

**Vehicle Research and Test Center
FMVSS 208 Dynamic Rollover
of a 2007 Ford Expedition
TRC Inc. Test Number 090930**

**Prepared By:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319**

**Final Report
September 2009 – March 2010**

**Prepared For:
Vehicle Research and Test Center
P. O. Box 37
East Liberty, OH 43319**

Notice

Transportation Research Center Inc. does not endorse or certify products of manufacturers. The manufacturer's name appears solely to identify the test article. Transportation Research Center Inc. assumes no liability for the report or use thereof. It is responsible for the facts and the accuracy of the data presented herein. This report does not constitute a standard, specification, or regulation.

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

TRC TEST NUMBER: 090930

Report Approved by:



Date: 3/24/10

Mike Tonneman
Project Manager
Transportation Research Center Inc.

Final Report Accepted by:

Date: _____

Allison Loudon
Project Engineer
Vehicle Research & Test Center

TABLE OF CONTENTS

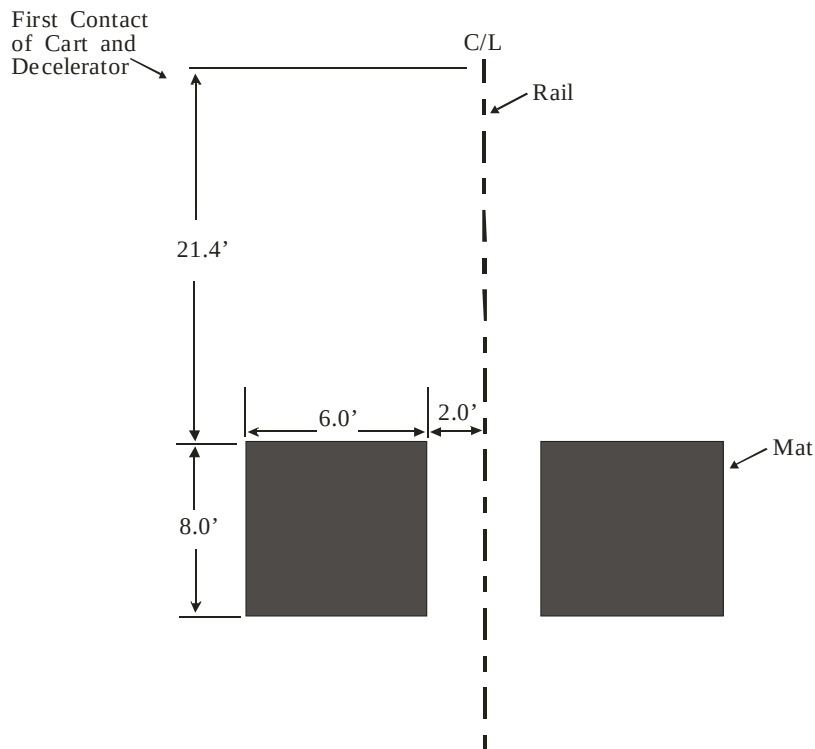
<u>Section</u>		<u>Page No.</u>
1	Purpose and Test Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	5
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	6
2	Seats and Seat Belts Data	9
3	Post-Test Observations	10
4	Dummy Measurements	12
5	Occupant Instrumentation Data	15
6	Vehicle Structural Measurements	18
7	Vehicle Exterior Crush Measurements	19
8	Vehicle Accelerometer Locations and Data Summary	30
9	High-Speed Camera Data	34
10	Dummy/Vehicle Temperature Stabilization Data	35
<u>Appendix</u>		
A	Photographs	A-1
B	Data Plots	B-1
C	Dummy Configuration and Performance Verification Data	C-1
D	Test Equipment List and Calibration Information	D-1
E	INSIA Report on Structural Measurements	E-1

SECTION 1

PURPOSE AND TEST PROCEDURE

This dynamic rollover crash test was conducted to investigate the dynamics of belted occupants during rollover crashes. This test was conducted with a modified 2007 Ford Expedition on the FMVSS 208 rollover cart moving at 47.8 km/h (30 mph), releasing the vehicle with its roll axis perpendicular to the direction of rollover cart motion, and first contacting the passenger's side. 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 air bags were disabled for this test condition. 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 system¹. The right front position was equipped with a non pretension 3-PT belt system¹. The pretensioners were fired manually at 300ms into the event and the motorized retractors were manually activated prior to launch. 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.).

The test setup included installing two sections of rubber matting² at the impact area secured with adhesive to steel plates. The left and right sides are symmetrical.



¹ Belt systems were provided by TRW Automotive.

² Rubber matting provided by VRTC.

SECTION 2

SUMMARY OF TEST RESULTS

A 2007 Ford Expedition, containing three (3) instrumented Part 572E test dummies was placed upon the rollover test device at 23 degrees above the horizontal and was released at 47.8 km/h (29.7 mph). The device was attached to the tow cable of the drive system. The device was brought to a stop with water filled decelerator tubes. After release, the vehicle impacted the ground on its right side. The vehicle made two rolls and came to rest on its wheels. The dynamic rollover test was conducted by Transportation Research Center Inc. in East Liberty, Ohio on September 30, 2009. Pre-test and post-test photographs of the test vehicle, the cart, and the dummies are included in Appendix A.

Three (3) restrained Part 572E Hybrid III 50th percentile adult male anthropomorphic test devices (dummies) were placed in the driver, right front, and left rear designated seating positions according 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 rotation rate gyroscopes. The ATD in position (3) was instrumented with six (6) additional head accelerometers to complete a 9-array head configuration. All dummies were calibrated prior to this test and were restrained by 3-point seat belts. All dummy instrumentation is detailed in this report. Seventy-eight (78) dummy channels of acceleration, force, moment, rotation, and displacement data were collected for this test. A total of 181 channels of data were recorded.

The rollover test was documented by one (1) real-time camera and fourteen (14) 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 and 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(#043)	Right Front ATD(#110)	Left Rear ATD(#001)
HIC15 CFC 1000	52	60	34
HIC36 CFC 1000	52	60	34
Chest Clip 3 ms (g) CFC 180	21.5	13.3	14.1
Chest Deflection (mm) CFC 600	-5.2	-9.5	-0.0
Neck Injury (NIJ) (ms) CFC 600			
NTE	0.16	0.11	0.15
NTF	0.08	0.07	0.07
NCE	0.11	0.47	1.14**
NCF	1.25*	0.07	0.06
Neck Tension (N) CFC1000	458.3	451.8	492.1
Neck Compression (N) CFC1000	-6605.8*	-1968.1	-3623.6

*See next page for test notes.

	2007 Ford Expedition
Vehicle Test Weight	2917.2 kg
Left Side - Maximum Crush	170.0 mm
Right Side - Maximum Crush	137.0 mm
Roof - Maximum Crush	149.0 mm
Impact Speed	47.8 km/h

TEST NOTES:

* The left front ATD's Neck injury Criterion (NIJ) for Neck Compression-flexion (NCF) exceeded the allowable injury assessment value of 1.0. The Neck Compression value also exceeded the allowable injury assessment value of 4000 N. The injury values are based on TP208-14. A post-test calibration was performed on the ATD's neck flexion and neck extension and passed. The post test calibration report is included in Appendix C of this report.

The left front ATD's lower neck Y-axis moment data channel exceeded the full scale value at 3,143 ms and recorded questionable data thereafter.

The right front passenger ATD's head top X-axis acceleration data channel recorded questionable data throughout the event.

** The left rear ATD's Neck Injury Criterion (NIJ) for Neck Compression-extension (NCE) exceeded the allowable injury assessment value of 1.0. The injury values are based on TP208-14. A post-test calibration was performed on the ATD's neck extension and passed. The post-test calibration report is included in Appendix C of this report.

The vehicle's roll rotation rate gyroscope at the center of gravity measuring about the X-axis recorded no valid data throughout the event.

The vehicle's redundant rear deck roll rotation rate gyroscope data channel measuring about the X-axis exceeded the full scale value at 415 milliseconds. The data appears to be valid.

The vehicle's redundant rear deck pitch rotation rate gyroscope data channel measuring about the Y-axis exceeded the full scale value at 1,870 milliseconds. The data appears to be valid.

The vehicle's redundant rear deck yaw rotation rate gyroscope data channel measuring about the Z-axis exceeded the full scale value at 420 milliseconds. The data appears to be valid.

The vehicle's airbags were disabled for this test.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

TEST VEHICLE INFORMATION AND OPTIONS

Make	Ford	Driv. & Front Pass Front Airbag ²	Yes
Model Year	2007	Driv. & Front Pass Side Airbag ²	Yes
Model	Expedition	Driv. & Front Pass Head Airbag	No
Body Style	4-door SUV	Driv. & Front Pass Curtain Airbag ²	Yes
		Driv. & Front Pass Knee Airbag	No
VIN	1FMFU15587LA35172	Rear Pass. Front Airbag	No
Color	Grey	Rear Pass. Side Airbag	No
Delivery Date	11/26/2008	Rear Pass. Head Airbag	No
Odometer Reading	--- ¹	Rear Pass. Curtain Airbag	Yes
Dealer	--- ¹	Rear Pass. Knee Airbag	No
Transmission	Automatic	Load Limiters	--- ³
Final Drive	Rear wheel drive	Anti-lock Brakes	Yes
Number of Cylinders	V8	All-Wheel Drive	No
Engine Displacement (L)	5.4L	Pretensioners	--- ³
Engine Placement	Longitudinal	Air Conditioning	Yes
Roof Rack	Yes	Tilt Wheel	Yes
Sunroof / T-Top	No	Power Seats	Yes
Tinted Glass	Yes	Power Windows	Yes
Traction Control	No	Power Steering	Yes
Power Brakes	Yes	AM/FM CD	Yes
Front Disc	Yes	Automatic Door Locks	Yes
Rear Disc	Yes	Other – Elect. Security System	Yes
Does owner's manual provide instructions to turn off automatic door locks?			Yes

DATA FROM CERTIFICATION LABEL

Manufactured by	Ford Motor Co.	GVWR (kg)	3357
Date of Manufacture	12/06	GAWR Front (kg)	1497
		GAWR Rear (kg)	1928

TEST VEHICLE SEAT TYPE AND CAPACITY

Measured Parameter	Front	Mid	Rear	Total
Type of Seats	Bucket	Split-Bench	Bench	
Designated Seating Capacity (DSC)	2	3	3	8
Type of Seat Back	Power Adjustable	Manual	Fixed	
(A) Capacity Wt. (VCW) (kg)				747
(B) DSC x 68.08 kg				544
(A-B) Cargo Wt. (RCLW) (kg)				203

¹ Not Recorded

² The airbags were disabled for this test

³ Owners manual not available at the time the report was prepared, information unknown.

DATA SHEET NO. 1 (CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2007 Ford ExpeditionTest Program: Dynamic RolloverTest Date: 09/30/09**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) ¹			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	642.6	637.0		677.5	785.0	
Right	kg	612.2	662.4		660.5	794.2	
Ratio	%	49.1	50.9		45.9	54.1	
Totals	kg	1254.8	1299.4	2554.2	1338.0	1579.2	2917.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
(A) Total Delivered Weight (UVW)	kg	2554.2 ¹
(B) Weight of 2 P572M ATDs	kg	165.2 ¹
(C) Rated Cargo/Luggage Weight (RCLW)	kg	136.0 ¹
(A+B+C) Vehicle Target Weight (TVTW)	kg	2855.4 ¹

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	904	910	901	905	1538
As Tested	mm	--- ²	--- ²	--- ²	--- ²	1636
Fully Loaded	mm	--- ²	--- ²	--- ²	--- ²	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheelbase	mm	3023.0 ³
Total Vehicle Length at Left Side	mm	--- ²
Total Vehicle Length at Centerline	mm	5208.0 ³
Total Vehicle Length at Right Side	mm	--- ²
Weight of Ballast in Cargo Area	kg	11.3
Vehicle Components Removed	each	N/A
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	98.4

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

² Measurements were not requested.

³ Measurements as recorded for 2007 Expedition used in December 3, 2008 test.

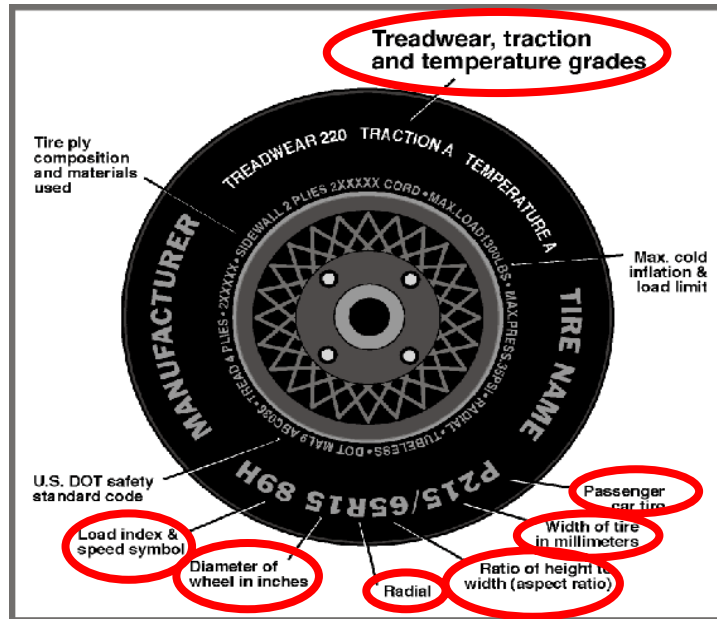
DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09



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	P245/70R17	P245/70R17
Tire Manufacturer	Continental	Continental
Tire Name	ContitracTR	ContitracTR
Load Index & Speed Symbol	113S	113S
Tread wear	520	520
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 2

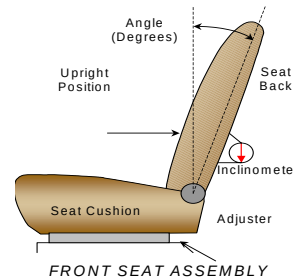
SEATS AND SEAT BELTS DATA

Test Vehicle: 2007 Ford Expedition
 Test Program: Dynamic Rollover

Test Date: 09/30/09

DUMMY RIDING POSITION

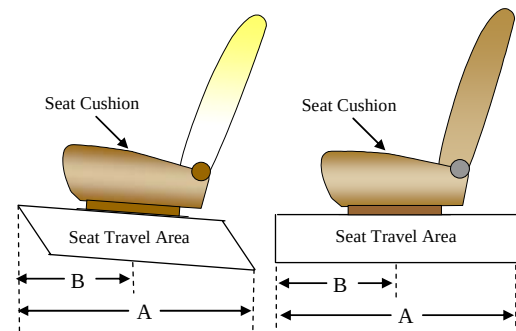
Driver: Total Number of detents: Power
 Passenger: Total Number of detents: 22
 Left Rear Passenger: Total Number of detents: 22
 Driver seat back angle: 15.8°
 Passenger seat back angle: 10.4°
 Left Rear Passenger seat back angle: 10.1°



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. Manual seat positions are numbered consecutively with the full forward position assigned as position number one.



SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	225	Mid
Fr Pass	205	Mid
Rear Seat	205	15 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.

DATA SHEET NO. 2 (CONTINUED)

SEATS AND SEAT BELTS DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

SEAT BELT CONFIGURATION

	Type	Configuration
Driver	3-PT: Motorized Retractor ¹ and Buckle Pretensioner ²	I
Left Rear Passenger	3-PT: Motorized Retractor ¹ and Buckle Pretensioner ²	I
Front Passenger	3-PT: non pretension	C

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

¹ Motorized Retractor activated at launch of test

² Pretensioners manually fired at 300ms

DATA SHEET NO. 3
POST TEST OBSERVATIONS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front Seat Driver	Right Front Passenger	Rear Seat Passenger
Dummy Type / Serial No.	Hybrid III 50 th / 043	Hybrid III 50 th / 110	Hybrid III 50 th / 001
Head Contact	Head restraint, B-pillar garnish, interior handle and headliner	Head restraint, headliner, and B-pillar garnish	Door Frame, headliner, and B- and C-pillar garnish
Upper Torso Contact	Arm rest, door panel	Arm rest, door panel	Arm rest, door panel
Lower Torso Contact	Arm rest, door panel	Arm rest, door panel	Arm rest, door panel
Left Knee Contact	No visible contact	No visible contact	Door panel, back of left front seat
Right Knee Contact	No visible contact	No visible contact	Back of left front seat

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 vehicle
Sill Separation	Did not separate from vehicle
Windshield Damage	Broken
Window Damage	Left and right side front, left and right third row back windows, and rear hatch shattered
Other Notable Effects	None

DATA SHEET NO. 3 (CONTINUED)**POST TEST OBSERVATIONS**Test Vehicle: 2007 Ford ExpeditionTest Program: Dynamic RolloverTest Date: 09/30/09**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type ¹	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	No	Yes	No
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	No	N/A	No	N/A

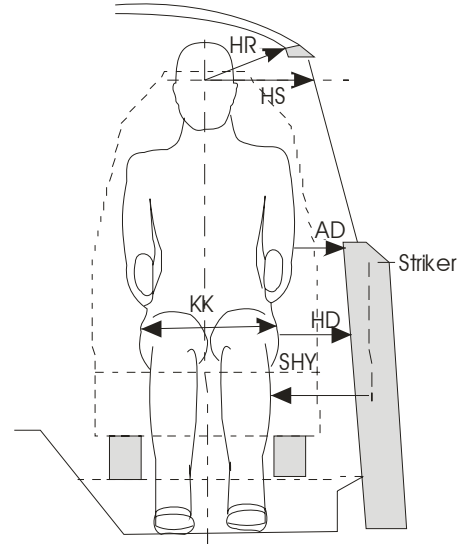
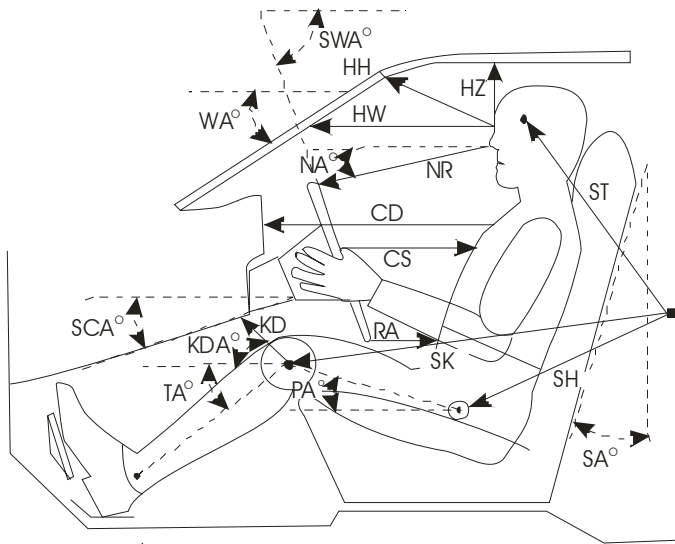
Restraint Type ¹	Left Rear (Passenger) Occupant Location 04	
	Installed	Operation
Front Airbag	N/A	N/A
Side Airbag	No	N/A
Head Airbag	No	N/A
Curtain Airbag	Yes	No
Seat Belt Pretensioner	Yes	Yes
Seat Belt Load Limiter	No	N/A

¹The airbags were disabled for this test

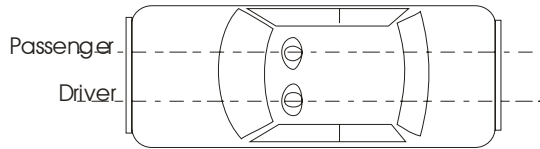
DATA SHEET NO. 4 **DUMMY MEASUREMENTS**

Test Vehicle: 2007 Ford Expedition
 Test Program: Dynamic Rollover

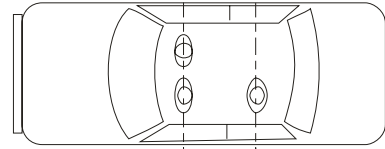
Test Date: 09/30/09



VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE



DATA SHEET NO. 4 (CONTINUED)**DUMMY MEASUREMENTS**Test Vehicle: 2007 Ford ExpeditionTest Program: Dynamic RolloverTest Date: 09/30/09**FRONT SEAT OCCUPANTS**

Code	Measurement Description	Driver (# 043)		Passenger (# 110)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		31.4		
SWA°	Steering Wheel Angle		--- ¹		
SCA°	Steering Column Angle		--- ¹		
SA°	Seat Back Angle (on headrest post)		15.8		10.4
HZ	Head to Roof (Z Direction)	239		227	
HH	Head to Header	427		433	
HW	Head to Windshield	684		689	
HR	Head to Side Header (Y Direction)	239		219	
NR	Nose to Rim	--- ¹	--- ¹		
CD	Chest to Dash	--- ¹		--- ¹	
CS	Steering Wheel to Chest	--- ¹			
RA	Rim to Abdomen	--- ¹			
KDL	Left Knee to Dash	158	5.0	165	
KDR	Right Knee to Dash	152		183	9.3
PA°	Pelvic Angle		26.1		24.4
TA°	Tibia Angle		56.8		51.3
KK	Knee to Knee (Y Direction)	277		291	
ST²	Striker to Head	643	-80.6	657	-82.7
SK²	Striker to Knee	643	-9.0	600	-8.2
SH²	Striker to H-Point	251	6.1	205	3.8
SHY	Striker to H-Point (Y Direction)	191		165	
HS	Head to Side Window (Y Direction)	319		336	
HD	H-Point to Door (Y Direction)	101		69	
AD	Arm to Door (Y Direction)	157		136	

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

¹ Measurement is not available, steering column was removed pre-test.

² A negative angle indicates the measurement point was above the striker.

DATA SHEET NO. 4 (CONTINUED)**DUMMY MEASUREMENTS**Test Vehicle: 2007 Ford ExpeditionTest Program: Dynamic RolloverTest Date: 09/30/09**LEFT REAR SEAT OCCUPANT**

Code	Measurement Description	Left Rear Passenger (#001)	
		Length (mm)	Angle (°)
WA°	Windshield Angle		
SWA°	Steering Wheel Angle		
SCA°	Steering Column Angle		
SA°	Seat Back Angle (on headrest post)		10.1
HZ	Head to Roof (Z Direction)	237	
HH	Head to Header	504	
HW	Head to Windshield		
HR	Head to Side Header (Y Direction)	308	
NR	Nose to Rim		
CD	Chest to Dash	454	
CS	Steering Wheel to Chest		
RA	Rim to Abdomen		
KDL	Left Knee to Dash (Seatback)	44	25.9
KDR	Right Knee to Dash (Seatback)	71	
PA°	Pelvic Angle		24.0
TA°	Tibia Angle		62.1
KK	Knee to Knee (Y Direction)	280	
ST¹	Striker to Head	652	-66.9
SK¹	Striker to Knee	743	0.4
SH¹	Striker to H-Point	375	9.4
SHY	Striker to H-Point (Y Direction)	181	
HS	Head to Side Window (Y Direction)	437	
HD	H-Point to Door (Y Direction)	83	
AD	Arm to Door (Y Direction)	167	

¹ 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: Dynamic Rollover

Test Date: 09/30/09

LEFT FRONT

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
Head Acceleration	X	g	11.4	1993.3	9.5	3138.2
	Y	g	20.4	3133.8	10.0	3151.4
	Z	g	32.7	3141.1	1.8	3178.6
	R	g	37.9	3141.1		
Head Rate Gyro	X	°/s	975.4	2530.3	1092.1	3137.8
	Y	°/s	914.9	3218.0	393.4	2836.6
	Z	°/s	520.4	3223.2	524.4	3283.5
Upper Neck Force	X	N	519.3	3144.9	178.0	3186.3
	Y	N	164.1	1984.1	945.4	3149.8
	Z	N	458.3	1141.3	6605.8 ¹	3145.2
Upper Neck Moment	X	Nm	97.2	3151.2	22.8	1617.0
	Y	Nm	68.0	3148.0	13.7	3285.2
	Z	Nm	6.7	3350.7	11.8	3194.6
Chest Acceleration	X	g	3.0	3182.2	7.5	3144.7
	Y	g	6.9	3280.1	5.6	5224.9
	Z	g	22.3	3143.7	2.0	391.8
	R	g	23.4	3143.8		
Chest Displacement	X	mm	2.8	5203.0	5.1	309.6
Lower Neck Force	X	N	232.2	3270.3	134.2	3183.3
	Y	N	146.7	3137.5	477.7	2495.6
	Z	N	592.9	1141.1	5881.1	3145.4
Lower Neck Moment	X	Nm	33.2	1991.8	95.4	3152.5
	Y	Nm	282.0 ¹	3143.3	60.2	3269.5
	Z	Nm	8.5	5195.2	34.7	2492.6
Pelvis Acceleration	X	g	3.1	1734.0	10.9	3253.7
	Y	g	9.5	1926.2	9.5	2472.1
	Z	g	17.3	3144.9	4.0	2504.2
	R	g	17.4	3144.9		

Positive Direction

Longitudinal: Forward
Lateral: Rightward
Vertical: Downward

Negative Direction

Longitudinal: Rearward
Lateral: Leftward
Vertical: Upward

¹ Reference test notes.

DATA SHEET NO. 5 (CONTINUED)
OCCUPANT INSTRUMENTATION DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

RIGHT FRONT

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
Head Acceleration	X	g	82.6	5208.0	87.6	5208.2
	Y	g	54.5	5207.9	59.5	5207.7
	Z	g	30.2	5207.1	17.7	5207.4
	R	g	104.6	5208.2		
Head Front Acceleration	Y	g	6.9	5207.3	35.8	1108.5
	Z	g	17.6	5207.4	7.3	5158.3
Head Top Acceleration ¹	X	g	0.2	5163.8	0.6	2665.0
	Y	g	11.3	5207.1	66.1	1108.1
Head Front Acceleration	X	g	25.3	5207.1	27.5	5207.4
	Z	g	34.4	5207.4	25.2	5207.0
Upper Neck Force	X	N	613.6	2615.5	362.4	5207.4
	Y	N	601.7	1126.3	1028.0	5207.1
	Z	N	451.8	5208.0	1968.1	1126.0
Upper Neck Moment	X	Nm	45.9	1110.8	21.0	5226.1
	Y	Nm	13.6	2283.7	20.8	1127.3
	Z	Nm	12.6	3365.4	20.0	2457.3
Chest Acceleration	X	g	5.4	1943.3	3.9	2052.7
	Y	g	4.1	3275.2	13.1	2428.4
	Z	g	9.4	1114.0	8.2	5157.8
	R	g	14.4	2706.9		
Chest Displacement	X	mm	4.1	442.0	9.5	3195.1
Lower Neck Force	X	N	432.7	2491.1	124.1	1133.8
	Y	N	289.3	1076.1	570.1	2432.0
	Z	N	506.6	1091.1	1653.9	1126.7
Lower Neck Moment	X	Nm	54.6	1125.8	89.8	5215.9
	Y	Nm	119.2	1127.1	56.9	3276.6
	Z	Nm	16.8	1060.4	37.0	2433.6
Pelvis Acceleration	X	g	5.1	1945.4	4.4	1067.5
	Y	g	5.1	1934.6	14.4	2458.2
	Z	g	7.5	1122.2	7.1	5152.0
	R	g	14.5	2458.2		

Positive Direction

Longitudinal: Forward
 Lateral: Rightward
 Vertical: Downward

Negative Direction

Longitudinal: Rearward
 Lateral: Leftward
 Vertical: Upward

¹ Reference test notes.

DATA SHEET NO. 5 (CONTINUED)
OCCUPANT INSTRUMENTATION DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

LEFT REAR

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
Head Acceleration	X	g	26.9	3156.7	11.9	3171.4
	Y	g	14.7	1936.9	9.0	5243.9
	Z	g	29.2	3155.8	3.3	1895.5
	R	g	39.1	3156.7		
Head Rate Gyro	X	°/s	758.4	5323.4	776.0	5223.2
	Y	°/s	726.2	2715.6	611.9	3159.4
	Z	°/s	700.7	1670.2	425.3	3257.9
Upper Neck Force ¹	X	N	267.0	3181.7	390.3	3263.0
	Y	N	245.2	1940.2	388.5	5243.8
	Z	N	492.1	308.7	3623.5	3175.1
Upper Neck Moment	X	Nm	51.4	3181.2	21.4	5250.1
	Y	Nm	16.6	1973.7	77.5	3170.3
	Z	Nm	14.3	1713.9	16.2	3292.7
Chest Acceleration	X	g	3.8	1966.0	8.4	306.9
	Y	g	11.3	1926.9	7.2	5208.6
	Z	g	15.0	3159.0	4.1	1896.7
	R	g	15.3	3159.0		
Chest Displacement	X	mm	6.5	309.2	0.0	2.0
Lower Neck Force	X	N	235.9	2688.1	606.9	3169.7
	Y	N	3349.0	3184.8	360.6	3163.8
	Z	N	621.8	308.4	2743.0	3161.1
Lower Neck Moment	X	Nm	125.1	3184.6	97.7	5241.0
	Y	Nm	223.5	3171.2	56.2	2685.3
	Z	Nm	116.3	3185.0	28.0	3277.0
Pelvis Acceleration	X	g	3.2	366.6	5.4	305.5
	Y	g	15.2	1910.6	6.1	5210.7
	Z	g	10.9	3161.0	5.2	1895.6
	R	g	15.5	1915.0		

Positive Direction

Longitudinal: Forward

Lateral: Rightward

Vertical: Downward

Negative Direction

Longitudinal: Rearward

Lateral: Leftward

Vertical: Upward

¹ Reference test notes

DATA SHEET NO. 6

VEHICLE STRUCTURAL MEASUREMENTS^{1, 2}

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

STRUCTURAL MEASUREMENTS

	Elements	Pre-Test
1	Total Length	5208
2	Total Width	2007
3	Bumper Top Height	491
4	Bumper Bottom Height	424
5	Longitudinal Member Top Height	499
6	Longitudinal Member Bottom Height	414
7	Distance Between Longitudinal Members	871
7'	Longitudinal Member Width	100
8	Engine Top Height	1170
9	Engine Bottom Height	288
10	Engine and Gearbox Width	750
11	Front Bumper - Engine Distance	755
12	Front Shock Absorber Fixing Height	566
13	Bonnet Leading Edge Height	1090
14	Front Shock Absorber Fixing Width	920
15	Front Bumper - Front Axle Distance	940
16	Front Axle - A Pillar Distance	680
17	A Pillar - B Pillar Distance	1070
18	B Pillar - Rear Axle Distance	1285
19	B Pillar - C Pillar Distance	1000
20	Roof Sill Bottom Height	1728
21	Roof Sill Top Height	1800
22	Floor Sill Bottom Height	497
23	Floor Sill Top Height	550

All distance measurements are in millimeters.

¹ Taken from INSIA report, "Structural Survey of Cars, Methodology of the Main Resistant Elements in the Car Body", March 1999.

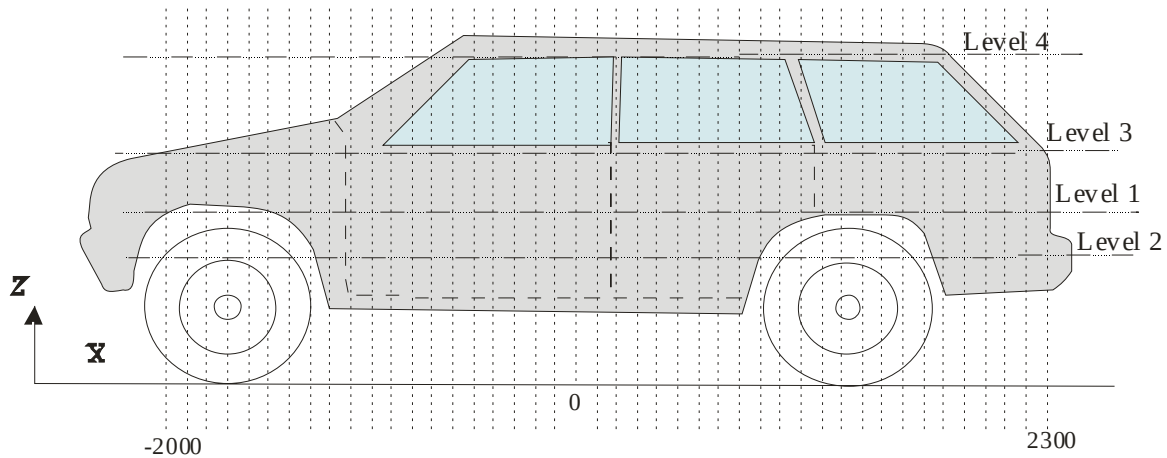
² The vertical measurements from the ground are adjusted based on the test vehicle's pre-test attitude measurements.

DATA SHEET NO. 7
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09



(X) + (Longitudinal)

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 100 millimeters.

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

DATA SHEET NO. 7 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

LEFT SIDE CRUSH

	Pre-Test				Post-Test				Difference			
	1	2	3	4	1	2	3	4	1	2	3	4
-2000			-802				-768				-34	
-1900			-823				-783				-40	
-1800			-840				-801				-39	
-1700			-855				-816				-39	
-1600			-868				-835				-33	
-1500	-978		-879		-991		-850		13		-29	
-1400	-980		-889		-993		-866		13		-23	
-1300	-982		-896		-995		-880		13		-16	
-1200	-976	-982	-903		-991	-996	-892		15	14	-11	
-1100	-968	-976	-909		-984	-991	-903		16	15	-6	
-1000	-966	-967	-914		-982	-983	-910		16	16	-4	
-900	-968	-968	-917	-883	-978	-981	-921	-878	10	13	-4	-5
-800	-972	-972	-922	-854	-984	-997	-891	-822	12	25	-31	-32
-700	-975	-975	-925	-831	-963	-990	-866	-767	-12	15	-59	-64
-600	-978	-978	-930	-796	-975	-987	-878	-691	-3	9	-52	-105
-500	-981	-980	-934	-768	-988	-988	-887	-638	7	8	-47	-130
-400	-983	-982	-937	-734	-991	-988	-896	-581	8	6	-41	-153
-300	-985	-984	-941	-702	-993	-987	-905	-533	8	3	-36	-169
-200	-987	-985	-944	-689	-991	-987	-914	-519	4	2	-30	-170
-100	-988	-987	-948	-686	-990	-987	-921	-522	2	0	-27	-164
0	-988	-988	-950	-684	-989	-988	-928	-529	1	0	-22	-155
100	-989	-989	-953	-684	-988	-989	-934	-536	-1	0	-19	-148
200	-990	-989	-956	-683	-986	-988	-938	-544	-4	-1	-18	-139
300	-990	-988	-958	-683	-980	-982	-938	-540	-10	-6	-20	-143
400	-990	-989	-960	-683	-981	-983	-939	-547	-9	-6	-21	-136
500	-990	-989	-961	-684	-981	-984	-940	-556	-9	-5	-21	-128
600	-990	-988	-962	-685	-981	-984	-939	-564	-9	-4	-23	-121
700	-989	-988	-963	-687	-981	-985	-939	-573	-8	-3	-24	-114
800	-989	-988	-964	-687	-981	-985	-939	-580	-8	-3	-25	-107
900	-988	-987	-964	-687	-981	-985	-938	-588	-7	-2	-26	-99
1000	-988	-986	-964	-688	-980	-984	-934	-599	-8	-2	-30	-89
1100	-990	-994	-964	-688	-982	-985	-927	-588	-8	-9	-37	-100
1200	-998	-998	-964	-689	-983	-973	-929	-594	-15	-25	-35	-95
1300	-1002		-961	-689	-970		-930	-598	-32		-31	-91
1400	-1001		-961	-689	-967		-932	-603	-34		-29	-86
1500	-1000		-960	-689	-967		-930	-610	-33		-30	-79
1600	-998		-959	-689	-968		-928	-617	-30		-31	-72
1700	-994		-957	-688	-968		-926	-620	-26		-31	-68
1800	-988		-955	-686	-962		-924	-622	-26		-31	-64
1900	-977		-953	-684	-959		-922	-625	-18		-31	-59
2000			-951	-683			-919	-630			-32	-53
2100			-949	-681			-915	-632			-34	-49
2200			-946	-679			-911	-635			-35	-44
2300			-943				-907				-36	

DATA SHEET NO. 7 (CONTINUED)

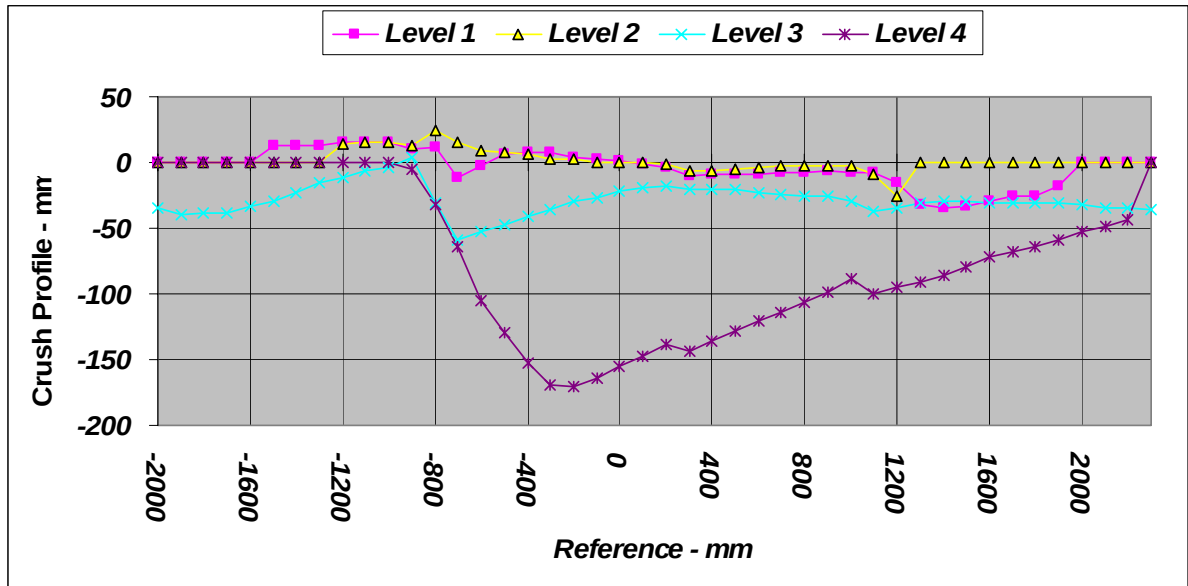
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

LEFT SIDE CRUSH



DATA SHEET NO. 7 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

RIGHT SIDE CRUSH

	Pre-Test				Post-Test				Difference			
	1	2	3	4	1	2	3	4	1	2	3	4
-2000			805				799				6	
-1900			827				818				9	
-1800			845				833				12	
-1700			859				843				16	
-1600			871				852				19	
-1500	977		880		942		857		35		23	
-1400	978		888		944		861		34		27	
-1300	978		894		944		864		34		30	
-1200	970	978	899		937	948	866		33	30	33	
-1100	962	971	904		927	939	867		35	32	37	
-1000	960	963	908		915	929	868		45	34	40	
-900	962	964	914	884	918	924	875	845	44	40	39	39
-800	966	967	919	853	925	932	873	854	41	35	46	-1
-700	969	970	924	821	940	944	869	853	29	26	55	-32
-600	972	973	928	794	951	954	874	852	21	19	54	-58
-500	975	976	932	762	960	963	891	849	15	13	41	-87
-400	977	978	936	731	969	972	907	843	8	6	29	-112
-300	979	980	940	699	977	980	923	832	2	0	17	-133
-200	981	982	943	684	986	988	937	821	-5	-6	6	-137
-100	982	983	946	681	993	996	952	809	-11	-13	-6	-128
0	983	984	948	681	1000	1003	962	802	-17	-19	-14	-121
100	985	985	951	679	1006	1010	968	794	-21	-25	-17	-115
200	985	985	953	679	1015	1017	987	788	-30	-32	-34	-109
300	985	985	954	680	993	990	971	797	-8	-5	-17	-117
400	986	985	957	681	992	989	971	794	-6	-4	-14	-113
500	986	986	959	682	991	989	974	792	-5	-3	-15	-110
600	986	986	961	683	990	987	975	790	-4	-1	-14	-107
700	987	986	962	684	988	986	975	788	-1	0	-13	-104
800	986	986	963	686	987	985	975	785	-1	1	-12	-99
900	986	986	964	685	984	983	974	782	2	3	-10	-97
1000	986	985	964	687	982	980	971	781	4	5	-7	-94
1100	986	990	964	690	980	980	964	763	6	10	0	-73
1200	993	996	963	689	981	976	965	760	12	20	-2	-71
1300	1000		961	688	978		963	754	22		-2	-66
1400	1001		962	687	970		959	754	31		3	-67
1500	1000		962	686	959		955	750	41		7	-64
1600	998		960	686	953		948	746	45		12	-60
1700	995		959	685	964		940	742	31		19	-57
1800	987		957	685	950		932	737	37		25	-52
1900	976		954	685	948		927	733	28		27	-48
2000			952	684			919	727			33	-43
2100			949	682			905	718			44	-36
2200			946	680			893	704			53	-24
2300			943				874				69	

DATA SHEET NO. 7

(CONTINUED)

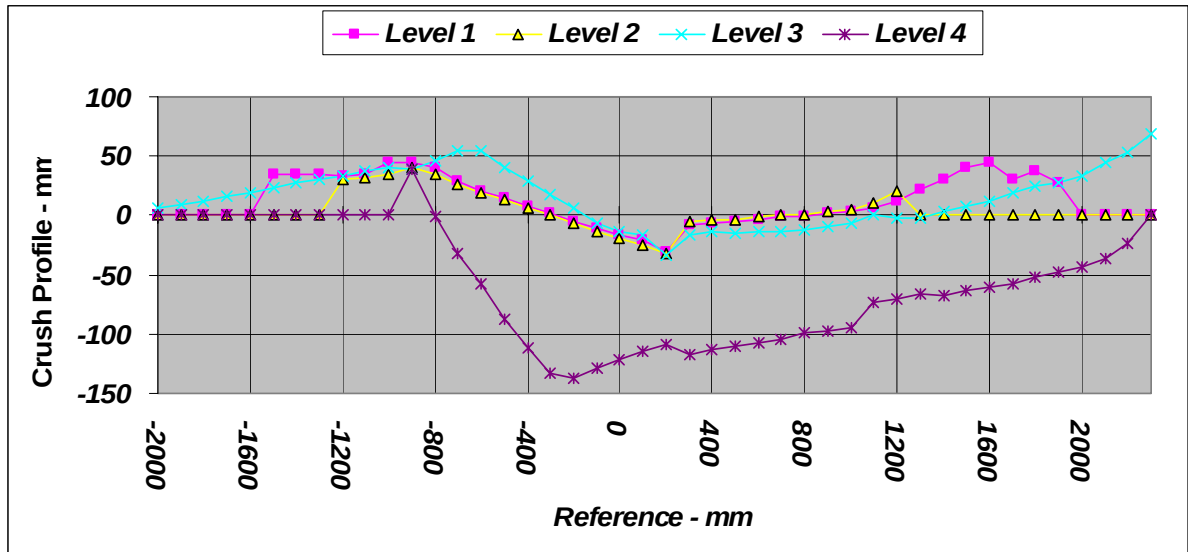
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

RIGHT SIDE CRUSH



DATA SHEET NO. 7 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

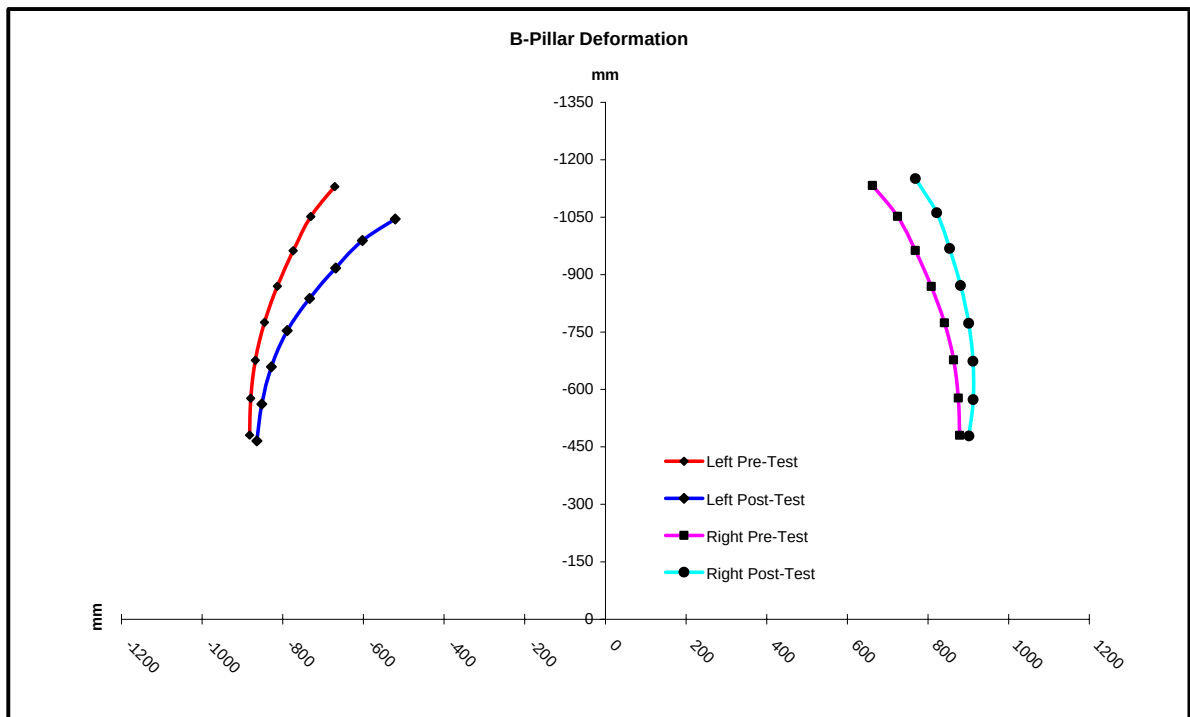
Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

B-PILLAR MEASUREMENTS

Index	Pre-Test			Post-Test			Difference		
Left B-Pillar	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)
(1)	2471.6	-670.8	-1130.0	2488.6	-521.0	-1045.0	-17.0	-149.8	-85.0
(2)	2476.9	-730.8	-1051.6	2496.1	-602.5	-989.3	-19.2	-128.3	-62.3
(3)	2480.6	-774.3	-962.5	2498.2	-669.0	-917.2	-17.6	-105.3	-45.3
(4)	2487.4	-813.2	-869.6	2503.9	-733.2	-837.7	-16.5	-80.0	-31.9
(5)	2488.2	-845.3	-775.1	2502.2	-789.0	-753.9	-14.0	-56.3	-21.2
(6)	2493.2	-868.0	-676.2	2504.4	-828.3	-659.6	-11.2	-39.7	-16.6
(7)	2498.1	-879.4	-577.3	2506.8	-852.1	-562.2	-8.7	-27.3	-15.1
(8)	2502.0	-882.5	-480.9	2509.8	-863.9	-465.7	-7.8	-18.6	-15.2
Right B-Pillar									
(1)	2473.6	662.0	-1132.4	2459.8	768.7	-1150.9	13.8	-106.7	18.5
(2)	2476.8	724.7	-1052.1	2462.6	821.8	-1061.5	14.2	-97.1	9.4
(3)	2482.2	768.7	-963.0	2467.6	853.7	-968.2	14.6	-85.0	5.2
(4)	2489.3	808.3	-869.1	2475.5	880.7	-871.2	13.8	-72.4	2.1
(5)	2491.9	840.9	-774.3	2479.4	900.9	-772.7	12.5	-60.0	-1.6
(6)	2497.2	863.8	-677.1	2485.4	911.6	-674.1	11.8	-47.8	-3.0
(7)	2500.5	875.2	-577.6	2490.9	912.0	-573.7	9.6	-36.8	-3.9
(8)	2506.7	878.2	-480.3	2500.5	901.7	-478.3	6.2	-23.5	-2.0



DATA SHEET NO. 7 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

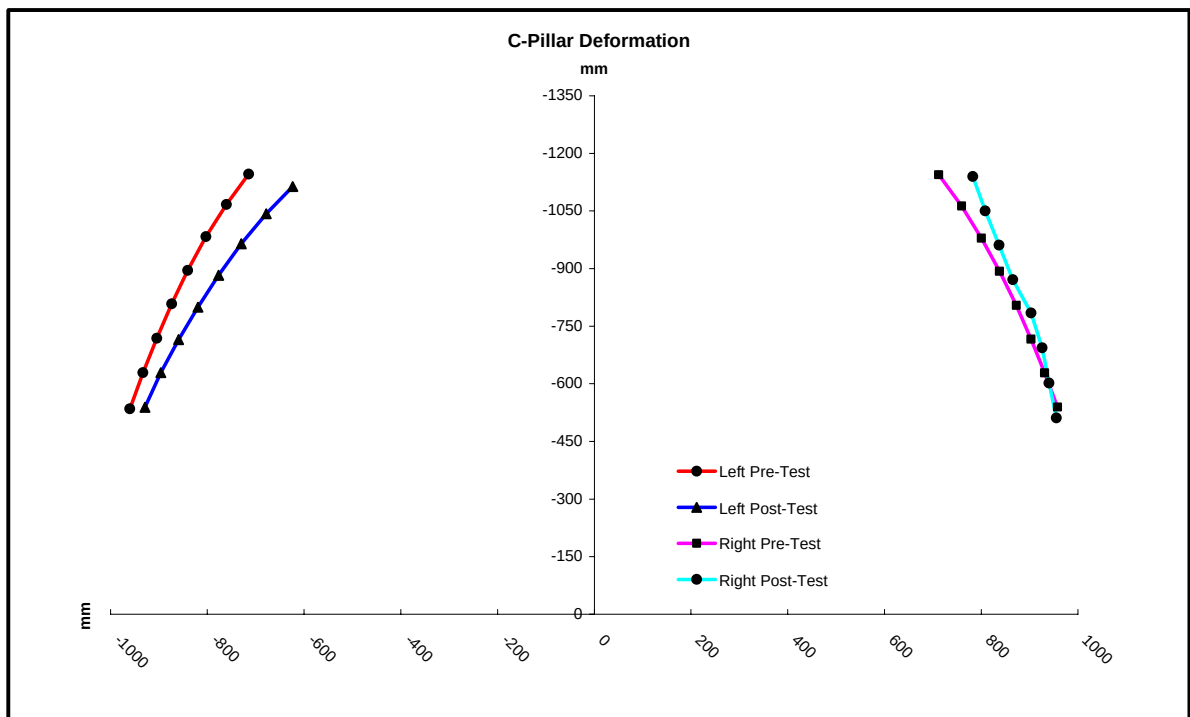
Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

C-PILLAR MEASUREMENTS

Index	Pre-Test			Post-Test			Difference		
Left C-Pillar	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)	X (mm)	Y (mm)	Z (mm)
(1)	1587.6	-714.3	-1146.2	1616.5	-623.2	-1113.6	-28.9	-91.1	-32.6
(2)	1552.9	-760.4	-1067.1	1581.0	-678.3	-1042.4	-28.1	-82.1	-24.7
(3)	1516.5	-802.5	-983.3	1543.1	-729.7	-964.6	-26.6	-72.8	-18.7
(4)	1481.2	-840.4	-895.5	1505.7	-776.6	-882.7	-24.5	-63.8	-12.8
(5)	1446.5	-873.6	-808.3	1468.3	-819.3	-799.7	-21.8	-54.3	-8.6
(6)	1412.0	-904.5	-718.5	1430.9	-859.1	-714.9	-18.9	-45.4	-3.6
(7)	1378.1	-933.0	-628.8	1394.2	-896.3	-629.0	-16.1	-36.7	0.2
(8)	1344.6	-959.9	-534.9	1357.4	-928.8	-538.9	-12.8	-31.1	4.0
Right C-Pillar									
(1)	1568.5	712.1	-1144.5	1554.7	782.6	-1140.0	13.8	-70.5	-4.5
(2)	1531.8	759.5	-1063.2	1518.7	808.4	-1050.3	13.1	-48.9	-12.9
(3)	1495.8	800.6	-979.4	1483.8	836.6	-961.1	12.0	-36.0	-18.3
(4)	1460.5	837.8	-893.4	1449.1	865.1	-871.1	11.4	-27.3	-22.3
(5)	1424.4	872.5	-804.0	1413.5	903.0	-784.2	10.9	-30.5	-19.8
(6)	1387.8	902.8	-716.3	1377.9	925.9	-693.9	9.9	-23.1	-22.4
(7)	1351.8	931.2	-628.5	1342.9	940.4	-602.0	8.9	-9.2	-26.5
(8)	1315.1	957.5	-539.3	1307.3	955.3	-511.2	7.8	2.2	-28.1



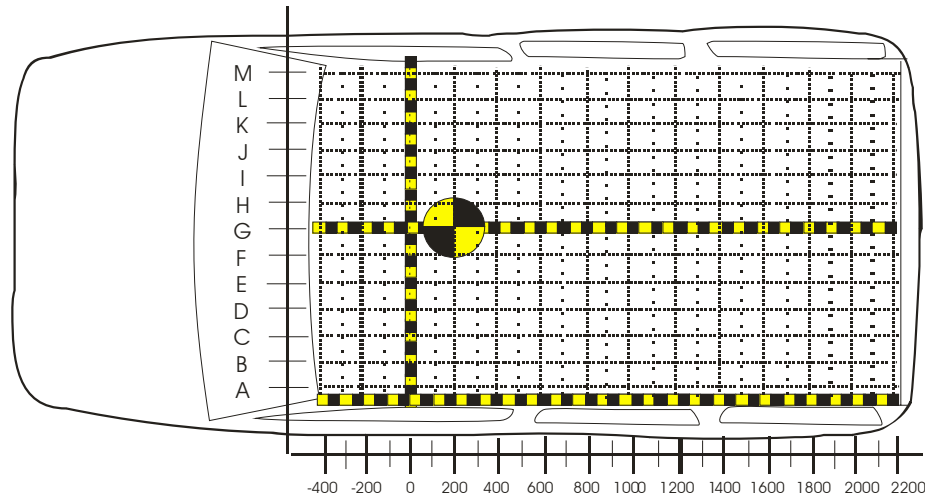
DATA SHEET NO. 7 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09



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	0	-1130	-1144	-1151	0	-1008	-1036	-1059	0	-122	-108	-92
-300	-1146	-1162	-1170	-1176	-1007	-1025	-1050	-1077	-139	-137	-120	-99
-200	-1167	-1177	-1184	-1188	-1018	-1037	-1058	-1079	-149	-140	-126	-109
-100	-1177	-1187	-1194	-1193	-1029	-1064	-1082	-1096	-148	-123	-112	-97
0	-1185	-1194	-1201	-1200	-1046	-1078	-1102	-1117	-139	-116	-99	-83
100	-1191	-1200	-1207	-1207	-1058	-1092	-1120	-1136	-133	-108	-87	-71
200	-1197	-1205	-1213	-1215	-1074	-1101	-1134	-1156	-123	-104	-79	-59
300	-1202	-1211	-1218	-1222	-1091	-1114	-1141	-1166	-111	-97	-77	-56
400	-1207	-1216	-1224	-1222	-1107	-1135	-1158	-1175	-100	-81	-66	-47
500	-1211	-1221	-1228	-1228	-1125	-1150	-1171	-1187	-86	-71	-57	-41
600	-1215	-1226	-1233	-1232	-1136	-1165	-1184	-1198	-79	-61	-49	-34
700	-1218	-1229	-1236	-1236	-1154	-1175	-1195	-1209	-64	-54	-41	-27
800	-1222	-1233	-1240	-1239	-1166	-1186	-1206	-1219	-56	-47	-34	-20
900	-1224	-1236	-1243	-1243	-1177	-1194	-1215	-1227	-47	-42	-28	-16
1000	-1227	-1239	-1246	-1246	-1187	-1203	-1223	-1235	-40	-36	-23	-11
1100	-1229	-1241	-1248	-1249	-1194	-1210	-1230	-1242	-35	-31	-18	-7
1200	-1231	-1242	-1250	-1250	-1201	-1218	-1238	-1247	-30	-24	-12	-3
1300	-1234	-1244	-1251	-1253	-1206	-1224	-1245	-1252	-28	-20	-6	-1
1400	-1235	-1244	-1252	-1257	-1214	-1230	-1245	-1255	-21	-14	-7	-2
1500	-1236	-1246	-1254	-1254	-1221	-1237	-1248	-1255	-15	-9	-6	1
1600	-1236	-1247	-1255	-1255	-1228	-1238	-1253	-1262	-8	-9	-2	7
1700	-1237	-1248	-1256	-1255	-1235	-1243	-1259	-1268	-2	-5	3	13
1800	-1238	-1248	-1256	-1255	-1240	-1247	-1264	-1274	2	-1	8	19
1900	-1238	-1247	-1256	-1256	-1246	-1251	-1270	-1281	8	4	14	25
2000	-1237	-1246	-1255	-1255	-1250	-1256	-1275	-1277	13	10	20	22
2100	-1235	-1245	-1254	-1258	-1252	-1261	-1273	-1276	17	16	19	18
2200	-1229	-1240	0	-1249	-1247	-1254	0	-1260	18	14	0	11

DATA SHEET NO. 7 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

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	-1157	-1160	-1161	-1160	-1156	-1082	-1102	-1117	-1135	-1148	-75	-58	-44	-25	-8
-300	-1179	-1182	-1182	-1181	-1179	-1103	-1125	-1140	-1157	-1170	-76	-57	-42	-24	-9
-200	-1193	-1189	-1196	-1189	-1193	-1108	-1133	-1159	-1168	-1186	-85	-56	-37	-21	-7
-100	-1203	-1199	-1205	-1198	-1202	-1122	-1148	-1173	-1182	-1200	-81	-51	-32	-16	-2
0	-1210	-1206	-1213	-1206	-1210	-1144	-1160	-1186	-1194	-1211	-66	-46	-27	-12	1
100	-1217	-1213	-1220	-1212	-1217	-1164	-1175	-1196	-1205	-1221	-53	-38	-24	-7	4
200	-1222	-1222	-1225	-1220	-1222	-1181	-1191	-1207	-1218	-1231	-41	-31	-18	-2	9
300	-1227	-1228	-1230	-1227	-1227	-1195	-1213	-1222	-1235	-1242	-32	-15	-8	8	15
400	-1233	-1228	-1236	-1228	-1232	-1204	-1219	-1235	-1239	-1249	-29	-9	-1	11	17
500	-1238	-1233	-1241	-1233	-1237	-1217	-1229	-1243	-1247	-1255	-21	-4	2	14	18
600	-1242	-1238	-1245	-1238	-1242	-1227	-1238	-1251	-1253	-1260	-15	0	6	15	18
700	-1246	-1242	-1249	-1242	-1246	-1235	-1245	-1257	-1258	-1263	-11	3	8	16	17
800	-1250	-1246	-1253	-1246	-1249	-1242	-1251	-1261	-1261	-1266	-8	5	8	15	17
900	-1253	-1249	-1256	-1249	-1253	-1249	-1255	-1266	-1264	-1269	-4	6	10	15	16
1000	-1256	-1252	-1259	-1252	-1256	-1255	-1260	-1269	-1267	-1271	-1	8	10	15	15
1100	-1259	-1255	-1261	-1255	-1259	-1261	-1263	-1273	-1268	-1272	2	8	12	13	13
1200	-1261	-1257	-1264	-1257	-1261	-1264	-1265	-1274	-1269	-1273	3	8	10	12	12
1300	-1262	-1258	-1265	-1258	-1262	-1265	-1266	-1275	-1269	-1273	3	8	10	11	11
1400	-1263	-1264	-1266	-1264	-1263	-1266	-1274	-1277	-1275	-1273	3	10	11	11	10
1500	-1264	-1260	-1267	-1260	-1264	-1272	-1273	-1280	-1272	-1274	8	13	13	12	10
1600	-1265	-1260	-1267	-1261	-1265	-1276	-1276	-1282	-1273	-1275	11	16	15	12	10
1700	-1265	-1261	-1267	-1261	-1265	-1281	-1279	-1282	-1273	-1274	16	18	15	12	9
1800	-1265	-1260	-1267	-1261	-1265	-1284	-1279	-1281	-1271	-1272	19	19	14	10	7
1900	-1264	-1259	-1266	-1260	-1264	-1284	-1276	-1278	-1269	-1270	20	17	12	9	6
2000	-1263	-1258	-1265	-1259	-1263	-1281	-1272	-1276	-1267	-1268	18	14	11	8	5
2100	-1261	-1263	-1263	-1263	-1261	-1276	-1275	-1272	-1269	-1264	15	12	9	6	3
2200	-1253	-1254	-1254	-1254	-1253	-1263	-1263	-1262	-1260	-1257	10	9	8	6	4

DATA SHEET NO. 7 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

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	-1151	-1141	-1127	0	-1157	-1164	-1165	0	6	23	38	0
-300	-1174	-1168	-1159	-1142	-1181	-1189	-1194	-1181	7	21	35	39
-200	-1189	-1183	-1176	-1165	-1196	-1204	-1209	-1205	7	21	33	40
-100	-1192	-1193	-1186	-1175	-1203	-1216	-1221	-1213	11	23	35	38
0	-1200	-1200	-1194	-1183	-1214	-1226	-1230	-1220	14	26	36	37
100	-1206	-1206	-1200	-1189	-1223	-1234	-1237	-1224	17	28	37	35
200	-1216	-1212	-1205	-1195	-1236	-1240	-1242	-1227	20	28	37	32
300	-1221	-1216	-1210	-1200	-1245	-1245	-1244	-1229	24	29	34	29
400	-1221	-1221	-1215	-1204	-1245	-1249	-1246	-1231	24	28	31	27
500	-1226	-1226	-1219	-1209	-1249	-1252	-1248	-1236	23	26	29	27
600	-1231	-1231	-1224	-1213	-1253	-1255	-1250	-1239	22	24	26	26
700	-1235	-1235	-1227	-1217	-1256	-1257	-1251	-1241	21	22	24	24
800	-1239	-1238	-1231	-1220	-1258	-1259	-1252	-1242	19	21	21	22
900	-1242	-1242	-1235	-1224	-1260	-1260	-1253	-1243	18	18	18	19
1000	-1245	-1245	-1238	-1227	-1262	-1262	-1254	-1243	17	17	16	16
1100	-1247	-1248	-1240	-1229	-1262	-1262	-1254	-1243	15	14	14	14
1200	-1250	-1250	-1242	-1231	-1263	-1263	-1255	-1243	13	13	13	12
1300	-1252	-1252	-1244	-1234	-1262	-1263	-1255	-1242	10	11	11	8
1400	-1257	-1252	-1245	-1236	-1267	-1261	-1254	-1241	10	9	9	5
1500	-1254	-1254	-1246	-1236	-1262	-1261	-1252	-1239	8	7	6	3
1600	-1254	-1255	-1247	-1237	-1261	-1260	-1251	-1237	7	5	4	0
1700	-1256	-1255	-1247	-1238	-1262	-1259	-1249	-1235	6	4	2	-3
1800	-1255	-1255	-1247	-1238	-1259	-1257	-1247	-1233	4	2	0	-5
1900	-1255	-1254	-1247	-1238	-1257	-1254	-1245	-1231	2	0	-2	-7
2000	-1253	-1253	-1246	-1237	-1254	-1252	-1242	-1228	1	-1	-4	-9
2100	-1258	-1252	-1245	-1235	-1258	-1249	-1239	-1225	0	-3	-6	-10
2200	-1250	0	-1239	-1232	-1252	0	-1234	-1223	2	0	-5	-9

DATA SHEET NO. 7 (CONTINUED)

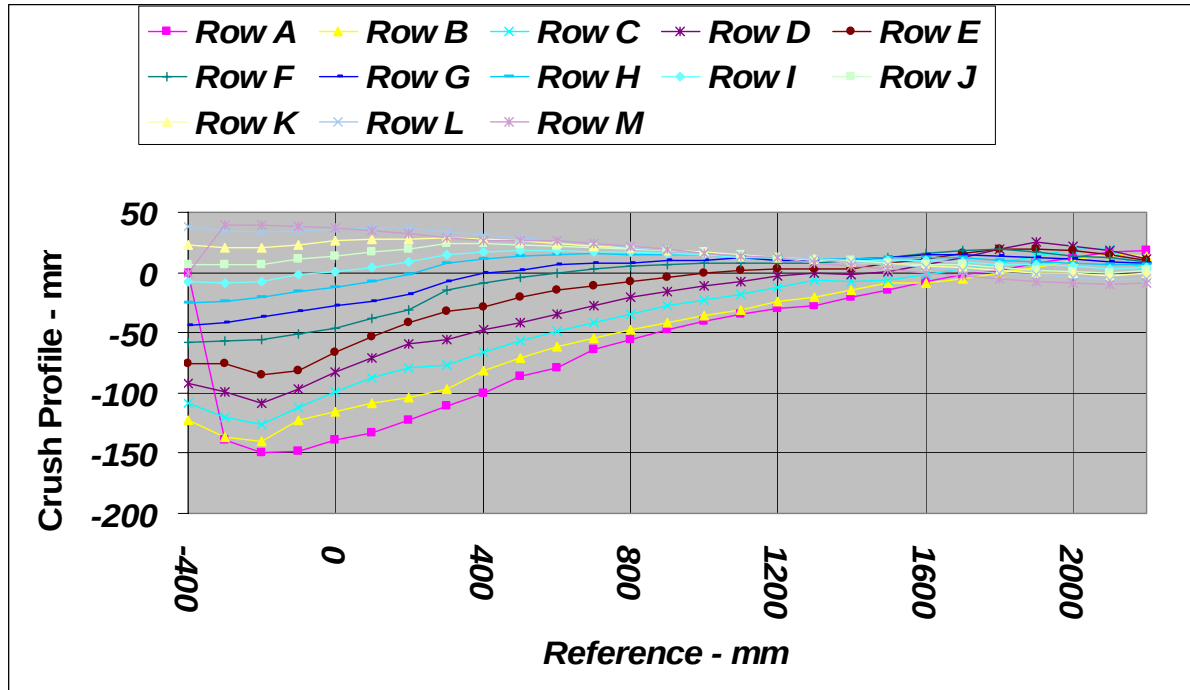
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

ROOF CRUSH



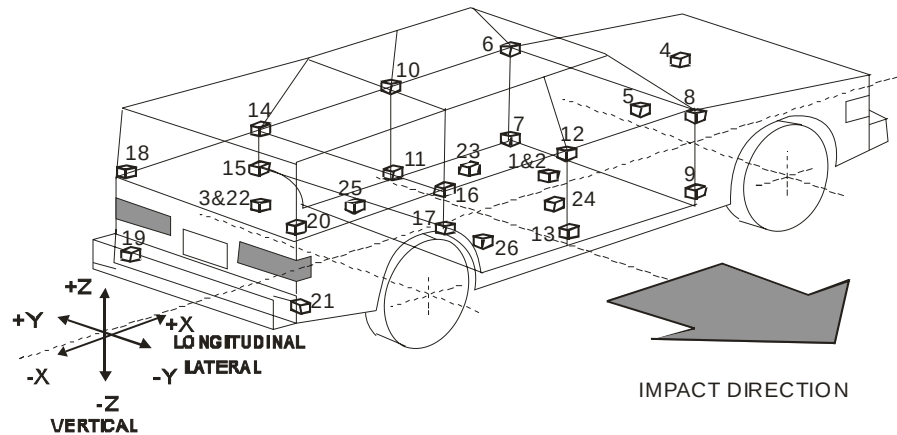
DATA SHEET NO. 8

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09



Location No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Vehicle Center of Gravity	----	----	-
2	Vehicle Center of Gravity ROLL	----	----	-
3	Rear Deck (cargo area) ROLL	425	0	-
4	Top of Engine	4410	156	-
5	Bottom of Engine	4060	42	-
6	Left A-Pillar Upper	3070	597	-
7	Left A-Pillar Lower	3580	830	-
8	Right A-Pillar Upper	3060	595	-
9	Right A-Pillar Lower	3560	830	-
10	Left B-Pillar Upper	2500	630	-
11	Left B-Pillar Lower	2470	840	-
12	Right B-Pillar Upper	2500	630	-
13	Right B-Pillar Lower	2480	825	-
14	Left C-Pillar Upper	1620	685	-
15	Left C-Pillar Lower	1850	825	-
16	Right C-Pillar Upper	1671	700	-
17	Right C-Pillar Lower	1770	825	-
18	Left D-Pillar Upper	535	605	-
19	Left D-Pillar Lower	345	720	-
20	Right D-Pillar Upper	535	595	-
21	Right D-Pillar Lower	335	715	-
22	Vehicle Rear Deck	380	10	-
23	LF Seat Position (on floor)	2860	442	-
24	RF Seat Position (on floor)	2860	440	-
25	LR Seat Position (on floor)	2020	480	-
26	RR Seat Position (on floor)	2150	475	-

DATA SHEET NO. 8 (CONTINUED)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
(1) Vehicle Center of Gravity Acceleration	X	g	3.6	1710.0	3.0	3245.4
	Y	g	10.4	1898.2	7.6	2417.8
	Z	g	11.7	1064.6	6.9	3854.7
	R	g	12.0	1064.5		
(2) Vehicle Center of Gravity Gyro¹	X	°/s	0.6	1985.4	1.5	1916.3
	Y	°/s	80.6	374.8	81.2	1929.7
	Z	°/s	60.4	1797.8	114.0	2517.4
(3) Rear Deck (cargo area)Gyro¹	X	°/s	294.4	3225.4	529.2	419.8
	Y	°/s	158.1	2677.1	221.0	2649.4
	Z	°/s	375.1	2656.6	63.7	1864.2
(4) Top of Engine	X	g	4.3	1894.9	2.2	3225.9
	Y	g	10.5	3224.1	10.5	2405.2
	Z	g	16.1	3214.9	8.8	5149.4
	R	g	17.9	3223.8		
(5) Bottom of Engine	X	g	3.8	2672.0	4.3	3212.6
	Y	g	15.9	3209.5	14.9	2394.6
	Z	g	13.8	3214.5	6.6	2405.2
	R	g	20.5	3210.7		
(6) Left A-Pillar Upper	X	g	6.8	3197.5	3.4	1566.6
	Y	g	30.1	3119.2	14.3	2664.2
	Z	g	59.0	3118.1	4.6	405.0
	R	g	65.0	3118.2		
(7) Left A-Pillar Lower	X	g	6.5	2644.3	3.9	2427.5
	Y	g	9.7	1899.0	11.5	2419.4
	Z	g	15.7	3181.0	5.1	2651.9
	R	g	16.0	3181.4		
(8) Right A-Pillar Upper	X	g	5.7	1883.3	4.5	1566.5
	Y	g	19.8	1568.2	19.0	2668.3
	Z	g	12.8	3119.8	9.2	1906.4
	R	g	20.8	3118.4		
(9) Right A-Pillar Lower	X	g	4.6	1874.1	5.6	2640.4
	Y	g	6.6	3223.0	23.3	1045.8
	Z	g	11.5	1045.6	6.8	1905.0
	R	g	26.1	1045.8		

¹ Reference test notes

DATA SHEET NO. 8 (CONTINUED)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

Location		Unit	Positive Direction Max.	Time (ms)	Negative Direction Max.	Time (ms)
(10) Left B-Pillar Upper	X	g	15.0	5251.4	7.3	3954.0
	Y	g	81.3	3124.3	11.8	5251.0
	Z	g	49.7	5251.3	6.3	1883.8
	R	g	82.1	3124.3		
(11) Left B-Pillar Lower	X	g	6.7	2642.8	4.7	2427.7
	Y	g	14.9	1897.8	7.8	2645.4
	Z	g	11.9	3133.1	6.8	1884.2
	R	g	15.8	1897.7		
(12) Right B-Pillar Upper	X	g	7.5	1905.0	6.0	3120.8
	Y	g	12.7	1567.9	25.1	1111.2
	Z	g	8.3	1051.0	9.0	5122.3
	R	g	25.1	1111.2		
(13) Right B-Pillar Lower	X	g	4.9	1918.3	6.0	2640.0
	Y	g	9.6	1898.6	16.2	1041.1
	Z	g	8.7	1041.4	7.1	5118.2
	R	g	18.5	1041.1		
(14) Left C-Pillar Upper	X	g	5.7	2644.9	4.9	2423.5
	Y	g	13.1	1897.4	12.1	306.2
	Z	g	10.7	3136.2	9.9	1881.4
	R	g	14.3	1897.3		
(15) Left C-Pillar Lower	X	g	5.9	2640.1	4.6	2427.1
	Y	g	11.9	1898.0	11.4	2641.0
	Z	g	10.2	3134.6	8.7	1882.3
	R	g	14.2	1898.7		
(16) Right C-Pillar Upper	X	g	7.4	1904.0	6.0	1565.9
	Y	g	9.5	1908.6	22.0	1113.8
	Z	g	7.8	2637.5	11.6	5118.5
	R	g	22.0	1113.8		
(17) Right C-Pillar Lower	X	g	6.7	1897.4	6.2	2687.5
	Y	g	14.3	1896.0	18.1	2641.3
	Z	g	6.3	1032.6	10.6	1895.4
	R	g	18.7	1895.9		
(18) Left D-Pillar Upper	X	g	6.3	2648.5	4.5	1893.2
	Y	g	17.9	1890.5	16.1	2645.3
	Z	g	11.3	2652.1	10.7	1880.9
	R	g	18.0	1890.6		

DATA SHEET NO. 8 (CONTINUED)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

Location		Unit	Positive Direction		Negative Direction	
			Max.	Time (ms)	Max.	Time (ms)
(19) Left D-Pillar Lower	X	g	8.5	2637.0	4.4	2420.8
	Y	g	18.4	1900.9	21.4	2637.4
	Z	g	10.3	1890.6	8.1	1880.3
	R	g	23.1	2637.4		
(20) Right D-Pillar Upper	X	g	6.9	1903.2	7.5	2687.5
	Y	g	16.0	1893.3	103.0	2763.8
	Z	g	564.5	2647.1	630.6	1946.3
	R	g	630.6	1946.3		
(21) Right D-Pillar Lower	X	g	20.4	5187.7	31.0	2699.9
	Y	g	20.5	2648.0	32.3	2746.7
	Z	g	19.9	2707.4	72.6	2699.4
	R	g	81.4	2699.5		
(22) Vehicle Rear Deck	X	g	4.1	2641.0	1.5	1905.0
	Y	g	18.7	1900.2	25.0	2637.0
	Z	g	8.5	2648.2	11.0	1882.8
	R	g	25.4	2637.1		
(23) LF Seat Position (on floor)	X	g	4.5	2643.8	3.1	2417.7
	Y	g	6.7	1040.8	10.7	1900.0
	Z	g	9.1	3133.8	3.9	1915.4
	R	g	10.9	1897.0		
(24) RF Seat Position (on floor)	X	g	5.0	1918.4	4.0	2640.1
	Y	g	8.9	1898.4	8.2	2418.0
	Z	g	7.0	3192.9	5.4	1897.6
	R	g	10.5	1897.9		
(25) LR Seat Position (on floor)	X	g	4.8	2643.1	3.0	2427.8
	Y	g	13.0	1897.9	11.7	2641.6
	Z	g	12.5	3833.5	10.6	1882.9
	R	g	13.8	1883.0		
(26) RR Seat Position (on floor)	X	g	4.8	1918.0	4.0	2639.3
	Y	g	9.7	1898.2	12.3	2641.8
	Z	g	7.9	1053.7	9.2	1909.0
	R	g	12.8	2641.6		

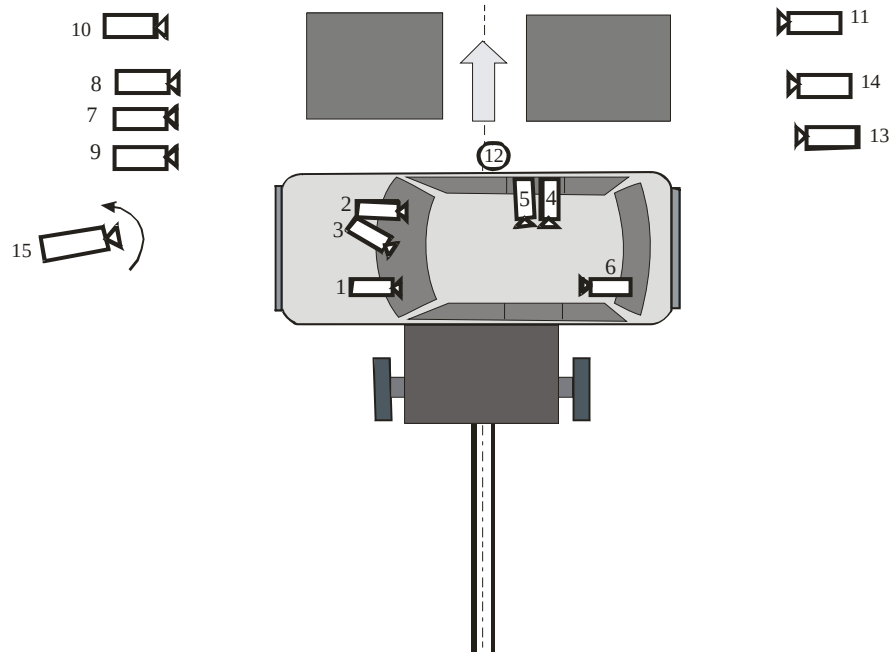
For acceleration data sign convention see Report Sign Convention in Appendix D.

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

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09



No.	Camera View	Camera Type	Lens (mm)	Speed (fps)	Trigger Delay (ms)
1	Driver Overall – Onboard ¹	VRTC – 1	4.8	500	0
2	Passenger Overall - Onboard	VRTC – 2	8	500	0
3	Driver Pelvis Area - Onboard	VRTC – 3	8.5	500	0
4	Rear Passenger Waste Up	Redlake – LE	8.5	500	0
5	Rear Passenger Overall	Redlake – LE	8.5	500	0
6	Rear Passenger Head	Redlake – LE	8	500	0
7	Vehicle Front Medium Tight 180-270 deg.	Visario G2	25	500	0
8	Vehicle Front Launch to180 deg.	Visario G1	25	500	0
9	Vehicle Front Medium Wide at 270 deg.	Visario G1	12.5	500	0
10	Vehicle Rear Medium Wide at 270 deg.	Redlake – LE	12.5	500	1000
11	Rear wide overall entire event	Redlake – LE	12.5	500	1000
12	Overhead wide	Visario G1	12.5	500	0
13	Rear wide Launch to180 deg. overall	Visario G1	6	500	0
14	Rear wide overall entire event	Visario G1	12.5	500	0
15	Real-time - Panning	Canon		24	

¹ Camera Damaged, video not available.

DATA SHEET NO. 10

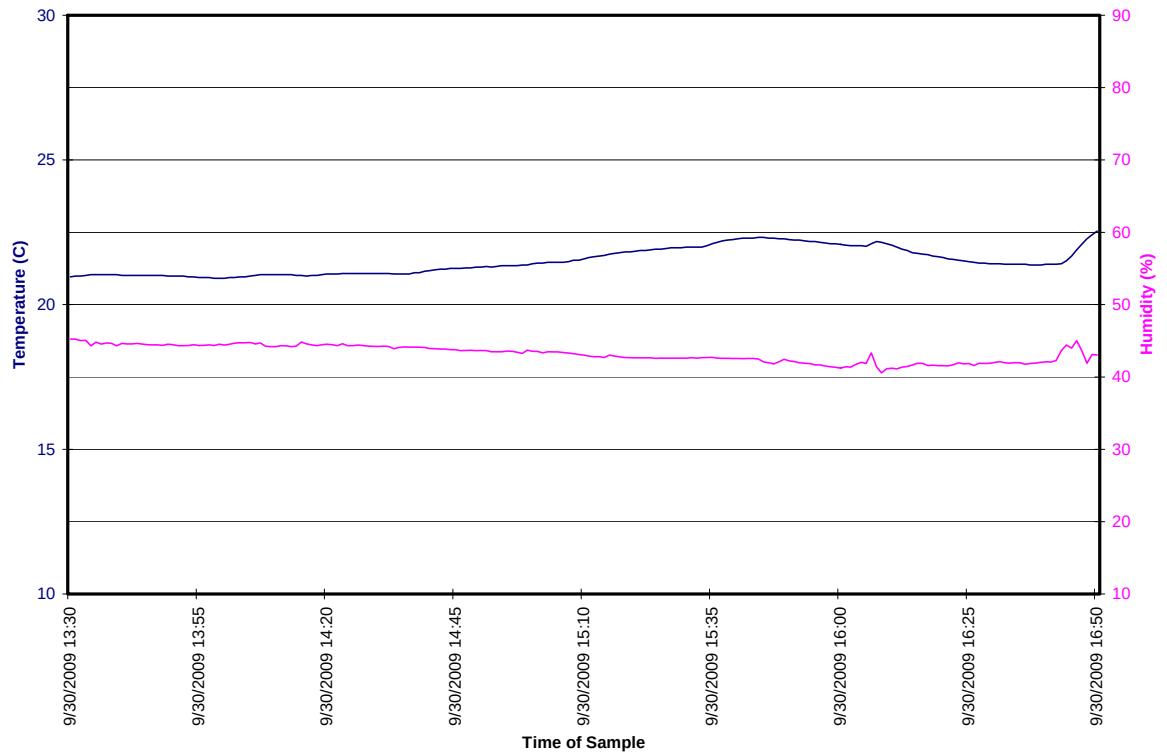
DUMMY / VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2007 Ford Expedition

Test Program: Dynamic Rollover

Test Date: 09/30/09

FMVSS 208 DYNAMIC ROLLOVER OF 2007 FORD EXPEDITION, TEST TIME 16:50



APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure		Page
A-1	Pre-Test Front View	A-5
A-2	Post-Test Front View	A-5
A-3	Pre-Test Left Front View	A-6
A-4	Post-Test Left Front View	A-6
A-5	Pre-Test Left Side View	A-7
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
A-11	Pre-Test Right Rear View	A-10
A-12	Post-Test Right Rear View	A-10
A-13	Pre-Test Right Side View	A-11
A-14	Post-Test Right Side View	A-11
A-15	Pre-Test Right Front View	A-12
A-16	Post-Test Right Front View	A-12
A-17	Pre-Test Overhead View	A-13
A-18	Post-Test Overhead View	A-13
A-19	Pre-Test Overhead Close-up View	A-14
A-20	Post-Test Overhead Close-up View	A-14
A-21	Pre-Test Front Underbody View	A-15
A-22	Post-Test Front Underbody View	A-15
A-23	Pre-Test Rear Underbody View	A-16
A-24	Post-Test Rear Underbody View	A-16
A-25	Pre-Test Windshield View	A-17
A-26	Post-Test Windshield View	A-17
A-27	Pre-Test Windshield View - Driver Dummy	A-18
A-28	Post-Test Windshield View - Driver Dummy	A-18

LIST OF PHOTOGRAPHS (CONTINUED)

Figure		Page
A-29	Pre-Test Driver Dummy - View 1	A-19
A-30	Post-Test Driver Dummy - View 1	A-19
A-31	Pre-Test Driver Dummy - View 2	A-20
A-32	Post-Test Driver Dummy - View 2	A-20
A-33	Pre-Test Driver Dummy - View 3	A-21
A-34	Post-Test Driver Dummy - View 3	A-21
A-35	Pre-Test Windshield View – Right Front Passenger	A-22
A-36	Post-Test Windshield View – Right Front Passenger	A-22
A-37	Pre-Test Right Front Passenger Dummy - View 1	A-23
A-38	Post-Test Right Front Passenger Dummy - View 1	A-23
A-39	Pre-Test Right Front Passenger Dummy - View 2	A-24
A-40	Post-Test Right Front Passenger Dummy - View 2	A-24
A-41	Pre-Test Right Front Passenger Dummy - View 3	A-25
A-42	Post-Test Right Front Passenger Dummy - View 3	A-25
A-43	Pre-Test Left Rear Passenger Dummy - View 1	A-26
A-44	Post-Test Left Rear Passenger Dummy - View 1	A-26
A-45	Pre-Test Left Rear Passenger Dummy - View 2	A-27
A-46	Post-Test Left Rear Passenger Dummy - View 2	A-27
A-47	Pre-Test Left Rear Passenger Dummy - View 3	A-28
A-48	Post-Test Left Rear Passenger Dummy - View 3	A-28
A-49	Post-Test Driver Dummy Head Contact - View 1	A-29
A-50	Post-Test Driver Dummy Head Contact - View 2	A-29
A-51	Post-Test Right Front Passenger Dummy Head Contact View	A-30
A-52	Post-Test Left Rear Passenger Dummy Head Contact View	A-31
A-53	Post-Test Left Rear Passenger Dummy Knee Contact View	A-31
A-54	Pre-Test Driver Buckle Status View	A-32
A-55	Post-Test Driver Buckle Status View	A-32
A-56	Pre-Test Right Front Passenger Buckle Status View	A-33
A-57	Post-Test Right Front Passenger Buckle Status View	A-33

LIST OF PHOTOGRAPHS (CONTINUED)

Figure		Page
A-58	Pre-Test Left Rear Passenger Buckle Status View	A-34
A-59	Post-Test Left Rear Passenger Buckle Status View	A-34
A-60	Vehicle Certification Label View	A-35
A-61	Vehicle Tire Pressure Label View	A-35
A-62	Pre-Test Right Front Tire on Cart View	A-36
A-63	Pre-Test Right Rear Tire on Cart View	A-36
A-64	Pre-Test Left Front Tire on Cart View	A-37
A-65	Pre-Test Left Rear Tire on Cart View	A-37
A-66	Pre-Test Ballast View 1	A-38
A-67	Pre-Test Ballast View 2	A-38
A-68	Pre-Test Rollover Cart View	A-39
A-69	Pre-Test Rollover Mats Placement View	A-40
A-70	Post-Test Rollover Mats Displacement View	A-40



Figure A-1 Pre-Test Front View

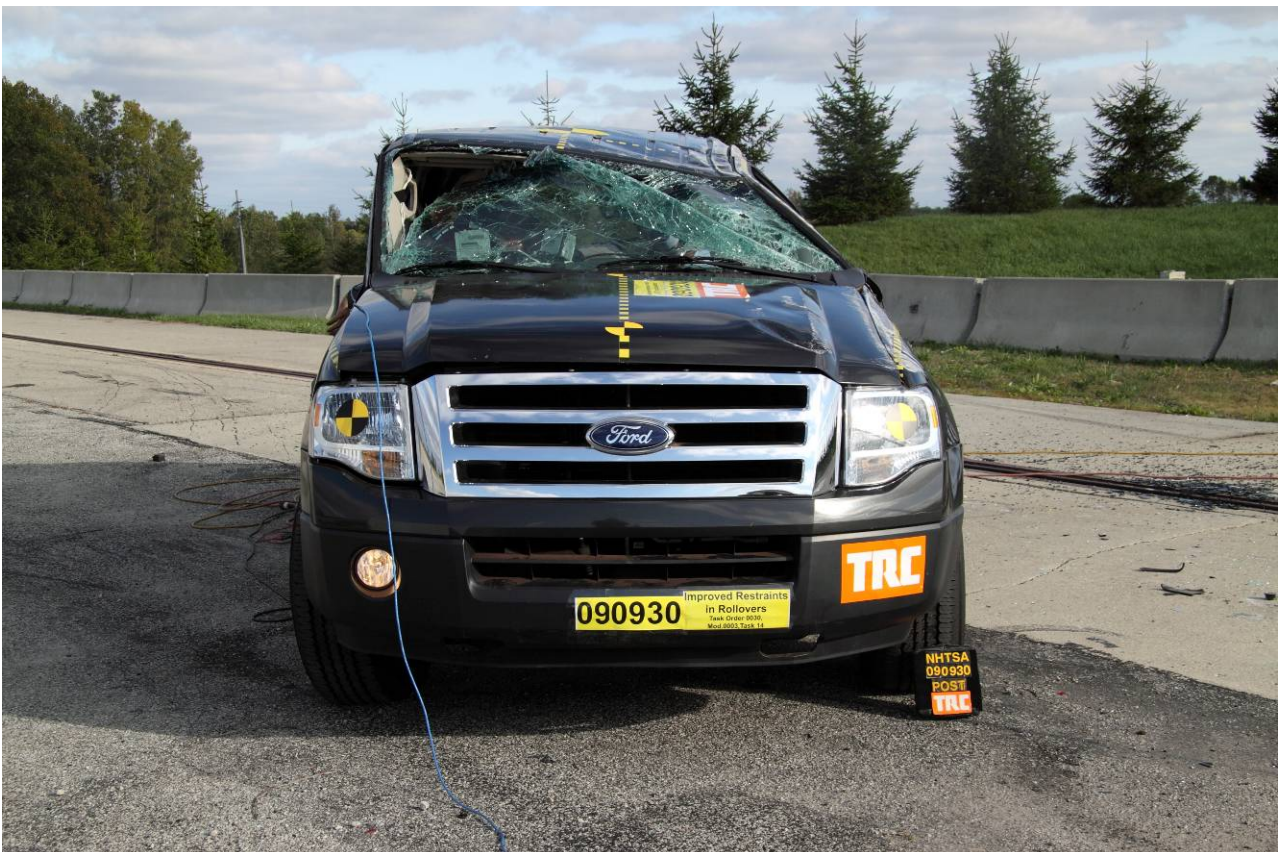


Figure A-2 Post-Test Front View



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

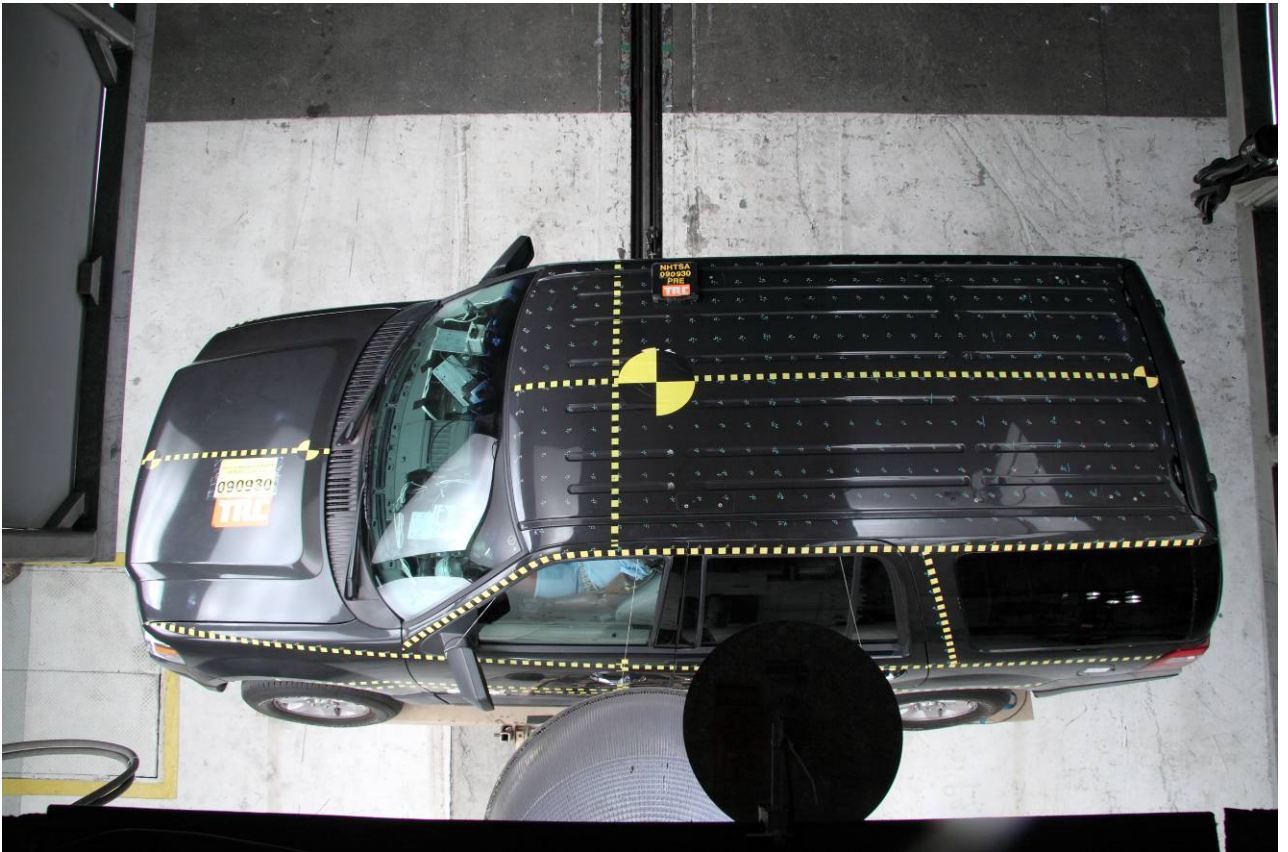


Figure A-17 Pre-Test Overhead View

Photo Not Available

Figure A-18 Post-Test Overhead View

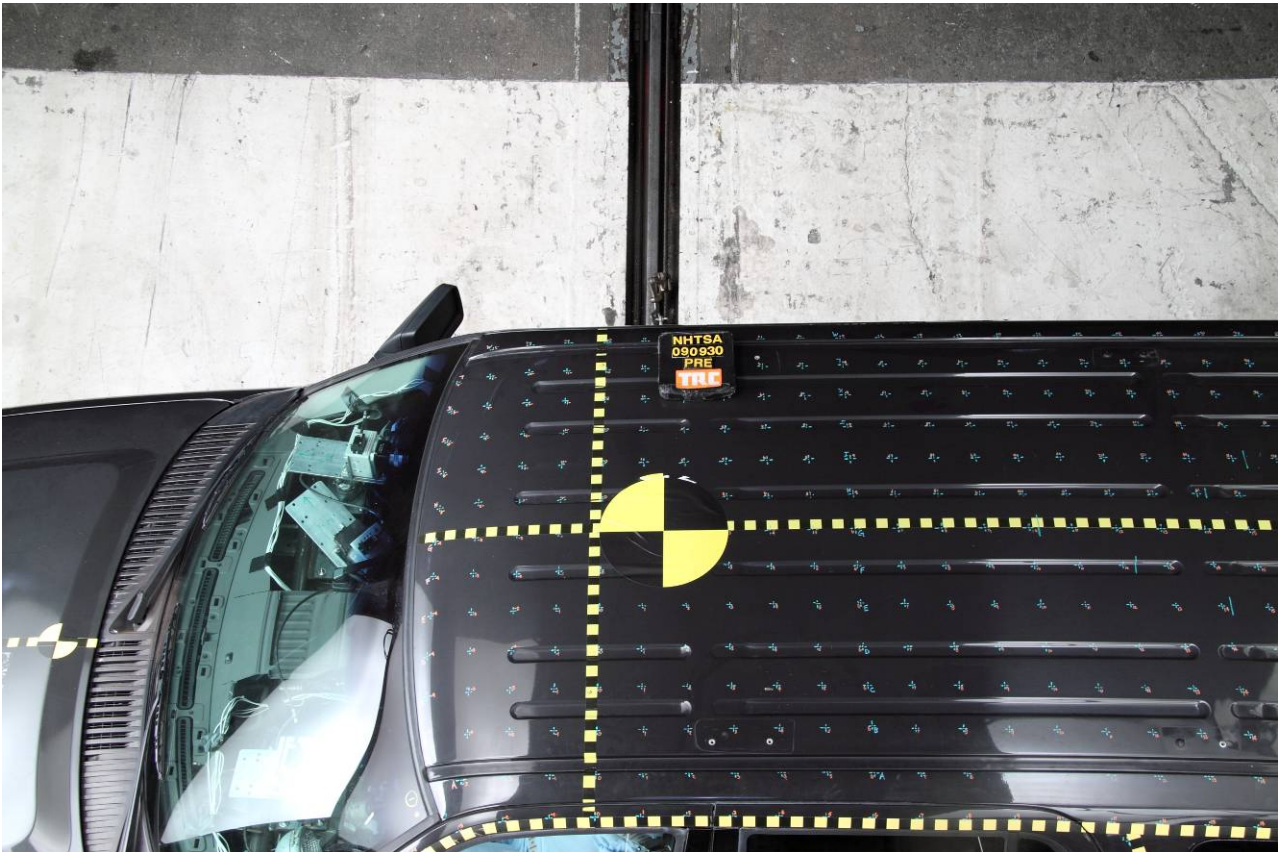


Figure A-19 Pre-Test Overhead Close-up View

Photo Not Available

Figure A-20 Post-Test Overhead Close-up View



Figure A-21 Pre-Test Front Underbody View



Figure A-22 Post-Test Front Underbody View

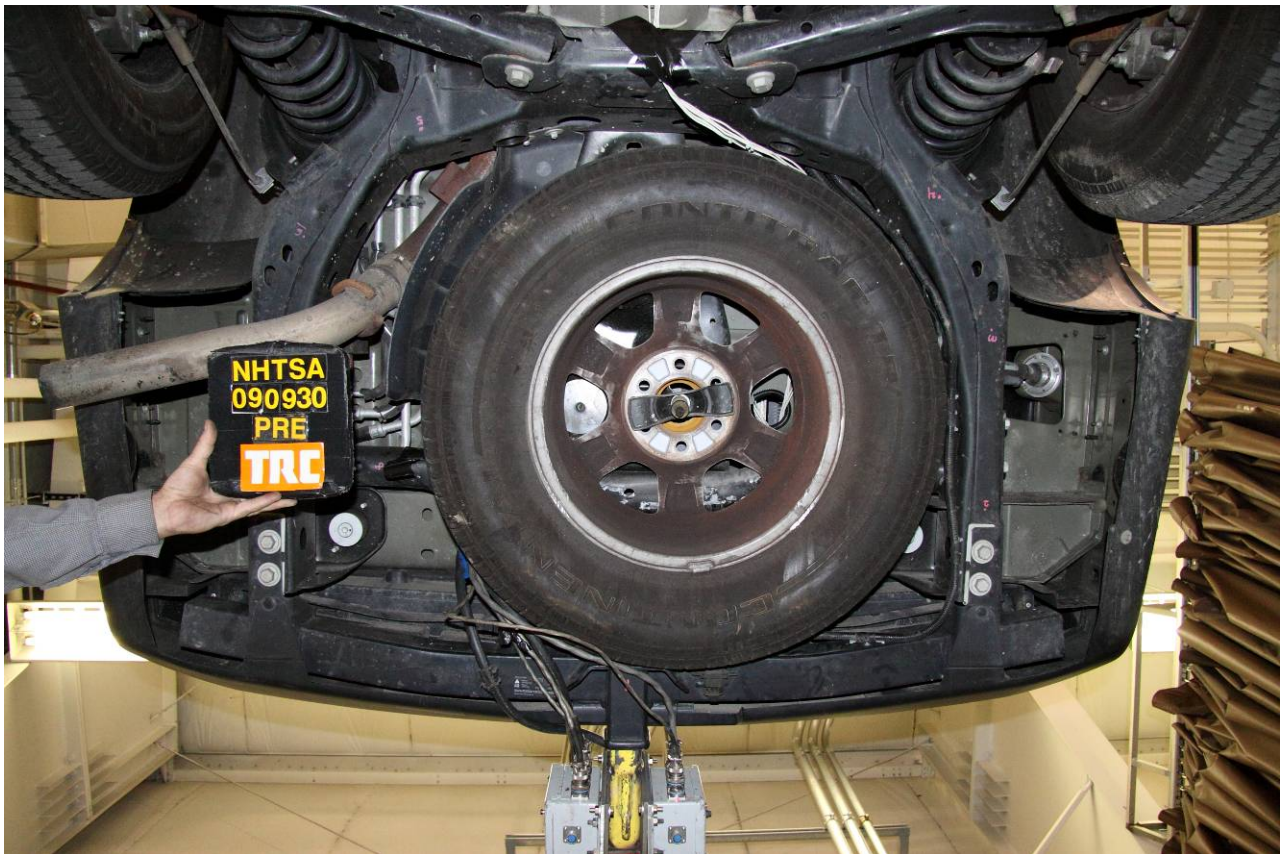


Figure A-23 Pre-Test Rear Underbody View



Figure A-24 Post-Test Rear Underbody View



Figure A-25 Pre-Test Windshield View



Figure A-26 Post-Test Windshield View



Figure A-27 Pre-Test Windshield View - Driver Dummy



Figure A-28 Post-Test Windshield View - Driver Dummy



Figure A-29 Pre-Test Driver Dummy - View 1



Figure A-30 Post-Test Driver Dummy - View 1

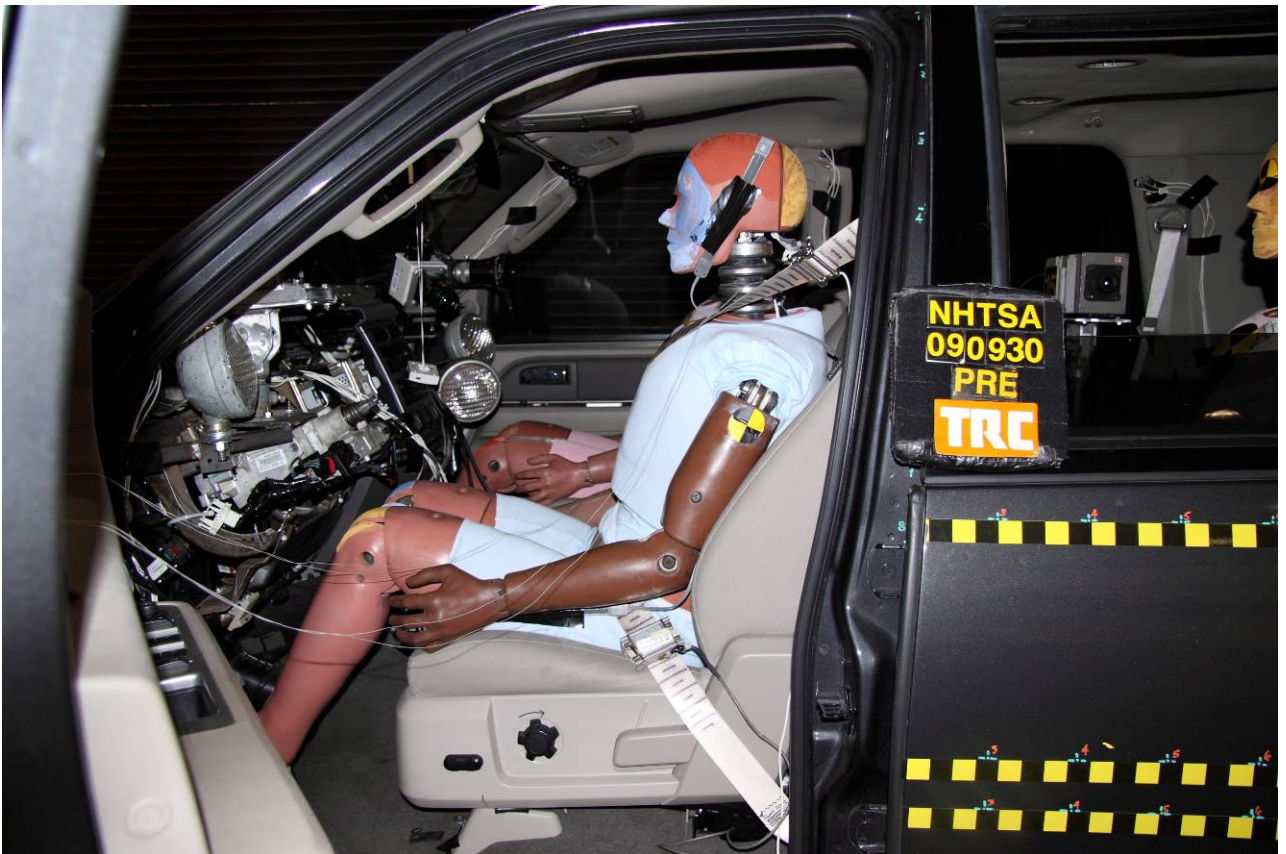


Figure A-31 Pre-Test Driver Dummy - View 2



Figure A-32 Post-Test Driver Dummy - View 2



Figure A-33 Pre-Test Driver Dummy - View 3

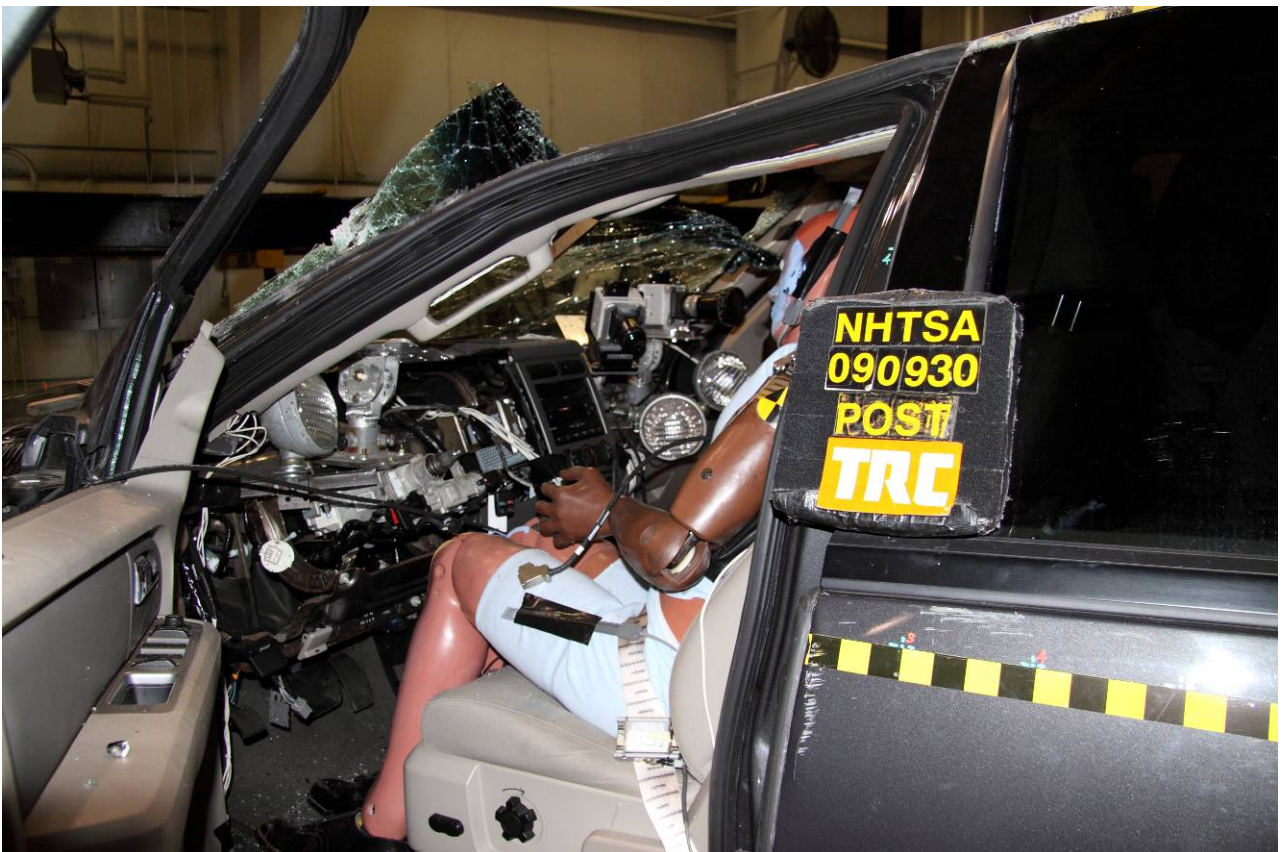


Figure A-34 Post-Test Driver Dummy - View 3



Figure A-35 Pre-Test Windshield View – Right Front Passenger



Figure A-36 Post-Test Windshield View – Right Front Passenger



Figure A-37 Pre-Test Right Front Passenger Dummy - View 1



Figure A-38 Post-Test Right Front Passenger Dummy - View 1



Figure A-39 Pre-Test Right Front Passenger Dummy - View 2



Figure A-40 Post-Test Right Front Passenger Dummy - View 2



Figure A-41 Pre-Test Right Front Passenger Dummy - View 3



Figure A-42 Post-Test Right Front Passenger Dummy - View 3



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

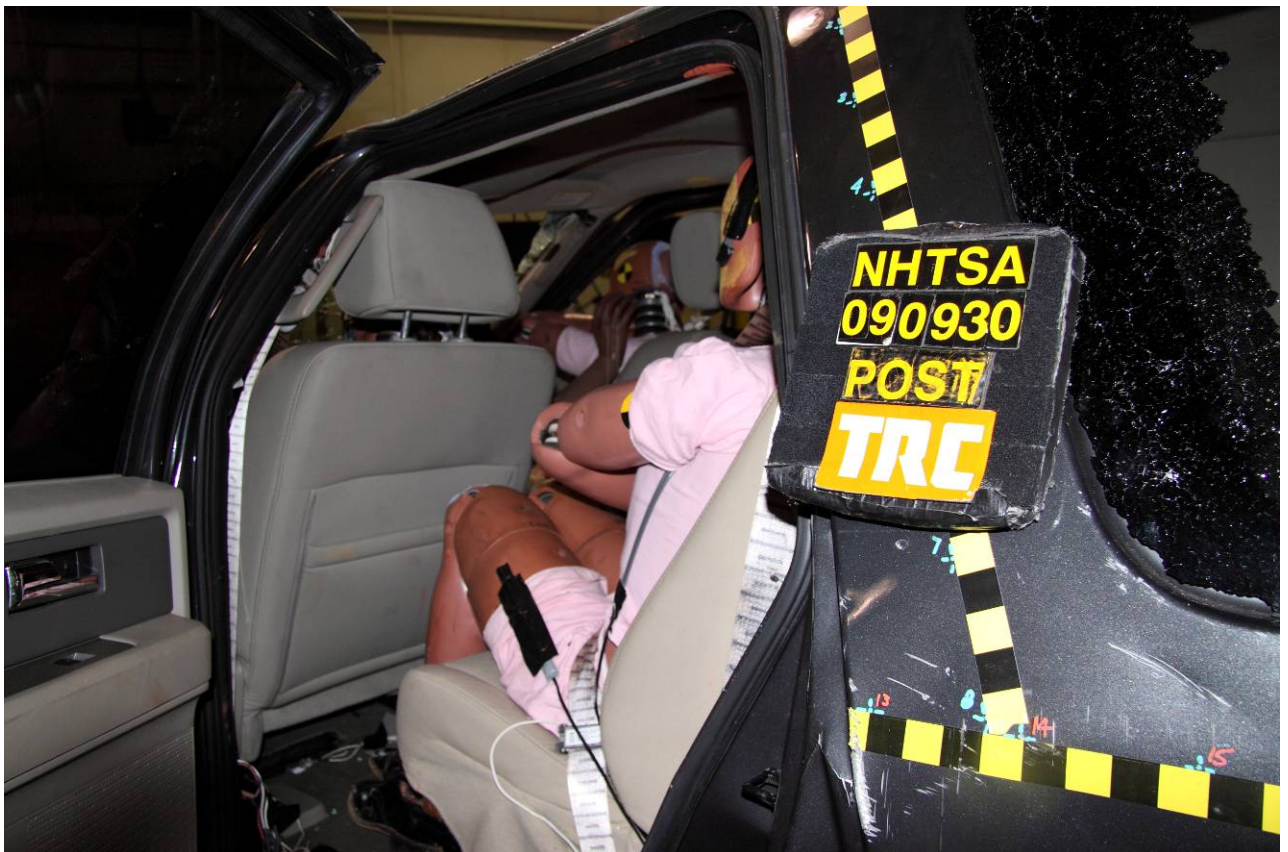


Figure A-48 Post-Test Left Rear Passenger Dummy - View 3



Figure A-49 Post-Test Driver Dummy Head Contact - View 1



Figure A-50 Post-Test Driver Dummy Head Contact - View 2



Figure A-51 Post-Test Right Front Passenger Dummy Head Contact View

Intentionally Left Blank



Figure A-52 Post-Test Left Rear Passenger Dummy Head Contact View



Figure A-53 Post-Test Left Rear Passenger Dummy Knee Contact View



Figure A-54 Pre-Test Driver Buckle Status View

Photo Not Available

Figure A-55 Post-Test Driver Buckle Status View



Figure A-56 Pre-Test Right Front Passenger Buckle Status View

Photo Not Available

Figure A-57 Post-Test Right Front Passenger Buckle Status View



Figure A-58 Pre-Test Left Rear Passenger Buckle Status View

Photo Not Available

Figure A-59 Post-Test Left Rear Passenger Buckle Status View

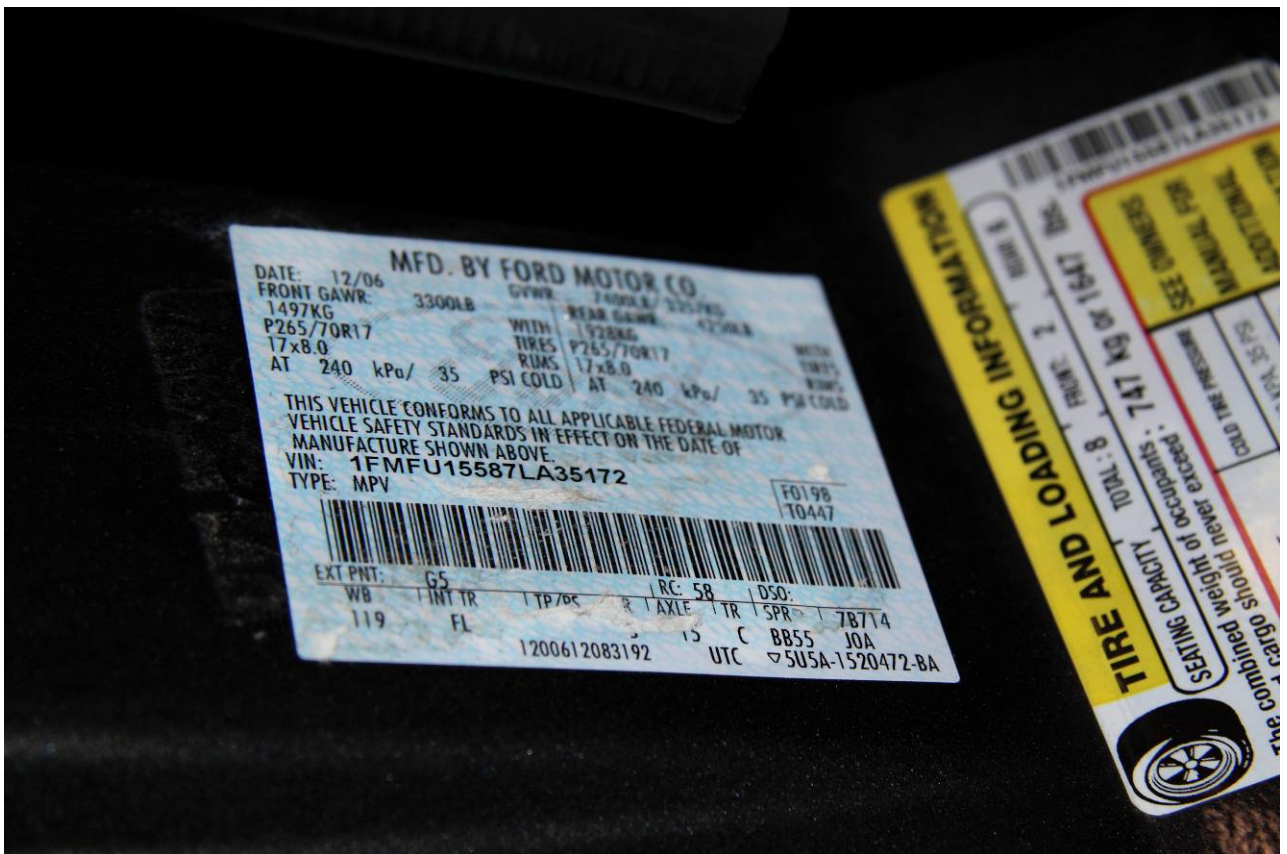


Figure A-60 Vehicle Certification Label View

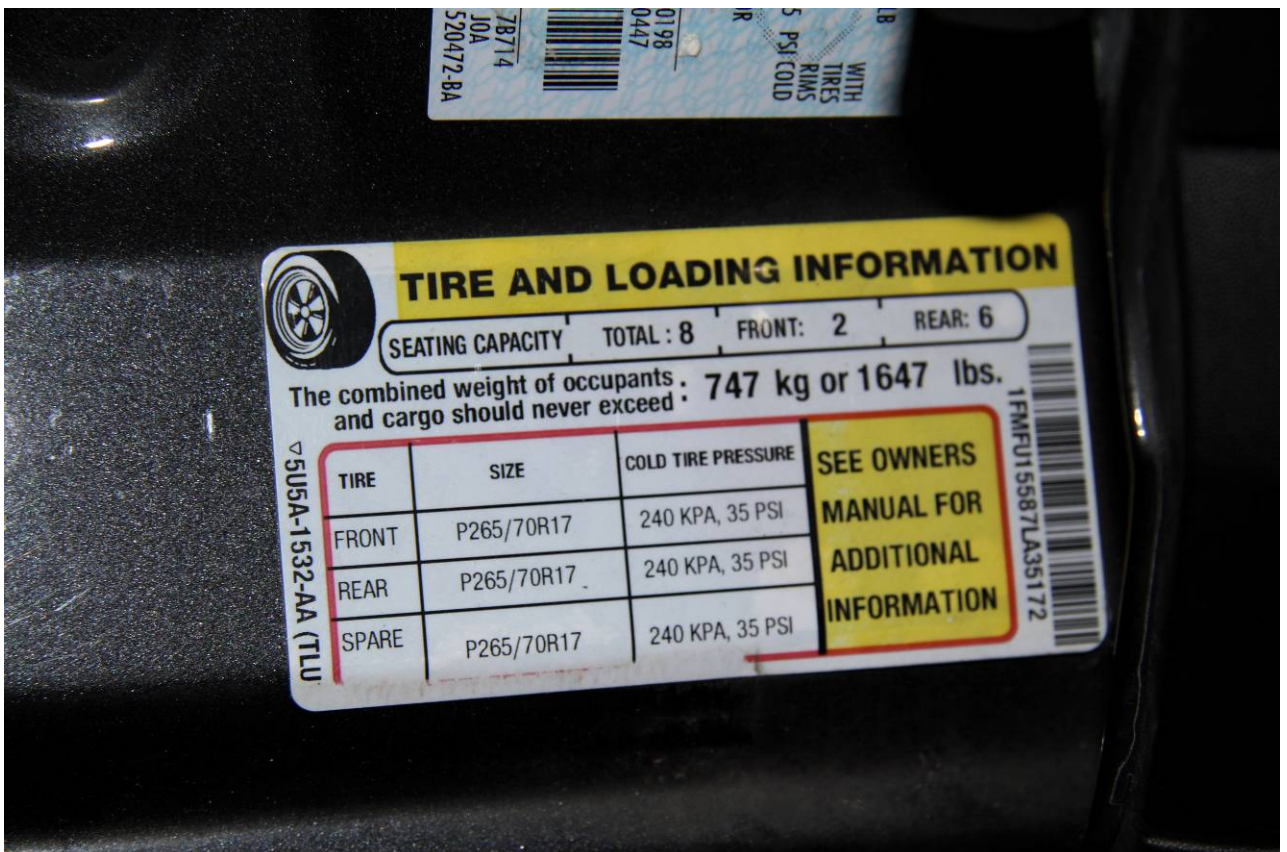


Figure A-61 Vehicle Tire Pressure Label View



Figure A-62 Pre-Test Right Front Tire on Cart View



Figure A-63 Pre-Test Right Rear Tire on Cart View



Figure A-64 Pre-Test Left Front Tire on Cart View



Figure A-65 Pre-Test Left Rear Tire on Cart View



Figure A-66 Pre-Test Ballast View 1



Figure A-67 Pre-Test Ballast View 2



Figure A-68 Pre-Test Rollover Cart View

Intentionally Left Blank



Figure A-69 Pre-Test Rollover Mats Placement View



Figure A-70 Post-Test Rollover Mats Displacement View

APPENDIX B
DATA PLOTS



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Driver Head X-Axis Acceleration

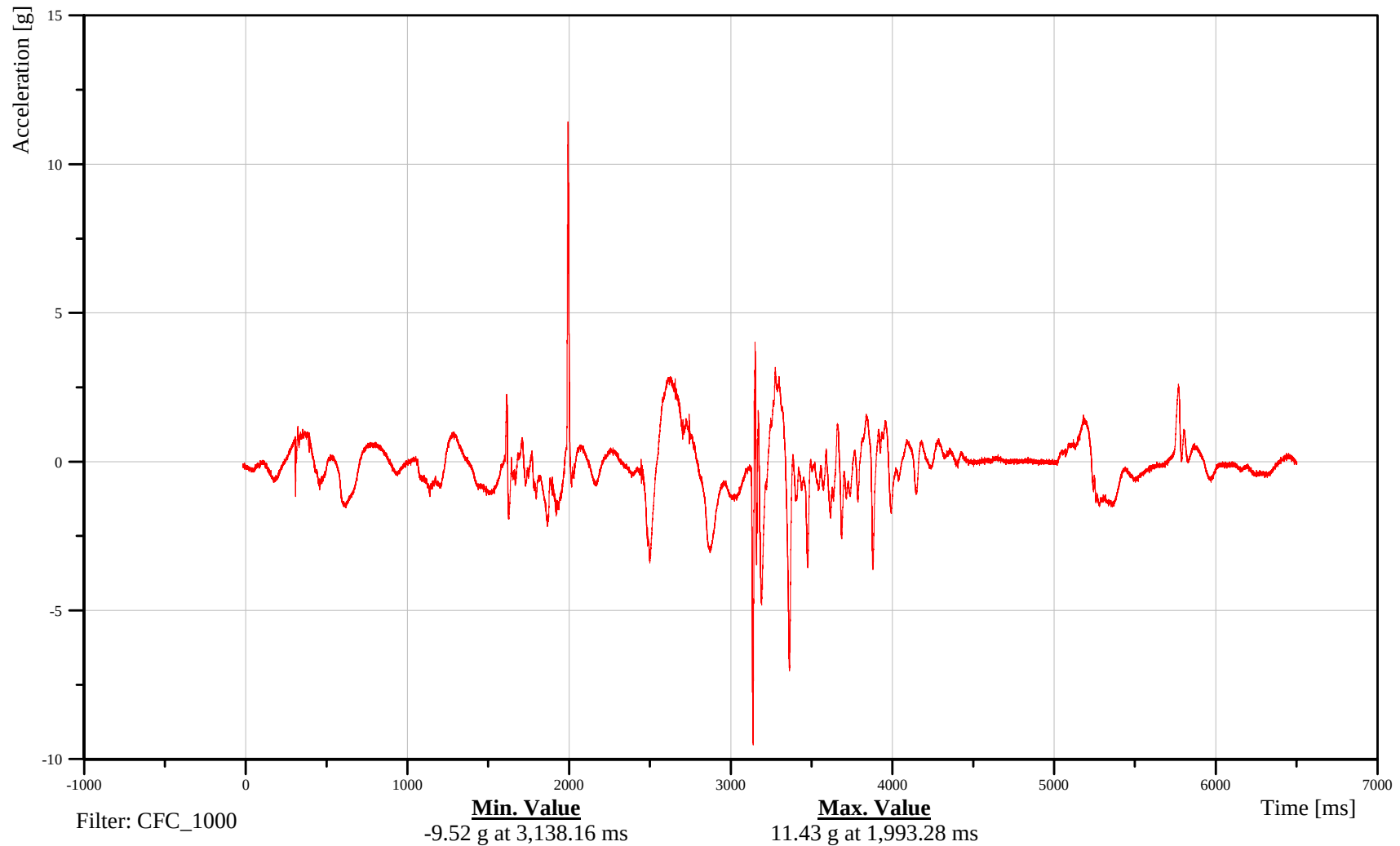
Time: 17:02

Customer: VRTC

11HEADCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-2

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Head Y-Axis Acceleration

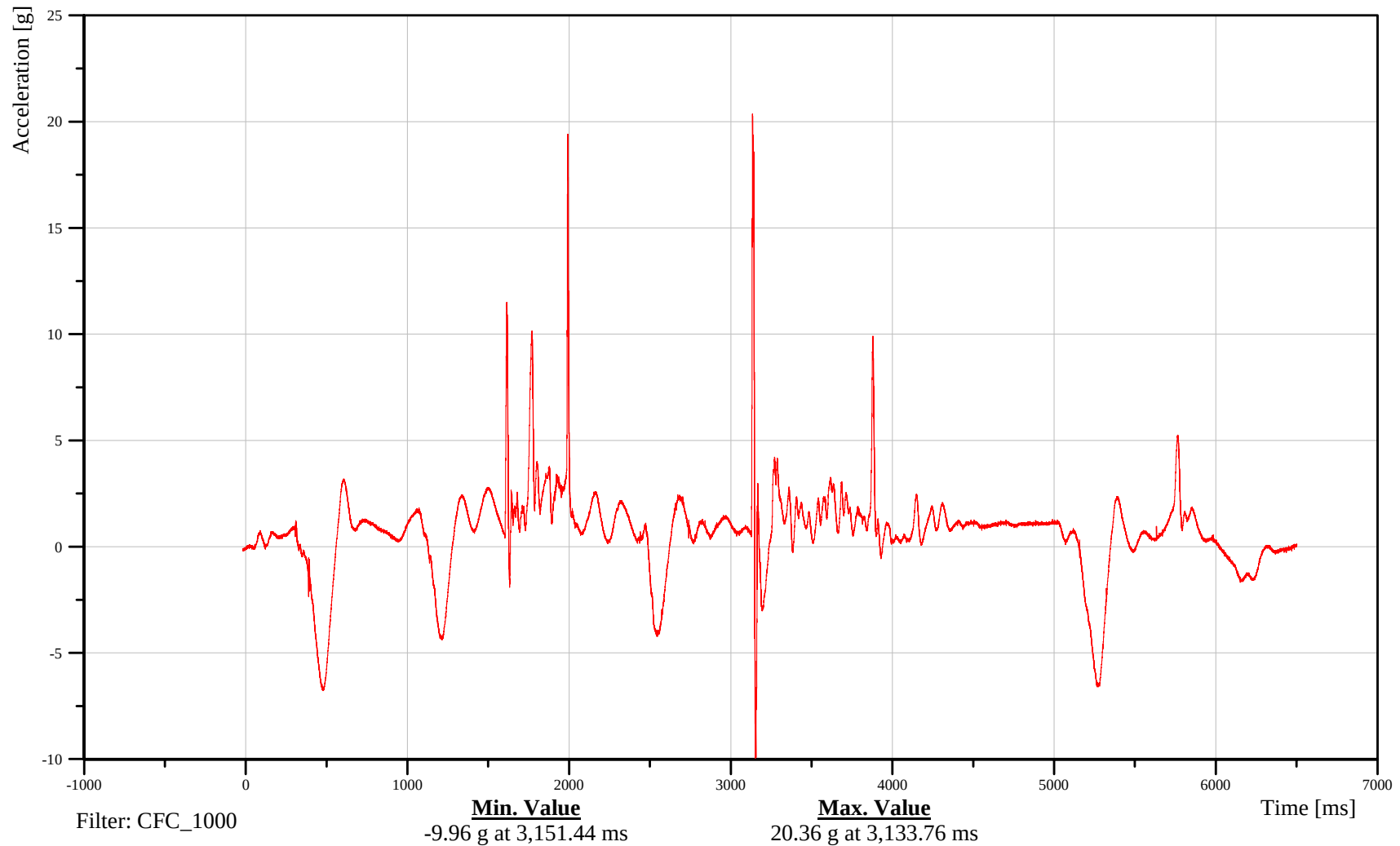
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11HEADCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-3

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Head Z-Axis Acceleration

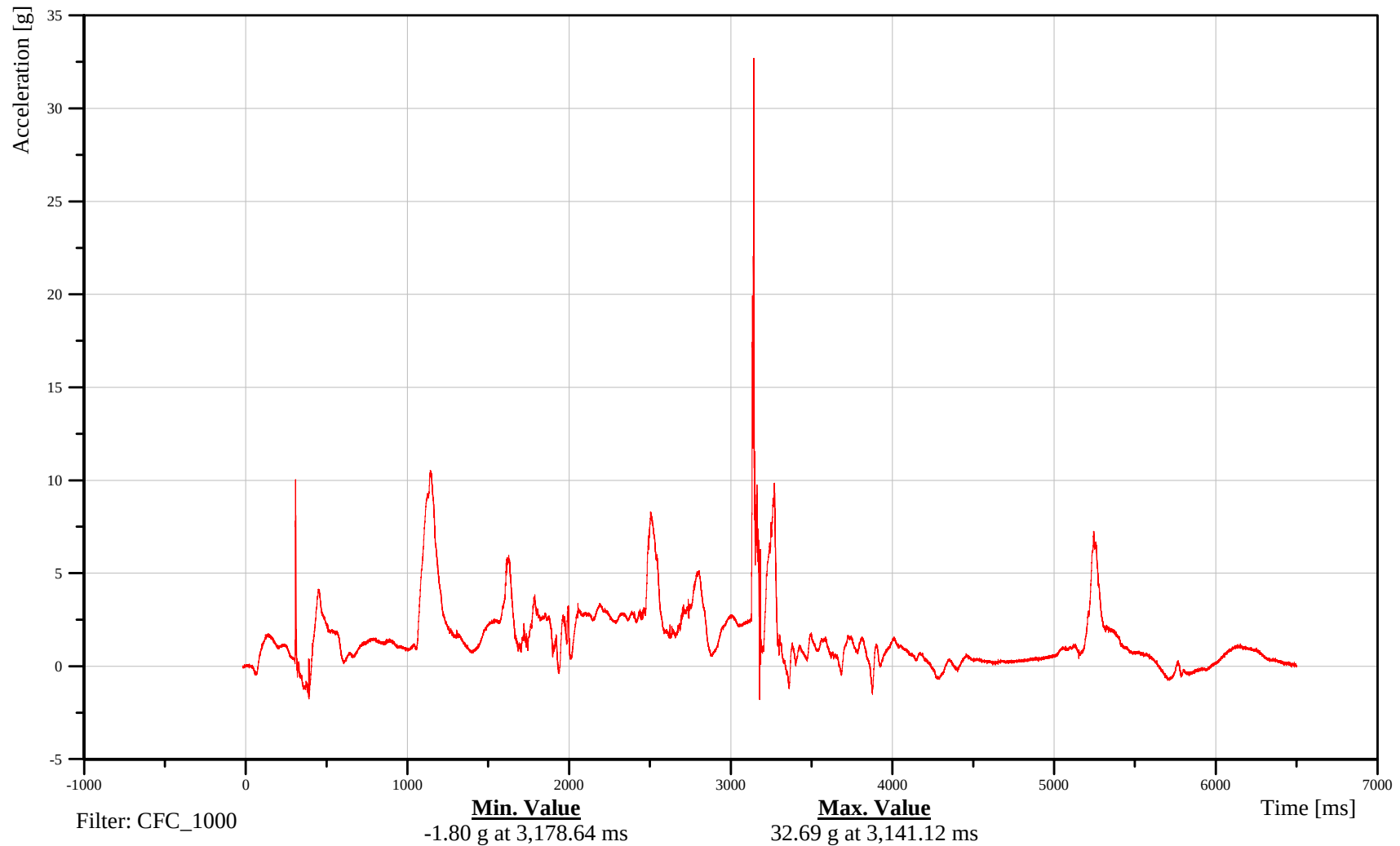
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11HEADCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-4

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Head Resultant Acceleration

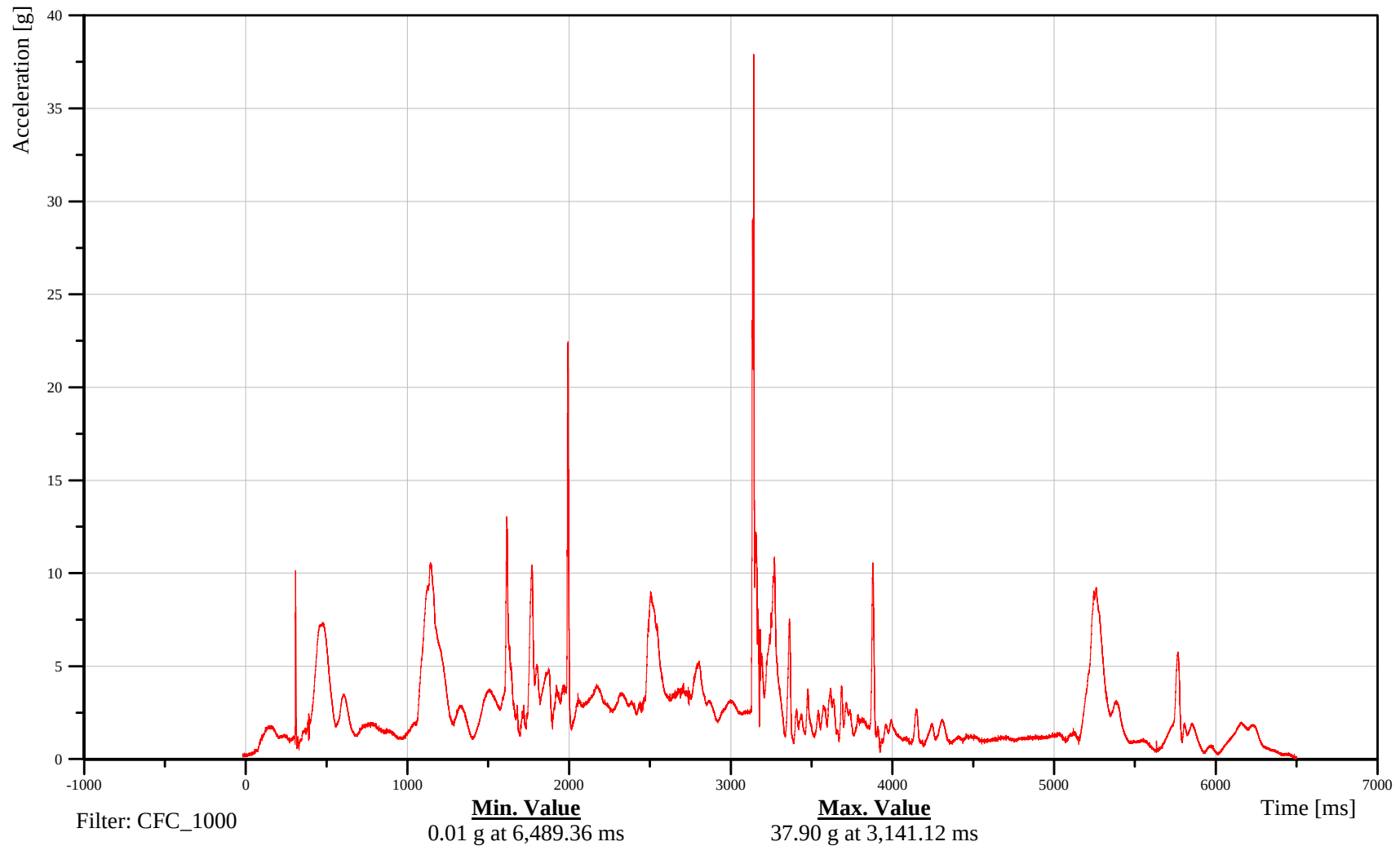
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11HEADCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-5

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Head (DTS ARS) Rate Gyro X

Date: 09/30/2009

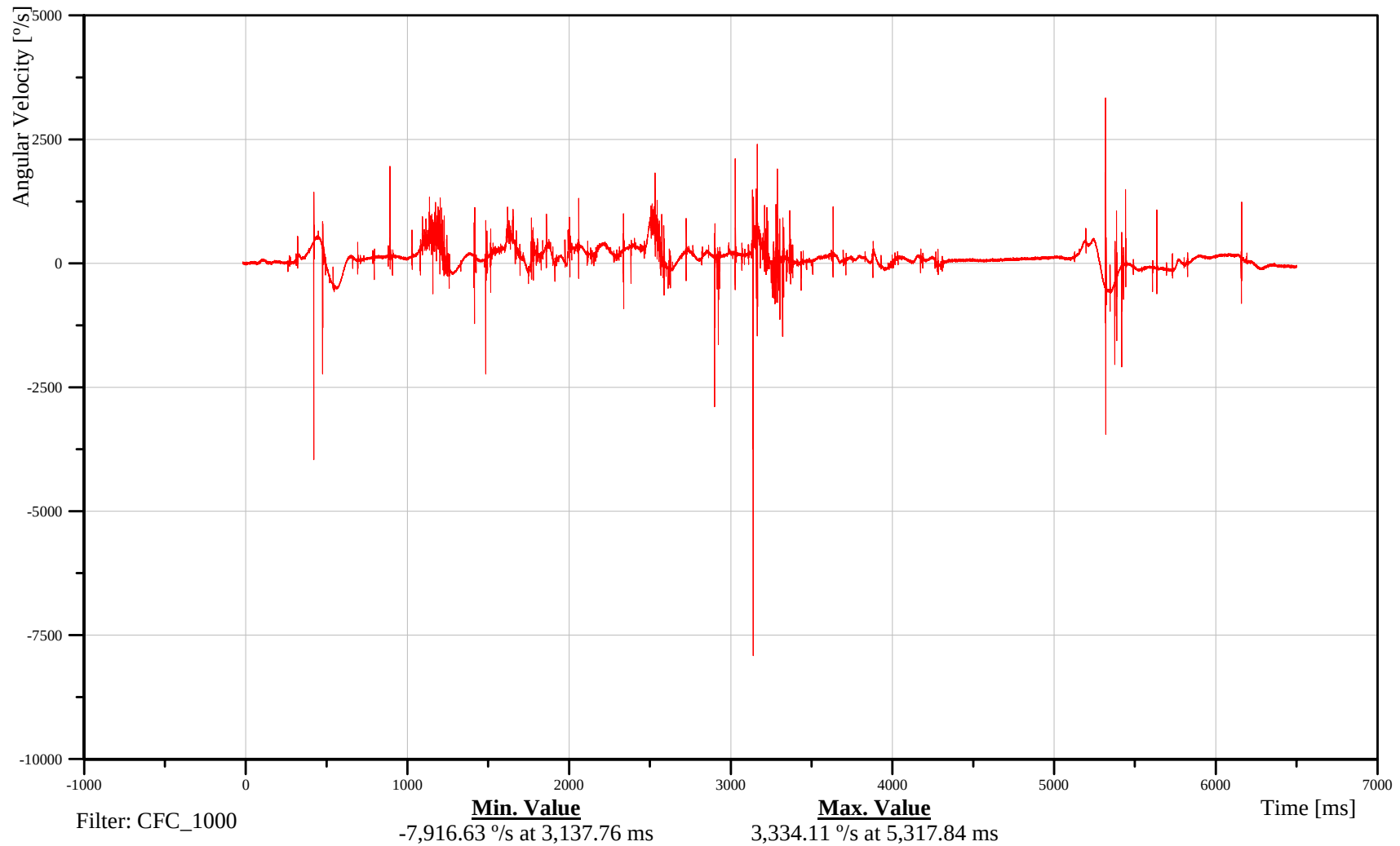
Time: 17:02

Customer: VRTC

11HEADCG00H3AVXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-6

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Head (DTS ARS) Rate Gyro Y

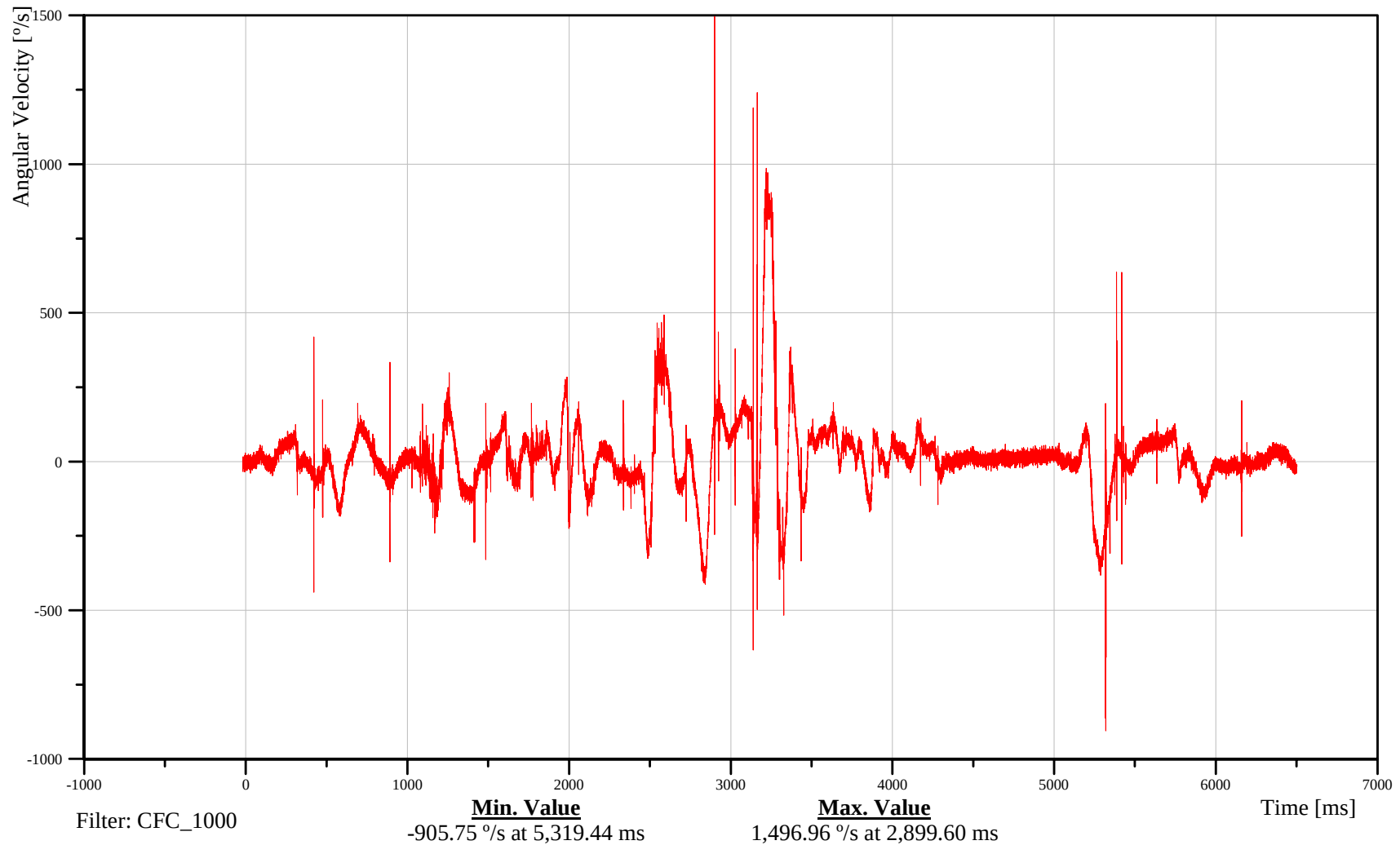
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11HEADCG00H3AVYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-7

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Head (DTS ARS) Rate Gyro Z

Date: 09/30/2009

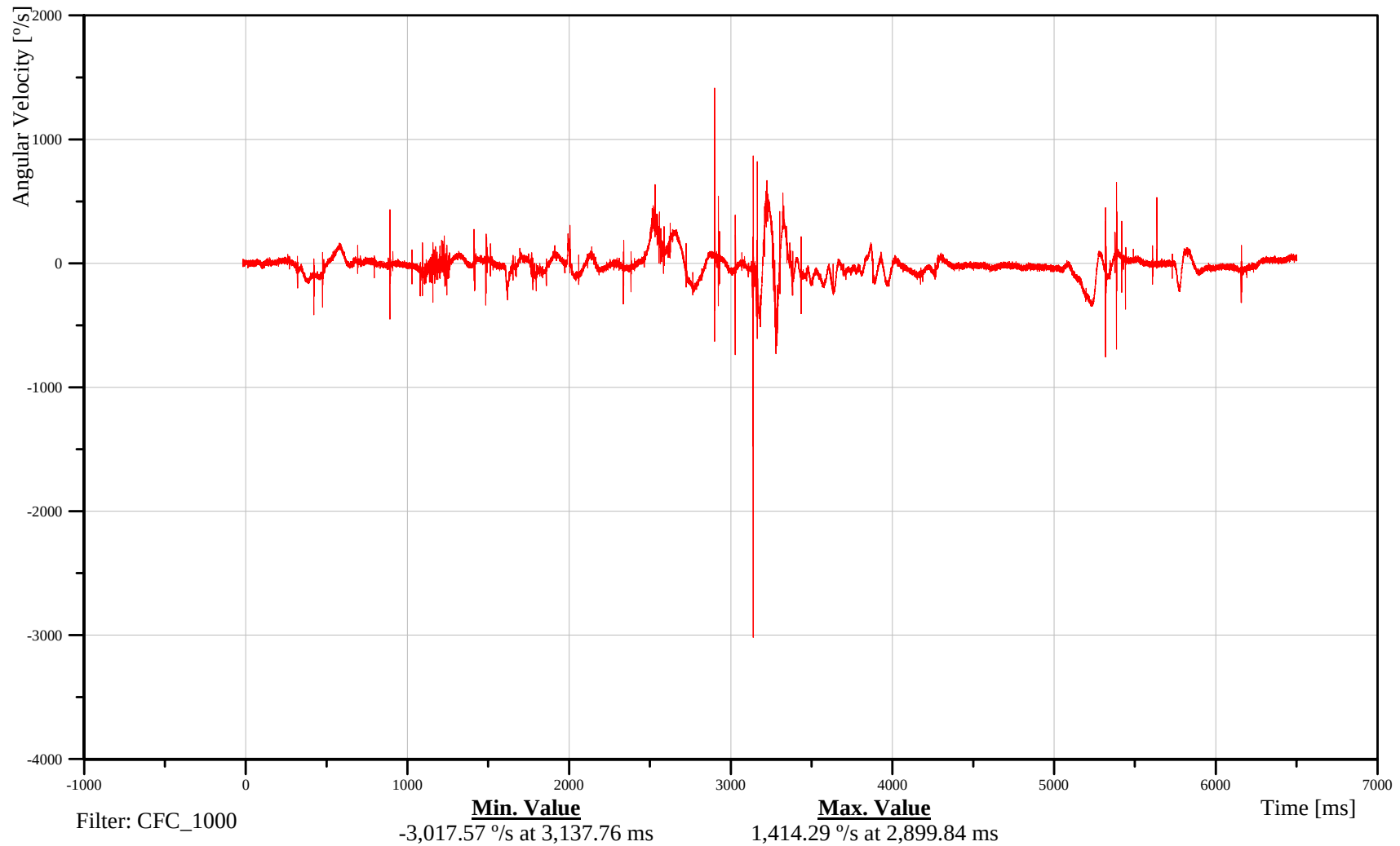
Time: 17:02

Customer: VRTC

11HEADCG00H3AVZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-8

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Upper Neck X-Axis Force

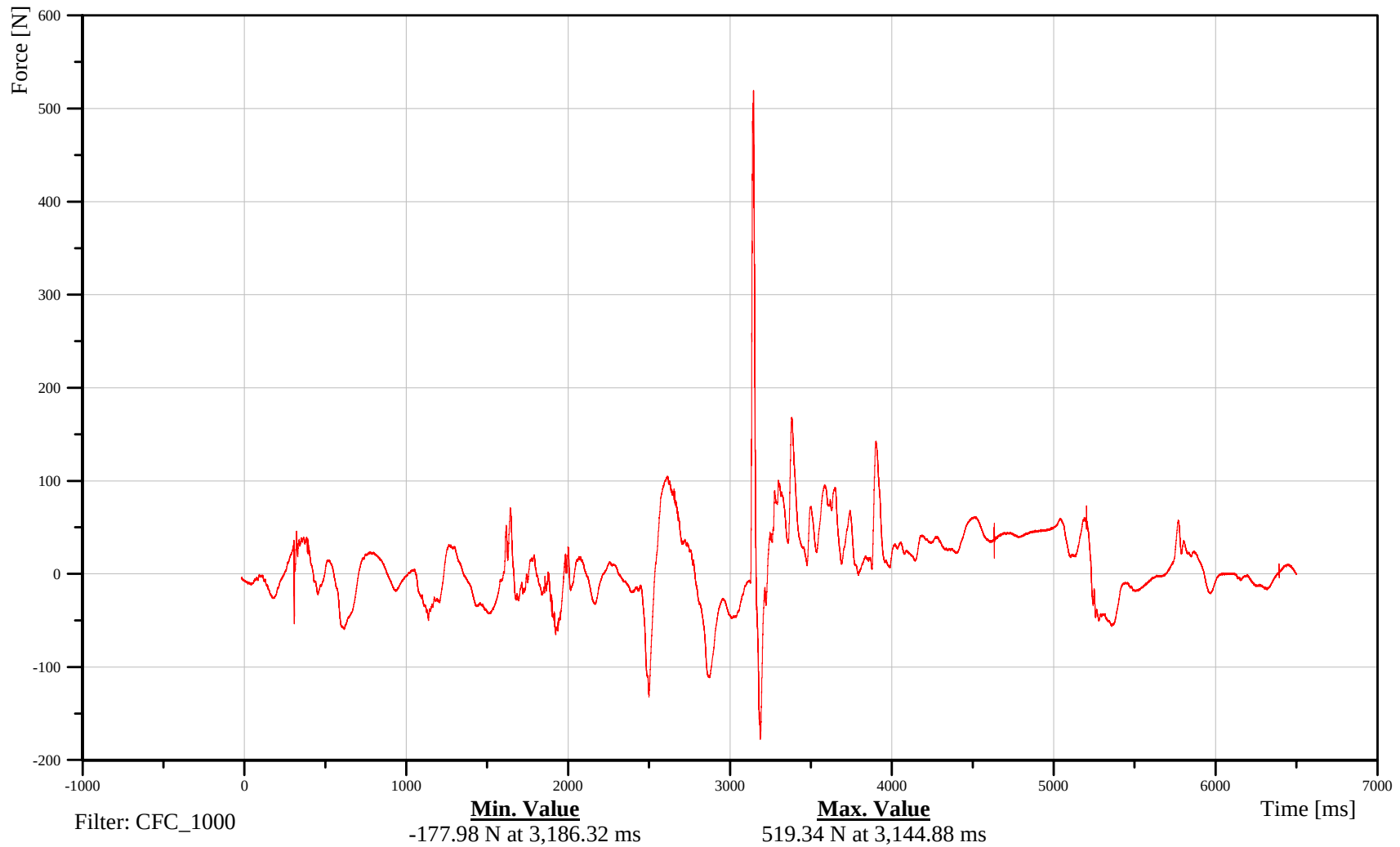
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKUP00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-9

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Upper Neck Y-Axis Force

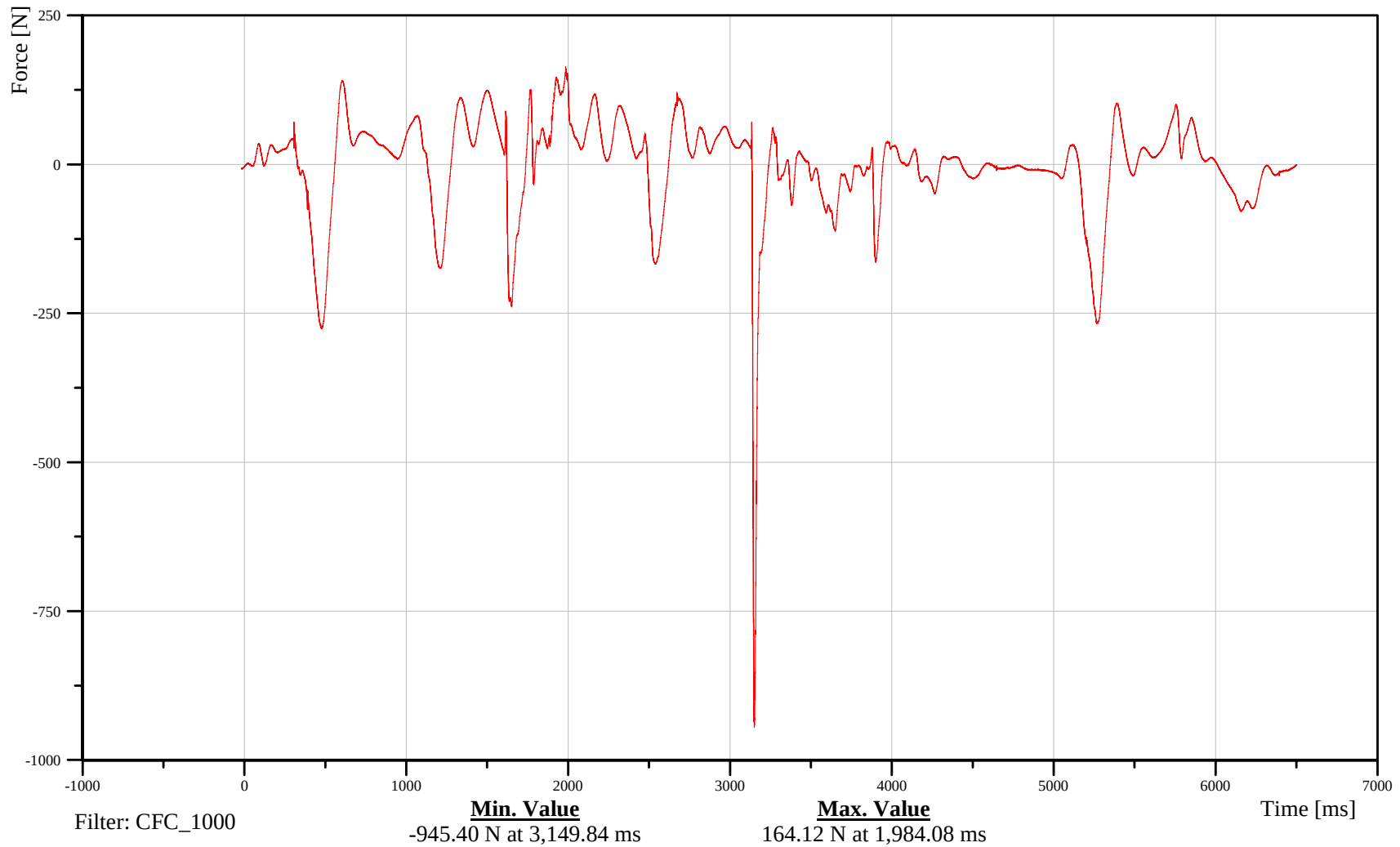
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKUP00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-10

