

**Vehicle Research and Test Center
Oblique Side Pole Impact
World SID
2005 Saturn Ion
TRC Inc. Test Number: 070806**

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**Prepared For
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Table of Contents

<u>Section</u>	<u>Description</u>	<u>Page</u>
1	Purpose and Test Procedure	1-1
2	Side Impact Test Results	2-1
3	Summary of Test Results	3-1
4	Occupant and Vehicle Information	4-1
Appendix A	Photographs	A-1
Appendix B	Data Plots	B-1
Appendix C	SID Configuration and Performance Verification Data	C-1
Appendix D	Miscellaneous Test Information	D-1

List of Tables

<u>Number</u>	<u>Description</u>	<u>Page</u>
1	General Vehicle Test Parameter Data	3-2
2	Test Vehicle Tire Information	3-6
3	Post-Test Observations	3-7
4	World SID Instrumentation Data	4-2
5	Vehicle Structural Measurements	4-9
6	Vehicle Exterior Crush Profiles - All Levels	4-11
7	Test Vehicle Accelerometer Locations and Data Summary	4-15

List of Figures

<u>Number</u>	<u>Description</u>	<u>Page</u>
1	World SID Longitudinal Clearance Dimensions	4-6
2	World SID Lateral Clearance Dimensions	4-7
3	Vehicle Pre-Test and Post-Test Measurements	4-8
4	Vehicle Side Measurements	4-10
5	Vehicle Damage Profile Distances	4-13
6	Test Vehicle Accelerometer Locations and Data Summary	4-14
7	High-Speed Camera Locations and Data	4-20

List of Photographs

<u>Description</u>	<u>Figure</u>
Pre-Test Front View	A-1
Post-Test Front View	A-2
Pre-Test Left Front View	A-3
Post-Test Left Front View	A-4
Pre-Test Left Side View	A-5
Post-Test Left Side View	A-6
Pre-Test Left Rear View	A-7
Post-Test Left Rear View	A-8
Pre-Test Rear View	A-9
Post-Test Rear View	A-10
Pre-Test Right Rear View	A-11
Post-Test Right Rear View	A-12
Pre-Test Right Side View	A-13
Post-Test Right Side View	A-14
Pre-Test Right Front View	A-15
Post-Test Right Front View	A-16
Pre-Test Overhead View	A-17
Post-Test Overhead View	A-18
Pre-Test Impact Alignment View	A-19
Post-Test Impact Alignment View	A-20
Pre-Test Impact Point View	A-21
Post-Test Impact Point View	A-22
Pre-Test Fuel Filler Cap View	A-23
Post-Test Fuel Filler Cap View	A-24
Pre-Test Pole Barrier Front View	A-25
Post-Test Pole Barrier Front View	A-26
Pre-Test Driver Dummy Side View	A-27
Post-Test Driver Dummy Side View	A-28

List of Photographs, Continued

<u>Description</u>	<u>Figure</u>
Pre-Test Right Side Dummy Occupant Compartment View	A-29
Post-Test Right Side Dummy Occupant Compartment View	A-30
Pre-Test Driver Dummy and Door Clearance View	A-31
Post-Test Driver Dummy and Door Clearance View	A-32
Pre-Test Driver Dummy Showing Belts, Chalking, and Contact Switches	A-33
Pre-Test Driver Door Panel View	A-34
Post-Test Driver Door Panel View	A-35
Post-Test Driver Dummy Head Contact View	A-36
Post-Test Driver Dummy Door Contact View	A-37
Certification Label View	A-38
Recommended Tire Pressure Label View	A-39
Pre-Test Ballast View	A-40
Post-Test Digital Light Trap Read-Out - View 1	A-41
Post-Test Digital Light Trap Read-Out - View 2	A-42

Section 1.0

Purpose and Test Procedure

Purpose

This side impact test is part of the proposed FMVSS 214 Side Impact Protection. It was conducted for the National Highway Traffic Safety Administration (NHTSA) and Vehicle Research and Test Center (VRTC) by Transportation research Center Inc. (TRC Inc.). The purpose of this test was to evaluate side impact protection of a 2005 Saturn Ion with the rigid pole. The test was conducted in accordance with the National Highway Traffic Safety Administration's Notice of Proposed Rulemaking (Docket No. NHTSA-2004-17694, May 17, 2004).

Section 2.0

Side Impact Test

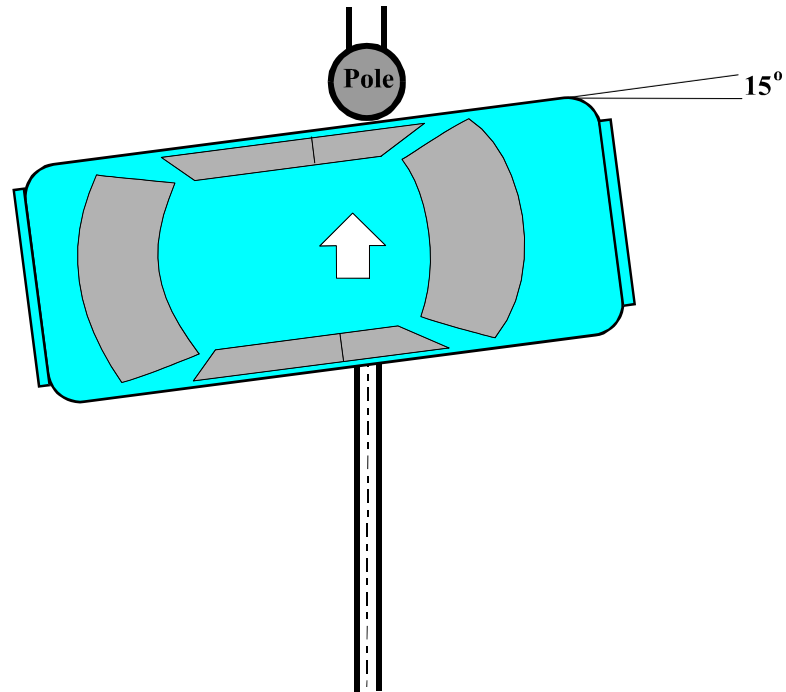
Summary of Side Impact Test

A 2005 Saturn Ion impacted an oblique rigid pole barrier at an angle of 285°, at a velocity of 31.0 km/h (19.2 mph). The pole was aligned with the dummy's head center of gravity. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, Ohio on August 6, 2007. Pre-test and post-test photographs of the test vehicle, the rigid pole barrier, and the side impact dummy (World SID) are included in Appendix A.

One restrained Side Impact Dummy (World SID) was placed in the driver (Pos. #1) designated seating position according to the instructions specified in the World SID Seating Procedure Draft 1.0. The World SID was calibrated prior to this test. The side impact test was documented by one (1) real-time camera and ten (10) high-speed digital cameras. Camera locations and other pertinent camera information are included in this report.

The World SID instrumentation is detailed in Table 4. Ninety-two (92) channels of acceleration, force, moment, and displacement data were collected for this test.

A summary of the side impact dummy (World SID) configuration and verification test data can be found in Appendix C. A total of 141 channels of data were recorded. Appendix B contains the vehicle, barrier, and dummy response data traces.



	Front World SID (#016)
HIC36 (g) CFC 1000	608
Upper Rib Deflection (mm) CFC 180	
Rib 1	67 mm
Rib 2	49 mm
Rib 3	43 mm
Lower Rib Deflection (mm) CFC 180	
Rib 1	66 mm
Rib 2	70 mm
Lower Spine Resultant (g) CFC 180	80 g
Pubic Symph. Force (N) CFC 1000	1253 N

	2005 Saturn Ion
Vehicle Test Weight	1450.2 kg (3197 lbs)
Impact Point (Horizontal)-behind center of front axle	1274 mm
Maximum Crush	392 mm Level 3
Impact Speed	19.24 mph

Data Acquisition Explanations

The dummy's left knee Y-axis force data channel, 11KNEERIOUWSFOYP, exceeded full-scale capacity at approximately 87 milliseconds.

The vehicle's left side sill at rear seat Y-axis acceleration data channel, 14SILBRE0000ACYA, exceeded full-scale at approximately 71 milliseconds and recorded no valid data thereafter. The velocity and displacement calculations were also affected.

The vehicle's left lower B-post Y-axis acceleration data channel, 14BPILLO0000ACYA, exceeded full-scale at approximately 57 milliseconds and recorded questionable data thereafter. The velocity calculation was also affected.

The vehicle's left mid B-post Y-axis acceleration data channel, 14BPILMI0000ACYA, exceeded full-scale at approximately 72 milliseconds and recorded no valid data thereafter. The velocity calculation was also affected.

The vehicle's left front seat track Y-axis acceleration data channel, 11SETRFR0000ACYA, exceeded full-scale at approximately 51 milliseconds and recorded no valid data thereafter. The velocity was also affected.

The vehicle's rear deck behind rear axle Y-axis acceleration data channel, 18DECK000000ACYA, recorded questionable data throughout the event. The resultant calculation was also affected. During post-test investigation, the data channel was found to be dislodged.

The vehicle's rear deck behind rear axle Z-axis acceleration data channel, 18DECK000000ACZA, recorded questionable data throughout the event. The resultant calculation was also affected. During post-test investigation, the data channel was found to be dislodged.

Section 3

Summary of Test Results

Table 1 General Test Vehicle Parameter Data

Test Vehicle: 2005 Saturn Ion

Test Date: 08/06/07

TEST VEHICLE INFORMATION

Make	Saturn
Model	Ion
Body Style	2-door
VIN	1G8AL54F5Z167434
Color	Blue
Odometer Reading	15,355 miles
Transmission	4-Speed Automatic
Final Drive	Front wheel drive
Number of Cylinders	4
Engine Displacement	2.2 L
Engine Placement	Transverse
Air Conditioning	Yes
Power Windows	Yes
Power Seats	No
Cruise Control	Yes
Tinted Glass	Yes
Keyless Entry	No

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	Yes
Driver Side Torso Airbag	Yes
Rear Passenger Side/Curtain Airbag	Yes
Rear Passenger Side Torso Airbag	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	No
Bucket Seats	Yes
Rear Defroster	Yes
2-door/4-door	2
AM/FM Radio	Yes
CD Player	Yes
Sun Roof	Yes
Telescoping Steering Wheel/Column	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Saturn Corporation
Date of Manufacture	04/05

GVWR (kg)	1746
GAWR Front (kg)	913
GAWR Rear (kg)	833

Measured Parameter	Front	Mid	Rear	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Number Of Occupants	2	N/A	3	5
Capacity Wt. (VCW)				408
Cargo Wt. (RCLW) (kg)				68

Table 1 General Test Vehicle Parameter Data, Continued

Test Vehicle: 2005 Saturn Ion

Test Date 08/06/07

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	388.6	264.0		407.2	310.8	
Right	kg	392.0	260.6		410.6	321.6	
Ratio	%	59.8	40.2		56.4	43.6	
Totals	kg	780.6	524.6	1305.2	817.8	632.4	1450.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1305.2
Weight of World SID ATD	kg	77.0
Rated Cargo/Luggage Weight (RCLW)	kg	68.0
Calculated Vehicle Target Weight (TVTW)	kg	1450.2

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	680	678	704	705	1053
As Tested	mm	730	732	723	740	1143
Fully Loaded	mm	672	677	670	680	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheelbase	mm	2620
Total Vehicle Length at Left Side	mm	4463
Total Vehicle Length at Centerline	mm	4670
Total Vehicle Length at Right Side	mm	4465
Weight of Ballast in Cargo Area	kg	32.7
Amount of Stoddard Solvent in Fuel Tank	liters	46.6

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Impact Reference Line From Front Axle	mm	1275
Impact Point	mm	1274
Impact Point Difference	mm	1 mm Left

¹ Wheel dollies were used for this test.

Table 1 General Test Vehicle Parameter Data, Continued

Test Vehicle: 2005 Saturn Ion

Test Date 08/06/07

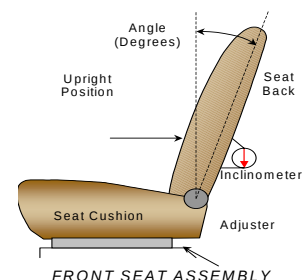
WORLD SID RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle.

Driver: Total Number of detents: 27

Test detent (with the forward-most detent defined as 0): 14

Driver seat back angle: The back was adjusted to 8.7° forward of vertical measured at the head restraint.

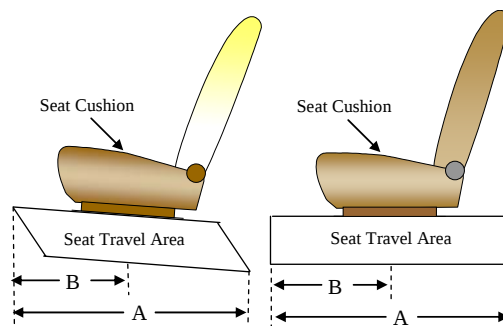


SEAT FORE/AFT POSITIONS

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

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	262 mm	131 mm
Rear Seat	Fixed	Fixed



SEAT BELT UPPER ANCHORAGE

	Total No. of Positions	Placed in Position No.
Driver Seat	4	Full up
Rear Seat	N/A	N/A

Position number one is the uppermost adjustment position.

Table 1 General Test Vehicle Parameter Data, Continued

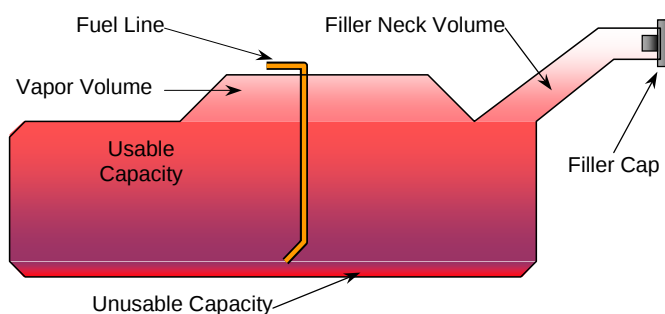
Test Vehicle: 2005 Saturn Ion

Test Date 08/06/07

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	50.0
Usable Capacity used for FMVSS301	50.0
Actual Amount of Solvent used	46.6

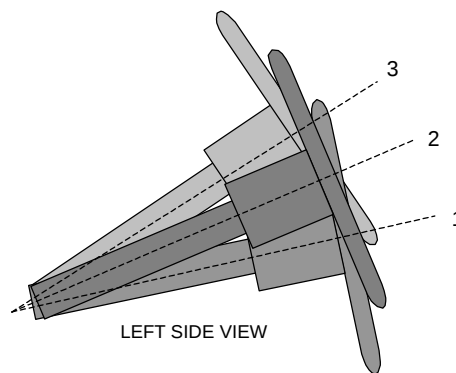
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

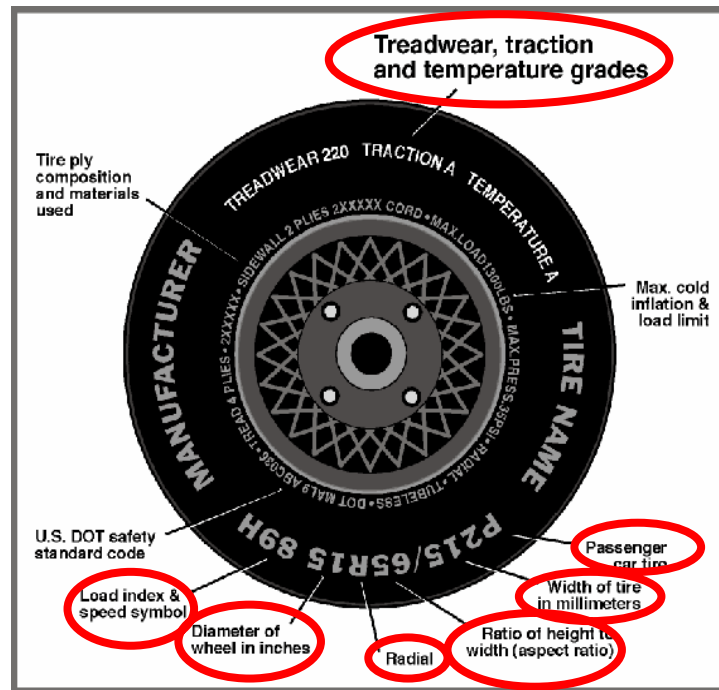
STEERING WHEEL/COLUMN POSITIONS

	Degrees	Fore/Aft Position, mm
Lowermost Position	N/A	N/A
Geometric Center Position	N/A	N/A
Uppermost Position	N/A	N/A

Table 2 Test Vehicle Tire Information

Test Vehicle: 2005 Saturn Ion

Test Date 08/06/07



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	210	210
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Firestone	Firestone
Tire Name	Firehawk	Firehawk
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	89H	89H
Treadwear	300	300
Traction Grade	A	A
Temperature Grade	A	A

Table 3 Post-Test Observations

Test Vehicle: 2005 Saturn Ion

Test Date 08/06/07

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat World SID
Dummy Type / Serial No.	World SID / 016
Head Contact	Side curtain airbag
Upper Torso Contact	Torso airbag
Lower Torso Contact	Door panel
Left Knee Contact	Door panel
Right Knee Contact	None

POST TEST door OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Unlocked	Unlocked
Left Side Door Opening	Jammed & Latched	Closed & Latched
Right Side Door Opening	Closed & Latched	Closed & 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	Broken
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

Section 4

Occupant and Vehicle Information

Table 4 World SID Instrumentation Data

Vehicle: 2005 Saturn Ion

Test Number: 070806

Driver Dummy Serial Number: 016

		Positive Direction		Negative Direction	
		Max.	Time	Max.	Time
Location		(g)	(ms)	(g)	(ms)
Head Acceleration	X	11.4	32.3	15.7	54.6
	Y	76.6	51.0	6.4	189.0
	Z	17.0	42.8	10.8	32.6
	R	77.8	51.0		
Head Angular Displacement	X	3156.3	32.8	2712.1	45.0
	Y	1223.7	32.1	2106.7	31.8
	Z	2970.9	31.7	2569.3	49.0
Upper Neck Force	X	278.9	158.6	282.9	48.4
	Y	242.0	45.4	245.9	190.7
	Z	752.5	43.7	223.0	34.3
Upper Neck Moment	X	9.6	122.2	58.4	49.0
	Y	20.9	80.9	29.5	46.7
	Z	11.2	54.3	8.6	209.2
Lower Neck Force	X	376.7	157.2	507.4	46.3
	Y	1147.4	48.7	281.1	174.2
	Z	932.6	43.2	333.4	88.7
Lower Neck Moment	X	54.6	49.6	56.7	186.2
	Y	36.4	47.7	76.6	156.2
	Z	10.7	73.7	6.8	141.9
Shoulder Force	X	313.7	29.4	616.2	50.2
	Y	532.8	110.7	2769.7	49.0
	Z	789.6	49.3	249.3	112.0
Shoulder Displacement	Y	64.2	46.4	1.1	137.3
Shoulder Acceleration	X	94.6	40.2	92.0	29.0
	Y	212.9	32.2	149.6	38.6
	Z	110.4	31.3	177.7	29.0
	R	239.5	31.3		

Table 4 World SID Instrumentation Data, Continued

Vehicle: 2005 Saturn Ion

Test Number: 070806

Driver Dummy Serial Number: 016

		Positive Direction		Negative Direction	
		Max.	Time	Max.	Time
Location		(g)	(ms)	(g)	(ms)
T1 Acceleration	X	8.2	105.0	17.5	40.3
	Y	62.2	39.2	11.1	127.8
	Z	9.2	50.7	3.8	30.6
	R	64.1	39.2		
T4 Acceleration	X	6.9	109.1	17.7	40.3
	Y	65.4	39.1	13.8	94.3
	Z	7.7	58.2	4.5	30.6
	R	67.2	39.2		
T12 Acceleration	X	12.7	64.0	16.3	39.8
	Y	78.1	39.8	22.8	91.4
	Z	6.0	51.3	5.3	108.0
	R	79.8	39.8		
Thorax Rib 1 Displacement	Y	66.7	49.8	1.7	262.5
Thorax Rib 1 Acceleration	X	103.5	39.2	110.2	38.9
	Y	138.7	29.5	171.6	38.9
	Z	155.7	105.7	168.4	39.2
	R	230.8	38.9		
Thorax Rib 2 Displacement	Y	49.0	48.6	1.7	131.1
Thorax Rib 2 Acceleration	X	61.4	37.8	66.0	64.9
	Y	155.3	37.8	98.8	37.5
	Z	49.0	38.2	88.3	37.8
	R	184.4	37.8		
Thorax Rib 3 Displacement	Y	42.9	47.6	1.9	130.0
Thorax Rib 3 Acceleration	X	44.6	79.2	53.6	33.0
	Y	250.8	33.7	242.0	36.6
	Z	70.1	108.7	129.9	36.9
	R	252.0	33.6		

Table 4 World SID Instrumentation Data, Continued

Vehicle: 2005 Saturn Ion

Test Number: 070806

Driver Dummy Serial Number: 016

		Positive Direction		Negative Direction	
		Max.	Time	Max.	Time
Location		(g)	(ms)	(g)	(ms)
Abdominal Rib 1 Displacement	Y	66.0	45.8	1.2	142.0
Abdominal Rib 1 Acceleration	X	152.4	32.6	104.3	36.7
	Y	279.9	28.8	371.5	31.9
	Z	201.7	32.5	180.7	32.2
	R	371.7	31.9		
Abdominal Rib 2 Displacement	Y	70.1	46.3	0.6	143.0
Abdominal Rib 2 Acceleration	X	59.3	28.9	39.3	42.8
	Y	232.9	28.2	225.0	43.0
	Z	186.3	42.9	177.4	43.3
	R	285.1	43.0		
Lumbar Force	X	585.7	67.9	333.8	32.7
	Y	987.3	39.3	558.8	96.3
	Z	1336.1	150.4	23.3	19.5
Lumbar Moment	X	51.5	39.5	49.5	101.0
	Y	16.4	32.6	33.2	70.6
	Z	5.3	35.3	15.3	107.4
Pelvis Acceleration	X	4.4	112.8	9.0	30.2
	Y	67.1	32.7	18.4	84.8
	Z	10.5	33.4	10.2	56.6
	R	68.1	32.7		
Sacro-Iliac Left Force	X	398.7	162.2	484.2	49.4
	Y	4.3	18.6	4131.7	38.5
	Z	137.5	46.3	676.7	149.6
Sacro-Iliac Left Moment	X	55.8	152.8	111.9	40.5
	Y	22.3	60.2	31.5	36.1
	Z	77.3	36.3	25.3	64.6

Table 4 World SID Instrumentation Data, Continued

Vehicle: 2005 Saturn Ion

Test Number: 070806

Driver Dummy Serial Number: 016

		Positive Direction		Negative Direction	
		Max.	Time	Max.	Time
Location		(g)	(ms)	(g)	(ms)
Sacro-Iliac Right Force	X	568.9	99.8	399.5	35.8
	Y	2296.3	39.9	2.9	14.2
	Z	679.0	60.5	161.1	36.1
Sacro-Iliac Right Moment	X	36.4	60.6	50.6	44.2
	Y	21.5	164.6	17.2	65.5
	Z	27.1	59.5	67.1	35.8
Pubic Force	Y	1253.0	36.5	11.1	16.2
Left Femur Force	X	806.5	42.5	12.0	21.3
	Y	84.7	83.8	1949.1	41.4
	Z	280.2	113.8	1569.6	42.9
Left Mid Femur Force	X	15.2	16.2	173.7	40.6
	Y	254.7	51.0	7.1	8.0
	Z	537.7	43.2	268.0	107.5
Left Mid Femur Moment	X	169.7	42.6	22.7	86.9
	Y	114.1	41.8	1.0	13.0
	Z	37.9	47.4	4.4	34.5
Left Knee Inboard Force ¹	Y	26590.9	301.0	27571.4	87.4
Right Mid Femur Force	X	129.0	51.0	51.1	82.2
	Y	76.2	162.6	297.1	64.6
	Z	806.1	58.4	328.3	135.8
Right Mid Femur Moment	X	32.3	105.8	118.2	49.8
	Y	19.4	158.0	24.2	50.9
	Z	0.3	20.7	47.0	65.2

Positive Direction

Longitudinal: Forward
Lateral: Rightward
Vertical: Downward

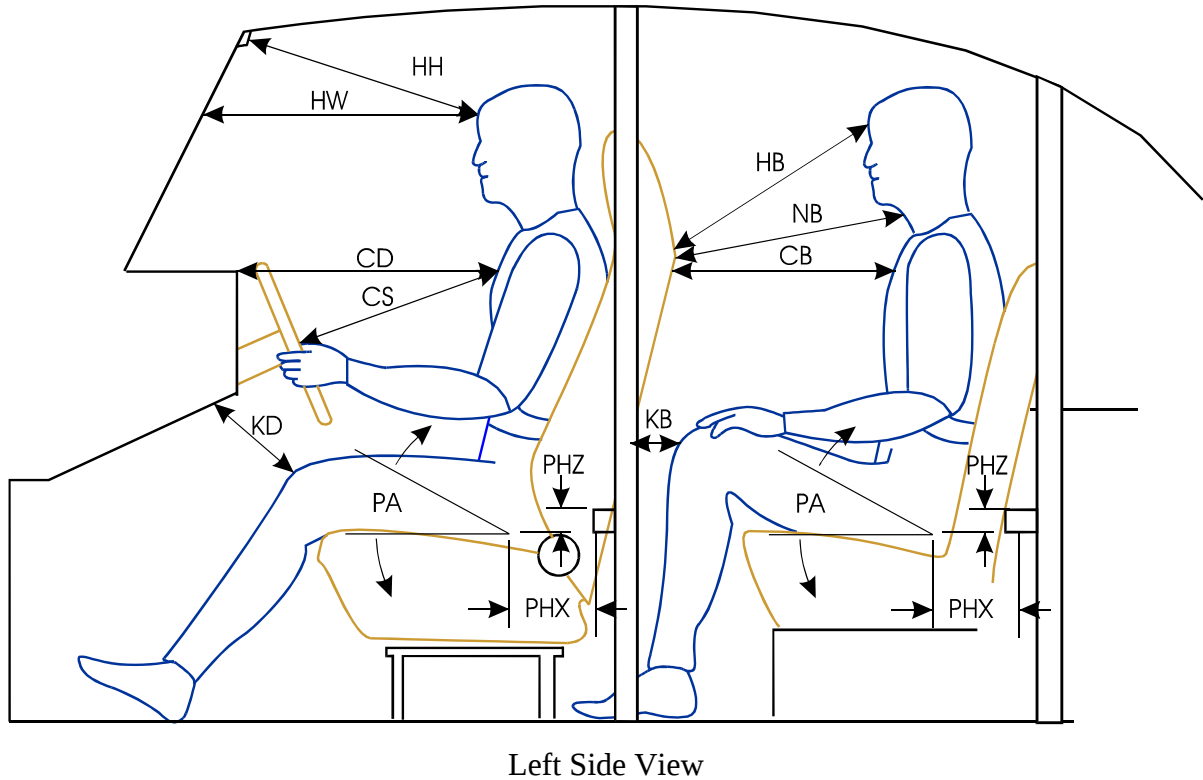
Negative Direction

Longitudinal: Rearward
Lateral: Leftward
Vertical: Upward

¹ See Data Acquisition Explanations

Figure 1 World SID Longitudinal Clearance Dimensions

Vehicle: 2005 Saturn Ion



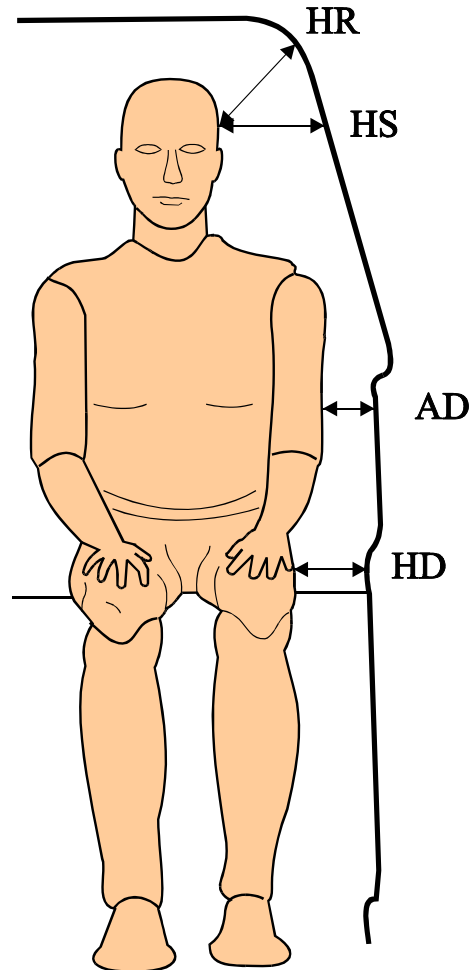
Note: All measurements are in millimeters with tolerance of ± 0.1 mm

Measurement	Driver World SID # 016
HH	403
HW	671
HZ	181
NR	452
CD	794
CS	394
KDL(KDA°)	97/(26.3°)
KDR(KDA°)	79/(34.9°)
PA°	N/A
PHX	206
PHZ	111

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

Figure 2 World SID Lateral Clearance Dimensions

Vehicle: 2005 Saturn Ion

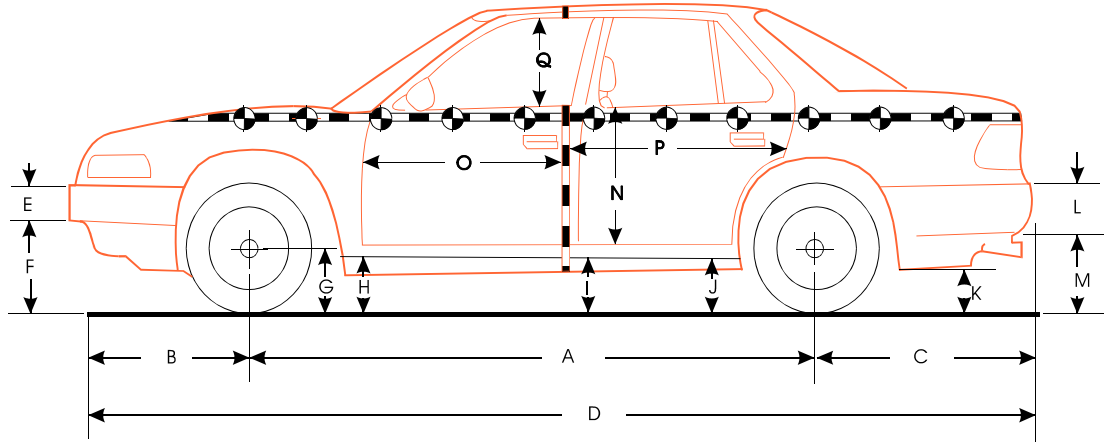


Note: All measurements are in millimeters with tolerance of ± 0.1 mm

Measurement	Driver World SID # 016
HR	218
HS	341
AD	Lower: 95 Upper: 143
HD	81

Figure 3 Vehicle Pre-Test And Post-Test Measurements

Vehicle: 2005 Saturn Ion



Left Side View

Note: All dimensions are in millimeters with tolerance of ± 0.1 mm

	Pre-Test (as delivered)	Pre-Test (as tested)	Post-Test (as tested)	Change
A	2620	2620	2462	158
B	1010	1010	1009	1
C	1040	1040	1045	-5
D	4670	4670	4667	3
E	180	180	180	0
F	390	439	355	84
G	297	354	285	69
H	280	316	254	62
I	272	322	333	-11
J1	210	254	305	-51
J2	284	320	367	-47
K	333	370	457	-87
L	190	190	190	0
M	460	499	585	-86
N	722	722	701	21
O	760	760	698	62
P	1245	1245	1068	177
Q	406	406	352	54
R	4465	4465	4472	-7
S	4463	4463	4338	125
T	1272	1272	927	345

D = Length at centerline

E and L = Bumper Thickness

R = Right Side Length

S = Left Side Length

T = Width at B-pillar

J1 = To Pinch Weld

J2 = To Sill

Table 5 Vehicle Structural Measurements^{1,2}

	Elements	Pre-Test
1	Total Length	4670
2	Total Width	1725
3	Bumper Top Height	500
4	Bumper Bottom Height	379
5	Longitudinal Member Top Height	508
6	Longitudinal Member Bottom Height	343
7	Distance Between Longitudinal Members	1045
7'	Longitudinal Member Width	80
8	Engine Top Height	790
9	Engine Bottom Height	153
10	Engine and Gearbox Width	800
11	Front Bumper - Engine Distance	510
12	Front Shock Absorber Fixing Height	845
13	Bonnet Leading Edge Height	714
14	Front Shock Absorber Fixing Width	1100
15	Front Bumper - Front Axle Distance	1010
16	Front Axle - A Pillar Distance	525
17	A Pillar - B Pillar Distance	1015
18	B Pillar - Rear Axle Distance	1100
19	B Pillar - C Pillar Distance	855
20	Roof Sill Bottom Height	1255
21	Roof Sill Top Height	1325
22	Floor Sill Bottom Height	280
23	Floor Sill Top Height	370

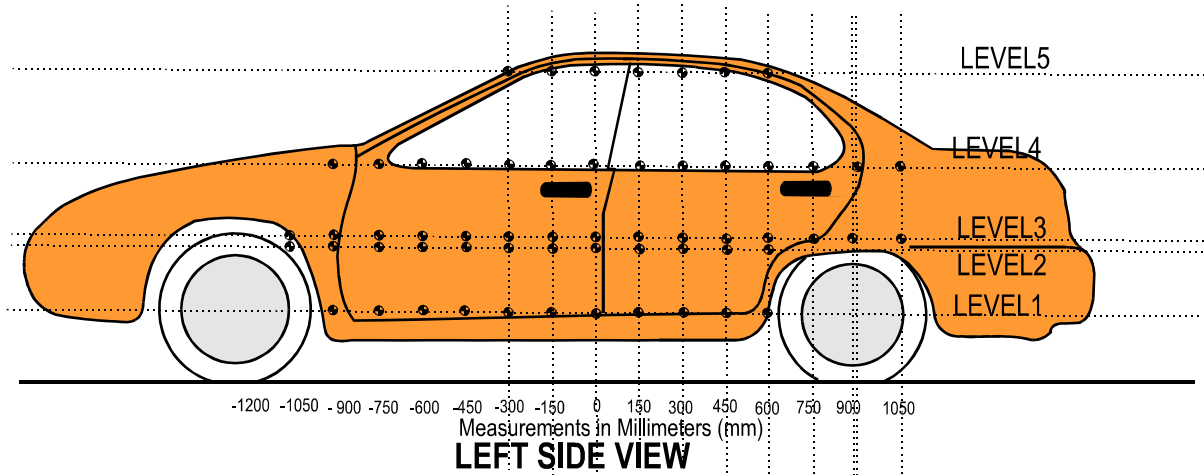
All distance measurements are in millimeters.

¹ Taken from INSIA report, “Structural Survey of Cars, Methodology of the Main Resistant Elements in the Car Body”, March 1999. This report is included in Appendix E.

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

Figure 4 Vehicle Side Measurements

Vehicle: 2005 Saturn Ion



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

Measurements along the vertical 750 mm line shown above.

Measurements vehicle forward of the impact line are negative.

All measurements below in mm.

Level	Measurement Description	Height Above Ground
5	Window	1360
4	Window Sill	880
3	Mid Door	615
2	Occupant H-Point	505
1	Sill Top	255

Table 6 Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2005 Saturn Ion

Location	Height		(mm) From Impact Point													
			-1231	-1181	-931	-781	-631	-481	-331	-181	-31	119	269	419	569	719
Level 1 Side Sill	255	Pre				801	803	805	807	808	808	807	806	806	804	802
		Post				777	727	679	631	579	498	733	760	777	789	800
		Crush				24	76	126	176	229	310	74	46	29	15	2
Level 2 H-Point	505	Pre			852	845	849	852	854	854	854	853	854	854	853	851
		Post			862	863	799	726	644	551	467	463	718	756	790	823
		Crush			-10	-18	50	126	210	303	387	390	136	98	63	28
Level 3 Mid-Door	615	Pre			849	844	850	853	855	856	854	851	851	853	855	853
		Post			872	883	809	731	646	555	469	459	703	743	780	814
		Crush			-23	-39	41	122	209	301	385	392	148	110	75	39
Level 4 Window Sill	880	Pre	764	779	789	800	811	817	821	824	827	827	828	829	830	829
		Post	844	839	829	884	809	729	648	561	473	446	657	695	732	766
		Crush	-80	-60	-40	-84	2	88	173	263	354	381	171	134	98	63
Level 5 Window Top	1360	Pre			758	749	718	685	652	624	609	598	593	591	593	596
		Post			811	774	714	652	587	524	---	---	460	508	538	565
		Crush			-53	-25	4	33	65	100	---	---	133	83	55	31

All measurements were recorded using TRC Inc.'s FARO Arm with a tolerance of ± 0.1 mm.

Note: Negative measurements are vehicle forward of the impact point.

The crush profile grid is established prior to test day based on an estimated impact point. The final distance to impact is determined after final dummy positioning. The pole is aligned with the center of gravity of the head.

¹ Post-test measurement point missing.

Table 6 Vehicle Exterior Crush Profiles - All Levels, Continued

Vehicle: 2005 Saturn Ion

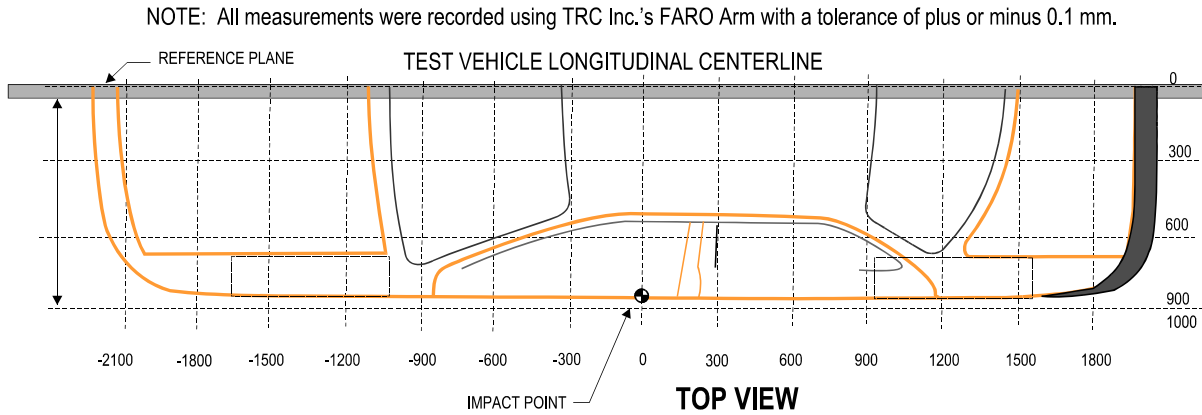
			(mm) From Impact Point												
Location	Height		869	1019	1169	1319	1469	1619	1769	1919	2069	2219	2369	2519	2669
Level 1 Side Sill	255	Pre	800												
		Post	811												
		Crush	-11												
Level 2 H-Point	505	Pre	849												
		Post	858												
		Crush	-9												
Level 3 Mid-Door	615	Pre	852	858											
		Post	847	888											
		Crush	5	-30											
Level 4 Window Sill	880	Pre	826	804	821										
		Post	799	812	862										
		Crush	27	-8	-41										
Level 5 Window Top	1360	Pre	605	620	641										
		Post	589	613	640										
		Crush	16	7	1										

All measurements were recorded using TRC Inc.'s FARO Arm with a tolerance of ± 0.1 mm.

Figure 5 Vehicle Damage Profile Distances

Test Vehicle: 2005 Saturn Ion

Test Date: 08/06/07



MEASUREMENT CONVENTIONS:

Forward of the impact point (towards front of vehicle) is considered negative (-)

Rearward of the impact point (towards rear end of vehicle) is considered positive (+)

DAMAGE PROFILE DISTANCES

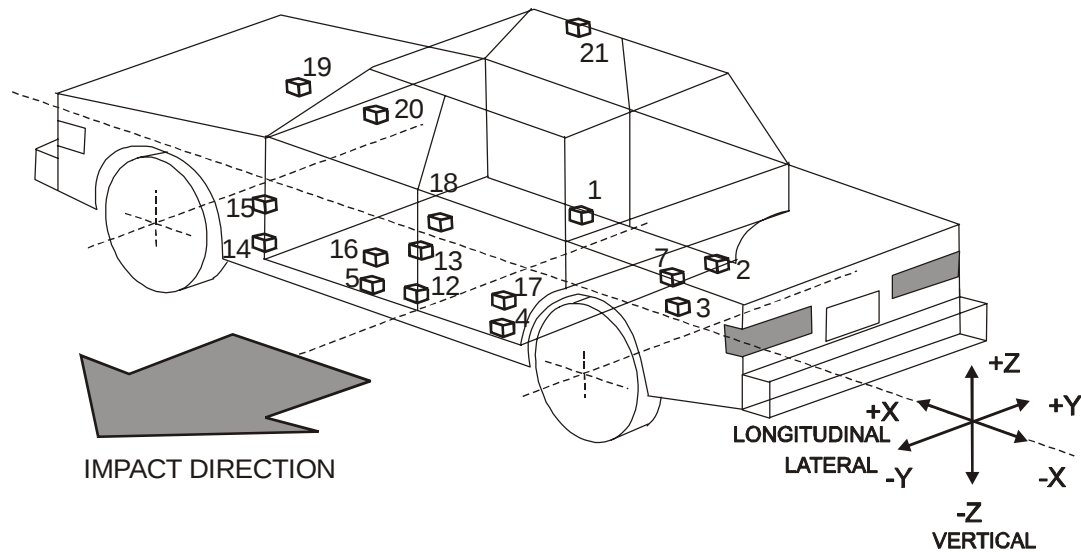
DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	869 mm	4	826	799	27
2	419 mm	4	829	695	134
3	119 mm	3	851	459	392
4	-181 mm	2	854	551	303
5	-481 mm	2	852	726	126
6	-781 mm	4	800	884	-84

Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body.

Figure 6 Test Vehicle Accelerometer Locations and Data Summary

Vehicle: 2005 Saturn Ion



- 1-Right Front Side Sill
- 2-Right Side Sill at Rear Seat
- 3-Rear Floorpan above Axle
- 4-Left Side Sill at Rear Seat
- 5-Left Front Side Sill
- 6-Left Front Door on Centerline
- 7-Right Rear Occupant Compartment
- 8-Left Front Door Mid Rear
- 9-Left Front Door Upper Centerline
- 10-Left Rear Door Mid Rear
- 11-Left Rear Door Upper Centerline

- 12-Left Side Lower B-pillar
- 13-Left Side Middle B-pillar
- 14-Left Side Lower A-pillar
- 15-Left Side Middle A-pillar
- 16-Left Side Front Seat Track at H-point
- 17-Left Rear Seat Track at H-point
- 18-Vehicle Center of Gravity
- 19-Top of Engine
- 20-Firewall
- 21-Right Side Roof Rail

Table 7 Test Vehicle Accelerometer Locations and Data Summary

Vehicle: 2005 Saturn Ion

Location	Coordinates (millimeters)			Positive Direction Max. Time (g) (ms)		Negative Direction Max. Time (g) (ms)	
	X	Y	Z				
1 Right Side Sill at Front Seat	3015	650	331				
Longitudinal				3.1	46.7	4.2	56.2
Lateral				16.6	97.4	1.1	299.6
Vertical				4.9	98.2	5.6	94.6
Resultant				17.2	97.5		
2 Right Side Sill at Rear Seat	2145	665	330				
Longitudinal				3.0	95.5	5.1	56.5
Lateral				23.7	53.4	0.8	296.6
Vertical				8.9	98.6	5.4	28.6
Resultant				23.8	53.4		
3 Rear Floorpan Above Axle	1300	0	550				
Longitudinal				5.8	38.8	2.2	30.4
Lateral				15.1	45.3	1.5	296.4
Vertical				3.8	34.5	6.1	23.8
Resultant				15.4	45.3		
4 Left Side Sill at Rear Seat	2134	665	330				
Longitudinal							
Lateral ¹				39.9	23.4	1050.2	90.8
Vertical							
Resultant							
5 Left Side Sill at Front Seat	3000	650	336				
Longitudinal							
Lateral				37.2	22.5	11.5	27.8
Vertical							
Resultant							

Table 7 Test Vehicle Accelerometer Locations and Data Summary, Continued

Vehicle: 2005 Saturn Ion

Location	Coordinates (millimeters)			Positive Direction		Negative Direction	
	X	Y	Z	Max. (g)	Time (ms)	Max. (g)	Time (ms)
6 Left Front Door on Centerline	2800	711	719				
Longitudinal							
Lateral ¹				111.0	8.1	61.1	15.8
Vertical							
Resultant							
7 Right Rear Occupant Compartment	1945	620	396				
Longitudinal							
Lateral				25.5	53.0	1.3	296.9
Vertical							
Resultant							
8 Left Front Door Mid-Rear	2434	710	719				
Longitudinal							
Lateral ¹				77.5	5.0	28.9	18.6
Vertical							
Resultant							
9 Left Front Door Upper Centerline	2800	712	929				
Longitudinal							
Lateral				137.1	9.2	23.3	22.1
Vertical							
Resultant							
10 Left Rear Door Mid Rear	1595	720	718				
Longitudinal							
Lateral				39.3	22.5	20.1	73.5
Vertical							
Resultant							

Table 7 Test Vehicle Accelerometer Locations and Data Summary, Continued

Vehicle: 2005 Saturn Ion

Location	Coordinates (millimeters)			Positive Direction		Negative Direction	
	X	Y	Z	Max. (g)	Time (ms)	Max. (g)	Time (ms)
11 Left Rear Door Upper Centerline	1835	717	965				
Longitudinal							
Lateral				43.5	30.0	14.5	37.0
Vertical							
Resultant							
12 Left Lower B-Pillar	2287	748	562				
Longitudinal							
Lateral ¹				1188.5	59.0	155.2	194.5
Vertical							
Resultant							
13 Left Middle B-Pillar	2250	740	904				
Longitudinal							
Lateral ¹				65.0	24.2	1627.2	76.3
Vertical							
Resultant							
14 Left Lower A-Pillar	3300	745	523				
Longitudinal							
Lateral				34.1	5.8	26.4	10.1
Vertical							
Resultant							
15 Left Middle A-Pillar	3300	740	870				
Longitudinal							
Lateral				19.8	33.7	4.4	9.5
Vertical							
Resultant							

Table 7 Test Vehicle Accelerometer Locations and Data Summary, Continued

Vehicle: 2005 Saturn Ion

Location	Coordinates (millimeters)			Positive Direction		Negative Direction	
	X	Y	Z	Max. (g)	Time (ms)	Max. (g)	Time (ms)
16 Left Front Seat Track	2495	545	297				
Longitudinal Lateral ¹ Vertical Resultant							
				1612.5	55.2	56.8	46.6
17 Left Rear Seat Track	1628	620	398				
Longitudinal Lateral Vertical Resultant							
				15.1	64.0	1.2	296.8
18 Vehicle CG	2643	0	472				
Longitudinal Lateral Vertical Resultant				13.3	31.5	18.8	56.3
				92.6	28.6	76.8	34.6
				23.9	51.8	14.8	72.4
				94.8	28.6		
19 Top of Engine	4020	20	846				
Longitudinal Lateral Vertical Resultant				4.1	86.2	13.7	41.7
				10.3	83.2	2.3	230.7
20 Firewall	3720	0	888				
Longitudinal Lateral Vertical Resultant				2.4	46.7	9.5	34.6
				10.7	42.0	1.5	4.2

Table 7 Test Vehicle Accelerometer Locations and Data Summary, Continued

Vehicle: 2005 Saturn Ion

Location	Coordinates (millimeters)			Positive Direction		Negative Direction	
	X	Y	Z	Max. (g)	Time (ms)	Max. (g)	Time (ms)
21 Right Side Roof Rail	2635	520	1396				
Longitudinal				4.9	45.9	3.1	40.6
Lateral				24.9	32.2	2.6	297.1
Vertical							
Resultant							
22 Right Side Sill	2800	710	254				
Longitudinal							
Lateral				19.6	52.6	0.8	297.8
Vertical							
Resultant							
23 Rear Deck Behind Rear Axle	425	0	575				
Longitudinal				6.2	22.1	9.4	28.2
Lateral ¹				15.5	52.2	2.1	225.8
Vertical ¹				4.7	55.0	4.7	89.7
Resultant				16.5	81.7		

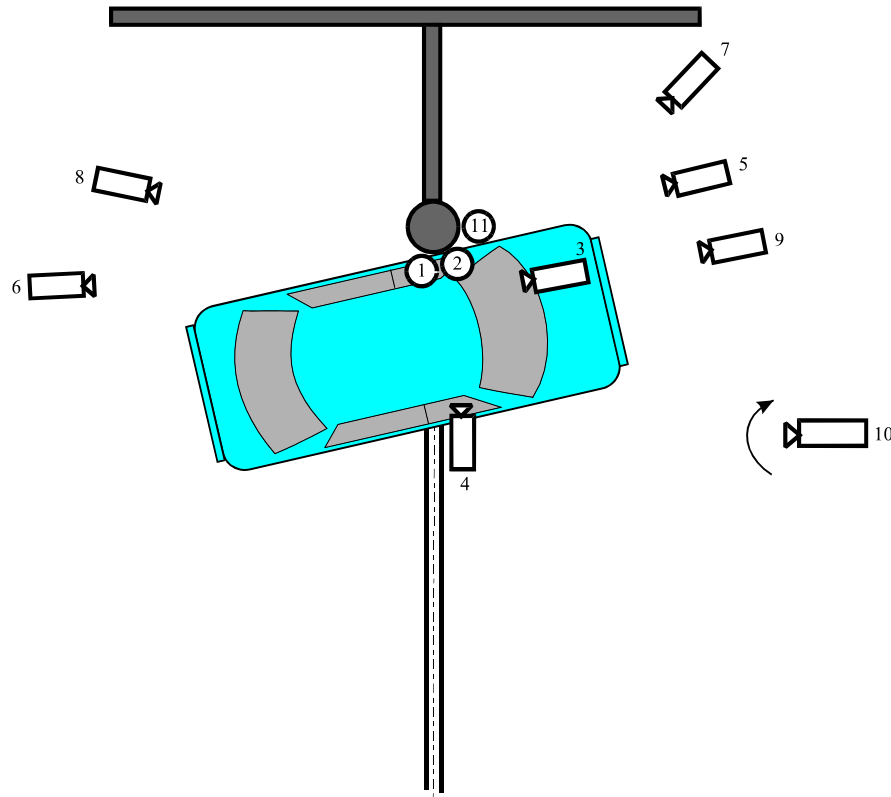
Reference: X: + Forward from rear bumper
 Y: + Rightward from vehicle centerline
 Z: + Downward from ground level

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

¹ See Data Acquisition Explanations

Figure 7 High-Speed Camera Locations and Data Summary

Vehicle: 2005 Saturn Ion



No.	Camera View	Location (mm)			Angle (deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	Overhead Wide	0	340	-5650	90.0	12.5	1000
2	Overhead Tight	0	0	-5650	90.0	25	1000
3	Onboard Front - Driver	420	1570	-1300	0.5	12.5	1000
4	Onboard Side Front	1450	0	-1260	9.5	6.5	1000
5	Front Vehicle to Pole	0	4850	-1040	5.5	12.5	1000
6	Rear Vehicle to Pole	0	5550	-1030	1.8	12.5	1000
7	Left Front Angled	860	3900	-1150	8.9	25	1000
8	Left Rear Angled	3130	5350	-1020	2.1	25	1000
9	Vehicle Front on Driver	3000	4140	-1830	9.5	50	1000
10	Panning	0	0	-3230	90.0	Zoom	30
11	Underbody	N/A	N/A	N/A	N/A	25	1000

+X: Forward (referenced to Pole) from impact point
+Y: Rightward (referenced to Pole) from impact point
+Z: Downward from ground level
Vehicle was at a 15° angle to the rigid pole.

Appendix A

Photographs



Figure A-1 Pre-Test Front View

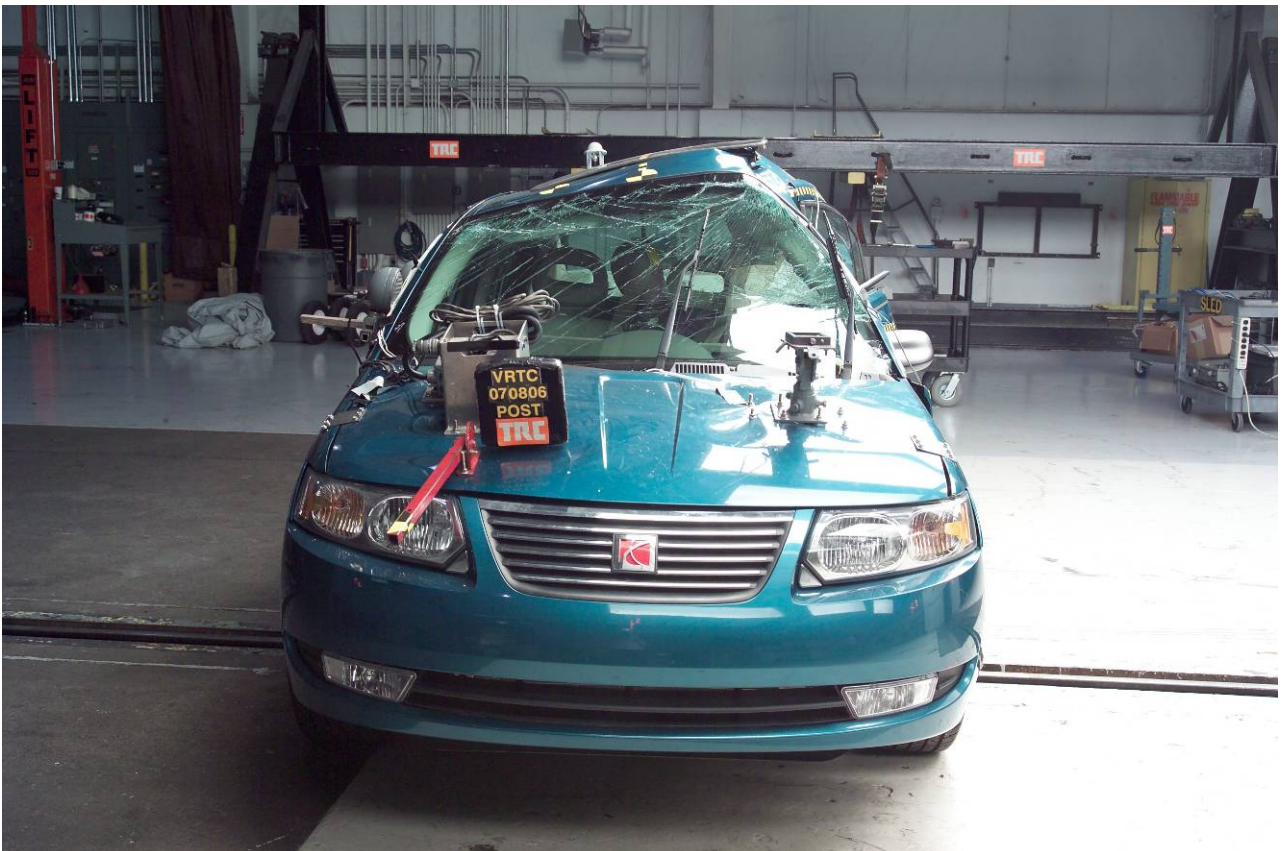


Figure A-2 Post-Test Front View

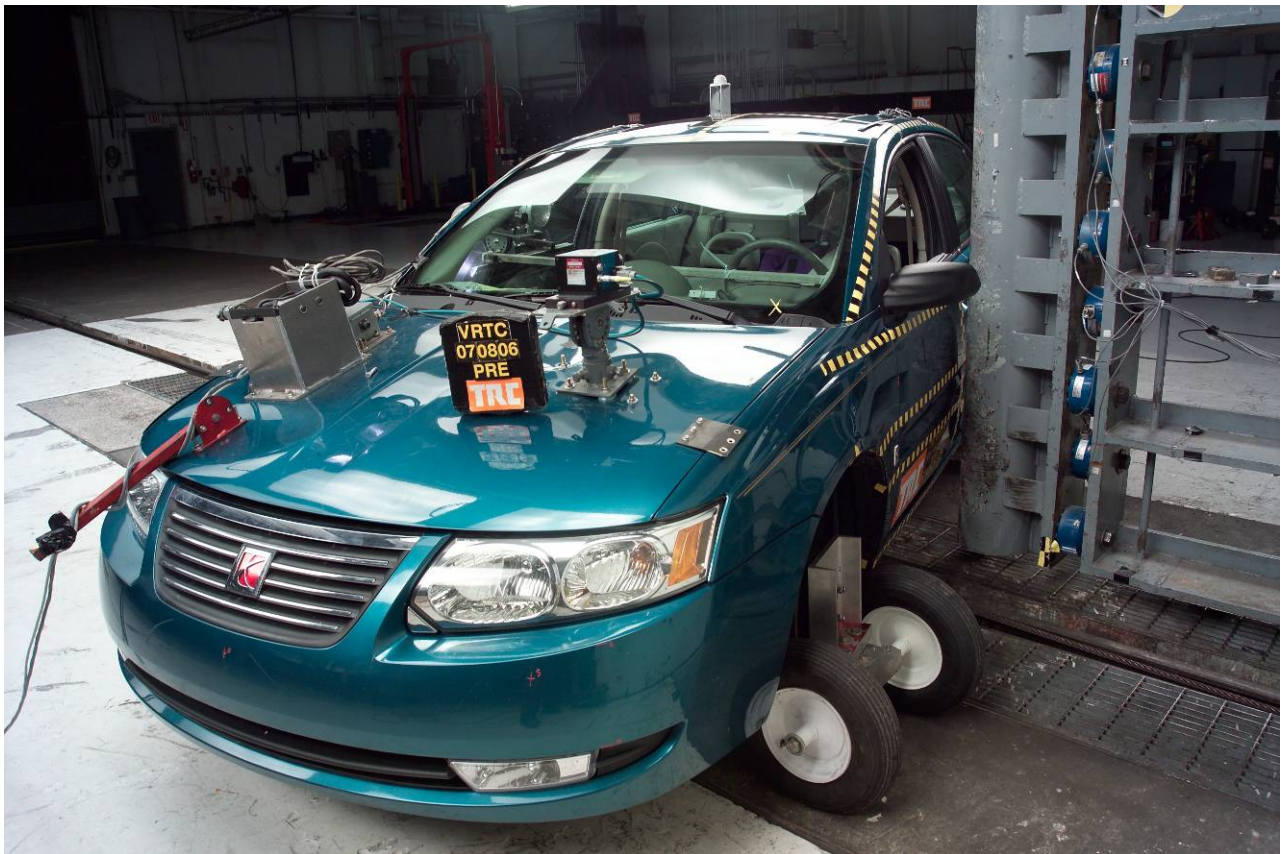


Figure A-3 Pre-Test Left Front View



Figure A-4 Post-Test Left Front View

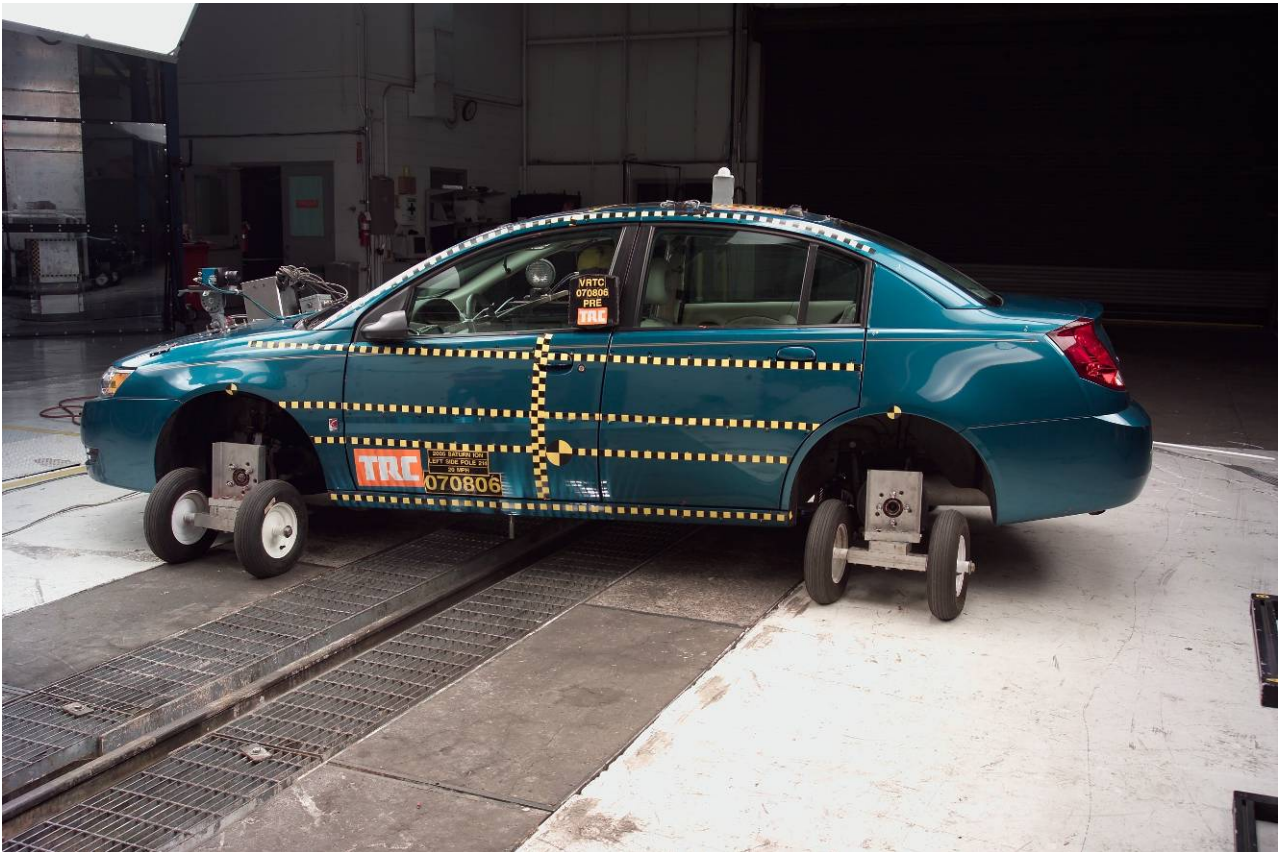


Figure A-5 Pre-Test Left Side View



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

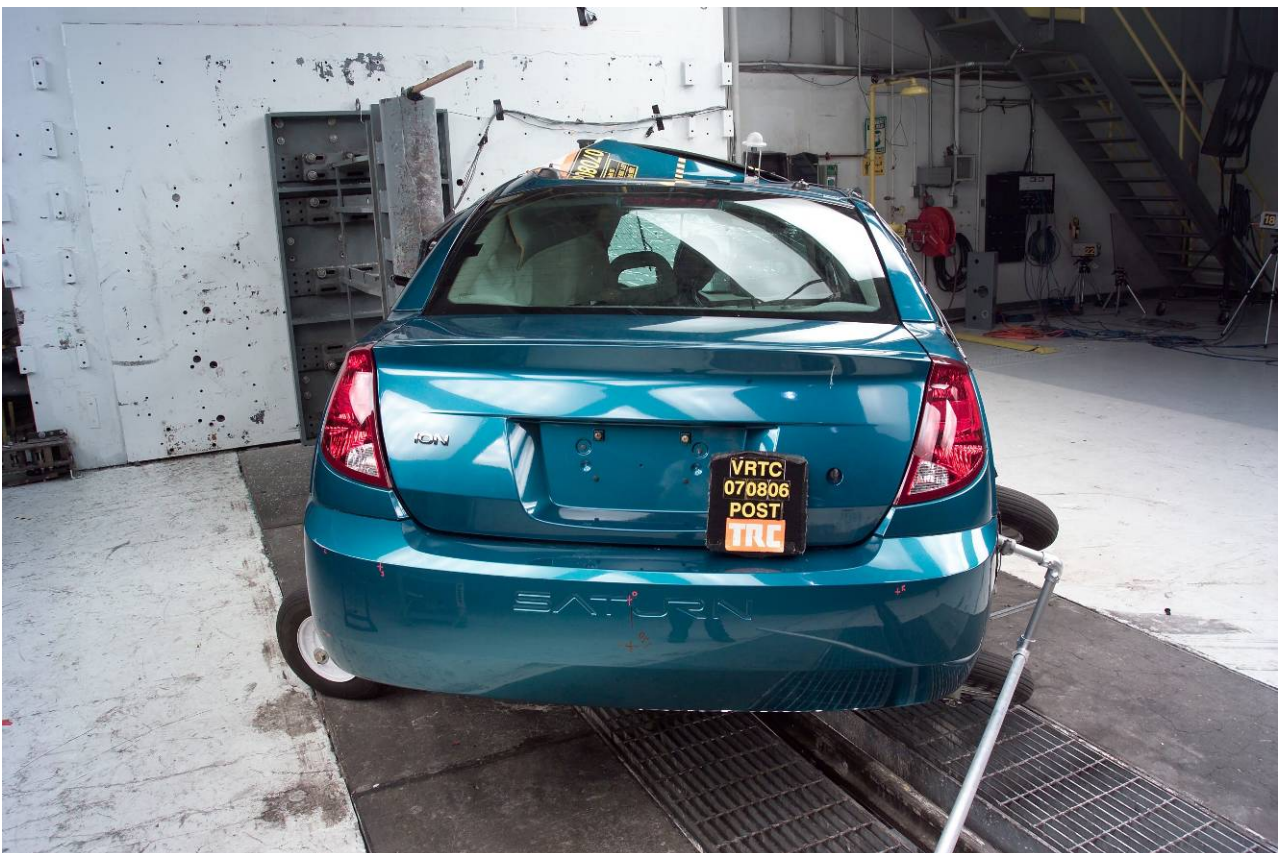


Figure A-10 Post-Test Rear View

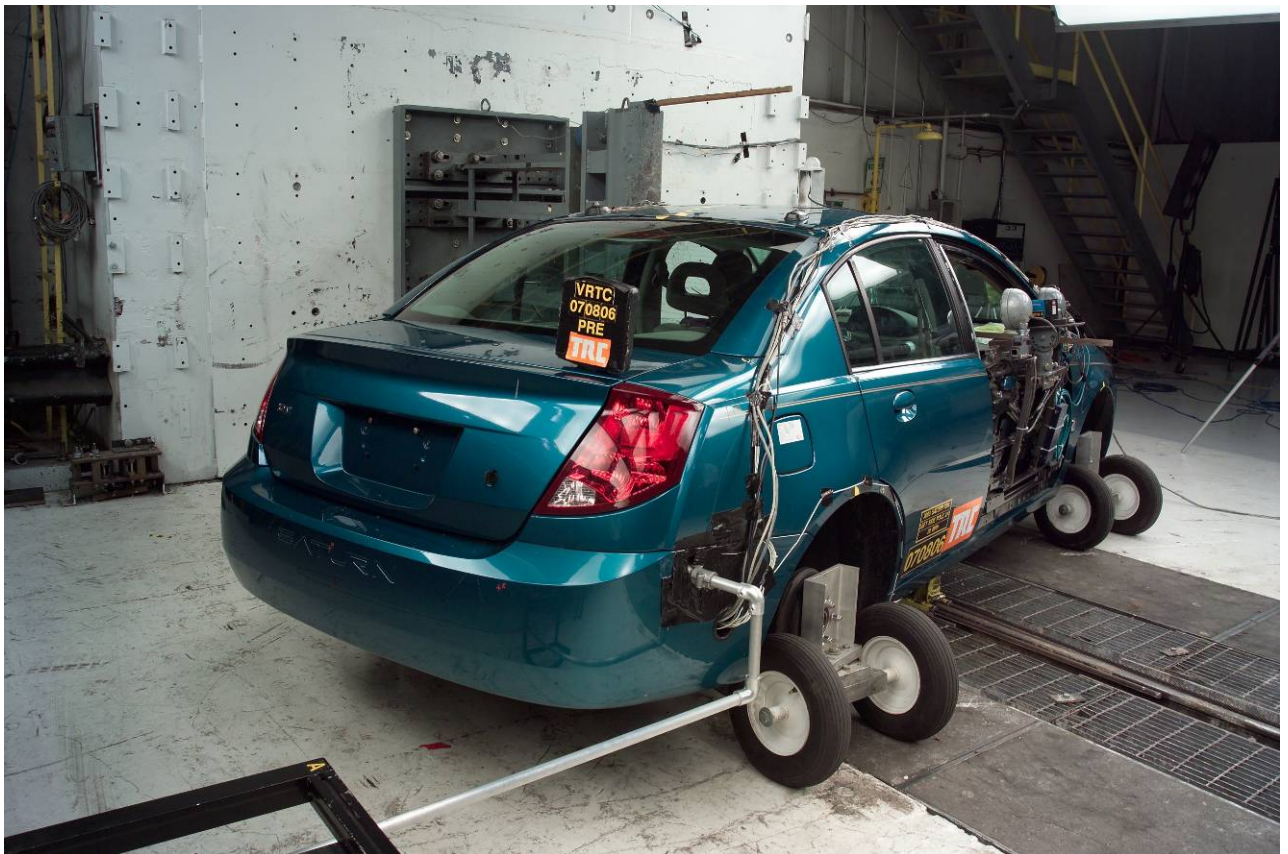


Figure A-11 Pre-Test Right Rear View

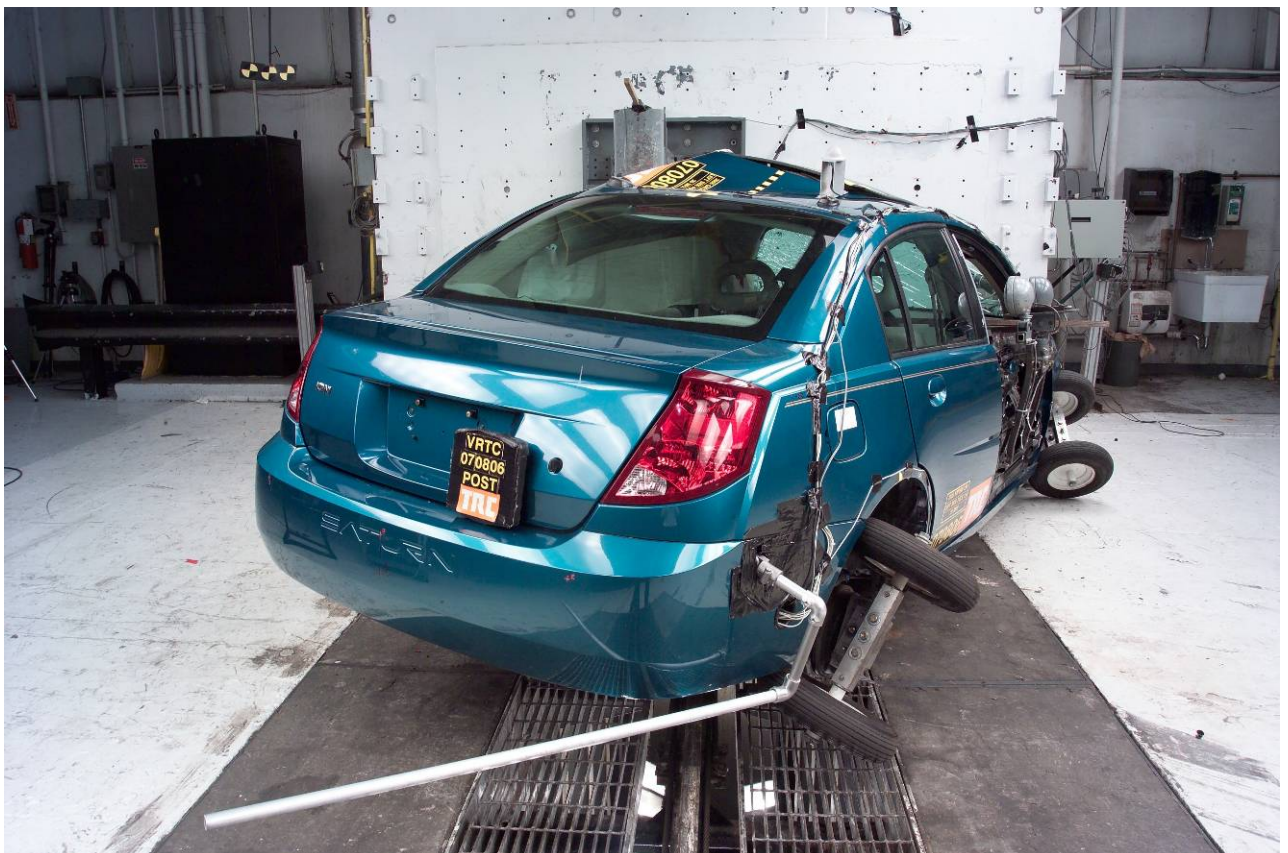


Figure A-12 Post-Test Right Rear View



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

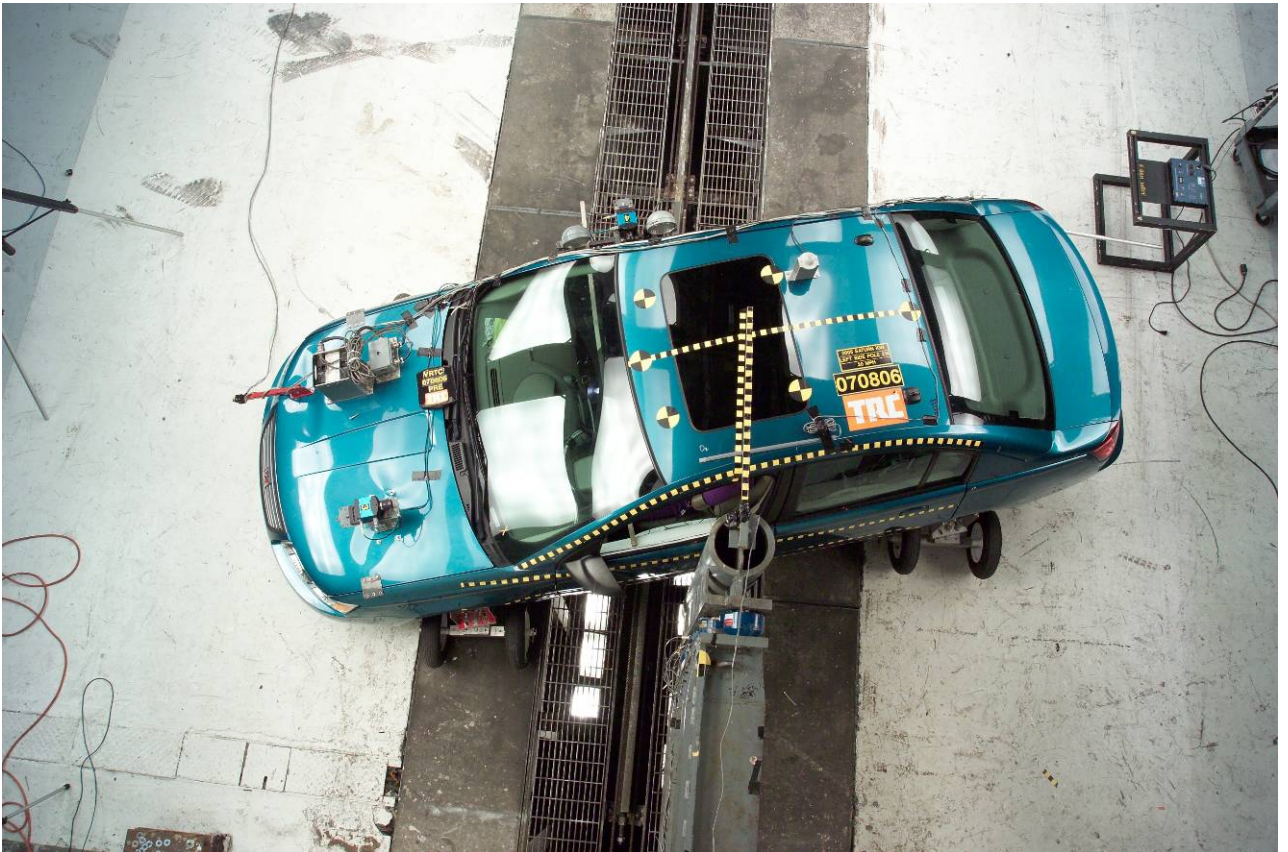


Figure A-17 Pre-Test Overhead View

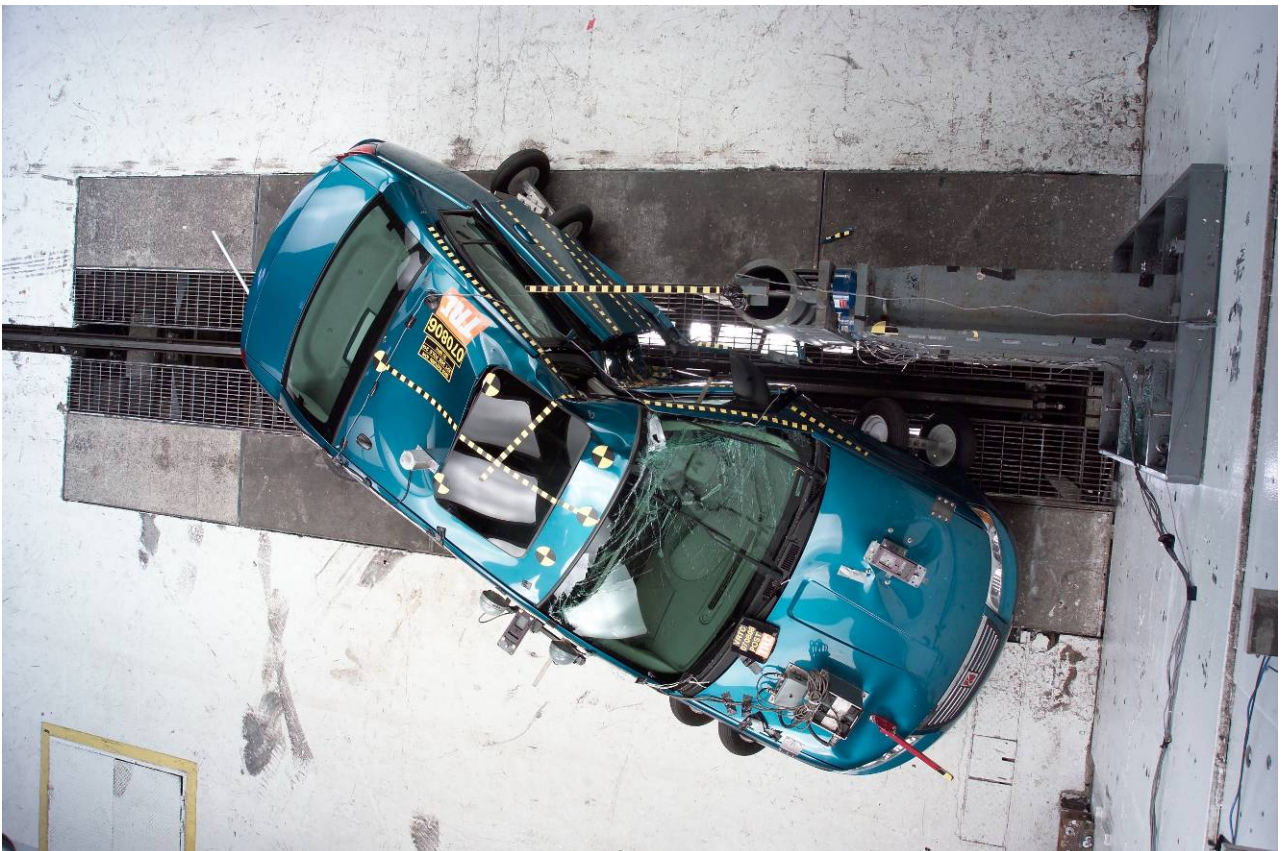


Figure A-18 Post-Test Overhead View

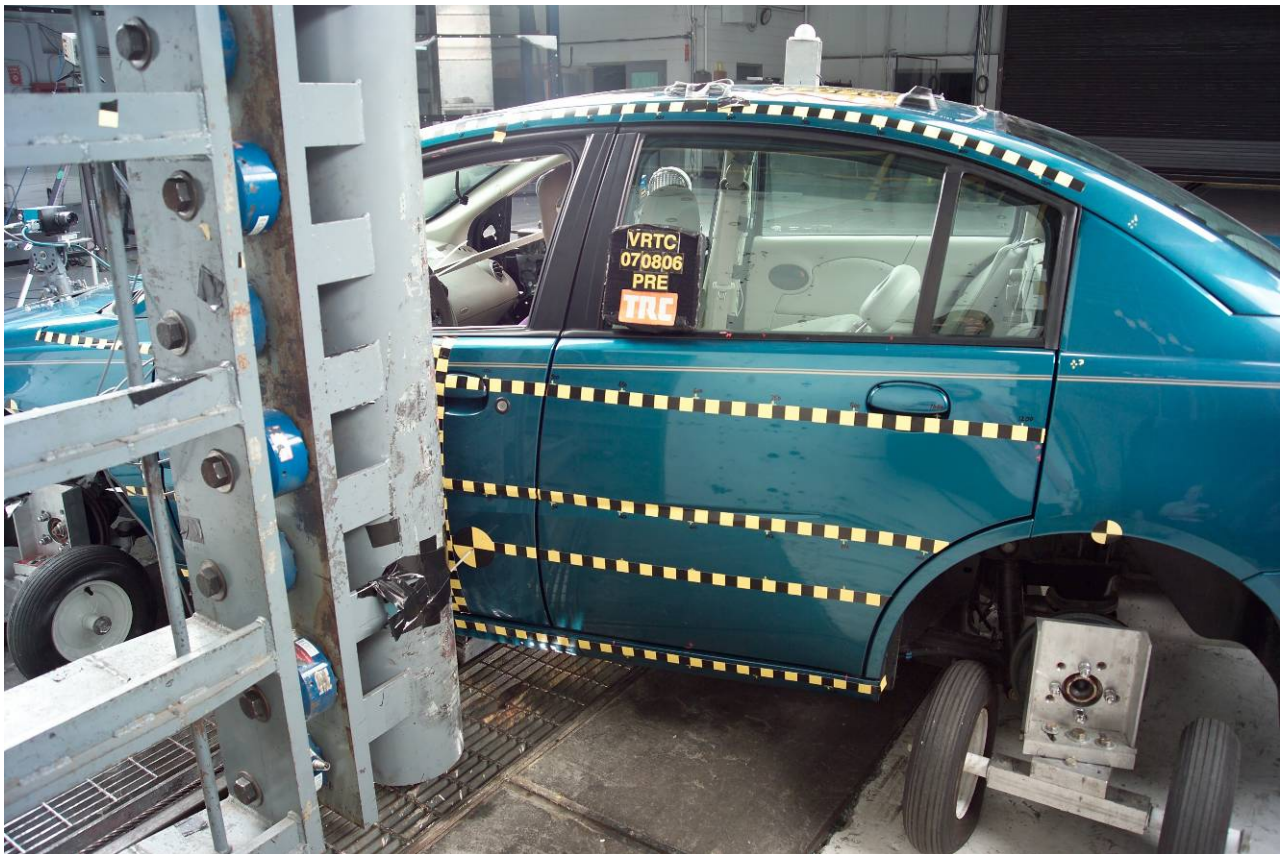


Figure A-19 Pre-Test Impact Alignment View



Figure A-20 Post-Test Impact Alignment View



Figure A-21 Pre-Test Impact Point View



Figure A-22 Post-Test Impact Point View

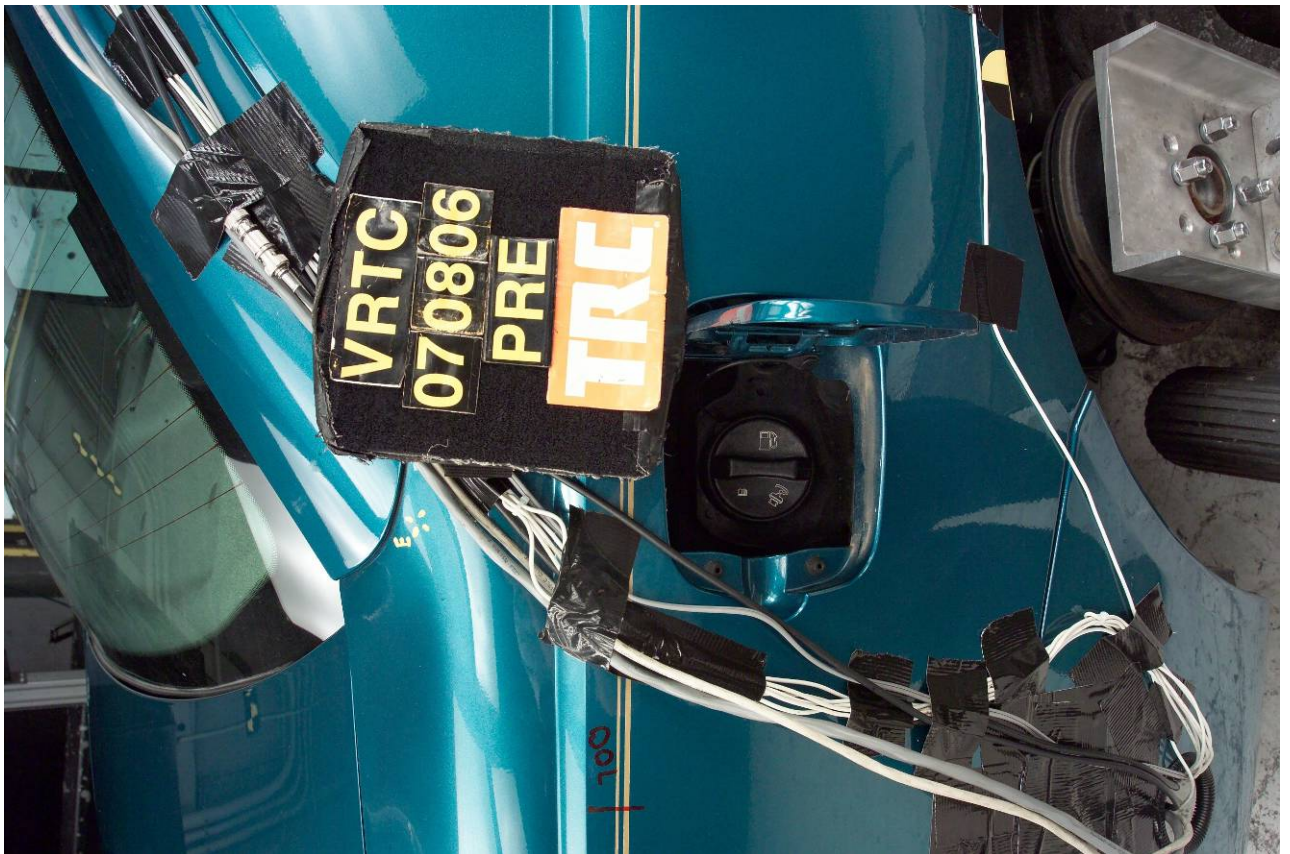


Figure A-23 Pre-Test Fuel Filler Cap View



Figure A-24 Post-Test Fuel Filler Cap View



Figure A-25 Pre-Test Pole Barrier Front View



Figure A-26 Post-Test Pole Barrier Front View



Figure A-27 Pre-Test Driver Dummy Side View



Figure A-28 Post-Test Driver Dummy Side View



Figure A-29 Pre-Test Right Side Dummy Occupant Compartment View



Figure A-30 Post-Test Right Side Dummy Occupant Compartment View



Figure A-31 Pre-Test Driver Dummy and Door Clearance View



Figure A-32 Post-Test Driver Dummy and Door Clearance View

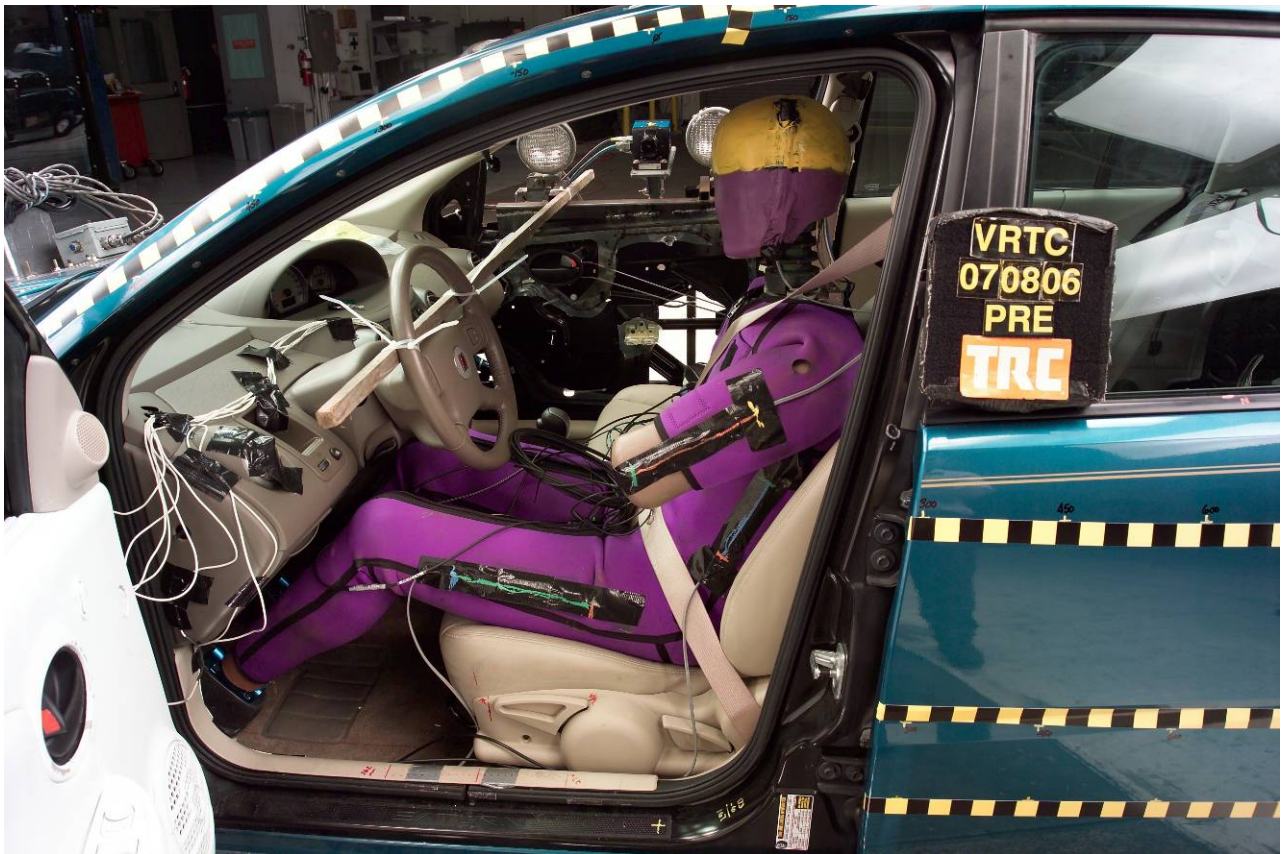


Figure A-33 Pre-Test Driver Dummy Showing Belts, Chalking, and Contact Switches

Intentionally Left Blank



Figure A-34 Pre-Test Driver Door Panel View



Figure A-35 Post-Test Driver Door Panel View



Figure A-36 Post-Test Driver Dummy Head Contact View



Figure A-37 Post-Test Driver Dummy Door Contact View



Figure A-38 Certification Label View



Figure A-39 Recommended Tire Pressure Label View



Figure A-40 Pre-Test Ballast View

Intentionally Left Blank

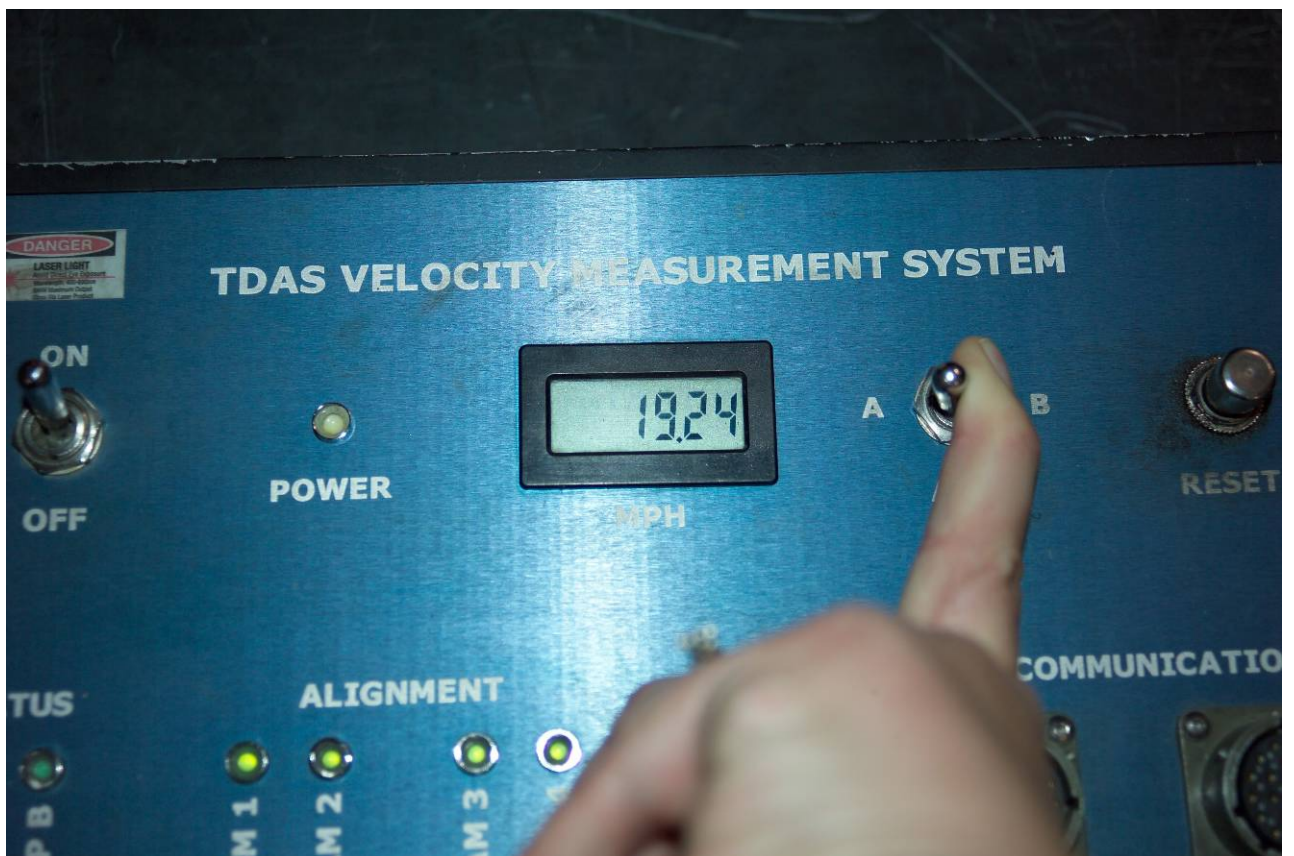


Figure A-41 Post-Test Digital Light Trap Read-Out - View 1



Figure A-42 Post-Test Digital Light Trap Read-Out - View 2

Appendix B

Data Plots



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

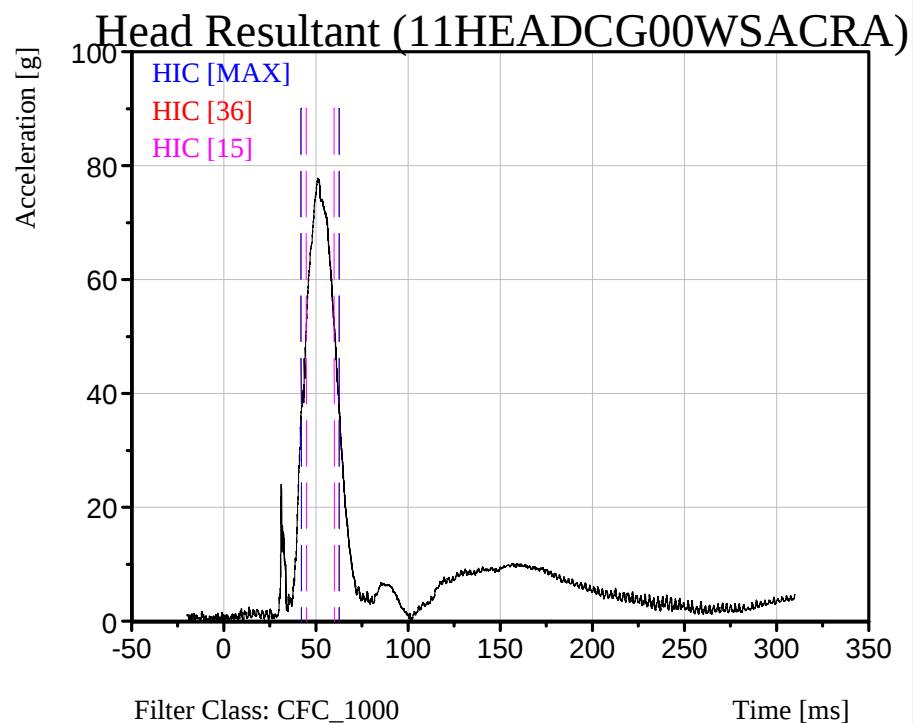
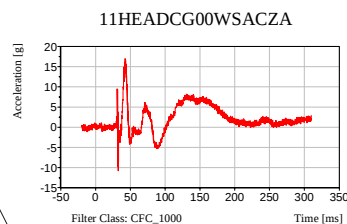
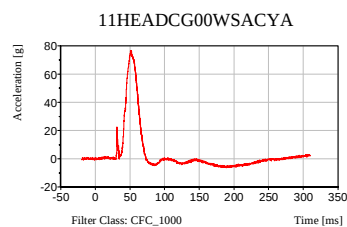
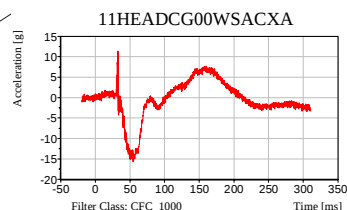
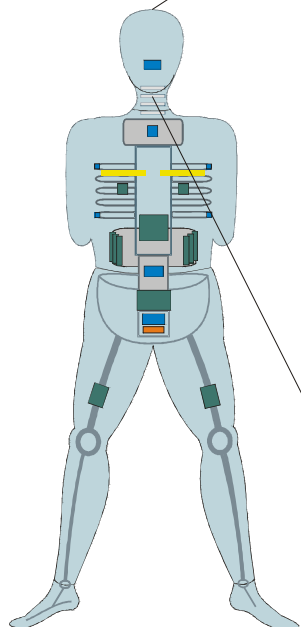
Head Injury Criterion (HIC)

Date: 8/6/2007
Time: 14:08

Customer: VRTC

TRC Inc. Test Lab: CTF

Test Number: 070806



	<u>T1</u> (Begin)	<u>T2</u> (End)	<u>Avg. g T1 to T2</u>
HIC [Max.] = 608.07	42.08 ms	62.80 ms	61.14 g
HIC [36] = 608.07	42.08 ms	62.80 ms	61.14 g
HIC [15] = 572.29	44.96 ms	60.00 ms	67.86 g

Dummy:
Seating Position:
Driver

HIC Source Code: SAE J2052 ISO/TC22/SC12/WG3 N 282 (Issued 1990-03-16)

