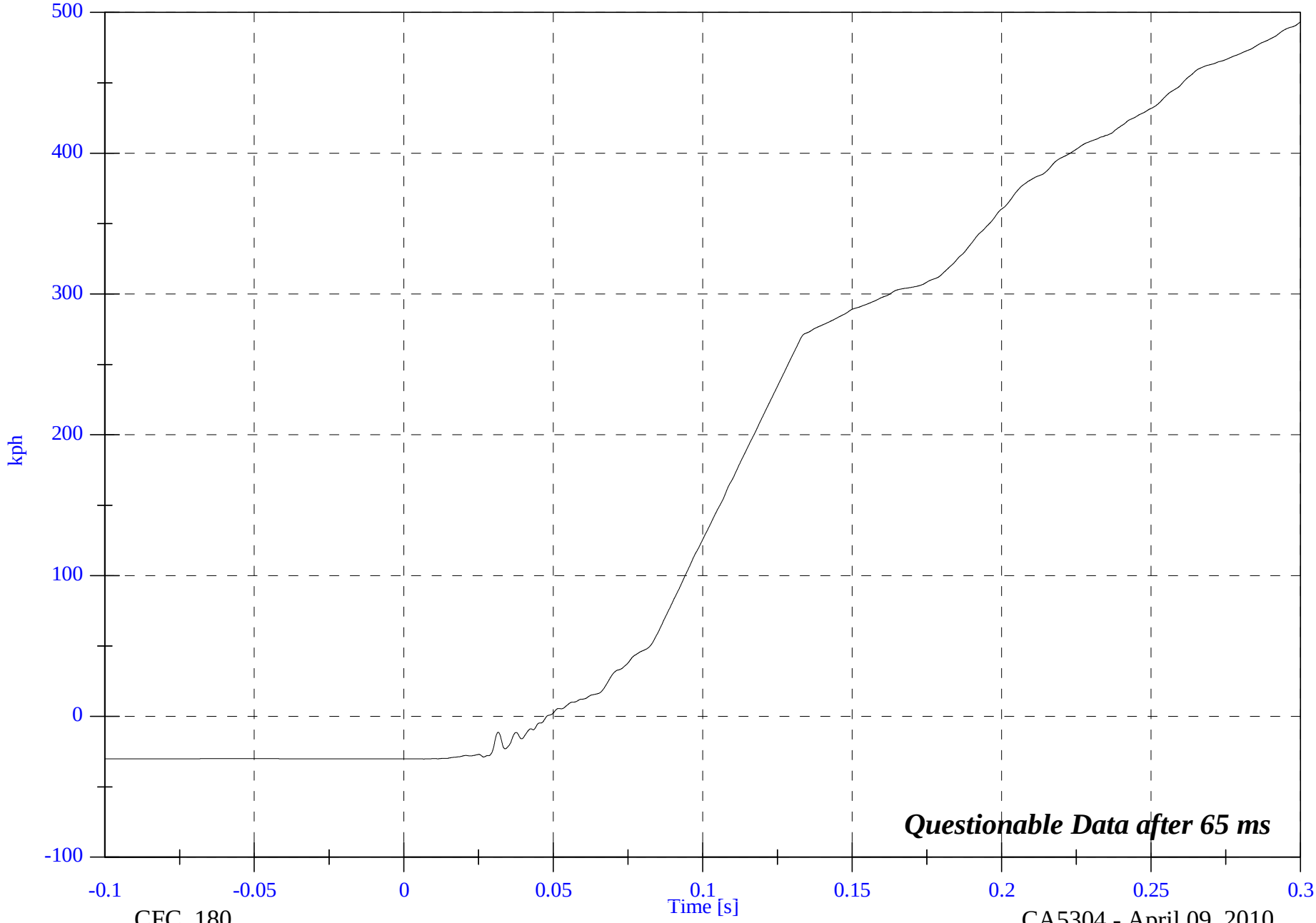
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left A-Pillar Top y Velocity

Max: 493.1 [kph] at 0.300 [s]

Min: -30.2 [kph] at 0.007 [s]




C-22

tr2435

CFC_180

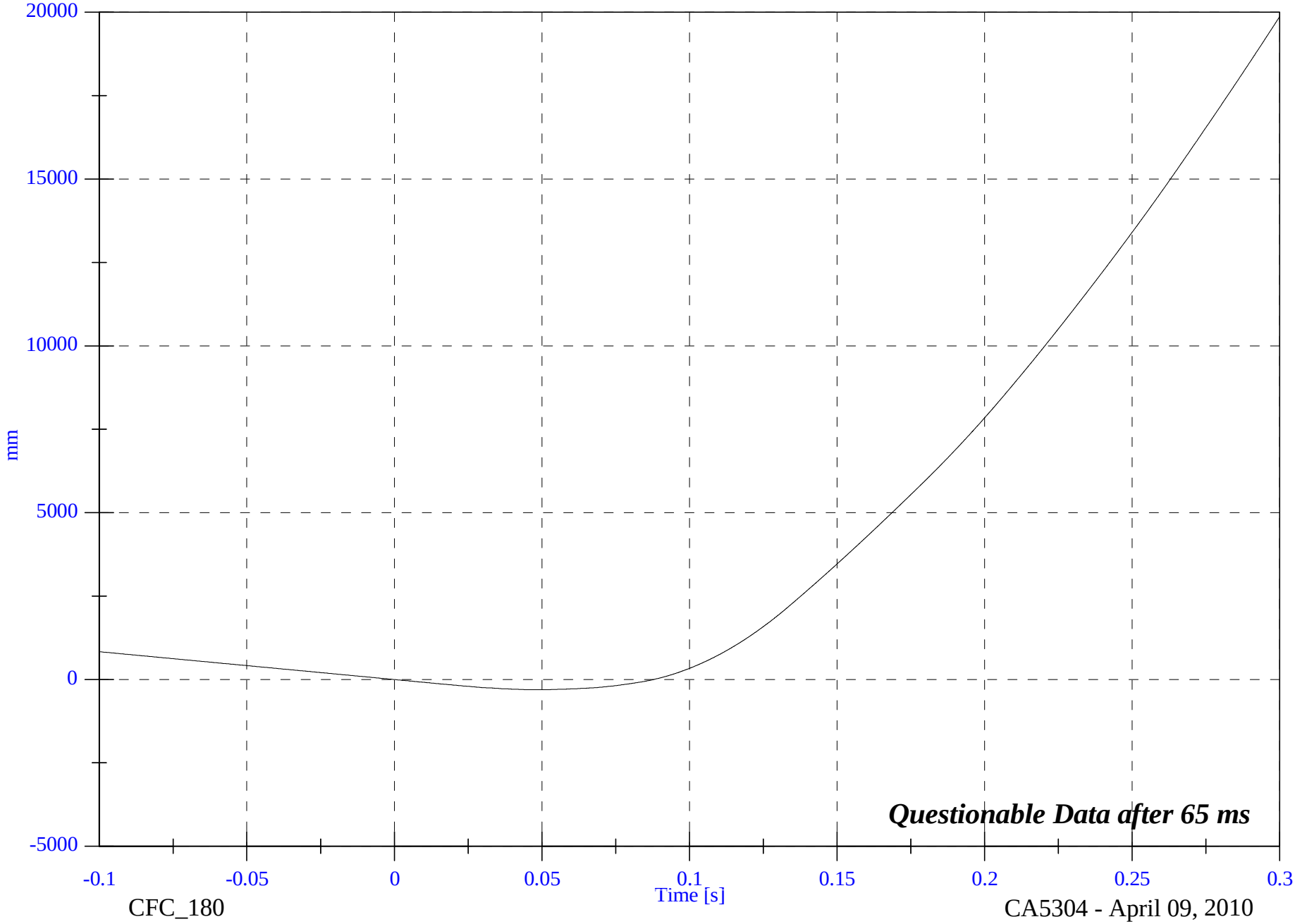
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left A-Pillar Top y Displacement

Max: 19861.7 [mm] at 0.300 [s]

Min: -303.7 [mm] at 0.048 [s]




C-23

tr2435

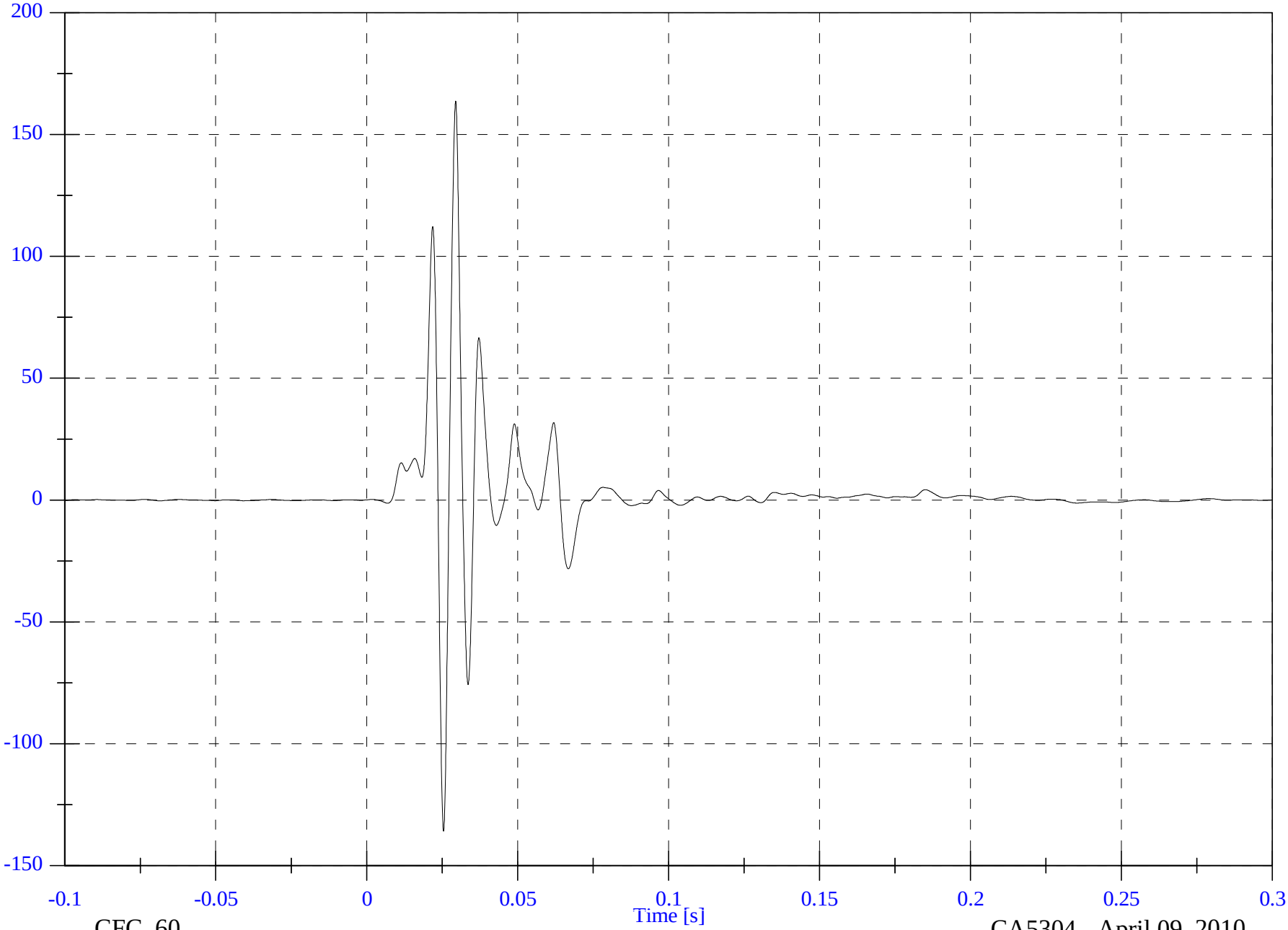
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Sill y

Max: 163.7 [g] at 0.029 [s]
Min: -135.8 [g] at 0.025 [s]




C-24

tr2435

CFC_60

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Sill y Velocity

Max: 0.8 [kph] at 0.231 [s]

Min: -32.0 [kph] at 0.027 [s]


C-25

tr2435

CFC_180

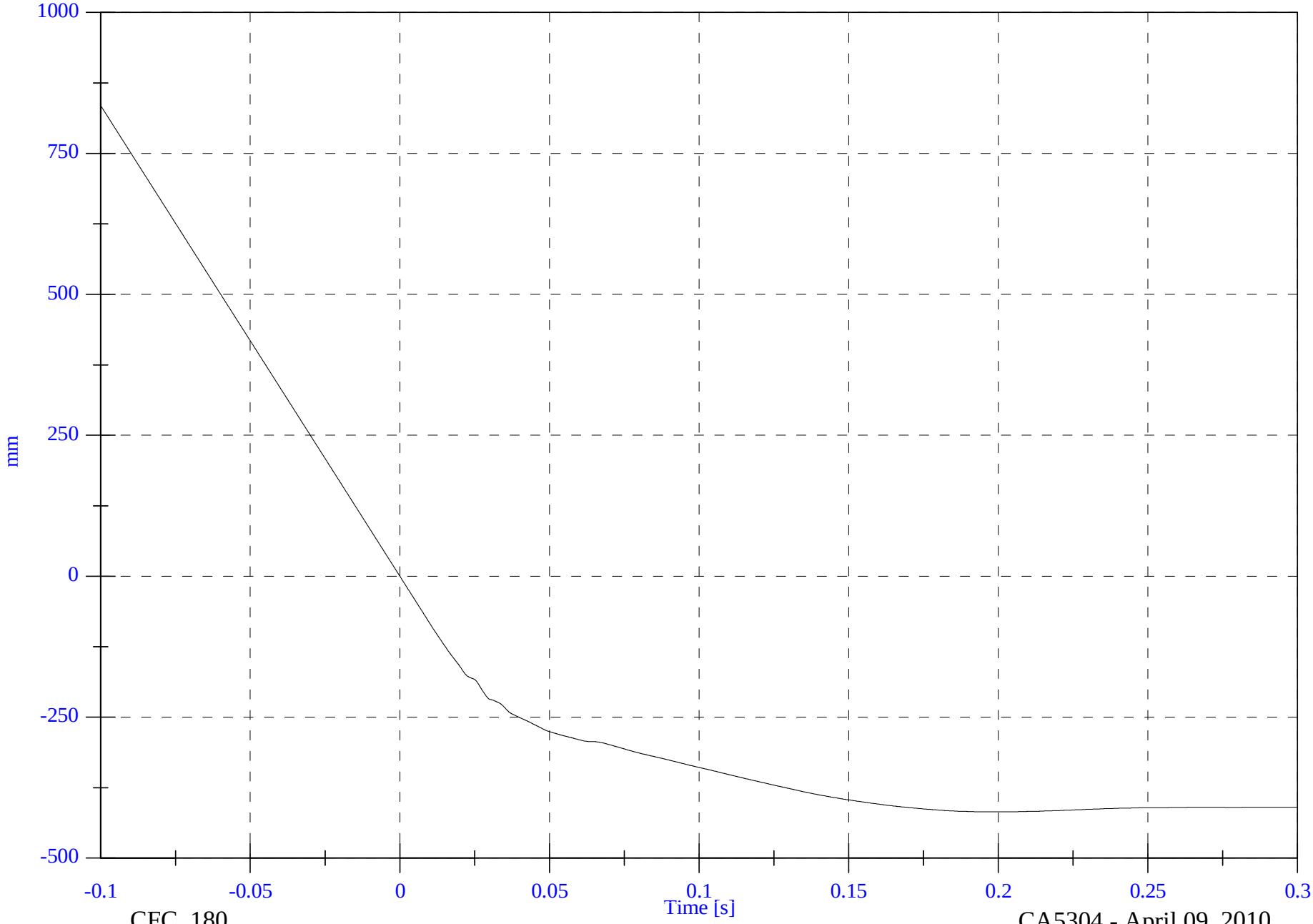
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Sill y Displacement

Max: 834.5 [mm] at -0.100 [s]

Min: -418.0 [mm] at 0.199 [s]

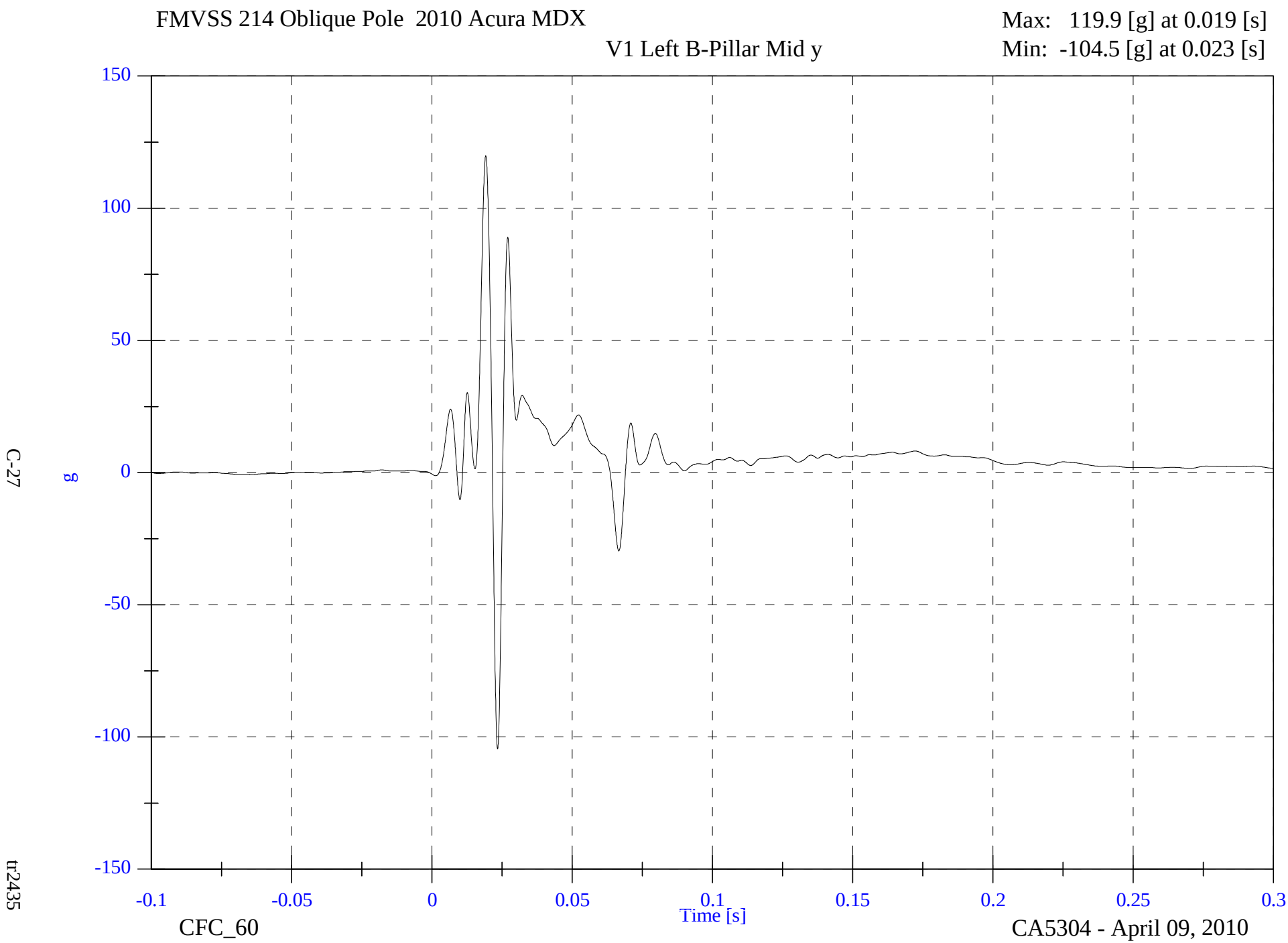



CFC_180

CA5304 - April 09, 2010

C-26

tr2435


FMVSS 214 Oblique Pole 2010 Acura MDX
V1 Left B-Pillar Mid y
Max: 119.9 [g] at 0.019 [s]
Min: -104.5 [g] at 0.023 [s]
150
100
50
0
-50
-100
-150
g
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
C-27
tr2435
CFC_60
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Mid y Velocity

Max: 42.1 [kph] at 0.300 [s]

Min: -30.8 [kph] at 0.011 [s]


CFC_180

CA5304 - April 09, 2010

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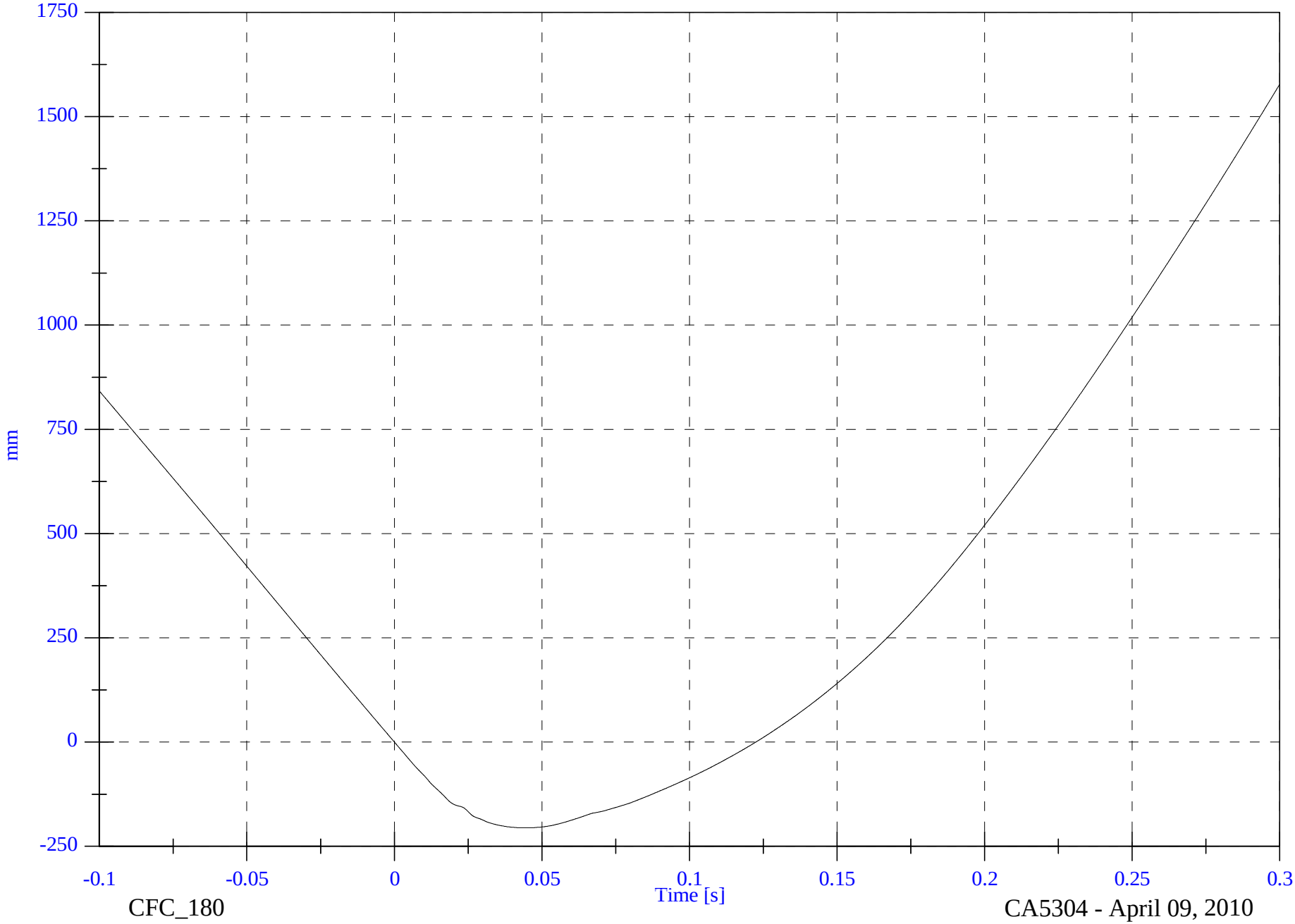
tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Mid y Displacement

Max: 1576.4 [mm] at 0.300 [s]

Min: -205.4 [mm] at 0.045 [s]




C-29

tr2435

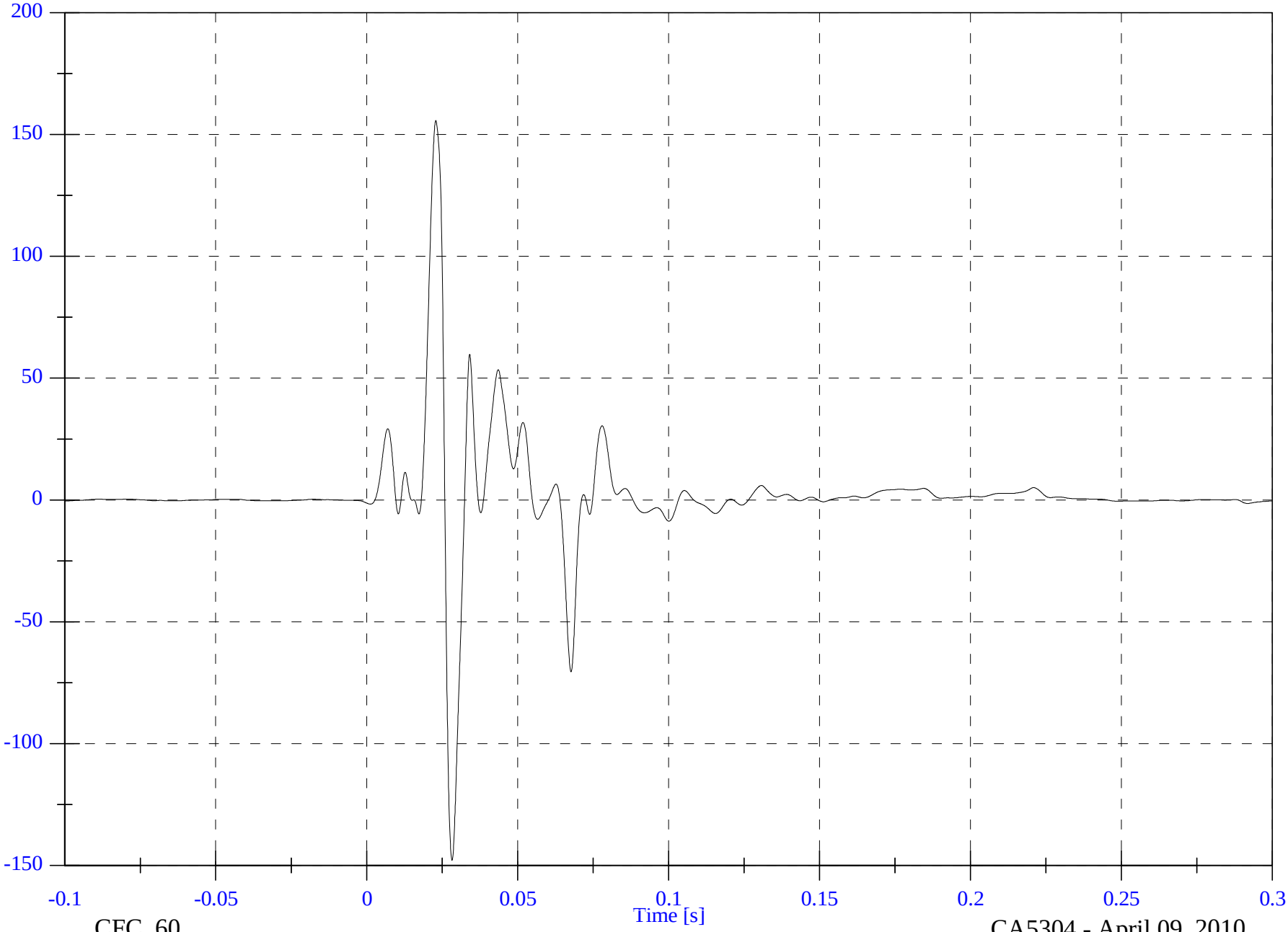
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Top y

Max: 155.7 [g] at 0.023 [s]
Min: -147.8 [g] at 0.028 [s]




C-30

tr2435

CFC_60

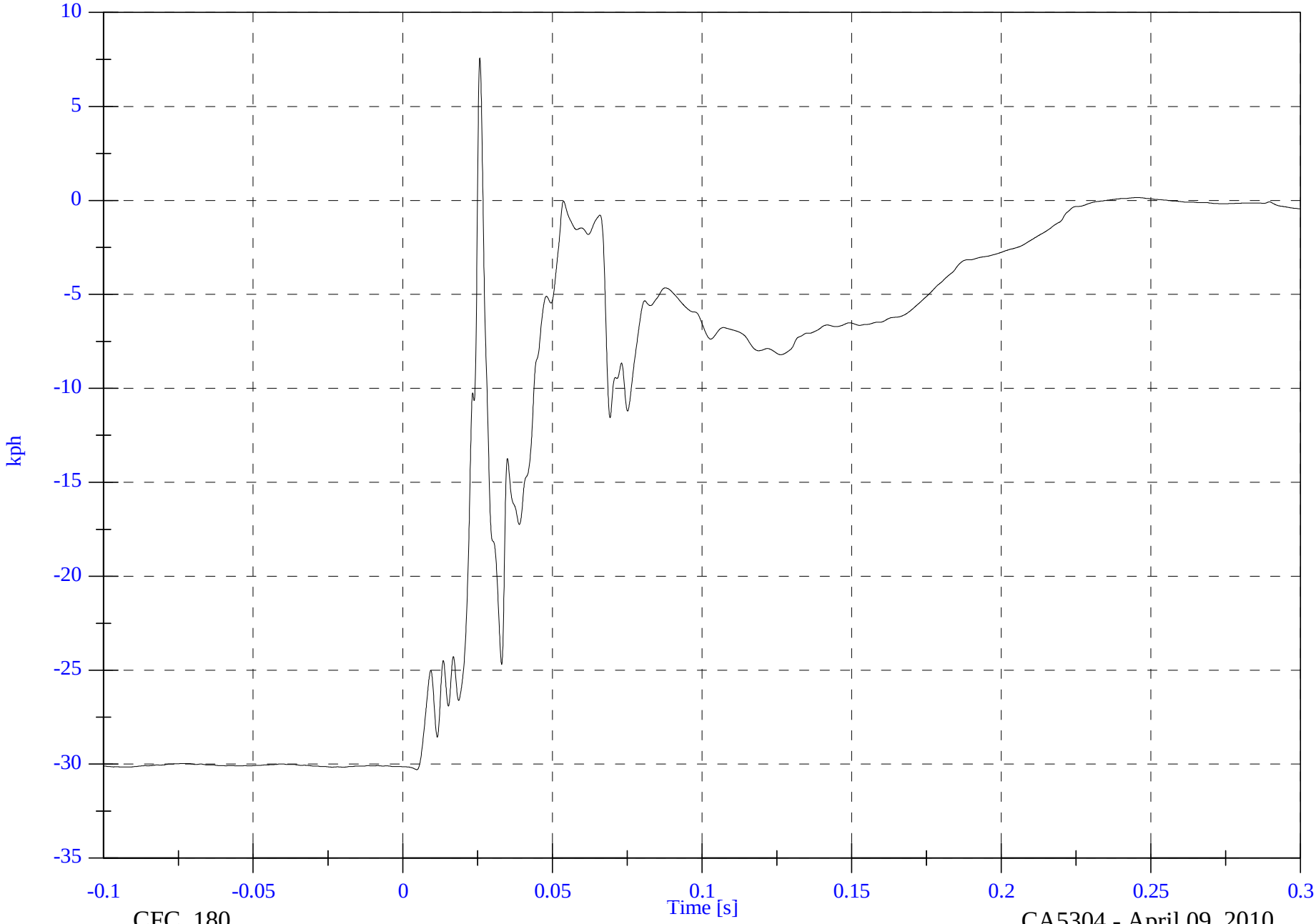
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Top y Velocity

Max: 7.6 [kph] at 0.026 [s]

Min: -30.3 [kph] at 0.005 [s]




C-31

tr2435

CFC_180

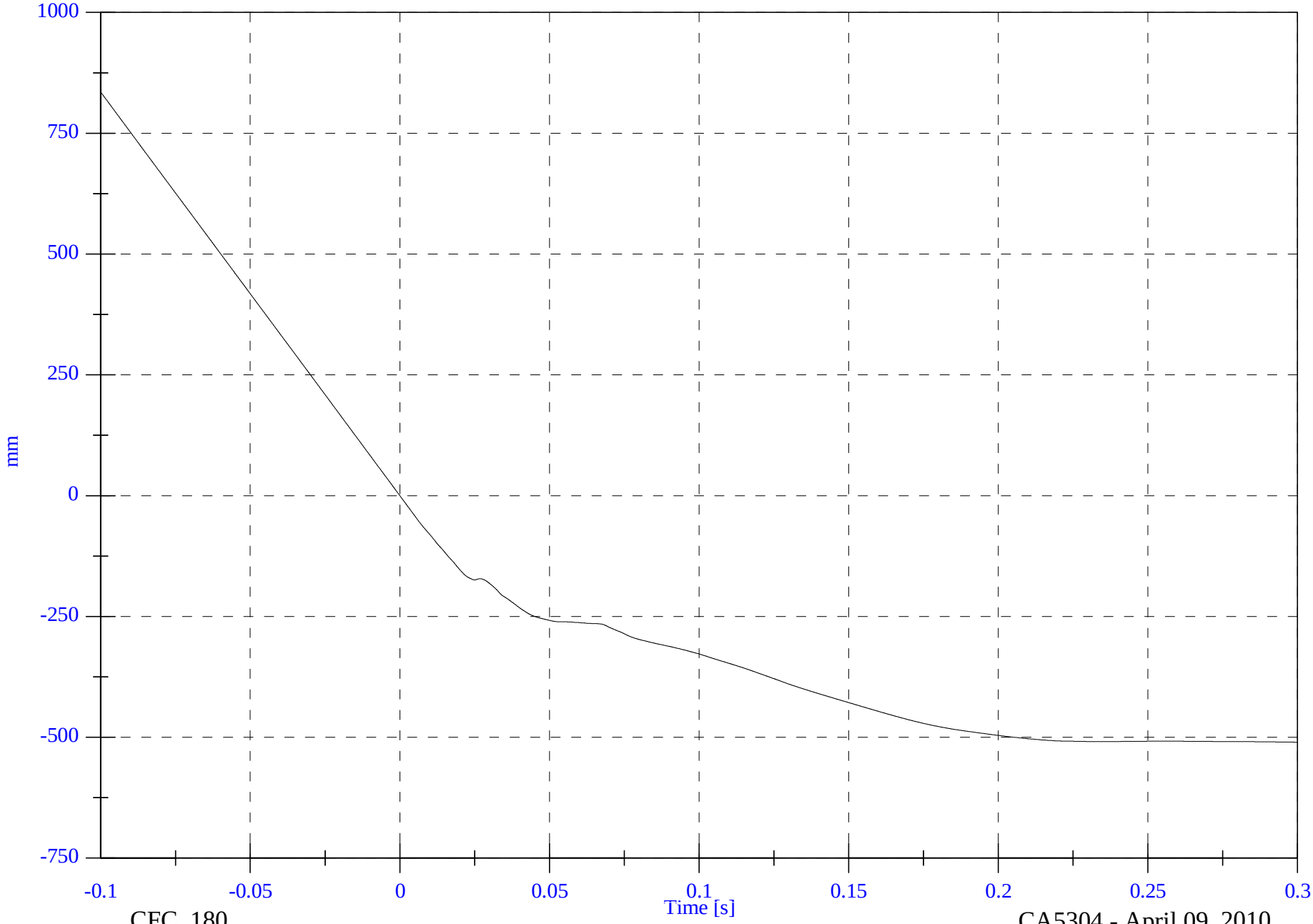
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Left B-Pillar Top y Displacement

