

**Vehicle Research and Test Center  
Soil Trip Rollover  
of a 2007 Ford Expedition  
TRC Inc. Test Number 100115**

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**Prepared For:  
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Notice

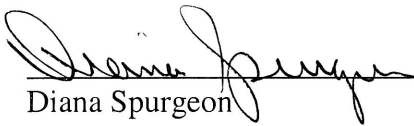
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**TRC TEST NUMBER: 100115**

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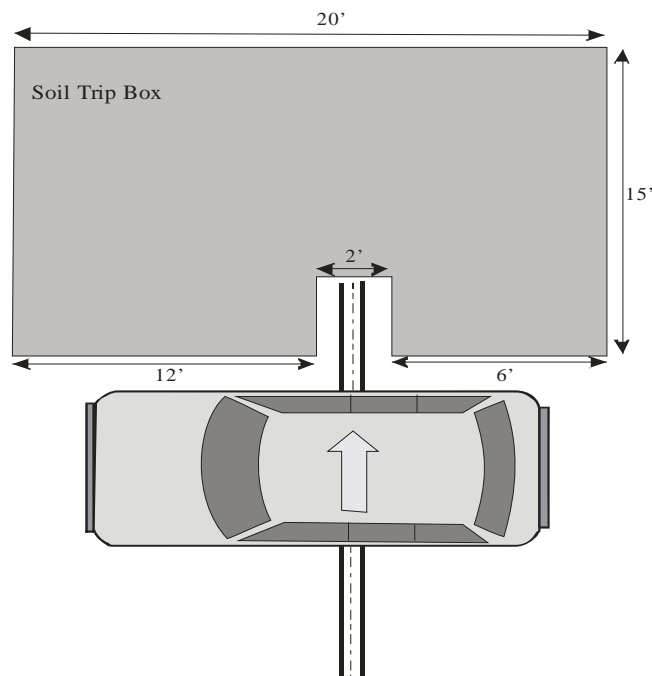
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## SECTION 1

### PURPOSE AND TEST PROCEDURE

This soil trip rollover crash test was conducted to investigate both vehicle and occupant dynamics during rollover crashes. This test was conducted with a 2007 Ford Expedition moving at 49.1 km/h (30.5 mph<sup>1</sup>), releasing the vehicle with its roll axis perpendicular to the direction of the soil trip area. The vehicle was modified by replacing the rear seat with a modified front seat to simulate similar characteristics in both seating positions. The center console was also removed. The test vehicle contained three (3) instrumented Part 572E dummies. The OEM belts and buckles were replaced in all positions. The driver and left rear positions were equipped with a motorized retractor and a pretension buckle system<sup>2</sup>. The right front position was equipped with a retractor and buckle pretension system<sup>2</sup>. The curtain air bags and pretensioners were fired manually at 100ms into the event and the motorized retractors were manually activated prior to launch.

The soil trip area was 300 square foot and filled with a number nine (#9) crushed limestone aggregate to a minimum depth of eight inches. It was conducted for the National Highway Traffic Safety Administration's (NHTSA) Vehicle Research and Test Center (VRTC) by the Transportation Research Center Inc. (TRC Inc.).



<sup>1</sup> Test Speed was calculated using the cable speed.

<sup>2</sup> Belt Systems were provided by TRW Automotive.

## **SECTION 2**

### **SUMMARY OF TEST RESULTS**

A 2007 Ford Expedition, containing three (3) instrumented Part 572E test dummies was released at 49.1 km/h (30.5 mph). The vehicle was towed in the lateral direction on a soap-covered runway. After release, the vehicle skidded into the soil, and made one (1) and three-quarter (3/4) rotations coming to rest on the driver's side. The soil trip rollover test was conducted by Transportation Research Center Inc. in East Liberty, Ohio on January 15, 2010. Pre- and post-test photographs of the test vehicle and the dummies are included in Appendix A.

Three (3) restrained Part 572E Hybrid III 50<sup>th</sup> percentile adult male anthropomorphic test devices (dummies) were placed in the driver, right front, and left rear designated seating positions relative to the placement procedures specified in Appendix F of Laboratory Procedure TP208-14. The dummies were instrumented with head, chest, and pelvis triaxial accelerometers, upper and lower six-axis neck load cells, and a chest deflection potentiometer. The ATDs in position (1) and (4) were also instrumented with triaxial head rotational rate gyroscopes. The ATD in position three was instrumented with six (6) additional head accelerometers to complete a 9-array head configuration. All dummies were restrained by 3-point seat belts. All dummy instrumentation is detailed in this report. Seventy-eight (78) dummy channels of acceleration, force, moment, roll rate, and displacement data were collected for this test. A total of 186 channels of data were recorded.

The rollover test was documented by one (1) real-time camera and thirteen (13) high-speed digital cameras. Camera locations and other pertinent camera information are included in this report.

Appendix A contains pre- & post-test photography. Appendix B contains the vehicle dummy response data traces. A summary of the front impact dummy configuration and verification test data can be found in Appendix C.

## TEST RESULTS SUMMARY

	Left Front ATD(#001)	Right Front ATD(#110)	Left Rear ATD(#043)
HIC15 CFC 1000	10	21	15
HIC36 CFC 1000	21	36	30
Chest Clip 3 ms (g) CFC 180	9.6	17.0	10.2
Chest Deflection (mm) CFC 600	-0.6	-7.8	-7.2
Neck Injury (NIJ) (ms) CFC 600			
NTE	0.13	0.12	0.12
NTF	0.04	0.07	0.04
NCE	0.20	0.15	0.05
NCF	0.03	0.06	0.06
Neck Tension (N) CFC1000	558.7	454.4	611.0
Neck Compression (N) CFC1000	-795.3	-473.0	-251.9

	2007 Ford Expedition
Vehicle Test Weight	2952.5 kg <sup>1</sup>
Left Side - Maximum Crush	46 mm
Right Side - Maximum Crush	32 mm
Roof - Maximum Crush	64 mm
Impact Speed	49.1 km/h

**NOTE: All vehicle and dummy measurements included in this report were achieved by using the coordinate measurement machine unless otherwise noted.**

<sup>1</sup> The vehicle test weight is heavier for the soil trip test mode because of adding the structure to tow the vehicle laterally.

## **TEST NOTES:**

The driver's chest Y-axis acceleration data channel recorded anomalous data spikes at approximately 2500 milliseconds.

The vehicle's center of gravity roll rate 1, X-axis rotational rate gyroscope exceeded the full scale value at approximately 1,883 milliseconds. The data appears valid.

The vehicle's center of yaw rate 1, gravity Z-axis rotational rate gyroscope exceeded the full scale value at approximately 105 milliseconds. The data appears valid.

The vehicle's rear deck pitch rate 1, Y-axis rotational rate gyroscope exceeded the full scale value at approximately 1,884 milliseconds. The data appears valid.

The vehicle's rear deck yaw rate 1, Z-axis rotational rate gyroscope exceeded the full scale value at approximately 1,884 milliseconds. The data appears valid.

The vehicle's right upper A-pillar X-, Y-, and Z-axis acceleration data channels recorded questionable data after approximately 1,698 milliseconds.

The left rear passenger dummy shoulder belt force data channel exceeded the full scale value at approximately 1,407 milliseconds and recorded questionable data throughout the event.

**SECTION 3**  
**OCCUPANT AND VEHICLE INFORMATION**

**DATA SHEET NO. 1  
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**TEST VEHICLE INFORMATION AND OPTIONS**

Make	Ford	Driv. & Front Pass. Front Airbag	Yes
Model Year	2007	Driv. & Front Pass. Side Airbag	Yes
Model	Expedition XLT	Driv. & Front Pass. Head Airbag	No
Body Style	4-door SUV	Driv. & Front Pass. Curtain Airbag <sup>4</sup>	Yes
VIN	1FMFU15547LA34200	Driv. & Front Pass. Knee Airbag	No
Color	Maroon	Rear Pass. Front Airbag	No
Delivery Date	12/23/09	Rear Pass. Side Airbag	No
Odometer Reading	24,338	Rear Pass. Head Airbag	No
Dealer	--- <sup>1</sup>	Rear Pass. Curtain Airbag	Yes
Transmission	Automatic	Rear Pass. Knee Airbag	No
Final Drive	Rear wheel drive	Load Limiters	--- <sup>2</sup>
Number of Cylinders	V8	Anti-lock Brakes	Yes
Engine Displacement (L)	5.4	All-Wheel Drive	No
Engine Placement	Longitudinal	Pretensioners	Yes
Roof Rack	Yes / Removed	Air Conditioning	Yes
Sunroof / T-Top	No	Tilt Wheel	Yes
Tinted Glass	Yes	Power Seats	Yes
Traction Control	Yes	Power Windows	Yes
Power Brakes	Yes	Power Steering	Yes
Front Disc	Yes	AM/FM CD	Yes
Rear Disc	Yes	Automatic Door Locks	Yes
		Other	N/A
Does owner's manual provide instructions to turn off automatic door locks?			Yes

**DATA FROM CERTIFICATION LABEL**

Manufactured by	Ford Motor Co.
Date of Manufacture	12/05

GVWR (kg)	3357
GAWR Front (kg)	1497
GAWR Rear (kg)	1928

**TEST VEHICLE SEAT TYPE AND CAPACITY**

Measured Parameter	Front	Mid <sup>3</sup>	Rear <sup>3</sup>	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Designated Seating Capacity (DSC)	2	3	3	8
Type of Seat Back	Manual Adjustable	Manual Adjustable	Manual Adjustable	
(A) Capacity Wt. (VCW) (kg)				748
(B) DSC x 68.08 kg				545
(A-B) Cargo Wt. (RCLW) (kg)				203

<sup>1</sup> Not Recorded

<sup>2</sup> Owner's manual not available at the time the report was prepared, information unknown.

<sup>3</sup> The original seats were removed. A bucket seat was installed in the second row for this test.

<sup>4</sup> The curtain airbags were fired manually.

**DATA SHEET NO. 1 (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) <sup>1</sup>			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	642.6	637.0		683.0	790.0	
Right	kg	612.2	662.4		668.5	811.0	
Ratio	%	49.1	50.9		45.8	54.2	
Totals	kg	1254.8	1299.4	2554.2	1351.5	1601.0	2952.5

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value <sup>1</sup>
(A) Total Delivered Weight (UVW)	kg	2254.2
(B) Weight of 2 P572M ATDs	kg	165.2
(C) Rated Cargo/Luggage Weight (RCLW)	kg	136.0
(A+B+C) Vehicle Target Weight (TVTW)	kg	2855.4

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	900 <sup>2</sup>	897 <sup>2</sup>	897 <sup>2</sup>	899 <sup>2</sup>	--- <sup>3</sup>
As Tested	mm	910	903	862	863	1638
Fully Loaded	mm	--- <sup>3</sup>	--- <sup>3</sup>	--- <sup>3</sup>	--- <sup>3</sup>	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Test Vehicle Wheelbase	mm	3020
Total Vehicle Length at Left Side	mm	--- <sup>3</sup>
Total Vehicle Length at Centerline	mm	5208
Total Vehicle Length at Right Side	mm	--- <sup>3</sup>
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	liters	98.4

Vehicle parts removed to make Target Vehicle Test Weight: None

<sup>1</sup> UVW and Target Test Weight was based on values recorded using a 5-passenger (DSC) vehicle as tested on December 3, 2008.

<sup>2</sup> Matched test conducted October 22, 2009.

<sup>3</sup> Measurement not requested.

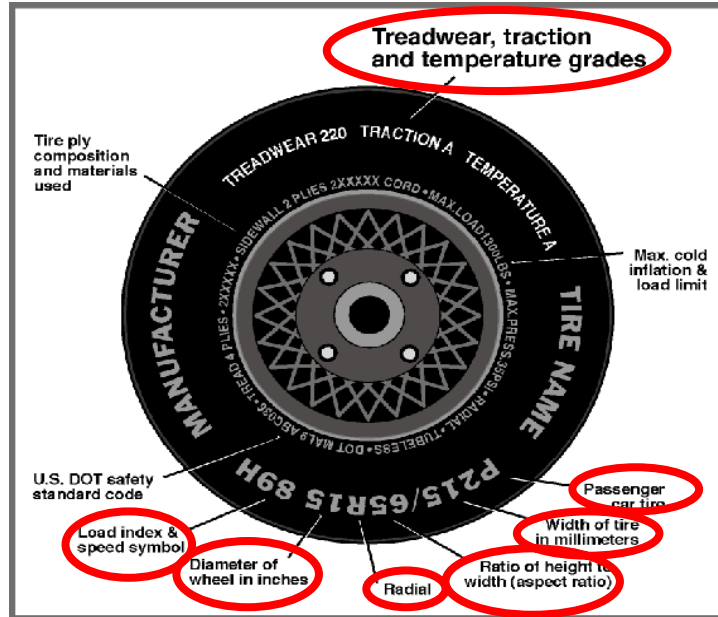
## DATA SHEET NO. 1 (CONTINUED)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10



### DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	P265/70R17	P265/70R17
Tire Size on Vehicle	P265/70R17	P265/70R17
Tire Manufacturer	Continental	Continental
Tire Name	Contitrac SUV	Contitrac SUV
Load Index & Speed Symbol	113S	113S
Tread wear	520	520
Traction Grade	A	A
Temperature Grade	B	B

## DATA SHEET NO. 2

### SEATS AND SEAT BELTS DATA

Test Vehicle: 2007 Ford Expedition  
 Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

#### DUMMY RIDING POSITION

Driver: Total Number of detents:

Power seat; 220 mm of travel

Passenger: Total Number of detents: 23

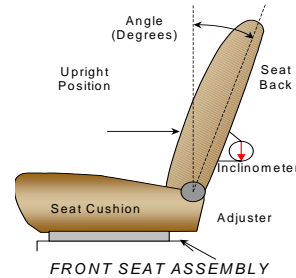
Left Rear Passenger: Total Number of detents: 23

Driver seat back angle: 12.8°

Passenger seat back angle: 11.2°

Left rear seat back angle: 9.7°

The rear seat was replaced with a modified front seat to replicate the front occupant seat.



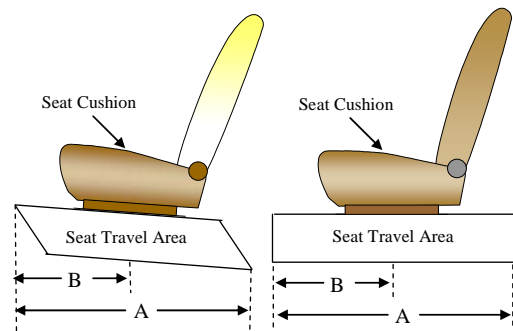
#### SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position with vertical adjustment at the lowest position obtainable for both the driver and passenger.

#### SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	220	Mid
Fr Pass	215	Mid
Rear Seat	215	17 of 22

Seat position number one is the full forward position.



#### SEAT BELT UPPER ANCHORAGE

	Total No. of Positions	Placed in Position No.
Driver Seat	5	3
Fr Pass	5	3
Rear Seat	Fixed	Fixed

Position number one is the uppermost adjustment position.

Note: Vertical height adjusted to match head to roof measurement with left rear dummy.

**DATA SHEET NO. 2 (CONTINUED)**

**SEATS AND SEAT BELTS DATA**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**SEAT BELT CONFIGURATION**

	Type	Configuration
Driver	3-PT: Motorized Retractor <sup>1</sup> and Buckle Pretensioner <sup>2</sup>	I
Left Rear Passenger	3-PT: Motorized Retractor <sup>1</sup> and Buckle Pretensioner <sup>2</sup>	I
Right Front Passenger	3-PT: Retractor and Buckle Pretensioner <sup>2</sup>	G

<sup>1</sup> Motorized Retractor activated at launch of test.

<sup>2</sup> Pretensioners manually fired at 100ms.

**DATA SHEET NO. 3**

**POST-TEST OBSERVATIONS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**TEST DUMMY INFORMATION AND CONTACT POINTS**

Description	Left Front Seat Driver	Right Front Passenger	Rear Seat Passenger
Dummy Type / Serial No.	Hybrid III 50 <sup>th</sup> / 001	Hybrid III 50 <sup>th</sup> / 110	Hybrid III 50 <sup>th</sup> / 043
Head Contact	Curtain airbag, headliner	Curtain airbag, headliner	Curtain airbag, headliner
Upper Torso Contact	No visible contact	No visible contact	No visible contact
Lower Torso Contact	No visible contact	No visible contact	No visible contact
Left Knee Contact	No visible contact	No visible contact	No visible contact
Right Knee Contact	No visible contact	No visible contact	No visible contact

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

Description	Front	Rear
Locked/Unlocked Doors	Unlocked	Unlocked
Left Side Door Opening	Closed and latched	Closed and latched
Right Side Door Opening	Closed and latched	Closed and latched
Seat Movement	None	None
Seat Back Failure	None	None

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Did not separate from the vehicle
Sill Separation	Did not separate from the vehicle
Windshield Damage	Cracked and broken separated at the roof on the right side.
Window Damage	Left front, rear, and right rear broke out. The left rear glass seal broke at rearward portion of window and separated from the vehicle during the event. The window remained attached to the vehicle.
Other Notable Effects	Right front and right rear tires flattened

**DATA SHEET NO. 3 (CONTINUED)**

**POST TEST OBSERVATIONS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type	Left Front (Driver) Occupant Location 01		Right Front (Passenger) Occupant Location 03	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No	Yes	No
Side Airbag	Yes	No	Yes	No
Head Airbag	No	N/A	No	N/A
Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Unknown	Unknown	Unknown	Unknown

Restraint Type	Left Rear (Passenger) Occupant Location 04	
	Installed	Operation
Front Airbag	No	N/A
Side Airbag	No	N/A
Head Airbag	No	N/A
Curtain Airbag	Yes	Yes
Seat Belt Pretensioner	Yes	Yes
Seat Belt Load Limiter	Unknown	Unknown

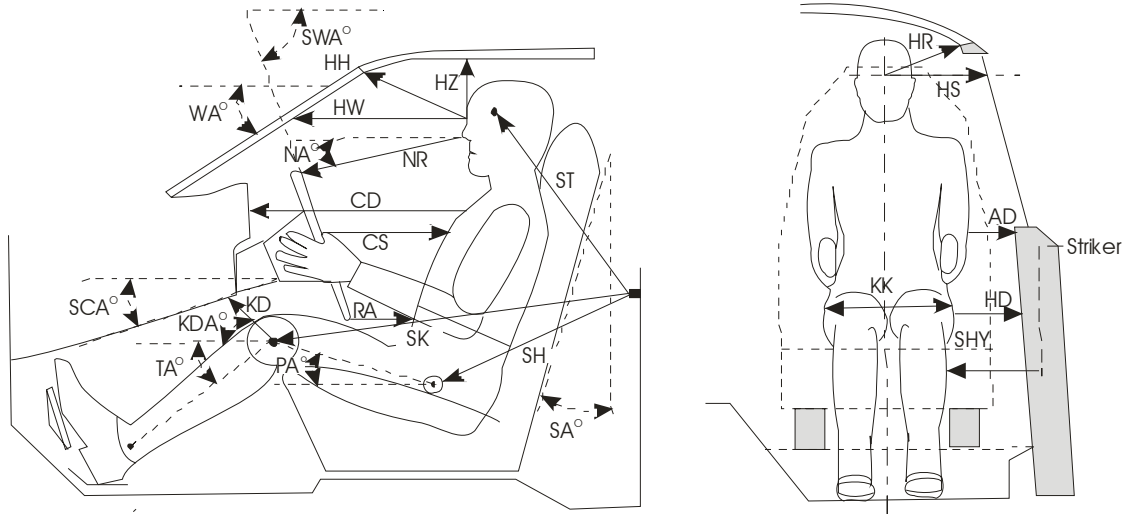
**NOTE: The occupants buckle pretensioners and the left and right side curtain airbags were deployed 100 milliseconds using TRC Inc.'s airbag firing system.**

# DATA SHEET NO. 4

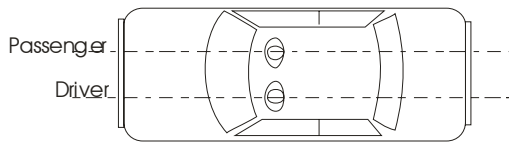
## DUMMY MEASUREMENTS

Test Vehicle: 2007 Ford Expedition  
 Test Program: Improved Restraints in Rollovers

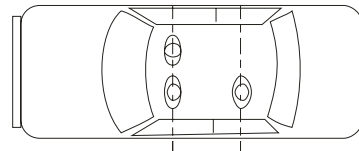
Test Date: 01/15/10



VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE



**DATA SHEET NO. 4 (CONTINUED)**

**DUMMY MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**FRONT SEAT OCCUPANTS**

Code	Measurement Description	Driver (# 001)		Passenger (# 110)	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		31.0		31.3
SWA°	Steering Wheel Angle		--- <sup>2</sup>		
SCA°	Steering Column Angle		--- <sup>2</sup>		
SA°	Seat Back Angle (on headrest post)		12.8		11.2
HZ	Head to Roof (Z Direction)	249		222	
HH	Head to Header	450		411	
HW	Head to Windshield	722		651	
HR	Head to Side Header (Y Direction)	244		219	
NR	Nose to Rim	--- <sup>2</sup>	--- <sup>2</sup>		
CD	Chest to Dash	--- <sup>1</sup>		--- <sup>1</sup>	
CS	Steering Wheel to Chest	--- <sup>2</sup>			
RA	Rim to Abdomen	--- <sup>2</sup>			
KDL	Left Knee to Dash	188	11.7	161	
KDR	Right Knee to Dash	195		173	15.1
PA°	Pelvic Angle		22.9		23.0
TA°	Tibia Angle		46.1		44.7
KK	Knee to Knee (Y Direction)	296		281	
ST	Striker to Head	636	-82.4	675	-80.6
SK	Striker to Knee	600	-6.4	607	-8.1
SH	Striker to H-Point	209	7.5	212	-1.8
SHY	Striker to H-Point (Y Direction)	160		169	
HS	Head to Side Window (Y Direction)	325		309	
HD	H-Point to Door (Y Direction)	69		67	
AD	Arm to Door (Y Direction)	136		136	

The seat back angle (SA°) is measured relative to vertical; all other angles are measured relative to horizontal.

A negative angle indicates the measurement point was above the striker.

<sup>1</sup> Measurement is not available.

<sup>2</sup> Measurement is not available, steering column was removed pre-test.

**DATA SHEET NO. 4 (CONTINUED)**

**DUMMY MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**LEFT REAR SEAT OCCUPANT**

Code	Measurement Description	Left Rear Passenger (#043)	
		Length (mm)	Angle(°)
WA°	Windshield Angle	114.3	
SWA°	Steering Wheel Angle		
SCA°	Steering Column Angle		
SA°	Seat Back Angle (on headrest post)		9.7
HZ	Head to Roof (Z Direction)	255	
HH	Head to Header	607	
HW	Head to Windshield		
HR	Head to Side Header (Y Direction)	240	
NR	Nose to Rim		
CD	Chest to Dash	569	
CS	Steering Wheel to Chest		
RA	Rim to Abdomen		
KDL	Left Knee to Dash (Seatback)	221	1.3
KDR	Right Knee to Dash (Seatback)	222	
PA°	Pelvic Angle		27.0
TA°	Tibia Angle		53.4
KK	Knee to Knee (Y Direction)	252	
ST	Striker to Head	528	-74.7
SK	Striker to Knee	675	0.9
SH	Striker to H-Point	324	27.2
SHY	Striker to H-Point (Y Direction)	205	
HS	Head to Side Window (Y Direction)	357	
HD	H-Point to Door (Y Direction)	109	
AD	Arm to Door (Y Direction)	174	

A negative angle indicates the measurement point was above the striker.

**DATA SHEET NO. 5**

**OCCUPANT INSTRUMENTATION DATA**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**LEFT FRONT**

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
Head Acceleration	X	g	3.2	1403.6	-3.2	3063.5
	Y	g	8.7	1416.7	-9.0	2018.5
	Z	g	12.9	1974.6	-3.9	1432.7
	R	g	13.9	1975.4		
Head Rate Gyro	X	°/s	700.9	2089.7	-1206.6	1979.6
	Y	°/s	308.2	2017.0	-305.0	2516.3
	Z	°/s	579.6	109.8	-560.0	1976.1
Upper Neck Force	X	N	52.2	205.3	-121.2	1991.7
	Y	N	137.7	2126.8	-472.3	1066.1
	Z	N	558.7	1976.3	-795.3	1059.4
Upper Neck Moment	X	Nm	24.6	1064.3	-26.9	1430.6
	Y	Nm	9.3	132.8	-10.6	1948.8
	Z	Nm	13.1	623.9	-8.6	2006.8
Chest Acceleration <sup>1</sup>	X	g	2.9	127.4	-5.9	106.6
	Y	g	9.6	2422.2	-9.6	1929.3
	Z	g	7.3	1043.4	-2.5	1922.2
	R	g	10.5	2422.2		
Chest Displacement	X	mm	4.1	121.1	-0.6	2020.1
Lower Neck Force	X	N	975.2	2123.8	-2766.5	2008.6
	Y	N	1284.1	1065.2	-1030.9	1963.8
	Z	N	1395.3	120.2	-2112.5	1995.8
Lower Neck Moment	X	Nm	4.8	2553.7	-5.6	125.2
	Y	Nm	5.1	2126.9	-17.6	1995.9
	Z	Nm	4.5	1970.2	-4.8	1061.8
Pelvis Acceleration	X	g	3.7	1929.4	-4.6	106.5
	Y	g	10.5	1404.9	-19.7	1929.8
	Z	g	5.7	1047.2	-3.2	1925.8
	R	g	19.9	1929.8		

Positive Direction

Longitudinal: Forward  
 Lateral: Rightward  
 Vertical: Downward

Negative Direction

Longitudinal: Rearward  
 Lateral: Leftward  
 Vertical: Upward

<sup>1</sup> See Test Notes.

**DATA SHEET NO. 5 (CONTINUED)**  
**OCCUPANT INSTRUMENTATION DATA**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**RIGHT FRONT**

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
Head Acceleration	X	g	5.5	185.9	-11.6	1943.7
	Y	g	5.1	1983.8	-15.1	1938.1
	Z	g	9.3	109.8	-9.5	1951.2
	R	g	18.9	1943.9		
Head Front Acceleration	Y	g	4.9	1517.2	-15.4	1931.1
	Z	g	9.7	109.7	-8.3	1945.8
Head Top Acceleration	X	g	7.2	185.8	-12.2	1941.7
	Y	g	8.2	1988.9	-16.2	1928.8
Head Side Acceleration	X	g	7.0	109.7	-12.2	1949.3
	Z	g	9.1	109.7	-12.2	1951.3
Upper Neck Force	X	N	224.8	1954.6	-133.5	908.2
	Y	N	648.8	1955.4	-94.6	2032.2
	Z	N	454.4	109.5	-473.0	882.2
Upper Neck Moment	X	Nm	17.2	1057.5	-14.5	2039.8
	Y	Nm	12.3	941.1	-13.9	859.9
	Z	Nm	7.3	202.6	-12.1	1929.4
Lower Neck Force	X	N	289.7	1978.8	-115.9	1952.0
	Y	N	459.5	1941.2	-417.8	1979.4
	Z	N	586.6	109.4	-586.8	1955.6
Lower Neck Moment	X	Nm	107.0	1947.4	-35.0	2035.7
	Y	Nm	55.2	1954.7	-36.9	1474.9
	Z	Nm	13.5	1941.4	-32.2	1979.3
Chest Acceleration	X	g	4.3	1422.5	-7.8	108.6
	Y	g	3.9	1414.5	-15.9	1946.1
	Z	g	7.4	1932.5	-6.6	1420.8
	R	g	17.1	1944.3		
Chest Displacement	X	mm	0.0	15.4	-7.7	114.1
Pelvis Acceleration	X	g	7.5	1427.5	-6.3	1931.8
	Y	g	7.3	1412.4	-13.5	1933.3
	Z	g	4.8	869.5	-5.3	1895.0
	R	g	15.1	1933.0		

Positive Direction

Longitudinal: Forward  
Lateral: Rightward  
Vertical: Downward

Negative Direction

Longitudinal: Rearward  
Lateral: Leftward  
Vertical: Upward

**DATA SHEET NO. 5 (CONTINUED)**  
**OCCUPANT INSTRUMENTATION DATA**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**LEFT REAR**

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
Head Acceleration	X	g	2.1	104.5	-3.9	1983.0
	Y	g	9.0	1411.4	-10.6	1998.0
	Z	g	14.9	1971.0	-3.5	1431.8
	R	g	16.3	1971.1		
Head Rate Gyro	X	°/s	627.9	2078.0	-1243.0	1973.9
	Y	°/s	214.3	2584.1	-286.3	2488.2
	Z	°/s	252.3	2113.3	-401.7	1972.9
Upper Neck Force	X	N	180.1	1039.3	-150.4	1994.6
	Y	N	186.9	2129.8	-422.2	1996.5
	Z	N	611.1	1969.8	-251.9	1060.1
Upper Neck Moment	X	Nm	8.5	2125.1	-23.9	2002.8
	Y	Nm	10.2	1062.2	-7.6	1951.7
	Z	Nm	4.4	2139.3	-9.7	1997.7
Chest Acceleration	X	g	1.7	160.8	-5.3	105.9
	Y	g	8.7	1412.6	-9.8	1960.1
	Z	g	7.7	1045.6	-3.3	1433.8
	R	g	10.3	1961.7		
Chest Displacement	X	mm	0.0	102.6	-7.2	2633.2
Lower Neck Force	X	N	1143.6	2131.0	-3223.9	1996.2
	Y	N	564.6	2027.0	-1122.7	1965.8
	Z	N	2790.9	1937.4	-2892.4	1418.2
Lower Neck Moment	X	Nm	12.0	1453.6	-3.2	2026.0
	Y	Nm	9.1	1935.8	-17.2	1994.1
	Z	Nm	5.1	1969.1	-1.0	2017.4
Pelvis Acceleration	X	g	2.6	1924.6	-7.4	105.4
	Y	g	11.6	1413.1	-12.3	1932.8
	Z	g	7.8	105.4	-3.3	1944.0
	R	g	12.7	1932.8		

Positive Direction

Longitudinal: Forward  
Lateral: Rightward  
Vertical: Downward

Negative Direction

Longitudinal: Rearward  
Lateral: Leftward  
Vertical: Upward

**DATA SHEET NO. 6**  
**VEHICLE STRUCTURAL MEASUREMENTS<sup>1,2</sup>**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**STRUCTURAL MEASUREMENTS**

	Elements	Pre-Test
1	Total Length	5208
2	Total Width	2007
3	Bumper Top Height	498
4	Bumper Bottom Height	423
5	Longitudinal Member Top Height	523
6	Longitudinal Member Bottom Height	443
7	Distance Between Longitudinal Members	845
7'	Longitudinal Member Width	100
8	Engine Top Height	993
9	Engine Bottom Height	293
10	Engine and Gearbox Width	750
11	Front Bumper - Engine Distance	650
12	Front Shock Absorber Fixing Height	823
13	Bonnet Leading Edge Height	1123
14	Front Shock Absorber Fixing Width	920
15	Front Bumper - Front Axle Distance	990
16	Front Axle - A Pillar Distance	675
17	A Pillar - B Pillar Distance	1065
18	B Pillar - Rear Axle Distance	1280
19	B Pillar - C Pillar Distance	995
20	Roof Sill Bottom Height	1643
21	Roof Sill Top Height	1782
22	Floor Sill Bottom Height	480
23	Floor Sill Top Height	533

All distance measurements are in millimeters and measured using a measuring tape.

<sup>1</sup> Taken from INSIA report, “Structural Survey of Cars, Methodology of the Main Resistant Elements in the Car Body”, March 1999.

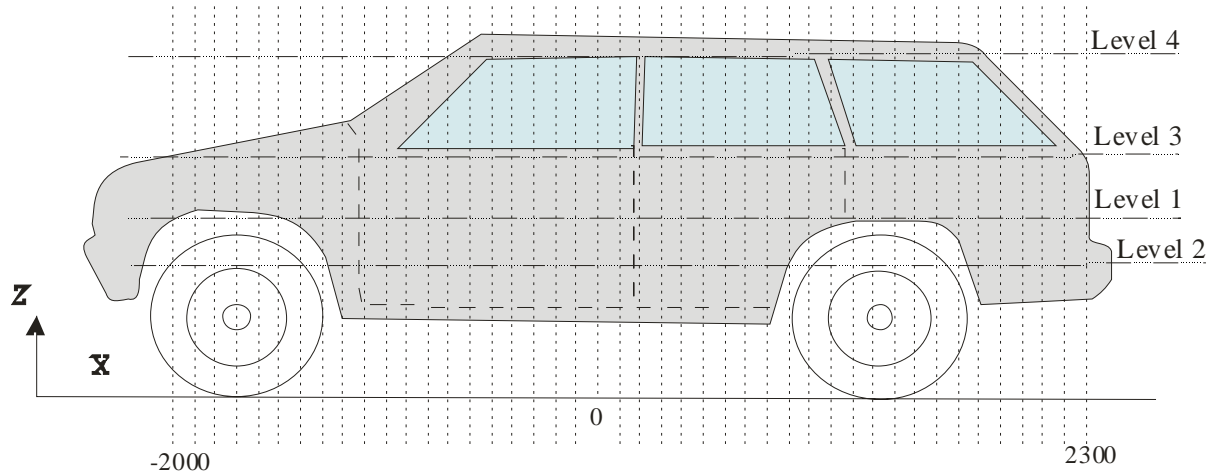
<sup>2</sup> The vertical measurements from the ground are adjusted based on the test vehicle’s pre-test attitude measurements.

**DATA SHEET NO. 7**  
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10



**Left Side View**  
**All measurements are in millimeters**

Measurements are taken when the vehicle is in the “As Tested” configuration.

Measurements along the vertical 0 mm line shown above.

Horizontal measurement spacing is approximately 100 millimeters.

Level	Measurement Description	Height Above Ground (mm)
4	Window Top	1780
3	Window Sill	1140
2	Occupant H-Point	830
1	Mid Door	920

Levels 1 through 4 measurements were achieved using a tape measure.

**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**LEFT SIDE CRUSH**

	Pre-Test				Post-Test				Difference			
	1	2	3	4	1	2	3	4	1	2	3	4
-2000			-842				-862				20	
-1900			-861				-880				19	
-1800			-875				-893				18	
-1700			-886				-903				17	
-1600			-895				-909				14	
-1500	-967		-902		-975		-914		8		12	
-1400	-969		-906		-977		-918		8		12	
-1300	-966		-910		-976		-922		10		12	
-1200	-958	-969	-913		-969	-979	-925		11	10	12	
-1100	-951	-964	-917		-961	-975	-929		10	11	12	
-1000	-952	-956	-920		-964	-967	-933		12	11	13	
-900	-955	-957	-922	-875	-965	-967	-932	-885	10	10	10	10
-800	-959	-961	-926	-845	-975	-978	-917	-855	16	17	-9	10
-700	-962	-964	-930	-819	-973	-978	-905	-829	11	14	-25	10
-600	-965	-967	-933	-789	-976	-981	-896	-792	11	14	-37	3
-500	-968	-969	-937	-754	-977	-982	-901	-737	9	13	-36	-17
-400	-971	-971	-940	-721	-984	-982	-910	-699	13	11	-30	-22
-300	-973	-974	-942	-688	-988	-986	-921	-648	15	12	-21	-40
-200	-975	-975	-944	-677	-994	-988	-931	-631	19	13	-13	-46
-100	-976	-977	-946	-673	-997	-991	-944	-628	21	14	-2	-45
0	-978	-978	-948	-672	-998	-994	-953	-630	20	16	5	-42
100	-979	-979	-950	-673	-997	-995	-962	-633	18	16	12	-40
200	-980	-979	-951	-673	-996	-996	-970	-635	16	17	19	-38
300	-980	-979	-952	-673	-989	-988	-969	-646	9	9	17	-27
400	-980	-979	-953	-673	-989	-987	-969	-649	9	8	16	-24
500	-980	-979	-954	-674	-988	-986	-969	-652	8	7	15	-22
600	-980	-979	-955	-675	-987	-986	-968	-656	7	7	13	-19
700	-980	-979	-955	-676	-987	-986	-967	-661	7	7	12	-15
800	-980	-979	-955	-676	-986	-984	-965	-667	6	5	10	-9
900	-979	-978	-955	-676	-985	-983	-963	-673	6	5	8	-3
1000	-979	-977	-954	-678	-984	-981	-961	-679	5	4	7	1
1100	-979	-985	-954	-680	-983	-987	-956	-671	4	2	2	-9
1200	-986	-990	-953	-680	-989	-986	-955	-671	3	-4	2	-9
1300	-993		-951	-679	-985		-950	-675	-8		-1	-4
1400	-994		-951	-678	-979		-949	-676	-15		-2	-2
1500	-993		-951	-678	-978		-950	-677	-15		-1	-1
1600	-991		-950	-678	-984		-949	-677	-7		-1	-1
1700	-987		-948	-677	-984		-948	-677	-3		0	0
1800	-979		-946	-676	-971		-946	-679	-8		0	3
1900	-968		-944	-675	-963		-946	-680	-5		2	5
2000			-941	-674			-944	-681			3	7
2100			-939	-672			-942	-680			3	8
2200			-936	-670			-939	-679			3	9
2300			-934				-937				3	

**DATA SHEET NO. 7 (CONTINUED)**

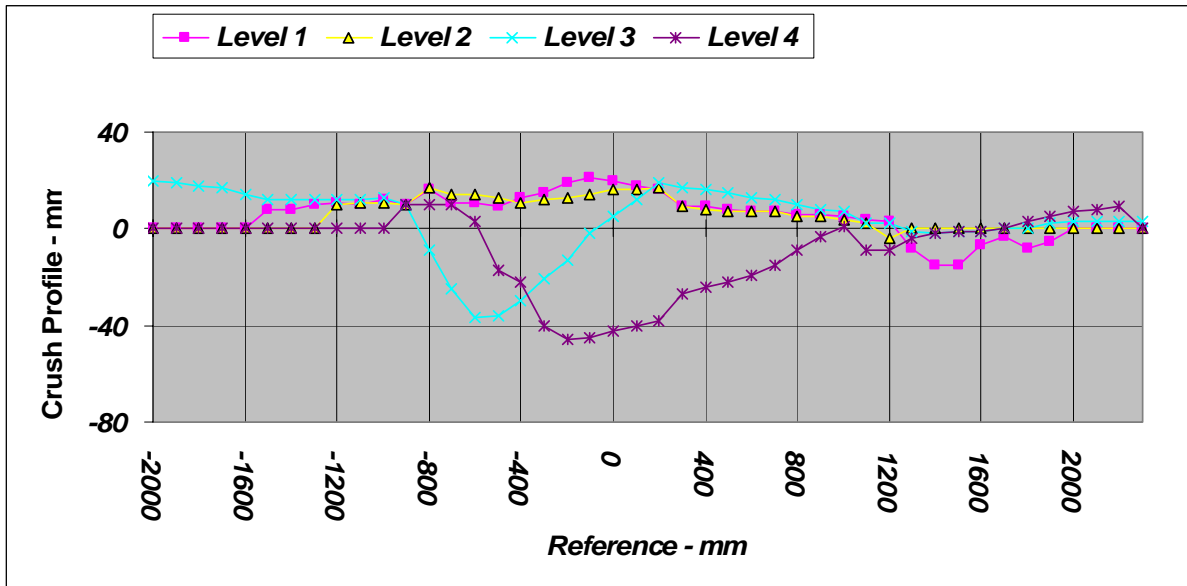
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**LEFT SIDE CRUSH**



The side vehicle crush measurements and plot reported are lateral.

**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**RIGHT SIDE CRUSH**

	Pre-Test				Post-Test				Difference			
	1	2	3	4	1	2	3	4	1	2	3	4
-2000			850				832				18	
-1900			869				852				17	
-1800			883				867				16	
-1700			894				878				16	
-1600			903				887				16	
-1500	984		911		970		894		14		17	
-1400	986		917		972		901		14		16	
-1300	985		922		971		906		14		16	
-1200	978	987	926		964	974	910		14	13	16	
-1100	970	982	930		957	970	915		13	12	15	
-1000	971	974	934		958	962	919		13	12	15	
-900	974	975	937	895	962	964	925	882	12	11	12	13
-800	978	979	942	865	970	970	924	854	8	9	18	11
-700	981	982	945	840	974	975	935	831	7	7	10	9
-600	984	985	949	811	978	979	942	802	6	6	7	9
-500	987	987	953	776	983	983	948	765	4	4	5	11
-400	989	990	956	738	987	987	953	730	2	3	3	8
-300	991	991	959	712	991	991	958	698	0	0	1	14
-200	993	993	961	700	995	994	962	683	-2	-1	-1	17
-100	994	994	964	695	997	998	967	676	-3	-4	-3	19
0	995	995	966	693	1000	1001	971	676	-5	-6	-5	17
100	996	996	968	692	1003	1003	975	679	-7	-7	-7	13
200	997	996	969	691	1006	1005	979	682	-9	-9	-10	9
300	995	994	969	690	998	996	974	683	-3	-2	-5	7
400	995	994	970	691	998	996	975	686	-3	-2	-5	5
500	995	994	971	692	997	995	976	689	-2	-1	-5	3
600	996	994	972	694	997	995	977	692	-1	-1	-5	2
700	995	994	973	695	997	995	977	695	-2	-1	-4	0
800	994	993	973	695	996	994	976	697	-2	-1	-3	-2
900	994	993	973	696	995	993	976	699	-1	0	-3	-3
1000	993	992	972	698	995	992	975	702	-2	0	-3	-4
1100	993	998	972	699	994	998	975	686	-1	0	-3	13
1200	999	1004	971	700	1000	1003	973	680	-1	1	-2	20
1300	1008		970	699	1006		968	681	2		2	18
1400	1009		970	698	1008		958	676	1		12	22
1500	1008		970	698	1008		957	671	0		13	27
1600	1005		968	697	1006		954	665	-1		14	32
1700	1002		966	696	1001		952	667	1		14	29
1800	994		964	695	992		949	668	2		15	27
1900	982		961	694	979		945	669	3		16	25
2000			959	692			941	669			18	23
2100			956	691			937	659			19	32
2200			954	688			932	658			22	30
2300			951				926				25	

**DATA SHEET NO. 7 (CONTINUED)**

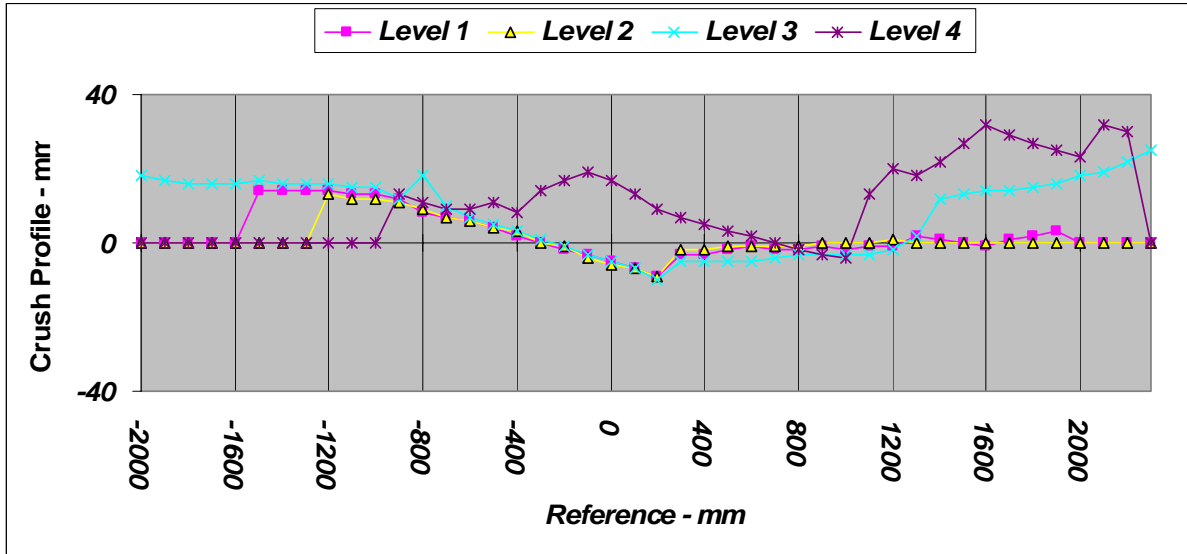
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**RIGHT SIDE CRUSH**



The side vehicle crush measurements and plot reported are lateral.

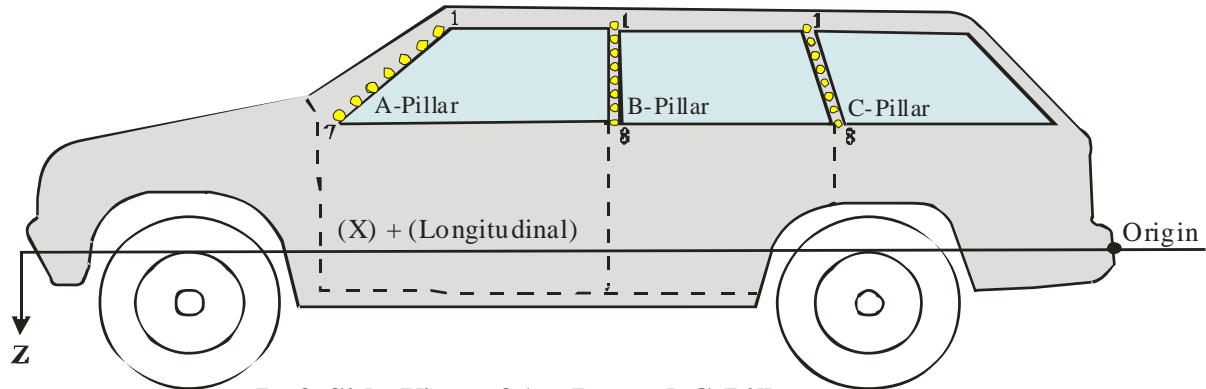
**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10



**Left Side View of A-, B-, and C-Pillars**

**Vertical measurement spacing is approximately 100 millimeters.**

**Points 1 through 7 on the A-Pillar are the same as measurements -900 through -300 on Level 1 of left and right side crush.**

**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

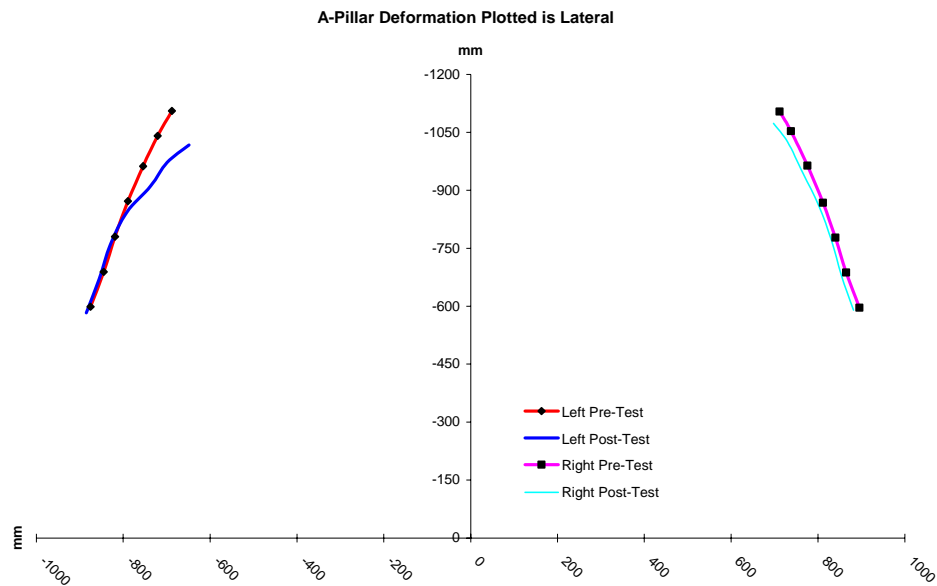
Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**A-PILLAR MEASUREMENTS**

Index	Pre-Test			Post-Test			Difference		
	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)
<b>Left A-Pillar</b>									
(1)	3627	-875	-599	3620	-885	-583	7	10	-16
(2)	3525	-845	-689	3517	-855	-671	8	10	-18
(3)	3425	-819	-780	3414	-829	-760	11	10	-20
(4)	3323	-789	-872	3307	-792	-843	16	3	-29
(5)	3220	-754	-963	3196	-737	-911	25	-17	-52
(6)	3123	-721	-1041	3091	-699	-972	32	-22	-69
(7)	3018	-688	-1105	2987	-648	-1017	31	-39	-88
(8)	3627	-875	-599	3620	-885	-583	7	10	-16
<b>Right A-Pillar</b>									
(1)	3631	895	-596	3637	882	-590	-6	13	-6
(2)	3528	865	-687	3533	854	-680	-4	11	-7
(3)	3429	840	-778	3432	831	-770	-3	9	-8
(4)	3330	811	-868	3326	802	-860	4	9	-7
(5)	3217	776	-964	3212	765	-945	5	11	-19
(6)	3104	738	-1053	3096	730	-1026	8	8	-27
(7)	3014	712	-1104	3004	698	-1073	11	14	-31
(8)	3631	895	-596	3637	882	-590	-6	13	-6



**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

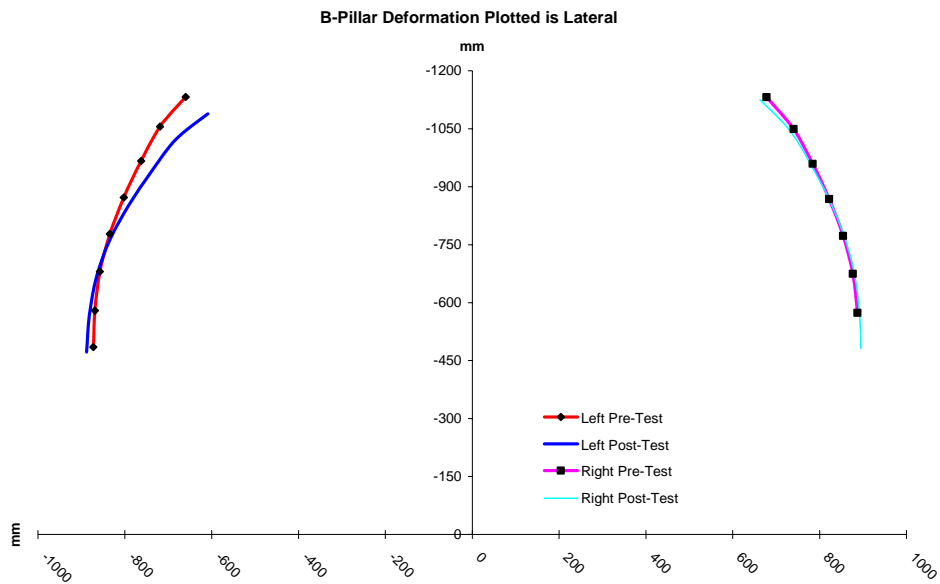
Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**B-PILLAR MEASUREMENTS**

Index	Pre-Test			Post-Test			Difference		
	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)
<b>Left B-Pillar</b>									
(1)	2471	-660	-1133	2459	-609	-1089	12	-51	-44
(2)	2475	-719	-1056	2463	-682	-1023	12	-37	-32
(3)	2484	-763	-967	2474	-737	-942	9	-25	-25
(4)	2487	-802	-872	2480	-789	-855	7	-13	-18
(5)	2490	-835	-778	2484	-834	-764	6	-1	-14
(6)	2494	-857	-681	2489	-865	-669	5	7	-12
(7)	2499	-869	-579	2496	-882	-567	4	13	-12
(8)	2502	-873	-485	2498	-888	-472	4	16	-13
<b>Right B-Pillar</b>									
(1)	2469	678	-1132	2470	663	-1125	-1	15	-7
(2)	2473	740	-1050	2475	731	-1046	-1	9	-4
(3)	2479	784	-959	2480	780	-958	-1	4	-2
(4)	2486	822	-868	2487	822	-868	-2	1	0
(5)	2492	854	-773	2494	856	-774	-2	-2	2
(6)	2497	877	-675	2499	880	-676	-2	-3	2
(7)	2502	887	-574	2504	892	-575	-2	-4	2
(8)	2504	890	-481	2506	895	-482	-2	-5	1



**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

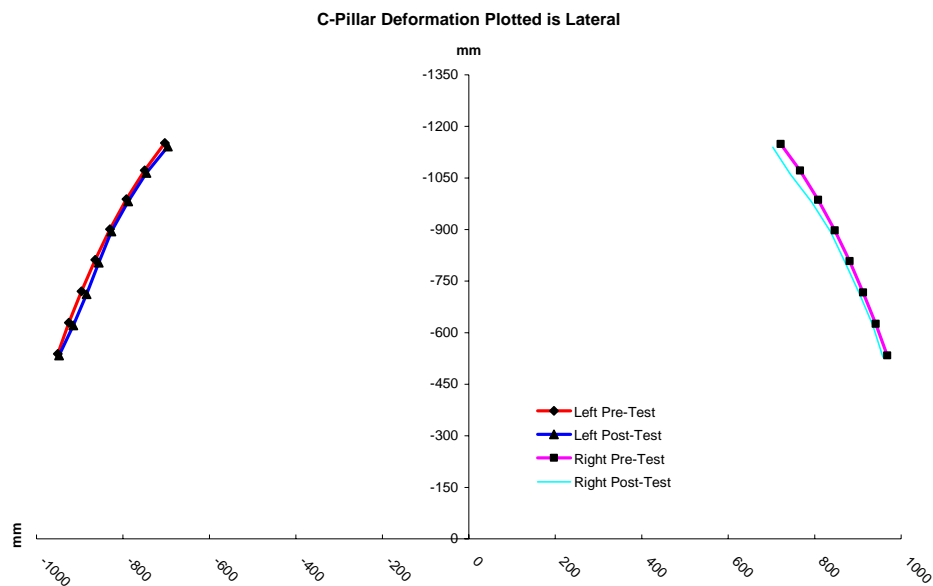
Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**C-PILLAR MEASUREMENTS**

Index	Pre-Test			Post-Test			Difference		
	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)
<b>Left C-Pillar</b>									
(1)	1562	-703	-1152	1570	-696	-1142	-8	-7	-10
(2)	1527	-750	-1072	1535	-746	-1065	-8	-4	-8
(3)	1493	-792	-989	1499	-788	-982	-6	-4	-7
(4)	1458	-830	-901	1464	-827	-895	-6	-3	-7
(5)	1425	-864	-812	1430	-856	-804	-6	-8	-8
(6)	1391	-896	-720	1397	-884	-712	-5	-12	-9
(7)	1359	-925	-629	1363	-915	-621	-4	-10	-8
(8)	1328	-951	-539	1332	-948	-534	-4	-3	-5
<b>Right C-Pillar</b>									
(1)	1568	721	-1149	1569	703	-1140	-1	18	-9
(2)	1536	766	-1072	1538	744	-1061	-2	23	-11
(3)	1502	808	-987	1503	793	-980	-1	15	-7
(4)	1469	847	-898	1470	837	-894	-1	10	-4
(5)	1438	881	-808	1438	870	-804	0	11	-4
(6)	1406	912	-717	1405	903	-714	1	9	-3
(7)	1374	941	-626	1374	934	-623	0	7	-3
(8)	1343	968	-534	1343	958	-530	1	10	-4



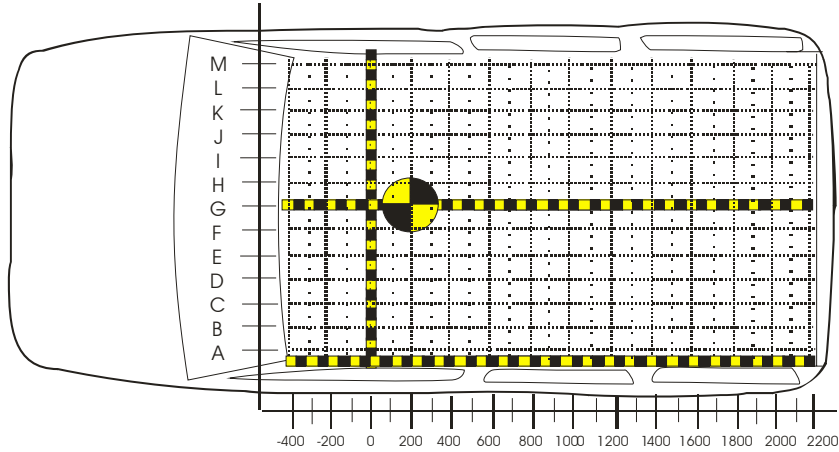
**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10



**ROOF EXTERIOR CRUSH LEFT (ROWS A – D)**

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
-400	-594	-486	-383	-284	-570	-468	-373	-277	-24	-18	-10	-7
-300	-590	-487	-386	-289	-548	-470	-374	-280	-42	-17	-12	-9
-200	-589	-488	-388	-289	-534	-452	-359	-277	-55	-36	-29	-12
-100	-591	-489	-390	-293	-527	-445	-354	-272	-64	-44	-36	-21
0	-592	-490	-390	-292	-533	-436	-351	-268	-59	-54	-39	-24
100	-594	-493	-393	-292	-540	-437	-355	-266	-54	-56	-38	-26
200	-593	-493	-392	-293	-541	-447	-355	-263	-52	-46	-37	-30
300	-595	-495	-392	-295	-543	-458	-368	-274	-52	-37	-24	-21
400	-594	-495	-395	-294	-544	-464	-379	-280	-50	-31	-16	-14
500	-595	-495	-395	-294	-557	-483	-384	-286	-38	-12	-11	-8
600	-595	-494	-395	-294	-574	-485	-388	-290	-21	-9	-7	-4
700	-594	-495	-395	-295	-577	-488	-392	-294	-17	-7	-3	-1
800	-593	-493	-393	-294	-582	-490	-393	-295	-11	-3	0	1
900	-592	-493	-394	-295	-585	-493	-395	-297	-7	0	1	2
1000	-593	-492	-395	-294	-587	-494	-396	-297	-6	2	1	3
1100	-593	-493	-393	-293	-590	-494	-395	-297	-3	1	2	4
1200	-595	-493	-394	-294	-593	-497	-398	-297	-2	4	4	3
1300	-595	-494	-394	-294	-595	-497	-399	-299	0	3	5	5
1400	-595	-496	-395	-295	-597	-500	-400	-301	2	4	5	6
1500	-598	-496	-396	-294	-600	-501	-402	-300	2	5	6	6
1600	-598	-493	-393	-294	-601	-498	-399	-300	3	5	6	6
1700	-599	-492	-393	-294	-604	-498	-399	-300	5	6	6	6
1800	-600	-495	-395	-294	-607	-502	-402	-302	7	7	7	8
1900	-599	-497	-396	-294	-606	-504	-403	-302	7	7	7	8
2000	-598	-495	-395	-294	-608	-503	-401	-302	10	8	6	8
2100	-596	-495	-397	-294	-607	-505	-404	-306	11	10	7	12
2200	-594	-496		-296	-605	-506		-305	11	10		9

**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**ROOF EXTERIOR CRUSH CENTER (ROWS E – I)**

	Pre-Test					Post-Test					Difference				
	E	F	G	H	I	E	F	G	H	I	E	F	G	H	I
-400	-185	-83	15	115	216	-176	-75	20	122	222	-9	-8	-5	-7	-6
-300	-185	-84	13	110	212	-177	-78	17	116	216	-8	-6	-4	-6	-4
-200	-187	-87	11	104	206	-181	-82	12	106	208	-6	-5	-1	-2	-2
-100	-190	-89	10	104	206	-187	-86	11	108	208	-3	-3	-1	-4	-2
0	-190	-88	10	109	209	-185	-87	9	110	209	-5	-1	1	-1	0
100	-194	-87	10	107	211	-181	-86	10	109	211	-13	-1	0	-2	0
200	-193	-91	9	109	208	-180	-87	10	111	211	-13	-4	-1	-2	-3
300	-195	-93	9	109	208	-178	-93	9	111	210	-17	0	0	-2	-2
400	-195	-92	9	107	207	-188	-89	12	108	210	-7	-3	-3	-1	-3
500	-194	-90	9	106	210	-191	-90	9	107	211	-3	0	0	-1	-1
600	-195	-90	9	106	207	-195	-91	9	106	209	0	1	0	0	-2
700	-195	-90	8	108	208	-196	-90	8	108	209	1	0	0	0	-1
800	-194	-90	8	106	209	-196	-93	8	107	210	2	3	0	-1	-1
900	-195	-88	9	108	210	-196	-90	6	106	209	1	2	3	2	1
1000	-195	-90	8	105	208	-196	-91	7	104	207	1	1	1	1	1
1100	-191	-91	8	107	206	-195	-93	6	106	205	4	2	2	1	1
1200	-194	-89	6	107	210	-197	-93	5	107	209	3	4	1	0	1
1300	-195	-90	8	108	211	-199	-93	4	107	209	4	3	4	1	2
1400	-195	-94	8	108	210	-200	-98	3	105	207	5	4	5	3	3
1500	-197	-93	8	108	208	-201	-96	3	104	205	4	3	5	4	3
1600	-193	-90	7	107	208	-200	-95	2	104	205	7	5	5	3	3
1700	-192	-89	7	106	208	-199	-96	1	102	204	7	7	6	4	4
1800	-193	-89	7	107	207	-201	-97	-0	102	202	8	8	7	5	5
1900	-196	-94	7	106	207	-203	-100	-1	100	201	7	6	8	6	6
2000	-195	-93	6	106	206	-204	-101	-1	99	201	9	8	7	7	5
2100	-195	-96	6	103	205	-204	-103	-2	96	198	9	7	8	7	7
2200	-198	-97	4	103	201	-206	-106	-5	96	194	8	9	9	7	7

**DATA SHEET NO. 7 (CONTINUED)**

**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**ROOF EXTERIOR CRUSH RIGHT (ROWS J – M)**

	Pre-Test				Post-Test				Difference			
	J	K	L	M	J	K	L	M	J	K	L	M
-400	312	412	509	613	319	419	516	620	-7	-7	-7	-7
-300	312	411	512	613	316	415	513	612	-4	-4	-1	1
-200	310	407	508	617	310	404	505	603	0	3	3	14
-100	312	408	507	615	311	406	504	584	1	2	3	31
0	312	409	511	611	312	409	505	587	0	0	6	24
100	312	411	510	611	313	411	509	594	-1	0	1	17
200	310	408	509	611	312	409	505	595	-2	-1	4	16
300	309	408	508	612	311	410	507	597	-2	-2	1	15
400	312	407	508	611	313	409	507	599	-1	-2	1	12
500	311	407	508	612	313	409	508	603	-2	-2	0	9
600	312	407	507	611	312	409	507	606	0	-2	0	5
700	311	408	509	611	312	410	509	607	-1	-2	0	4
800	312	408	508	612	313	409	508	608	-1	-1	0	4
900	311	409	509	612	311	406	506	607	0	3	3	5
1000	311	408	508	615	310	406	505	608	1	2	3	7
1100	312	406	507	615	310	405	505	610	2	1	2	5
1200	312	410	511	616	309	408	508	610	3	2	3	6
1300	312	410	511	615	310	408	508	609	2	2	3	6
1400	310	408	509	614	308	407	506	607	2	1	3	7
1500	311	408	509	613	307	405	505	605	4	3	4	8
1600	311	407	507	612	307	404	502	603	4	3	5	9
1700	311	409	508	611	307	404	504	601	4	5	4	10
1800	310	407	507	610	305	402	502	600	5	5	5	10
1900	310	406	507	611	305	401	501	601	5	5	6	10
2000	310	407	507	609	304	401	500	600	6	6	7	9
2100	307	406	504	608	299	399	498	598	8	7	6	10
2200	312		503	608	303		495	597	9		8	11

---<sup>1</sup> Tailgate hinge location, measurement could not be acquired

**DATA SHEET NO. 7 (CONTINUED)**

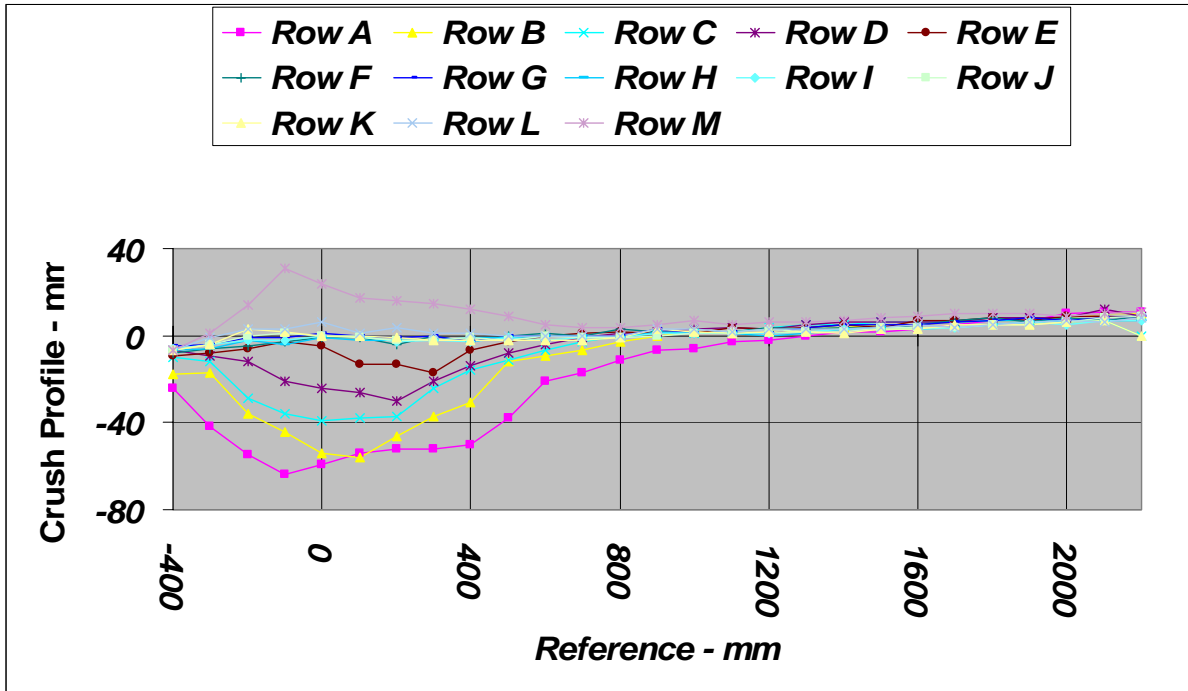
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

**ROOF CRUSH**



The roof crush measurements and plot reported are vertical.

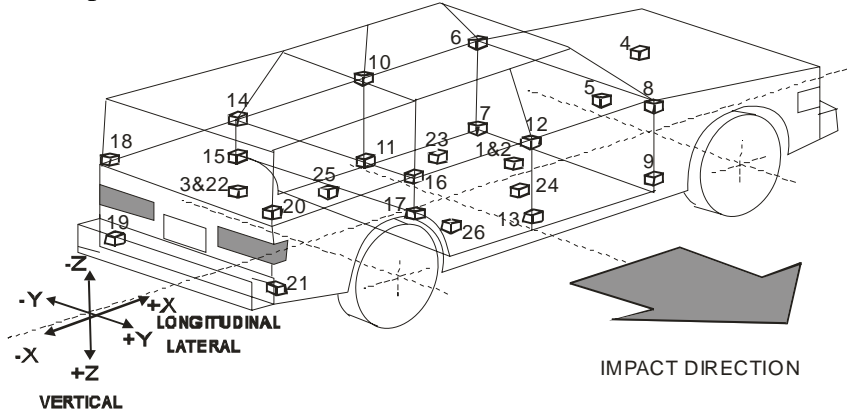
## DATA SHEET NO. 8

### VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Vehicle Center of Gravity	2590	3	-
2	Vehicle Center of Gravity ROLL	2590	-50	-
3	Rear Deck (cargo area) ROLL	380	0	-
4	Top of Engine	4387	-160	-
5	Bottom of Engine	4047	-90	-
6	Left A-Pillar Upper	3080	620	-
7	Left A-Pillar Lower	3581	820	-
8	Right A-Pillar Upper	3080	-620	-
9	Right A-Pillar Lower	3581	-820	-
10	Left B-Pillar Upper	2470	657	-
11	Left B-Pillar Lower	2500	835	-
12	Right B-Pillar Upper	2468	-657	-
13	Right B-Pillar Lower	2500	-835	-
14	Left C-Pillar Upper	1660	672	-
15	Left C-Pillar Lower	1785	800	-
16	Right C-Pillar Upper	1670	-672	-
17	Right C-Pillar Lower	1790	-800	-
18	Left D-Pillar Upper	525	610	-
19	Left D-Pillar Lower	340	735	-
20	Right D-Pillar Upper	508	-610	-
21	Right D-Pillar Lower	320	-735	-
22	Vehicle Rear Deck	415	0	-
23	LF Seat Position (on floor)	2830	420	-
24	RF Seat Position (on floor)	2830	-420	-
25	LR Seat Position (on floor)	1870	440	-
26	RR Seat Position (on floor)	1900	-440	-

**DATA SHEET NO. 8 (CONTINUED)**

**VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
(1) Vehicle Center of Gravity Acceleration	X	g	3.6	1373.9	-4.5	1902.3
	Y	g	11.7	1373.8	-16.5	1889.4
	Z	g	7.8	1899.5	-14.4	1875.4
	R	g	16.5	1889.4		
(2) Vehicle Center of Gravity Gyro <sup>1</sup>	X	°/s	1497.3	6038.2	-1531.9	1883.8
	Y	°/s	1041.4	1885.2	-1035.6	1886.8
	Z	°/s	1229.7	110.0	-1251.7	105.7
(3) Rear Deck Gyro (cargo area) <sup>1</sup>	X	°/s	654.1	2335.3	-993.0	2309.0
	Y	°/s	1087.6	3785.8	-1198.9	2327.0
	Z	°/s	1548.2	2327.0	-1594.7	3736.6
(4) Top of Engine	X	g	5.5	1386.5	-2.1	1910.8
	Y	g	12.0	1375.0	-16.3	1892.9
	Z	g	8.9	849.5	-10.5	1876.1
	R	g	18.5	1877.4		
(5) Bottom of Engine	X	g	3.6	1875.6	-2.3	1428.3
	Y	g	20.7	1370.7	-11.5	1873.0
	Z	g	7.2	1034.1	-9.1	1878.2
	R	g	21.3	1370.7		
(6) Left A-Pillar Upper	X	g	5.3	1048.8	-17.1	102.9
	Y	g	22.0	997.5	-55.2	104.6
	Z	g	14.9	105.6	-5.3	1400.1
	R	g	58.3	104.6		
(7) Left A-Pillar Lower	X	g	2.1	2306.8	-2.3	1877.1
	Y	g	13.2	1375.6	-17.4	1890.1
	Z	g	13.3	1006.2	-9.0	1893.6
	R	g	18.4	1890.2		
(8) Right A-Pillar Upper <sup>1</sup>	X	g	17.3	1697.9	-18.6	104.2
	Y	g	64.2	1711.3	-21.4	1994.2
	Z	g	27.4	1698.0	-9.9	2451.8
	R	g	66.2	1711.3		
(9) Right A-Pillar Lower	X	g	3.9	1380.2	-3.0	1887.0
	Y	g	10.6	1374.0	-21.0	1891.2
	Z	g	6.4	2451.3	-7.8	1875.6
	R	g	21.0	1891.3		

<sup>1</sup> See Test Notes.

**DATA SHEET NO. 8 (CONTINUED)**

**VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
(10) Left B-Pillar Upper	X	g	3.7	1013.0	-18.7	1008.0
	Y	g	37.5	103.4	-13.2	1912.1
	Z	g	17.5	998.6	-5.1	118.7
	R	g	37.6	103.4		
(11) Left B-Pillar Lower	X	g	2.2	2306.2	-3.3	1877.3
	Y	g	13.7	1374.2	-17.2	1891.0
	Z	g	10.9	1391.0	-10.3	1890.5
	R	g	20.2	1890.7		
(12) Right B-Pillar Upper	X	g	14.8	1888.9	-18.0	957.4
	Y	g	15.2	1433.8	-23.7	1123.3
	Z	g	33.3	1433.4	-24.4	1400.1
	R	g	36.6	1433.4		
(13) Right B-Pillar Lower	X	g	2.4	1380.2	-4.4	1887.1
	Y	g	11.3	1373.9	-18.2	1889.9
	Z	g	11.7	109.7	-9.9	1871.4
	R	g	18.5	1889.8		
(14) Left C-Pillar Upper	X	g	2.8	1007.7	-4.6	998.7
	Y	g	16.9	108.9	-17.2	105.3
	Z	g	14.0	1015.7	-3.9	1428.5
	R	g	18.4	105.3		
(15) Left C-Pillar Lower	X	g	3.1	1899.8	-3.2	1387.0
	Y	g	14.2	1372.1	-12.2	1893.3
	Z	g	10.1	1390.2	-8.5	1892.5
	R	g	14.9	1892.6		
(16) Right C-Pillar Upper	X	g	16.7	109.5	-4.1	1049.6
	Y	g	11.1	1394.6	-12.4	1907.2
	Z	g	7.2	878.9	-7.1	1919.0
	R	g	18.9	109.4		
(17) Right C-Pillar Lower	X	g	4.6	1385.4	-2.0	2306.0
	Y	g	13.6	1373.2	-13.9	1890.8
	Z	g	6.2	1426.3	-9.7	1373.3
	R	g	17.1	1373.2		
(18) Left D-Pillar Upper	X	g	3.3	2360.9	-10.6	839.4
	Y	g	16.5	838.4	-11.3	1894.7
	Z	g	9.1	2342.9	-5.2	1894.1
	R	g	19.3	838.6		

**DATA SHEET NO. 8 (CONTINUED)**

**VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
(19) Left D-Pillar Lower	X	g	42.2	2342.5	-4.2	1892.0
	Y	g	14.7	1384.8	-11.3	1895.8
	Z	g	8.3	1391.7	-10.8	1893.6
	R	g	43.0	2342.5		
(20) Right D-Pillar Upper	X	g	5.7	1385.4	-9.7	2313.4
	Y	g	11.1	1383.7	-59.2	2320.1
	Z	g	321.3	2313.0	-353.7	1392.1
	R	g	353.9	1392.0		
(21) Right D-Pillar Lower	X	g	9.7	3247.1	-14.7	3236.6
	Y	g	16.5	3236.6	-24.1	2393.7
	Z	g	24.1	2393.3	-36.6	2356.8
	R	g	43.0	2356.7		
(22) Vehicle Rear Deck	X	g	1.8	1375.4	-31.4	2345.1
	Y	g	15.2	1375.4	-13.4	1895.9
	Z	g	10.4	2337.3	-7.7	1882.6
	R	g	31.8	2345.1		
(23) LF Seat Position (on floor)	X	g	1.7	2305.8	-2.4	1889.6
	Y	g	12.6	1373.1	-15.1	1889.5
	Z	g	9.0	1017.9	-8.3	1879.6
	R	g	15.3	1889.7		
(24) RF Seat Position (on floor)	X	g	3.7	1373.2	-3.9	1888.5
	Y	g	11.1	1373.4	-14.8	1889.8
	Z	g	9.4	1899.0	-12.9	1869.6
	R	g	15.2	1889.2		
(25) LR Seat Position (on floor)	X	g	3.3	1899.4	-4.8	1387.0
	Y	g	14.8	1373.0	-13.8	1889.5
	Z	g	16.2	1385.8	-9.8	1879.0
	R	g	19.0	1385.9		
(26) RR Seat Position (on floor)	X	g	8.9	1383.2	-0.2	109.8
	Y	g	19.0	1369.8	-14.0	1889.4
	Z	g	7.2	1433.4	-13.1	1383.0
	R	g	19.1	1369.8		

Reference: X: + Forward from rear bumper

Y: + Rightward from vehicle centerline

Z: + Downward from ground level

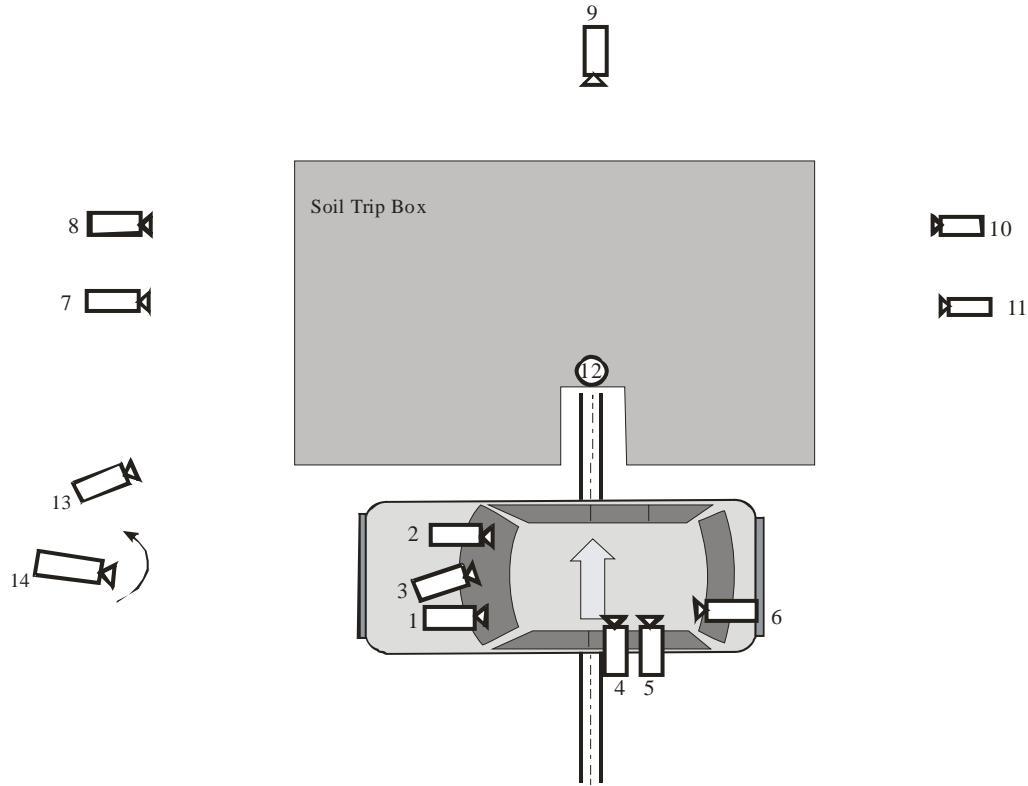
For acceleration data sign convention see Report Sign Convention in Appendix D.

**DATA SHEET NO. 9**  
**HIGH-SPEED CAMERA DATA**

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10



No.	Camera View	Camera Type	Lens (mm)	Speed (fps)	Trigger Delay (ms)
1	Driver Overall - Onboard	VRTC - 1	5.5	500	0
2	Passenger Overall - Onboard	VRTC - 2	6.5	500	0
3	Driver Pelvis Area - Onboard	VRTC - 3	8	500	0
4	Rear Passenger Waste Up	Redlake - LE	6	500	0
5	Rear Passenger Overall	Redlake - LE	4.8	500	0
6	Rear Passenger Head	Redlake - LE	6	500	0
7	Vehicle Left Side Launch	Visario G2	10	500	0
8	Vehicle Left Side Later in Event	Redlake - LE	12.5	500	0
9	Downstream Wide	Visario G2	10	500	0
10	Vehicle Right Side Later in Event	Visario G1	16	500	0
11	Vehicle Right Side Launch	Visario G1	25	500	0
12	Overhead wide	Visario G1	12.5	500	0
13	Upstream Oblique Wide	Visario G1	12.5	500	0
14	Real-time Panning	Canon	zoom	24	

# DATA SHEET NO. 10

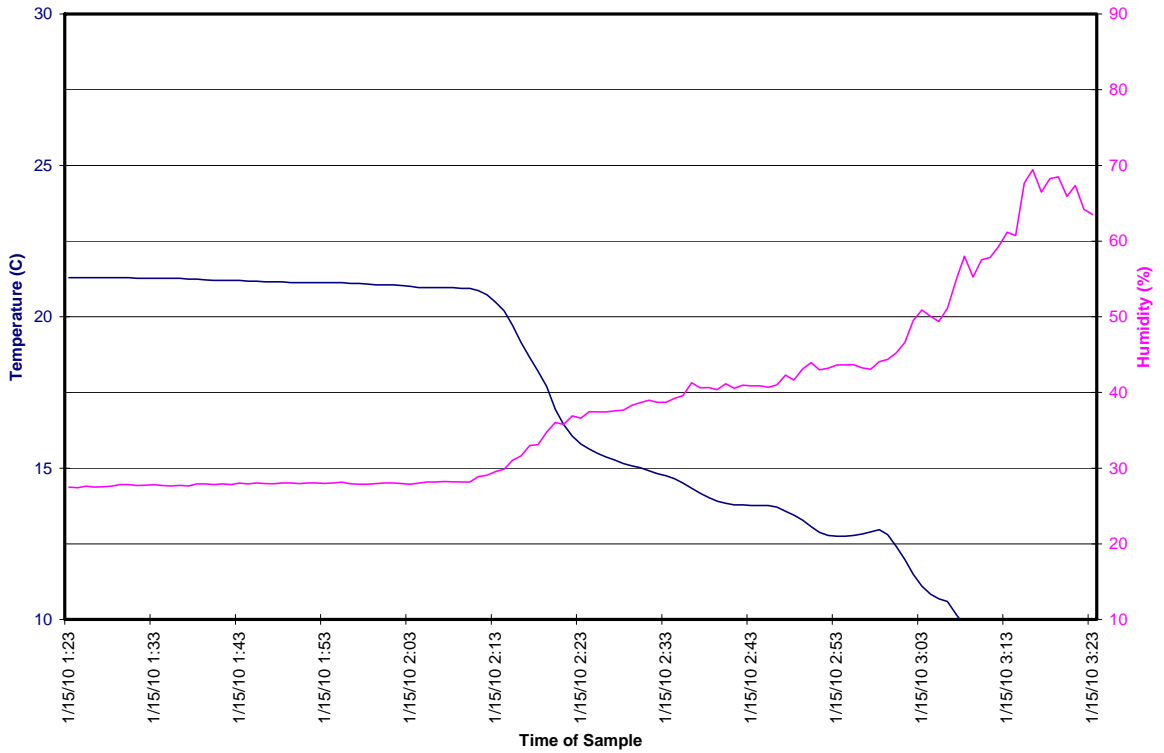
## DUMMY / VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Improved Restraints in Rollovers

Test Date: 01/15/10

2007 Ford Expedition Soil Trip Rollover 100115; Test Time 15:23



**APPENDIX A**  
**PHOTOGRAPHS**

## LIST OF PHOTOGRAPHS

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A-6	Post-Test Left Side View	A-7
A-7	Pre-Test Left Rear View	A-8
A-8	Post-Test Left Rear View	A-8
A-9	Pre-Test Rear View	A-9
A-10	Post-Test Rear View	A-9
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**Figure A-1 Pre-Test Front View**



**Figure A-2 Post-Test Front View**



**Figure A-3 Pre-Test Left Front View**



**Figure A-4 Post-Test Left Front View**



**Figure A-5 Pre-Test Left Side View**



**Figure A-6 Post-Test Left Side View**



**Figure A-7 Pre-Test Left Rear View**



**Figure A-8 Post-Test Left Rear View**



**Figure A-9 Pre-Test Rear View**



**Figure A-10 Post-Test Rear View**



**Figure A-11 Pre-Test Right Rear View**



**Figure A-12 Post-Test Right Rear View**



**Figure A-13 Pre-Test Right Side View**



**Figure A-14 Post-Test Right Side View**



**Figure A-15 Pre-Test Right Front View**



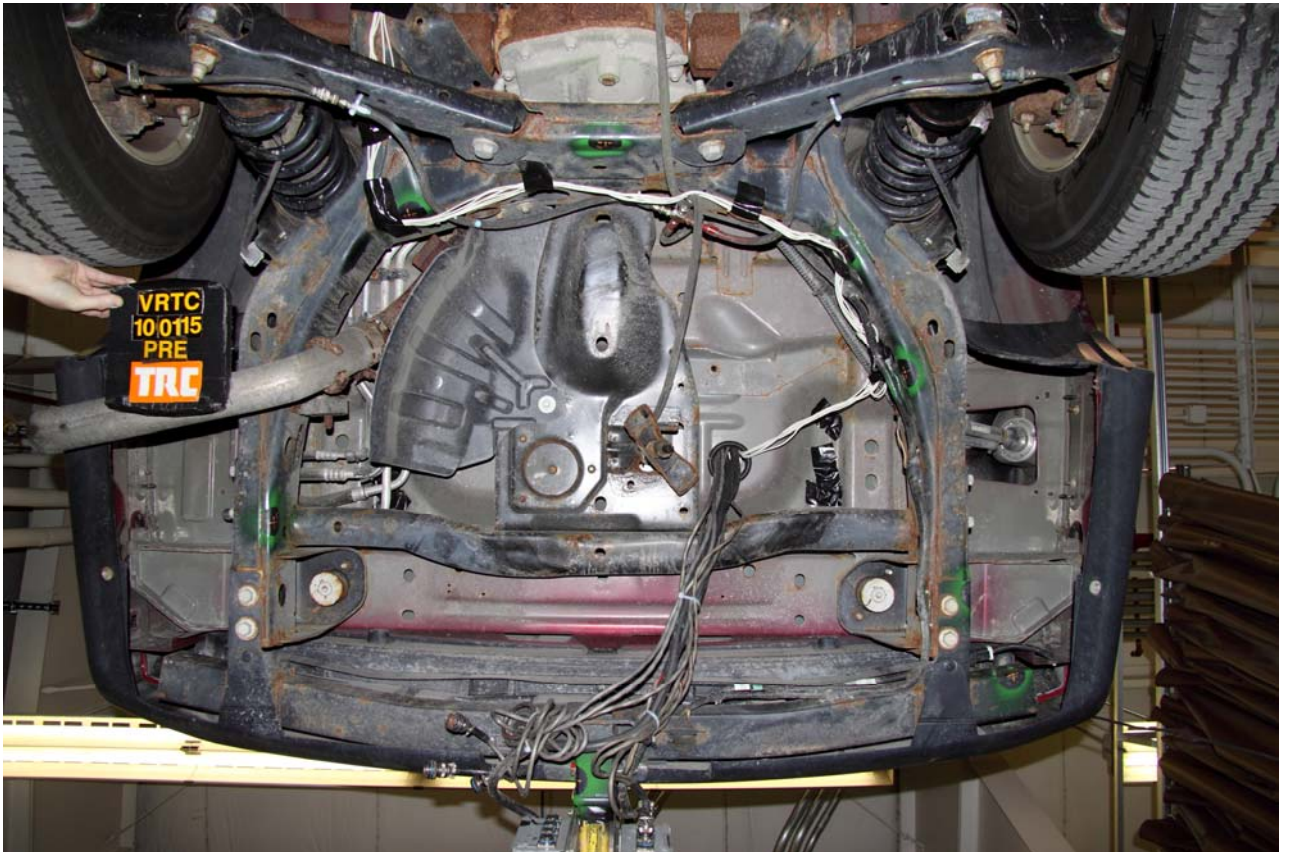
**Figure A-16 Post-Test Right Front View**



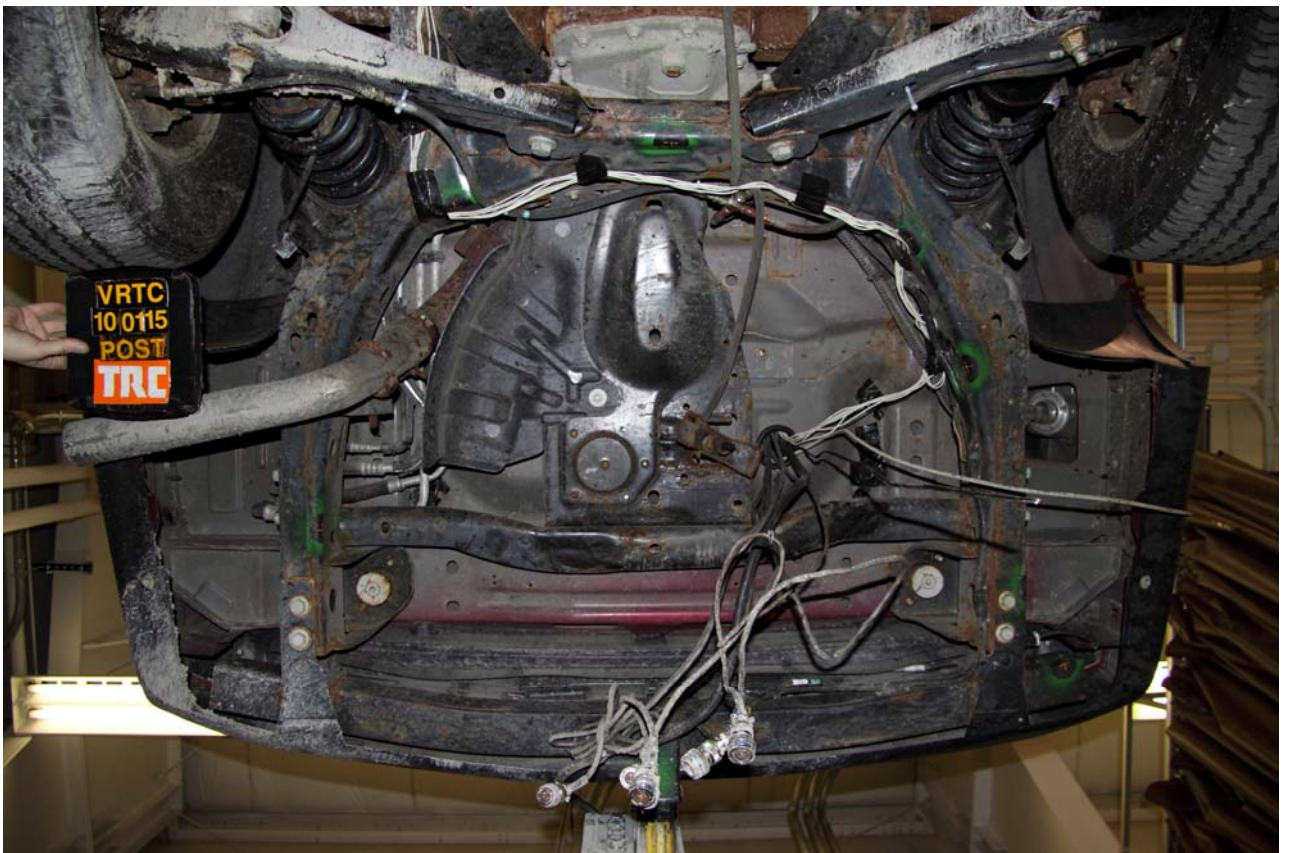
**Figure A-17 Pre-Test Front Underbody View**



**Figure A-18 Post-Test Front Underbody View**



**Figure A-19 Pre-Test Rear Underbody View**



**Figure A-20 Post-Test Rear Underbody View**



**Figure A-21 Pre-Test Windshield View**



**Figure A-22 Post-Test Windshield View**



**Figure A-23 Pre-Test Windshield View – Driver Dummy**



**Figure A-24 Post-Test Windshield View – Driver Dummy**



**Figure A-25 Pre-Test Driver Dummy - View 1**



**Figure A-26 Post-Test Driver Dummy - View 1**



**Figure A-27 Pre-Test Driver Dummy - View 2**



**Figure A-28 Post-Test Driver Dummy - View 2**



**Figure A-29 Pre-Test Driver Dummy - View 3**



**Figure A-30 Post-Test Driver Dummy - View 3**



**Figure A-31 Pre-Test Driver Dummy - View 4**



**Figure A-32 Post-Test Driver Dummy - View 4**



**Figure A-33 Pre-Test Windshield View – Right Front Passenger**



**Figure A-34 Post-Test Windshield View – Right Front Passenger**



Figure A-35 Pre-Test Right Front Passenger Dummy - View 1



Figure A-36 Post-Test Right Front Passenger Dummy - View 1



**Figure A-37 Pre-Test Right Front Passenger Dummy - View 2**



**Figure A-38 Post-Test Right Front Passenger Dummy - View 2**



**Figure A-39 Pre-Test Right Front Passenger Dummy - View 3**



**Figure A-40 Post-Test Right Front Passenger Dummy - View 3**



**Figure A-41 Pre-Test Right Front Passenger Dummy - View 4**



**Figure A-42 Post-Test Right Front Passenger Dummy - View 4**



**Figure A-43 Pre-Test Left Rear Passenger Dummy - View 1**



**Figure A-44 Post-Test Left Rear Passenger Dummy - View 1**



**Figure A-45 Pre-Test Left Rear Passenger Dummy - View 2**



**Figure A-46 Post-Test Left Rear Passenger Dummy - View 2**



**Figure A-47 Pre-Test Left Rear Passenger Dummy - View 3**



**Figure A-48 Post-Test Left Rear Passenger Dummy - View 3**



**Figure A-49 Pre-Test Left Rear Passenger Dummy - View 4**



**Figure A-50 Post-Test Left Rear Passenger Dummy - View 4**

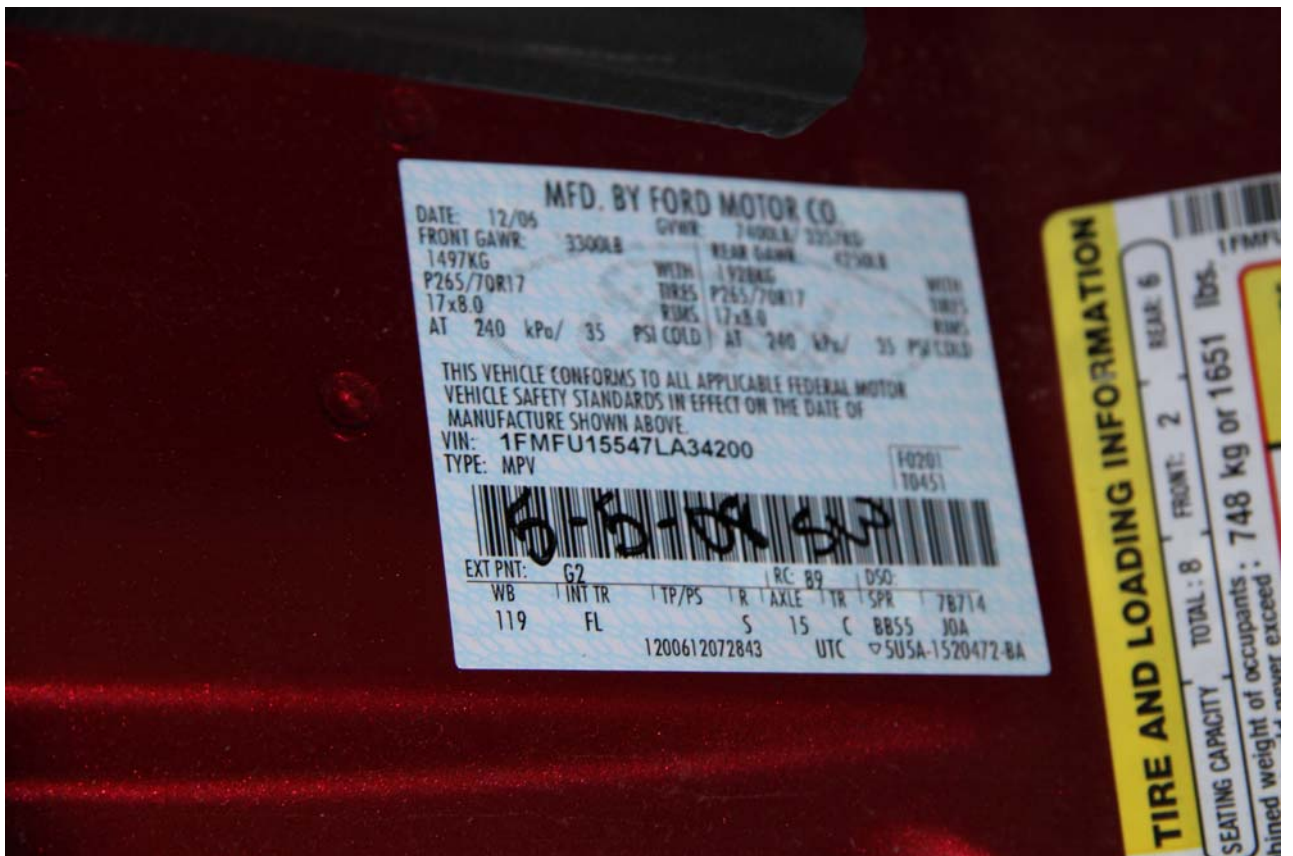


Figure A-51 Vehicle Certification Label View



Figure A-52 Vehicle Tire Pressure Label View



**Figure A-53 Post-Test Driver Dummy Overall**



**Figure A-54 Post-Test Driver Dummy Contact - View 1**



**Figure A-55 Post-Test Right Front Passenger Dummy Overall**



**Figure A-56 Post-Test Right Front Passenger Dummy Contact - View 1**



**Figure A-57 Post-Test Left Rear Passenger Dummy Overall**



**Figure A-58 Post-Test Left Rear Passenger Dummy Contact View**



**Figure A-59 Pre-Test Test Area - View 1**



**Figure A-60 Post-Test Test Area - View 1**



**Figure A-61 Pre-Test Test Area - View 2**



**Figure A-62 Post-Test Test Area - View 2**



**Figure A-63 Pre-Test Test Area - View 3**



**Figure A-64 Post-Test Test Area - View 3**



**Figure A-65 Post-Test Vehicle Resting Position – Front**



**Figure A-66 Post-Test Vehicle Resting Position – Left Side**



**Figure A-67 Post-Test Vehicle Resting Position - Rear**



**Figure A-68 Post-Test Vehicle Resting Position – Right Side**

**APPENDIX B**  
**DATA PLOTS**



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Head X-Axis Acceleration

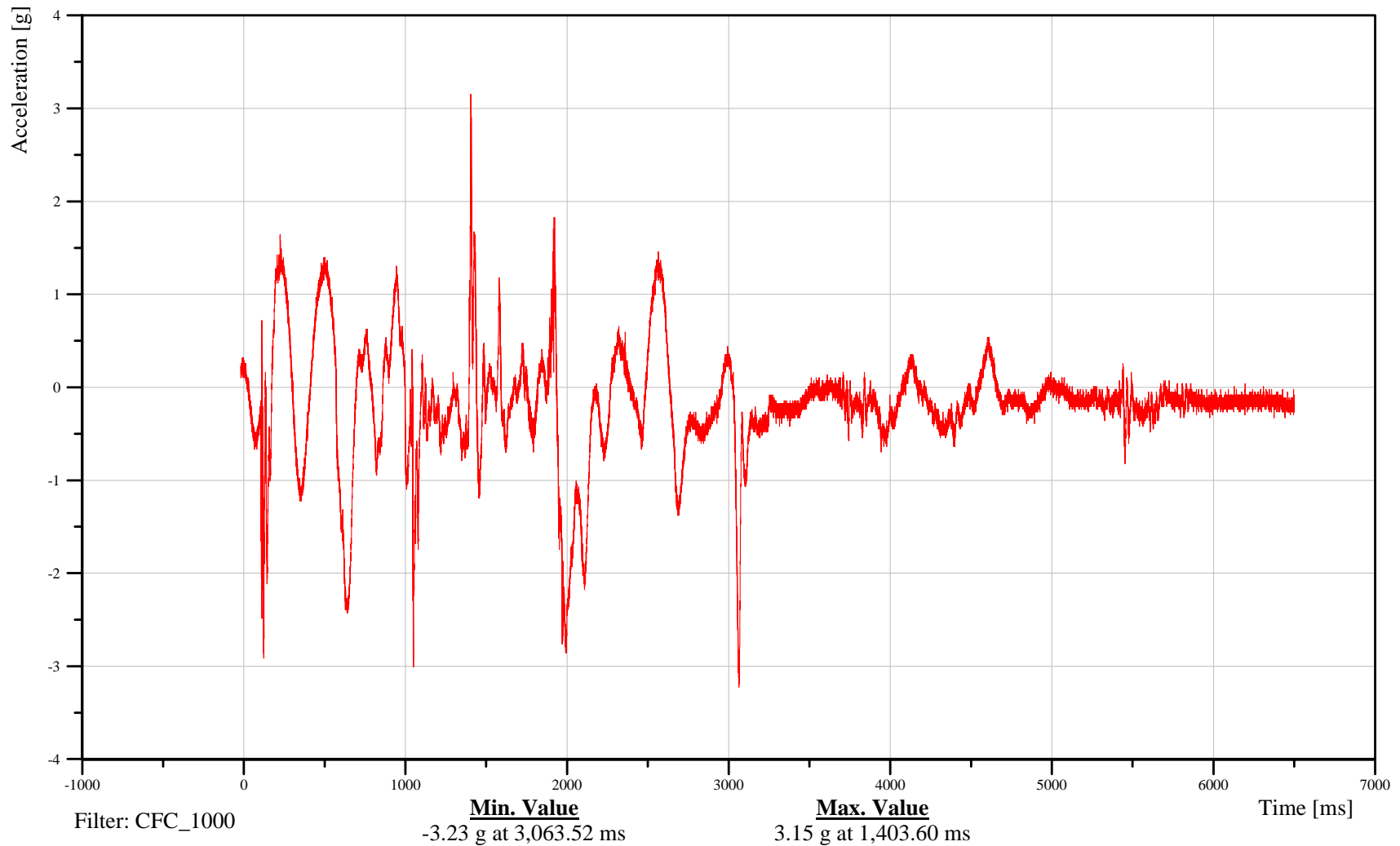
Time: 16:26

Customer: VRTC

### 11HEADCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-2

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Head Y-Axis Acceleration

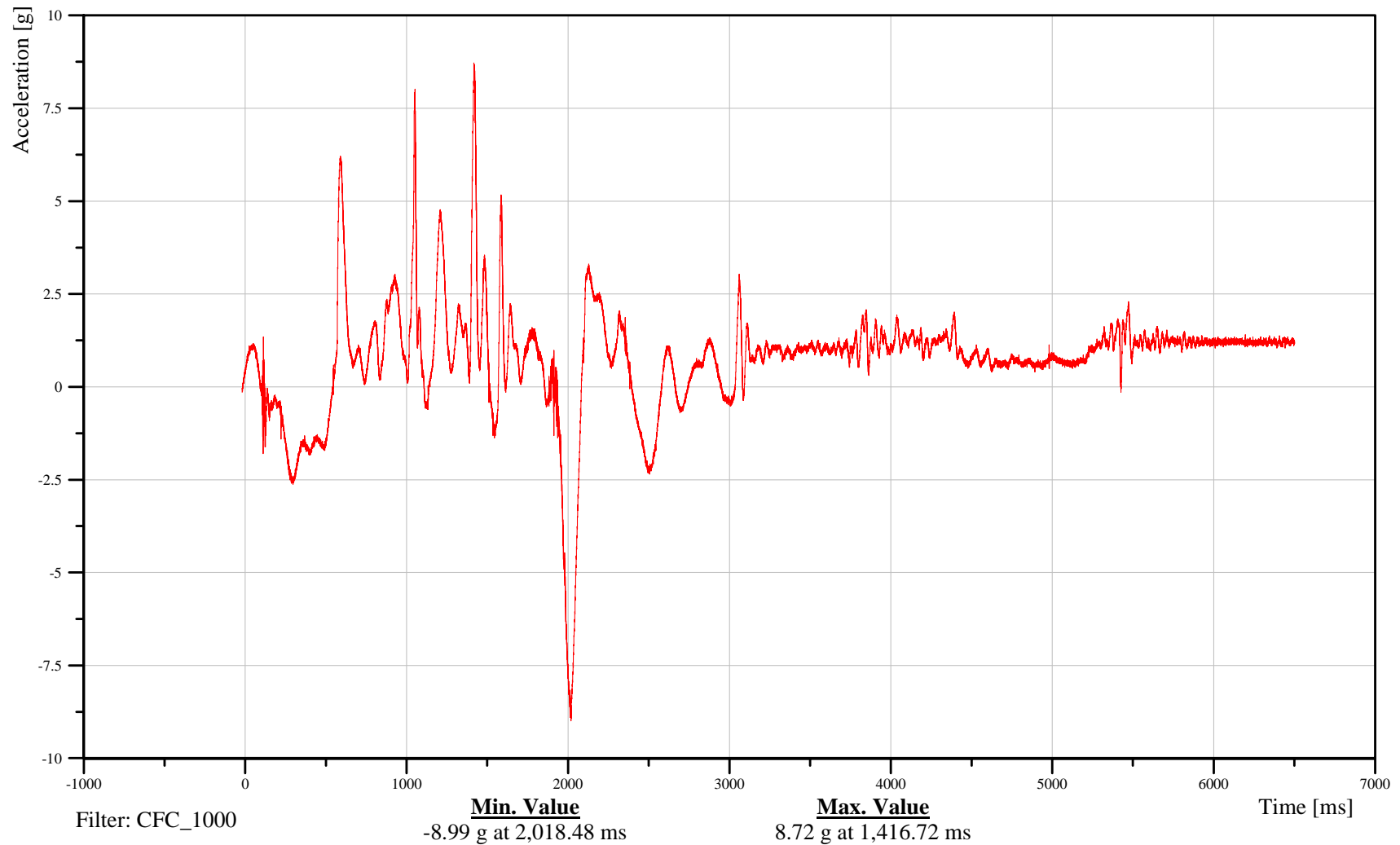
Time: 16:26

Customer: VRTC

# 11HEADCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-3

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Head Z-Axis Acceleration

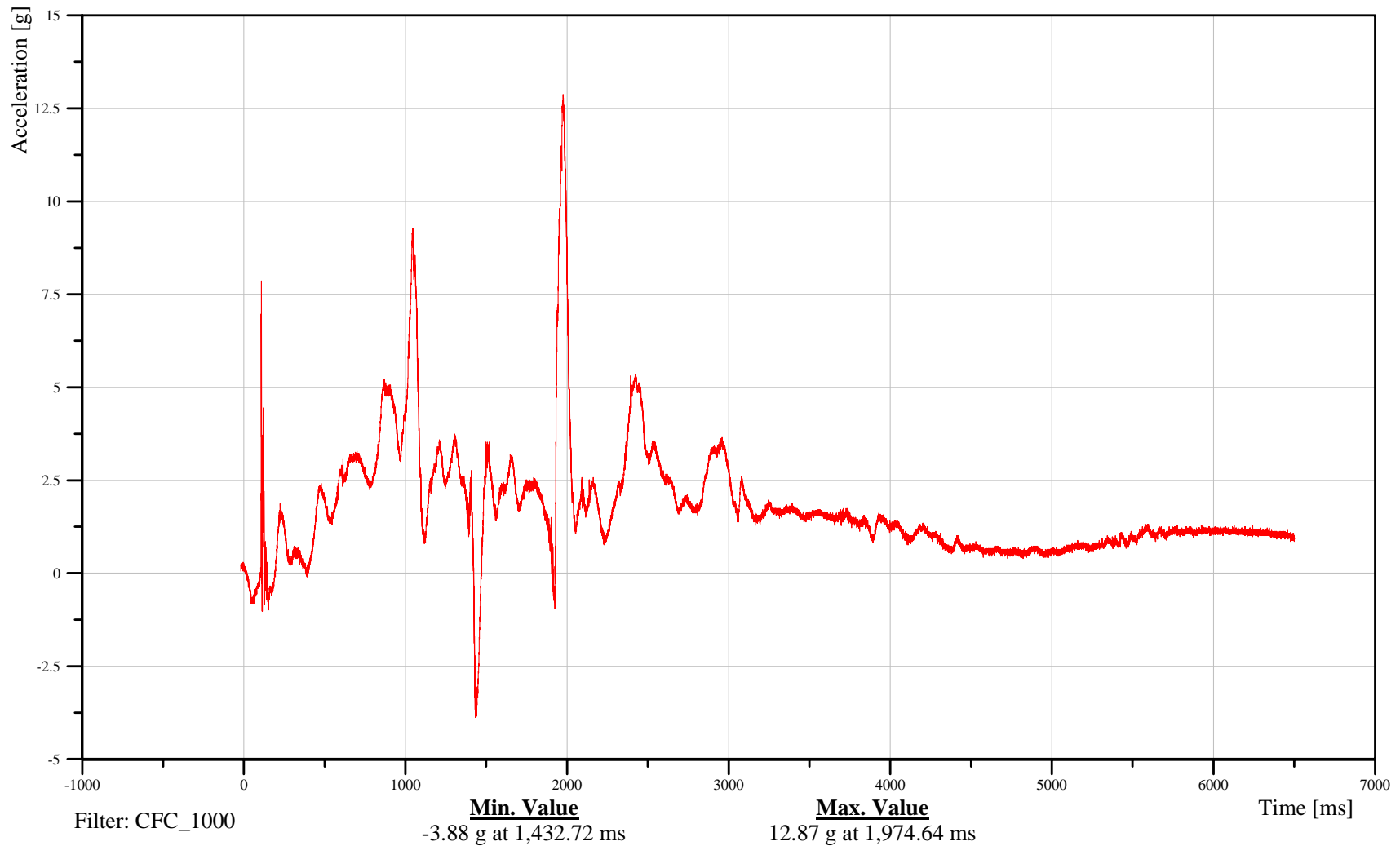
Time: 16:26

Customer: VRTC

### 11HEADCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-4

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Head Resultant Acceleration

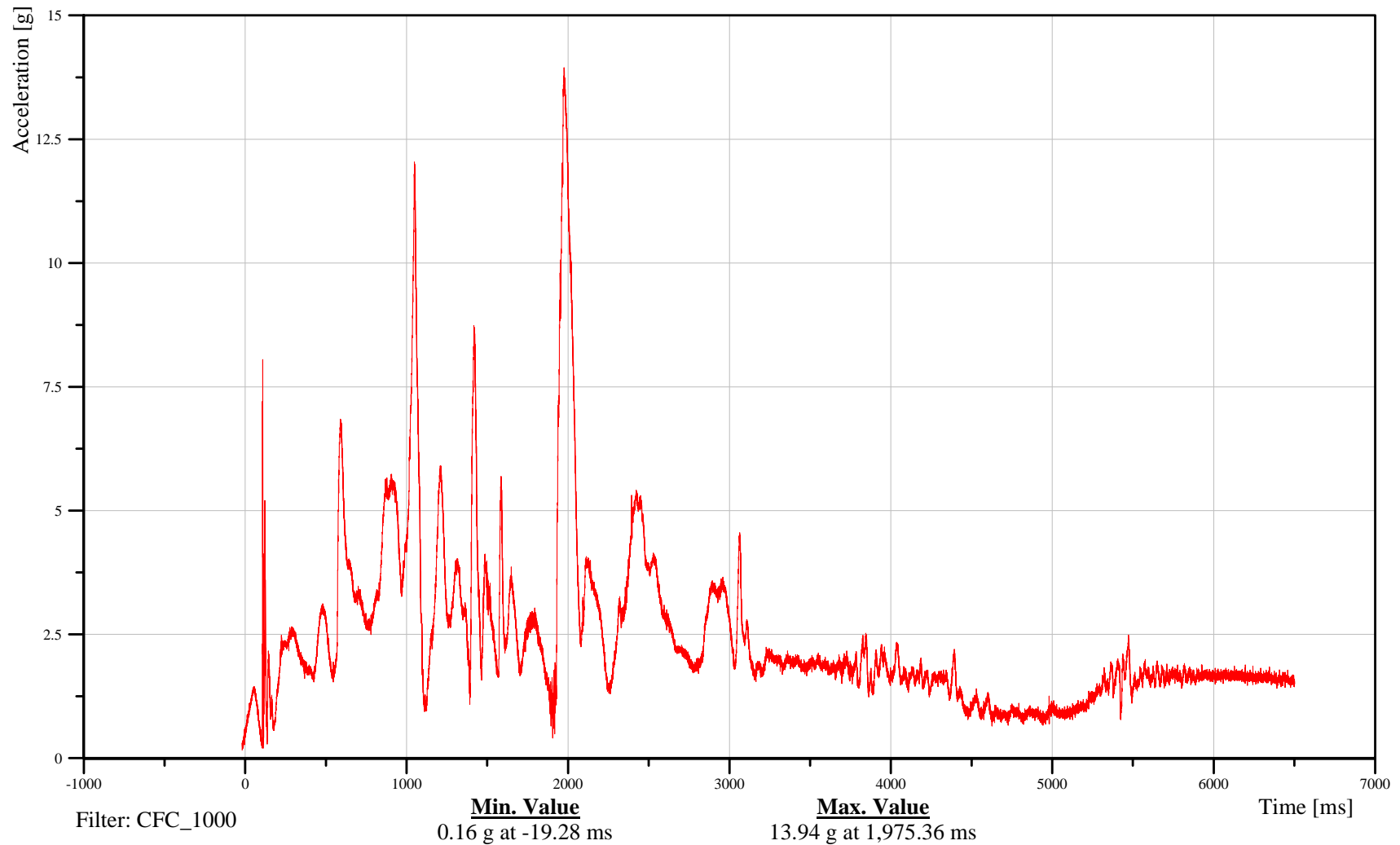
Time: 16:26

Customer: VRTC

### 11HEADCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-5

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Driver Head (DTS ARS) Rate Gyro X

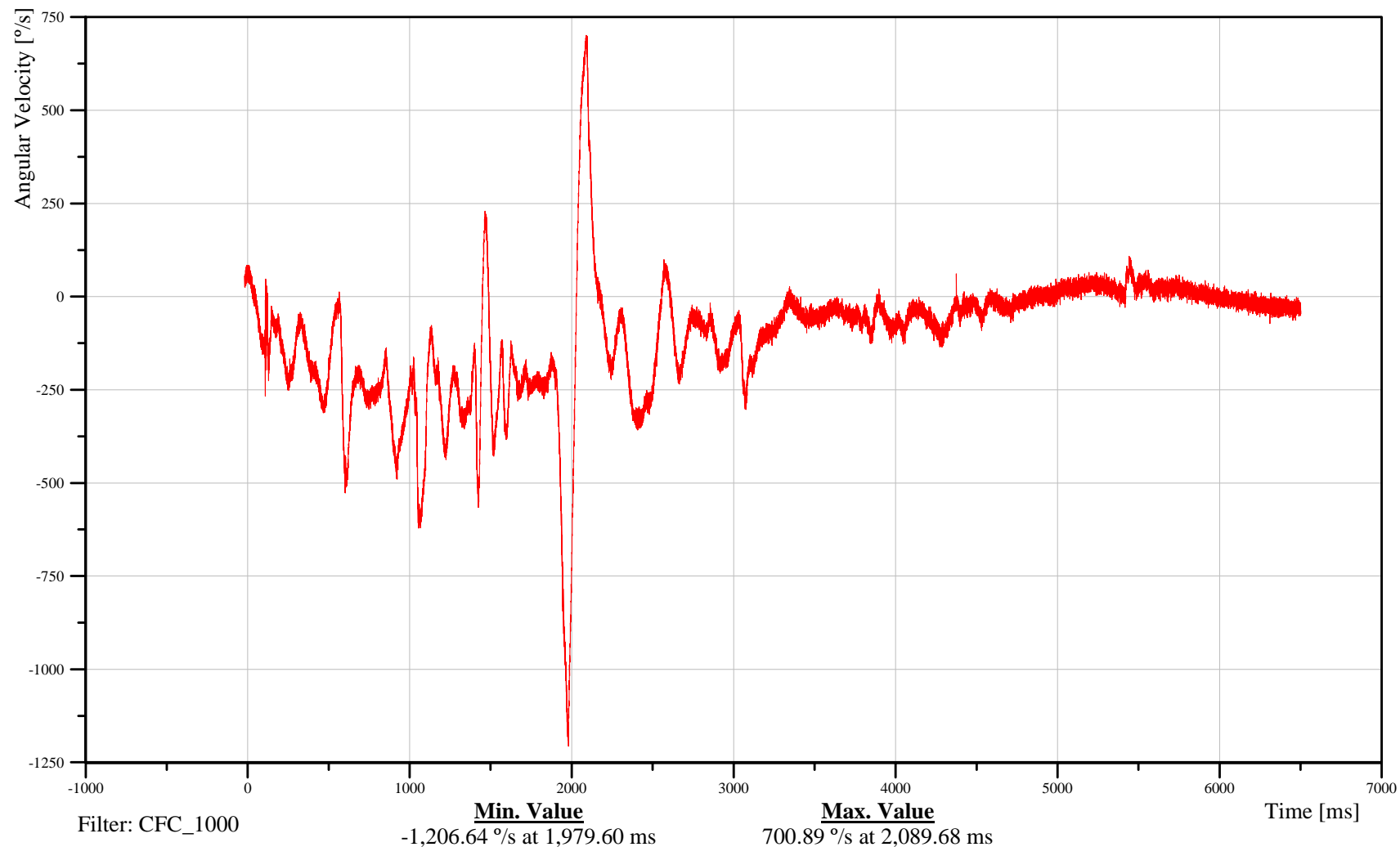
Time: 16:26

Customer: VRTC

## 11HEADCG00H3AVXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-6

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Driver Head (DTS ARS) Rate Gyro Y

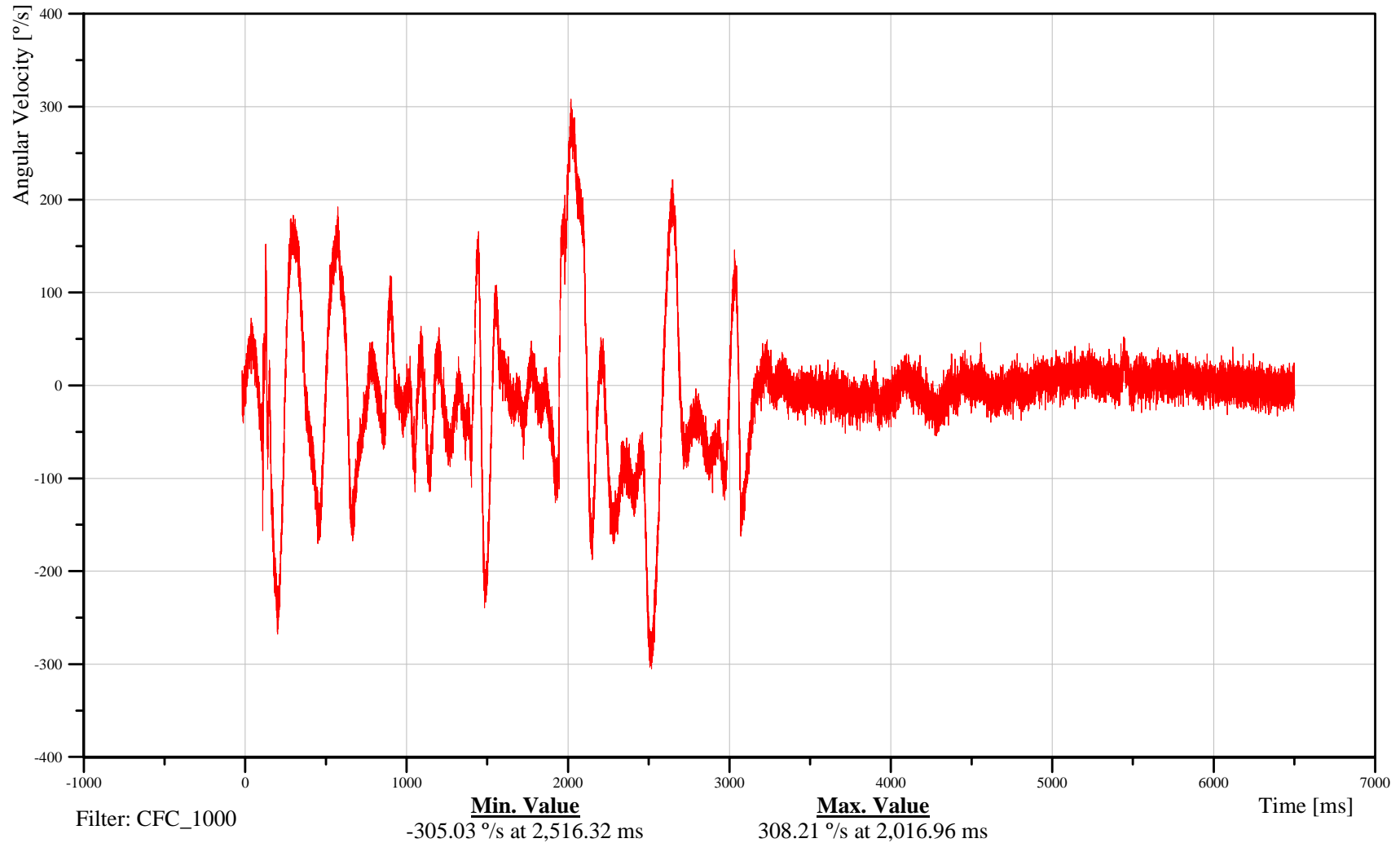
Time: 16:26

Customer: VRTC

## 11HEADCG00H3AVYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-7

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Driver Head (DTS ARS) Rate Gyro Z

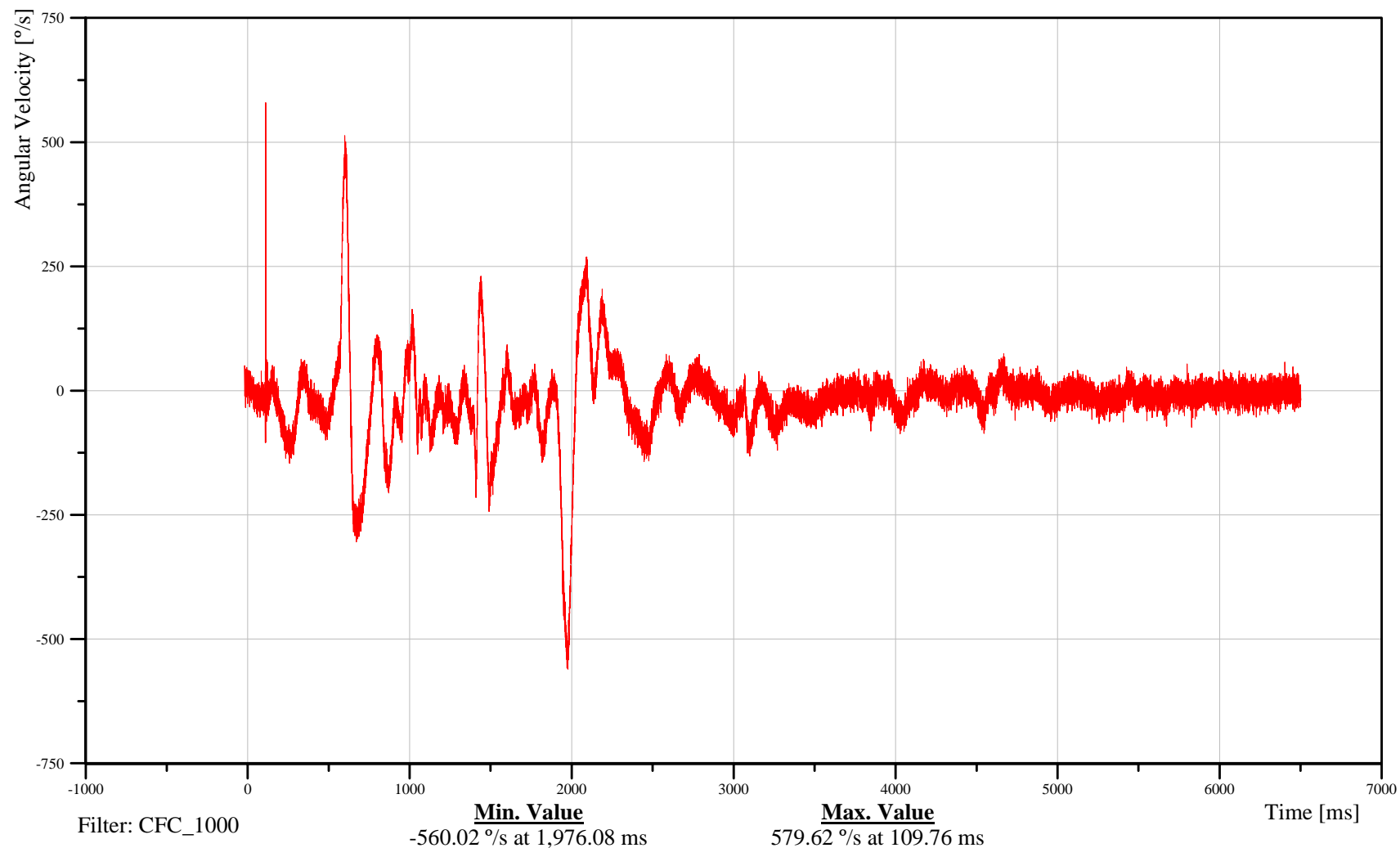
Time: 16:26

Customer: VRTC

## 11HEADCG00H3AVZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-8

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

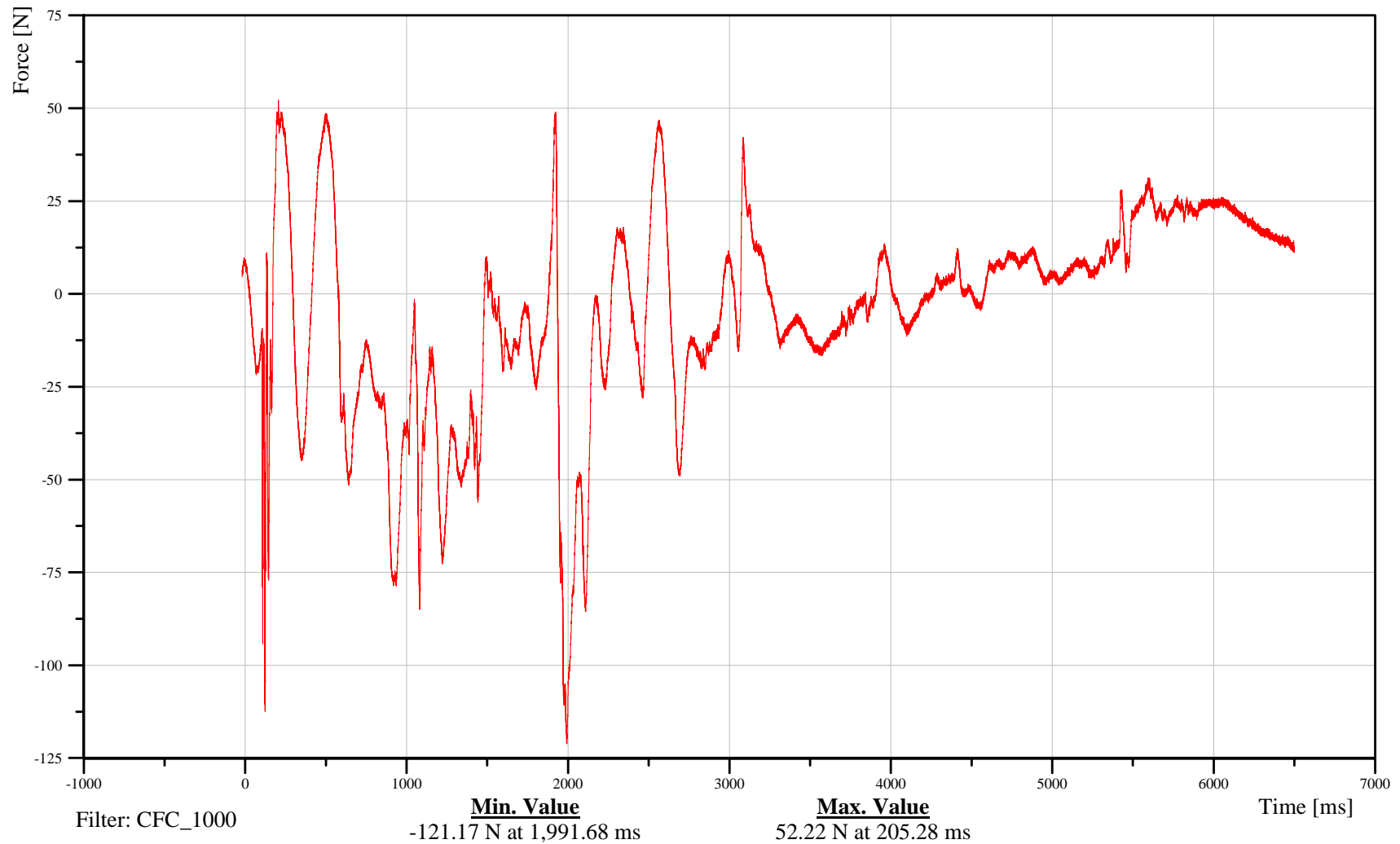
## Driver Upper Neck X-Axis Force

Customer: VRTC

# 11NECKUP00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-9

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

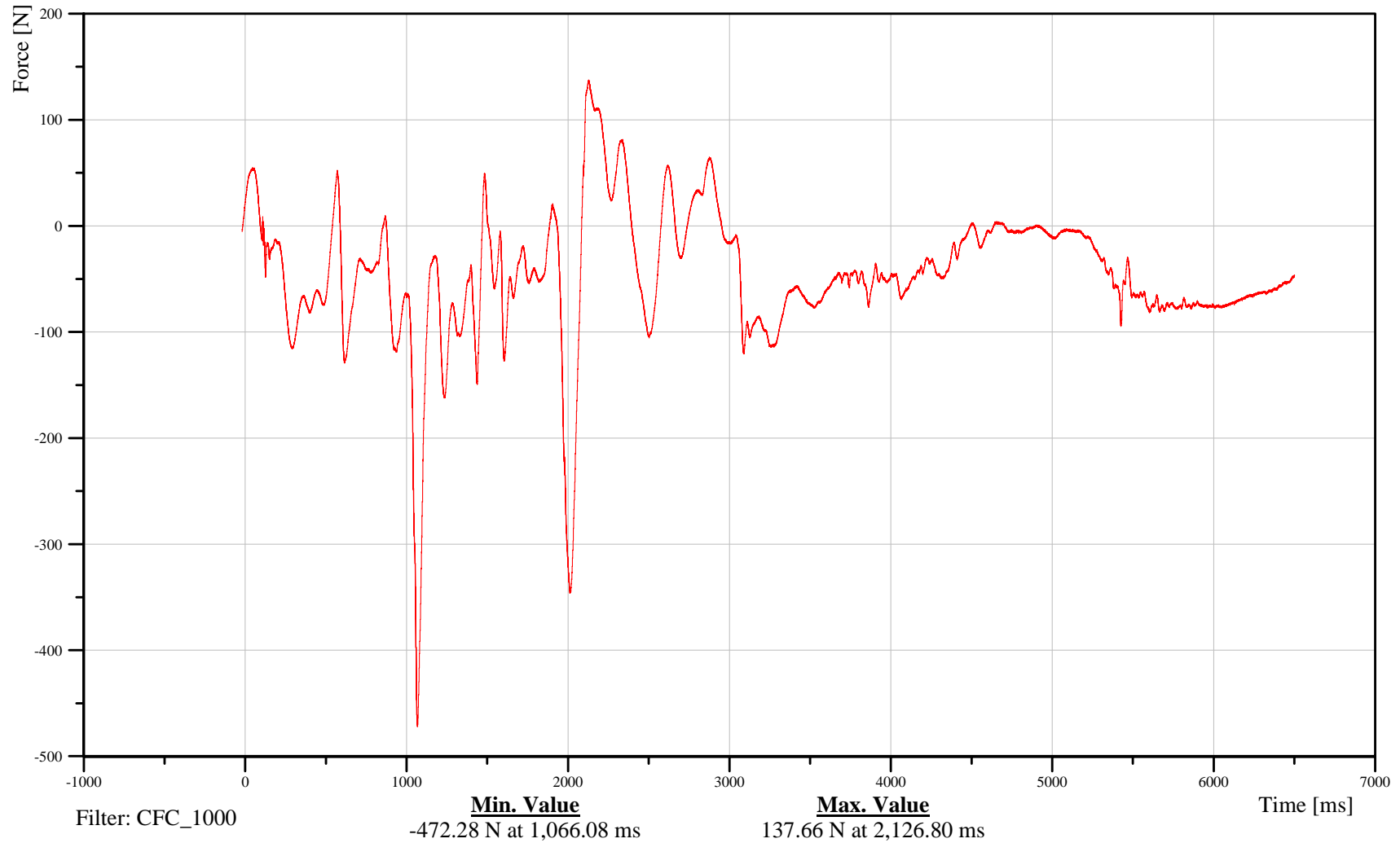
## Driver Upper Neck Y-Axis Force

Customer: VRTC

# 11NECKUP00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-10

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

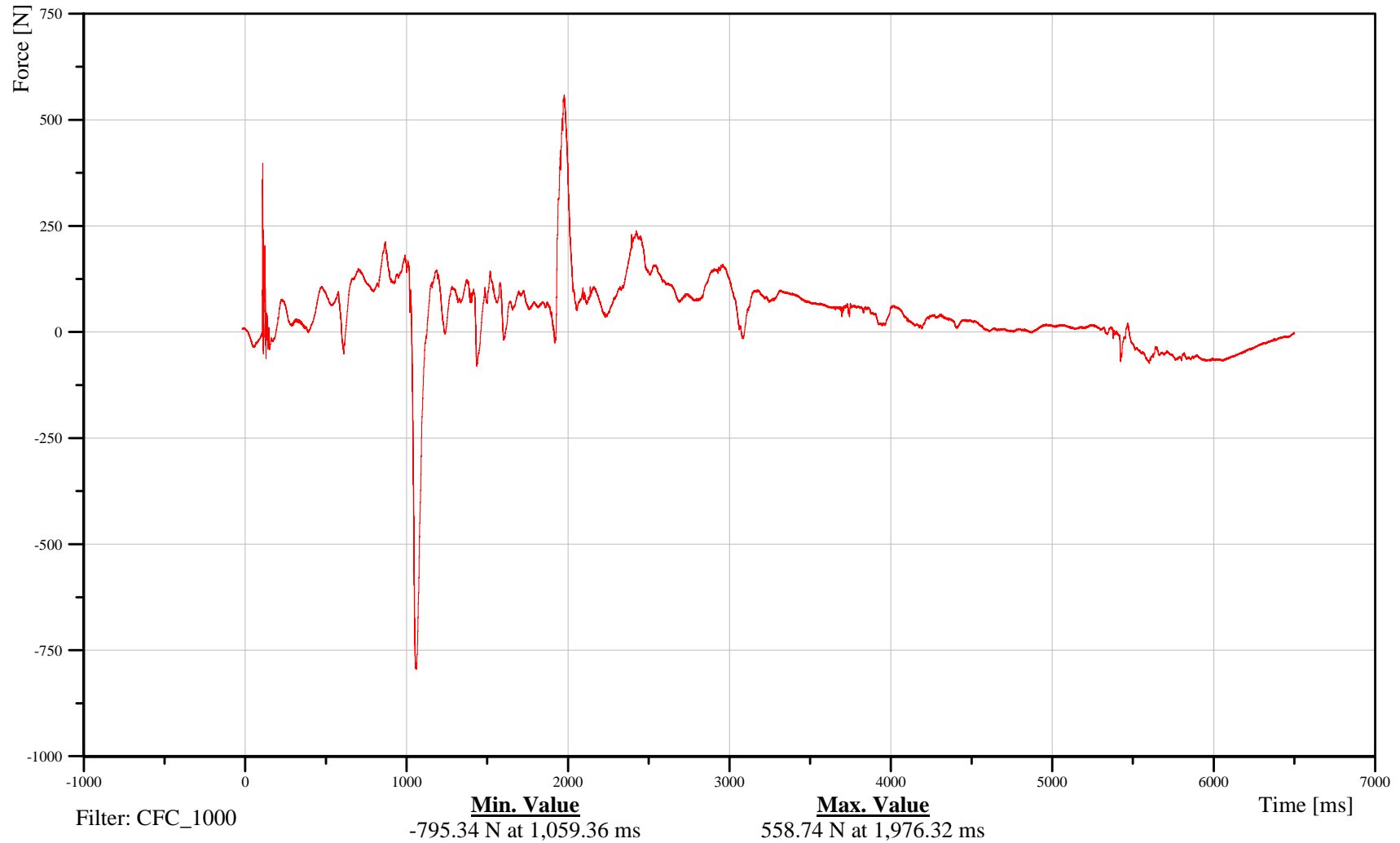
## Driver Upper Neck Z-Axis Force

Customer: VRTC

# 11NECKUP00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-11

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Upper Neck Moment About X Axis

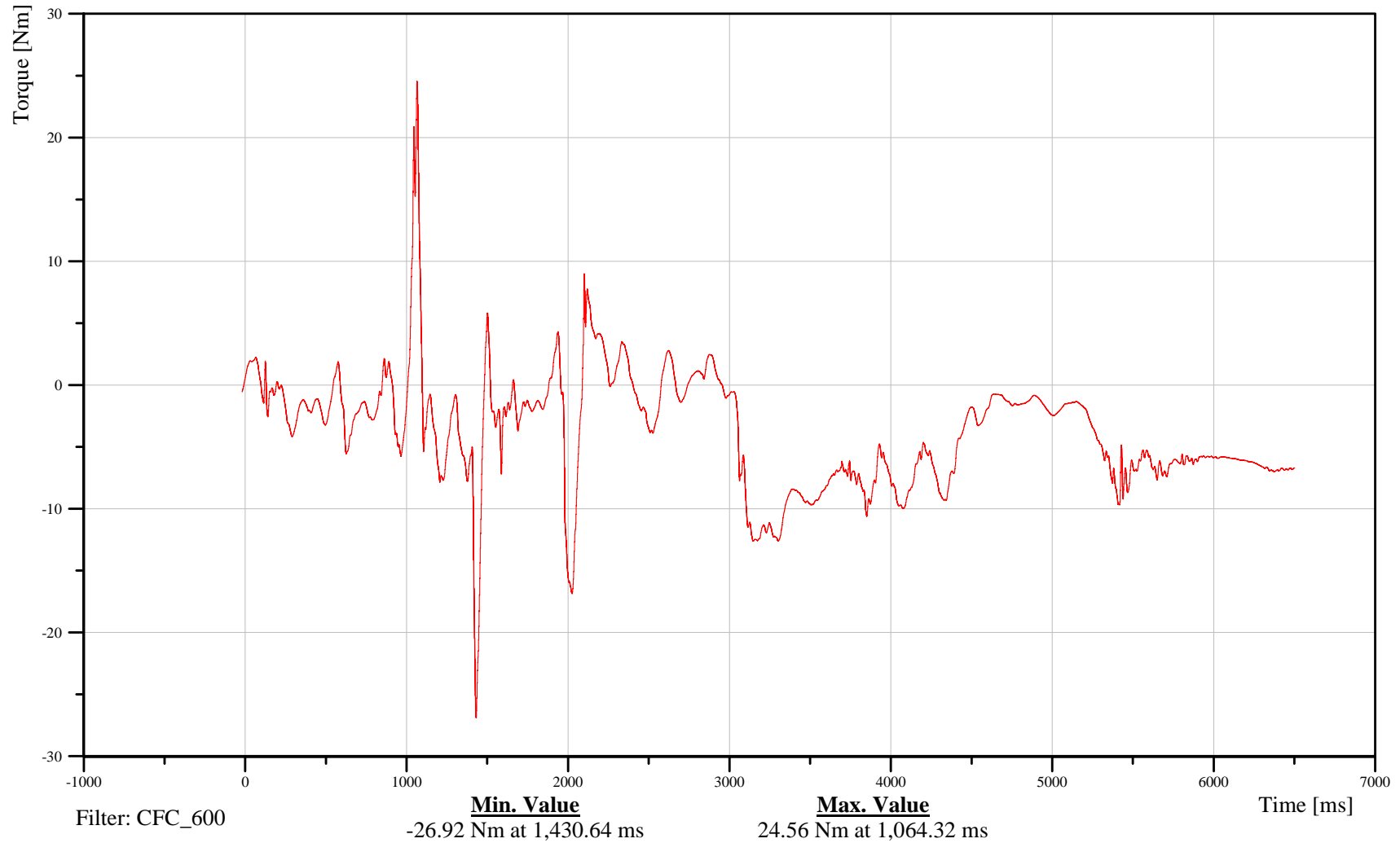
Time: 16:26

Customer: VRTC

### 11NECKUP00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-12

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Upper Neck Moment About Y Axis

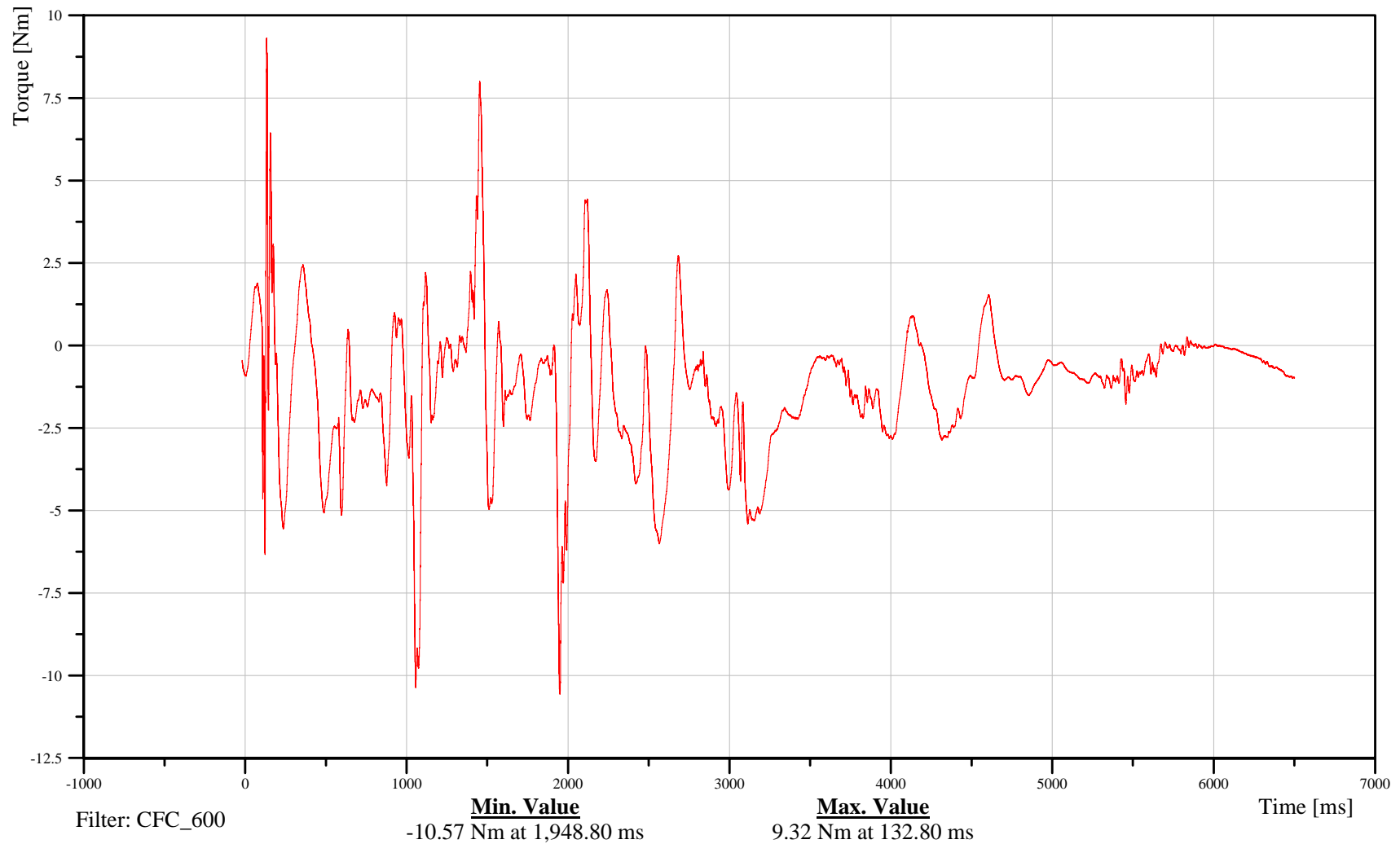
Time: 16:26

Customer: VRTC

### 11NECKUP00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-13

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Upper Neck Moment About Z Axis