B-2

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

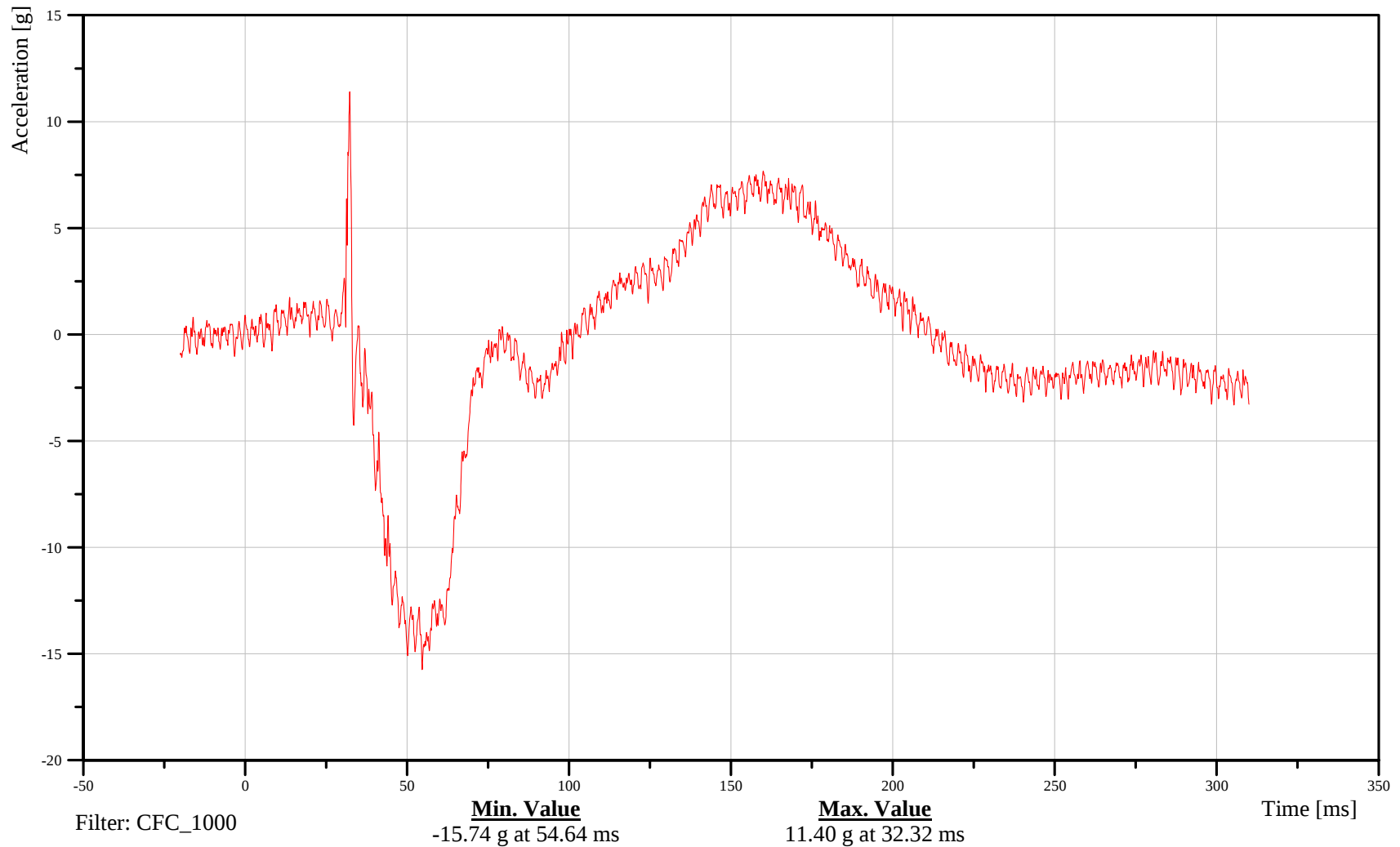
Head X-Axis Acceleration

Customer: VRTC

11HEADCG00WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-3

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

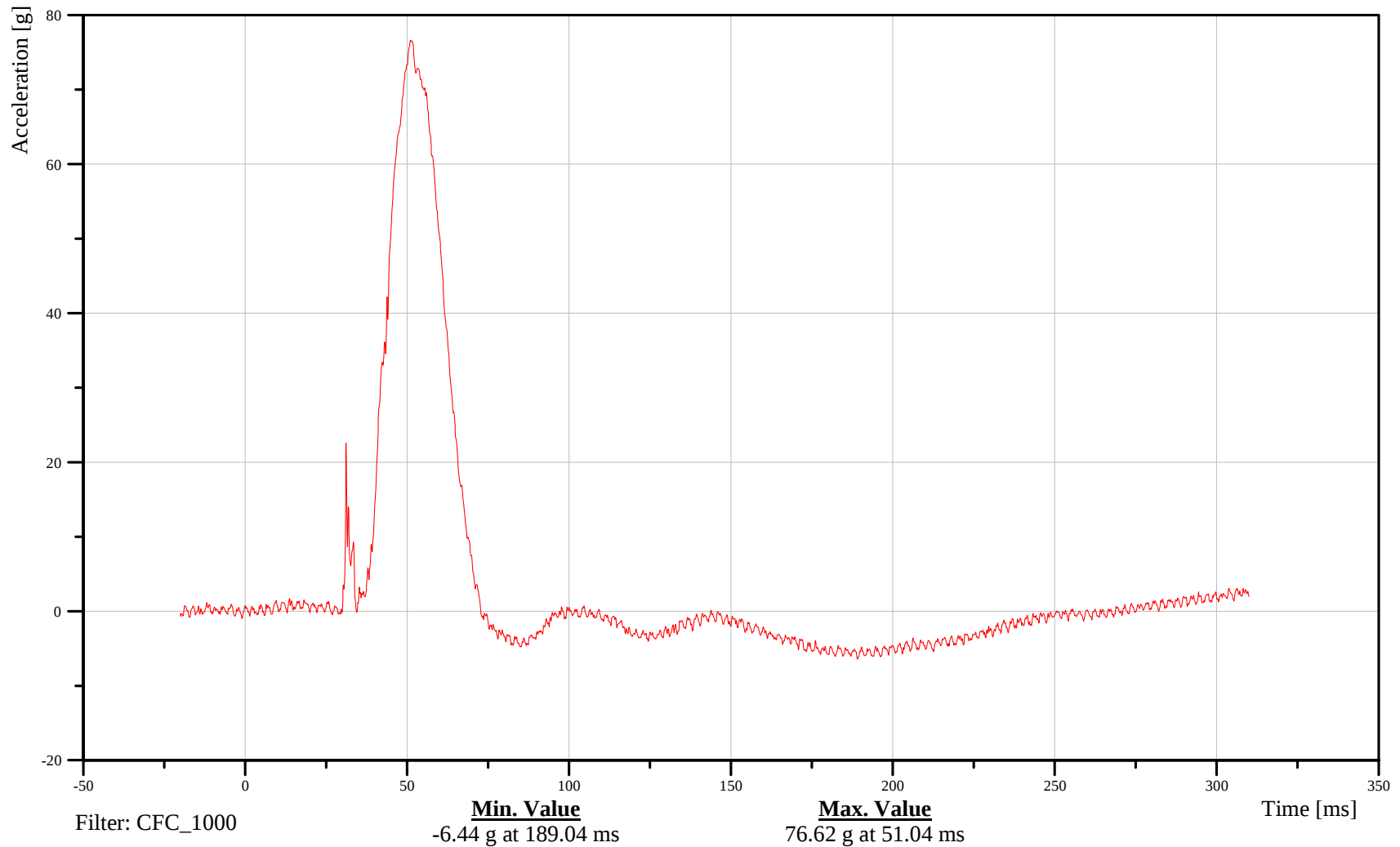
Head Y-Axis Acceleration

Customer: VRTC

11HEADCG00WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-4

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

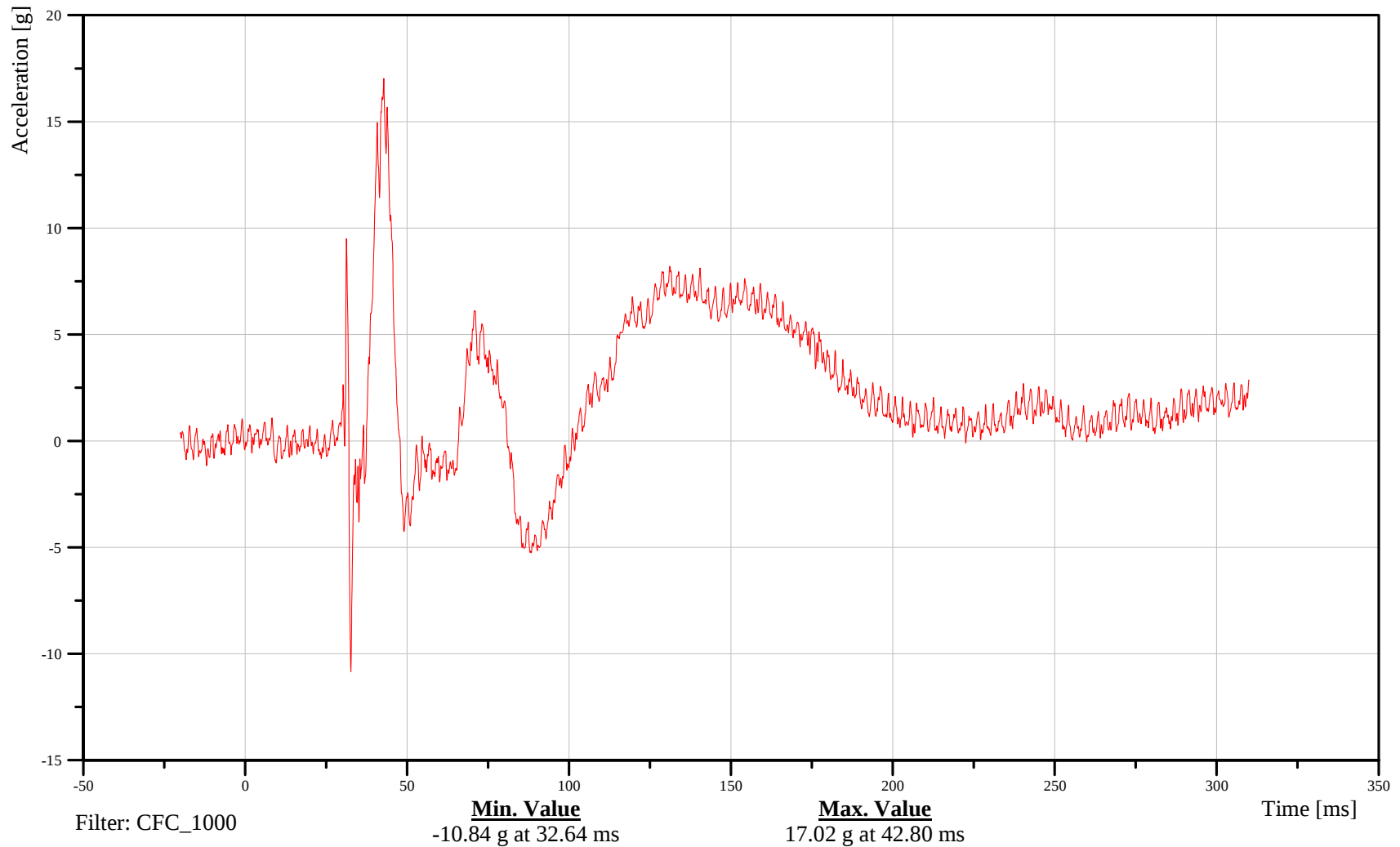
Head Z-Axis Acceleration

Customer: VRTC

11HEADCG00WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-5

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

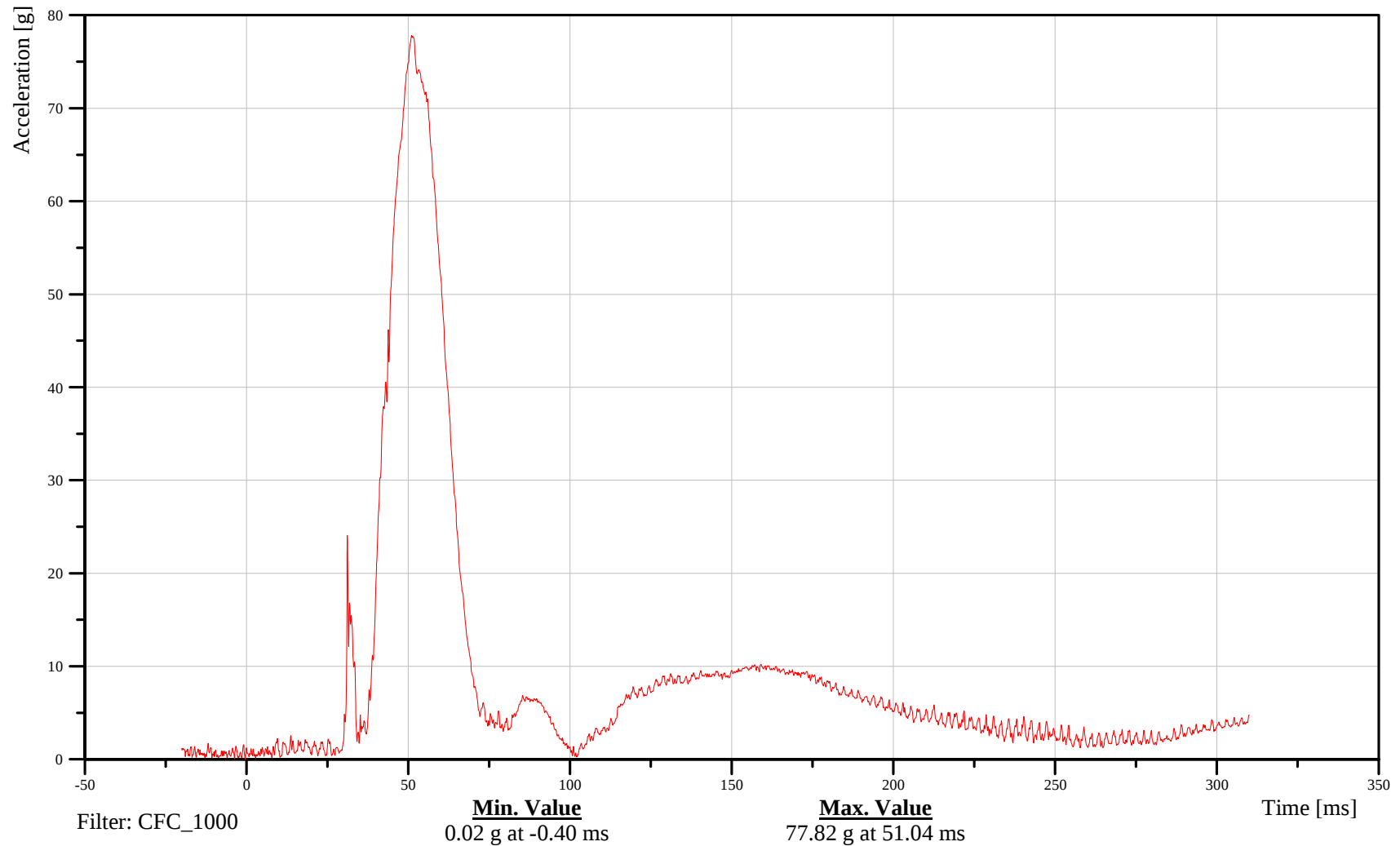
Head Resultant Acceleration

Customer: VRTC

11HEADCG00WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-6

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

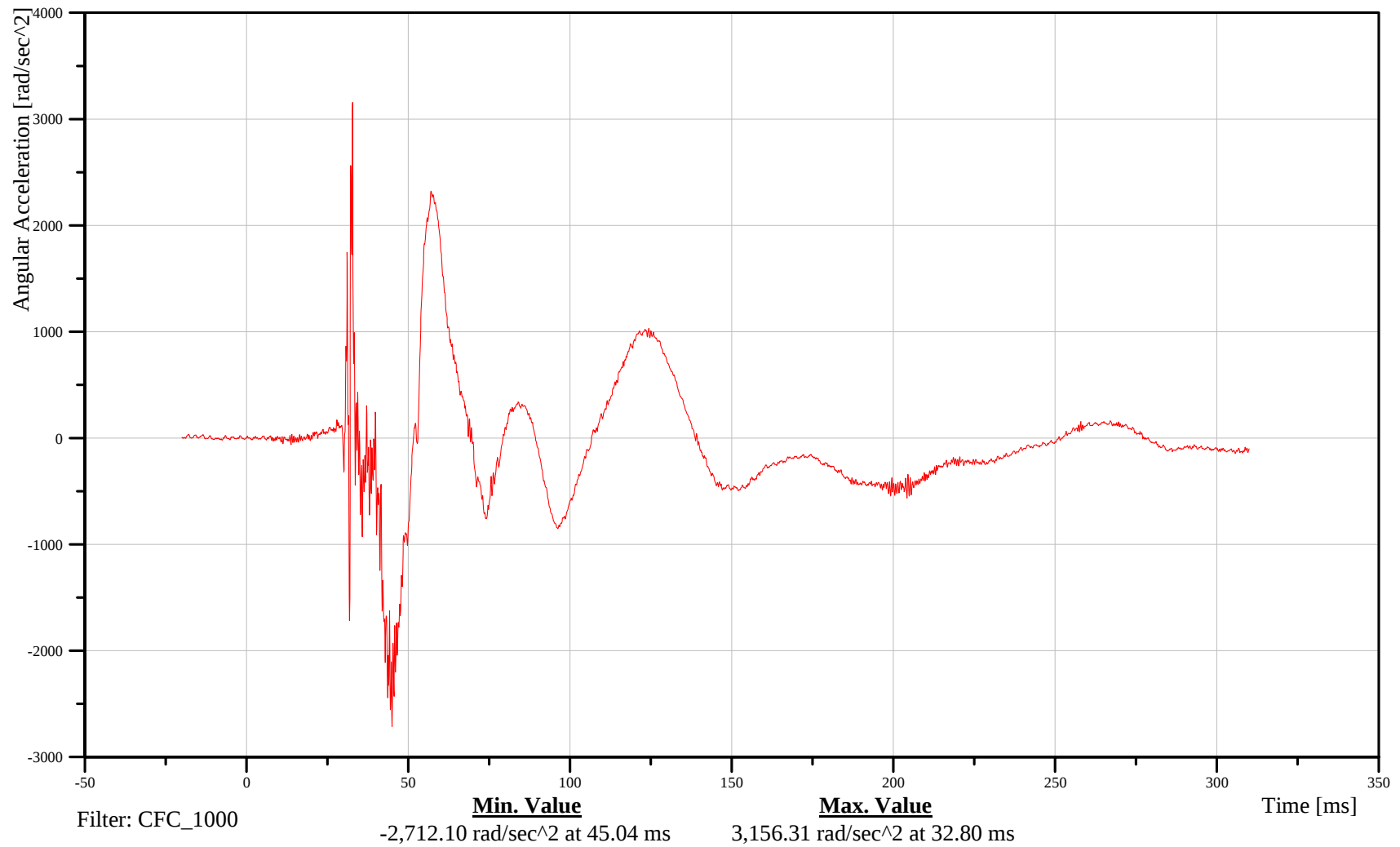
Head X-Axis Angular Displacement

Customer: VRTC

11HEADCG00WSANXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-7

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

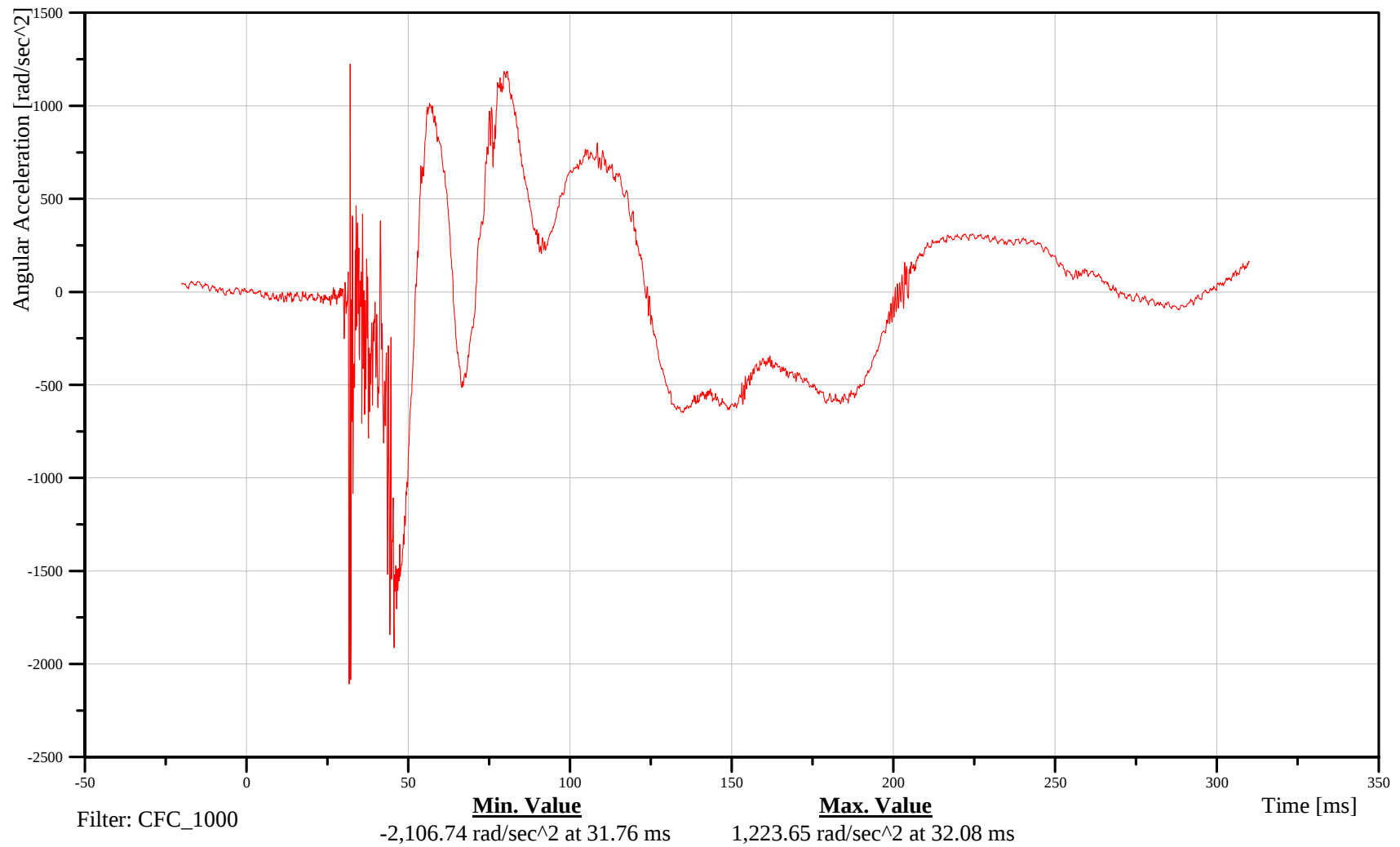
Head Y-Axis Angular Displacement

Customer: VRTC

11HEADCG00WSANYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-8

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

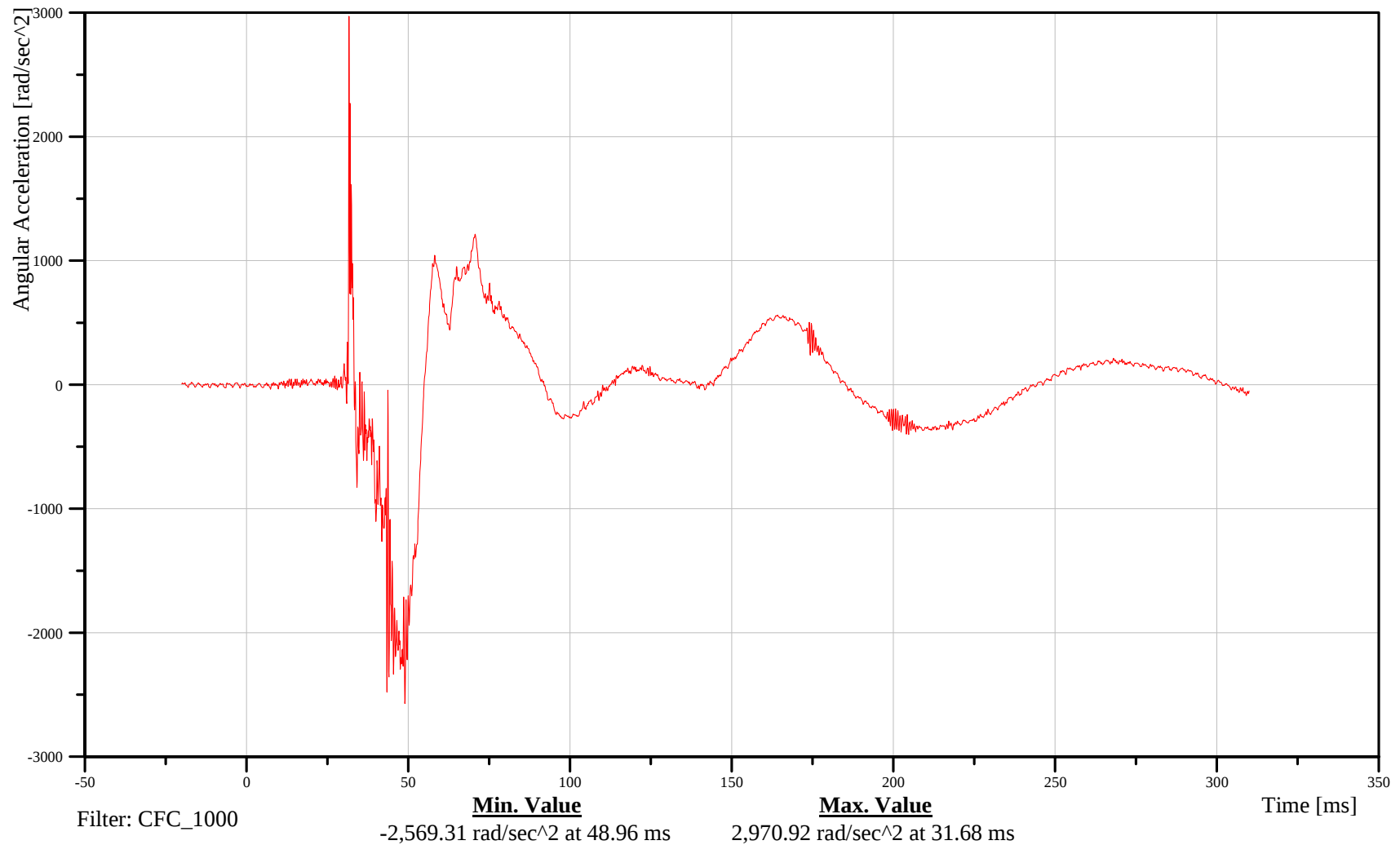
Head Z-Axis Angular Displacement

Customer: VRTC

11HEADCG00WSANZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-9

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

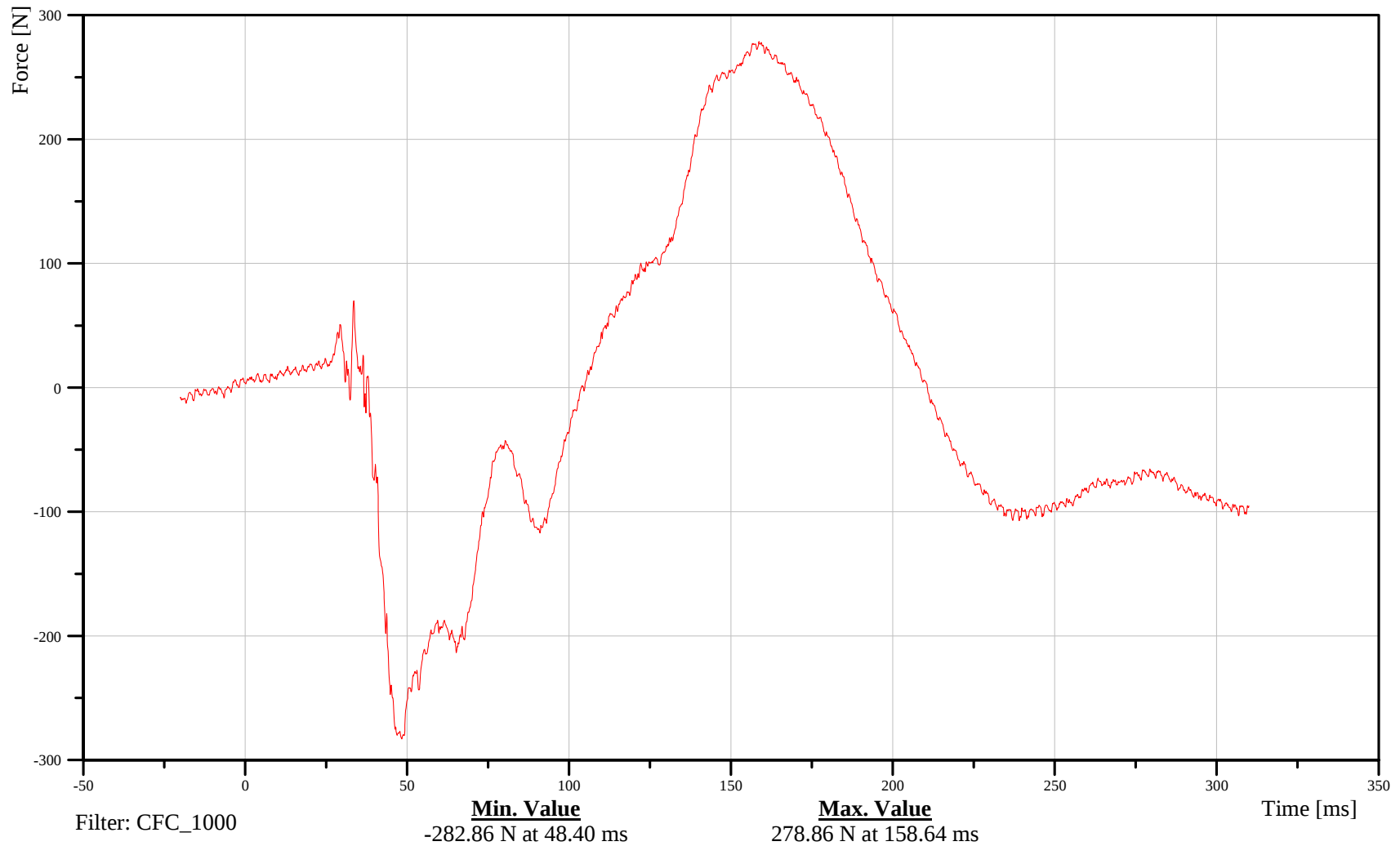
Upper Neck X-Axis Force

Customer: VRTC

11NECKUP00WSFOXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-10

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

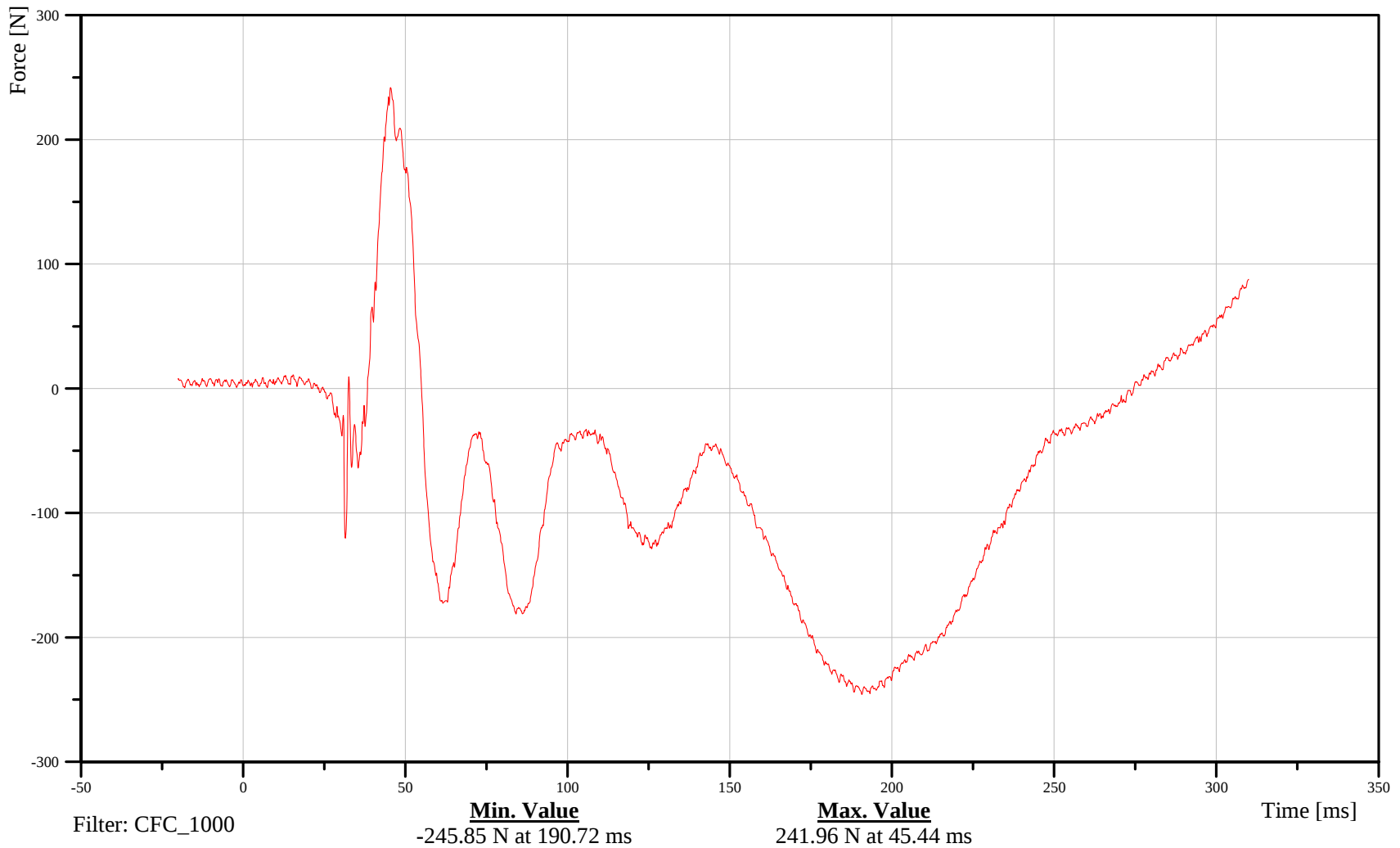
Upper Neck Y-Axis Force

Customer: VRTC

11NECKUP00WSFOYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-11

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

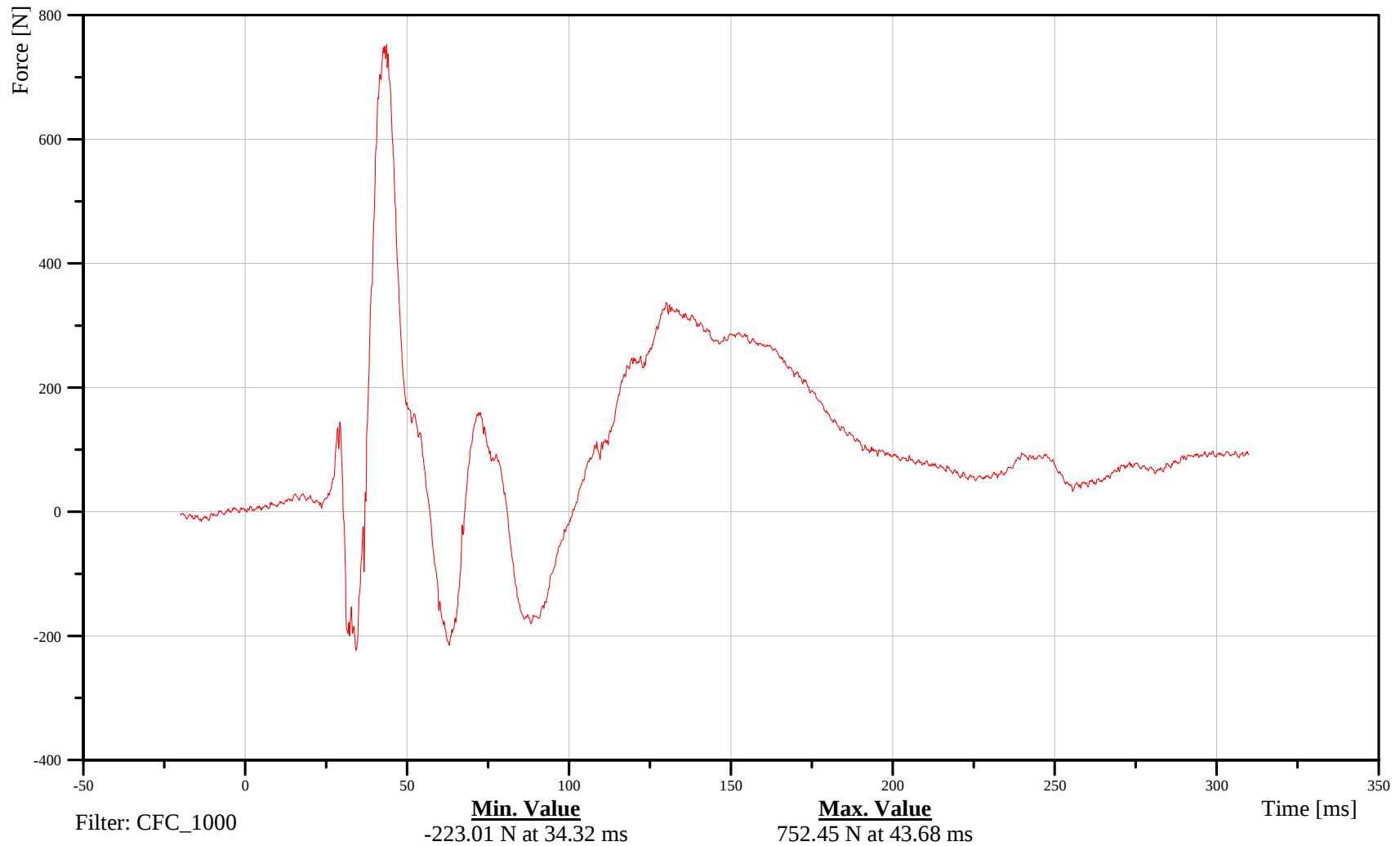
Upper Neck Z-Axis Force

Customer: VRTC

11NECKUP00WSFOZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-12

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

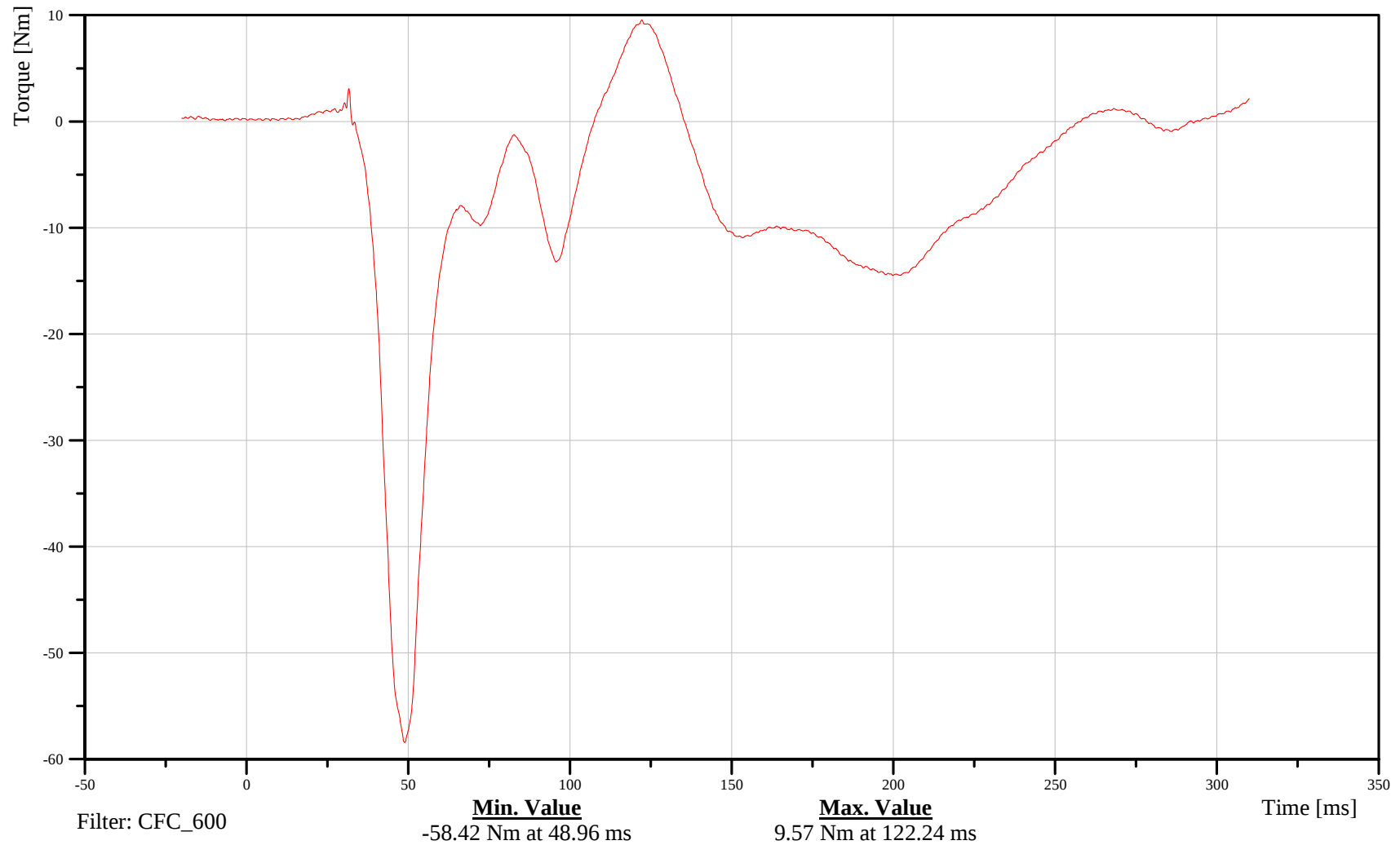
Upper Neck Moment About X Axis

Customer: VRTC

11NECKUP00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-13

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

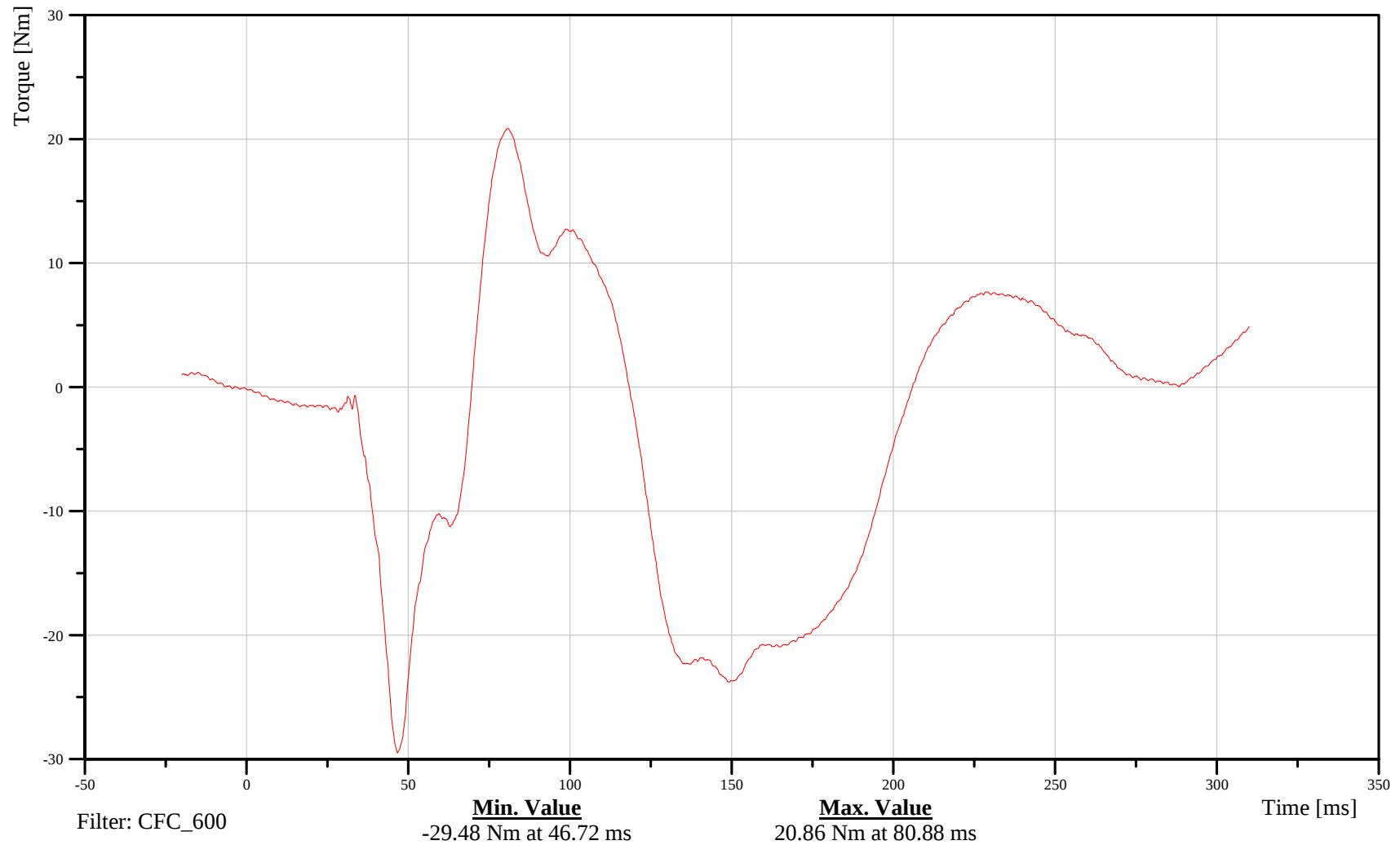
Upper Neck Moment About Y Axis

Customer: VRTC

11NECKUP00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-14

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

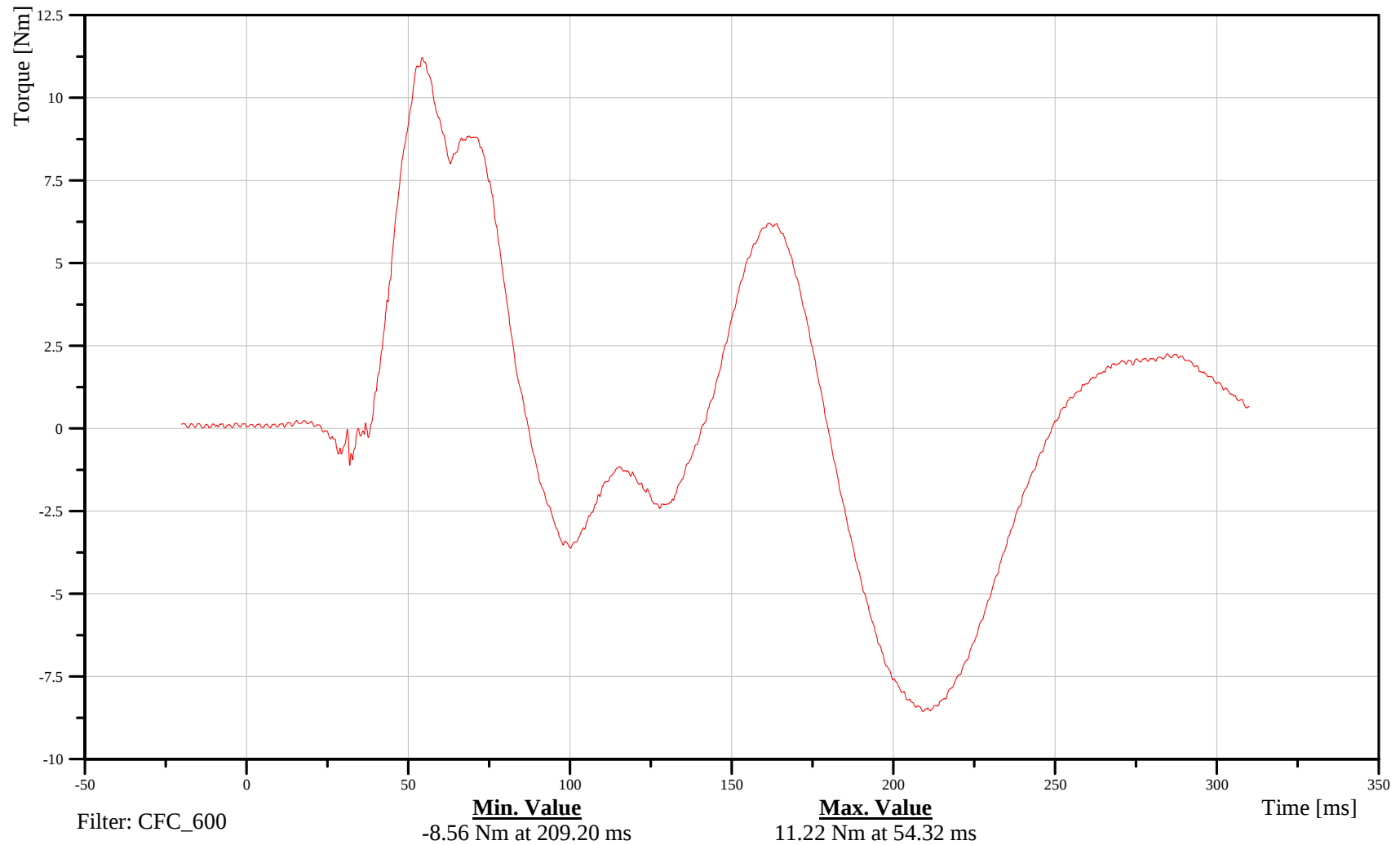
Upper Neck Moment About Z Axis

Customer: VRTC

11NECKUP00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-15

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

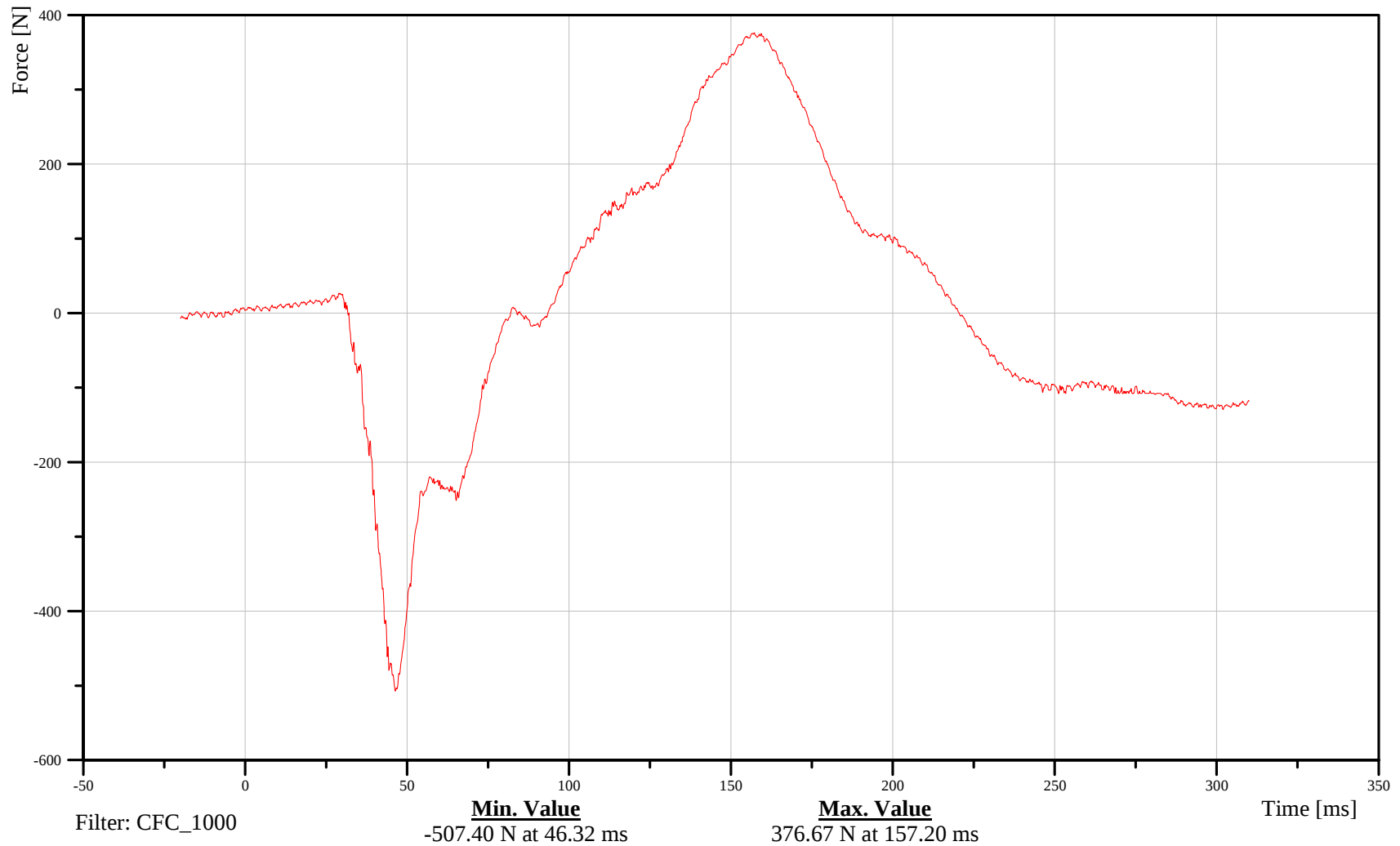
Lower Neck X-Axis Force

Customer: VRTC

11NECKLO00WSFOXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-16

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

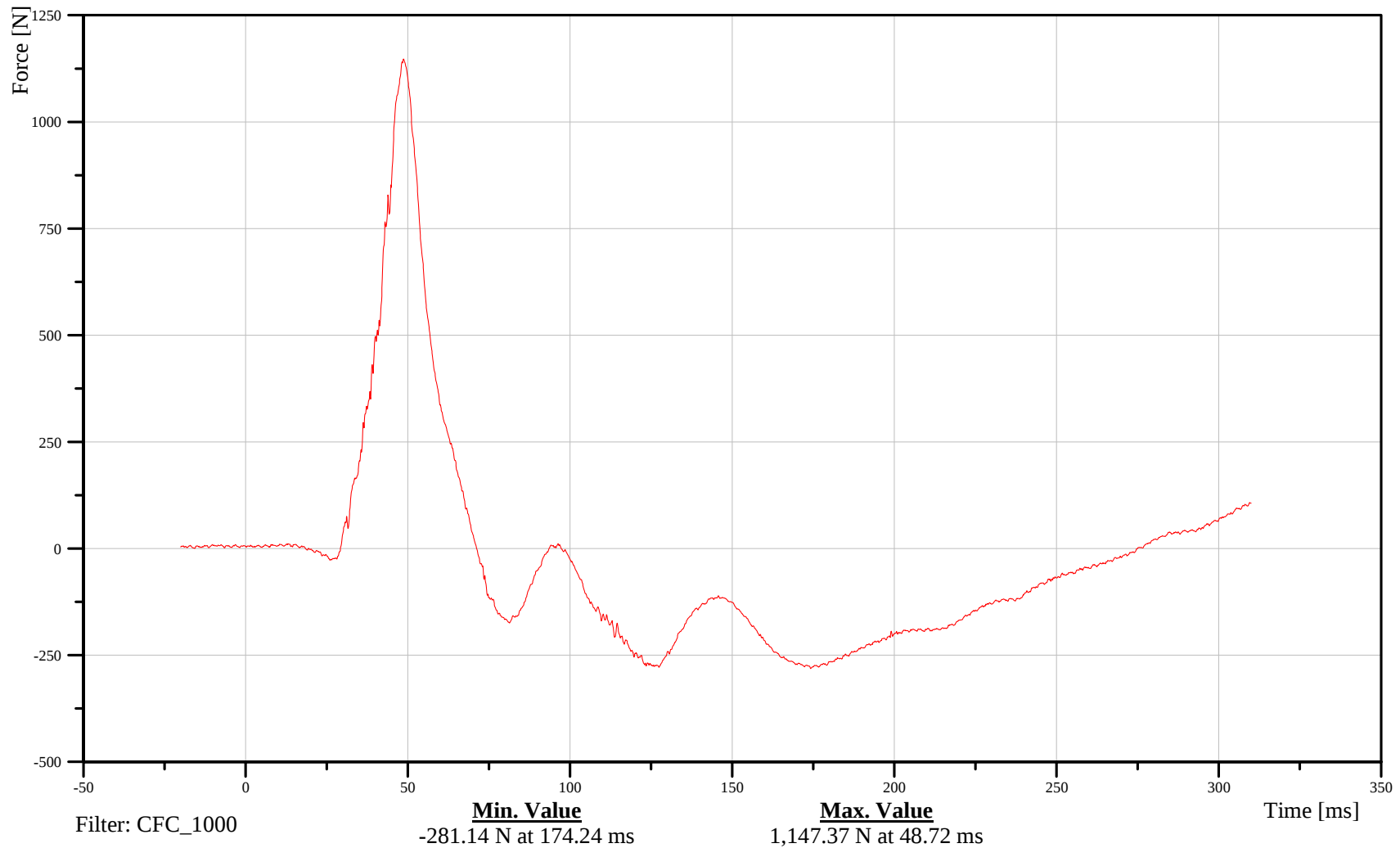
Lower Neck Y-Axis Force

Customer: VRTC

11NECKLO00WSFOYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-17

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

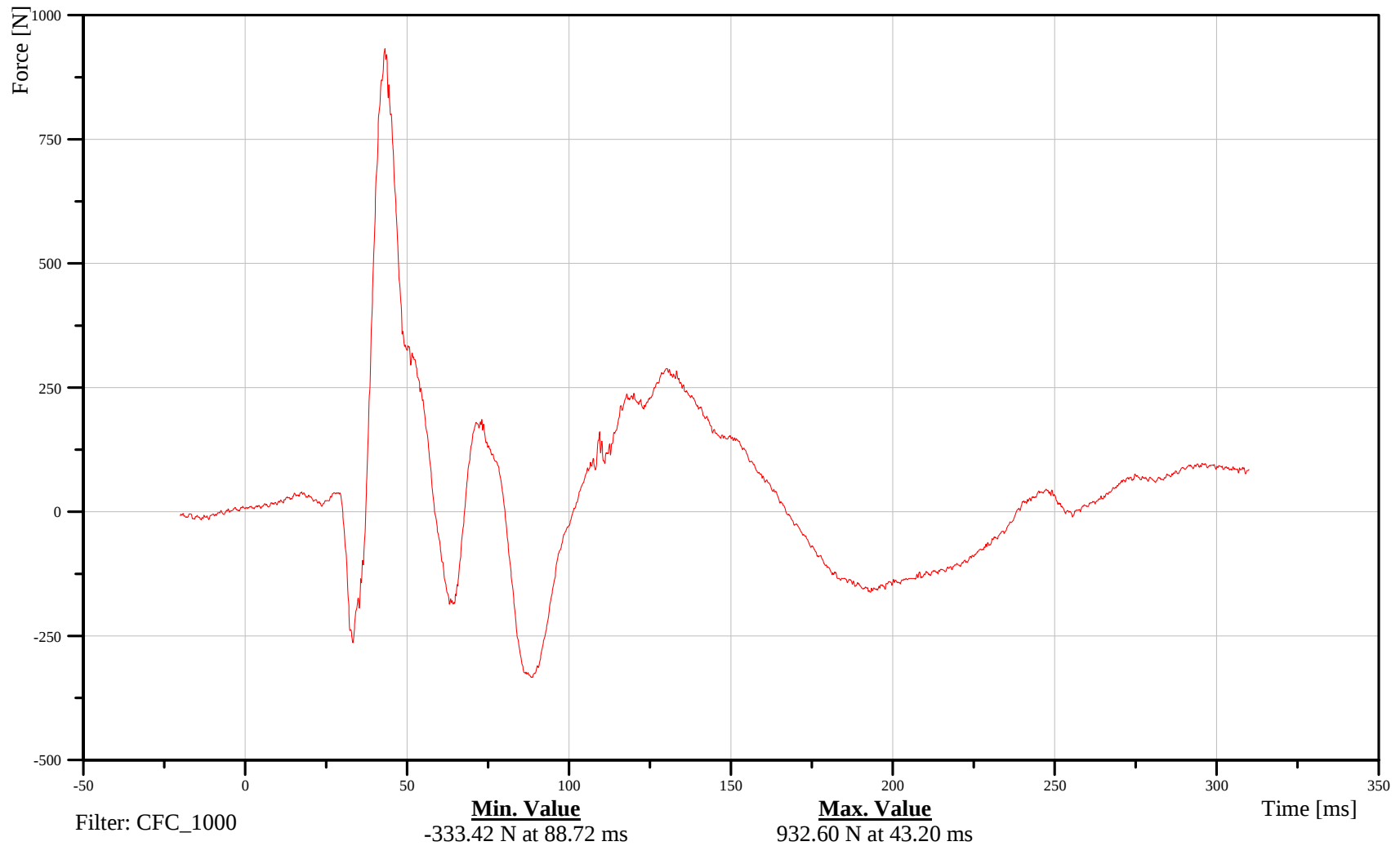
Lower Neck Z-Axis Force

Customer: VRTC

11NECKLO00WSFOZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-18

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

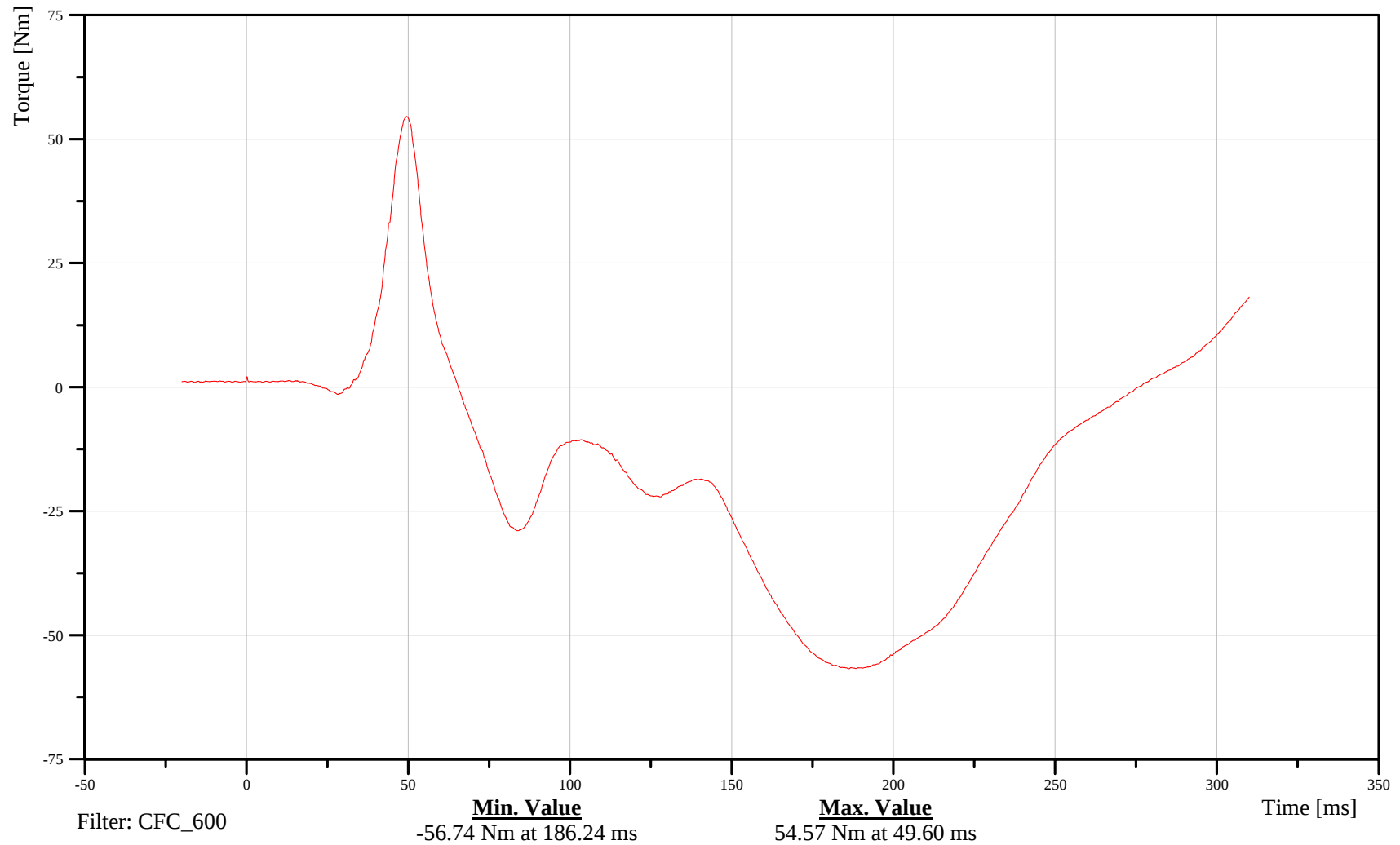
Lower Neck Moment About X Axis

Customer: VRTC

11NECKLO00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-19

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

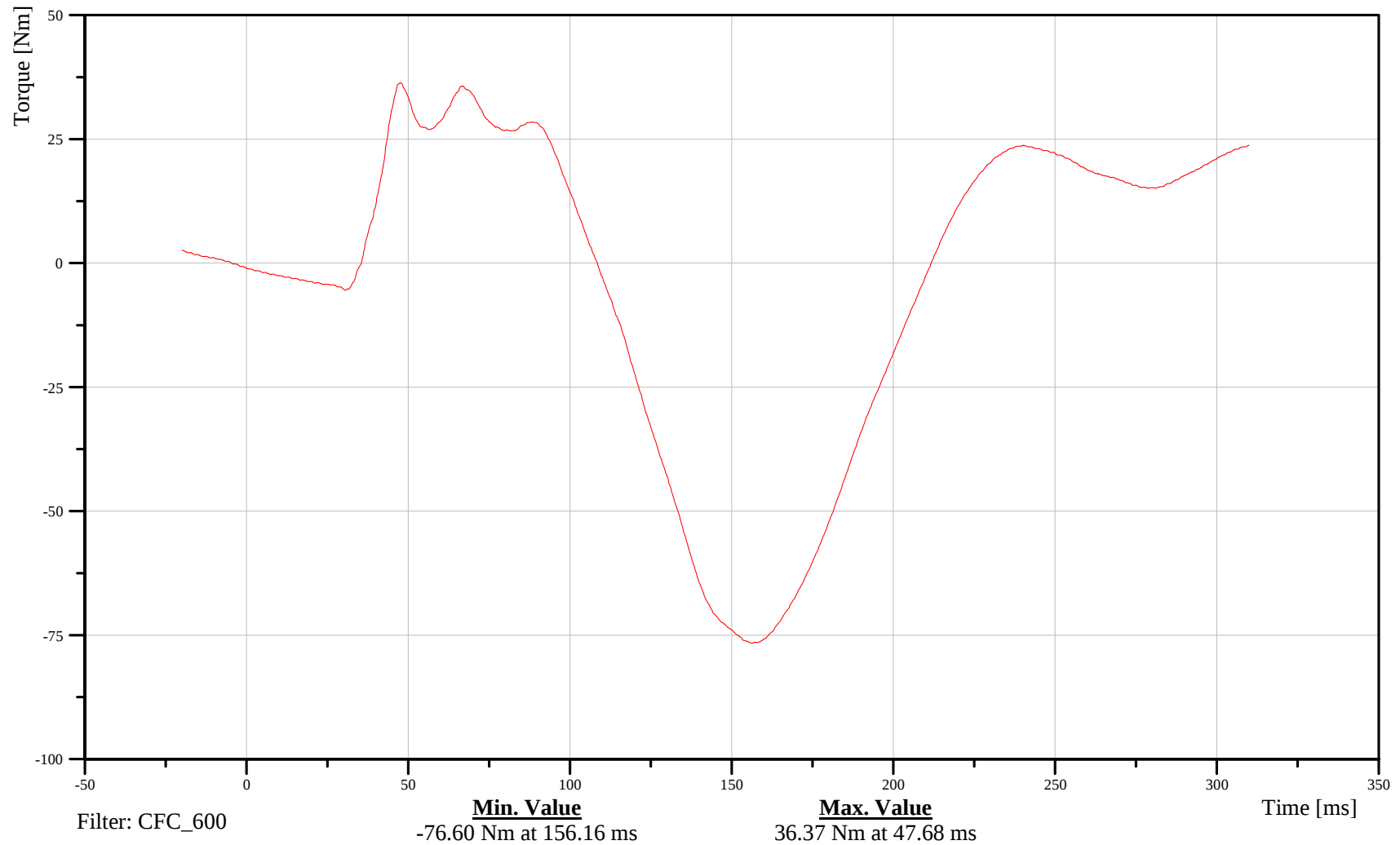
Lower Neck Moment About Y Axis

Customer: VRTC

11NECKLO00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-20

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

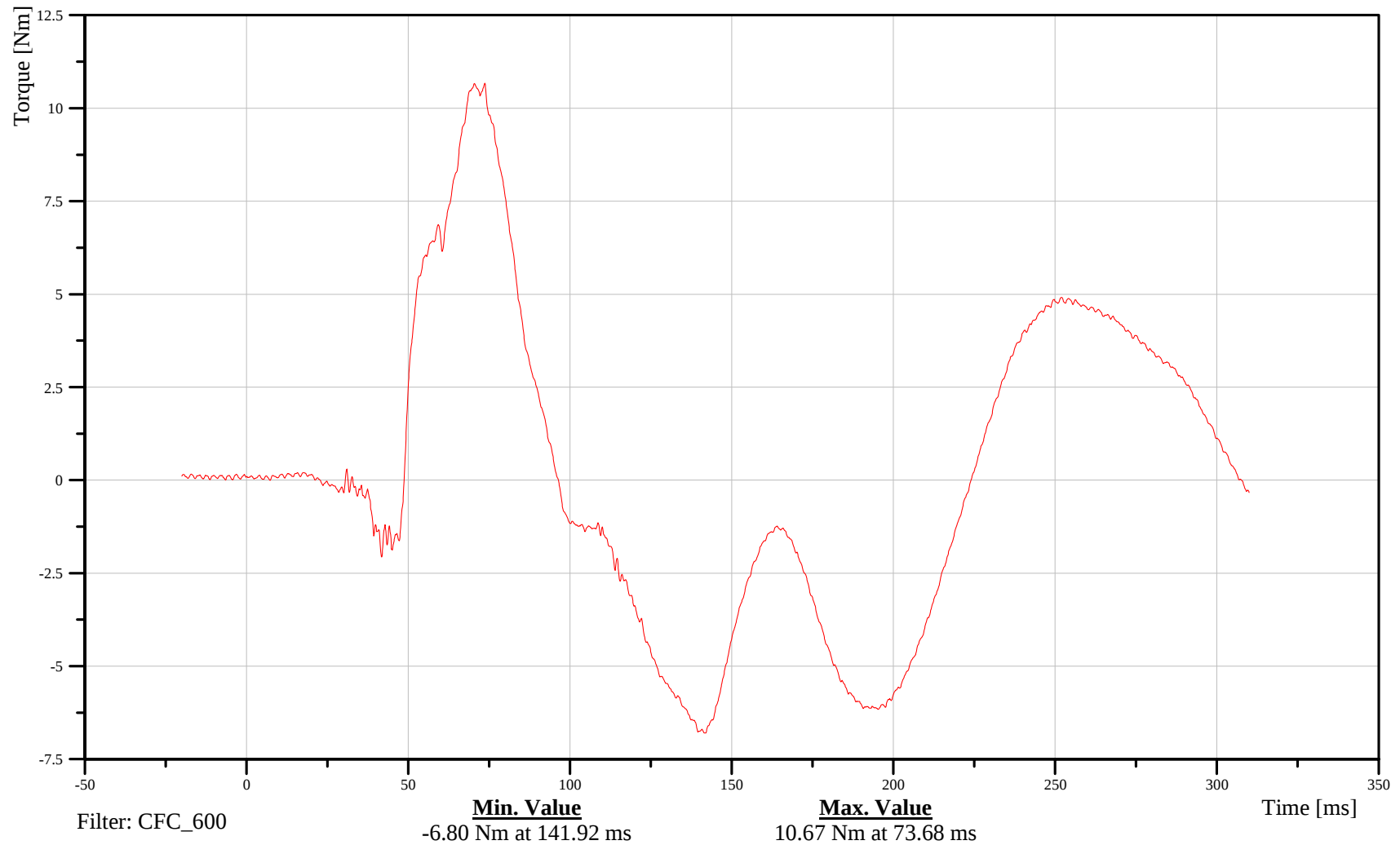
Lower Neck Moment About Z Axis

Customer: VRTC

11NECKLO00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-21

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

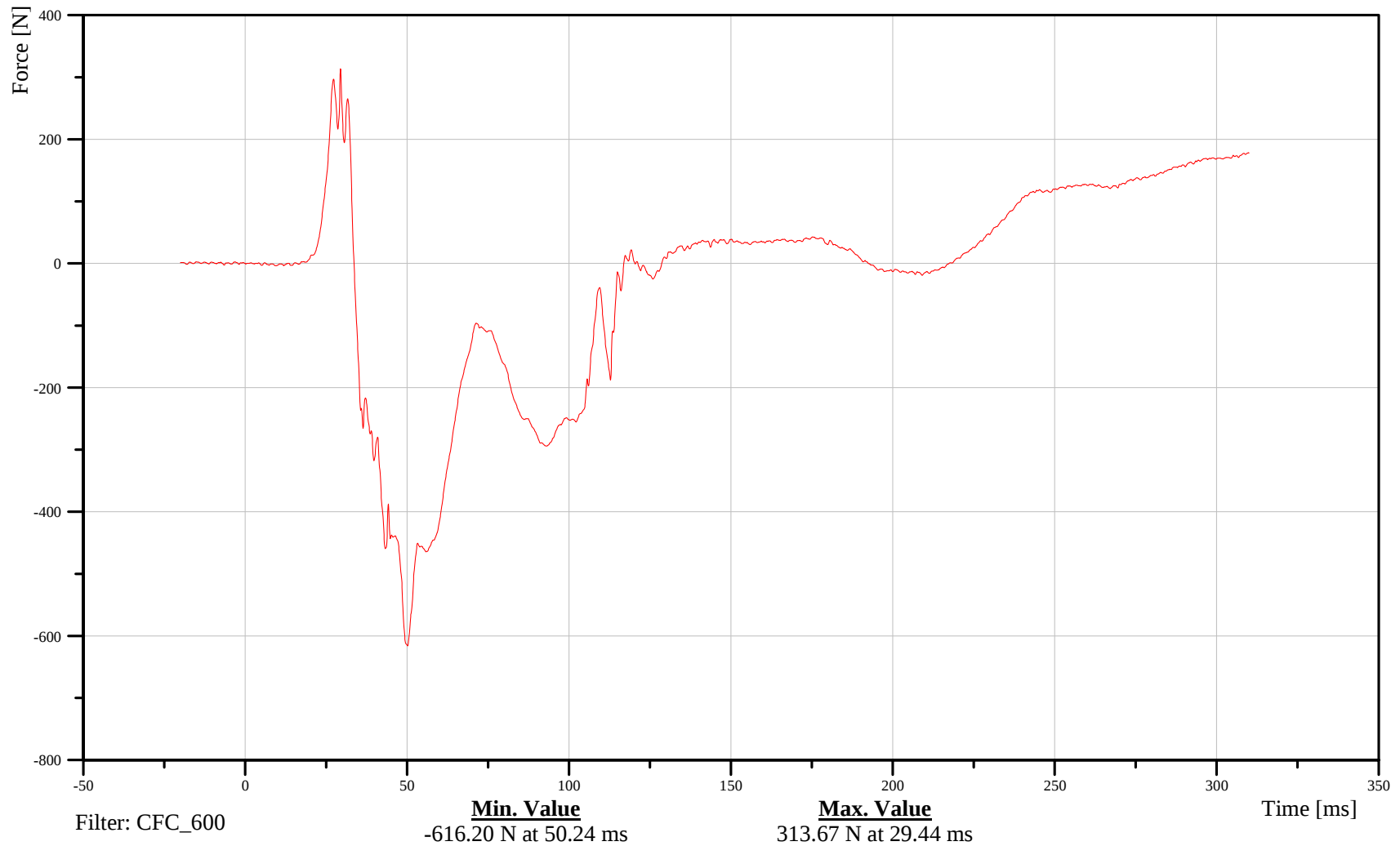
Shoulder X-Axis Force

Customer: VRTC

11SHLDLE00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-22

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

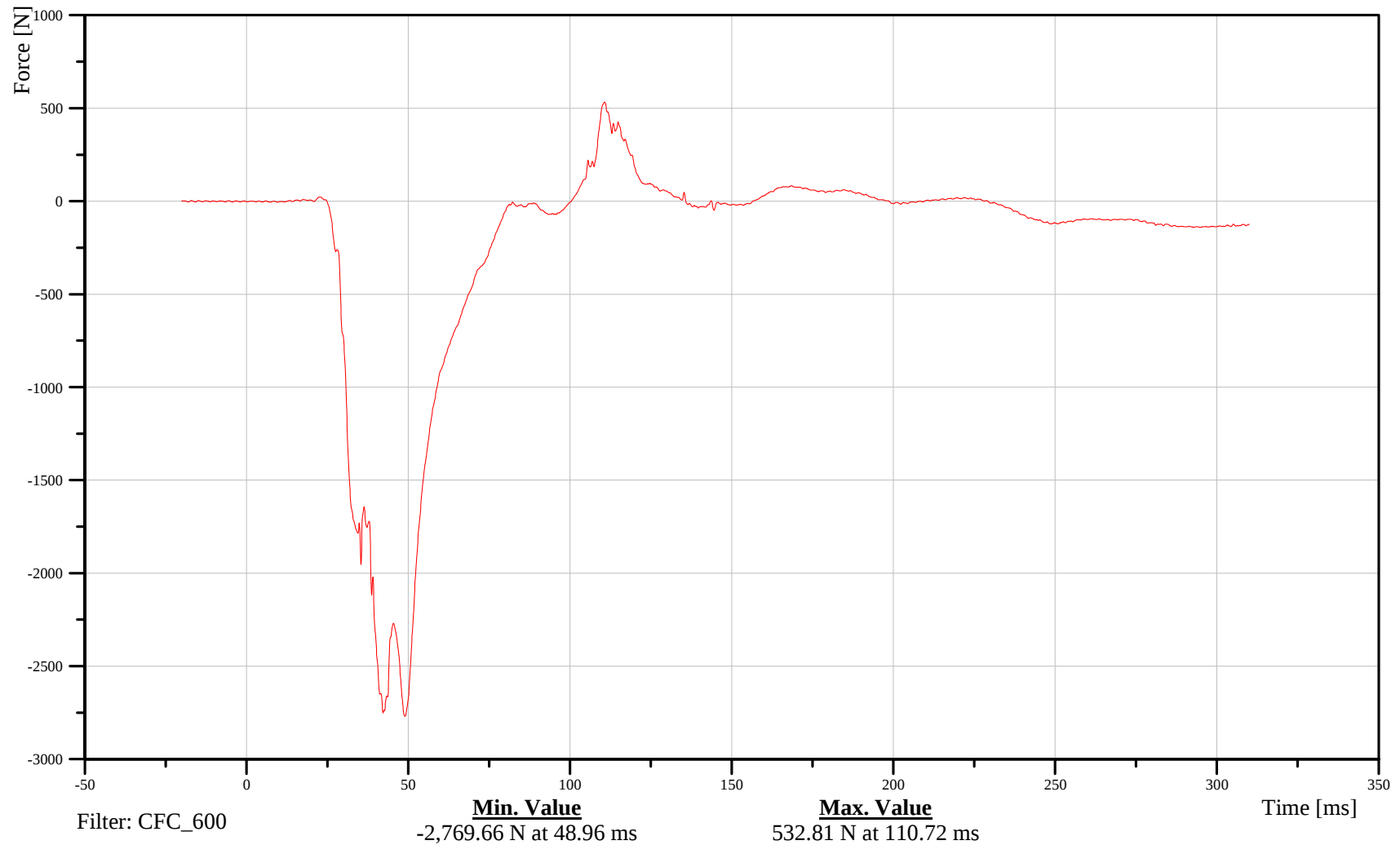
Shoulder Y-Axis Force

Customer: VRTC

11SHLDLE00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-23

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