Max: 835.1 [mm] at -0.100 [s]

Min: -510.2 [mm] at 0.300 [s]




C-32

tr2435

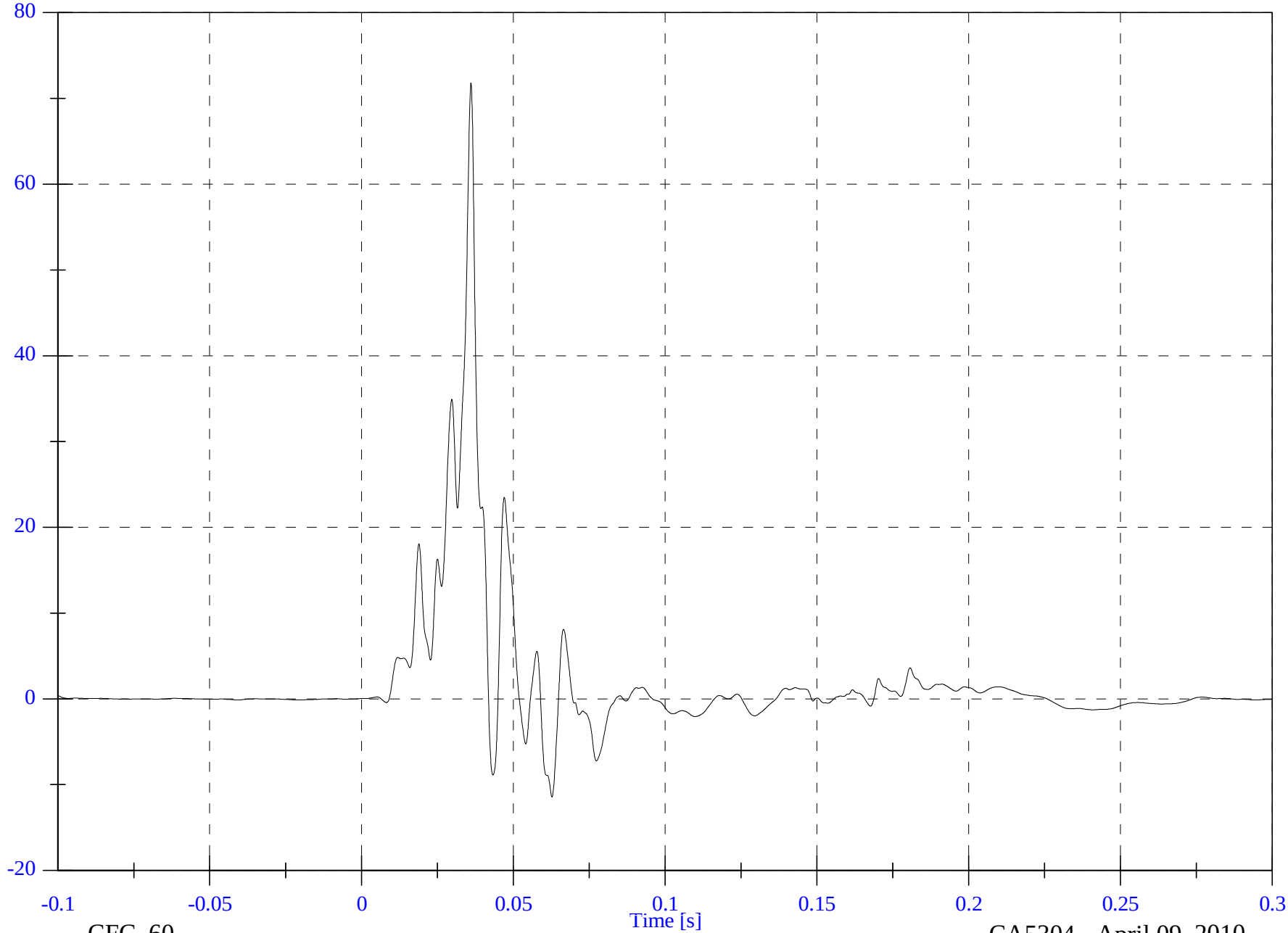
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Seat Track y

Max: 71.8 [g] at 0.036 [s]
Min: -11.4 [g] at 0.063 [s]




C-33

tr2435

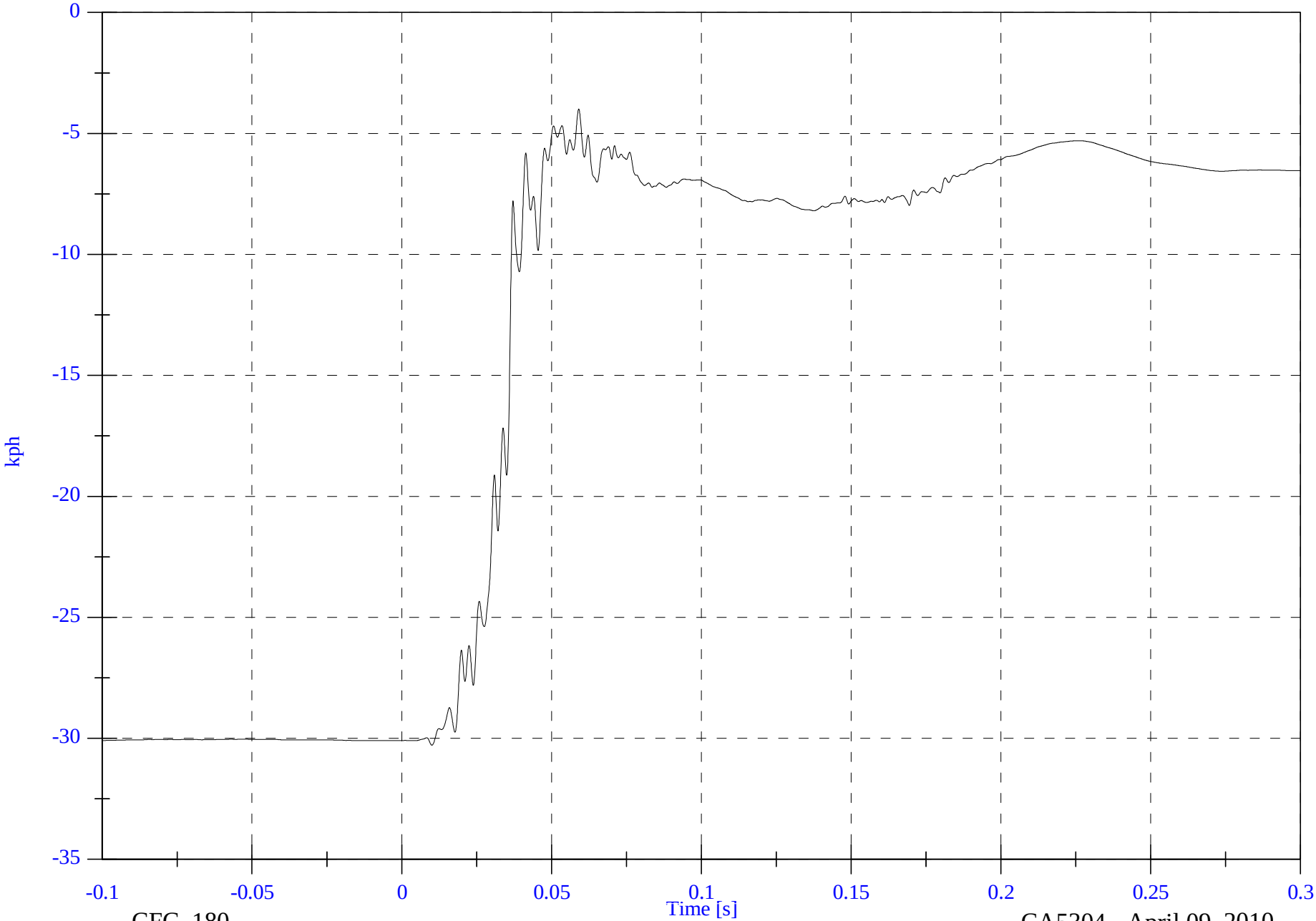
CFC_60

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Seat Track y Velocity

Max: -4.0 [kph] at 0.059 [s]
Min: -30.3 [kph] at 0.010 [s]




C-34

tr2435

CFC_180

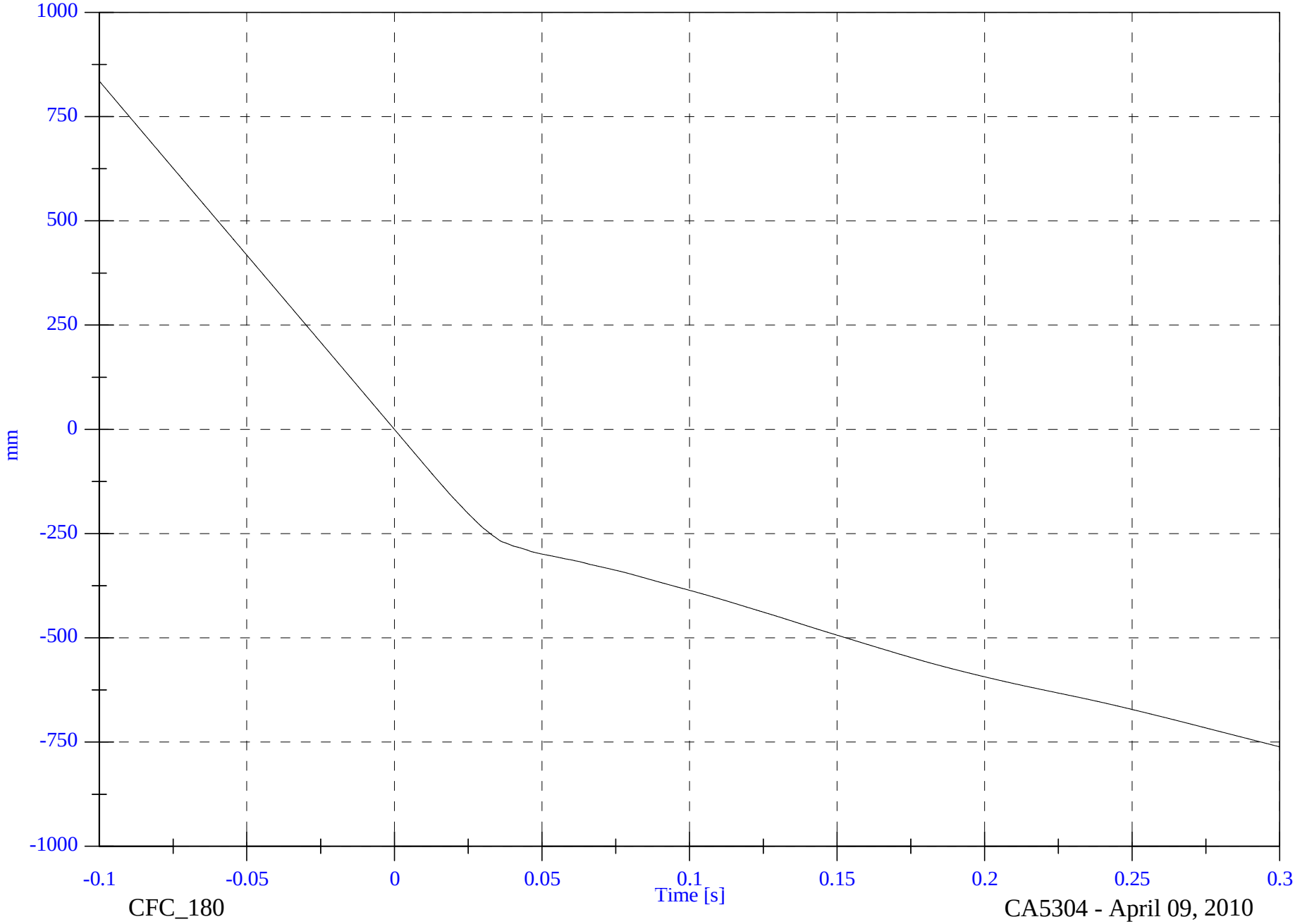
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Seat Track y Displacement

Max: 834.7 [mm] at -0.100 [s]

Min: -761.2 [mm] at 0.300 [s]

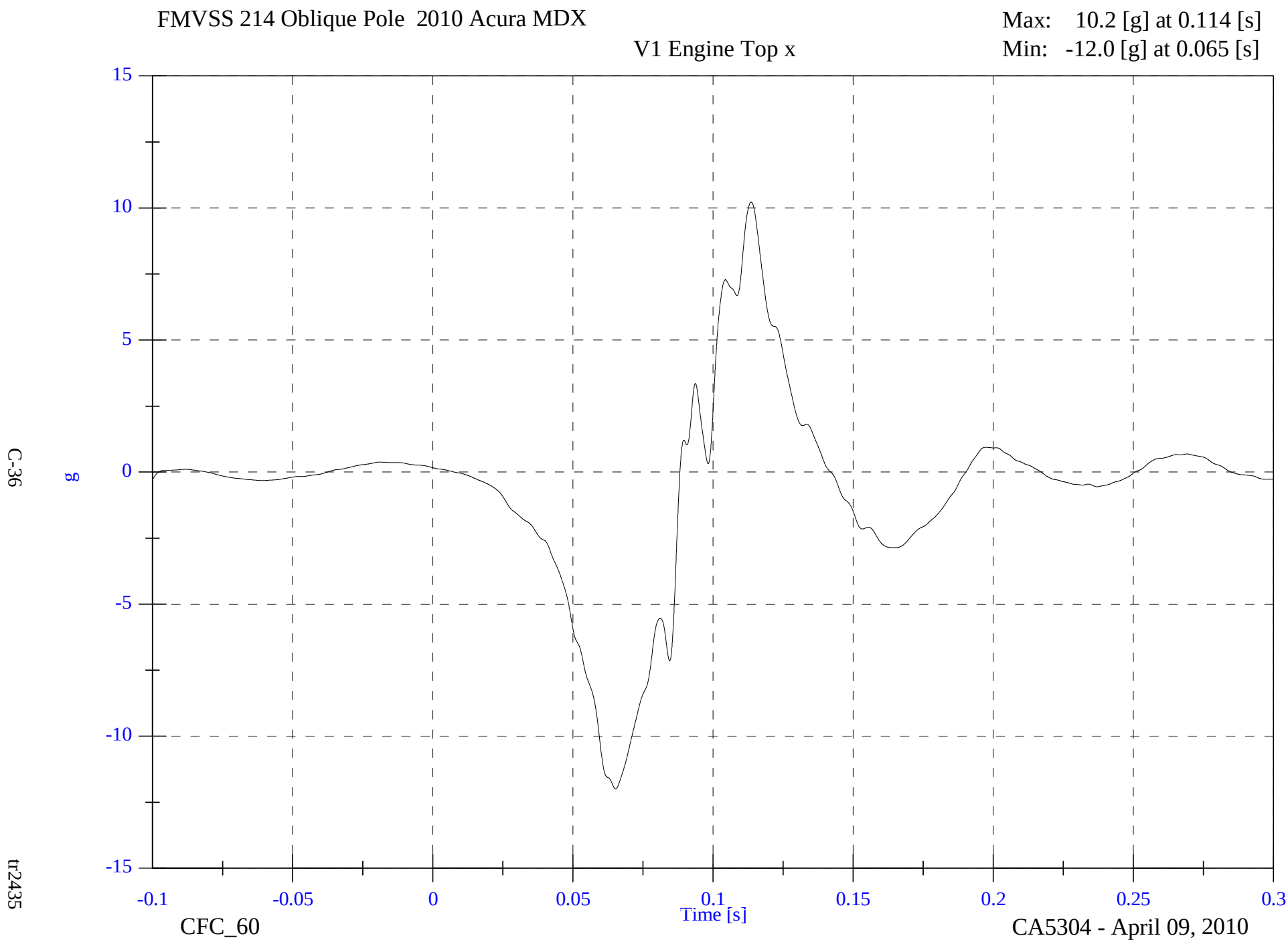



CFC_180

CA5304 - April 09, 2010

C-35

tr2435

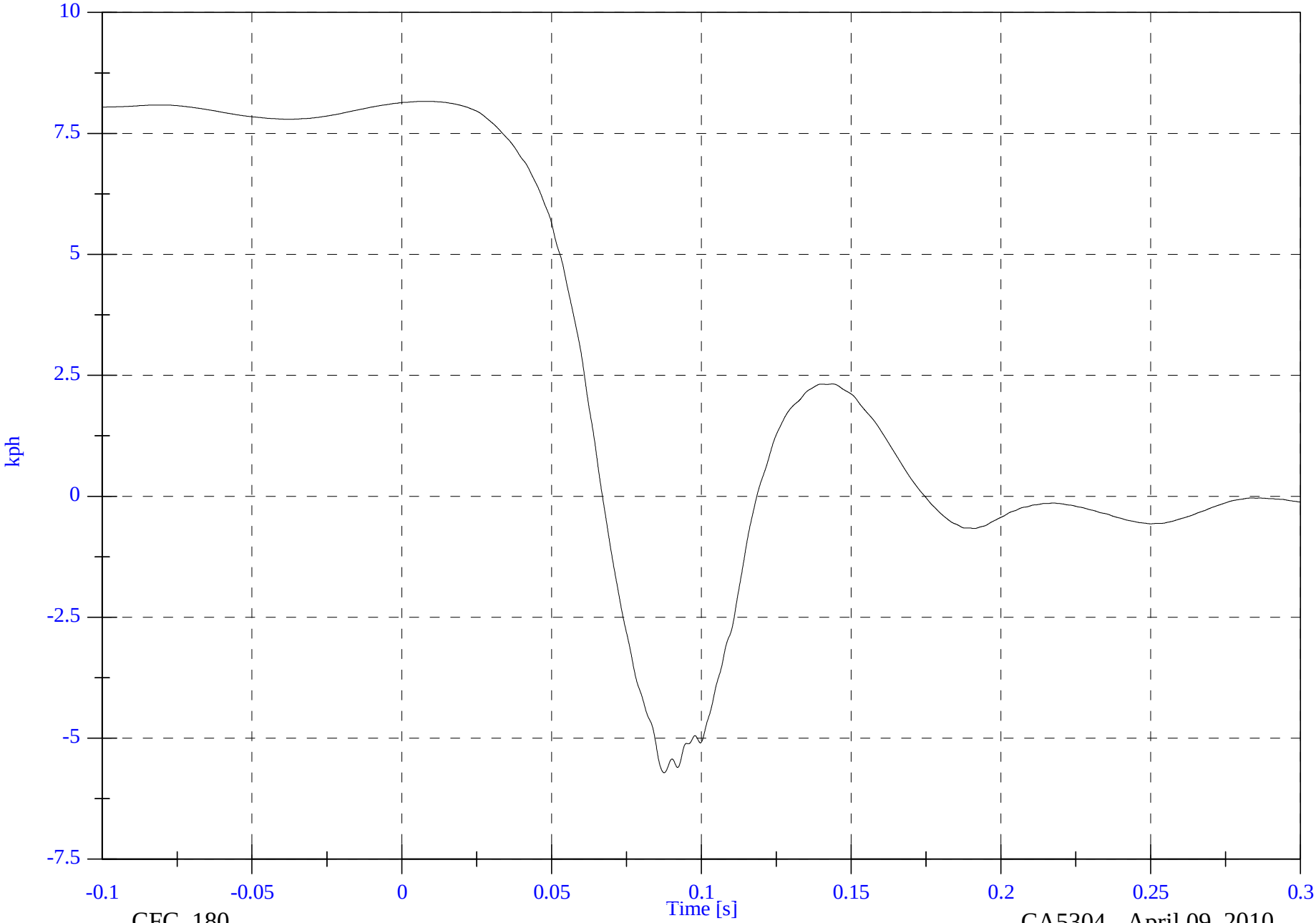

FMVSS 214 Oblique Pole 2010 Acura MDX
V1 Engine Top x
Max: 10.2 [g] at 0.114 [s]
Min: -12.0 [g] at 0.065 [s]
15
10
5
0
-5
-10
-15
g
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
C-36
tr2435
CFC_60
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Engine Top x Velocity

Max: 8.2 [kph] at 0.007 [s]

Min: -5.7 [kph] at 0.088 [s]




C-37

tr2435

CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Engine Top y

Max: 17.8 [g] at 0.063 [s]
Min: -1.3 [g] at 0.200 [s]


C-38

tr2435

CFC_60

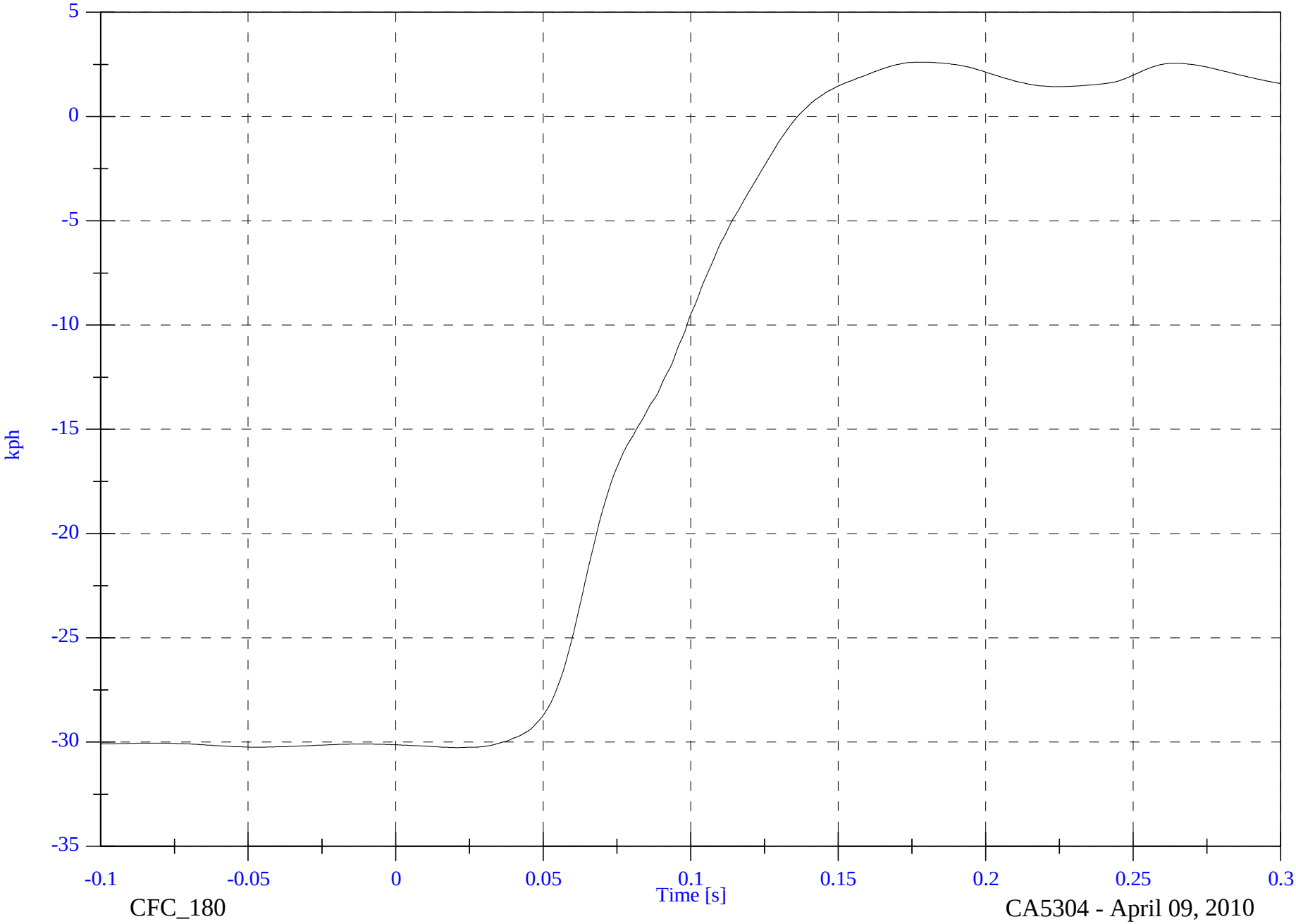
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Engine Top y Velocity

Max: 2.6 [kph] at 0.180 [s]

Min: -30.3 [kph] at 0.021 [s]

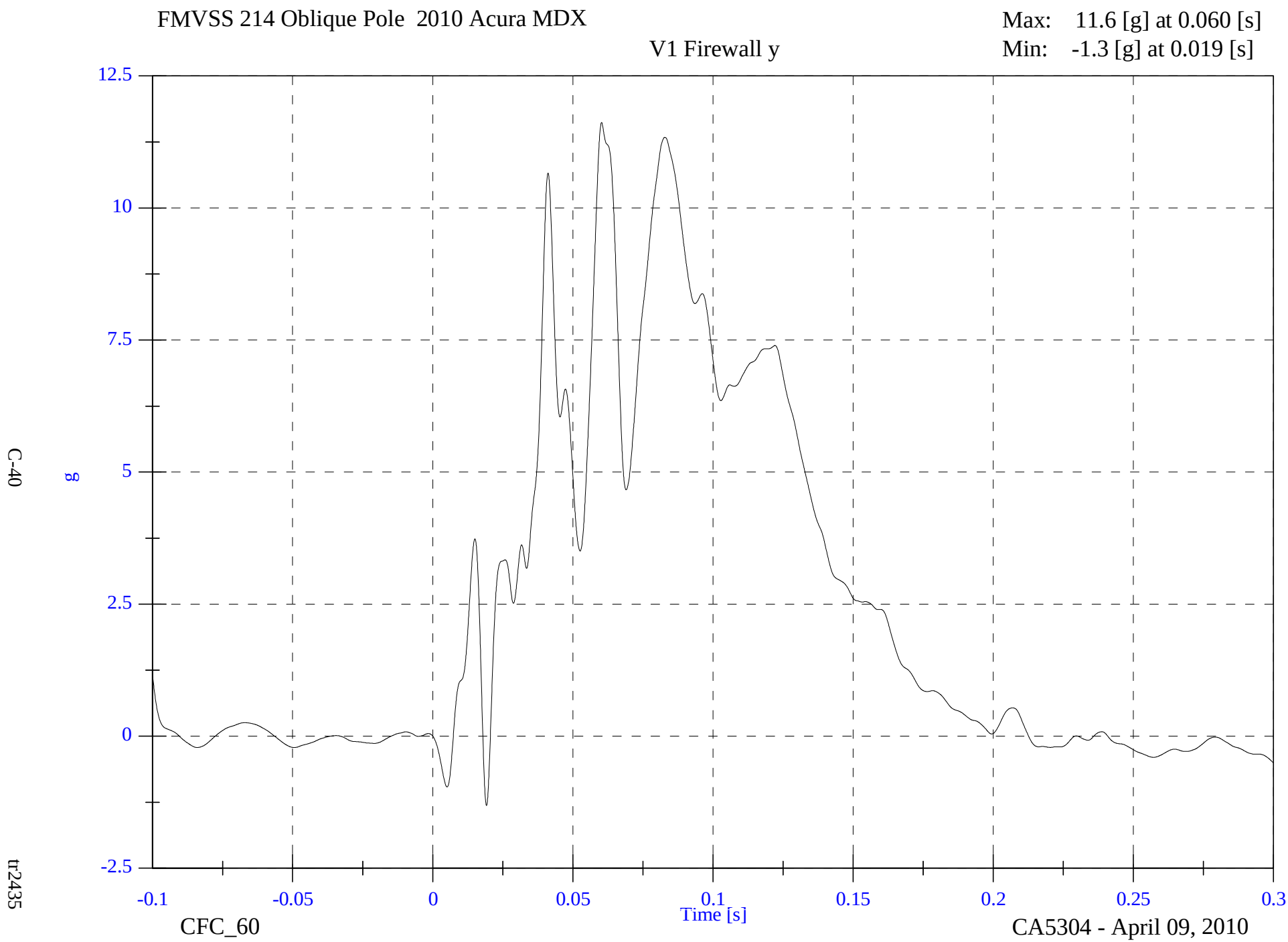



CFC_180

CA5304 - April 09, 2010

C-39

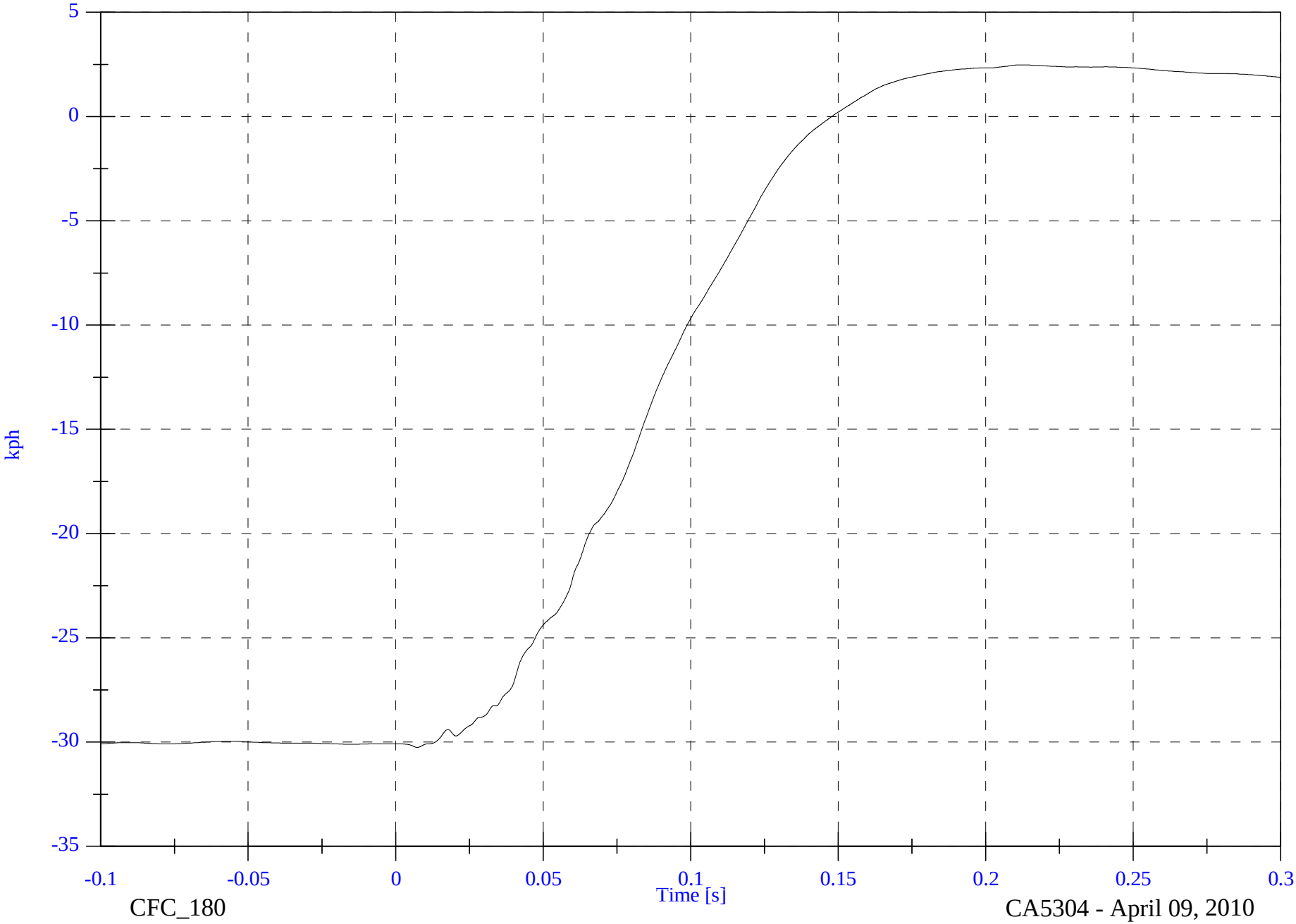
tr2435


FMVSS 214 Oblique Pole 2010 Acura MDX
V1 Firewall y
Max: 11.6 [g] at 0.060 [s]
Min: -1.3 [g] at 0.019 [s]
12.5
10
7.5
5
2.5
0
-2.5
g
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
C-40
tr2435
CFC_60
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Firewall y Velocity

Max: 2.5 [kph] at 0.213 [s]
Min: -30.3 [kph] at 0.007 [s]