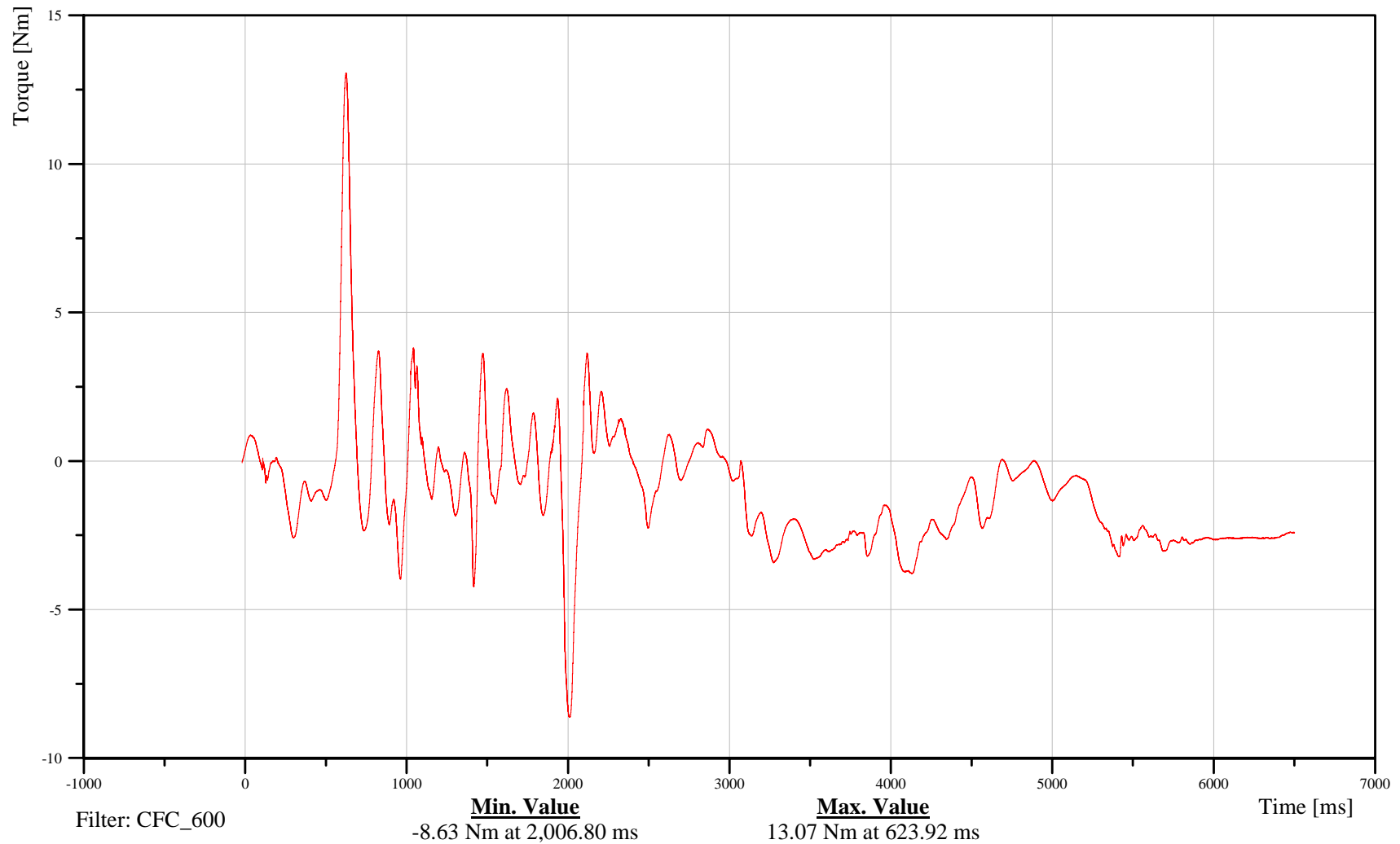
Time: 16:26

Customer: VRTC

### 11NECKUP00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-14

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Chest X-Axis Acceleration

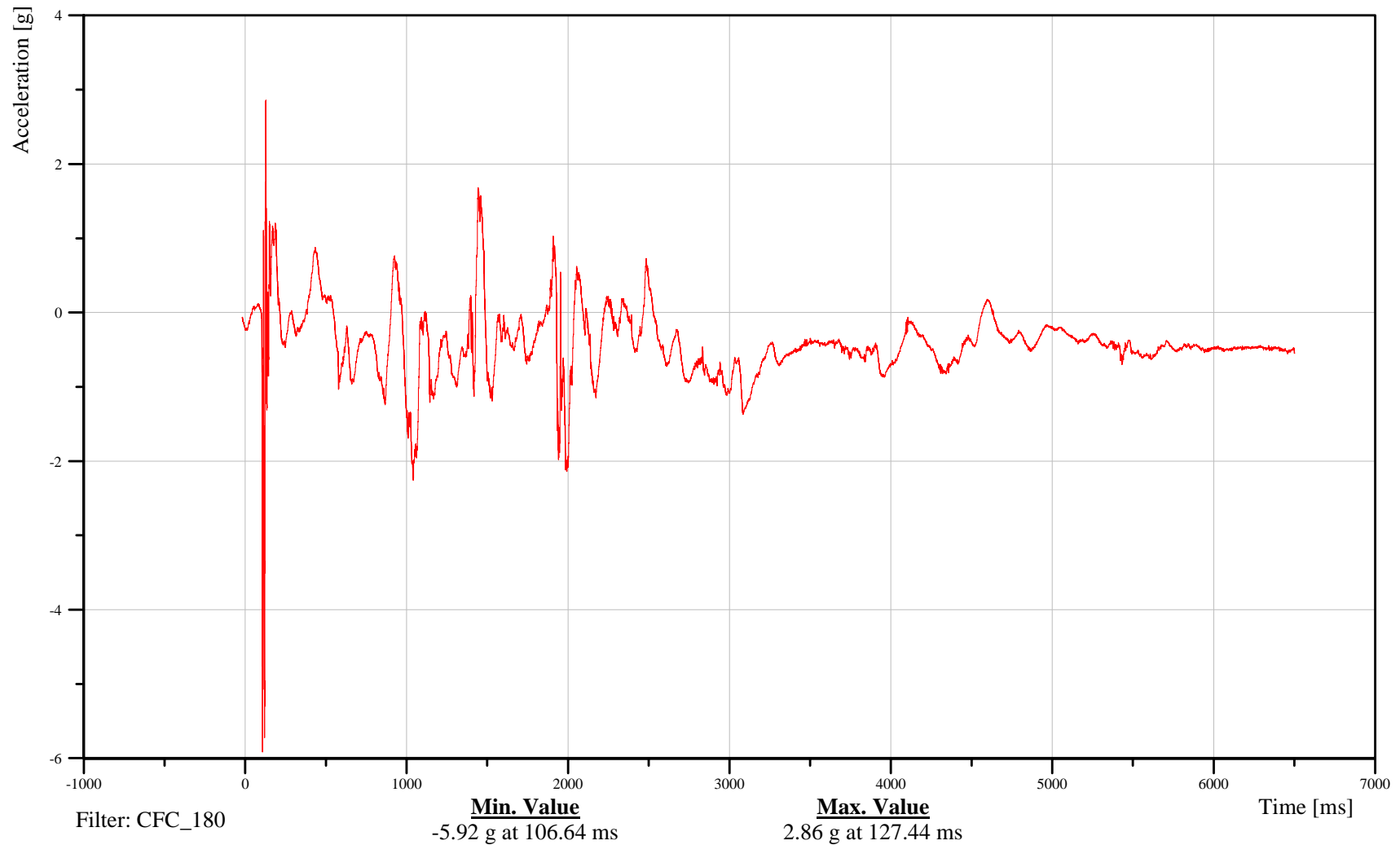
Time: 16:26

Customer: VRTC

# 11CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-15

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Chest Y-Axis Acceleration

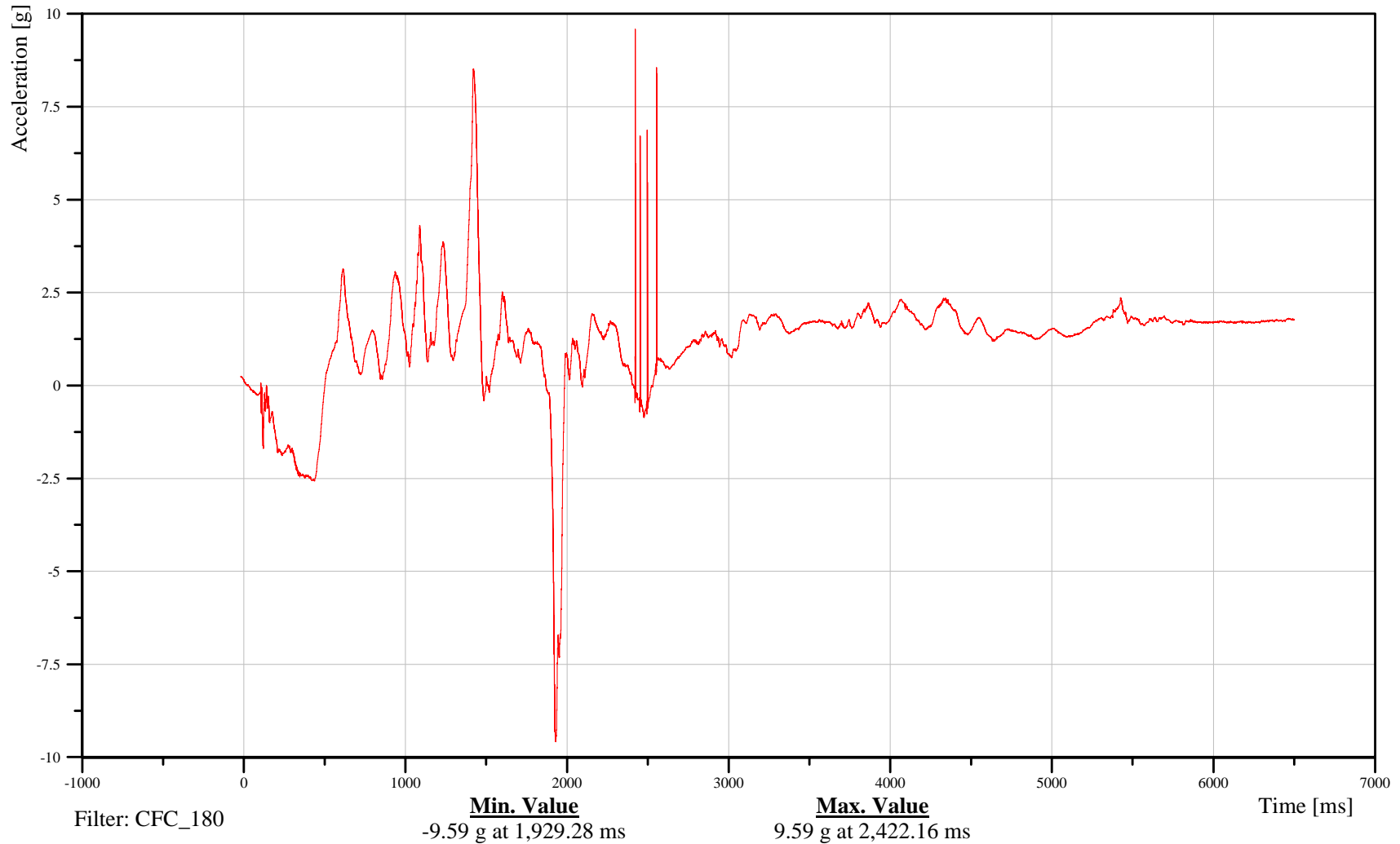
Time: 16:26

Customer: VRTC

# 11CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-16

100115



# Soil Trip Rollover 2007 Ford Expedition

## Driver Chest Z-Axis Acceleration

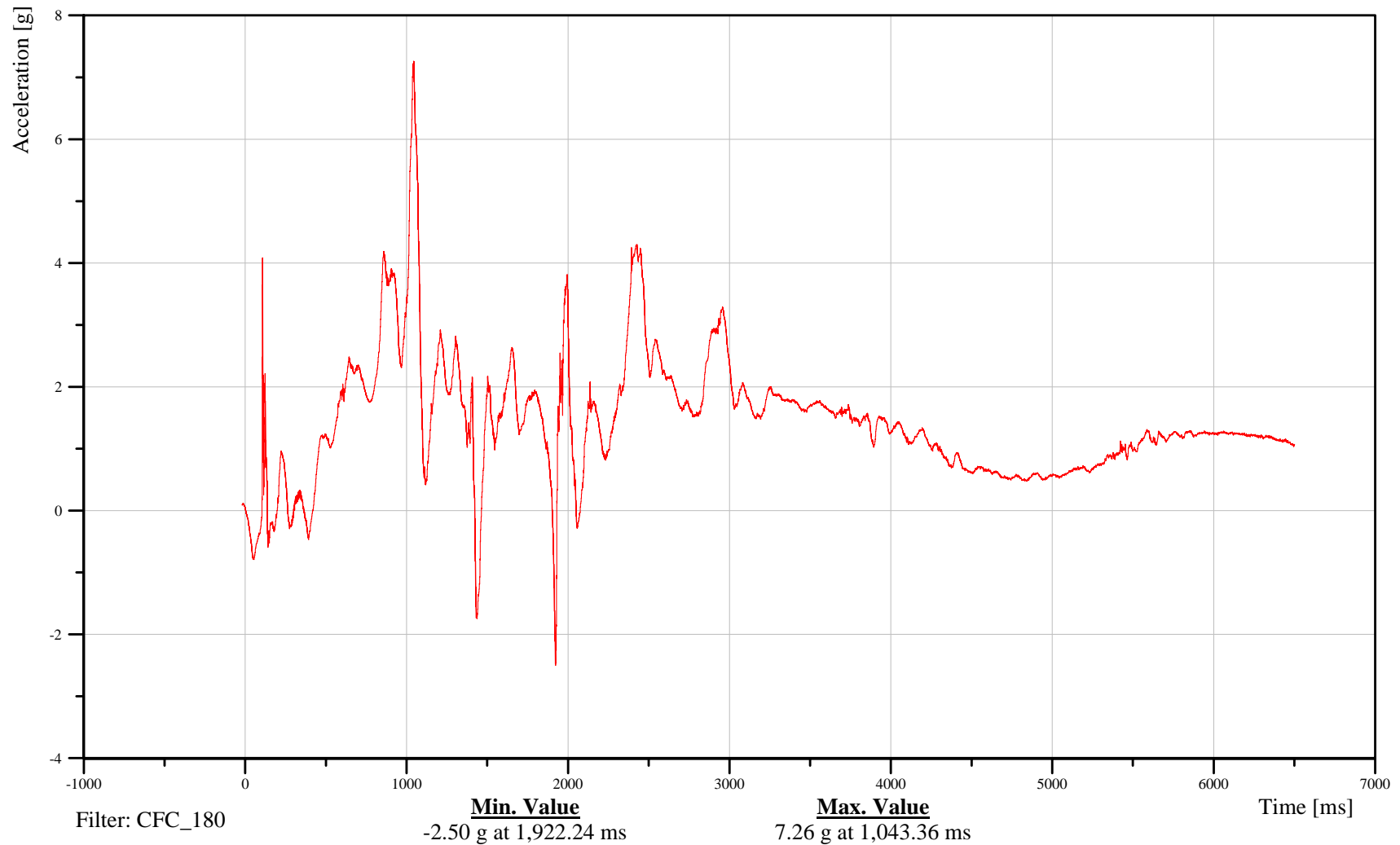
Date: 01/15/2010  
Time: 16:26

Customer: VRTC

# 11CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-17

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Chest Resultant Acceleration

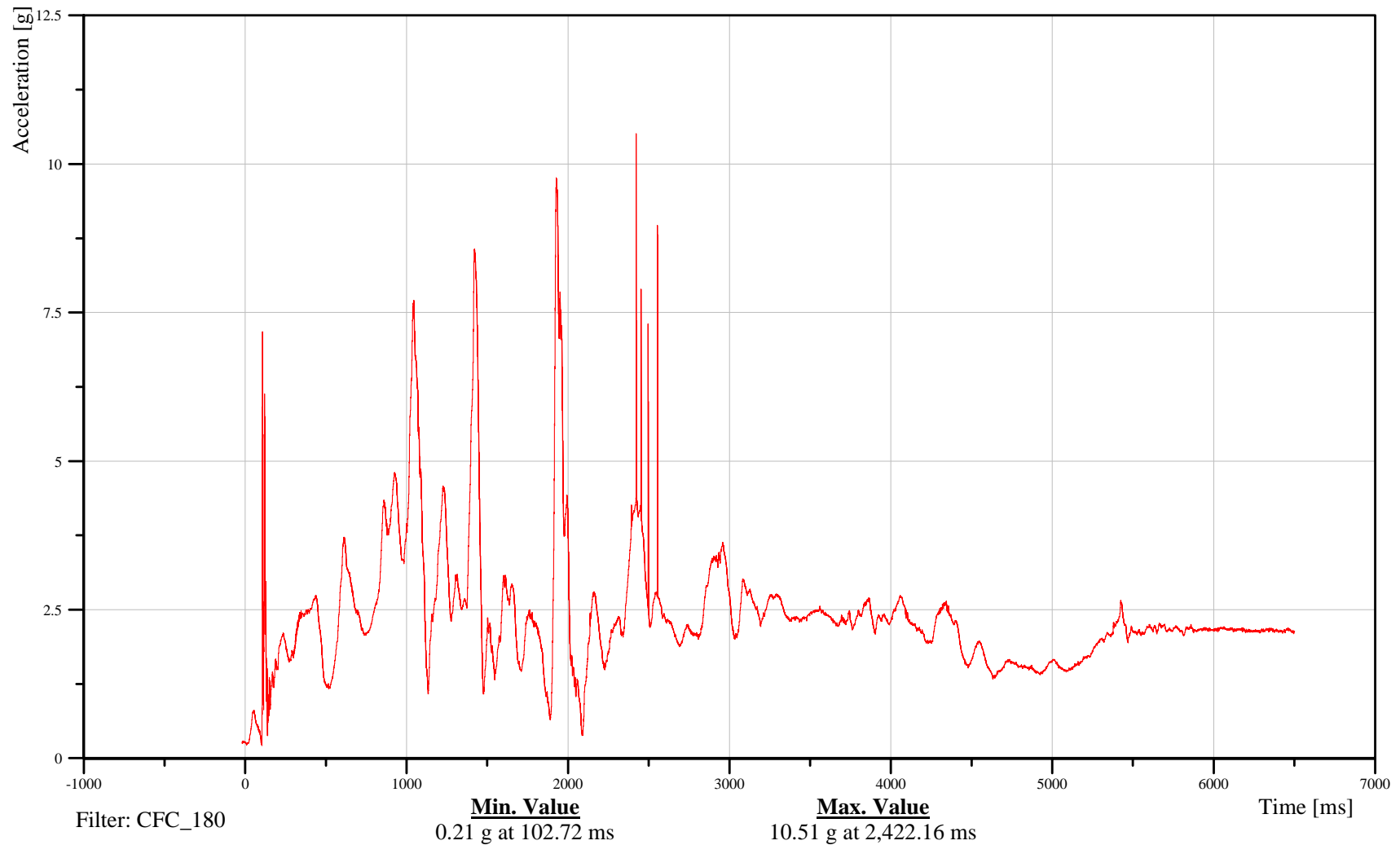
Time: 16:26

Customer: VRTC

# 11CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-18

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Chest X-Axis Displacement

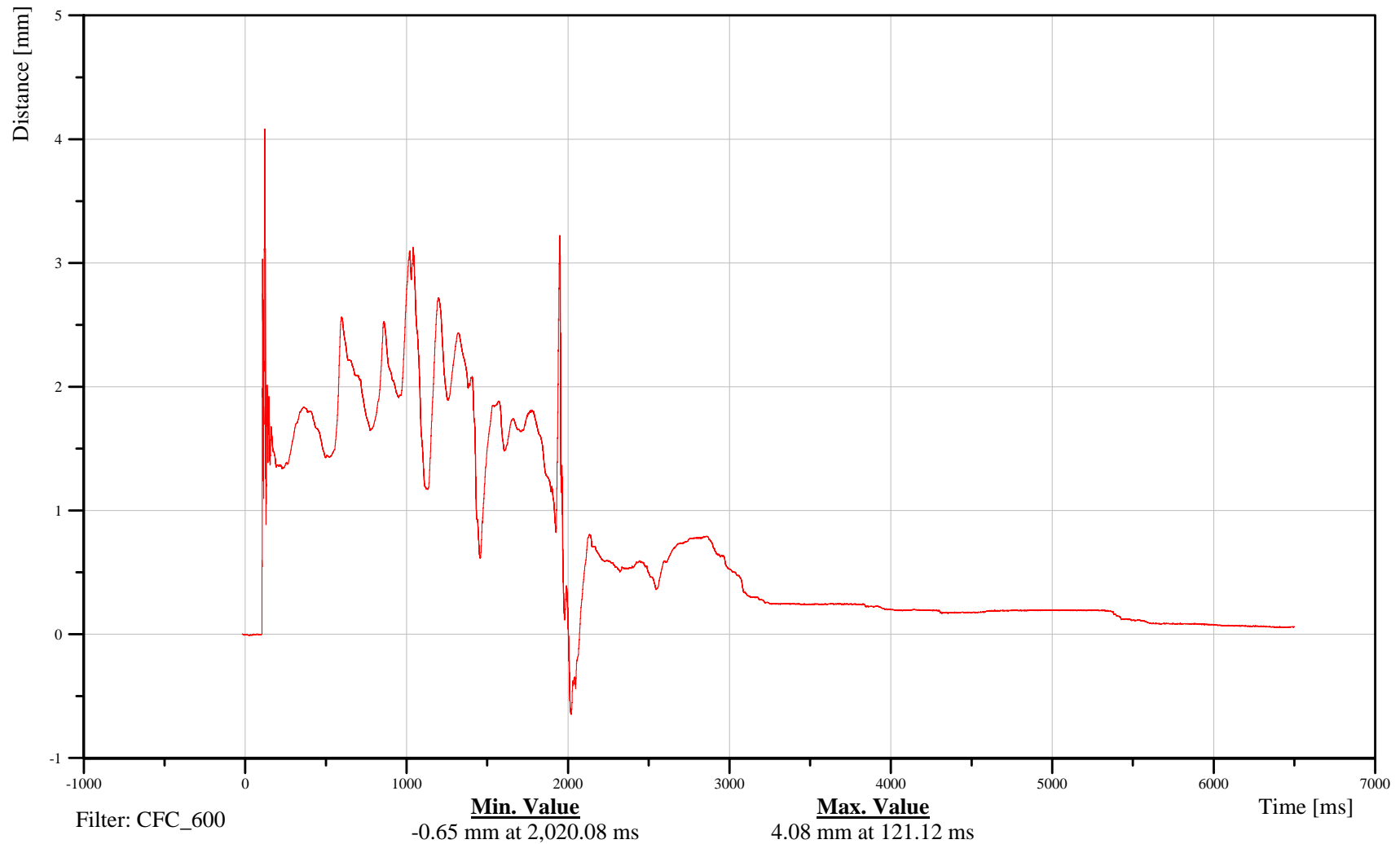
Time: 16:26

Customer: VRTC

### 11CHST0000H3DSXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-19

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

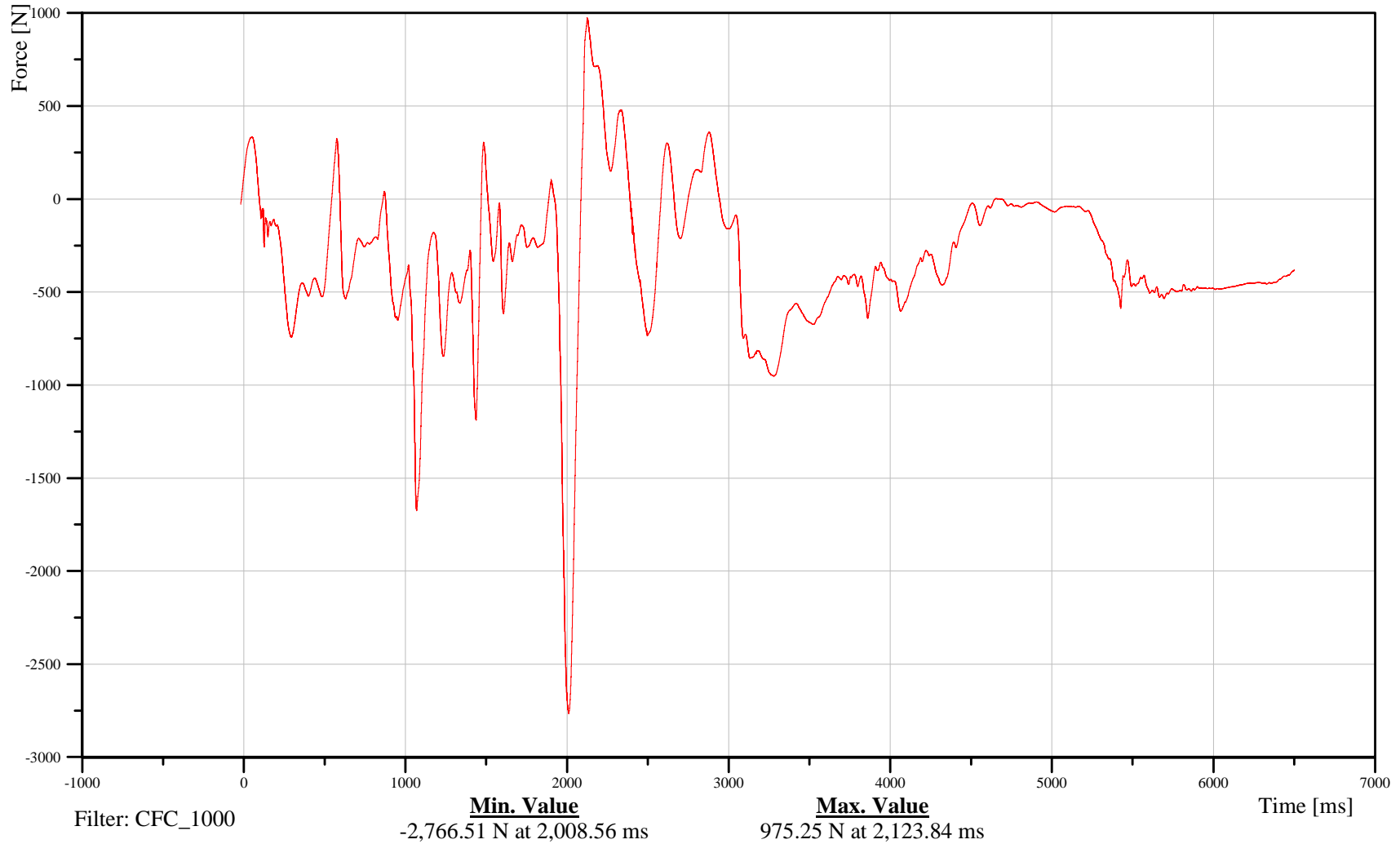
## Driver Lower Neck X-Axis Force

Customer: VRTC

# 11NECKLO00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-20

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Lower Neck Y-Axis Force

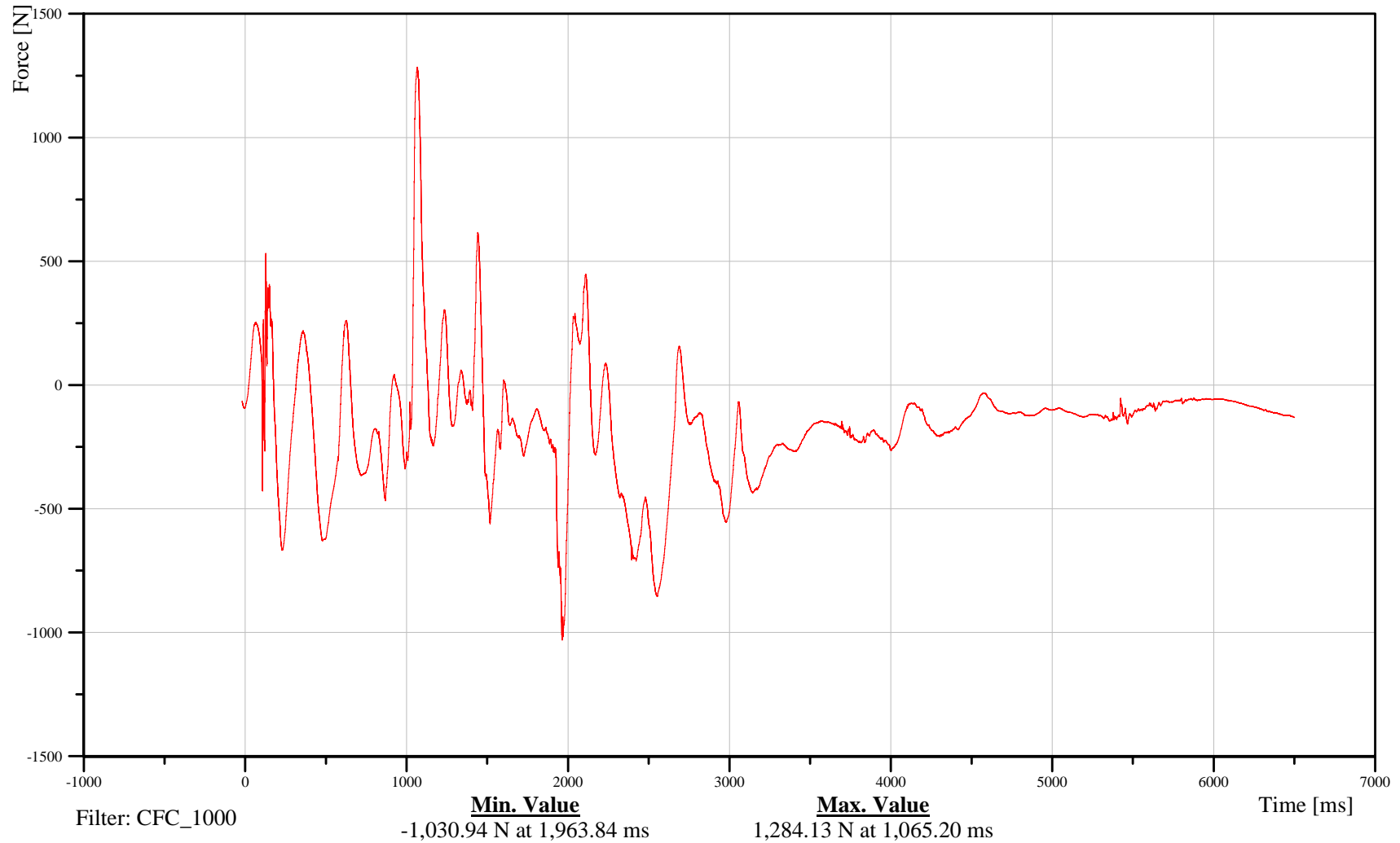
Time: 16:26

Customer: VRTC

# 11NECKLO00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-21

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Lower Neck Z-Axis Force

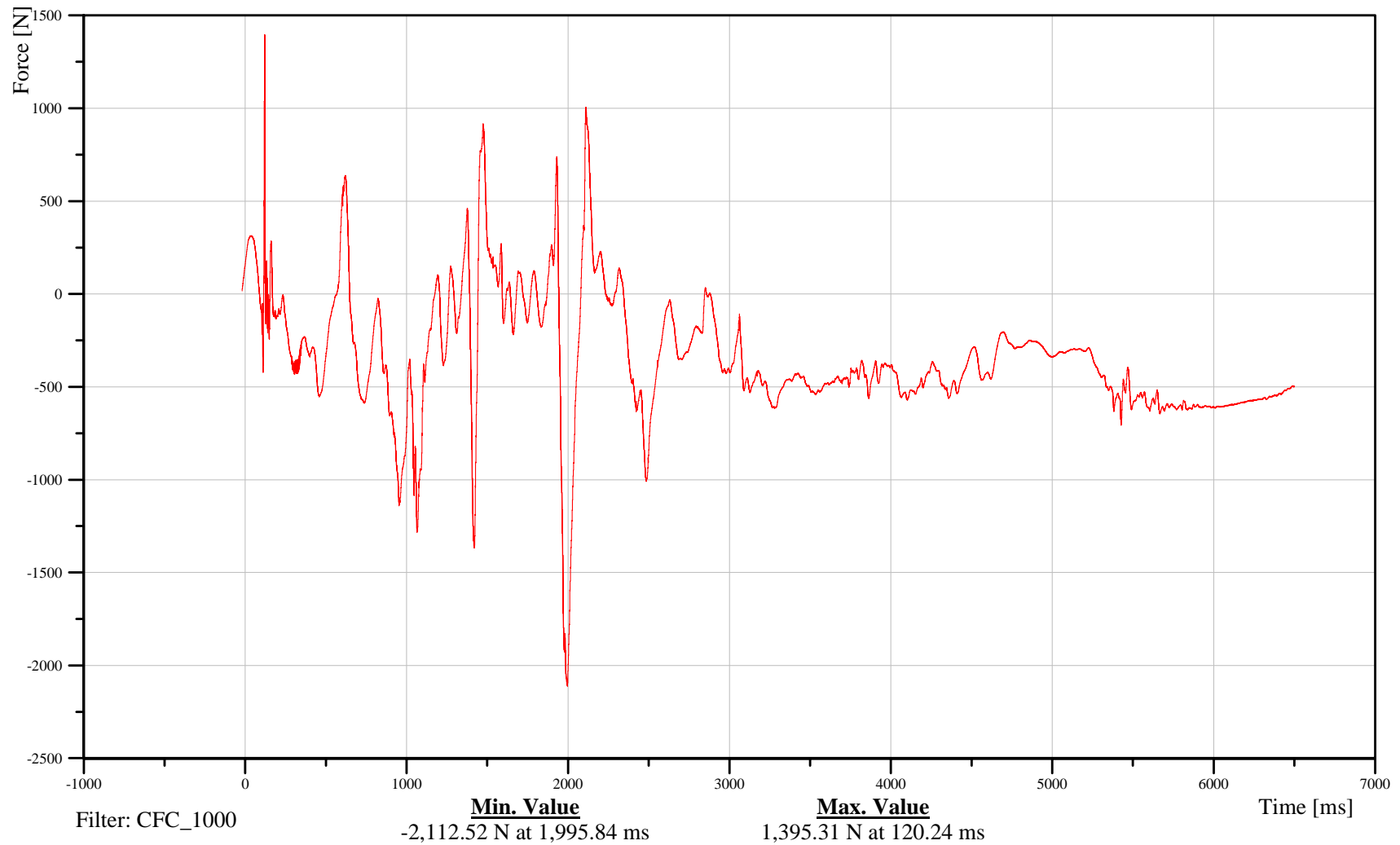
Time: 16:26

Customer: VRTC

# 11NECKLO00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-22

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Lower Neck Moment About X Axis

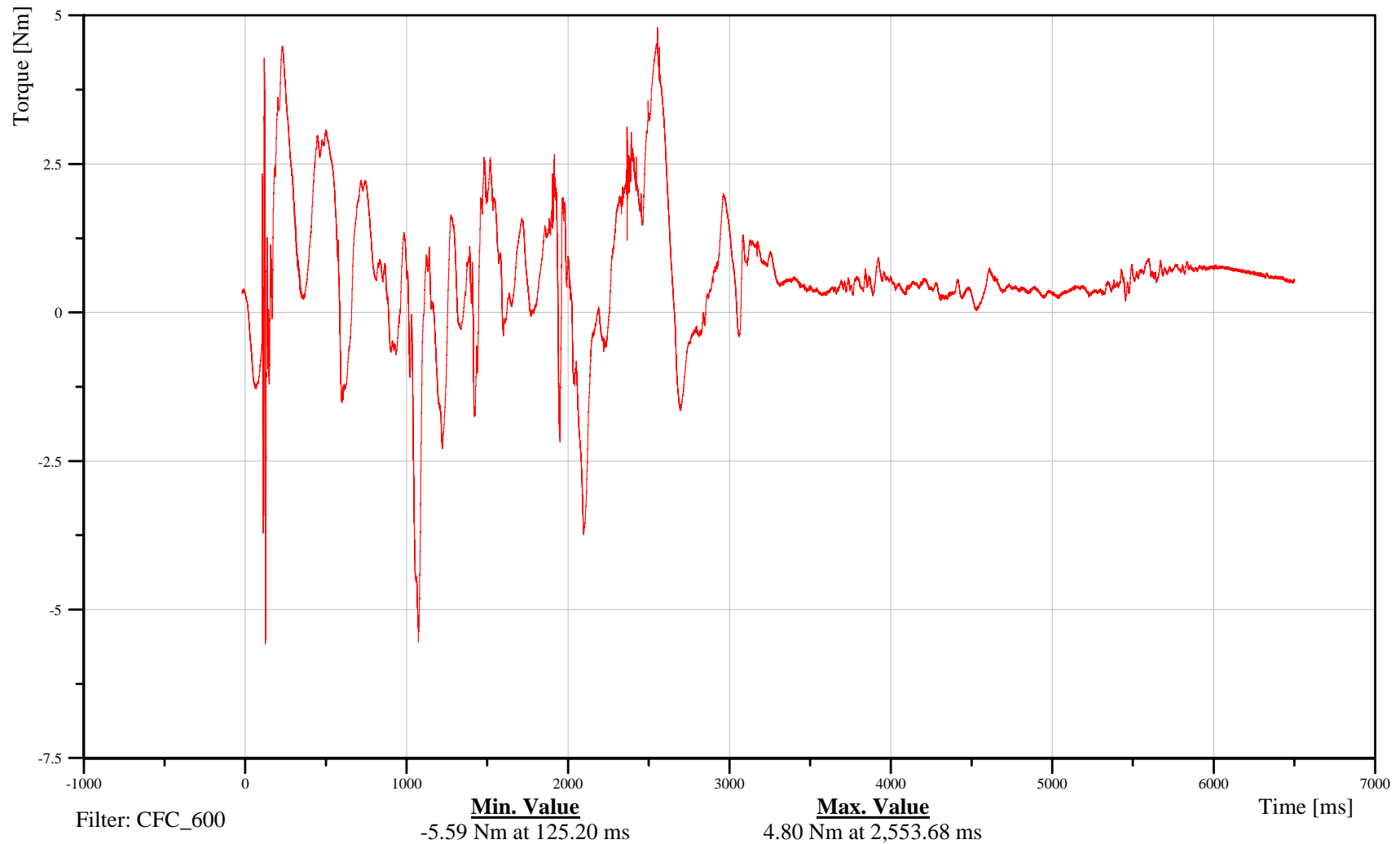
Time: 16:26

Customer: VRTC

### 11NECKLO00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-23

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Lower Neck Moment About Y Axis

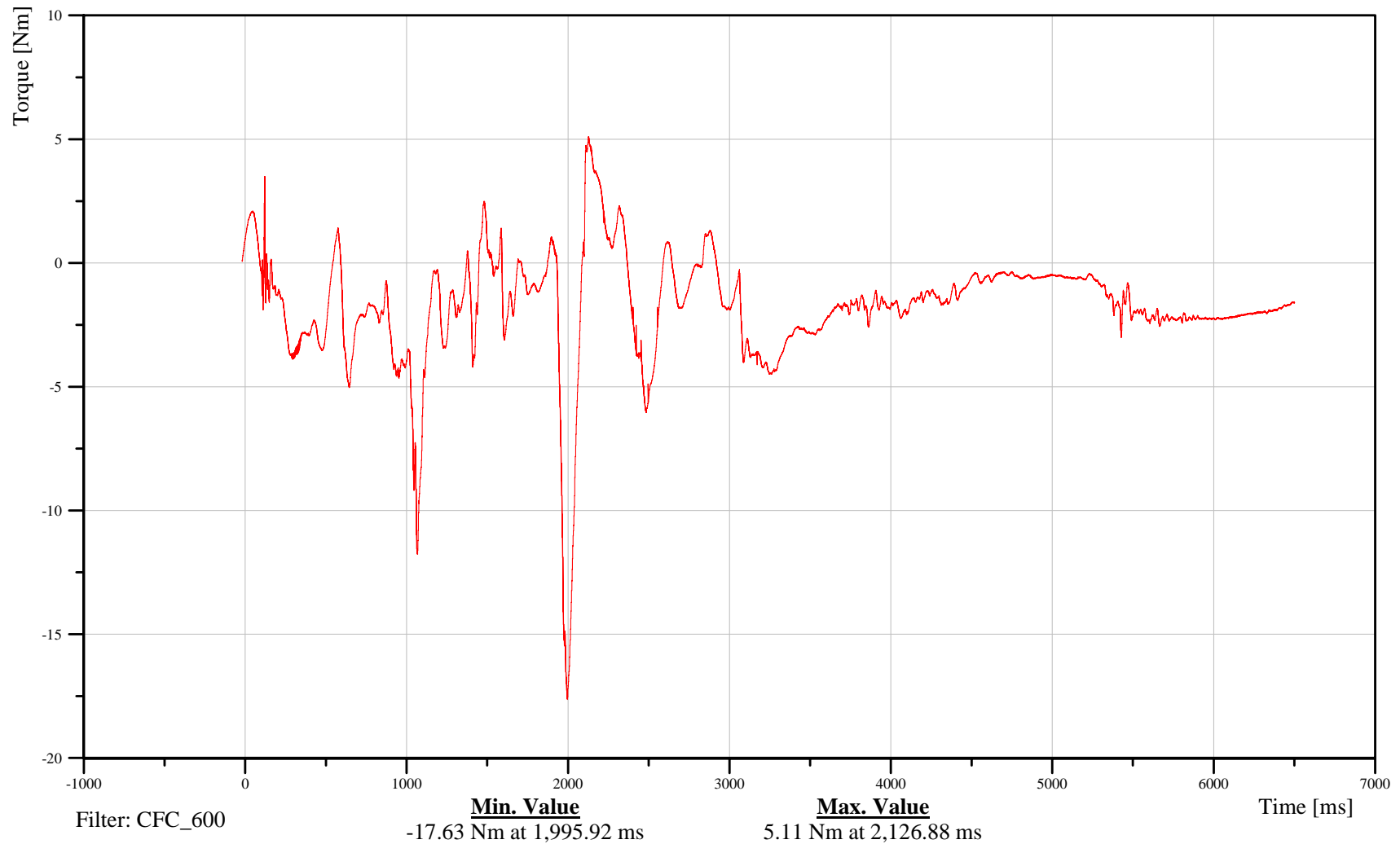
Time: 16:26

Customer: VRTC

### 11NECKLO00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-24

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Lower Neck Moment About Z Axis

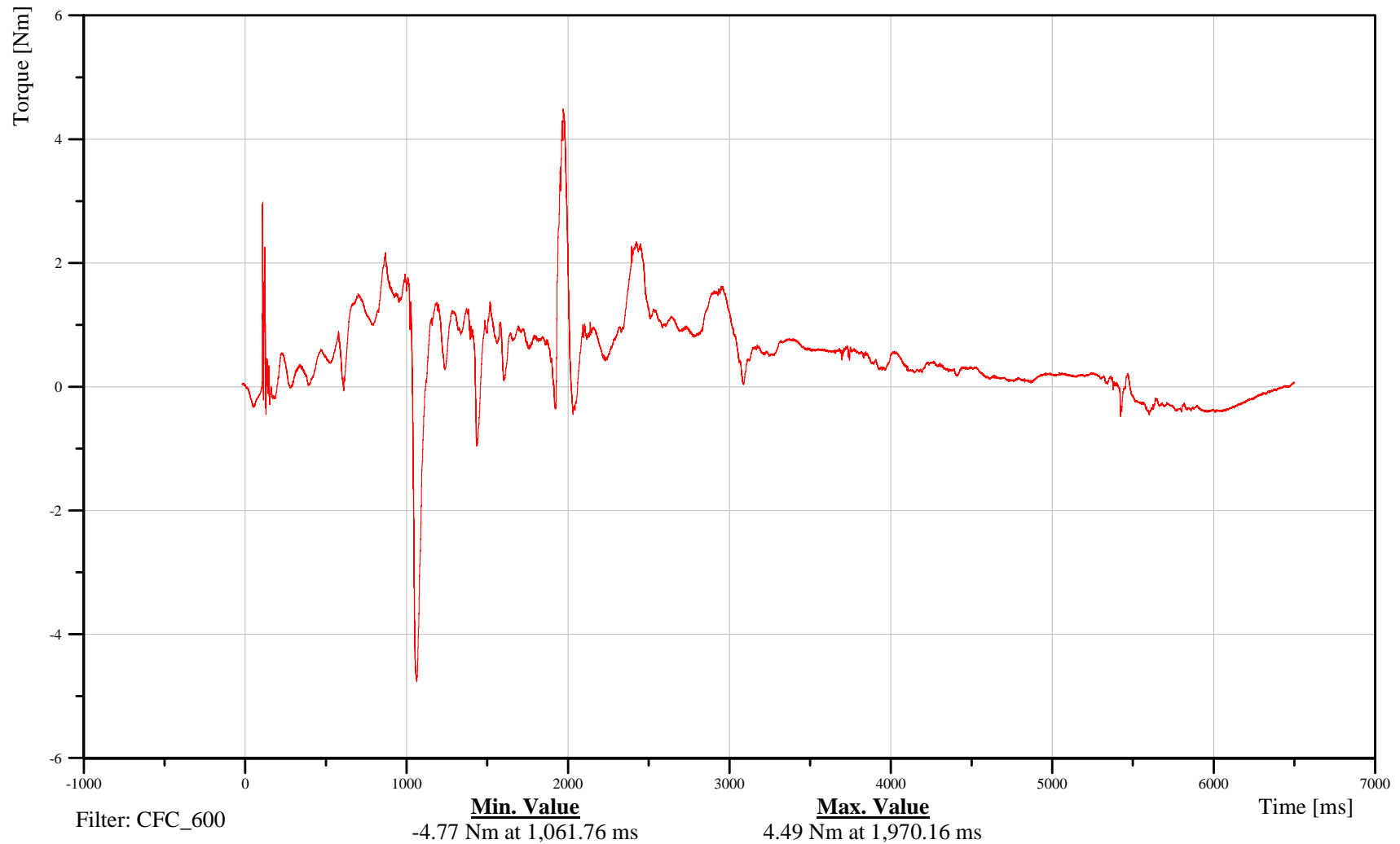
Time: 16:26

Customer: VRTC

### 11NECKLO00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-25

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Pelvis X-Axis Acceleration

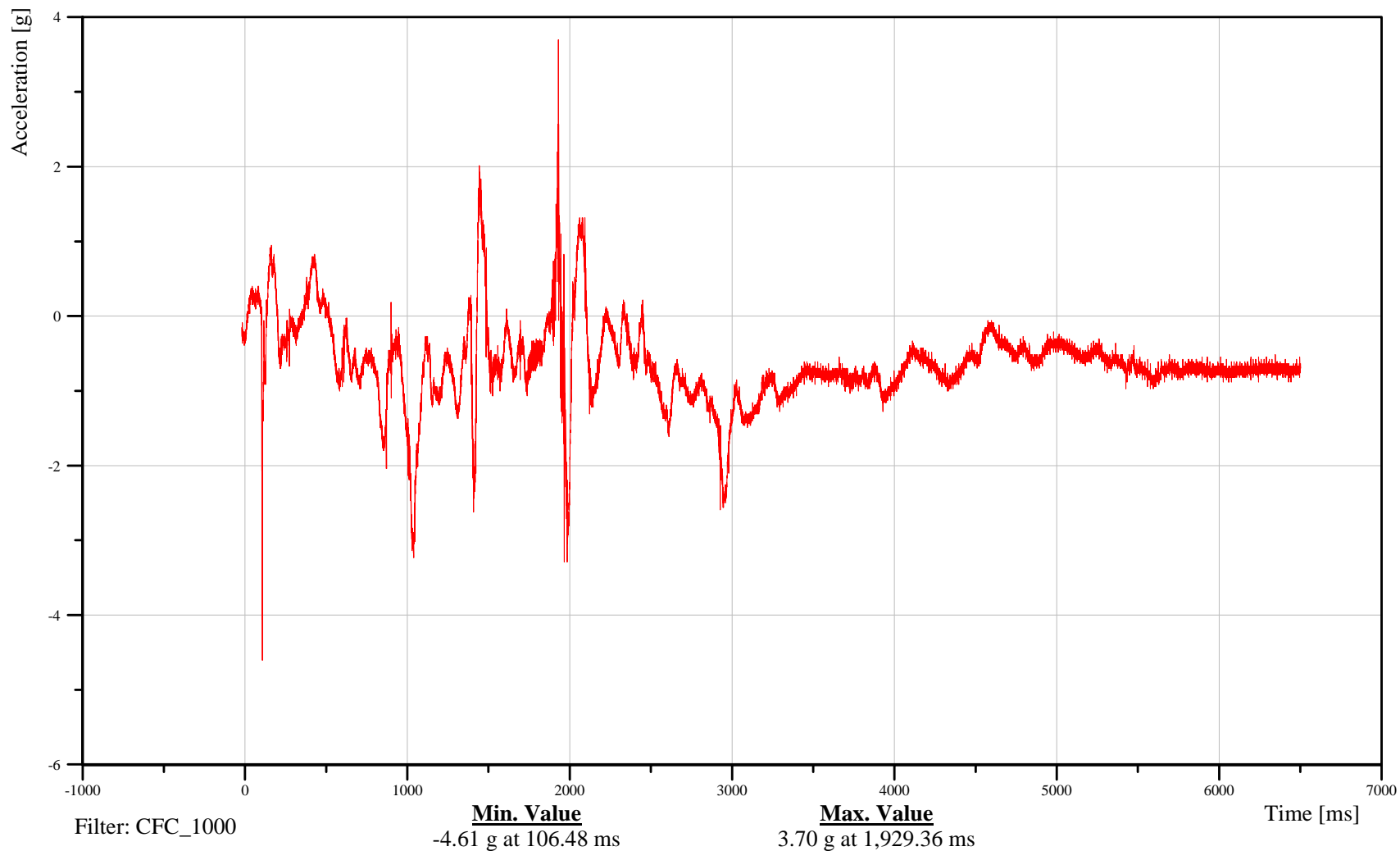
Time: 16:26

Customer: VRTC

### 11PELVCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-26

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Pelvis Y-Axis Acceleration

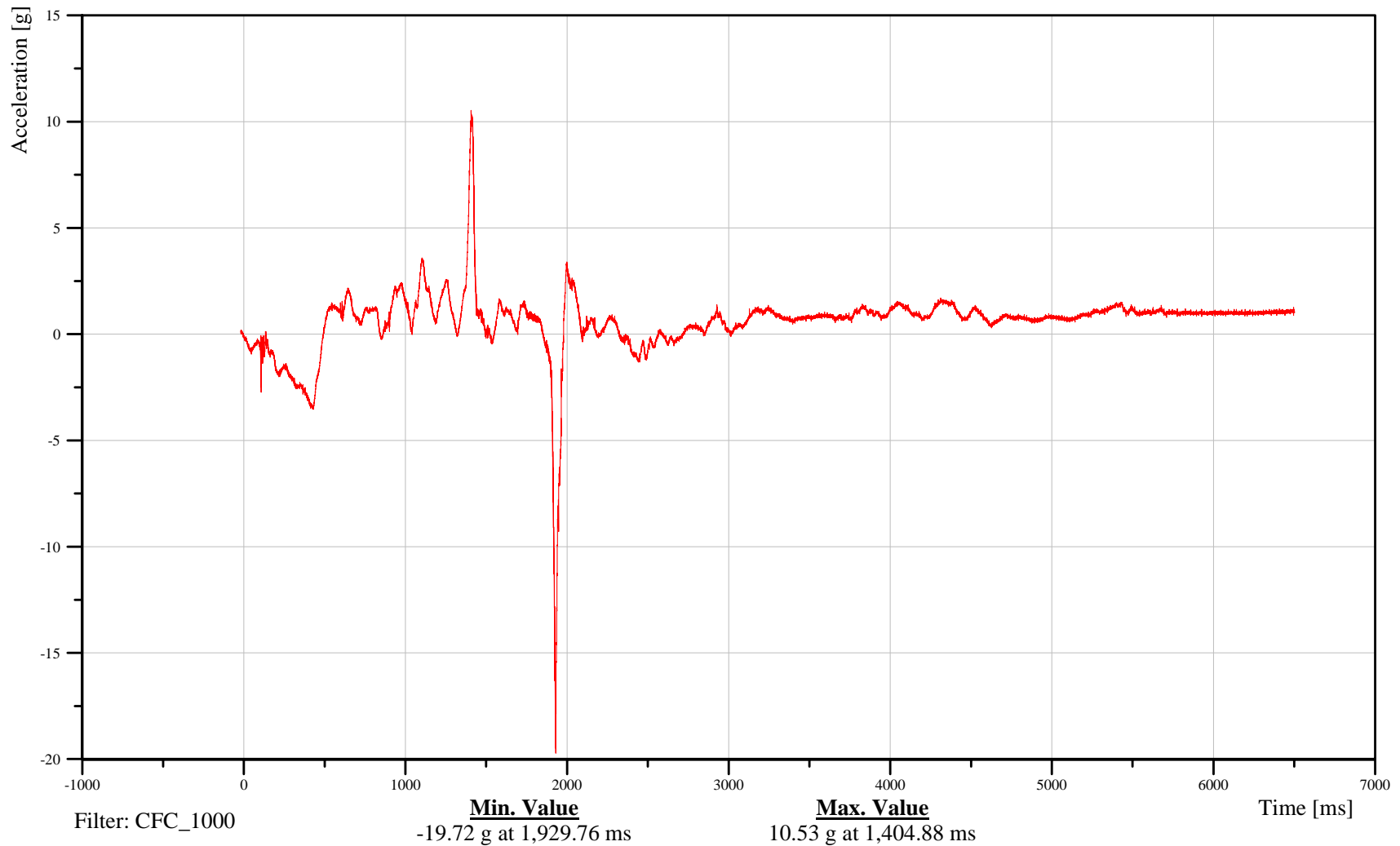
Time: 16:26

Customer: VRTC

# 11PELVCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-27

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Pelvis Z-Axis Acceleration

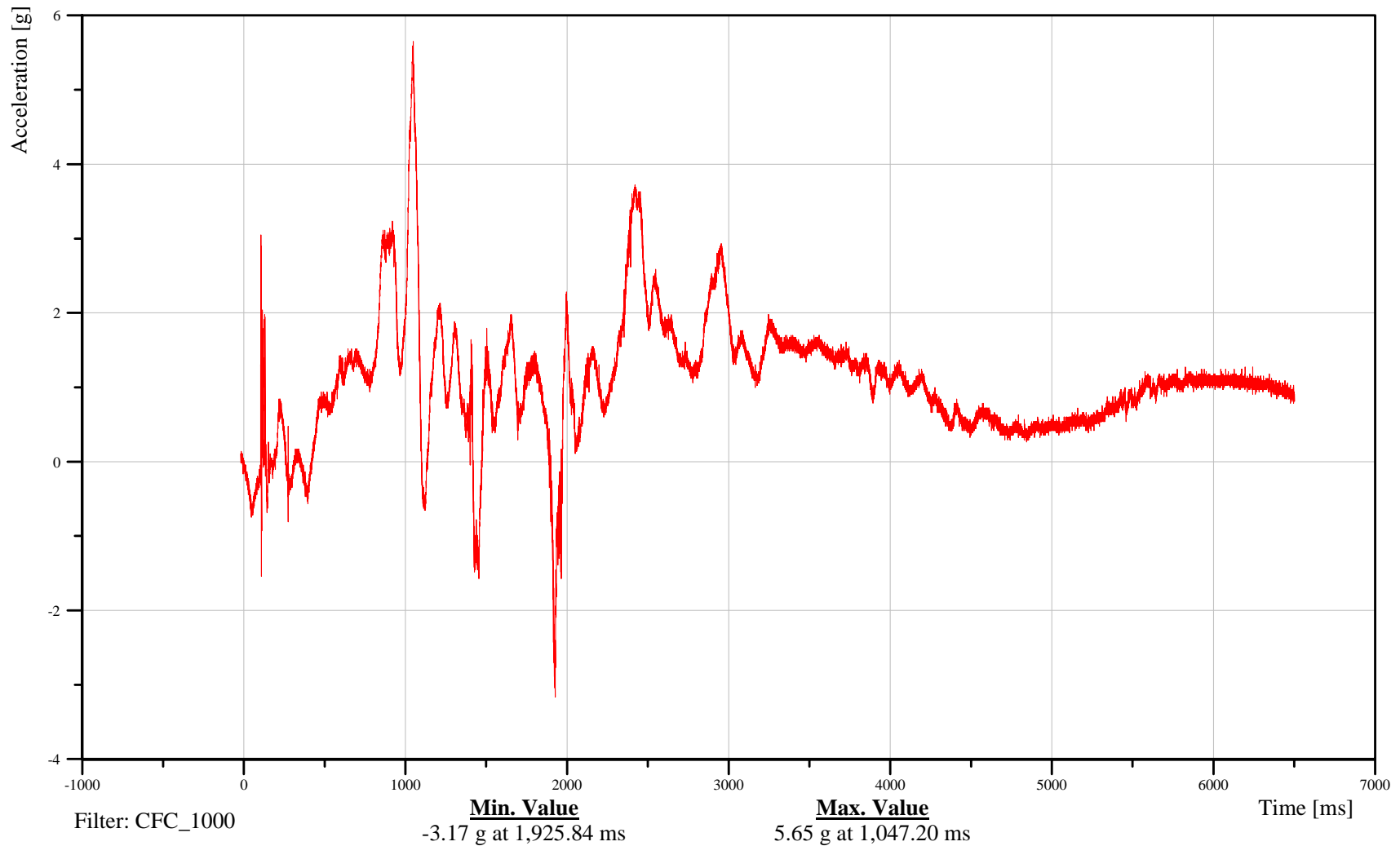
Time: 16:26

Customer: VRTC

# 11PELVCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-28

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Pelvis Resultant Acceleration

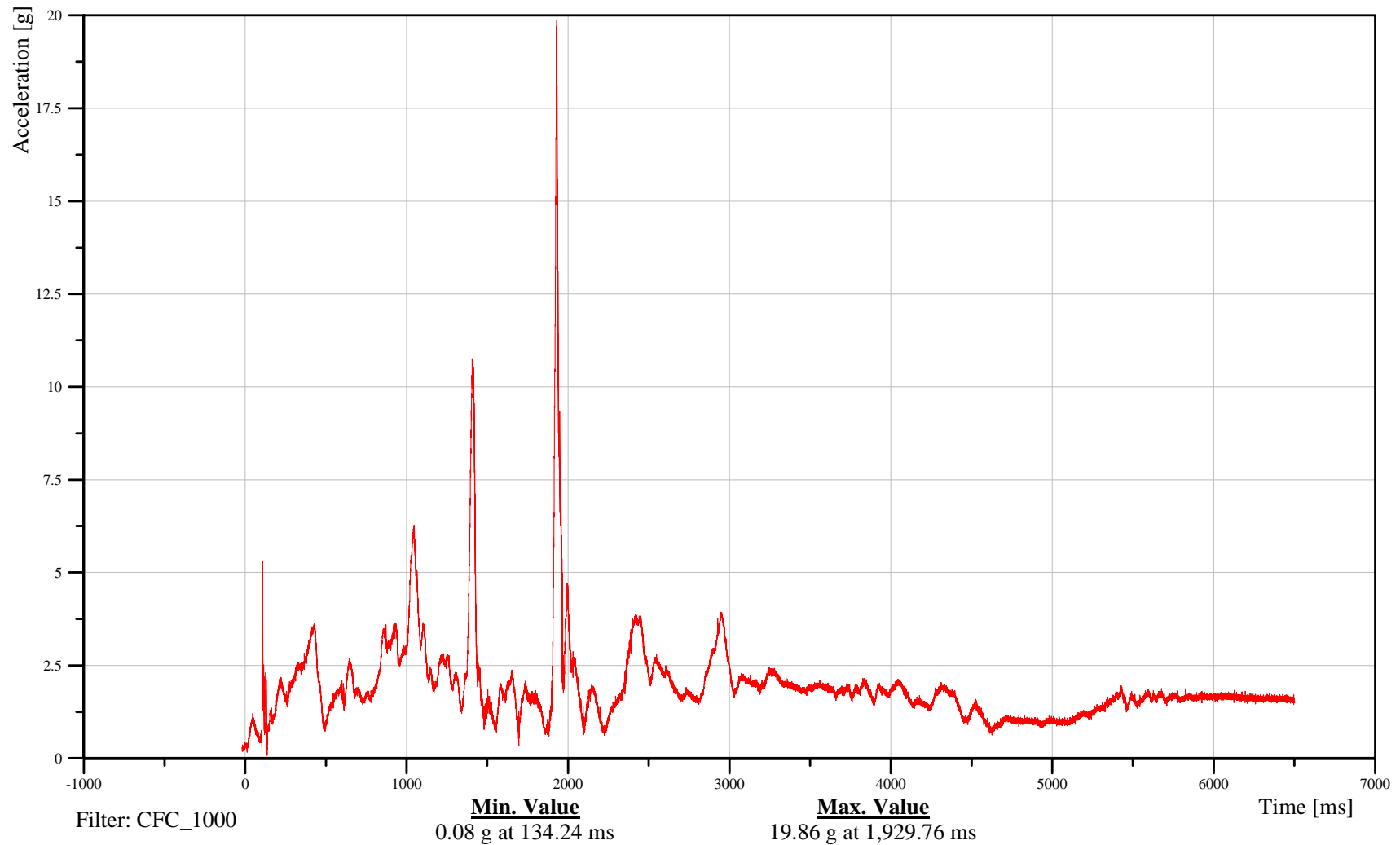
Time: 16:26

Customer: VRTC

### 11PELVCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-29

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Head X-Axis Acceleration

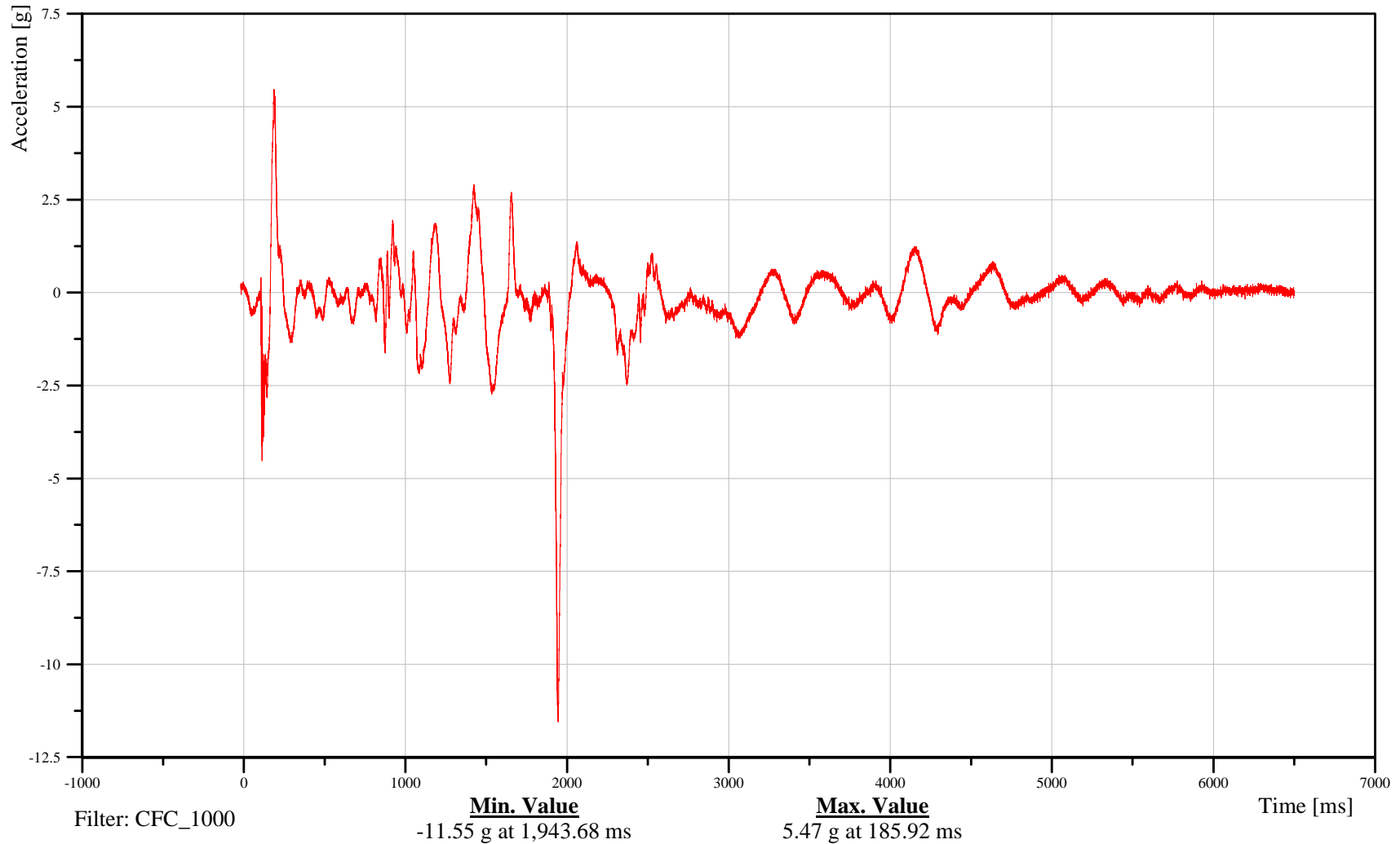
Time: 16:26

Customer: VRTC

### 13HEADCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-30

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Head Y-Axis Acceleration

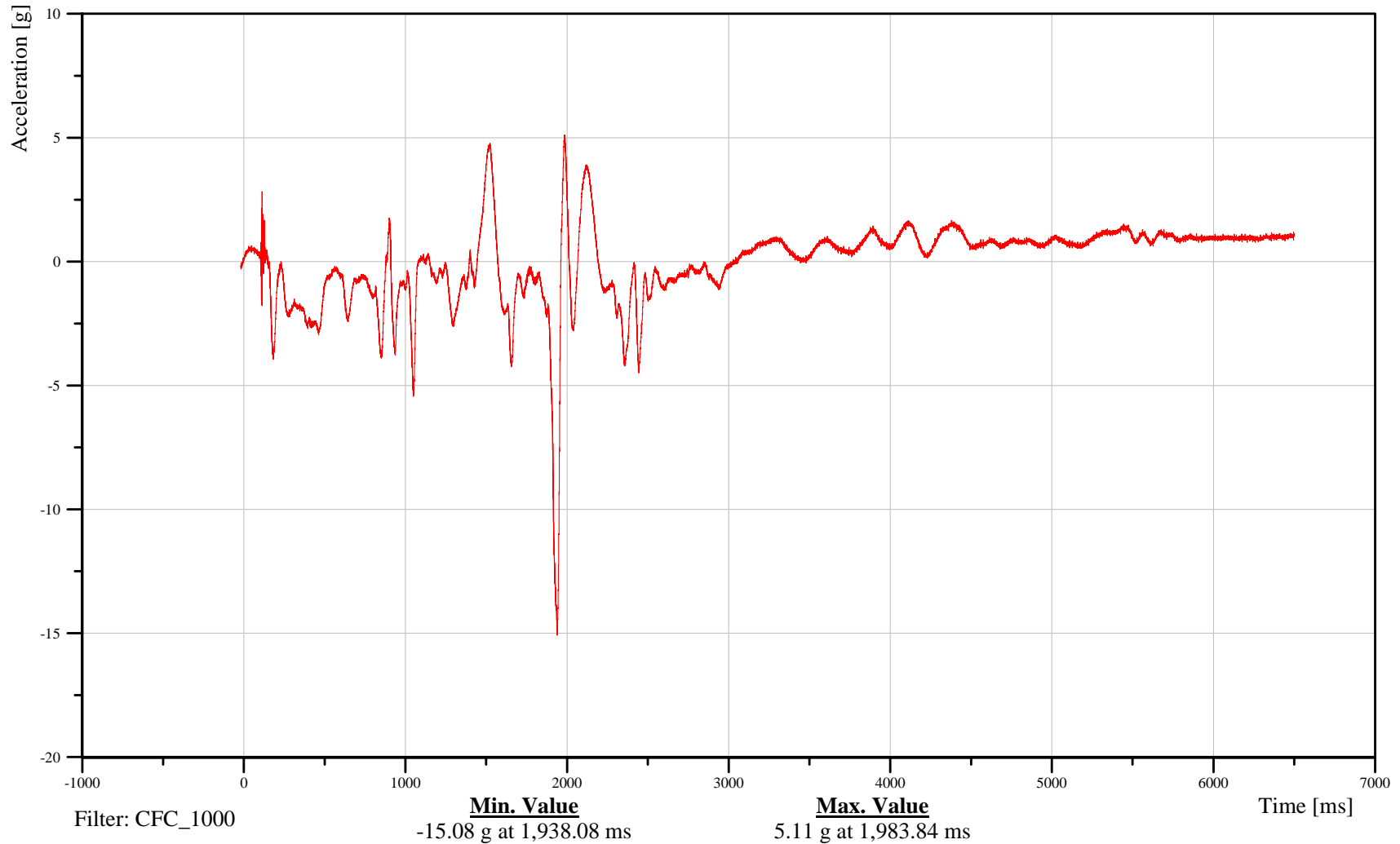
Time: 16:26

Customer: VRTC

### 13HEADCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-31

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Head Z-Axis Acceleration

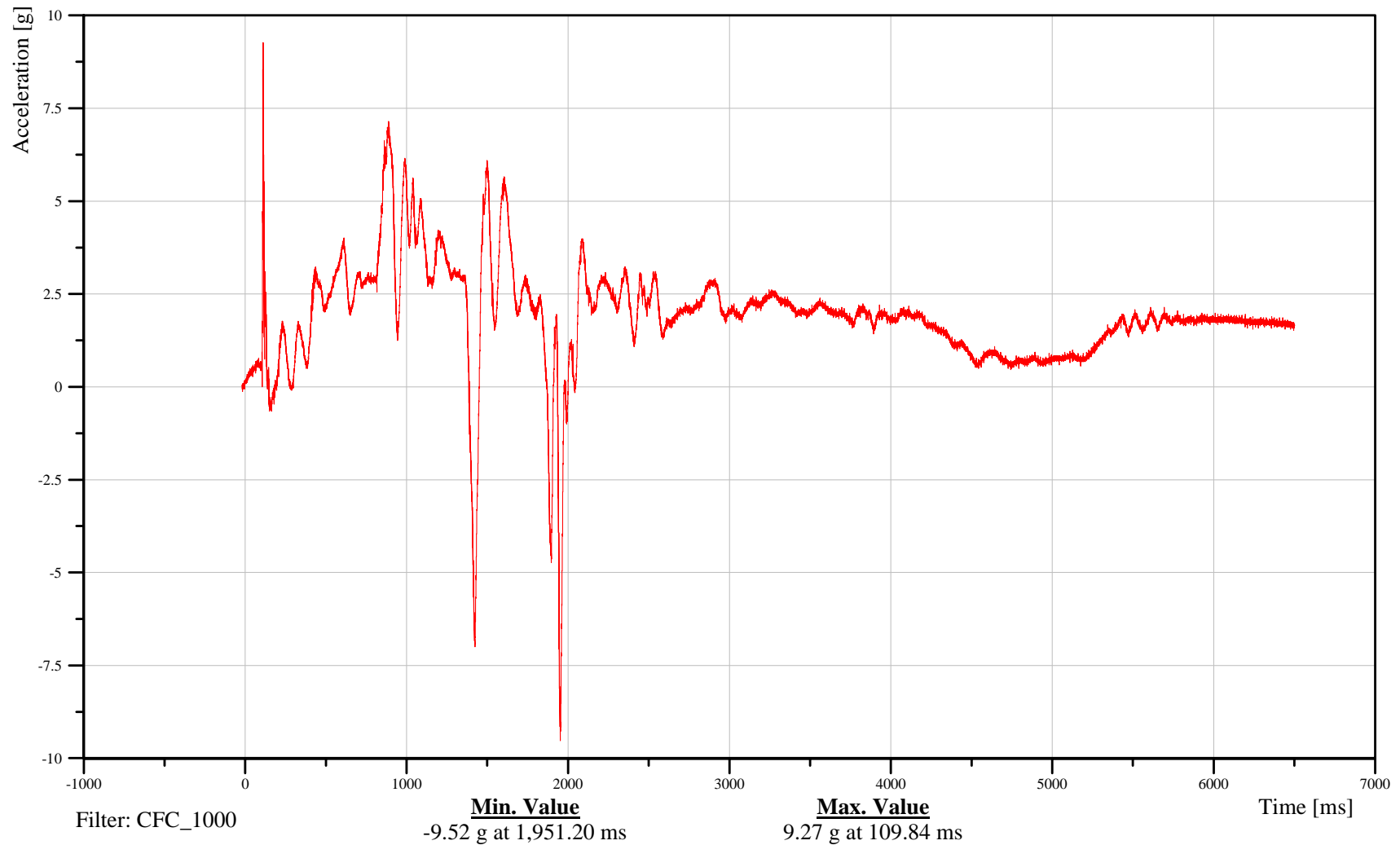
Time: 16:26

Customer: VRTC

### 13HEADCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-32

100115



# Soil Trip Rollover 2007 Ford Expedition

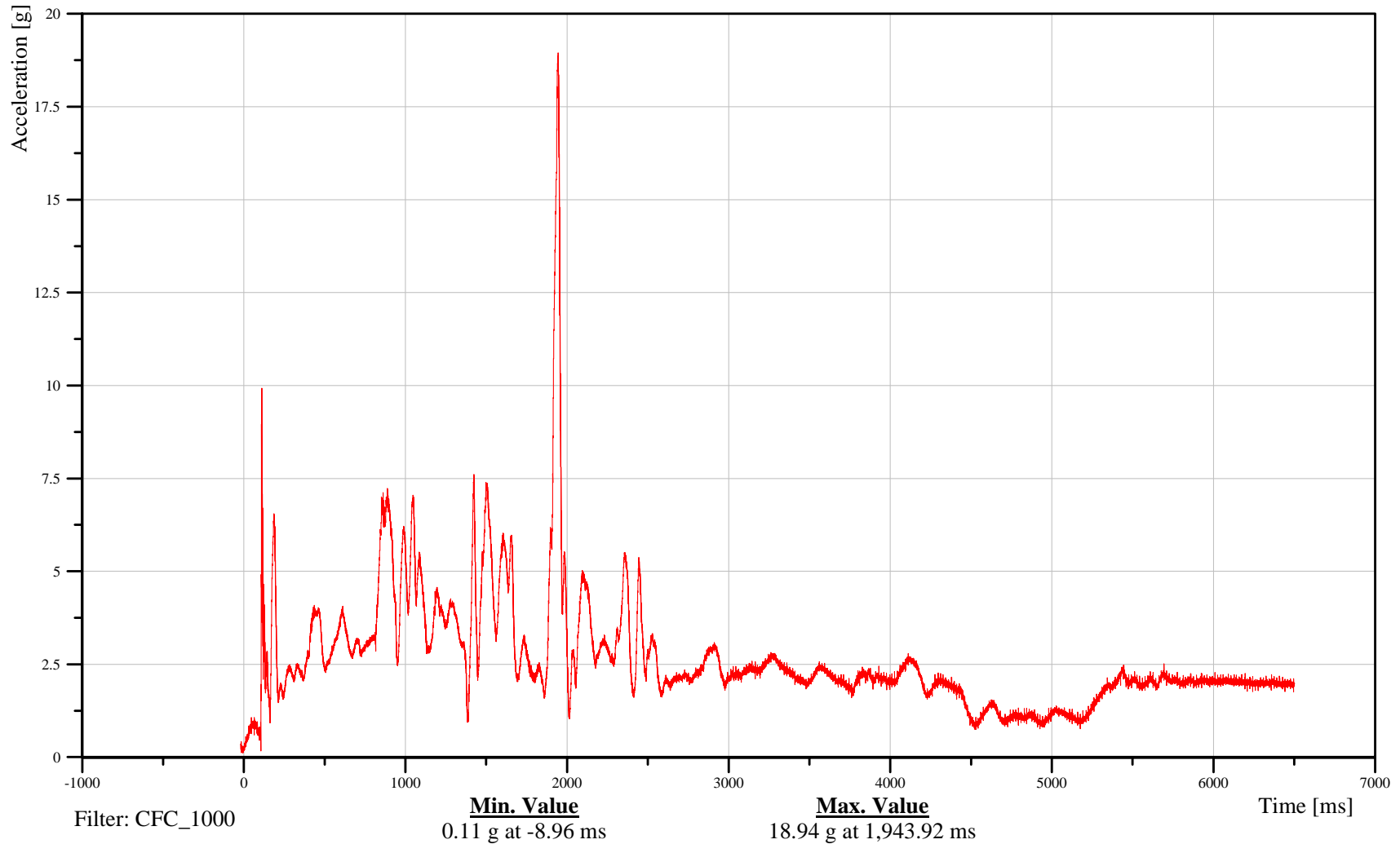
## Right Front Passenger Head Resultant Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13HEADCG00H3ACRA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-33

100115



# Soil Trip Rollover 2007 Ford Expedition

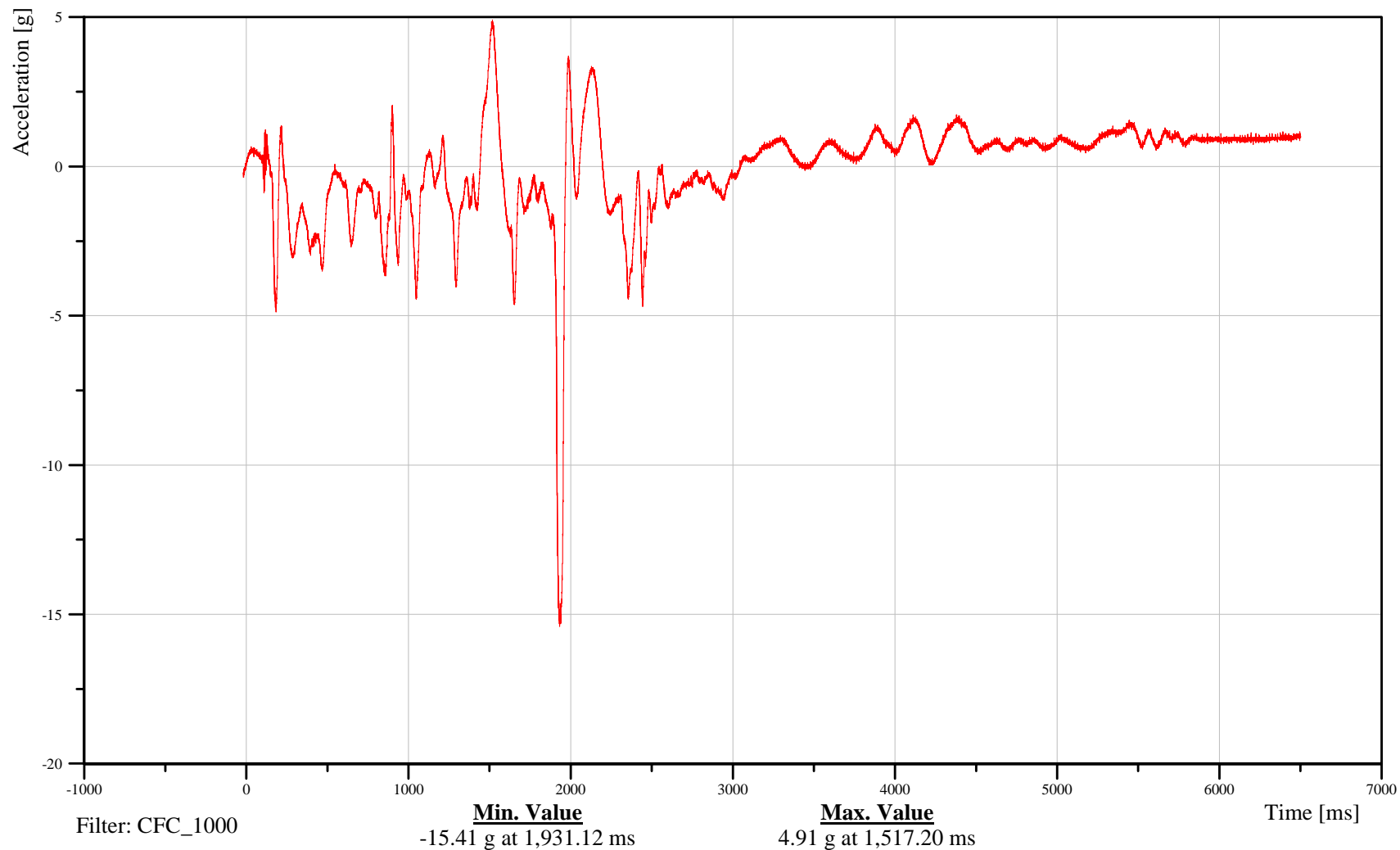
## Right Front Passenger Head Front Y-Axis Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13HEADFR00H3ACYA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-34

100115



# Soil Trip Rollover 2007 Ford Expedition

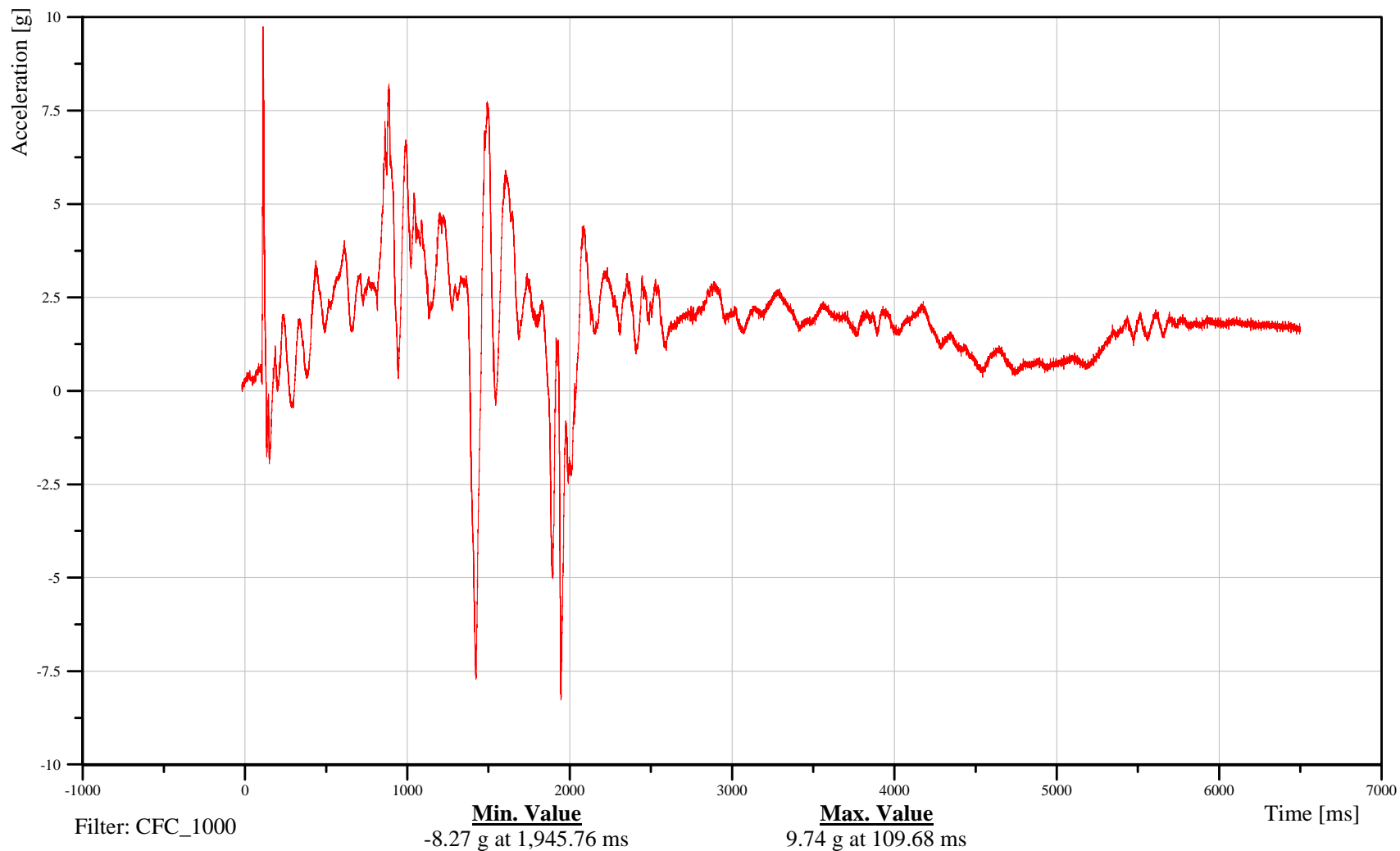
## Right Front Passenger Head Front Z-Axis Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13HEADFR00H3ACZA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-35

100115



# Soil Trip Rollover 2007 Ford Expedition

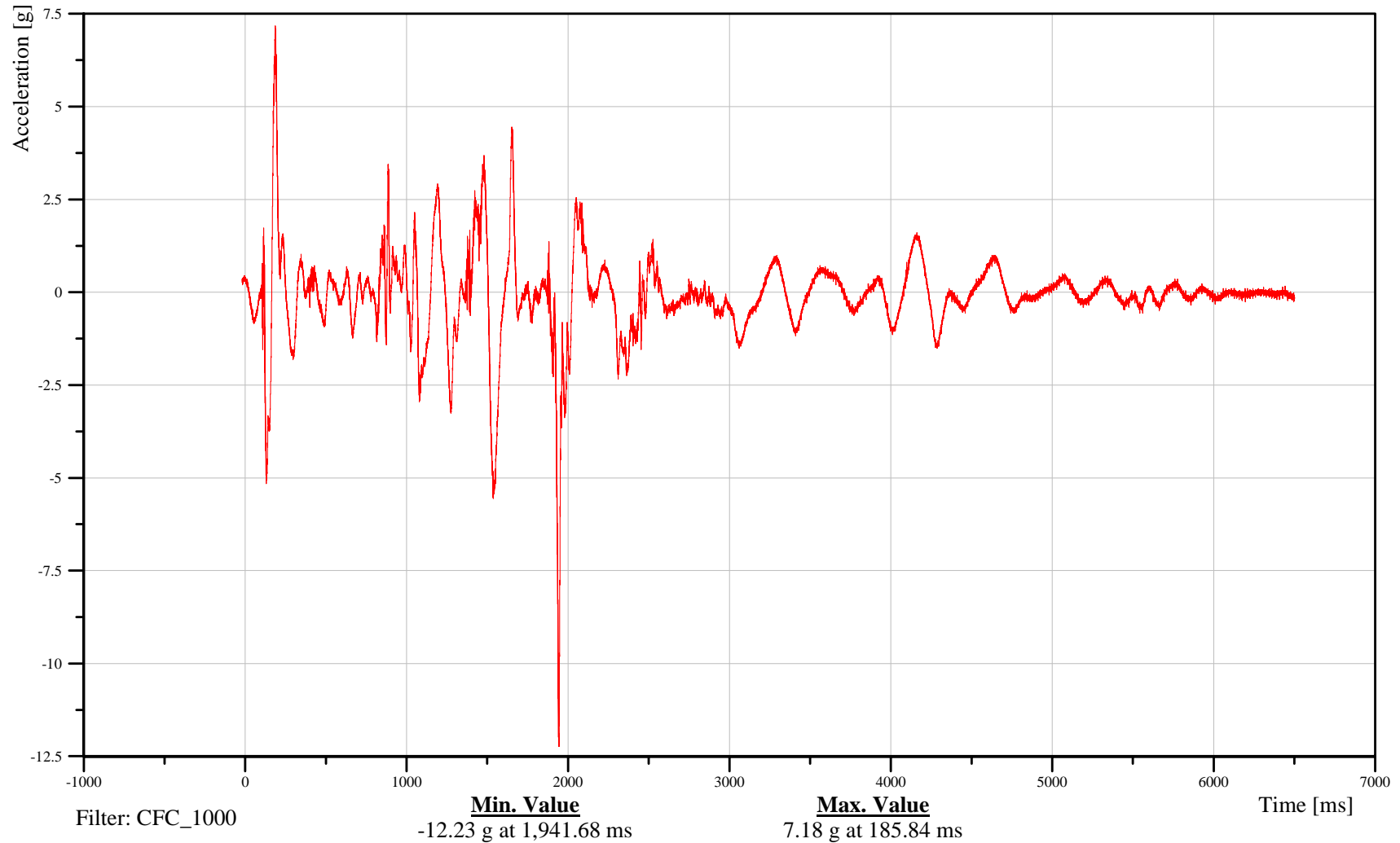
## Right Front Passenger Head Top X-Axis Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13HEADUP00H3ACXA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-36

100115



# Soil Trip Rollover 2007 Ford Expedition

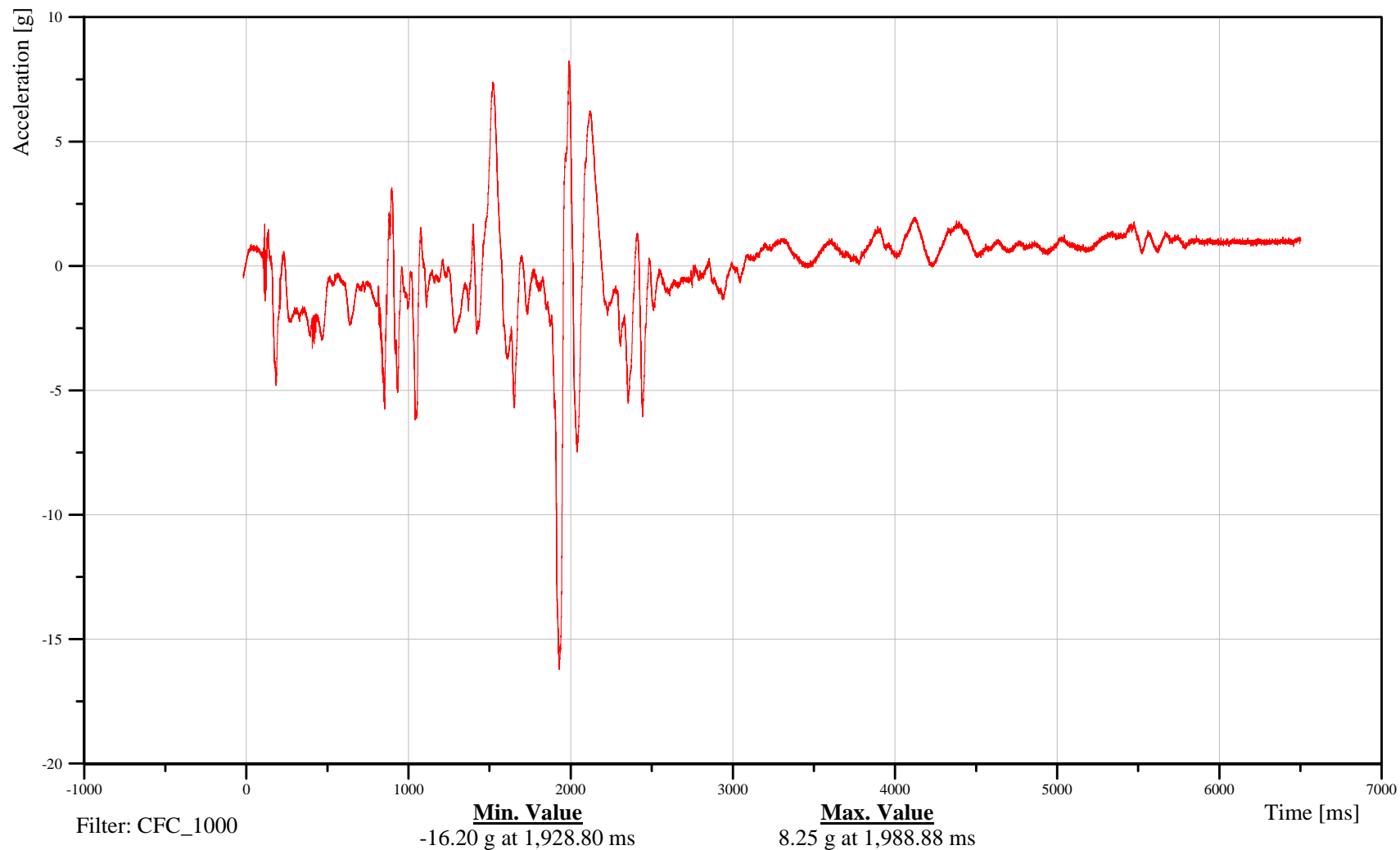
## Right Front Passenger Head Top Y-Axis Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13HEADUP00H3ACYA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-37

100115



# Soil Trip Rollover 2007 Ford Expedition

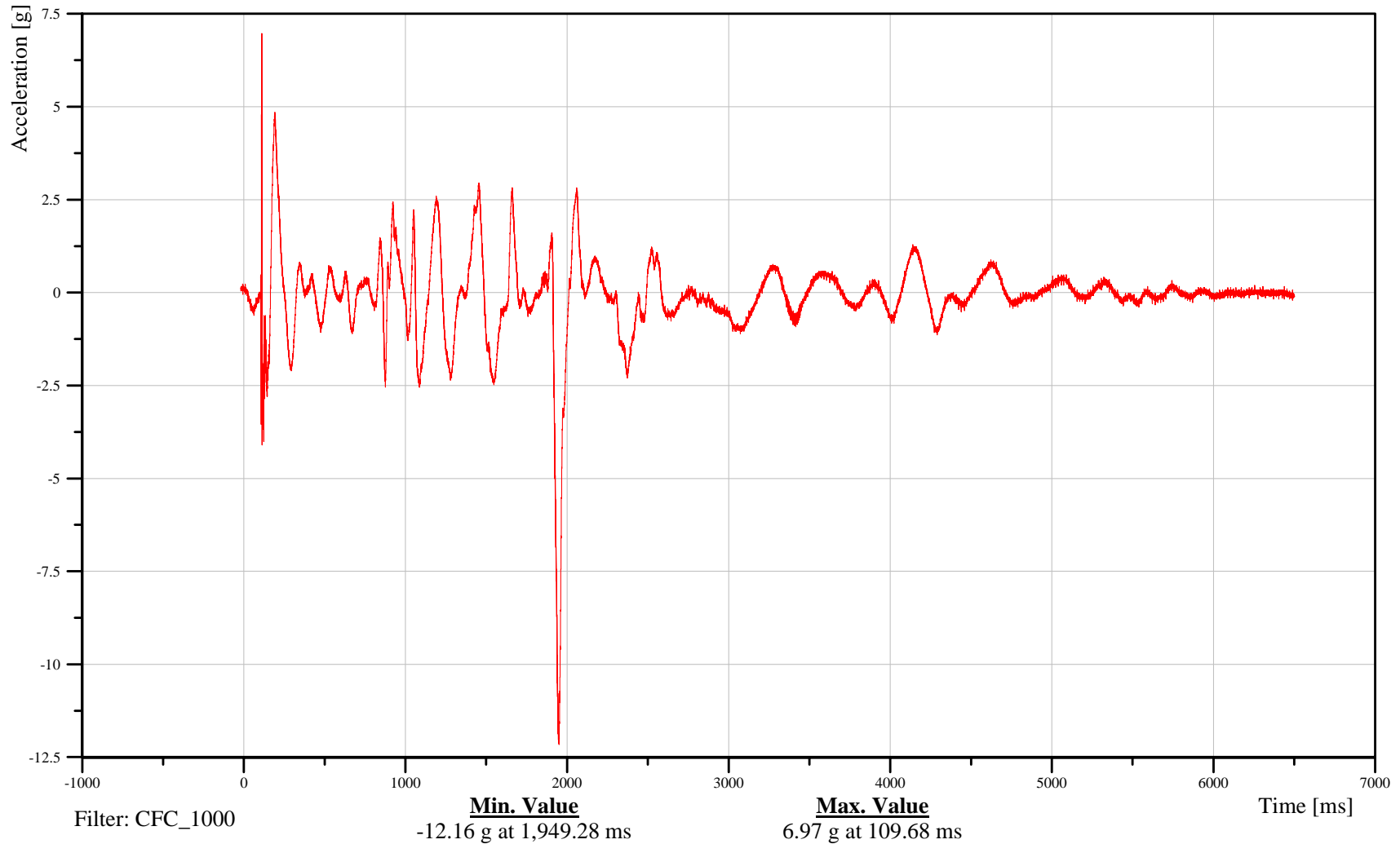
## Right Front Passenger Head Left X-Axis Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13HEADLE00H3ACXA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-38

100115



# Soil Trip Rollover 2007 Ford Expedition

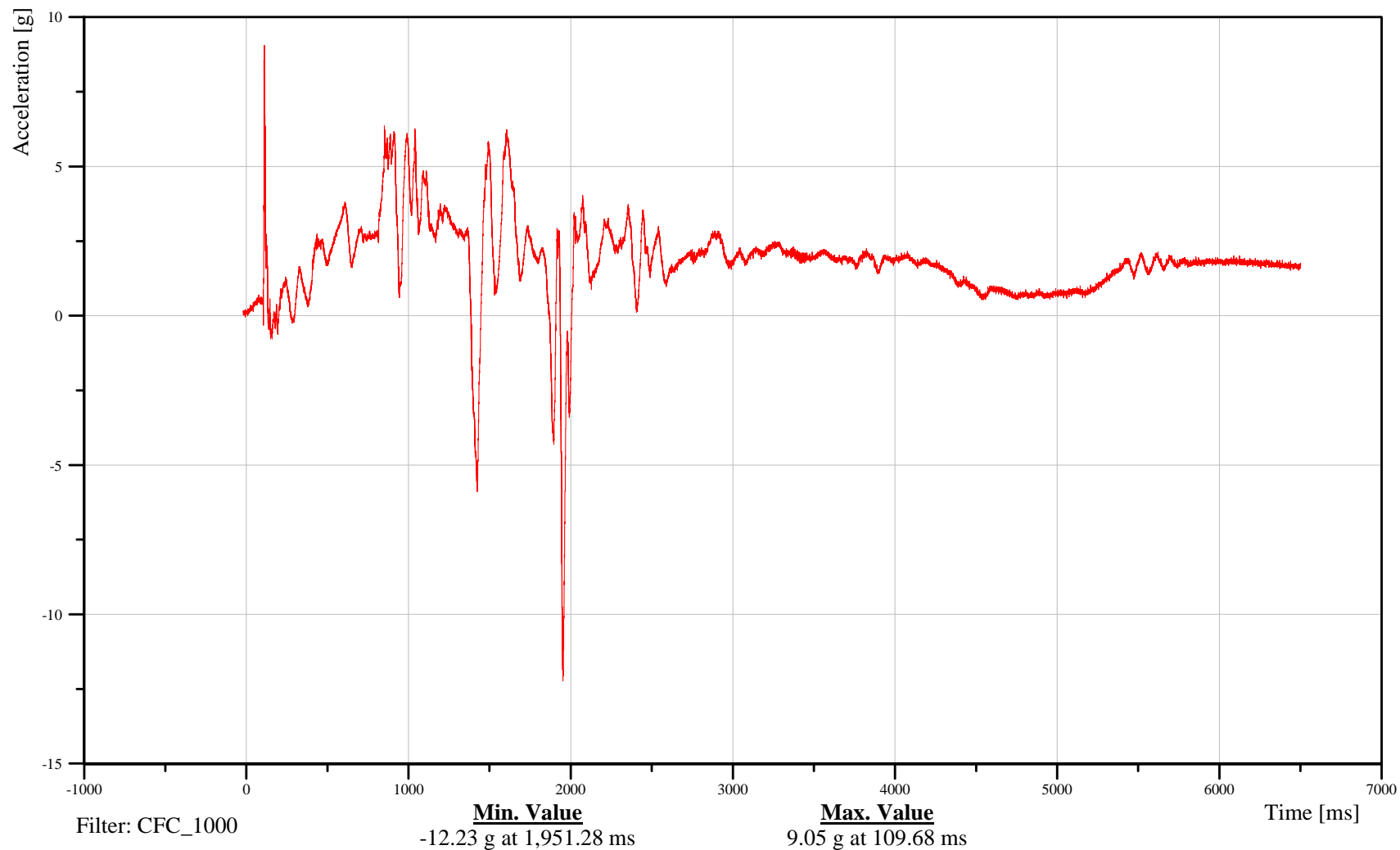
## Right Front Passenger Head Left Z-Axis Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13HEADLE00H3ACZA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-39

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Upper Neck X-Axis Force

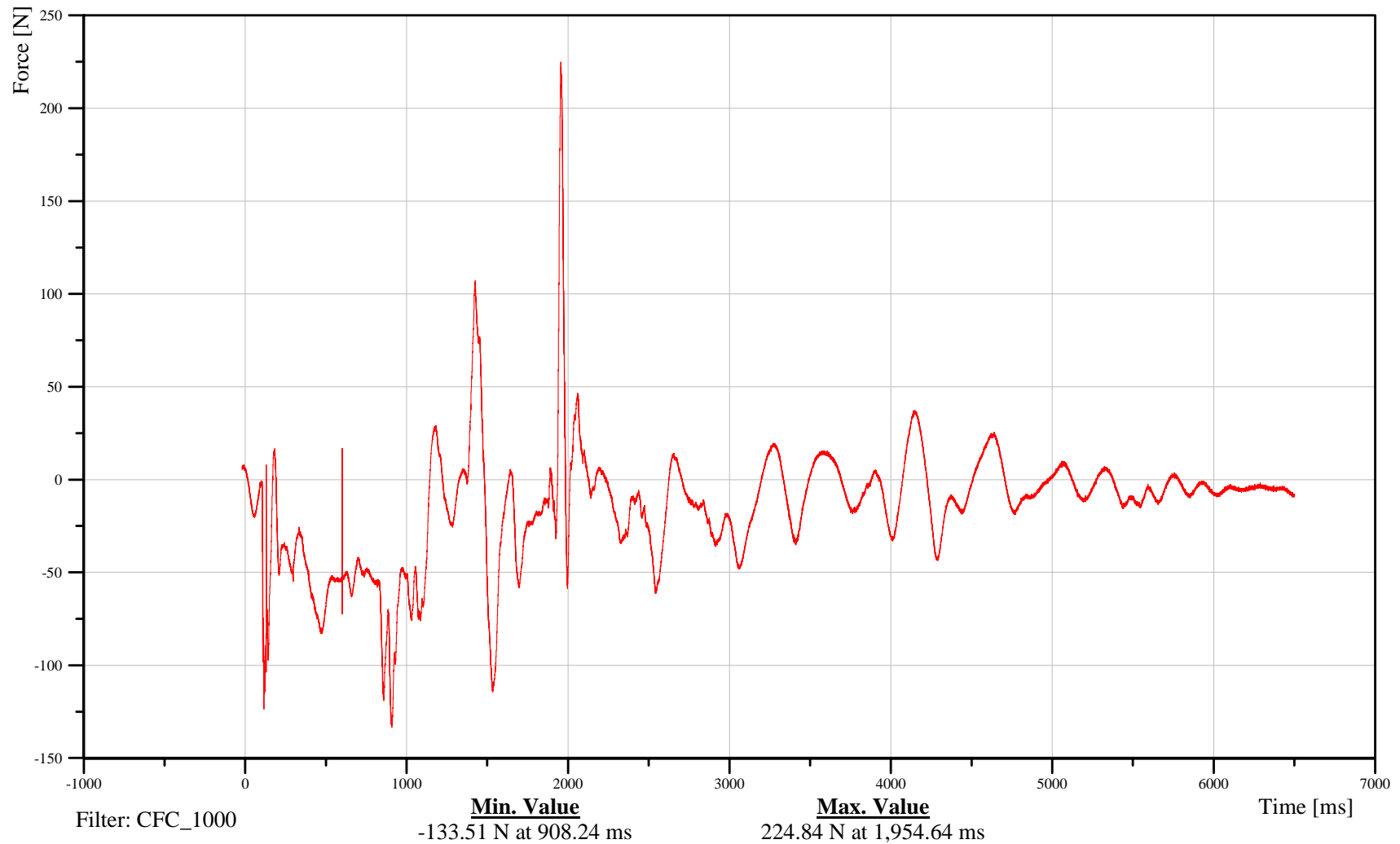
Time: 16:26

Customer: VRTC

# 13NECKUP00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-40

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Upper Neck Y-Axis Force

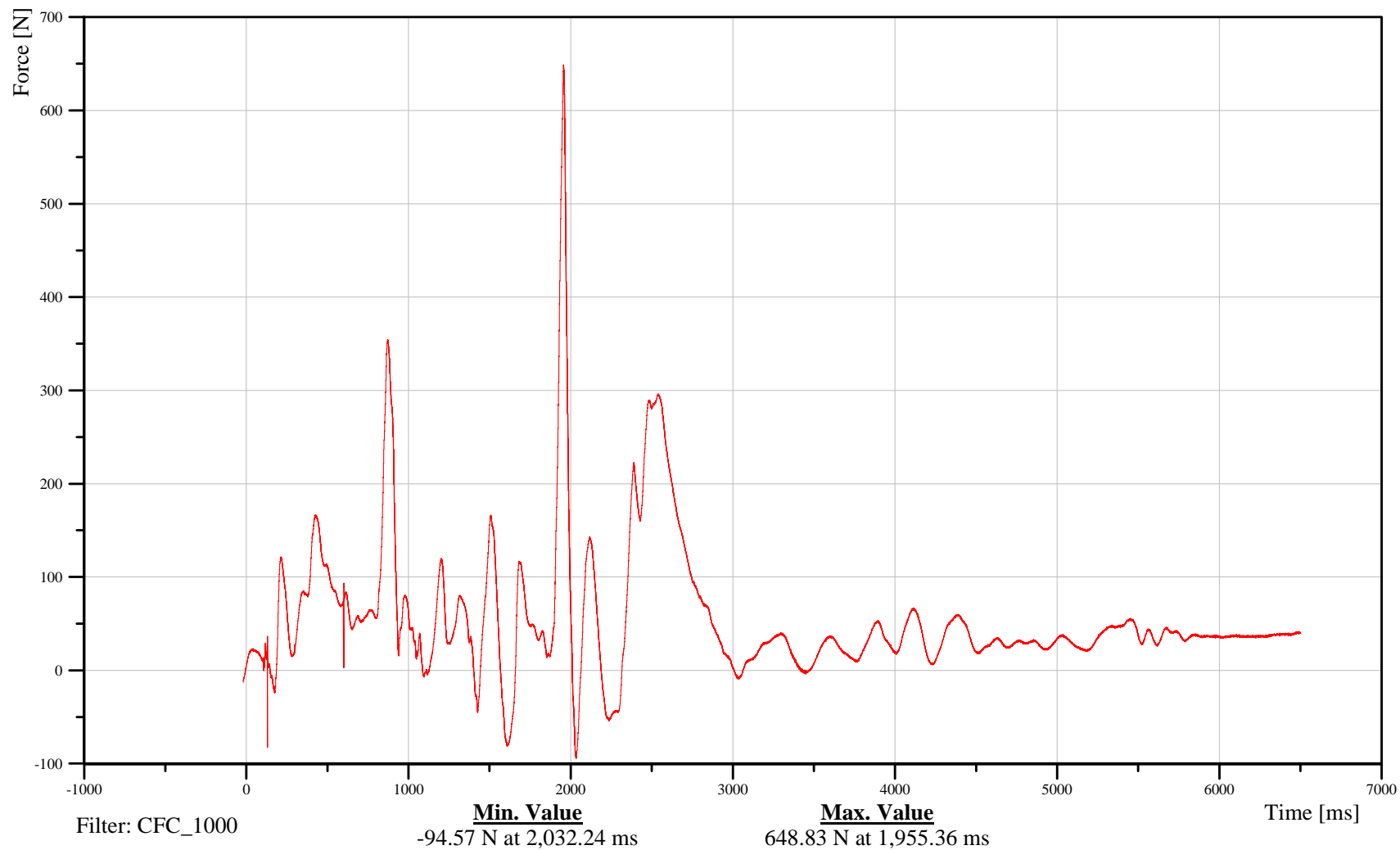
Time: 16:26

Customer: VRTC

# 13NECKUP00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-41

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Upper Neck Z-Axis Force

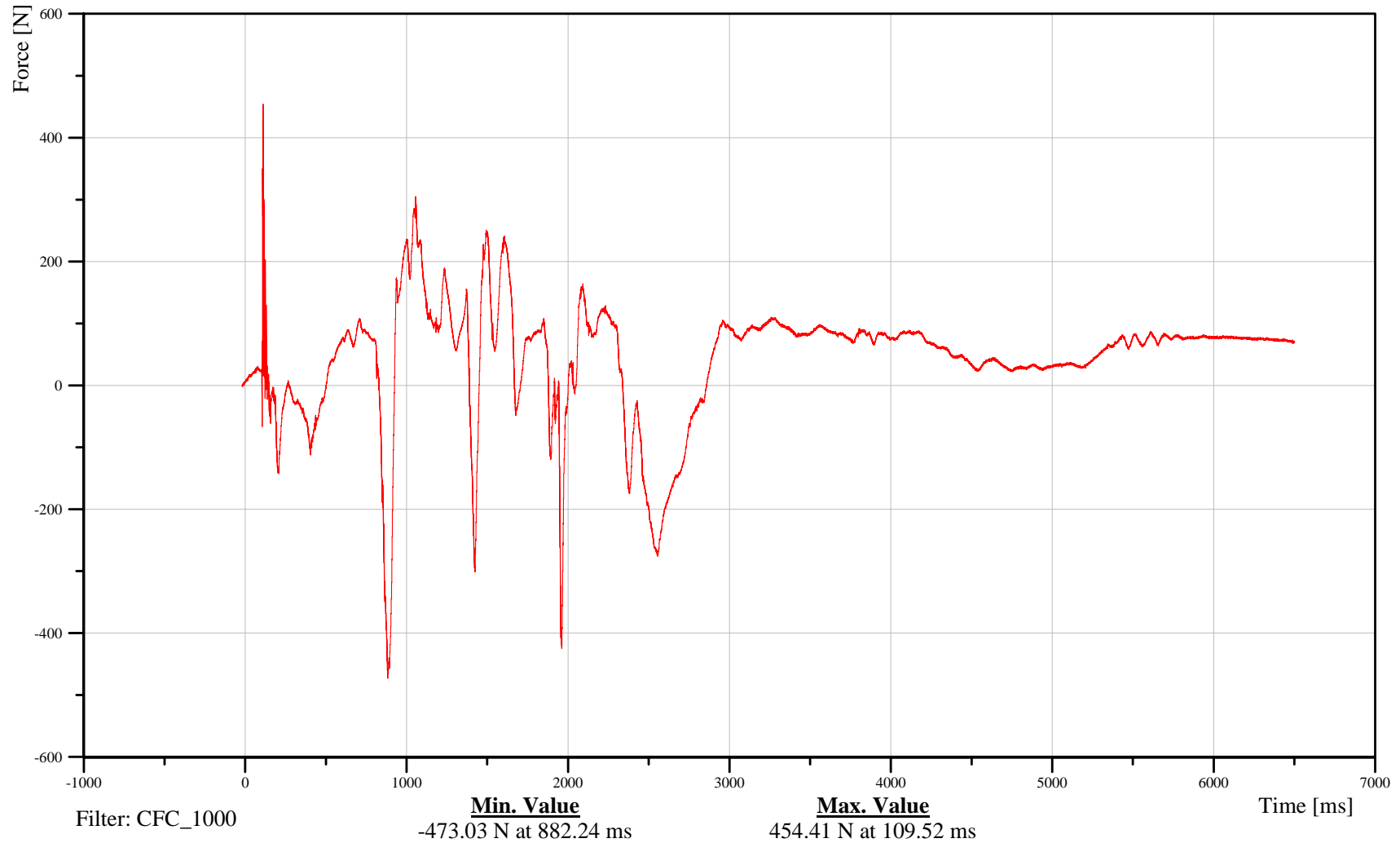
Time: 16:26

Customer: VRTC

# 13NECKUP00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-42

100115



# Soil Trip Rollover 2007 Ford Expedition

## Right Front Passenger Upper Neck Moment About X Axis

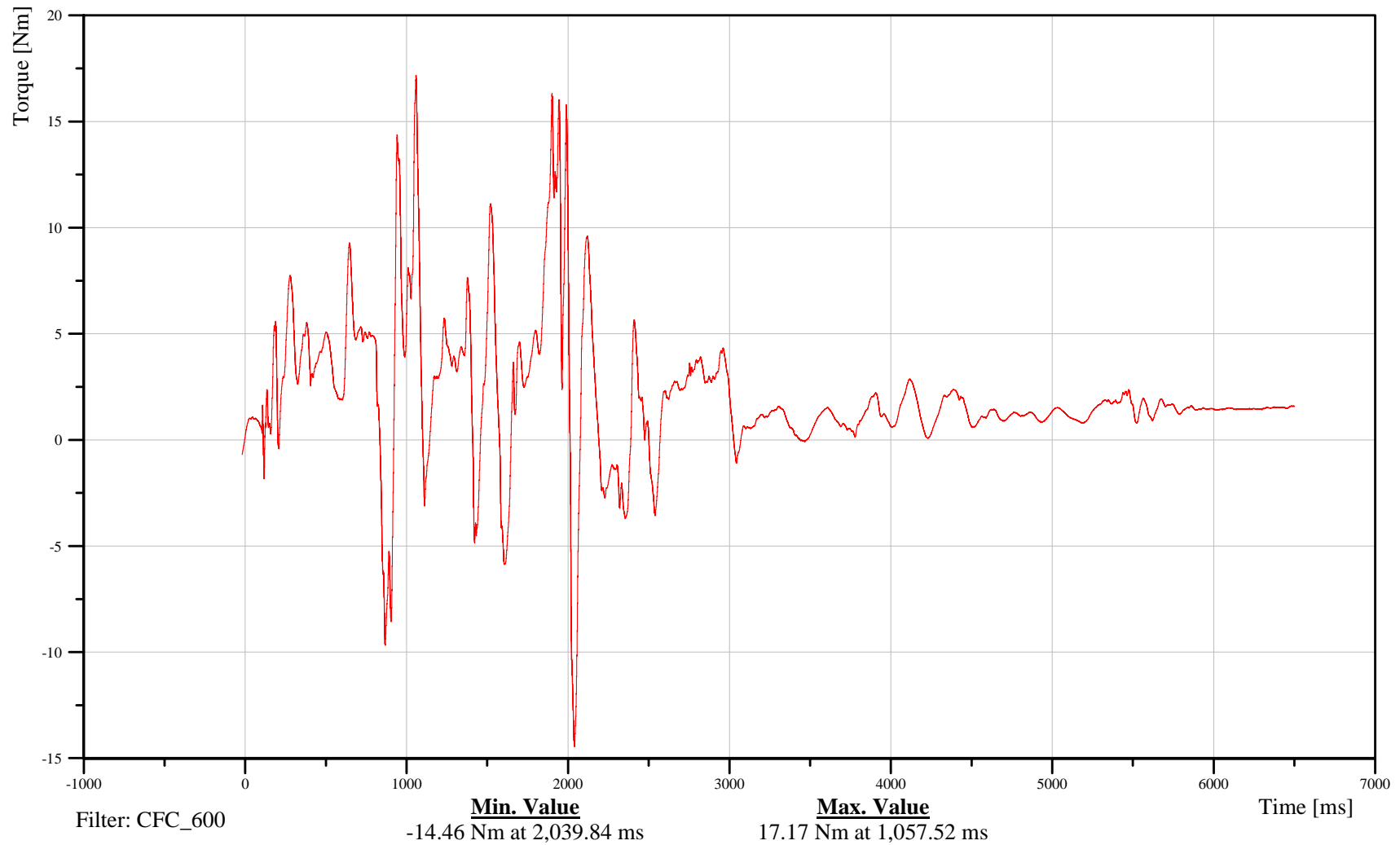
Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13NECKUP00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-43

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

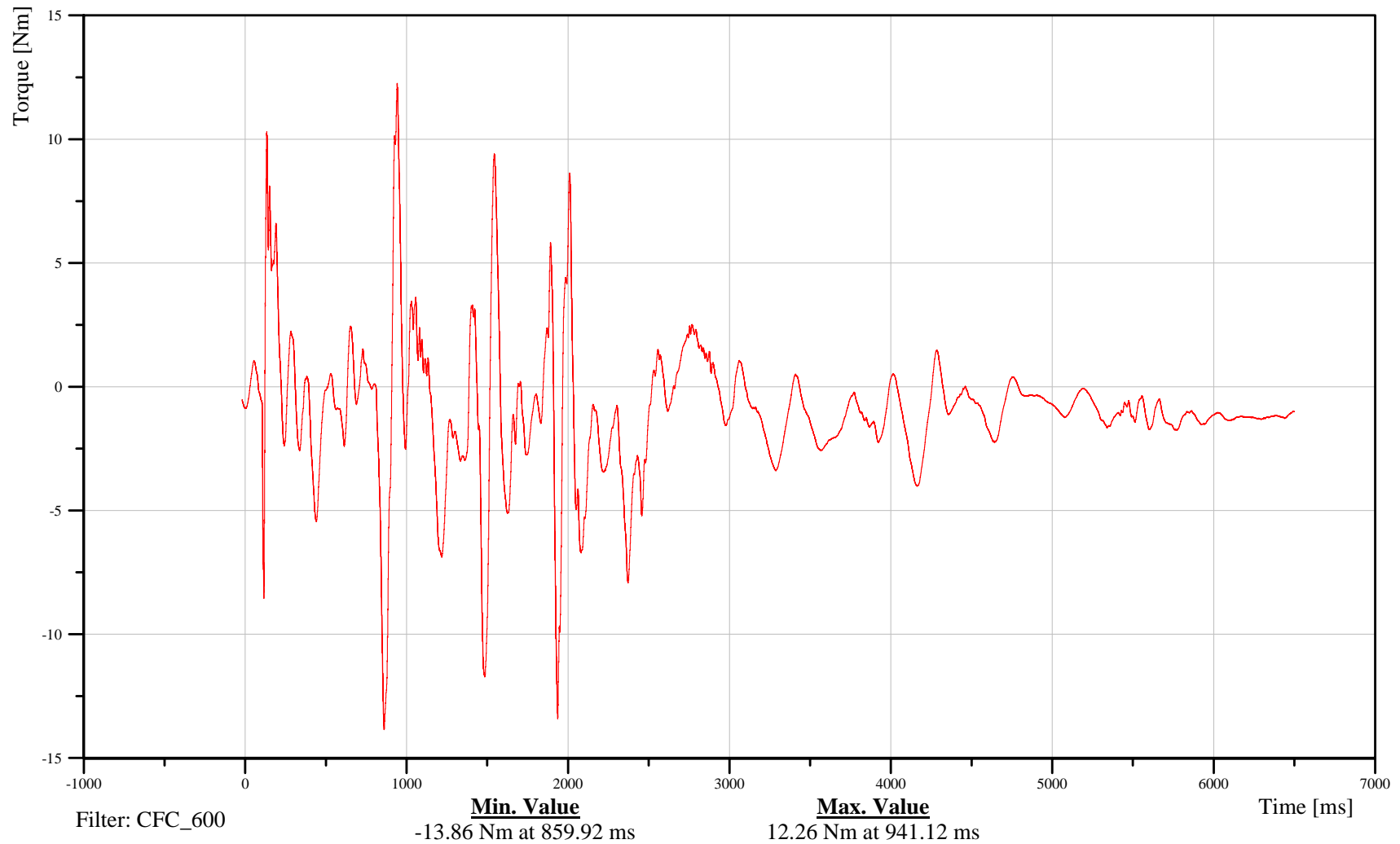
## Right Front Passenger Upper Neck Moment About Y Axis

Customer: VRTC

### 13NECKUP00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-44

100115



Soil Trip Rollover 2007 Ford Expedition  
Right Front Passenger Upper Neck Moment About Z Axis

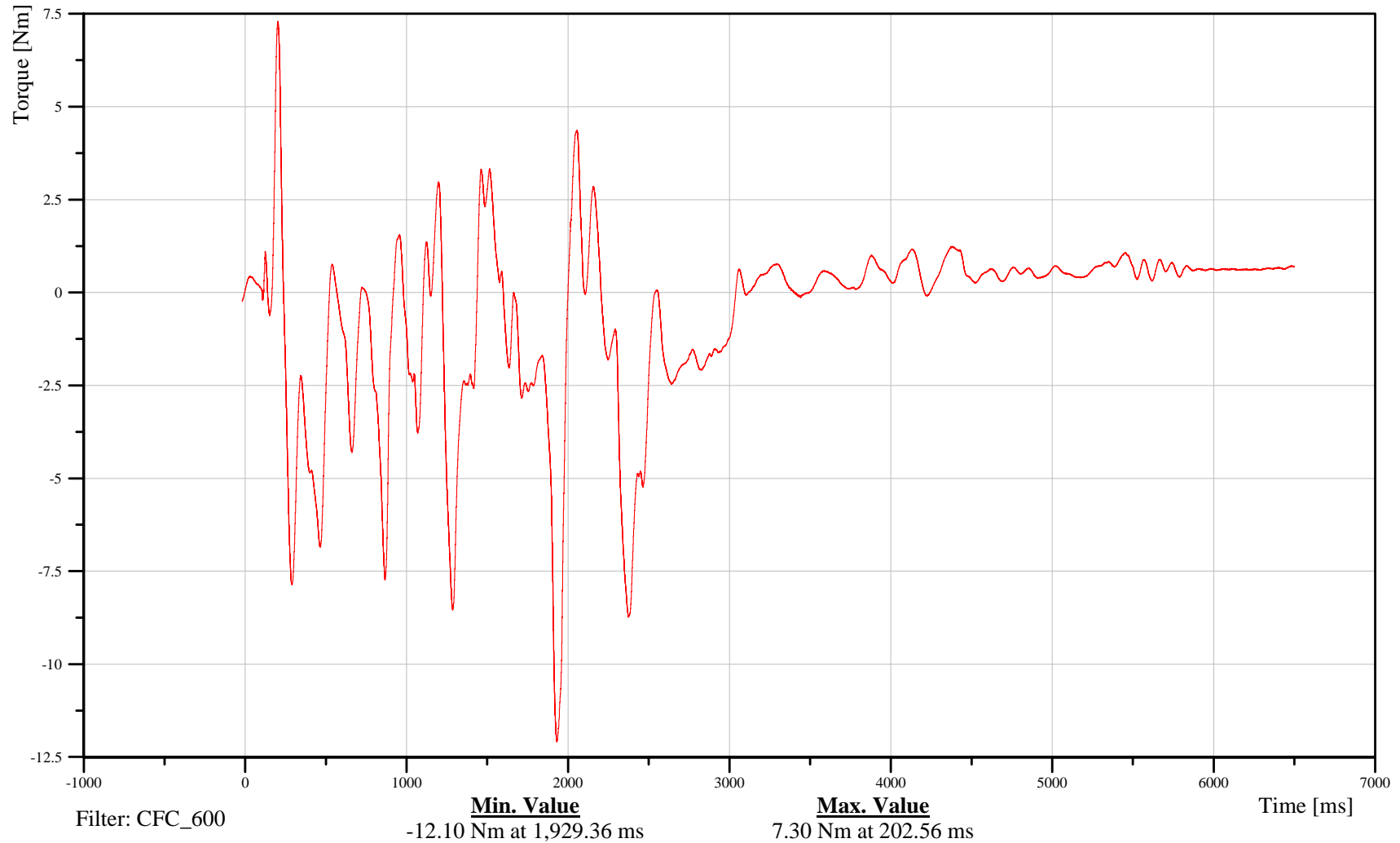
Date: 01/15/2010  
Time: 16:26

Customer: VRTC

13NECKUP00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-45

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Lower Neck X-Axis Force

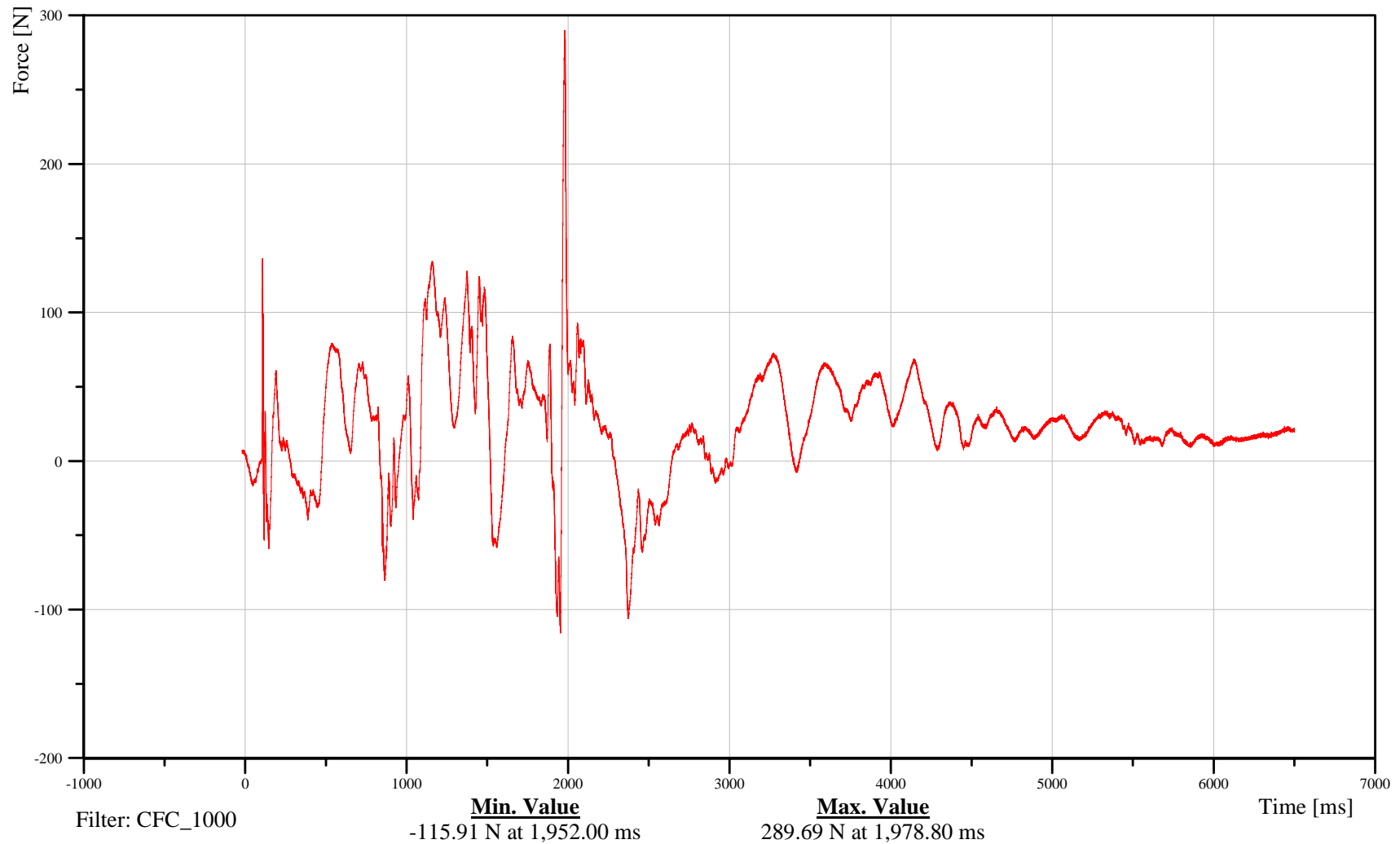
Time: 16:26

Customer: VRTC

### 13NECKLO00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-46

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Lower Neck Y-Axis Force

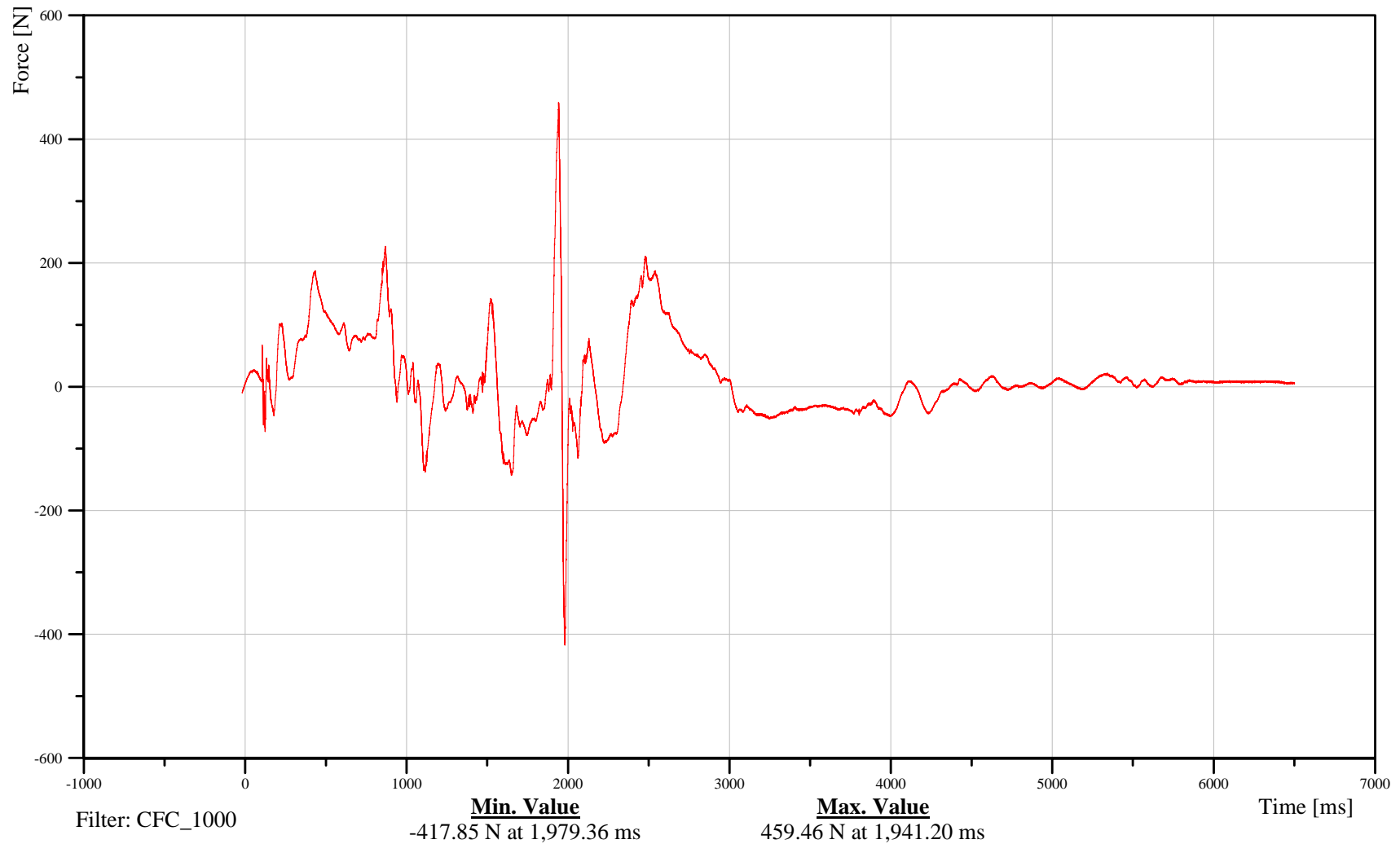
Time: 16:26

Customer: VRTC

# 13NECKLO00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-47

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Lower Neck Z-Axis Force

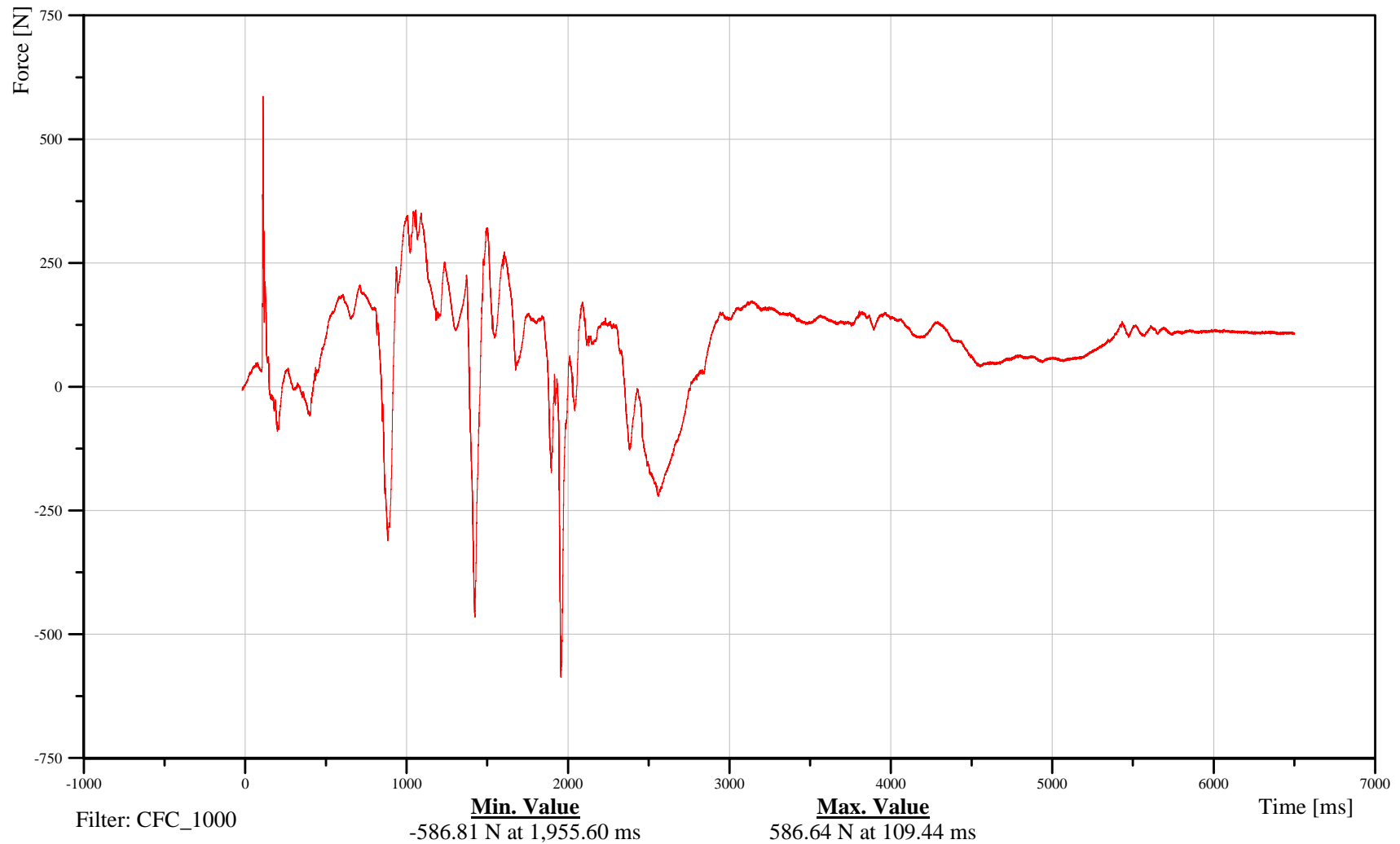
Time: 16:26

Customer: VRTC

# 13NECKLO00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-48

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

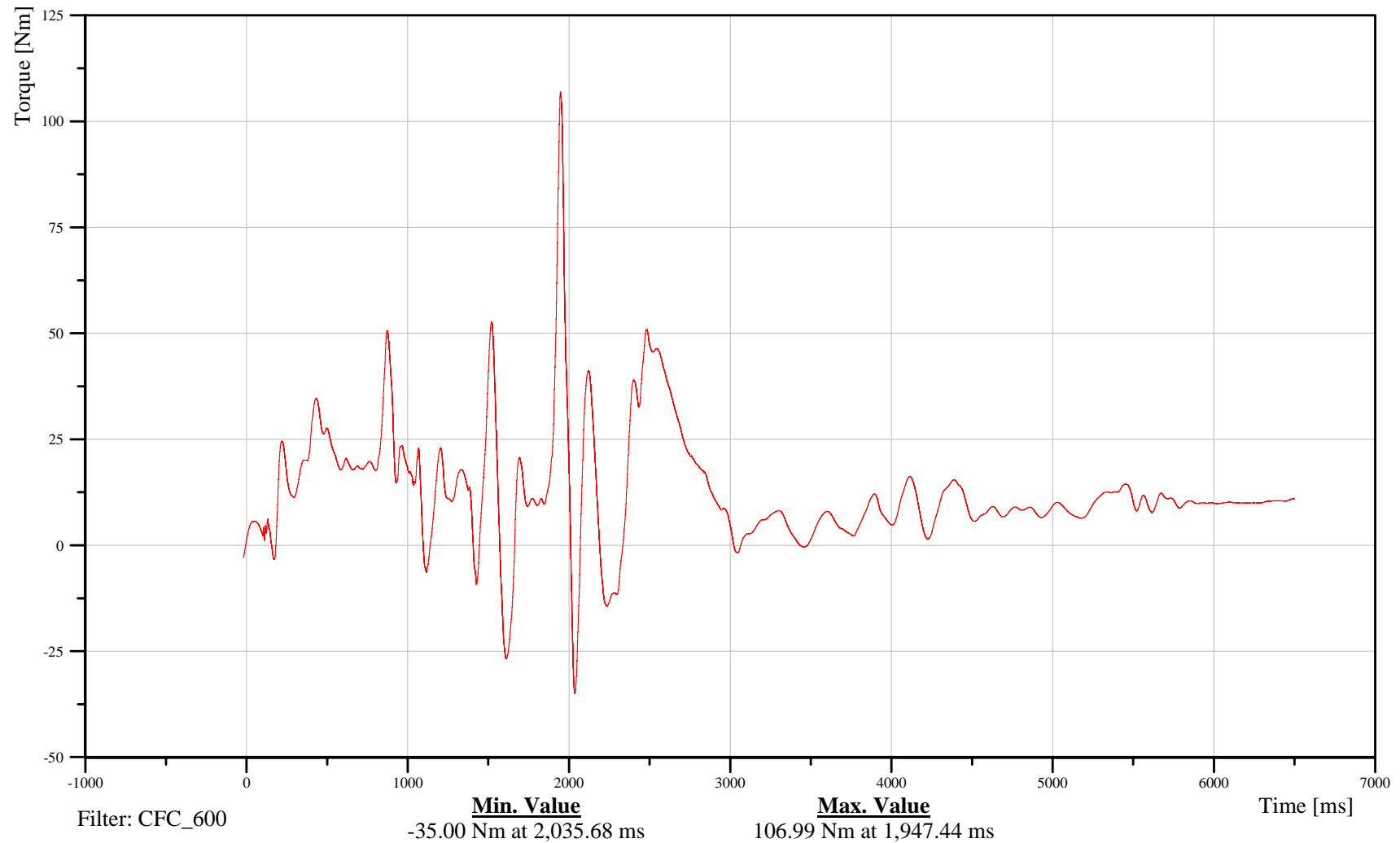
## Right Front Passenger Lower Neck Moment About X Axis

Customer: VRTC

### 13NECKLO00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-49

100115



# Soil Trip Rollover 2007 Ford Expedition

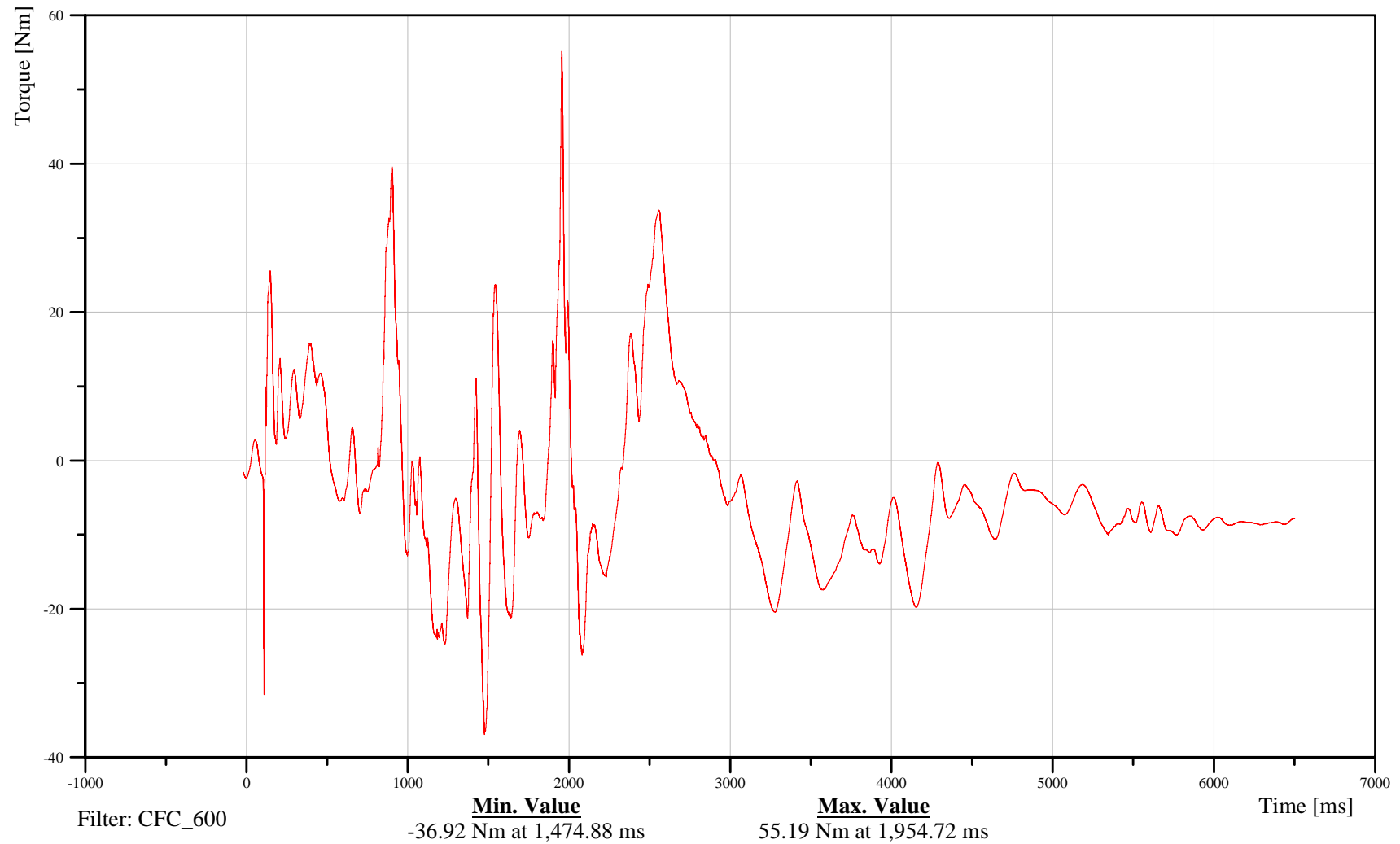
## Right Front Passenger Lower Neck Moment About Y Axis

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13NECKLO00H3MOYB

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-50

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

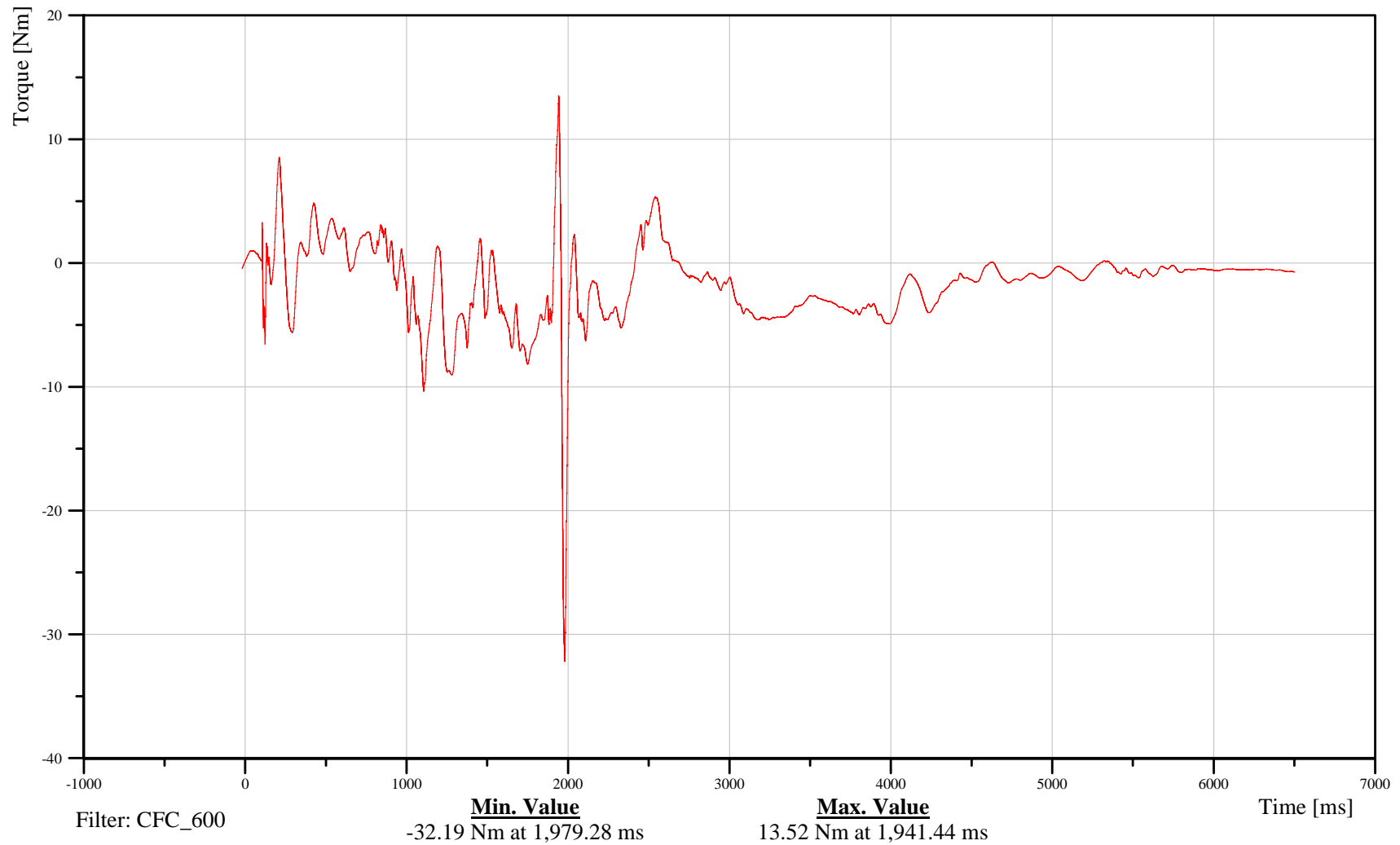
## Right Front Passenger Lower Neck Moment About Z Axis

Customer: VRTC

# 13NECKLO00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-51

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Chest X-Axis Acceleration

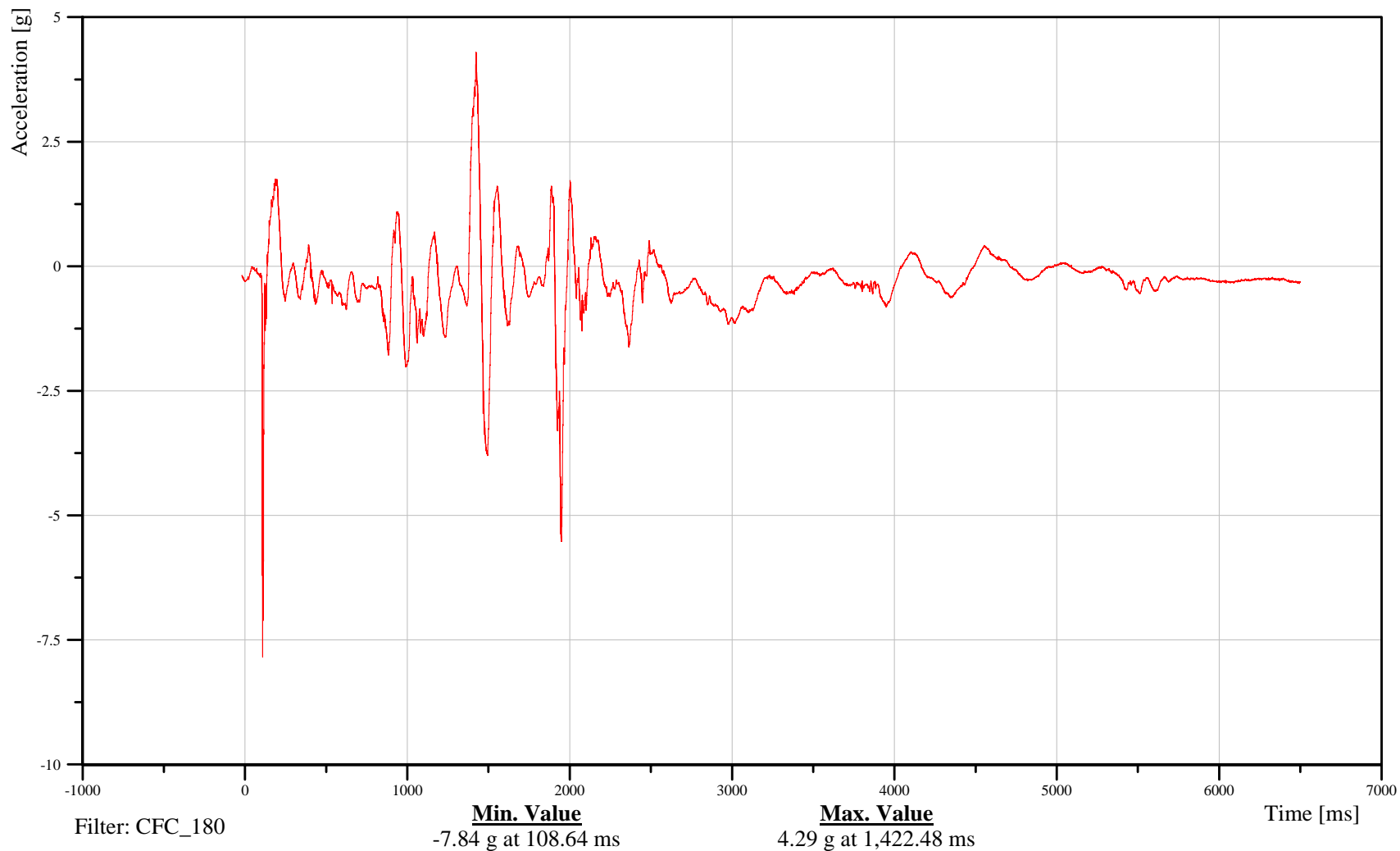
Time: 16:26

Customer: VRTC

# 13CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-52

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Chest Y-Axis Acceleration

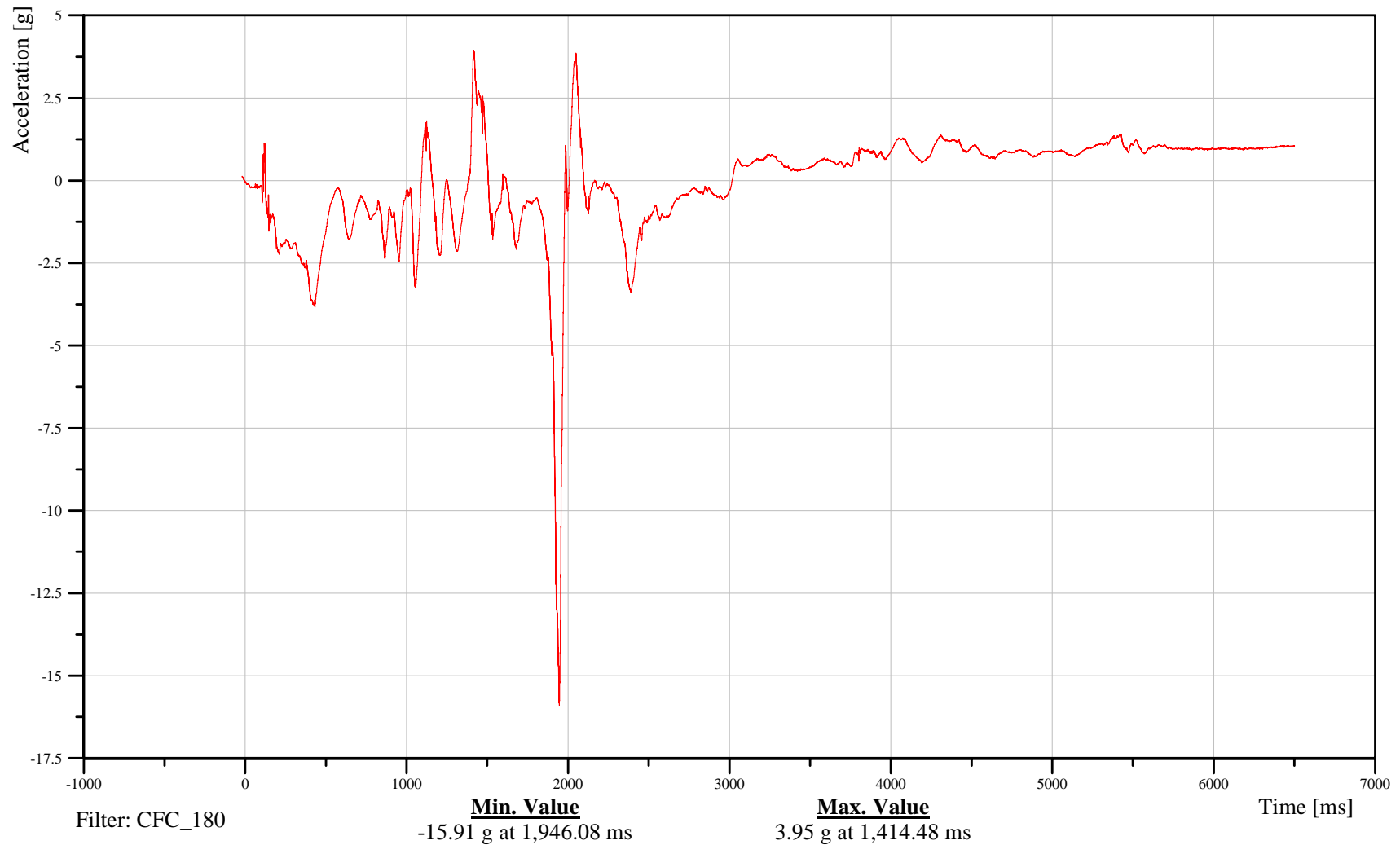
Time: 16:26

Customer: VRTC

# 13CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-53

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Chest Z-Axis Acceleration

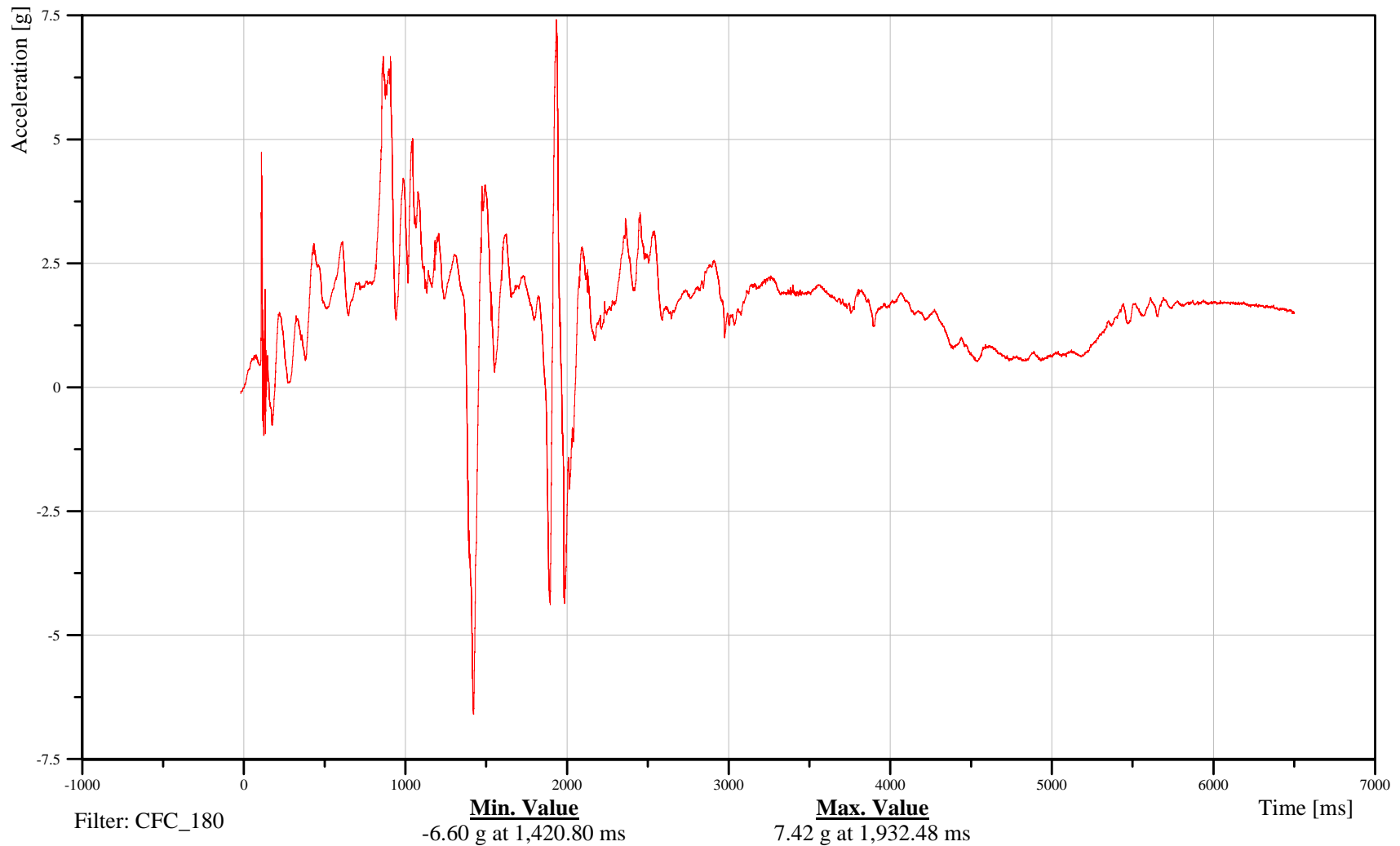
Time: 16:26

Customer: VRTC

# 13CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-54

100115



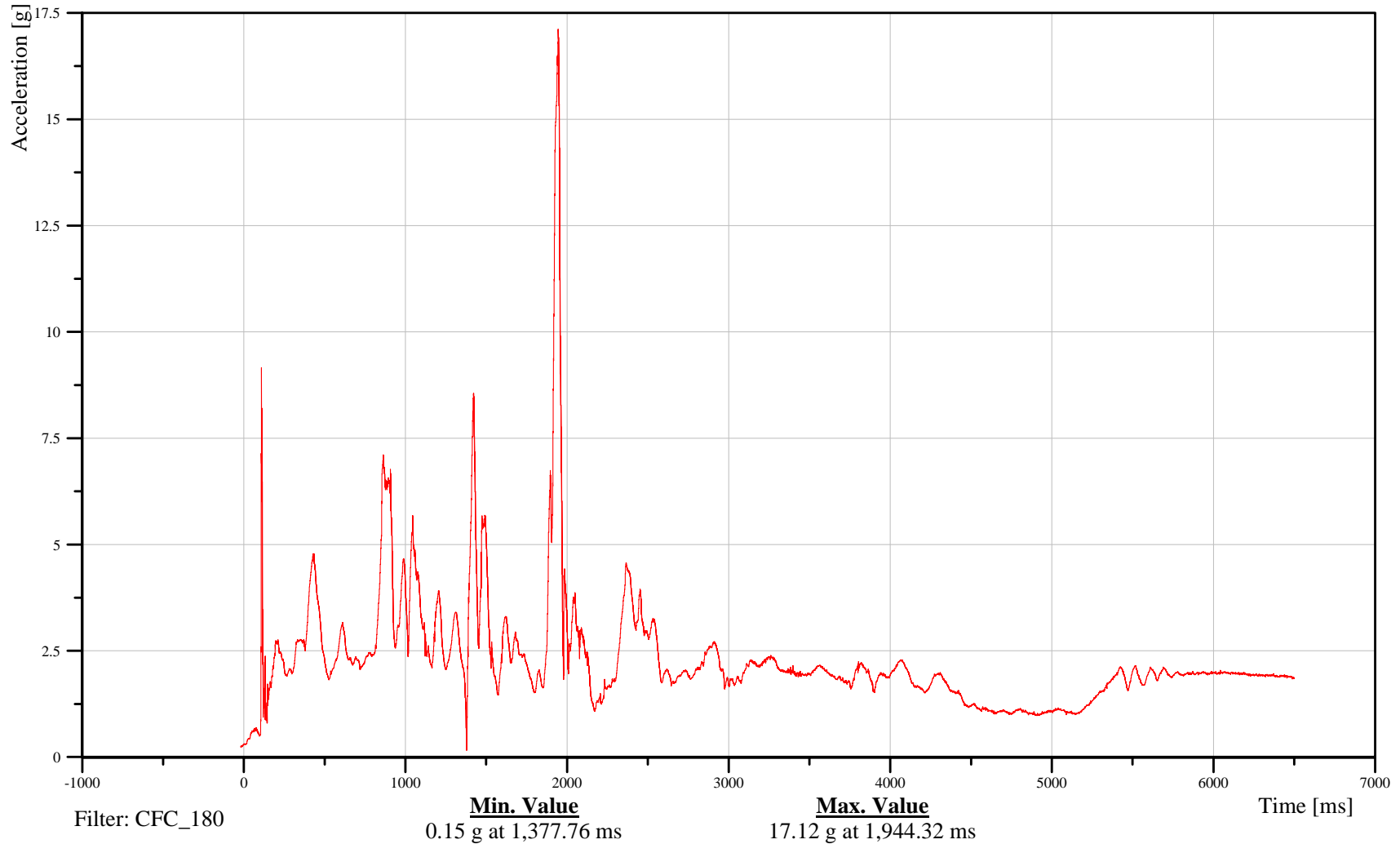
Soil Trip Rollover 2007 Ford Expedition  
Right Front Passenger Chest Resultant Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

13CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-55

100115



# Soil Trip Rollover 2007 Ford Expedition

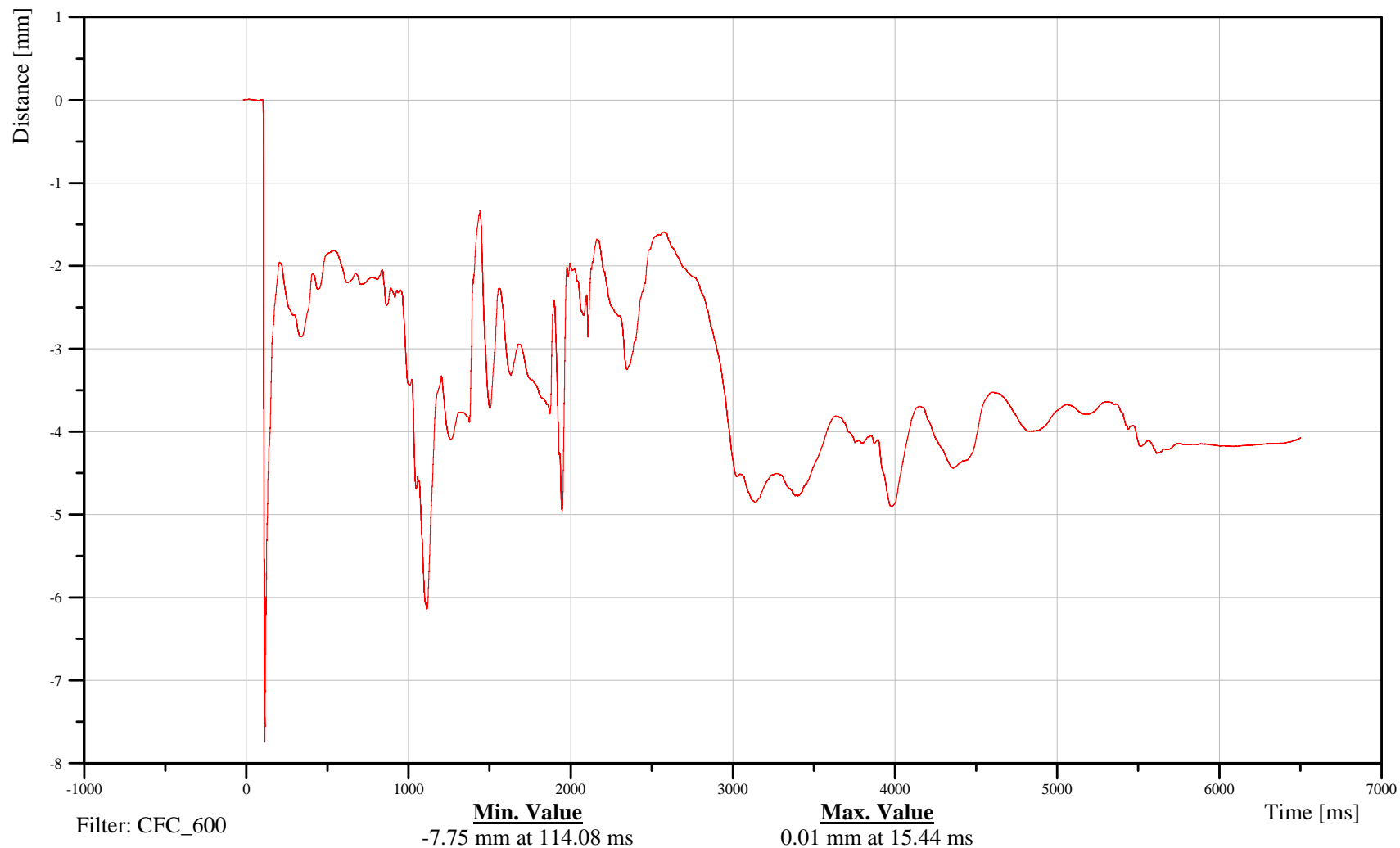
## Right Front Passenger Chest X-Axis Displacement

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13CHST0000H3DSXB

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-56

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Pelvis X-Axis Acceleration

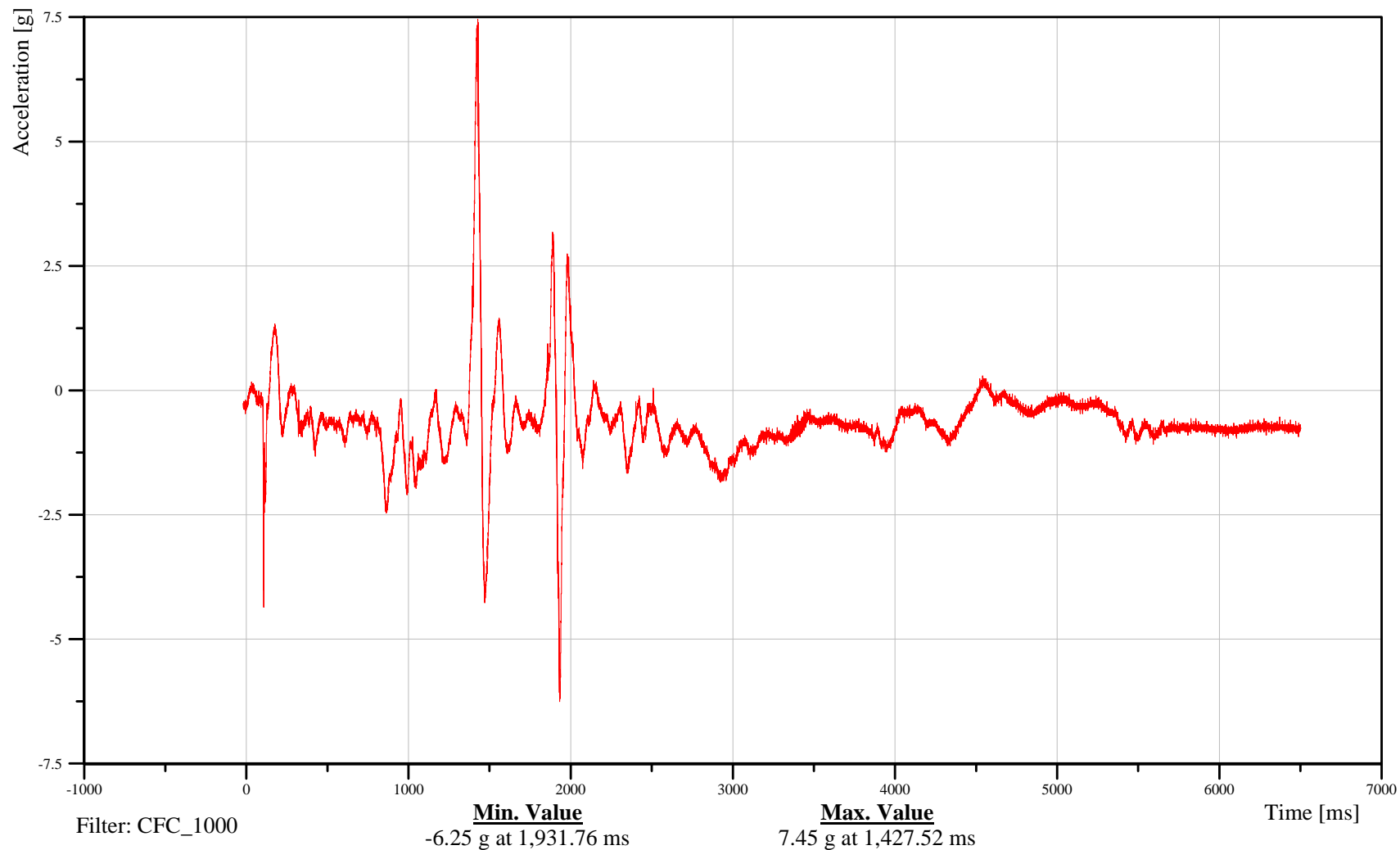
Time: 16:26

Customer: VRTC

### 13PELVCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-57

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Pelvis Y-Axis Acceleration

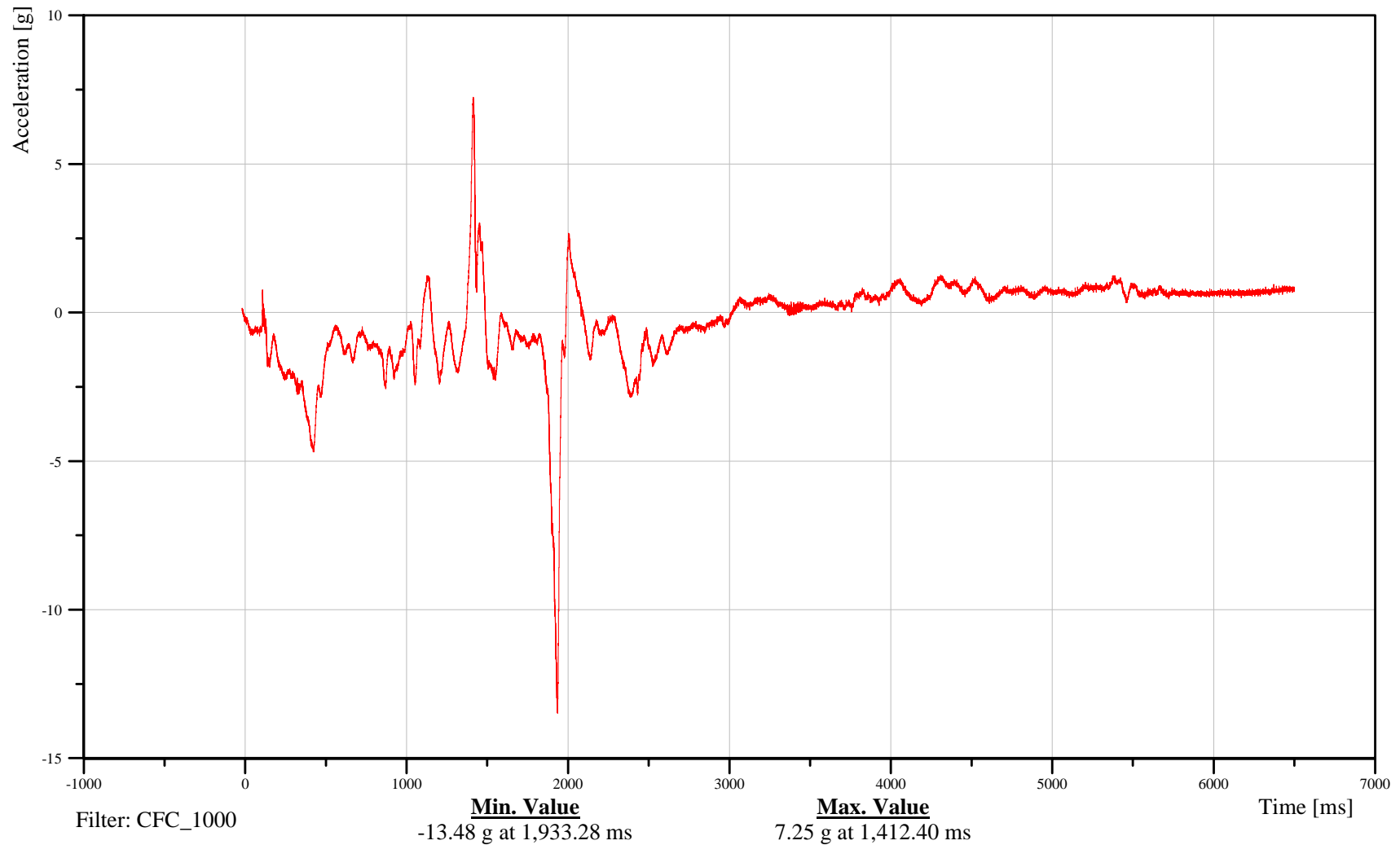
Time: 16:26

Customer: VRTC

# 13PELVCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-58

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Pelvis Z-Axis Acceleration

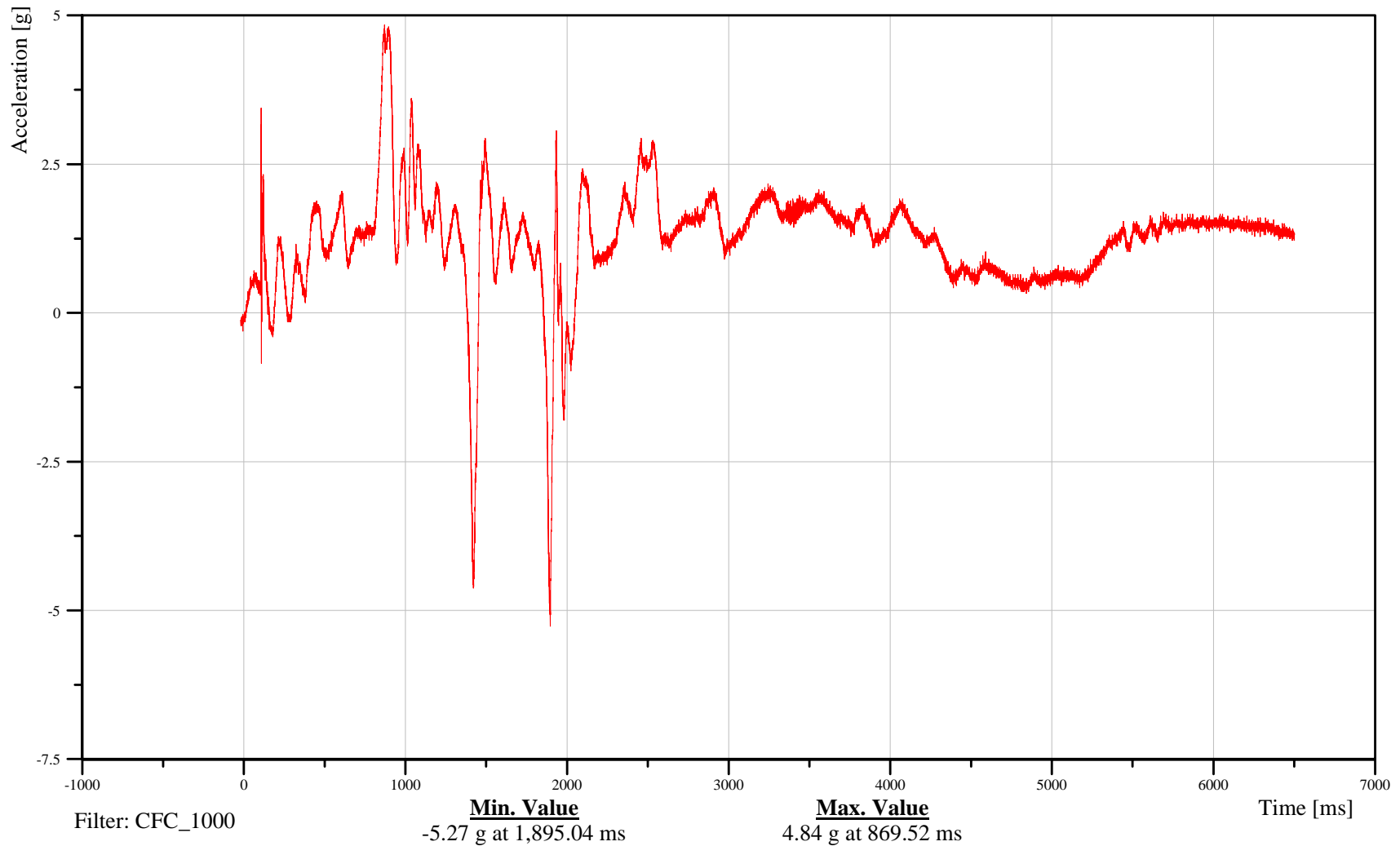
Time: 16:26

Customer: VRTC

# 13PELVCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-59

100115



# Soil Trip Rollover 2007 Ford Expedition

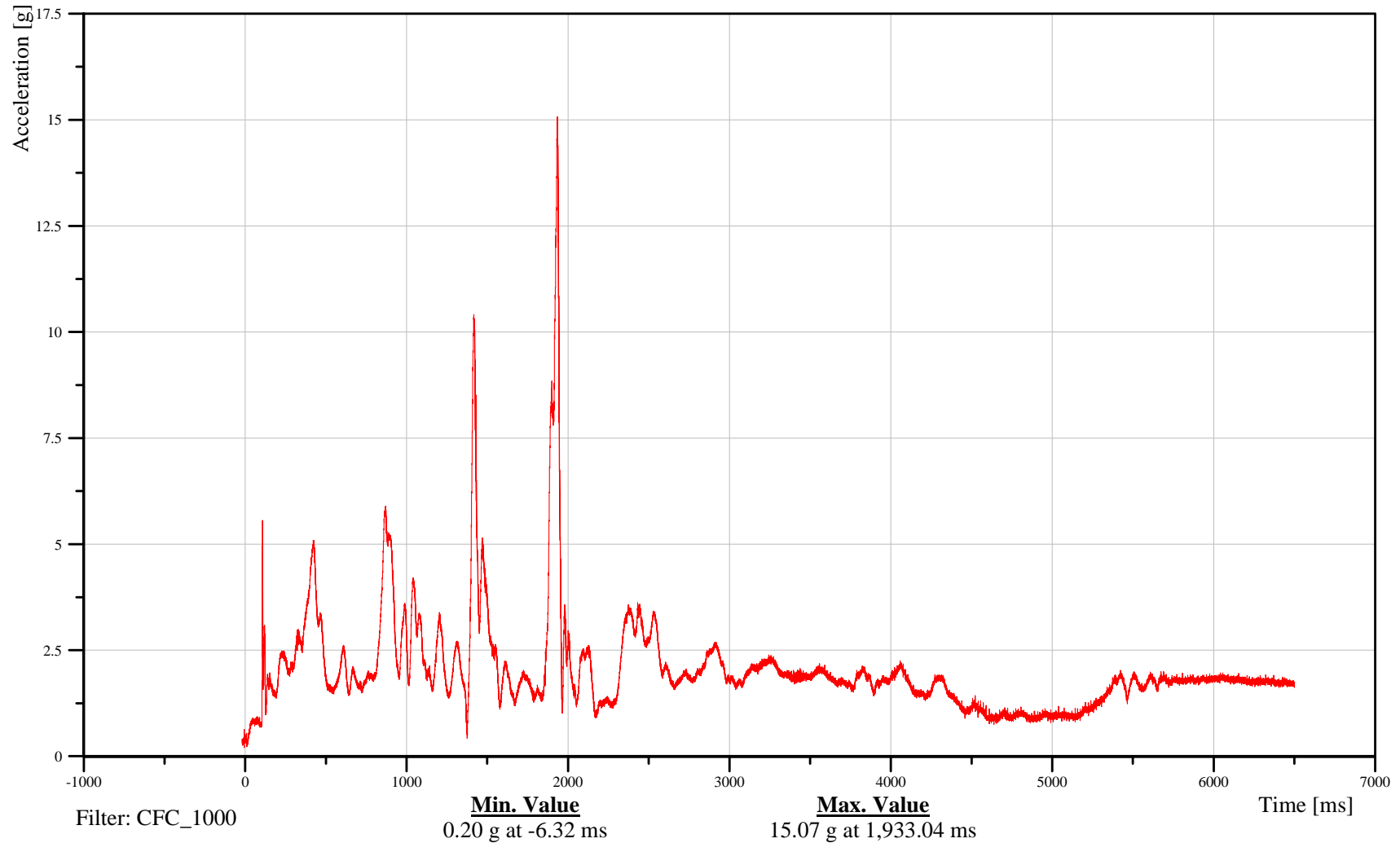
## Right Front Passenger Pelvis Resultant Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13PELVCG00H3ACRA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-60

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Head X-Axis Acceleration

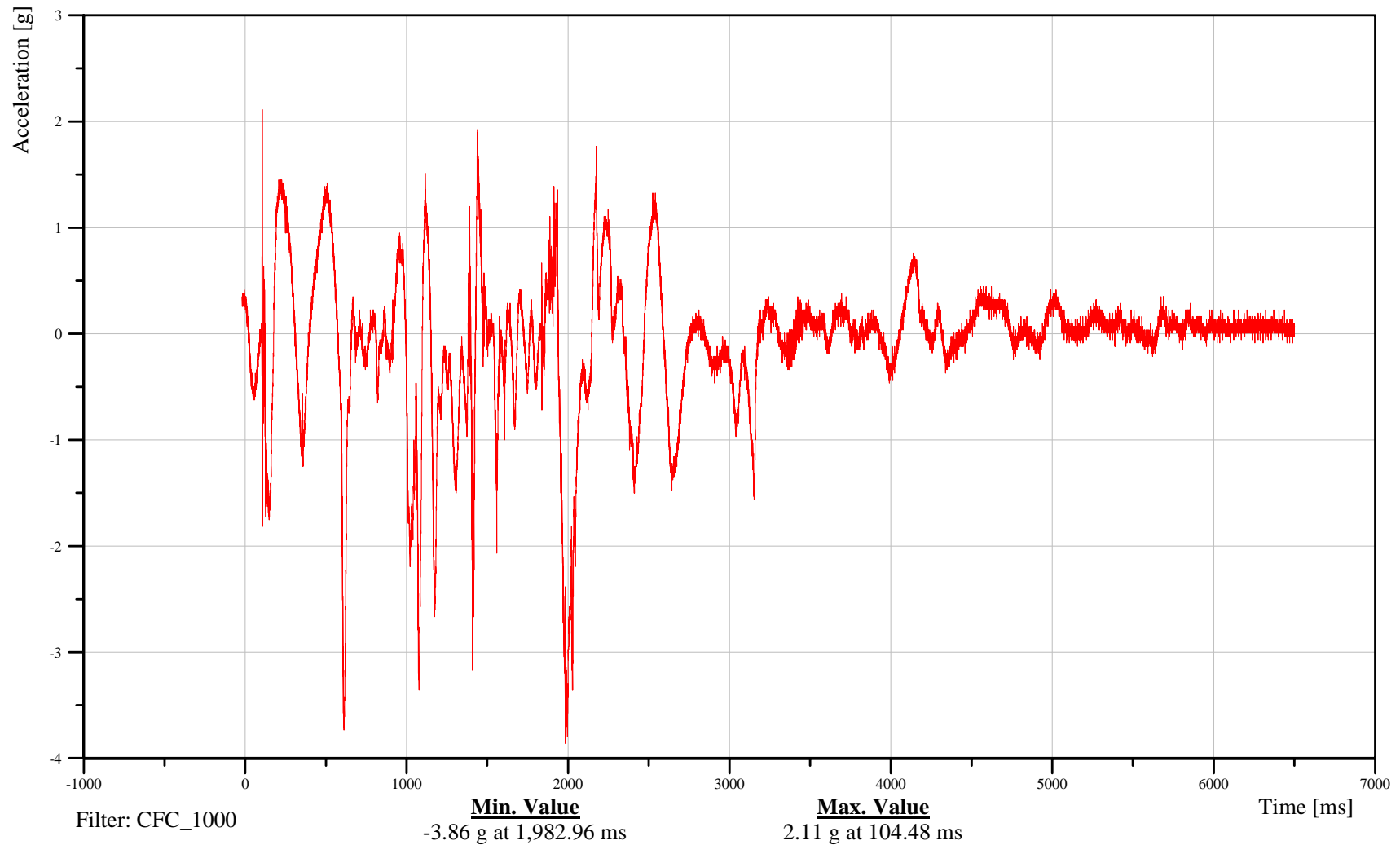
Time: 16:26

Customer: VRTC

### 14HEADCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-61

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Head Y-Axis Acceleration

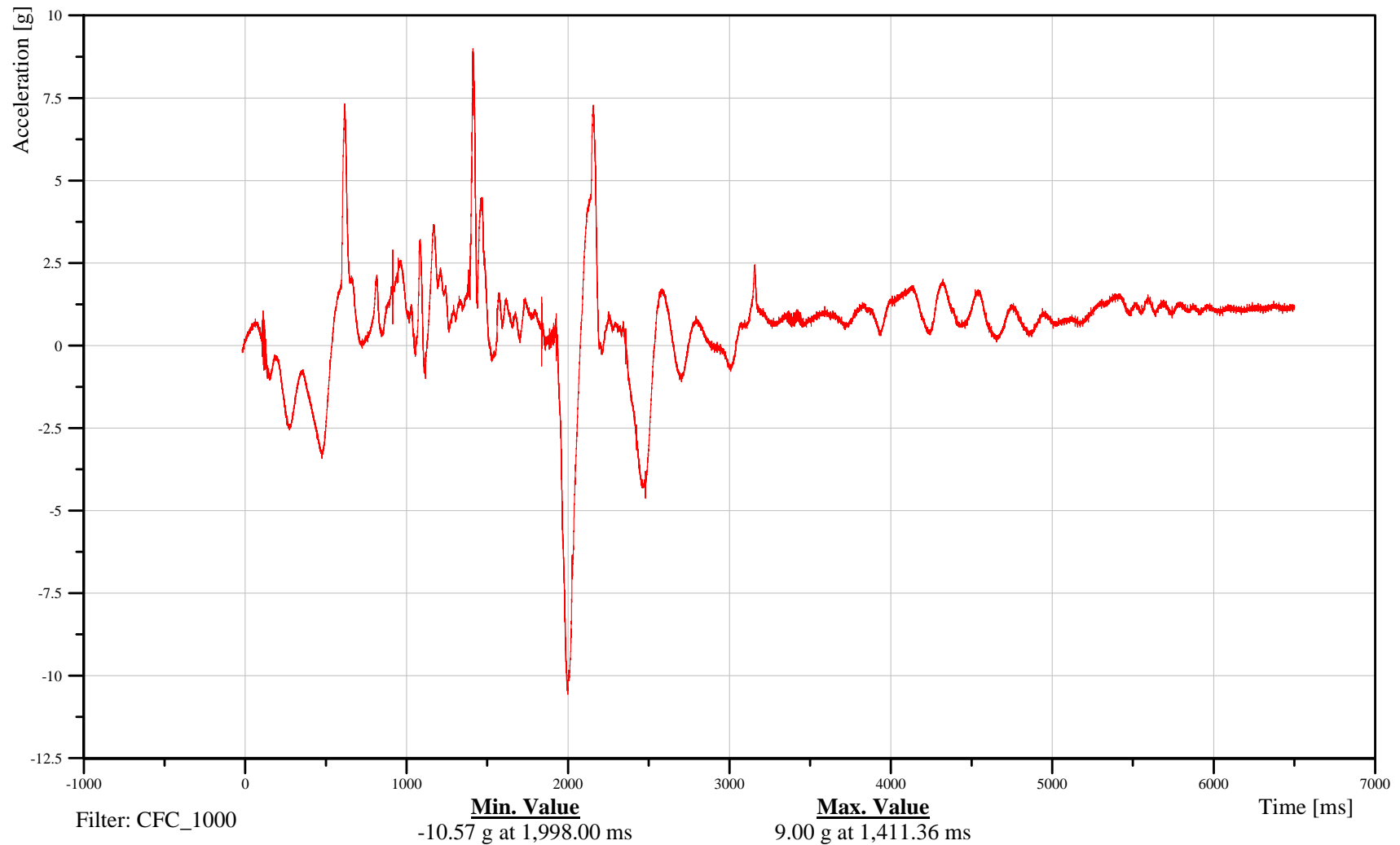
Time: 16:26

Customer: VRTC

### 14HEADCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-62

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Head Z-Axis Acceleration

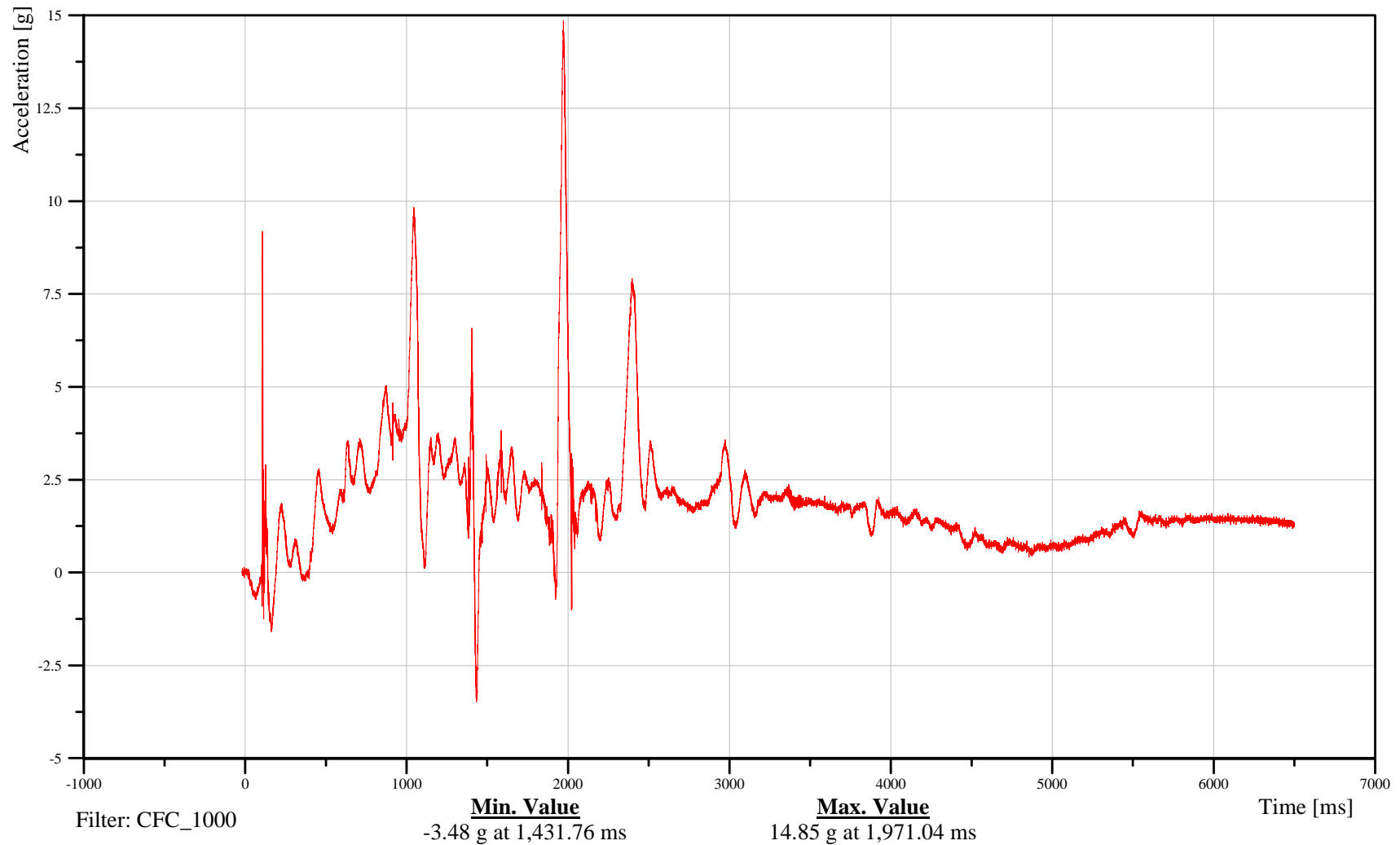
Time: 16:26

Customer: VRTC

### 14HEADCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-63

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Head Resultant Acceleration

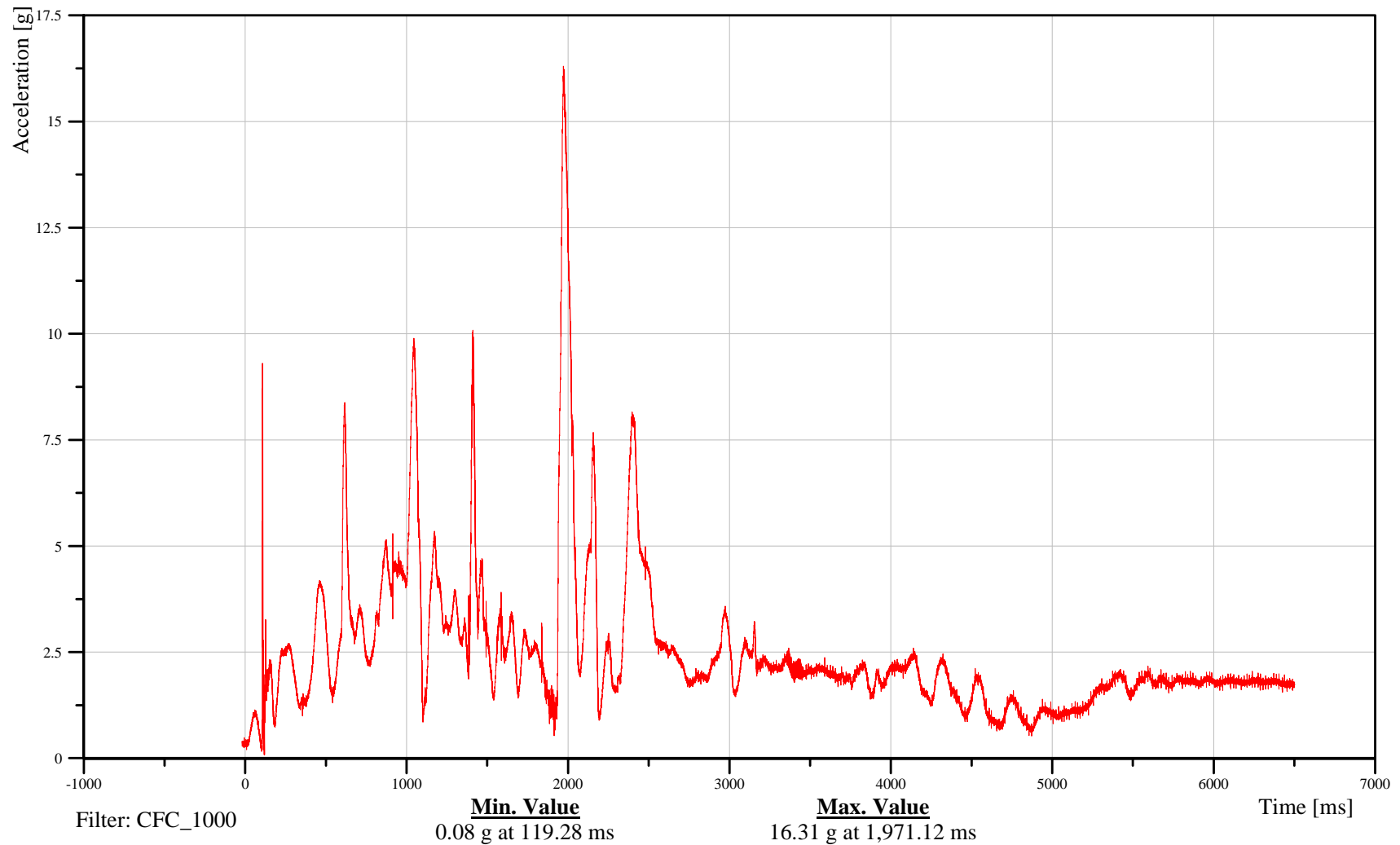
Time: 16:26

Customer: VRTC

### 14HEADCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-64

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Head (DTS ARS) Rate Gyro X

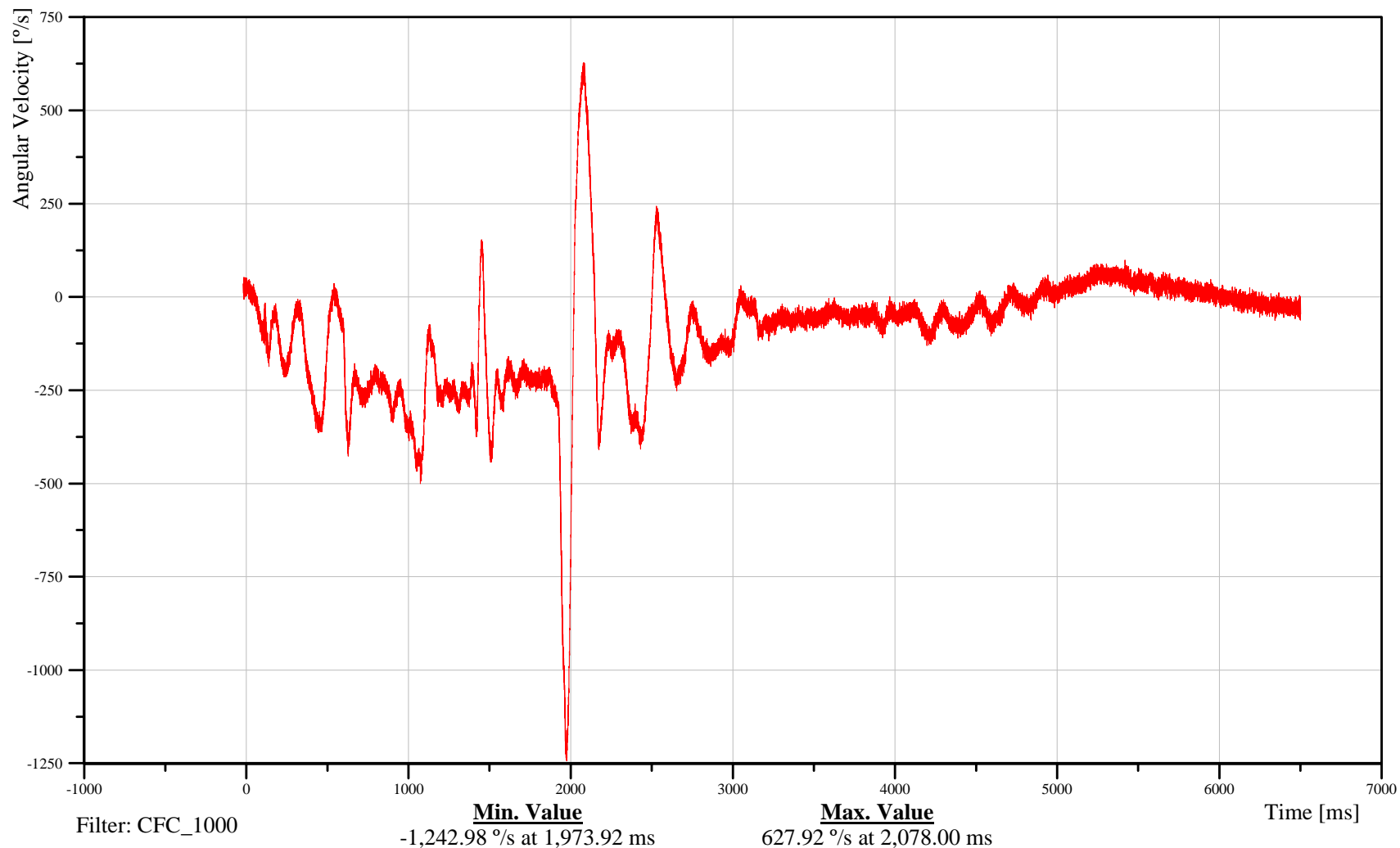
Time: 16:26

Customer: VRTC

### 14HEADCG00H3AVXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-65

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Left Rear Passenger Head (DTS ARS) Rate Gyro Y

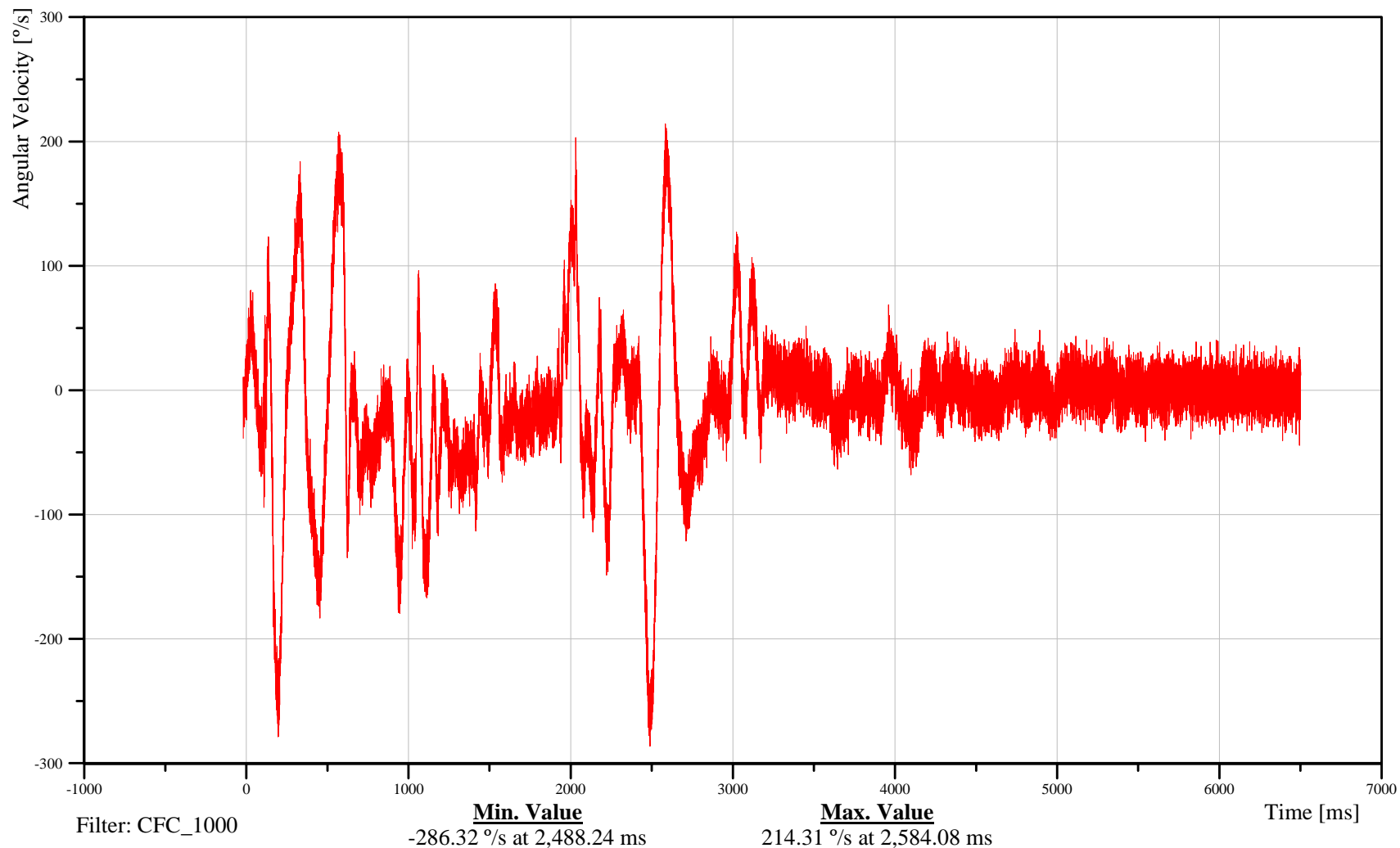
Time: 16:26

Customer: VRTC

## 14HEADCG00H3AVYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-66

100115



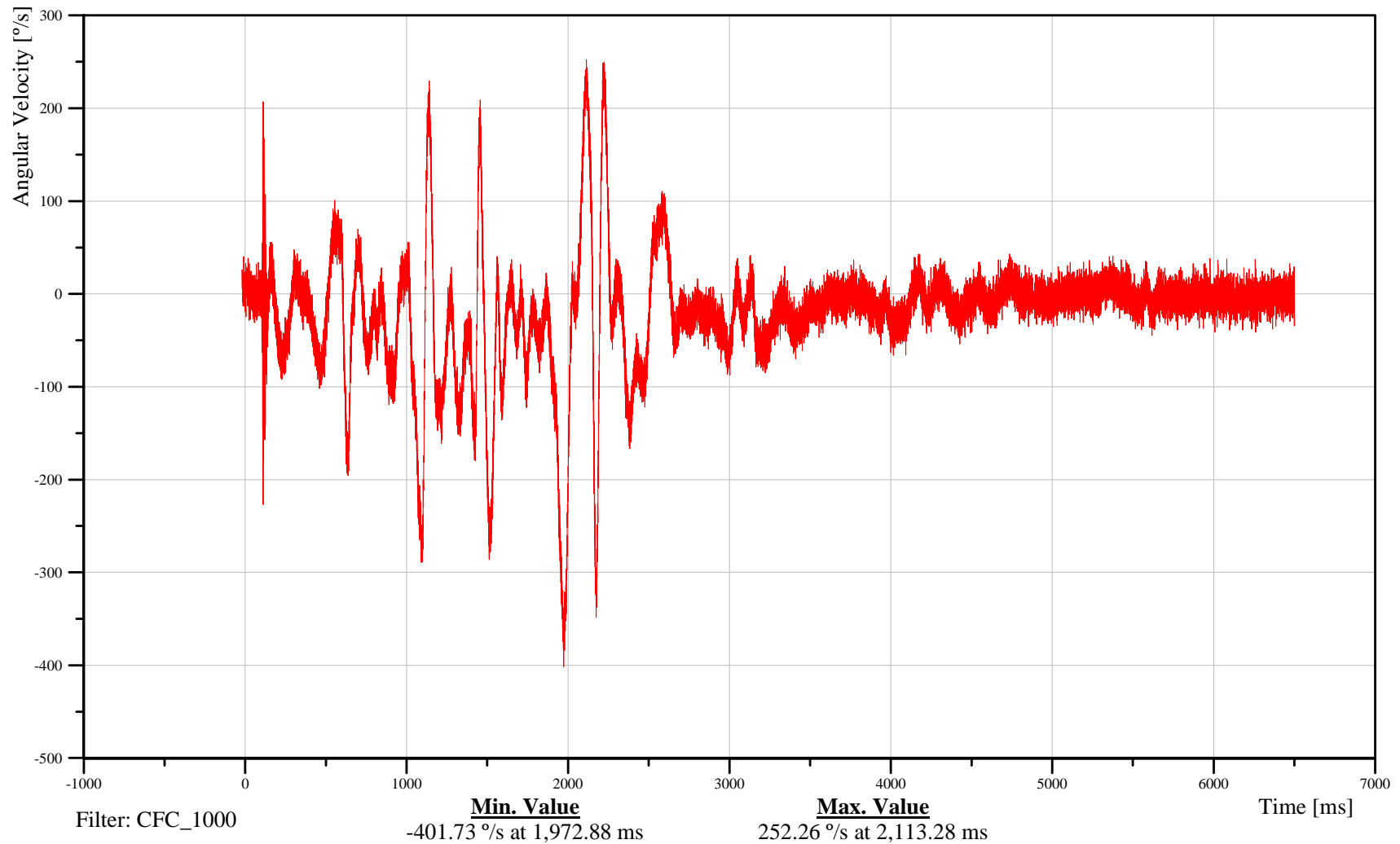
Soil Trip Rollover 2007 Ford Expedition  
Left Rear Passenger Head (DTS ARS) Rate Gyro Z

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

14HEADCG00H3AVZA

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-67

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Upper Neck X-Axis Force

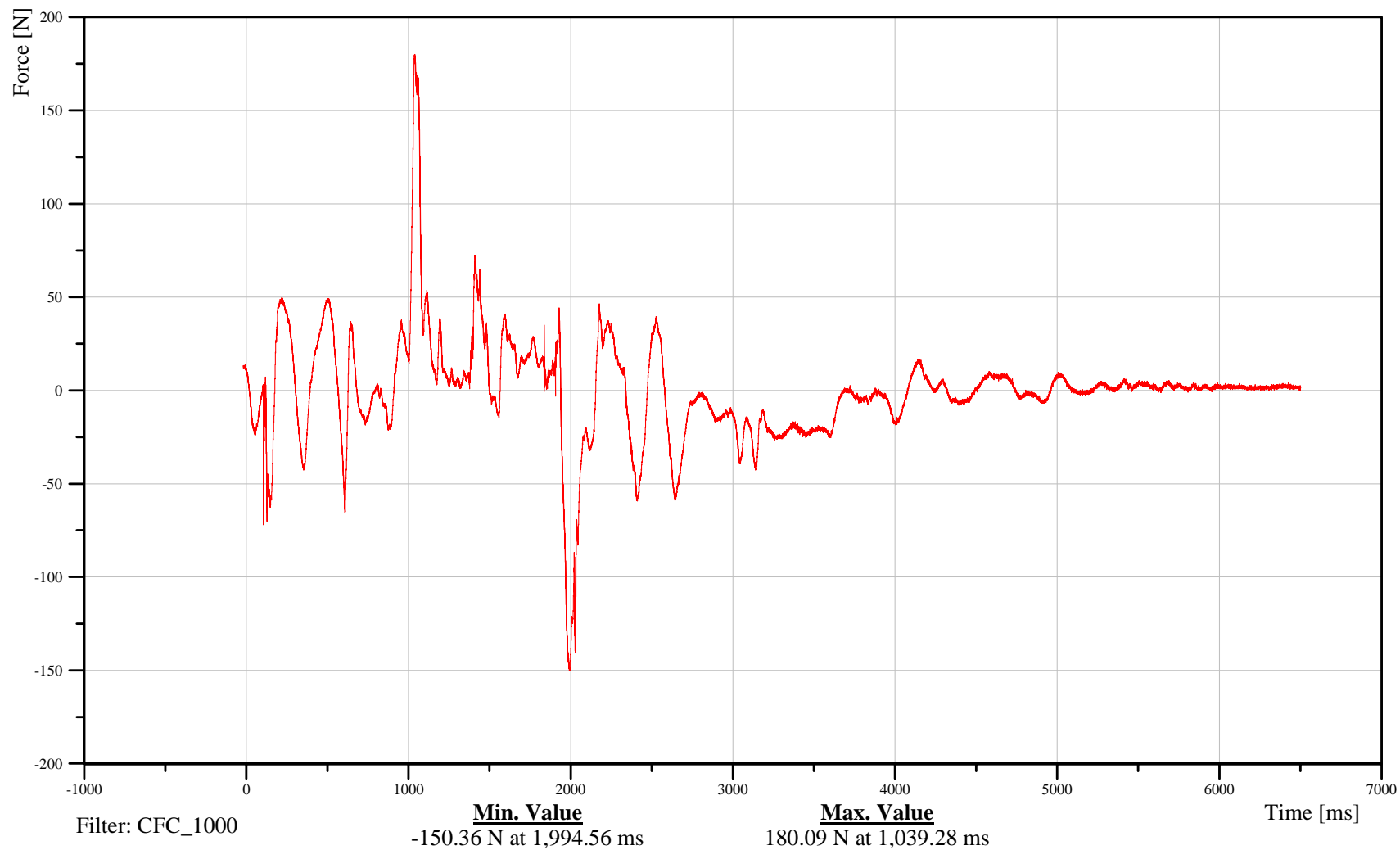
Time: 16:26

Customer: VRTC

### 14NECKUP00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-68

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Upper Neck Y-Axis Force

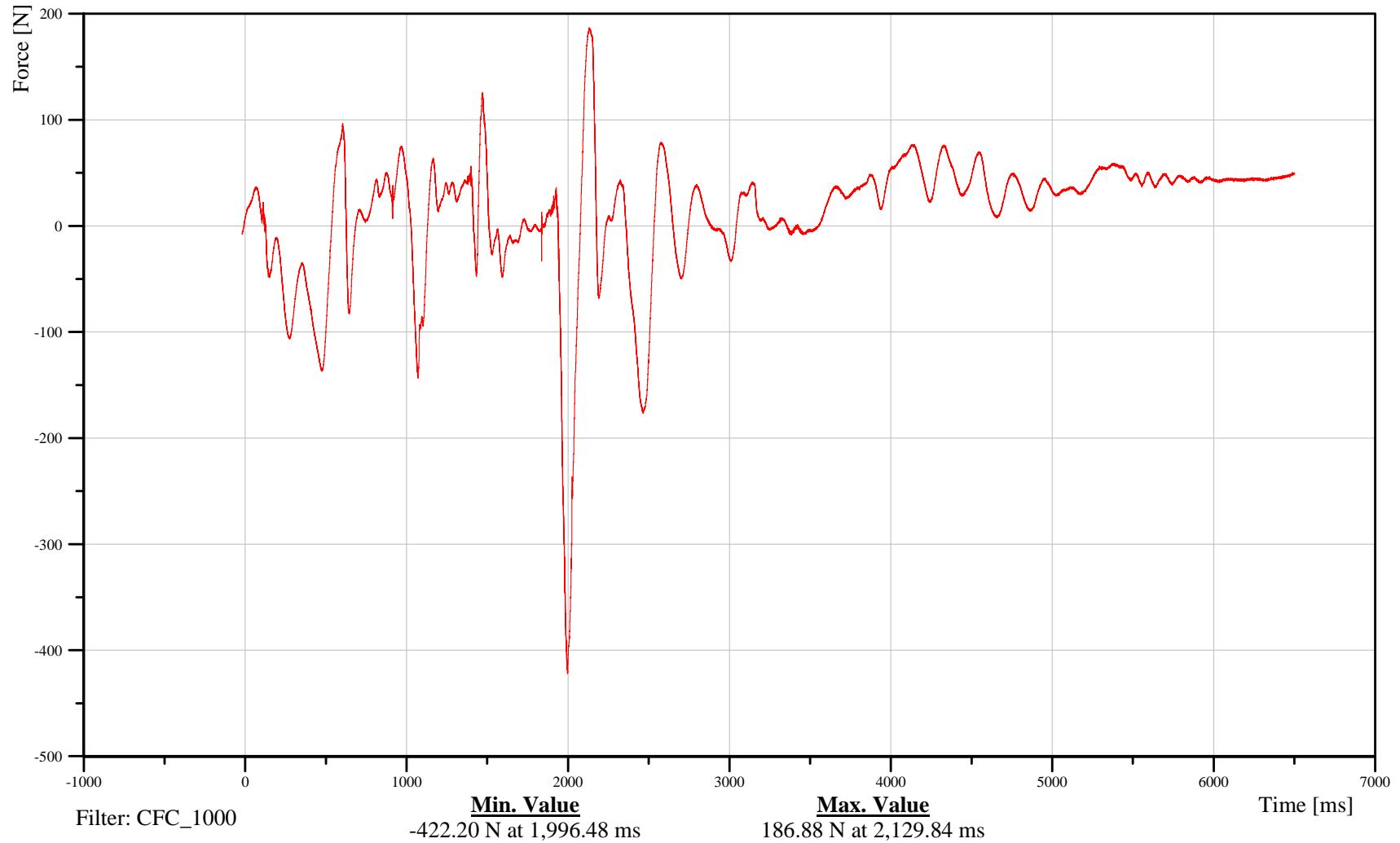
Time: 16:26

Customer: VRTC

### 14NECKUP00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-69

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

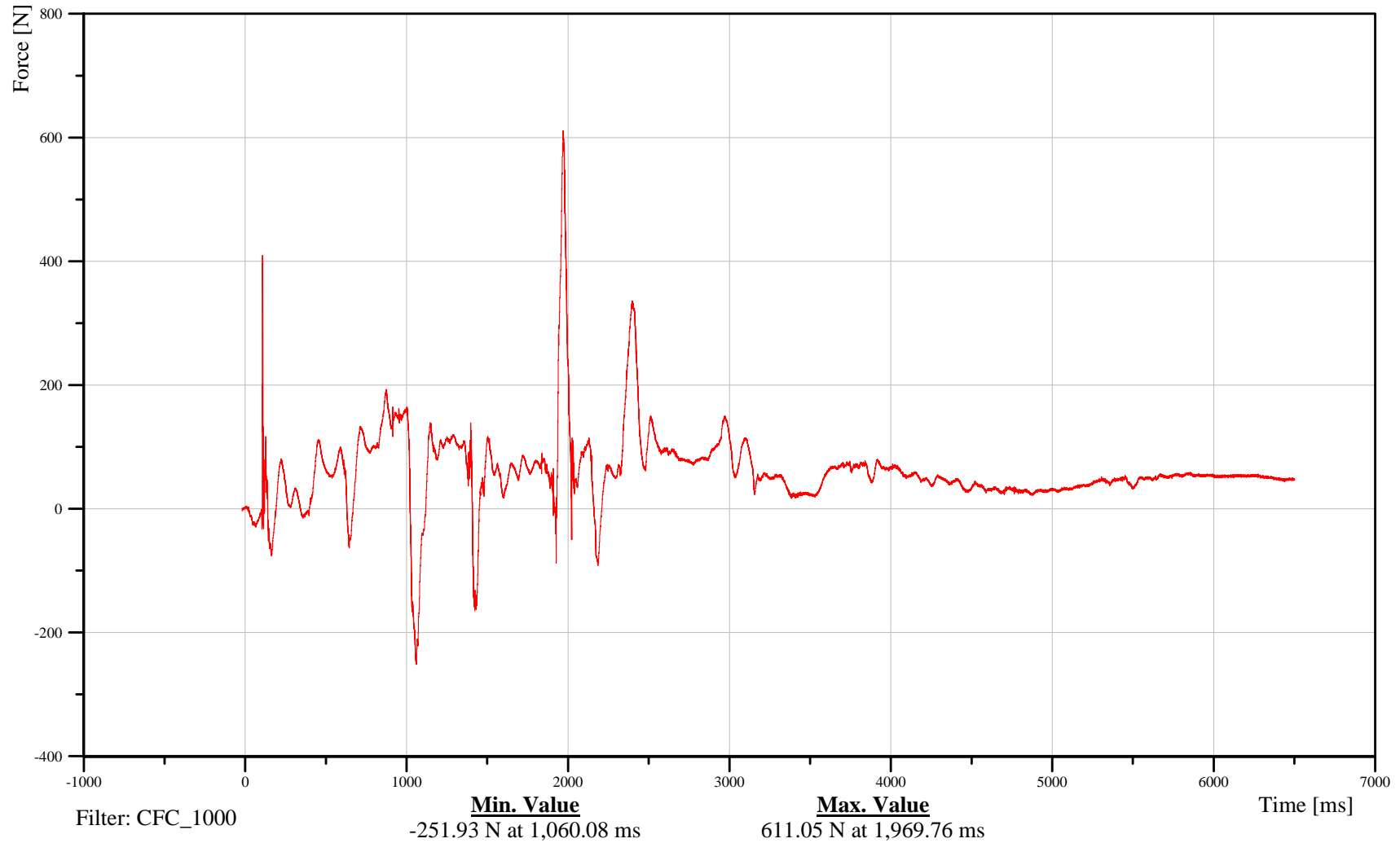
## Left Rear Passenger Upper Neck Z-Axis Force

Customer: VRTC

# 14NECKUP00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-70

100115



# Soil Trip Rollover 2007 Ford Expedition

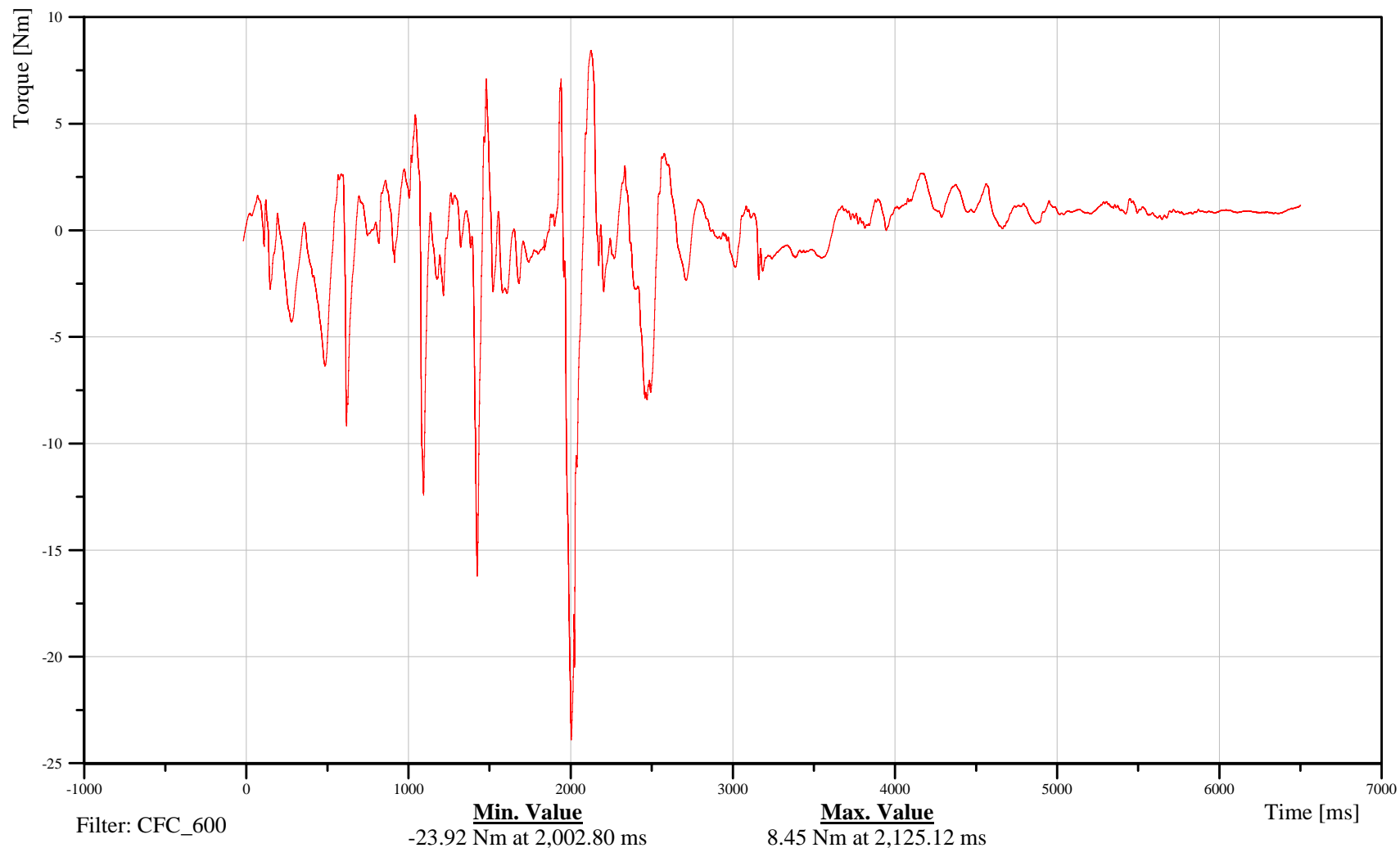
## Left Rear Passenger Upper Neck Moment About X Axis

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 14NECKUP00H3MOXB

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-71

100115



# Soil Trip Rollover 2007 Ford Expedition

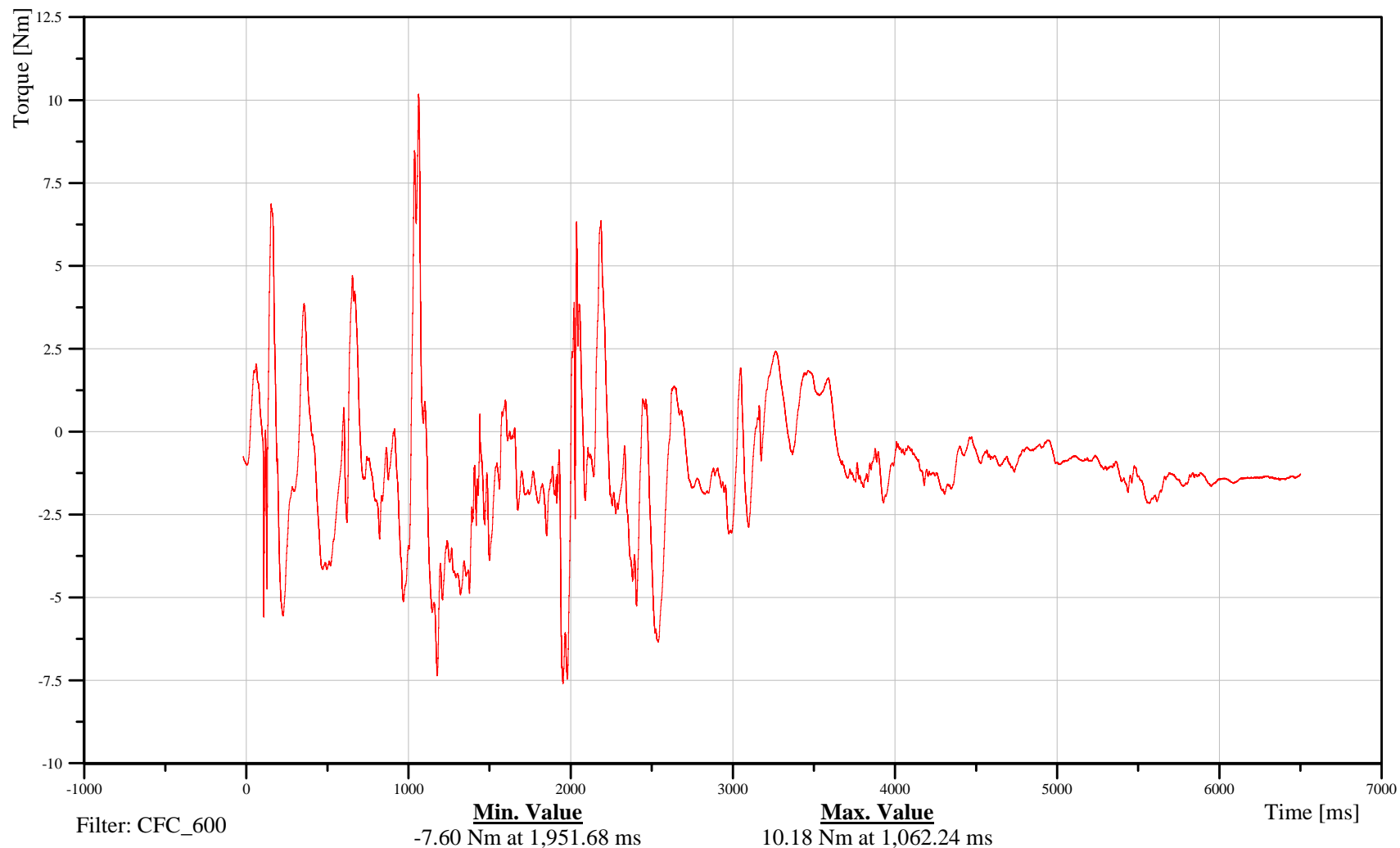
## Left Rear Passenger Upper Neck Moment About Y Axis

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 14NECKUP00H3MOYB

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-72

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

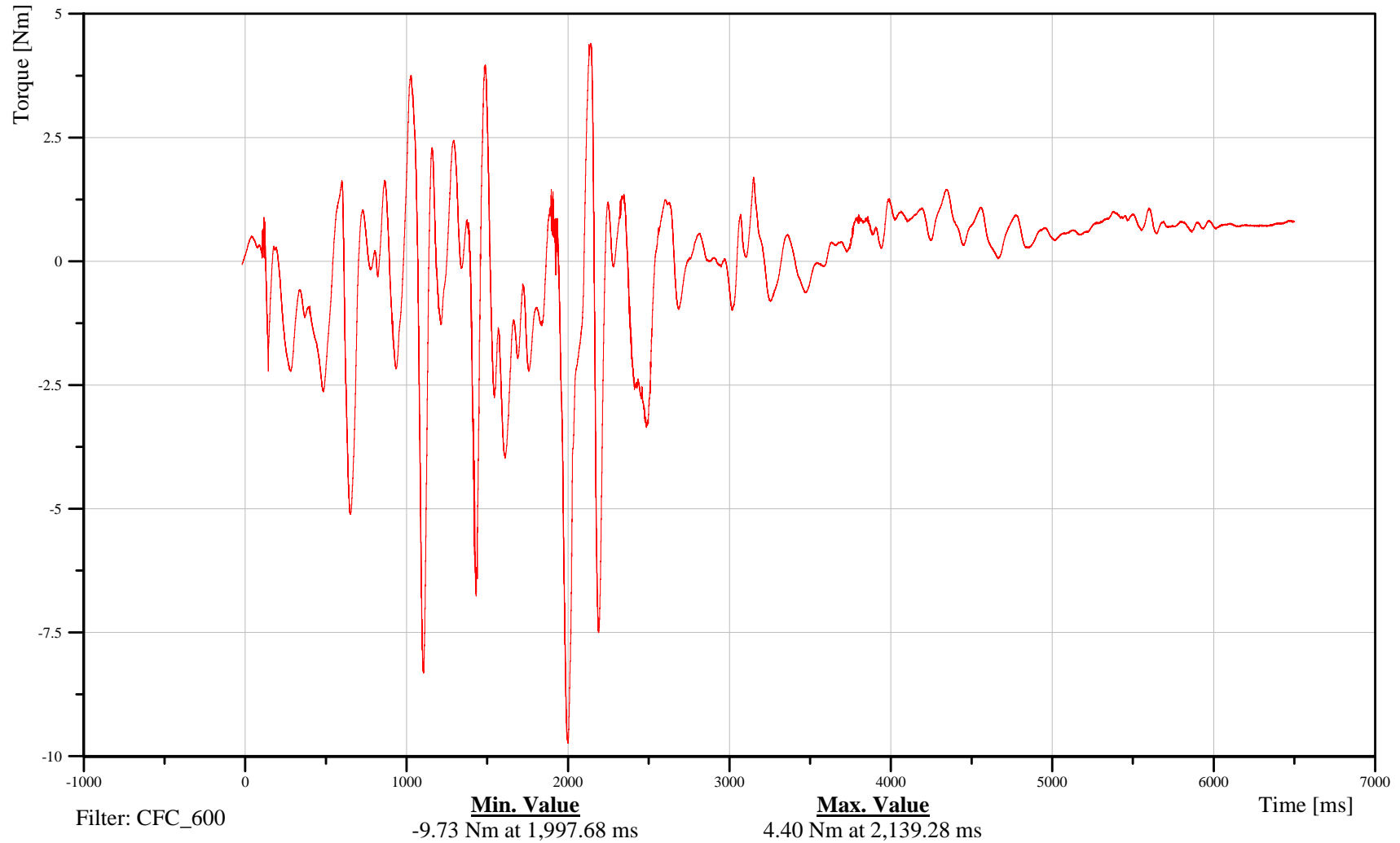
## Left Rear Passenger Upper Neck Moment About Z Axis

Customer: VRTC

### 14NECKUP00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-73

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Chest X-Axis Acceleration

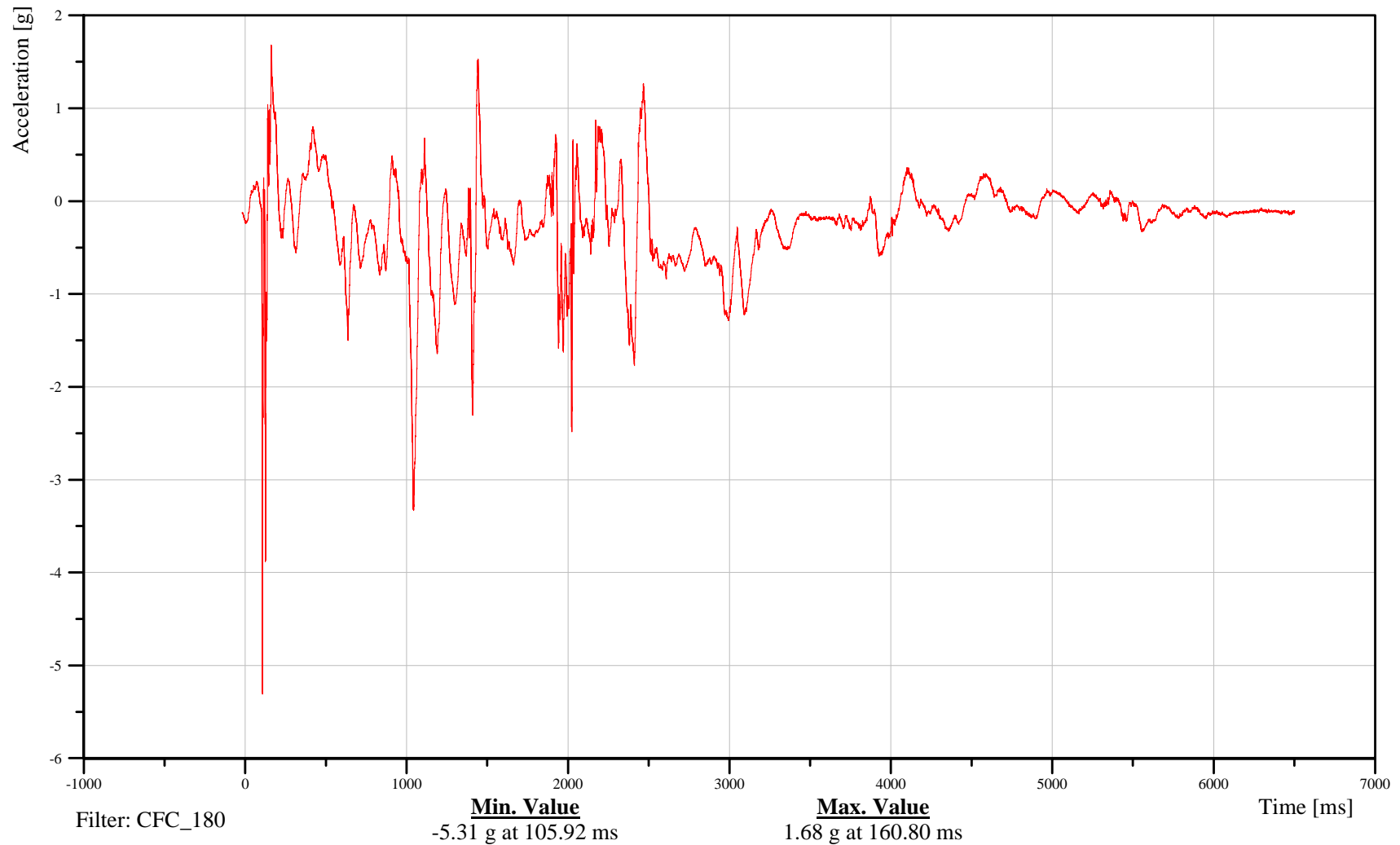
Time: 16:26

Customer: VRTC

# 14CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-74

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Chest Y-Axis Acceleration

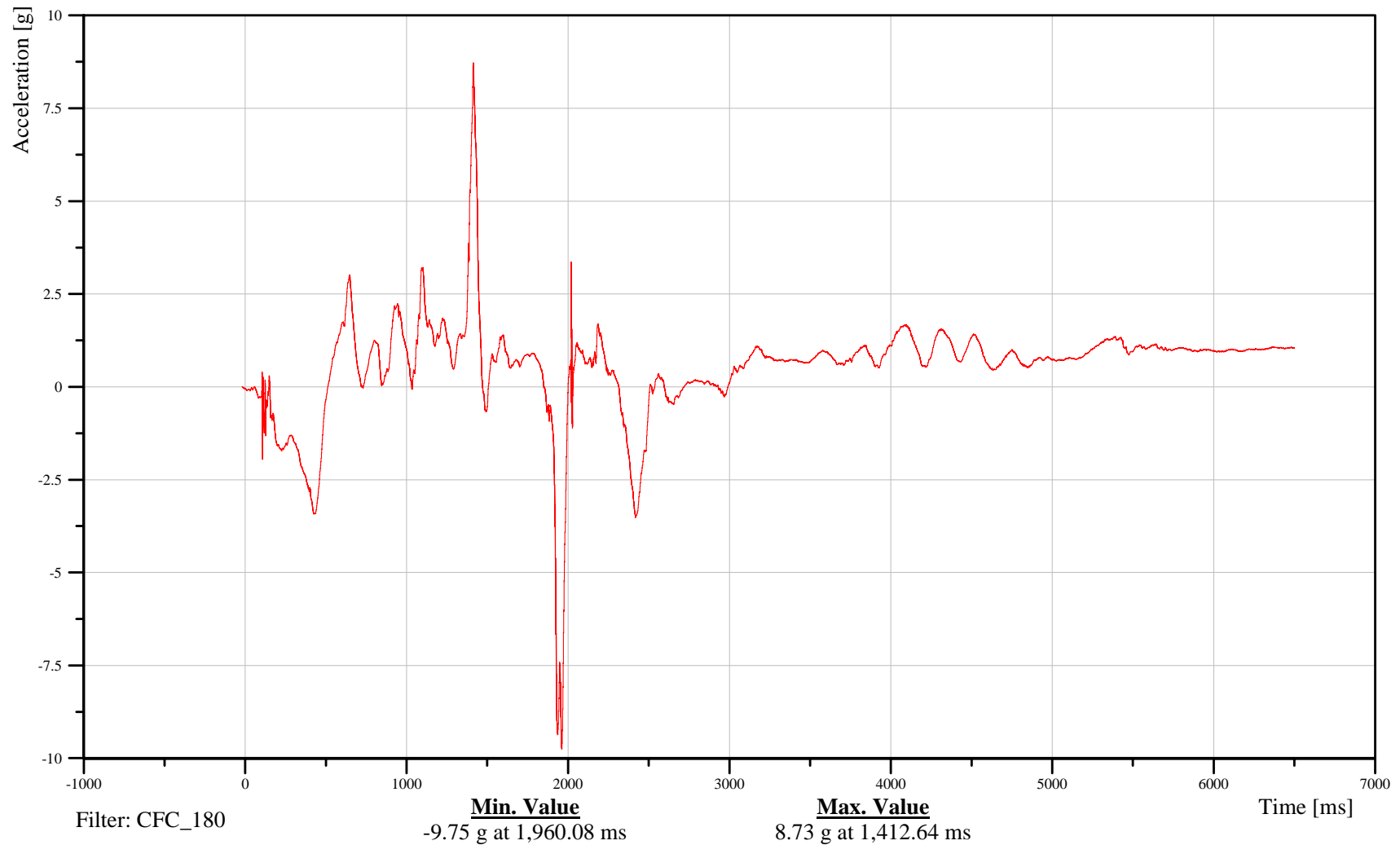
Time: 16:26

Customer: VRTC

# 14CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-75

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Chest Z-Axis Acceleration

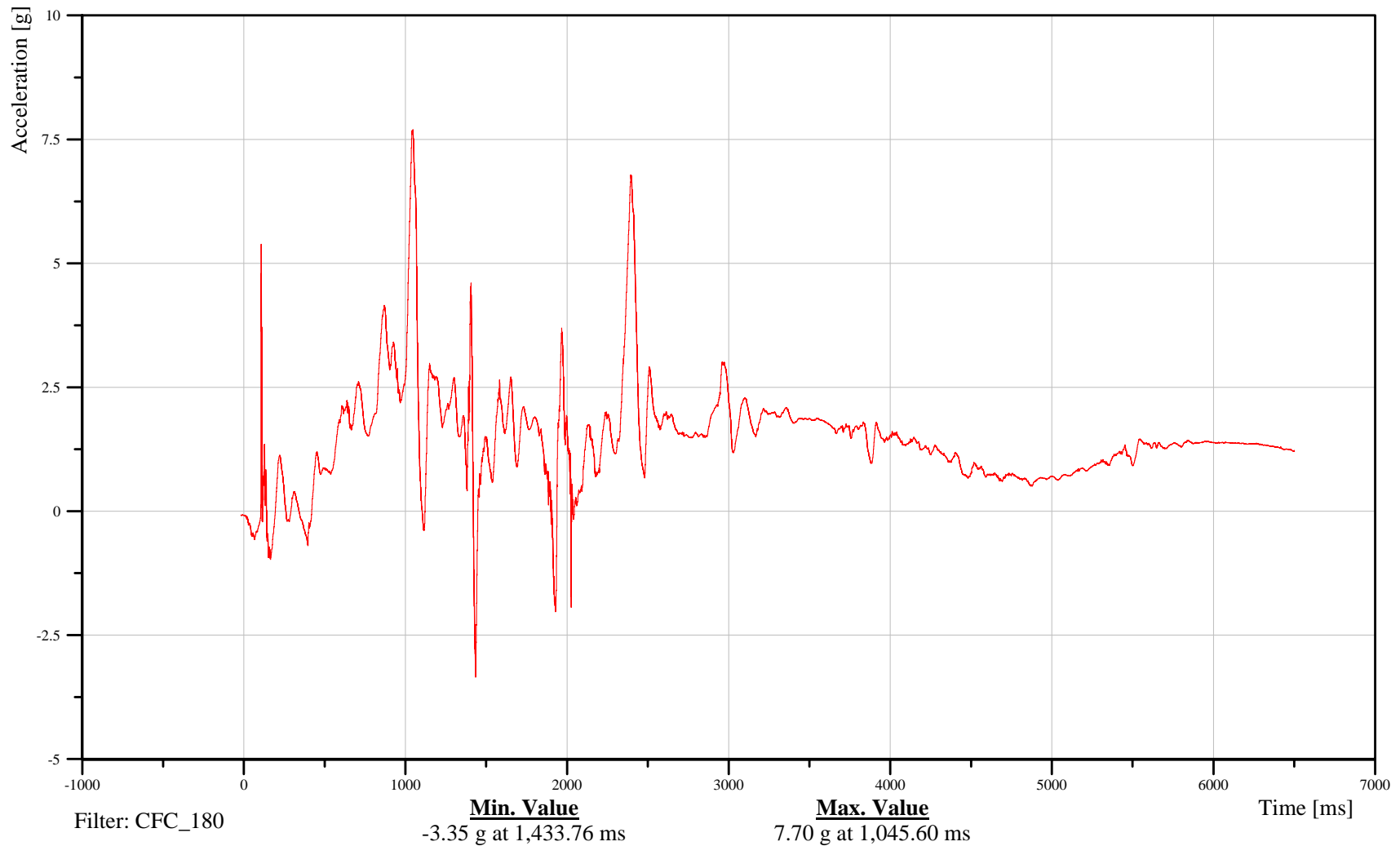
Time: 16:26

Customer: VRTC

# 14CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-76

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Chest Resultant Acceleration

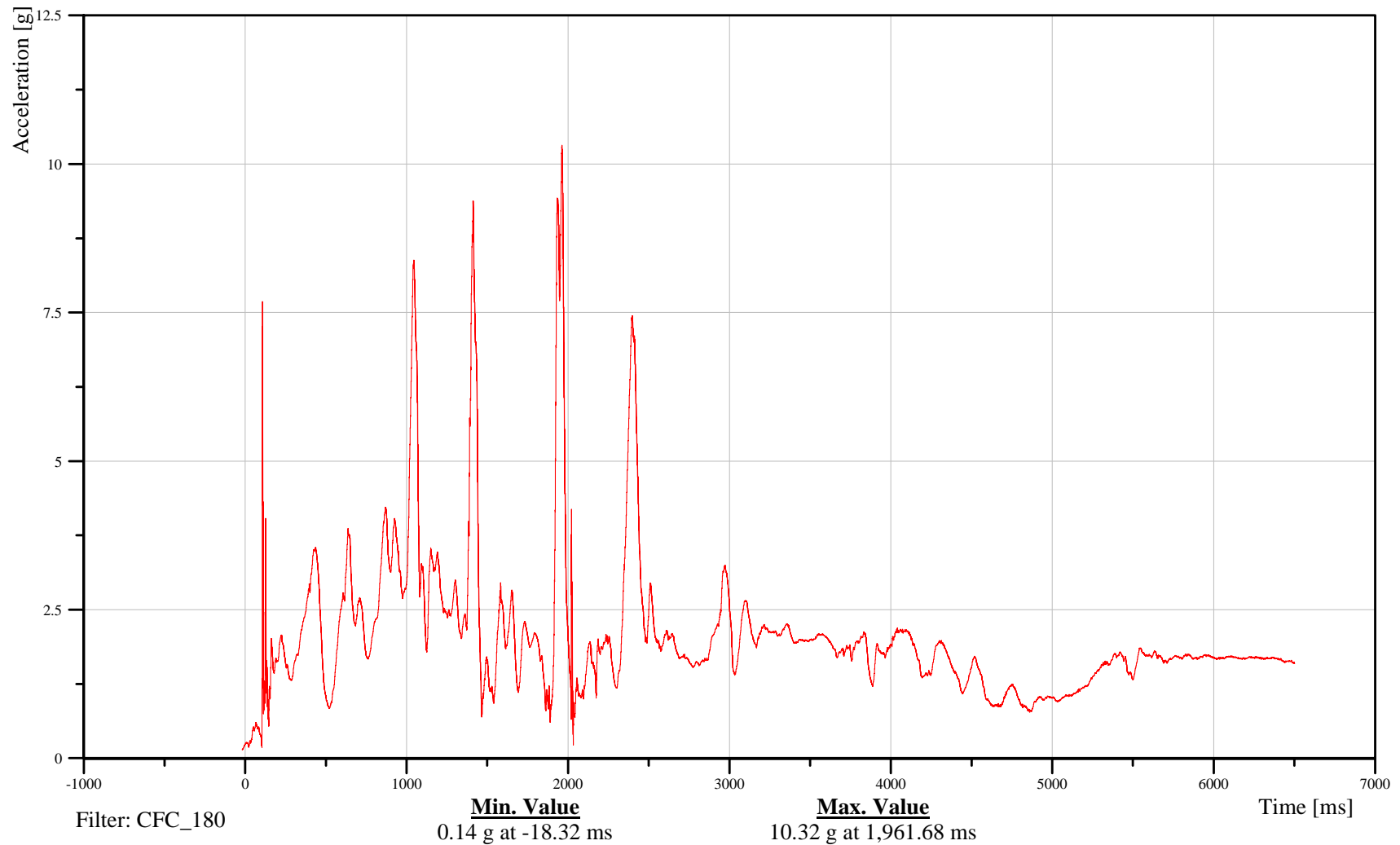
Time: 16:26

Customer: VRTC

# 14CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF

Test Number: 100115



B-77

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Chest X-Axis Displacement

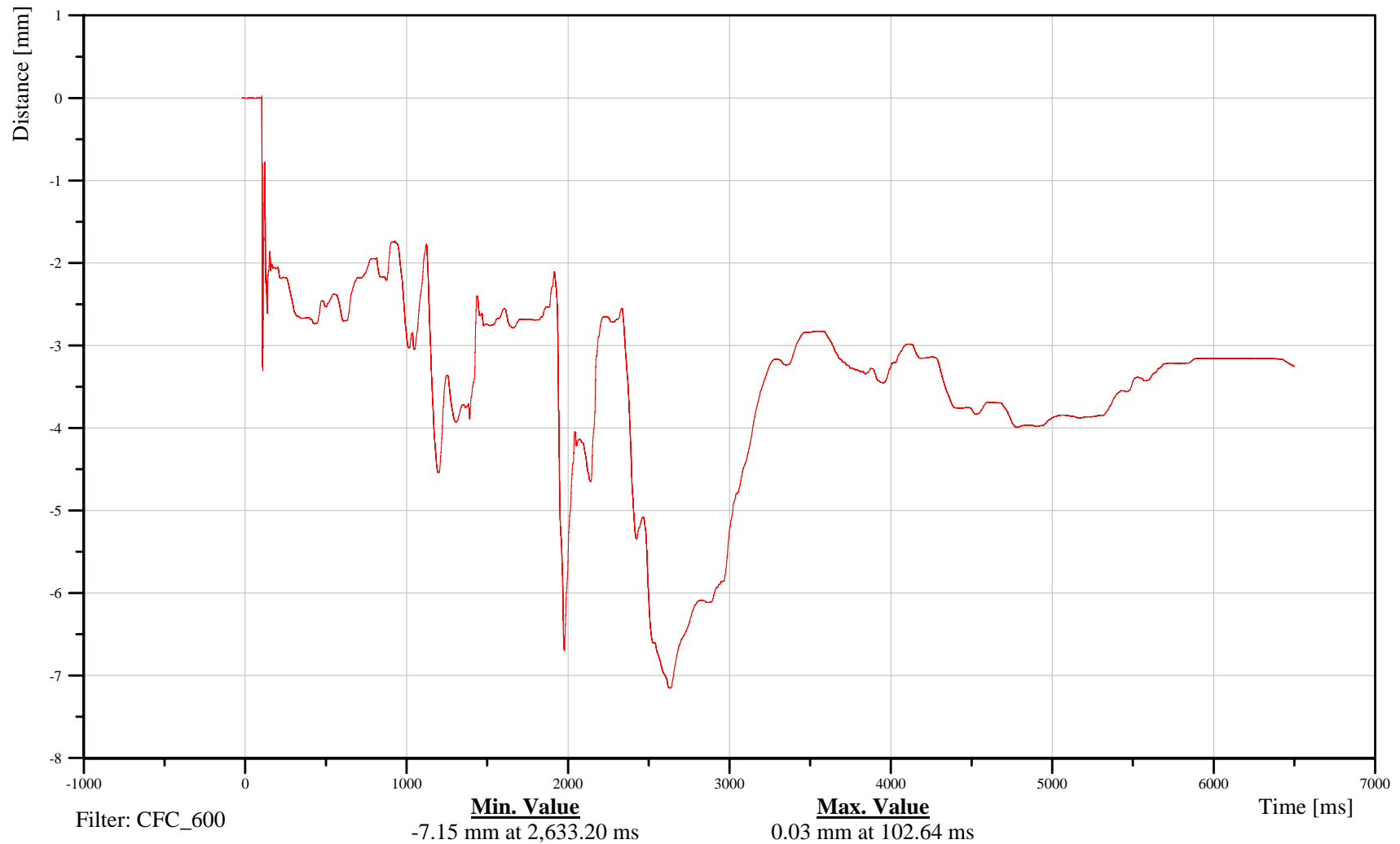
Time: 16:26

Customer: VRTC

### 14CHST0000H3DSXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-78

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Pelvis X-Axis Acceleration

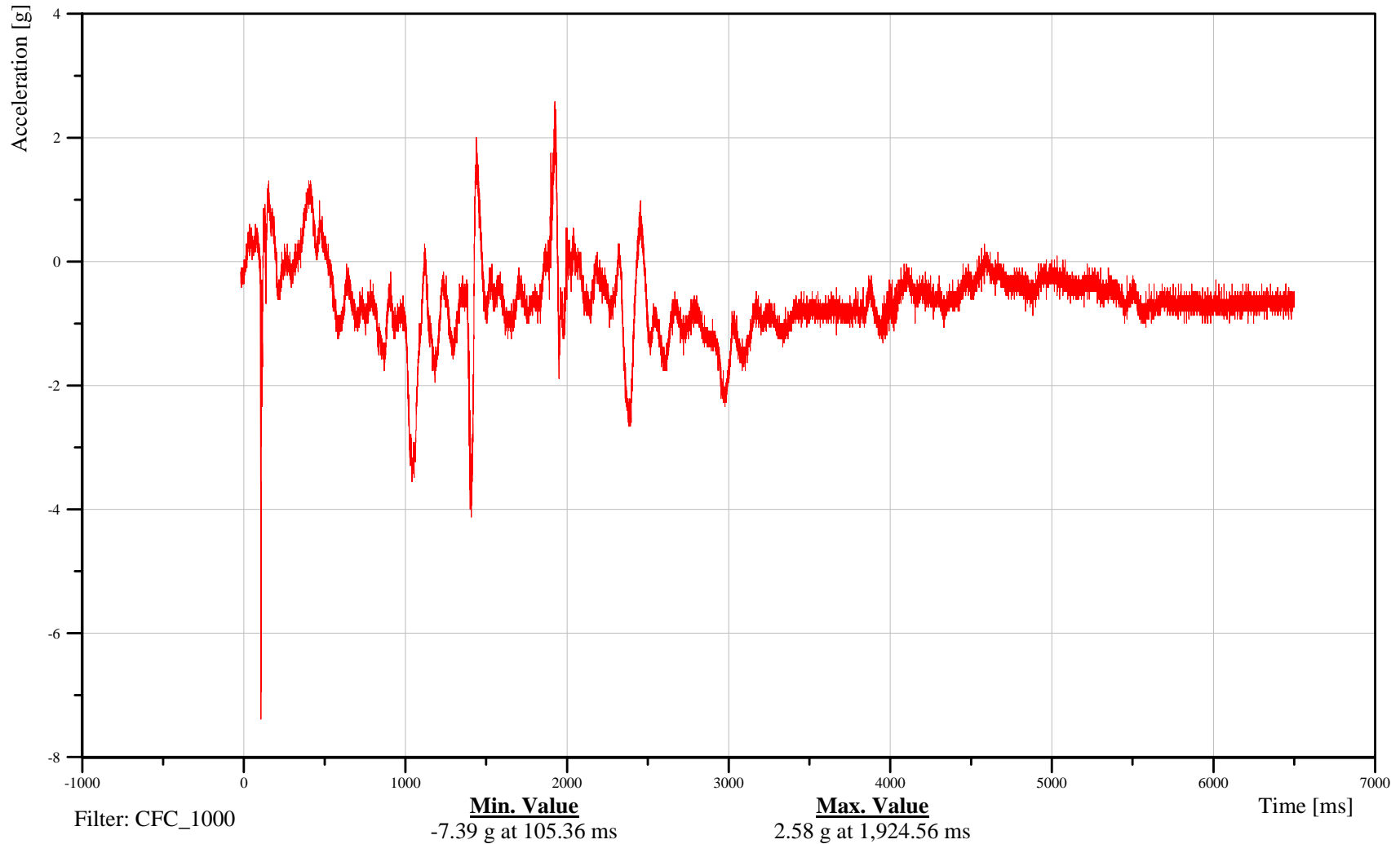
Time: 16:26

Customer: VRTC

### 14PELVCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-79

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Pelvis Y-Axis Acceleration

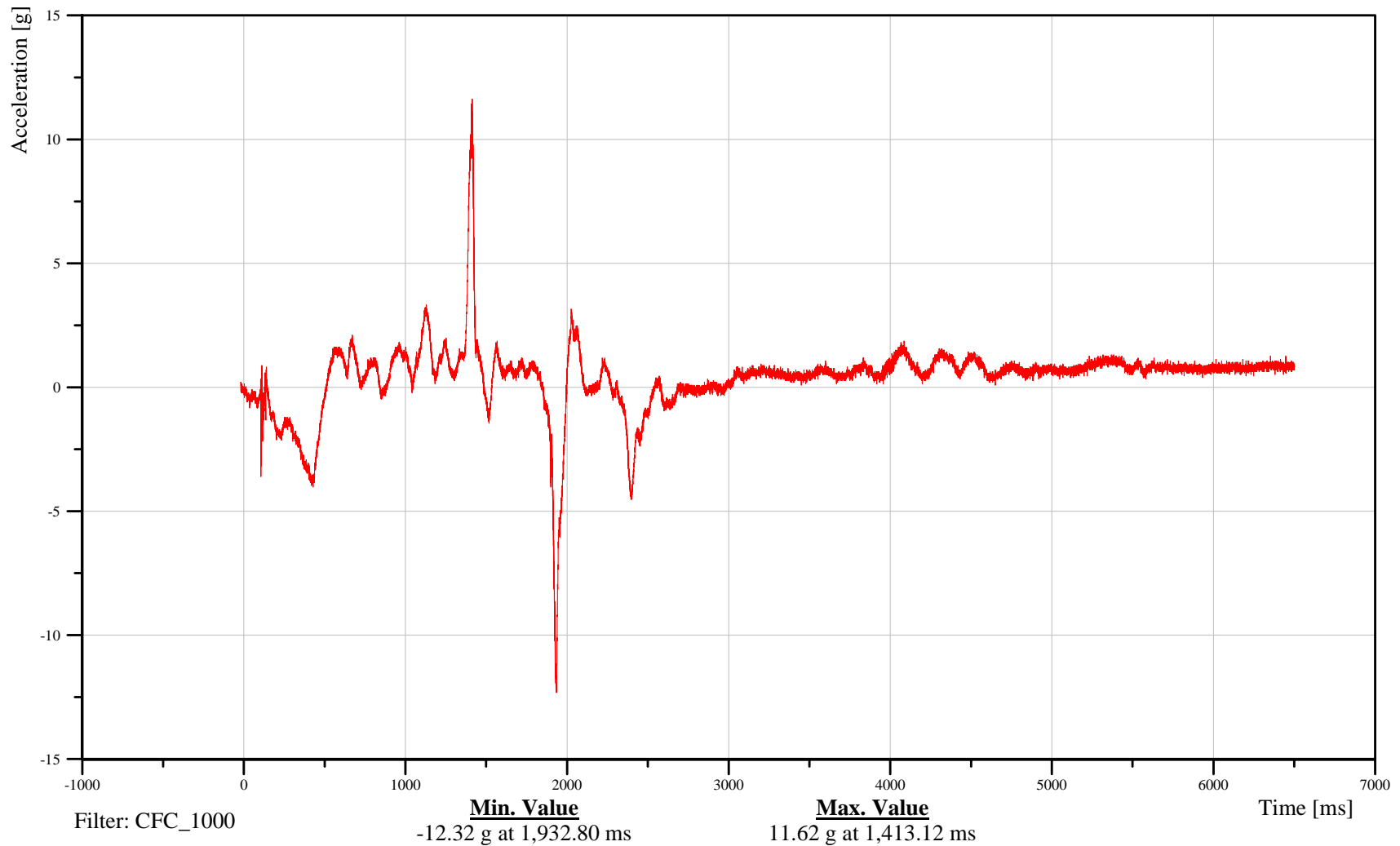
Time: 16:26

Customer: VRTC

### 14PELVCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-80

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Pelvis Z-Axis Acceleration

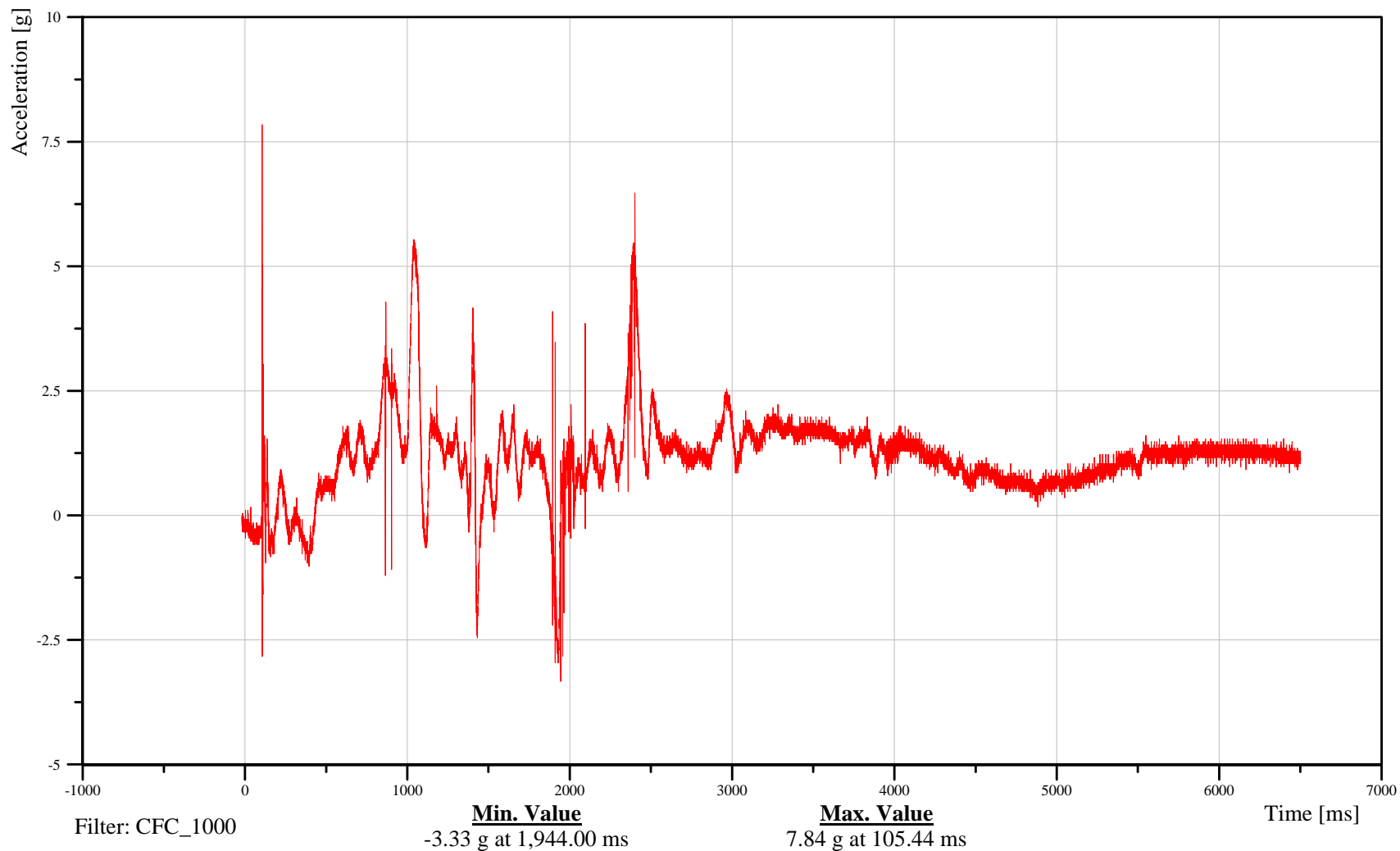
Time: 16:26

Customer: VRTC

# 14PELVCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-81

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Pelvis Resultant Acceleration

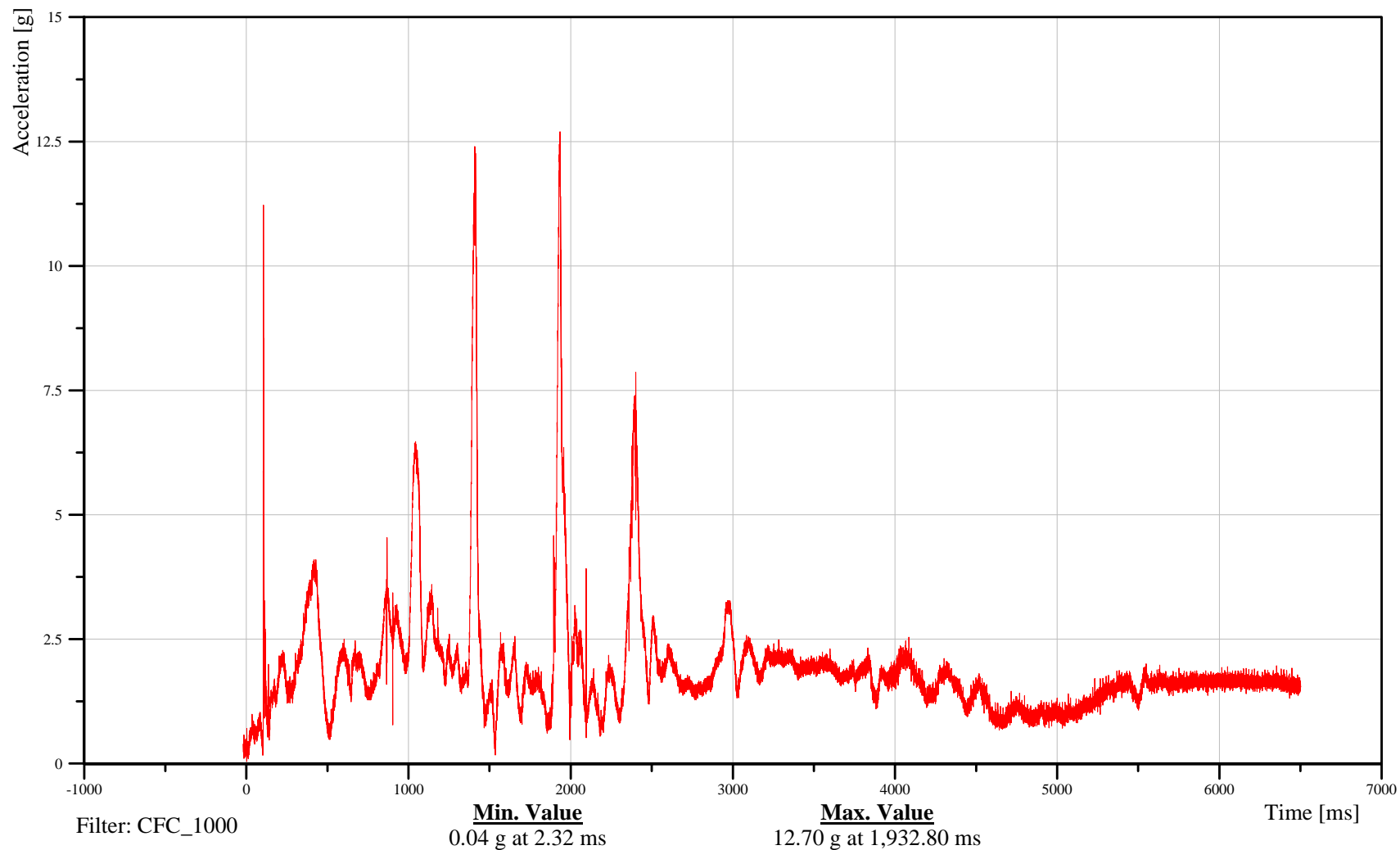
Time: 16:26

Customer: VRTC

### 14PELVCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-82

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

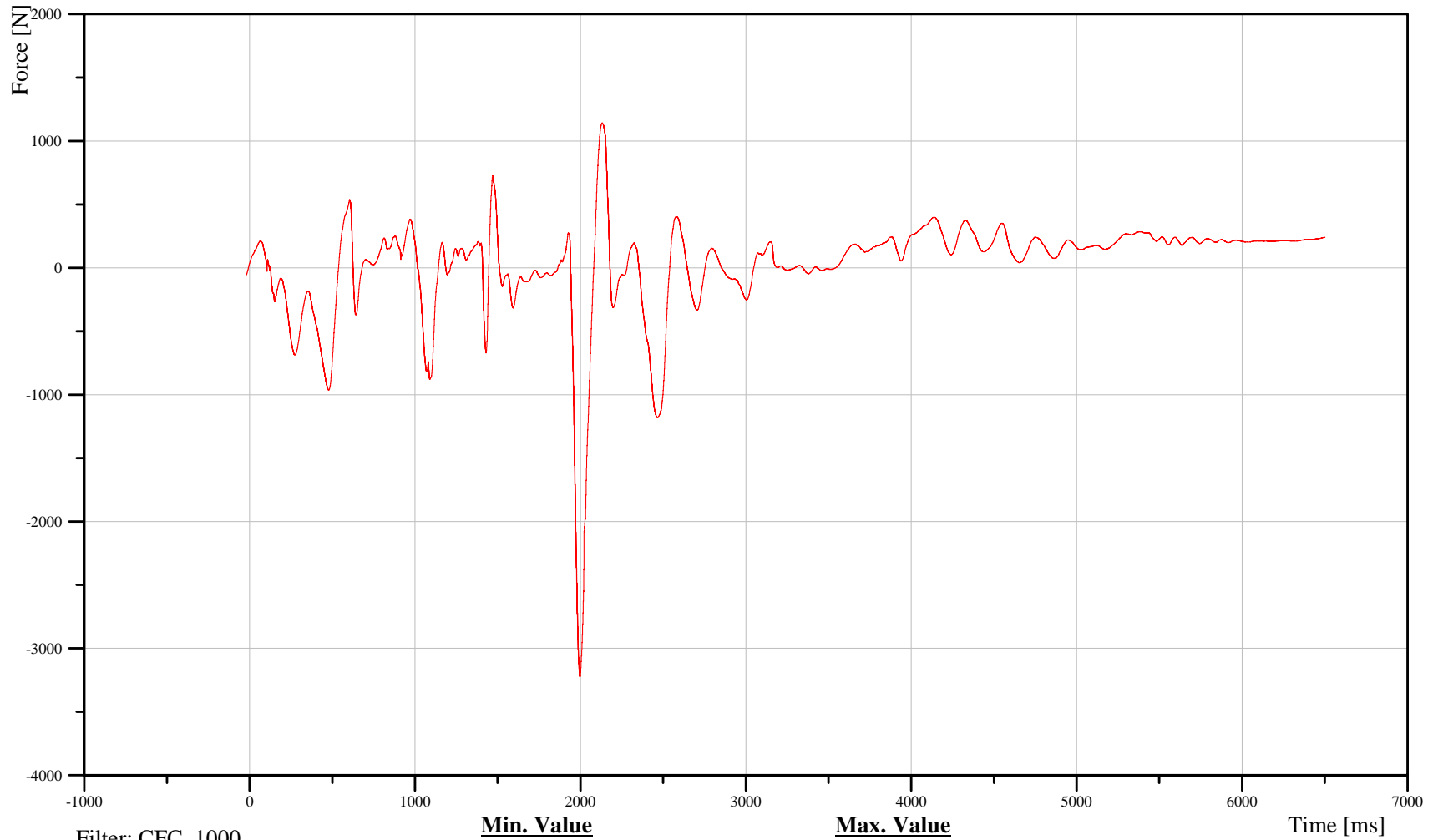
## Left Rear Passenger Lower Neck X-Axis Force

Customer: VRTC

### 14NECKLO00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-83

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Lower Neck Y-Axis Force

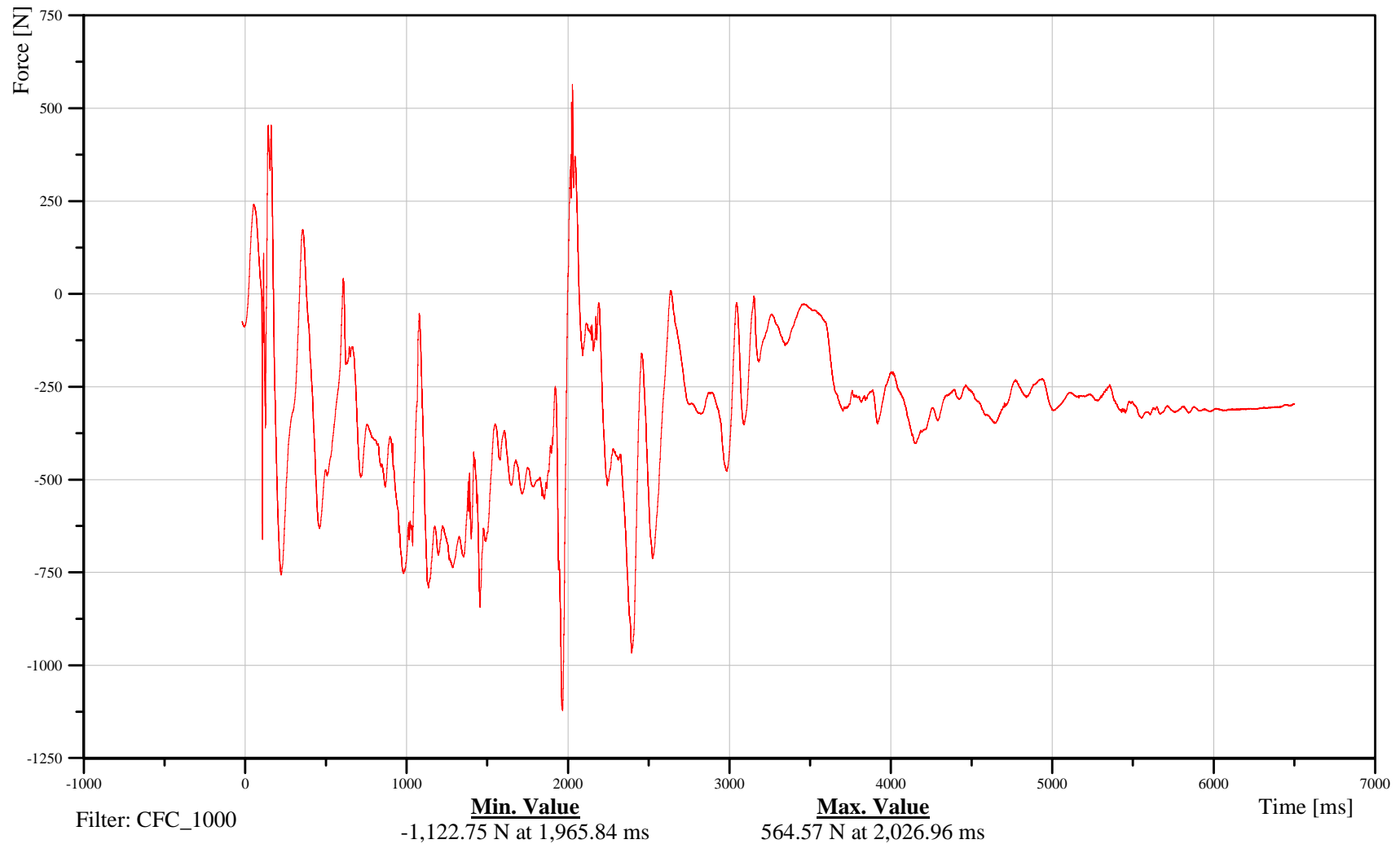
Time: 16:26

Customer: VRTC

# 14NECKLO00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-84

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Lower Neck Z-Axis Force

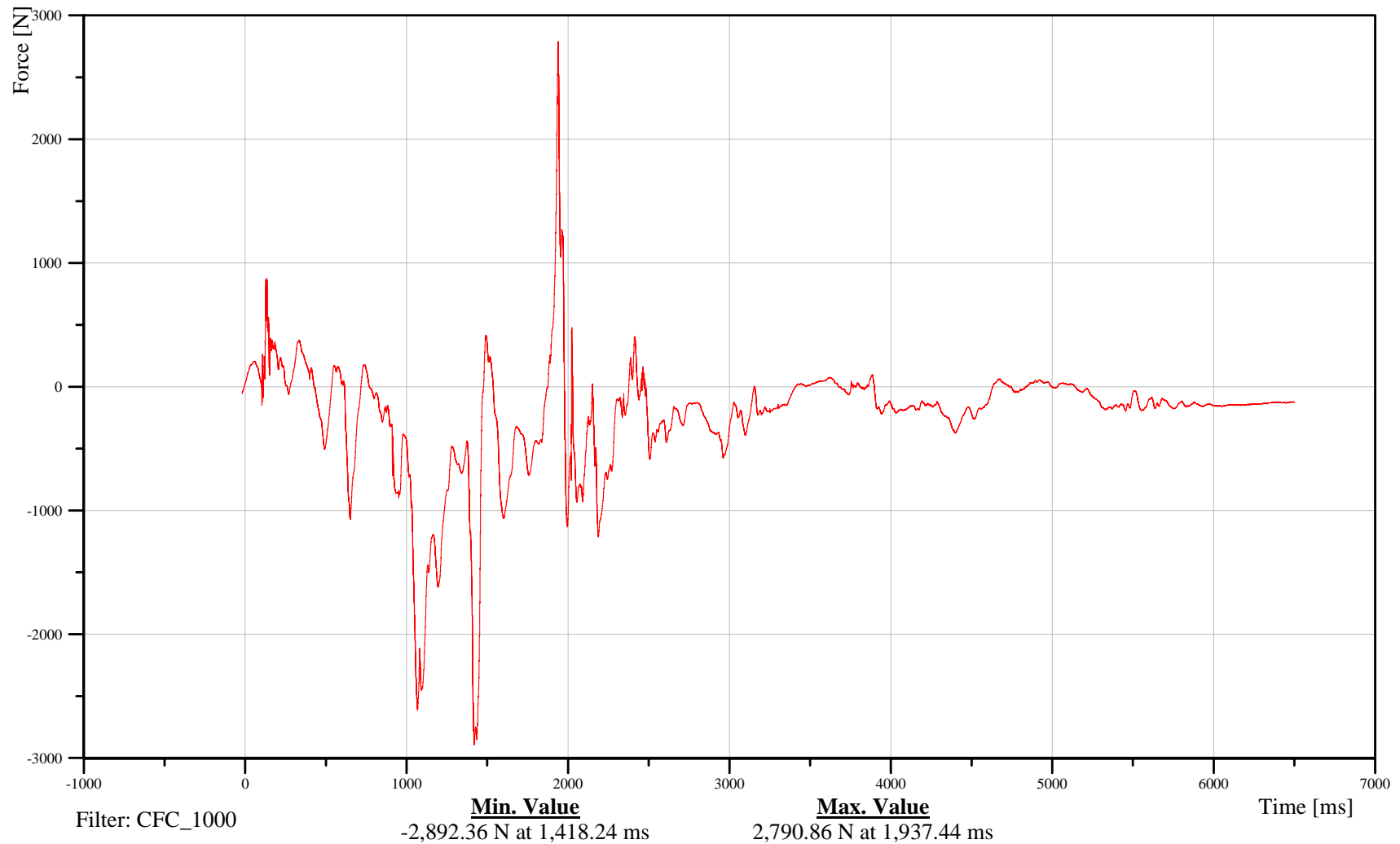
Time: 16:26

Customer: VRTC

### 14NECKLO00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 100115



B-85

100115



# Soil Trip Rollover 2007 Ford Expedition

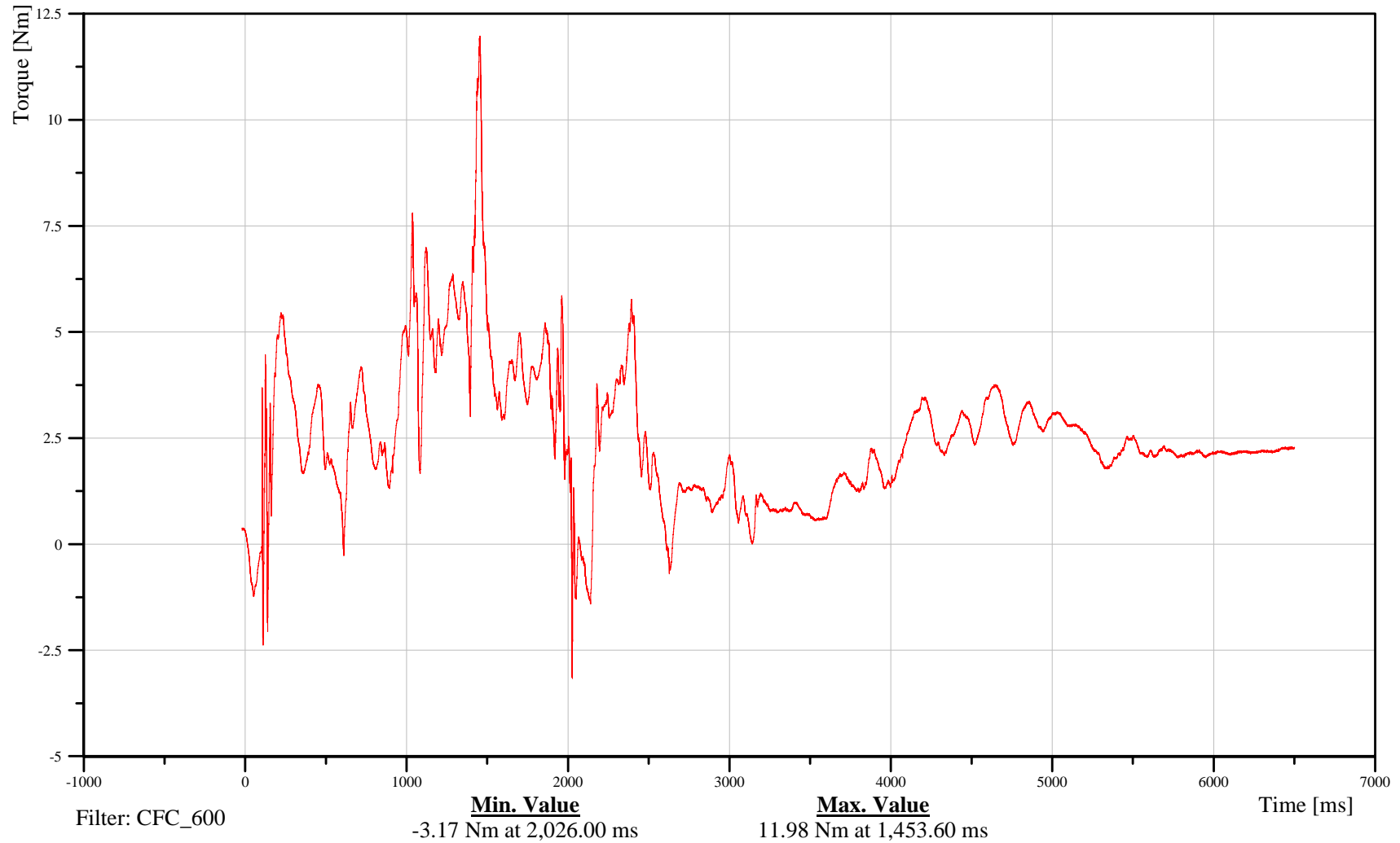
## Left Rear Passenger Lower Neck Moment About X Axis

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 14NECKLO00H3MOXB

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-86

100115



# Soil Trip Rollover 2007 Ford Expedition

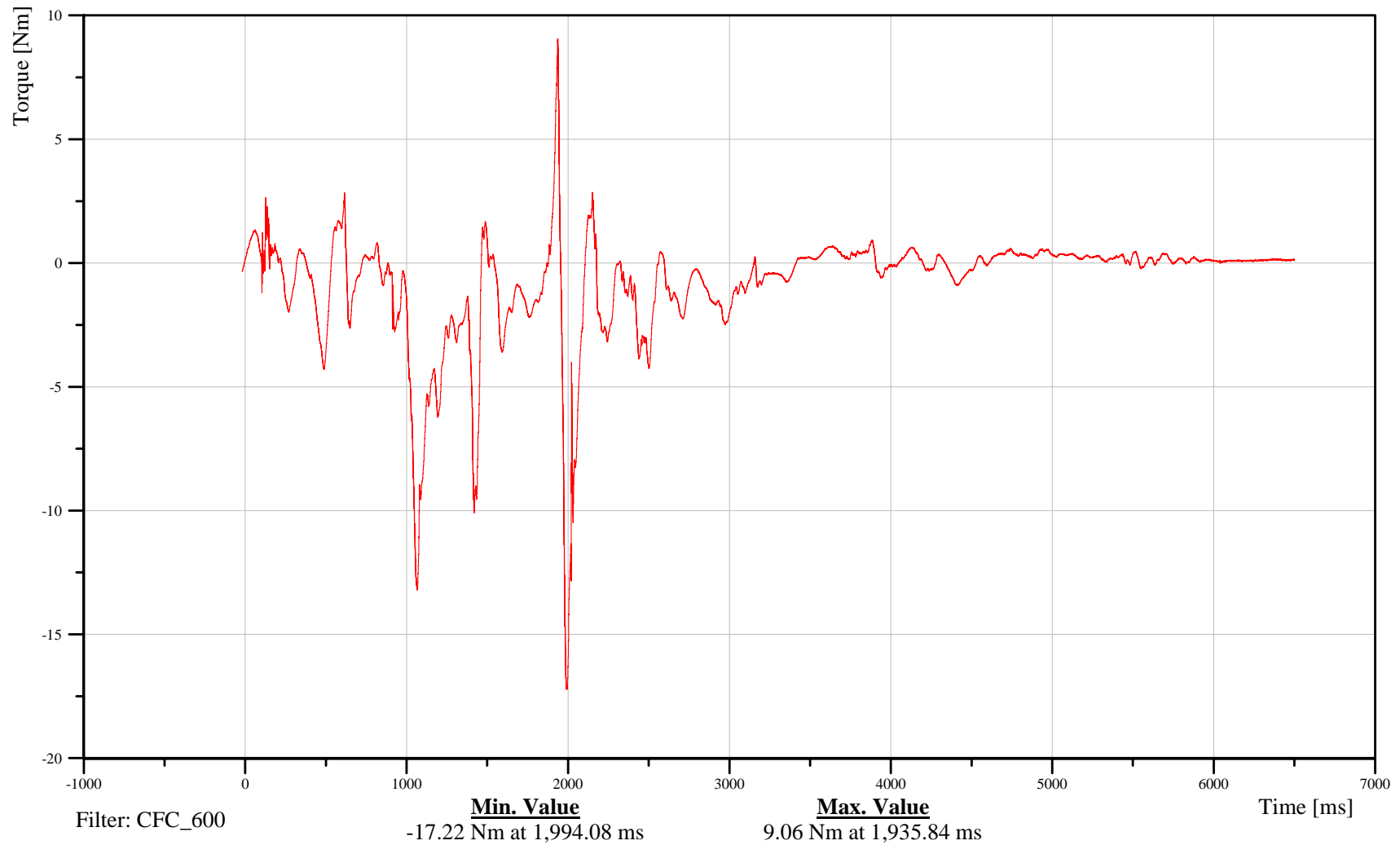
## Left Rear Passenger Lower Neck Moment About Y Axis

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 14NECKLO00H3MOYB

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-87

100115



# Soil Trip Rollover 2007 Ford Expedition

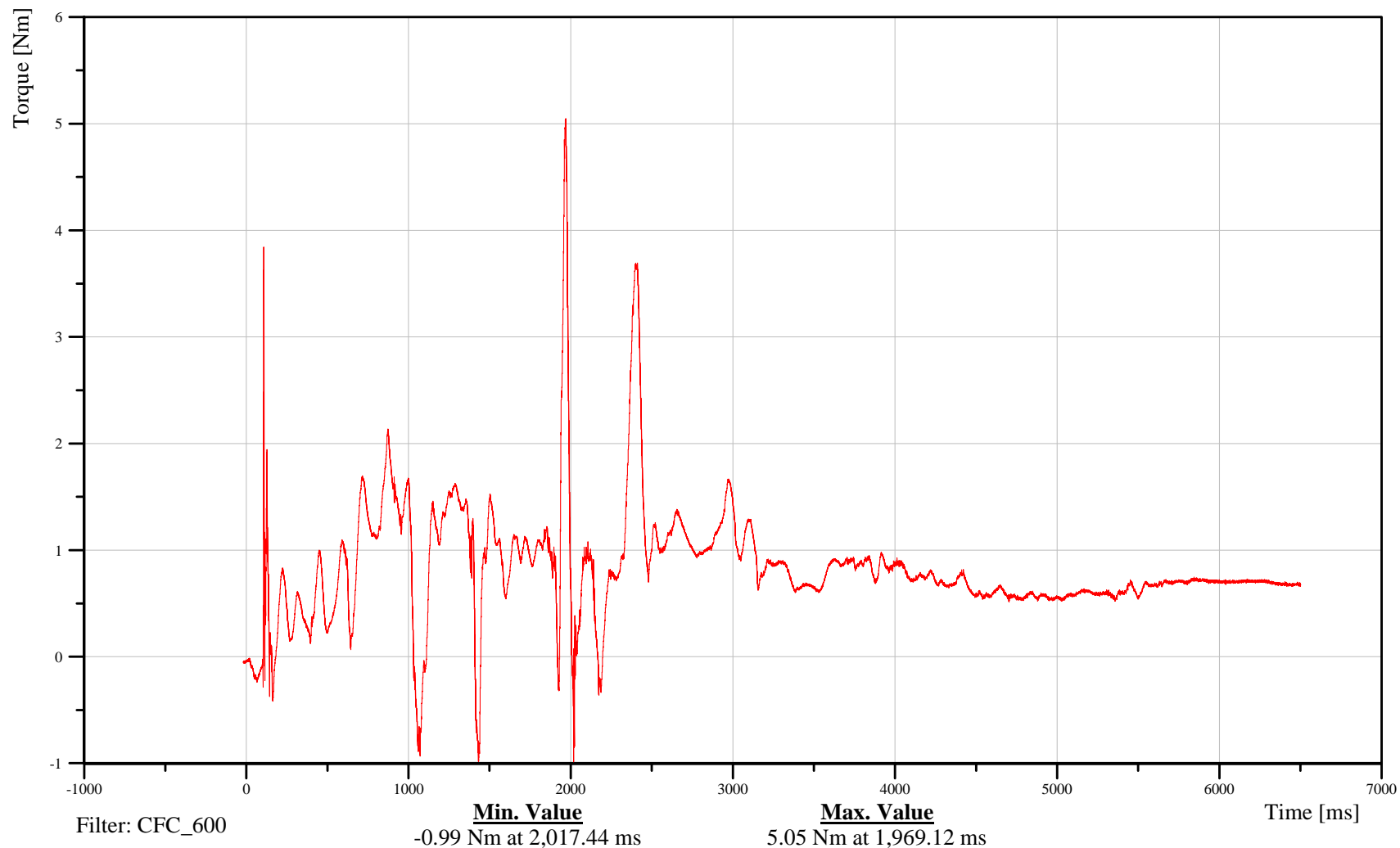
## Left Rear Passenger Lower Neck Moment About Z Axis

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 14NECKLO00H3MOZB

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-88

100115



# Soil Trip Rollover 2007 Ford Expedition

## Vehicle Center of Gravity X-Axis Acceleration

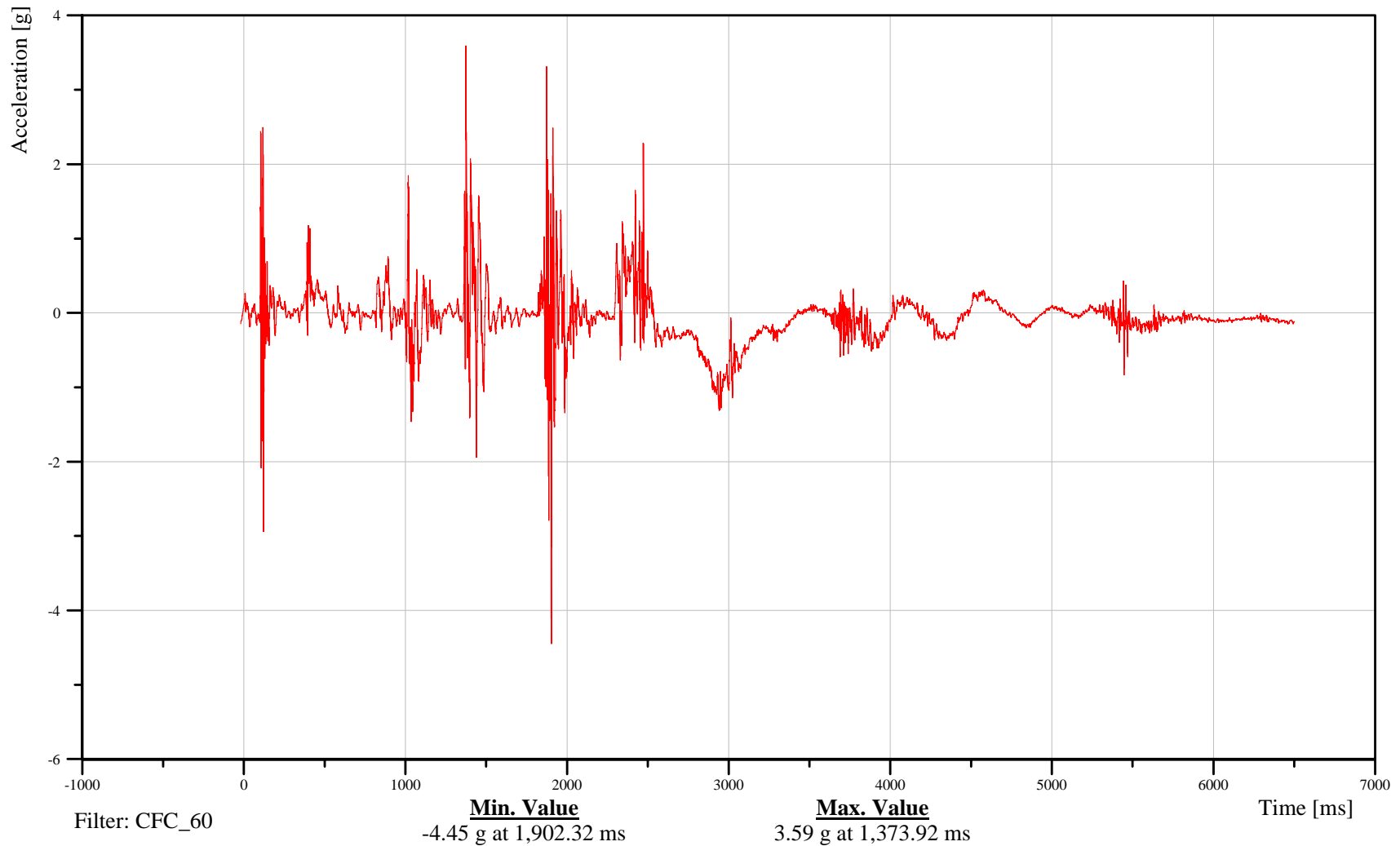
Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 10VEHCCG0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-89

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Vehicle Center of Gravity Y-Axis Acceleration

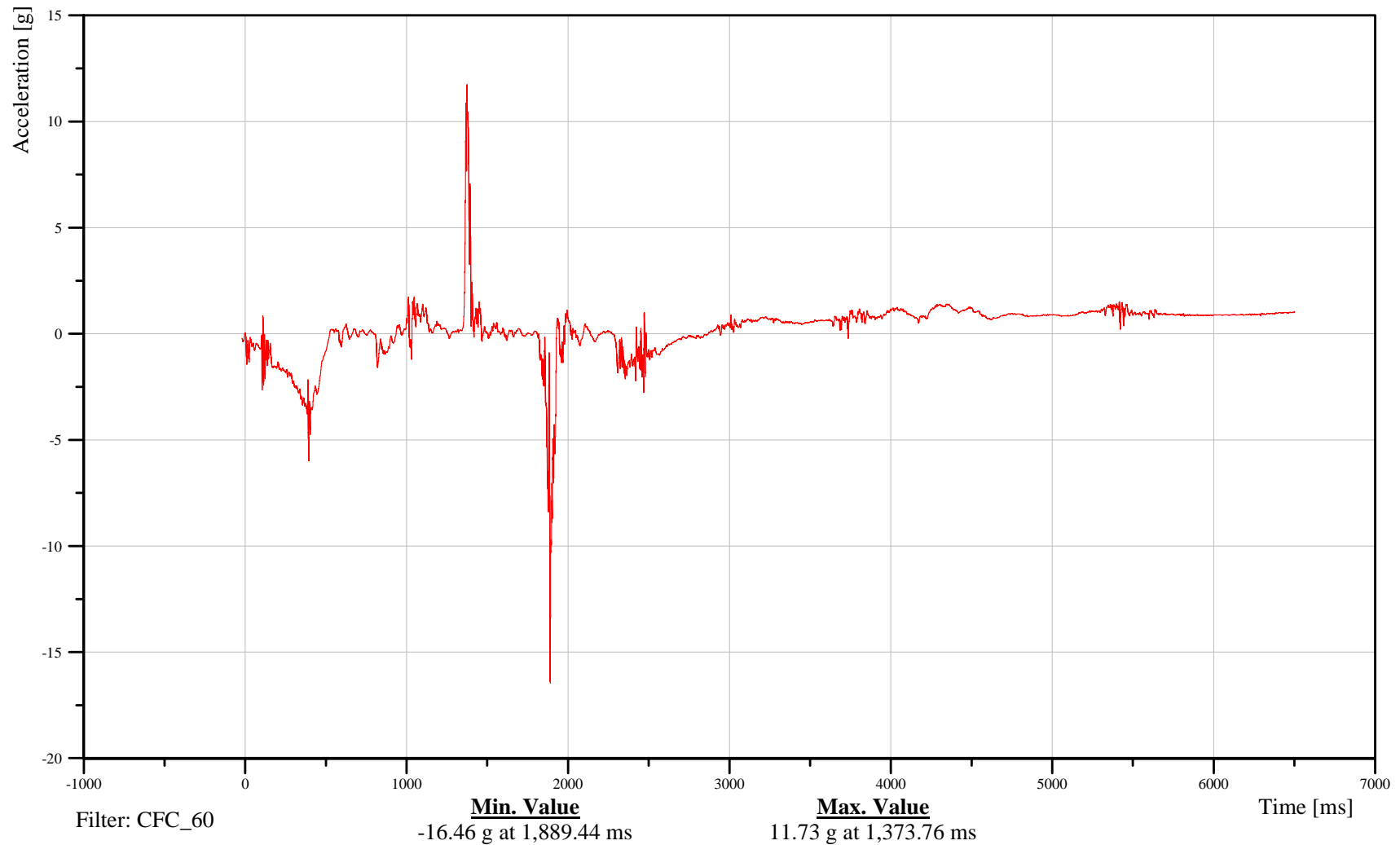
Time: 16:26

Customer: VRTC

# 10VEHCCG0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-90

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Vehicle Center of Gravity Z-Axis Acceleration

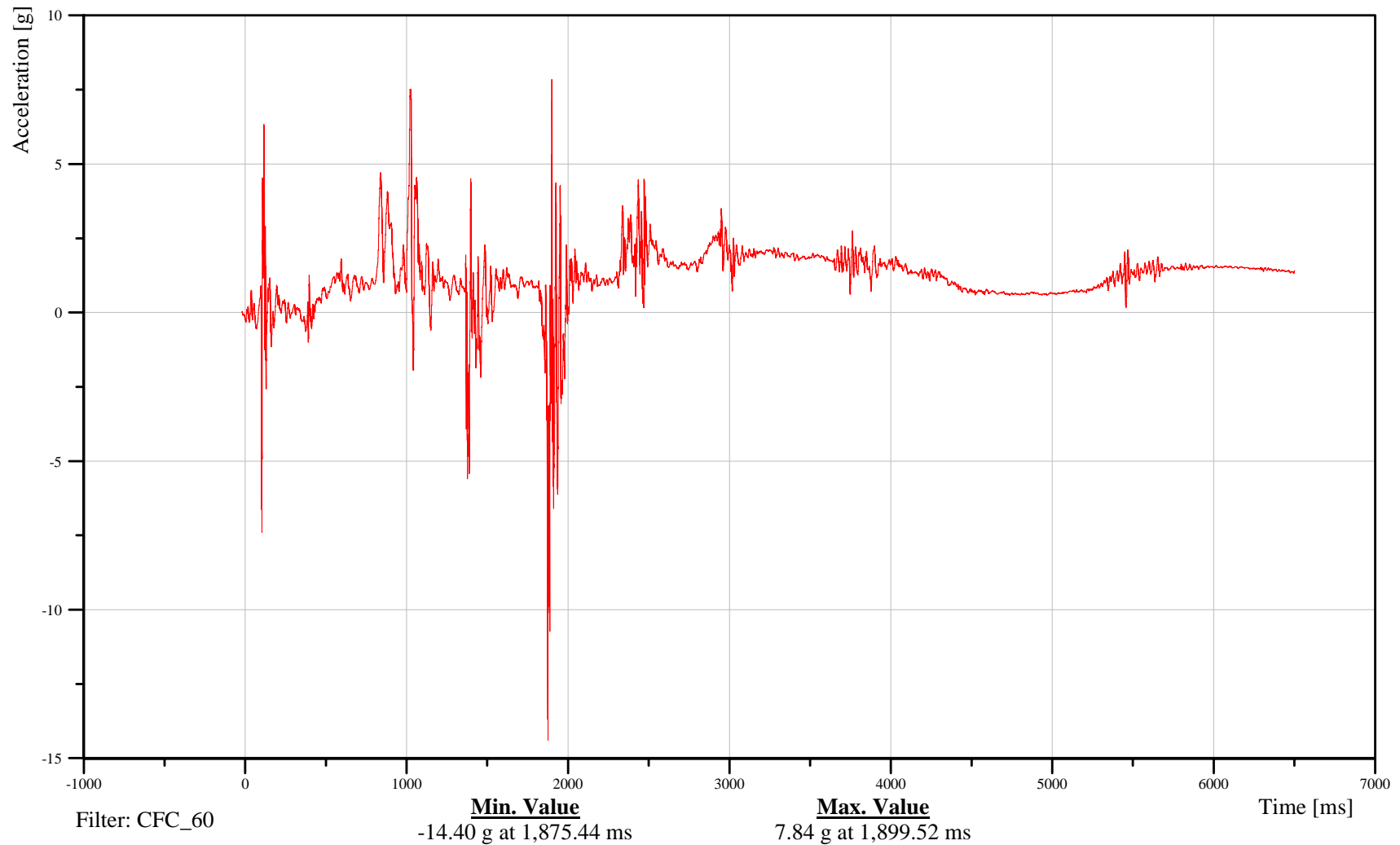
Time: 16:26

Customer: VRTC

# 10VEHCCG0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-91

100115



# Soil Trip Rollover 2007 Ford Expedition

## Vehicle Center of Gravity Resultant Acceleration

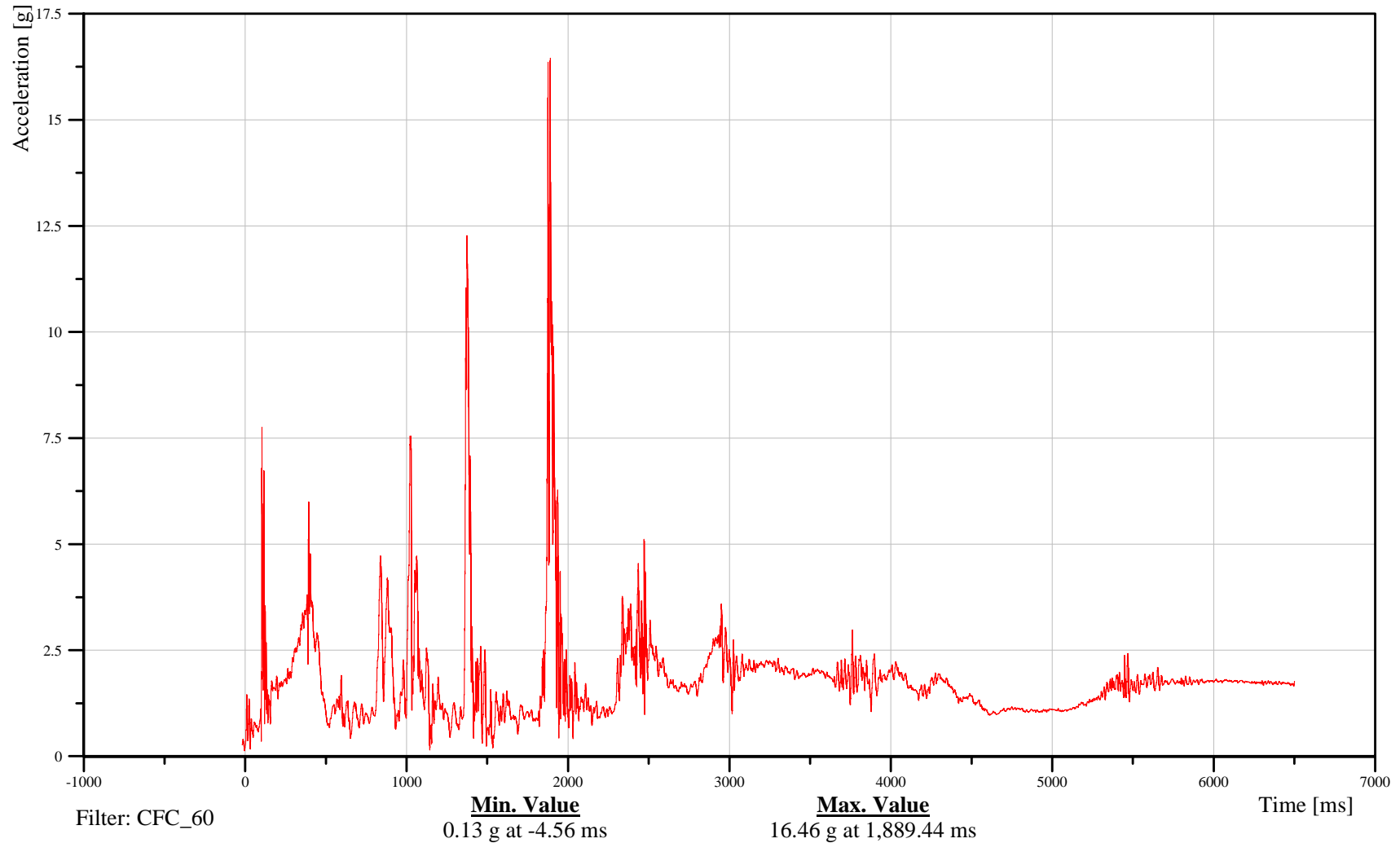
Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 10VEHCCG0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-92