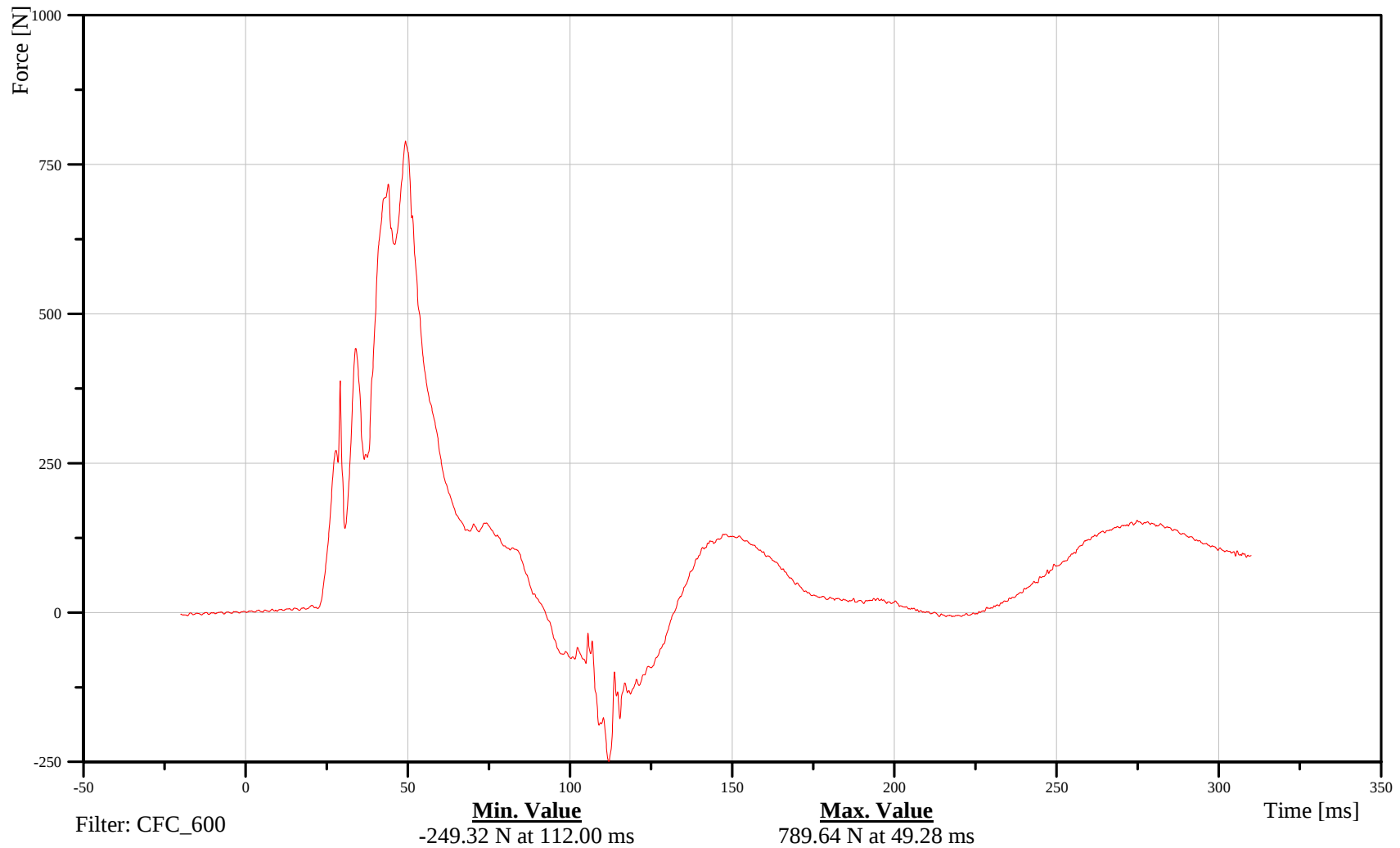
Shoulder Z-Axis Force

Customer: VRTC

11SHLDLE00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-24

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

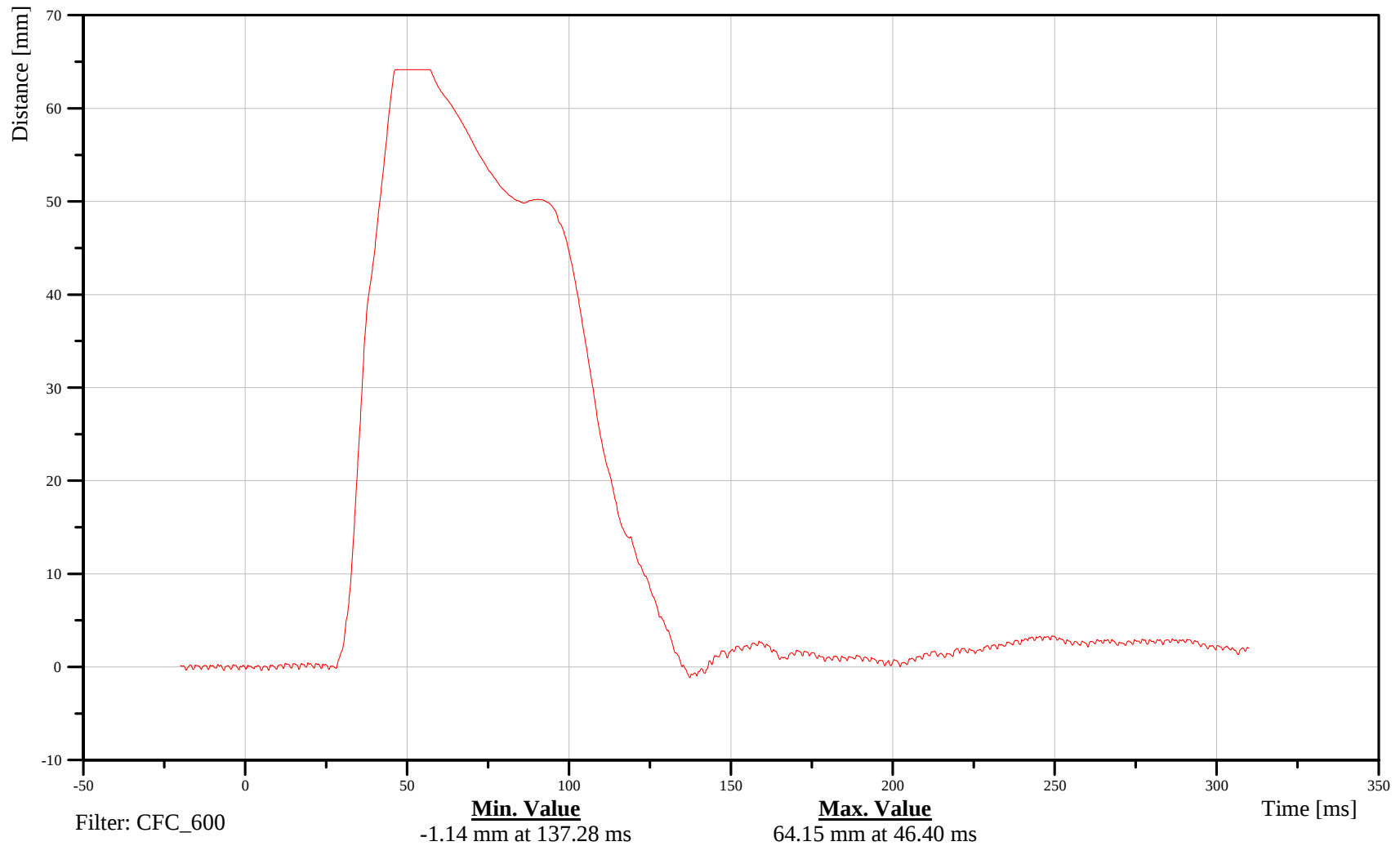
Shoulder Y-Axis Displacement

Customer: VRTC

11SHLDLE00WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-25

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

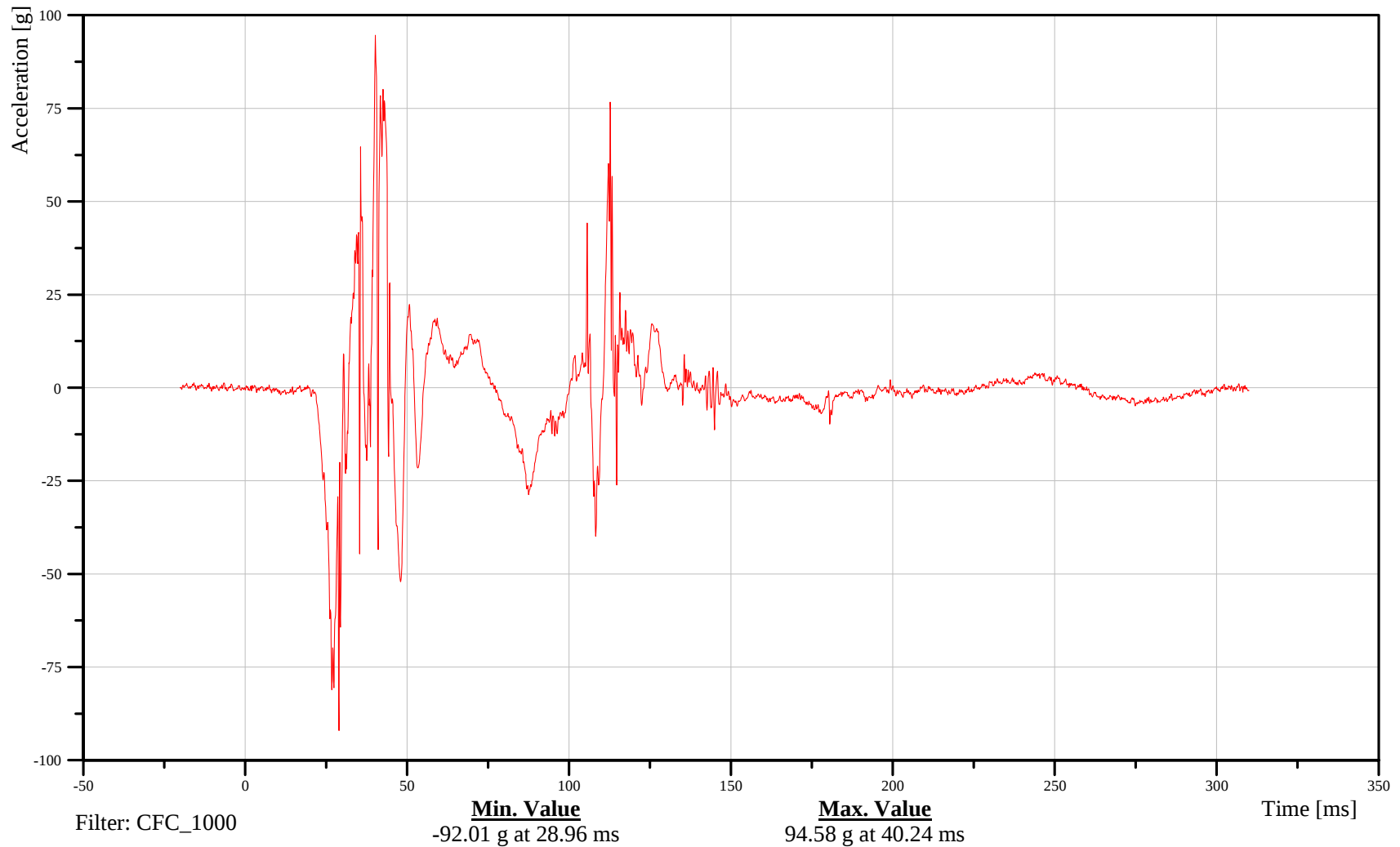
Shoulder X-Axis Acceleration

Customer: VRTC

11SHLDLE00WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-26

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

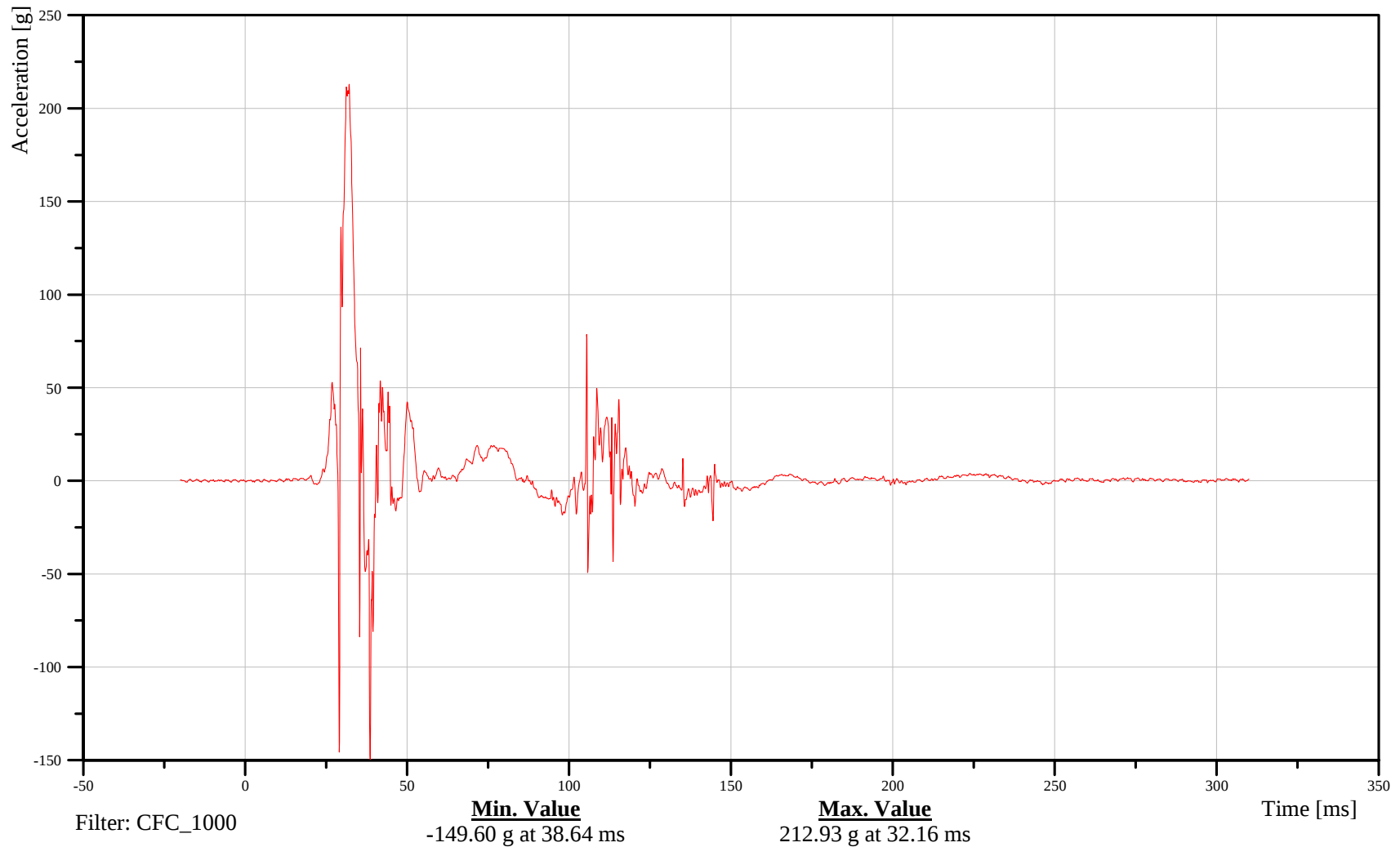
Shoulder Y-Axis Acceleration

Customer: VRTC

11SHLDLE00WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-27

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

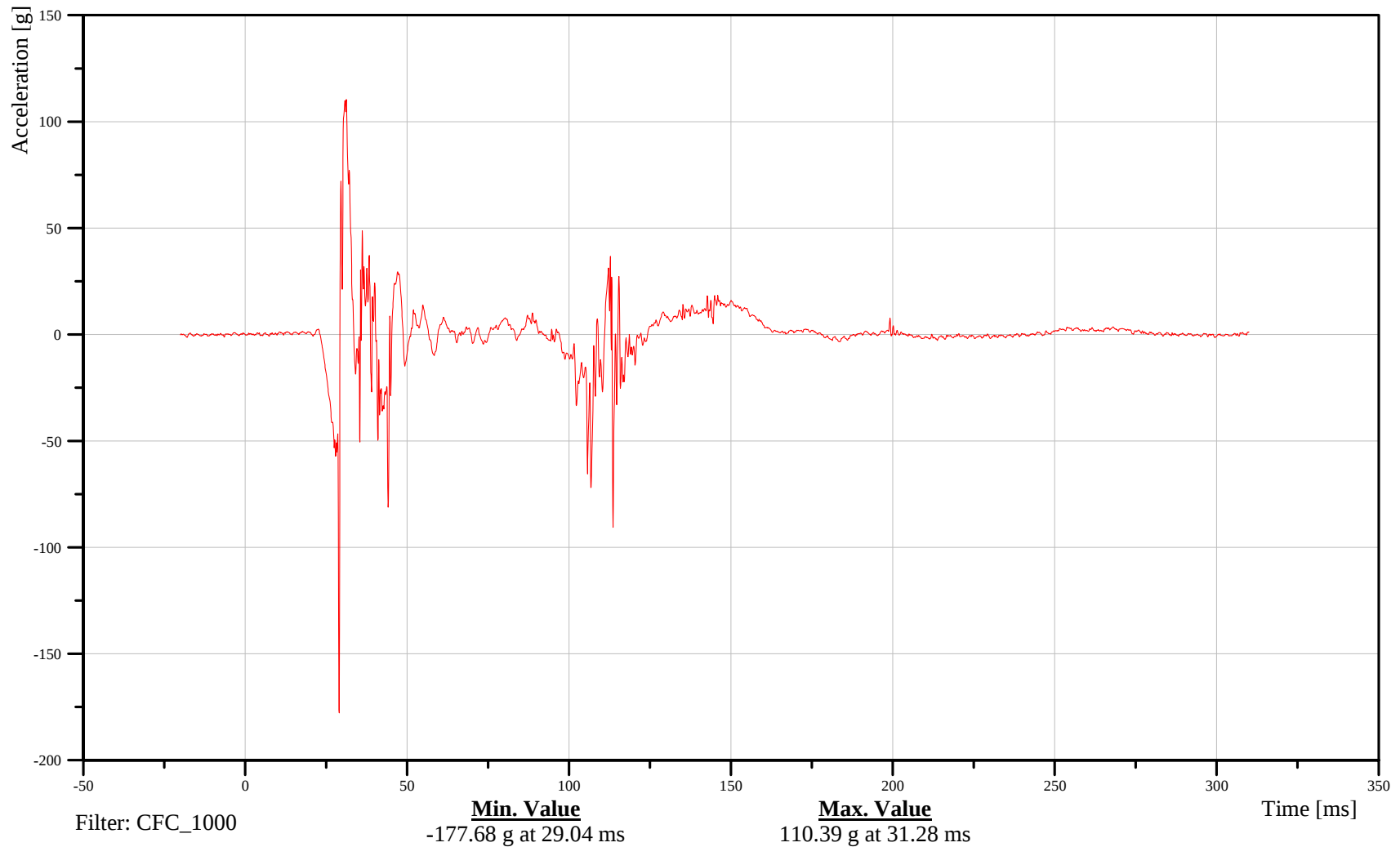
Shoulder Z-Axis Acceleration

Customer: VRTC

11SHLDLE00WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-28

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

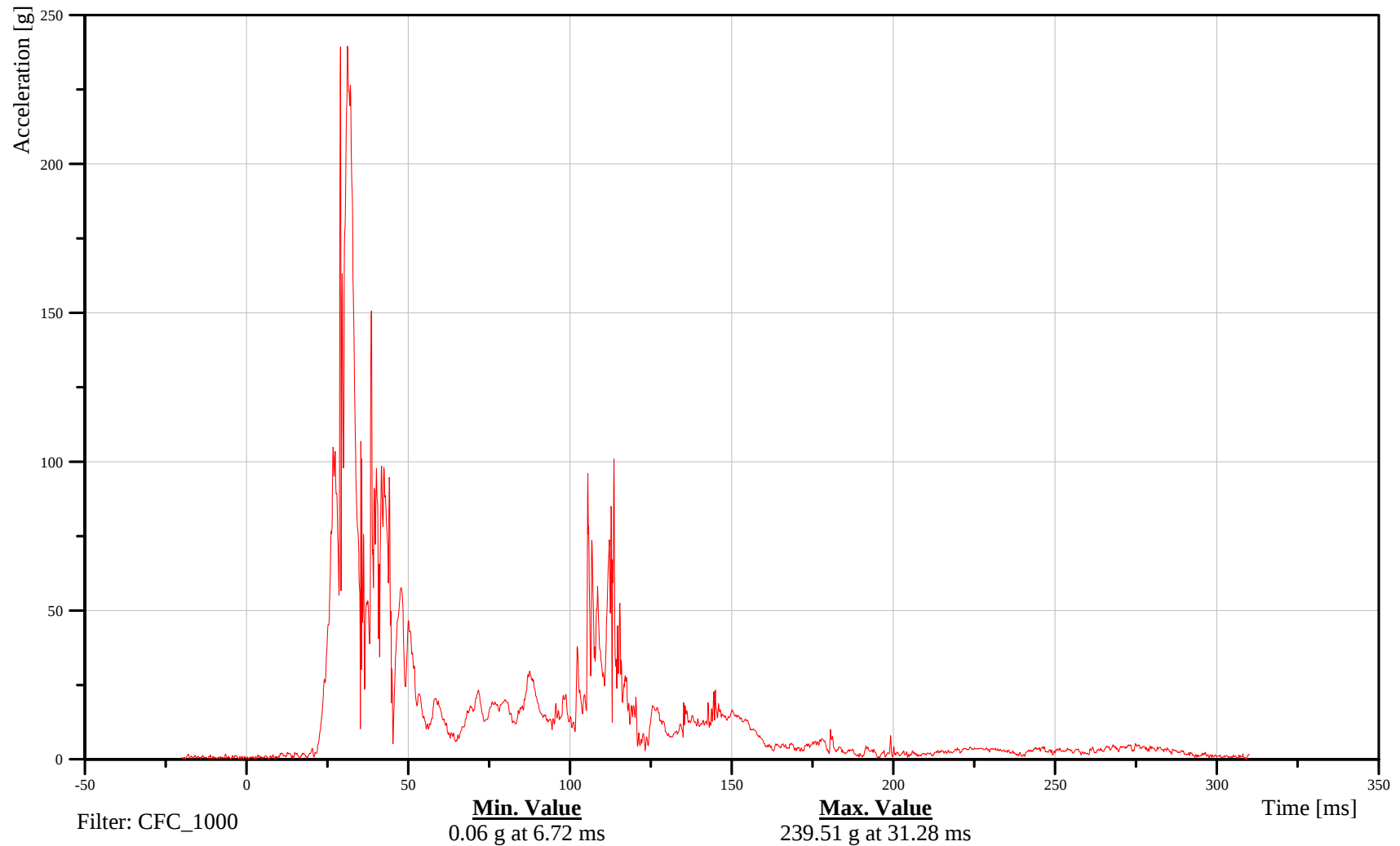
Shoulder Resultant Acceleration

Customer: VRTC

11SHLDLE00WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-29

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

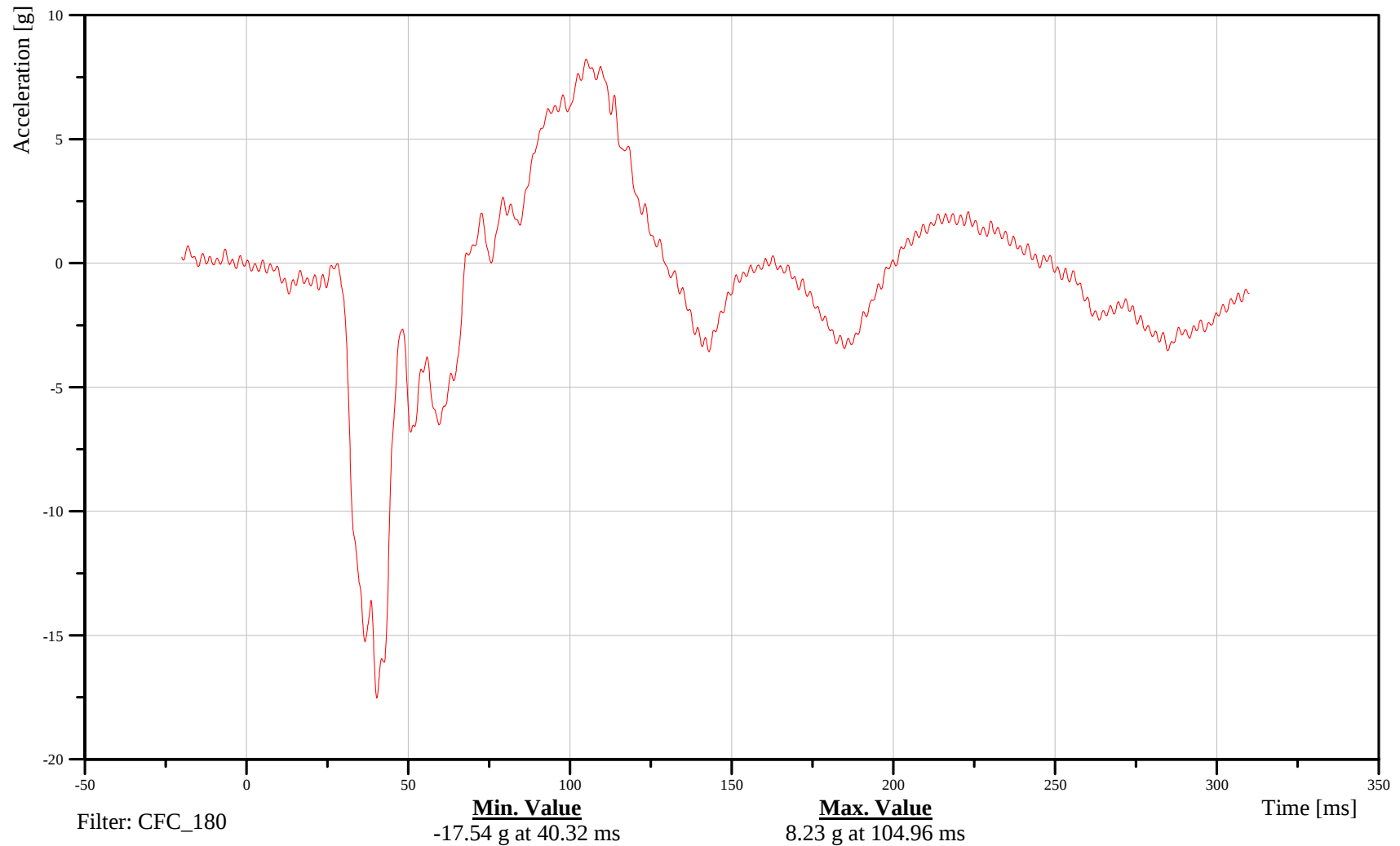
T1 X-Axis Acceleration

Customer: VRTC

11THSP0100WSACXC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-30

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

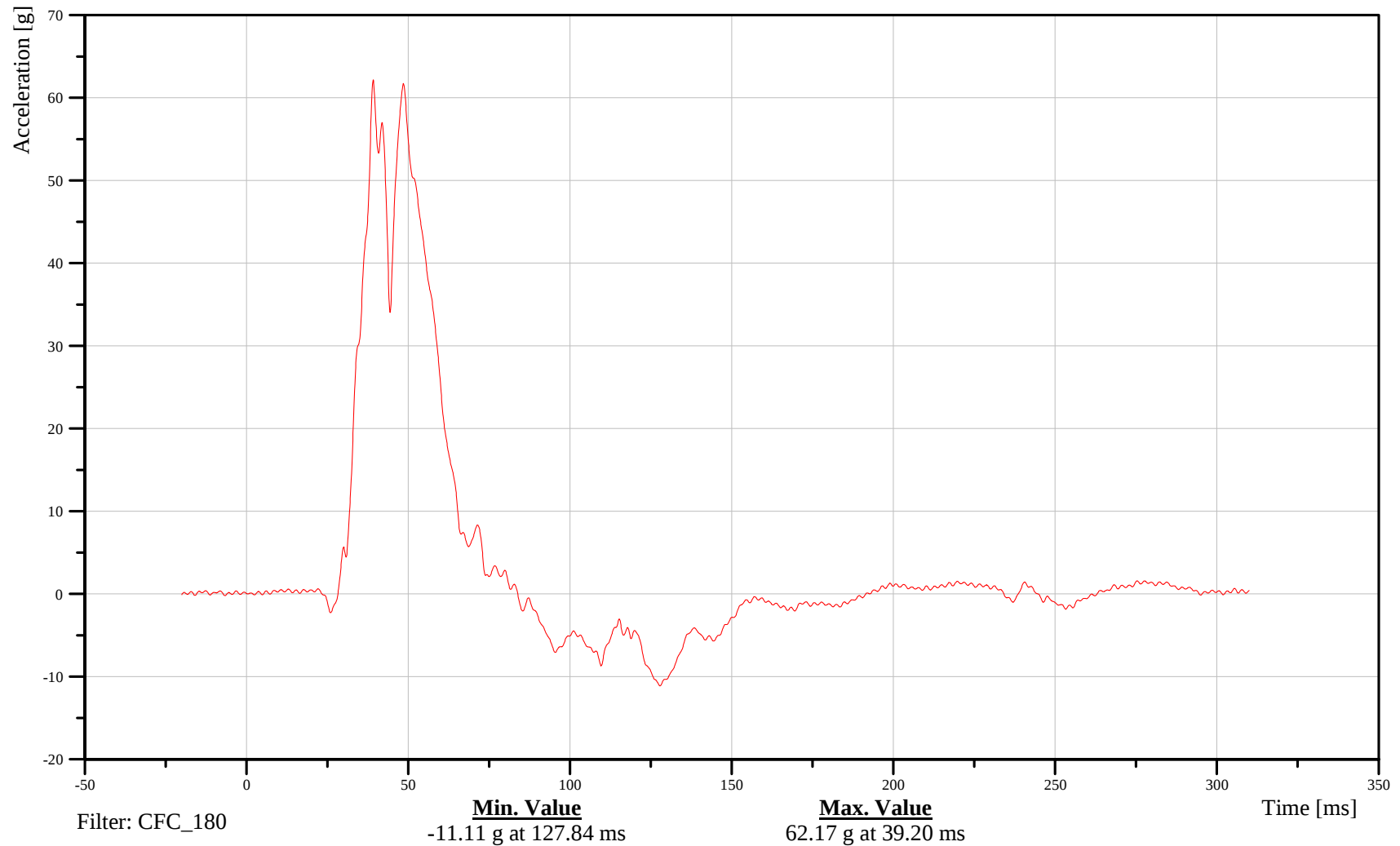
T1 Y-Axis Acceleration

Customer: VRTC

11THSP0100WSACYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-31

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

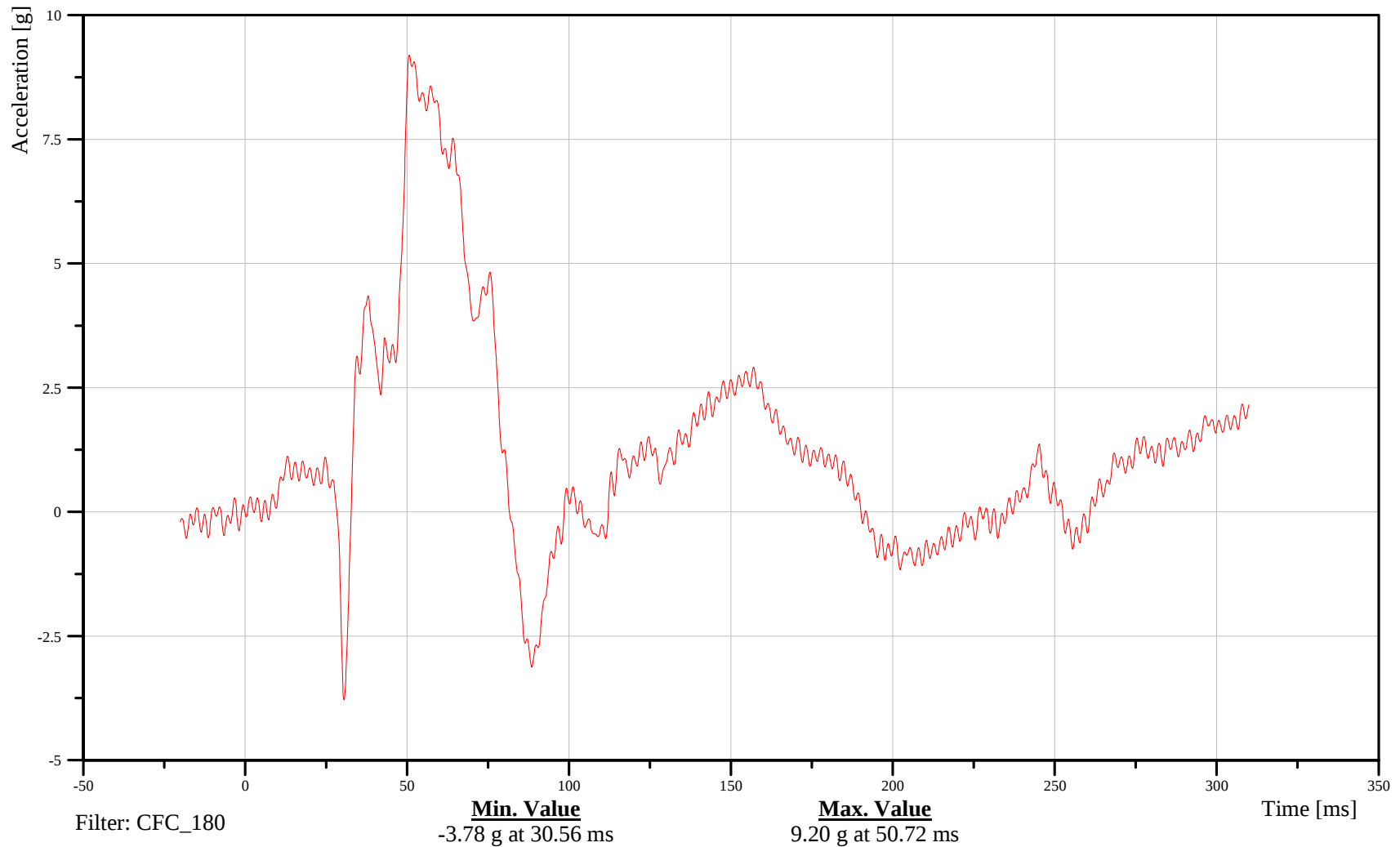
T1 Z-Axis Acceleration

Customer: VRTC

11THSP0100WSACZC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-32

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

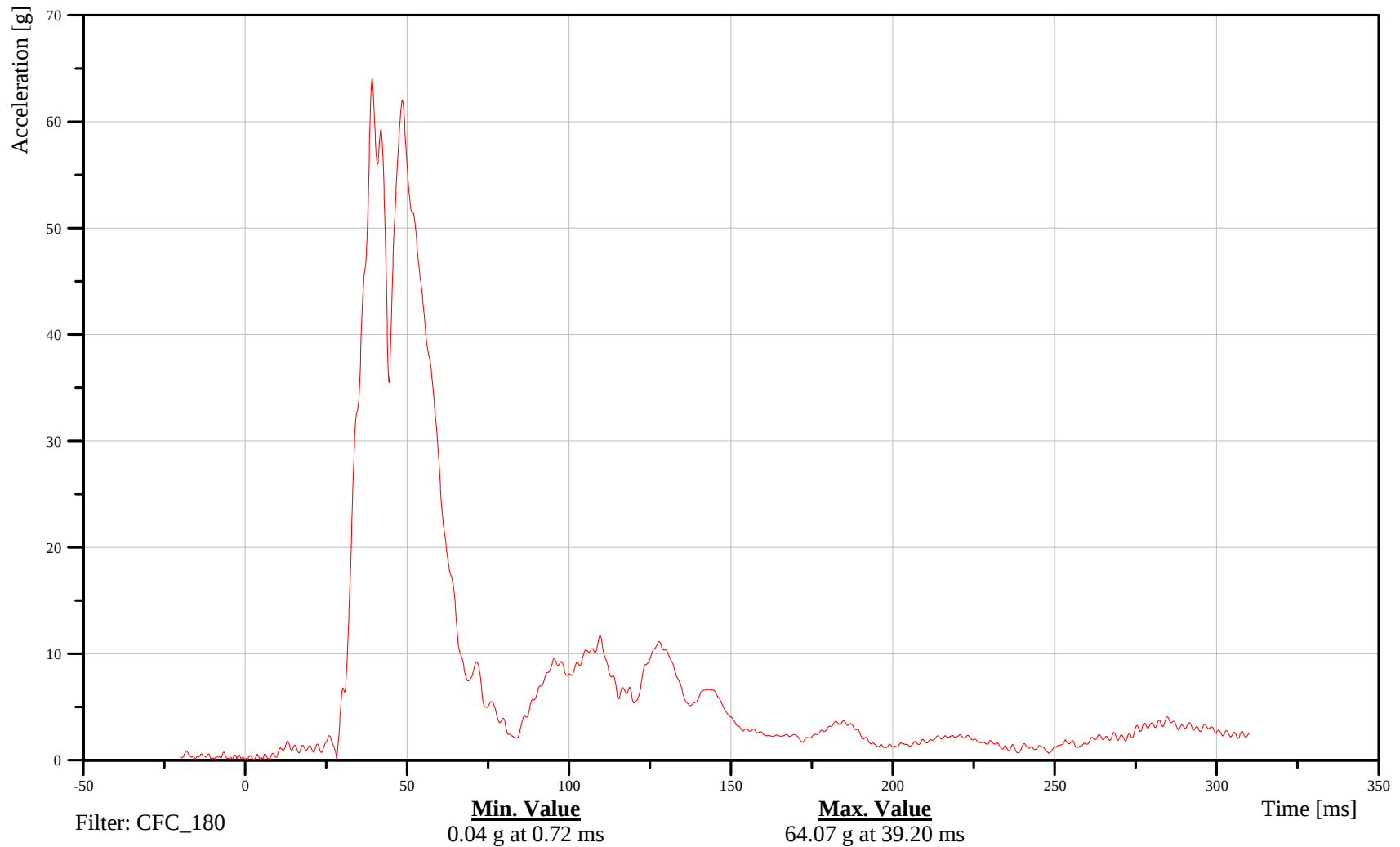
T1 Resultant Acceleration

Customer: VRTC

11THSP0100WSACRC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-33

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

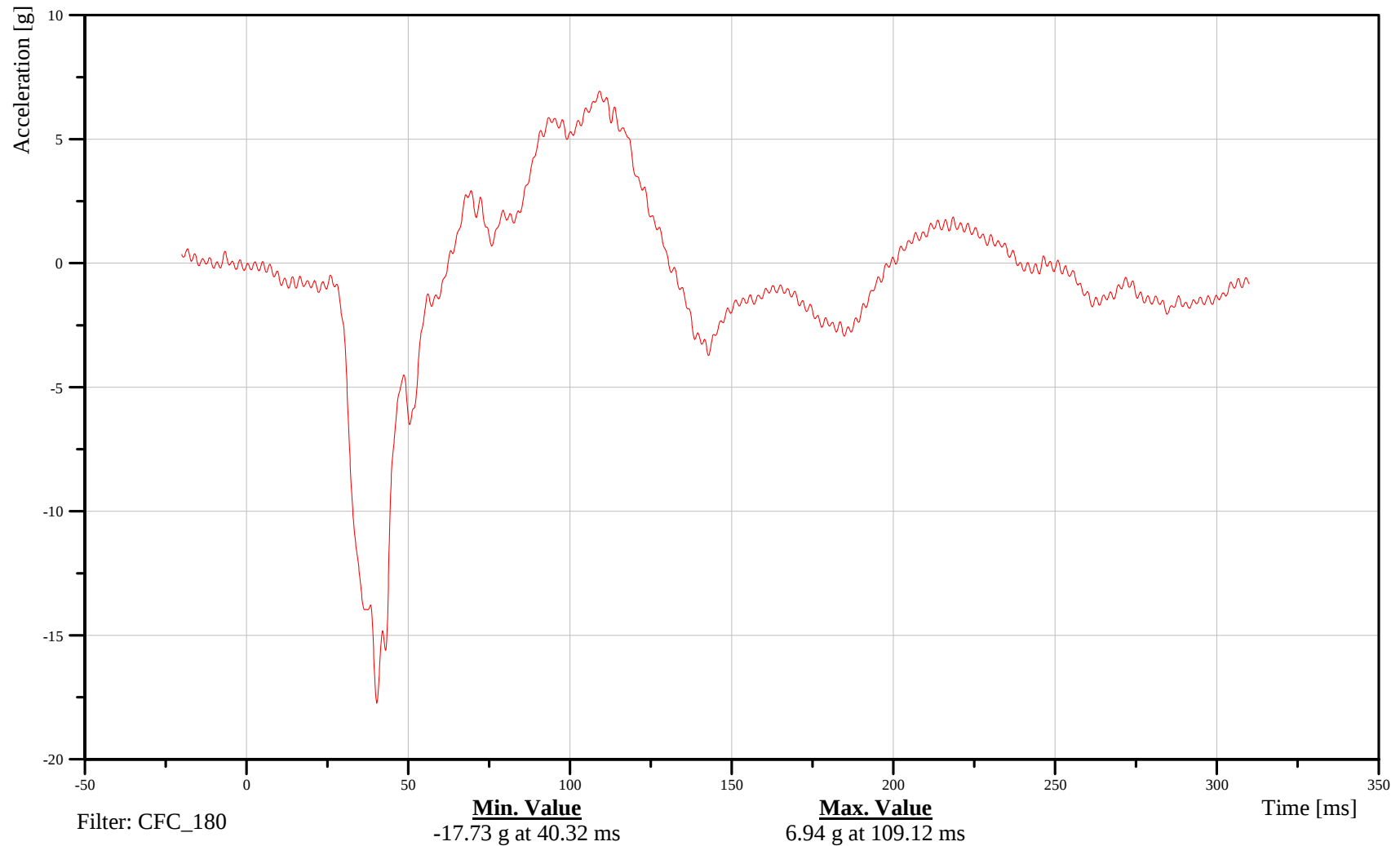
T4 X-Axis Acceleration

Customer: VRTC

11THSP0400WSACXC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-34

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

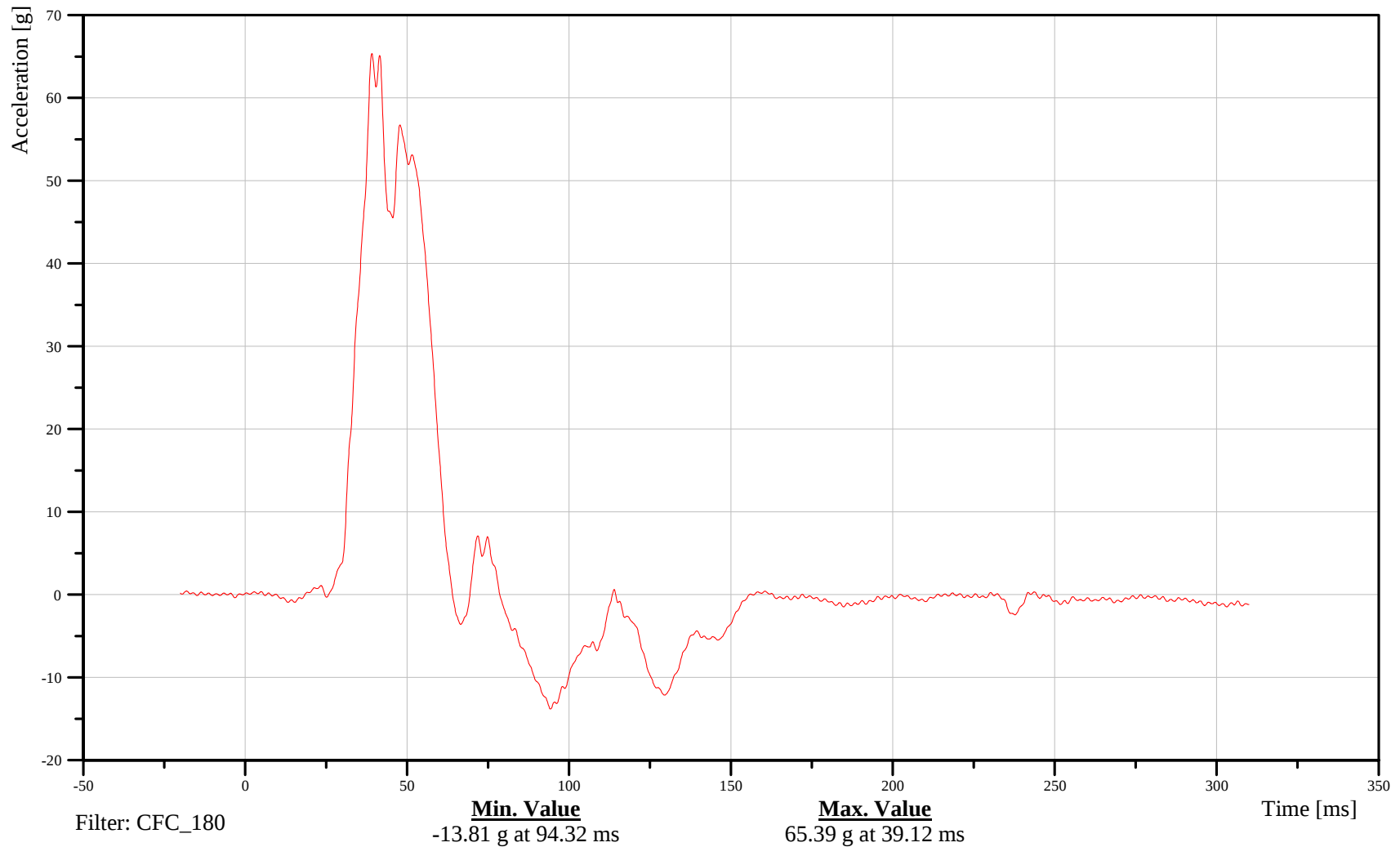
T4 Y-Axis Acceleration

Customer: VRTC

11THSP0400WSACYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-35

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

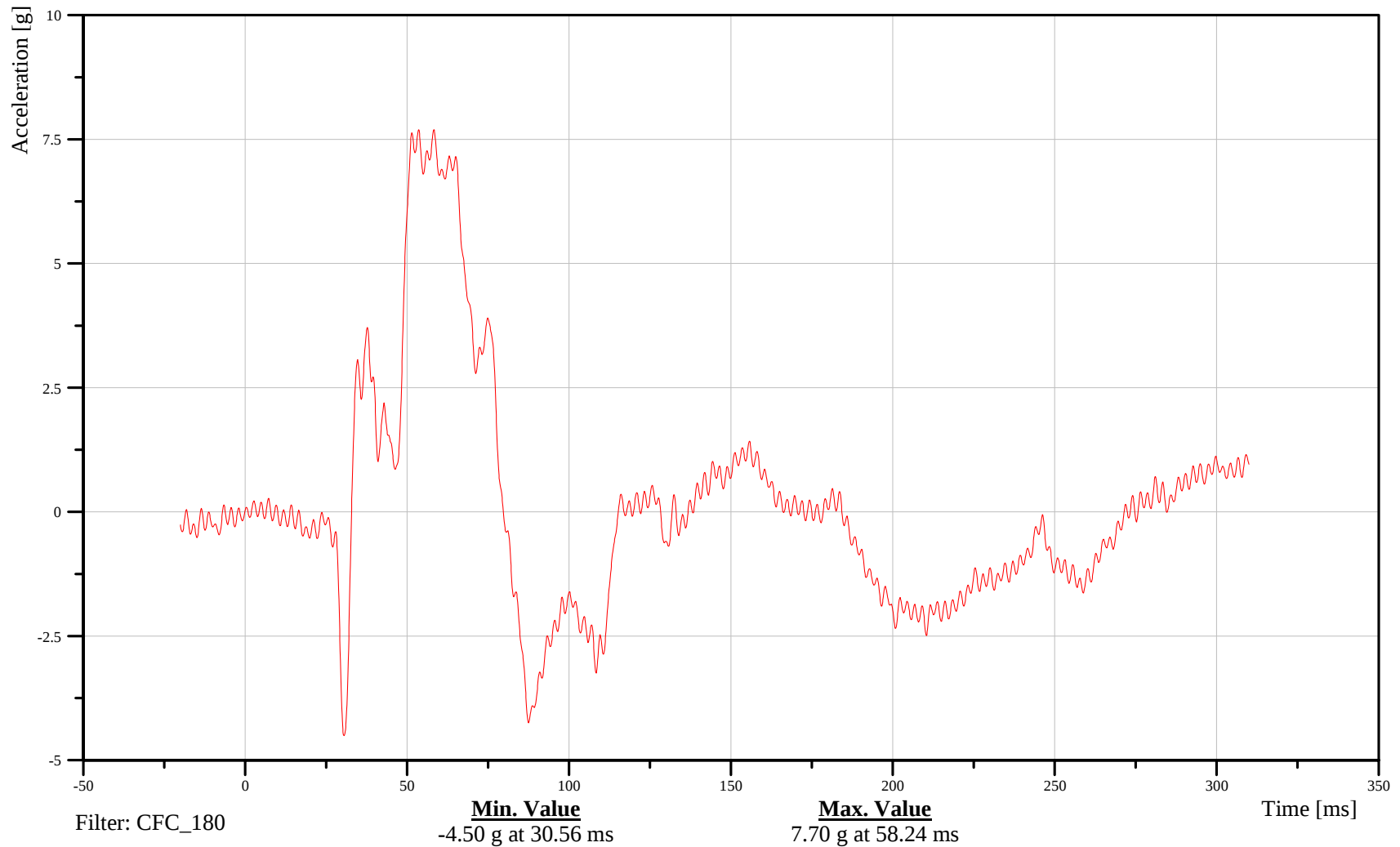
T4 Z-Axis Acceleration

Customer: VRTC

11THSP0400WSACZC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-36

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

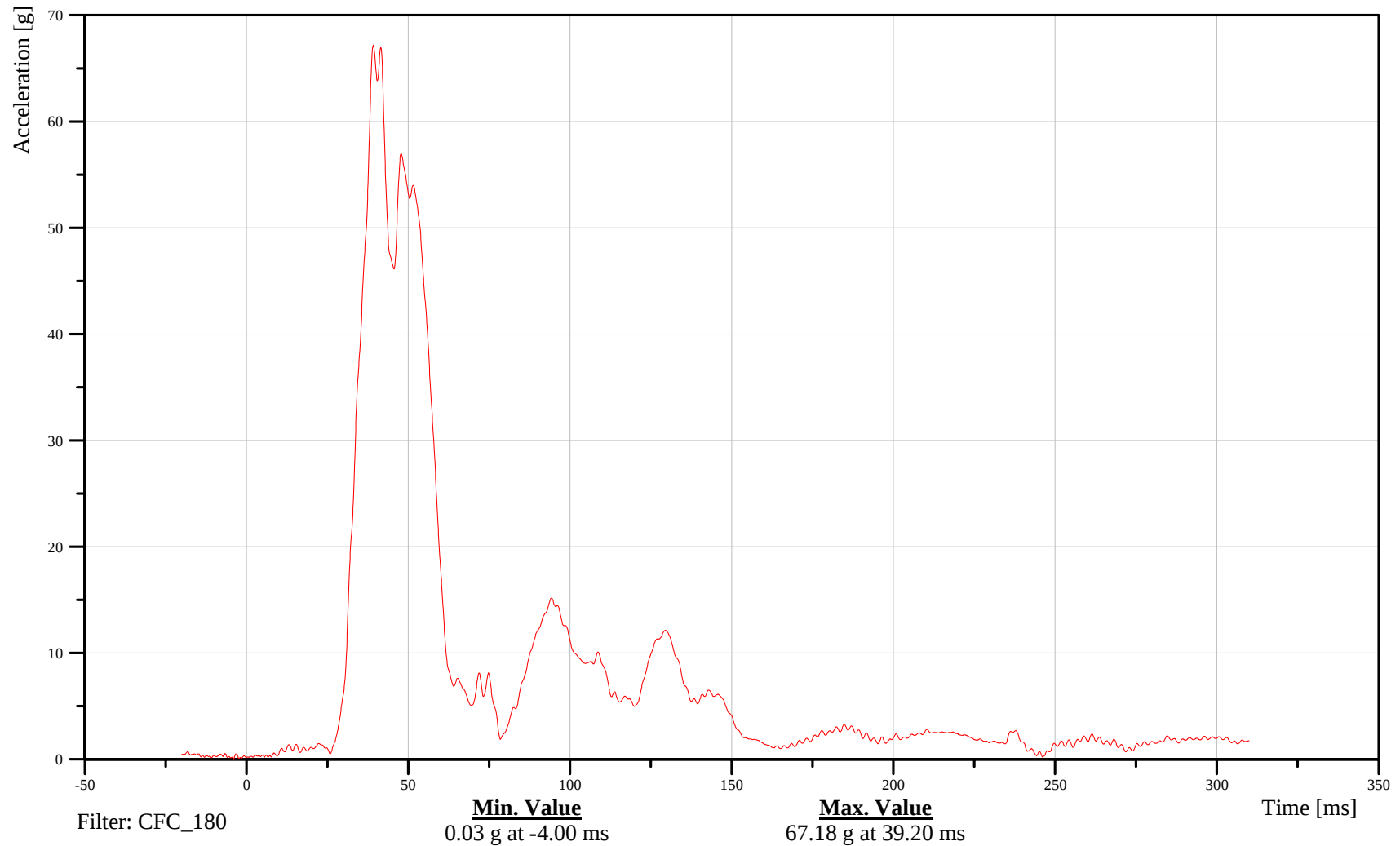
T4 Resultant Acceleration

Customer: VRTC

11THSP0400WSACRC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-37

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

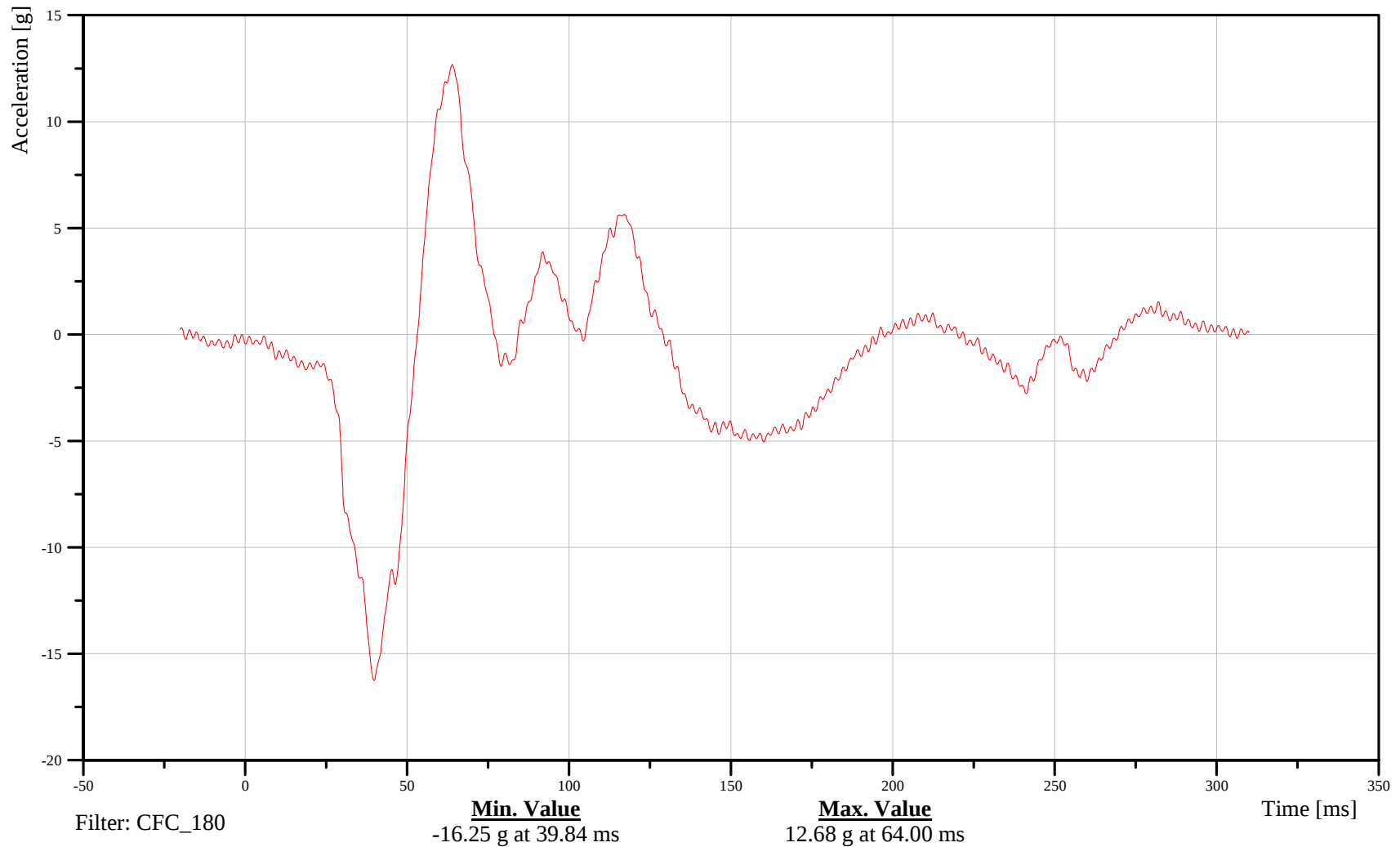
T12 X-Axis Acceleration

Customer: VRTC

11THSP1200WSACXC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-38

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

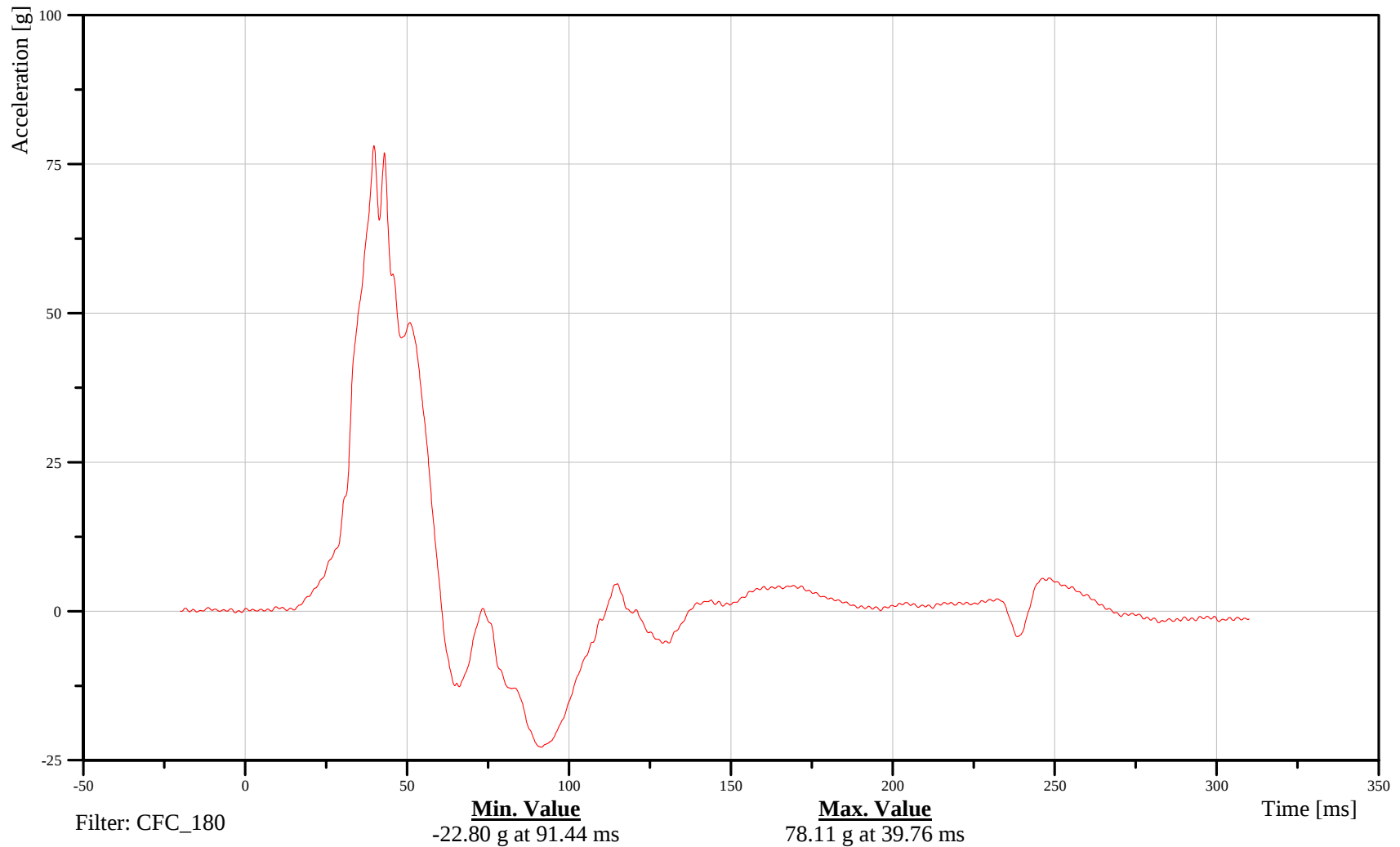
T12 Y-Axis Acceleration

Customer: VRTC

11THSP1200WSACYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-39

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

T12 Z-Axis Acceleration

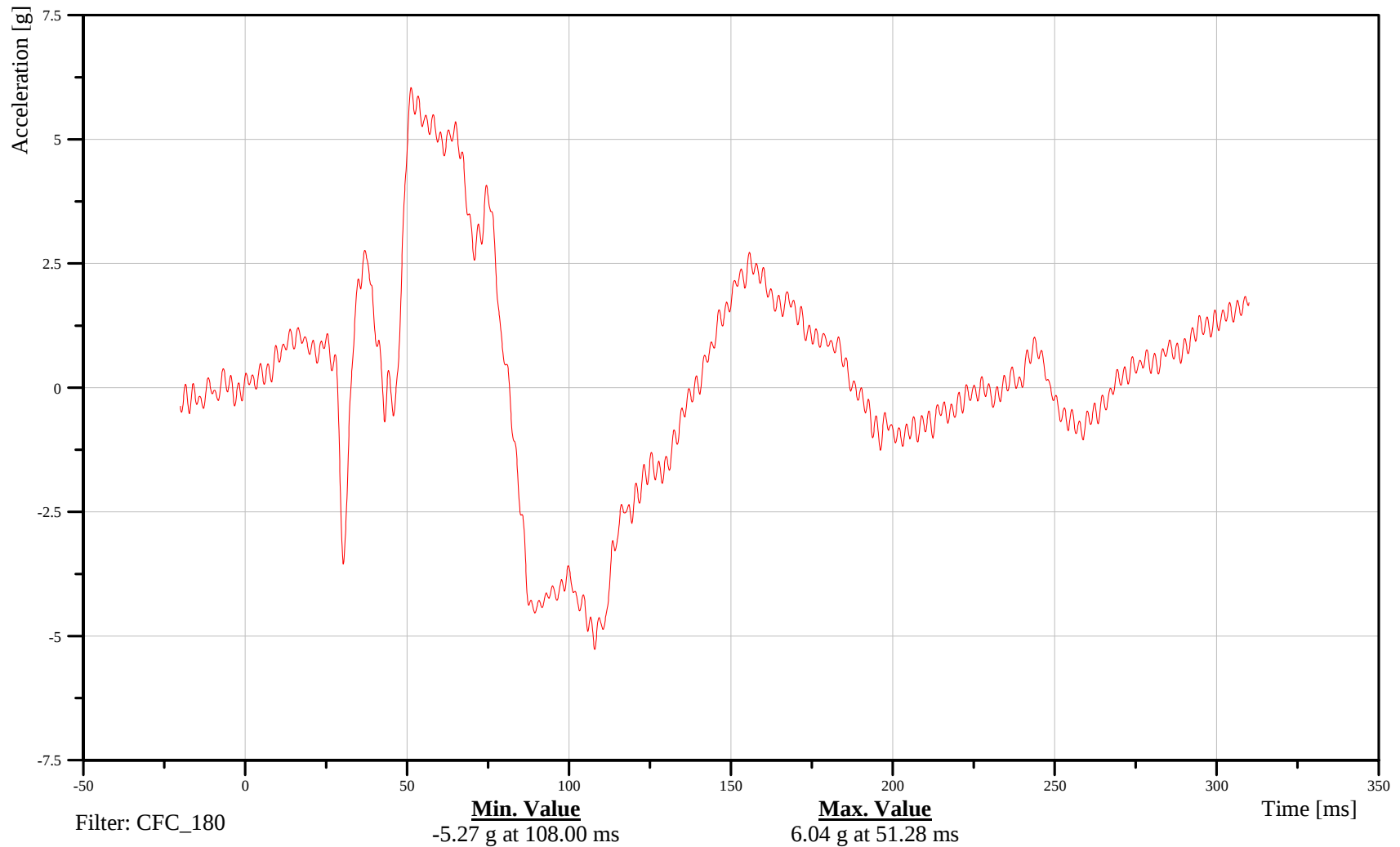
Date: 8/6/2007
Time: 14:08

Customer: VRTC

11THSP1200WSACZC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-40

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

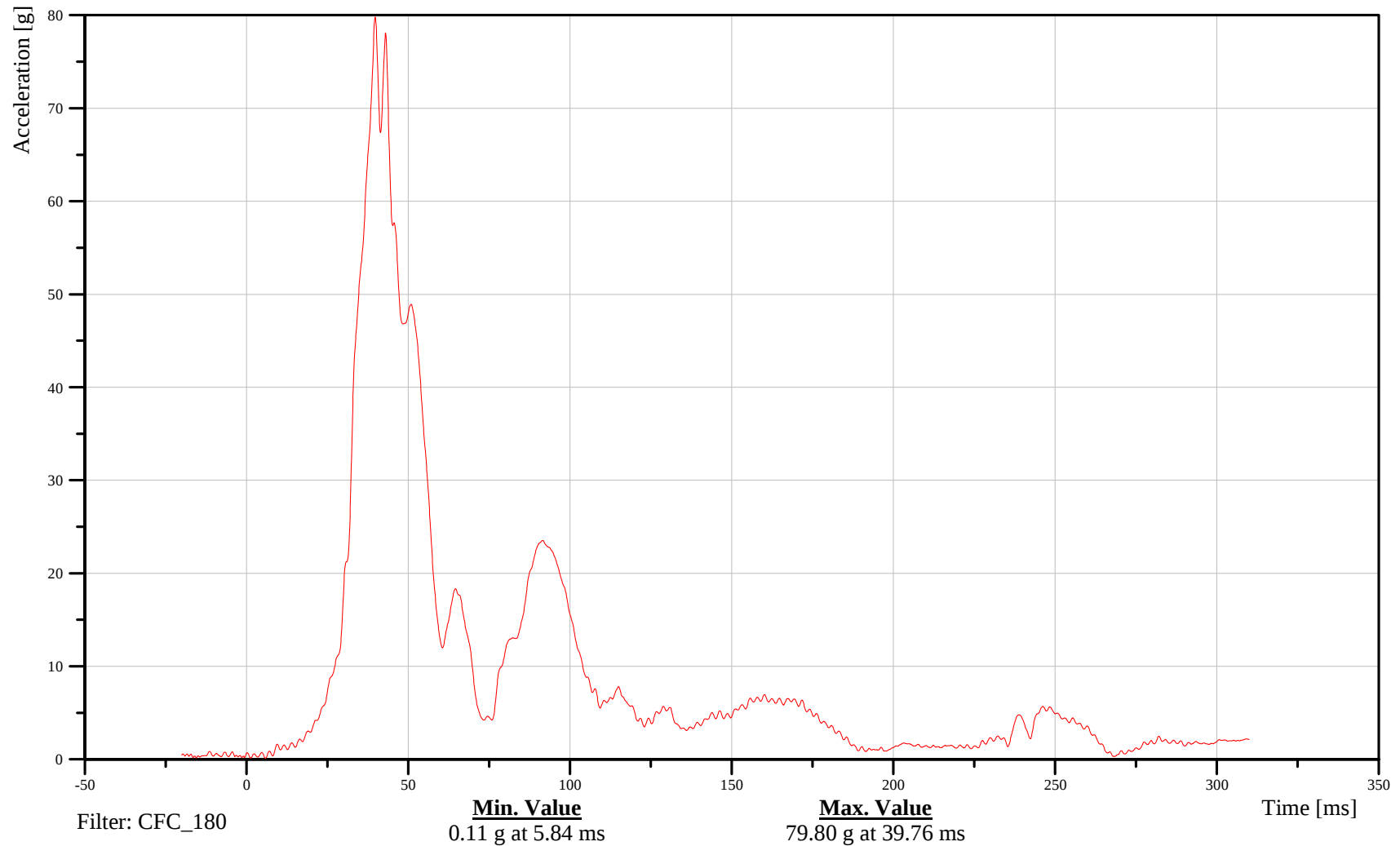
T12 Resultant Acceleration

Customer: VRTC

11THSP1200WSACRC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-41

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

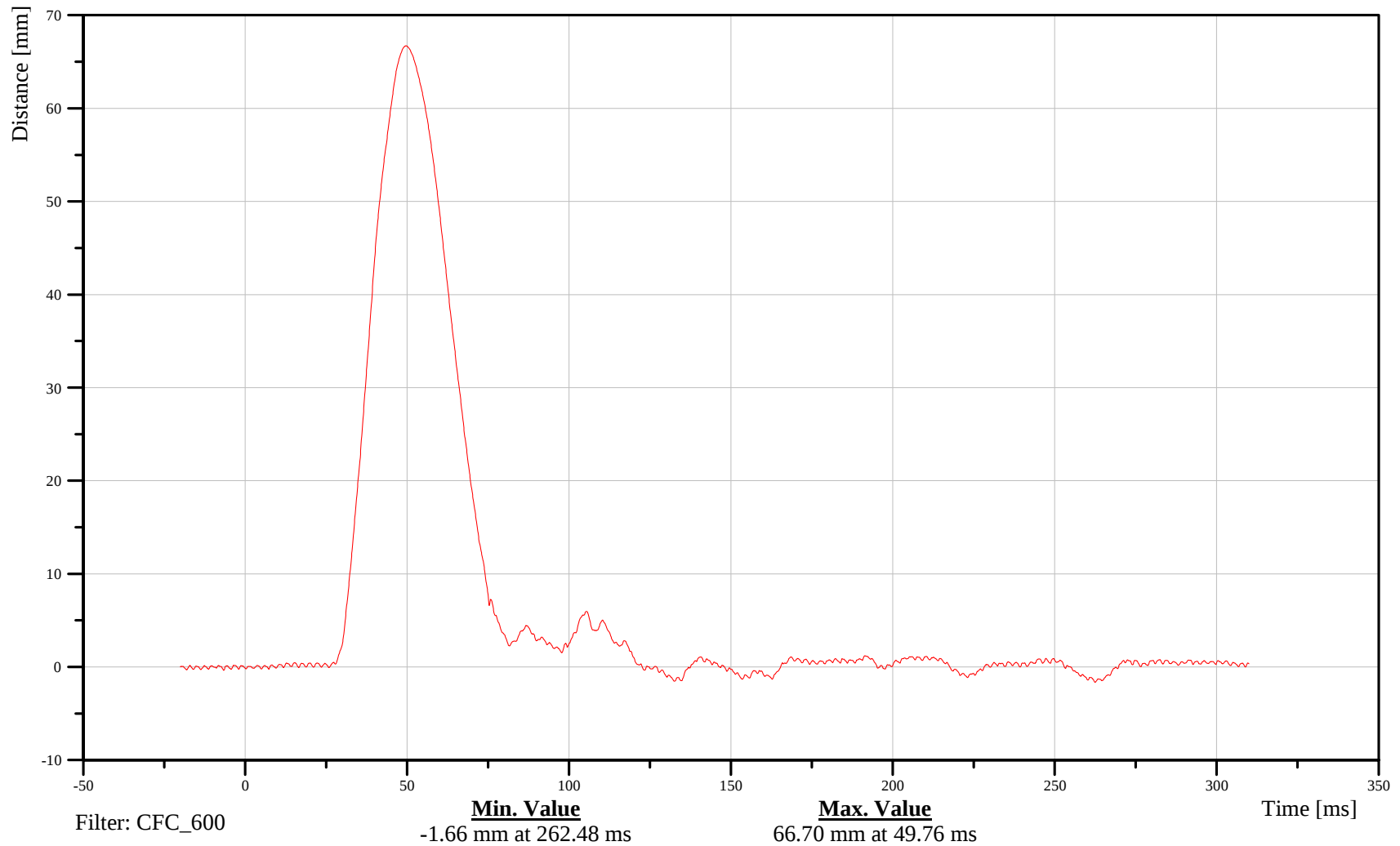
Thorax Rib 1 Y-Axis Displacement

Customer: VRTC

11TRRILE01WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-42

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

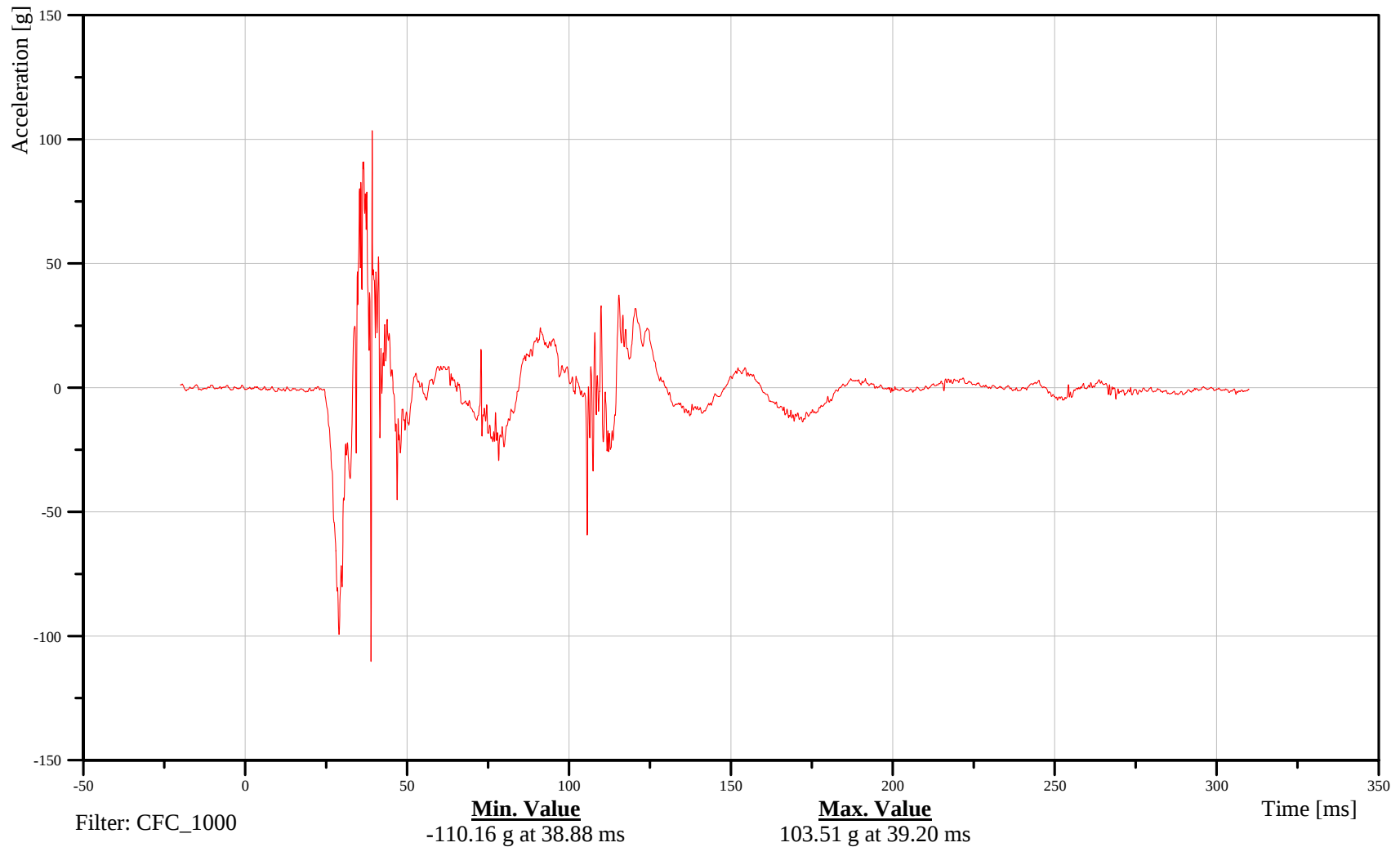
Thorax Rib 1 X-Axis Acceleration

Customer: VRTC

11TRRILE01WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-43

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

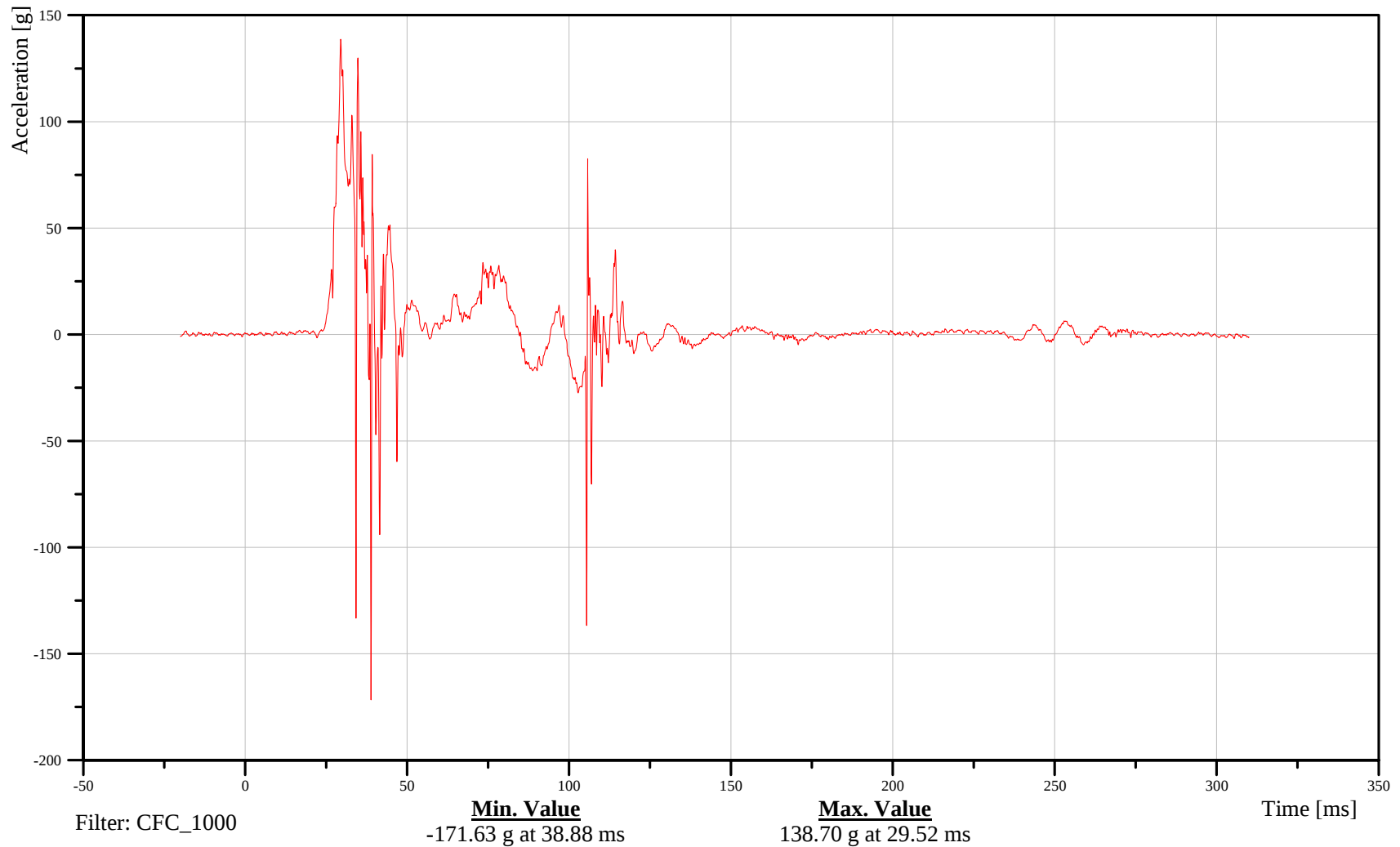
Thorax Rib 1 Y-Axis Acceleration

Customer: VRTC

11TRRILE01WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-44

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Thorax Rib 1 Z-Axis Acceleration