C-41

tr2435

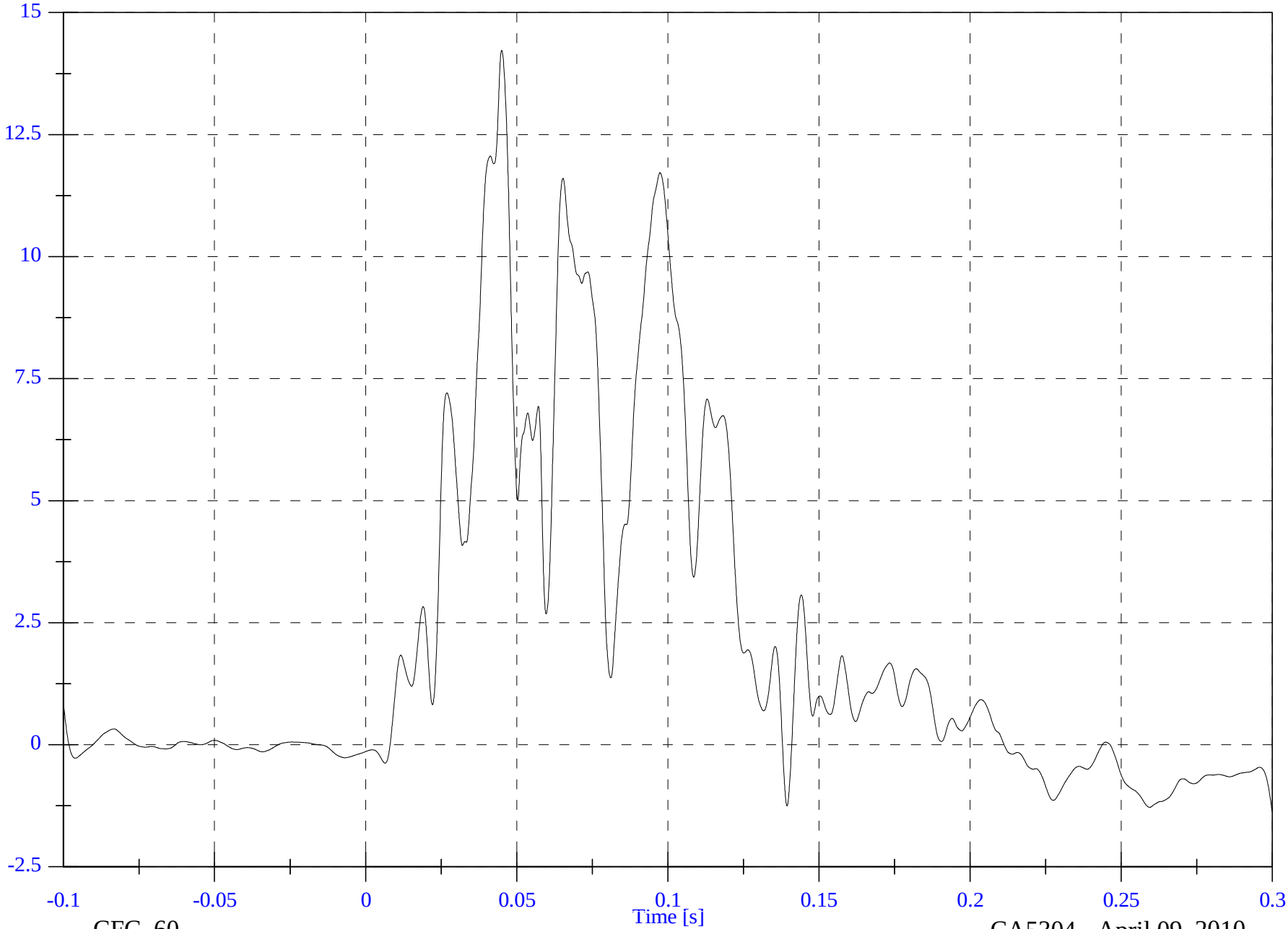
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Roof Rail y

Max: 14.2 [g] at 0.045 [s]
Min: -1.4 [g] at 0.300 [s]




C-42

tr2435

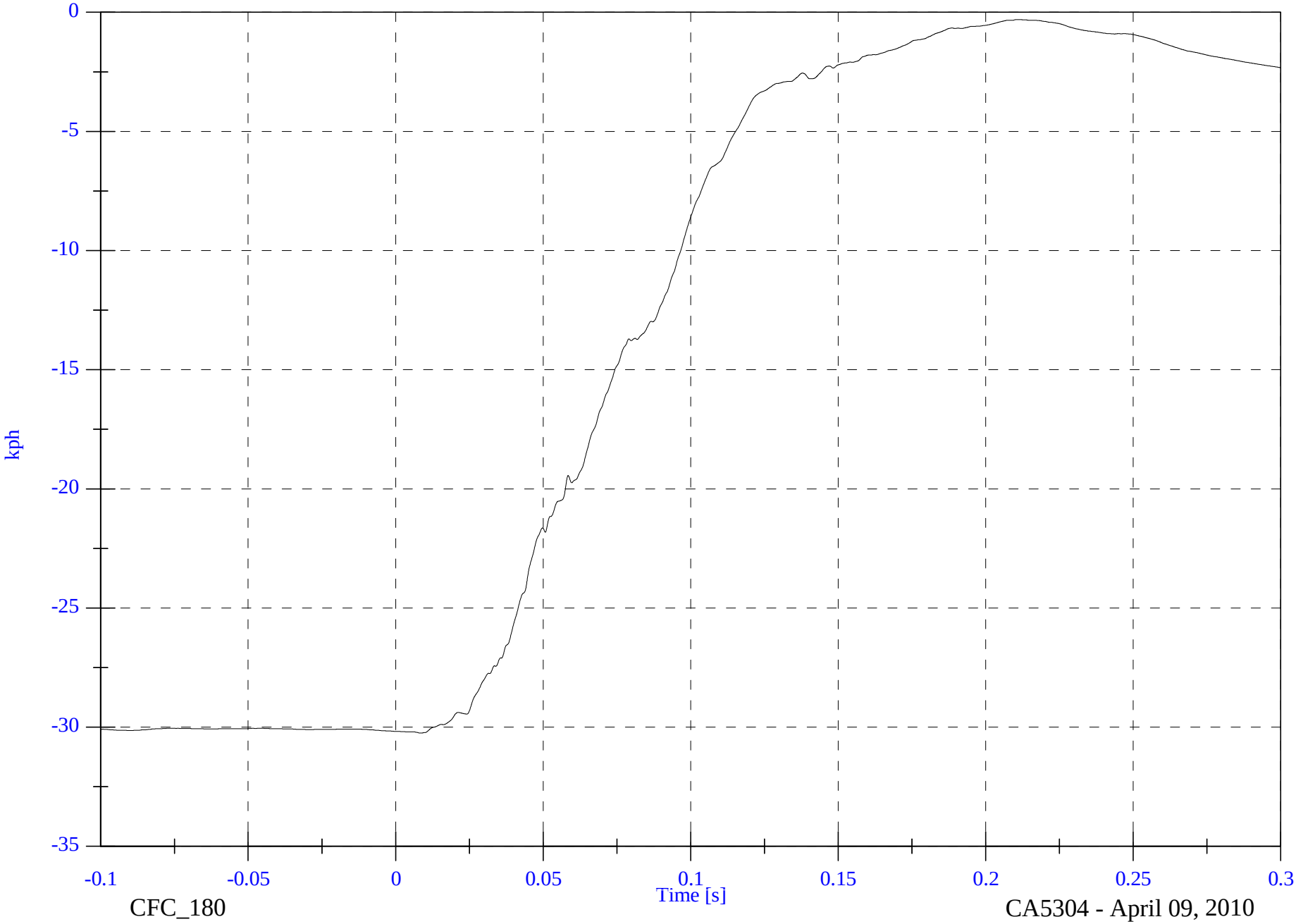
CFC_60

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Roof Rail y Velocity

Max: -0.3 [kph] at 0.211 [s]
Min: -30.2 [kph] at 0.009 [s]




C-43

tr2435

CFC_180

CA5304 - April 09, 2010

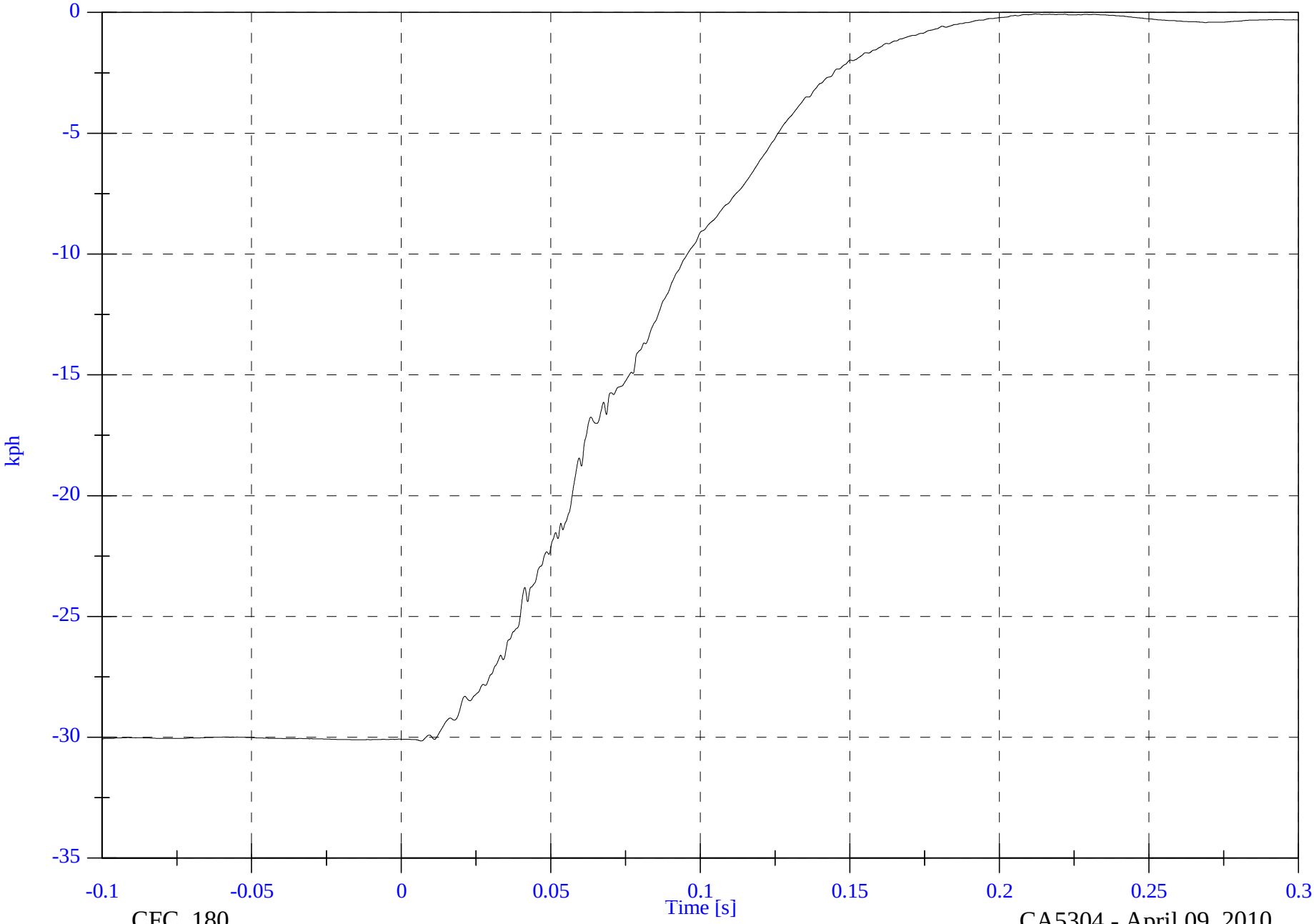

FMVSS 214 Oblique Pole 2010 Acura MDX
V1 Front Right Side Rail y
Max: 16.6 [g] at 0.058 [s]
Min: -0.5 [g] at 0.300 [s]
17.5
15
12.5
10
7.5
5
2.5
0
-2.5
g
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
C-44
tr2435
CFC_60
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Front Right Side Rail y Velocity

Max: -0.1 [kph] at 0.212 [s]

Min: -30.1 [kph] at 0.007 [s]




C-45

tr2435

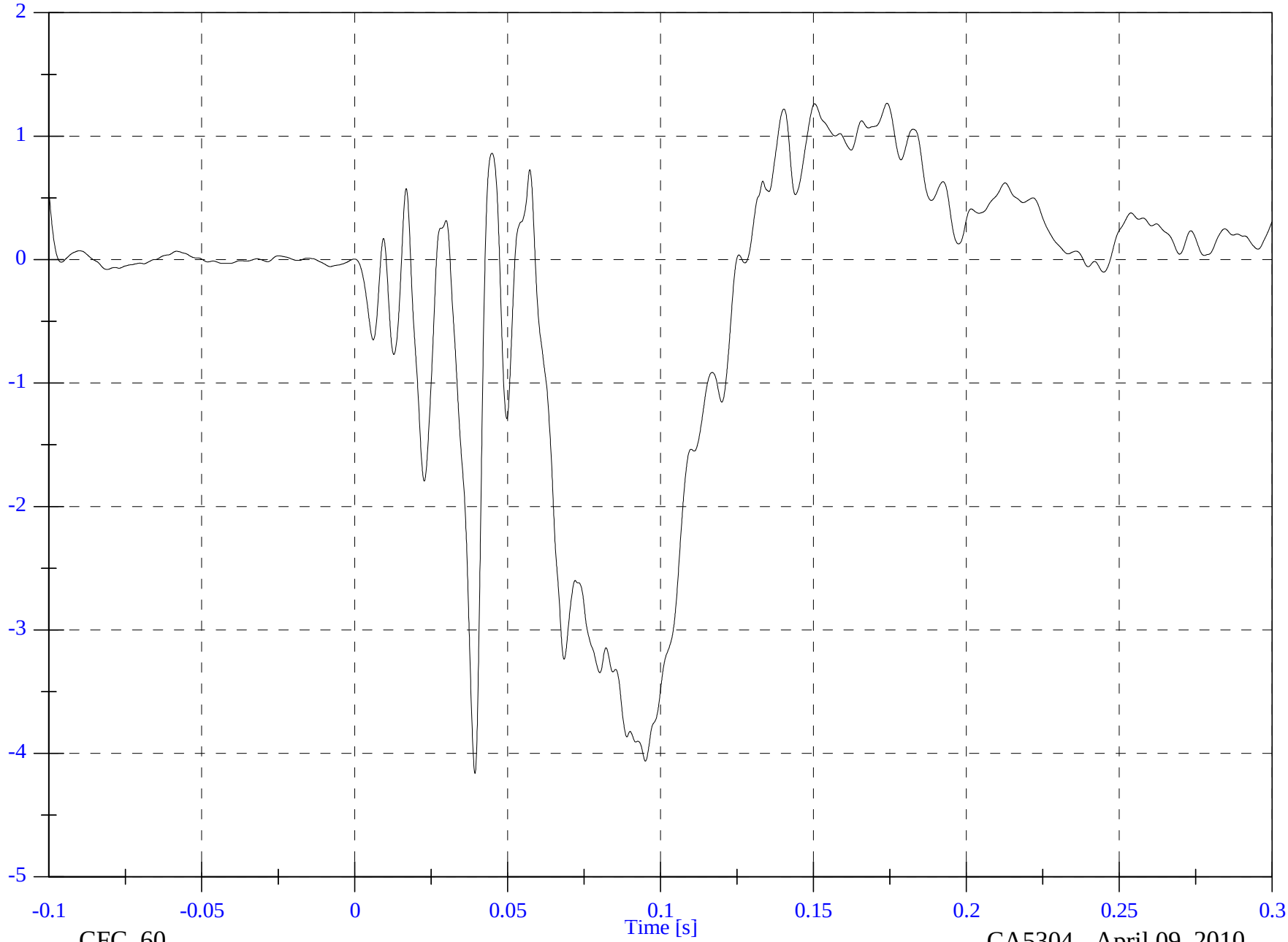
CFC_180

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Rear Floorpan x

Max: 1.3 [g] at 0.174 [s]
Min: -4.2 [g] at 0.039 [s]




C-46

tr2435

CFC_60

CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Rear Floorpan x Velocity

Max: 8.1 [kph] at -0.086 [s]

Min: 1.1 [kph] at 0.124 [s]


CFC_180

CA5304 - April 09, 2010

C-47

tr2435

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Rear Floorpan y

Max: 18.4 [g] at 0.059 [s]
Min: -0.8 [g] at 0.183 [s]


C-48

tr2435

CFC_60

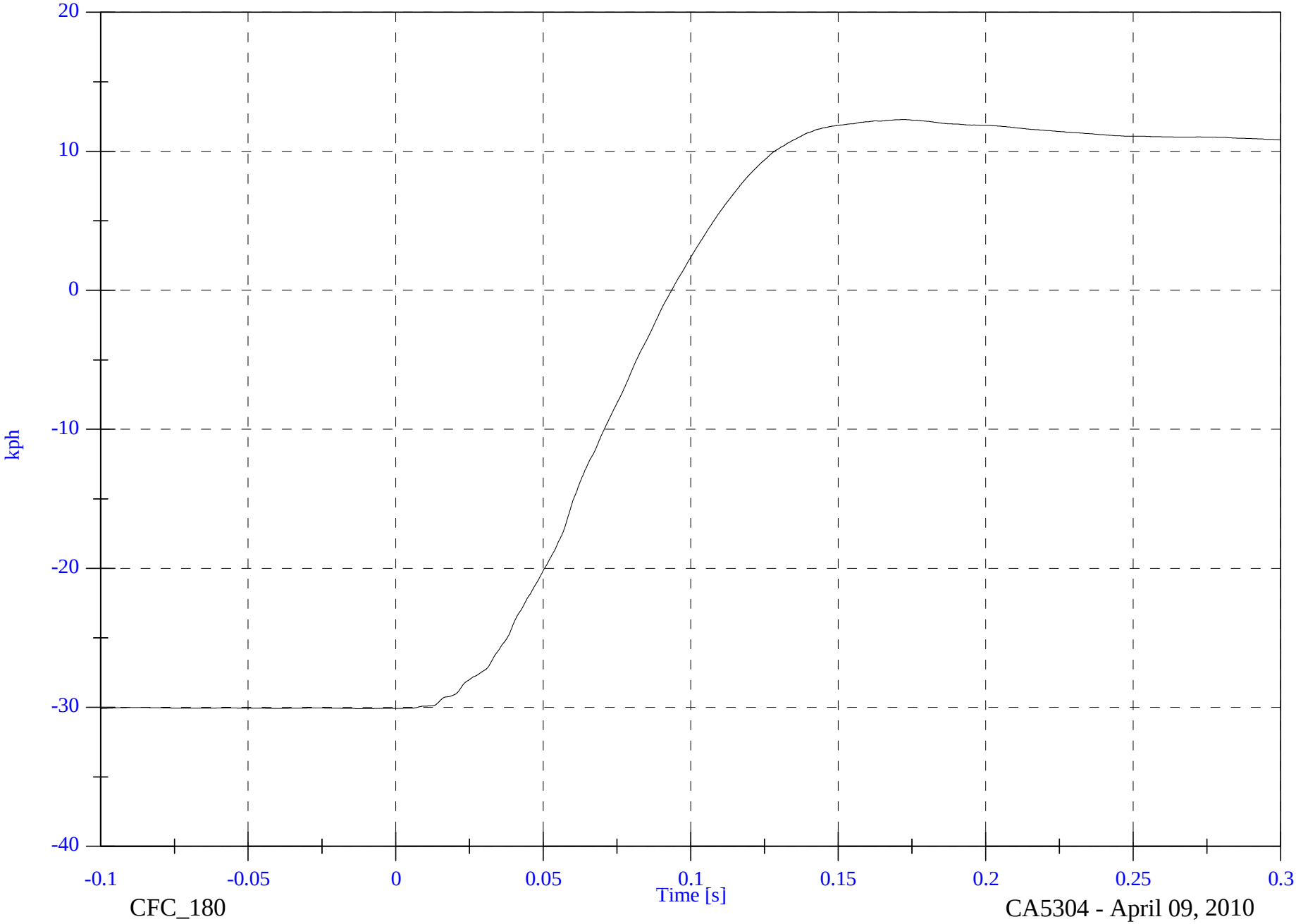
CA5304 - April 09, 2010

FMVSS 214 Oblique Pole 2010 Acura MDX

V1 Rear Floorpan y Velocity

Max: 12.3 [kph] at 0.172 [s]

Min: -30.1 [kph] at -0.011 [s]




C-49

tr2435

CFC_180

CA5304 - April 09, 2010

# APPENDIX D

# DUMMY ES2-re PERFORMANCE CALIBRATION TEST DATA

**PRE-TEST**

**ES2-re S/N: 0037**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Head Drop** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Head Drop** | Test Date: | **4/8/2010** |
| Test Number: | **2** | Test Time: | **8:53:04 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-1007** | |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10 | -- | 70 | **45** | %RH | P |
| Resultant Acceleration | 125 | -- | 155 | **141** | g | P |
| Oscillation | 0.0 | -- | 15.0 | **3.8** | % | P |
| Fore-Aft Acceleration | -15.00 | -- | 15.00 | **6.47** | g | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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www.calspan.com
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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Endevco** | **7264-2000** | **AC-P18639** | **1/25/2010** |
| **Endevco** | **7264-2000** | **AC-P23128** | **1/25/2010** |
| **Endevco** | **7264-2000** | **AC-P16591** | **1/25/2010** |

Test ID: **Head Drop** Test Time: **8:53:04 AM** Test Date: **4/8/2010**

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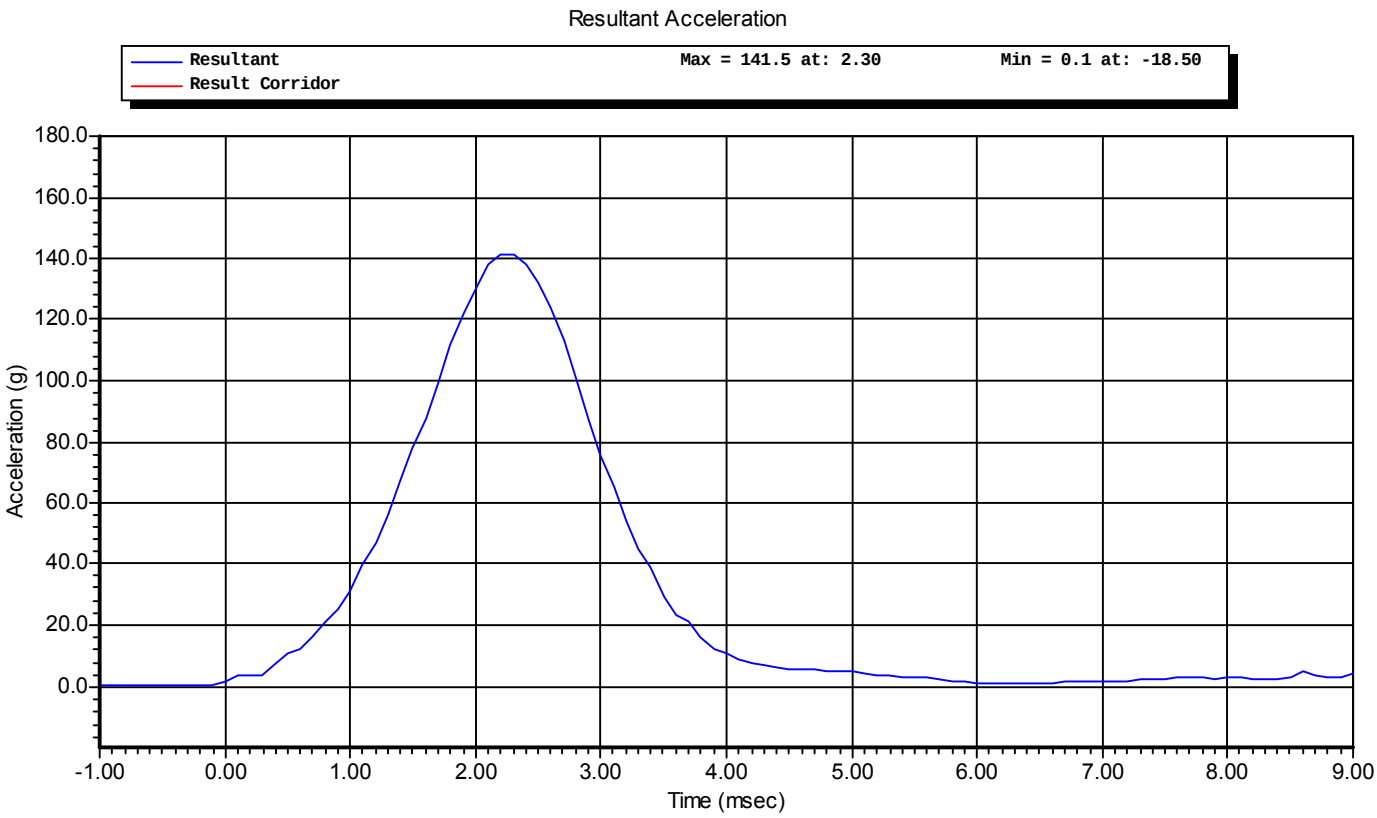
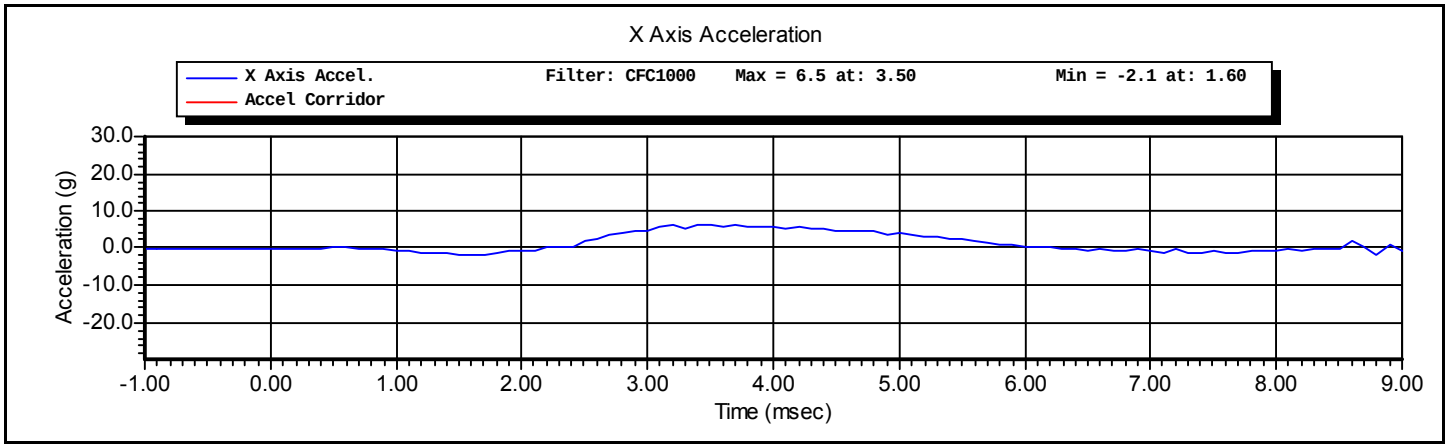
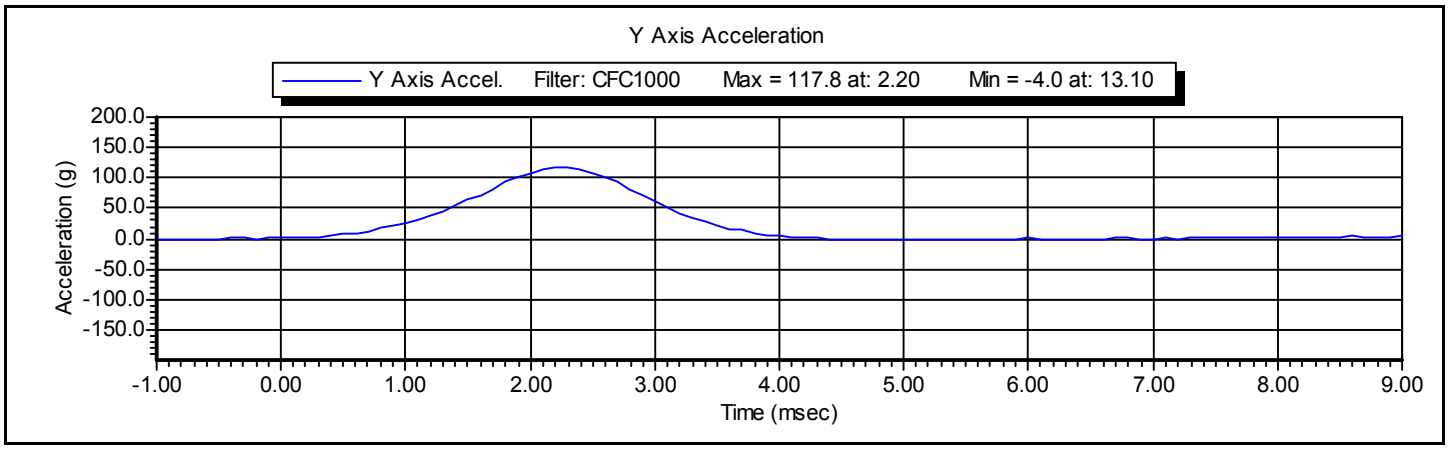
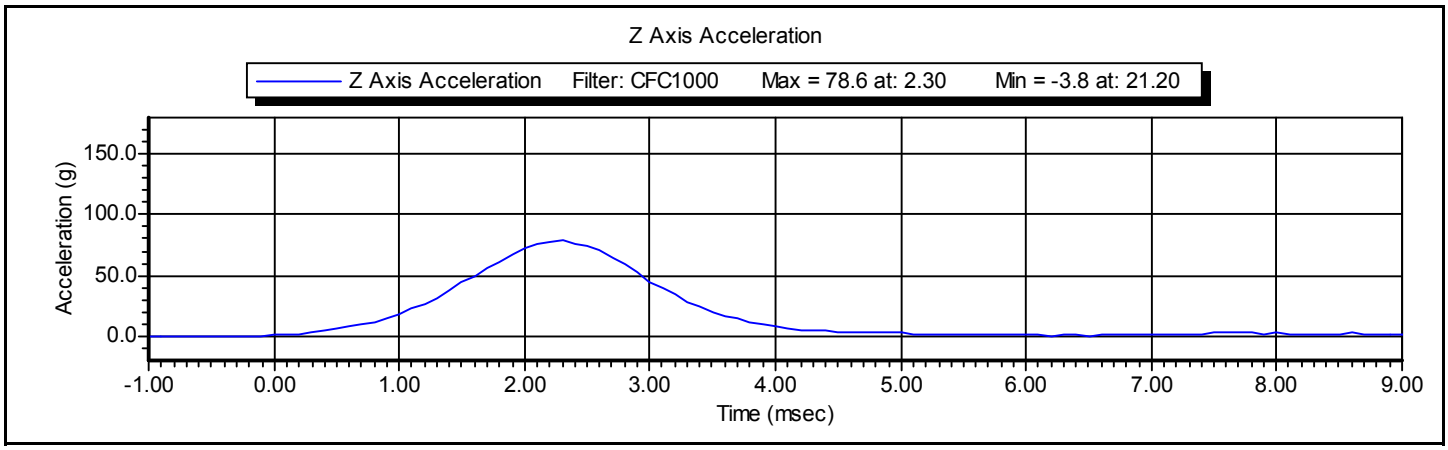
| | | | |
|---|---|---|---|
| Test Name: | **Head Drop** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Head Drop** | Test Date: | **4/8/2010** |
| Test Number: | **2** | Test Time: | **8:53:04 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-1007** | |






Test ID: **Head Drop** Test Time: **8:53:04 AM** Test Date: **4/8/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Neck Flexion** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Neck Flexion** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **11:22:05 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-2002** | **19-020118A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10 | -- | 70 | **39** | %RH | P |
| Velocity | 3.30 | -- | 3.50 | **3.38** | m/s | P |
| Maximum Neck Flexion Angle | 49.0 | -- | 59.0 | **53.5** | degrees | P |
| Time At Maximum Neck Flexion | 54.0 | -- | 66.0 | **58.8** | ms | P |
| Decay to Zero Degrees | 53.0 | -- | 88.0 | **61.0** | ms | P |
| Velocity Corridor | | -- | | | | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7231CT** | **AF5B3** | **2/24/2010** |
| **DentonATD** | **7000428** | **094** | **10/23/2009** |
| **DentonATD** | **7000428** | **095** | **10/23/2009** |
| **DentonATD** | **7000428** | **093** | **10/23/2009** |