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Vehicle Roll Rate

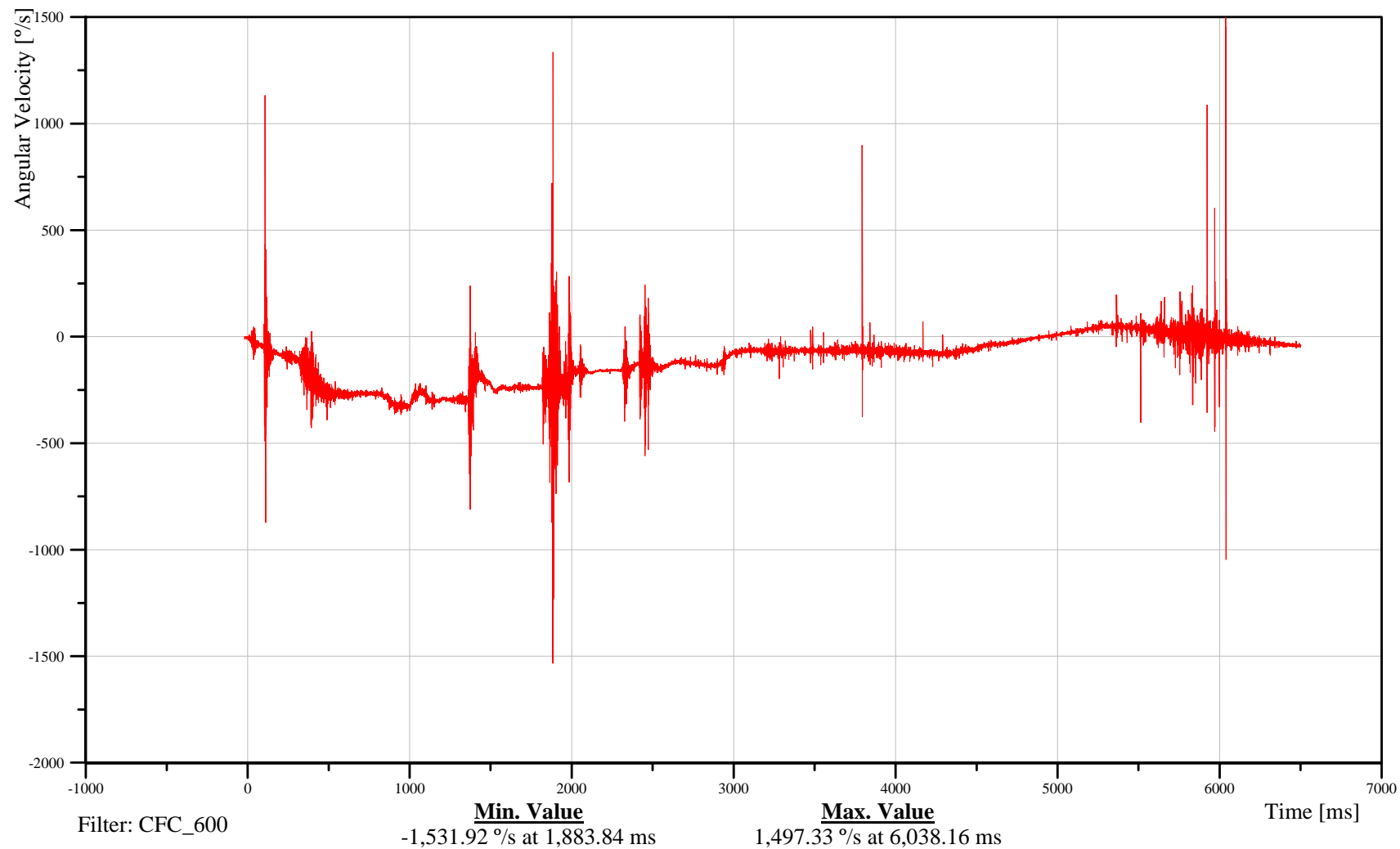
Time: 16:26

Customer: VRTC

# 10VEHCCG0000AVXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-93

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Vehicle Pitch Rate

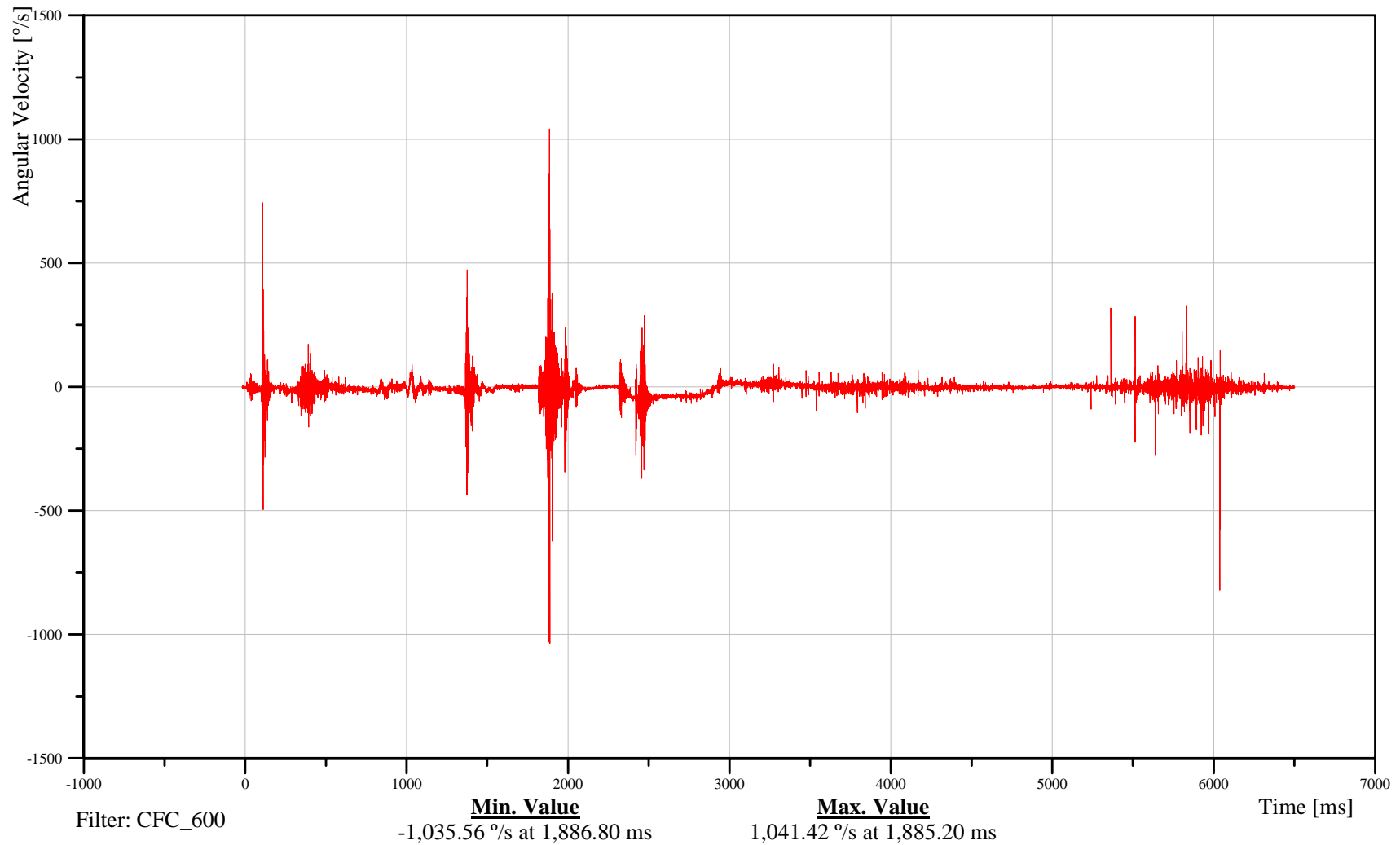
Time: 16:26

Customer: VRTC

# 10VEHCCG0000AVYB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-94

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Vehicle Yaw Rate

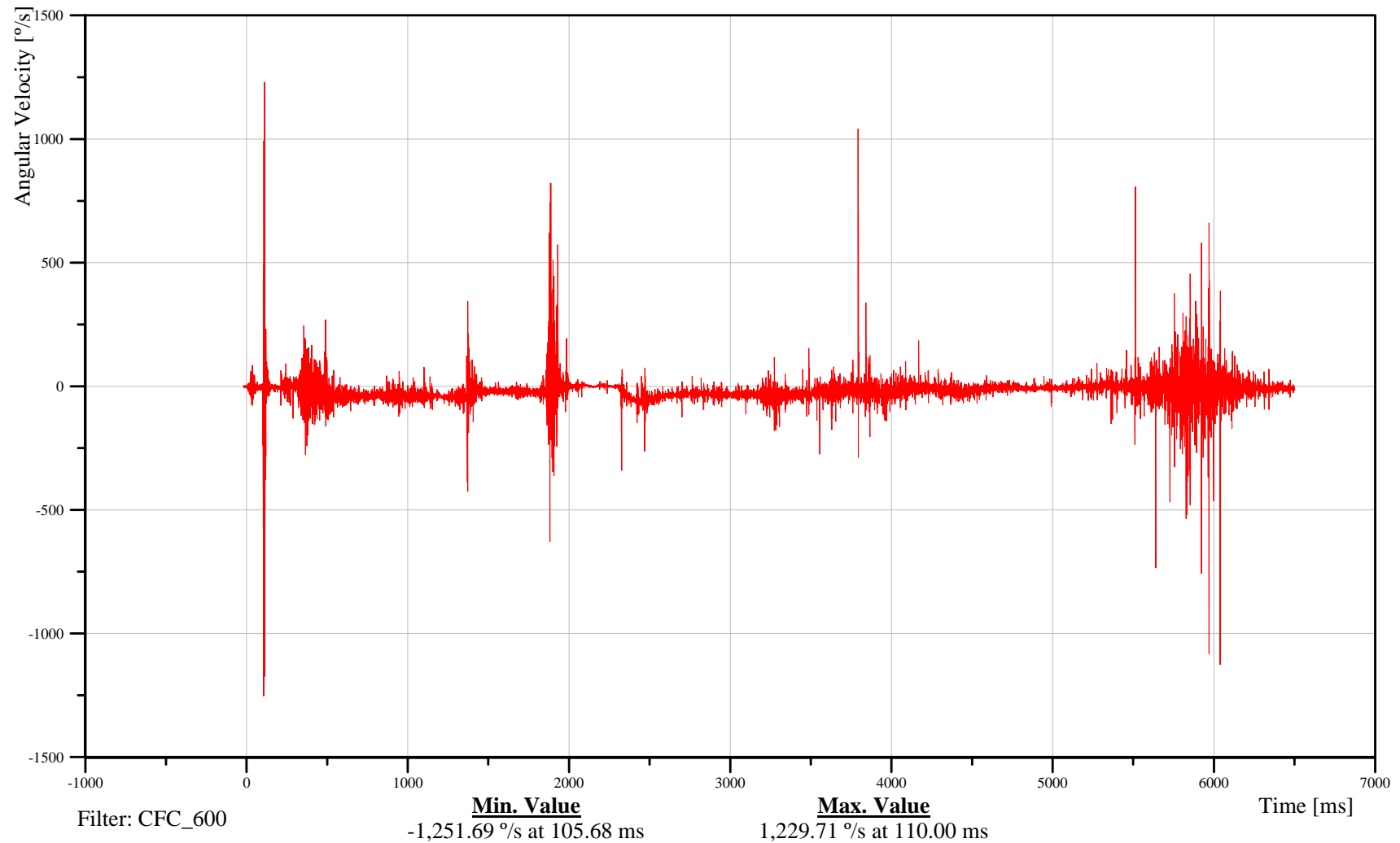
Time: 16:26

Customer: VRTC

# 10VEHCCG0000AVZB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-95

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Rear Deck Roll Rate Redundant

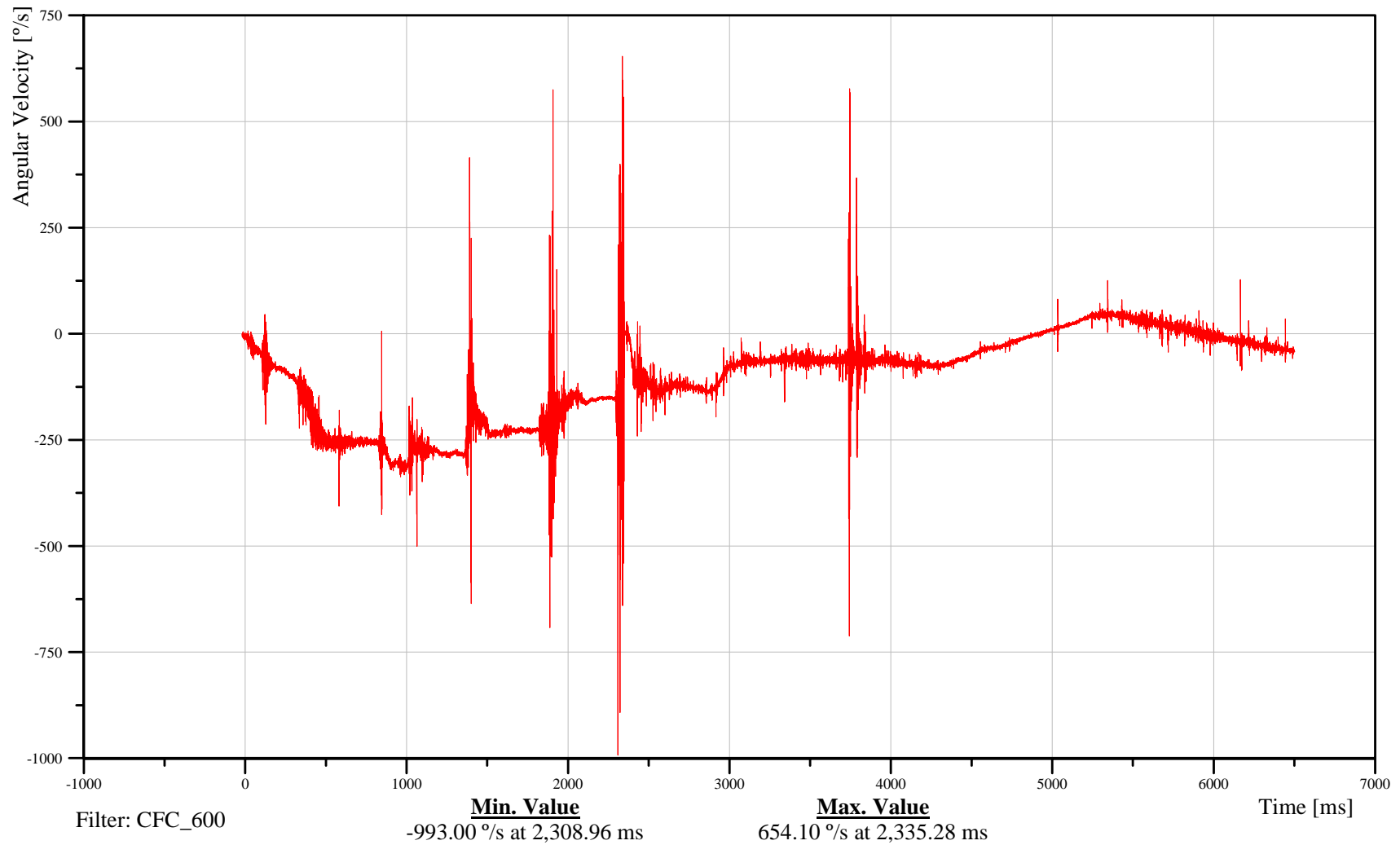
Time: 16:26

Customer: VRTC

## 10VEHCREDK00AVXB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-96

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Rear Deck Pitch Rate Redundant

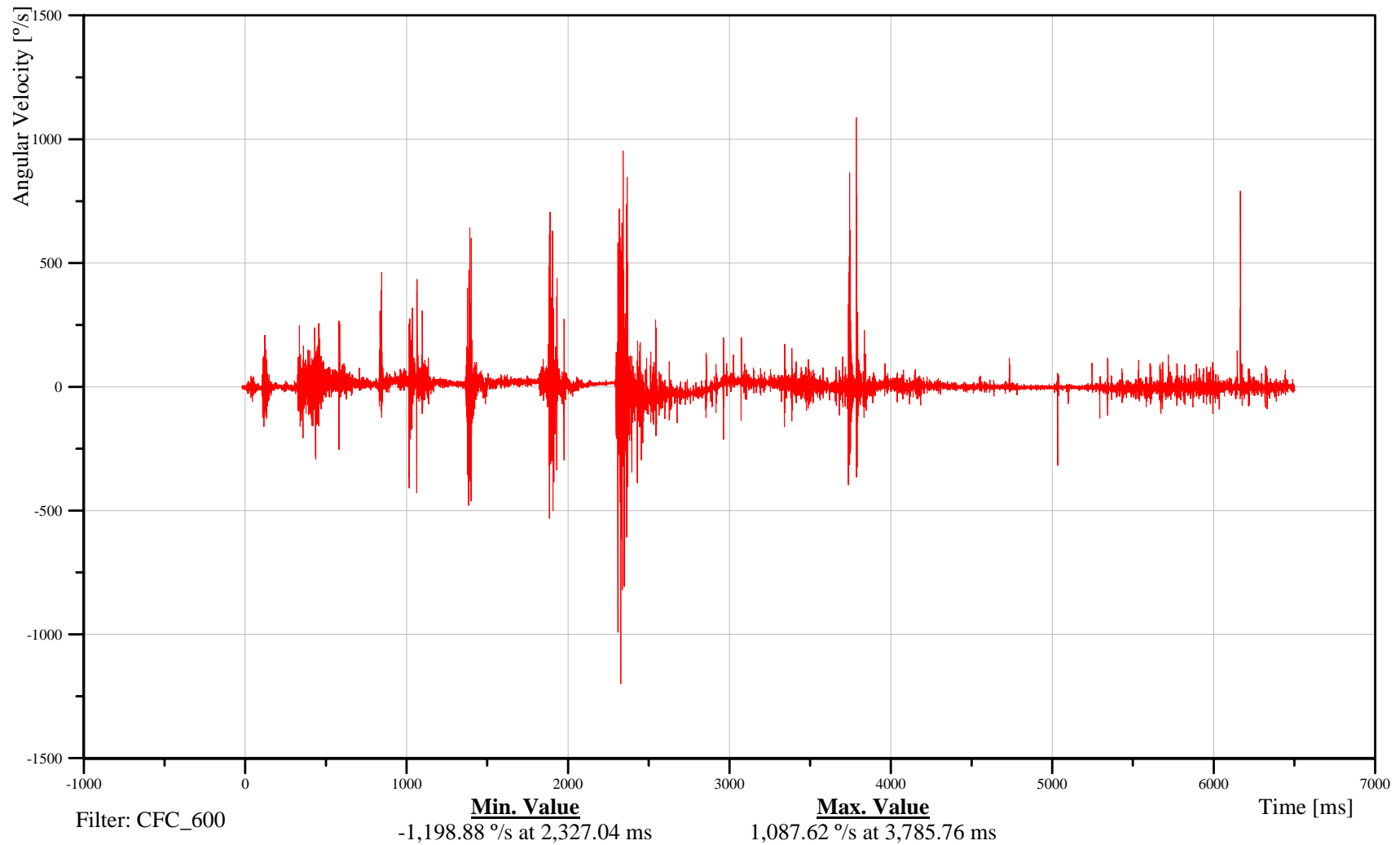
Time: 16:26

Customer: VRTC

# 10VEHCREDK00AVYB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-97

100115



# Soil Trip Rollover 2007 Ford Expedition

Rear Deck Yaw Rate Redundant

Date: 01/15/2010

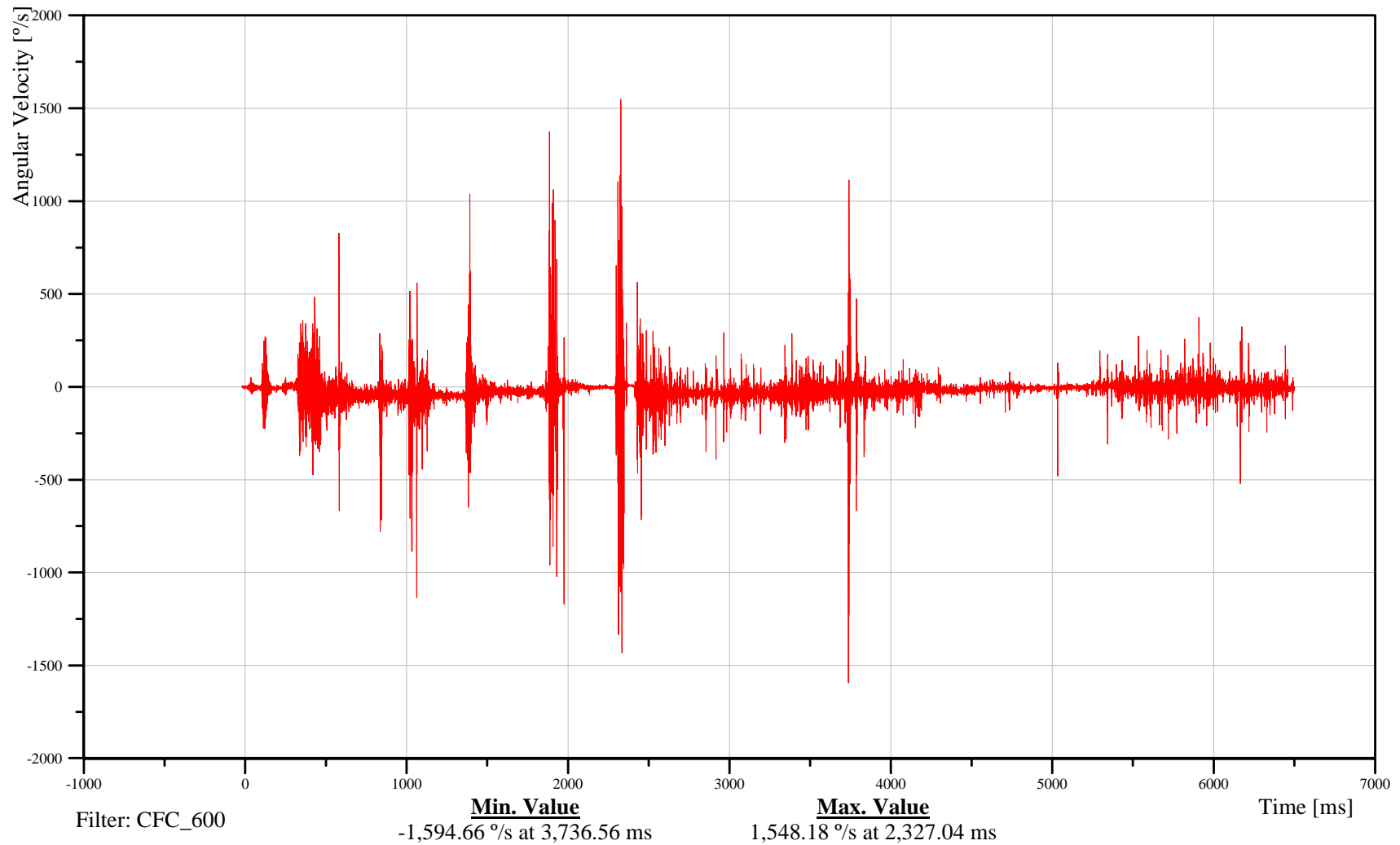
Time: 16:26

Customer: VRTC

## 10VEHCREDK00AVZB

TRC Inc. Test Lab: CTF

Test Number: 100115



B-98

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Top of Engine X-Axis Acceleration

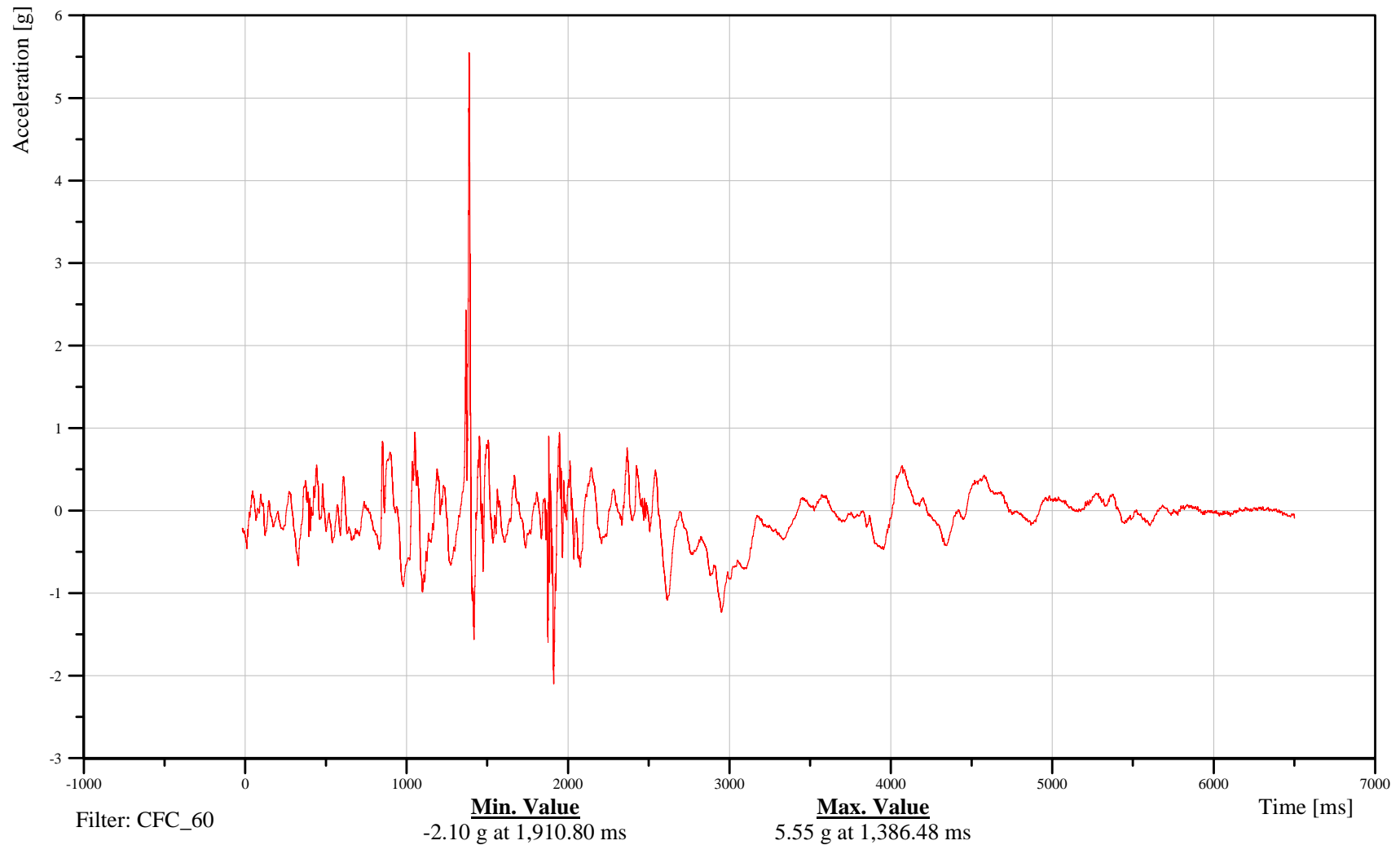
Time: 16:26

Customer: VRTC

### 10ENGNTTP0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-99

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Top of Engine Y-Axis Acceleration

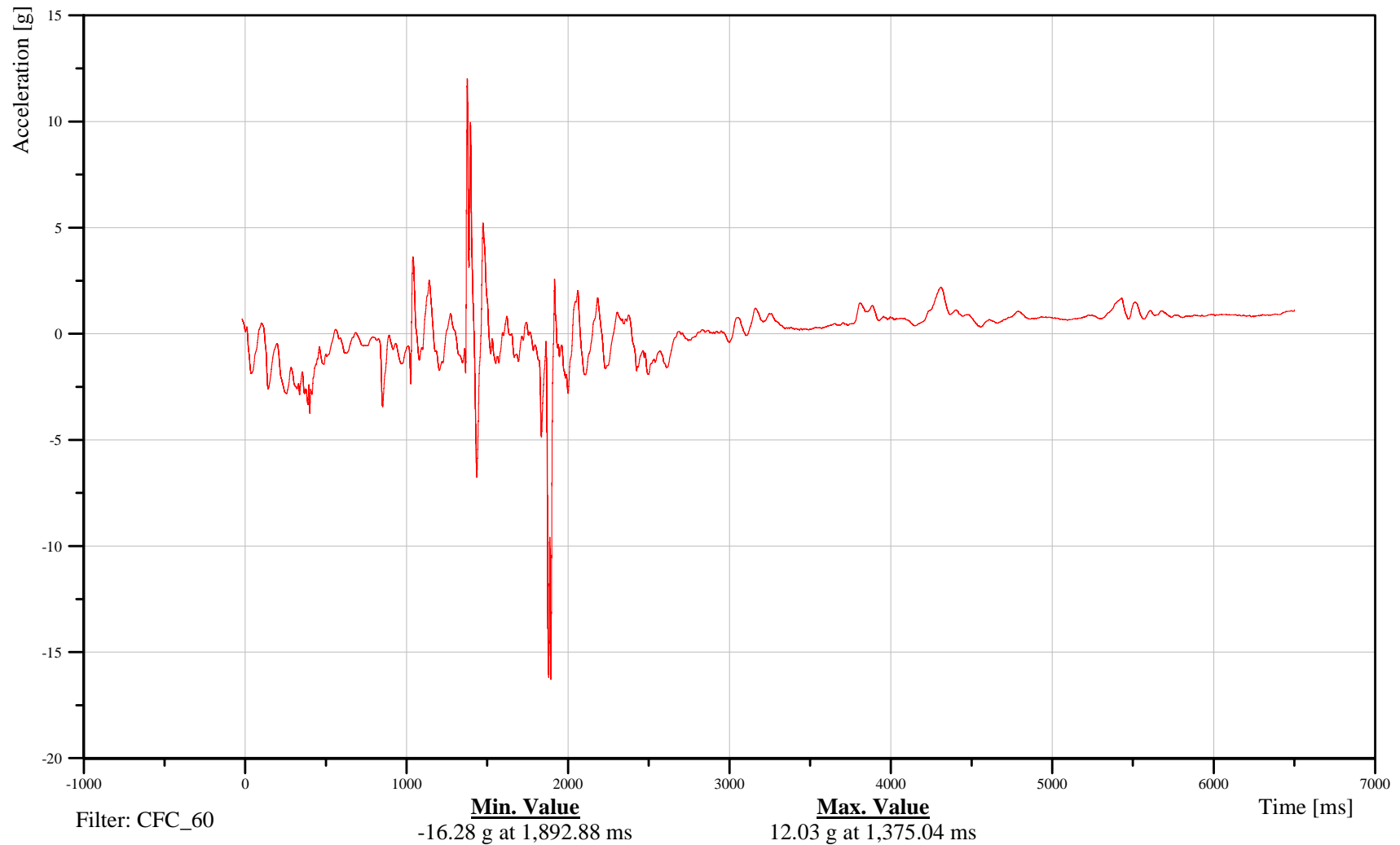
Time: 16:26

Customer: VRTC

# 10ENGNTTP0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-100

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Top of Engine Z-Axis Acceleration

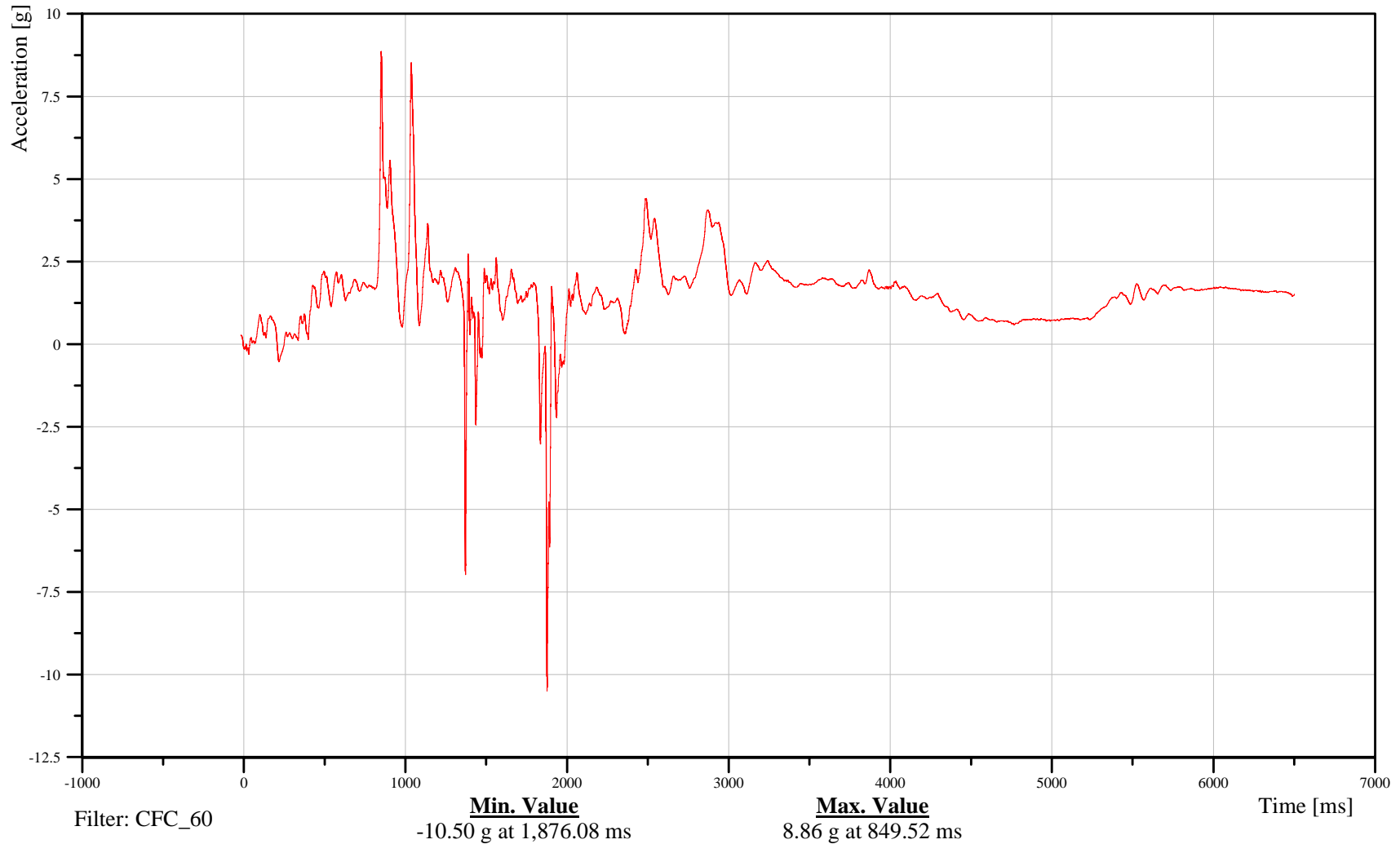
Time: 16:26

Customer: VRTC

### 10ENGNTTP0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-101

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Top of Engine Resultant Acceleration

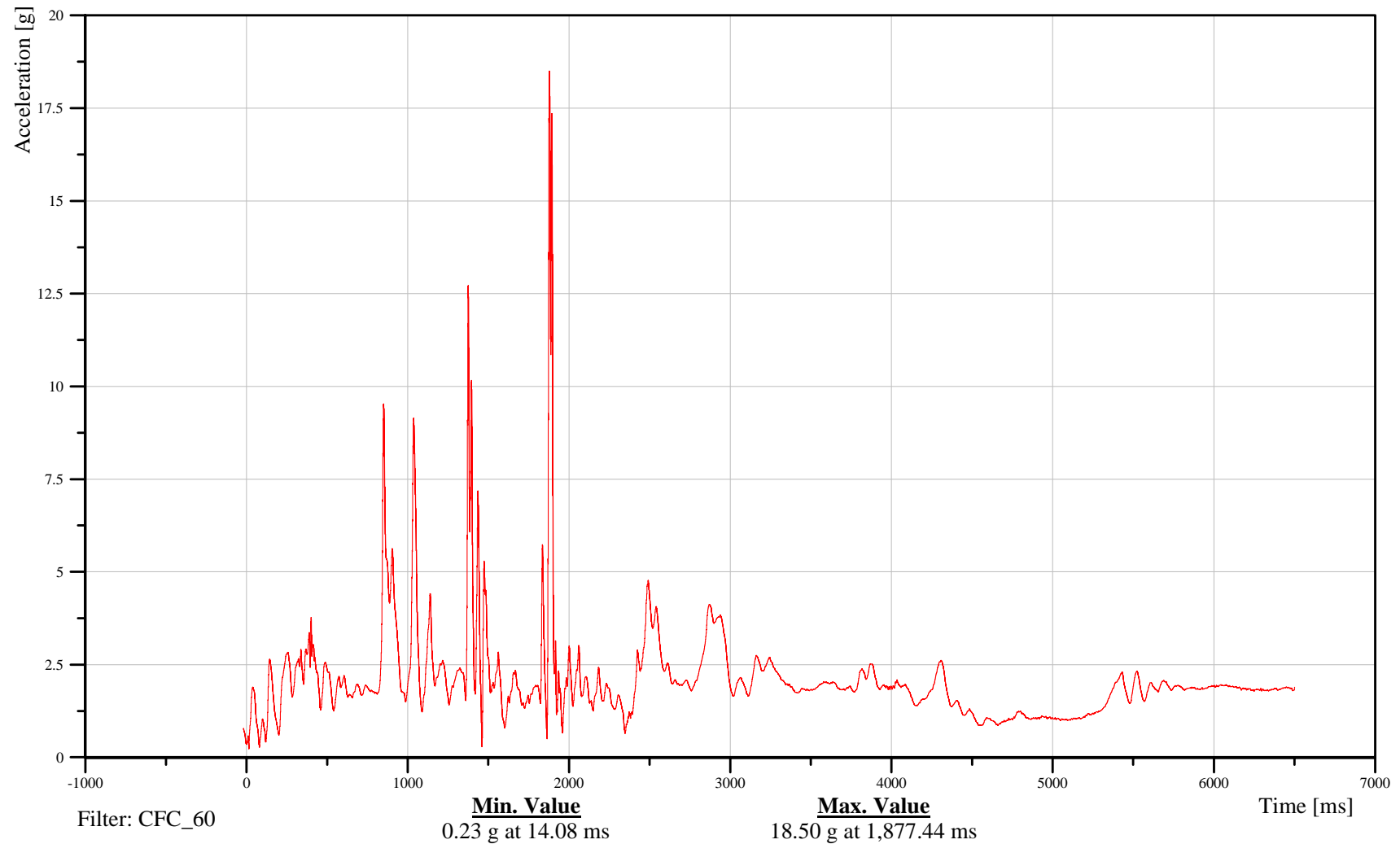
Time: 16:26

Customer: VRTC

# 10ENGNTTP0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-102

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Bottom of Engine X-Axis Acceleration

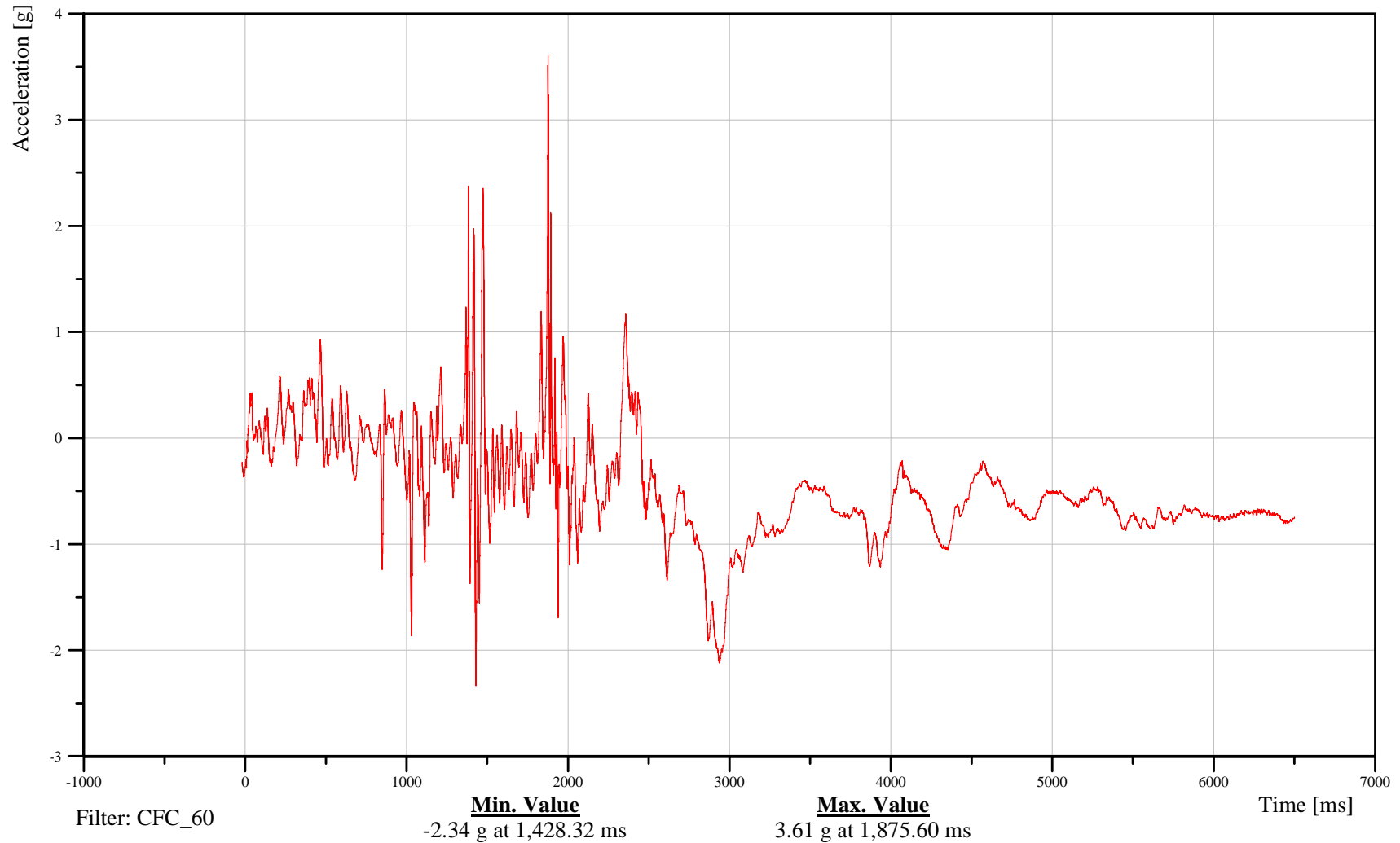
Time: 16:26

Customer: VRTC

# 10ENGNB00000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-103

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Bottom of Engine Y-Axis Acceleration

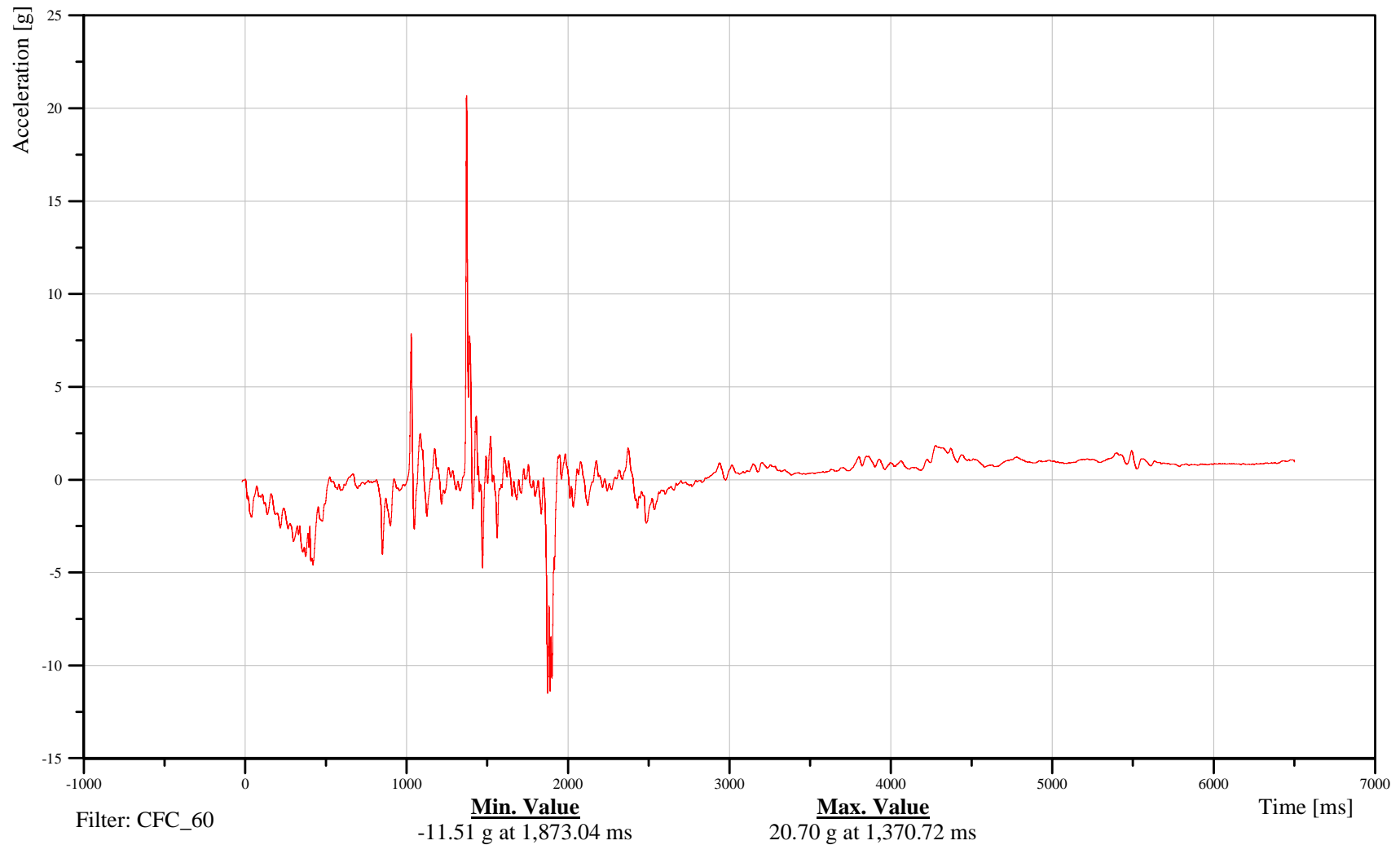
Time: 16:26

Customer: VRTC

# 10ENGNB00000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-104

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Bottom of Engine Z-Axis Acceleration

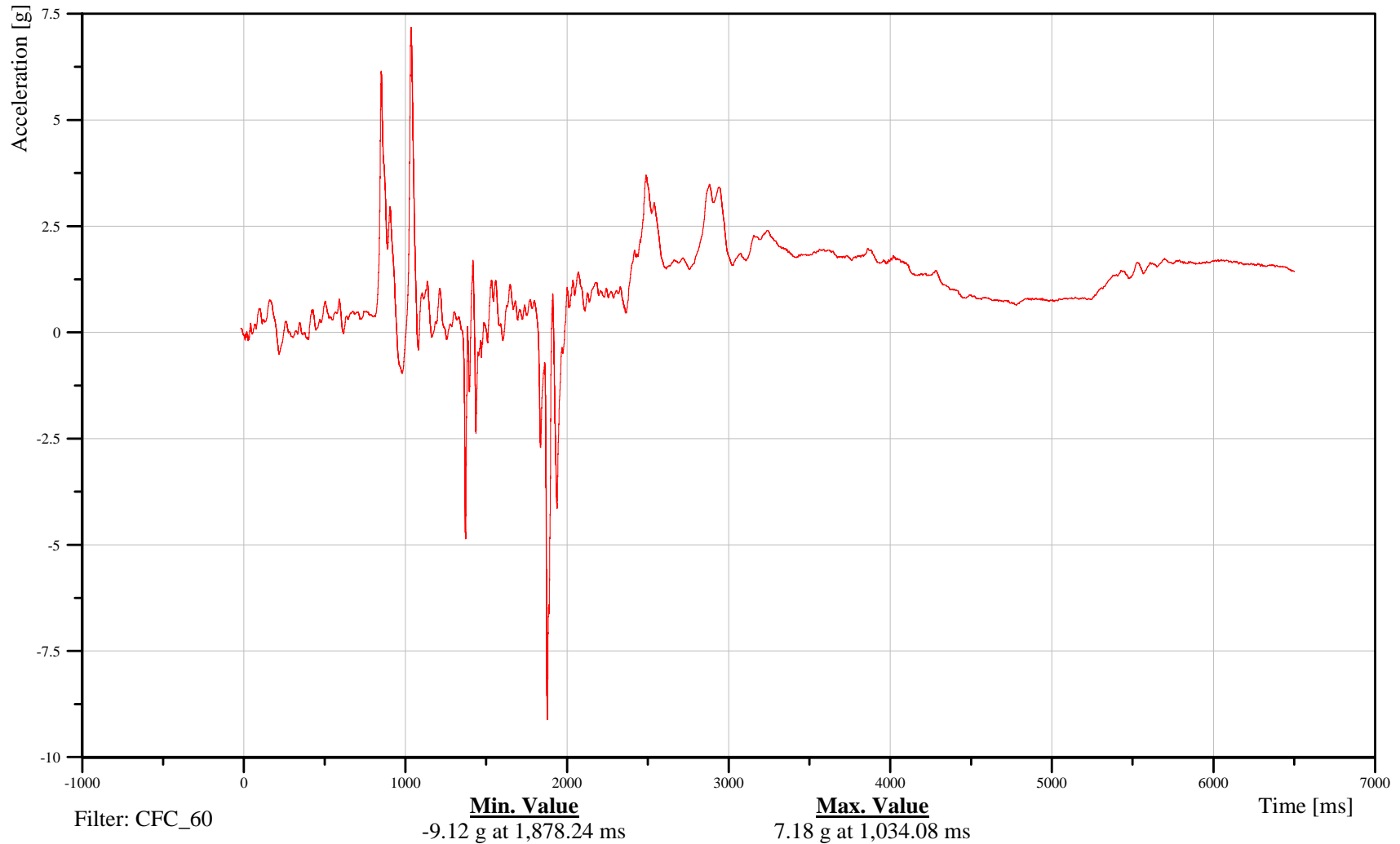
Time: 16:26

Customer: VRTC

# 10ENGNBO0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-105

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

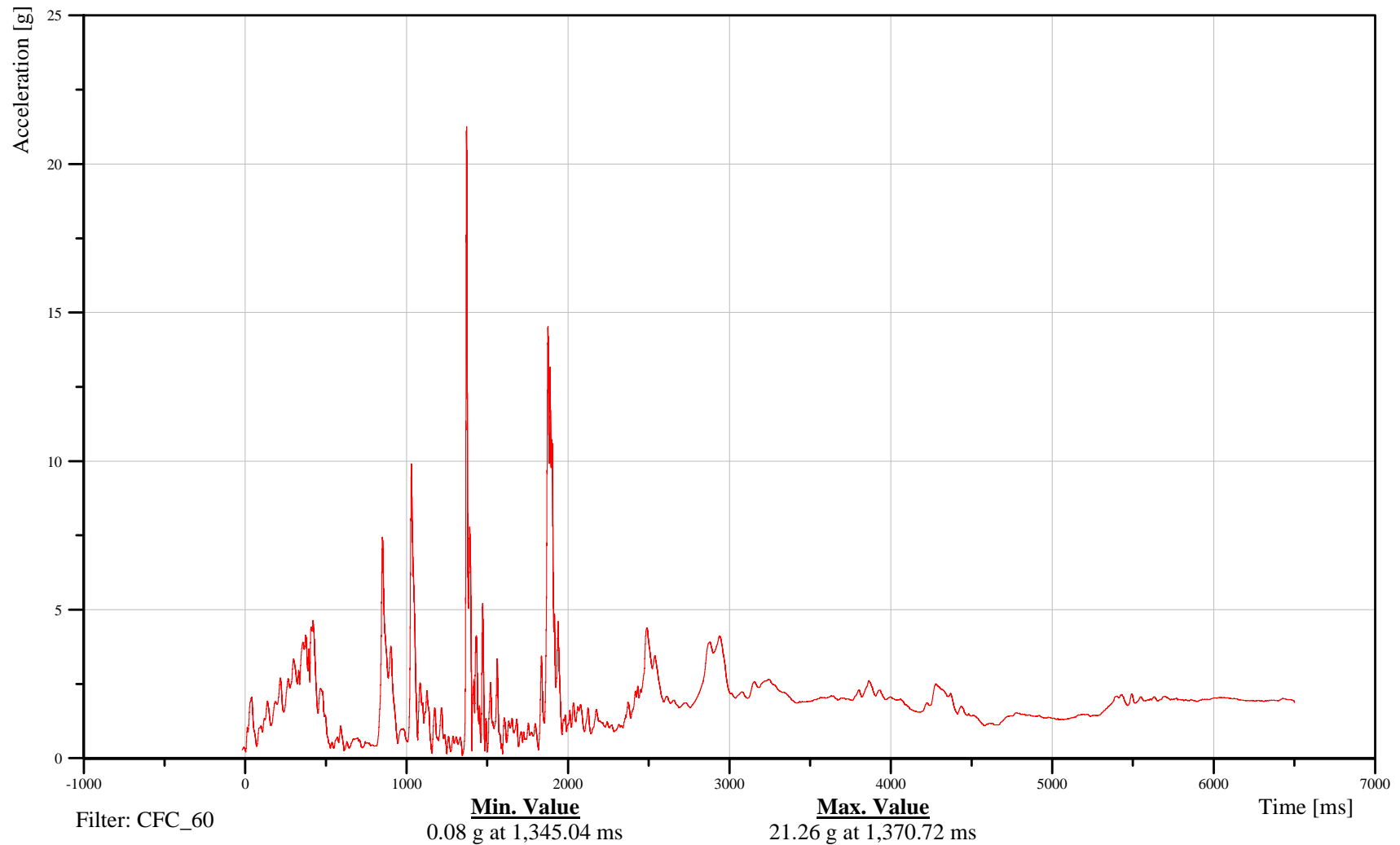
## Bottom of Engine Resultant Acceleration

Customer: VRTC

# 10ENGNB00000ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-106

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

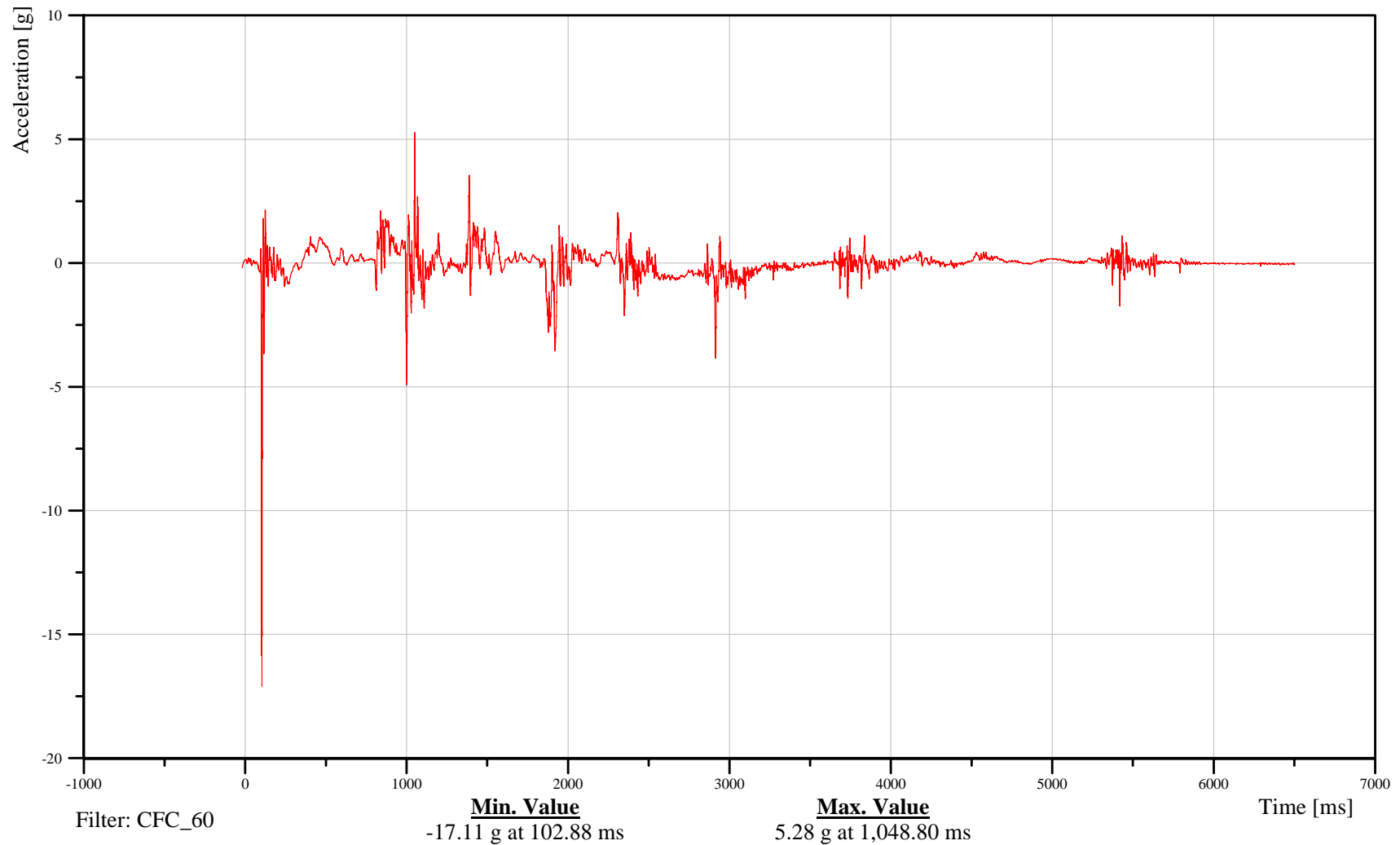
## Left A-Pillar Upper X-Axis Acceleration

Customer: VRTC

# 10APILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-107

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

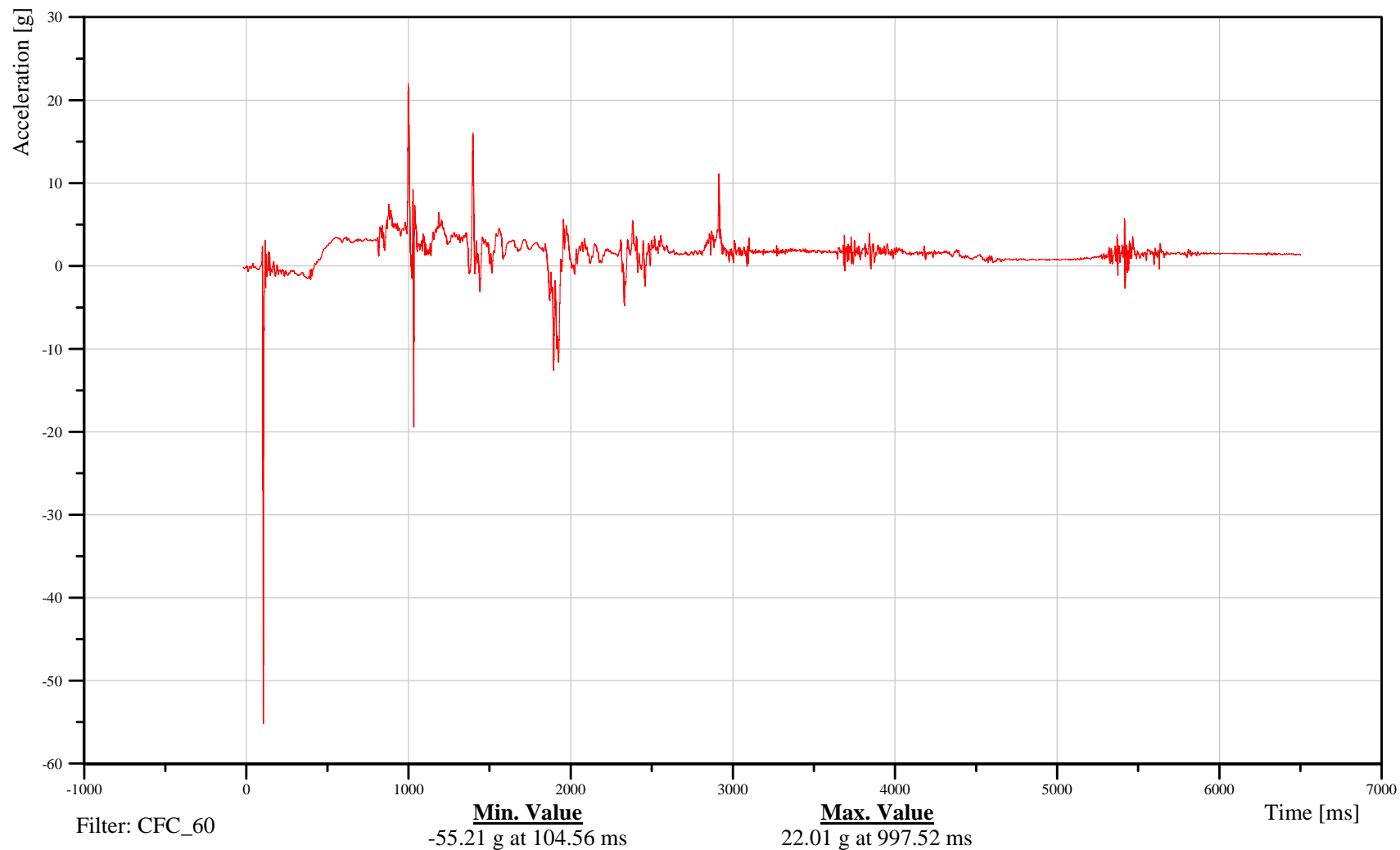
## Left A-Pillar Upper Y-Axis Acceleration

Customer: VRTC

# 10APILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-108

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

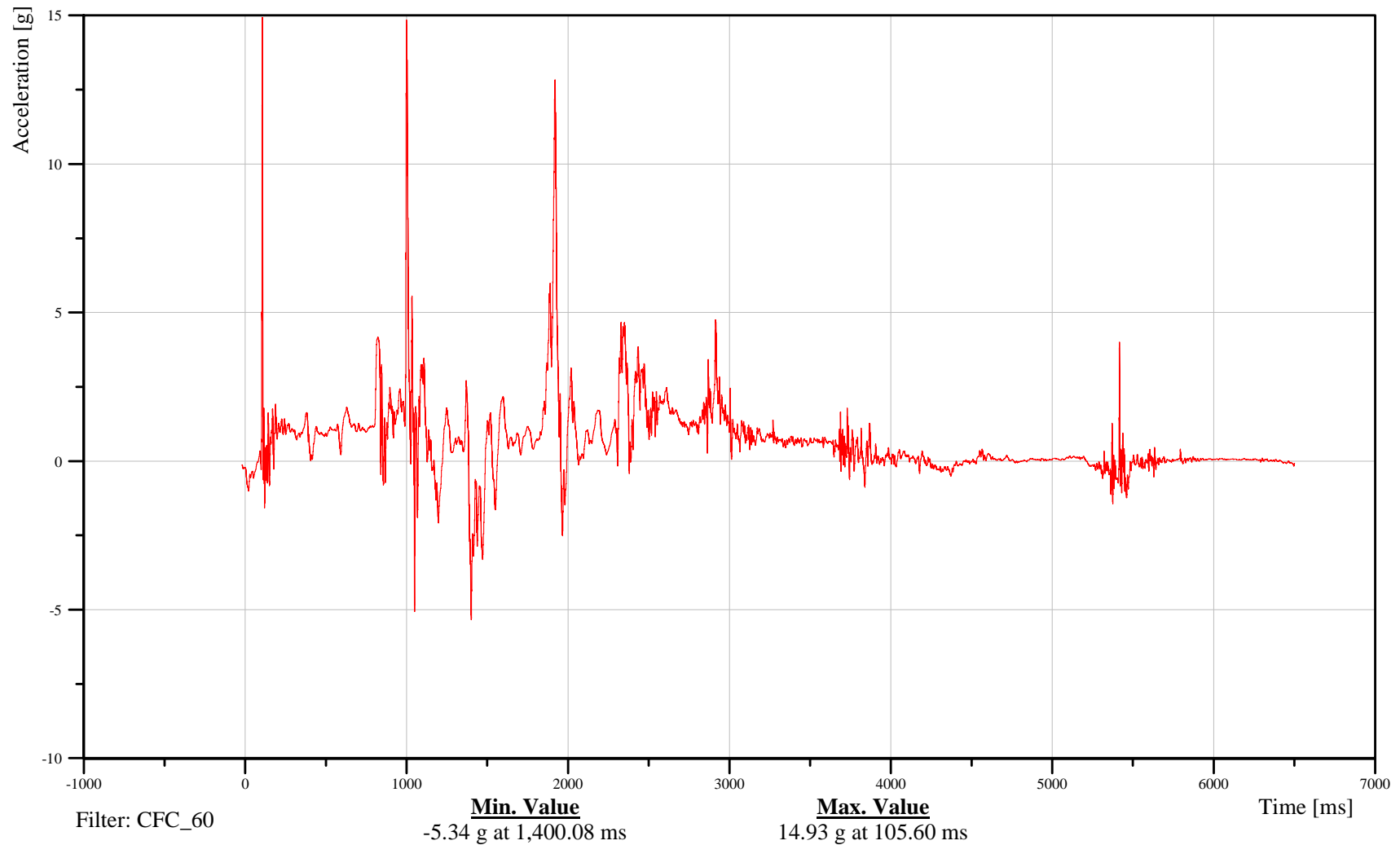
## Left A-Pillar Upper Z-Axis Acceleration

Customer: VRTC

# 10APILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-109

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left A-Pillar Upper Resultant Acceleration

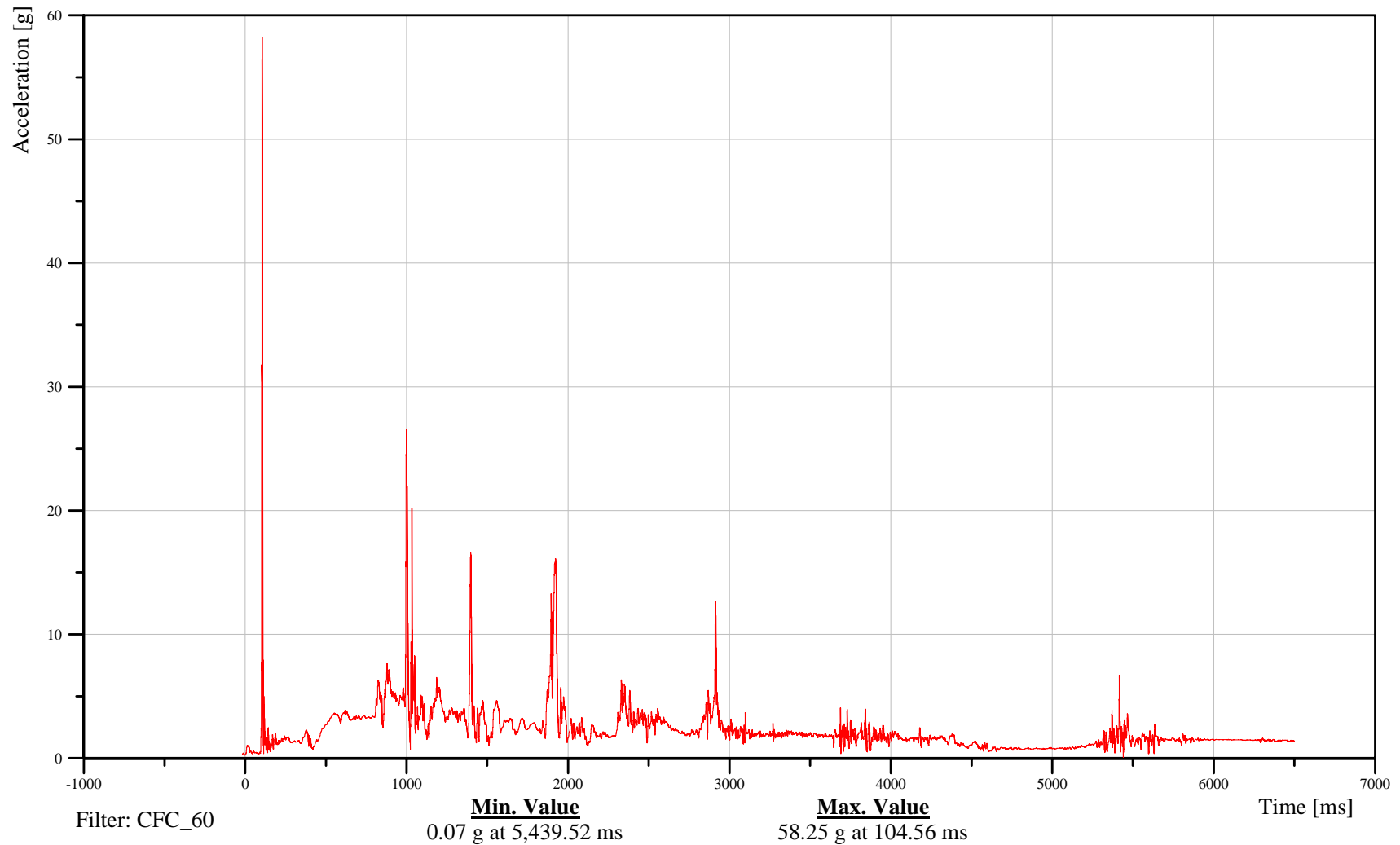
Time: 16:26

Customer: VRTC

# 10APILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-110

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

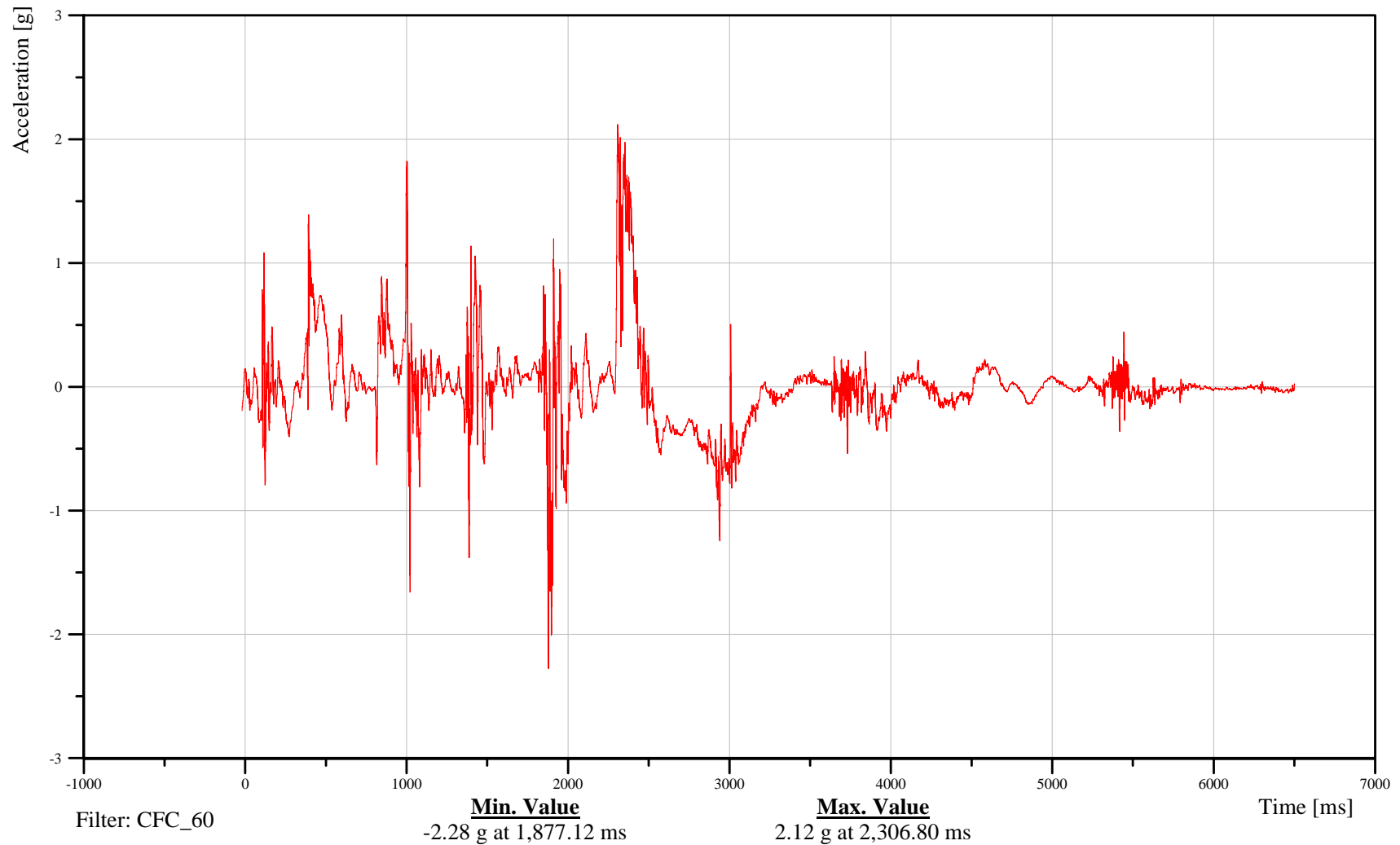
## Left A-Pillar Lower X-Axis Acceleration

Customer: VRTC

# 10APILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-111

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

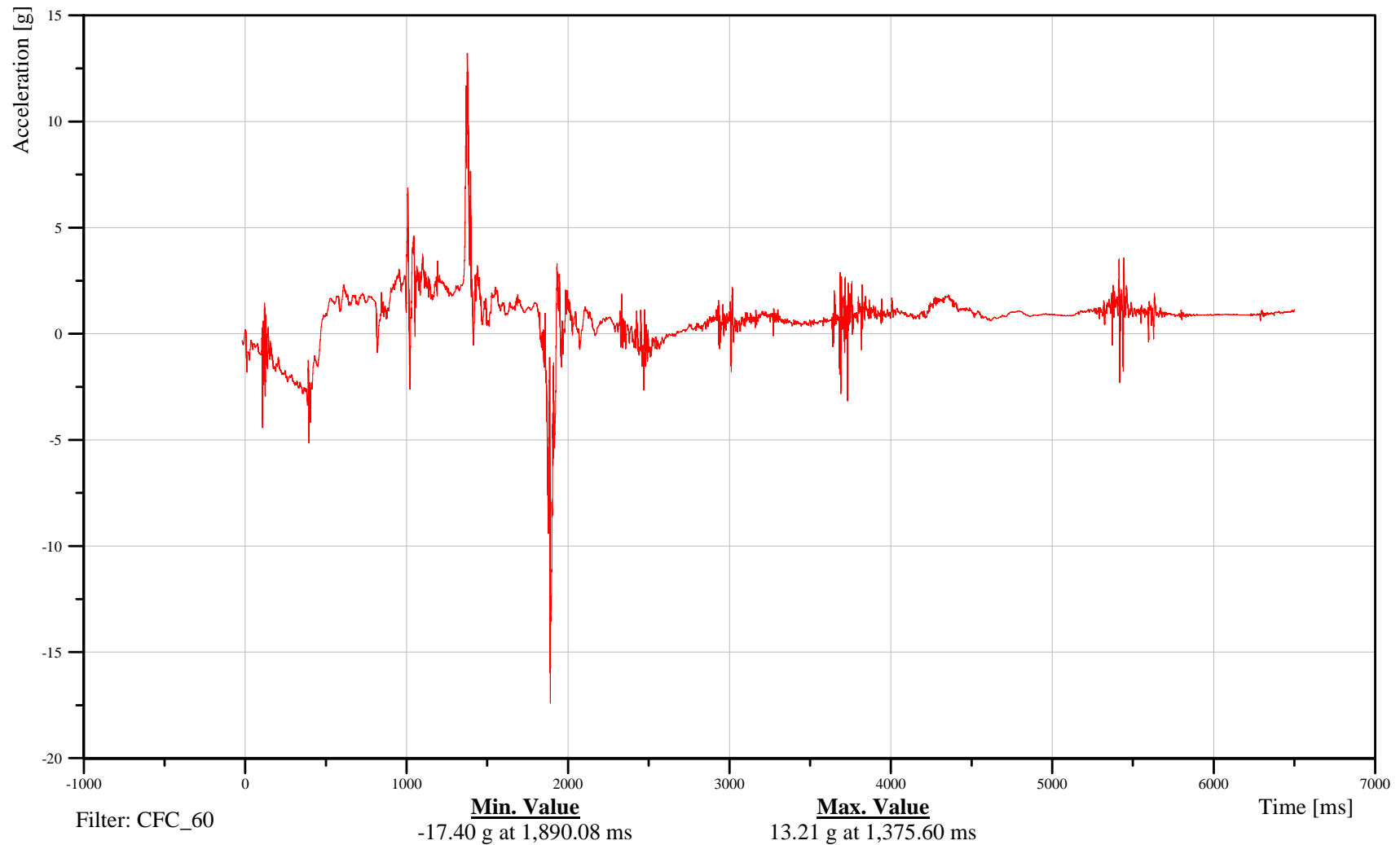
## Left A-Pillar Lower Y-Axis Acceleration

Customer: VRTC

# 10APILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-112

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

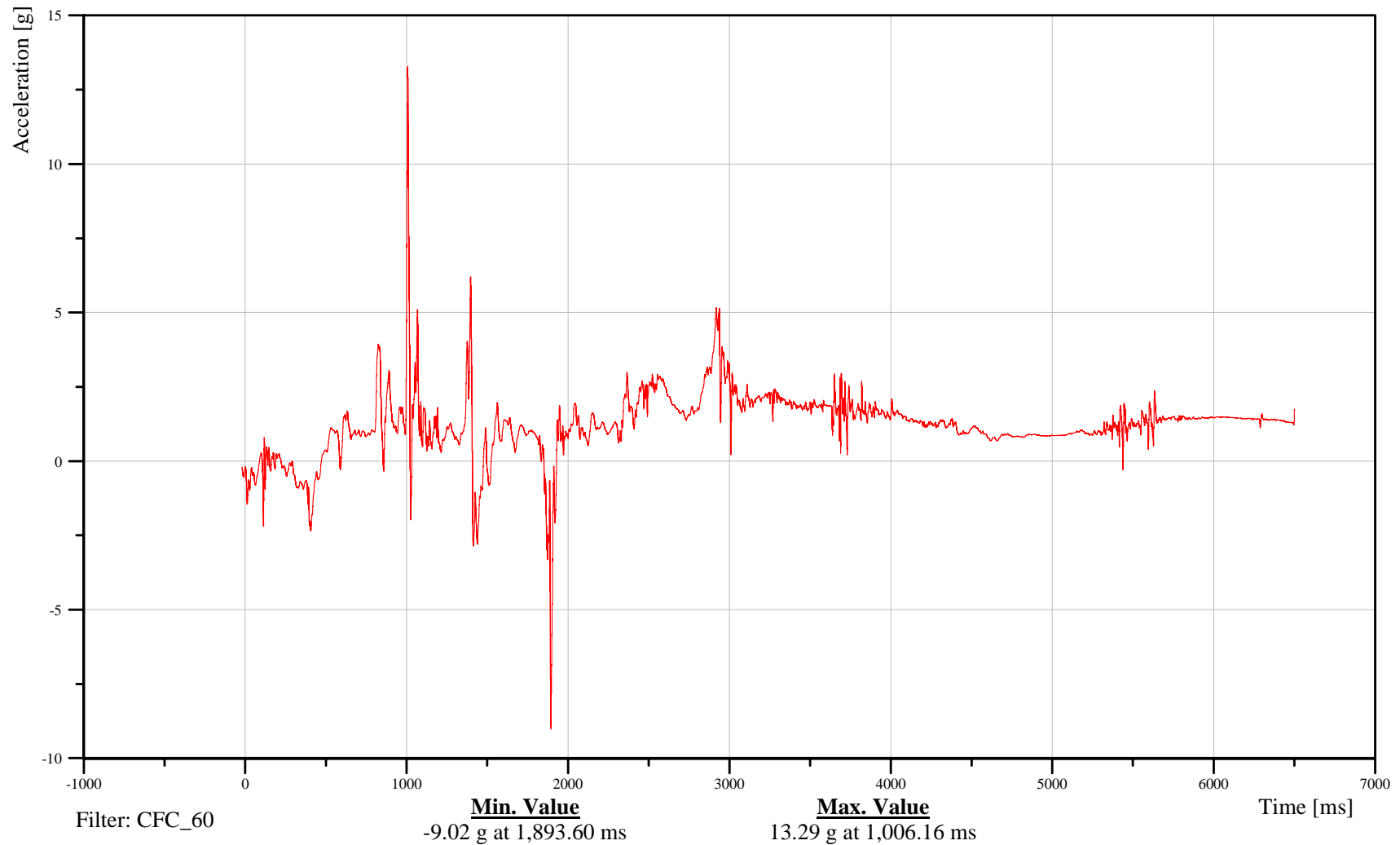
## Left A-Pillar Lower Z-Axis Acceleration

Customer: VRTC

# 10APILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-113

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left A-Pillar Lower Resultant Acceleration

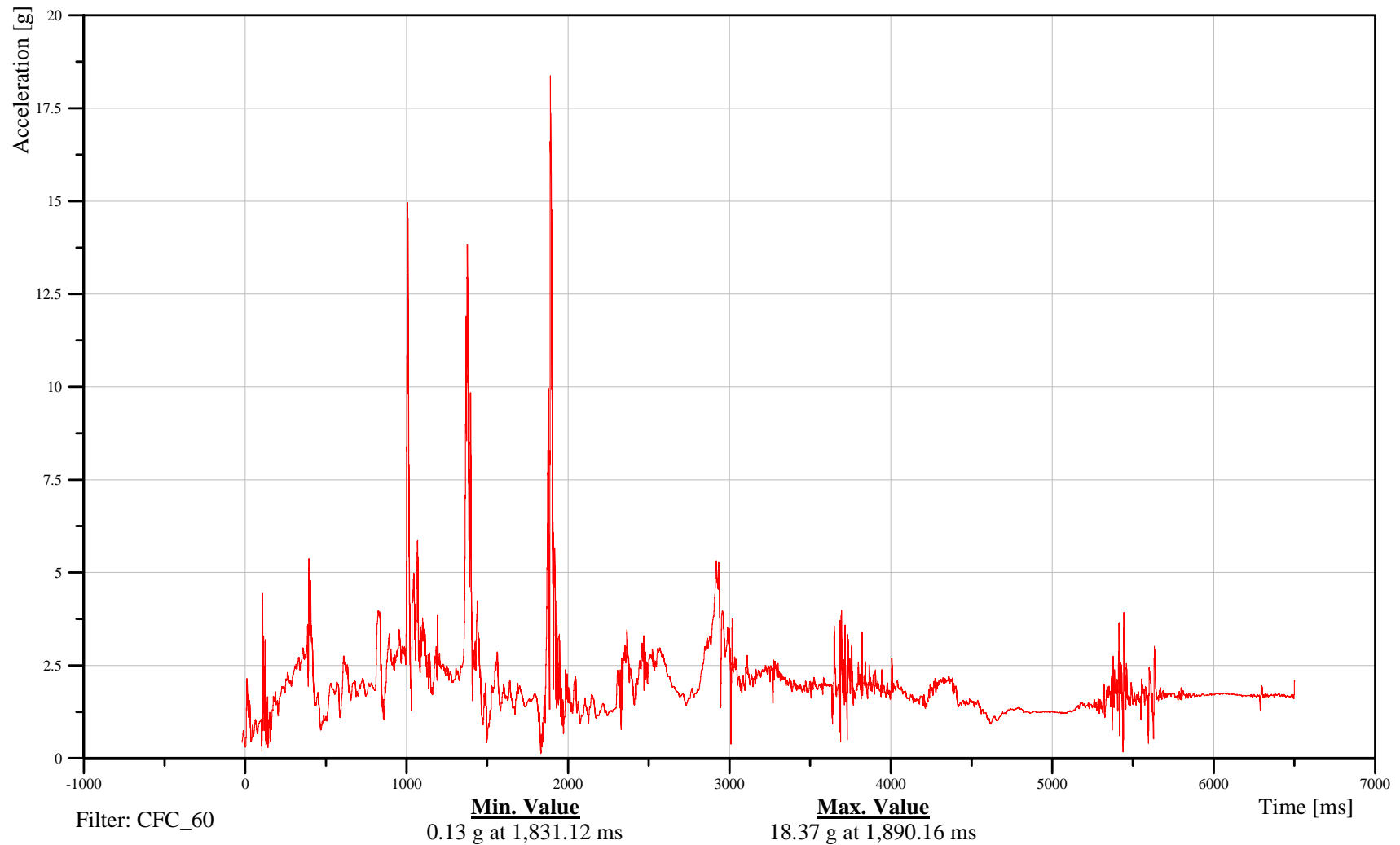
Time: 16:26

Customer: VRTC

# 10APILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-114

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

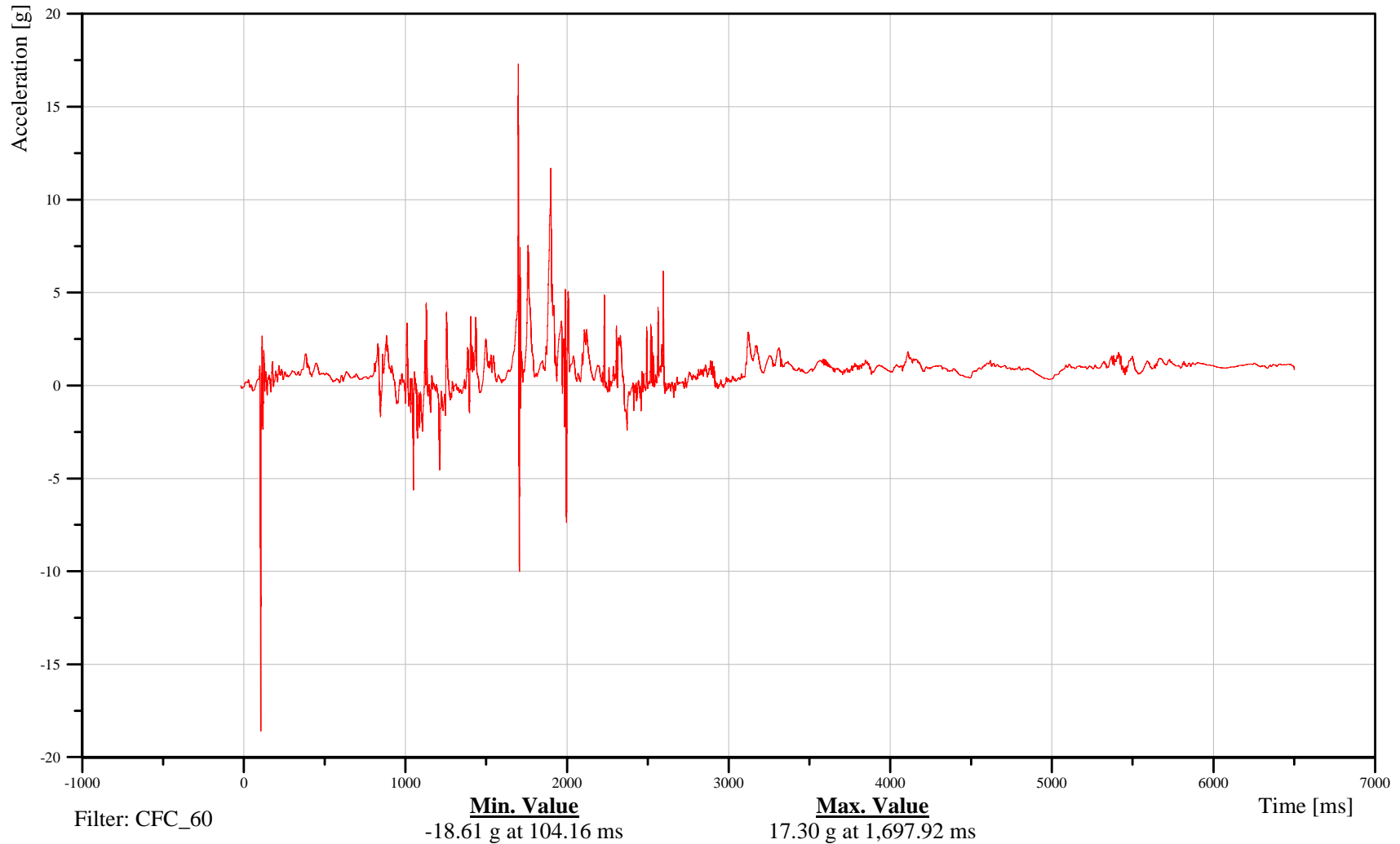
## Right A-Pillar Upper X-Axis Acceleration

Customer: VRTC

# 10APILUPRI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-115

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right A-Pillar Upper Y-Axis Acceleration

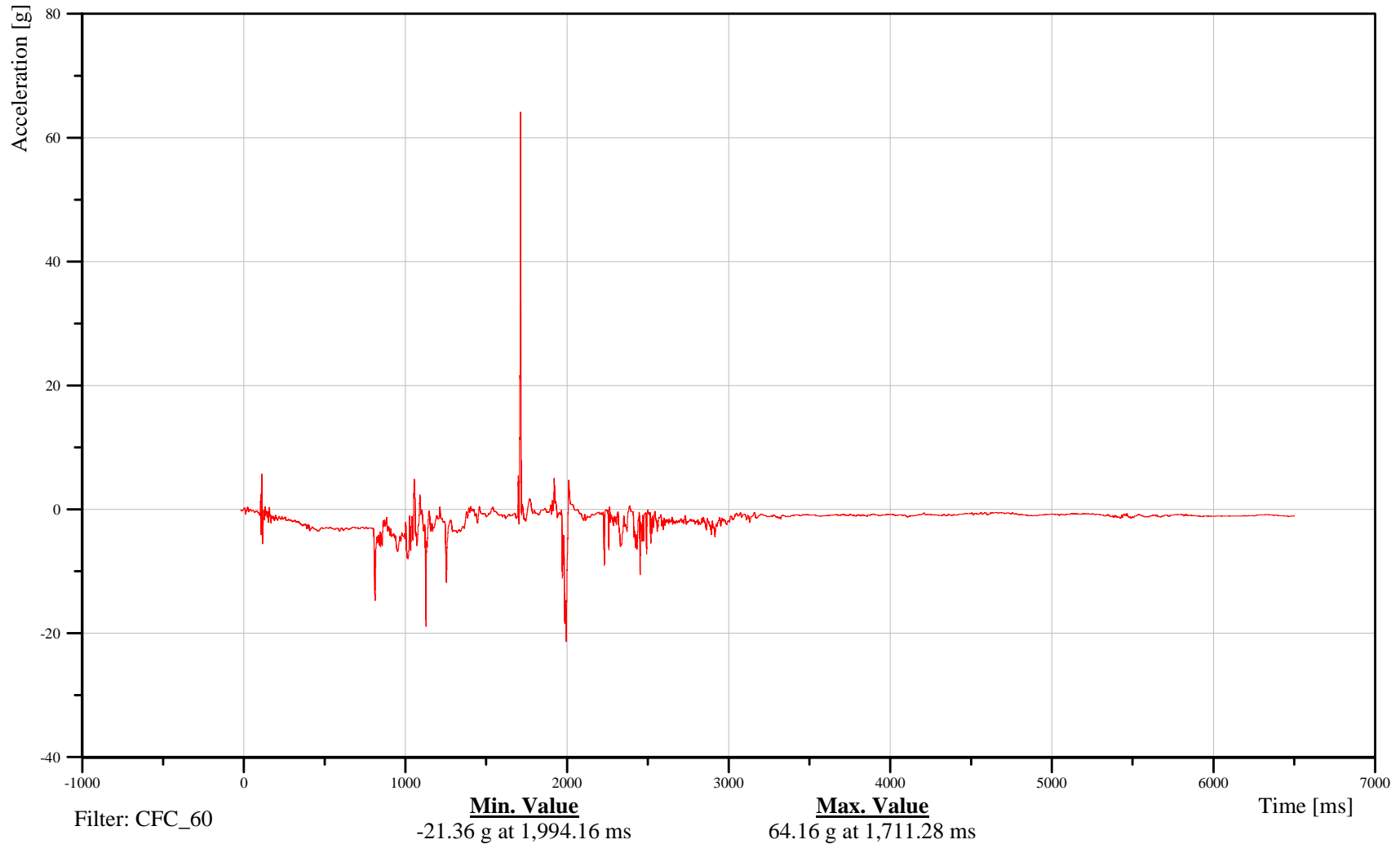
Time: 16:26

Customer: VRTC

# 10APILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-116

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

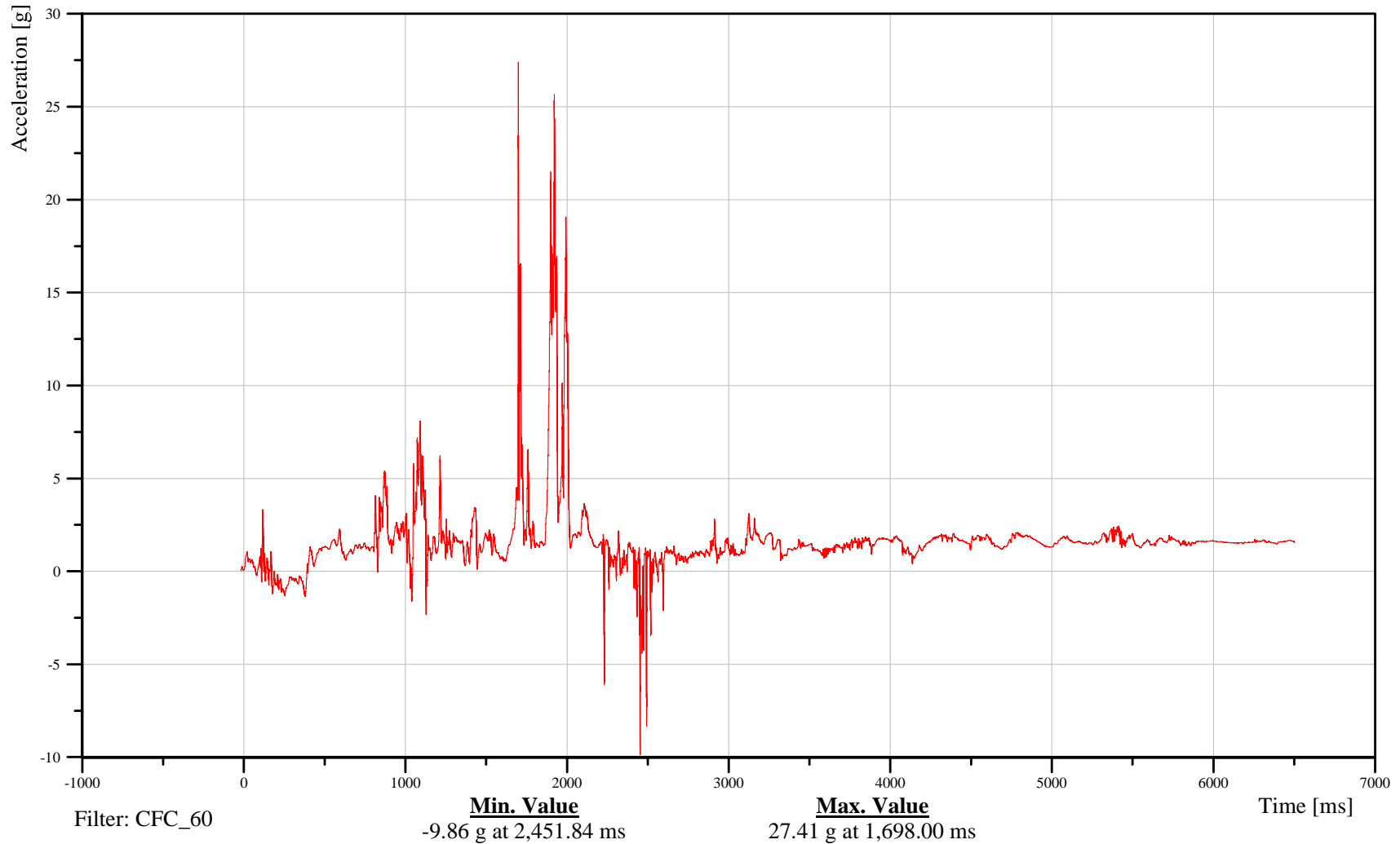
## Right A-Pillar Upper Z-Axis Acceleration

Customer: VRTC

TRC Inc. Test Lab: CTF

# 10APILUPRI00ACZD

Test Number: 100115



B-117

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right A-Pillar Upper Resultant Acceleration

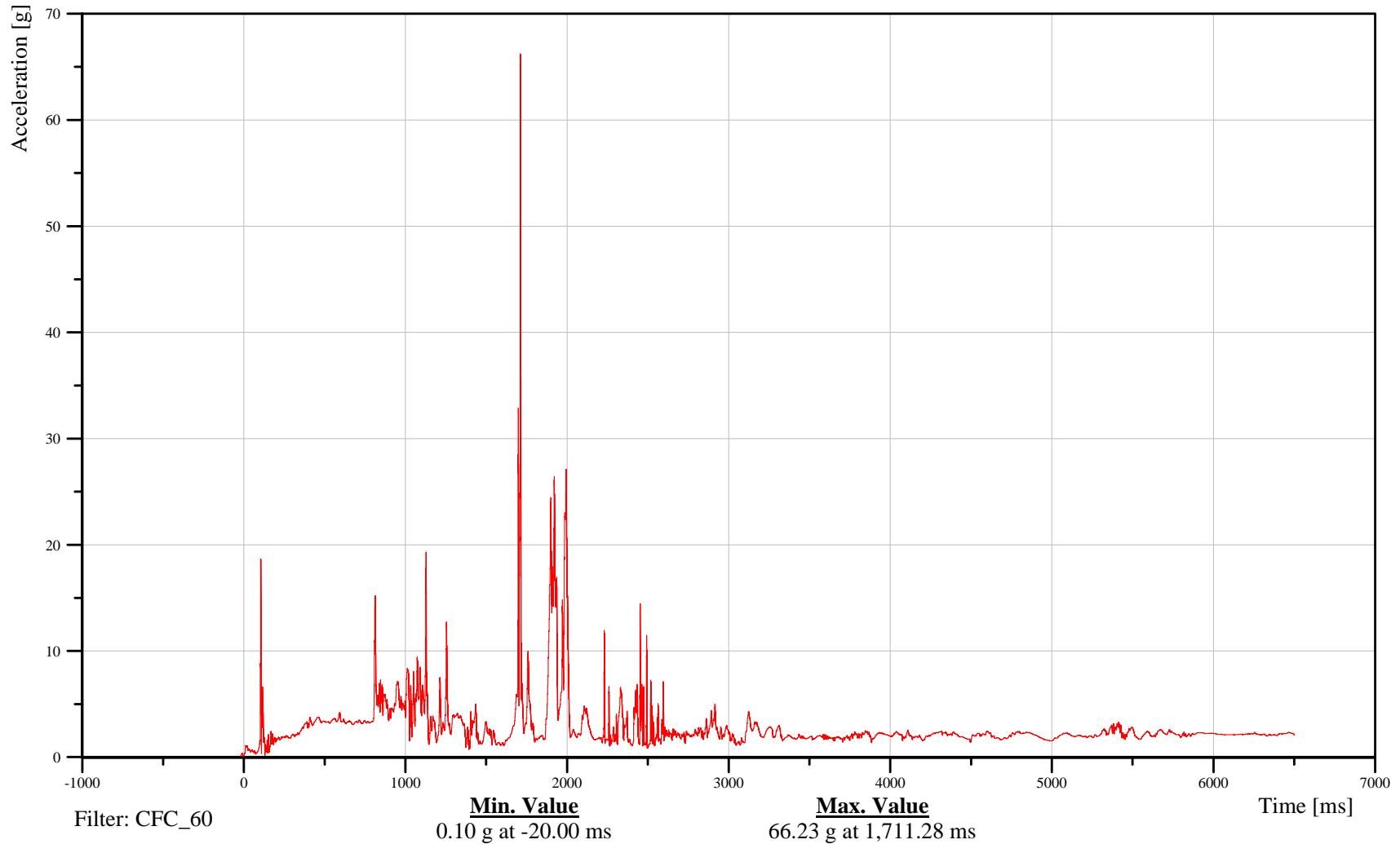
Time: 16:26

Customer: VRTC

# 10APILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-118

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right A-Pillar Lower X-Axis Acceleration

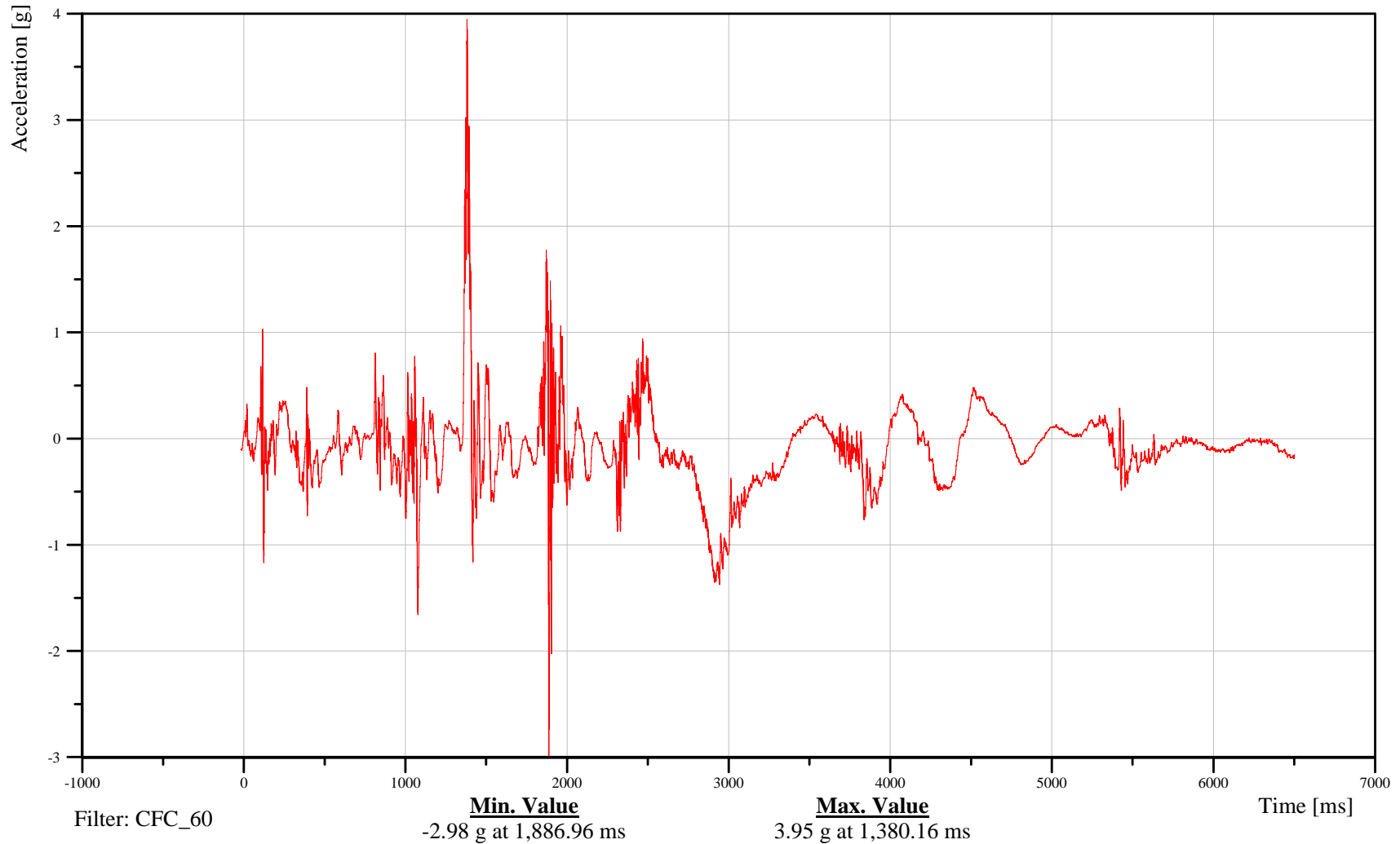
Time: 16:26

Customer: VRTC

### 10APILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-119

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right A-Pillar Lower Y-Axis Acceleration

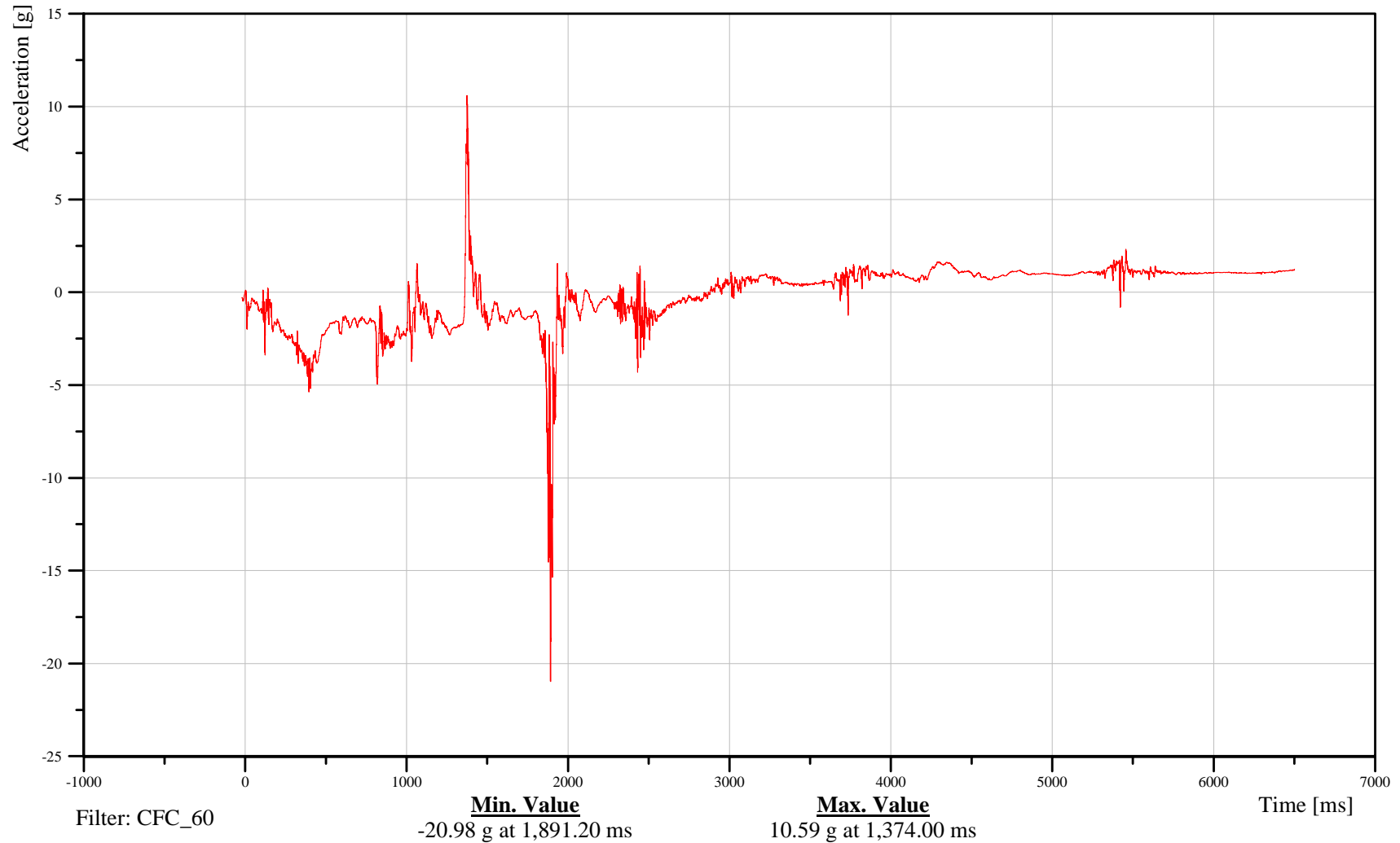
Time: 16:26

Customer: VRTC

# 10APILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-120

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right A-Pillar Lower Z-Axis Acceleration

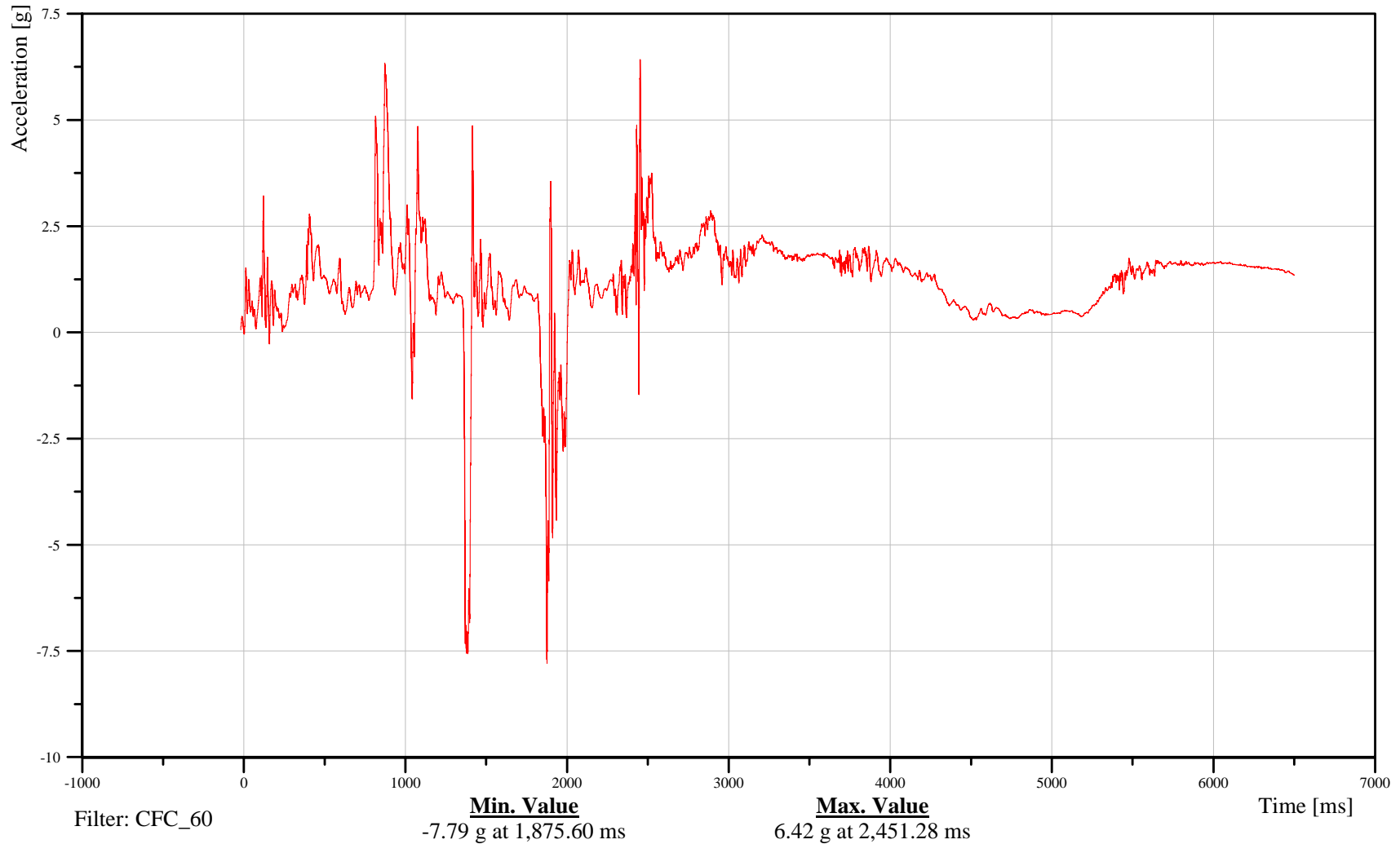
Time: 16:26

Customer: VRTC

### 10APILLORI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-121

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right A-Pillar Lower Resultant Acceleration

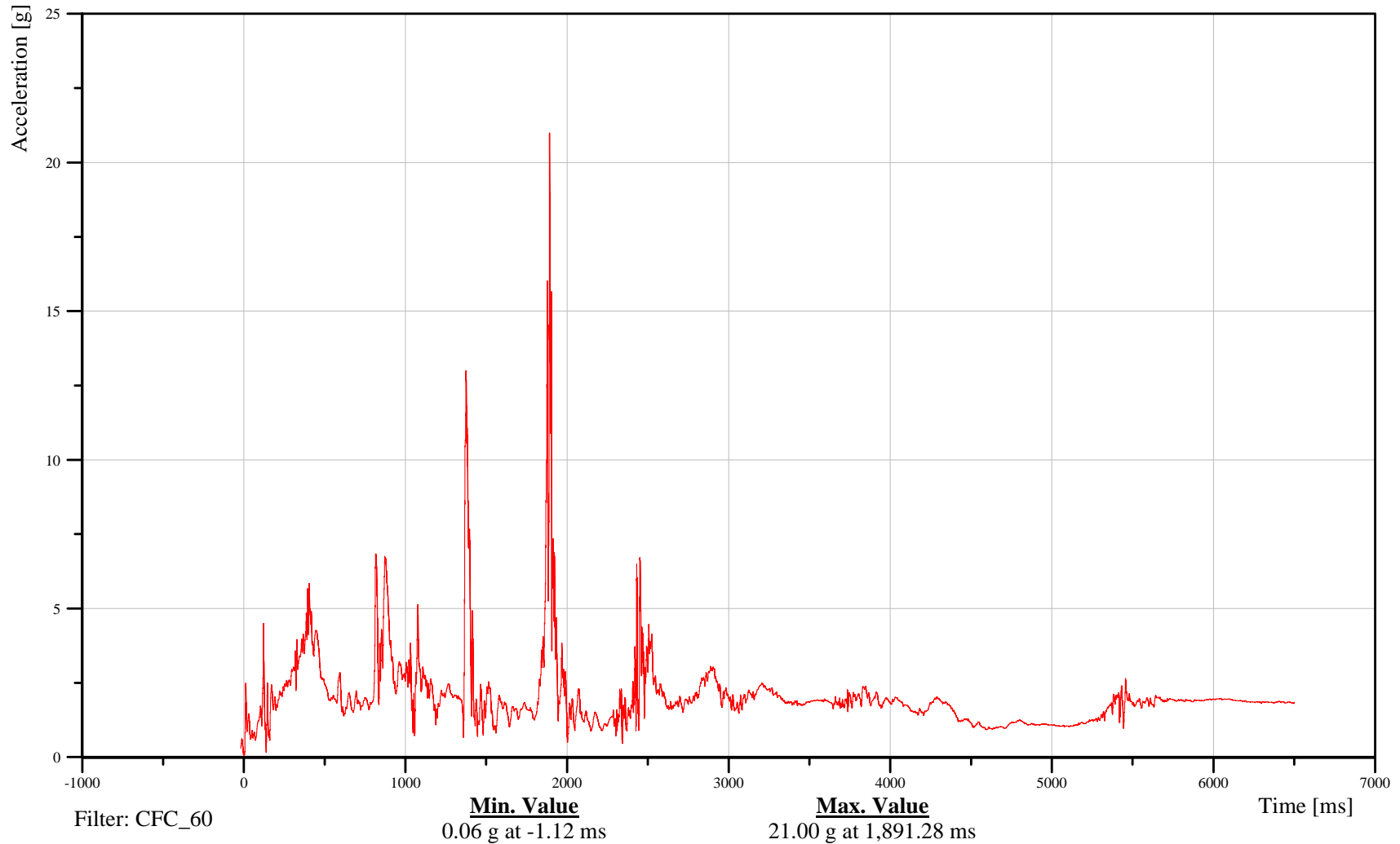
Time: 16:26

Customer: VRTC

# 10APILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-122

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

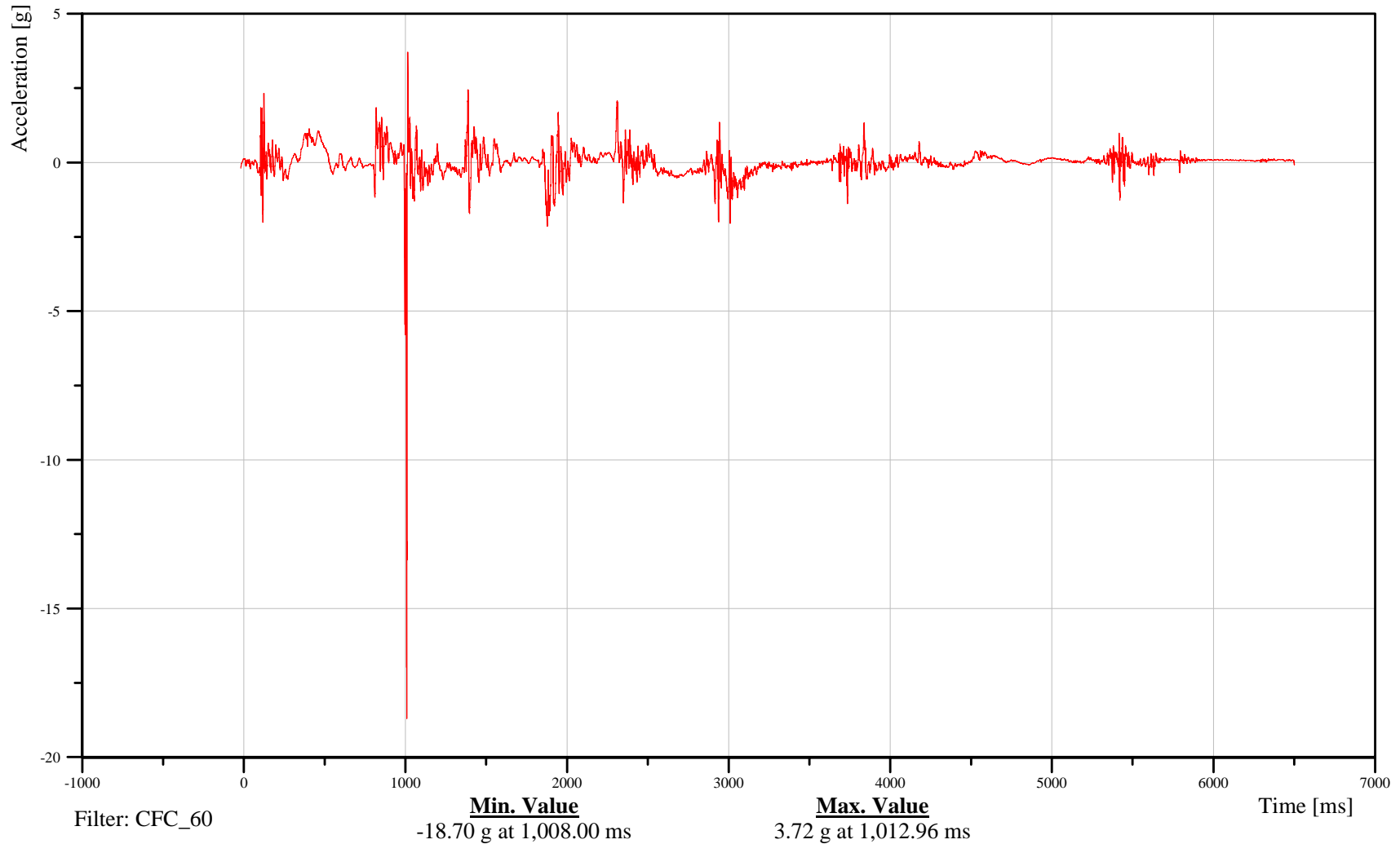
## Left B-Pillar Upper X-Axis Acceleration

Customer: VRTC

# 10BPILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-123

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left B-Pillar Upper Y-Axis Acceleration

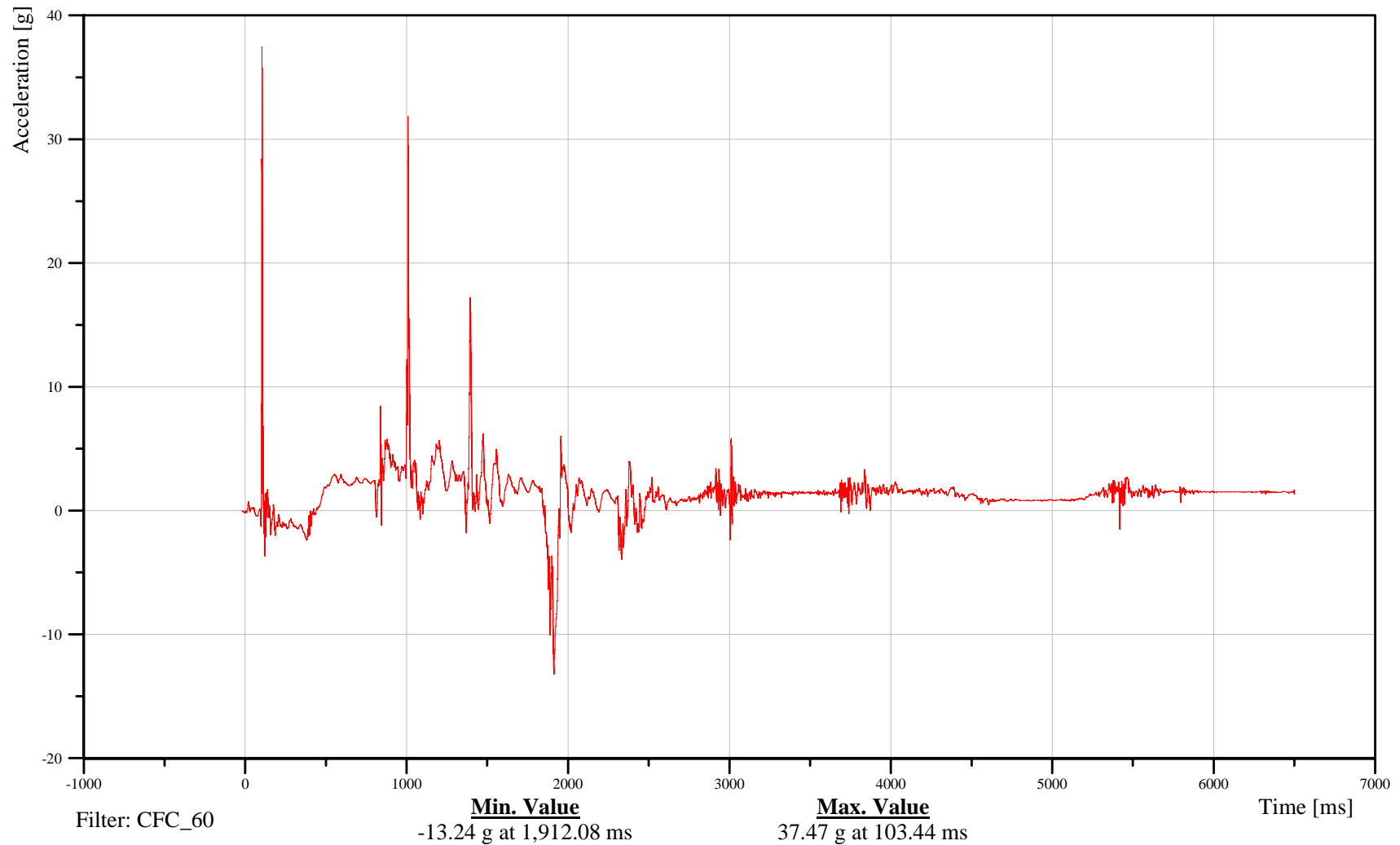
Time: 16:26

Customer: VRTC

# 10BPILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-124

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left B-Pillar Upper Z-Axis Acceleration

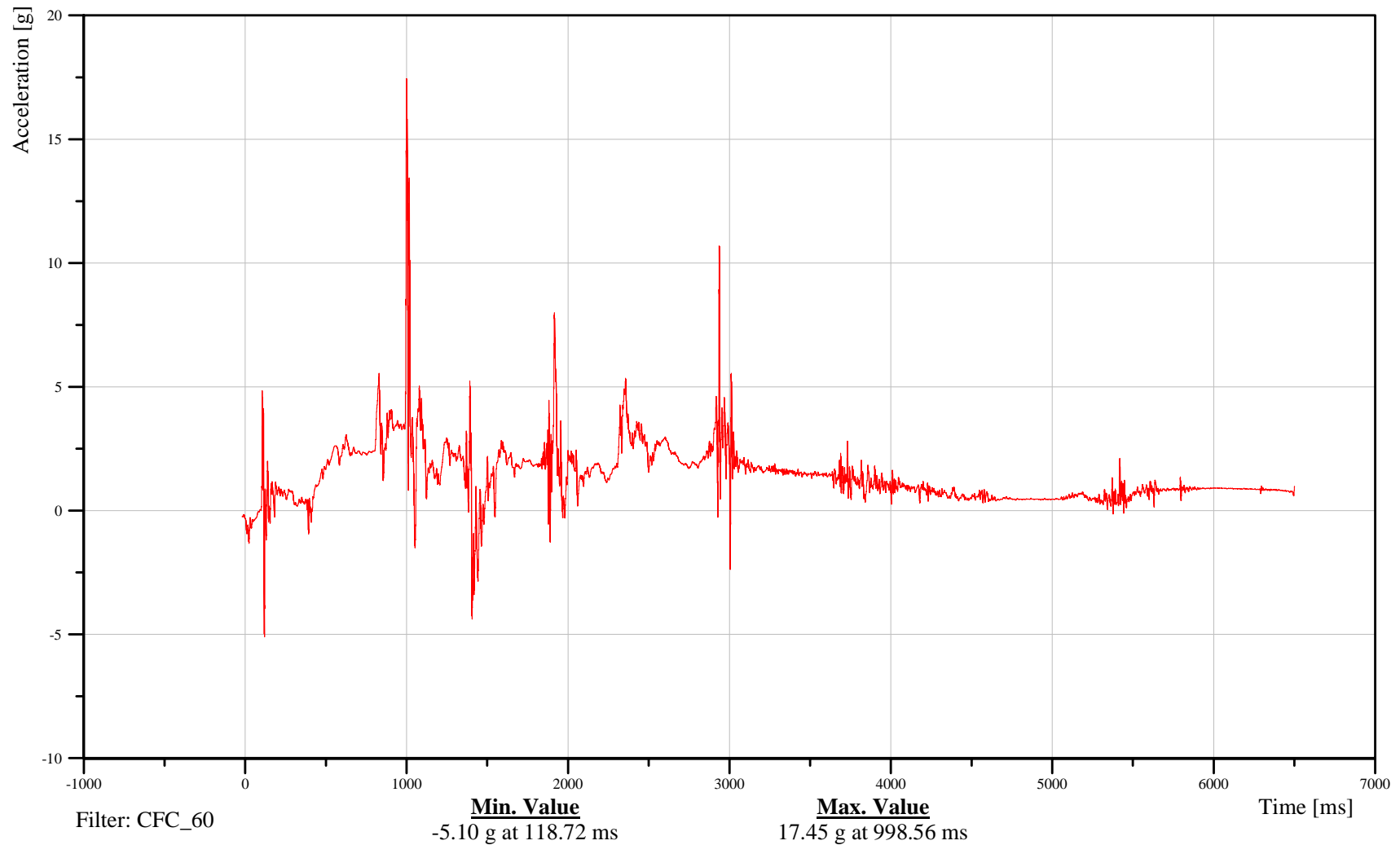
Time: 16:26

Customer: VRTC

# 10BPILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-125

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left B-Pillar Upper Resultant Acceleration

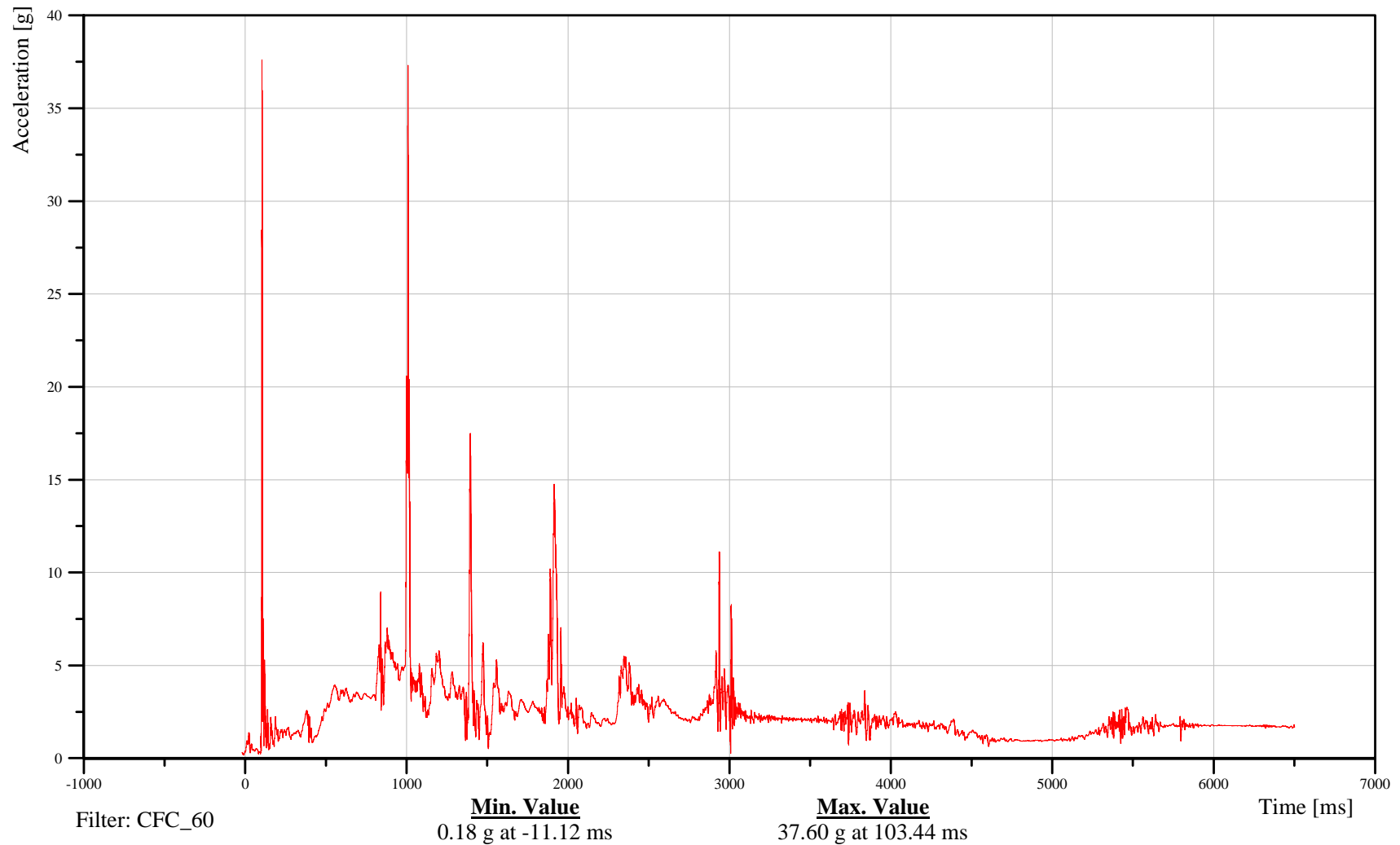
Time: 16:26

Customer: VRTC

### 10BPILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-126

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

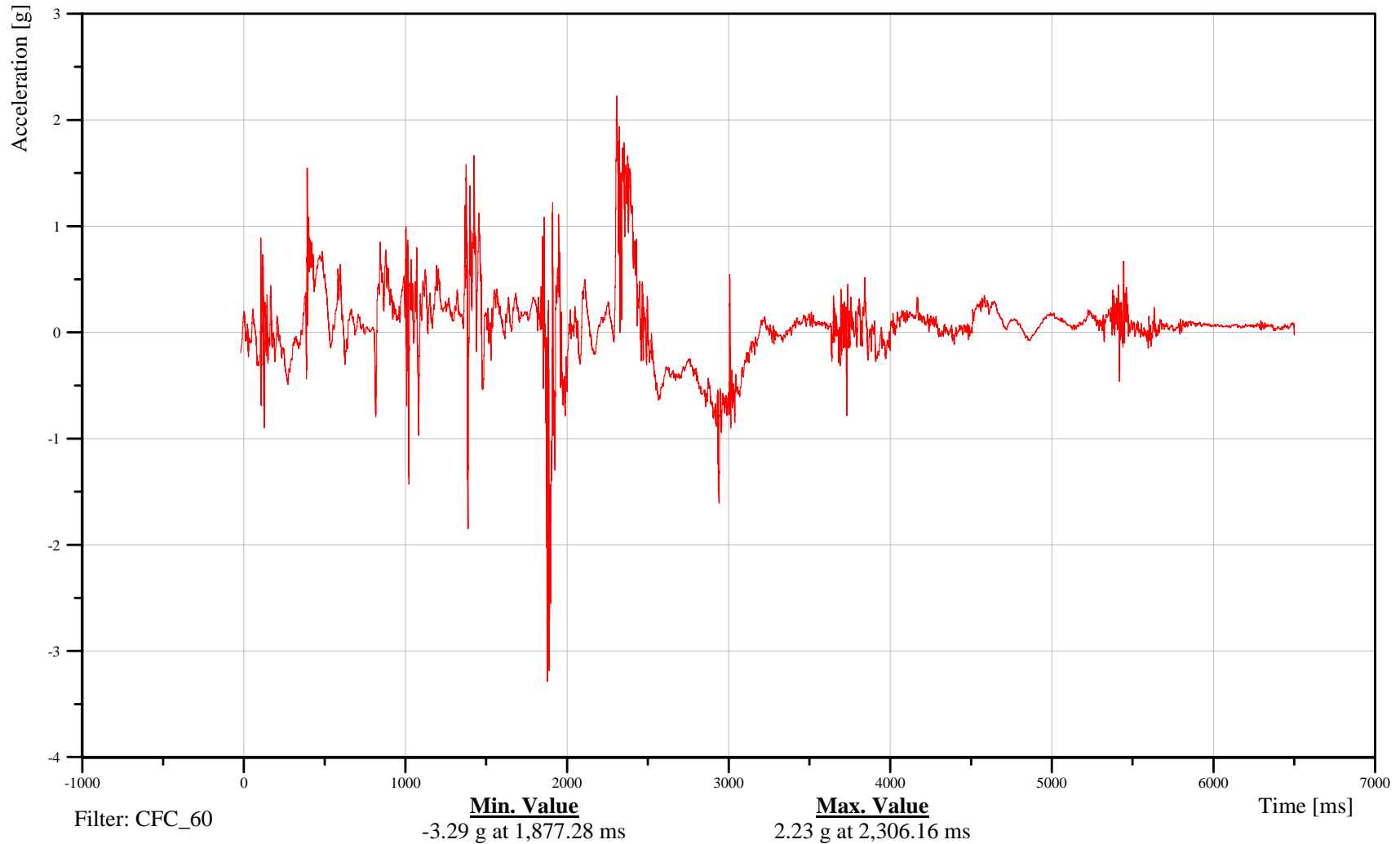
## Left B-Pillar Lower X-Axis Acceleration

Customer: VRTC

# 10BPILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-127

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

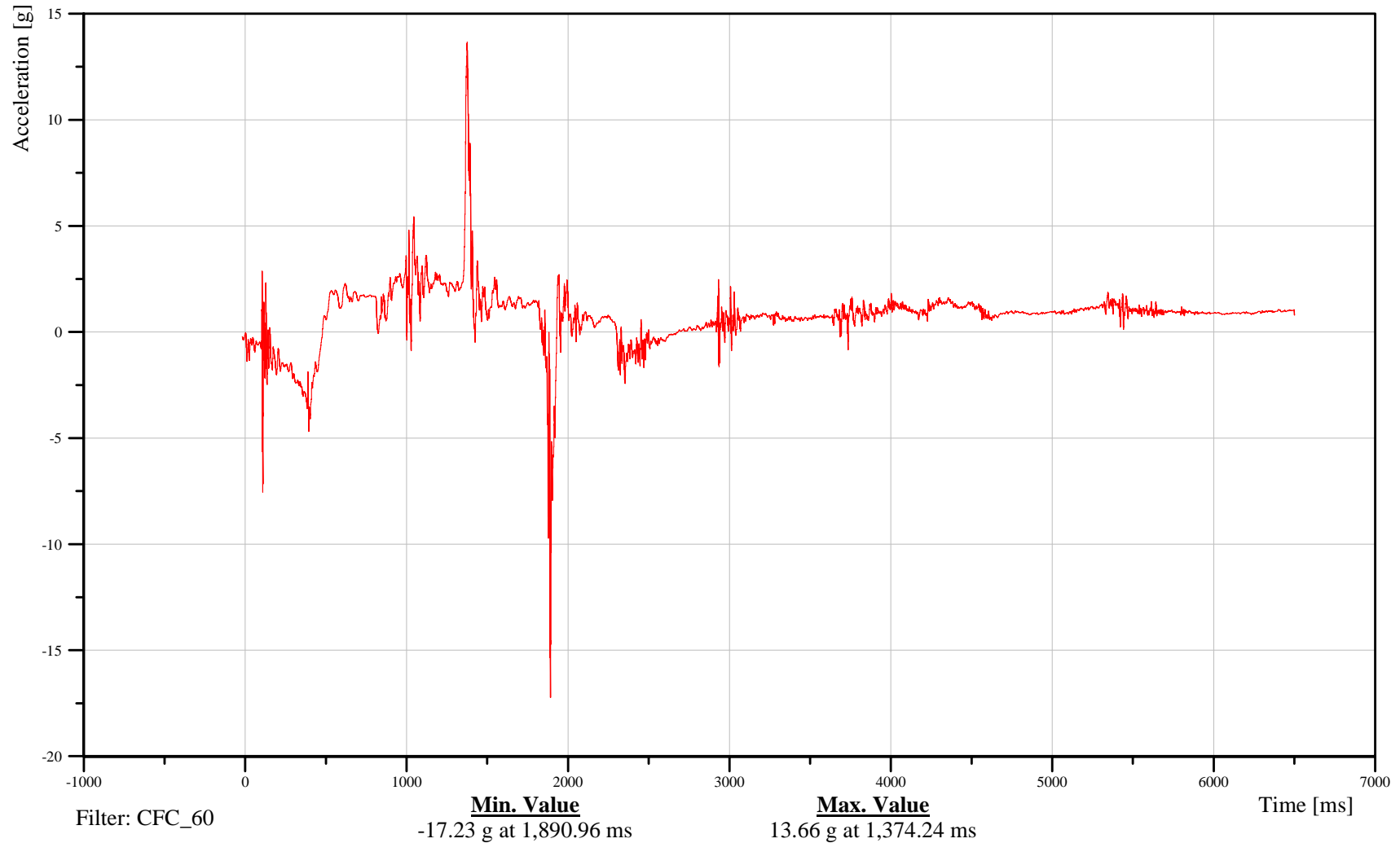
## Left B-Pillar Lower Y-Axis Acceleration

Customer: VRTC

# 10BPILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-128

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

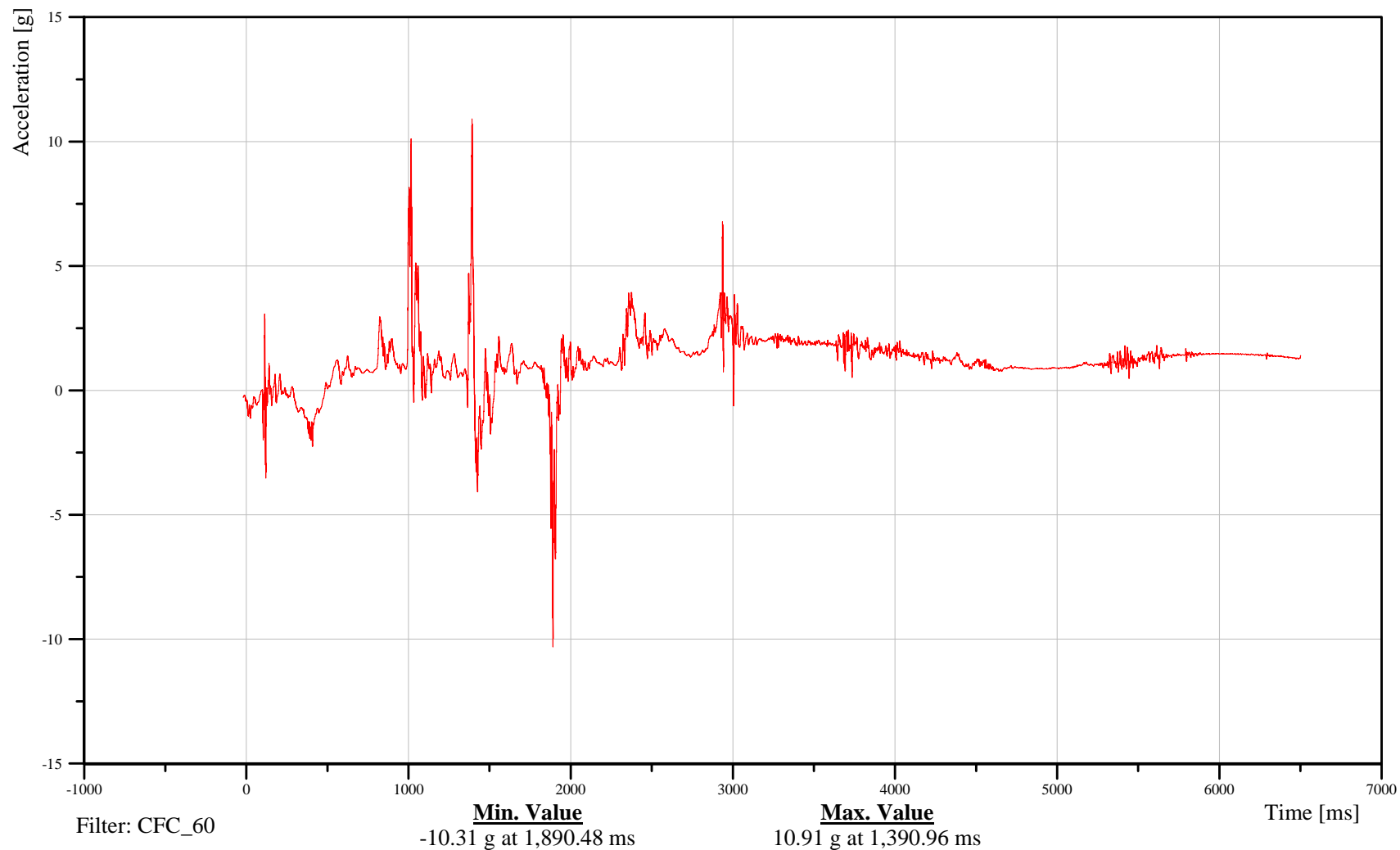
## Left B-Pillar Lower Z-Axis Acceleration

Customer: VRTC

# 10BPILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-129

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left B-Pillar Lower Resultant Acceleration

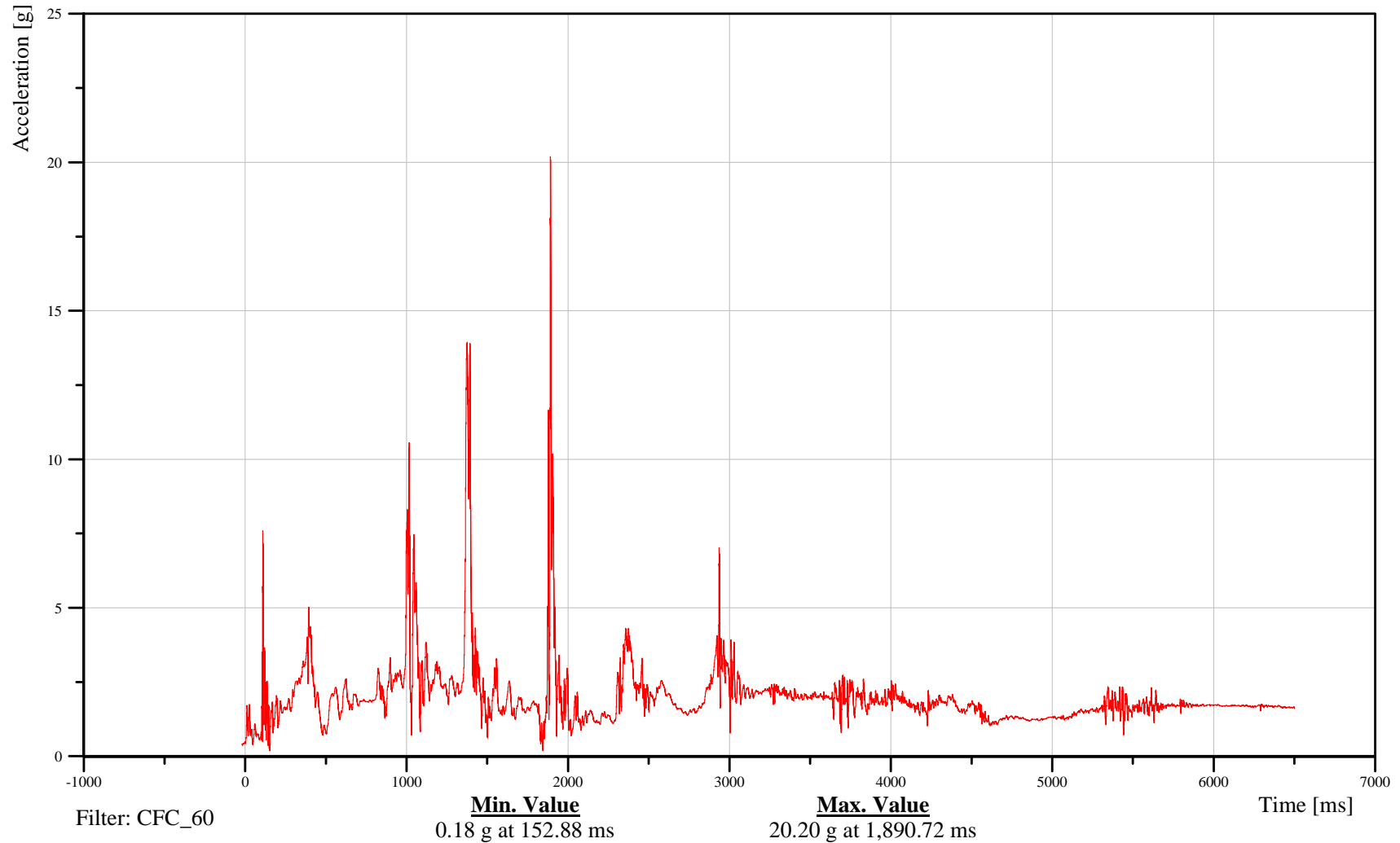
Time: 16:26

Customer: VRTC

# 10BPILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-130

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

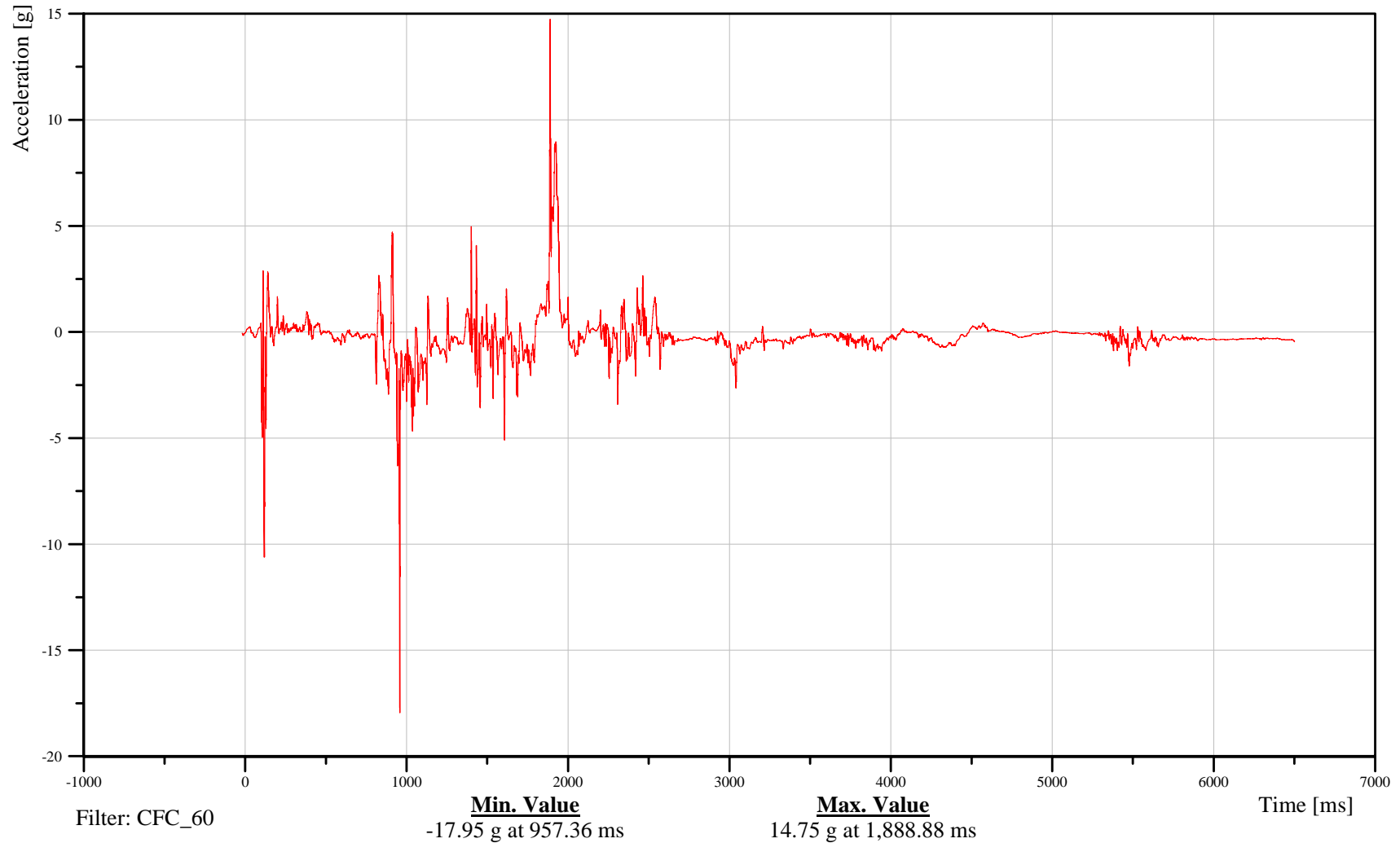
## Right B-Pillar Upper X-Axis Acceleration