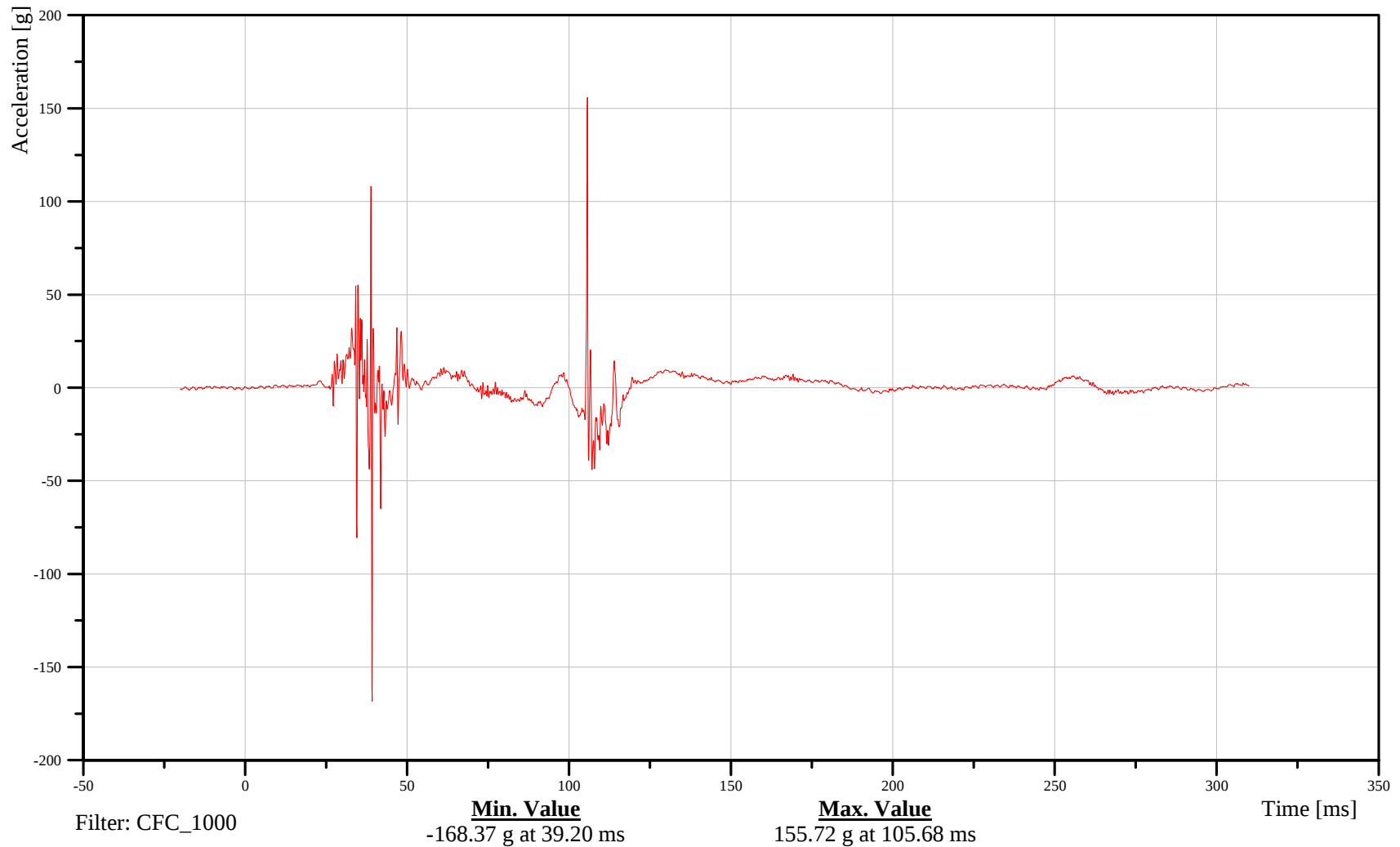
Date: 8/6/2007
Time: 14:08

Customer: VRTC

11TRRILE01WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-45

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

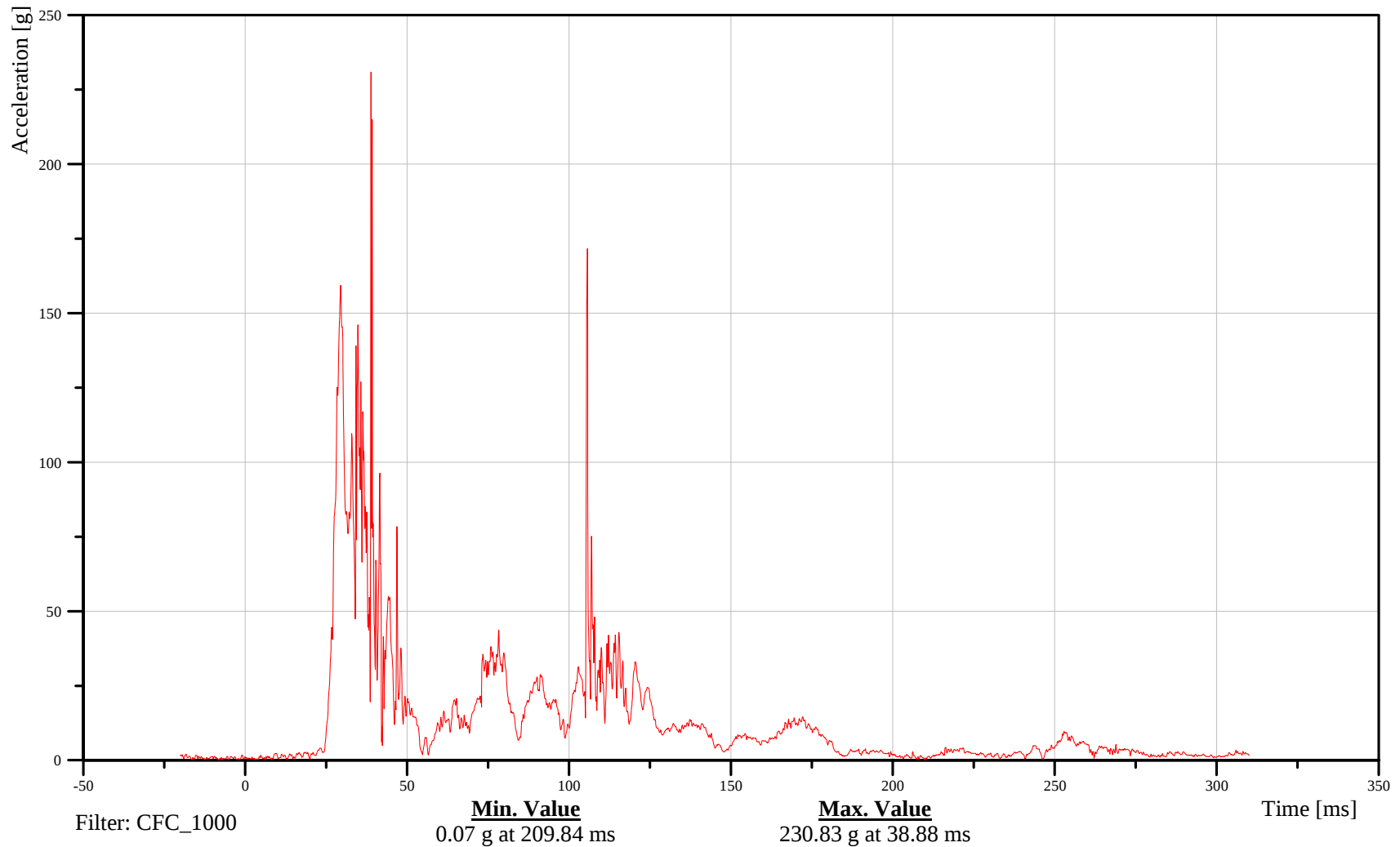
Thorax Rib 1 Resultant Acceleration

Customer: VRTC

11TRRILE01WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-46

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

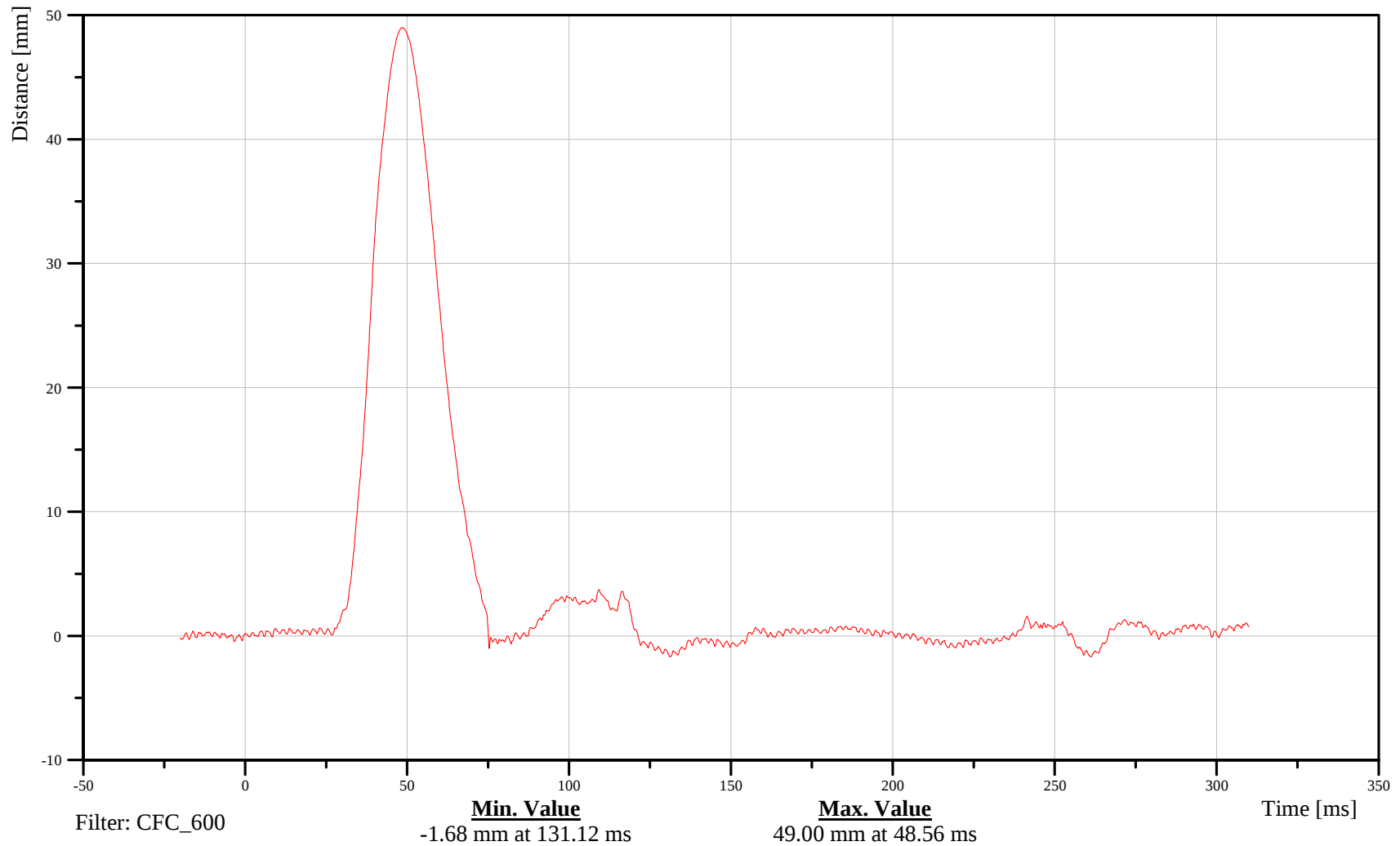
Thorax Rib 2 Y-Axis Displacement

Customer: VRTC

11TRRILE02WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-47

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

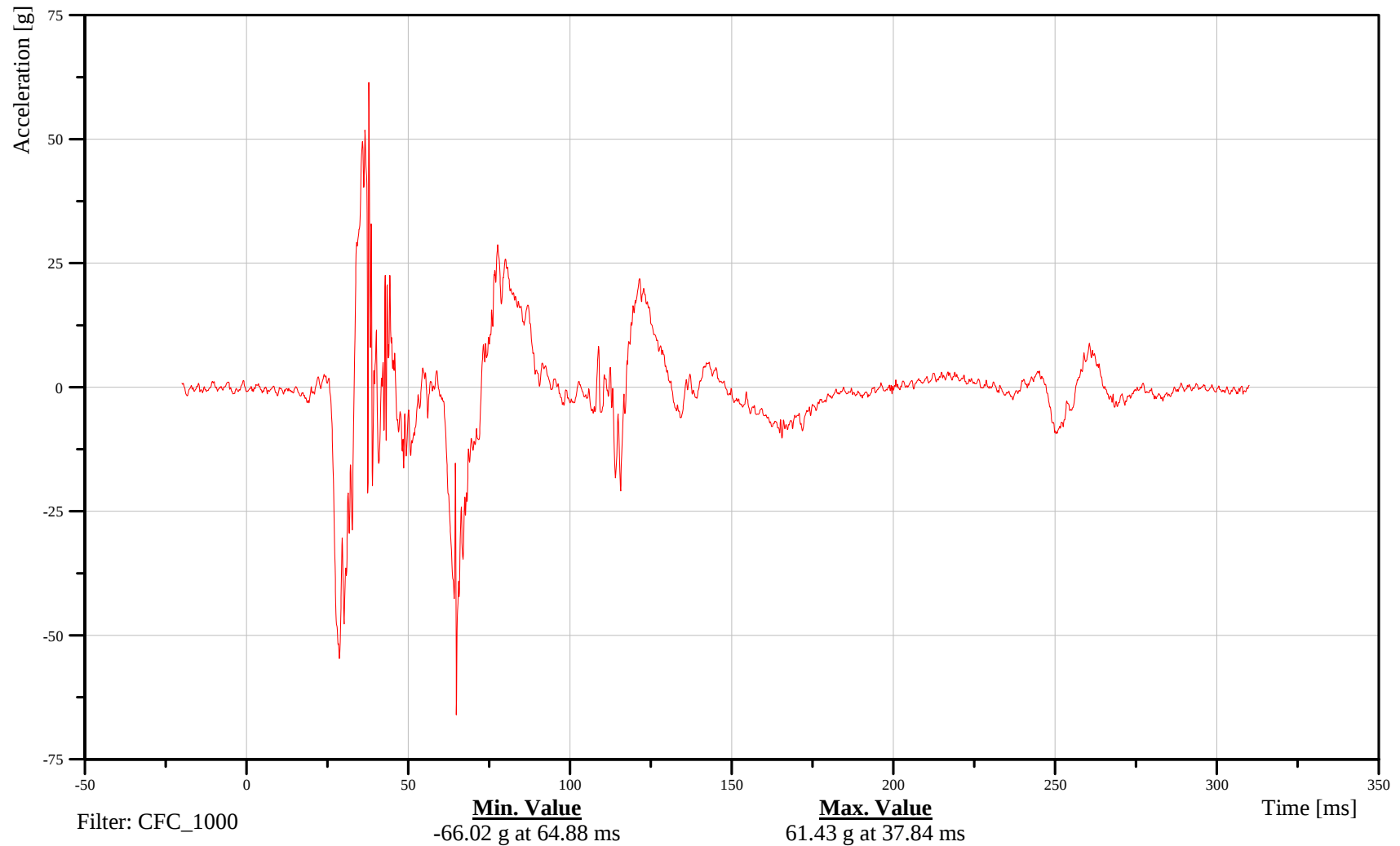
Thorax Rib 2 X-Axis Acceleration

Customer: VRTC

11TRRILE02WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-48

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

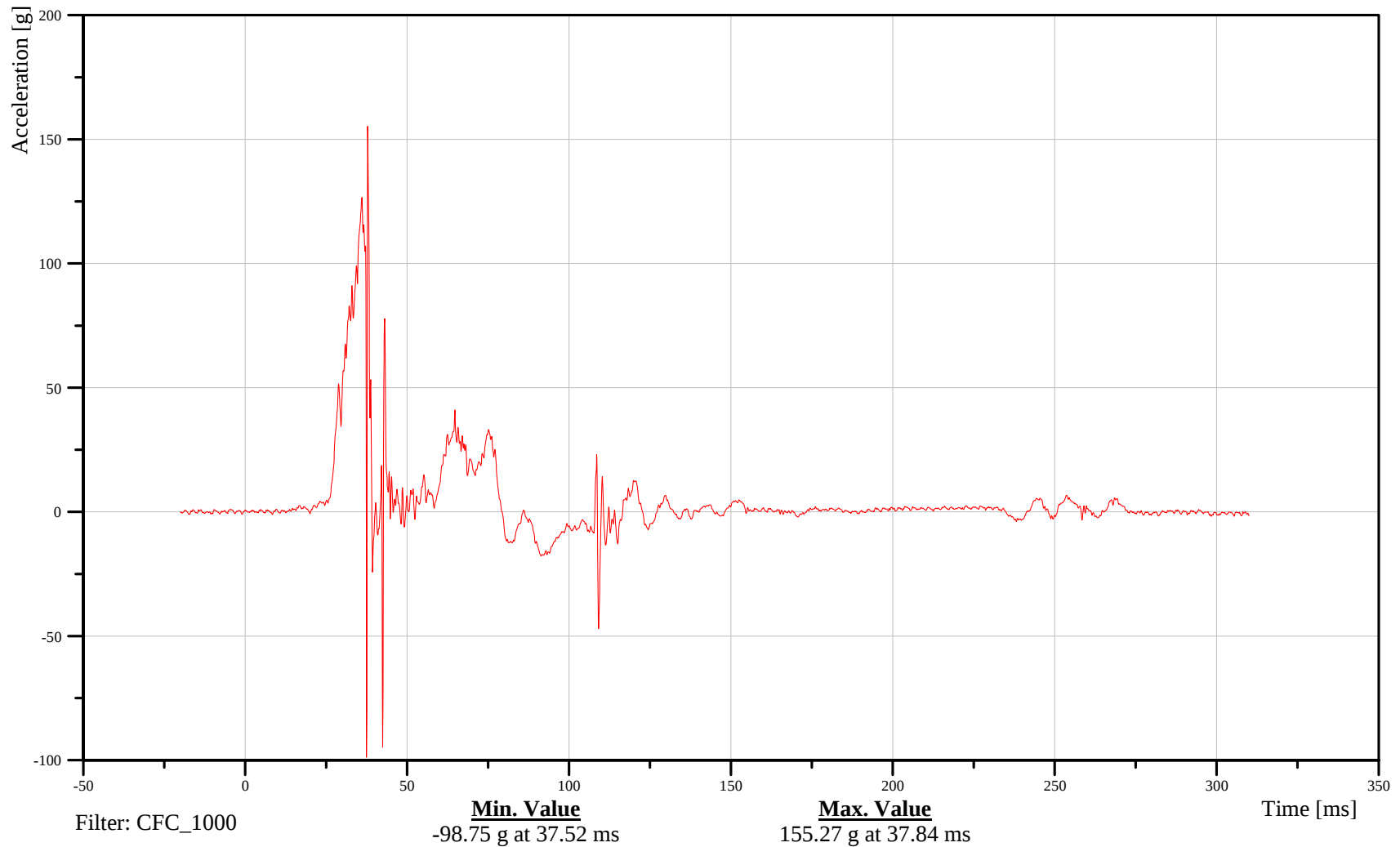
Thorax Rib 2 Y-Axis Acceleration

Customer: VRTC

11TRRILE02WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-49

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

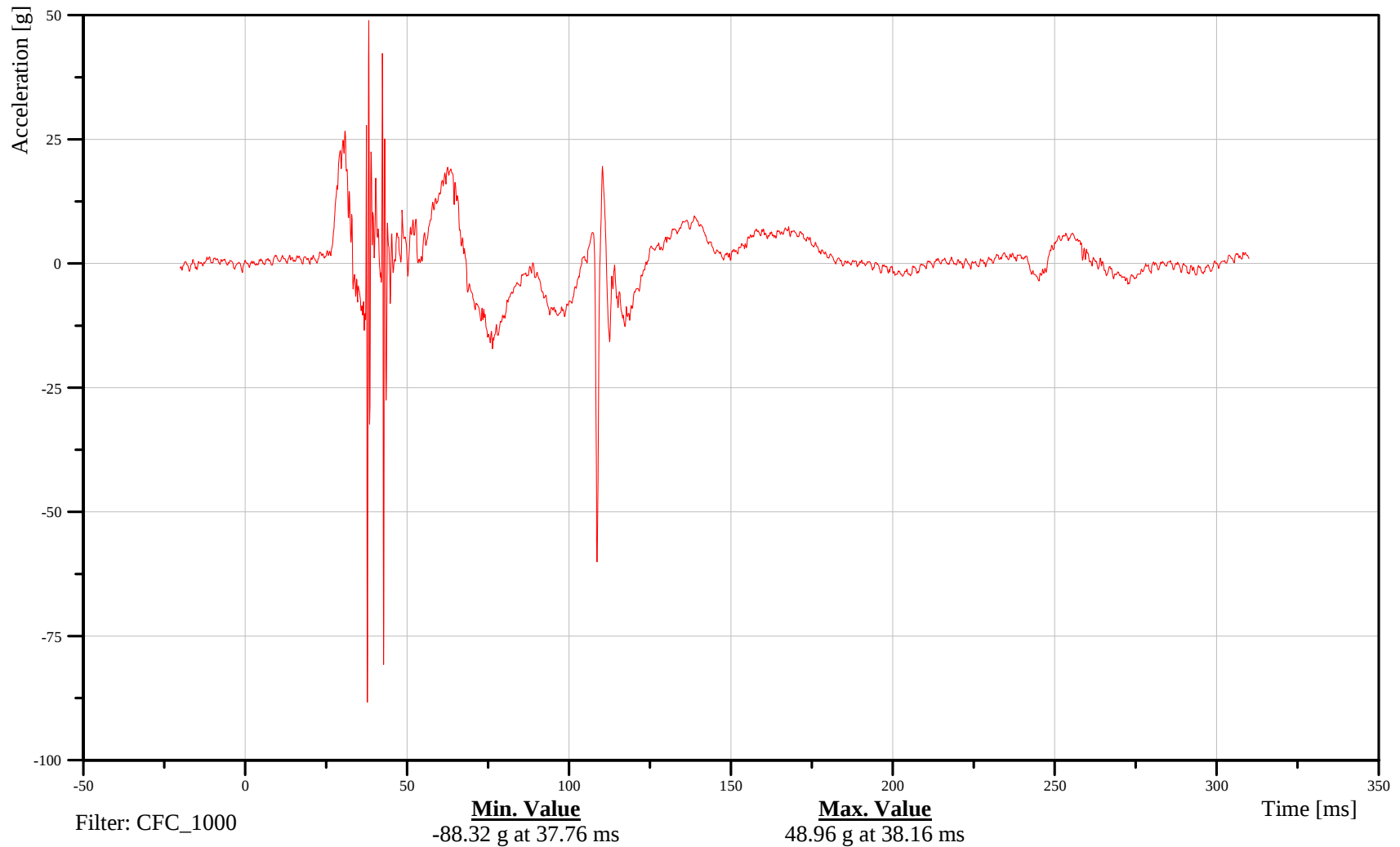
Thorax Rib 2 Z-Axis Acceleration

Customer: VRTC

11TRRILE02WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-50

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

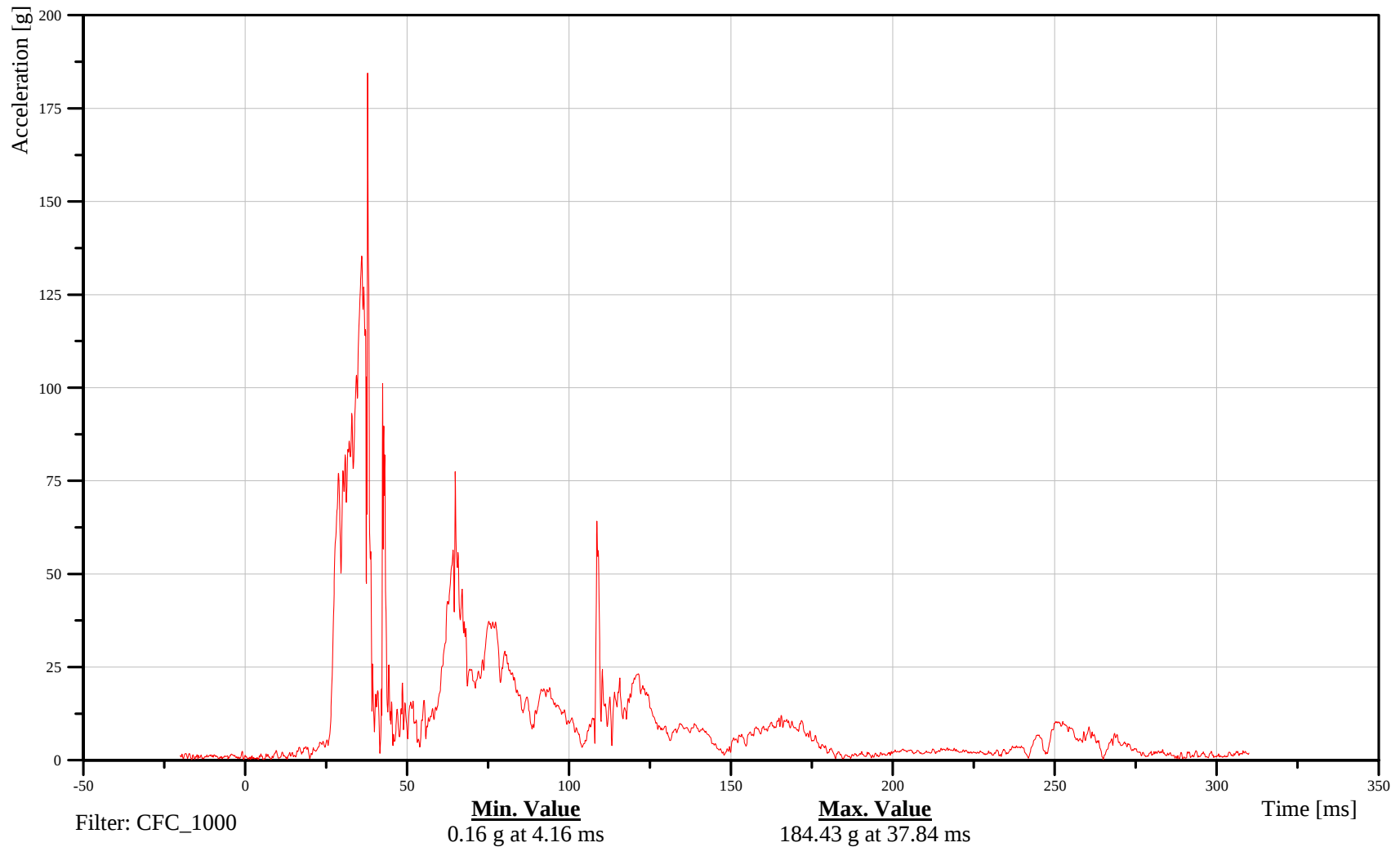
Thorax Rib 2 Resultant Acceleration

Customer: VRTC

11TRRILE02WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-51

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

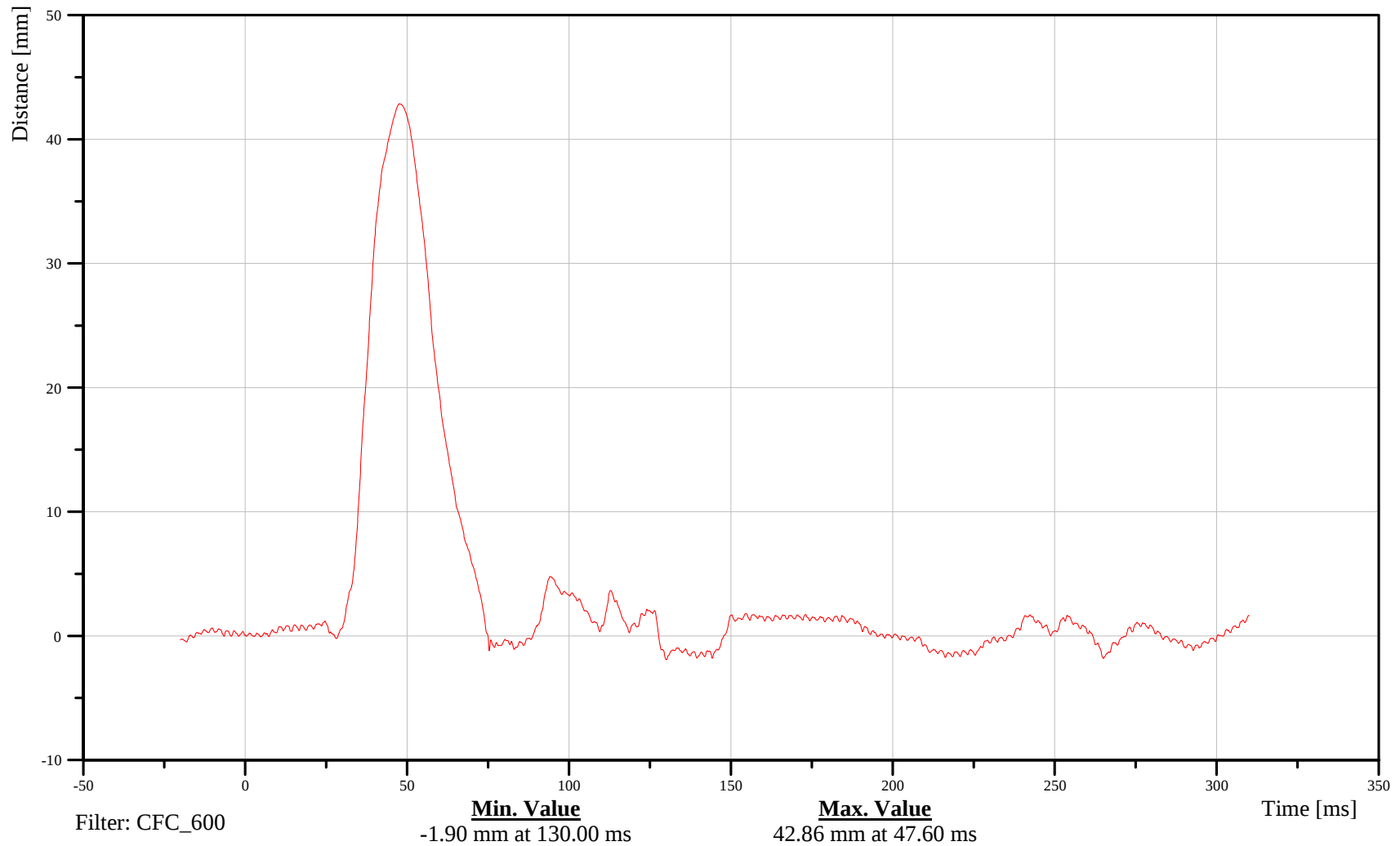
Thorax Rib 3 Y-Axis Displacement

Customer: VRTC

11TRRILE03WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-52

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

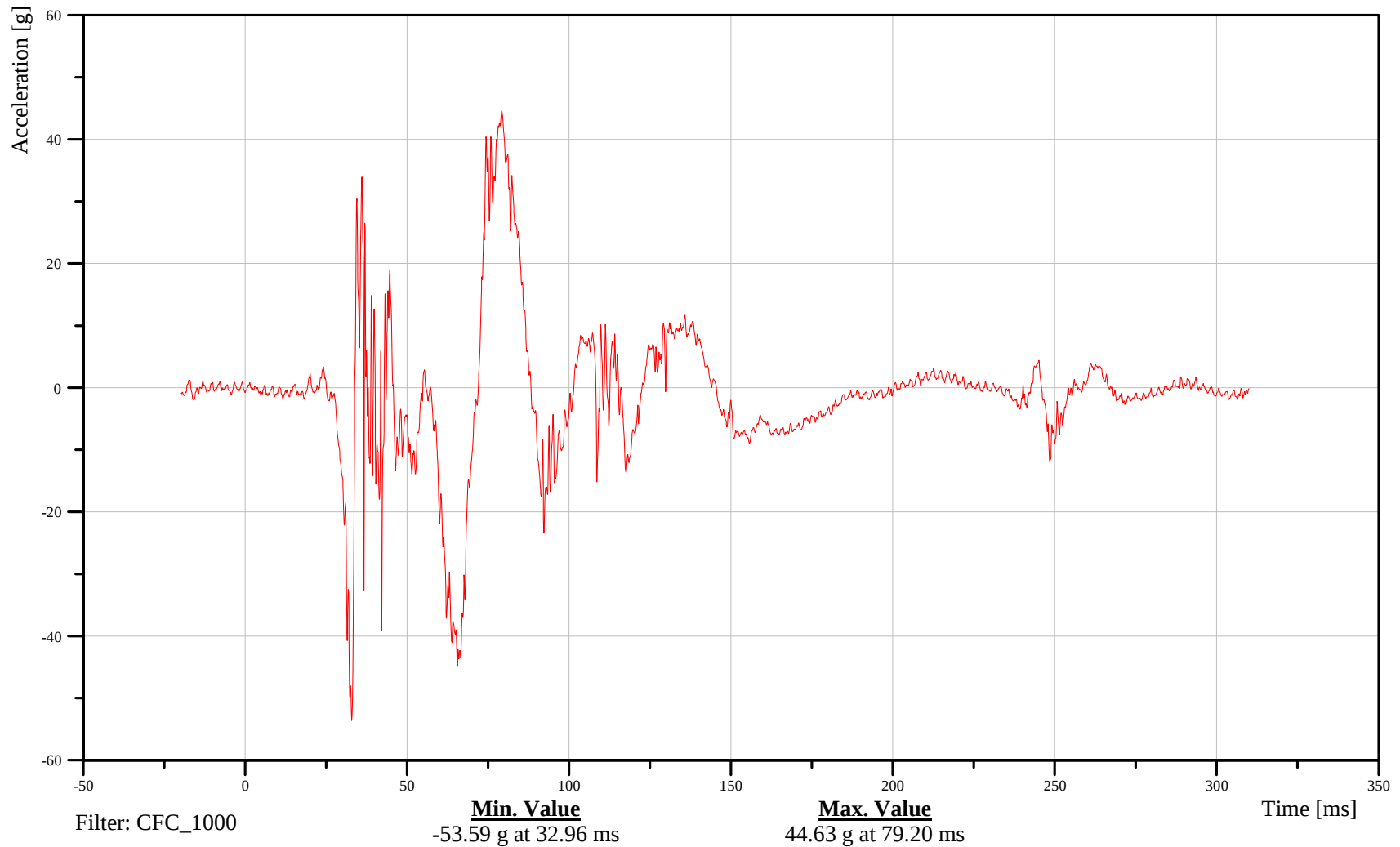
Thorax Rib 3 X-Axis Acceleration

Customer: VRTC

11TRRILE03WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-53

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

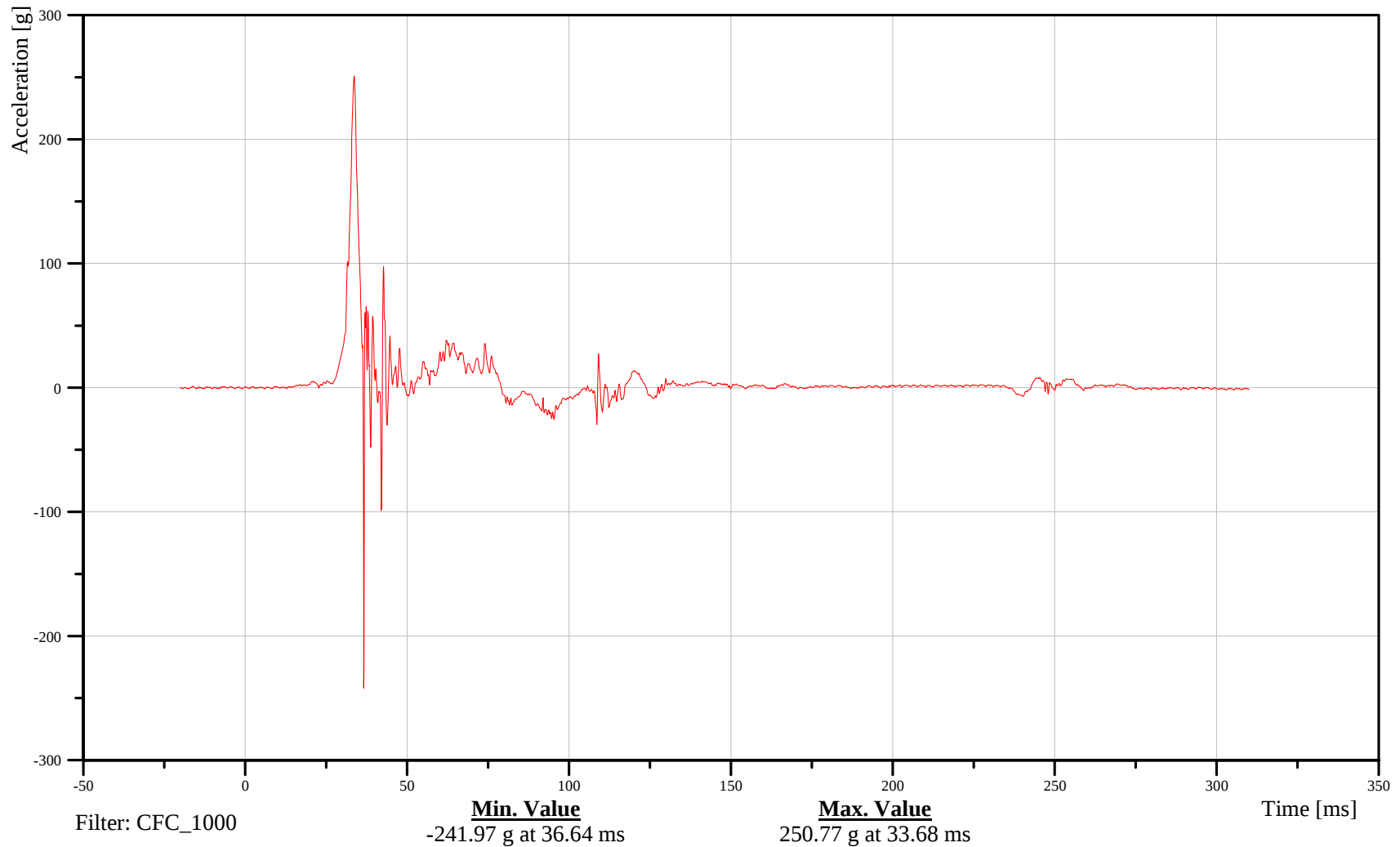
Thorax Rib 3 Y-Axis Acceleration

Customer: VRTC

11TRRILE03WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-54

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

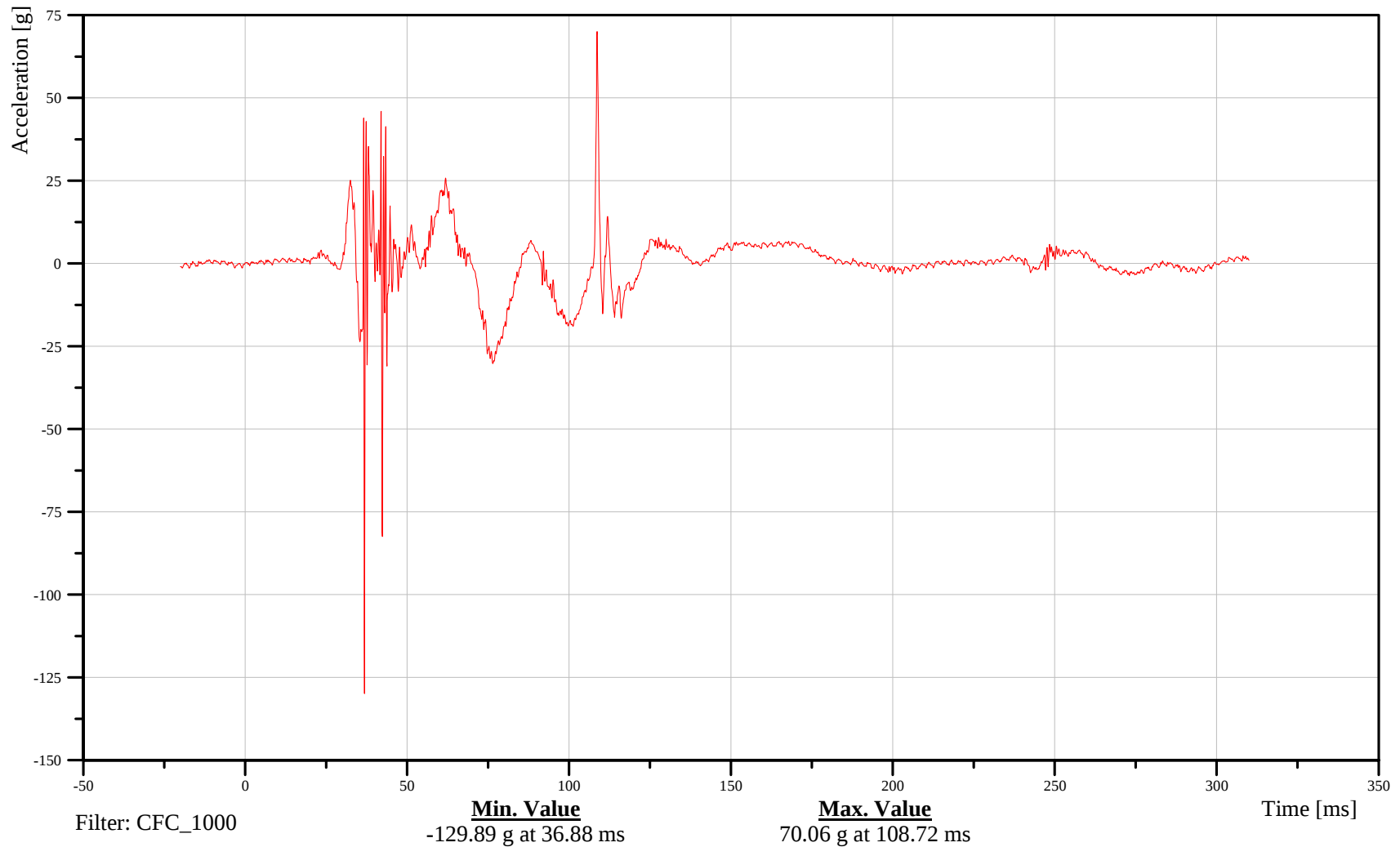
Thorax Rib 3 Z-Axis Acceleration

Customer: VRTC

11TRRILE03WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-55

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

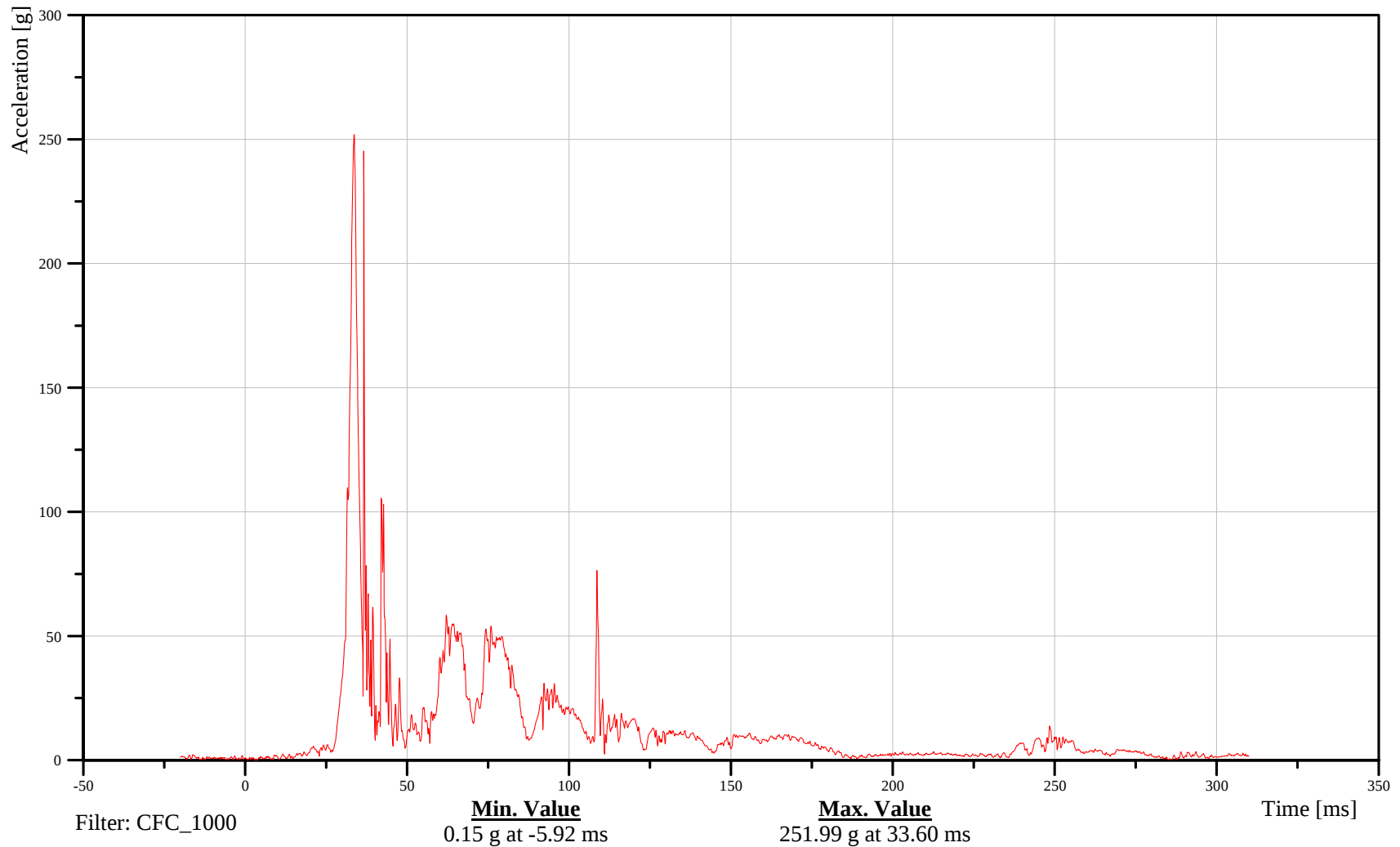
Thorax Rib 3 Resultant Acceleration

Customer: VRTC

11TRRILE03WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-56

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

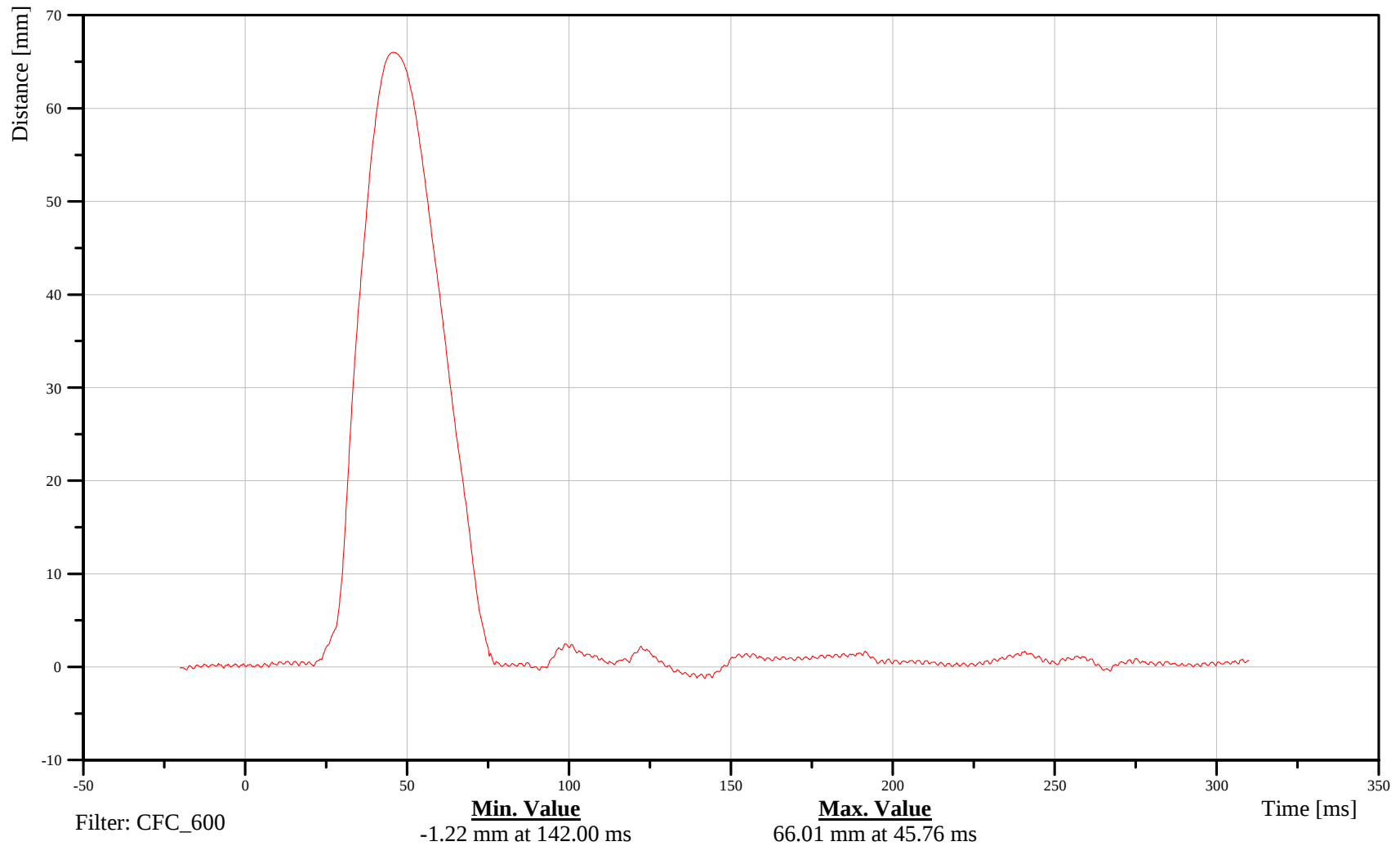
Abdominal Rib 1 Y-Axis Displacement

Customer: VRTC

11ABRILE01WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-57

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

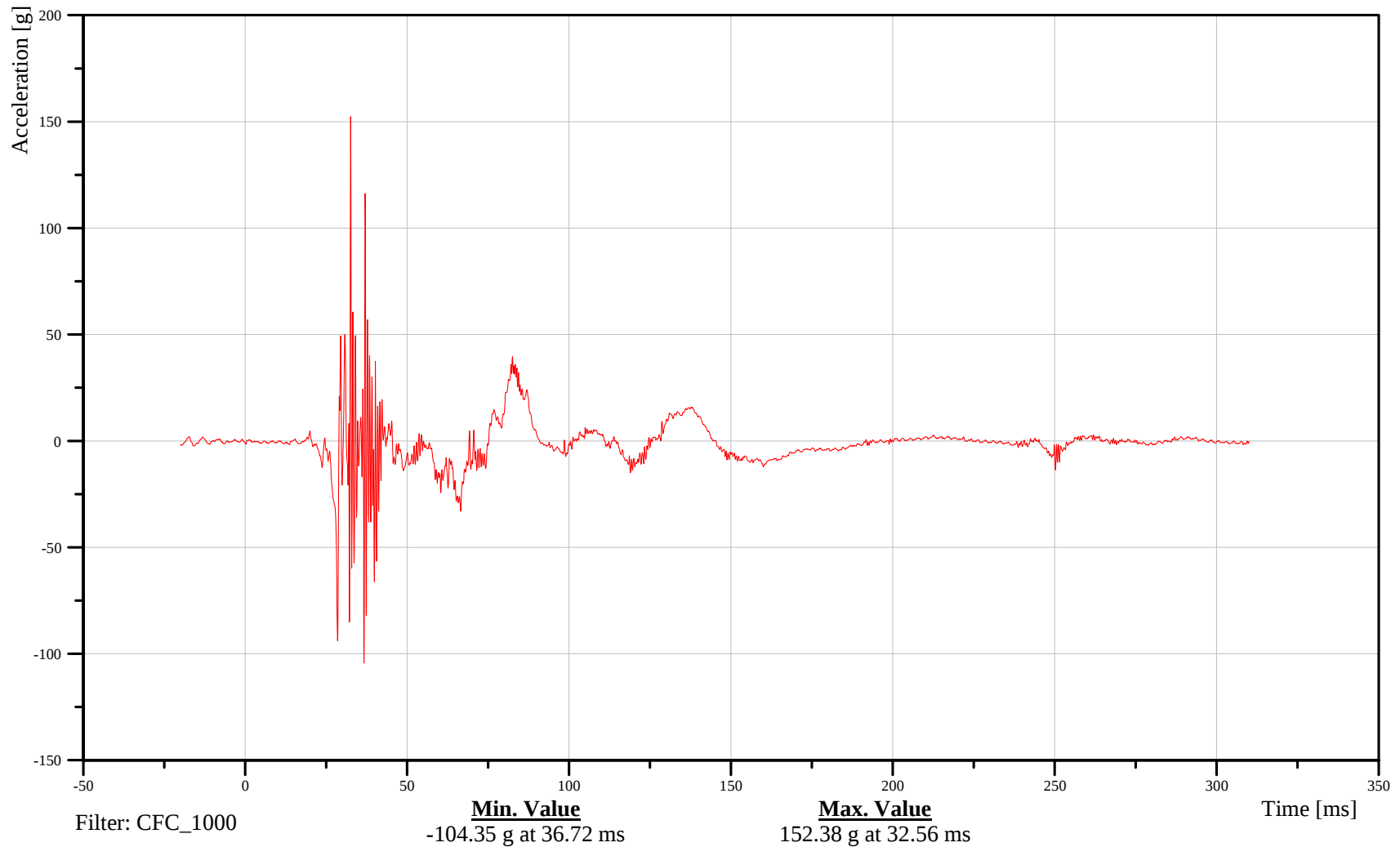
Abdominal Rib 1 X-Axis Acceleration

Customer: VRTC

11ABRILE01WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-58

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

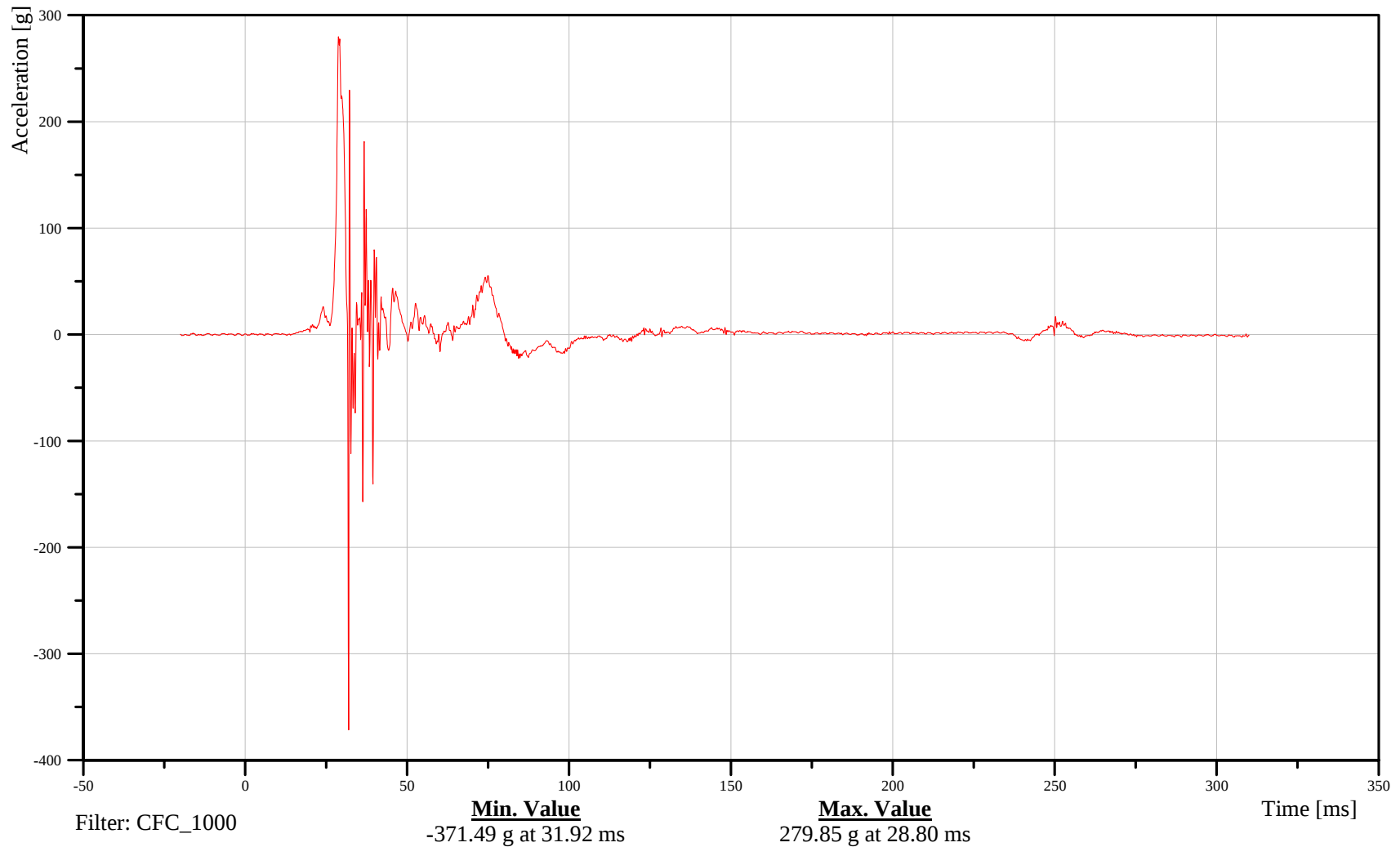
Abdominal Rib 1 Y-Axis Acceleration

Customer: VRTC

11ABRILE01WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-59

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

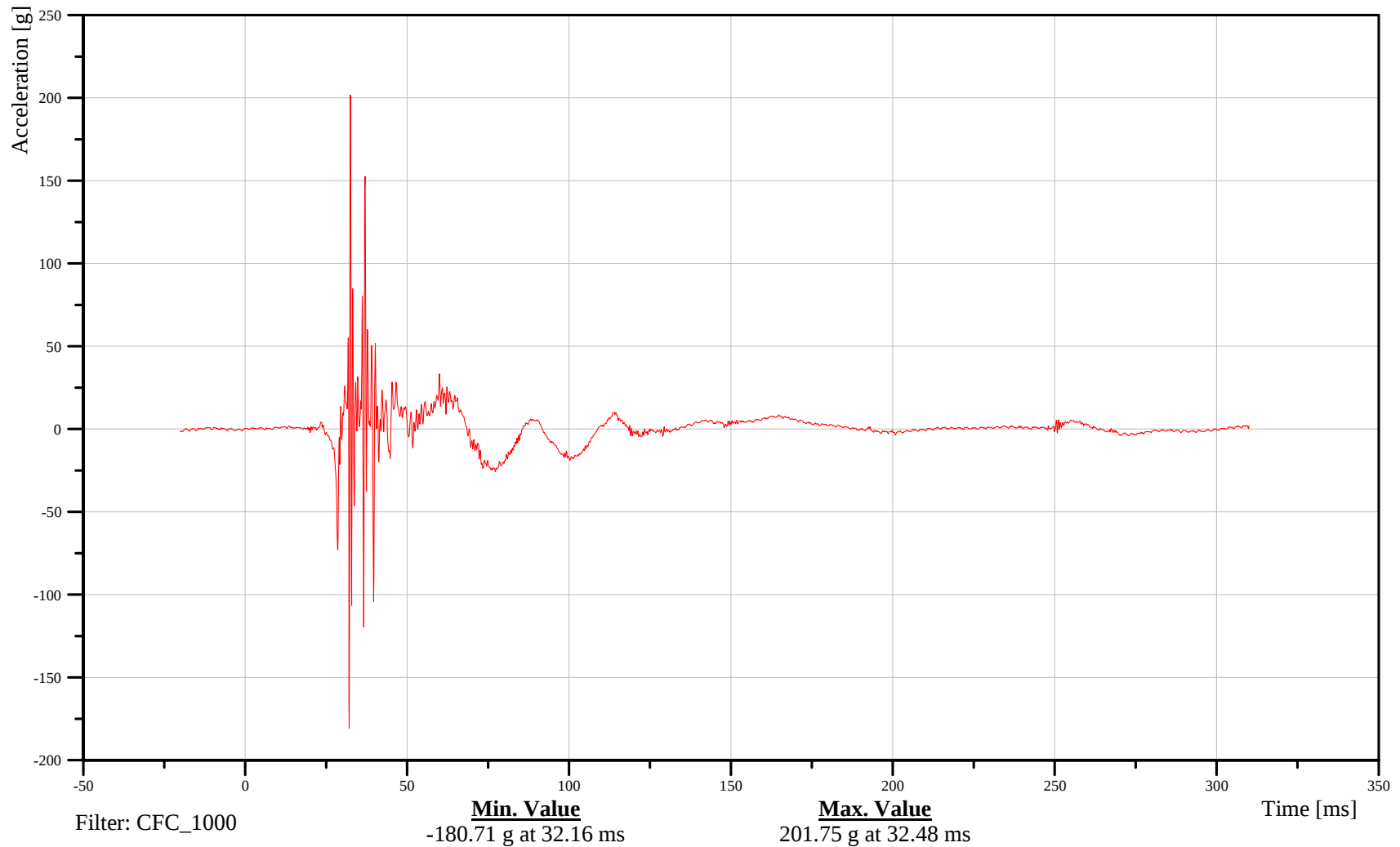
Abdominal Rib 1 Z-Axis Acceleration

Customer: VRTC

11ABRILE01WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-60

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

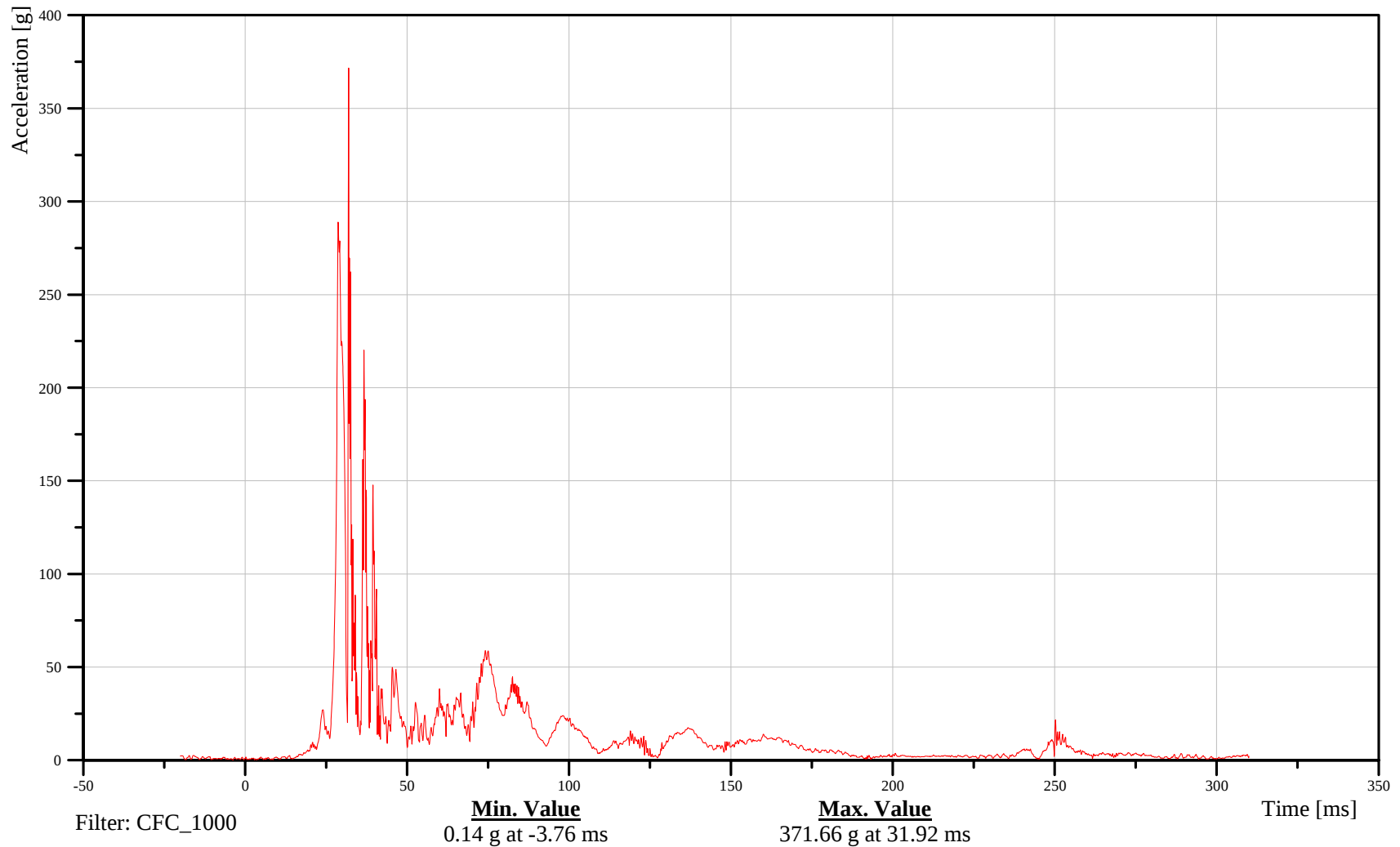
Abdominal Rib 1 Resultant Acceleration

Customer: VRTC

11ABRILE01WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-61

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

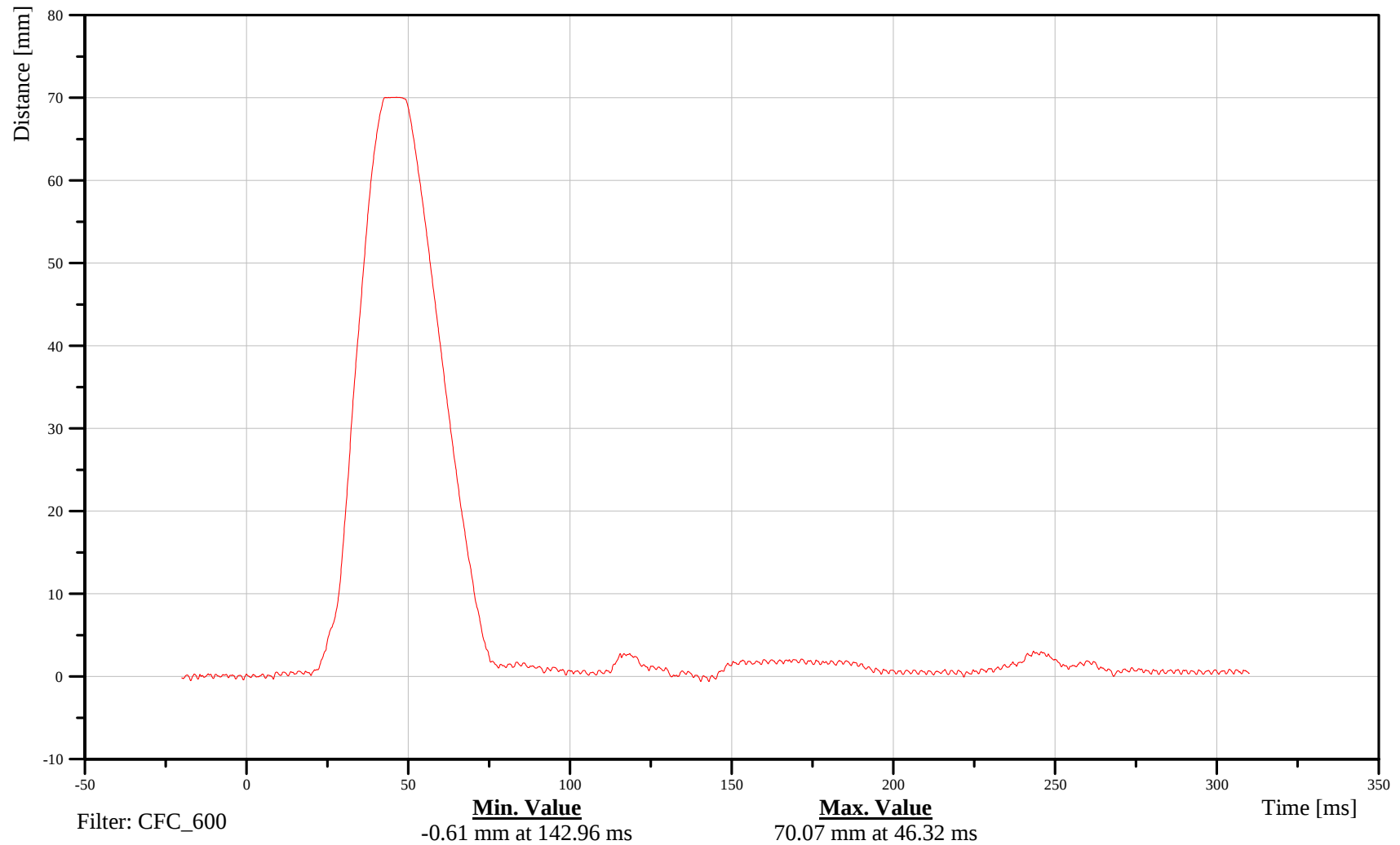
Abdominal Rib 2 Y-Axis Displacement

Customer: VRTC

11ABRILE02WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-62

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

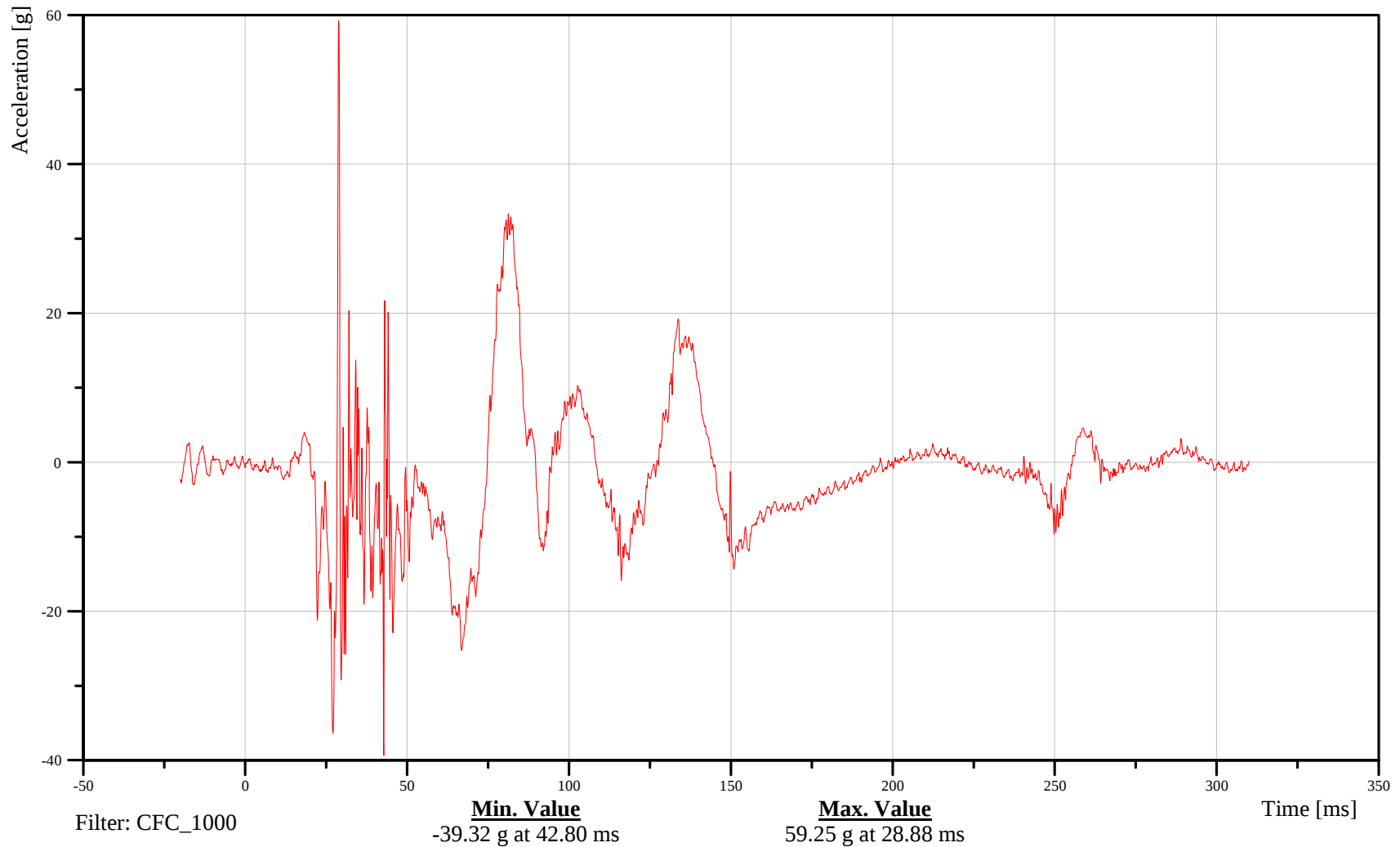
Abdominal Rib 2 X-Axis Acceleration

Customer: VRTC

11ABRILE02WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-63

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

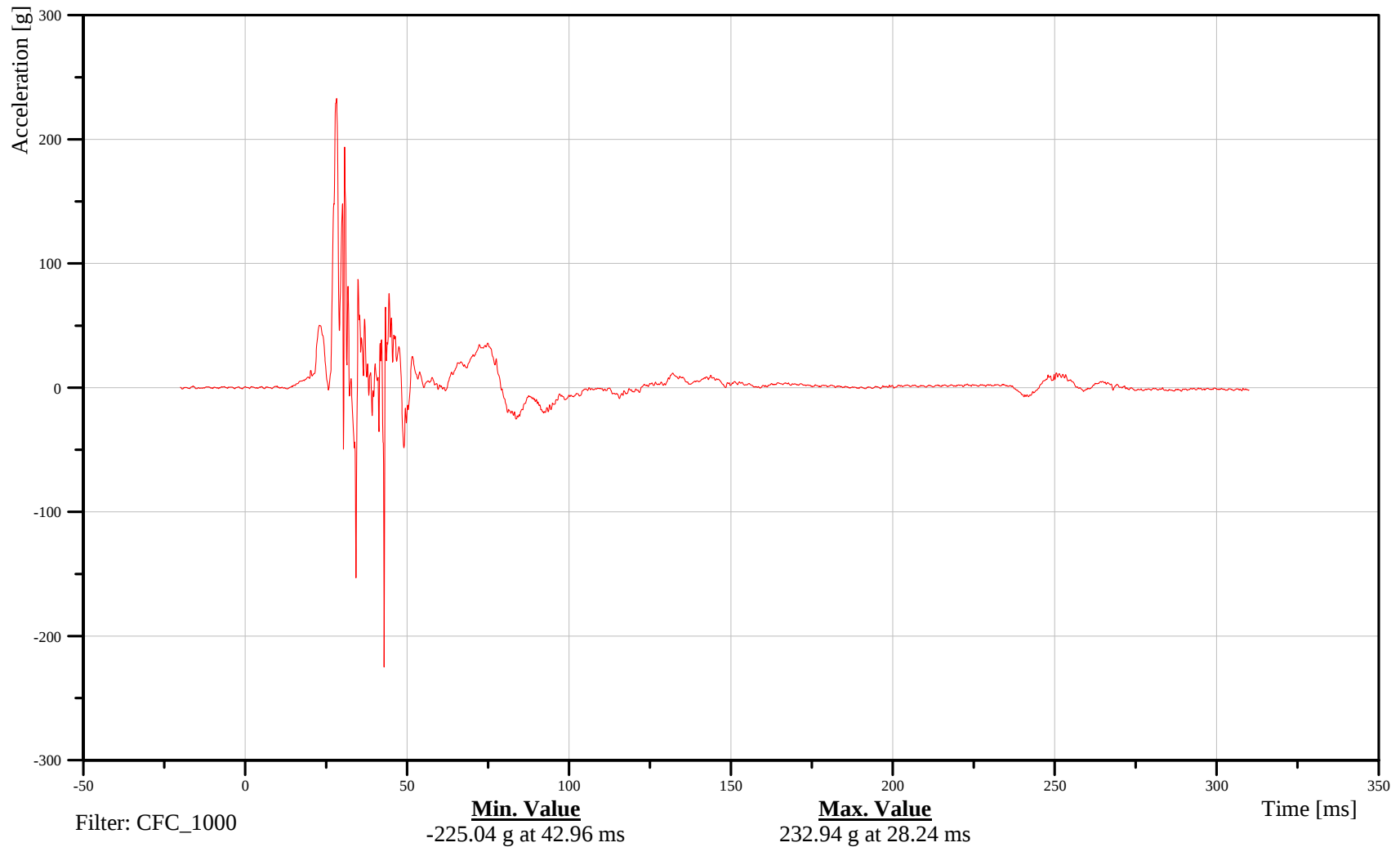
Abdominal Rib 2 Y-Axis Acceleration

Customer: VRTC

11ABRILE02WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-64

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

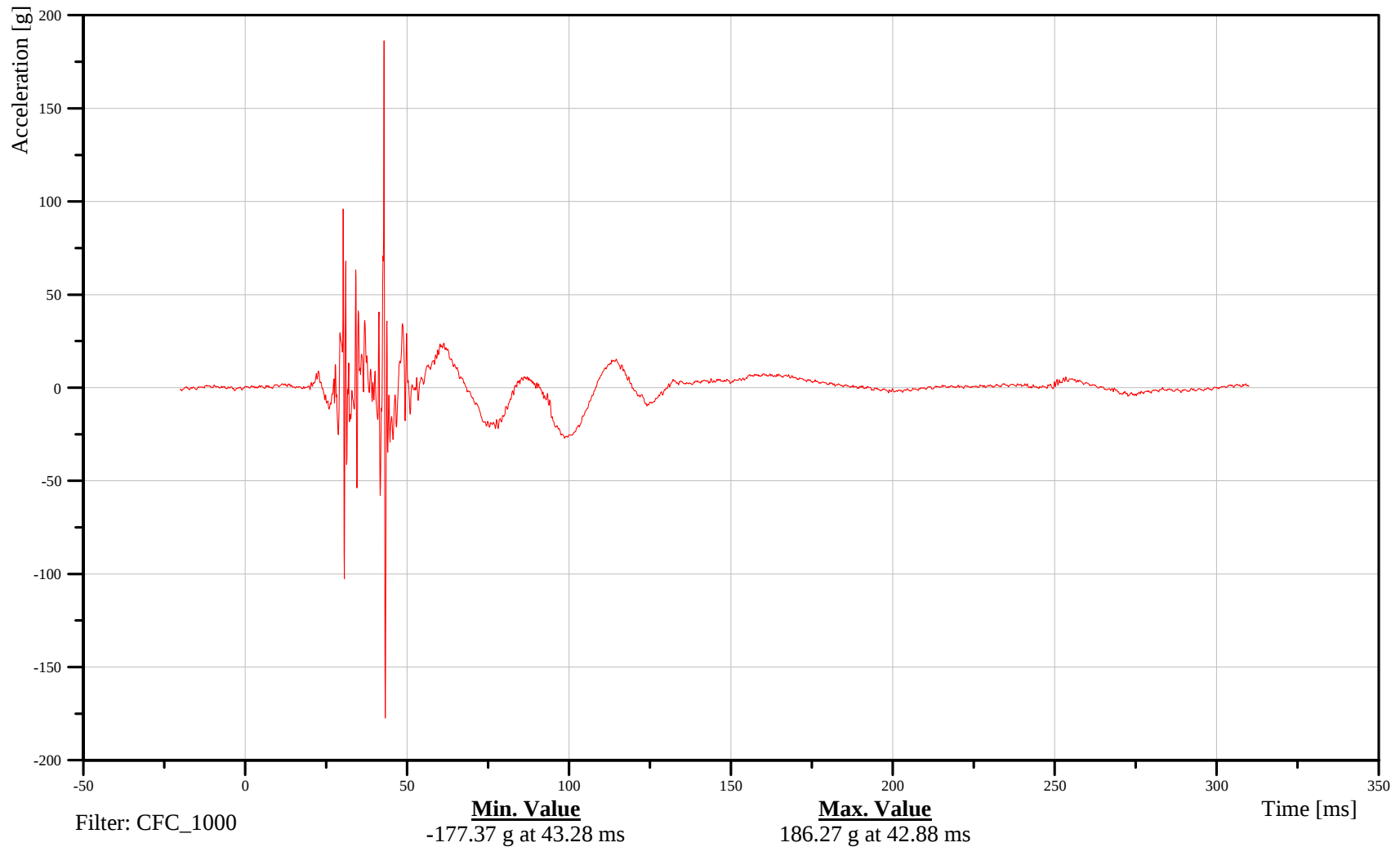
Abdominal Rib 2 Z-Axis Acceleration

Customer: VRTC

11ABRILE02WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-65

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

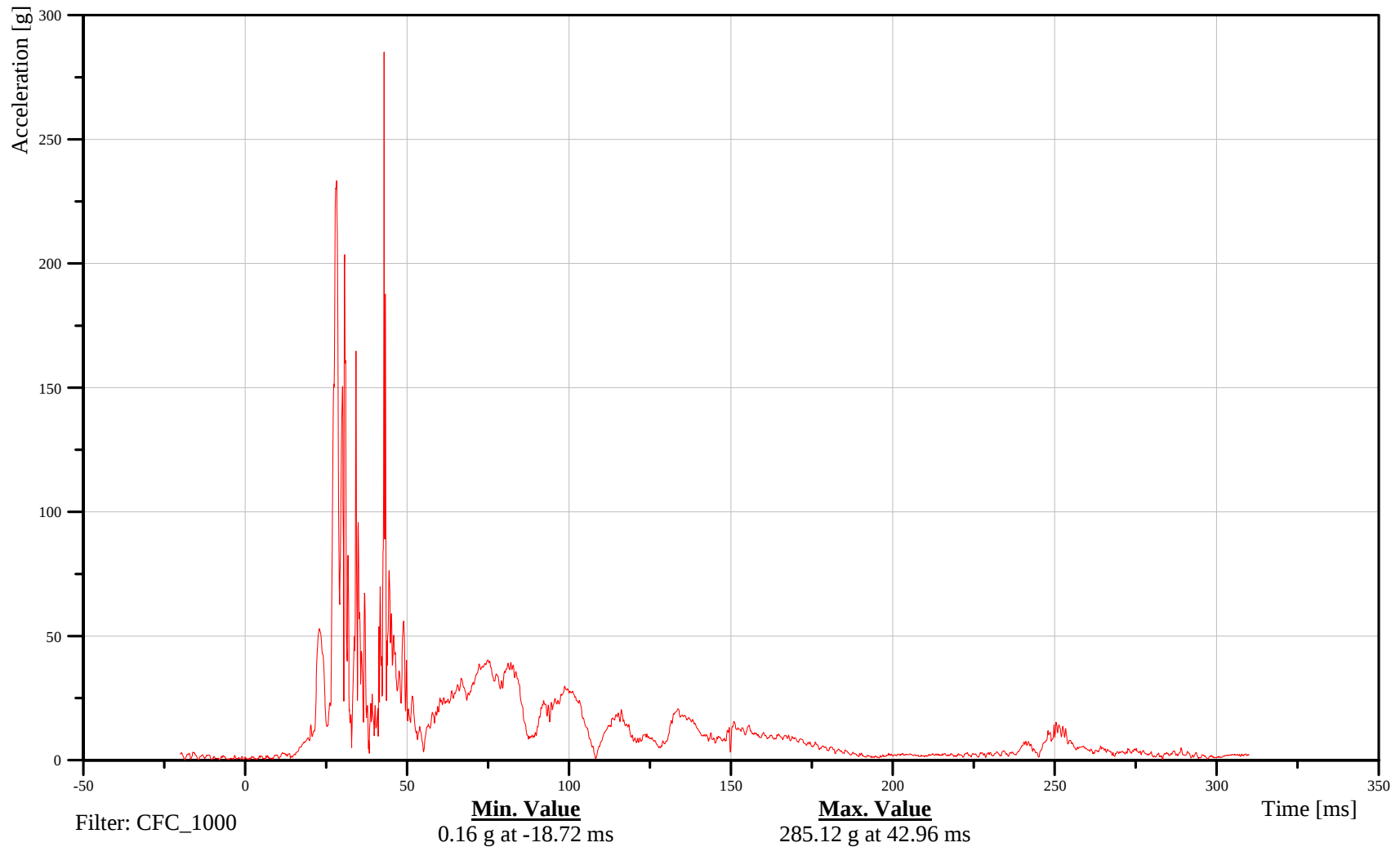
Abdominal Rib 2 Resultant Acceleration

Customer: VRTC

11ABRILE02WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-66

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

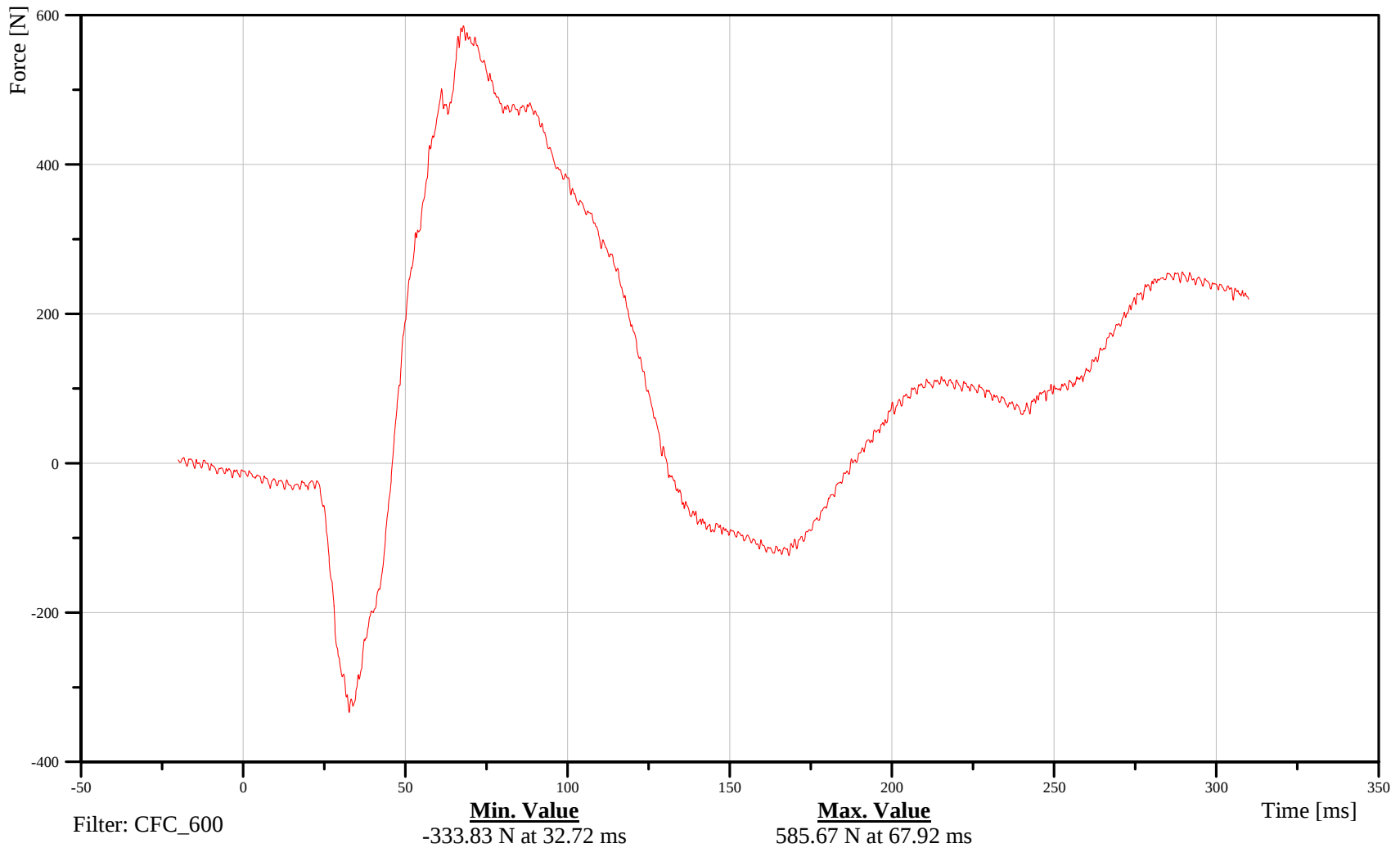
Lumbar X-Axis Force

Customer: VRTC

11LUSP0000WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-67

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

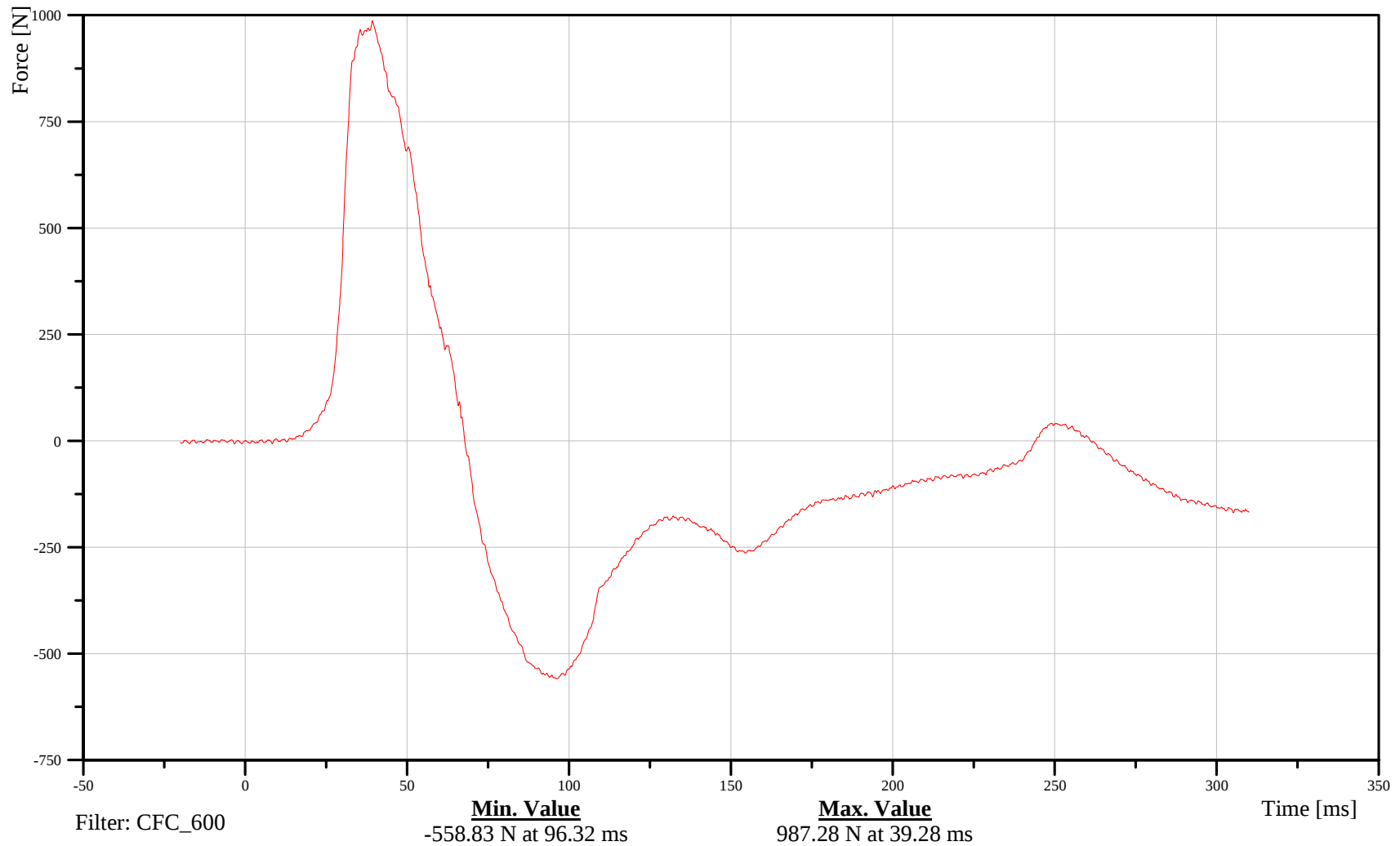
Lumbar Y-Axis Force

Customer: VRTC

11LUSP0000WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-68

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

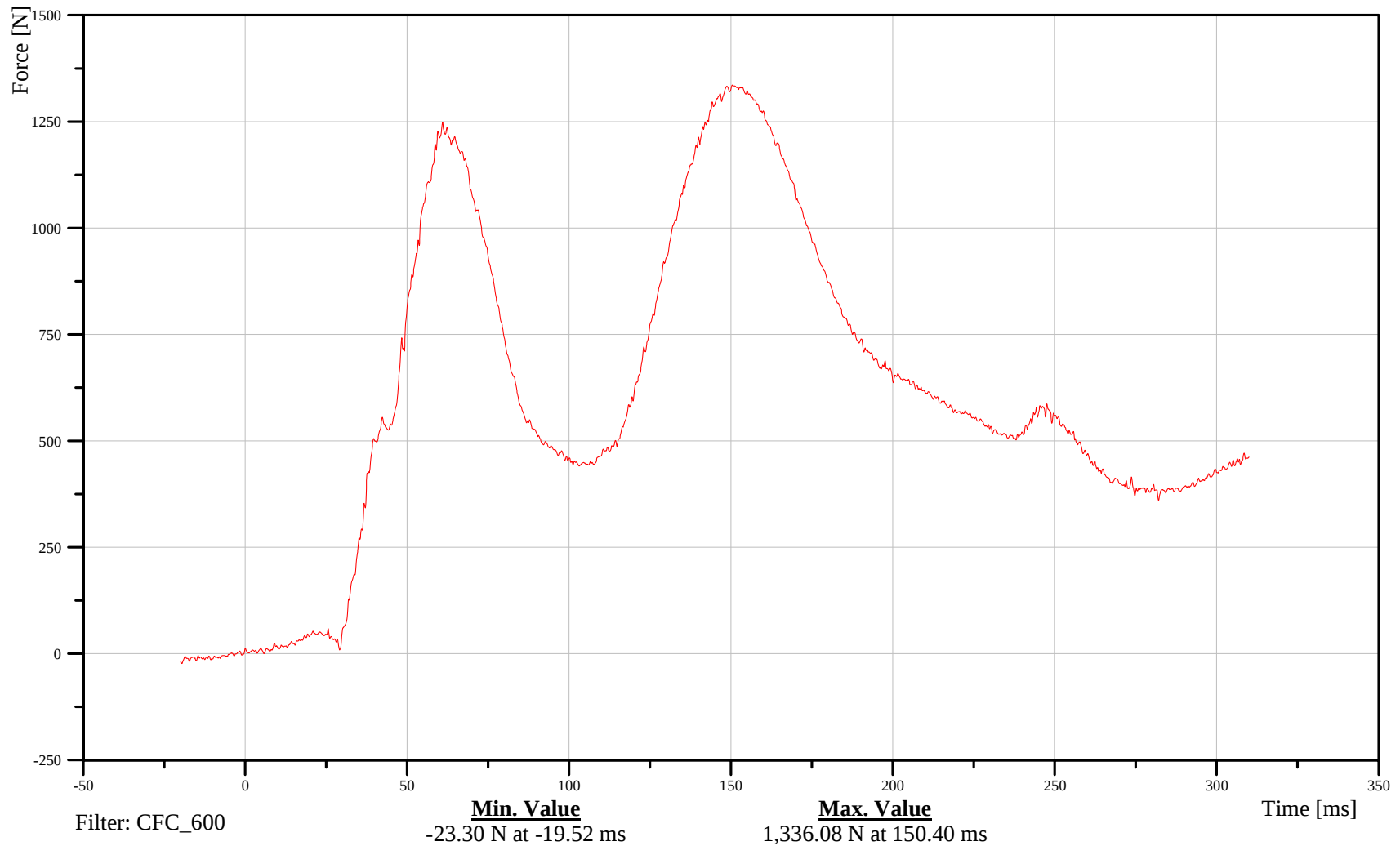
Lumbar Z-Axis Force

Customer: VRTC

11LUSP0000WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-69

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

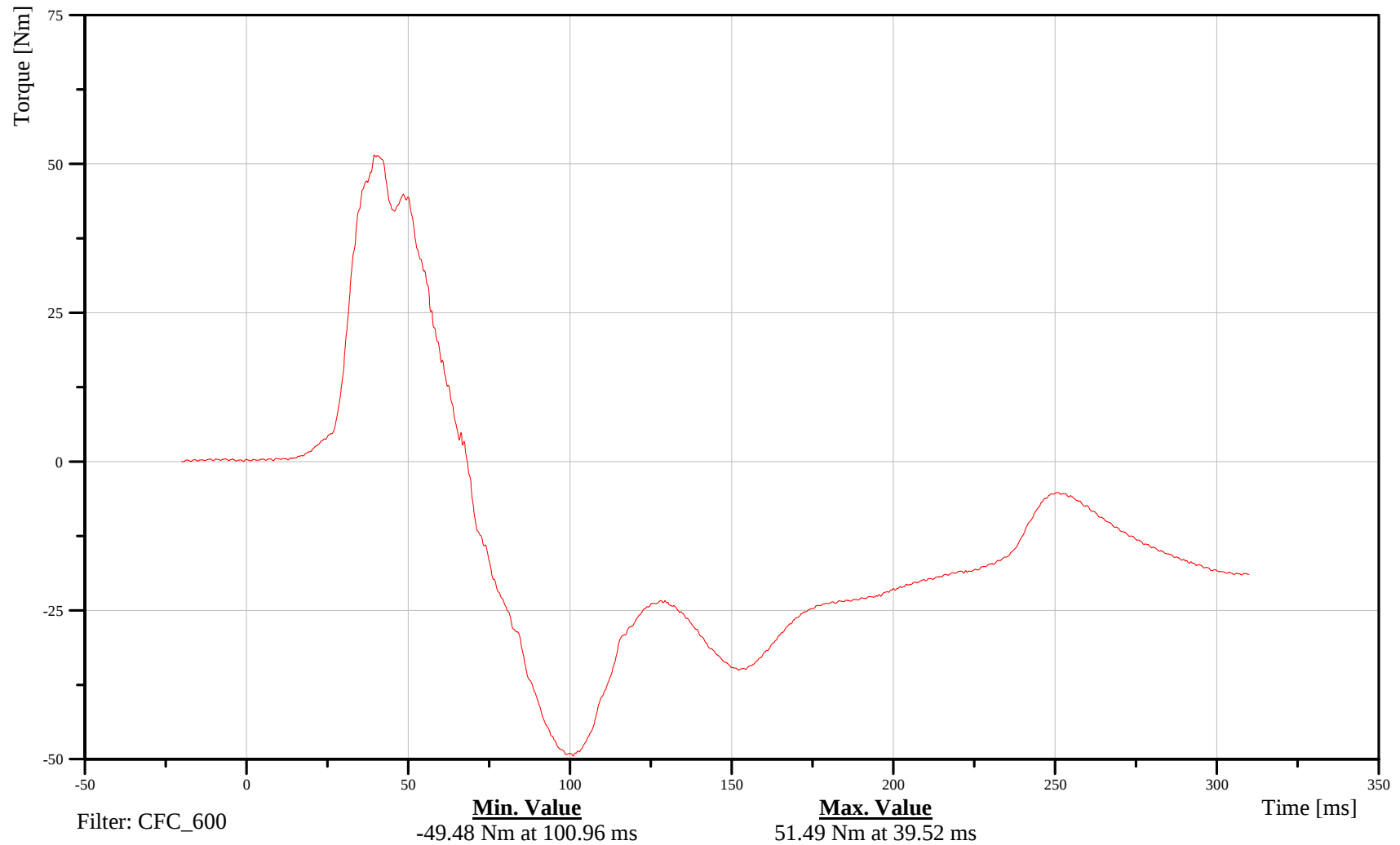
Lumbar Moment About X Axis

Customer: VRTC

11LUSP0000WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-70

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

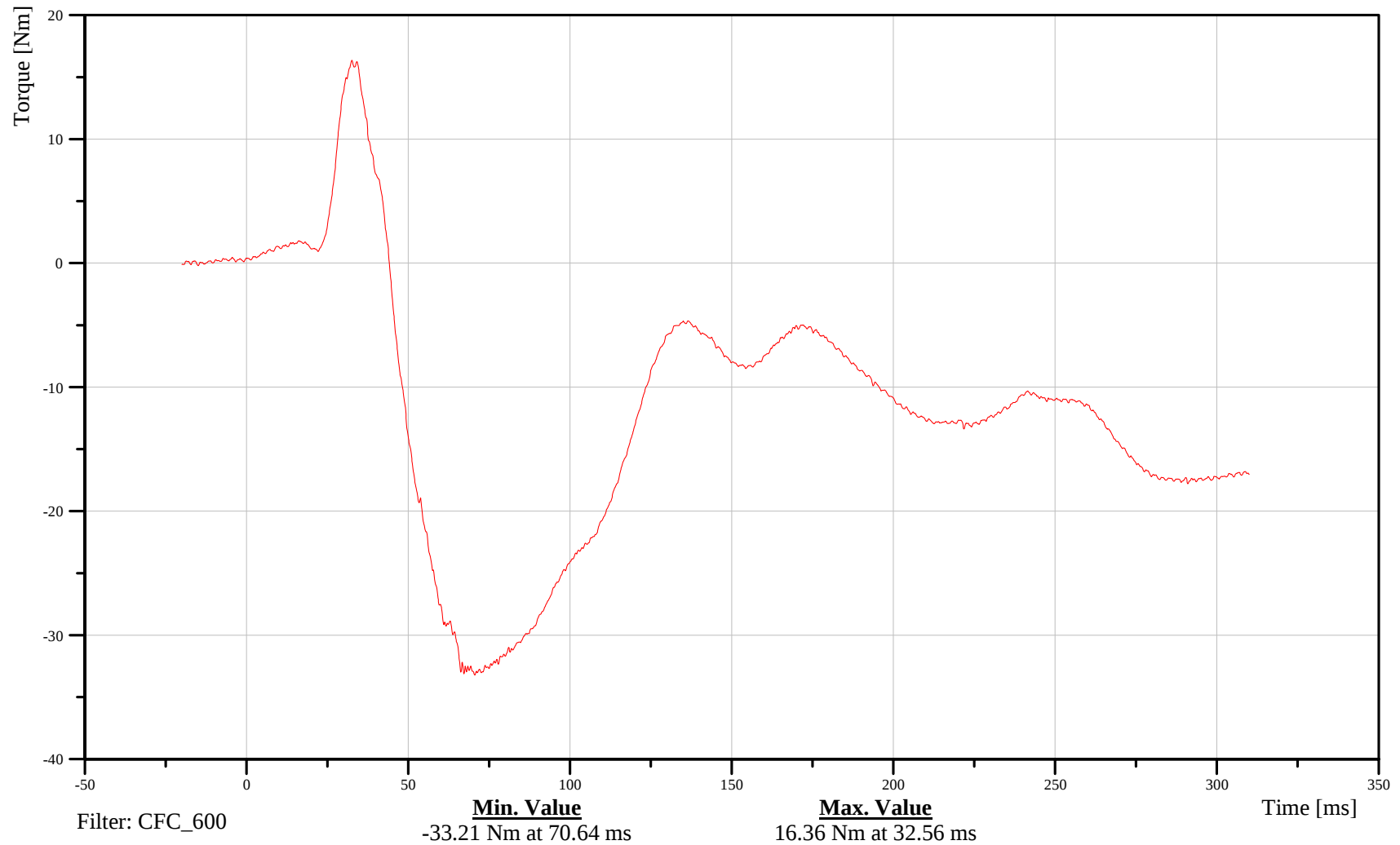
Lumbar Moment About Y Axis

Customer: VRTC

11LUSP0000WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-71

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

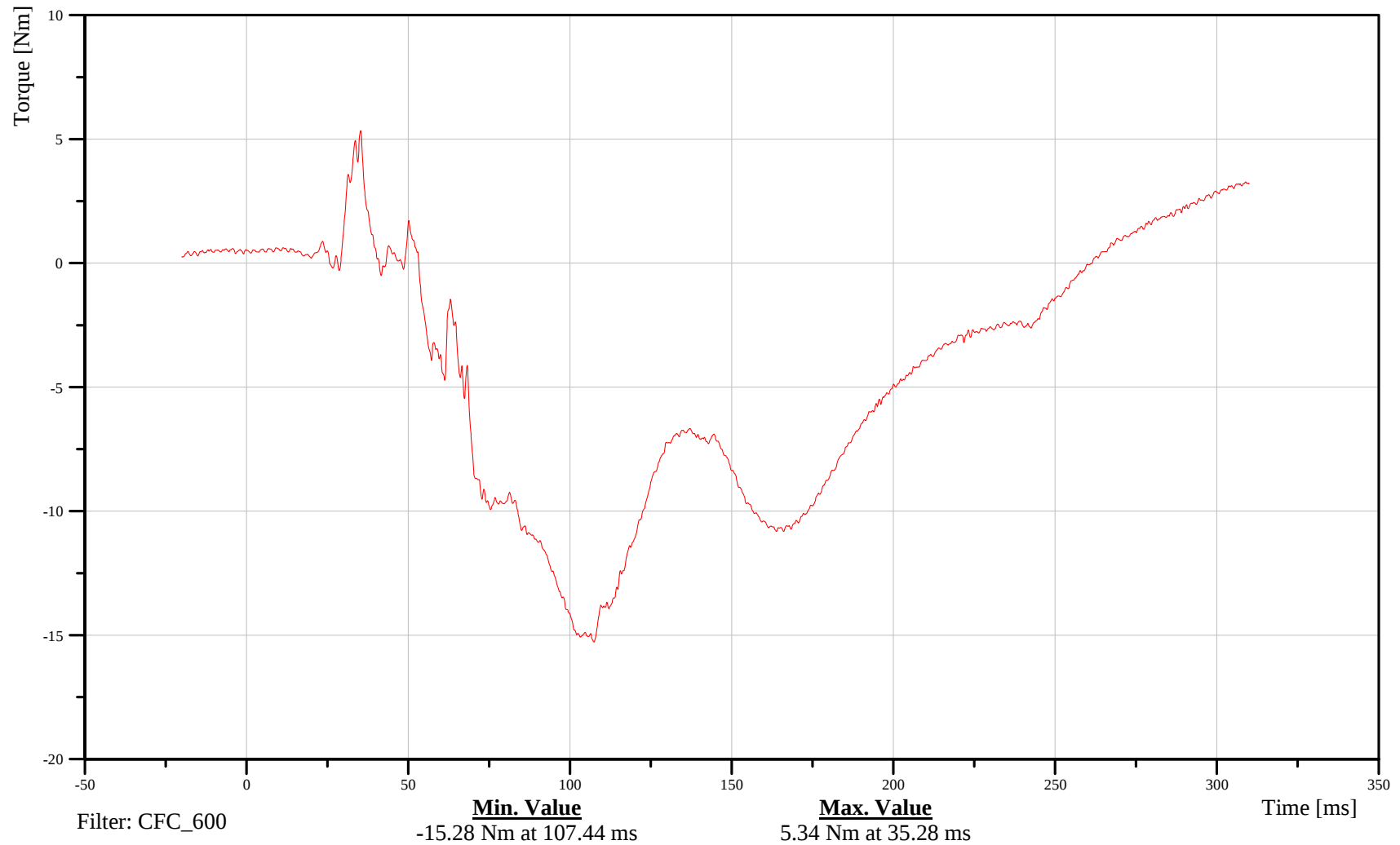
Lumbar Moment About Z Axis

Customer: VRTC

11LUSP0000WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-72

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

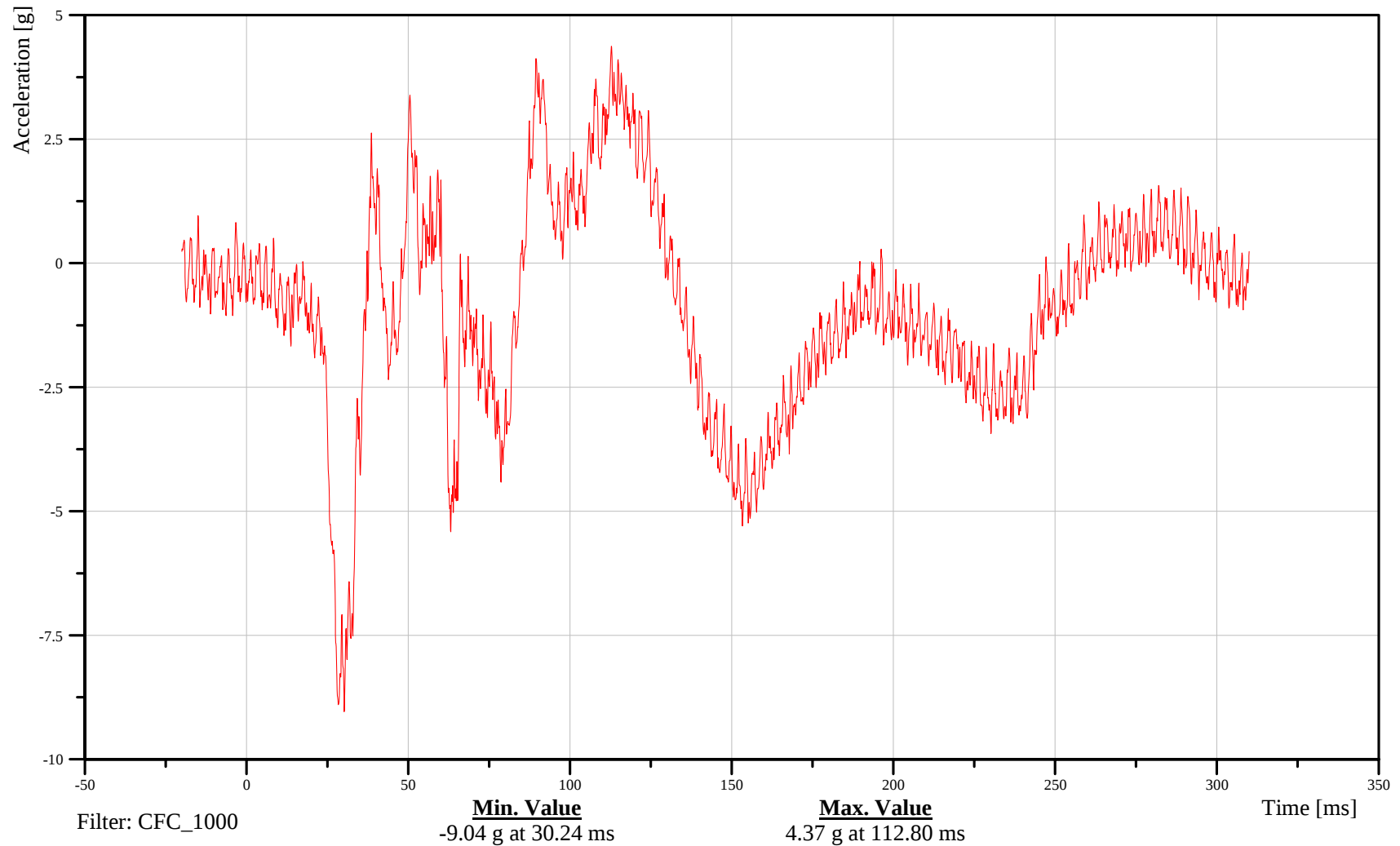
Pelvis X-Axis Acceleration

Customer: VRTC

11PELVCG00WSACXA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-73

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

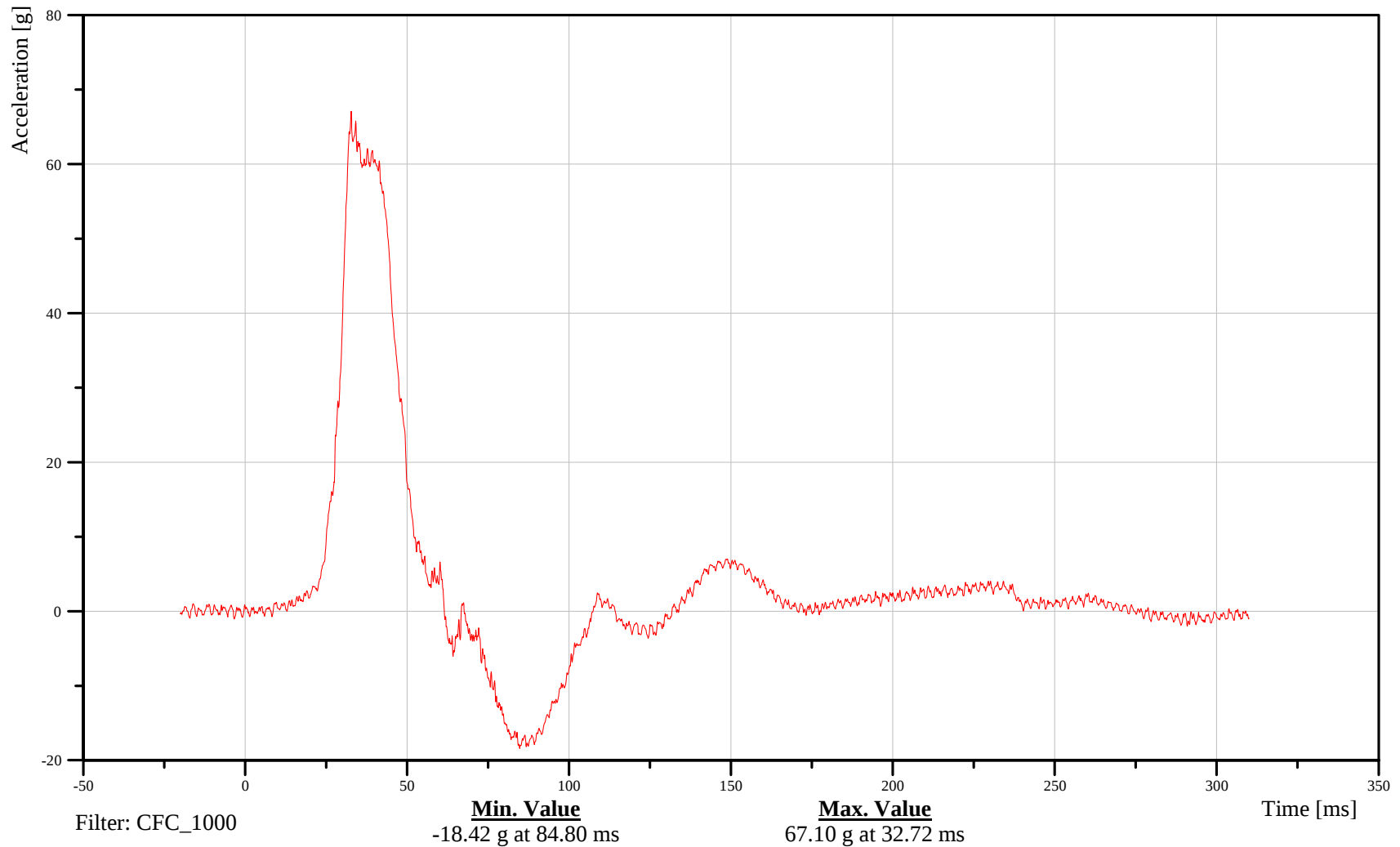
Pelvis Y-Axis Acceleration

Customer: VRTC

11PELVCG00WSACYA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-74

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

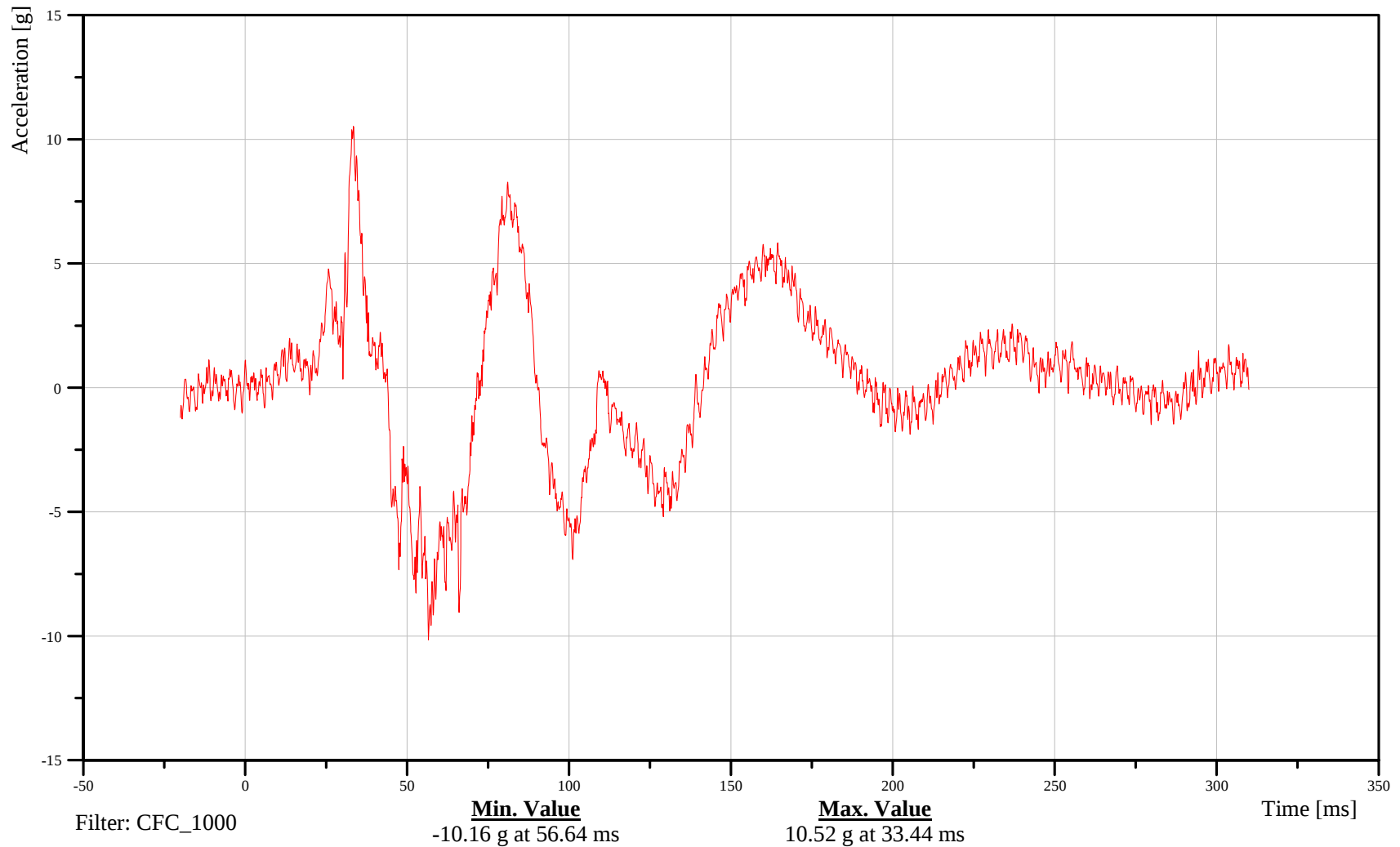
Pelvis Z-Axis Acceleration

Customer: VRTC

11PELVCG00WSACZA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-75

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

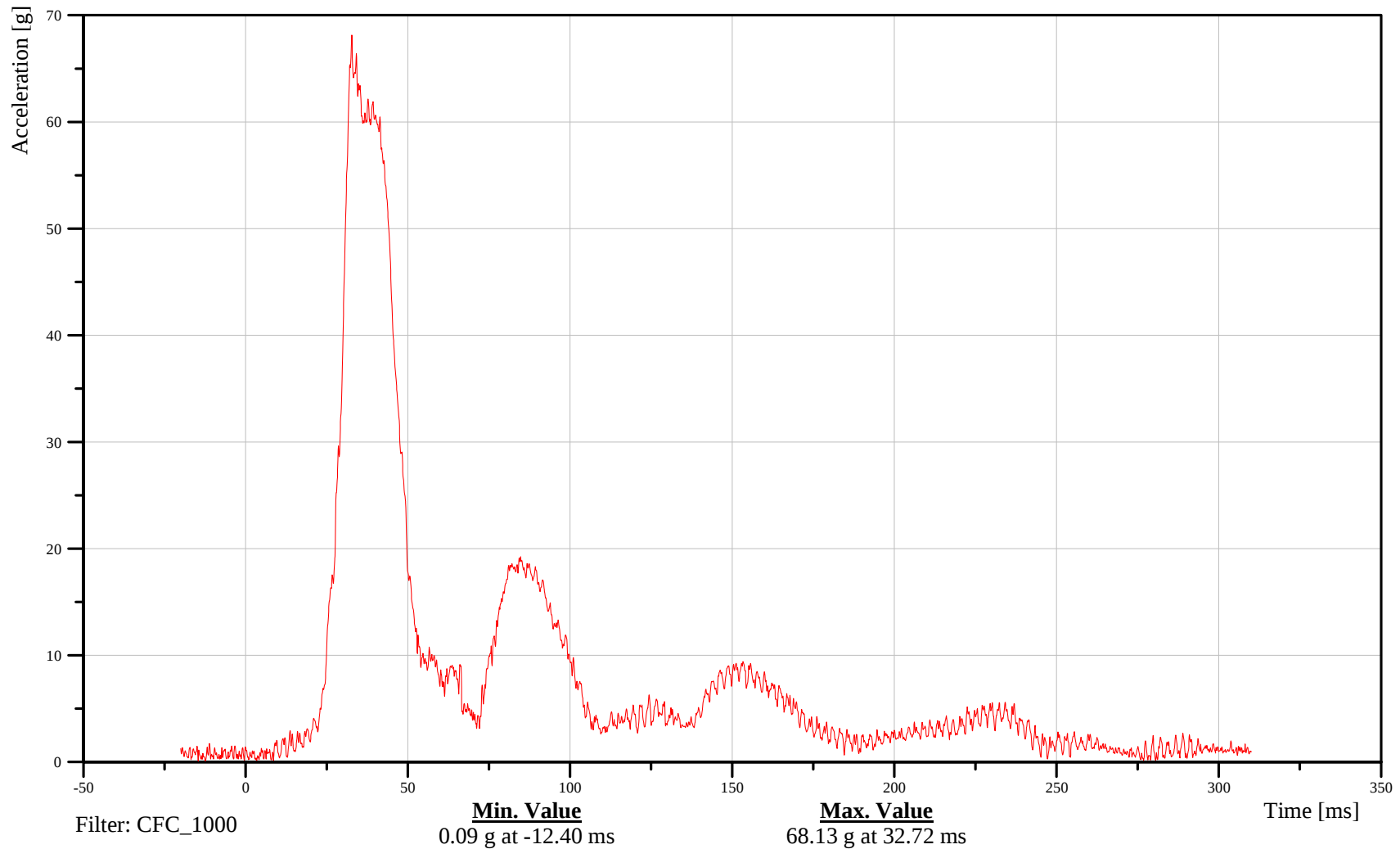
Pelvis Resultant Acceleration

Customer: VRTC

11PELVCG00WSACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-76

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

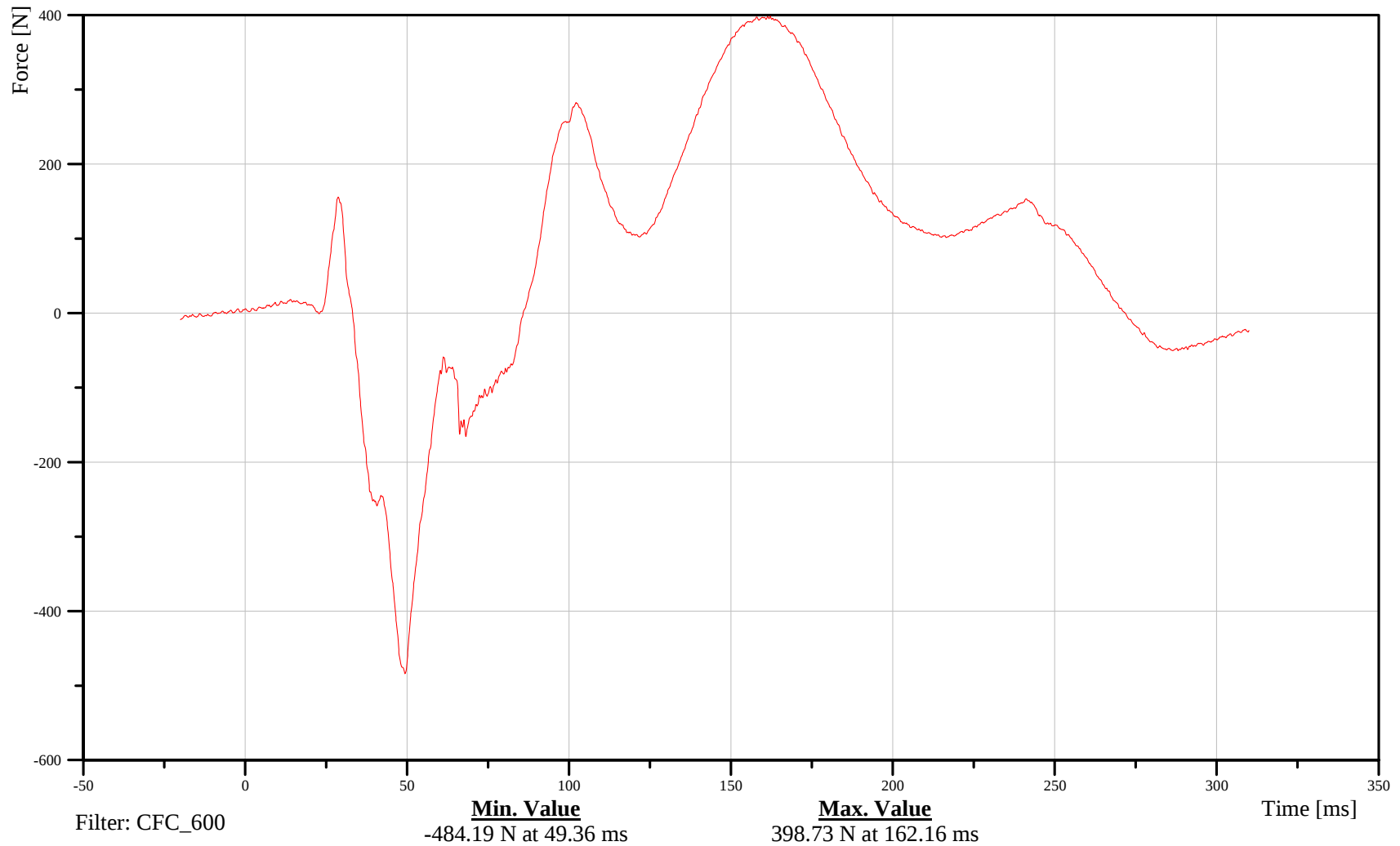
Sacro-Iliac Left X-Axis Force

Customer: VRTC

11SACRLE00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-77

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