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Upper Neck Z-Axis Force

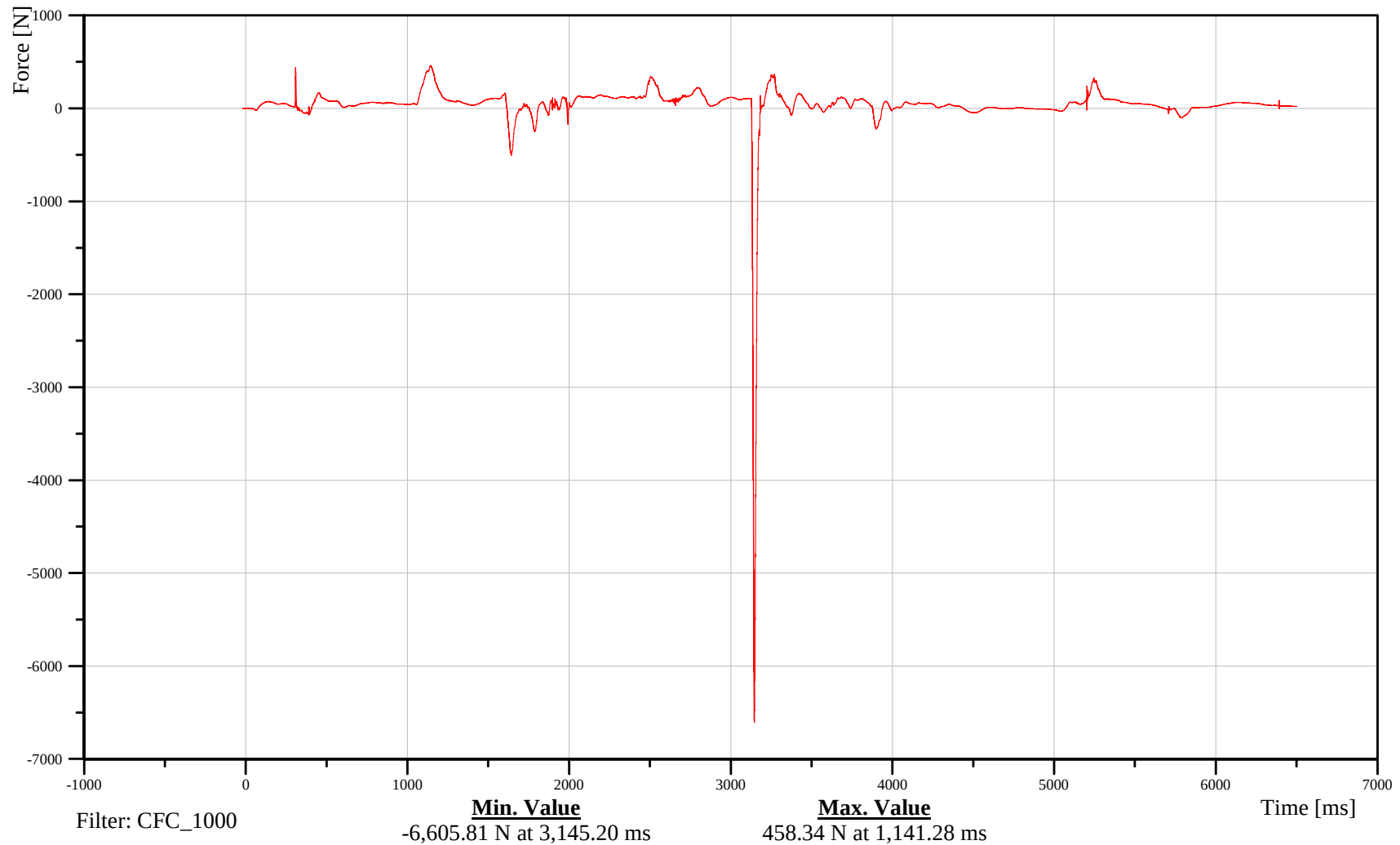
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKUP00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-11

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Driver Upper Neck Moment About X Axis

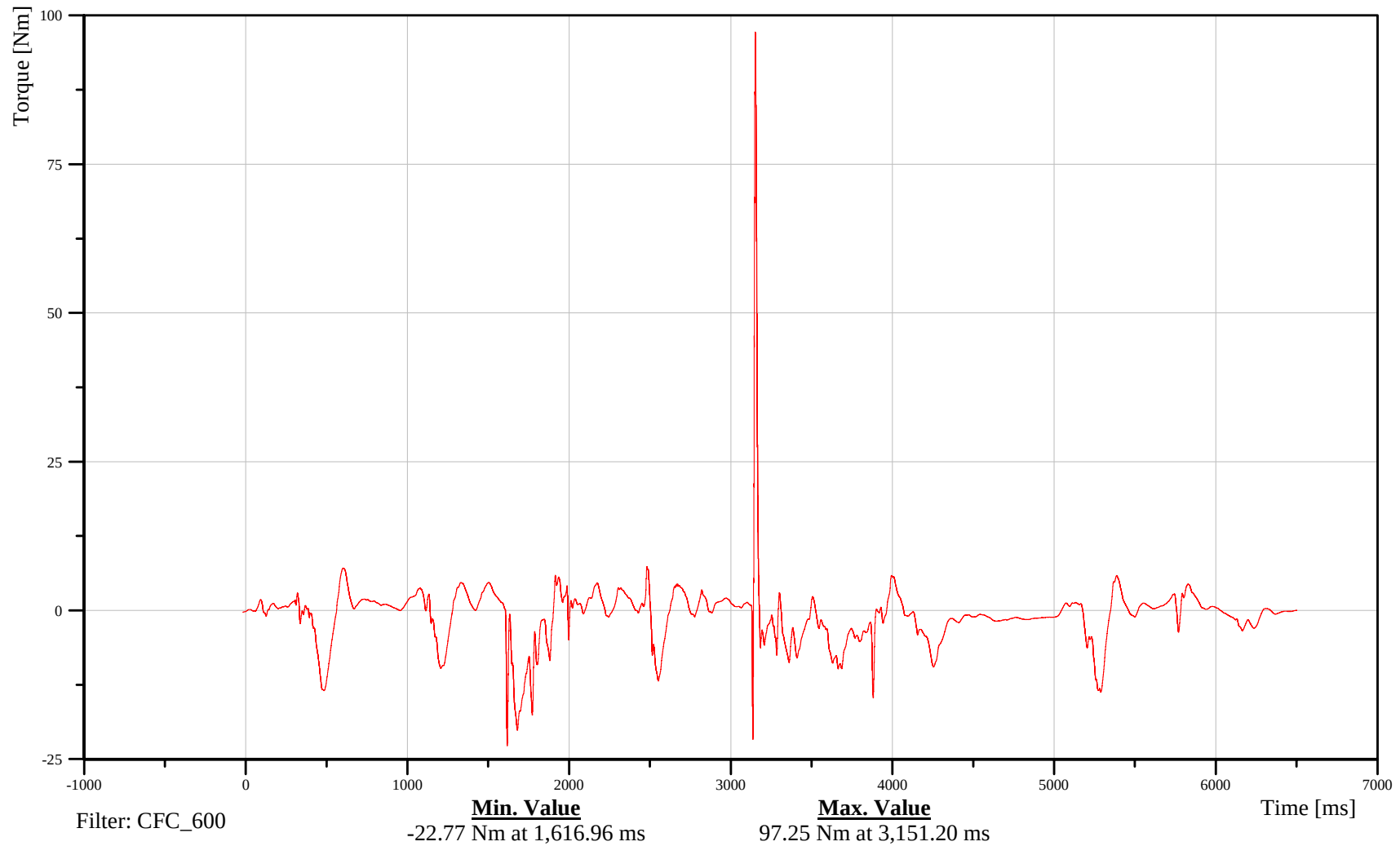
Time: 17:02

Customer: VRTC

11NECKUP00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 090930





FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Driver Upper Neck Moment About Y Axis

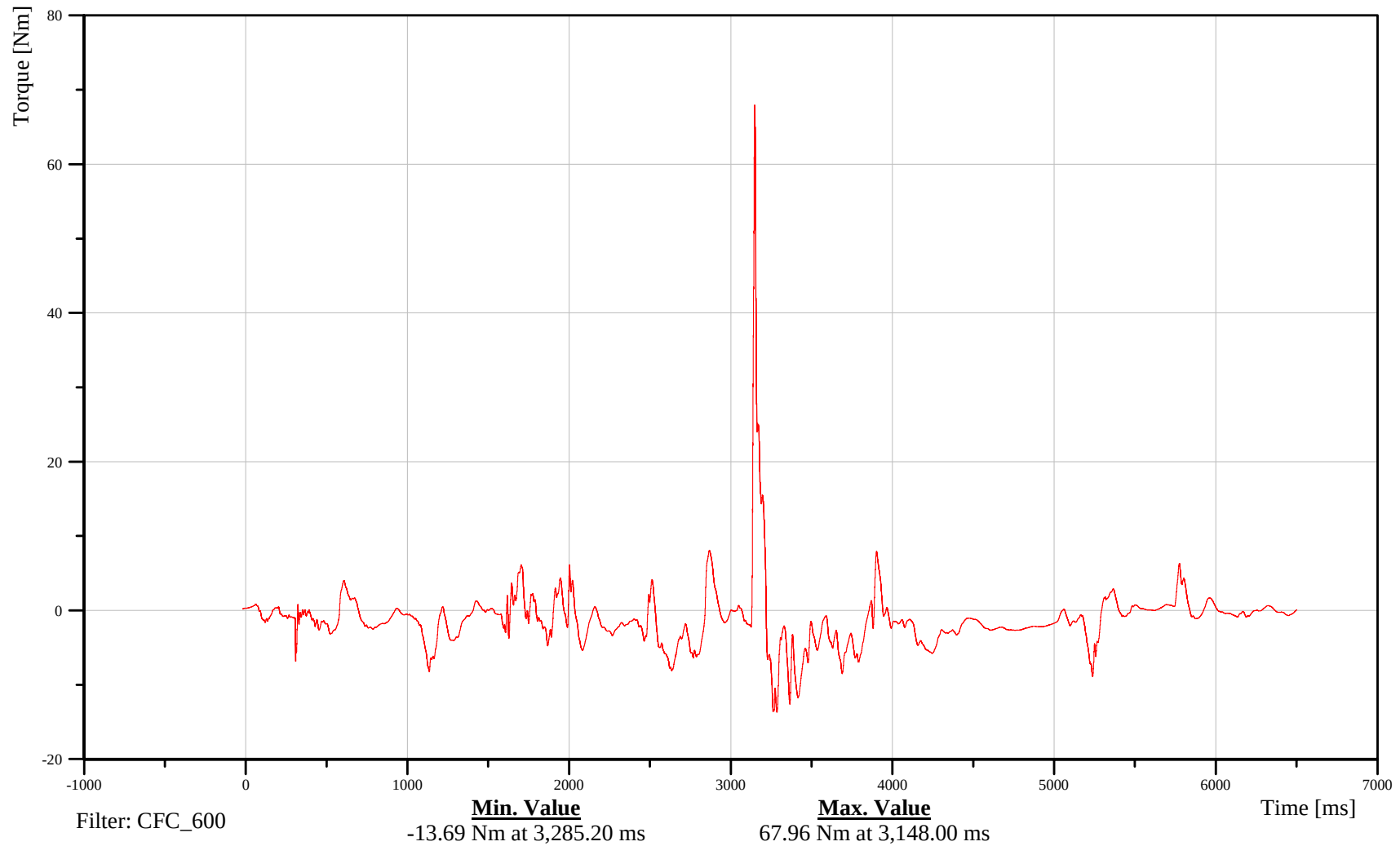
Time: 17:02

Customer: VRTC

11NECKUP00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-13

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Upper Neck Moment About Z Axis

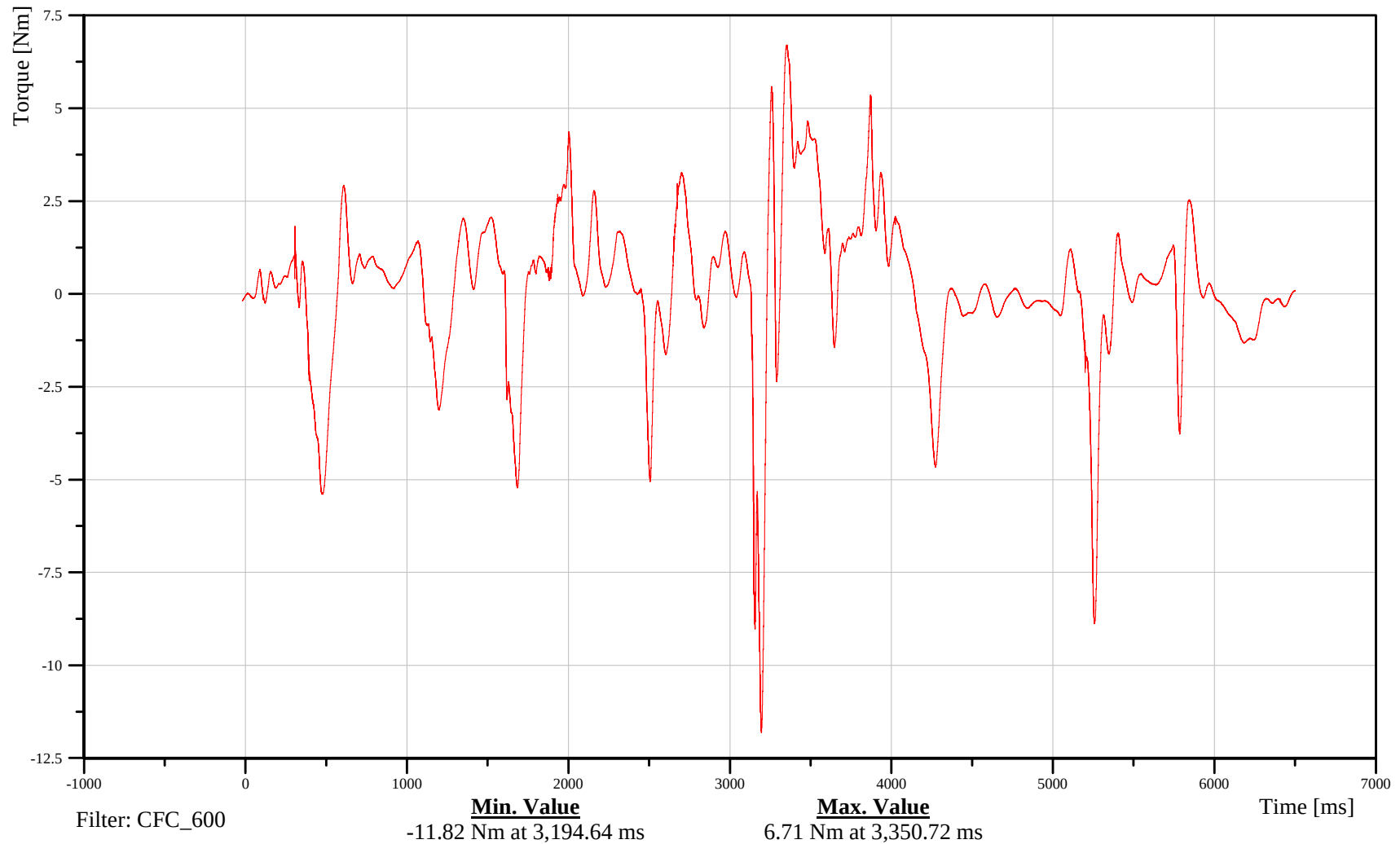
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKUP00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-14

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Chest X-Axis Acceleration

Date: 09/30/2009

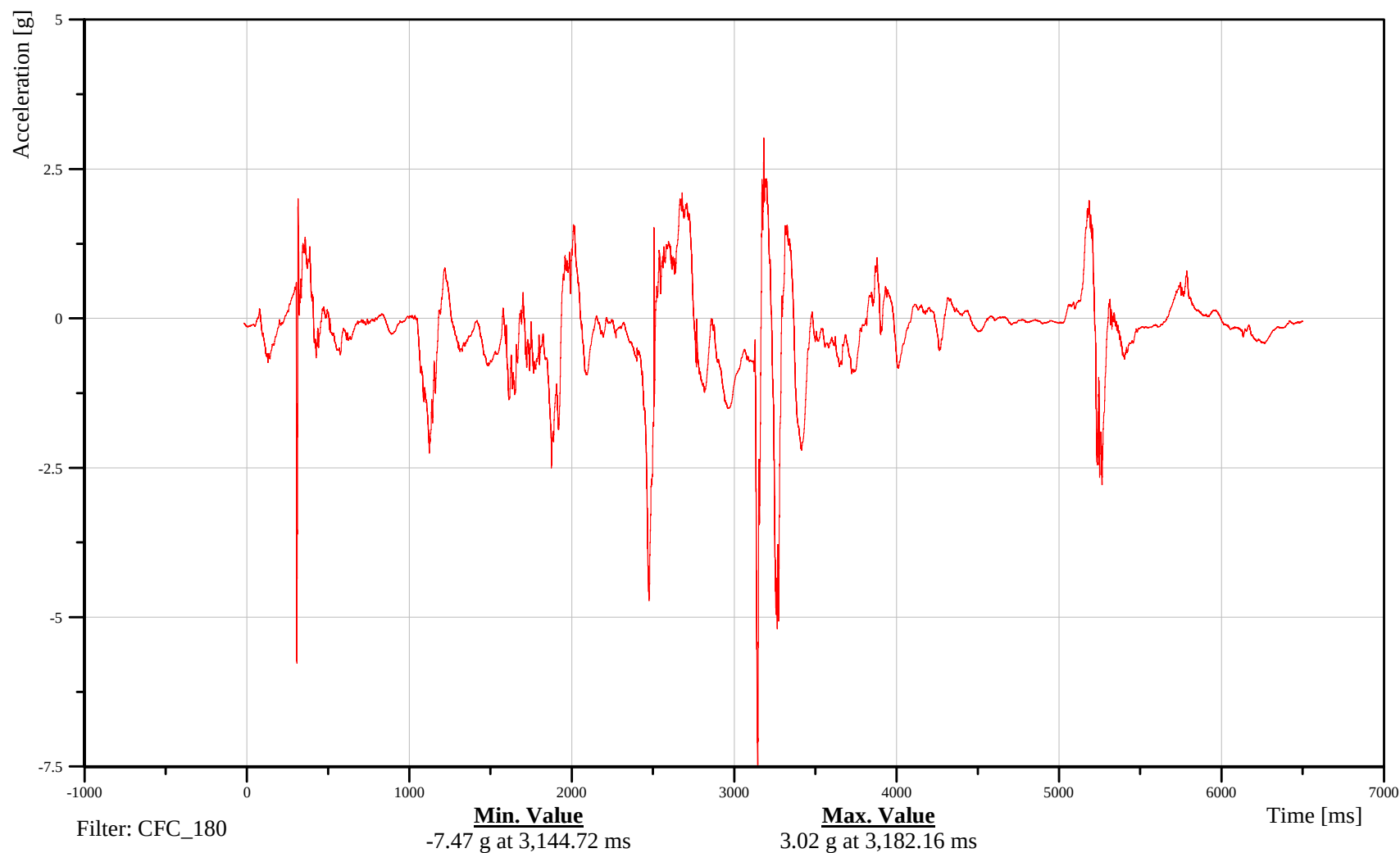
Time: 17:02

Customer: VRTC

11CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-15

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Chest Y-Axis Acceleration

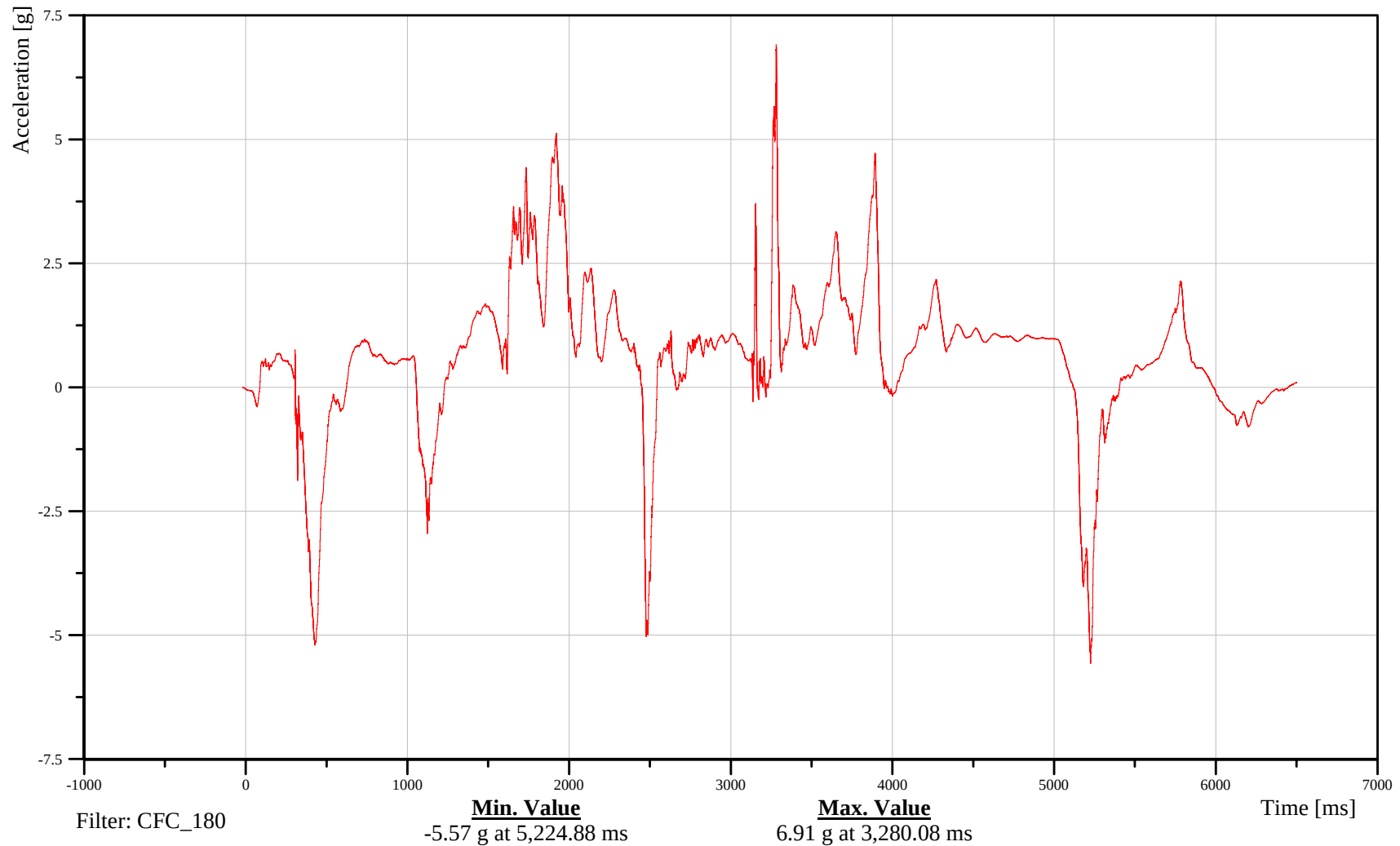
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-16

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Chest Z-Axis Acceleration

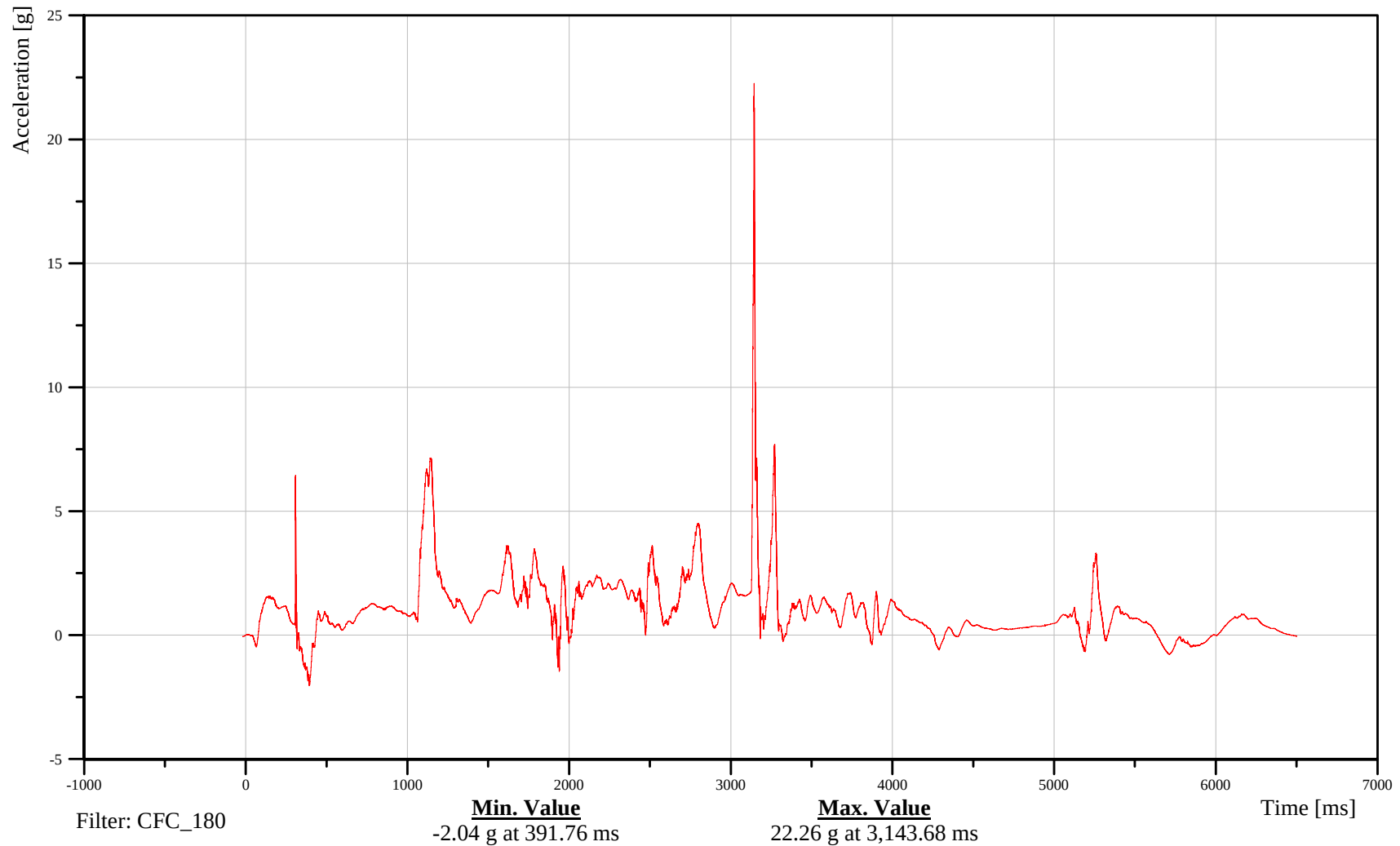
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF

Test Number: 090930





FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

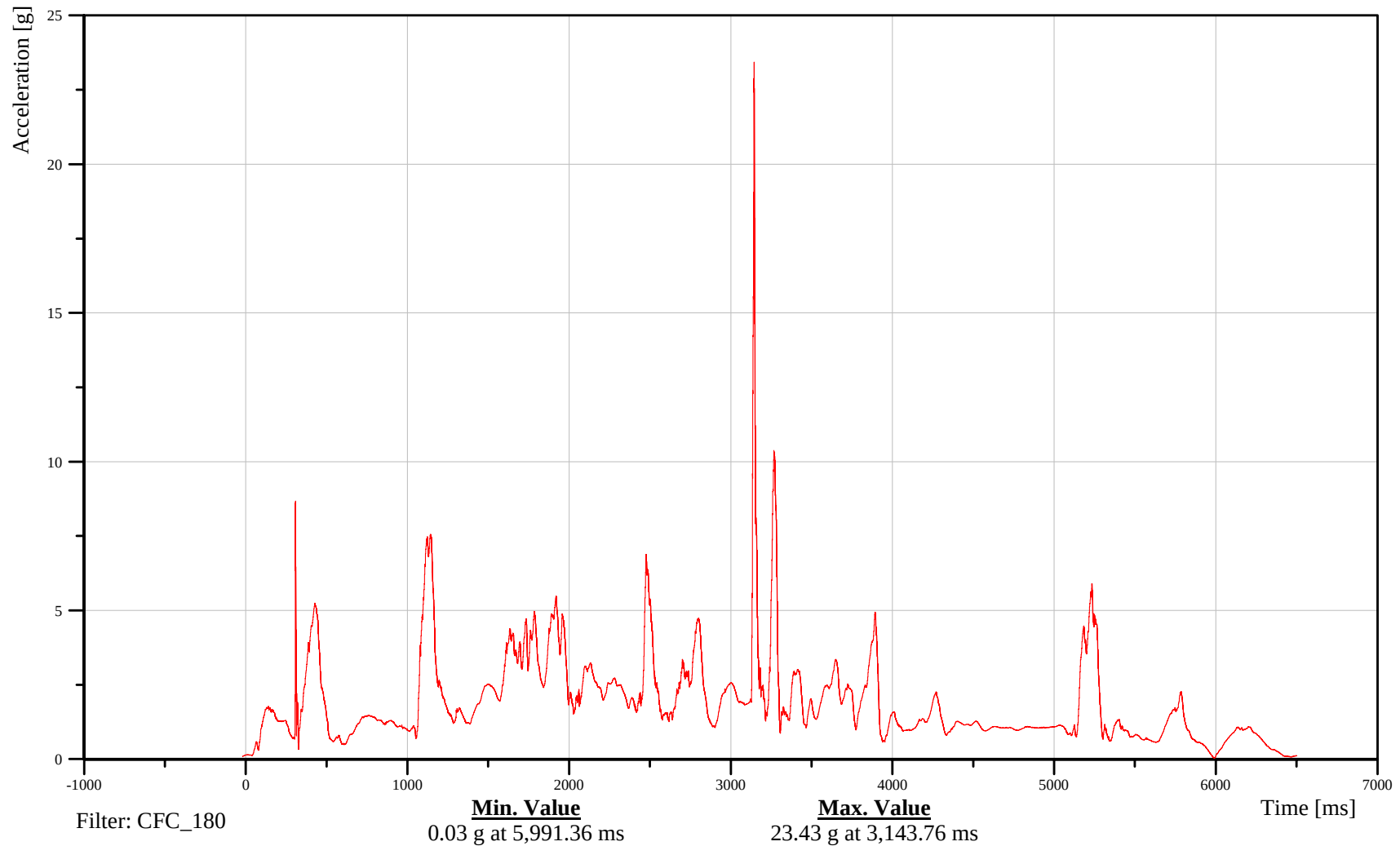
Driver Chest Resultant Acceleration

Customer: VRTC

11CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF

Test Number: 090930





FMVSS 208 Rollover 2007 Ford Expedition

Driver Chest X-Axis Displacement

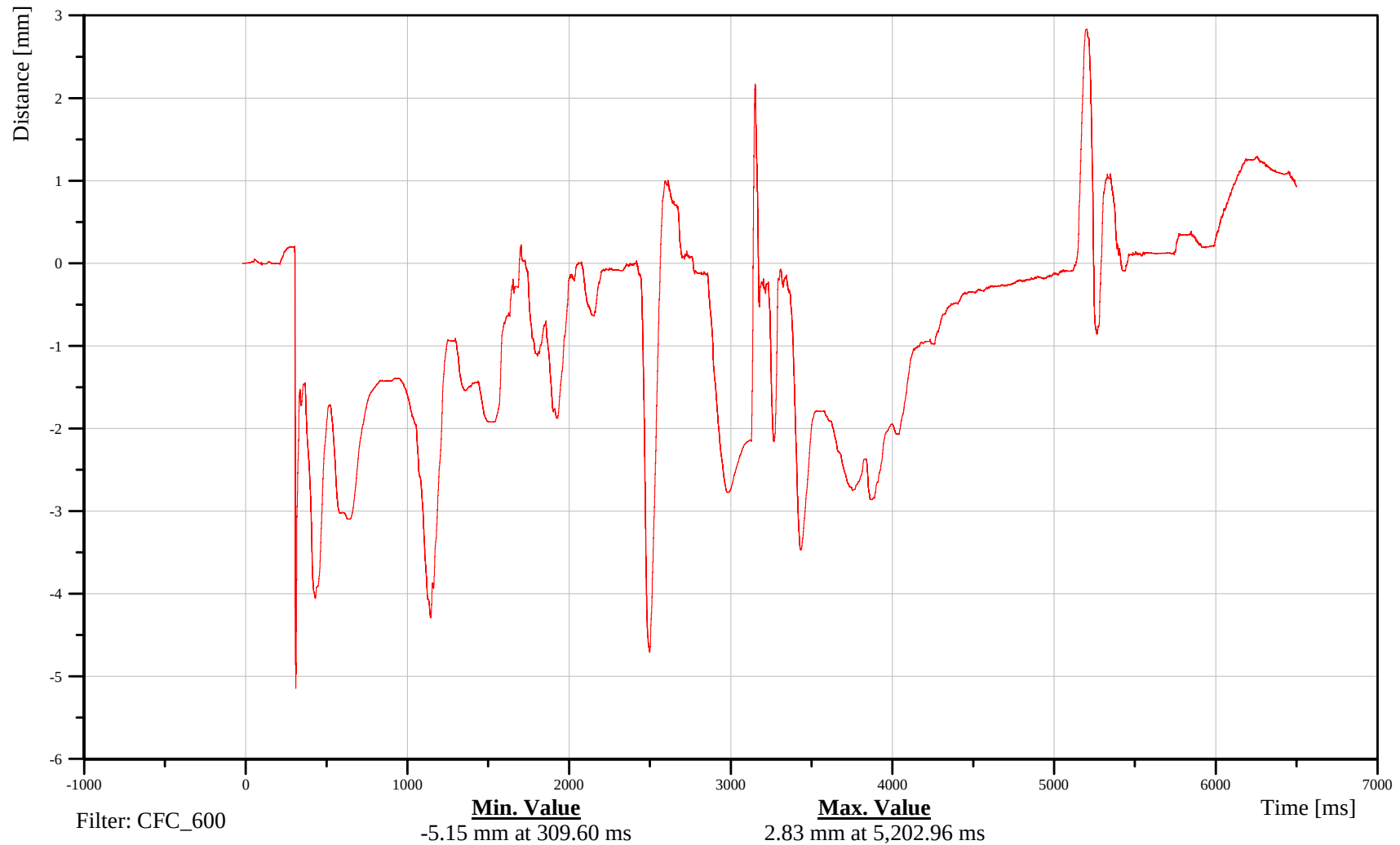
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11CHST0000H3DSXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-19

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Lower Neck X-Axis Force

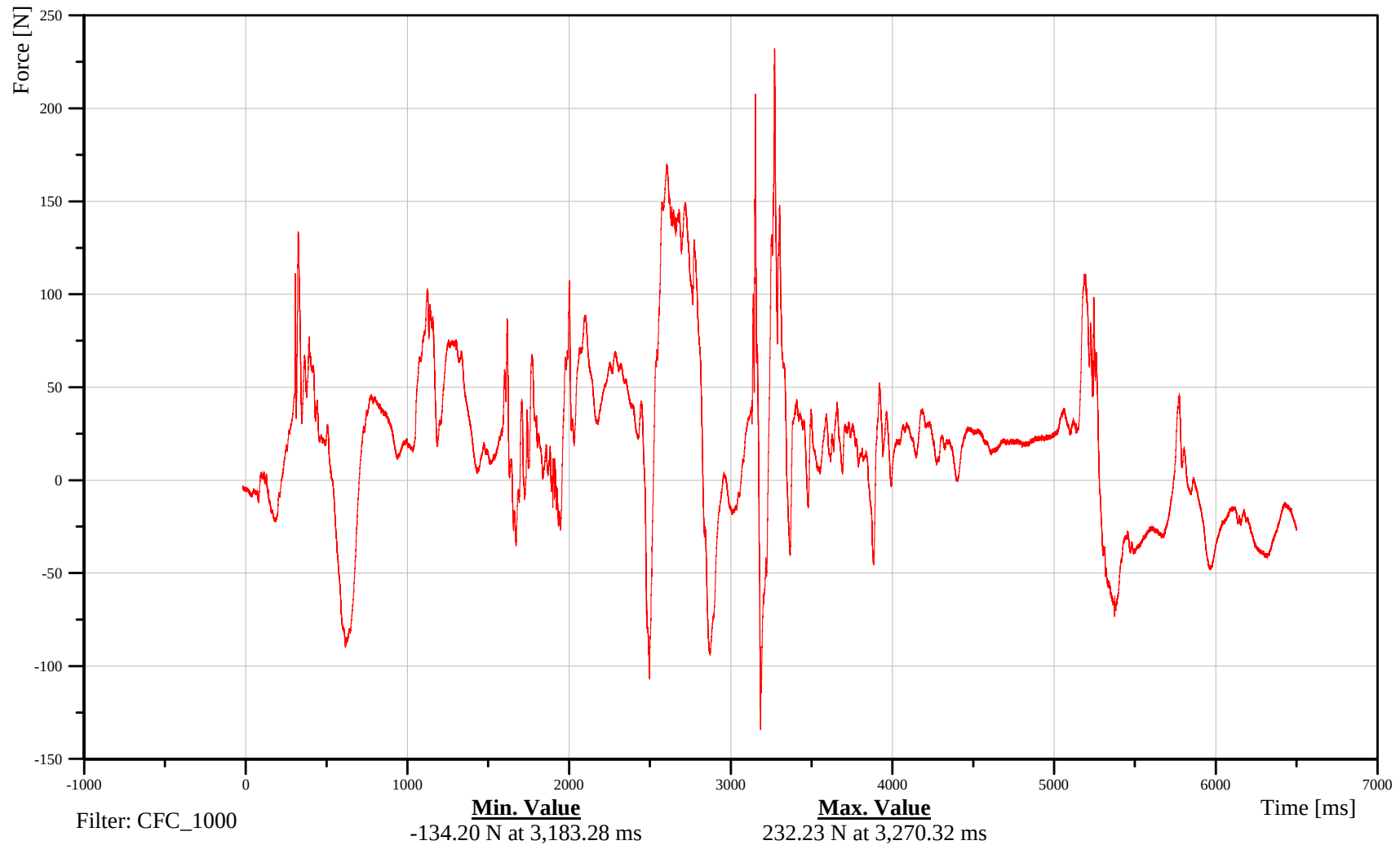
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKLO00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-20

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Lower Neck Y-Axis Force

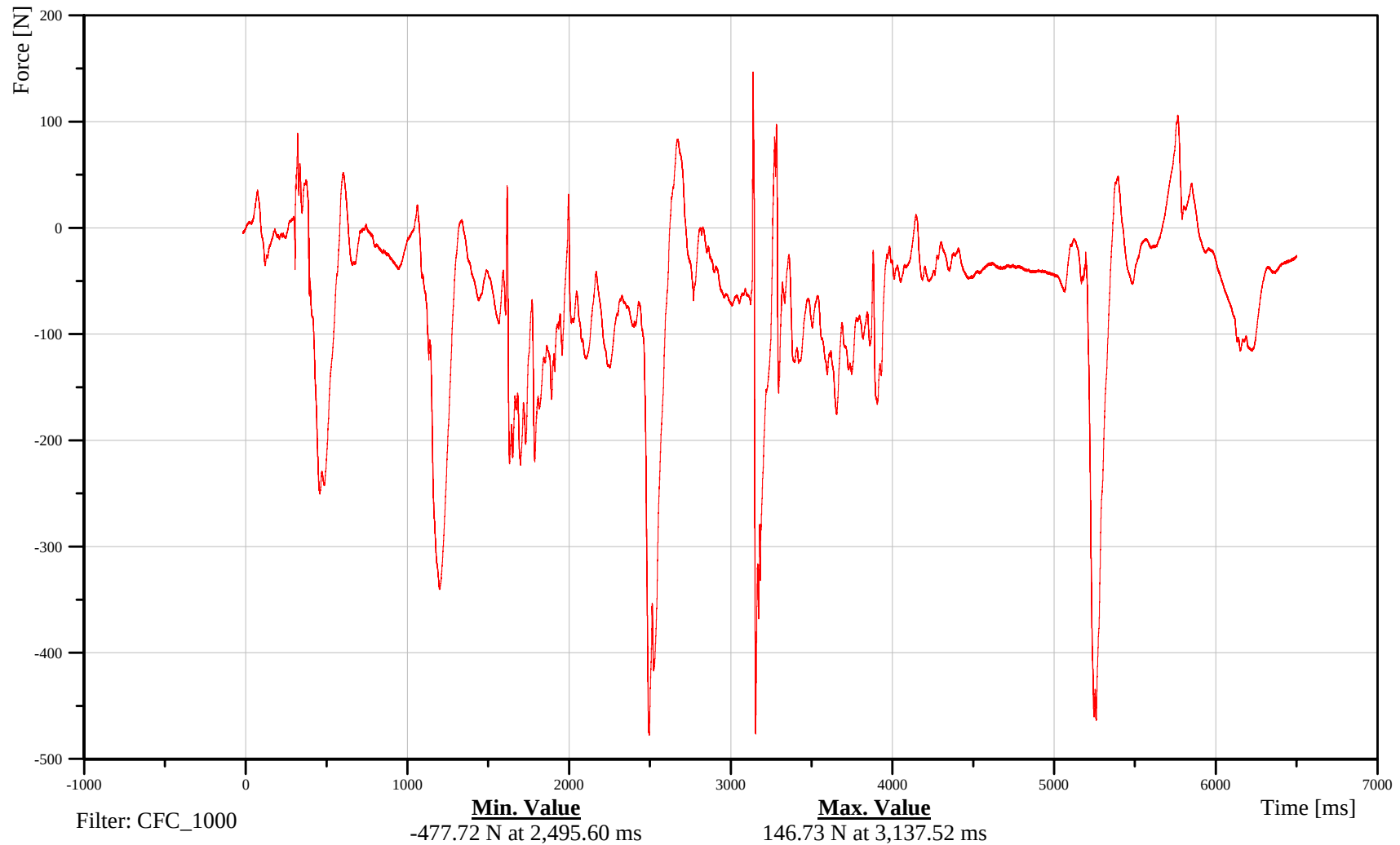
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKLO00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-21

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Lower Neck Z-Axis Force

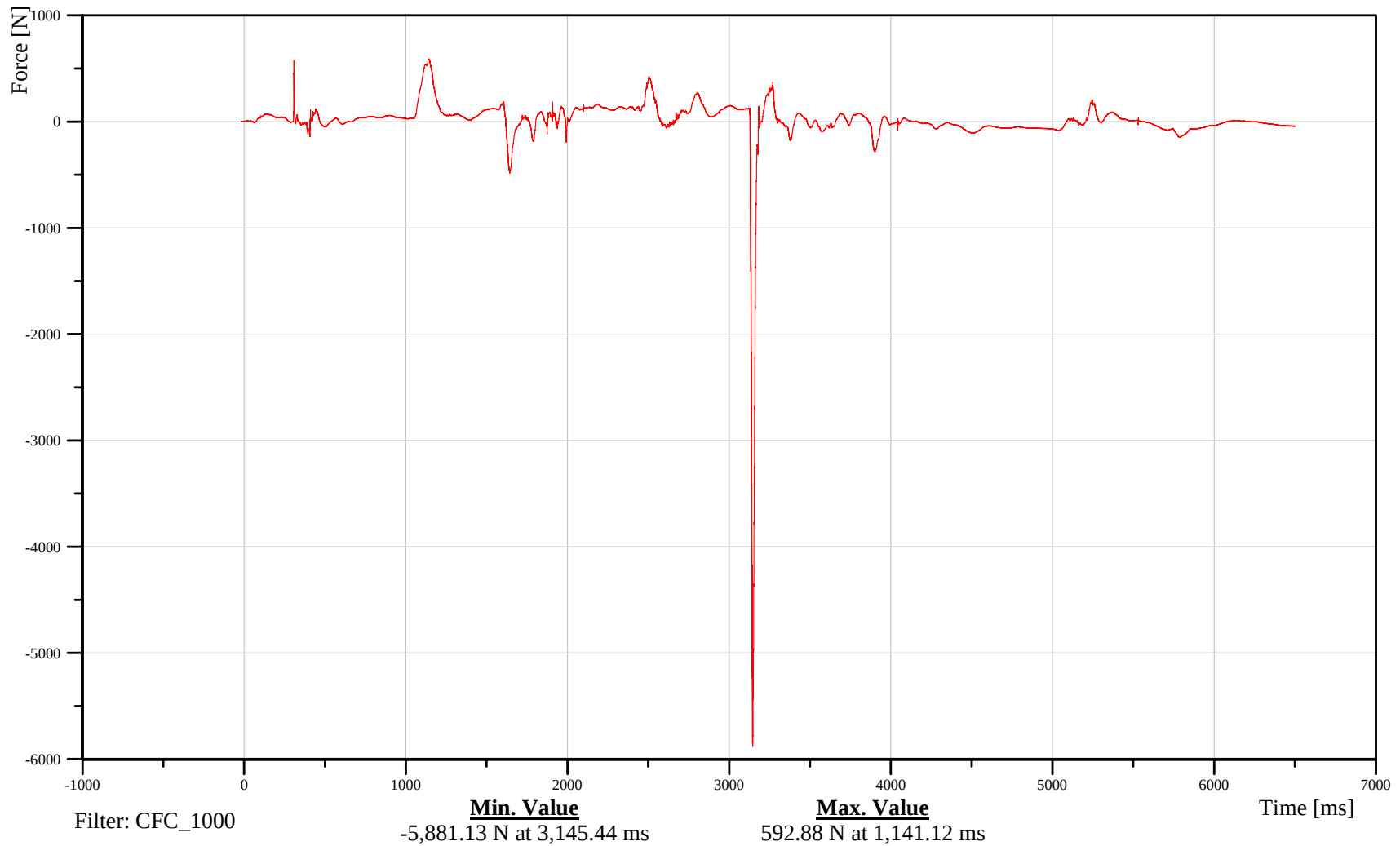
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKLO00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-22

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Lower Neck Moment About X Axis

Date: 09/30/2009

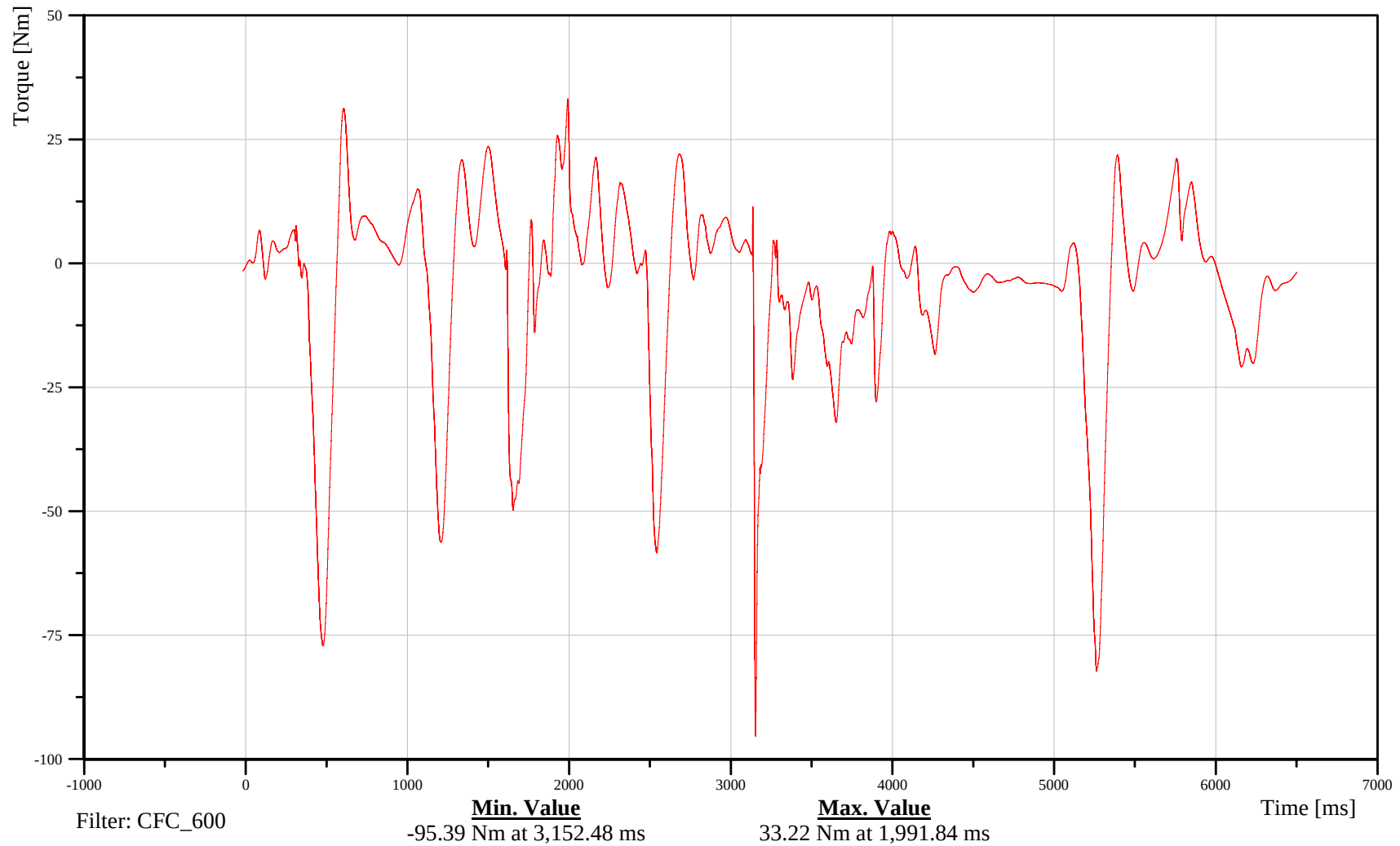
Time: 17:02

Customer: VRTC

11NECKLO00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-23

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Lower Neck Moment About Y Axis

Date: 09/30/2009

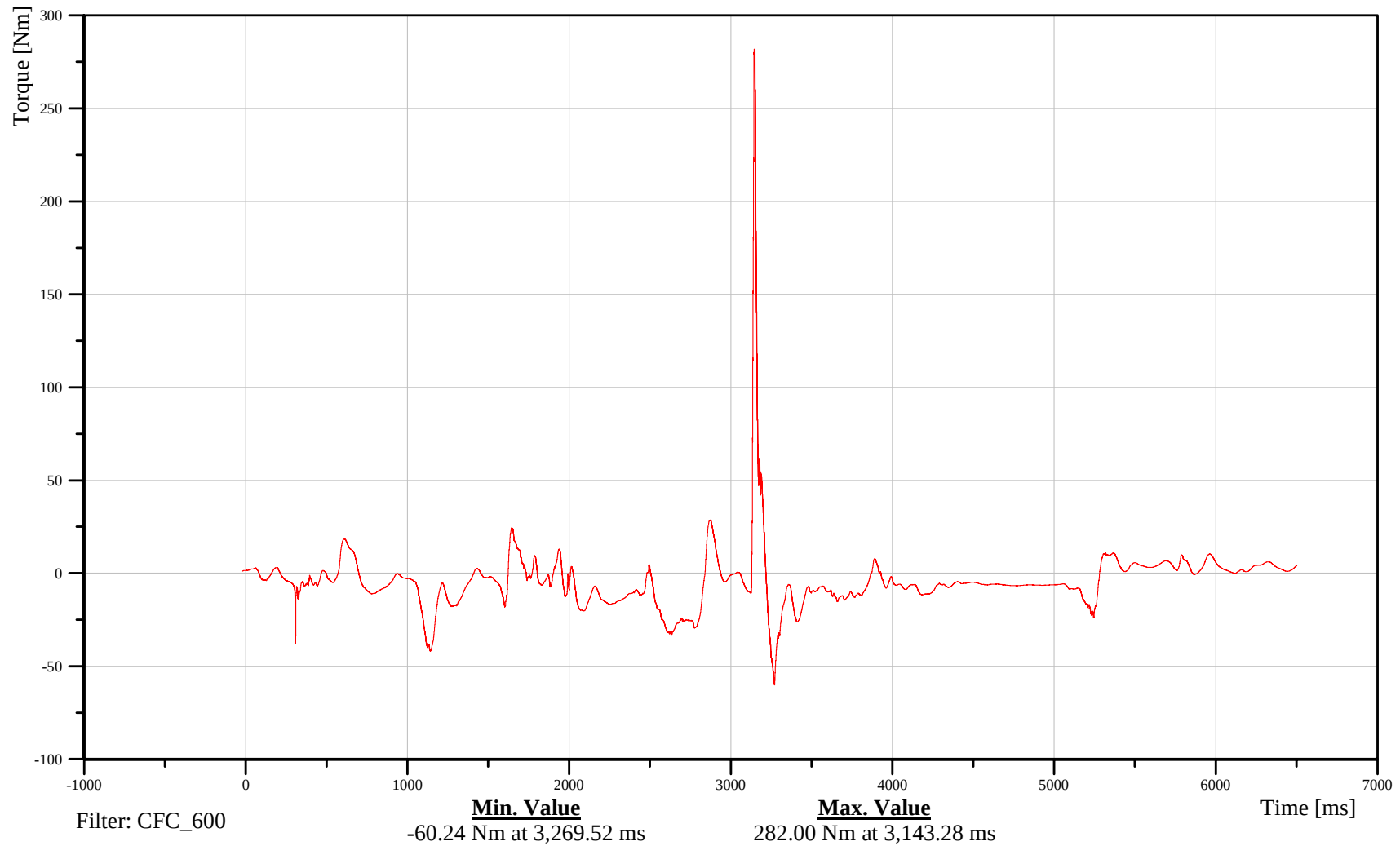
Time: 17:02

Customer: VRTC

11NECKLO00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-24

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Lower Neck Moment About Z Axis

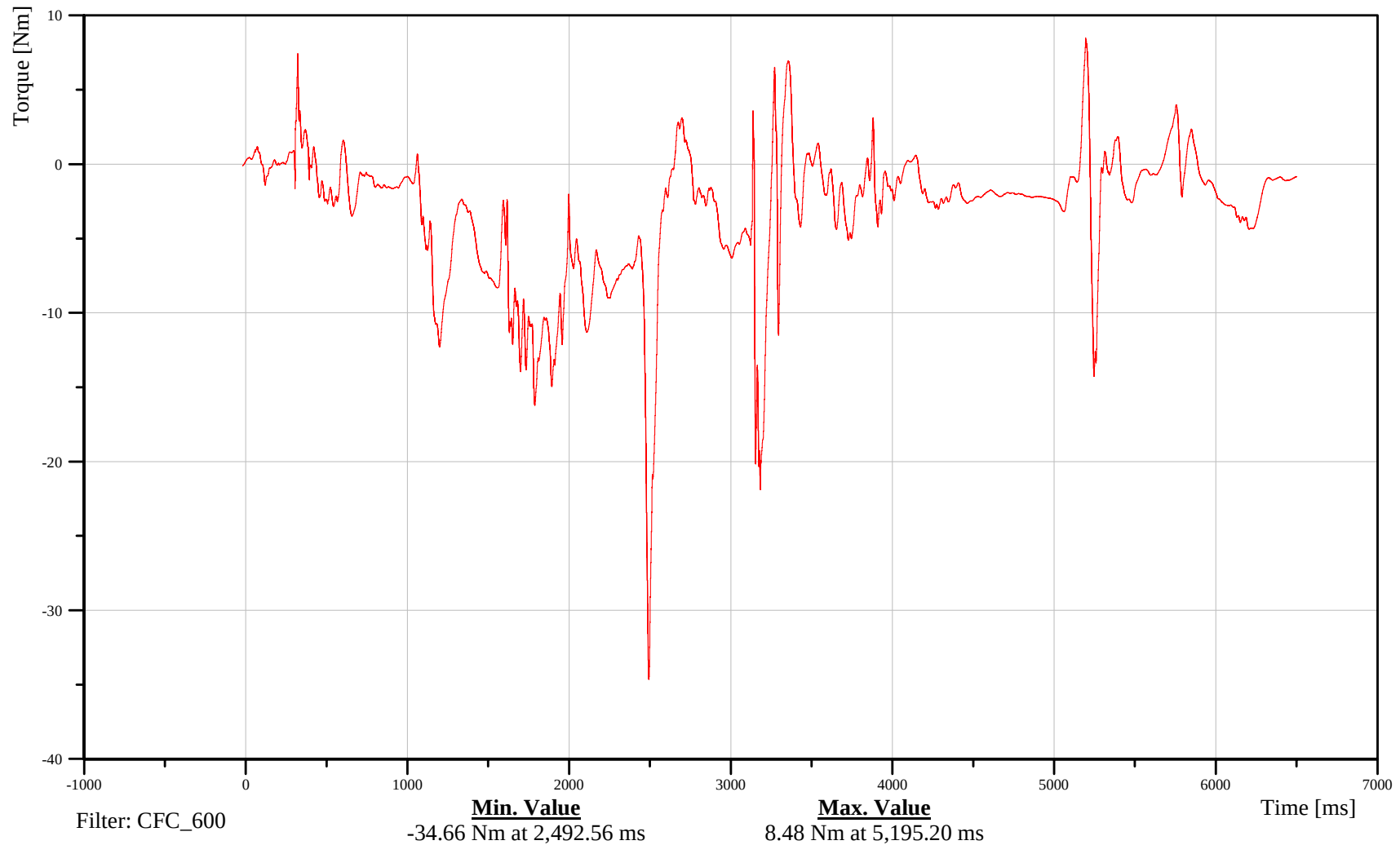
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11NECKLO00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-25

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Pelvis X-Axis Acceleration

Date: 09/30/2009

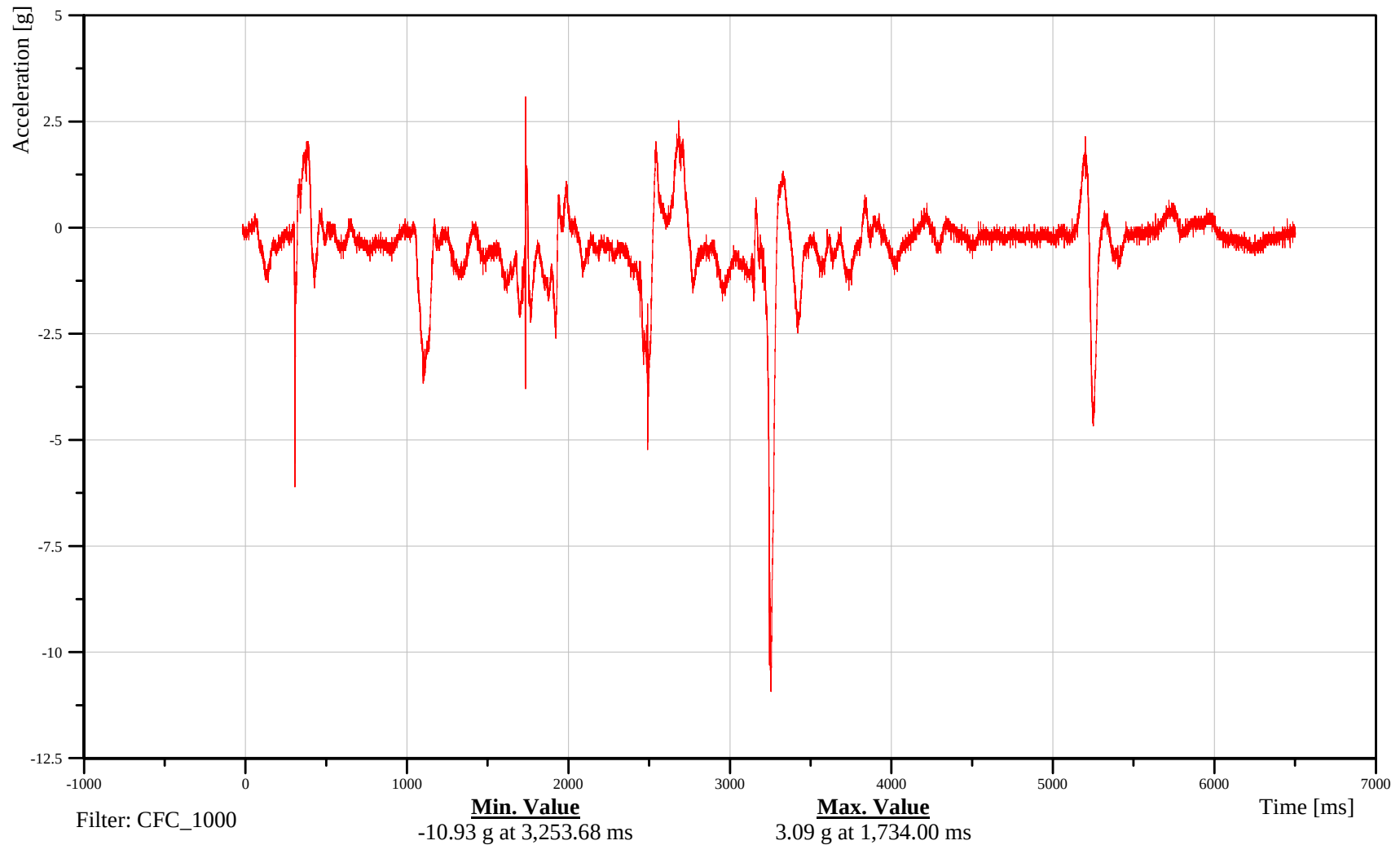
Time: 17:02

Customer: VRTC

11PELVCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-26

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Pelvis Y-Axis Acceleration

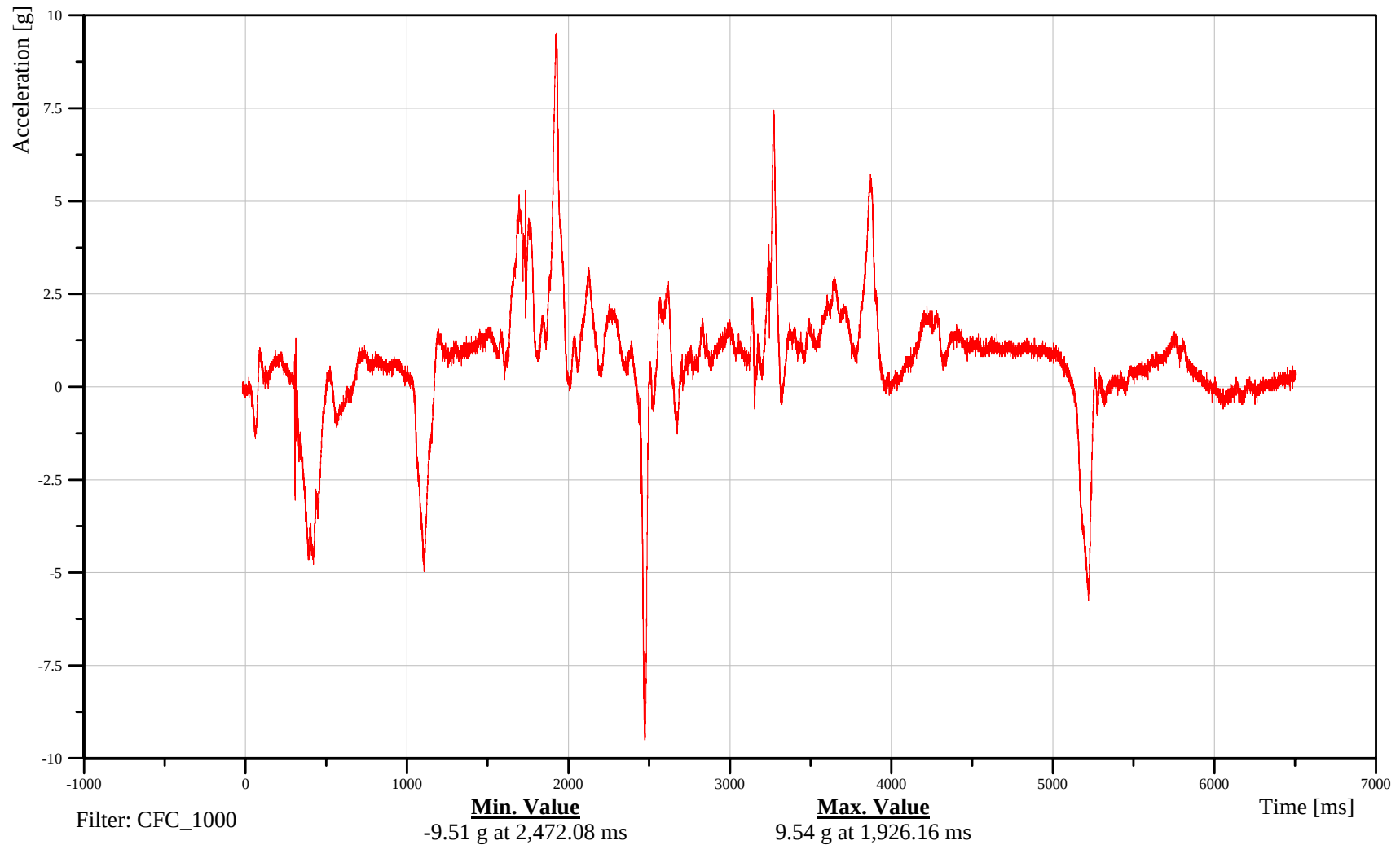
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11PELVCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-27

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Pelvis Z-Axis Acceleration

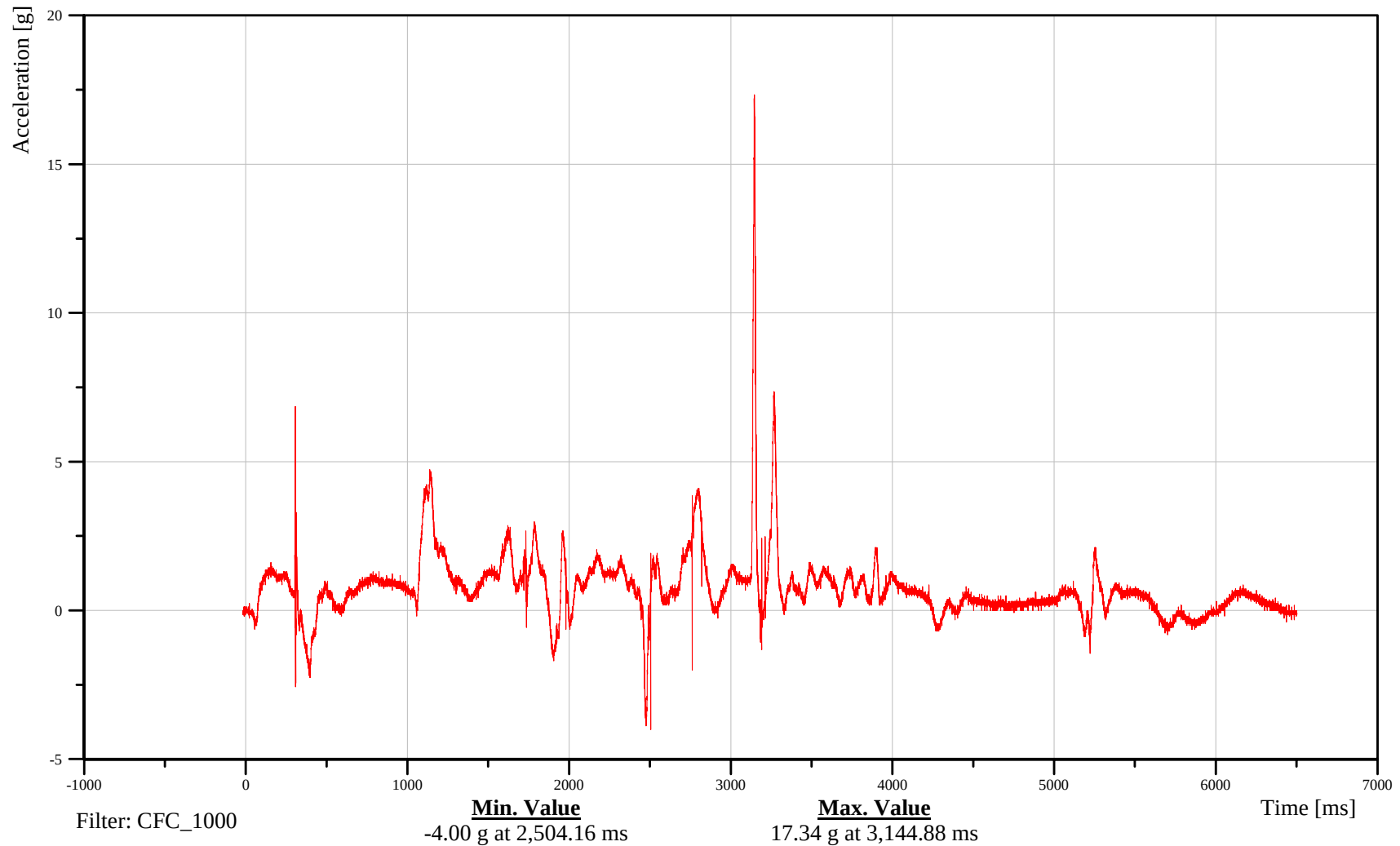
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11PELVCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930





FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Driver Pelvis Resultant Acceleration

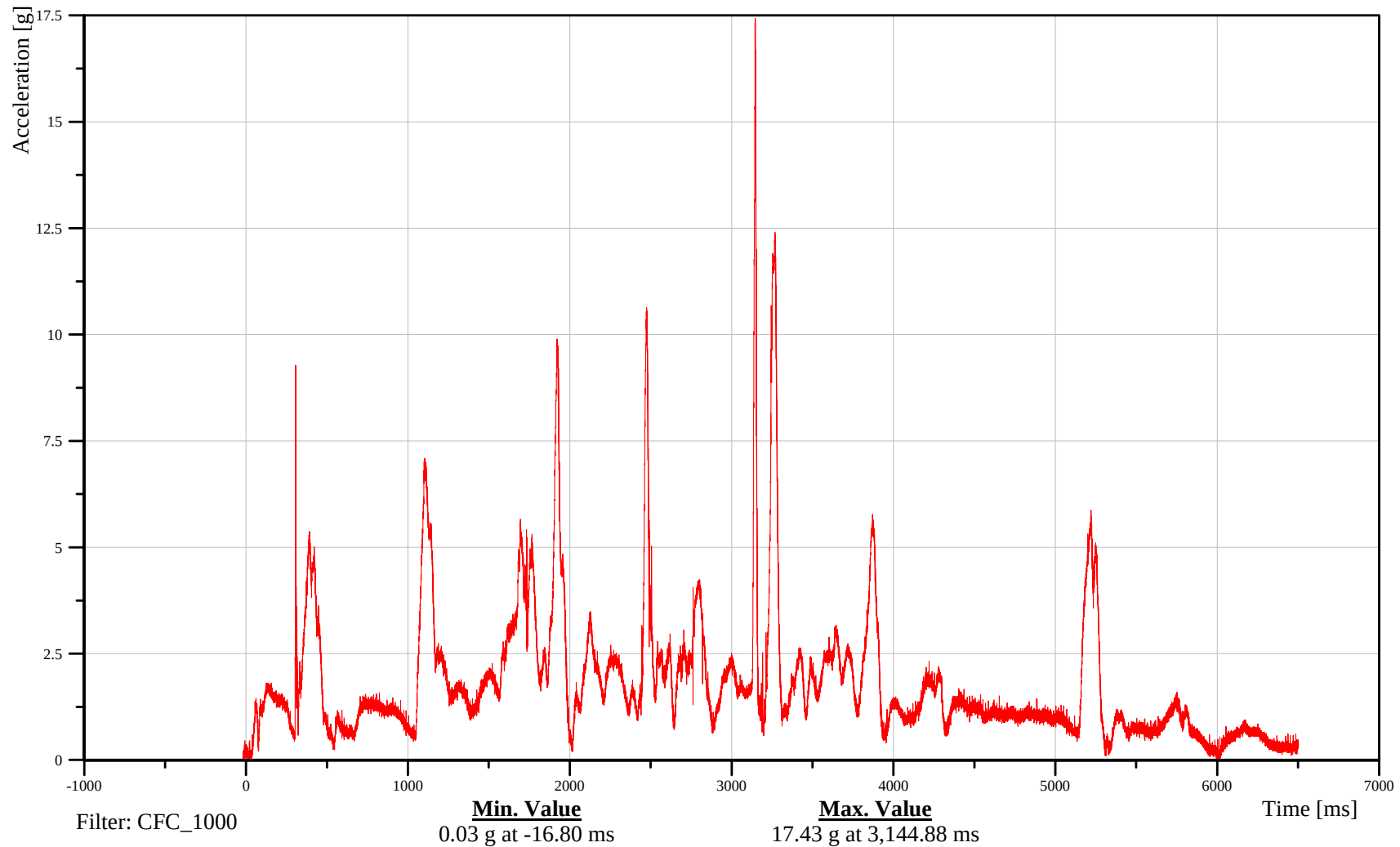
Time: 17:02

Customer: VRTC

11PELVCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-29

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Head X-Axis Acceleration

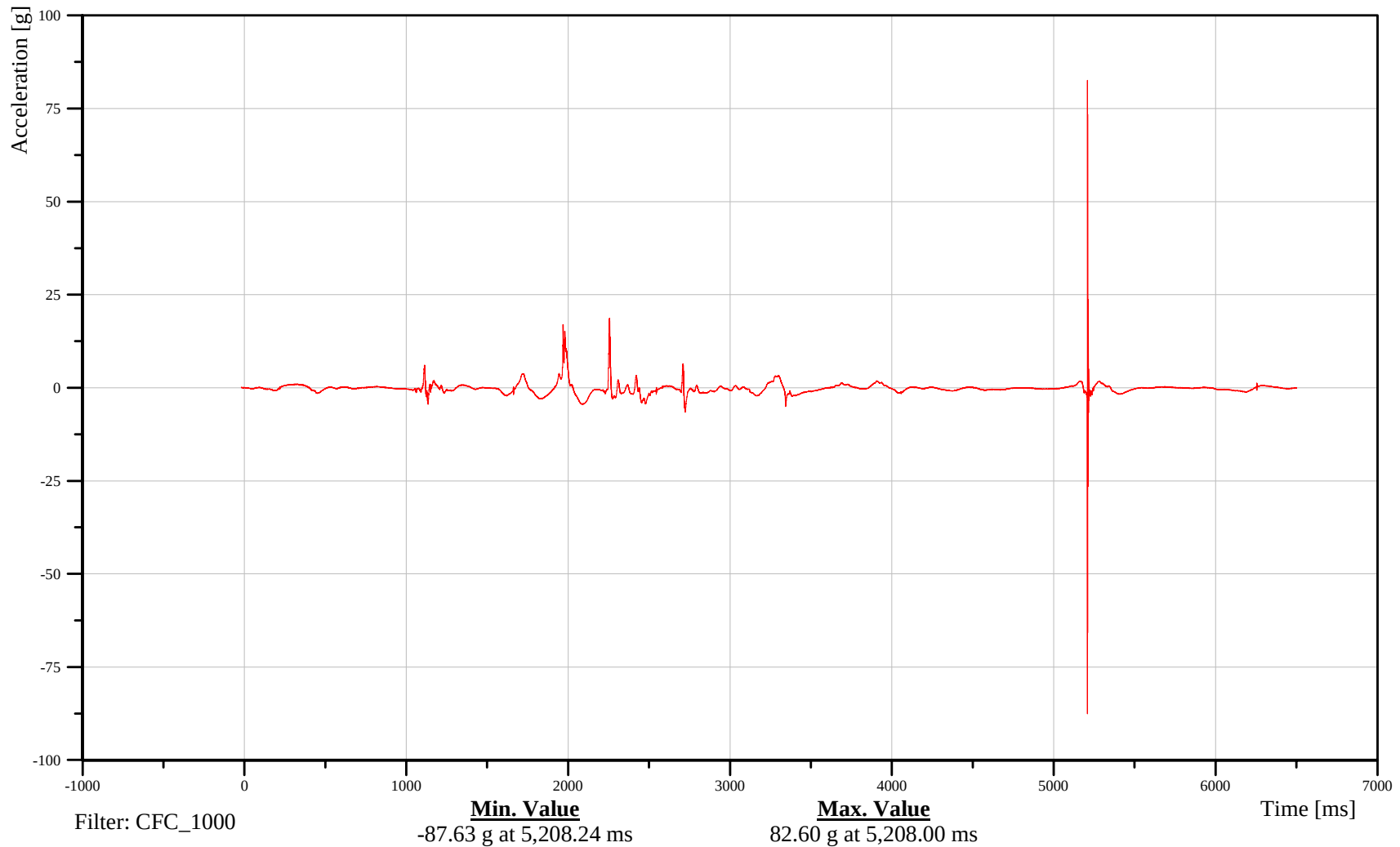
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13HEADCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-30

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Head Y-Axis Acceleration

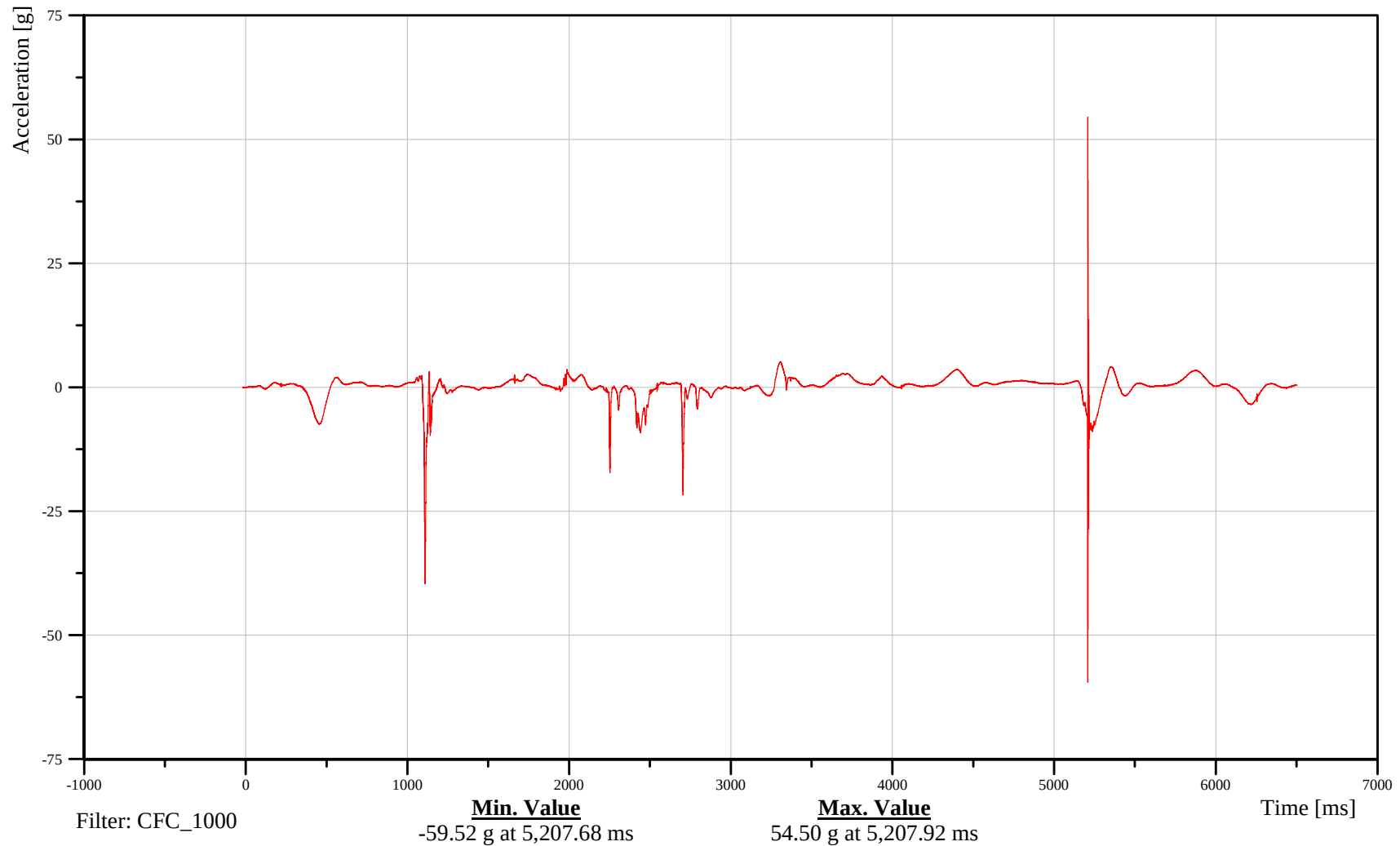
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13HEADCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-31

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Head Z-Axis Acceleration

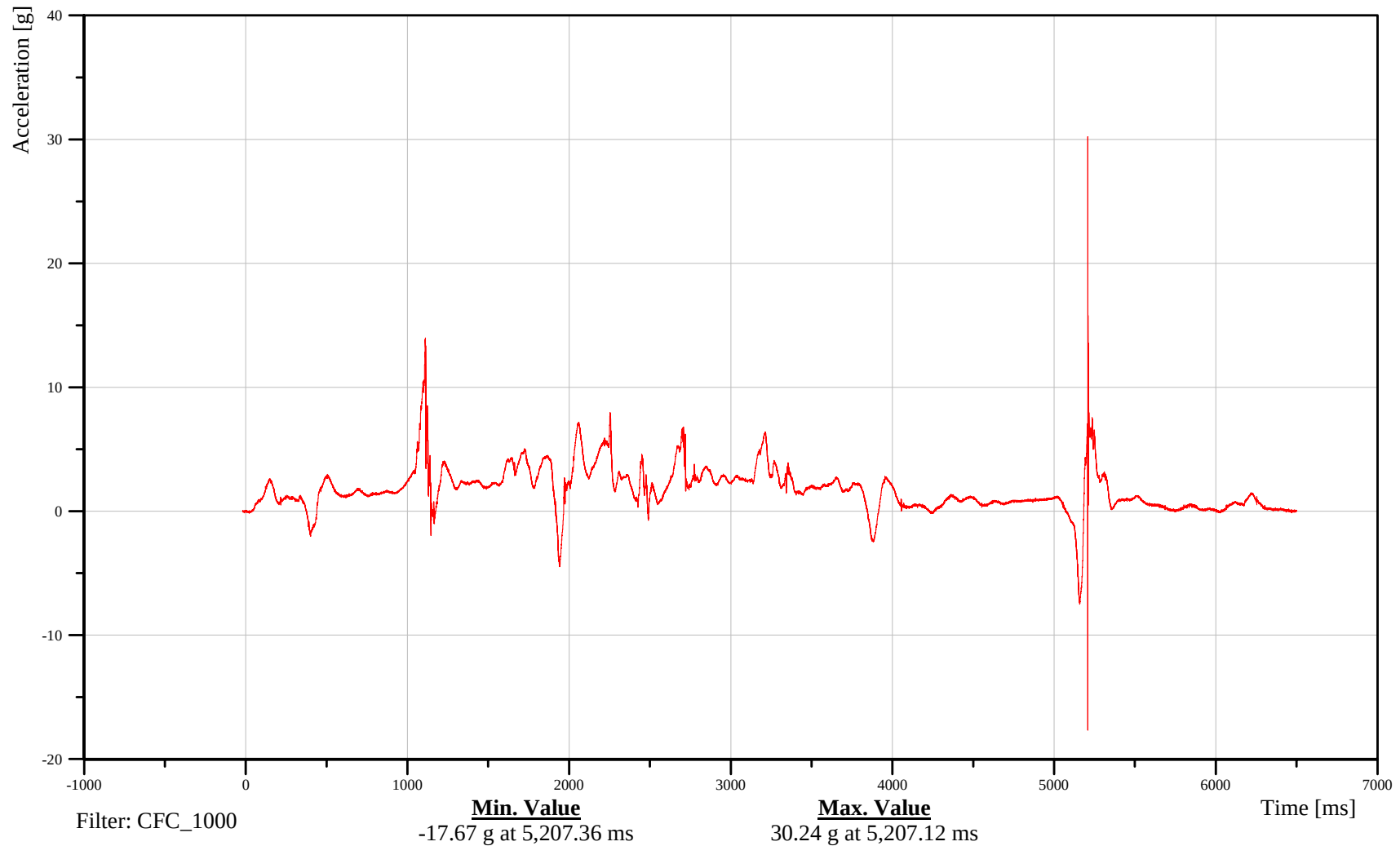
Time: 17:02

Customer: VRTC

13HEADCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-32

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

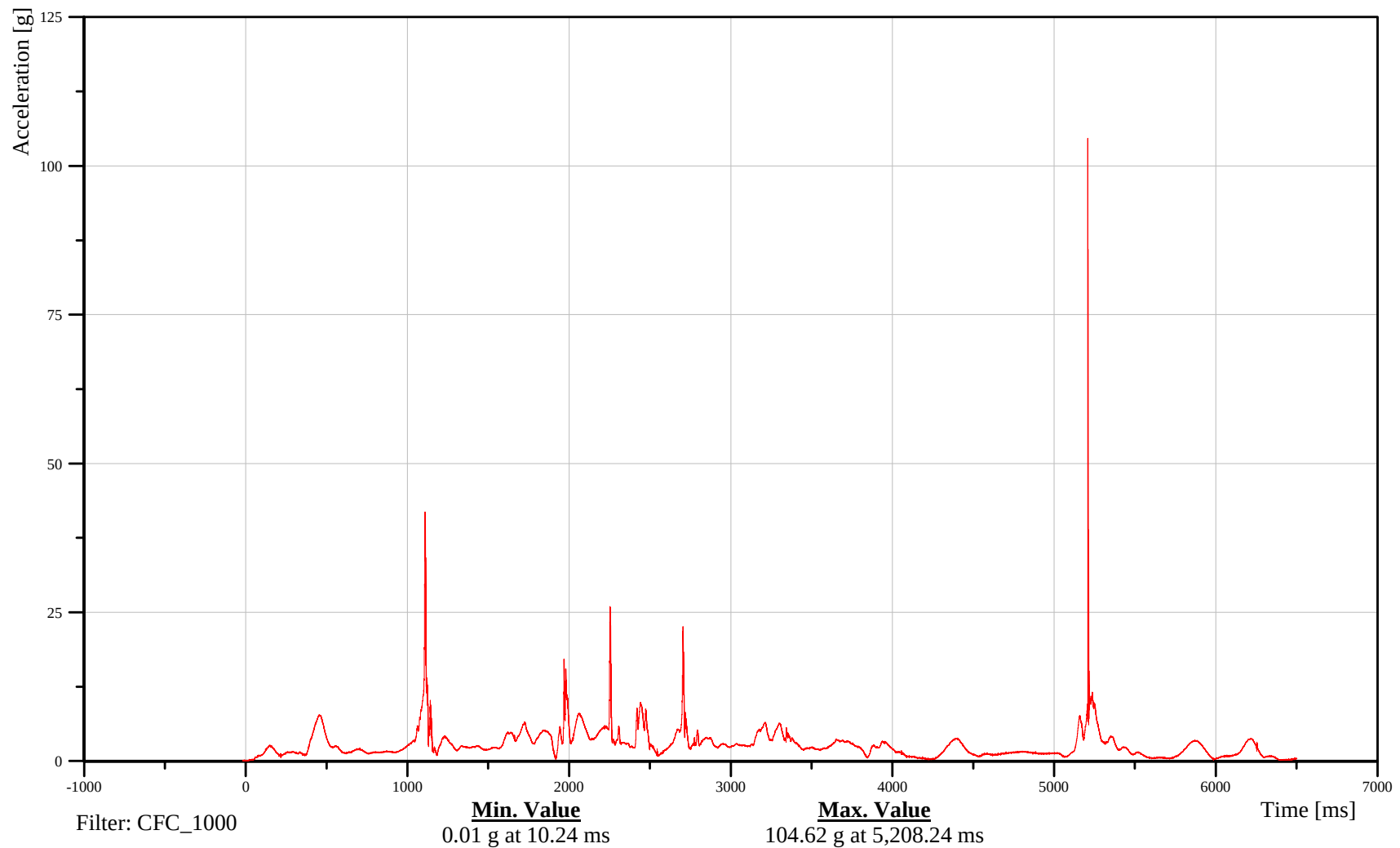
Right Front Passenger Head Resultant Acceleration

Customer: VRTC

13HEADCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-33

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Head Front Y-Axis Acceleration

Date: 09/30/2009

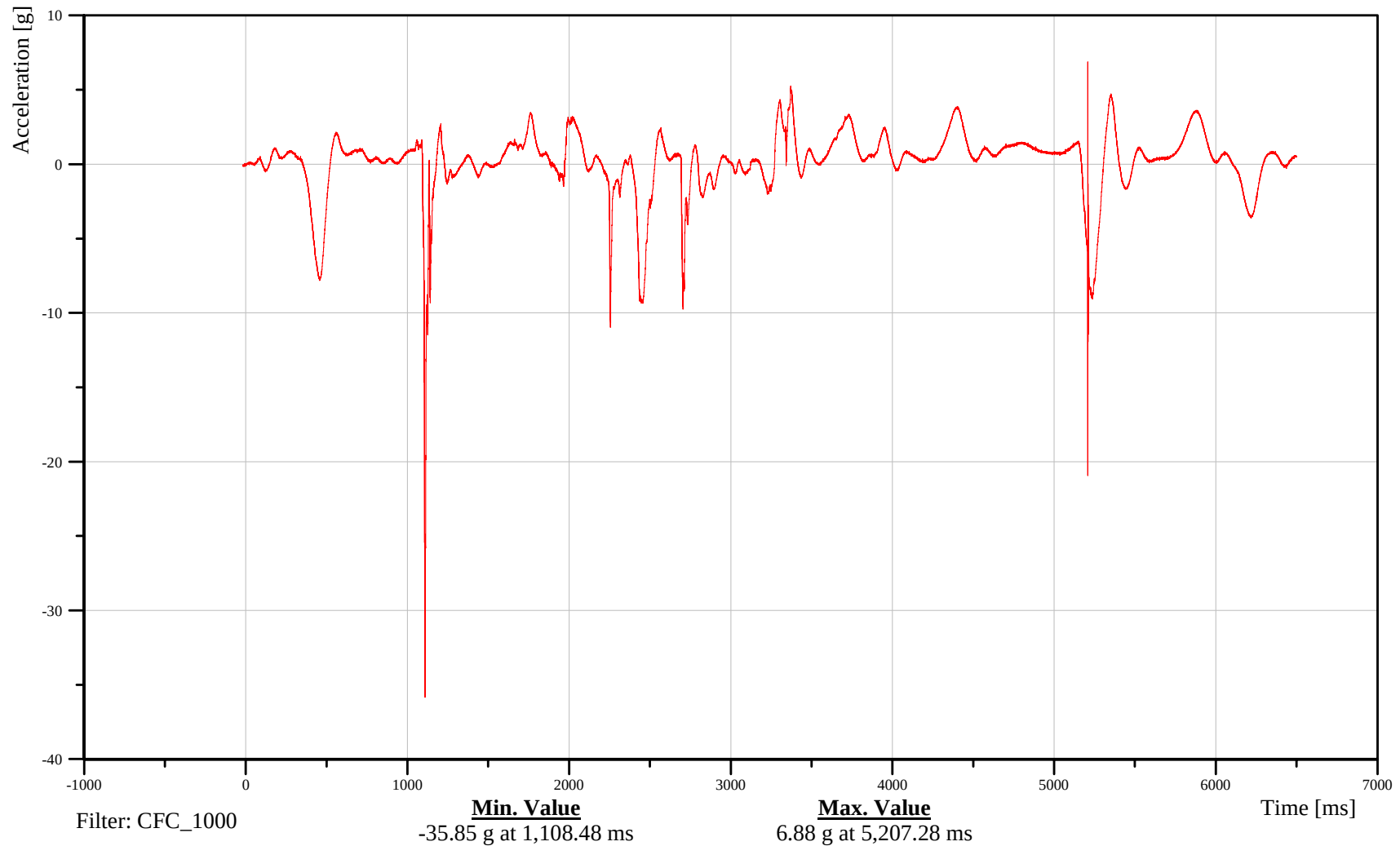
Time: 17:02

Customer: VRTC

13HEADFR00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-34

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Head Front Z-Axis Acceleration

Date: 09/30/2009

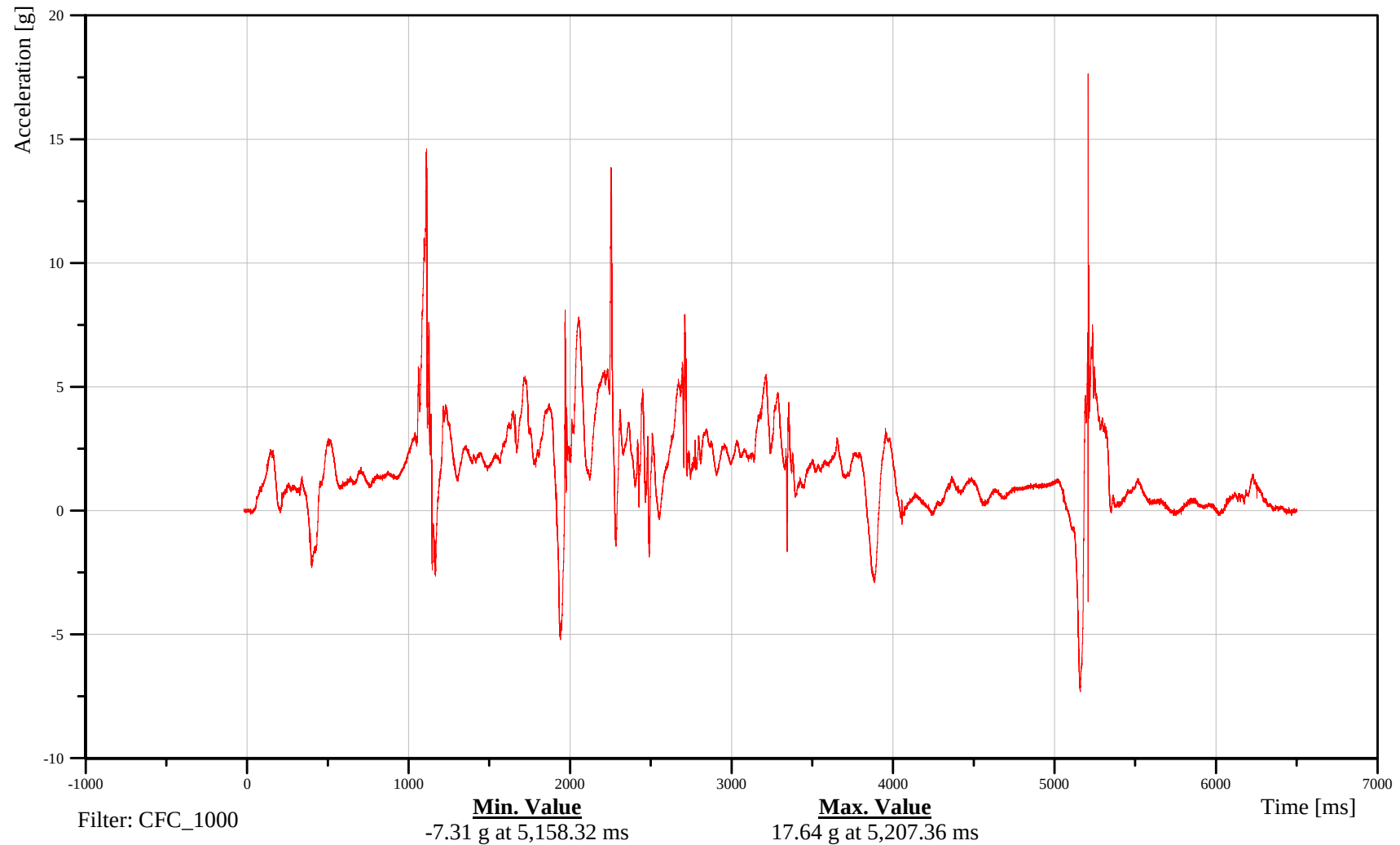
Time: 17:02

Customer: VRTC

13HEADFR00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-35

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Head Top X-Axis Acceleration

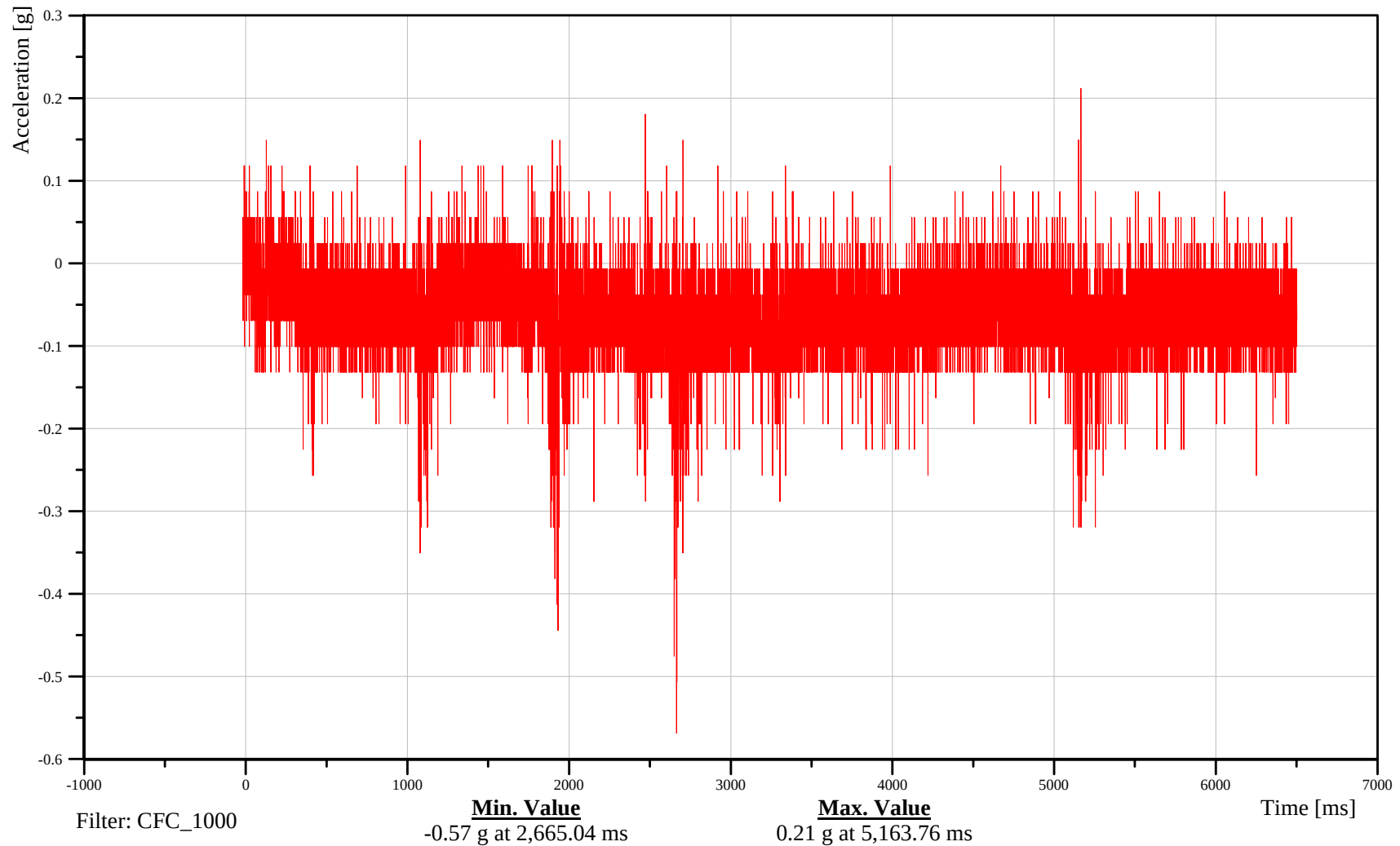
Time: 17:02

Customer: VRTC

13HEADUP00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-36

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Head Top Y-Axis Acceleration

Date: 09/30/2009

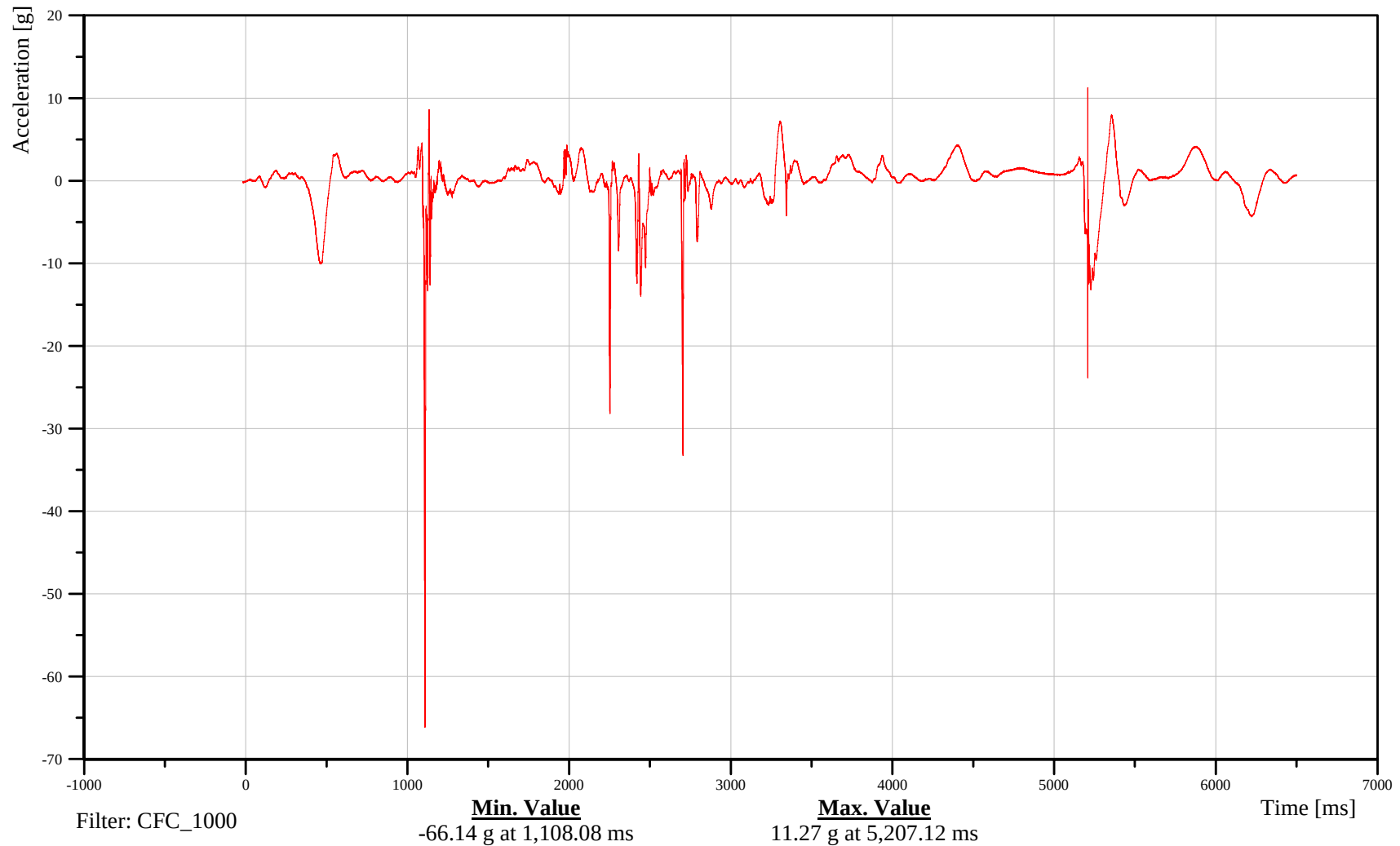
Time: 17:02

Customer: VRTC

13HEADUP00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-37

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Head Left X-Axis Acceleration

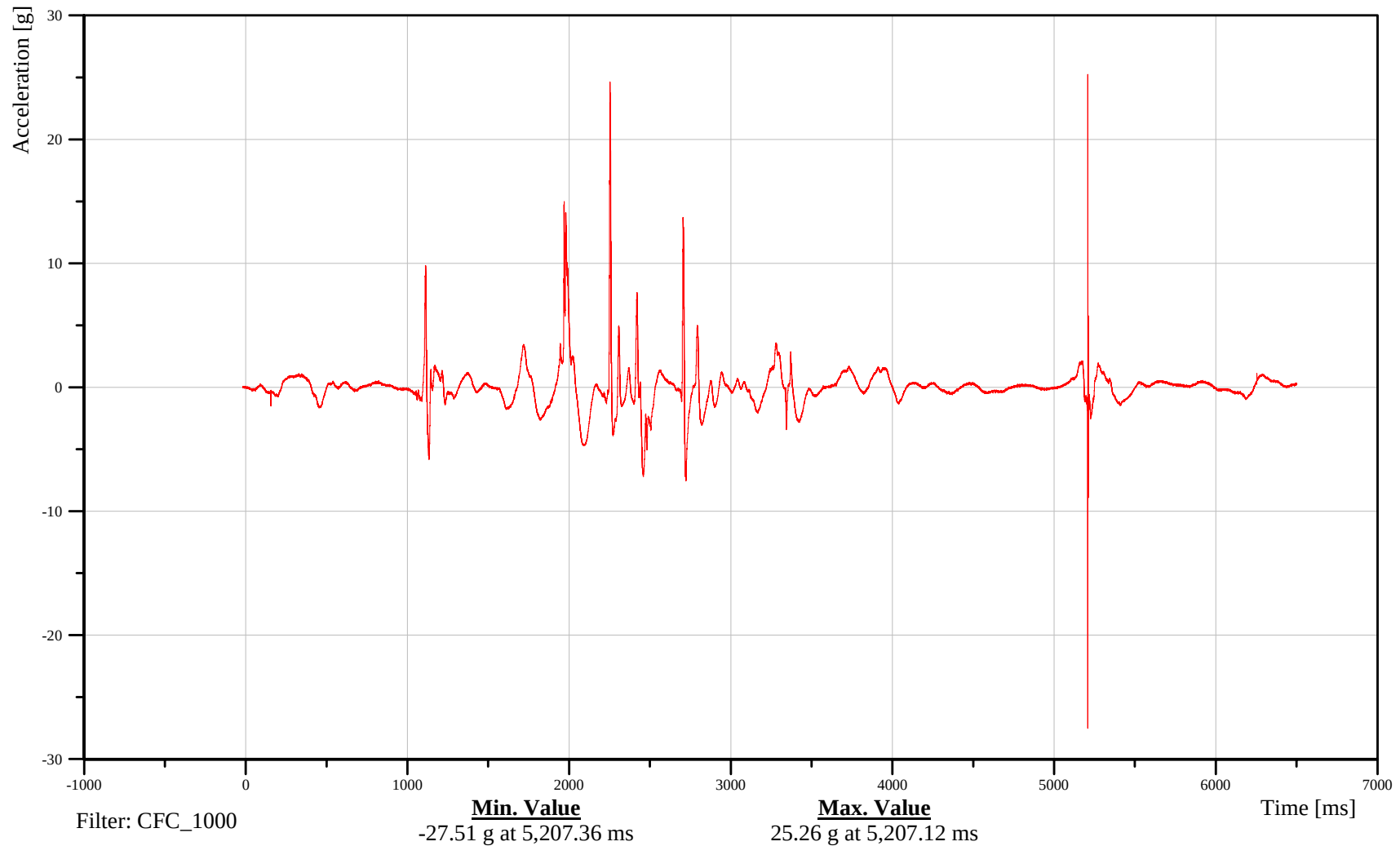
Time: 17:02

Customer: VRTC

13HEADLE00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-38

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Head Left Z-Axis Acceleration

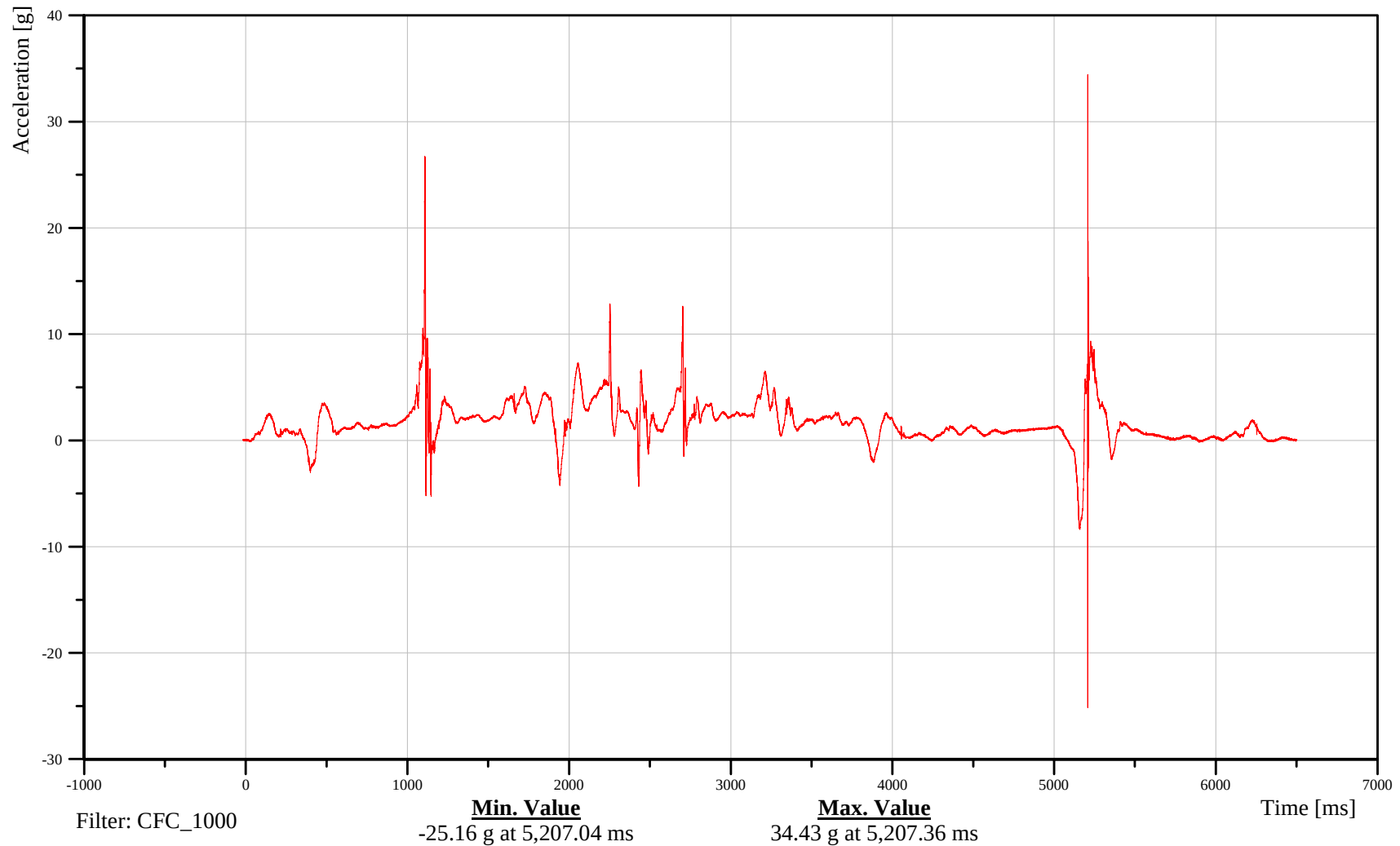
Time: 17:02

Customer: VRTC

13HEADLE00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-39

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Upper Neck X-Axis Force

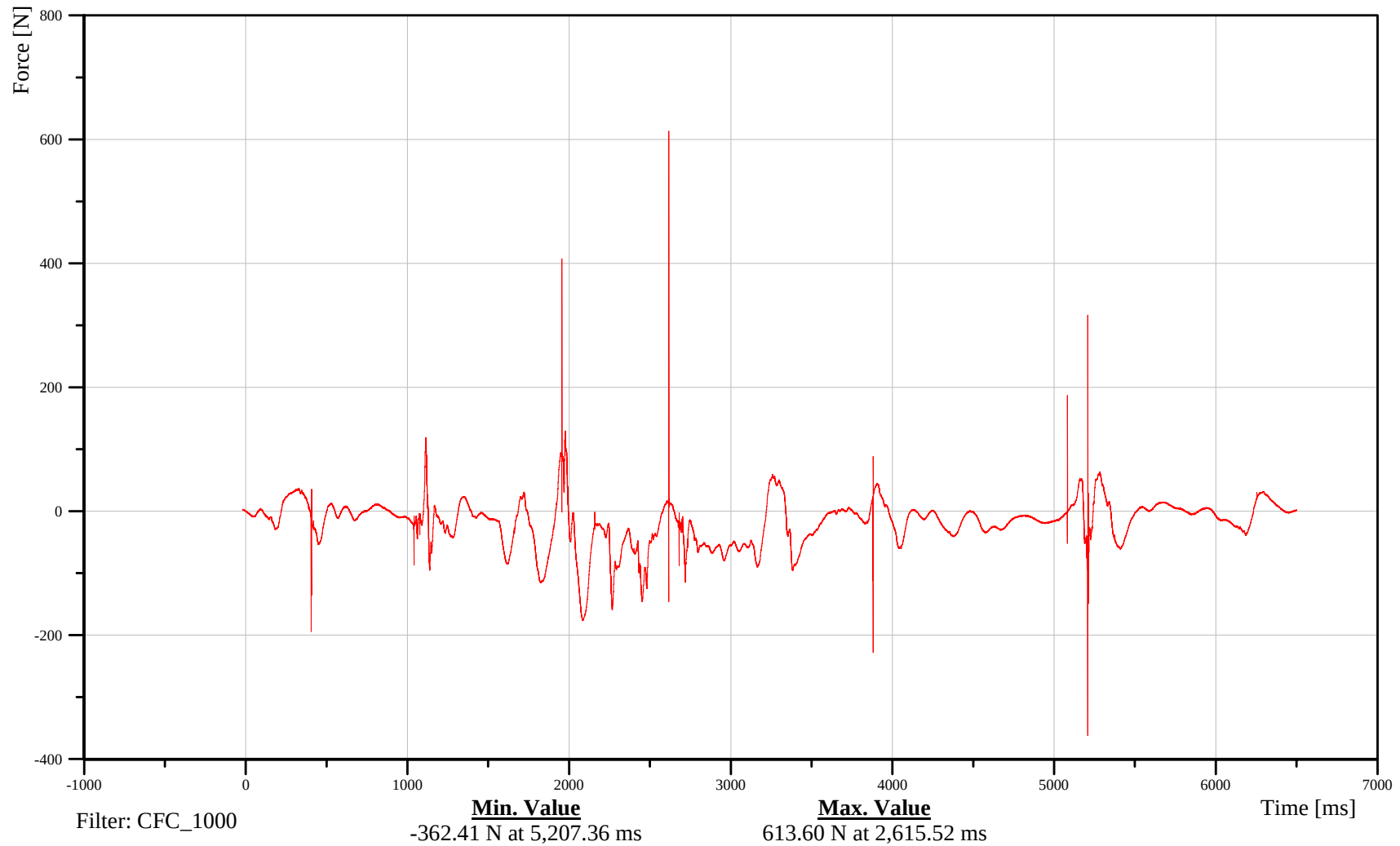
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13NECKUP00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-40

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Upper Neck Y-Axis Force

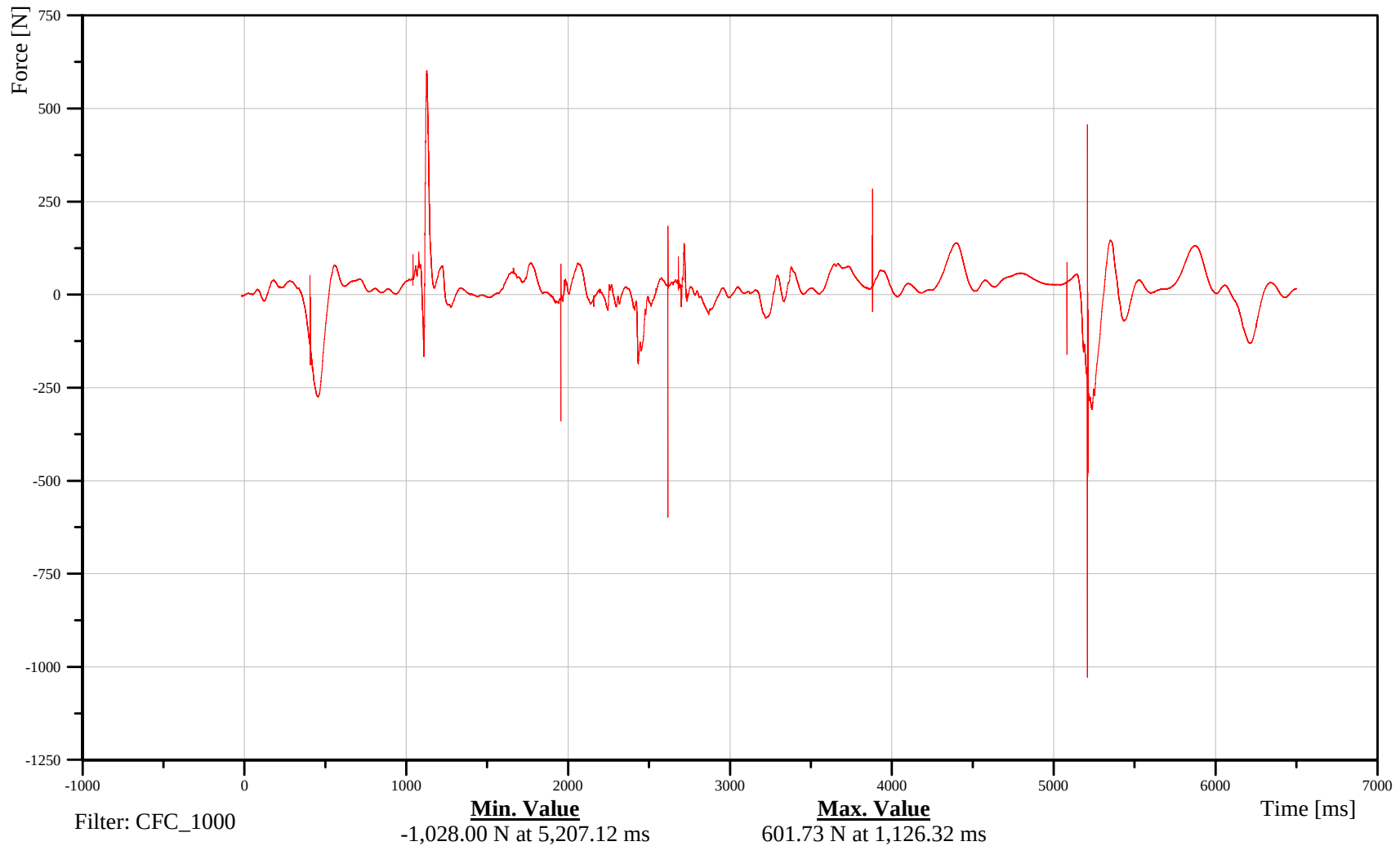
Time: 17:02

Customer: VRTC

13NECKUP00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-41

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Upper Neck Z-Axis Force

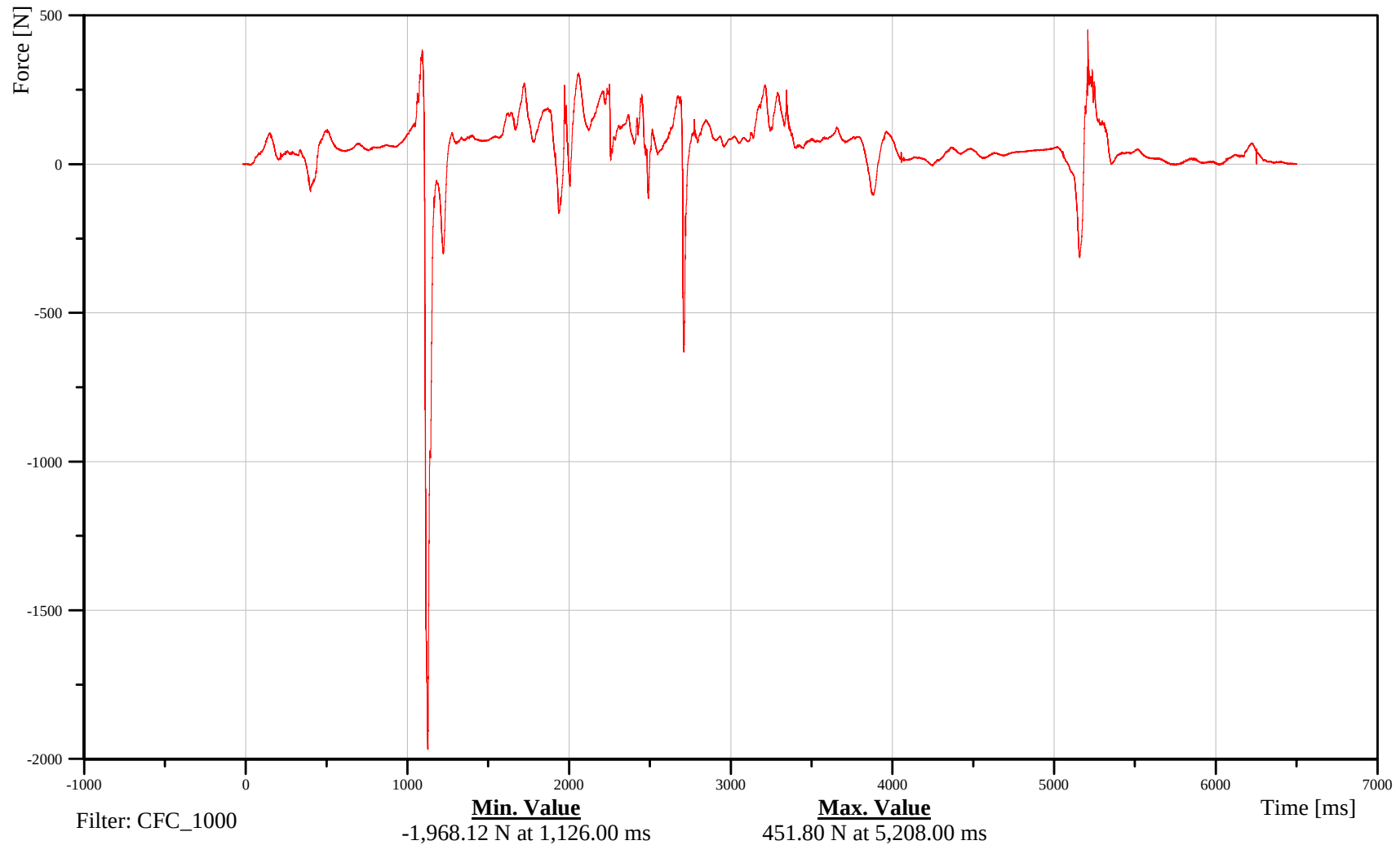
Time: 17:02

Customer: VRTC

13NECKUP00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-42

090930



FMVSS 208 Rollover 2007 Ford Expedition
Right Front Passenger Upper Neck Moment About X Axis

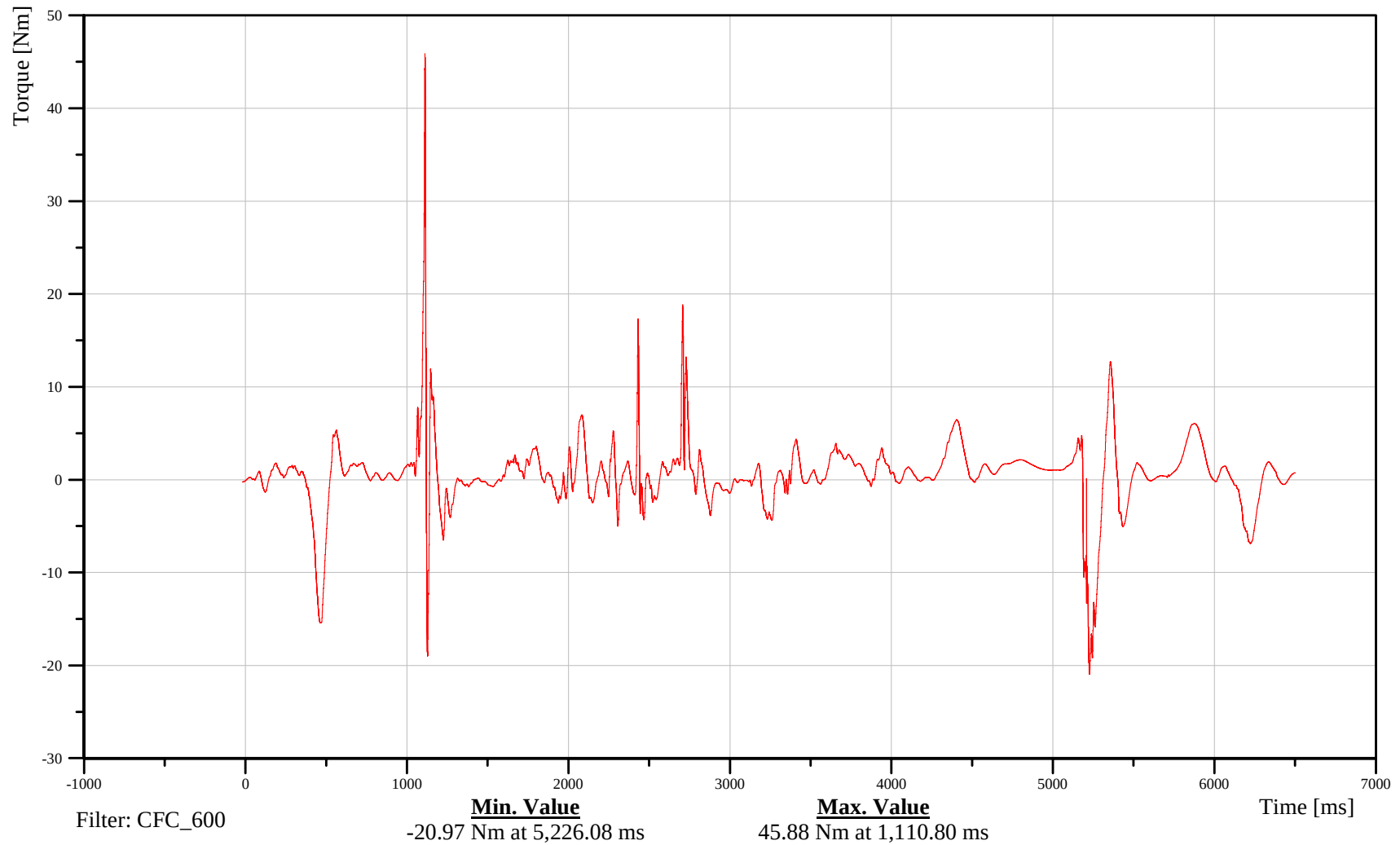
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13NECKUP00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-43

090930



FMVSS 208 Rollover 2007 Ford Expedition
Right Front Passenger Upper Neck Moment About Y Axis

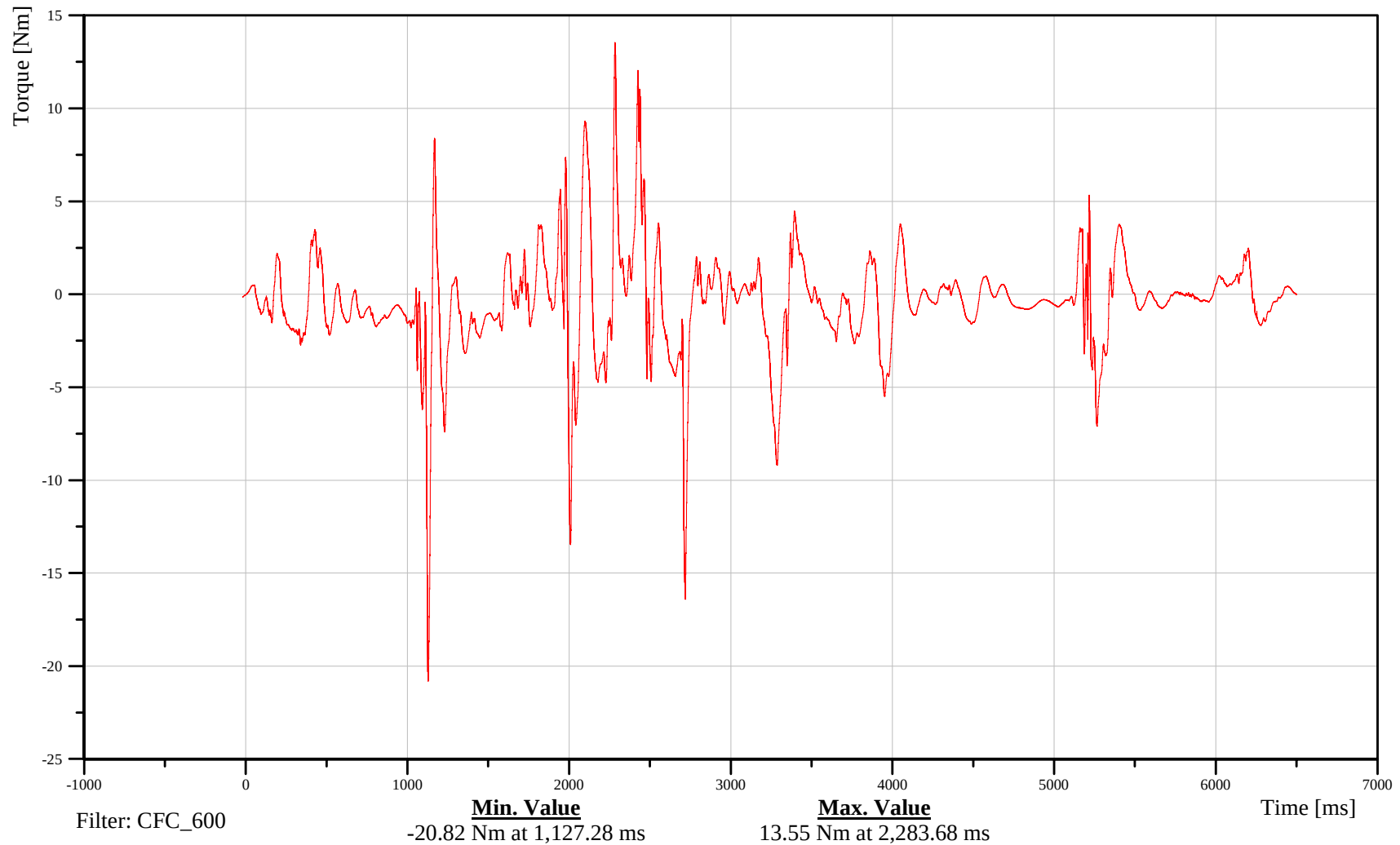
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13NECKUP00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-44

090930



FMVSS 208 Rollover 2007 Ford Expedition
Right Front Passenger Upper Neck Moment About Z Axis

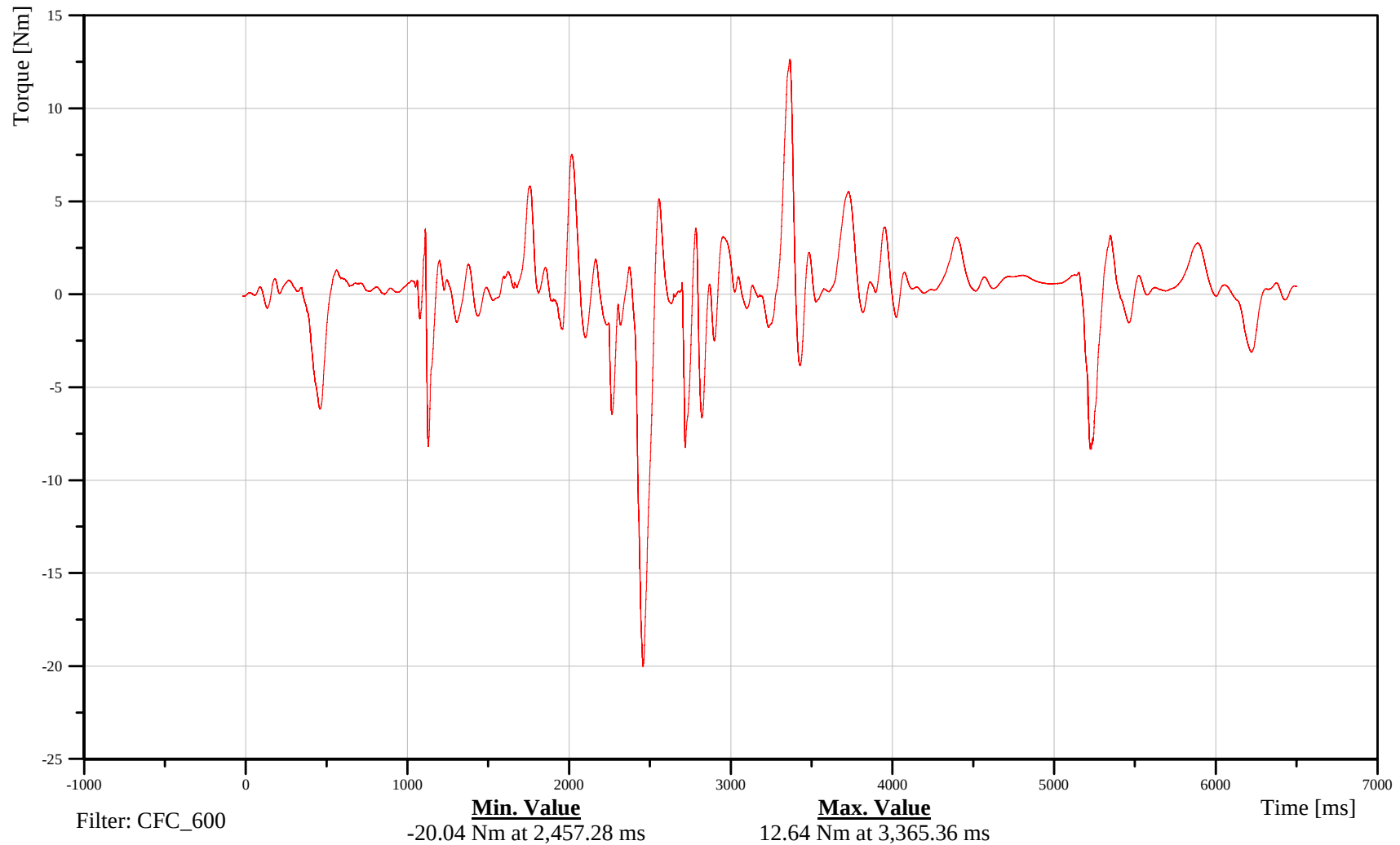
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13NECKUP00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-45

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

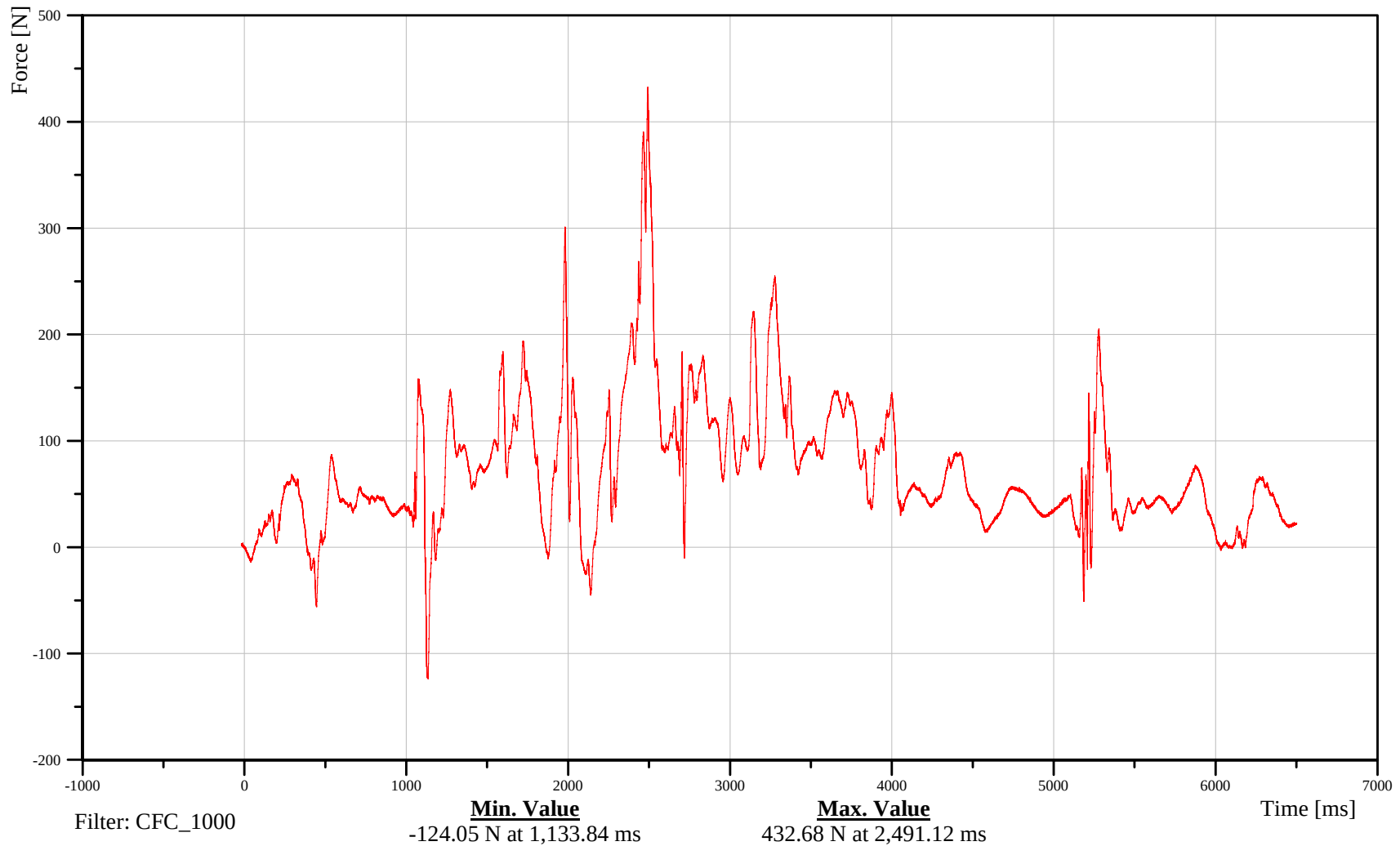
Right Front Passenger Lower Neck X-Axis Force

Customer: VRTC

13NECKLO00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-46

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

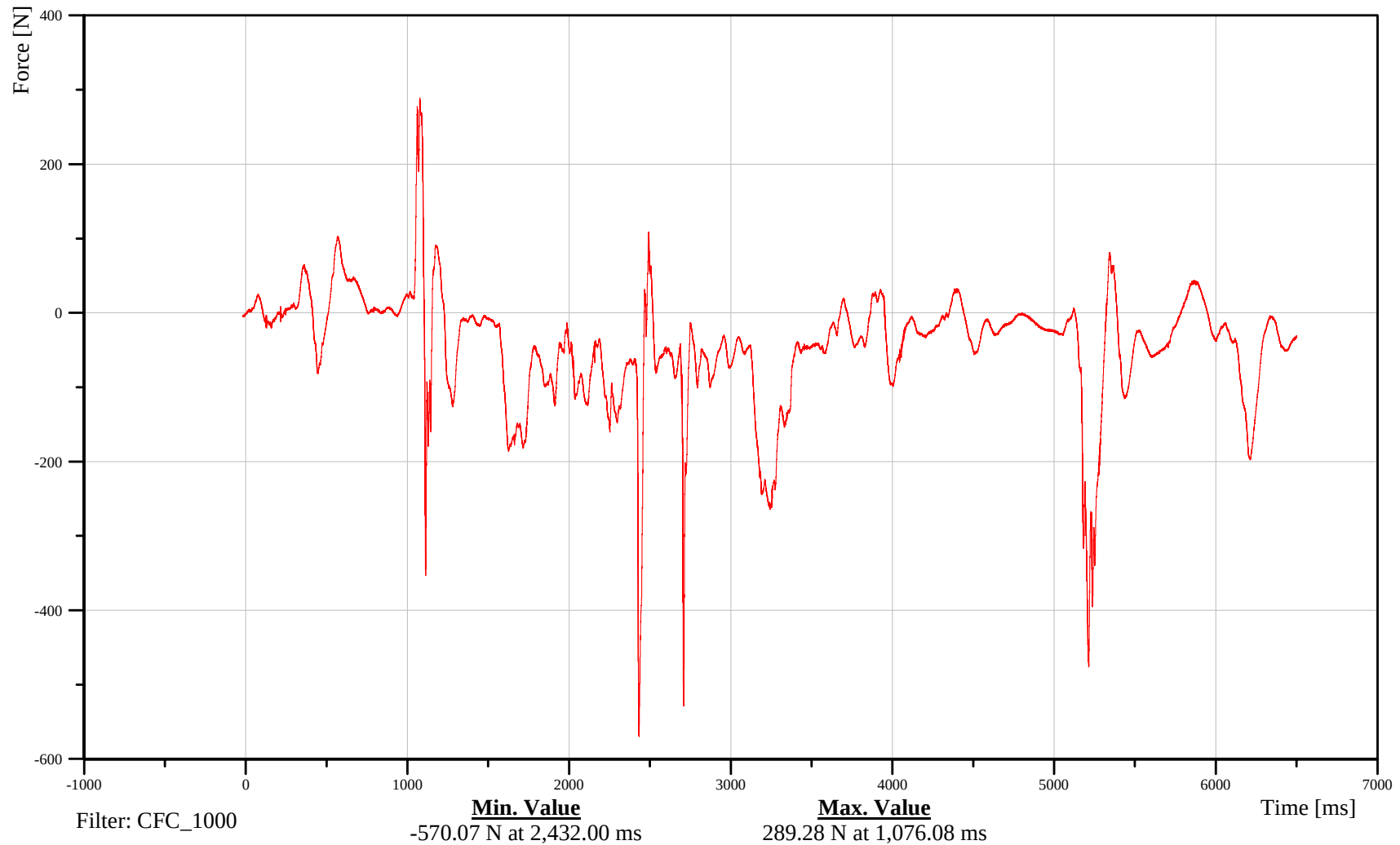
Right Front Passenger Lower Neck Y-Axis Force

Customer: VRTC

13NECKLO00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-47

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Lower Neck Z-Axis Force

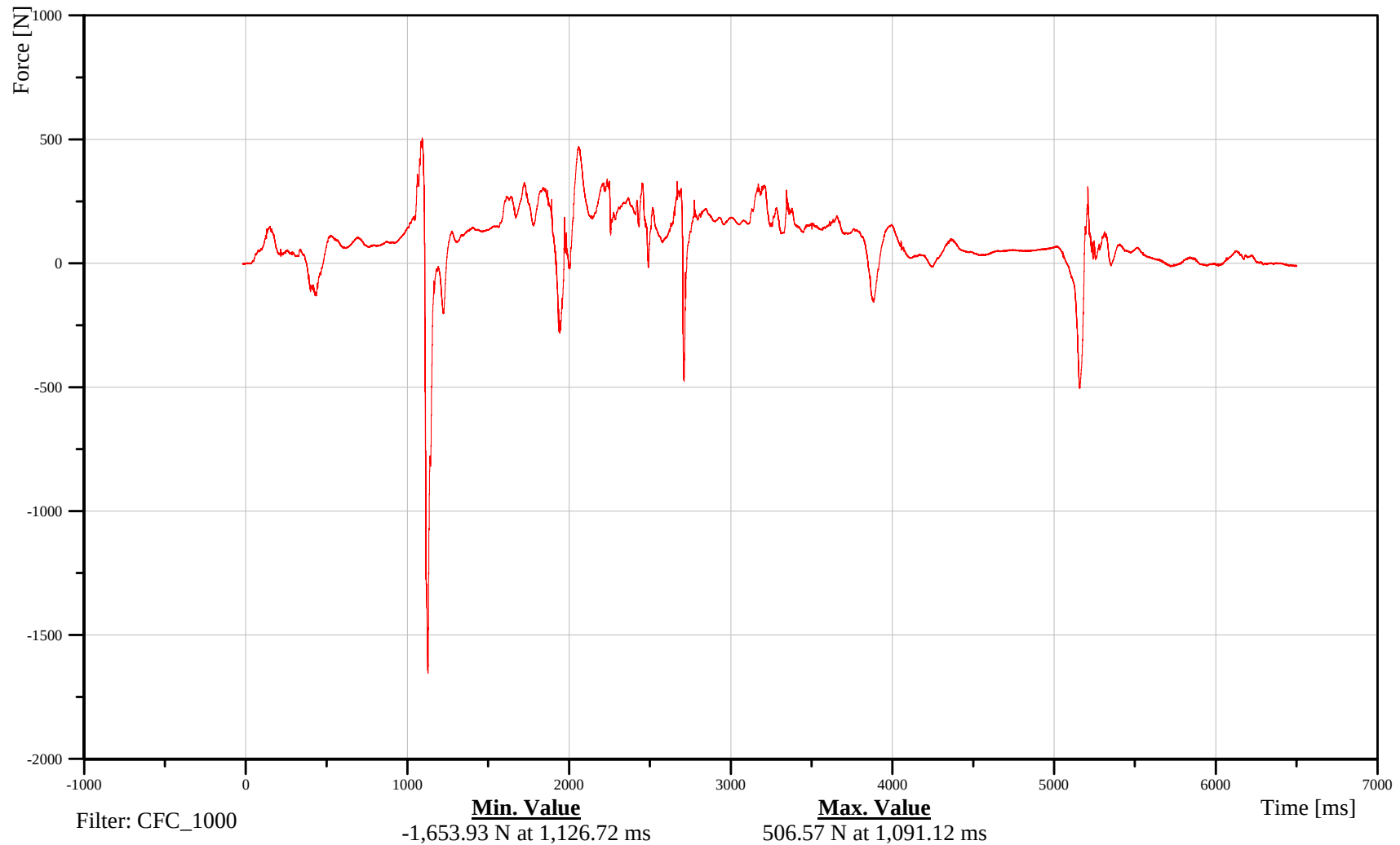
Time: 17:02

Customer: VRTC

13NECKLO00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-48

090930



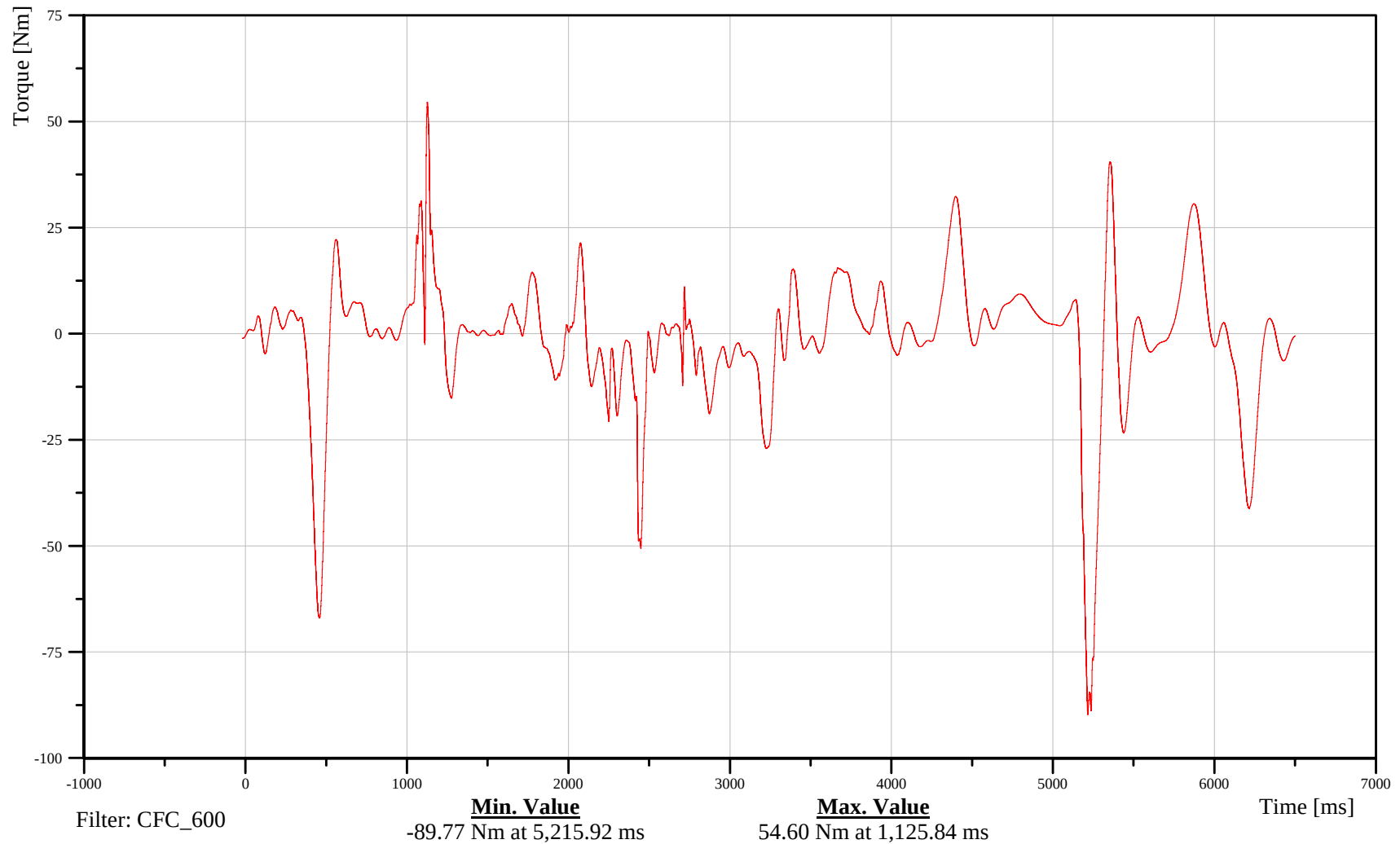
FMVSS 208 Rollover 2007 Ford Expedition
Right Front Passenger Lower Neck Moment About X Axis

Date: 09/30/2009
Time: 17:02

Customer: VRTC

13NECKLO00H3MOXB

TRC Inc. Test Lab: CTF
Test Number: 090930



B-49

090930



FMVSS 208 Rollover 2007 Ford Expedition
Right Front Passenger Lower Neck Moment About Y Axis