Test ID: **Neck Flexion** Test Time: **11:22:05 AM** Test Date: **4/7/2010**

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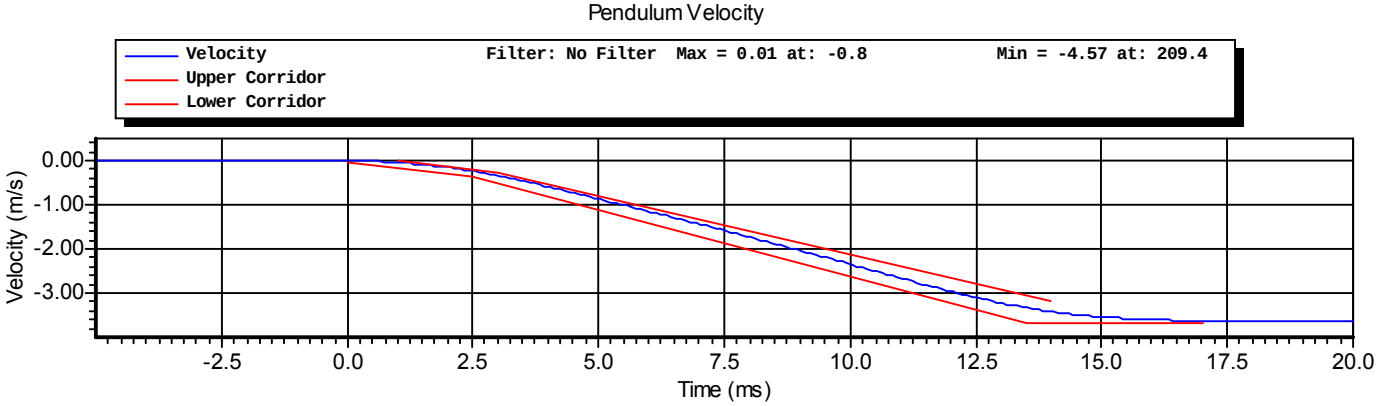
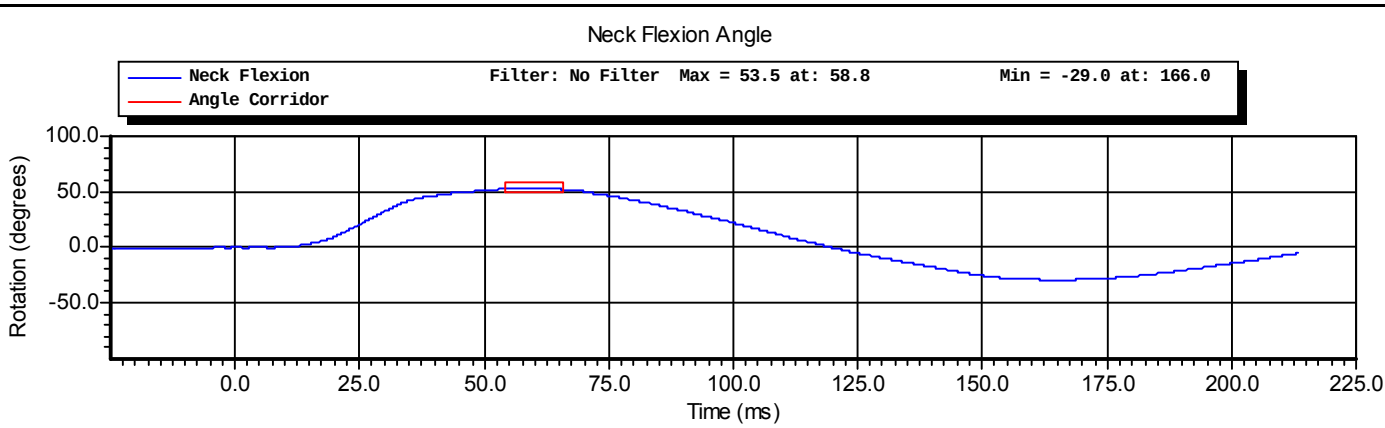
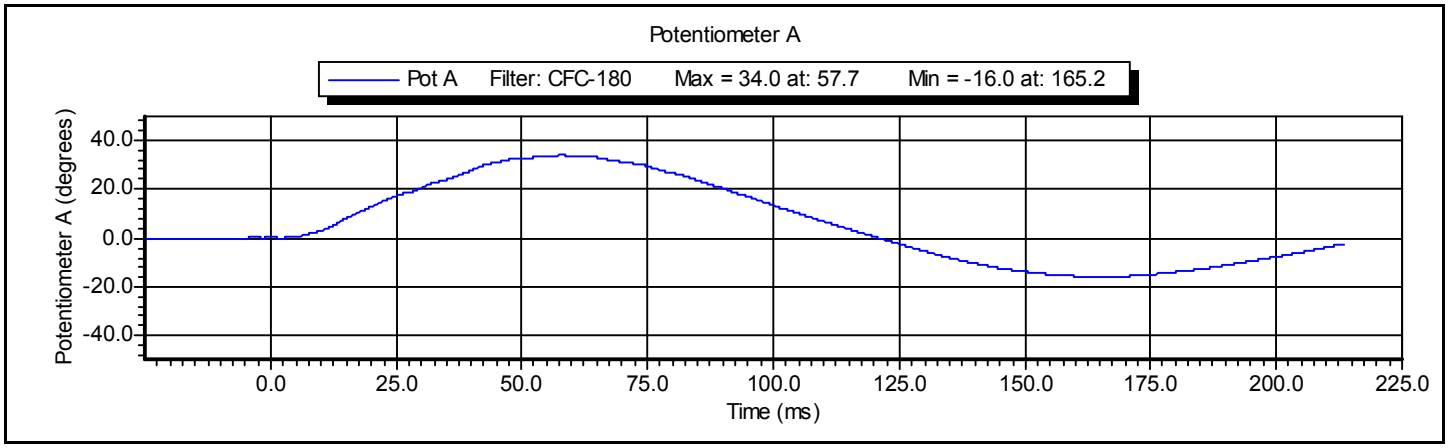
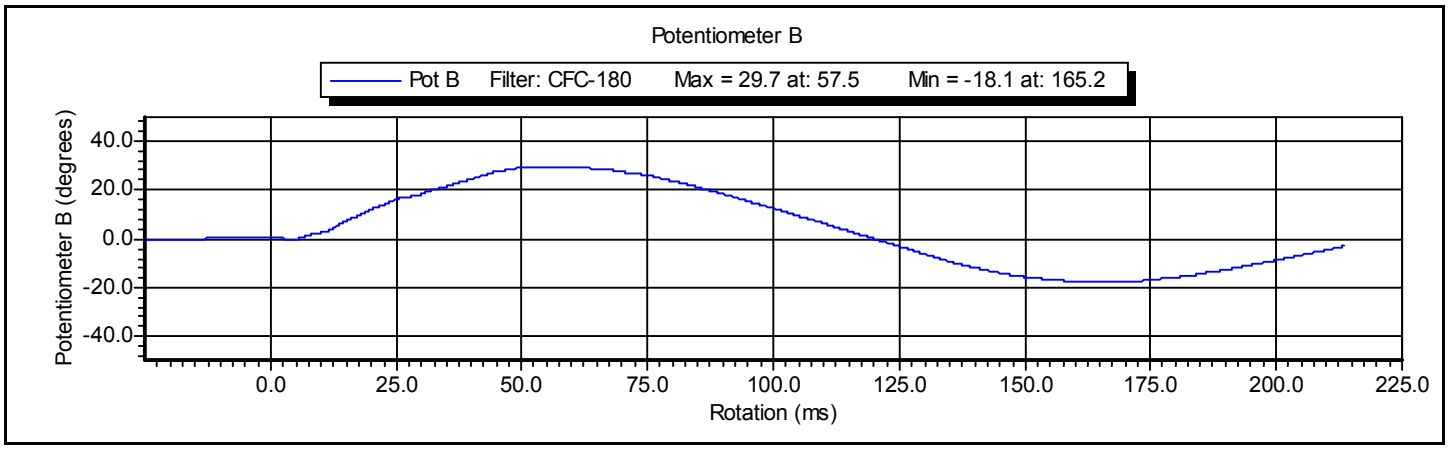
| | | | |
|---|---|---|---|
| Test Name: | **Neck Flexion** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Neck Flexion** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **11:22:05 AM** |

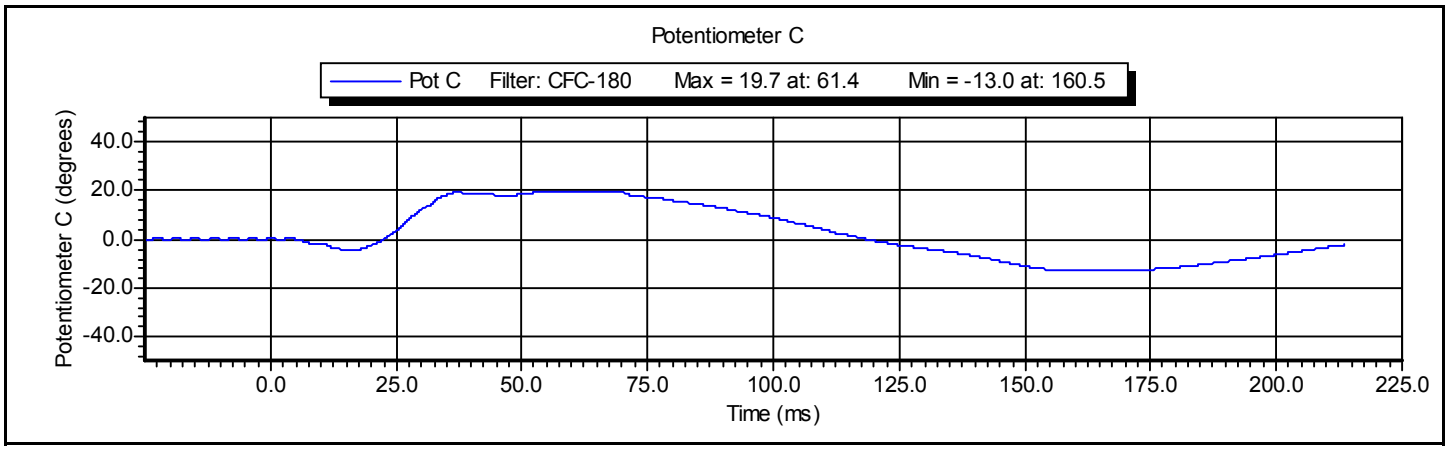
| Component Part Number | Component Serial Number |
|---|---|
| **455-2002** | **19-020118A** |






Test ID: **Neck Flexion** Test Time: **11:22:05 AM** Test Date: **4/7/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Shoulder Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Shoulder Impact** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **3:40:30 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **960715-313** | |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **39.0** | %RH | P |
| Velocity | 4.20 | -- | 4.40 | **4.29** | m/s | P |
| Pendulum Acceleration | -10.50 | -- | -7.50 | **-7.90** | g | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |

Test ID: **Shoulder Impact** Test Time: **3:40:30 PM** Test Date: **4/6/2010**

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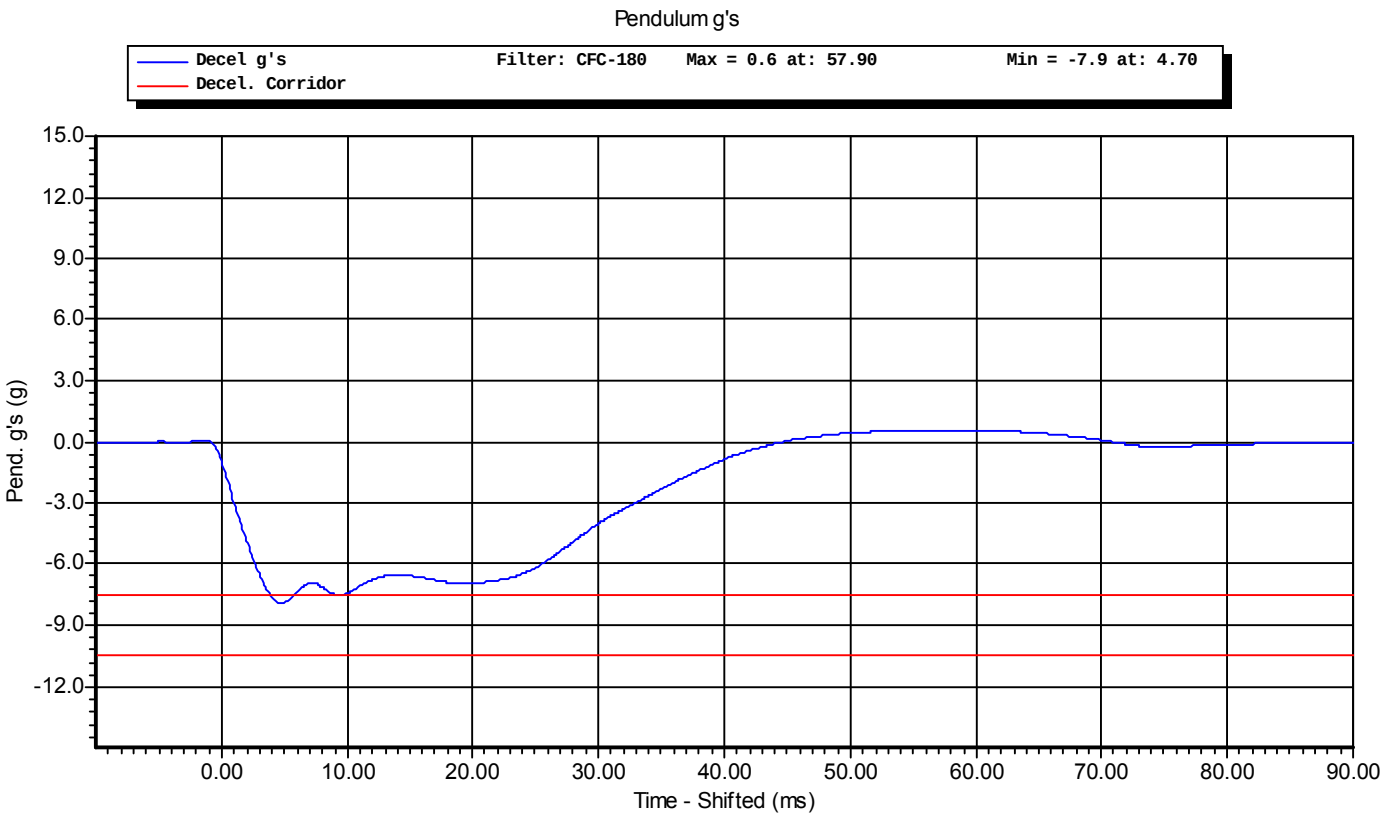
| | | | |
|---|---|---|---|
| Test Name: | **Shoulder Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Shoulder Impact** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **3:40:30 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **960715-313** | |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib 4 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **4:12:15 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **40.0** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **3.99** | m/s | P |
| Rib Displacement | -51.00 | -- | -46.00 | **-47.99** | mm | P |
| Drop Height | 807.0 | -- | 823.0 | **815.0** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-3** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Lower Rib 4 m/s** Test Time: **4:12:15 PM** Test Date: **4/6/2010**

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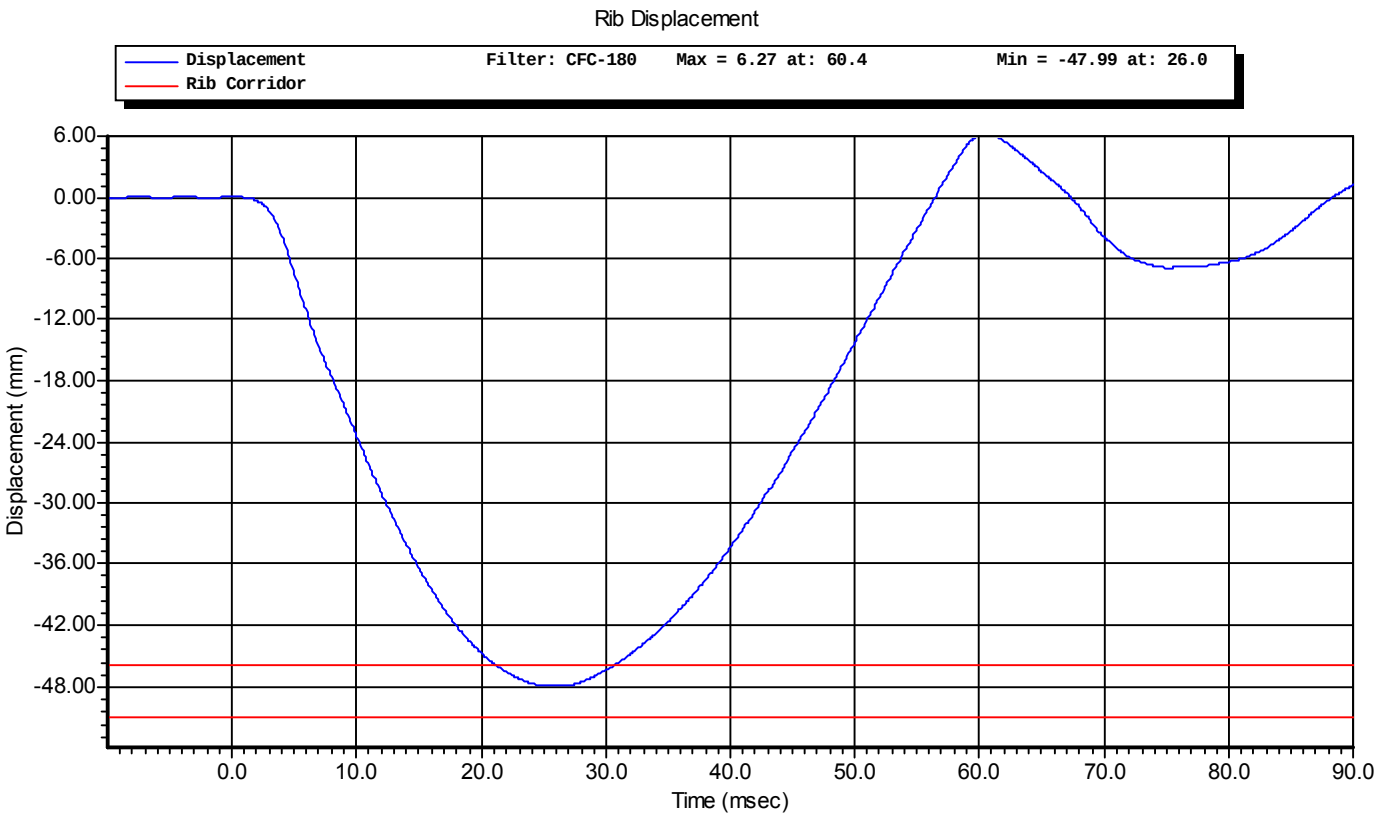
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib 4 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **4:12:15 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib 3 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **4:17:53 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **40.0** | %RH | P |
| Velocity | 2.90 | -- | 3.10 | **2.98** | m/s | P |
| Rib Displacement | -40.00 | -- | -36.00 | **-38.34** | mm | P |
| Drop Height | 454 | -- | 464 | **459** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-3** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Lower Rib 3 m/s** Test Time: **4:17:53 PM** Test Date: **4/6/2010**

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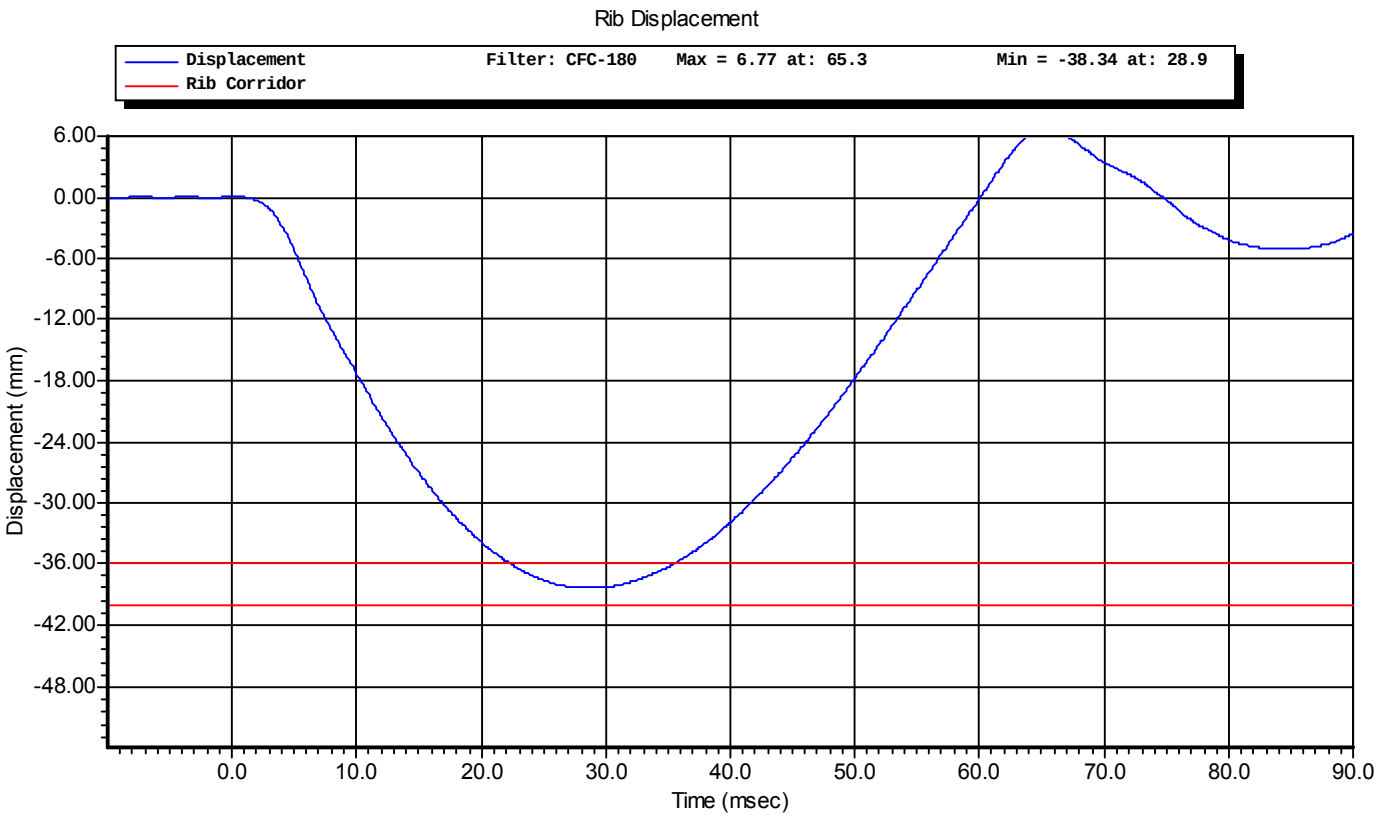
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib 3 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **4:17:53 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 4 m/s** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **8:18:12 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0125A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **39.0** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **4.01** | m/s | P |
| Rib Displacement | -51.00 | -- | -46.00 | **-48.33** | mm | P |
| Drop Height | 807.0 | -- | 823.0 | **815.0** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0807** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Middle Rib 4 m/s** Test Time: **8:18:12 AM** Test Date: **4/7/2010**

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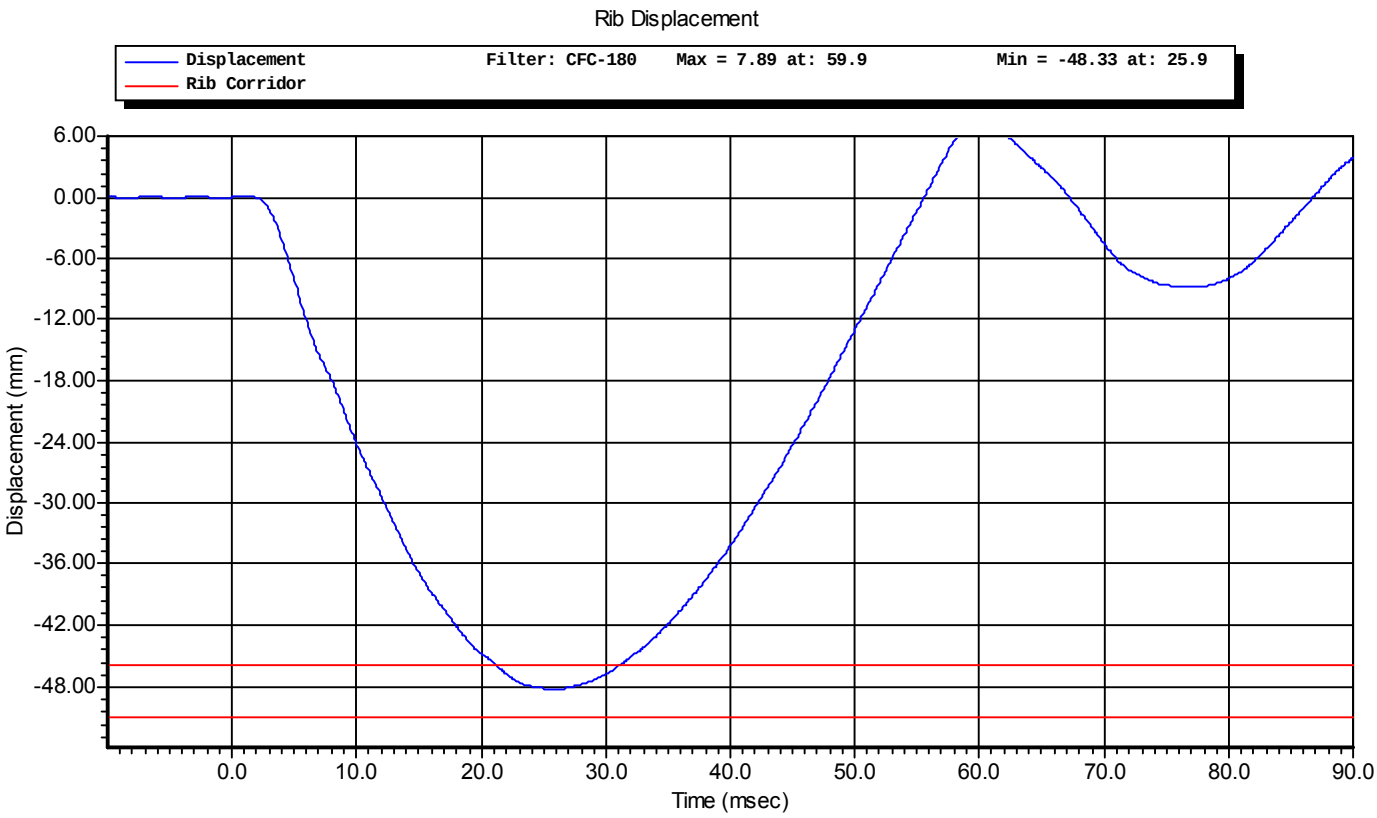
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 4 m/s** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **8:18:12 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0125A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 3 m/s** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **8:25:01 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-1025A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **39.0** | %RH | P |
| Velocity | 2.90 | -- | 3.10 | **2.99** | m/s | P |
| Rib Displacement | -40.00 | -- | -36.00 | **-37.57** | mm | P |
| Drop Height | 454 | -- | 464 | **459** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0807** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Middle Rib 3 m/s** Test Time: **8:25:01 AM** Test Date: **4/7/2010**

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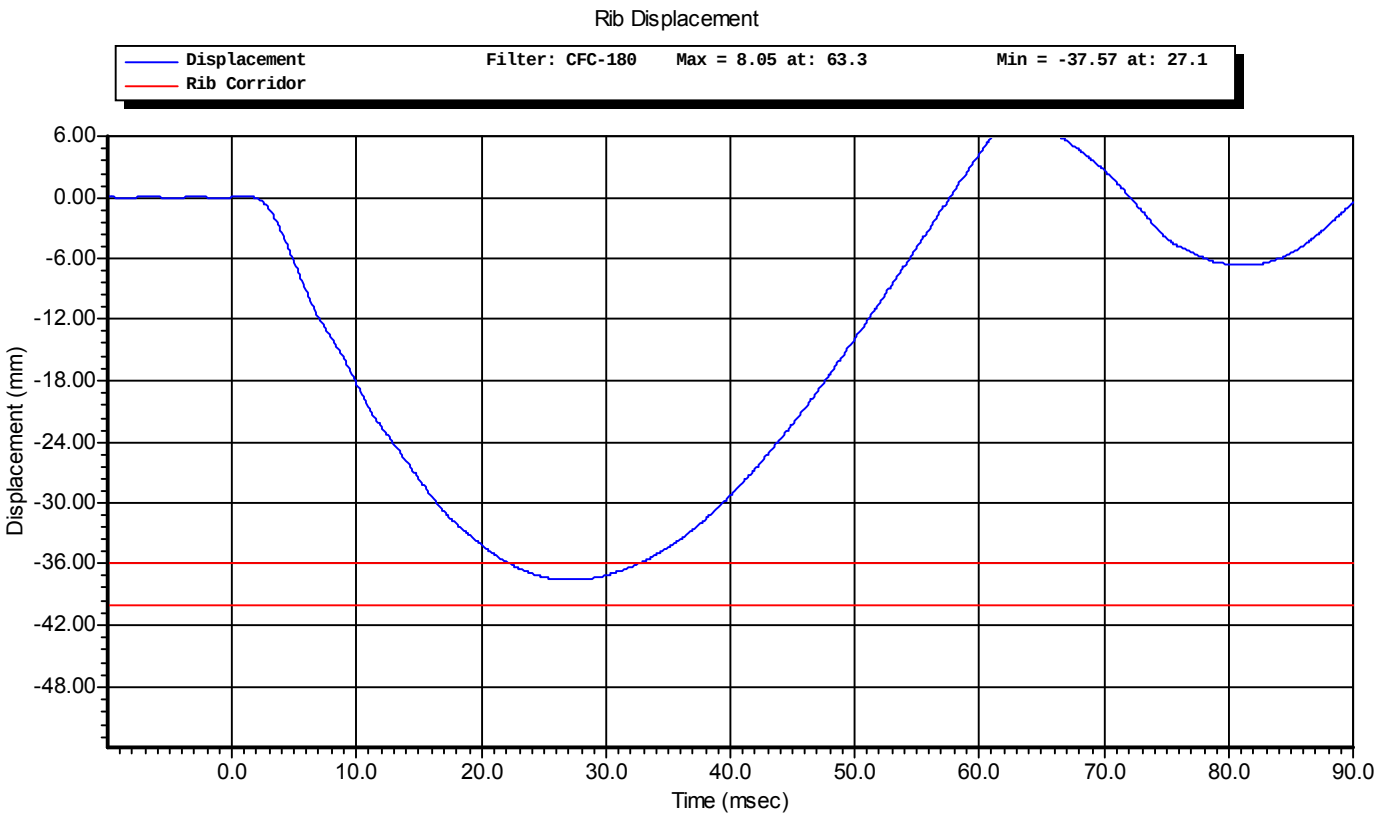
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 3 m/s** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **8:25:01 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-1025A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 4 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **3:59:07 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **40.0** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **4.00** | m/s | P |
| Rib Displacement | -51.00 | -- | -46.00 | **-49.35** | mm | P |
| Drop Height | 807.0 | -- | 823.0 | **815.0** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-01** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Upper Rib 4 m/s** Test Time: **3:59:07 PM** Test Date: **4/6/2010**

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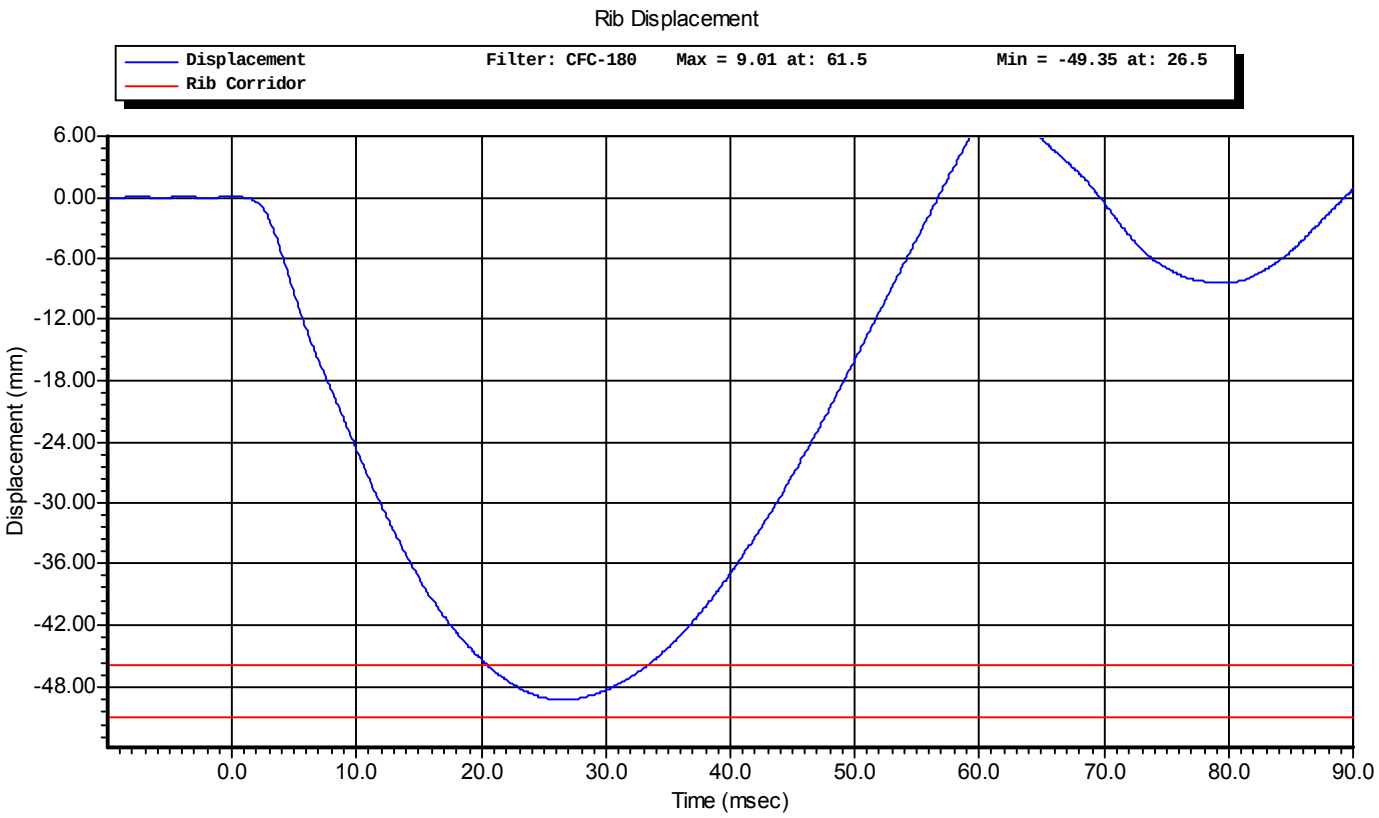
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 4 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **3:59:07 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 3 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **4:06:41 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **40.0** | %RH | P |
| Velocity | 2.90 | -- | 3.10 | **2.95** | m/s | P |
| Rib Displacement | -40.00 | -- | -36.00 | **-38.03** | mm | P |
| Drop Height | 454 | -- | 464 | **459** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-01** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Upper Rib 3 m/s** Test Time: **4:06:41 PM** Test Date: **4/6/2010**