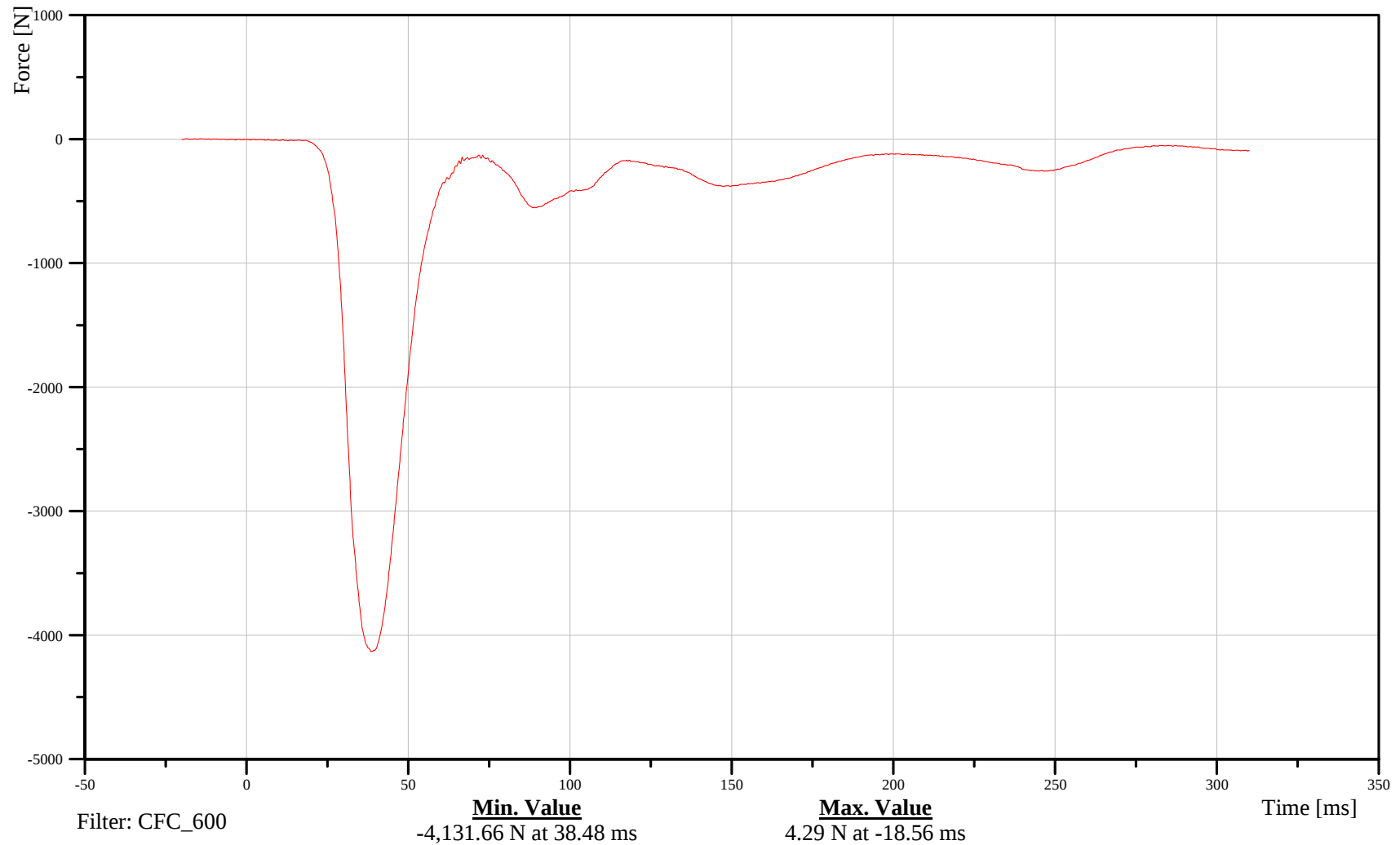
Sacro-Iliac Left Y-Axis Force

Customer: VRTC

11SACRLE00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-78

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

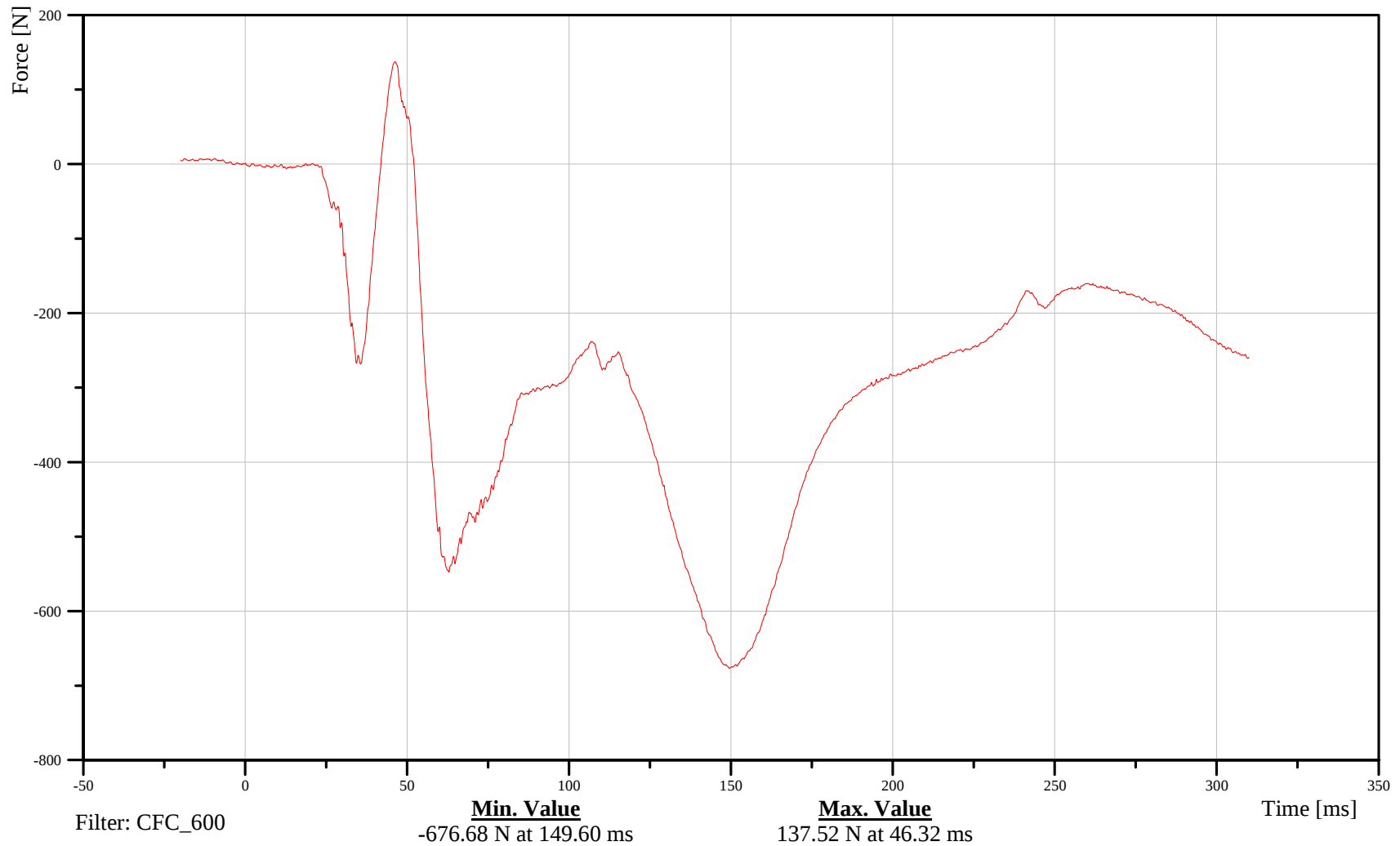
Sacro-Iliac Left Z-Axis Force

Customer: VRTC

11SACRLE00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-79

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

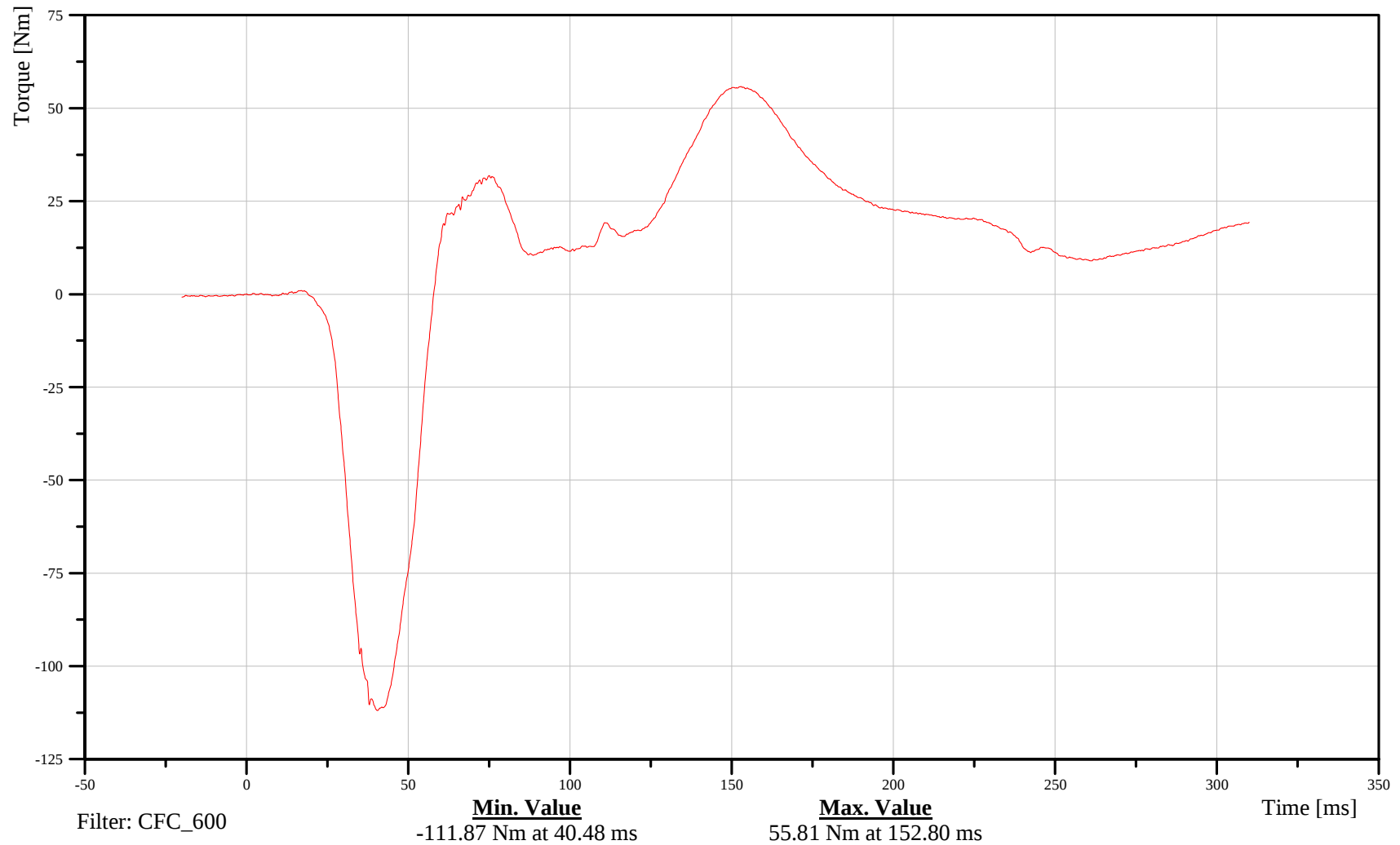
Sacro-Iliac Left Moment About X Axis

Customer: VRTC

11SACRLE00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-80

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

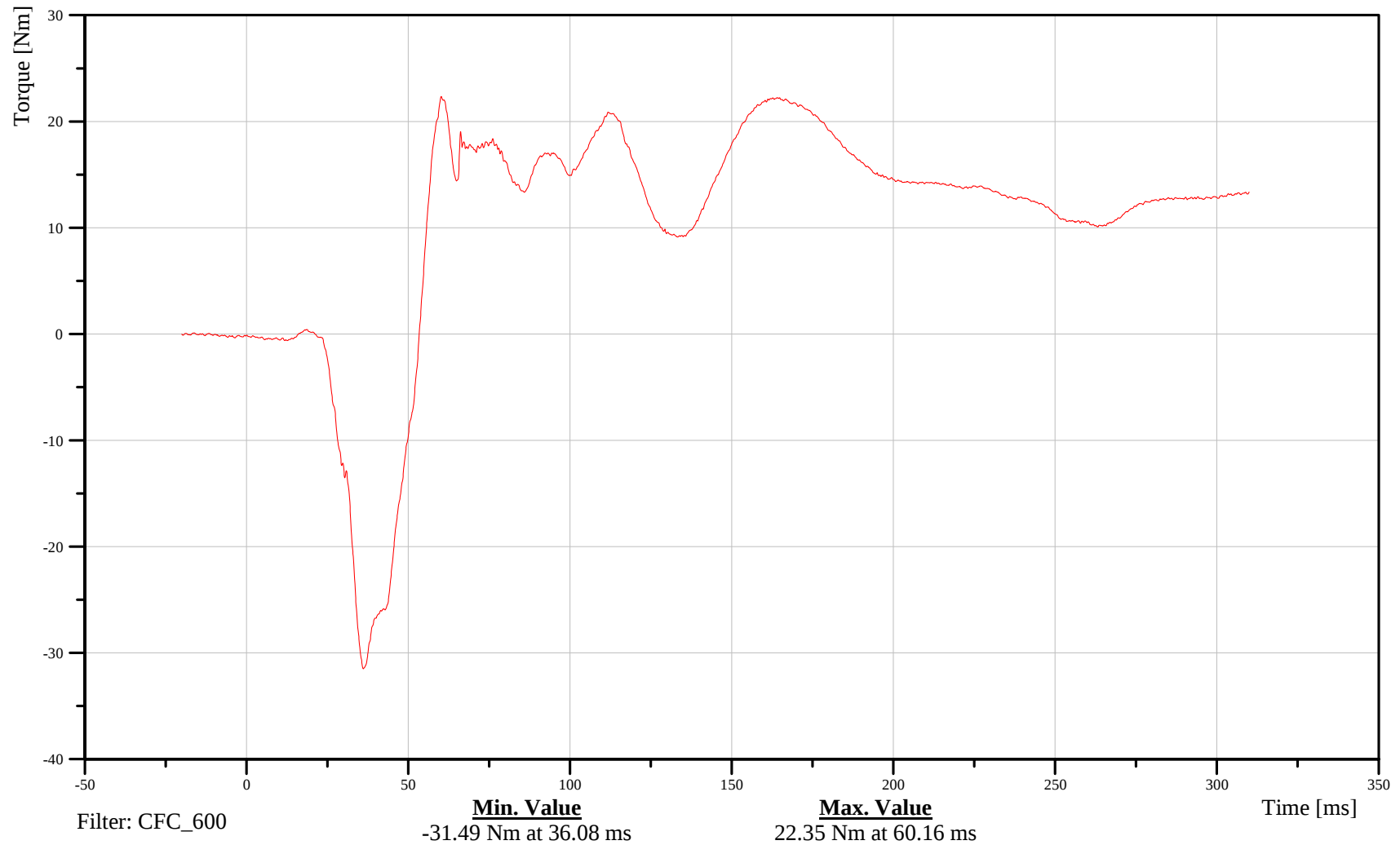
Sacro-Iliac Left Moment About Y Axis

Customer: VRTC

11SACRLE00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-81

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

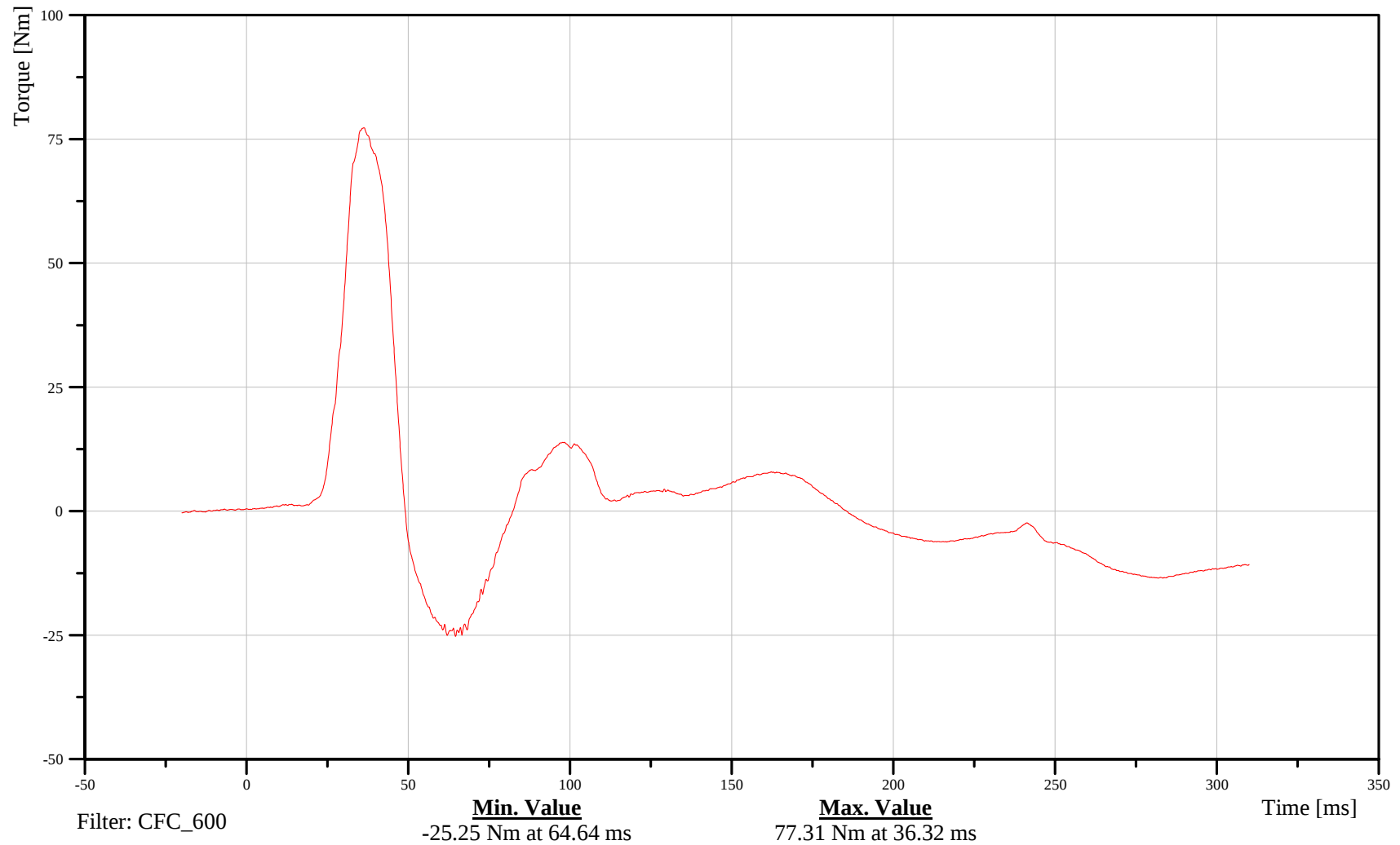
Sacro-Iliac Left Moment About Z Axis

Customer: VRTC

11SACRLE00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-82

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

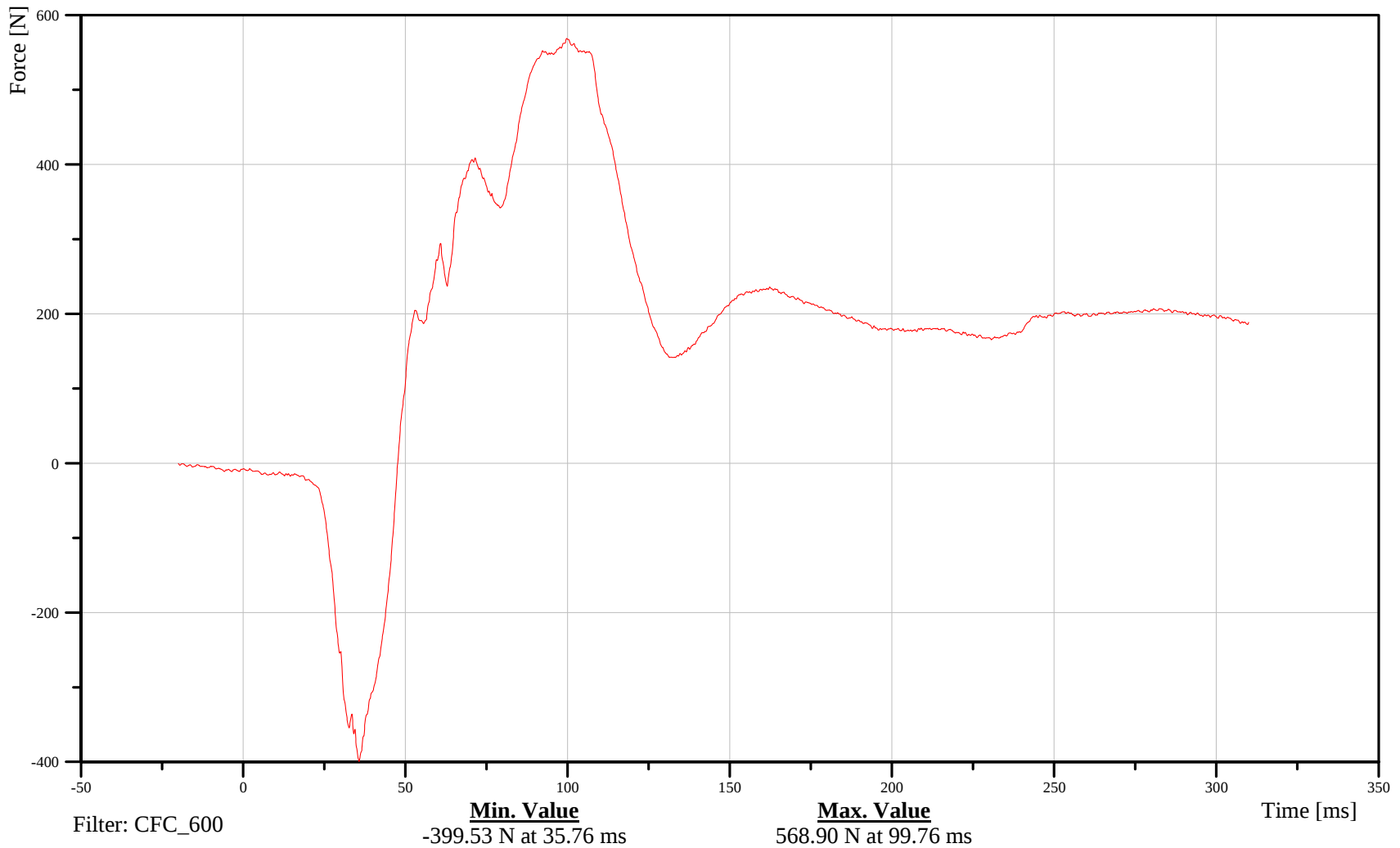
Sacro-Iliac Right X-Axis Force

Customer: VRTC

11SACRRI00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-83

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

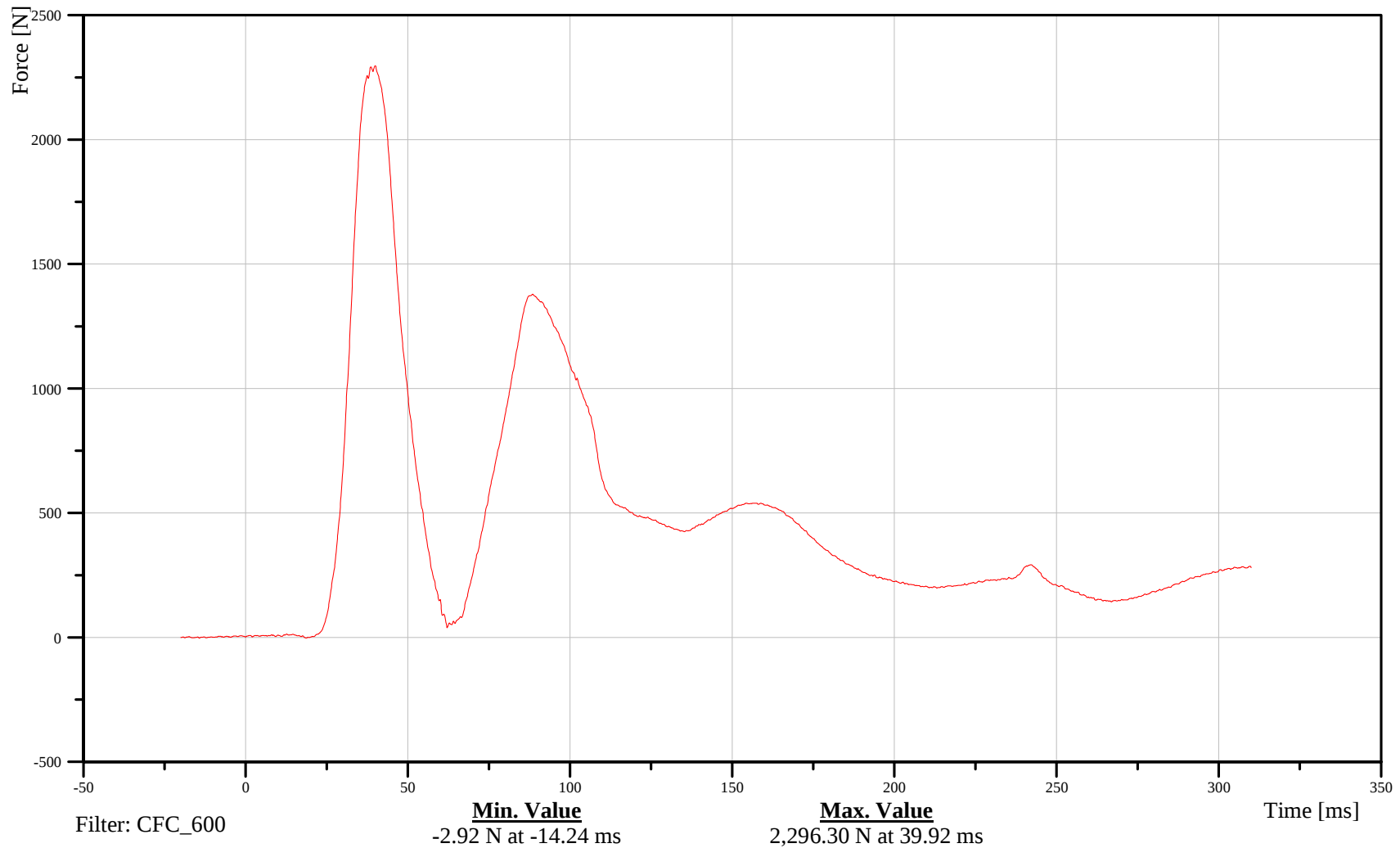
Sacro-Iliac Right Y-Axis Force

Customer: VRTC

11SACRRI00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-84

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

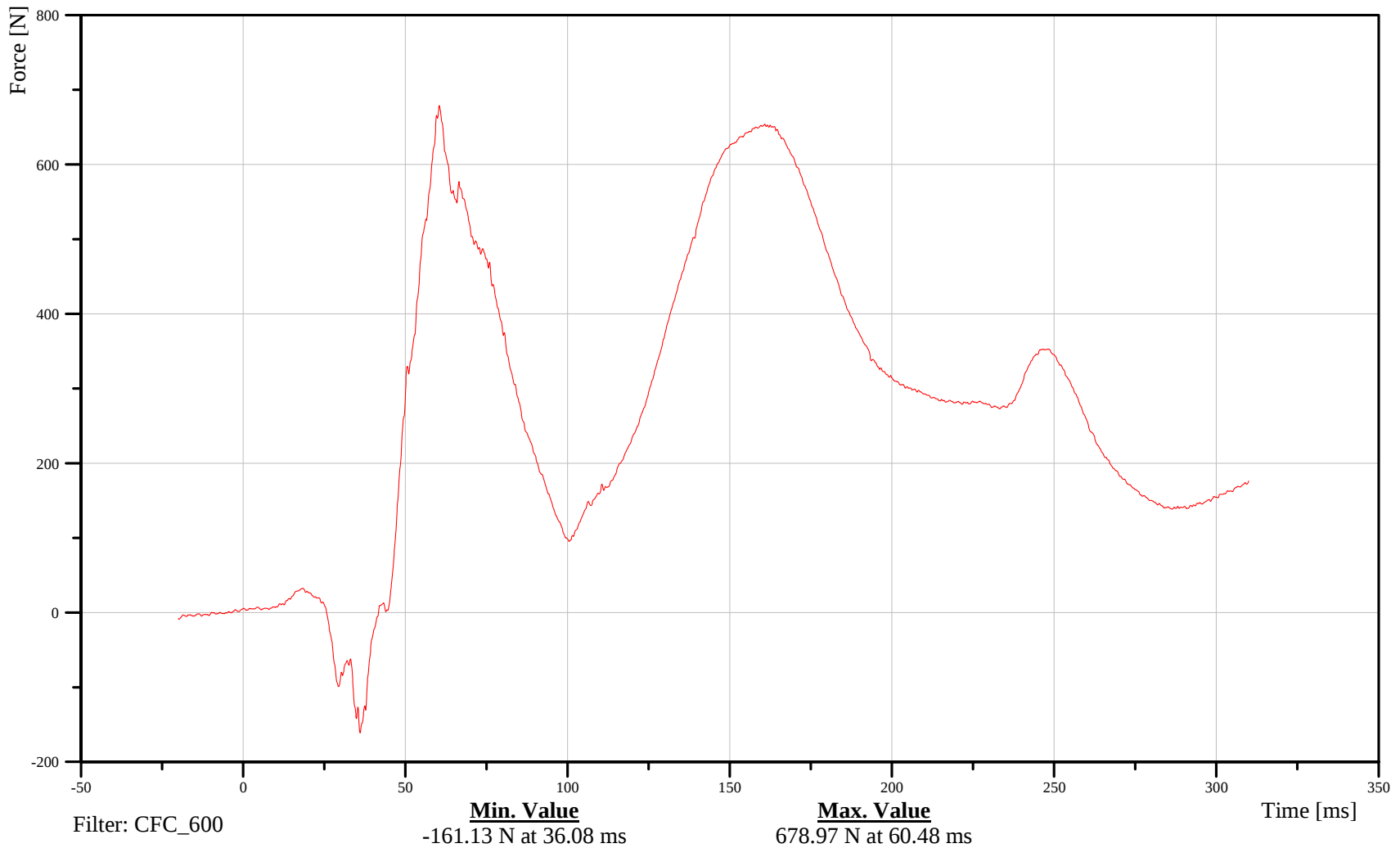
Sacro-Iliac Right Z-Axis Force

Customer: VRTC

11SACRRI00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-85

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

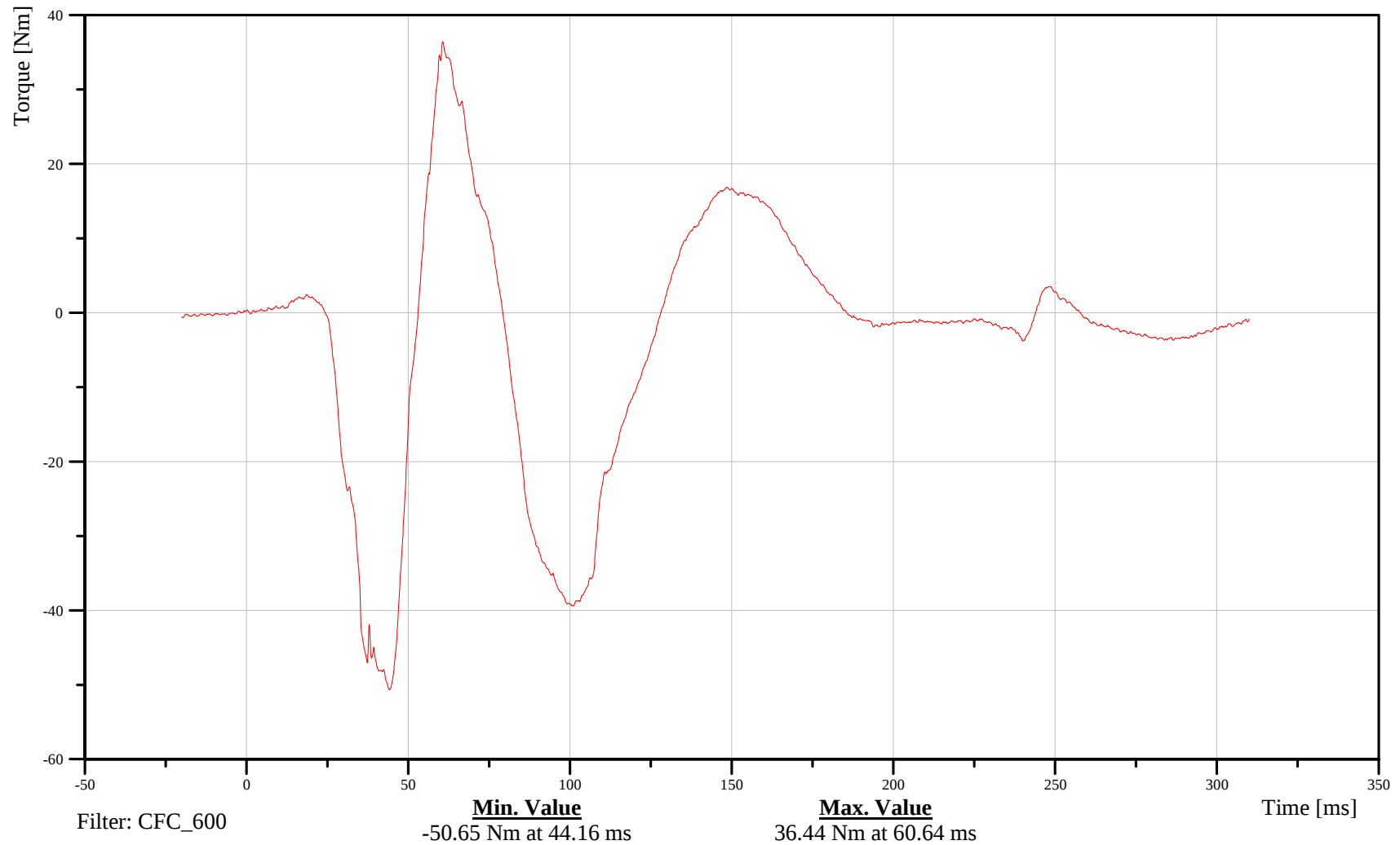
Sacro-Iliac Right Moment About X Axis

Customer: VRTC

11SACRRI00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-86

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

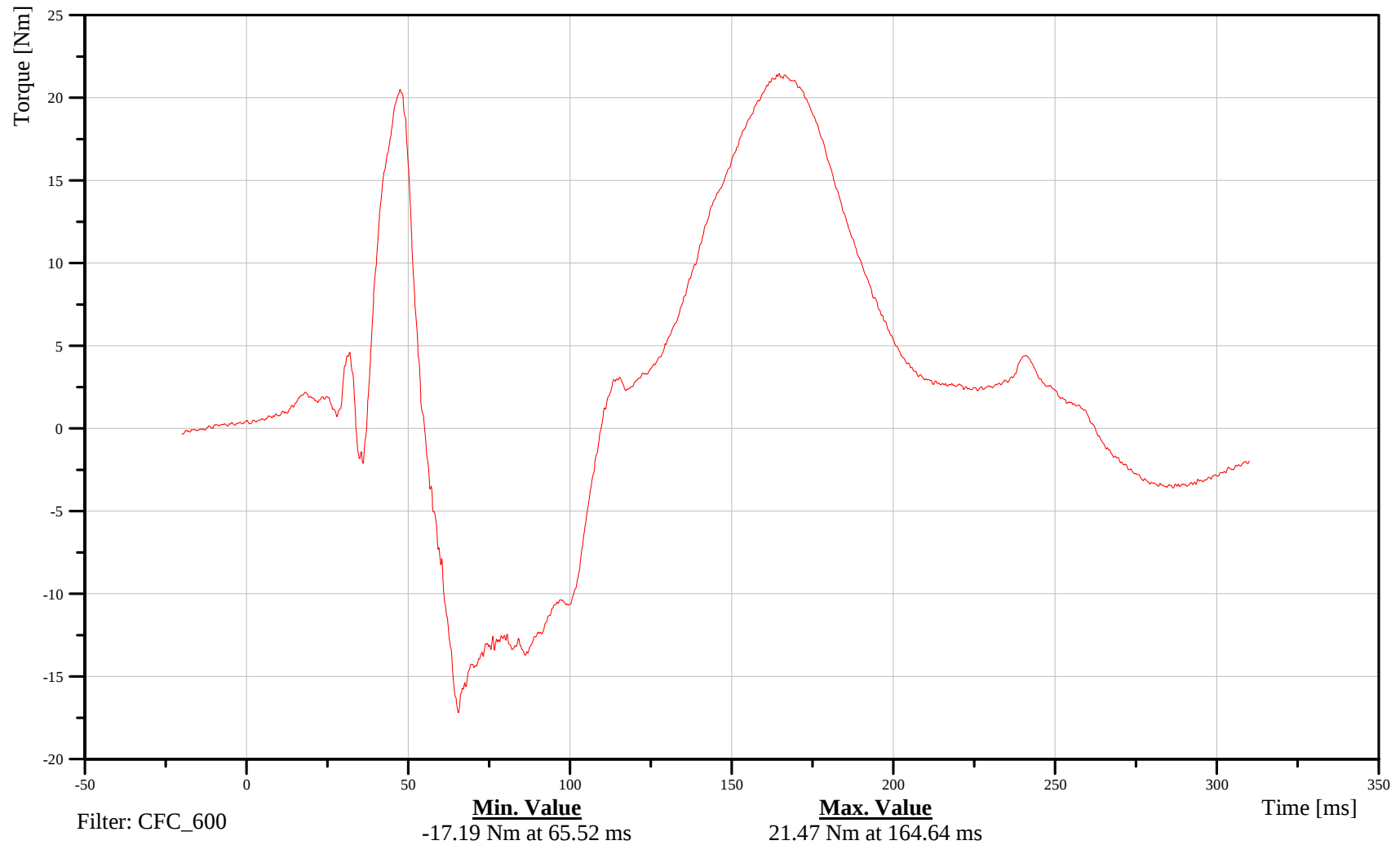
Sacro-Iliac Right Moment About Y Axis

Customer: VRTC

11SACRRI00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-87

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

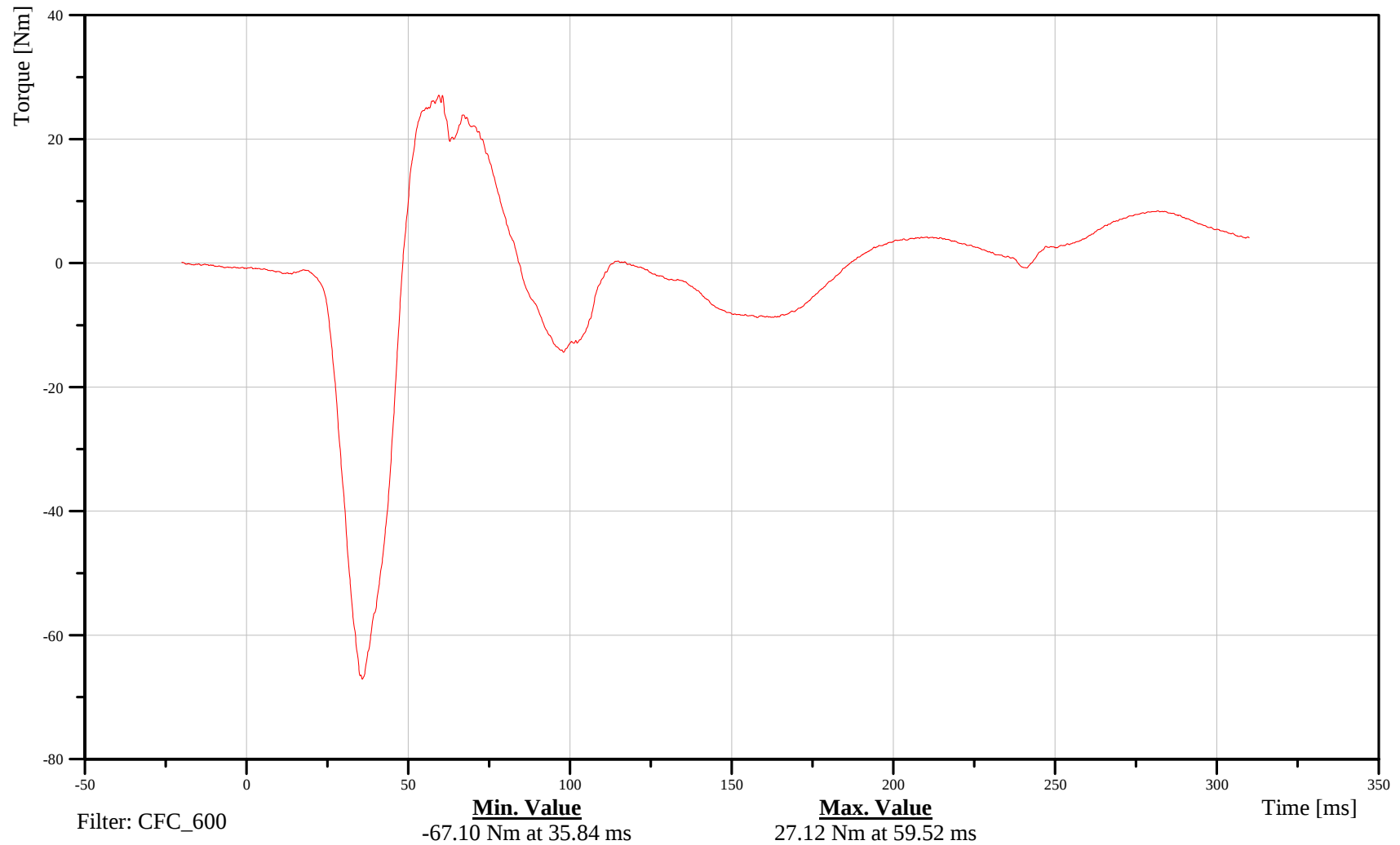
Sacro-Iliac Right Moment About Z Axis

Customer: VRTC

11SACRRI00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-88

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

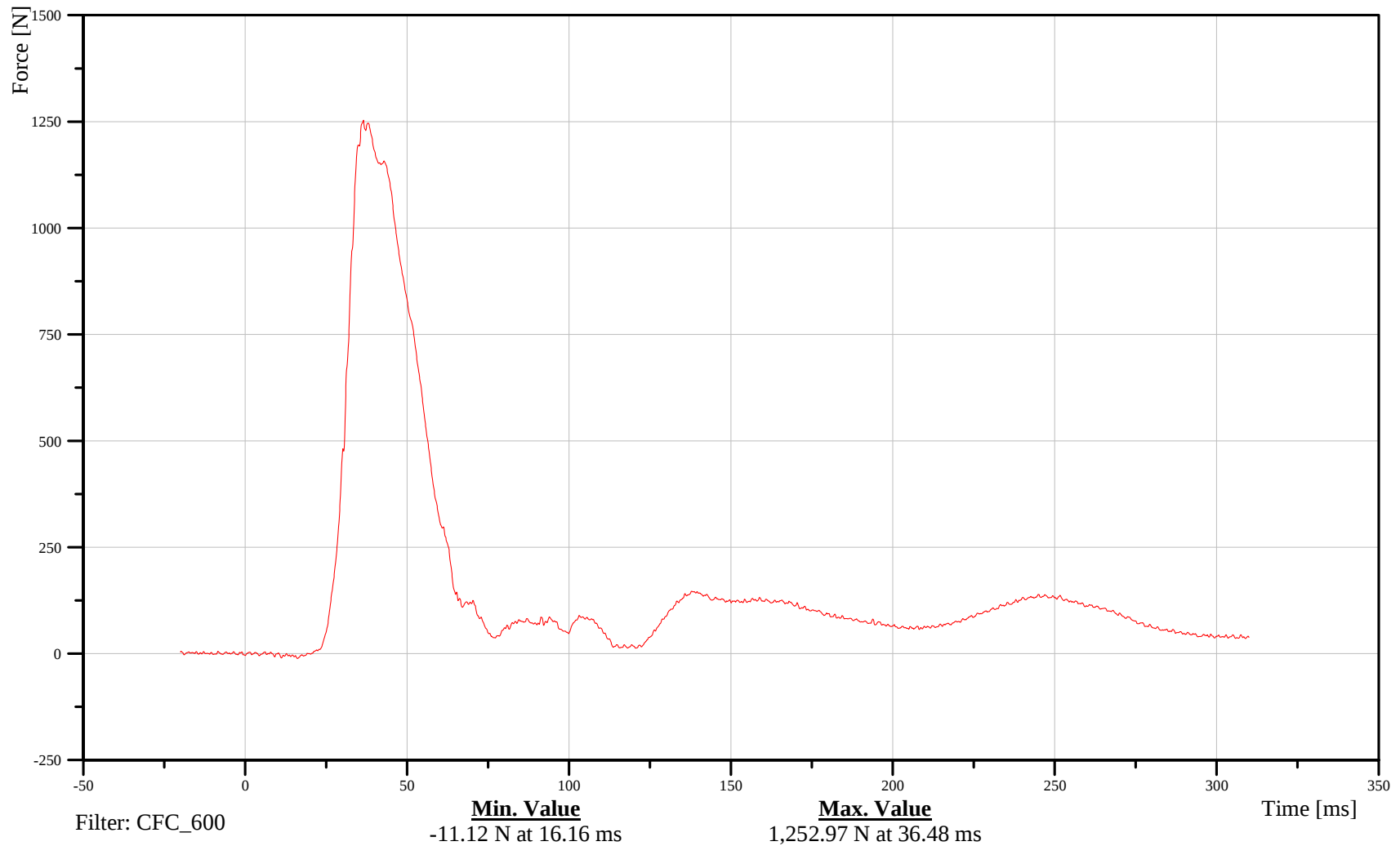
Pubic Y-Axis Force

Customer: VRTC

11PUBC0000WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-89

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

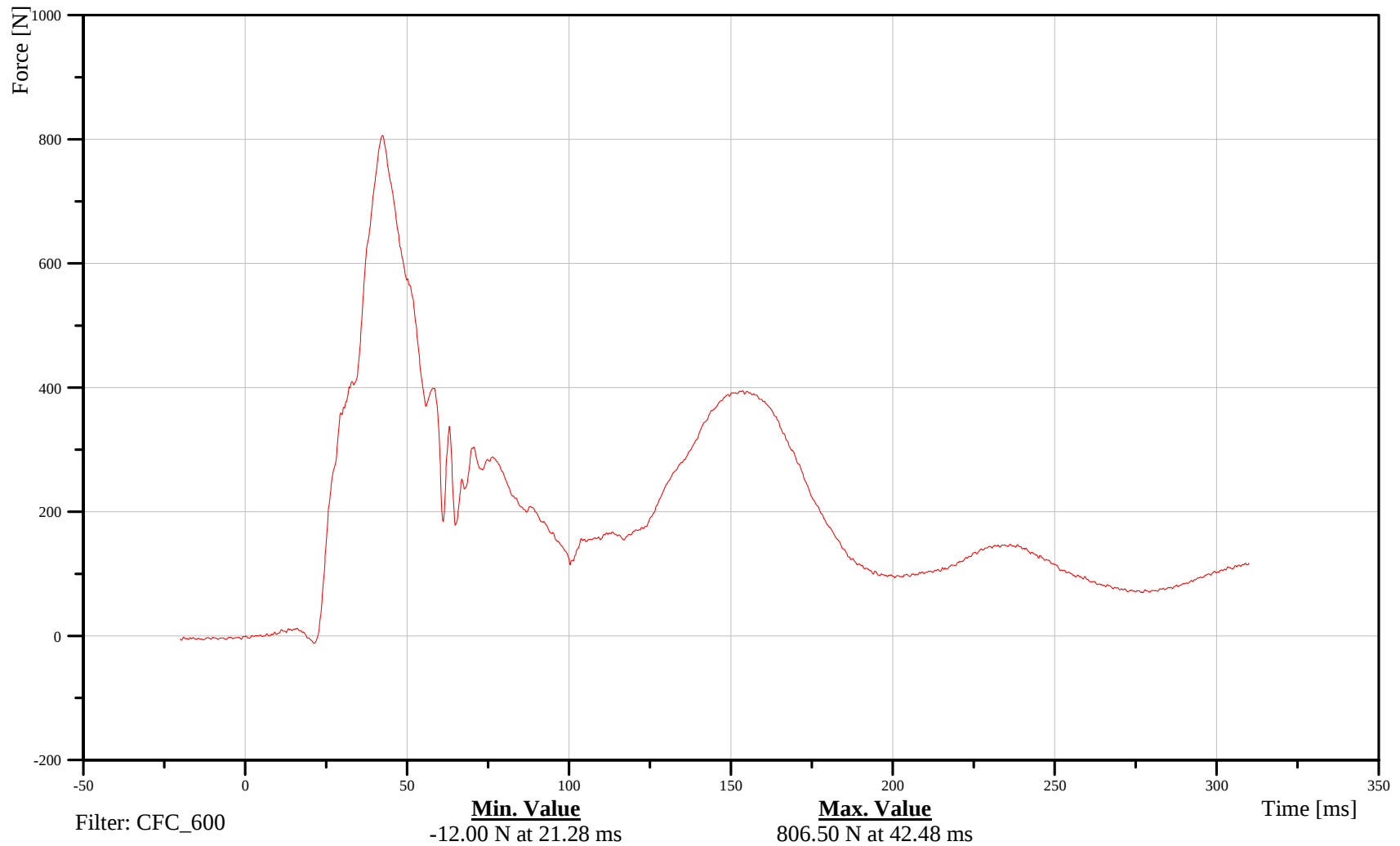
Left Femur X-Axis Force

Customer: VRTC

11FEMRLL00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-90

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

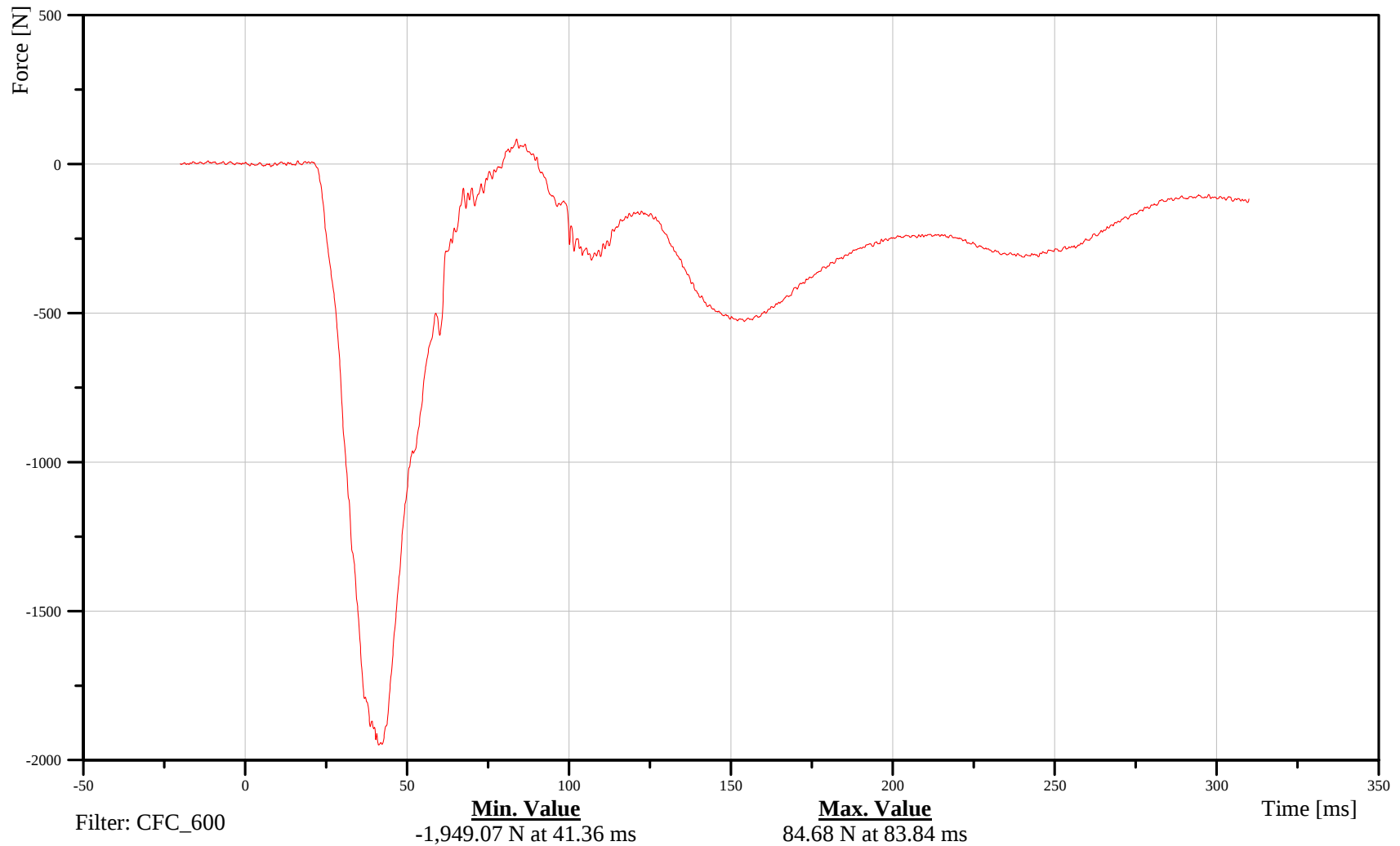
Left Femur Y-Axis Force

Customer: VRTC

11FEMRLL00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-91

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

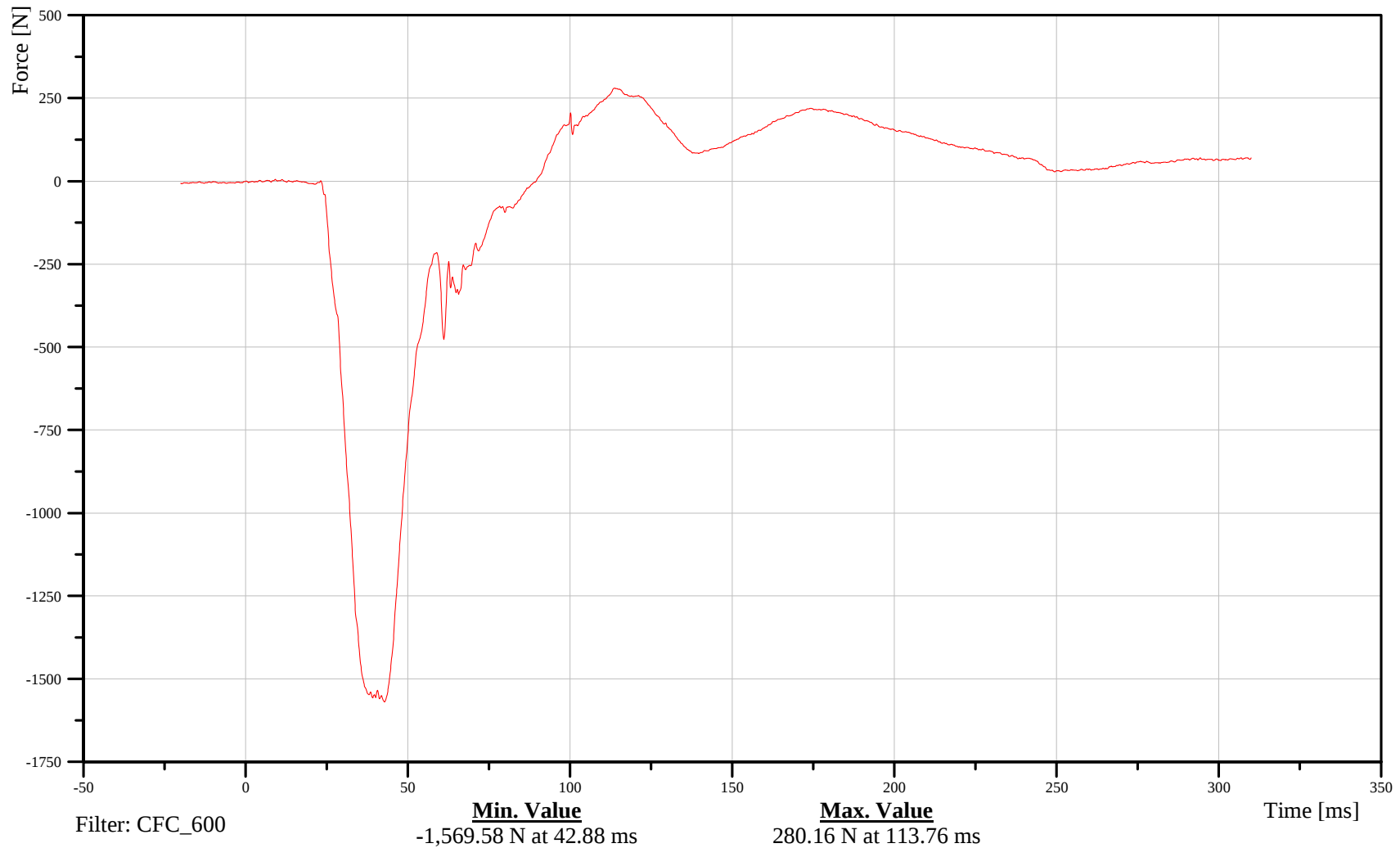
Left Femur Z-Axis Force

Customer: VRTC

11FEMRLL00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-92

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

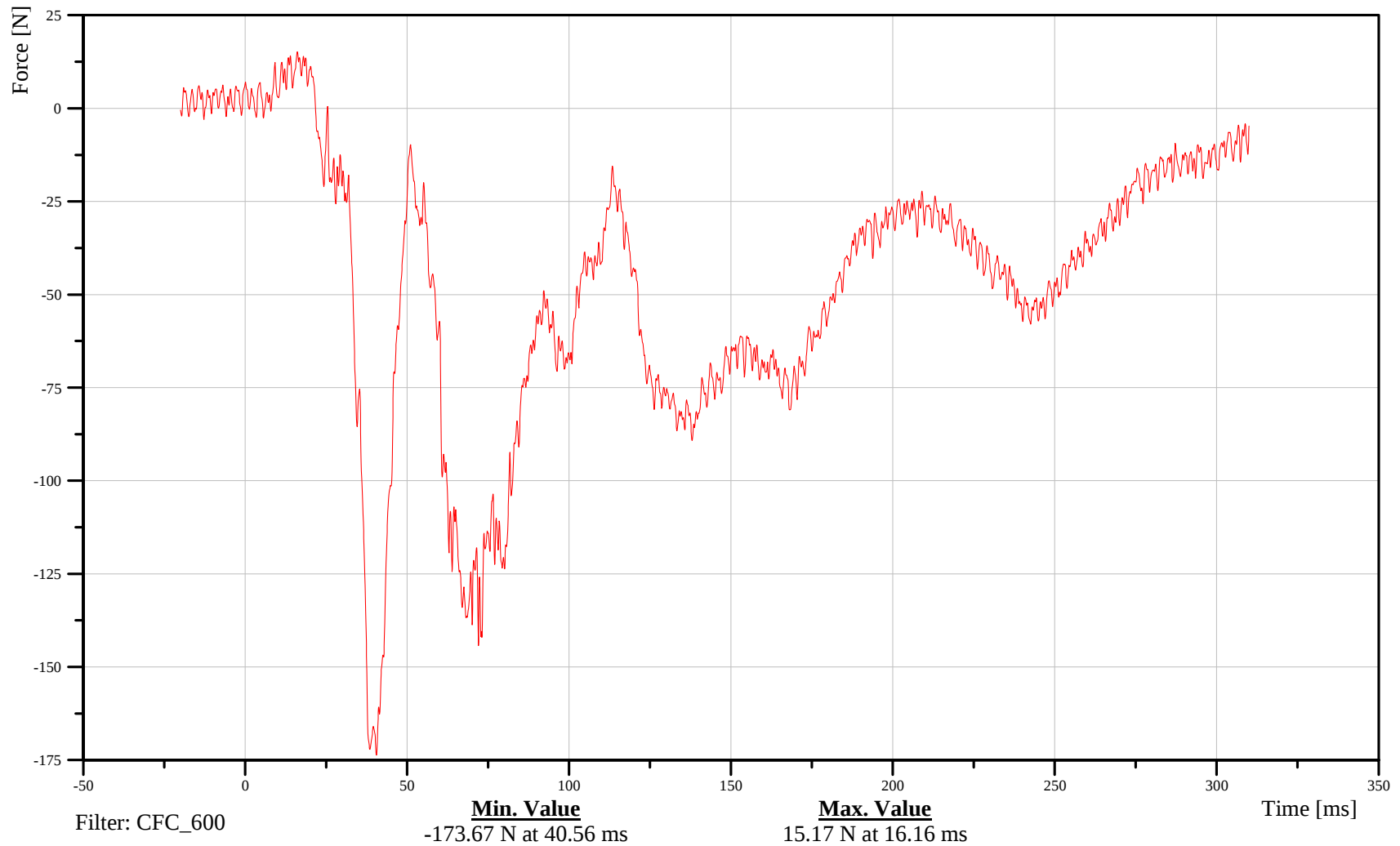
Left Mid Femur X-Axis Force

Customer: VRTC

11FEMRLEMIWSFOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-93

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

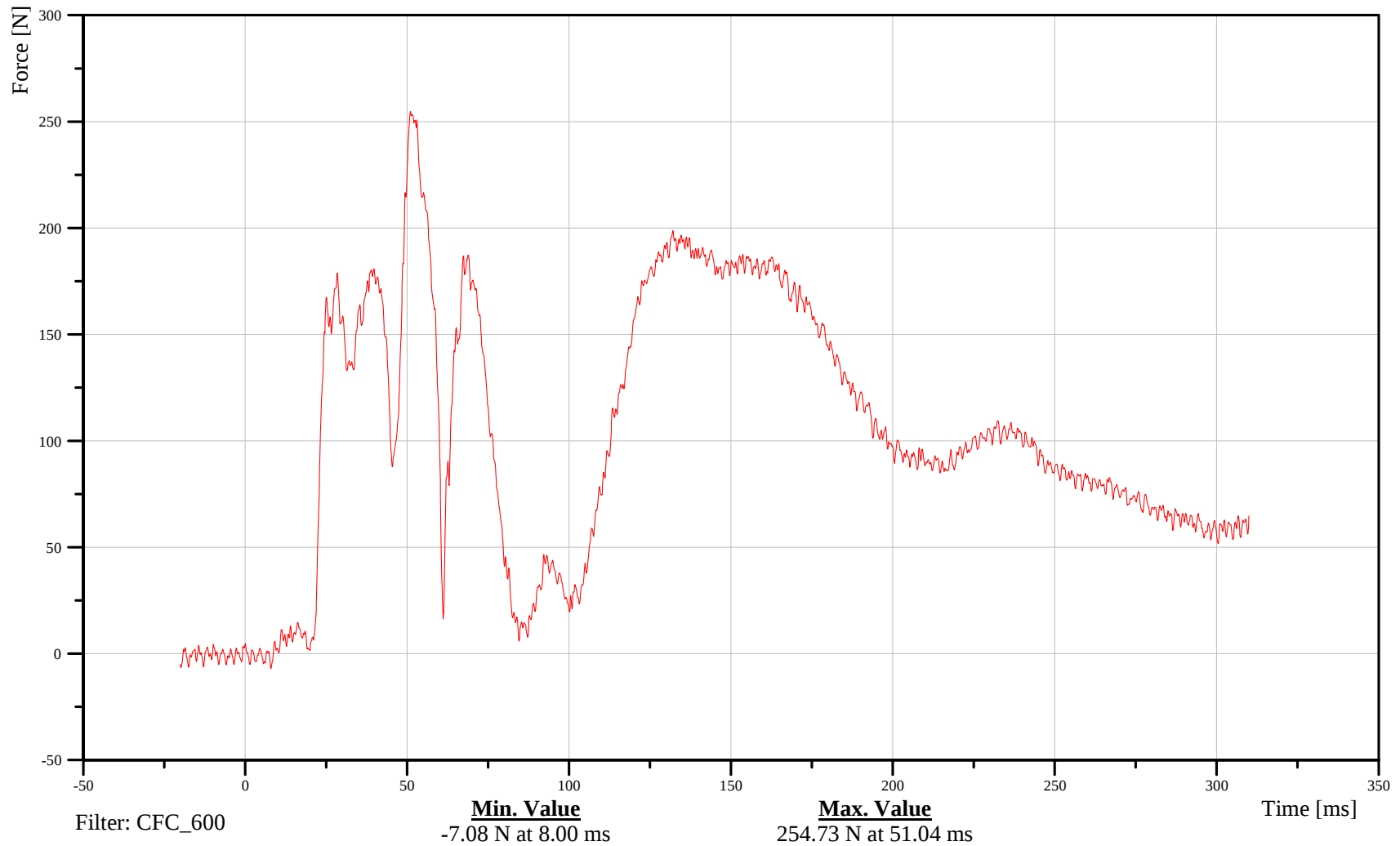
Left Mid Femur Y-Axis Force

Customer: VRTC

11FEMRLEMIWSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-94

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

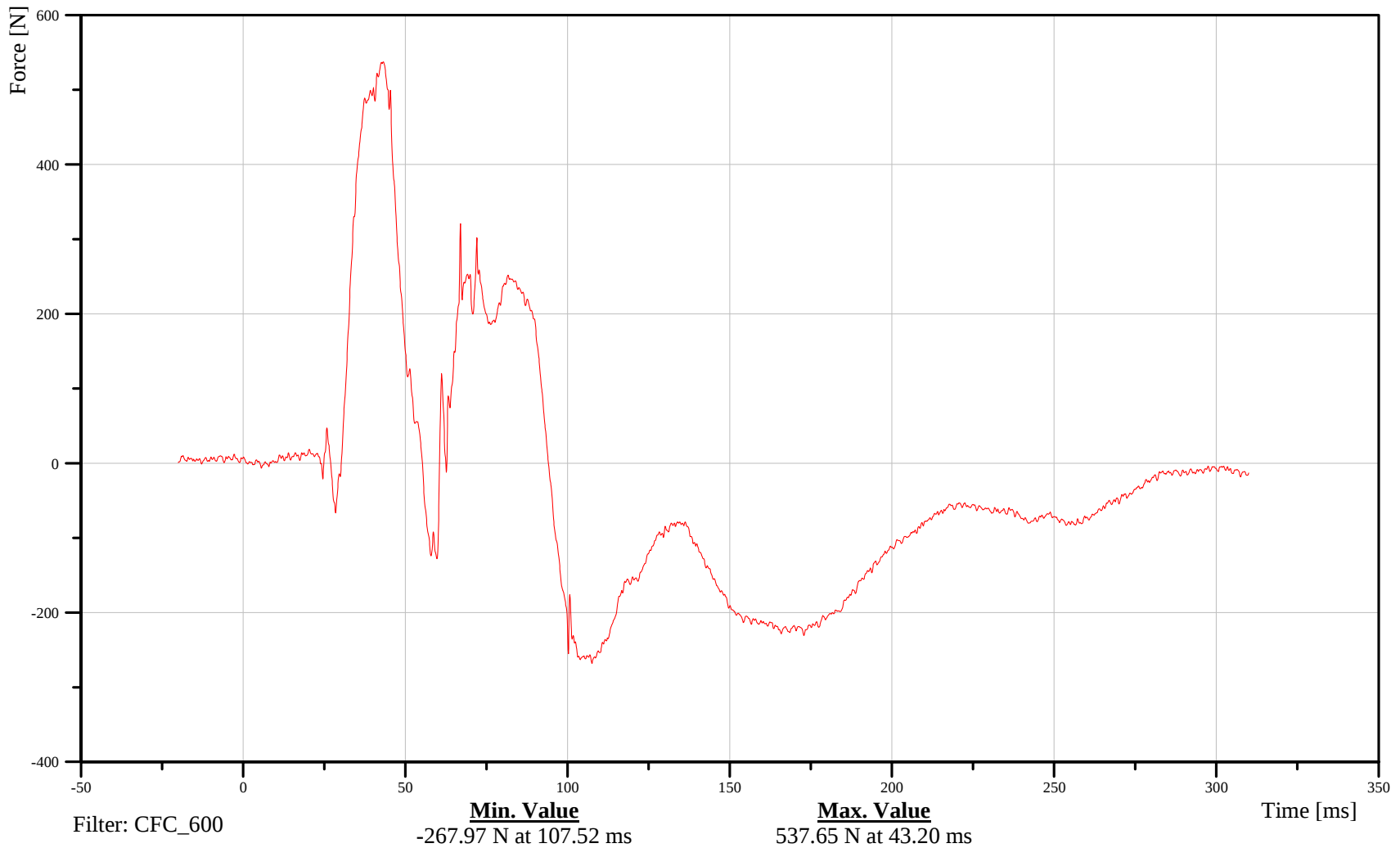
Left Mid Femur Z-Axis Force

Customer: VRTC

11FEMRLEMIWSFOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-95

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

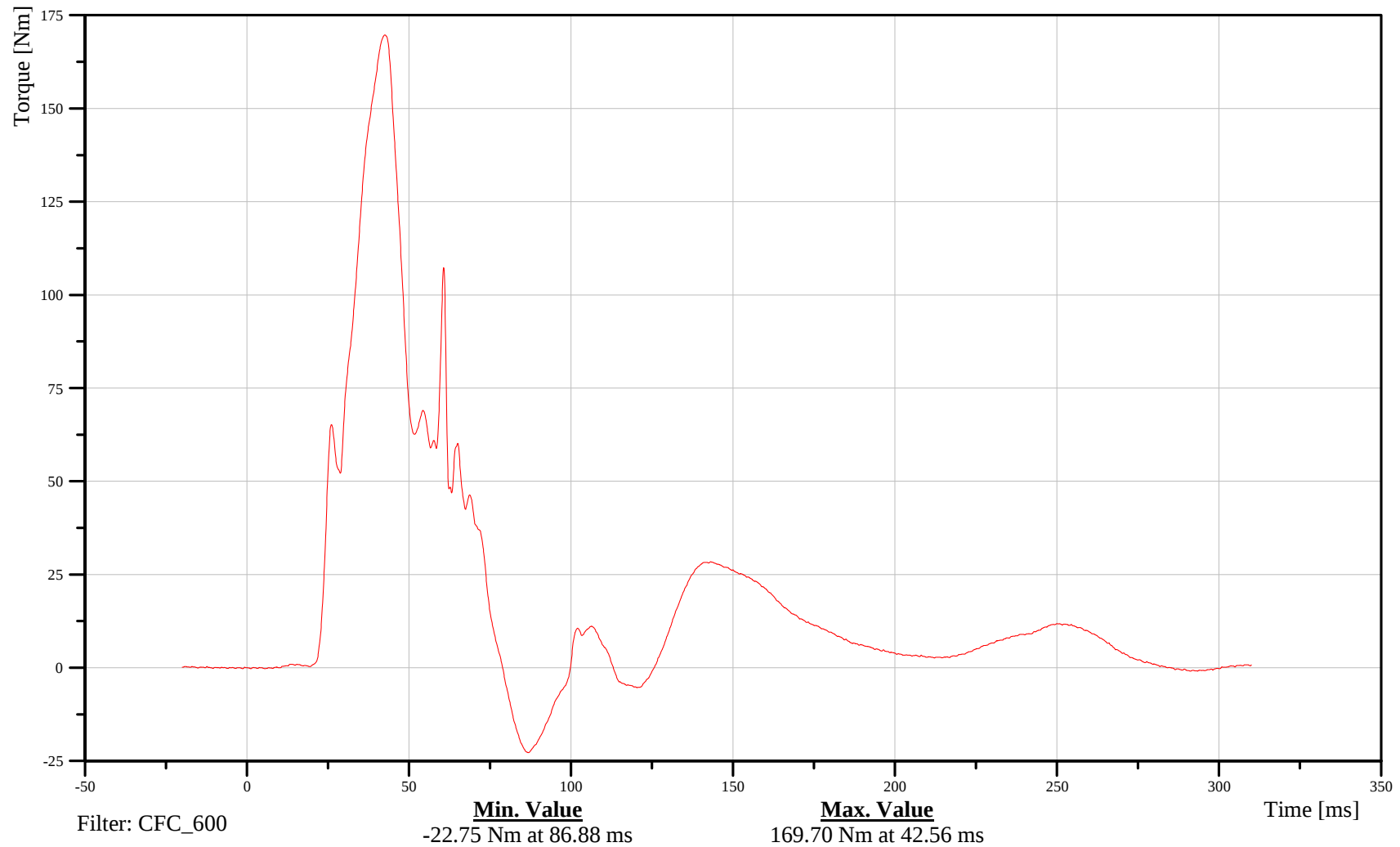
Left Mid Femur Moment About X Axis

Customer: VRTC

11FEMRLEMIWSMOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-96

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

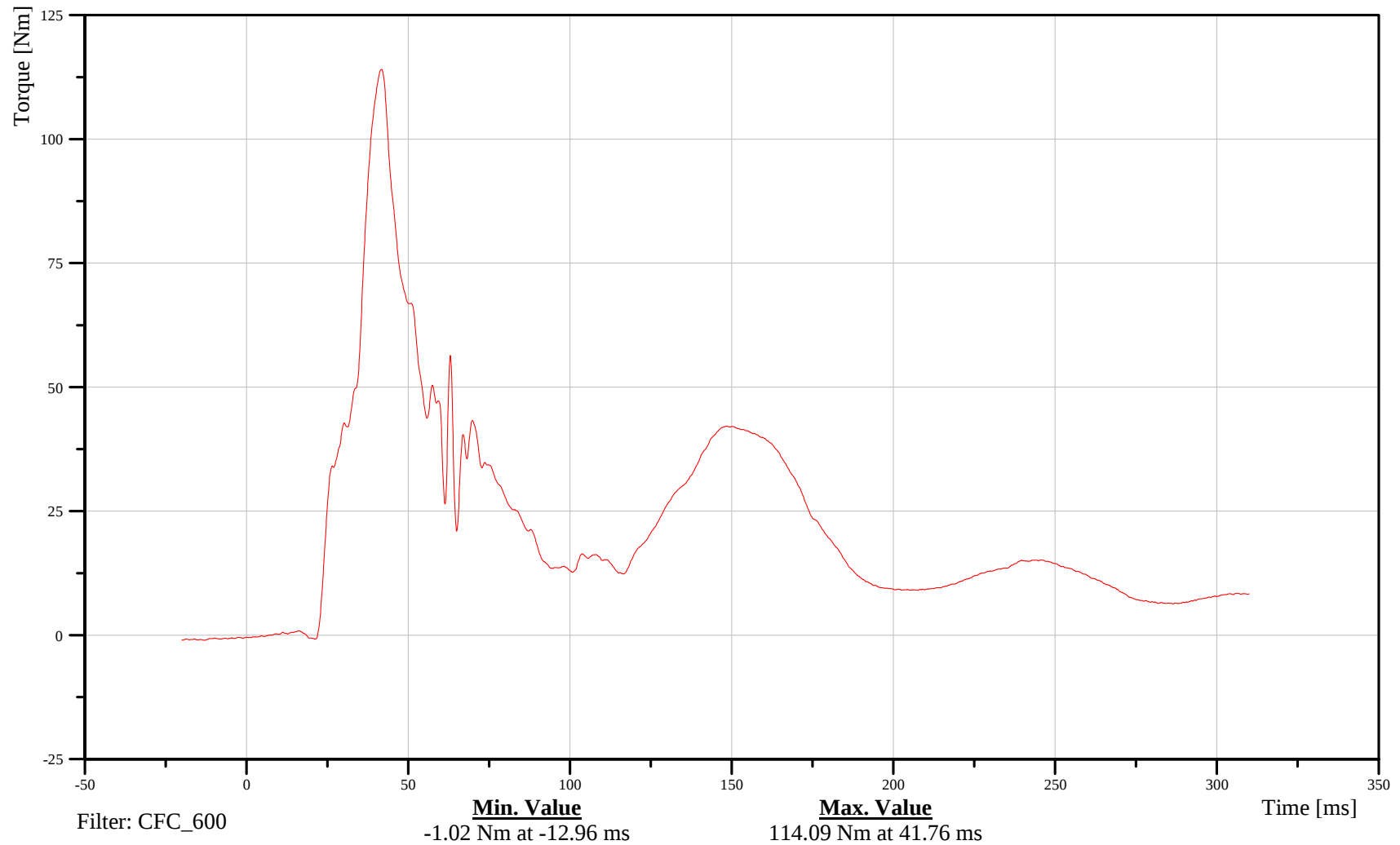
Left Mid Femur Moment About Y Axis

Customer: VRTC

11FEMRLEMIWSMOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-97

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

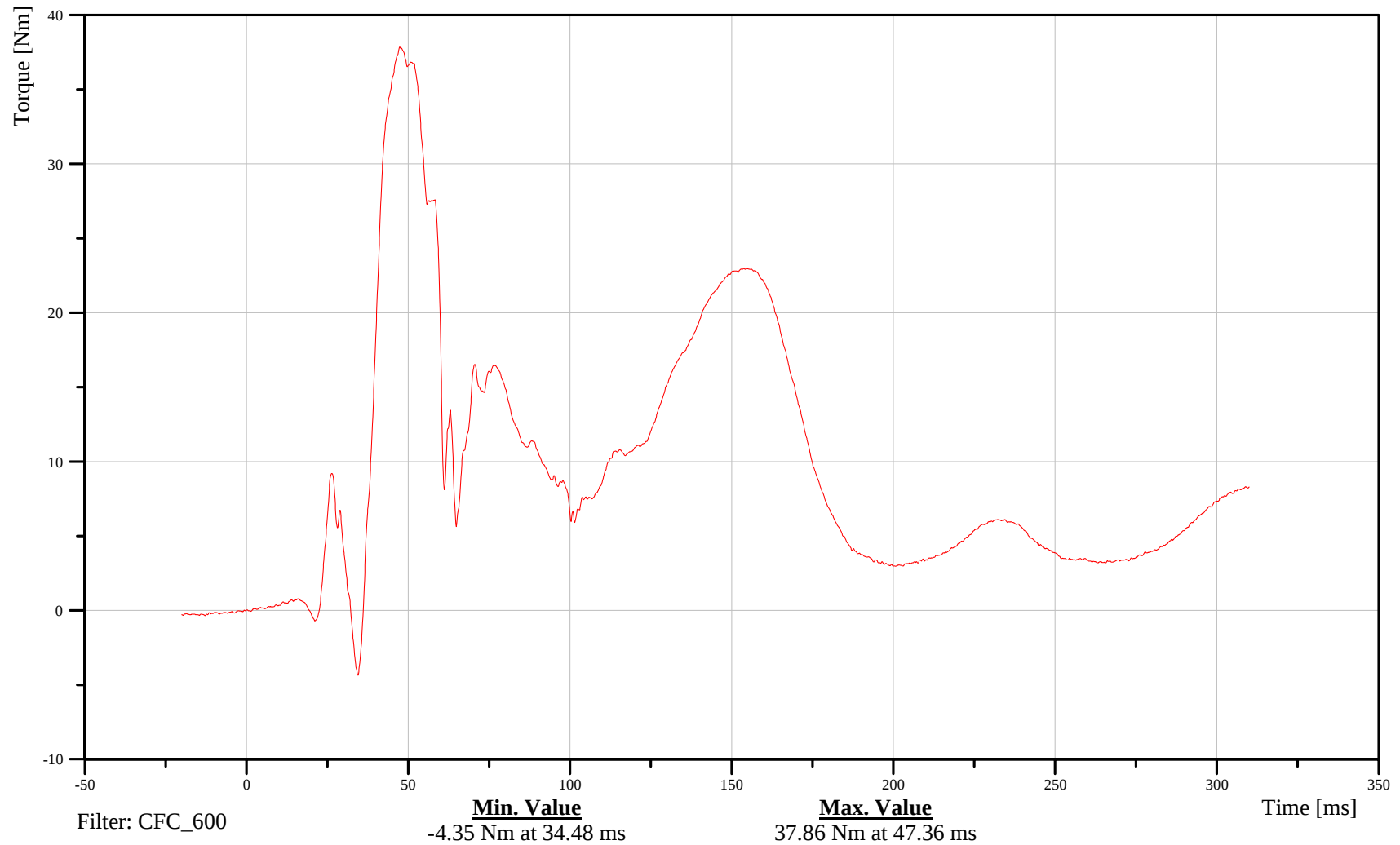
Left Mid Femur Moment About Z Axis

Customer: VRTC

11FEMRLEMIWSMOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-98

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

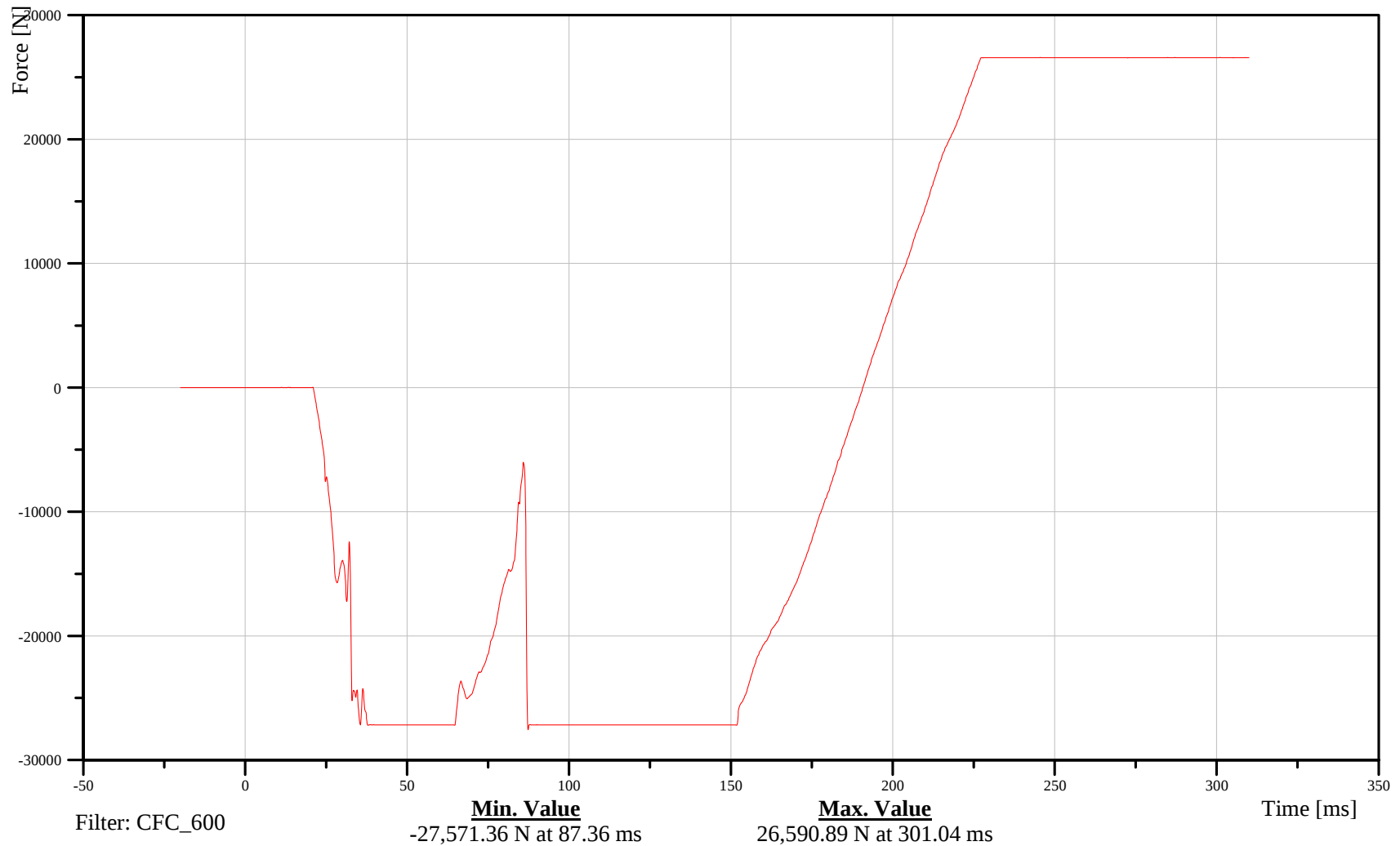
Left Knee Inboard Y-Axis Force

Customer: VRTC

11KNEERIOUWSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-99

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

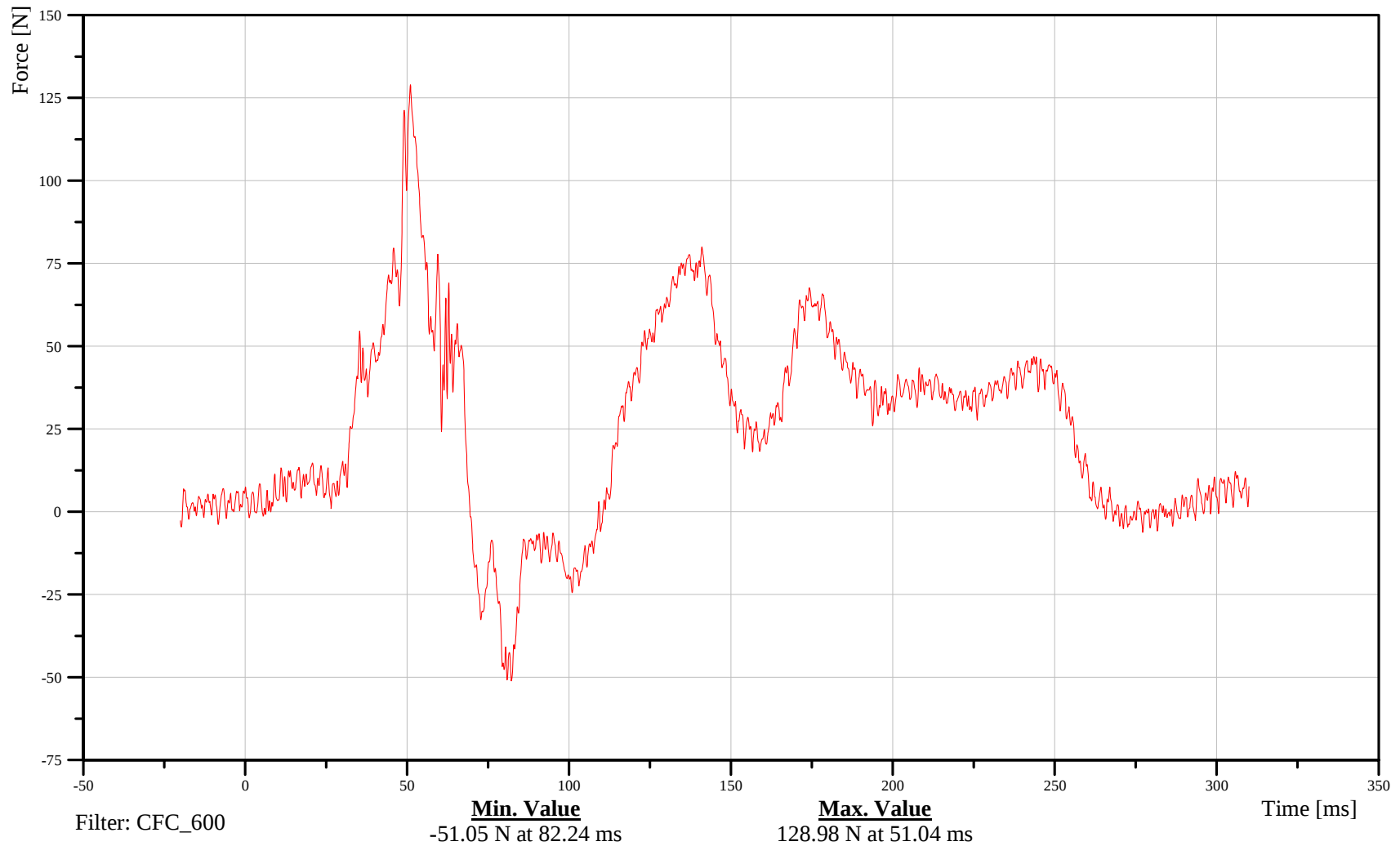
Right Mid Femur X-Axis Force

Customer: VRTC

11FEMRRIMIWSFOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-100

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

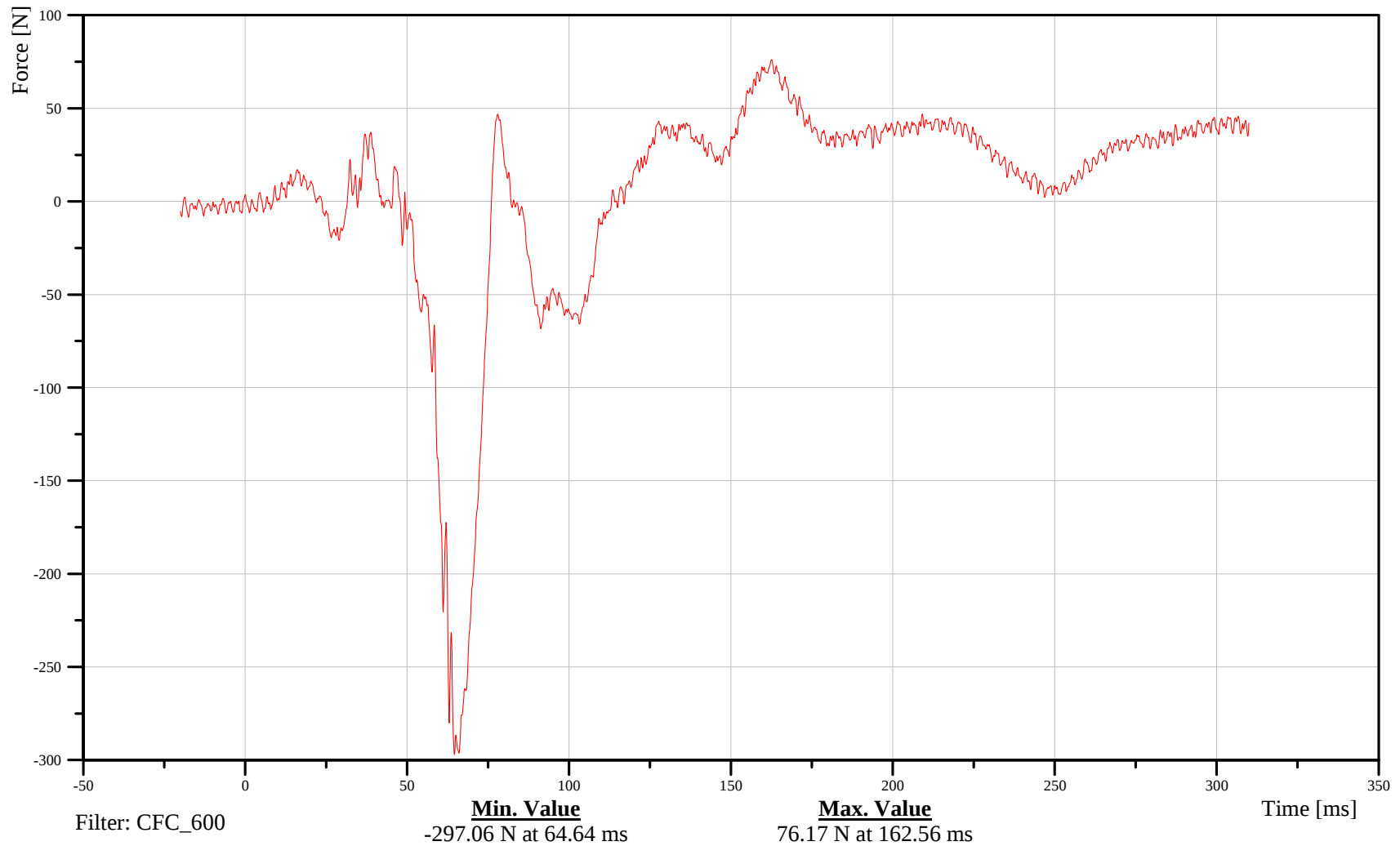
Right Mid Femur Y-Axis Force

Customer: VRTC

11FEMRRIMIWSFOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-101

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

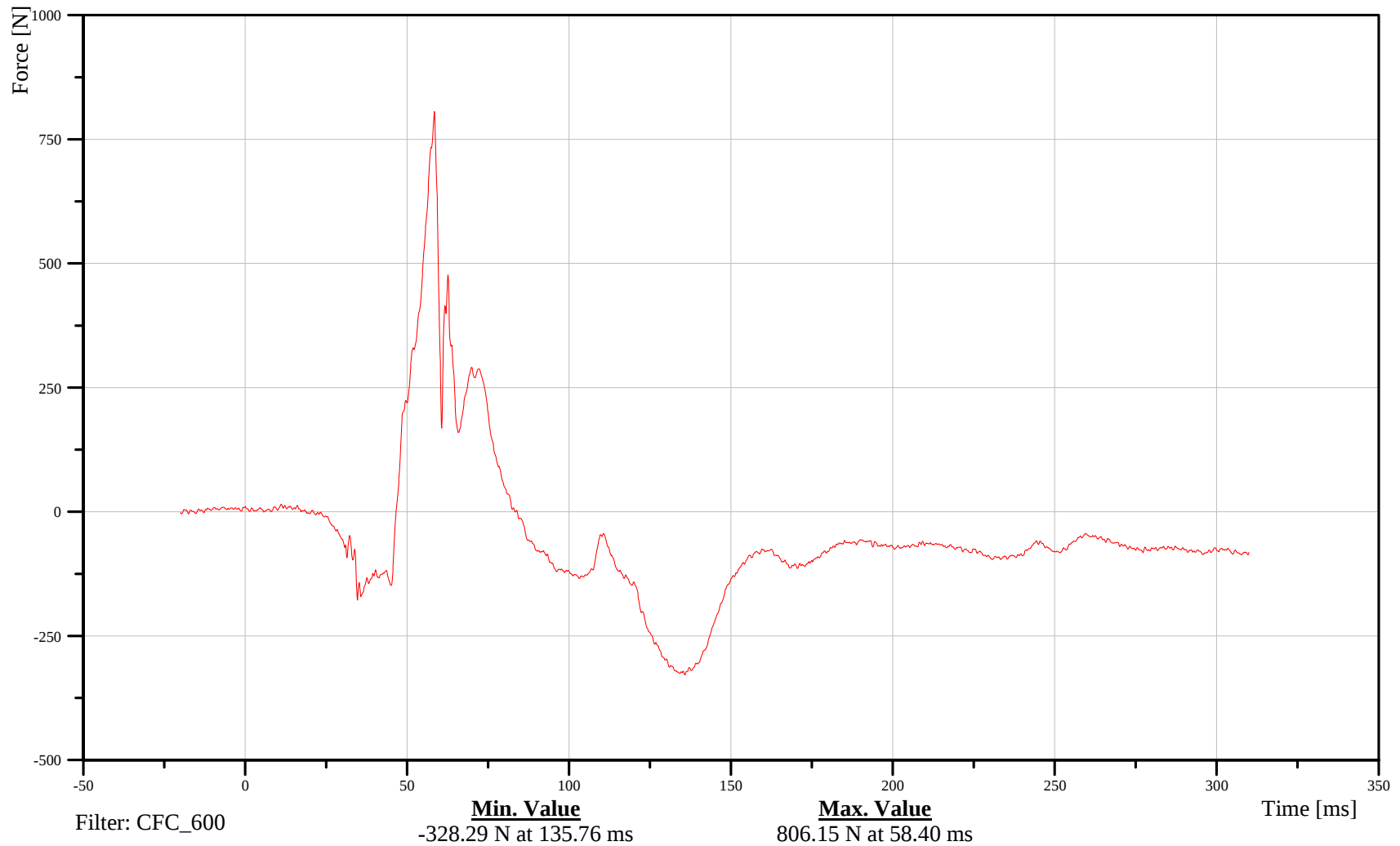
Right Mid Femur Z-Axis Force

Customer: VRTC

11FEMRRIMIWSFOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-102

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

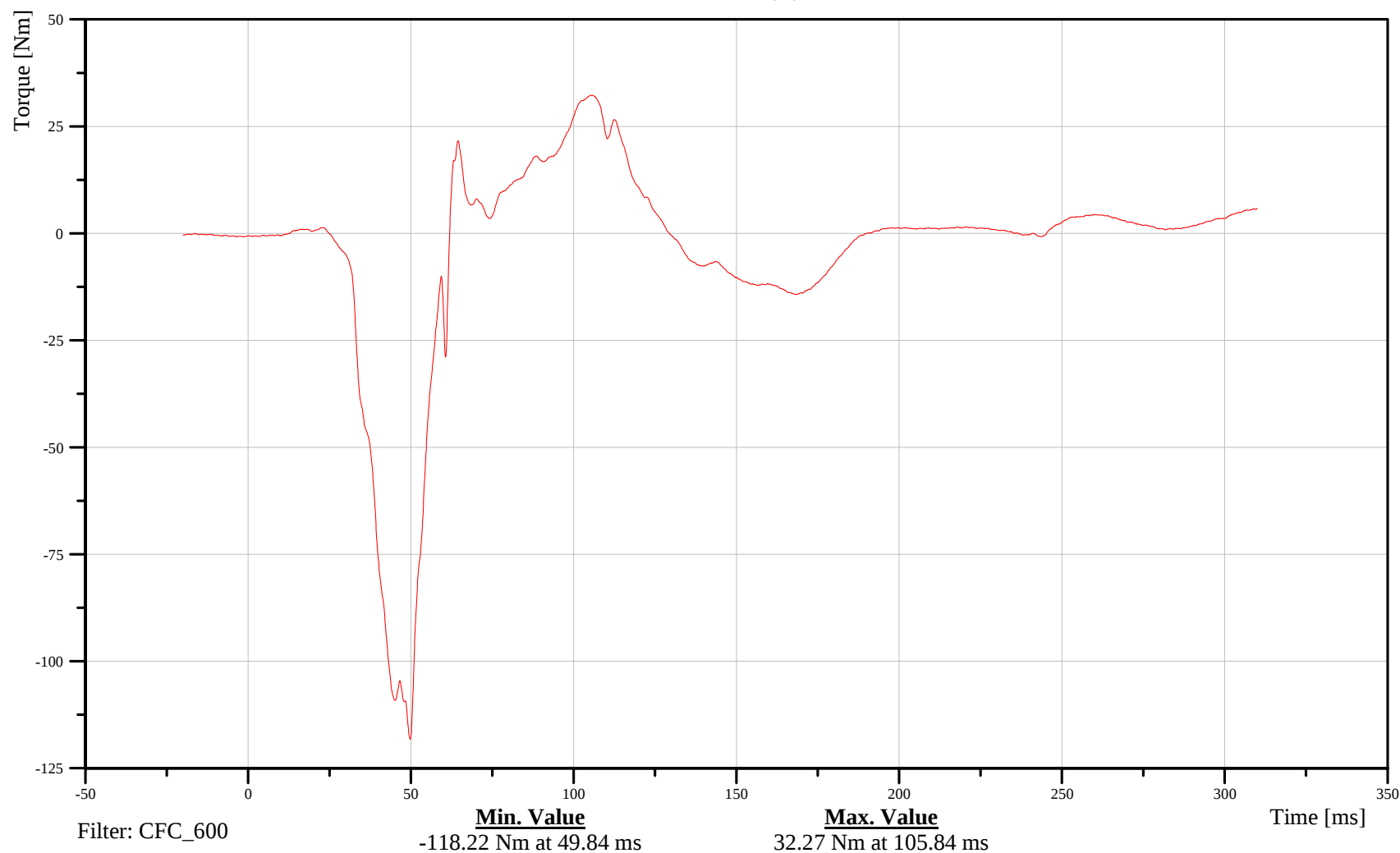
Right Mid Femur Moment About X Axis

Customer: VRTC

11FEMRRIMIWSMOXB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-103

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

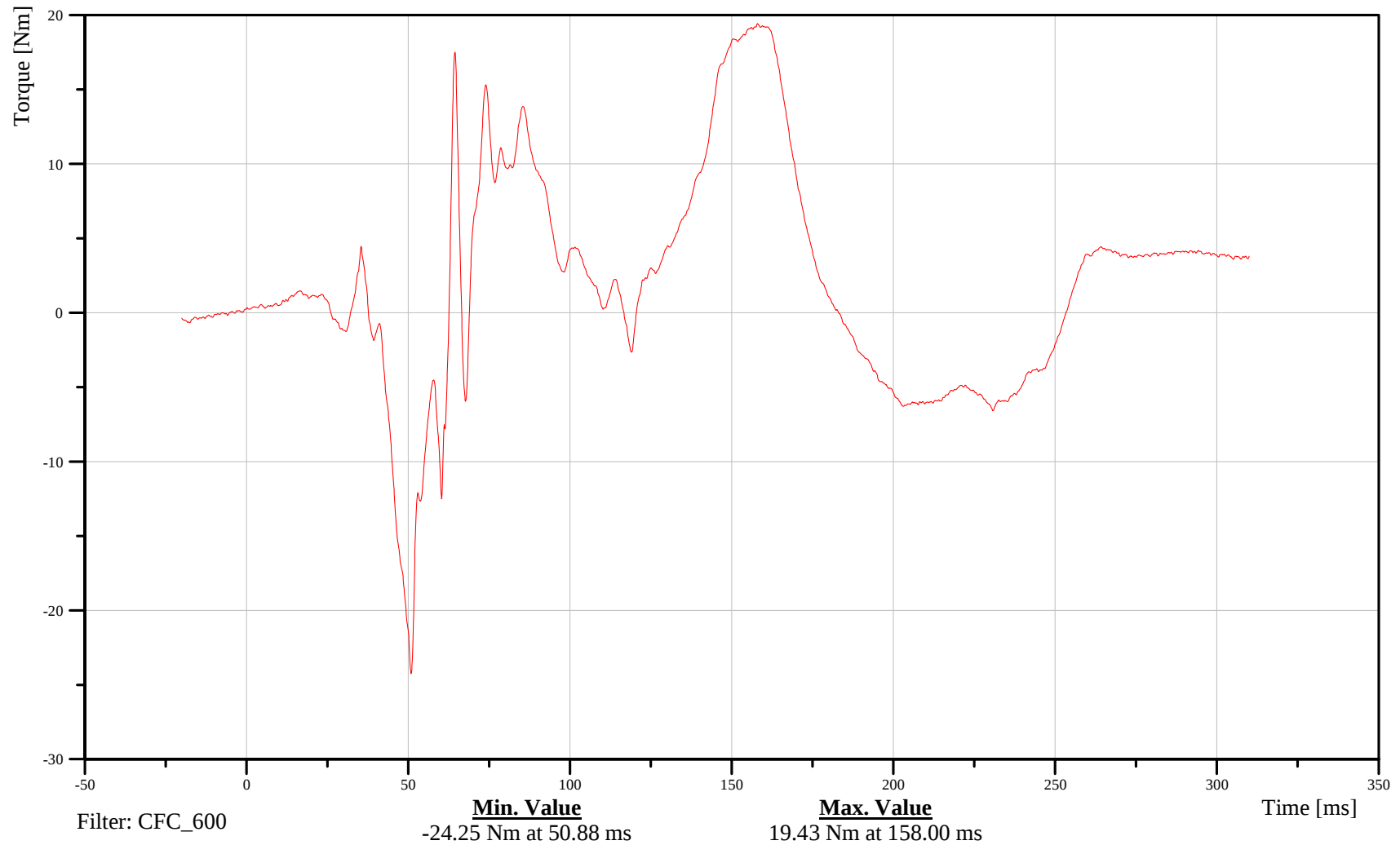
Right Mid Femur Moment About Y Axis

Customer: VRTC

11FEMRRIMIWSMOYB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-104

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

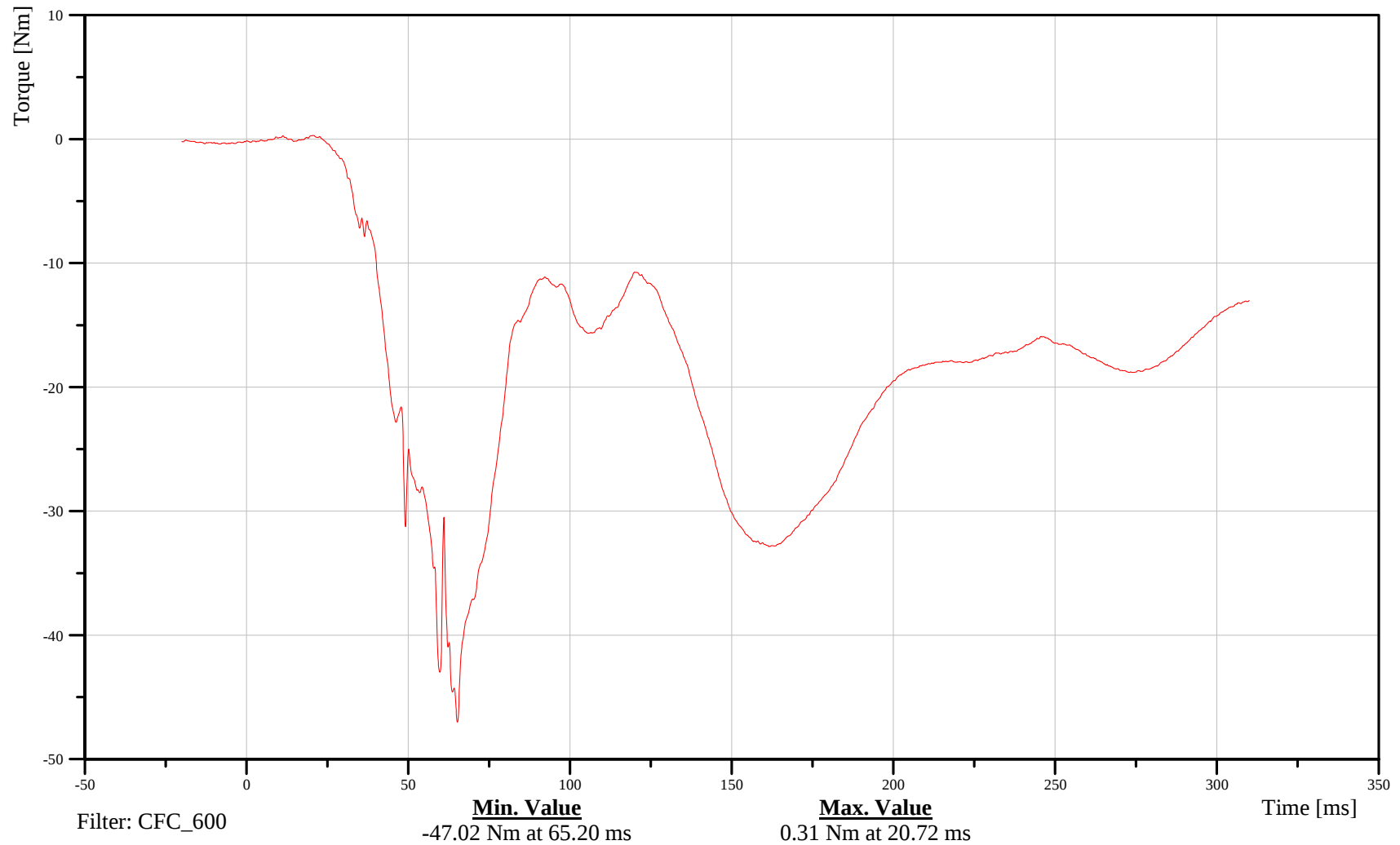
Right Mid Femur Moment About Z Axis

Customer: VRTC

11FEMRRIMIWSMOZB

TRC Inc. Test Lab: CTF

Test Number: 070806



B-105

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

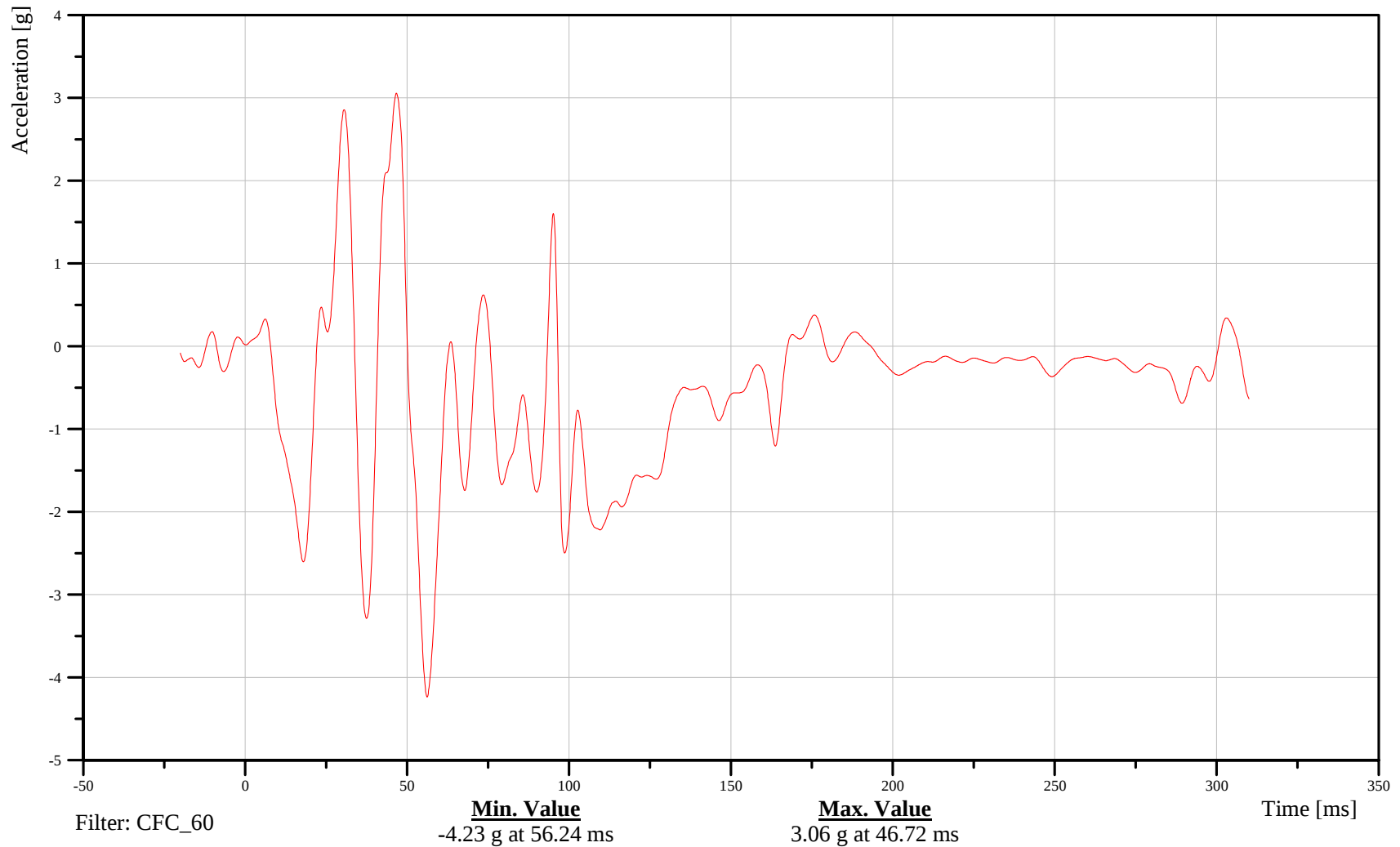
Right Side Sill at Front Seat X-Axis Acceleration

Customer: VRTC

16SILBFR0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-106

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

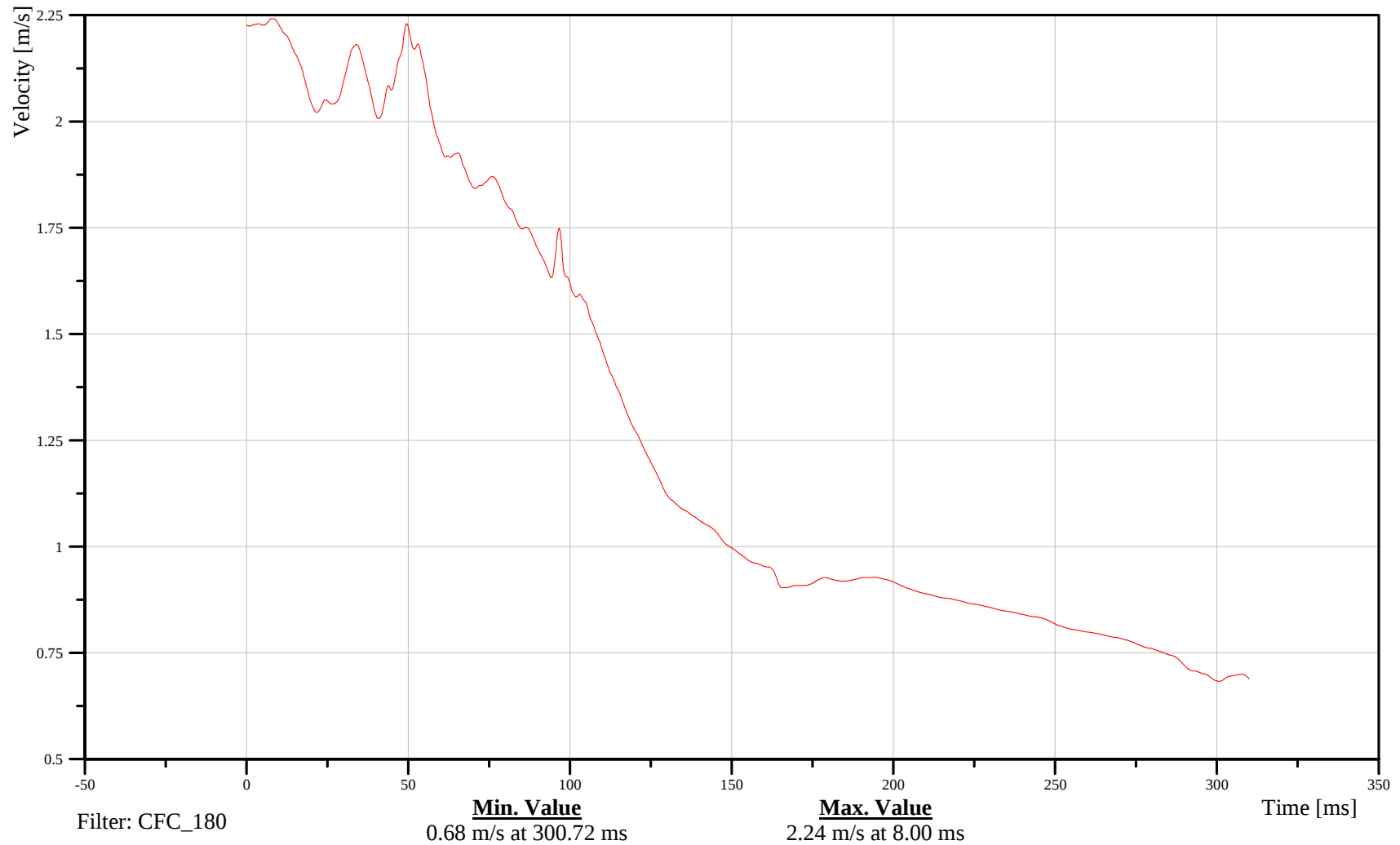
Right Side Sill at Front Seat X-Axis Velocity

Customer: VRTC

16SILBFR0000VEXC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-107

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

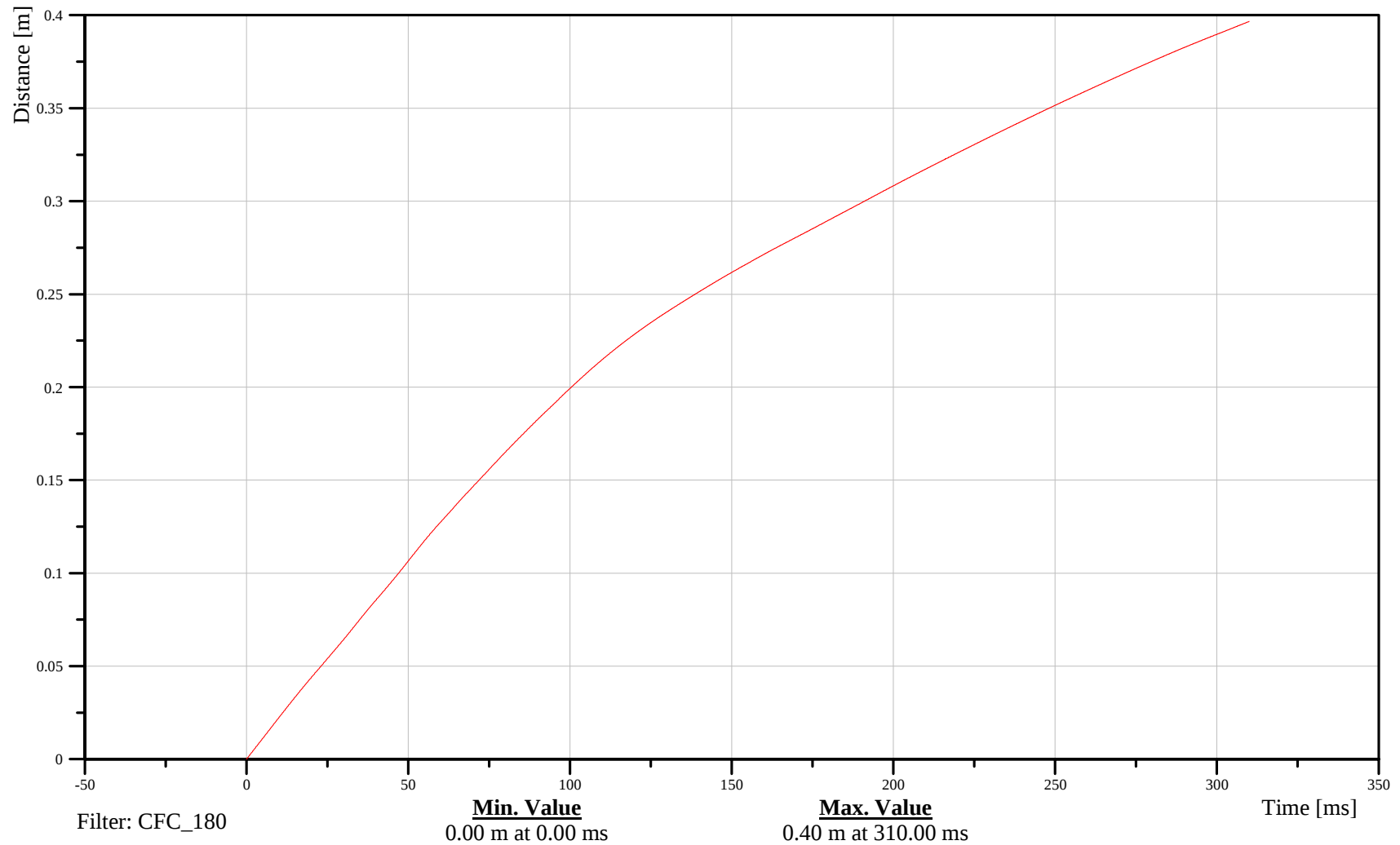
Right Side Sill at Front Seat X-Axis Displacement

Customer: VRTC

16SILBFR0000DCXC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-108

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

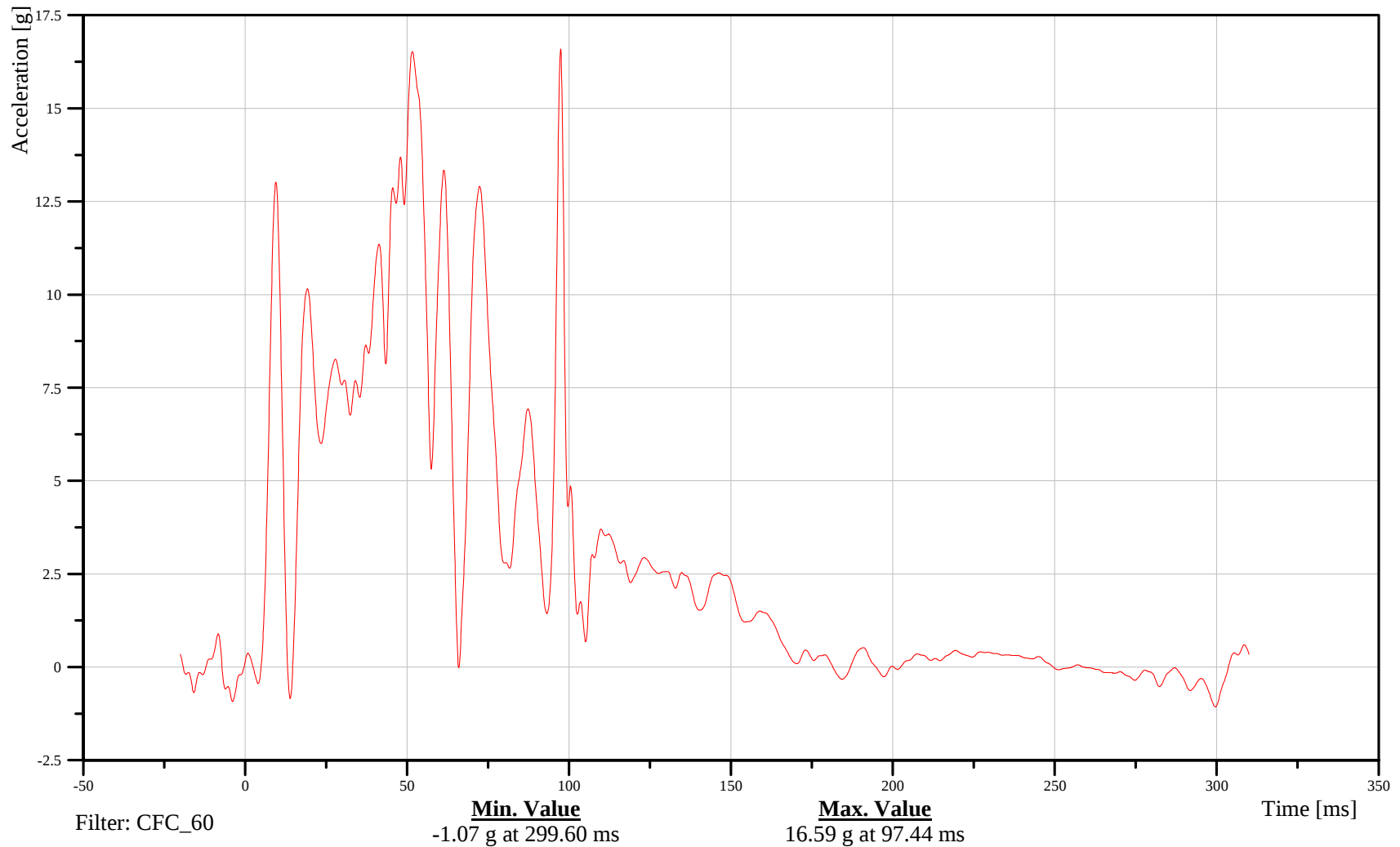
Right Side Sill at Front Seat Y-Axis Acceleration

Customer: VRTC

16SILBFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-109

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

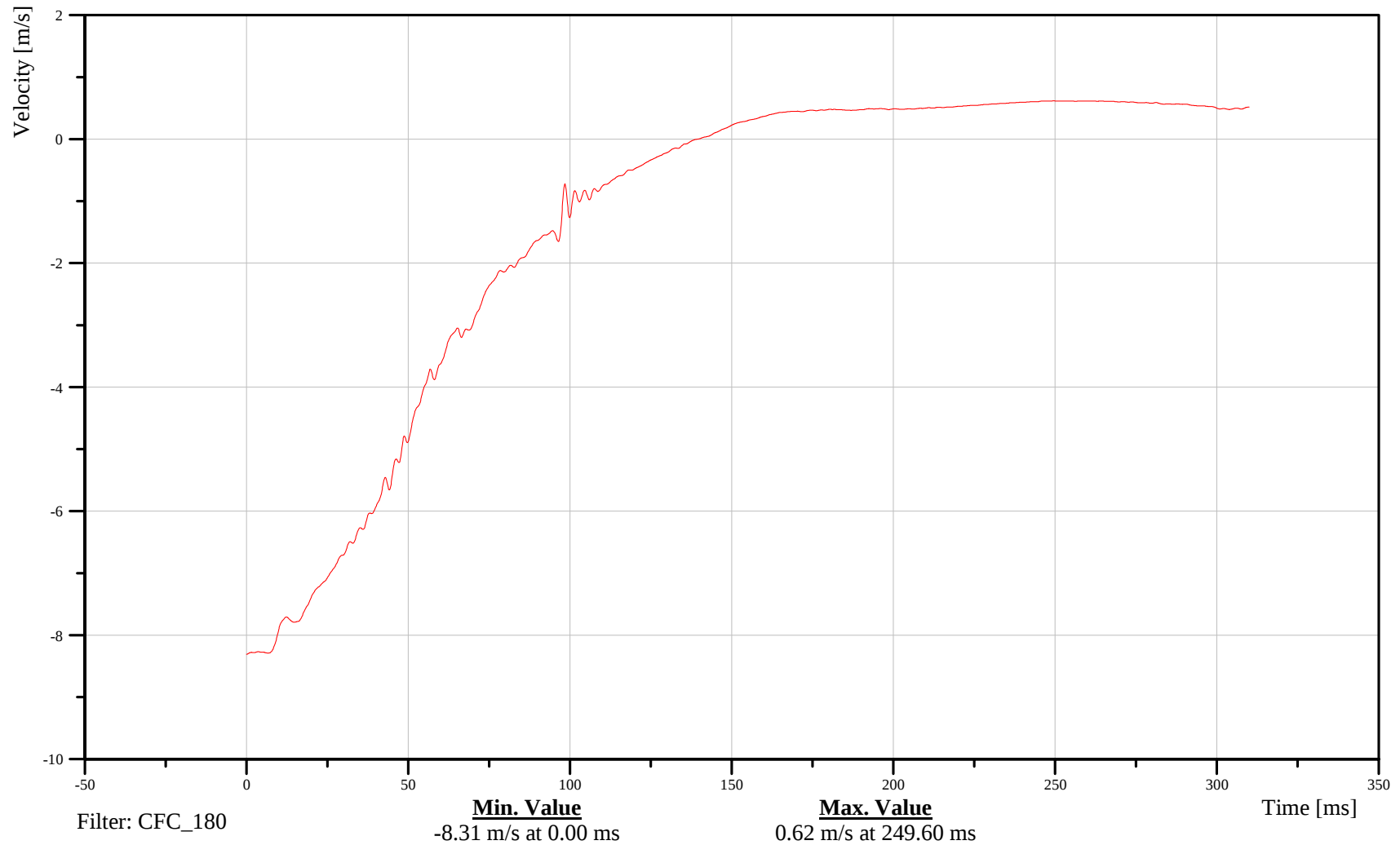
Right Side Sill at Front Seat Y-Axis Velocity