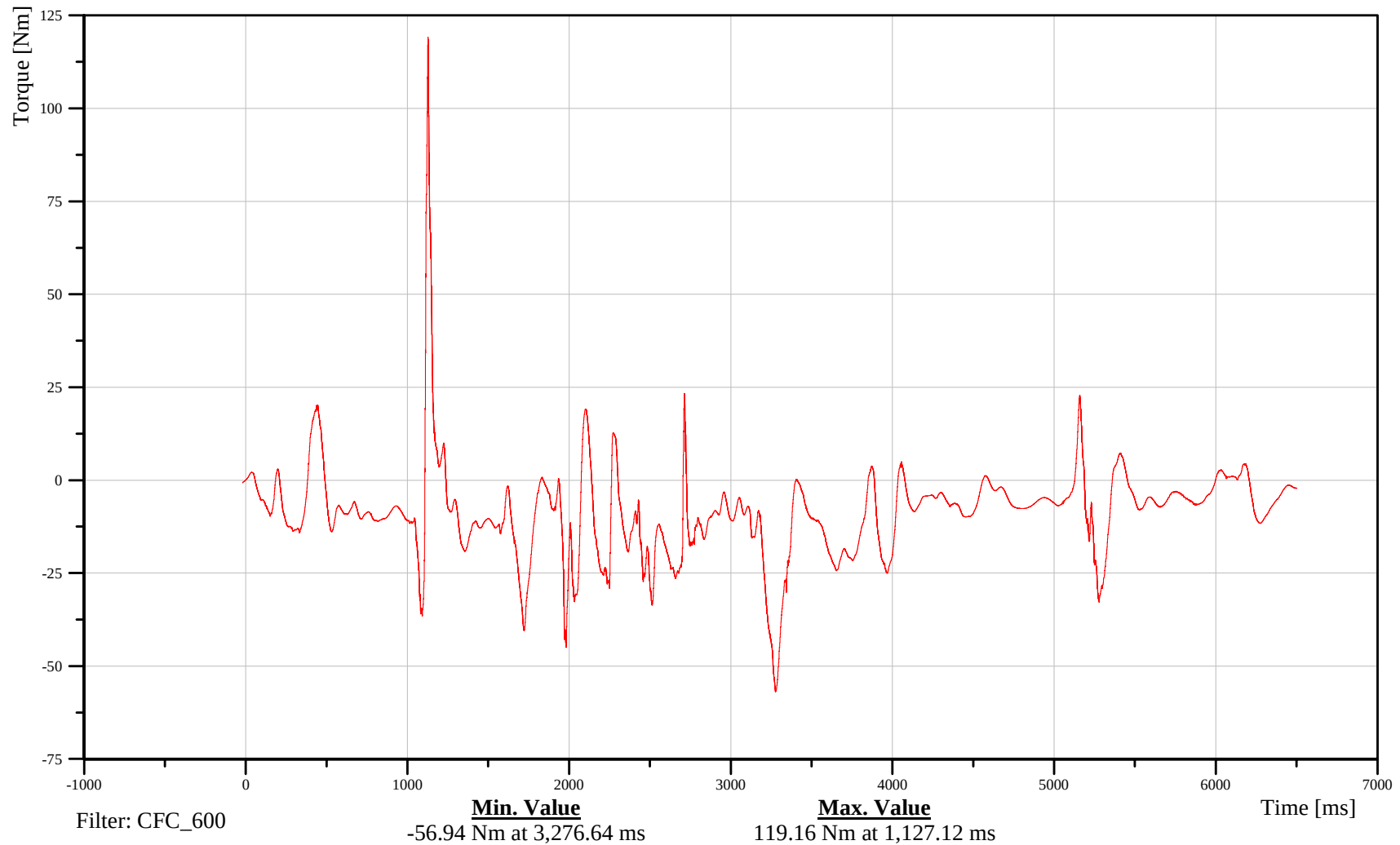
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13NECKLO00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-50

090930



FMVSS 208 Rollover 2007 Ford Expedition
Right Front Passenger Lower Neck Moment About Z Axis

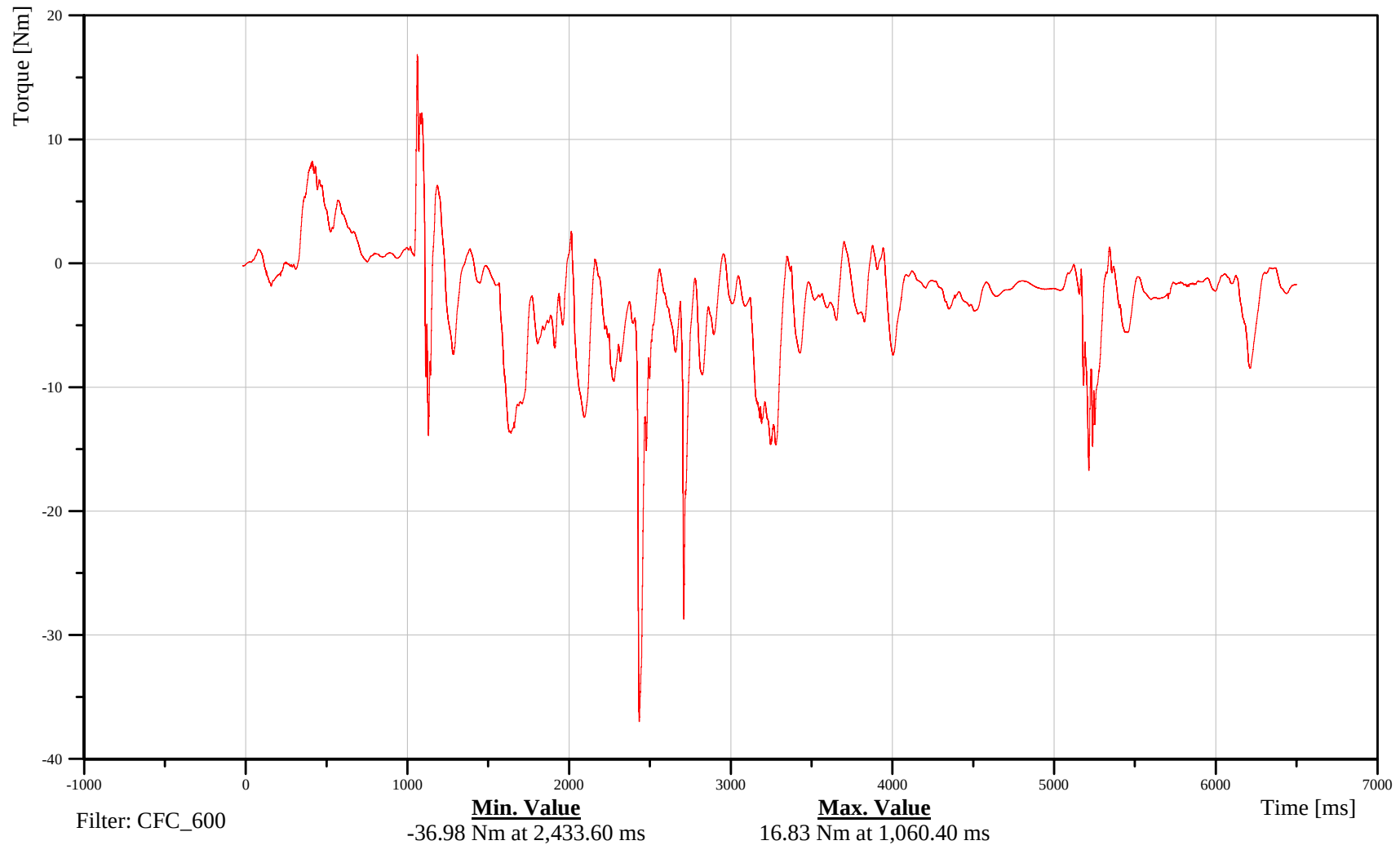
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13NECKLO00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-51

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Chest X-Axis Acceleration

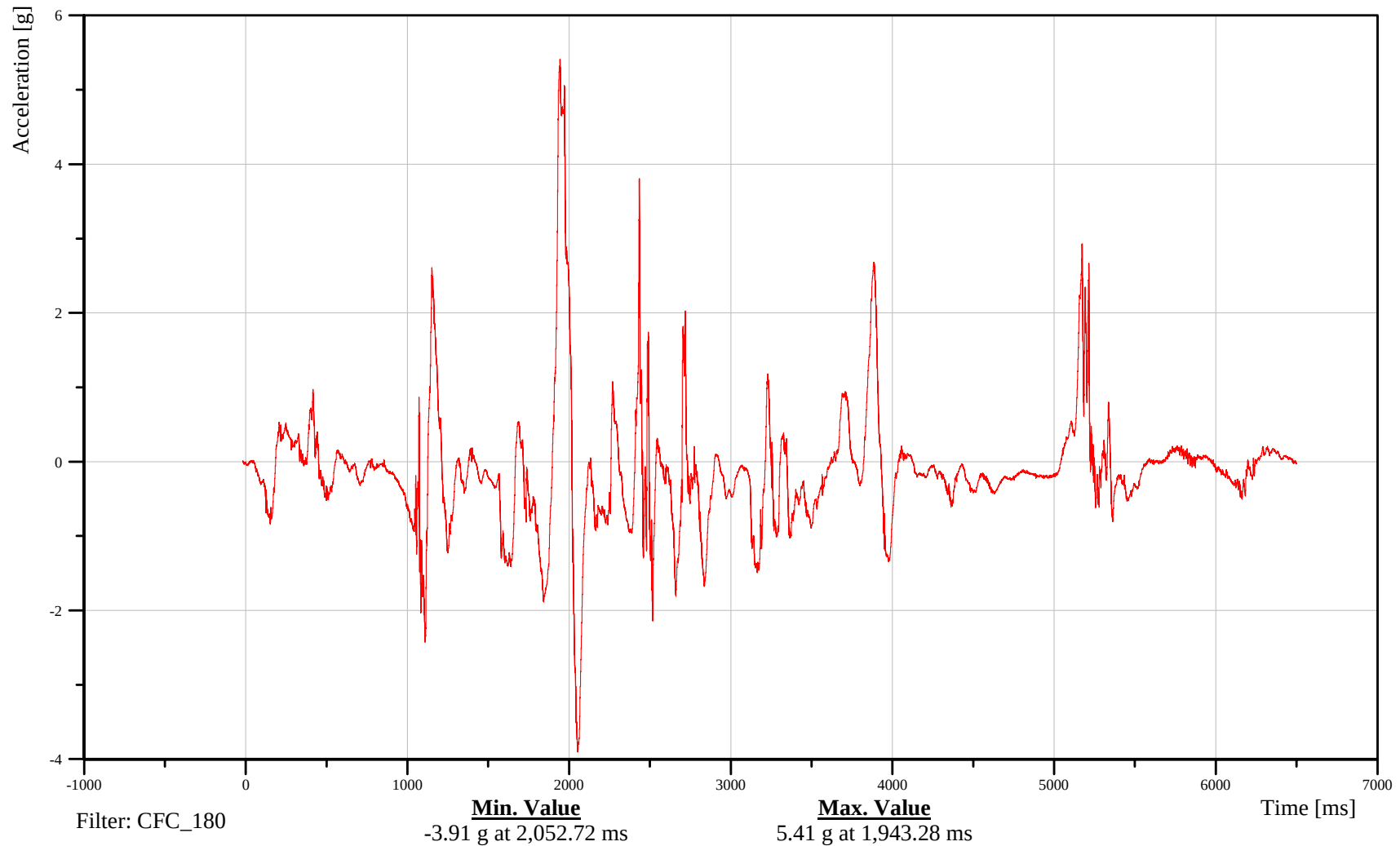
Time: 17:02

Customer: VRTC

13CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-52

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Chest Y-Axis Acceleration

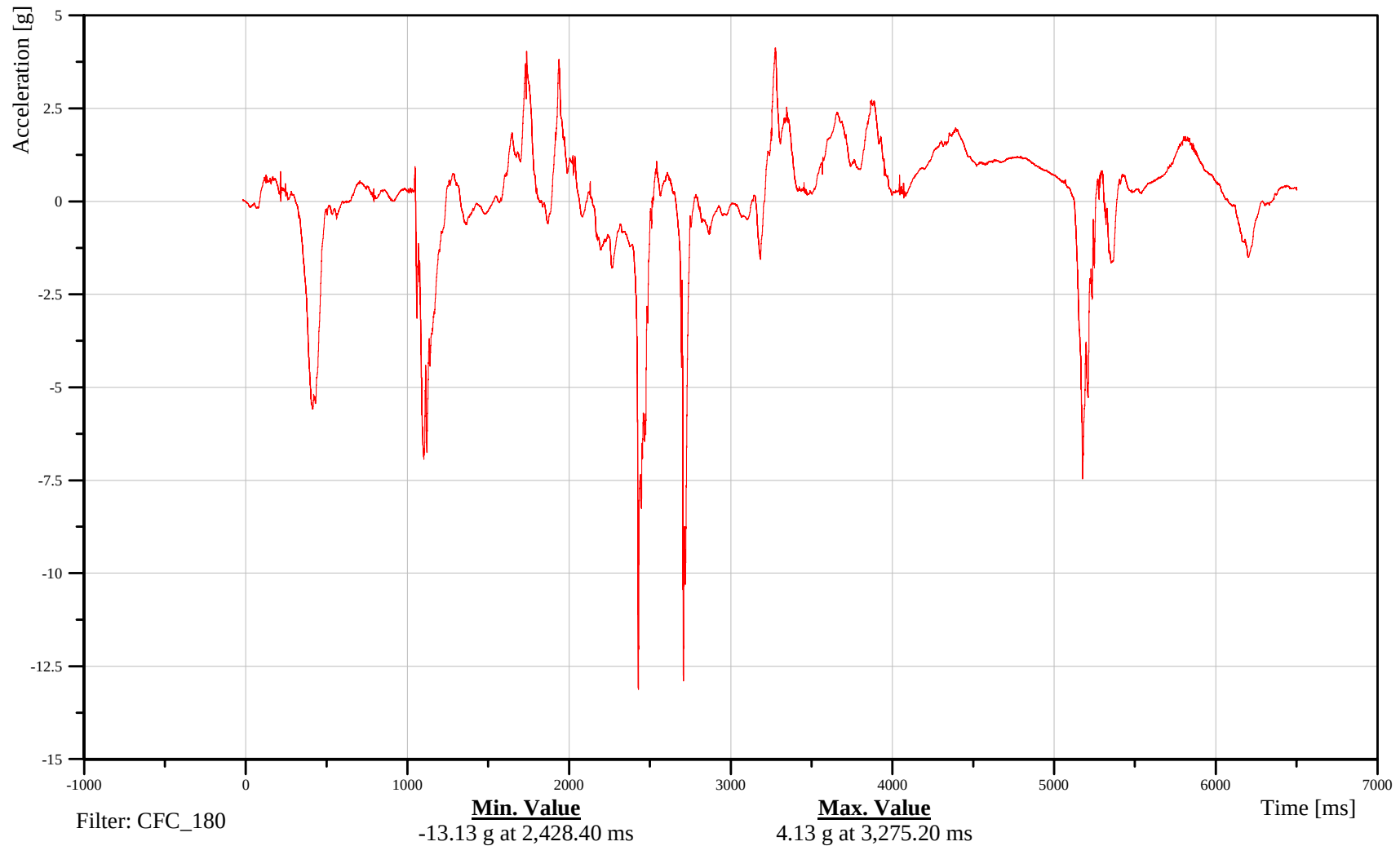
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-53

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Chest Z-Axis Acceleration

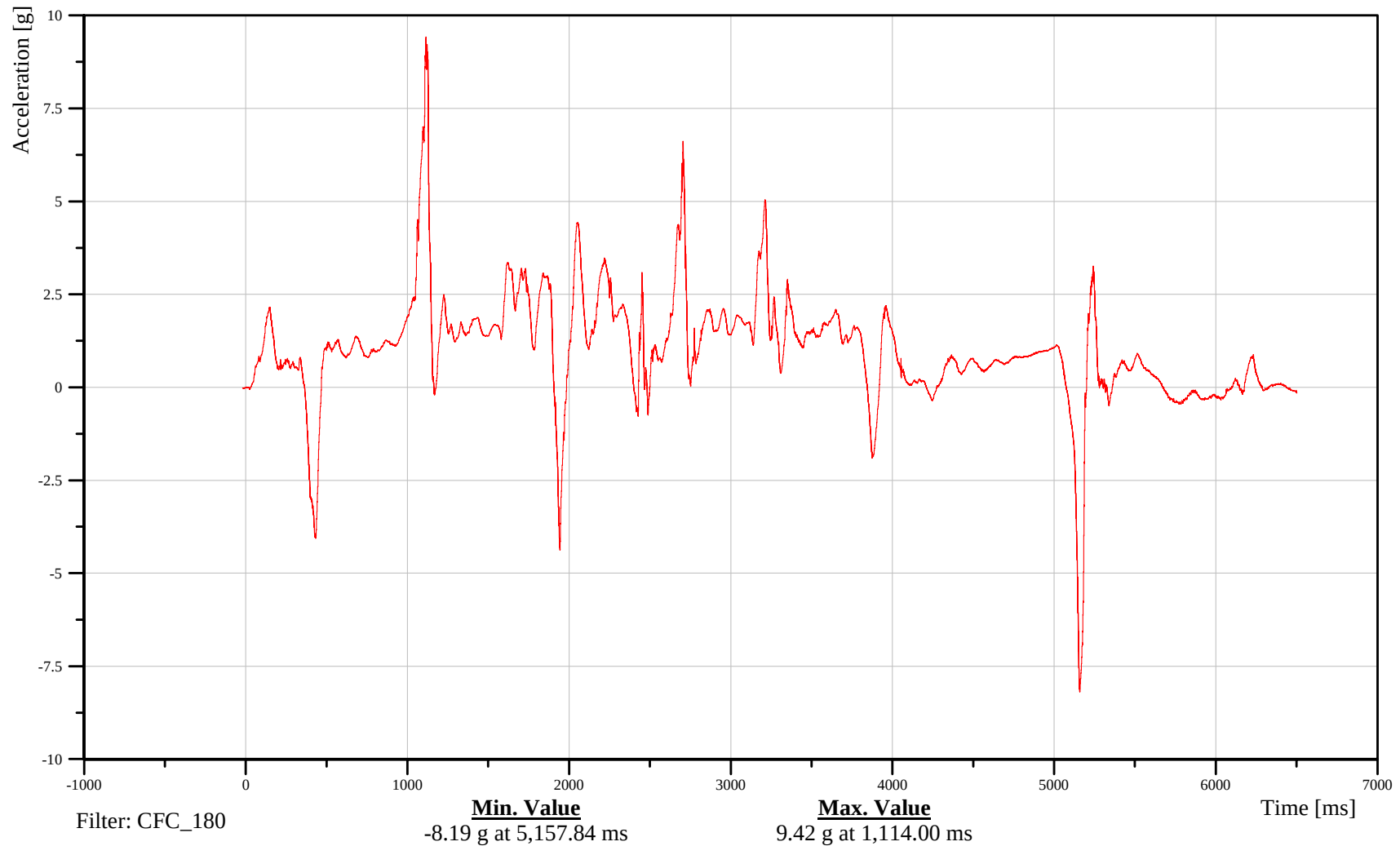
Time: 17:02

Customer: VRTC

13CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-54

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

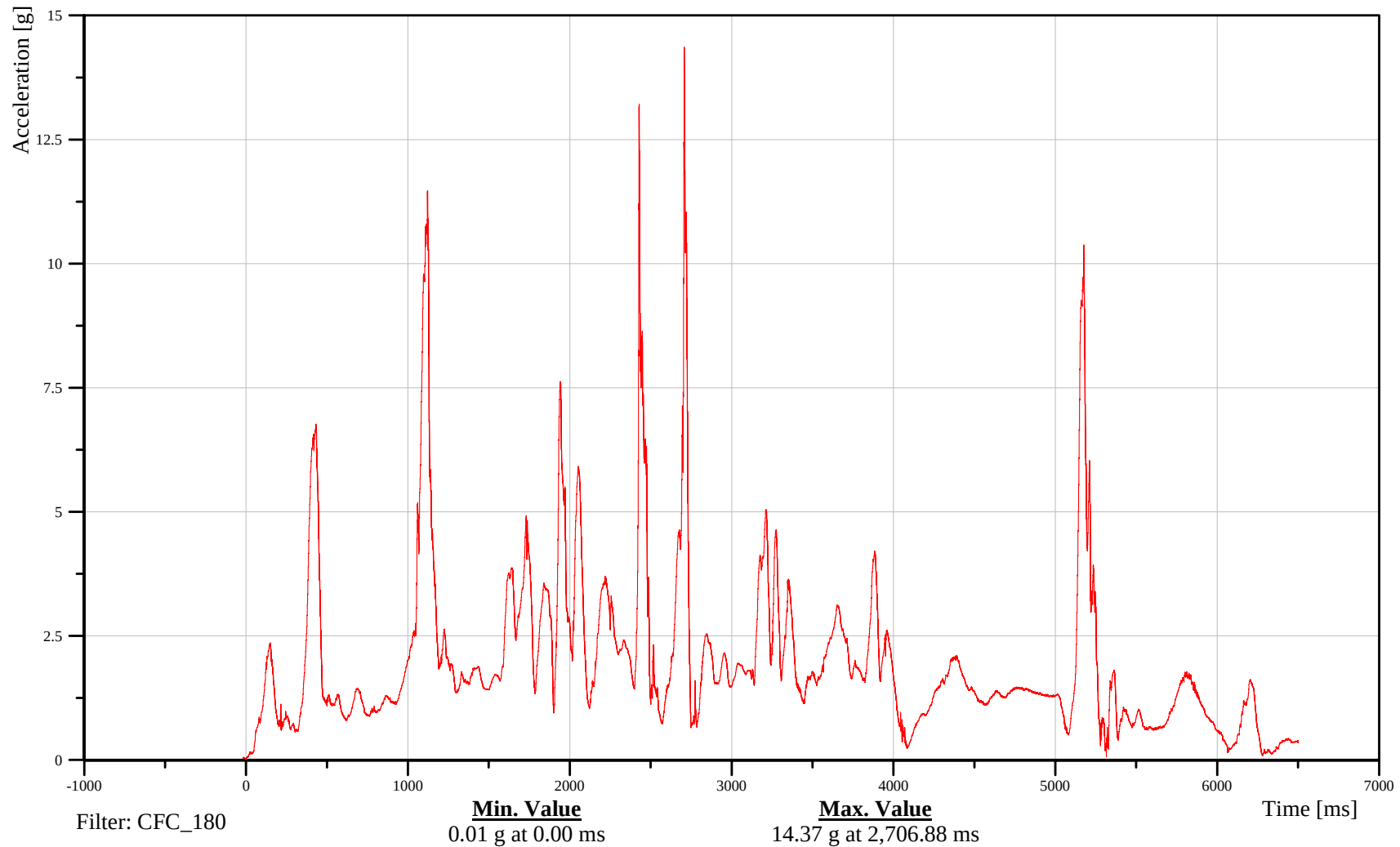
Right Front Passenger Chest Resultant Acceleration

Customer: VRTC

13CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-55

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Chest X-Axis Displacement

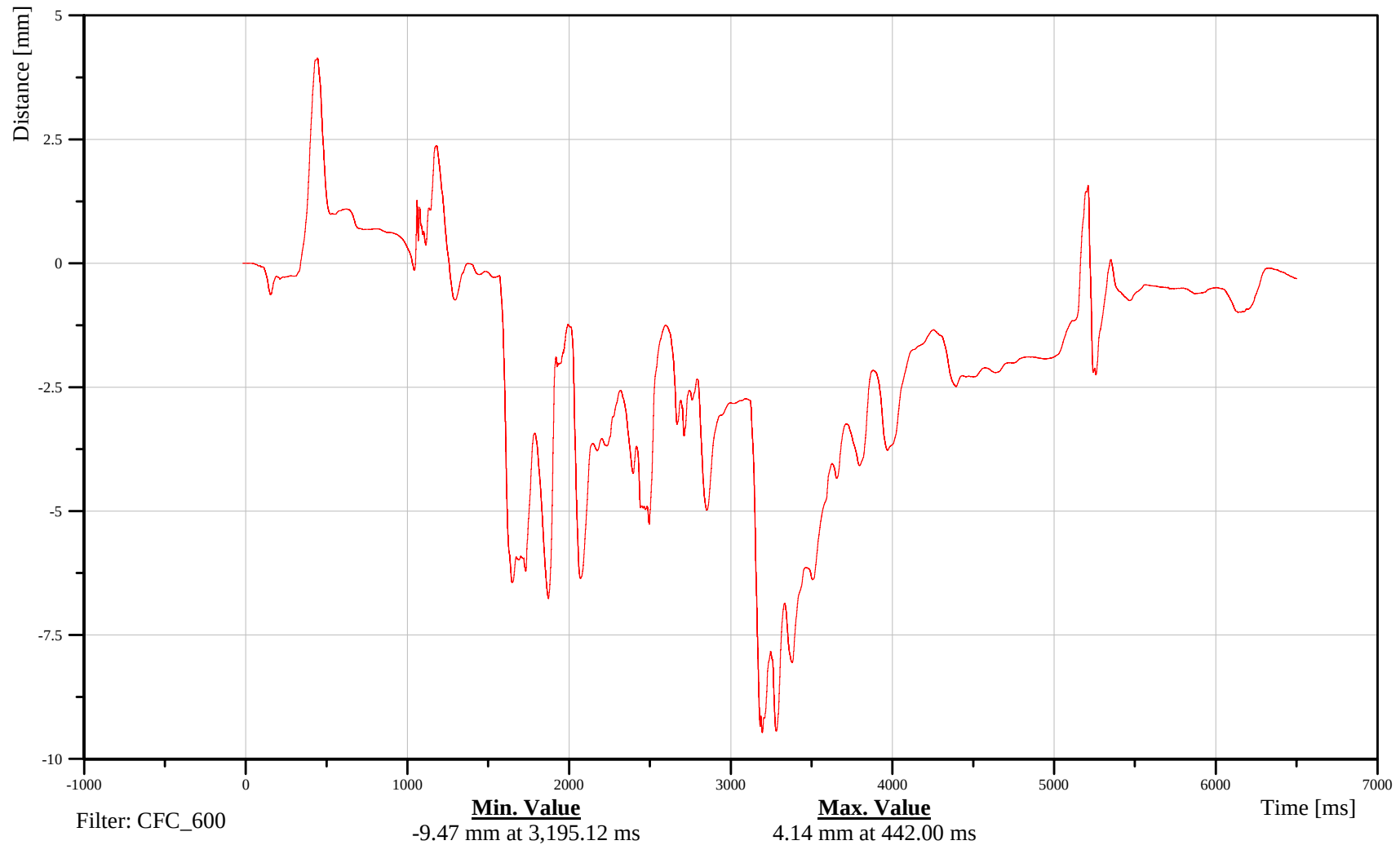
Time: 17:02

Customer: VRTC

13CHST0000H3DSXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-56

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Pelvis X-Axis Acceleration

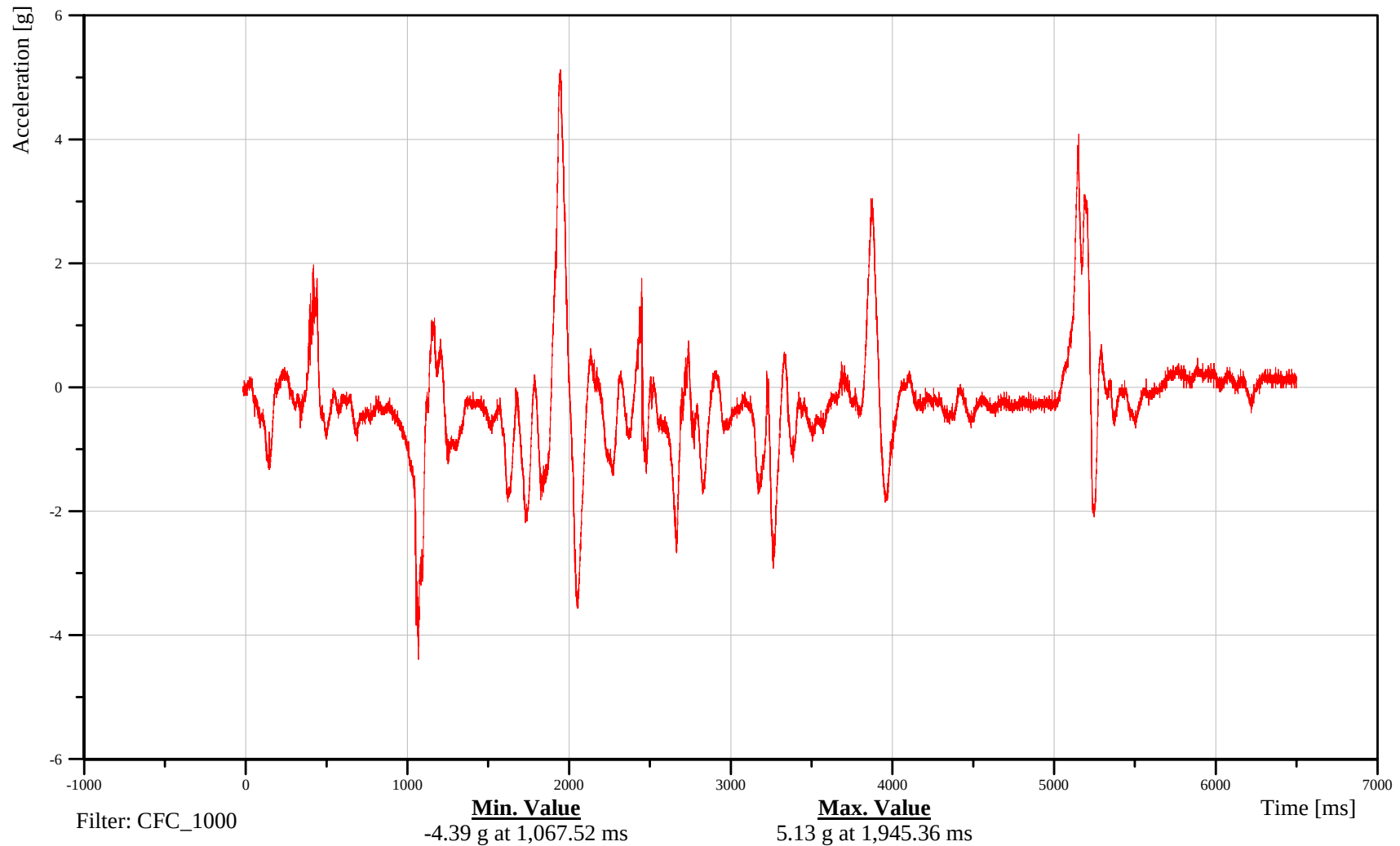
Time: 17:02

Customer: VRTC

13PELVCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-57

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Pelvis Y-Axis Acceleration

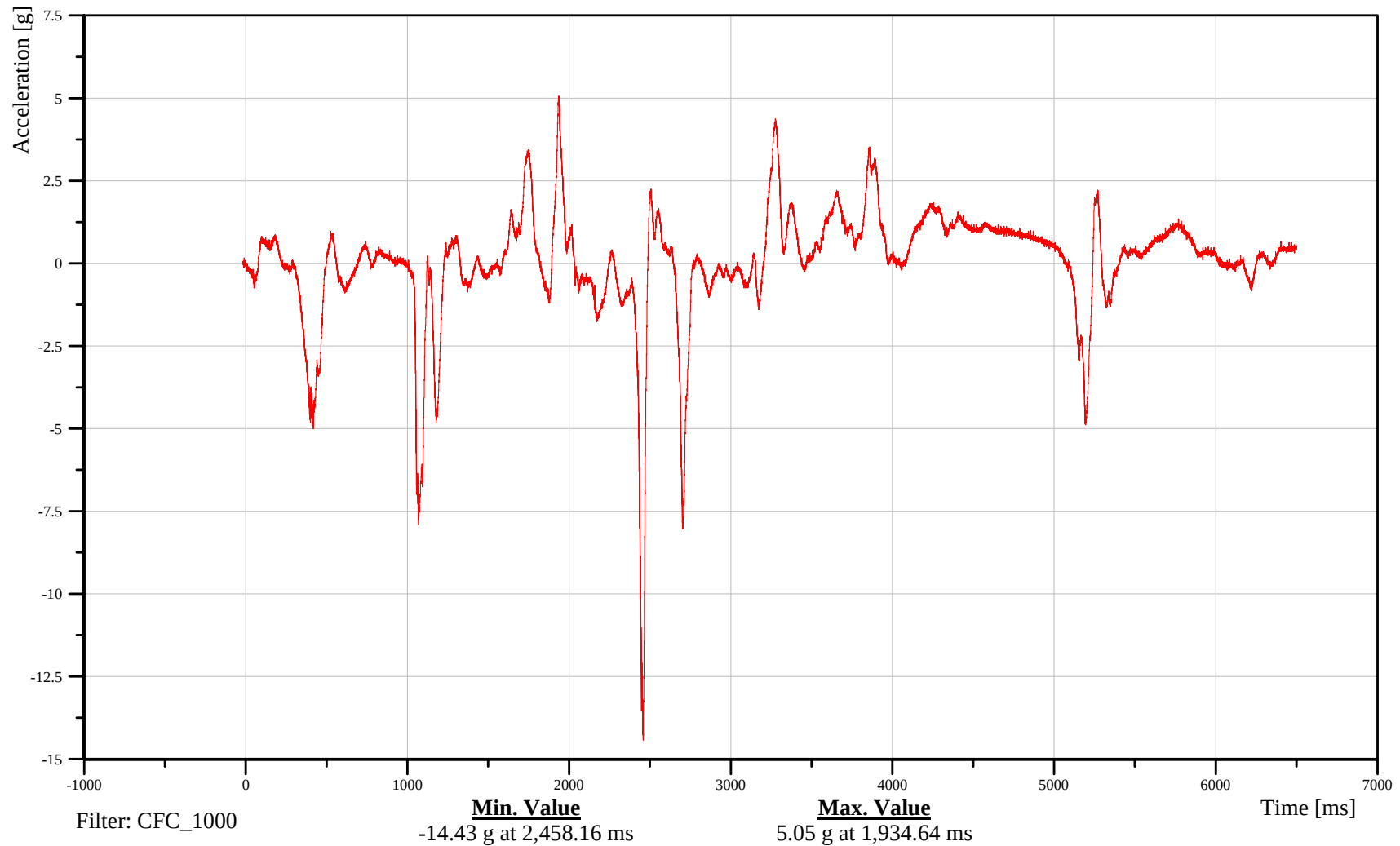
Time: 17:02

Customer: VRTC

13PELVCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-58

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Pelvis Z-Axis Acceleration

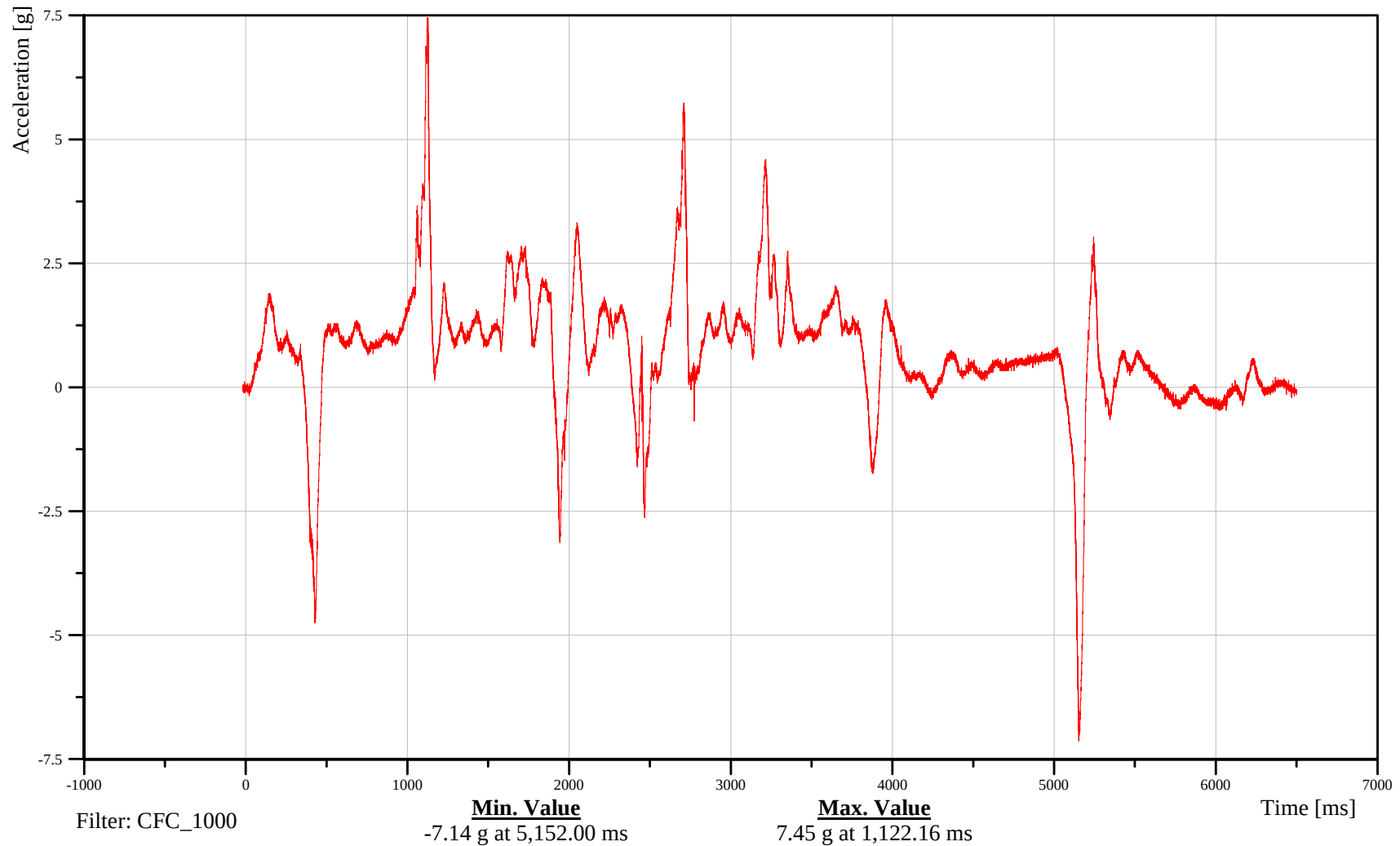
Time: 17:02

Customer: VRTC

13PELVCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-59

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

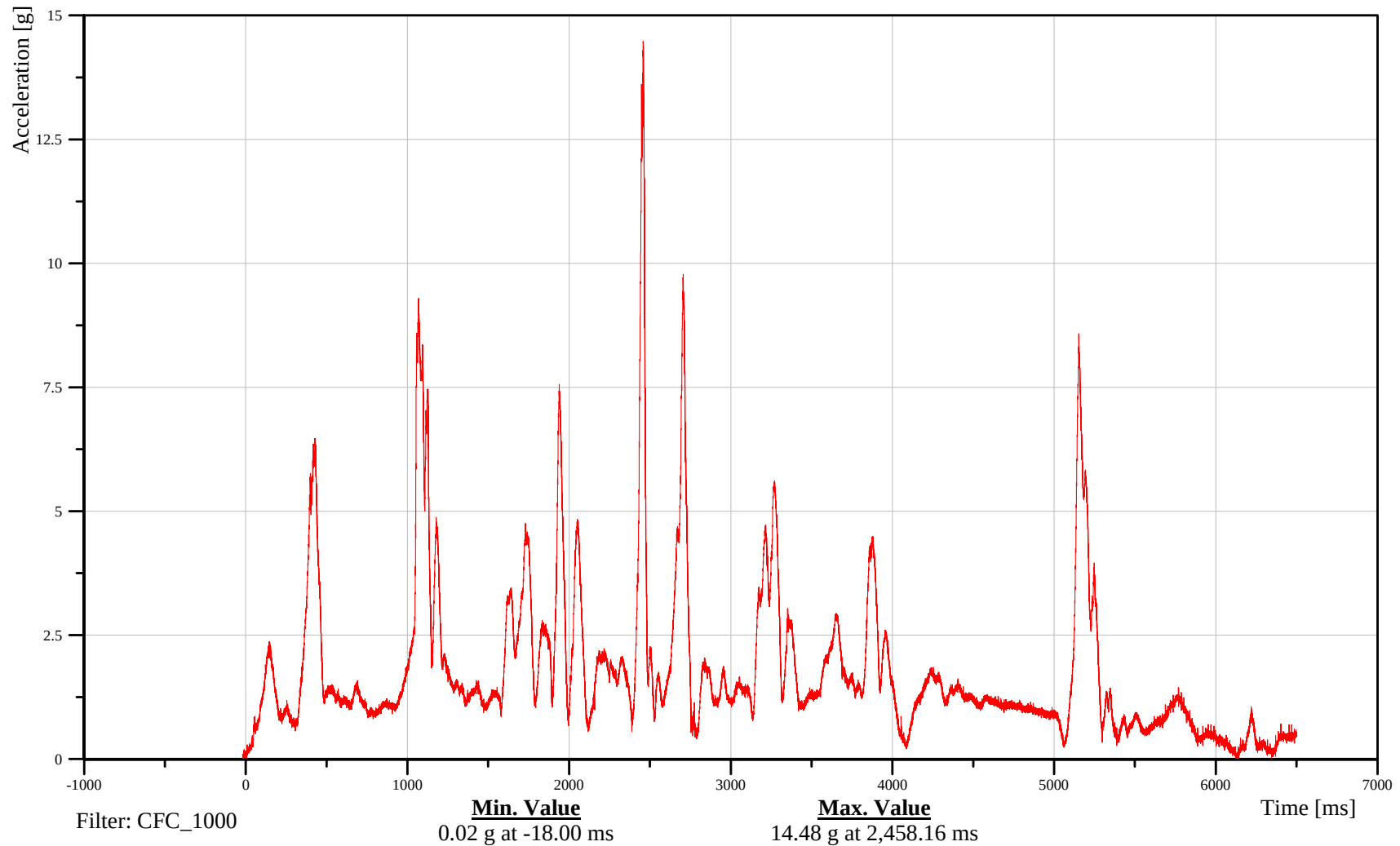
Right Front Passenger Pelvis Resultant Acceleration

Customer: VRTC

13PELVCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-60

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Head X-Axis Acceleration

Date: 09/30/2009

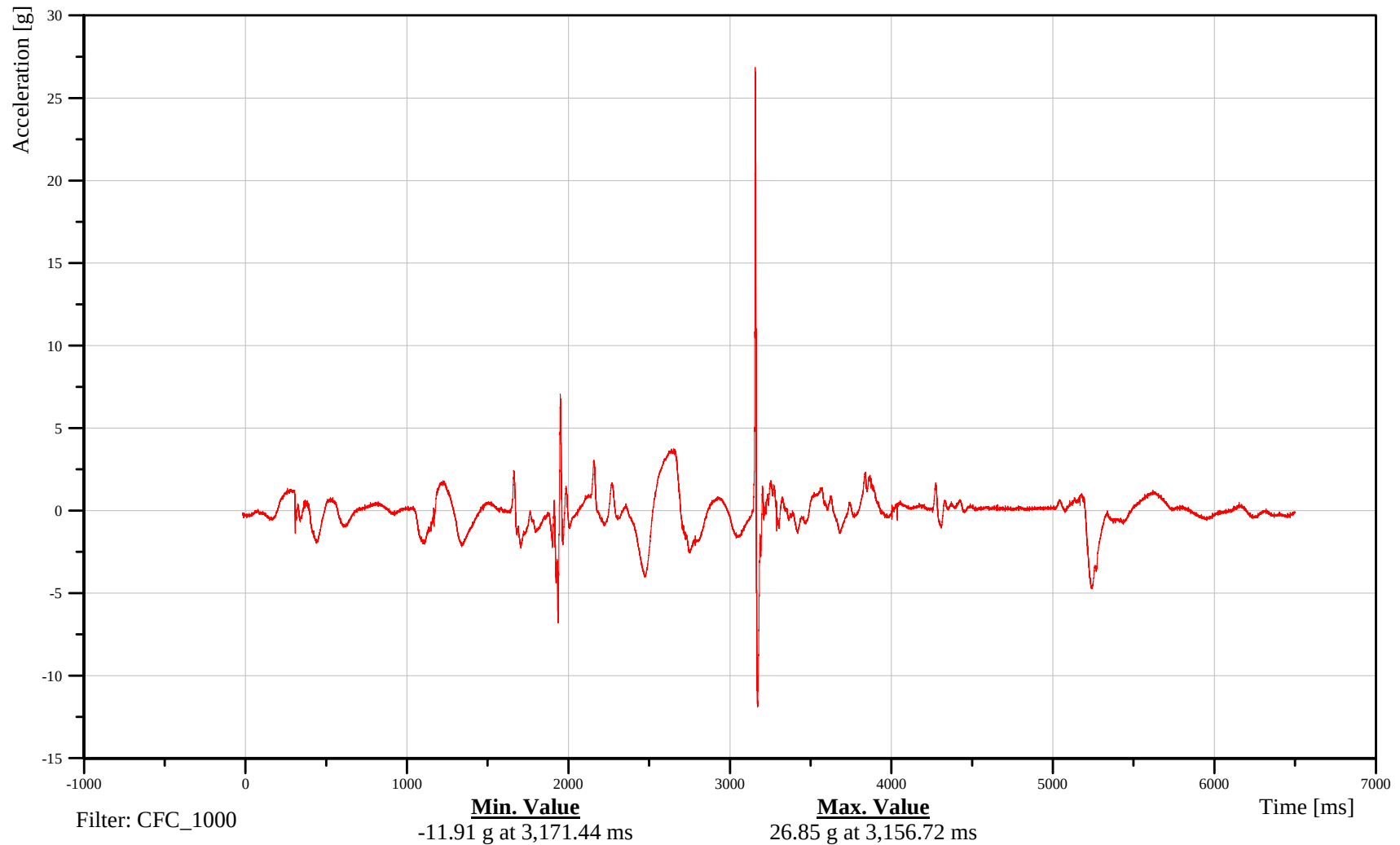
Time: 17:02

Customer: VRTC

14HEADCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-61

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Head Y-Axis Acceleration

Date: 09/30/2009

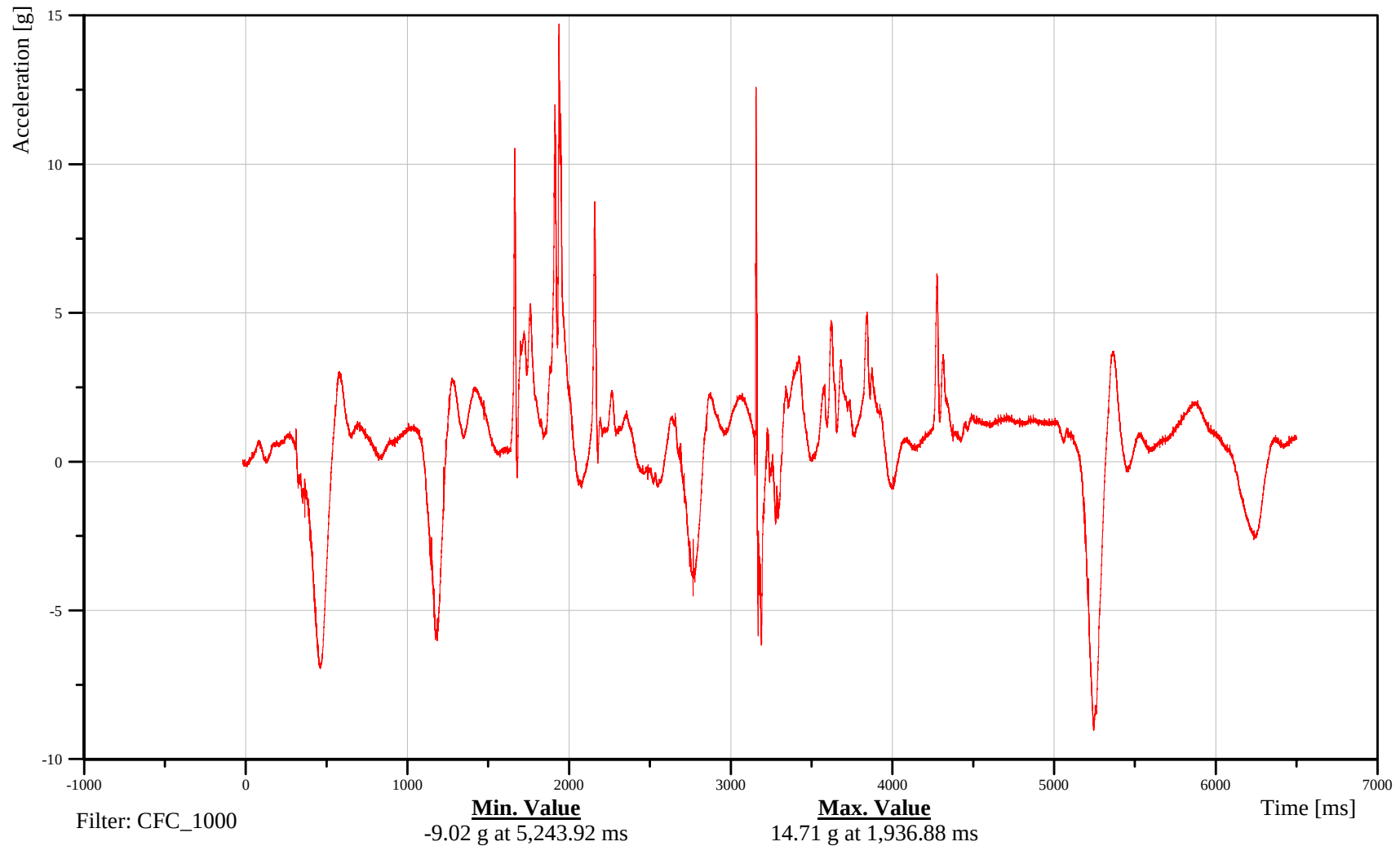
Time: 17:02

Customer: VRTC

14HEADCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-62

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Head Z-Axis Acceleration

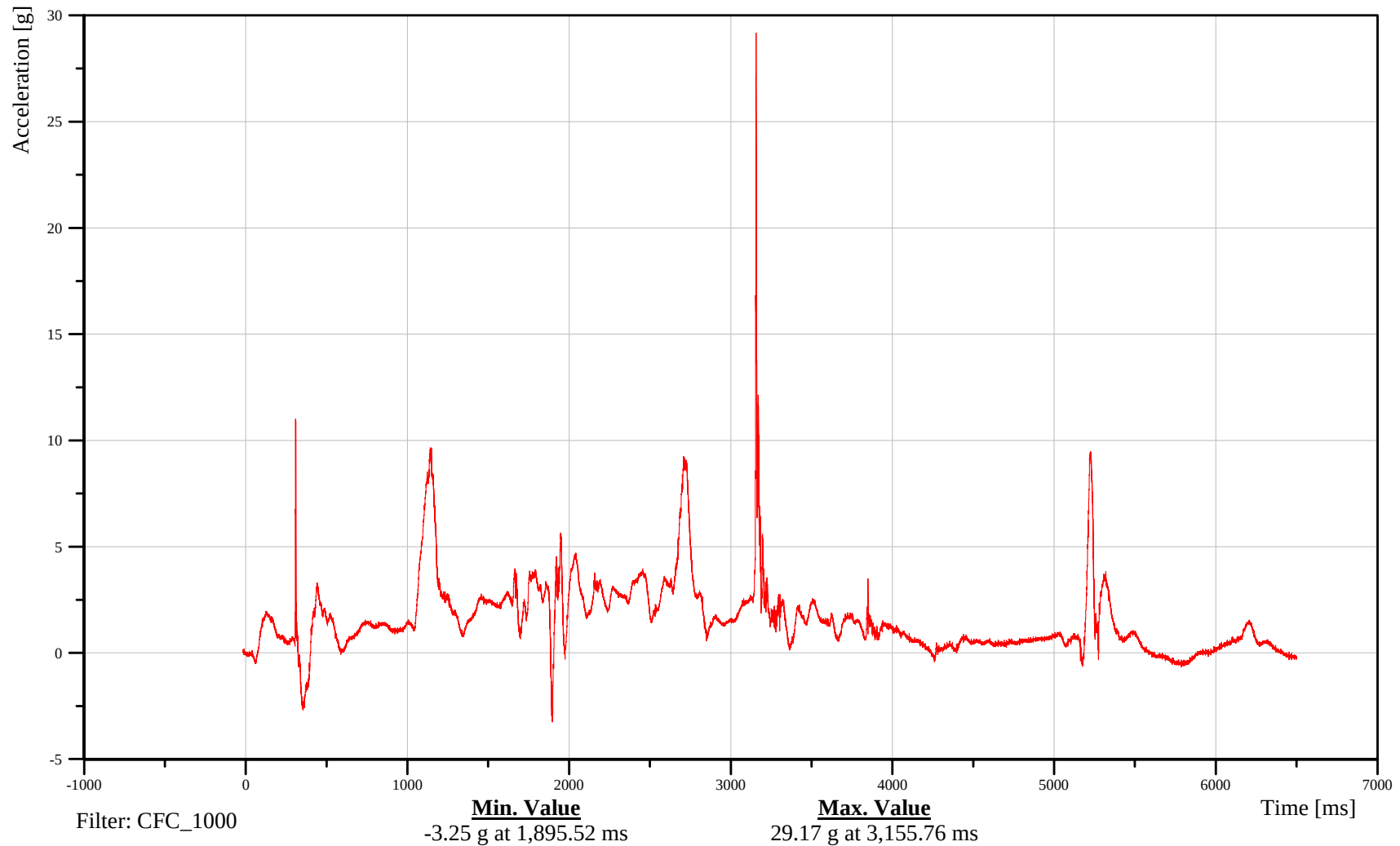
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14HEADCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-63

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Head Resultant Acceleration

Date: 09/30/2009

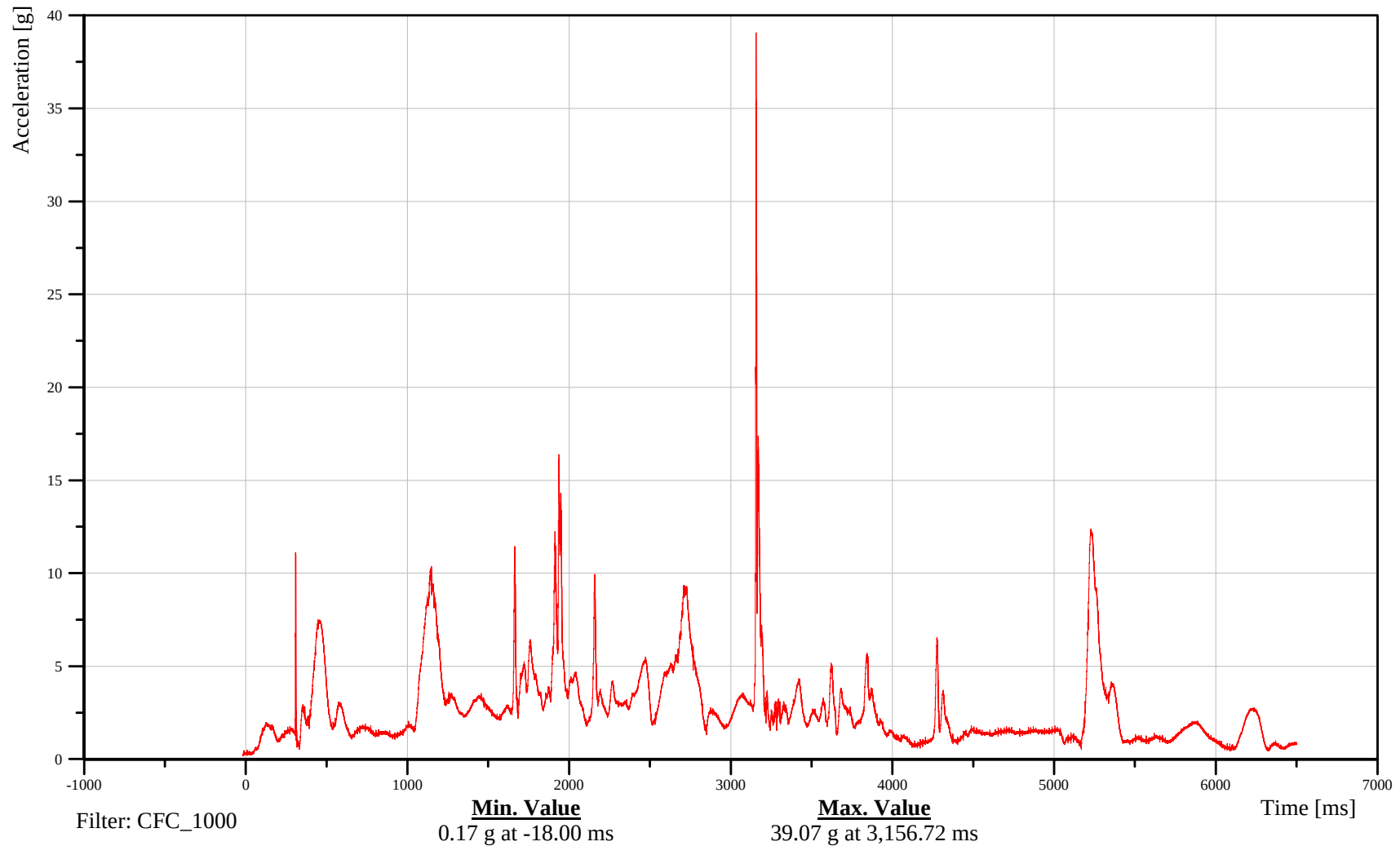
Time: 17:02

Customer: VRTC

14HEADCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-64

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

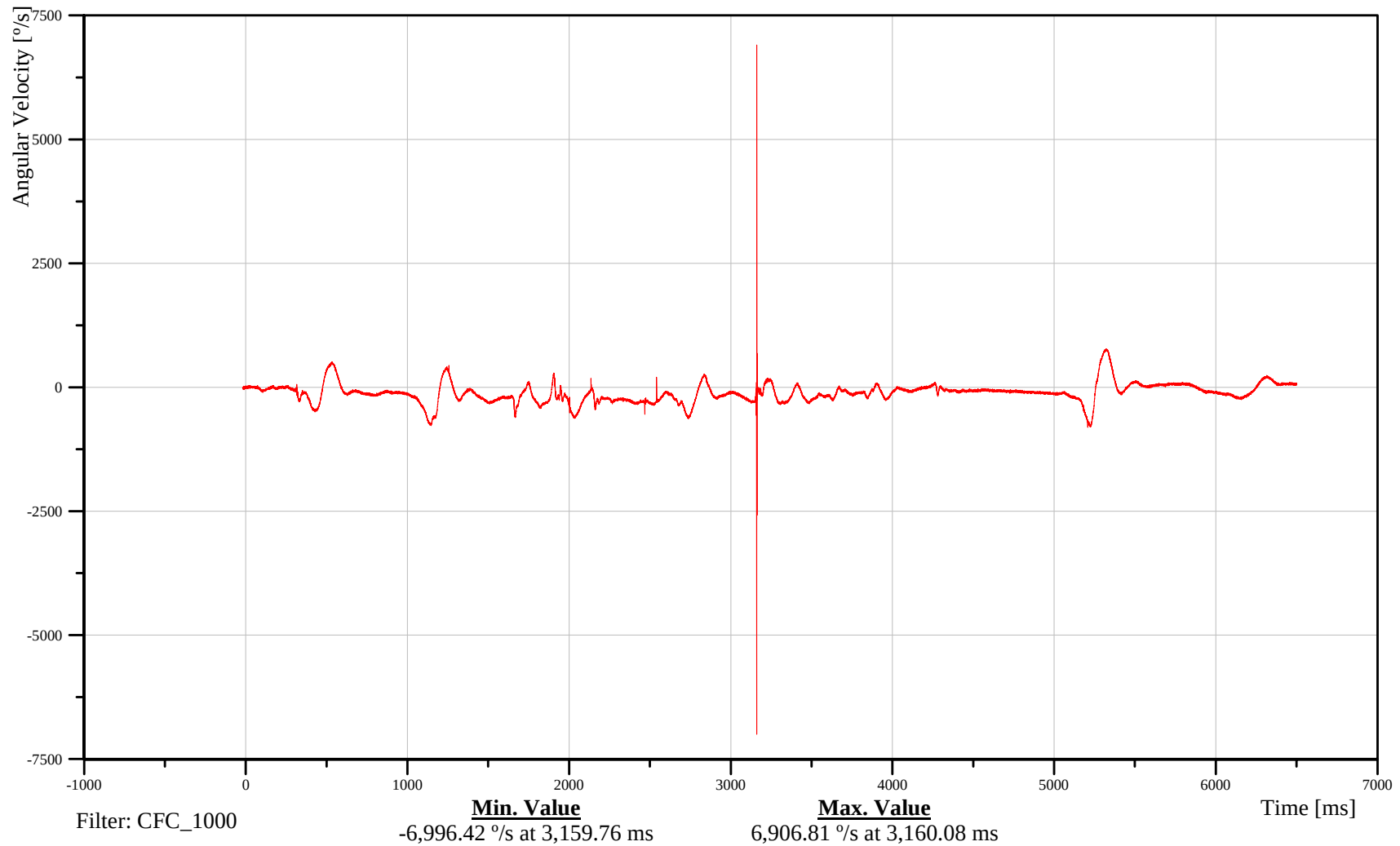
Left Rear Passenger Head (DTS ARS) Rate Gyro X

Customer: VRTC

14HEADCG00H3AVXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-65

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Head (DTS ARS) Rate Gyro Y

Date: 09/30/2009

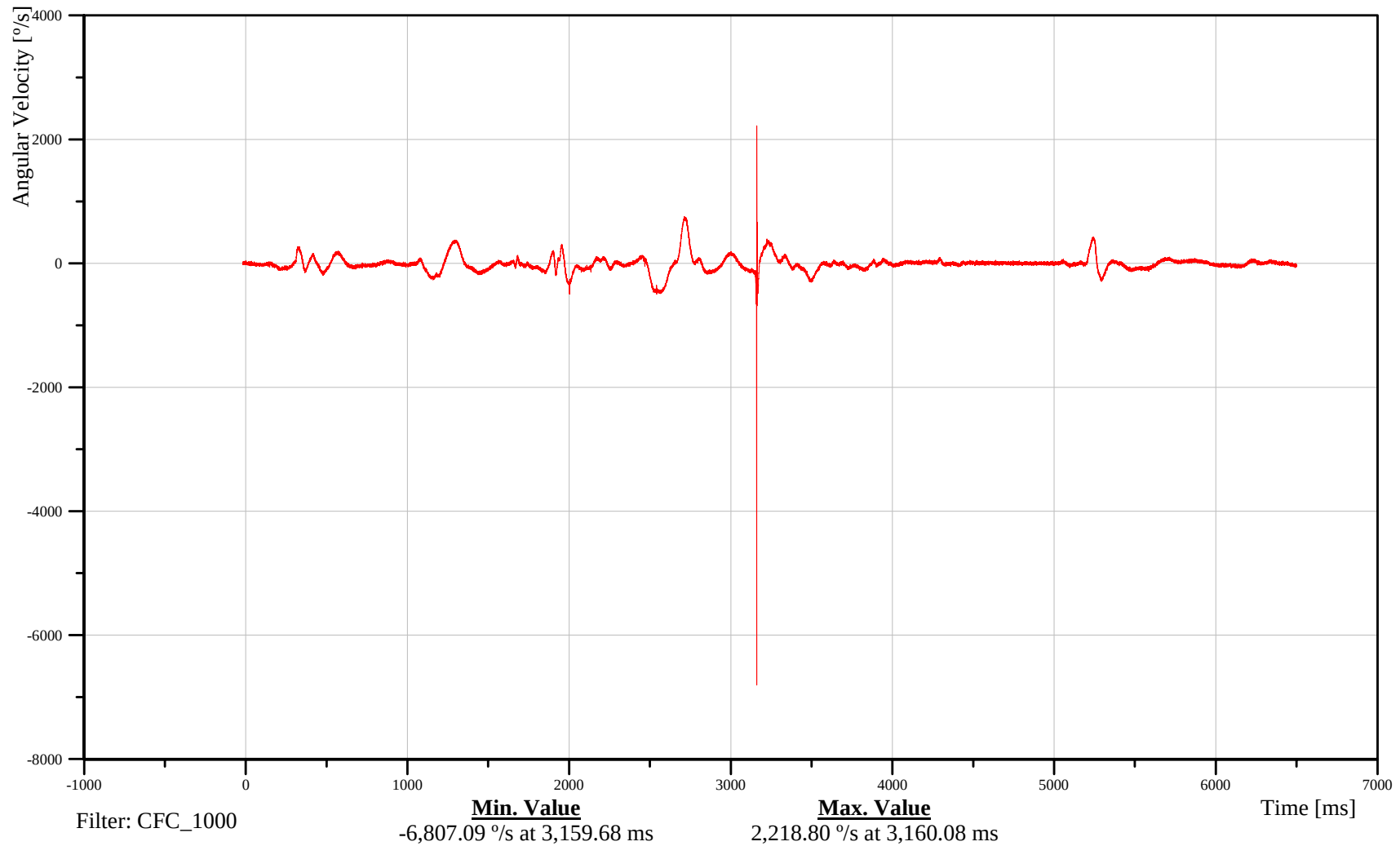
Time: 17:02

Customer: VRTC

14HEADCG00H3AVYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-66

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Head (DTS ARS) Rate Gyro Z

Date: 09/30/2009

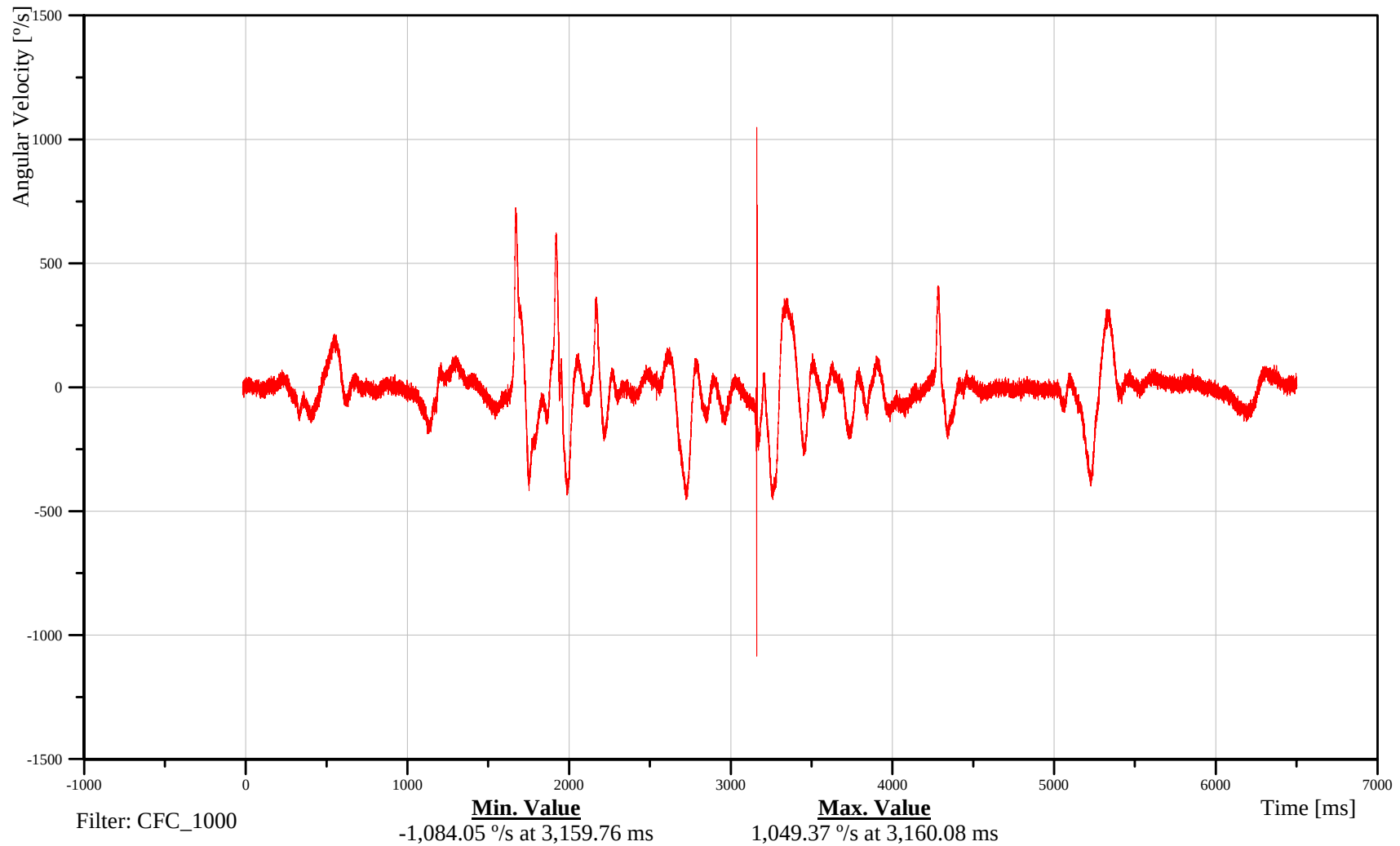
Time: 17:02

Customer: VRTC

14HEADCG00H3AVZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-67

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left Rear Passenger Upper Neck X-Axis Force

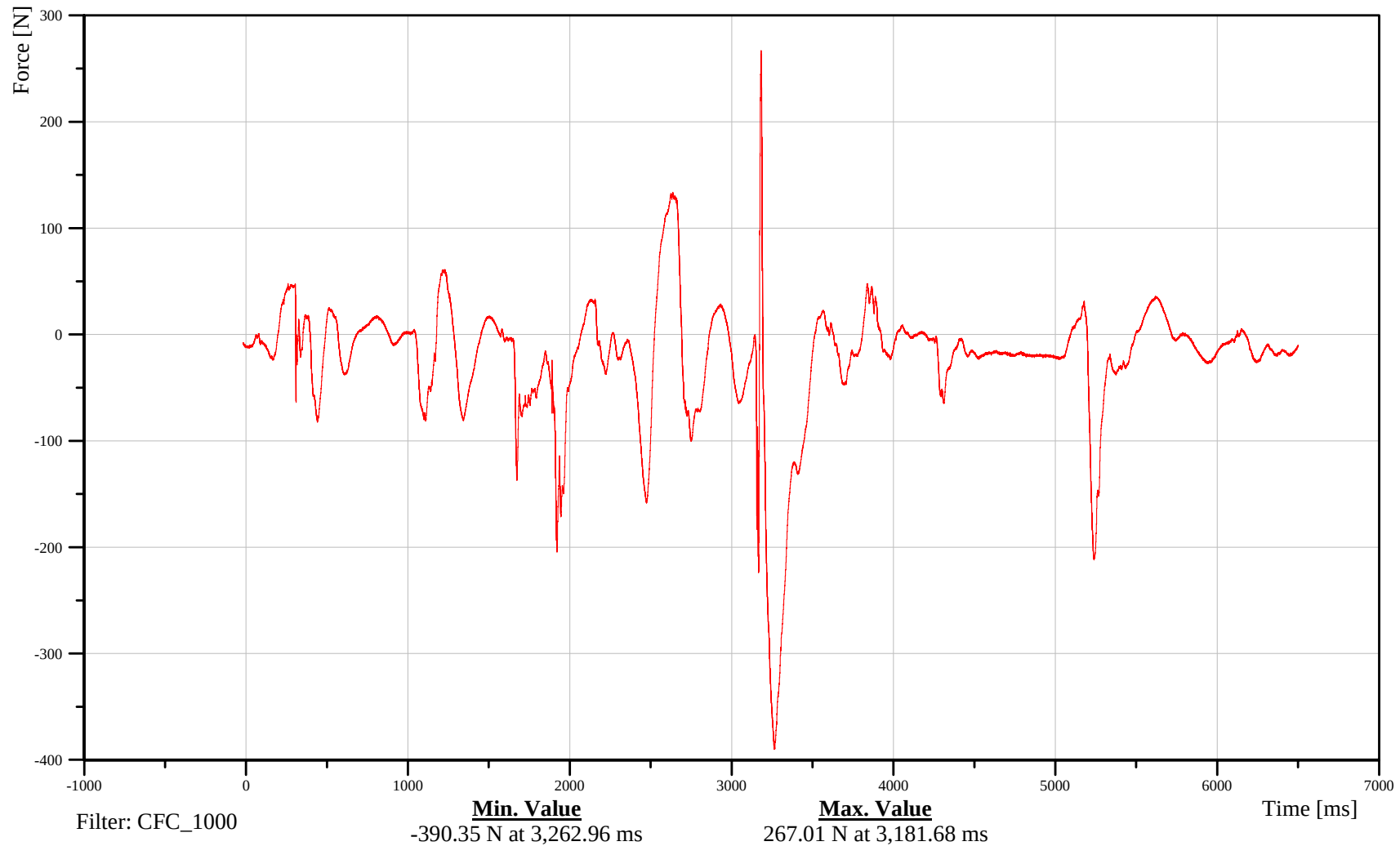
Time: 17:02

Customer: VRTC

14NECKUP00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-68

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left Rear Passenger Upper Neck Y-Axis Force

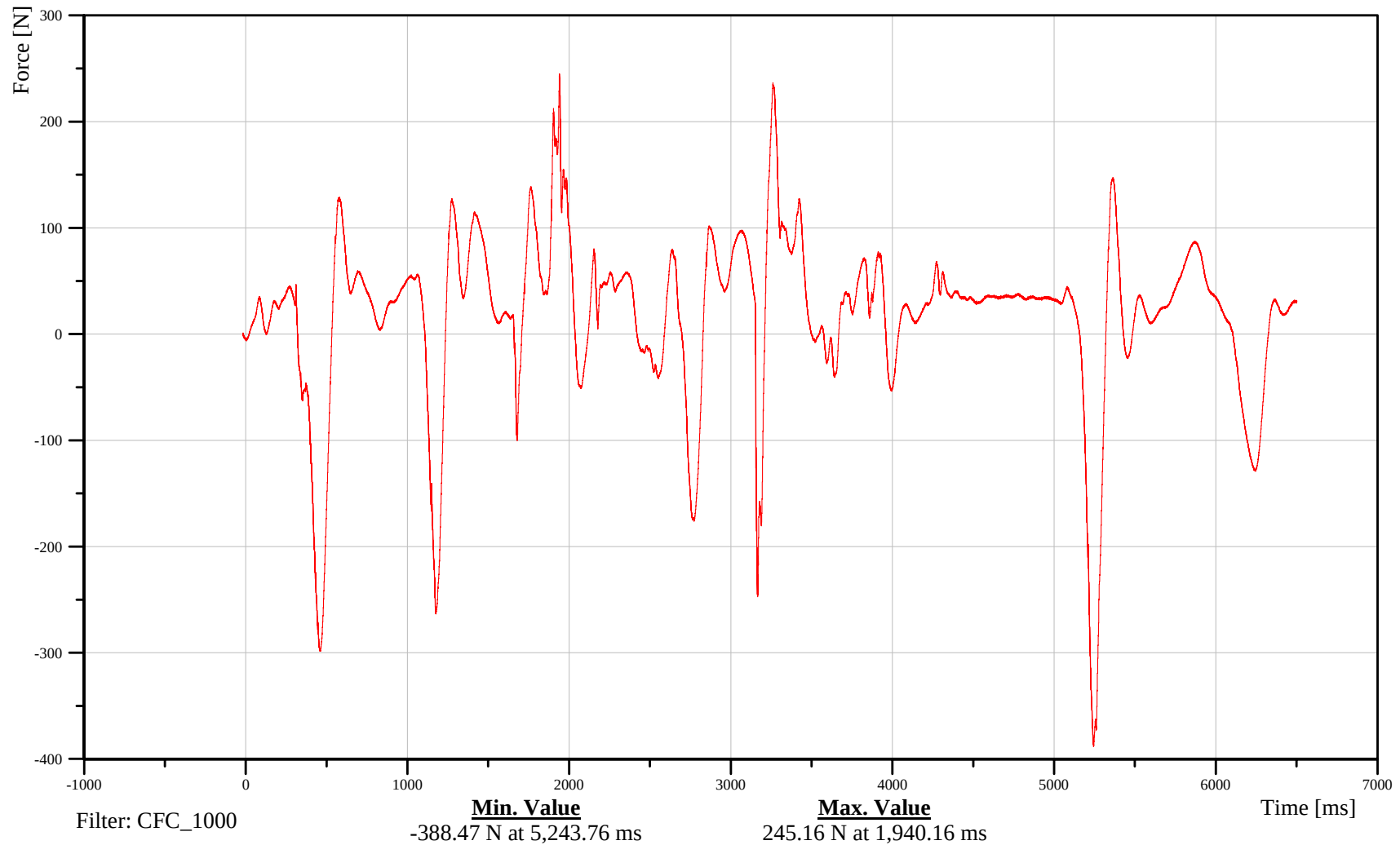
Time: 17:02

Customer: VRTC

14NECKUP00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-69

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

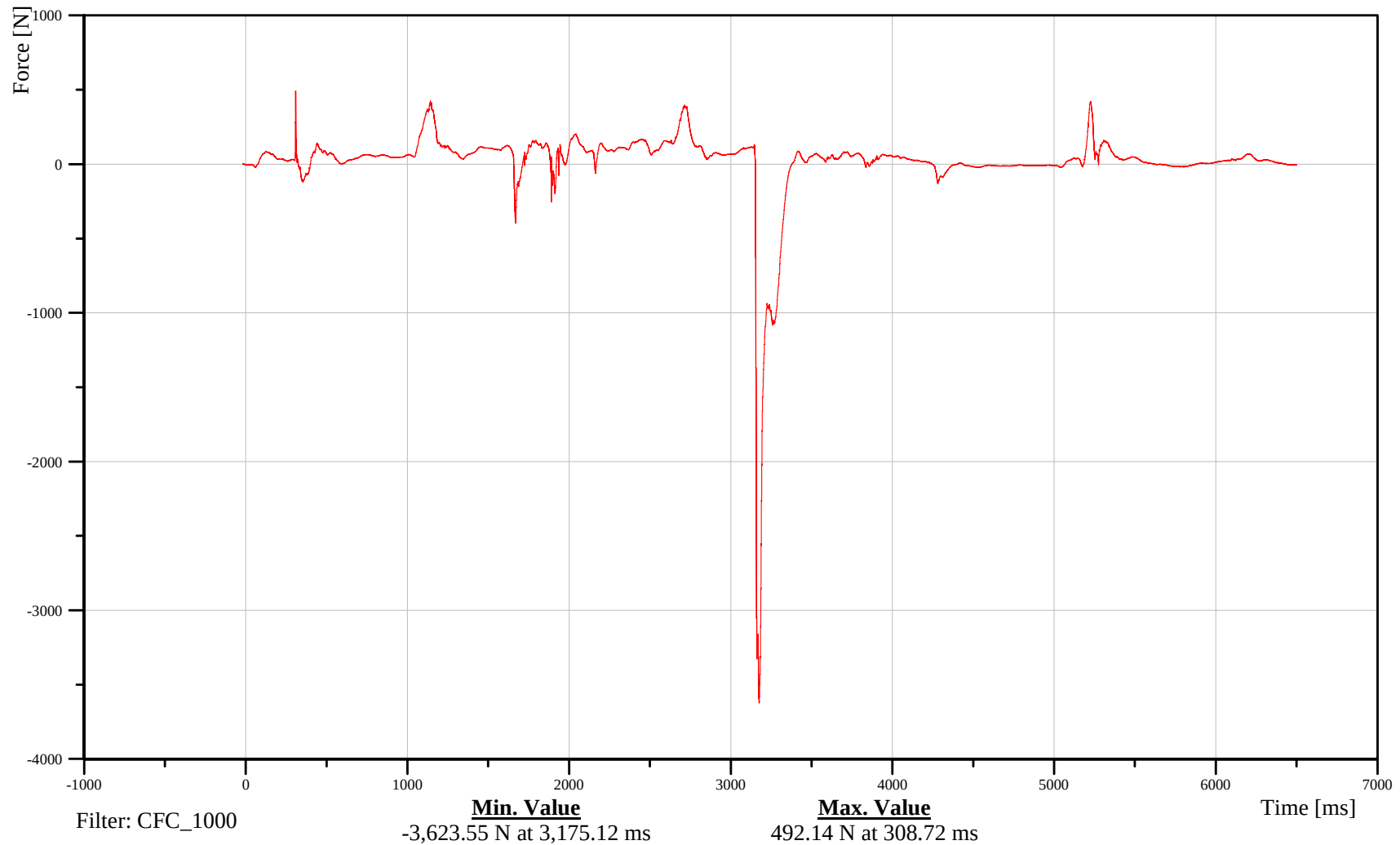
Left Rear Passenger Upper Neck Z-Axis Force

Customer: VRTC

14NECKUP00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-70

090930



FMVSS 208 Rollover 2007 Ford Expedition
Left Rear Passenger Upper Neck Moment About X Axis

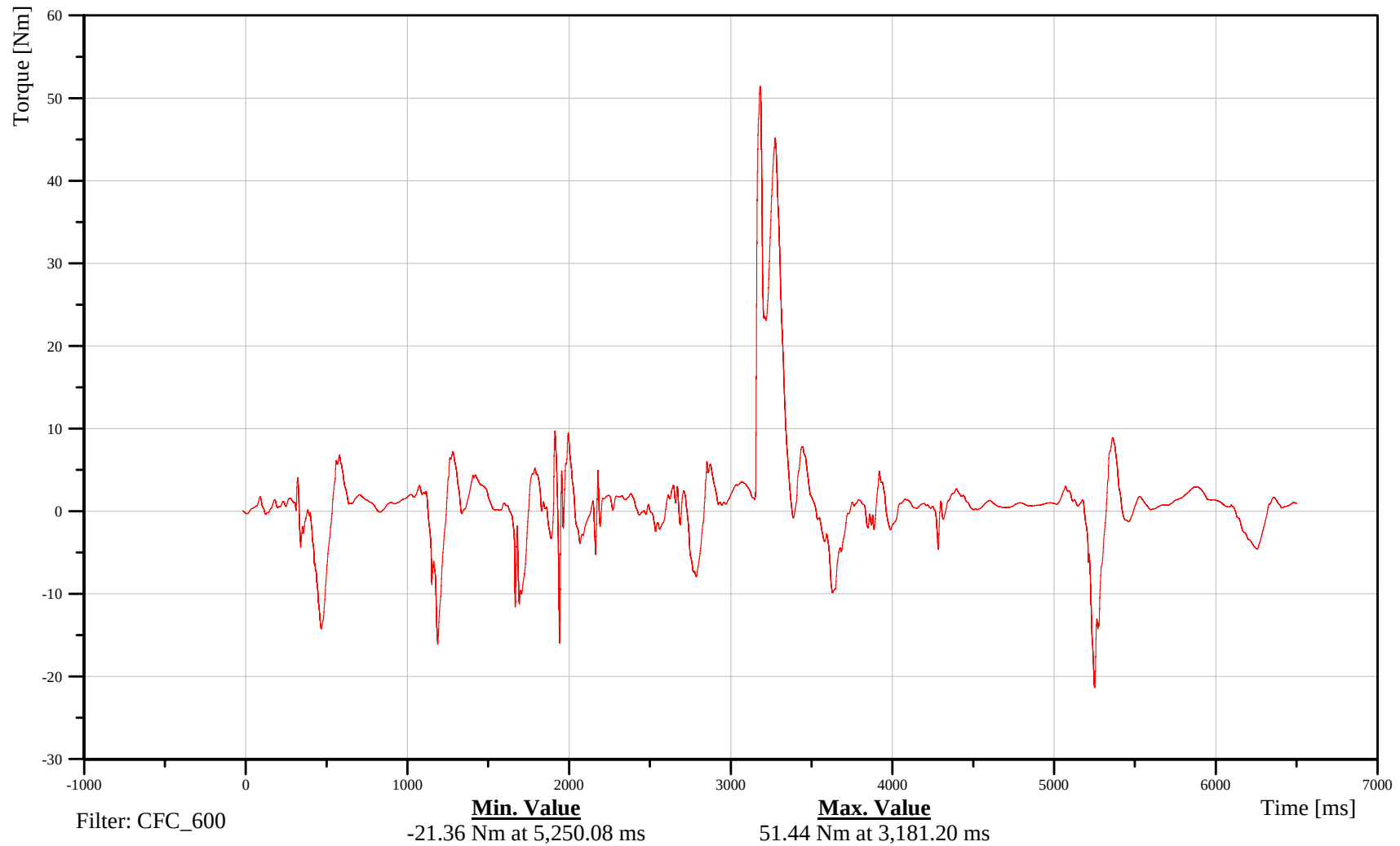
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14NECKUP00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-71

090930



FMVSS 208 Rollover 2007 Ford Expedition
Left Rear Passenger Upper Neck Moment About Y Axis

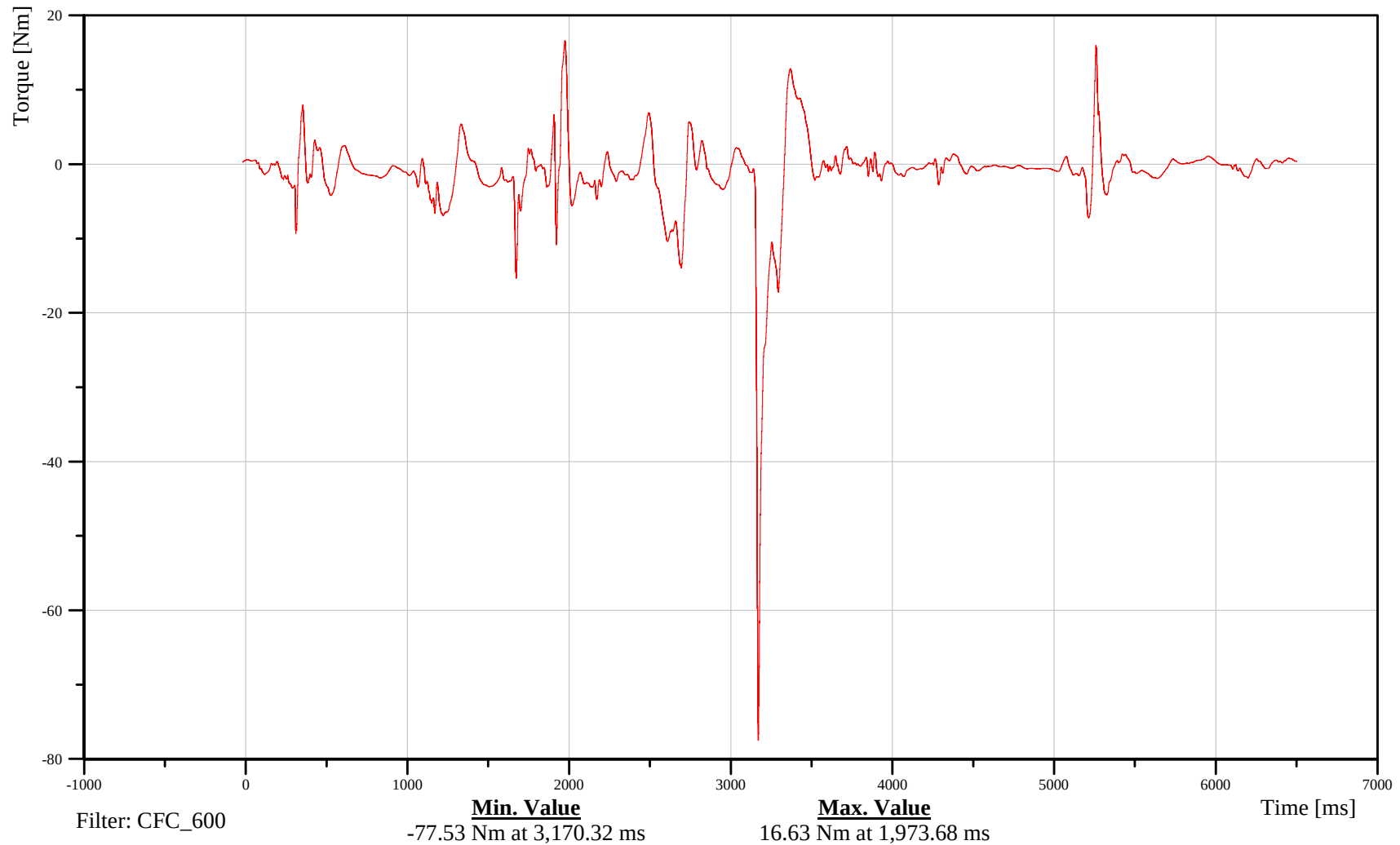
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14NECKUP00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-72

090930



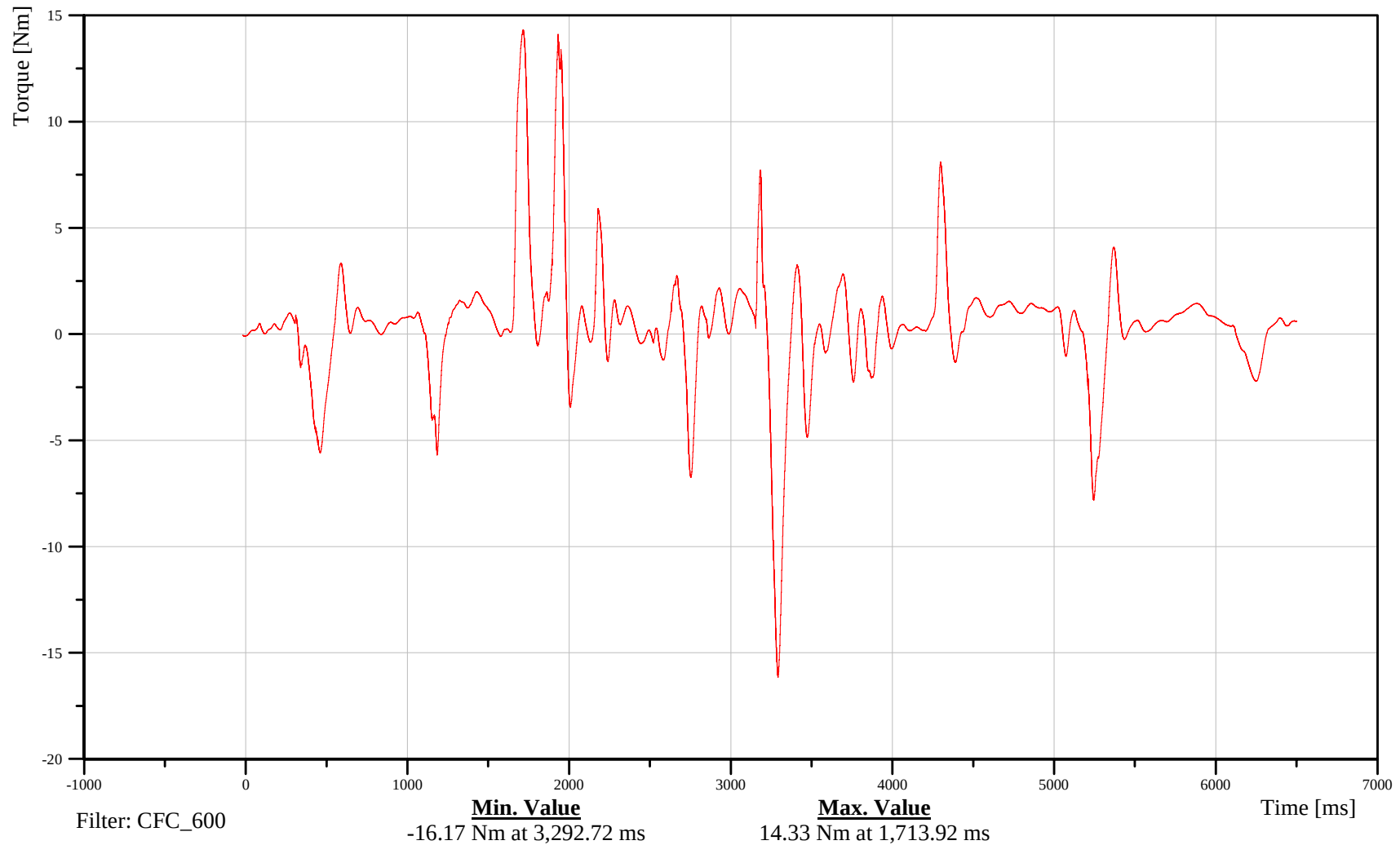
FMVSS 208 Rollover 2007 Ford Expedition
Left Rear Passenger Upper Neck Moment About Z Axis

Date: 09/30/2009
Time: 17:02

Customer: VRTC

14NECKUP00H3MOZB

TRC Inc. Test Lab: CTF
Test Number: 090930



B-73

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Chest X-Axis Acceleration

Date: 09/30/2009

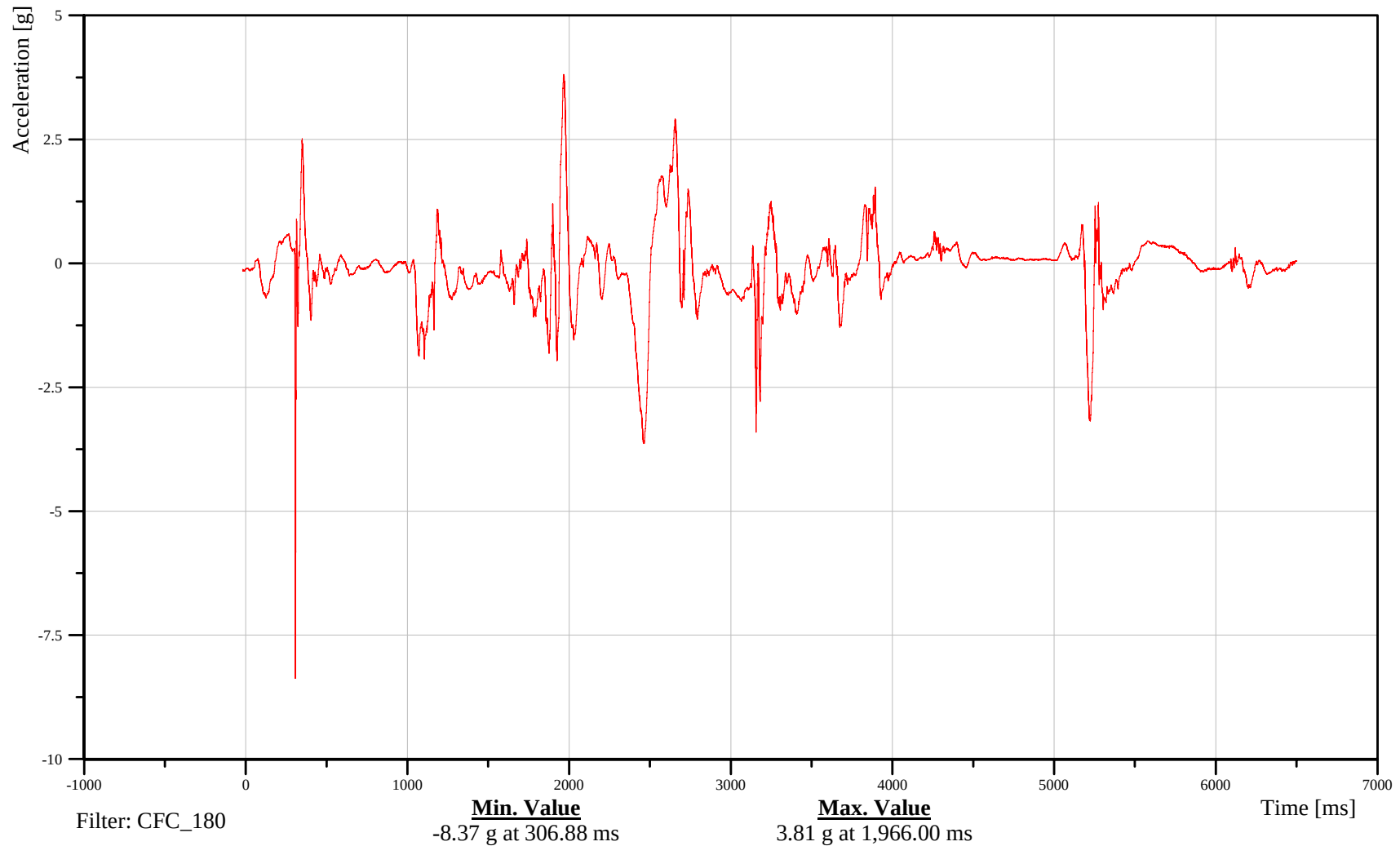
Time: 17:02

Customer: VRTC

14CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-74

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Chest Y-Axis Acceleration

Date: 09/30/2009

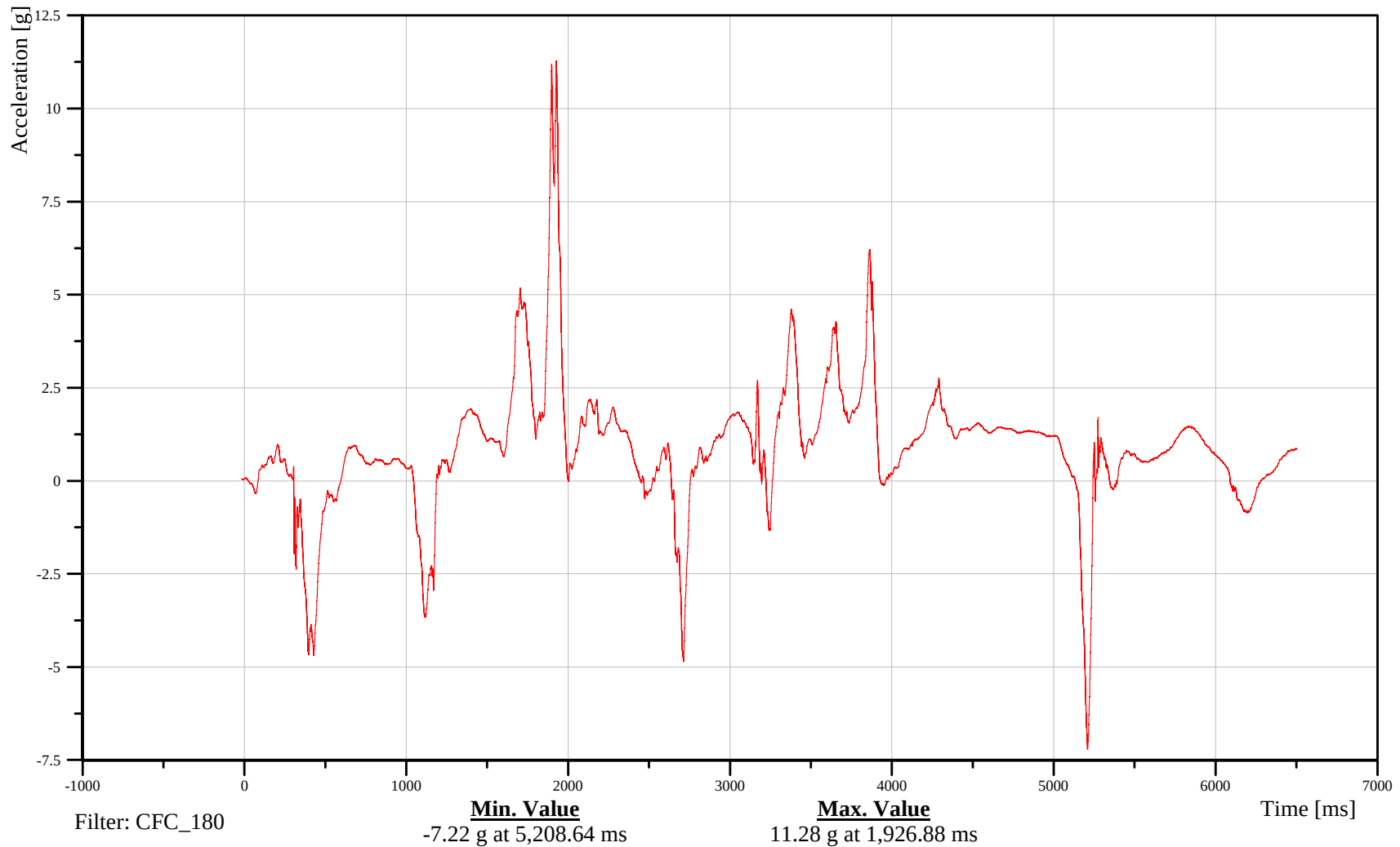
Time: 17:02

Customer: VRTC

14CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-75

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Chest Z-Axis Acceleration

Date: 09/30/2009

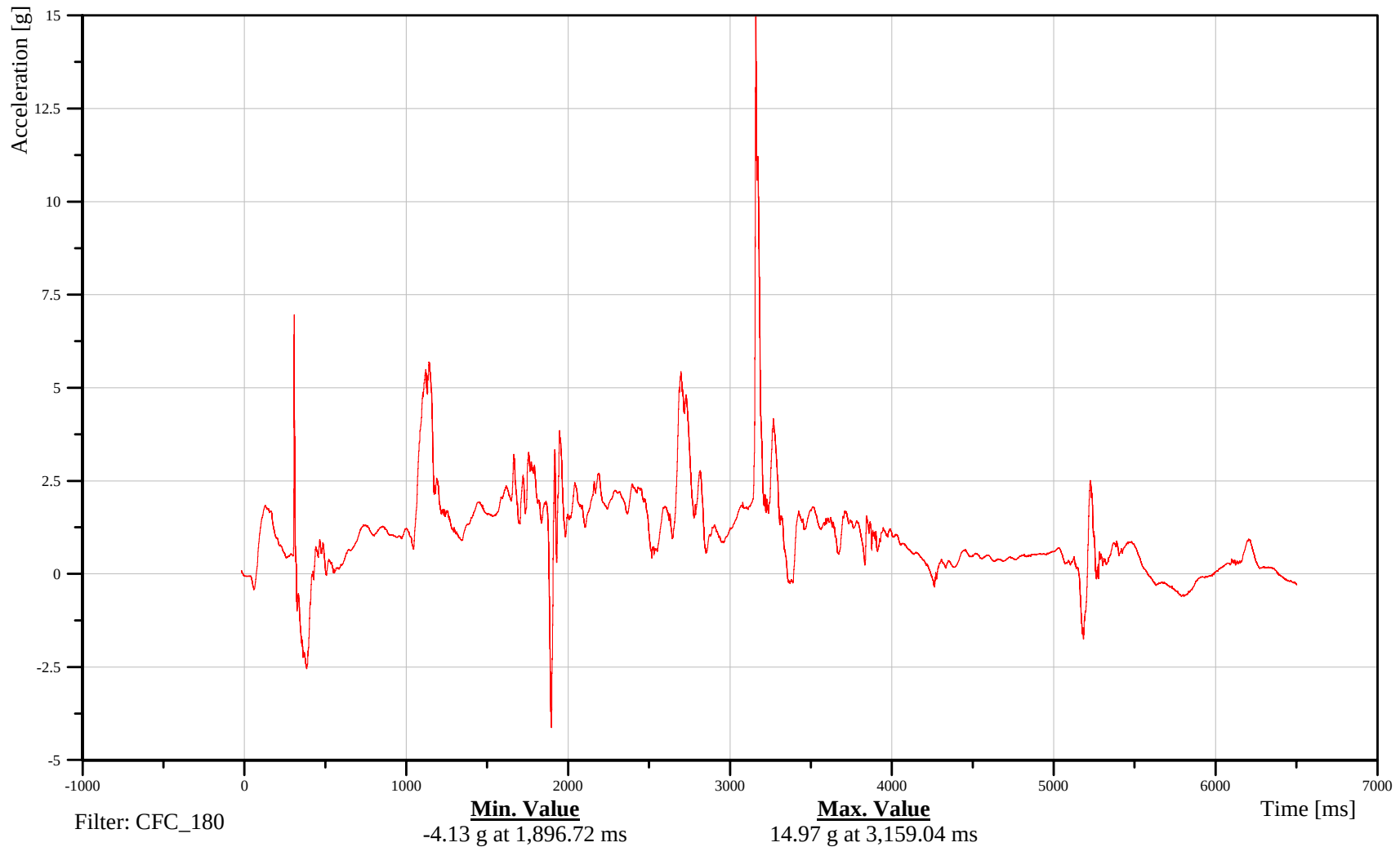
Time: 17:02

Customer: VRTC

14CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-76

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Chest Resultant Acceleration

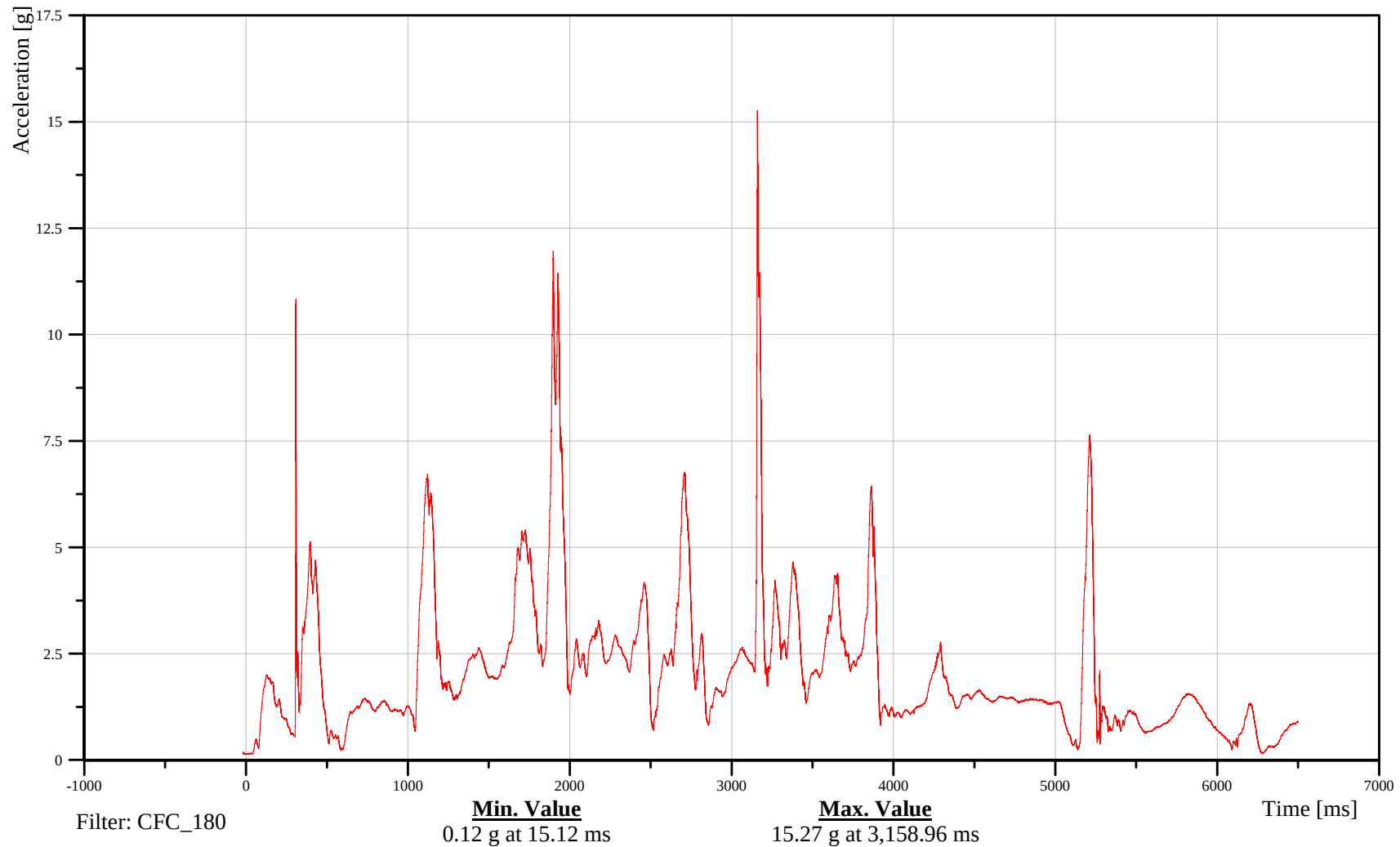
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF

Test Number: 090930



B-77

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Chest X-Axis Displacement

Date: 09/30/2009

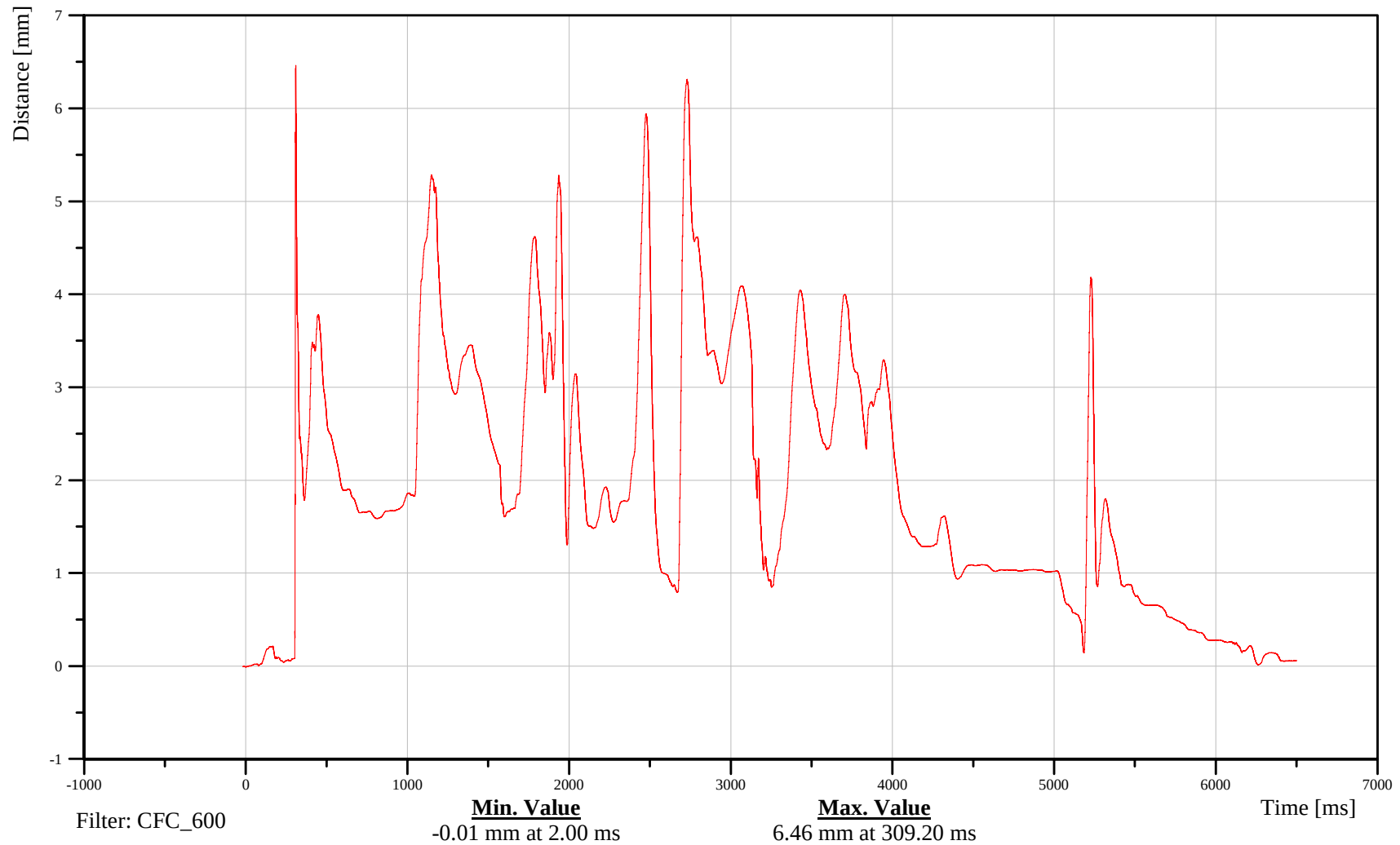
Time: 17:02

Customer: VRTC

14CHST0000H3DSXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-78

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Pelvis X-Axis Acceleration

Date: 09/30/2009

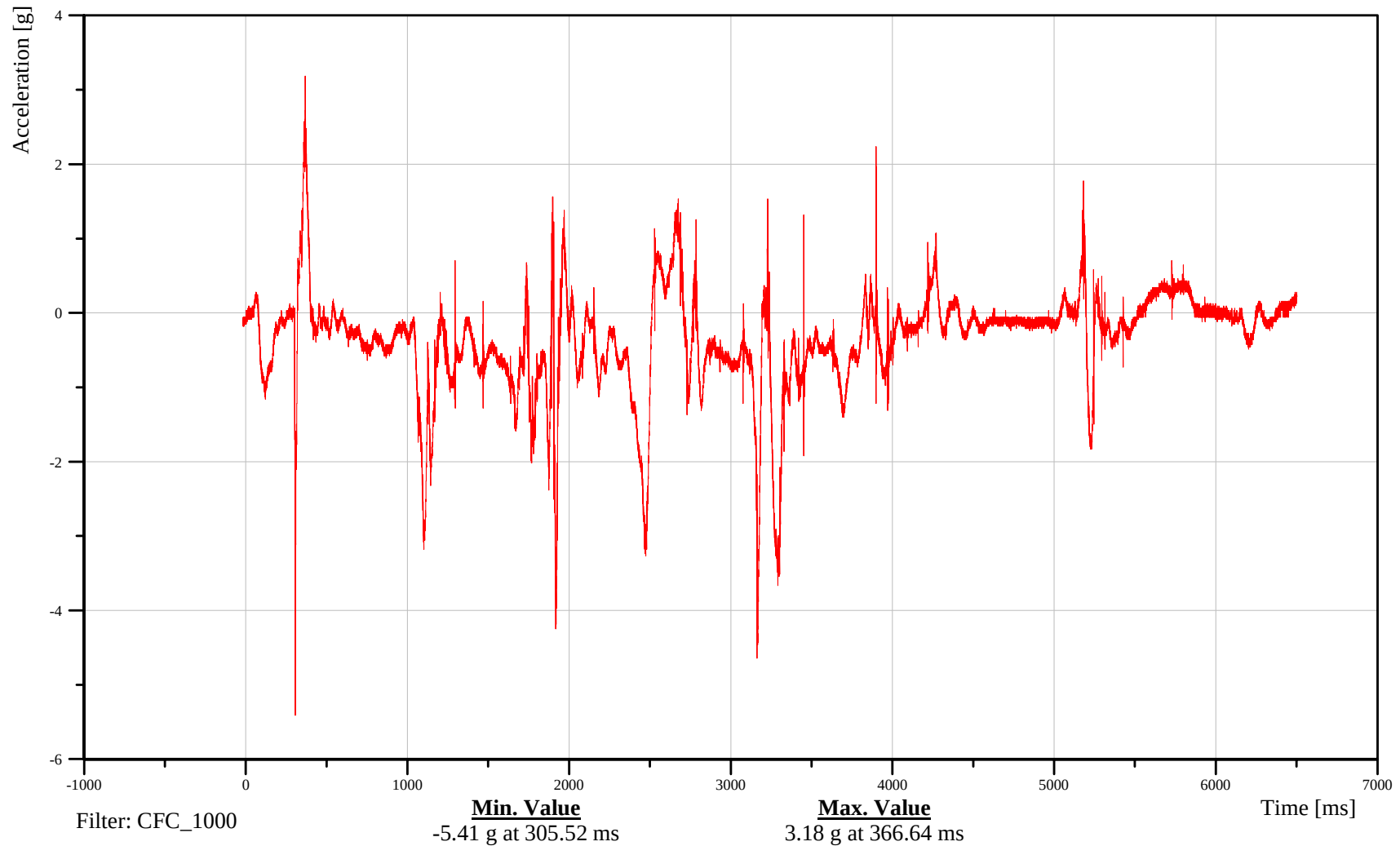
Time: 17:02

Customer: VRTC

14PELVCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-79

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Pelvis Y-Axis Acceleration

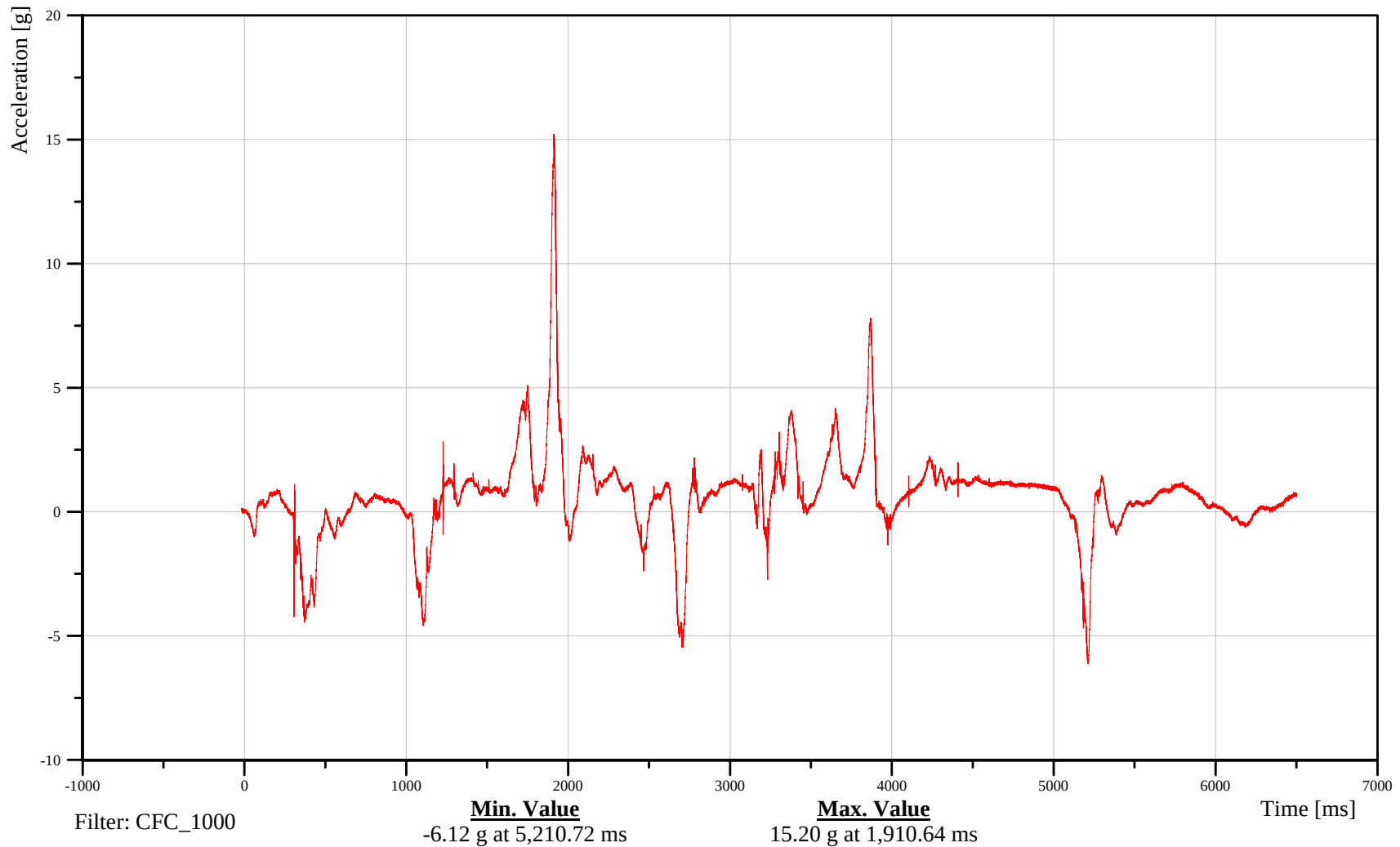
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14PELVCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-80

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Pelvis Z-Axis Acceleration

Date: 09/30/2009

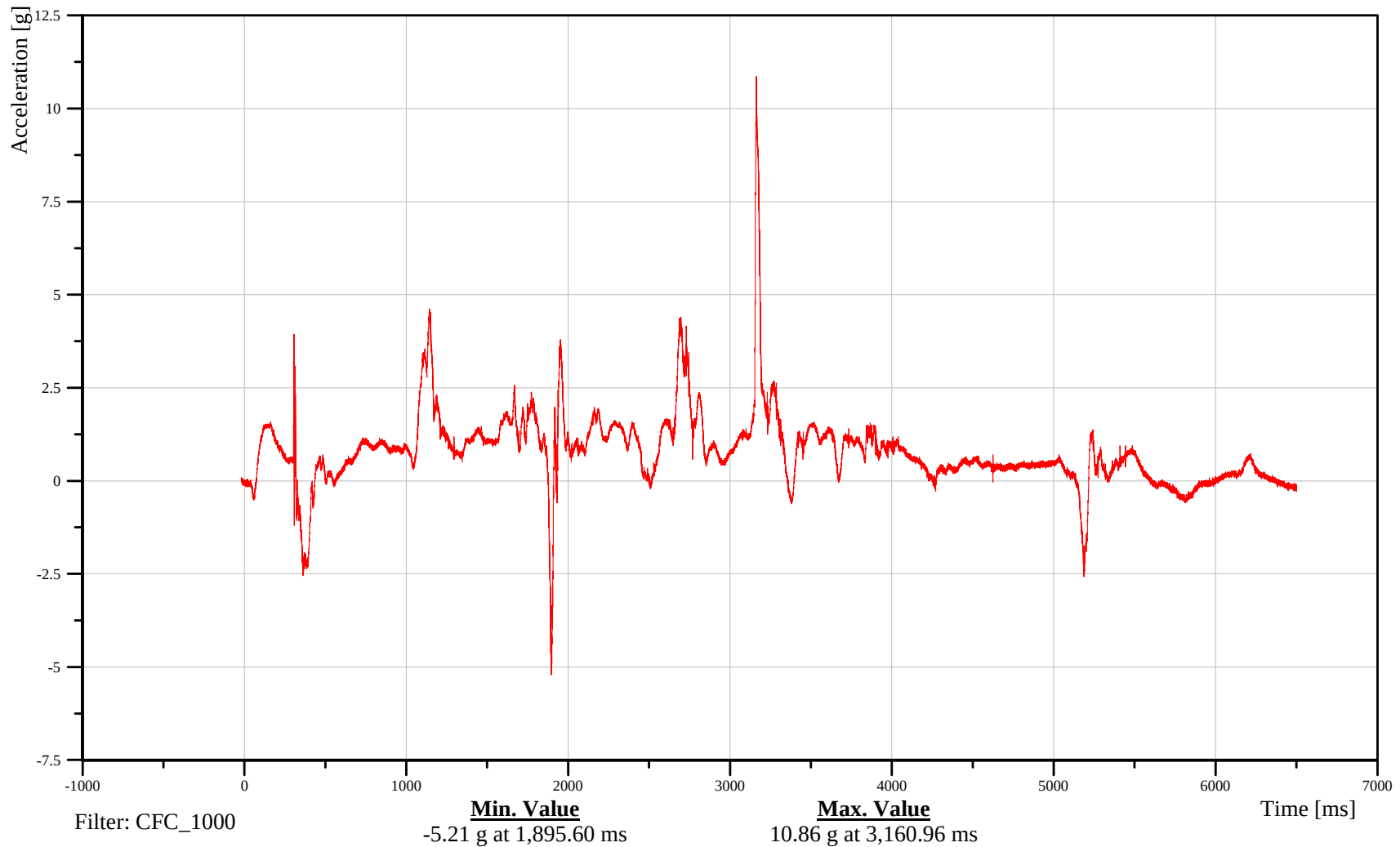
Time: 17:02

Customer: VRTC

14PELVCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-81

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left Rear Passenger Pelvis Resultant Acceleration

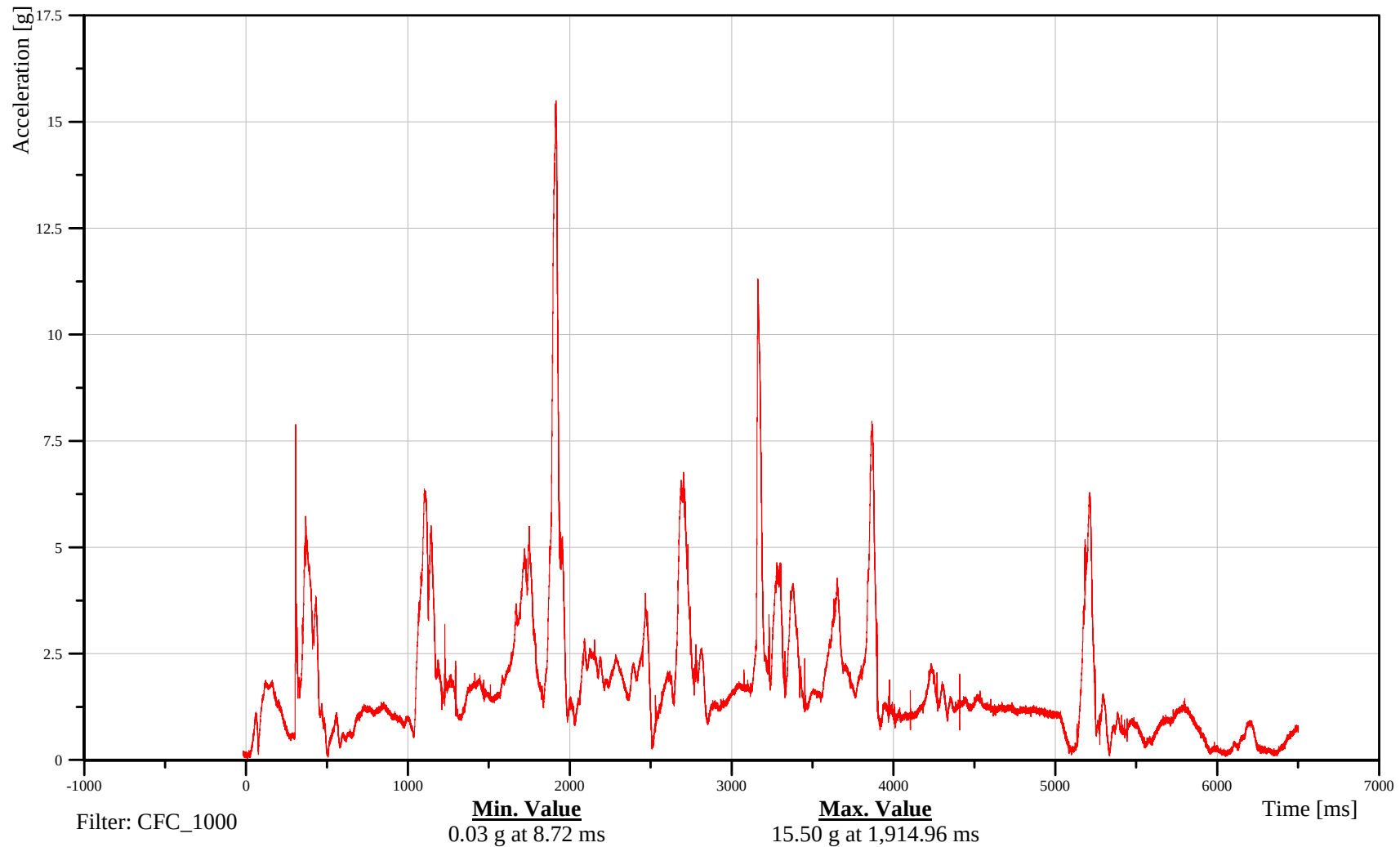
Time: 17:02

Customer: VRTC

14PELVCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-82

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left Rear Passenger Lower Neck X-Axis Force

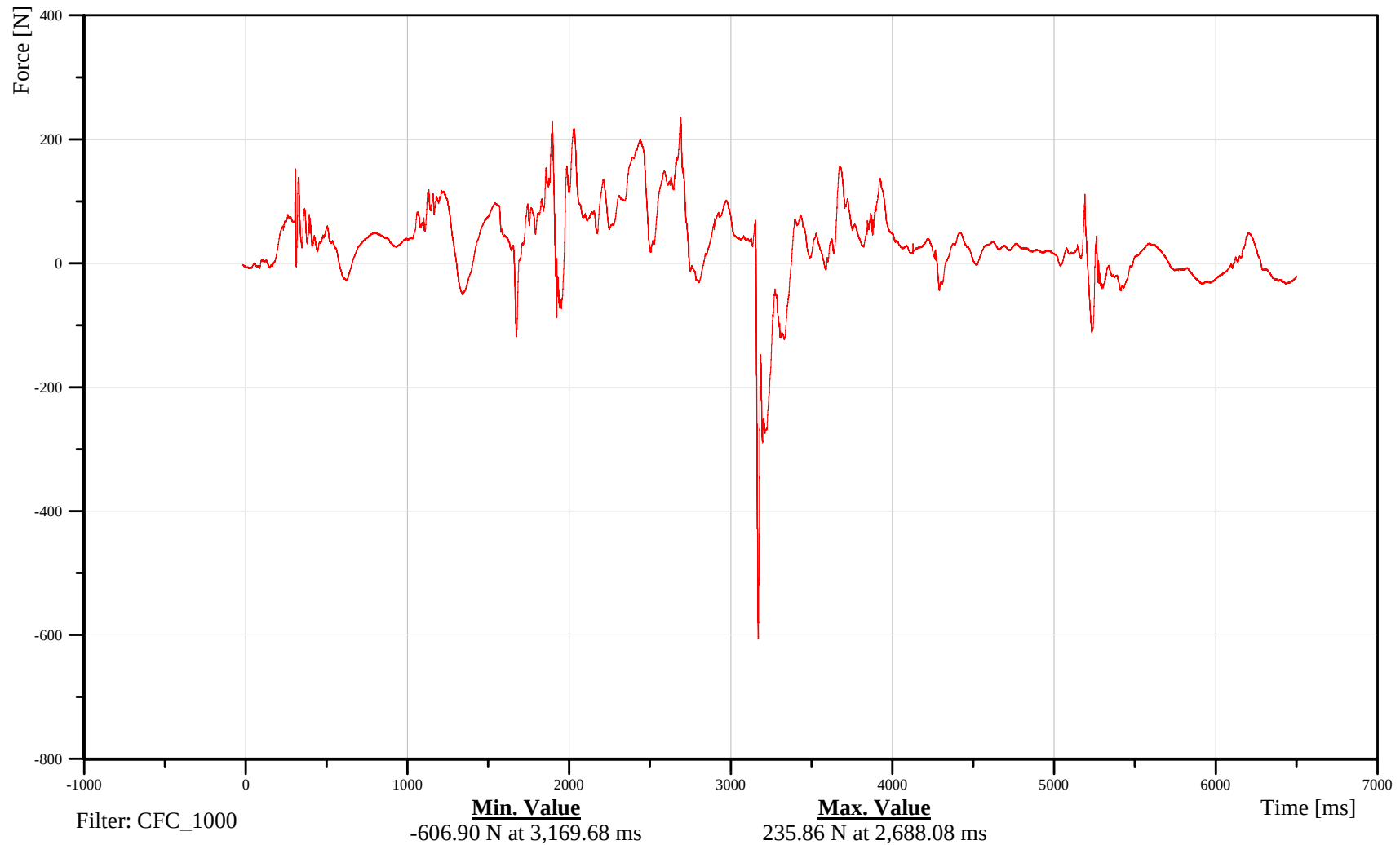
Time: 17:02

Customer: VRTC

14NECKLO00H3FOXA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-83

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left Rear Passenger Lower Neck Y-Axis Force

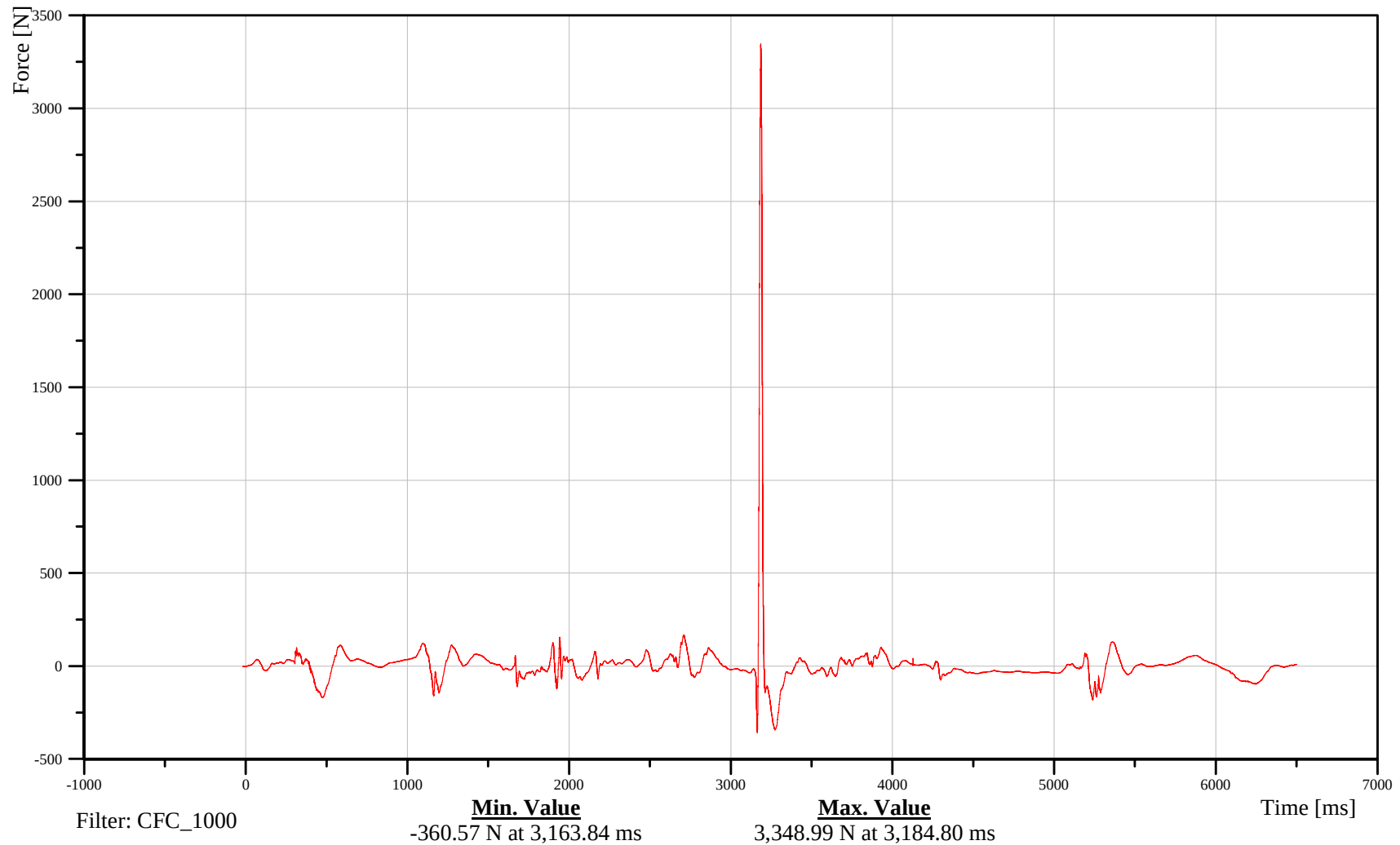
Time: 17:02

Customer: VRTC

14NECKLO00H3FOYA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-84

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left Rear Passenger Lower Neck Z-Axis Force

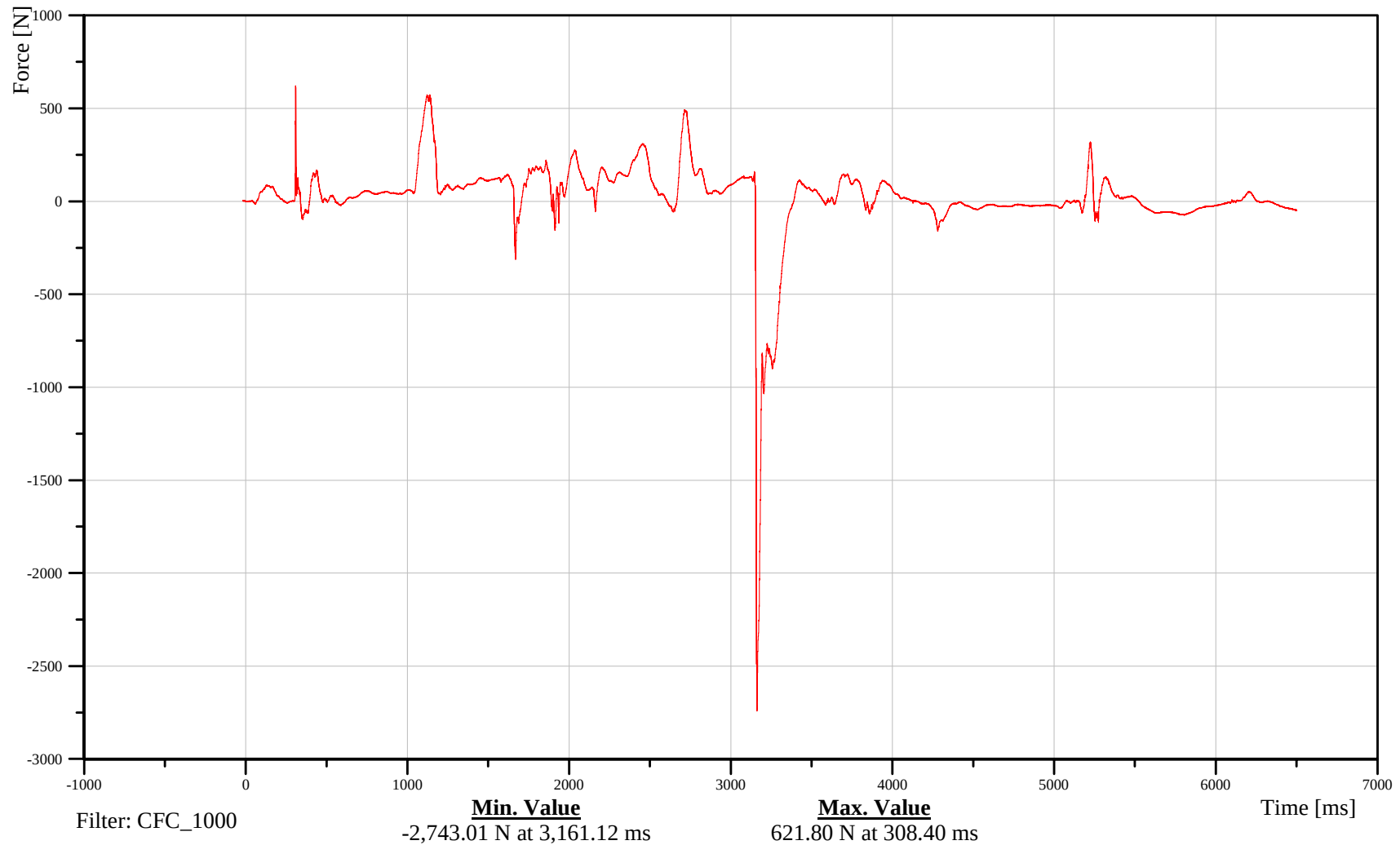
Time: 17:02

Customer: VRTC

14NECKLO00H3FOZA

TRC Inc. Test Lab: CTF

Test Number: 090930



B-85

090930



FMVSS 208 Rollover 2007 Ford Expedition
Left Rear Passenger Lower Neck Moment About X Axis

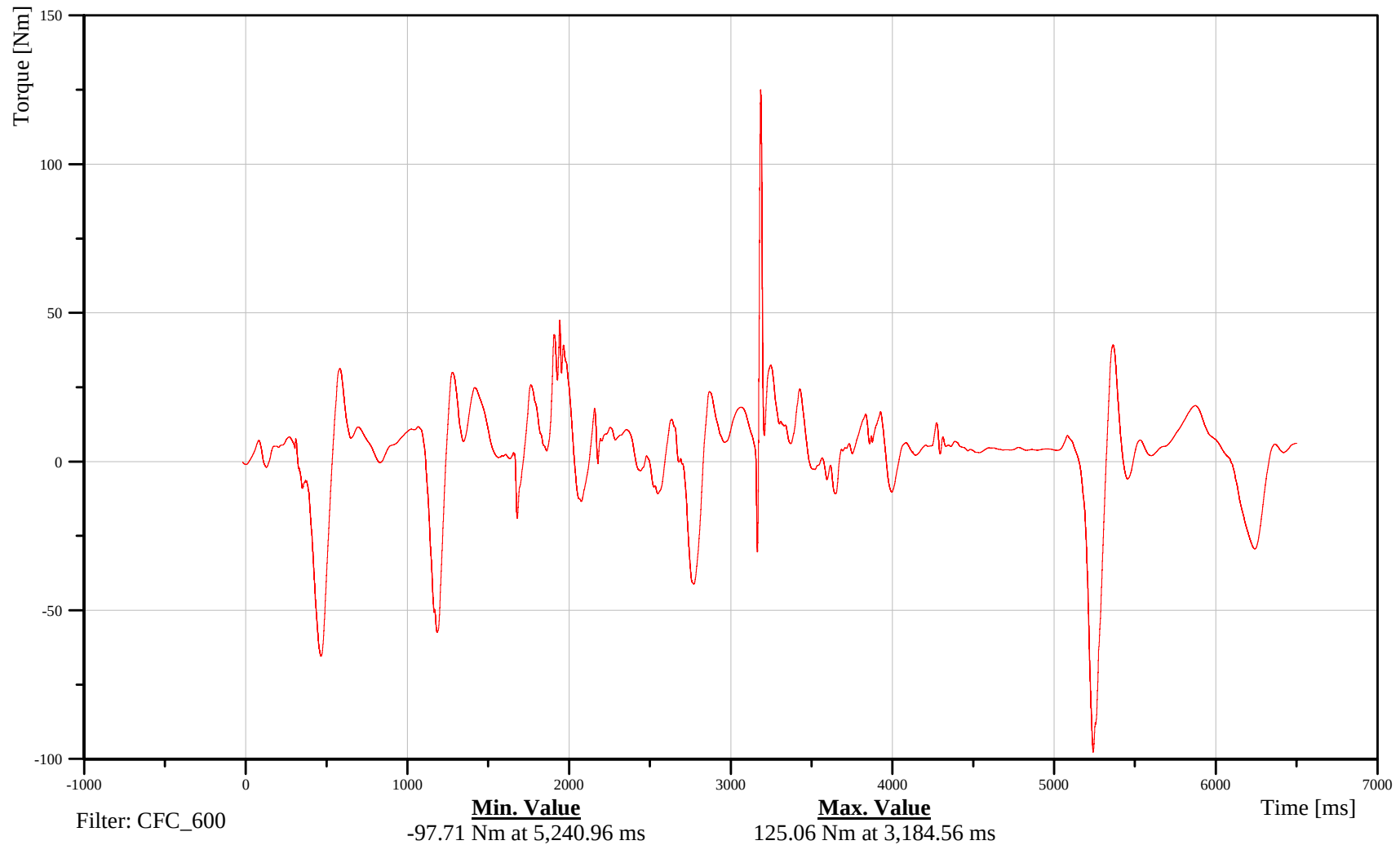
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14NECKLO00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-86

090930



FMVSS 208 Rollover 2007 Ford Expedition
Left Rear Passenger Lower Neck Moment About Y Axis

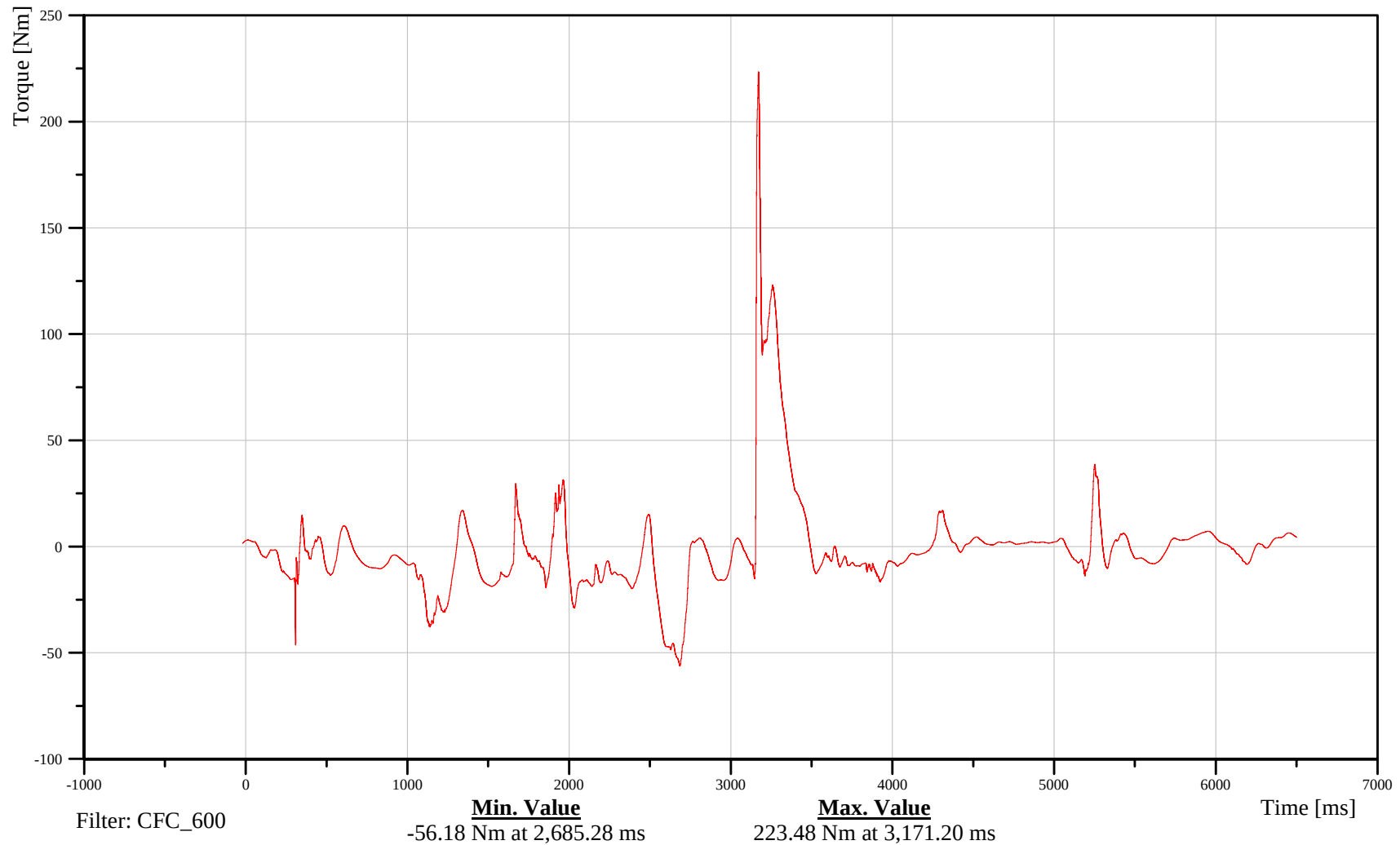
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14NECKLO00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-87

090930



FMVSS 208 Rollover 2007 Ford Expedition
Left Rear Passenger Lower Neck Moment About Z Axis

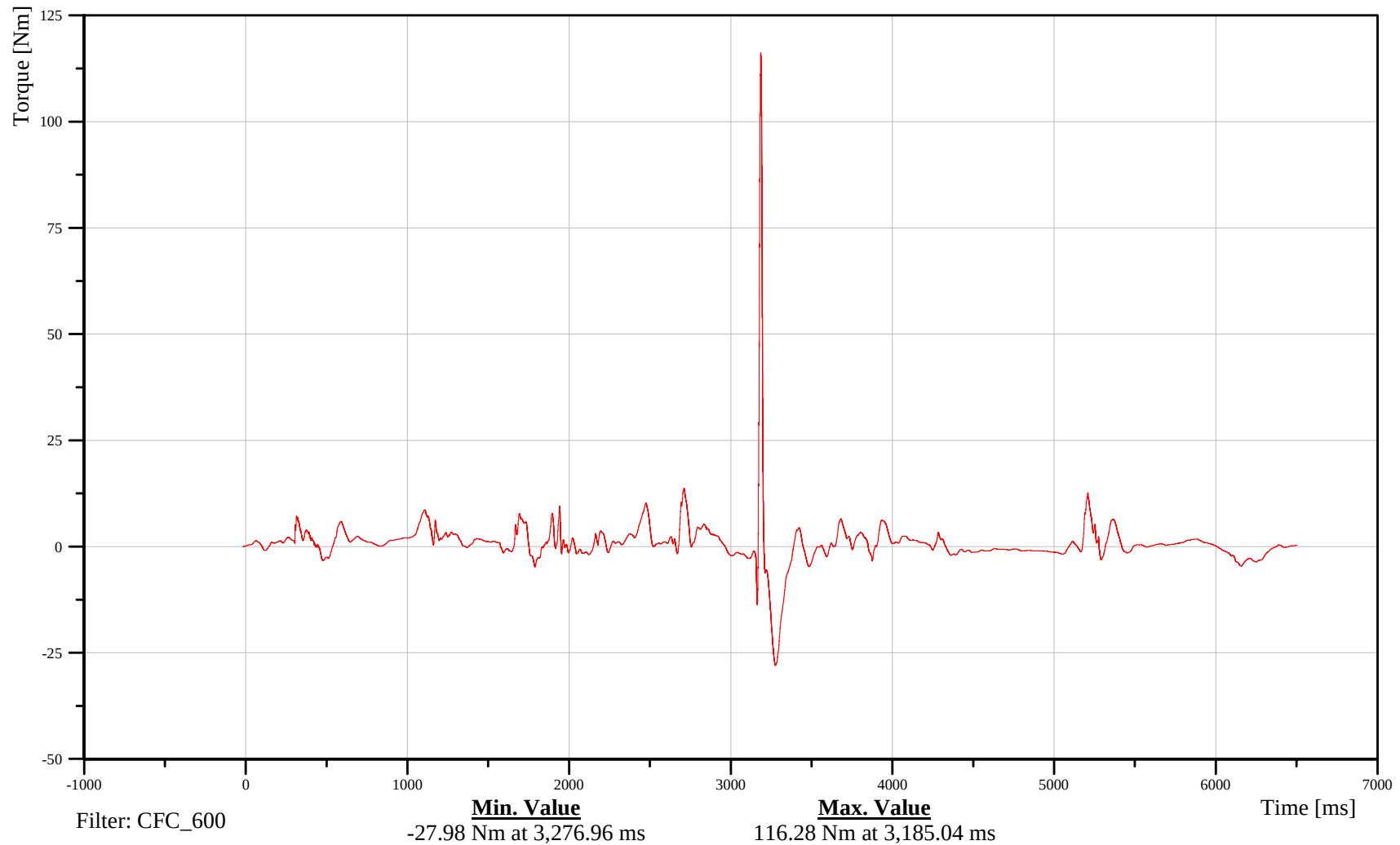
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14NECKLO00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-88

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Center of Gravity X-Axis Acceleration

Date: 09/30/2009

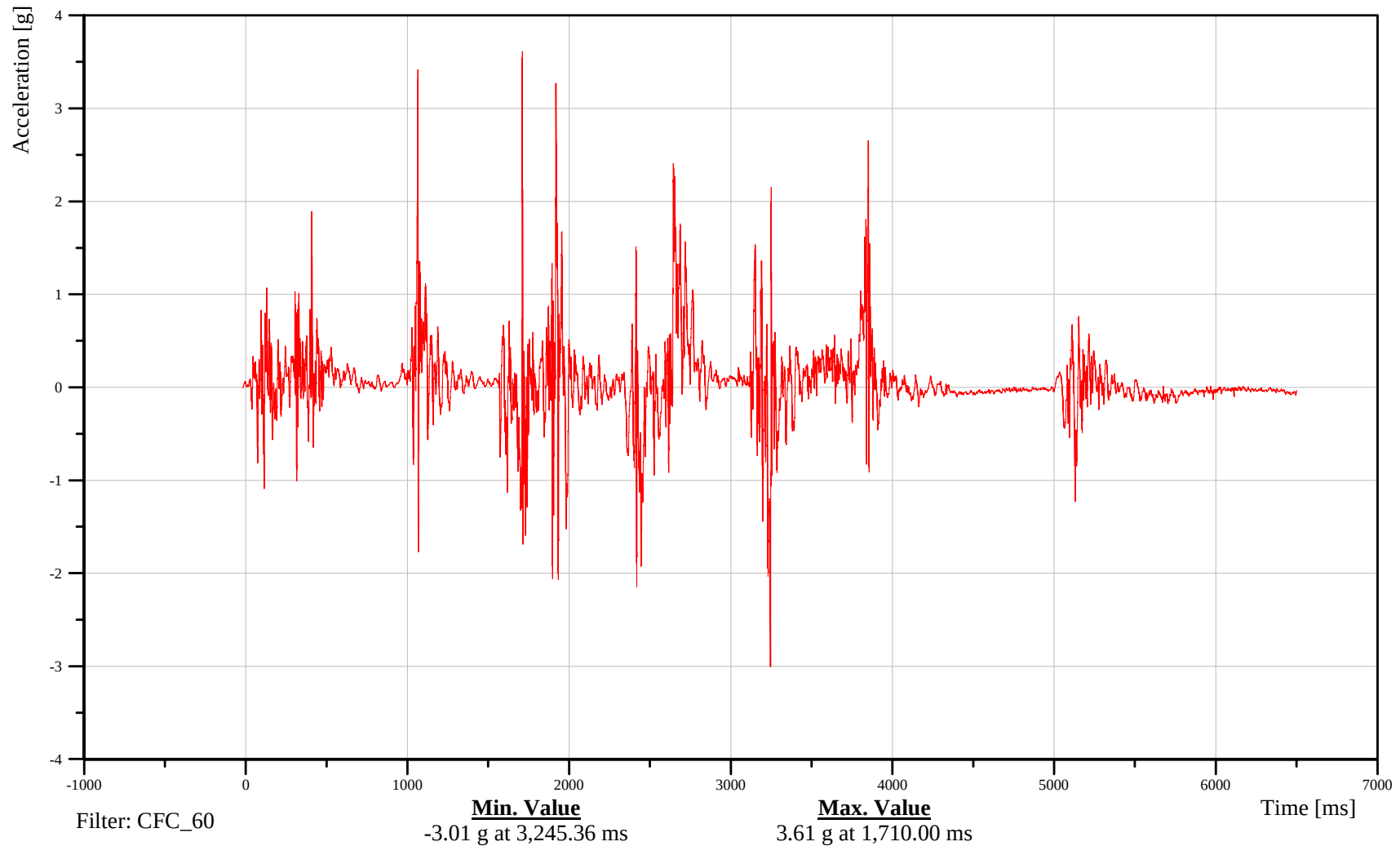
Time: 17:02

Customer: VRTC

10VEHCCG0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-89

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Center of Gravity Y-Axis Acceleration