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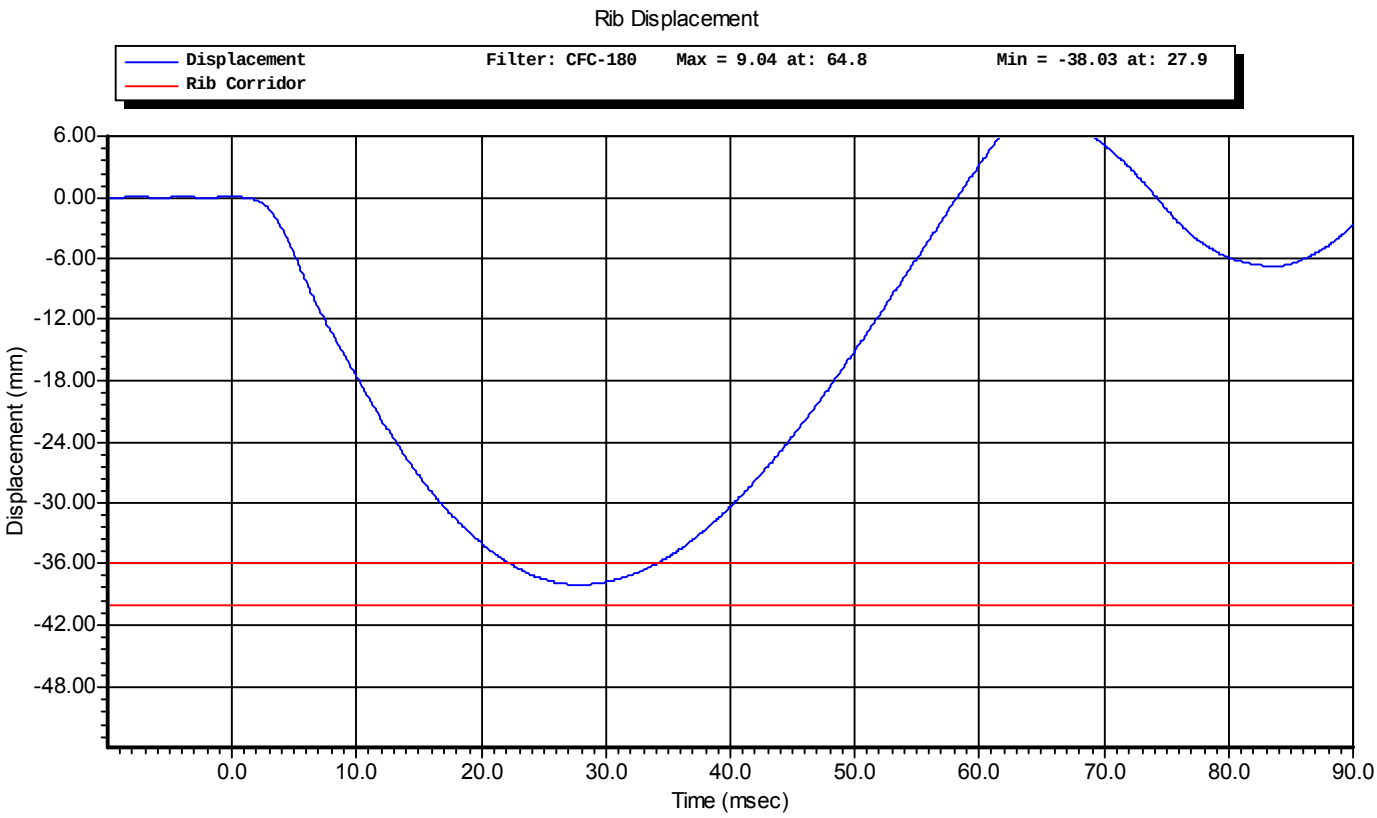
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 3 m/s** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **4:06:41 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Thorax Impact** | Revision: | **8/15/2008** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Thorax Impact** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **9:43:38 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **Upper Rib - 175-4002** | **1954-0124A** |
| **Middle Rib - 175-4002** | **1954-0125A** |
| **Lower Rib - 175-4002** | **1954-0126A** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **40.0** | %RH | P |
| Velocity | 5.40 | -- | 5.60 | **5.50** | m/s | P |
| Upper Rib Displacement | 34.0 | -- | 41.0 | **36.0** | mm | P |
| Middle Rib Displacement | 37.0 | -- | 45.0 | **40.8** | mm | P |
| Lower Rib Displacement | 37.0 | -- | 44.0 | **43.1** | mm | P |
| Impactor Force | 5100 | -- | 6200 | **5789** | N | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |
| **Honeywell** | **MLT-38000** | **DS-0552-01** | **1/11/2010** |
| **Honeywell** | **MLT-38000** | **DS-0807** | **1/11/2010** |
| **Honeywell** | **MLT-38000** | **DS-0552-3** | **1/11/2010** |

Test ID: **Thorax Impact** Test Time: **9:43:38 AM** Test Date: **4/7/2010**

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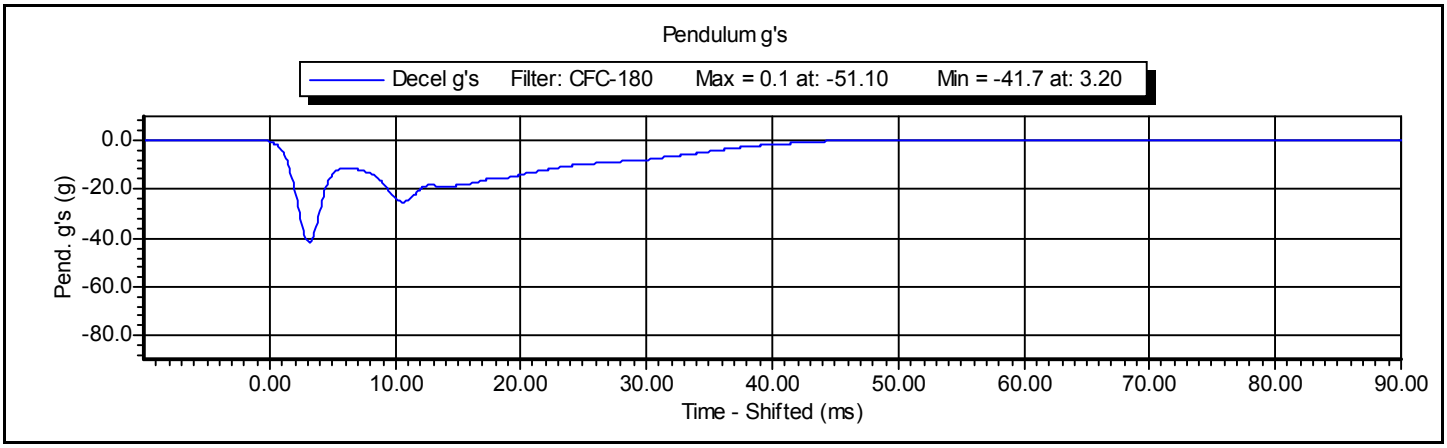
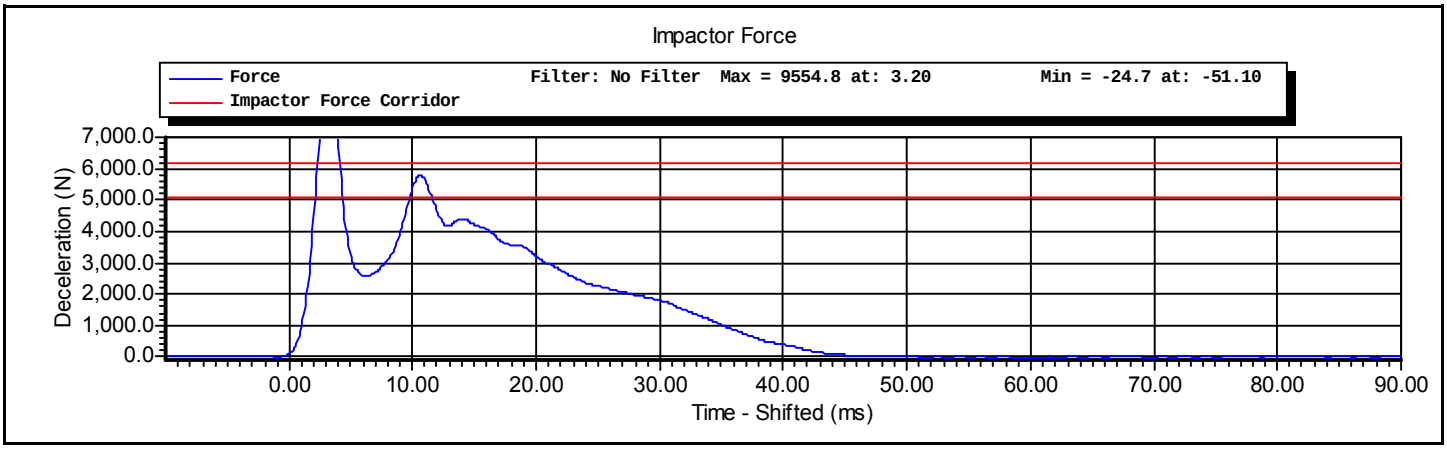
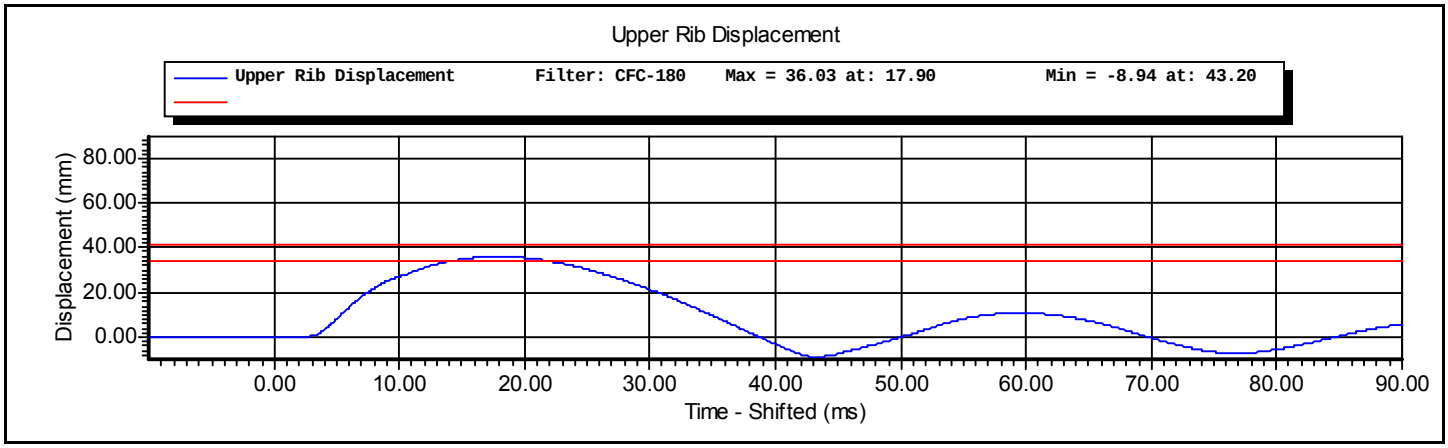
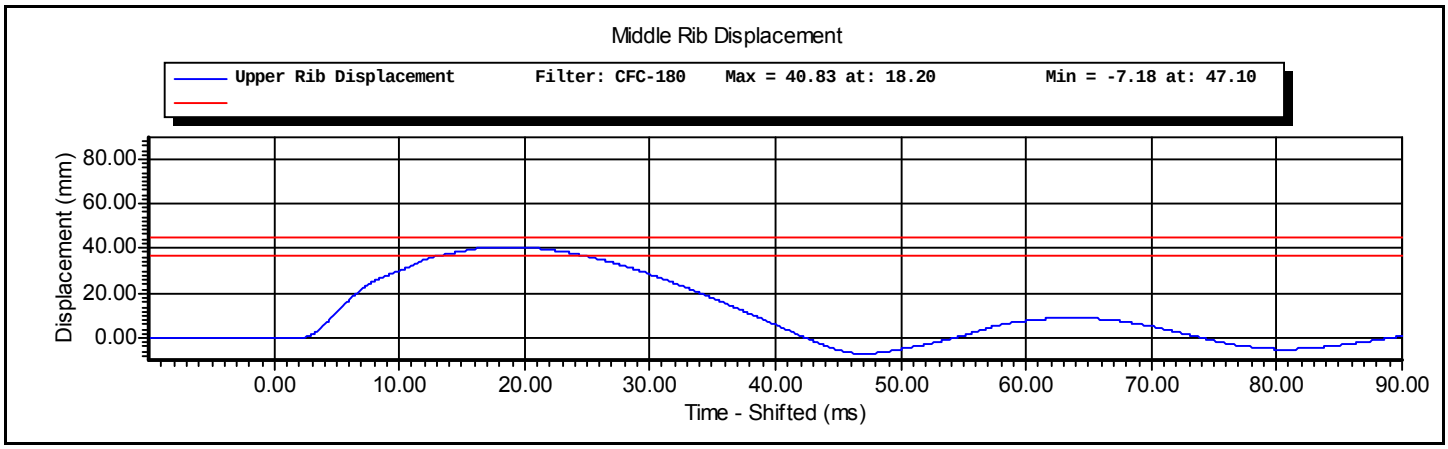
| | | | |
|---|---|---|---|
| Test Name: | **Thorax Impact** | Revision: | **8/15/2008** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Thorax Impact** | Test Date: | **4/7/2010** |
| Test Number: | **1** | Test Time: | **9:43:38 AM** |

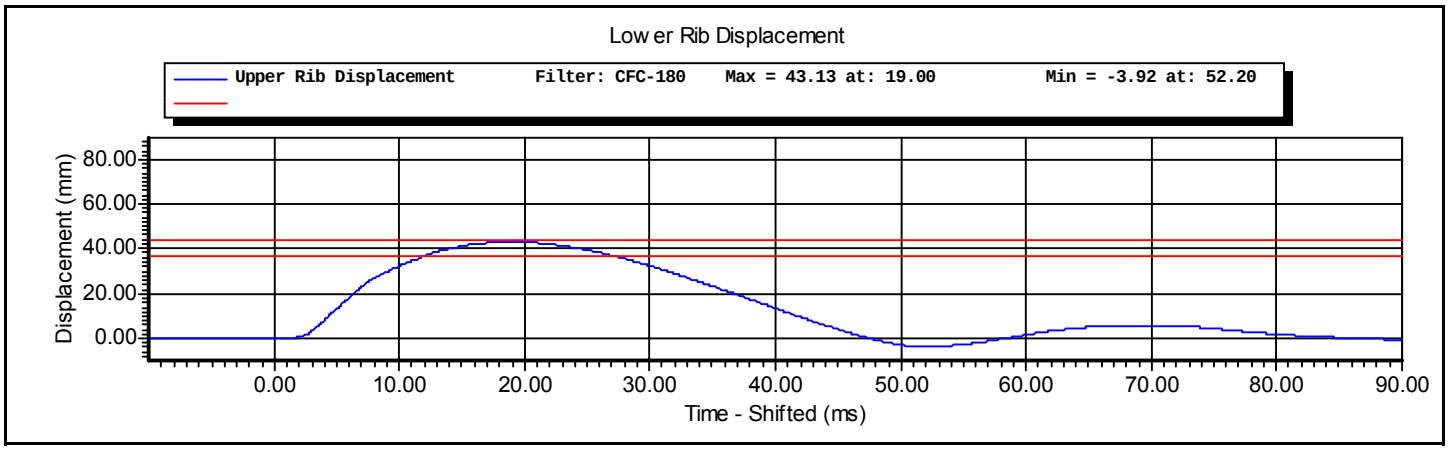
| Component Part Number | Component Serial Number |
|---|---|
| **Upper Rib - 175-4002** | **1954-0124A** |






Test ID: **Thorax Impact** Test Time: **9:43:38 AM** Test Date: **4/7/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Abdominal Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Abdominal Impact** | Test Date: | **4/8/2010** |
| Test Number: | **1** | Test Time: | **10:13:08 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-4001** | **1804-00882** |

Comments:
Denton abdomen S/N 1804-00882; previous abdomen Denton S/N 19-179

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10 | -- | 70 | **45** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **3.93** | m/s | P |
| Peak Abdominal Force | -2.70 | -- | -2.20 | **-2.70** | kN | P |
| Time At Peak Abdominal Force | 10.0 | -- | 12.3 | **11.0** | ms | P |
| Maximum Pendulum Force | -4.80 | -- | -4.00 | **-4.40** | kN | P |
| Time at Peak Pendumlum Force | 10.6 | -- | 13.0 | **11.4** | ms | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |
| **Denton** | **2631** | **LC-1507Fy** | **1/7/2010** |
| **Denton** | **2631** | **LC-1508Fy** | **1/7/2010** |
| **Denton** | **2631** | **LC-1509Fy** | **1/7/2010** |

Test ID: **Abdominal Impact** Test Time: **10:13:08 AM** Test Date: **4/8/2010**

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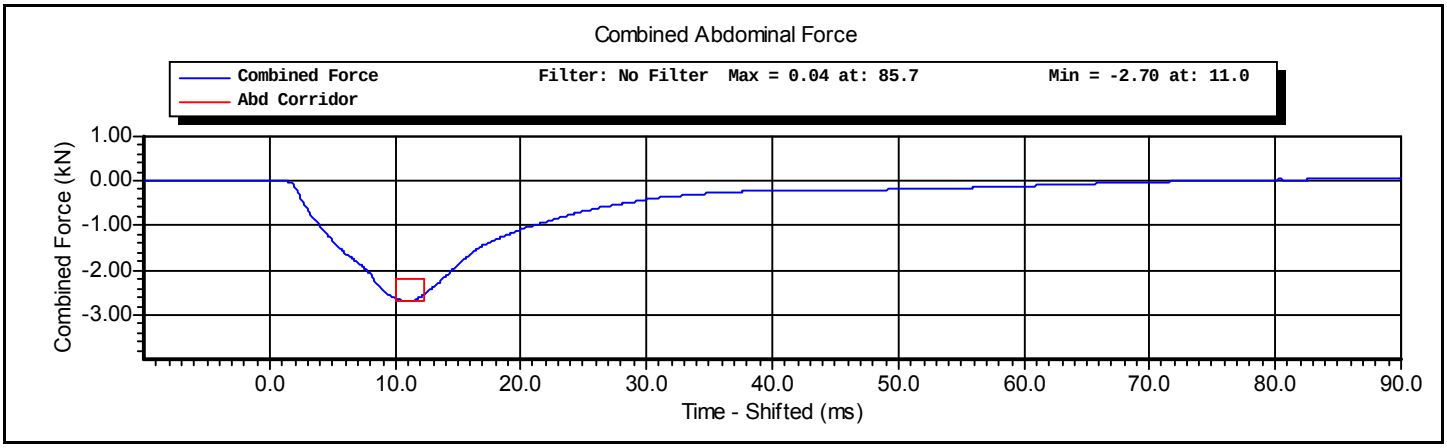
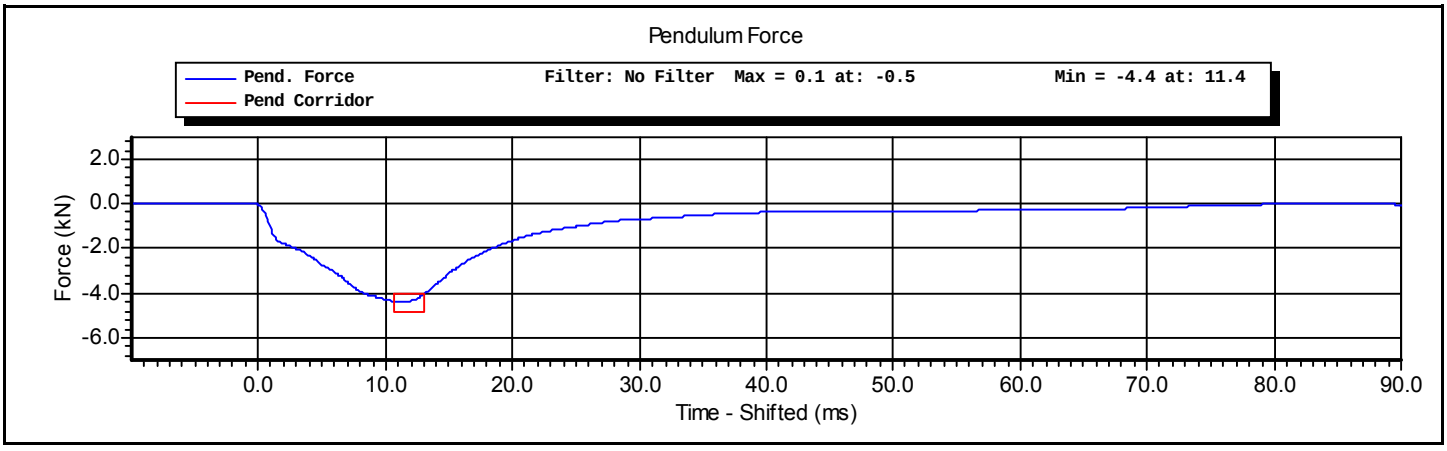
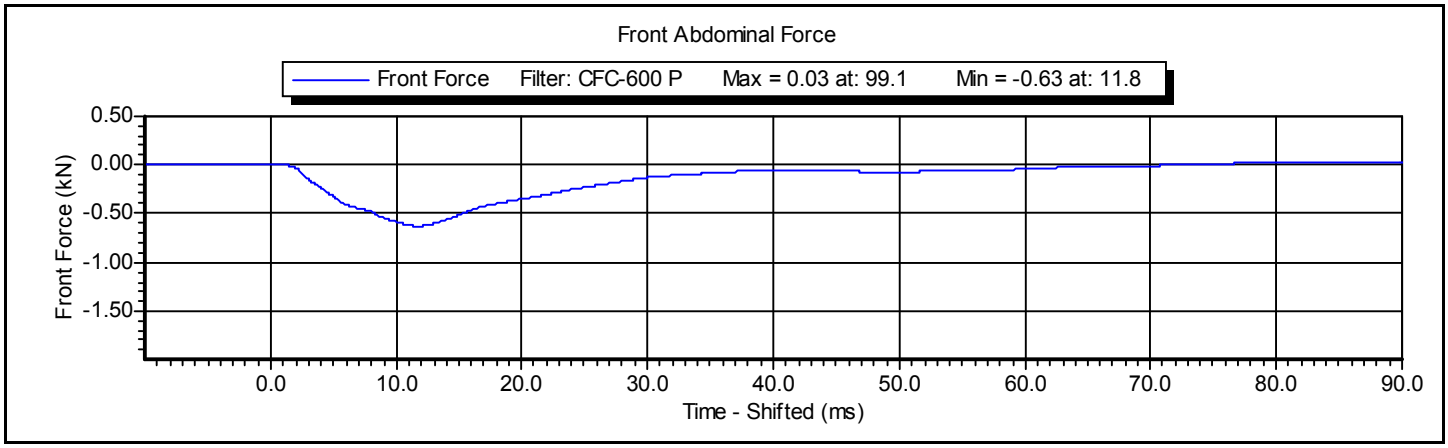
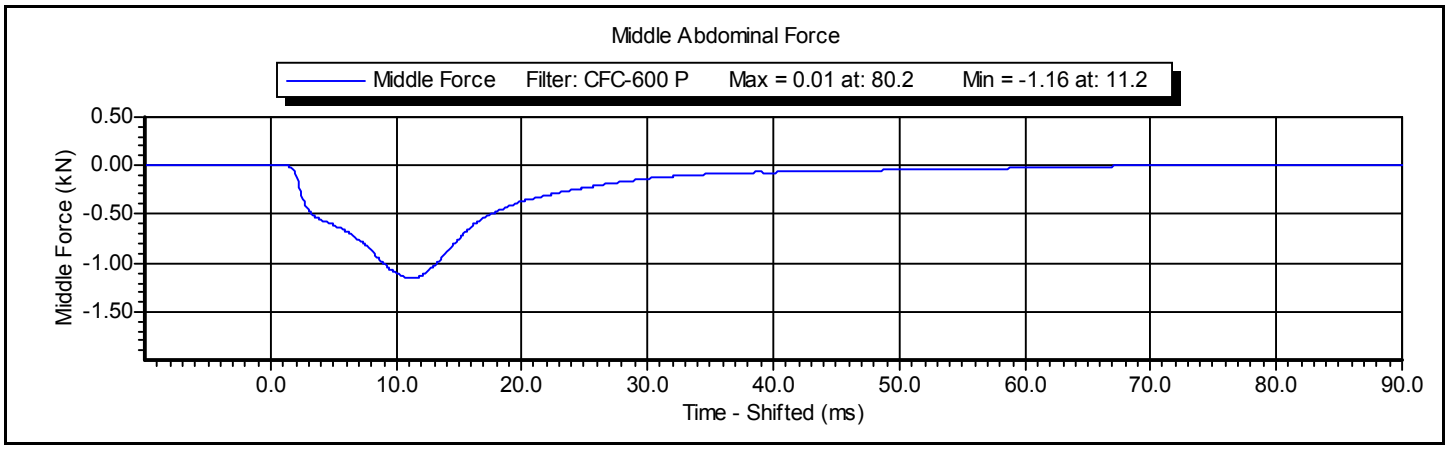
| | | | |
|---|---|---|---|
| Test Name: | **Abdominal Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Abdominal Impact** | Test Date: | **4/8/2010** |
| Test Number: | **1** | Test Time: | **10:13:08 AM** |

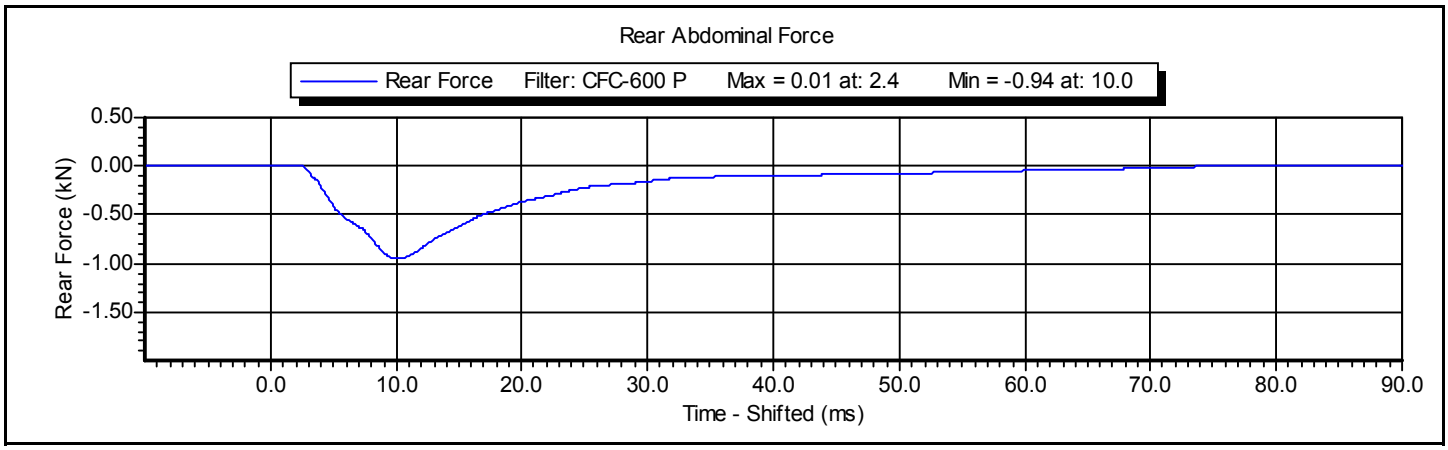
| Component Part Number | Component Serial Number |
|---|---|
| **455-4001** | **1804-00882** |






Test ID: **Abdominal Impact** Test Time: **10:13:08 AM** Test Date: **4/8/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Lumbar Spine** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lumbar Spine** | Test Date: | **4/7/2010** |
| Test Number: | **4** | Test Time: | **3:52:49 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **175-5501** | **15-0376** |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10 | -- | 70 | **40** | %RH | P |
| Velocity | 5.95 | -- | 6.15 | **6.01** | m/s | P |
| Maximum Headform Flexion Angle | 45.0 | -- | 55.0 | **48.3** | degrees | P |
| Time at Maximum Headform Flexion Angle | 39.0 | -- | 53.0 | **44.0** | ms | P |
| Decay to Zero Degrees | 37.0 | -- | 57.0 | **37.6** | ms | P |
| Velocity Corridor | | -- | | | | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Ttravale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7231CT** | **AF5B3** | **2/24/2010** |
| **DentonATD** | **7000428** | **094** | **10/23/2009** |
| **DentonATD** | **7000428** | **095** | **10/23/2009** |
| **DentonATD** | **7000428** | **093** | **10/23/2009** |

Test ID: **Lumbar Spine** Test Time: **3:52:49 PM** Test Date: **4/7/2010**

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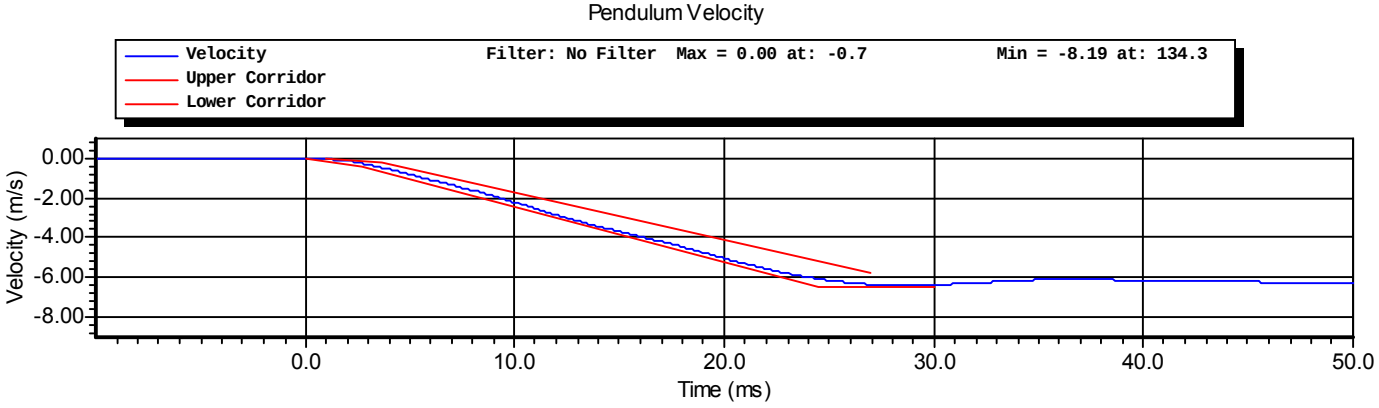
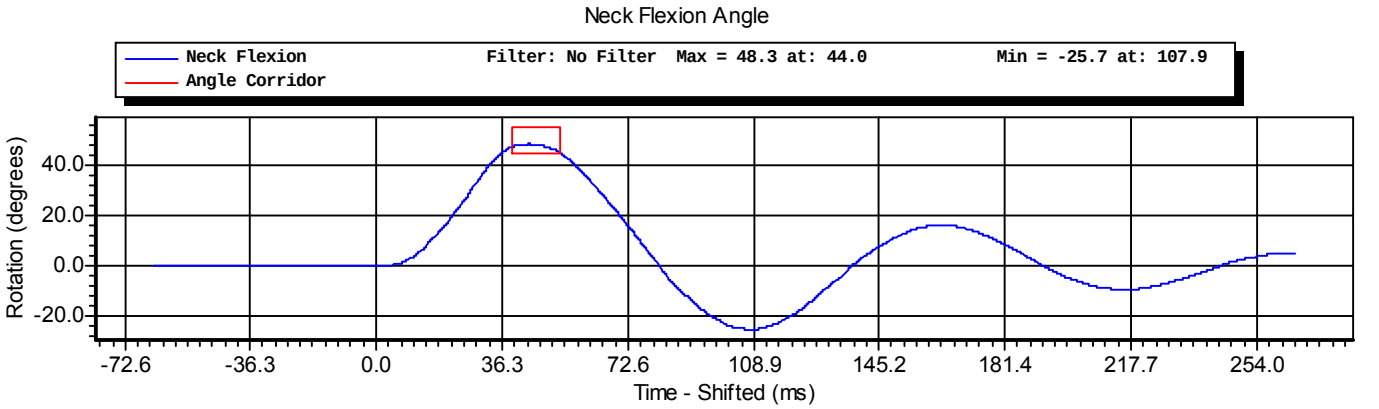
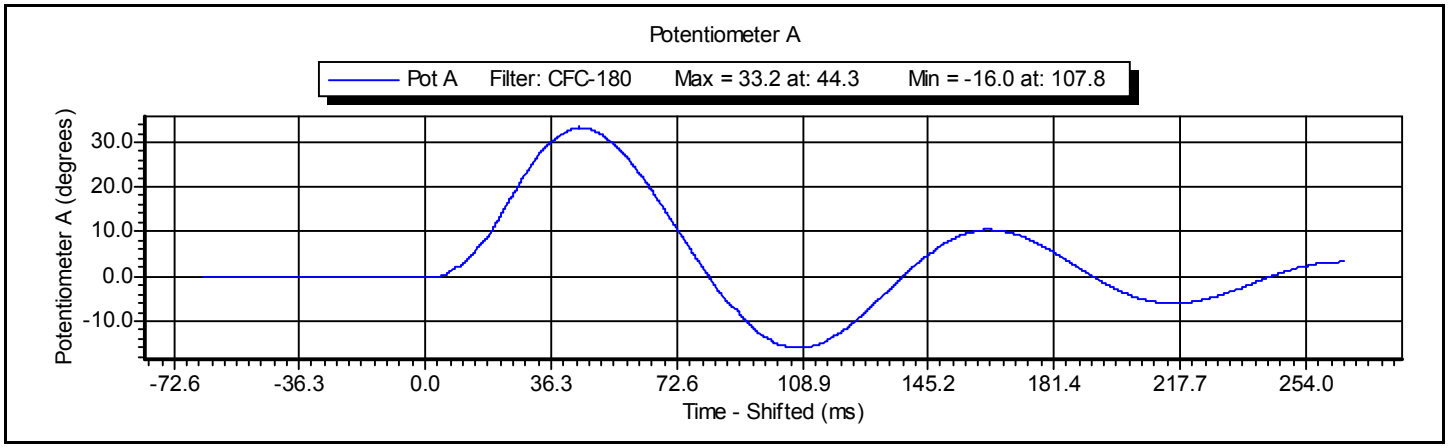
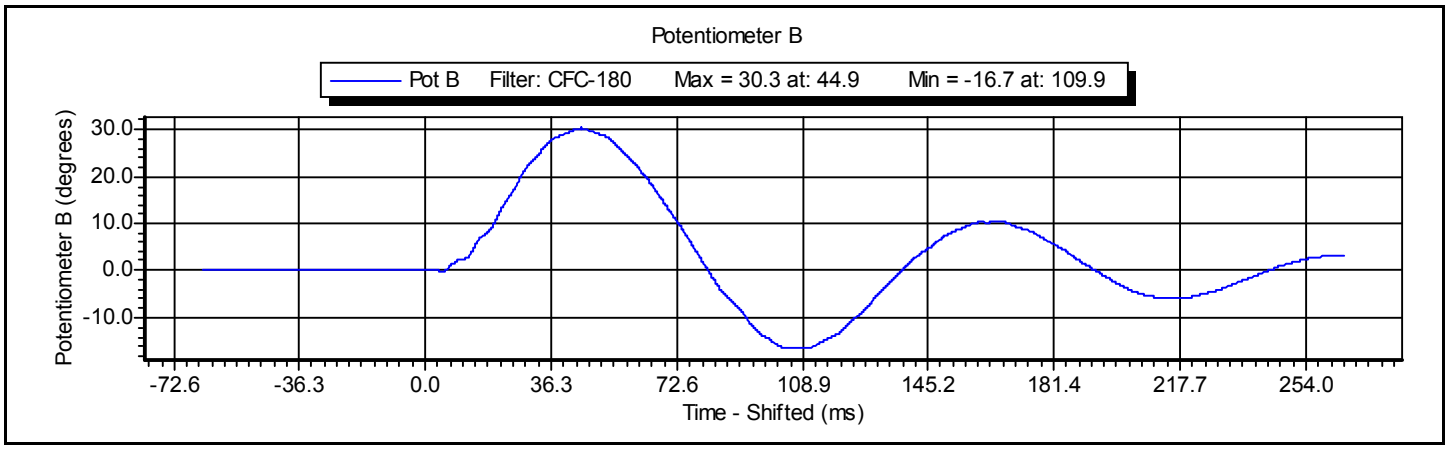
| | | | |
|---|---|---|---|
| Test Name: | **Lumbar Spine** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lumbar Spine** | Test Date: | **4/7/2010** |
| Test Number: | **4** | Test Time: | **3:52:49 PM** |

