

**Vehicle Research and Test Center
Left Crabbed Moving Barrier Impact
WorldSID
2011 Hyundai Sonata
TRC Inc. Test Number: 130124**

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TRC TEST NUMBER: 130124

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Report Approved July 23, 2013

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Section 1

Purpose and Test Procedure

Purpose

This moving deformable barrier side impact test is part of Federal Motor Vehicle Safety Standard 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 refine the seating procedure for the 50th male and 5th female WorldSID dummies and to begin to evaluate the performance of the post-FMVSS 214 fleet. The test was conducted in accordance with the National Highway Traffic Safety Administration's modified test procedures FMVSS 214/NCAP side impact moving deformable barrier (January, 2010) along with VRTC seating procedure for the WorldSID dummies.

Section 2

Side Impact Test Results

Summary of Side Impact Test

A 2011 Hyundai Sonata was impacted on the left side by a crabbed moving deformable barrier, at a velocity of 61.5 km/h (38.2 mph). The target vehicle was stationary and was positioned at an angle of 62.5° to the line of forward motion. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, Ohio on January 24, 2013. Pre-test and post-test photographs of the test vehicle, the moving barrier, and the side impact dummy (WorldSID) are included in Appendix A.

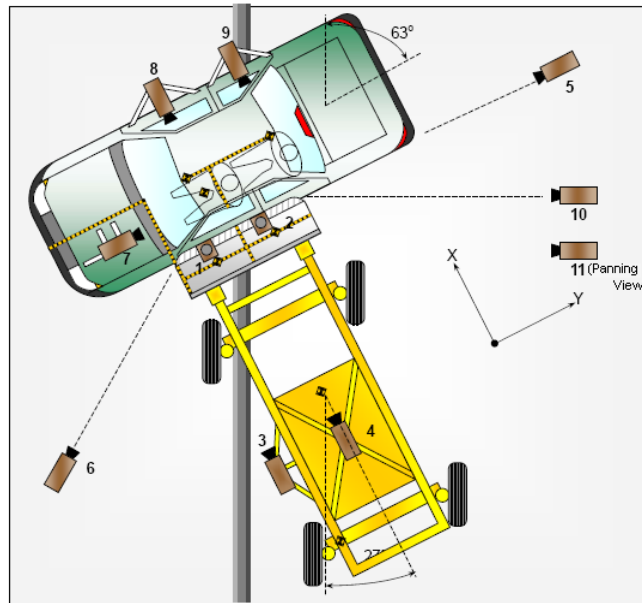
One restrained Side Impact Dummy, (WorldSID) S/N 016, was placed in the driver (Position #1) designated and one restrained Side Impact Dummy, (WorldSID) S/N 236, was placed in the left rear passenger (Position #4) designated seating position according to the instructions specified in the VRTC WorldSID Seating Procedures. The WorldSID's were calibrated prior to this test. The side impact test was documented by one (1) real-time camera and nine (9) high-speed digital cameras. Camera locations and other pertinent camera information are included in this report.

The driver front airbag, passenger front airbag, and passenger side curtain and torso airbags were disabled prior to the test performance.

The WorldSID's instrumentation is detailed in Table 4. The 5th female WorldSID dummy had a chest band recording rib movement and both the 50th male and 5th female contained 2D IRTRAC data channels. The results of the chest band can be found in Appendix E. One Hundred and seventy (170) dummy channels of acceleration, force, moment, and displacement data were collected for this test. Thirty one (31) chest band channels were recorded.

A summary of the side impact dummies (WorldSID) configuration and verification test data can be found in Appendix C. A total of two hundred and fifty nine (259) channels of data were recorded. Appendix B contains the vehicle, barrier, and dummy response data traces.

Test Results Summary



	Left Front WorldSID (#16)	Left Rear WorldSID (#236)
HIC36 (g) CFC 1000	182	301
Upper Rib Deflection (mm) CFC 600	See Table 4	See Table 4
Lower Rib Deflection (mm) CFC 600	See Table 4	See Table 4
Lower Spine Resultant (g) CFC 180	41.4	59.7
Pubic Symphysis Force (N) CFC 600	-1503.0	-1293.7

	2011 Hyundai Sonata
Vehicle Test Weight	1674.4 kg (3691.4 lbs)
Impact Point (Horizontal) rearward of front axle	459 mm
Impact Angle	62.5°
Maximum Crush	254 mm Level 2
Impact Speed	61.5 km/h

Data Acquisition Explanations

The Vehicle Left Lower A-Post y-axis acceleration data channel lost data after approximately 15 milliseconds.

The Vehicle Left Lower B-Post y-axis acceleration data channel recorded questionable data throughout the event.

The Vehicle Engine Block y-axis acceleration data channel recorded questionable data throughout the event.

The Vehicle Left Front Door Mid Centerline y-axis acceleration data channel lost data after approximately 25 milliseconds.

The Vehicle Left Front Door Mid Rear y-axis acceleration data channel lost data after approximately 35 milliseconds.

The Vehicle Left Rear Door Mid Rear y-axis acceleration data channel lost data after approximately 50 milliseconds.

The Vehicle Center of Gravity Pitch Rate angular rate data channel recorded no valid data.

The Vehicle Rear Deck Yaw Rate angular rate data channel exceeded the full scale at approximately 35 milliseconds.