Date: 09/30/2009

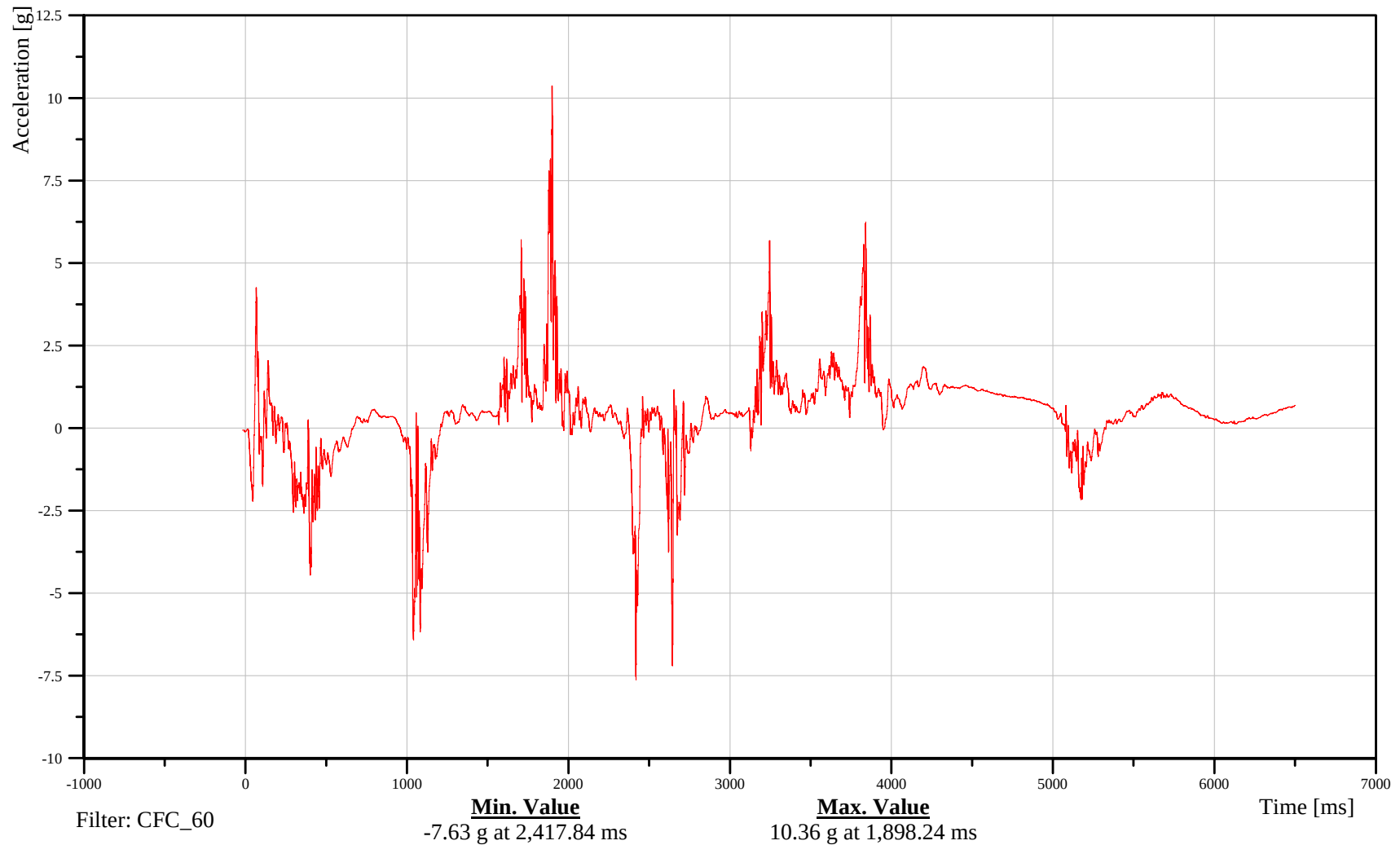
Time: 17:02

Customer: VRTC

10VEHCCG0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-90

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Center of Gravity Z-Axis Acceleration

Date: 09/30/2009

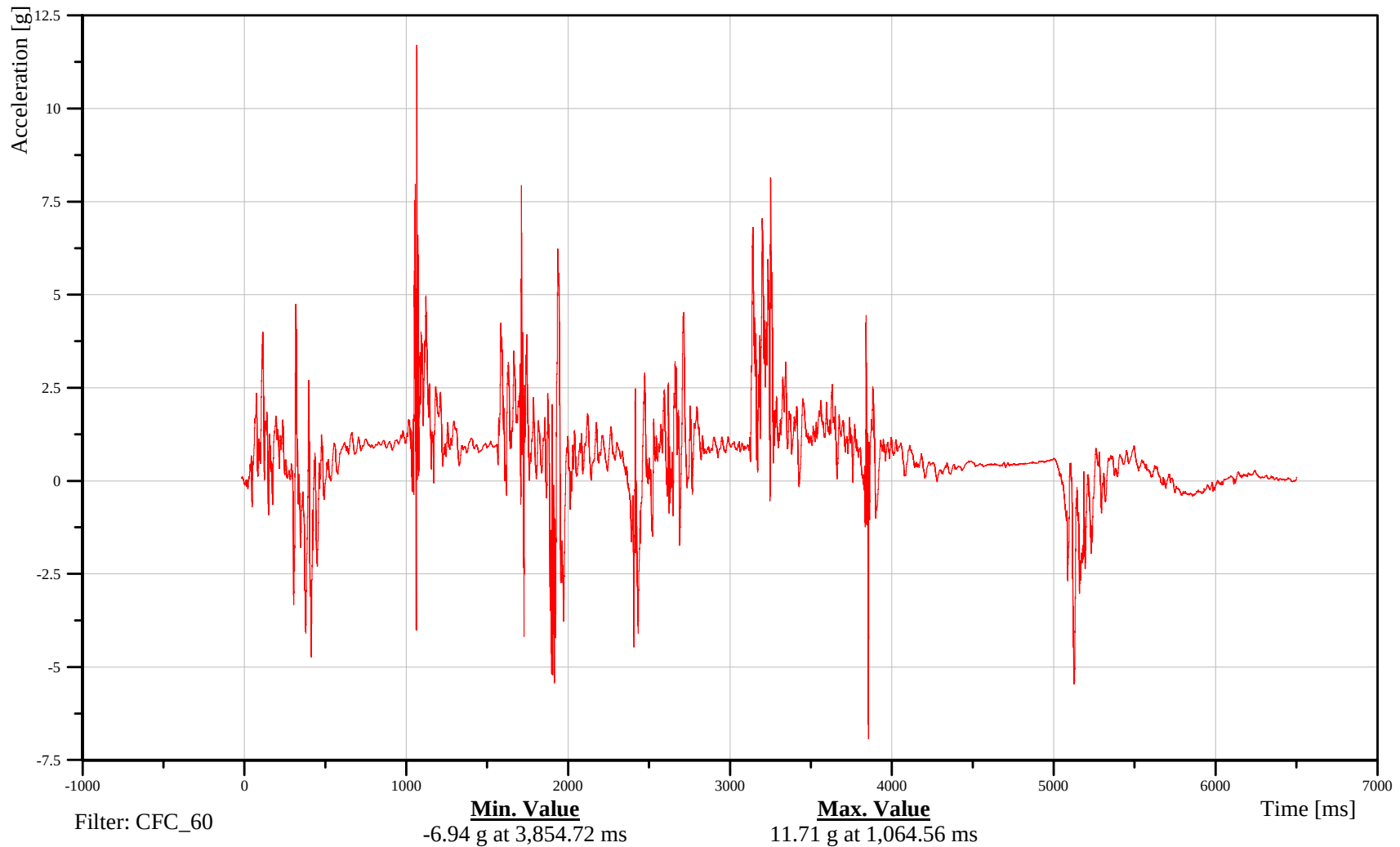
Time: 17:02

Customer: VRTC

10VEHCCG0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-91

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Center of Gravity Resultant Acceleration

Date: 09/30/2009

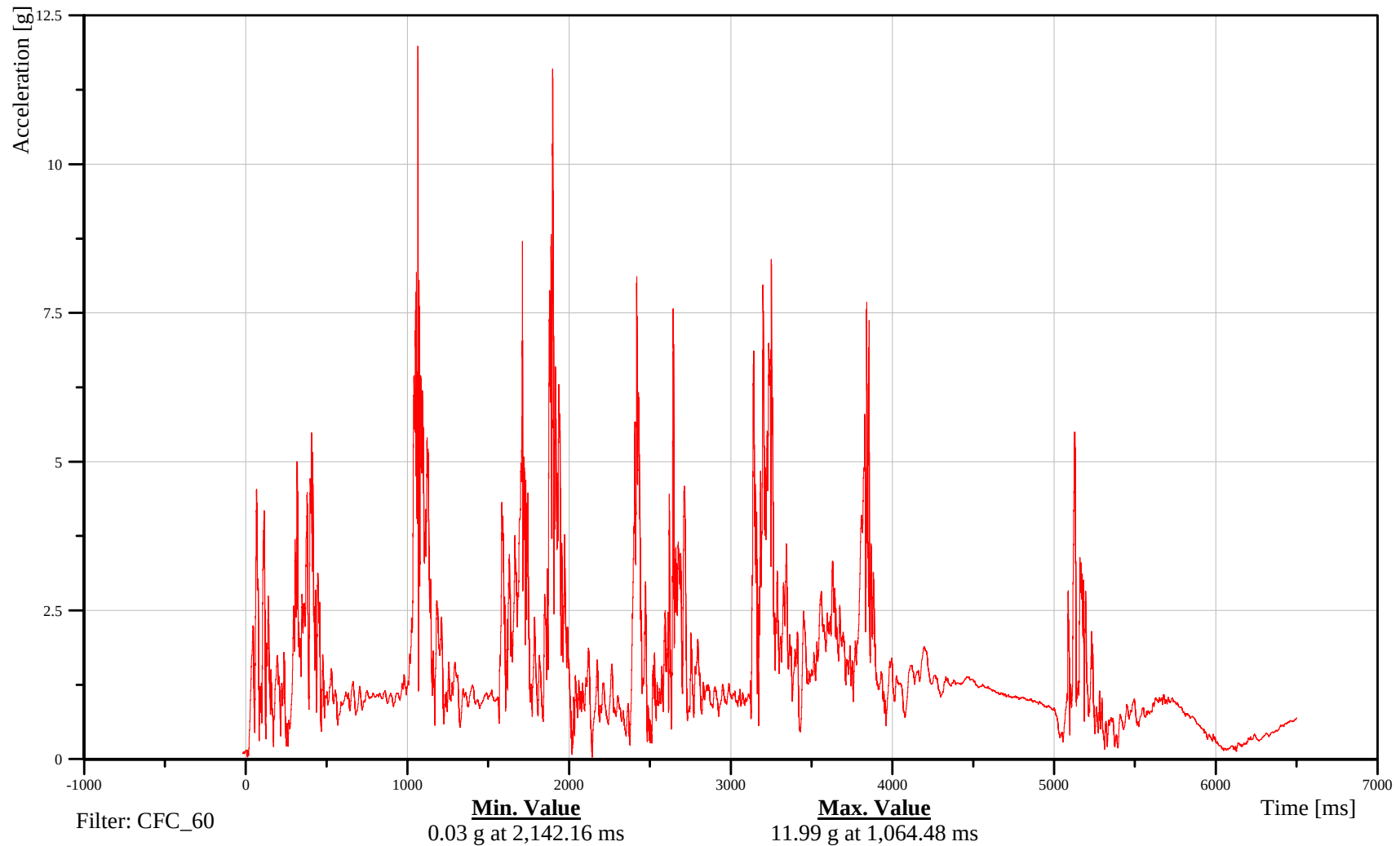
Time: 17:02

Customer: VRTC

10VEHCCG0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-92

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Roll Rate

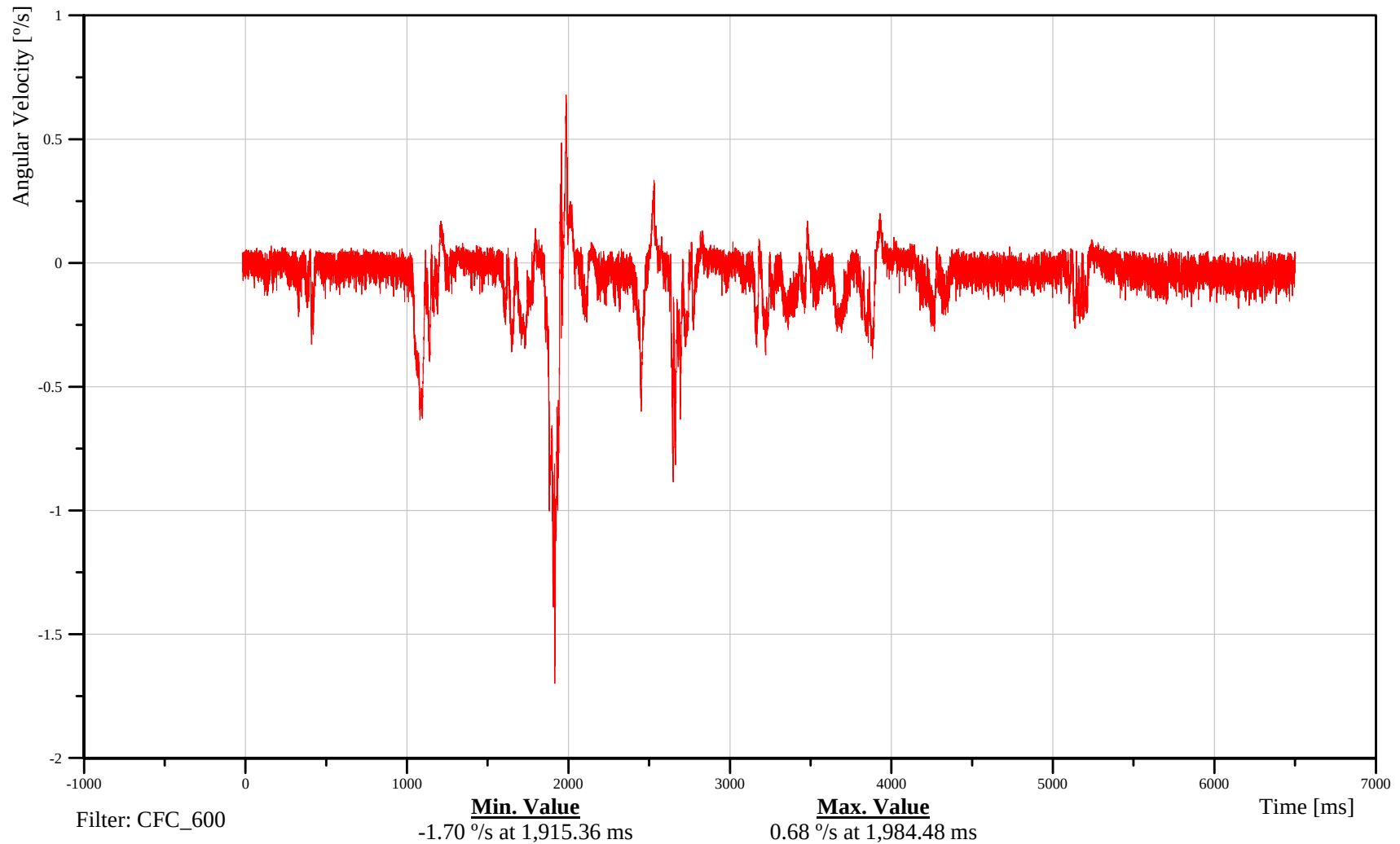
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10VEHCCG0000AVXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-93

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Pitch Rate

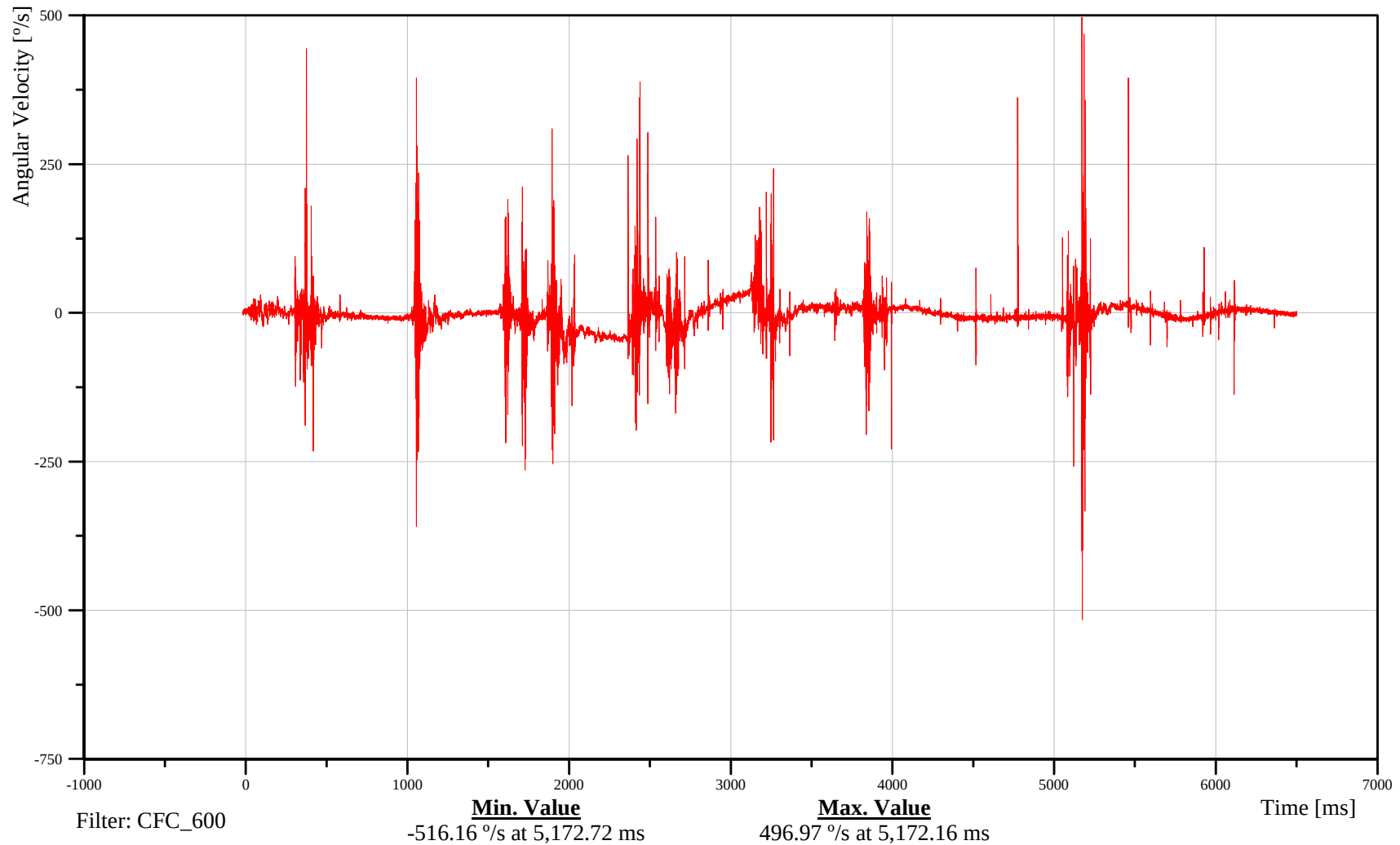
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10VEHCCG0000AVYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-94

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Yaw Rate

Date: 09/30/2009

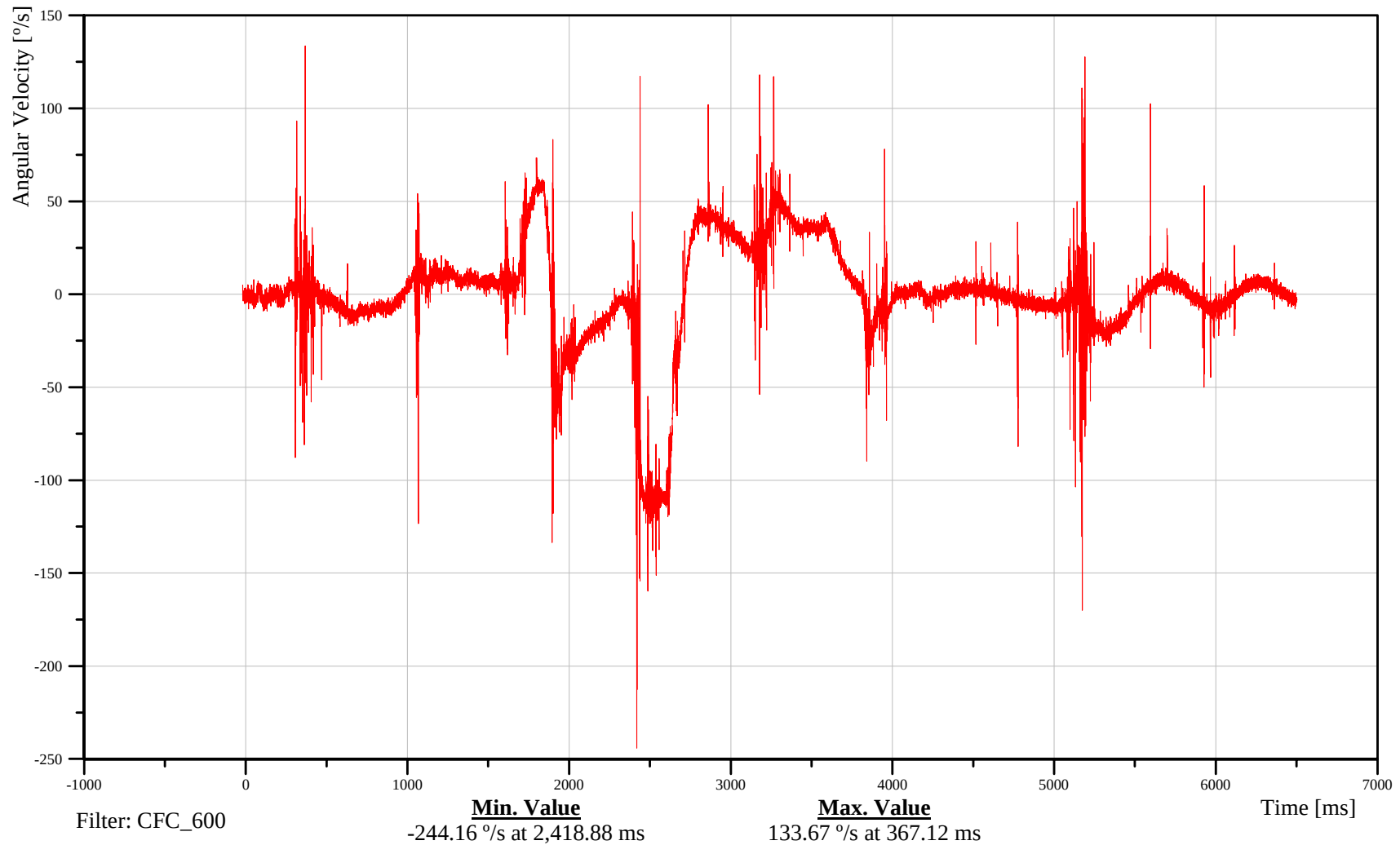
Time: 17:02

Customer: VRTC

10VEHCCG0000AVZB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-95

090930



FMVSS 208 Rollover 2007 Ford Expedition

Rear Deck Roll Rate Redundant

Date: 09/30/2009

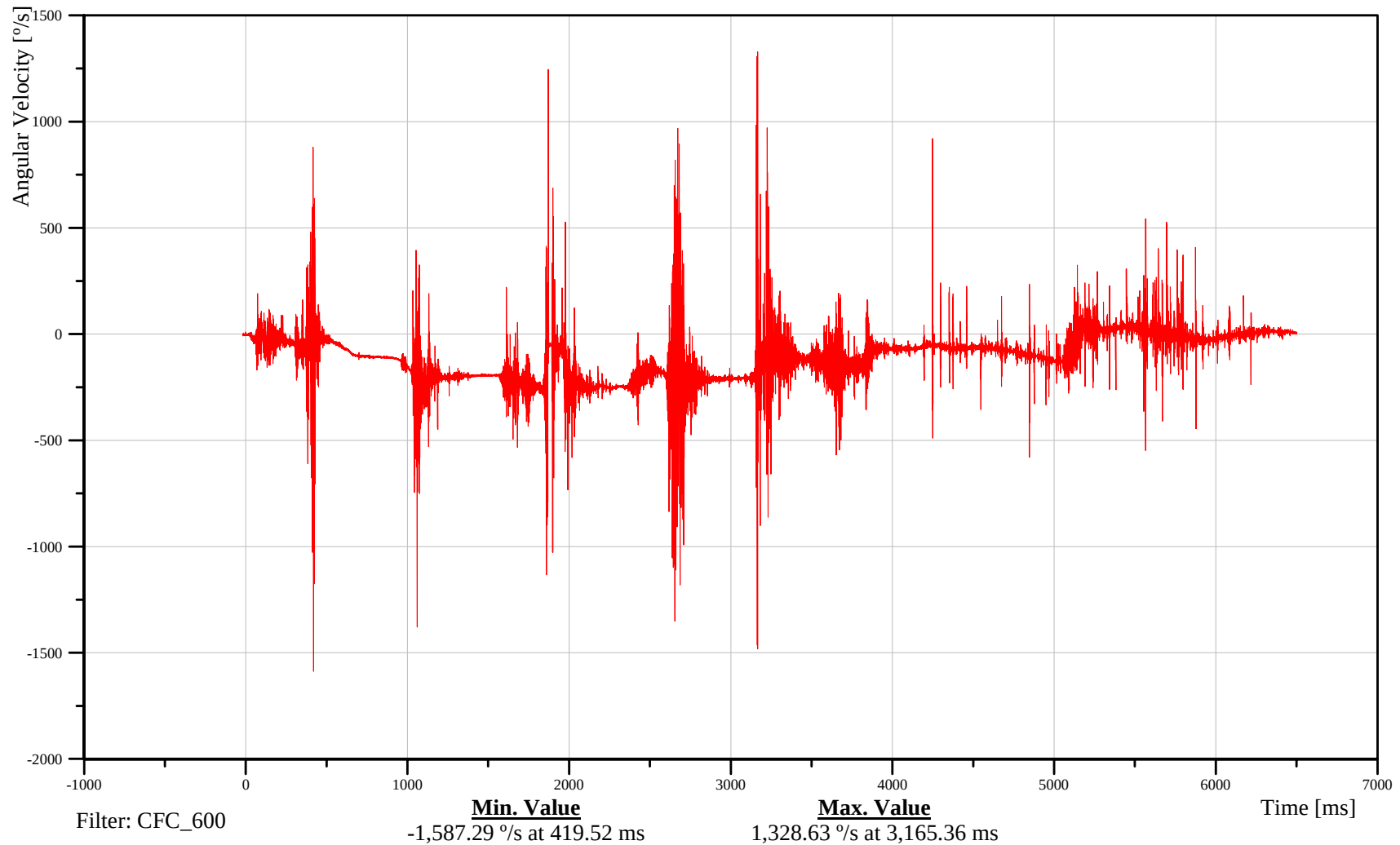
Time: 17:02

Customer: VRTC

10VEHCREDK00AVXB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-96

090930



FMVSS 208 Rollover 2007 Ford Expedition

Rear Deck Pitch Rate Redundant

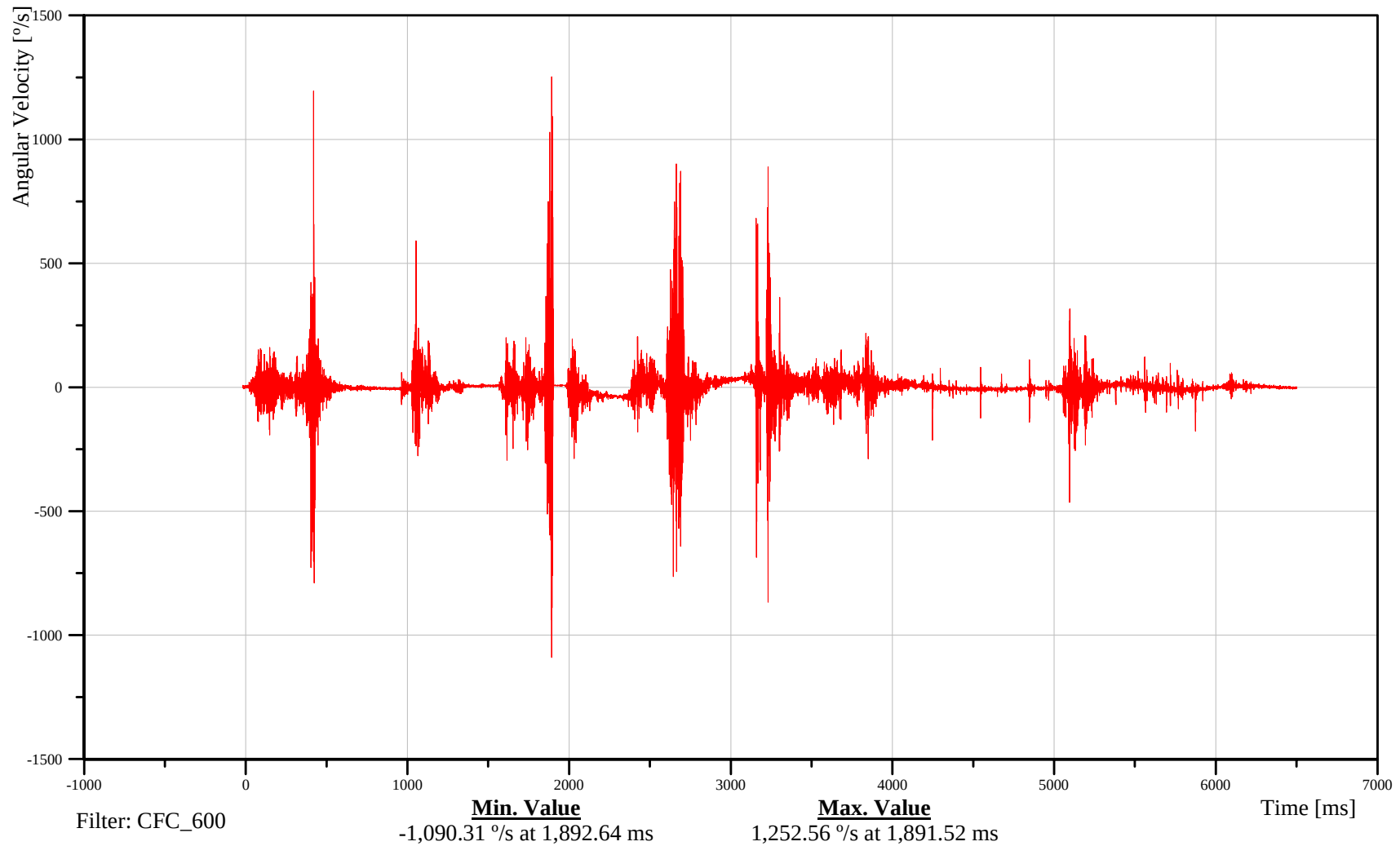
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10VEHCREDK00AVYB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-97

090930



FMVSS 208 Rollover 2007 Ford Expedition

Rear Deck Yaw Rate Redundant

Date: 09/30/2009

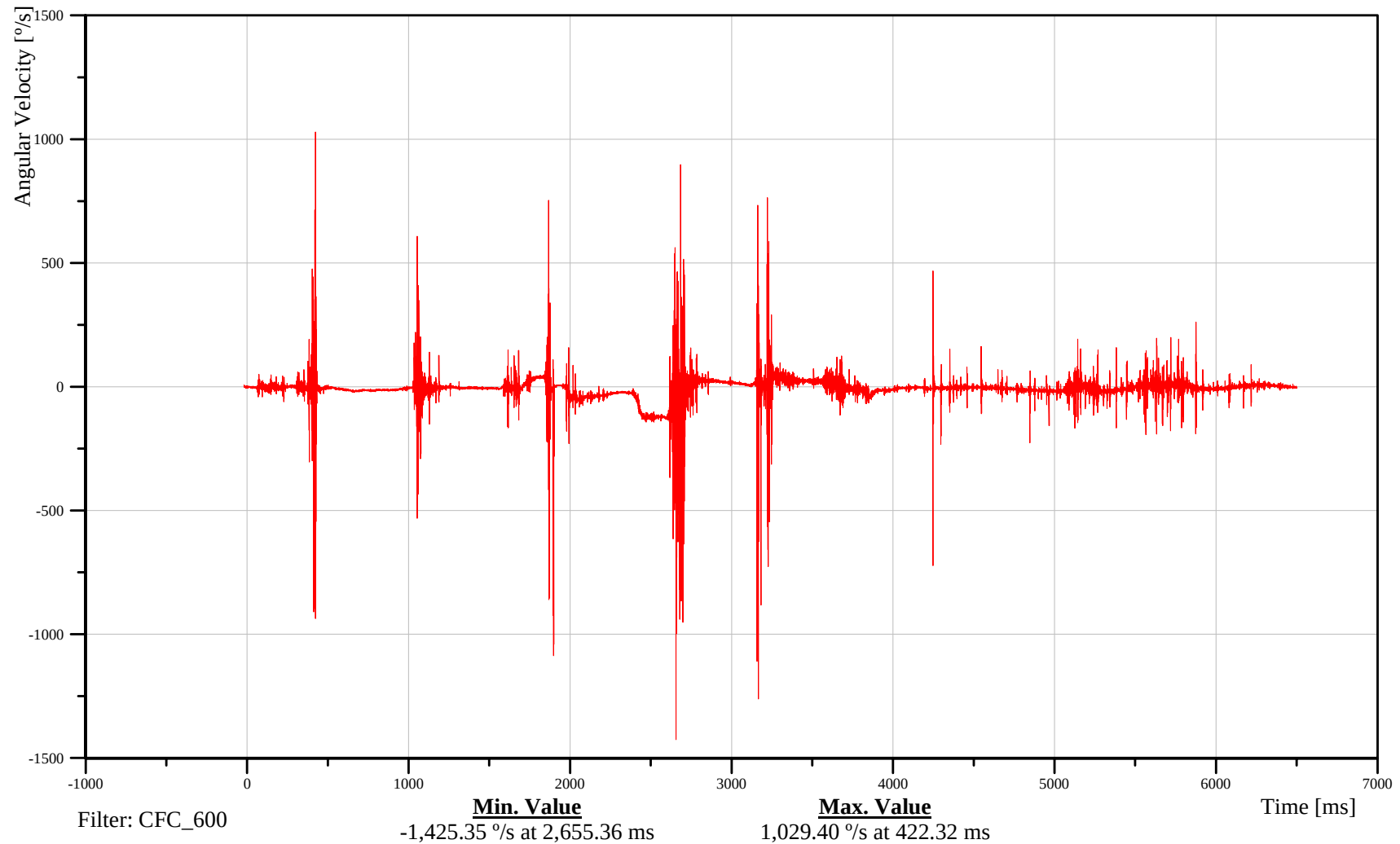
Time: 17:02

Customer: VRTC

10VEHCREDK00AVZB

TRC Inc. Test Lab: CTF

Test Number: 090930



B-98

090930



FMVSS 208 Rollover 2007 Ford Expedition

Top of Engine X-Axis Acceleration

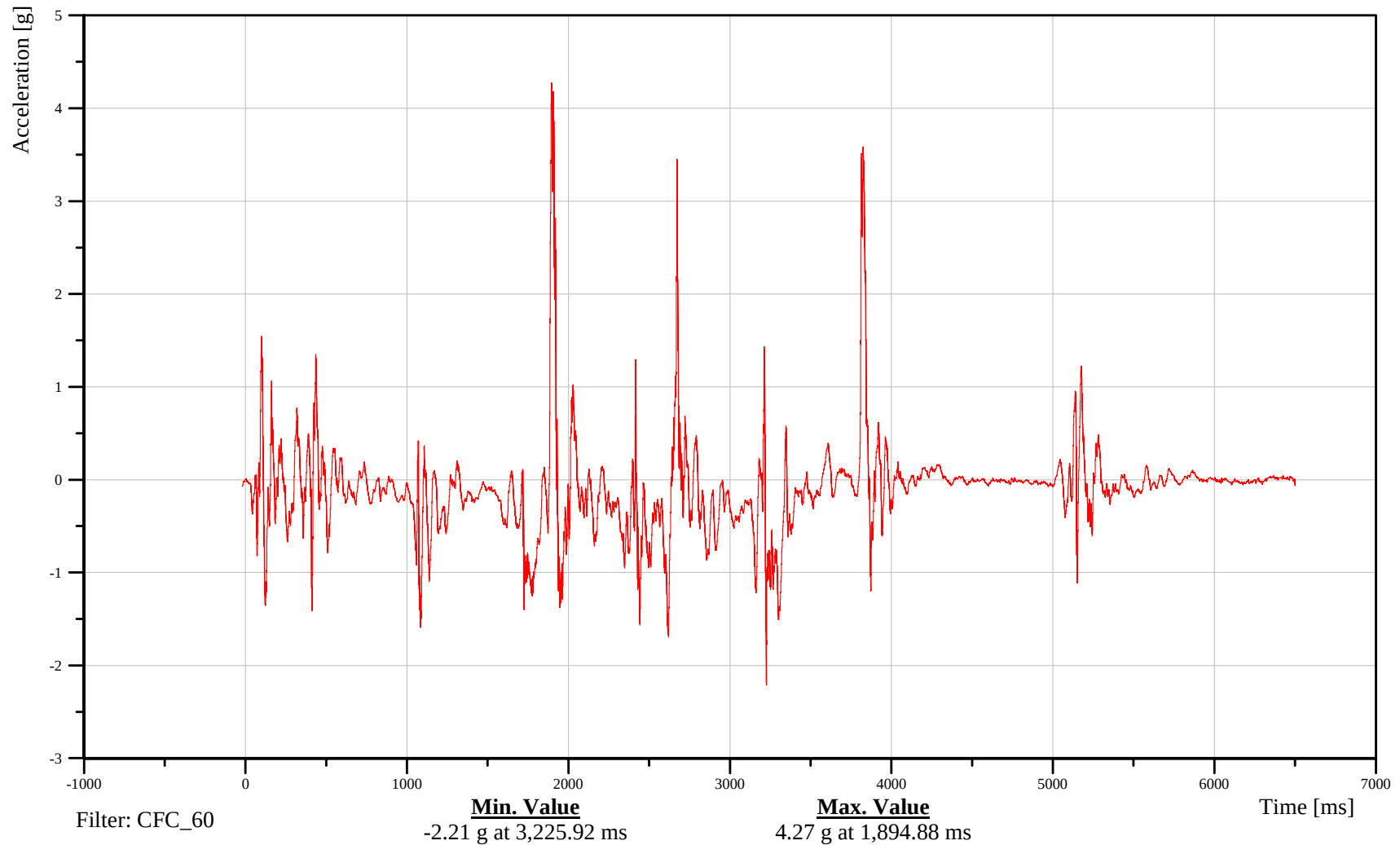
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10ENGNTTP0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-99

090930



FMVSS 208 Rollover 2007 Ford Expedition

Top of Engine Y-Axis Acceleration

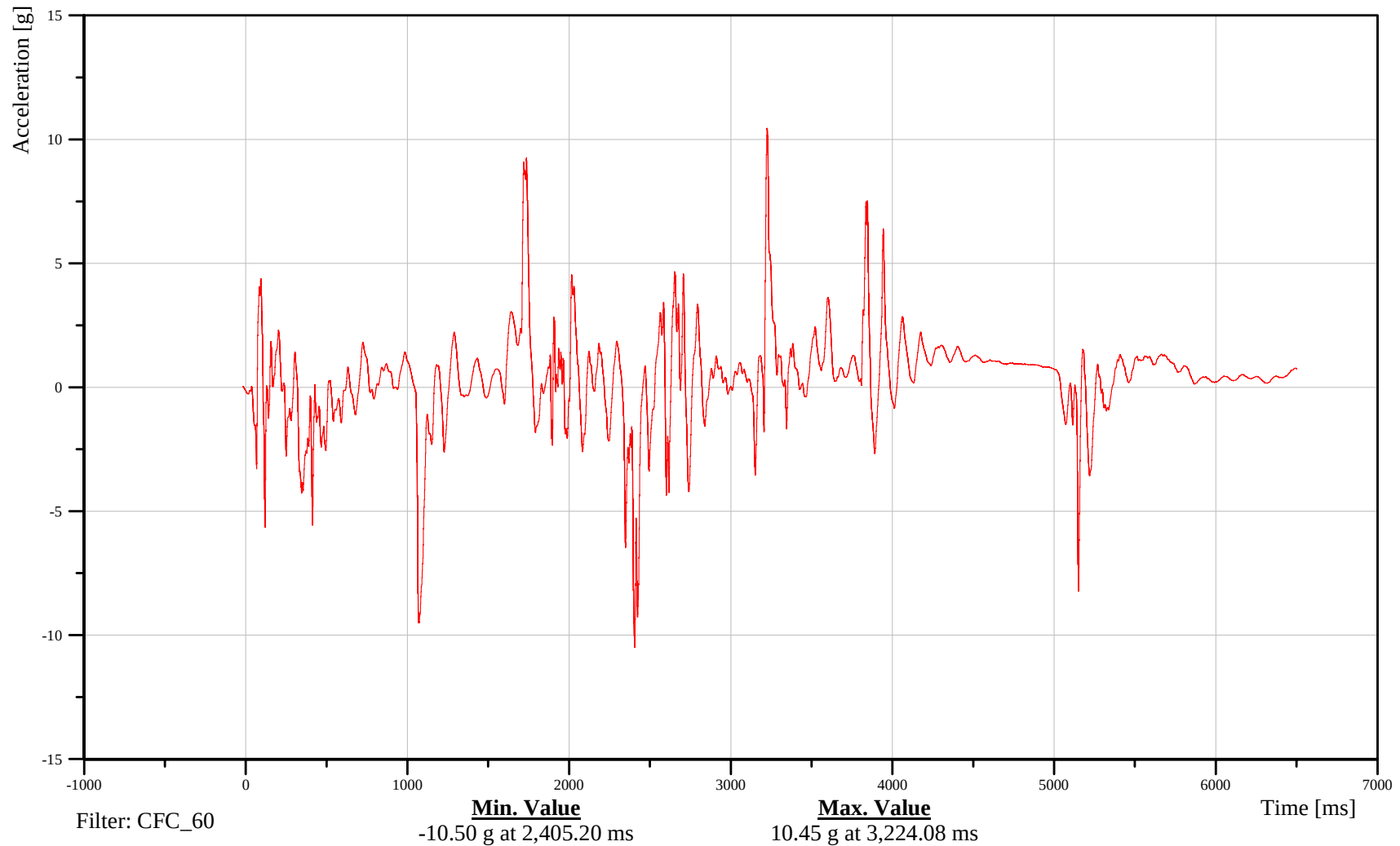
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10ENGNTTP0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-100

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

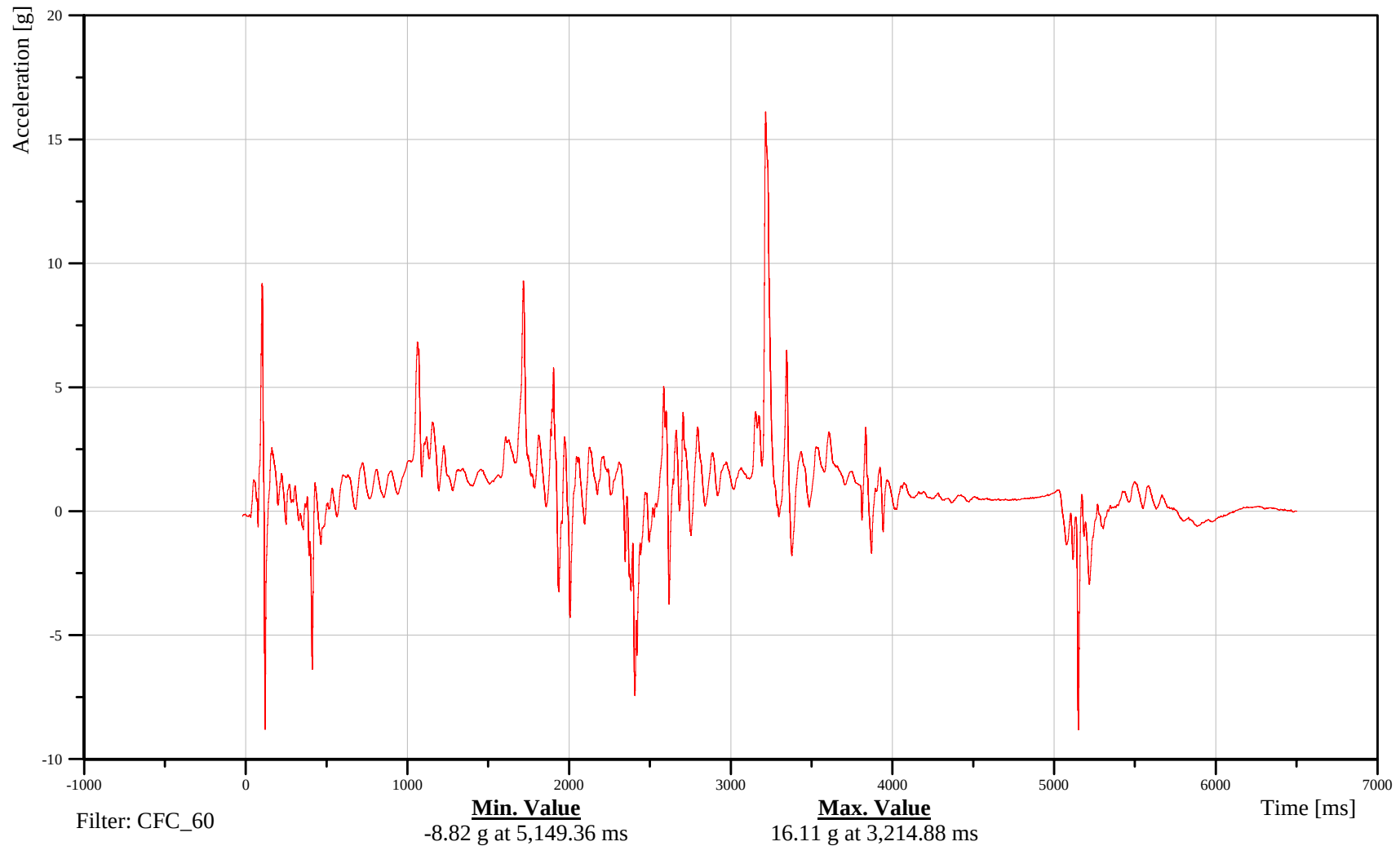
Top of Engine Z-Axis Acceleration

Customer: VRTC

10ENGNTTP0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-101

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

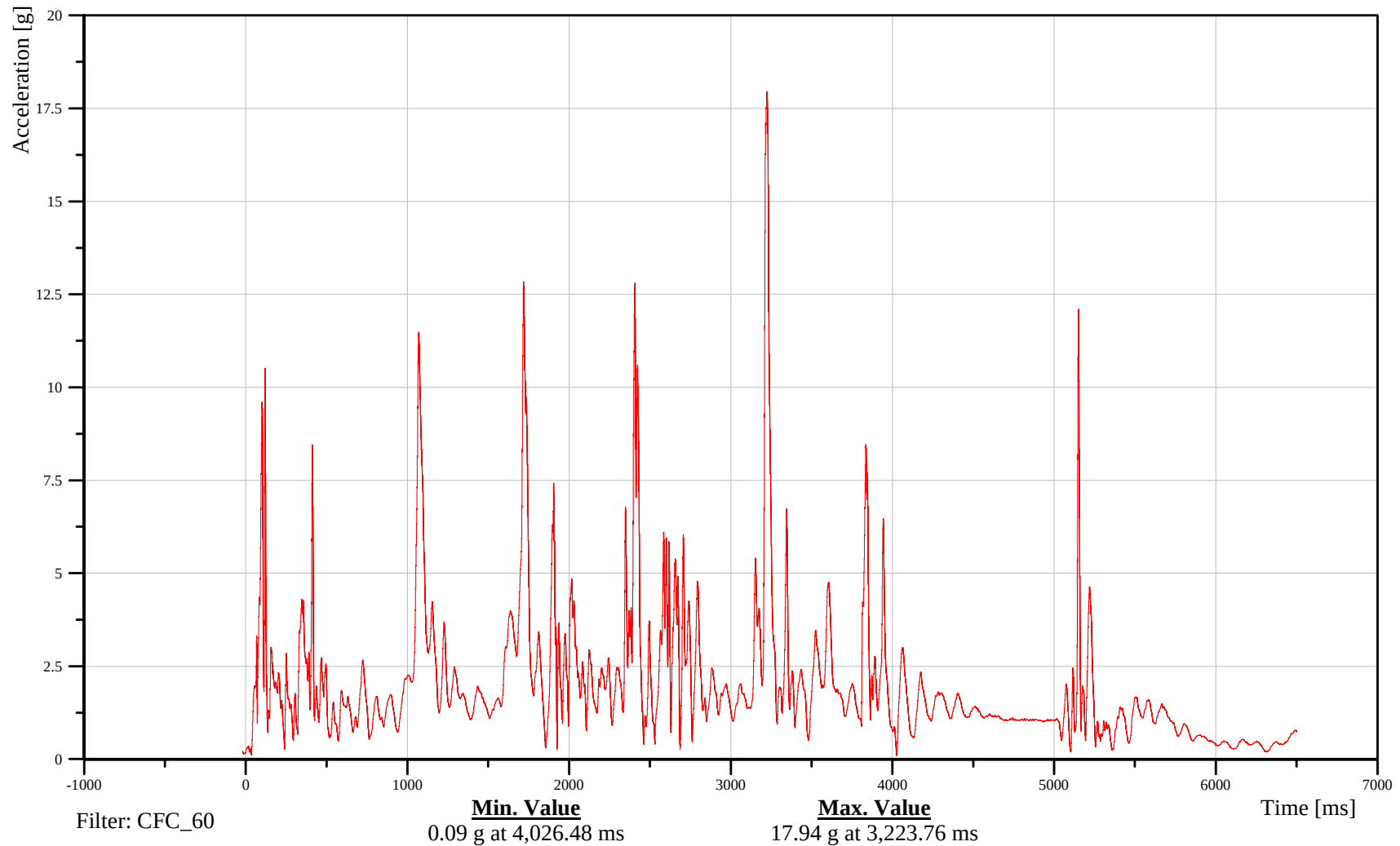
Top of Engine Resultant Acceleration

Customer: VRTC

10ENGNTTP0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-102

090930



FMVSS 208 Rollover 2007 Ford Expedition

Bottom of Engine X-Axis Acceleration

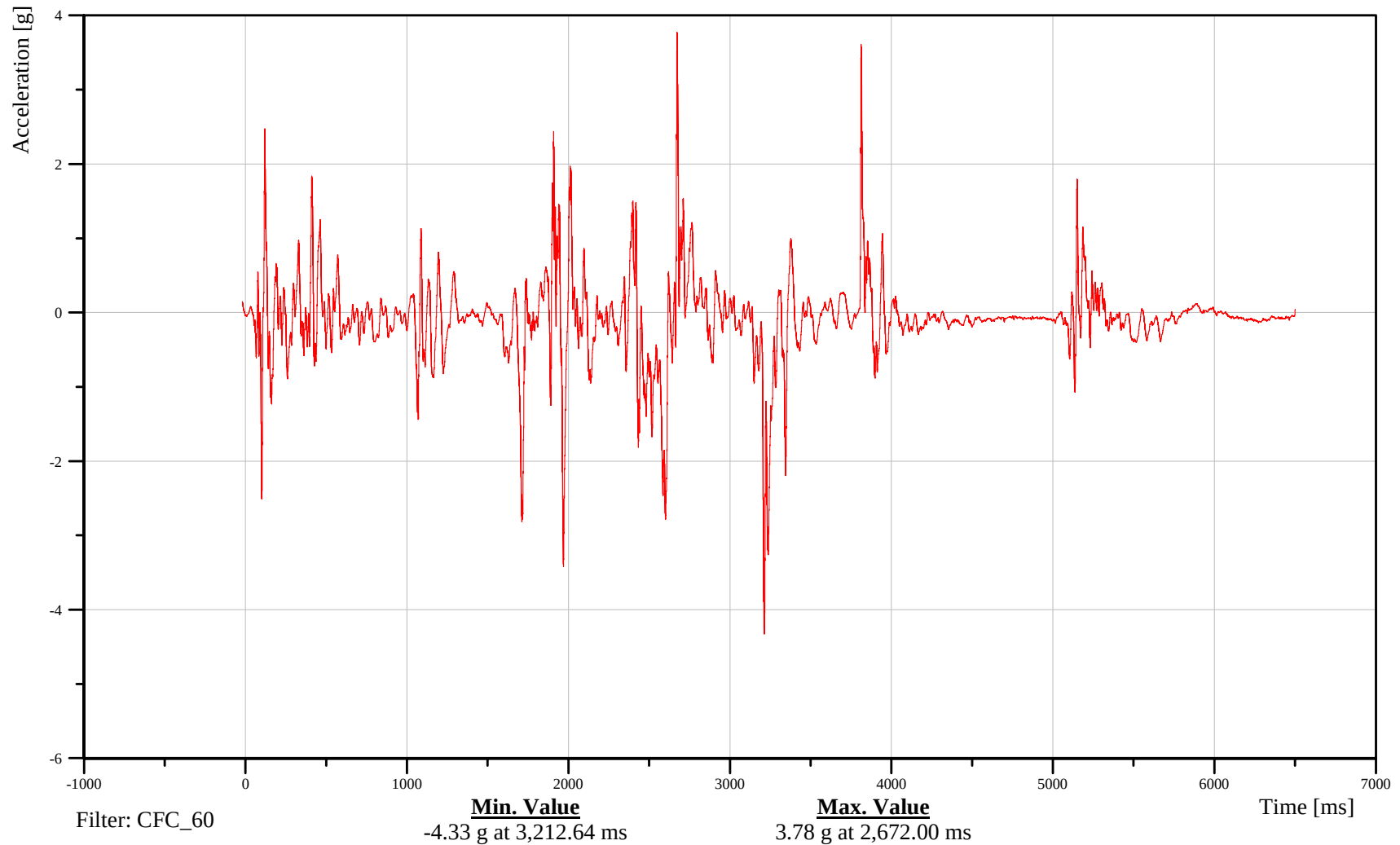
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10ENG NBO0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-103

090930



FMVSS 208 Rollover 2007 Ford Expedition

Bottom of Engine Y-Axis Acceleration

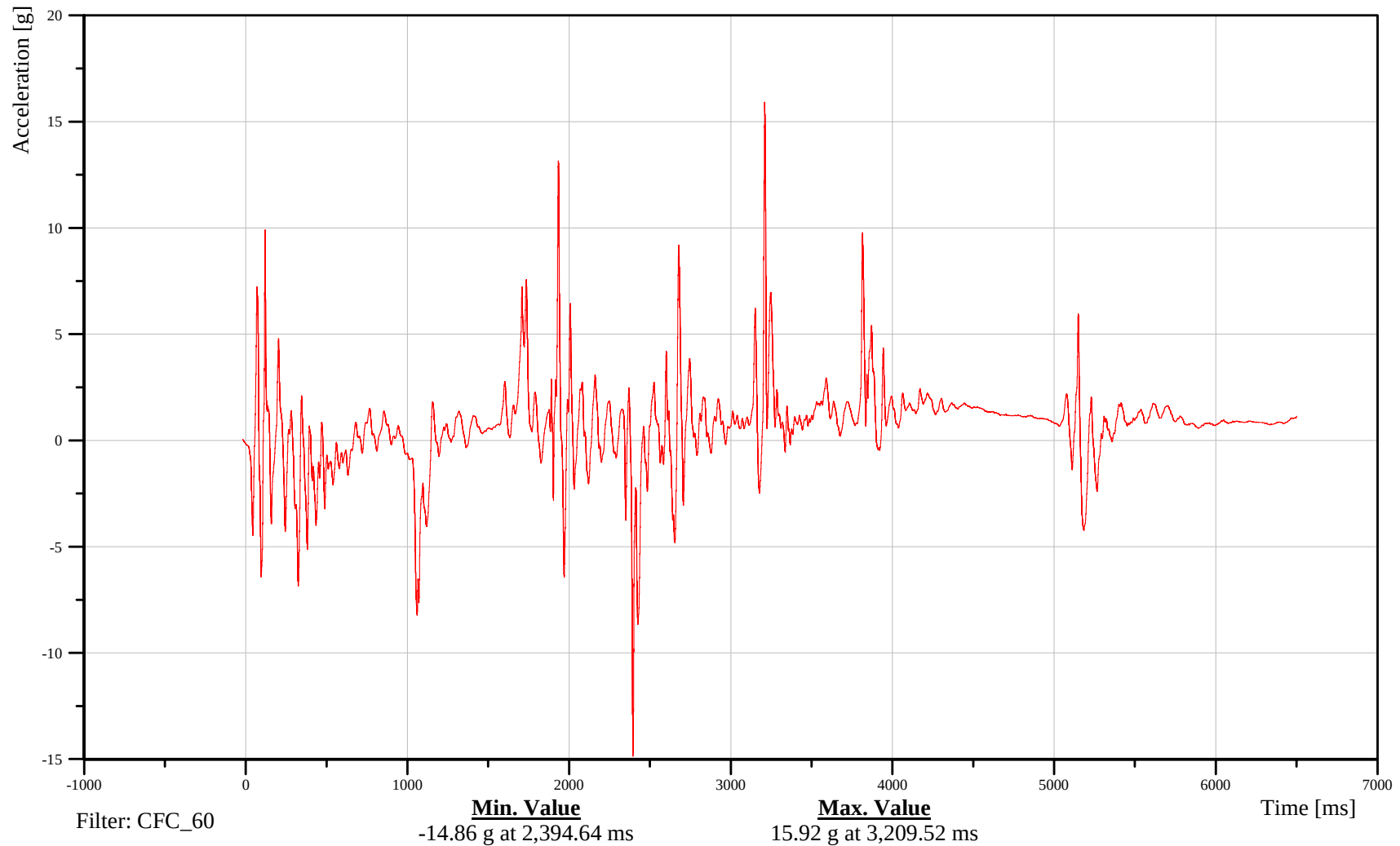
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10ENGNBO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-104

090930



FMVSS 208 Rollover 2007 Ford Expedition

Bottom of Engine Z-Axis Acceleration

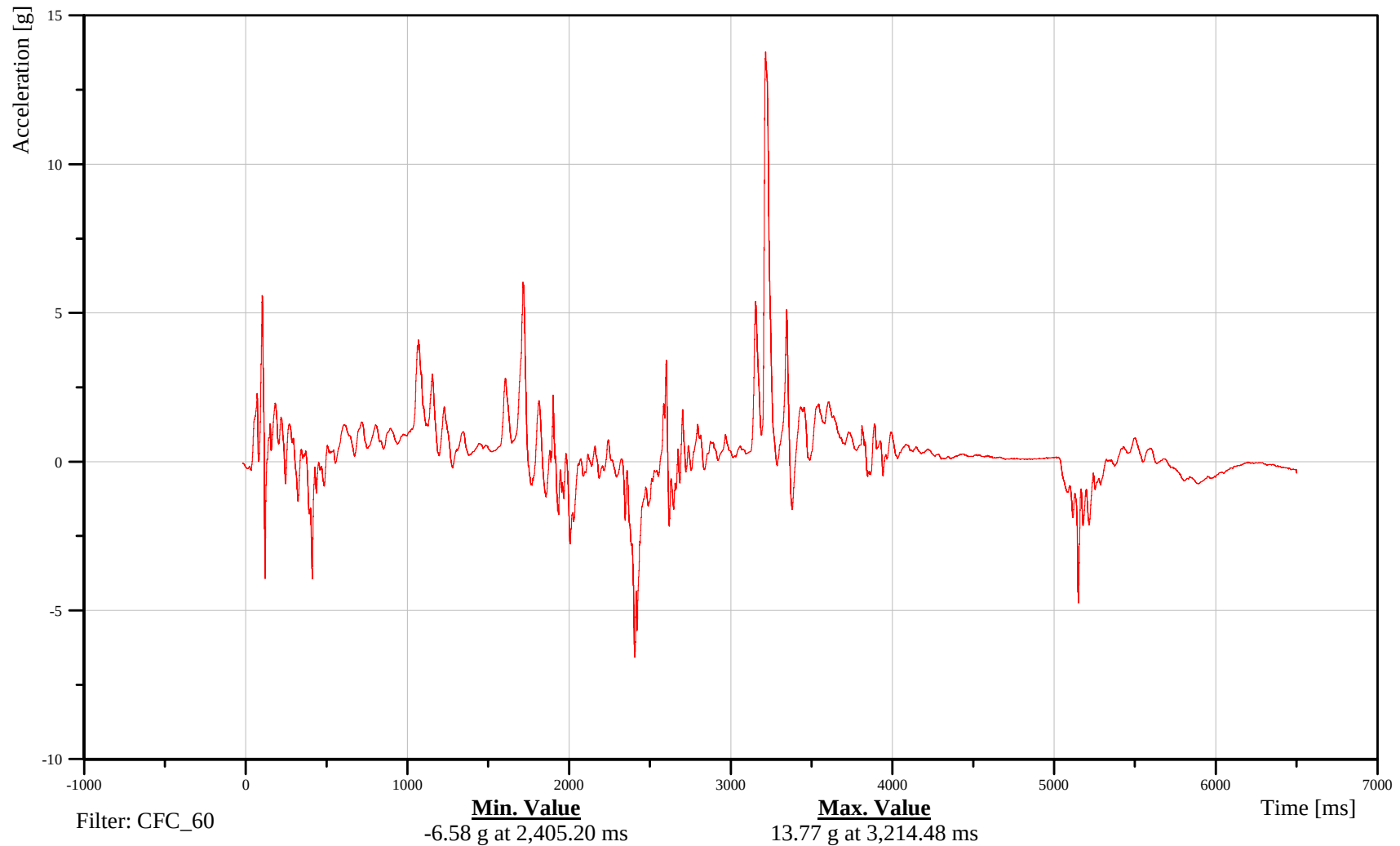
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10ENG NBO0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-105

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Bottom of Engine Resultant Acceleration

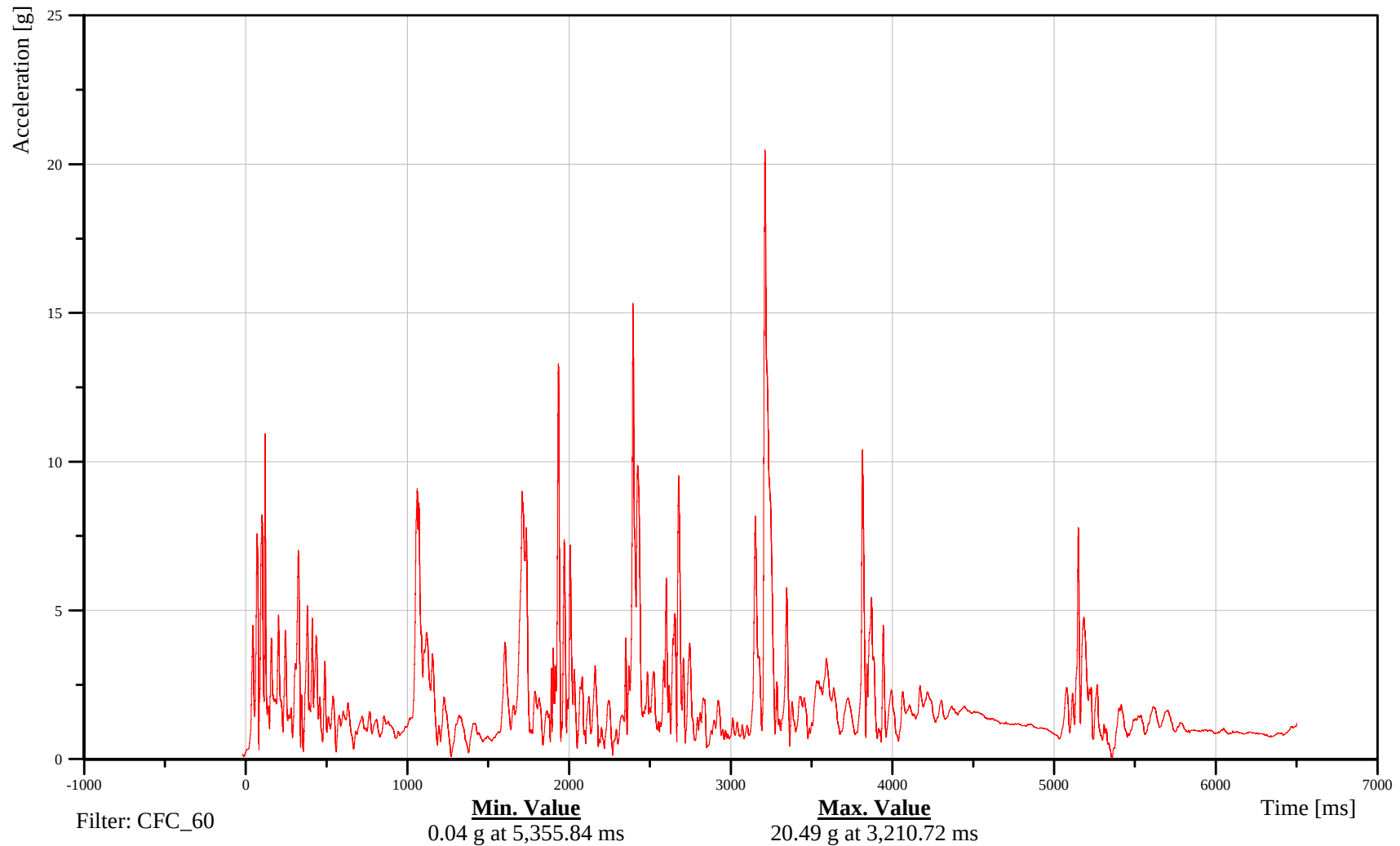
Time: 17:02

Customer: VRTC

10ENGNBO0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-106

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left A-Pillar Upper X-Axis Acceleration

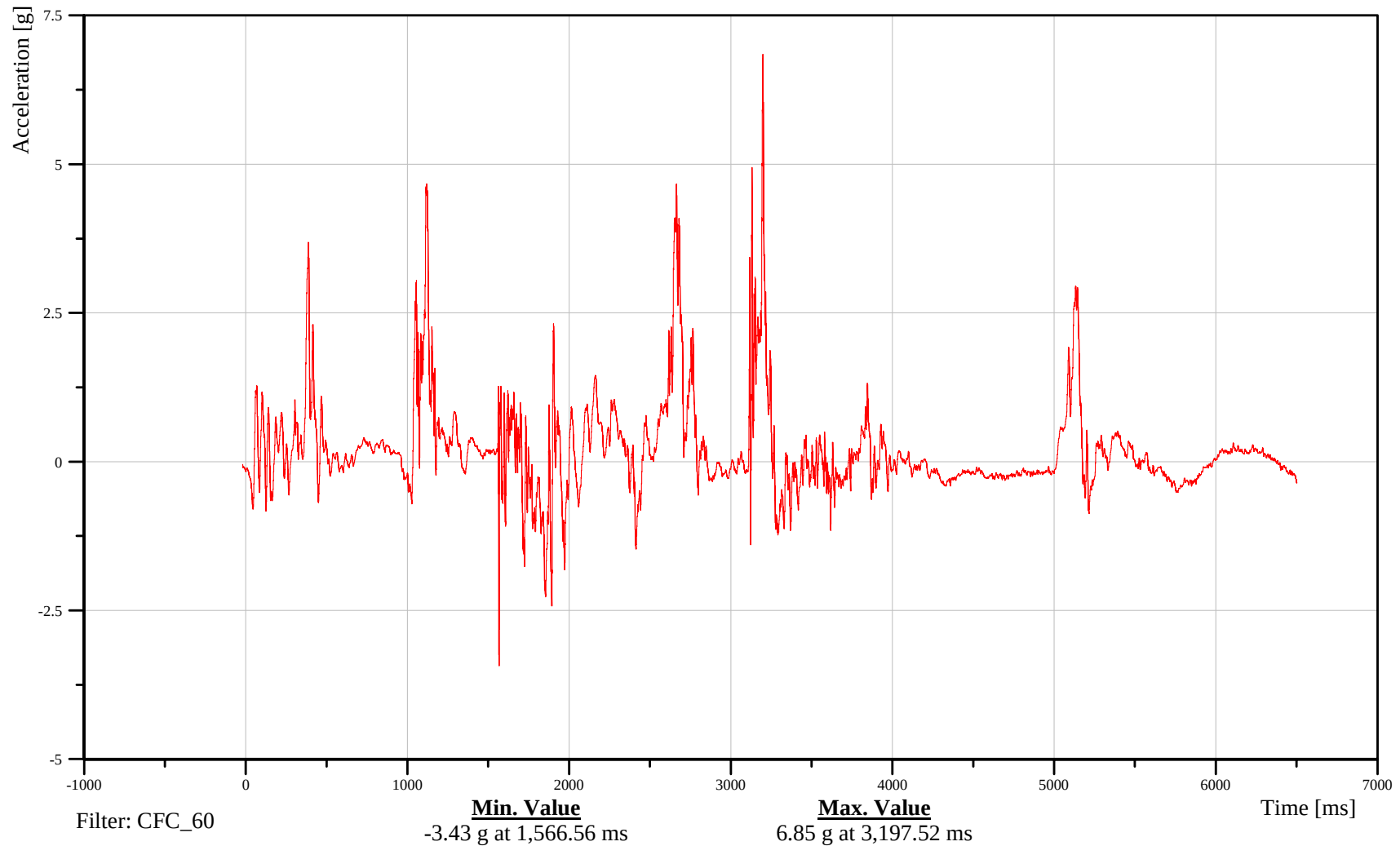
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10APILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-107

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left A-Pillar Upper Y-Axis Acceleration

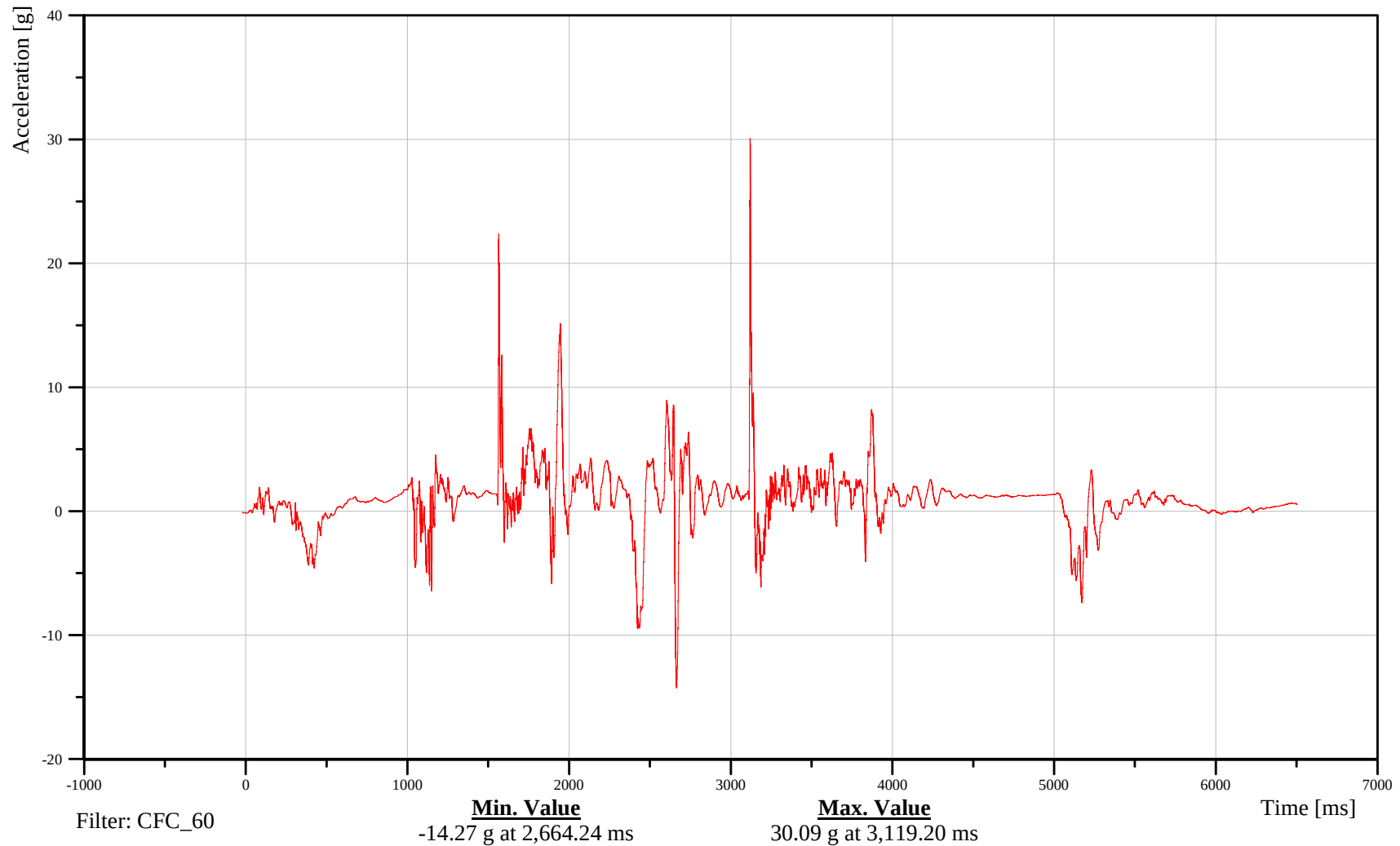
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10APILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-108

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

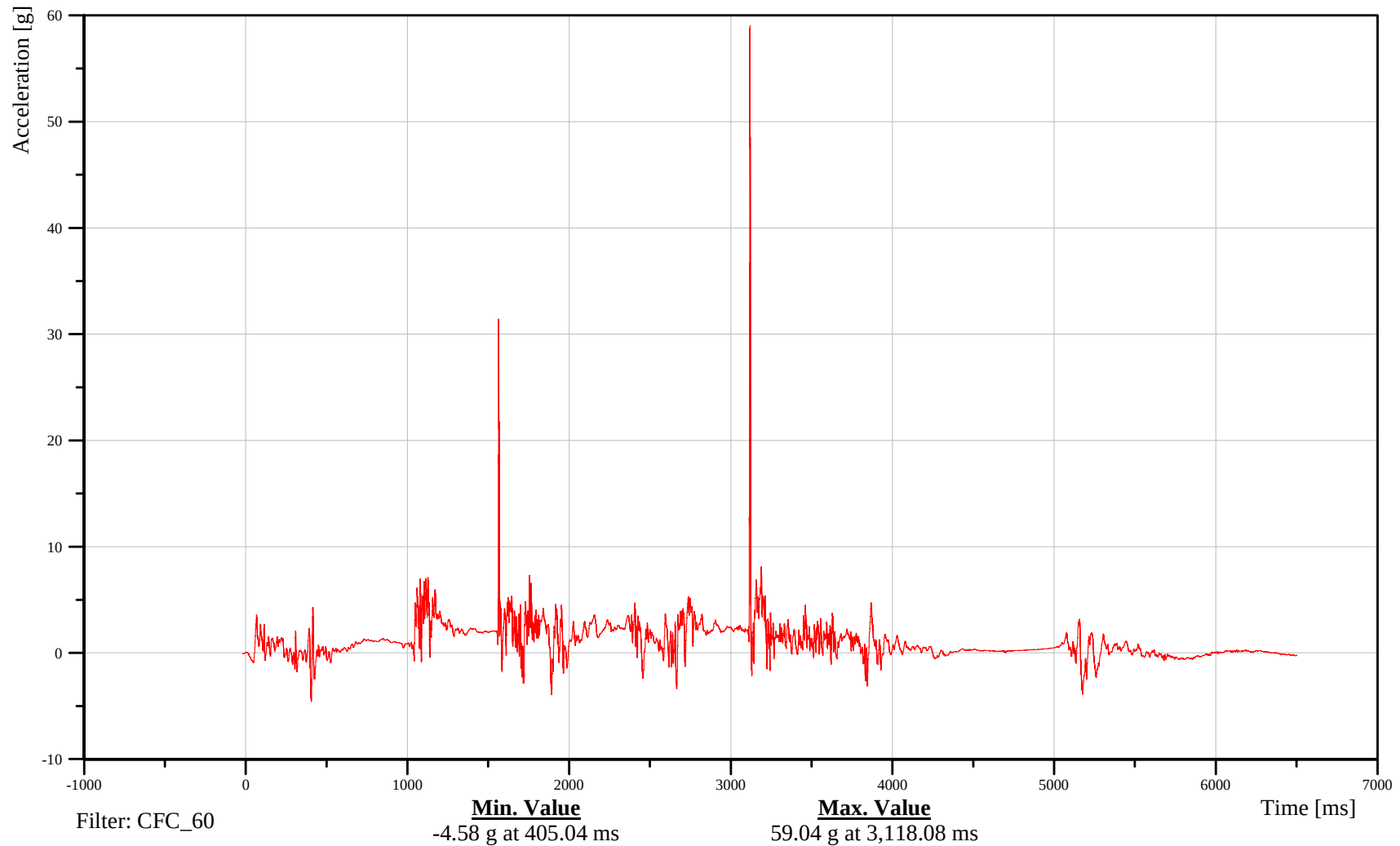
Left A-Pillar Upper Z-Axis Acceleration

Customer: VRTC

10APILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-109

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left A-Pillar Upper Resultant Acceleration

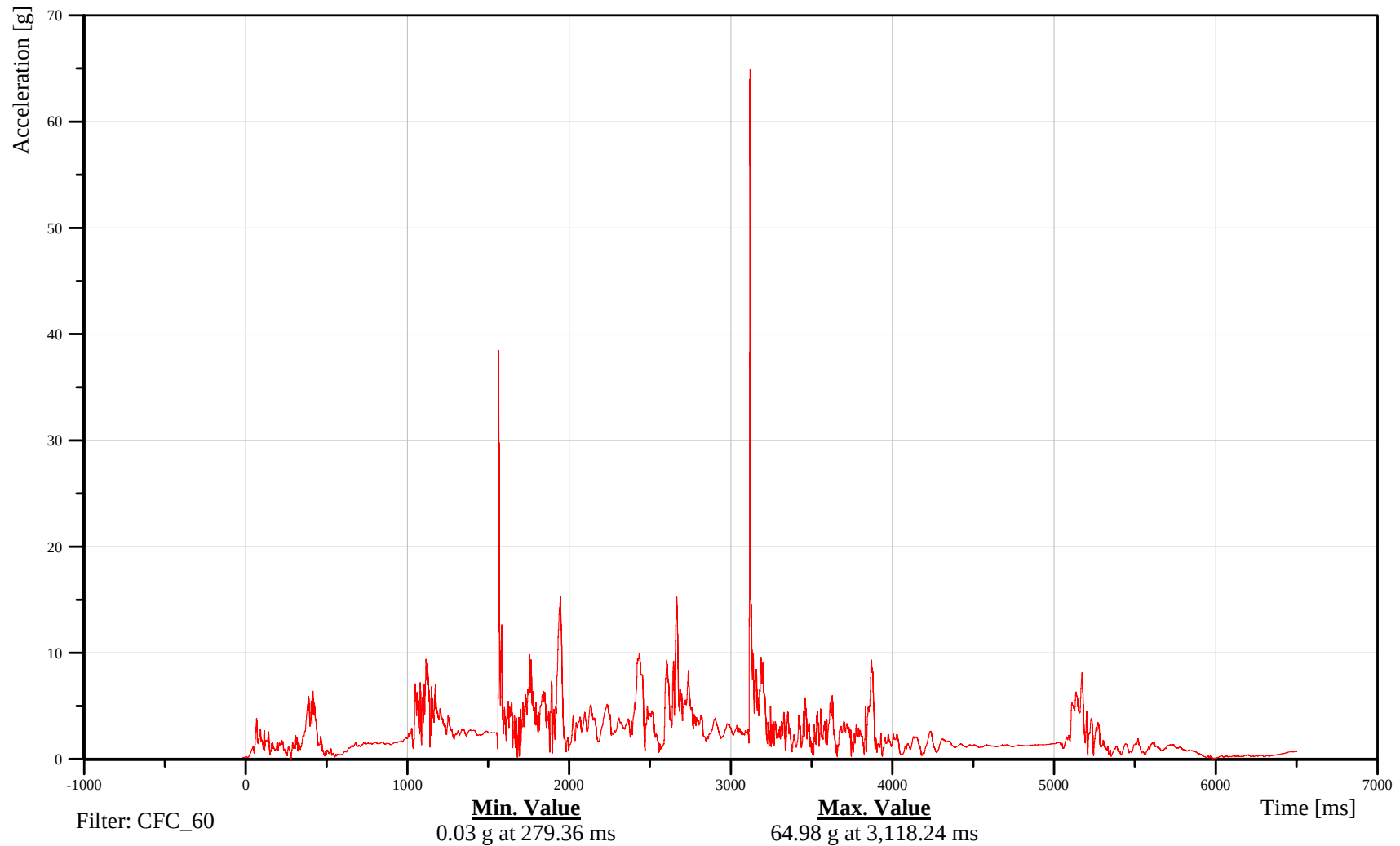
Time: 17:02

Customer: VRTC

10APILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-110

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left A-Pillar Lower X-Axis Acceleration

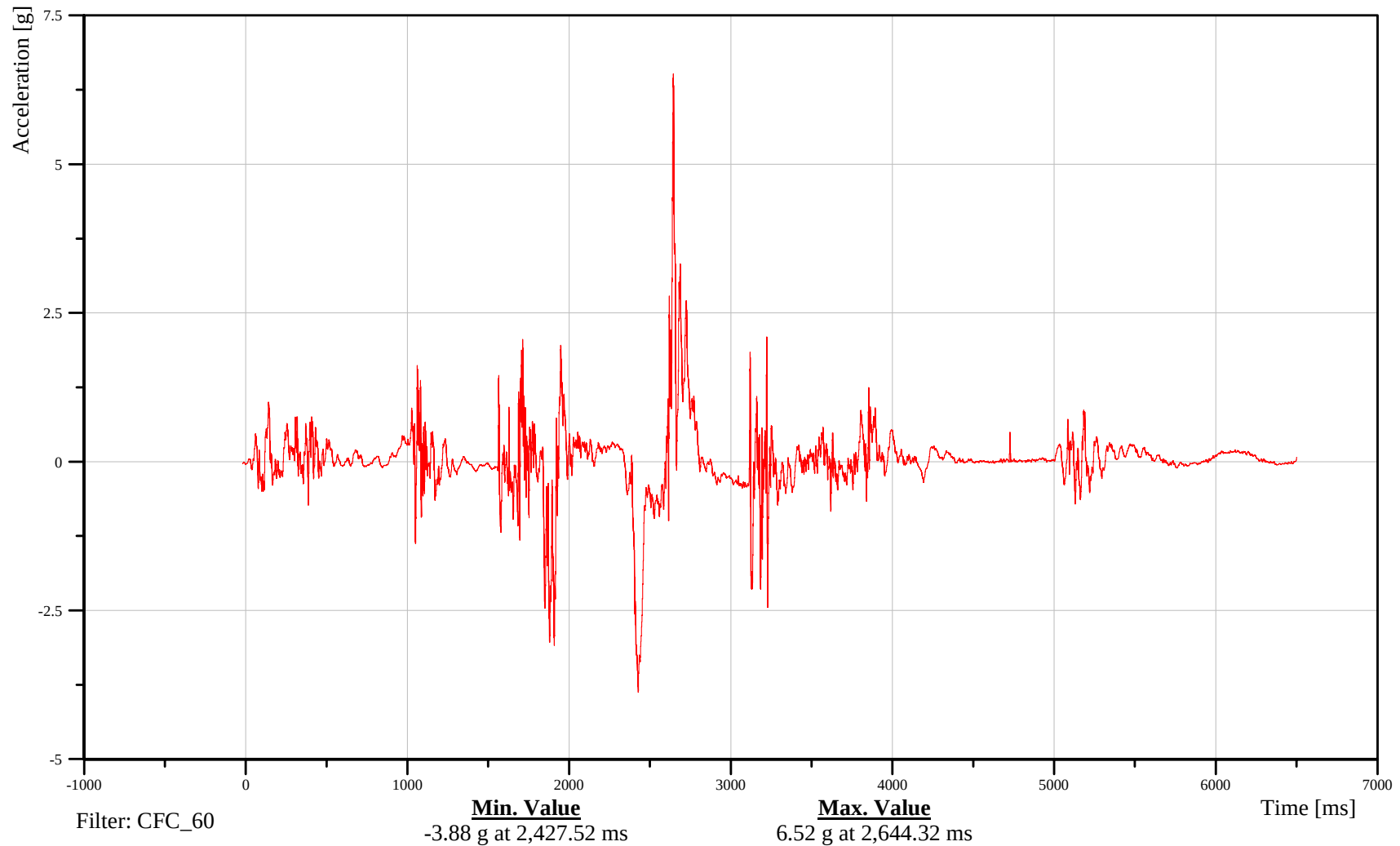
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10APILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-111

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left A-Pillar Lower Y-Axis Acceleration

Date: 09/30/2009

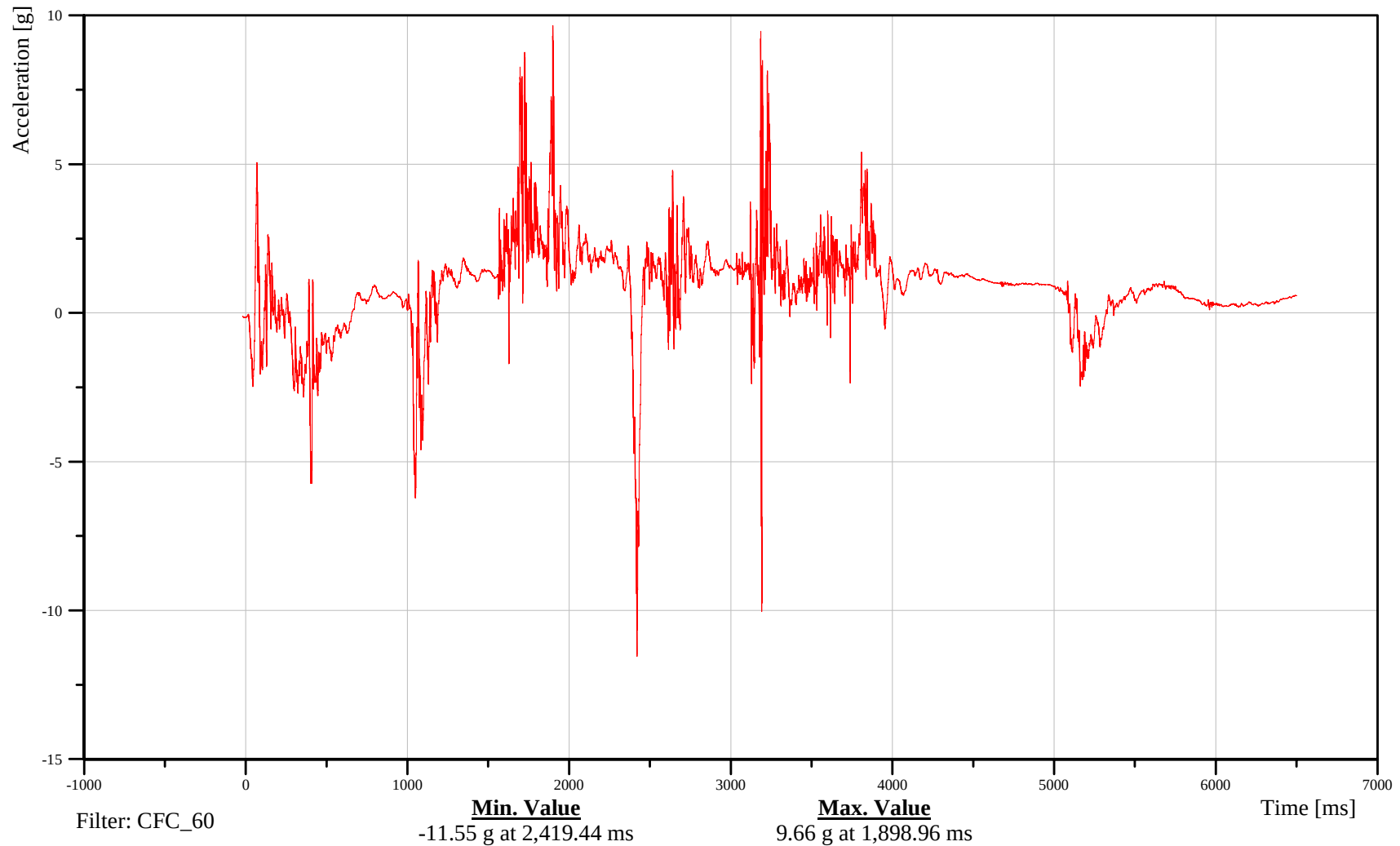
Time: 17:02

Customer: VRTC

10APILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-112

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left A-Pillar Lower Z-Axis Acceleration

Date: 09/30/2009

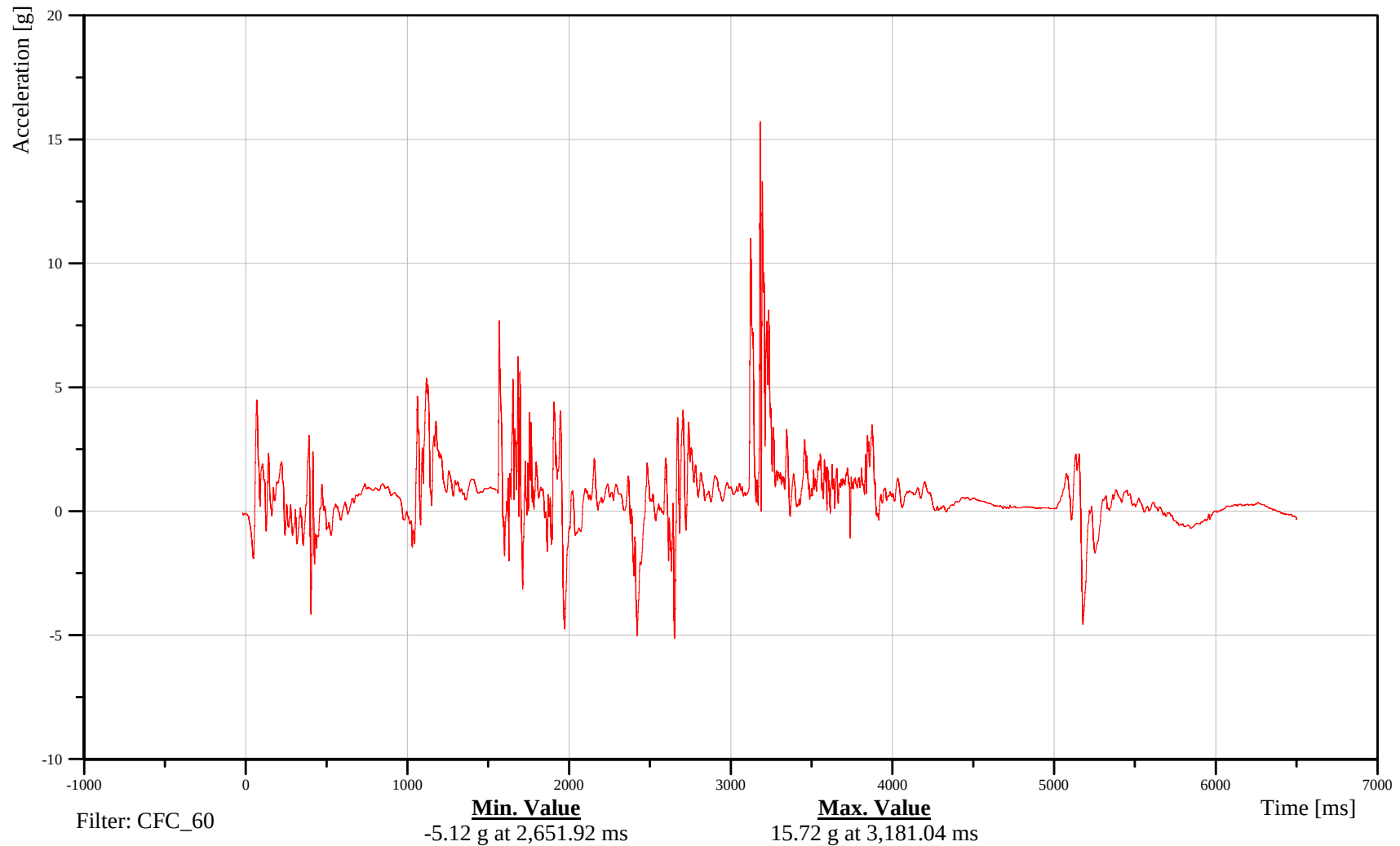
Time: 17:02

Customer: VRTC

10APILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-113

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left A-Pillar Lower Resultant Acceleration

Date: 09/30/2009

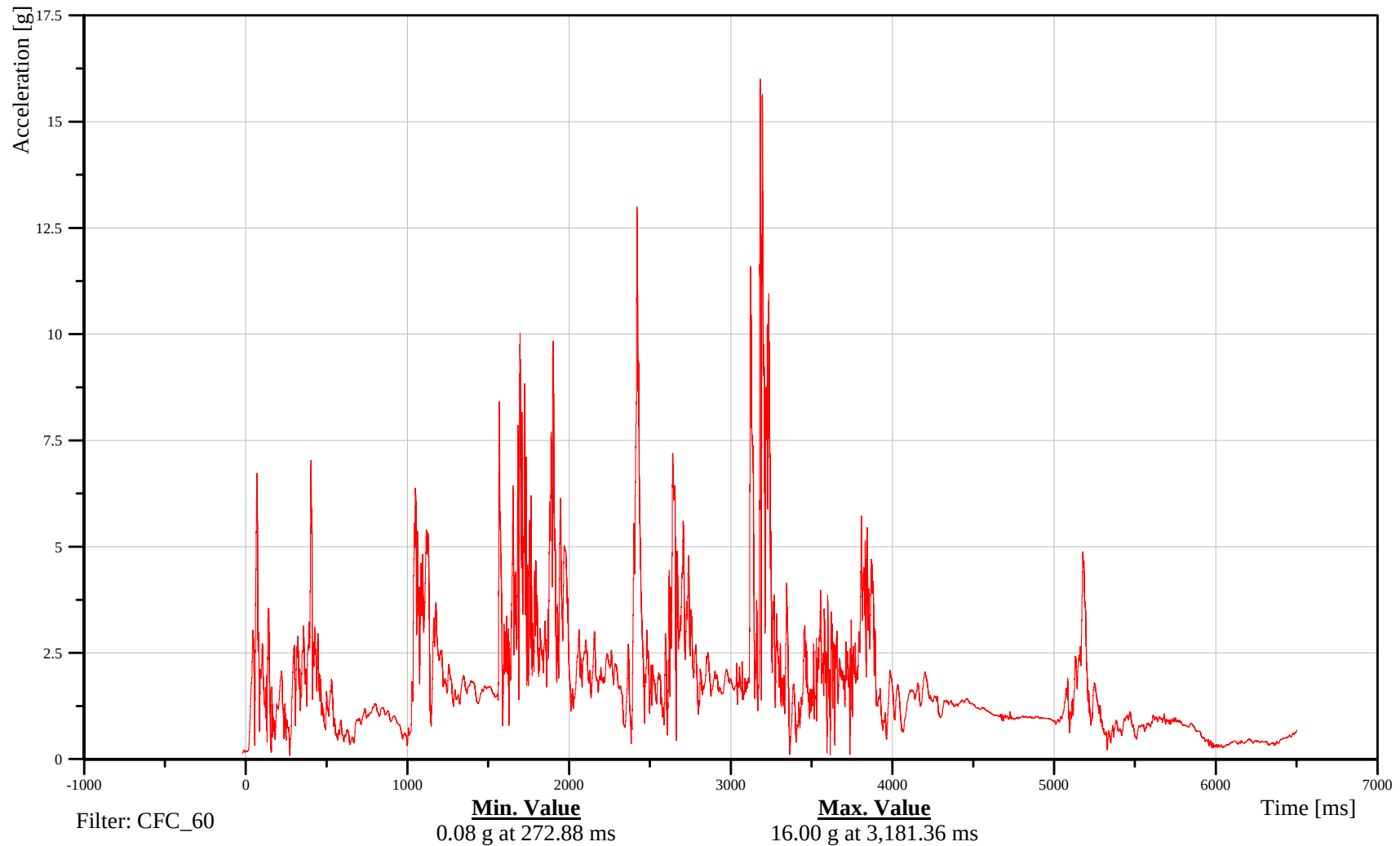
Time: 17:02

Customer: VRTC

10APILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-114

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right A-Pillar Upper X-Axis Acceleration

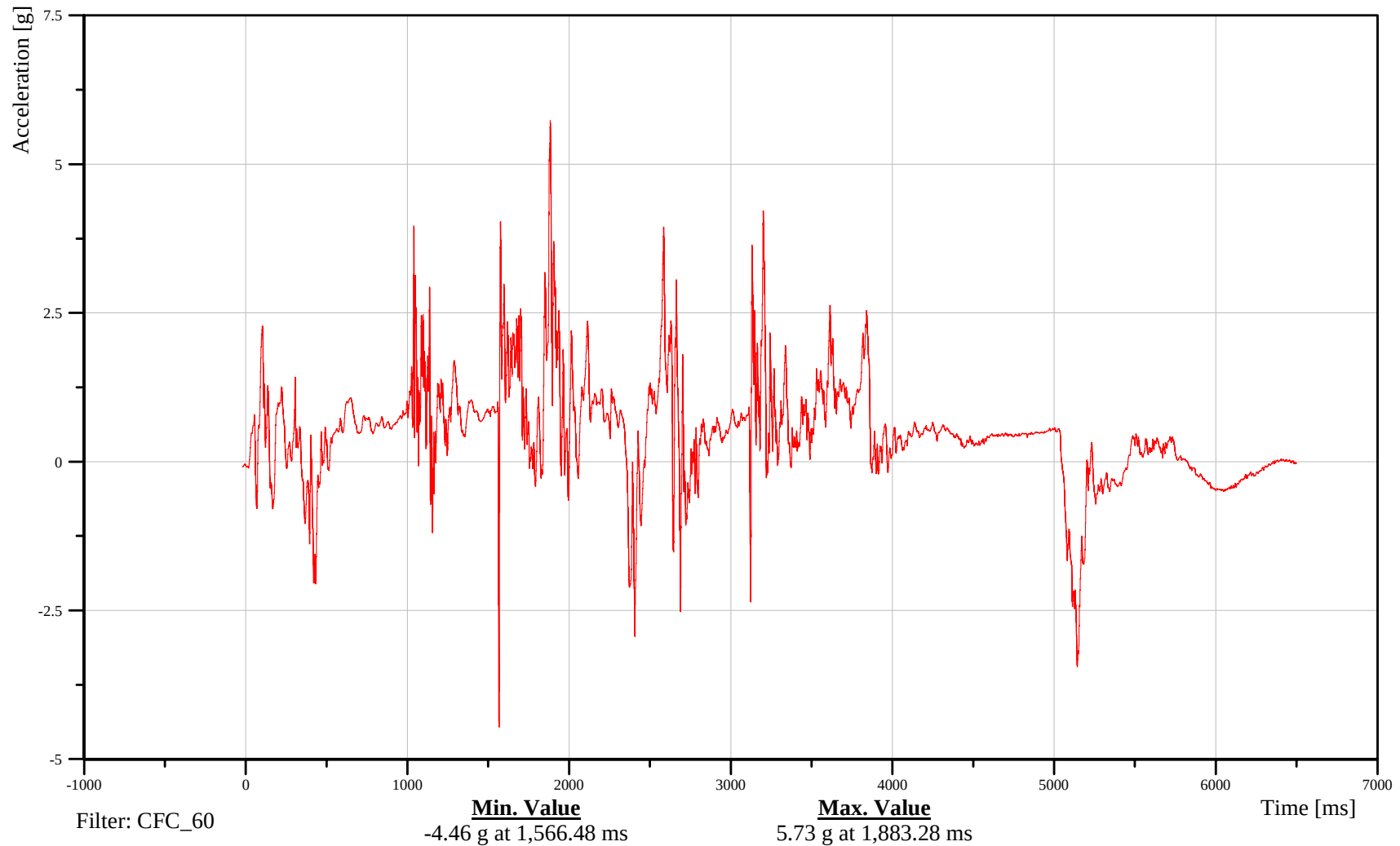
Time: 17:02

Customer: VRTC

10APILUPRI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-115

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

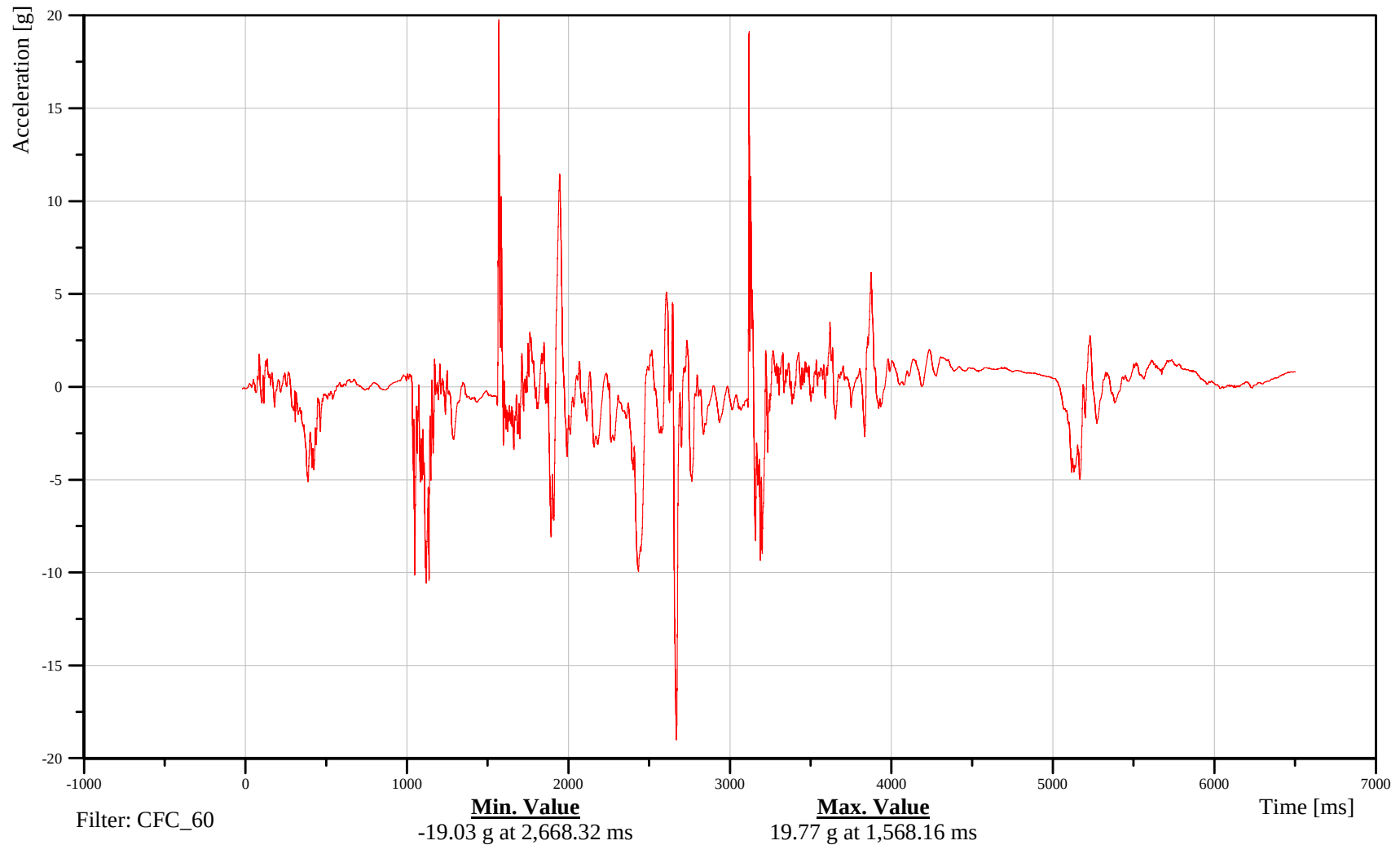
Right A-Pillar Upper Y-Axis Acceleration

Customer: VRTC

10APILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-116

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right A-Pillar Upper Z-Axis Acceleration

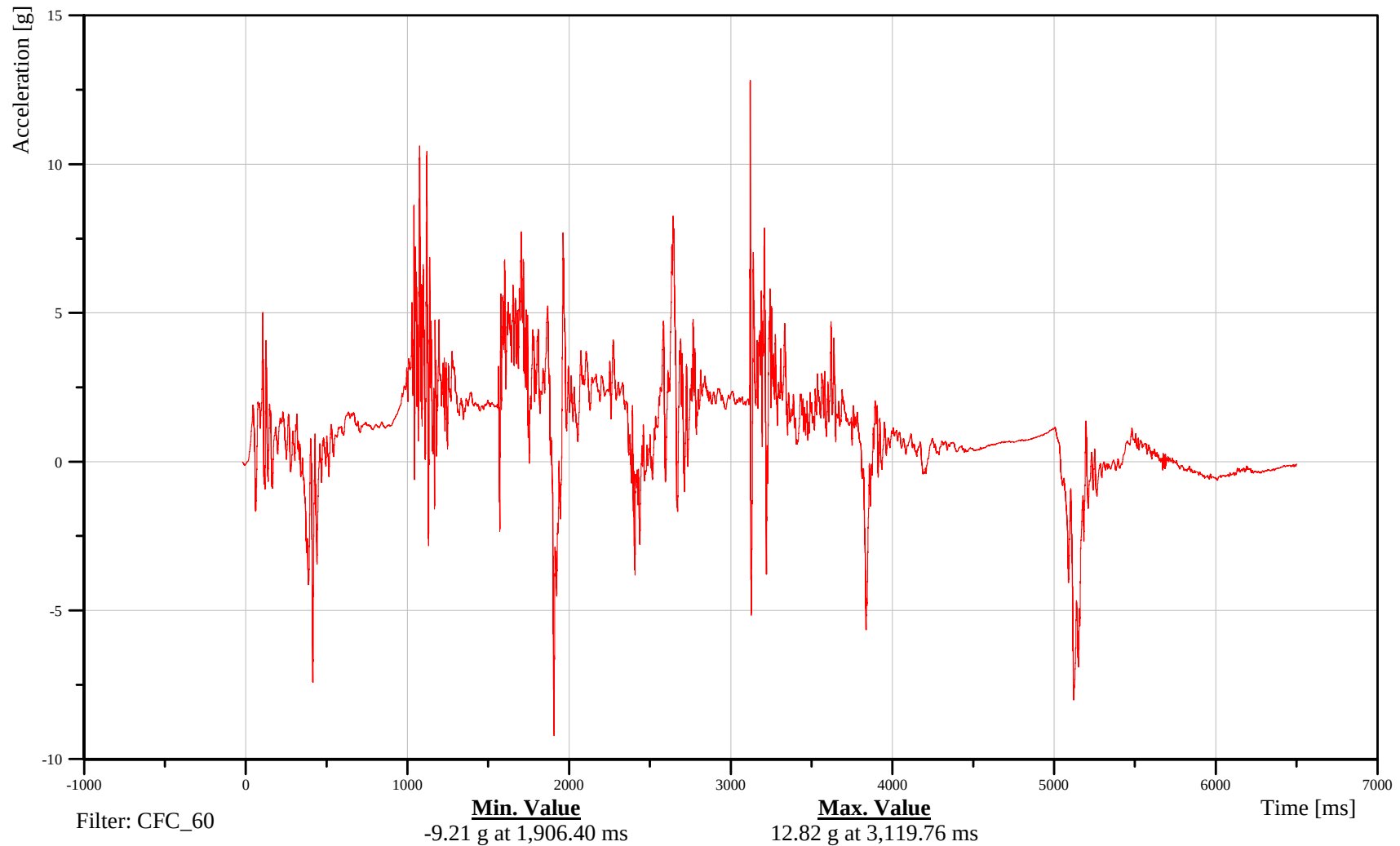
Time: 17:02

Customer: VRTC

10APILUPRI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-117

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right A-Pillar Upper Resultant Acceleration

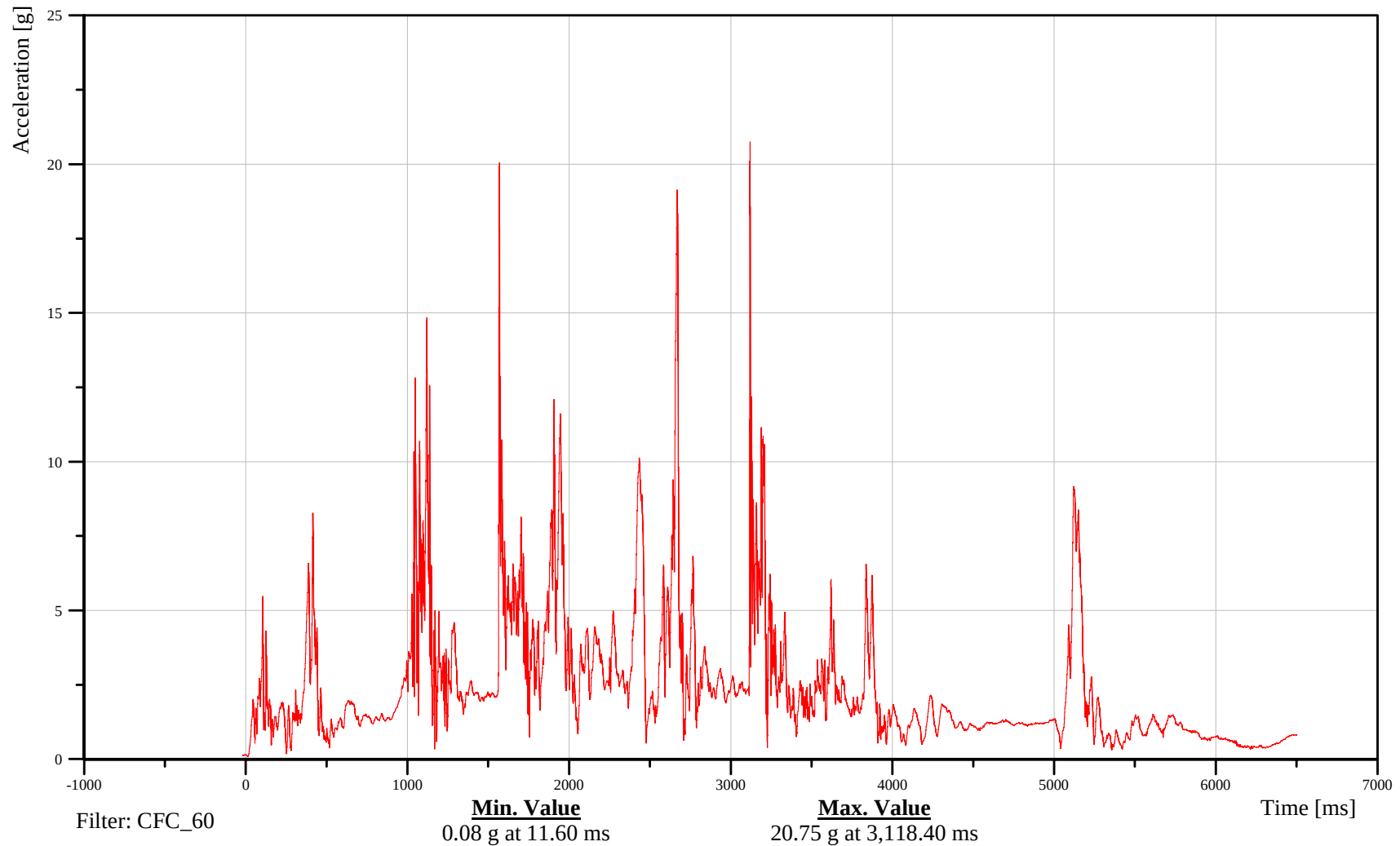
Time: 17:02

Customer: VRTC

10APILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-118

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

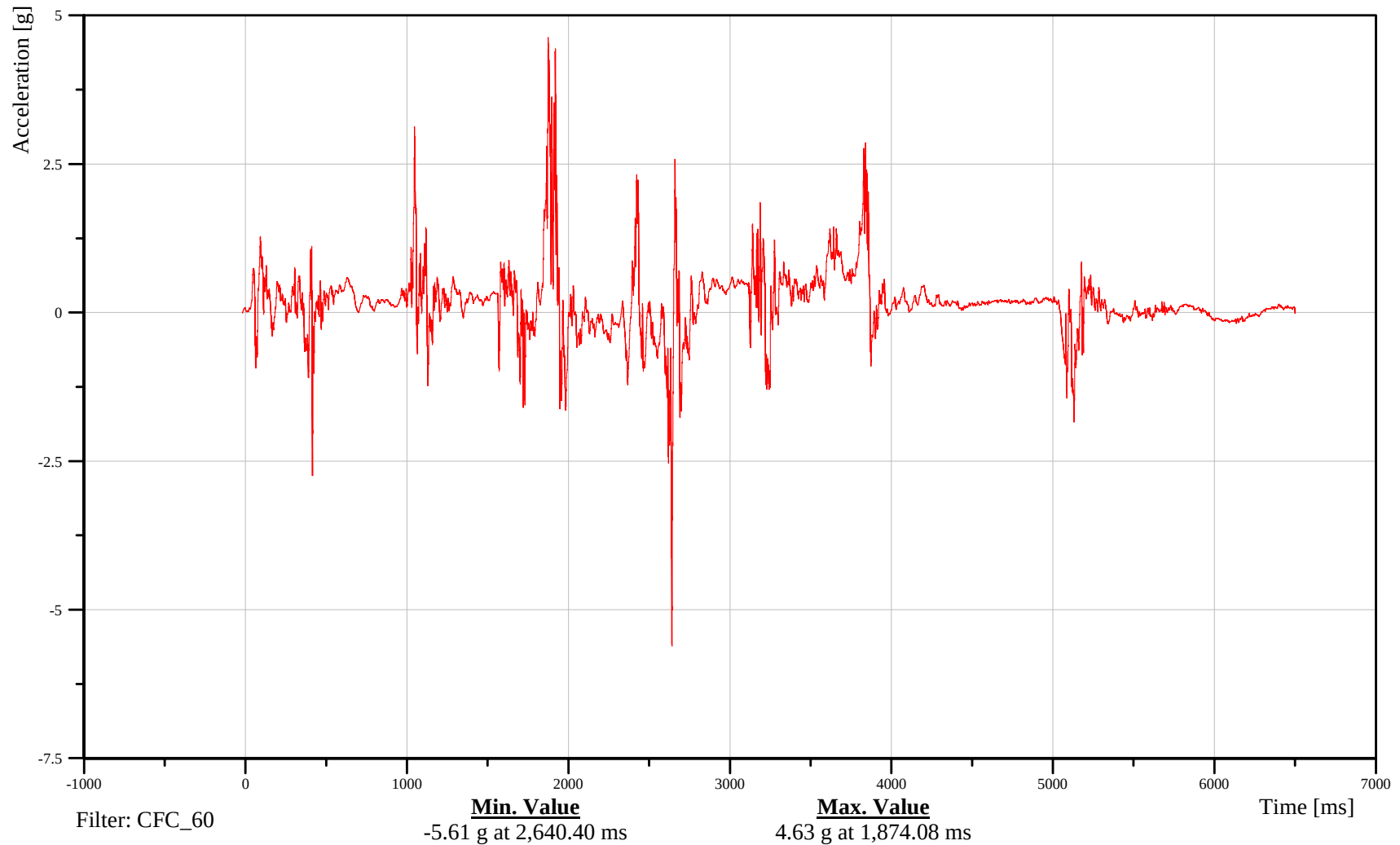
Right A-Pillar Lower X-Axis Acceleration

Customer: VRTC

10APILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-119

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right A-Pillar Lower Y-Axis Acceleration

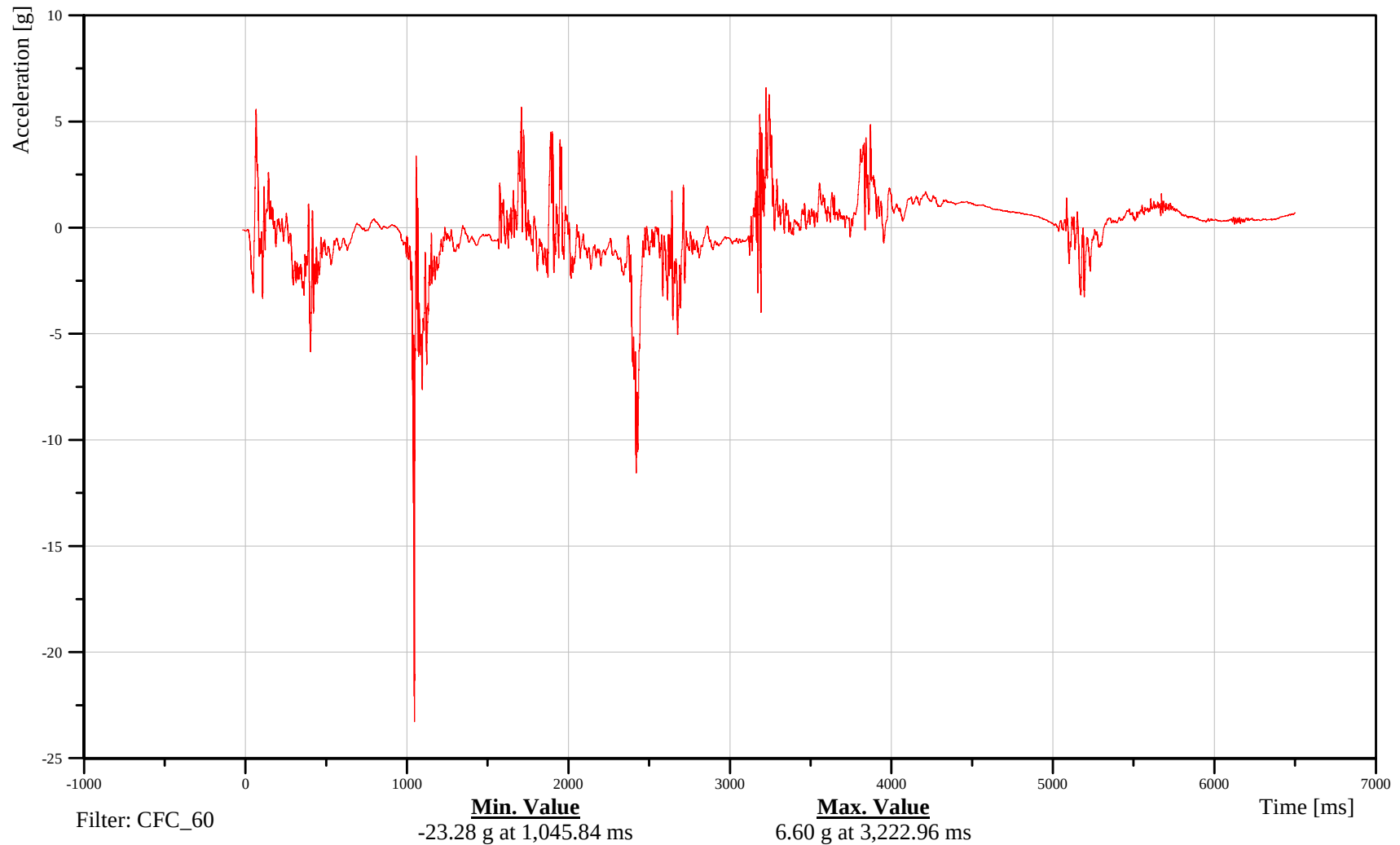
Time: 17:02

Customer: VRTC

10APILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-120

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

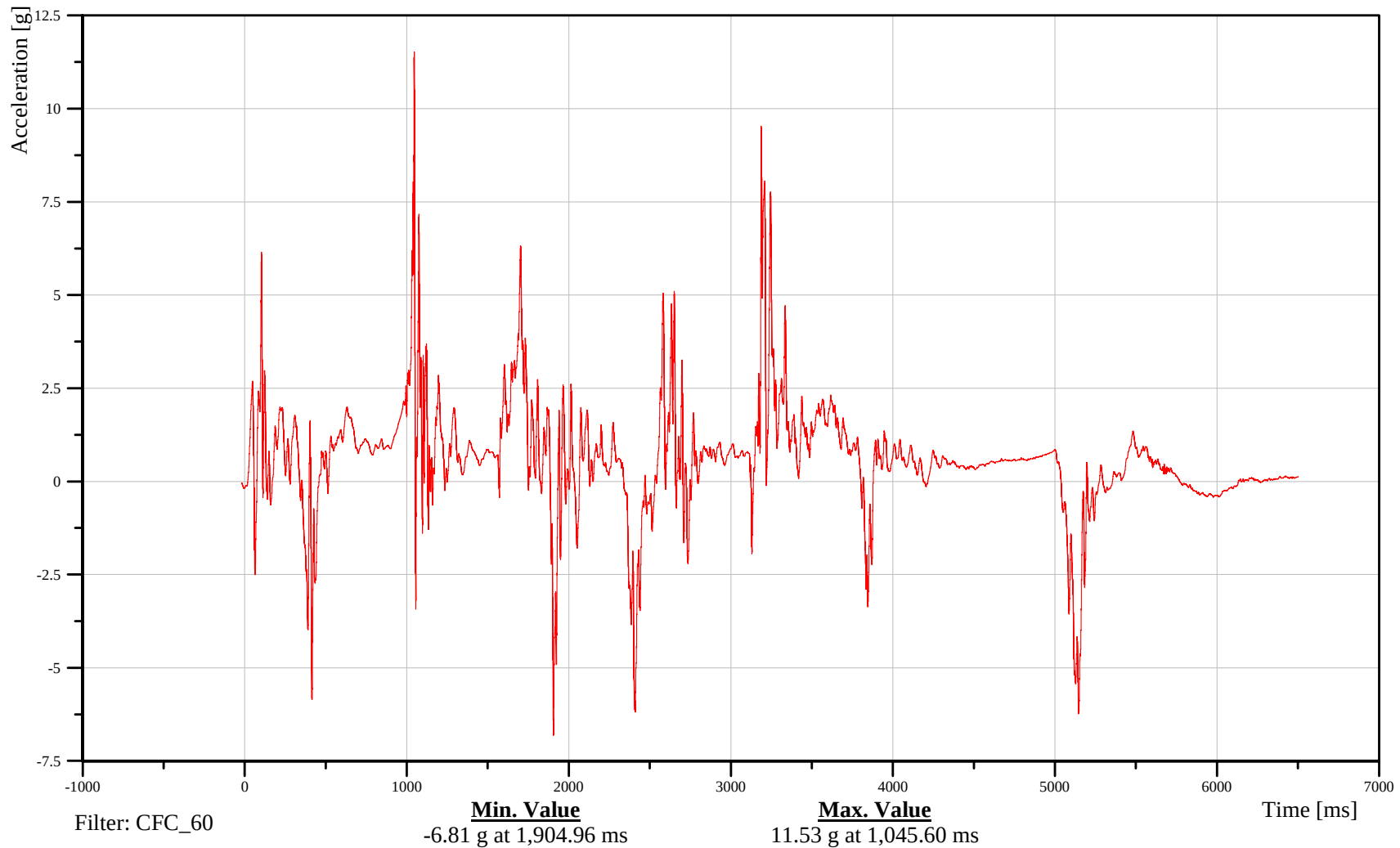
Right A-Pillar Lower Z-Axis Acceleration

Customer: VRTC

10APILLORI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-121

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

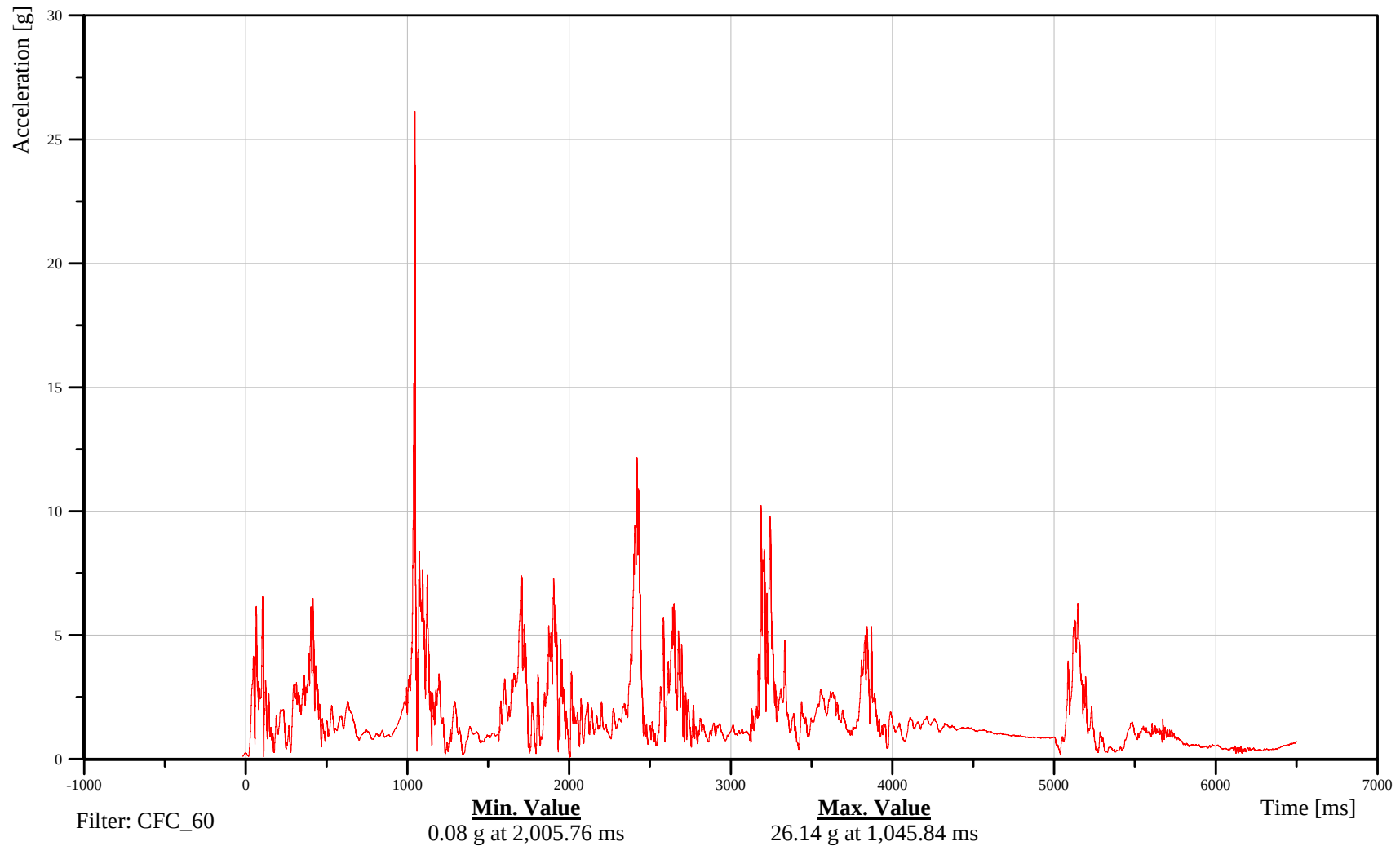
Right A-Pillar Lower Resultant Acceleration

Customer: VRTC

10APILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-122

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left B-Pillar Upper X-Axis Acceleration

Date: 09/30/2009

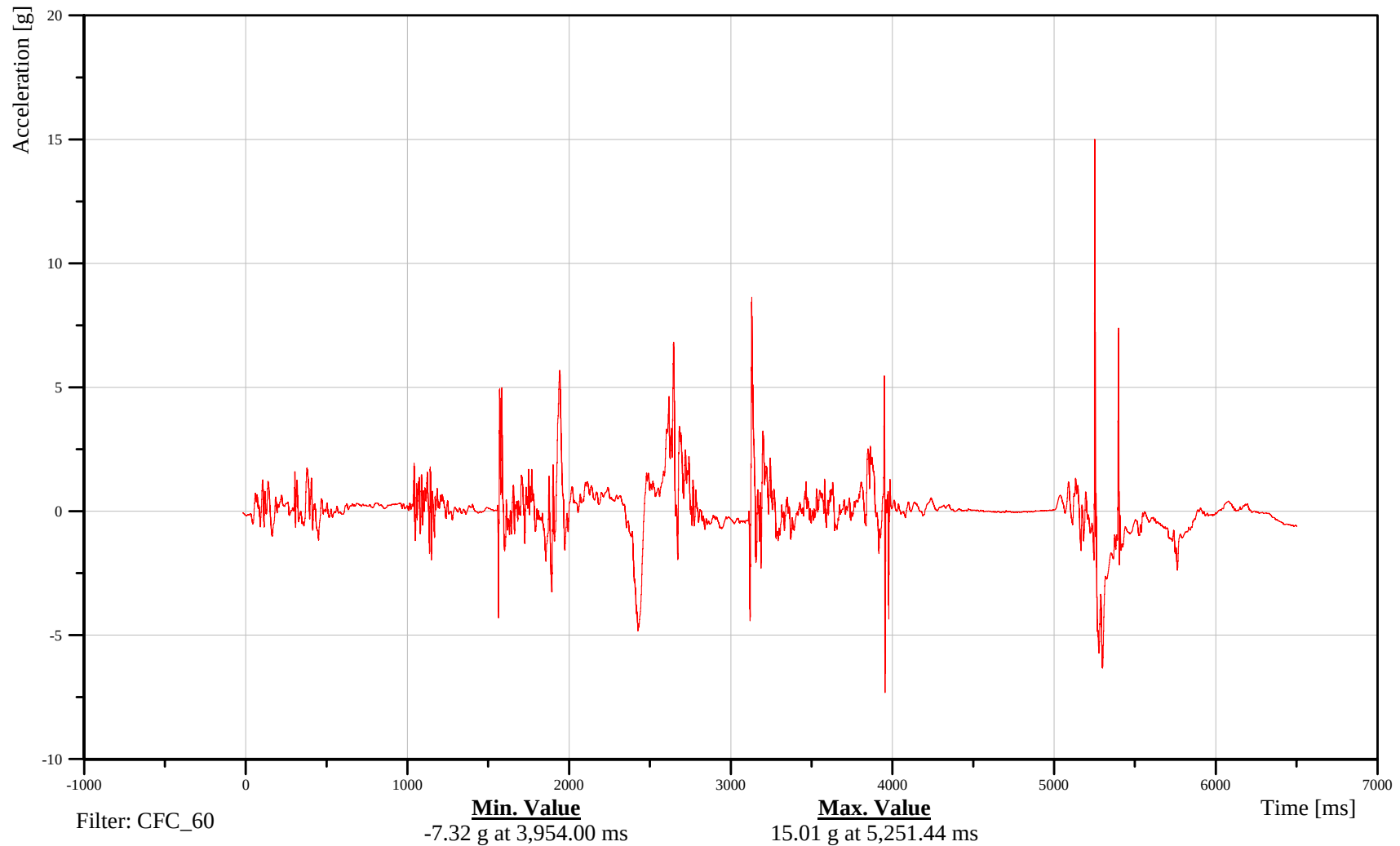
Time: 17:02

Customer: VRTC

10BPILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-123

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left B-Pillar Upper Y-Axis Acceleration

Date: 09/30/2009

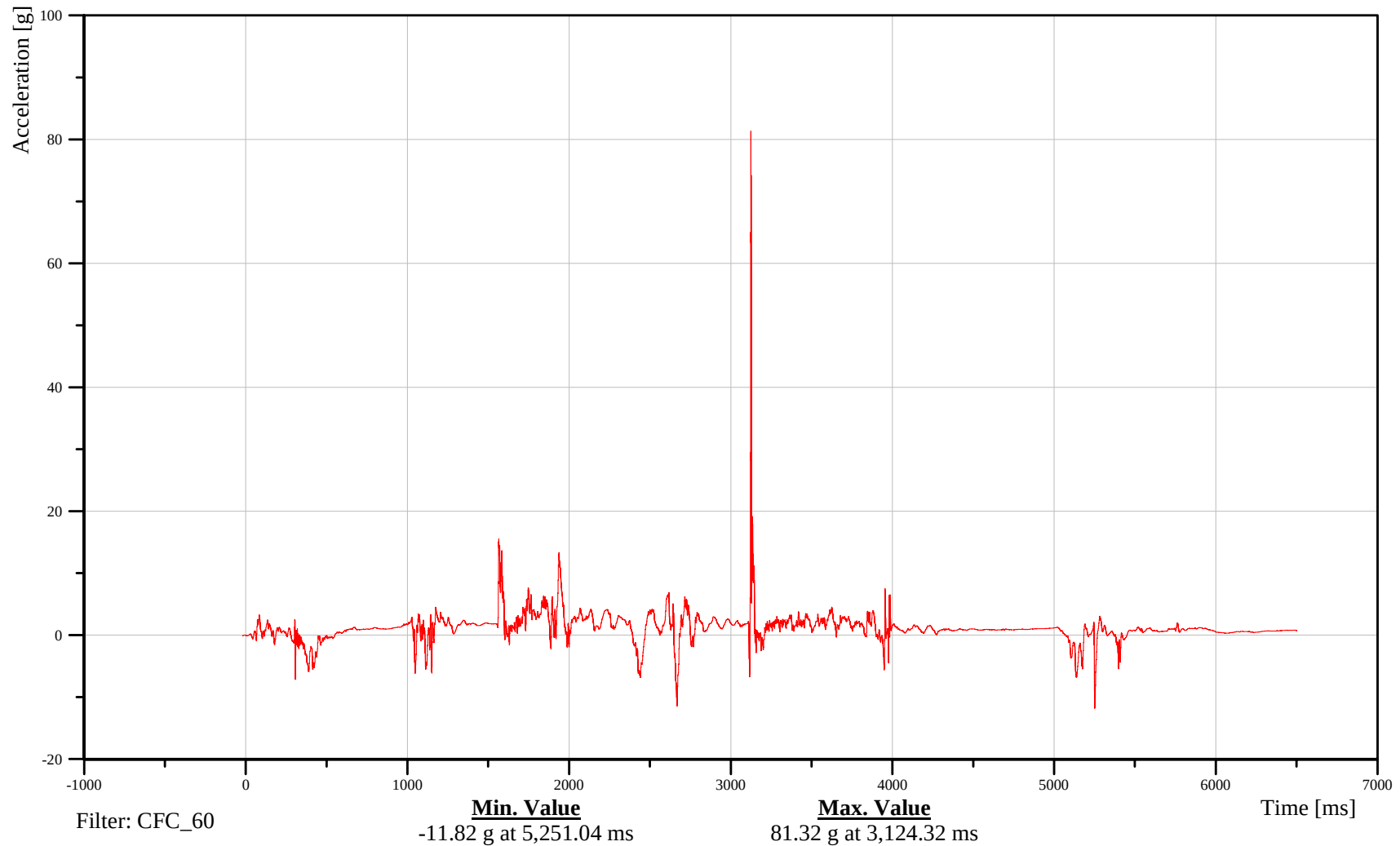
Time: 17:02

Customer: VRTC

10BPILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-124

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left B-Pillar Upper Z-Axis Acceleration

Date: 09/30/2009

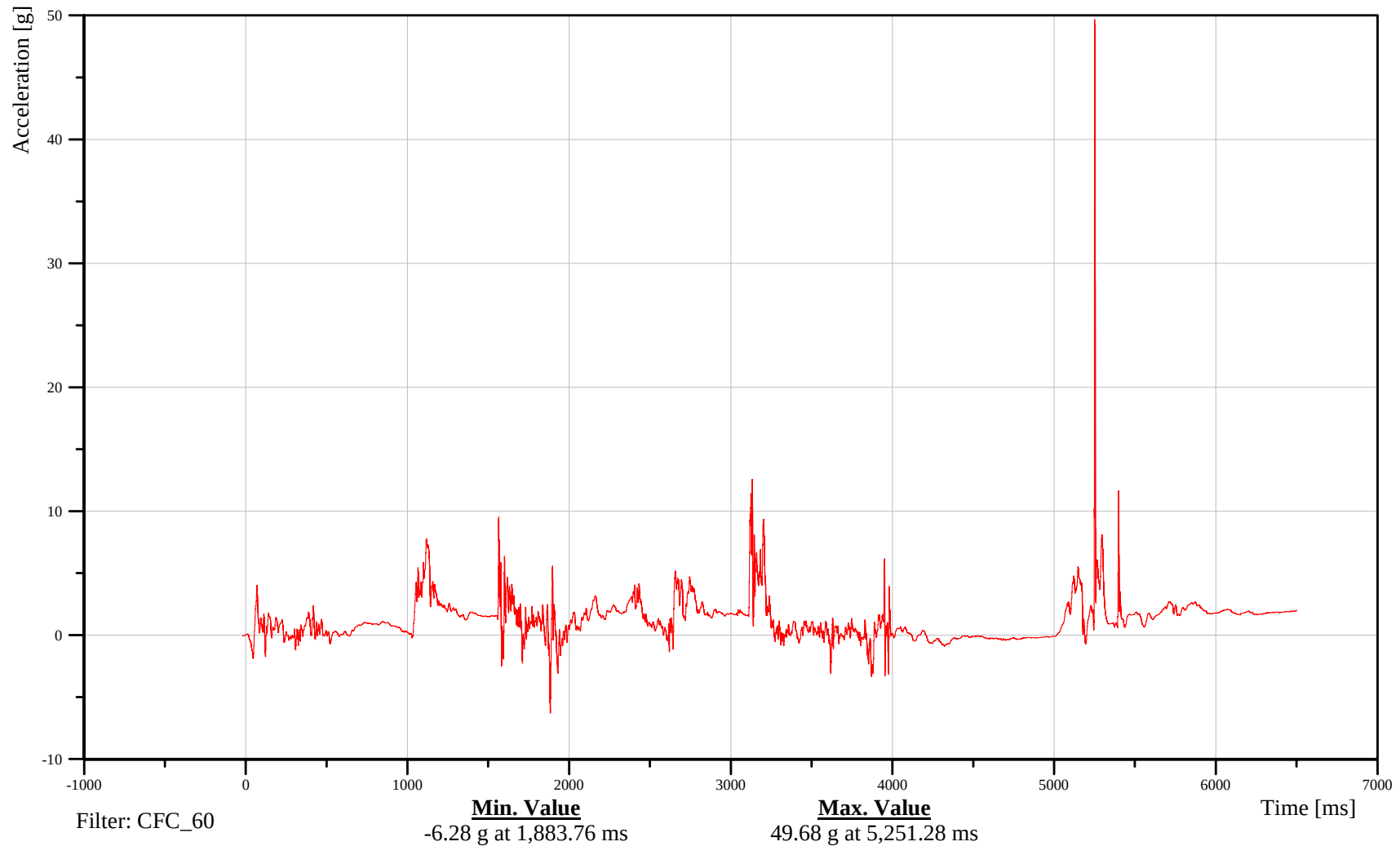
Time: 17:02

Customer: VRTC

10BPILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-125

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

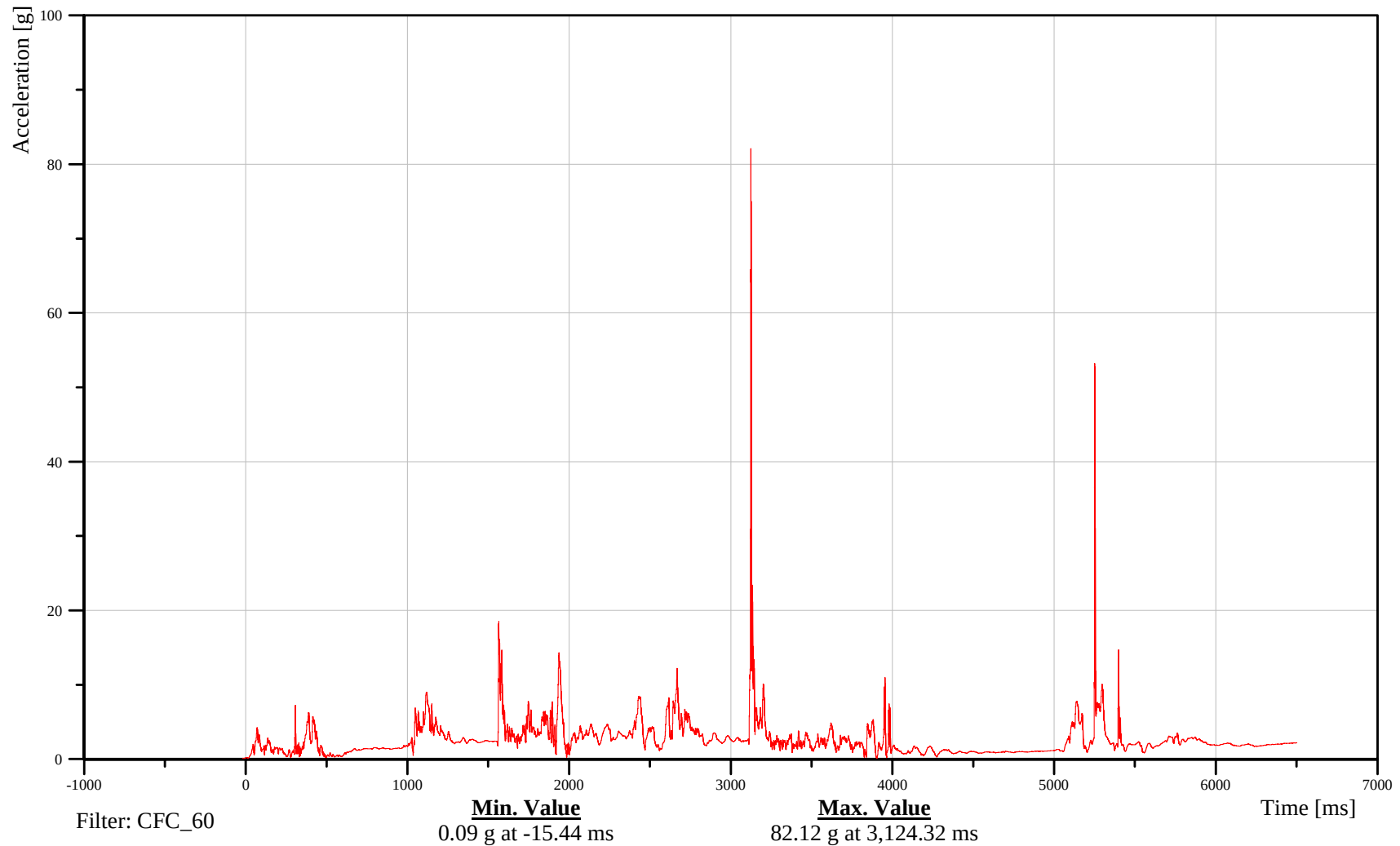
Left B-Pillar Upper Resultant Acceleration

Customer: VRTC

10BPILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-126

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left B-Pillar Lower X-Axis Acceleration

Date: 09/30/2009

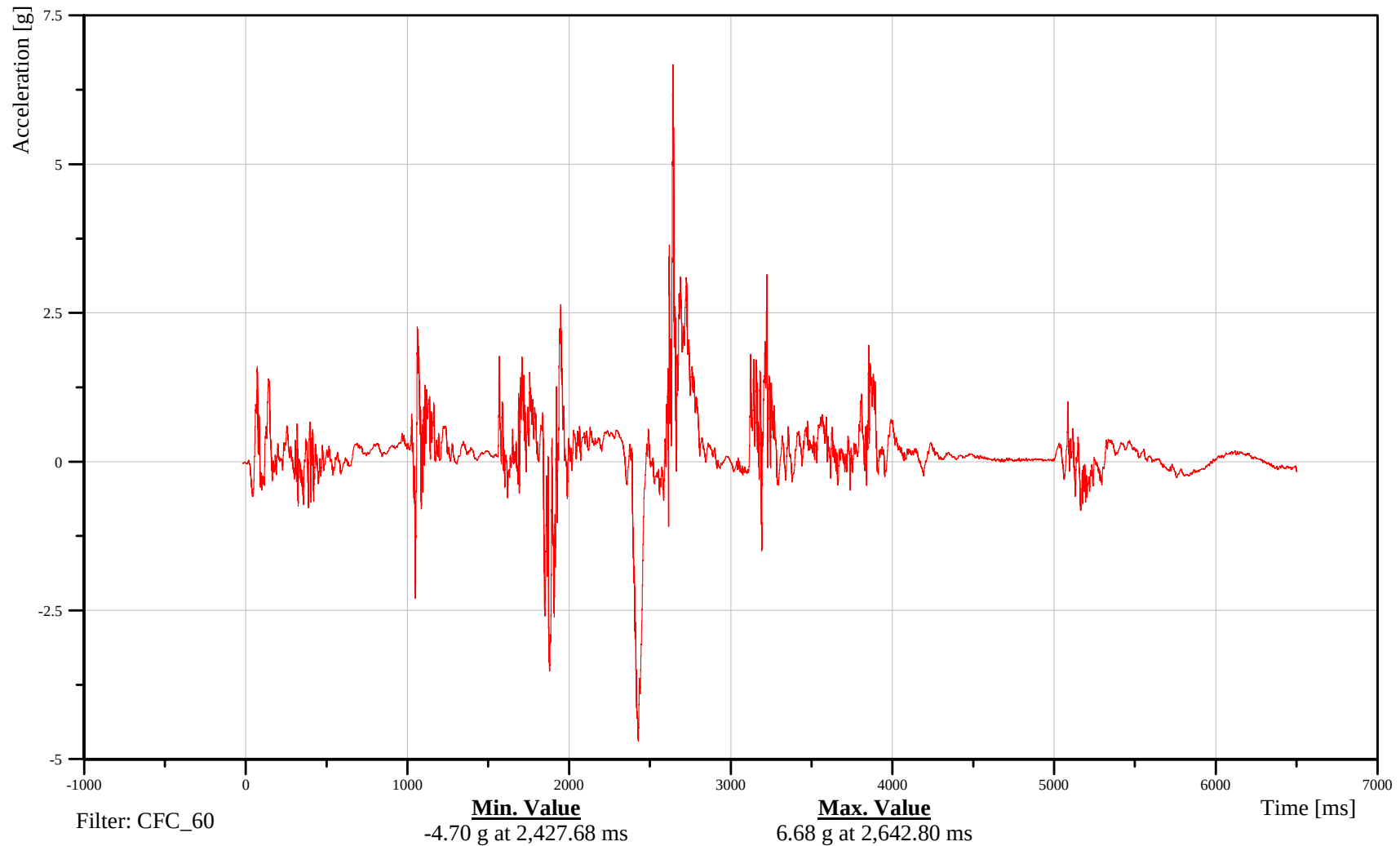
Time: 17:02

Customer: VRTC

10BPILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-127

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left B-Pillar Lower Y-Axis Acceleration

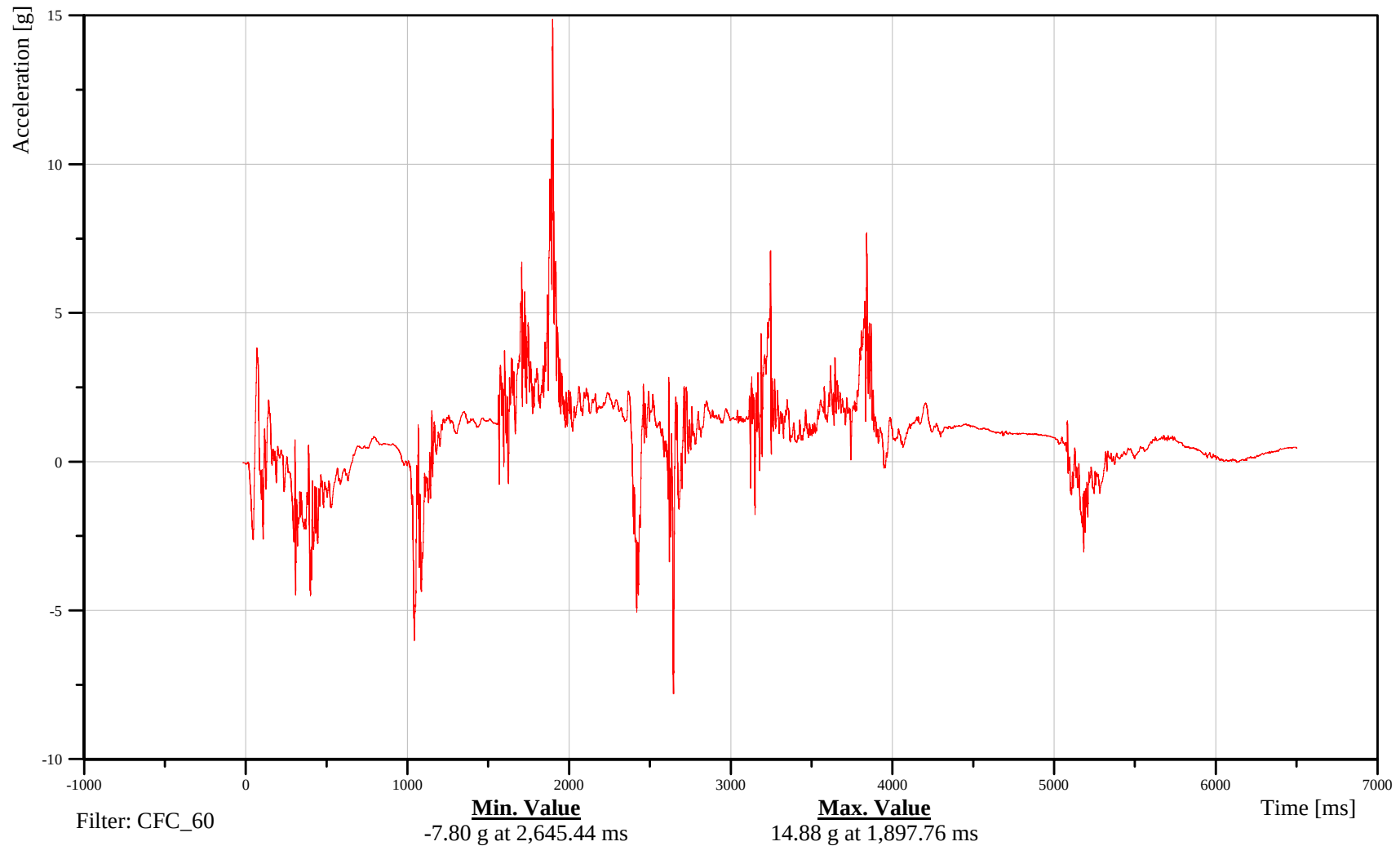
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10BPILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-128

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left B-Pillar Lower Z-Axis Acceleration