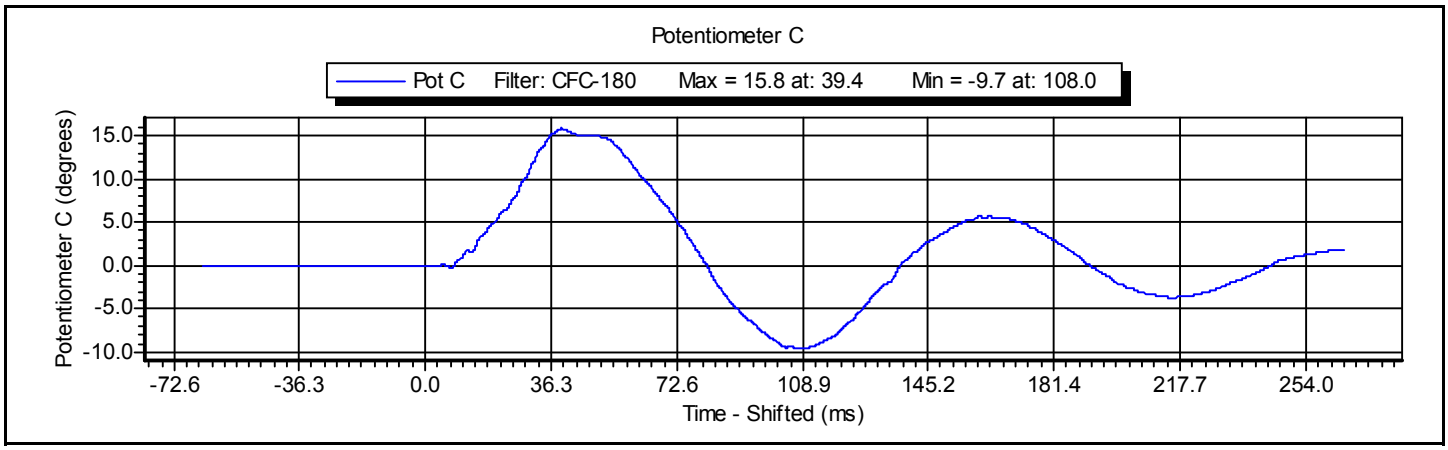
| Component Part Number | Component Serial Number |
|---|---|
| **175-5501** | **15-0376** |






Test ID: **Lumbar Spine** Test Time: **3:52:49 PM** Test Date: **4/7/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Pelvis Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Pelvis Impact** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **3:22:16 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-4003** | |

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10 | -- | 70 | **40** | %RH | P |
| Velocity | 4.20 | -- | 4.40 | **4.27** | m/s | P |
| Peak Pendulum Force | -5.40 | -- | -4.70 | **-5.14** | kN | P |
| Time at Peak Pendulum Force | 11.80 | -- | 16.10 | **14.70** | ms | P |
| Peak Pubic Symphysis Force | -1.59 | -- | -1.23 | **-1.52** | kN | P |
| Time at Peak Pubic Symphysis Force | 12.20 | -- | 17.00 | **15.20** | ms | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |
| **Denton** | **3096** | **LC-458Fy** | **1/7/2010** |

Test ID: **Pelvis Impact** Test Time: **3:22:16 PM** Test Date: **4/6/2010**

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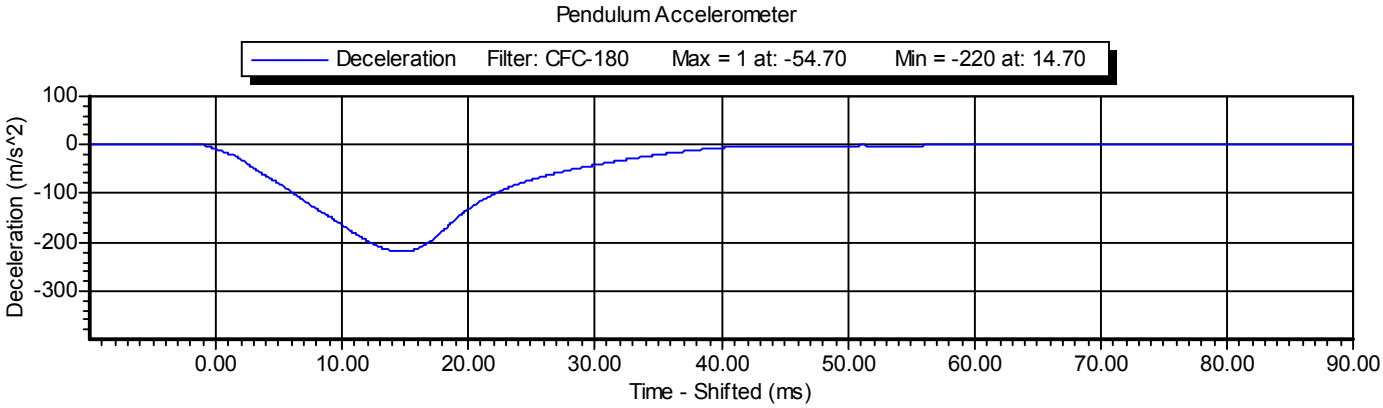
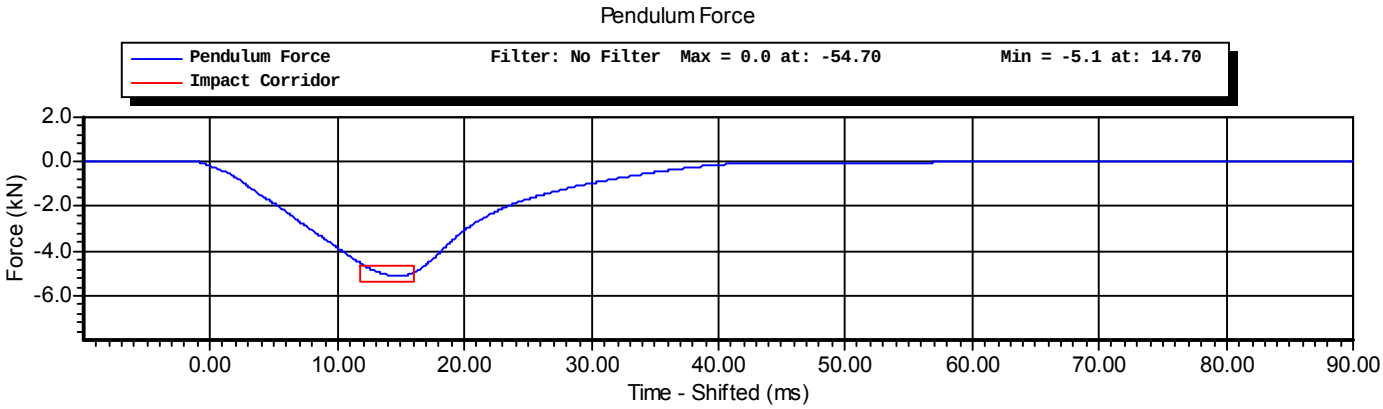
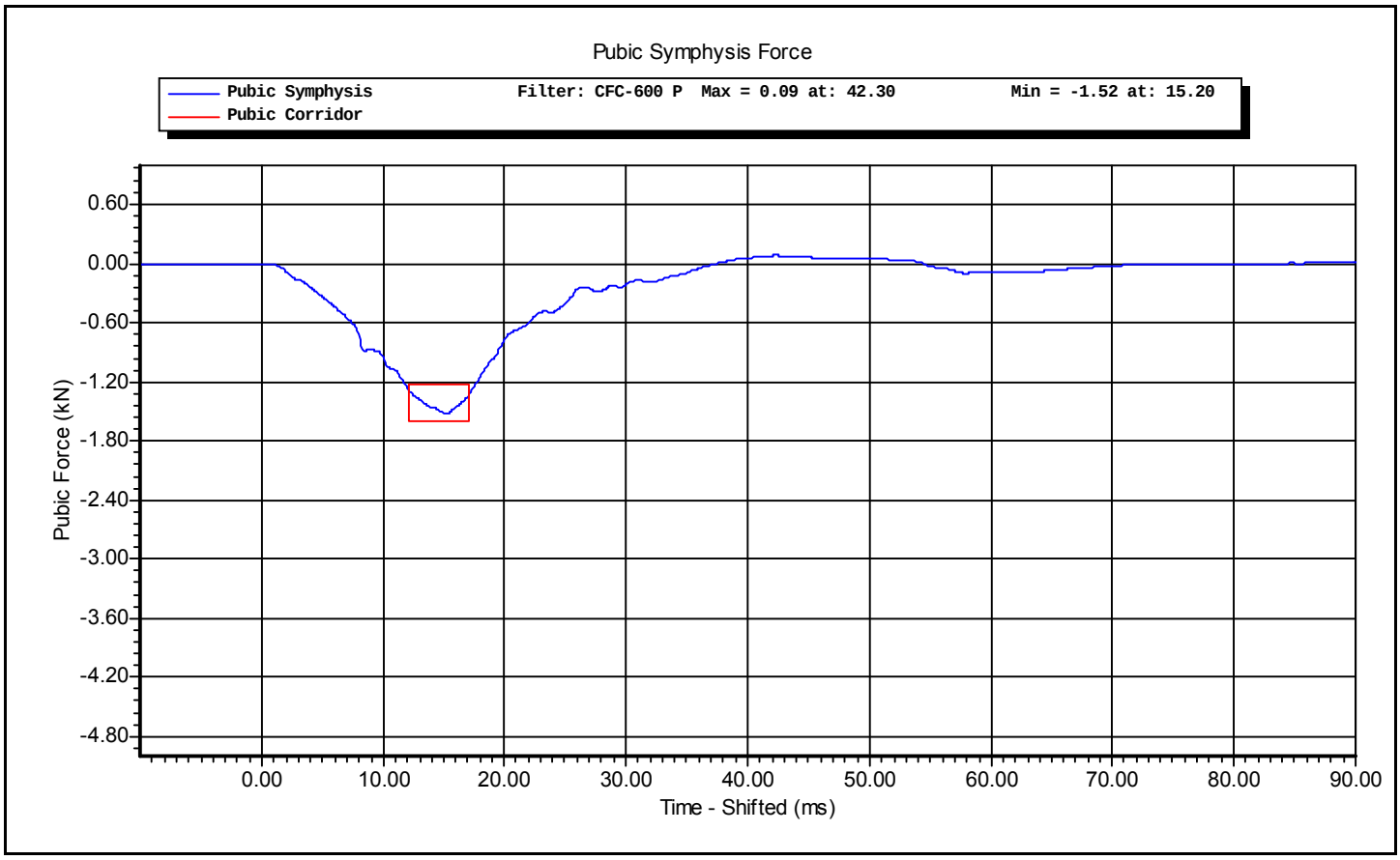
| | | | |
|---|---|---|---|
| Test Name: | **Pelvis Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Pelvis Impact** | Test Date: | **4/6/2010** |
| Test Number: | **1** | Test Time: | **3:22:16 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-4003** | |






Test ID: **Pelvis Impact** Test Time: **3:22:16 PM** Test Date: **4/6/2010**

**POST-TEST**

**ES2-re S/N: 0037**

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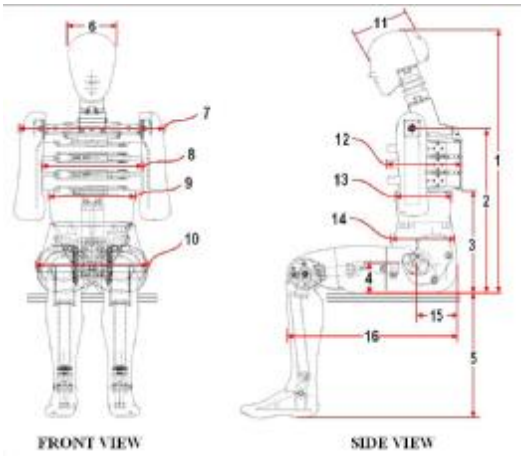
# ES-2re External Measurements

## S/N D037




| Dim. No. | Description | Specification (mm) | Result | Pass/Fail |
|---|---|---|---|---|
| 1 | Sitting Height | 900-918 | 913 | Pass |
| 2 | Seat to Shoulder Joint | 558-572 | 565 | Pass |
| 3 | Seat to Lower Face of Thoracic Spine Box | 346-356 | 352 | Pass |
| 4 | Seat to Hip Joint (center of bolt) | 97-103 | 101 | Pass |
| 5 | Sole to Seat, Sitting | 333-451 | 441 | Pass |
| 6 | Head Width | 152-158 | 155 | Pass |
| 7 | Shoulder/Arm Width | 461-479 | 473 | Pass |
| 8 | Thorax Width | 322-332 | 327 | Pass |
| 9 | Abdomen Width | 273-287 | 282 | Pass |
| 10 | Pelvis Lap Width | 359-373 | 369 | Pass |
| 11 | Head Depth | 196-206 | 199 | Pass |
| 12 | Thorax Depth | 262-272 | 266 | Pass |
| 13 | Abdomen Depth | 194-204 | 198 | Pass |
| 14 | Pelvis Depth | 235-245 | 242 | Pass |
| 15 | Back of Buttocks to Hip Joint (center of bolt) | 150-160 | 157 | Pass |
| 16 | Back of Buttocks to Front Knee | 597-615 | 605 | Pass |

Technician : A. Rudniski

Date: 05/07/2010

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Neck Flexion** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Neck Flexion** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **1:38:18 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-2002** | **19-020118A** |

Comments:
4x7 PC, 47 degrees.

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.7** | deg C | P |
| Humidity | 10 | -- | 70 | **37** | %RH | P |
| Velocity | 3.30 | -- | 3.50 | **3.38** | m/s | P |
| Maximum Neck Flexion Angle | 49.0 | -- | 59.0 | **53.3** | degrees | P |
| Time At Maximum Neck Flexion | 54.0 | -- | 66.0 | **60.3** | ms | P |
| Decay to Zero Degrees | 53.0 | -- | 88.0 | **60.2** | ms | P |
| Velocity Corridor | | -- | | | | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7231CT** | **AF5B3** | **2/24/2010** |
| **DentonATD** | **7000428** | **094** | **10/23/2009** |
| **DentonATD** | **7000428** | **095** | **10/23/2009** |
| **DentonATD** | **7000428** | **093** | **10/23/2009** |

Test ID: **Neck Flexion** Test Time: **1:38:18 PM** Test Date: **4/22/2010**

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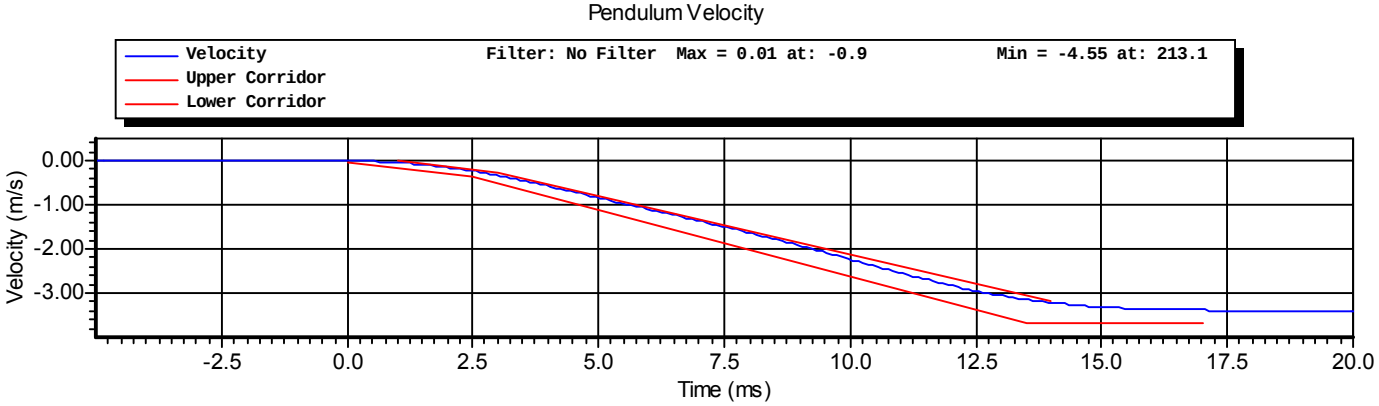
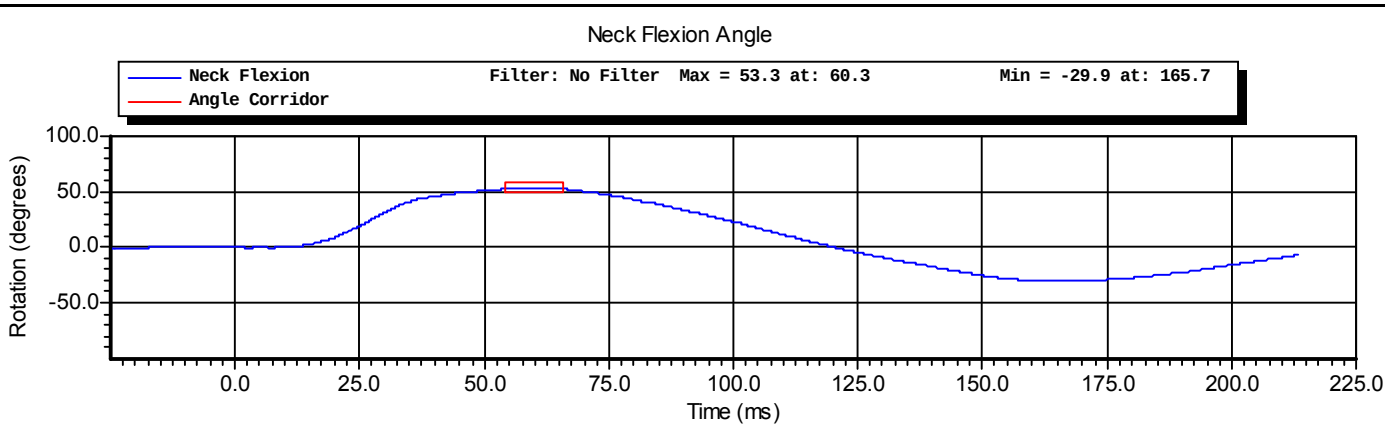
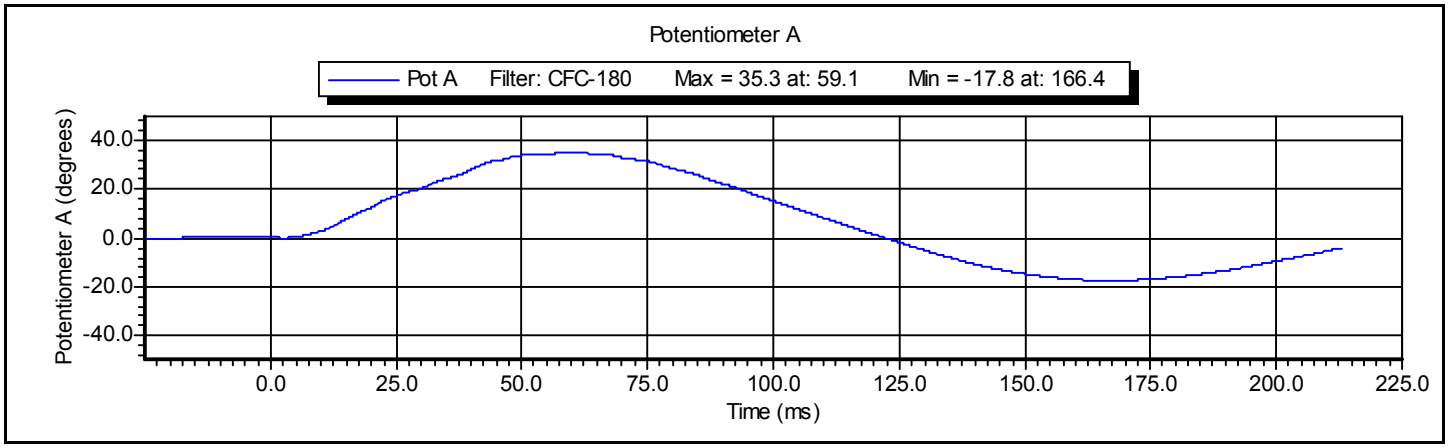
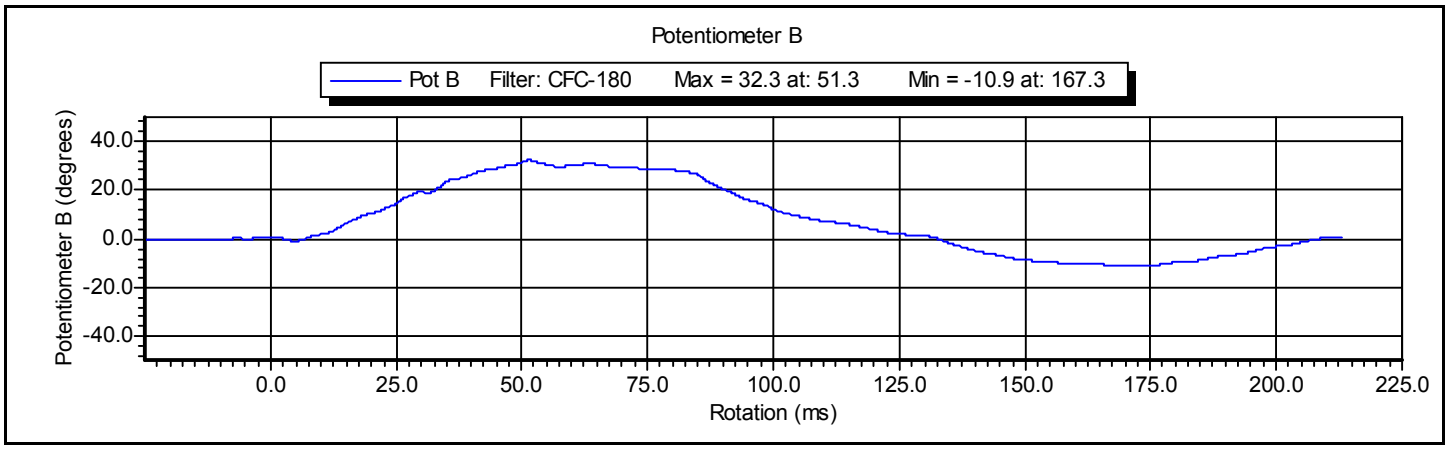
| | | | |
|---|---|---|---|
| Test Name: | **Neck Flexion** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Neck Flexion** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **1:38:18 PM** |

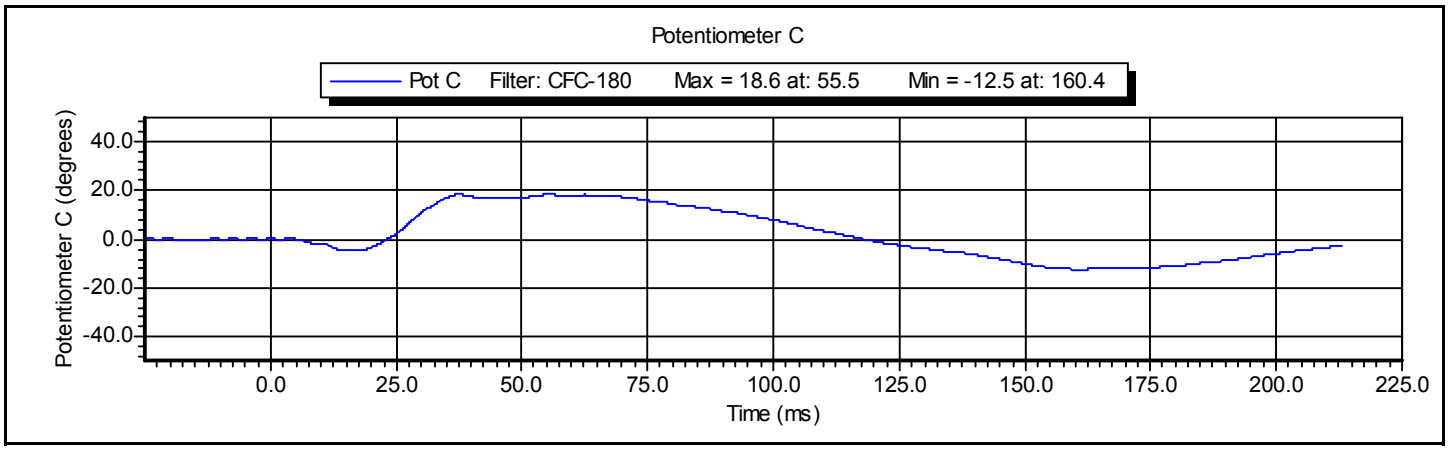
| Component Part Number | Component Serial Number |
|---|---|
| **455-2002** | **19-020118A** |






Test ID: **Neck Flexion** Test Time: **1:38:18 PM** Test Date: **4/22/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Shoulder Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Shoulder Impact** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:15:52 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **960715-313** | |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **34.0** | %RH | P |
| Velocity | 4.20 | -- | 4.40 | **4.28** | m/s | P |
| Pendulum Acceleration | -10.50 | -- | -7.50 | **-7.90** | g | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |

Test ID: **Shoulder Impact** Test Time: **9:15:52 AM** Test Date: **4/22/2010**

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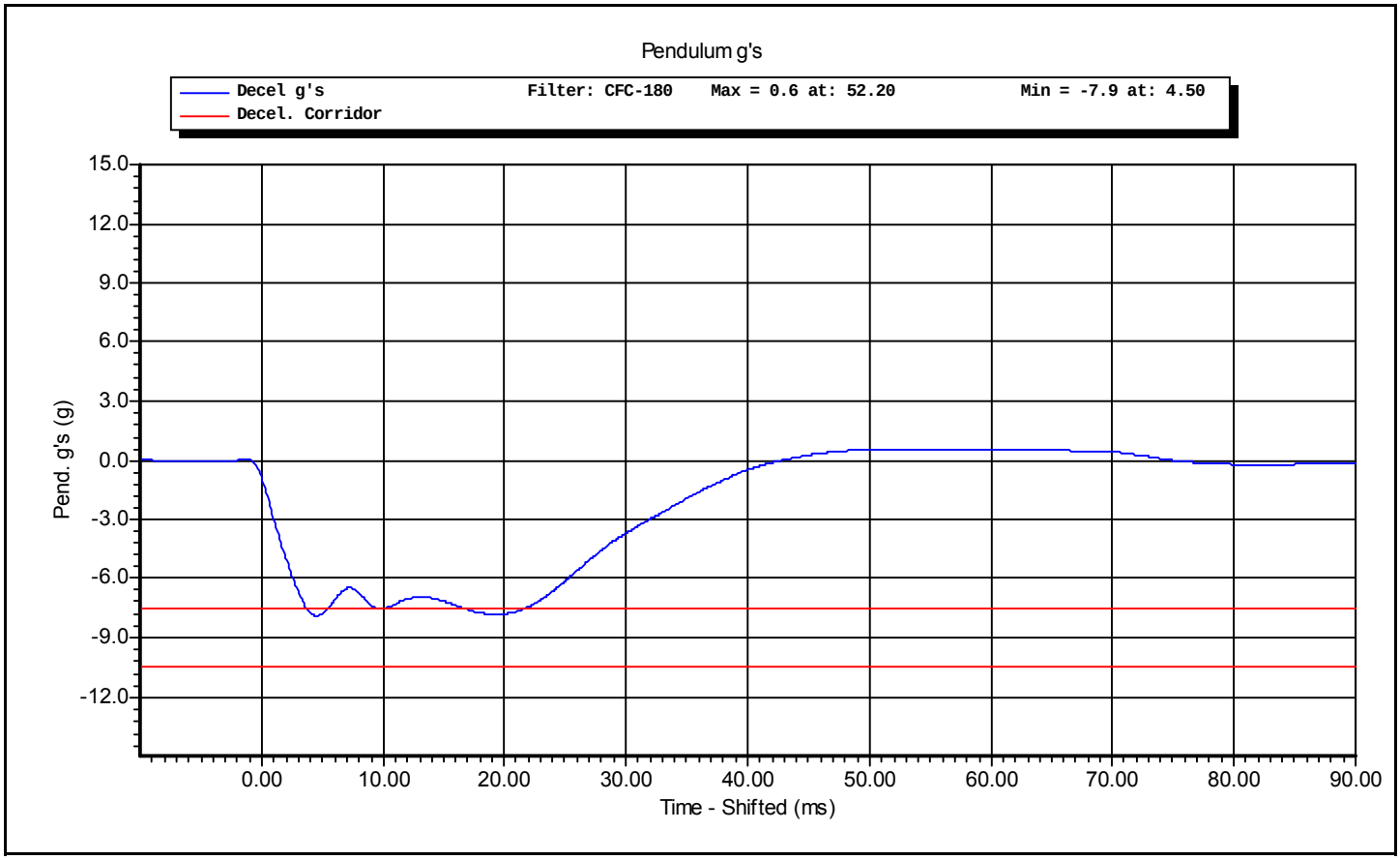
| | | | |
|---|---|---|---|
| Test Name: | **Shoulder Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Shoulder Impact** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:15:52 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **960715-313** | |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib 4 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **10:06:02 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **35.0** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **3.98** | m/s | P |
| Rib Displacement | -51.00 | -- | -46.00 | **-46.74** | mm | P |
| Drop Height | 807.0 | -- | 823.0 | **815.0** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-3** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Lower Rib 4 m/s** Test Time: **10:06:02 AM** Test Date: **4/22/2010**

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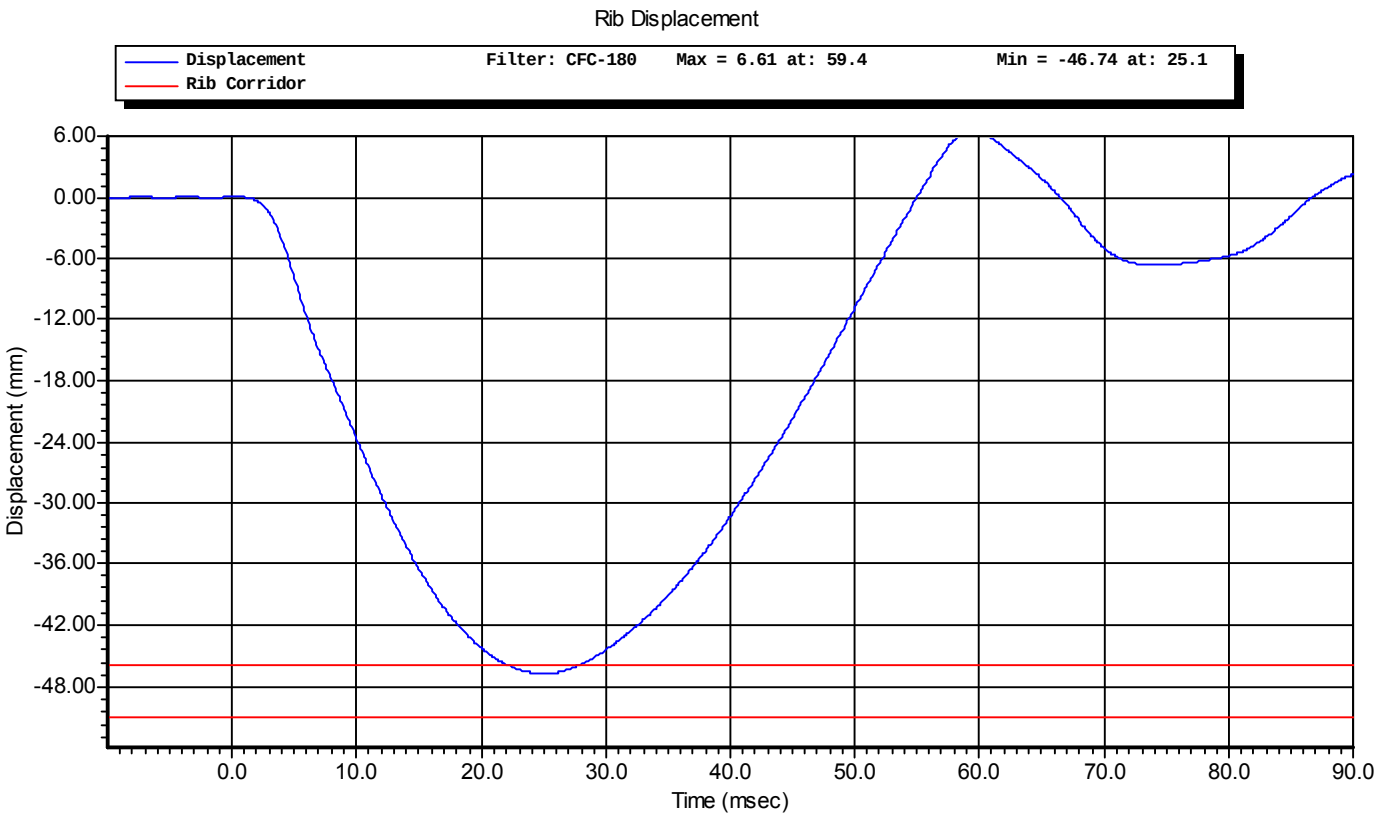
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib 4 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **10:06:02 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **10:21:15 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **35.0** | %RH | P |
| Velocity | 2.90 | -- | 3.10 | **2.97** | m/s | P |
| Rib Displacement | -40.00 | -- | -36.00 | **-37.88** | mm | P |
| Drop Height | 454 | -- | 464 | **459** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-3** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Lower Rib** Test Time: **10:21:15 AM** Test Date: **4/22/2010**