Customer: VRTC

16SILBFR0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-110

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

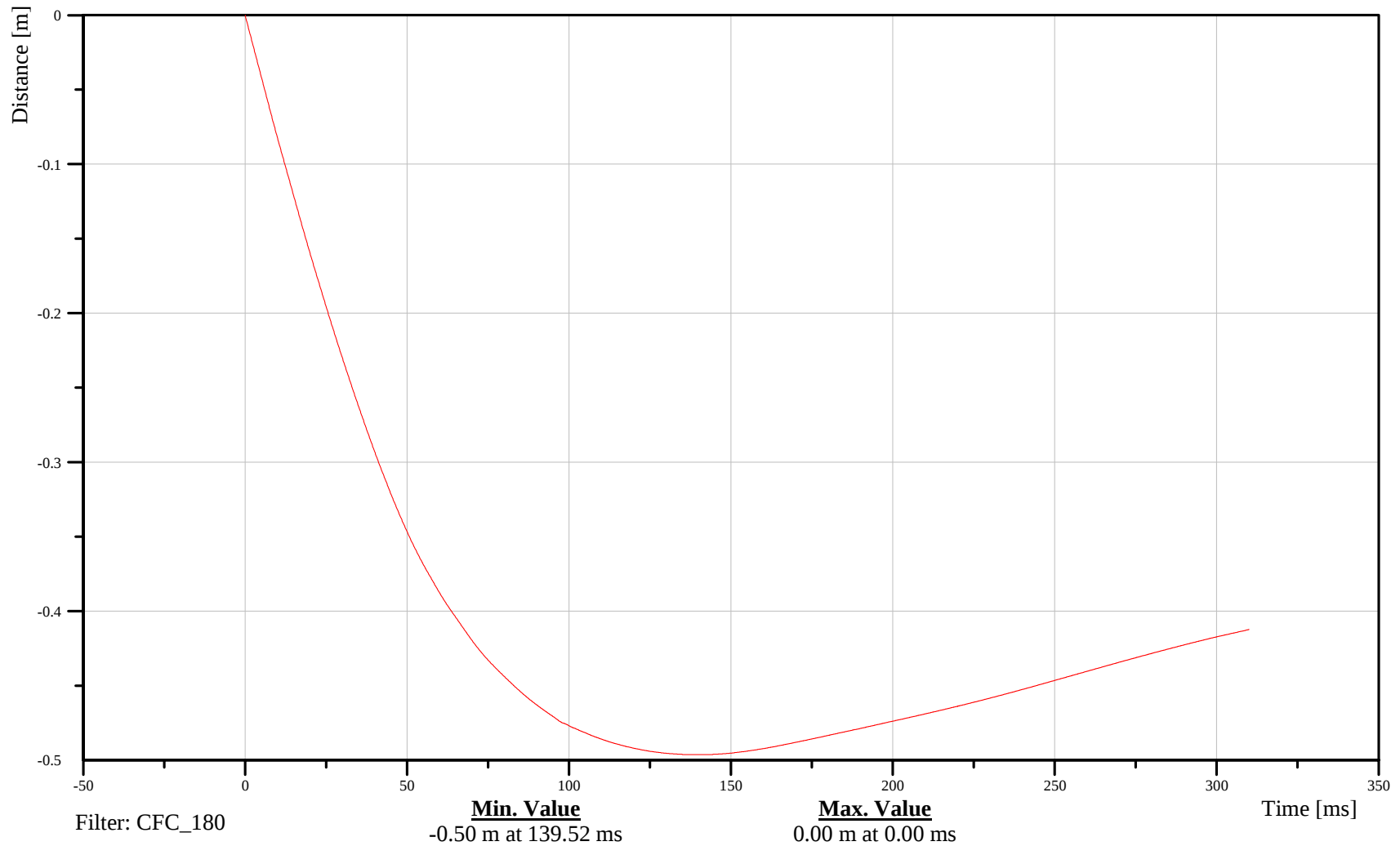
Right Side Sill at Front Seat Y-Axis Displacement

Customer: VRTC

16SILBFR0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-111

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

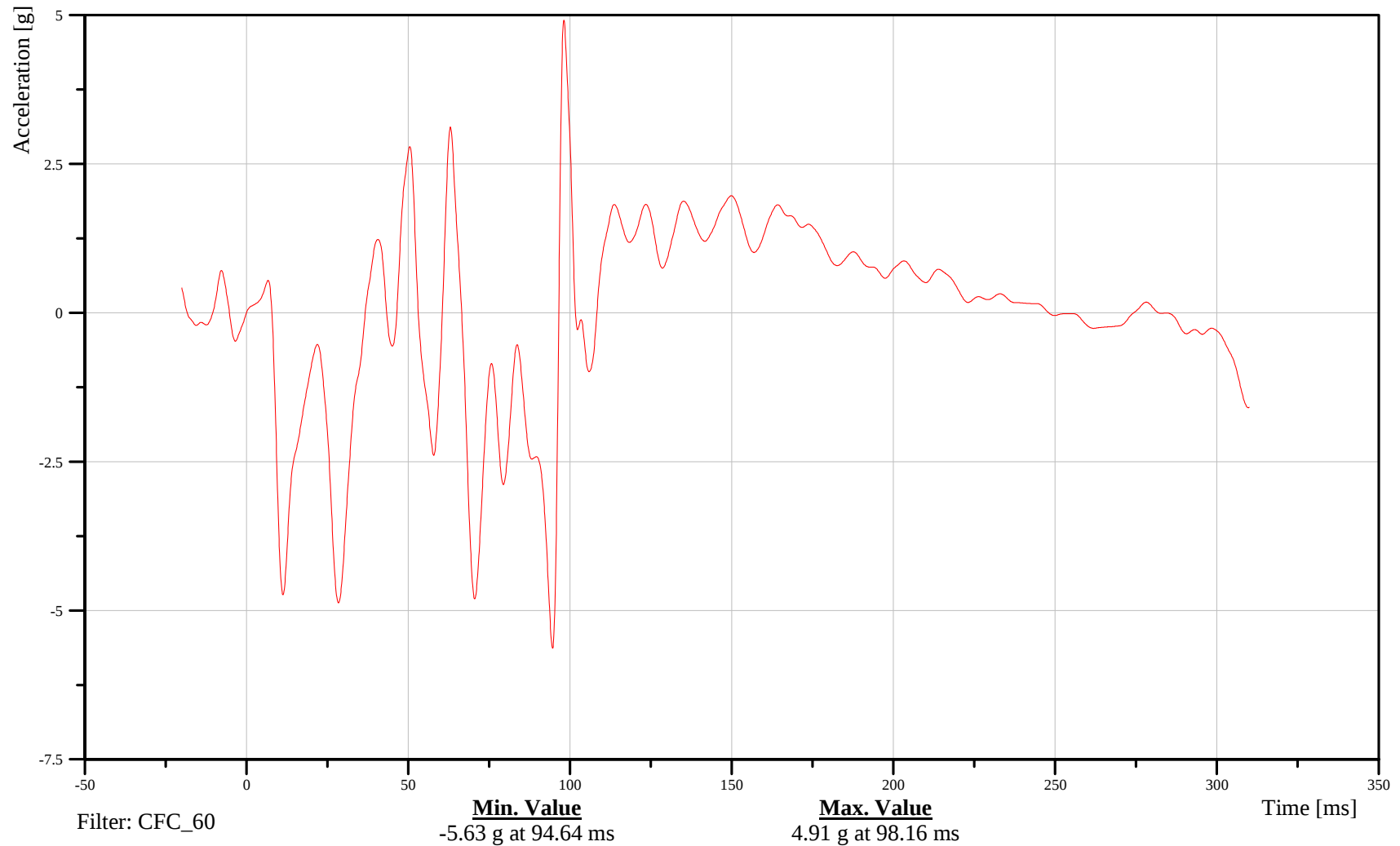
Right Side Sill at Front Seat Z-Axis Acceleration

Customer: VRTC

16SILBFR0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-112

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

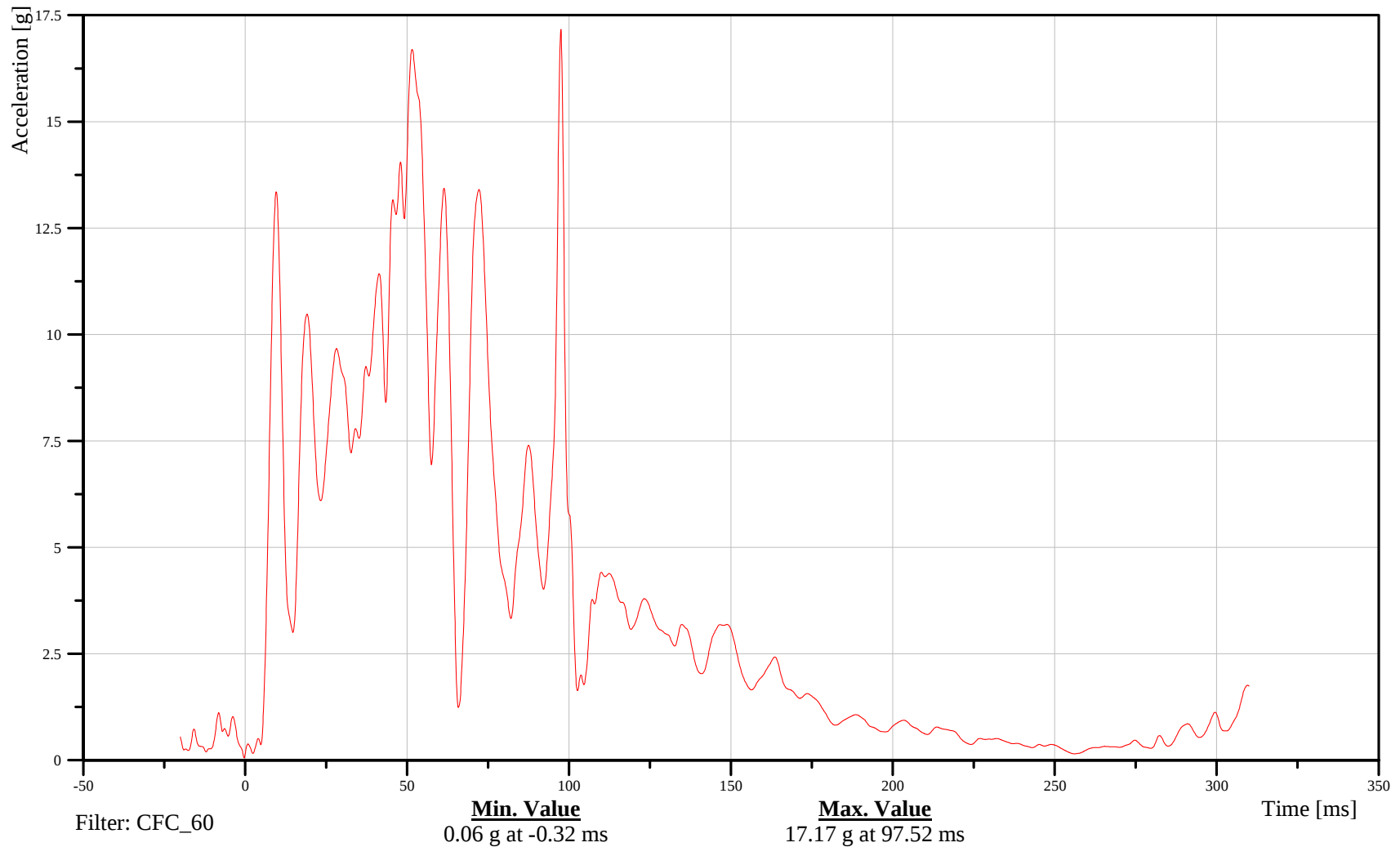
Right Side Sill at Front Seat Resultant Acceleration

Customer: VRTC

16SILBFR0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-113

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

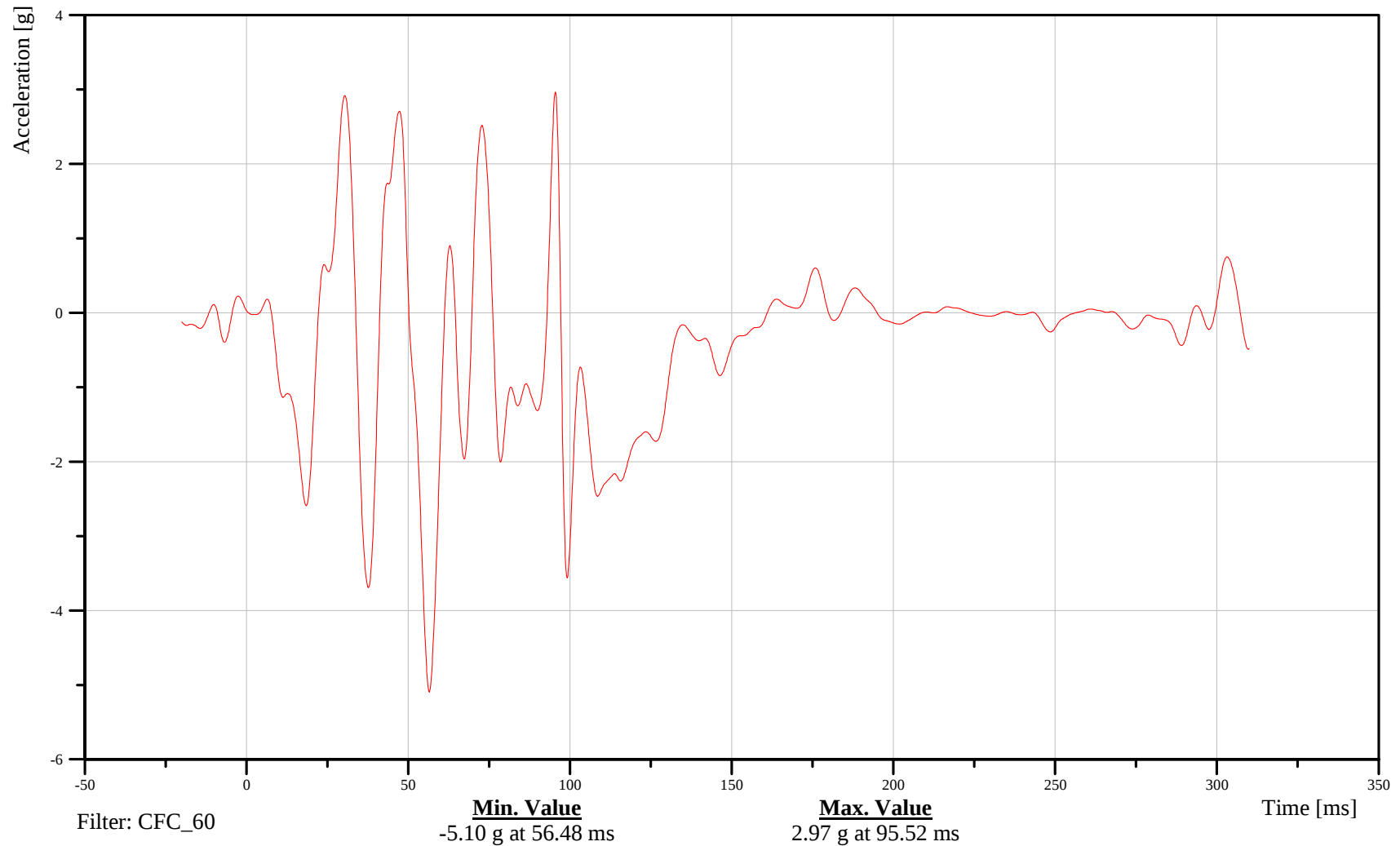
Right Side Sill at Rear Seat X-Axis Acceleration

Customer: VRTC

16SILBRE0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-114

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

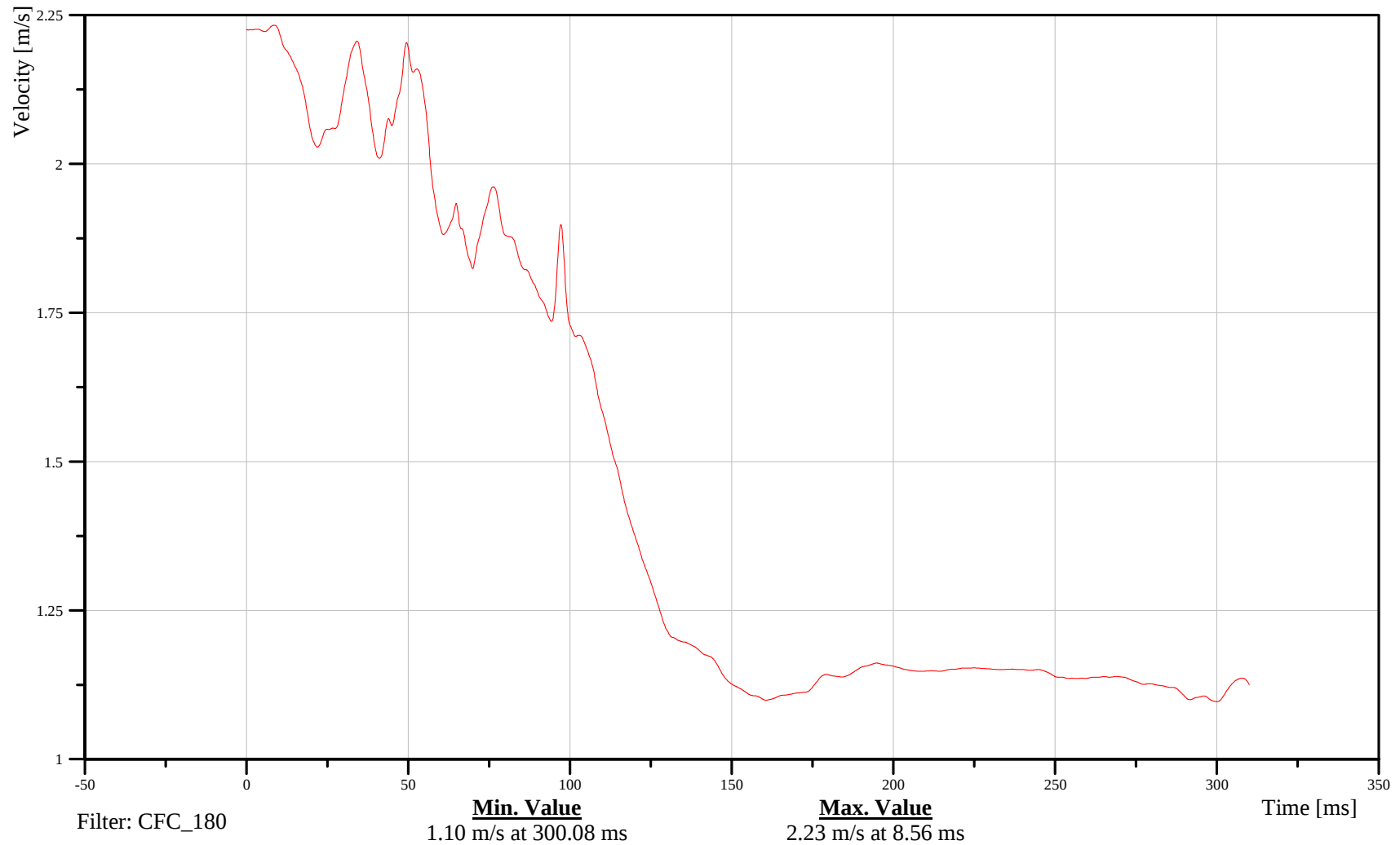
Right Side Sill at Rear Seat X-Axis Velocity

Customer: VRTC

16SILBRE0000VEXC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-115

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

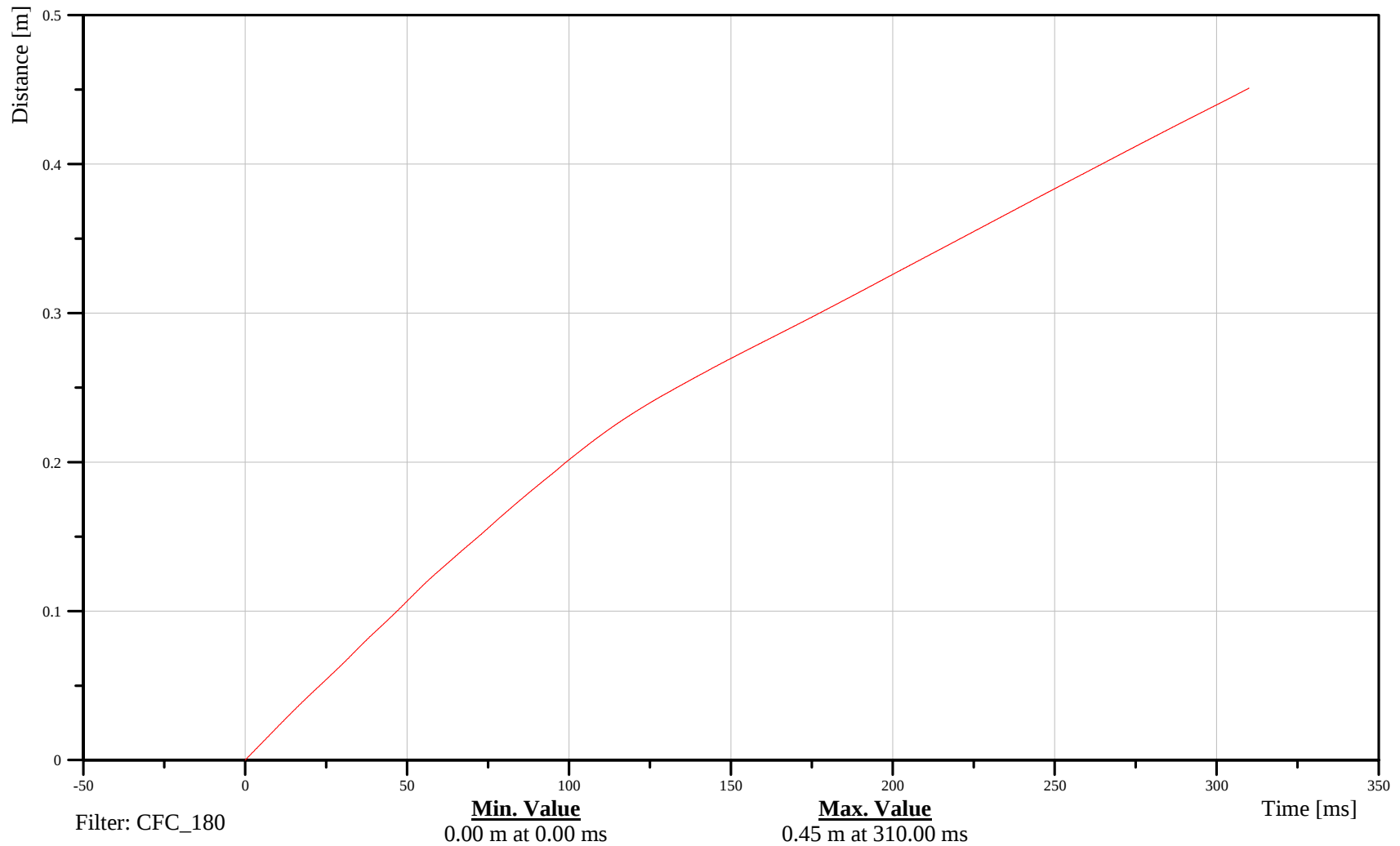
Right Side Sill at Rear Seat X-Axis Displacement

Customer: VRTC

16SILBRE0000DCXC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-116

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

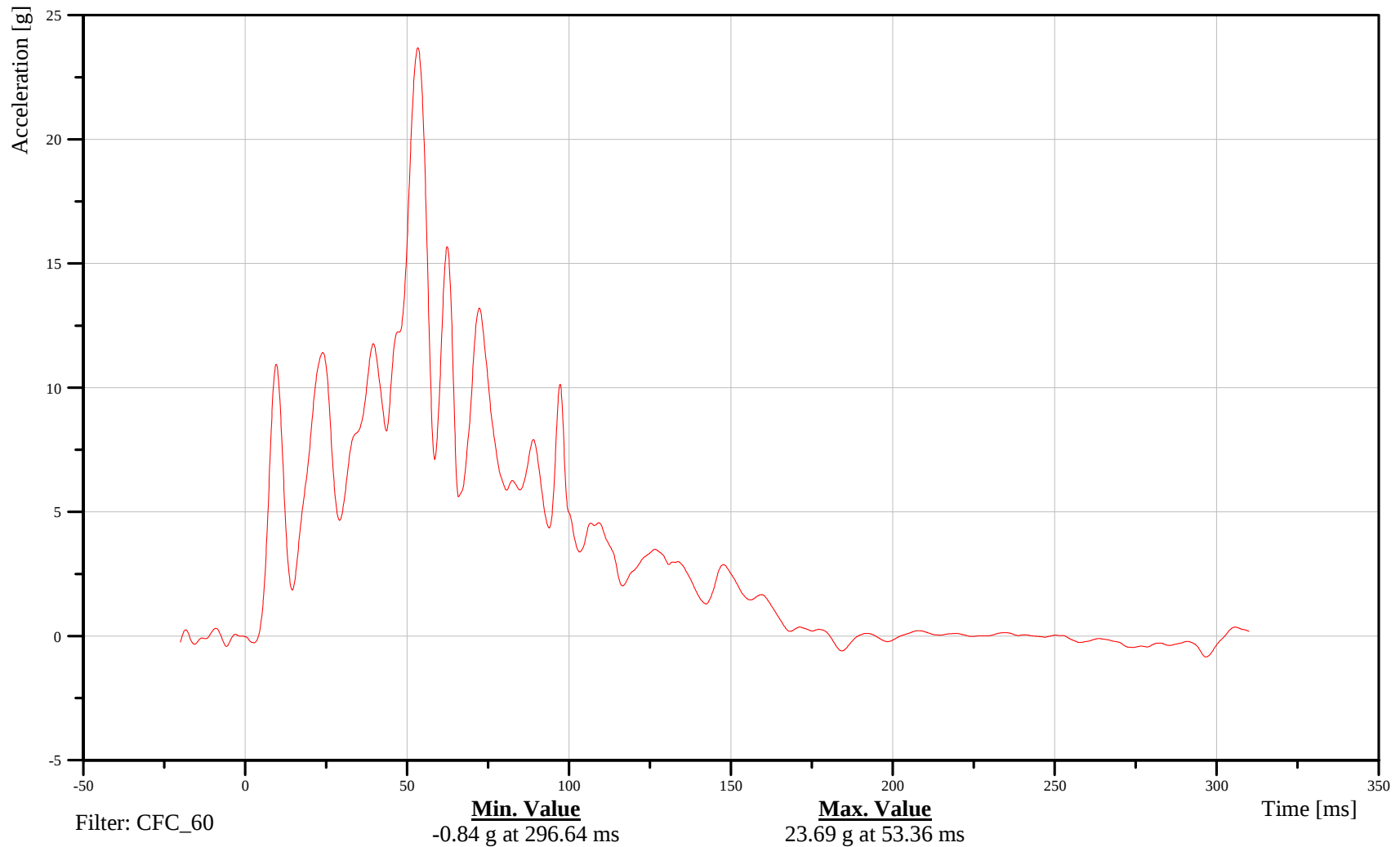
Right Side Sill at Rear Seat Y-Axis Acceleration

Customer: VRTC

16SILBRE0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-117

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

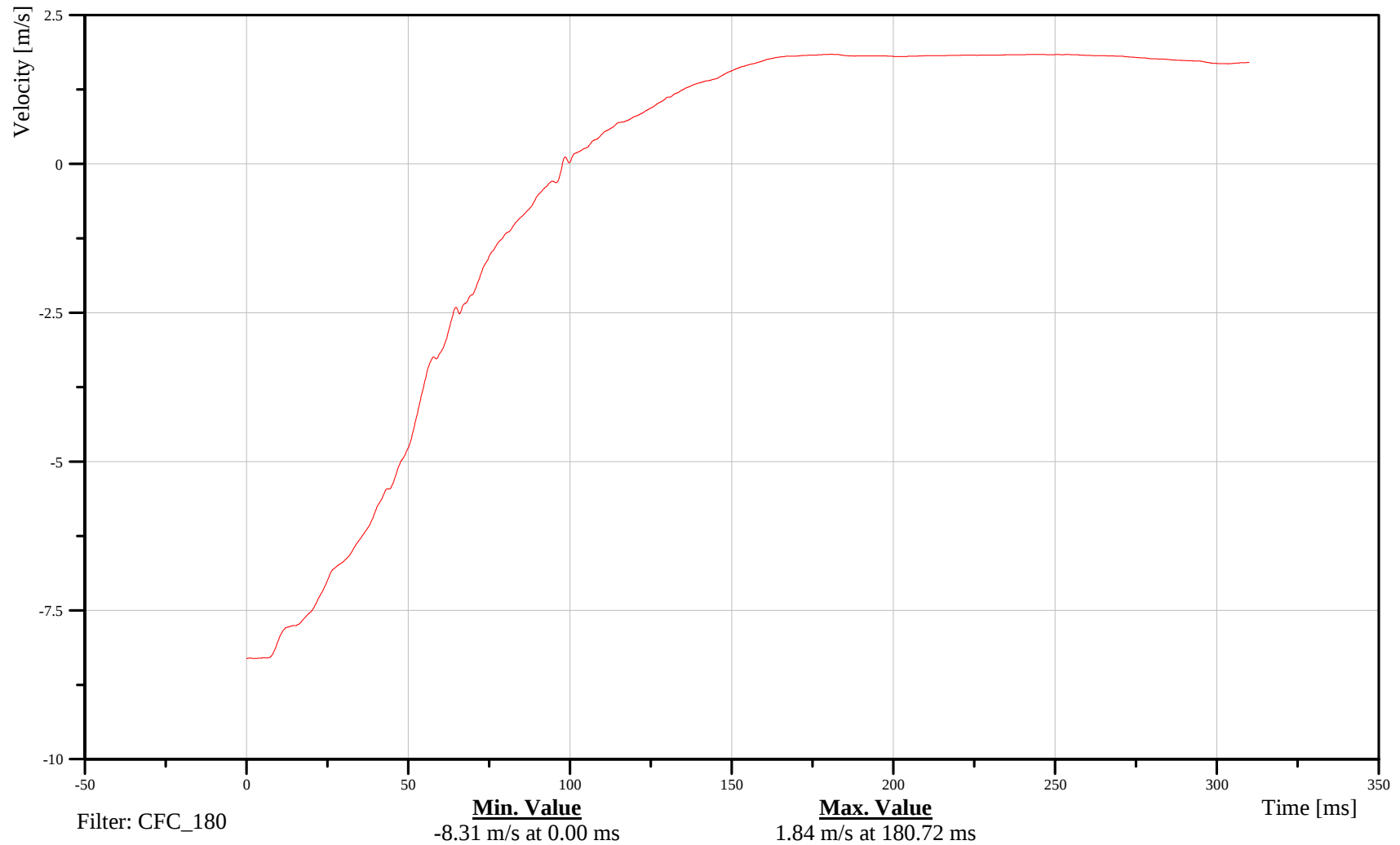
Right Side Sill at Rear Seat Y-Axis Velocity

Customer: VRTC

16SILBRE0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-118

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

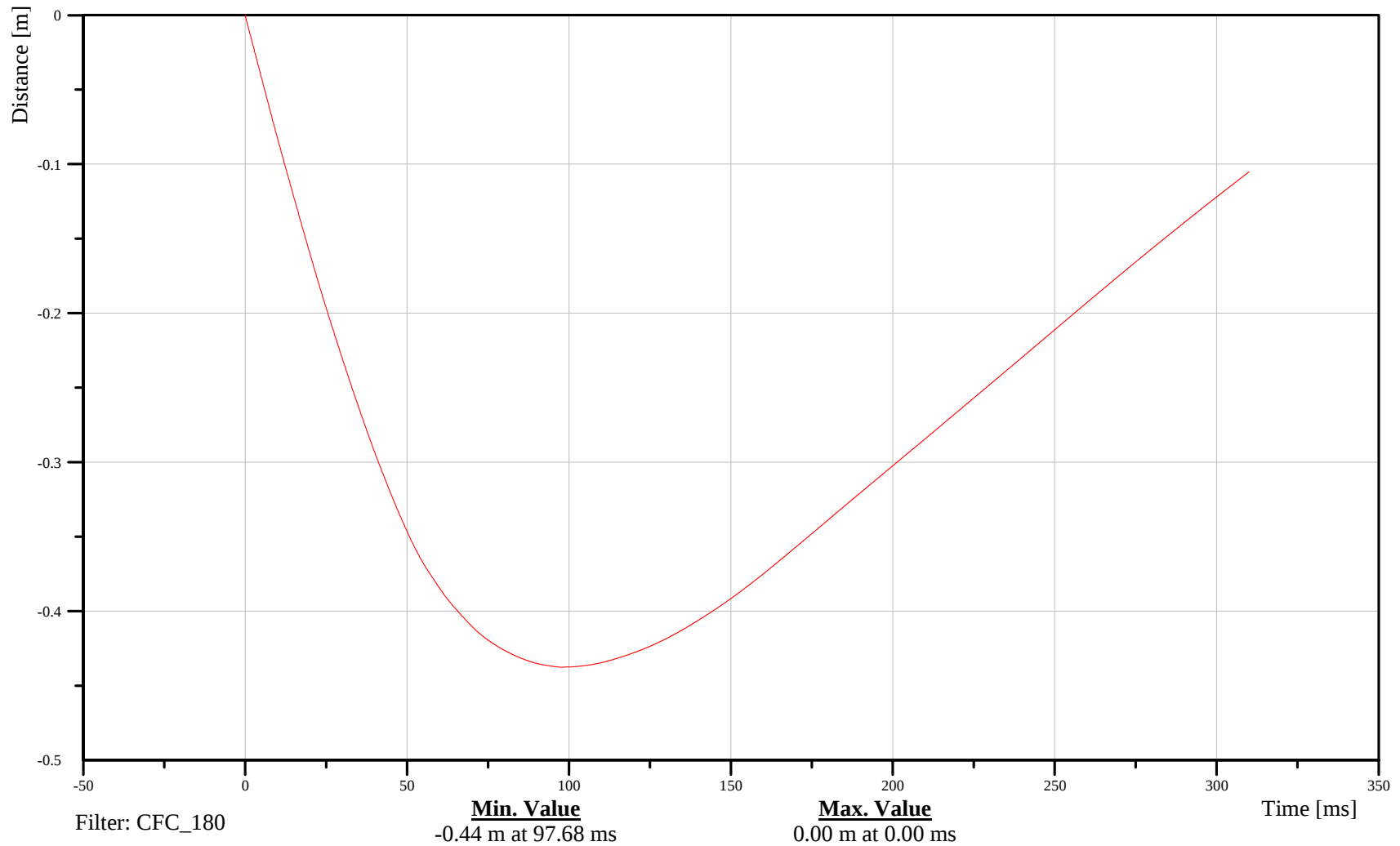
Right Side Sill at Rear Seat Y-Axis Displacement

Customer: VRTC

16SILBRE0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-119

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

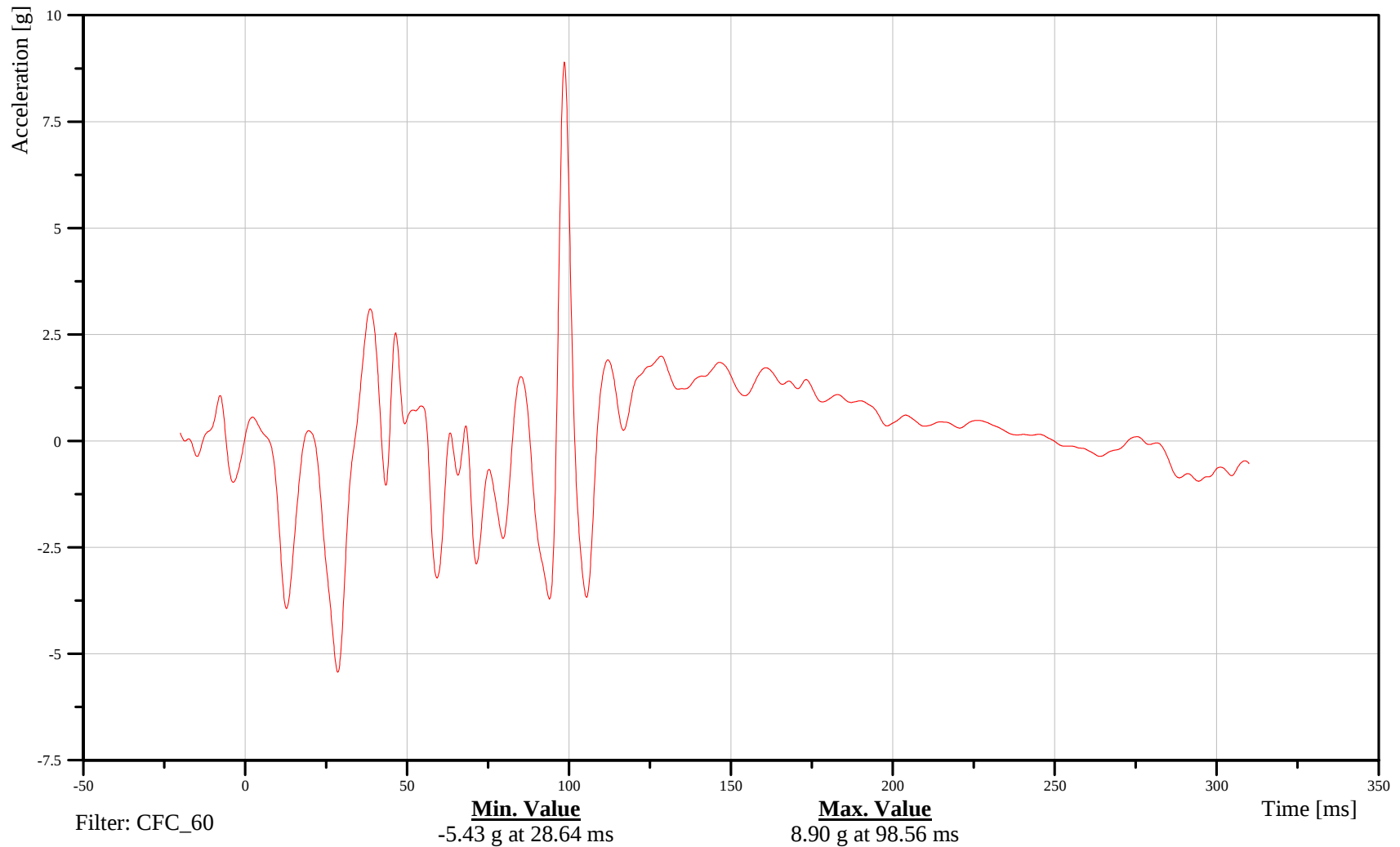
Right Side Sill at Rear Seat Z-Axis Acceleration

Customer: VRTC

16SILBRE0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-120

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

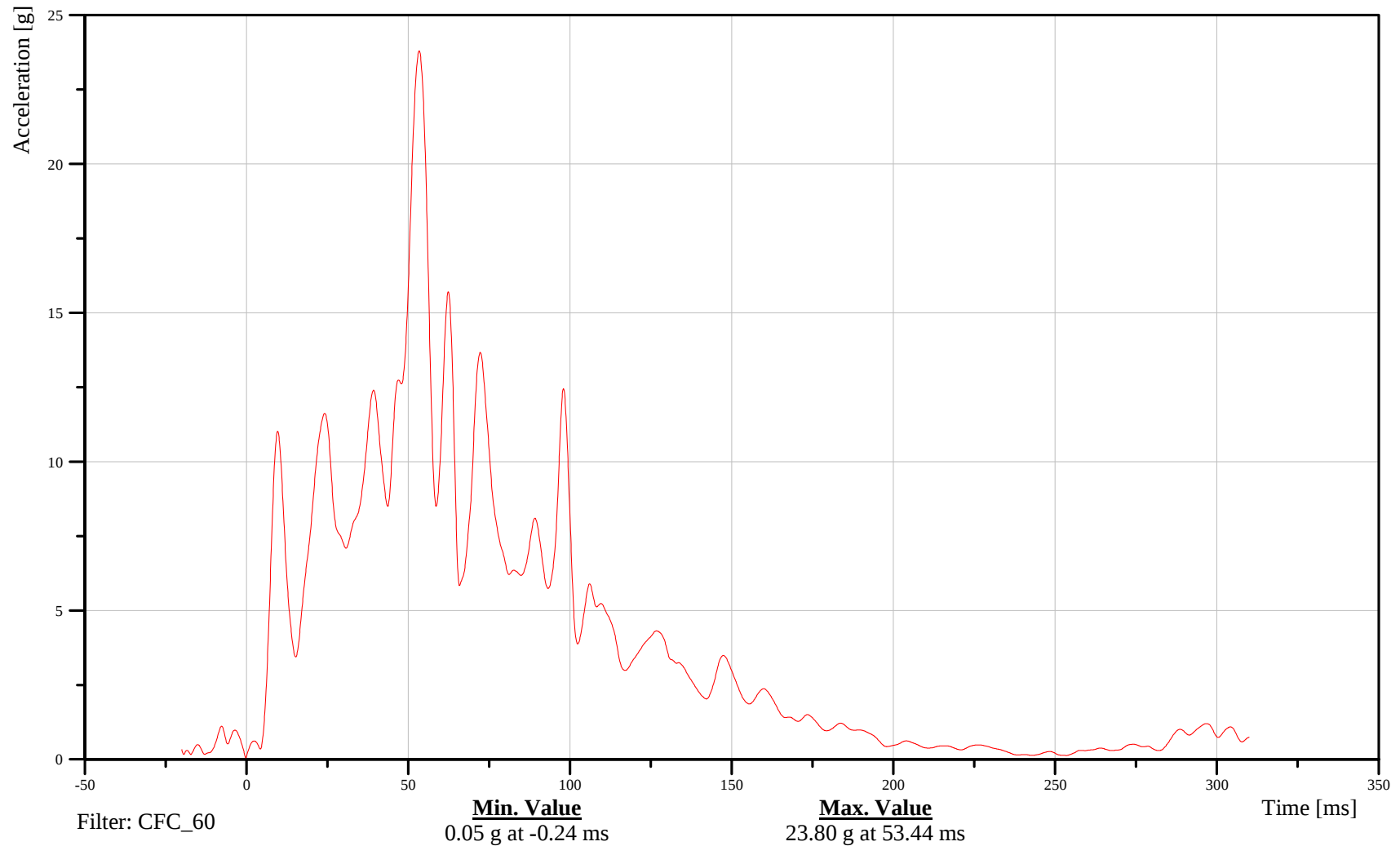
Right Side Sill at Rear Seat Resultant Acceleration

Customer: VRTC

16SILBRE0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-121

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

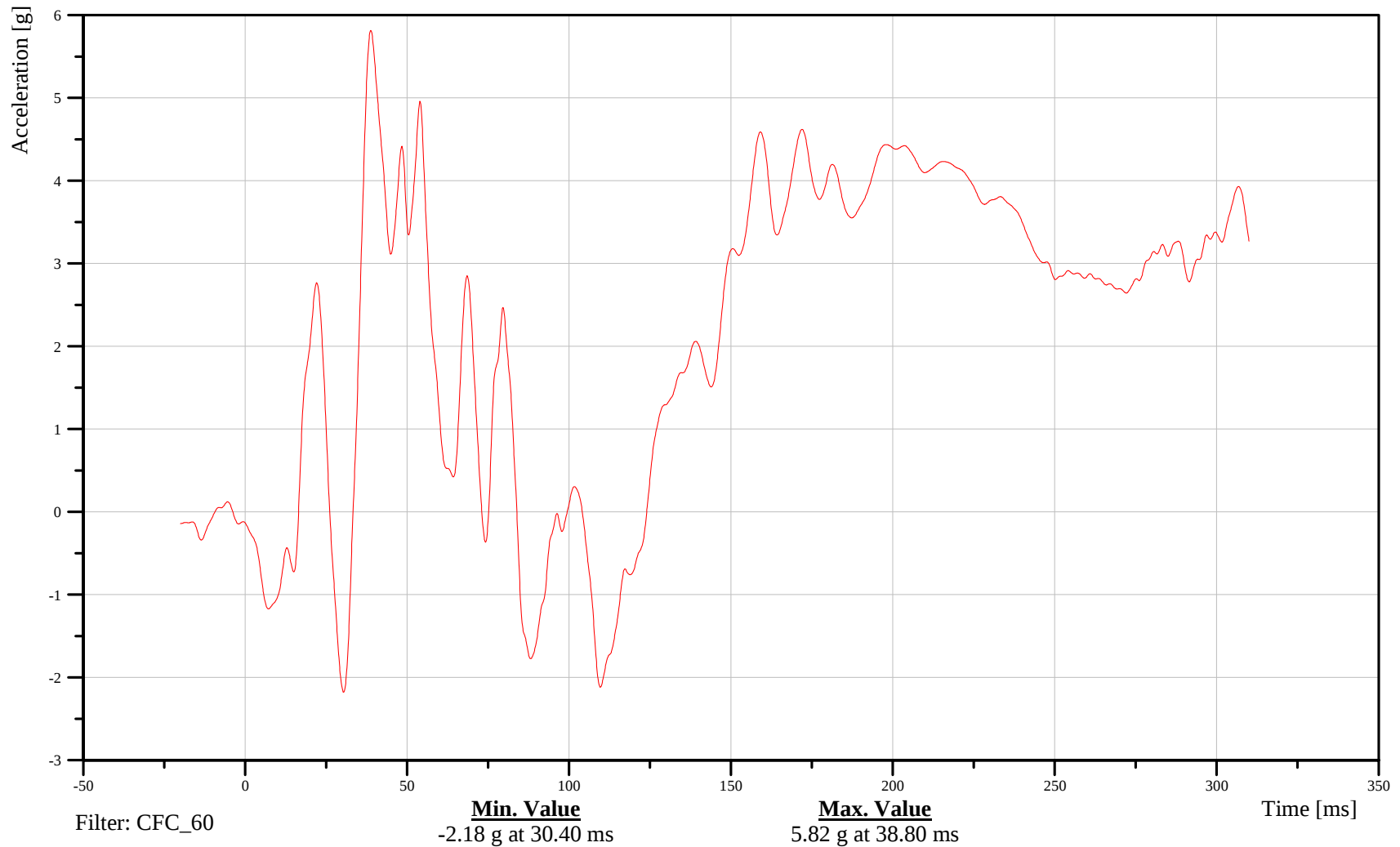
Rear Floorpan Above Axle X-Axis Acceleration

Customer: VRTC

18FORA000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-122

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

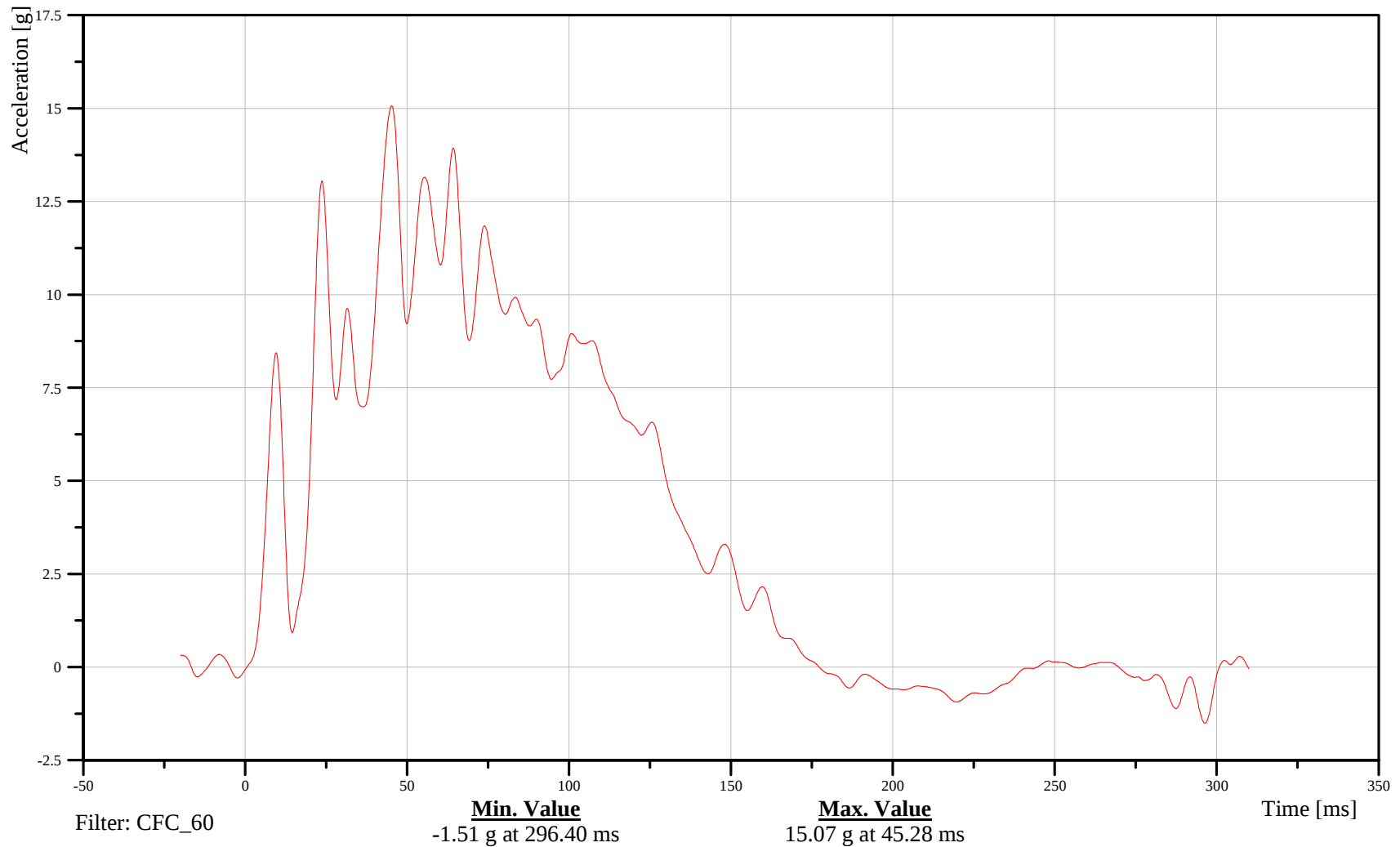
Rear Floorpan Above Axle Y-Axis Acceleration

Customer: VRTC

18FORA000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-123

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

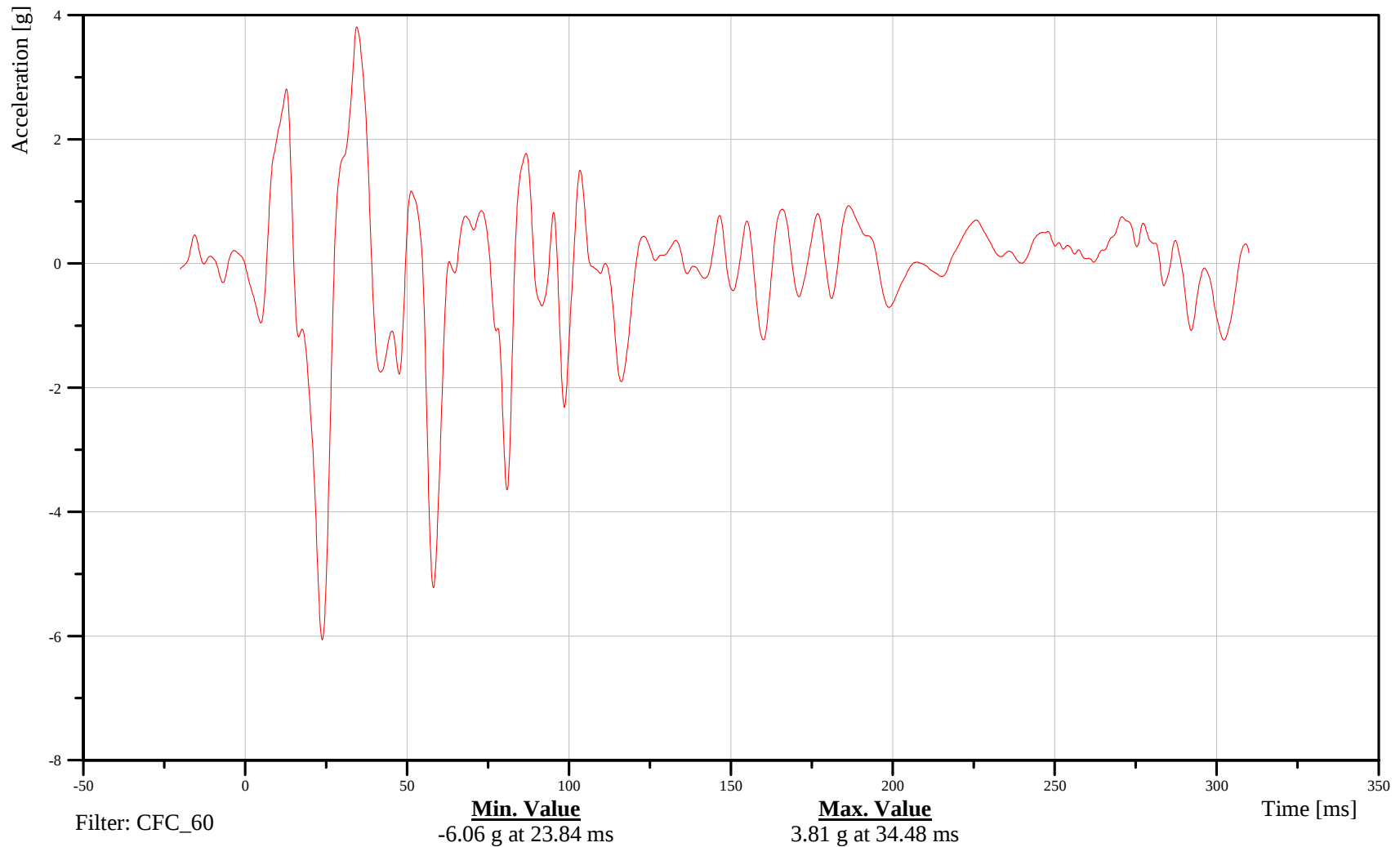
Rear Floorpan Above Axle Z-Axis Acceleration

Customer: VRTC

18FORA000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-124

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

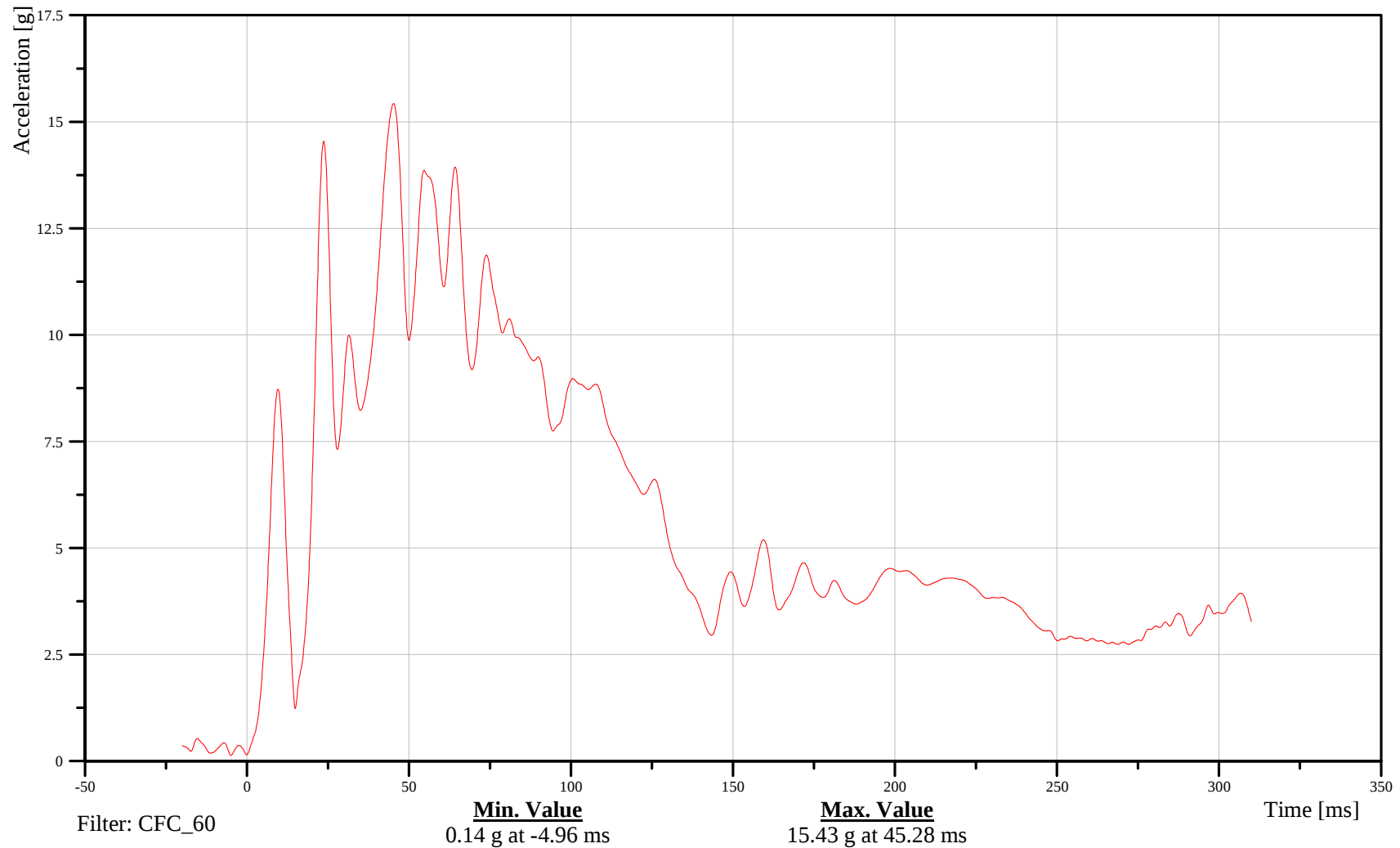
Rear Floorpan Above Axle Resultant Acceleration

Customer: VRTC

18FORA000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-125

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

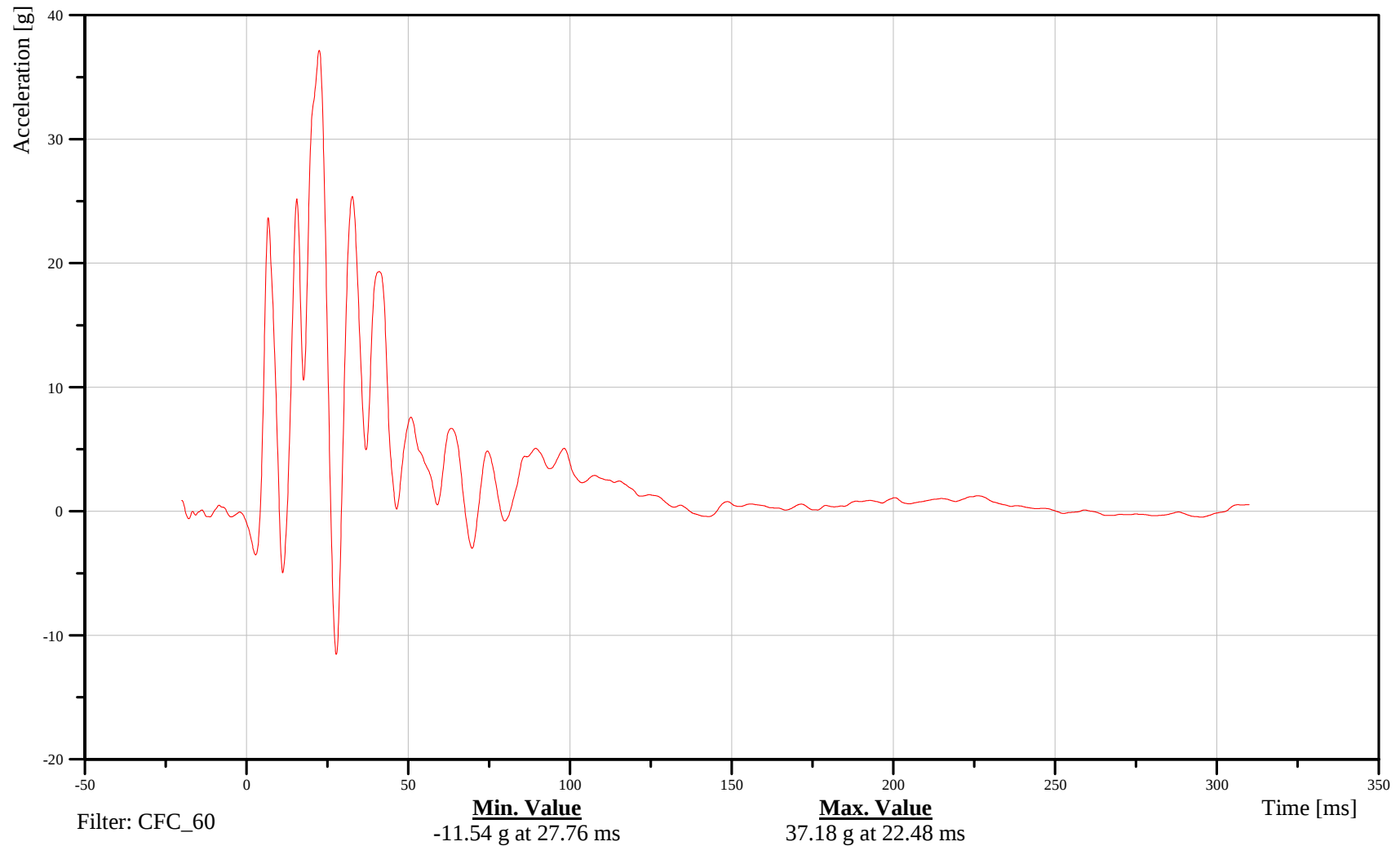
Left Side Sill at Front Seat Y-Axis Acceleration

Customer: VRTC

14SILBFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-126

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

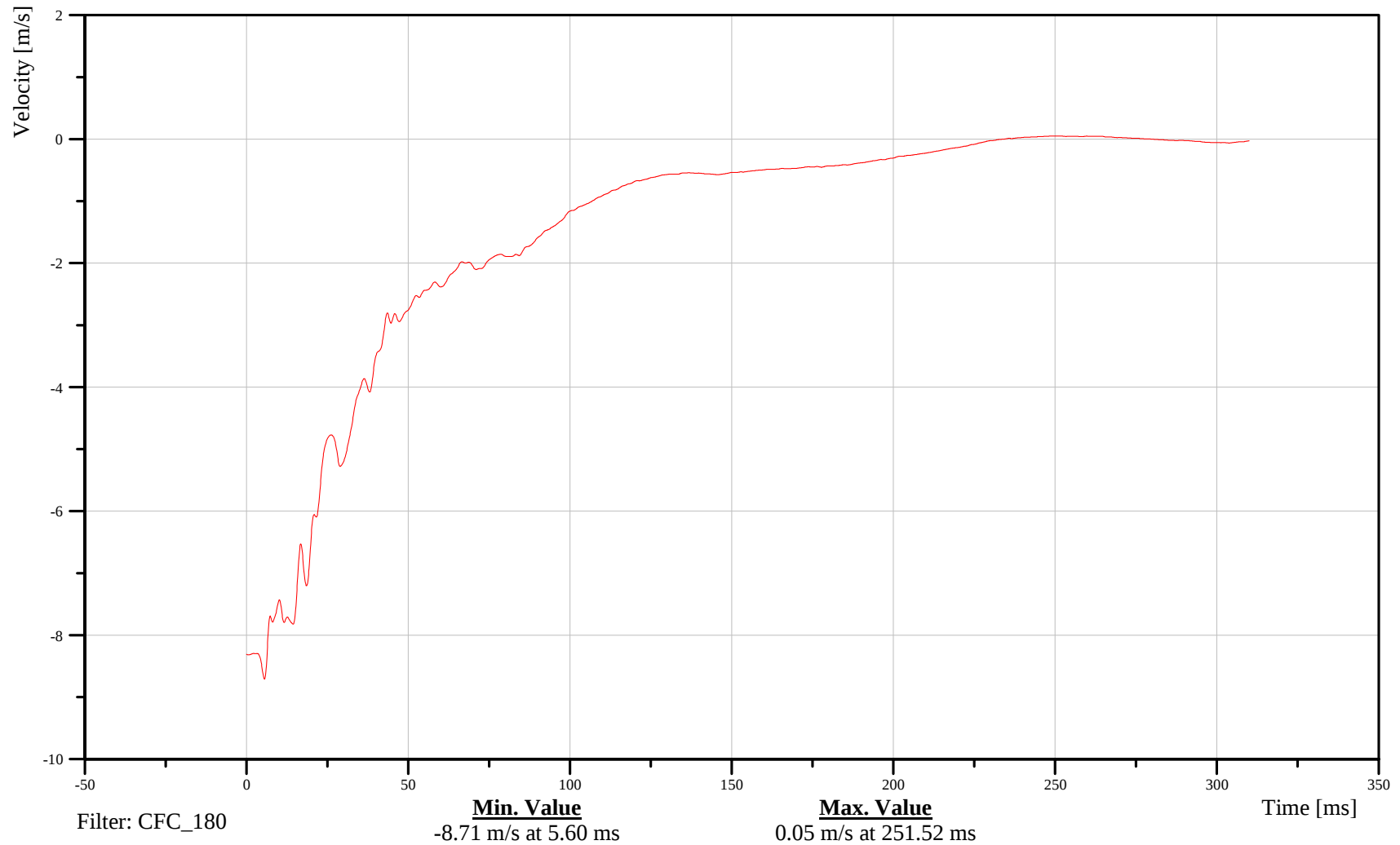
Left Side Sill at Front Seat Y-Axis Velocity

Customer: VRTC

14SILBFR0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-127

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

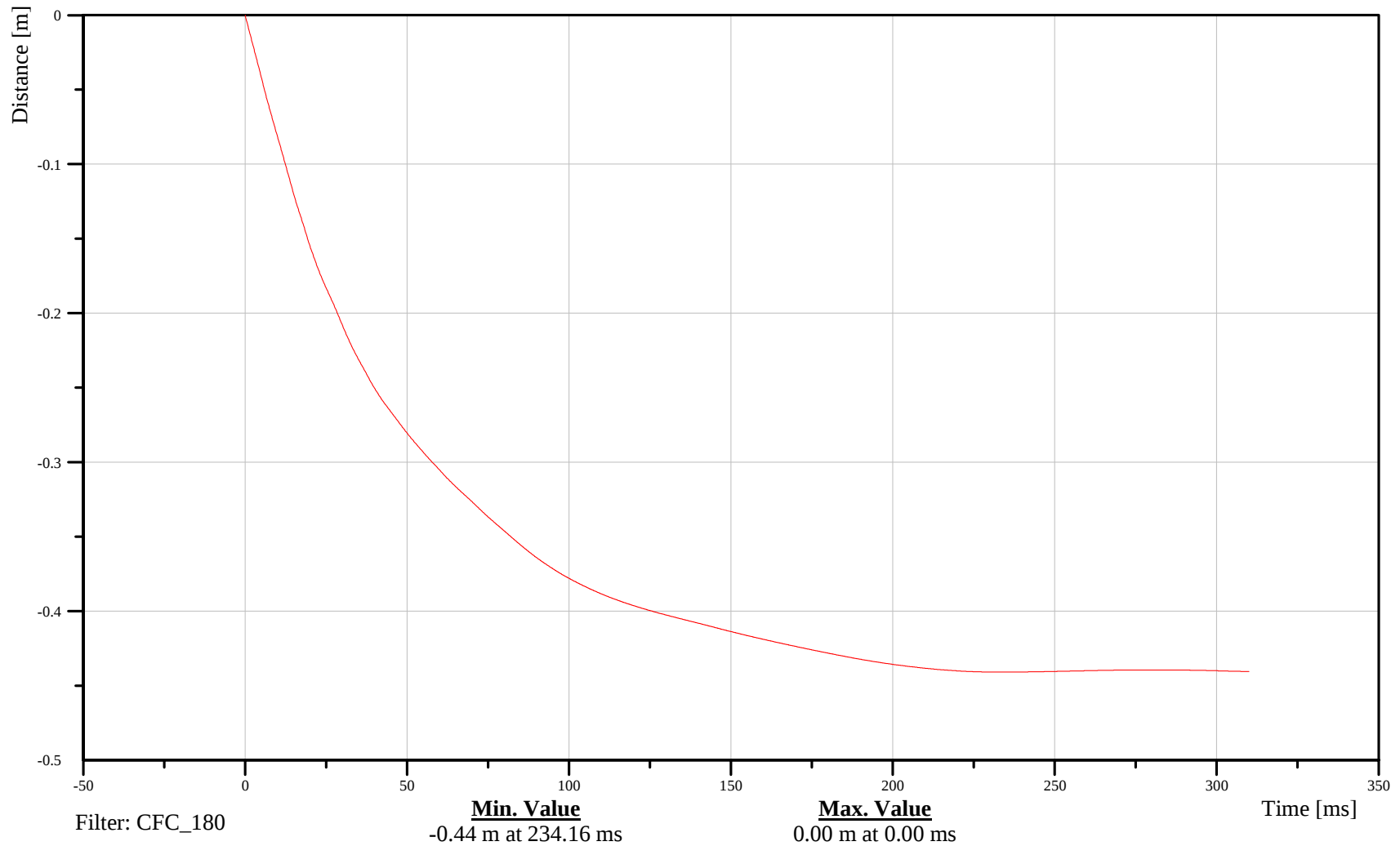
Left Side Sill at Front Seat Y-Axis Displacement

Customer: VRTC

14SILBFR0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-128

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

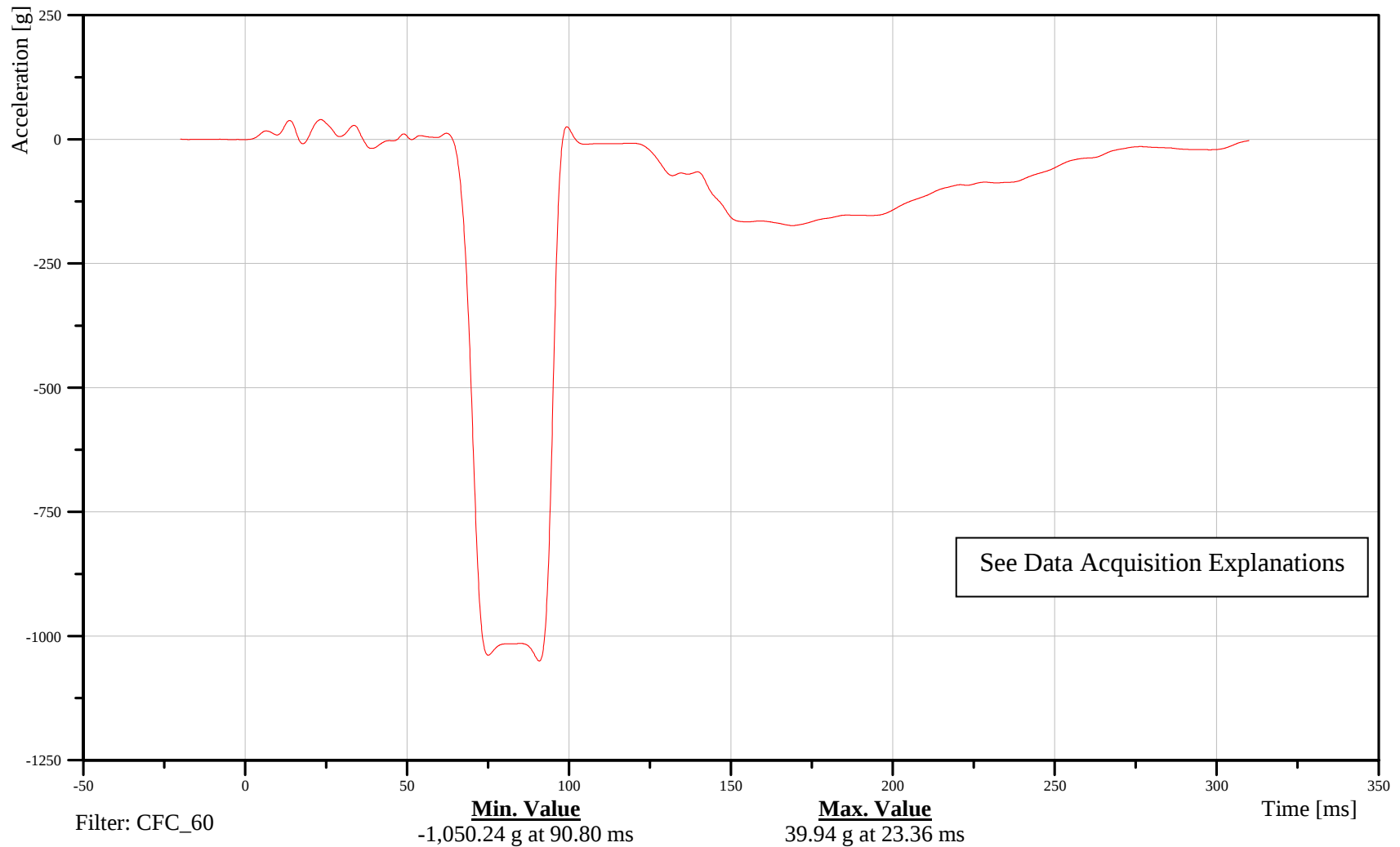
Left Side Sill at Rear Seat Y-Axis Acceleration

Customer: VRTC

14SILBRE0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-129

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

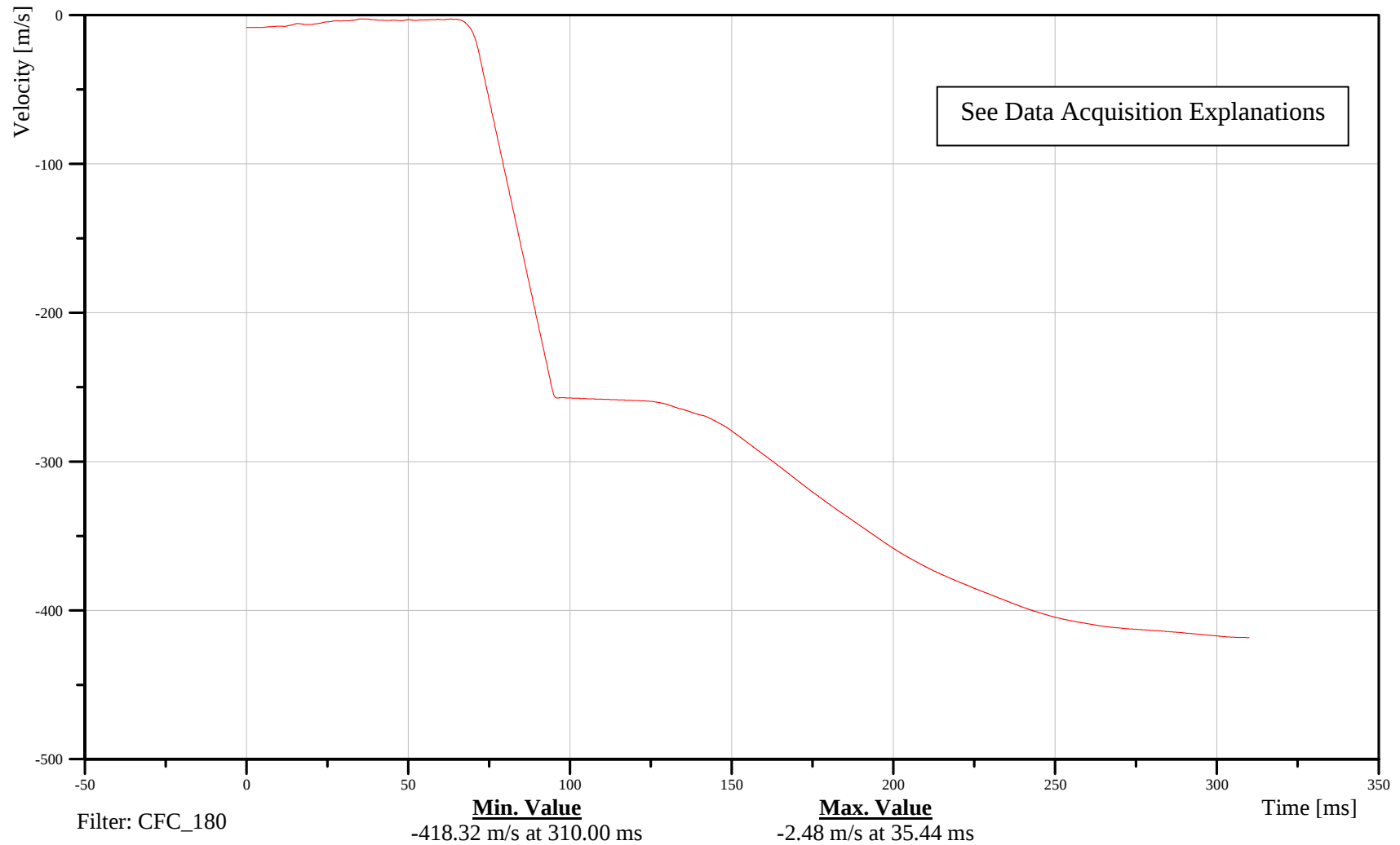
Left Side Sill at Rear Seat Y-Axis Velocity

Customer: VRTC

14SILBRE0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-130

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

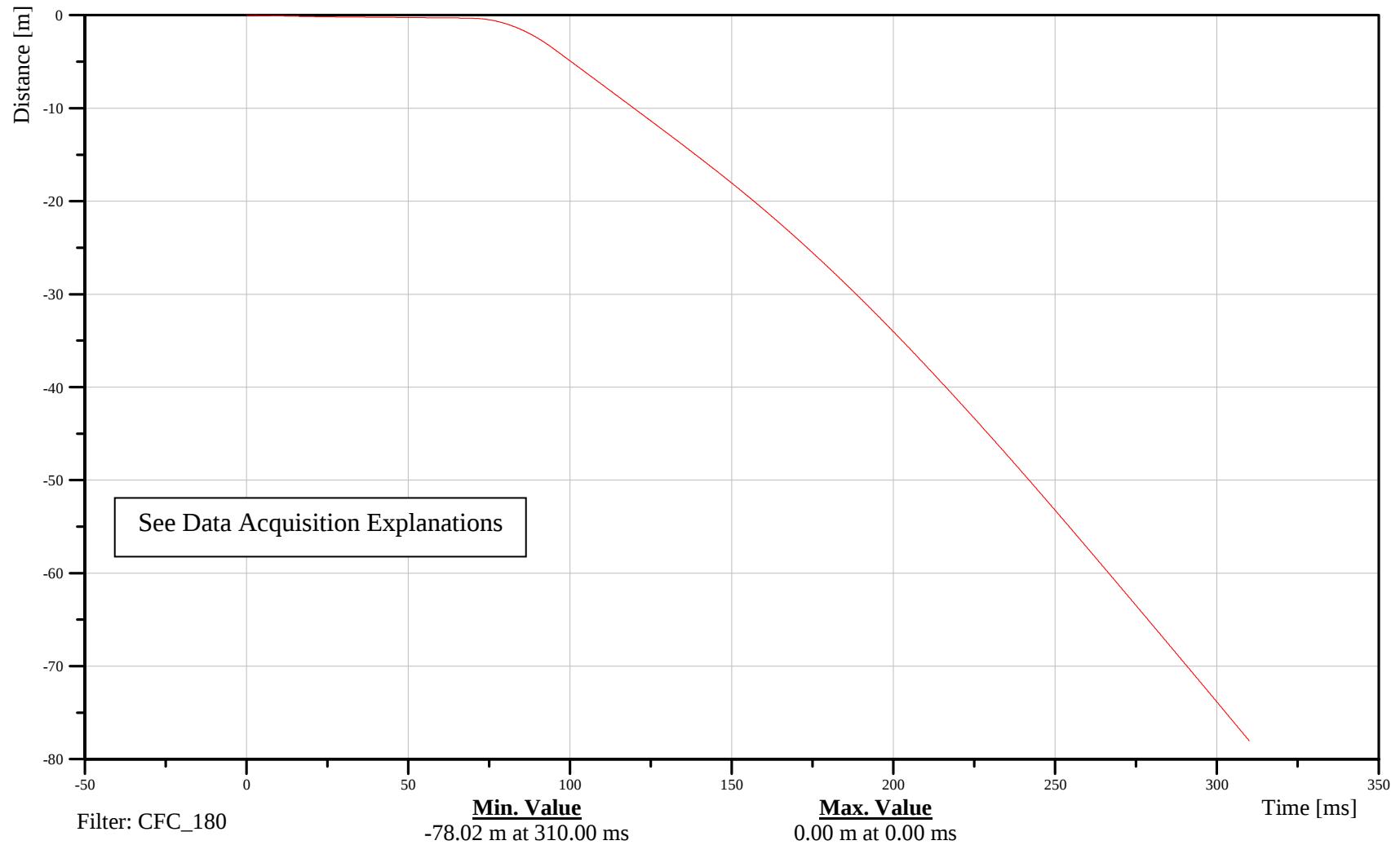
Left Side Sill at Rear Seat Y-Axis Displacement

Customer: VRTC

14SILBRE0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 070806



B-131

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

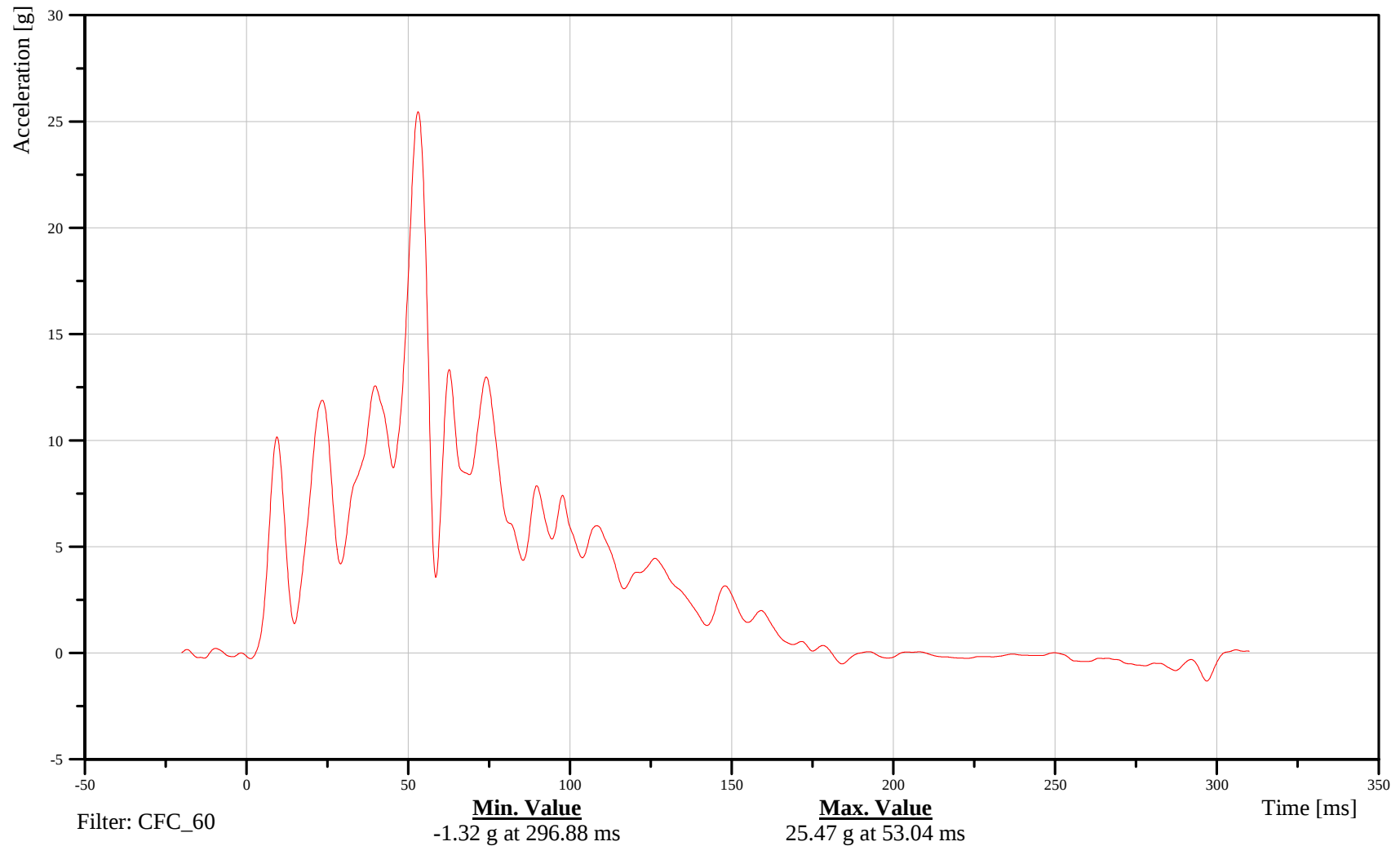
Right Rear Occupant Compartment Y-Axis Acceleration

Customer: VRTC

16VEHCRE0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-132

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

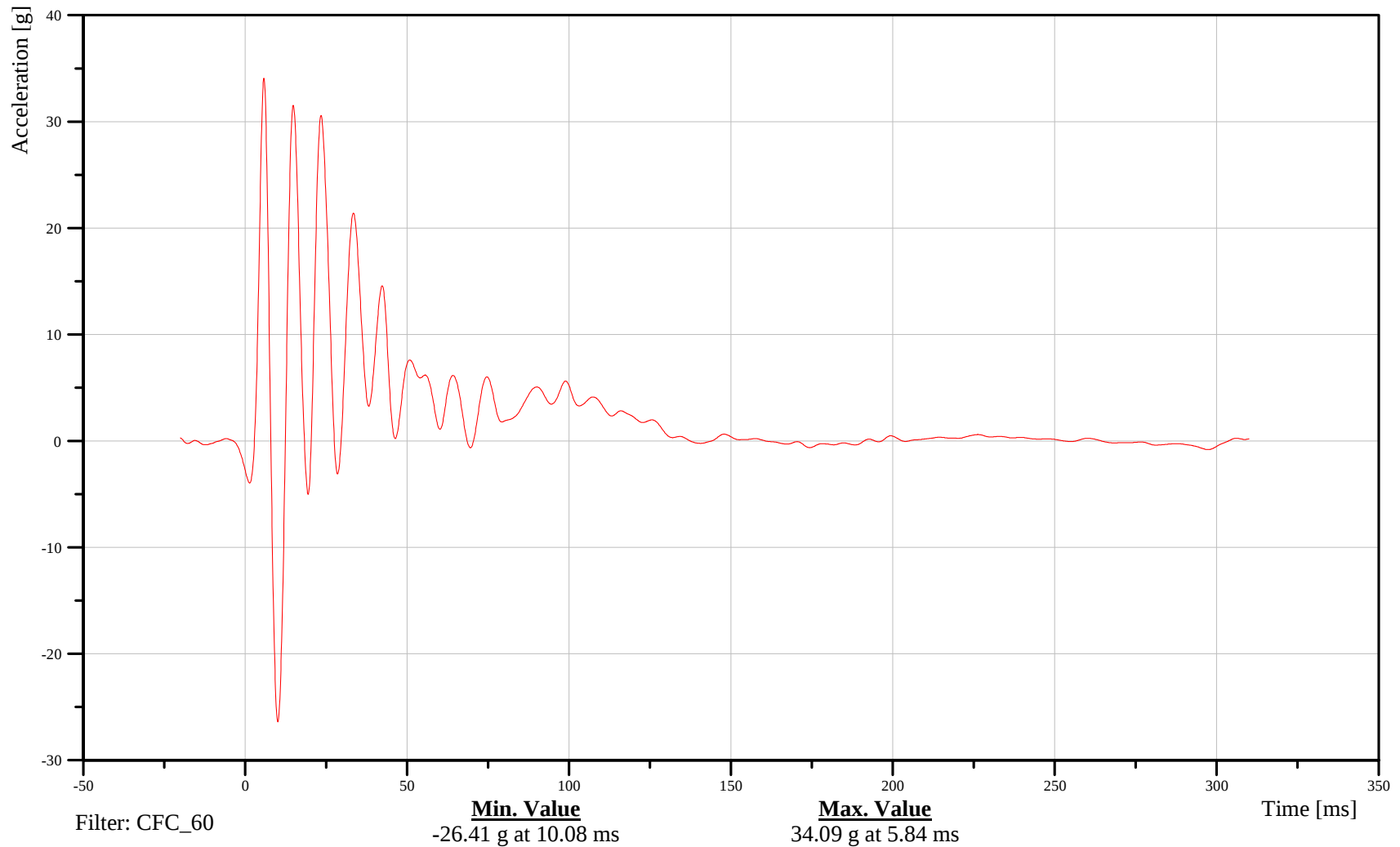
Left Lower A-Post Y-Axis Acceleration

Customer: VRTC

11APILLO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-133

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

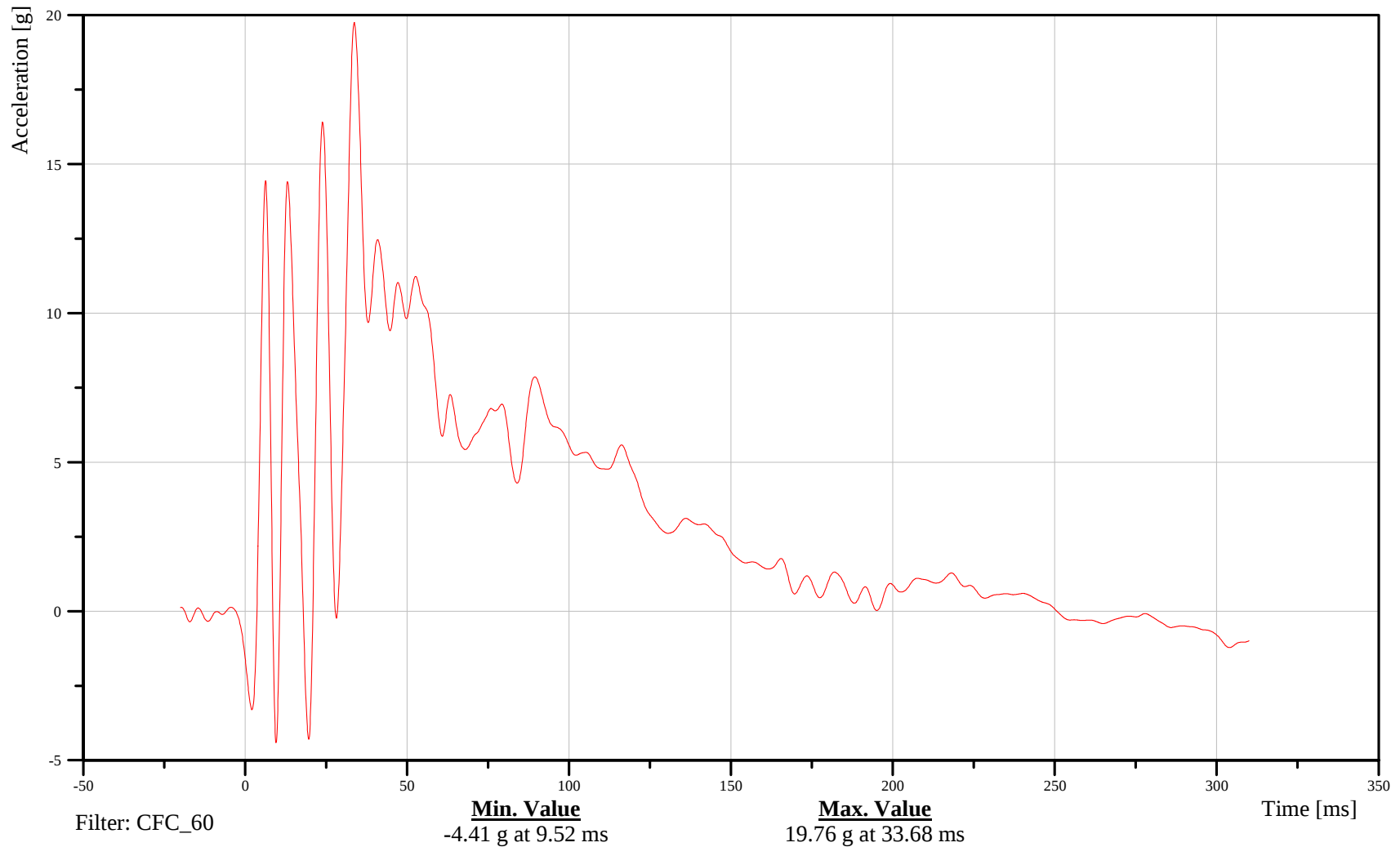
Left Mid A-Post Y-Axis Acceleration

Customer: VRTC

11APILMI0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-134

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

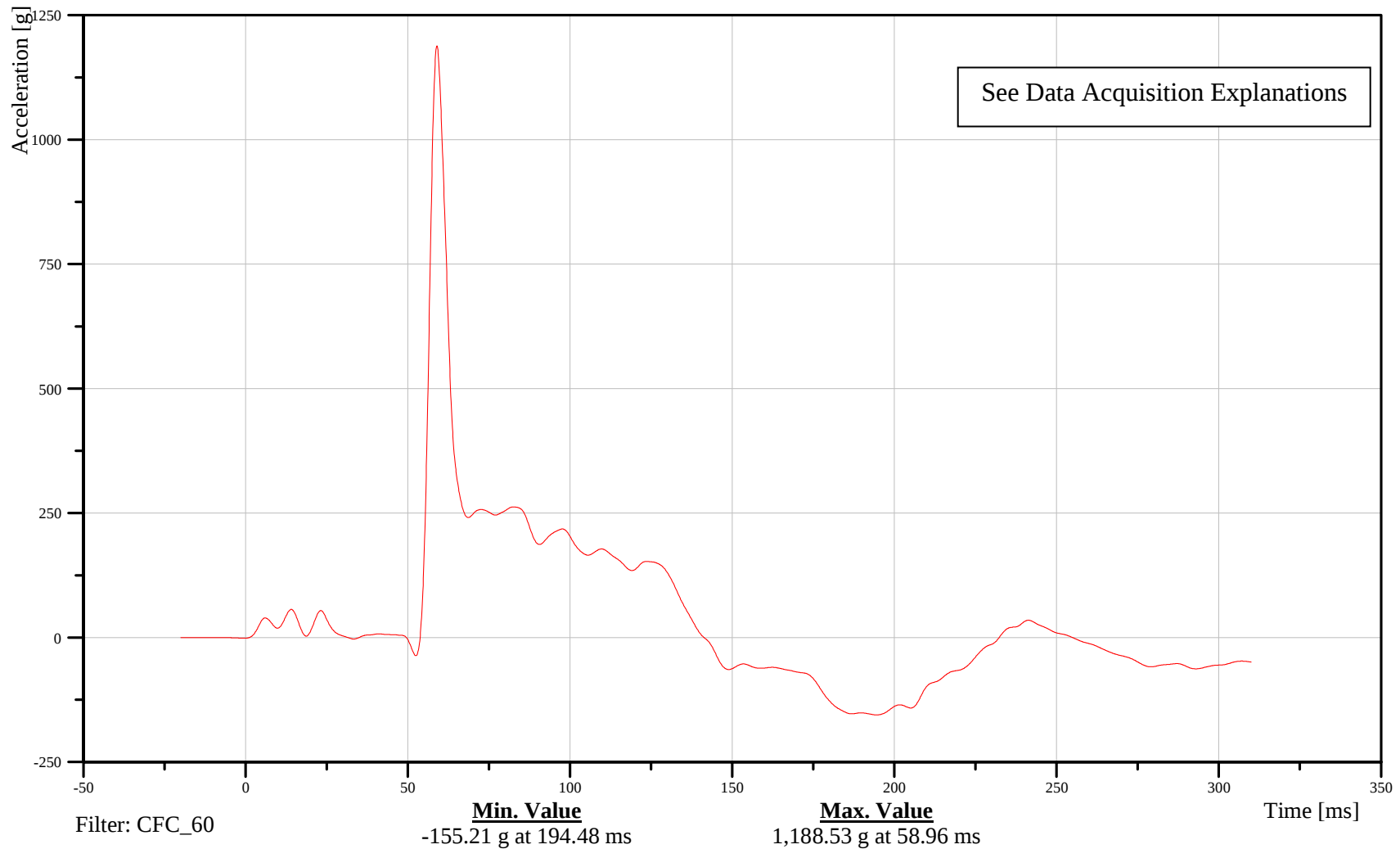
Left Lower B-Post Y-Axis Acceleration

Customer: VRTC

14BPILLO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-135

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Left Mid B-Post Y-Axis Acceleration

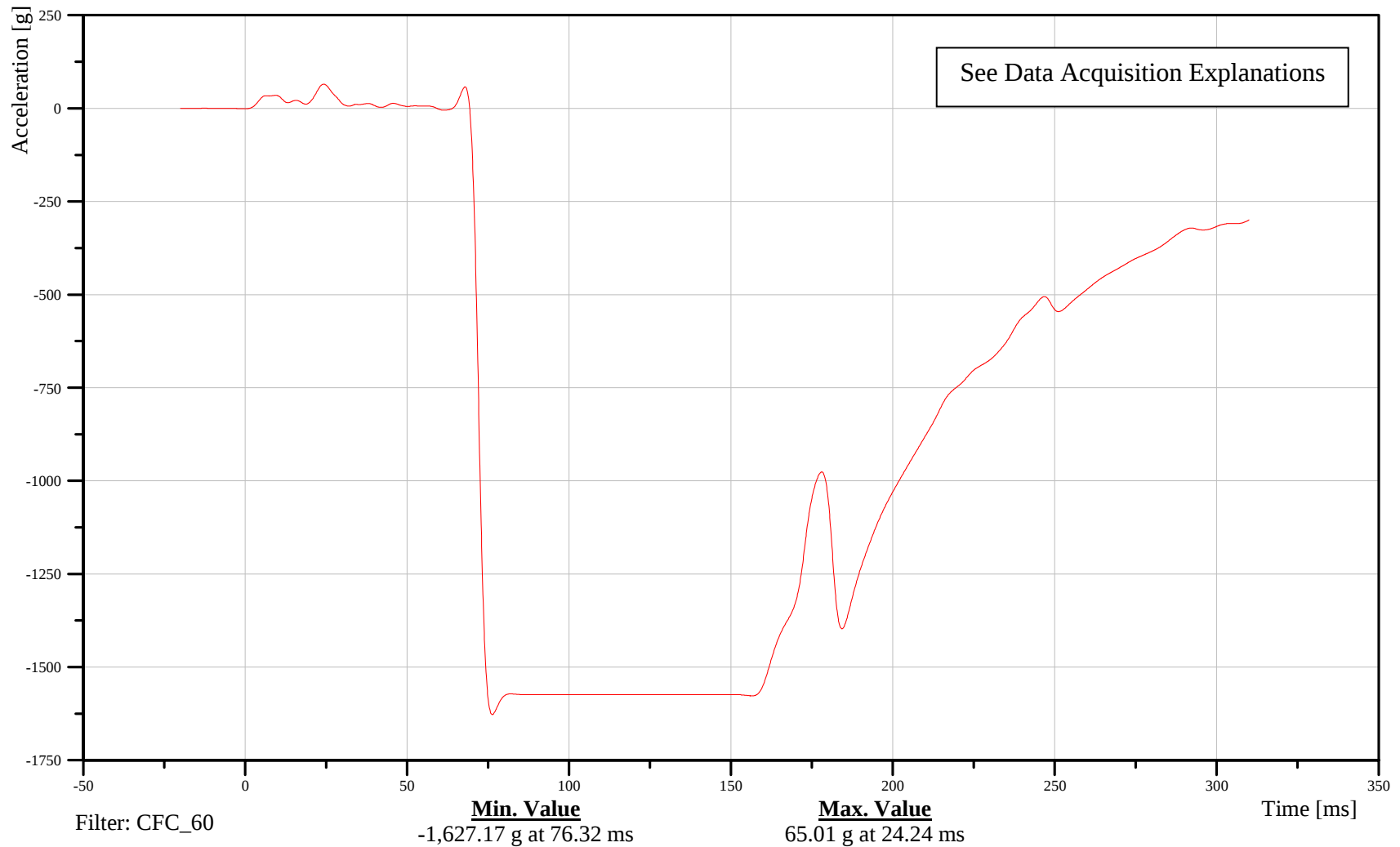
Date: 8/6/2007
Time: 14:08

Customer: VRTC

14BPILMI0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-136

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

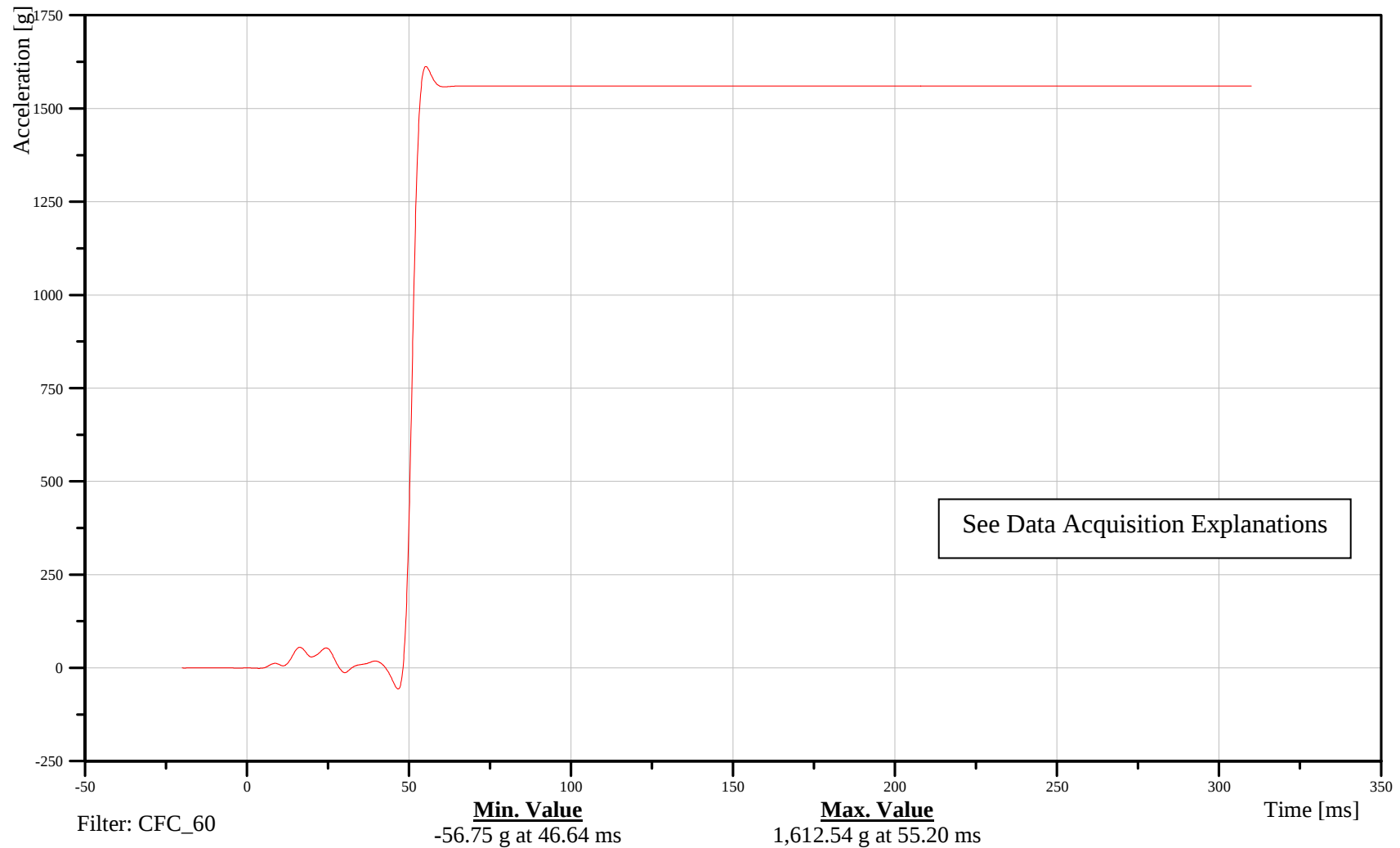
Left Front Seat Track Y-Axis Acceleration