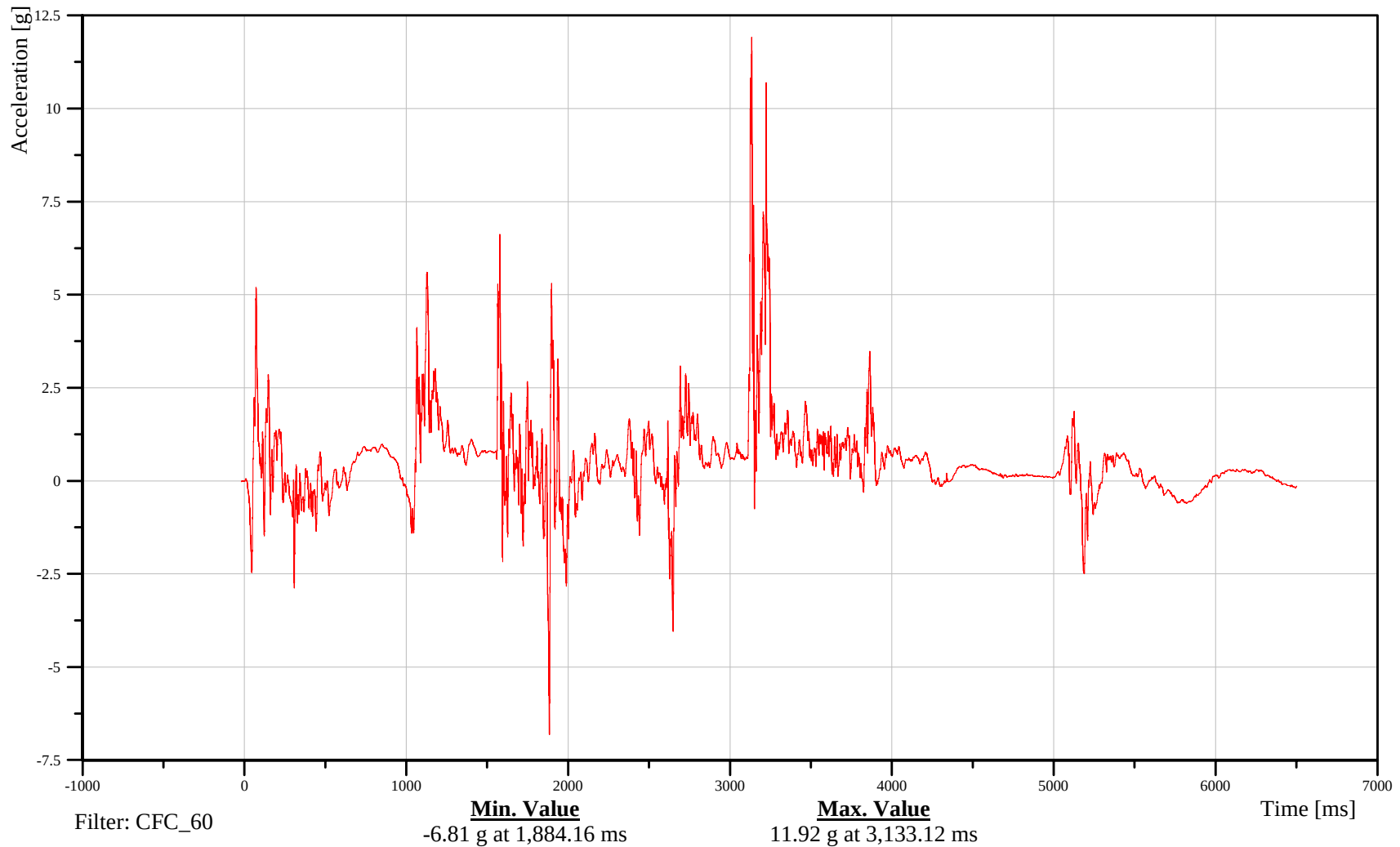
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10BPILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-129

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left B-Pillar Lower Resultant Acceleration

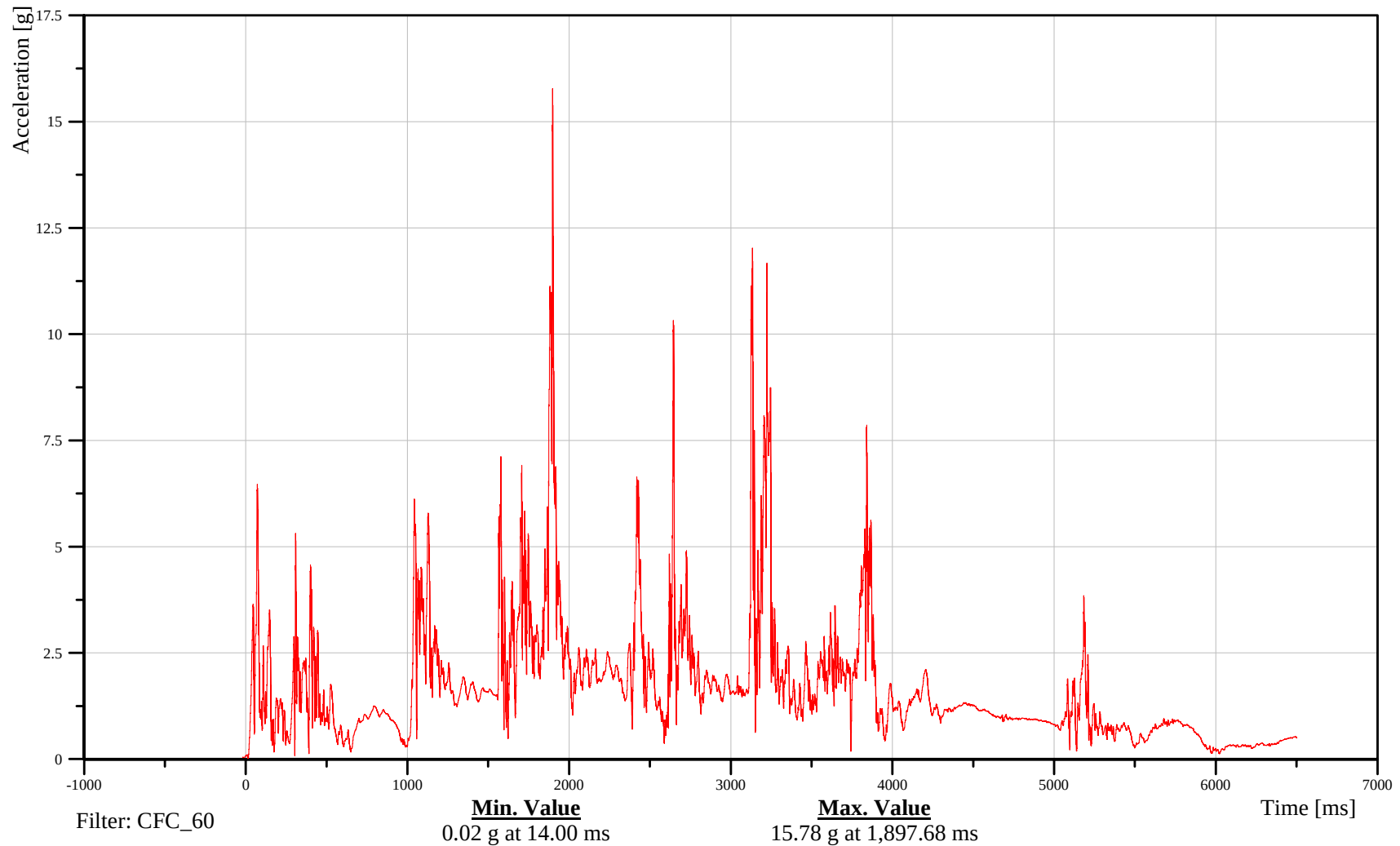
Time: 17:02

Customer: VRTC

10BPILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-130

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

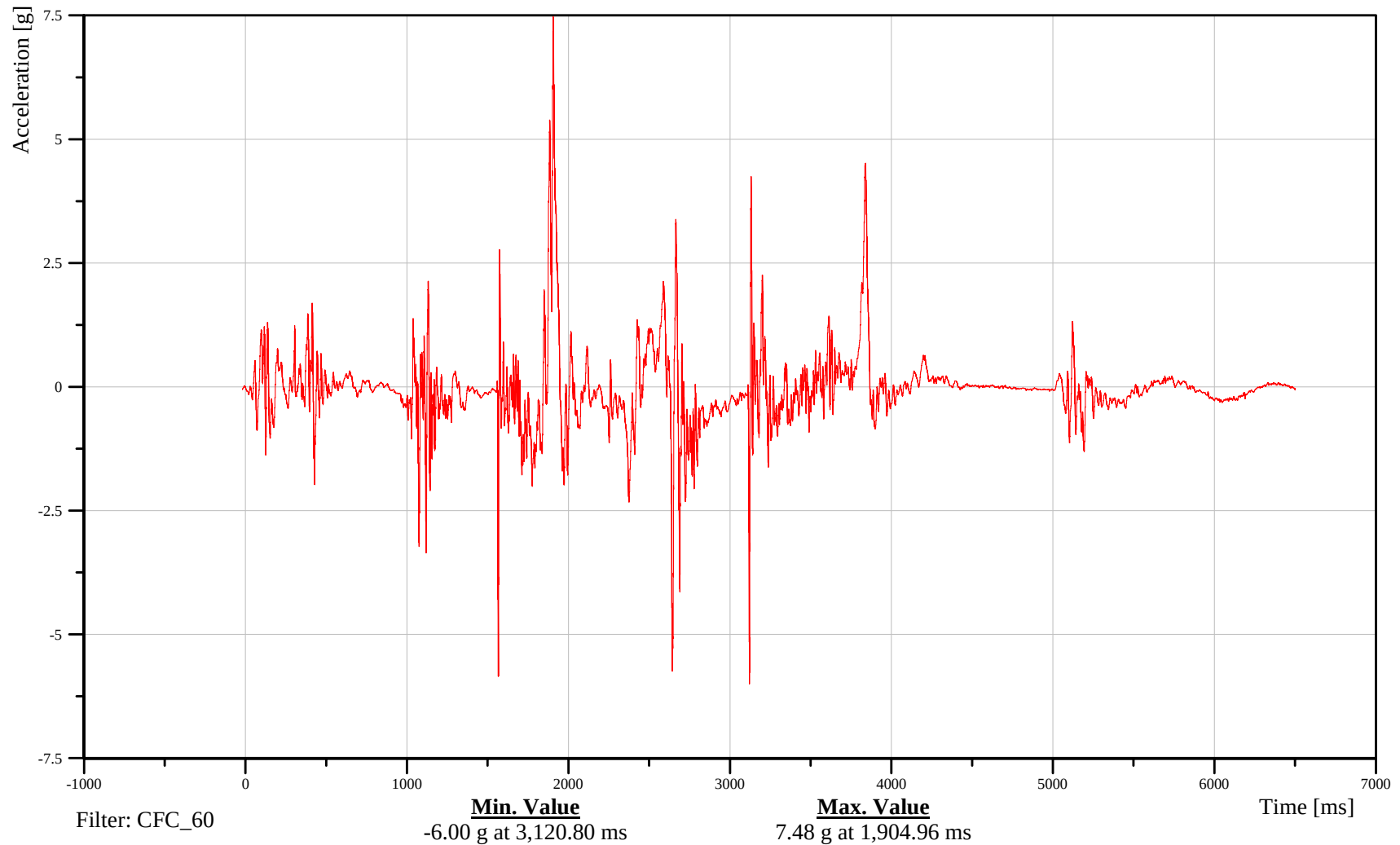
Right B-Pillar Upper X-Axis Acceleration

Customer: VRTC

10BPILUPRI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-131

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right B-Pillar Upper Y-Axis Acceleration

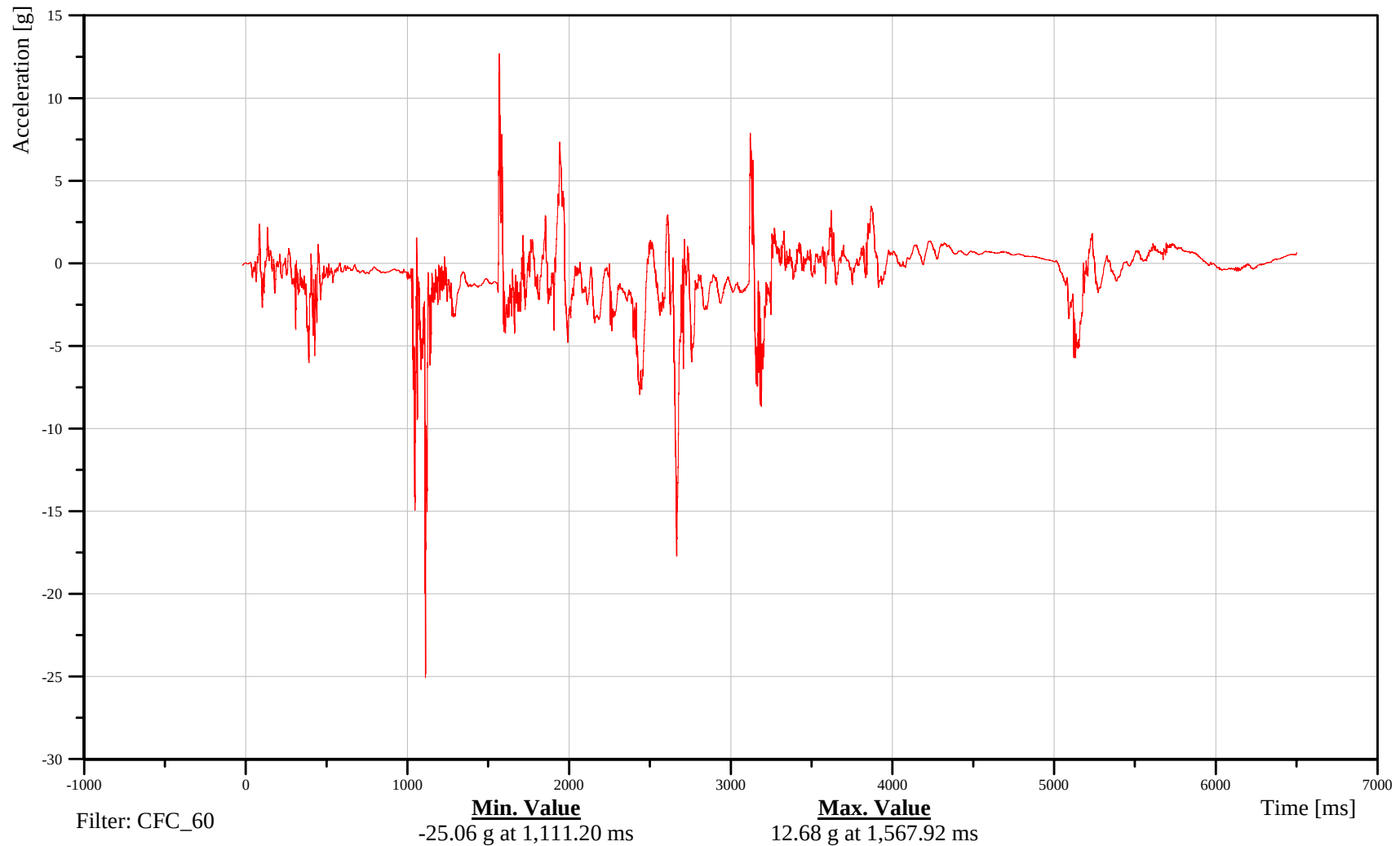
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10BPILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-132

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

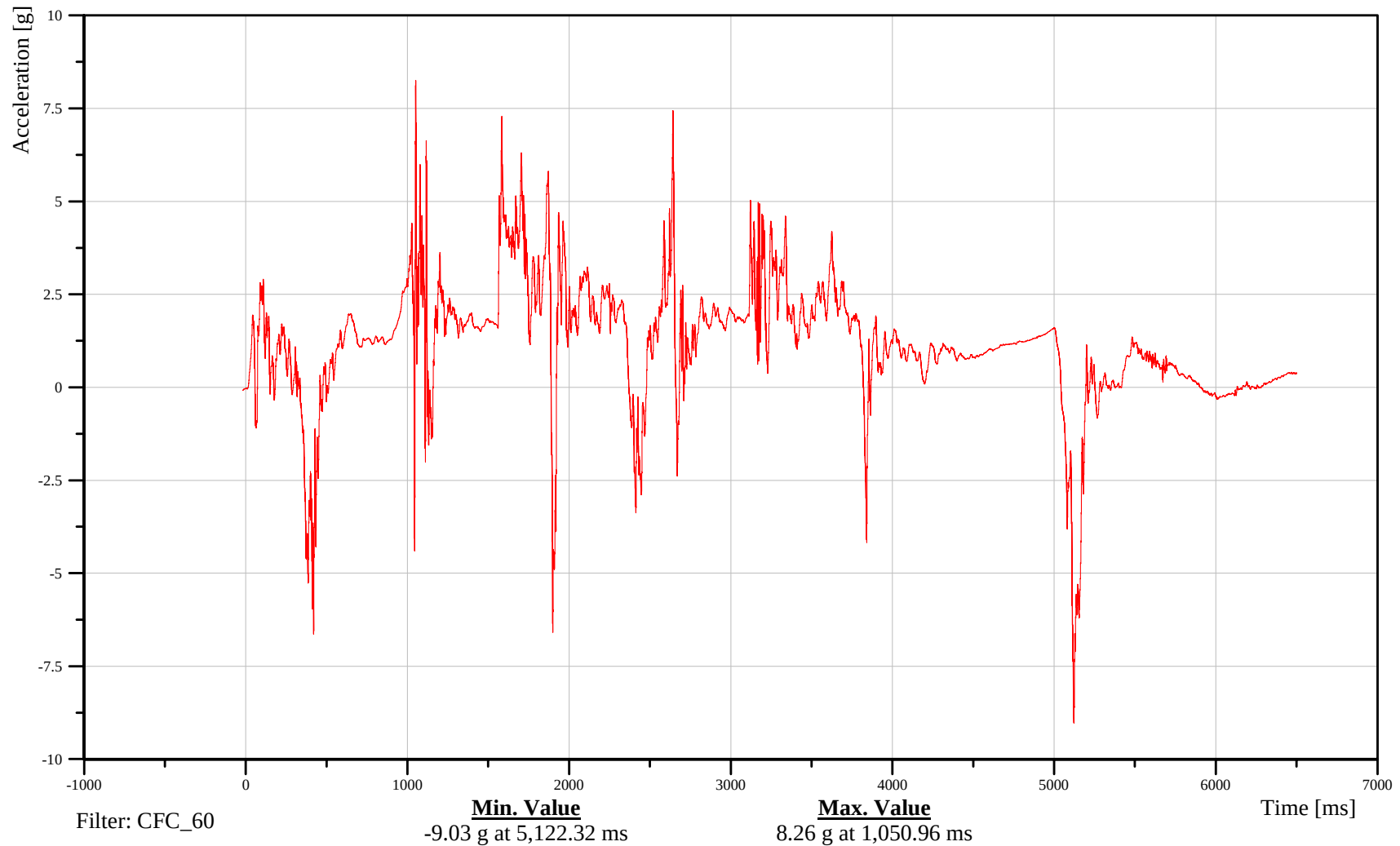
Right B-Pillar Upper Z-Axis Acceleration

Customer: VRTC

10BPILUPRI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-133

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

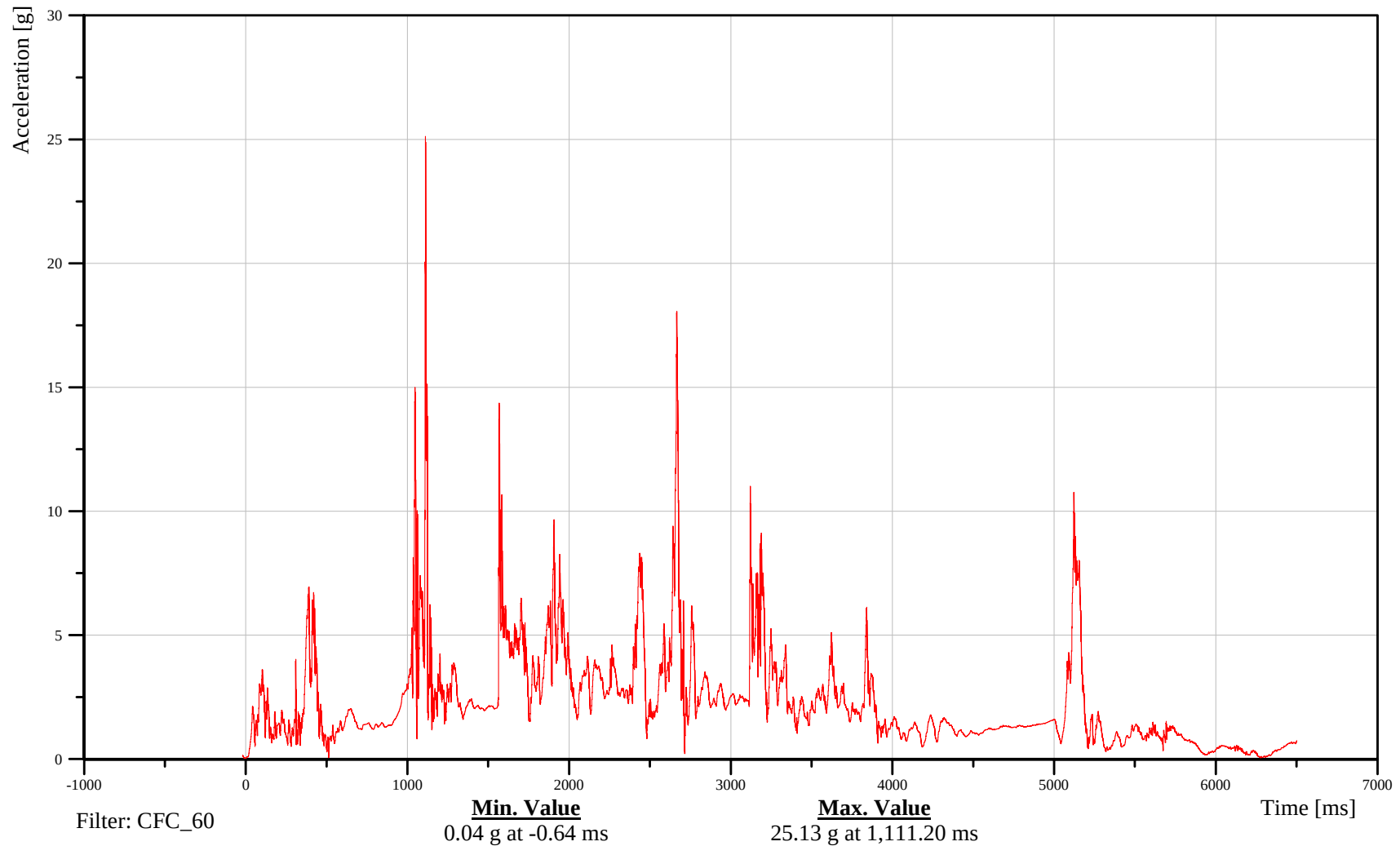
Right B-Pillar Upper Resultant Acceleration

Customer: VRTC

10BPILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-134

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

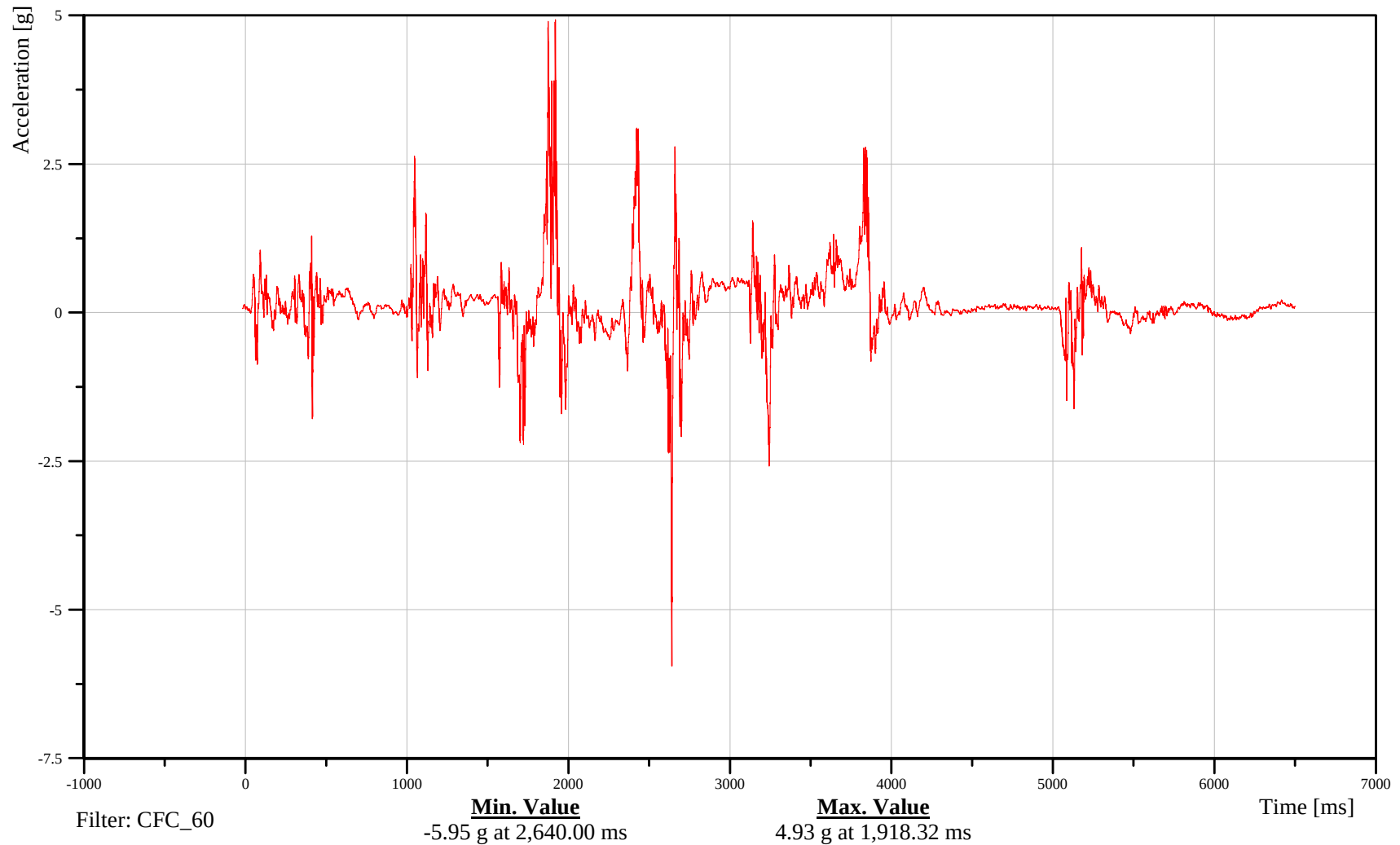
Right B-Pillar Lower X-Axis Acceleration

Customer: VRTC

10BPILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-135

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right B-Pillar Lower Y-Axis Acceleration

Date: 09/30/2009

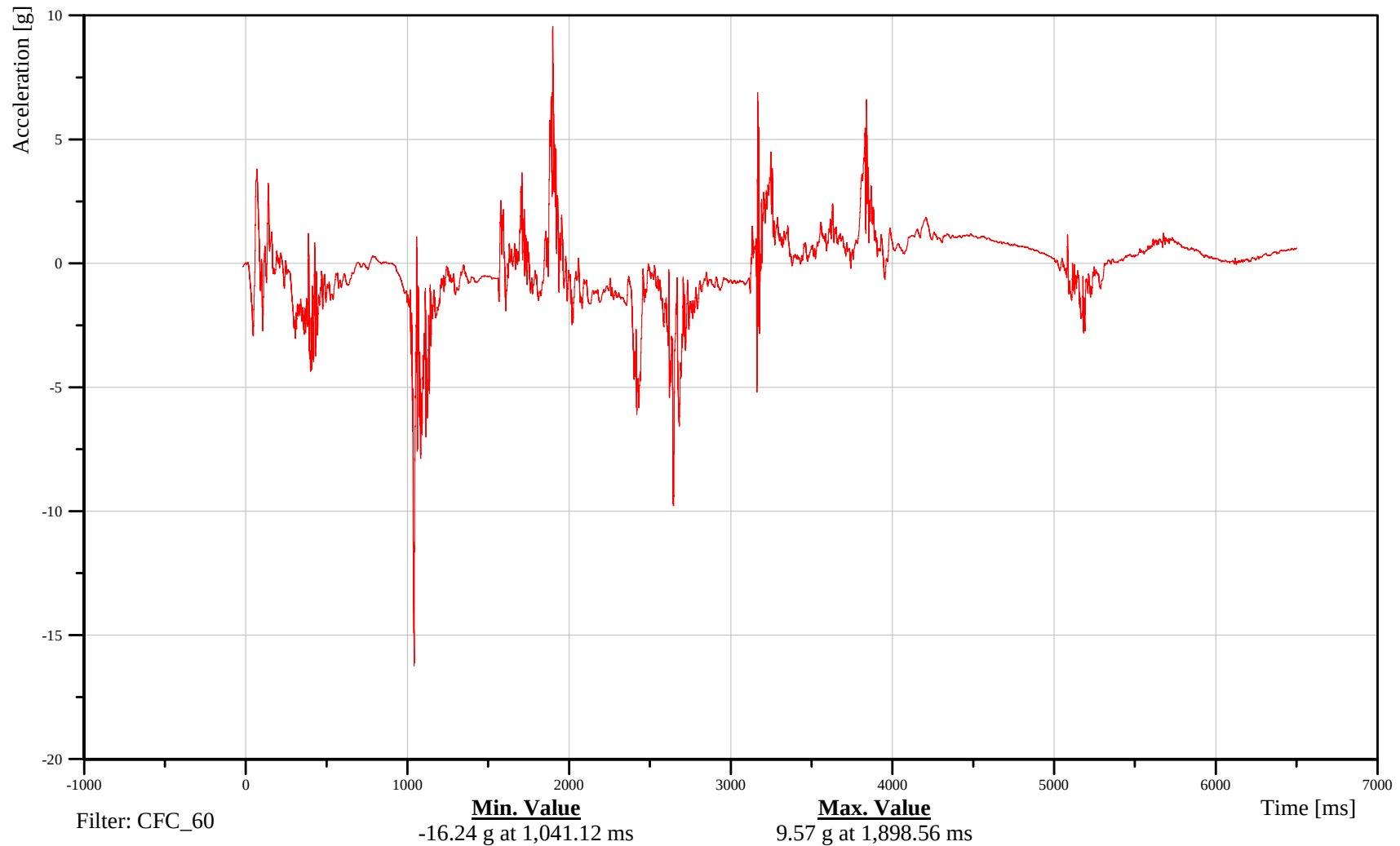
Time: 17:02

Customer: VRTC

10BPILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-136

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

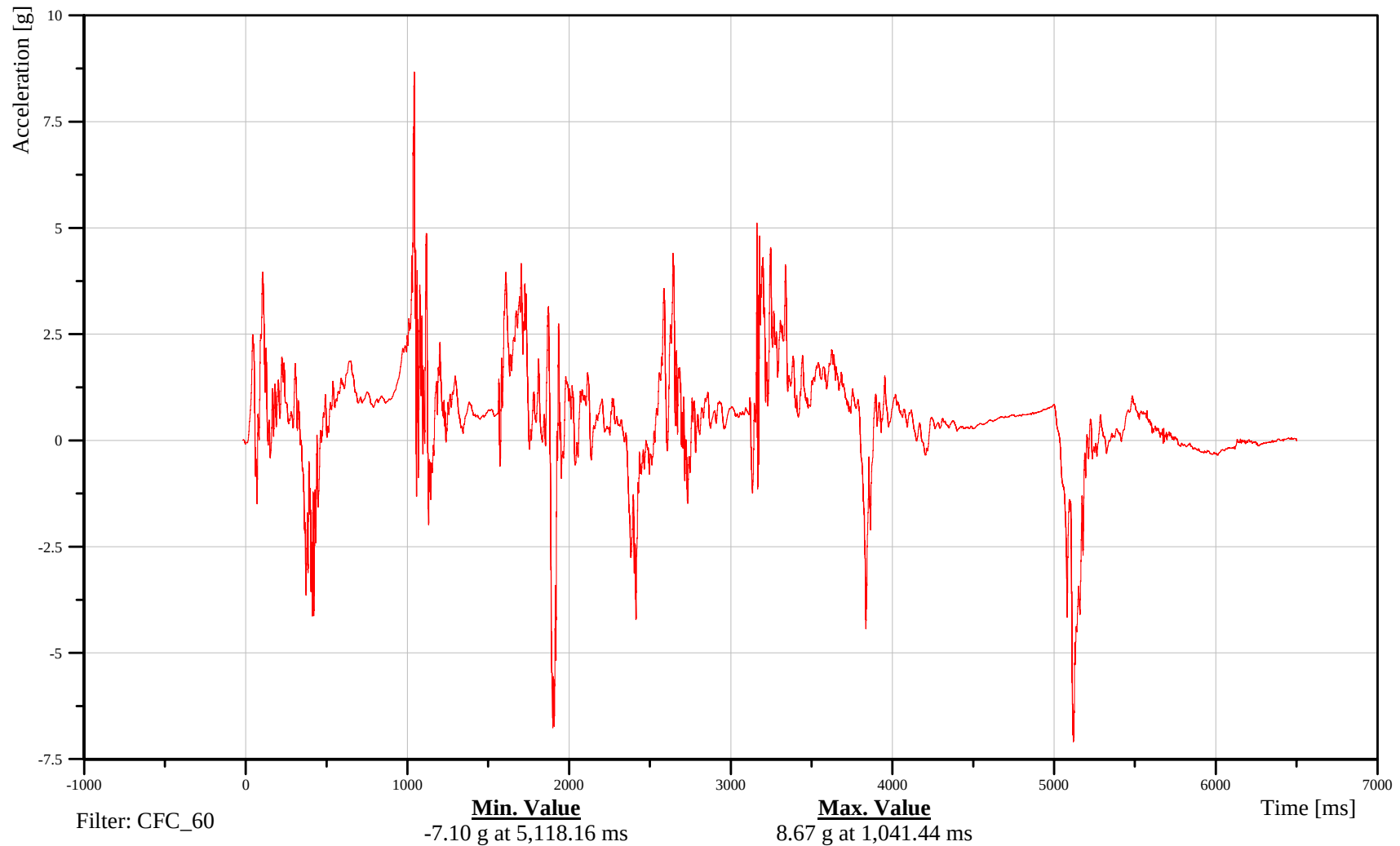
Right B-Pillar Lower Z-Axis Acceleration

Customer: VRTC

10BPILLORI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-137

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right B-Pillar Lower Resultant Acceleration

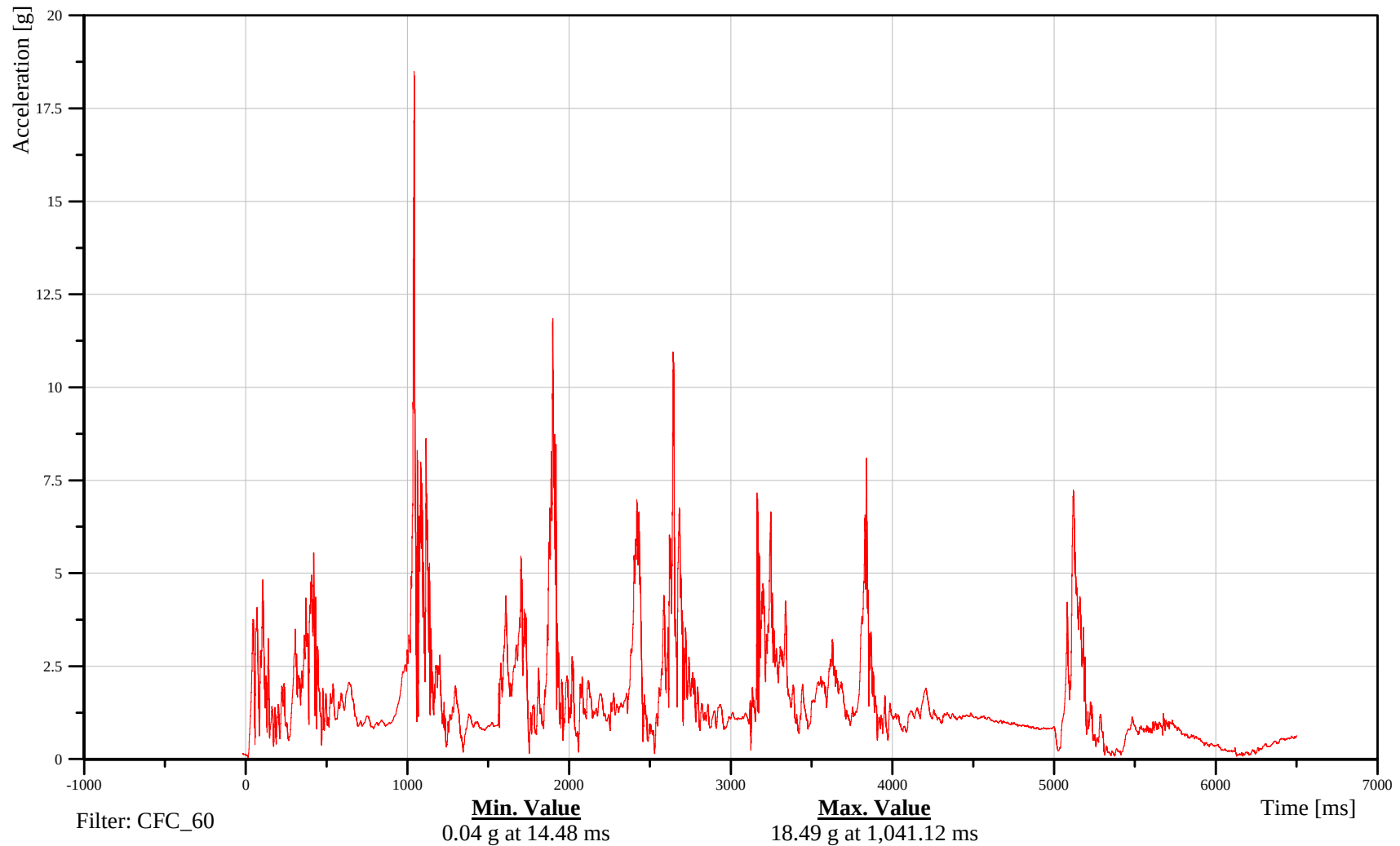
Time: 17:02

Customer: VRTC

10BPILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-138

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left C-Pillar Upper X-Axis Acceleration

Date: 09/30/2009

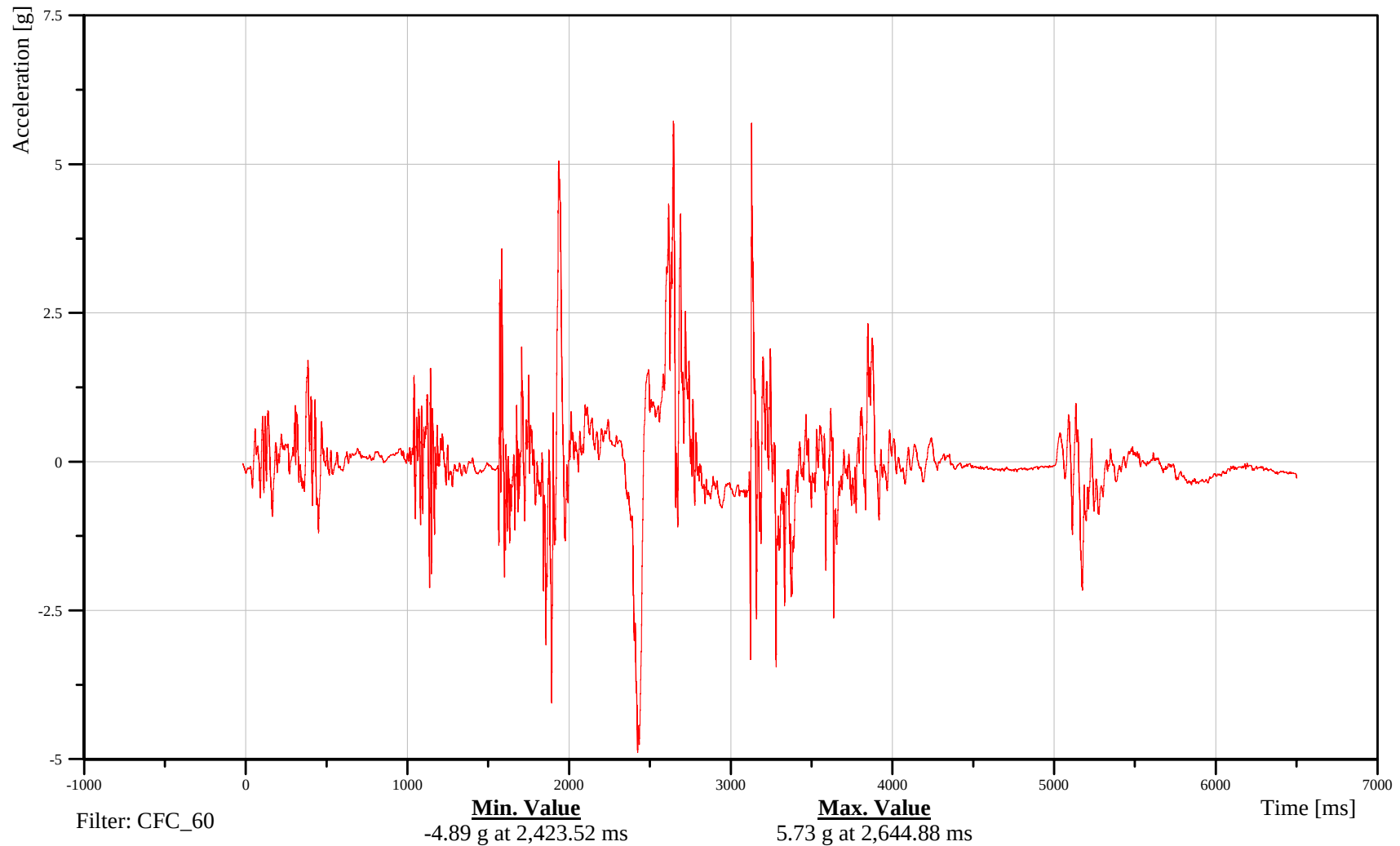
Time: 17:02

Customer: VRTC

10CPILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-139

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left C-Pillar Upper Y-Axis Acceleration

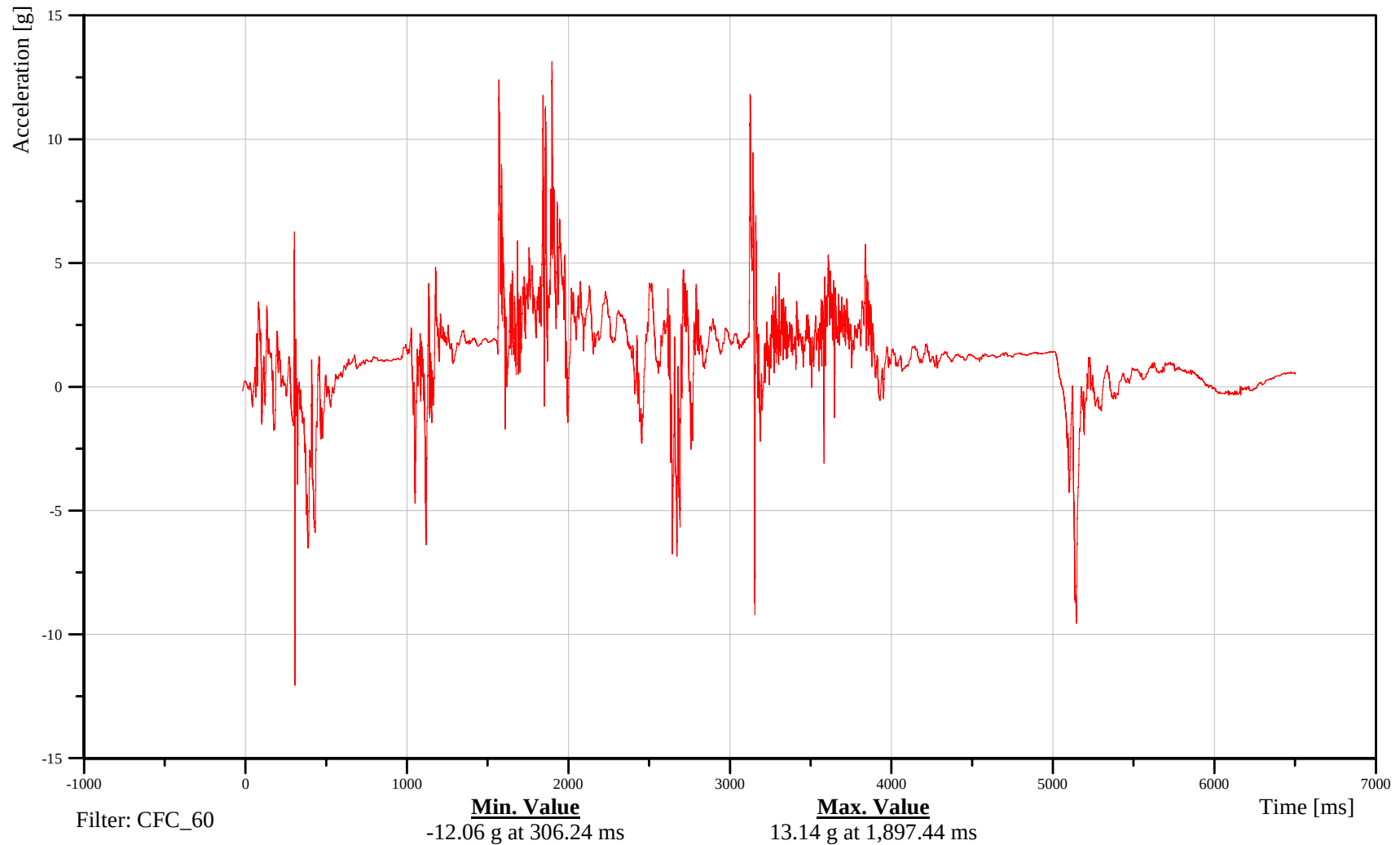
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10CPILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-140

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left C-Pillar Upper Z-Axis Acceleration

Date: 09/30/2009

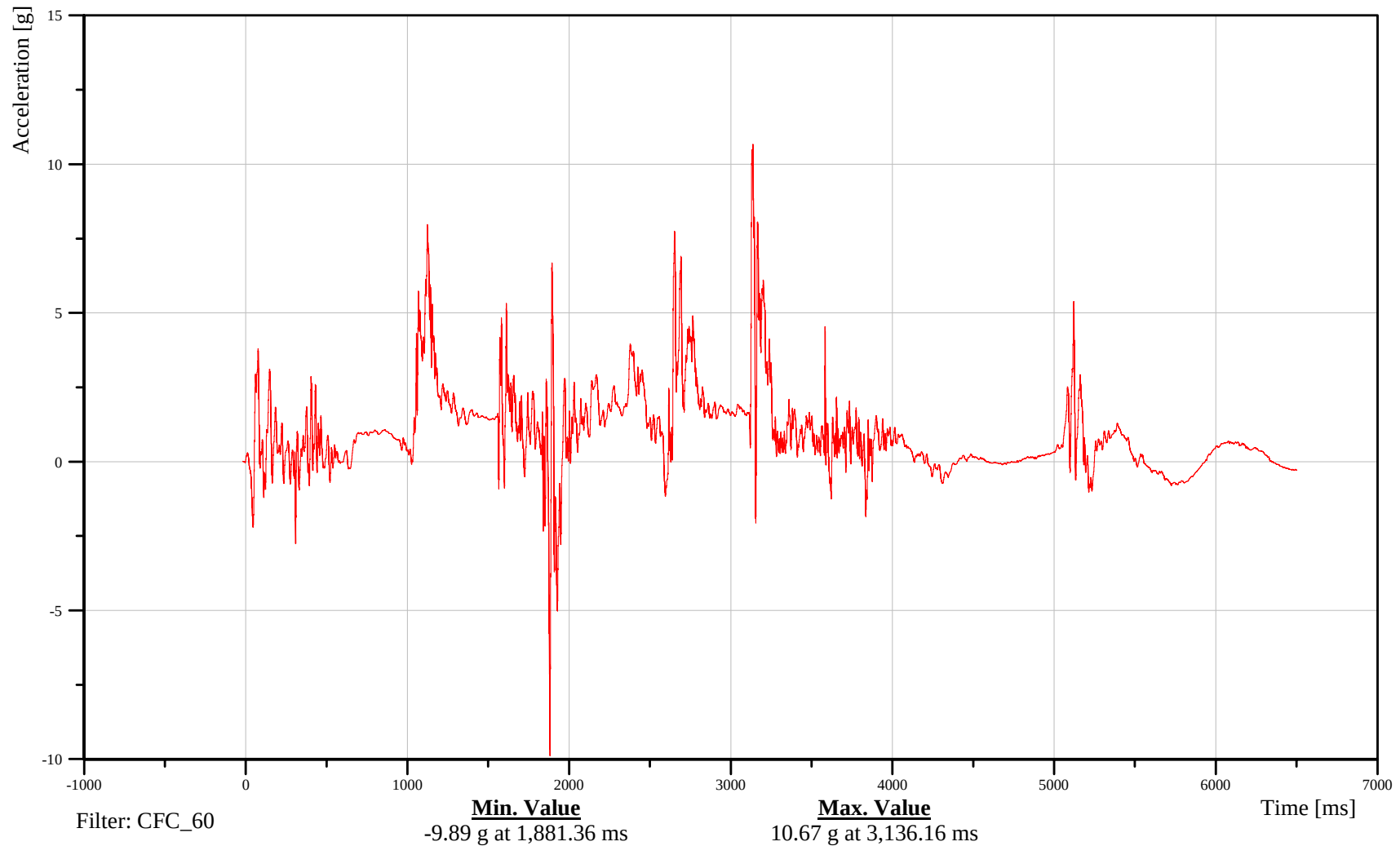
Time: 17:02

Customer: VRTC

10CPILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-141

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left C-Pillar Upper Resultant Acceleration

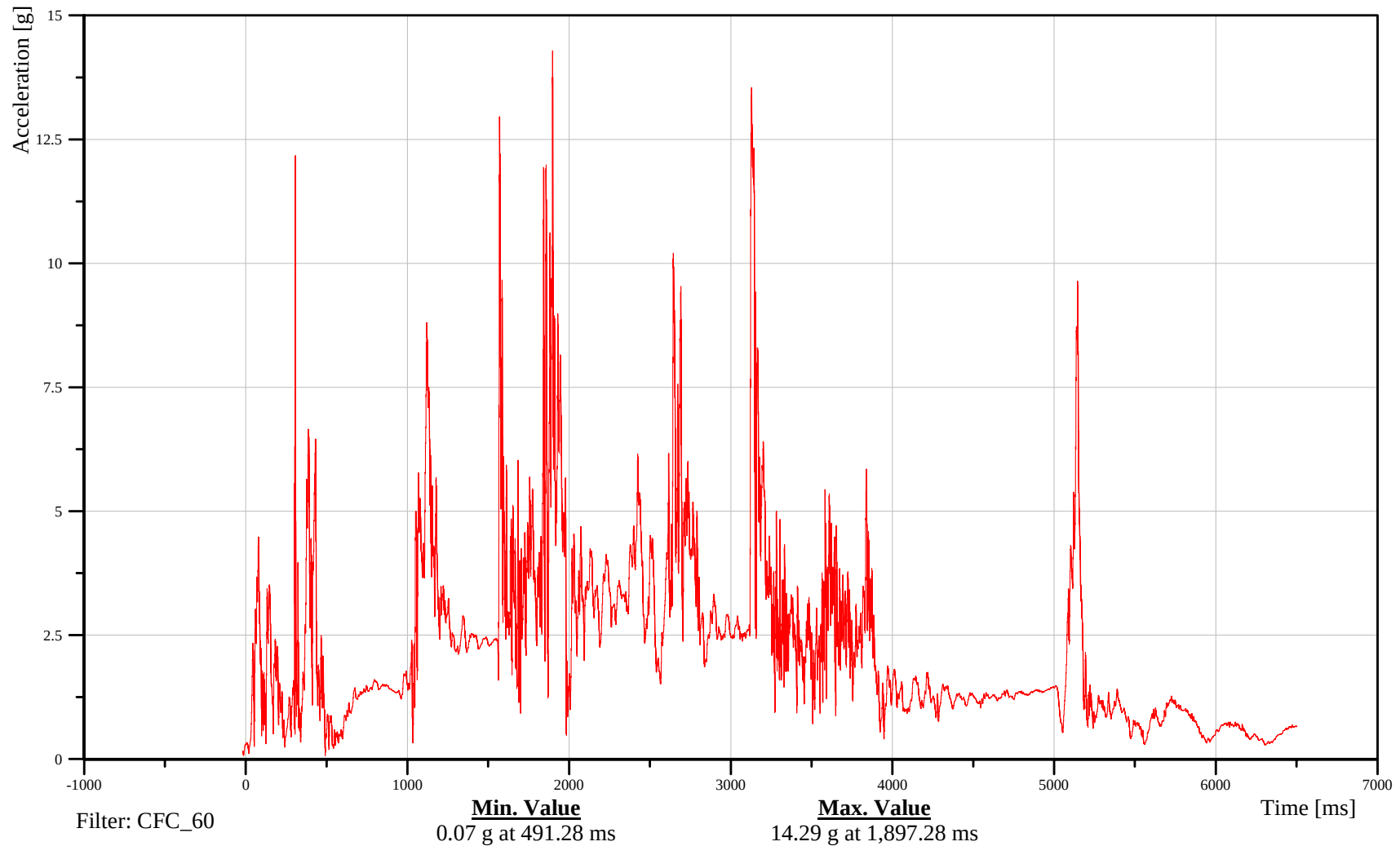
Time: 17:02

Customer: VRTC

10CPILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-142

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left C-Pillar Lower X-Axis Acceleration

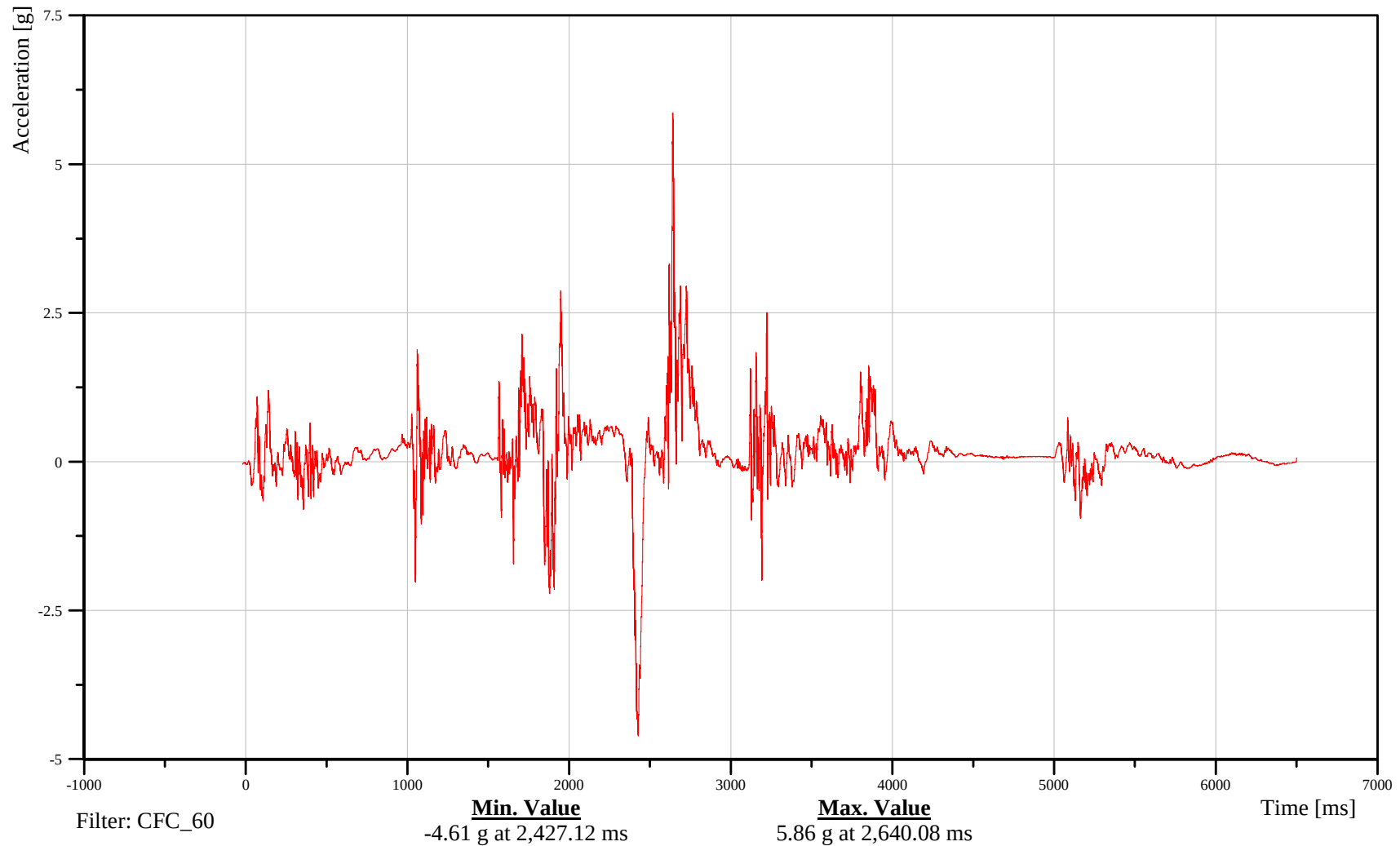
Time: 17:02

Customer: VRTC

10CPILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-143

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left C-Pillar Lower Y-Axis Acceleration

Date: 09/30/2009

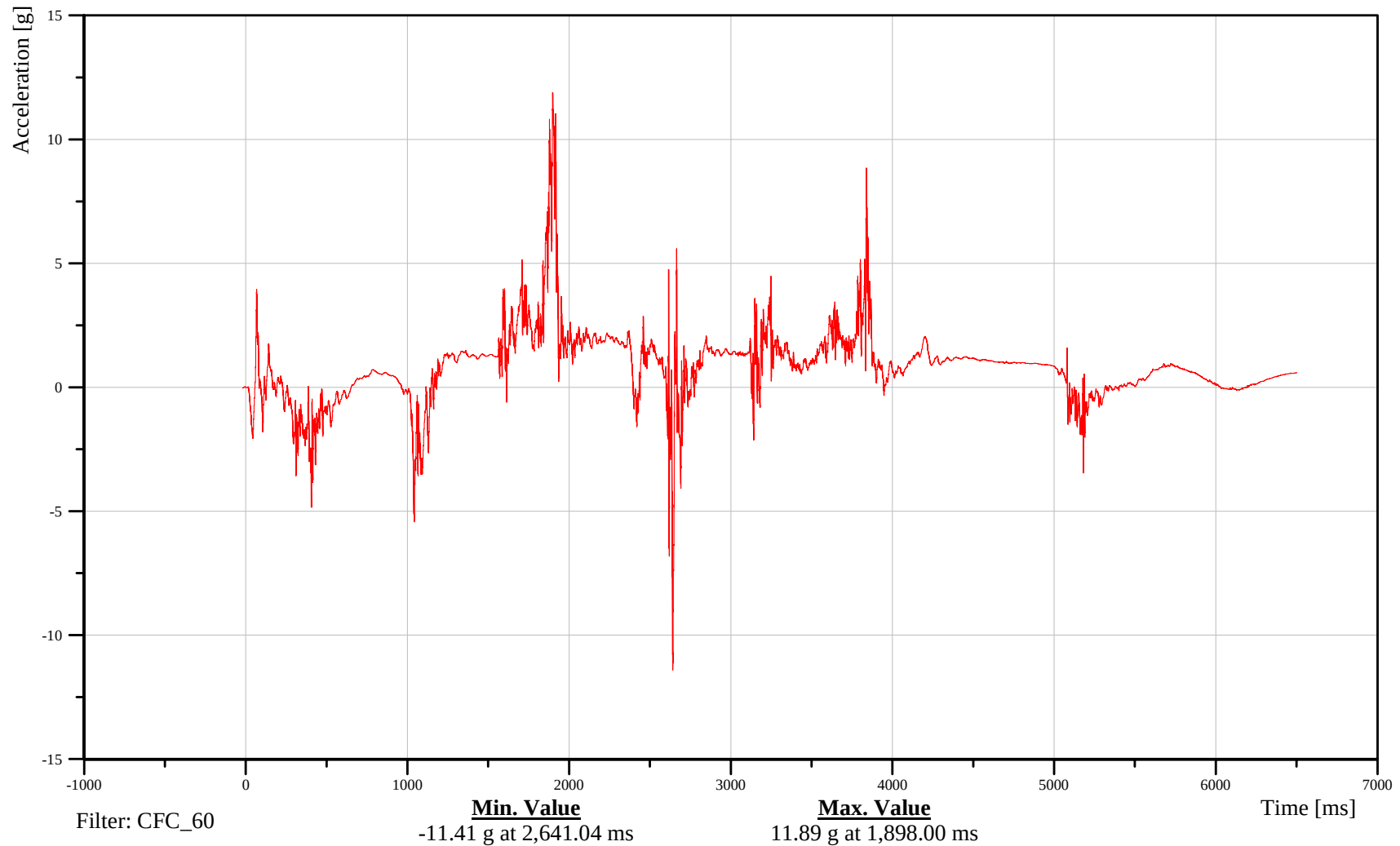
Time: 17:02

Customer: VRTC

10CPILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-144

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left C-Pillar Lower Z-Axis Acceleration

Date: 09/30/2009

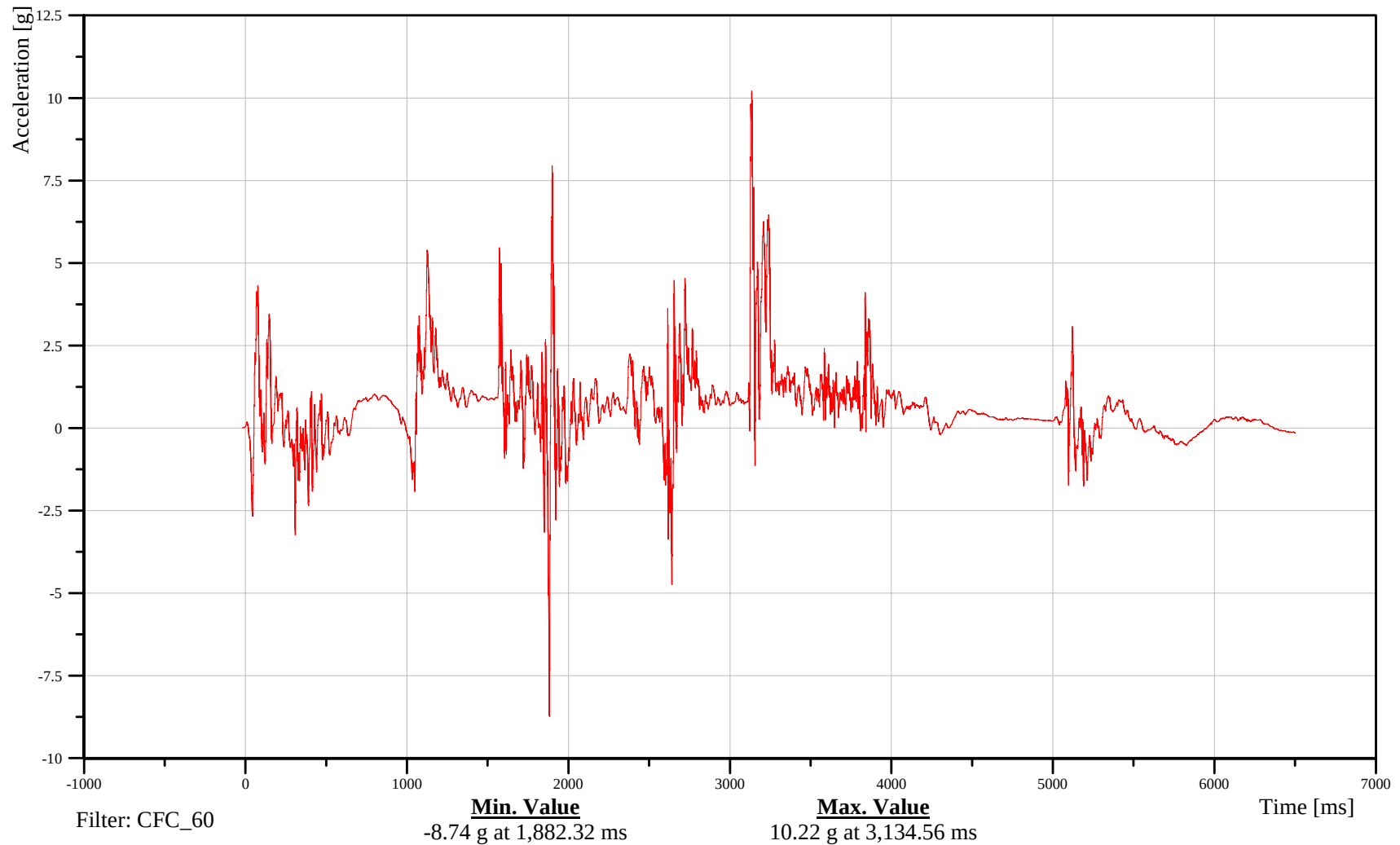
Time: 17:02

Customer: VRTC

10CPILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-145

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left C-Pillar Lower Resultant Acceleration

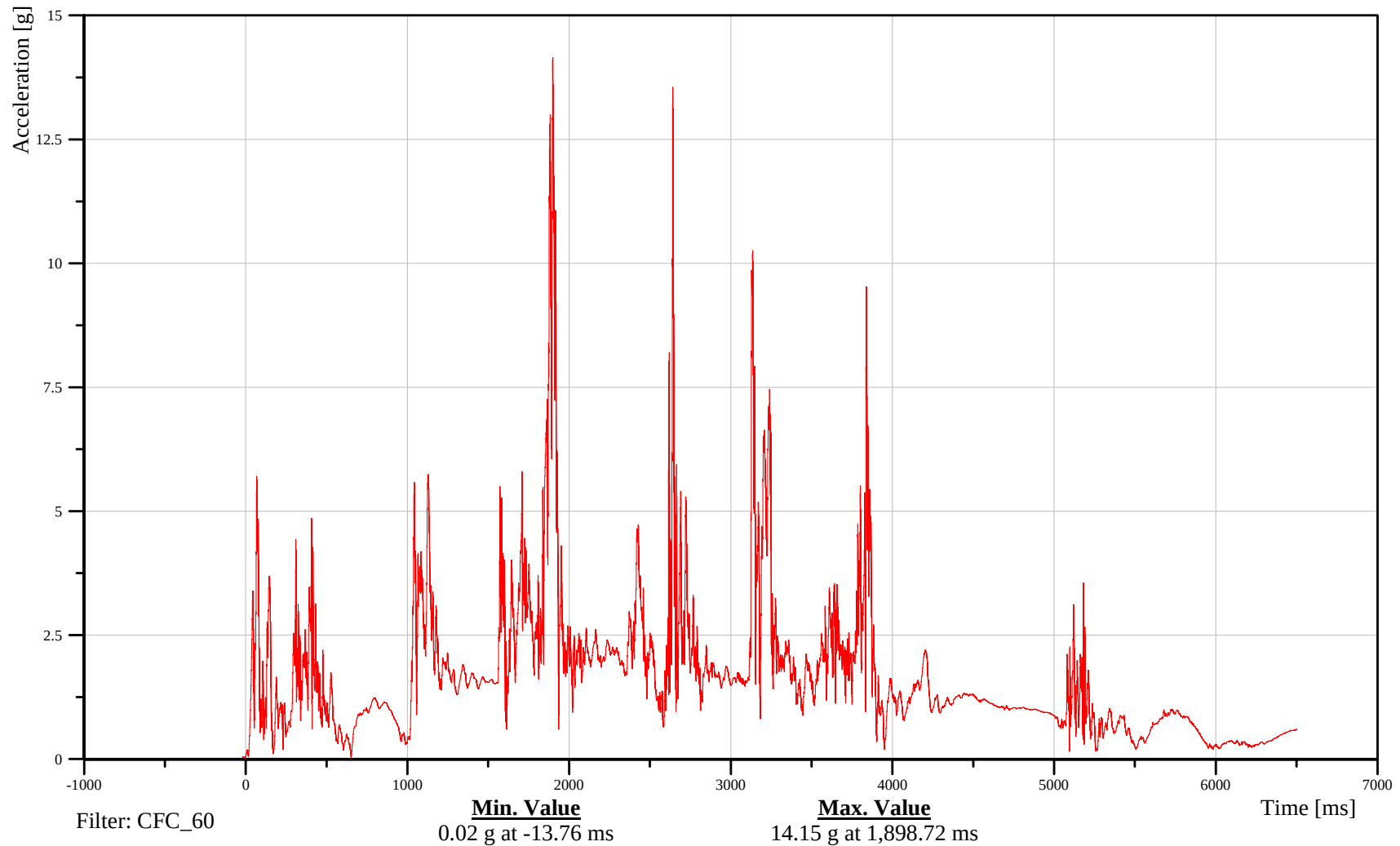
Time: 17:02

Customer: VRTC

10CPILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-146

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

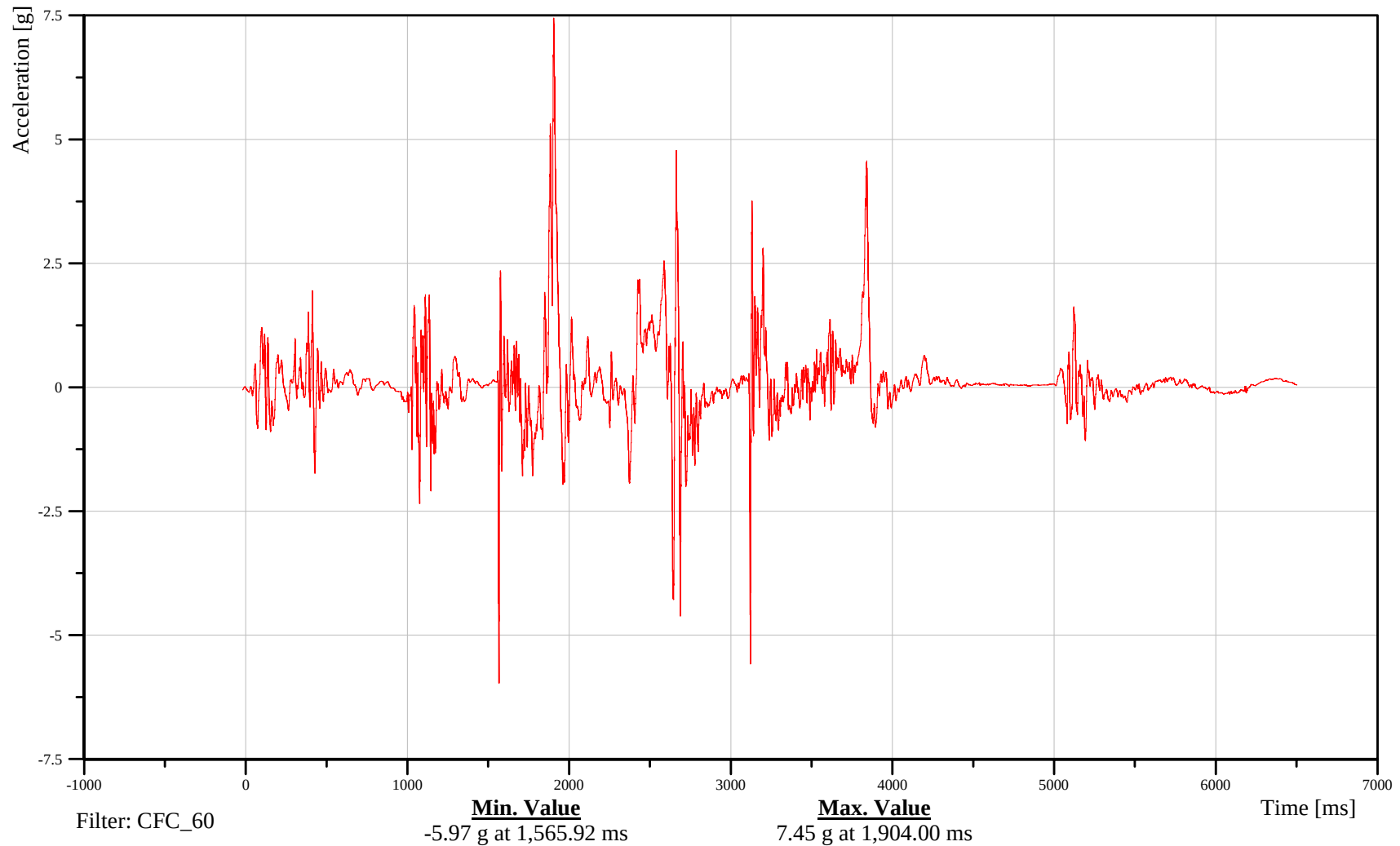
Right C-Pillar Upper X-Axis Acceleration

Customer: VRTC

10CPILUPRI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-147

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right C-Pillar Upper Y-Axis Acceleration

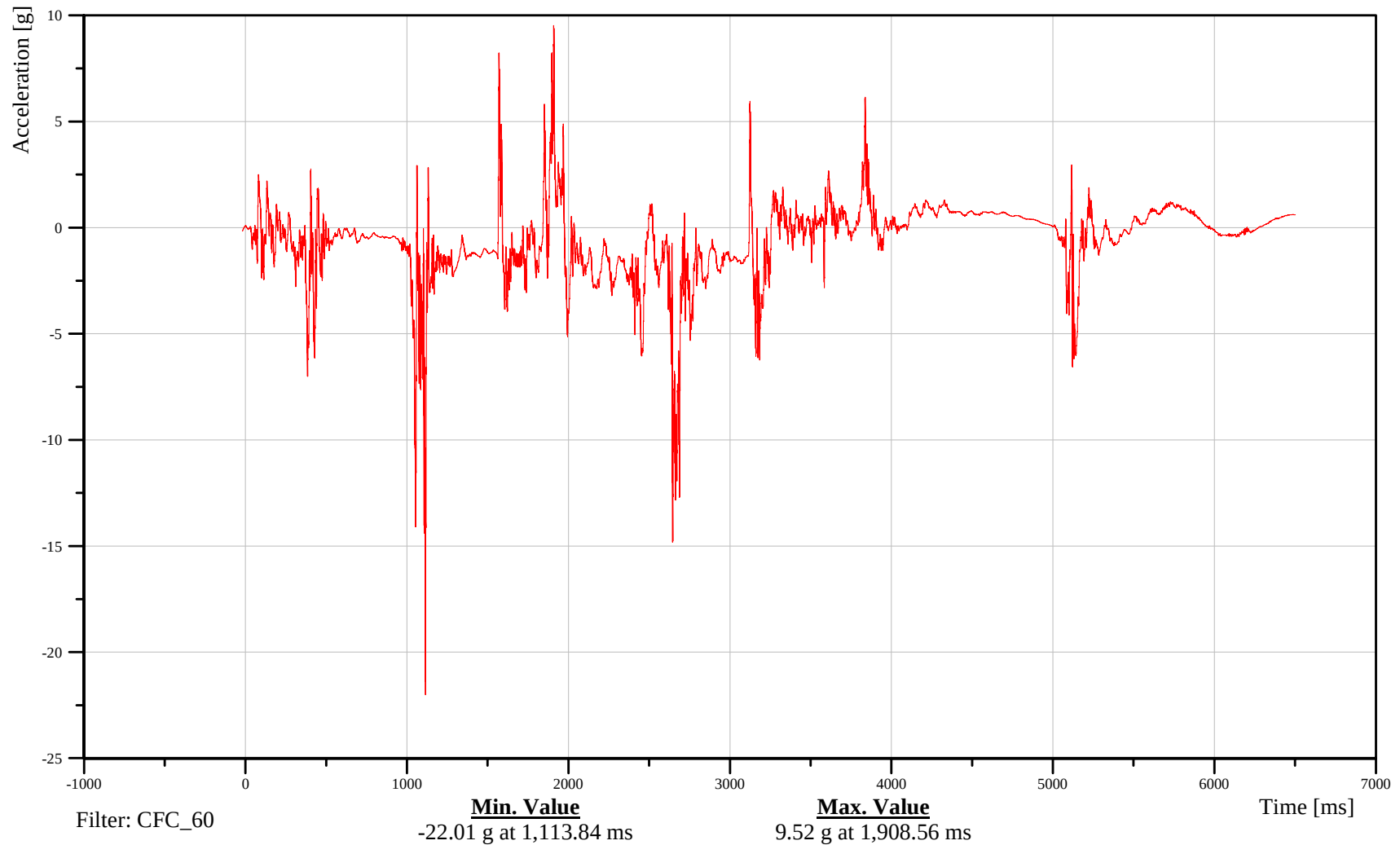
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10CPILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-148

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right C-Pillar Upper Z-Axis Acceleration

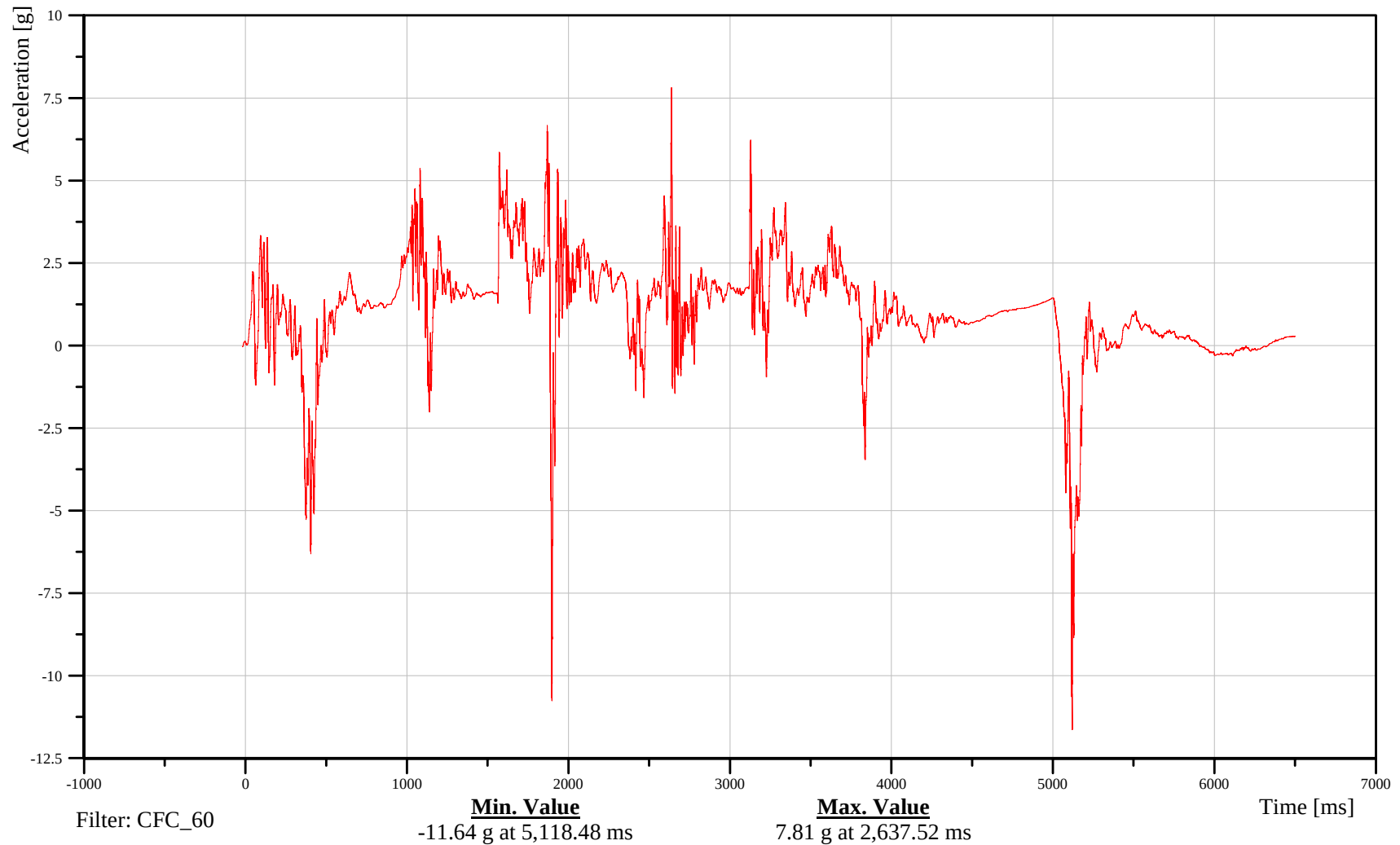
Time: 17:02

Customer: VRTC

10CPILUPRI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-149

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

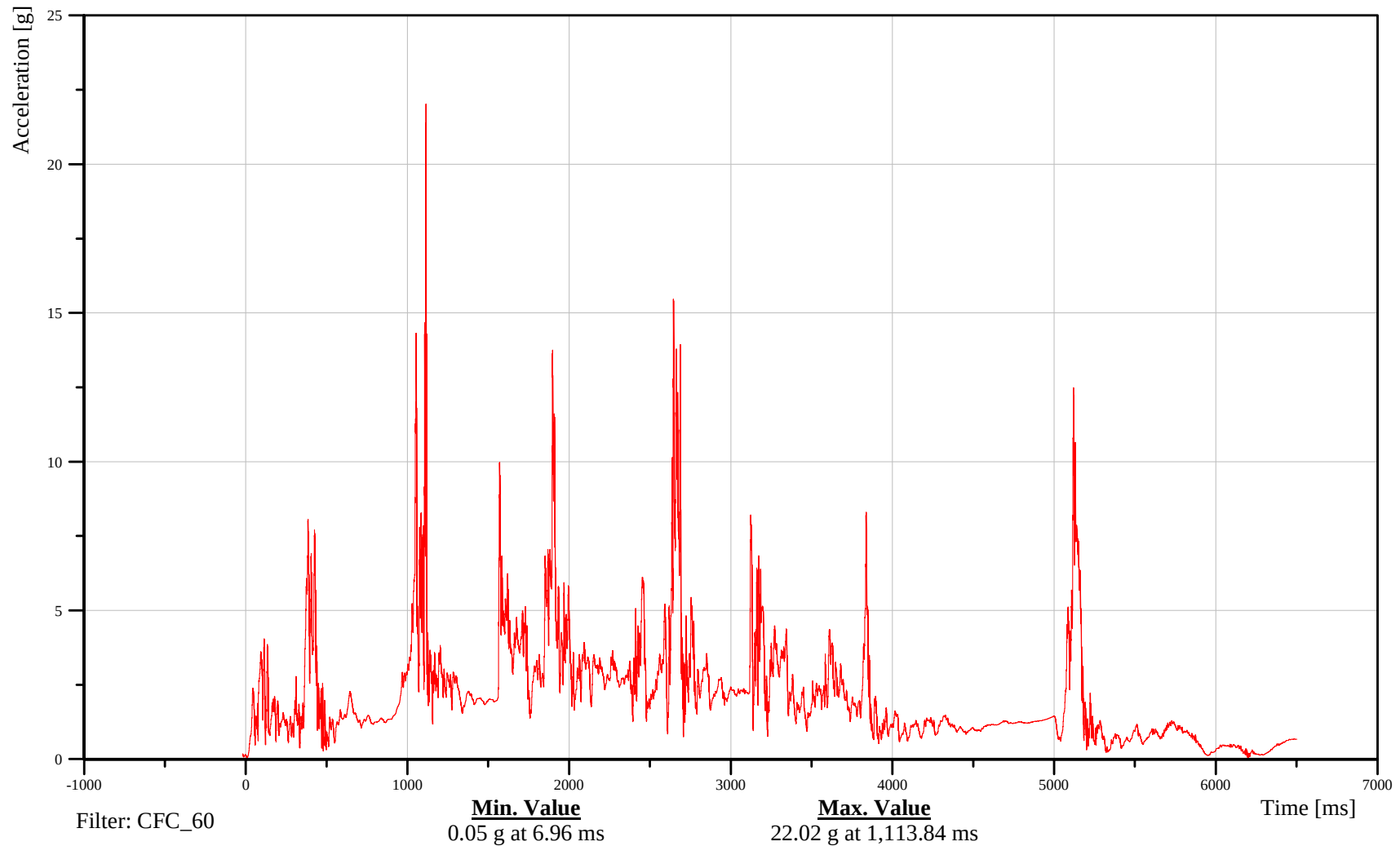
Right C-Pillar Upper Resultant Acceleration

Customer: VRTC

10CPILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-150

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right C-Pillar Lower X-Axis Acceleration

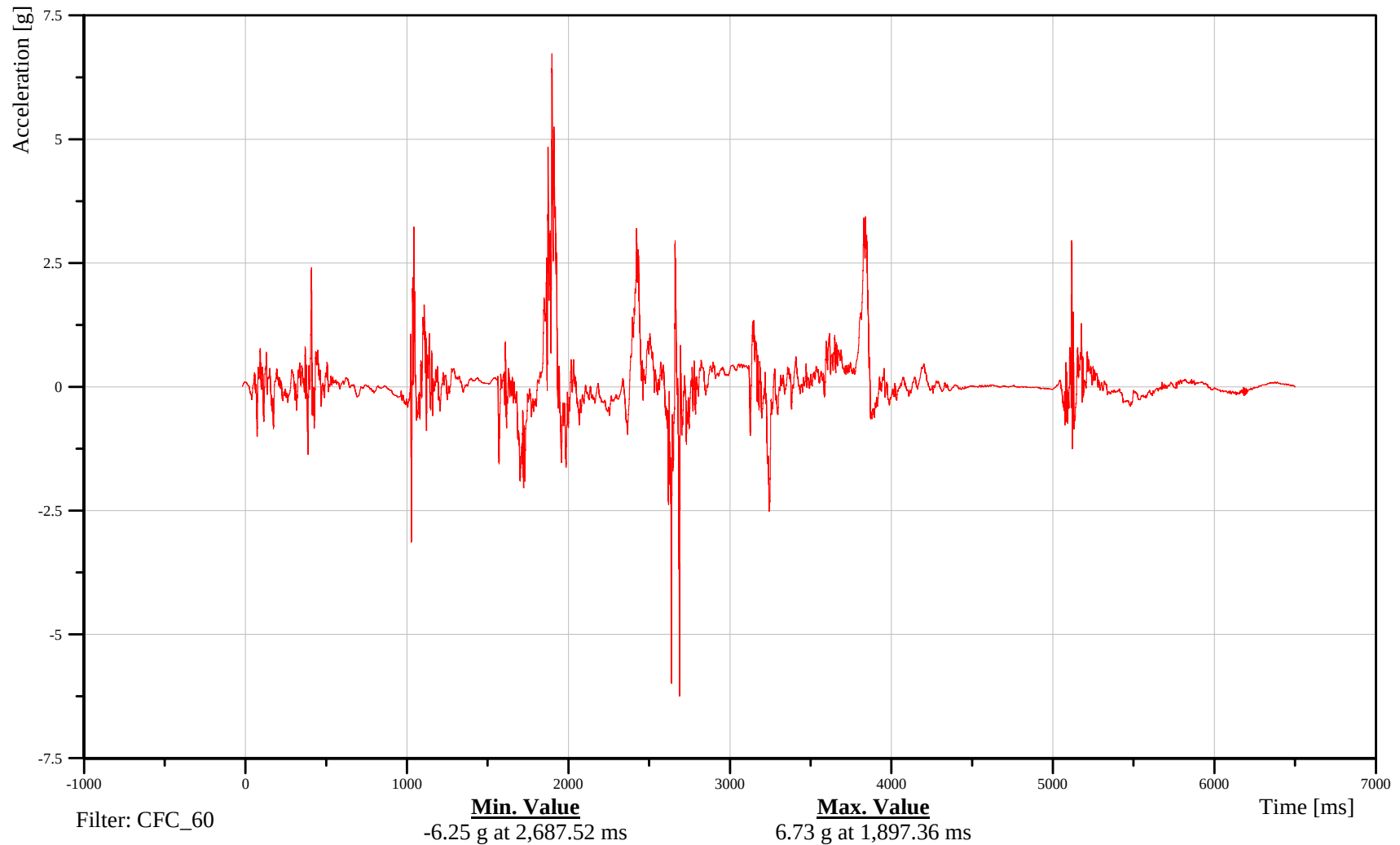
Time: 17:02

Customer: VRTC

10CPILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-151

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right C-Pillar Lower Y-Axis Acceleration

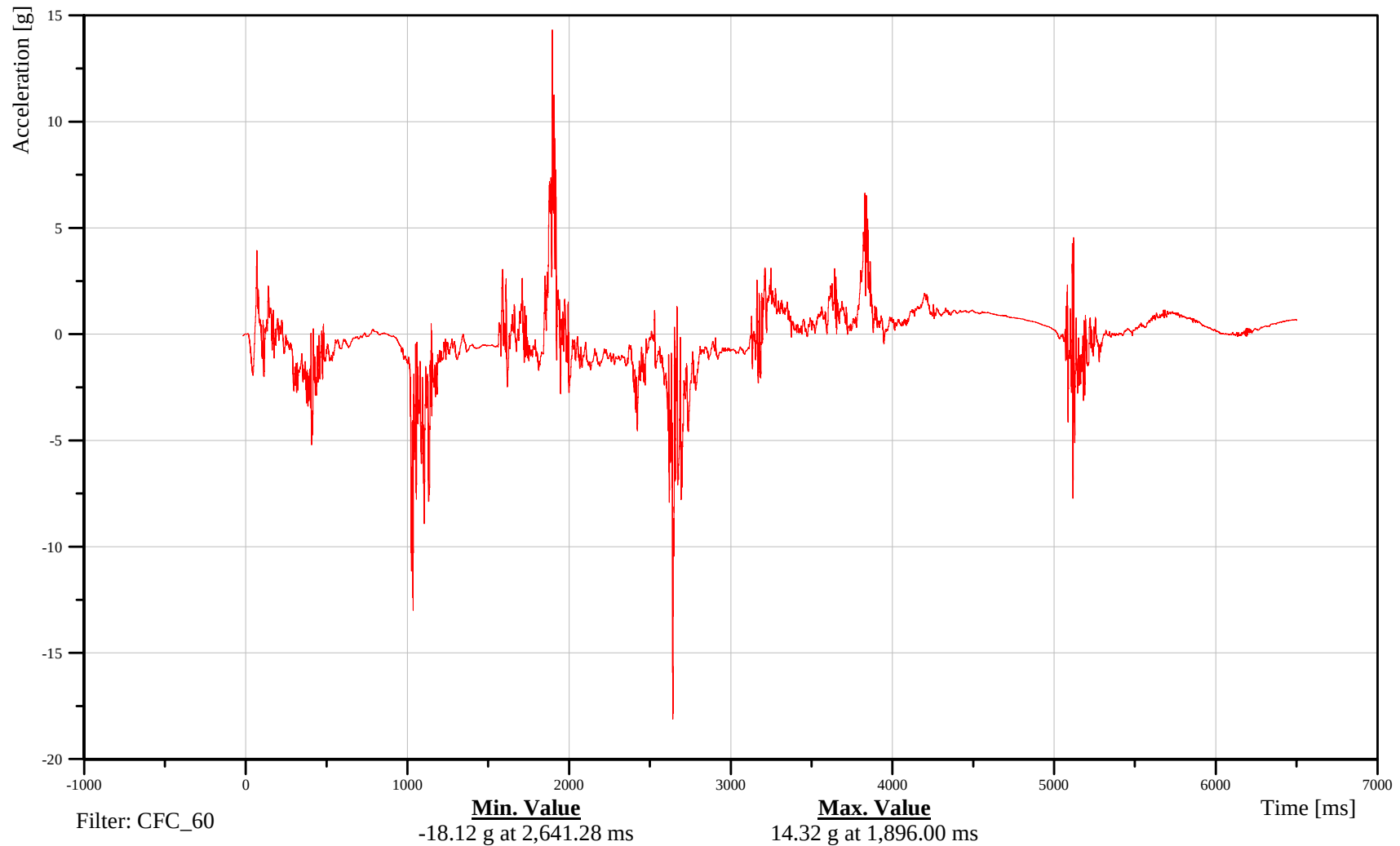
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10CPILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-152

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right C-Pillar Lower Z-Axis Acceleration

Date: 09/30/2009

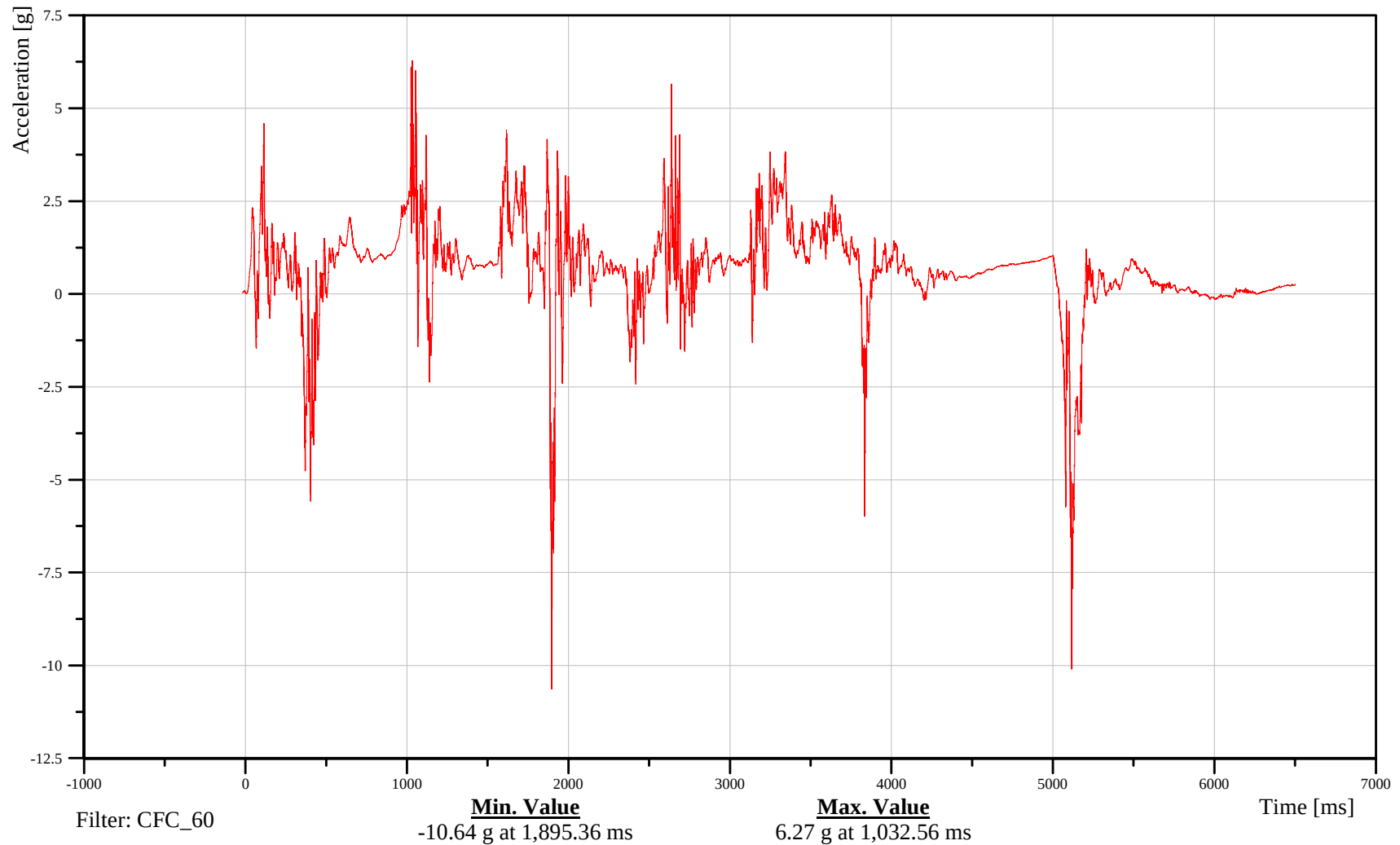
Time: 17:02

Customer: VRTC

10CPILLORI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-153

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right C-Pillar Lower Resultant Acceleration

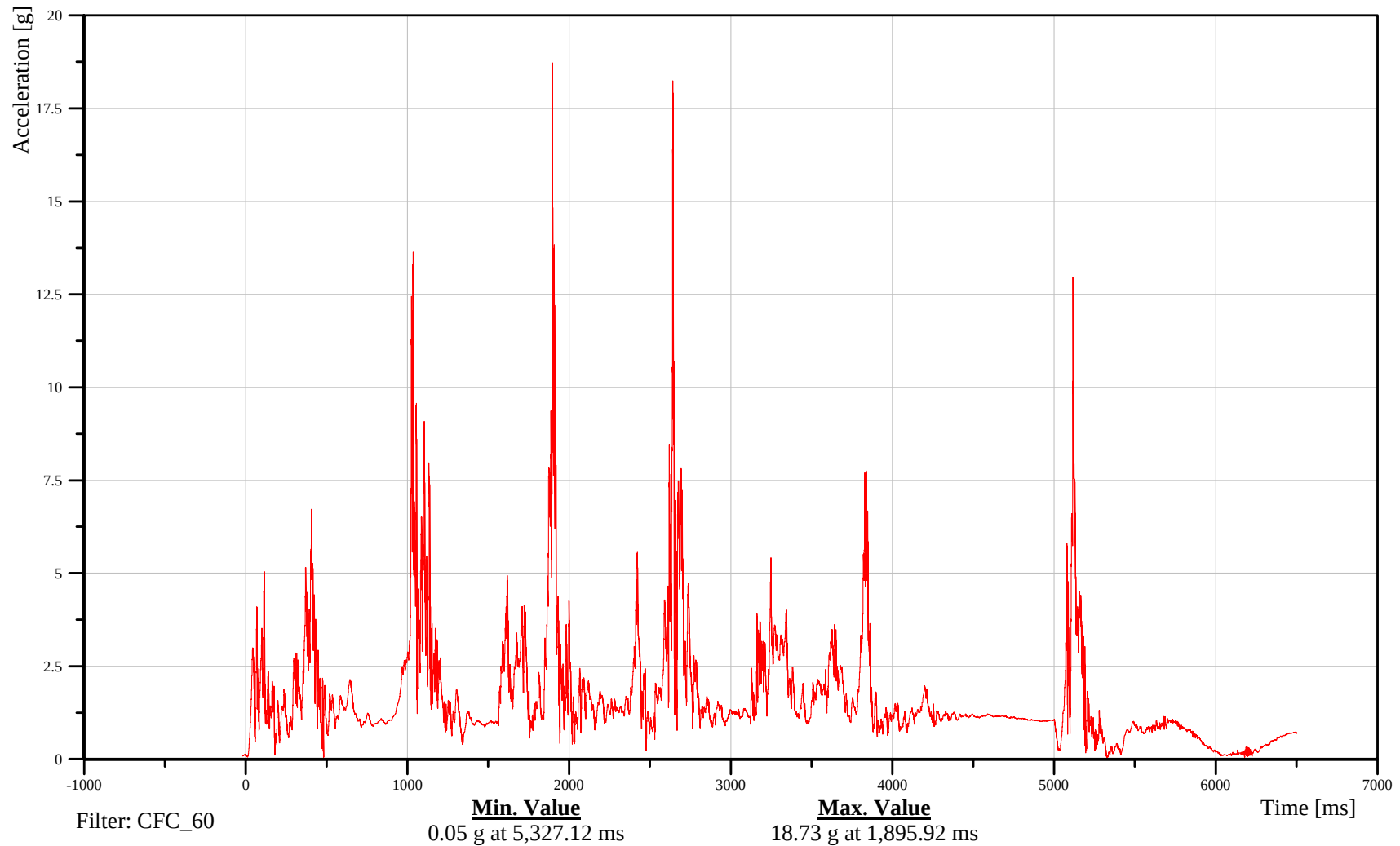
Time: 17:02

Customer: VRTC

10CPILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-154

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left D-Pillar Upper X-Axis Acceleration

Date: 09/30/2009

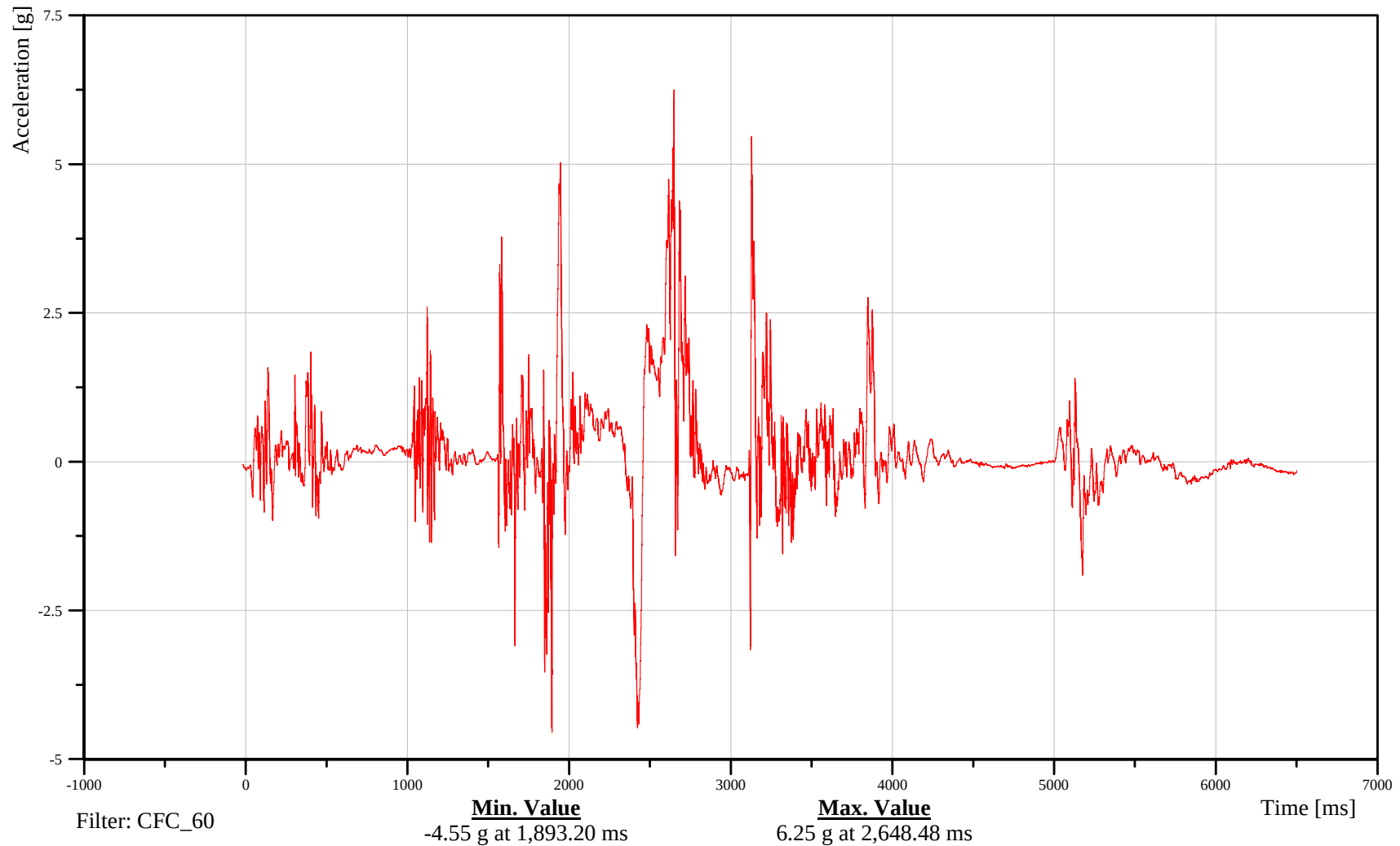
Time: 17:02

Customer: VRTC

10DPILUPLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-155

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left D-Pillar Upper Y-Axis Acceleration

Date: 09/30/2009

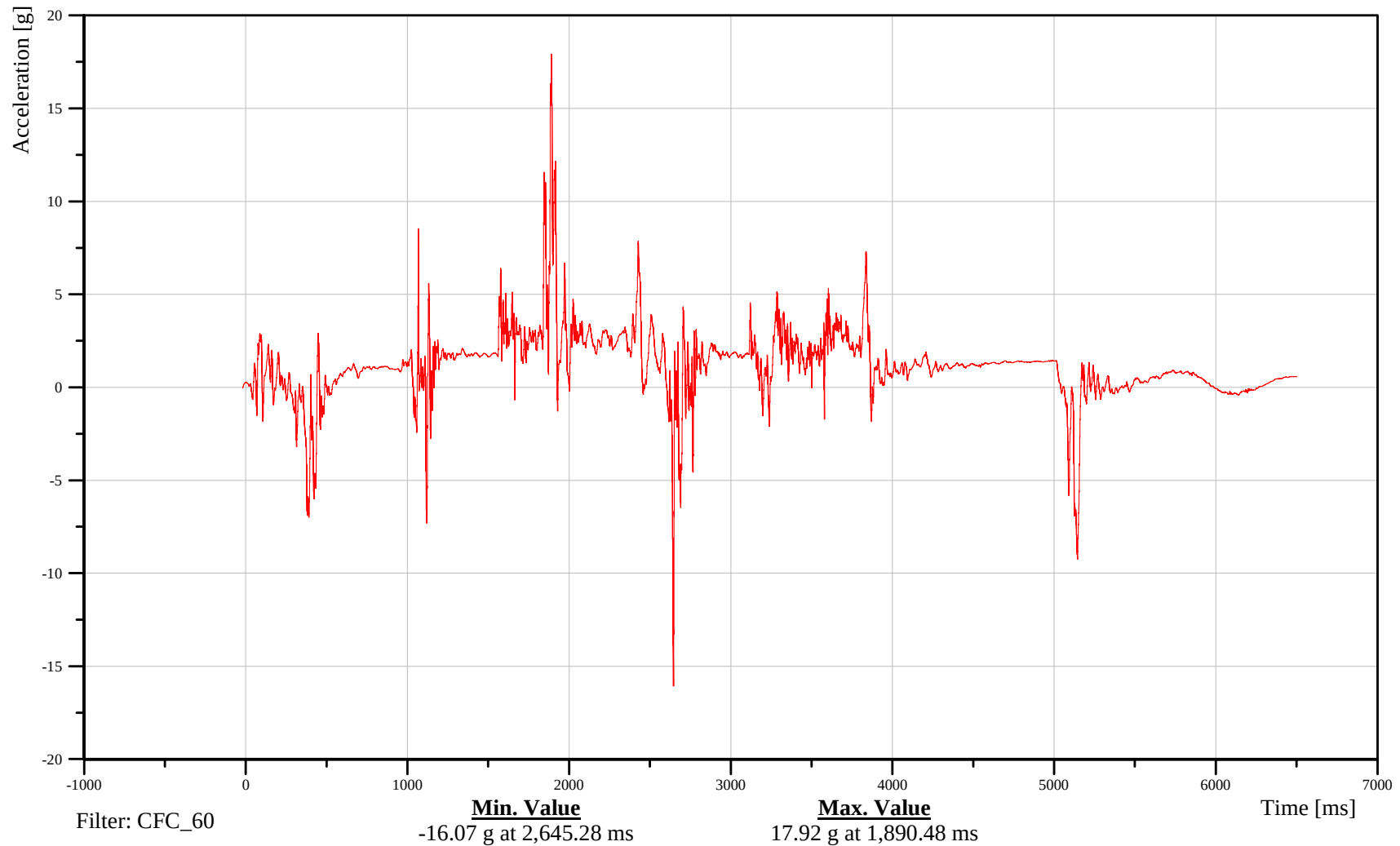
Time: 17:02

Customer: VRTC

10DPILUPLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-156

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left D-Pillar Upper Z-Axis Acceleration

Date: 09/30/2009

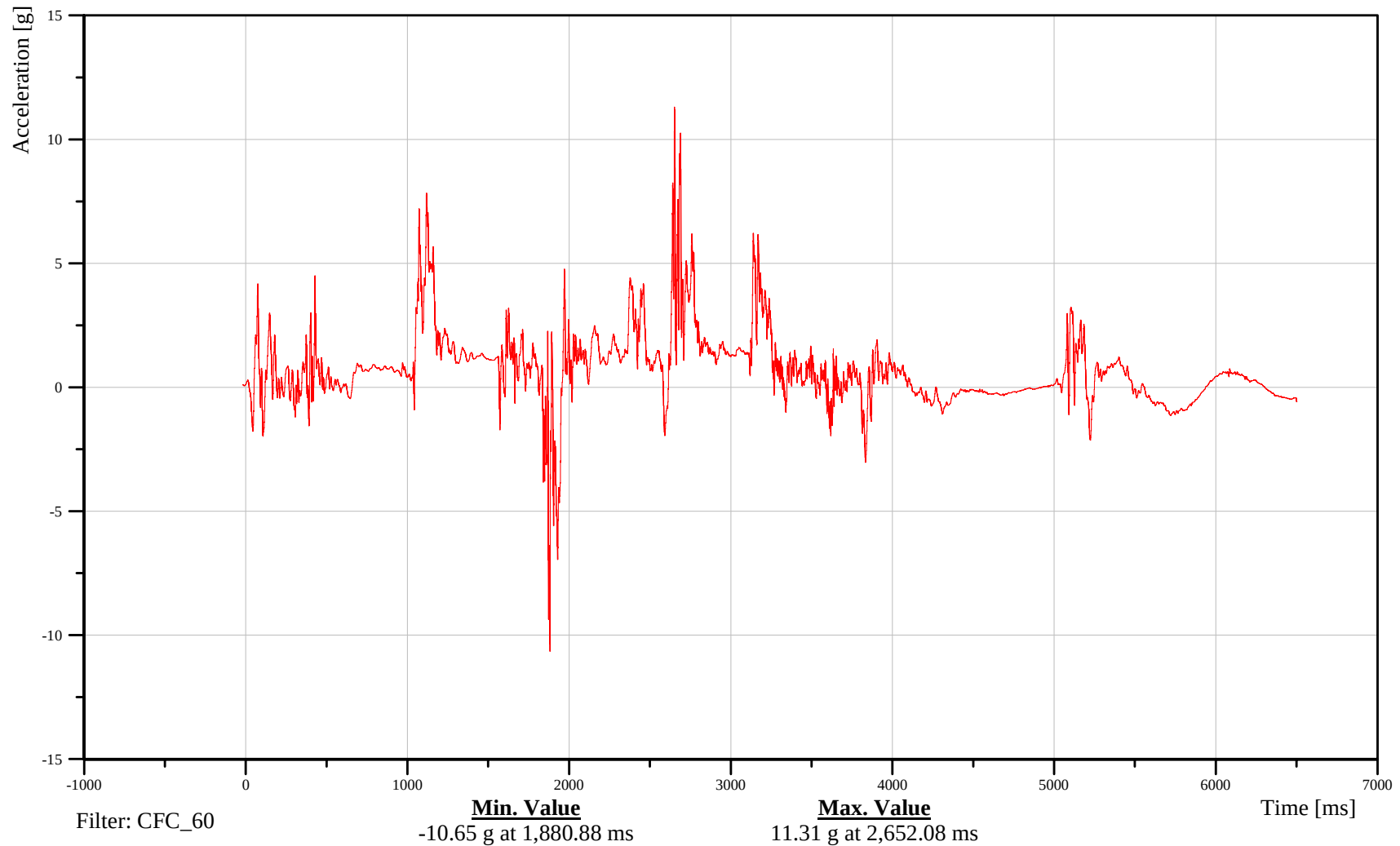
Time: 17:02

Customer: VRTC

10DPILUPLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-157

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left D-Pillar Upper Resultant Acceleration

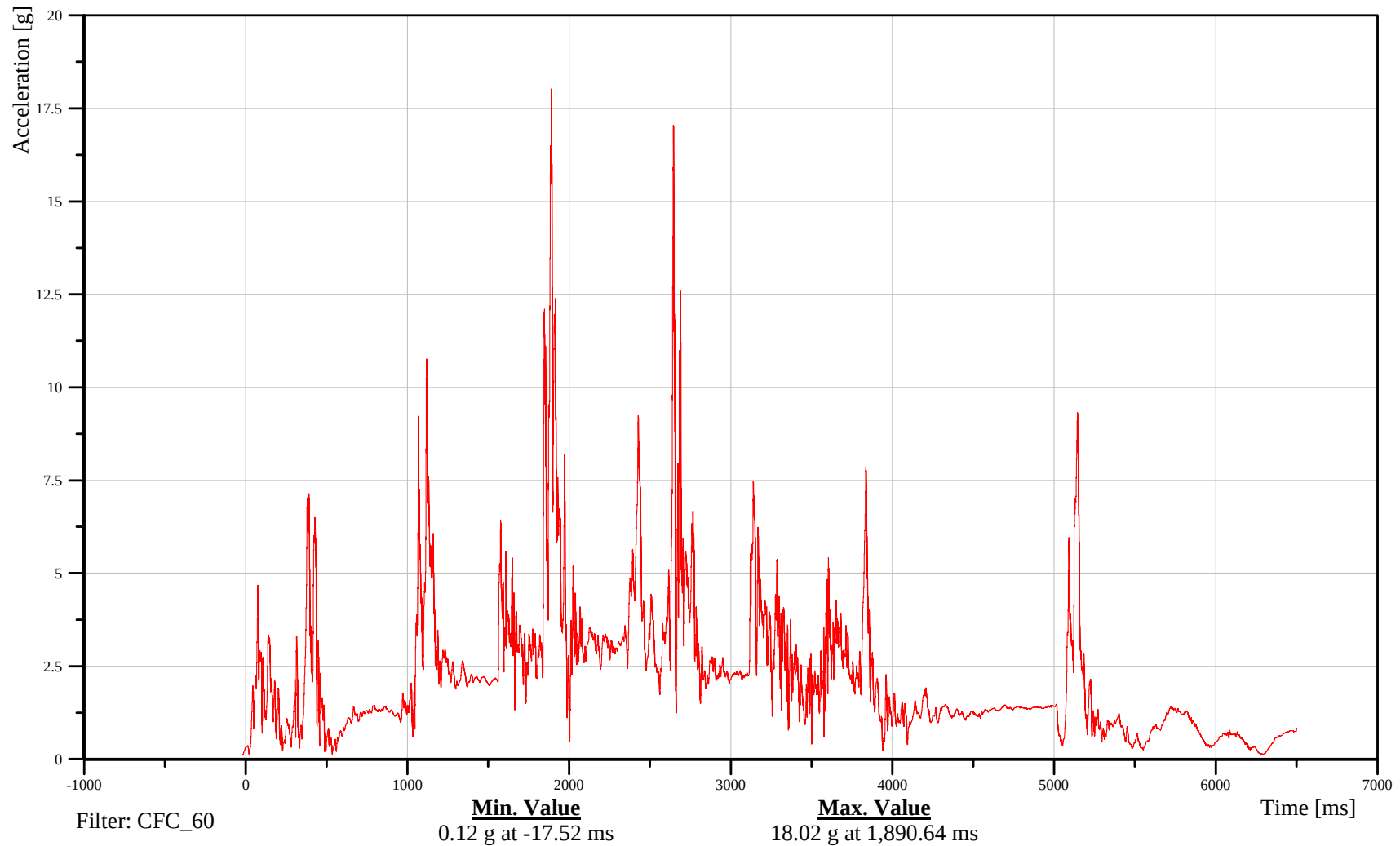
Time: 17:02

Customer: VRTC

10DPILUPLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-158

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left D-Pillar Lower X-Axis Acceleration

Date: 09/30/2009

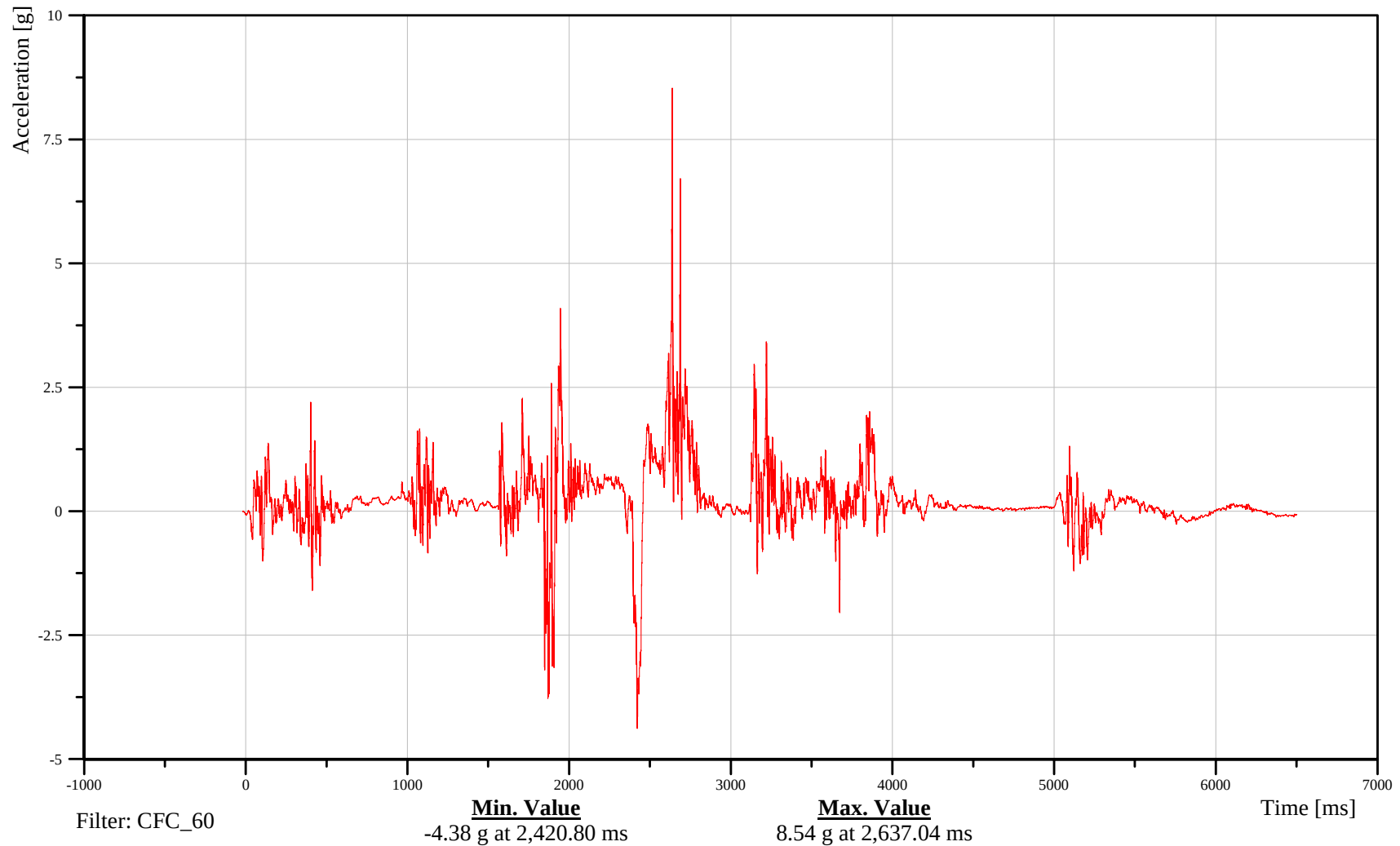
Time: 17:02

Customer: VRTC

10DPILLOLE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-159

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left D-Pillar Lower Y-Axis Acceleration

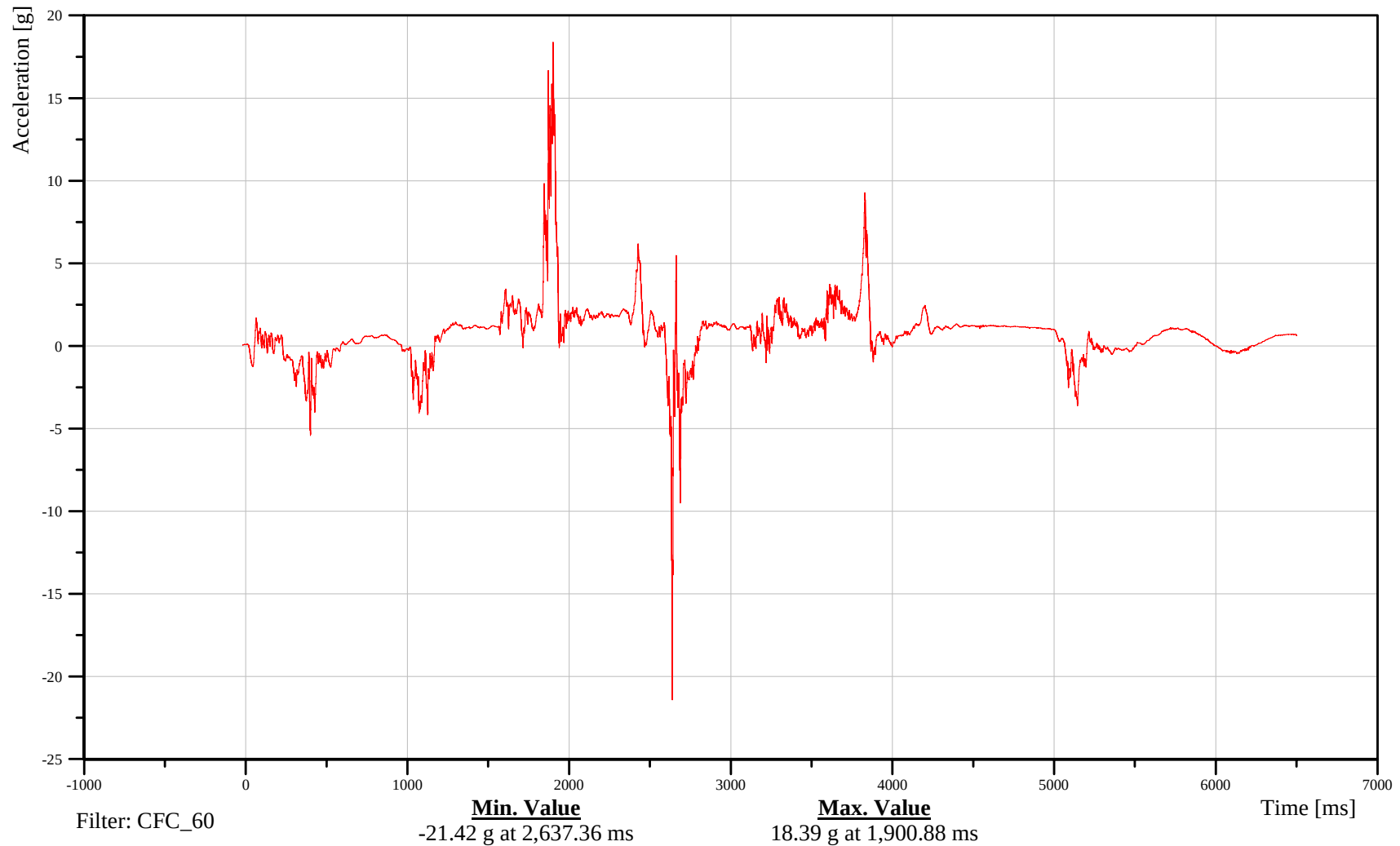
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10DPILLOLE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-160

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left D-Pillar Lower Z-Axis Acceleration

Date: 09/30/2009

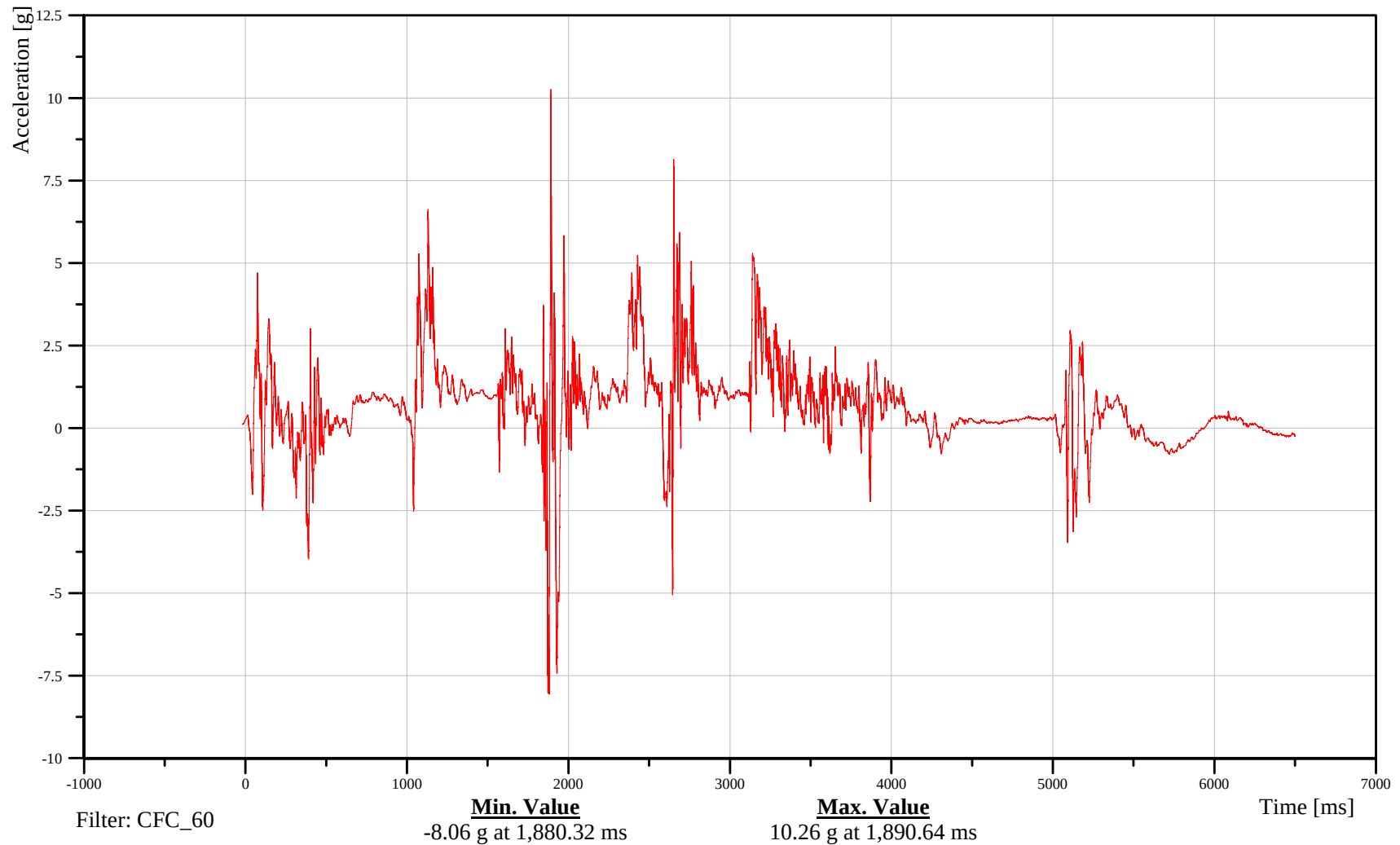
Time: 17:02

Customer: VRTC

10DPILLOLE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-161

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left D-Pillar Lower Resultant Acceleration

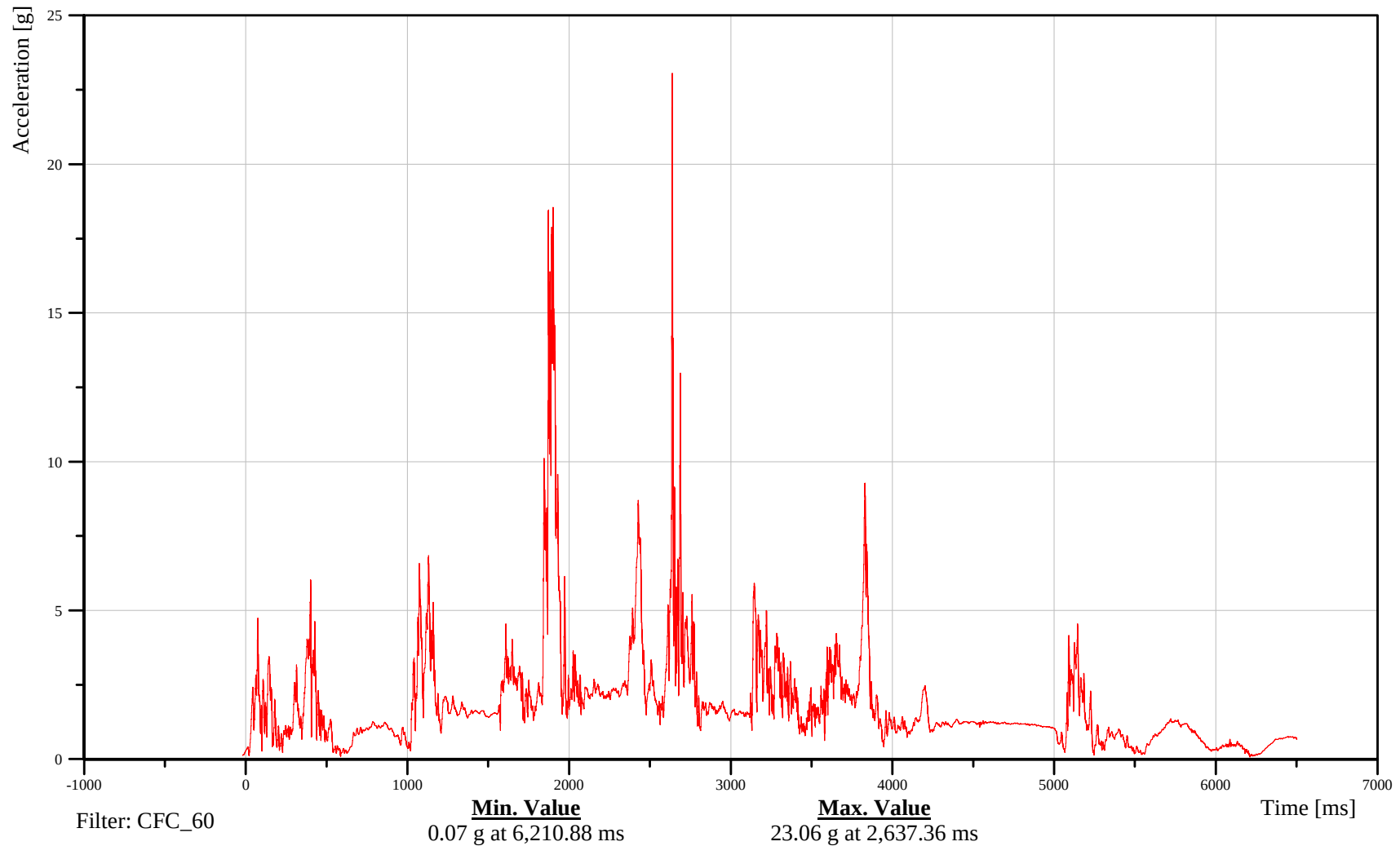
Time: 17:02

Customer: VRTC

10DPILLOLE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-162

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

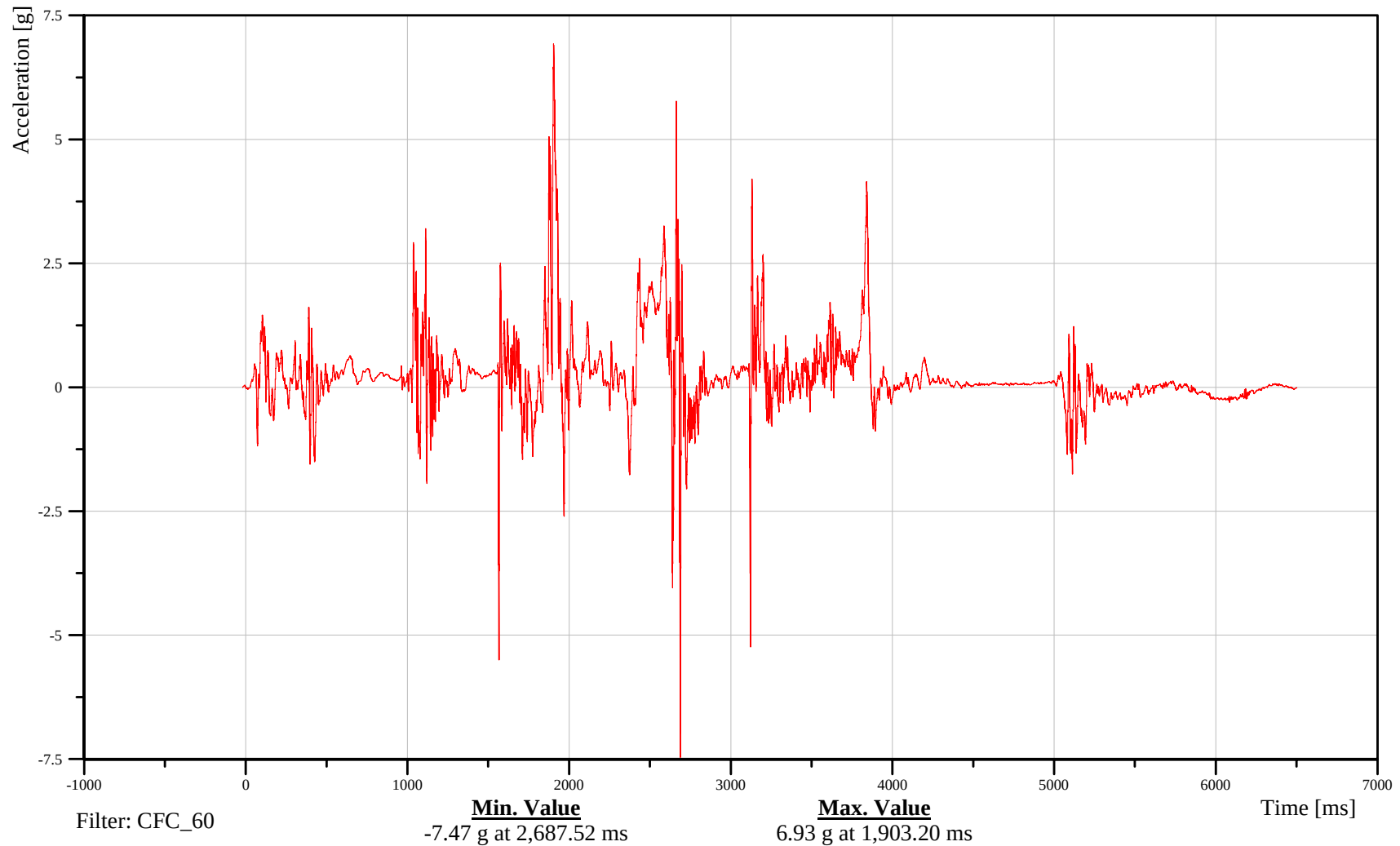
Right D-Pillar Upper X-Axis Acceleration

Customer: VRTC

10DPILUPRI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-163

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

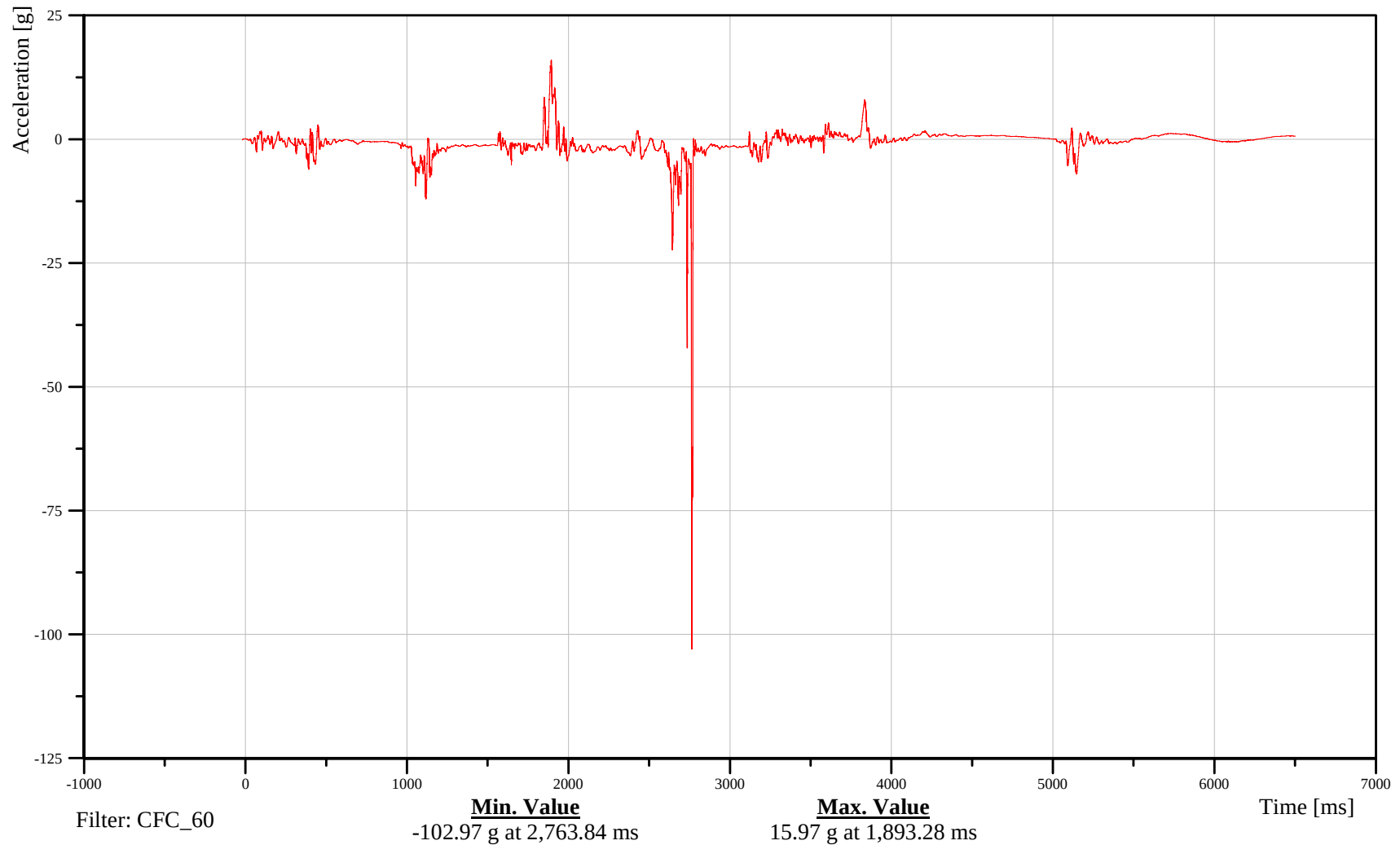
Right D-Pillar Upper Y-Axis Acceleration

Customer: VRTC

10DPILUPRI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-164

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

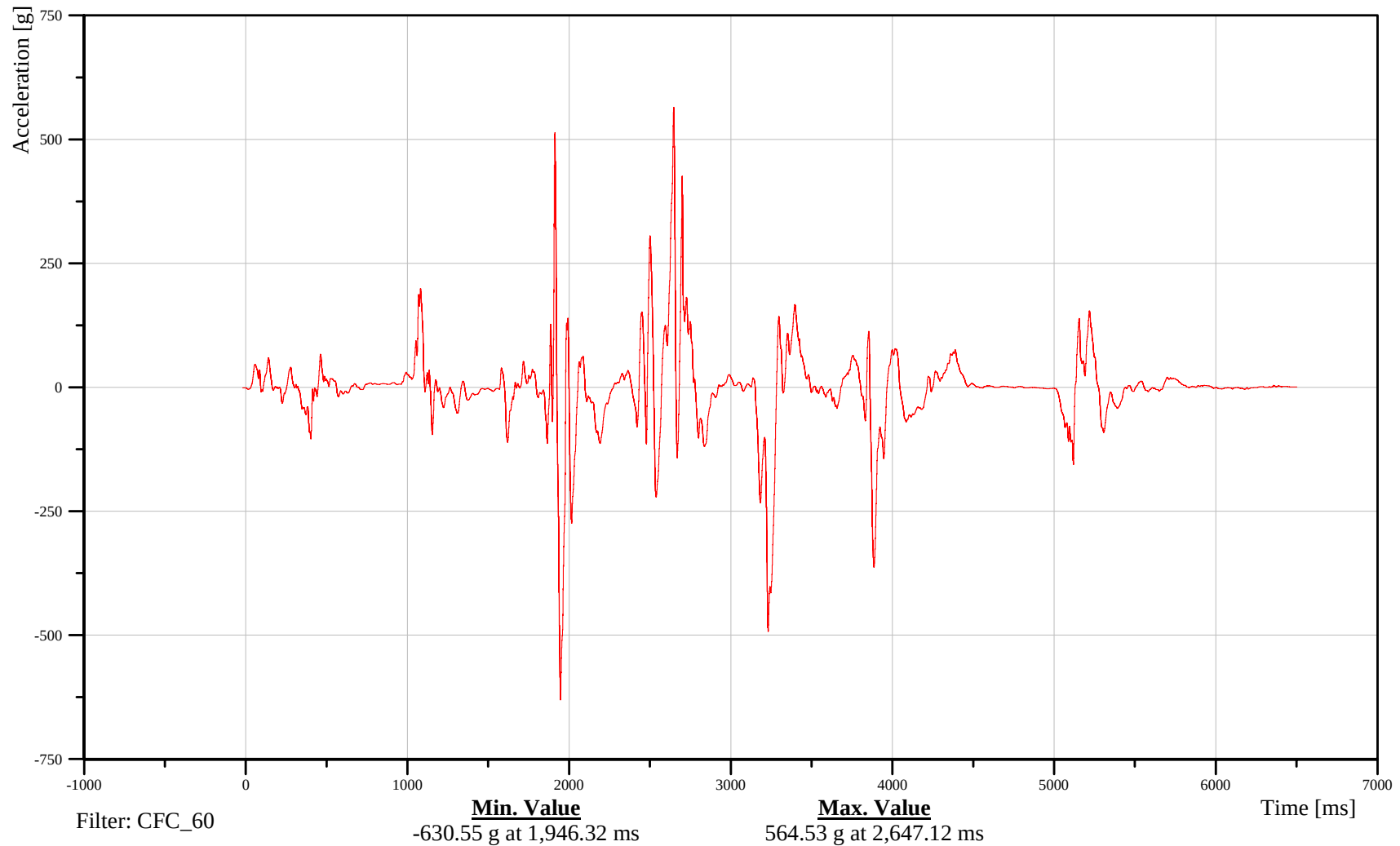
Right D-Pillar Upper Z-Axis Acceleration

Customer: VRTC

10DPILUPRI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-165

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

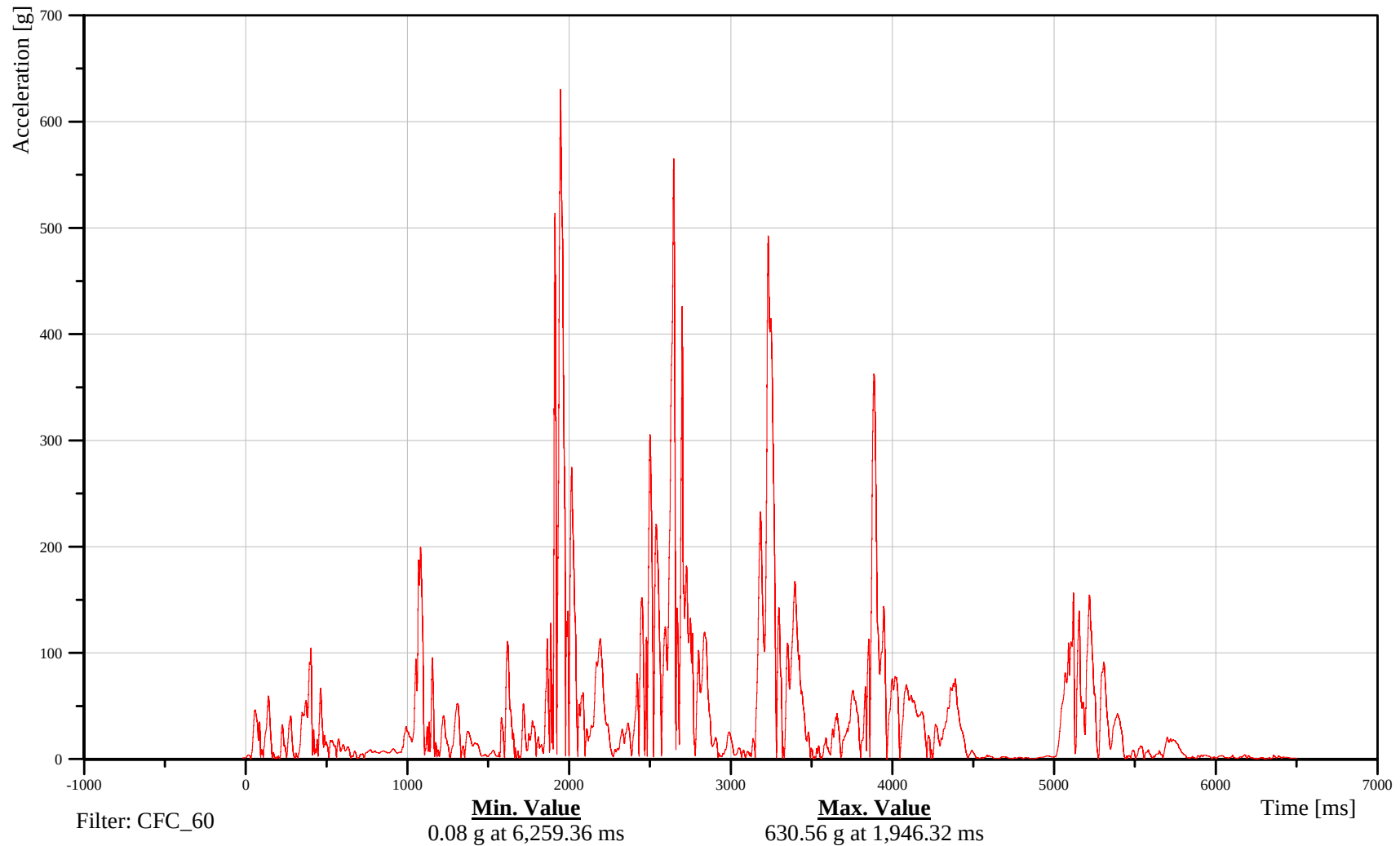
Right D-Pillar Upper Resultant Acceleration

Customer: VRTC

10DPILUPRI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-166

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right D-Pillar Lower X-Axis Acceleration

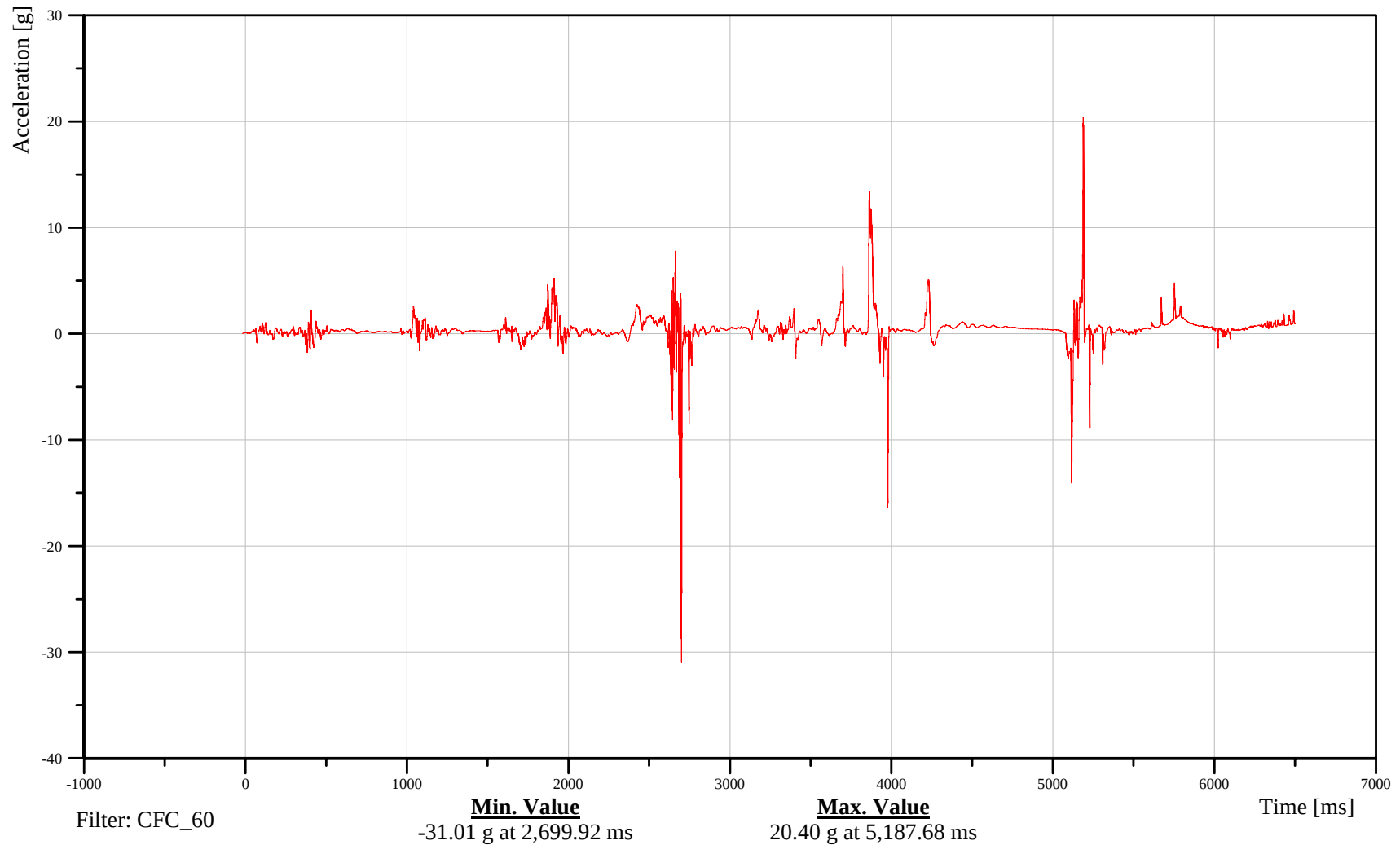
Time: 17:02

Customer: VRTC

10DPILLORI00ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-167

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right D-Pillar Lower Y-Axis Acceleration

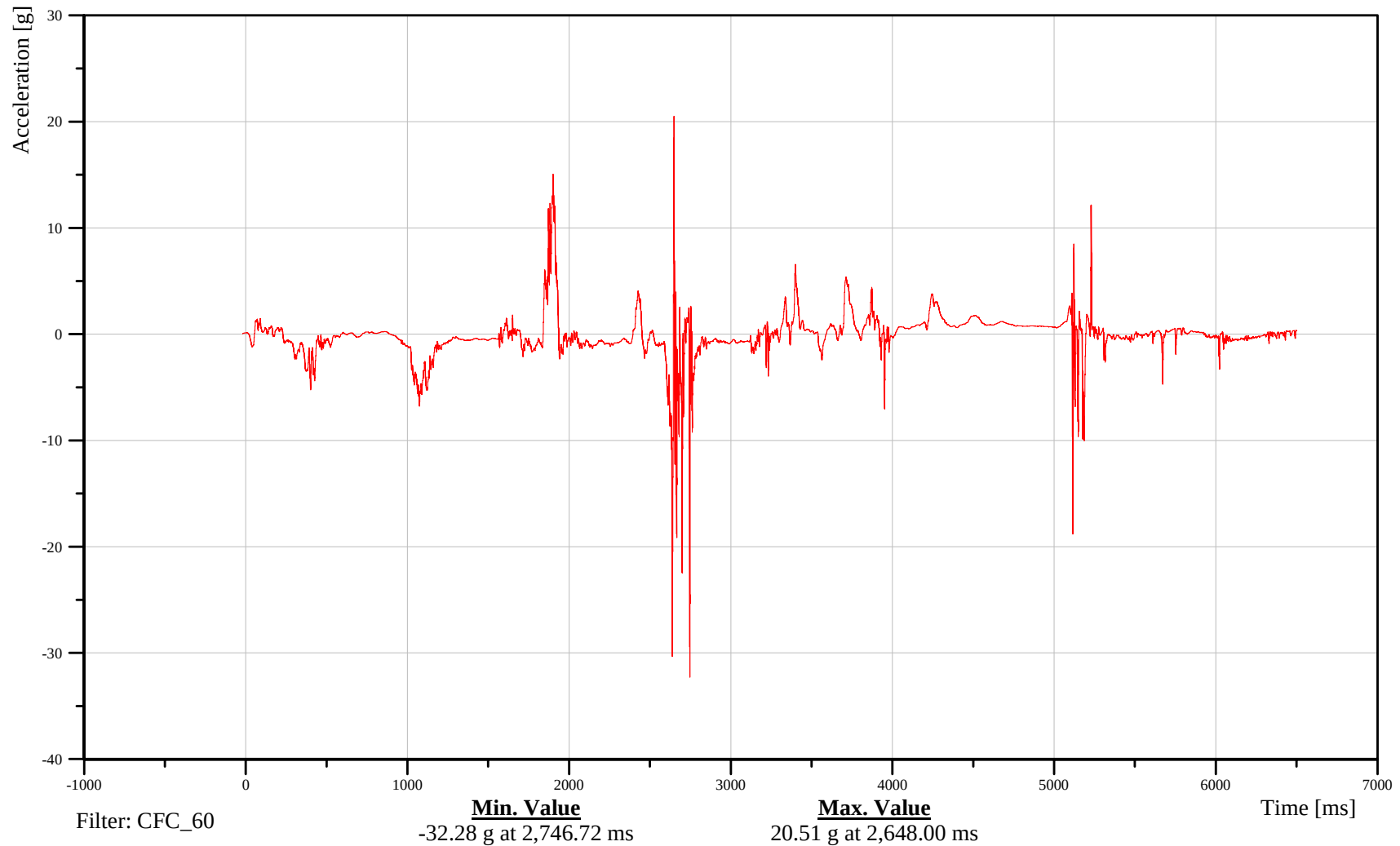
Date: 09/30/2009
Time: 17:02

Customer: VRTC

10DPILLORI00ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-168

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

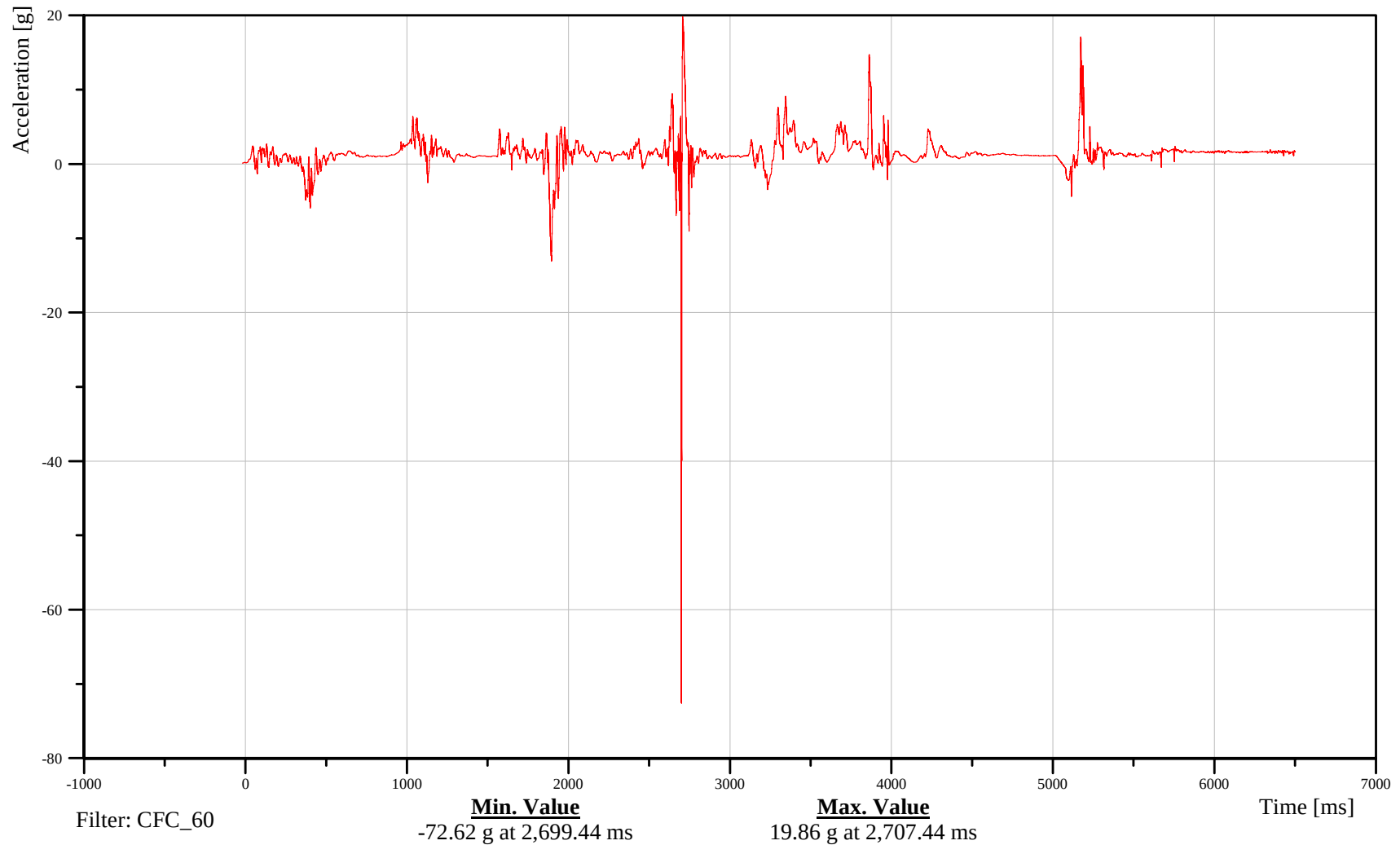
Right D-Pillar Lower Z-Axis Acceleration