Customer: VRTC

TRC Inc. Test Lab: CTF

# 10BPILUPRI00ACXD

Test Number: 100115



B-131

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right B-Pillar Upper Y-Axis Acceleration

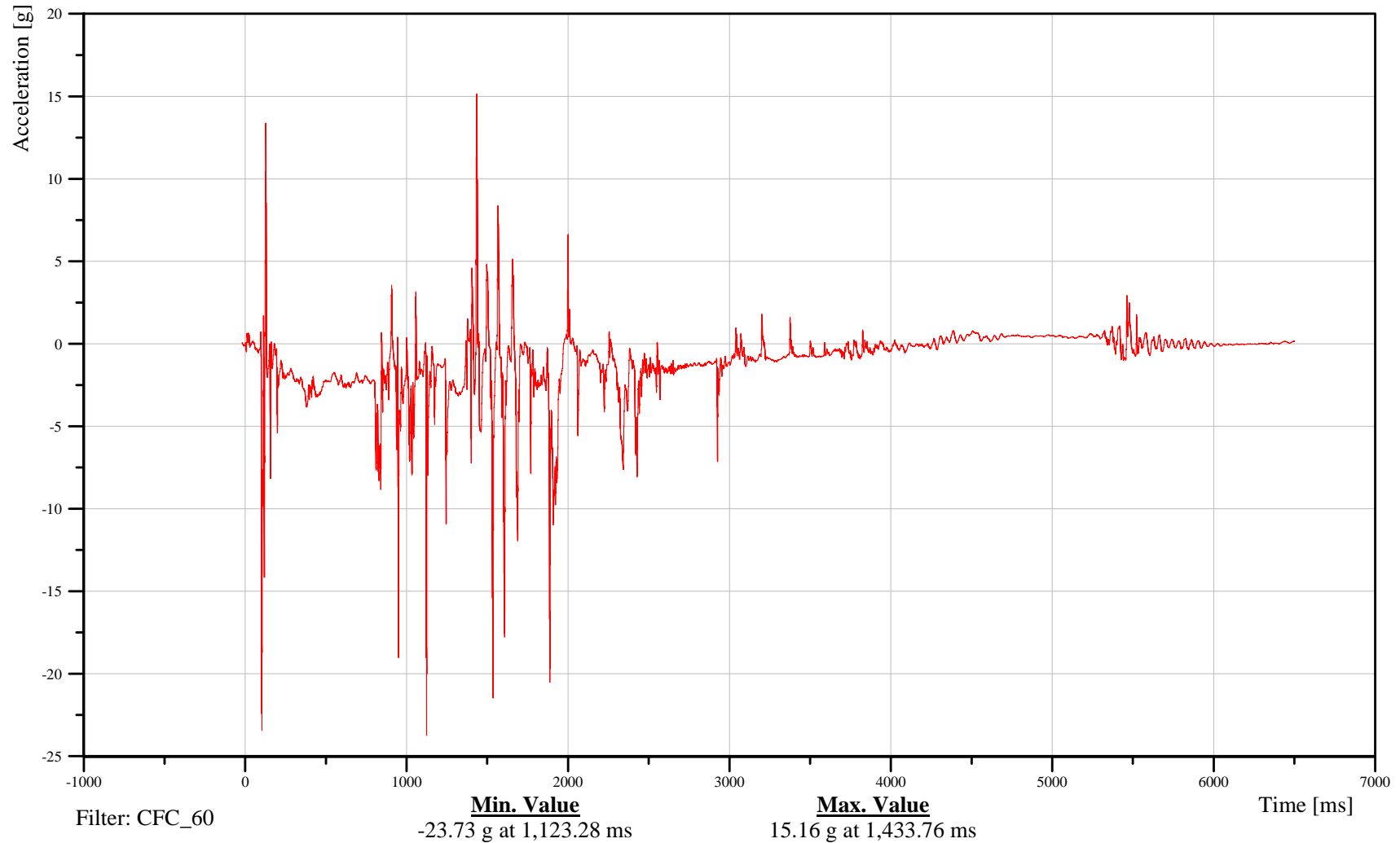
Time: 16:26

Customer: VRTC

# 10BPILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-132

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

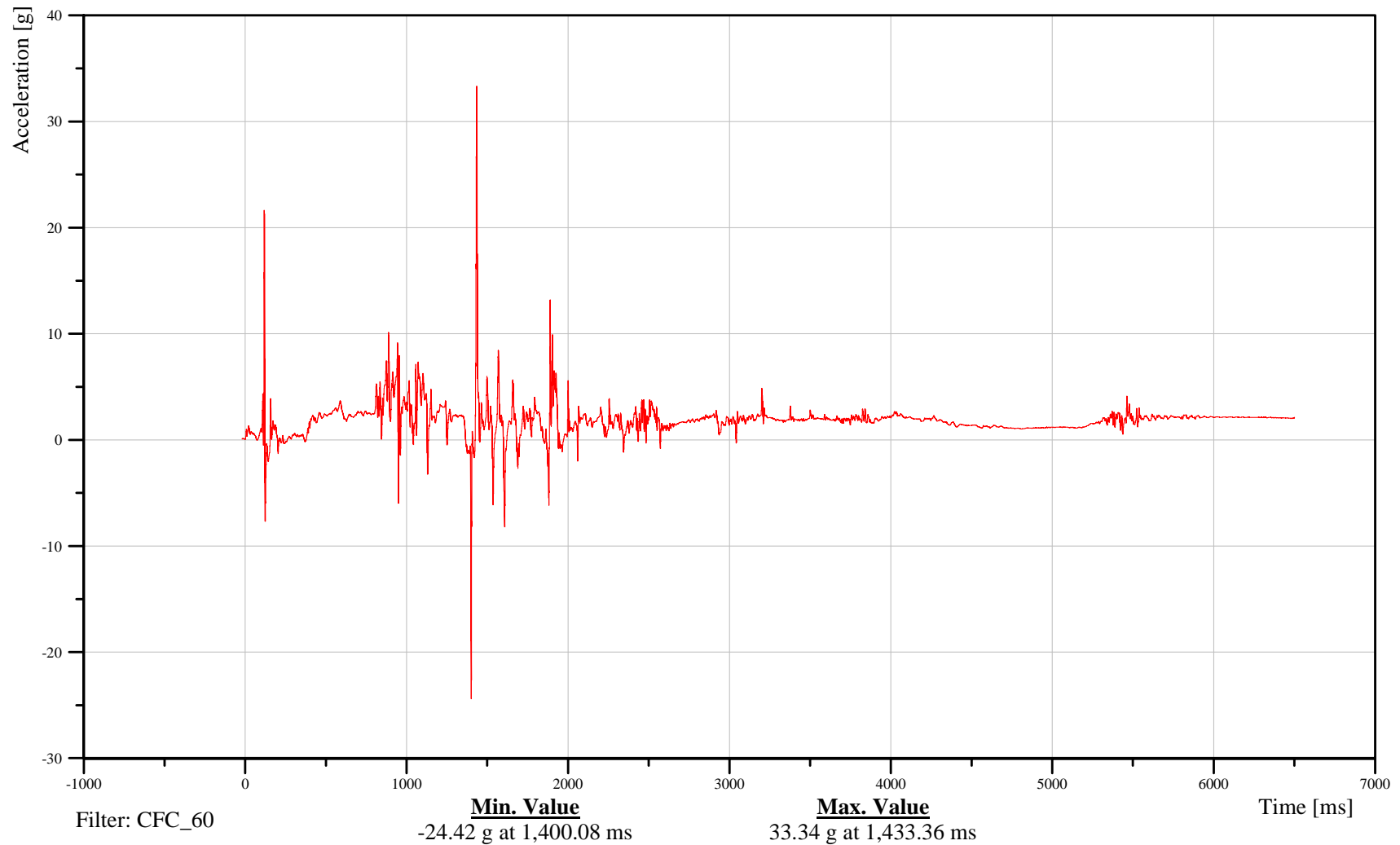
## Right B-Pillar Upper Z-Axis Acceleration

Customer: VRTC

TRC Inc. Test Lab: CTF

# 10BPILUPRI00ACZD

Test Number: 100115



B-133

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right B-Pillar Upper Resultant Acceleration

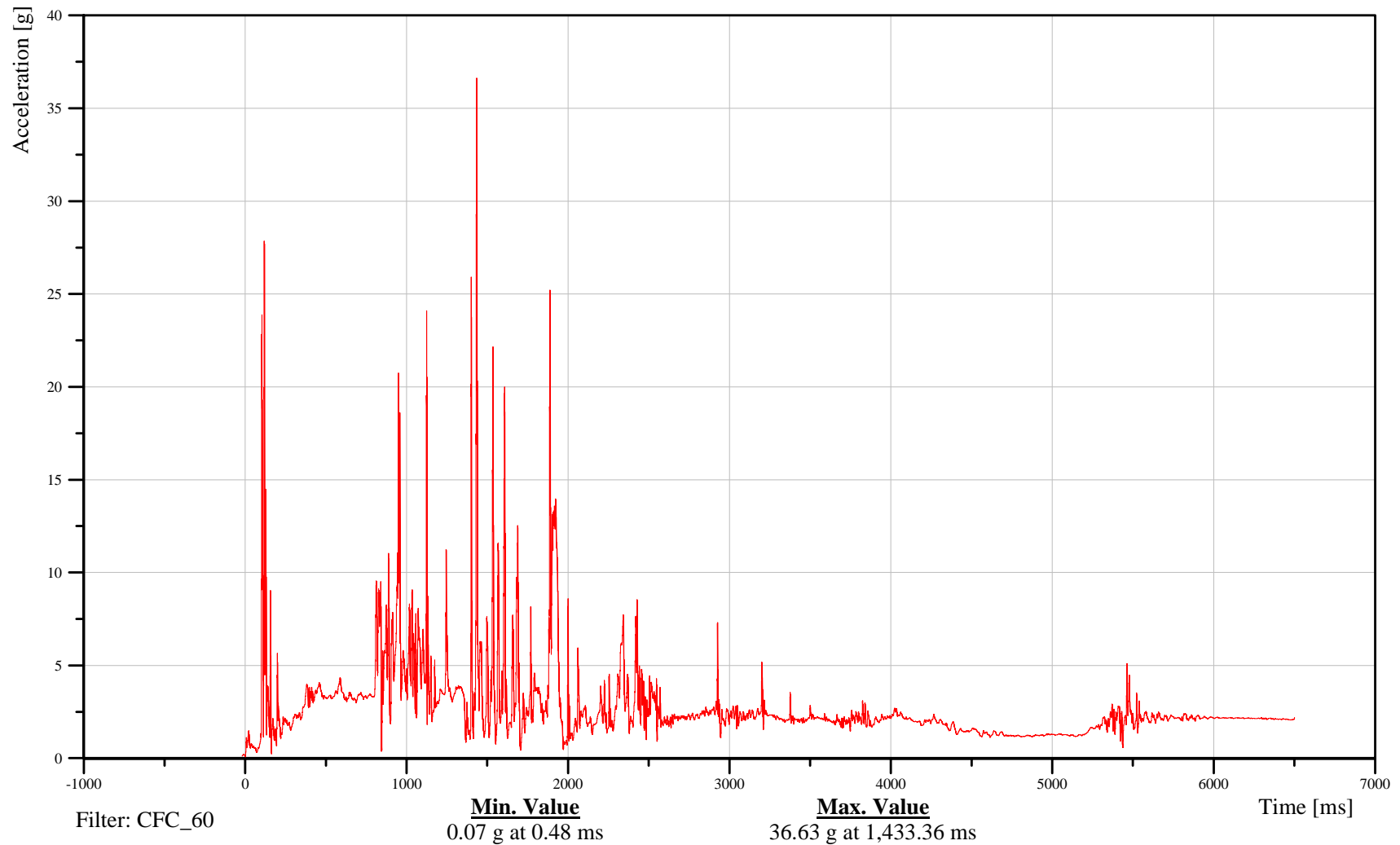
Time: 16:26

Customer: VRTC

### 10BPILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-134

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right B-Pillar Lower X-Axis Acceleration

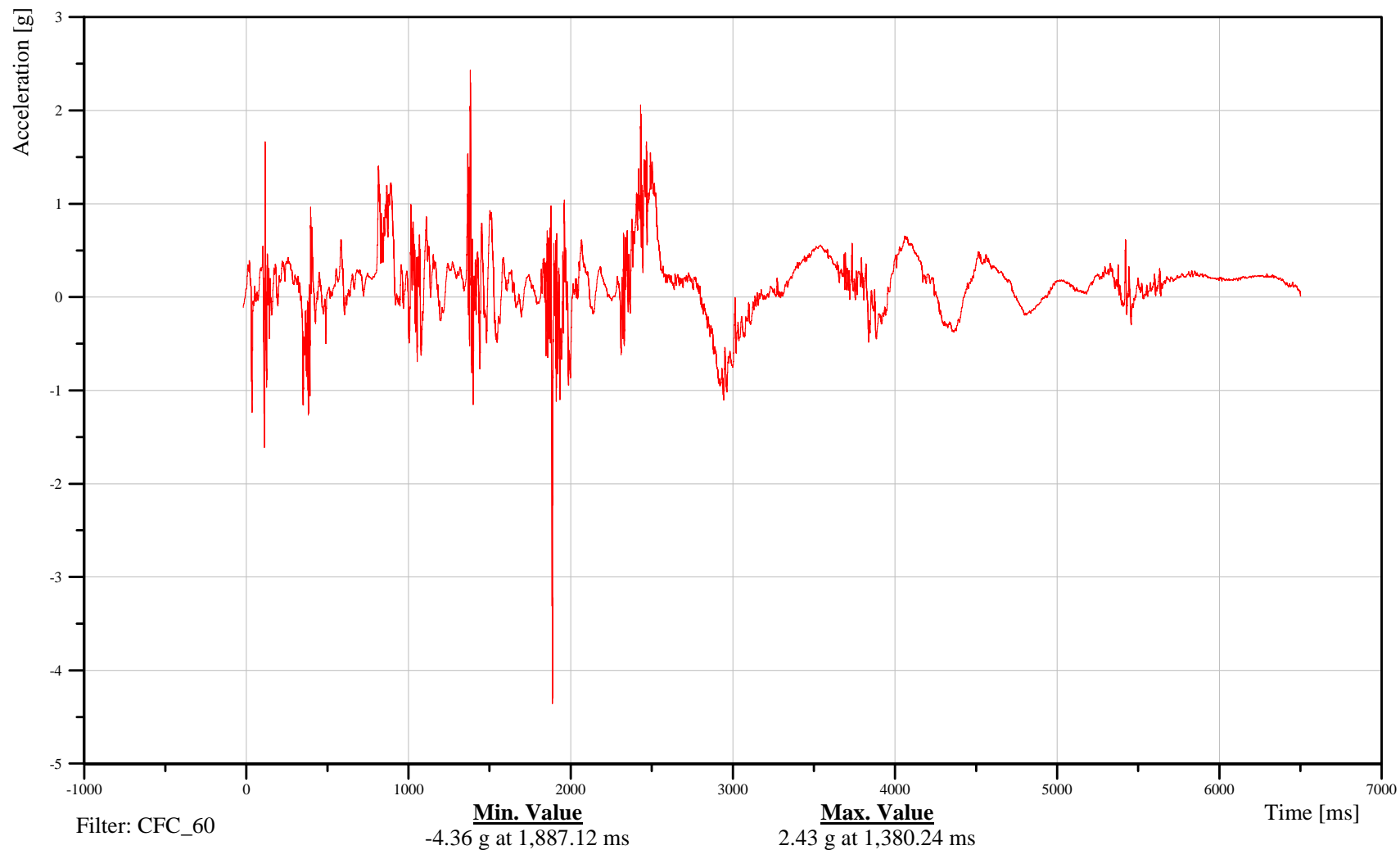
Time: 16:26

Customer: VRTC

### 10BPILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-135

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right B-Pillar Lower Y-Axis Acceleration

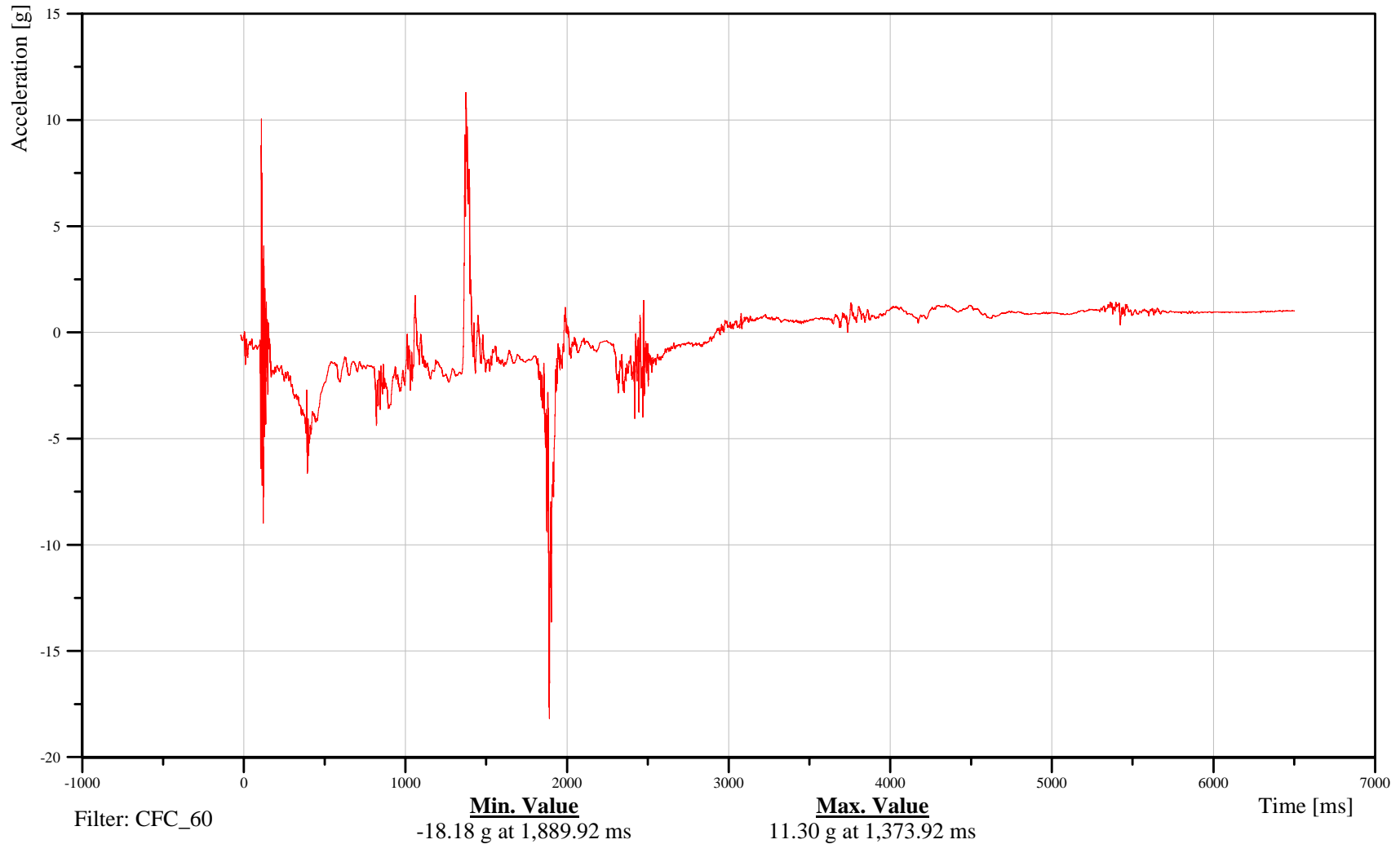
Time: 16:26

Customer: VRTC

# 10BPILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-136

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right B-Pillar Lower Z-Axis Acceleration

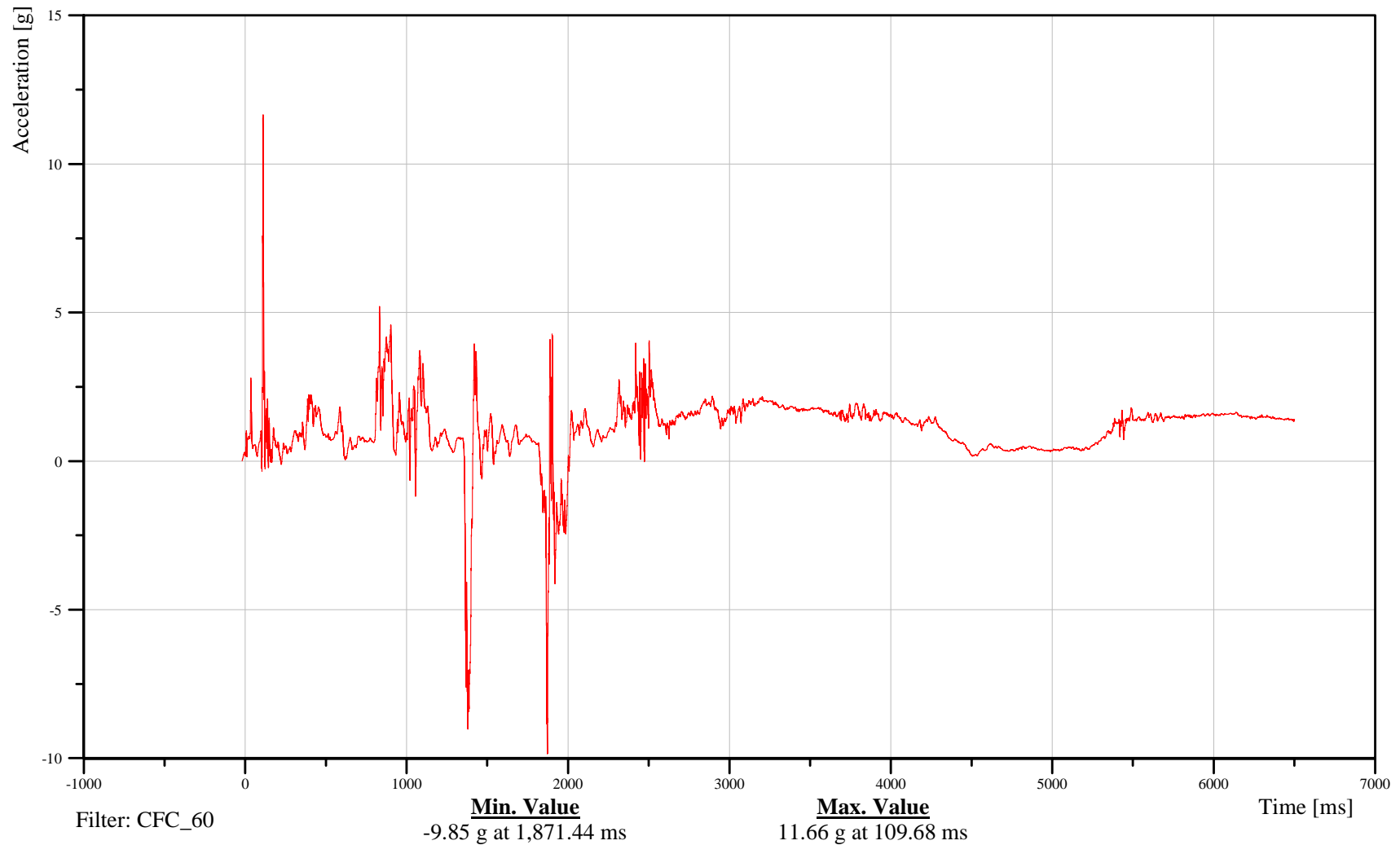
Time: 16:26

Customer: VRTC

### 10BPILLORI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-137

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right B-Pillar Lower Resultant Acceleration

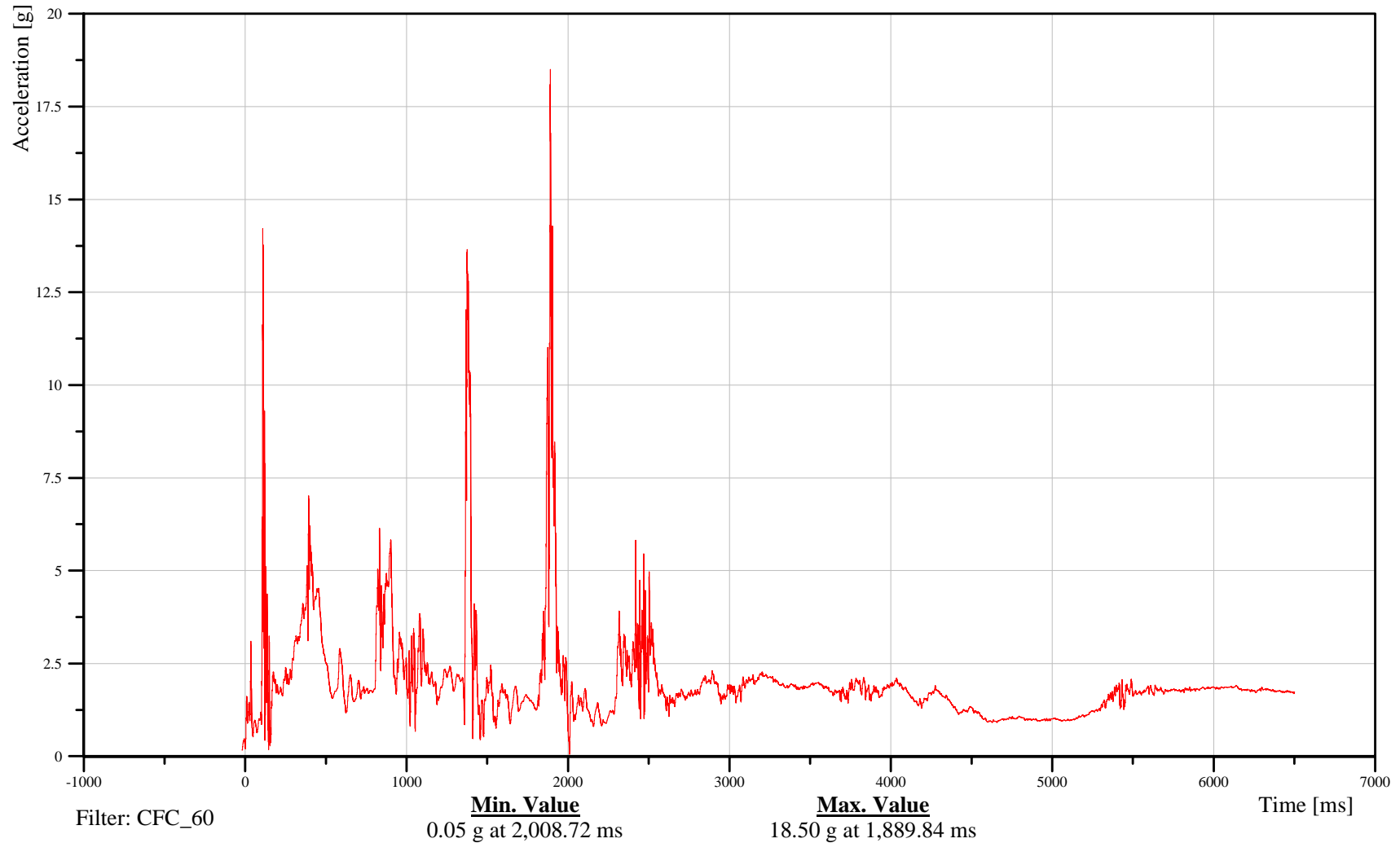
Time: 16:26

Customer: VRTC

### 10BPILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-138

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

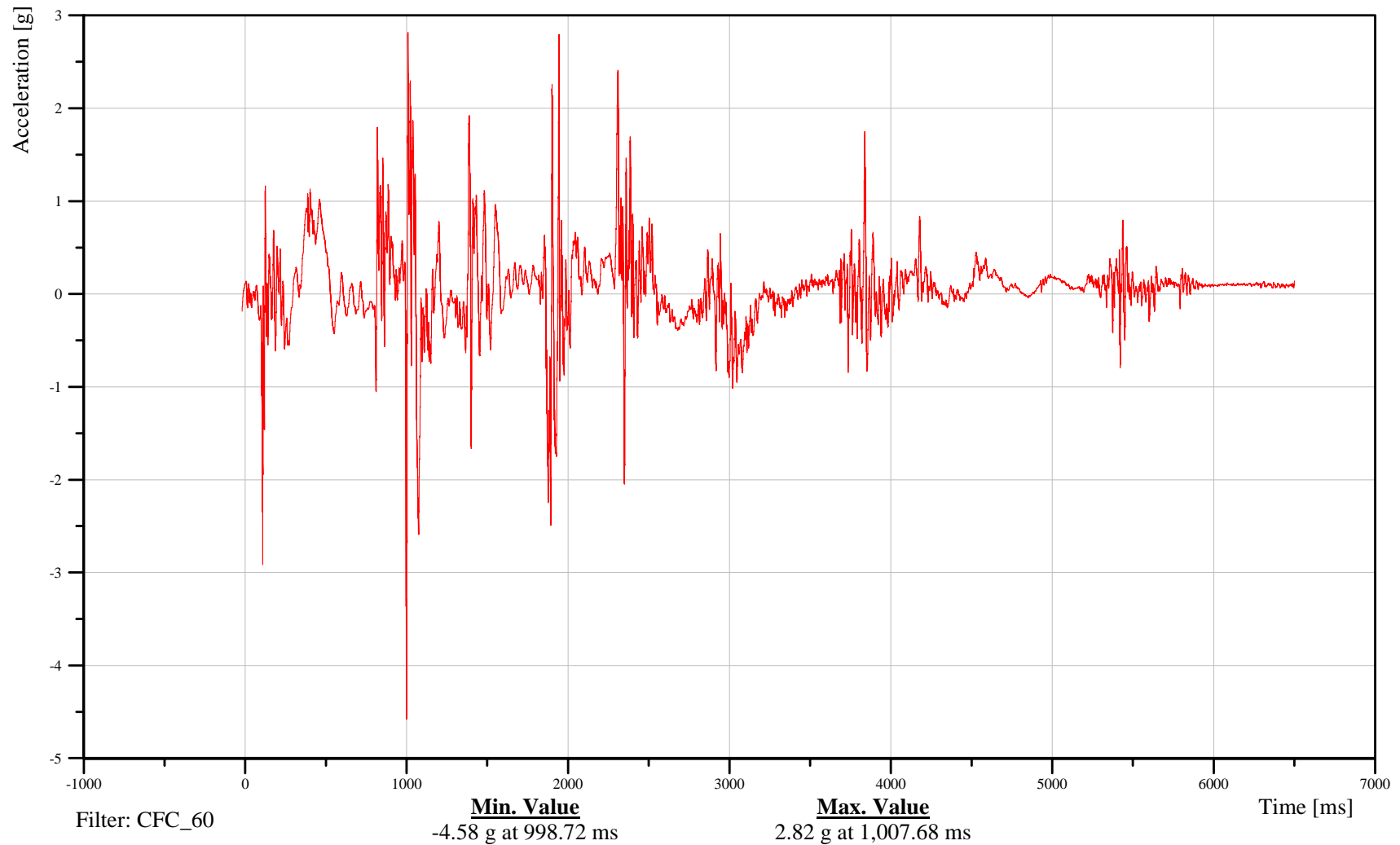
## Left C-Pillar Upper X-Axis Acceleration

Customer: VRTC

# 10CPILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-139

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

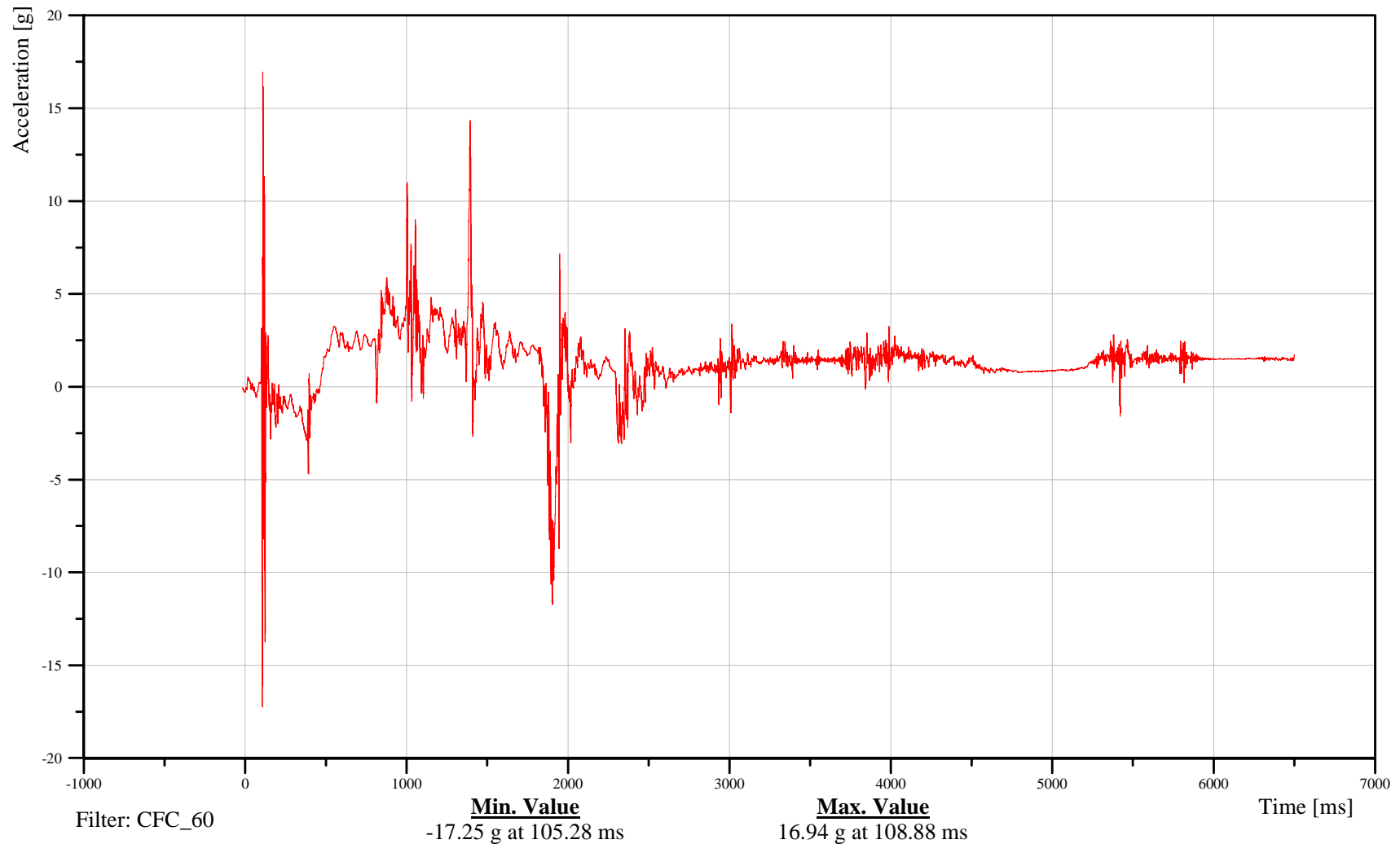
## Left C-Pillar Upper Y-Axis Acceleration

Customer: VRTC

# 10CPILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-140

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left C-Pillar Upper Z-Axis Acceleration

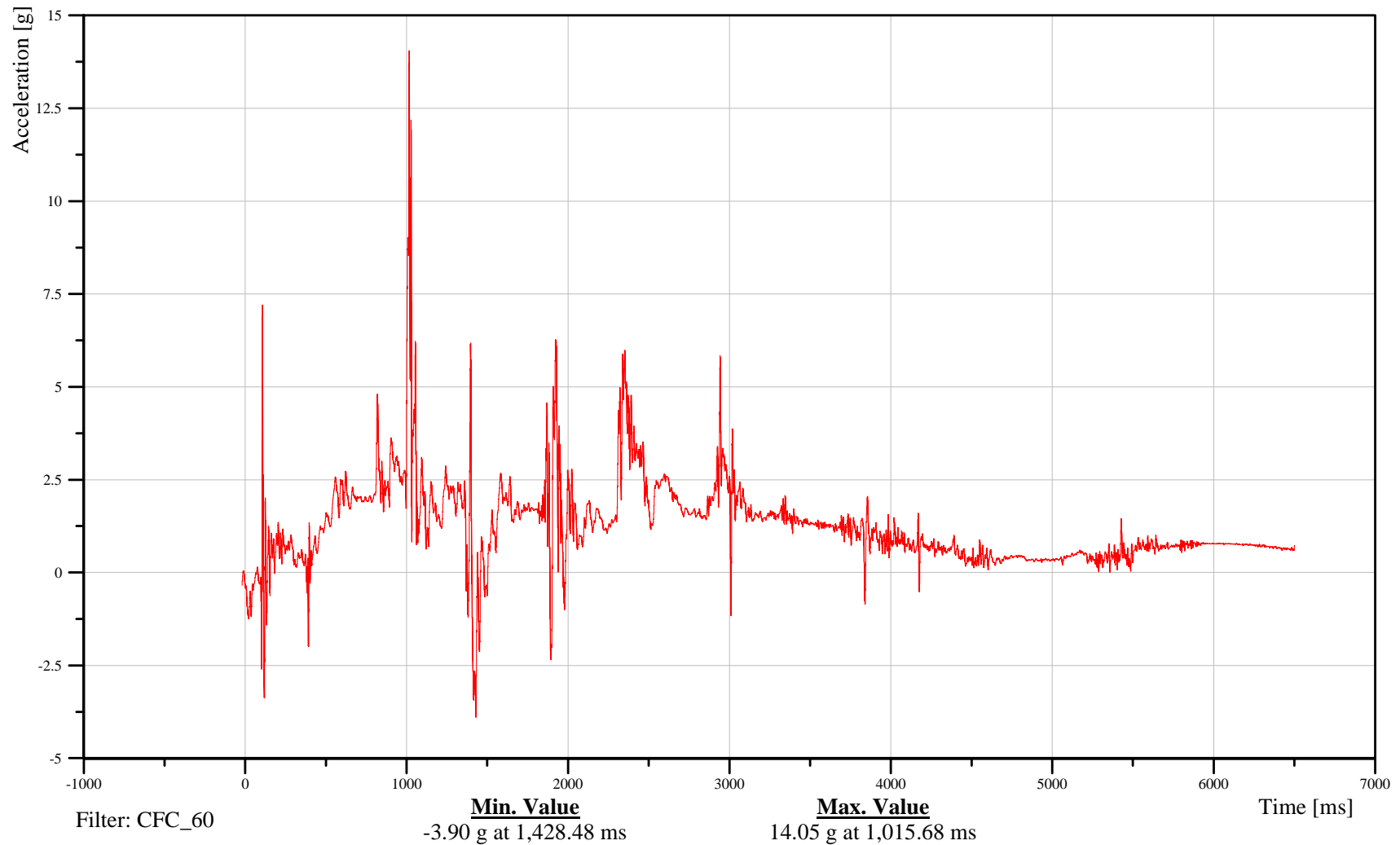
Time: 16:26

Customer: VRTC

# 10CPILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-141

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left C-Pillar Upper Resultant Acceleration

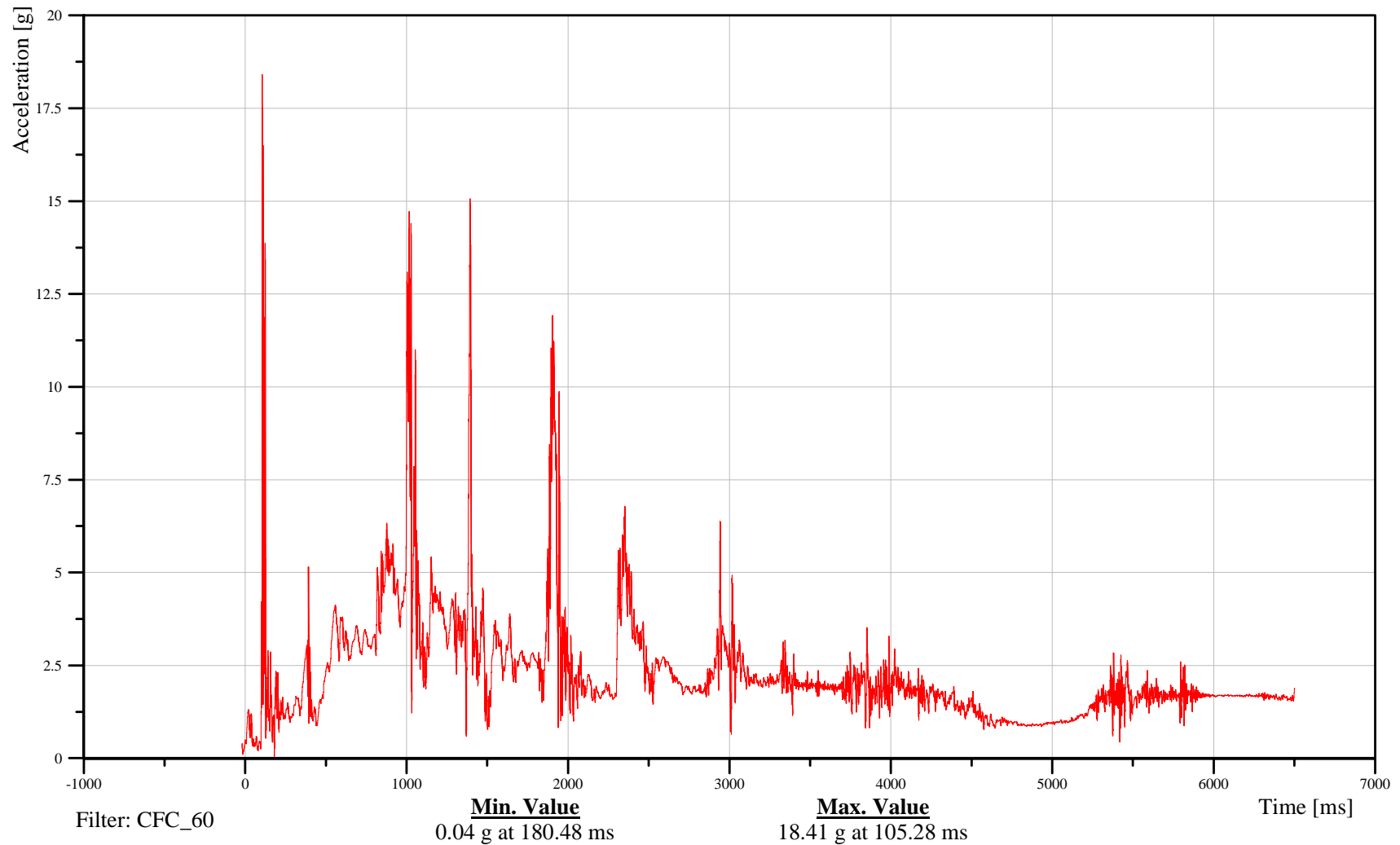
Time: 16:26

Customer: VRTC

# 10CPILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-142

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

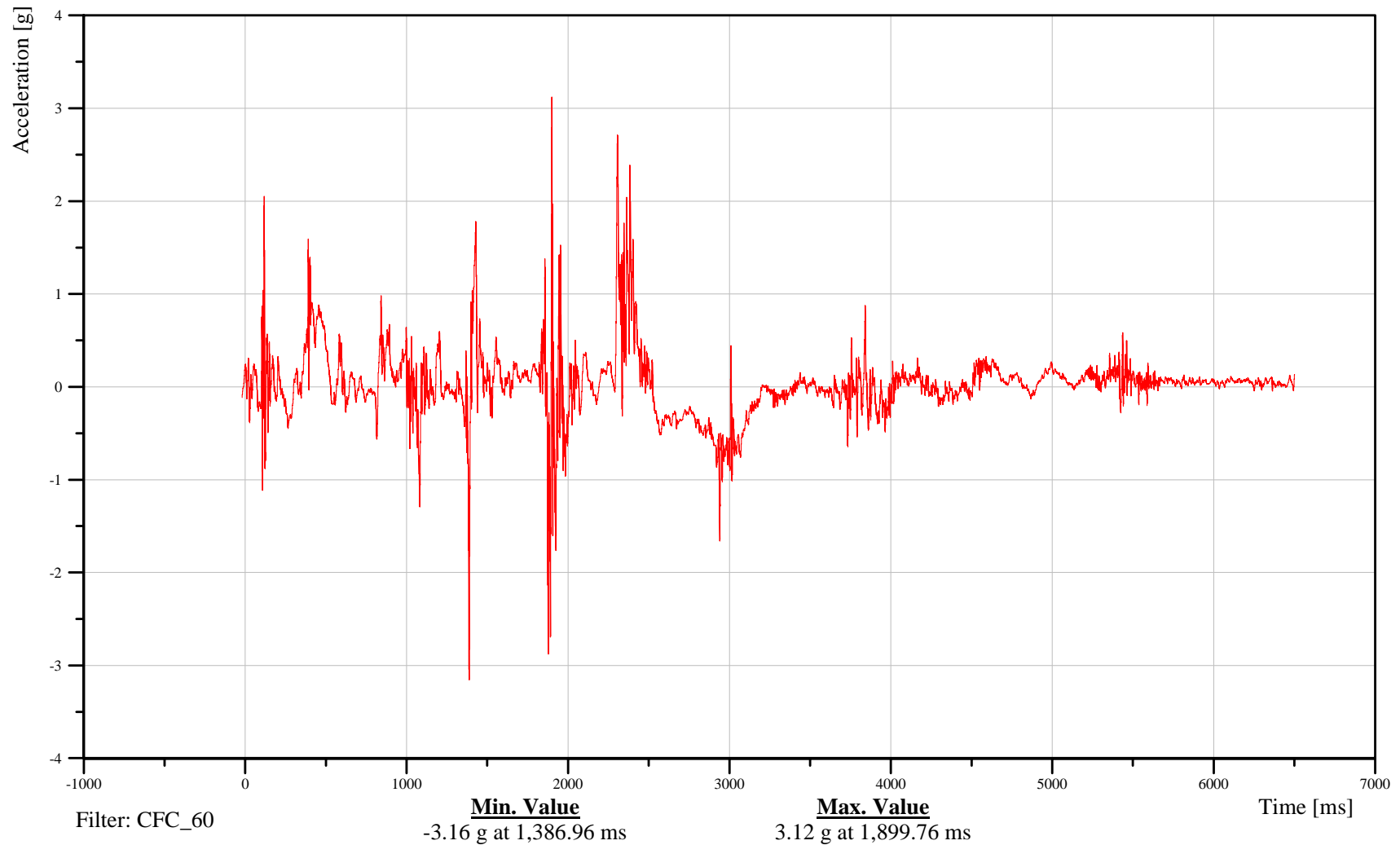
## Left C-Pillar Lower X-Axis Acceleration

Customer: VRTC

# 10CPILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-143

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

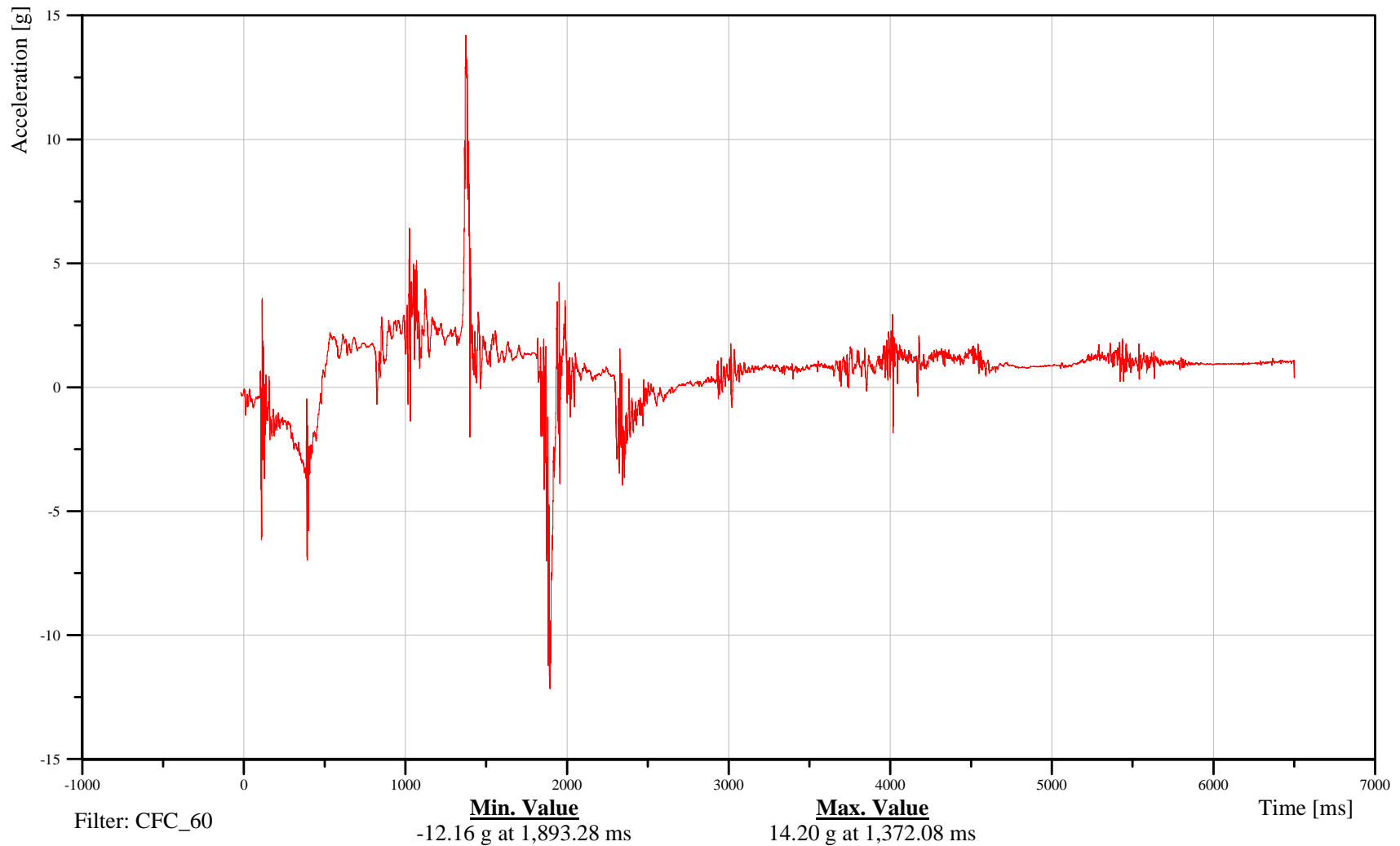
## Left C-Pillar Lower Y-Axis Acceleration

Customer: VRTC

# 10CPILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-144

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left C-Pillar Lower Z-Axis Acceleration

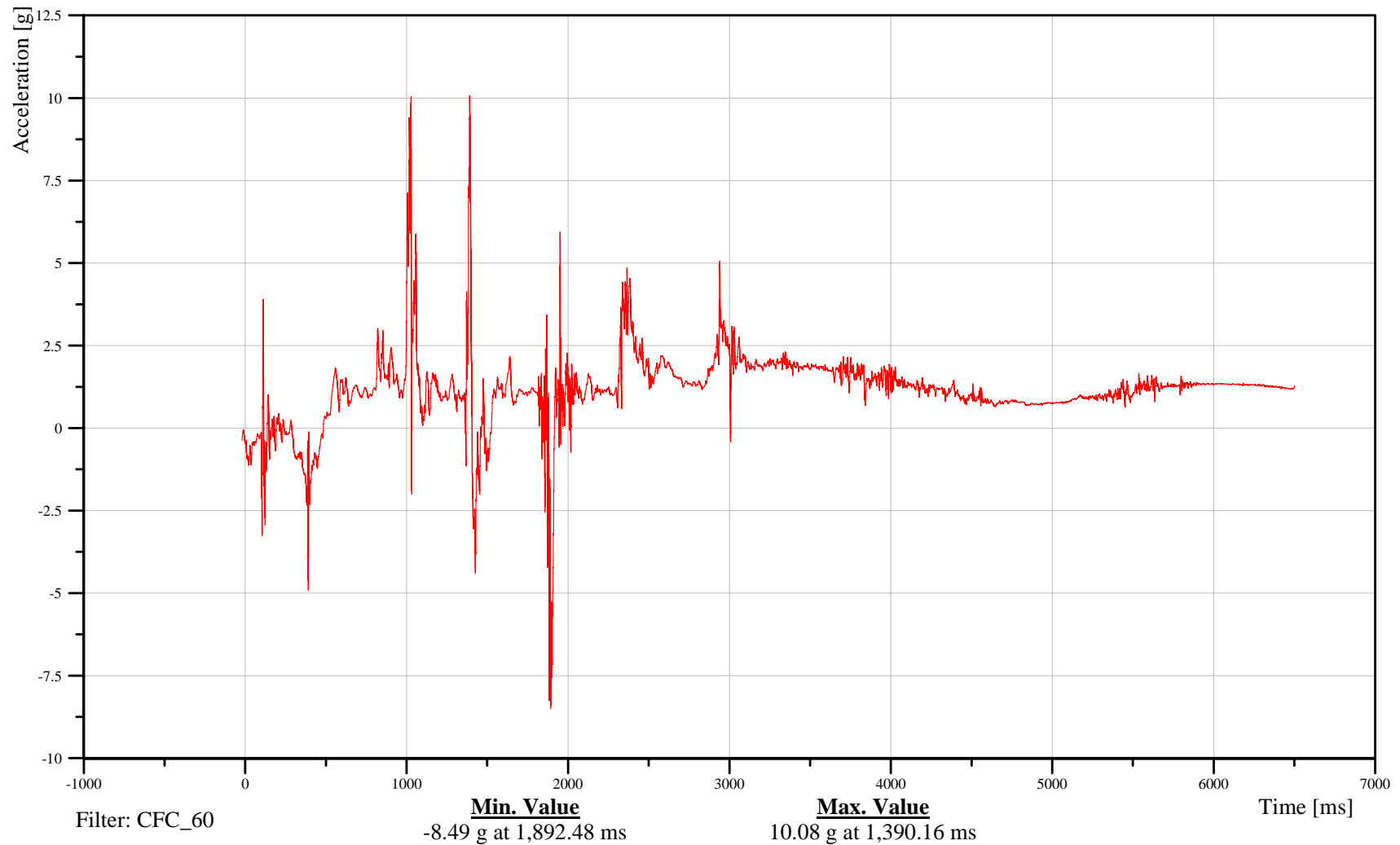
Time: 16:26

Customer: VRTC

### 10CPILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-145

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left C-Pillar Lower Resultant Acceleration

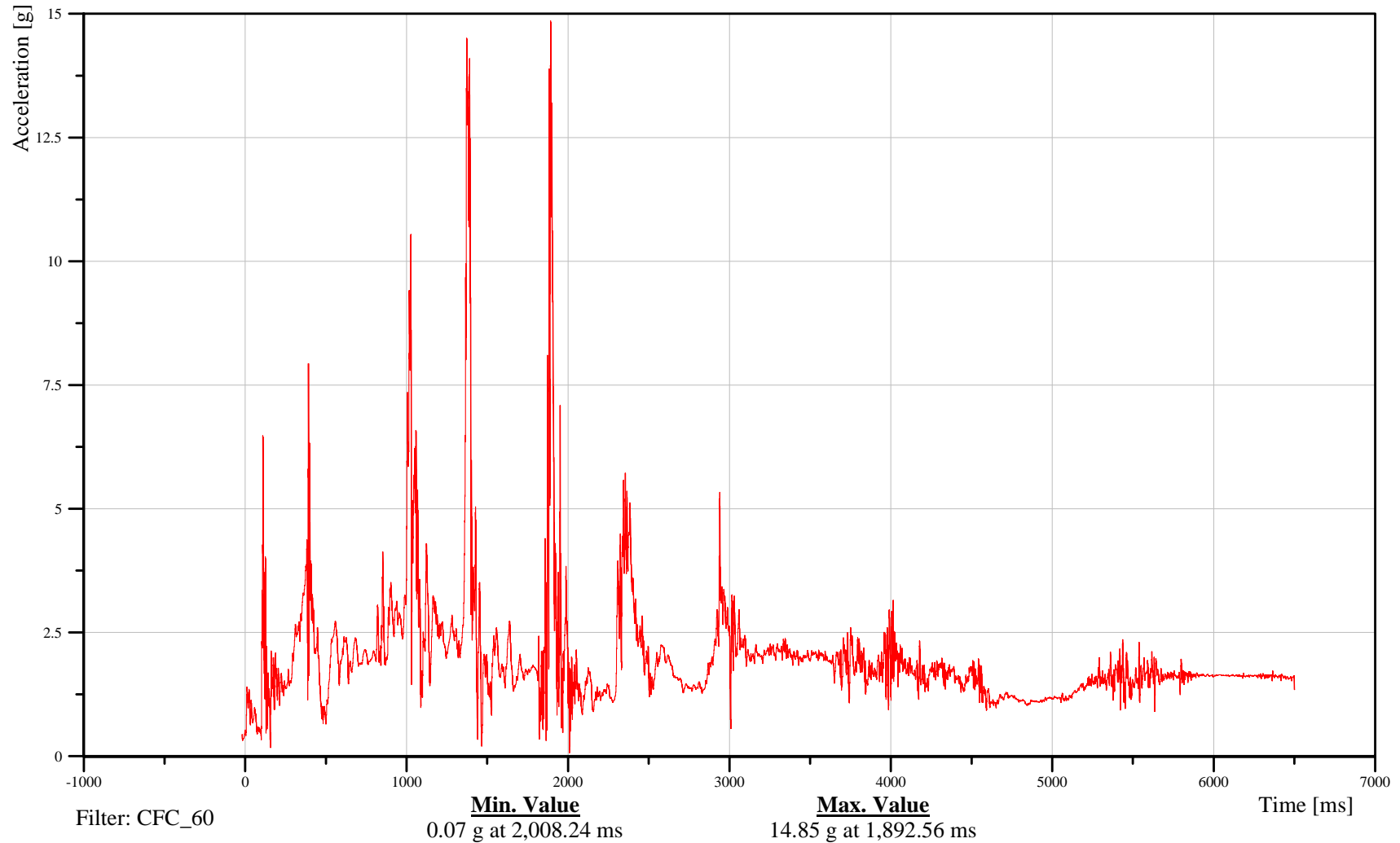
Time: 16:26

Customer: VRTC

# 10CPILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-146

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right C-Pillar Upper X-Axis Acceleration

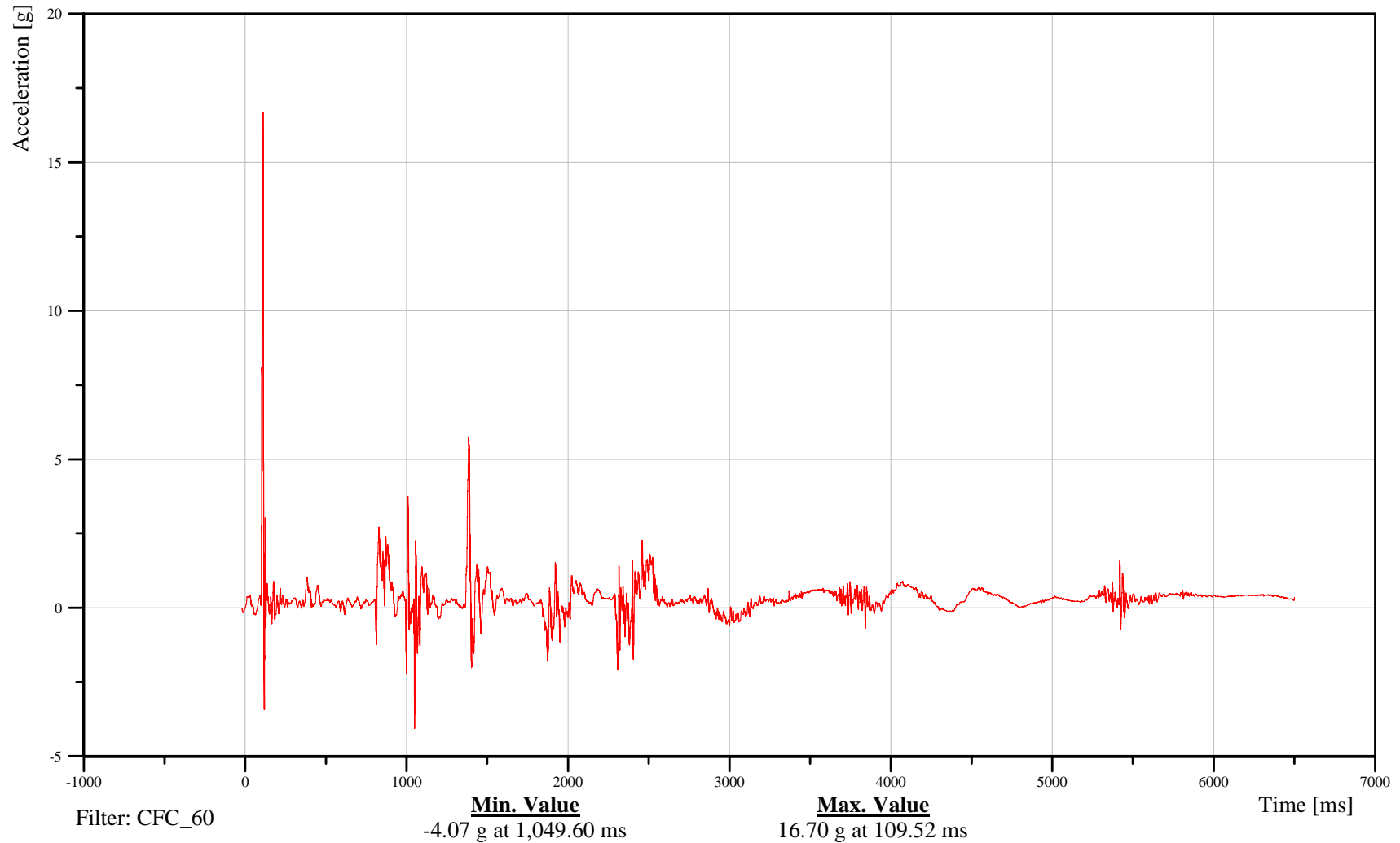
Time: 16:26

Customer: VRTC

### 10CPILUPRI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-147

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right C-Pillar Upper Y-Axis Acceleration

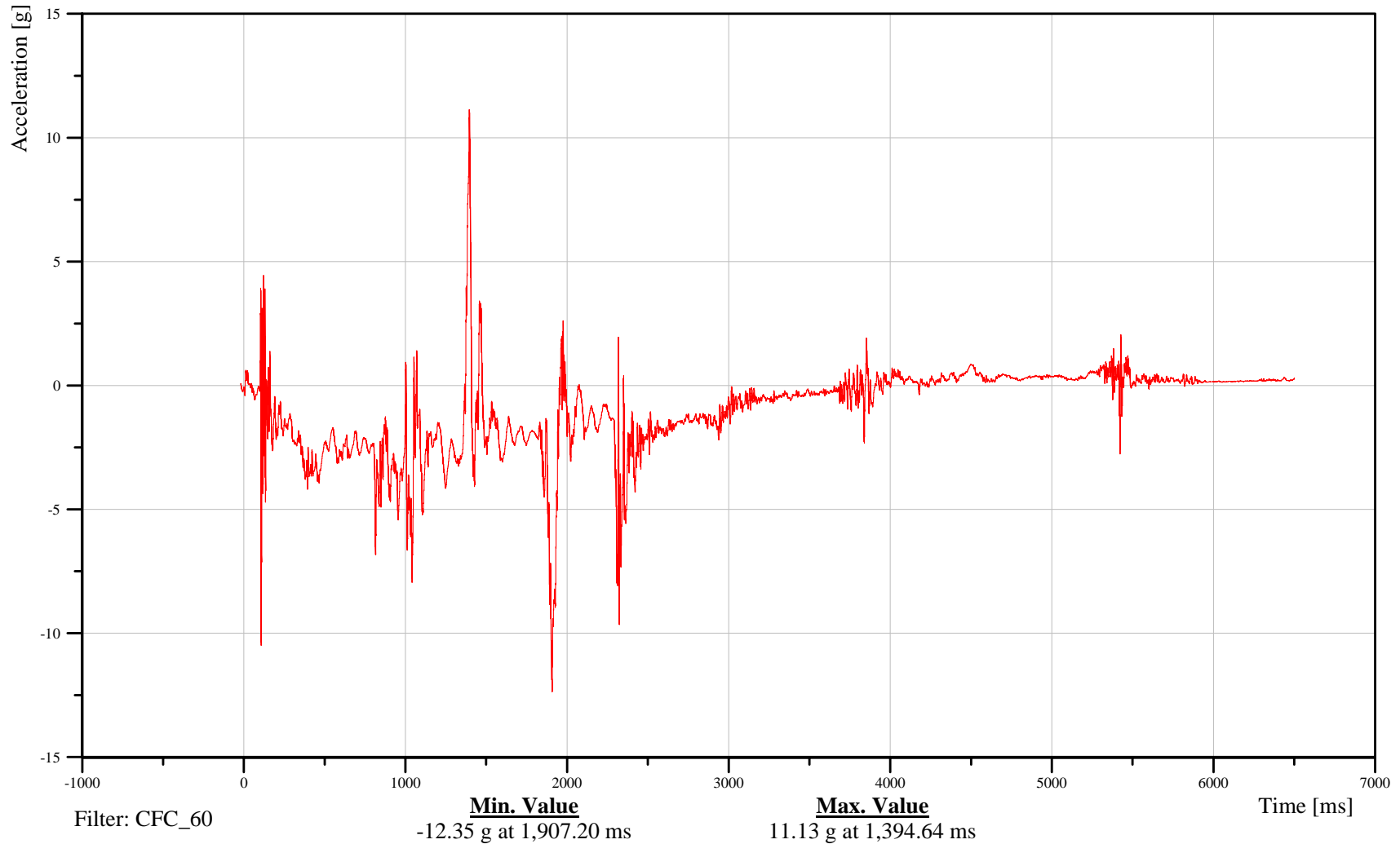
Time: 16:26

Customer: VRTC

# 10CPILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-148

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

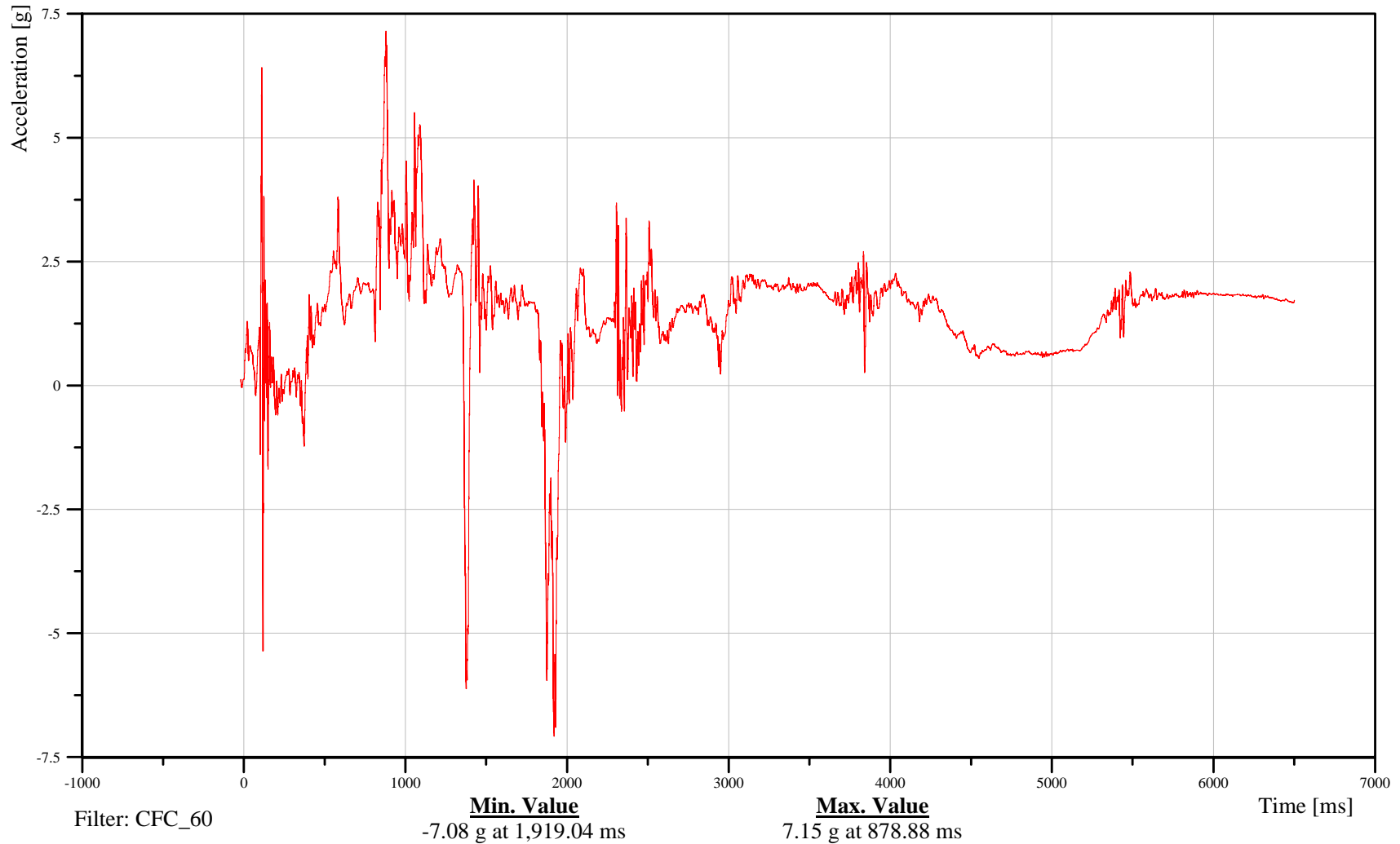
## Right C-Pillar Upper Z-Axis Acceleration

Customer: VRTC

TRC Inc. Test Lab: CTF

# 10CPILUPRI00ACZD

Test Number: 100115



B-149

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right C-Pillar Upper Resultant Acceleration

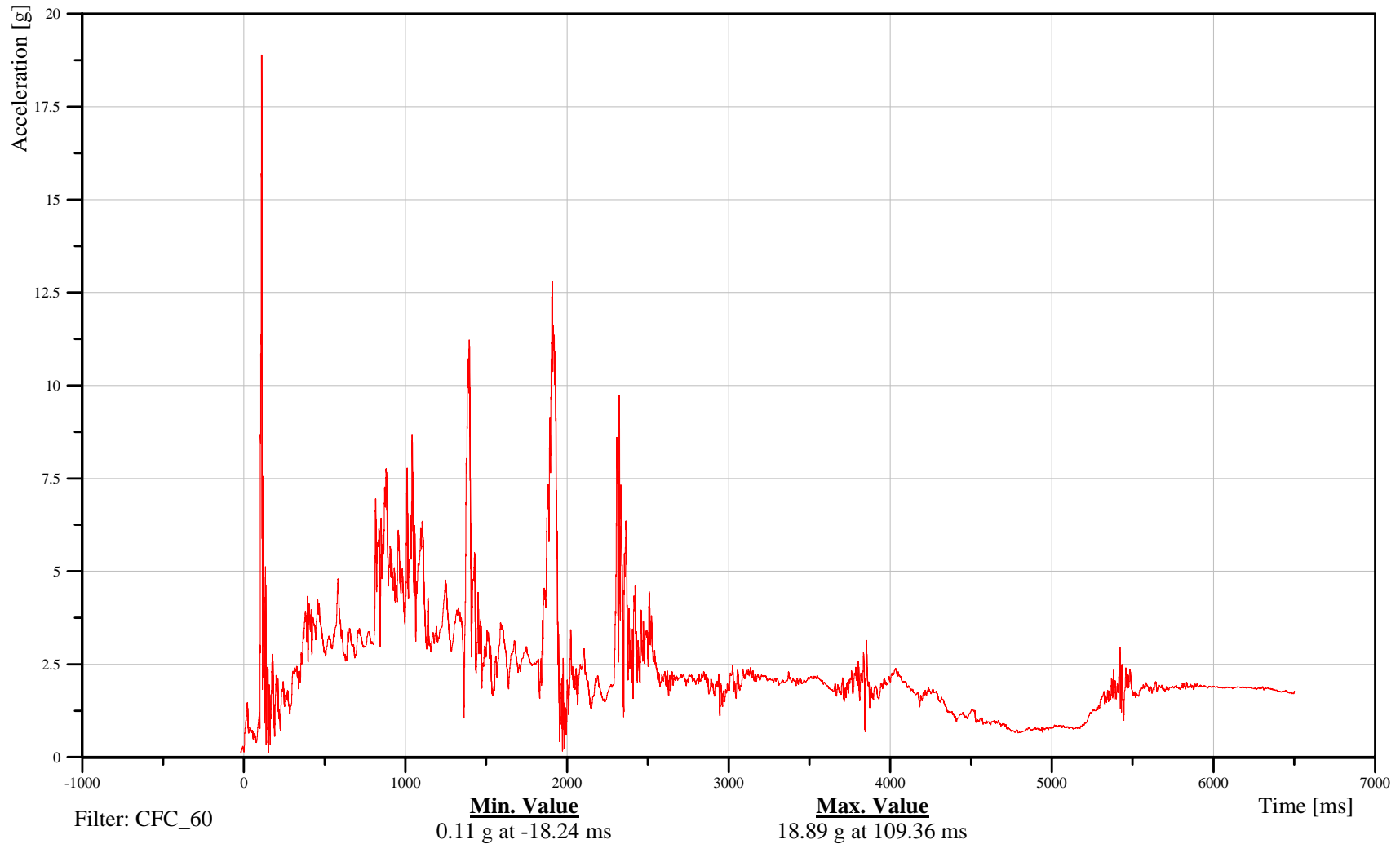
Time: 16:26

Customer: VRTC

### 10CPILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-150

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right C-Pillar Lower X-Axis Acceleration

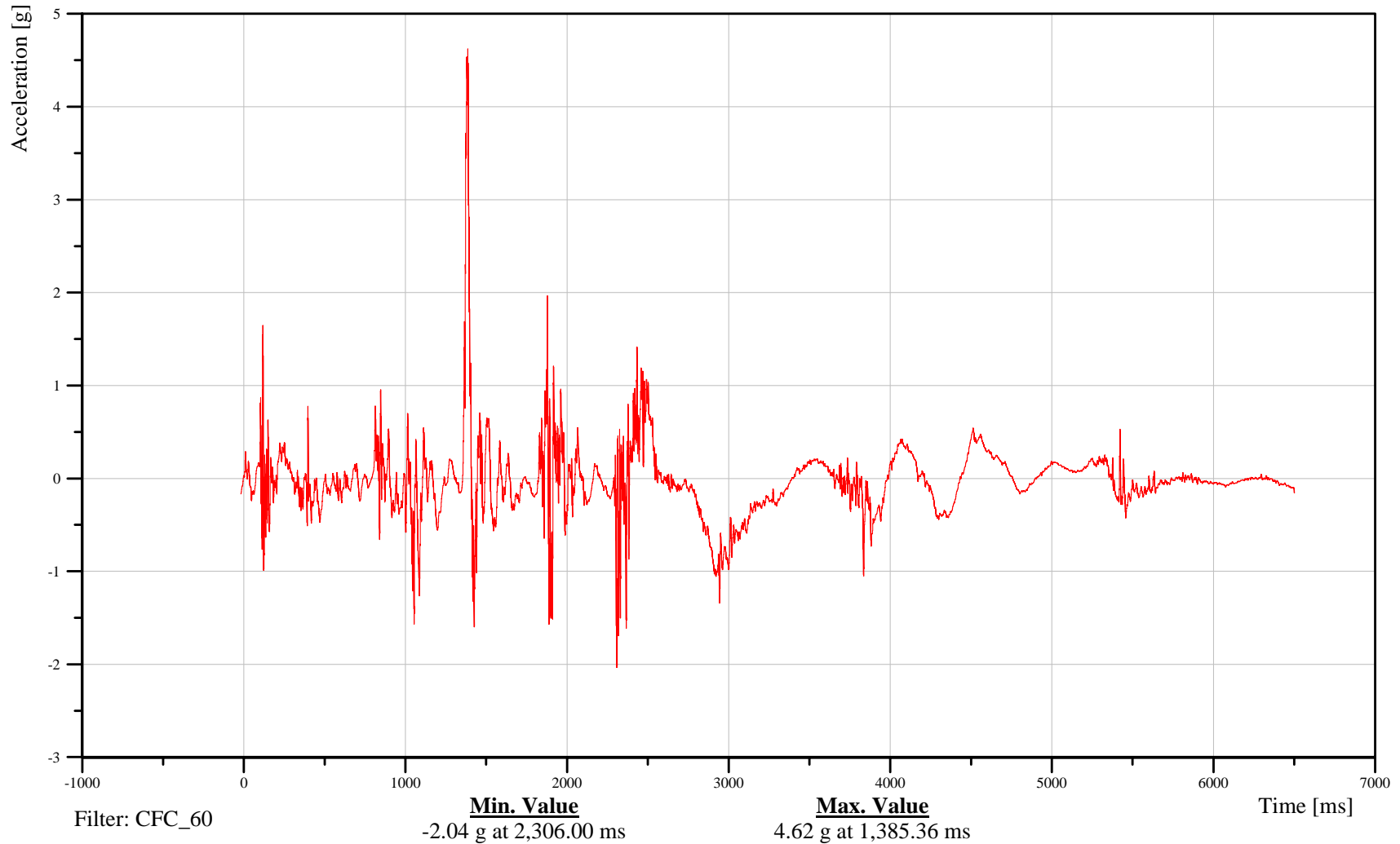
Time: 16:26

Customer: VRTC

### 10CPILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-151

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

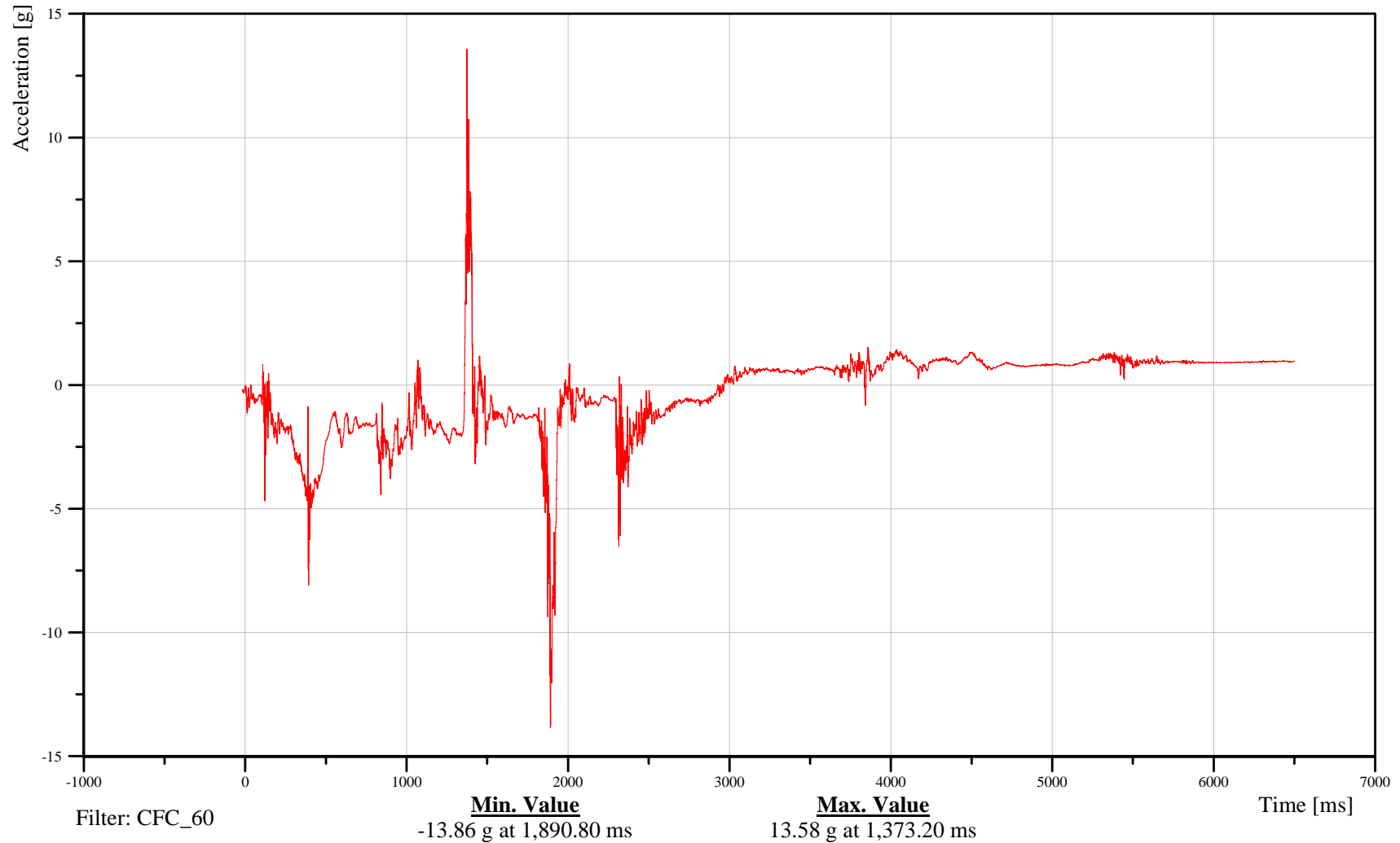
## Right C-Pillar Lower Y-Axis Acceleration

Customer: VRTC

# 10CPILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-152

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

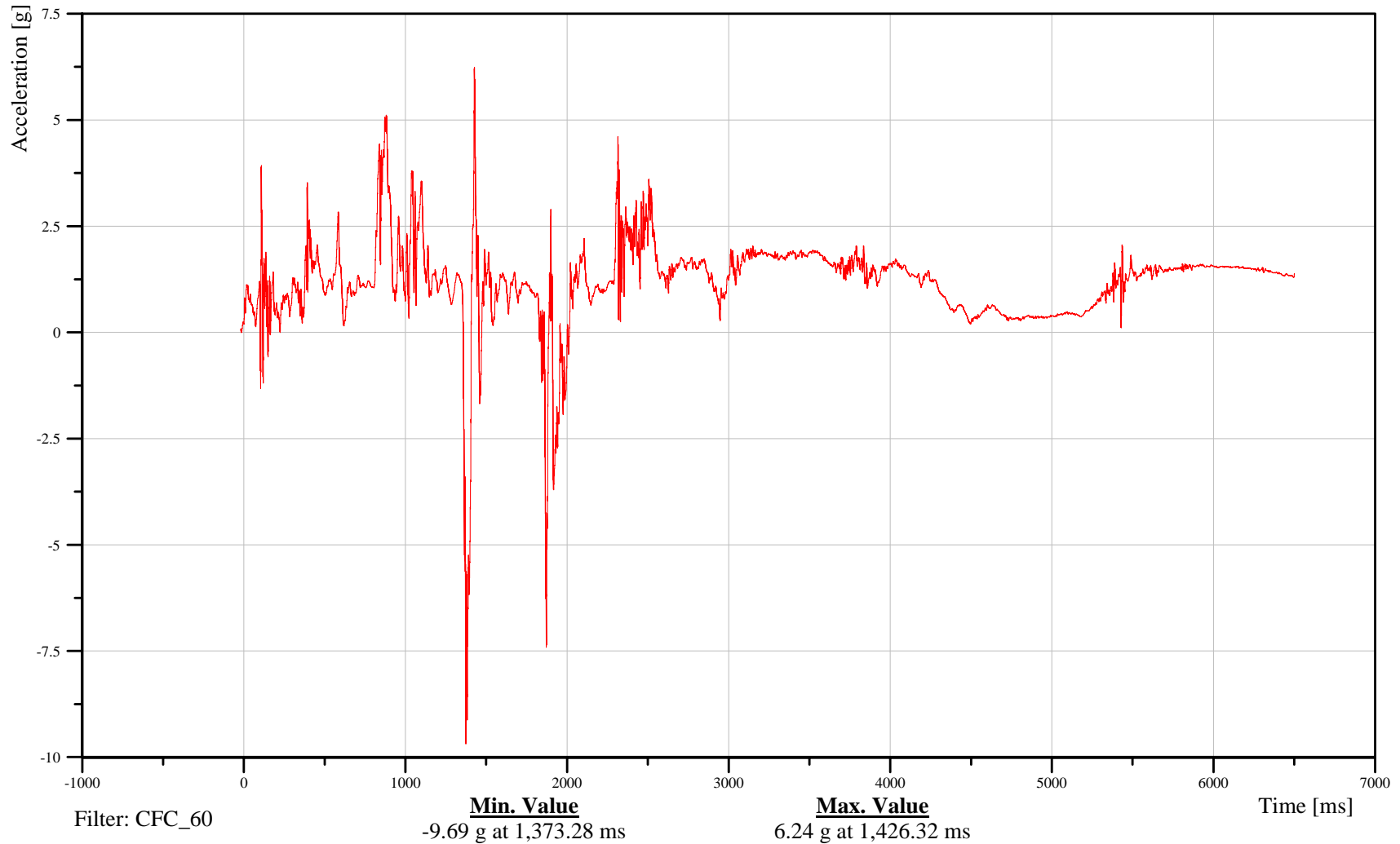
## Right C-Pillar Lower Z-Axis Acceleration

Customer: VRTC

TRC Inc. Test Lab: CTF

# 10CPILLORI00ACZD

Test Number: 100115



B-153

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right C-Pillar Lower Resultant Acceleration

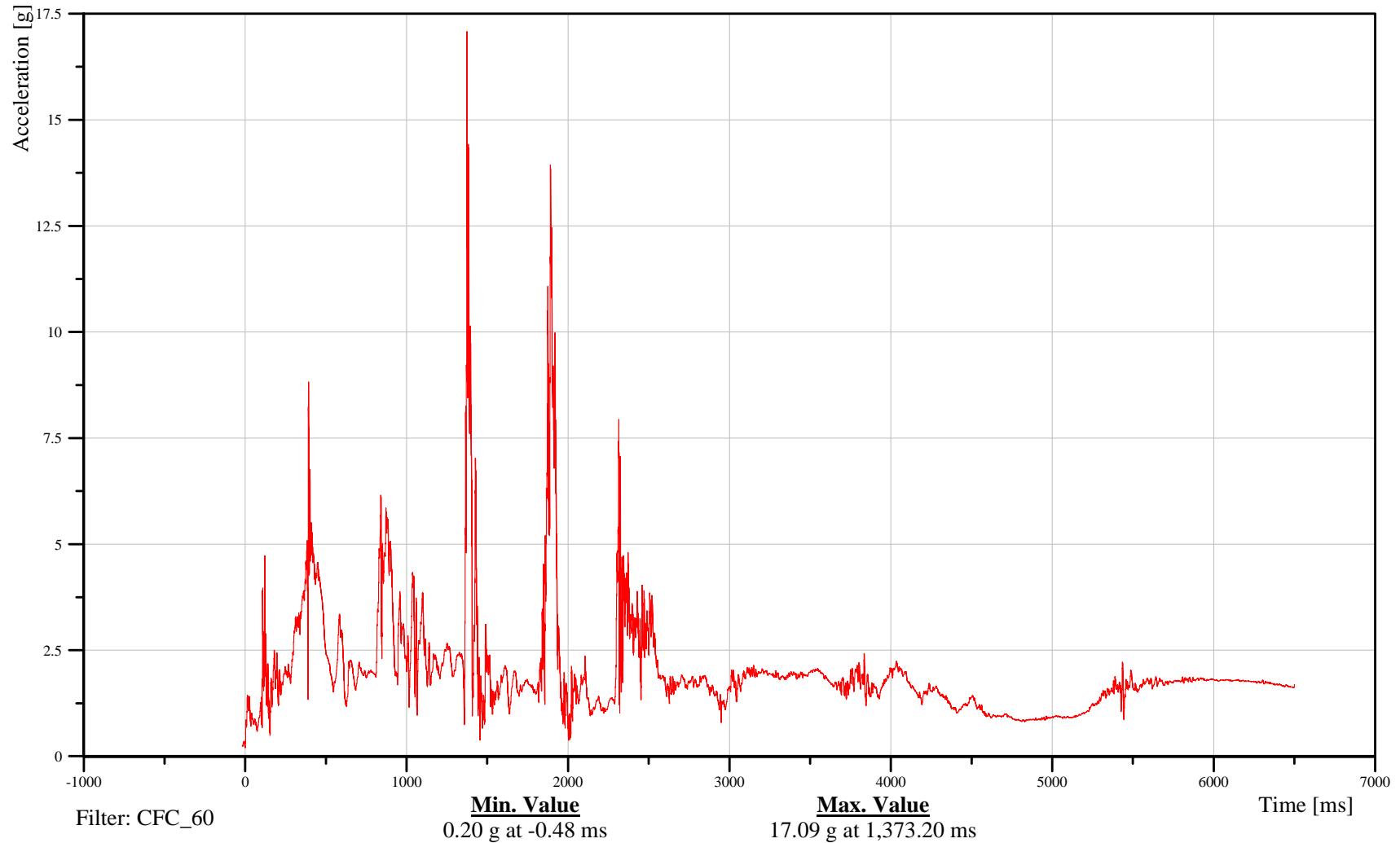
Time: 16:26

Customer: VRTC

# 10CPILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-154

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

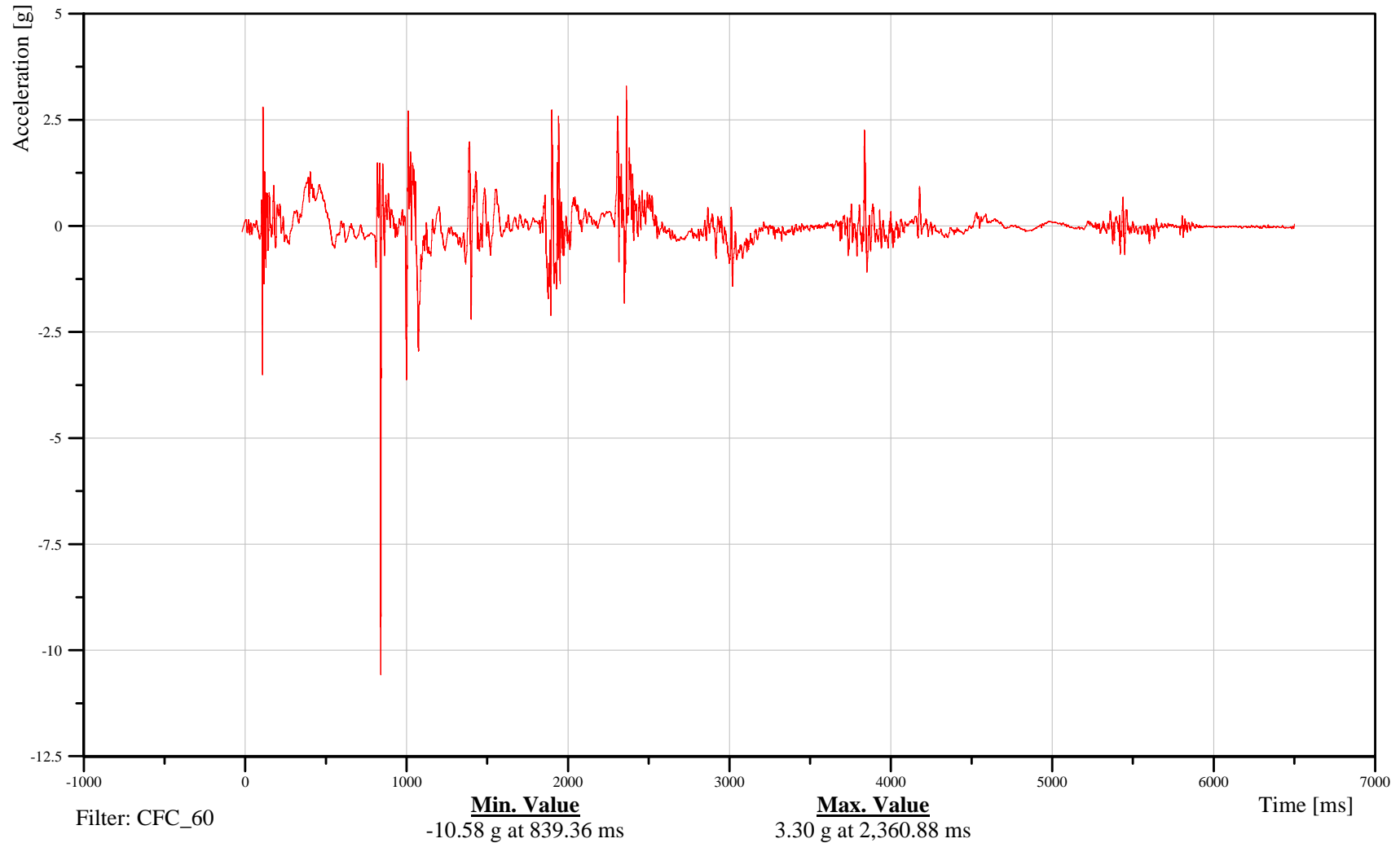
## Left D-Pillar Upper X-Axis Acceleration

Customer: VRTC

# 10DPILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-155

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

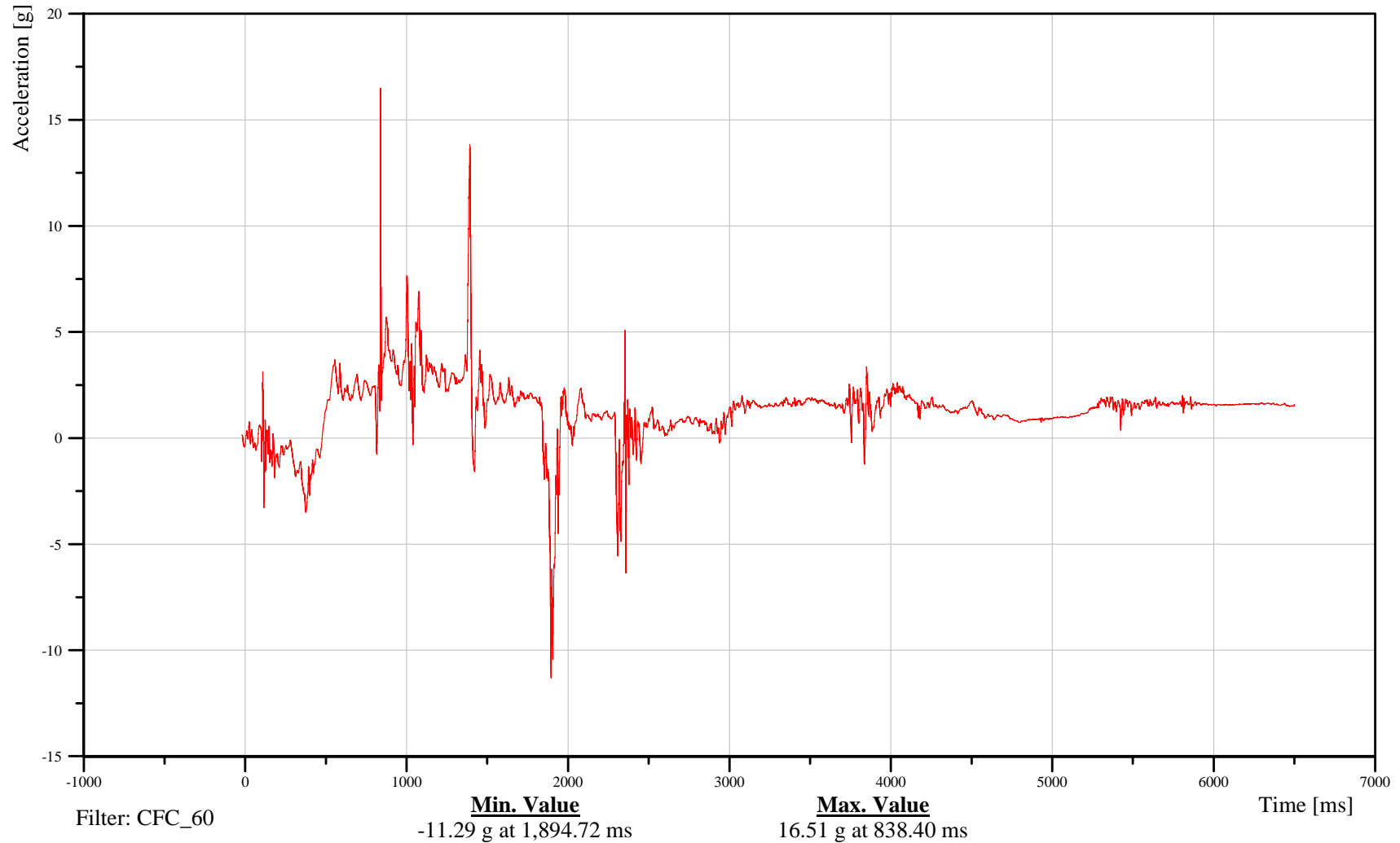
## Left D-Pillar Upper Y-Axis Acceleration

Customer: VRTC

# 10DPILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-156

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

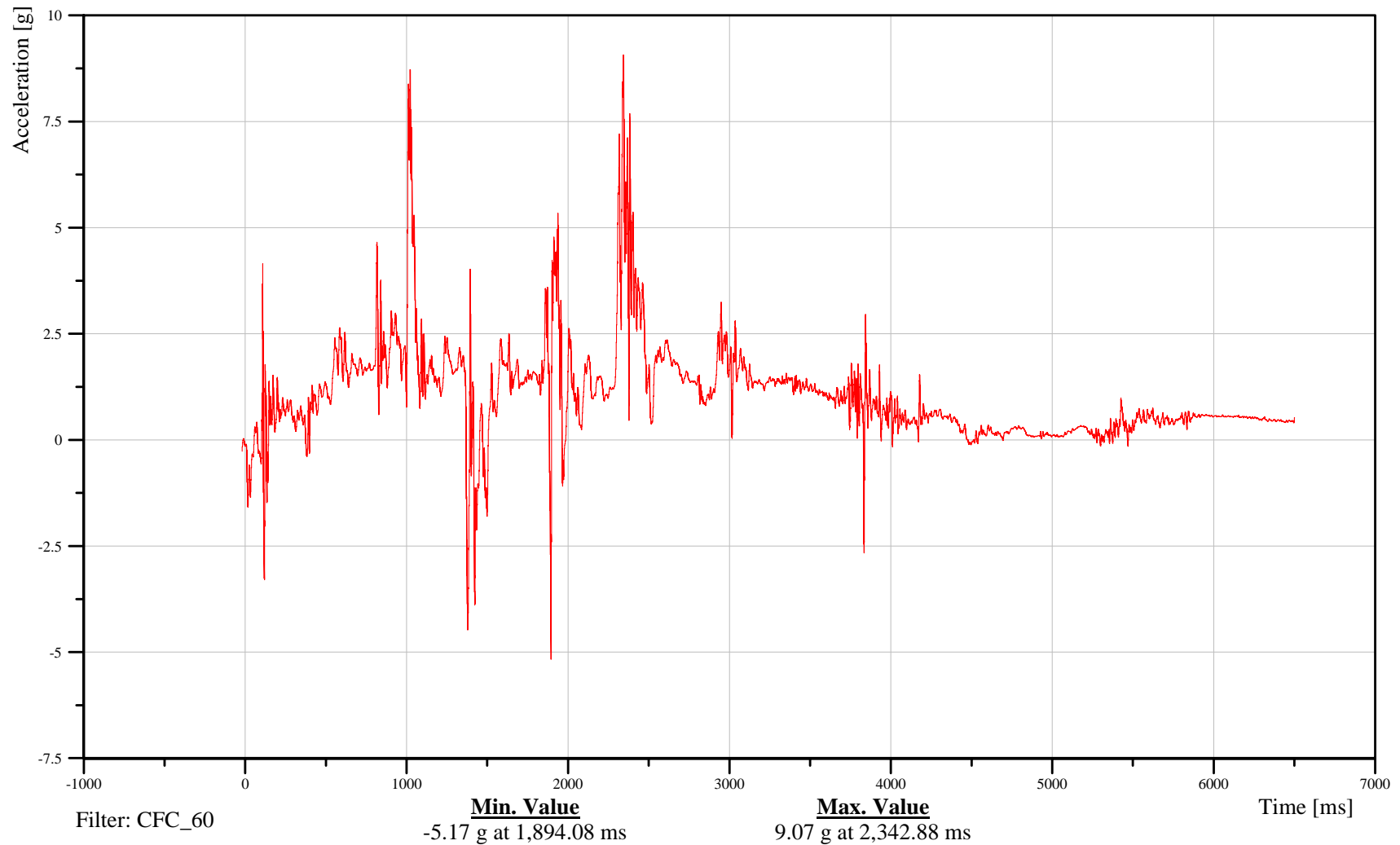
## Left D-Pillar Upper Z-Axis Acceleration

Customer: VRTC

# 10DPILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-157

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left D-Pillar Upper Resultant Acceleration

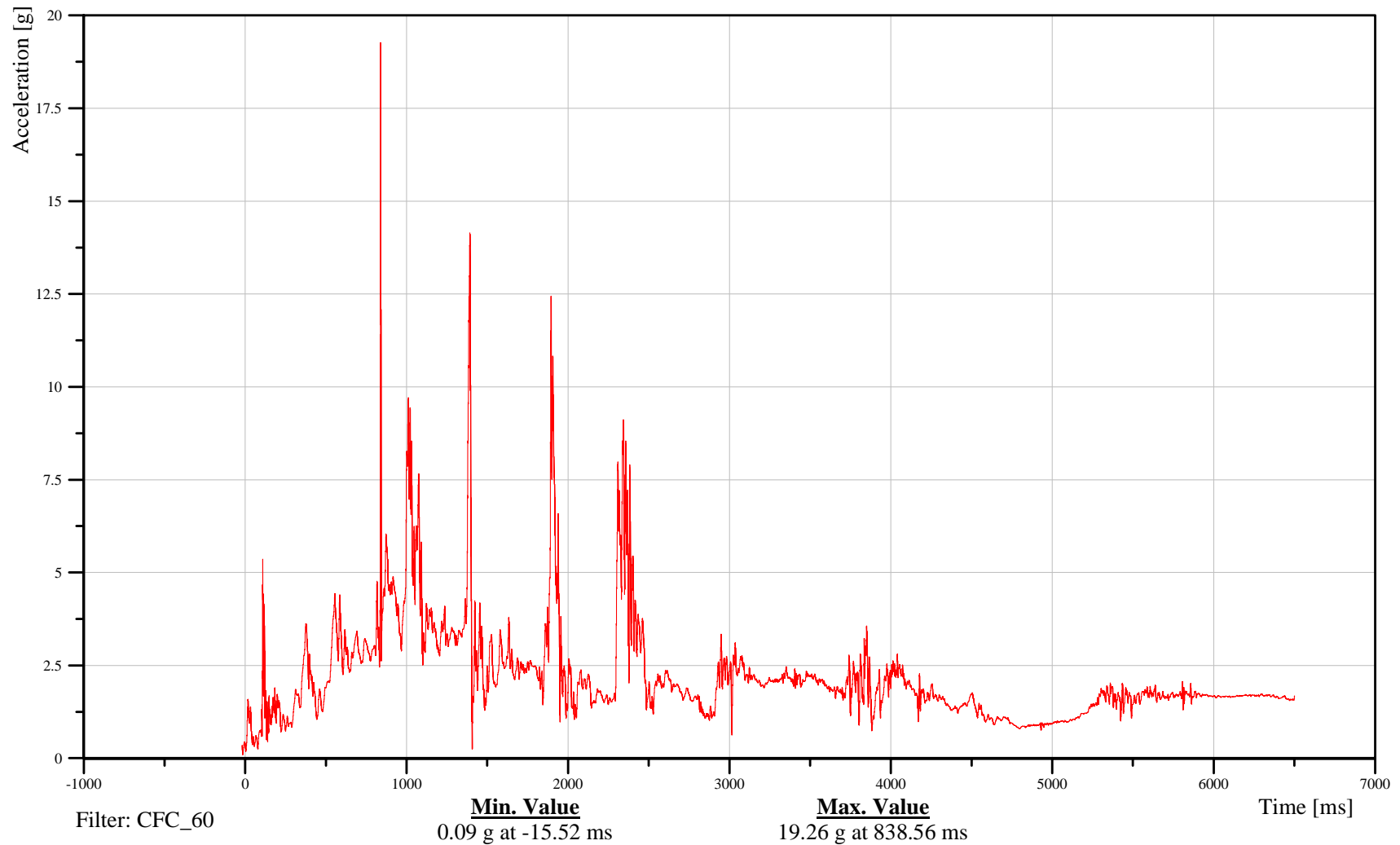
Time: 16:26

Customer: VRTC

### 10DPILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-158

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

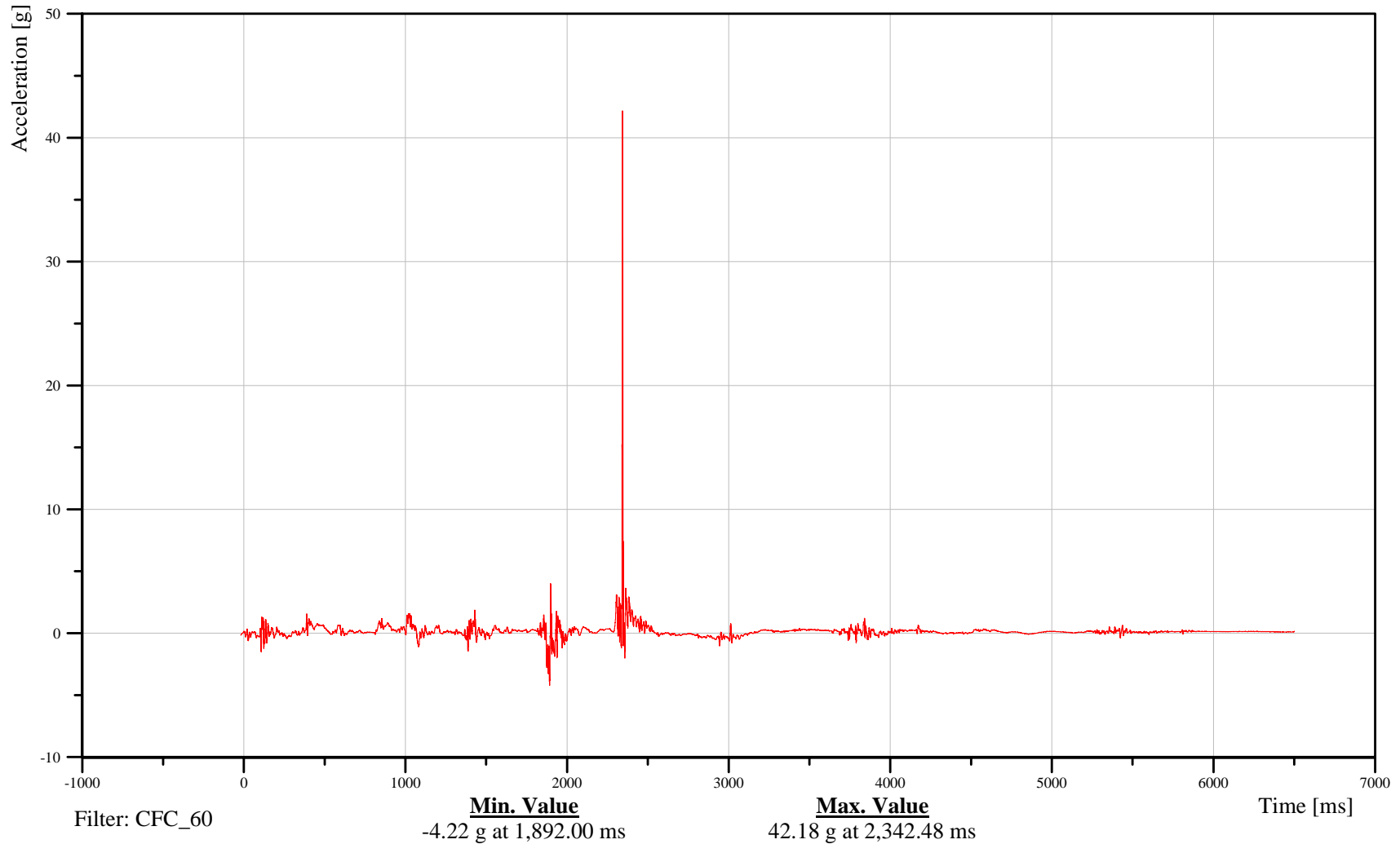
## Left D-Pillar Lower X-Axis Acceleration

Customer: VRTC

# 10DPILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-159

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left D-Pillar Lower Y-Axis Acceleration

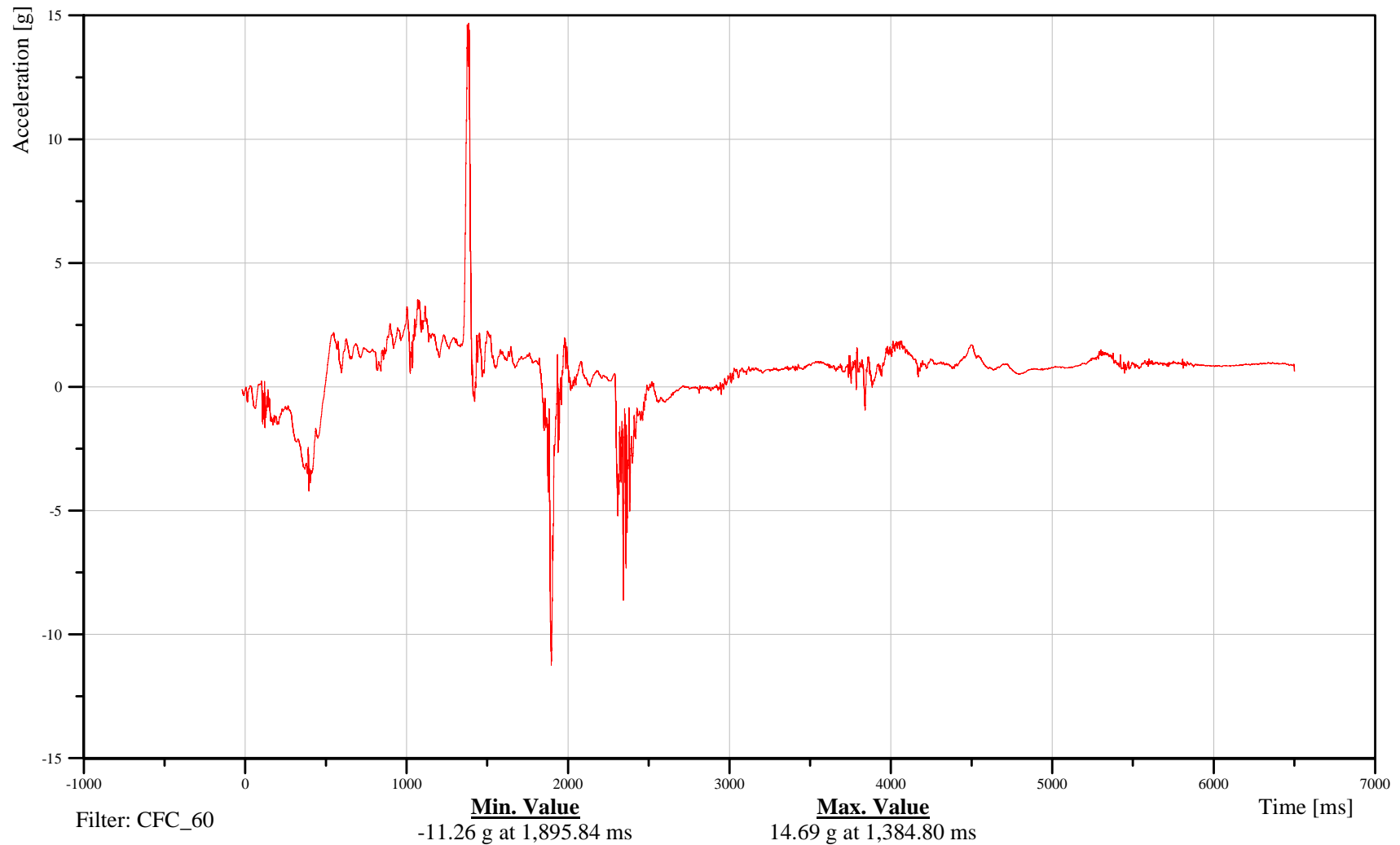
Time: 16:26

Customer: VRTC

# 10DPILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-160

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

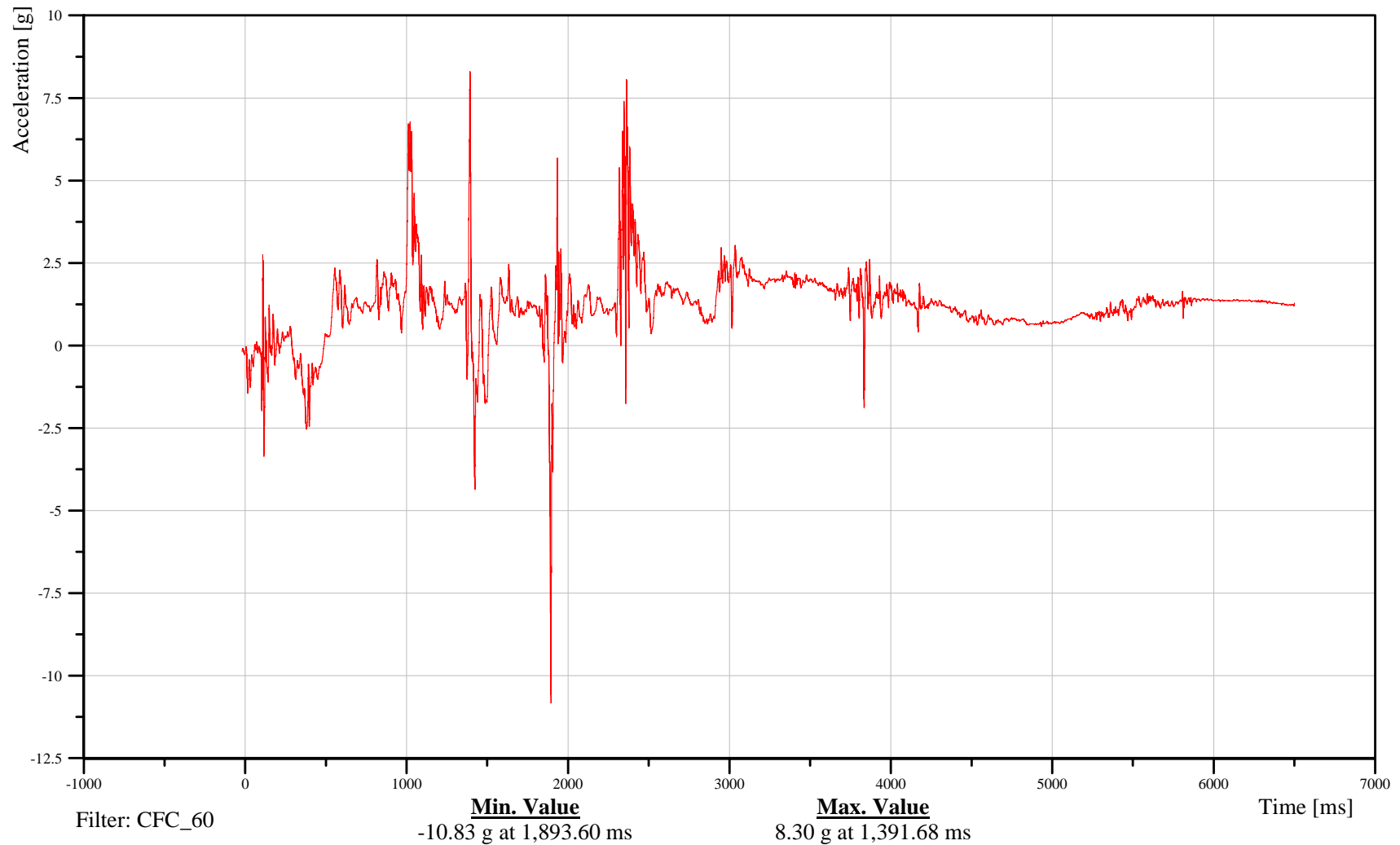
## Left D-Pillar Lower Z-Axis Acceleration

Customer: VRTC

# 10DPILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-161

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left D-Pillar Lower Resultant Acceleration

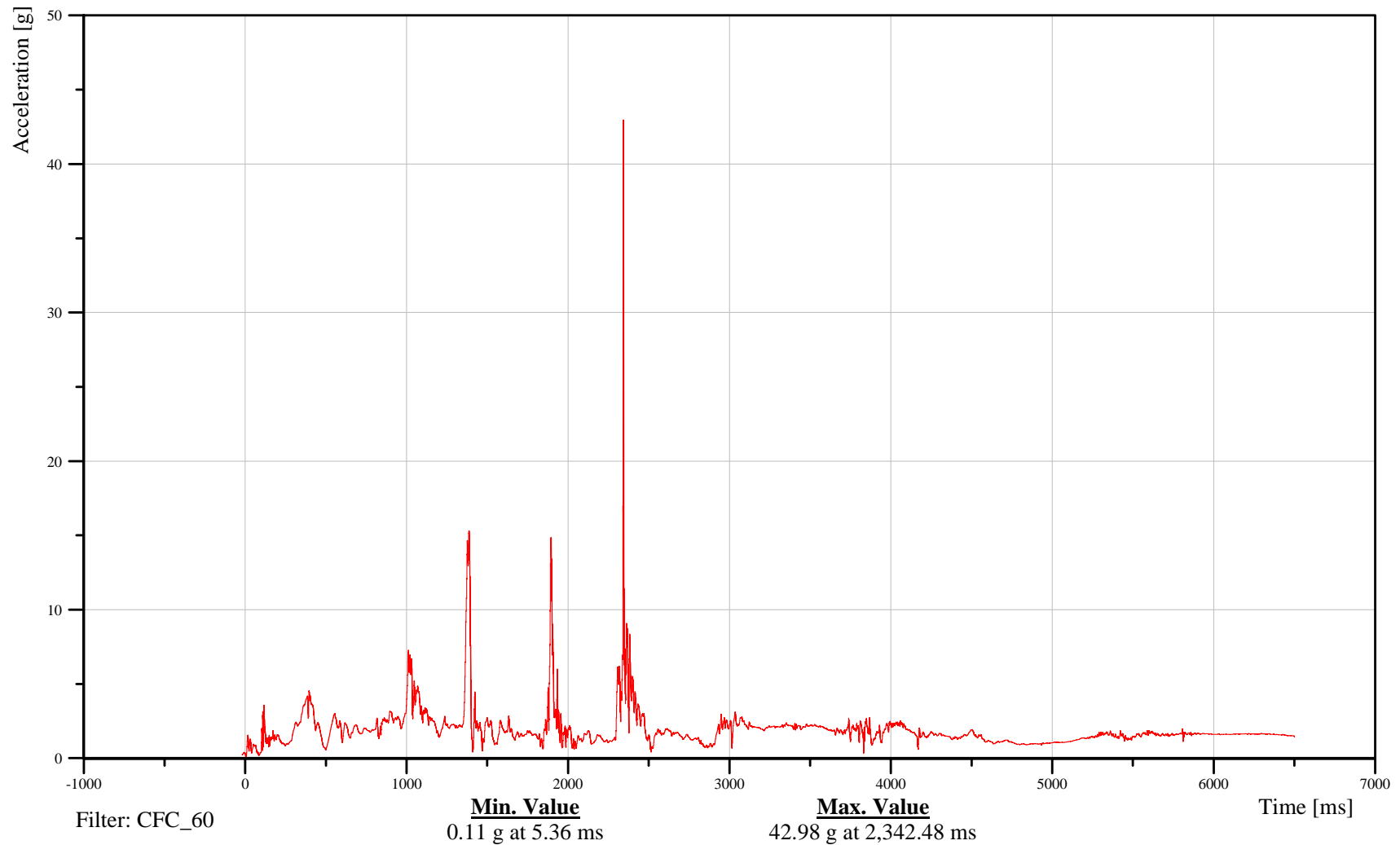
Time: 16:26

Customer: VRTC

### 10DPILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-162

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Upper X-Axis Acceleration

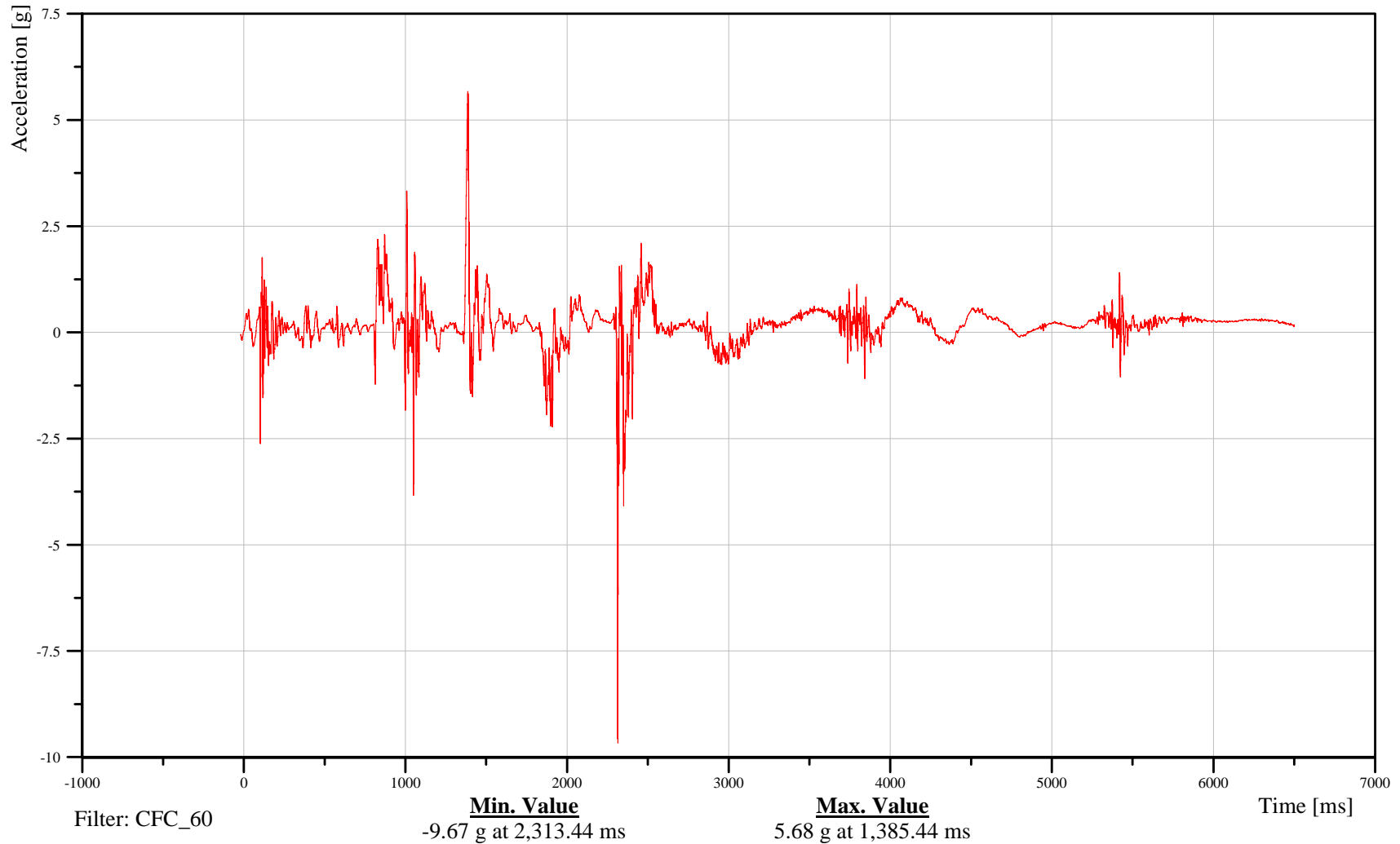
Time: 16:26

Customer: VRTC

### 10DPILUPRI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-163

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Upper Y-Axis Acceleration

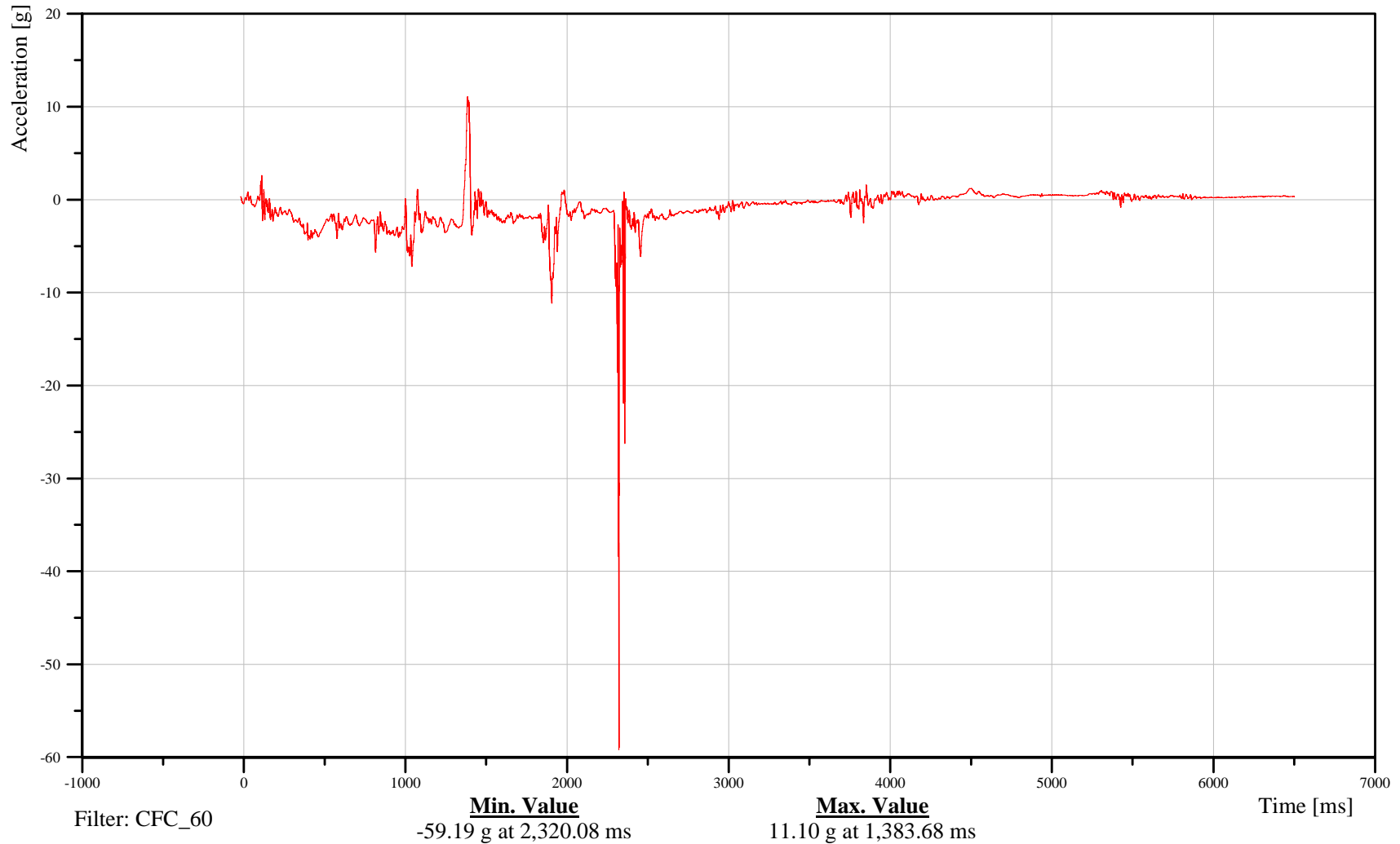
Time: 16:26

Customer: VRTC

# 10DPILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-164

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Upper Z-Axis Acceleration

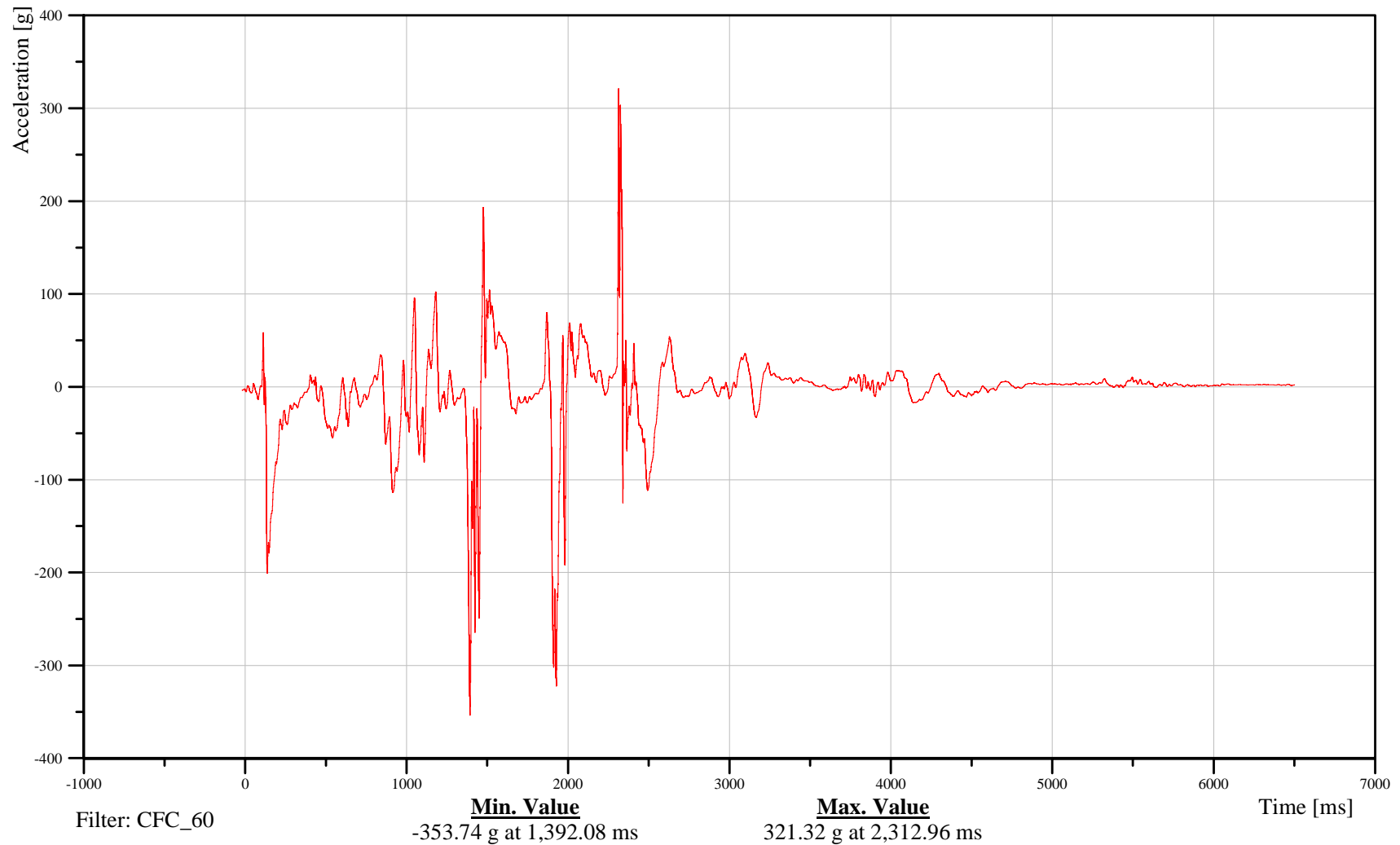
Time: 16:26

Customer: VRTC

# 10DPILUPRI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-165

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Upper Resultant Acceleration

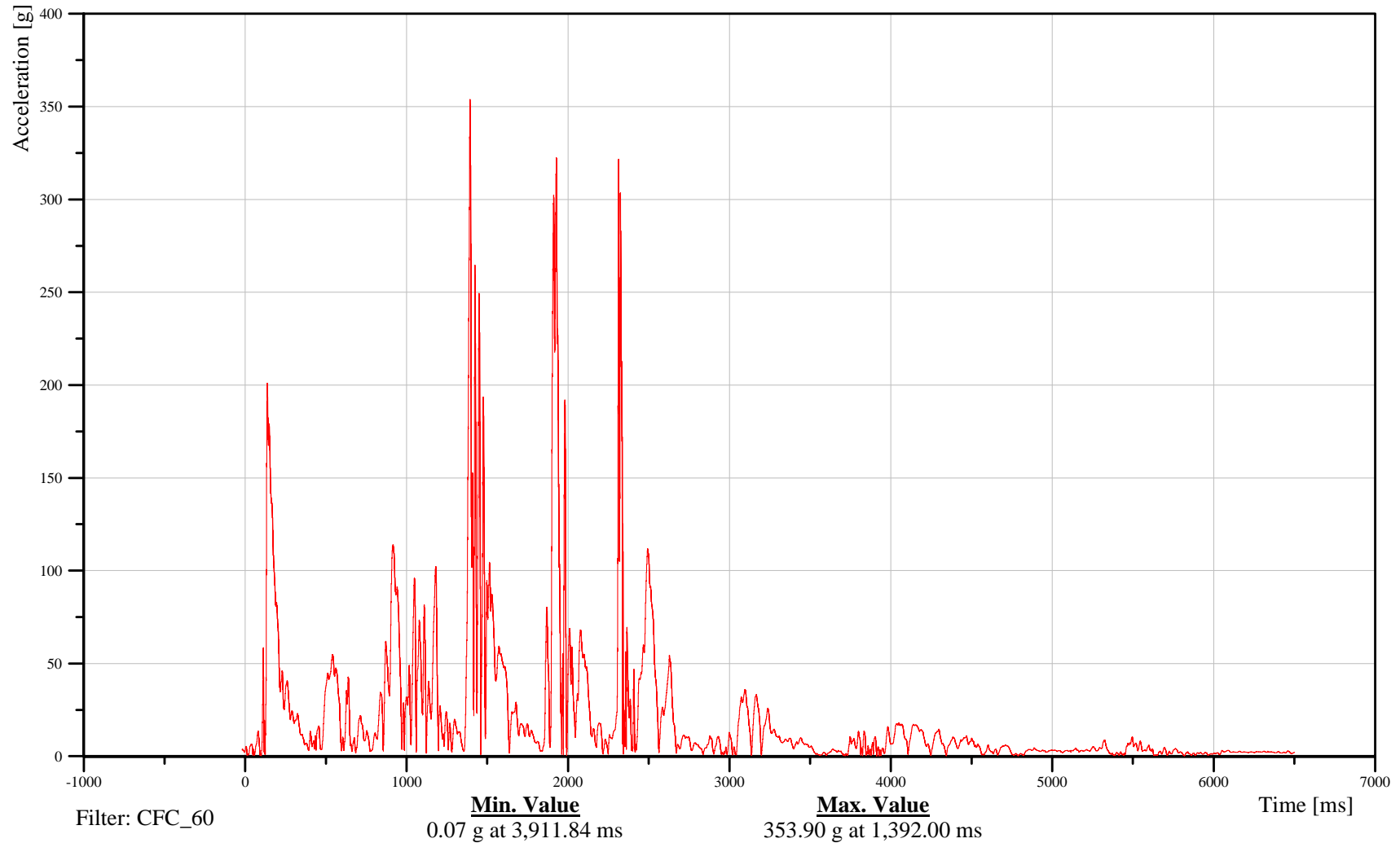
Time: 16:26

Customer: VRTC

# 10DPILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-166

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Lower X-Axis Acceleration

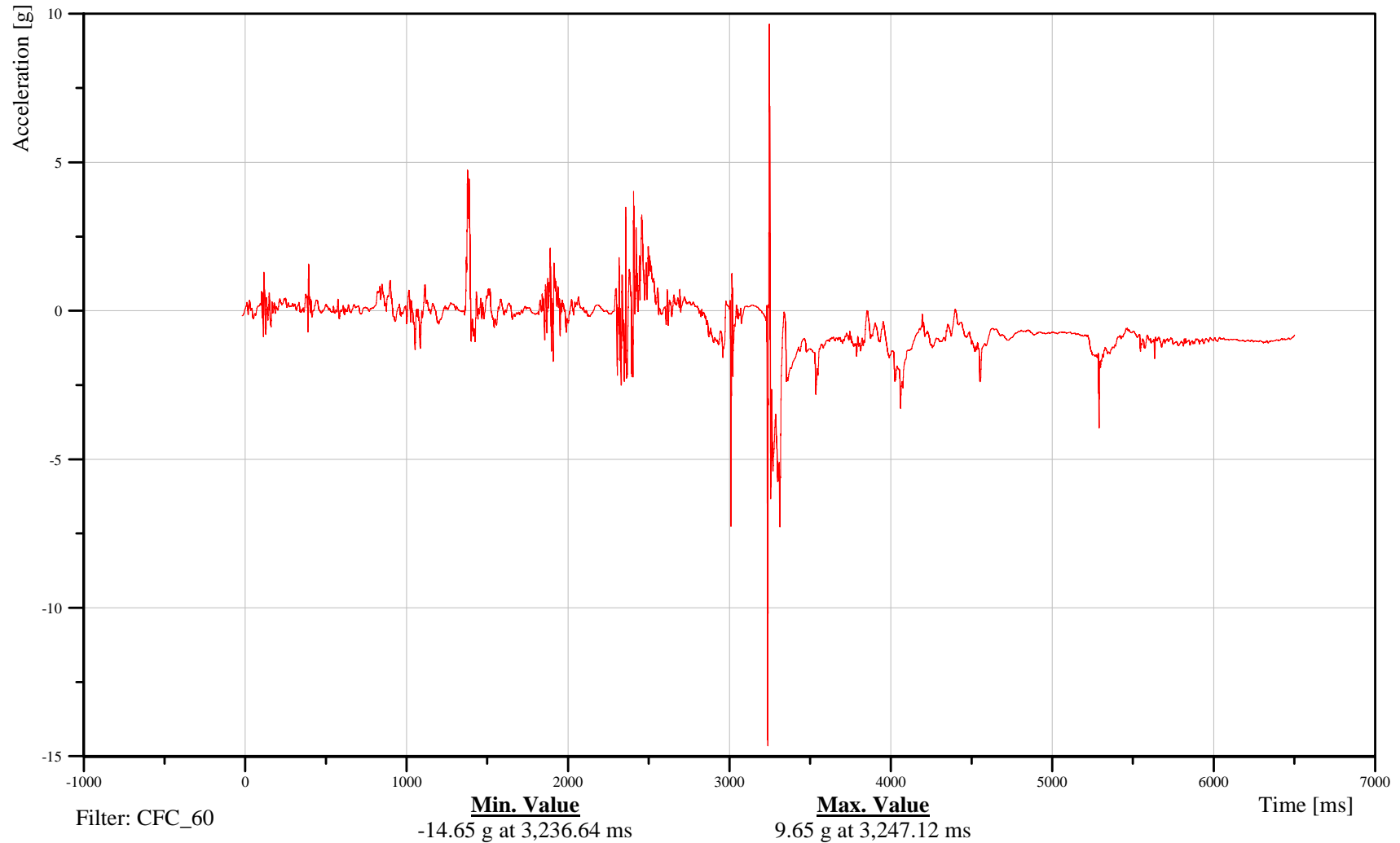
Time: 16:26

Customer: VRTC

### 10DPILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-167

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Lower Y-Axis Acceleration

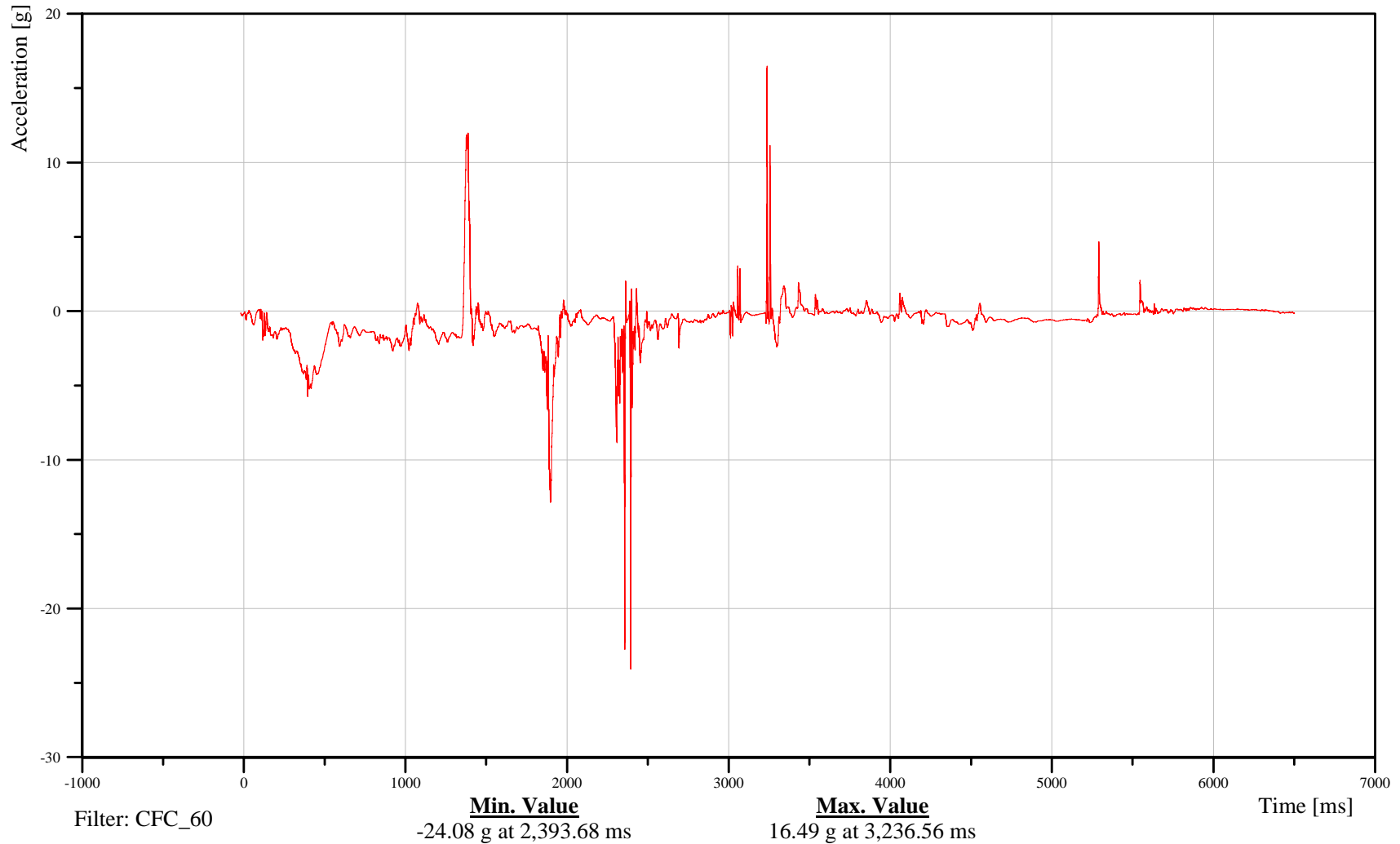
Time: 16:26

Customer: VRTC

# 10DPILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-168

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Lower Z-Axis Acceleration

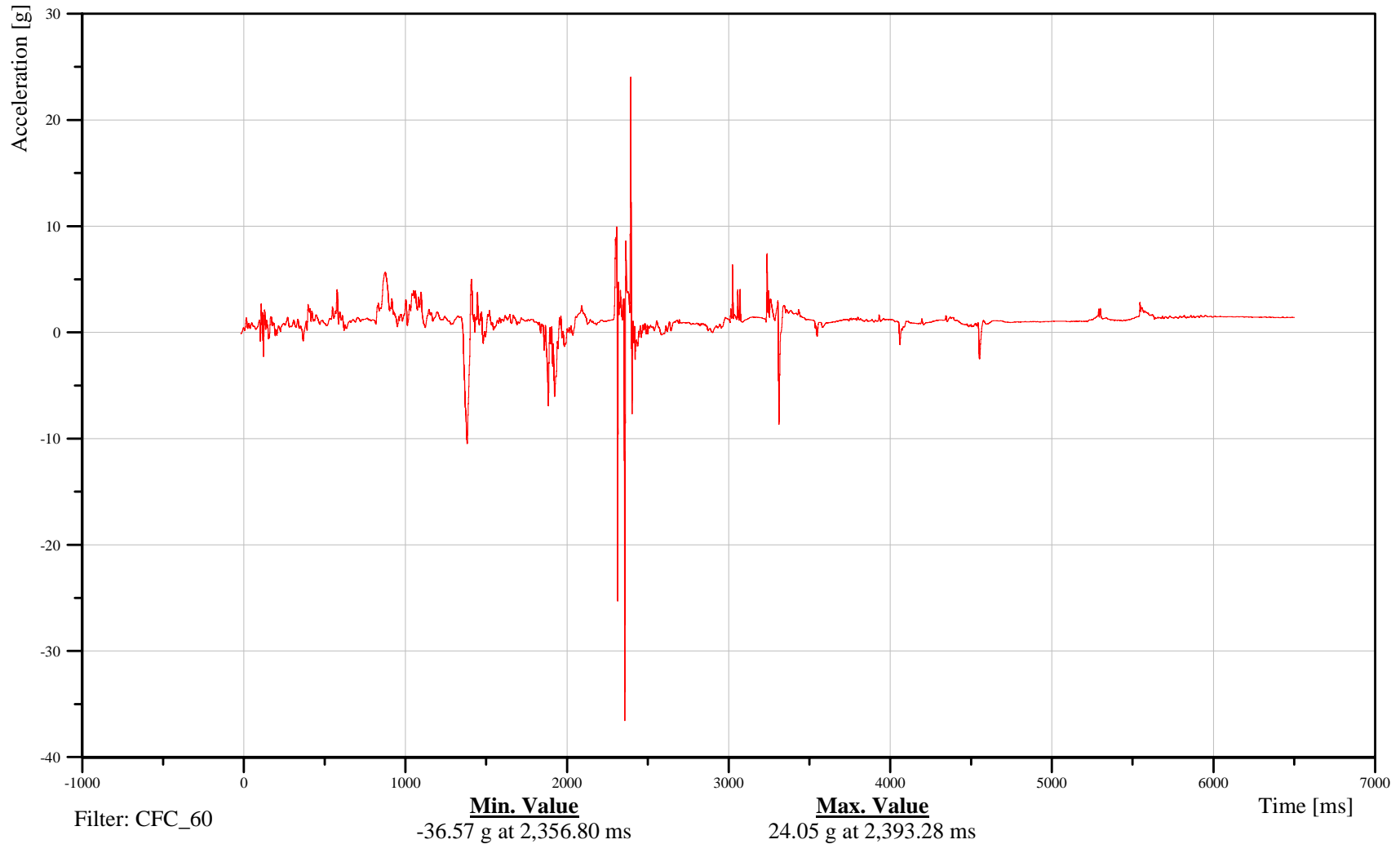
Time: 16:26

Customer: VRTC

### 10DPILLORI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-169

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right D-Pillar Lower Resultant Acceleration

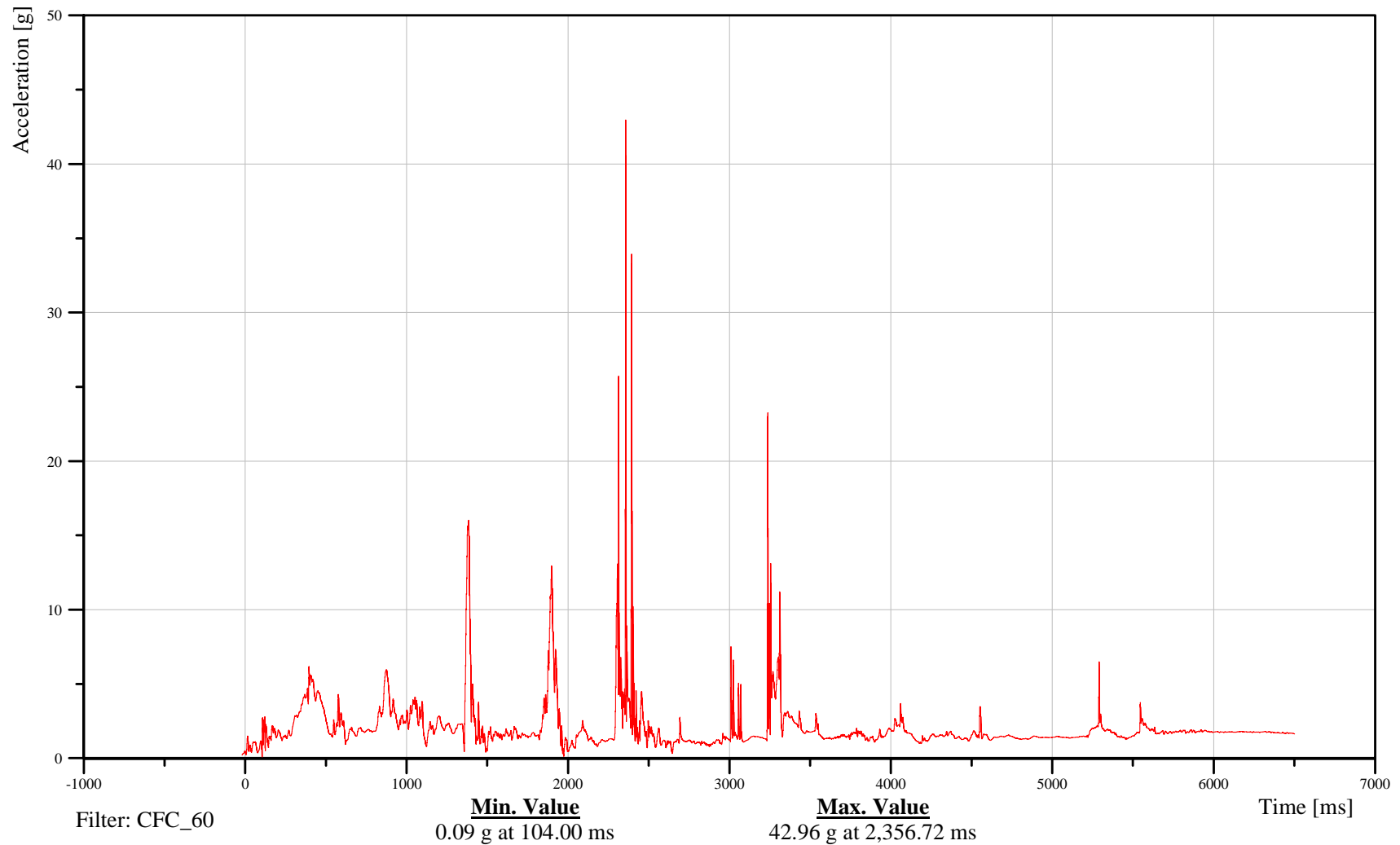
Time: 16:26

Customer: VRTC

# 10DPILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-170

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Vehicle Rear Deck X-Axis Acceleration