Customer: VRTC

11SETRFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-137

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

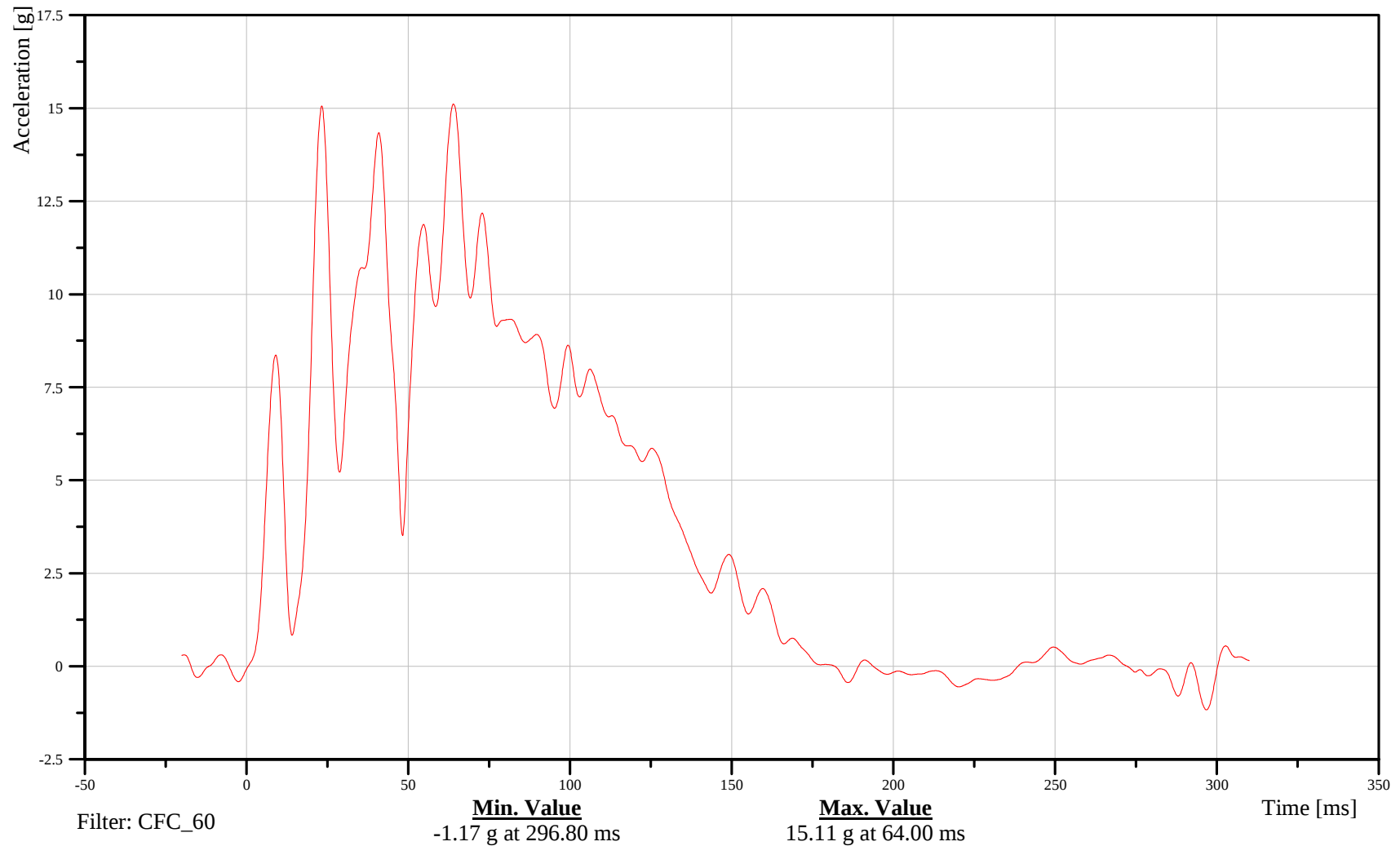
Left Rear Seat Track Y-Axis Acceleration

Customer: VRTC

14SETRLERE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-138

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

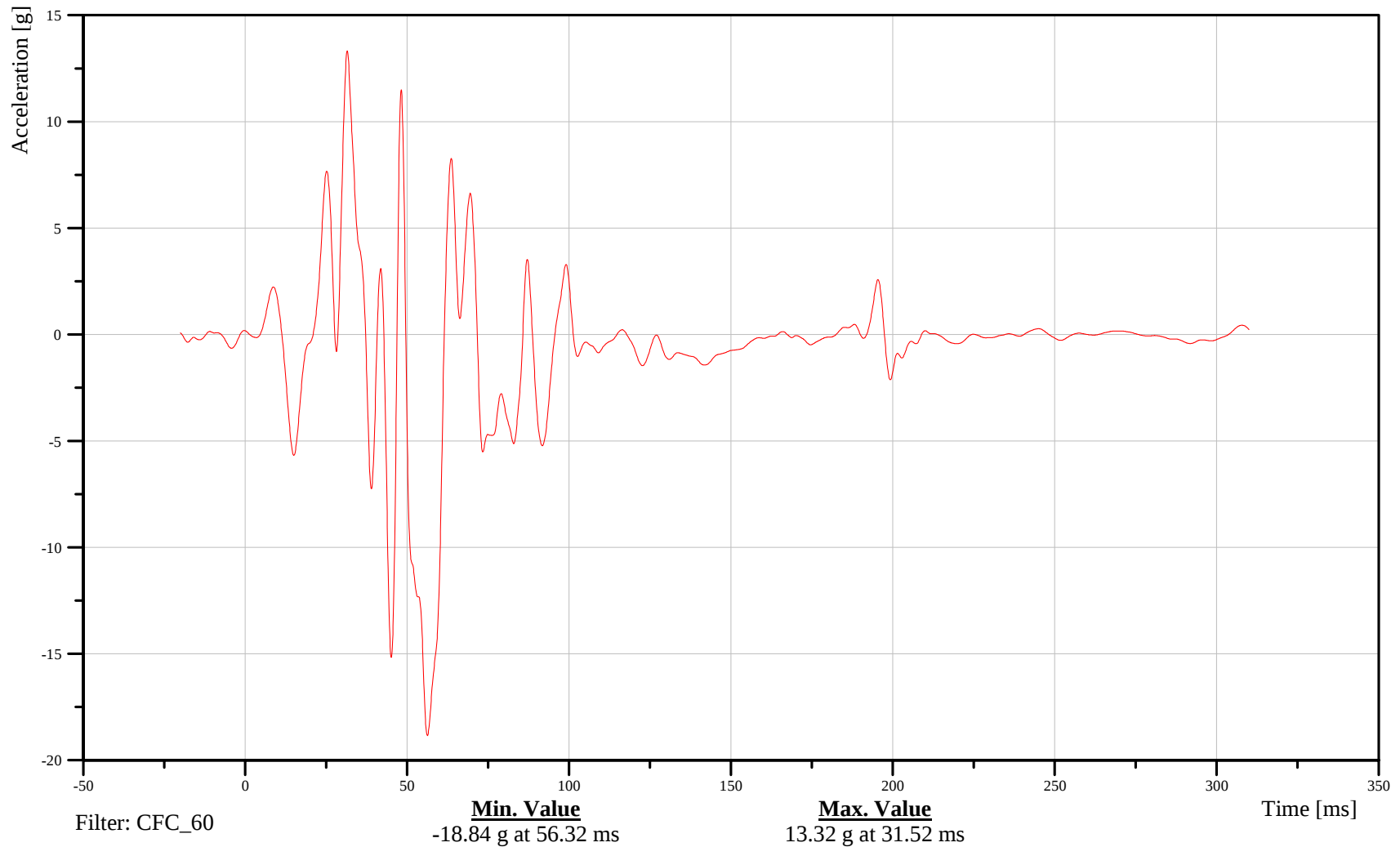
Vehicle Center of Gravity X-Axis Acceleration

Customer: VRTC

10VEHCCG0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-139

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

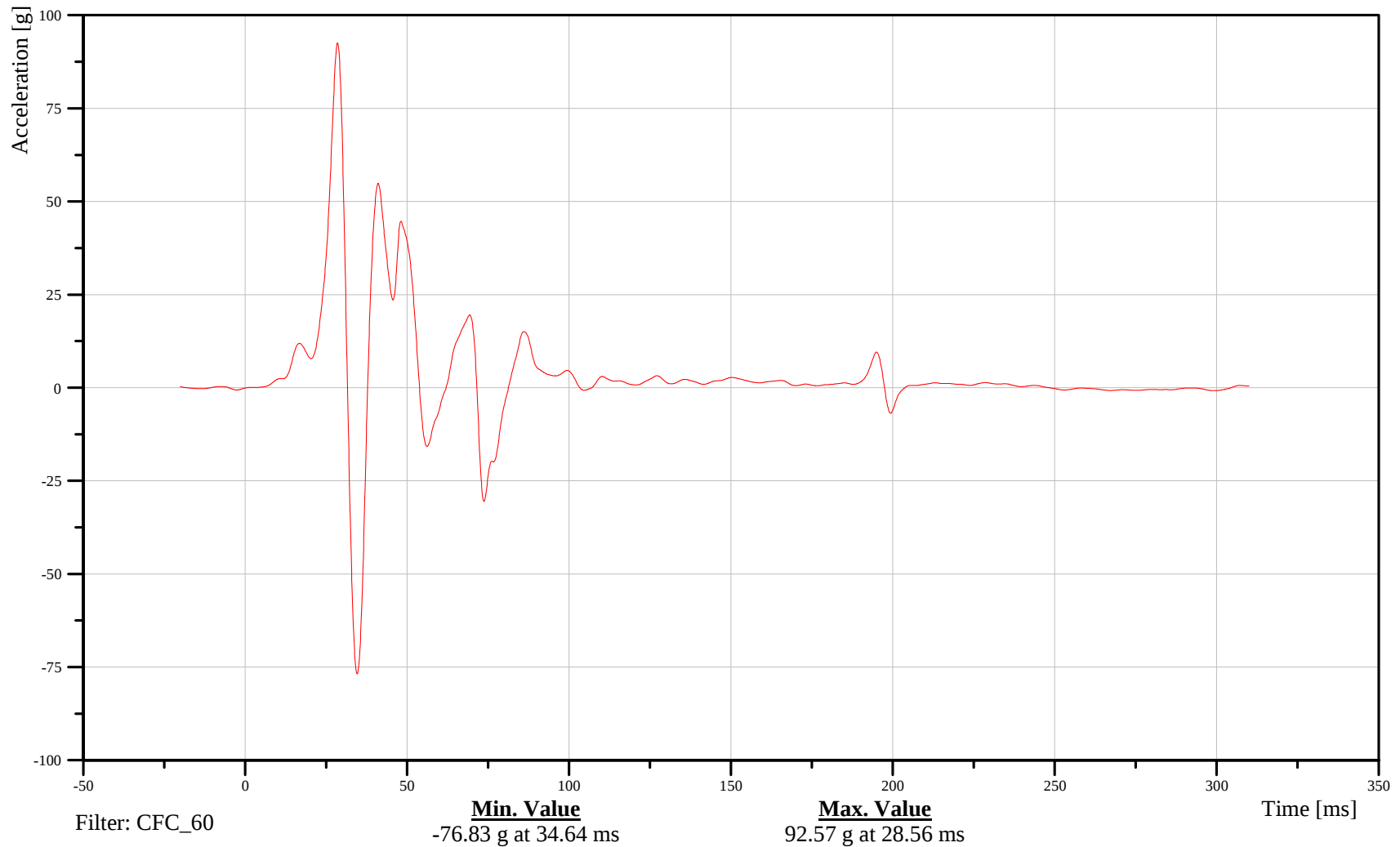
Vehicle Center of Gravity Y-Axis Acceleration

Customer: VRTC

10VEHCCG0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-140

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

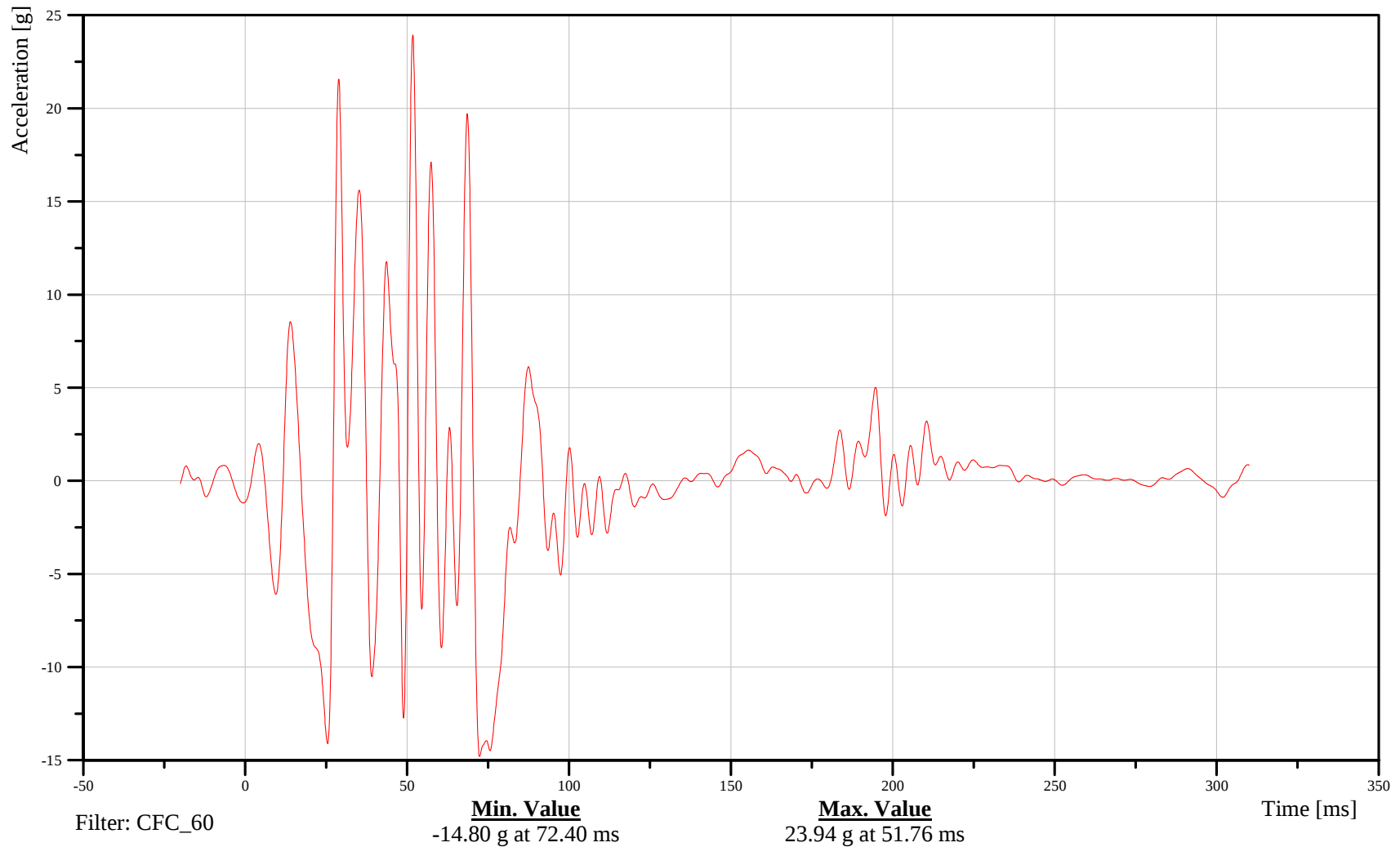
Vehicle Center of Gravity Z-Axis Acceleration

Customer: VRTC

10VEHCCG0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-141

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

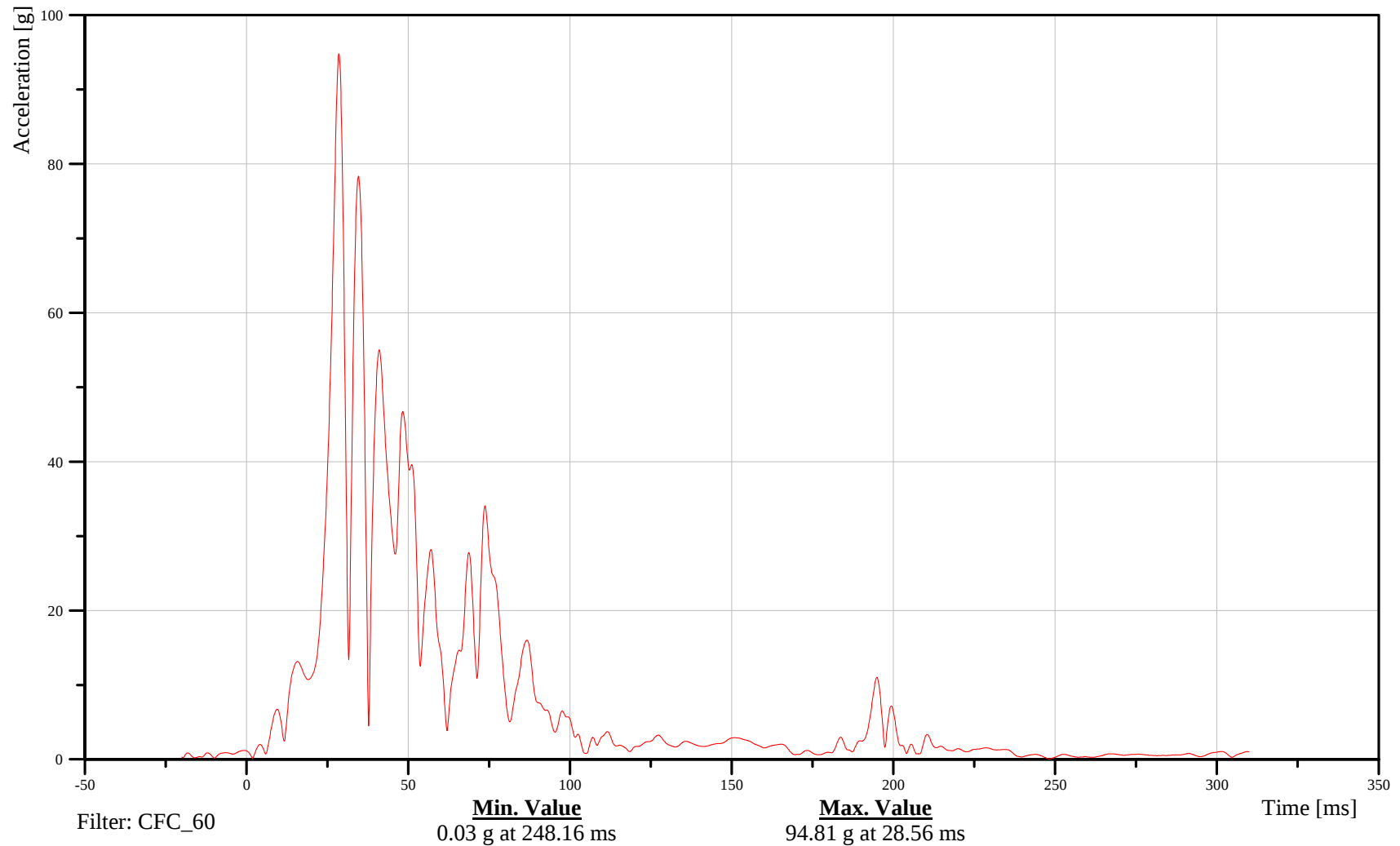
Vehicle Center of Gravity Resultant Acceleration

Customer: VRTC

10VEHCCG0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-142

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

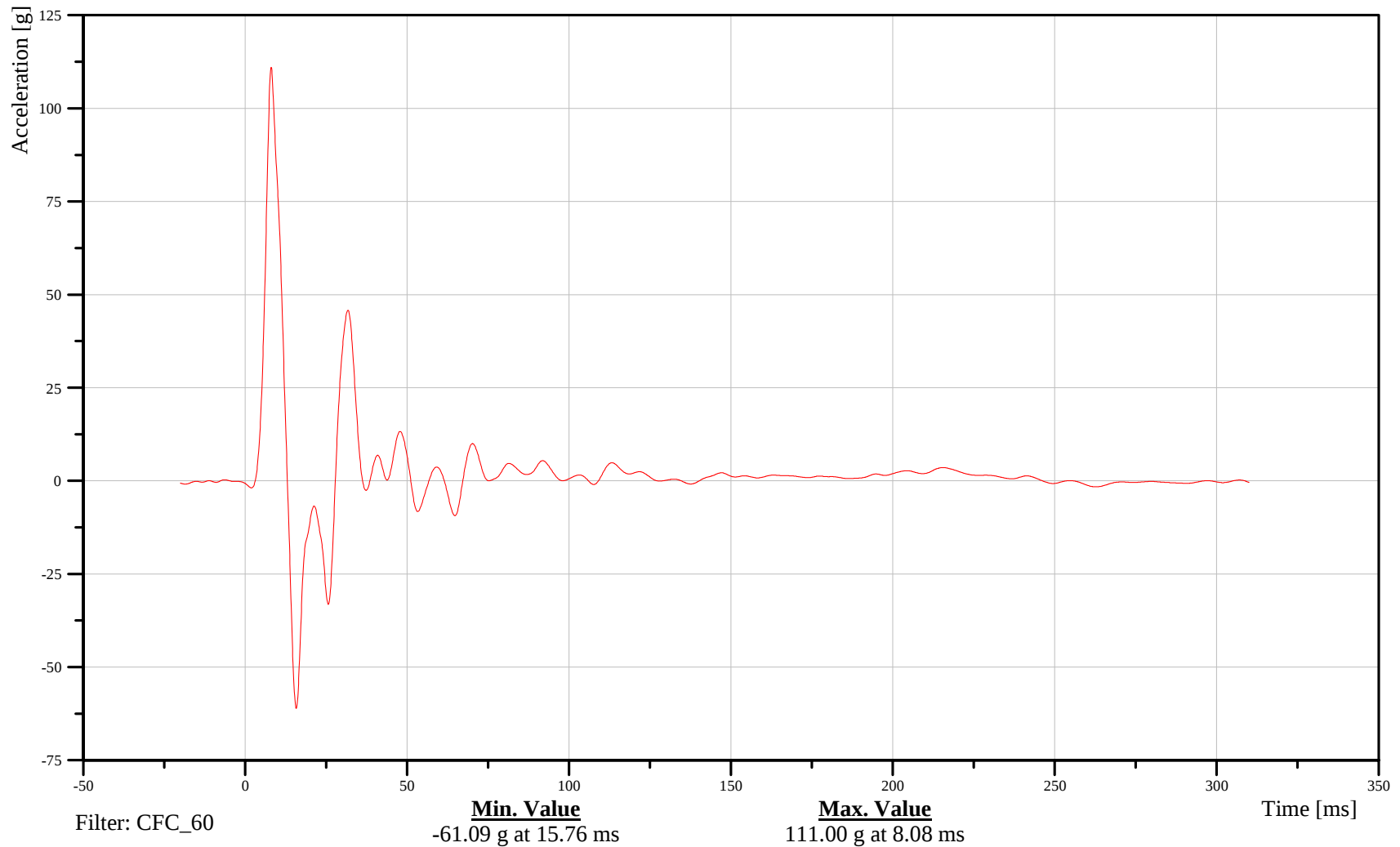
Vehicle Front Door Centerline 430 mm Above Ground Y-Axis Acceleration

Customer: VRTC

14DOOR000001ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-143

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

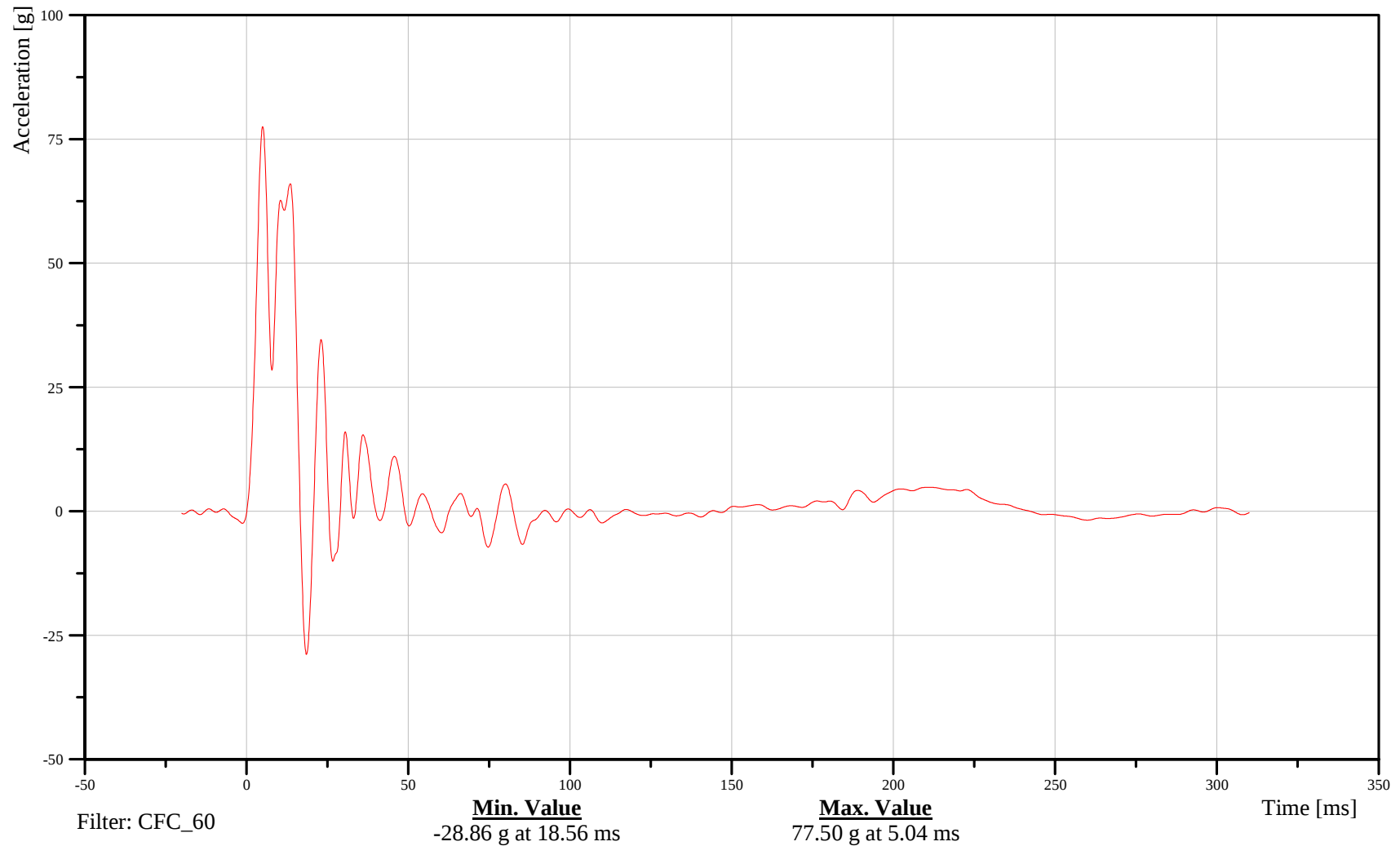
Vehicle Front Door Mid-Rear 430 mm Above Ground Y-Axis Acceleration

Customer: VRTC

14DOOR000002ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-144

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph
Vehicle Front Door Upper Centerline 685 mm Above Ground Y-Axis Acceleration

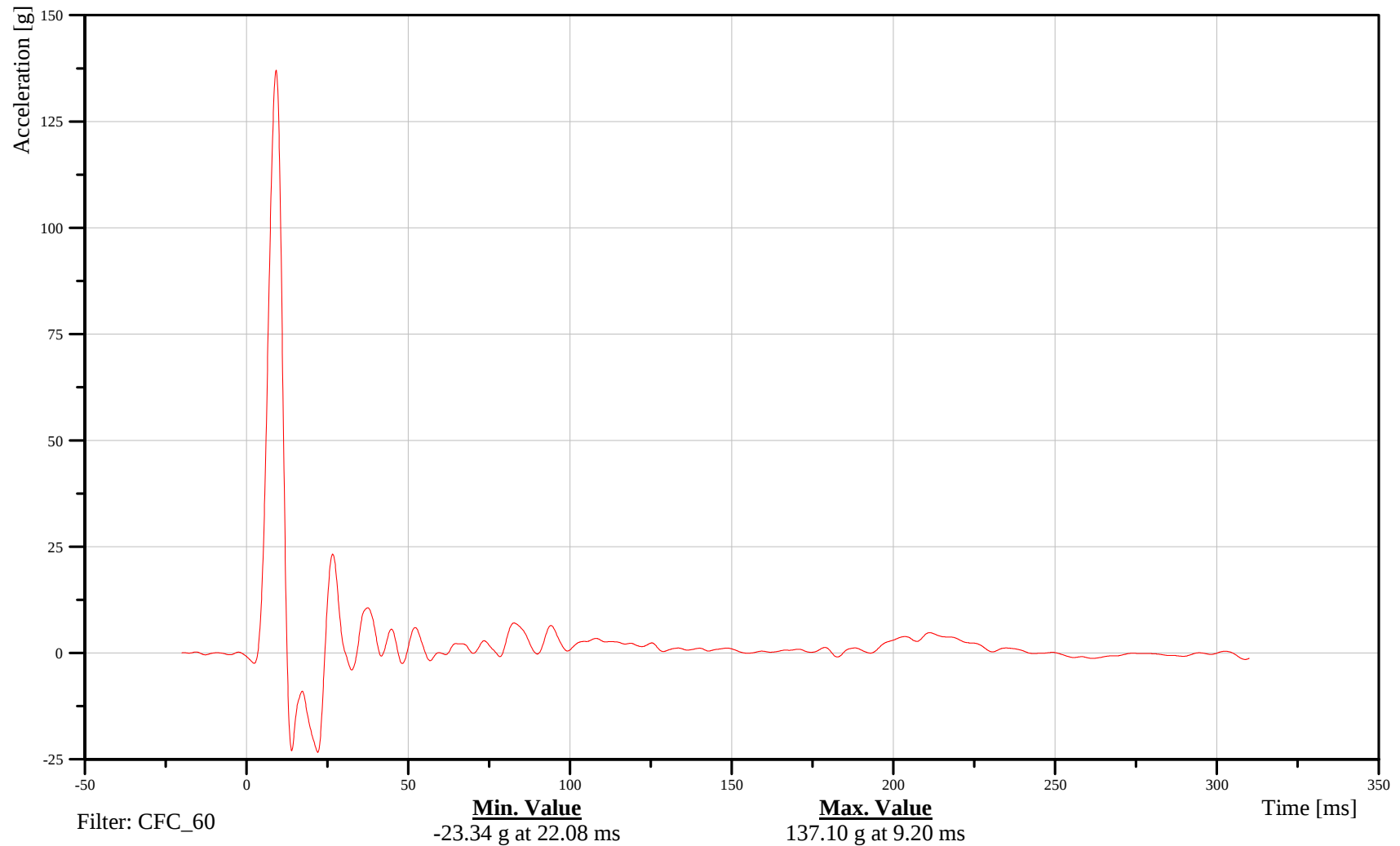
Date: 8/6/2007
Time: 14:08

Customer: VRTC

14DOOR000003ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-145

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

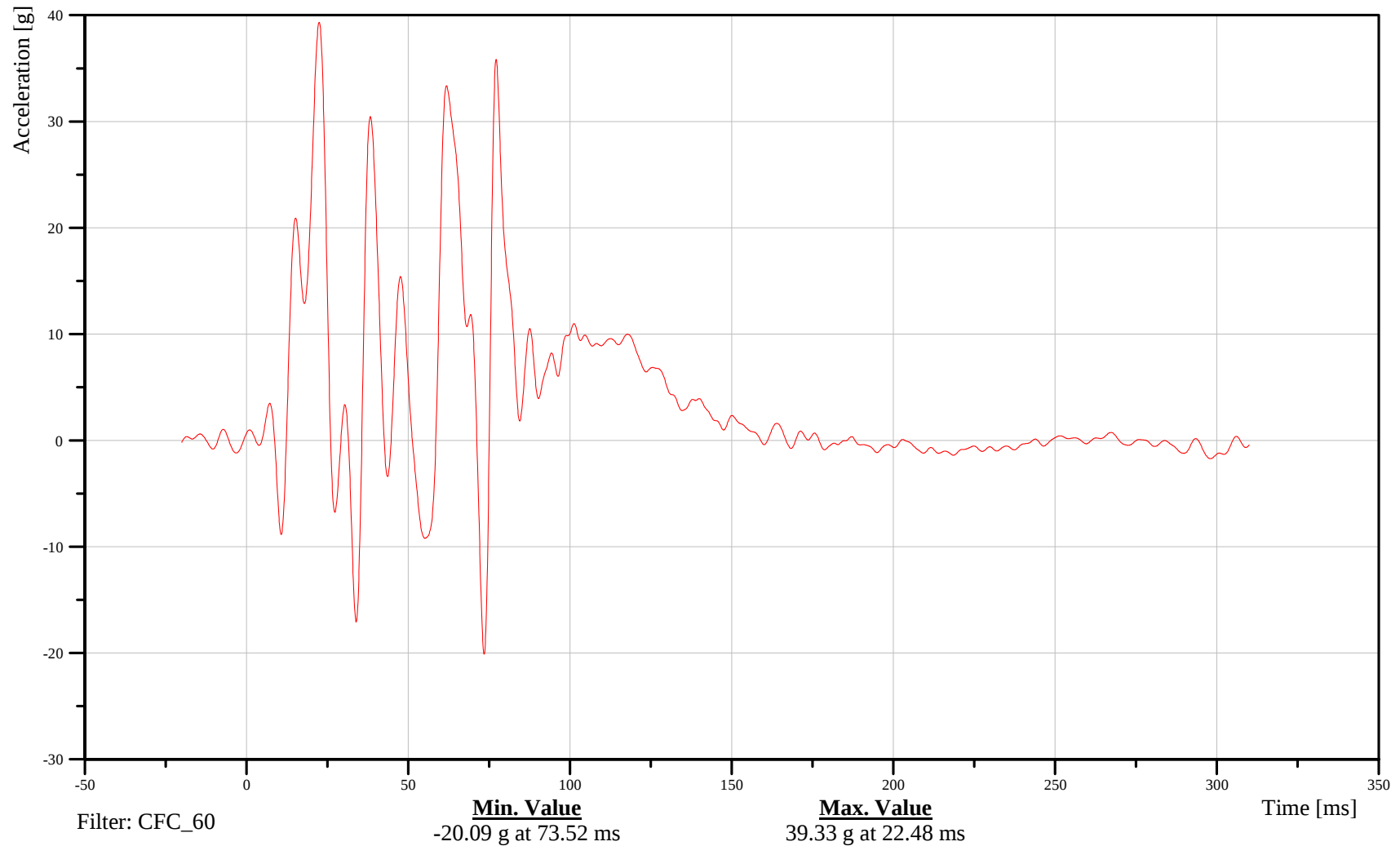
Vehicle Rear Door Mid-Rear 430 mm Above Ground Y-Axis Acceleration

Customer: VRTC

16DOOR000002ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-146

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph
Vehicle Rear Door Upper Centerline 685 mm Above Ground Y-Axis Acceleration

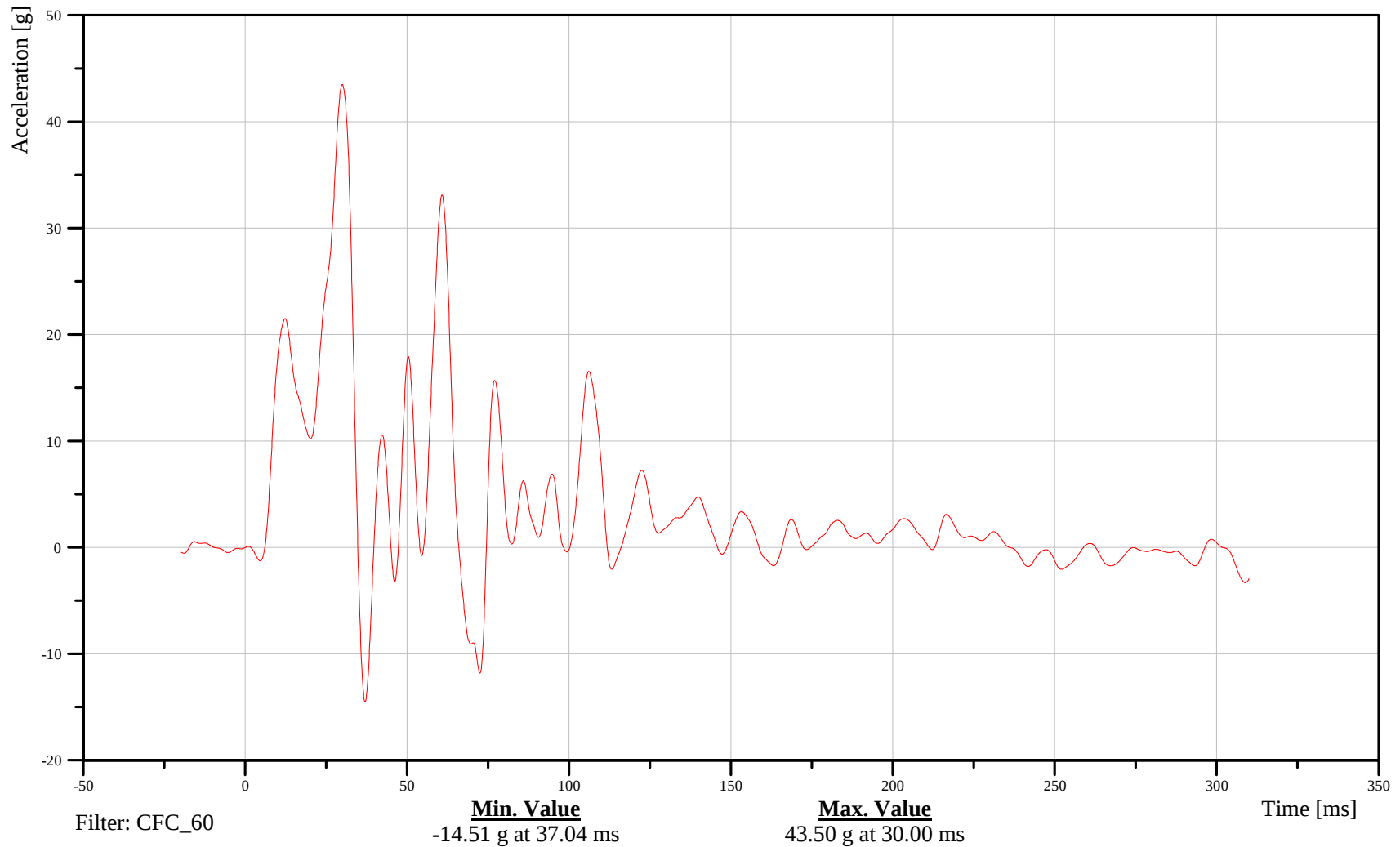
Date: 8/6/2007
Time: 14:08

Customer: VRTC

16DOOR000003ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-147

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

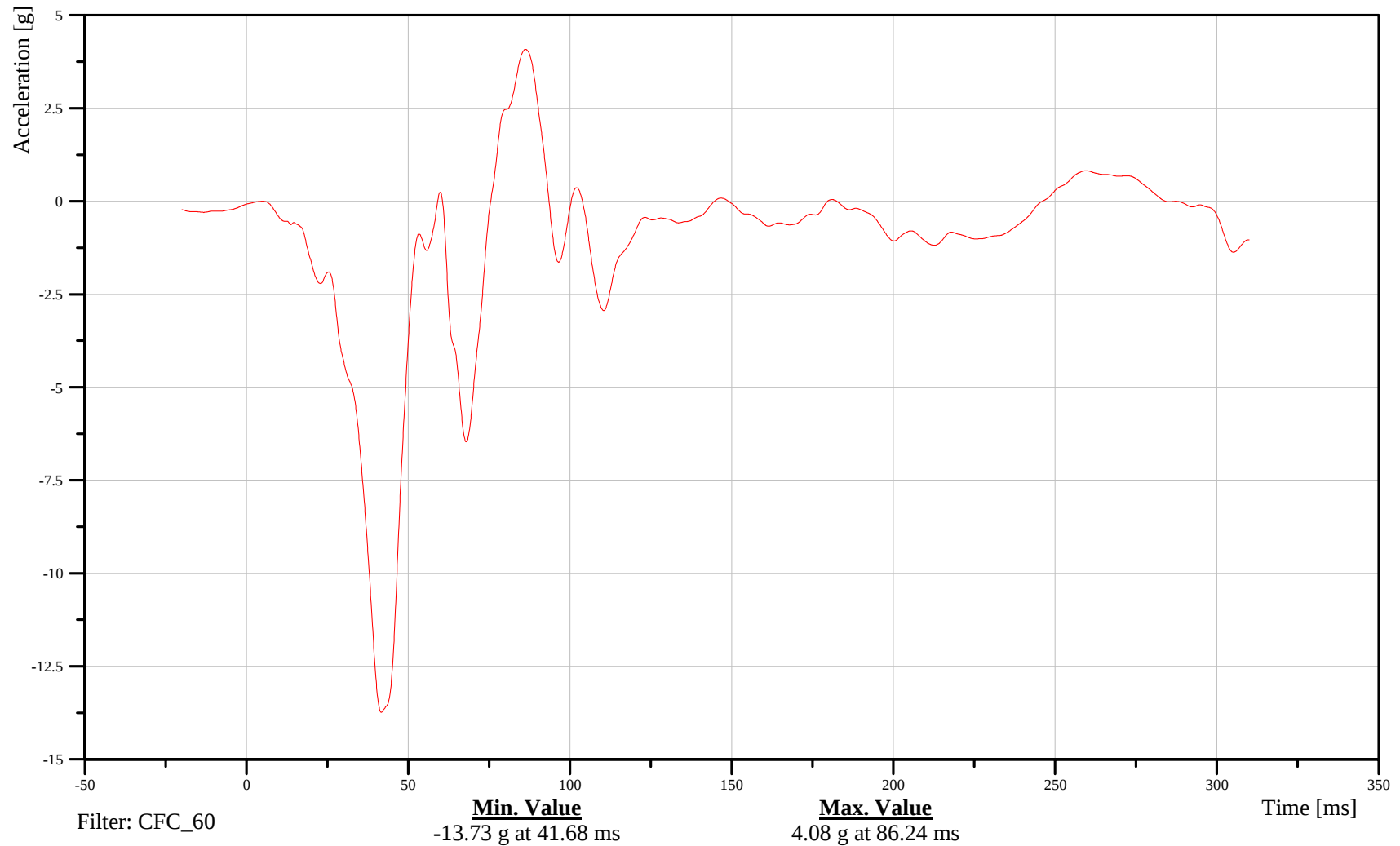
Top of Engine X-Axis Acceleration

Customer: VRTC

12ENGNTTP0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-148

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

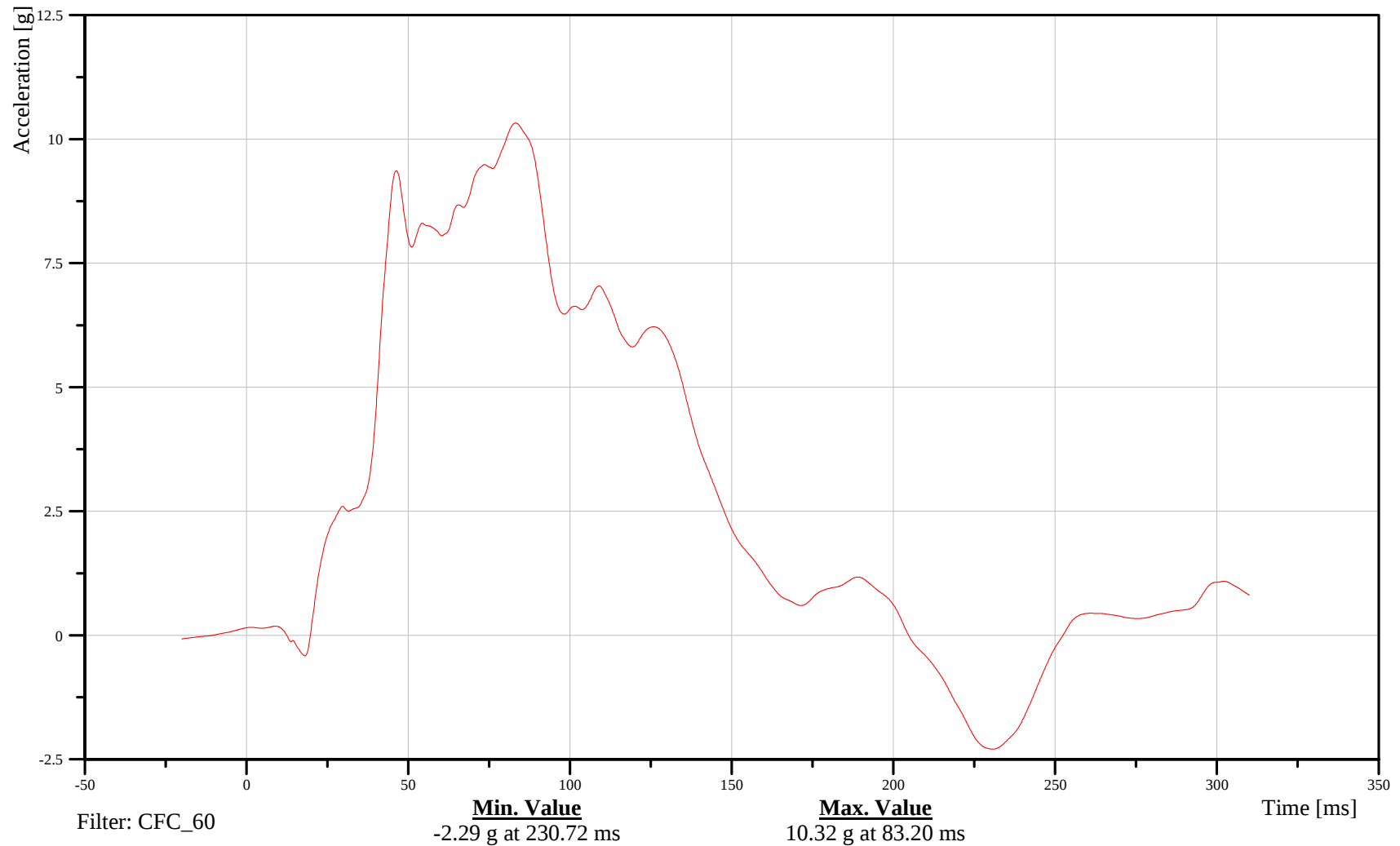
Top of Engine Y-Axis Acceleration

Customer: VRTC

12ENGNTTP0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-149

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

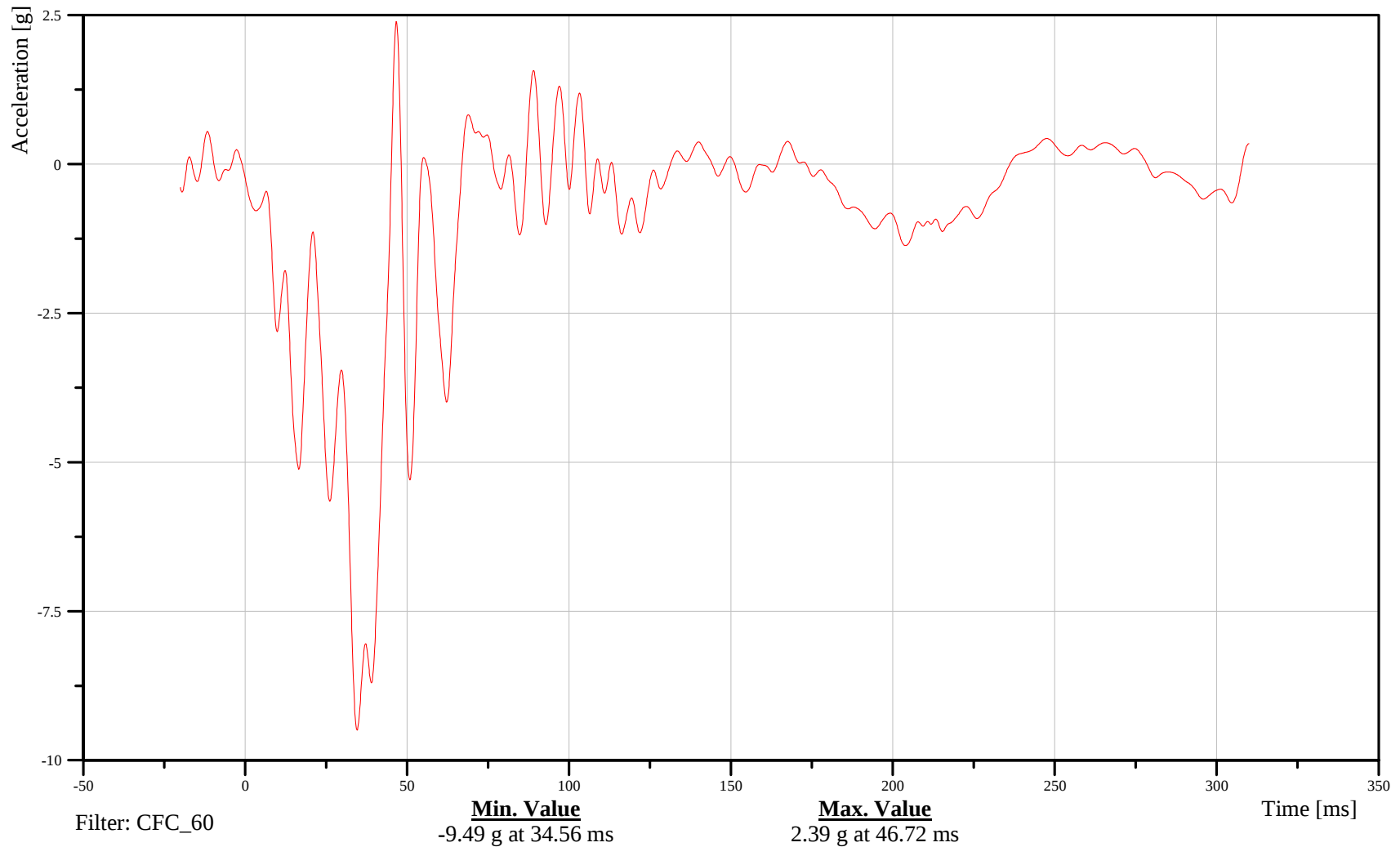
Firewall X-Axis Acceleration

Customer: VRTC

12VEHC000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-150

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

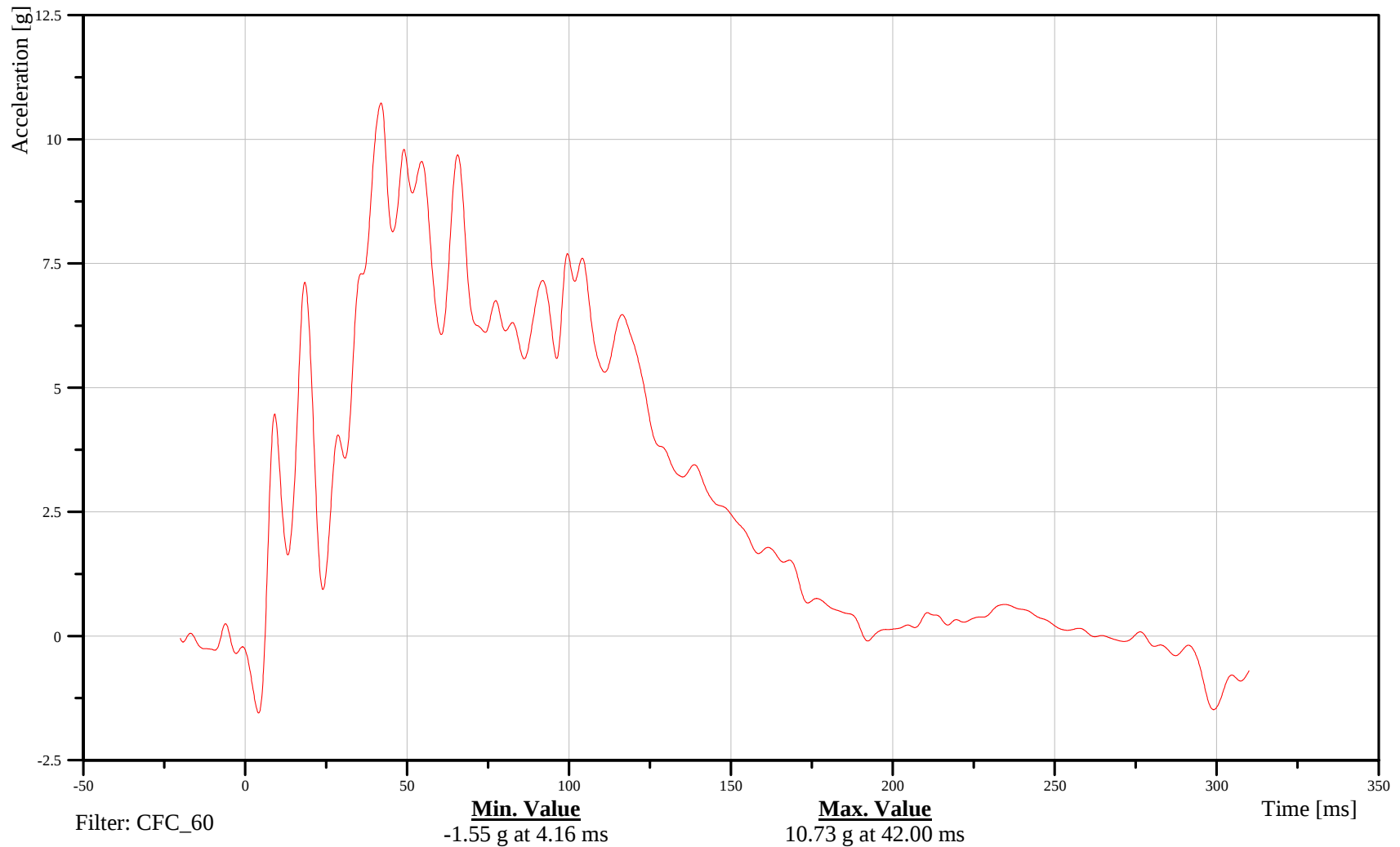
Firewall Y-Axis Acceleration

Customer: VRTC

12VEHC000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-151

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

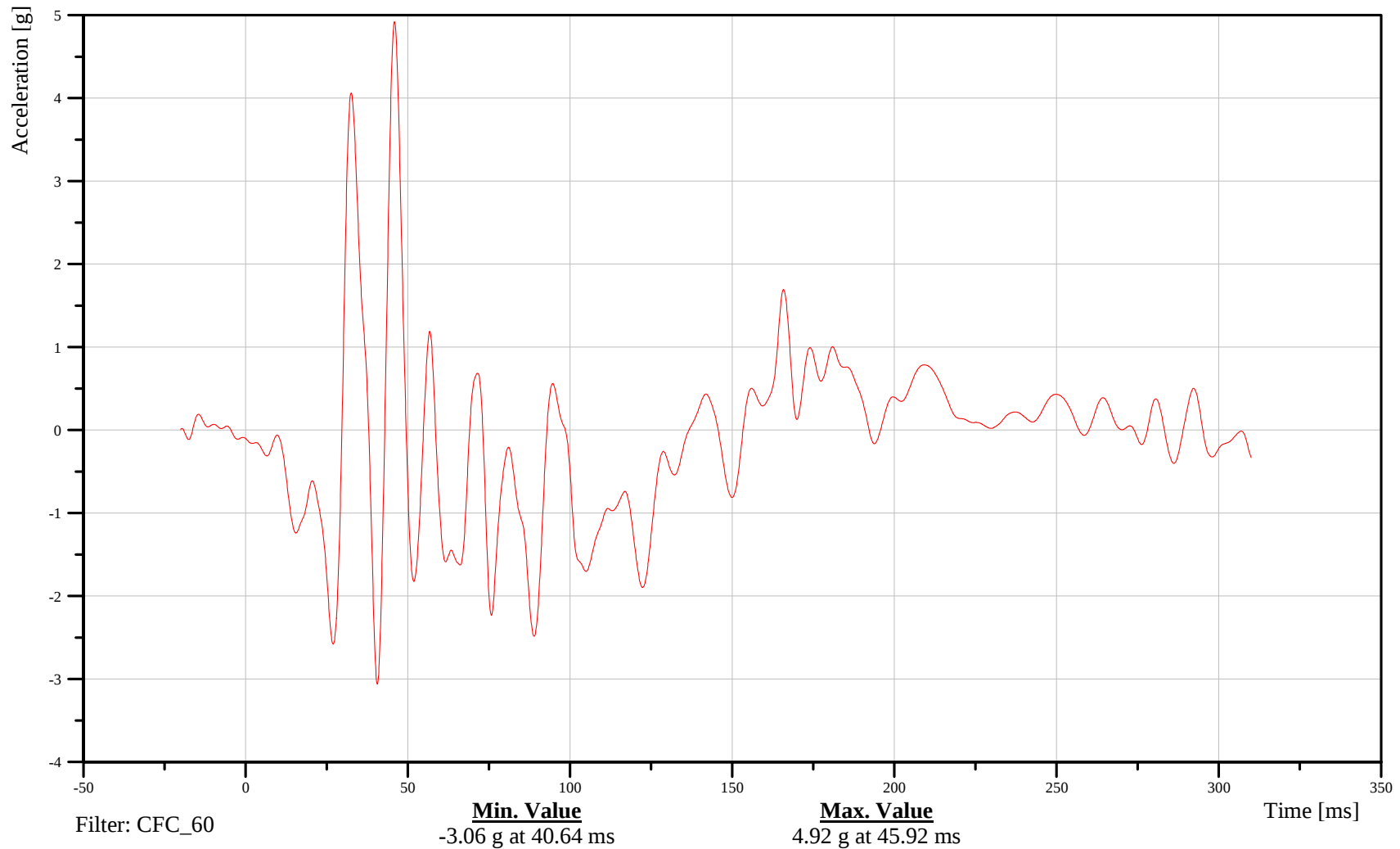
Right Side Roof Rail (in line with impact point) X-Axis Acceleration

Customer: VRTC

13ROOF000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-152

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

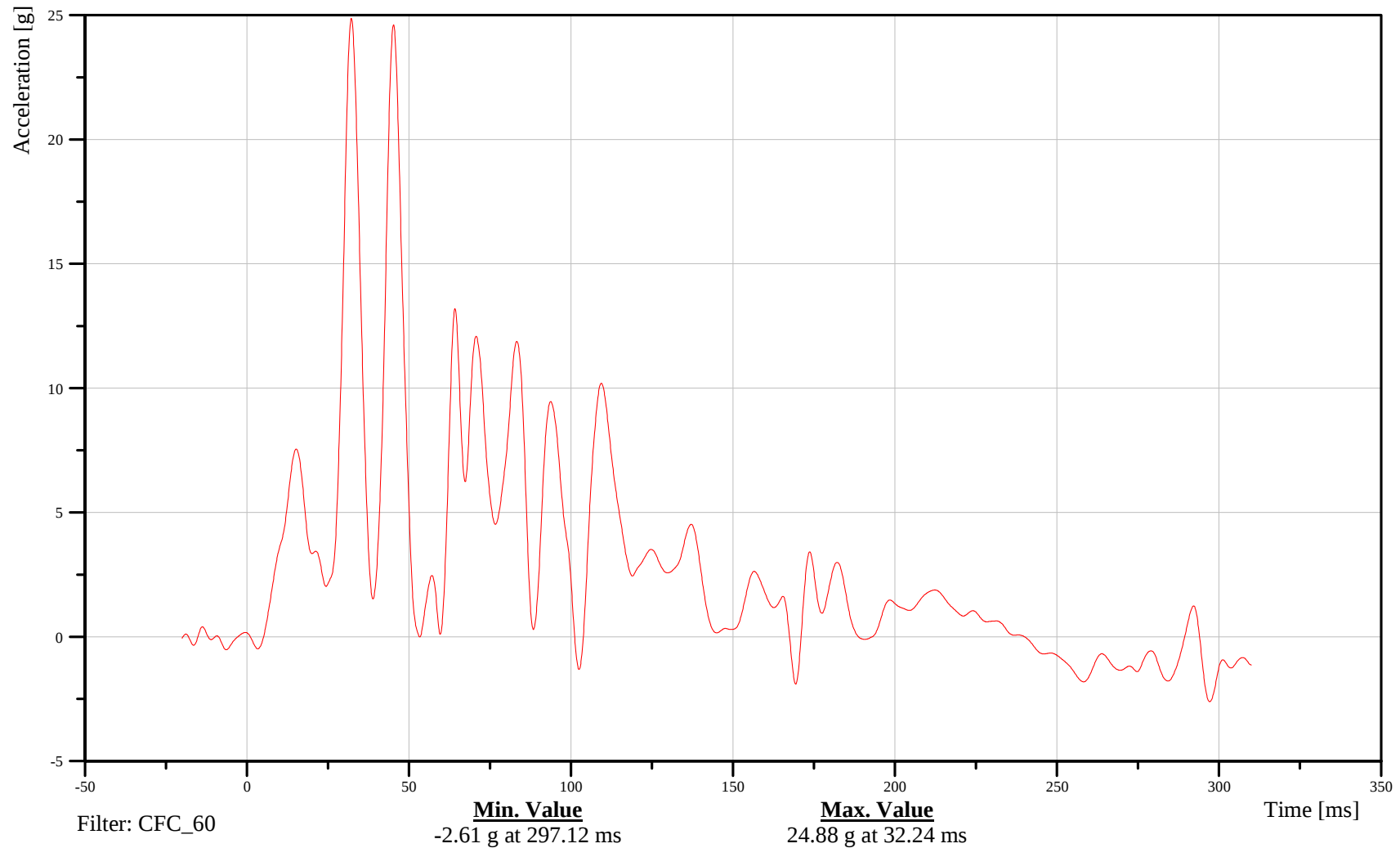
Right Side Roof Rail (in line with impact point) Y-Axis Acceleration

Customer: VRTC

13ROOF000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-153

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

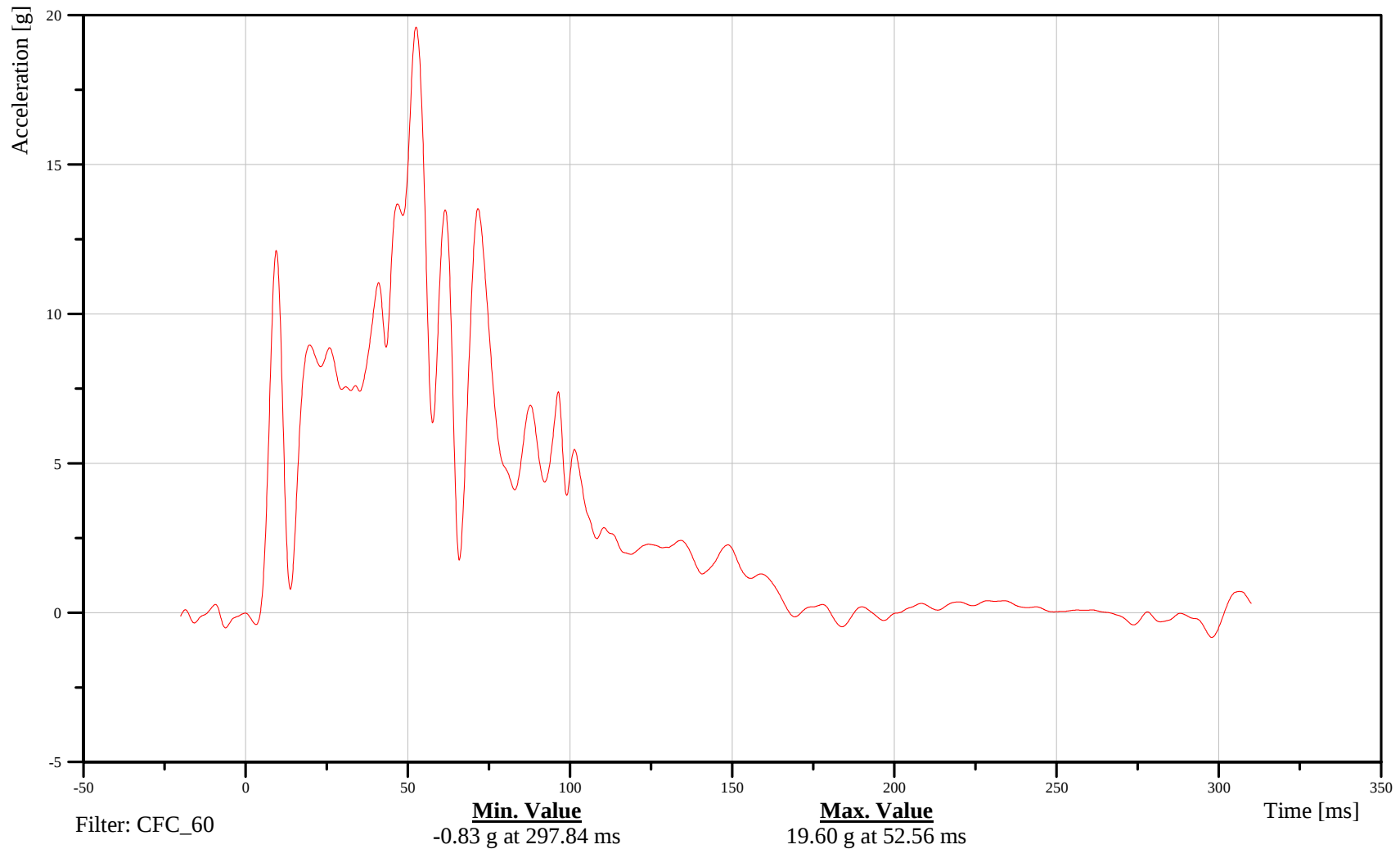
Right Side Sill (in-line with impact location) Y-Axis Acceleration

Customer: VRTC

13SILBFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-154

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

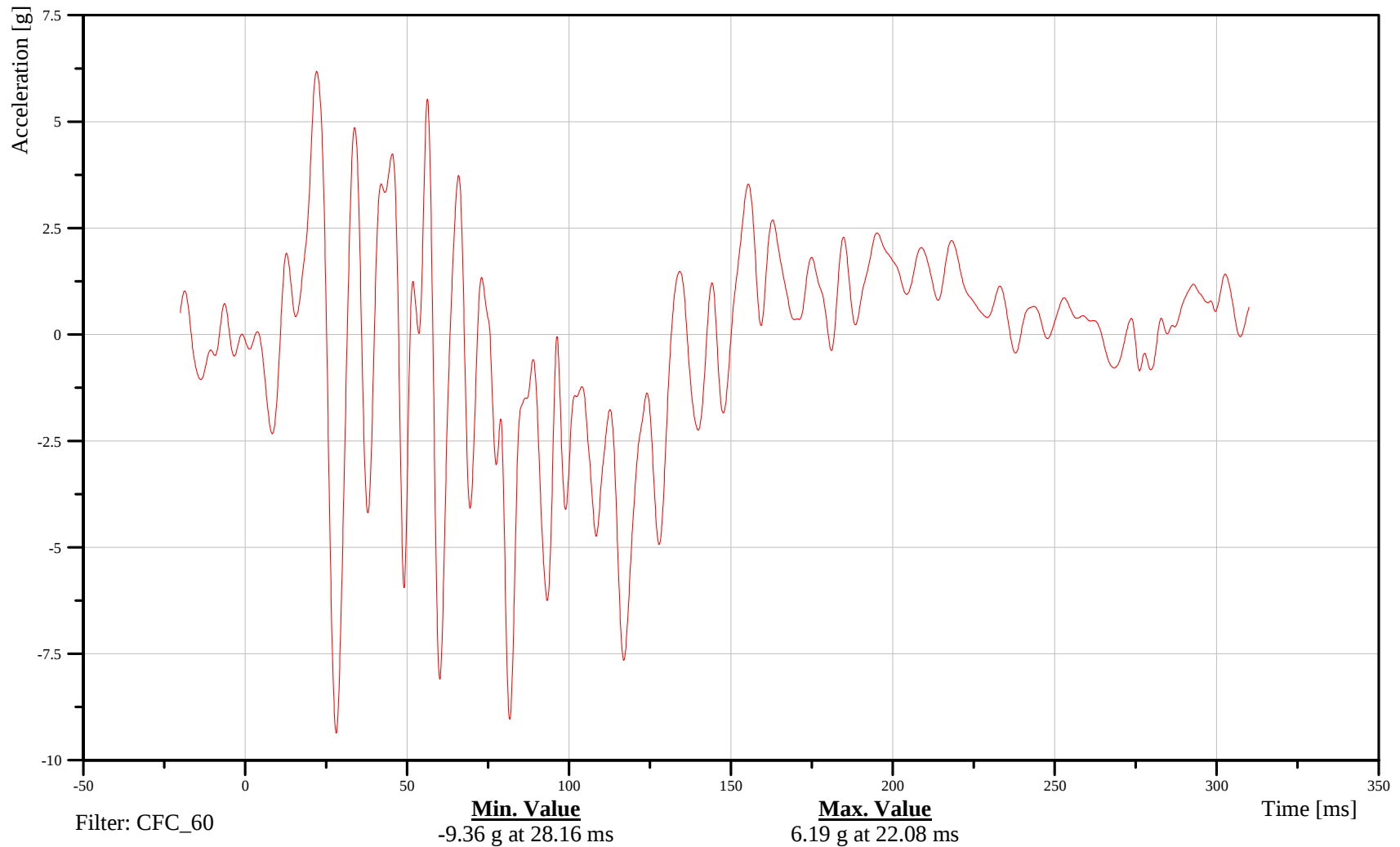
Rear Deck Behind Rear Axle X-Axis Acceleration

Customer: VRTC

18DECK000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-155

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

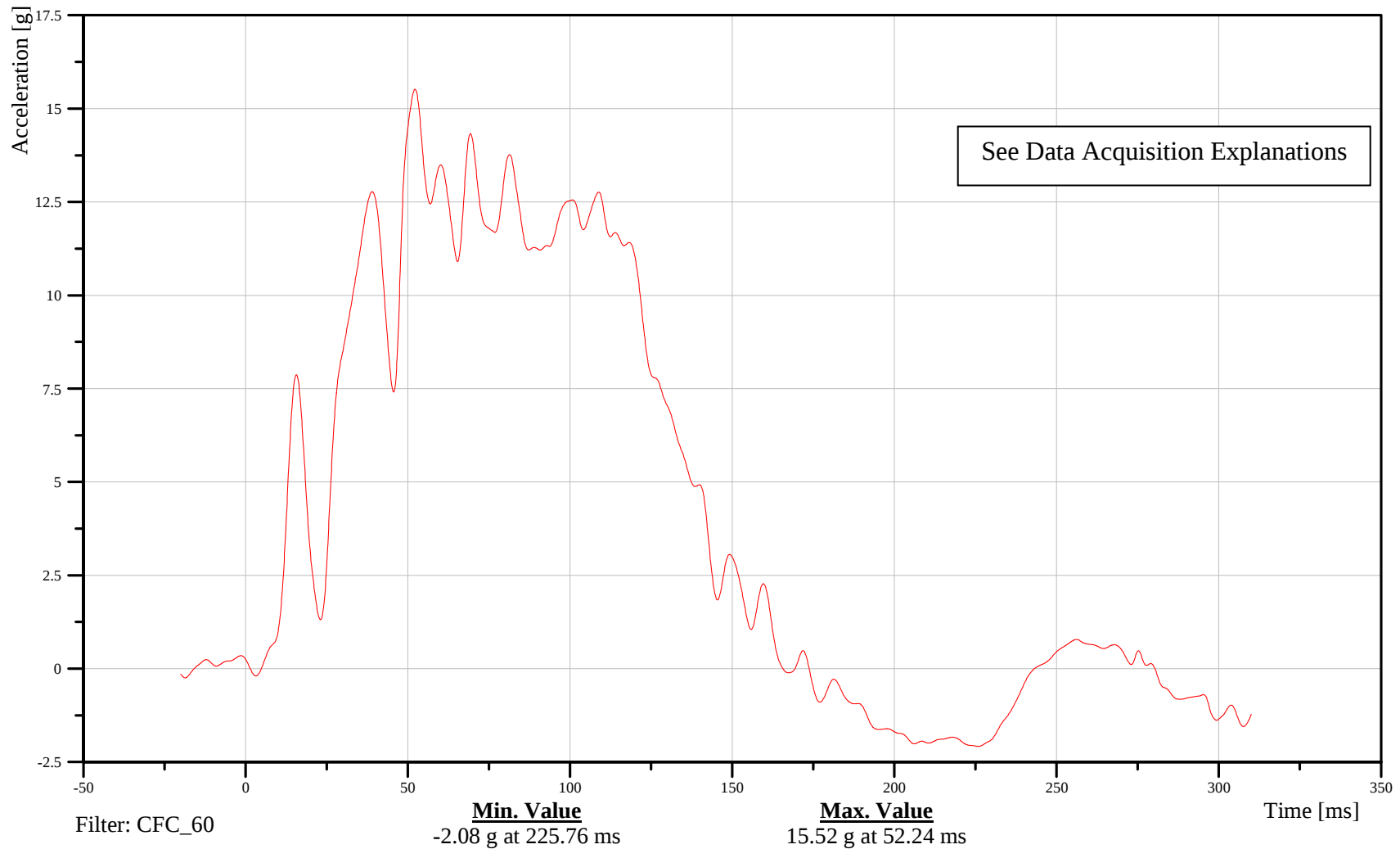
Rear Deck Behind Rear Axle Y-Axis Acceleration

Customer: VRTC

18DECK000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-156

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

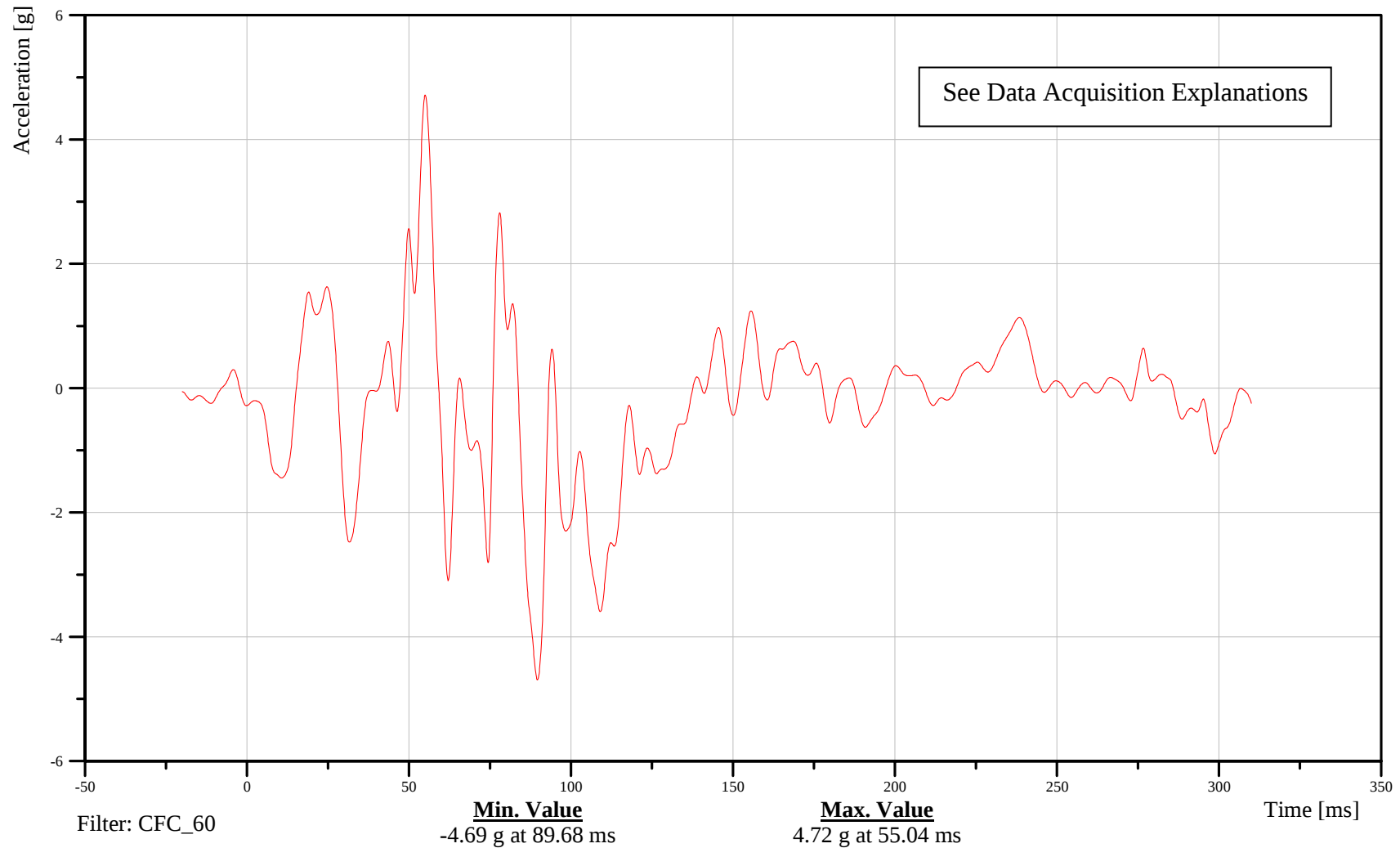
Rear Deck Behind Rear Axle Z-Axis Acceleration

Customer: VRTC

18DECK000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-157

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

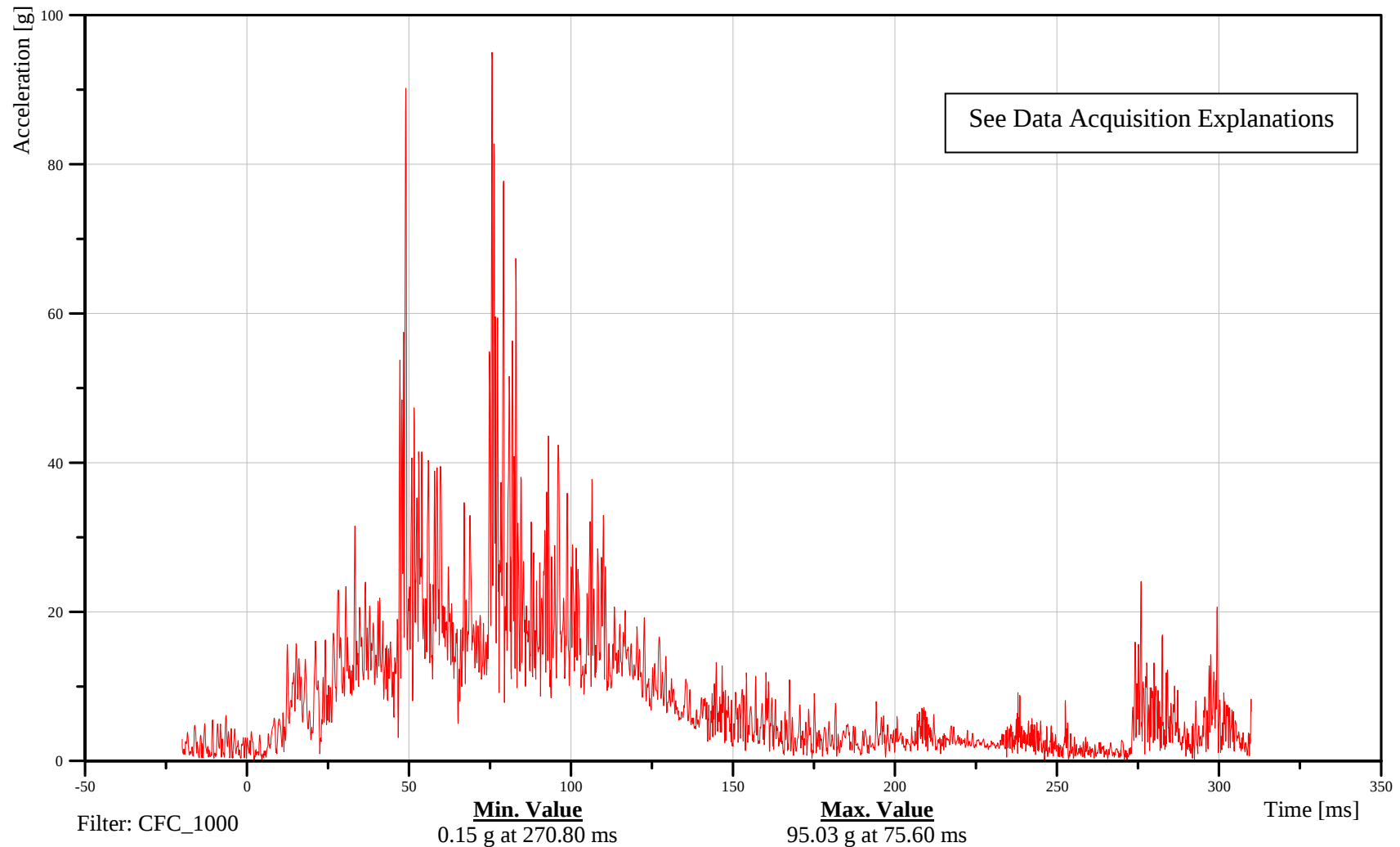
Rear Deck Behind Rear Axle Resultant Acceleration