Customer: VRTC

10DPILLORI00ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-169

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right D-Pillar Lower Resultant Acceleration

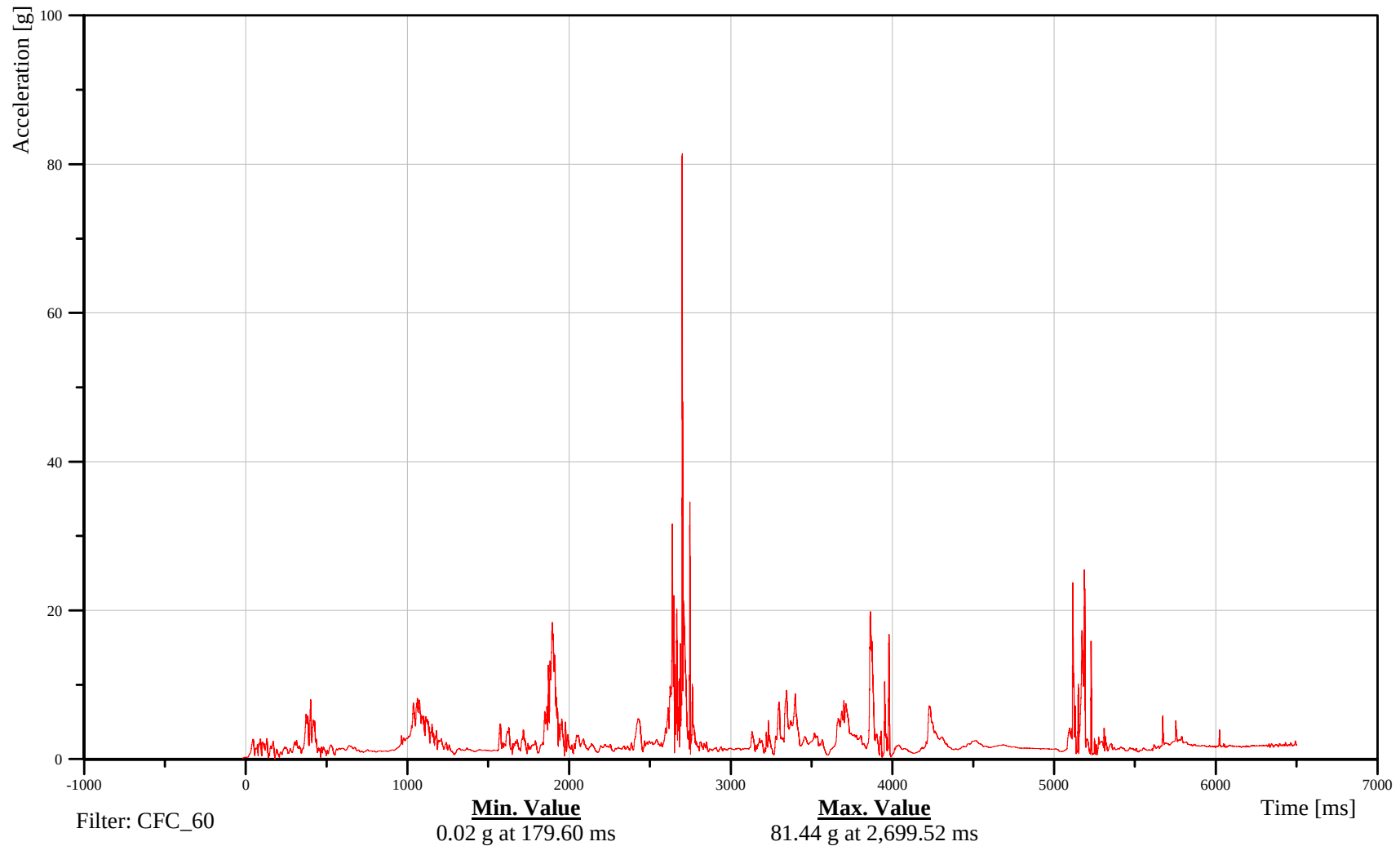
Time: 17:02

Customer: VRTC

10DPILLORI00ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-170

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Rear Deck X-Axis Acceleration

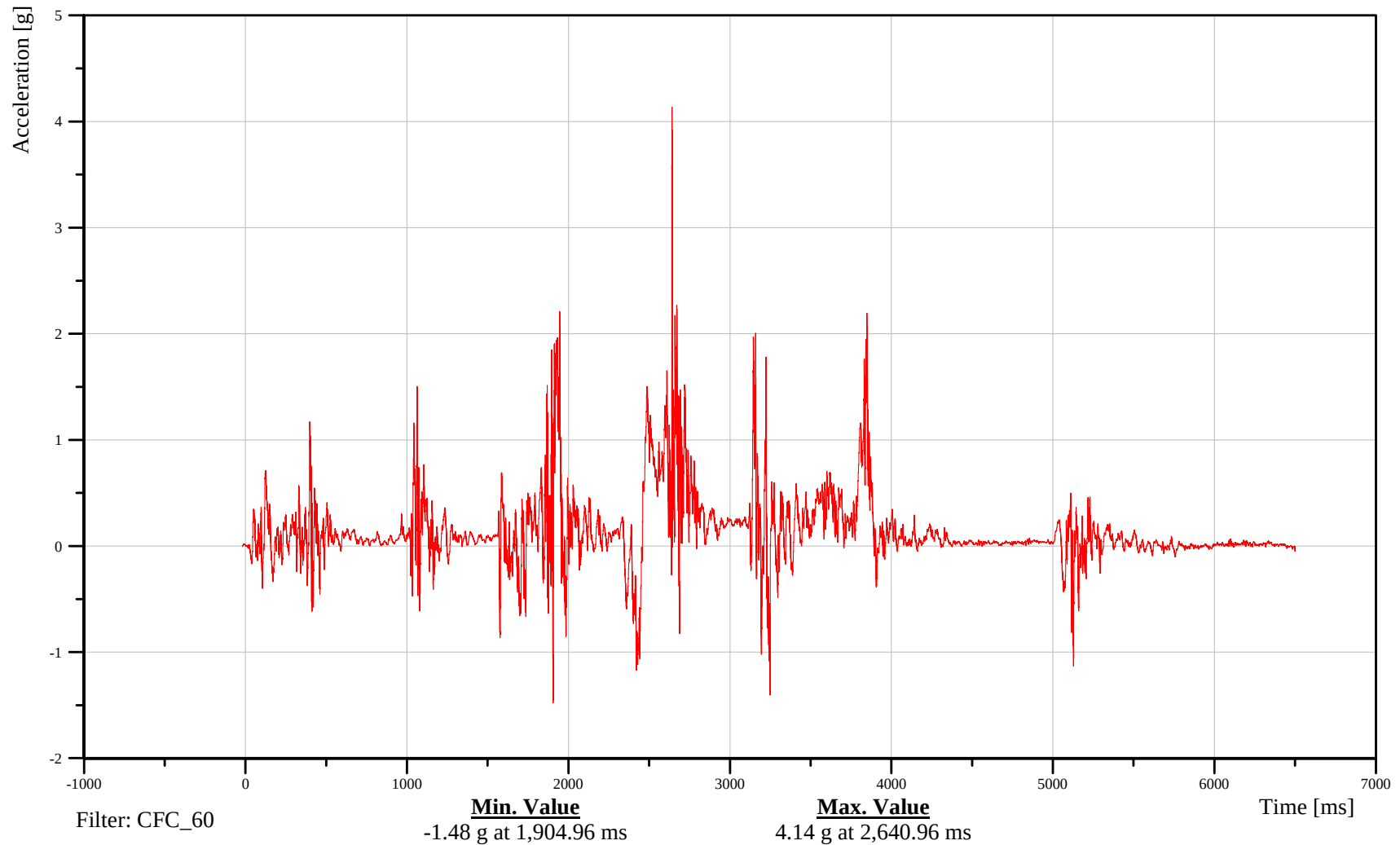
Date: 09/30/2009
Time: 17:02

Customer: VRTC

102RDK000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-171

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Rear Deck Y-Axis Acceleration

Date: 09/30/2009

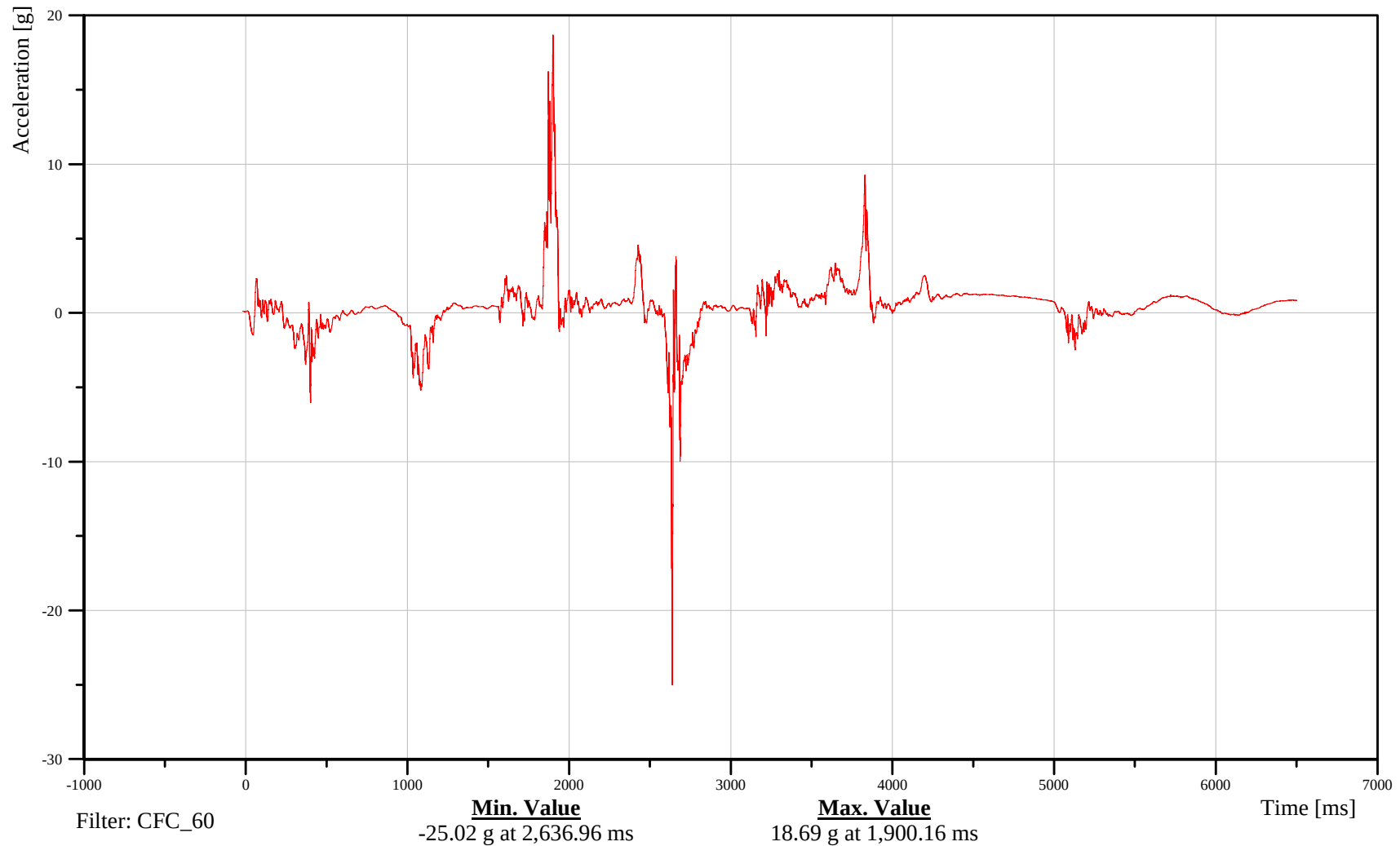
Time: 17:02

Customer: VRTC

102RDK000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-172

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Rear Deck Z-Axis Acceleration

Date: 09/30/2009

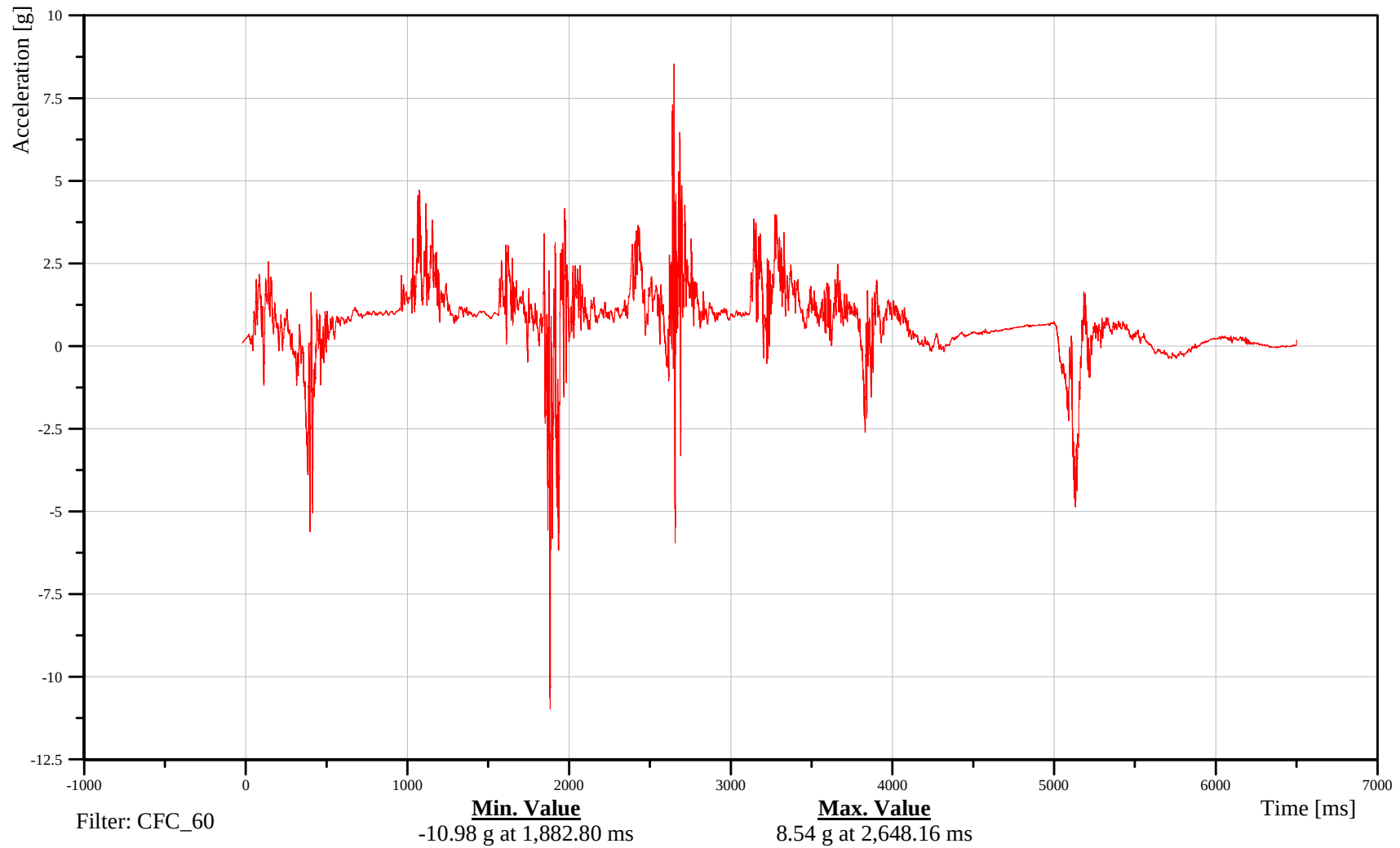
Time: 17:02

Customer: VRTC

102RDK000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-173

090930



FMVSS 208 Rollover 2007 Ford Expedition

Vehicle Rear Deck Resultant Acceleration

Date: 09/30/2009

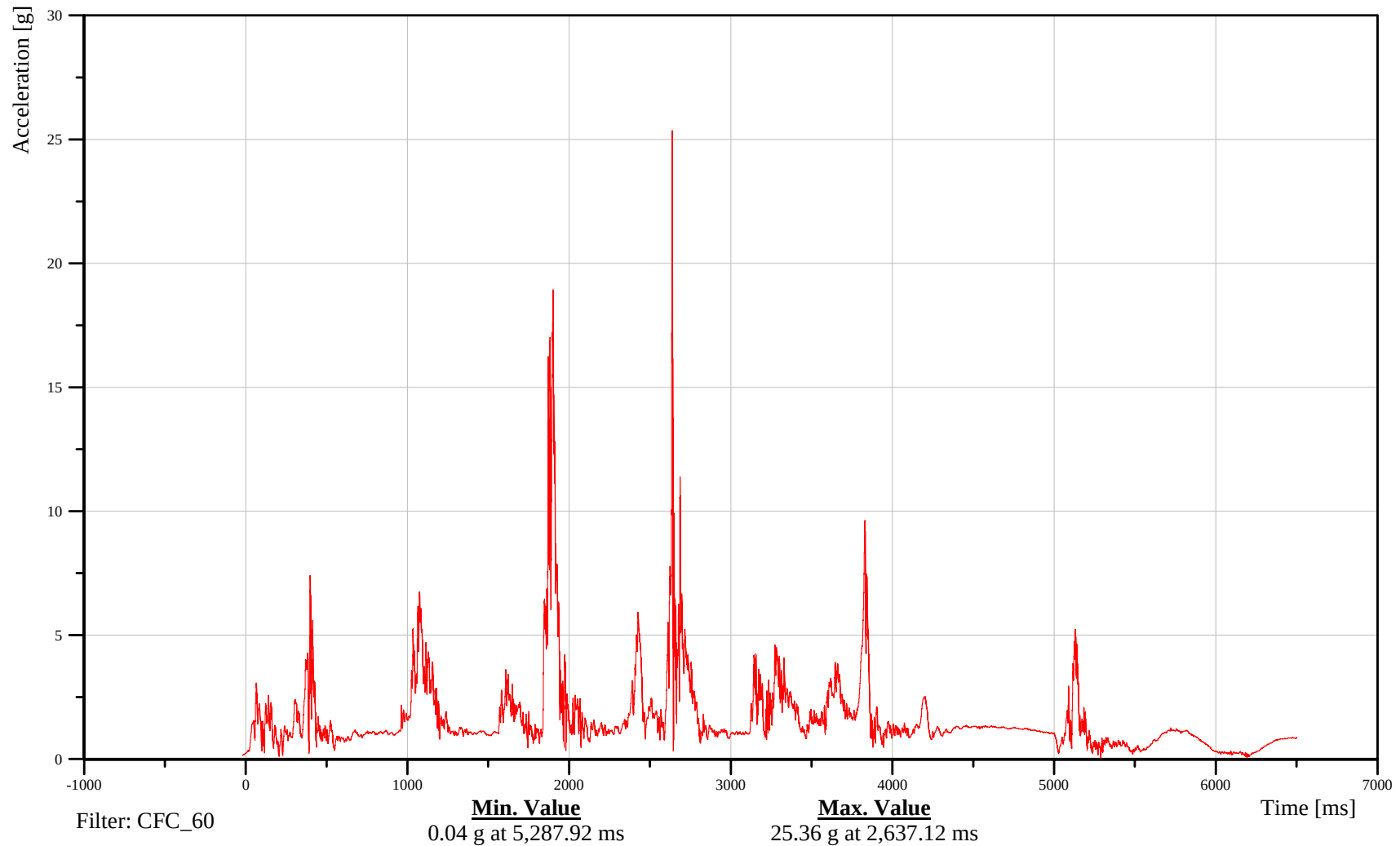
Time: 17:02

Customer: VRTC

102RDK000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-174

090930



FMVSS 208 Rollover 2007 Ford Expedition

LF Seat Position (on floor) X-Axis Acceleration

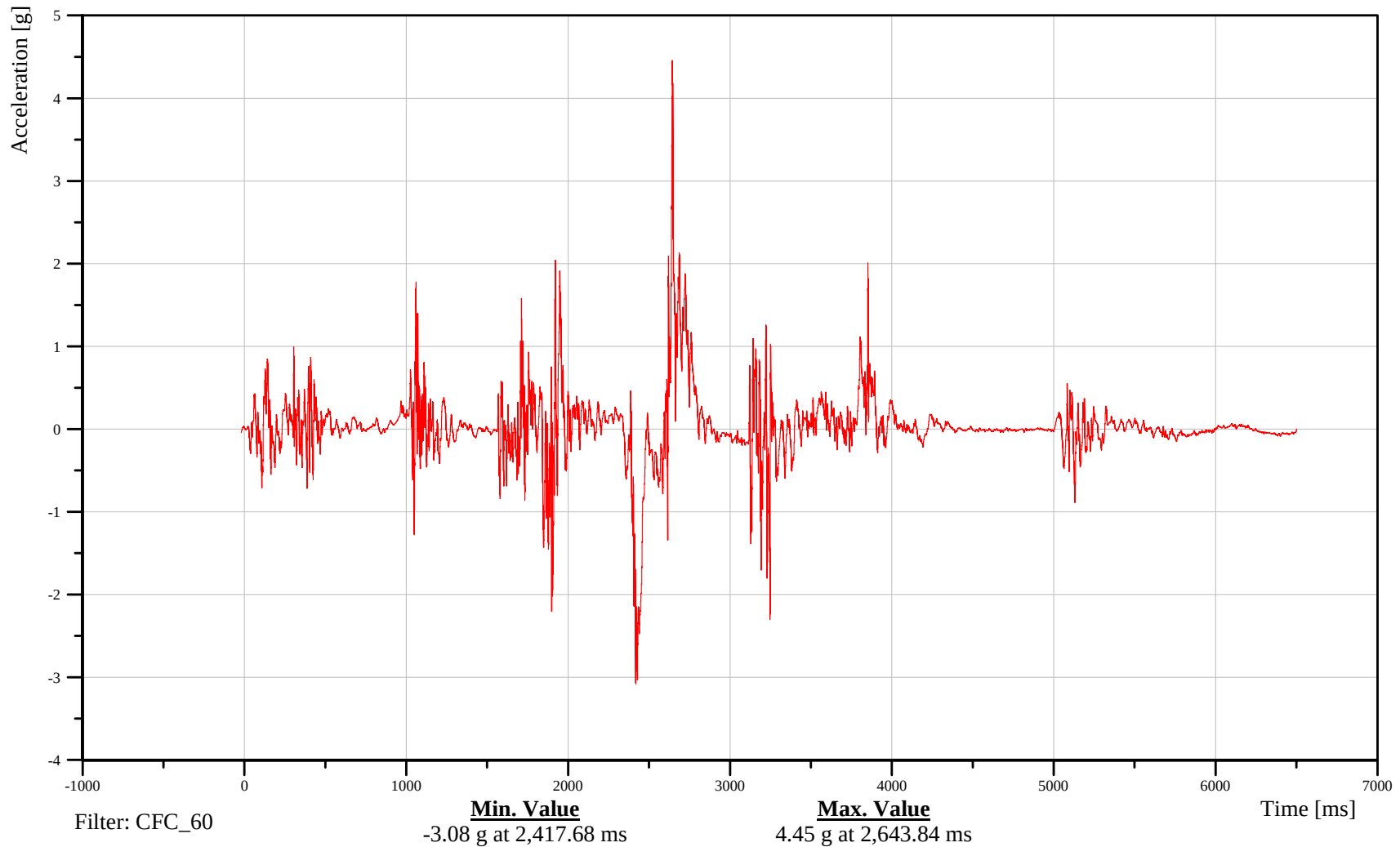
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-175

090930



FMVSS 208 Rollover 2007 Ford Expedition

LF Seat Position (on floor) Y-Axis Acceleration

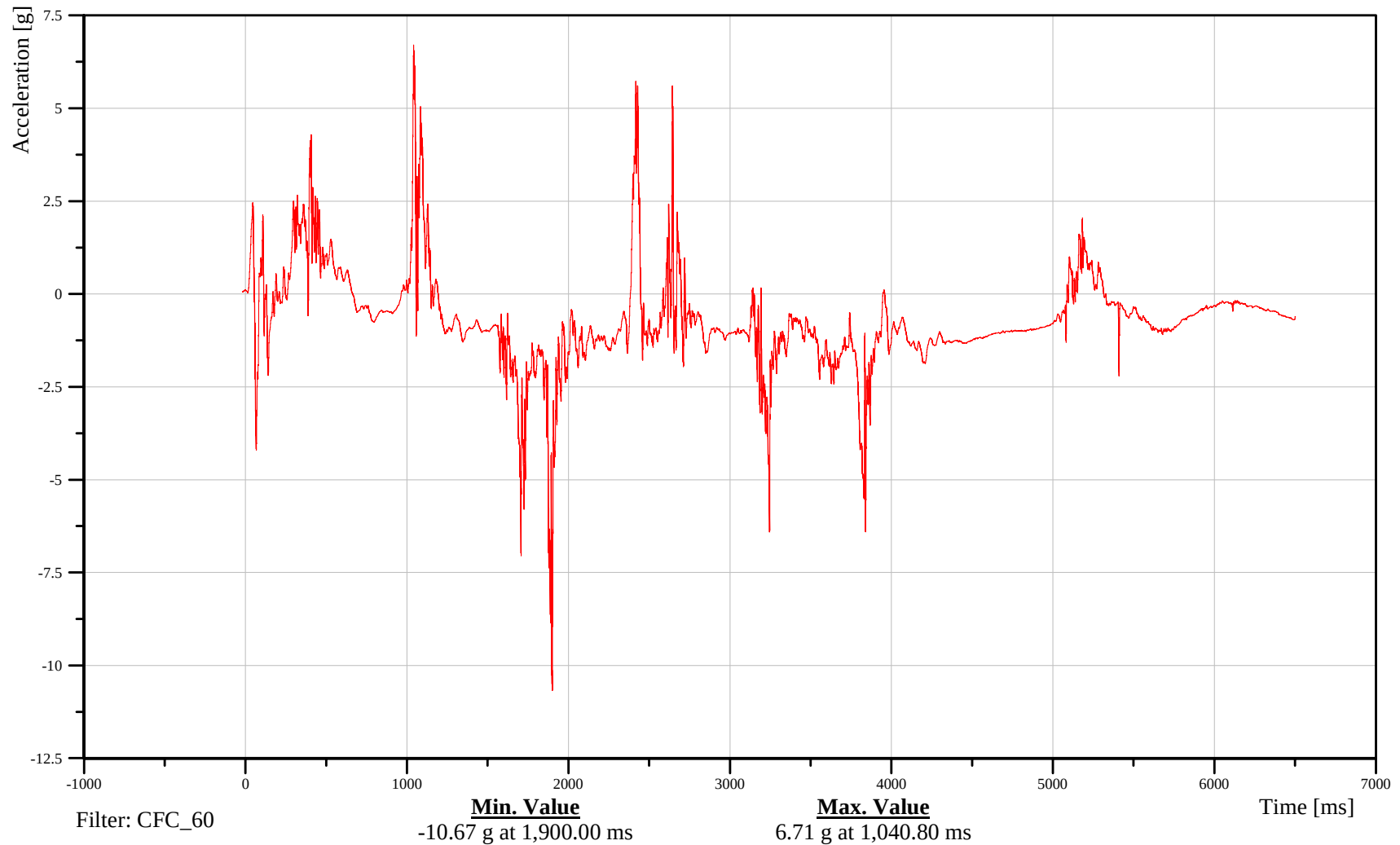
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-176

090930



FMVSS 208 Rollover 2007 Ford Expedition

LF Seat Position (on floor) Z-Axis Acceleration

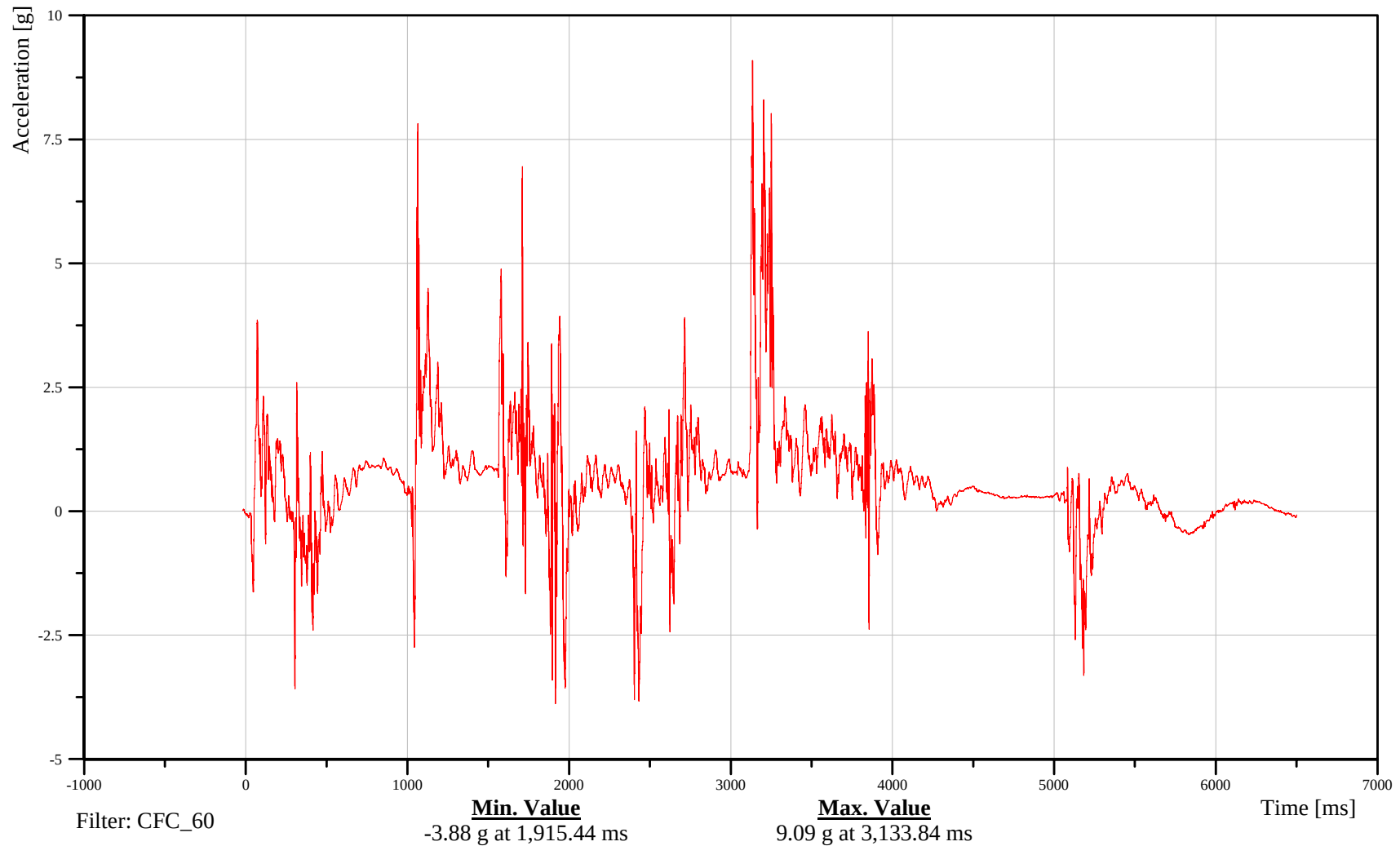
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-177

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

LF Seat Position (on floor) Resultant Acceleration

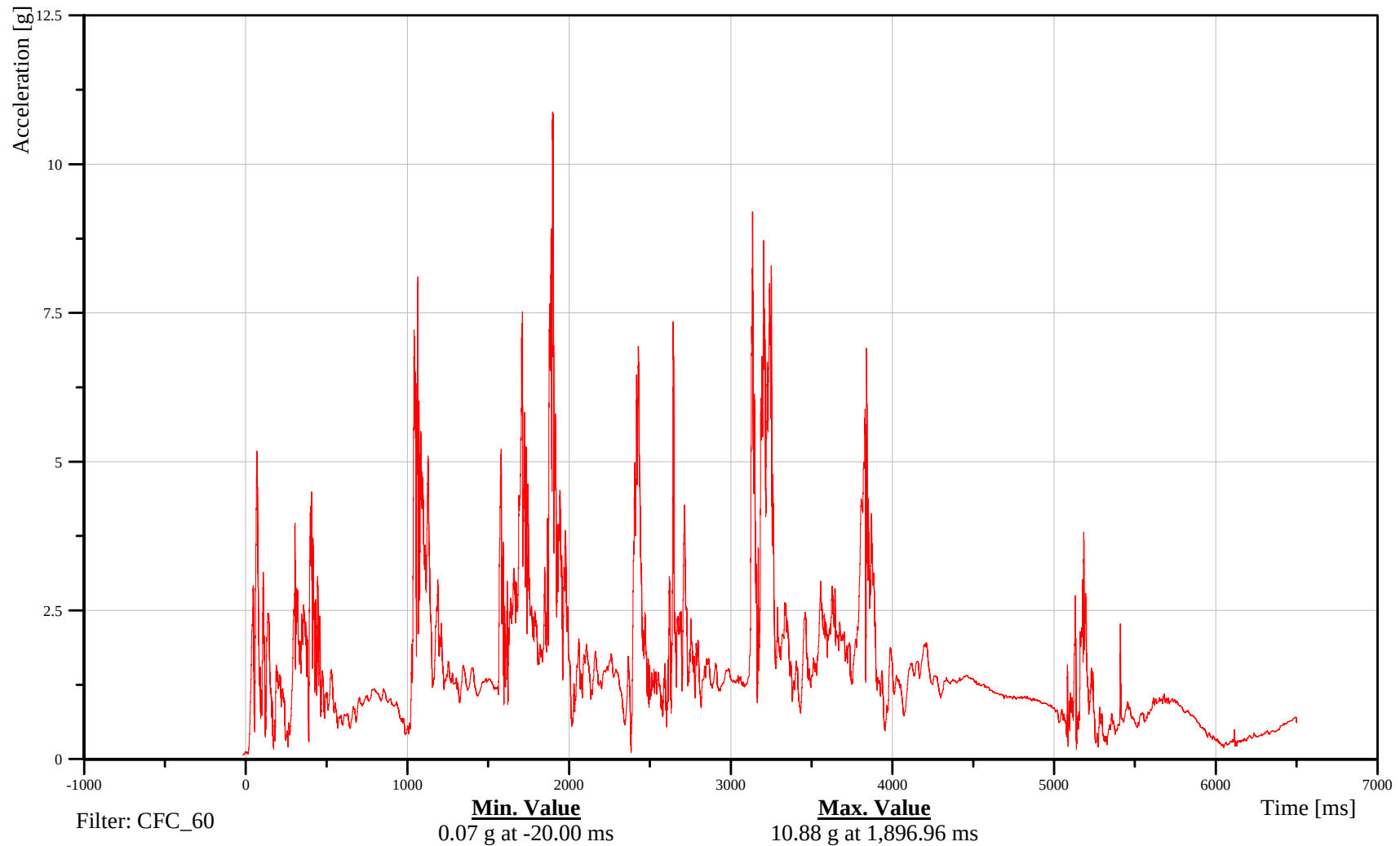
Time: 17:02

Customer: VRTC

11SEAT000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-178

090930



FMVSS 208 Rollover 2007 Ford Expedition

RF Seat Position (on floor) X-Axis Acceleration

Date: 09/30/2009

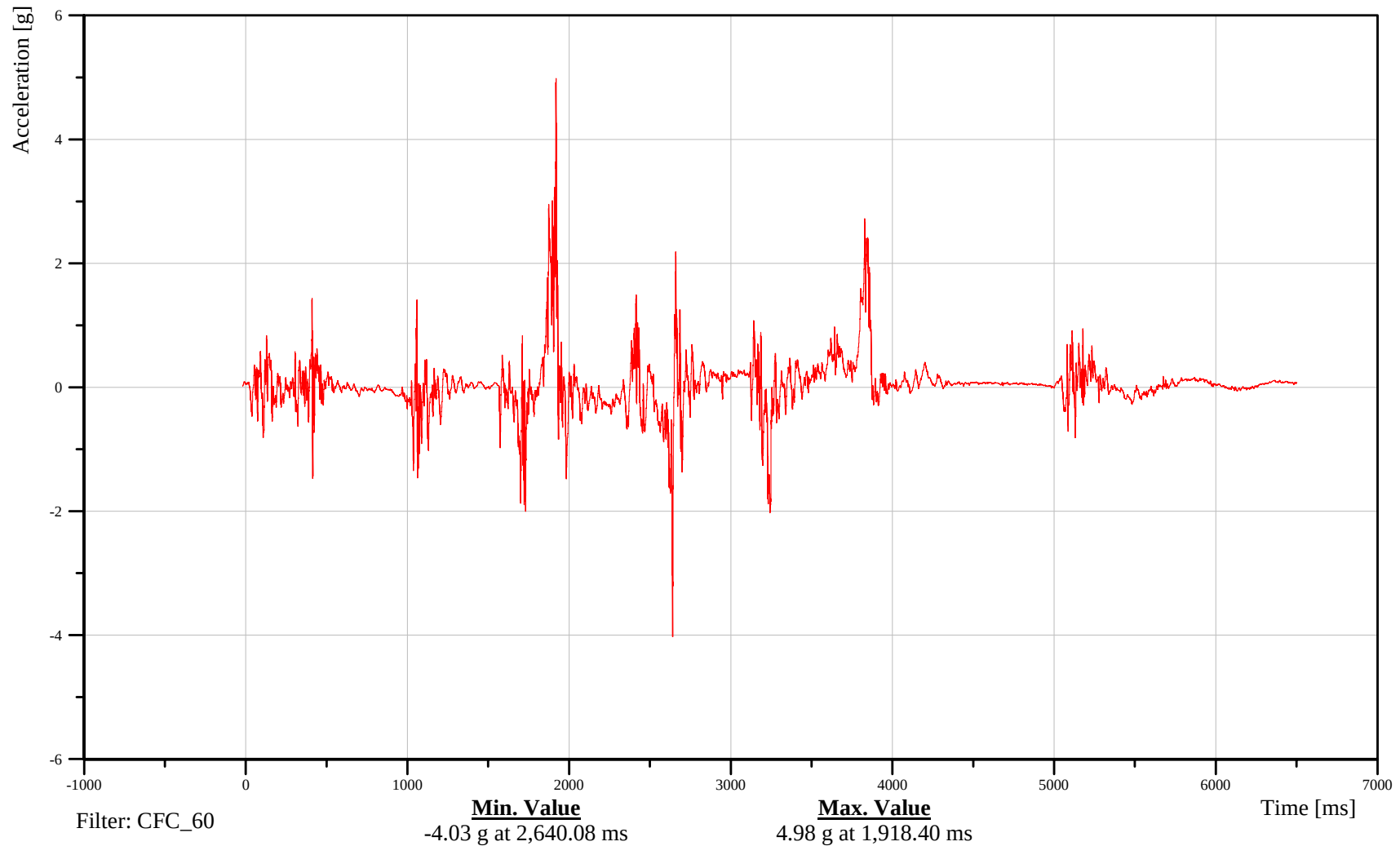
Time: 17:02

Customer: VRTC

13SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-179

090930



FMVSS 208 Rollover 2007 Ford Expedition

RF Seat Position (on floor) Y-Axis Acceleration

Date: 09/30/2009

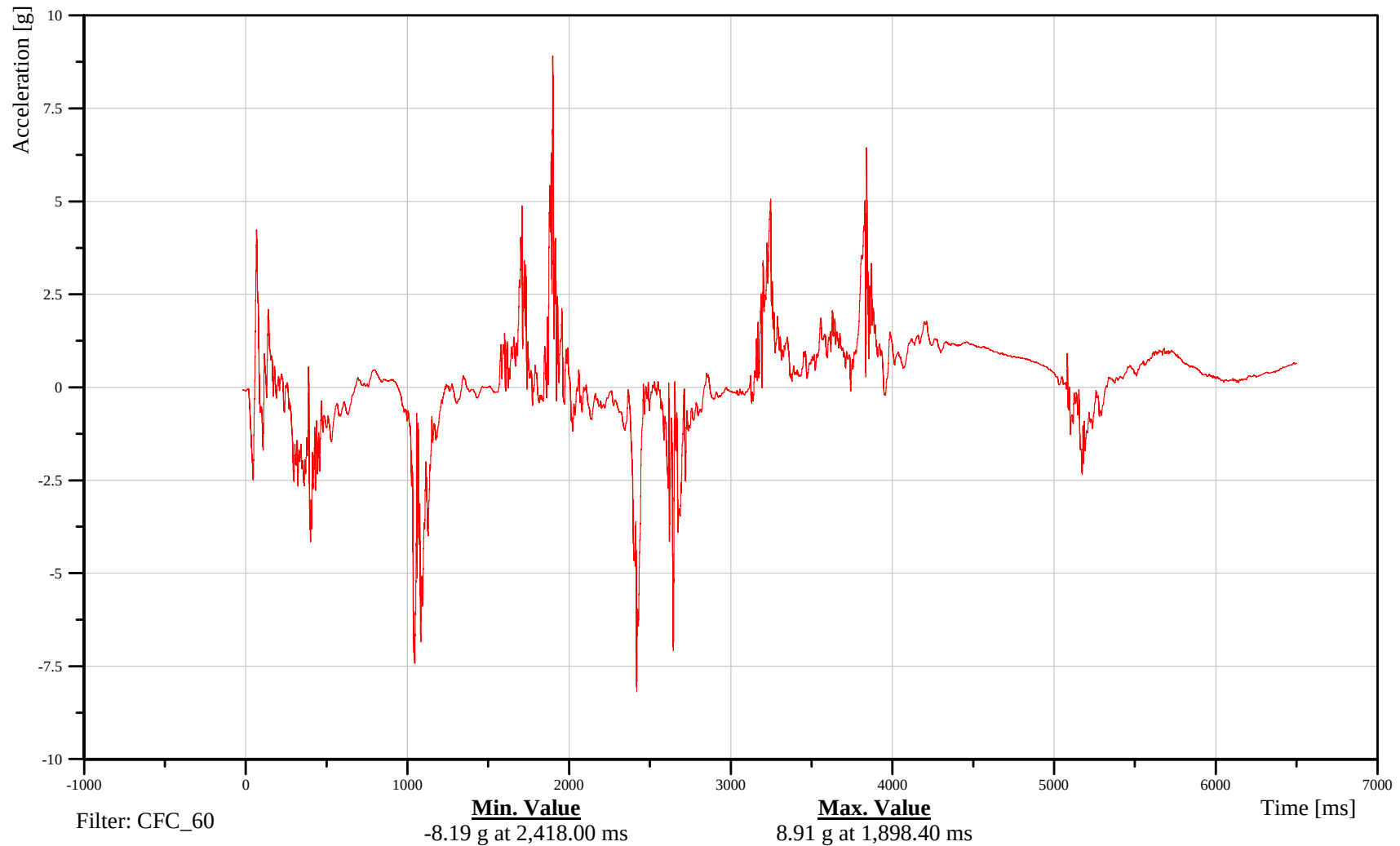
Time: 17:02

Customer: VRTC

13SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-180

090930



FMVSS 208 Rollover 2007 Ford Expedition

RF Seat Position (on floor) Z-Axis Acceleration

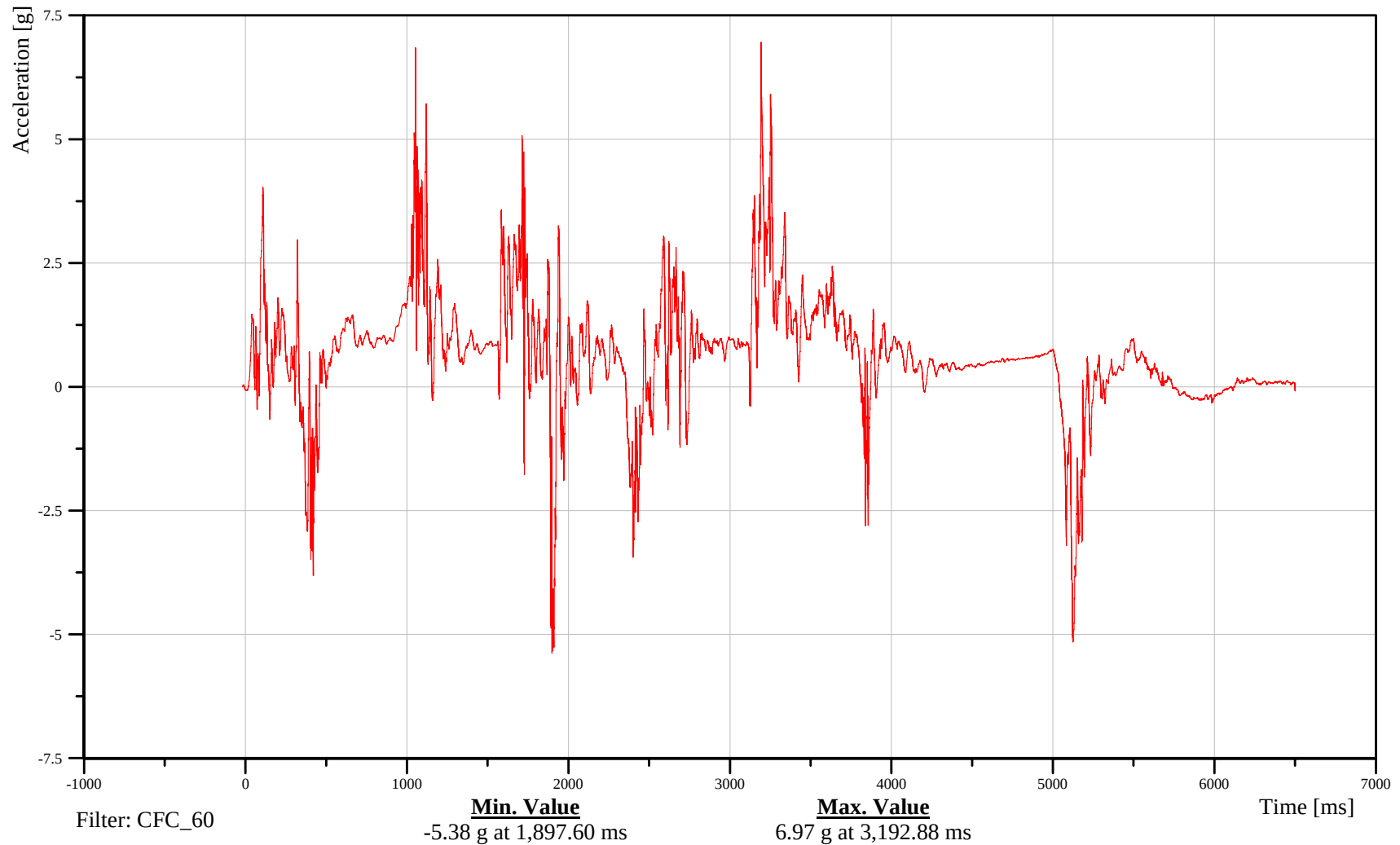
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-181

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

RF Seat Position (on floor) Resultant Acceleration

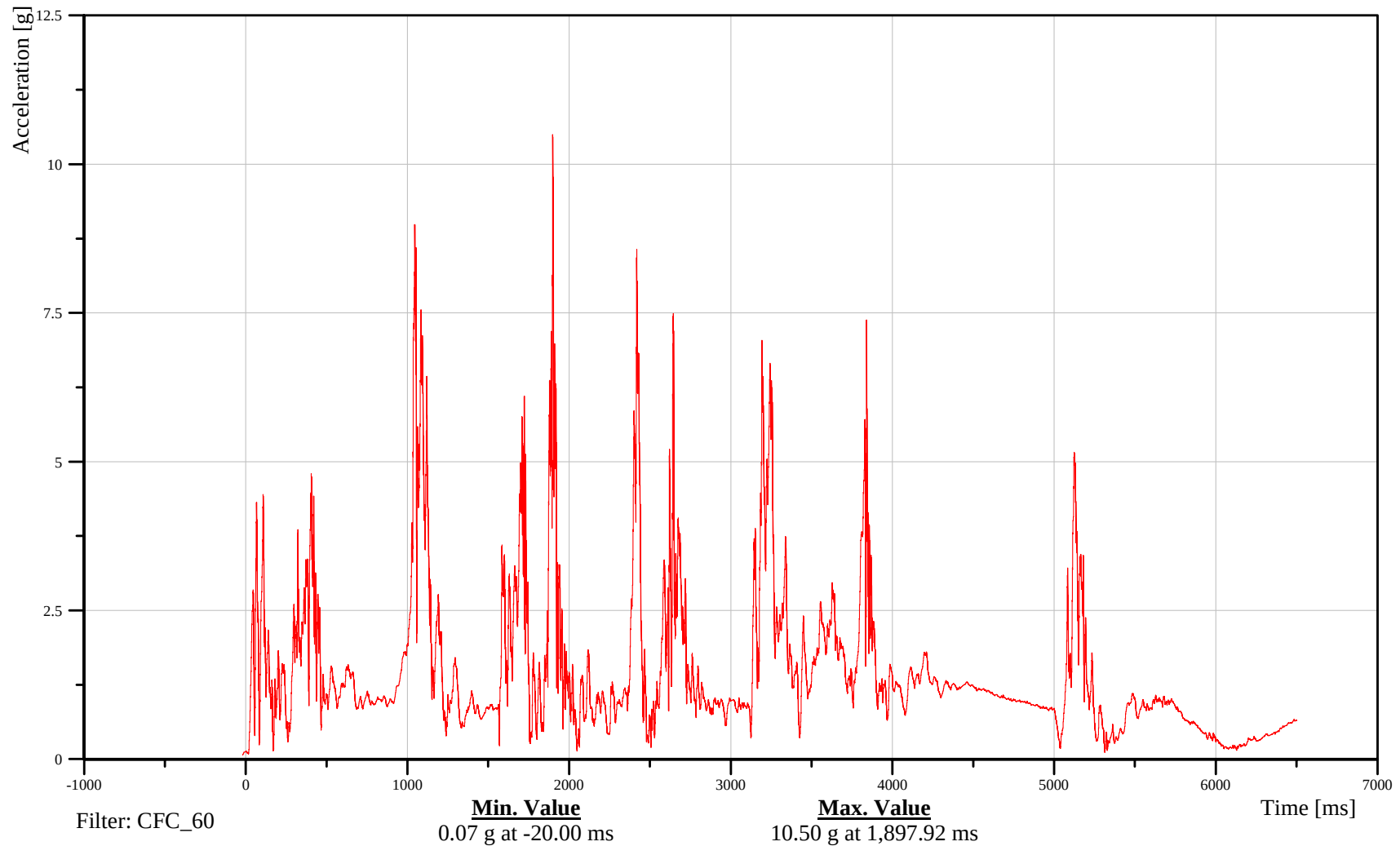
Time: 17:02

Customer: VRTC

13SEAT000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-182

090930



FMVSS 208 Rollover 2007 Ford Expedition

LR Seat Position (on floor) X-Axis Acceleration

Date: 09/30/2009

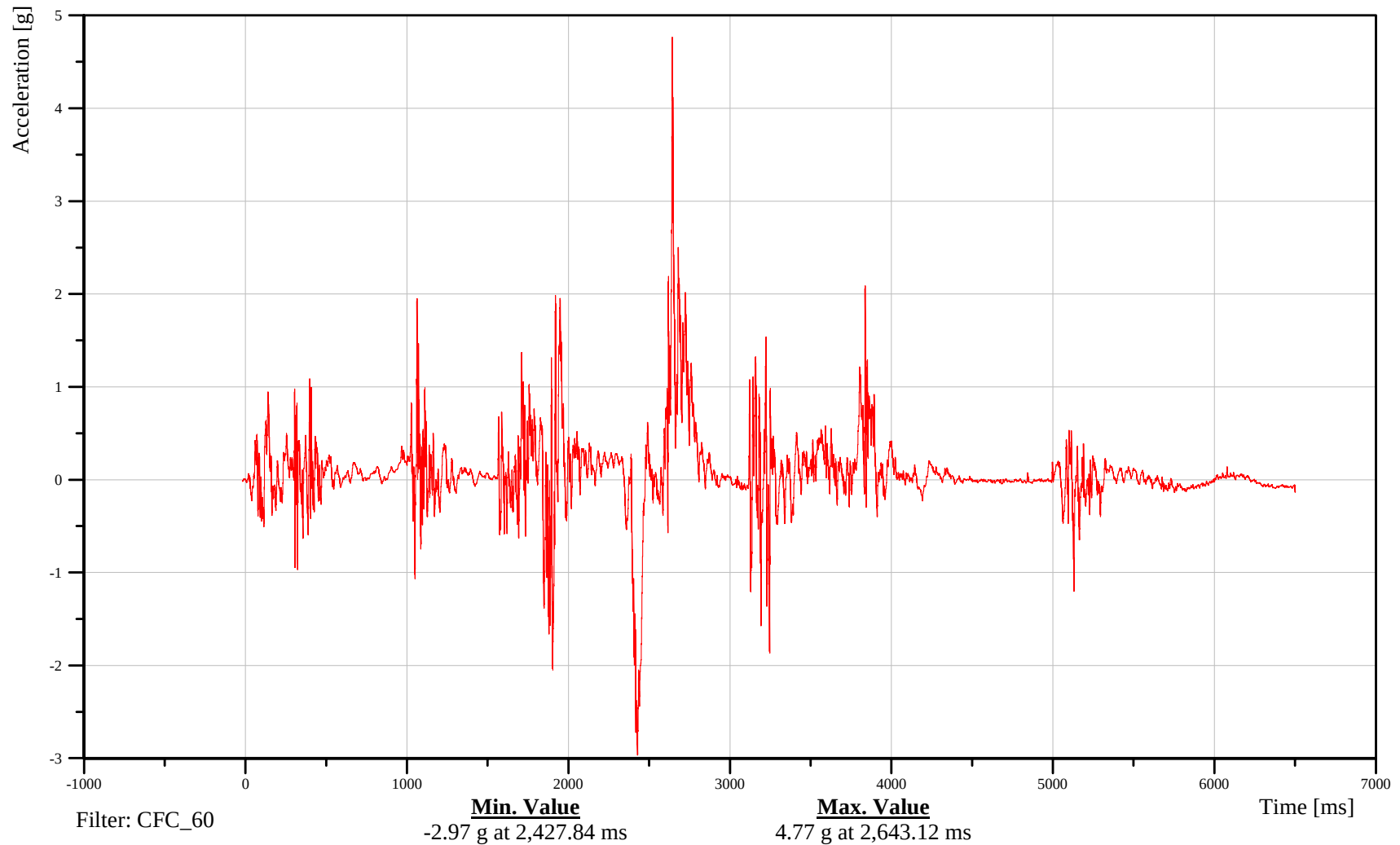
Time: 17:02

Customer: VRTC

14SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-183

090930



FMVSS 208 Rollover 2007 Ford Expedition

LR Seat Position (on floor) Y-Axis Acceleration

Date: 09/30/2009

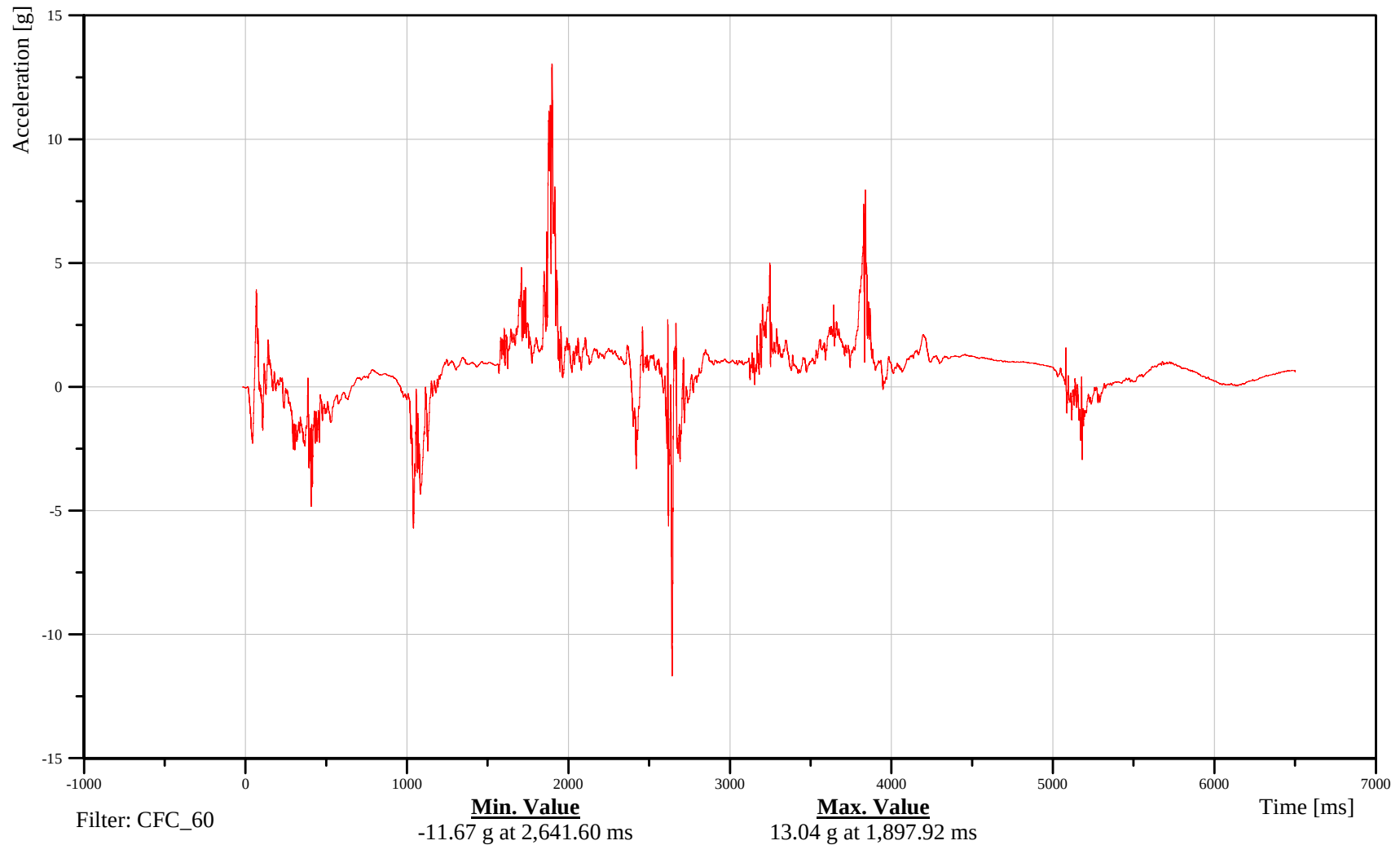
Time: 17:02

Customer: VRTC

14SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-184

090930



FMVSS 208 Rollover 2007 Ford Expedition

LR Seat Position (on floor) Z-Axis Acceleration

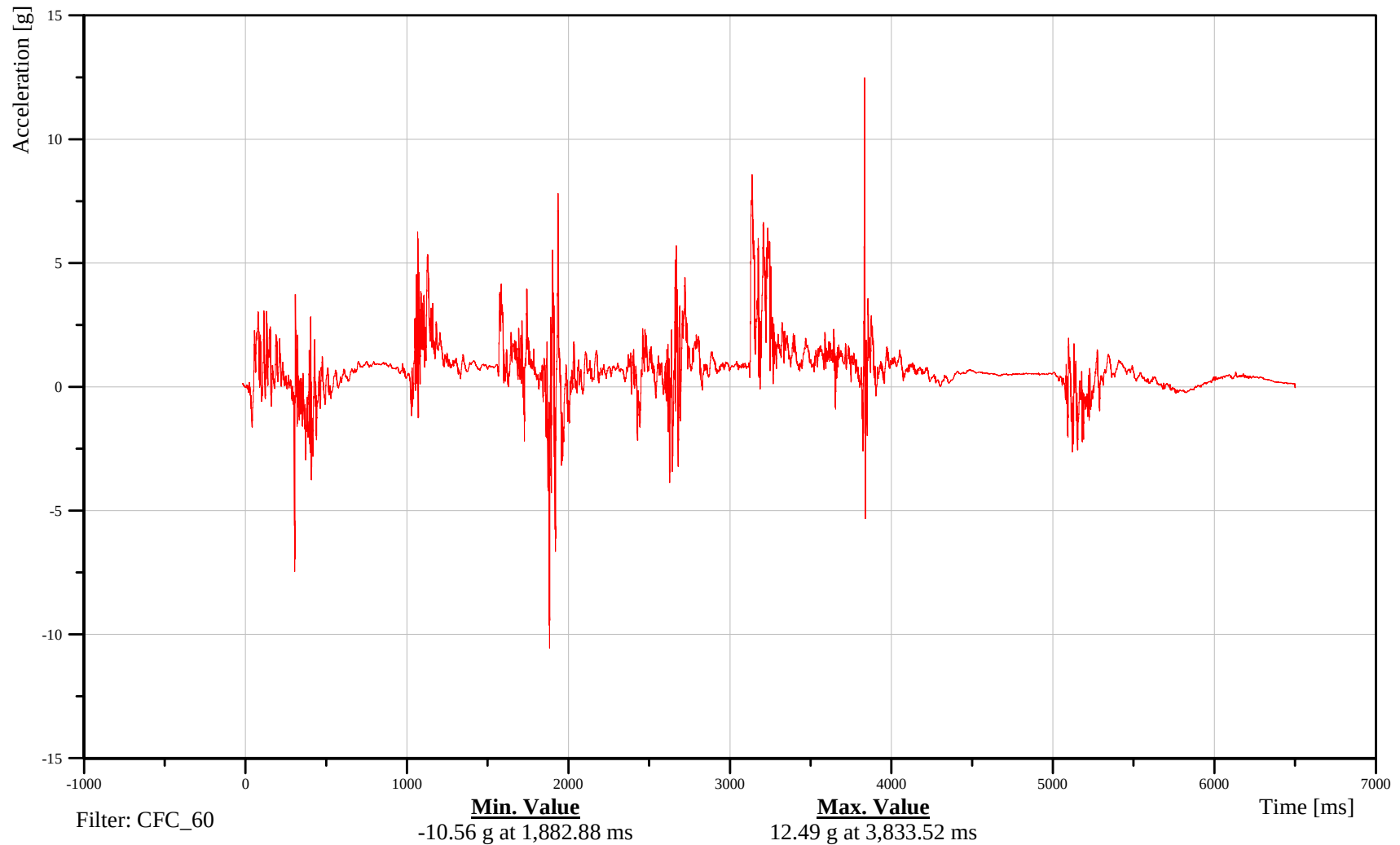
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-185

090930



FMVSS 208 Rollover 2007 Ford Expedition

LR Seat Position (on floor) Resultant Acceleration

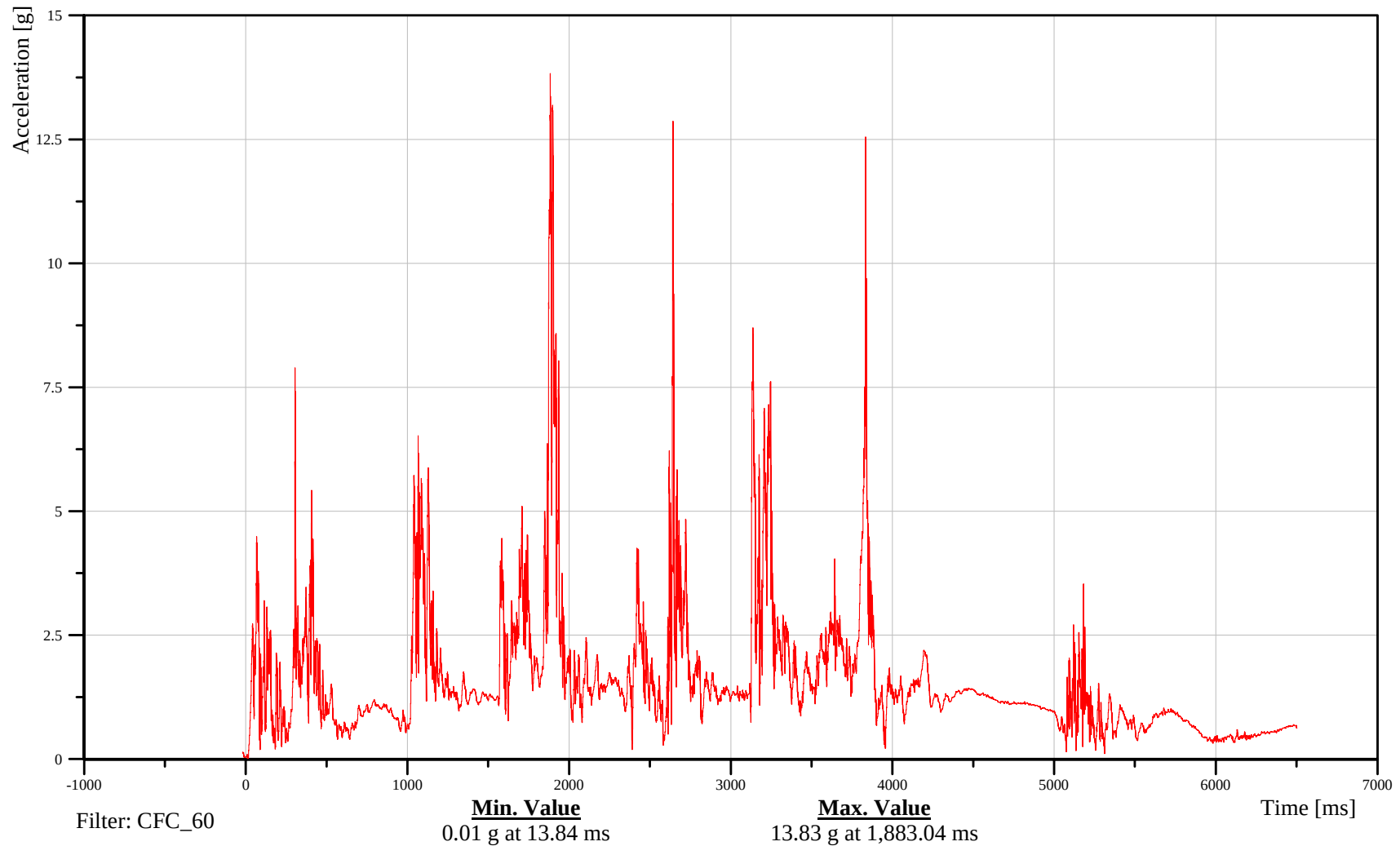
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14SEAT000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-186

090930



FMVSS 208 Rollover 2007 Ford Expedition

RR Seat Position (on floor) X-Axis Acceleration

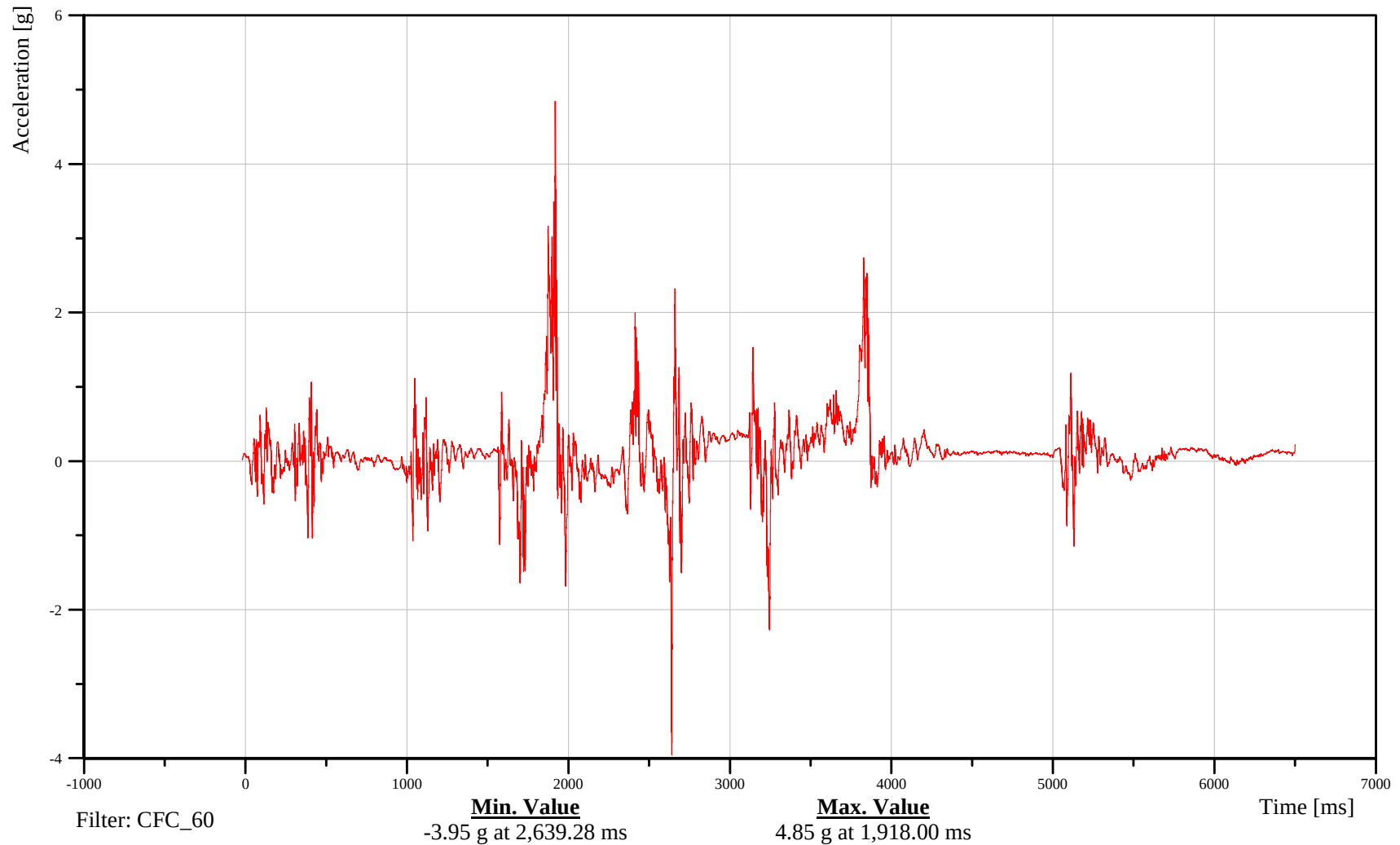
Date: 09/30/2009
Time: 17:02

Customer: VRTC

16SEAT000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-187

090930



FMVSS 208 Rollover 2007 Ford Expedition

RR Seat Position (on floor) Y-Axis Acceleration

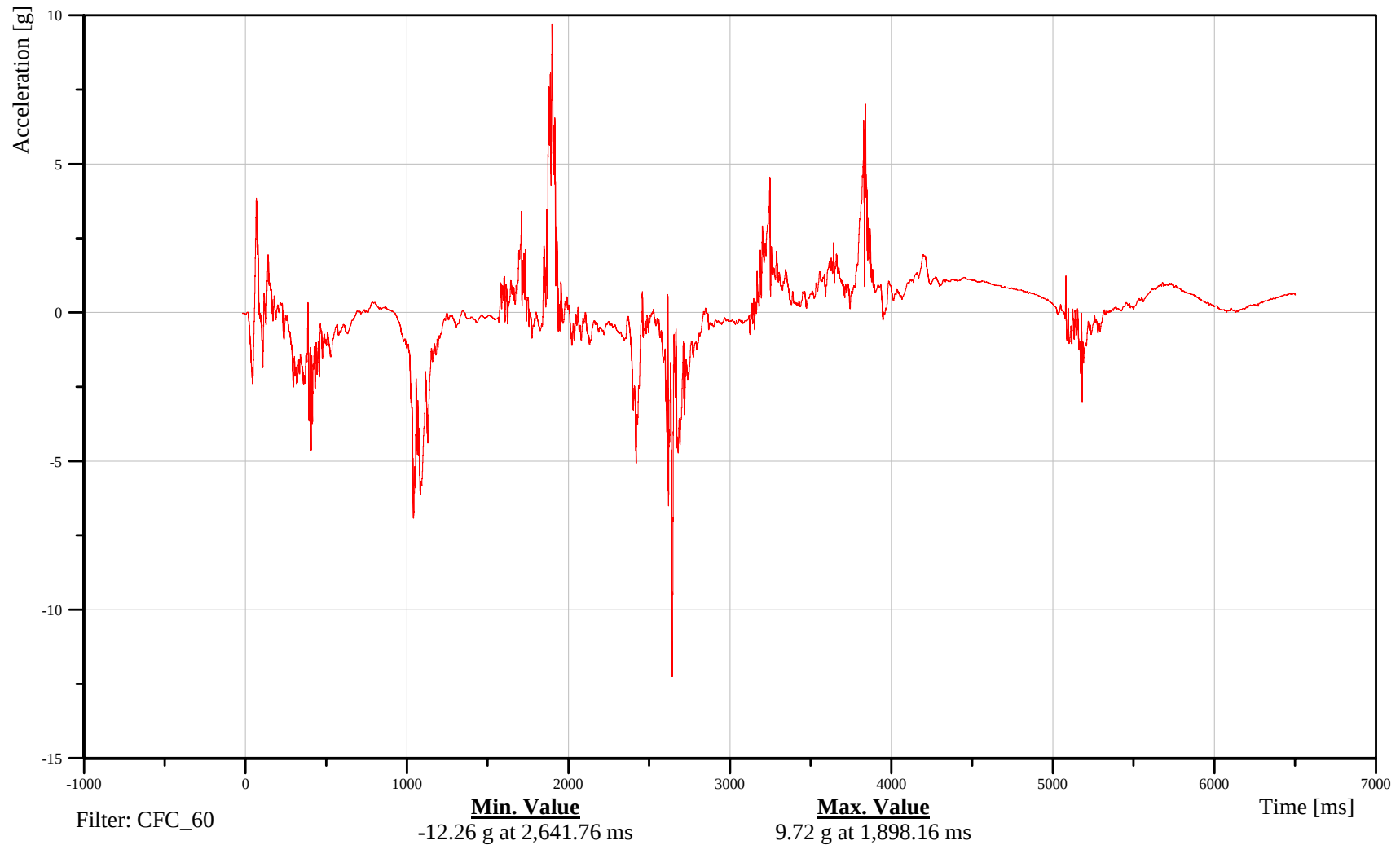
Date: 09/30/2009
Time: 17:02

Customer: VRTC

16SEAT000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-188

090930



FMVSS 208 Rollover 2007 Ford Expedition

RR Seat Position (on floor) Z-Axis Acceleration

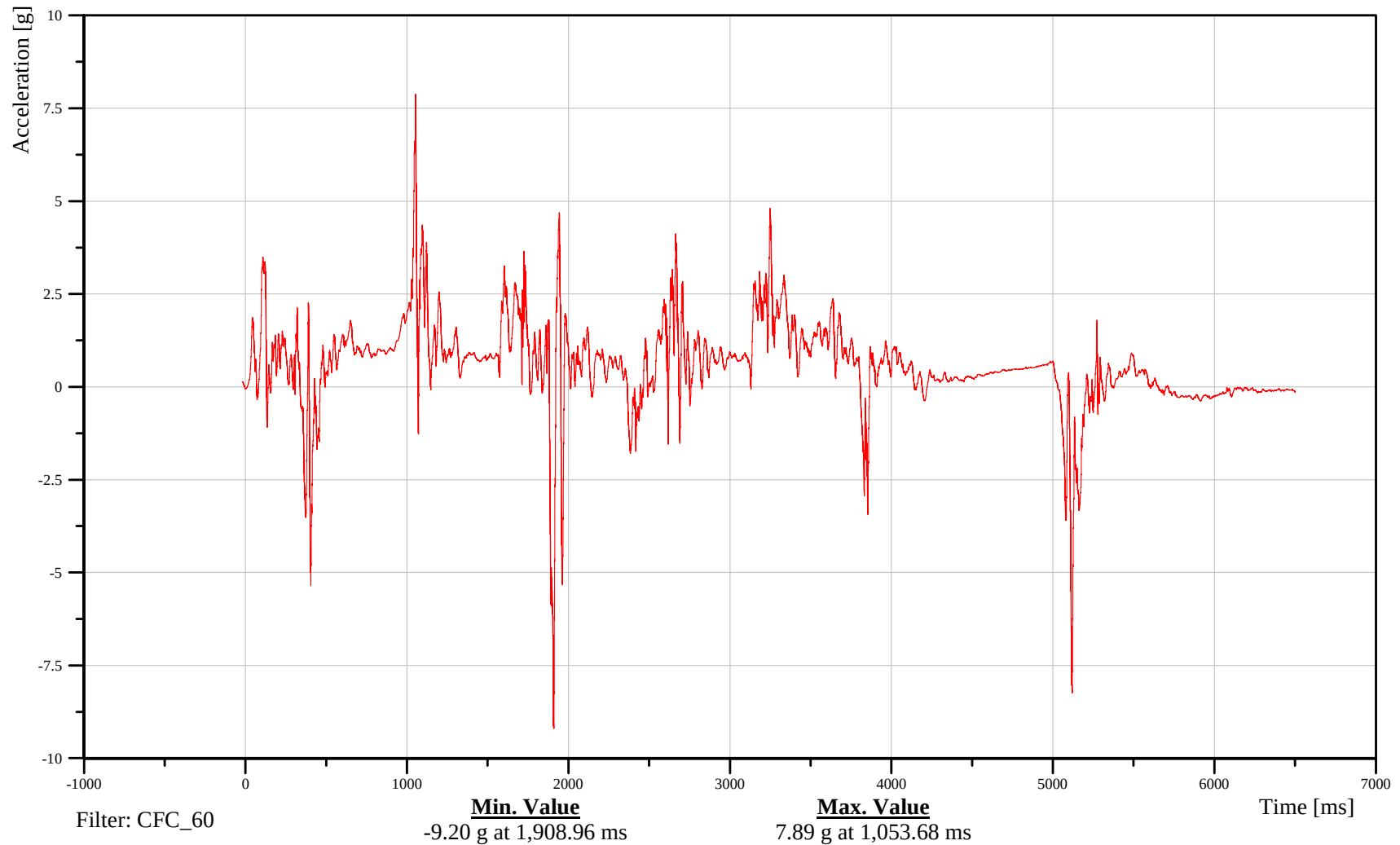
Date: 09/30/2009
Time: 17:02

Customer: VRTC

16SEAT000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-189

090930



FMVSS 208 Rollover 2007 Ford Expedition

RR Seat Position (on floor) Resultant Acceleration

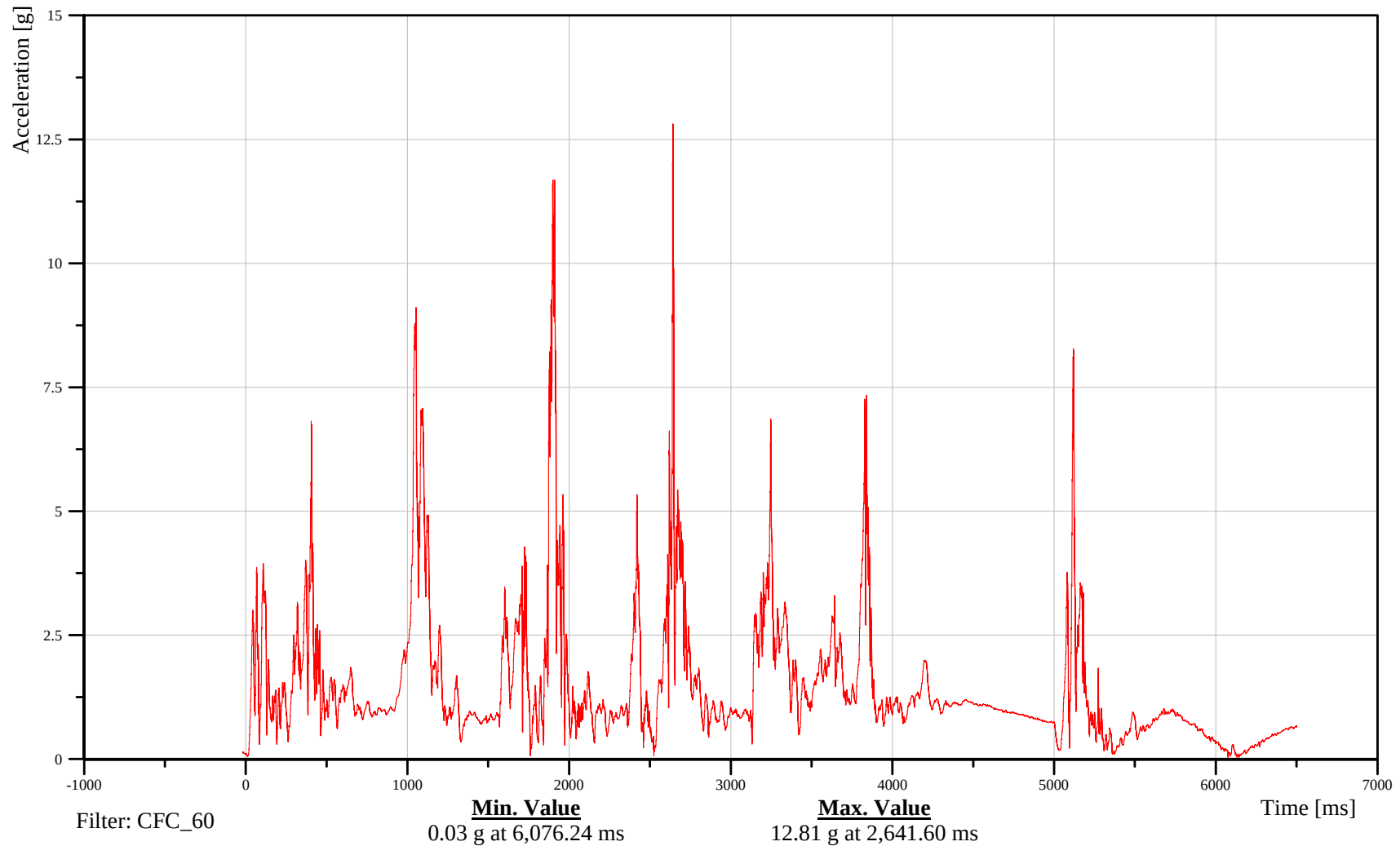
Date: 09/30/2009
Time: 17:02

Customer: VRTC

16SEAT000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-190

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009
Time: 17:02

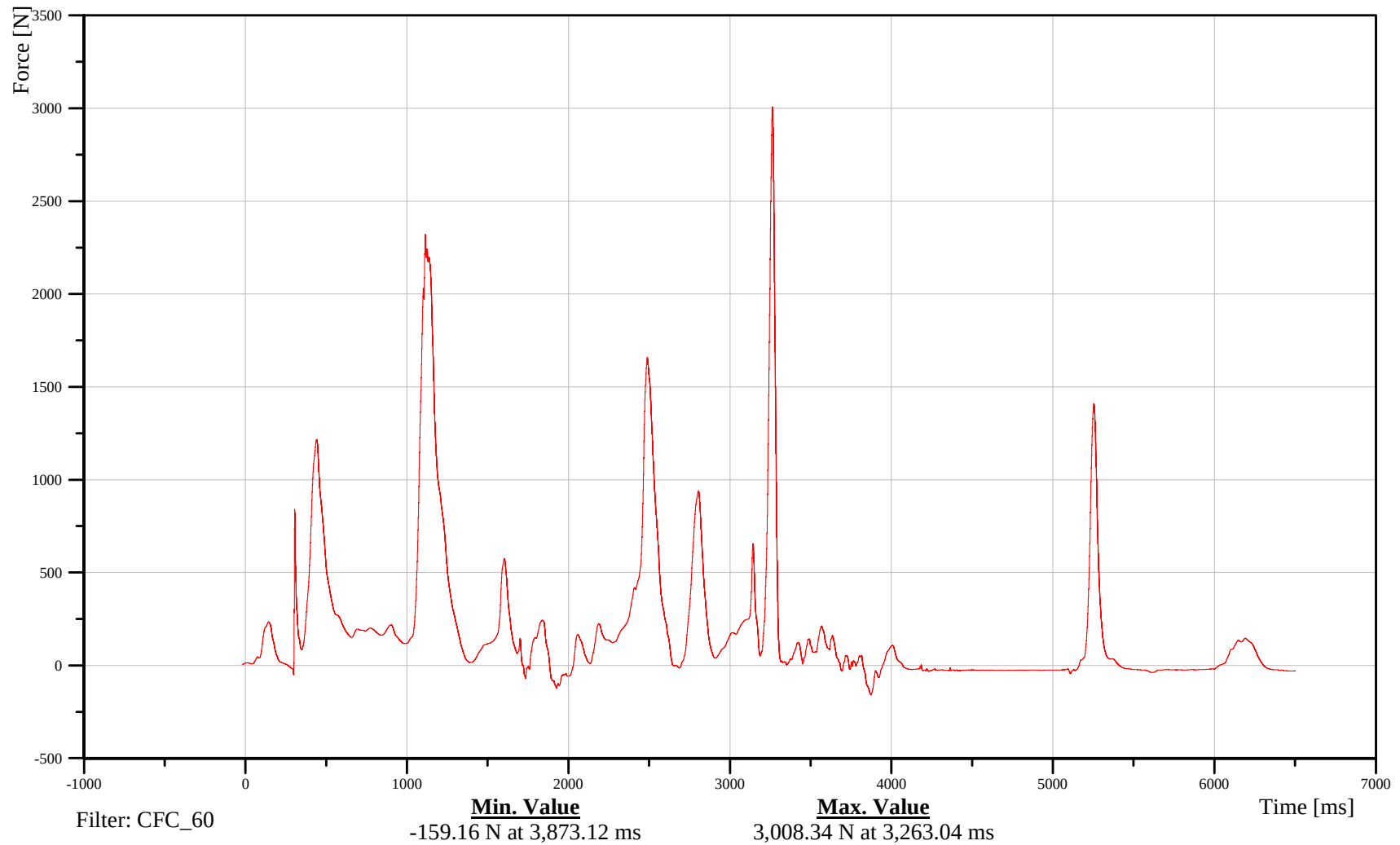
Driver Lap Belt Force

Customer: VRTC

11SEBE0000B5FO0D

TRC Inc. Test Lab: CTF

Test Number: 090930



B-191

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Shoulder Belt Force

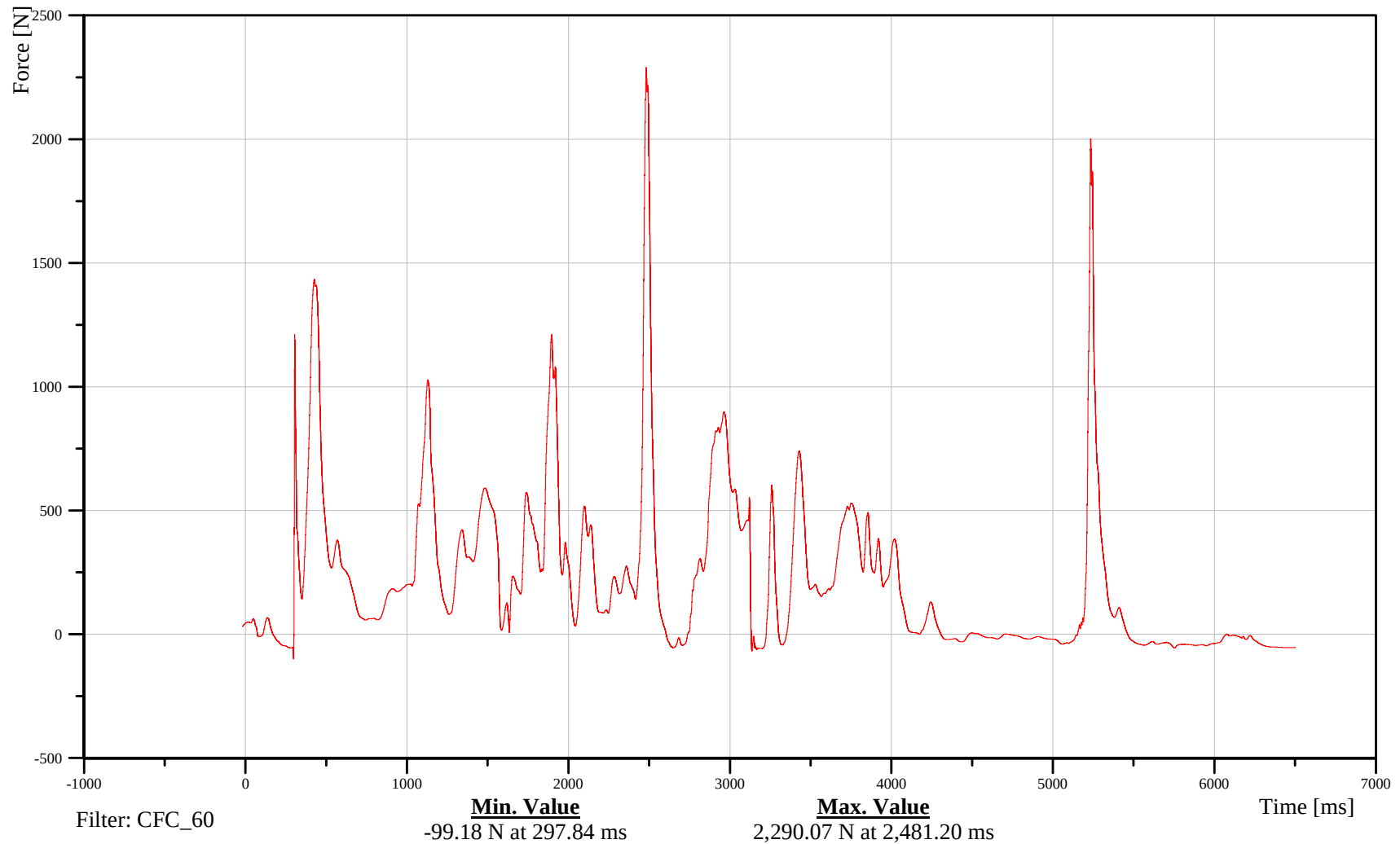
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11SEBE0000B3FO0D

TRC Inc. Test Lab: CTF

Test Number: 090930



B-192

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Right Front Passenger Lap Belt Force

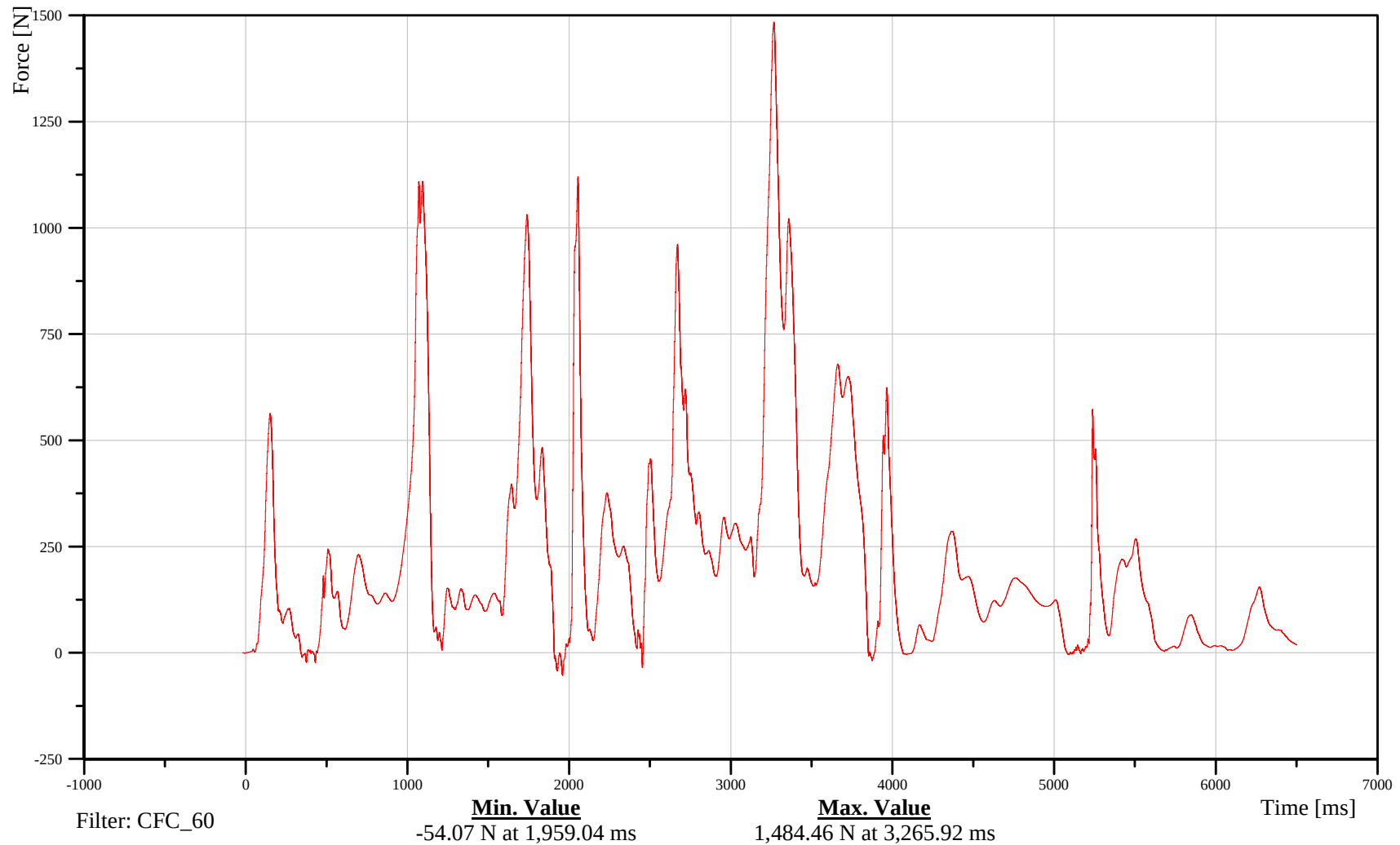
Time: 17:02

Customer: VRTC

13SEBE0000B5FO0D

TRC Inc. Test Lab: CTF

Test Number: 090930



B-193

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Shldr. Belt Force

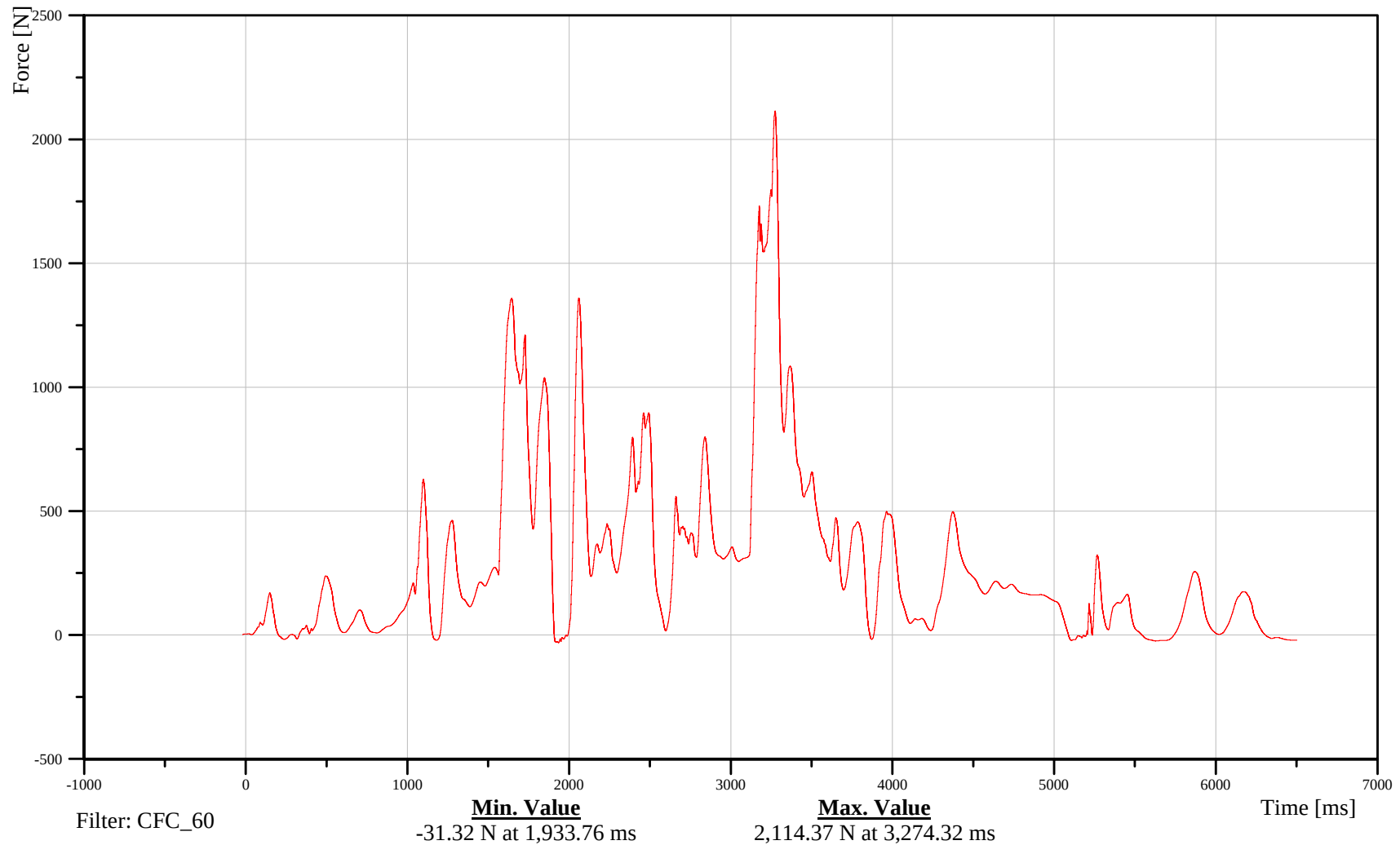
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13SEBE0000B3FO0D

TRC Inc. Test Lab: CTF

Test Number: 090930



B-194

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Left Rear Passenger Lap Belt Force

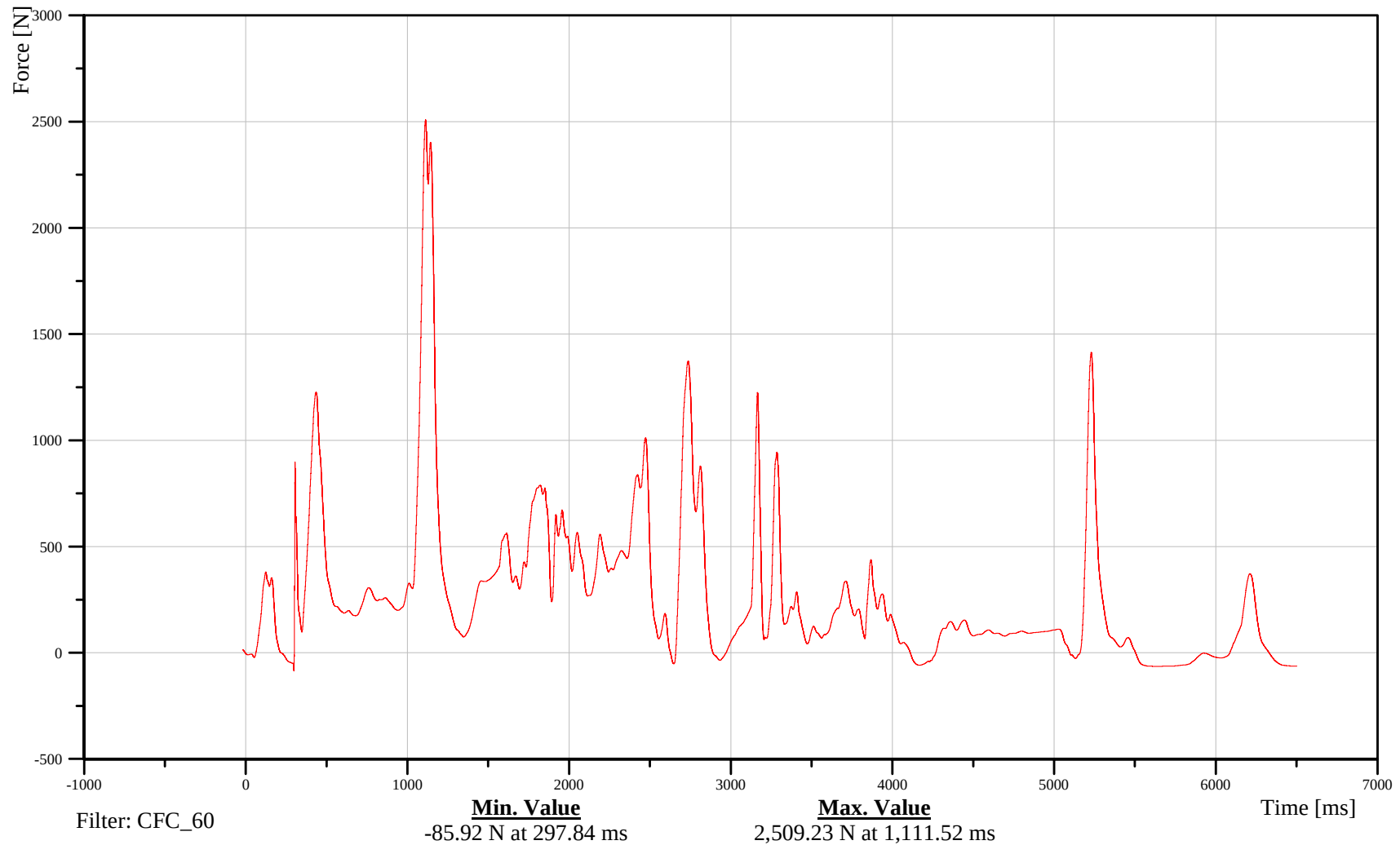
Time: 17:02

Customer: VRTC

14SEBE0000B5FO0D

TRC Inc. Test Lab: CTF

Test Number: 090930



B-195

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Shoulder Belt Force

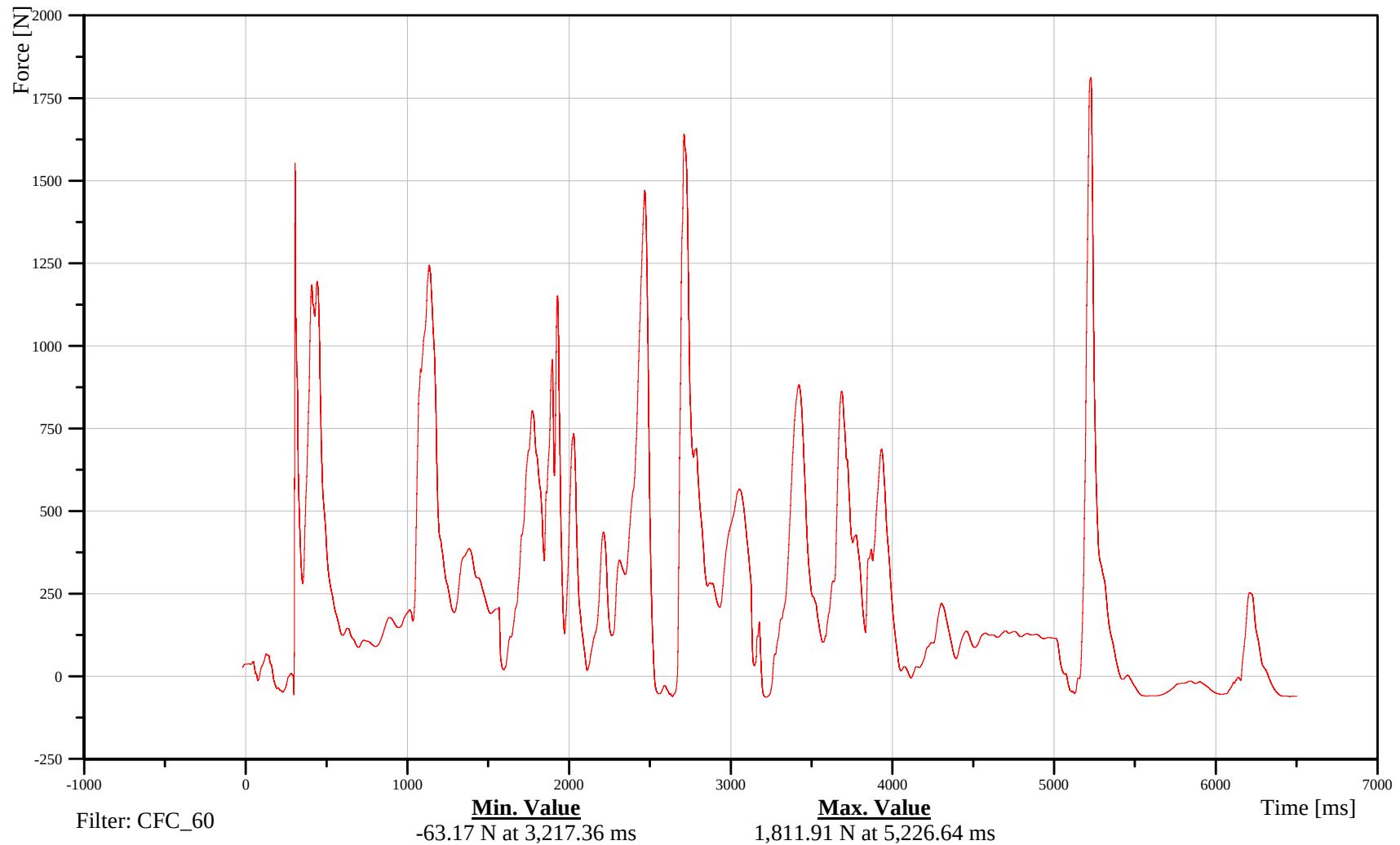
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14SEBE0000B3FO0D

TRC Inc. Test Lab: CTF

Test Number: 090930



B-196

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Seat Belt Spool Potentiometers

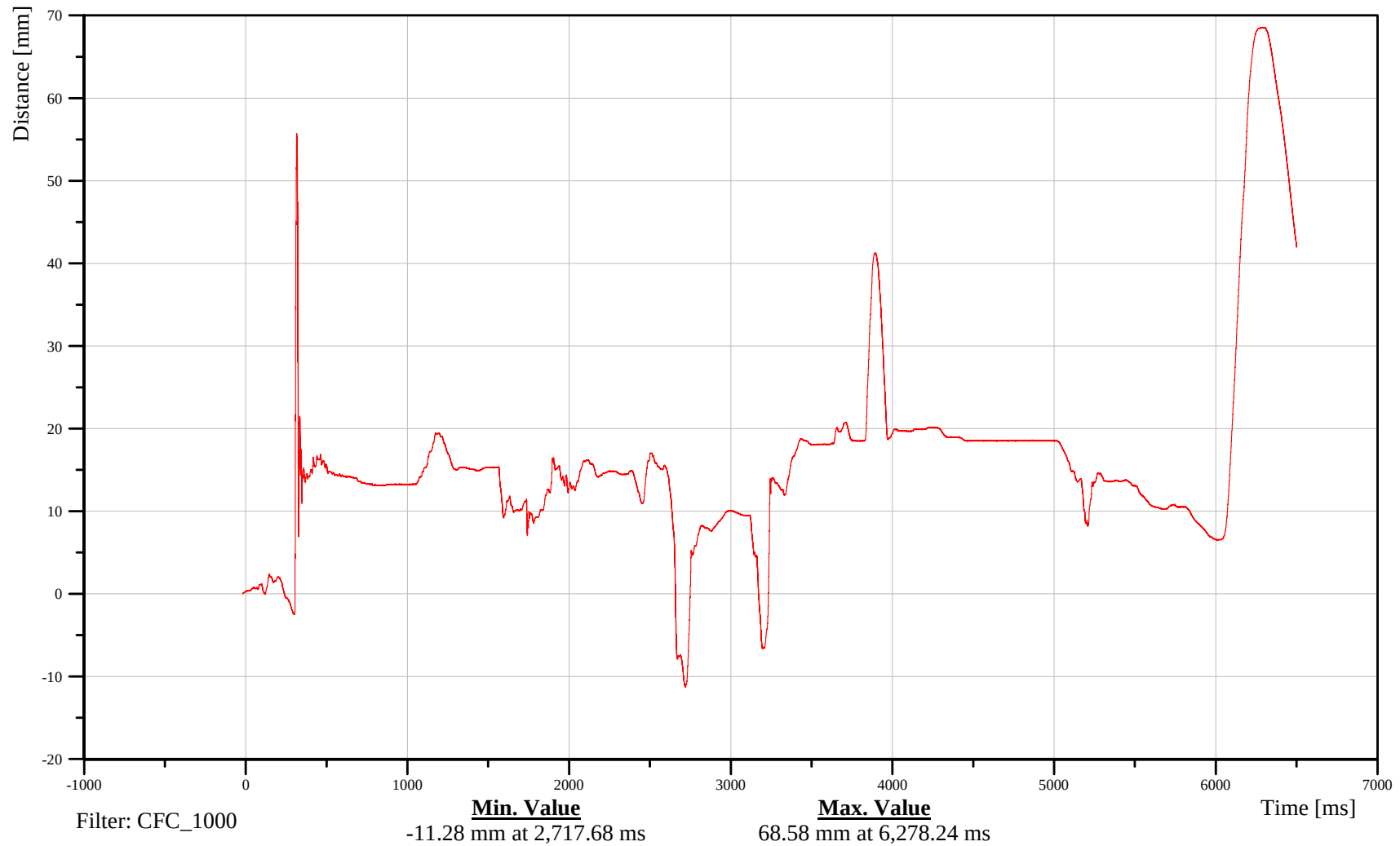
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11SEBE0000B5DS0A

TRC Inc. Test Lab: CTF

Test Number: 090930



B-197

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Belt Spool Potentiometers

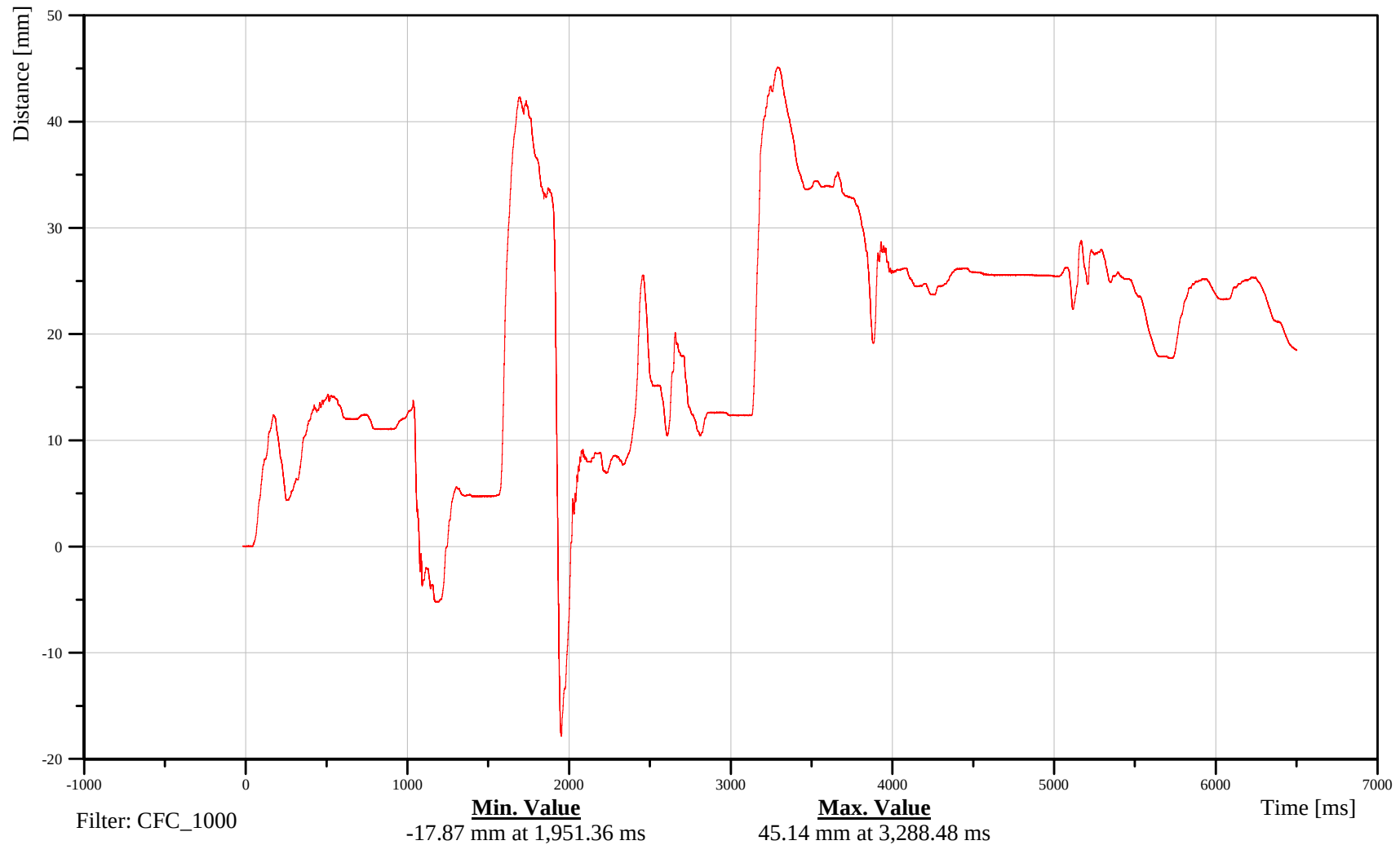
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13SEBE0000B5DS0A

TRC Inc. Test Lab: CTF

Test Number: 090930



B-198

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Belt Spool Potentiometers

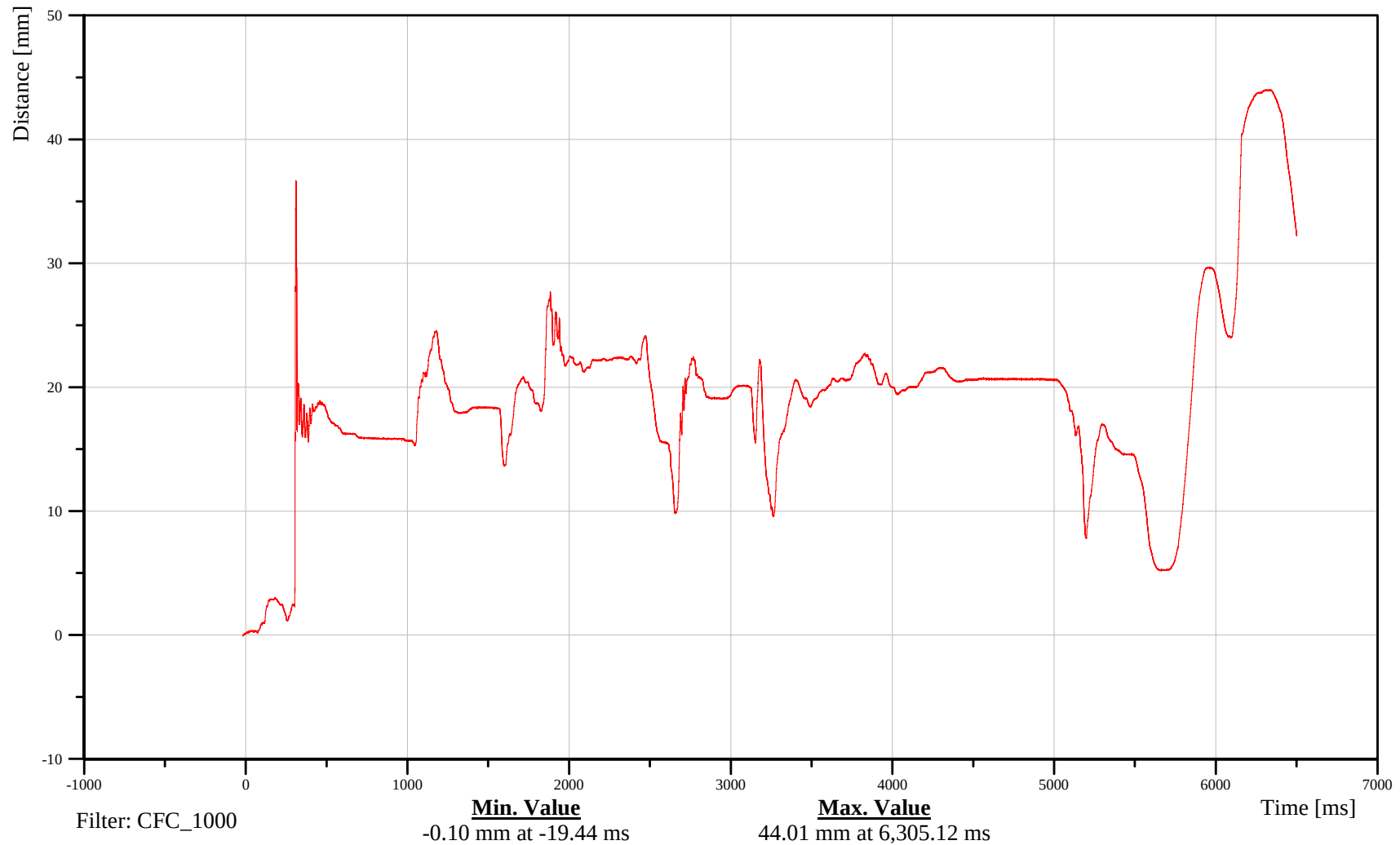
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14SEBE0000B5DS0A

TRC Inc. Test Lab: CTF

Test Number: 090930



B-199

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Head Contact

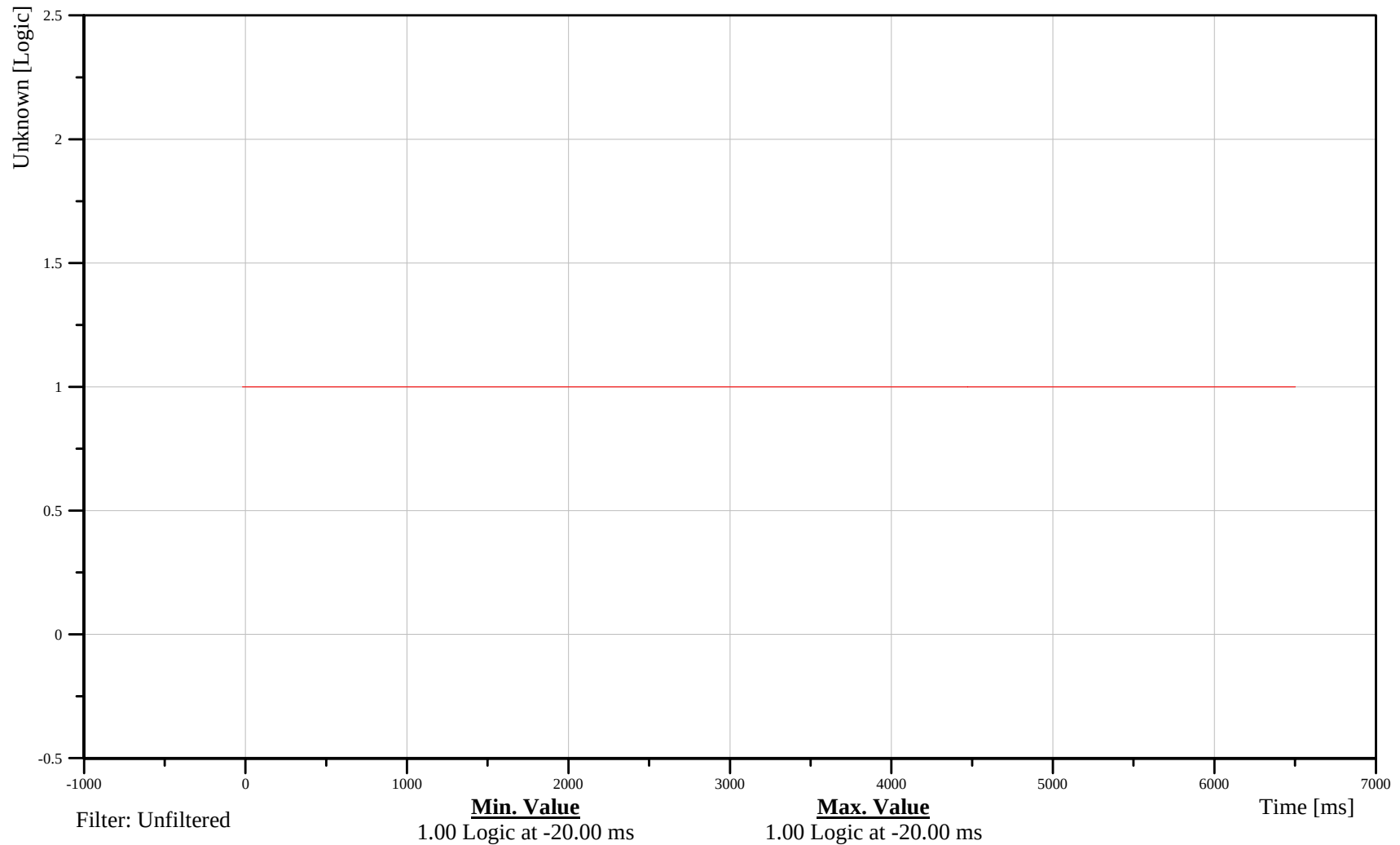
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11CONT000023EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-200

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Thorax Contact

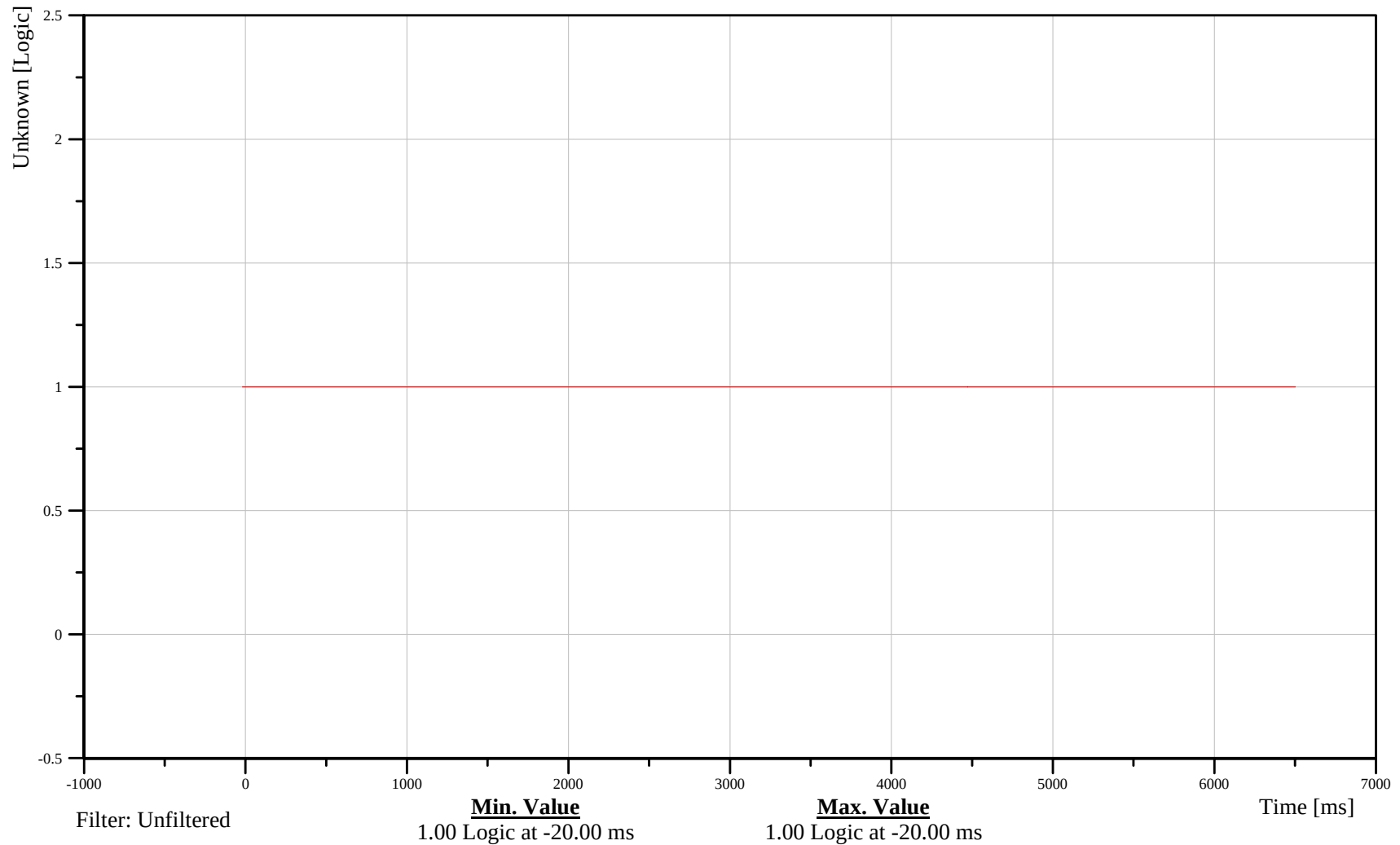
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11CONT000024EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-201

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Pelvis Contact

Date: 09/30/2009

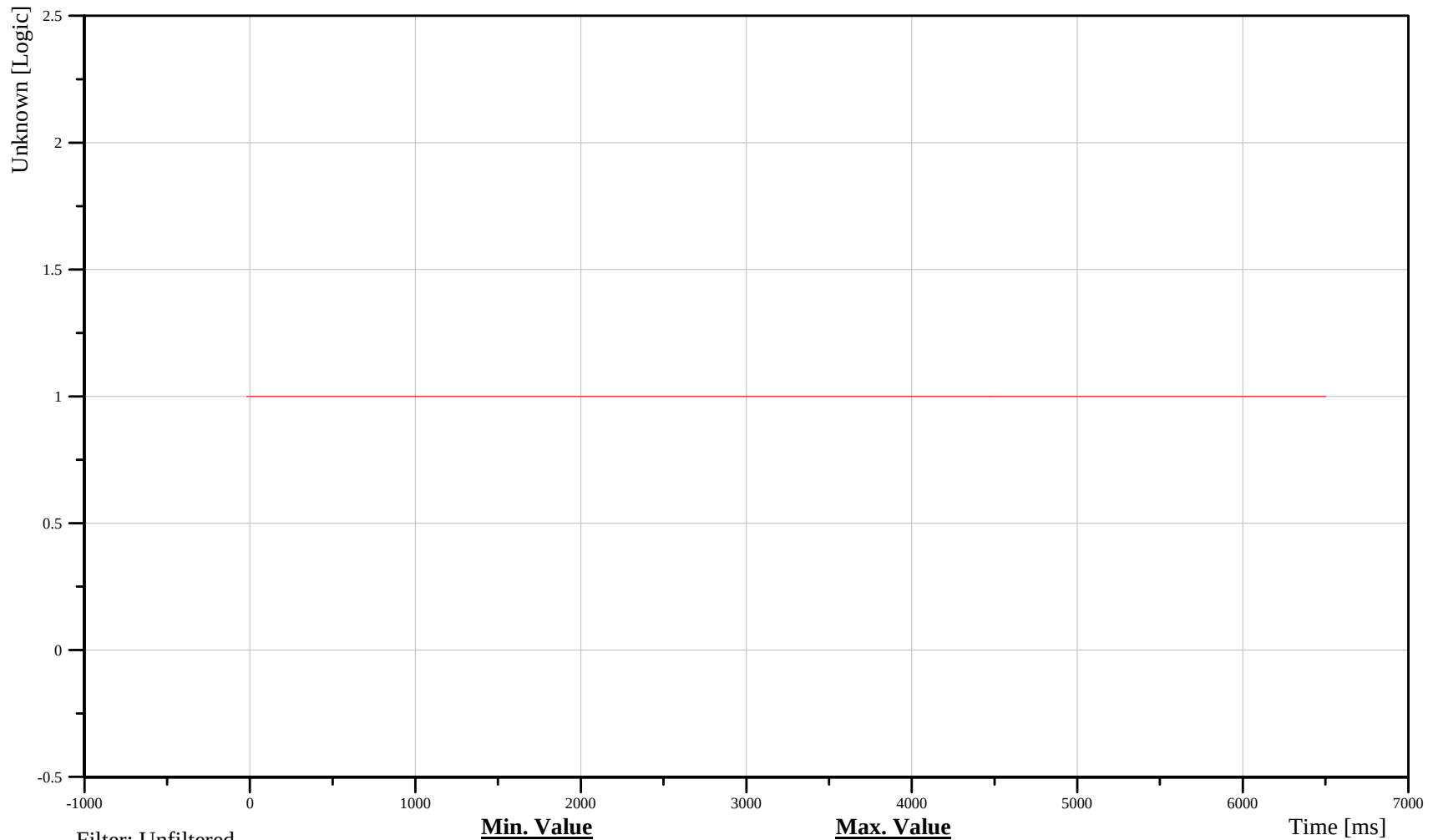
Time: 17:02

Customer: VRTC

11CONT000025EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-202

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

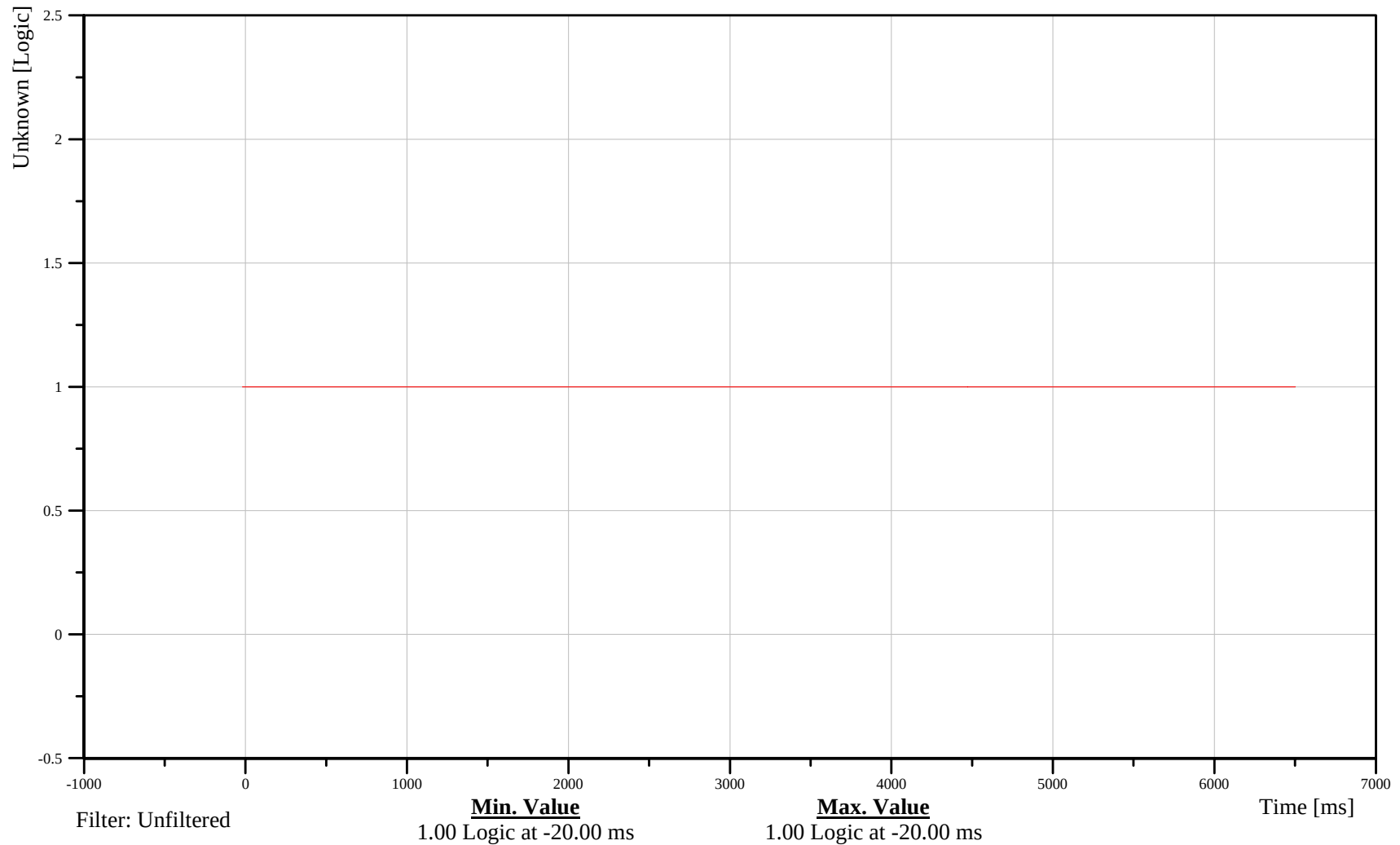
Right Front Passenger Head Contact Switch

Customer: VRTC

13CONT000026EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-203

090930



FMVSS 208 Rollover 2007 Ford Expedition

Right Front Passenger Thorax Contact Switch

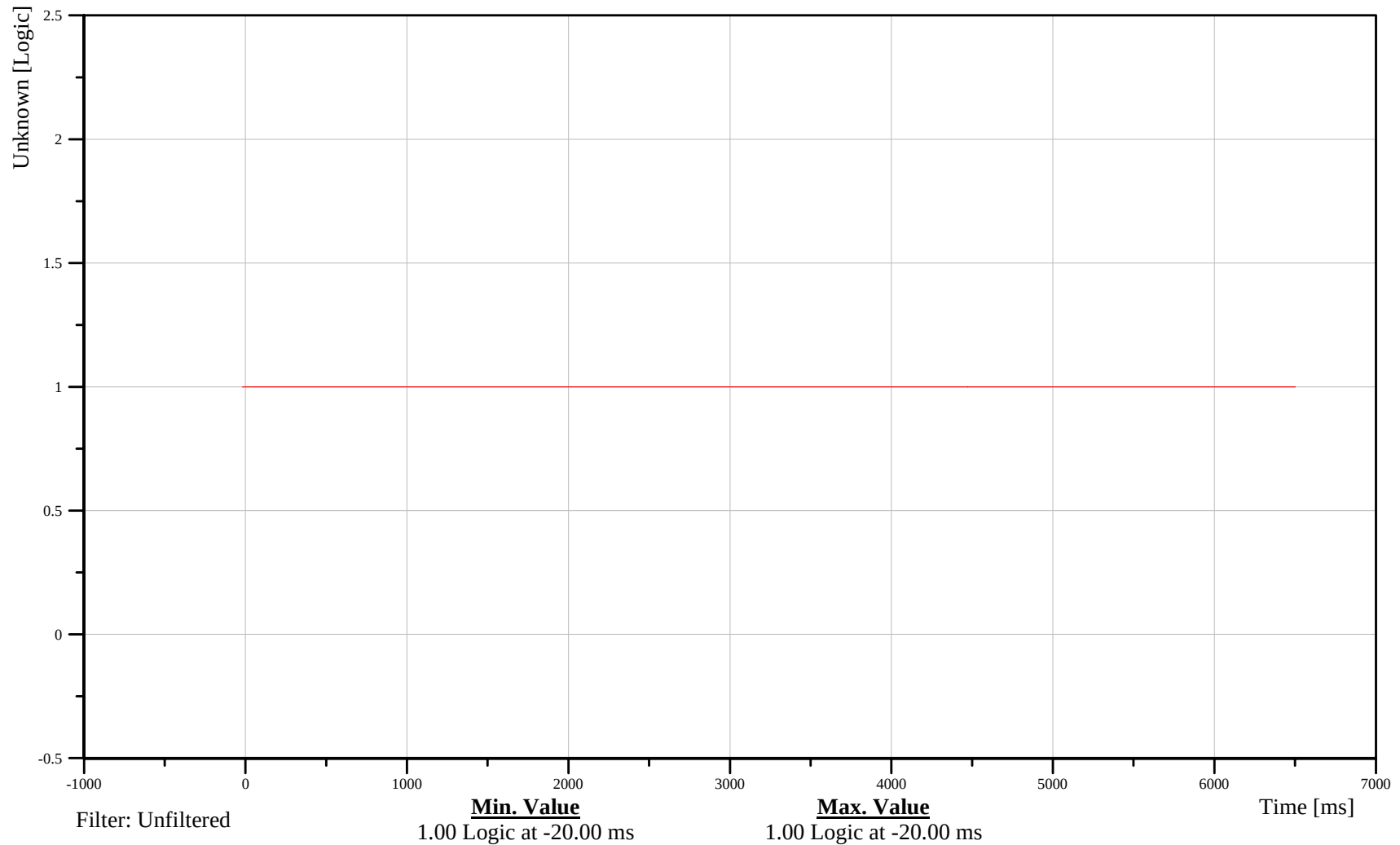
Date: 09/30/2009
Time: 17:02

Customer: VRTC

13CONT000027EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-204

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

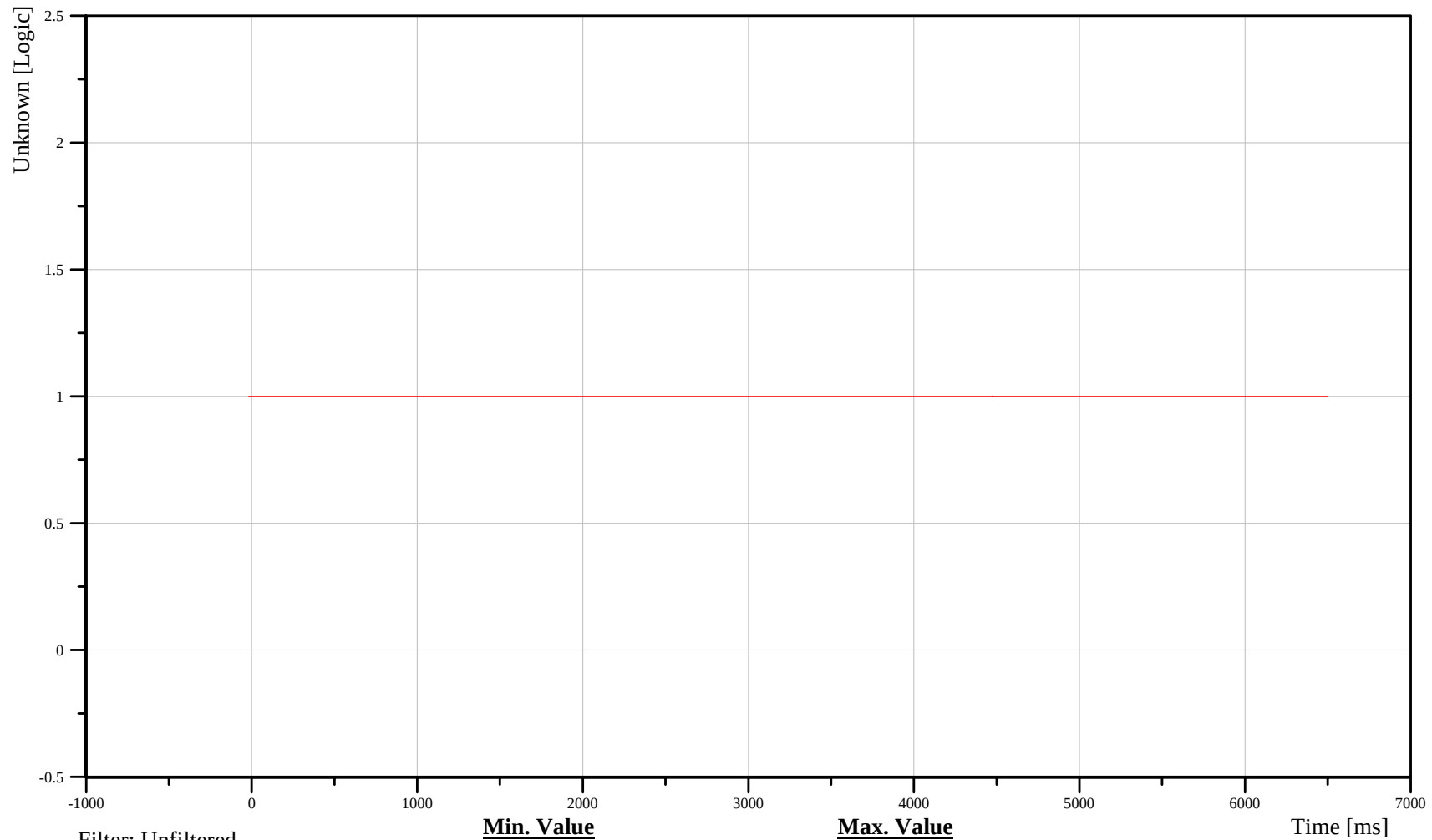
Right Front Passenger Pelvis Contact Switch

Customer: VRTC

13CONT000028EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-205

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Head Contact

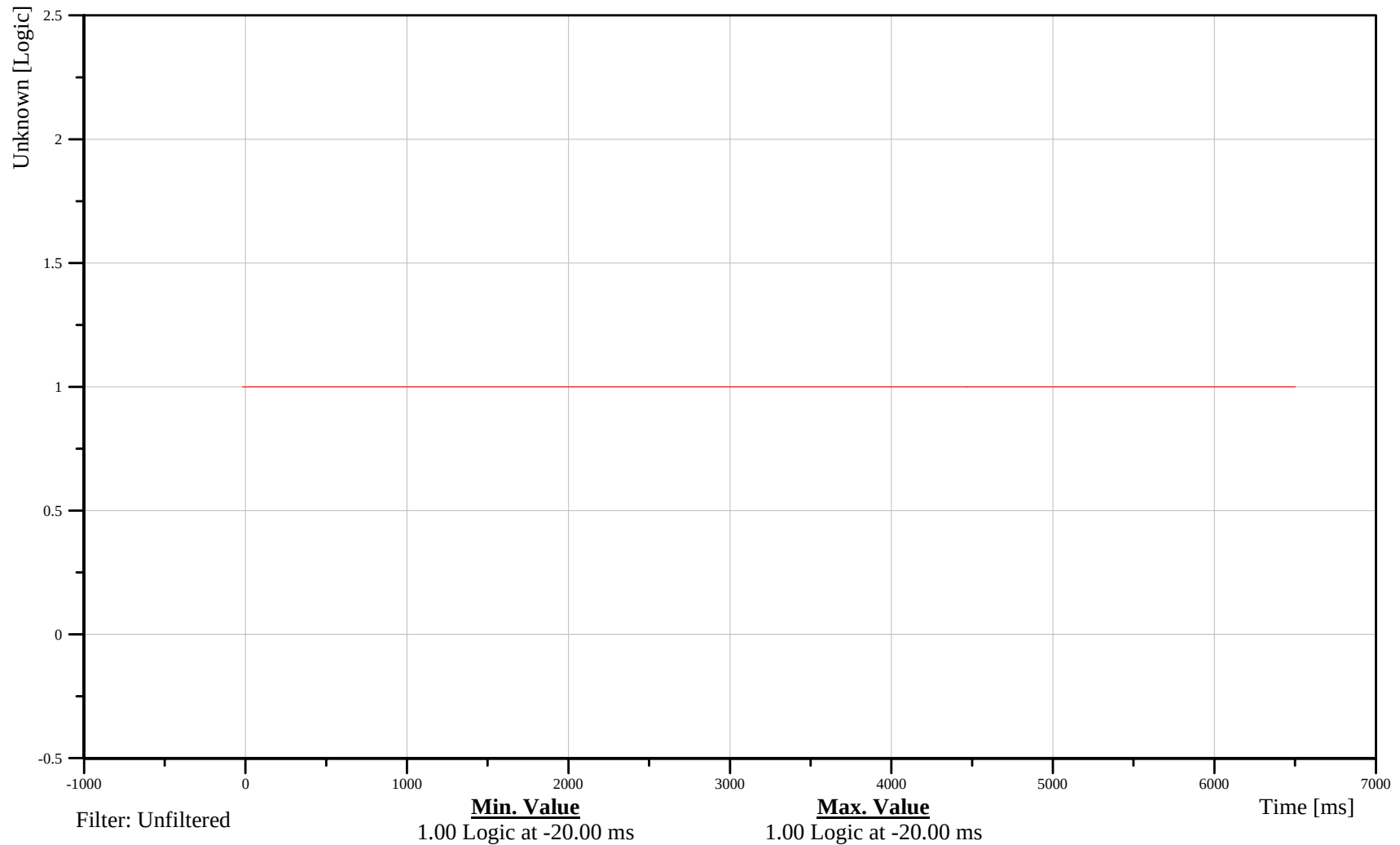
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14CONT000029EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-206

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Thorax Contact

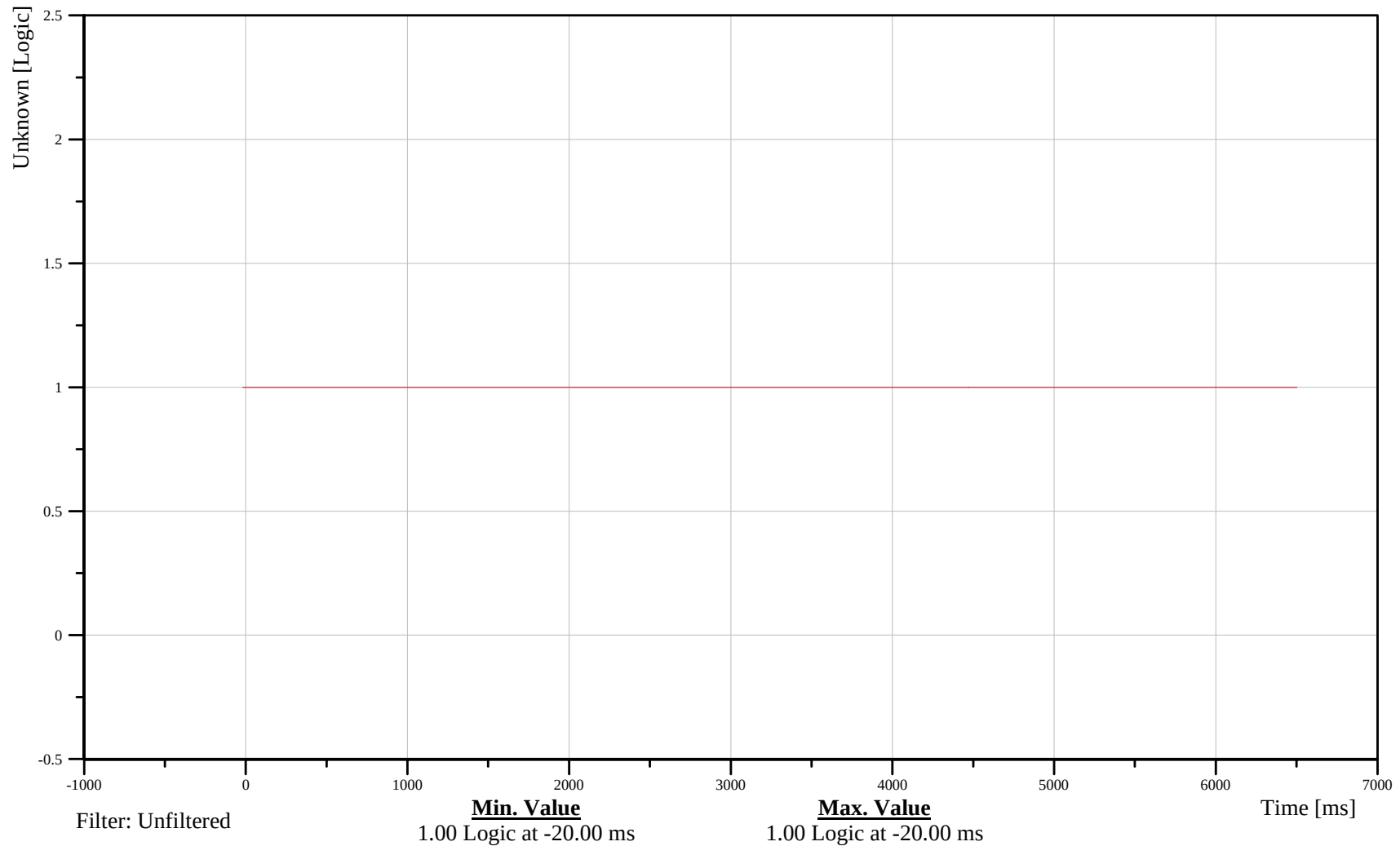
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14CONT000030EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-207