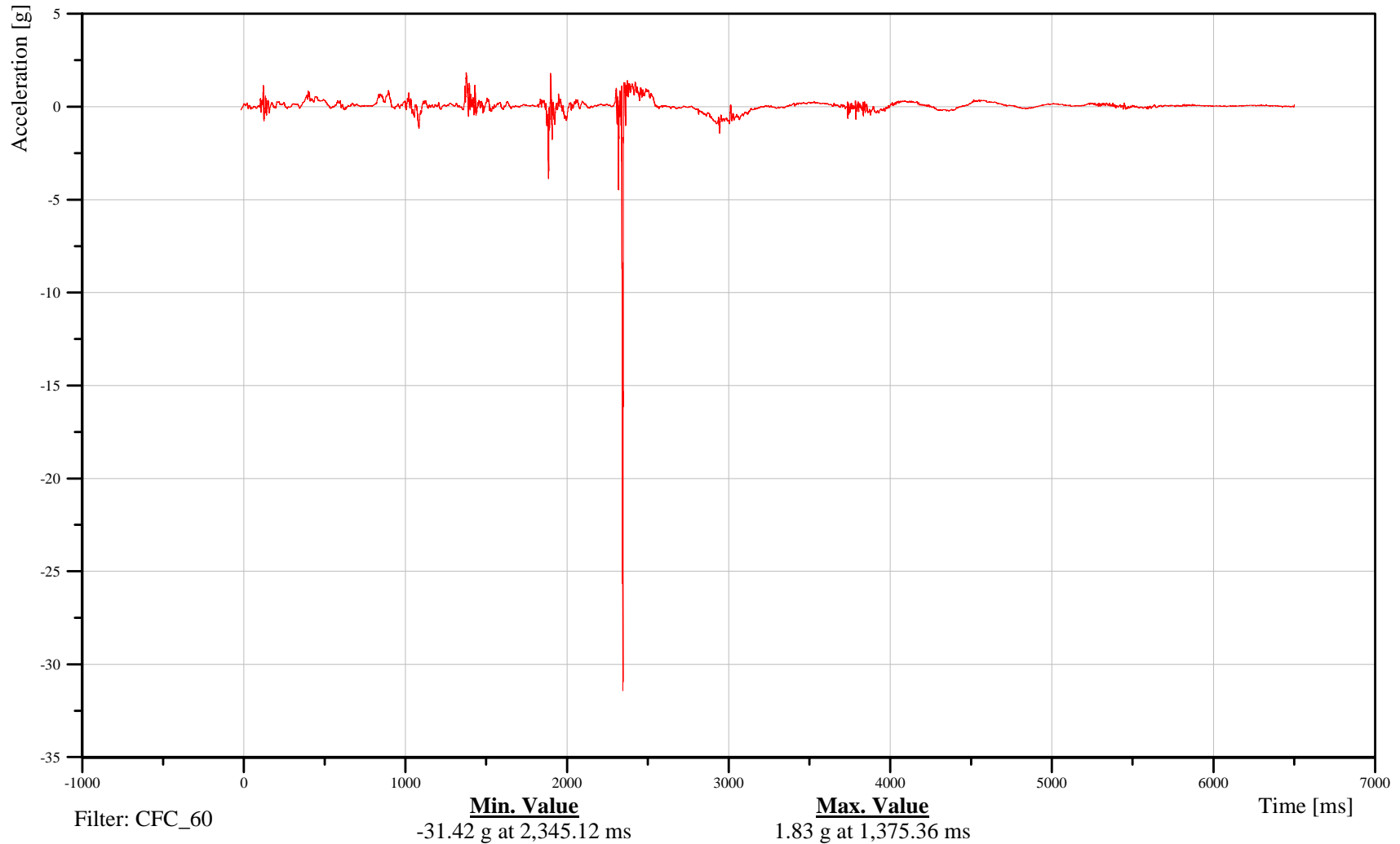
Time: 16:26

Customer: VRTC

### 102RDK000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-171

100115



# Soil Trip Rollover 2007 Ford Expedition

## Vehicle Rear Deck Y-Axis Acceleration

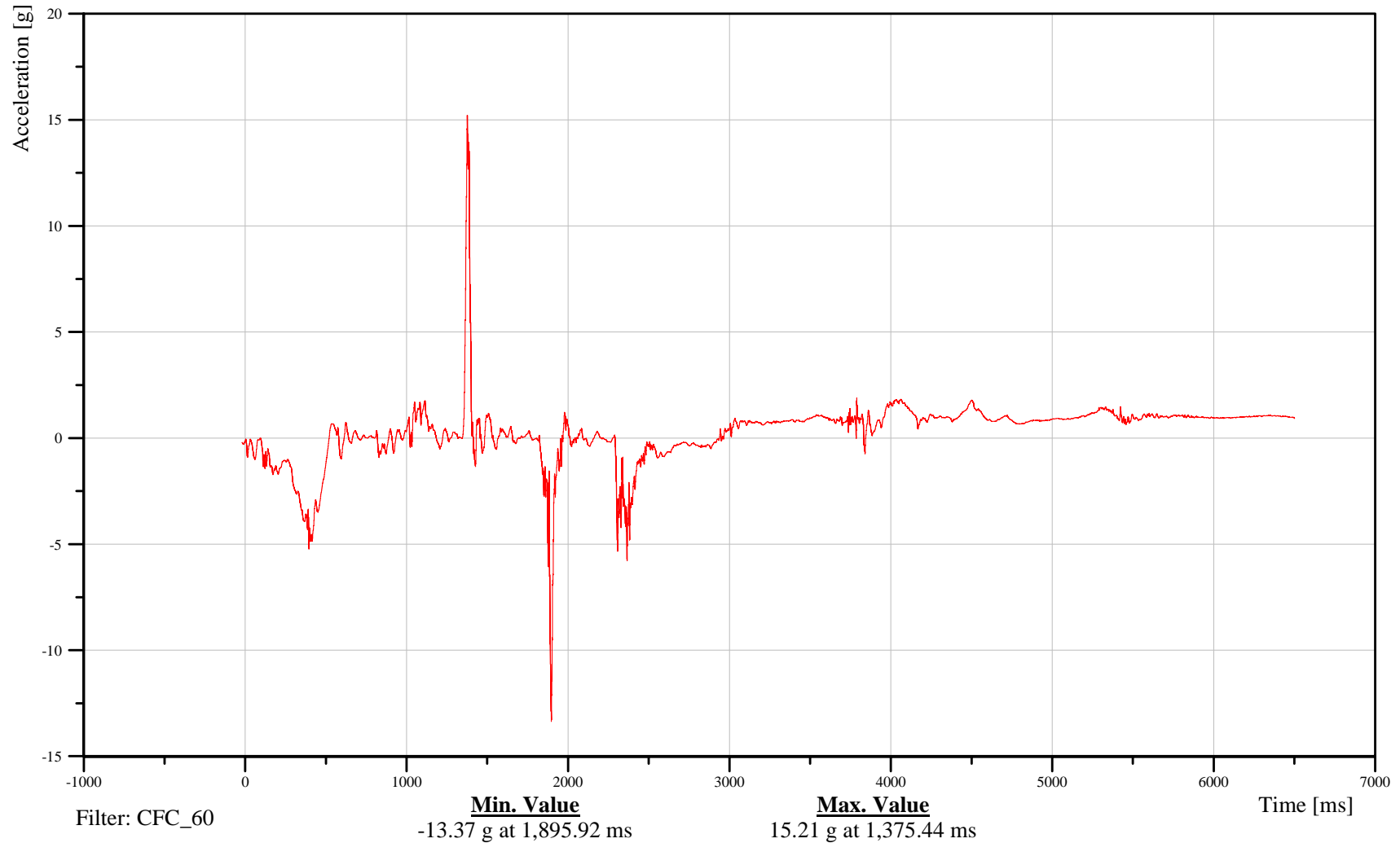
Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 102RDK000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-172

100115



# Soil Trip Rollover 2007 Ford Expedition

## Vehicle Rear Deck Z-Axis Acceleration

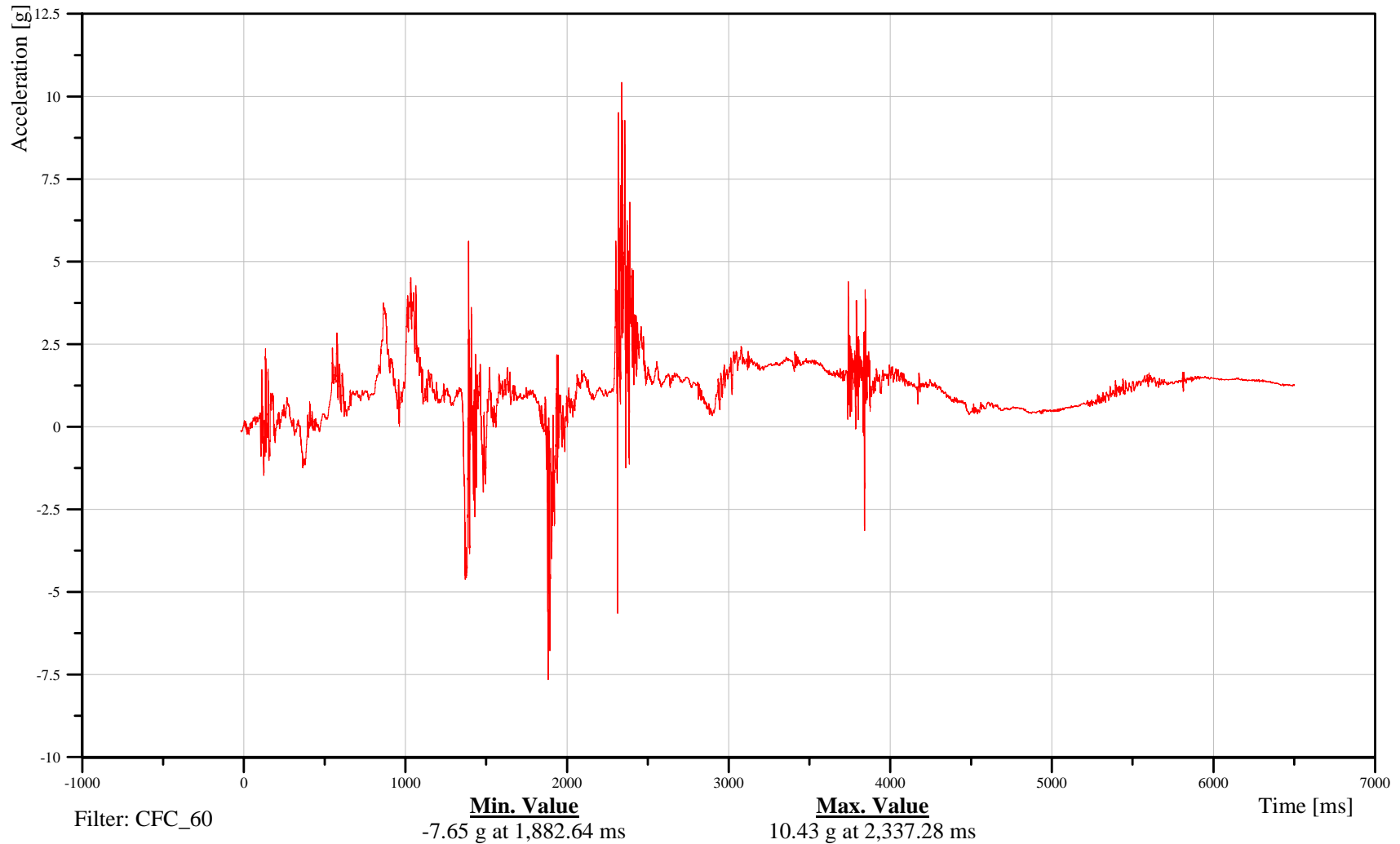
Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 102RDK000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-173

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Vehicle Rear Deck Resultant Acceleration

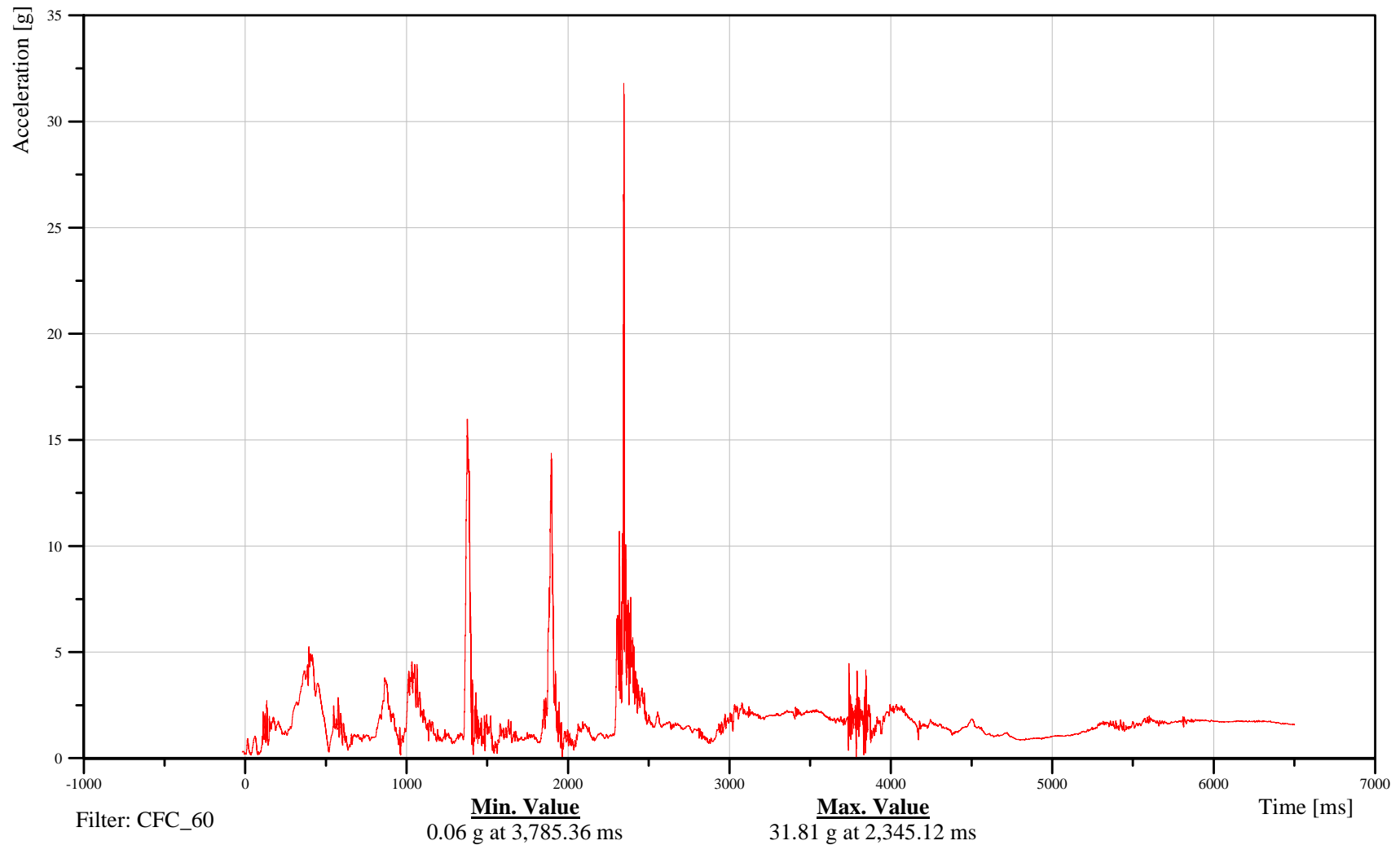
Time: 16:26

Customer: VRTC

### 102RDK000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-174

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LF Seat Position (on floor) X-Axis Acceleration

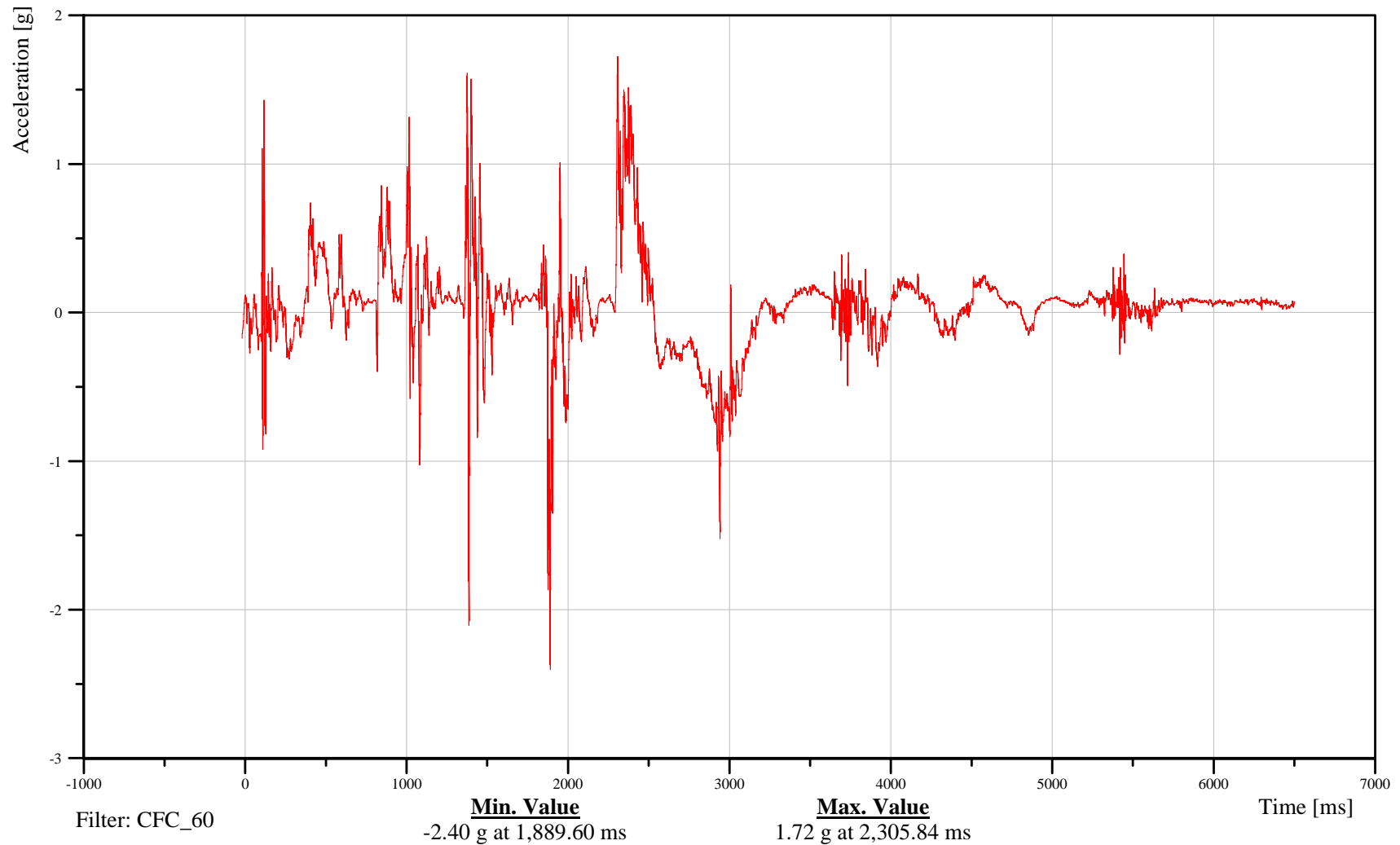
Time: 16:26

Customer: VRTC

### 11SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-175

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LF Seat Position (on floor) Y-Axis Acceleration

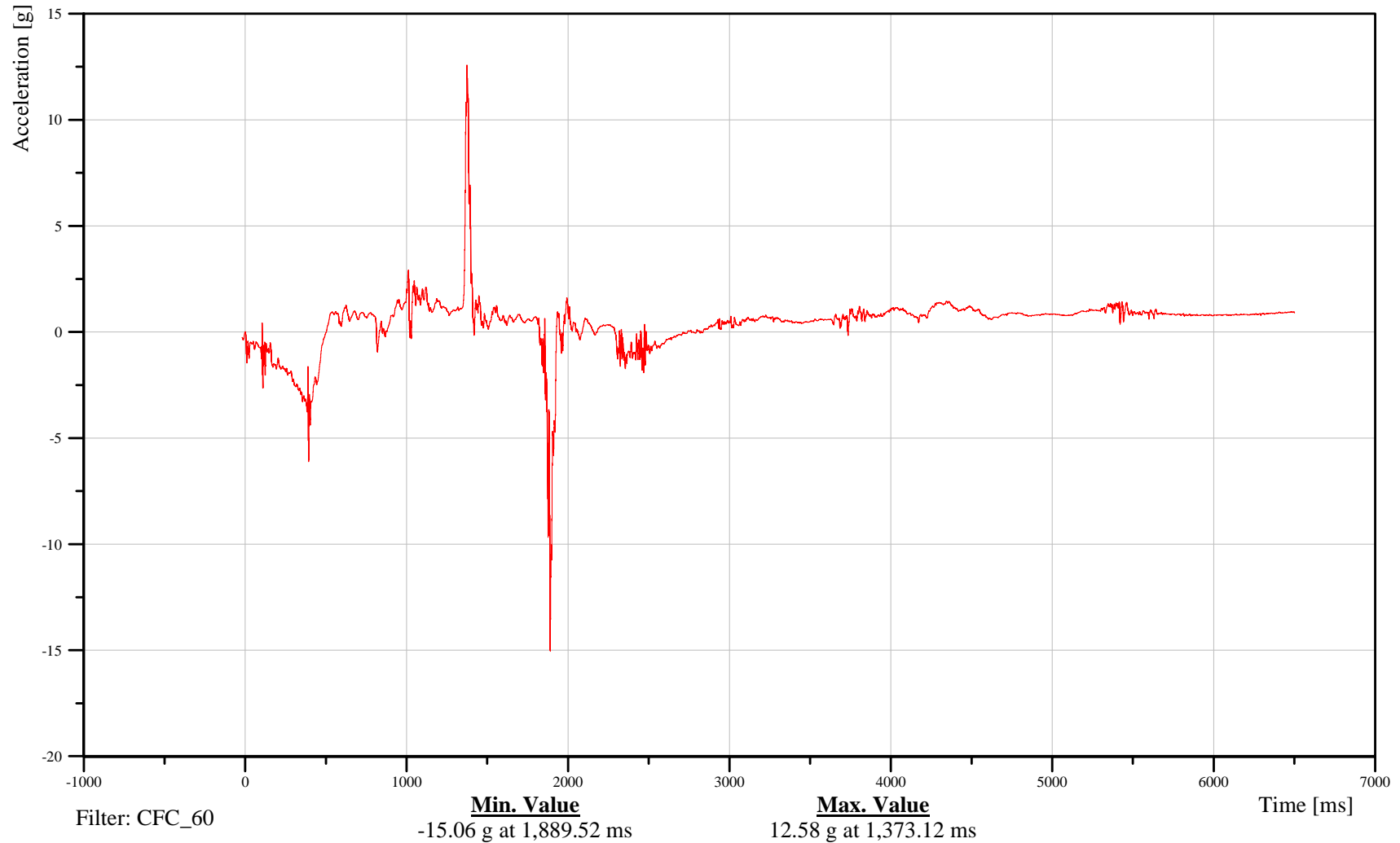
Time: 16:26

Customer: VRTC

### 11SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-176

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LF Seat Position (on floor) Z-Axis Acceleration

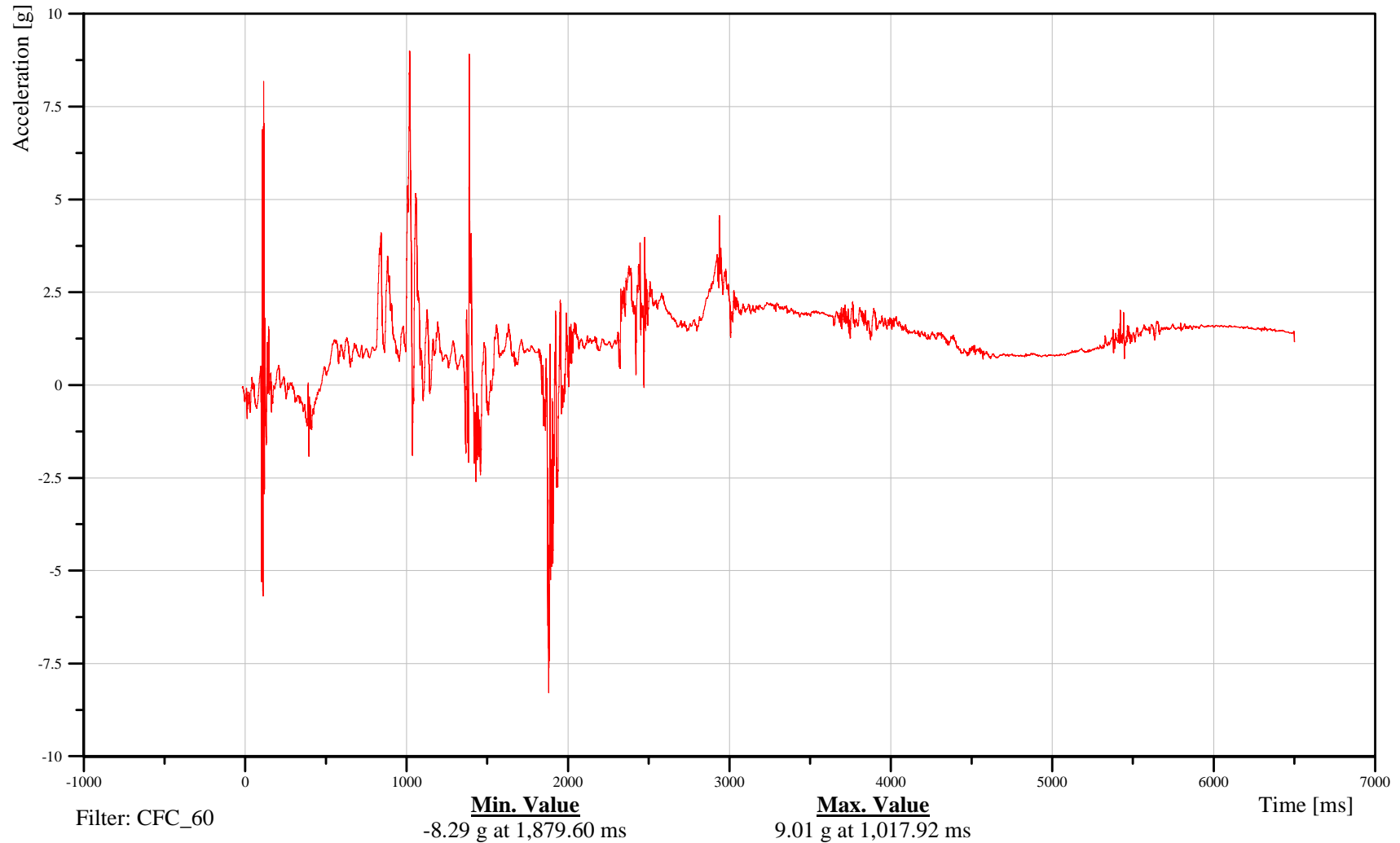
Time: 16:26

Customer: VRTC

### 11SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-177

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LF Seat Position (on floor) Resultant Acceleration

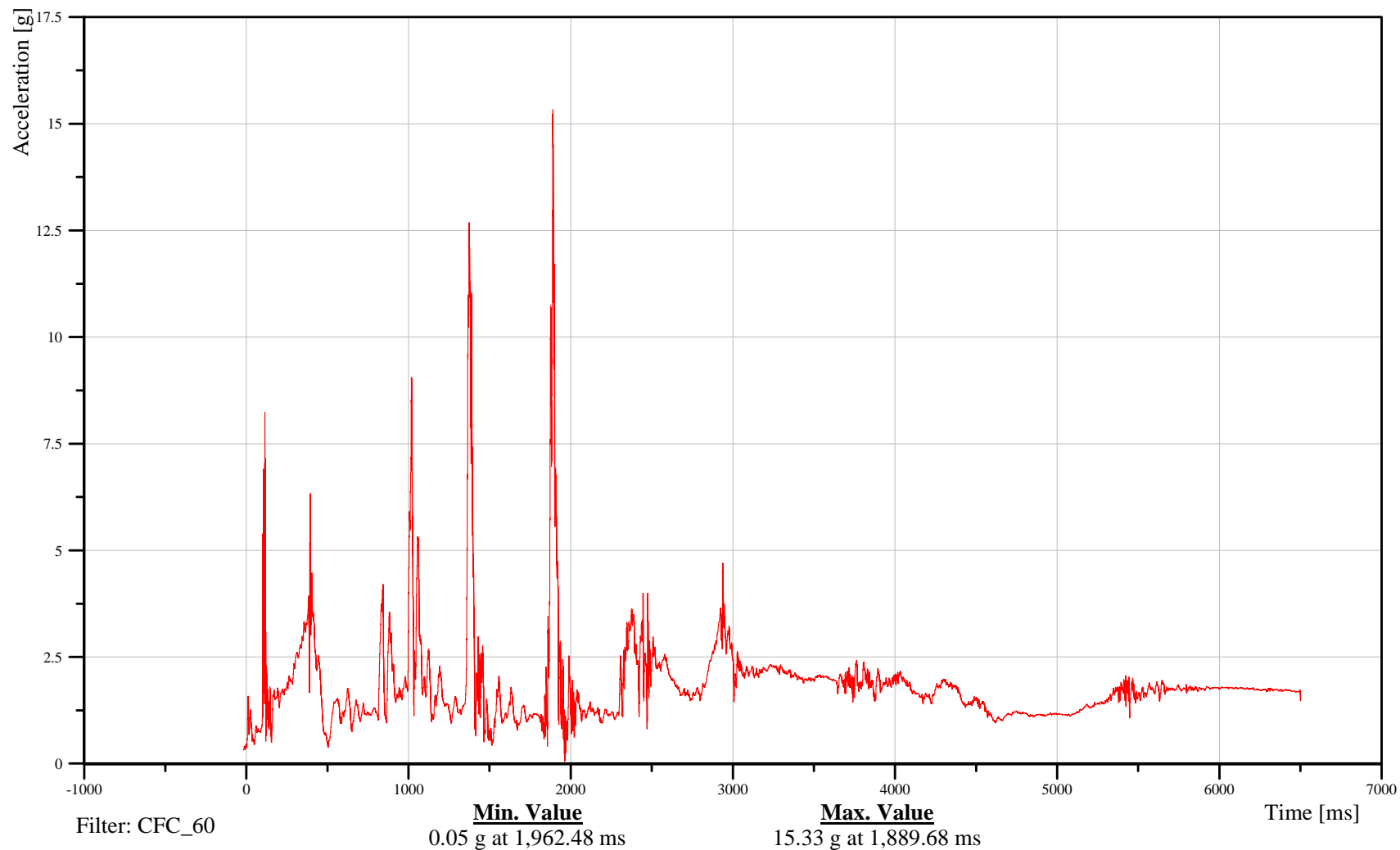
Time: 16:26

Customer: VRTC

### 11SEAT000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-178

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## RF Seat Position (on floor) X-Axis Acceleration

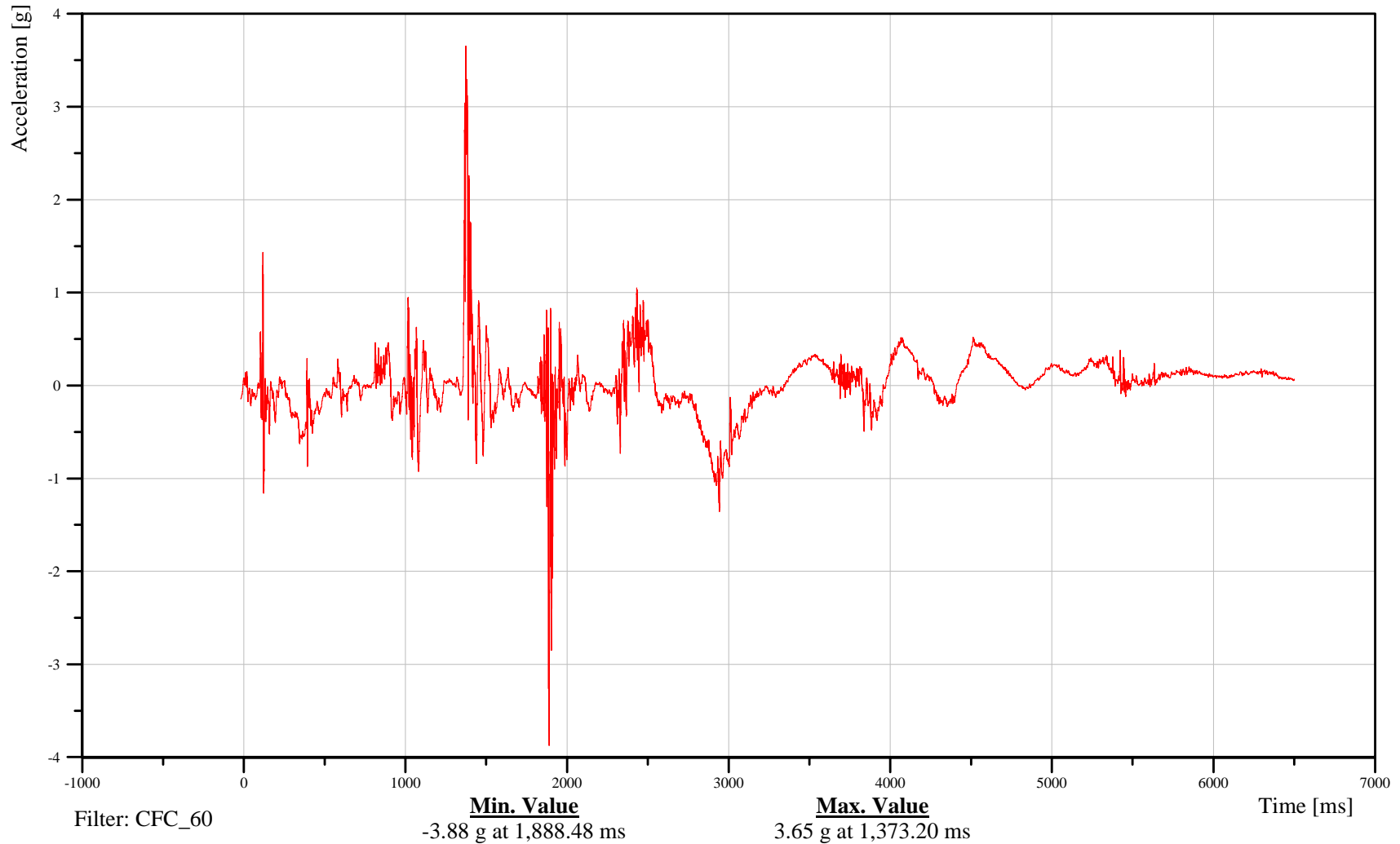
Time: 16:26

Customer: VRTC

### 13SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-179

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## RF Seat Position (on floor) Y-Axis Acceleration

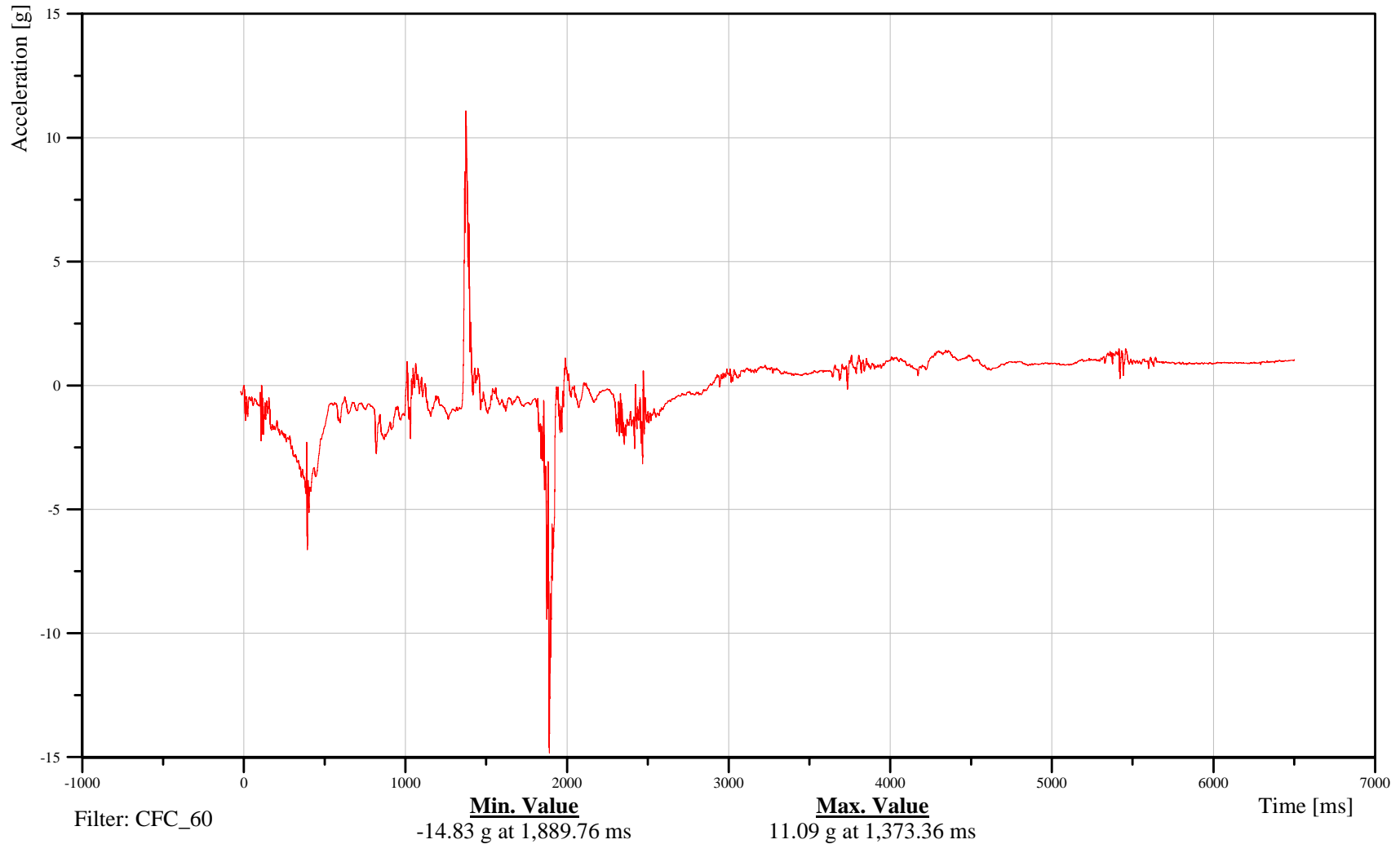
Time: 16:26

Customer: VRTC

### 13SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-180

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## RF Seat Position (on floor) Z-Axis Acceleration

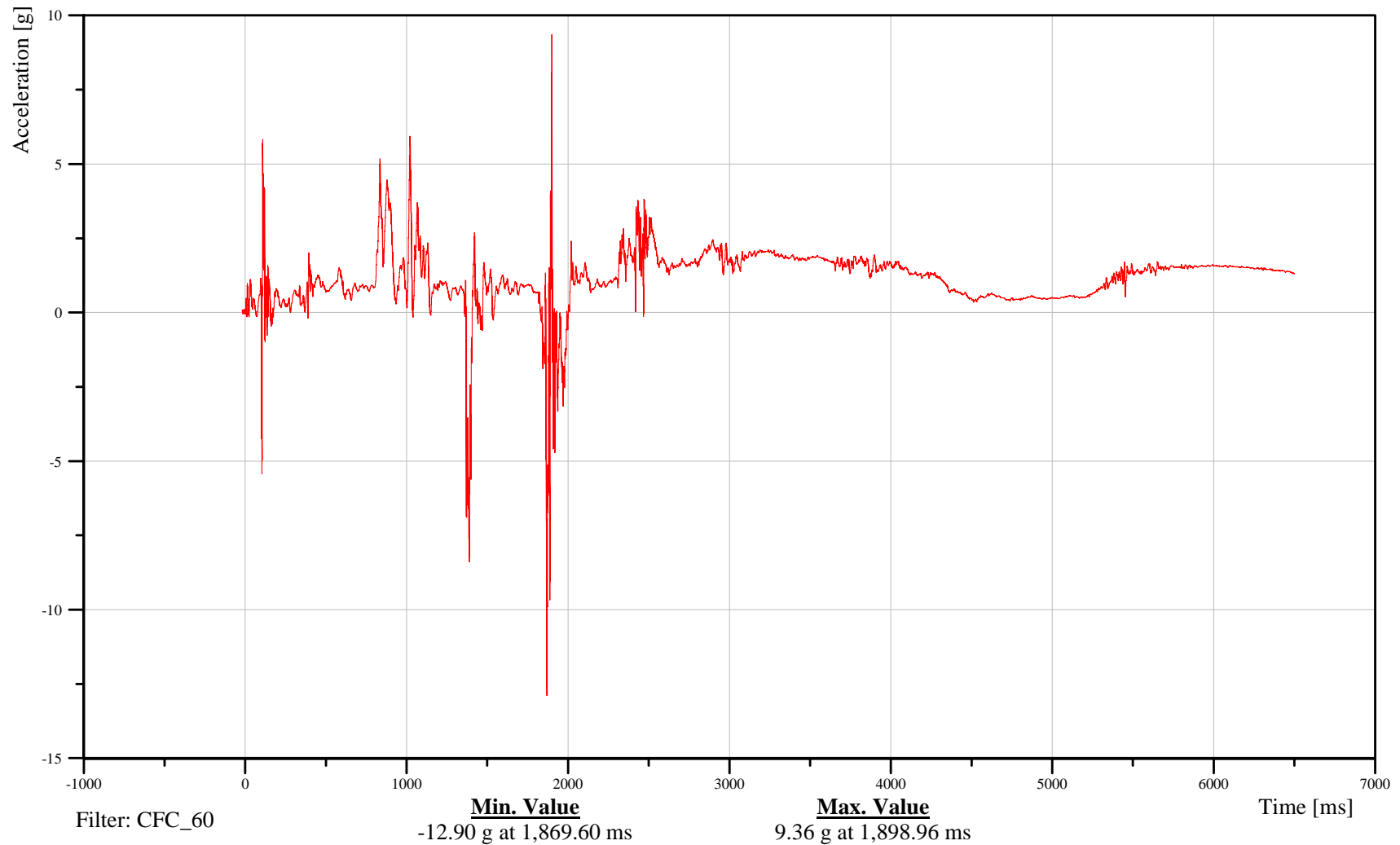
Time: 16:26

Customer: VRTC

### 13SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-181

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## RF Seat Position (on floor) Resultant Acceleration

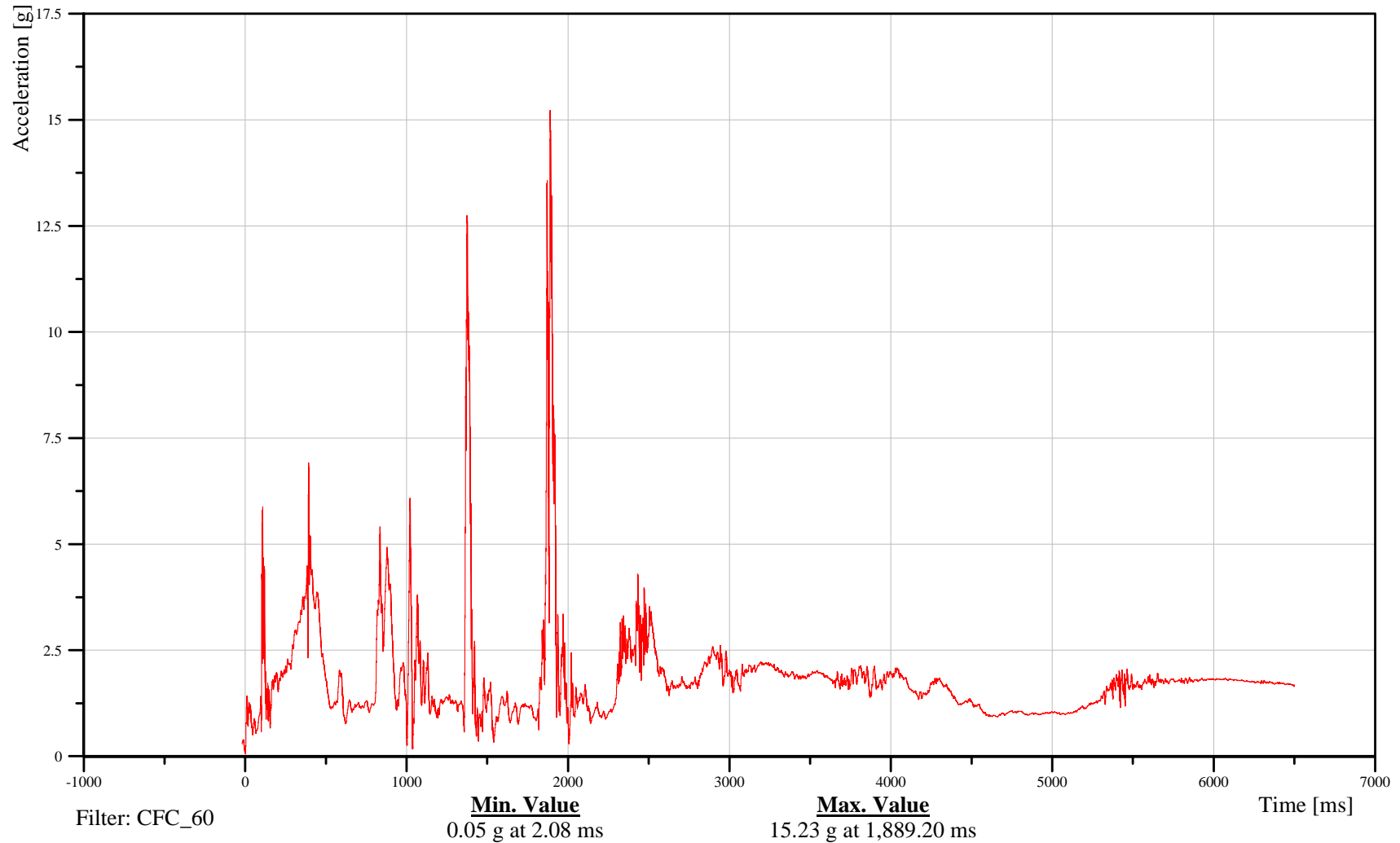
Time: 16:26

Customer: VRTC

### 13SEAT000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-182

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LR Seat Position (on floor) X-Axis Acceleration

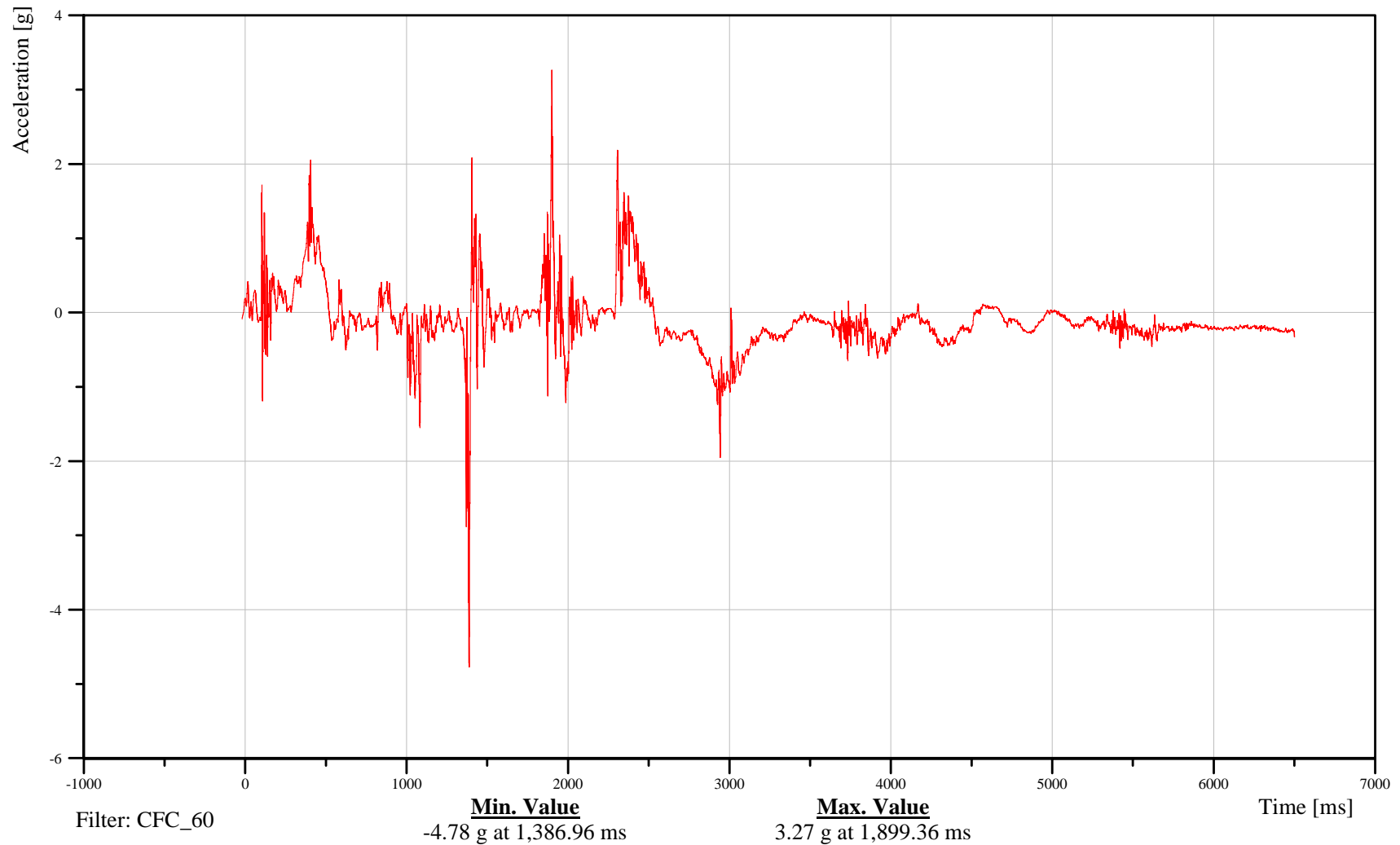
Time: 16:26

Customer: VRTC

### 14SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-183

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LR Seat Position (on floor) Y-Axis Acceleration

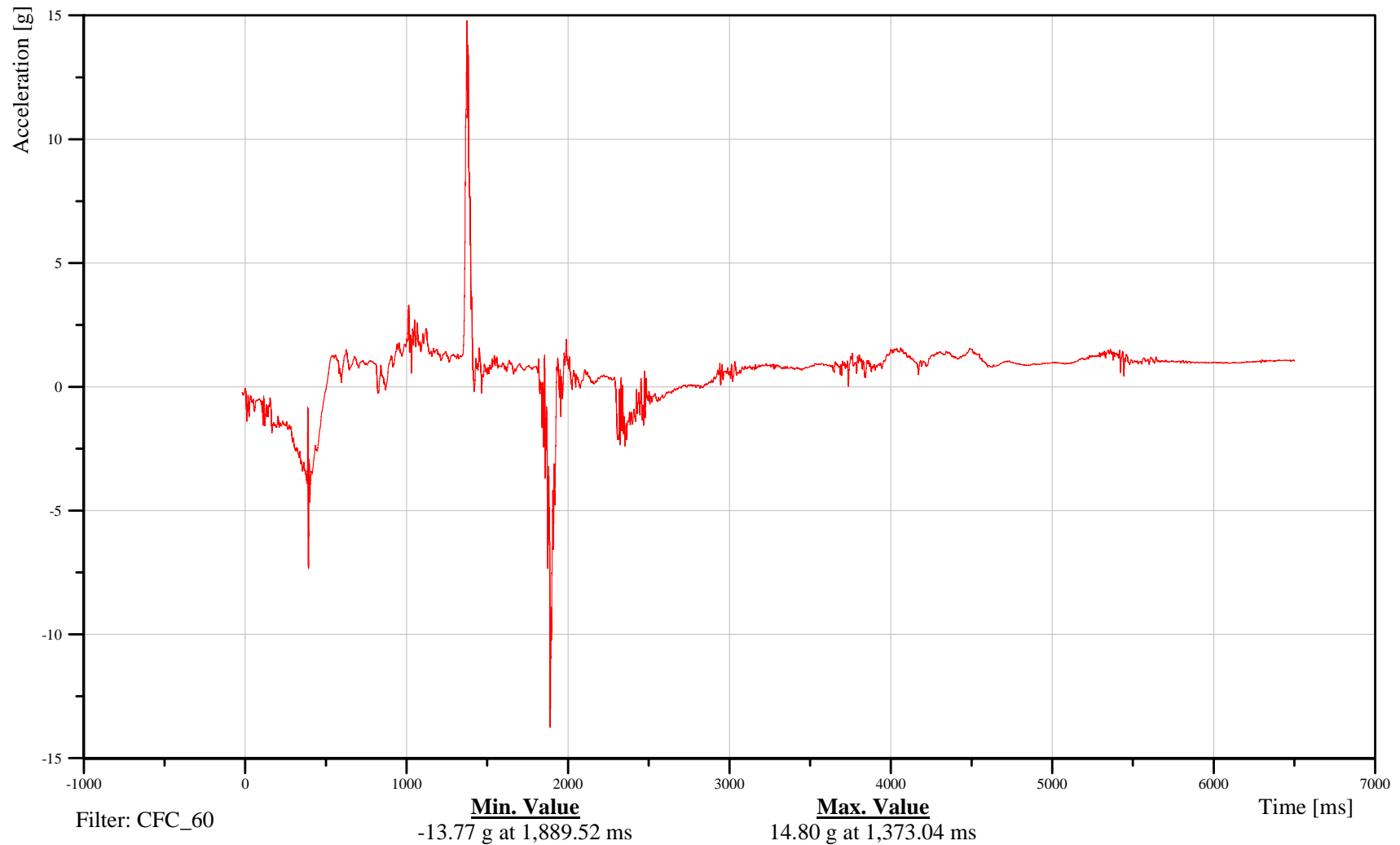
Time: 16:26

Customer: VRTC

### 14SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-184

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LR Seat Position (on floor) Z-Axis Acceleration

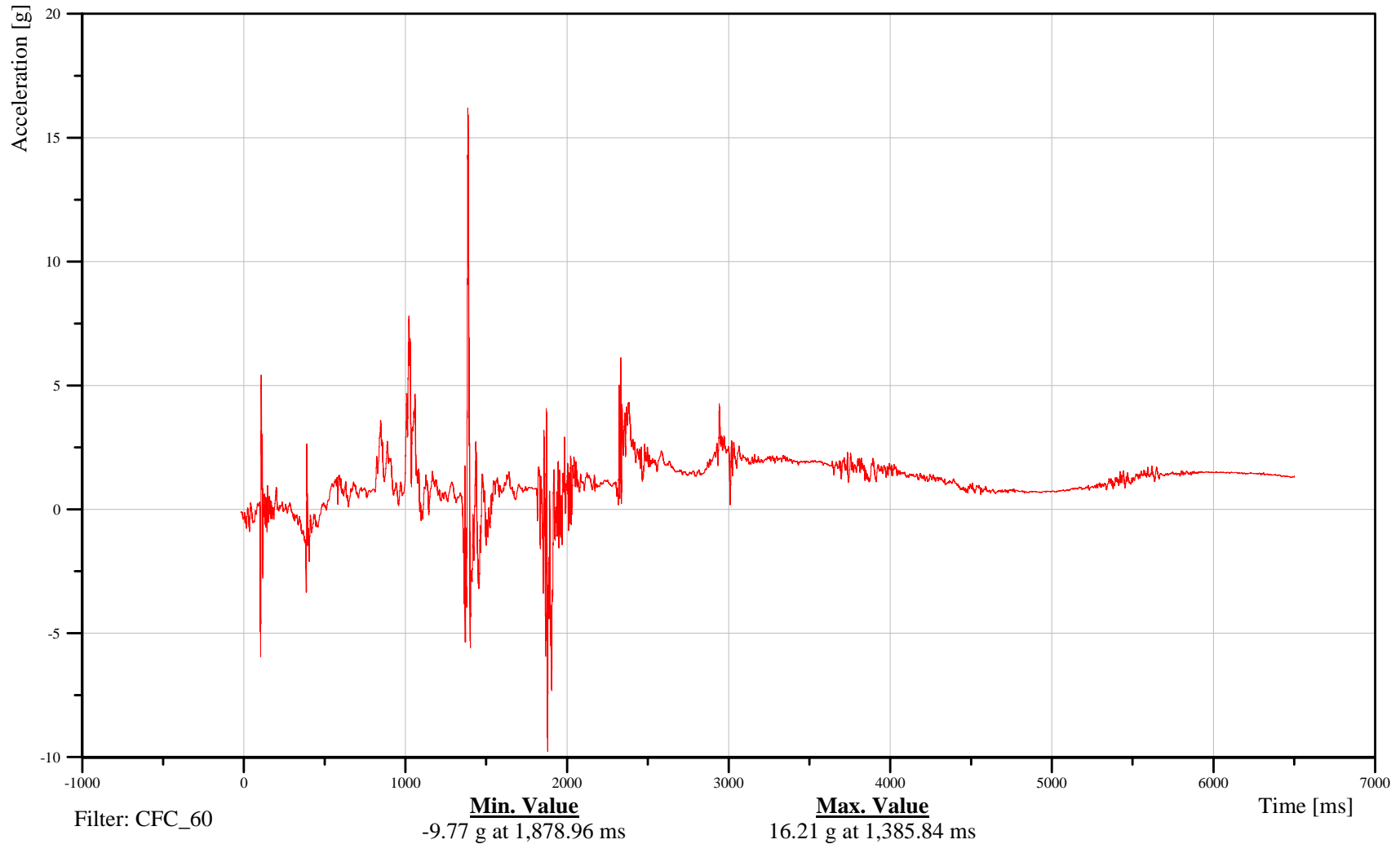
Time: 16:26

Customer: VRTC

### 14SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-185

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## LR Seat Position (on floor) Resultant Acceleration

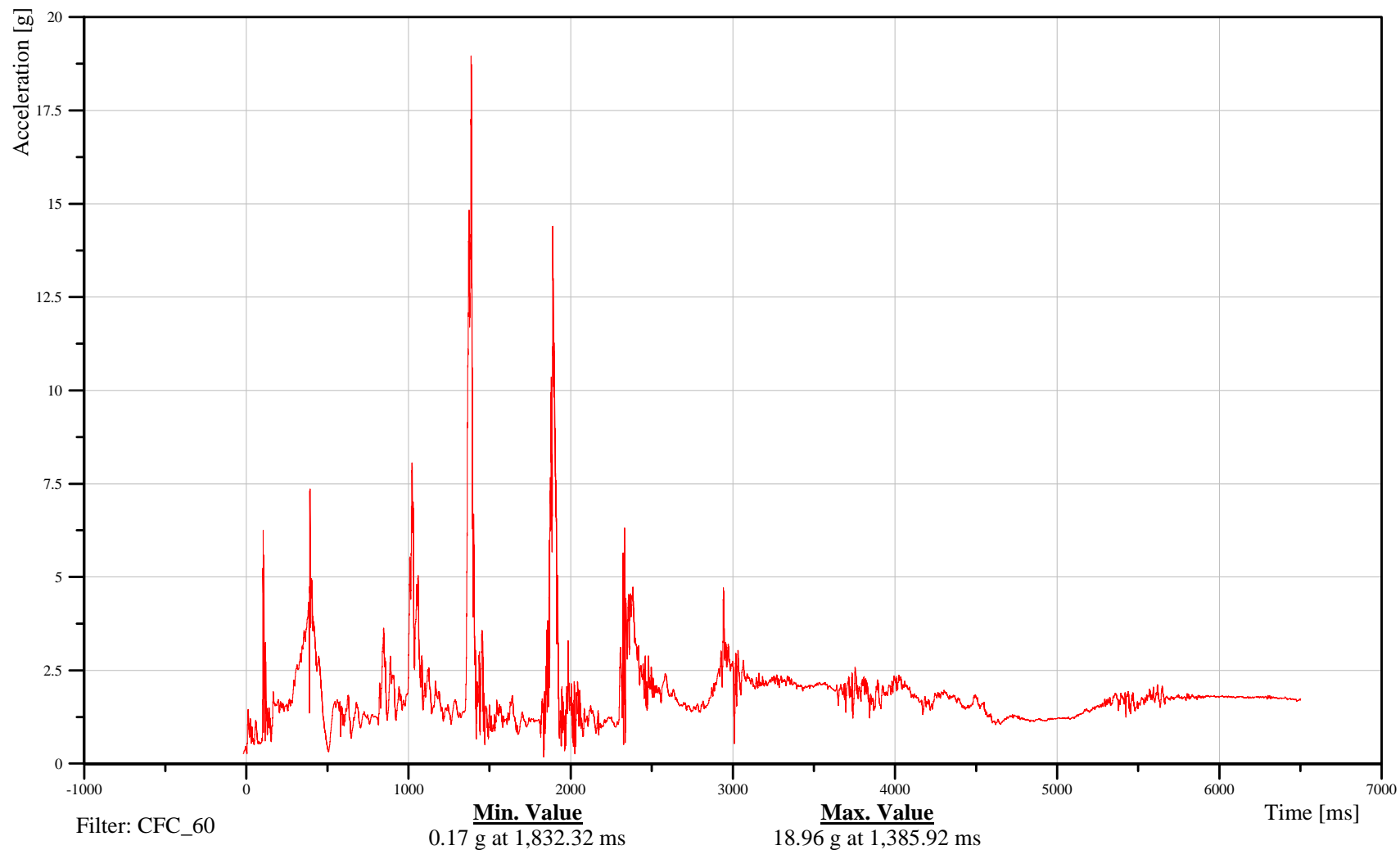
Time: 16:26

Customer: VRTC

### 14SEAT000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-186

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## RR Seat Position (on floor) X-Axis Acceleration

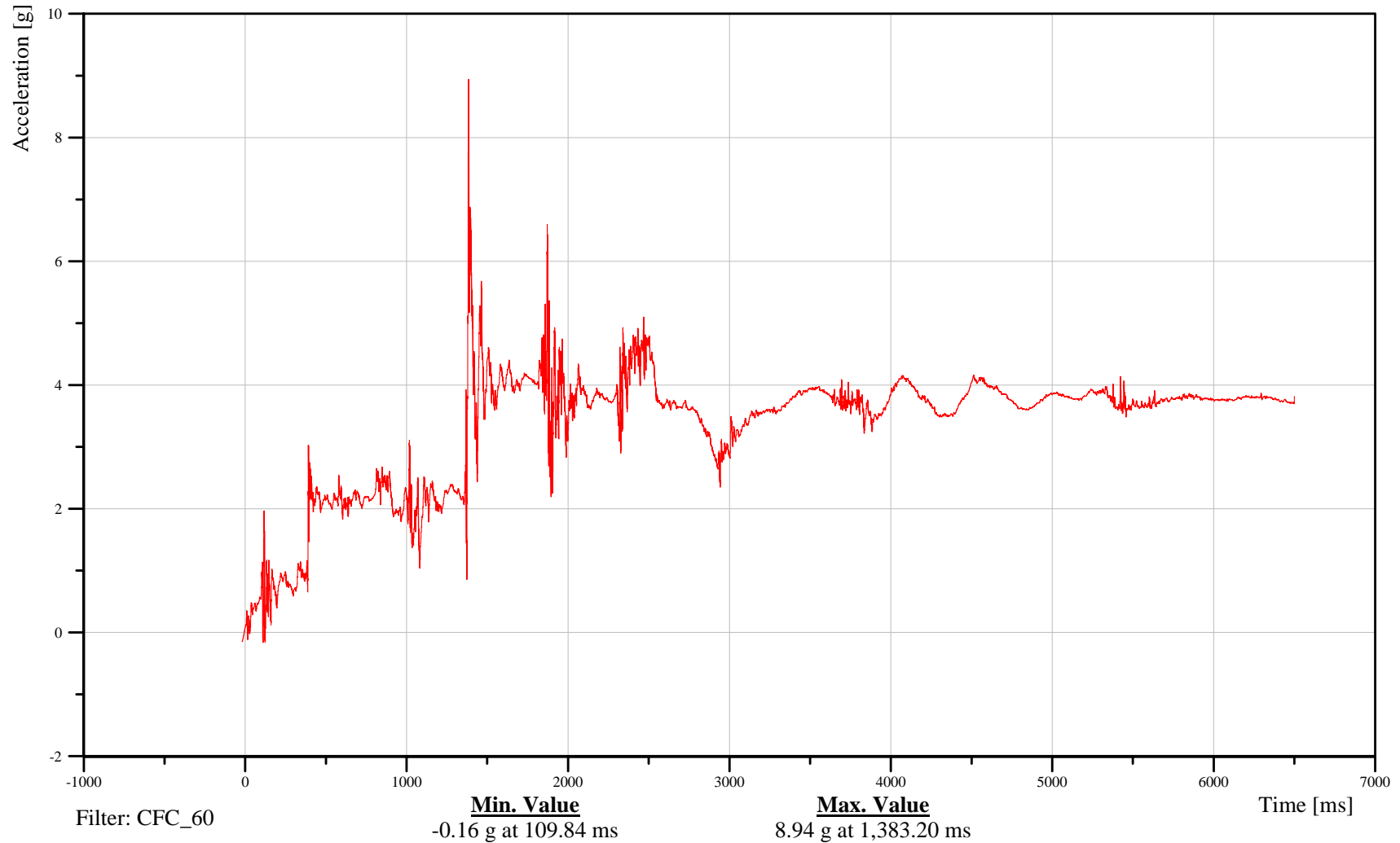
Time: 16:26

Customer: VRTC

### 16SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-187

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## RR Seat Position (on floor) Y-Axis Acceleration

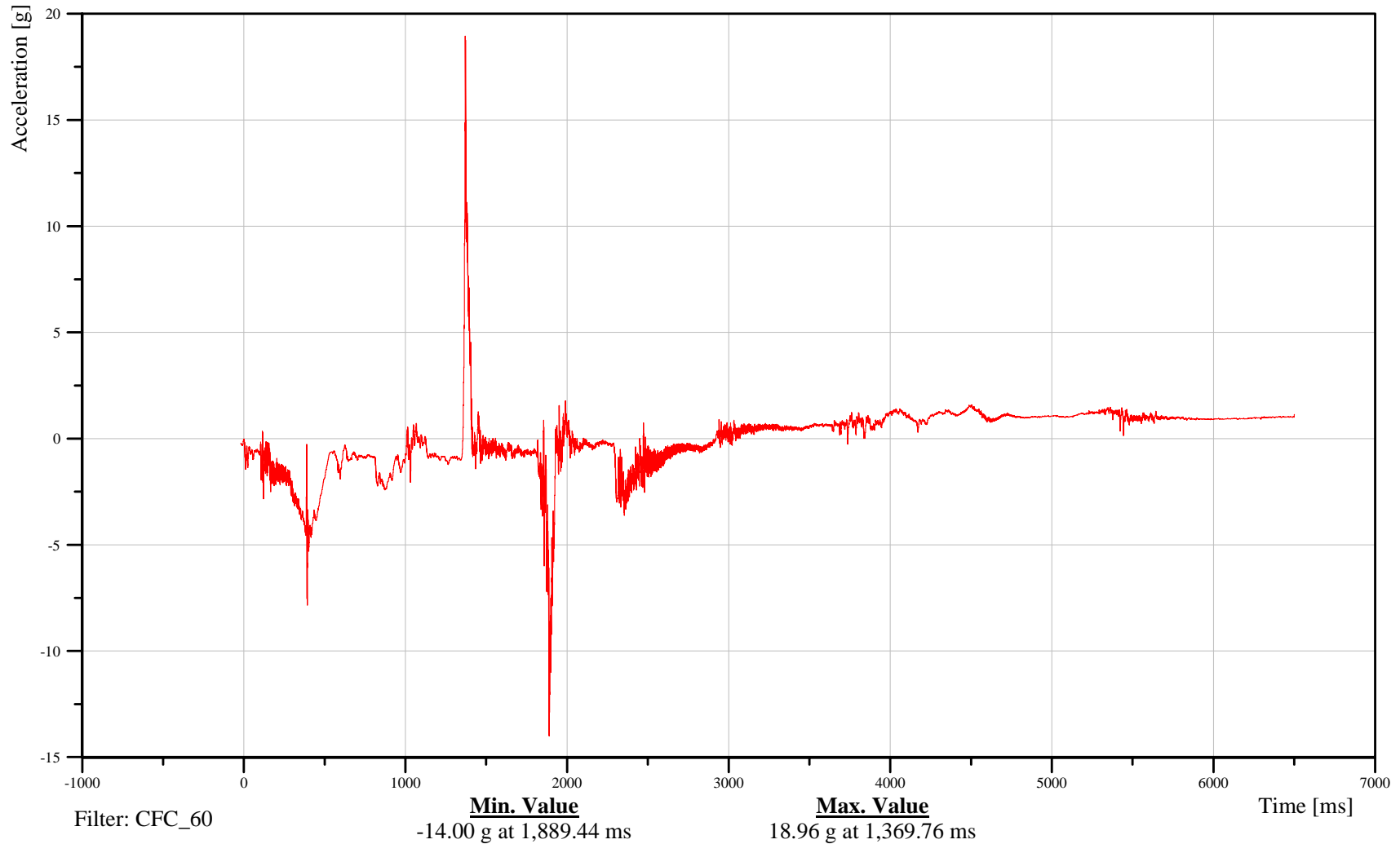
Time: 16:26

Customer: VRTC

### 16SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-188

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## RR Seat Position (on floor) Z-Axis Acceleration

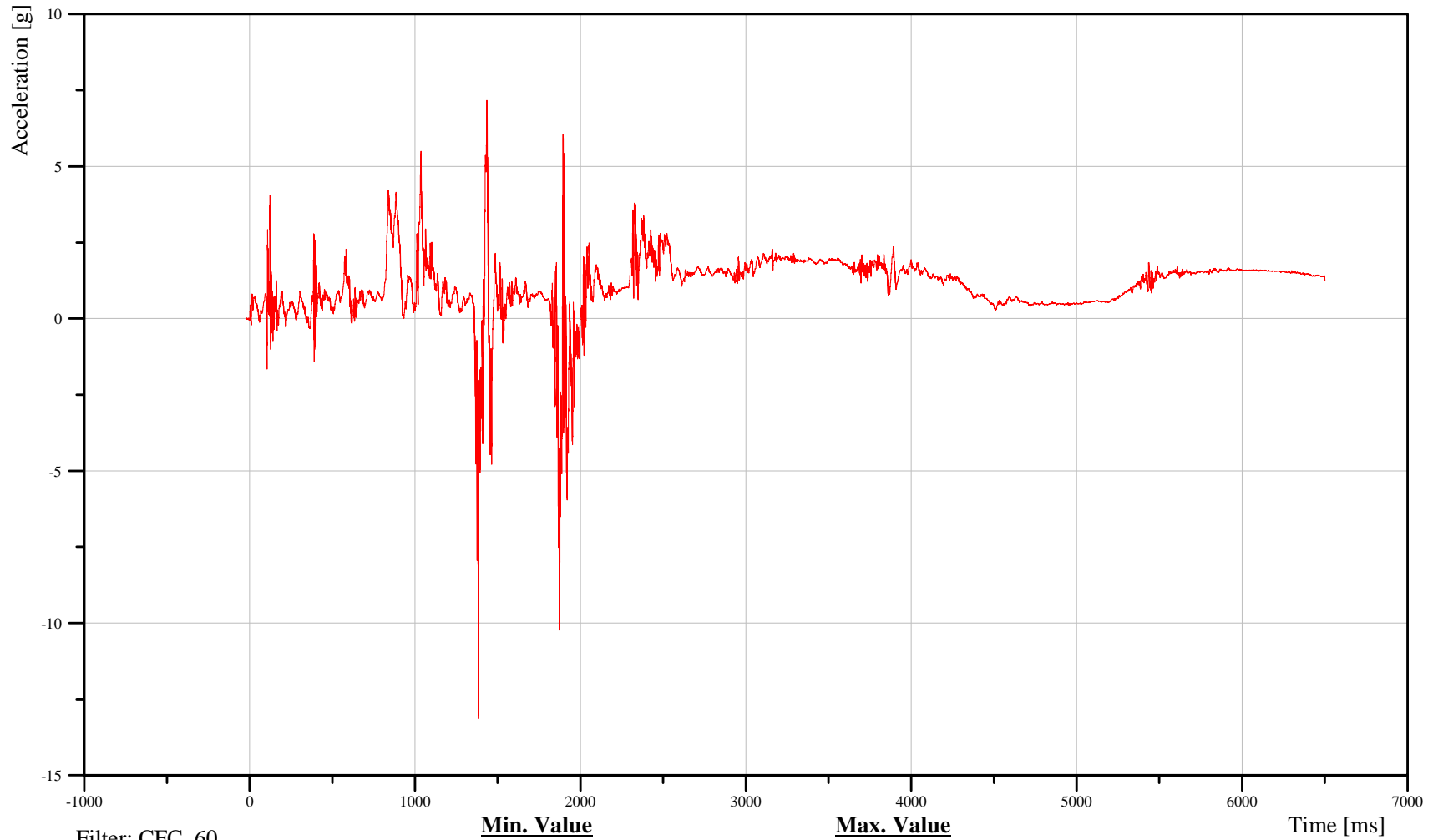
Time: 16:26

Customer: VRTC

### 16SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-189

100115



# Soil Trip Rollover 2007 Ford Expedition

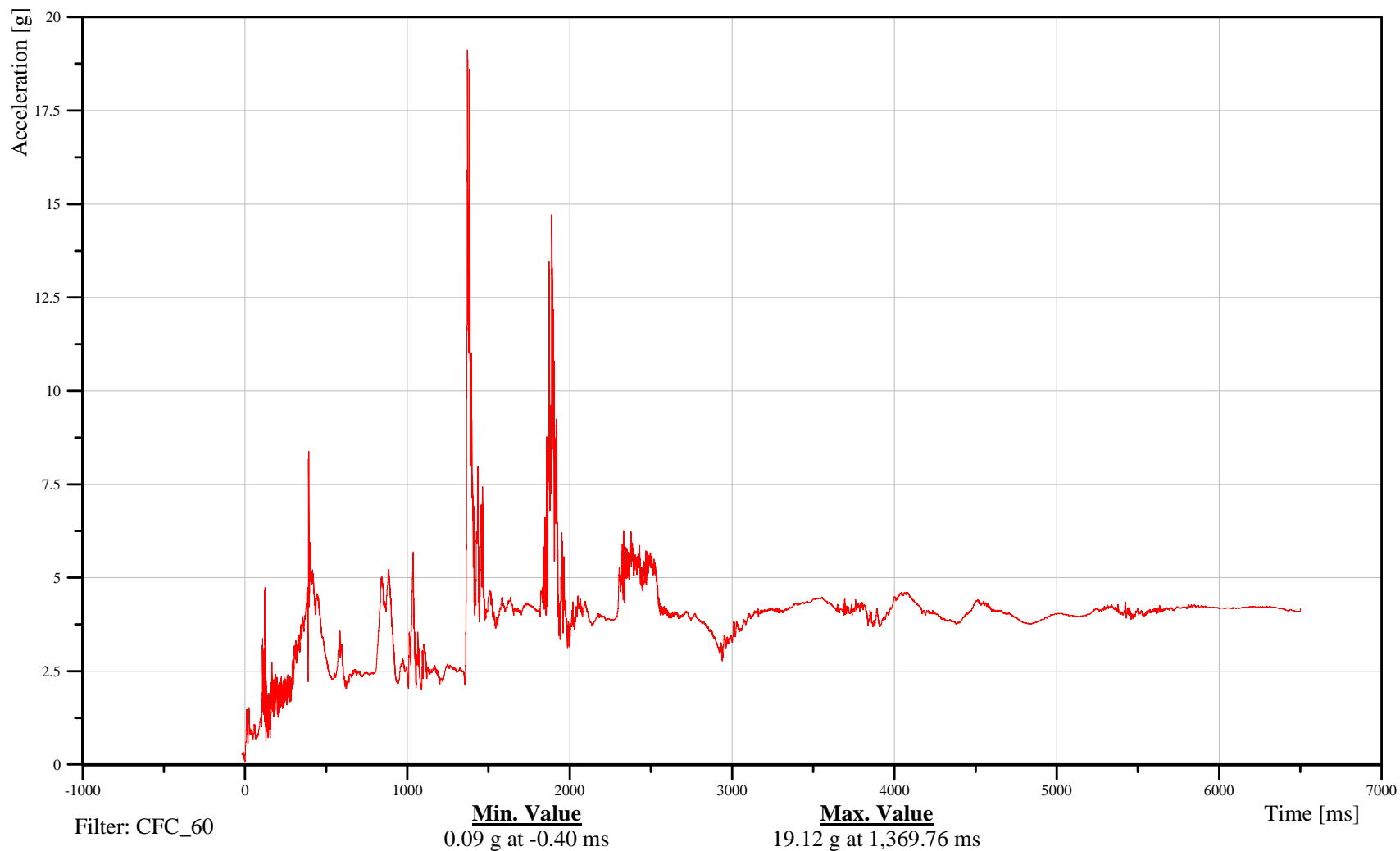
## RR Seat Position (on floor) Resultant Acceleration

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 16SEAT000000ACRD

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-190

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

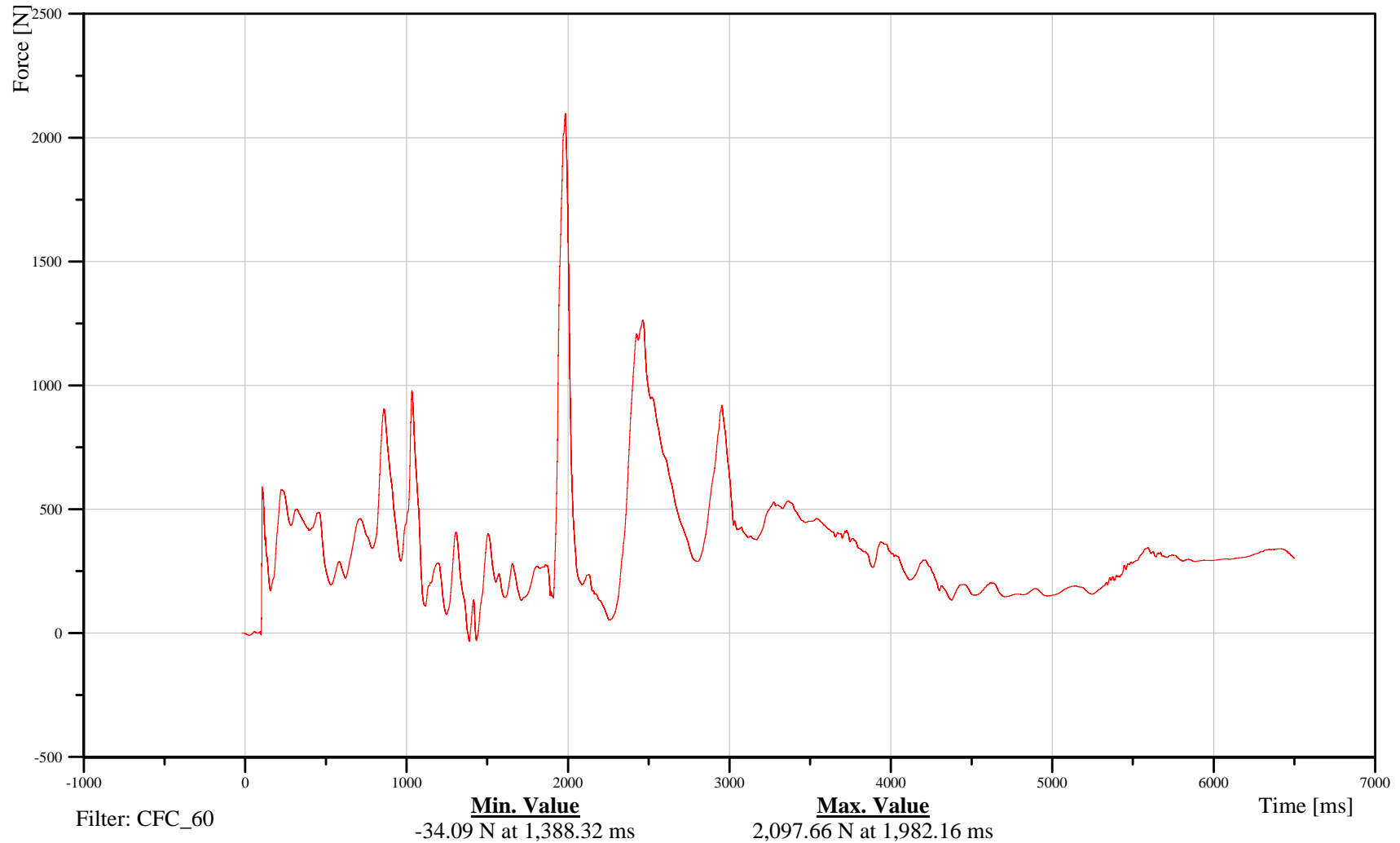
## Driver Lap Belt Force

Customer: VRTC

# 11SEBE0000B5FOOD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-191

100115



# Soil Trip Rollover 2007 Ford Expedition

## Driver Shoulder Belt Force

Date: 01/15/2010

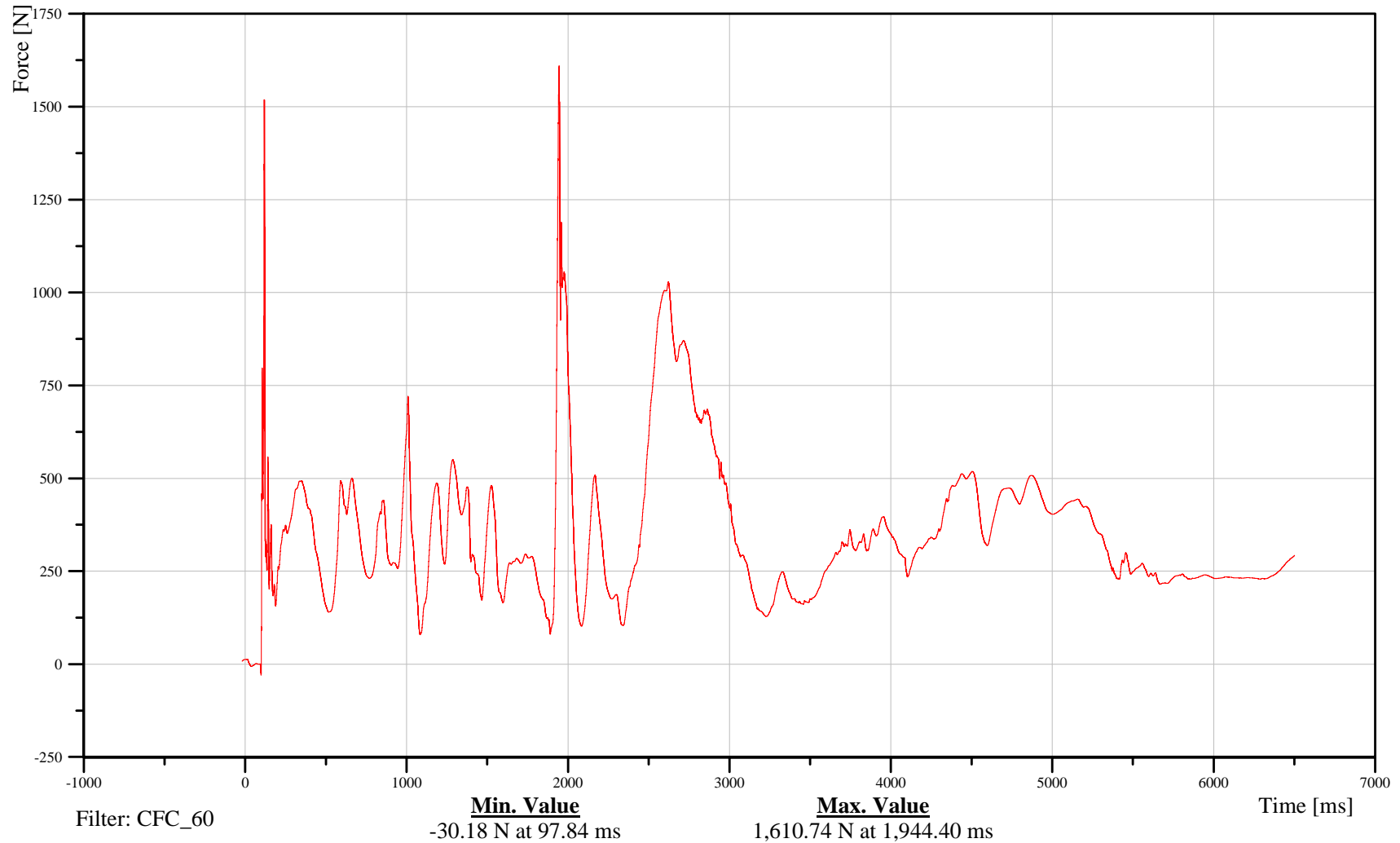
Time: 16:26

Customer: VRTC

### 11SEBE0000B3FOOD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-192

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

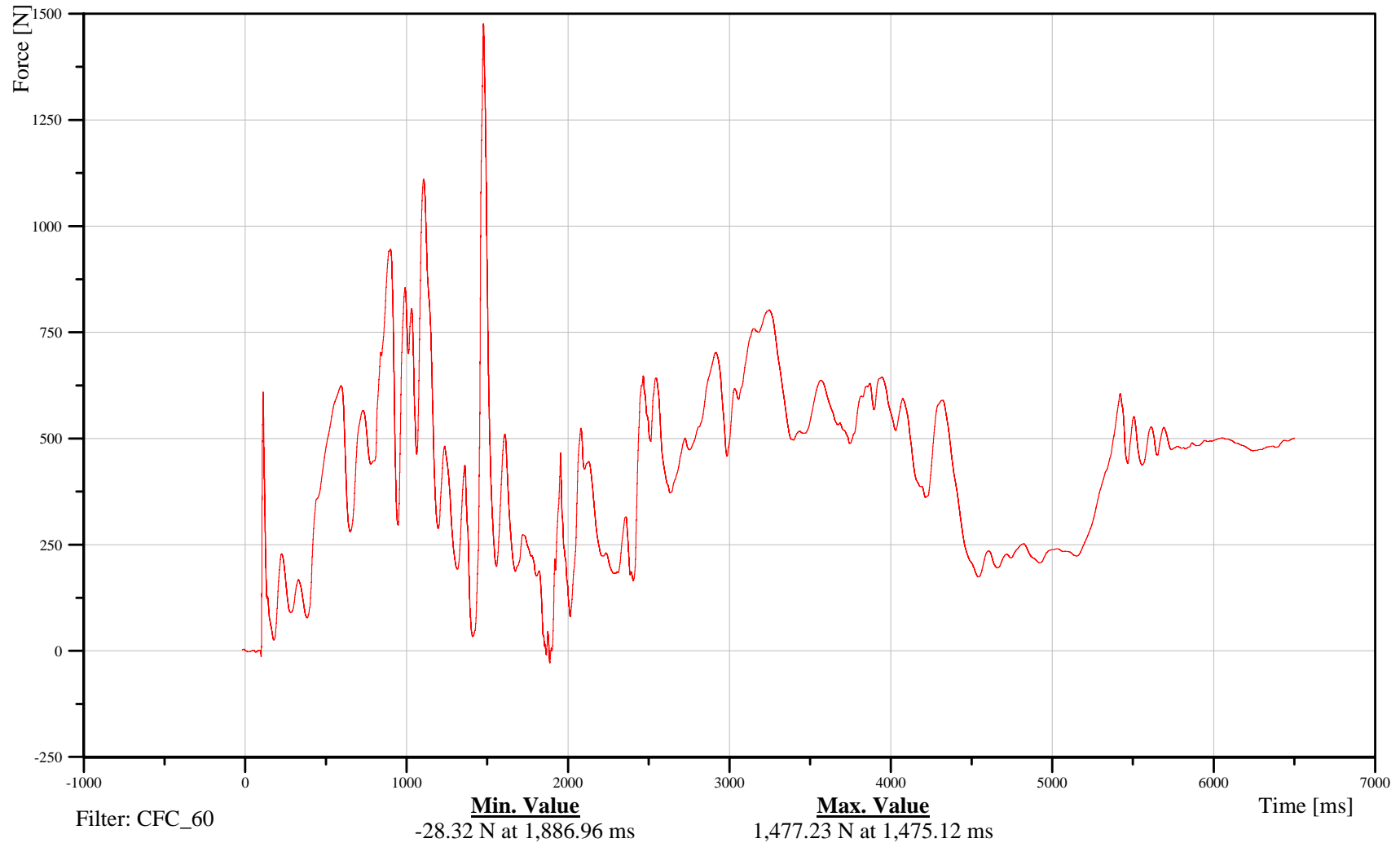
## Right Front Passenger Lap Belt Force

Customer: VRTC

# 13SEBE0000B5FOOD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-193

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

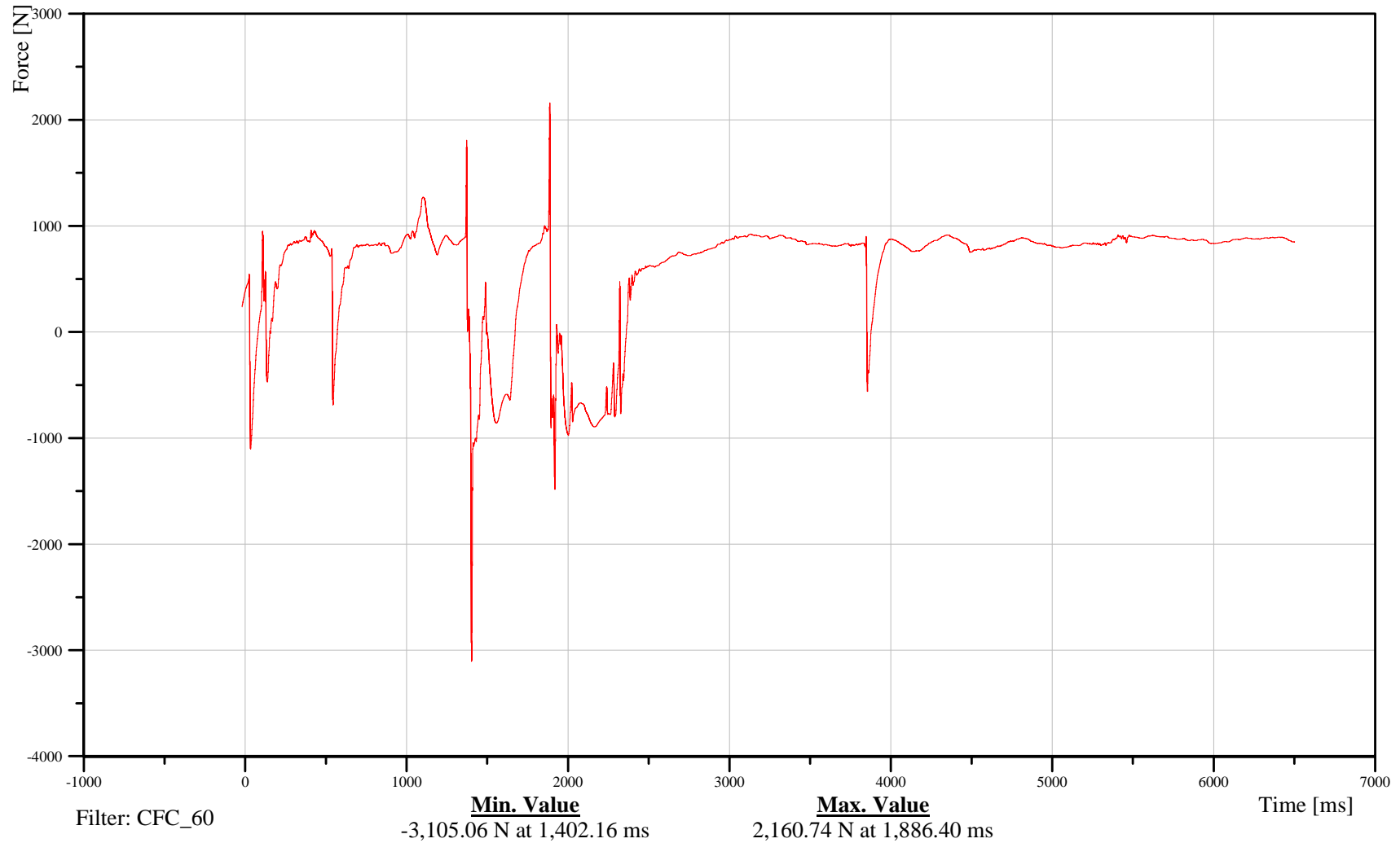
## Right Front Passenger Shoulder Belt Force

Customer: VRTC

# 13SEBE0000B3FOOD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-194

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

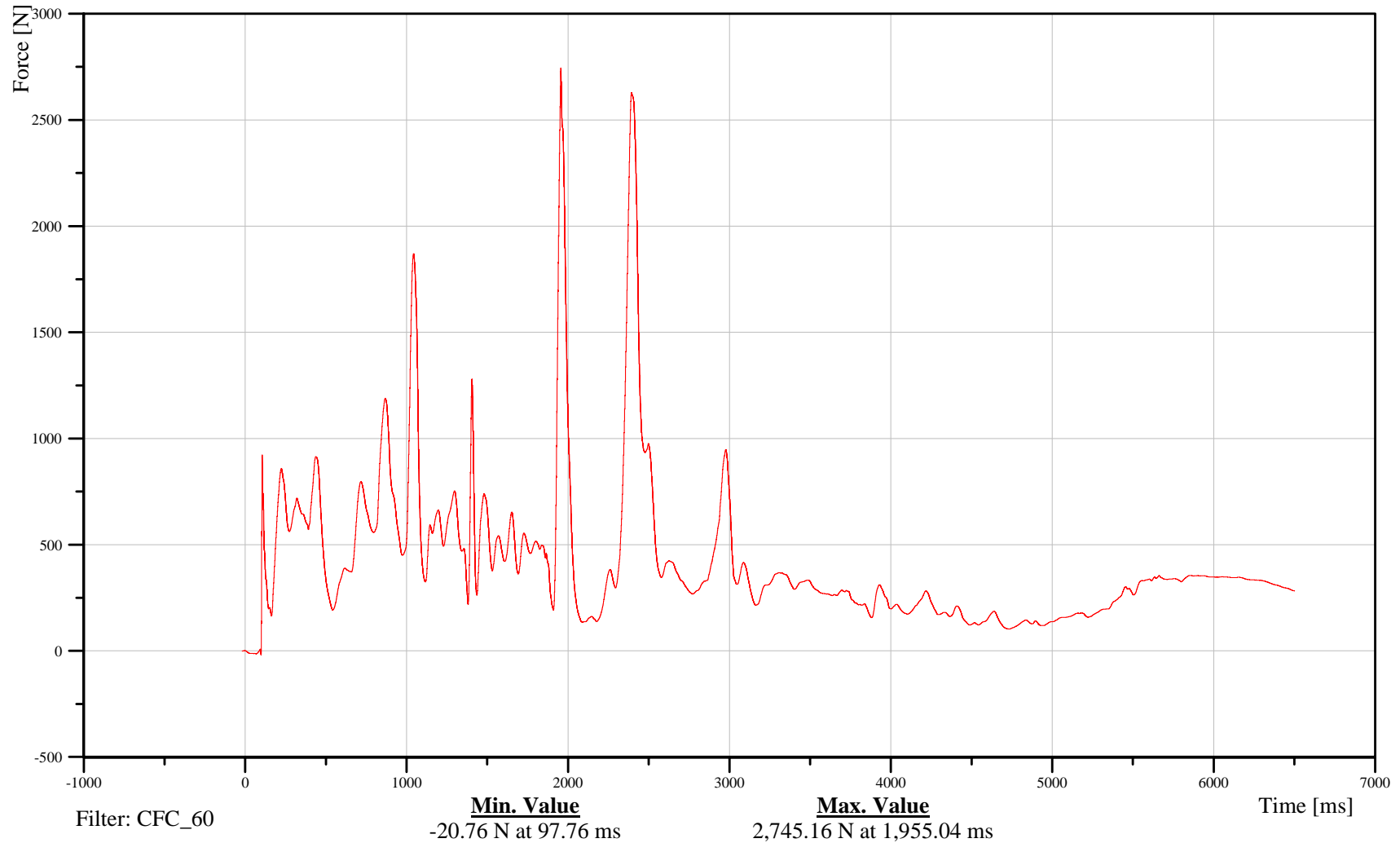
## Left Rear Passenger Lap Belt Force

Customer: VRTC

# 14SEBE0000B5FOOD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-195

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

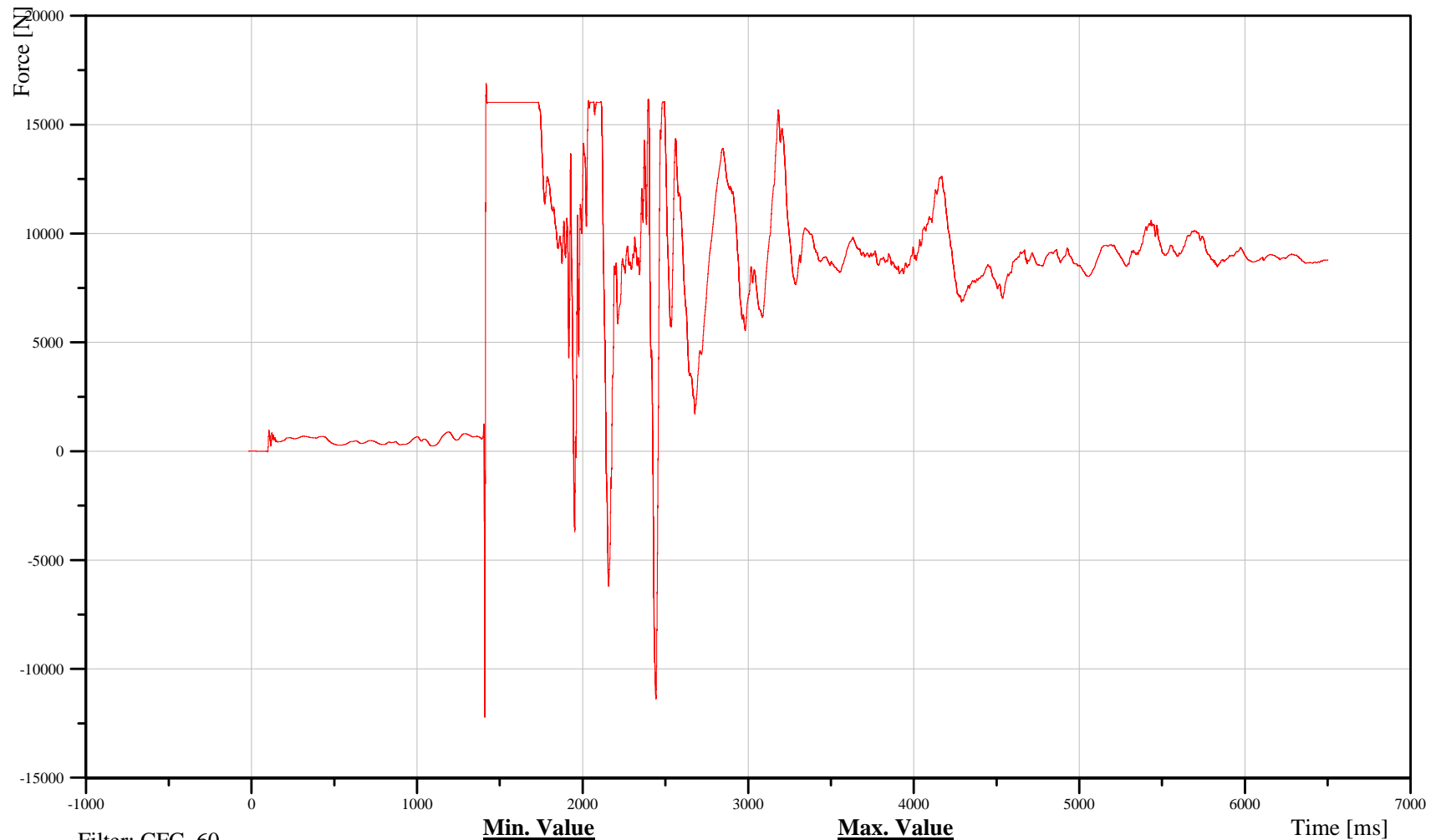
## Left Rear Passenger Shoulder Belt Force

Customer: VRTC

# 14SEBE0000B3FOOD

TRC Inc. Test Lab: CTF

Test Number: 100115



B-196

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Seat Belt Spool Potentiometer

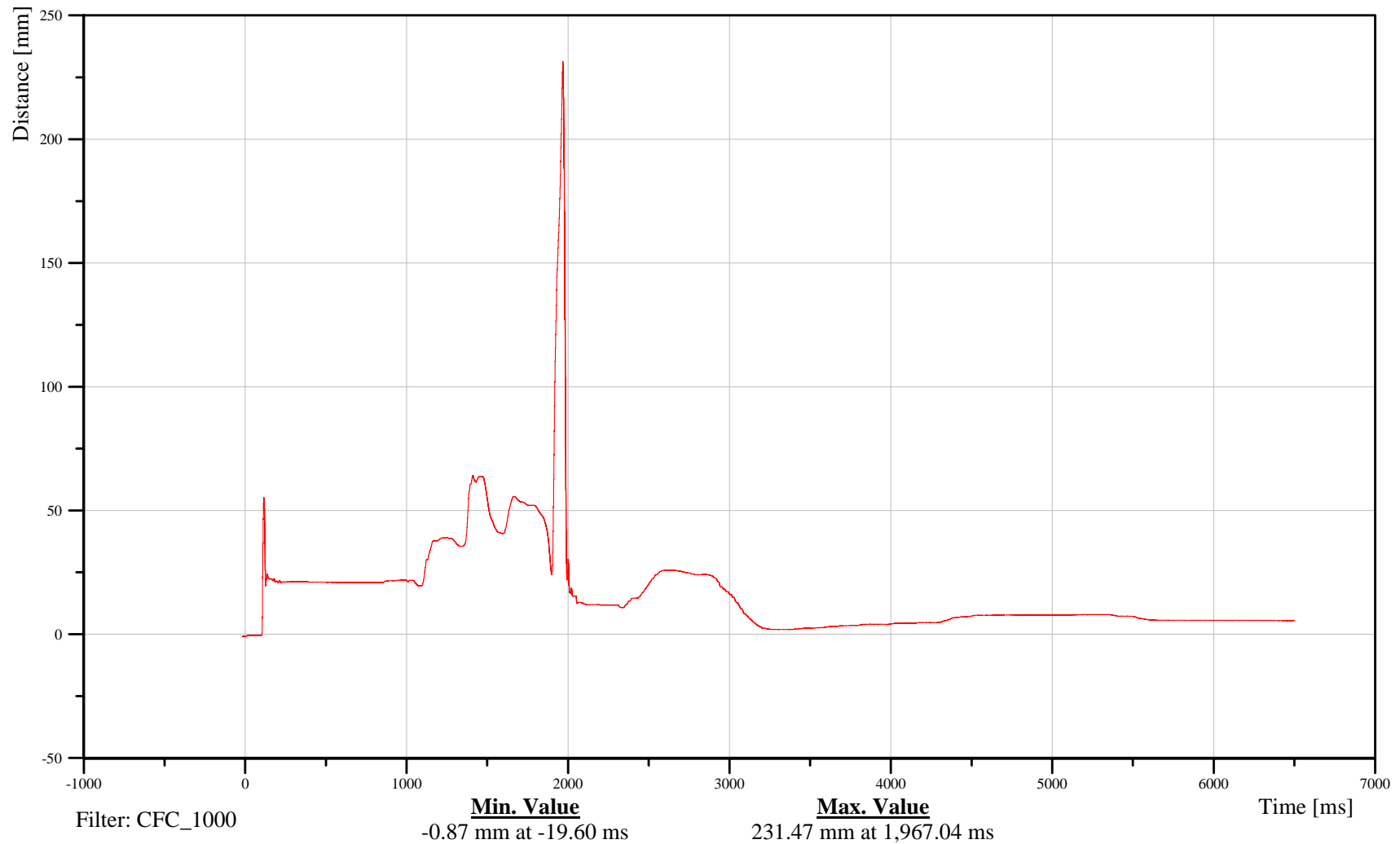
Time: 16:26

Customer: VRTC

### 11SEBE0000B5DS0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-197

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Belt Spool Potentiometer

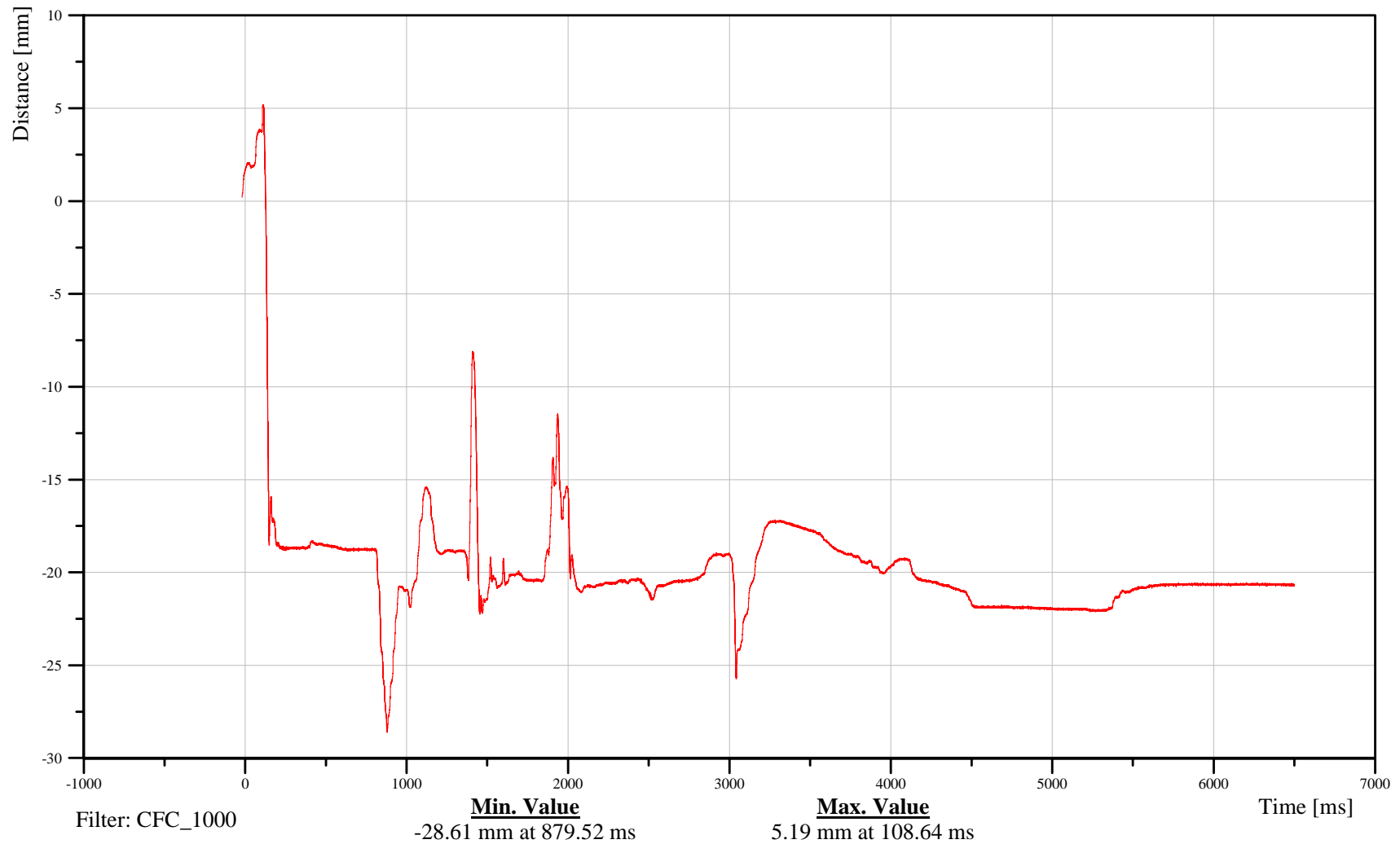
Time: 16:26

Customer: VRTC

### 13SEBE0000B5DS0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-198

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Belt Spool Potentiometer

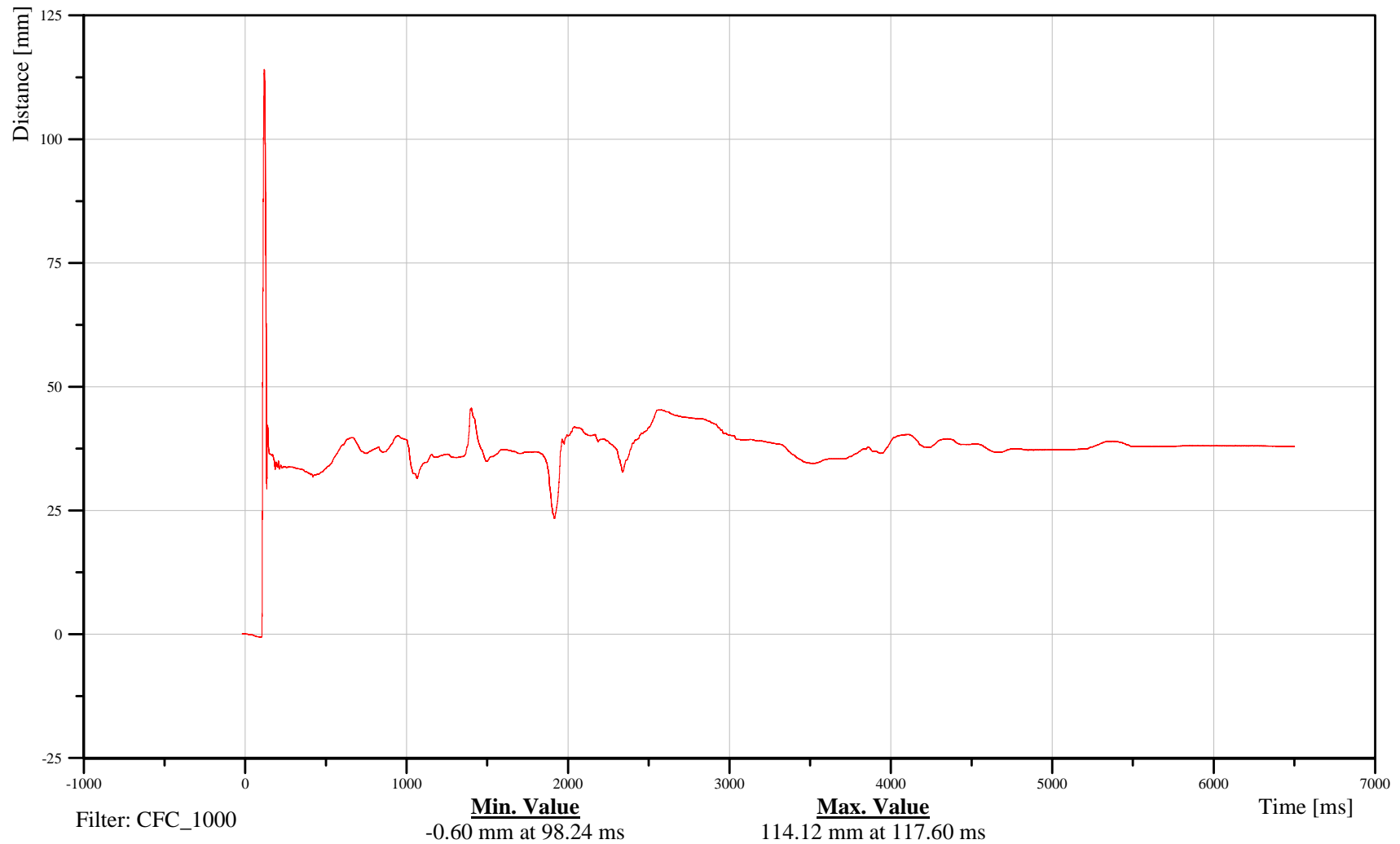
Time: 16:26

Customer: VRTC

### 14SEBE0000B5DS0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-199

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

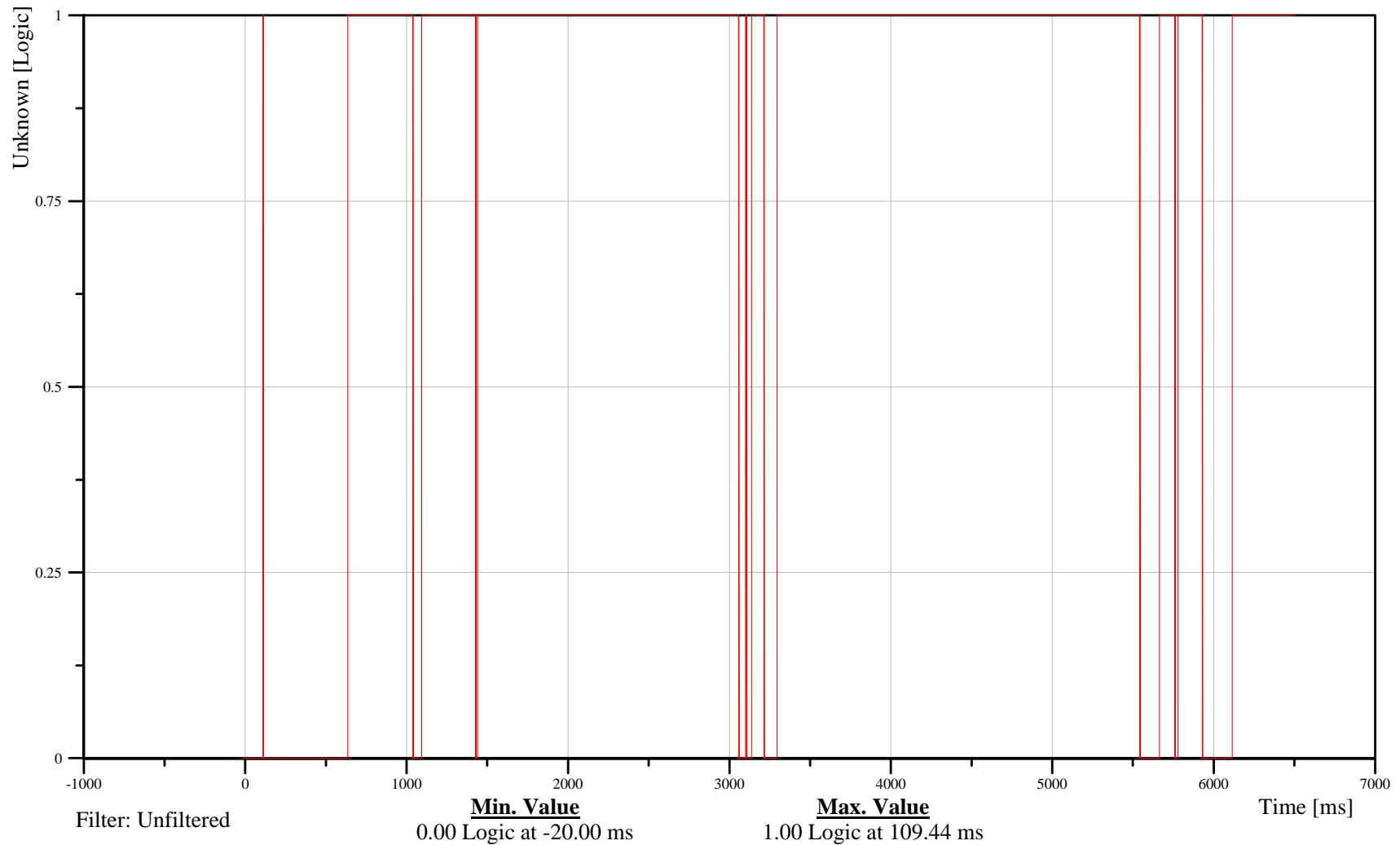
## Driver Head Contact

Customer: VRTC

# 11CONT000023EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-200

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

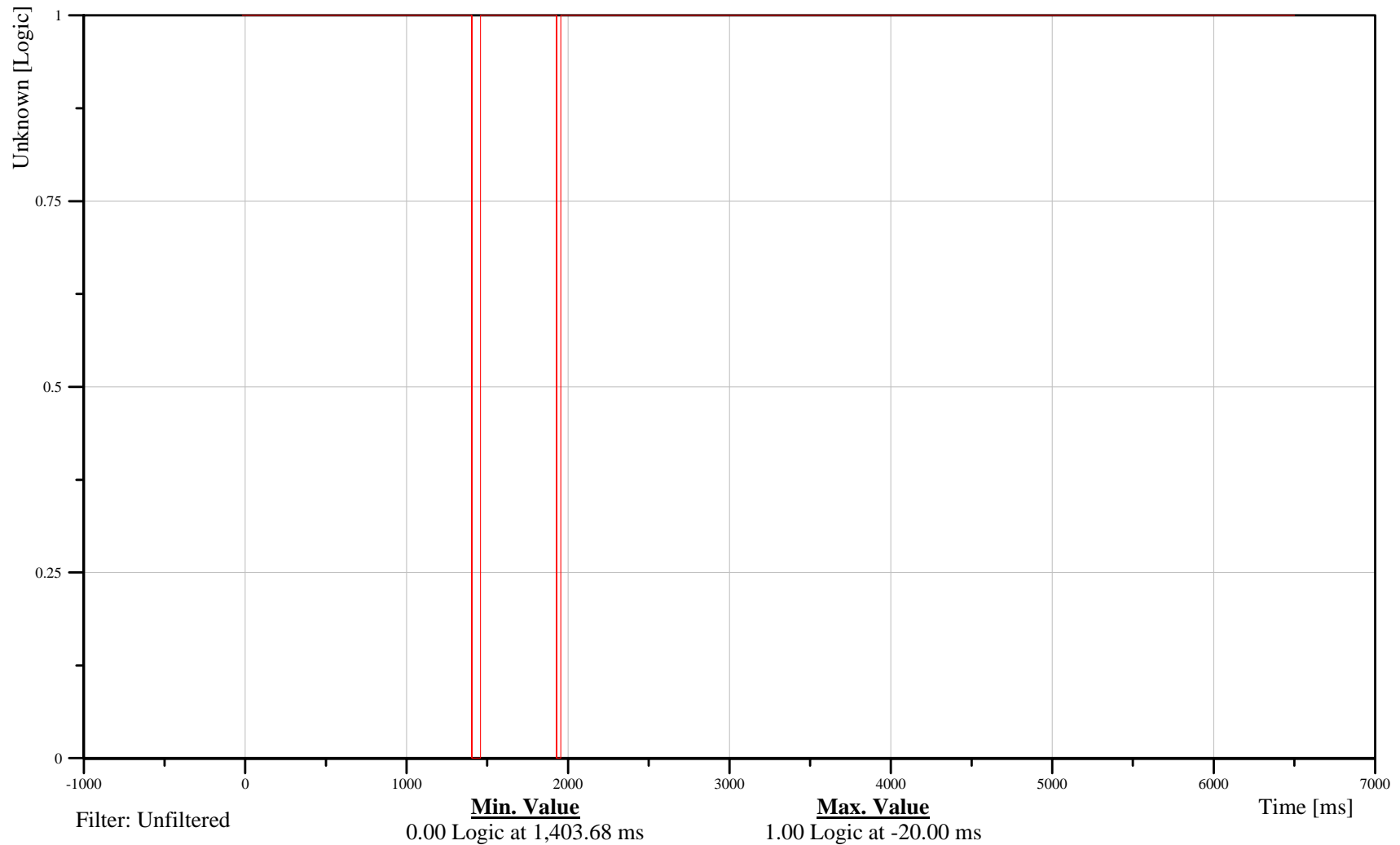
## Driver Thorax Contact

Customer: VRTC

# 11CONT000024EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-201

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

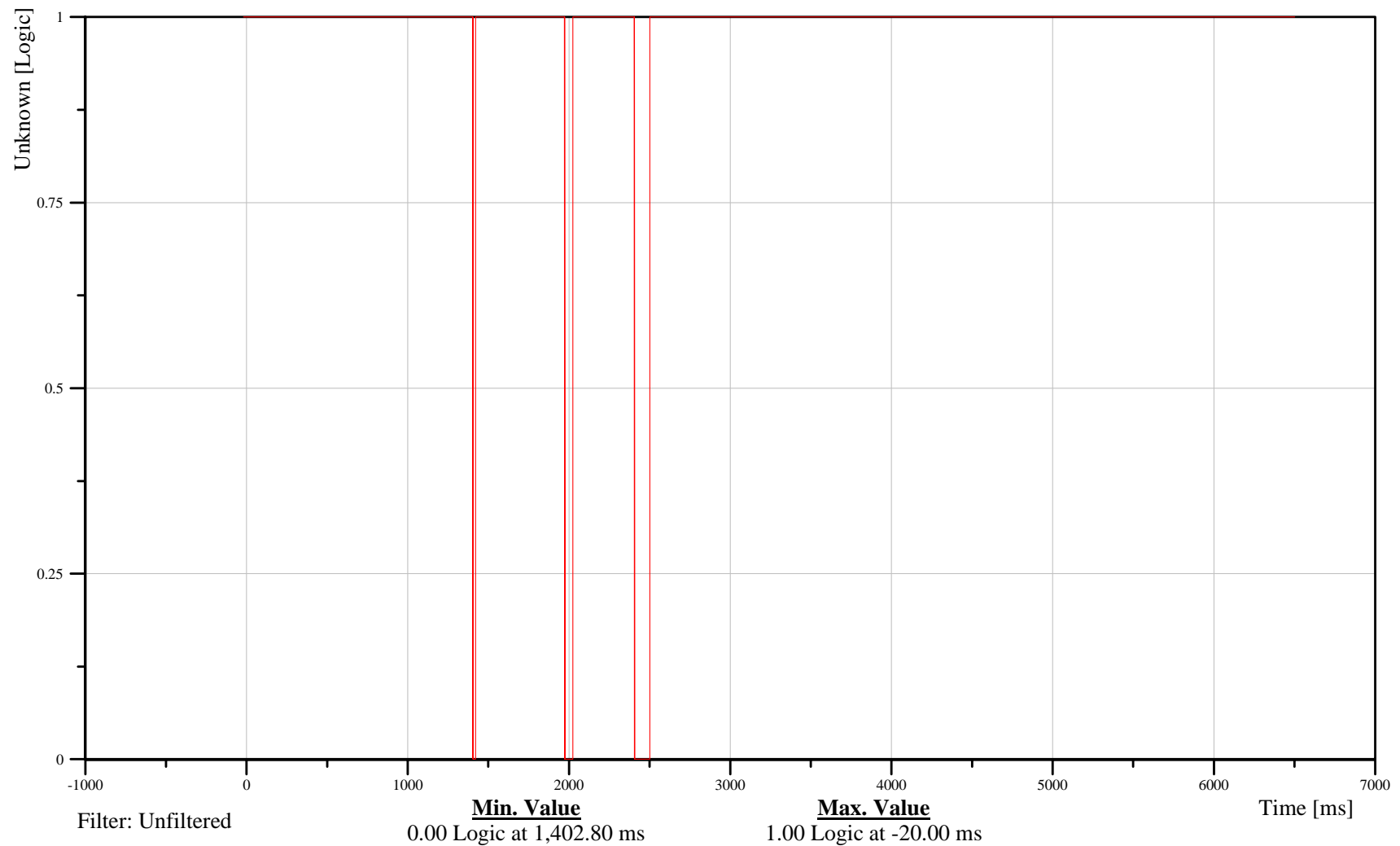
## Driver Pelvis Contact

Customer: VRTC

# 11CONT000025EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-202

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

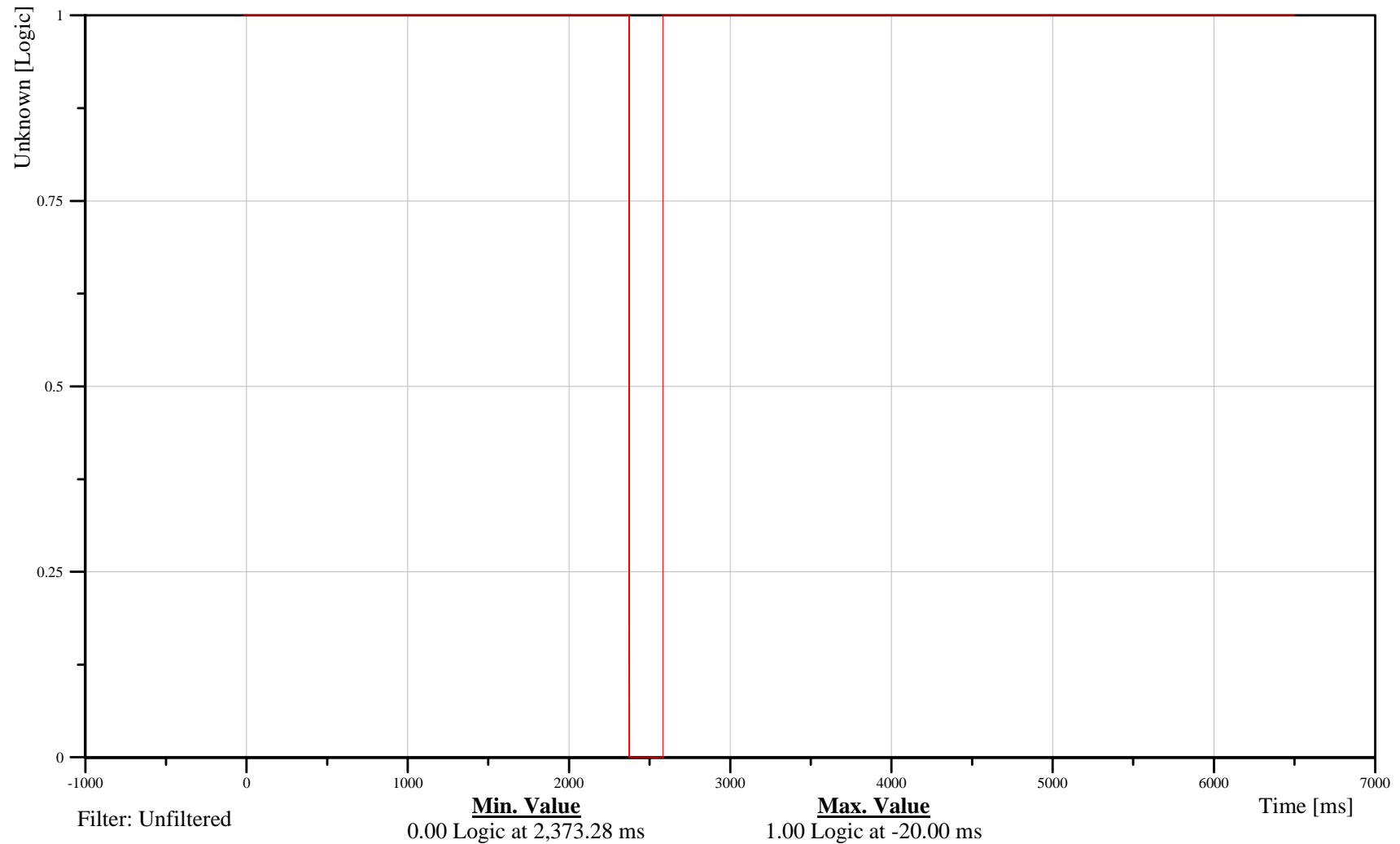
## Right Front Passenger Head Contact Switch

Customer: VRTC

# 13CONT000026EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-203

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Right Front Passenger Thorax Contact Switch

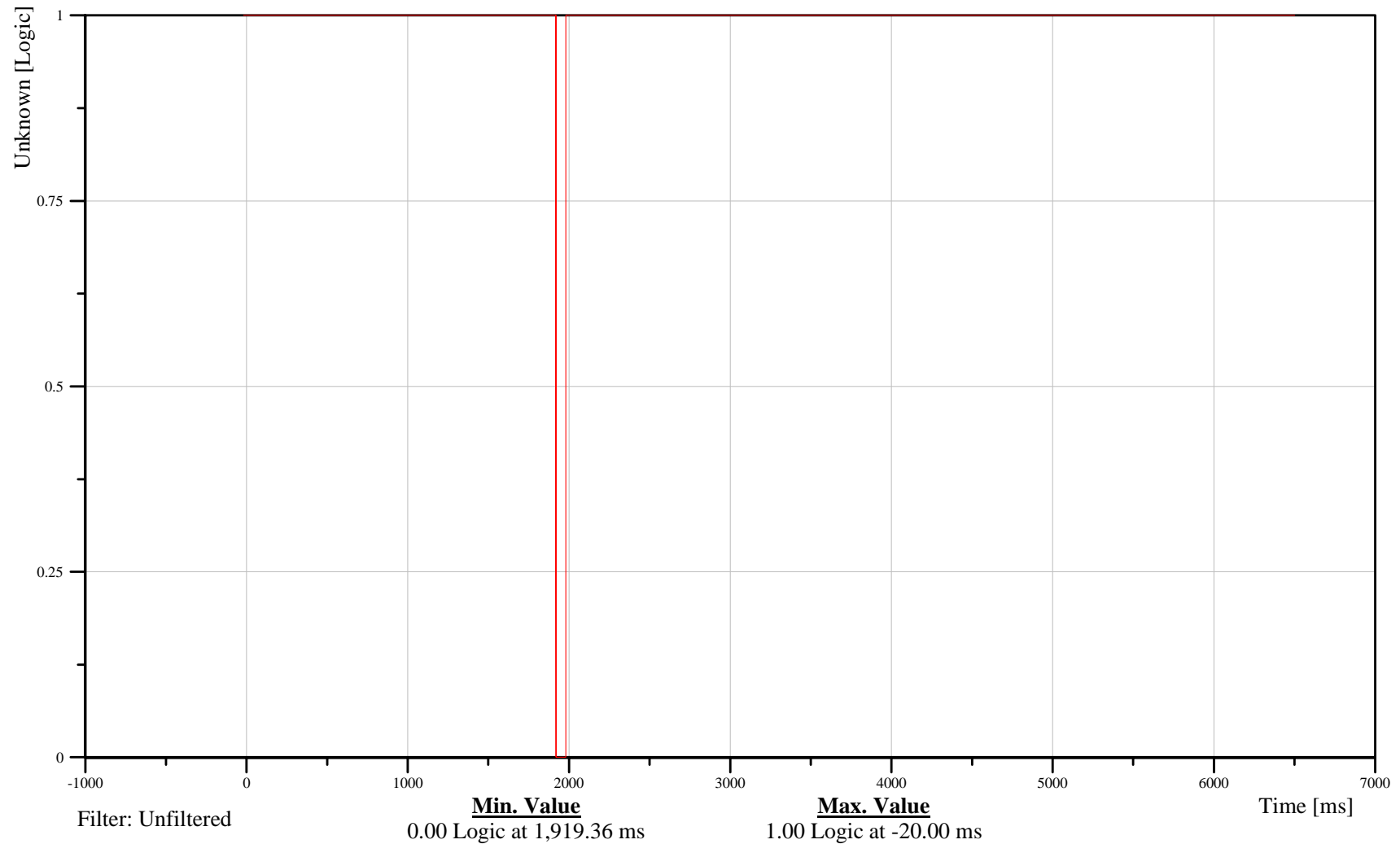
Time: 16:26

Customer: VRTC

### 13CONT000027EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-204

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

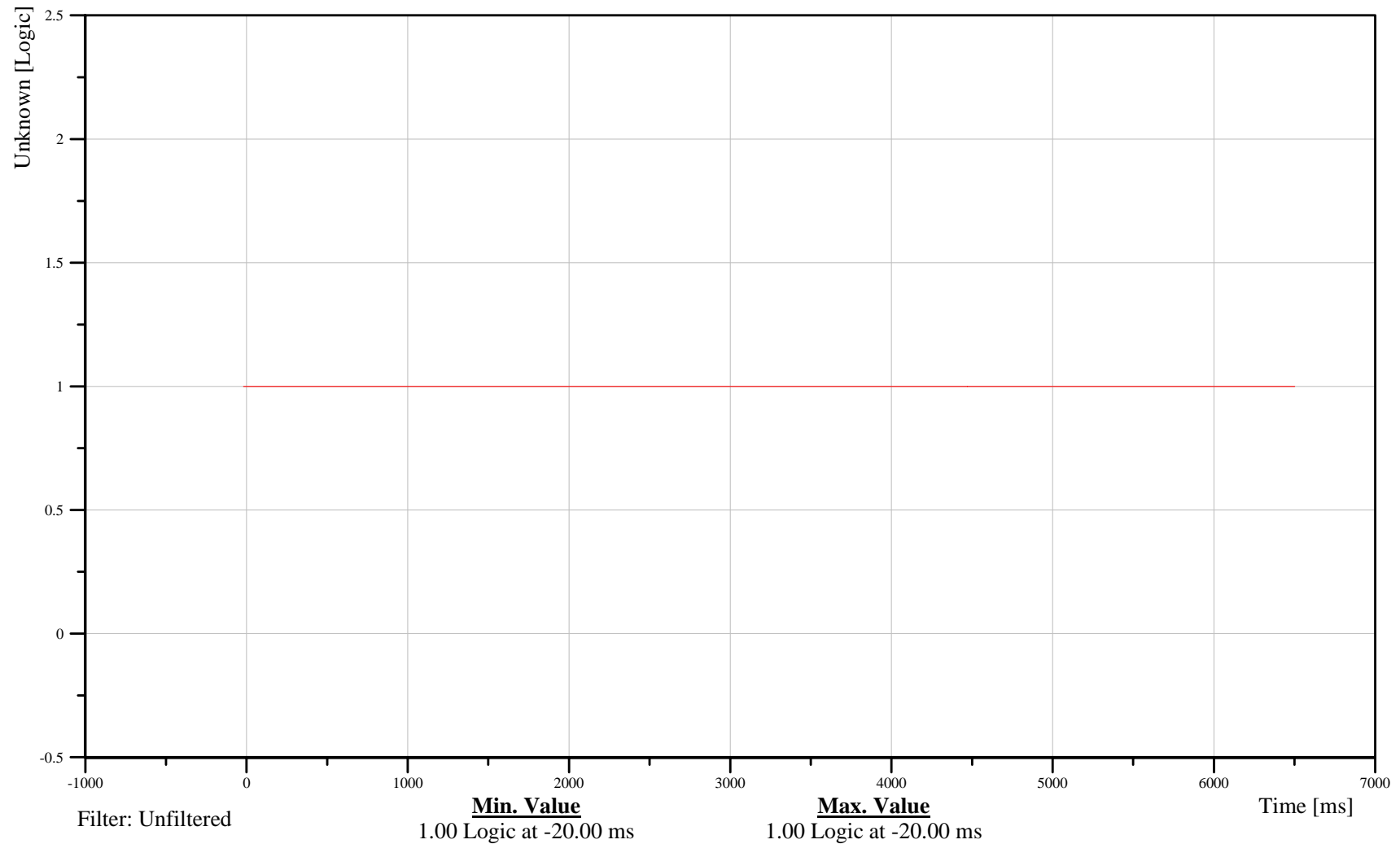
## Right Front Passenger Pelvis Contact Switch

Customer: VRTC

# 13CONT000028EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-205

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Head Contact

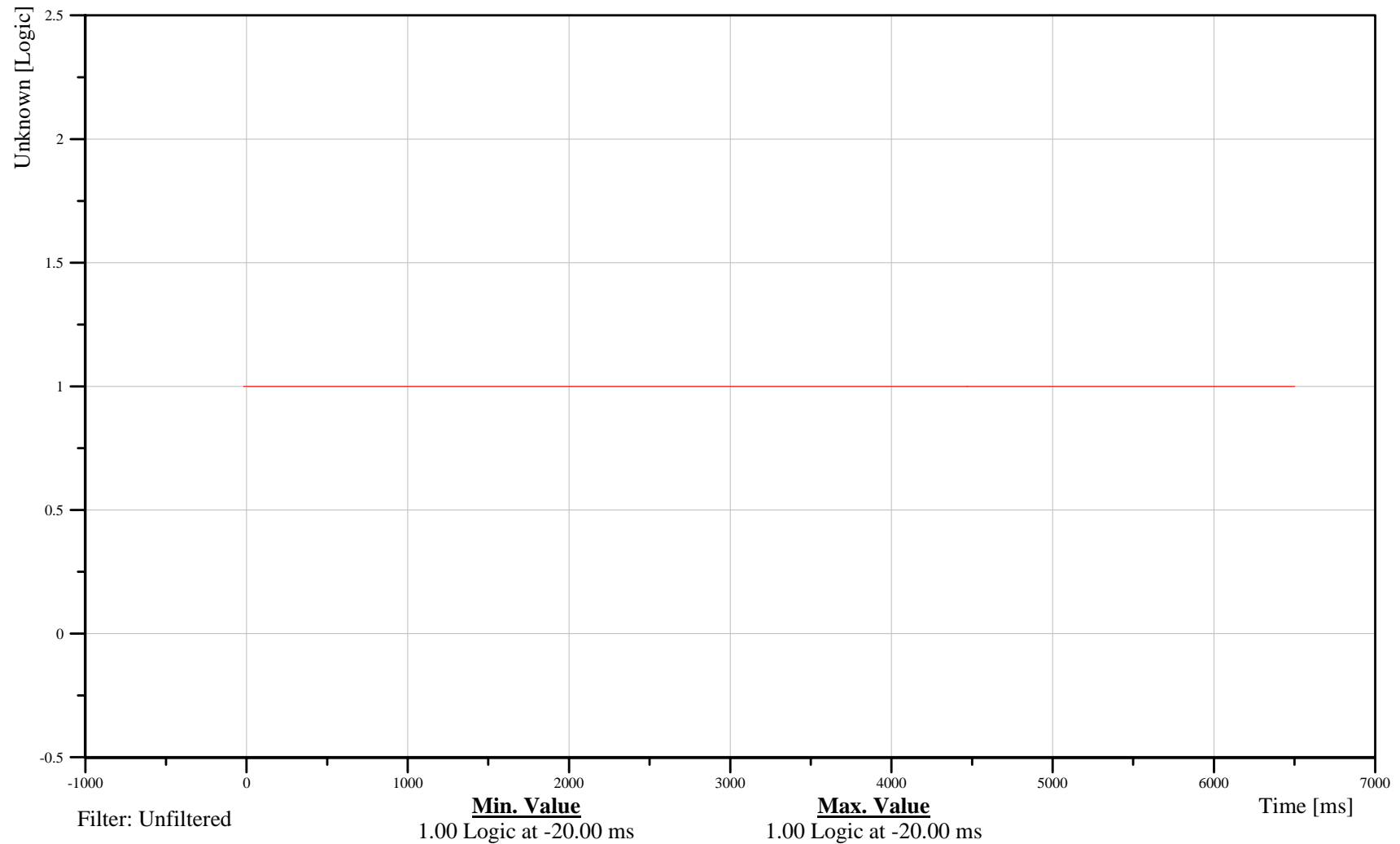
Time: 16:26

Customer: VRTC

### 14CONT000029EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-206

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

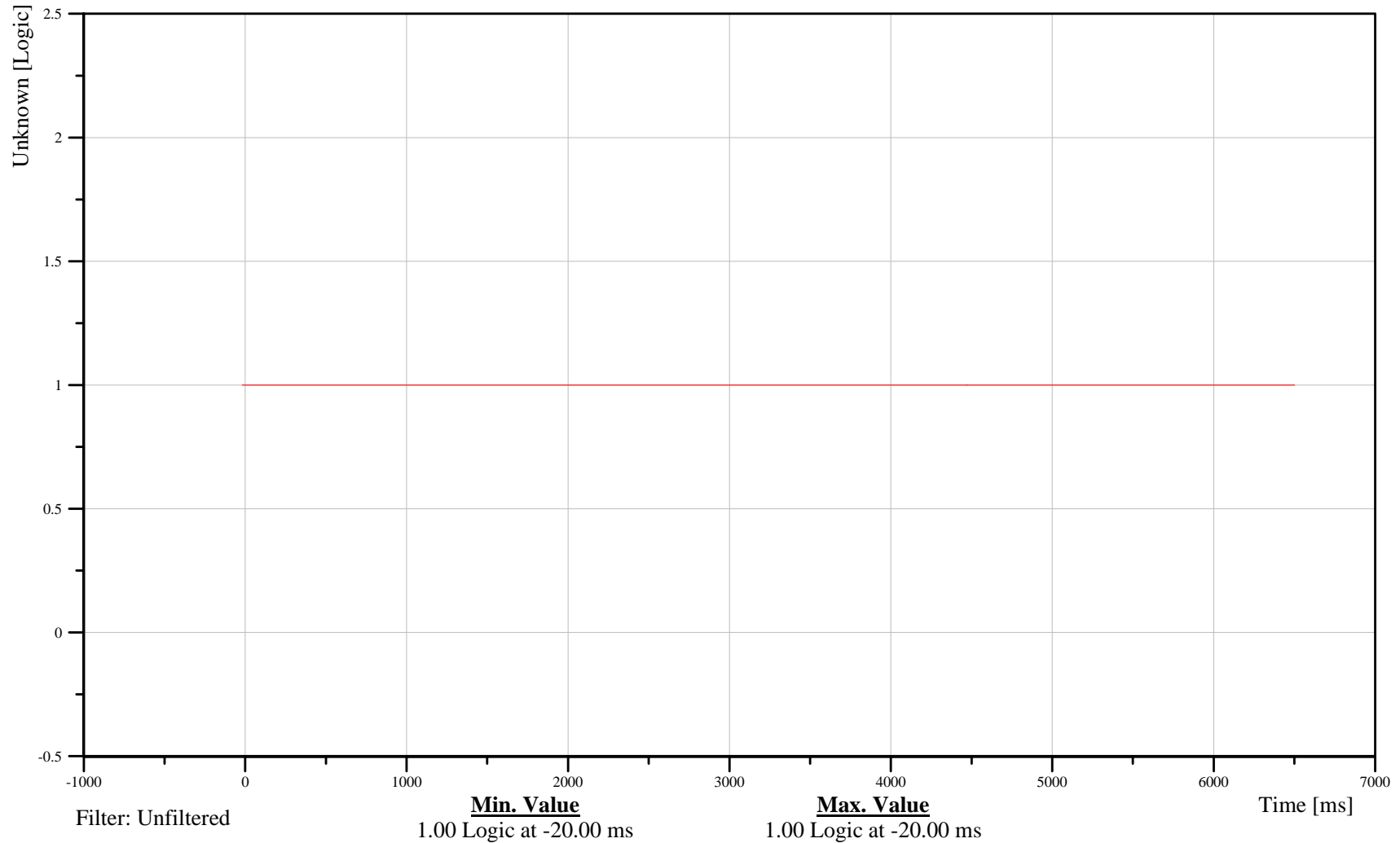
Left Rear Passenger Thorax Contact

Customer: VRTC

## 14CONT000030EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-207

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Passenger Pelvis Contact

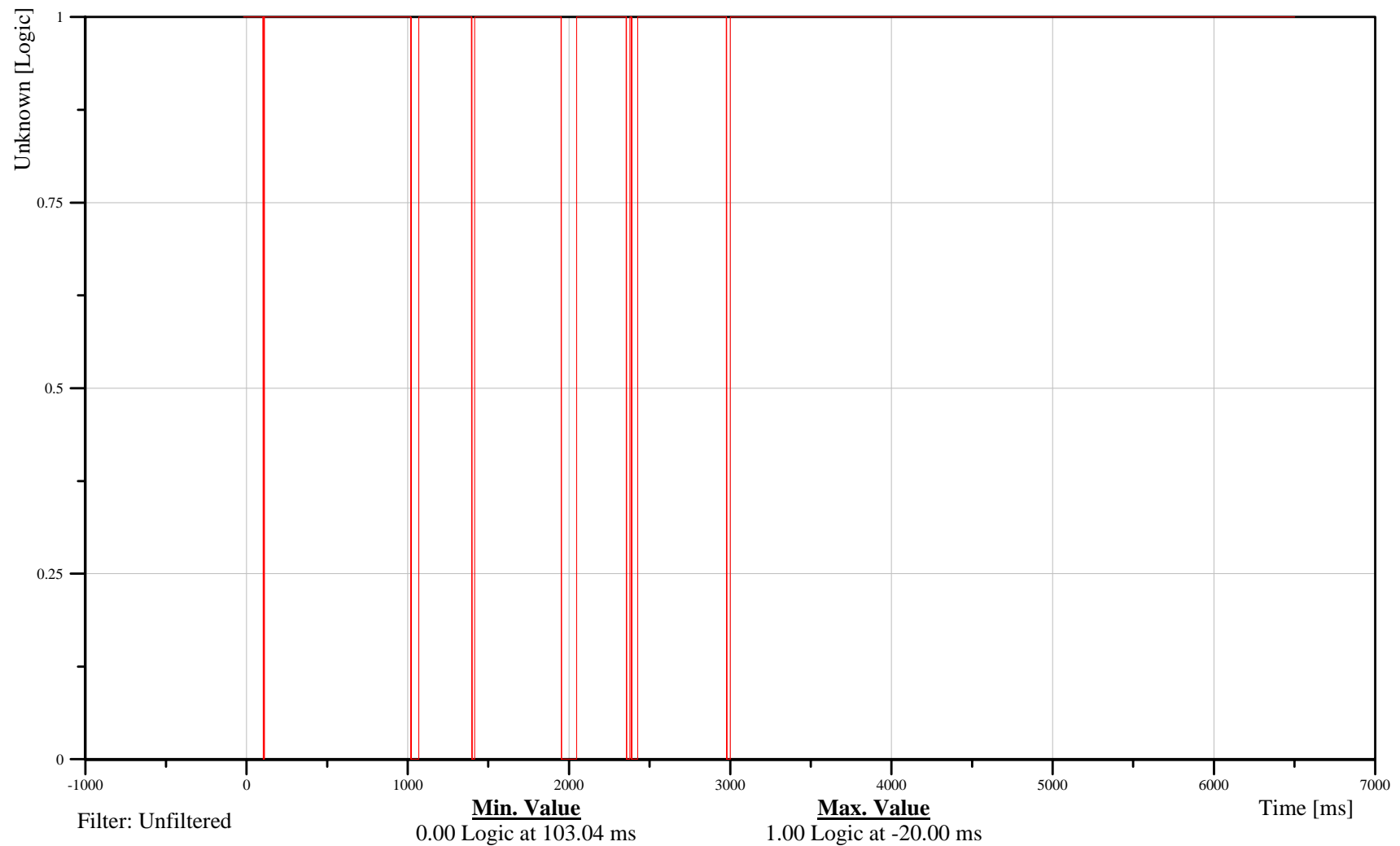
Time: 16:26

Customer: VRTC

### 14CONT000031EV00

TRC Inc. Test Lab: CTF

Test Number: 100115



B-208

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

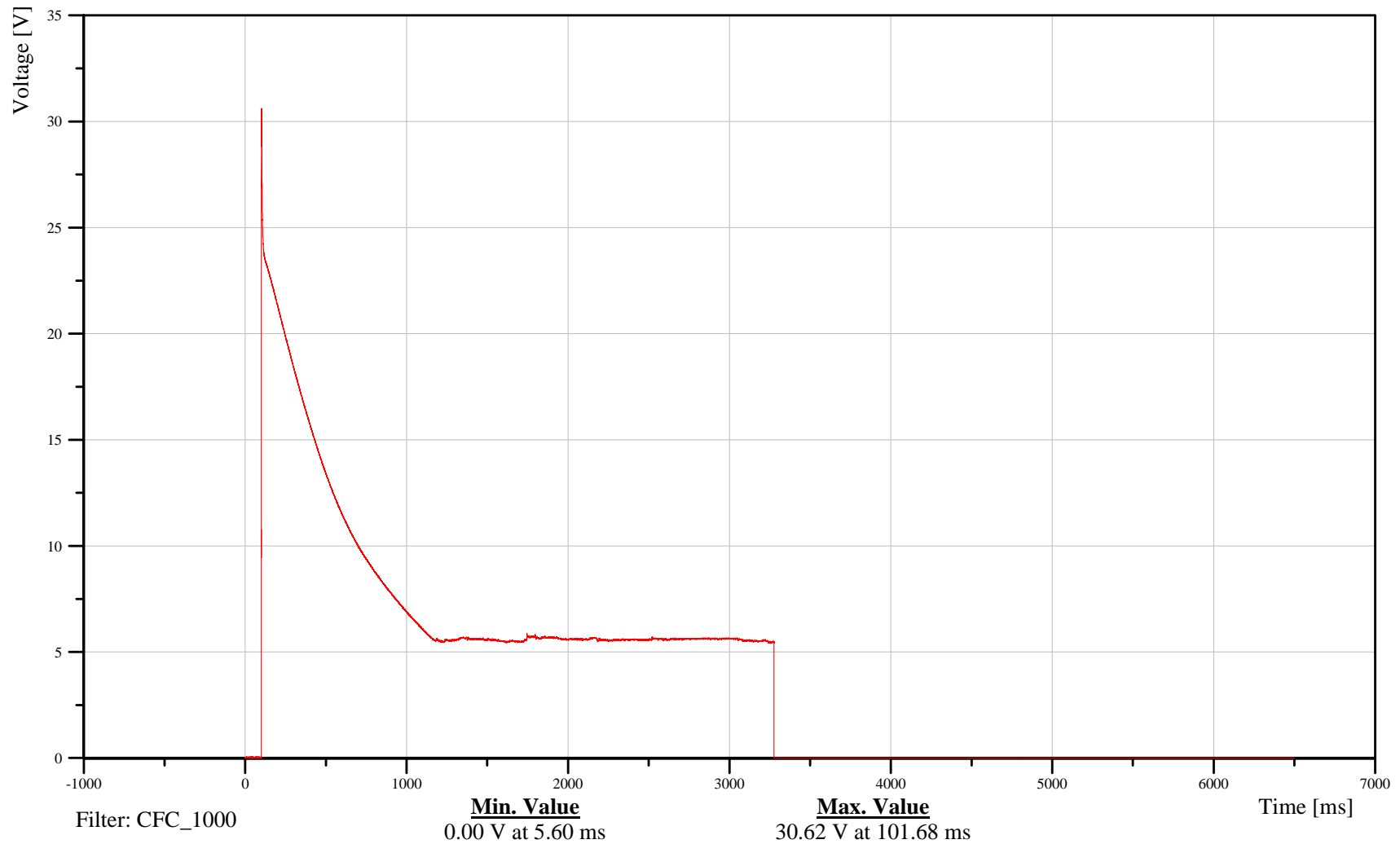
## Left Side Curtain Voltage

Customer: VRTC

# 11AIRB000000VO0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-209

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

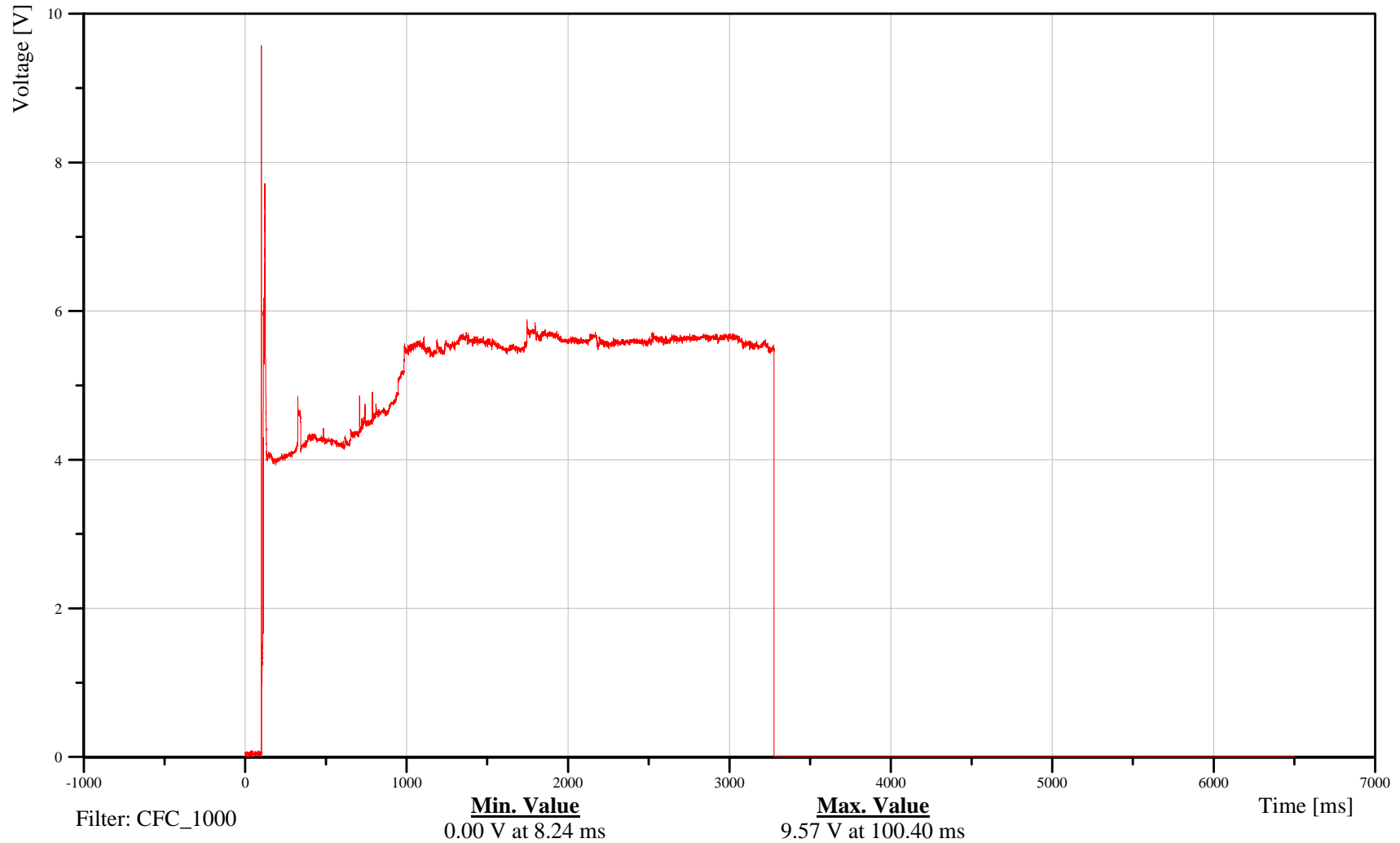
## Right Side Curtain Voltage

Customer: VRTC

# 13AIRB000000VO0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-210

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Driver Motorized Pretensioner Voltage