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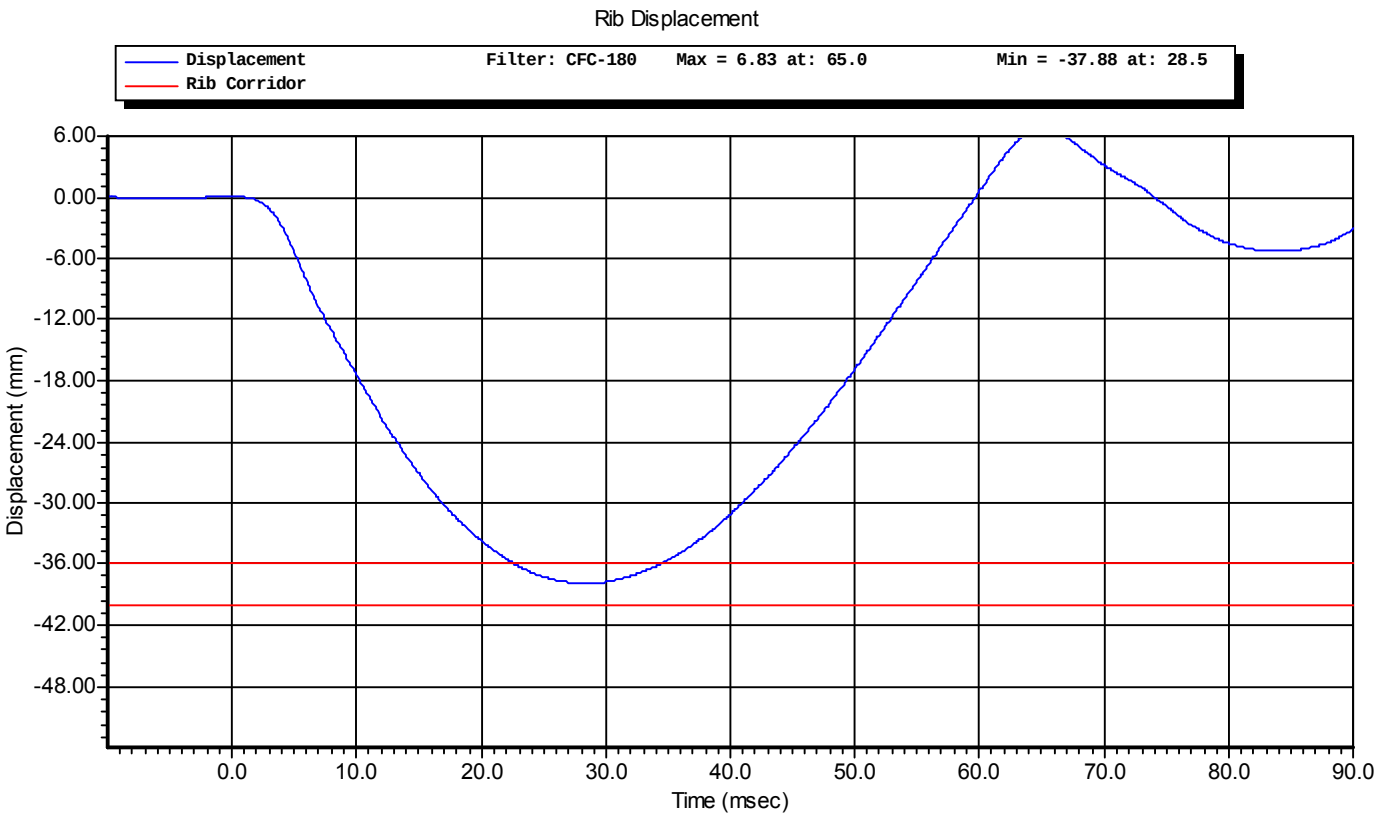
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lower Rib** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **10:21:15 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0126A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 4 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:52:04 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0125A** |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **35.0** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **3.99** | m/s | P |
| Rib Displacement | -51.00 | -- | -46.00 | **-47.96** | mm | P |
| Drop Height | 807.0 | -- | 823.0 | **815.0** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0807** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Middle Rib 4 m/s** Test Time: **9:52:04 AM** Test Date: **4/22/2010**

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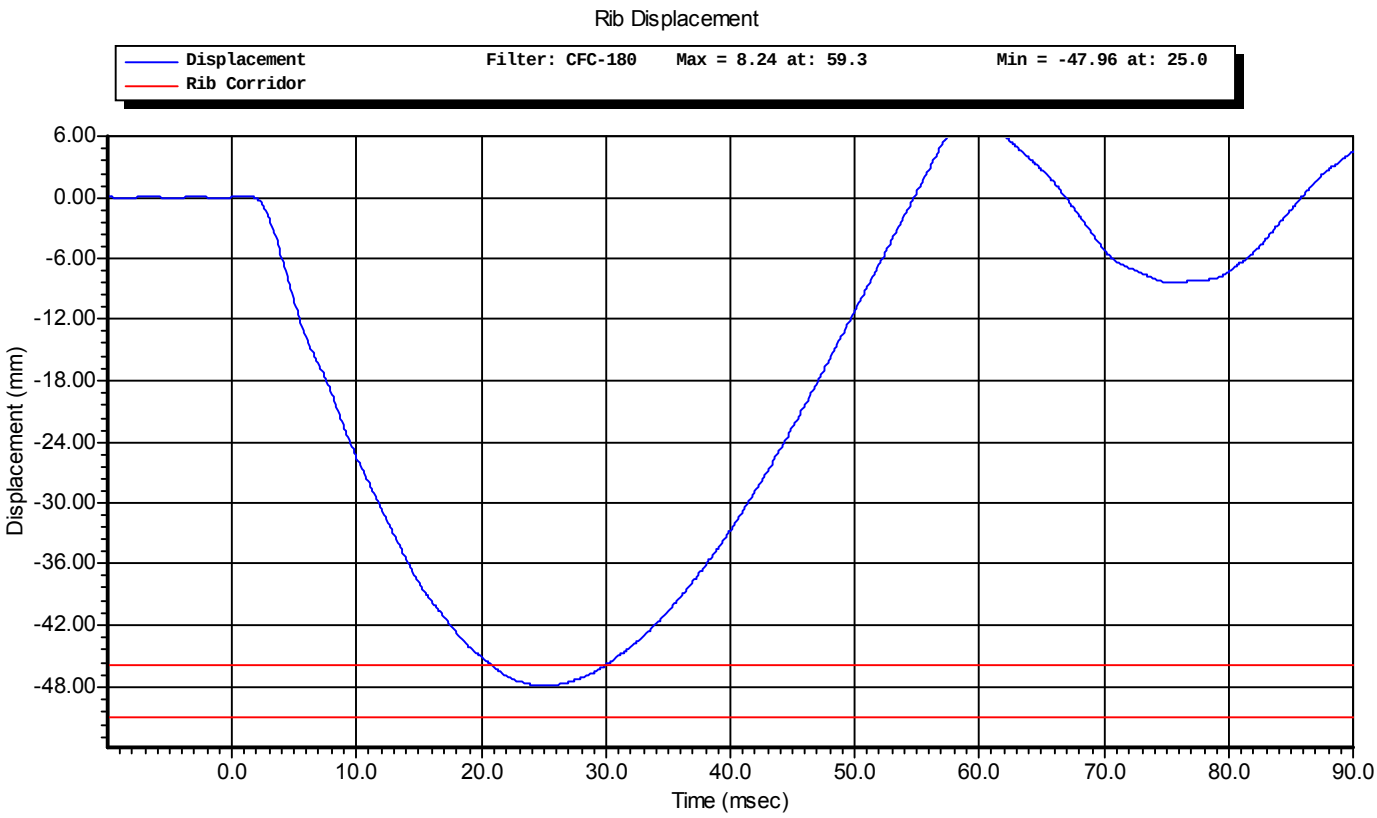
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 4 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:52:04 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0125A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 3 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **10:00:09 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0125A** |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **35.0** | %RH | P |
| Velocity | 2.90 | -- | 3.10 | **3.00** | m/s | P |
| Rib Displacement | -40.00 | -- | -36.00 | **-37.49** | mm | P |
| Drop Height | 454 | -- | 464 | **459** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0807** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Middle Rib 3 m/s** Test Time: **10:00:09 AM** Test Date: **4/22/2010**

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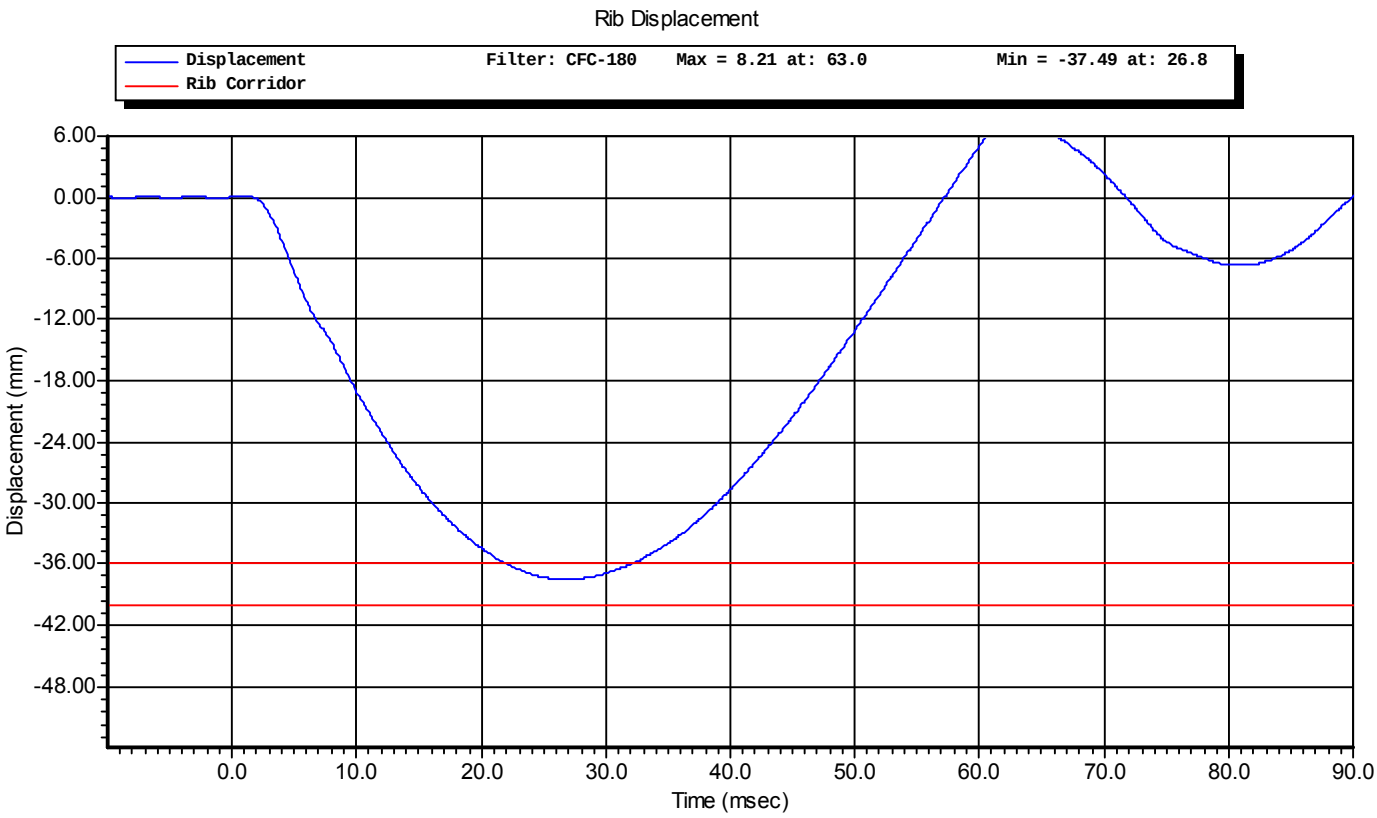
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Middle Rib 3 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **10:00:09 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0125A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 4 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:35:50 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **34.0** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **3.99** | m/s | P |
| Rib Displacement | -51.00 | -- | -46.00 | **-49.41** | mm | P |
| Drop Height | 807.0 | -- | 823.0 | **815.0** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-01** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Upper Rib 4 m/s** Test Time: **9:35:50 AM** Test Date: **4/22/2010**

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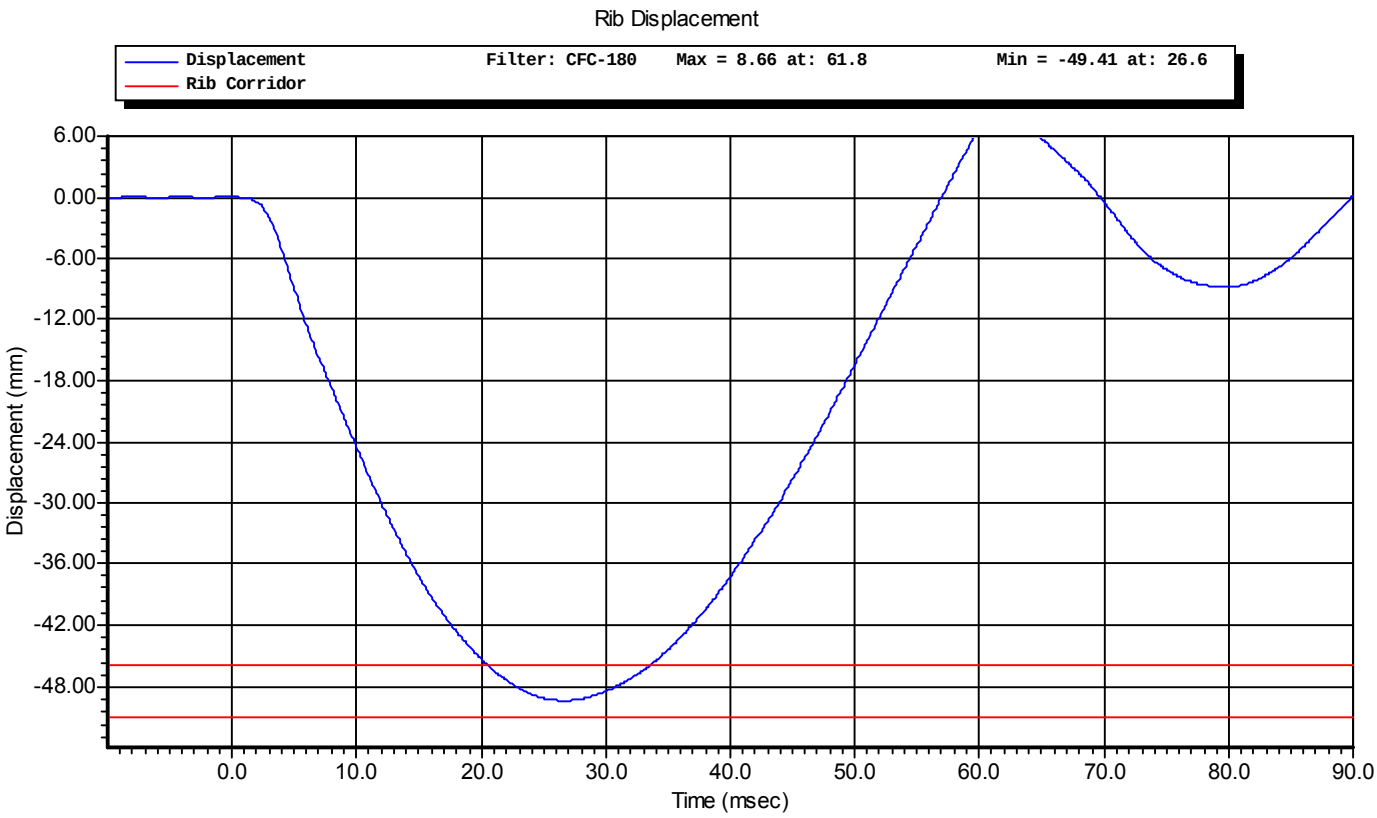
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **4.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 4 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:35:50 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 3 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:42:14 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **35.0** | %RH | P |
| Velocity | 2.90 | -- | 3.10 | **2.97** | m/s | P |
| Rib Displacement | -40.00 | -- | -36.00 | **-37.99** | mm | P |
| Drop Height | 454 | -- | 464 | **459** | mm | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **Honeywell** | **MLT-38000** | **DS-0552-01** | **1/11/2010** |
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P23137** | **1/22/2010** |

Test ID: **Upper Rib 3 m/s** Test Time: **9:42:14 AM** Test Date: **4/22/2010**

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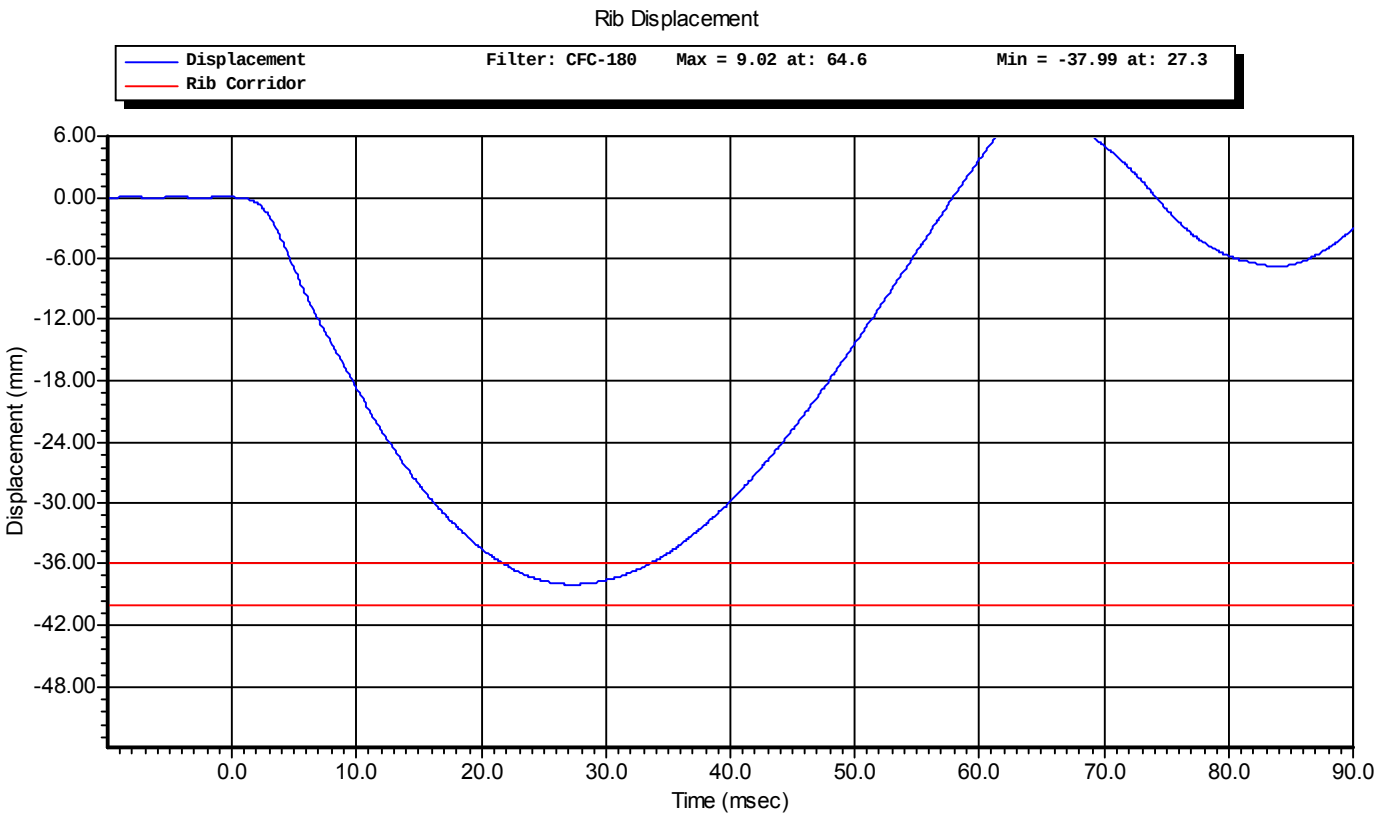
| | | | |
|---|---|---|---|
| Test Name: | **Full Rib Module Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | **3.0 Meters/Second** | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Upper Rib 3 m/s** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **9:42:14 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-3100** | **1954-0124A** |



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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Thorax Impact** | Revision: | **8/15/2008** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Thorax Impact** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **11:00:41 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **Upper Rib - 175-4002** | **1954-0124A** |
| **Middle Rib - 175-4002** | **1954-0125A** |
| **Lower Rib - 175-4002** | **1954-0126A** |

Comments:

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10.0 | -- | 70.0 | **35.0** | %RH | P |
| Velocity | 5.40 | -- | 5.60 | **5.49** | m/s | P |
| Upper Rib Displacement | 34.0 | -- | 41.0 | **37.9** | mm | P |
| Middle Rib Displacement | 37.0 | -- | 45.0 | **40.8** | mm | P |
| Lower Rib Displacement | 37.0 | -- | 44.0 | **41.9** | mm | P |
| Impactor Force | 5100 | -- | 6200 | **5544** | N | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |
| **Honeywell** | **MLT-38000** | **DS-0552-01** | **1/11/2010** |
| **Honeywell** | **MLT-38000** | **DS-0807** | **1/11/2010** |
| **Honeywell** | **MLT-38000** | **DS-0552-3** | **1/11/2010** |

Test ID: **Thorax Impact** Test Time: **11:00:41 AM** Test Date: **4/22/2010**

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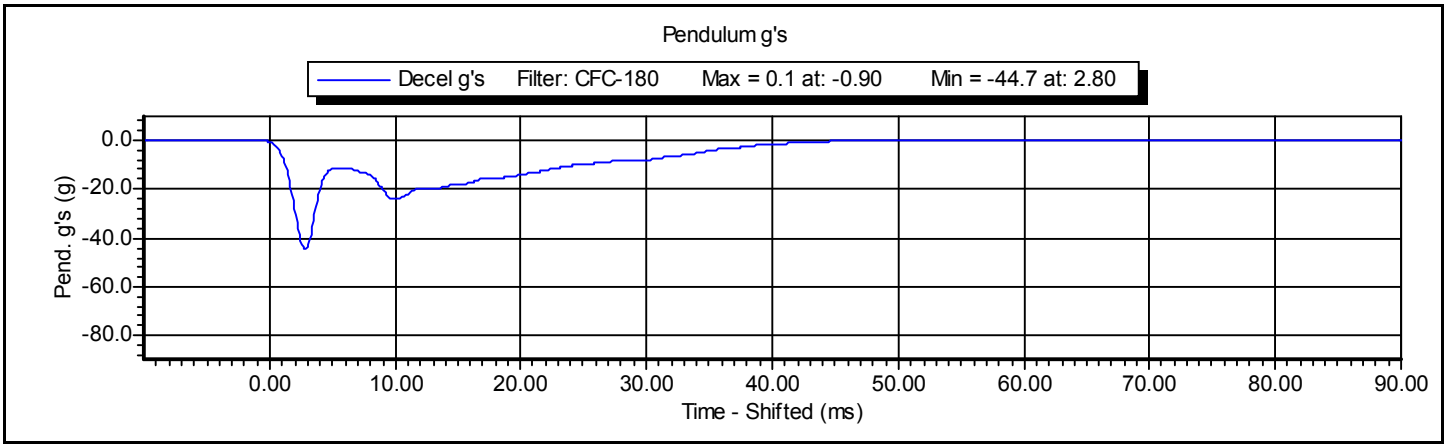
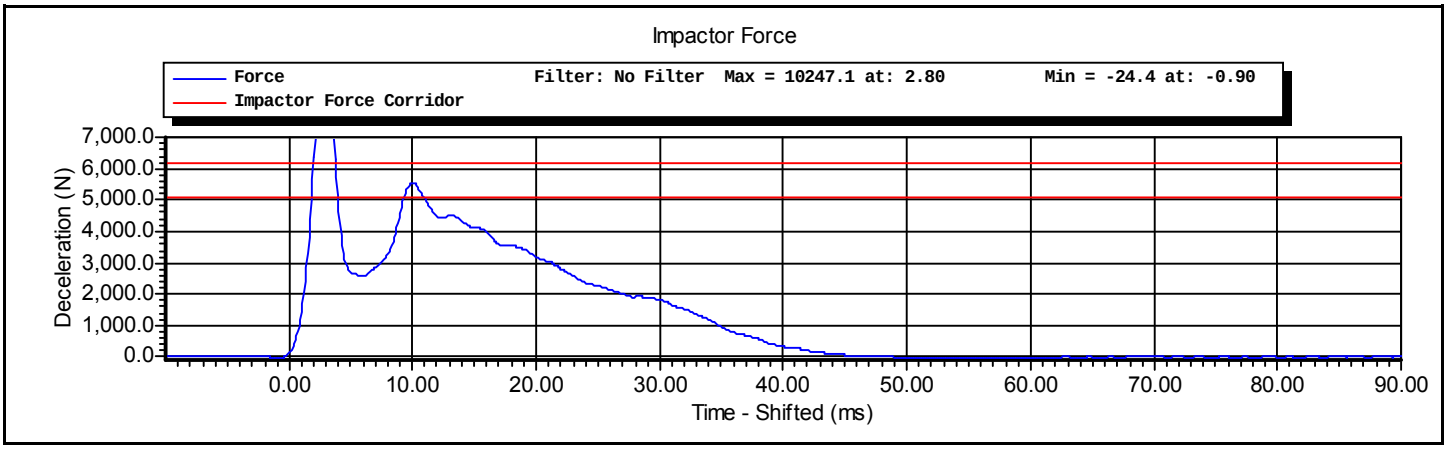
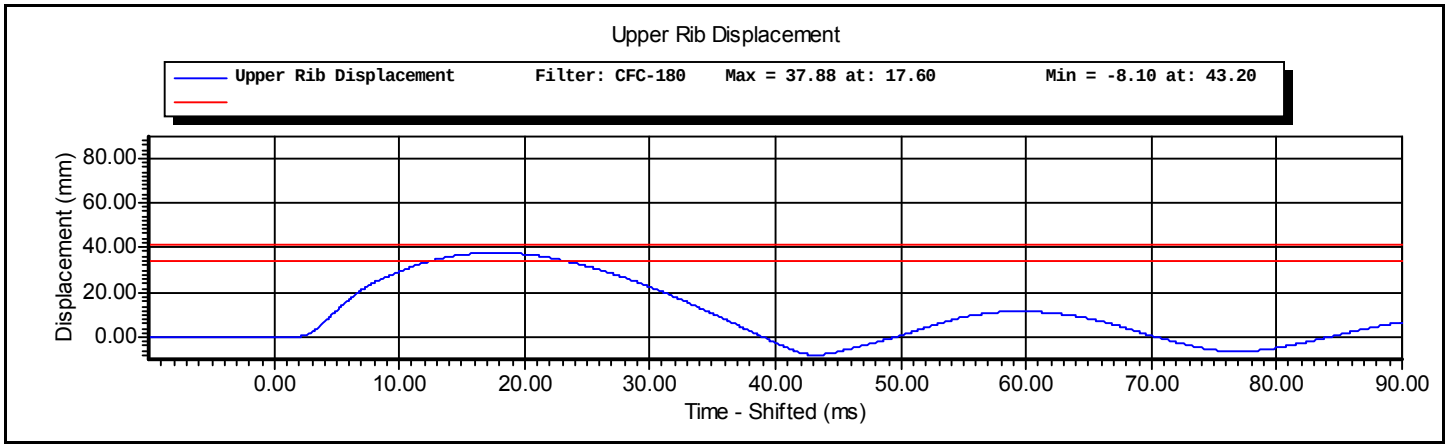
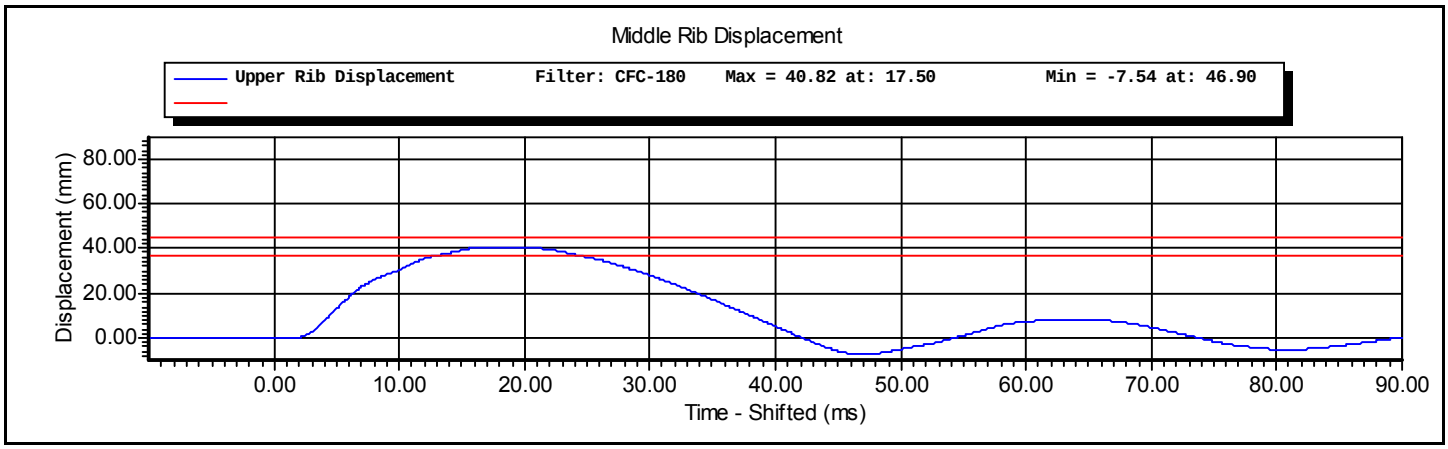
| | | | |
|---|---|---|---|
| Test Name: | **Thorax Impact** | Revision: | **8/15/2008** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Thorax Impact** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **11:00:41 AM** |

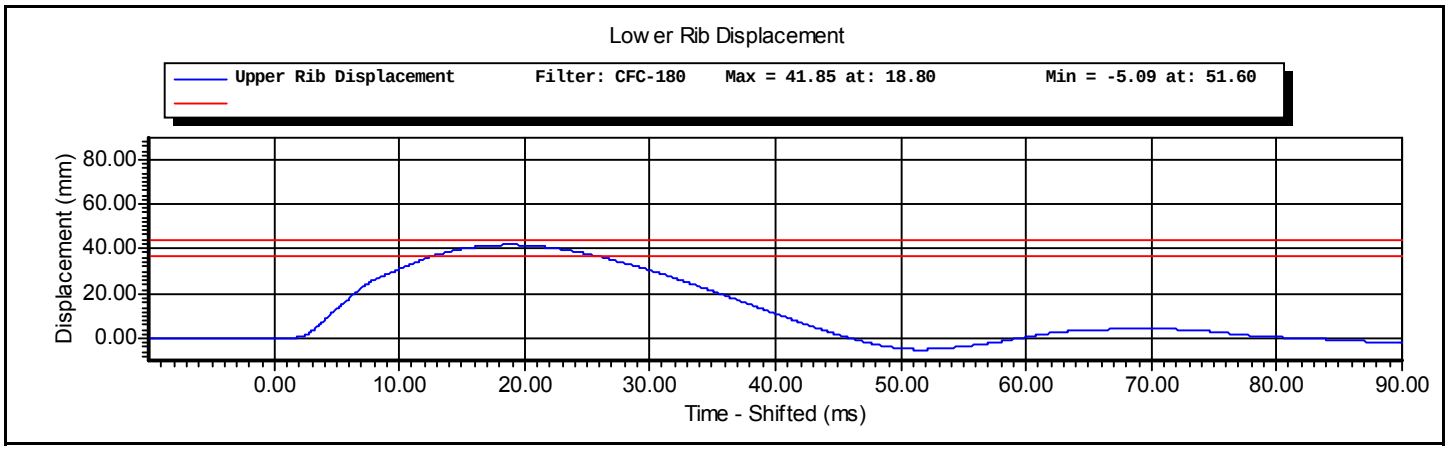
| Component Part Number | Component Serial Number |
|---|---|
| **Upper Rib - 175-4002** | **1954-0124A** |






Test ID: **Thorax Impact** Test Time: **11:00:41 AM** Test Date: **4/22/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Abdominal Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Abdominal Impact** | Test Date: | **4/23/2010** |
| Test Number: | **2** | Test Time: | **8:30:31 AM** |

| Component Part Number | Component Serial Number |
|---|---|
| **FTSS-0004** | **07/118** |

Comments:
FTSS Abdomen
Model - FTSS-0004
Serial - 07/118

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.1** | deg C | P |
| Humidity | 10 | -- | 70 | **36** | %RH | P |
| Velocity | 3.90 | -- | 4.10 | **3.95** | m/s | P |
| Peak Abdominal Force | -2.70 | -- | -2.20 | **-2.48** | kN | P |
| Time At Peak Abdominal Force | 10.0 | -- | 12.3 | **10.6** | ms | P |
| Maximum Pendulum Force | -4.80 | -- | -4.00 | **-4.28** | kN | P |
| Time at Peak Pendumlum Force | 10.6 | -- | 13.0 | **10.8** | ms | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |
| **Denton** | **2631** | **LC-1507Fy** | **1/7/2010** |
| **Denton** | **2631** | **LC-1508Fy** | **1/7/2010** |
| **Denton** | **2631** | **LC-1509Fy** | **1/7/2010** |