090930



FMVSS 208 Rollover 2007 Ford Expedition

Left Rear Passenger Pelvis Contact

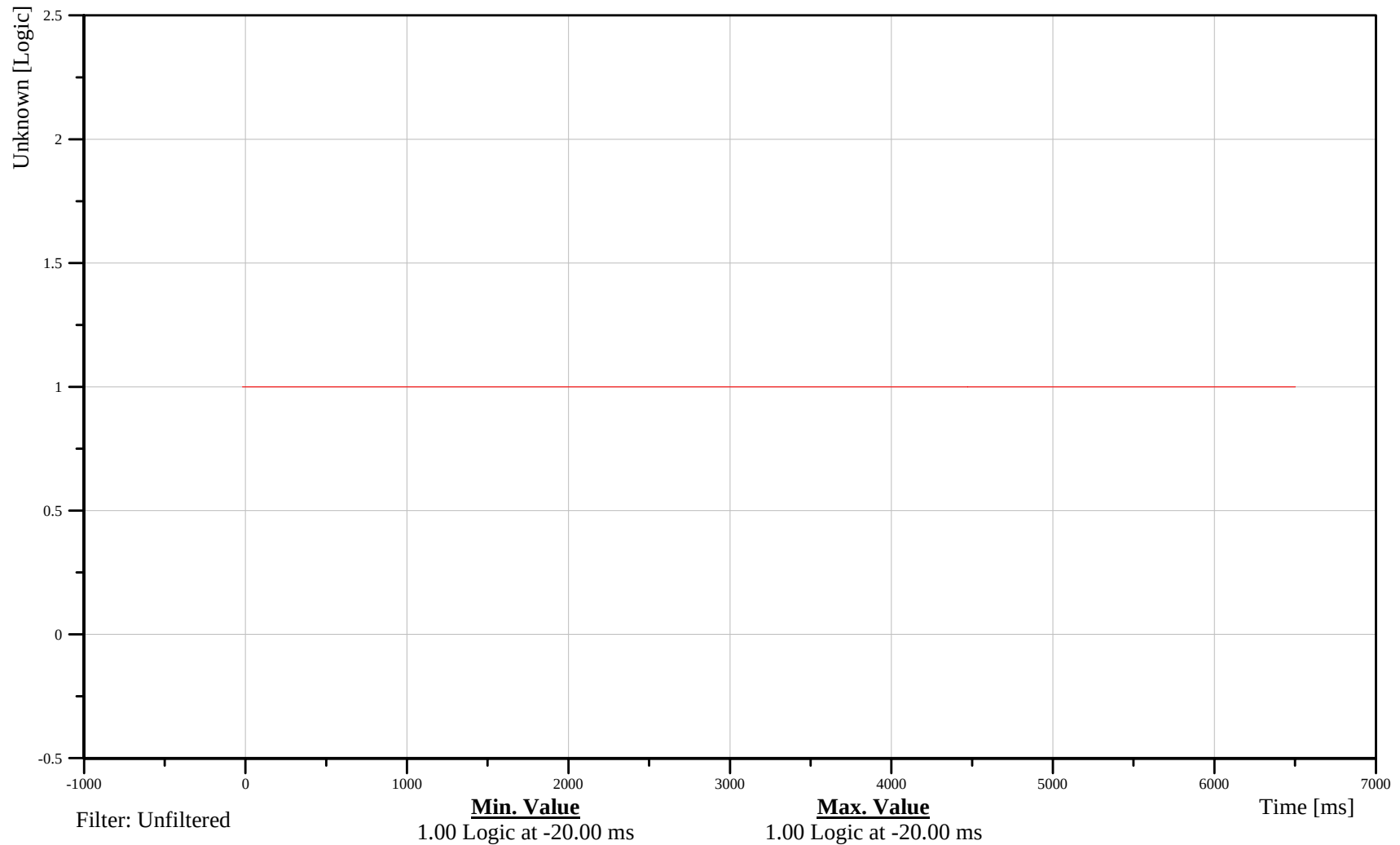
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14CONT000031EV00

TRC Inc. Test Lab: CTF

Test Number: 090930



B-208

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Inner Buckle Voltage

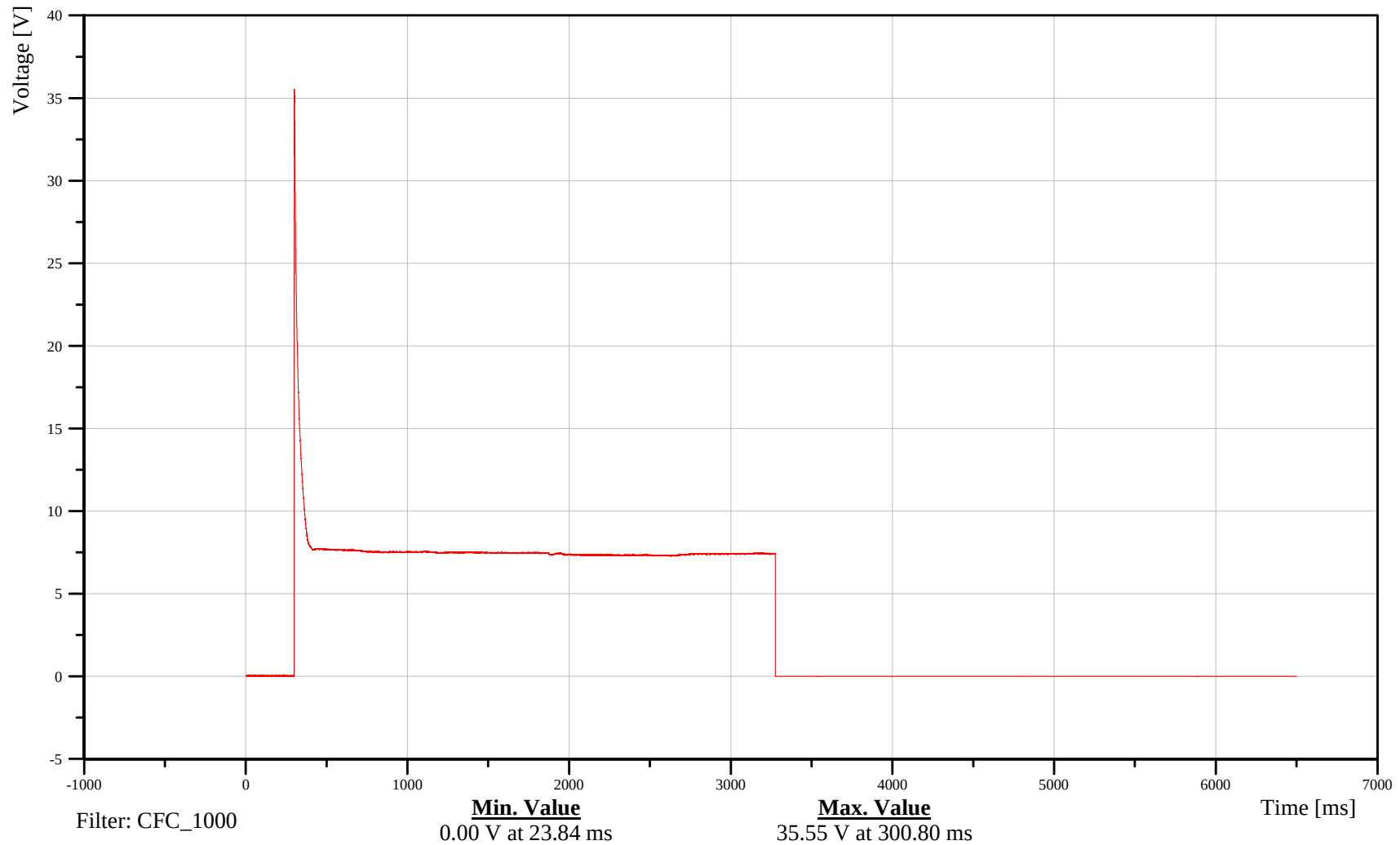
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11BCKLIN0000VO0A

TRC Inc. Test Lab: CTF

Test Number: 090930



B-209

090930



FMVSS 208 Rollover 2007 Ford Expedition

Rear Passenger Inner Buckle Voltage

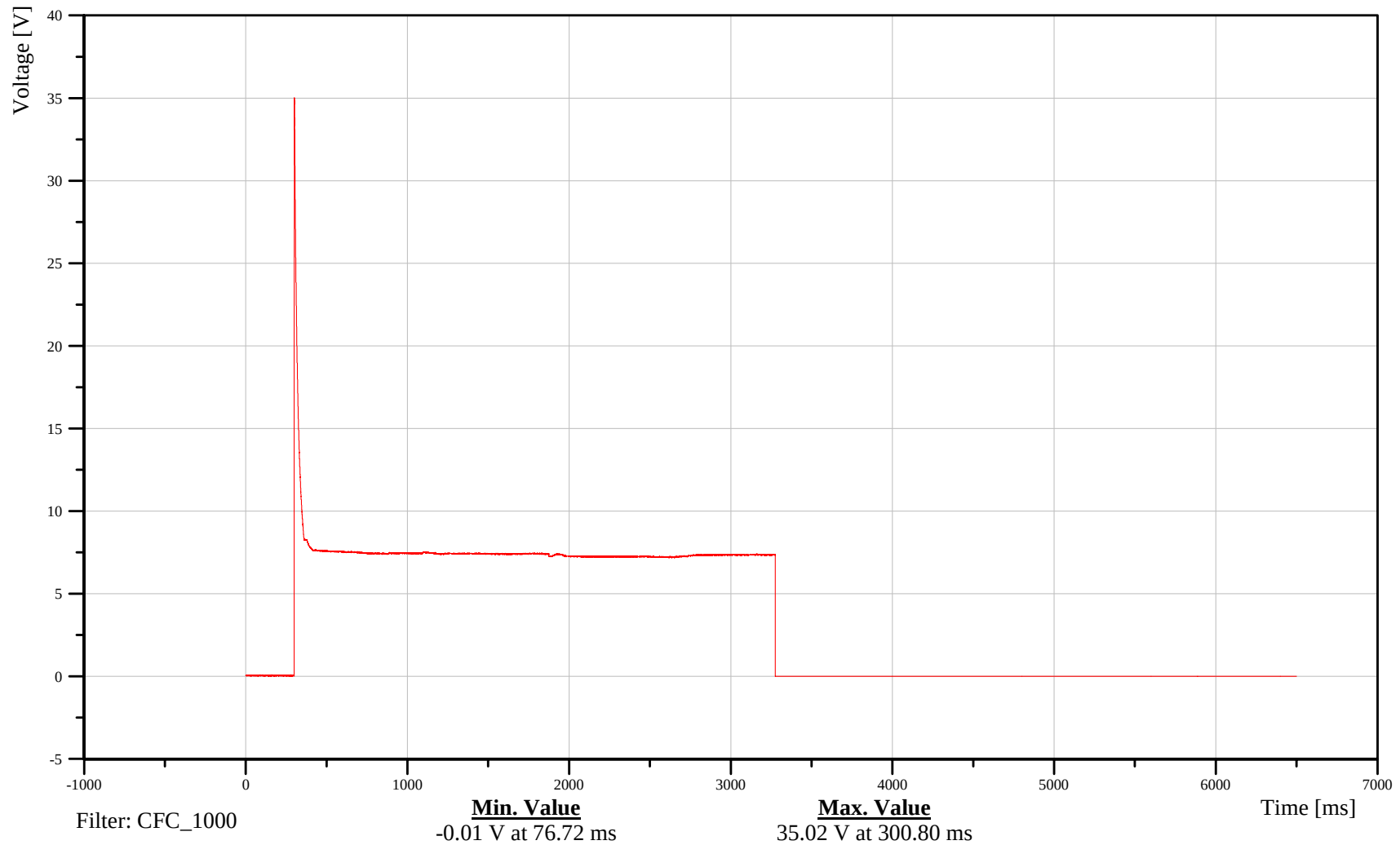
Date: 09/30/2009
Time: 17:02

Customer: VRTC

14BCKLIN0000VO0A

TRC Inc. Test Lab: CTF

Test Number: 090930



B-210

090930



FMVSS 208 Rollover 2007 Ford Expedition

Driver Inner Buckle Current

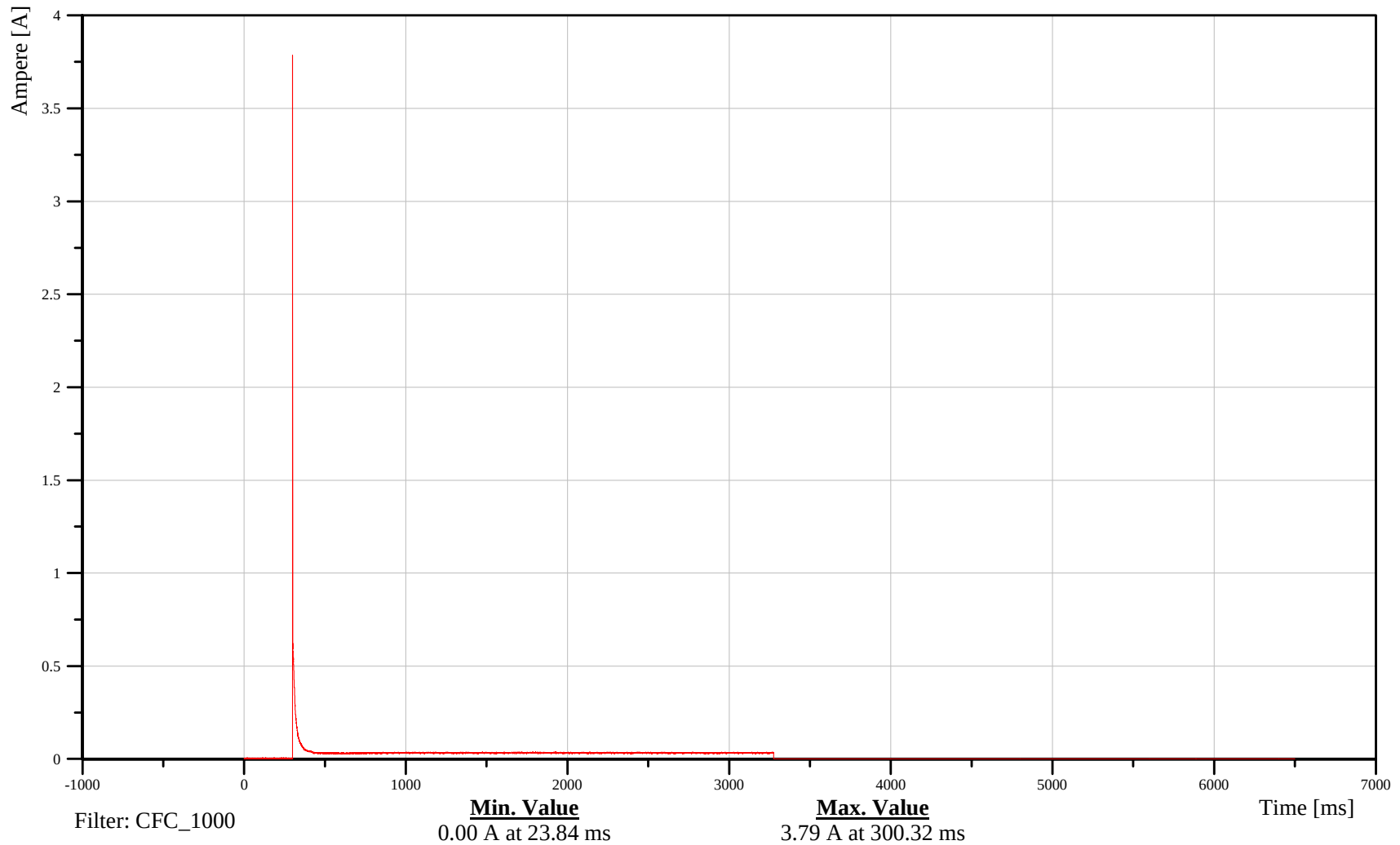
Date: 09/30/2009
Time: 17:02

Customer: VRTC

11BCKLIN0000CU0A

TRC Inc. Test Lab: CTF

Test Number: 090930



B-211

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

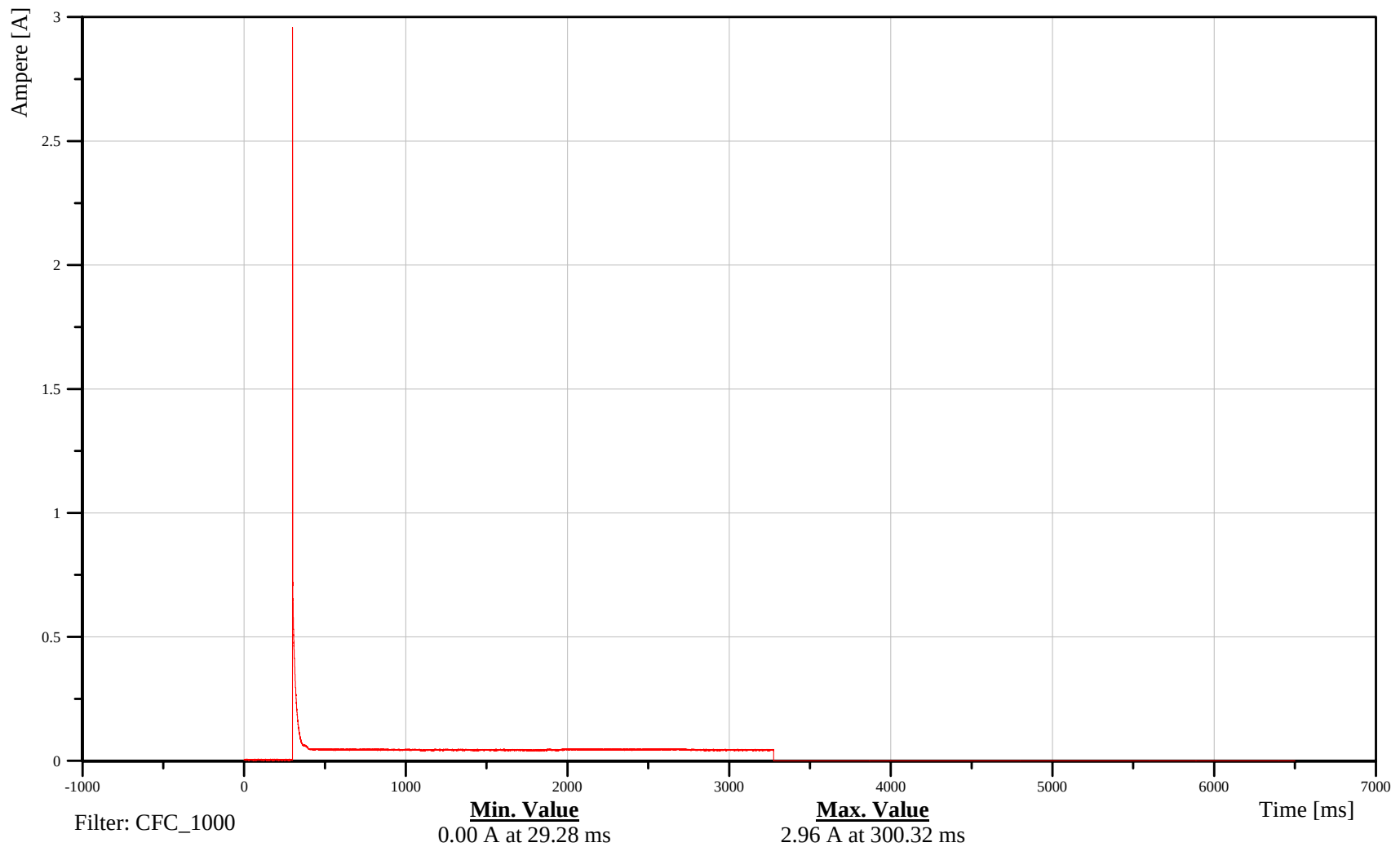
Rear Passenger Inner Buckle Current

Customer: VRTC

14BCKLIN0000CU0A

TRC Inc. Test Lab: CTF

Test Number: 090930



B-212

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

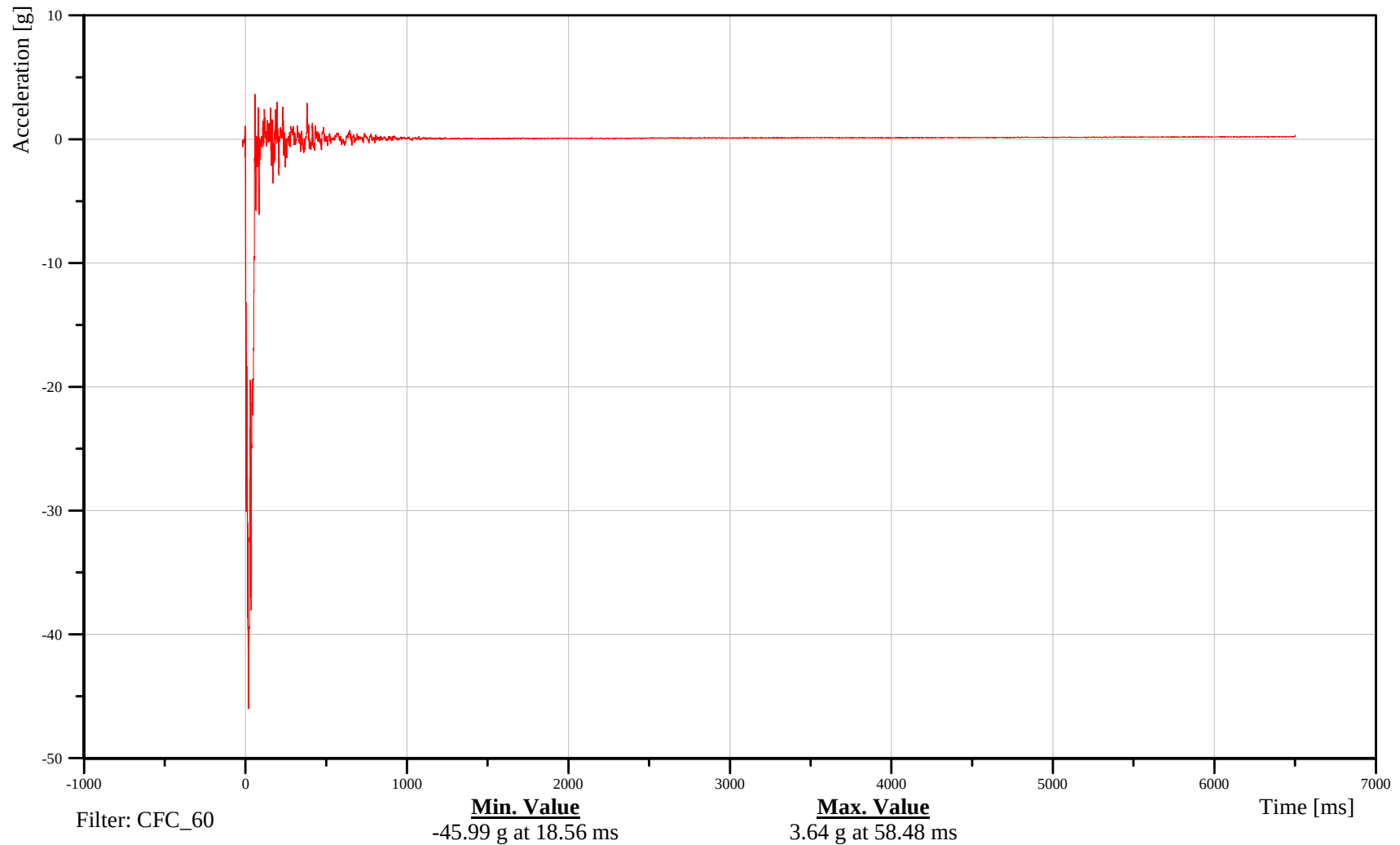
Cart X-Axis Acceleration

Customer: VRTC

M2VEHC000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-213

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

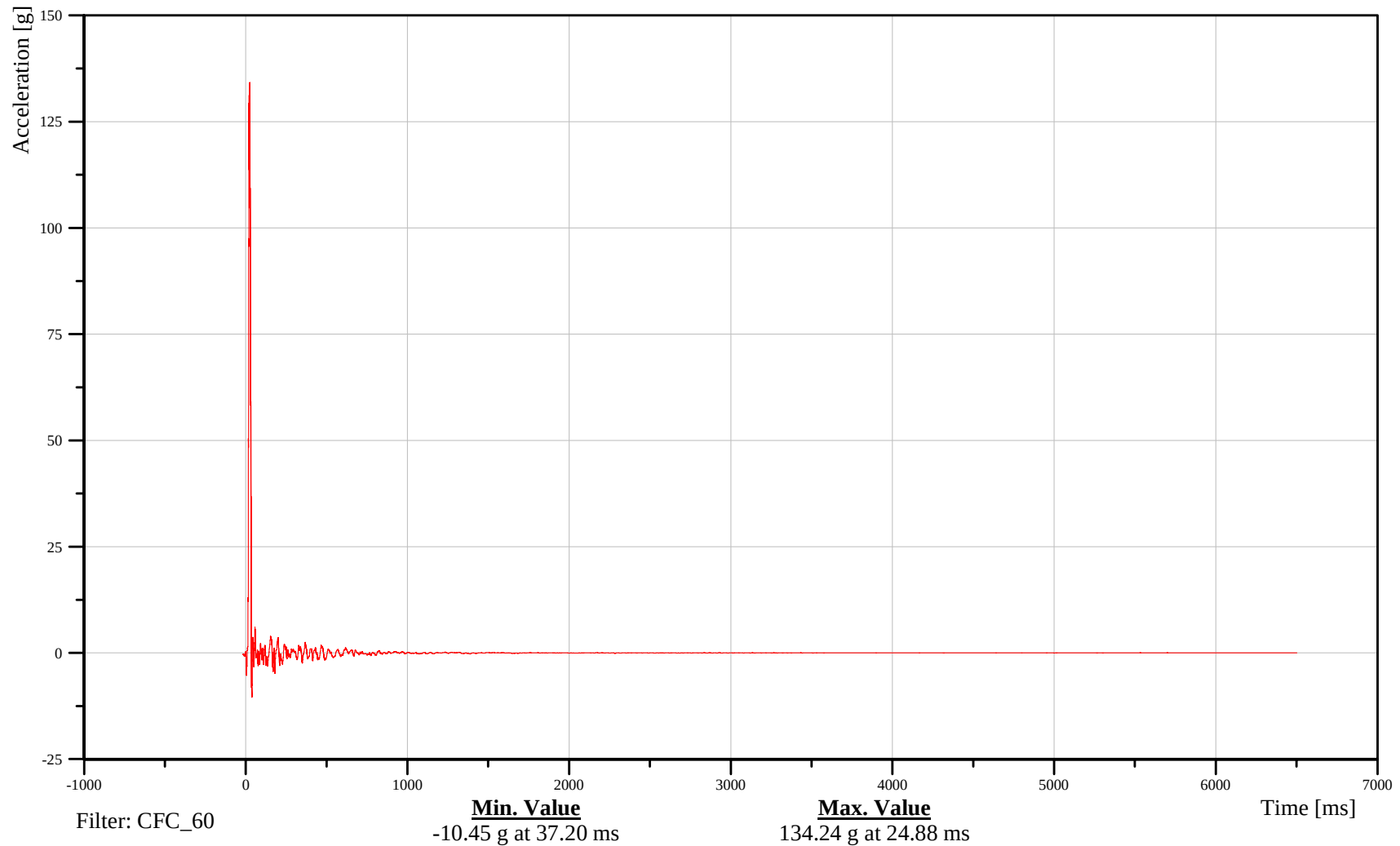
Cart Y-Axis Acceleration

Customer: VRTC

M2VEHC000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-214

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

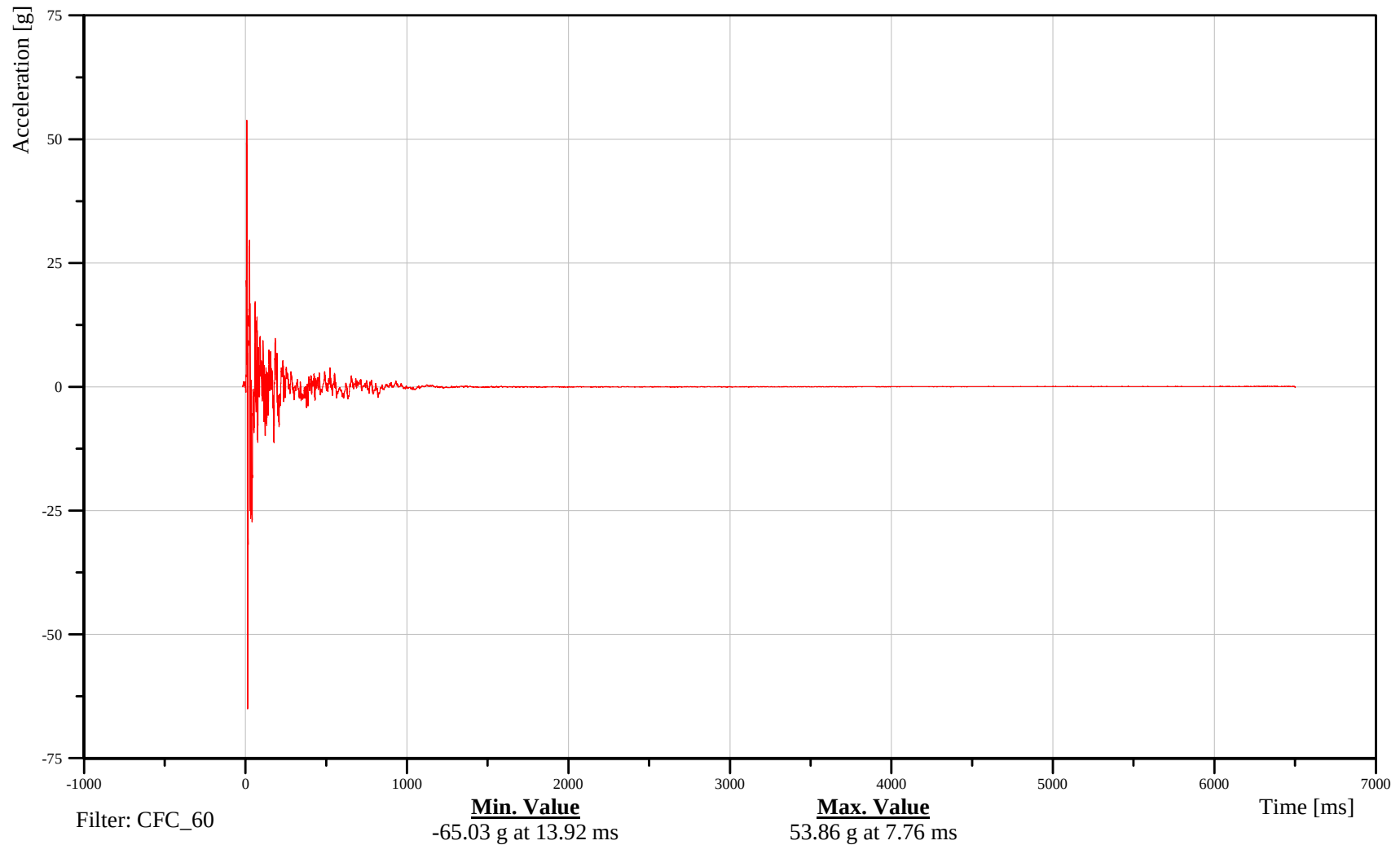
Cart Z-Axis Acceleration

Customer: VRTC

M2VEHC000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-215

090930



FMVSS 208 Rollover 2007 Ford Expedition

Date: 09/30/2009

Time: 17:02

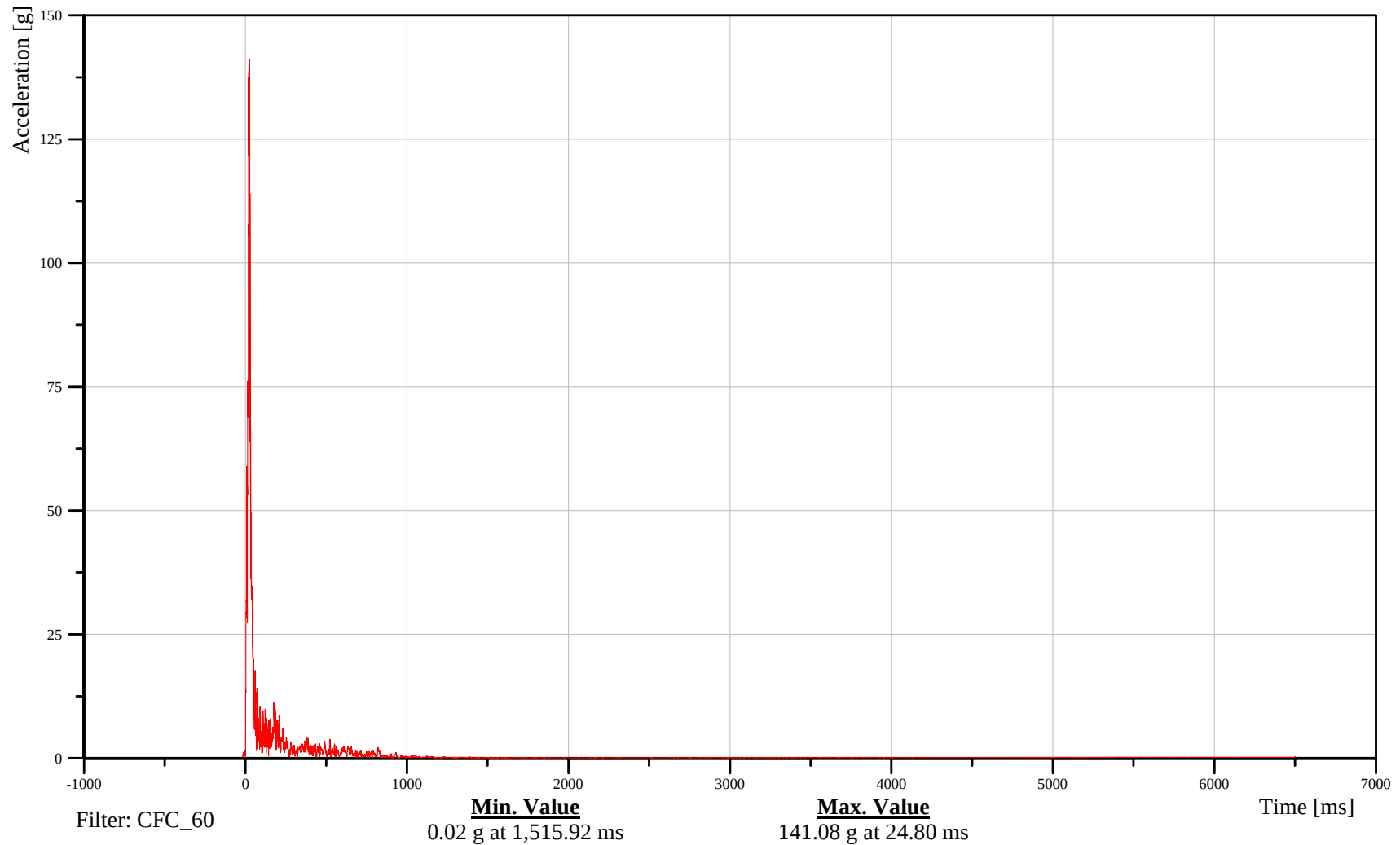
Cart Resultant Acceleration

Customer: VRTC

M2VEHC000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 090930



B-216

090930

APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Calibration Test Results

Pre-Test

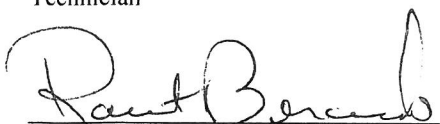
Driver Dummy S/N: 043

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 043
Calibration No. 05

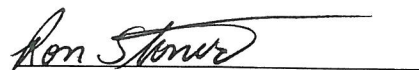
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	882	Yes
B	Shoulder Pivot Height	505.5 - 520.7	518	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	136	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	89	Yes
F	Thigh Clearance	139.7 - 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	332	Yes
J	Elbow Rest Height	190.5 - 210.8	203	Yes
K	Buttock Knee Length	579.1 - 604.5	601	Yes
L	Popliteal Height	429.3 - 454.7	435	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	223	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	858	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



Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 043 Certification No. 5-2

Test Date: 11/24/2008

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	231.0 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Raul Bermeas

Approved

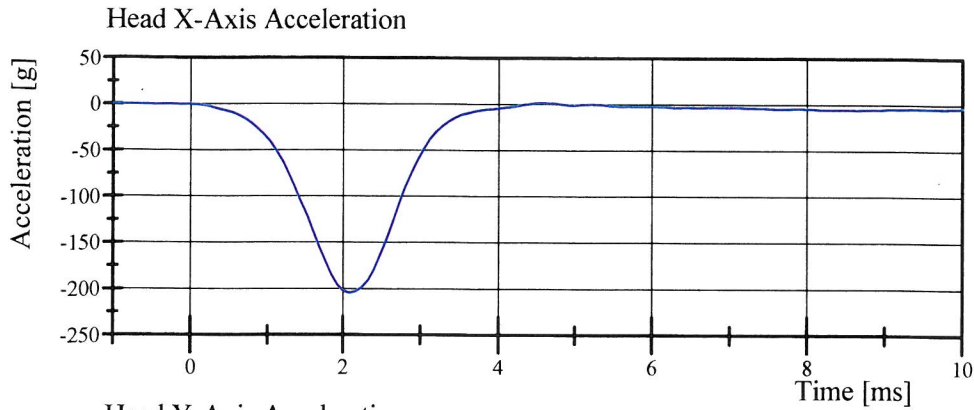
Ron Storer

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 043 Certification No. 5-2

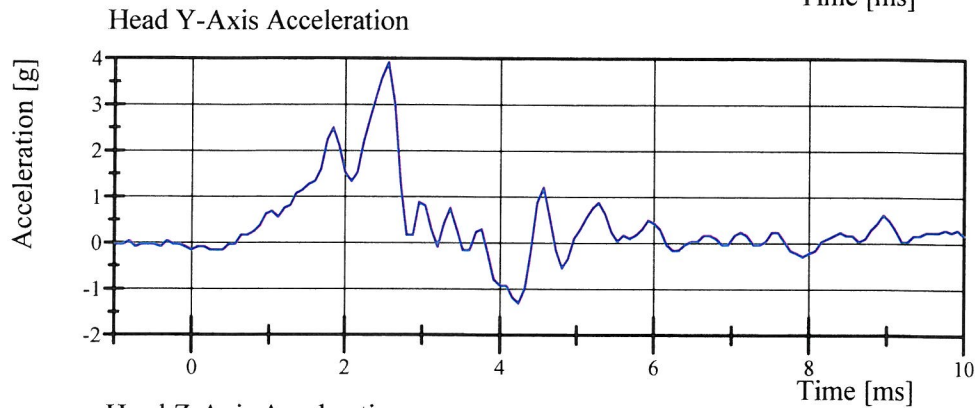
Test Date: 11/24/2008



Filter Class: CFC_1000

Max: 1.8 g at 4.6 ms

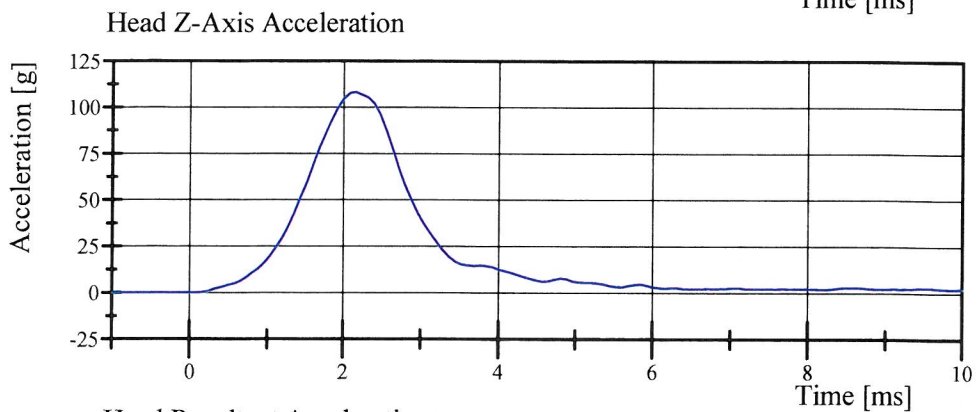
Min: -204.3 g at 2.1 ms



Filter Class: CFC_1000

Max: 3.9 g at 2.6 ms

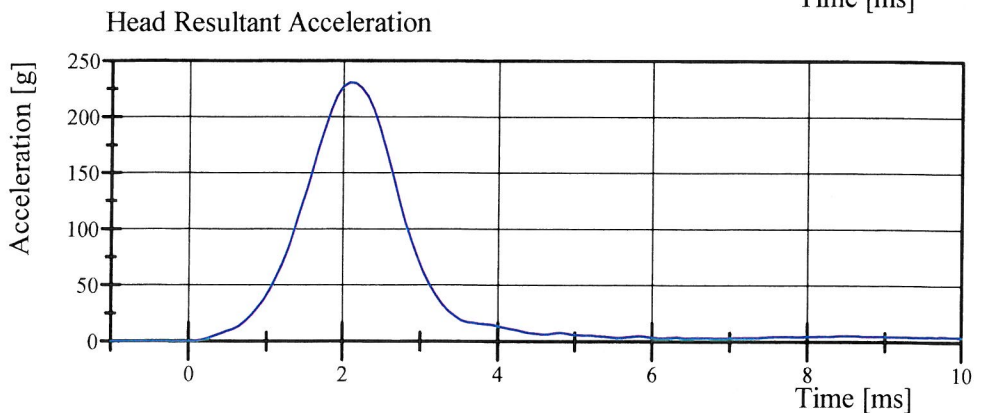
Min: -1.3 g at 4.2 ms



Filter Class: CFC_1000

Max: 108.3 g at 2.2 ms

Min: -0.1 g at -1.0 ms



Filter Class: CFC_1000

Max: 231.0 g at 2.1 ms

Min: 0.0 g at -0.6 ms

Transportation Research Center Inc.

Neck Flexion

HIH 50th Serial No. 043 Certification No. 5-3

Test Date: 11/24/2008

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.906 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	41.3 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.96 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.90 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-14.22 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-14.22 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-71.6 °	Yes
Time of Peak	57 - 64 ms	60.8 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	121.7 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	94.5 N·m	Yes
Time of Peak	47 - 58 ms	53.3 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	99.5 ms	Yes

Test meets specifications.

Comments:

Technician

Paul Barcels

Approved

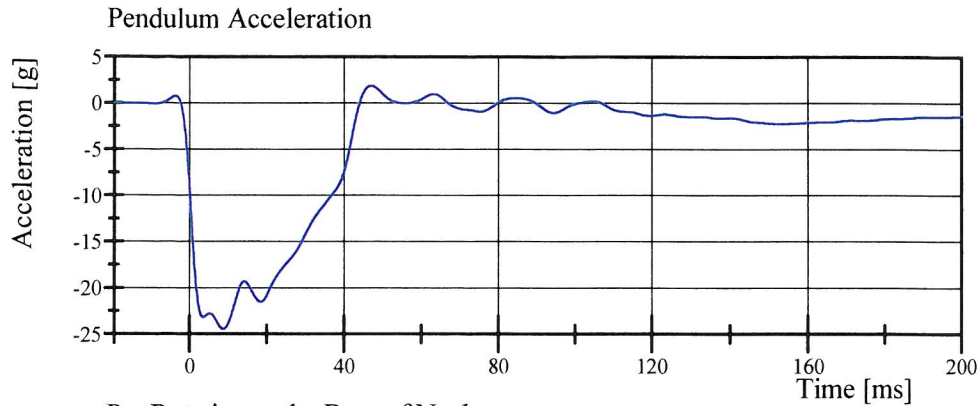
Ron Stoner

Transportation Research Center Inc.

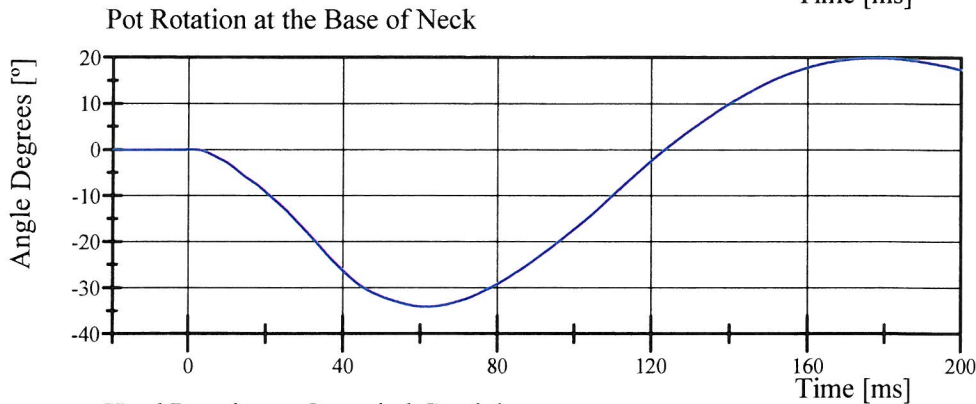
Neck Flexion

HIII 50th Serial No. 043 Certification No. 5-3

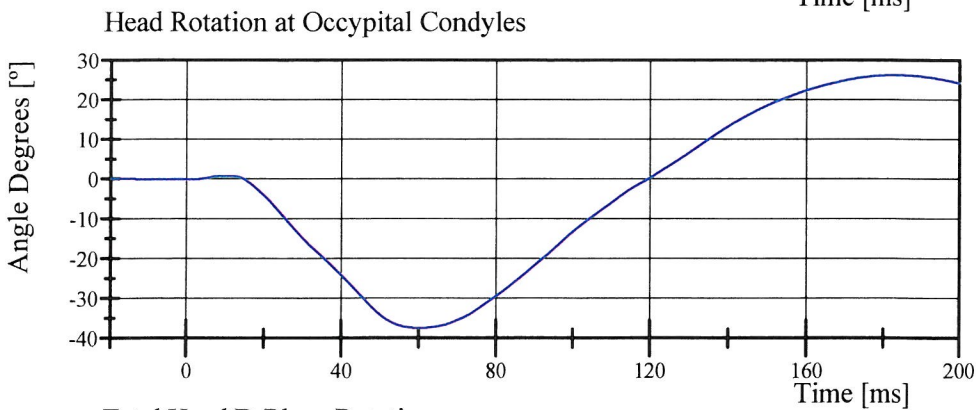
Test Date: 11/24/2008



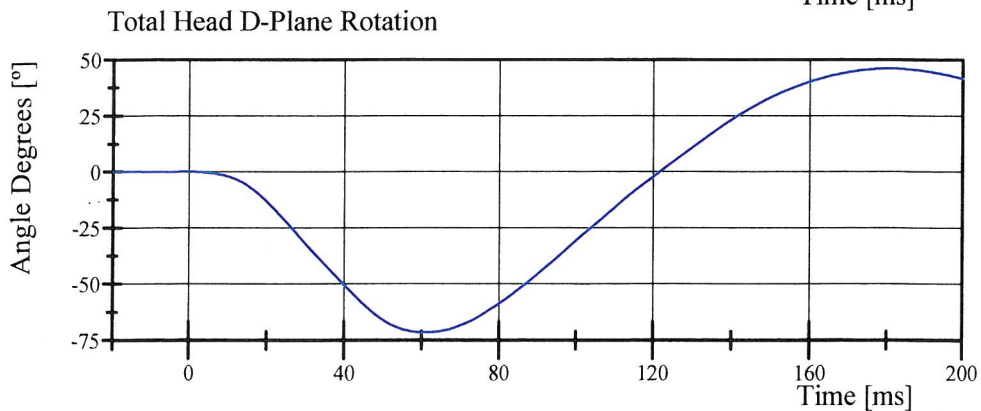
Filter Class: CFC_60
Max: 1.9 g at 46.9 ms
Min: -24.4 g at 8.9 ms



Filter Class: CFC_60
Max: 20.0 ° at 178.1 ms
Min: -34.1 ° at 61.4 ms



Filter Class: CFC_60
Max: 26.2 ° at 183.0 ms
Min: -37.5 ° at 60.2 ms



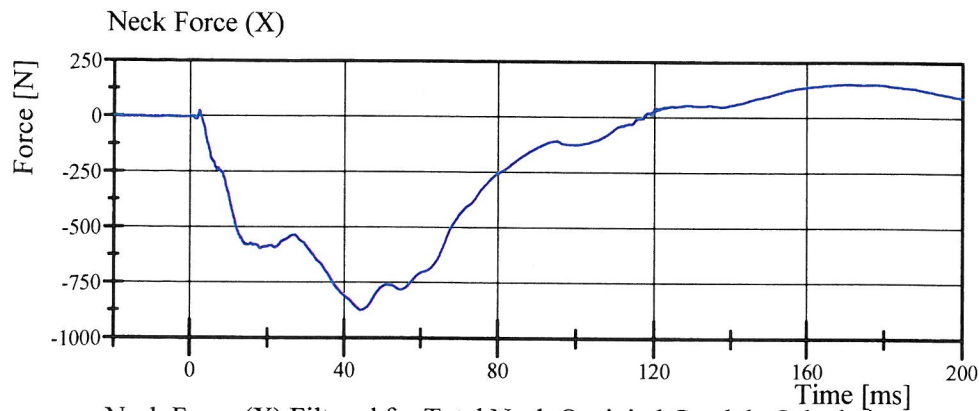
Filter Class: CFC_60
Max: 46.1 ° at 180.9 ms
Min: -71.6 ° at 60.8 ms

Transportation Research Center Inc.

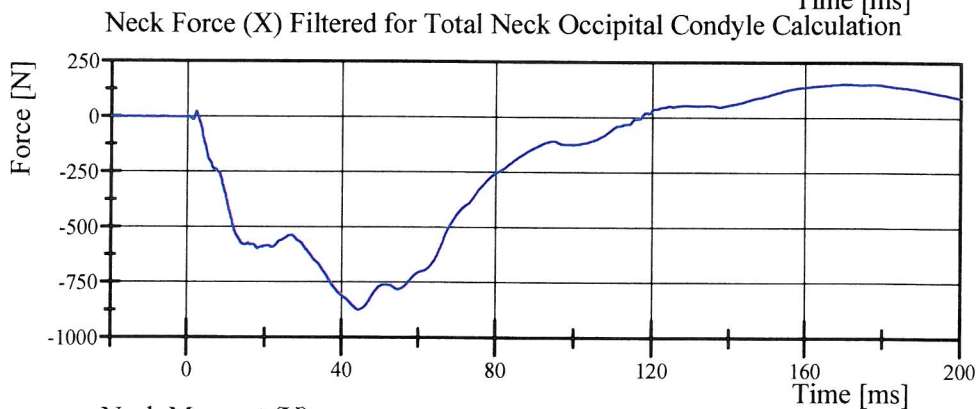
Neck Flexion

HIII 50th Serial No. 043 Certification No. 5-3

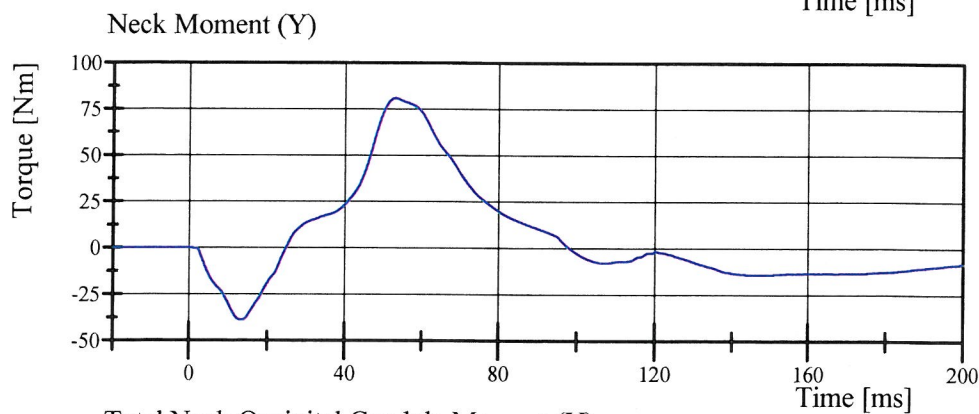
Test Date: 11/24/2008



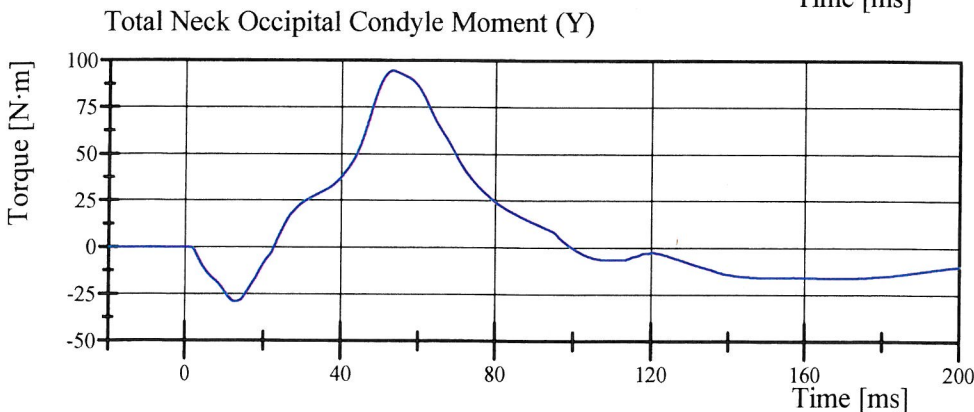
Filter Class: CFC_1000
Max: 154.9 N at 169.5 ms
Min: -874.3 N at 44.4 ms



Filter Class: CFC_600
Max: 154.5 N at 169.6 ms
Min: -873.7 N at 44.4 ms



Filter Class: CFC_600
Max: 80.9 Nm at 53.1 ms
Min: -38.8 Nm at 13.5 ms



Filter Class: CFC_600
Max: 94.5 N·m at 53.3 ms
Min: -29.1 N·m at 12.9 ms

Transportation Research Center Inc.

Neck Extension

HIH 50th Serial No. 043 Certification No. 5-1

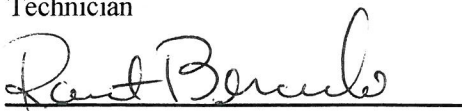
Test Date: 11/24/2008

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.984 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.1 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.67 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	18.77 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.72 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.72 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	96.1 °	Yes
Time of Peak	72 - 82 ms	76.8 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	158.7 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-68.5 N·m	Yes
Time of Peak	65 - 79 ms	70.5 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	143.9 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



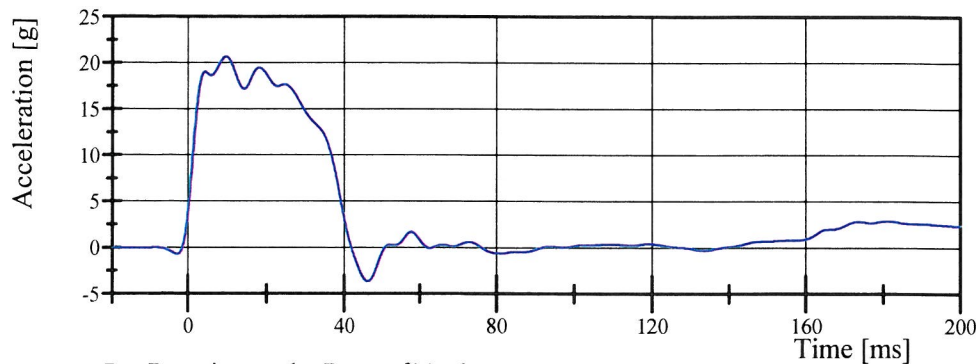
Transportation Research Center Inc.

Neck Extension

HIH 50th Serial No. 043 Certification No. 5-1

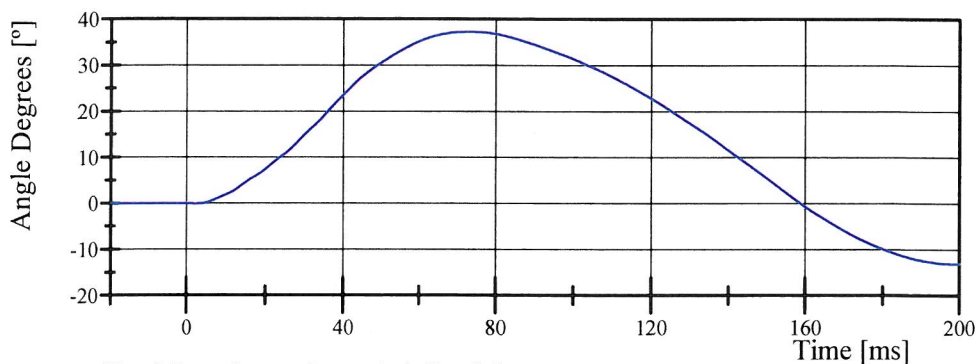
Test Date: 11/24/2008

Pendulum Acceleration



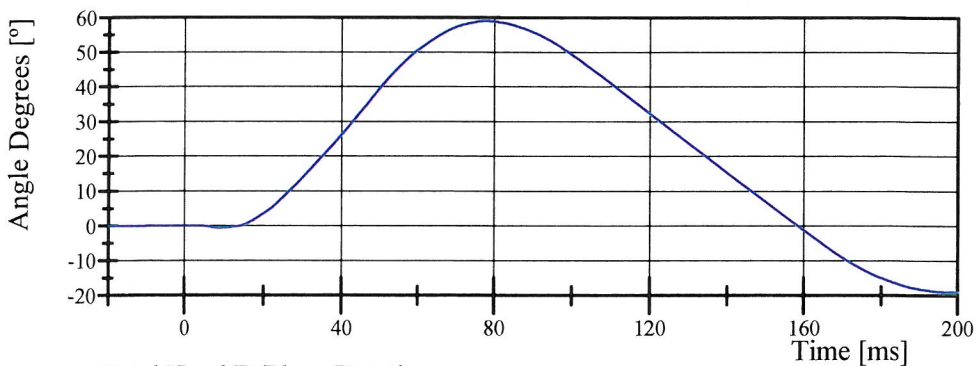
Filter Class: CFC_60
Max: 20.7 g at 9.7 ms
Min: -3.7 g at 46.2 ms

Pot Rotation at the Base of Neck



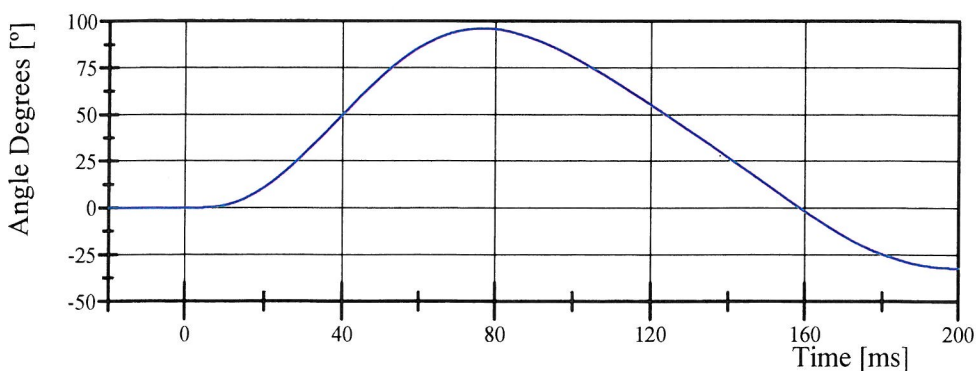
Filter Class: CFC_60
Max: 37.3 ° at 73.1 ms
Min: -13.1 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 59.0 ° at 77.8 ms
Min: -19.0 ° at 199.7 ms

Total Head D-Plane Rotation



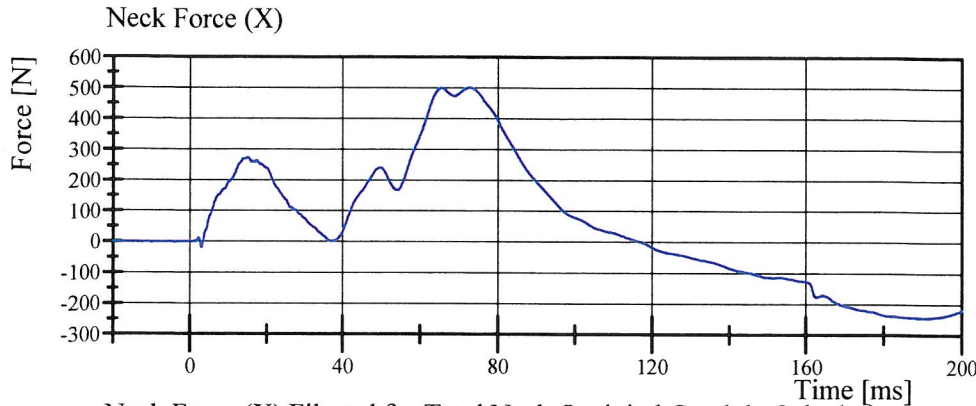
Filter Class: CFC_60
Max: 96.1 ° at 76.8 ms
Min: -32.1 ° at 200.0 ms

Transportation Research Center Inc.

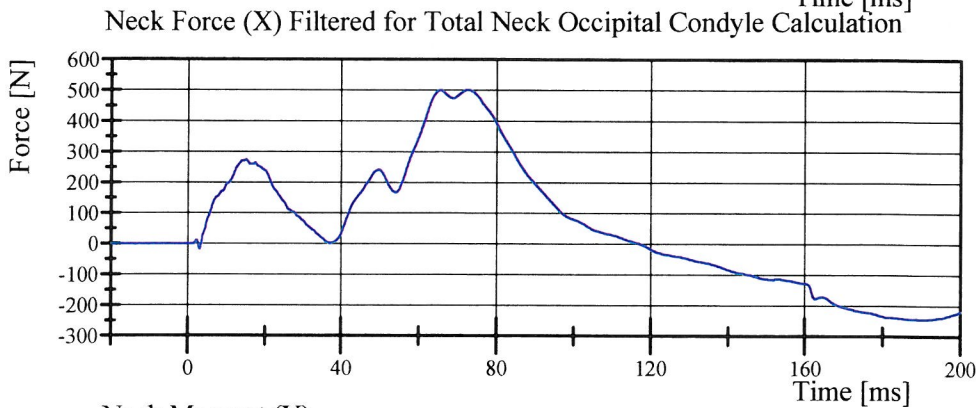
Neck Extension

HIII 50th Serial No. 043 Certification No. 5-1

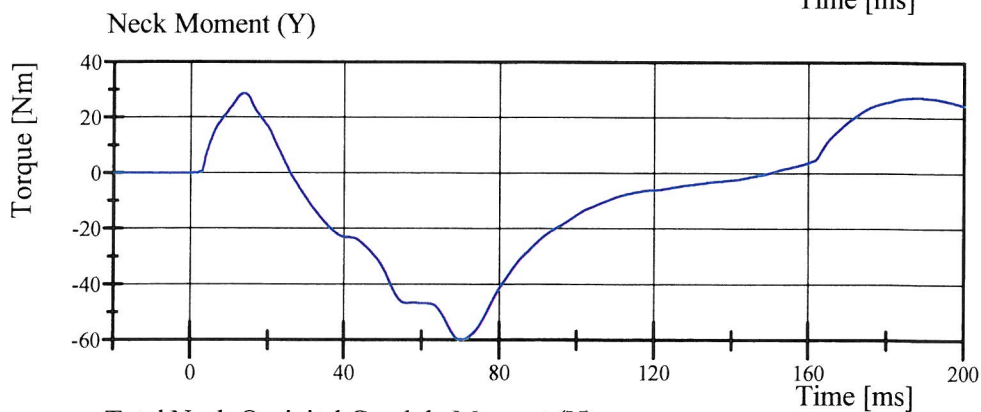
Test Date: 11/24/2008



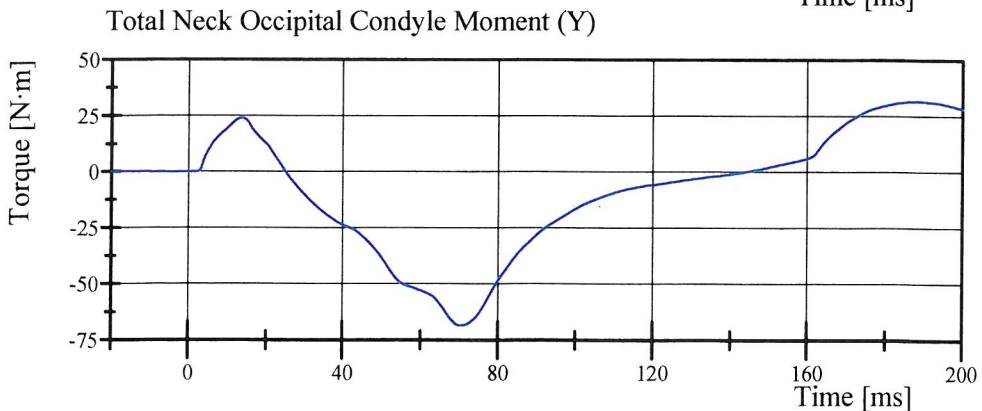
Filter Class: CFC_1000
Max: 502.3 N at 72.5 ms
Min: -244.7 N at 191.4 ms



Filter Class: CFC_600
Max: 502.2 N at 72.6 ms
Min: -244.2 N at 191.4 ms



Filter Class: CFC_600
Max: 28.7 Nm at 13.8 ms
Min: -59.9 Nm at 70.2 ms



Filter Class: CFC_600
Max: 31.6 N·m at 189.0 ms
Min: -68.5 N·m at 70.5 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 043 Certification No. 5-1

Test Date: 11/24/2008

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	19 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.685 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,777.6 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-69.38 mm	Yes
Internal Hysteresis	65 - 85 %	74.7 %	Yes

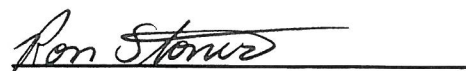
Test meets specifications.

Comments:

Technician



Approved

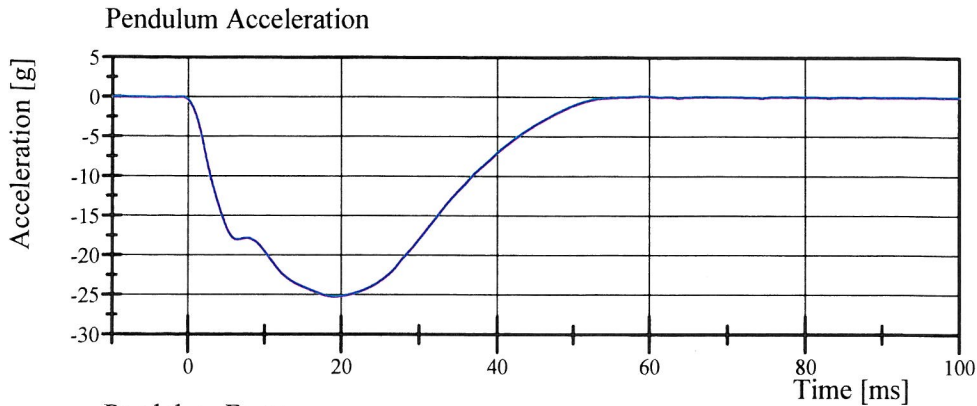


Transportation Research Center Inc.

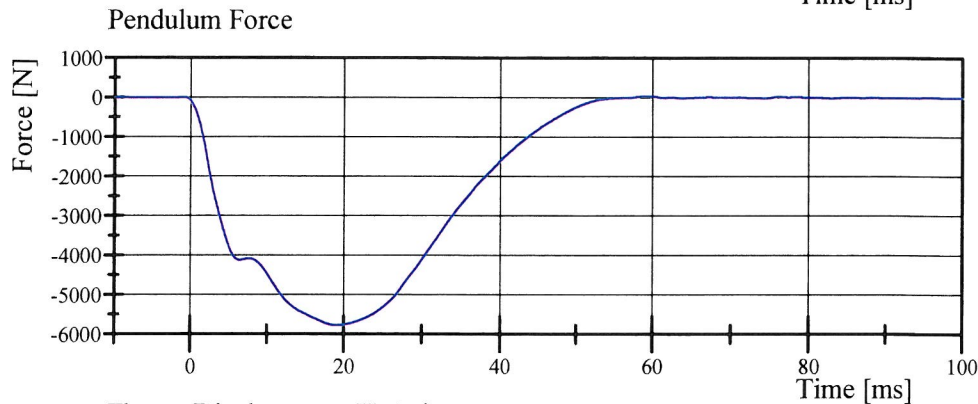
Front Thorax

HIII 50th Serial No. 043 Certification No. 5-1

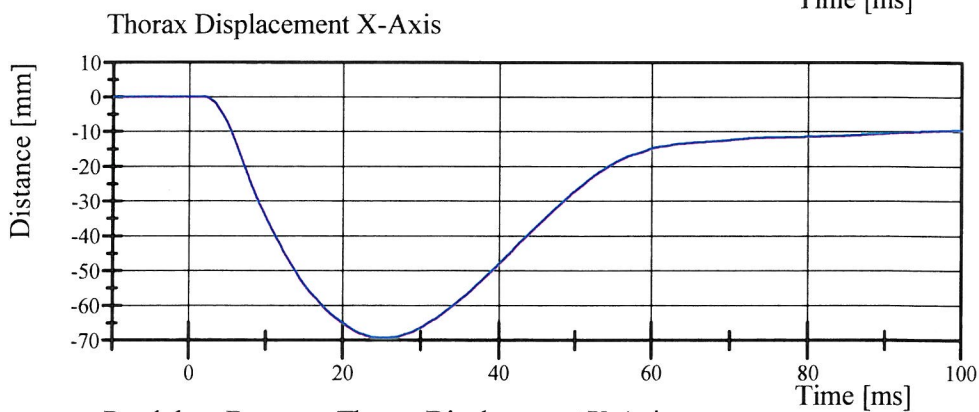
Test Date: 11/24/2008



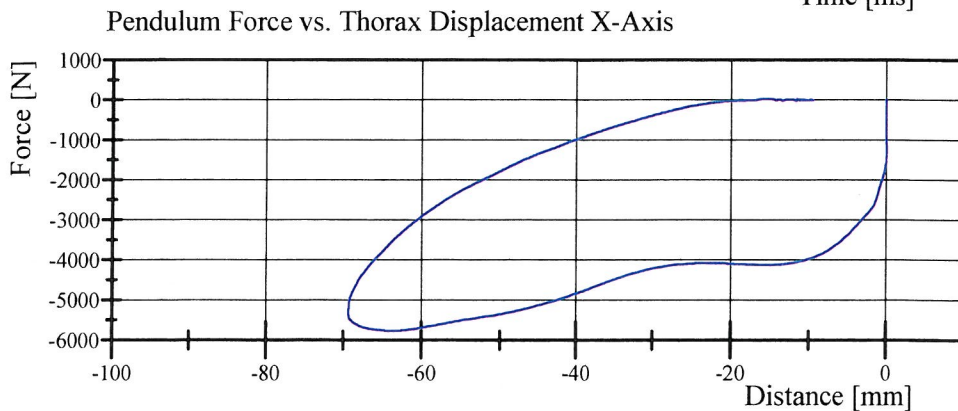
Filter Class: CFC_180
Max: 0.1 g at 59.4 ms
Min: -25.2 g at 19.1 ms



Filter Class: CFC_180
Max: 28.2 N at 59.4 ms
Min: -5,777.6 N at 19.1 ms



Filter Class: CFC_600
Max: 0.1 mm at 1.9 ms
Min: -69.4 mm at 25.0 ms



Filter Class: CFC_180
Max: 28.2 N at -15.4 mm
Min: -5,777.6 N at -63.7 mm

Transportation Research Center Inc

Hybrid III Hip Range of Motion

Serial Number: 043L

Date: 11/24/2008

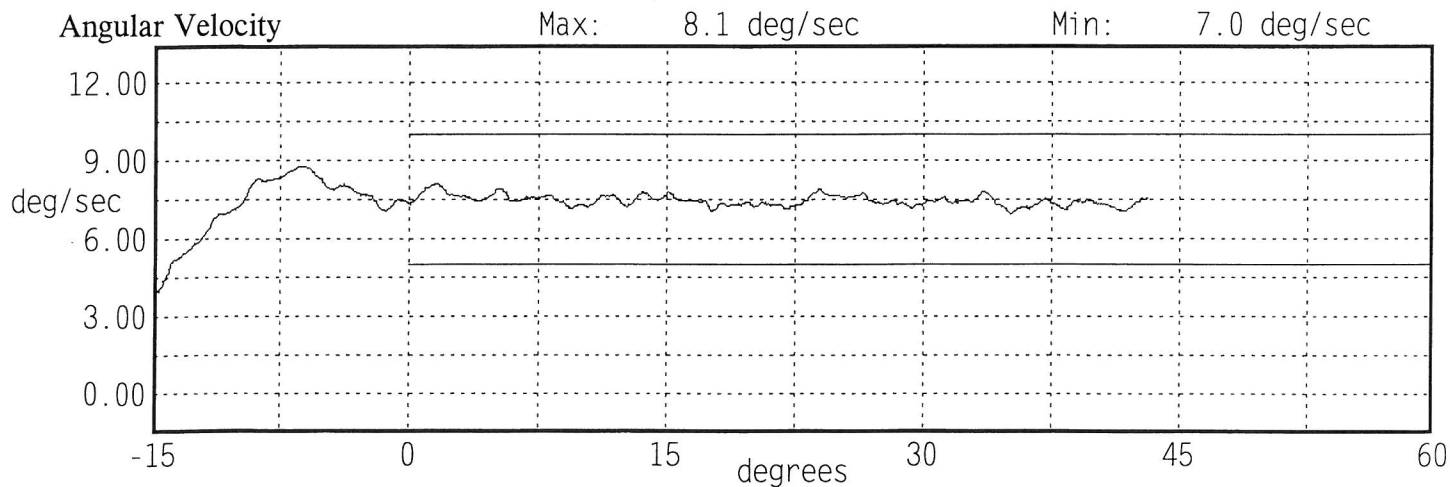
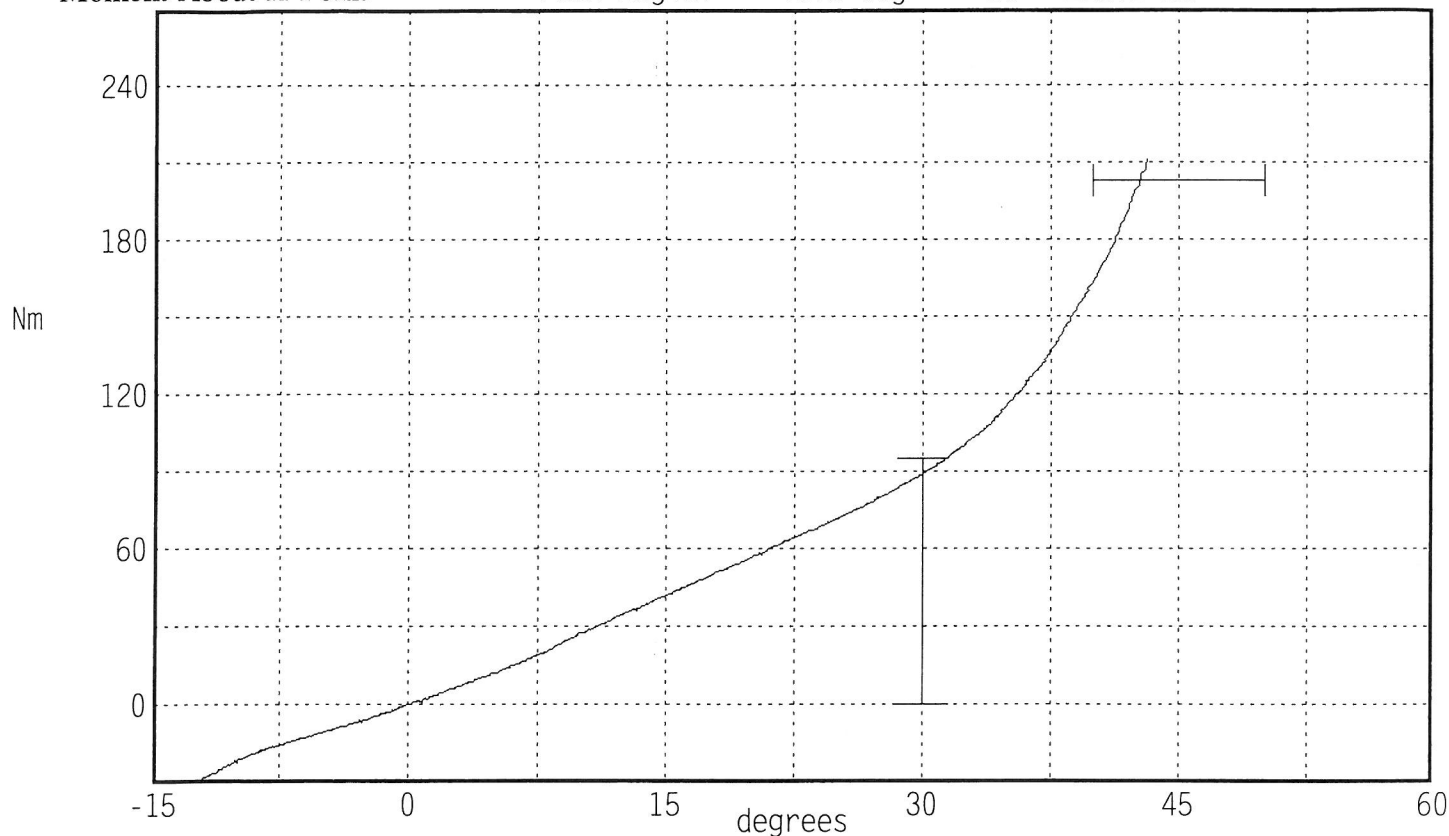
Test Number: 043C05

Time: 09:38

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.2 °C Pass
Humidity	10 - 70	20 % Pass
Moment at 30 deg	<= 94.9	89.6 Nm Pass
Angle at 203 Nm	40.0 - 50.0	42.7 deg Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec Pass

Moment About H-Point
Peak Moment: 211.2 Nm at 43.2 deg
Peak Angle: 43.2 deg at 211.2 Nm



Transportation Research Center Inc

Hybrid III Hip Range of Motion

Serial Number: 043R

Date: 11/24/2008

Test Number: 043C05

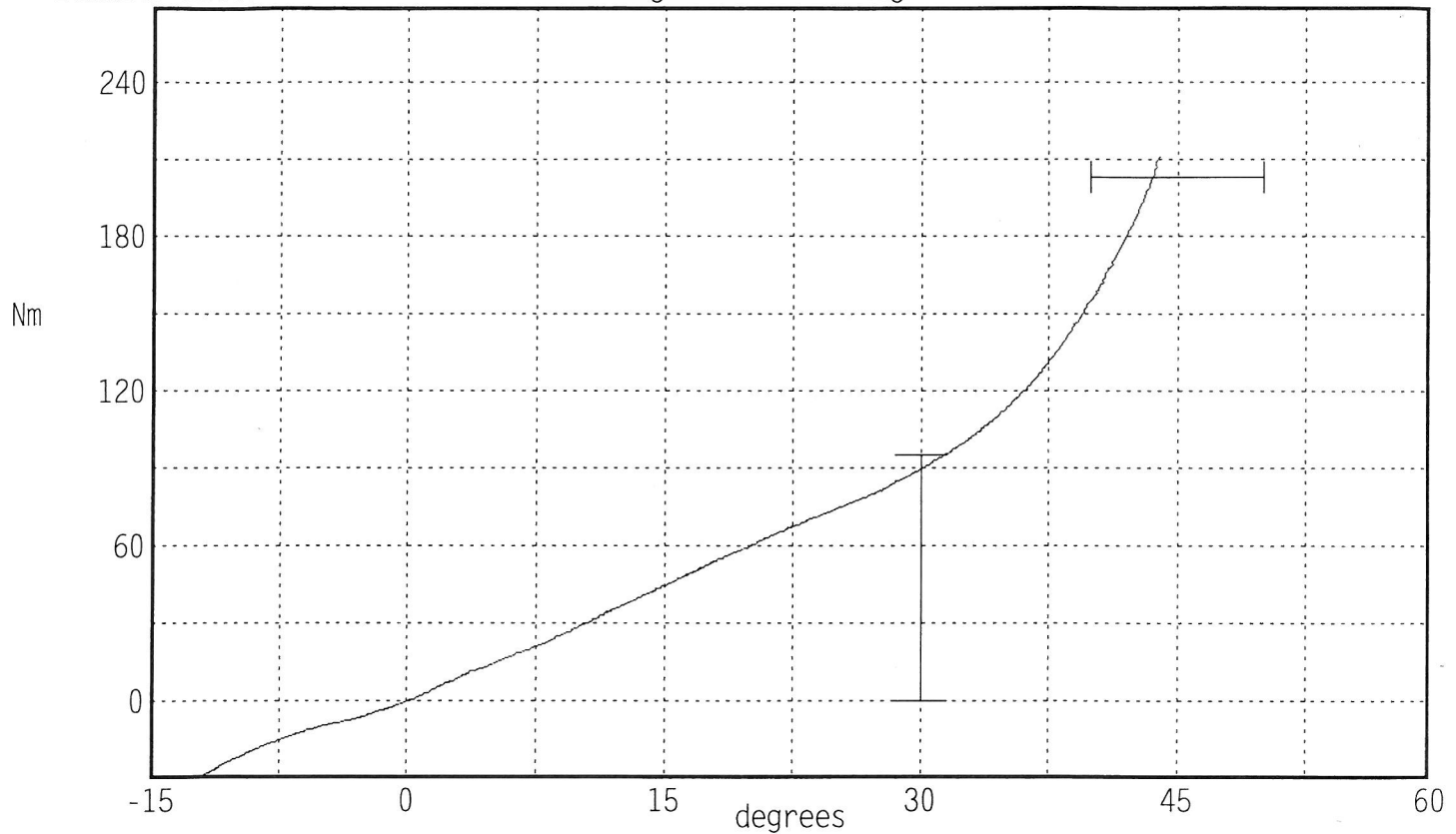
Time: 09:49

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.2 °C Pass
Humidity	10 - 70	21 % Pass
Moment at 30 deg	<= 94.9	89.6 Nm Pass
Angle at 203 Nm	40.0 - 50.0	43.6 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

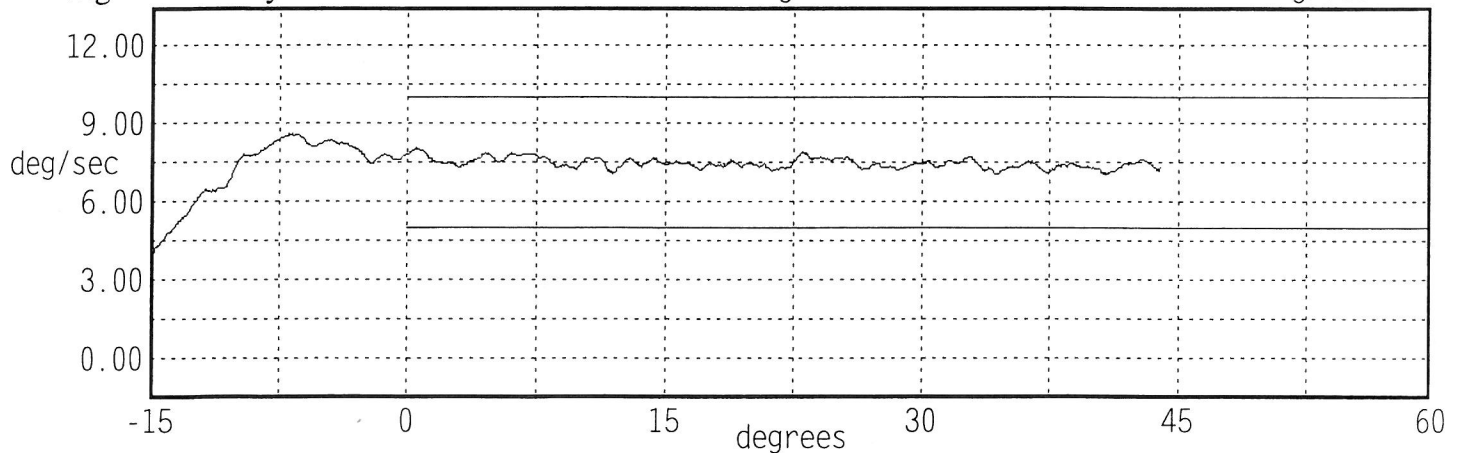
Moment About H-Point

Peak Moment: 211.0 Nm at 43.9 deg
Peak Angle: 43.9 deg at 211.0 Nm



Angular Velocity

Max: 8.0 deg/sec Min: 7.0 deg/sec



Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 043 Certification No. 5-2
Test Date: 11/24/2008

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.116 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,107.96 N	Yes

Test meets specifications.

Comments:

Technician

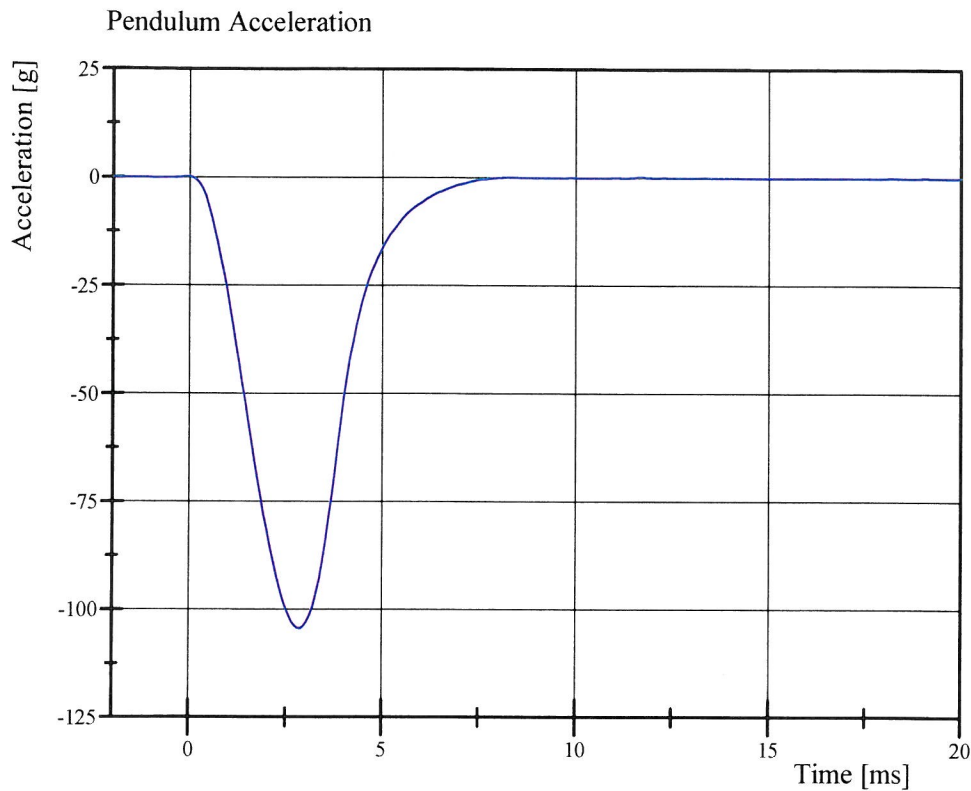
Raef Berube

Approved

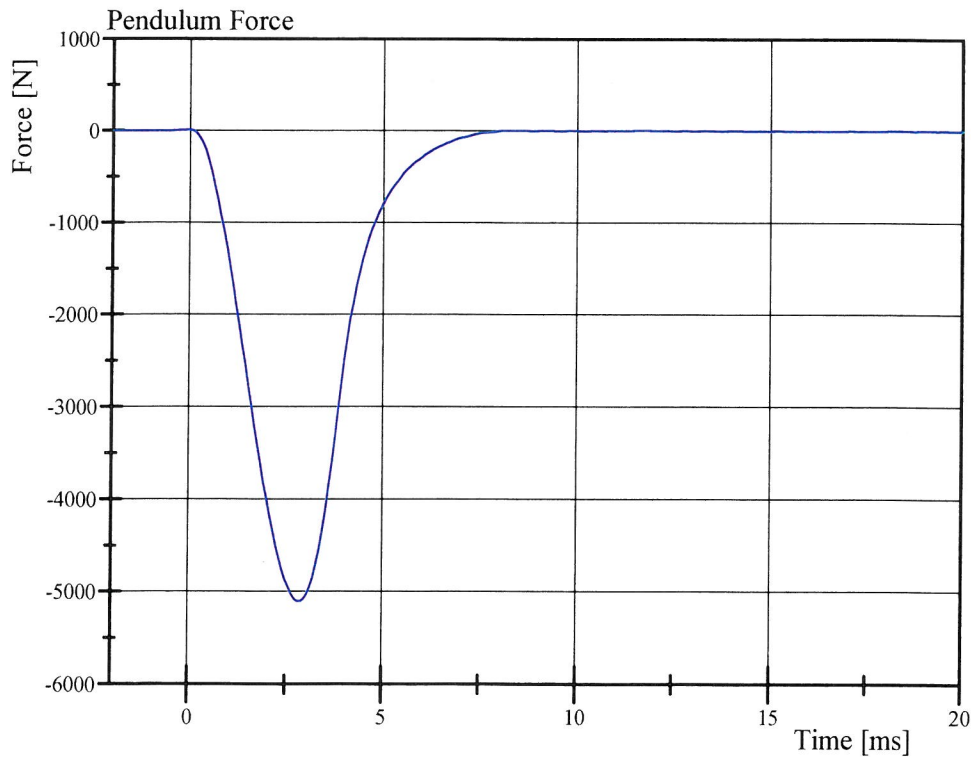
Ron Stover

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 043 Certification No. 5-2
Test Date: 11/24/2008



Filter Class: CFC_600
Max: 0.2 g at -0.1 ms
Min: -104.4 g at 2.9 ms



Filter Class: CFC_600
Max: 10.0 N at -0.1 ms
Min: -5,108.0 N at 2.9 ms

Transportation Research Center Inc.

Right Knee Femur Response Test

HIII 50th Serial No. 043 Certification No. 5-2

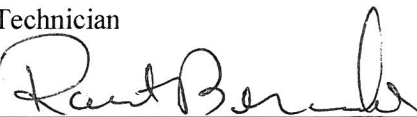
Test Date: 11/24/2008

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.118 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,003.03 N	Yes

Test meets specifications.

Comments:

Technician

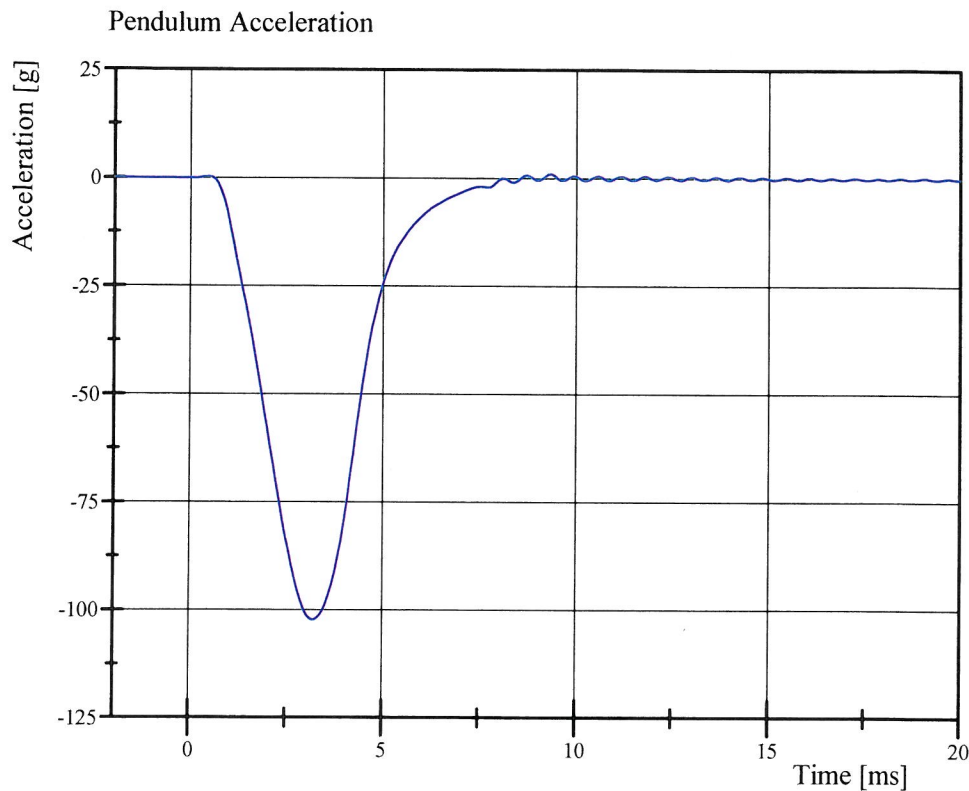


Approved

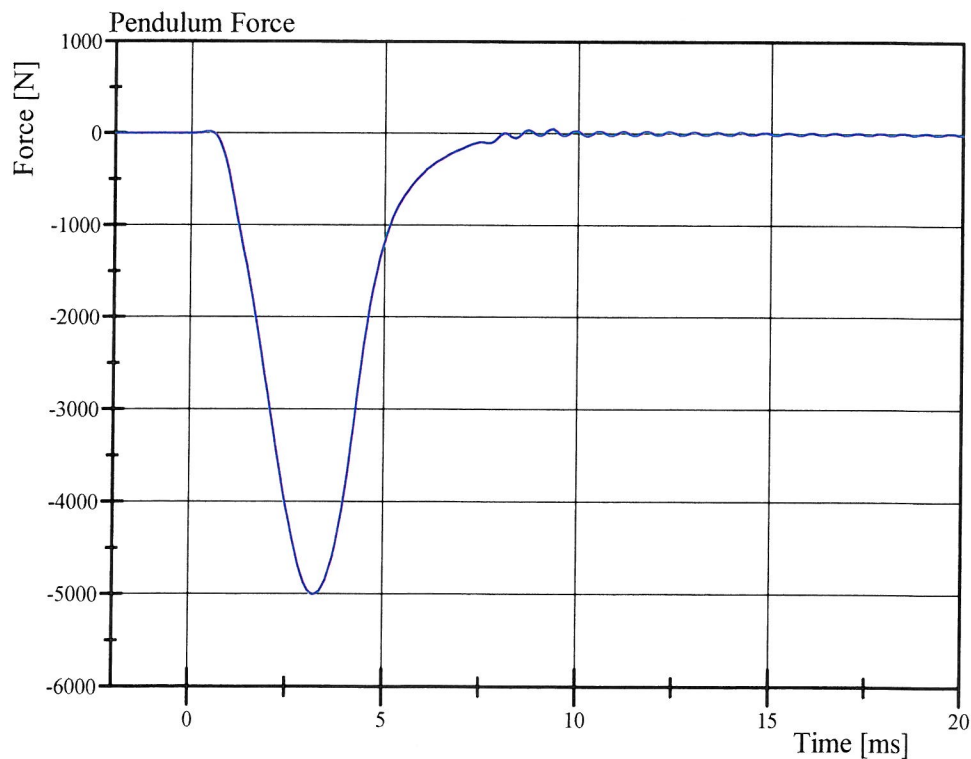


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 043 Certification No. 5-2
Test Date: 11/24/2008



Filter Class: CFC_600
Max: 1.0 g at 9.4 ms
Min: -102.2 g at 3.2 ms



Filter Class: CFC_600
Max: 48.1 N at 9.4 ms
Min: -5,003.0 N at 3.2 ms

Partial Injury Calibration Test Results

Post-Test

Driver Dummy S/N: 043

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 043 Certification No. 6-3

Test Date: 10/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.907 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	41.1 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.76 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.27 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.51 g	Yes
Pendulum Acceleration > 30ms	$\geq$ (-29.0) g	-15.51 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-68.5 °	Yes
Time of Peak	57 - 64 ms	60.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	122.1 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	95.3 N·m	Yes
Time of Peak	47 - 58 ms	53.3 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	100.2 ms	Yes

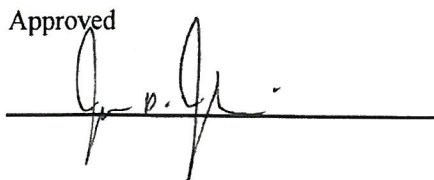
Test meets specifications.

Comments:

Technician



Approved



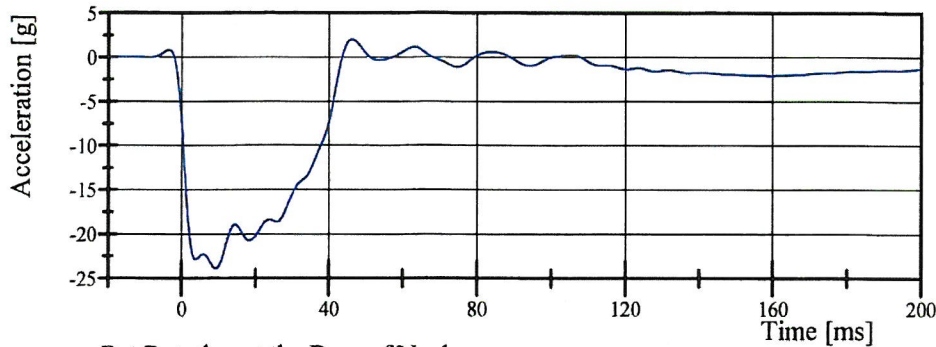
Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 043 Certification No. 6-3

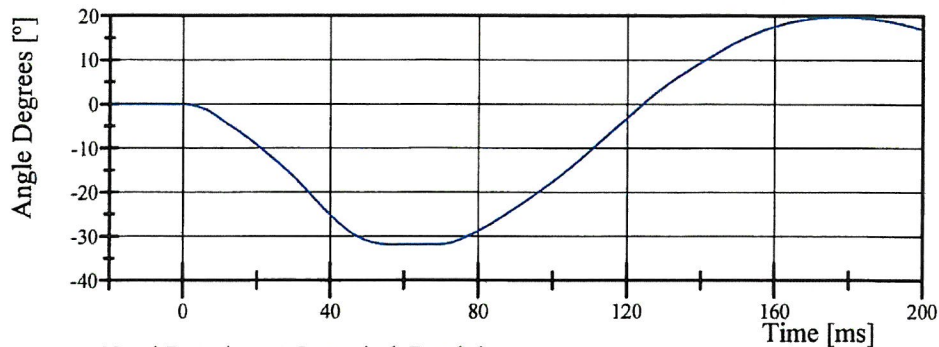
Test Date: 10/2/2009

Pendulum Acceleration



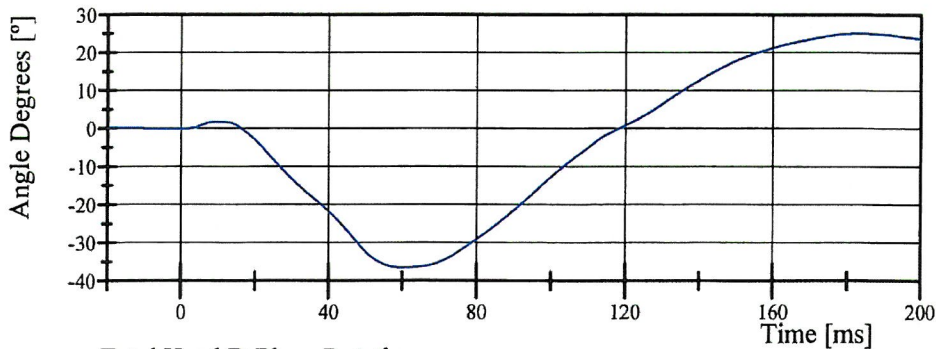
Filter Class: CFC_60
Max: 2.0 g at 46.2 ms
Min: -23.9 g at 9.4 ms

Pot Rotation at the Base of Neck



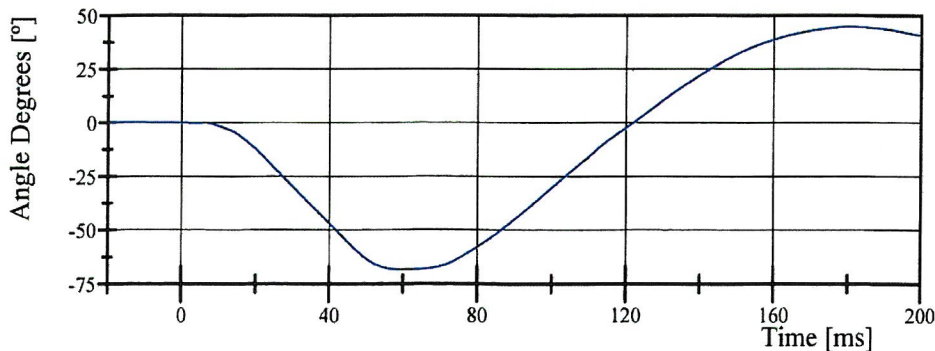
Filter Class: CFC_60
Max: 19.7 ° at 178.2 ms
Min: -31.9 ° at 61.4 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 25.0 ° at 183.5 ms
Min: -36.6 ° at 60.3 ms

Total Head D-Plane Rotation



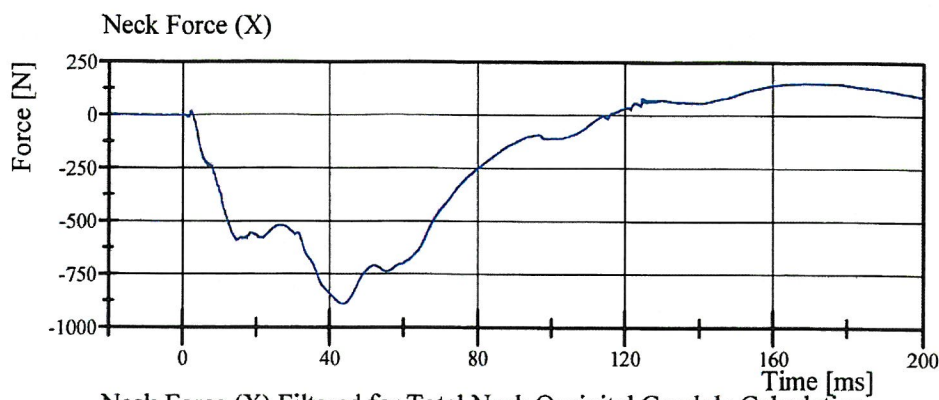
Filter Class: CFC_60
Max: 44.7 ° at 180.6 ms
Min: -68.5 ° at 60.4 ms

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 043 Certification No. 6-3

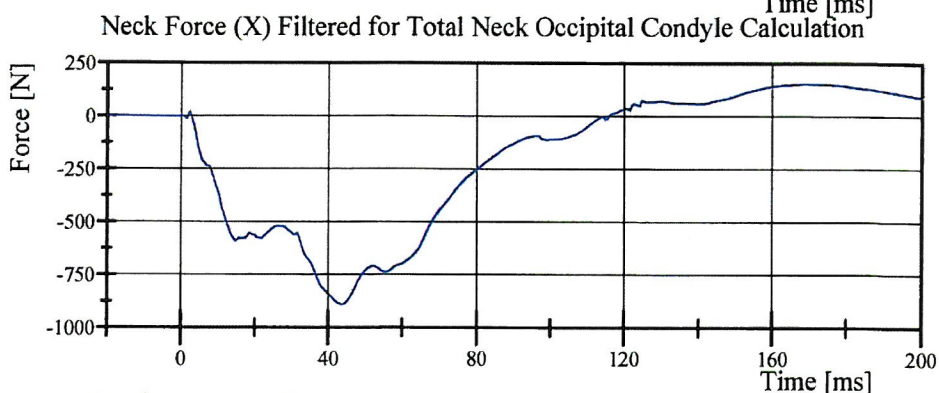
Test Date: 10/2/2009



Filter Class: CFC_1000

Max: 154.7 N at 168.7 ms

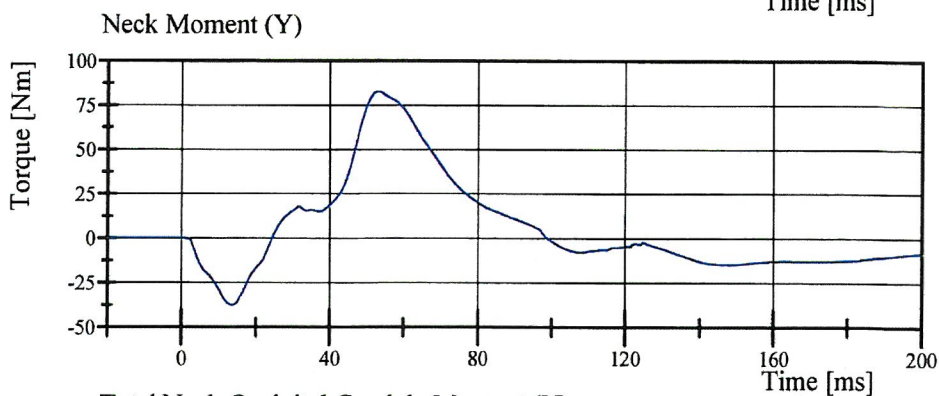
Min: -891.0 N at 43.7 ms



Filter Class: CFC_600

Max: 154.0 N at 168.7 ms

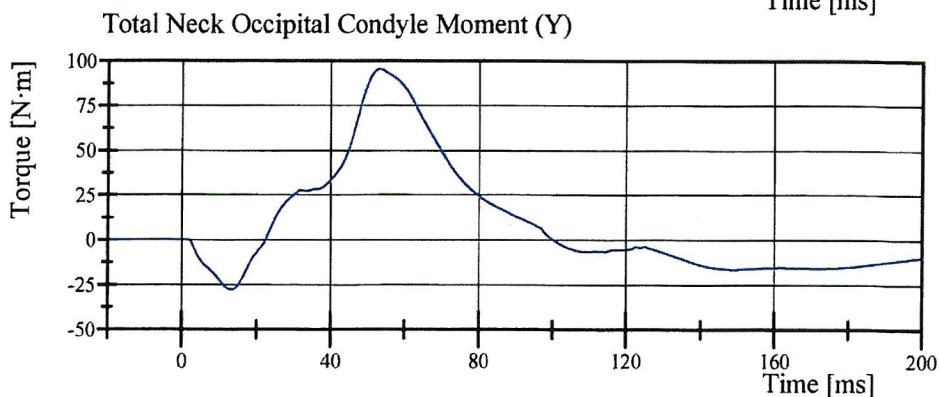
Min: -890.4 N at 43.8 ms



Filter Class: CFC_600

Max: 82.7 Nm at 53.2 ms

Min: -37.6 Nm at 13.6 ms



Filter Class: CFC_600

Max: 95.3 N·m at 53.3 ms

Min: -27.8 N·m at 13.2 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 043 Certification No. 6-5

Test Date: 10/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.974 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	42.1 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.58 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.04 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.14 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.14 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	96.5 °	Yes
Time of Peak	72 - 82 ms	78.0 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	159.7 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-65.6 N·m	Yes
Time of Peak	65 - 79 ms	72.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	144.3 ms	Yes

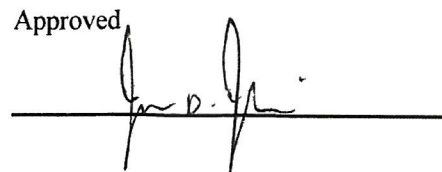
Test meets specifications.

Comments:

Technician



Approved



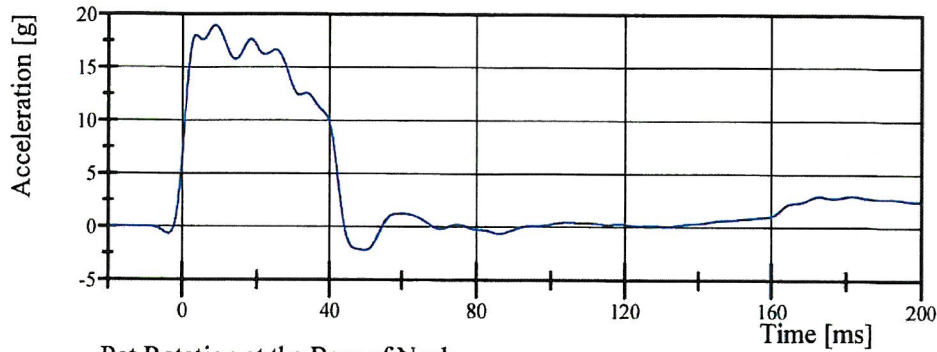
Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 043 Certification No. 6-5

Test Date: 10/2/2009

Pendulum Acceleration

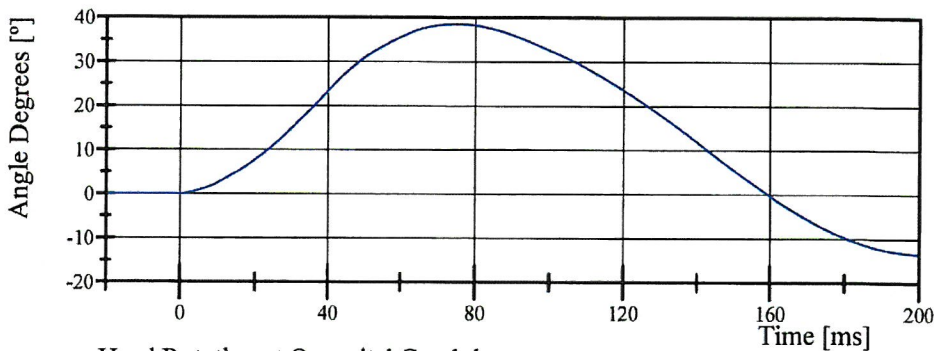


Filter Class: CFC_60

Max: 19.0 g at 8.8 ms

Min: -2.2 g at 49.7 ms

Pot Rotation at the Base of Neck

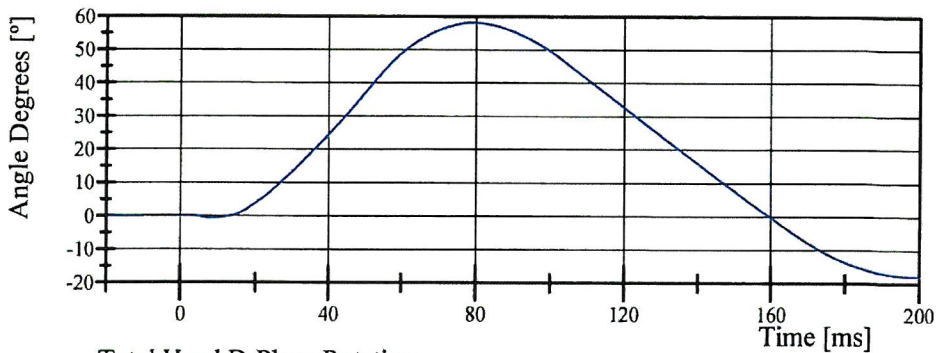


Filter Class: CFC_60

Max: 38.5 ° at 75.0 ms

Min: -13.5 ° at 200.0 ms

Head Rotation at Occypital Condyles

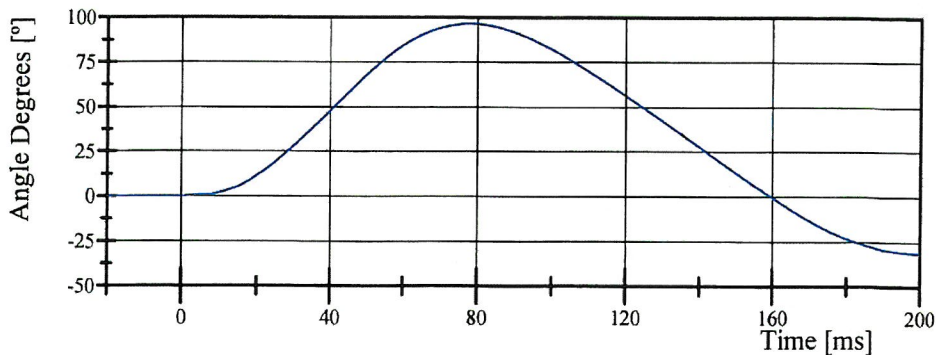


Filter Class: CFC_60

Max: 58.1 ° at 79.0 ms

Min: -18.0 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 96.5 ° at 78.0 ms

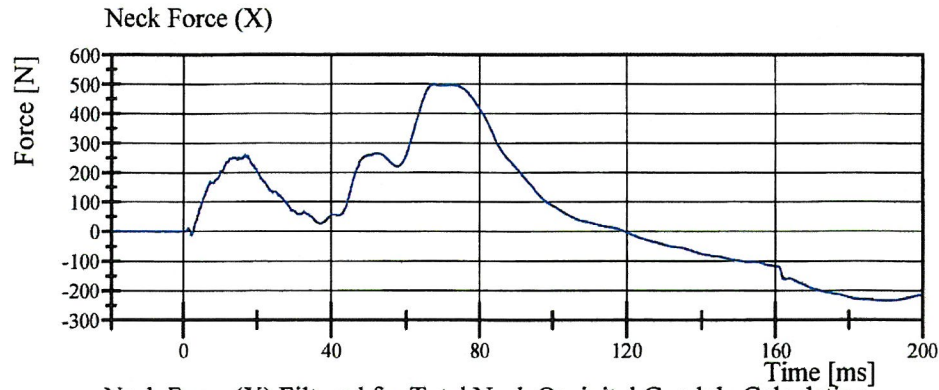
Min: -31.6 ° at 200.0 ms

Transportation Research Center Inc.

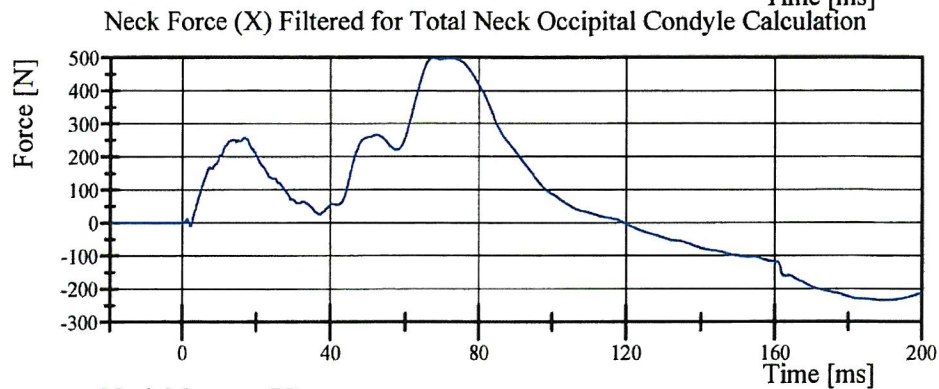
Neck Extension

HIH 50th Serial No. 043 Certification No. 6-5

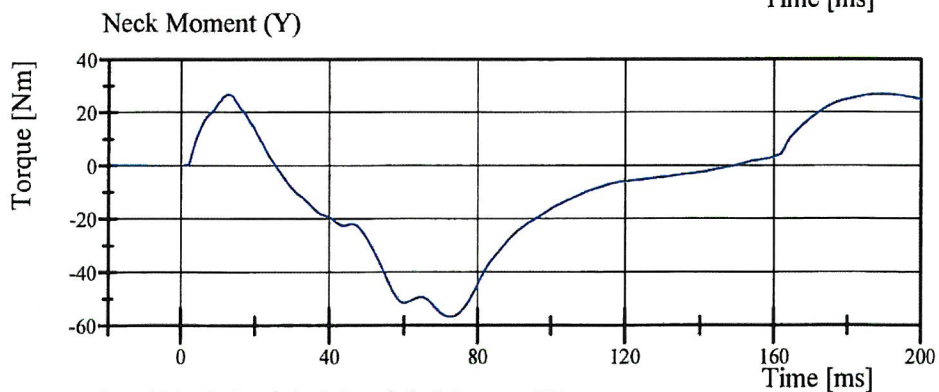
Test Date: 10/2/2009



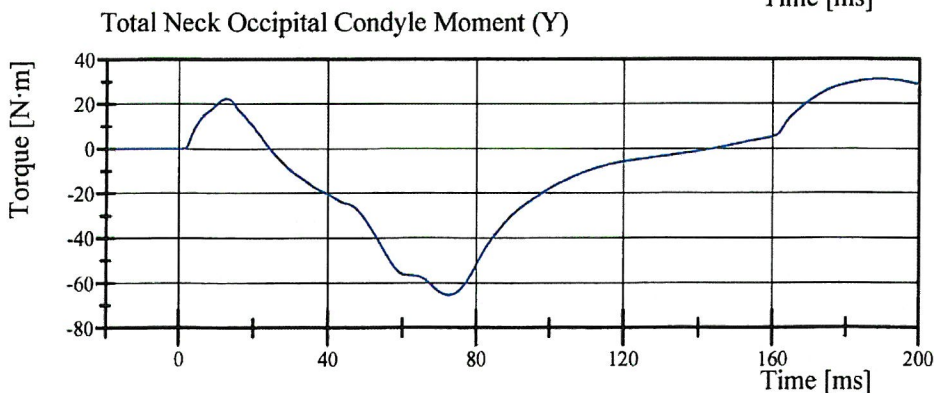
Filter Class: CFC_1000
Max: 500.2 N at 67.6 ms
Min: -235.2 N at 191.1 ms



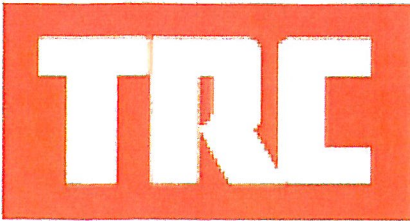
Filter Class: CFC_600
Max: 499.7 N at 67.6 ms
Min: -234.8 N at 191.1 ms



Filter Class: CFC_600
Max: 26.9 Nm at 189.8 ms
Min: -56.8 Nm at 72.6 ms



Filter Class: CFC_600
Max: 31.0 N·m at 189.8 ms
Min: -65.6 N·m at 72.6 ms



TRANSPORTATION RESEARCH CENTER INC.

10820 State Route 347
East Liberty, Ohio 43319-0367
Phone: 937-666-2011 Fax: 937-666-5705
www.trcpg.com

Calibration Report Uni-Directional Calibration

Automated Load Cell Calibration System
Copyright (c) 1987-1997 Robert A. Denton, Inc.

Calibration No.	A5449000	Date	Oct 2, 2009	Due	Oct 2, 2010
Model No.	1794A	Fixture No.	1920	Serial No.	250
Technician	S. Bazzle	Temp (C) / Hum. (%)	21.1 / 51.5		
Customer	VRTC	Last Calibrated	Nov 19, 2008		
Description	Lower Neck	Manufacturer	Denton		
		Excitation (V)	9.701		

Voltage Calibration

<u>Bridge</u>	<u>Capacity</u>	<u>Zero Offset</u>	<u>Nonlinearity</u>	<u>Hysteresis</u>	<u>Output @ Capacity</u>	<u>% Change</u>
FX	13345.0 N	-0.0022 mV/V	0.12 % FS	0.20 % FS	1.8951 mV/V	0.13 % FS
FY	13345.0 N	0.0234 mV/V	0.10 % FS	0.17 % FS	1.8644 mV/V	0.06 % FS
FZ	13345.0 N	0.0801 mV/V	0.31 % FS	0.24 % FS	-0.9031 mV/V	0.35 % FS
MX	452.0 Nm	0.0107 mV/V	0.24 % FS	1.20 % FS	1.7199 mV/V	-0.19 % FS
MY	452.0 Nm	-0.0008 mV/V	0.05 % FS	0.63 % FS	1.6971 mV/V	0.30 % FS
MZ	452.0 Nm	0.0619 mV/V	0.47 % FS	1.10 % FS	4.2267 mV/V	0.80 % FS

Shunt

<u>Bridge</u>	<u>Shunt Value</u>	<u>Equivalent Load</u>	<u>Bridge Resistance (nom)</u>
FX	60.0 K Ohms	10363.3 N	350.0 Ohms
FY	60.0 K Ohms	10533.1 N	350.0 Ohms
FZ	60.0 K Ohms	42964.9 N	700.0 Ohms
MX	60.0 K Ohms	388.8 Nm	350.0 Ohms
MY	60.0 K Ohms	393.8 Nm	350.0 Ohms
MZ	80.0 K Ohms	235.0 Nm	700.0 Ohms

NOTE: Positive shunt is between +Exc_+Sig Negative shunt is between -Exc_+Sig

Wire Color Codes

<u>FX-MX</u>	<u>FY-MY</u>	<u>FZ-MZ</u>
Brown + Exc.	Red-Stripe + Exc.	Green + Exc.
Red + Sig.	Black + Sig.	Blue + Sig.
Orange - Exc.	White - Exc.	Violet - Exc.
Yellow - Sig.	Black-Stripe - Sig.	Grey - Sig.

Reference Load Cell

<u>Manufacturer</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Calibration Due Date</u>
Interface	1610AJH-5K	327261	Jun 4, 2010

System Measurement Uncertainty 0.02% of Reading (95% Confidence)

This is to certify that the equipment and reference load cells used during the calibration of this transducer are traceable to the National Institute of Standards and Technology (NIST).
Morehouse Instrument Company Report No. 88589



CALIBRATION REPORT

Uni-Directional Calibration Crosstalk Summary



Automated Load Cell Calibration System
Copyright (c)1987-1997 Robert A. Denton, Inc.

Calibration Number	A5449000	This Calibration	14:13:22	Oct 2, 2009
Model Number	1794A	Calibration Due		Oct 2, 2010
Serial Number	250	Last Calibrated		Nov 19, 2008
Description	Lower Neck	Temp (C) / Hum. (%)		21.1 / 51.5
Customer	VRTC	Customer Tag Number		N/A

Raw Crosstalk Data (mv/V)

Bridge		FX	FY	FZ	MX	MY	MZ
	<u>Applied Load</u>	13345.0	13345.0	13345.0	452.0	452.0	452.0
		<u>N</u>	<u>N</u>	<u>N</u>	<u>Nm</u>	<u>Nm</u>	<u>Nm</u>
FX	13345.0 N	1.8951	-0.0140	-0.0248	-0.0014	0.0769	0.0862
FY	13345.0 N	0.0208	1.8644	0.0024	-0.0420	-0.0099	0.0794
FZ	13345.0 N	0.0027	0.0002	-0.9031	-0.0109	0.0811	-0.0013
MX	452.0 Nm	0.0073	-0.0055	-0.5849	1.7199	0.0357	-0.0062
MY	452.0 Nm	0.0139	0.0038	-0.5642	-0.0033	1.6971	0.0227
MZ	452.0 Nm	1.6790	-0.0293	0.0415	-0.0279	0.0343	4.2267

% FS Crosstalk *

Bridge		FX	FY	FZ	MX	MY	MZ
	<u>Applied Load</u>	13345.0	13345.0	13345.0	452.0	452.0	452.0
		<u>N</u>	<u>N</u>	<u>N</u>	<u>Nm</u>	<u>Nm</u>	<u>Nm</u>
FX	13345.0 N	0.00%	-0.75%	2.74%	-0.08%	4.53%	2.04%
FY	13345.0 N	1.10%	0.00%	-0.26%	-2.44%	-0.59%	1.88%
FZ	13345.0 N	0.14%	0.01%	0.00%	-0.63%	4.78%	-0.03%
MX	452.0 Nm	0.38%	-0.30%	1.91%	0.00%	2.10%	-0.15%
MY	452.0 Nm	0.73%	0.20%	4.20%	-0.19%	0.00%	0.54%
MZ	452.0 Nm	0.30%	-1.57%	-4.60%	-1.62%	2.02%	0.00%

* Percentage crosstalk for force channels applying moments are corrected for the applied force.

Calibration Test Results

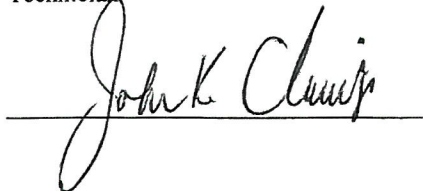
Pre-Test

Right Front Passenger Dummy S/N: 110

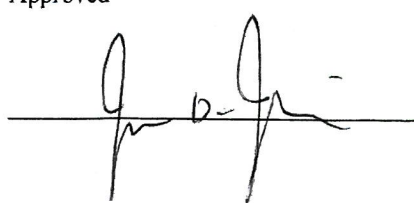
Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 110 Calibration No. 31

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	292	Yes
H	Skull Cap To Backline	40.6 - 45.7	44	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	445	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	996	Yes
Z	Waist Circumference	835.7 - 866.1	861	Yes
AA	Location For Chest Circumference	429.3 - 434.3	431	Yes
BB	Location For Waist Circumference	226.1 - 231.1	229	Yes

Technician



Approved



Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 110 Certification No. 31-2

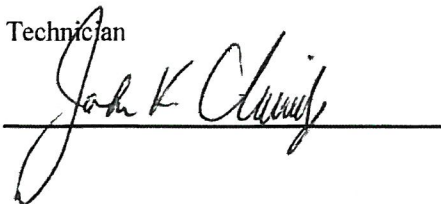
Test Date: 6/26/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	241.3 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	4.5 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

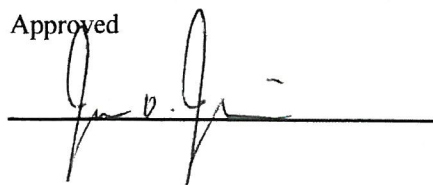
Test meets specifications.

Comments:

Technician



Approved



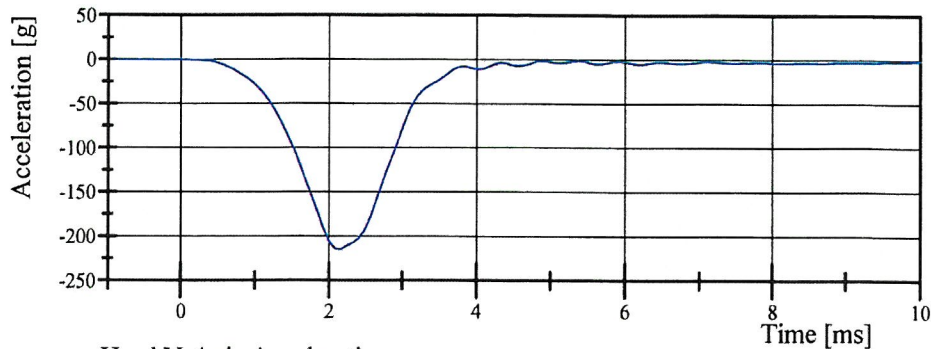
Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 110 Certification No. 31-2

Test Date: 6/26/2009

Head X-Axis Acceleration

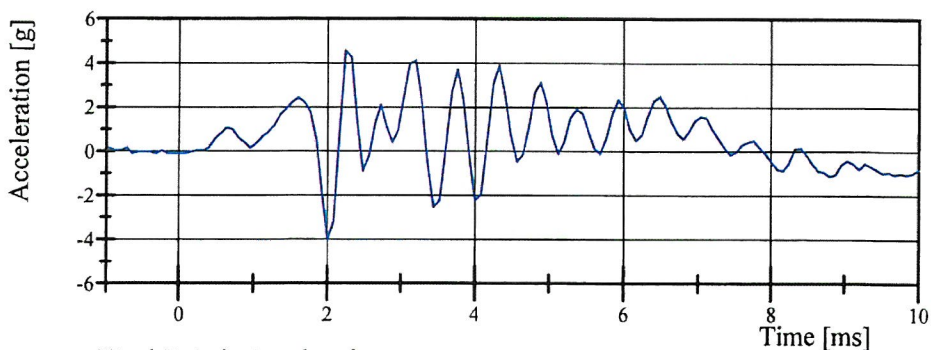


Filter Class: CFC_1000

Max: 0.3 g at -0.9 ms

Min: -214.5 g at 2.2 ms

Head Y-Axis Acceleration

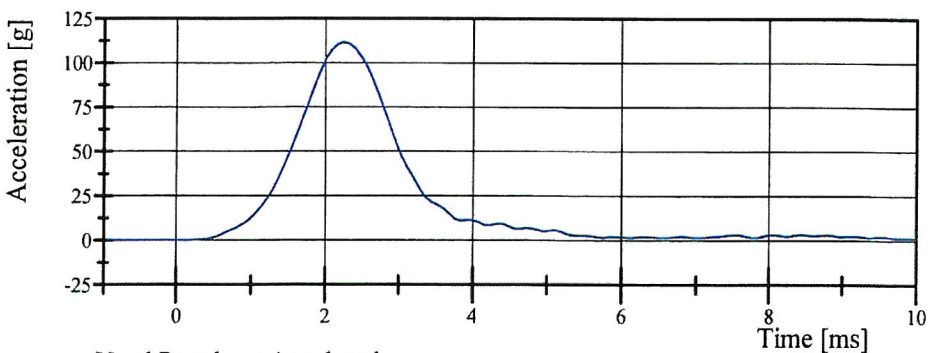


Filter Class: CFC_1000

Max: 4.5 g at 2.2 ms

Min: -4.0 g at 2.0 ms

Head Z-Axis Acceleration

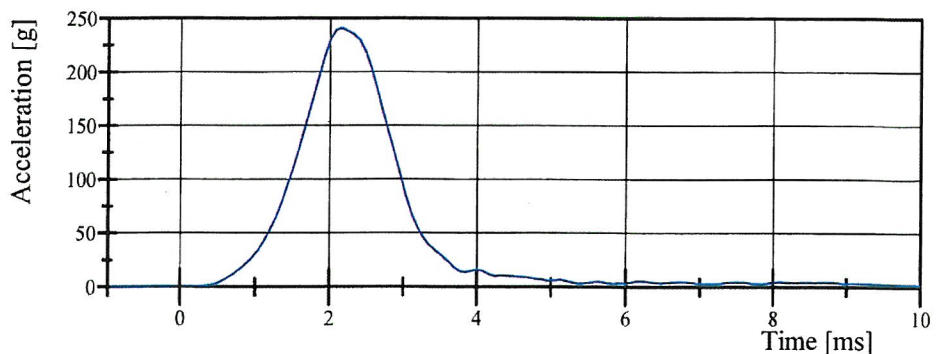


Filter Class: CFC_1000

Max: 111.7 g at 2.2 ms

Min: -0.1 g at -0.9 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 241.3 g at 2.2 ms

Min: 0.1 g at -0.5 ms

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 110 Certification No. 31-1

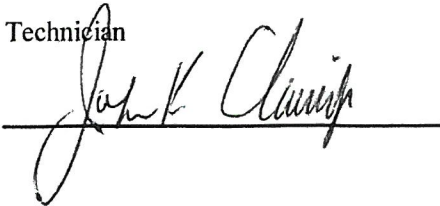
Test Date: 6/27/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.927 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	36.0 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.63 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.29 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-17.61 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-17.61 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-75.1 °	Yes
Time of Peak	57 - 64 ms	61.1 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	122.3 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	97.2 N·m	Yes
Time of Peak	47 - 58 ms	49.9 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	101.3 ms	Yes

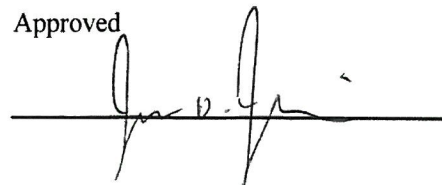
Test meets specifications.

Comments:

Technician



Approved



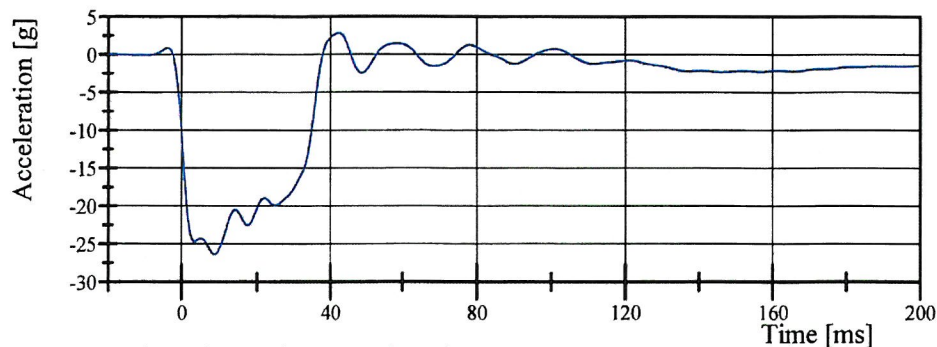
Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 110 Certification No. 31-1

Test Date: 6/27/2009

Pendulum Acceleration

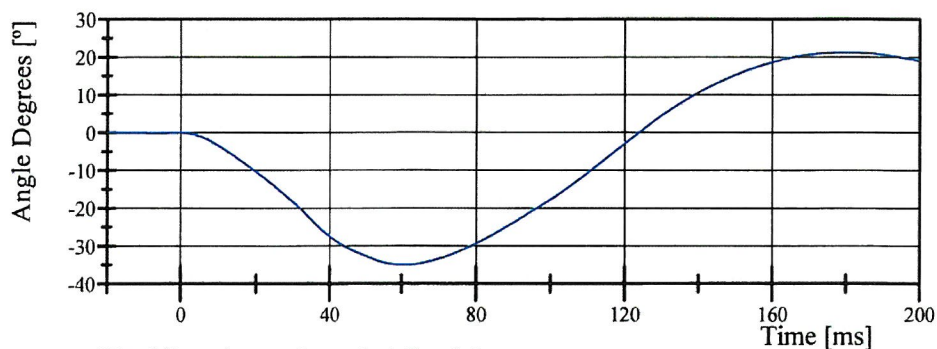


Filter Class: CFC_60

Max: 2.9 g at 42.3 ms

Min: -26.3 g at 8.8 ms

Pot Rotation at the Base of Neck

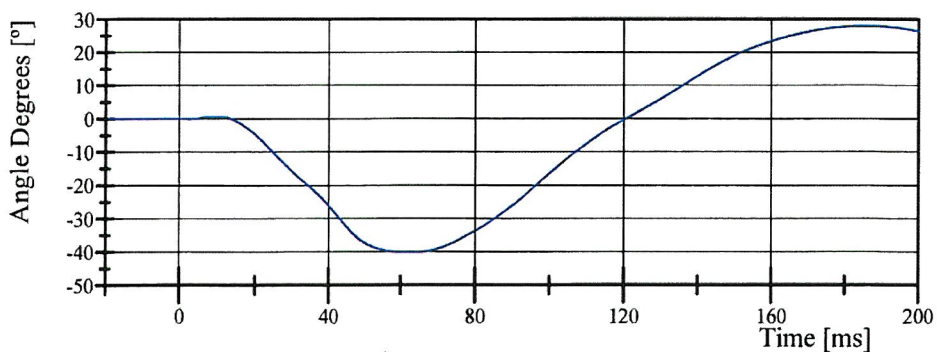


Filter Class: CFC_60

Max: 21.3 ° at 180.2 ms

Min: -35.0 ° at 60.9 ms

Head Rotation at Occypital Condyles

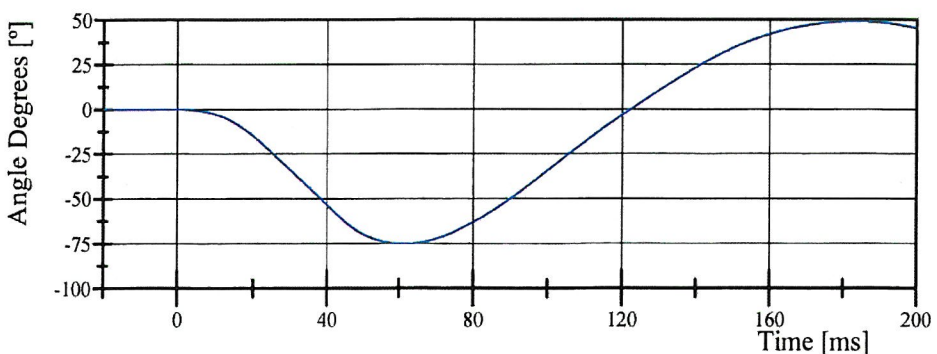


Filter Class: CFC_60

Max: 27.9 ° at 186.6 ms

Min: -40.1 ° at 62.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 49.1 ° at 182.9 ms

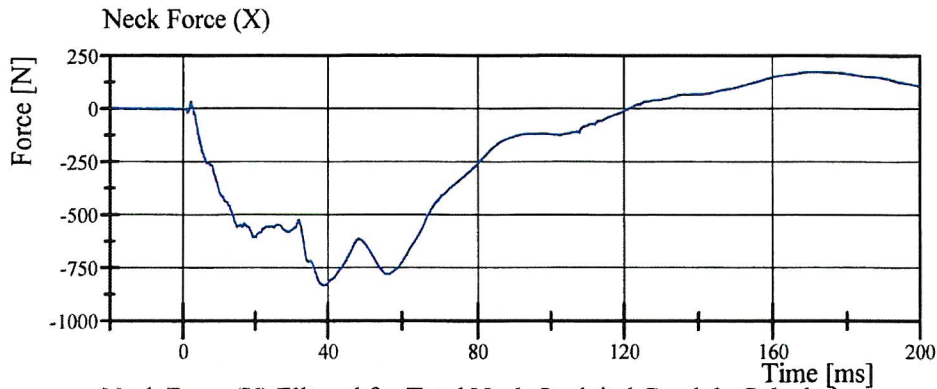
Min: -75.1 ° at 61.1 ms

Transportation Research Center Inc.

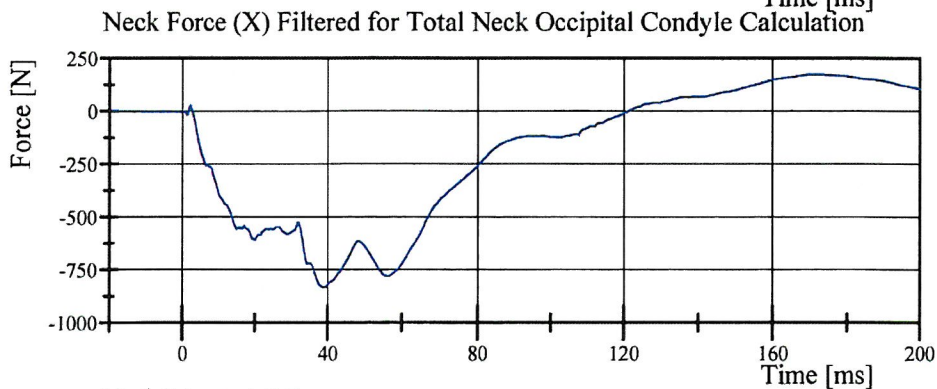
Neck Flexion

HIII 50th Serial No. 110 Certification No. 31-1

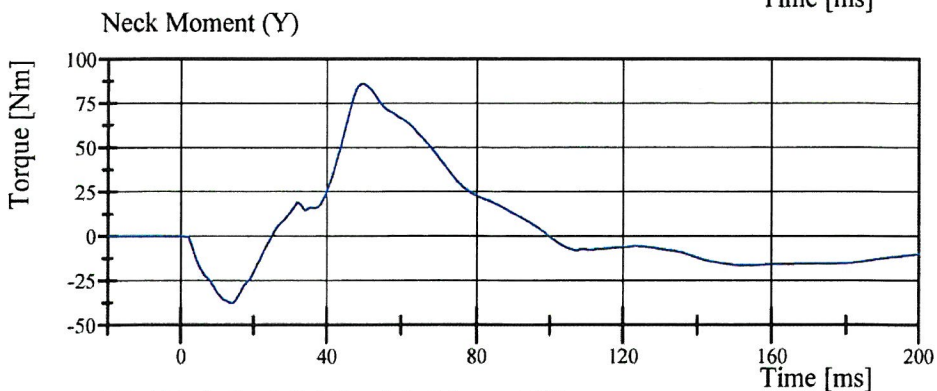
Test Date: 6/27/2009



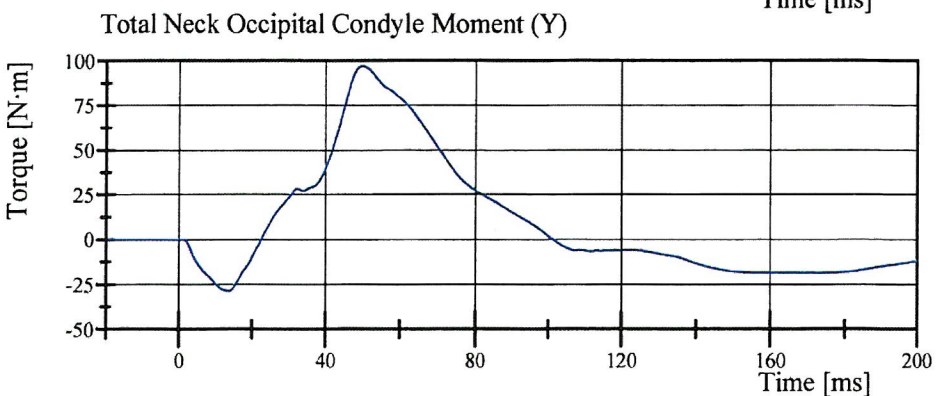
Filter Class: CFC_1000
Max: 174.9 N at 170.7 ms
Min: -832.7 N at 39.0 ms



Filter Class: CFC_600
Max: 174.6 N at 171.0 ms
Min: -832.1 N at 38.9 ms



Filter Class: CFC_600
Max: 86.0 Nm at 49.7 ms
Min: -37.5 Nm at 14.2 ms



Filter Class: CFC_600
Max: 97.2 N·m at 49.9 ms
Min: -28.6 N·m at 13.6 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 110 Certification No. 31-2

Test Date: 6/27/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.967 m/s	Yes
Pendulum Acceleration Decay			
Crossing 5g	38 - 46 ms	39.5 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.92 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.64 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.16 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.42 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	98.4 °	Yes
Time of Peak	72 - 82 ms	77.8 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	147 - 174 ms	157.6 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-71.0 N·m	Yes
Time of Peak	65 - 79 ms	70.6 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	120 - 148 ms	142.8 ms	Yes

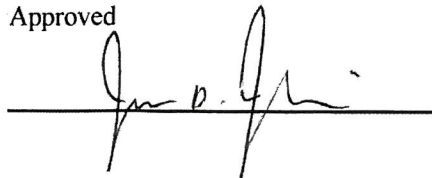
Test meets specifications.

Comments:

Technician



Approved



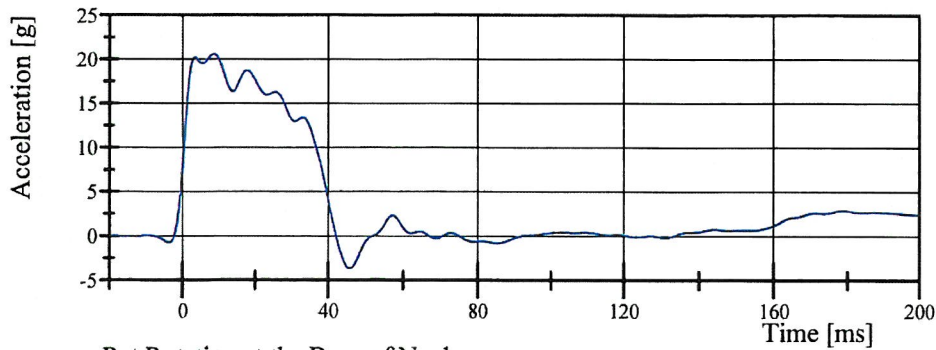
Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 110 Certification No. 31-2

Test Date: 6/27/2009

Pendulum Acceleration

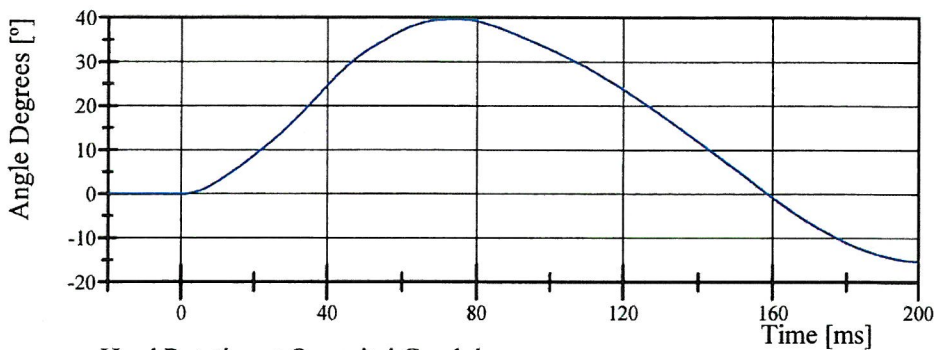


Filter Class: CFC_60

Max: 20.6 g at 8.5 ms

Min: -3.7 g at 45.8 ms

Pot Rotation at the Base of Neck

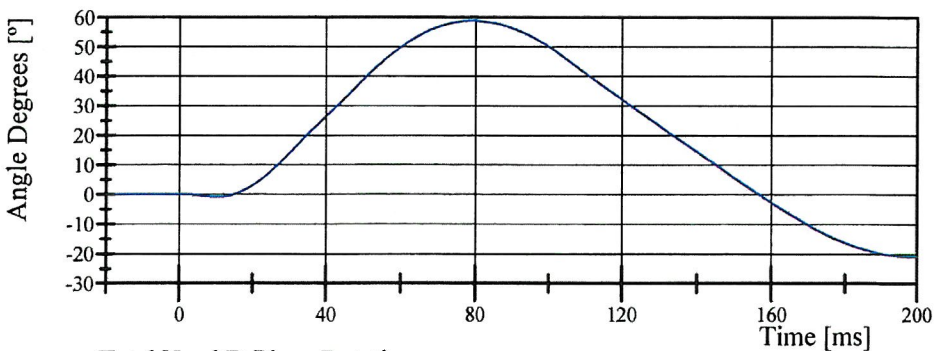


Filter Class: CFC_60

Max: 39.7 ° at 74.0 ms

Min: -15.3 ° at 200.0 ms

Head Rotation at Occypital Condyles

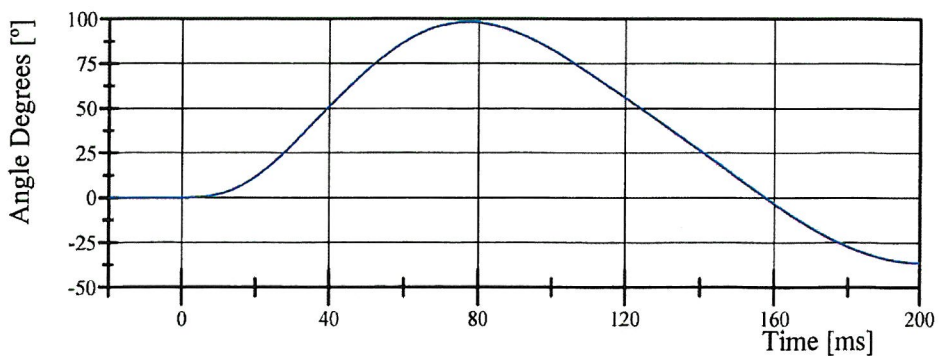


Filter Class: CFC_60

Max: 58.9 ° at 78.9 ms

Min: -21.0 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 98.4 ° at 77.8 ms

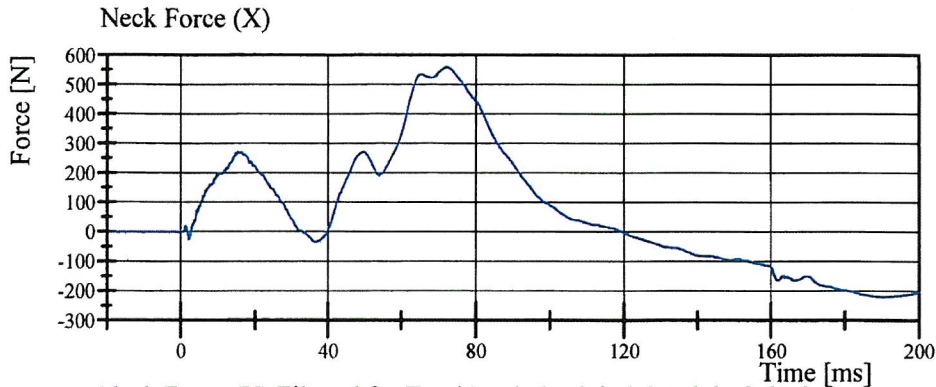
Min: -36.3 ° at 200.0 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 110 Certification No. 31-2

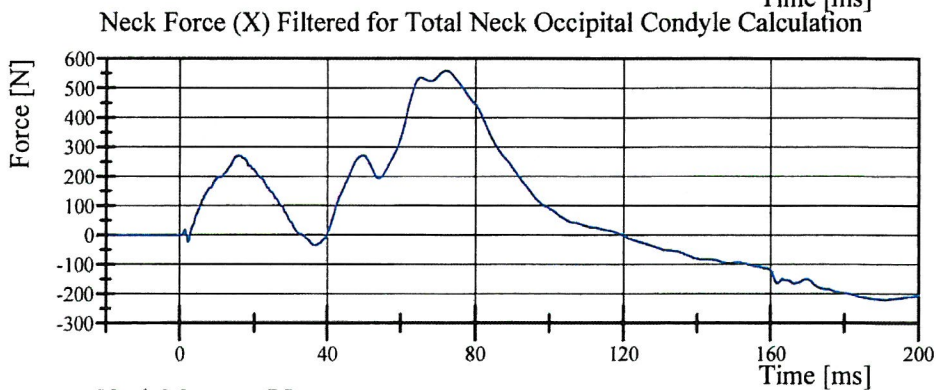
Test Date: 6/27/2009



Filter Class: CFC_1000

Max: 560.4 N at 72.0 ms

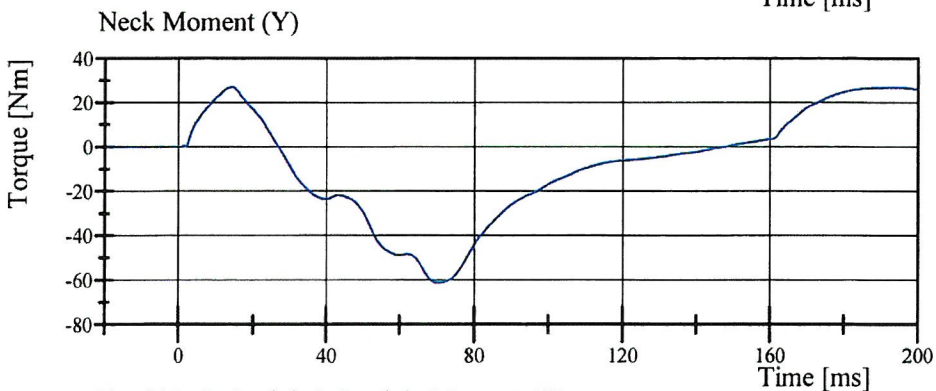
Min: -221.0 N at 190.7 ms



Filter Class: CFC_600

Max: 560.1 N at 72.0 ms

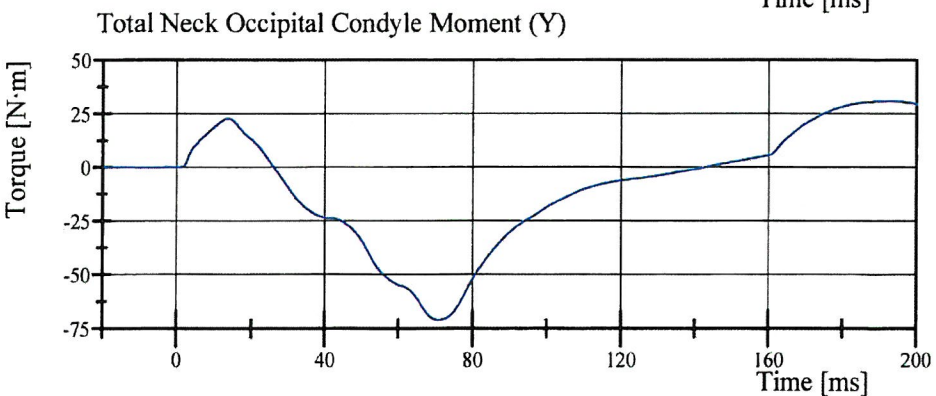
Min: -220.5 N at 190.8 ms



Filter Class: CFC_600

Max: 27.1 Nm at 14.1 ms

Min: -61.3 Nm at 70.3 ms



Filter Class: CFC_600

Max: 30.8 N·m at 193.1 ms

Min: -71.0 N·m at 70.6 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 110 Certification No. 31-1

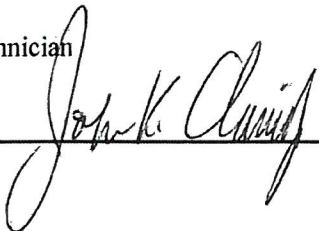
Test Date: 6/27/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.748 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,686.6 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-69.64 mm	Yes
Internal Hysteresis	65 - 85 %	73.2 %	Yes

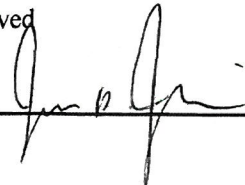
Test meets specifications.

Comments:

Technician



Approved

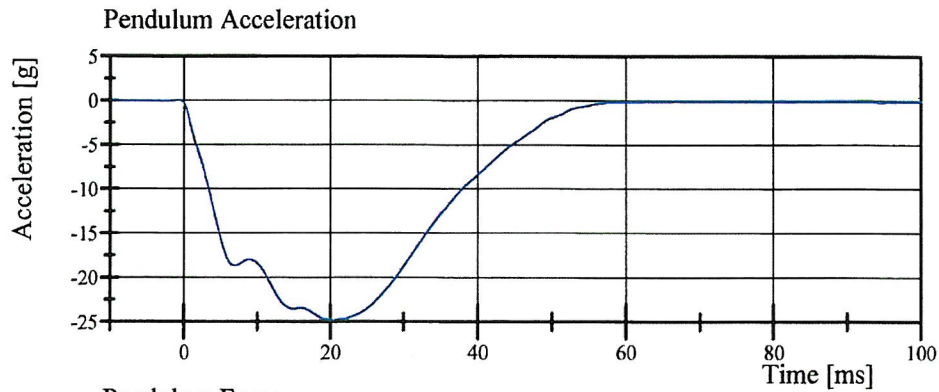


Transportation Research Center Inc.