Customer: VRTC

18DECK000000ACRA

TRC Inc. Test Lab: CTF

Test Number: 070806



B-158

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

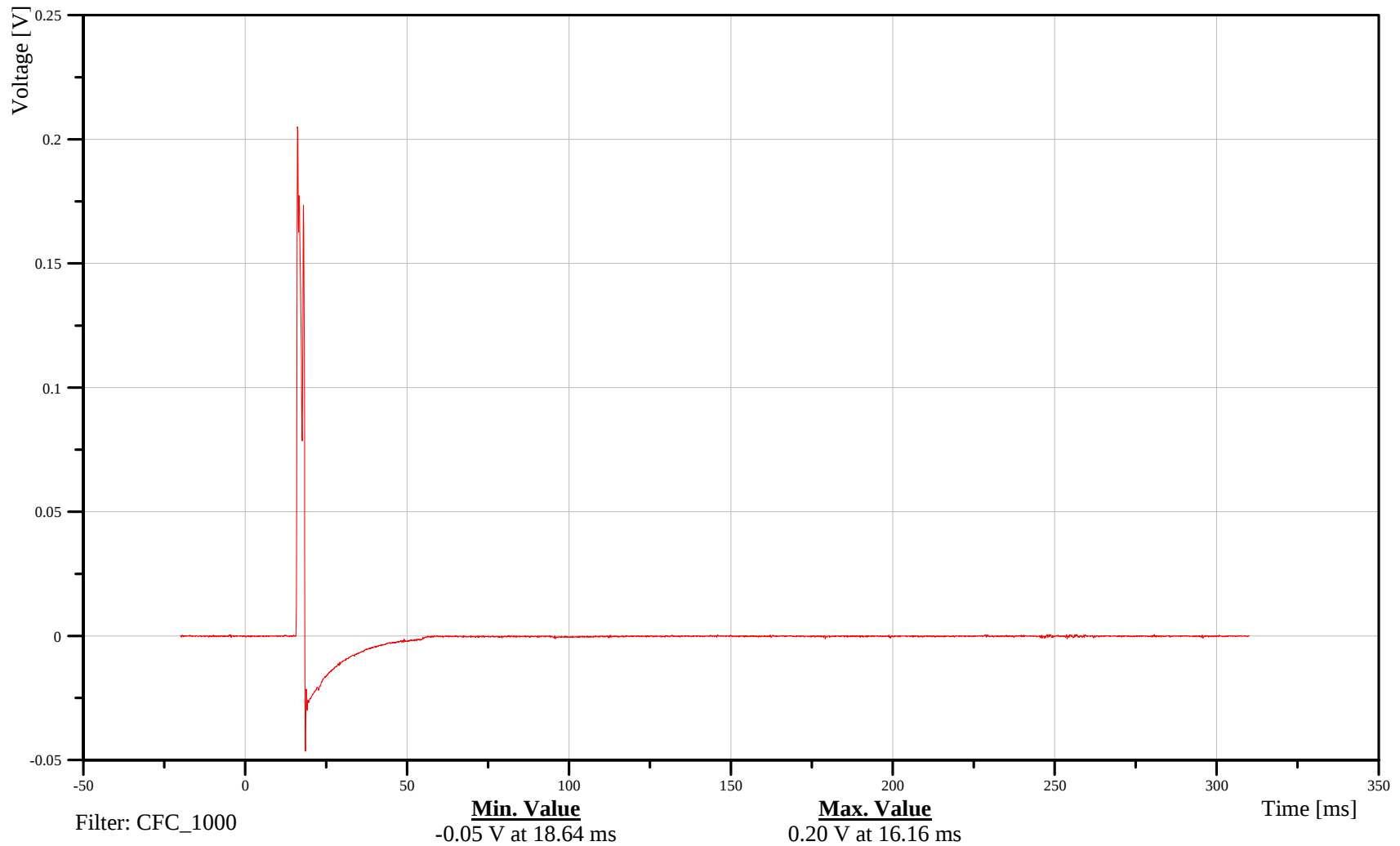
Driver Side Curtain Inductor

Customer: VRTC

11AIRBTPL E00EV0A

TRC Inc. Test Lab: CTF

Test Number: 070806



B-159

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

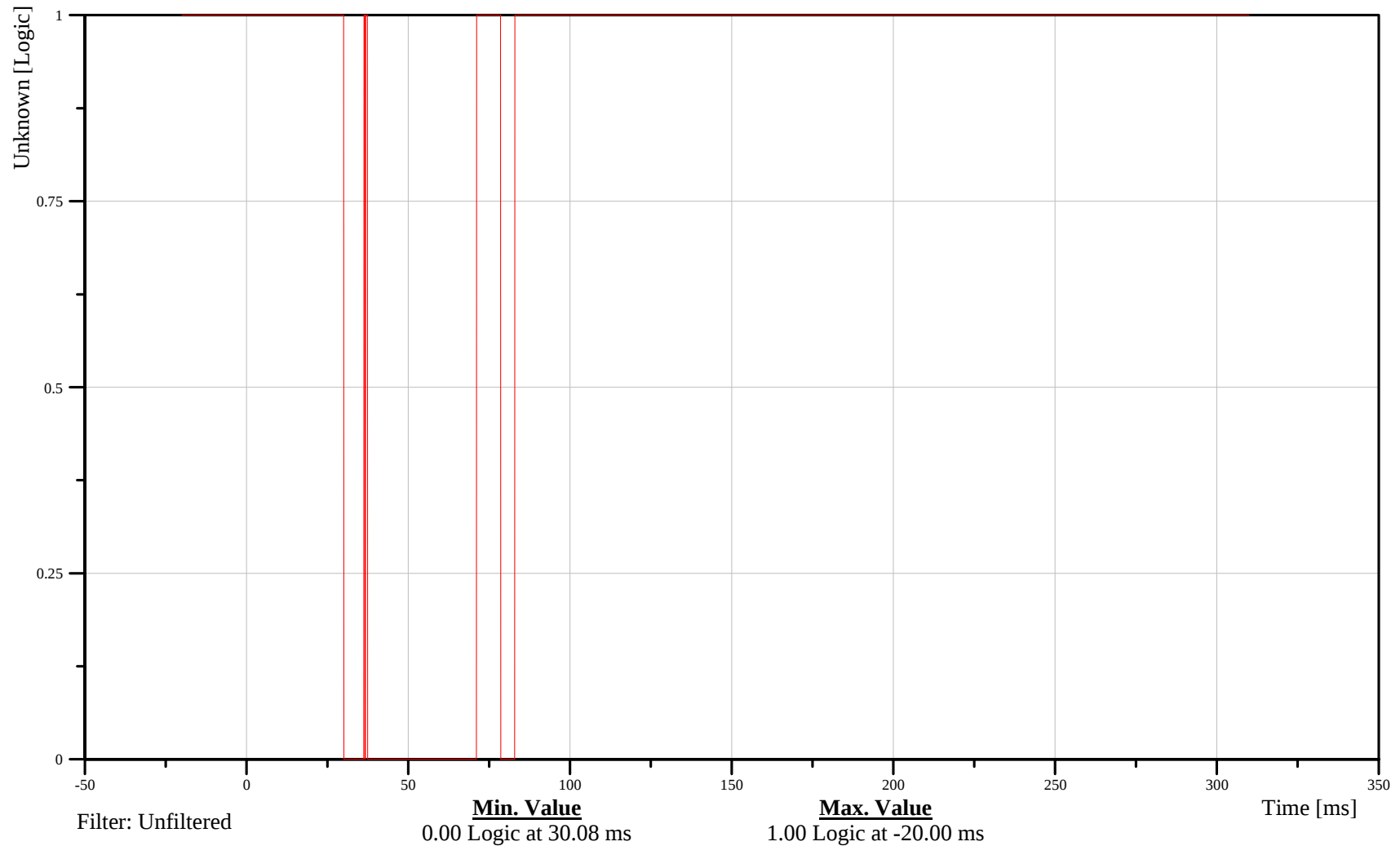
Head Contact Switch

Customer: VRTC

11CONT000001VO00

TRC Inc. Test Lab: CTF

Test Number: 070806



B-160

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

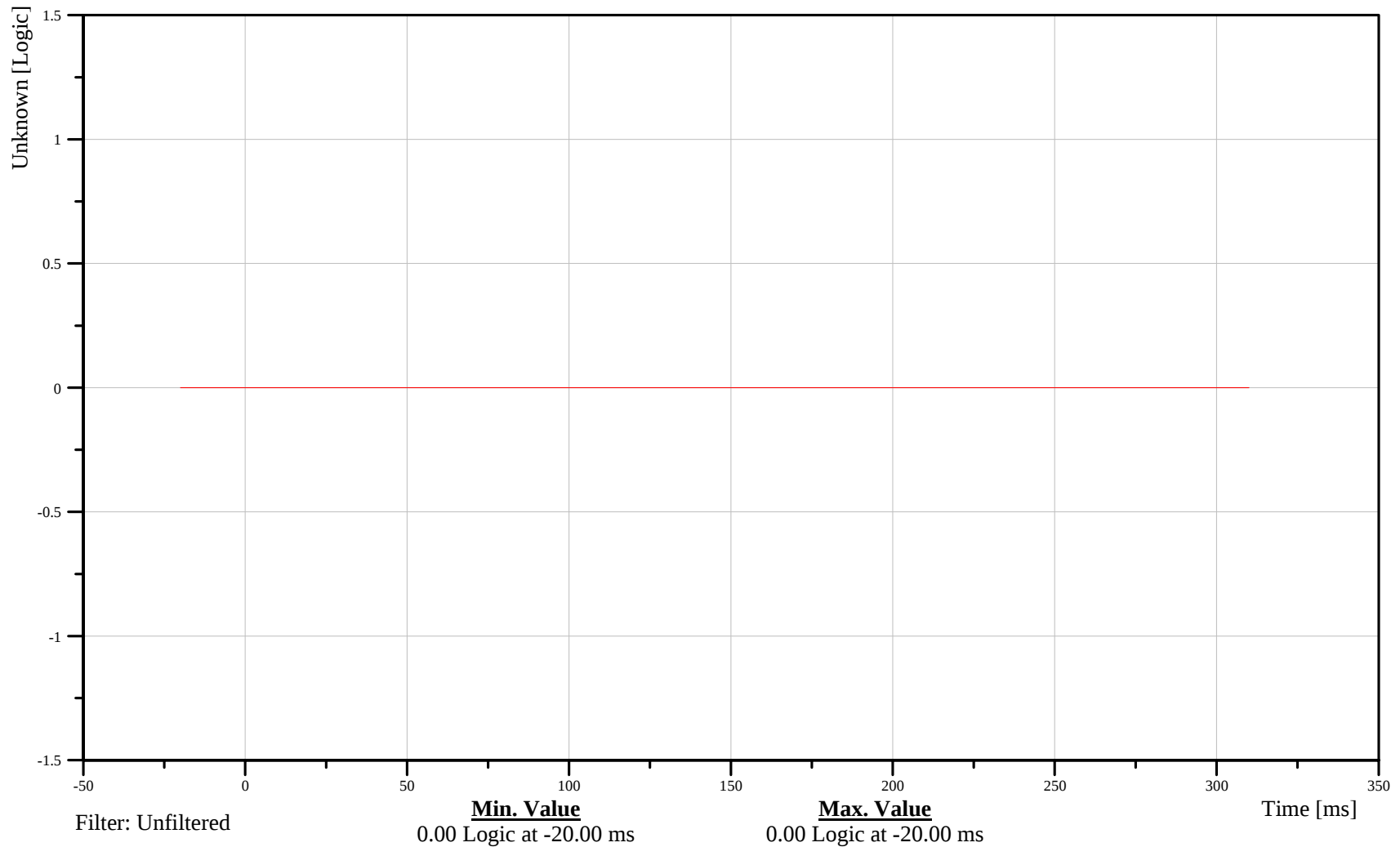
Shoulder Contact Switch

Customer: VRTC

11CONT000002VO00

TRC Inc. Test Lab: CTF

Test Number: 070806



B-161

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

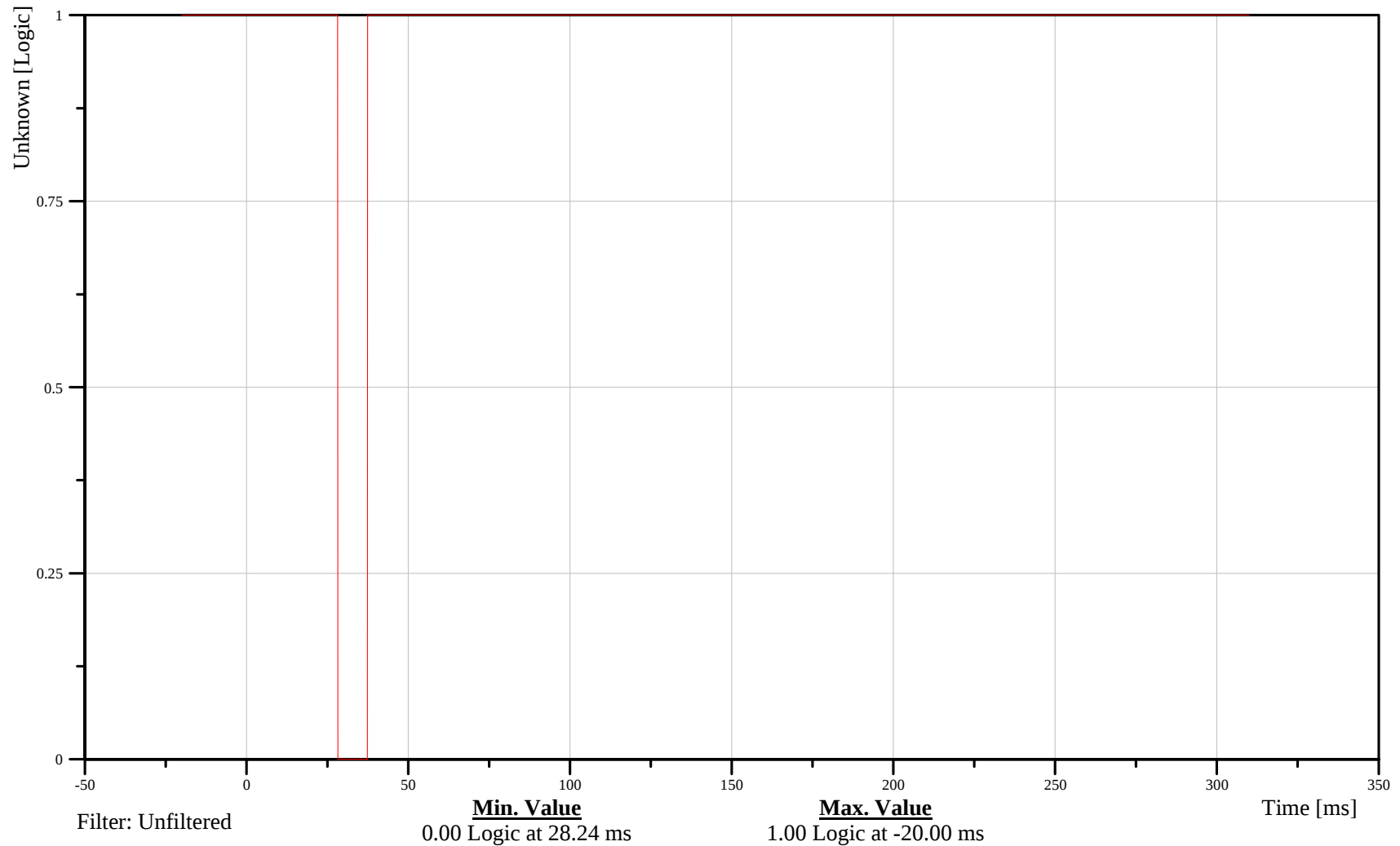
Torso Contact Switch

Customer: VRTC

11CONT000003VO00

TRC Inc. Test Lab: CTF

Test Number: 070806



B-162

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

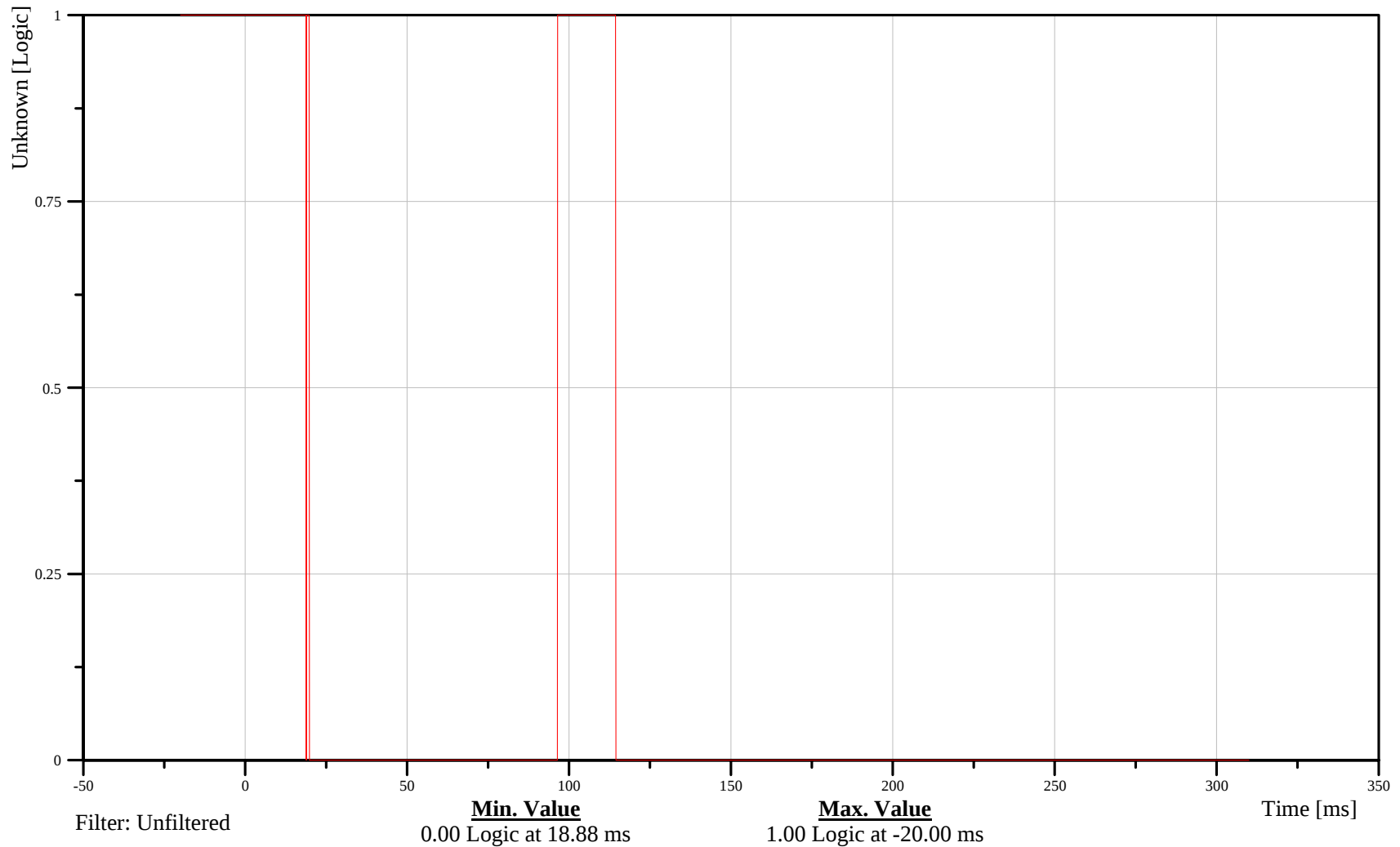
Left Contact Switch

Customer: VRTC

11CONT000004VO00

TRC Inc. Test Lab: CTF

Test Number: 070806



B-163

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

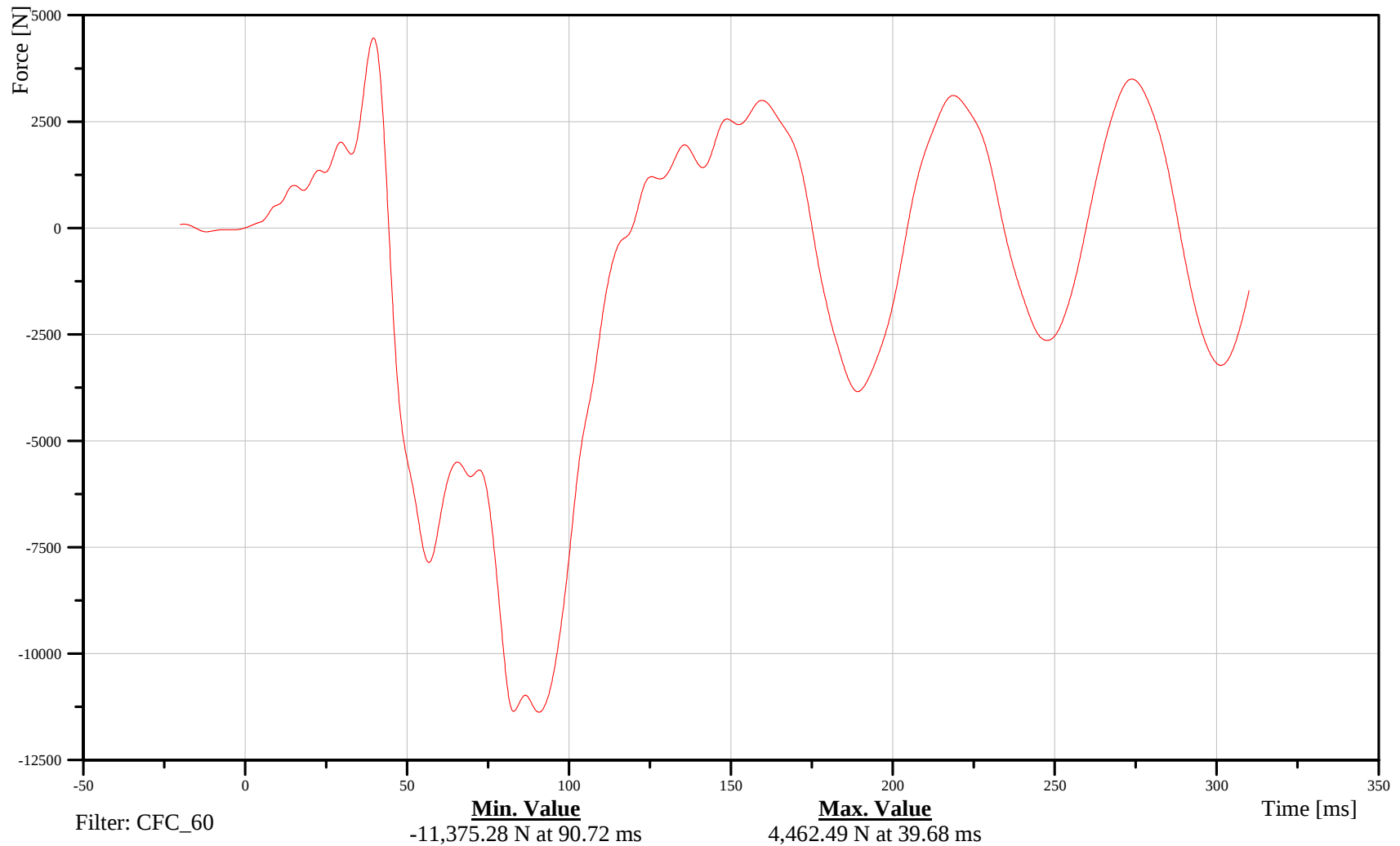
Pole Load Cell 1

Customer: VRTC

K0FBAR010000FOX

TRC Inc. Test Lab: CTF

Test Number: 070806



B-164

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

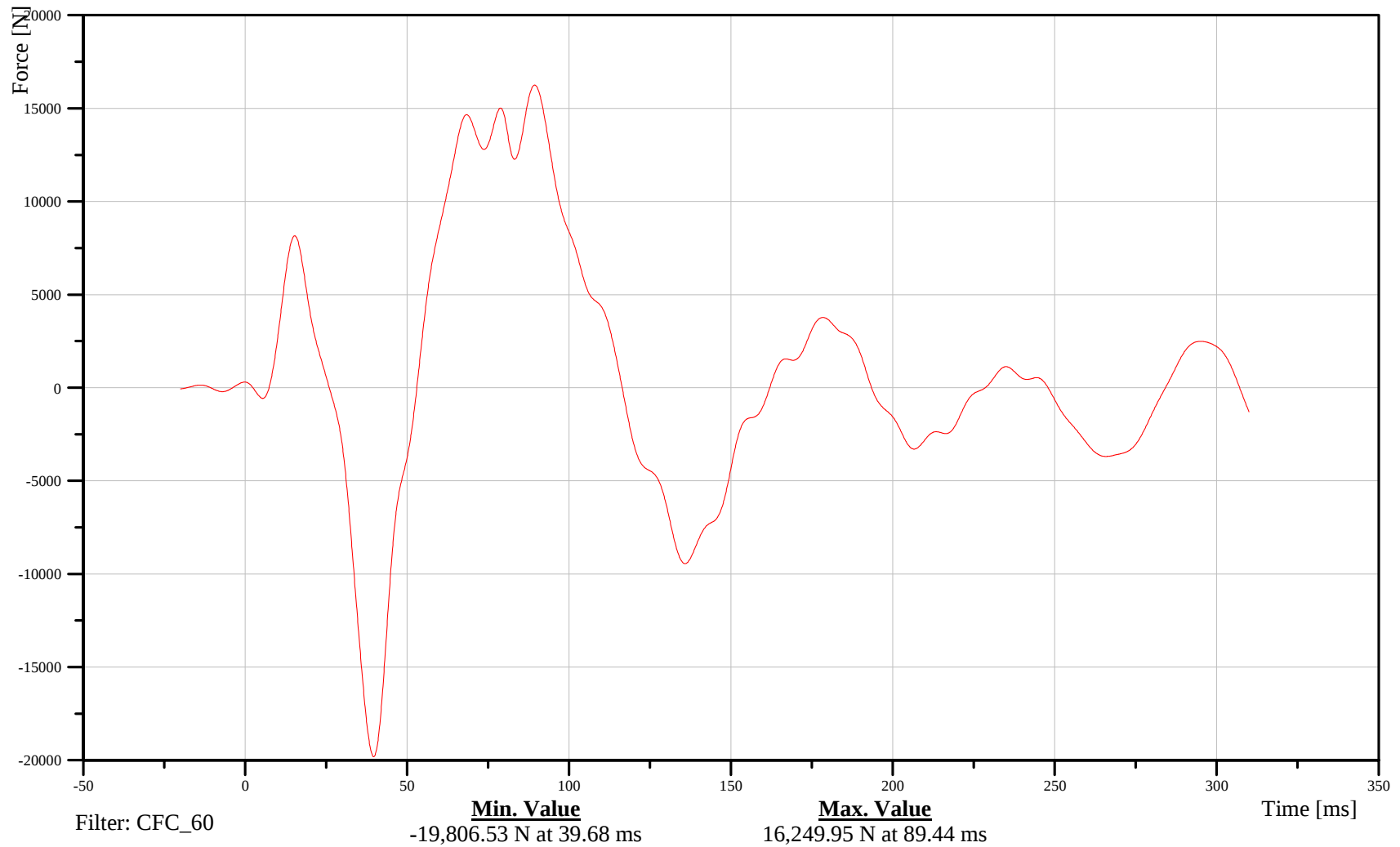
Pole Load Cell 2

Customer: VRTC

K0FBAR020000FOXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-165

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

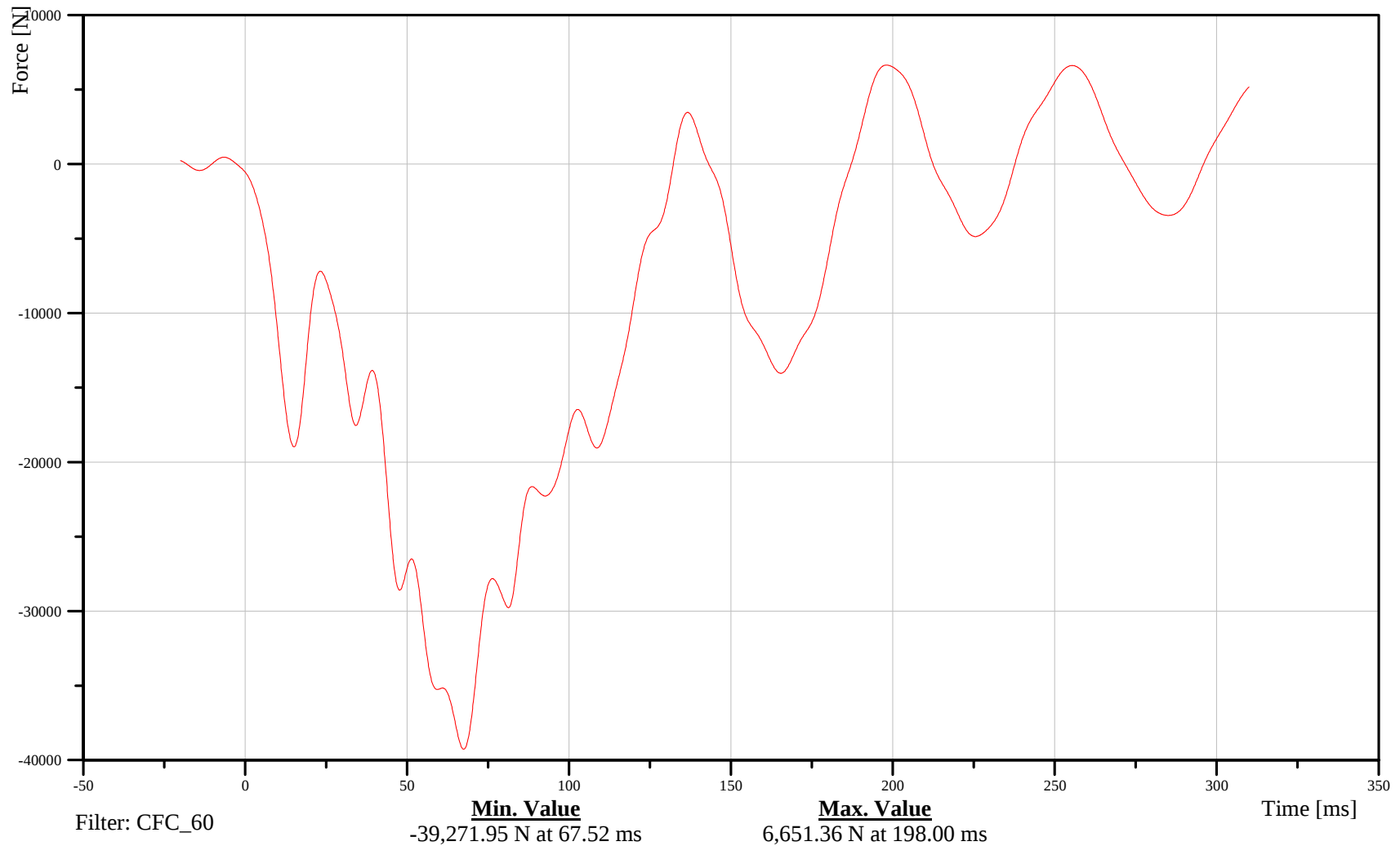
Pole Load Cell 3

Customer: VRTC

K0FBAR030000FOX

TRC Inc. Test Lab: CTF

Test Number: 070806



B-166

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

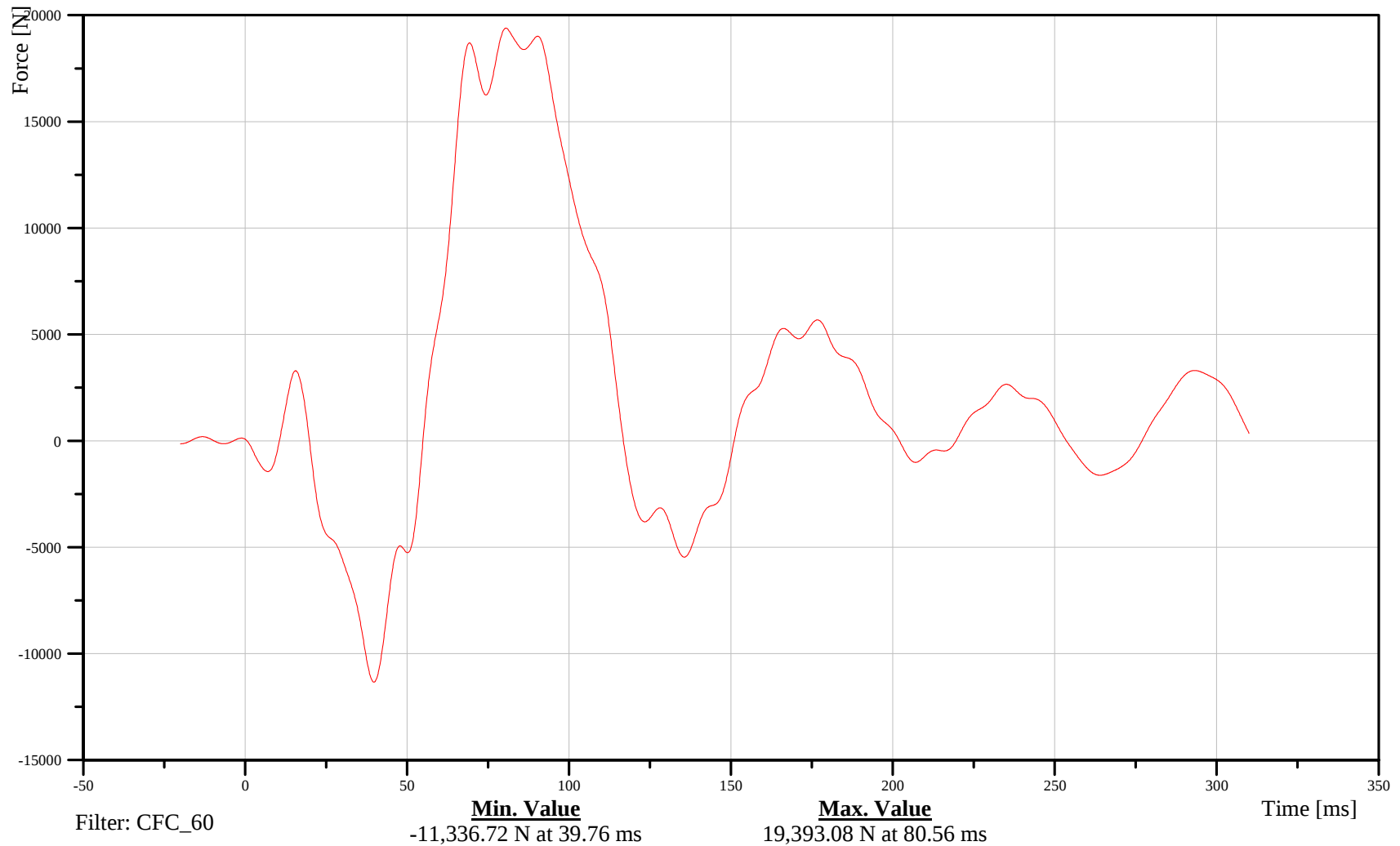
Pole Load Cell 4

Customer: VRTC

K0FBAR040000FOXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-167

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Date: 8/6/2007
Time: 14:08

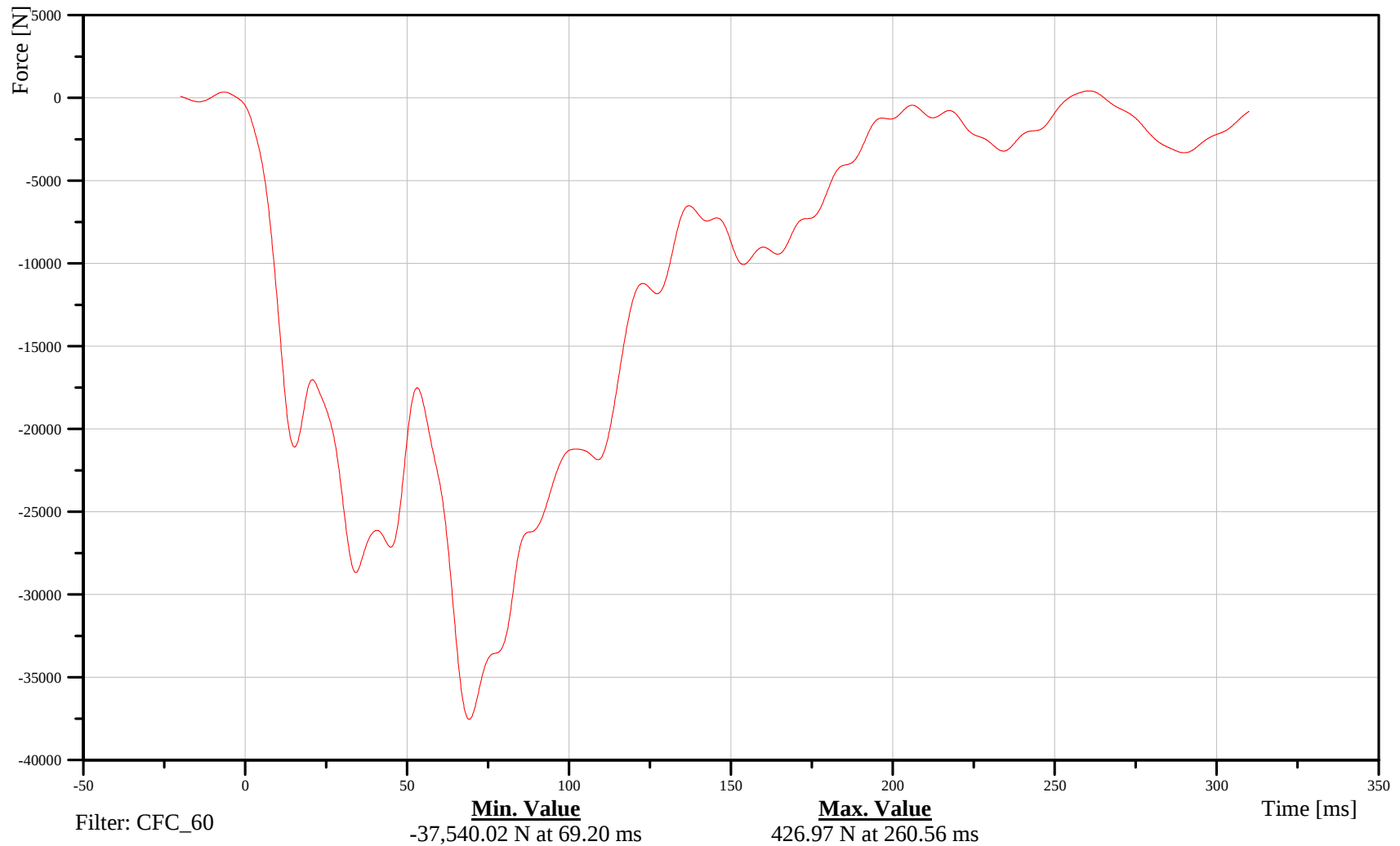
Pole Load Cell 5

Customer: VRTC

K0FBAR050000FOXD

TRC Inc. Test Lab: CTF

Test Number: 070806



B-168

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Pole Load Cell 6

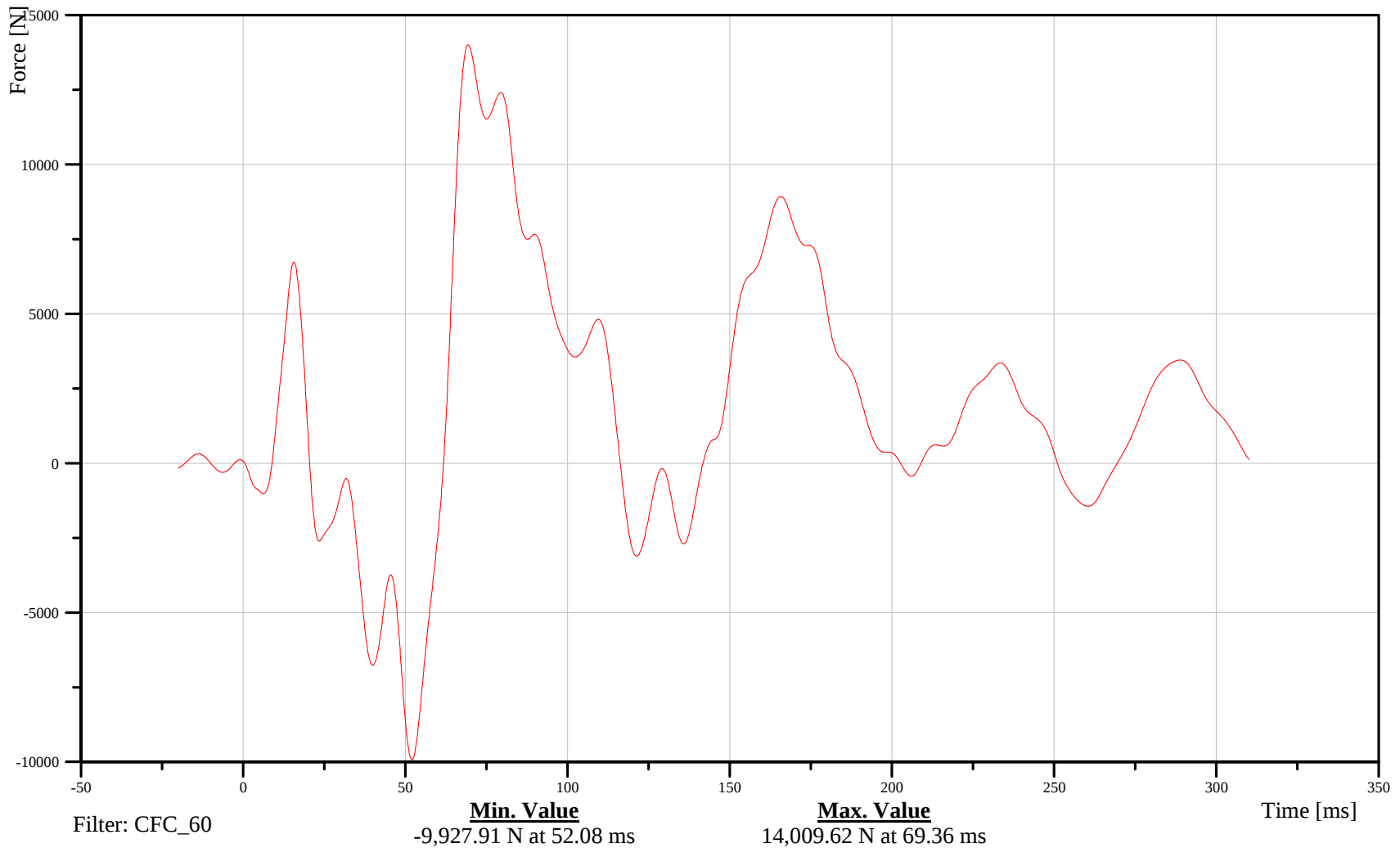
Date: 8/6/2007
Time: 14:08

Customer: VRTC

K0FBAR060000FOX

TRC Inc. Test Lab: CTF

Test Number: 070806



B-169

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Pole Load Cell 7

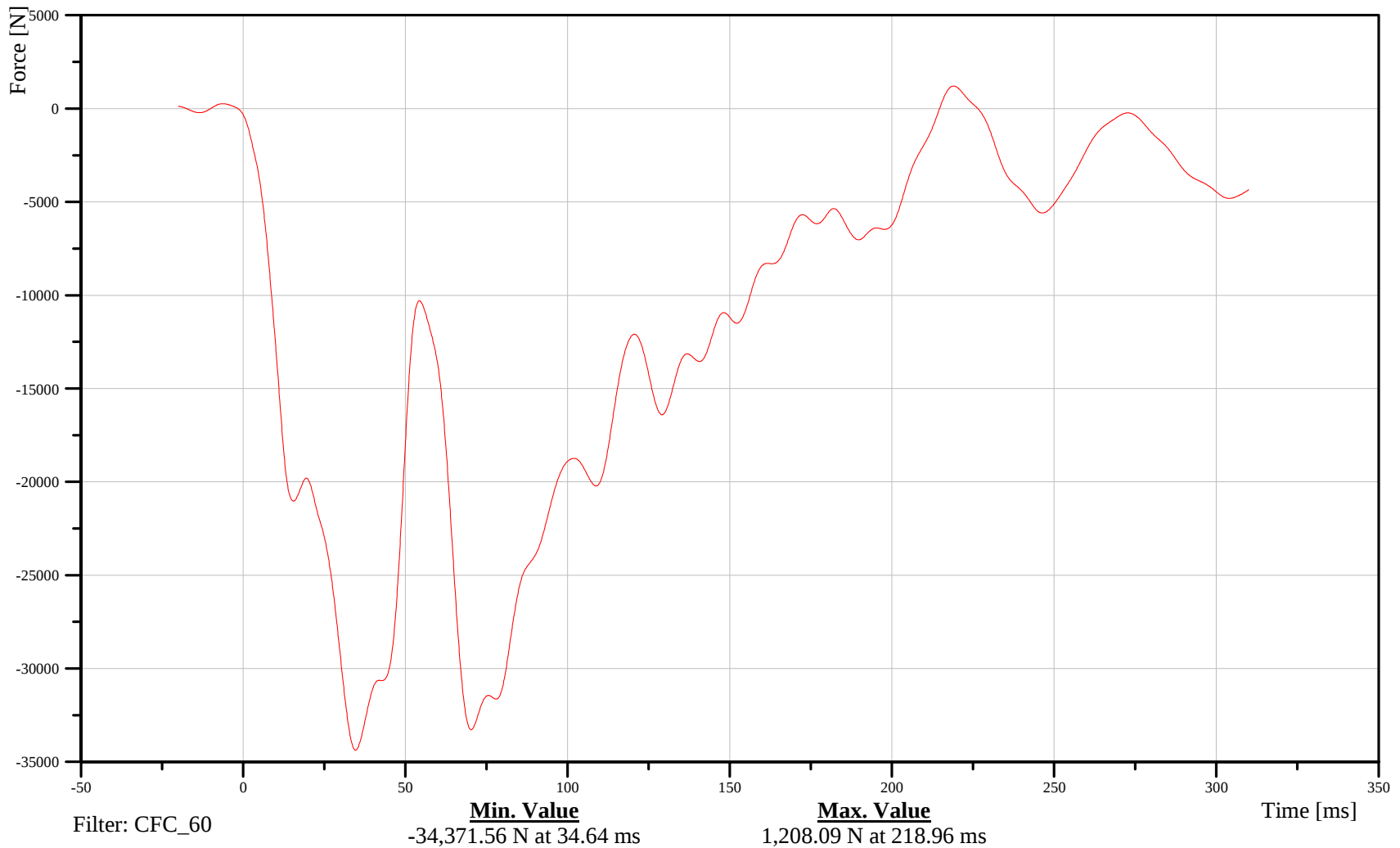
Date: 8/6/2007
Time: 14:08

Customer: VRTC

K0FBAR070000FOX

TRC Inc. Test Lab: CTF

Test Number: 070806



B-170

070806



2005 Saturn Ion Left Side FMVSS 214 Pole Impact at 32 kph

Pole Load Cell 8

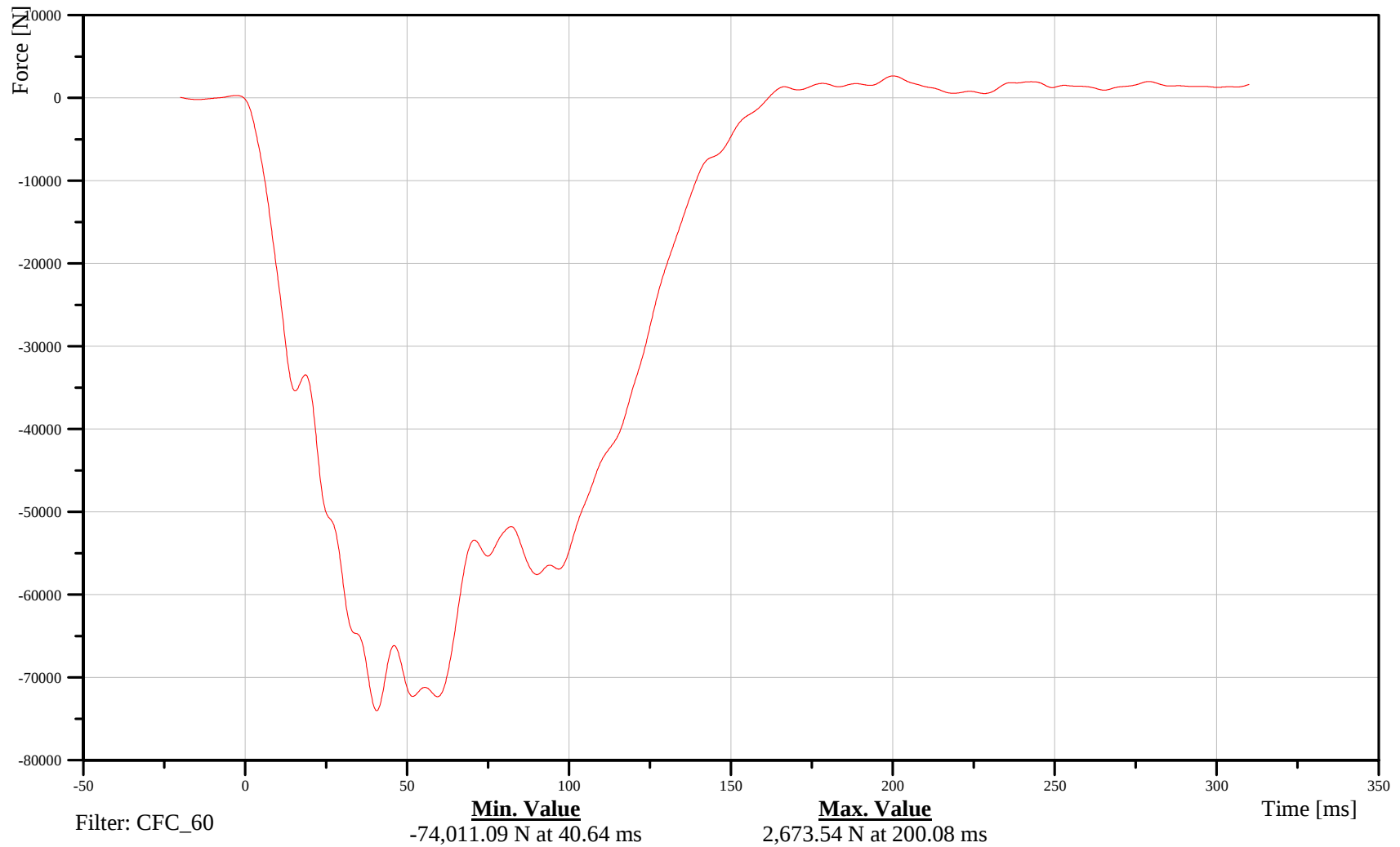
Date: 8/6/2007
Time: 14:08

Customer: VRTC

K0FBAR080000FOX

TRC Inc. Test Lab: CTF

Test Number: 070806



B-171

070806

Appendix C

World SID Configuration and Performance Verification Data

Calibration Test Results

Pre-Test

World SID: 016

Configured for Left Side Impact

Transportation Research Center Inc.

Front

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-2

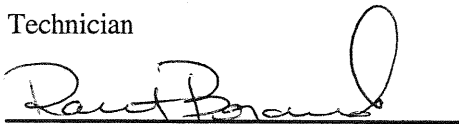
Test Date: 7/19/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	228.9 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-5.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



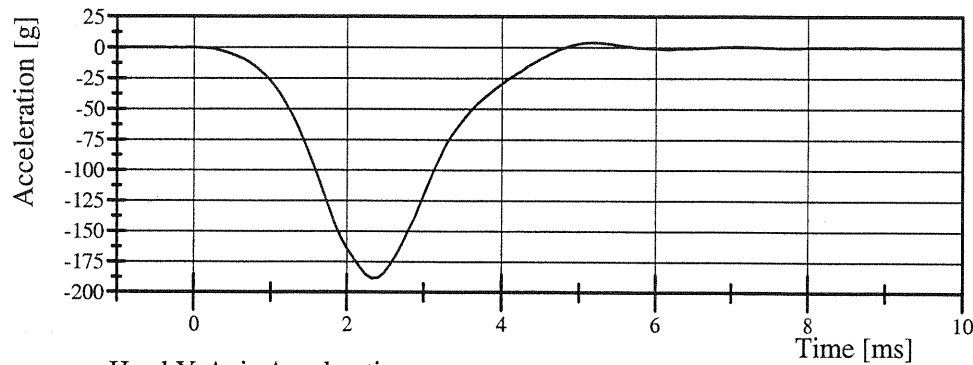
Transportation Research Center Inc.

Front

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-2

Test Date: 7/19/2007

Head X-Axis Acceleration

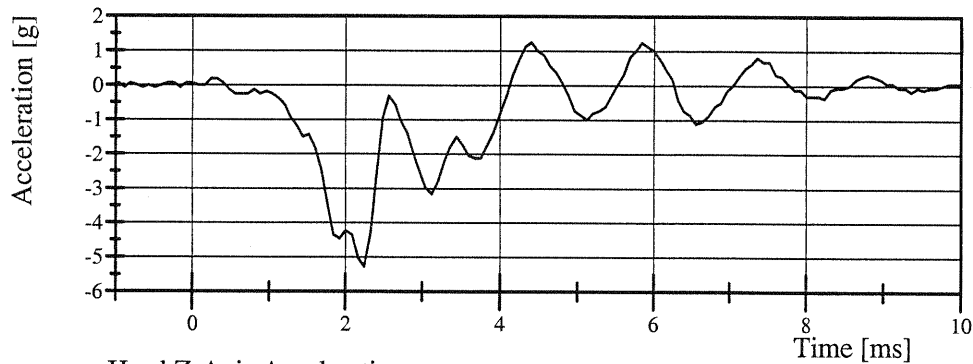


Filter Class: CFC_1000

Max: 3.9 g at 5.1 ms

Min: -188.7 g at 2.3 ms

Head Y-Axis Acceleration

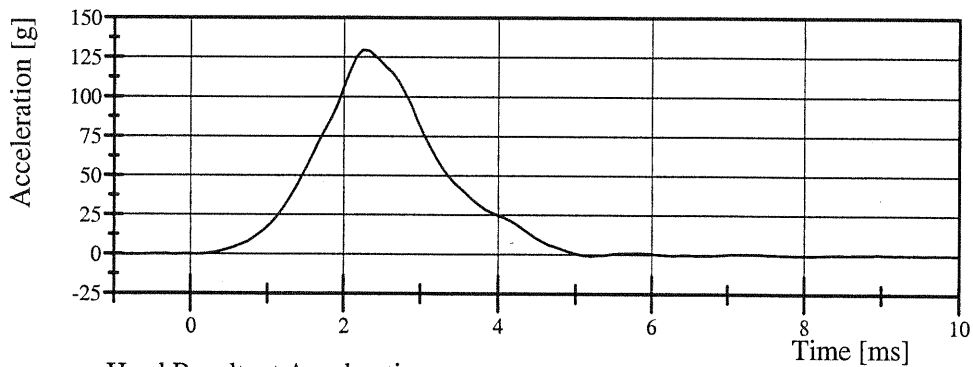


Filter Class: CFC_1000

Max: 1.2 g at 4.4 ms

Min: -5.3 g at 2.2 ms

Head Z-Axis Acceleration

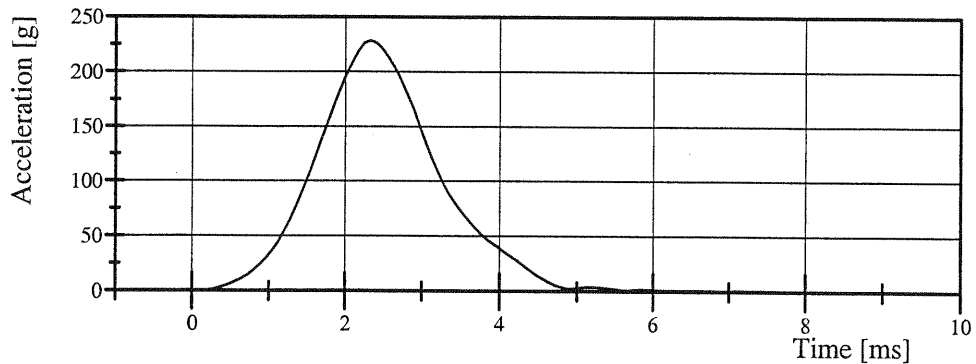


Filter Class: CFC_1000

Max: 129.7 g at 2.2 ms

Min: -0.9 g at 5.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 228.9 g at 2.3 ms

Min: 0.0 g at -0.6 ms

Transportation Research Center Inc.

Right Lateral

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

Test Date: 7/19/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Peak Head Resultant Acceleration	99 - 121 g	112.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	3.6 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Beale

Approved

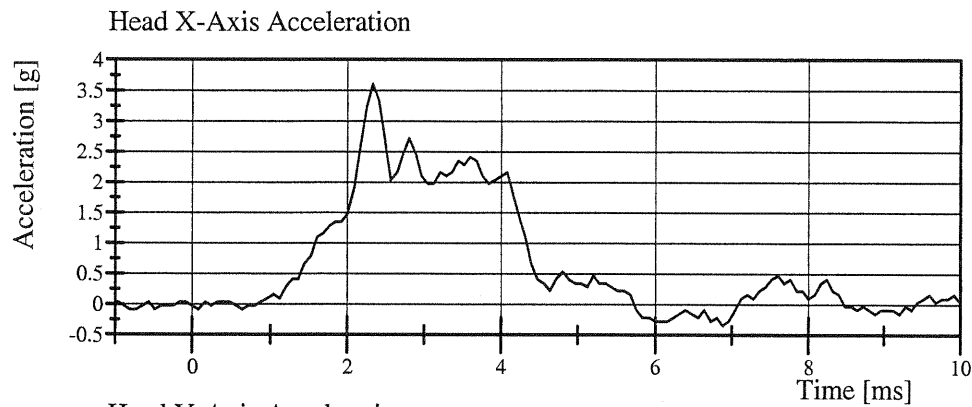
Ron Stoner

Transportation Research Center Inc.

Right Lateral

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

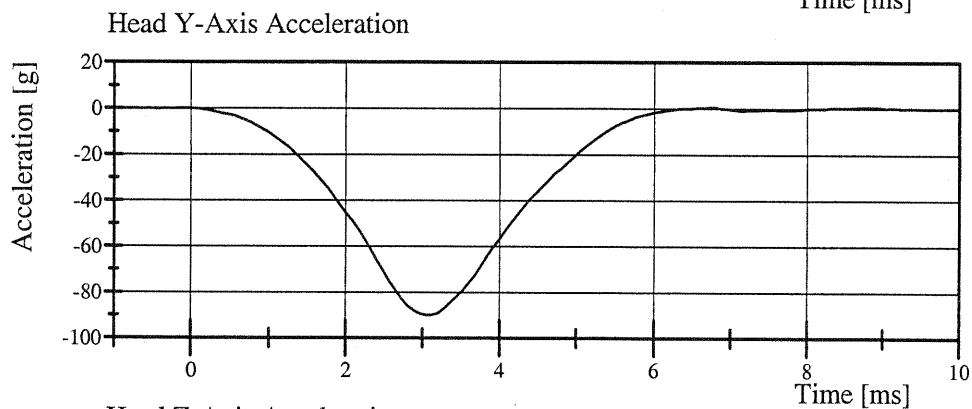
Test Date: 7/19/2007



Filter Class: CFC_1000

Max: 3.6 g at 2.3 ms

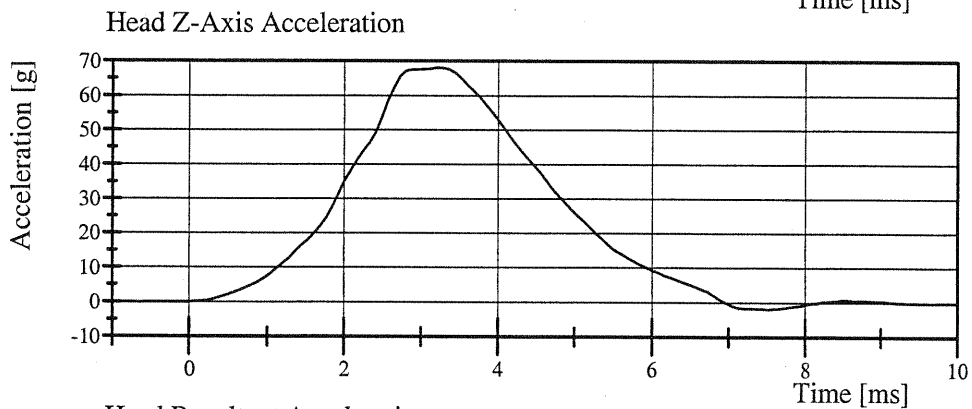
Min: -0.3 g at 6.9 ms



Filter Class: CFC_1000

Max: 0.6 g at 6.7 ms

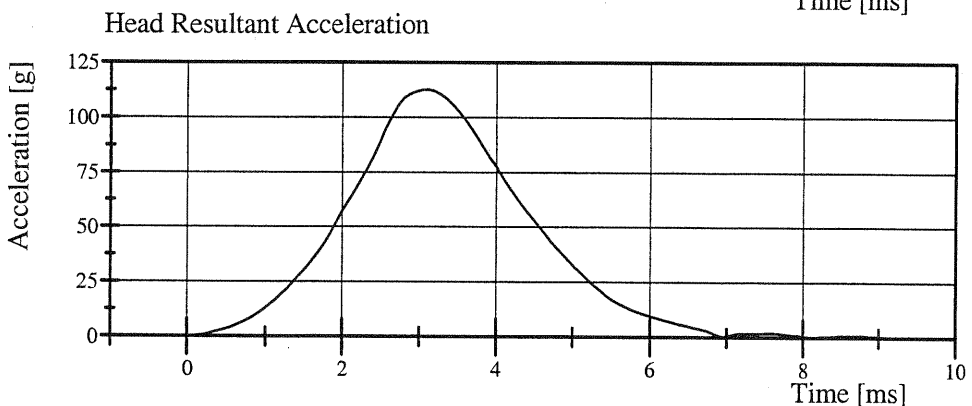
Min: -90.0 g at 3.0 ms



Filter Class: CFC_1000

Max: 68.1 g at 3.2 ms

Min: -1.9 g at 7.5 ms



Filter Class: CFC_1000

Max: 112.7 g at 3.1 ms

Min: 0.0 g at -0.6 ms

Transportation Research Center Inc.

Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-2

Test Date: 7/20/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.32 m/s	Yes
Pendulum Integrated Velocity			
Change at 4 ms	0.77 - 1.04 m/s	0.900 m/s	Yes
Change at 8 ms	1.6 - 2.16 m/s	1.799 m/s	Yes
Change at 12 ms	2.43 - 3.29 m/s	2.752 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-54.7 deg	Yes
Headform Flexion Decay			
- from Peak to Zero Degrees	58 - 72 ms	65.8 ms	Yes
Total Neck Occipital Condyles Moment	55 - 68 N·m	58.9 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	71 - 87 ms	79.0 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-32) - (-39) °	-35.6 °	Yes
Time of Peak	56 - 68 ms	59.2 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-30) - (-37) °	-32.1 °	Yes
Time of Peak	56 - 68 ms	60.0 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Stoner

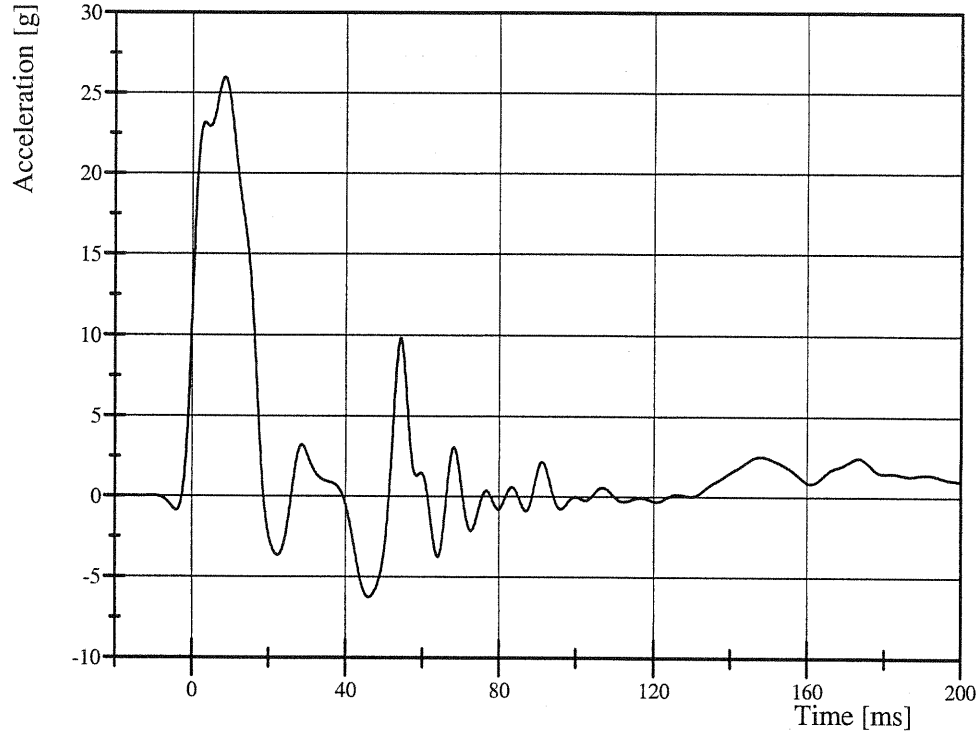
Transportation Research Center Inc.

Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-2

Test Date: 7/20/2007

Pendulum Acceleration

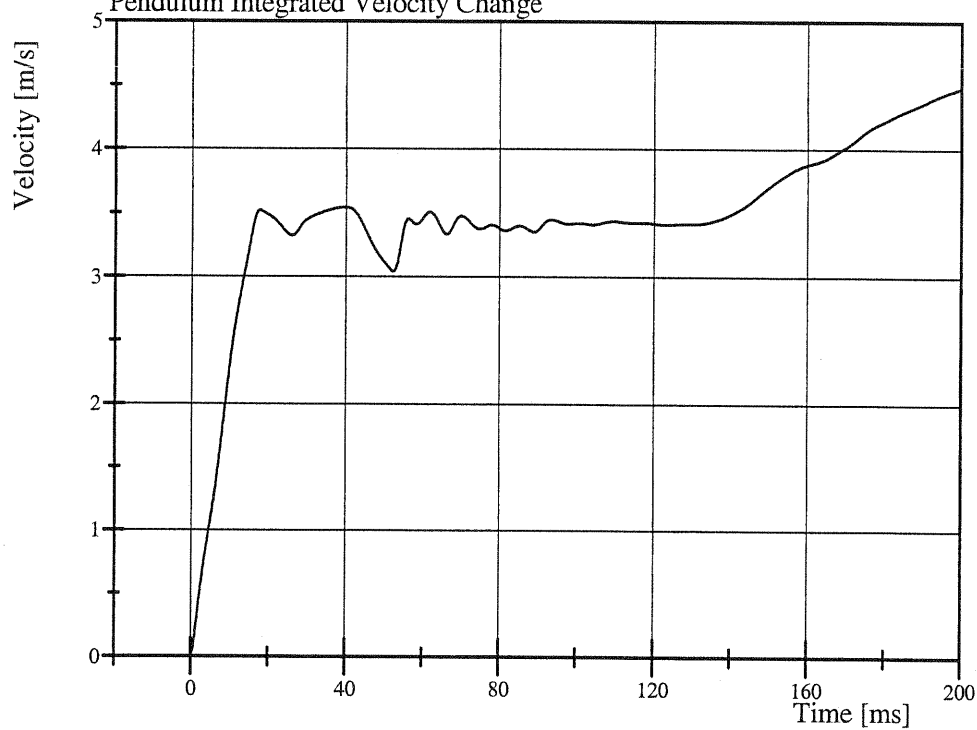


Filter Class: CFC_60

Max: 26.0 g at 8.4 ms

Min: -6.2 g at 46.1 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 4.5 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

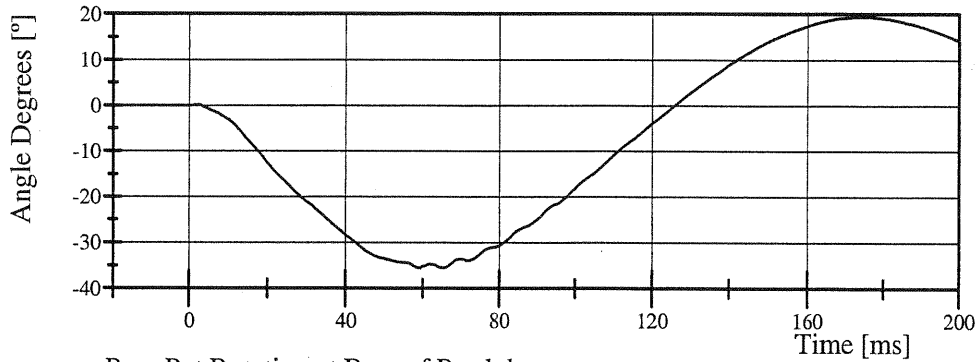
Transportation Research Center Inc.

Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-2

Test Date: 7/20/2007

Forward Pot Rotation at Base of Pendulum

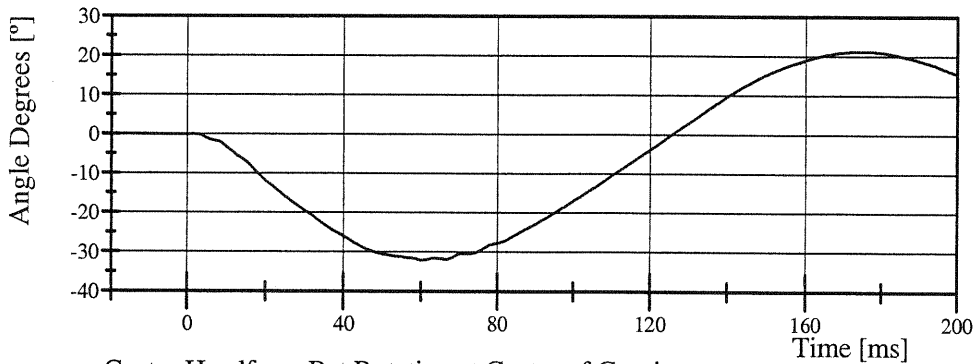


Filter Class: CFC_1000

Max: 19.4 ° at 175.0 ms

Min: -35.6 ° at 59.2 ms

Rear Pot Rotation at Base of Pendulum

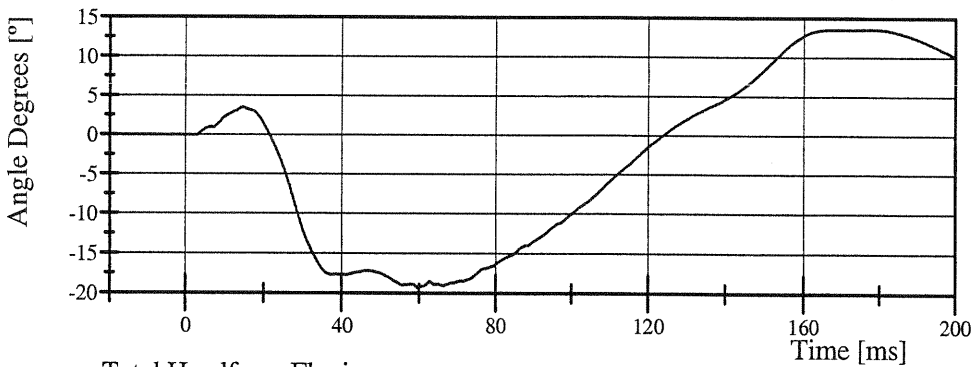


Filter Class: CFC_1000

Max: 21.3 ° at 173.5 ms

Min: -32.1 ° at 60.0 ms

Center Headform Pot Rotation at Center of Gravity

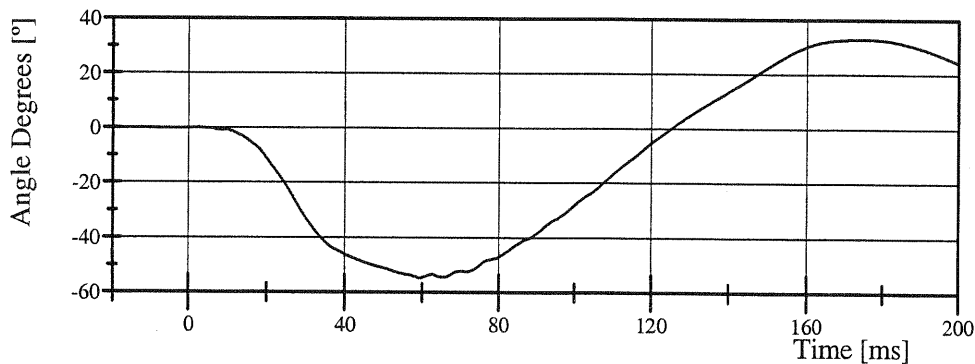


Filter Class: CFC_1000

Max: 13.6 ° at 177.0 ms

Min: -19.3 ° at 59.6 ms

Total Headform Flexion



Filter Class: CFC_1000

Max: 33.0 ° at 175.5 ms

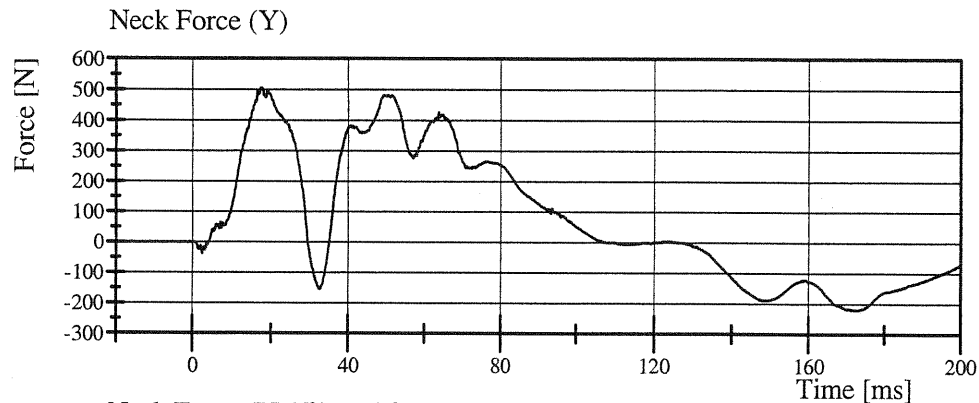
Min: -54.7 ° at 59.4 ms

Transportation Research Center Inc.

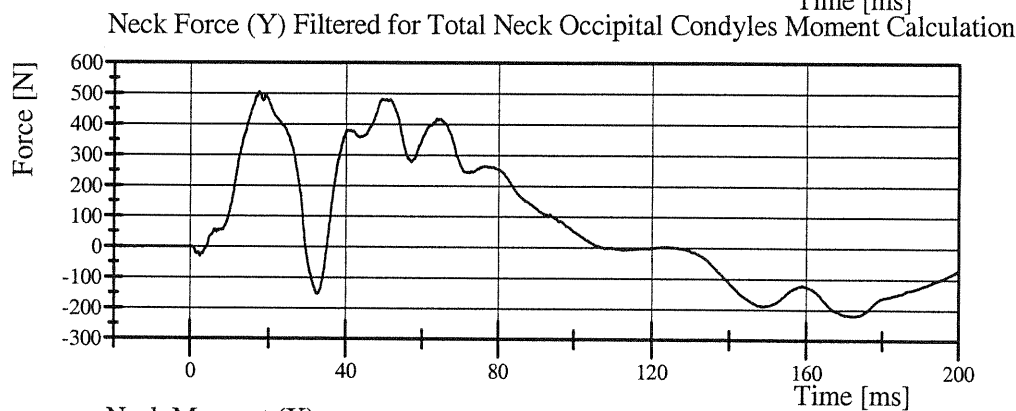
Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-2

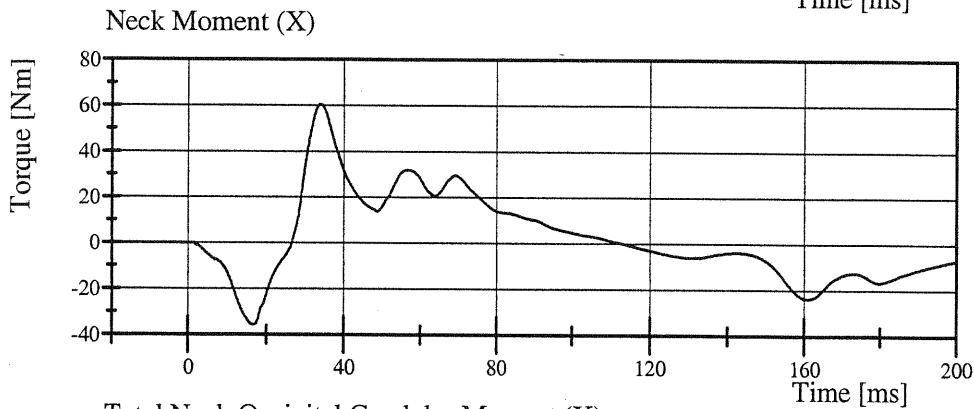
Test Date: 7/20/2007



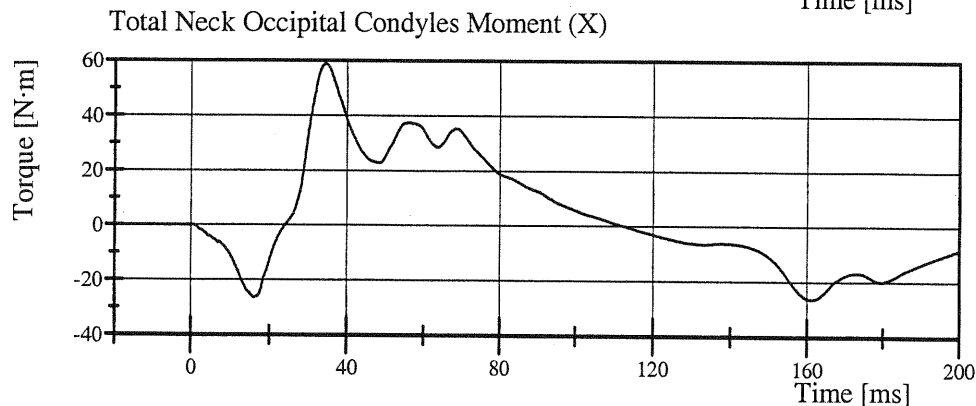
Filter Class: CFC_1000
Max: 505.5 N at 17.3 ms
Min: -220.6 N at 172.8 ms



Filter Class: CFC_600
Max: 506.1 N at 17.4 ms
Min: -220.2 N at 172.7 ms



Filter Class: CFC_600
Max: 60.5 Nm at 33.8 ms
Min: -35.6 Nm at 16.7 ms



Filter Class: CFC_600
Max: 58.9 N·m at 34.4 ms
Min: -26.5 N·m at 16.2 ms

Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

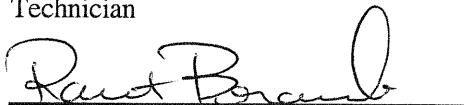
Test Date: 7/24/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Force	(-2,600) - (-3,300) N	-2,918.4 N	Yes
Shoulder Displacement	35 - 44 mm	42.8 mm	Yes

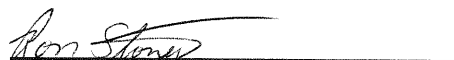
Test meets specifications.

Comments:

Technician



Approved



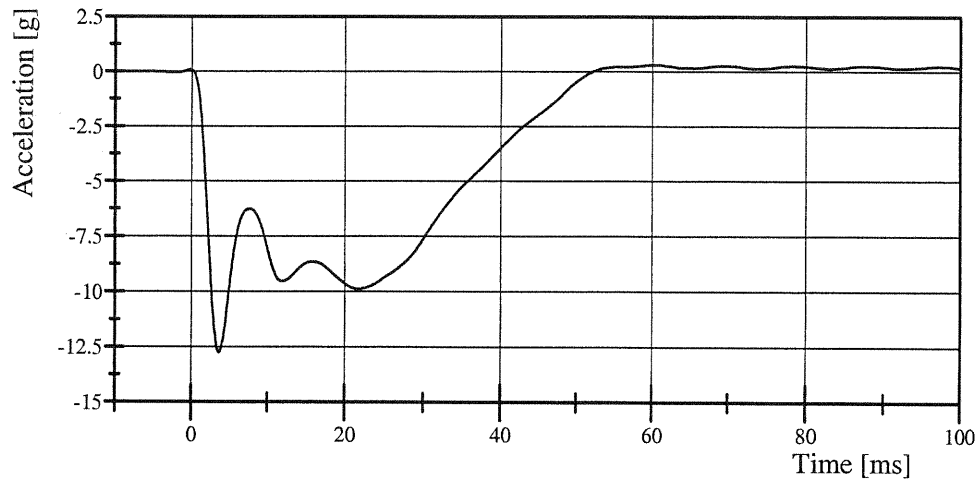
Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

Test Date: 7/24/2007

Impactor Acceleration

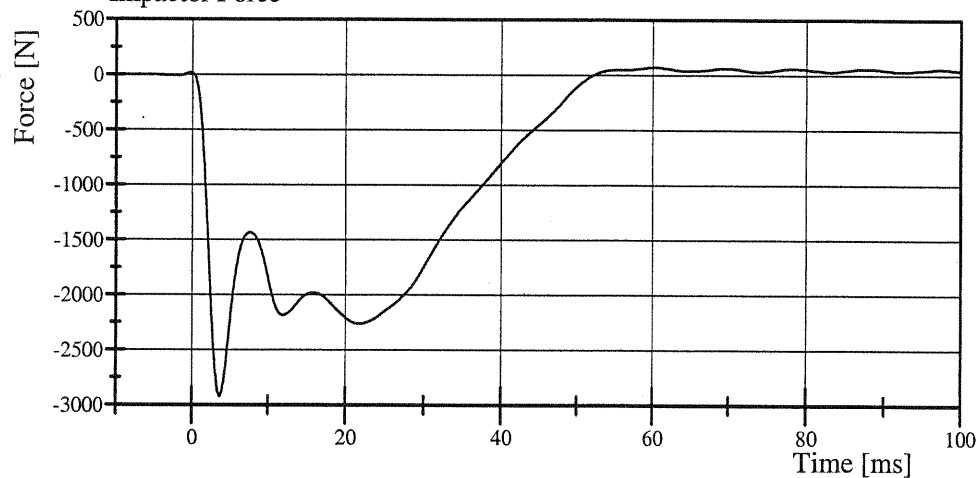


Filter Class: CFC_180

Max: 0.3 g at 60.4 ms

Min: -12.7 g at 3.6 ms

Impactor Force

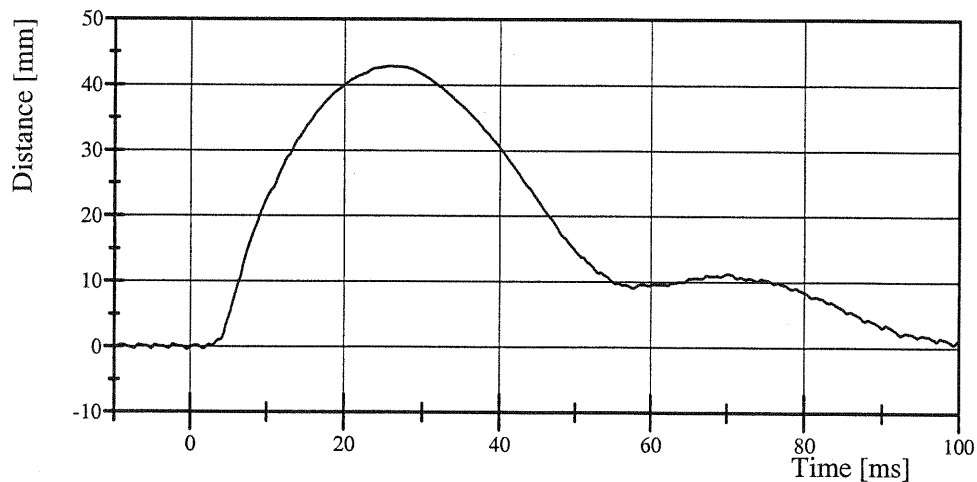


Filter Class: CFC_180

Max: 72.4 N at 60.4 ms

Min: -2,918.4 N at 3.6 ms

Shoulder Displacement



Filter Class: CFC_600

Max: 42.8 mm at 25.7 ms

Min: -0.4 mm at -0.4 ms

Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

Test Date: 7/24/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Force	(-2,600) - (-3,300) N	-2,830.9 N	Yes
Upper Abdominal Rib Displacement	33 - 41 mm	37.1 mm	Yes
Lower Abdominal Rib Displacement	31 - 39 mm	32.9 mm	Yes
Lower Spine Lateral Acceleration	15 - 20 g	16.1 g	Yes

Test meets specifications.

Comments:

Technician



Approved

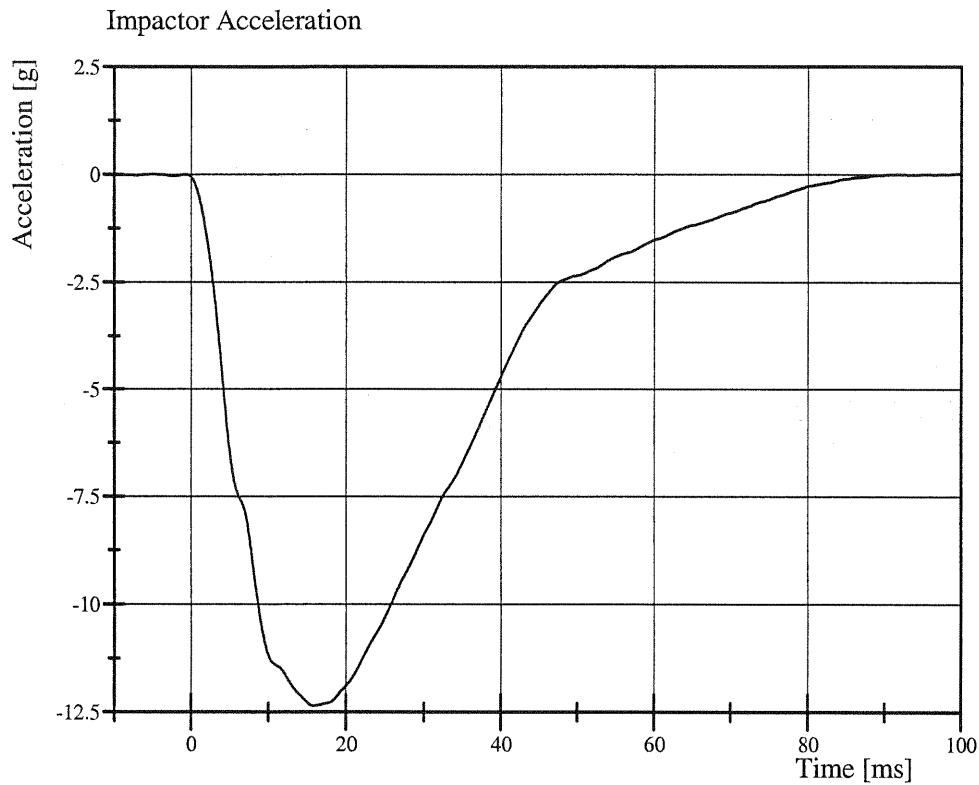


Transportation Research Center Inc.

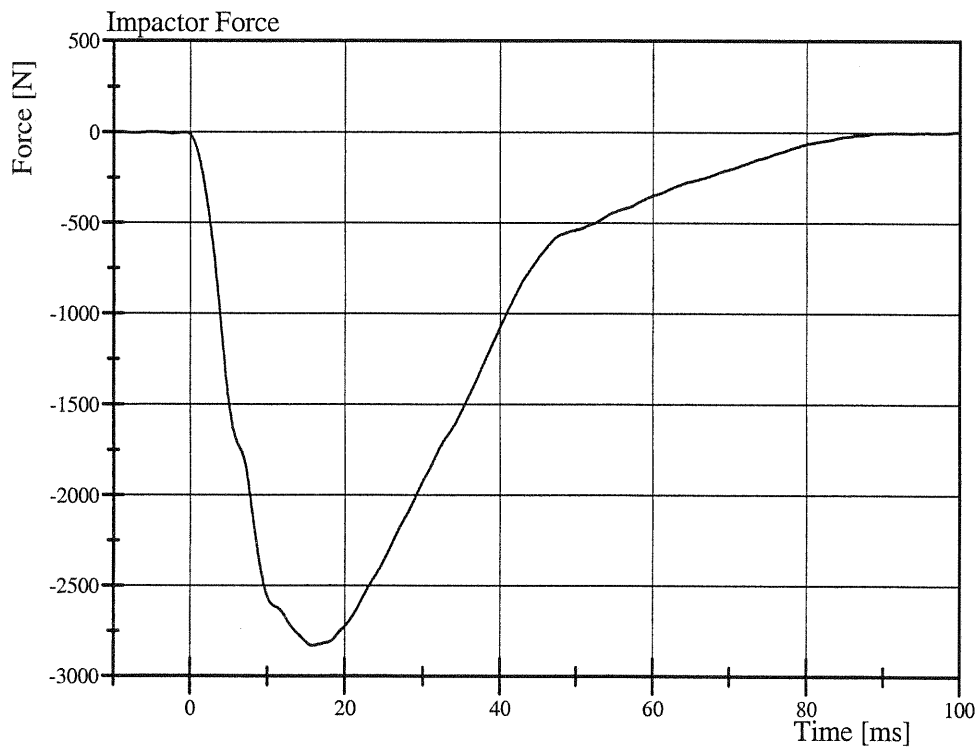
Left Lateral Abdomen

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

Test Date: 7/24/2007



Filter Class: CFC_180
Max: 0.0 g at 99.7 ms
Min: -12.4 g at 15.8 ms



Filter Class: CFC_180
Max: 3.7 N at 99.7 ms
Min: -2,830.9 N at 15.8 ms

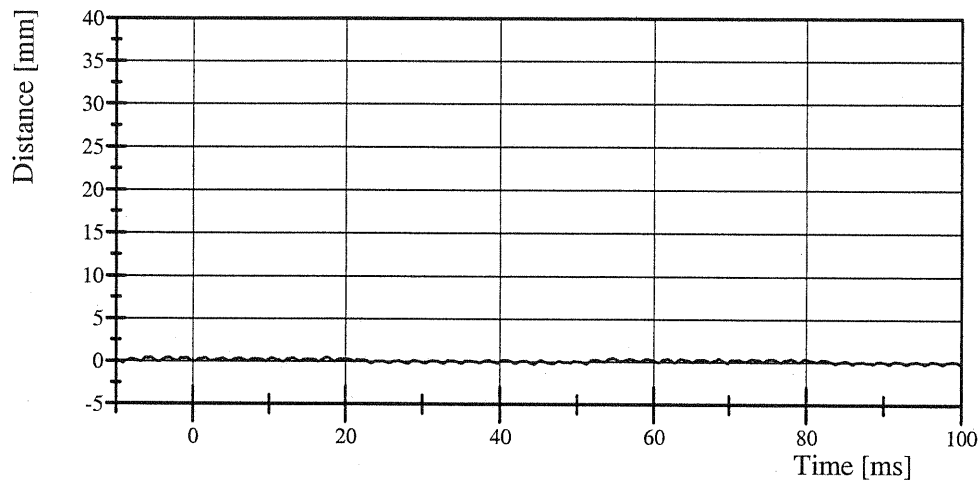
Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

Test Date: 7/24/2007

Upper Abdominal Rib Displacement

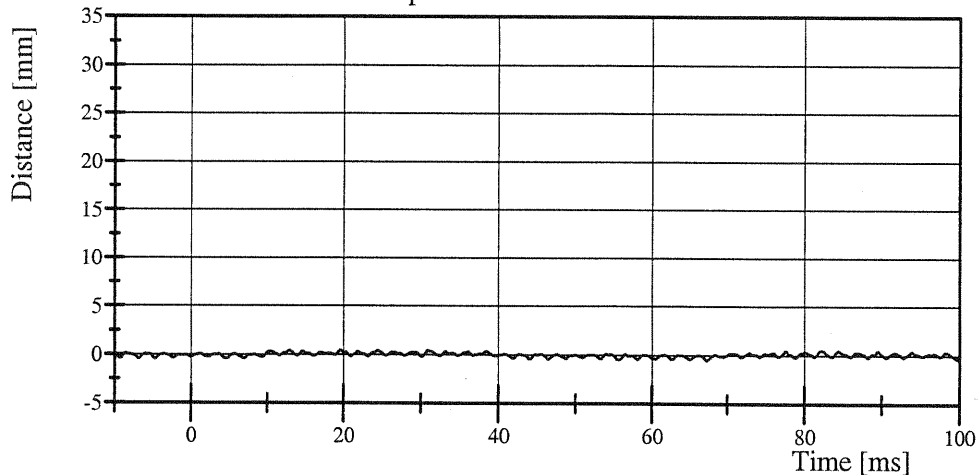


Filter Class: CFC_600

Max: 37.1 mm at 0.0 ms

Min: -0.4 mm at 0.0 ms

Lower Abdominal Rib Displacement

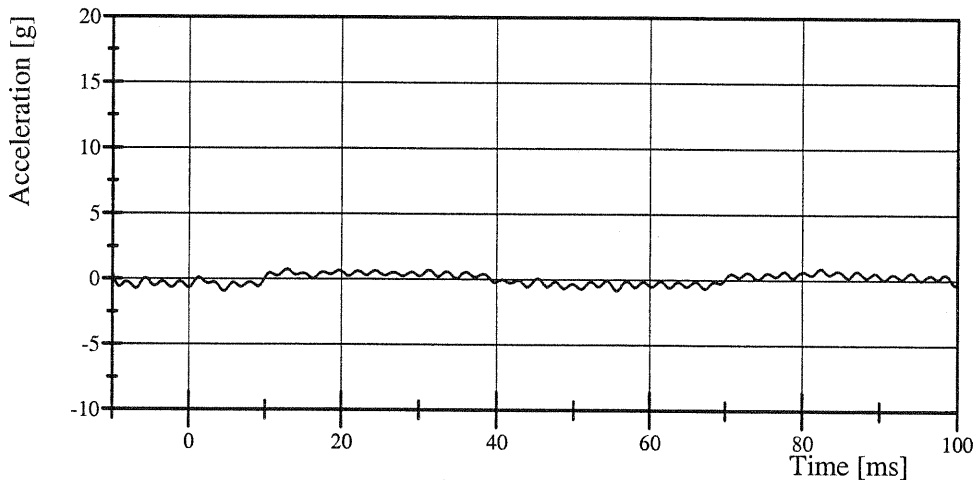


Filter Class: CFC_600

Max: 32.9 mm at 0.0 ms

Min: -0.5 mm at 67.3 ms

Lower Spine Acceleration (Y)



Filter Class: CFC_180

Max: 16.1 g at 0.0 ms

Min: -6.7 g at 0.0 ms

Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

Test Date: 7/24/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.69 m/s	Yes
Impactor Force	(-6,300) - (-7,800) N	-7,282.3 N	Yes
Pelvis Lateral Acceleration	41 - 51 g	42.1 g	Yes
Lower Spine Lateral Acceleration	10 - 14 g	13.1 g	Yes

Test meets specifications.

Comments:

Technician



Approved

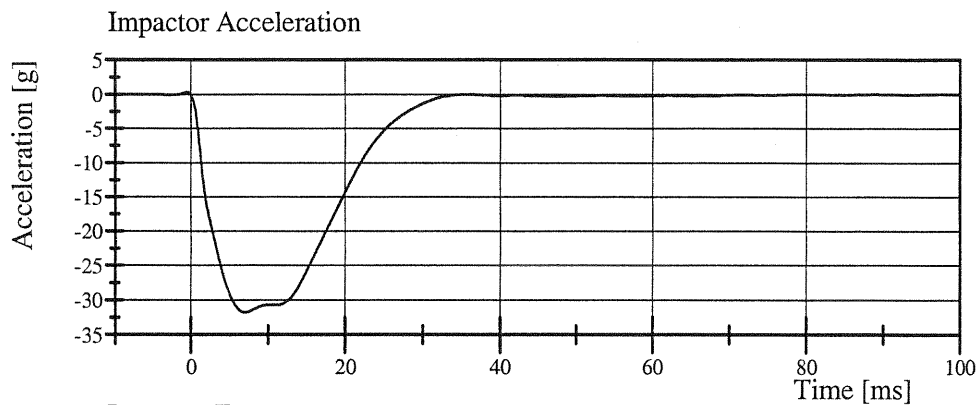


Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID ISO 15830-2 Serial No. 016 Certification No. 2-1

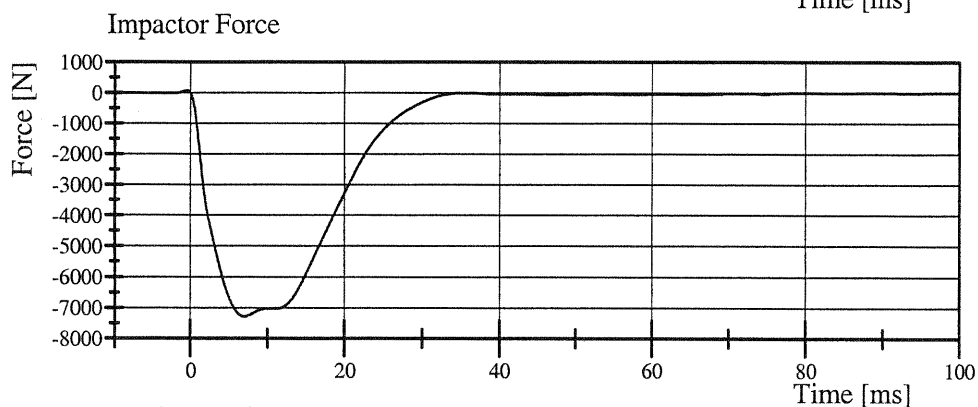
Test Date: 7/24/2007



Filter Class: CFC_180

Max: 0.3 g at -0.5 ms

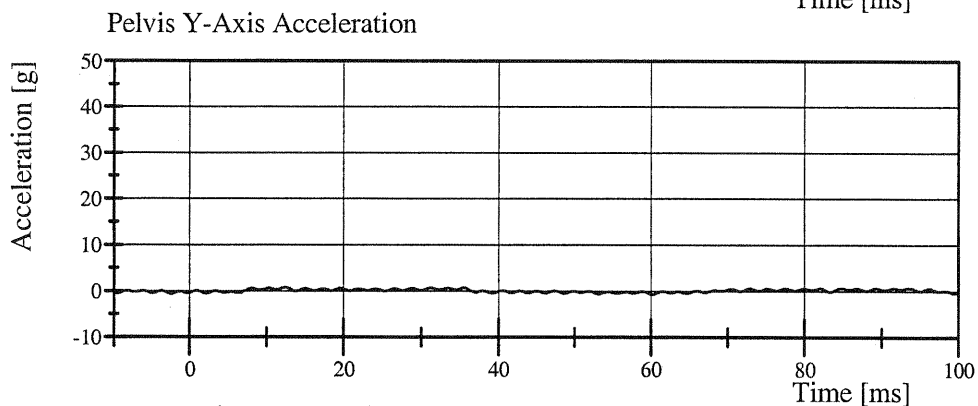
Min: -31.8 g at 7.0 ms



Filter Class: CFC_180

Max: 79.5 N at -0.5 ms

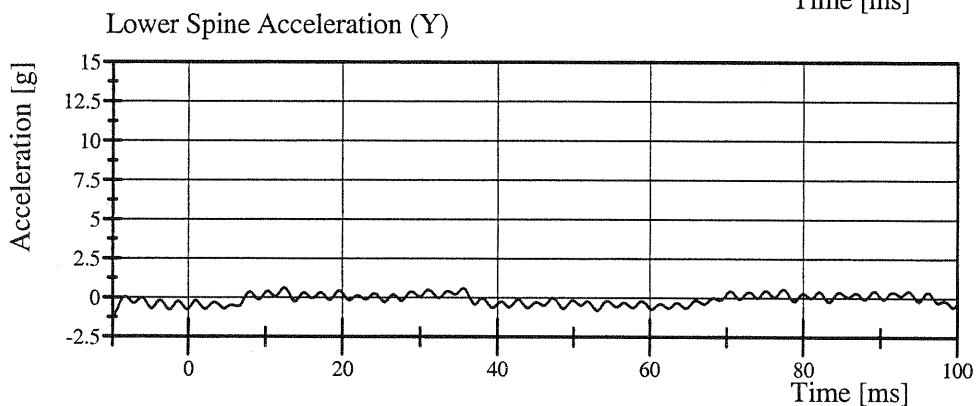
Min: -7,282.3 N at 7.0 ms



Filter Class: CFC_180

Max: 42.1 g at 0.0 ms

Min: -6.7 g at 0.0 ms



Filter Class: CFC_180

Max: 13.1 g at 0.0 ms

Min: -1.5 g at 0.0 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 070806

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS	Flip	Positive Polarity	Assembly
1	Trig D1	10ZERO000000VO0A	EVENT		1 Logic		+	Bipolar	
2	P47546	16SILBFR0000ACXA	RIGHT SIDE SILL AT FRONT SEAT (X) ACCELERATION VS TIME (#1)	400	g		+	Forward	
3	P54288	16SILBFR0000ACYA	RIGHT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME (#1)	1000	g		-	Leftward	
4	P49899	16SILBFR0000ACZA	RIGHT SIDE SILL AT FRONT SEAT (Z) ACCELERATION VS TIME (#1)	400	g		-	Upward	
5	P49302	16SILBRE0000ACXA	RIGHT SIDE SILL AT REAR SEAT (X) ACCELERATION VS TIME (#2)	400	g		+	Forward	
6	P49336	16SILBRE0000ACYA	RIGHT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME (#2)	1000	g		-	Leftward	
7	P49566	16SILBRE0000ACZA	RIGHT SIDE SILL AT REAR SEAT (Z) ACCELERATION VS TIME (#2)	400	g		-	Upward	
8	P54555	18FORA000000ACXA	REAR FLOOR PAN ABOVE AXLE (X) ACCELERATION VS TIME (#3)	1000	g		+	Forward	
9	P54770	18FORA000000ACYA	REAR FLOOR PAN ABOVE AXLE (Y) ACCELERATION VS TIME (#3)	1000	g		-	Leftward	
10	P54859	18FORA000000ACZA	REAR FLOOR PAN ABOVE AXLE (Z) ACCELERATION VS TIME (#3)	1000	g		-	Upward	
11	P54546	14SILBFR0000ACYA	LEFT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME (#5)	1000	g		+	Rightward	
12	P56929	14SILBRE0000ACYA	LEFT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME (#4)	1000	g		+	Rightward	
13	P47538	16VEHCRE0000ACYA	RIGHT REAR OCCUPANT COMPARTMENT (Y) ACCELERATION VS TIME (#7)	1500	g		-	Leftward	
14	P47730	11APILLO0000ACYA	LEFT LOWER A-POST (Y) ACCELERATION VS TIME (#14)	1500	g		-	Leftward	
15	P56959	11APILMI0000ACYA	LEFT MID A-POST (Y) ACCELERATION VS TIME (#15)	1500	g		-	Leftward	
16	P50277	14BPILLO0000ACYA	LEFT LOWER B-POST (Y) ACCELERATION VS TIME (#12)	1500	g		-	Leftward	
17	P54872	14BPILMI0000ACYA	LEFT MID B-POST (Y) ACCELERATION VS TIME (#13)	1500	g		-	Leftward	
18	P54603	11SETRFR0000ACYA	LEFT FRONT SEAT TRACK (Y) ACCELERATION VS TIME (#16) - align with h-point	1500	g		+	Rightward	
19	P54599	14SETRLERE00ACYA	LEFT REAR SEAT TRACK (Y) ACCELERATION VS TIME (#17)	1500	g		-	Leftward	
20	P54523	10VEHCCG0000ACXA	VEHICLE CENTER OF GRAVITY (X) ACCELERATION VS TIME (#18)	1000	g		+	Forward	
21	P54769	10VEHCCG0000ACYA	VEHICLE CENTER OF GRAVITY (Y) ACCELERATION VS TIME (#18)	1000	g		-	Leftward	
22	P54537	10VEHCCG0000ACZA	VEHICLE CENTER OF GRAVITY (Z) ACCELERATION VS TIME (#18)	1000	g		-	Upward	
23	P54813	14DOOR000001ACYA	Vehicle Front Door centerline 430 mm above ground Y acceleration	1500	g		+	Rightward	
24	P50470	14DOOR000002ACYA	Vehicle Front Door mid-rear 430 mm above ground Y acceleration	1500	g		+	Rightward	
25	P49933	14DOOR000003ACYA	Vehicle Front Door upper centerline 685 mm above ground Y acceleration	1500	g		+	Rightward	
26	P50930	16DOOR000002ACYA	Vehicle Rear Door mid-rear 430 mm above ground Y acceleration	1500	g		+	Rightward	
27	P54117	16DOOR000003ACYA	Vehicle Rear Door upper centerline 685 mm above ground Y acceleration	1500	g		+	Rightward	
28	P54860	12ENGNT0000ACXA	Top of Engine X acceleration	1000	g		+	Forward	
29	P50851	12ENGNT0000ACYA	Top of Engine Y acceleration	1000	g		+	Rightward	
30	P56955	12VEHC000000ACXA	Firewall X acceleration	1000	g		+	Forward	
31	P56957	12VEHC000000ACYA	Firewall Y acceleration	1000	g		-	Leftward	
32	P56928	13ROOF000000ACXA	Right side Roof Rail (in line with impact point) X acceleration	1000	g		-	Rearward	
33	P56930	13ROOF000000ACYA	Right side Roof Rail (in line with impact point) Y acceleration	1000	g		-	Leftward	
34	P56981	13SILBFR0000ACYA	Right side sill in-line with impact location Y-axis acceleration	1000	g		+	Rightward	
35	P50791	18DECK000000ACXA	Rear deck behind rear axel X-axis Accel	1000	g		+	Forward	
36	P49567	18DECK000000ACYA	Rear deck behind rear axel Y-axis Accel	1000	g		-	Leftward	
37	P40578	18DECK000000ACZA	Rear deck behind rear axel Z-axis Accel	1000	g		+	Downward	
38	ABFire2	11AIRBTPLE00EV0A	DRIV. SIDE CURTAIN IND (IP 44)	5	V		+	Bipolar	
39	Bit.00	11CONT000001VO00	Head contact switch	1	Logic		+	Bipolar	
40	Bit.01	11CONT000002VO00	Shoulder contact switch	1	Logic		+	Bipolar	
41	Bit.02	11CONT000003VO00	Torso contact switch	1	Logic		+	Bipolar	
42	Bit.03	11CONT000004VO00	Leg contact switch	1	Logic		+	Bipolar	
43	68054	K0FBAR010000FOXA	POLE LOAD CELL 1	222400	N		+	Tension force	0-Barrier 201 Pole.001
44	68032	K0FBAR020000FOXA	POLE LOAD CELL 2	222400	N		+	Tension force	0-Barrier 201 Pole.002
45	1220BZY-50K-122067A	K0FBAR030000FOXA	POLE LOAD CELL 3	222400	N		+	Tension force	0-Barrier 201 Pole.003
46	1220BZY-50K-122027A	K0FBAR040000FOXA	POLE LOAD CELL 4	222400	N		+	Tension force	0-Barrier 201 Pole.004
47	1220BZY-50K-122061A	K0FBAR050000FOXA	POLE LOAD CELL 5	222400	N		+	Tension force	0-Barrier 201 Pole.005

D-6

070806

Channel Report Test Number 070806

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS		
						Flip	Positive Polarity	Assembly
48	1220BZY-50K-114016A	K0FBAR060000FOXA	POLE LOAD CELL 6	222400	N	+	Tension force	0-Barrier 201 Pole.006
49	1220TX-50K-68056A	K0FBAR070000FOXA	POLE LOAD CELL 7	222400	N	+	Tension force	0-Barrier 201 Pole.007
50	1220TX-50K-68022A	K0FBAR080000FOXA	POLE LOAD CELL 8	222400	N	+	Tension force	0-Barrier 201 Pole.008
51	P45846	00TESTSENSORACZA	Test sensor	2000	g	+	Downward	
52	E001814	02TESTSENSORACZA	Test sensor II	2000	g	-	Upward	

Command File Test Number 070806

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
1	11HEADCG00WSACXP	Head X-Axis Acceleration	1000	+	yes	2000
2	11HEADCG00WSACYP	Head Y-Axis Acceleration	1000	+	yes	2000
3	11HEADCG00WSACZP	Head Z-Axis Acceleration	1000	+	yes	2000
3A	11HEADCG00WSACRA	Head Resultant Acceleration	1000			
4	11HEADCG00WSANXP	Head X-Axis Angular Displacement	1000	+	no	50000
5	11HEADCG00WSANYP	Head Y-Axis Angular Displacement	1000	+	no	50000
6	11HEADCG00WSANZP	Head Z-Axis Angular Displacement	1000	+	no	50000
7	11NECKUP00WSFOXP	Upper Neck X-Axis Force	1000	+	yes	10000
8	11NECKUP00WSFOYP	Upper Neck Y-Axis Force	1000	+	yes	10000
9	11NECKUP00WSFOZP	Upper Neck Z-Axis Force	1000	+	yes	12000
10	11NECKUP00WSMOXP	Upper Neck Moment About X Axis	600	+	yes	300
11	11NECKUP00WSMOYP	Upper Neck Moment About Y Axis	600	+	yes	300
12	11NECKUP00WSMOZP	Upper Neck Moment About Z Axis	600	+	yes	200
13	11NECKLO00WSFOXP	Lower Neck X-Axis Force	1000	+	yes	10000
14	11NECKLO00WSFOYP	Lower Neck Y-Axis Force	1000	+	yes	10000
15	11NECKLO00WSFOZP	Lower Neck Z-Axis Force	1000	+	yes	12000
16	11NECKLO00WSMOXP	Lower Neck Moment About X Axis	600	+	yes	300
17	11NECKLO00WSMOYP	Lower Neck Moment About Y Axis	600	+	yes	300
18	11NECKLO00WSMOZP	Lower Neck Moment About Z Axis	600	+	yes	200
19	11SHLDLE00WSFOXP	Shoulder X-Axis Force	600	+	yes	5000
20	11SHLDLE00WSFOYP	Shoulder Y-Axis Force	600	+	yes	10000
21	11SHLDLE00WSFOZP	Shoulder Z-Axis Force	600	+	yes	5000
22	11SHLDLE00WSDSYP	Shoulder Y-Axis Displacement	600	+	yes	90
23	11SHLDLE00WSACXP	Shoulder X-Axis Acceleration	1000	+	yes	2000
24	11SHLDLE00WSACYP	Shoulder Y-Axis Acceleration	1000	+	yes	2000
25	11SHLDLE00WSACZP	Shoulder Z-Axis Acceleration	1000	+	yes	2000
25A	11SHLDLE00WSACRA	Shoulder Resultant Acceleration	1000			
26	11THSP0100WSACXP	T1 X-Axis Acceleration	180	+	yes	2000
27	11THSP0100WSACYP	T1 Y-Axis Acceleration	180	+	yes	2000
28	11THSP0100WSACZP	T1 Z-Axis Acceleration	180	+	yes	2000
28A	11THSP0100WSACRA	T1 Resultant Acceleration	180			
29	11THSP0400WSACXP	T4 X-Axis Acceleration	180	+	yes	2000
30	11THSP0400WSACYP	T4 Y-Axis Acceleration	180	+	yes	2000
31	11THSP0400WSACZP	T4 Z-Axis Acceleration	180	+	yes	2000
31A	11THSP0400WSACRA	T4 Resultant Acceleration	180			
32	11THSP1200WSACXP	T12 X-Axis Acceleration	180	+	yes	2000
33	11THSP1200WSACYP	T12 Y-Axis Acceleration	180	+	yes	2000

Command File Test Number 070806

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
34	11THSP1200WSACZP	T12 Z-Axis Acceleration	180	+	yes	2000
34A	11THSP1200WSACRA	T12 Resultant Acceleration	180			
35	11TRRILE01WSDSYP	Thorax Rib 1 Y-Axis Displacement	600	+	yes	90
36	11TRRILE01WSACXP	Thorax Rib 1 X-Axis Acceleration	1000	+	yes	2000
37	11TRRILE01WSACYP	Thorax Rib 1 Y-Axis Acceleration	1000	+	yes	2000
38	11TRRILE01WSACZP	Thorax Rib 1 Z-Axis Acceleration	1000	+	yes	2000
38A	11TRRILE01WSACRA	Thorax Rib 1 Resultant Acceleration	1000			
39	11TRRILE02WSDSYP	Thorax Rib 2 Y-Axis Displacement	600	+	yes	90
40	11TRRILE02WSACXP	Thorax Rib 2 X-Axis Acceleration	1000	+	yes	2000
41	11TRRILE02WSACYP	Thorax Rib 2 Y-Axis Acceleration	1000	+	yes	2000
42	11TRRILE02WSACZP	Thorax Rib 2 Z-Axis Acceleration	1000	+	yes	2000
42A	11TRRILE02WSACRA	Thorax Rib 2 Resultant Acceleration	1000			
43	11TRRILE03WSDSYP	Thorax Rib 3 Y-Axis Displacement	600	+	yes	90
44	11TRRILE03WSACXP	Thorax Rib 3 X-Axis Acceleration	1000	+	yes	2000
45	11TRRILE03WSACYP	Thorax Rib 3 Y-Axis Acceleration	1000	+	yes	2000
46	11TRRILE03WSACZP	Thorax Rib 3 Z-Axis Acceleration	1000	+	yes	2000
46A	11TRRILE03WSACRA	Thorax Rib 3 Resultant Acceleration	1000			
47	11ABRILE01WSDSYP	Abdominal Rib 1 Y-Axis Displacement	600	+	yes	90
48	11ABRILE01WSACXP	Abdominal Rib 1 X-Axis Acceleration	1000	+	yes	2000
49	11ABRILE01WSACYP	Abdominal Rib 1 Y-Axis Acceleration	1000	+	yes	2000
50	11ABRILE01WSACZP	Abdominal Rib 1 Z-Axis Acceleration	1000	+	yes	2000
50A	11ABRILE01WSACRA	Abdominal Rib 1 Resultant Acceleration	1000			
51	11ABRILE02WSDSYP	Abdominal Rib 2 Y-Axis Displacement	600	+	yes	90
52	11ABRILE02WSACXP	Abdominal Rib 2 X-Axis Acceleration	1000	+	yes	2000
53	11ABRILE02WSACYP	Abdominal Rib 2 Y-Axis Acceleration	1000	+	yes	2000
54	11ABRILE02WSACZP	Abdominal Rib 2 Z-Axis Acceleration	1000	+	yes	2000
54A	11ABRILE02WSACRA	Abdominal Rib 2 Resultant Acceleration	1000			
55	11LUSP0000WSFOXP	Lumbar X-Axis Force	600	+	yes	10000
56	11LUSP0000WSFOYP	Lumbar Y-Axis Force	600	+	yes	10000
57	11LUSP0000WSFOZP	Lumbar Z-Axis Force	600	+	yes	12000
58	11LUSP0000WSMOXP	Lumbar Moment About X Axis	600	+	yes	300
59	11LUSP0000WSMOYP	Lumbar Moment About Y Axis	600	+	yes	300
60	11LUSP0000WSMOZP	Lumbar Moment About Z Axis	600	+	yes	200
61	11PELVCG00WSACXP	Pelvis X-Axis Acceleration	1000	+	yes	2000
62	11PELVCG00WSACYP	Pelvis Y-Axis Acceleration	1000	+	yes	2000
63	11PELVCG00WSACZP	Pelvis Z-Axis Acceleration	1000	+	yes	2000
63A	11PELVCG00WSACRA	Pelvis Resultant Acceleration	1000			

Command File Test Number 070806

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
64	11SACRLE00WSFOXP	Sacro-Iliac Left X-Axis Force	600	+	yes	6000
65	11SACRLE00WSFOYP	Sacro-Iliac Left Y-Axis Force	600	+	yes	12000
66	11SACRLE00WSFOZP	Sacro-Iliac Left Z-Axis Force	600	+	yes	6000
67	11SACRLE00WSMOXP	Sacro-Iliac Left Moment About X Axis	600	+	yes	1000
68	11SACRLE00WSMOYP	Sacro-Iliac Left Moment About Y Axis	600	+	yes	400
69	11SACRLE00WSMOZP	Sacro-Iliac Left Moment About Z Axis	600	+	yes	400
70	11SACRRI00WSFOXP	Sacro-Iliac Right X-Axis Force	600	+	yes	6000
71	11SACRRI00WSFOYP	Sacro-Iliac Right Y-Axis Force	600	+	yes	12000
72	11SACRRI00WSFOZP	Sacro-Iliac Right Z-Axis Force	600	+	yes	6000
73	11SACRRI00WSMOXP	Sacro-Iliac Right Moment About X Axis	600	+	yes	1000
74	11SACRRI00WSMOYP	Sacro-Iliac Right Moment About Y Axis	600	+	yes	400
75	11SACRRI00WSMOZP	Sacro-Iliac Right Moment About Z Axis	600	+	yes	400
76	11PUBC0000WSFOYP	Pubic Y-Axis Force	600	+	yes	12000
77	11FEMRL00WSFOXP	Left Femur X-Axis Force	600	+	yes	10000
78	11FEMRL00WSFOYP	Left Femur Y-Axis Force	600	+	yes	25000
79	11FEMRL00WSFOZP	Left Femur Z-Axis Force	600	+	yes	10000
80	11FEMRLEMIWSFOXP	Left Mid Femur X-Axis Force	600	+	yes	15000
81	11FEMRLEMIWSFOYP	Left Mid Femur Y-Axis Force	600	+	yes	15000
82	11FEMRLEMIWSFOZP	Left Mid Femur Z-Axis Force	600	+	yes	15000
83	11FEMRLEMIWSMOXP	Left Mid Femur Moment About X Axis	600	+	yes	350
84	11FEMRLEMIWSMOYP	Left Mid Femur Moment About Y Axis	600	+	yes	350
85	11FEMRLEMIWSMOZP	Left Mid Femur Moment About Z Axis	600	+	yes	300
86	11KNEERIOUWSFOYP	Left Knee Inboard Y-Axis Force	600	+	yes	20000
87	11FEMRRIMIWSFOXP	Right Mid Femur X-Axis Force	600	+	yes	15000
88	11FEMRRIMIWSFOYP	Right Mid Femur Y-Axis Force	600	+	yes	15000
89	11FEMRRIMIWSFOZP	Right Mid Femur Z-Axis Force	600	+	yes	15000
90	11FEMRRIMIWSMOXP	Right Mid Femur Moment About X Axis	600	+	yes	350
91	11FEMRRIMIWSMOYP	Right Mid Femur Moment About Y Axis	600	+	yes	350
92	11FEMRRIMIWSMOZP	Right Mid Femur Moment About Z Axis	600	+	yes	300
93	16SILBFR0000ACXA	Right Side Sill at Front Seat X-Axis Acceleration	60	+	yes	400
93A	16SILBFR0000VEXC	Right Side Sill at Front Seat X-Axis Velocity	180			
93B	16SILBFR0000DCXC	Right Side Sill at Front Seat X-Axis Displacement	180			
94	16SILBFR0000ACYA	Right Side Sill at Front Seat Y-Axis Acceleration	60	+	yes	1000
94A	16SILBFR0000VEYC	Right Side Sill at Front Seat Y-Axis Velocity	180			
94B	16SILBFR0000DCYC	Right Side Sill at Front Seat Y-Axis Displacement	180			
95	16SILBFR0000ACZA	Right Side Sill at Front Seat Z-Axis Acceleration	60	+	yes	400
95A	16SILBFR0000ACRA	Right Side Sill at Front Seat Resultant Acceleration	60			

Command File Test Number 070806

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
96	16SILBRE0000ACXA	Right Side Sill at Rear Seat X-Axis Acceleration	60	+	yes	400
96A	16SILBRE0000VEXC	Right Side Sill at Rear Seat X-Axis Velocity	180			
96B	16SILBRE0000DCXC	Right Side Sill at Rear Seat X-Axis Displacement	180			
97	16SILBRE0000ACYA	Right Side Sill at Rear Seat Y-Axis Acceleration	60	+	yes	1000
97A	16SILBRE0000VEYC	Right Side Sill at Rear Seat Y-Axis Velocity	180			
97B	16SILBRE0000DCYC	Right Side Sill at Rear Seat Y-Axis Displacement	180			
98	16SILBRE0000ACZA	Right Side Sill at Rear Seat Z-Axis Acceleration	60	+	yes	400
98A	16SILBRE0000ACRA	Right Side Sill at Rear Seat Resultant Acceleration	60			
99	18FORA000000ACXA	Rear Floorpan Above Axle X-Axis Acceleration	60	+	yes	1000
100	18FORA000000ACYA	Rear Floorpan Above Axle Y-Axis Acceleration	60	+	yes	1000
101	18FORA000000ACZA	Rear Floorpan Above Axle Z-Axis Acceleration	60	+	yes	1000
101A	18FORA000000ACRA	Rear Floorpan Above Axle Resultant Acceleration	60			
102	14SILBFR0000ACYA	Left Side Sill at Front Seat Y-Axis Acceleration	60	+	yes	1000
102A	14SILBFR0000VEYC	Left Side Sill at Front Seat Y-Axis Velocity	180			
102B	14SILBFR0000DCYC	Left Side Sill at Front Seat Y-Axis Displacement	180			
103	14SILBRE0000ACYA	Left Side Sill at Rear Seat Y-Axis Acceleration	60	+	yes	1000
103A	14SILBRE0000VEYC	Left Side Sill at Rear Seat Y-Axis Velocity	180			
103B	14SILBRE0000DCYC	Left Side Sill at Rear Seat Y-Axis Displacement	180			
104	16VEHCRE0000ACYA	Right Rear Occupant Compartment Y-Axis Acceleration	60	+	yes	1500
105	11APILLO0000ACYA	Left Lower A-Post Y-Axis Acceleration	60	+	yes	1500
106	11APILMI0000ACYA	Left Mid A-Post Y-Axis Acceleration	60	+	yes	1500
107	14BPILLO0000ACYA	Left Lower B-Post Y-Axis Acceleration	60	+	yes	1500
108	14BPILMI0000ACYA	Left Mid B-Post Y-Axis Acceleration	60	+	yes	1500
109	11SETRFR0000ACYA	Left Front Seat Track Y-Axis Acceleration	60	+	yes	1500
110	14SETRLERE00ACYA	Left Rear Seat Track Y-Axis Acceleration	60	+	yes	1500
111	10VEHCCG0000ACXA	Vehicle Center of Gravity X-Axis Acceleration	60	+	yes	1000
112	10VEHCCG0000ACYA	Vehicle Center of Gravity Y-Axis Acceleration	60	+	yes	1000
113	10VEHCCG0000ACZA	Vehicle Center of Gravity Z-Axis Acceleration	60	+	yes	1000
113A	10VEHCCG0000ACRA	Vehicle Center of Gravity Resultant Acceleration	60			
114	14DOOR000001ACYA	Vehicle Front Door Centerline 430 mm Above Ground Y-Axis Acceleration	60	+	yes	1500
115	14DOOR000002ACYA	Vehicle Front Door Mid-Rear 430 mm Above Ground Y-Axis Acceleration	60	+	yes	1500
116	14DOOR000003ACYA	Vehicle Front Door Upper Centerline 685 mm Above Ground Y-Axis Acceleration	60	+	yes	1500
117	16DOOR000002ACYA	Vehicle Rear Door Mid-Rear 430 mm Above Ground Y-Axis Acceleration	60	+	yes	1500
118	16DOOR000003ACYA	Vehicle Rear Door Upper Centerline 685 mm Above Ground Y-Axis Acceleration	60	+	yes	1500
119	12ENGNTTP0000ACXA	Top of Engine X-Axis Acceleration	60	+	yes	1000
120	12ENGNTTP0000ACYA	Top of Engine Y-Axis Acceleration	60	+	yes	1000
121	12VEHC000000ACXA	Firewall X-Axis Acceleration	60	+	yes	1000

Command File Test Number 070806

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
122	12VEHC000000ACYA	Firewall Y-Axis Acceleration	60	+	yes	1000
123	13ROOF000000ACXA	Right Side Roof Rail (in line with impact point) X-Axis Acceleration	60	+	yes	1000
124	13ROOF000000ACYA	Right Side Roof Rail (in line with impact point) Y-Axis Acceleration	60	+	yes	1000
125	13SILBFR00000ACYA	Right Side Sill (in-line with impact location) Y-Axis Acceleration	60	+	yes	1000
126	18DECK000000ACXA	Rear Deck Behind Rear Axle X-Axis Acceleration	60	+	yes	1000
127	18DECK000000ACYA	Rear Deck Behind Rear Axle Y-Axis Acceleration	60	+	yes	1000
128	18DECK000000ACZA	Rear Deck Behind Rear Axle Z-Axis Acceleration	60	+	yes	1000
128A	18DECK000000ACRA	Rear Deck Behind Rear Axle Resultant Acceleration	60			
129	11AIRBTPLE00EV0A	Driver Side Curtain Inductor	1000	+	no	5
130	11CONT000001VO00	Head Contact Switch	0	+	no	1
131	11CONT000002VO00	Shoulder Contact Switch	0	+	no	1
132	11CONT000003VO00	Torso Contact Switch	0	+	no	1
133	11CONT000004VO00	Left Contact Switch	0	+	no	1
134	K0FBAR010000FOXA	Pole Load Cell 1	60	+	yes	222400
135	K0FBAR020000FOXA	Pole Load Cell 2	60	+	yes	222400
136	K0FBAR030000FOXA	Pole Load Cell 3	60	+	yes	222400
137	K0FBAR040000FOXA	Pole Load Cell 4	60	+	yes	222400
138	K0FBAR050000FOXA	Pole Load Cell 5	60	+	yes	222400
139	K0FBAR060000FOXA	Pole Load Cell 6	60	+	yes	222400
140	K0FBAR070000FOXA	Pole Load Cell 7	60	+	yes	222400
141	K0FBAR080000FOXA	Pole Load Cell 8	60	+	yes	222400

2005 SATURN ION LEFT SIDE FMVSS 214 POLE IMPACT AT 32 KPH