Test ID: **Abdominal Impact** Test Time: **8:30:31 AM** Test Date: **4/23/2010**

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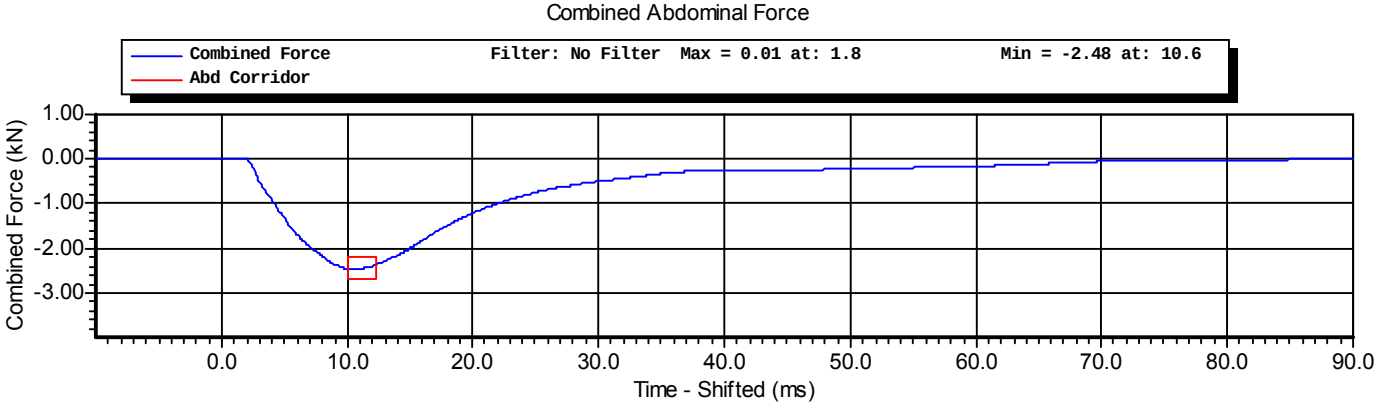
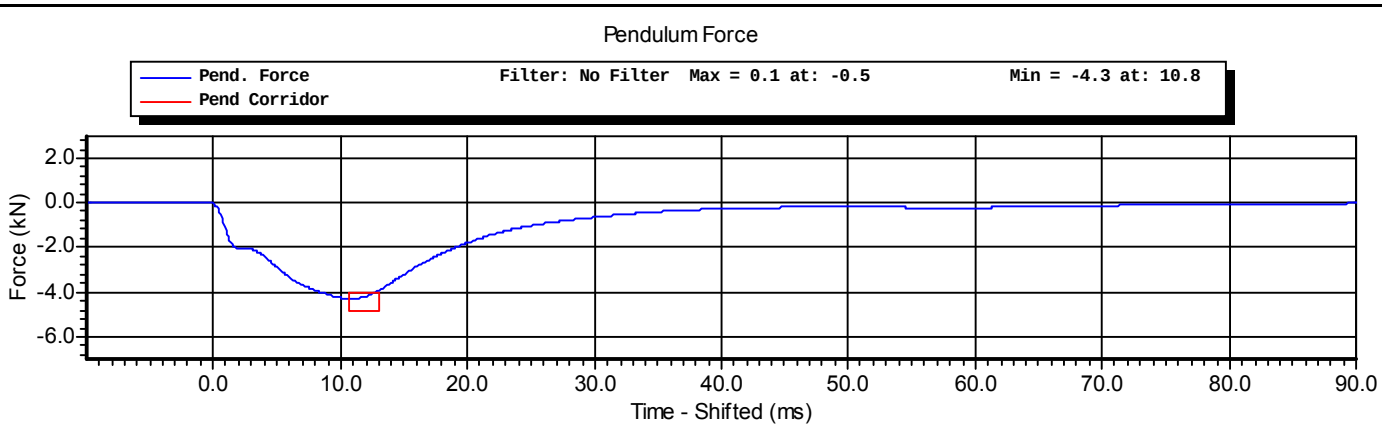
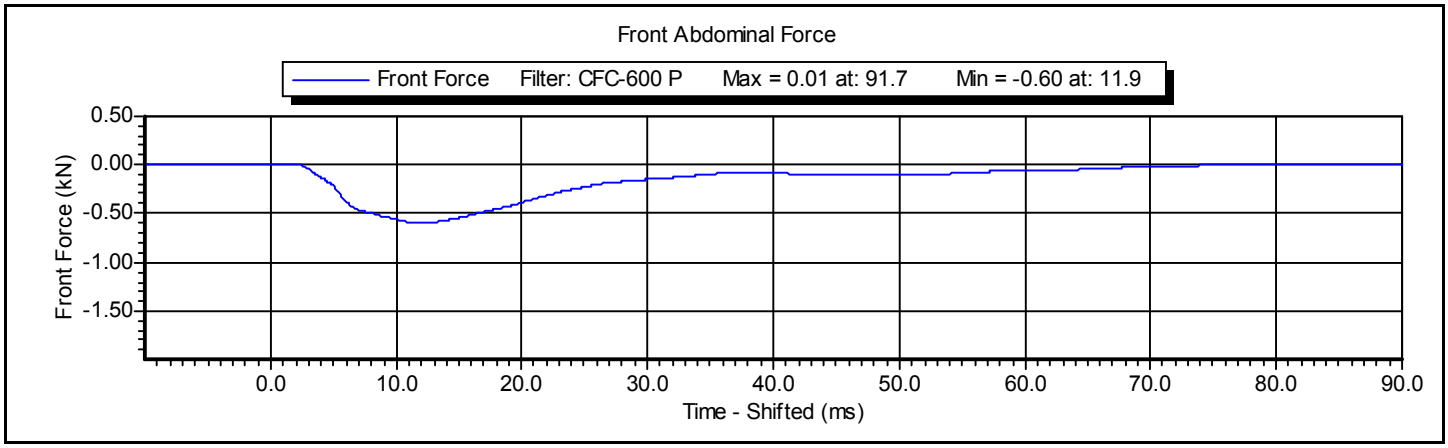
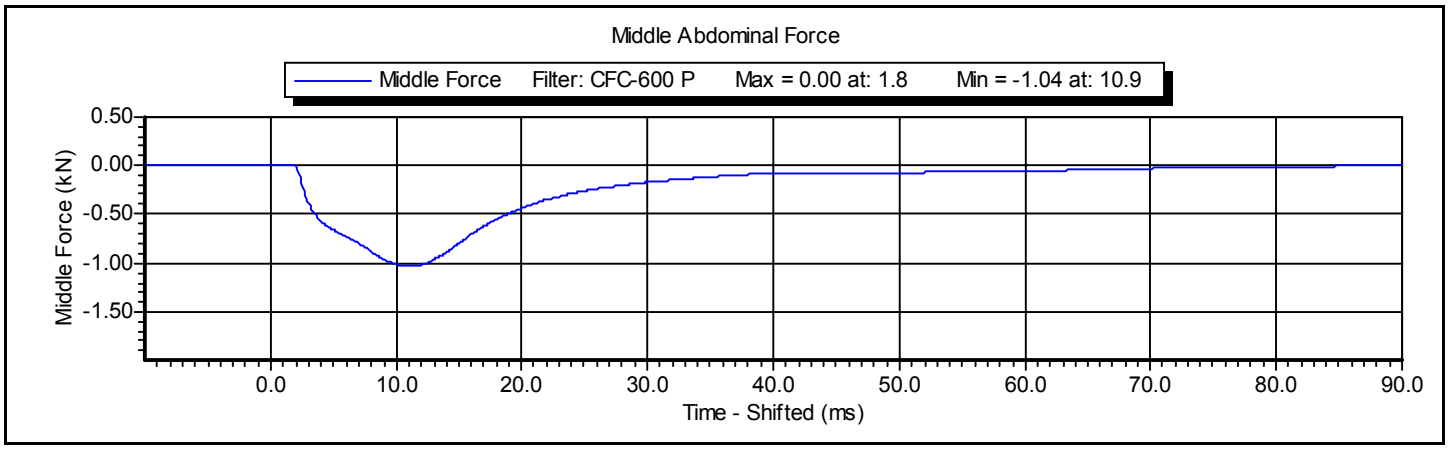
| | | | |
|---|---|---|---|
| Test Name: | **Abdominal Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Abdominal Impact** | Test Date: | **4/23/2010** |
| Test Number: | **2** | Test Time: | **8:30:31 AM** |

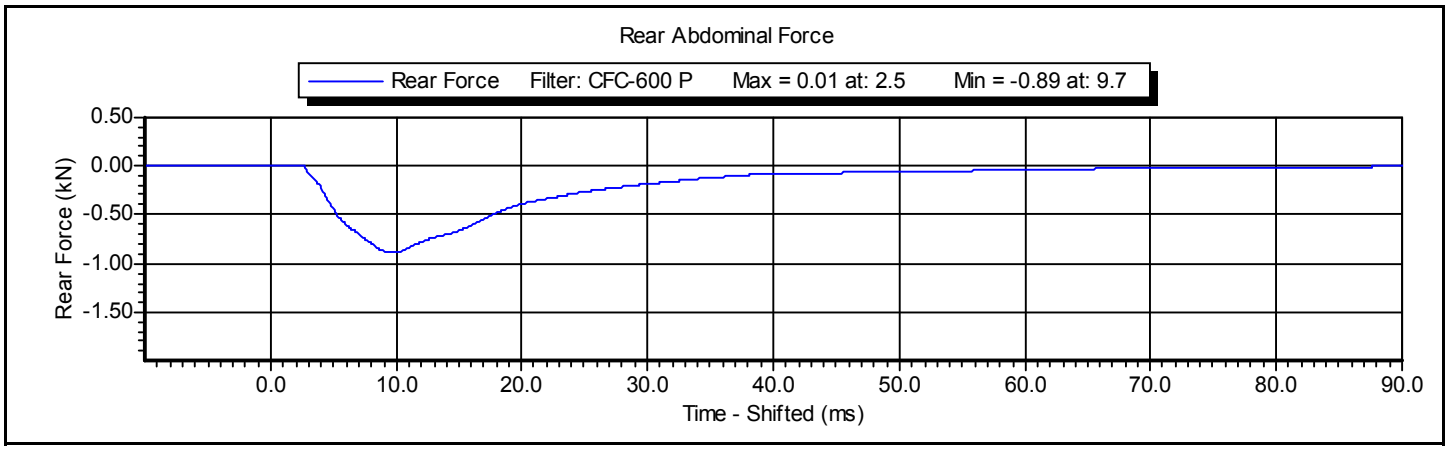
| Component Part Number | Component Serial Number |
|---|---|
| **FTSS-0004** | **07/118** |






Test ID: **Abdominal Impact** Test Time: **8:30:31 AM** Test Date: **4/23/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Lumbar Spine** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lumbar Spine** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **2:26:35 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **175-5501** | **15-0376** |

Comments:
7x9 PC, 92.6 deg.

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **21.7** | deg C | P |
| Humidity | 10 | -- | 70 | **36** | %RH | P |
| Velocity | 5.95 | -- | 6.15 | **6.06** | m/s | P |
| Maximum Headform Flexion Angle | 45.0 | -- | 55.0 | **47.5** | degrees | P |
| Time at Maximum Headform Flexion Angle | 39.0 | -- | 53.0 | **41.3** | ms | P |
| Decay to Zero Degrees | 37.0 | -- | 57.0 | **38.6** | ms | P |
| Velocity Corridor | | -- | | | | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7231CT** | **AF5B3** | **2/24/2010** |
| **DentonATD** | **7000428** | **094** | **10/23/2009** |
| **DentonATD** | **7000428** | **095** | **10/23/2009** |
| **DentonATD** | **7000428** | **093** | **10/23/2009** |

Test ID: **Lumbar Spine** Test Time: **2:26:35 PM** Test Date: **4/22/2010**

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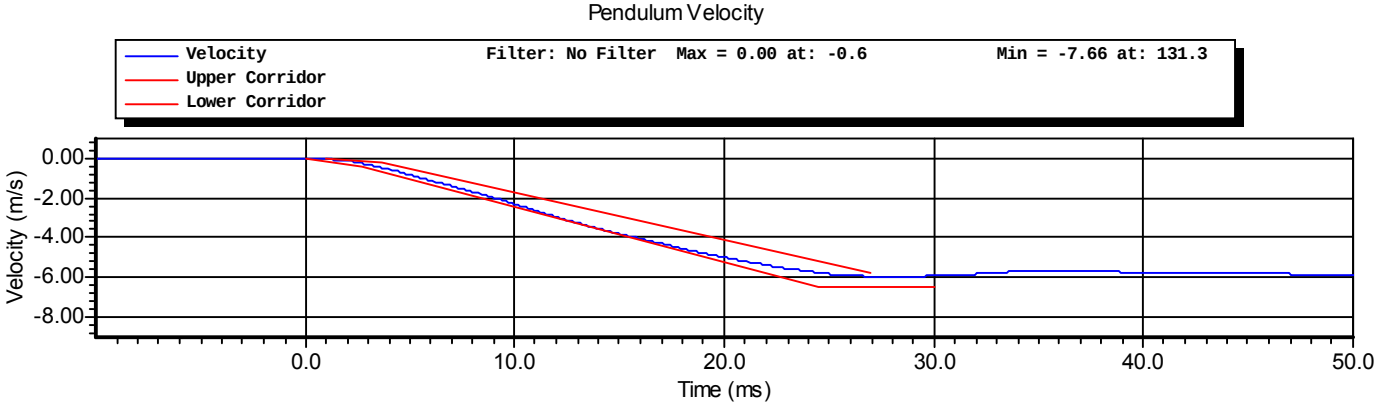
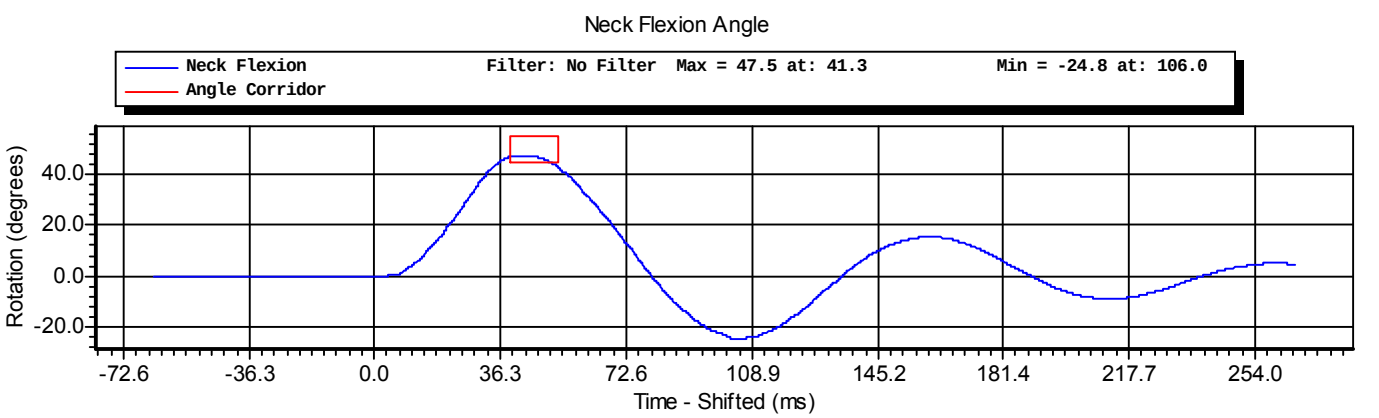
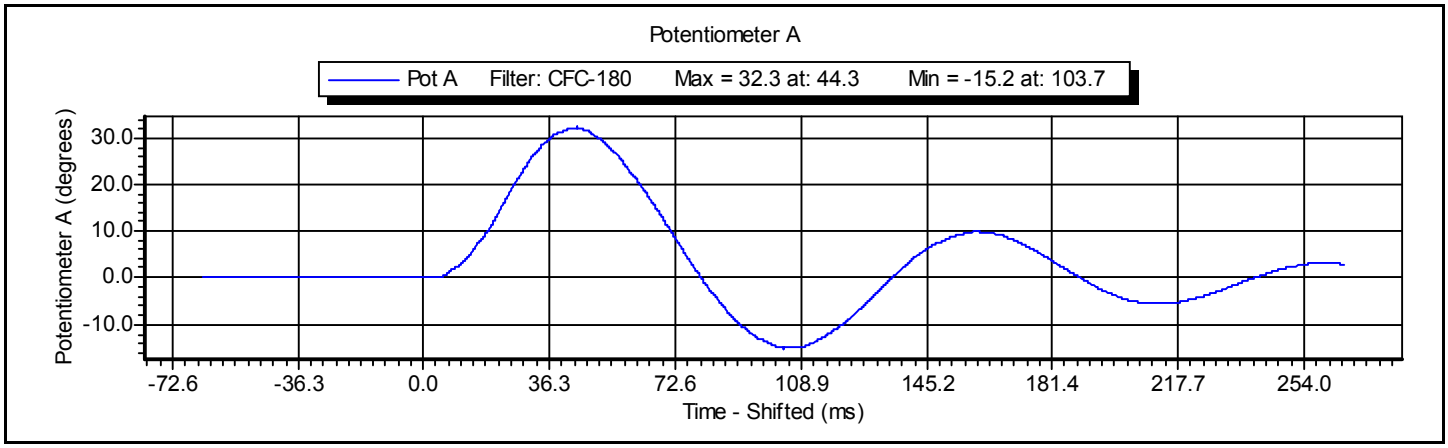
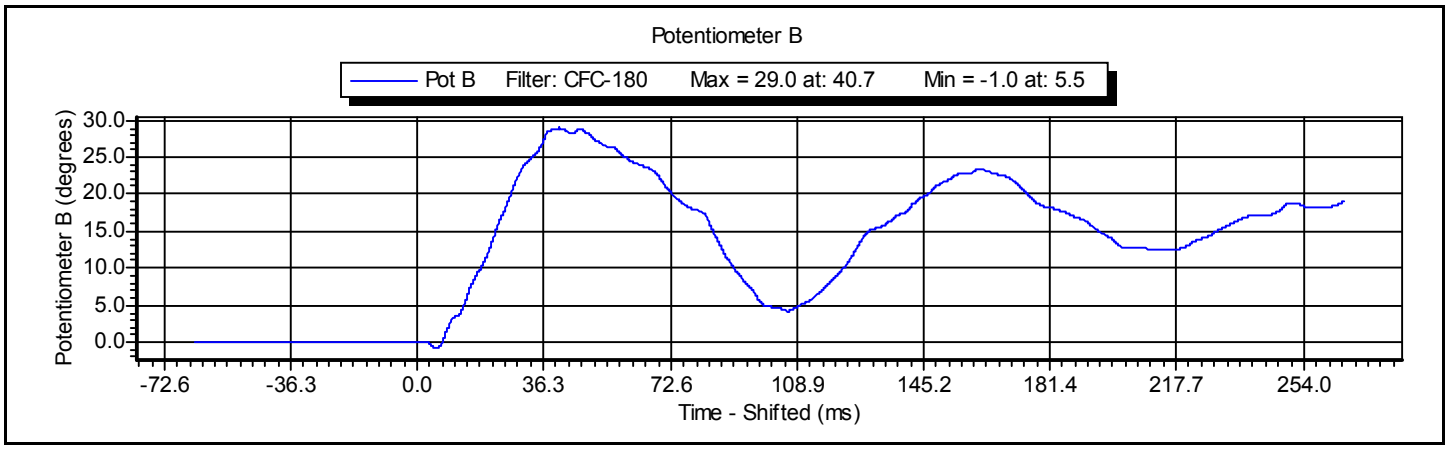
| | | | |
|---|---|---|---|
| Test Name: | **Lumbar Spine** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Lumbar Spine** | Test Date: | **4/22/2010** |
| Test Number: | **1** | Test Time: | **2:26:35 PM** |

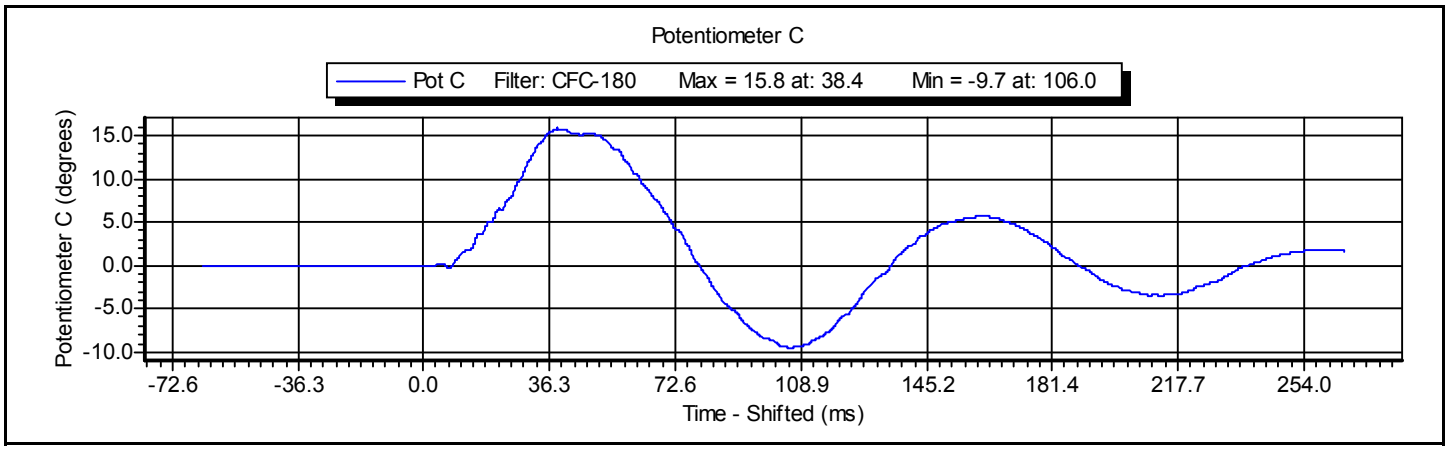
| Component Part Number | Component Serial Number |
|---|---|
| **175-5501** | **15-0376** |






Test ID: **Lumbar Spine** Test Time: **2:26:35 PM** Test Date: **4/22/2010**

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# VERIFICATION REPORT

| | | | |
|---|---|---|---|
| Test Name: | **Pelvis Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Pelvis Impact** | Test Date: | **4/21/2010** |
| Test Number: | **1** | Test Time: | **3:39:29 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-4003** | |

Comments:
10.0 N-m torque on bushings.

| Test Parameters | Test Specifications | | | Test Results | | |
|---|---|---|---|---|---|---|
| Temperature | 20.6 | -- | 22.2 | **22.2** | deg C | P |
| Humidity | 10 | -- | 70 | **35** | %RH | P |
| Velocity | 4.20 | -- | 4.40 | **4.26** | m/s | P |
| Peak Pendulum Force | -5.40 | -- | -4.70 | **-5.15** | kN | P |
| Time at Peak Pendulum Force | 11.80 | -- | 16.10 | **14.30** | ms | P |
| Peak Pubic Symphysis Force | -1.59 | -- | -1.23 | **-1.49** | kN | P |
| Time at Peak Pubic Symphysis Force | 12.20 | -- | 17.00 | **14.90** | ms | P |

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

# VERIFICATION REPORT

REFERENCE EQUIPMENT

| Manufacturer | Model | Serial Number | Calibration Date |
|---|---|---|---|
| **DentonATD** | **Velocity Trap** | **1** | **1/11/2010** |
| **Endevco** | **7264-2000** | **P16576** | **4/6/2010** |
| **Denton** | **3096** | **LC-458Fy** | **1/7/2010** |

Test ID: **Pelvis Impact** Test Time: **3:39:29 PM** Test Date: **4/21/2010**

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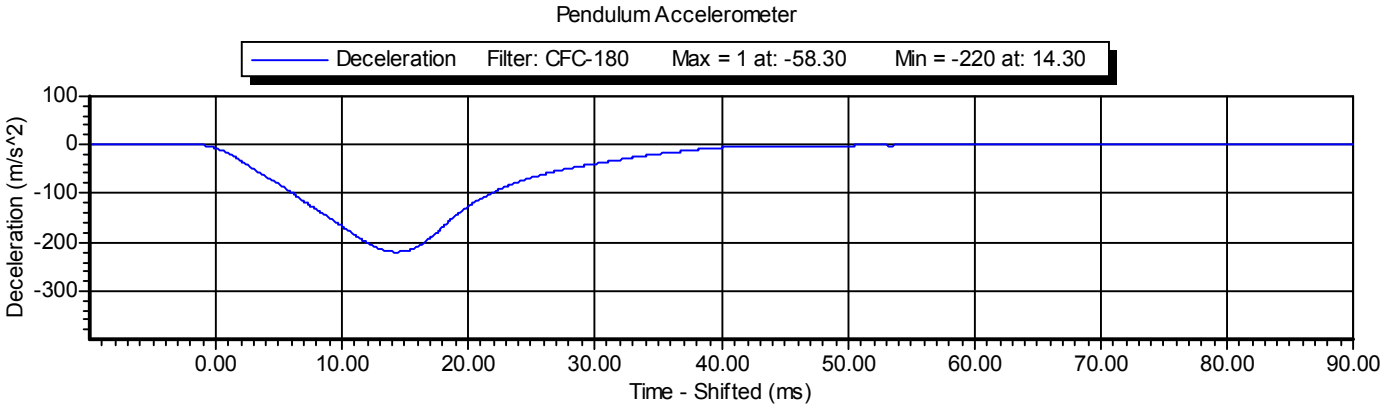
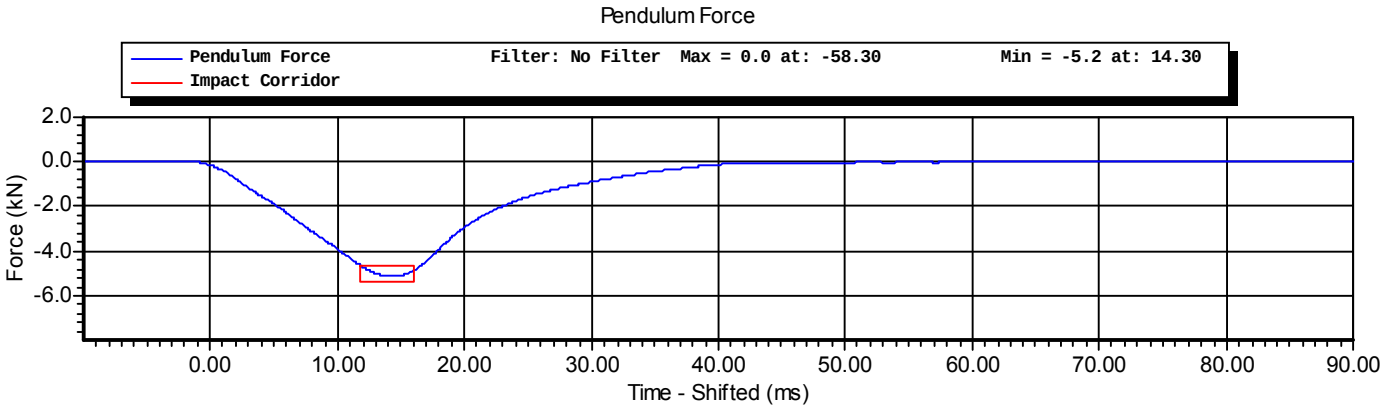
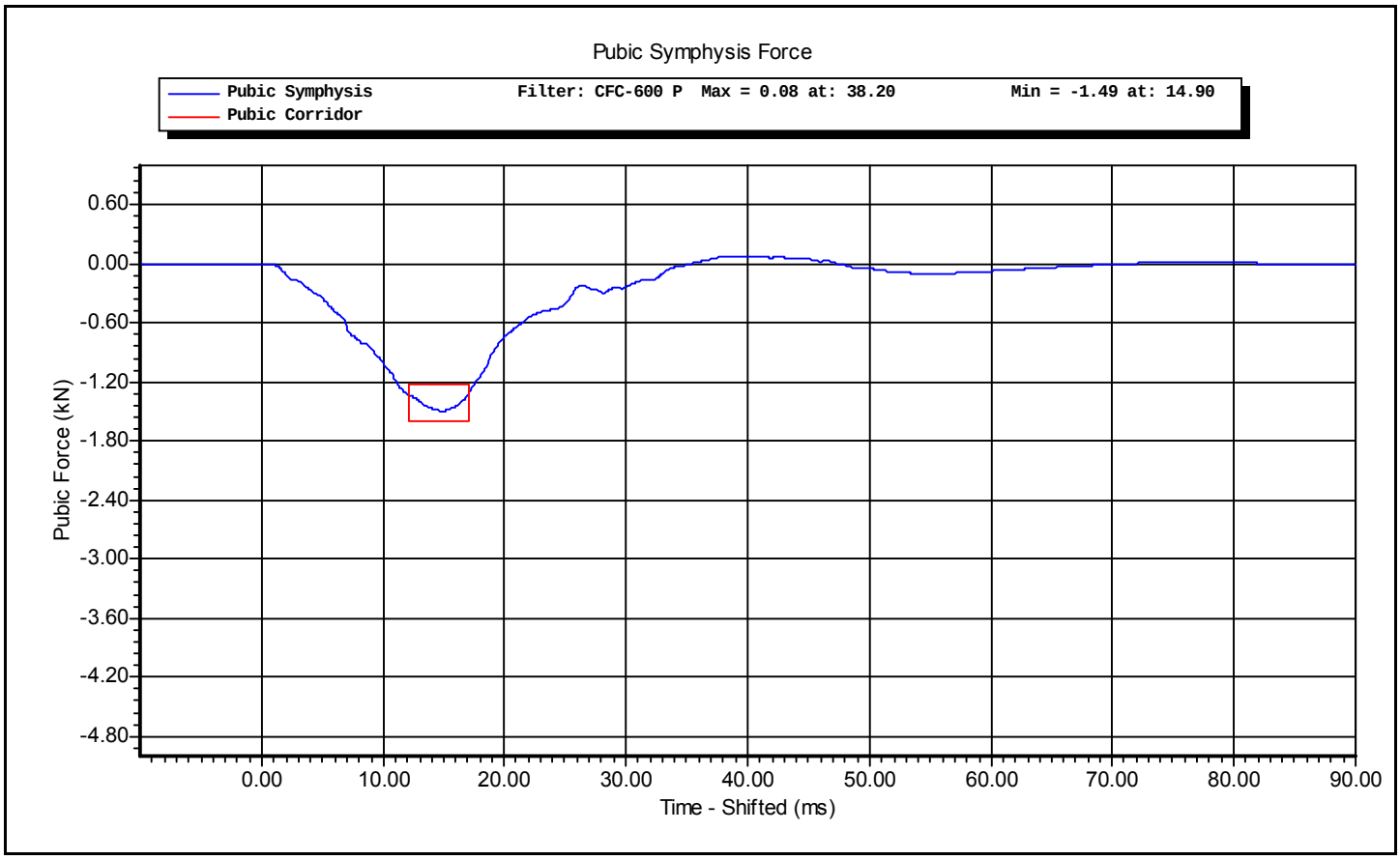
| | | | |
|---|---|---|---|
| Test Name: | **Pelvis Impact** | Revision: | **12/14/2006** |
| Sub Test Name: | | Spec Type: | **NHTSA** |
| ATD Type: | **ES-2re** | | |
| ATD Serial Number: | **D037** | | |
| Test ID: | **Pelvis Impact** | Test Date: | **4/21/2010** |
| Test Number: | **1** | Test Time: | **3:39:29 PM** |

| Component Part Number | Component Serial Number |
|---|---|
| **455-4003** | |






Test ID: **Pelvis Impact** Test Time: **3:39:29 PM** Test Date: **4/21/2010**

# APPENDIX E

# TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**DUMMY INSTRUMENTATION**

| | | FRONT ES2-re NO.: 0037 | | |
|---|---|---|---|---|
| | | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| Head Accelerometers | X | AC-P18639 | Endevco | 25-Jan-10 |
| | Y | AC-P23128 | Endevco | 25-Jan-10 |
| | Y | AC-P16591 | Endevco | 25-Jan-10 |
| Head Accelerometers | X (Redundant) | AC-J45479 | Endevco | 22-Jan-10 |
| | Y (Redundant) | AC-P32453 | Endevco | 25-Jan-10 |
| | Z (Redundant) | AC-P22639 | Endevco | 25-Jan-10 |
| Thorax Potentiometers | Upper Rib (Y) | DS-0552-01 | Honeywell | 11-Jan-10 |
| | Middle Rib (Y) | DS-0807 | Honeywell | 11-Jan-10 |
| | Lower Rib (Y) | DS-0552-3 | Honeywell | 11-Jan-10 |
| Abdomen Load Cells | Forward (Y) | LC-1507Fy | Denton | 07-Jan-10 |
| | Middle (Y) | LC-1508Fy | Denton | 07-Jan-10 |
| | Rear (Y) | LC-1509Fy | Denton | 07-Jan-10 |
| Pubic Symphysis Load Cell (Y) | | LC-458Fy | Denton | 07-Jan-10 |

**REMARKS:** None

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**VEHICLE AND MDB INSTRUMENTATION**

| VEHICLE INSTRUMENTATION | VEHICLE AND MDB INSTRUMENTS | | |
|---|---|---|---|
| | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| VEHICLE CG (X) | AC-P26263 | Endevco | 02-Feb-10 |
| VEHICLE CG (Y) | AC-P47300 | Endevco | 02-Feb-10 |
| VEHICLE CG (Z) | AC-P32146 | Endevco | 02-Feb-10 |
| LEFT FLOOR SILL (Y) | AC-P24145 | Endevco | 11-Feb-10 |
| A-PILLAR LEFT SILL (Y) | AC-P21516 | Endevco | 04-Nov-09 |
| LOWER LEFT A-PILLAR (Y) | AC-J38127 | Endevco | 04-Nov-09 |
| MIDDLE LEFT A-PILLAR (Y) | AC-P35798 | Endevco | 25-Jan-10 |
| B-PILLAR LEFT SILL (Y) | AC-P19217 | Endevco | 22-Jan-10 |
| LOWER LEFT B- PILLAR (Y) | AC-J32838 | Endevco | 04-Nov-09 |
| MIDDLE LEFT B-PILLAR (Y) | AC-P23288 | Endevco | 04-Nov-09 |
| DRIVER SEAT TRACK (Y) | AC-P16841 | Endevco | 24-Feb-10 |
| ENGINE TOP (X) | AC-P19363 | Endevco | 26-Jan-10 |
| ENGINE TOP (Y) | AC-P17457 | Endevco | 26-Jan-10 |
| FIREWAELL CENTER (Y) | AC-P16862 | Endevco | 29-Mar-10 |
| RIGHT ROOF at VERTICAL IMPACT REFERENCE (Y) | AC-P35793 | Endevco | 24-Feb-10 |
| RIGHT SILL at VERTICAL IMPACT REFERENCE (Y) | AC-P38132 | Endevco | 06-Apr-10 |
| REAR FLOORPAN BEHIND REAR AXLE at C/L (X) | AC-P35811 | Endevco | 29-Mar-10 |
| REAR FLOORPAN BEHIND REAR AXLE at C/L (Y) | AC-P35803 | Endevco | 29-Mar-10 |

**REMARKS:** None