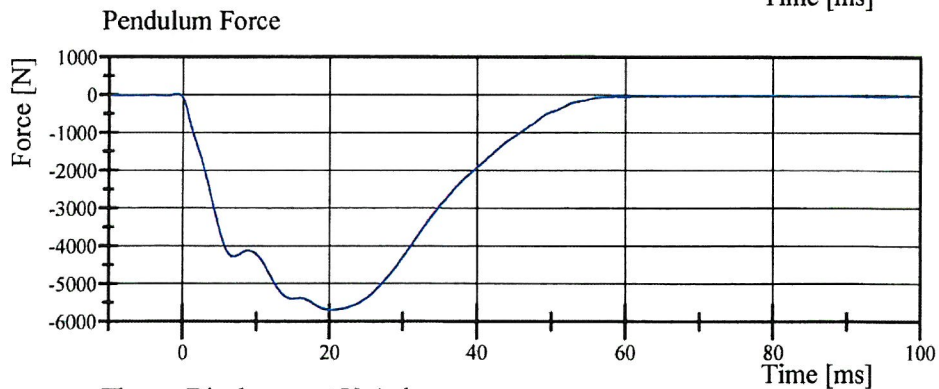
Front Thorax

HIII 50th Serial No. 110 Certification No. 31-1

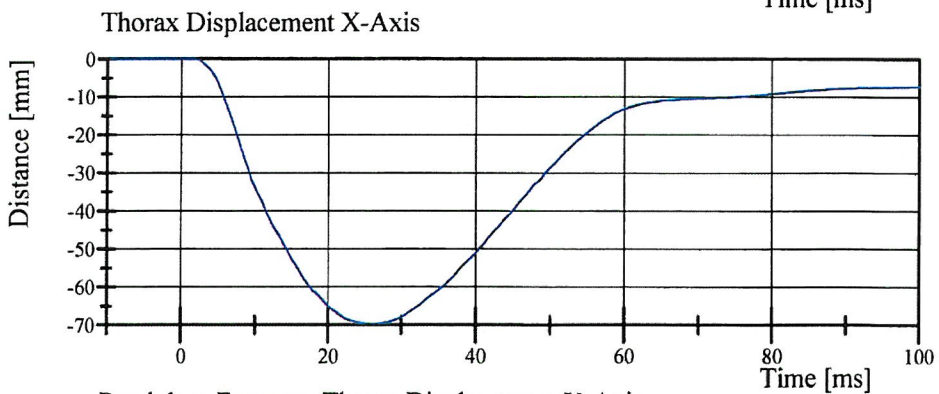
Test Date: 6/27/2009



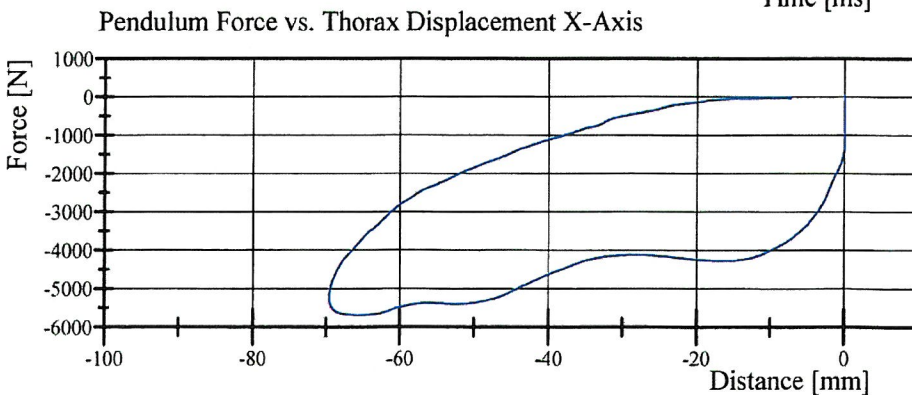
Filter Class: CFC_180
Max: 0.1 g at -0.7 ms
Min: -24.8 g at 20.3 ms



Filter Class: CFC_180
Max: 23.7 N at -0.7 ms
Min: -5,686.6 N at 20.3 ms



Filter Class: CFC_600
Max: 0.0 mm at -9.5 ms
Min: -69.6 mm at 25.8 ms



Filter Class: CFC_180
Max: 23.7 N at 0.0 mm
Min: -5,686.6 N at -65.6 mm

Transportation Research Center Inc

Hybrid III Hip Range of Motion

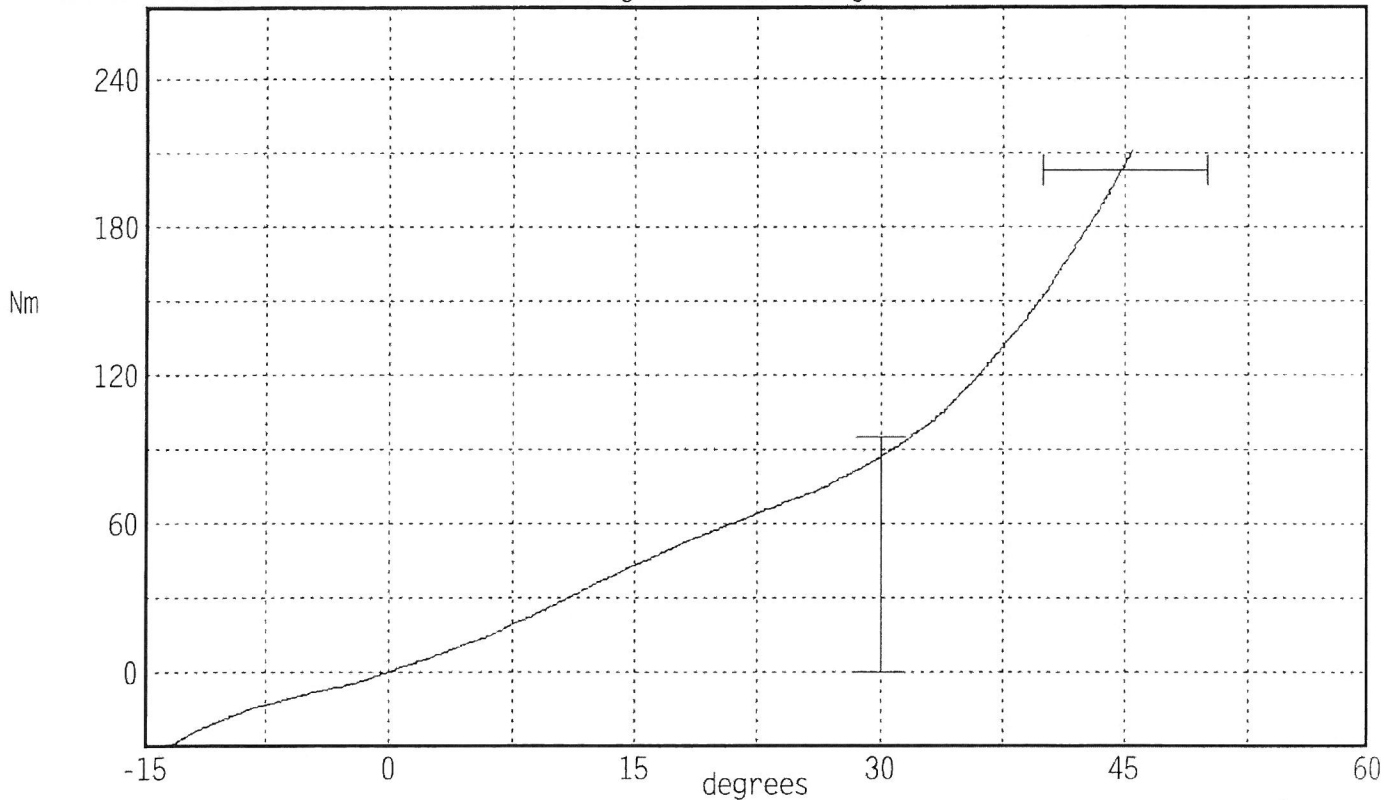
Serial Number: 110L
Test Number: 110C31
Comments:

Date: 06/25/2009
Time: 16:13

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.3 °C Pass
Humidity	10 - 70	45 % Pass
Moment at 30 deg	<= 94.9	87.4 Nm Pass
Angle at 203 Nm	40.0 - 50.0	44.8 deg Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec Pass

Peak Moment: 211.0 Nm at 45.5 deg
Peak Angle: 45.5 deg at 211.0 Nm

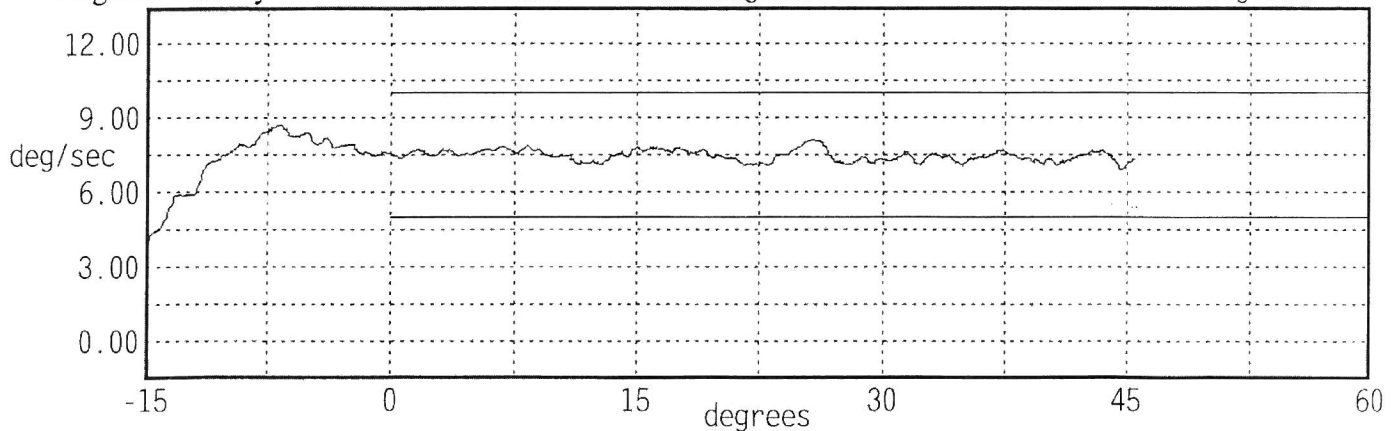
Moment About H-Point



Angular Velocity

Max: 8.1 deg/sec

Min: 6.9 deg/sec



Transportation Research Center Inc

Hybrid III Hip Range of Motion

Serial Number: 110R

Date: 06/25/2009

Test Number: 110C31

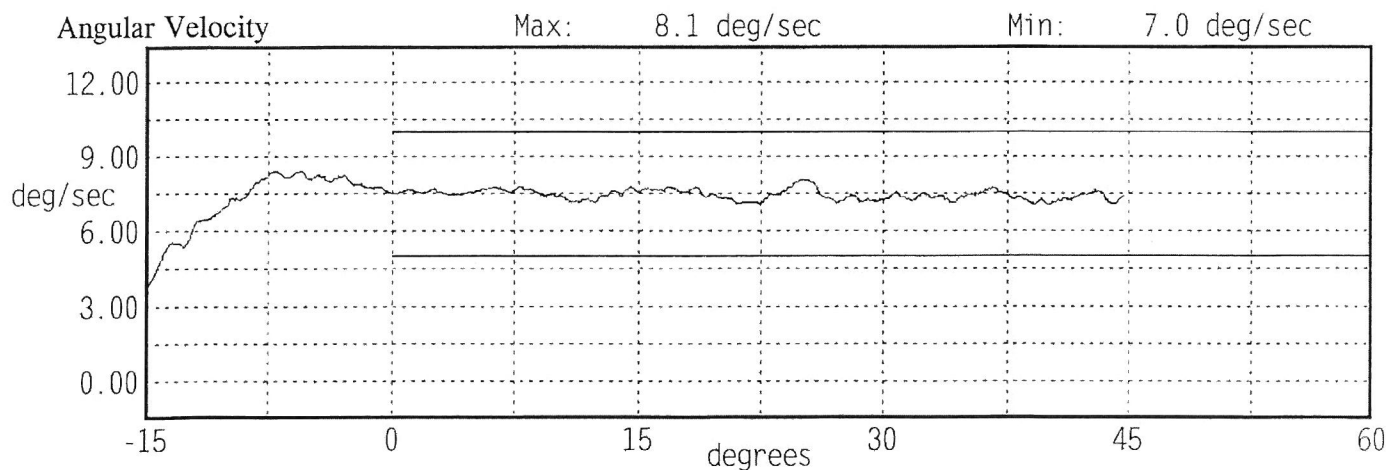
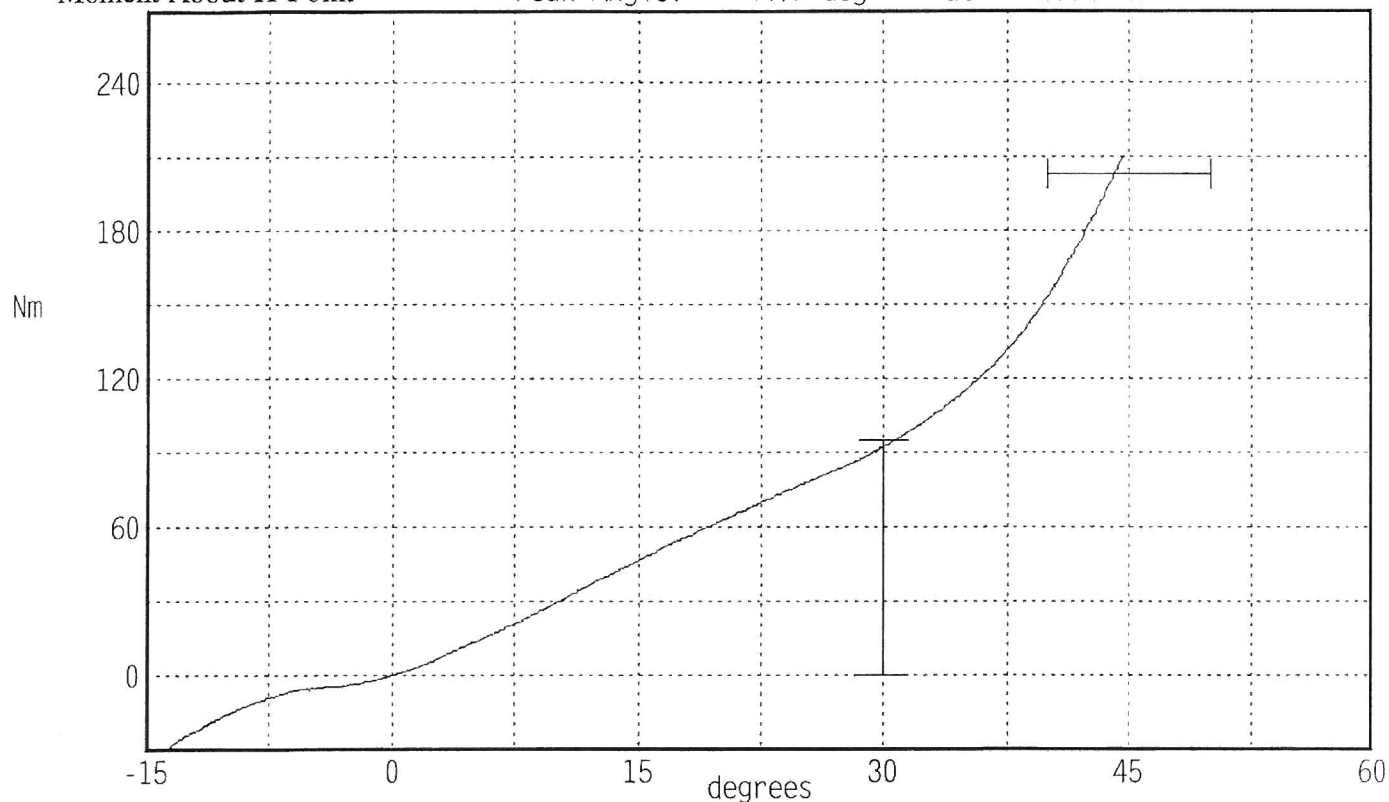
Time: 16:20

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.3 °C	Pass
Humidity	10 - 70	45 %	Pass
Moment at 30 deg	<= 94.9	92.2 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	44.1 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point

Peak Moment: 210.1 Nm at 44.7 deg
Peak Angle: 44.7 deg at 210.1 Nm



Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 110 Certification No. 31-1
Test Date: 6/26/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.087 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-4,941.99 N	Yes

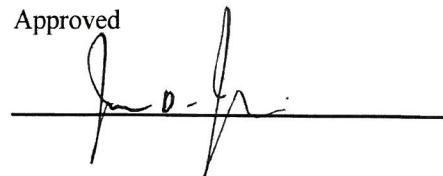
Test meets specifications.

Comments:

Technician

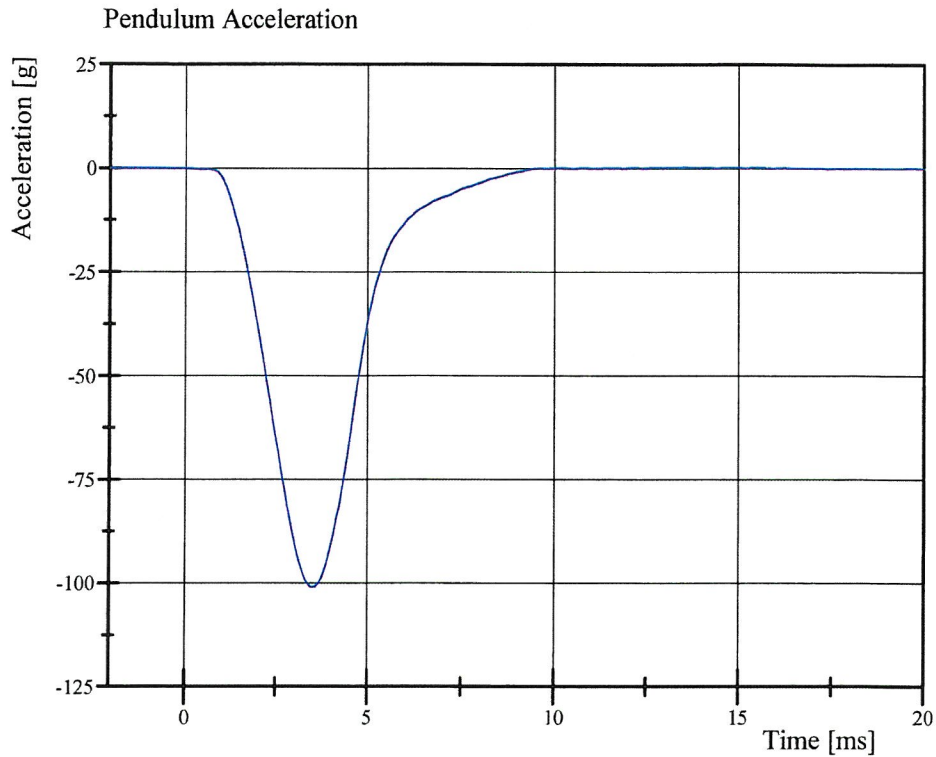


Approved

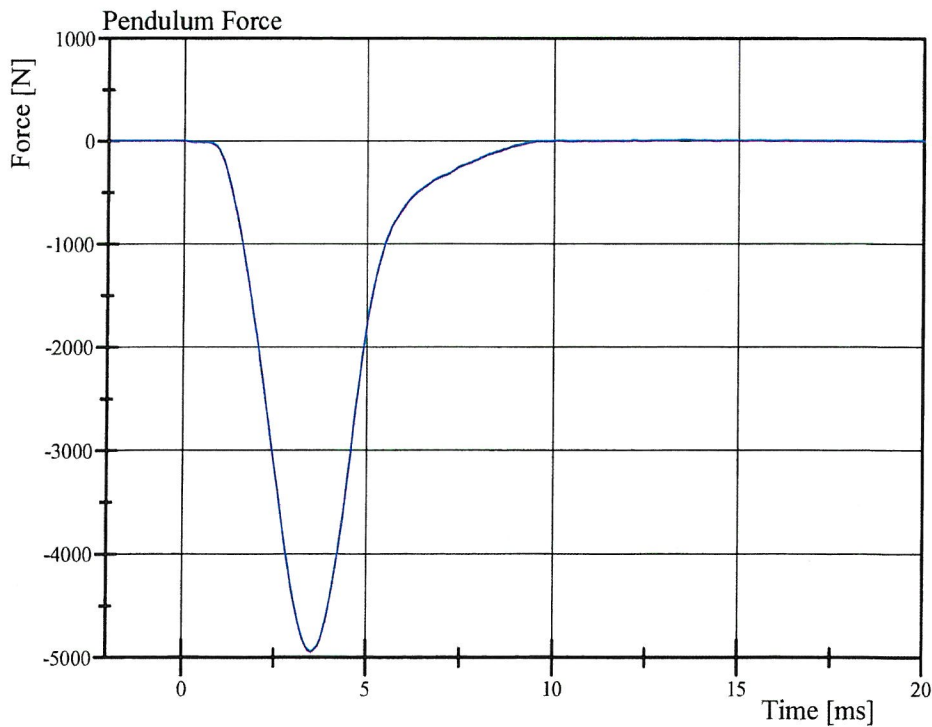


Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 110 Certification No. 31-1
Test Date: 6/26/2009



Filter Class: CFC_600
Max: 0.2 g at 13.6 ms
Min: -101.0 g at 3.5 ms



Filter Class: CFC_600
Max: 11.3 N at 13.6 ms
Min: -4,942.0 N at 3.5 ms

Transportation Research Center Inc.

Right Knee Femur Response Test

HIII 50th Serial No. 110 Certification No. 31-1

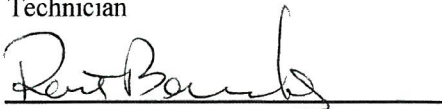
Test Date: 6/26/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.084 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,122.99 N	Yes

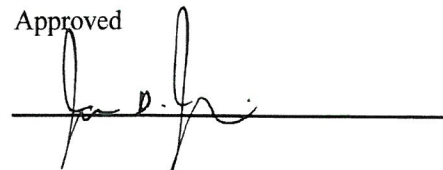
Test meets specifications.

Comments:

Technician

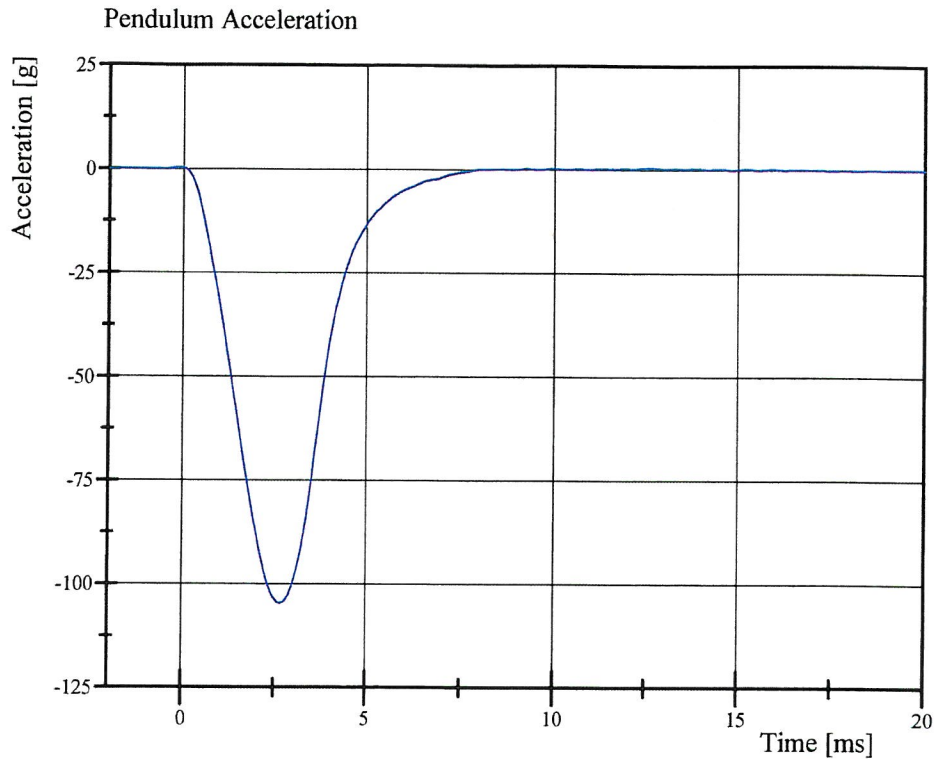


Approved

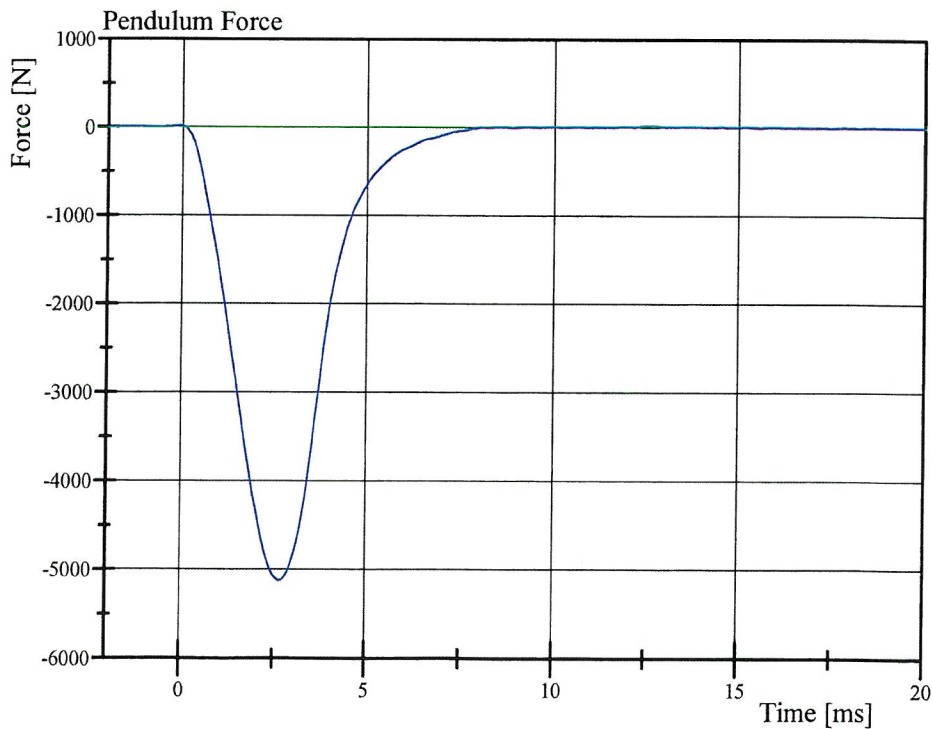


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 110 Certification No. 31-1
Test Date: 6/26/2009



Filter Class: CFC_600
Max: 0.5 g at 12.6 ms
Min: -104.7 g at 2.6 ms



Filter Class: CFC_600
Max: 22.0 N at 12.6 ms
Min: -5,123.0 N at 2.6 ms

Calibration Test Results

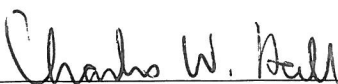
Pre-Test

Left Rear Passenger Dummy S/N: 001

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 001 Calibration No. 10

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	880	Yes
B	Shoulder Pivot Height	505.5 - 520.7	515	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	94	Yes
F	Thigh Clearance	139.7 - 154.9	152	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	299	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	341	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	595	Yes
L	Popliteal Height	429.3 - 454.7	431	Yes
M	Knee Pivot Height	485.1 - 500.4	498	Yes
N	Buttock Popliteal Length	452.1 - 477.5	460	Yes
O	Chest Depth	213.4 - 228.6	227	Yes
P	Foot Length	251.5 - 266.7	260	Yes
V	Shoulder Breadth	421.6 - 436.9	426	Yes
W	Foot Breadth	91.4 - 106.7	99	Yes
Y	Chest Circumference	970.3 - 1000.8	990	Yes
Z	Waist Circumference	835.7 - 866.1	854	Yes
AA	Location For Chest Circumference	429.3 - 434.3	432	Yes
BB	Location For Waist Circumference	226.1 - 231.1	229	Yes

Technician



Approved



Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 001 Certification No. 10-1

Test Date: 7/1/2008

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	262.9 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	6.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bull

Approved

Ron Stoner

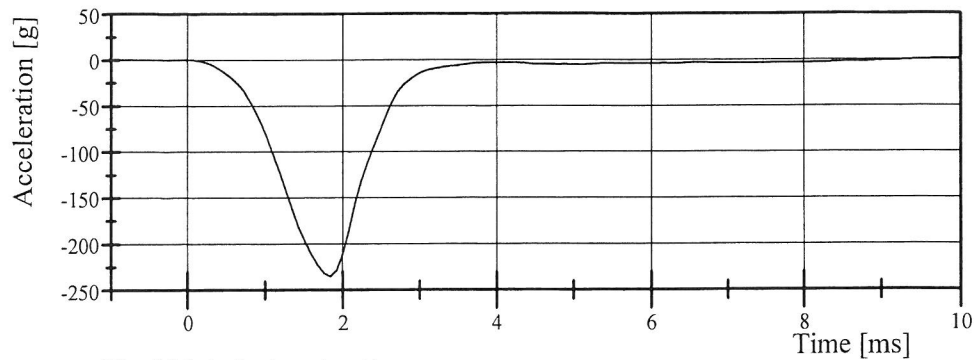
Transportation Research Center Inc.

Front Head Drop

HIH 50th Serial No. 001 Certification No. 10-1

Test Date: 7/1/2008

Head X-Axis Acceleration

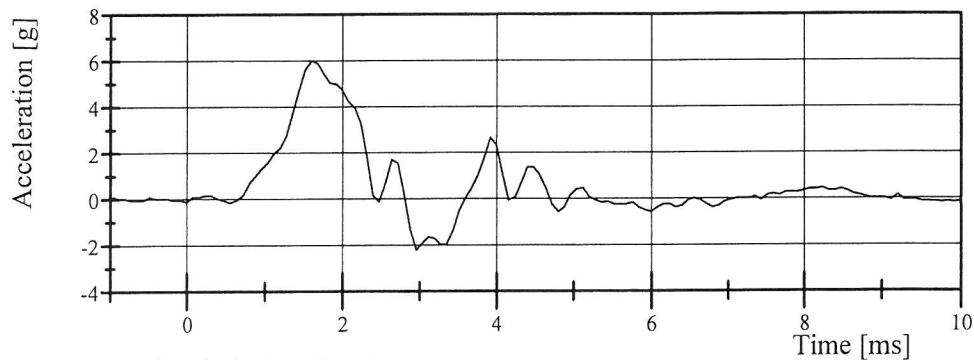


Filter Class: CFC_1000

Max: 1.1 g at 10.0 ms

Min: -235.2 g at 1.8 ms

Head Y-Axis Acceleration

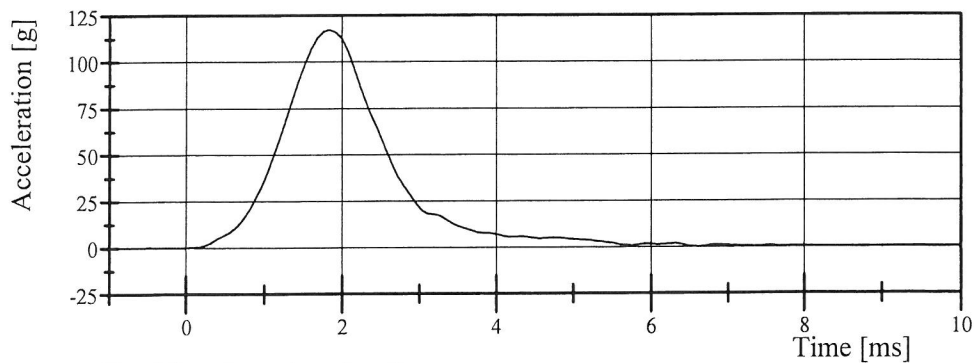


Filter Class: CFC_1000

Max: 6.0 g at 1.6 ms

Min: -2.2 g at 3.0 ms

Head Z-Axis Acceleration

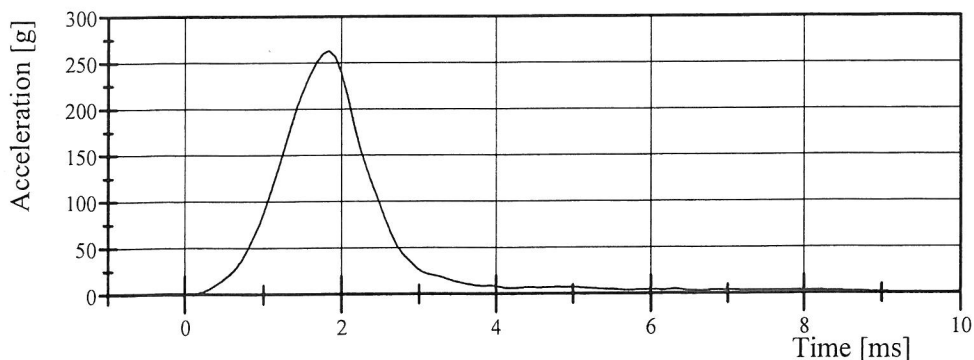


Filter Class: CFC_1000

Max: 117.4 g at 1.8 ms

Min: -0.1 g at -1.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 262.9 g at 1.8 ms

Min: 0.0 g at -0.8 ms

Transportation Research Center Inc.

Neck Flexion

HIH 50th Serial No. 001 Certification No. 10-1

Test Date: 7/1/2008

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.934 m/s	Yes
Pendulum Acceleration Decay			
Crossing -5g	34 - 42 ms	38.7 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.79 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.66 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.64 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.64 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-74.7 °	Yes
Time of Peak	57 - 64 ms	61.1 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	113 - 128 ms	118.8 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88 - 108 N·m	95.0 N·m	Yes
Time of Peak	47 - 58 ms	51.8 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	97 - 107 ms	101.9 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Hehl

Approved

Ron Stoner

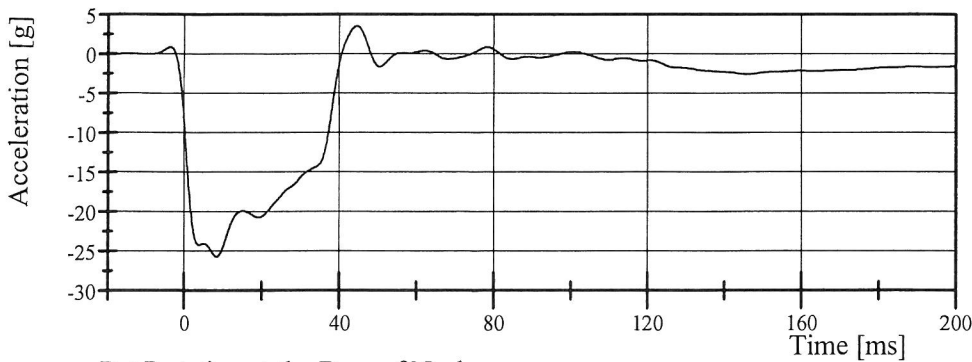
Transportation Research Center Inc.

Neck Flexion

HIH 50th Serial No. 001 Certification No. 10-1

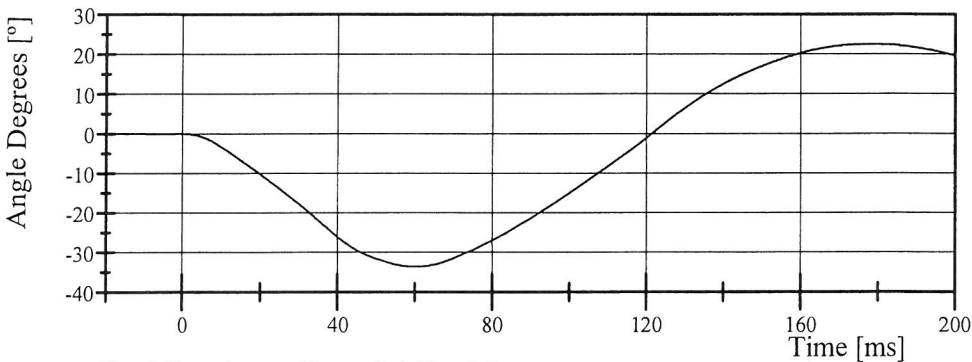
Test Date: 7/1/2008

Pendulum Acceleration



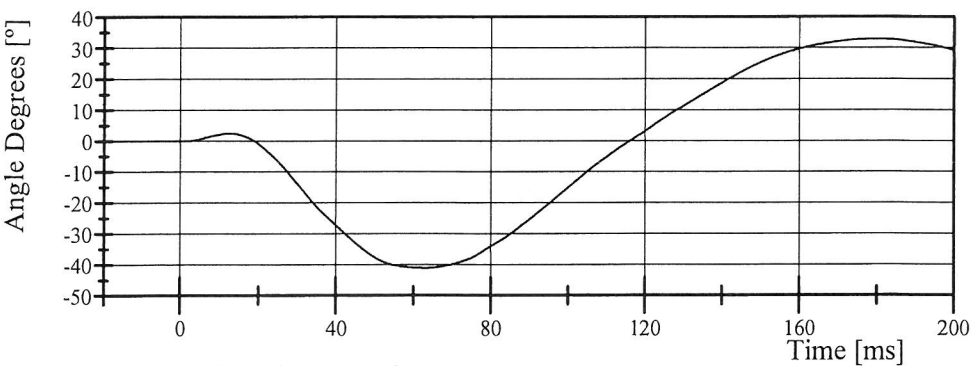
Filter Class: CFC_60
Max: 3.5 g at 44.6 ms
Min: -25.7 g at 8.6 ms

Pot Rotation at the Base of Neck



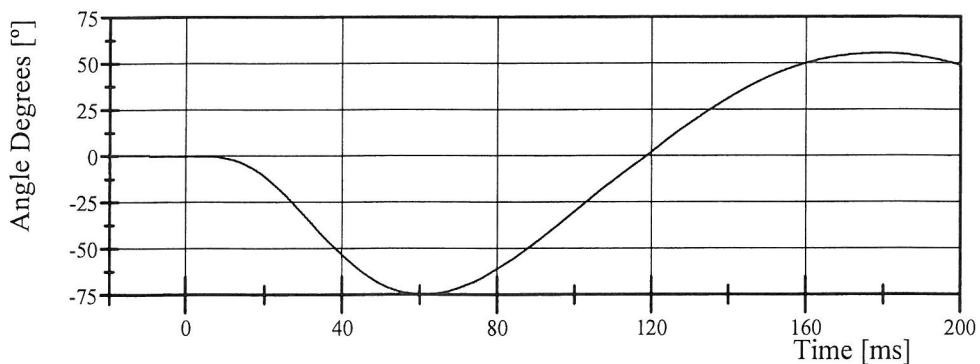
Filter Class: CFC_60
Max: 22.5 ° at 178.4 ms
Min: -33.6 ° at 60.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 32.9 ° at 180.0 ms
Min: -41.1 ° at 63.3 ms

Total Head D-Plane Rotation



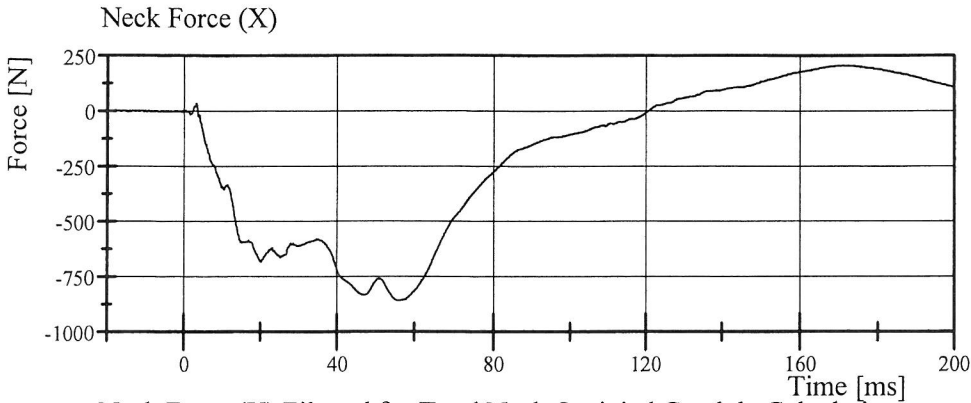
Filter Class: CFC_60
Max: 55.4 ° at 179.3 ms
Min: -74.7 ° at 61.1 ms

Transportation Research Center Inc.

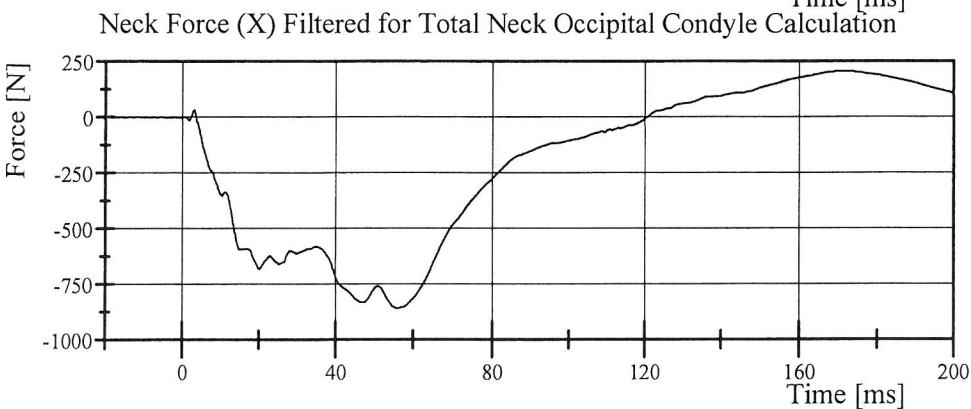
Neck Flexion

HIH 50th Serial No. 001 Certification No. 10-1

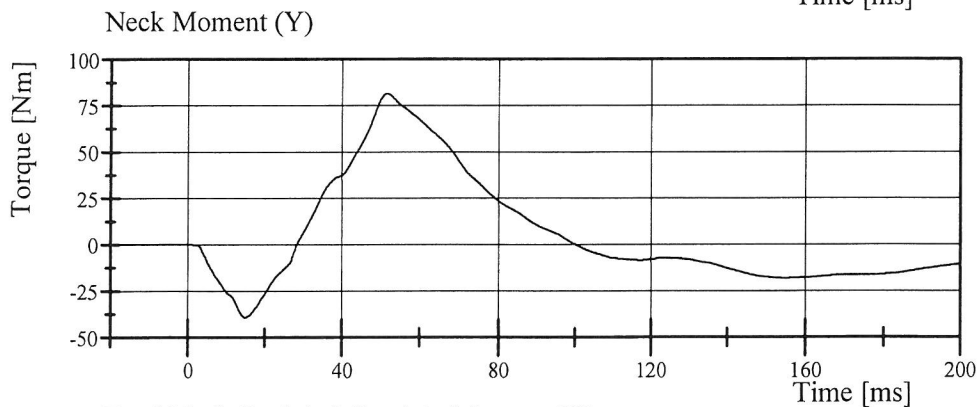
Test Date: 7/1/2008



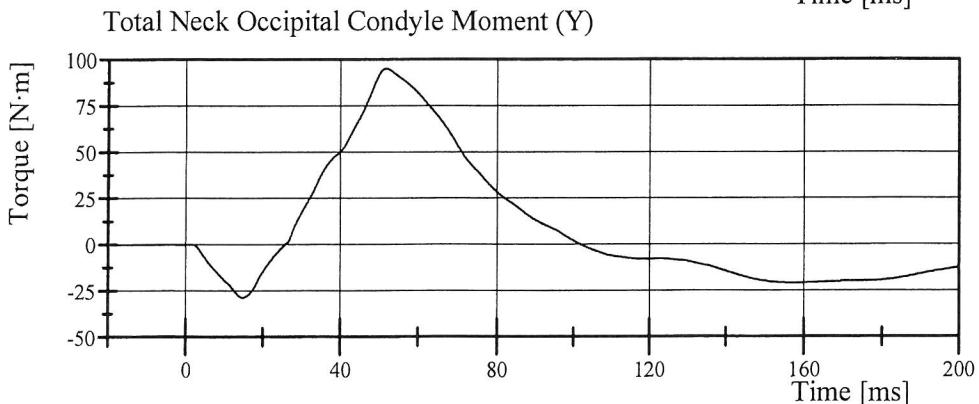
Filter Class: CFC_1000
Max: 205.6 N at 171.2 ms
Min: -858.8 N at 56.2 ms



Filter Class: CFC_600
Max: 205.3 N at 171.2 ms
Min: -858.4 N at 56.2 ms



Filter Class: CFC_600
Max: 81.5 Nm at 51.7 ms
Min: -39.1 Nm at 15.0 ms



Filter Class: CFC_600
Max: 95.0 N·m at 51.8 ms
Min: -28.7 N·m at 14.9 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 001 Certification No. 10-1

Test Date: 7/1/2008

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.995 m/s	Yes
Pendulum Acceleration Decay			
Crossing 5g	38 - 46 ms	42.1 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.98 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.42 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	12.56 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	12.56 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	99.5 °	Yes
Time of Peak	72 - 82 ms	77.5 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	147 - 174 ms	156.2 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-70.5 N·m	Yes
Time of Peak	65 - 79 ms	72.1 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	120 - 148 ms	144.7 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Stoner

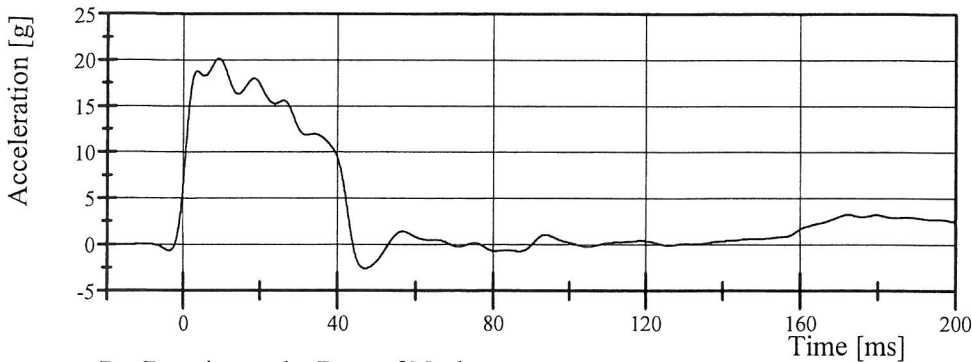
Transportation Research Center Inc.

Neck Extension

HIH 50th Serial No. 001 Certification No. 10-1

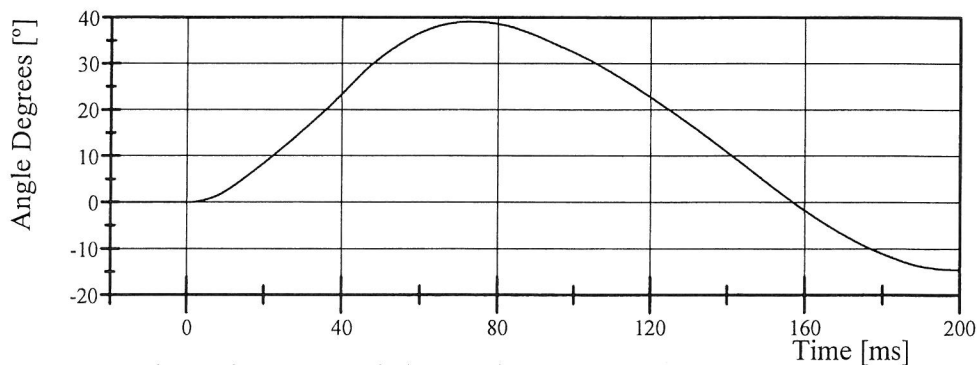
Test Date: 7/1/2008

Pendulum Acceleration



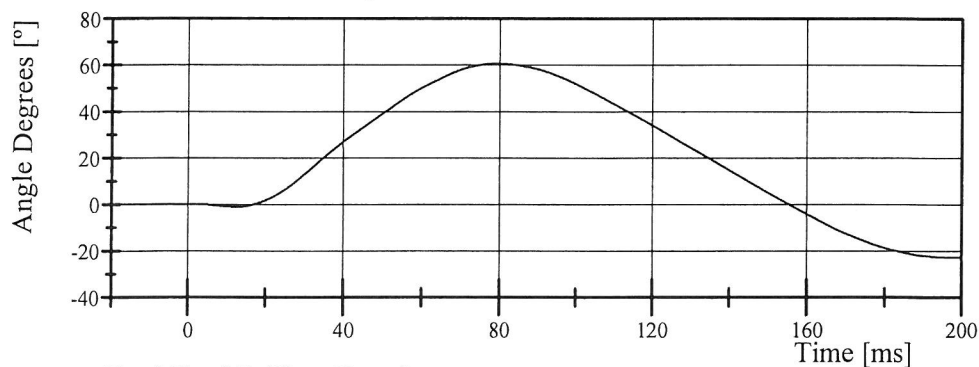
Filter Class: CFC_60
Max: 20.1 g at 9.3 ms
Min: -2.6 g at 47.0 ms

Pot Rotation at the Base of Neck



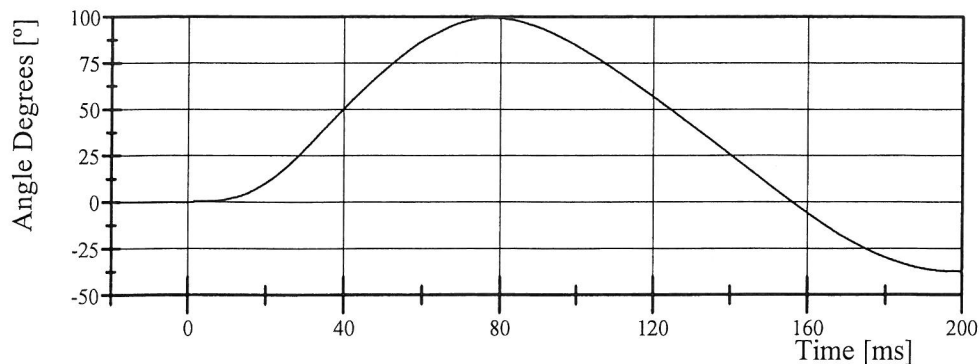
Filter Class: CFC_60
Max: 39.1 ° at 73.5 ms
Min: -14.5 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 60.7 ° at 79.0 ms
Min: -22.8 ° at 199.1 ms

Total Head D-Plane Rotation



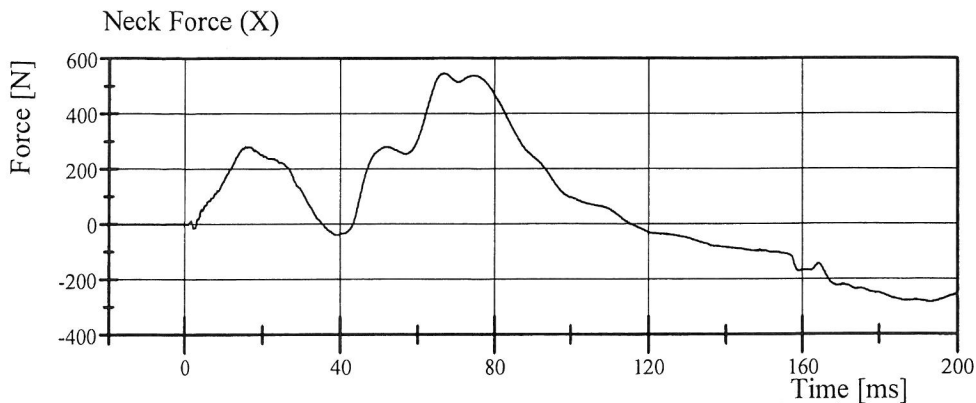
Filter Class: CFC_60
Max: 99.5 ° at 77.5 ms
Min: -37.4 ° at 199.5 ms

Transportation Research Center Inc.

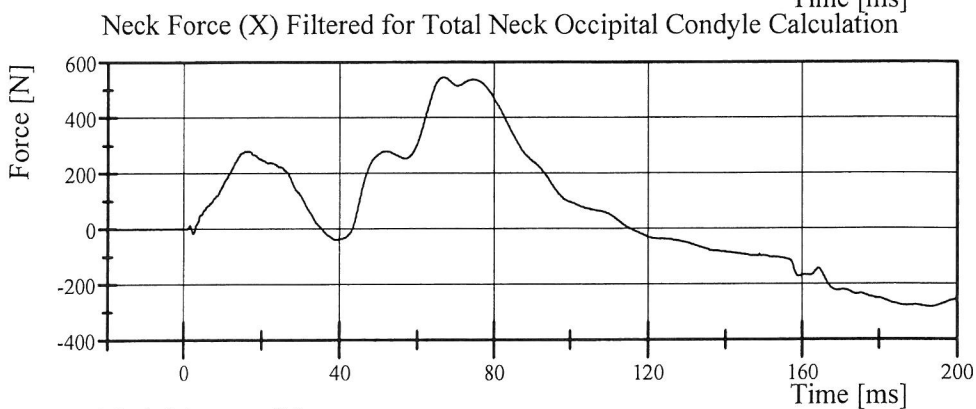
Neck Extension

HIH 50th Serial No. 001 Certification No. 10-1

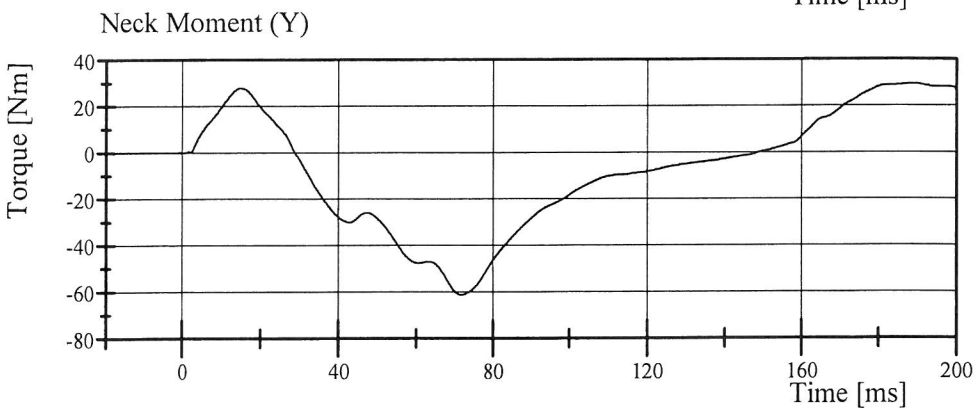
Test Date: 7/1/2008



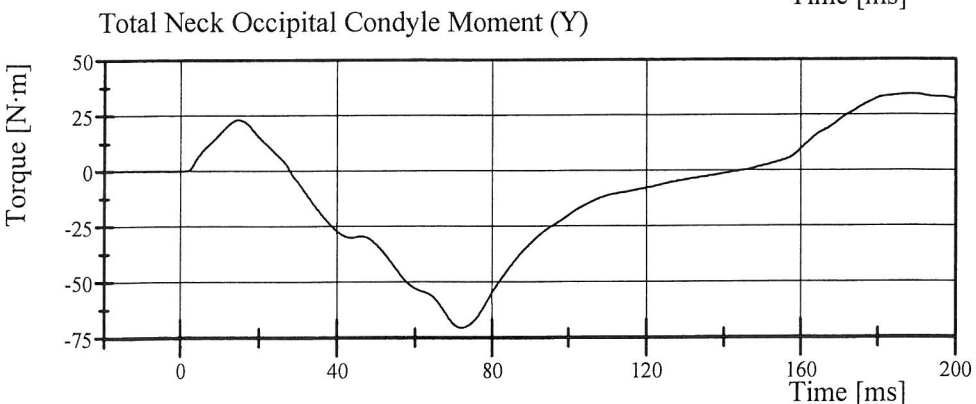
Filter Class: CFC_1000
Max: 545.8 N at 66.7 ms
Min: -282.6 N at 193.5 ms



Filter Class: CFC_600
Max: 545.7 N at 66.9 ms
Min: -282.3 N at 193.5 ms



Filter Class: CFC_600
Max: 29.5 Nm at 189.1 ms
Min: -61.3 Nm at 71.8 ms



Filter Class: CFC_600
Max: 34.4 N·m at 189.0 ms
Min: -70.5 N·m at 72.1 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 001 Certification No. 10-3

Test Date: 7/2/2008

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.617 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,839.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-70.42 mm	Yes
Internal Hysteresis	65 - 85 %	72.1 %	Yes

Test meets specifications.

Comments:

Technician

Charles W. Ball

Approved

Ron Stoner

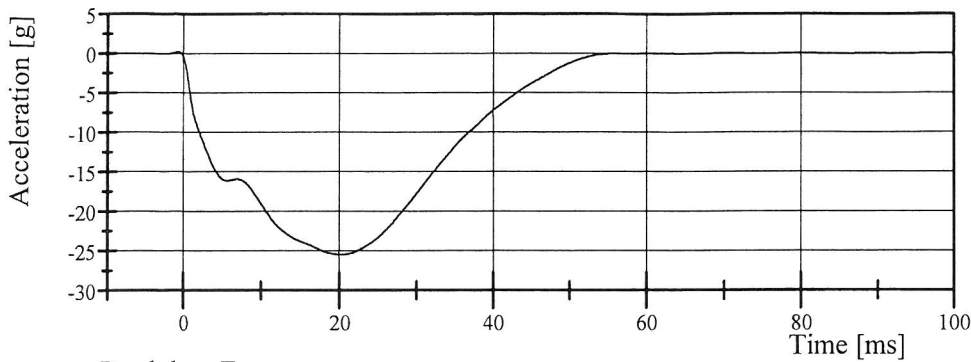
Transportation Research Center Inc.

Front Thorax

HIH 50th Serial No. 001 Certification No. 10-3

Test Date: 7/2/2008

Pendulum Acceleration

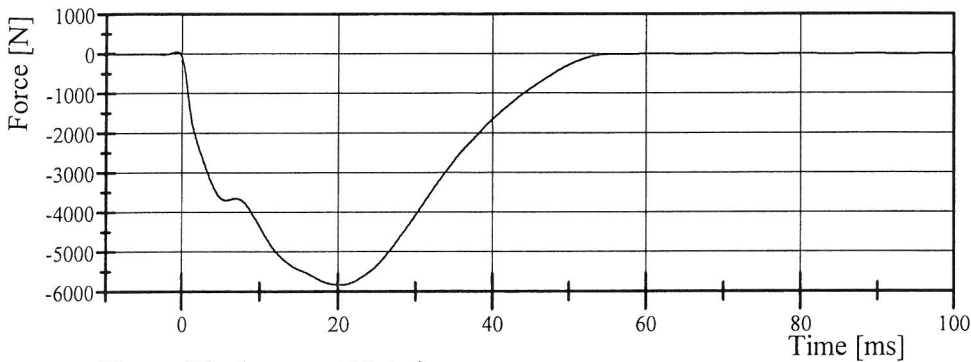


Filter Class: CFC_180

Max: 0.2 g at -0.6 ms

Min: -25.5 g at 20.2 ms

Pendulum Force

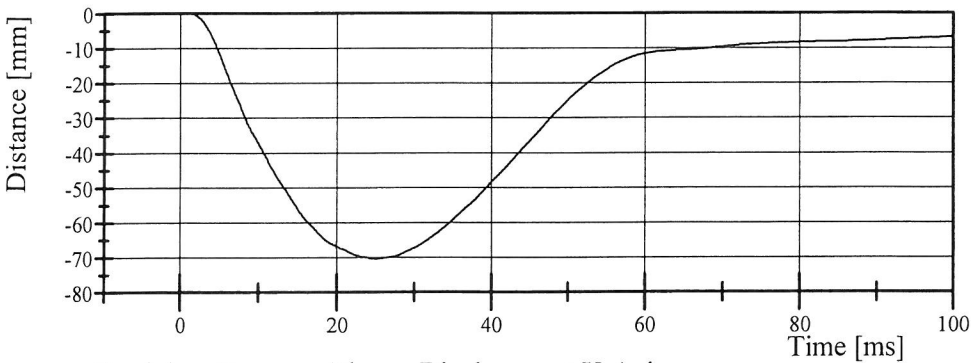


Filter Class: CFC_180

Max: 45.8 N at -0.6 ms

Min: -5,839.5 N at 20.2 ms

Thorax Displacement X-Axis

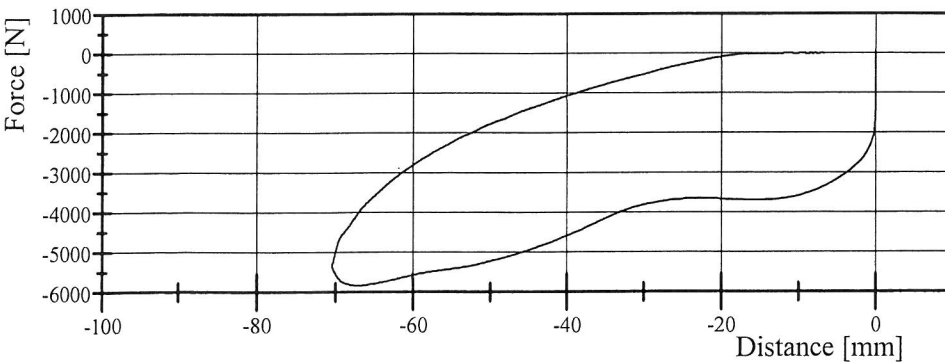


Filter Class: CFC_600

Max: 0.0 mm at -9.4 ms

Min: -70.4 mm at 25.0 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180

Max: 45.8 N at -0.0 mm

Min: -5,839.5 N at -67.1 mm

Transportation Research Center Inc

Hybrid III Hip Range of Motion

Serial Number: 001L

Date: 07/01/2008

Test Number: 001C10

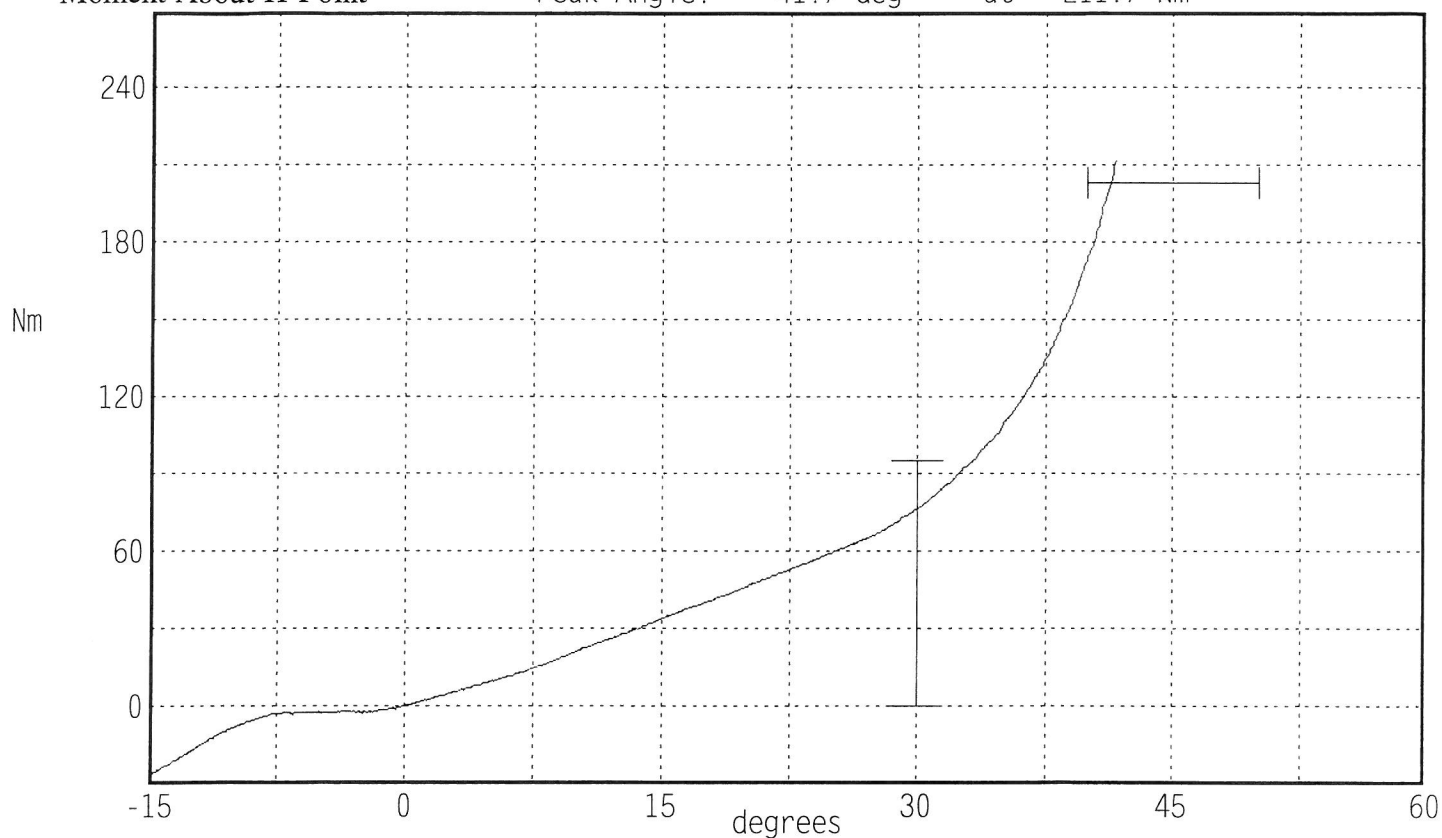
Time: 14:52

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.4 °C Pass
Humidity	10 - 70	47 % Pass
Moment at 30 deg	<= 94.9	76.3 Nm Pass
Angle at 203 Nm	40.0 - 50.0	41.5 deg Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec Pass

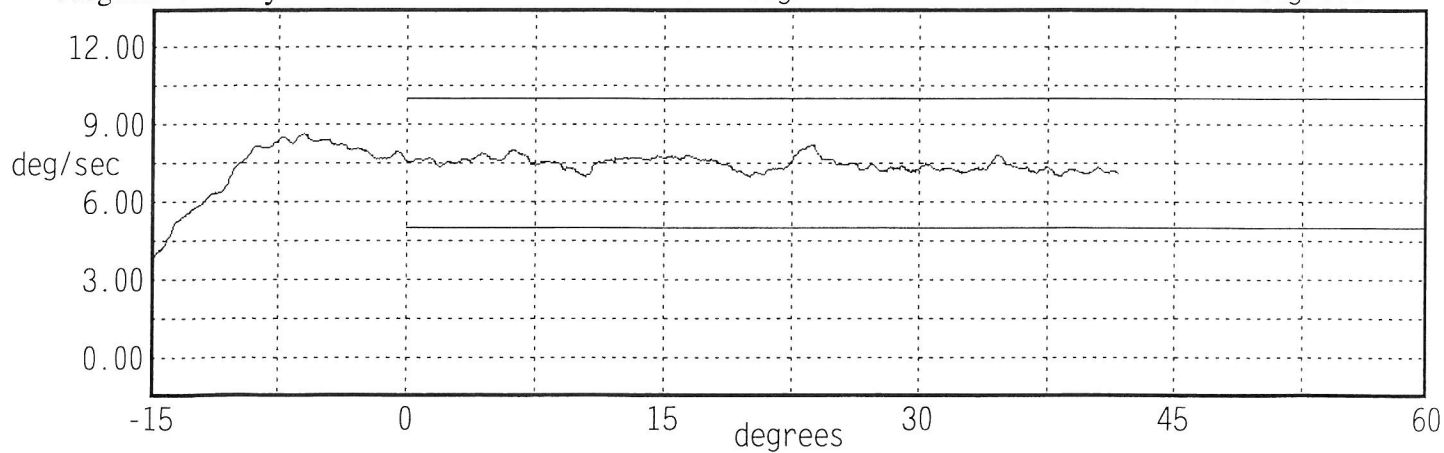
Moment About H-Point

Peak Moment: 211.7 Nm at 41.7 deg
Peak Angle: 41.7 deg at 211.7 Nm



Angular Velocity

Max: 8.2 deg/sec Min: 7.0 deg/sec



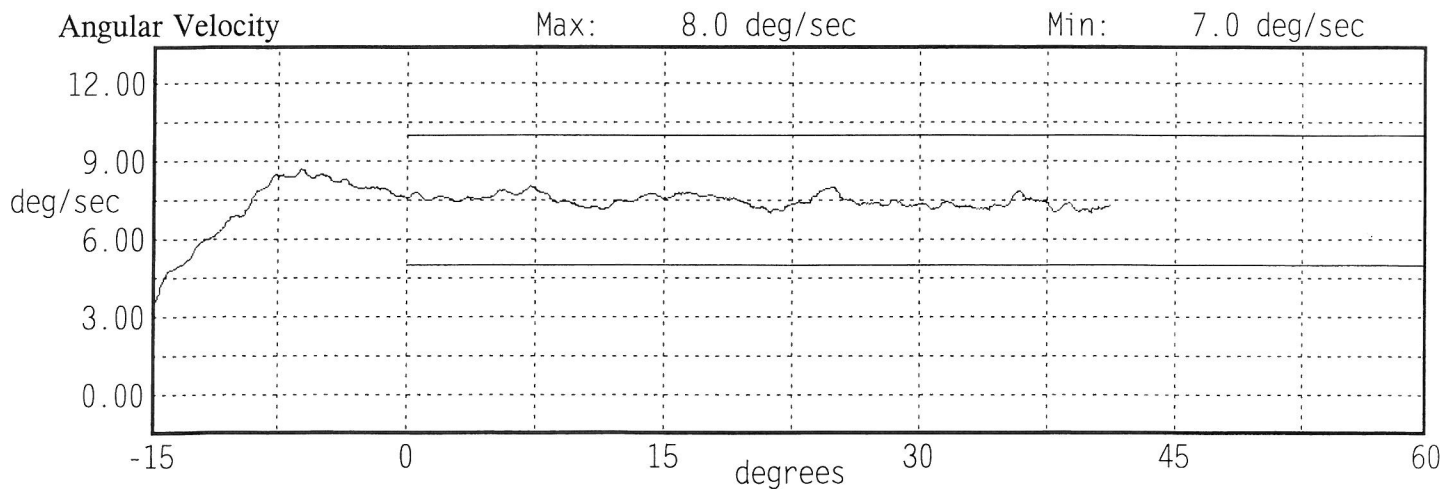
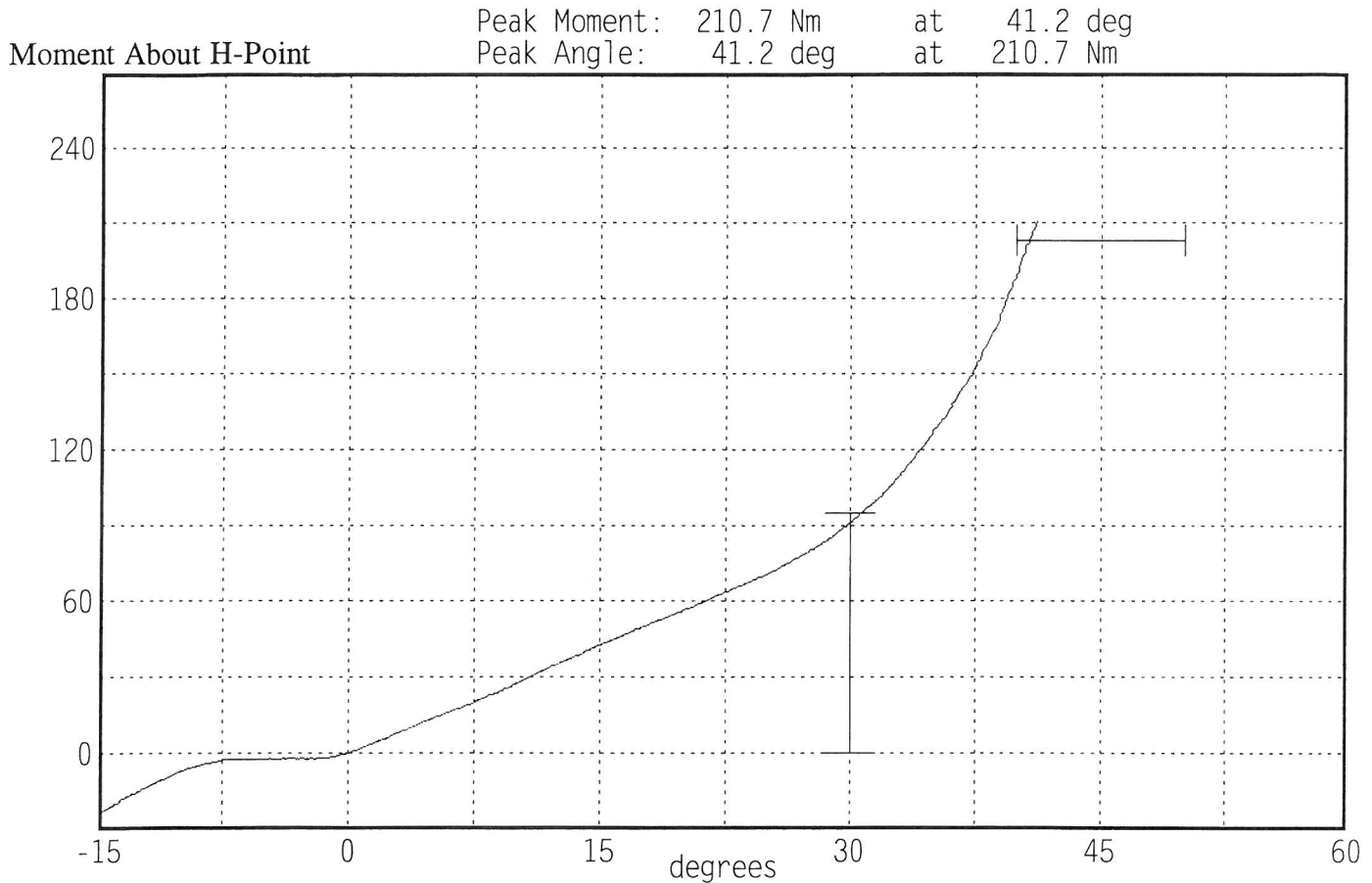
Transportation Research Center Inc

Hybrid III Hip Range of Motion

Serial Number: 001R
Test Number: 001C10
Comments:

Date: 07/01/2008
Time: 15:01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.5 °C Pass
Humidity	10 - 70	49 % Pass
Moment at 30 deg	<= 94.9	91.3 Nm Pass
Angle at 203 Nm	40.0 - 50.0	40.7 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass



Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 001 Certification No. 10-1
Test Date: 7/1/2008

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.081 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,332.17 N	Yes

Test meets specifications.

Comments:

Technician

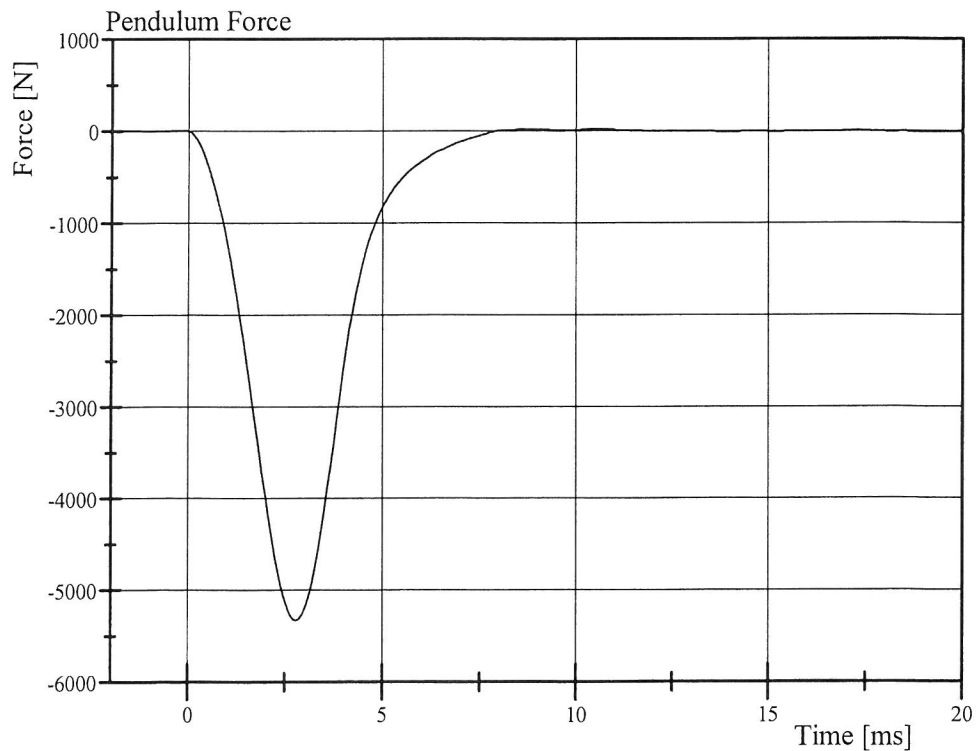
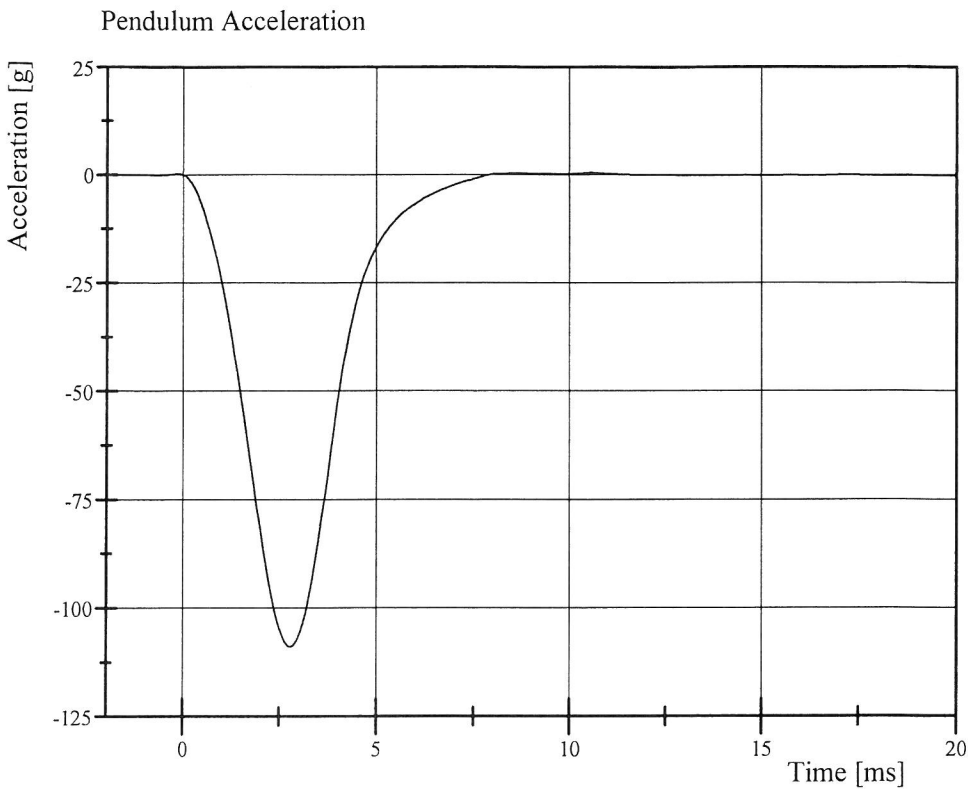


Approved



Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 001 Certification No. 10-1
Test Date: 7/1/2008



Transportation Research Center Inc.

Right Knee Femur Response Test

HIII 50th Serial No. 001 Certification No. 10-1

Test Date: 7/1/2008

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.086 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,320.77 N	Yes

Test meets specifications.

Comments:

Technician

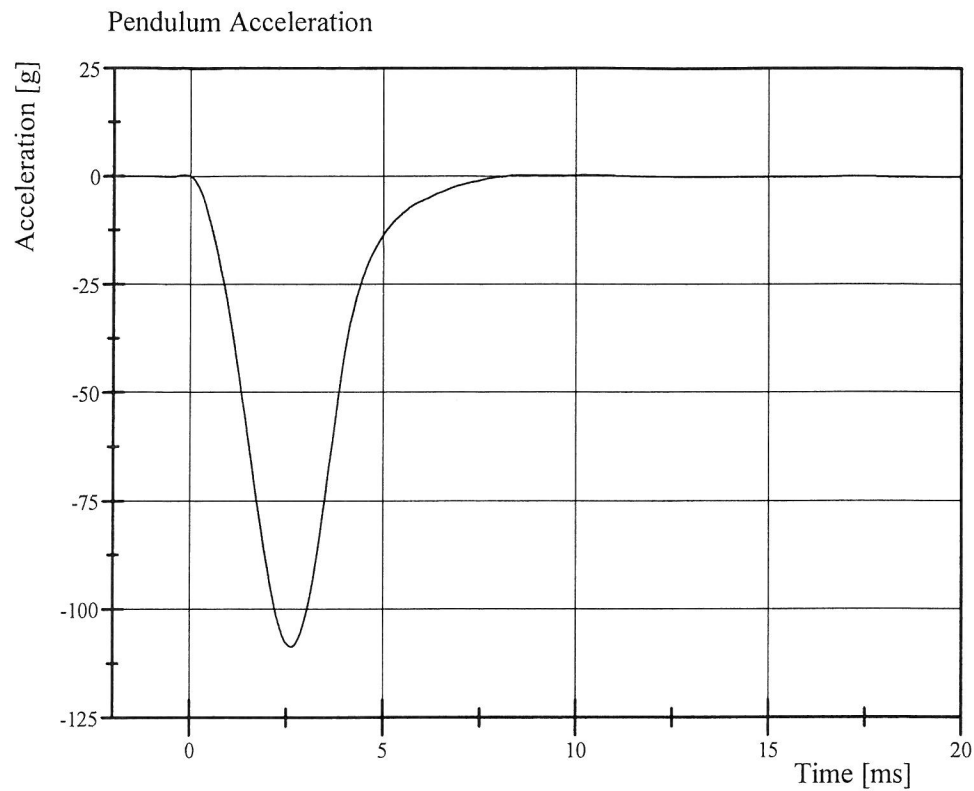


Approved

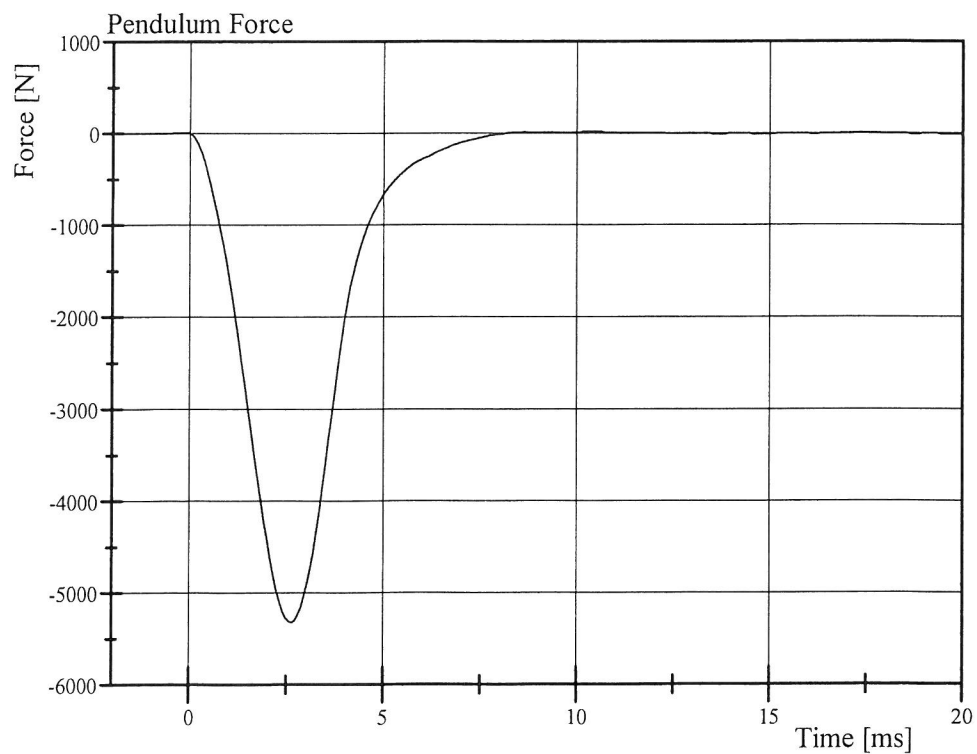


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 001 Certification No. 10-1
Test Date: 7/1/2008



Filter Class: CFC_600
Max: 0.4 g at 10.4 ms
Min: -108.7 g at 2.6 ms



Filter Class: CFC_600
Max: 18.3 N at 10.4 ms
Min: -5320.8 N at 2.6 ms

Partial Injury Calibration Test Results

Post-Test

Left Rear Passenger Dummy S/N: 001

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 001 Certification No. 11-3

Test Date: 10/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.990 m/s	Yes
Pendulum Acceleration Decay			
Crossing 5g	38 - 46 ms	42.3 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.92 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.31 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.92 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.92 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	96.4 °	Yes
Time of Peak	72 - 82 ms	76.8 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	147 - 174 ms	155.0 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-63.5 N·m	Yes
Time of Peak	65 - 79 ms	72.2 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	120 - 148 ms	141.3 ms	Yes

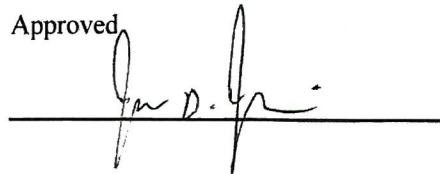
Test meets specifications.

Comments:

Technician



Approved



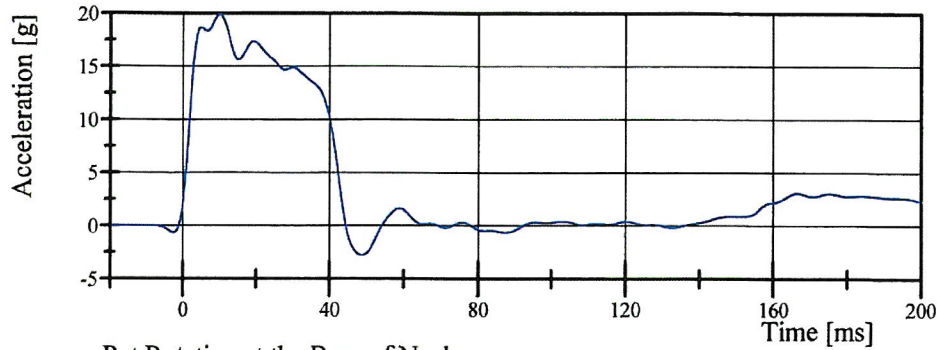
Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 001 Certification No. 11-3

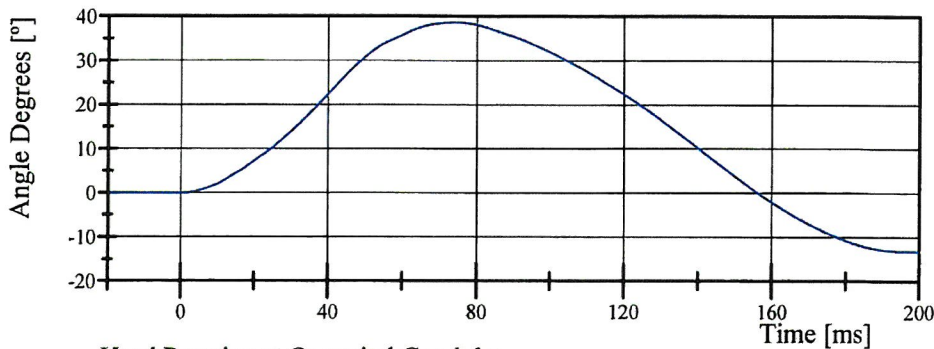
Test Date: 10/2/2009

Pendulum Acceleration



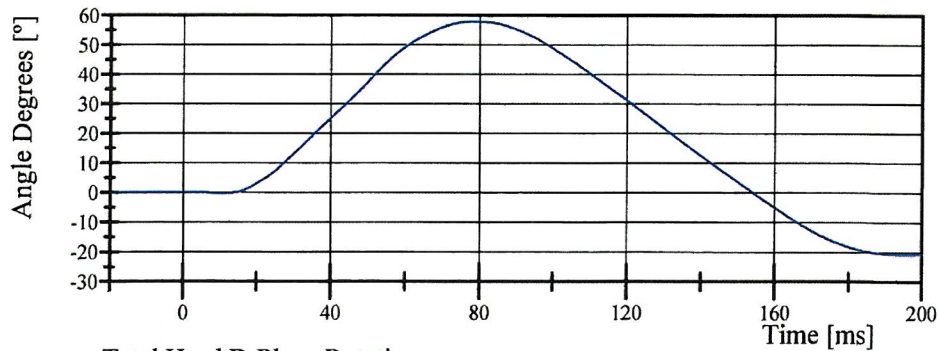
Filter Class: CFC_60
Max: 19.9 g at 10.0 ms
Min: -2.8 g at 48.8 ms

Pot Rotation at the Base of Neck



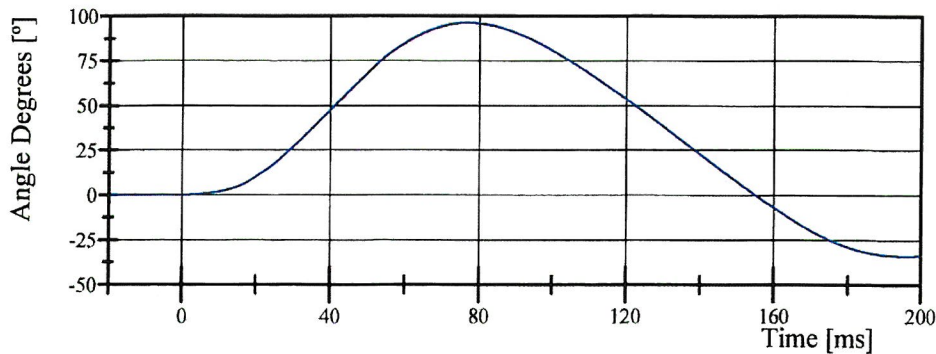
Filter Class: CFC_60
Max: 38.6 ° at 74.6 ms
Min: -13.2 ° at 197.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 57.9 ° at 78.6 ms
Min: -20.8 ° at 195.3 ms

Total Head D-Plane Rotation



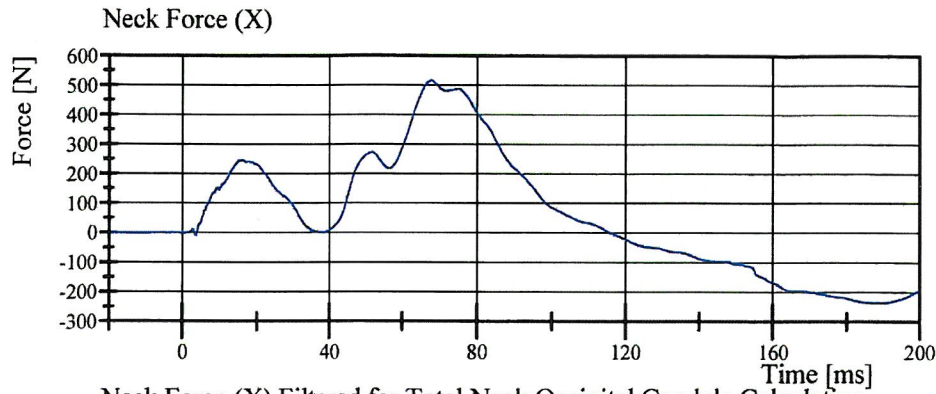
Filter Class: CFC_60
Max: 96.4 ° at 76.8 ms
Min: -34.0 ° at 196.2 ms

Transportation Research Center Inc.

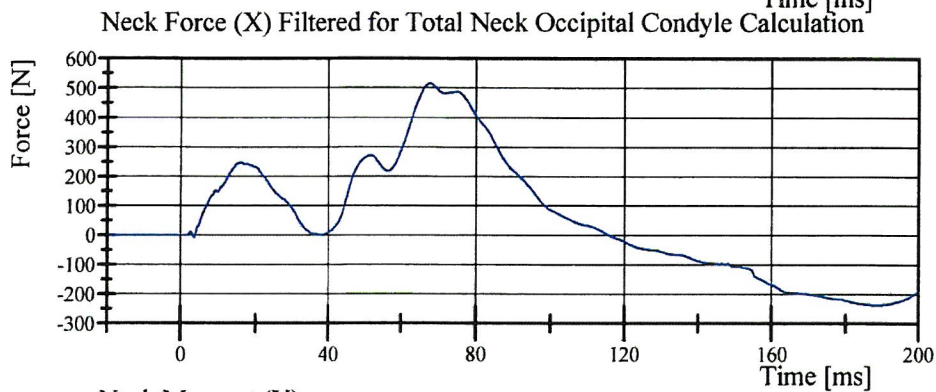
Neck Extension

HIII 50th Serial No. 001 Certification No. 11-3

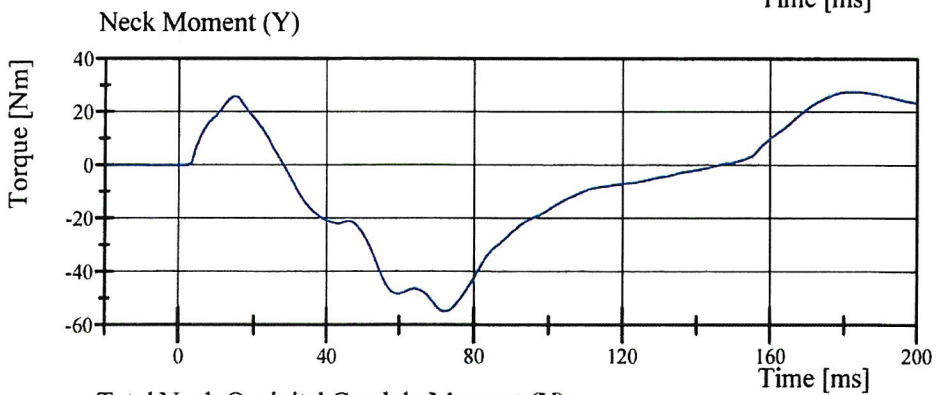
Test Date: 10/2/2009



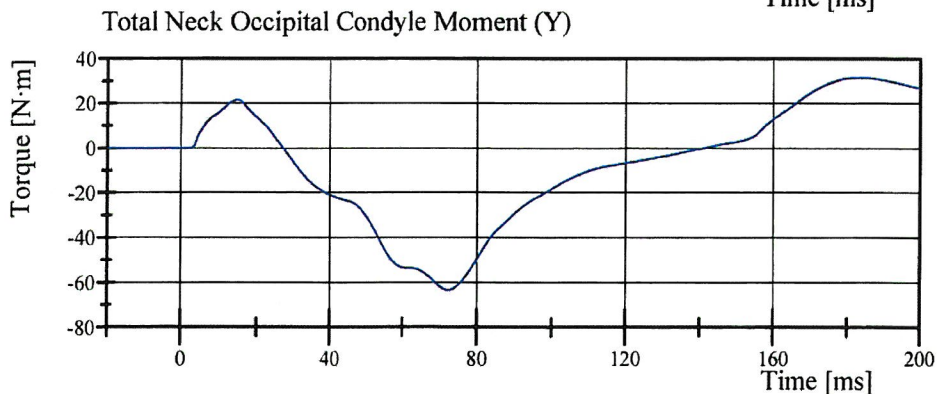
Filter Class: CFC_1000
Max: 517.5 N at 67.8 ms
Min: -236.9 N at 187.5 ms



Filter Class: CFC_600
Max: 517.0 N at 67.8 ms
Min: -236.6 N at 187.7 ms



Filter Class: CFC_600
Max: 27.6 Nm at 181.4 ms
Min: -55.0 Nm at 72.2 ms



Filter Class: CFC_600
Max: 31.6 N·m at 183.4 ms
Min: -63.5 N·m at 72.2 ms

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

<u>Lumbar load cells:</u>	+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 090930

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity	Assembly
1	Trig D1	10ZERO000000VO0A	EVENT		1 Logic	Bipolar	
2	P52023	11HEADCG00H3ACXA	Head Accel X	1000	g	-Bipolar	1-043 HIII 50th VRTC.001
3	P52013	11HEADCG00H3ACYA	Head Accel Y	1000	g	-Bipolar	1-043 HIII 50th VRTC.002
4	P52083	11HEADCG00H3ACZA	Head Accel Z	1000	g	-Bipolar	1-043 HIII 50th VRTC.003
5	ARS-12K-ARS2240	11HEADCG00H3AVXA	Head (DTS ARS) Rate Gyro X	12000	%s	Bipolar	
6	ARS-12K-ARS2238	11HEADCG00H3AVYA	Head (DTS ARS) Rate Gyro Y	12000	%s	Bipolar	
7	ARS-12K-ARS0253	11HEADCG00H3AVZA	Head (DTS ARS) Rate Gyro Z	12000	%s	Bipolar	
8	1716A-798-FX	11NECKUP00H3FOXA	Upper Neck Force X	8896	N	-Bipolar	1-043 HIII 50th VRTC.004
9	1716A-798-FY	11NECKUP00H3FOYA	Upper Neck Force Y	8896	N	Bipolar	1-043 HIII 50th VRTC.005
10	1716A-798-FZ	11NECKUP00H3FOZA	Upper Neck Force Z	13344	N	Bipolar	1-043 HIII 50th VRTC.006
11	1716A-798-MX	11NECKUP00H3MOXA	Upper Neck Moment X	282	Nm	-Bipolar	1-043 HIII 50th VRTC.007
12	1716A-798-MY	11NECKUP00H3MOYA	Upper Neck Moment Y	282	Nm	Bipolar	1-043 HIII 50th VRTC.008
13	1716A-798-MZ	11NECKUP00H3MOZA	Upper Neck Moment Z	282	Nm	Bipolar	1-043 HIII 50th VRTC.009
14	P16899	11CHSTCG00H3ACXA	Chest Accel X	400	g	Bipolar	1-043 HIII 50th VRTC.010
15	P16517	11CHSTCG00H3ACYA	Chest Accel Y	400	g	-Bipolar	1-043 HIII 50th VRTC.011
16	P51702	11CHSTCG00H3ACZA	Chest Accel Z	400	g	-Bipolar	1-043 HIII 50th VRTC.012
17	84892-A-CST043	11CHST0000H3DSXA	Chest Deflection X	84	mm	-Bipolar	1-043 HIII 50th VRTC.013
18	1794A-250-FX	11NECKLO00H3FOXA	Lower Neck Force X	8896	N	-Bipolar	1-043 HIII 50th VRTC.016
19	1794A-250-FY	11NECKLO00H3FOYA	Lower Neck Force Y	8896	N	Bipolar	1-043 HIII 50th VRTC.017
20	1794A-250-FZ	11NECKLO00H3FOZA	Lower Neck Force Z	13345	N	Bipolar	1-043 HIII 50th VRTC.018
21	1794A-250-MX	11NECKLO00H3MOXA	Lower Neck Moment X	282	Nm	-Bipolar	1-043 HIII 50th VRTC.019
22	1794A-250-MY	11NECKLO00H3MOYA	Lower Neck Moment Y	282	Nm	Bipolar	1-043 HIII 50th VRTC.020
23	1794A-250-MZ	11NECKLO00H3MOZA	Lower Neck Moment Z	282	Nm	Bipolar	1-043 HIII 50th VRTC.021
24	98H10-F18	11PELVCG00H3ACXA	Pelvis Accel X	2000	g	-Bipolar	1-043 HIII 50th VRTC.022
25	P51710	11PELVCG00H3ACYA	Pelvis Accel Y	2000	g	-Bipolar	1-043 HIII 50th VRTC.023
26	P16225	11PELVCG00H3ACZA	Pelvis Accel Z	2000	g	-Bipolar	1-043 HIII 50th VRTC.024
27	05G20-L12	13HEADCG00H3ACXA	Head Accel X	1000	g	Bipolar	3-110 HIII 50th FTSS.001
28	02A18-N15	13HEADCG00H3ACYA	Head Accel Y	1000	g	-Bipolar	3-110 HIII 50th FTSS.002
29	02I02I05-F09	13HEADCG00H3ACZA	Head Accel Z	1000	g	-Bipolar	3-110 HIII 50th FTSS.003
30	P51712	13HEADFR00H3ACYA	Head (FT) Accel Y	1000	g	-Bipolar	3-110 HIII 50th FTSS.004
31	P51717	13HEADFR00H3ACZA	Head (FT) Accel Z	1000	g	-Bipolar	3-110 HIII 50th FTSS.005
32	99H30-Z13	13HEADUP00H3ACXA	Head (TP) Accel X	1000	g	Bipolar	3-110 HIII 50th FTSS.006
33	B02A25-N01	13HEADUP00H3ACYA	Head (TP) Accel Y	1000	g	-Bipolar	3-110 HIII 50th FTSS.007
34	02A18-N01	13HEADLE00H3ACXA	Head (LT) Accel X	1000	g	Bipolar	3-110 HIII 50th FTSS.008
35	03F03J01-R11	13HEADLE00H3ACZA	Head (LT) Accel Z	1000	g	-Bipolar	3-110 HIII 50th FTSS.009
36	1716A-1597-FX	13NECKUP00H3FOXA	Neck Force X	8896.4	N	-Bipolar	3-110 HIII 50th FTSS.010
37	1716A-1597-FY	13NECKUP00H3FOYA	Neck Force Y	8896.4	N	Bipolar	3-110 HIII 50th FTSS.011

D-6

090930

Channel Report Test Number 090930

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity	Assembly
38	1716A-1597-FZ	13NECKUP00H3FOZA	Neck Force Z	13344.6	N	Bipolar	3-110 HIII 50th FTSS.012
39	1716A-1597-MX	13NECKUP00H3MOXA	Neck Moment X	282.4	Nm	-Bipolar	3-110 HIII 50th FTSS.013
40	1716A-1597-MY	13NECKUP00H3MOYA	Neck Moment Y	282.4	Nm	Bipolar	3-110 HIII 50th FTSS.014
41	1716A-1597-MZ	13NECKUP00H3MOZA	Neck Moment Z	282.4	Nm	Bipolar	3-110 HIII 50th FTSS.015
42	1794A-0216-FX	13NECKLO00H3FOXA	Neck Lower Force X	13345	N	-Bipolar	3-110 HIII 50th FTSS.016
43	1794A-0216-FY	13NECKLO00H3FOYA	Neck Lower Force Y	13344.6	N	Bipolar	3-110 HIII 50th FTSS.017
44	1794A-0216-FZ	13NECKLO00H3FOZA	Neck Lower Force Z	13344.6	N	Bipolar	3-110 HIII 50th FTSS.018
45	1794A-0216-MX	13NECKLO00H3MOXA	Neck Lower Moment X	452	Nm	-Bipolar	3-110 HIII 50th FTSS.019
46	1794A-0216-MY	13NECKLO00H3MOYA	Neck Lower Moment Y	452	Nm	Bipolar	3-110 HIII 50th FTSS.020
47	1794A-0216-MZ	13NECKLO00H3MOZA	Neck Lower Moment Z	452	Nm	Bipolar	3-110 HIII 50th FTSS.021
48	99H12-F24	13CHSTCG00H3ACXA	Chest Accel X	1000	g	Bipolar	3-110 HIII 50th FTSS.022
49	02I02I05-F04	13CHSTCG00H3ACYA	Chest Accel Y	1000	g	-Bipolar	3-110 HIII 50th FTSS.023
50	03D03C27-N07	13CHSTCG00H3ACZA	Chest Accel Z	1000	g	-Bipolar	3-110 HIII 50th FTSS.024
51	CST110	13CHST0000H3DSXA	Chest Deflection X	84	mm	Bipolar	3-110 HIII 50th FTSS.028
52	P52008	13PELVCG00H3ACXA	Pelvis Accel X	1000	g	-Bipolar	3-110 HIII 50th FTSS.029
53	04J04I20-Z24	13PELVCG00H3ACYA	Pelvis Accel Y	1000	g	-Bipolar	3-110 HIII 50th FTSS.030
54	98H13-F19	13PELVCG00H3ACZA	Pelvis Accel Z	1000	g	-Bipolar	3-110 HIII 50th FTSS.031
55	P51954	14HEADCG00H3ACXA	Head Accel X	1000	g	-Bipolar	4-001 VRTC H3 50th.001
56	P58726	14HEADCG00H3ACYA	Head Accel Y	1000	g	-Bipolar	4-001 VRTC H3 50th.002
57	P51266	14HEADCG00H3ACZA	Head Accel Z	1000	g	-Bipolar	4-001 VRTC H3 50th.003
58	ARS-12K-ARS1082	14HEADCG00H3AVXA	Head (DTS ARS) Rate Gyro X	12000	%/s	Bipolar	
59	ARS-12K-ARS1087	14HEADCG00H3AVYA	Head (DTS ARS) Rate Gyro Y	12000	%/s	Bipolar	
60	ARS-12K-ARS1034	14HEADCG00H3AVZA	Head (DTS ARS) Rate Gyro Z	12000	%/s	Bipolar	
61	IF-205-261-FX	14NECKUP00H3FOXA	Neck Force X	8896	N	-Bipolar	4-001 VRTC H3 50th.007
62	IF-205-261-FY	14NECKUP00H3FOYA	Neck Force Y	8896	N	Bipolar	4-001 VRTC H3 50th.008
63	IF-205-261-FZ	14NECKUP00H3FOZA	Neck Force Z	13344	N	Bipolar	4-001 VRTC H3 50th.009
64	IF-205-261-MX	14NECKUP00H3MOXA	Neck Moment X	282.5	Nm	-Bipolar	4-001 VRTC H3 50th.010
65	IF-205-261-MY	14NECKUP00H3MOYA	Neck Moment Y	282.5	Nm	Bipolar	4-001 VRTC H3 50th.011
66	IF-205-261-MZ	14NECKUP00H3MOZA	Neck Moment Z	282.5	Nm	Bipolar	4-001 VRTC H3 50th.012
67	P52081	14CHSTCG00H3ACXA	Chest Accel X	1000	g	Bipolar	4-001 VRTC H3 50th.013
68	02I02I05-F11	14CHSTCG00H3ACYA	Chest Accel Y	1000	g	-Bipolar	4-001 VRTC H3 50th.014
69	P58771	14CHSTCG00H3ACZA	Chest Accel Z	1000	g	-Bipolar	4-001 VRTC H3 50th.015
70	CST001	14CHST0000H3DSXA	Chest Deflection X	84	mm	Bipolar	4-001 VRTC H3 50th.019
71	P58870	14PELVCG00H3ACXA	Pelvis Accel X	1000	g	-Bipolar	4-001 VRTC H3 50th.020
72	P52071	14PELVCG00H3ACYA	Pelvis Accel Y	1000	g	-Bipolar	4-001 VRTC H3 50th.021
73	P52086	14PELVCG00H3ACZA	Pelvis Accel Z	1000	g	-Bipolar	4-001 VRTC H3 50th.022
74	1794A-249-FX	14NECKLO00H3FOXA	Lower Neck Force X	8896	N	-Bipolar	4-001 VRTC H3 50th.025

Channel Report Test Number 090930

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity	Assembly
75	1794A-249-FY	14NECKLO00H3FOYA	Lower Neck Force Y	8896	N	Bipolar	4-001 VRTC H3 50th.026
76	1794A-249-FZ	14NECKLO00H3FOZA	Lower Neck Force Z	13345	N	Bipolar	4-001 VRTC H3 50th.027
77	1794A-249-MX	14NECKLO00H3MOXA	Lower Neck Moment X	282.5	Nm	-Bipolar	4-001 VRTC H3 50th.028
78	1794A-249-MY	14NECKLO00H3MOYA	Lower Neck Moment Y	282.5	Nm	Bipolar	4-001 VRTC H3 50th.029
79	1794A-249-MZ	14NECKLO00H3MOZA	Lower Neck Moment Z	282.5	Nm	Bipolar	4-001 VRTC H3 50th.030
80	P54837	10VEHCCG0000ACXA	Vehicle Center of Gravity X-axis Acceleration	2000	g	Bipolar	
81	P61434	10VEHCCG0000ACYA	Vehicle Center of Gravity Y-axis Acceleration	2000	g	-Bipolar	
82	P57784	10VEHCCG0000ACZA	Vehicle Center of Gravity Z-axis Acceleration	2000	g	-Bipolar	
83	ARS-1500-ARS2609	10VEHCCG0000AVXA	Vehicle Center of Gravity ROLL RATE 1	1500	%s	Bipolar	
84	ARS-1500-ARS0732	10VEHCCG0000AVYA	Vehicle Center of Gravity PITCH RATE 1	1500	%s	Bipolar	
85	ARS-1500-ARS0665	10VEHCCG0000AVZA	Vehicle Center of Gravity YAW RATE 1	1500	%s	Bipolar	
86	ARS-1500-ARS0737	10VEHCREDK00AVXA	Rear Deck (cargo area) ROLL RATE 1 Redundant	1500	%s	Bipolar	
87	ARS-1500-ARS1055	10VEHCREDK00AVYA	Rear Deck (cargo area) PITCH RATE 1 Redundant	1500	%s	Bipolar	
88	ARS-1500-ARS1091	10VEHCREDK00AVZA	Rear Deck (cargo area) YAW RATE 1 Redundant	1500	%s	Bipolar	
89	P57790	10ENGNTPO000ACXA	Top of Engine X-axis Accel	2000	g	Bipolar	
90	P61453	10ENGNTPO000ACYA	Top of Engine Y-axis Accel	2000	g	-Bipolar	
91	P34212	10ENGNTPO000ACZA	Top of Engine Z-axis Accel	2000	g	-Bipolar	
92	P57876	10ENGNB00000ACXA	Bottom of Engine X-axis Accel	2000	g	Bipolar	
93	P57207	10ENGNB00000ACYA	Bottom of Engine Y-axis Accel	2000	g	-Bipolar	
94	P61536	10ENGNB00000ACZA	Left Bottom of Engine Z-axis Accel	2000	g	Bipolar	
95	P63147	10APILUPLE00ACXA	Left A-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
96	P64806	10APILUPLE00ACYA	Left A-Pillar Upper Y-Axis Acceleration	2000	g	-Bipolar	
97	P63123	10APILUPLE00ACZA	Left A-Pillar Upper Z-Axis Acceleration	2000	g	Bipolar	
98	P63125	10APILLOLE00ACXA	Left A-Pillar Lower X-Axis Acceleration	2000	g	-Bipolar	
99	P62204	10APILLOLE00ACYA	Left A-Pillar Lower Y-Axis Acceleration	2000	g	Bipolar	
100	P62216	10APILLOLE00ACZA	Left A-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
101	P62553	10APILUPRI00ACXA	Right A-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
102	P62580	10APILUPRI00ACYA	Right A-Pillar Upper Y-Axis Acceleration	2000	g	Bipolar	
103	P62619	10APILUPRI00ACZA	Right A-Pillar Upper Z-Axis Acceleration	2000	g	Bipolar	
104	P63161	10APILLORI00ACXA	Right A-Pillar Lower X-Axis Acceleration	2000	g	Bipolar	
105	P63187	10APILLORI00ACYA	Right A-Pillar Lower Y-Axis Acceleration	2000	g	-Bipolar	
106	P63169	10APILLORI00ACZA	Right A-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
107	P46509	10BPILUPLE00ACXA	Left B-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
108	P58544	10BPILUPLE00ACYA	Left B-Pillar Upper Y-Axis Acceleration	2000	g	Bipolar	
109	A044385	10BPILUPLE00ACZA	Left B-Pillar Upper Z-Axis Acceleration	2000	g	-Bipolar	
110	P62623	10BPILLOLE00ACXA	Left B-Pillar Lower X-Axis Acceleration	2000	g	Bipolar	
111	P62550	10BPILLOLE00ACYA	Left B-Pillar Lower Y-Axis Acceleration	2000	g	Bipolar	

Channel Report Test Number 090930

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity	Assembly
112	P62547	10BPILLOLE00ACZA	Left B-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
113	P63133	10BPILUPRI00ACXA	Right B-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
114	P62232	10BPILUPRI00ACYA	Right B-Pillar Upper Y-Axis Acceleration	2000	g	-Bipolar	
115	P62207	10BPILUPRI00ACZA	Right B-Pillar Upper Z-Axis Acceleration (F)	2000	g	-Bipolar	
116	P63124	10BPILLORI00ACXA	Right B-Pillar Lower X-Axis Acceleration	2000	g	Bipolar	
117	P63138	10BPILLORI00ACYA	Right B-Pillar Lower Y-Axis Acceleration	2000	g	-Bipolar	
118	P63139	10BPILLORI00ACZA	Right B-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
119	P61316	10CPILUPLE00ACXA	Left C-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
120	P61746	10CPILUPLE00ACYA	Left C-Pillar Upper Y-Axis Acceleration	2000	g	Bipolar	
121	P61444	10CPILUPLE00ACZA	Left C-Pillar Upper Z-Axis Acceleration	2000	g	-Bipolar	
122	P62225	10CPILLOLE00ACXA	Left C-Pillar Lower X-Axis Acceleration	2000	g	Bipolar	
123	P62634	10CPILLOLE00ACYA	Left C-Pillar Lower Y-Axis Acceleration	2000	g	Bipolar	
124	P61773	10CPILLOLE00ACZA	Left C-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
125	P62628	10CPILUPRI00ACXA	Right C-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
126	P61296	10CPILUPRI00ACYA	Right C-Pillar Upper Y-Axis Acceleration	2000	g	-Bipolar	
127	P62240	10CPILUPRI00ACZA	Right C-Pillar Upper Z-Axis Acceleration	2000	g	-Bipolar	
128	P45012	10CPILLORI00ACXA	Right C-Pillar Lower X-Axis Acceleration	2000	g	Bipolar	
129	P62213	10CPILLORI00ACYA	Right C-Pillar Lower Y-Axis Acceleration	2000	g	-Bipolar	
130	P63128	10CPILLORI00ACZA	Right C-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
131	P57160	10DPILUPLE00ACXA	Left D-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
132	P61282	10DPILUPLE00ACYA	Left D-Pillar Upper Y-Axis Acceleration	2000	g	Bipolar	
133	P63134	10DPILUPLE00ACZA	Left D-Pillar Upper Z-Axis Acceleration	2000	g	-Bipolar	
134	P62202	10DPILLOLE00ACXA	Left D-Pillar Lower X-Axis Acceleration	2000	g	Bipolar	
135	P62233	10DPILLOLE00ACYA	Left D-Pillar Lower Y-Axis Acceleration	2000	g	Bipolar	
136	P63126	10DPILLOLE00ACZA	Left D-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
137	P62633	10DPILUPRI00ACXA	Right D-Pillar Upper X-Axis Acceleration	2000	g	Bipolar	
138	P61731	10DPILUPRI00ACYA	Right D-Pillar Upper Y-Axis Acceleration	2000	g	-Bipolar	
139	P62575	10DPILUPRI00ACZA	Right D-Pillar Upper Z-Axis Acceleration	2000	g	-Bipolar	
140	P62215	10DPILLORI00ACXA	Right D-Pillar Lower X-Axis Acceleration	2000	g	Bipolar	
141	P62632	10DPILLORI00ACYA	Right D-Pillar Lower Y-Axis Acceleration	2000	g	-Bipolar	
142	P61765	10DPILLORI00ACZA	Right D-Pillar Lower Z-Axis Acceleration	2000	g	-Bipolar	
143	P62574	102RDK000000ACXA	Vehicle Rear Deck X-axis Acceleration	2000	g	Bipolar	
144	P61533	102RDK000000ACYA	Vehicle Rear Deck Y-axis Acceleration	2000	g	-Bipolar	
145	P61314	102RDK000000ACZA	Vehicle Rear Deck Z-axis Acceleration	2000	g	-Bipolar	
146	P61537	11SEAT000000ACXA	LF Seat Position (on floor) X-axis Acceleration	2000	g	Bipolar	
147	P58607	11SEAT000000ACYA	LF Seat Position (on floor) Y-axis Acceleration	2000	g	Bipolar	
148	P61310	11SEAT000000ACZA	LF Seat Position (on floor) Z-axis Acceleration	2000	g	-Bipolar	

D-9

090930

Channel Report Test Number 090930

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity	Assembly
149	P63135	13SEAT000000ACXA	RF Seat Position (on floor) X-axis Acceleration	2000	g	Bipolar	
150	P62208	13SEAT000000ACYA	RF Seat Position (on floor) Y-axis Acceleration	2000	g	-Bipolar	
151	P63157	13SEAT000000ACZA	RF Seat Position (on floor) Z-axis Acceleration	2000	g	-Bipolar	
152	P49022	14SEAT000000ACXA	LR Seat Position (on floor) X-axis Acceleration	2000	g	Bipolar	
153	P62635	14SEAT000000ACYA	LR Seat Position (on floor) Y-axis Acceleration	2000	g	-Bipolar	
154	P61712	14SEAT000000ACZA	LR Seat Position (on floor) Z-axis Acceleration	2000	g	-Bipolar	
155	P62217	16SEAT000000ACXA	RR Seat Position (on floor) X-axis Acceleration	2000	g	Bipolar	
156	P62197	16SEAT000000ACYA	RR Seat Position (on floor) Y-axis Acceleration	2000	g	Bipolar	
157	P62203	16SEAT000000ACZA	RR Seat Position (on floor) Z-axis Acceleration	2000	g	-Bipolar	
158	3419T-828	11SEBE0000B5FO0A	Driver Lap Belt Force	13344	N	Bipolar	
159	X08010	11SEBE0000B3FO0A	Driver Shoulder Belt Force (J10)	13344	N	Bipolar	
160	3419-830	13SEBE0000B5FO0A	Front Pass. Lap Belt Force (743)	13344	N	Bipolar	
161	X08013	13SEBE0000B3FO0A	Front Pass. Shldr. Belt Force (J2)	13344	N	Bipolar	
162	X08014	14SEBE0000B5FO0A	Left Rear Pass. Lap Belt Force (W11)	13344	N	Bipolar	
163	X08012	14SEBE0000B3FO0A	Left Rear Pass. Shldr. Belt Force (602)	13344	N	Bipolar	
164	G1805342B	11SEBE0000B5DS0A	Driver Seat Belt Spool Potentiometers	750	mm	Bipolar	
165	B1801244B	13SEBE0000B5DS0A	Front Pass. Belt Spool Potentiometers	750	mm	Bipolar	
166	G1805344B	14SEBE0000B5DS0A	Left Rear Pass. Belt Spool Potentiometers	750	mm	Bipolar	
167	Bit.00	11CONT000023EV00	DRIV. Head Contact Switch	1	Logic	Bipolar	
168	Bit.01	11CONT000024EV00	DRIV. Thorax Contact Switch	1	Logic	Bipolar	
169	Bit.02	11CONT000025EV00	DRIV. Pelvis Contact Switch	1	Logic	Bipolar	
170	Bit.03	13CONT000026EV00	Pass. Head Contact Switch	1	Logic	Bipolar	
171	Bit.04	13CONT000027EV00	Pass. Thorax Contact Switch	1	Logic	Bipolar	
172	Bit.05	13CONT000028EV00	Pass. Pelvis Contact Switch	1	Logic	Bipolar	
173	Bit.06	14CONT000029EV00	Left Rear Pass. Head Contact Switch	1	Logic	Bipolar	
174	Bit.07	14CONT000030EV00	Left Rear Pass. Thorax Contact Switch	1	Logic	Bipolar	
175	Bit.08	14CONT000031EV00	Left Rear Pass. Pelvis Contact Switch	1	Logic	Bipolar	
176	ABT squib volts	11BCKLIN0000VO0A	Driver Inner Buckle Voltage	50	V	Bipolar	
177	ABT squib volts	14BCKLIN0000VO0A	Rear Passenger Inner Buckle Voltage	50	V	Bipolar	
178	P62546	M2VEHC000000ACXA	Cart X	2000	g	Bipolar	
179	P57185	M2VEHC000000ACYA	Cart Y	2000	g	Bipolar	
180	P61752	M2VEHC000000ACZA	Cart Z	2000	g	-Bipolar	
	ABT squib amps	11BCKLIN0000CU0A	Driver Inner Buckle Current	5	A	Bipolar	
	ABT squib amps	14BCKLIN0000CU0A	Rear Passenger Inner Buckle Current	5	A	Bipolar	

D-10

090930

Command File Test Number 090930

Channel	ISO mnemonic	Channel Title	Filter Class	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	60	+	yes	12000
5	11HEADCG00H3AVYA	Driver Head (DTS ARS) Rate Gyro Y	60	+	yes	12000
6	11HEADCG00H3AVZA	Driver Head (DTS ARS) Rate Gyro Z	60	+	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
11	11NECKUP00H3MOYA	Driver Upper Neck Moment About Y Axis	600	+	yes	282
12	11NECKUP00H3MOZA	Driver Upper Neck Moment About Z Axis	600	+	yes	282
13	11CHSTCG00H3ACXA	Driver Chest X-Axis Acceleration	180	+	yes	400
14	11CHSTCG00H3ACYA	Driver Chest Y-Axis Acceleration	180	+	yes	400
15	11CHSTCG00H3ACZA	Driver Chest Z-Axis Acceleration	180	+	yes	400
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
21	11NECKLO00H3MOYA	Driver Lower Neck Moment About Y Axis	600	+	yes	282
22	11NECKLO00H3MOZA	Driver Lower Neck Moment About Z Axis	600	+	yes	282
23	11PELVCG00H3ACXA	Driver Pelvis X-Axis Acceleration	1000	+	yes	2000
24	11PELVCG00H3ACYA	Driver Pelvis Y-Axis Acceleration	1000	+	yes	2000
25	11PELVCG00H3ACZA	Driver Pelvis Z-Axis Acceleration	1000	+	yes	2000
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

Command File Test Number 090930

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
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
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	60	+	yes	12000
58	14HEADCG00H3AVYA	Left Rear Passenger Head (DTS ARS) Rate Gyro Y	60	+	yes	12000
59	14HEADCG00H3AVZA	Left Rear Passenger Head (DTS ARS) Rate Gyro Z	60	+	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	282.5
64	14NECKUP00H3MOYA	Left Rear Passenger Upper Neck Moment About Y Axis	600	+	yes	282.5
65	14NECKUP00H3MOZA	Left Rear Passenger Upper Neck Moment About Z Axis	600	+	yes	282.5
66	14CHSTCG00H3ACXA	Left Rear Passenger Chest X-Axis Acceleration	180	+	yes	1000
67	14CHSTCG00H3ACYA	Left Rear Passenger Chest Y-Axis Acceleration	180	+	yes	1000

D-12

090930

Command File Test Number 090930

Channel	ISO mnemonic	Channel Title	Filter	Class	Flip	Zero	Full Scale
68	14CHSTCG00H3ACZA	Left Rear Passenger Chest Z-Axis Acceleration	180	+		yes	1000
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	1000
71	14PELVCG00H3ACYA	Left Rear Passenger Pelvis Y-Axis Acceleration	1000	+		yes	1000
72	14PELVCG00H3ACZA	Left Rear Passenger Pelvis Z-Axis Acceleration	1000	+		yes	1000
72A	14PELVCG00H3ACRA	Left Rear Passenger Pelvis Resultant Acceleration	1000				
73	14NECKLO00H3FOXAX	Left Rear Passenger Lower Neck X-Axis Force	1000	+		yes	8896
74	14NECKLO00H3FOYAX	Left Rear Passenger Lower Neck Y-Axis Force	1000	+		yes	8896
75	14NECKLO00H3FOZAX	Left Rear Passenger Lower Neck Z-Axis Force	1000	+		yes	13345
76	14NECKLO00H3MOXAX	Left Rear Passenger Lower Neck Moment About X Axis	600	+		yes	282.5
77	14NECKLO00H3MOYAX	Left Rear Passenger Lower Neck Moment About Y Axis	600	+		yes	282.5
78	14NECKLO00H3MOZAX	Left Rear Passenger Lower Neck Moment About Z Axis	600	+		yes	282.5
79	10VEHCCG0000ACXAX	Vehicle Center of Gravity X-Axis Acceleration	60	+		yes	2000
80	10VEHCCG0000ACYAX	Vehicle Center of Gravity Y-Axis Acceleration	60	+		yes	2000
81	10VEHCCG0000ACZAX	Vehicle Center of Gravity Z-Axis Acceleration	60	+		yes	2000
81A	10VEHCCG0000ACRAX	Vehicle Center of Gravity Resultant Acceleration	60				
82	10VEHCCG0000AVXAX	Vehicle Roll Rate	60	+		yes	1500
83	10VEHCCG0000AVYAX	Vehicle Pitch Rate	60	+		yes	1500
84	10VEHCCG0000AVZAX	Vehicle Yaw Rate	60	+		yes	1500
85	10VEHCREDK00AVXAX	Rear Deck Roll Rate Redundant	60	+		yes	1500
86	10VEHCREDK00AVYAX	Rear Deck Pitch Rate Redundant	60	+		yes	1500
87	10VEHCREDK00AVZAX	Rear Deck Yaw Rate Redundant	60	+		yes	1500
88	10ENGNTTP0000ACXAX	Top of Engine X-Axis Acceleration	60	+		yes	2000
89	10ENGNTTP0000ACYAX	Top of Engine Y-Axis Acceleration	60	+		yes	2000
90	10ENGNTTP0000ACZAX	Top of Engine Z-Axis Acceleration	60	+		yes	2000
90A	10ENGNTTP0000ACRAX	Top of Engine Resultant Acceleration	60				
91	10ENGNB0000ACXAX	Bottom of Engine X-Axis Acceleration	60	+		yes	2000
92	10ENGNB0000ACYAX	Bottom of Engine Y-Axis Acceleration	60	+		yes	2000
93	10ENGNB0000ACZAX	Bottom of Engine Z-Axis Acceleration	60	+		yes	2000
93A	10ENGNB0000ACRAX	Bottom of Engine Resultant Acceleration	60				
94	10APILUPLE00ACXAX	Left A-Pillar Upper X-Axis Acceleration	60	+		yes	2000
95	10APILUPLE00ACYAX	Left A-Pillar Upper Y-Axis Acceleration	60	+		yes	2000
96	10APILUPLE00ACZAX	Left A-Pillar Upper Z-Axis Acceleration	60	+		yes	2000
96A	10APILUPLE00ACRAX	Left A-Pillar Upper Resultant Acceleration	60				
97	10APILLOLE00ACXAX	Left A-Pillar Lower X-Axis Acceleration	60	+		yes	2000
98	10APILLOLE00ACYAX	Left A-Pillar Lower Y-Axis Acceleration	60	+		yes	2000

Command File Test Number 090930

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
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
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

Command File Test Number 090930

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
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
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			

D-15

090930

Command File Test Number 090930

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
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	13344
159	13SEBE0000B5FO0A	Right Front Passenger Lap Belt Force	60	+	yes	13344
160	13SEBE0000B3FO0A	Right Front Passenger Shldr. Belt Force	60	+	yes	13344
161	14SEBE0000B5FO0A	Left Rear Passenger Lap Belt Force	60	+	yes	13344
162	14SEBE0000B3FO0A	Left Rear Passenger Shoulder Belt Force	60	+	yes	13344
163	11SEBE0000B5DS0A	Driver Seat Belt Spool Potentiometers	1000	+	yes	750
164	13SEBE0000B5DS0A	Right Front Passenger Belt Spool Potentiometers	1000	+	yes	750
165	14SEBE0000B5DS0A	Left Rear Passenger Belt Spool Potentiometers	1000	+	yes	750
166	11CONT000023EV00	Driver Head Contact	0	+	no	1
167	11CONT000024EV00	Driver Thorax Contact	0	+	no	1
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	11BCKLIN0000VO0A	Driver Inner Buckle Voltage	1000	+	no	50
176	14BCKLIN0000VO0A	Rear Passenger Inner Buckle Voltage	1000	+	no	50
177	11BCKLIN0000CU0A	Driver Inner Buckle Current	1000	+	no	5
178	14BCKLIN0000CU0A	Rear Passenger Inner Buckle Current	1000	+	no	5
179	M2VEHC000000ACXA	Cart X-Axis Acceleration	60	+	yes	2000
180	M2VEHC000000ACYA	Cart Y-Axis Acceleration	60	+	yes	2000
181	M2VEHC000000ACZA	Cart Z-Axis Acceleration	60	+	yes	2000
181A	M2VEHC000000ACRA	Cart Resultant Acceleration	60			

APPENDIX E
INSIA Report on Structural Measurements



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

**APARICIO IZQUIERDO, FRANCISCO
PÁEZ AYUSO, FRANCISCO JAVIER**

**INSIA
Carretera de Valencia, km. 7
Campus Sur de la Universidad Politécnica de Madrid
28031 – MADRID – (SPAIN)**

March, 1999

REPORT DOCUMENTATION PAGE	
Title:	<i>STRUCTURAL SURVEY OF CARS. MEASUREMENT METHODOLOGY OF THE MAIN RESISTANT ELEMENTS IN THE CAR BODY</i>
Author(s):	Aparicio Izquierdo, Francisco Páez Ayuso, Francisco Javier
Performing Organisation name and address:	INSIA – University Institute for Automobile Research Carretera de Valencia, Km. 7 – Campus Sur de la Universidad Politécnica de Madrid 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 -<i>Structural Survey of Cars</i>- 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.

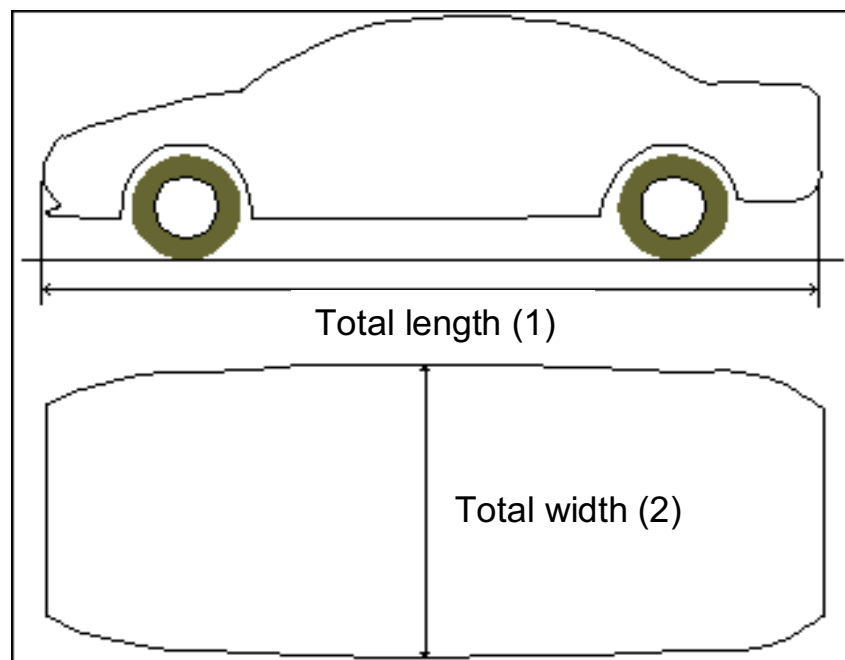


Figure 1.- Definition of the main resistant elements. General dimensions.

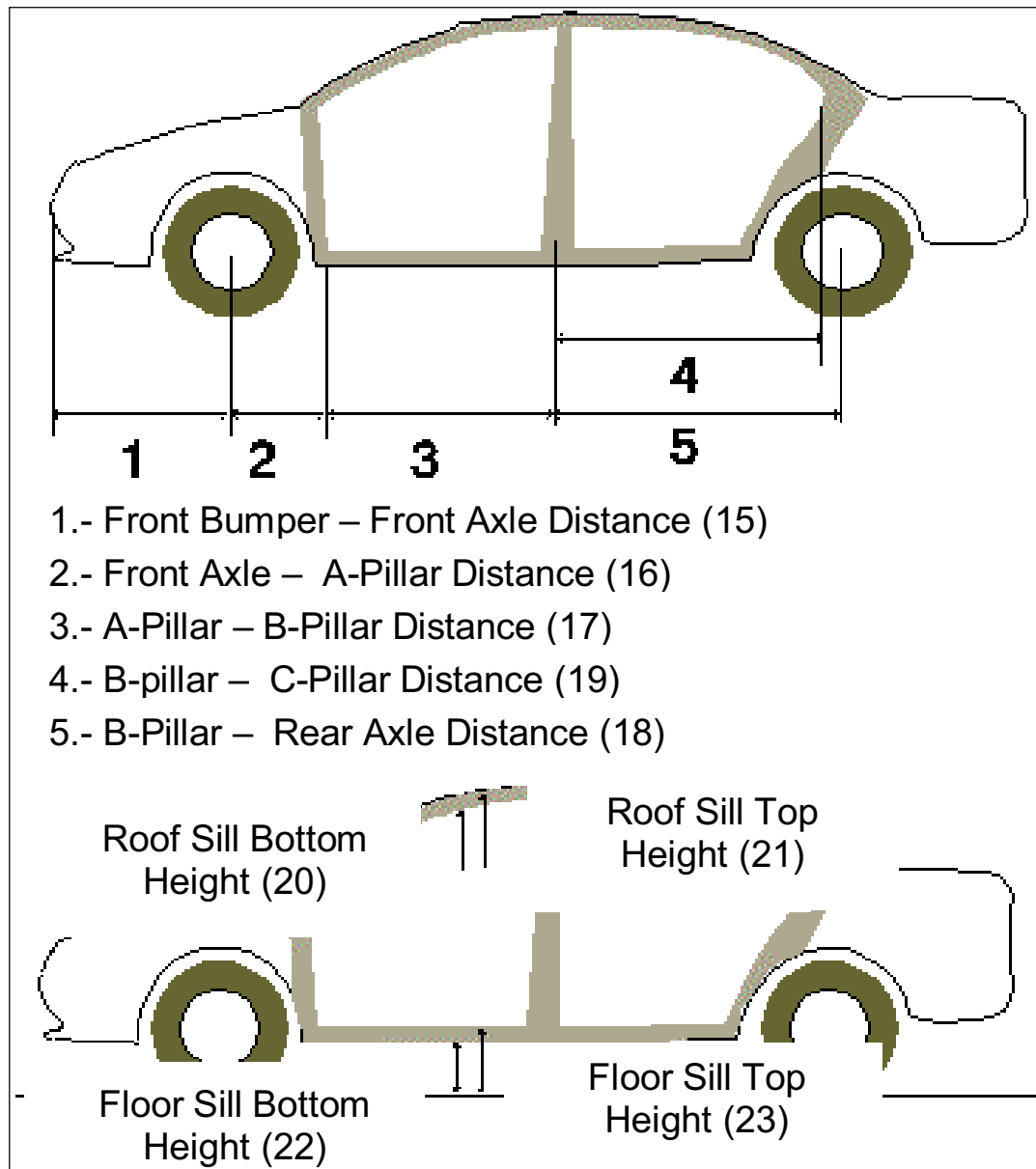


Figure 2.- Definition of the main resistant elements. Side elements.

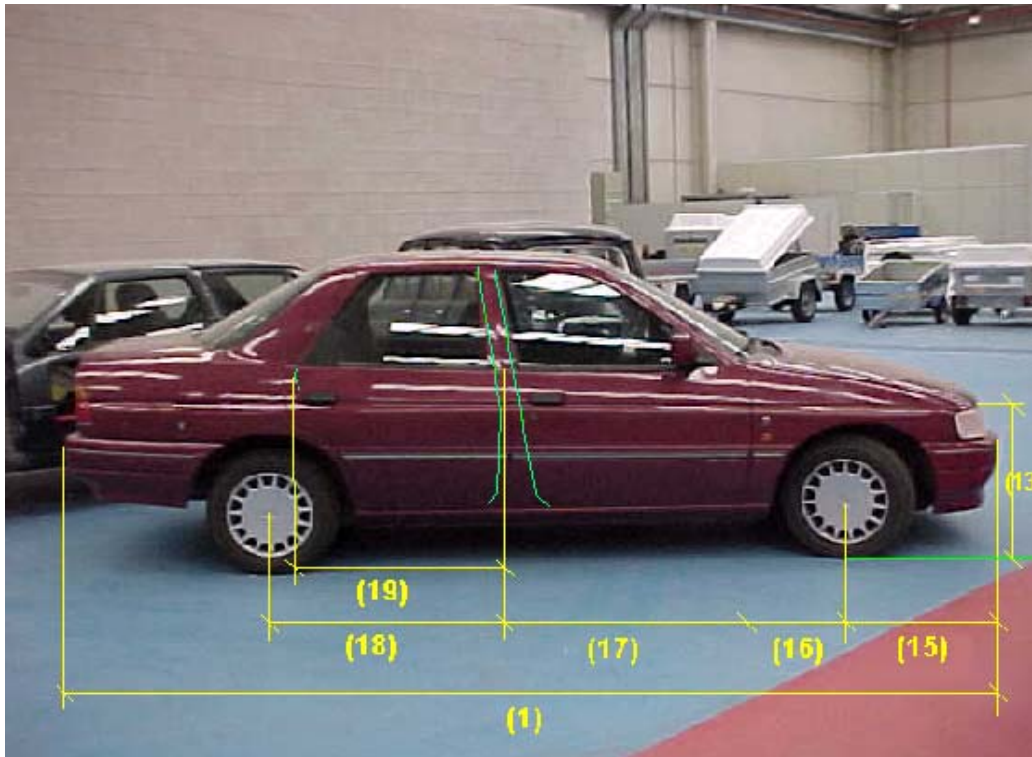


Figure 3.-
Measurements of
the side resistant
elements (outer).

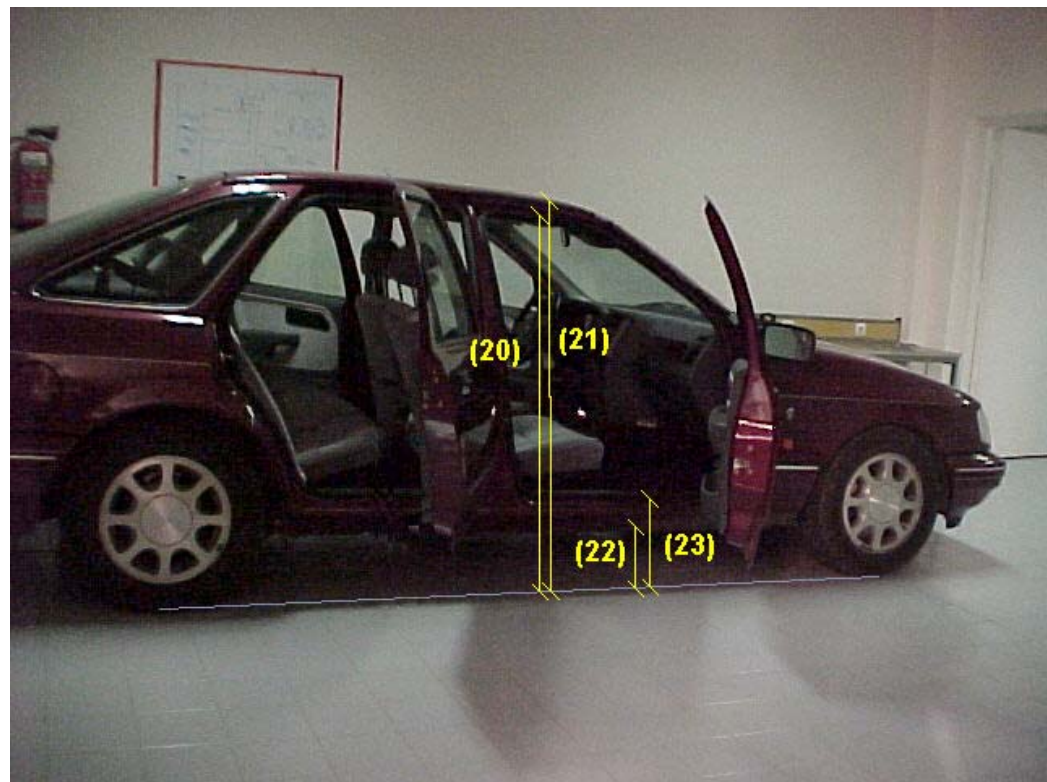


Figure 4.- Measurements
of the side resistant
elements (inner).

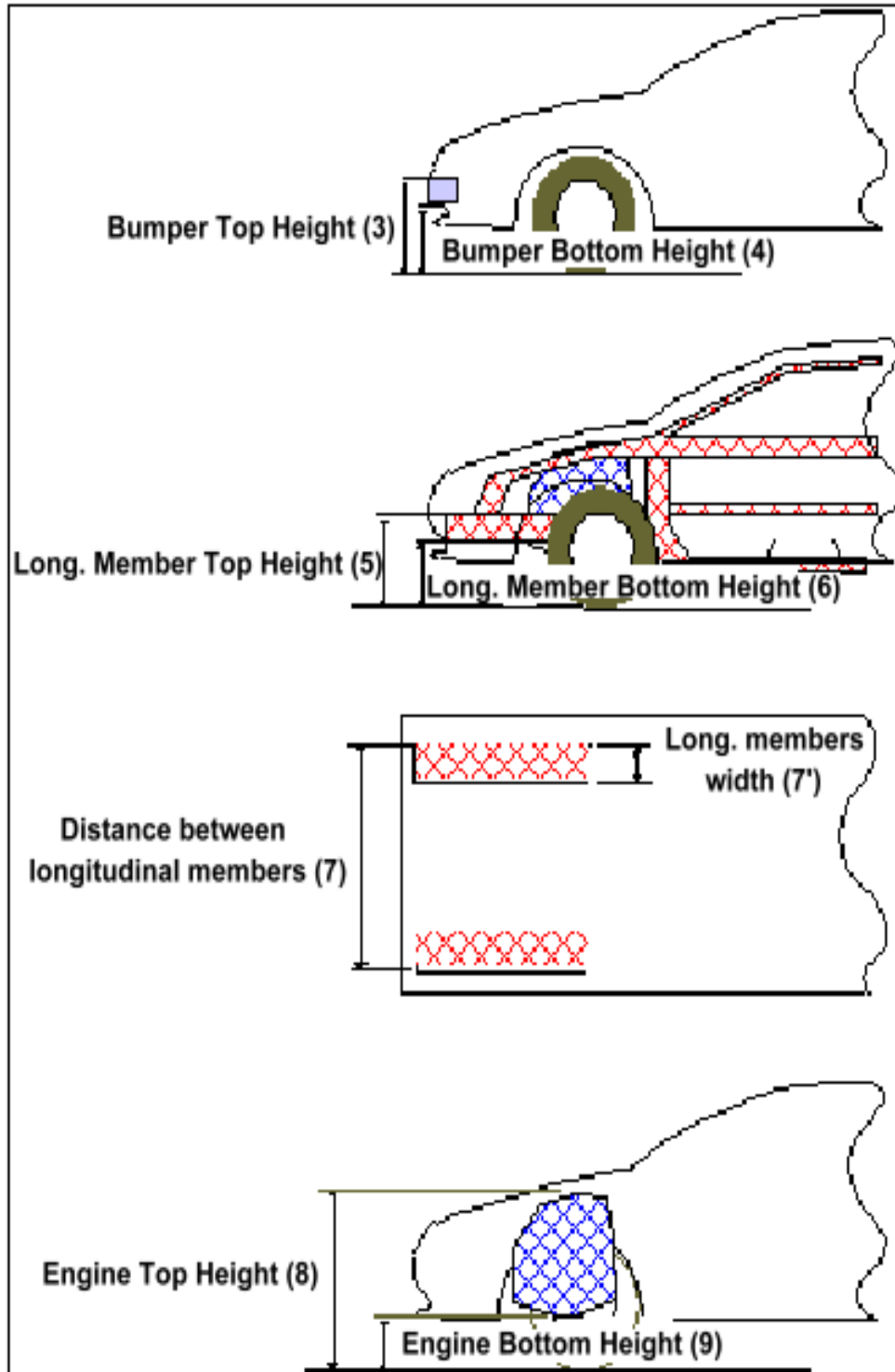


Figure 5.- Definition of the main resistant elements. Front elements.

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

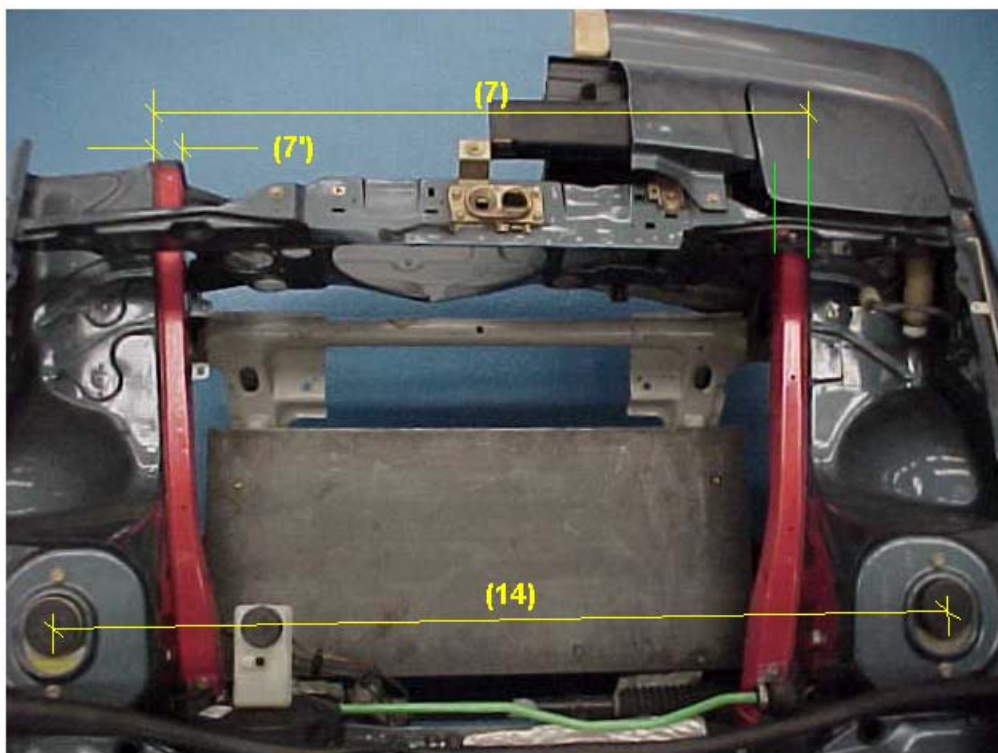
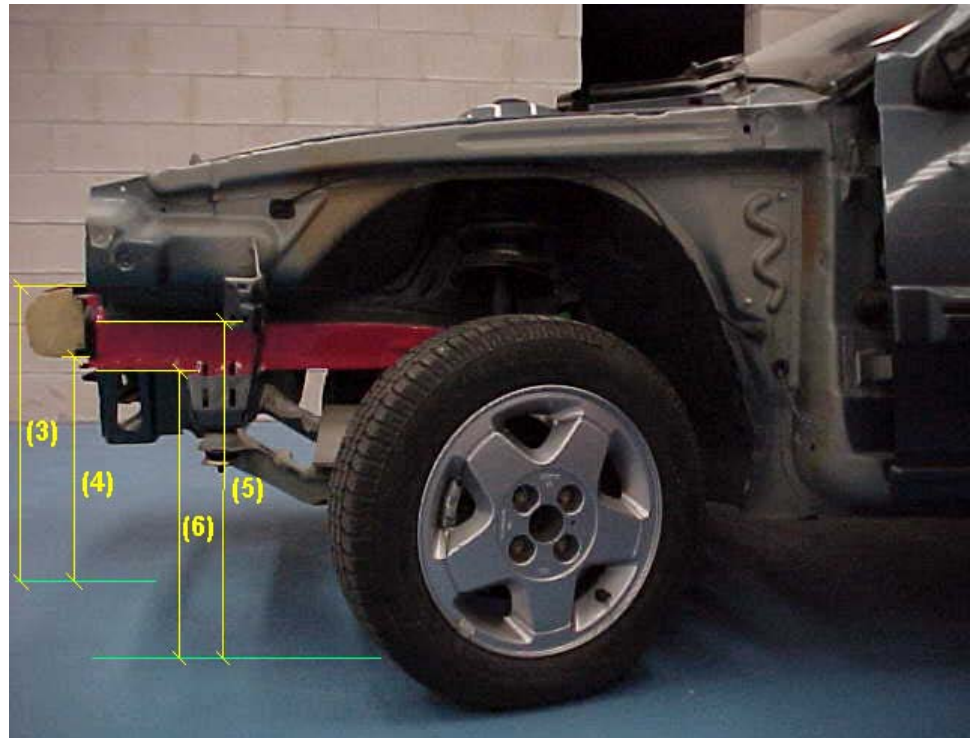


Figure 7.-
Measurements
of the main
resistant
elements. Front
elements 2.

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

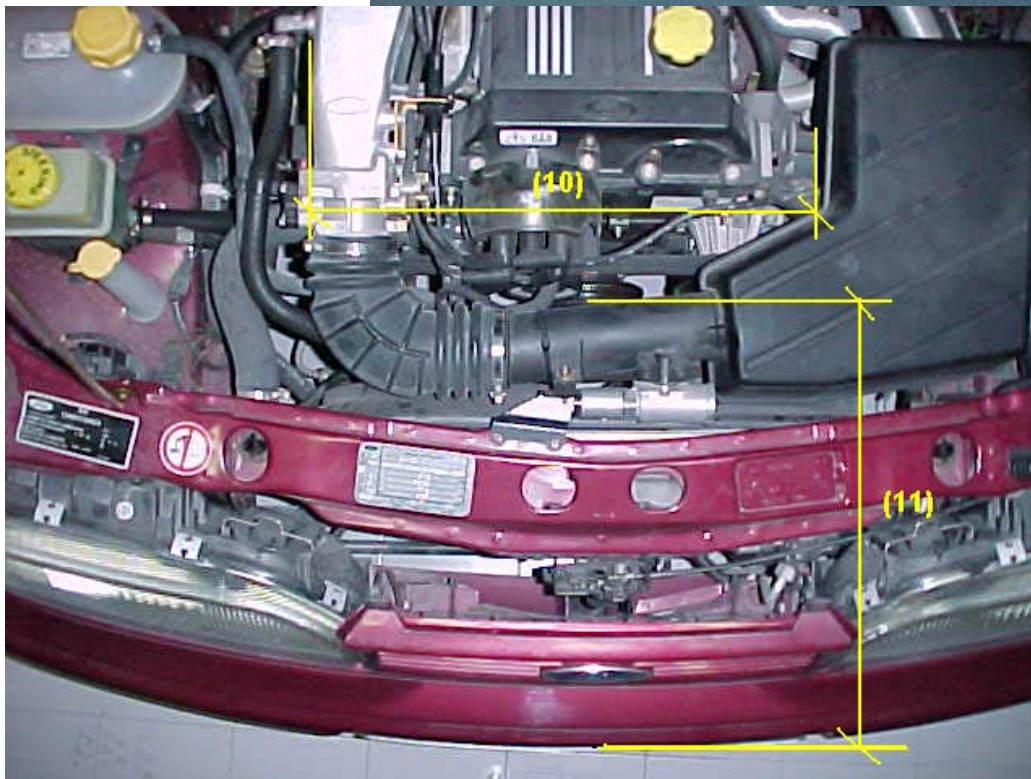
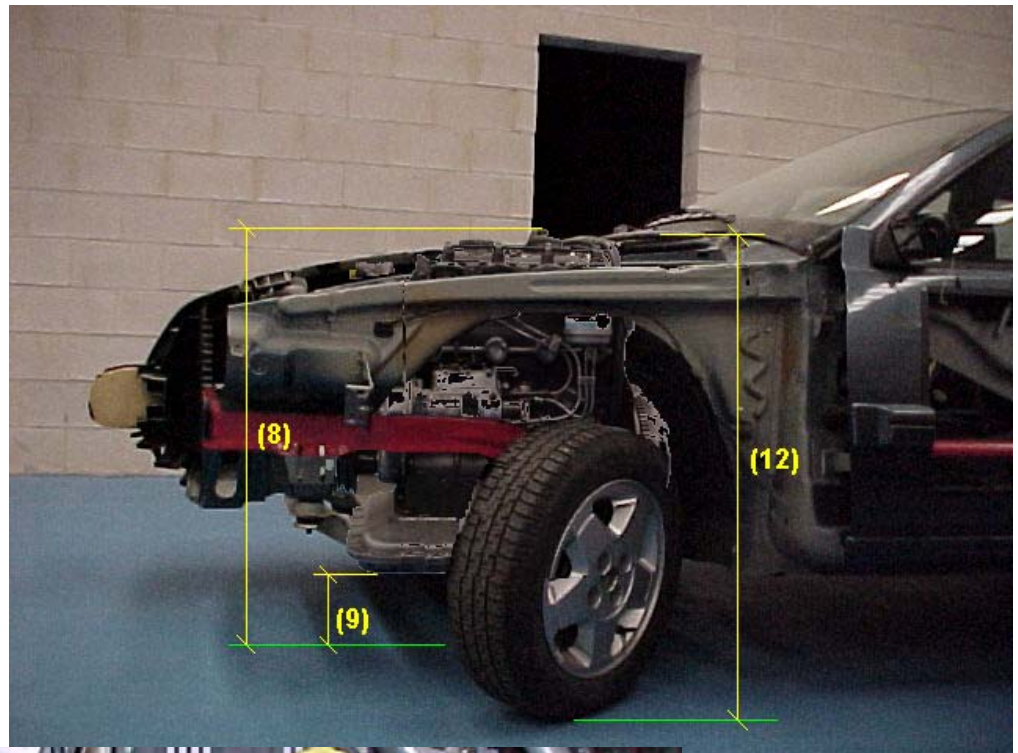


Figure 9.-
Definition of
the main
resistant
elements. Front
elements
(Longitudinal
engine).



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.