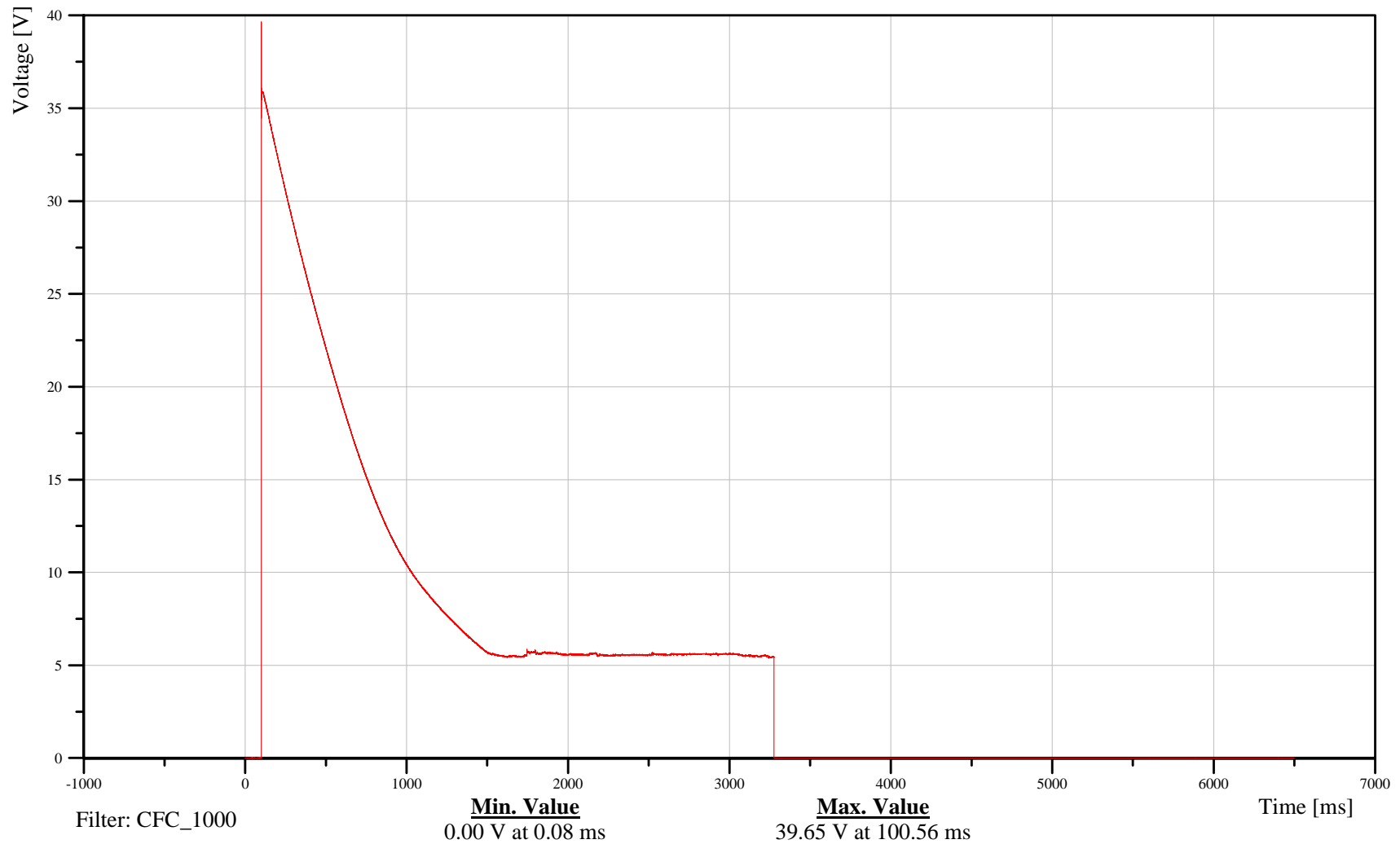
Time: 16:26

Customer: VRTC

# 11MOTPRET000VO0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-211

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Pass Motorized Pretensioner Voltage

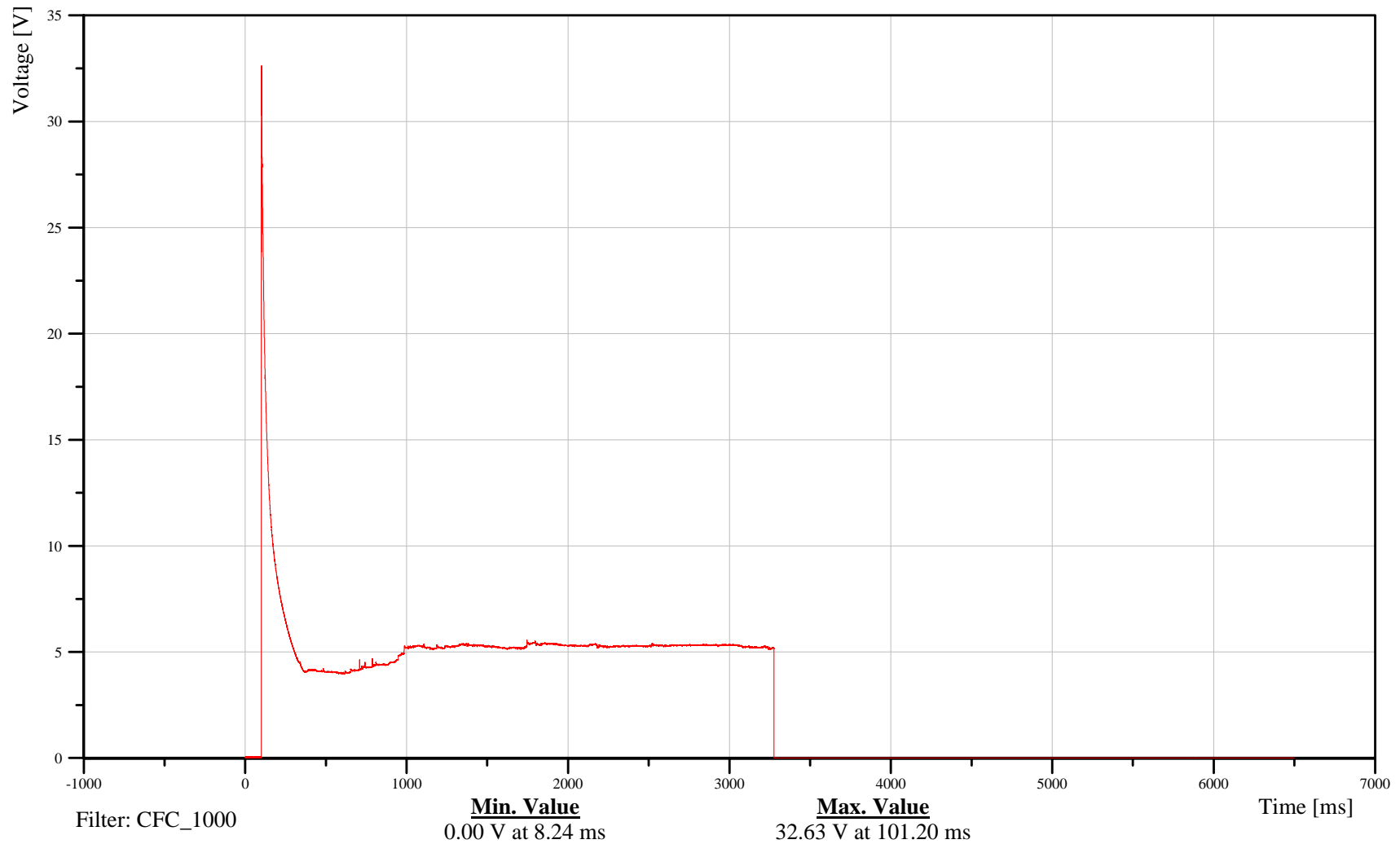
Time: 16:26

Customer: VRTC

# 14MOTPRET000VO0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-212

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

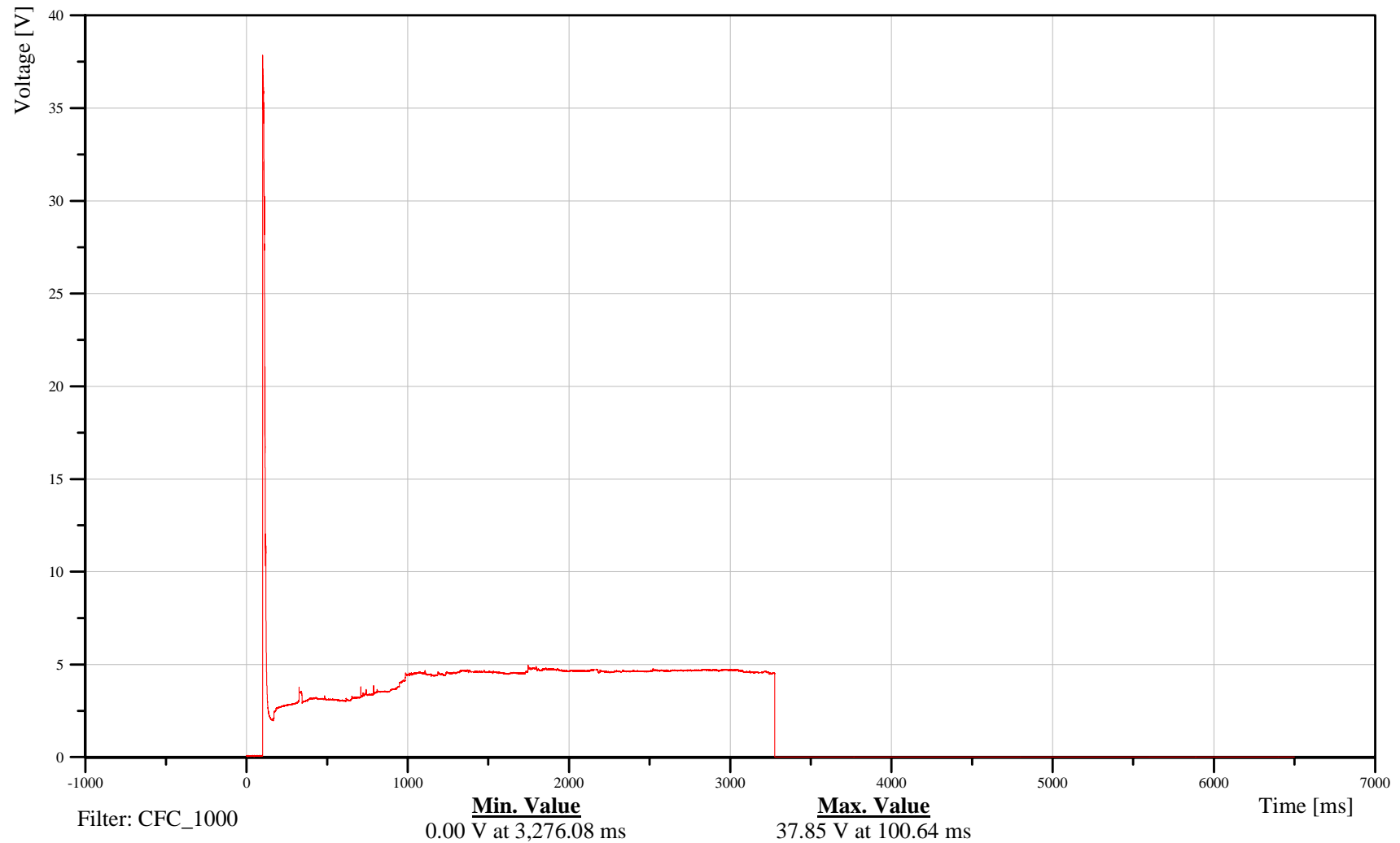
## Right Front Passenger Retractor Voltage

Customer: VRTC

# 13RETR000000V00A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-213

100115



# Soil Trip Rollover 2007 Ford Expedition

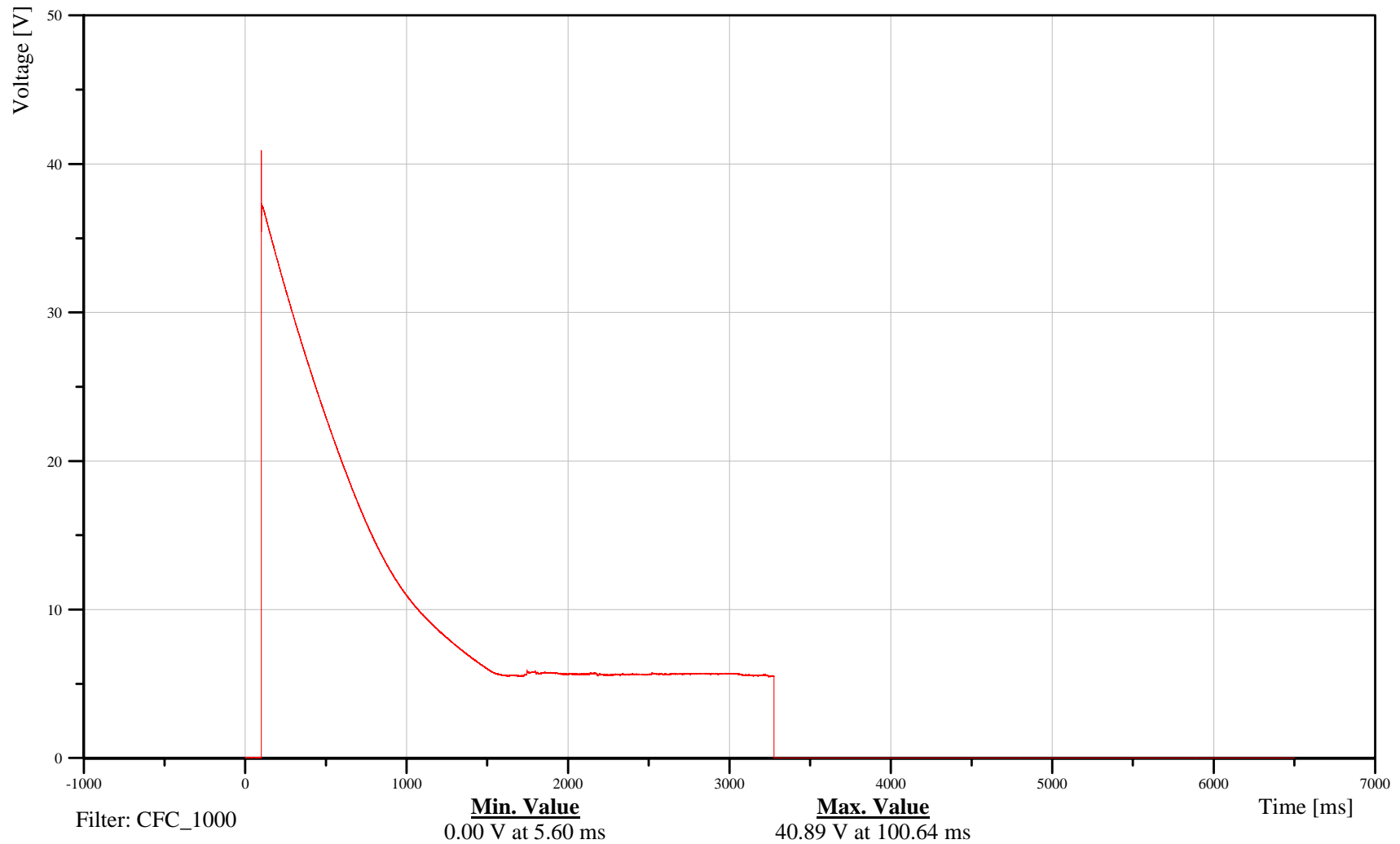
## Right Front Passenger Buckle Pretensioner Voltage

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13PRET000000V00A

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-214

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Side Curtain Current

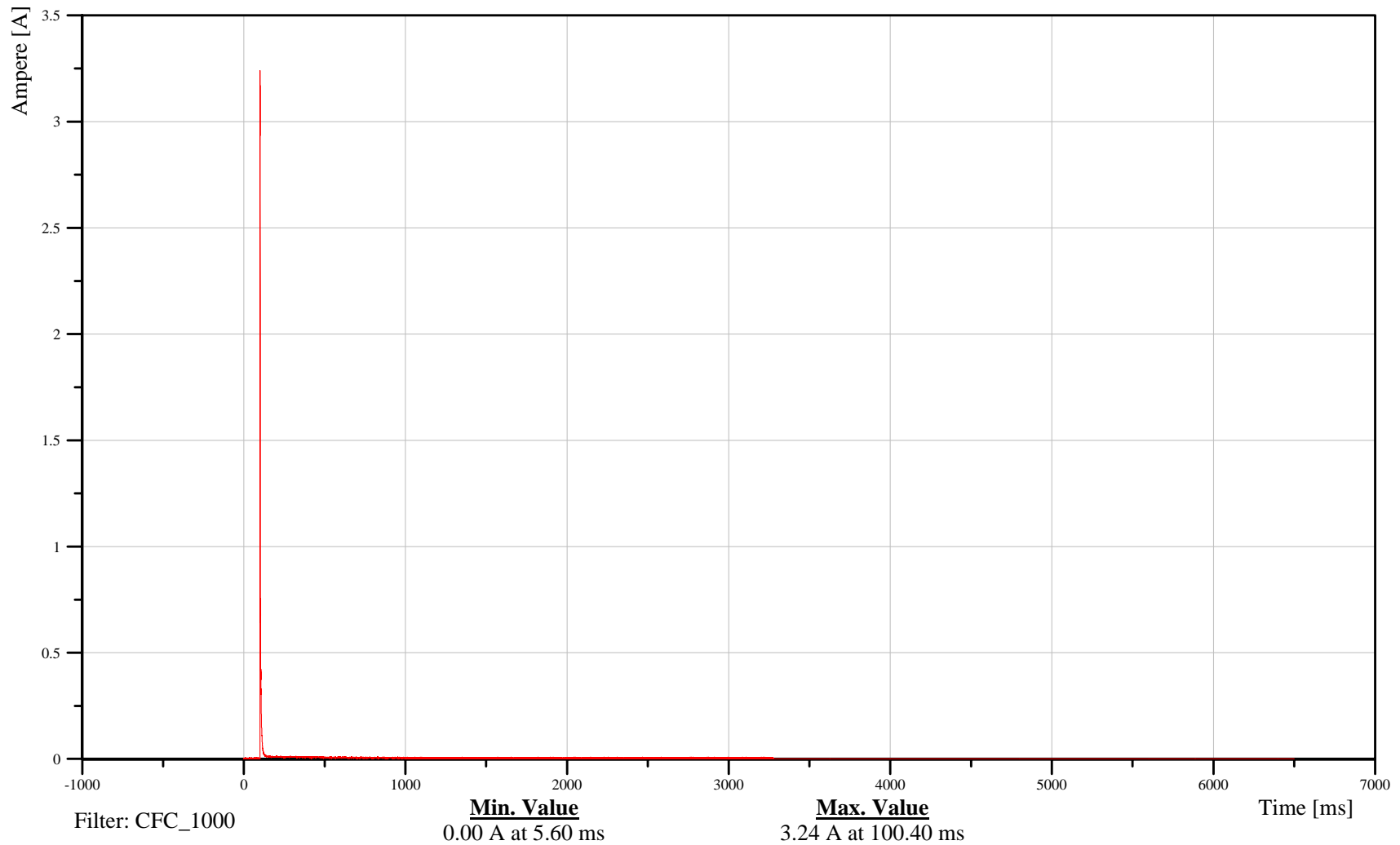
Time: 16:26

Customer: VRTC

# 11AIRB000000CU0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-215

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010  
Time: 16:26

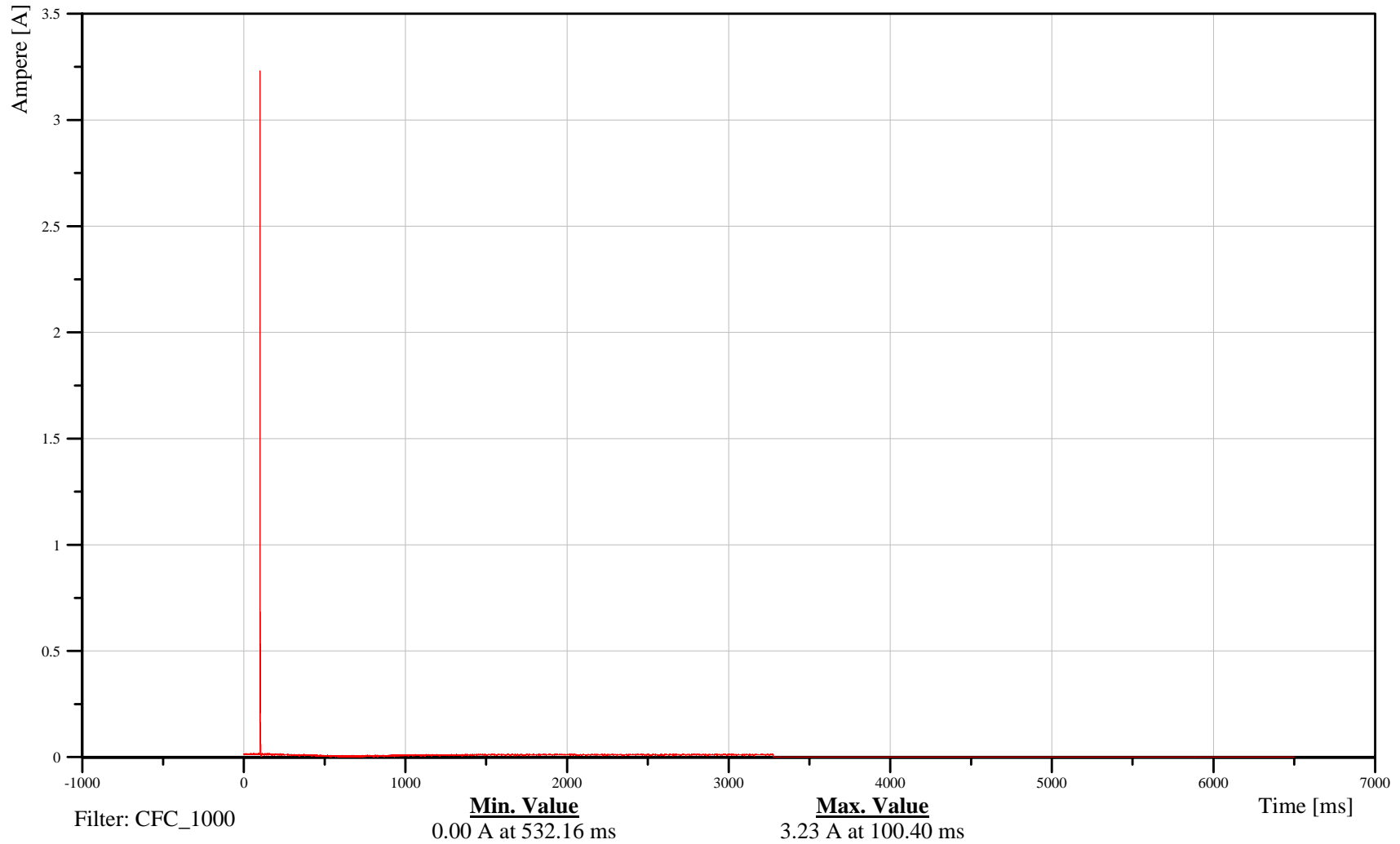
## Driver Motorized Pretensioner Current

Customer: VRTC

# 11MOTPRET000CU0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-216

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

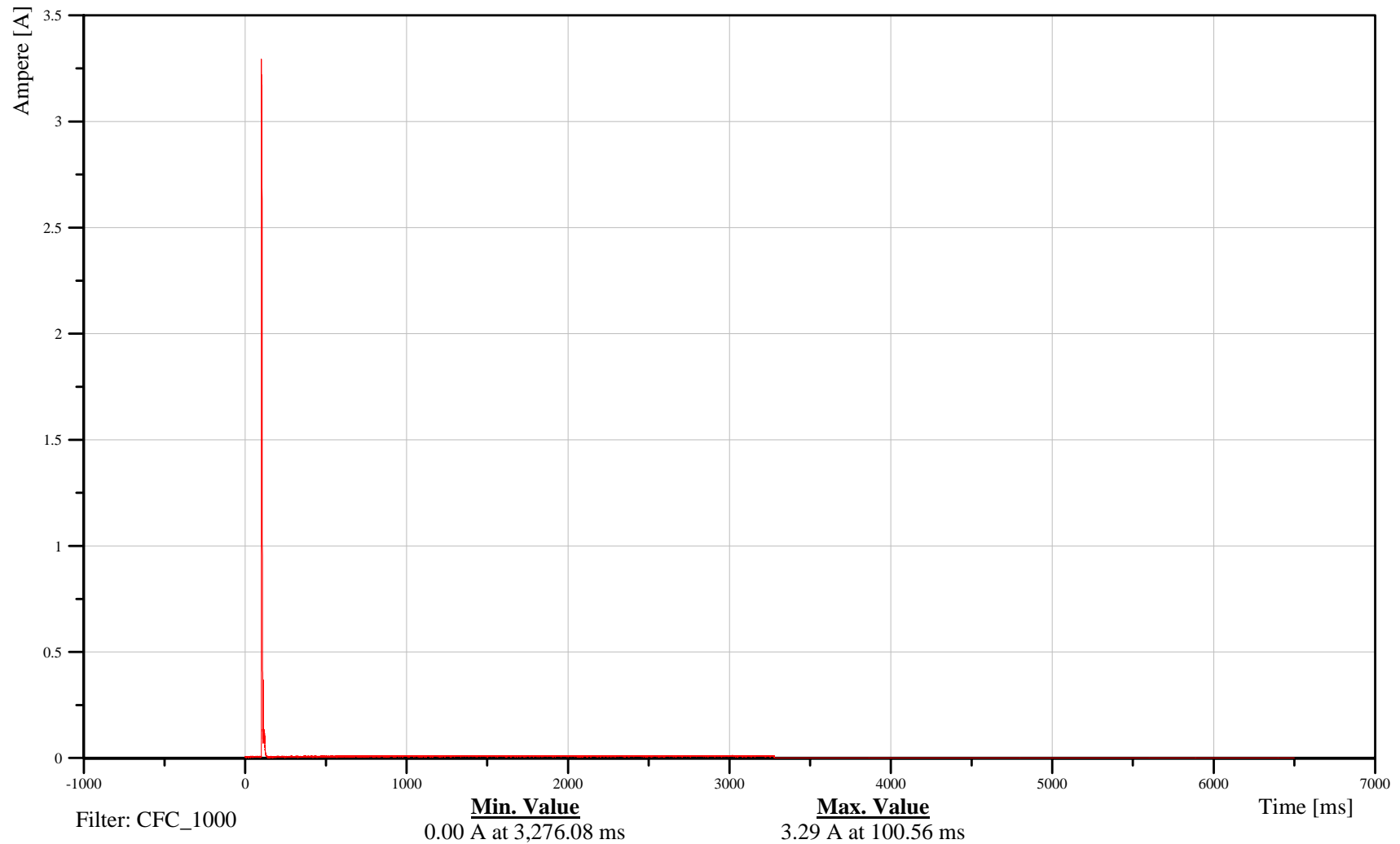
## Right Side Curtain Current

Customer: VRTC

# 13AIRB000000CU0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-217

100115



# Soil Trip Rollover 2007 Ford Expedition

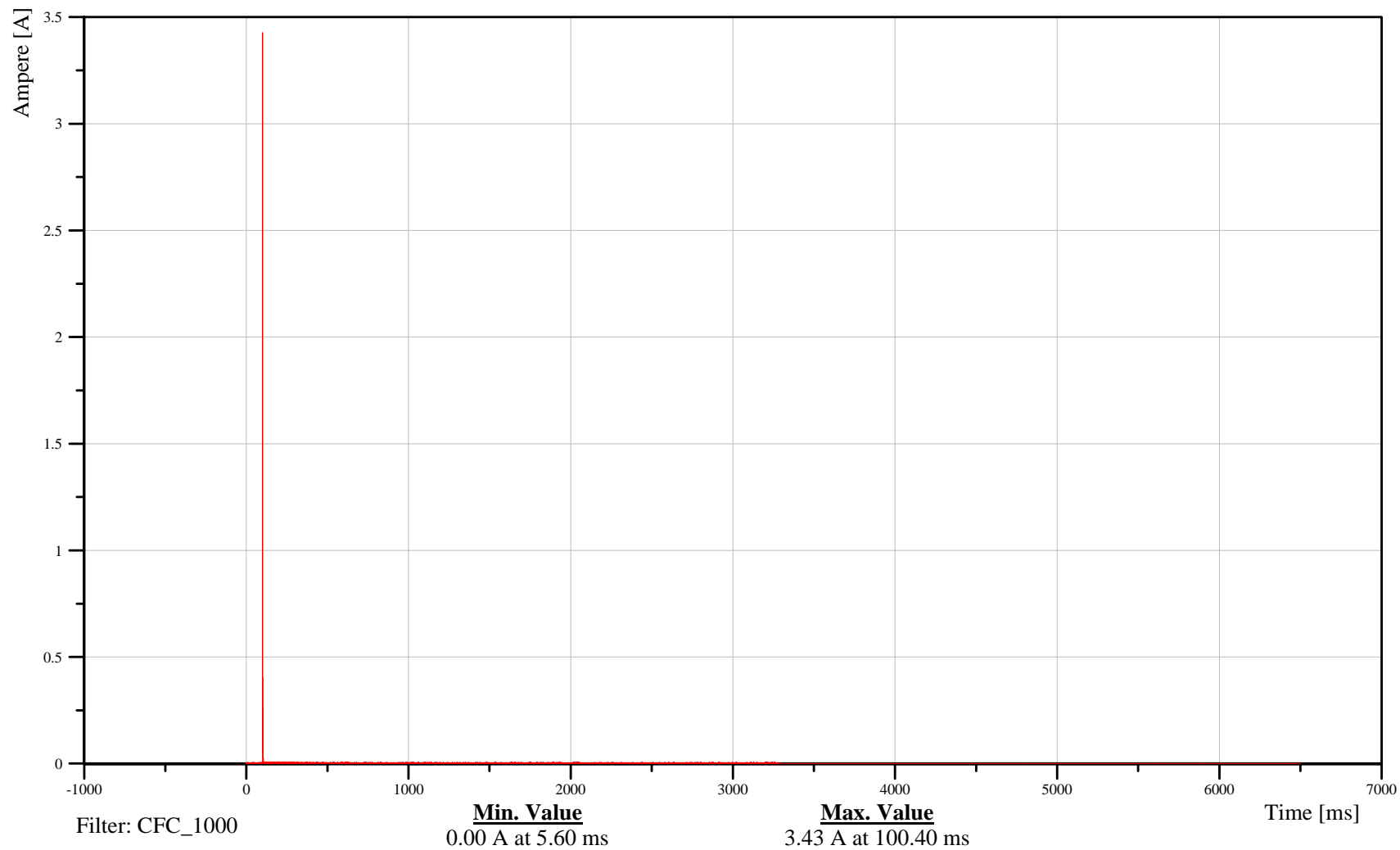
## Right Front Passenger Buckle Pretensioner Current

Date: 01/15/2010  
Time: 16:26

Customer: VRTC

### 13PRET000000CU0A

TRC Inc. Test Lab: CTF  
Test Number: 100115



B-218

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

Time: 16:26

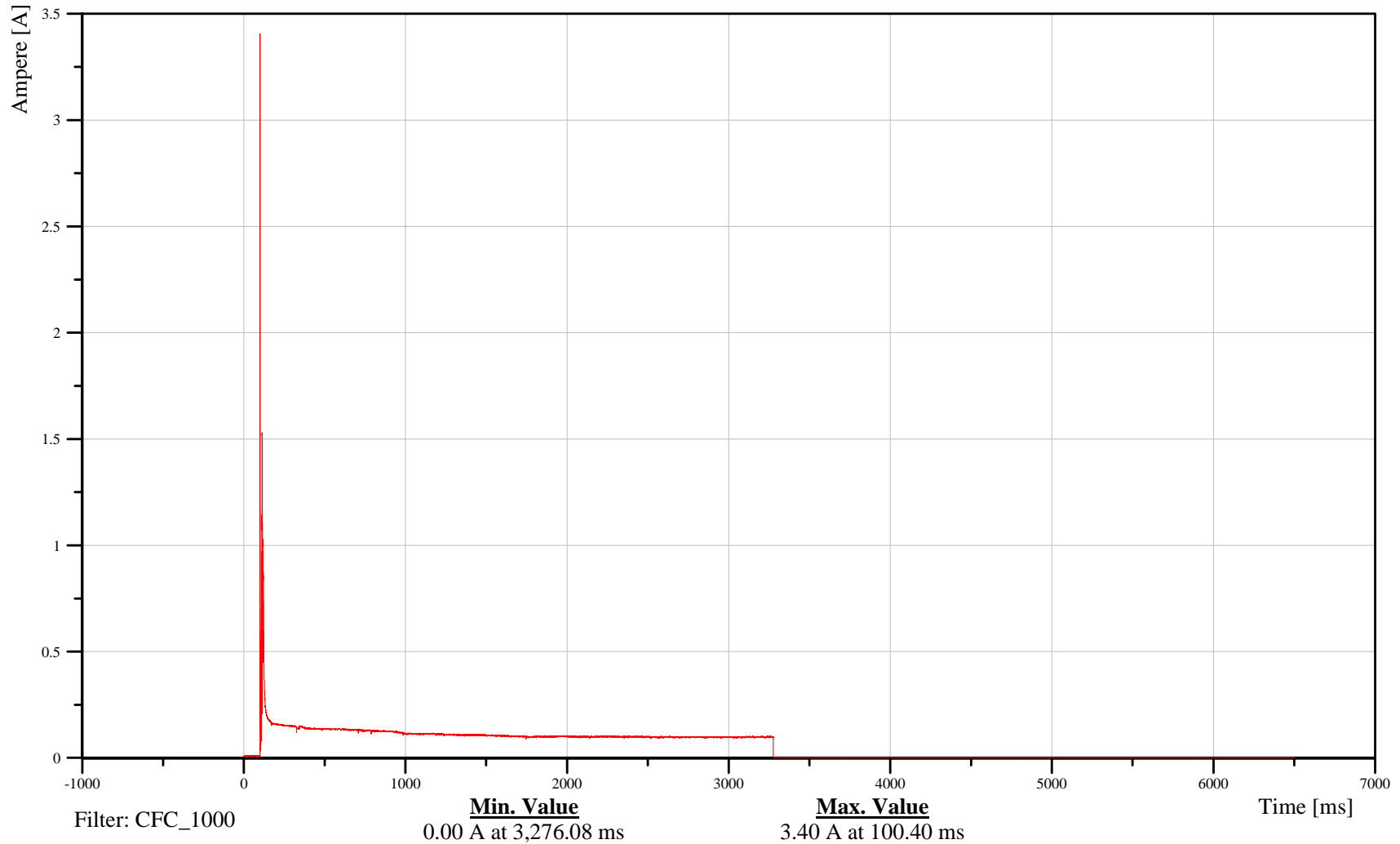
## Right Front Passenger Retractor Current

Customer: VRTC

# 13RETR000000CU0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-219

100115



# Soil Trip Rollover 2007 Ford Expedition

Date: 01/15/2010

## Left Rear Pass Motorized Pretensioner Current

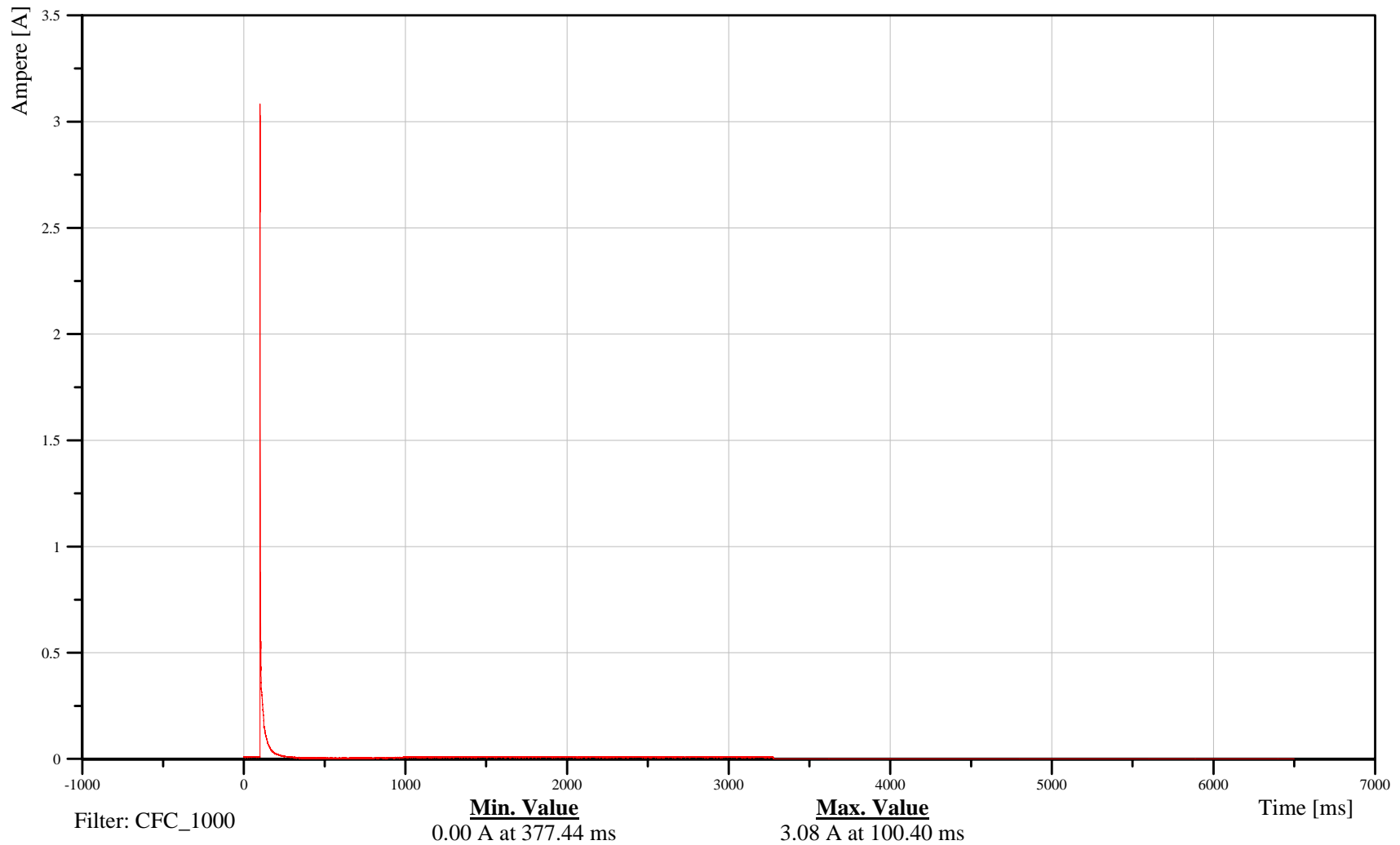
Time: 16:26

Customer: VRTC

# 14MOTPRET000CU0A

TRC Inc. Test Lab: CTF

Test Number: 100115



B-220

100115

**APPENDIX C**  
**ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**Calibration Test Results**

**Pre-Test**

**Driver Dummy S/N: 001**

# Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 001 Certification No. 12-1

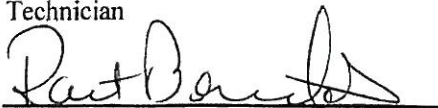
Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	271.7 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	11.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

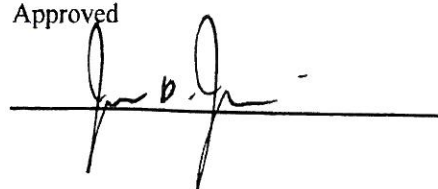
**Test meets specifications.**

**Comments:**

Technician



Approved

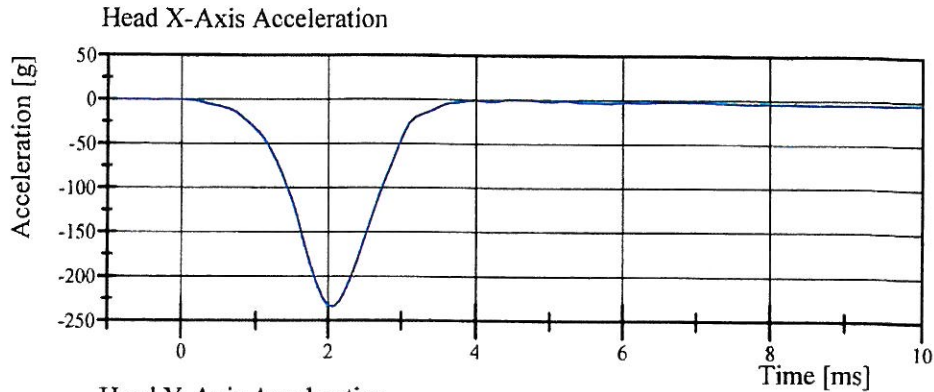


# Transportation Research Center Inc.

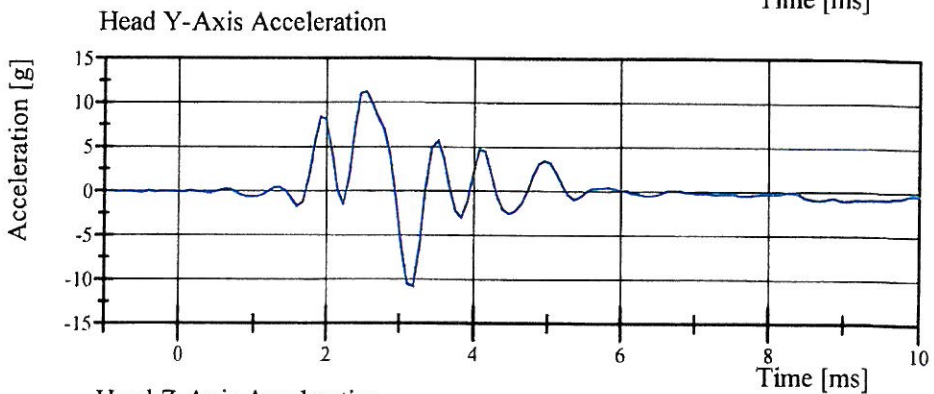
Front Head Drop

HIII 50th Serial No. 001 Certification No. 12-1

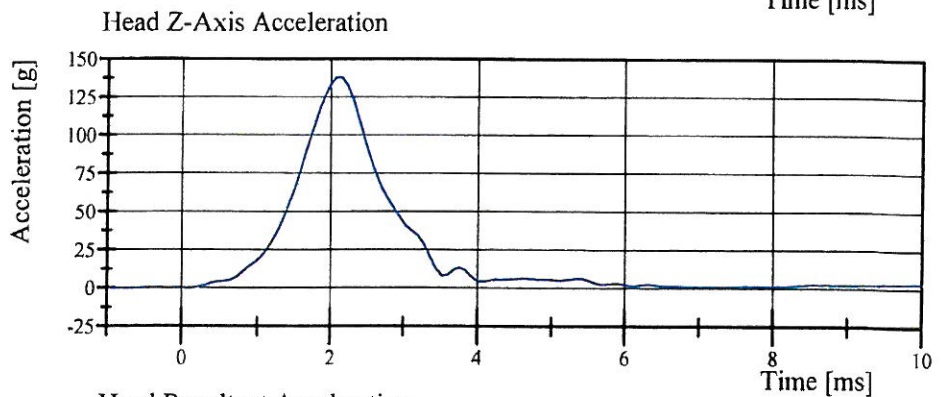
Test Date: 10/28/2009



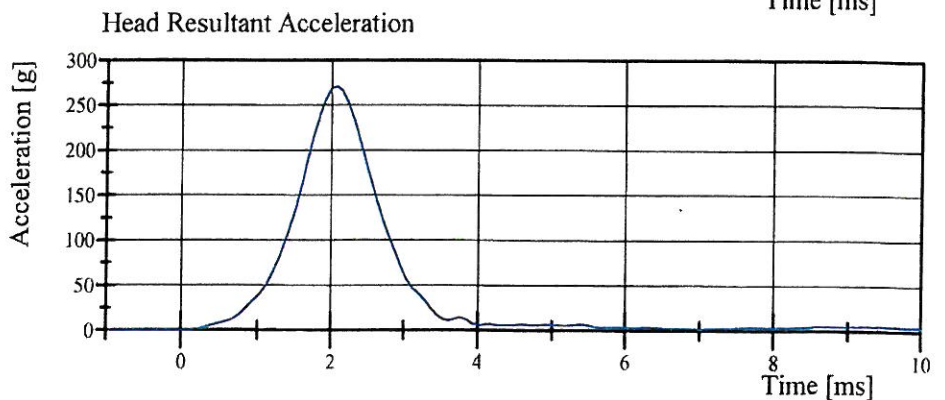
Filter Class: CFC\_1000  
Max: 0.7 g at 4.5 ms  
Min: -234.1 g at 2.1 ms



Filter Class: CFC\_1000  
Max: 11.3 g at 2.6 ms  
Min: -10.8 g at 3.2 ms



Filter Class: CFC\_1000  
Max: 138.0 g at 2.2 ms  
Min: -0.1 g at -1.0 ms



Filter Class: CFC\_1000  
Max: 271.7 g at 2.1 ms  
Min: 0.0 g at 0.0 ms

# Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 001 Certification No. 12-2

Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.928 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	36.2 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-26.91 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-22.39 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-18.01 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-18.01 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-70.2 °	Yes
Time of Peak	57 - 64 ms	58.7 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	115.0 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	102.3 N·m	Yes
Time of Peak	47 - 58 ms	49.8 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	97.0 ms	Yes

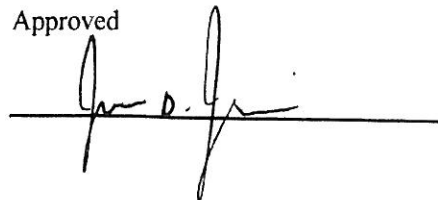
**Test meets specifications.**

**Comments:**

Technician



Approved



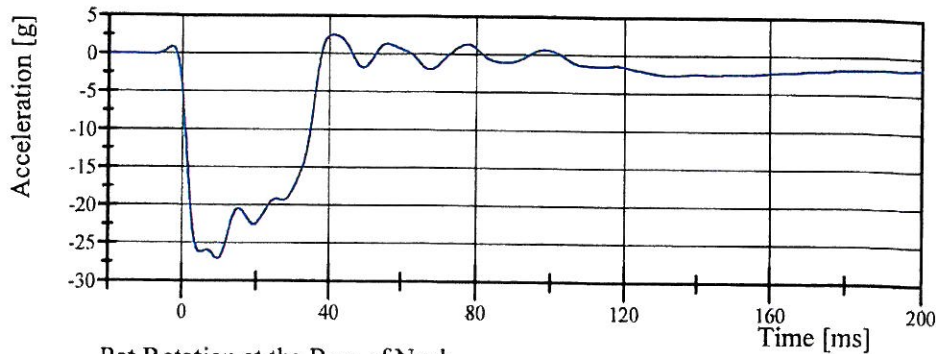
# Transportation Research Center Inc.

## Neck Flexion

HIII 50th Serial No. 001 Certification No. 12-2

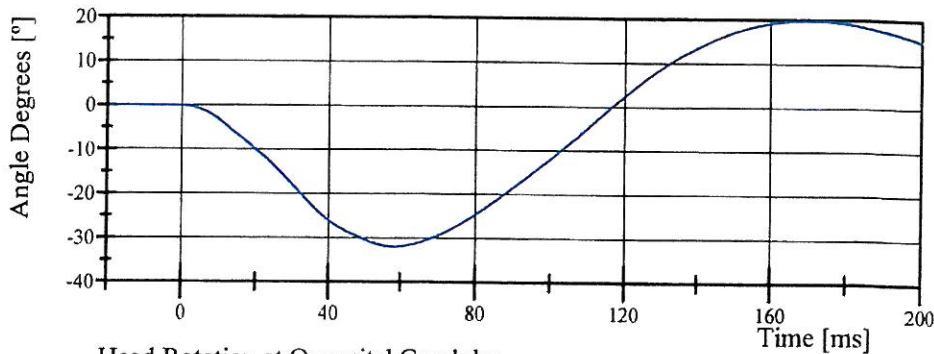
Test Date: 10/28/2009

Pendulum Acceleration



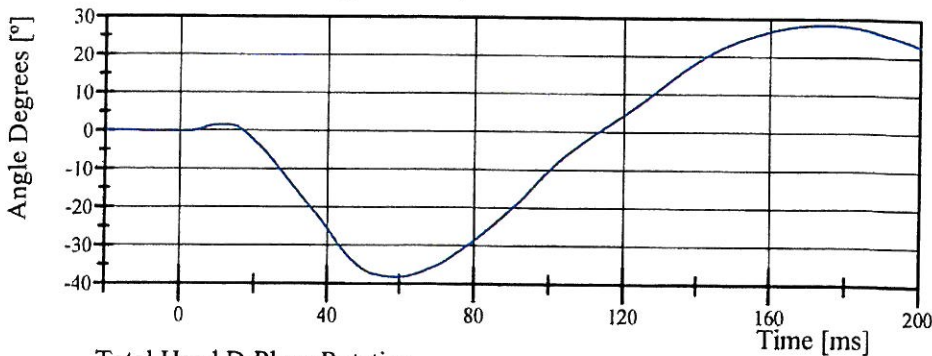
Filter Class: CFC\_60  
Max: 2.6 g at 41.0 ms  
Min: -27.0 g at 9.5 ms

Pot Rotation at the Base of Neck



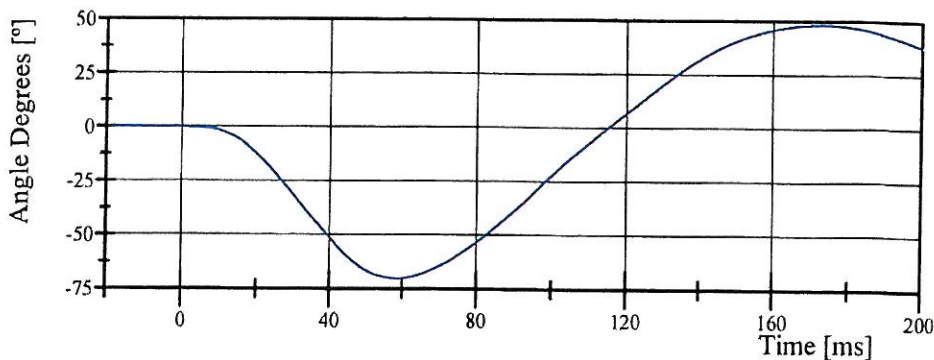
Filter Class: CFC\_60  
Max: 19.9 ° at 169.6 ms  
Min: -32.0 ° at 58.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 28.5 ° at 174.6 ms  
Min: -38.3 ° at 59.3 ms

Total Head D-Plane Rotation



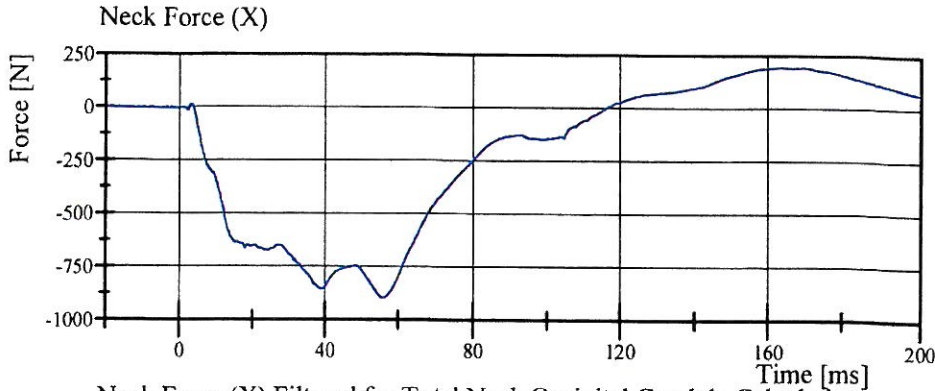
Filter Class: CFC\_60  
Max: 48.3 ° at 172.9 ms  
Min: -70.2 ° at 58.7 ms

# Transportation Research Center Inc.

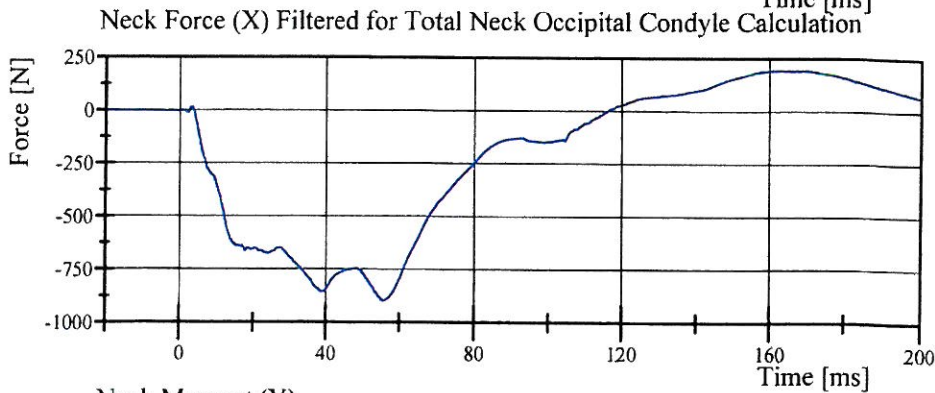
Neck Flexion

HIII 50th Serial No. 001 Certification No. 12-2

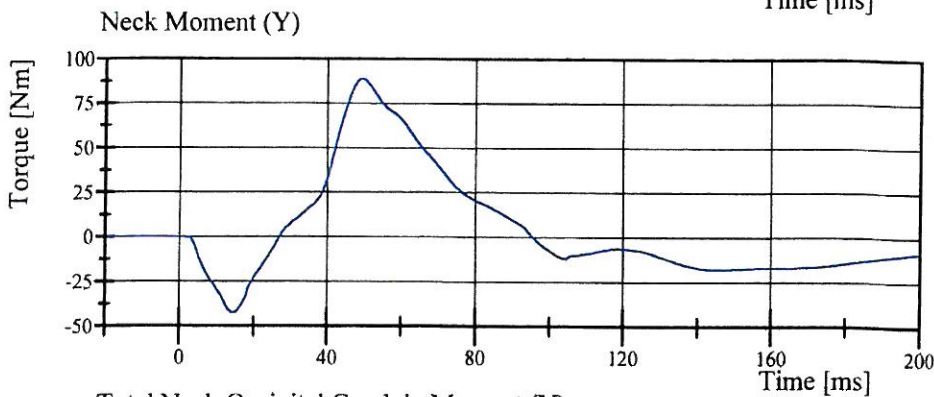
Test Date: 10/28/2009



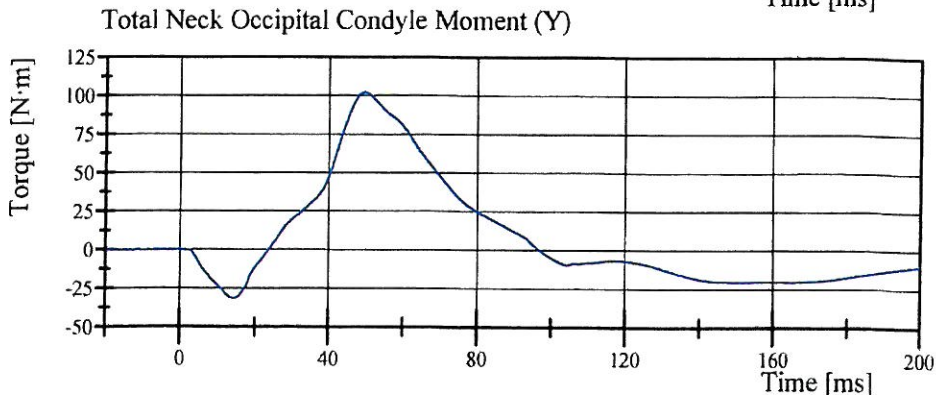
Filter Class: CFC\_1000  
Max: 196.5 N at 163.9 ms  
Min: -896.1 N at 55.8 ms



Filter Class: CFC\_600  
Max: 195.7 N at 163.9 ms  
Min: -895.7 N at 55.8 ms



Filter Class: CFC\_600  
Max: 89.0 Nm at 49.5 ms  
Min: -42.4 Nm at 14.4 ms



Filter Class: CFC\_600  
Max: 102.3 N·m at 49.8 ms  
Min: -31.5 N·m at 14.2 ms

# Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 001 Certification No. 12-1

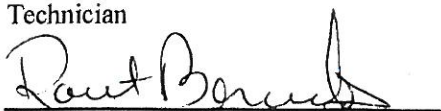
Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.990 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	44.6 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.36 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.29 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	12.67 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	12.67 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	88.2 °	Yes
Time of Peak	72 - 82 ms	76.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	153.8 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-62.6 N·m	Yes
Time of Peak	65 - 79 ms	65.3 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	140.6 ms	Yes

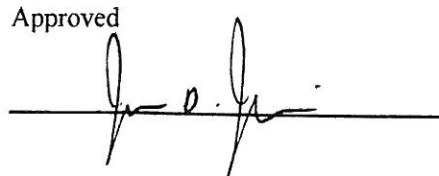
**Test meets specifications.**

**Comments:**

Technician



Approved



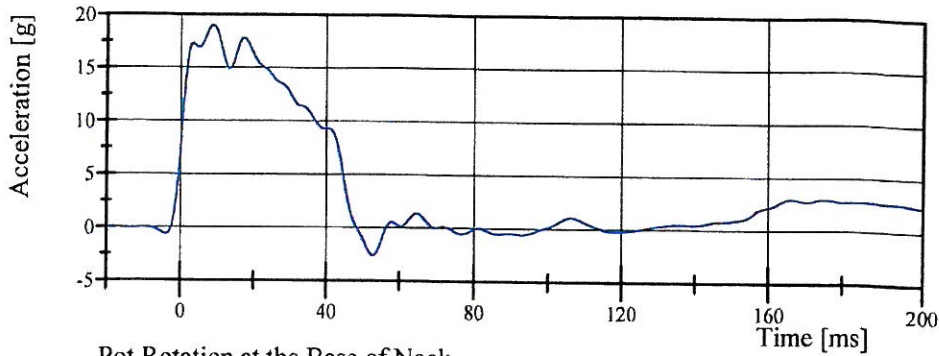
# Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 001 Certification No. 12-1

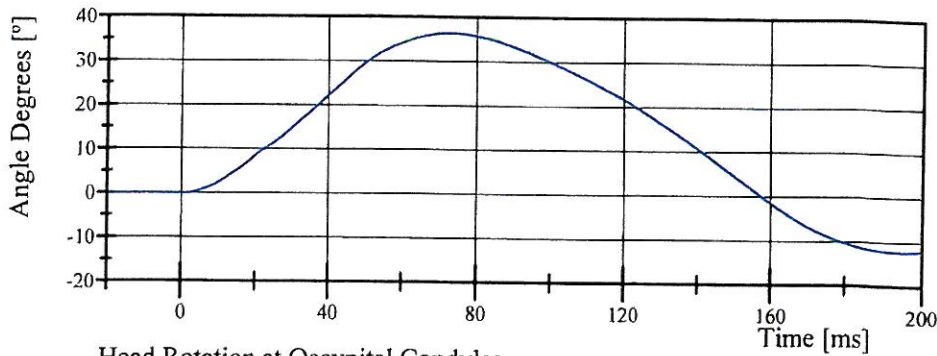
Test Date: 10/28/2009

Pendulum Acceleration



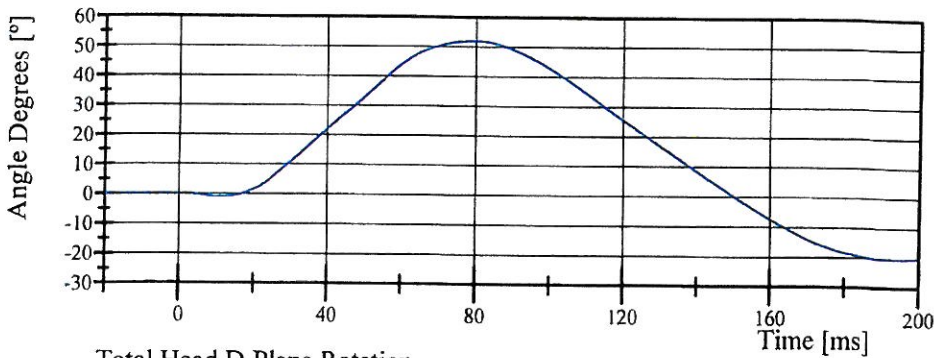
Filter Class: CFC\_60  
Max: 19.0 g at 8.6 ms  
Min: -2.6 g at 52.9 ms

Pot Rotation at the Base of Neck



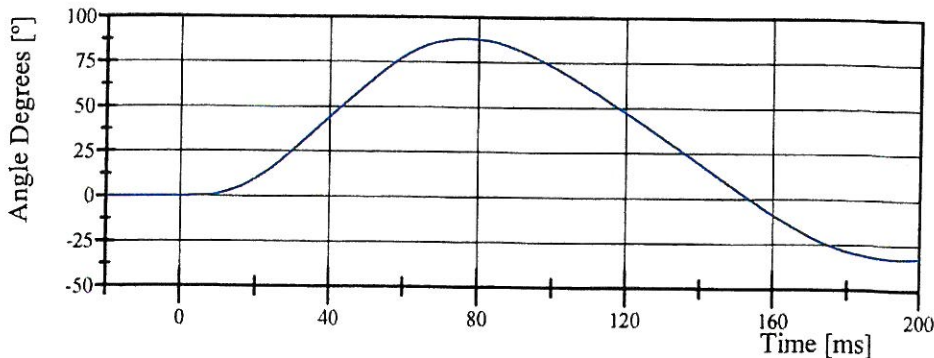
Filter Class: CFC\_60  
Max: 36.5 ° at 73.0 ms  
Min: -12.2 ° at 195.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 52.0 ° at 79.8 ms  
Min: -20.3 ° at 194.6 ms

Total Head D-Plane Rotation



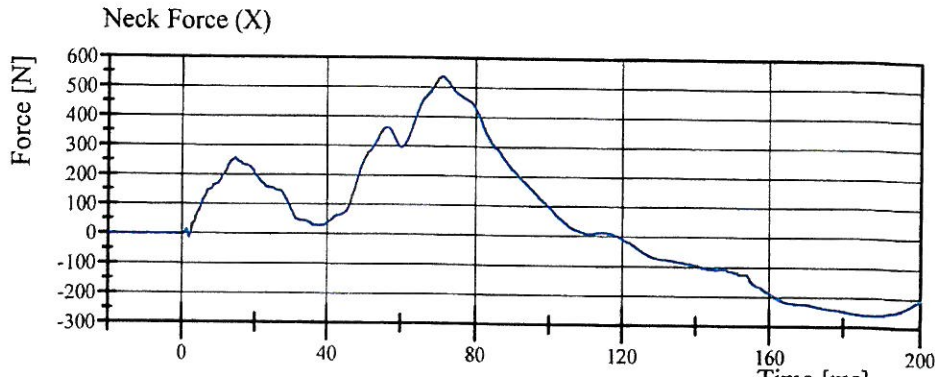
Filter Class: CFC\_60  
Max: 88.2 ° at 76.4 ms  
Min: -32.5 ° at 195.0 ms

# Transportation Research Center Inc.

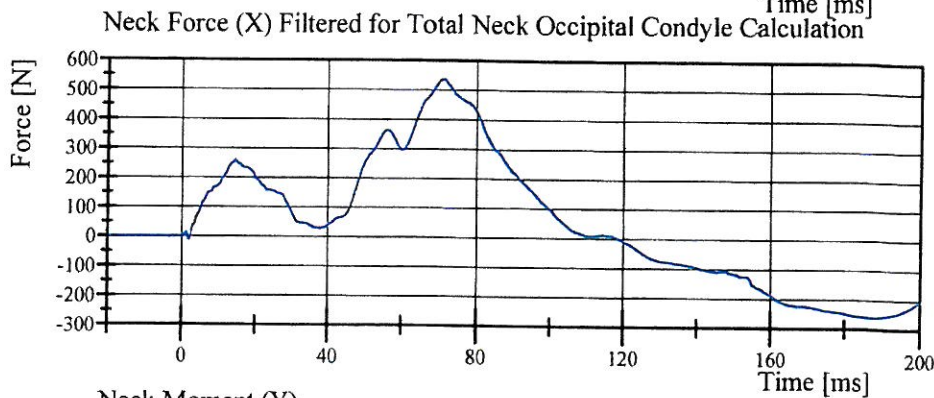
Neck Extension

HIII 50th Serial No. 001 Certification No. 12-1

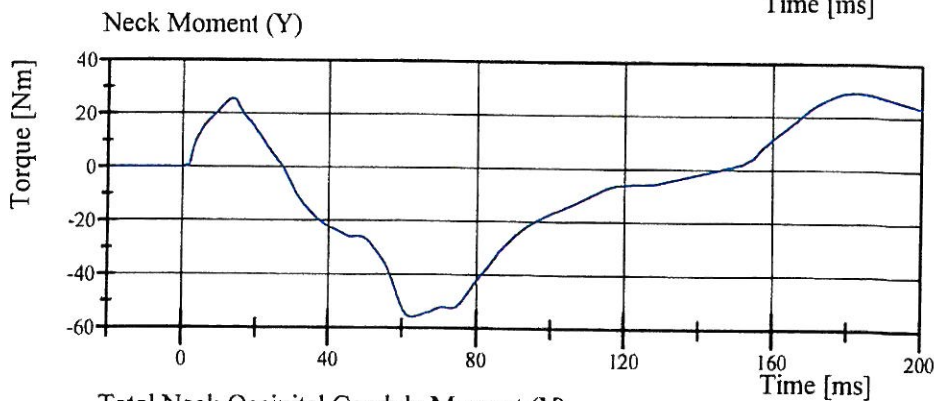
Test Date: 10/28/2009



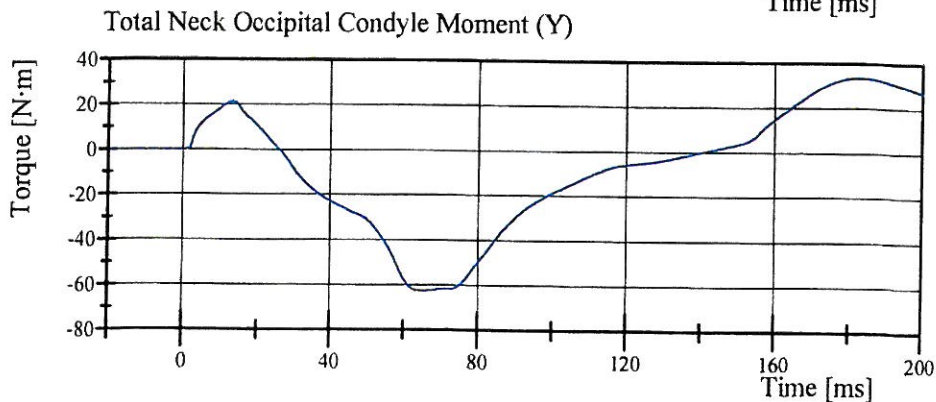
Filter Class: CFC\_1000  
Max: 539.5 N at 71.0 ms  
Min: -259.2 N at 188.0 ms



Filter Class: CFC\_600  
Max: 539.2 N at 71.0 ms  
Min: -258.4 N at 188.0 ms



Filter Class: CFC\_600  
Max: 29.2 Nm at 182.3 ms  
Min: -55.9 Nm at 62.9 ms



Filter Class: CFC\_600  
Max: 33.7 N·m at 183.1 ms  
Min: -62.6 N·m at 65.3 ms

# Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 001 Certification No. 12-2

Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.622 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,661.4 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-68.08 mm	Yes
Internal Hysteresis	65 - 85 %	71.9 %	Yes

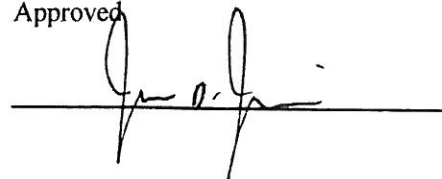
**Test meets specifications.**

**Comments:**

Technician



Approved

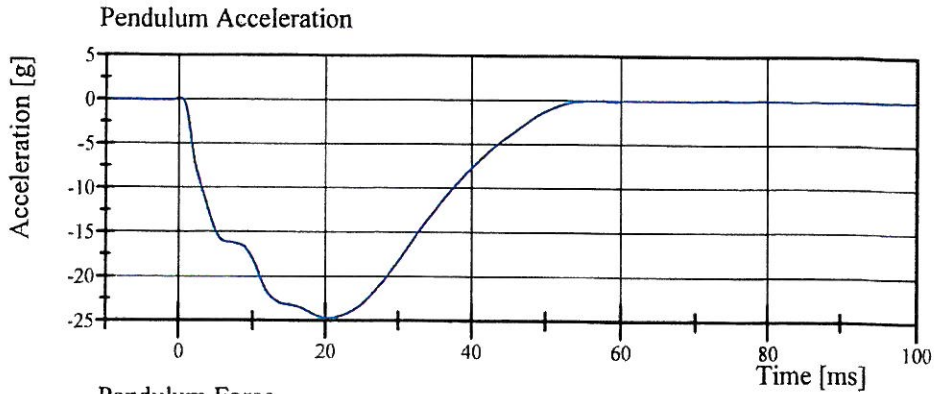


# Transportation Research Center Inc.

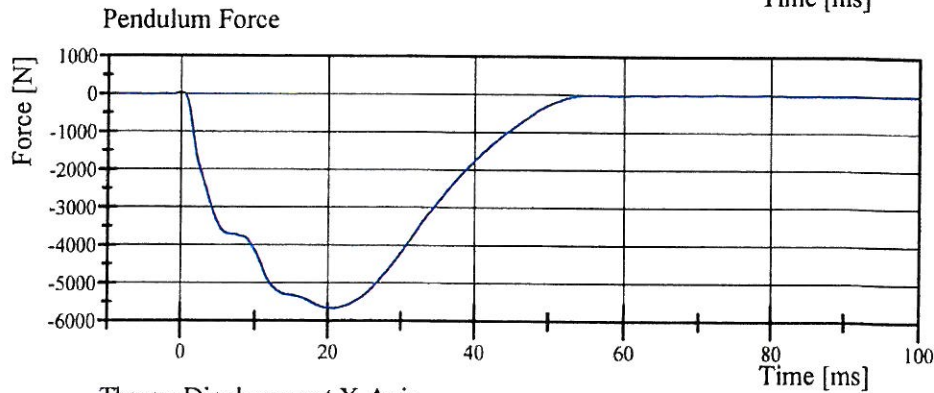
Front Thorax

HIII 50th Serial No. 001 Certification No. 12-2

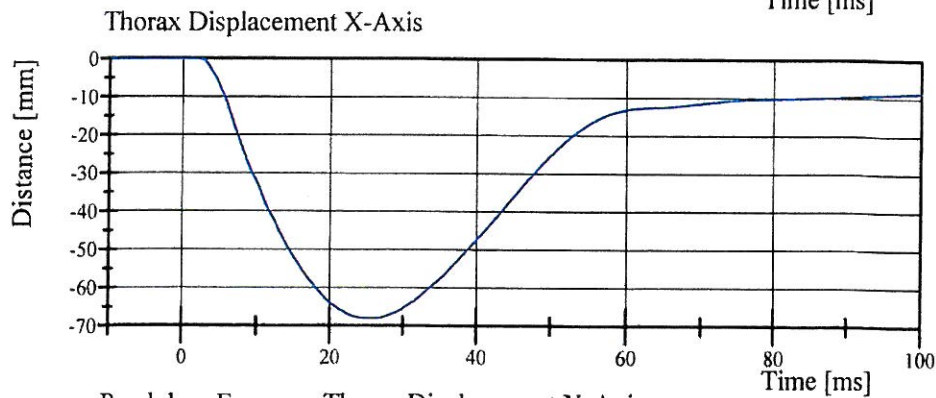
Test Date: 10/28/2009



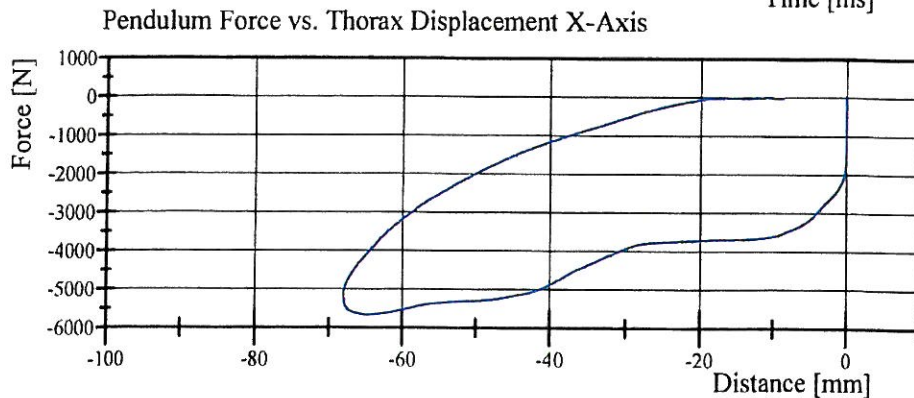
Filter Class: CFC\_180  
Max: 0.2 g at 0.1 ms  
Min: -24.7 g at 20.7 ms



Filter Class: CFC\_180  
Max: 43.9 N at 0.1 ms  
Min: -5,661.4 N at 20.7 ms



Filter Class: CFC\_600  
Max: 0.0 mm at -2.2 ms  
Min: -68.1 mm at 26.1 ms



Filter Class: CFC\_180  
Max: 43.9 N at -0.0 mm  
Min: -5,661.4 N at -65.0 mm

# Transportation Research Center Inc

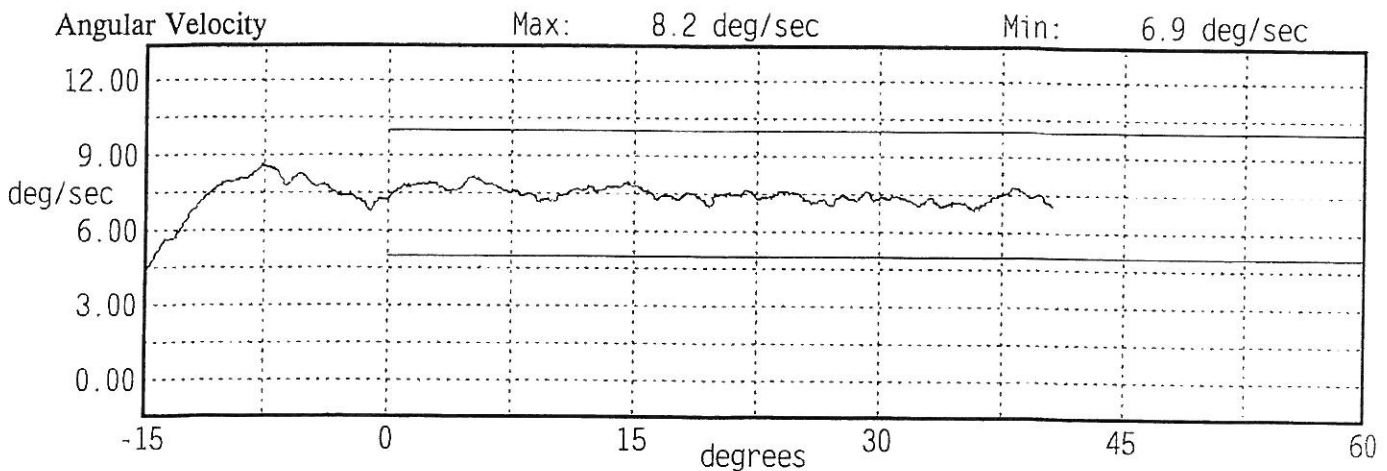
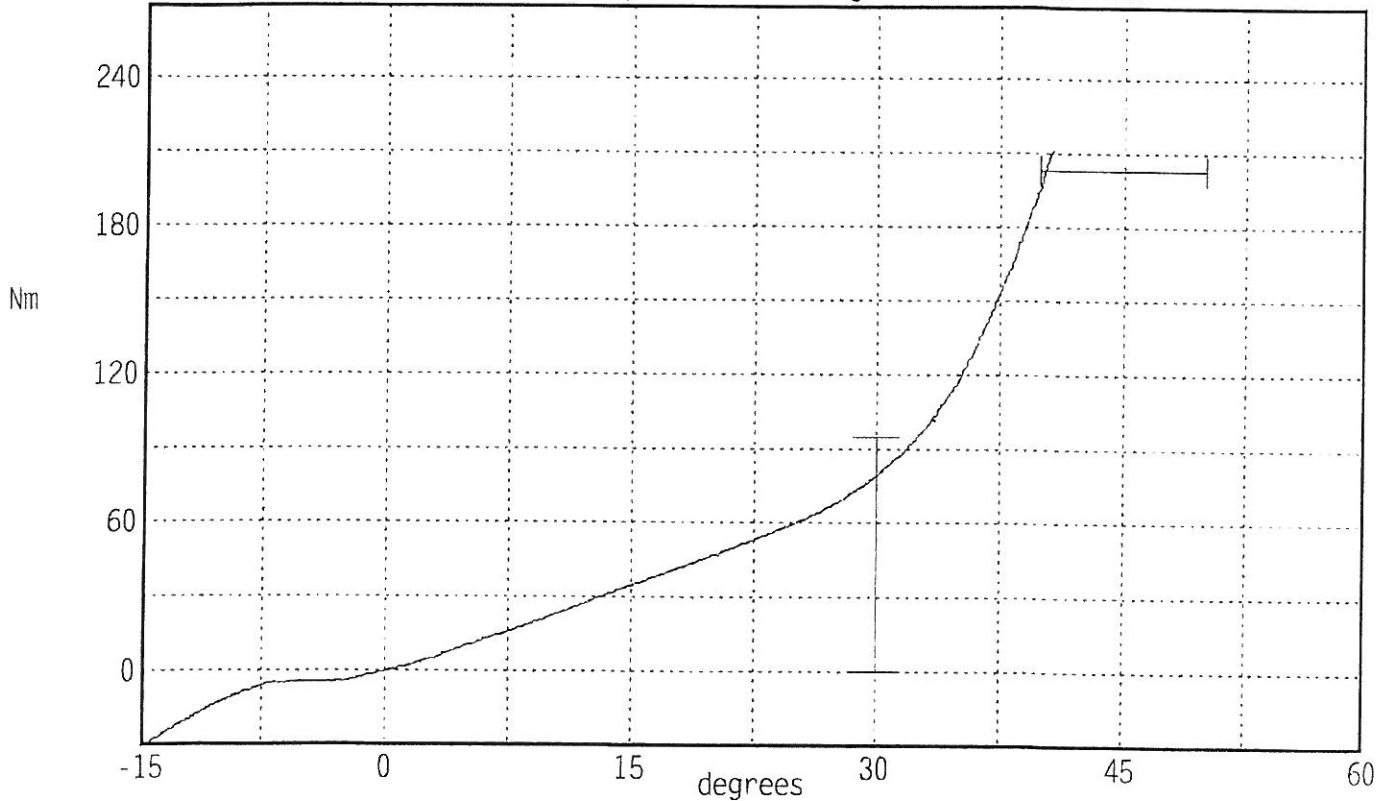
Hybrid III Hip Range of Motion

Serial Number: 001L  
 Test Number: 001C12  
 Comments:

Date: 10/28/2009  
 Time: 12:45

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.8 °C	Pass
Humidity	10 - 70	45 %	Pass
Moment at 30 deg	<= 94.9	79.3 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.4 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point  
 Peak Moment: 211.0 Nm at 40.6 deg  
 Peak Angle: 40.6 deg at 211.0 Nm



# Transportation Research Center Inc

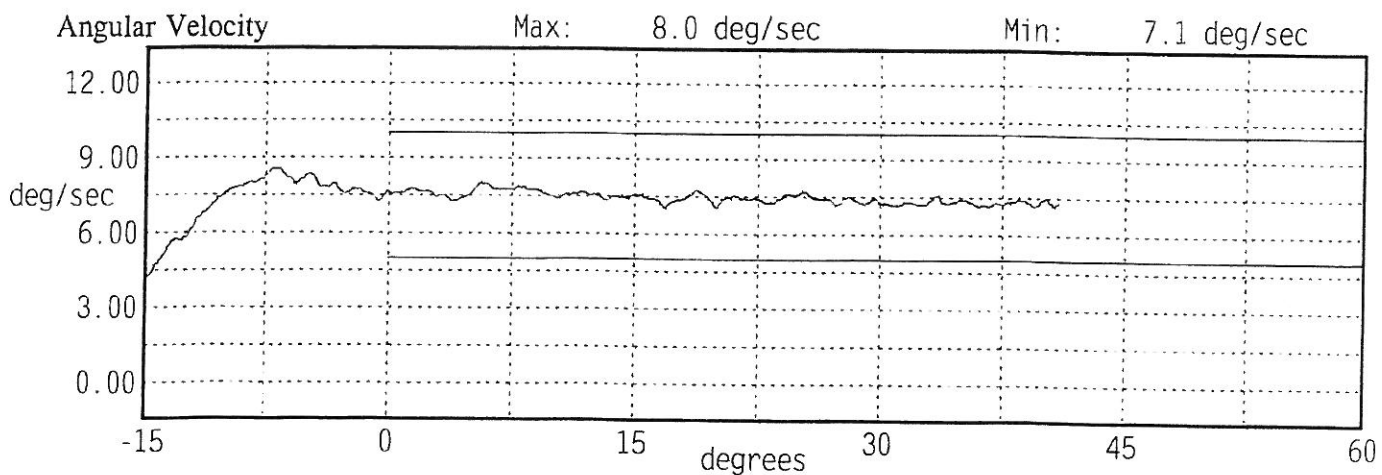
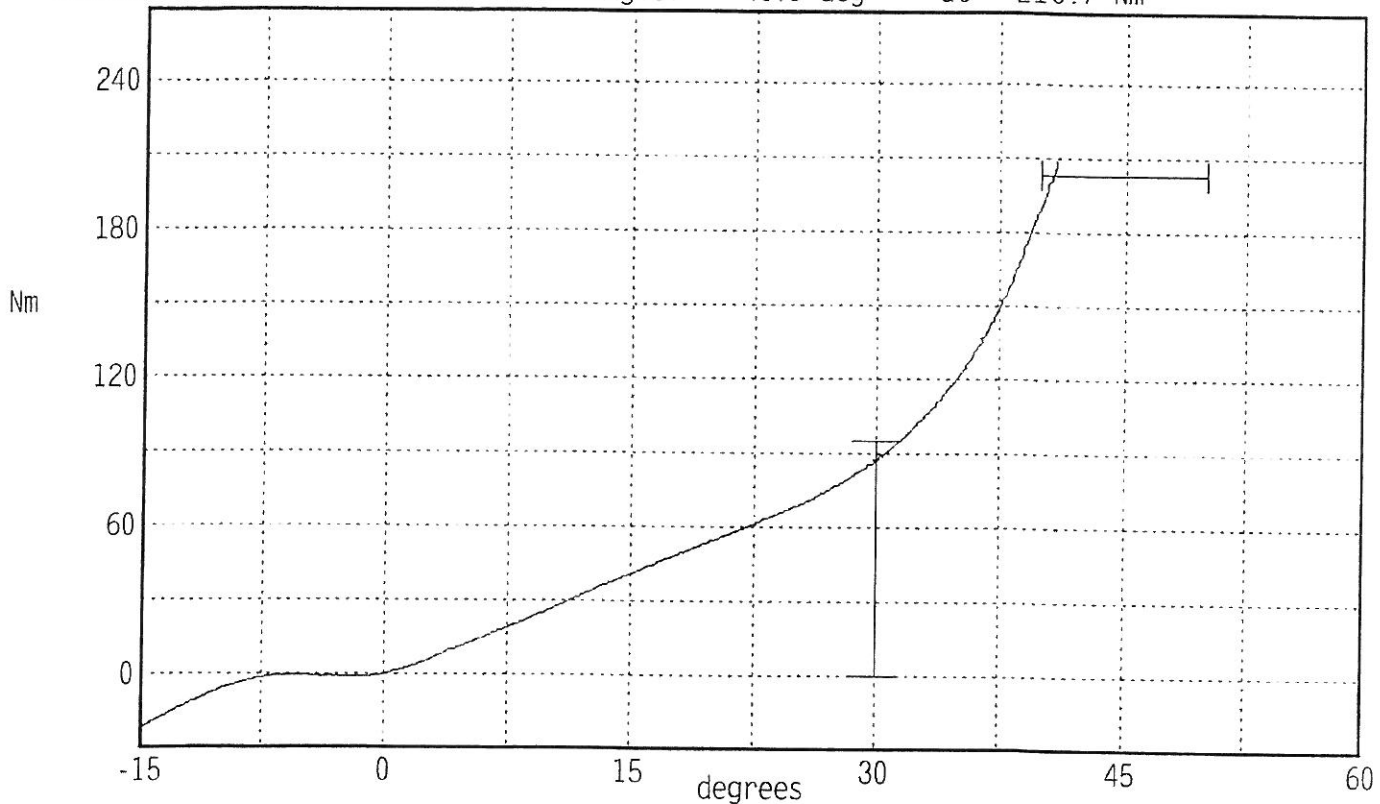
Hybrid III Hip Range of Motion

Serial Number: 001R  
 Test Number: 001C12  
 Comments:

Date: 10/28/2009  
 Time: 13:20

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.9 °C	Pass
Humidity	10 - 70	43 %	Pass
Moment at 30 deg	<= 94.9	87.7 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.7 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point  
 Peak Moment: 210.7 Nm at 40.9 deg  
 Peak Angle: 40.9 deg at 210.7 Nm



# Transportation Research Center Inc.

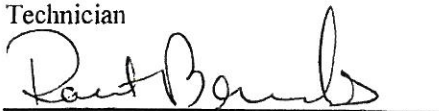
Left Knee Femur Response Test  
HIII 50th Serial No. 001 Certification No. 12-2  
Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.106 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,574.32 N	Yes

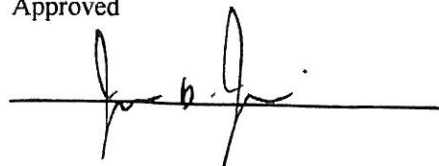
**Test meets specifications.**

**Comments:**

Technician



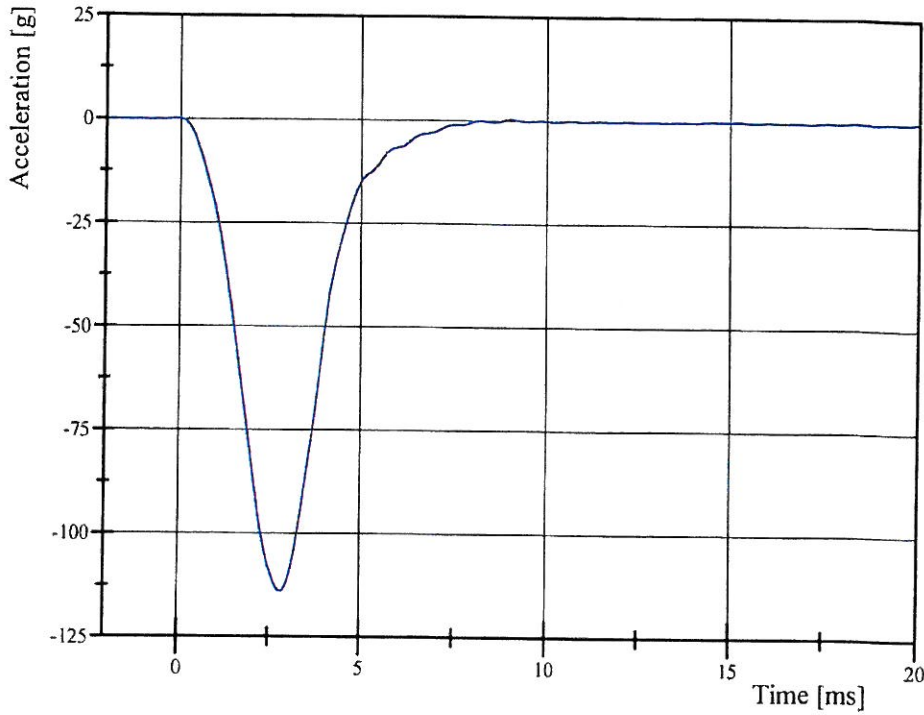
Approved



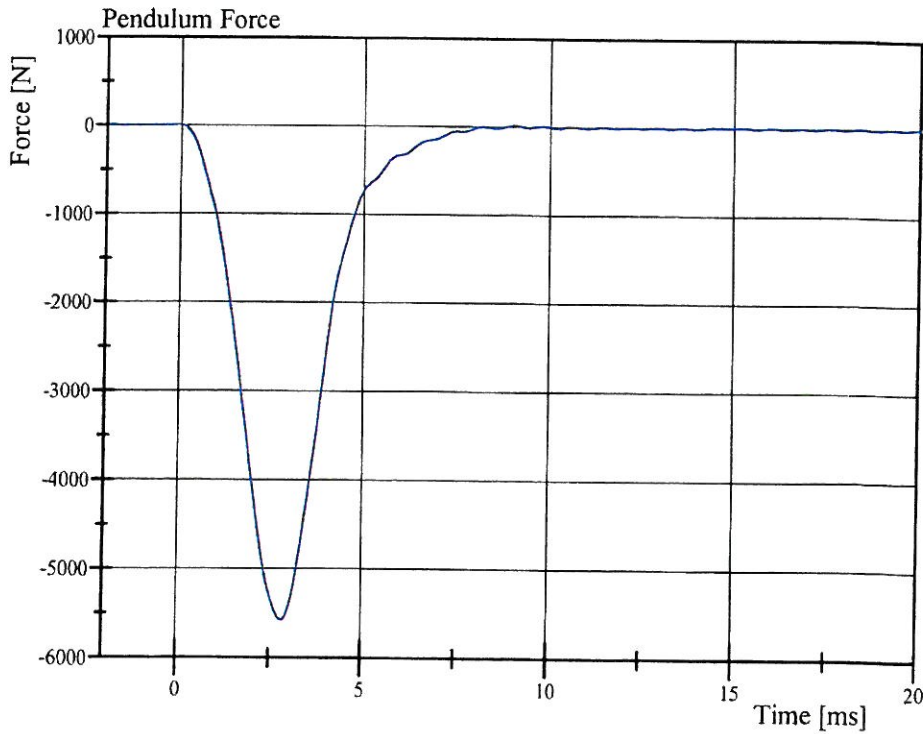
# Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 001 Certification No. 12-2  
Test Date: 10/28/2009

Pendulum Acceleration



Filter Class: CFC\_600  
Max: 0.4 g at 9.0 ms  
Min: -113.9 g at 2.8 ms



Filter Class: CFC\_600  
Max: 19.6 N at 9.0 ms  
Min: -5,574.3 N at 2.8 ms

# Transportation Research Center Inc.

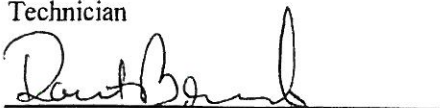
Right Knee Femur Response Test  
HIII 50th Serial No. 001 Certification No. 12-1  
Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.102 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-4,962.01 N	Yes

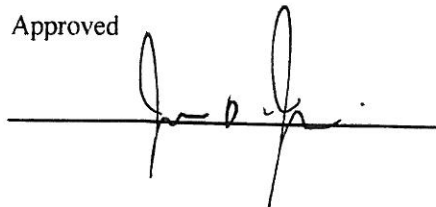
**Test meets specifications.**

**Comments:**

Technician

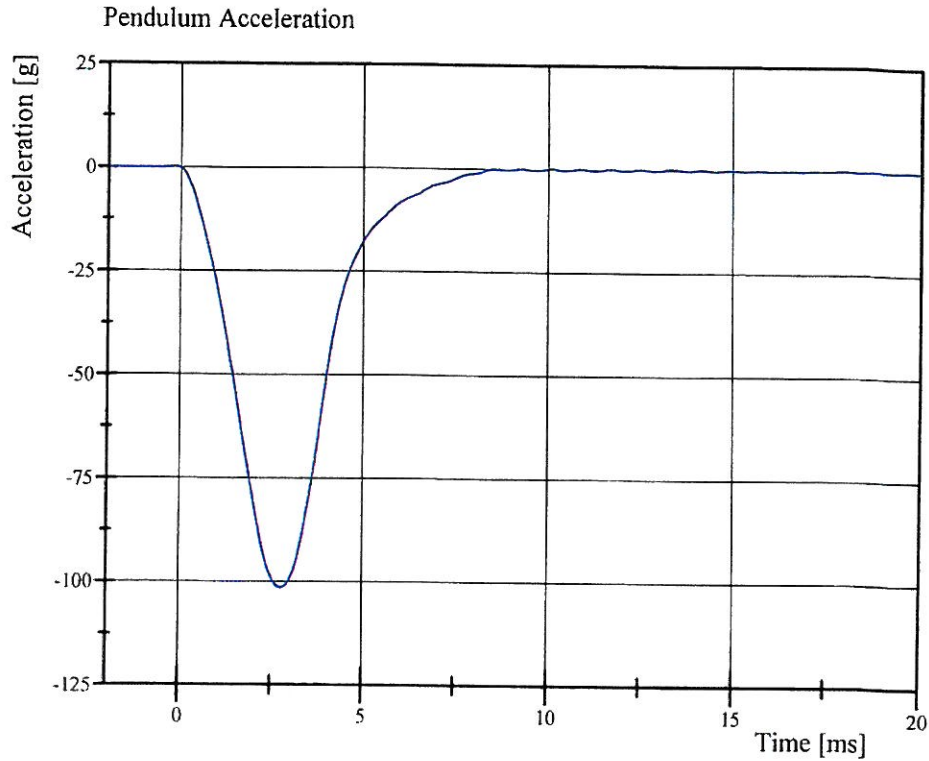


Approved

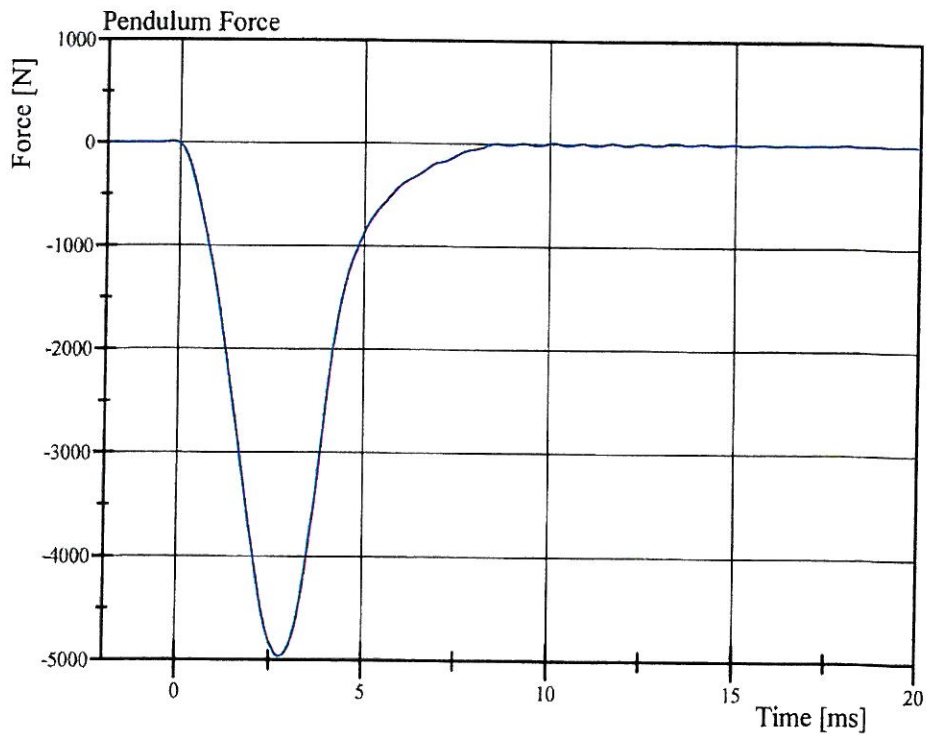


# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 001 Certification No. 12-1  
Test Date: 10/28/2009



Filter Class: CFC\_600  
Max: 0.3 g at 13.4 ms  
Min: -101.4 g at 2.8 ms

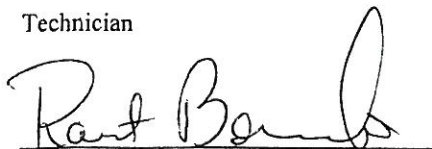


Filter Class: CFC\_600  
Max: 15.9 N at 13.4 ms  
Min: -4,962.0 N at 2.8 ms

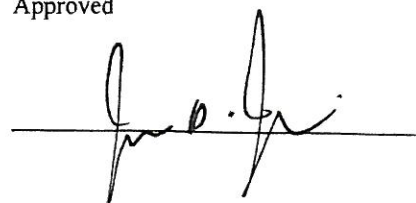
**Transportation Research Center Inc.**  
**572E HIII 50th Male Dummy**  
**External Dimensions**  
**Serial No. 001 Calibration No. 12**

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	883	Yes
B	Shoulder Pivot Height	505.5 - 520.7	516	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	137	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	93	Yes
F	Thigh Clearance	139.7 - 154.9	153	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	297	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	339	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	597	Yes
L	Popliteal Height	429.3 - 454.7	437	Yes
M	Knee Pivot Height	485.1 - 500.4	498	Yes
N	Buttock Popliteal Length	452.1 - 477.5	465	Yes
O	Chest Depth	213.4 - 228.6	228	Yes
P	Foot Length	251.5 - 266.7	260	Yes
V	Shoulder Breadth	421.6 - 436.9	429	Yes
W	Foot Breadth	91.4 - 106.7	99	Yes
Y	Chest Circumference	970.3 - 1000.8	995	Yes
Z	Waist Circumference	835.7 - 866.1	860	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	229	Yes

Technician



Approved



**Calibration Test Results**

**Pre-Test**

**Right Front Passenger Dummy S/N: 110**

# Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 110 Certification No. 32-1

Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	245.0 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-1.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

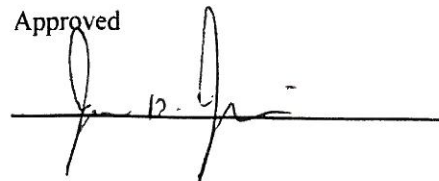
**Test meets specifications.**

**Comments:**

Technician



Approved

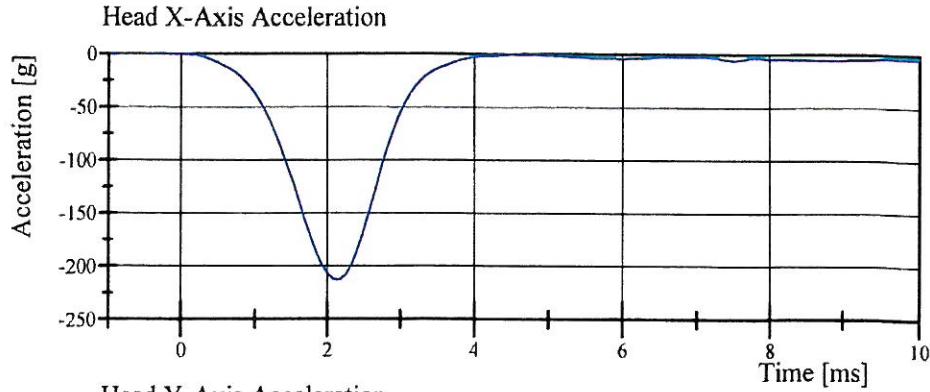


# Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 110 Certification No. 32-1

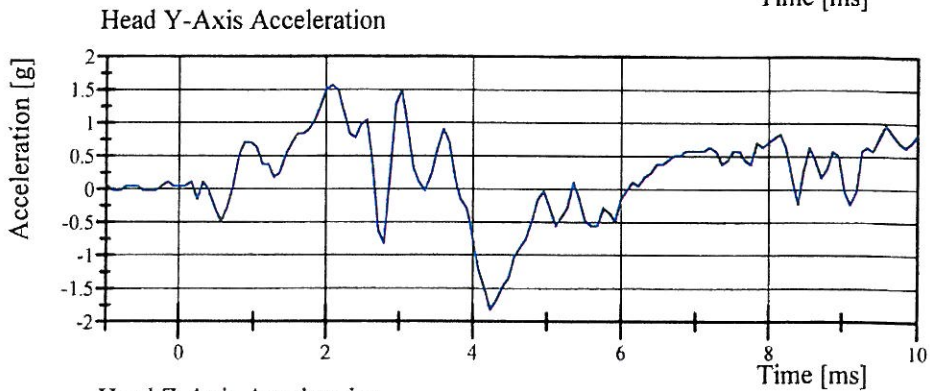
Test Date: 10/28/2009



Filter Class: CFC\_1000

Max: 0.0 g at -0.8 ms

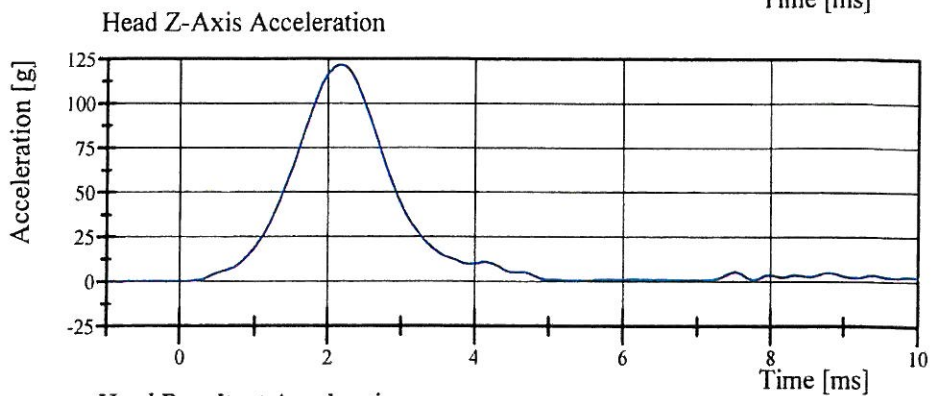
Min: -212.5 g at 2.2 ms



Filter Class: CFC\_1000

Max: 1.6 g at 2.1 ms

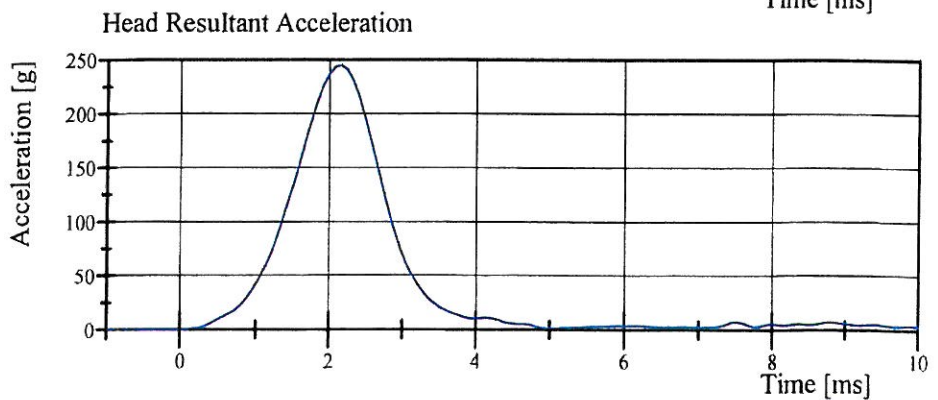
Min: -1.8 g at 4.2 ms



Filter Class: CFC\_1000

Max: 121.9 g at 2.2 ms

Min: -0.2 g at -0.8 ms



Filter Class: CFC\_1000

Max: 245.0 g at 2.2 ms

Min: 0.0 g at -0.4 ms

# Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 110 Certification No. 32-3

Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.948 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	37.1 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.90 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-22.18 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-17.53 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-17.53 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-73.4 °	Yes
Time of Peak	57 - 64 ms	60.9 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	122.6 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	96.5 N·m	Yes
Time of Peak	47 - 58 ms	50.3 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	101.7 ms	Yes

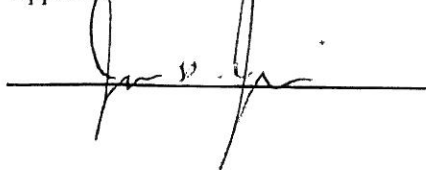
**Test meets specifications.**

**Comments:**

Technician



Approved



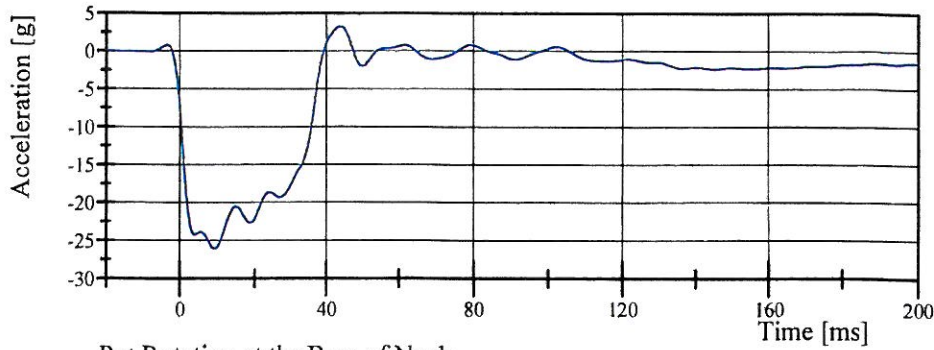
# Transportation Research Center Inc.

## Neck Flexion

HIII 50th Serial No. 110 Certification No. 32-3

Test Date: 10/29/2009

### Pendulum Acceleration

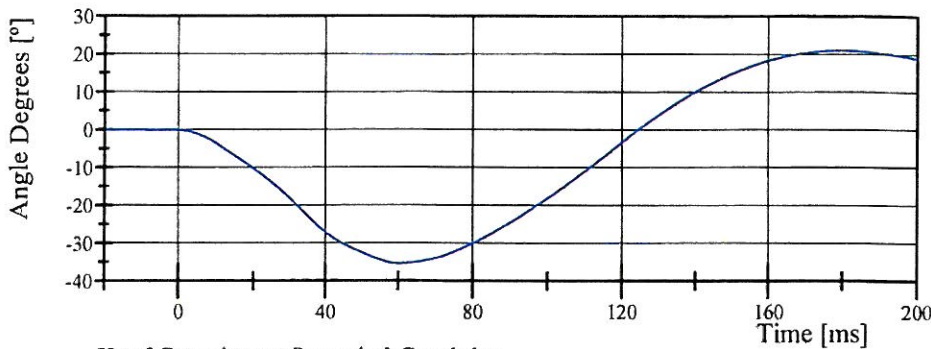


Filter Class: CFC\_60

Max: 3.3 g at 43.8 ms

Min: -26.1 g at 9.4 ms

### Pot Rotation at the Base of Neck

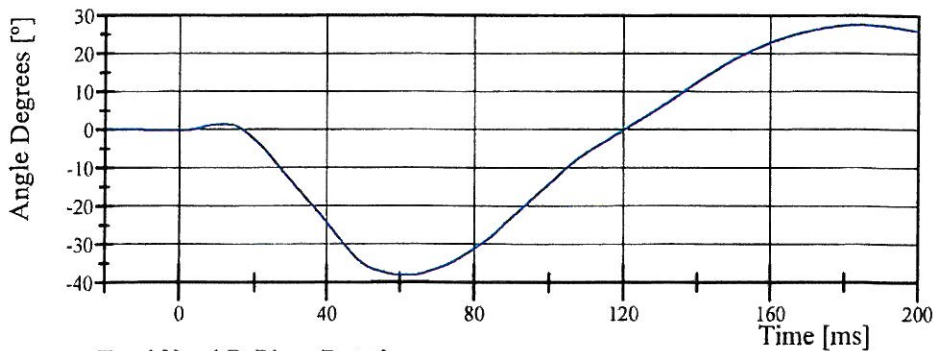


Filter Class: CFC\_60

Max: 21.0 ° at 179.8 ms

Min: -35.3 ° at 60.5 ms

### Head Rotation at Occypital Condyles

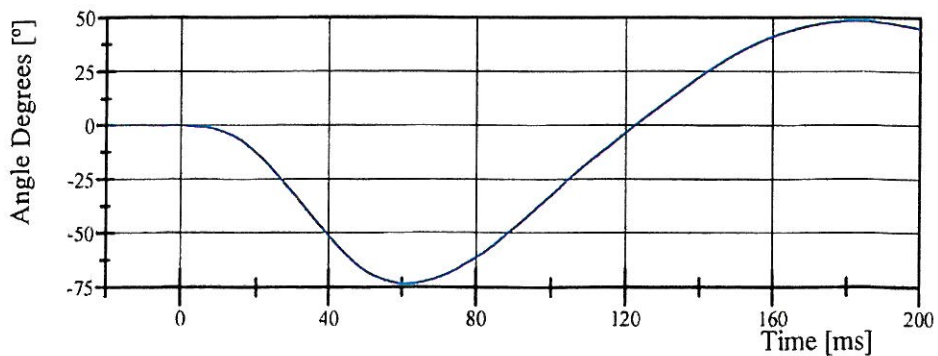


Filter Class: CFC\_60

Max: 27.6 ° at 185.0 ms

Min: -38.1 ° at 61.7 ms

### Total Head D-Plane Rotation



Filter Class: CFC\_60

Max: 48.5 ° at 182.9 ms

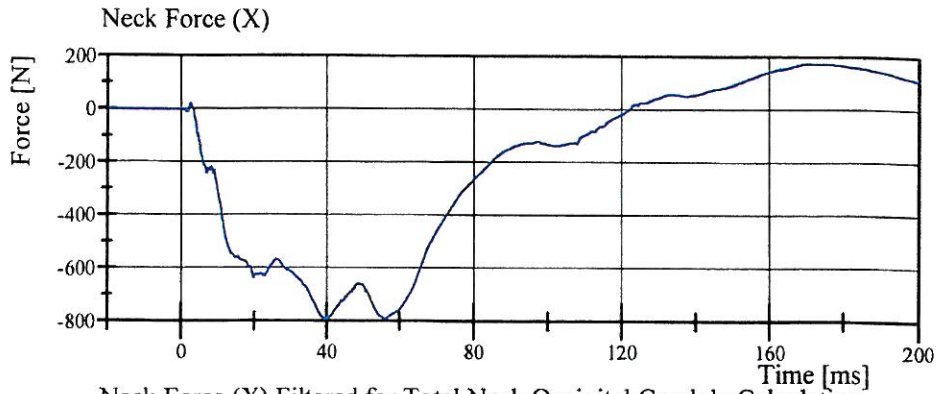
Min: -73.4 ° at 60.9 ms

# Transportation Research Center Inc.

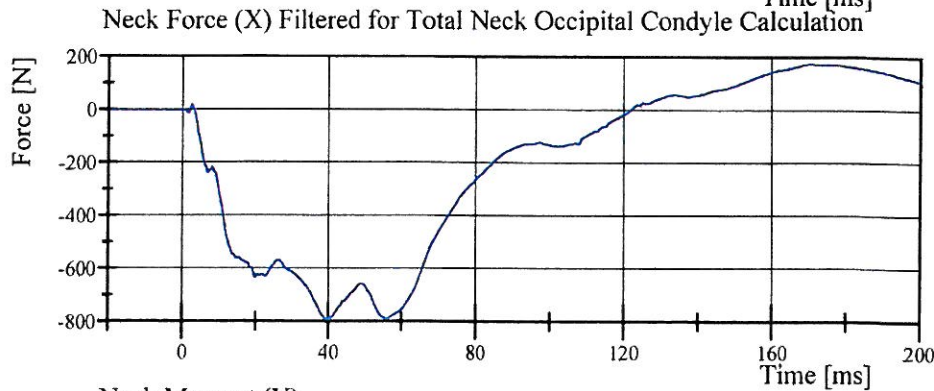
## Neck Flexion

HIII 50th Serial No. 110 Certification No. 32-3

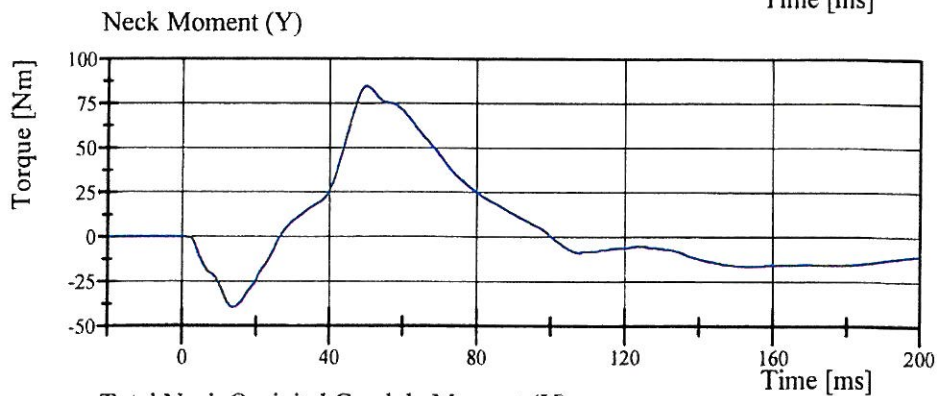
Test Date: 10/29/2009



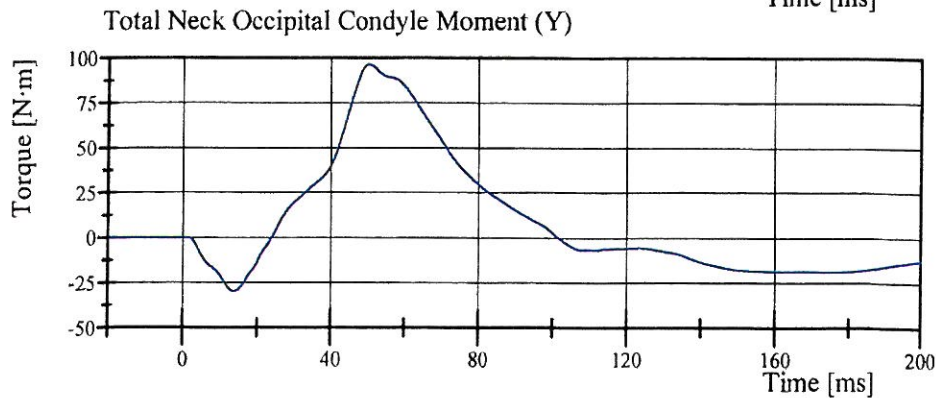
Filter Class: CFC\_1000  
Max: 176.8 N at 171.0 ms  
Min: -793.3 N at 39.6 ms



Filter Class: CFC\_600  
Max: 176.2 N at 171.1 ms  
Min: -792.8 N at 39.7 ms



Filter Class: CFC\_600  
Max: 84.7 Nm at 50.2 ms  
Min: -39.6 Nm at 13.8 ms



Filter Class: CFC\_600  
Max: 96.5 N·m at 50.3 ms  
Min: -30.0 N·m at 13.7 ms

# Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 110 Certification No. 32-1

Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.980 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	41.7 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.05 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.11 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.13 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.13 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	91.1 °	Yes
Time of Peak	72 - 82 ms	78.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	158.2 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-66.8 N·m	Yes
Time of Peak	65 - 79 ms	72.4 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	144.5 ms	Yes

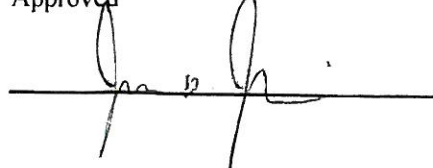
**Test meets specifications.**

**Comments:**

Technician



Approved

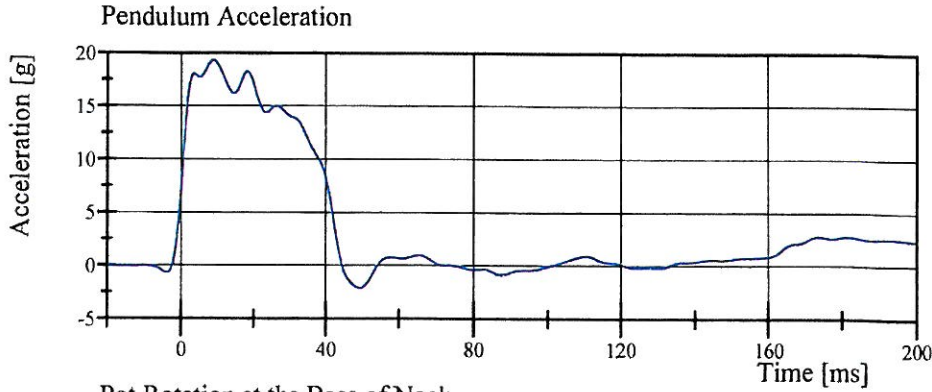


# Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 110 Certification No. 32-1

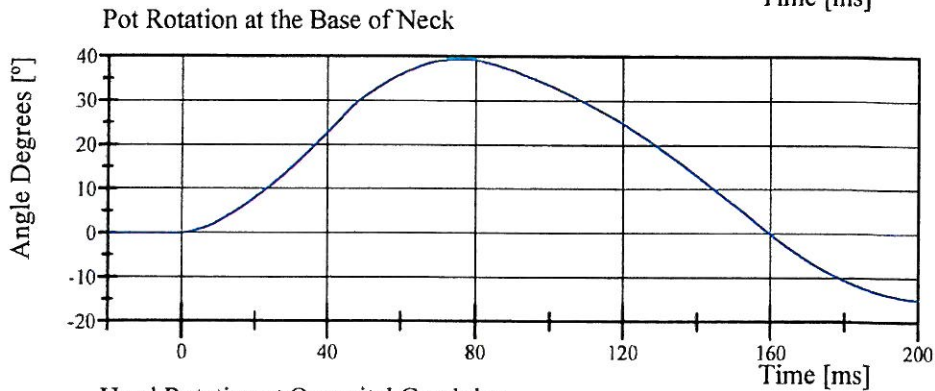
Test Date: 10/29/2009



Filter Class: CFC\_60

Max: 19.4 g at 8.8 ms

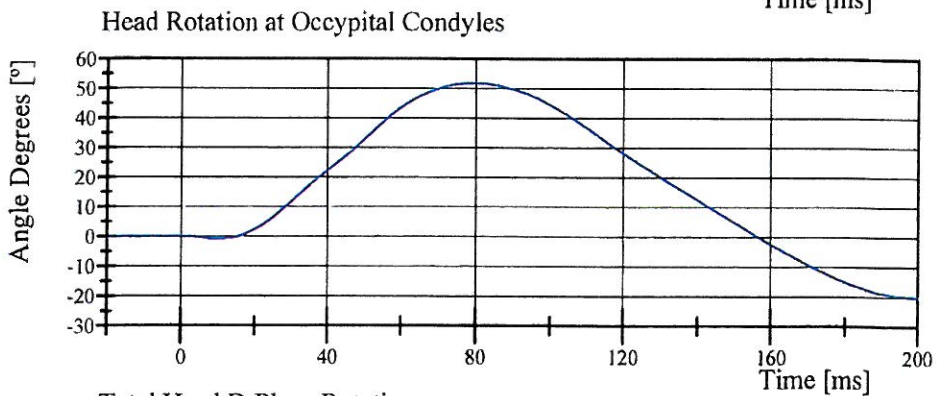
Min: -2.1 g at 49.4 ms



Filter Class: CFC\_60

Max: 39.4 ° at 77.2 ms

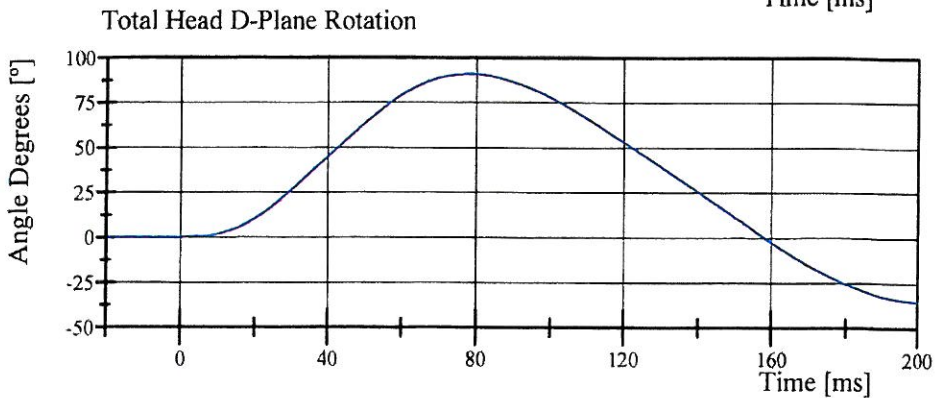
Min: -14.9 ° at 200.0 ms



Filter Class: CFC\_60

Max: 51.8 ° at 80.0 ms

Min: -20.2 ° at 200.0 ms



Filter Class: CFC\_60

Max: 91.1 ° at 78.4 ms

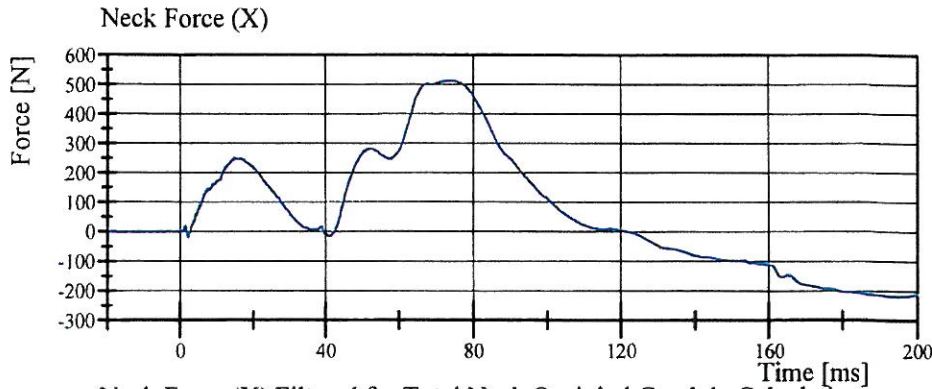
Min: -35.1 ° at 200.0 ms

# Transportation Research Center Inc.

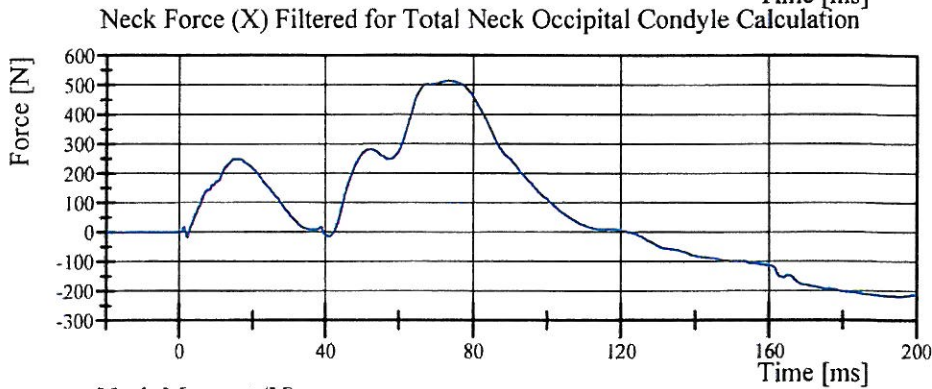
Neck Extension

HIII 50th Serial No. 110 Certification No. 32-1

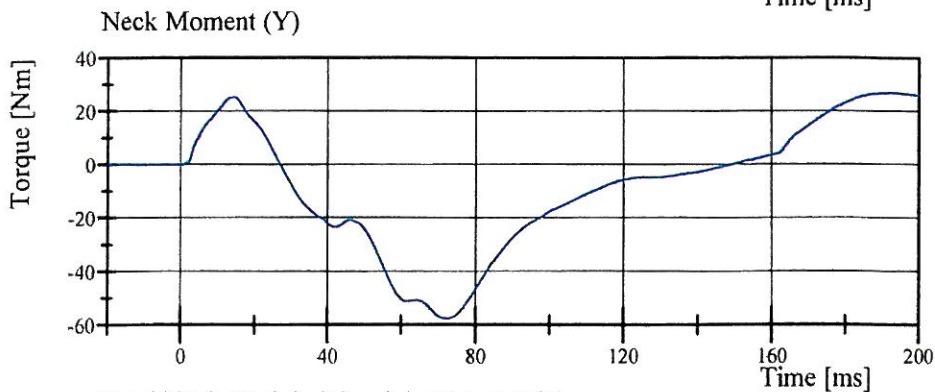
Test Date: 10/29/2009



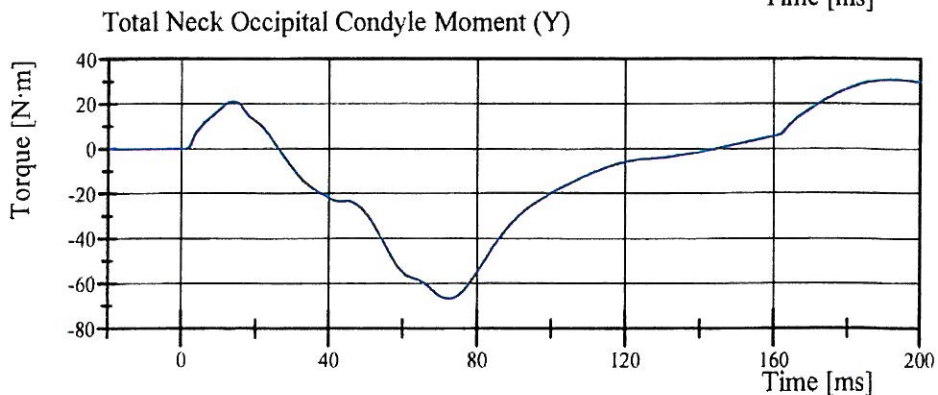
Filter Class: CFC\_1000  
Max: 515.6 N at 73.8 ms  
Min: -219.0 N at 194.6 ms



Filter Class: CFC\_600  
Max: 515.1 N at 73.9 ms  
Min: -218.4 N at 194.6 ms



Filter Class: CFC\_600  
Max: 26.9 Nm at 192.2 ms  
Min: -57.7 Nm at 72.3 ms



Filter Class: CFC\_600  
Max: 30.7 N·m at 192.3 ms  
Min: -66.8 N·m at 72.4 ms

# Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 110 Certification No. 32-1

Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.642 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,609.3 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-71.69 mm	Yes
Internal Hysteresis	65 - 85 %	71.1 %	Yes

Test meets specifications.

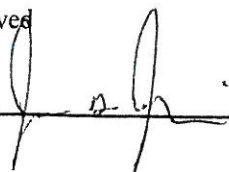
Comments:

Technician



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Approved



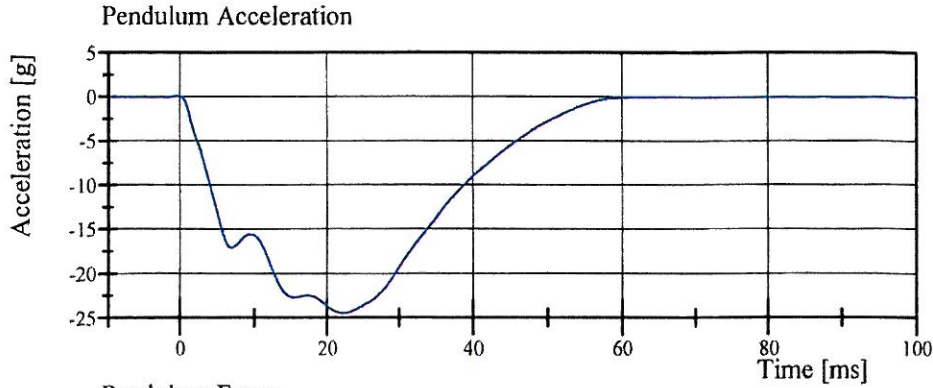
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# Transportation Research Center Inc.

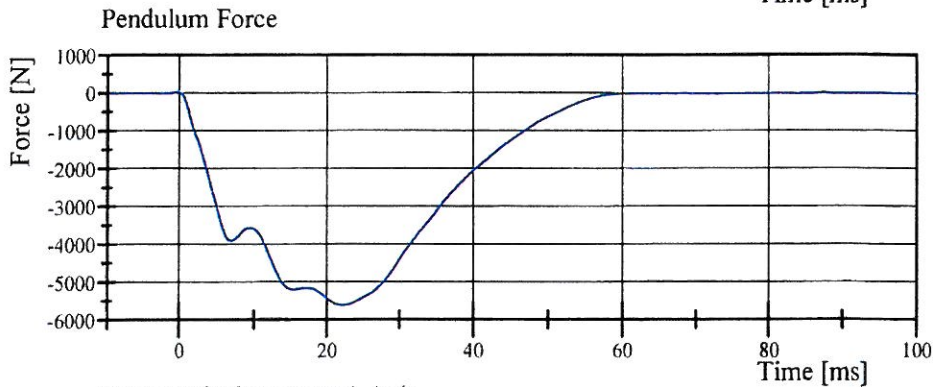
Front Thorax

HIII 50th Serial No. 110 Certification No. 32-1

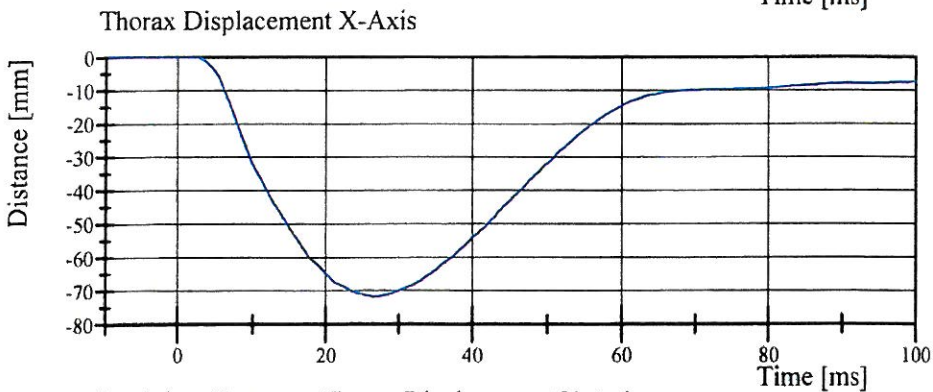
Test Date: 10/29/2009



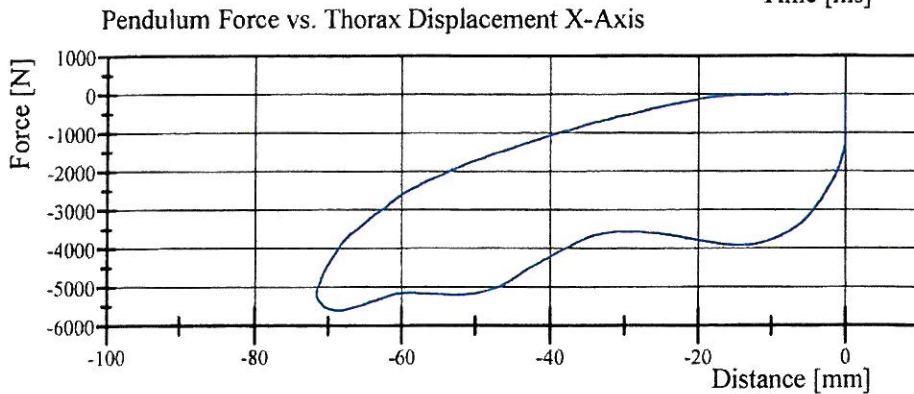
Filter Class: CFC\_180  
Max: 0.1 g at -0.2 ms  
Min: -24.5 g at 22.3 ms



Filter Class: CFC\_180  
Max: 25.2 N at -0.2 ms  
Min: -5,609.3 N at 22.3 ms



Filter Class: CFC\_600  
Max: 0.0 mm at -9.0 ms  
Min: -71.7 mm at 26.8 ms



Filter Class: CFC\_180  
Max: 25.2 N at 0.0 mm  
Min: -5,609.3 N at -68.6 mm

# Transportation Research Center Inc

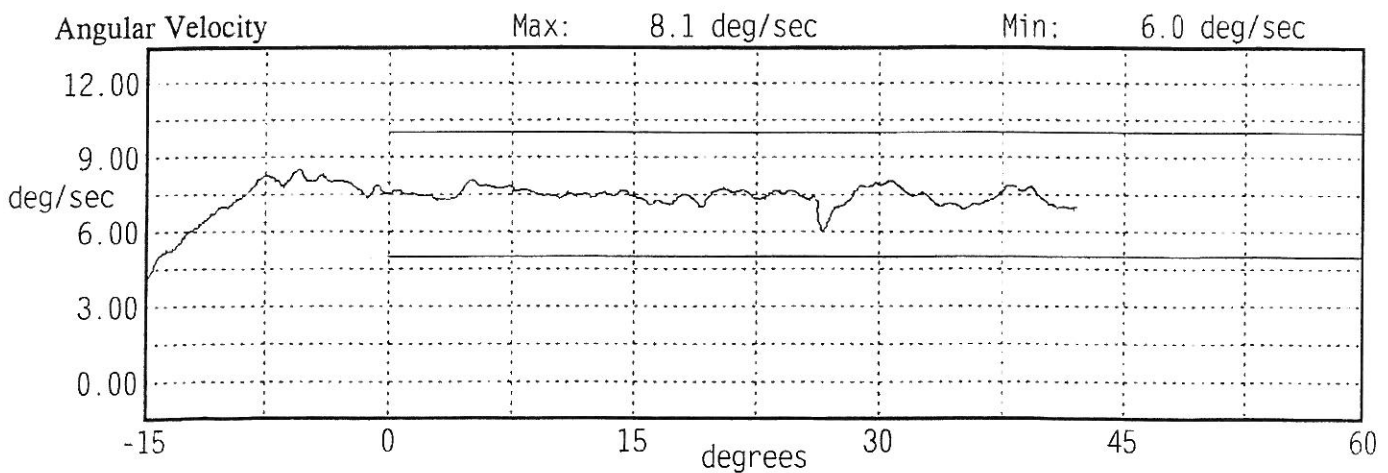
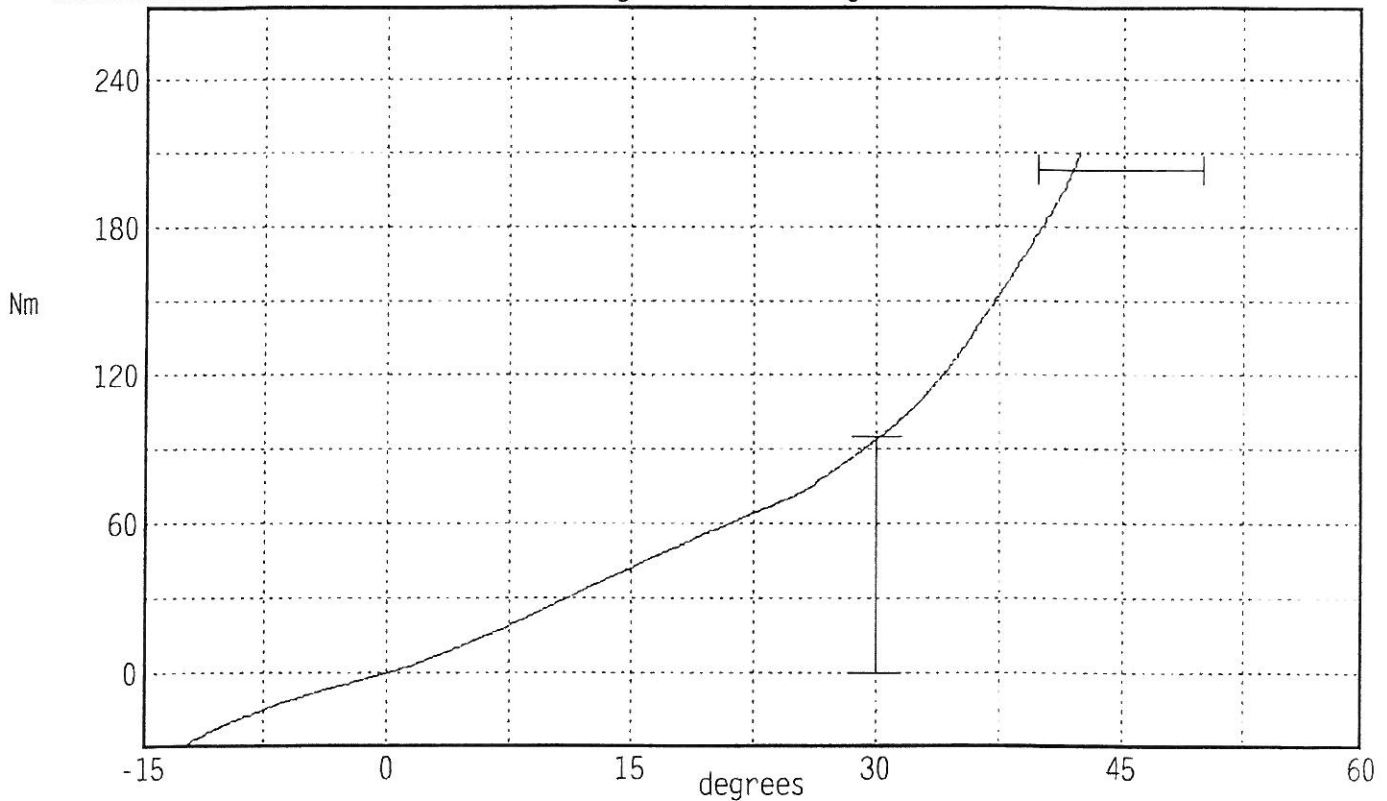
Hybrid III Hip Range of Motion

Serial Number: 110L  
Test Number: 110C32  
Comments:

Date: 10/28/2009  
Time: 15:53

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.8 °C	Pass
Humidity	10 - 70	45 %	Pass
Moment at 30 deg	<= 94.9	94.1 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.0 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point  
Peak Moment: 210.5 Nm at 42.3 deg  
Peak Angle: 42.3 deg at 209.3 Nm



# Transportation Research Center Inc

Hybrid III Hip Range of Motion

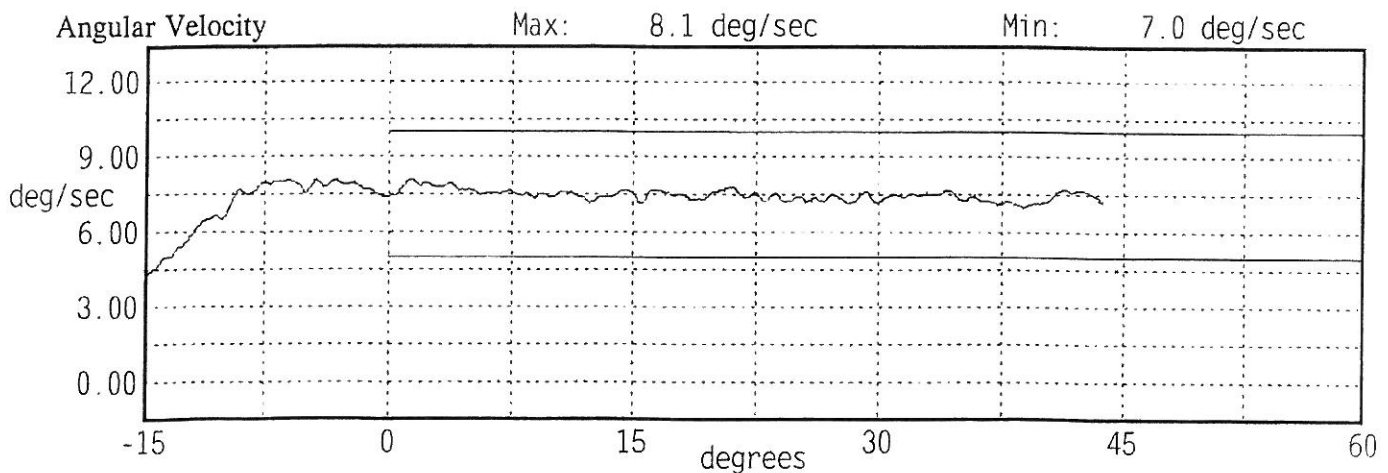
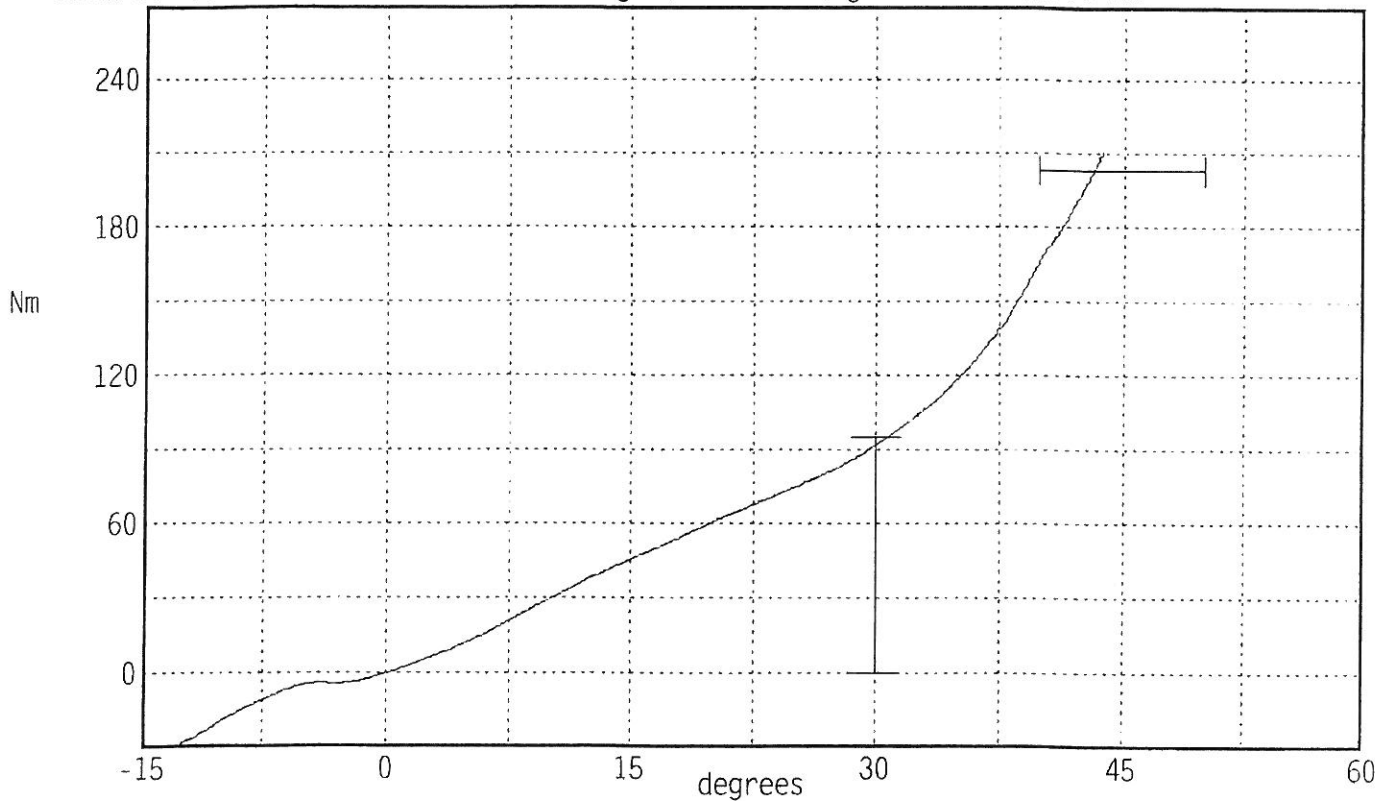
Serial Number: 110R  
 Test Number: 110C32

Date: 10/28/2009  
 Time: 16:01

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.8 °C	Pass
Humidity	10 - 70	45 %	Pass
Moment at 30 deg	<= 94.9	92.0 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	43.1 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point  
 Peak Moment: 210.5 Nm at 43.6 deg  
 Peak Angle: 43.6 deg at 209.5 Nm



# Transportation Research Center Inc.

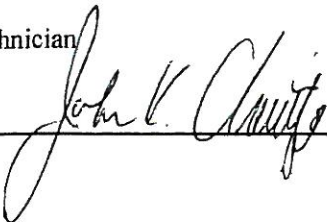
Left Knee Femur Response Test  
HIII 50th Serial No. 110 Certification No. 32-1  
Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.095 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,199.84 N	Yes

**Test meets specifications.**

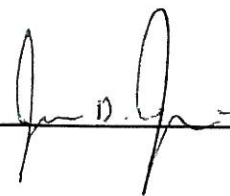
**Comments:**

Technician



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Approved

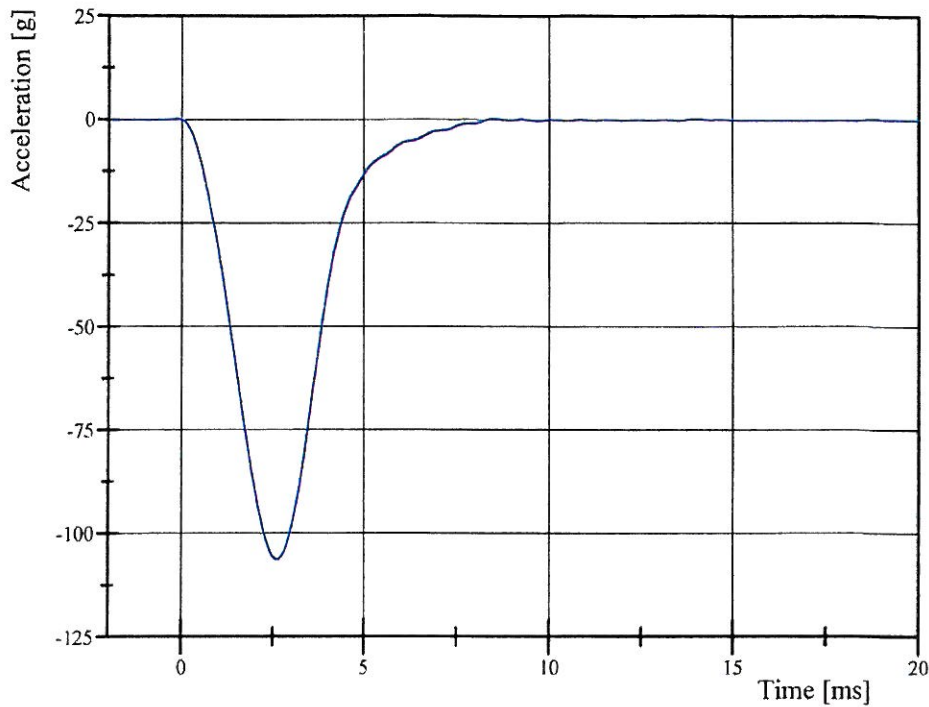


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# Transportation Research Center Inc.

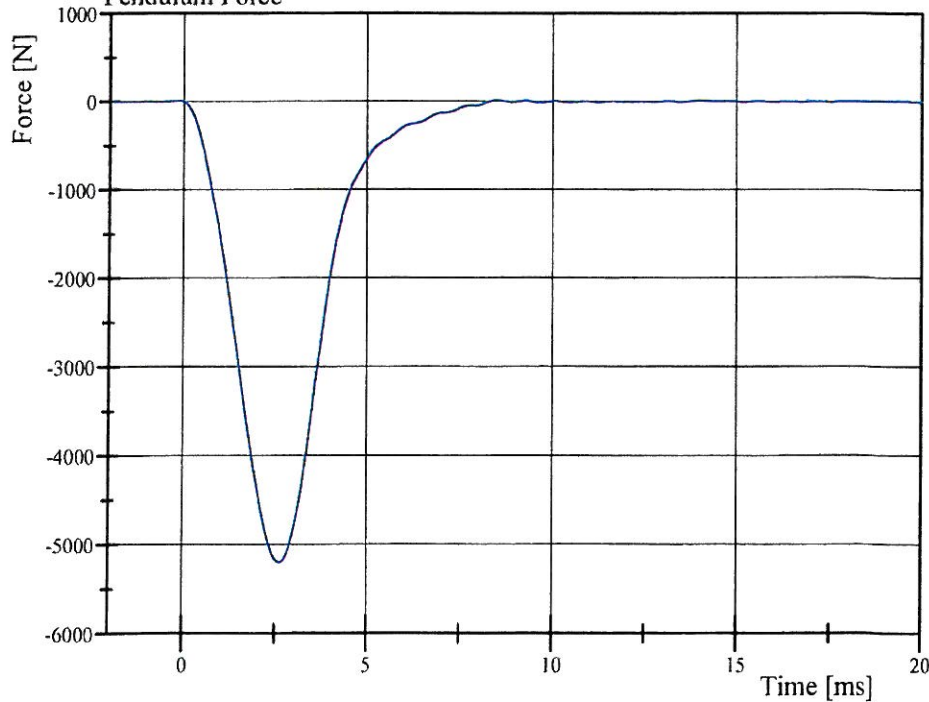
Left Knee Femur Response Test  
HIII 50th Serial No. 110 Certification No. 32-1  
Test Date: 10/28/2009

Pendulum Acceleration



Filter Class: CFC\_600  
Max: 0.3 g at 8.5 ms  
Min: -106.3 g at 2.6 ms

Pendulum Force



Filter Class: CFC\_600  
Max: 16.3 N at 8.5 ms  
Min: -5,199.8 N at 2.6 ms

# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 110 Certification No. 32-3  
Test Date: 10/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.100 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,606.17 N	Yes

Test meets specifications.

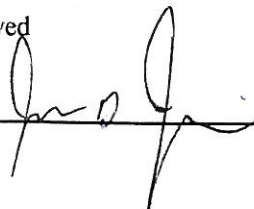
Comments:

Technician



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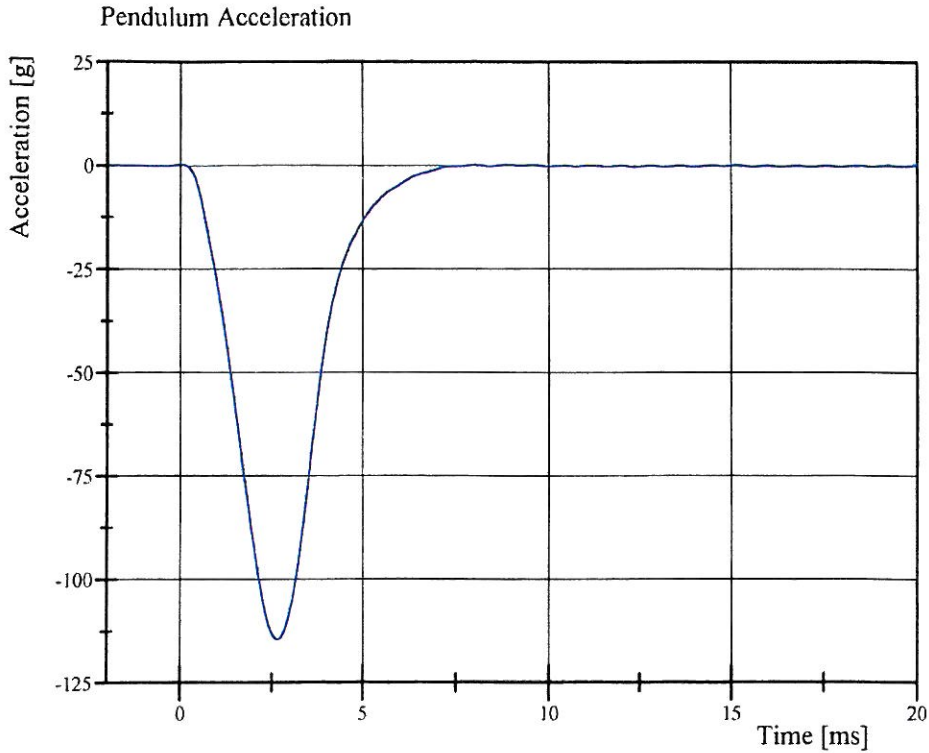
Approved



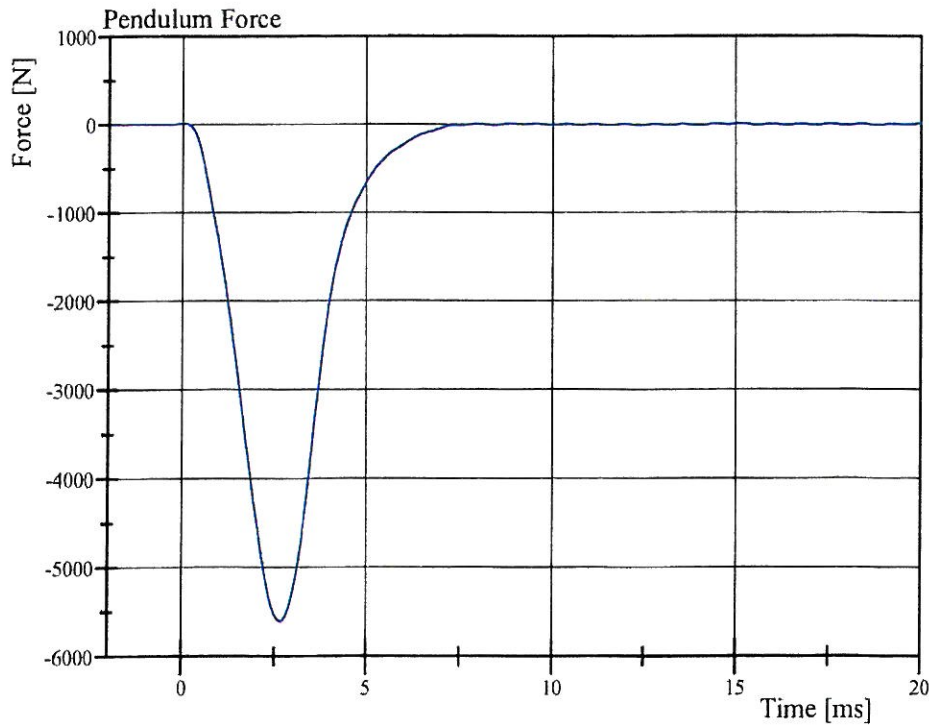
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# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 110 Certification No. 32-3  
Test Date: 10/28/2009



Filter Class: CFC\_600  
Max: 0.3 g at 0.0 ms  
Min: -114.6 g at 2.6 ms

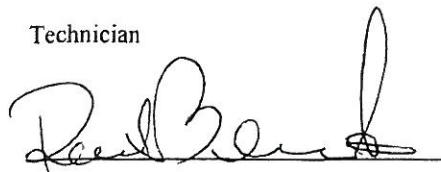


Filter Class: CFC\_600  
Max: 15.2 N at 0.0 ms  
Min: -5,606.2 N at 2.6 ms

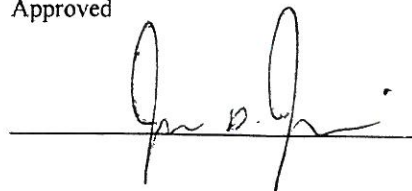
**Transportation Research Center Inc.**  
**572E HIII 50th Male Dummy**  
**External Dimensions**  
**Serial No. 110 Calibration No. 32**

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	885	Yes
B	Shoulder Pivot Height	505.5 - 520.7	513	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	93	Yes
F	Thigh Clearance	139.7 - 154.9	152	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	293	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	337	Yes
J	Elbow Rest Height	190.5 - 210.8	202	Yes
K	Buttock Knee Length	579.1 - 604.5	598	Yes
L	Popliteal Height	429.3 - 454.7	443	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	473	Yes
O	Chest Depth	213.4 - 228.6	225	Yes
P	Foot Length	251.5 - 266.7	260	Yes
V	Shoulder Breadth	421.6 - 436.9	431	Yes
W	Foot Breadth	91.4 - 106.7	100	Yes
Y	Chest Circumference	970.3 - 1000.8	997	Yes
Z	Waist Circumference	835.7 - 866.1	863	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Technician



Approved



**Calibration Test Results**

**Pre-Test**

**Left Rear Passenger Dummy S/N: 043**

# Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 043 Certification No. 8-1

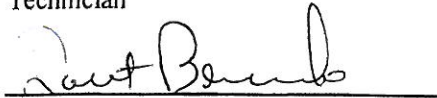
Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	256.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	5.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

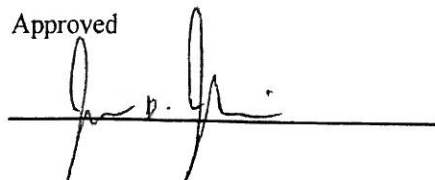
**Test meets specifications.**

**Comments:**

Technician



Approved

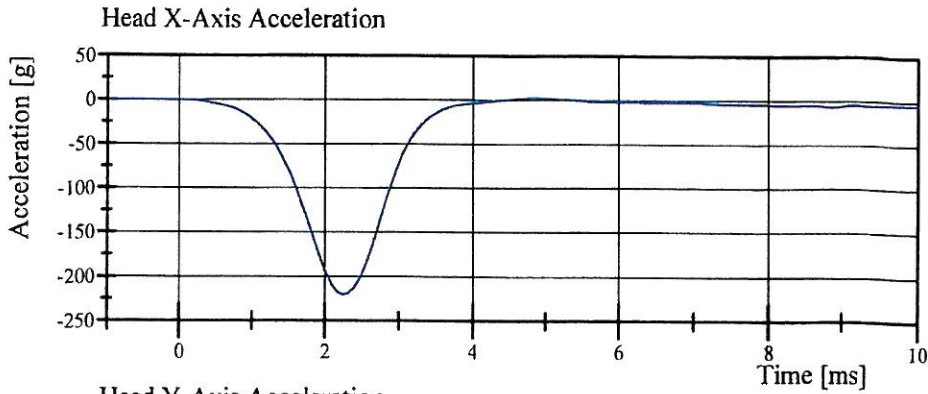


# Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 043 Certification No. 8-1

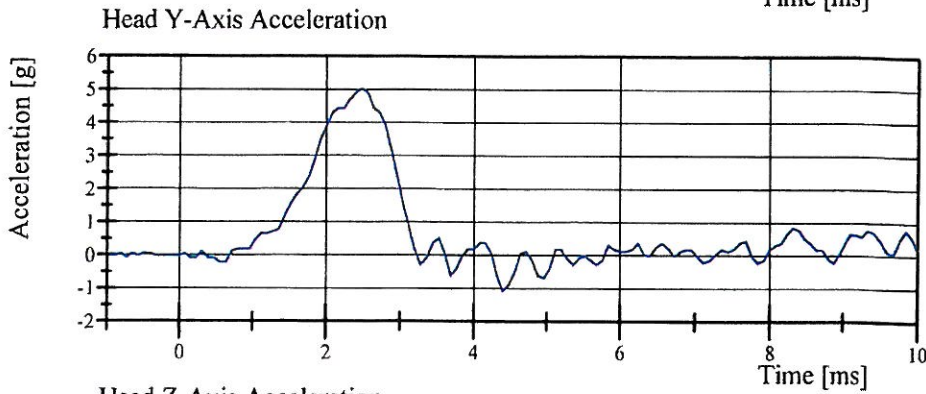
Test Date: 10/29/2009



Filter Class: CFC\_1000

Max: 3.1 g at 4.8 ms

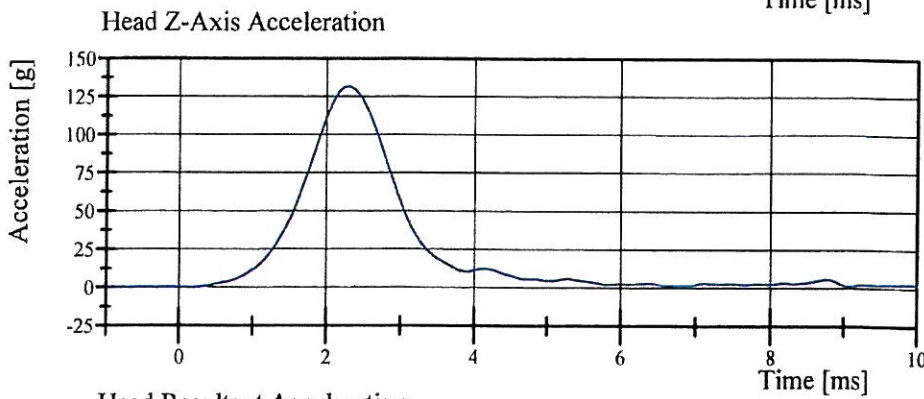
Min: -220.3 g at 2.2 ms



Filter Class: CFC\_1000

Max: 5.0 g at 2.5 ms

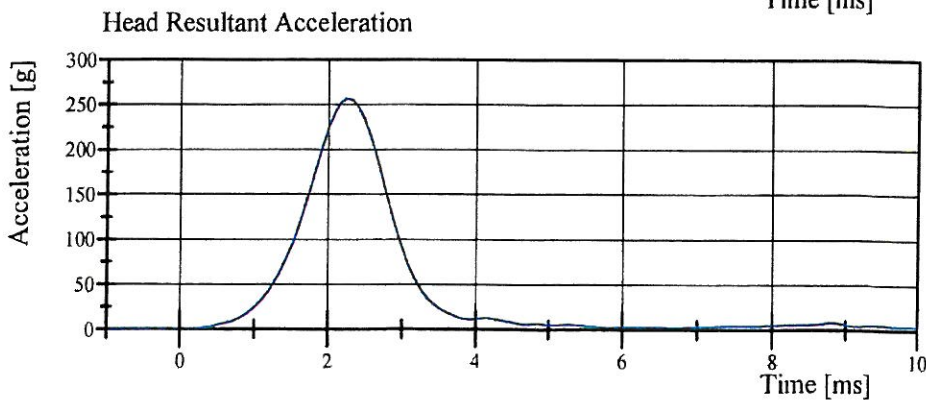
Min: -1.1 g at 4.4 ms



Filter Class: CFC\_1000

Max: 132.0 g at 2.3 ms

Min: -0.1 g at -1.0 ms



Filter Class: CFC\_1000

Max: 256.5 g at 2.2 ms

Min: 0.0 g at -1.0 ms

# Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 043 Certification No. 8-1

Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.949 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.6 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.87 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-22.44 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.85 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.85 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-68.3 °	Yes
Time of Peak	57 - 64 ms	60.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	121.1 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	97.3 N·m	Yes
Time of Peak	47 - 58 ms	51.3 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.2 ms	Yes

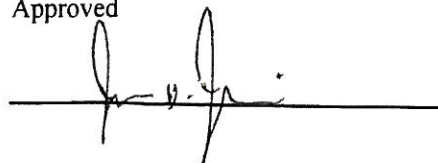
**Test meets specifications.**

**Comments:**

Technician



Approved

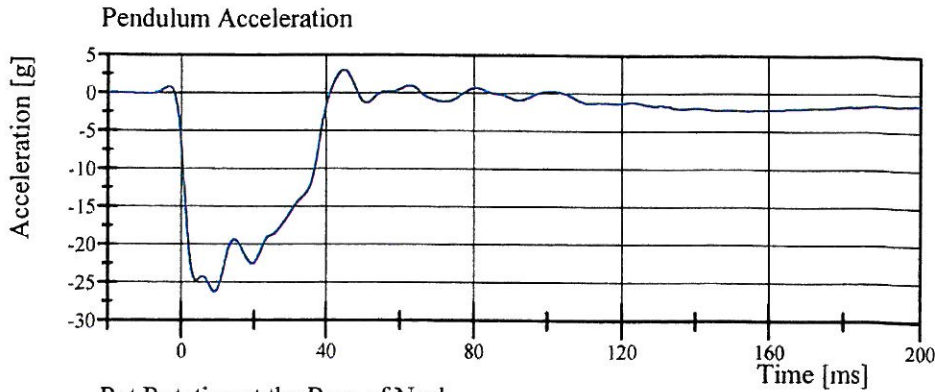


# Transportation Research Center Inc.

## Neck Flexion

HIII 50th Serial No. 043 Certification No. 8-1

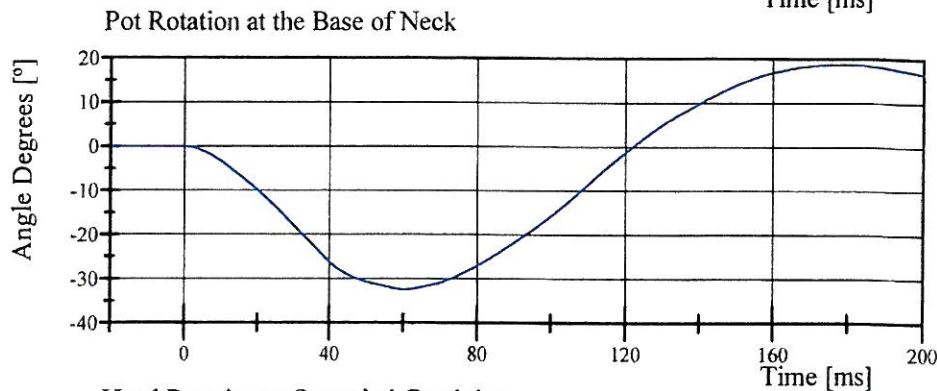
Test Date: 10/29/2009



Filter Class: CFC\_60

Max: 3.1 g at 44.9 ms

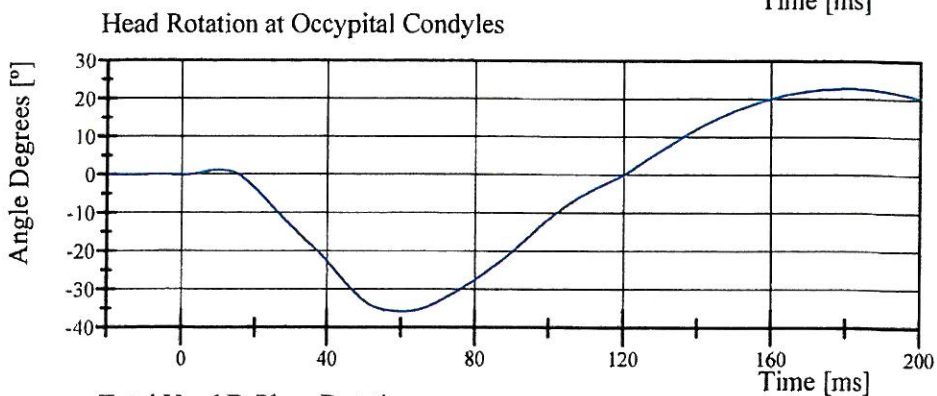
Min: -26.2 g at 9.3 ms



Filter Class: CFC\_60

Max: 18.9 ° at 178.3 ms

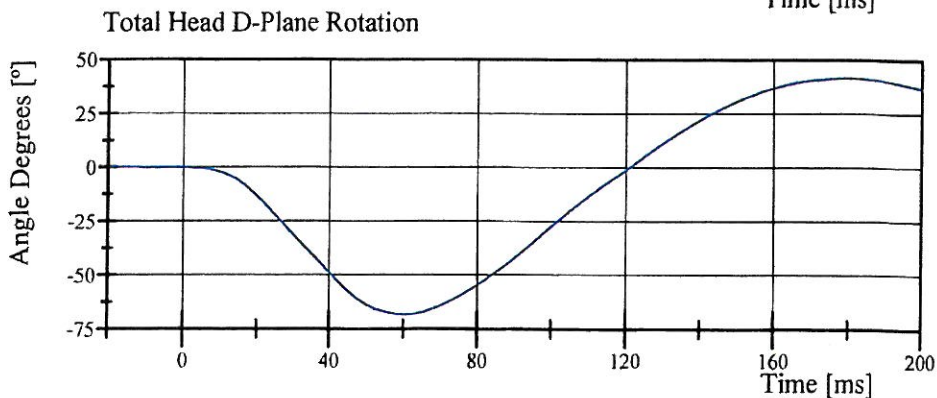
Min: -32.4 ° at 60.4 ms



Filter Class: CFC\_60

Max: 22.8 ° at 181.4 ms

Min: -35.8 ° at 60.4 ms



Filter Class: CFC\_60

Max: 41.7 ° at 179.5 ms

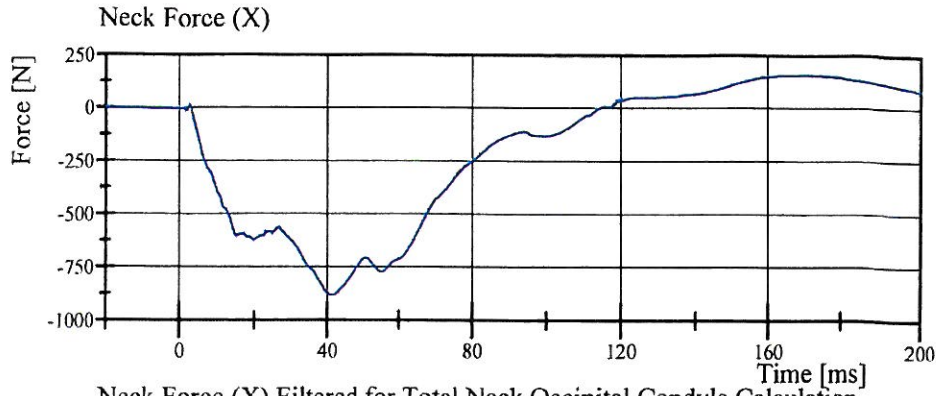
Min: -68.3 ° at 60.4 ms

# Transportation Research Center Inc.

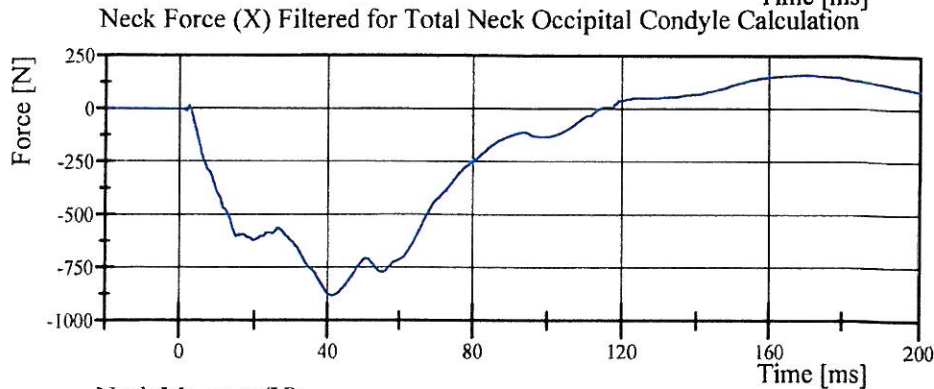
## Neck Flexion

HIII 50th Serial No. 043 Certification No. 8-1

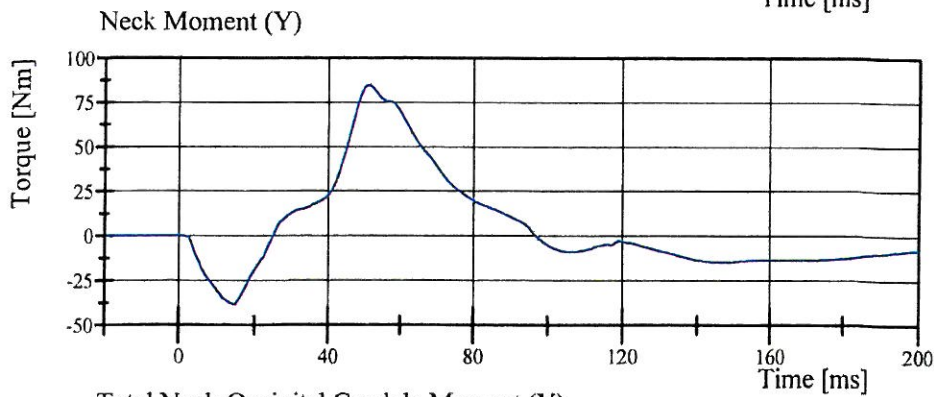
Test Date: 10/29/2009



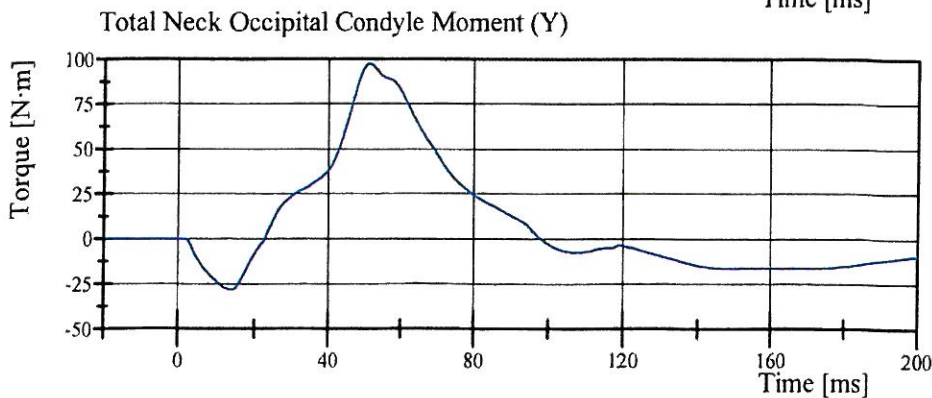
Filter Class: CFC\_1000  
Max: 162.4 N at 170.1 ms  
Min: -881.4 N at 41.0 ms



Filter Class: CFC\_600  
Max: 162.2 N at 170.2 ms  
Min: -881.2 N at 41.2 ms



Filter Class: CFC\_600  
Max: 84.8 Nm at 51.2 ms  
Min: -38.4 Nm at 14.6 ms



Filter Class: CFC\_600  
Max: 97.3 N·m at 51.3 ms  
Min: -28.3 N·m at 14.0 ms

# Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 043 Certification No. 8-1

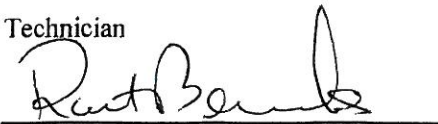
Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.979 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	43.1 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.35 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.43 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.11 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.11 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	92.1 °	Yes
Time of Peak	72 - 82 ms	77.9 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	161.0 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-64.7 N·m	Yes
Time of Peak	65 - 79 ms	73.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	145.1 ms	Yes

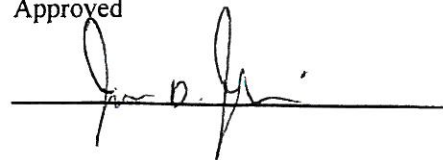
**Test meets specifications.**

**Comments:**

Technician



Approved

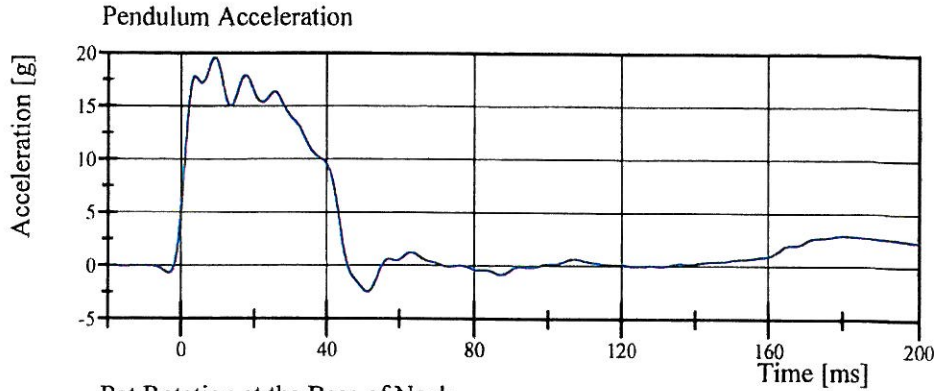


# Transportation Research Center Inc.

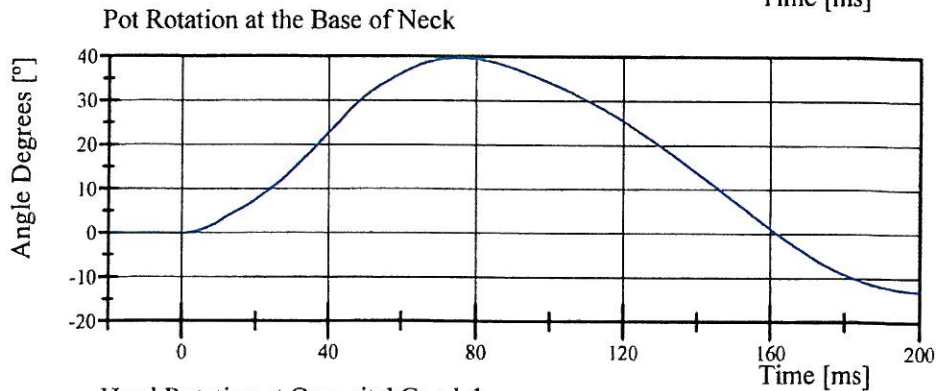
## Neck Extension

HIII 50th Serial No. 043 Certification No. 8-1

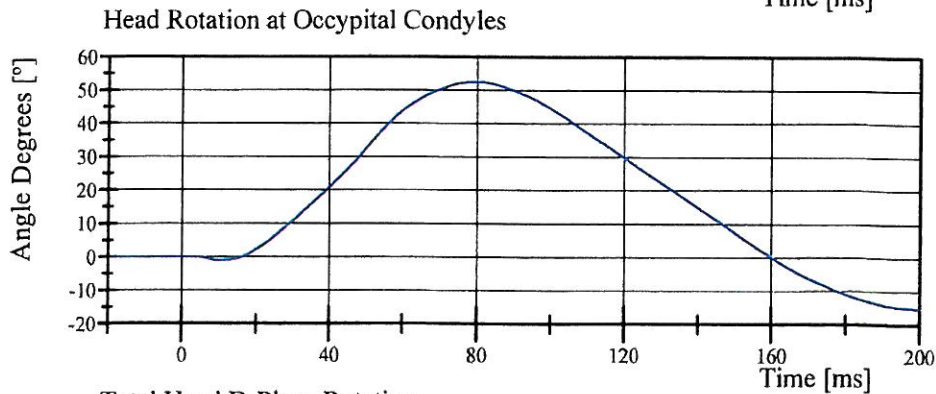
Test Date: 10/29/2009



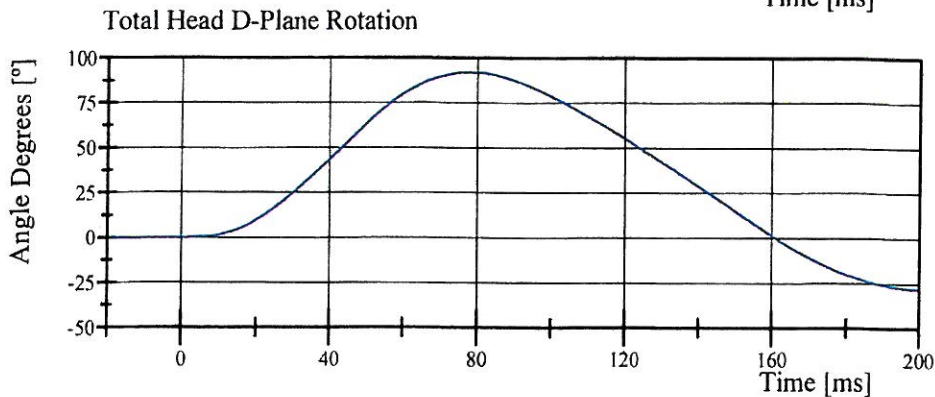
Filter Class: CFC\_60  
Max: 19.6 g at 9.3 ms  
Min: -2.4 g at 51.1 ms



Filter Class: CFC\_60  
Max: 39.7 ° at 75.7 ms  
Min: -13.0 ° at 200.0 ms



Filter Class: CFC\_60  
Max: 52.5 ° at 79.9 ms  
Min: -15.2 ° at 200.0 ms



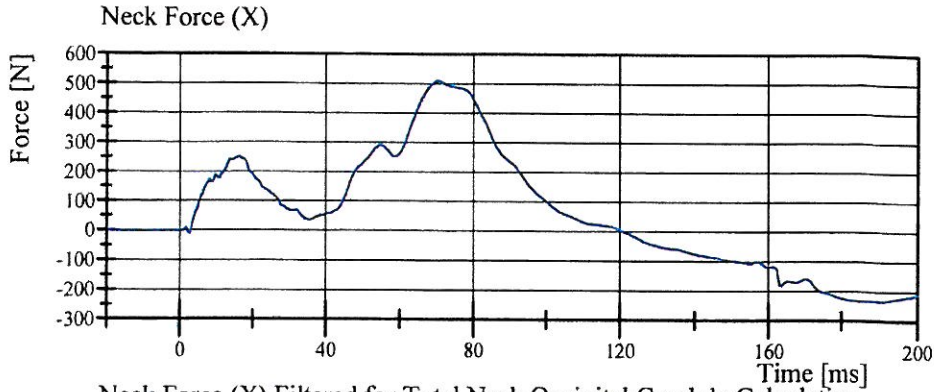
Filter Class: CFC\_60  
Max: 92.1 ° at 77.9 ms  
Min: -28.1 ° at 200.0 ms

# Transportation Research Center Inc.

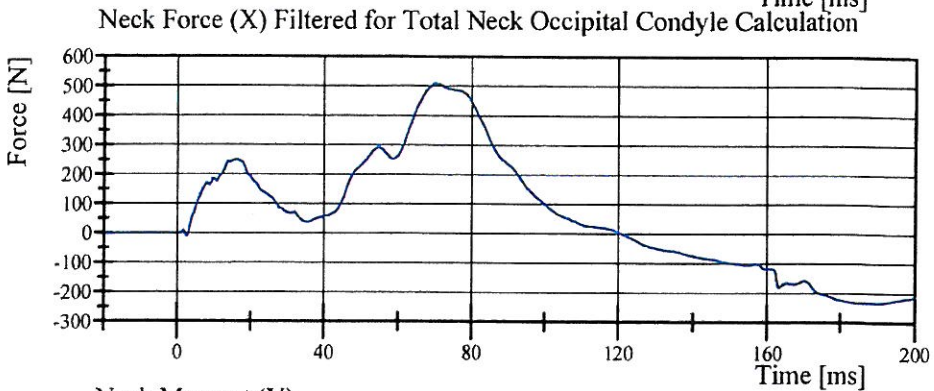
Neck Extension

HIII 50th Serial No. 043 Certification No. 8-1

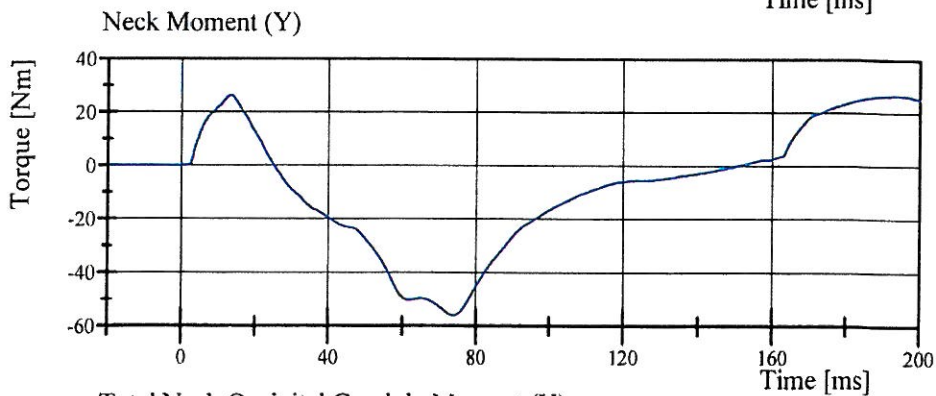
Test Date: 10/29/2009



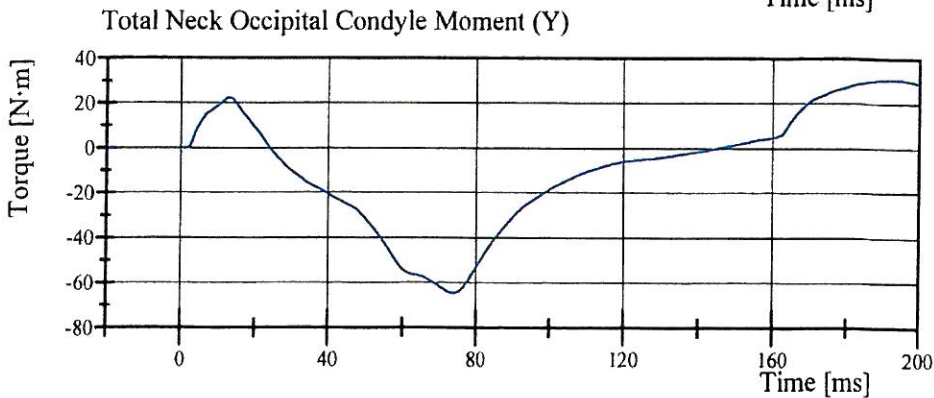
Filter Class: CFC\_1000  
Max: 510.4 N at 69.9 ms  
Min: -233.1 N at 190.2 ms



Filter Class: CFC\_600  
Max: 510.3 N at 70.1 ms  
Min: -232.6 N at 190.2 ms



Filter Class: CFC\_600  
Max: 26.6 Nm at 194.1 ms  
Min: -56.0 Nm at 73.7 ms



Filter Class: CFC\_600  
Max: 30.7 N·m at 192.6 ms  
Min: -64.7 N·m at 73.6 ms

# Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 043 Certification No. 8-1

Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.651 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,518.9 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-71.49 mm	Yes
Internal Hysteresis	65 - 85 %	74.0 %	Yes

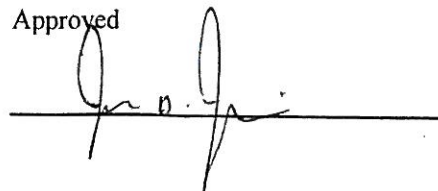
**Test meets specifications.**

**Comments:**

Technician



Approved



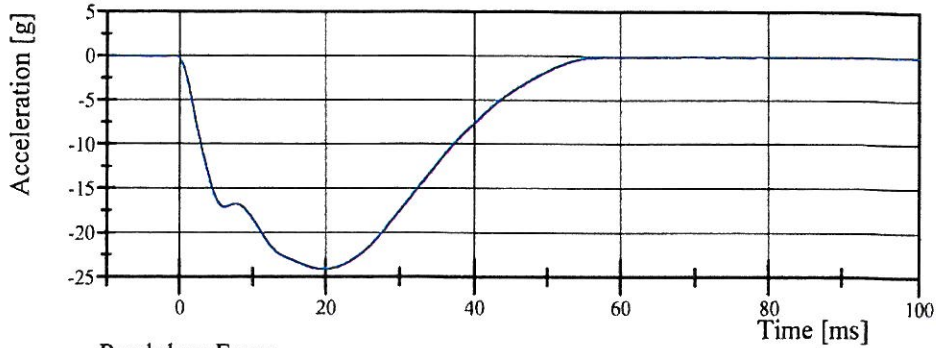
# Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 043 Certification No. 8-1

Test Date: 10/29/2009

Pendulum Acceleration

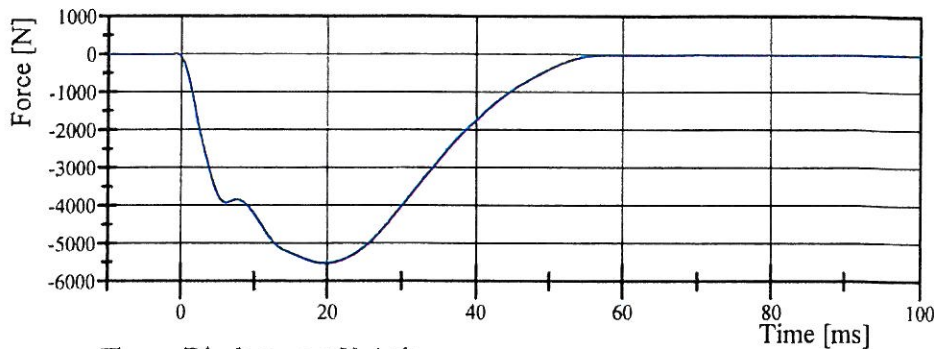


Filter Class: CFC\_180

Max: 0.1 g at -0.7 ms

Min: -24.1 g at 19.7 ms

Pendulum Force

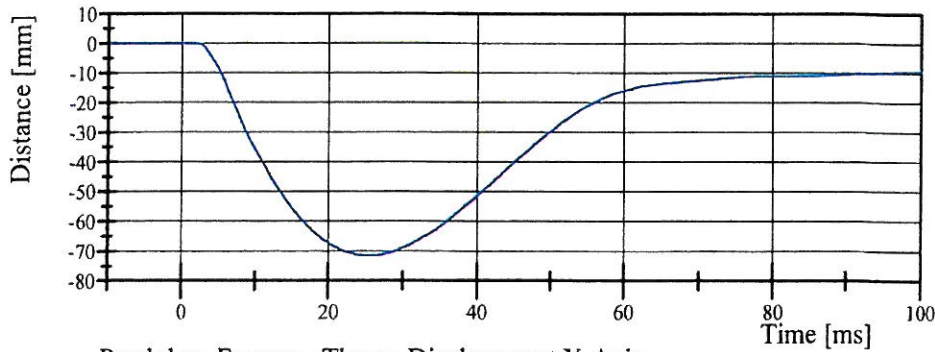


Filter Class: CFC\_180

Max: 14.1 N at -0.7 ms

Min: -5,518.9 N at 19.7 ms

Thorax Displacement X-Axis

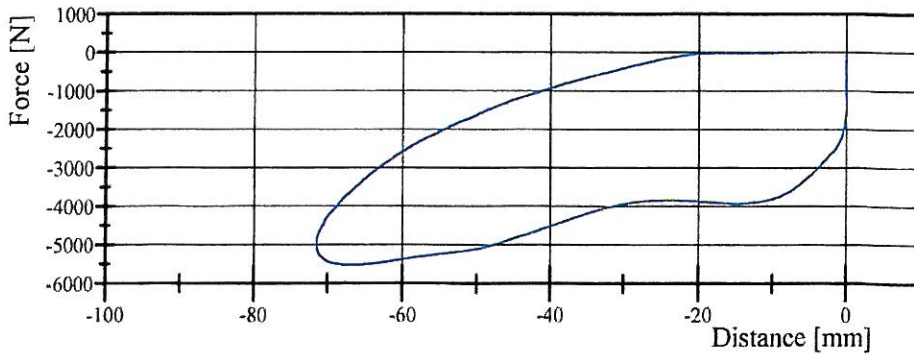


Filter Class: CFC\_600

Max: 0.1 mm at 1.8 ms

Min: -71.5 mm at 25.8 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC\_180

Max: 14.1 N at 0.0 mm

Min: -5,518.9 N at -66.7 mm

# Transportation Research Center Inc

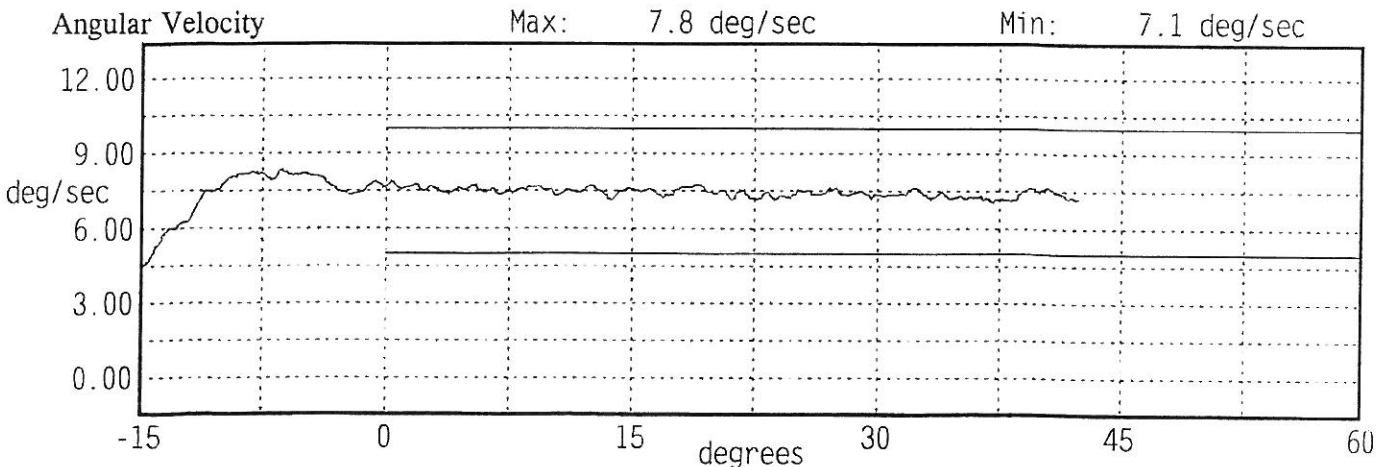
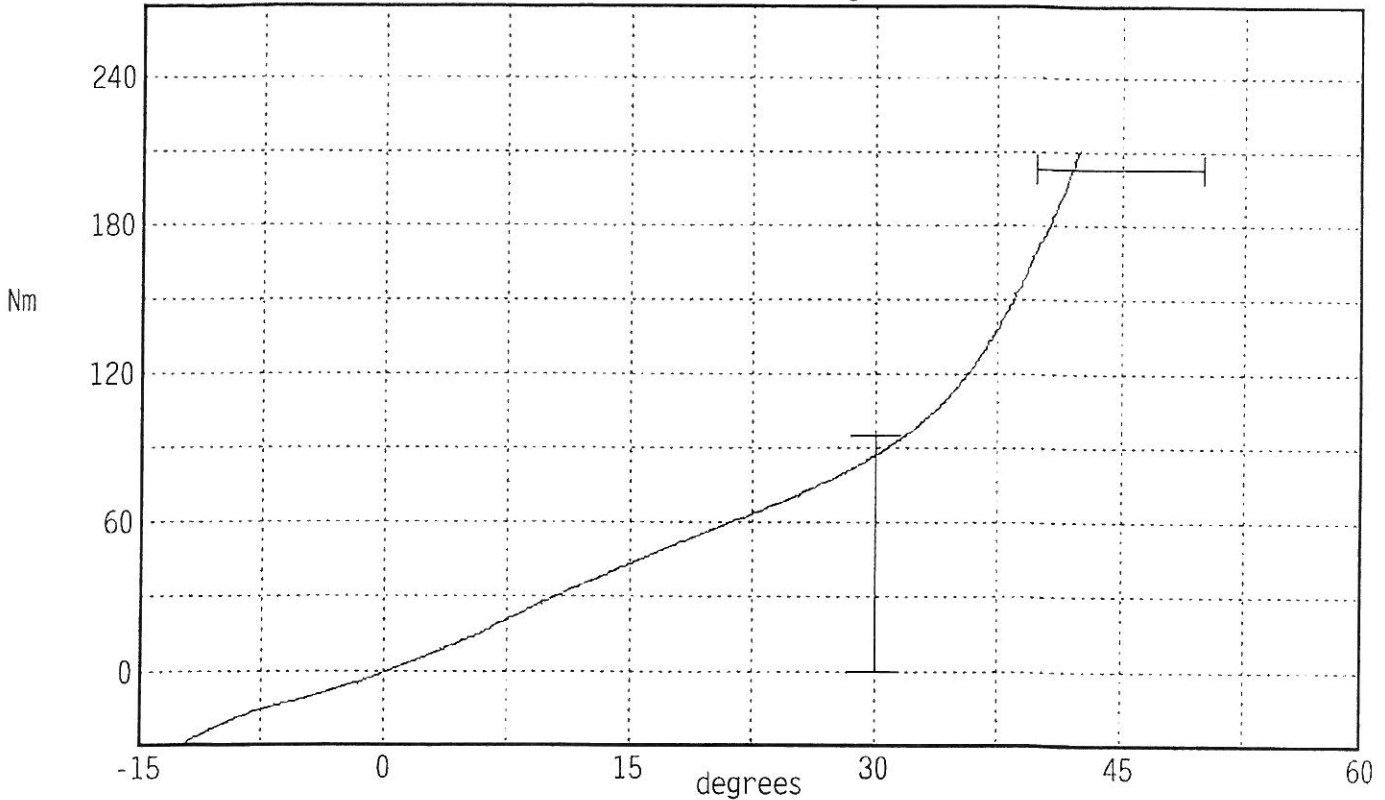
Hybrid III Hip Range of Motion

Serial Number: 043L  
Test Number: 043C08  
Comments:

Date: 10/29/2009  
Time: 08:41

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.7 °C	Pass
Humidity	10 - 70	44 %	Pass
Moment at 30 deg	<= 94.9	87.3 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.0 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point  
Peak Moment: 210.7 Nm at 42.4 deg  
Peak Angle: 42.4 deg at 210.7 Nm



# Transportation Research Center Inc

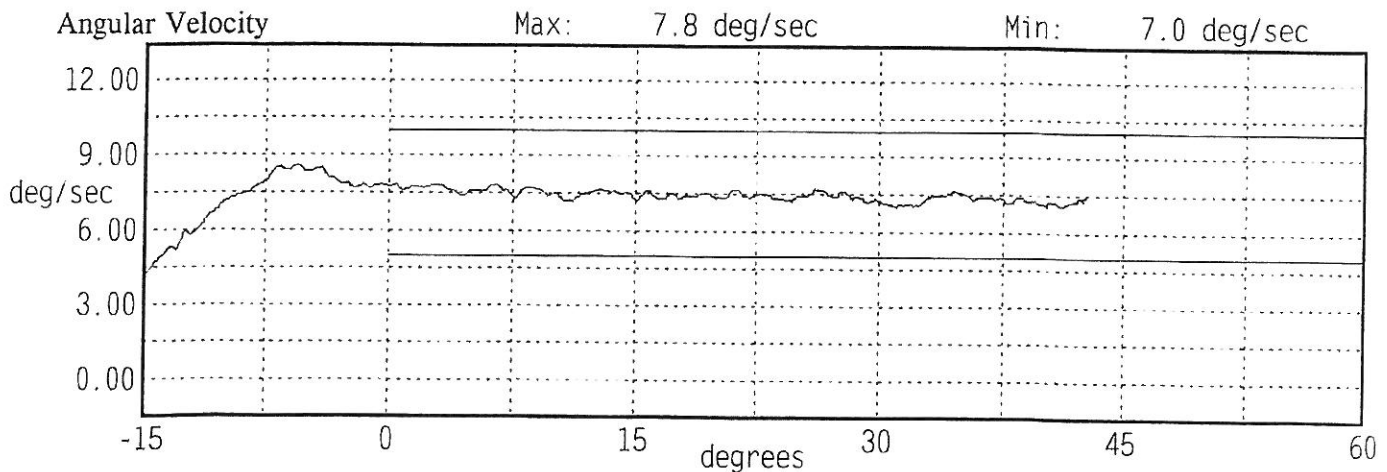
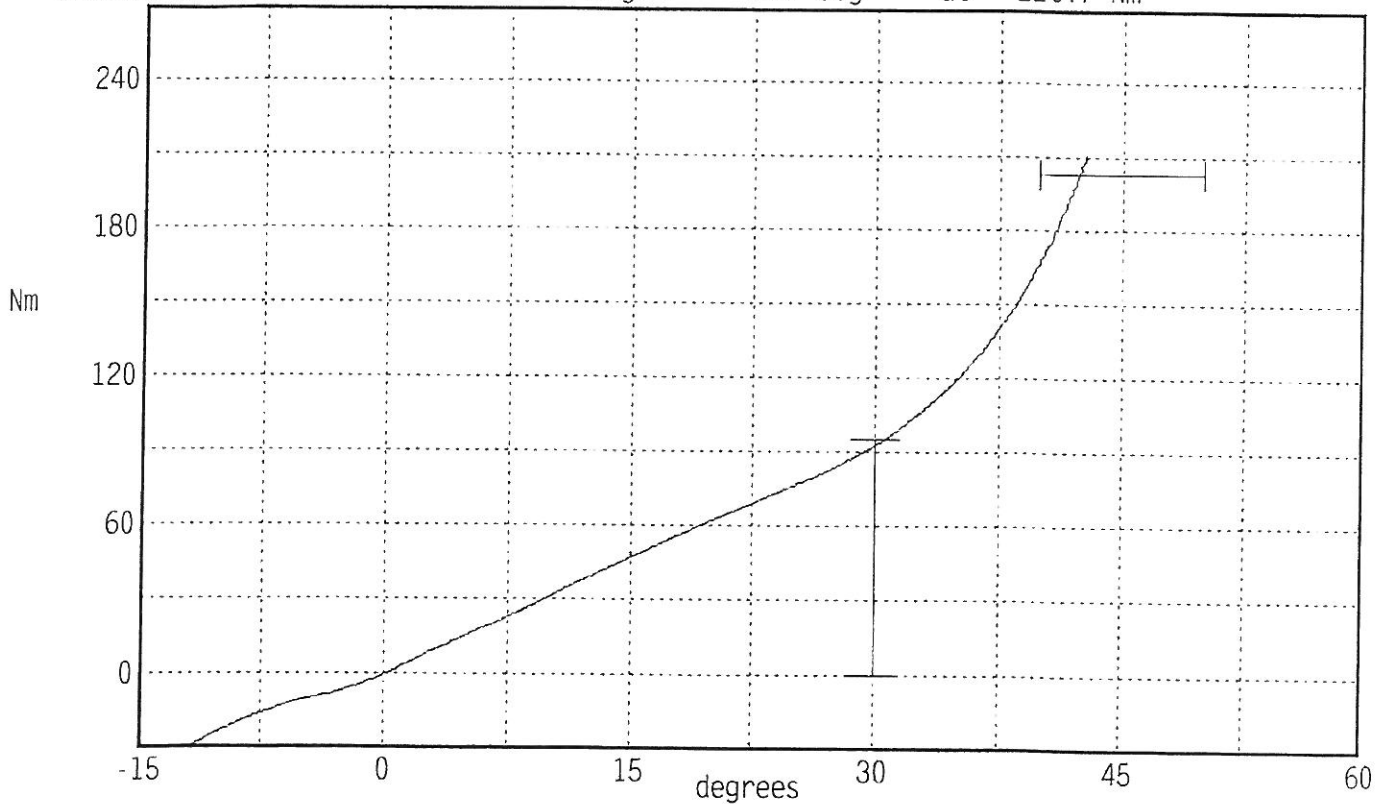
Hybrid III Hip Range of Motion

Serial Number: 043R  
Test Number: 043C08  
Comments:

Date: 10/29/2009  
Time: 09:14

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.9 °C	Pass
Humidity	10 - 70	44 %	Pass
Moment at 30 deg	<= 94.9	92.7 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.3 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point  
Peak Moment: 210.7 Nm at 42.7 deg  
Peak Angle: 42.7 deg at 210.7 Nm



# Transportation Research Center Inc.

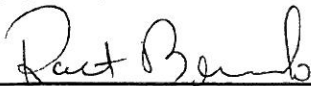
Left Knee Femur Response Test  
HIII 50th Serial No. 043 Certification No. 8-1  
Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.117 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,243.39 N	Yes

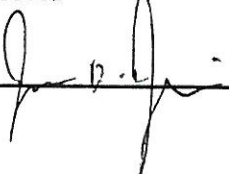
**Test meets specifications.**

**Comments:**

Technician

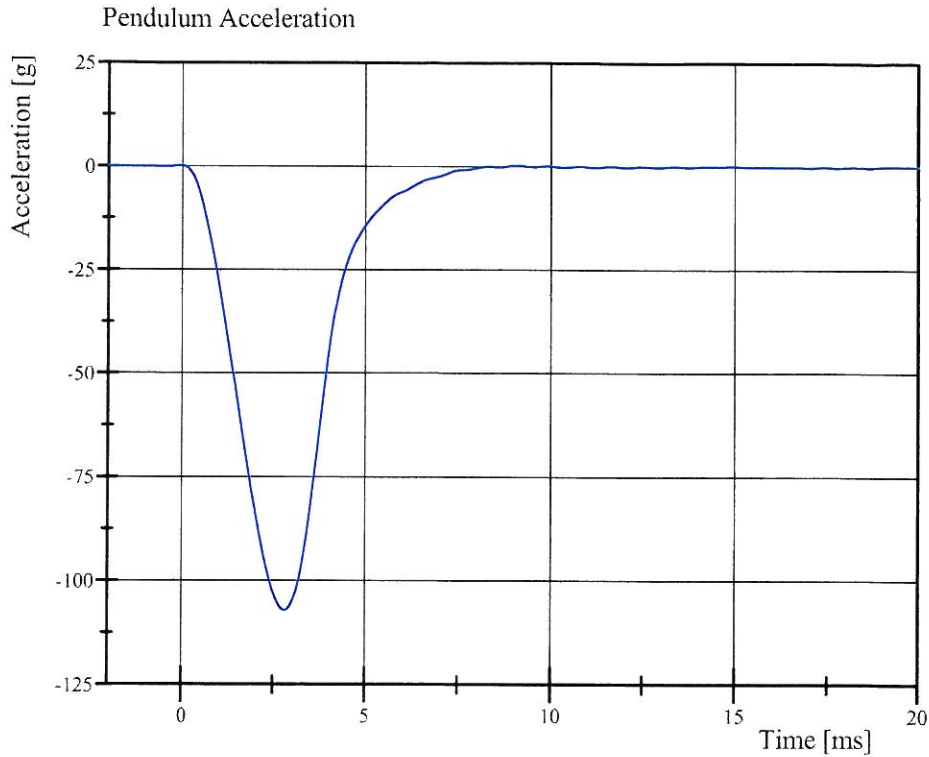
  
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Approved

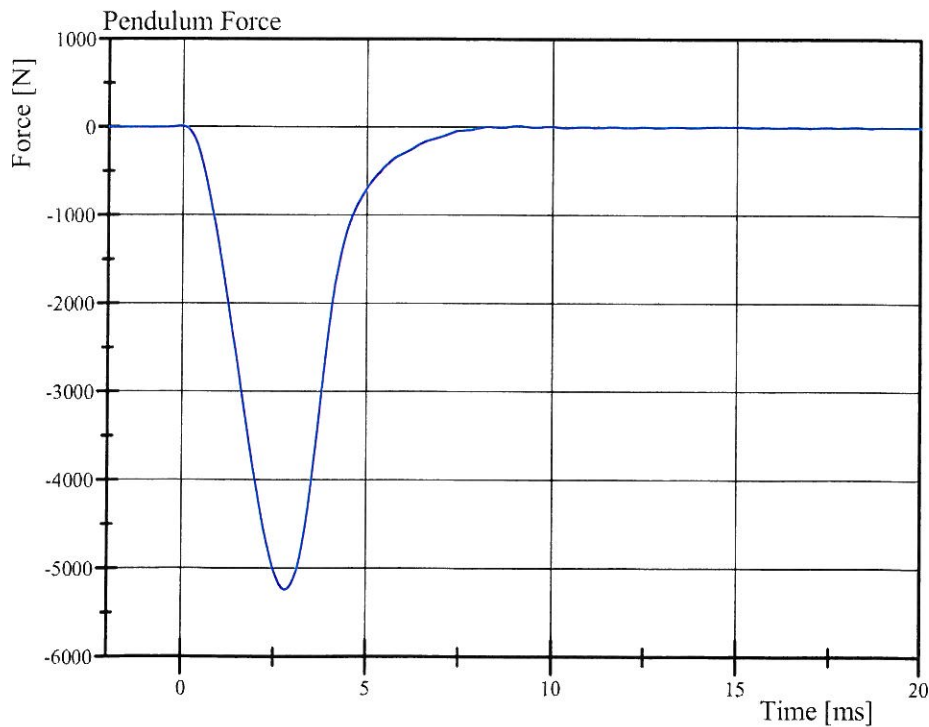
  
\_\_\_\_\_

# Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 043 Certification No. 8-1  
Test Date: 10/29/2009



Filter Class: CFC\_600  
Max: 0.3 g at 9.0 ms  
Min: -107.2 g at 2.8 ms



Filter Class: CFC\_600  
Max: 14.7 N at 9.0 ms  
Min: -5,243.4 N at 2.8 ms

# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 043 Certification No. 8-1  
Test Date: 10/29/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.117 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,090.55 N	Yes

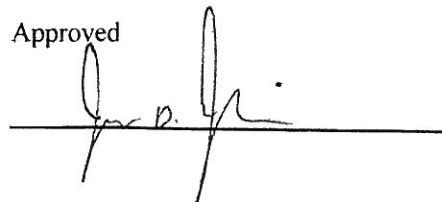
Test meets specifications.

Comments:

Technician

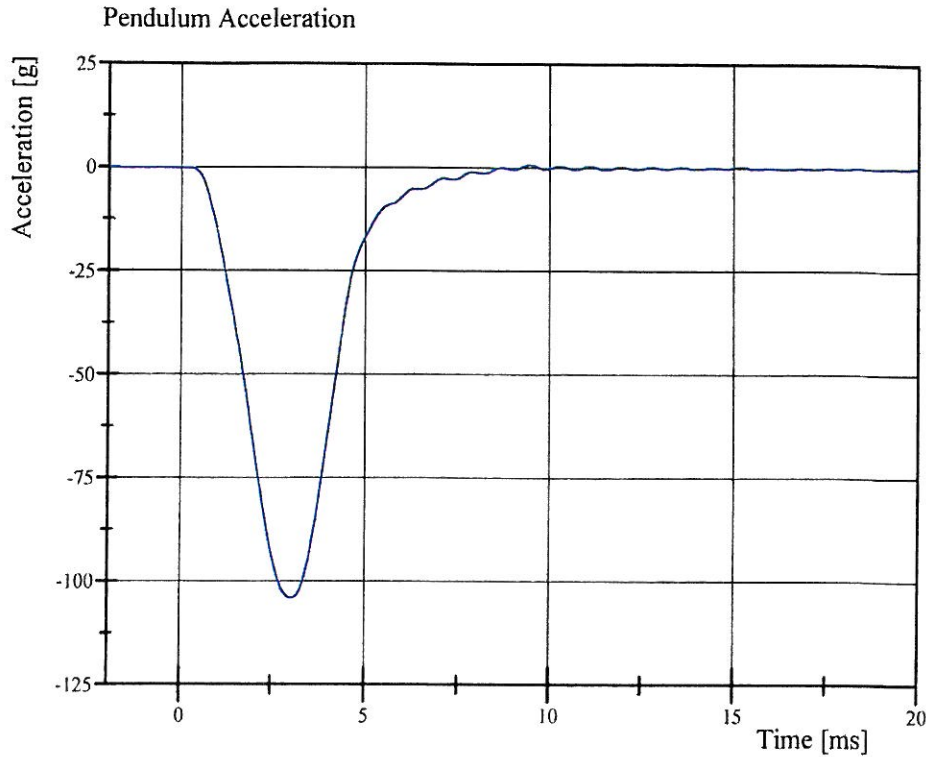
  
\_\_\_\_\_

Approved

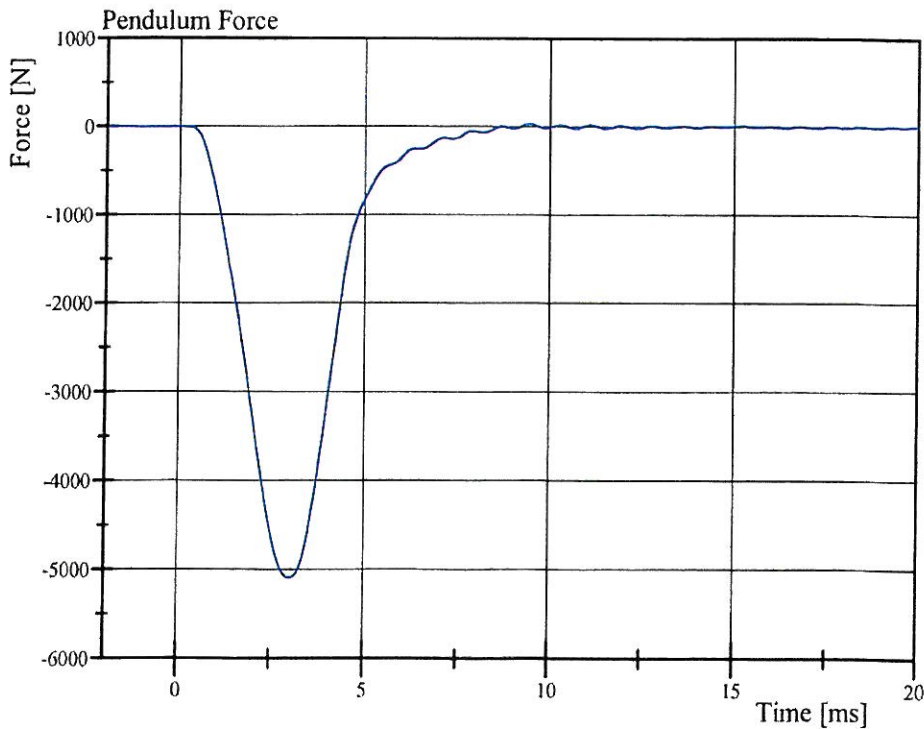
  
\_\_\_\_\_

# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 043 Certification No. 8-1  
Test Date: 10/29/2009



Filter Class: CFC\_600  
Max: 0.7 g at 9.4 ms  
Min: -104.0 g at 3.0 ms



Filter Class: CFC\_600  
Max: 35.5 N at 9.4 ms  
Min: -5,090.5 N at 3.0 ms

**Transportation Research Center Inc.**  
**572E HIII 50th Male Dummy**  
**External Dimensions**  
**Serial No. 043**  
**Calibration No. 08**

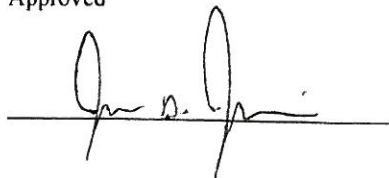
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	884	Yes
B	Shoulder Pivot Height	505.5 - 520.7	518	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	136	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	89	Yes
F	Thigh Clearance	139.7 - 154.9	153	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	294	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	333	Yes
J	Elbow Rest Height	190.5 - 210.8	205	Yes
K	Buttock Knee Length	579.1 - 604.5	601	Yes
L	Popliteal Height	429.3 - 454.7	438	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	222	Yes
P	Foot Length	251.5 - 266.7	260	Yes
V	Shoulder Breadth	421.6 - 436.9	430	Yes
W	Foot Breadth	91.4 - 106.7	100	Yes
Y	Chest Circumference	970.3 - 1000.8	988	Yes
Z	Waist Circumference	835.7 - 866.1	861	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Technician



Approved



**APPENDIX D**  
**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

Sign Convention  
SAE J211 MAR95

Accelerometers:

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

Potentiometers:

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

Rotation potentiometers:

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

Load cells:

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

Neck load cells:

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

Tibia load cells:

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

Sign Convention (Continued)  
SAE J211 MAR95

Lumbar load cells:

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

Frequency Response Classes  
SAE J211 MAR95

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

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

### Channel Report Test Number 100115

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Polarity	Assembly
1	Trig D1	10ZERO000000VO0A	EVENT		1 Bipolar	
2	P52086	11PELVCG00H3ACZA	Pelvis Accel Z	1000	-Bipolar	1-001 VRTC H3 50th.022
3	P51954	11HEADCG00H3ACXA	Head Accel X	1000	-Bipolar	1-001 VRTC H3 50th.001
4	P58726	11HEADCG00H3ACYA	Head Accel Y	1000	-Bipolar	1-001 VRTC H3 50th.002
5	P51266	11HEADCG00H3ACZA	Head Accel Z	1000	-Bipolar	1-001 VRTC H3 50th.003
6	ARS-12K-ARS1082	11HEADCG00H3AVXA	Head (DTS ARS) Rate Gyro X	12000	Bipolar	1-001 HIII 50th VRTC.031
7	ARS-12K-ARS2630	11HEADCG00H3AVYA	Head(DTS ARS) Rate Gyro Y	12000	Bipolar	1-001 HIII 50th VRTC.032
8	ARS-12K-ARS1034	11HEADCG00H3AVZA	Head (DTS ARS) Rate Gyro Z	12000	Bipolar	1-001 HIII 50th VRTC.033
9	IF-205-261-FX	11NECKUP00H3FOXA	Neck Force X	8896	-Bipolar	1-001 VRTC H3 50th.007
10	IF-205-261-FY	11NECKUP00H3FOYA	Neck Force Y	8896	Bipolar	1-001 VRTC H3 50th.008
11	IF-205-261-FZ	11NECKUP00H3FOZA	Neck Force Z	13344	Bipolar	1-001 VRTC H3 50th.009
12	IF-205-261-MX	11NECKUP00H3MOXA	Neck Moment X	282.5	-Bipolar	1-001 VRTC H3 50th.010
13	IF-205-261-MY	11NECKUP00H3MOYA	Neck Moment Y	282.5	Bipolar	1-001 VRTC H3 50th.011
14	IF-205-261-MZ	11NECKUP00H3MOZA	Neck Moment Z	282.5	Bipolar	1-001 VRTC H3 50th.012
15	P52081	11CHSTCG00H3ACXA	Chest Accel X	1000	Bipolar	1-001 VRTC H3 50th.013
16	02I02I05-F11	11CHSTCG00H3ACYA	Chest Accel Y	1000	-Bipolar	1-001 VRTC H3 50th.014
17	P58771	11CHSTCG00H3ACZA	Chest Accel Z	1000	-Bipolar	1-001 VRTC H3 50th.015
18	CST001	11CHST0000H3DSXA	Chest Deflection X	84	Bipolar	1-001 VRTC H3 50th.019
19	1794A-249-FX	11NECKLO00H3FOXA	Lower Neck Force X	8896	-Bipolar	1-001 VRTC H3 50th.025
20	1794A-249-FY	11NECKLO00H3FOYA	Lower Neck Force Y	8896	Bipolar	1-001 VRTC H3 50th.026
21	1794A-249-FZ	11NECKLO00H3FOZA	Lower Neck Force Z	13345	Bipolar	1-001 VRTC H3 50th.027
22	1794A-249-MX	11NECKLO00H3MOXA	Lower Neck Moment X	282.5	-Bipolar	1-001 VRTC H3 50th.028
23	1794A-249-MY	11NECKLO00H3MOYA	Lower Neck Moment Y	282.5	Bipolar	1-001 VRTC H3 50th.029
24	1794A-249-MZ	11NECKLO00H3MOZA	Lower Neck Moment Z	282.5	Bipolar	1-001 VRTC H3 50th.030
25	P58870	11PELVCG00H3ACXA	Pelvis Accel X	1000	-Bipolar	1-001 VRTC H3 50th.020
26	P52071	11PELVCG00H3ACYA	Pelvis Accel Y	1000	-Bipolar	1-001 VRTC H3 50th.021
27	05G20-L12	13HEADCG00H3ACXA	Head Accel X	1000	Bipolar	3-110 HIII 50th FTSS.001
28	02A18-N15	13HEADCG00H3ACYA	Head Accel Y	1000	-Bipolar	3-110 HIII 50th FTSS.002
29	02I02I05-F09	13HEADCG00H3ACZA	Head Accel Z	1000	-Bipolar	3-110 HIII 50th FTSS.003
30	P51712	13HEADFR00H3ACYA	Head (FT) Accel Y	1000	-Bipolar	3-110 HIII 50th FTSS.004
31	P51717	13HEADFR00H3ACZA	Head (FT) Accel Z	1000	-Bipolar	3-110 HIII 50th FTSS.005
32	P50099	13HEADUP00H3ACXA	Head (TP) Accel X	1000	Bipolar	3-110 HIII 50th FTSS.006
33	B02A25-N01	13HEADUP00H3ACYA	Head (TP) Accel Y	1000	-Bipolar	3-110 HIII 50th FTSS.007
34	02A18-N01	13HEADLE00H3ACXA	Head (LT) Accel X	1000	Bipolar	3-110 HIII 50th FTSS.008

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### Channel Report Test Number 100115

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Polarity	Assembly
35	03F03J01-R11	13HEADLE00H3ACZA	Head (LT) Accel Z	1000	-Bipolar	3-110 HIII 50th FTSS.009
36	1716A-1597-FX	13NECKUP00H3FOXA	Neck Force X	8896.4	-Bipolar	3-110 HIII 50th FTSS.010
37	1716A-1597-FY	13NECKUP00H3FOYA	Neck Force Y	8896.4	Bipolar	3-110 HIII 50th FTSS.011
38	1716A-1597-FZ	13NECKUP00H3FOZA	Neck Force Z	13344.6	Bipolar	3-110 HIII 50th FTSS.012
39	1716A-1597-MX	13NECKUP00H3MOXA	Neck Moment X	282.4	-Bipolar	3-110 HIII 50th FTSS.013
40	1716A-1597-MY	13NECKUP00H3MOYA	Neck Moment Y	282.4	Bipolar	3-110 HIII 50th FTSS.014
41	1716A-1597-MZ	13NECKUP00H3MOZA	Neck Moment Z	282.4	Bipolar	3-110 HIII 50th FTSS.015
42	1794A-0216-FX	13NECKLO00H3FOXA	Neck Lower Force X	13345	-Bipolar	3-110 HIII 50th FTSS.016
43	1794A-0216-FY	13NECKLO00H3FOYA	Neck Lower Force Y	13344.6	Bipolar	3-110 HIII 50th FTSS.017
44	1794A-0216-FZ	13NECKLO00H3FOZA	Neck Lower Force Z	13344.6	Bipolar	3-110 HIII 50th FTSS.018
45	1794A-0216-MX	13NECKLO00H3MOXA	Neck Lower Moment X	452	-Bipolar	3-110 HIII 50th FTSS.019
46	1794A-0216-MY	13NECKLO00H3MOYA	Neck Lower Moment Y	452	Bipolar	3-110 HIII 50th FTSS.020
47	1794A-0216-MZ	13NECKLO00H3MOZA	Neck Lower Moment Z	452	Bipolar	3-110 HIII 50th FTSS.021
48	99H12-F24	13CHSTCG00H3ACXA	Chest Accel X	1000	Bipolar	3-110 HIII 50th FTSS.022
49	02I02I05-F04	13CHSTCG00H3ACYA	Chest Accel Y	1000	-Bipolar	3-110 HIII 50th FTSS.023
50	03D03C27-N07	13CHSTCG00H3ACZA	Chest Accel Z	1000	-Bipolar	3-110 HIII 50th FTSS.024
51	CST110	13CHST0000H3DSXA	Chest Deflection X	84	Bipolar	3-110 HIII 50th FTSS.028
52	P52008	13PELVCG00H3ACXA	Pelvis Accel X	1000	-Bipolar	3-110 HIII 50th FTSS.029
53	04J04I20-Z24	13PELVCG00H3ACYA	Pelvis Accel Y	1000	-Bipolar	3-110 HIII 50th FTSS.030
54	98H13-F19	13PELVCG00H3ACZA	Pelvis Accel Z	1000	-Bipolar	3-110 HIII 50th FTSS.031
55	P52023	14HEADCG00H3ACXA	Head Accel X	1000	-Bipolar	4-043 HIII 50th VRTC.001
56	P52013	14HEADCG00H3ACYA	Head Accel Y	1000	-Bipolar	4-043 HIII 50th VRTC.002
57	P52083	14HEADCG00H3ACZA	Head Accel Z	1000	-Bipolar	4-043 HIII 50th VRTC.003
58	ARS-12K-ARS2240	14HEADCG00H3AVXA	Head (DTS ARS) Rate Gyro X	12000	Bipolar	4-043 HIII 50th VRTC.025
59	ARS-12K-ARS2238	14HEADCG00H3AVYA	Head (DTS ARS) Rate Gyro Y	12000	Bipolar	4-043 HIII 50th VRTC.026
60	ARS-12K-ARS0253	14HEADCG00H3AVZA	Head (DTS ARS) Rate Gyro Z	12000	Bipolar	4-043 HIII 50th VRTC.027
61	1716A-798-FX	14NECKUP00H3FOXA	Upper Neck Force X	8896	-Bipolar	4-043 HIII 50th VRTC.004
62	1716A-798-FY	14NECKUP00H3FOYA	Upper Neck Force Y	8896	Bipolar	4-043 HIII 50th VRTC.005
63	1716A-798-FZ	14NECKUP00H3FOZA	Upper Neck Force Z	13344	Bipolar	4-043 HIII 50th VRTC.006
64	1716A-798-MX	14NECKUP00H3MOXA	Upper Neck Moment X	282	-Bipolar	4-043 HIII 50th VRTC.007
65	1716A-798-MY	14NECKUP00H3MOYA	Upper Neck Moment Y	282	Bipolar	4-043 HIII 50th VRTC.008
66	1716A-798-MZ	14NECKUP00H3MOZA	Upper Neck Moment Z	282	Bipolar	4-043 HIII 50th VRTC.009
67	P16899	14CHSTCG00H3ACXA	Chest Accel X	400	Bipolar	4-043 HIII 50th VRTC.010
68	P16517	14CHSTCG00H3ACYA	Chest Accel Y	400	-Bipolar	4-043 HIII 50th VRTC.011

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### Channel Report Test Number 100115

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Polarity	Assembly
69	P51702	14CHSTCG00H3ACZA	Chest Accel Z	400	-Bipolar	4-043 HIII 50th VRTC.012
70	84892-A-CST043	14CHST0000H3DSXA	Chest Deflection X	84	-Bipolar	4-043 HIII 50th VRTC.013
71	1794A-250-FX	14NECKLO00H3FOXA	Lower Neck Force X	8896	-Bipolar	4-043 HIII 50th VRTC.016
72	1794A-250-FY	14NECKLO00H3FOYA	Lower Neck Force Y	8896	Bipolar	4-043 HIII 50th VRTC.017
73	1794A-250-FZ	14NECKLO00H3FOZA	Lower Neck Force Z	13345	Bipolar	4-043 HIII 50th VRTC.018
74	1794A-250-MX	14NECKLO00H3MOXA	Lower Neck Moment X	282	-Bipolar	4-043 HIII 50th VRTC.019
75	1794A-250-MY	14NECKLO00H3MOYA	Lower Neck Moment Y	282	Bipolar	4-043 HIII 50th VRTC.020
76	1794A-250-MZ	14NECKLO00H3MOZA	Lower Neck Moment Z	282	Bipolar	4-043 HIII 50th VRTC.021
77	P52108	14PELVCG00H3ACXA	Pelvis Accel X	2000	-Bipolar	4-043 HIII 50th VRTC.022
78	P51710	14PELVCG00H3ACYA	Pelvis Accel Y	2000	-Bipolar	4-043 HIII 50th VRTC.023
79	P16225	14PELVCG00H3ACZA	Pelvis Accel Z	2000	-Bipolar	4-043 HIII 50th VRTC.024
80	P61424	10VEHCCG0000ACXA	Vehicle Center of Gravity X-axis Acceleration	2000	Bipolar	
81	P61282	10VEHCCG0000ACYA	Vehicle Center of Gravity Y-axis Acceleration	2000	-Bipolar	
82	P63134	10VEHCCG0000ACZA	Vehicle Center of Gravity Z-axis Acceleration	2000	-Bipolar	
83	ARS-1500-ARS1091	10VEHCCG0000AVXA	Vehicle Center of Gravity ROLL RATE 1	1500	Bipolar	
84	ARS-1500-ARS1055	10VEHCCG0000AVYA	Vehicle Center of Gravity PITCH RATE 1	1500	-Bipolar	
85	ARS-1500-ARS0738	10VEHCCG0000AVZA	Vehicle Center of Gravity YAW RATE 1	1500	-Bipolar	
86	ARS-1500-ARS0665	10VEHCREDK00AVXA	Rear Deck (cargo area) ROLL RATE 1 Redundar	1500	Bipolar	
87	ARS-1500-ARS0737	10VEHCREDK00AVYA	Rear Deck (cargo area) PITCH RATE 1 Redunda	1500	Bipolar	
88	ARS-1500-ARS0732	10VEHCREDK00AVZA	Rear Deck (cargo area) YAW RATE 1 Redundan	1500	-Bipolar	
89	P63125	10ENGNTTP0000ACXA	Top of Engine X-axis Accel	2000	-Bipolar	
90	P62216	10ENGNTTP0000ACYA	Top of Engine Y-axis Accel	2000	-Bipolar	
91	P62204	10ENGNTTP0000ACZA	Top of Engine Z-axis Accel	2000	-Bipolar	
92	P45012	10ENGNBO0000ACXA	Bottom of Engine X-axis Accel	2000	Bipolar	
93	P62213	10ENGNBO0000ACYA	Bottom of Engine Y-axis Accel	2000	-Bipolar	
94	P61394	10ENGNBO0000ACZA	Left Bottom of Engine Z-axis Accel	2000	Bipolar	
95	P57207	10APILUPLE00ACXA	Left A-Pillar Upper X-Axis Acceleration	2000	Bipolar	
96	P61536	10APILUPLE00ACYA	Left A-Pillar Upper Y-Axis Acceleration	2000	Bipolar	
97	P57876	10APILUPLE00ACZA	Left A-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
98	P61361	10APILLOLE00ACXA	Left A-Pillar Lower X-Axis Acceleration	2000	Bipolar	
99	P61746	10APILLOLE00ACYA	Left A-Pillar Lower Y-Axis Acceleration	2000	Bipolar	
100	P61774	10APILLOLE00ACZA	Left A-Pillar Lower Z-Axis Acceleration	2000	-Bipolar	
101	P61310	10APILUPRI00ACXA	Right A-Pillar Upper X-Axis Acceleration	2000	-Bipolar	
102	P61388	10APILUPRI00ACYA	Right A-Pillar Upper Y-Axis Acceleration	2000	-Bipolar	

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Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Polarity	Assembly
103	P62632	10APILUPRI00ACZA	Right A-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
104	P63131	10APILLORI00ACXA	Right A-Pillar Lower X-Axis Acceleration	2000	Bipolar	
105	P64806	10APILLORI00ACYA	Right A-Pillar Lower Y-Axis Acceleration	2000	-Bipolar	
106	P61405	10APILLORI00ACZA	Right A-Pillar Lower Z-Axis Acceleration	2000	-Bipolar	
107	P57790	10BPILUPLE00ACXA	Left B-Pillar Upper X-Axis Acceleration	2000	Bipolar	
108	P34212	10BPILUPLE00ACYA	Left B-Pillar Upper Y-Axis Acceleration	2000	Bipolar	
109	P61453	10BPILUPLE00ACZA	Left B-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
110	P62203	10BPILLOLE00ACXA	Left B-Pillar Lower X-Axis Acceleration	2000	Bipolar	
111	P63126	10BPILLOLE00ACYA	Left B-Pillar Lower Y-Axis Acceleration	2000	Bipolar	
112	P62222	10BPILLOLE00ACZA	Left B-Pillar Lower Z-Axis Acceleration	2000	-Bipolar	
113	P61434	10BPILUPRI00ACXA	Right B-Pillar Upper X-Axis Acceleration	2000	Bipolar	
114	P57784	10BPILUPRI00ACYA	Right B-Pillar Upper Y-Axis Acceleration	2000	-Bipolar	
115	P63168	10BPILUPRI00ACZA	Right B-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
116	P57430	10BPILLORI00ACXA	Right B-Pillar Lower X-Axis Acceleration	2000	Bipolar	
117	P61317	10BPILLORI00ACYA	Right B-Pillar Lower Y-Axis Acceleration	2000	-Bipolar	
118	P61736	10BPILLORI00ACZA	Right B-Pillar Lower Z-Axis Acceleration	2000	-Bipolar	
119	P61296	10CPILUPLE00ACXA	Left C-Pillar Upper X-Axis Acceleration	2000	Bipolar	
120	P63123	10CPILUPLE00ACYA	Left C-Pillar Upper Y-Axis Acceleration	2000	Bipolar	
121	P62197	10CPILUPLE00ACZA	Left C-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
122	P63138	10CPILLOLE00ACXA	Left C-Pillar Lower X-Axis Acceleration	2000	Bipolar	
123	P61537	10CPILLOLE00ACYA	Left C-Pillar Lower Y-Axis Acceleration	2000	Bipolar	
124	P62574	10CPILLOLE00ACZA	Left C-Pillar Lower Z-Axis Acceleration	2000	Bipolar	
125	P61344	10CPILUPRI00ACXA	Right C-Pillar Upper X-Axis Acceleration	2000	-Bipolar	
126	P62630	10CPILUPRI00ACYA	Right C-Pillar Upper Y-Axis Acceleration	2000	-Bipolar	
127	P61297	10CPILUPRI00ACZA	Right C-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
128	P63135	10CPILLORI00ACXA	Right C-Pillar Lower X-Axis Acceleration	2000	-Bipolar	
129	P46517	10CPILLORI00ACYA	Right C-Pillar Lower Y-Axis Acceleration	2000	-Bipolar	
130	P62208	10CPILLORI00ACZA	Right C-Pillar Lower Z-Axis Acceleration	2000	-Bipolar	
131	P62233	10DPILUPLE00ACXA	Left D-Pillar Upper X-Axis Acceleration	2000	Bipolar	
132	P62232	10DPILUPLE00ACYA	Left D-Pillar Upper Y-Axis Acceleration	2000	Bipolar	
133	P58576	10DPILUPLE00ACZA	Left D-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
134	P57185	10DPILLOLE00ACXA	Left D-Pillar Lower X-Axis Acceleration	2000	Bipolar	
135	P58023	10DPILLOLE00ACYA	Left D-Pillar Lower Y-Axis Acceleration	2000	Bipolar	
136	P58024	10DPILLOLE00ACZA	Left D-Pillar Lower Z-Axis Acceleration	2000	-Bipolar	

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### Channel Report Test Number 100115

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Polarity	Assembly
137	P62627	10DPILUPRI00ACXA	Right D-Pillar Upper X-Axis Acceleration	2000	Bipolar	
138	P61735	10DPILUPRI00ACYA	Right D-Pillar Upper Y-Axis Acceleration	2000	-Bipolar	
139	P61325	10DPILUPRI00ACZA	Right D-Pillar Upper Z-Axis Acceleration	2000	-Bipolar	
140	P33907	10DPILLORI00ACXA	Right D-Pillar Lower X-Axis Acceleration	2000	Bipolar	
141	P58552	10DPILLORI00ACYA	Right D-Pillar Lower Y-Axis Acceleration	2000	-Bipolar	
142	P62546	10DPILLORI00ACZA	Right D-Pillar Lower Z-Axis Acceleration	2000	-Bipolar	
143	P62202	102RDK000000ACXA	Vehicle Rear Deck X-axis Acceleration	2000	Bipolar	
144	P61752	102RDK000000ACYA	Vehicle Rear Deck Y-axis Acceleration	2000	-Bipolar	
145	P62550	102RDK000000ACZA	Vehicle Rear Deck Z-axis Acceleration	2000	-Bipolar	
146	P61314	11SEAT000000ACXA	LF Seat Position (on floor) X-axis Acceleration	2000	Bipolar	
147	P62628	11SEAT000000ACYA	LF Seat Position (on floor) Y-axis Acceleration	2000	Bipolar	
148	P46509	11SEAT000000ACZA	LF Seat Position (on floor) Z-axis Acceleration	2000	-Bipolar	
149	P61733	13SEAT000000ACXA	RF Seat Position (on floor) X-axis Acceleration	2000	Bipolar	
150	P61754	13SEAT000000ACYA	RF Seat Position (on floor) Y-axis Acceleration	2000	Bipolar	
151	P61732	13SEAT000000ACZA	RF Seat Position (on floor) Z-axis Acceleration	2000	-Bipolar	
152	P63169	14SEAT000000ACXA	LR Seat Position (on floor) X-axis Acceleration	2000	Bipolar	
153	P49042	14SEAT000000ACYA	LR Seat Position (on floor) Y-axis Acceleration	2000	-Bipolar	
154	P48116	14SEAT000000ACZA	LR Seat Position (on floor) Z-axis Acceleration	2000	-Bipolar	
155	P62225	16SEAT000000ACXA	RR Seat Position (on floor) X-axis Acceleration	2000	Bipolar	
156	P57781	16SEAT000000ACYA	RR Seat Position (on floor) Y-axis Acceleration	2000	-Bipolar	
157	P61269	16SEAT000000ACZA	RR Seat Position (on floor) Z-axis Acceleration	2000	-Bipolar	
158	3419T-828	11SEBE0000B5FO0A	Driver Lap Belt Force	13344	Bipolar	
159	X08010	11SEBE0000B3FO0A	Driver Shoulder Belt Force	16000	Bipolar	
160	3419-830	13SEBE0000B5FO0A	Front Pass. Lap Belt Force	15568	Bipolar	
161	X08012	13SEBE0000B3FO0A	Front Pass. Shldr. Belt Force	16000	Bipolar	
162	X08013	14SEBE0000B5FO0A	Left Rear Pass. Lap Belt Force	16000	Bipolar	
163	X08014	14SEBE0000B3FO0A	Left Rear Pass. Shldr. Belt Force	16000	Bipolar	
164	G1805342B	11SEBE0000B5DS0A	Driver Seat Belt Spool Potentiometer (S3)	750	Bipolar	
165	K1506282A	13SEBE0000B5DS0A	Right Front Belt Spool Potentiometers	750	Bipolar	
166	B1801244B	14SEBE0000B5DS0A	Left Rear Passenger Belt Spool Potentiometer	750	Bipolar	
167	Bit.00	11CONT000023EV00	DRIV. Head Contact Switch	1	Bipolar	
168	Bit.01	11CONT000024EV00	DRIV. Thorax Contact Switch	1	Bipolar	
169	Bit.02	11CONT000025EV00	DRIV. Pelvis Contact Switch	1	Bipolar	
170	Bit.03	13CONT000026EV00	Pass. Head Contact Switch	1	Bipolar	

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**Channel Report Test Number 100115**

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Polarity	Assembly
171	Bit.05	13CONT000027EV00	Pass. Thorax Contact Switch	1	Bipolar	
172	Bit.06	13CONT000028EV00	Pass. Pelvis Contact Switch	1	Bipolar	
173	Bit.07	14CONT000029EV00	Left Rear Pass. Head Contact Switch	1	Bipolar	
174	Bit.08	14CONT000030EV00	Left Rear Pass. Thorax Contact Switch	1	Bipolar	
175	Bit.09	14CONT000031EV00	Left Rear Pass. Pelvis Contact Switch	1	Bipolar	
176	ABT squib volts	11AIRB000000VO0A	Left Side Curtain Voltage	50	Bipolar	
177	ABT squib volts	13AIRB000000VO0A	Right Side Curtain Voltage	50	Bipolar	
178	ABT squib volts	11MOTPRET000VO0A	Driver Motorized Pretensioner Voltage	50	Bipolar	
179	ABT squib volts	14MOTPRET000VO0A	Left Rear Pass Motorized Pretensioner Voltage	50	Bipolar	
180	ABT squib volts	13RETR000000VO0A	Right Front Passenger Retractor Voltage	50	Bipolar	
181	ABT squib volts	13PRET000000VO0A	Right Front Passenger Buckle Pretensioner Volta	50	Bipolar	
	ABT squib amps	11AIRB000000CU0A	Left Side Curtain Current	5	Bipolar	
	ABT squib amps	11MOTPRET000CU0A	Driver Motorized Pretensioner Current	5	Bipolar	
	ABT squib amps	13AIRB000000CU0A	Right Side Curtain Current	5	Bipolar	
	ABT squib amps	13PRET000000CU0A	Right Front Passenger Buckle Pretensioner Curre	5	Bipolar	
	ABT squib amps	13RETR000000CU0A	Right Front Passenger Retractor Current	5	Bipolar	
	ABT squib amps	14MOTPRET000CU0A	Left Rear Pass Motorized Pretensioner Current	5	Bipolar	

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# Command File Test Number 100115

Chan	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale	
	1	11HEADCG00H3ACXA	Driver Head X-Axis Acceleration	1000	+	yes	1000
	2	11HEADCG00H3ACYA	Driver Head Y-Axis Acceleration	1000	+	yes	1000
	3	11HEADCG00H3ACZA	Driver Head Z-Axis Acceleration	1000	+	yes	1000
3A		11HEADCG00H3ACRA	Driver Head Resultant Acceleration	1000			
	4	11HEADCG00H3AVXA	Driver Head (DTS ARS) Rate Gyro X	1000	+	yes	12000
	5	11HEADCG00H3AVYA	Driver Head (DTS ARS) Rate Gyro Y	1000	+	yes	12000
	6	11HEADCG00H3AVZA	Driver Head (DTS ARS) Rate Gyro Z	1000	+	yes	12000
	7	11NECKUP00H3FOXA	Driver Upper Neck X-Axis Force	1000	+	yes	8896
	8	11NECKUP00H3FOYA	Driver Upper Neck Y-Axis Force	1000	+	yes	8896
	9	11NECKUP00H3FOZA	Driver Upper Neck Z-Axis Force	1000	+	yes	13344
	10	11NECKUP00H3MOXA	Driver Upper Neck Moment About X Axis	600	+	yes	282.5
	11	11NECKUP00H3MOYA	Driver Upper Neck Moment About Y Axis	600	+	yes	282.5
	12	11NECKUP00H3MOZA	Driver Upper Neck Moment About Z Axis	600	+	yes	282.5
	13	11CHSTCG00H3ACXA	Driver Chest X-Axis Acceleration	180	+	yes	1000
	14	11CHSTCG00H3ACYA	Driver Chest Y-Axis Acceleration	180	+	yes	1000
	15	11CHSTCG00H3ACZA	Driver Chest Z-Axis Acceleration	180	+	yes	1000
15A		11CHSTCG00H3ACRA	Driver Chest Resultant Acceleration	180			
	16	11CHST0000H3DSXA	Driver Chest X-Axis Displacement	600	+	yes	84
	17	11NECKLO00H3FOXA	Driver Lower Neck X-Axis Force	1000	+	yes	8896
	18	11NECKLO00H3FOYA	Driver Lower Neck Y-Axis Force	1000	+	yes	8896
	19	11NECKLO00H3FOZA	Driver Lower Neck Z-Axis Force	1000	+	yes	13345
	20	11NECKLO00H3MOXA	Driver Lower Neck Moment About X Axis	600	+	yes	282.5
	21	11NECKLO00H3MOYA	Driver Lower Neck Moment About Y Axis	600	+	yes	282.5
	22	11NECKLO00H3MOZA	Driver Lower Neck Moment About Z Axis	600	+	yes	282.5
	23	11PELVCG00H3ACXA	Driver Pelvis X-Axis Acceleration	1000	+	yes	1000
	24	11PELVCG00H3ACYA	Driver Pelvis Y-Axis Acceleration	1000	+	yes	1000
	25	11PELVCG00H3ACZA	Driver Pelvis Z-Axis Acceleration	1000	+	yes	1000
25A		11PELVCG00H3ACRA	Driver Pelvis Resultant Acceleration	1000			
	26	13HEADCG00H3ACXA	Right Front Passenger Head X-Axis Acceleration	1000	+	yes	1000
	27	13HEADCG00H3ACYA	Right Front Passenger Head Y-Axis Acceleration	1000	+	yes	1000
	28	13HEADCG00H3ACZA	Right Front Passenger Head Z-Axis Acceleration	1000	+	yes	1000
28A		13HEADCG00H3ACRA	Right Front Passenger Head Resultant Acceleration	1000			
	29	13HEADFR00H3ACYA	Right Front Passenger Head Front Y-Axis Acceleration	1000	+	yes	1000
	30	13HEADFR00H3ACZA	Right Front Passenger Head Front Z-Axis Acceleration	1000	+	yes	1000
	31	13HEADUP00H3ACXA	Right Front Passenger Head Top X-Axis Acceleration	1000	+	yes	1000
	32	13HEADUP00H3ACYA	Right Front Passenger Head Top Y-Axis Acceleration	1000	+	yes	1000
	33	13HEADLE00H3ACXA	Right Front Passenger Head Left X-Axis Acceleration	1000	+	yes	1000
	34	13HEADLE00H3ACZA	Right Front Passenger Head Left Z-Axis Acceleration	1000	+	yes	1000
	35	13NECKUP00H3FOXA	Right Front Passenger Upper Neck X-Axis Force	1000	+	yes	8896.4
	36	13NECKUP00H3FOYA	Right Front Passenger Upper Neck Y-Axis Force	1000	+	yes	8896.4

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100115

# Command File Test Number 100115

Chan	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
37	13NECKUP00H3FOZA	Right Front Passenger Upper Neck Z-Axis Force	1000	+	yes	13344.6
38	13NECKUP00H3MOXA	Right Front Passenger Upper Neck Moment About X Axis	600	+	yes	282.4
39	13NECKUP00H3MOYA	Right Front Passenger Upper Neck Moment About Y Axis	600	+	yes	282.4
40	13NECKUP00H3MOZA	Right Front Passenger Upper Neck Moment About Z Axis	600	+	yes	282.4
41	13NECKLO00H3FOXA	Right Front Passenger Lower Neck X-Axis Force	1000	+	yes	13345
42	13NECKLO00H3FOYA	Right Front Passenger Lower Neck Y-Axis Force	1000	+	yes	13344.6
43	13NECKLO00H3FOZA	Right Front Passenger Lower Neck Z-Axis Force	1000	+	yes	13344.6
44	13NECKLO00H3MOXA	Right Front Passenger Lower Neck Moment About X Axis	600	+	yes	452
45	13NECKLO00H3MOYA	Right Front Passenger Lower Neck Moment About Y Axis	600	+	yes	452
46	13NECKLO00H3MOZA	Right Front Passenger Lower Neck Moment About Z Axis	600	+	yes	452
47	13CHSTCG00H3ACXA	Right Front Passenger Chest X-Axis Acceleration	180	+	yes	1000
48	13CHSTCG00H3ACYA	Right Front Passenger Chest Y-Axis Acceleration	180	+	yes	1000
49	13CHSTCG00H3ACZA	Right Front Passenger Chest Z-Axis Acceleration	180	+	yes	1000
49A	13CHSTCG00H3ACRA	Right Front Passenger Chest Resultant Acceleration	180			
50	13CHST0000H3DSXA	Right Front Passenger Chest X-Axis Displacement	600	+	yes	84
51	13PELVCG00H3ACXA	Right Front Passenger Pelvis X-Axis Acceleration	1000	+	yes	1000
52	13PELVCG00H3ACYA	Right Front Passenger Pelvis Y-Axis Acceleration	1000	+	yes	1000
53	13PELVCG00H3ACZA	Right Front Passenger Pelvis Z-Axis Acceleration	1000	+	yes	1000
53A	13PELVCG00H3ACRA	Right Front Passenger Pelvis Resultant Acceleration	1000			
54	14HEADCG00H3ACXA	Left Rear Passenger Head X-Axis Acceleration	1000	+	yes	1000
55	14HEADCG00H3ACYA	Left Rear Passenger Head Y-Axis Acceleration	1000	+	yes	1000
56	14HEADCG00H3ACZA	Left Rear Passenger Head Z-Axis Acceleration	1000	+	yes	1000
56A	14HEADCG00H3ACRA	Left Rear Passenger Head Resultant Acceleration	1000			
57	14HEADCG00H3AVXA	Left Rear Passenger Head (DTS ARS) Rate Gyro X	1000	+	yes	12000
58	14HEADCG00H3AVYA	Left Rear Passenger Head (DTS ARS) Rate Gyro Y	1000	+	yes	12000
59	14HEADCG00H3AVZA	Left Rear Passenger Head (DTS ARS) Rate Gyro Z	1000	+	yes	12000
60	14NECKUP00H3FOXA	Left Rear Passenger Upper Neck X-Axis Force	1000	+	yes	8896
61	14NECKUP00H3FOYA	Left Rear Passenger Upper Neck Y-Axis Force	1000	+	yes	8896
62	14NECKUP00H3FOZA	Left Rear Passenger Upper Neck Z-Axis Force	1000	+	yes	13344
63	14NECKUP00H3MOXA	Left Rear Passenger Upper Neck Moment About X Axis	600	+	yes	282
64	14NECKUP00H3MOYA	Left Rear Passenger Upper Neck Moment About Y Axis	600	+	yes	282
65	14NECKUP00H3MOZA	Left Rear Passenger Upper Neck Moment About Z Axis	600	+	yes	282
66	14CHSTCG00H3ACXA	Left Rear Passenger Chest X-Axis Acceleration	180	+	yes	400
67	14CHSTCG00H3ACYA	Left Rear Passenger Chest Y-Axis Acceleration	180	+	yes	400
68	14CHSTCG00H3ACZA	Left Rear Passenger Chest Z-Axis Acceleration	180	+	yes	400
68A	14CHSTCG00H3ACRA	Left Rear Passenger Chest Resultant Acceleration	180			
69	14CHST0000H3DSXA	Left Rear Passenger Chest X-Axis Displacement	600	+	yes	84
70	14PELVCG00H3ACXA	Left Rear Passenger Pelvis X-Axis Acceleration	1000	+	yes	2000
71	14PELVCG00H3ACYA	Left Rear Passenger Pelvis Y-Axis Acceleration	1000	+	yes	2000
72	14PELVCG00H3ACZA	Left Rear Passenger Pelvis Z-Axis Acceleration	1000	+	yes	2000

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100115

## Command File Test Number 100115

Chan	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
72A	14PELVCG00H3ACRA	Left Rear Passenger Pelvis Resultant Acceleration	1000			
	73 14NECKLO00H3FOXA	Left Rear Passenger Lower Neck X-Axis Force	1000 +	yes		8896
	74 14NECKLO00H3FOYA	Left Rear Passenger Lower Neck Y-Axis Force	1000 +	yes		8896
	75 14NECKLO00H3FOZA	Left Rear Passenger Lower Neck Z-Axis Force	1000 +	yes		13345
	76 14NECKLO00H3MOXA	Left Rear Passenger Lower Neck Moment About X Axis	600 +	yes		282
	77 14NECKLO00H3MOYA	Left Rear Passenger Lower Neck Moment About Y Axis	600 +	yes		282
	78 14NECKLO00H3MOZA	Left Rear Passenger Lower Neck Moment About Z Axis	600 +	yes		282
	79 10VEHCCG0000ACXA	Vehicle Center of Gravity X-Axis Acceleration	60 +	yes		2000
	80 10VEHCCG0000ACYA	Vehicle Center of Gravity Y-Axis Acceleration	60 +	yes		2000
	81 10VEHCCG0000ACZA	Vehicle Center of Gravity Z-Axis Acceleration	60 +	yes		2000
81A	10VEHCCG0000ACRA	Vehicle Center of Gravity Resultant Acceleration	60			
	82 10VEHCCG0000AVXA	Vehicle Roll Rate	600 +	yes		1500
	83 10VEHCCG0000AVYA	Vehicle Pitch Rate	600 +	yes		1500
	84 10VEHCCG0000AVZA	Vehicle Yaw Rate	600 +	yes		1500
	85 10VEHCREDK00AVXA	Rear Deck Roll Rate Redundant	600 +	yes		1500
	86 10VEHCREDK00AVYA	Rear Deck Pitch Rate Redundant	600 +	yes		1500
	87 10VEHCREDK00AVZA	Rear Deck Yaw Rate Redundant	600 +	yes		1500
	88 10ENGNTTP0000ACXA	Top of Engine X-Axis Acceleration	60 +	yes		2000
	89 10ENGNTTP0000ACYA	Top of Engine Y-Axis Acceleration	60 +	yes		2000
	90 10ENGNTTP0000ACZA	Top of Engine Z-Axis Acceleration	60 +	yes		2000
90A	10ENGNTTP0000ACRA	Top of Engine Resultant Acceleration	60			
	91 10ENGNBO0000ACXA	Bottom of Engine X-Axis Acceleration	60 +	yes		2000
	92 10ENGNBO0000ACYA	Bottom of Engine Y-Axis Acceleration	60 +	yes		2000
	93 10ENGNBO0000ACZA	Bottom of Engine Z-Axis Acceleration	60 +	yes		2000
93A	10ENGNBO0000ACRA	Bottom of Engine Resultant Acceleration	60			
	94 10APILUPLE00ACXA	Left A-Pillar Upper X-Axis Acceleration	60 +	yes		2000
	95 10APILUPLE00ACYA	Left A-Pillar Upper Y-Axis Acceleration	60 +	yes		2000
	96 10APILUPLE00ACZA	Left A-Pillar Upper Z-Axis Acceleration	60 +	yes		2000
96A	10APILUPLE00ACRA	Left A-Pillar Upper Resultant Acceleration	60			
	97 10APILLOLE00ACXA	Left A-Pillar Lower X-Axis Acceleration	60 +	yes		2000
	98 10APILLOLE00ACYA	Left A-Pillar Lower Y-Axis Acceleration	60 +	yes		2000
	99 10APILLOLE00ACZA	Left A-Pillar Lower Z-Axis Acceleration	60 +	yes		2000
99A	10APILLOLE00ACRA	Left A-Pillar Lower Resultant Acceleration	60			
	100 10APILUPRI00ACXA	Right A-Pillar Upper X-Axis Acceleration	60 +	yes		2000
	101 10APILUPRI00ACYA	Right A-Pillar Upper Y-Axis Acceleration	60 +	yes		2000
	102 10APILUPRI00ACZA	Right A-Pillar Upper Z-Axis Acceleration	60 +	yes		2000
102A	10APILUPRI00ACRA	Right A-Pillar Upper Resultant Acceleration	60			
	103 10APILLORI00ACXA	Right A-Pillar Lower X-Axis Acceleration	60 +	yes		2000
	104 10APILLORI00ACYA	Right A-Pillar Lower Y-Axis Acceleration	60 +	yes		2000
	105 10APILLORI00ACZA	Right A-Pillar Lower Z-Axis Acceleration	60 +	yes		2000

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100115

# Command File Test Number 100115

Chan	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
105A	10APILLORI00ACRA	Right A-Pillar Lower Resultant Acceleration	60			
106	10BPILUPLE00ACXA	Left B-Pillar Upper X-Axis Acceleration	60 +		yes	2000
107	10BPILUPLE00ACYA	Left B-Pillar Upper Y-Axis Acceleration	60 +		yes	2000
108	10BPILUPLE00ACZA	Left B-Pillar Upper Z-Axis Acceleration	60 +		yes	2000
108A	10BPILUPLE00ACRA	Left B-Pillar Upper Resultant Acceleration	60			
109	10BPILLOLE00ACXA	Left B-Pillar Lower X-Axis Acceleration	60 +		yes	2000
110	10BPILLOLE00ACYA	Left B-Pillar Lower Y-Axis Acceleration	60 +		yes	2000
111	10BPILLOLE00ACZA	Left B-Pillar Lower Z-Axis Acceleration	60 +		yes	2000
111A	10BPILLOLE00ACRA	Left B-Pillar Lower Resultant Acceleration	60			
112	10BPILUPRI00ACXA	Right B-Pillar Upper X-Axis Acceleration	60 +		yes	2000
113	10BPILUPRI00ACYA	Right B-Pillar Upper Y-Axis Acceleration	60 +		yes	2000
114	10BPILUPRI00ACZA	Right B-Pillar Upper Z-Axis Acceleration	60 +		yes	2000
114A	10BPILUPRI00ACRA	Right B-Pillar Upper Resultant Acceleration	60			
115	10BPILLORI00ACXA	Right B-Pillar Lower X-Axis Acceleration	60 +		yes	2000
116	10BPILLORI00ACYA	Right B-Pillar Lower Y-Axis Acceleration	60 +		yes	2000
117	10BPILLORI00ACZA	Right B-Pillar Lower Z-Axis Acceleration	60 +		yes	2000
117A	10BPILLORI00ACRA	Right B-Pillar Lower Resultant Acceleration	60			
118	10CPILUPLE00ACXA	Left C-Pillar Upper X-Axis Acceleration	60 +		yes	2000
119	10CPILUPLE00ACYA	Left C-Pillar Upper Y-Axis Acceleration	60 +		yes	2000
120	10CPILUPLE00ACZA	Left C-Pillar Upper Z-Axis Acceleration	60 +		yes	2000
120A	10CPILUPLE00ACRA	Left C-Pillar Upper Resultant Acceleration	60			
121	10CPILLOLE00ACXA	Left C-Pillar Lower X-Axis Acceleration	60 +		yes	2000
122	10CPILLOLE00ACYA	Left C-Pillar Lower Y-Axis Acceleration	60 +		yes	2000
123	10CPILLOLE00ACZA	Left C-Pillar Lower Z-Axis Acceleration	60 +		yes	2000
123A	10CPILLOLE00ACRA	Left C-Pillar Lower Resultant Acceleration	60			
124	10CPILUPRI00ACXA	Right C-Pillar Upper X-Axis Acceleration	60 +		yes	2000
125	10CPILUPRI00ACYA	Right C-Pillar Upper Y-Axis Acceleration	60 +		yes	2000
126	10CPILUPRI00ACZA	Right C-Pillar Upper Z-Axis Acceleration	60 +		yes	2000
126A	10CPILUPRI00ACRA	Right C-Pillar Upper Resultant Acceleration	60			
127	10CPILLORI00ACXA	Right C-Pillar Lower X-Axis Acceleration	60 +		yes	2000
128	10CPILLORI00ACYA	Right C-Pillar Lower Y-Axis Acceleration	60 +		yes	2000
129	10CPILLORI00ACZA	Right C-Pillar Lower Z-Axis Acceleration	60 +		yes	2000
129A	10CPILLORI00ACRA	Right C-Pillar Lower Resultant Acceleration	60			
130	10DPILUPLE00ACXA	Left D-Pillar Upper X-Axis Acceleration	60 +		yes	2000
131	10DPILUPLE00ACYA	Left D-Pillar Upper Y-Axis Acceleration	60 +		yes	2000
132	10DPILUPLE00ACZA	Left D-Pillar Upper Z-Axis Acceleration	60 +		yes	2000
132A	10DPILUPLE00ACRA	Left D-Pillar Upper Resultant Acceleration	60			
133	10DPILLOLE00ACXA	Left D-Pillar Lower X-Axis Acceleration	60 +		yes	2000
134	10DPILLOLE00ACYA	Left D-Pillar Lower Y-Axis Acceleration	60 +		yes	2000
135	10DPILLOLE00ACZA	Left D-Pillar Lower Z-Axis Acceleration	60 +		yes	2000

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## Command File Test Number 100115

Chan	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
135A	10DPILLOLE00ACRA	Left D-Pillar Lower Resultant Acceleration	60			
136	10DPILUPRI00ACXA	Right D-Pillar Upper X-Axis Acceleration	60 +	yes	2000	
137	10DPILUPRI00ACYA	Right D-Pillar Upper Y-Axis Acceleration	60 +	yes	2000	
138	10DPILUPRI00ACZA	Right D-Pillar Upper Z-Axis Acceleration	60 +	yes	2000	
138A	10DPILUPRI00ACRA	Right D-Pillar Upper Resultant Acceleration	60			
139	10DPILLORI00ACXA	Right D-Pillar Lower X-Axis Acceleration	60 +	yes	2000	
140	10DPILLORI00ACYA	Right D-Pillar Lower Y-Axis Acceleration	60 +	yes	2000	
141	10DPILLORI00ACZA	Right D-Pillar Lower Z-Axis Acceleration	60 +	yes	2000	
141A	10DPILLORI00ACRA	Right D-Pillar Lower Resultant Acceleration	60			
142	102RDK000000ACXA	Vehicle Rear Deck X-Axis Acceleration	60 +	yes	2000	
143	102RDK000000ACYA	Vehicle Rear Deck Y-Axis Acceleration	60 +	yes	2000	
144	102RDK000000ACZA	Vehicle Rear Deck Z-Axis Acceleration	60 +	yes	2000	
144A	102RDK000000ACRA	Vehicle Rear Deck Resultant Acceleration	60			
145	11SEAT000000ACXA	LF Seat Position (on floor) X-Axis Acceleration	60 +	yes	2000	
146	11SEAT000000ACYA	LF Seat Position (on floor) Y-Axis Acceleration	60 +	yes	2000	
147	11SEAT000000ACZA	LF Seat Position (on floor) Z-Axis Acceleration	60 +	yes	2000	
147A	11SEAT000000ACRA	LF Seat Position (on floor) Resultant Acceleration	60			
148	13SEAT000000ACXA	RF Seat Position (on floor) X-Axis Acceleration	60 +	yes	2000	
149	13SEAT000000ACYA	RF Seat Position (on floor) Y-Axis Acceleration	60 +	yes	2000	
150	13SEAT000000ACZA	RF Seat Position (on floor) Z-Axis Acceleration	60 +	yes	2000	
150A	13SEAT000000ACRA	RF Seat Position (on floor) Resultant Acceleration	60			
151	14SEAT000000ACXA	LR Seat Position (on floor) X-Axis Acceleration	60 +	yes	2000	
152	14SEAT000000ACYA	LR Seat Position (on floor) Y-Axis Acceleration	60 +	yes	2000	
153	14SEAT000000ACZA	LR Seat Position (on floor) Z-Axis Acceleration	60 +	yes	2000	
153A	14SEAT000000ACRA	LR Seat Position (on floor) Resultant Acceleration	60			
154	16SEAT000000ACXA	RR Seat Position (on floor) X-Axis Acceleration	60 +	yes	2000	
155	16SEAT000000ACYA	RR Seat Position (on floor) Y-Axis Acceleration	60 +	yes	2000	
156	16SEAT000000ACZA	RR Seat Position (on floor) Z-Axis Acceleration	60 +	yes	2000	
156A	16SEAT000000ACRA	RR Seat Position (on floor) Resultant Acceleration	60			
157	11SEBE0000B5FO0A	Driver Lap Belt Force	60 +	yes	13344	
158	11SEBE0000B3FO0A	Driver Shoulder Belt Force	60 +	yes	16000	
159	13SEBE0000B5FO0A	Right Front Passenger Lap Belt Force	60 +	yes	15568	
160	13SEBE0000B3FO0A	Right Front Passenger Shoulder Belt Force	60 +	yes	16000	
161	14SEBE0000B5FO0A	Left Rear Passenger Lap Belt Force	60 +	yes	16000	
162	14SEBE0000B3FO0A	Left Rear Passenger Shoulder Belt Force	60 +	yes	16000	
163	11SEBE0000B5DS0A	Driver Seat Belt Spool Potentiometer	1000 +	yes	750	
164	13SEBE0000B5DS0A	Right Front Passenger Belt Spool Potentiometer	1000 +	yes	750	
165	14SEBE0000B5DS0A	Left Rear Passenger Belt Spool Potentiometer	1000 +	yes	750	
166	11CONT000023EV00	Driver Head Contact	0 +	no	1	
167	11CONT000024EV00	Driver Thorax Contact	0 +	no	1	

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## Command File Test Number 100115

Chan	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
168	11CONT000025EV00	Driver Pelvis Contact	0	+	no	1
169	13CONT000026EV00	Right Front Passenger Head Contact Switch	0	+	no	1
170	13CONT000027EV00	Right Front Passenger Thorax Contact Switch	0	+	no	1
171	13CONT000028EV00	Right Front Passenger Pelvis Contact Switch	0	+	no	1
172	14CONT000029EV00	Left Rear Passenger Head Contact	0	+	no	1
173	14CONT000030EV00	Left Rear Passenger Thorax Contact	0	+	no	1
174	14CONT000031EV00	Left Rear Passenger Pelvis Contact	0	+	no	1
175	11AIRB000000VO0A	Left Side Curtain Voltage	1000	+	no	50
176	13AIRB000000VO0A	Right Side Curtain Voltage	1000	+	no	50
177	11MOTPRET000VO0A	Driver Motorized Pretensioner Voltage	1000	+	no	50
178	14MOTPRET000VO0A	Left Rear Pass Motorized Pretensioner Voltage	1000	+	no	50
179	13RETR000000VO0A	Right Front Passenger Retractor Voltage	1000	+	no	50
180	13PRET000000VO0A	Right Front Passenger Buckle Pretensioner Voltage	1000	+	no	50
181	11AIRB000000CU0A	Left Side Curtain Current	1000	+	no	5
182	11MOTPRET000CU0A	Driver Motorized Pretensioner Current	1000	+	no	5
183	13AIRB000000CU0A	Right Side Curtain Current	1000	+	no	5
184	13PRET000000CU0A	Right Front Passenger Buckle Pretensioner Current	1000	+	no	5
185	13RETR000000CU0A	Right Front Passenger Retractor Current	1000	+	no	5
186	14MOTPRET000CU0A	Left Rear Pass Motorized Pretensioner Current	1000	+	no	5

**APPENDIX E**  
**INSIA Report on Structural Measurements**

# **STRUCTURAL SURVEY OF CARS. MEASUREMENT METHODOLOGY OF THE MAIN RESISTANT ELEMENTS IN THE CAR BODY**

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March, 1999

**REPORT DOCUMENTATION PAGE****Title:**

*STRUCTURAL SURVEY OF CARS. MEASUREMENT METHODOLOGY OF THE MAIN RESISTANT ELEMENTS IN THE CAR BODY*

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28031 – Madrid – Spain

**Supplementary notes:**

Under contract to:

THE EUROPEAN COMMUNITY

Project: “Improvement of Crash Compatibility between Cars”  
Contract N°: RO – 97 – SC.1064

**Abstract:**

The main aim of this working package -*Structural Survey of Cars*- is the reduction of incompatibilities, both structural and geometric, between passenger vehicles and their potential collision partners. The understanding of these incompatibilities needs a previous step for the knowledge of the existing car fleet.

Firstly, it is necessary to select the main resistant elements in the car body. These elements have to be chosen from the point of view of the sort of collision that we want to study, that is to say, frontal and side impacts.

Detailed measurements have been taken from exterior and interior elements, spread to a total number of 74 models selected from the main vehicle manufacturers at Spain. All of them are being sold this year. Using the information available from the previous measurements in vehicles, the geometric characteristics of the main resistant elements involved in the geometric compatibility between cars will be defined.

This report shows the methodology followed to get these measurements.

**Subject terms:**

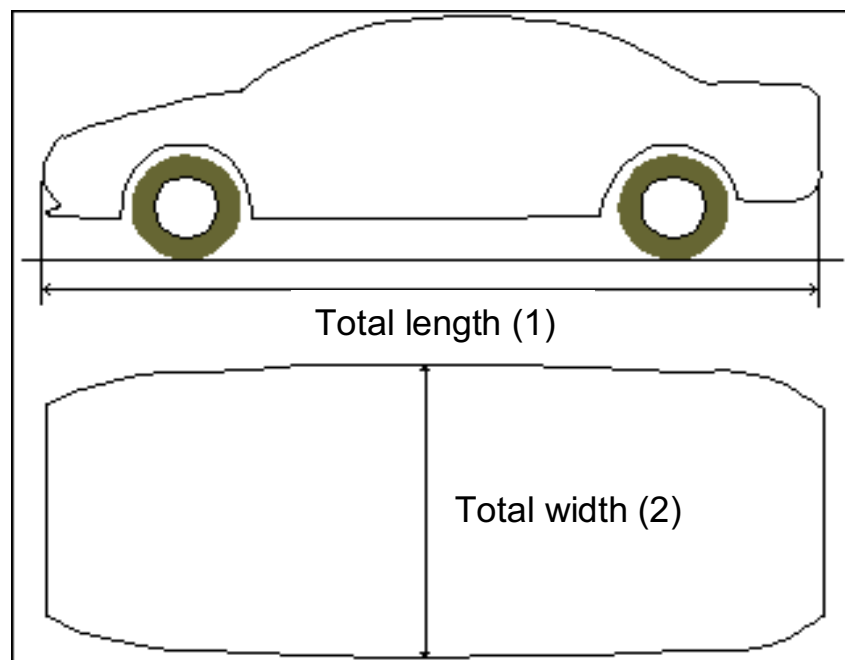
Crash compatibility, geometric compatibility, resistant elements, measure methodology

**Date:**

March, 1999

## 1.- METHODOLOGY.

Detailed measurements have been taken from exterior and interior elements. Using the information available from the previous measurements in vehicles, the geometric characteristics of the main resistant elements involved in the geometric compatibility between cars have been defined. These elements are presented in the following figures, and have been divided in two main groups according to the vehicle zones studied in this project.



*Figure 1.- Definition of the main resistant elements. General dimensions.*

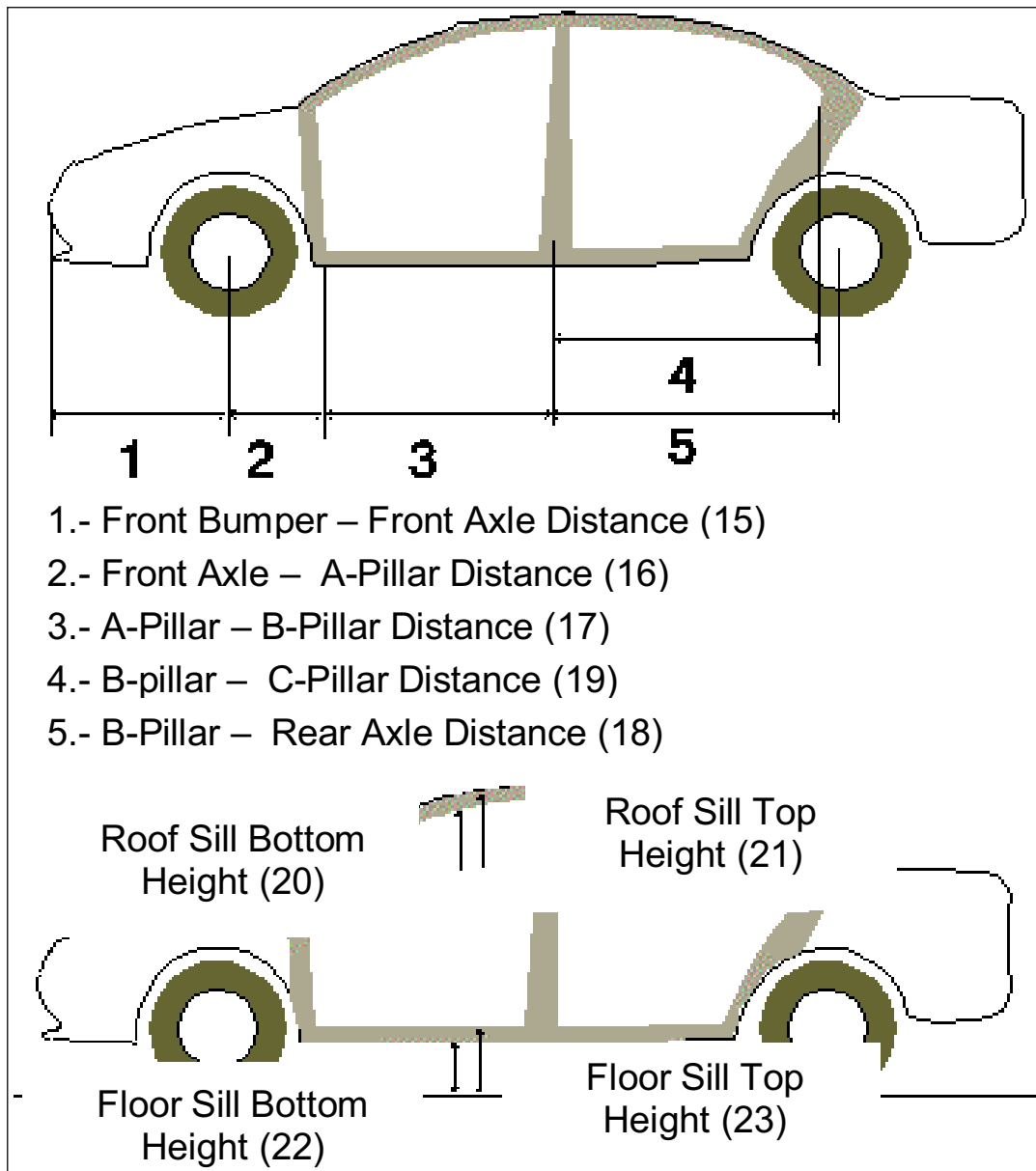


Figure 2.- Definition of the main resistant elements. Side elements.

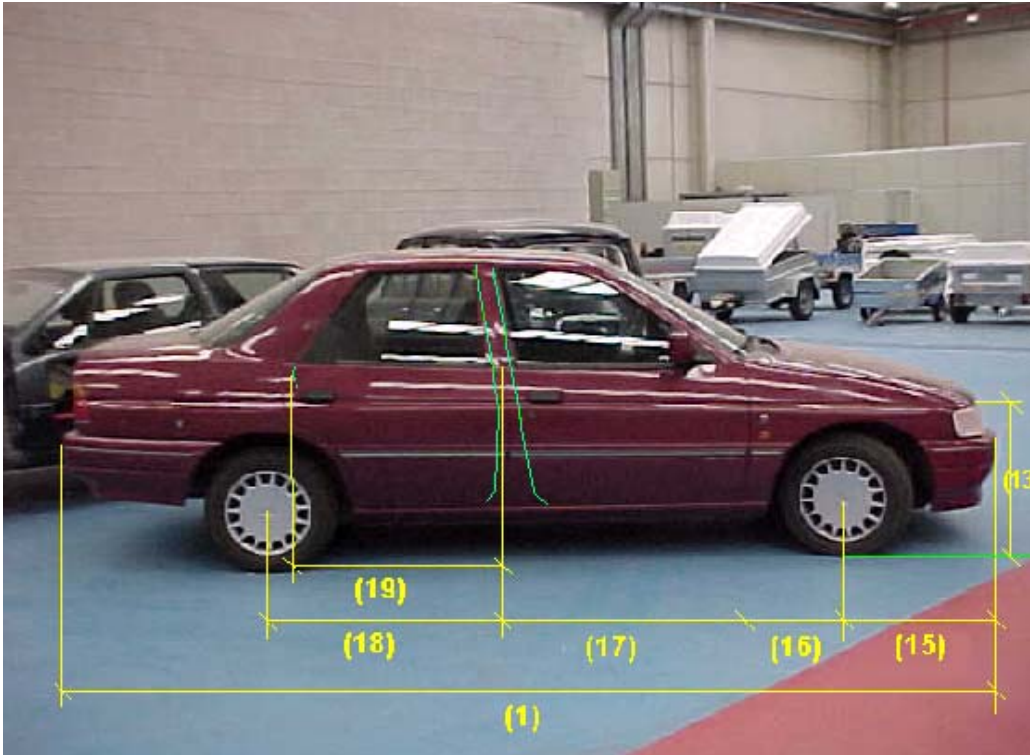
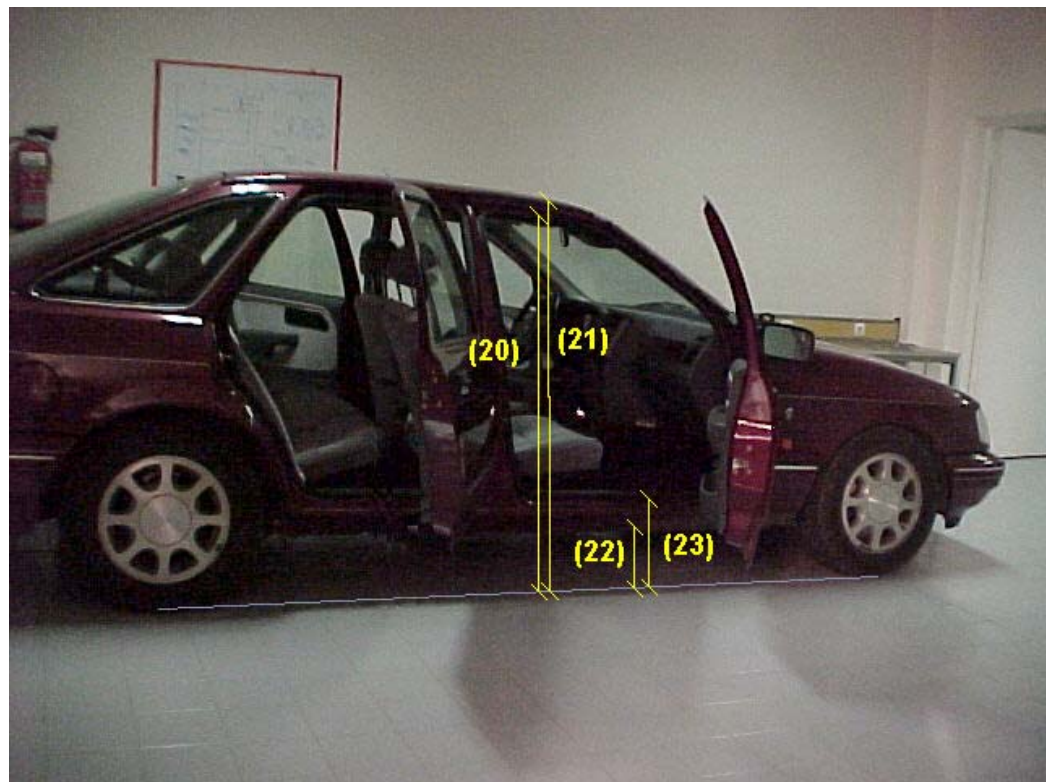


Figure 3.-  
Measurements of  
the side resistant  
elements (outer).

Figure 4.- Measurements  
of the side resistant  
elements (inner).



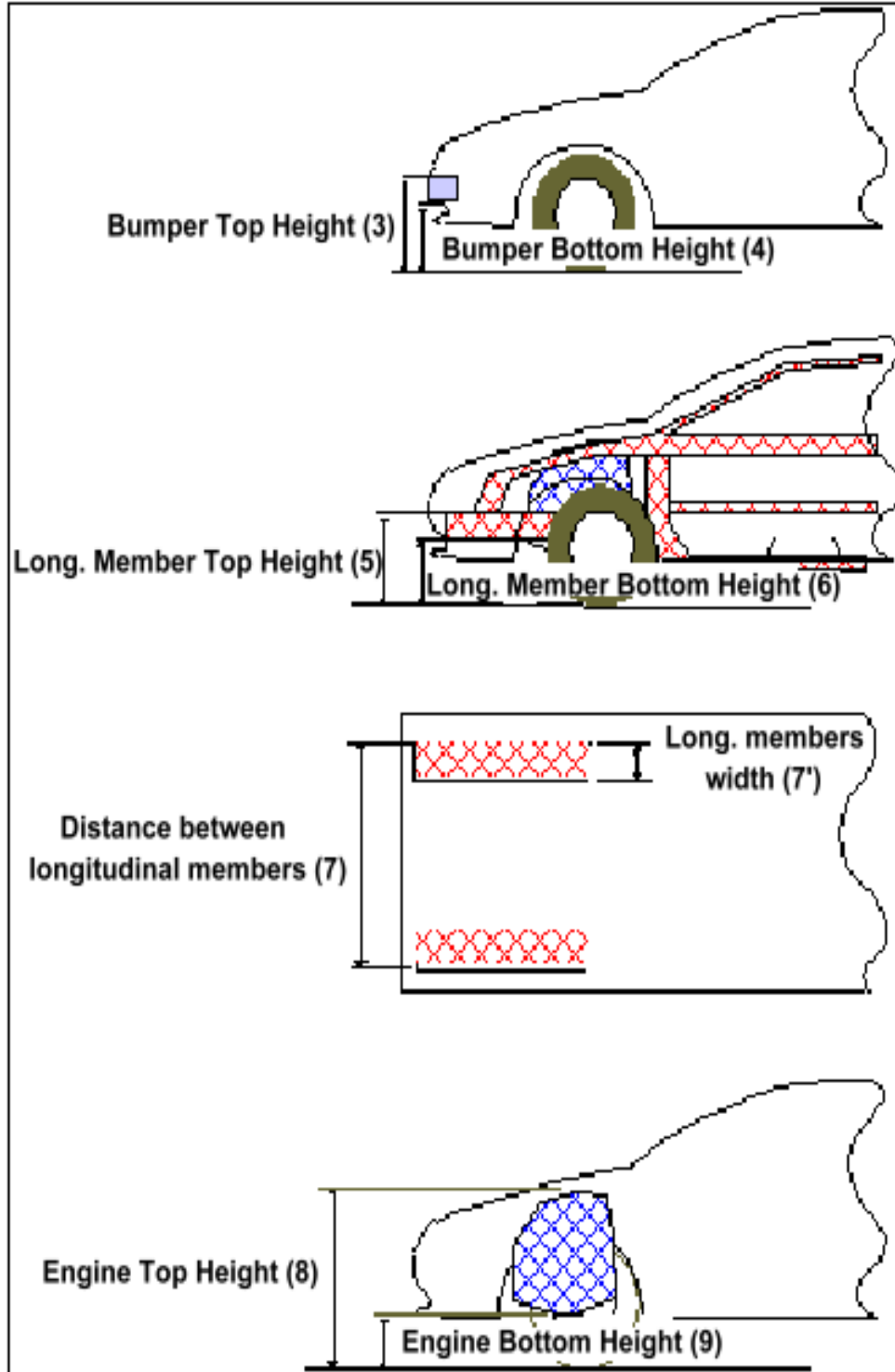


Figure 5.- Definition of the main resistant elements. Front elements.

Figure 6.-  
Measurements of the  
main resistant elements.  
Front elements 1.

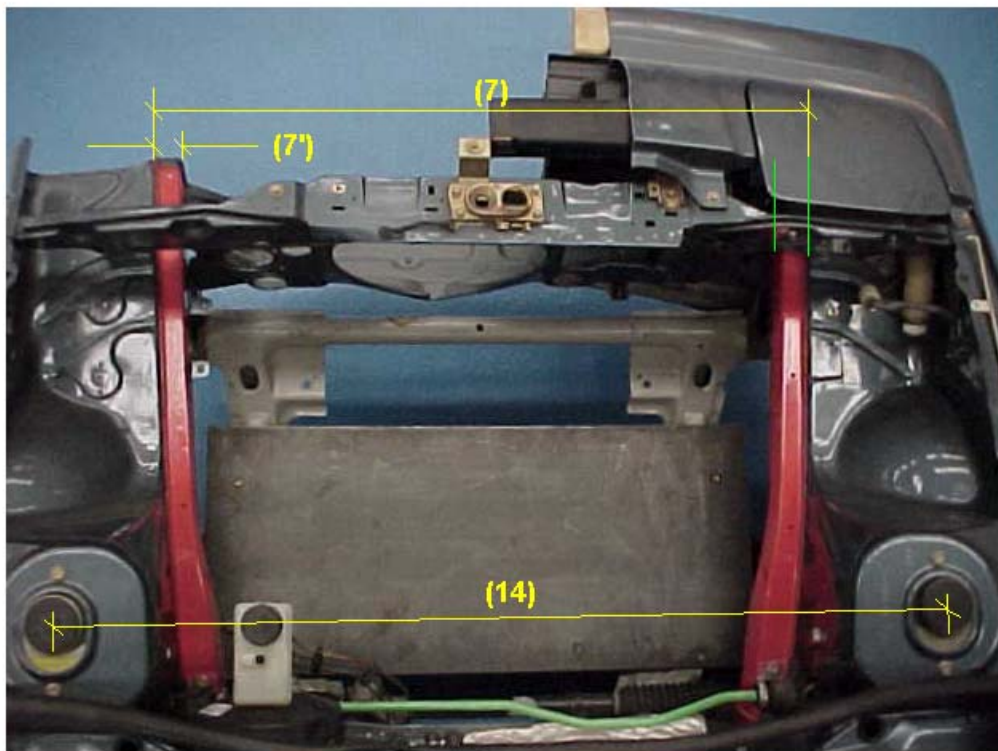
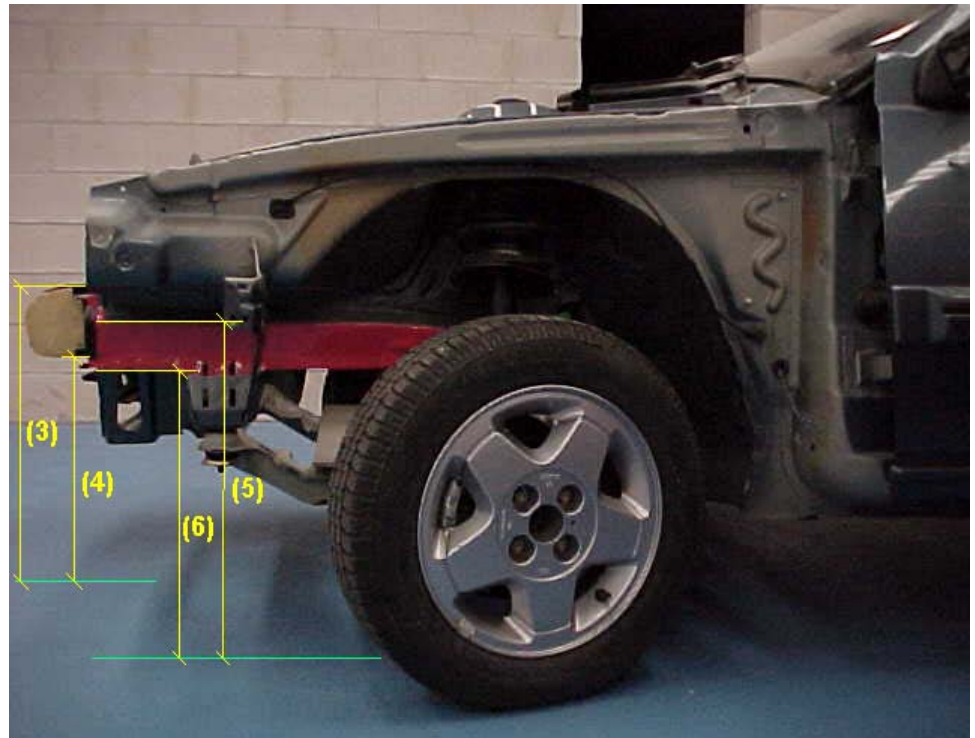


Figure 7.-  
Measurements  
of the main  
resistant  
elements. Front  
elements 2.

Figure 8.-  
Measurements of  
the main resistant  
elements. Front  
elements 3.

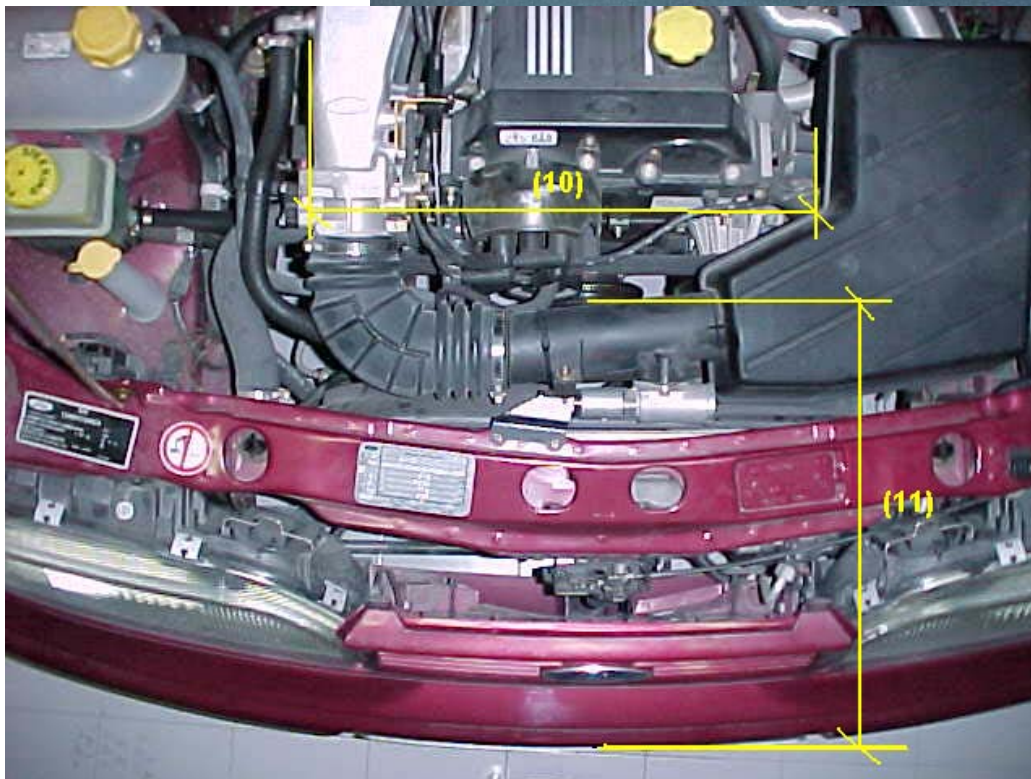
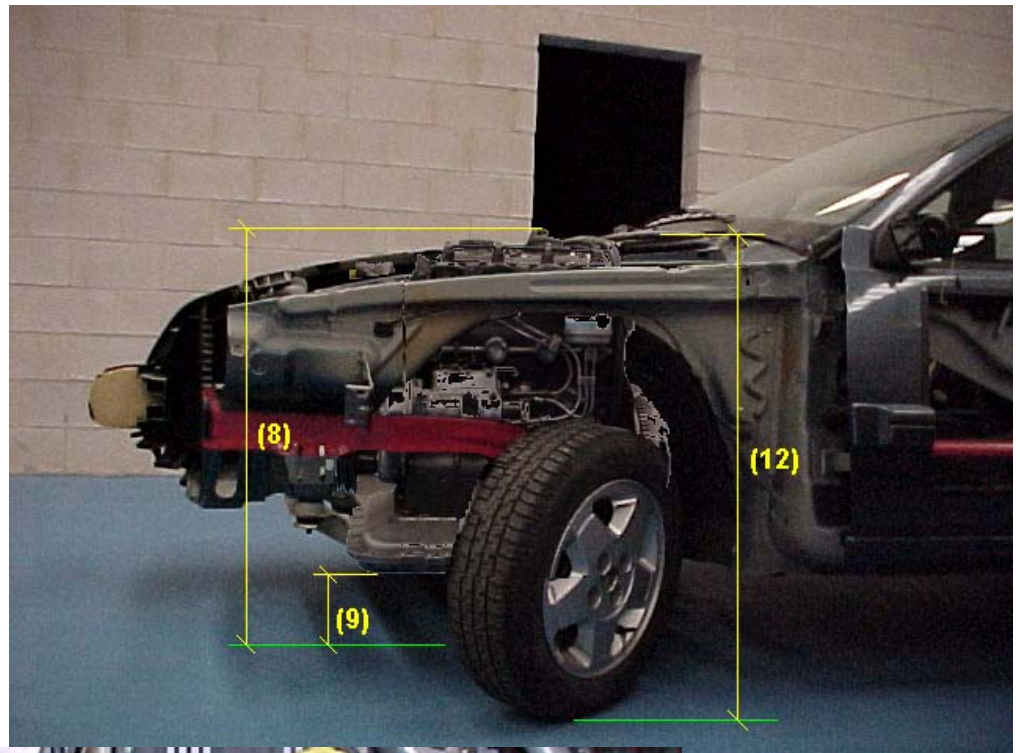


Figure 9.-  
Definition of  
the main  
resistant  
elements. Front  
elements  
(Longitudinal  
engine).

The procedure considered to measure these elements is described as follows, where it is indicated the location of these ones in the Excel Sheet (SURVEY.XLS) into brackets:

### **FRONT ELEMENTS**

- **Total Length –(1)- (Side & Front Sheets - C column):** distance between the point in the front bumper further on and the point in the rear bumper further back.
- **Weight (Side & Front Sheets - D column):** mass, including an average driver weight (70 kg), and the fuel tank mass (at half-capacity).
- **Total Width –(2)- (Side & Front Sheets - E column):** distance between the outer side points in a transverse plane of the vehicle (middle plane between the front and rear axles).
- **Bumper bottom height –(4)- (Front Sheet G column):** distance between the ground and the lowest point on the front bumper, being a resistant member (aerodynamic elements under the front bumper are not considered).
- **Bumper top height –(3)- (Front Sheet H column):** distance between the ground and the highest point on the front bumper, being a resistant member (aerodynamic elements are not considered).
- **Longitudinal member top height –(5)- (Front Sheet I column):** distance between the ground and the highest point on the longitudinal members, measured approximately in the front bumper-longitudinal member joint (when accessible).
- **Longitudinal member bottom height –(6)- (Front Sheet J column):** distance between the ground and the lowest point on the longitudinal members, measured approximately in the front bumper-longitudinal member joint.
- **Distance between longitudinal members (Front Sheet K column):** transverse distance between extreme points in longitudinal members, measured approximately in the front bumper-longitudinal member joint.

Depending on the accessibility of these members, the extreme points are the inner points (I) or the outer points (O).

- **Longitudinal member width -7'- (Front Sheet L column):** width of one of the longitudinal members, measured approximately in the front bumper-longitudinal member joint.

- 
- **Engine top height (8) (Front Sheet N column):** distance between the ground and the highest point on the engine that can be a resistant member in case of accident (usually, the highest point on the head, or the highest point of the inlet or exhaust manifolds).
  - **Engine bottom height (9) (Front Sheet M column):** distance between the ground and the lowest point on the engine (usually, the lowest point on the crankcase).
  - **Engine and Gearbox width (10) (Front Sheet O & P columns):**
    - *Transverse configuration engine:* distance between extreme points in the gearbox-cylinder block unit or others resistant members attached to the cylinder block unit, i.e. fan belts (from a front point of view).
    - *Longitudinal configuration engine:* distance between extreme points in the cylinder block unit (from a front point of view).
  - **Front bumper - Engine distance (11) (Front Sheet Q column):** distance between the point in the front bumper further on and the point in the engine further on that is a resistant element, i.e. the further on point of the exhaust manifold placed in the front of the engine.
  - **Front shock absorber fixing width (14) (Front Sheet R column):** transverse distance between the front shock absorber - body car joints.
  - **Front shock absorber fixing height (12) (Front Sheet S column):** distance between the ground and the front shock absorber-body car joint.
  - **Bonnet leading edge height (Front Sheet T column):** distance between the ground and the bonnet edge further on.

## SIDE ELEMENTS

- **Front bumper - Front axle distance (15) (Side Sheet G column):** distance between the point in the front bumper further on and the middle point in the front tyre-road contact patch.
- **Front axle - A Pillar distance (16) (Side Sheet H column):** distance between the middle point in the front tyre-road contact patch and the point in the A-pillar further back.
- **A Pillar - B Pillar distance (17) (Side Sheet I column):** distance between the point in the A-pillar further back and the middle point in the B-pillar.
- **B Pillar - C Pillar distance (19) (Side Sheet J column):** distance between the middle point in the B-pillar and the point in the C-pillar further back (only 4/5-door vehicles).
- **B Pillar - Rear axle distance (18) (Side Sheet K column):** distance between the middle point in the B-pillar and the middle point in the rear tyre-road contact patch.
- **Roof sill bottom height (20) (Side Sheet L column):** distance between the ground and the lowest point on the roof sill, measured in the front door middle point.
- **Roof sill top height (21) (Side Sheet M column):** distance between the ground and the highest point on the roof sill (usually located in the sill-roof joint), measured in the front door middle point.
- **Floor sill bottom height (22) (Side Sheet N column):** distance between the ground and the lowest point on the floor sill, measured in the front door middle point.
- **Floor sill top height (23) (Side Sheet O column):** distance between the ground and the highest point on the floor sill, measured in the front door middle point.

## NOTE

- N/A: dimension not available.