Section 3

Summary of Test Results

Table 1 General Test Vehicle Parameter Data

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

TEST VEHICLE INFORMATION

Make	Hyundai
Model	Sonata
Body Style	Passenger
VIN	5NPEB4AC9BH175529
Color	Blue
Odometer Reading	27,710
Transmission	Automatic
Final Drive	Front
Number of Cylinders	4
Engine Displacement	2.4
Engine Placement	Straight
Air Conditioning	Yes
Power Windows	Yes
Power Seats	No
Cruise Control	Yes
Tinted Glass	Yes
Keyless Entry	Yes

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes ¹
Driver Side Curtain Airbag	Yes
Driver Side Torso Airbag	Yes
Rear Passenger Side/Curtain Airbag	Yes
Rear Passenger Side Torso Airbag	No
Power Steering	Yes
Power Door Locks	No
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	No
Bucket Seats	Yes
Rear Defroster	Yes
4-Door	Yes
AM/FM Radio	Yes
CD Player	Yes
Sun Roof	No
Telescoping Steering Wheel/Column	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Manufacturing Alabama
Date of Manufacture	10/2010

GVWR (kg)	1950
GAWR Front (kg)	1100
GAWR Rear (kg)	960

Measured Parameter	Front	Mid	Rear	Total
Type of Seats	Bucket	N/A	Split Bench	
Number Of Occupants	2	0	3	5
Capacity Wt. (VCW) (kg)				410

¹ Airbags were disabled prior to the test performance

Table 1 General Test Vehicle Parameter Data, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

TEST VEHICLE WEIGHTS

	Units	As Delivered (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	456.2	294.6		492.4	364.2	
Right	kg	441.6	293.8		455.2	362.6	
Ratio	%	60.4	39.6		56.6	43.4	
Totals	kg	897.8	588.4	1486.2	947.6	726.8	1674.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight	kg	1486.2
Weight of WorldSID ATD	kg	125.0
Rated Cargo/Luggage Weight (RCLW)	kg	69.8
Calculated Vehicle Target Weight (TVTW)	kg	1681.0

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	700	699	700	702	1109
As Tested	mm	690	695	669	674	1215
Fully Loaded	mm	683	695	670	680	1243

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheelbase	mm	2800
Total Vehicle Length at Left Side	mm	4650
Total Vehicle Length at Centerline	mm	4820
Total Vehicle Length at Right Side	mm	4650
Weight of Ballast	kg	34.0
Amount of Stoddard Solvent in Fuel Tank	liters	0.0

TEST VEHICLE IMPACT ACCURACY DATA

Measurement Description	Units	Intended	Actual	Difference
Impact Reference Line From Front Axle	mm	462	459	3 Left
Impact Point Angle	Degrees	63	62.5	0.5

Table 1 General Test Vehicle Parameter Data, Continued

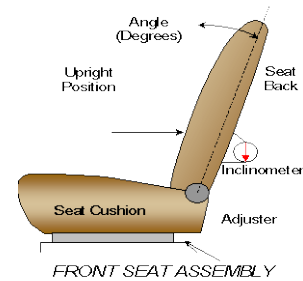
Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

WORLDSID RIDING POSITION

The driver seat back is positioned according to the procedure defined in SAE J826, “Devices for use in Defining and Measuring Vehicle Seating Accommodation”, November, 2008.

Driver seat back angle: The back was adjusted to 8.0° as measured on head rest post.

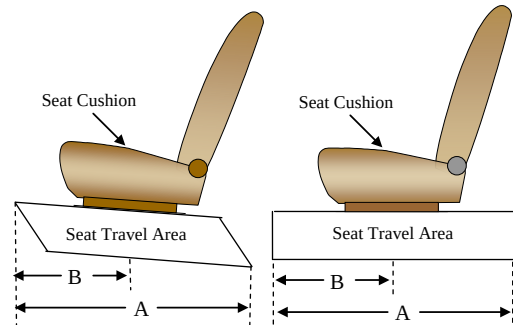


SEAT FORE/AFT POSITIONS

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 the driver. The rear seating position was not tested.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	15 of 25	20 mm rear of mid
Rear Seat	N/A	N/A



SEAT BELT UPPER ANCHORAGE

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

Position number one is the uppermost adjustment position.

Table 1 General Test Vehicle Parameter Data, Continued

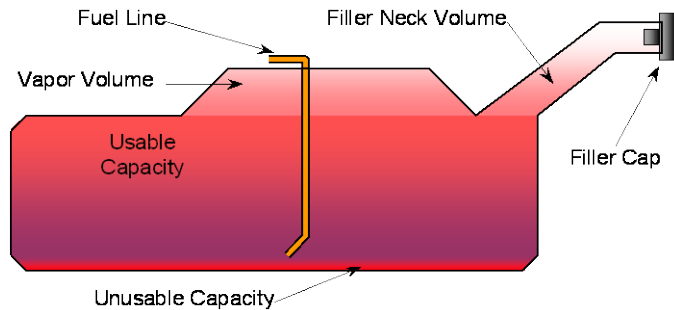
Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	70.0
Usable Capacity used for FMVSS 301	64.4-65.8
Actual Amount of Solvent used	0.0

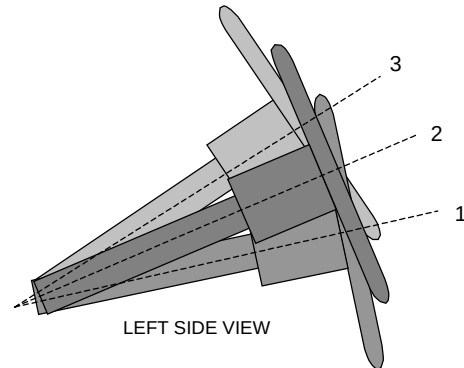
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies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

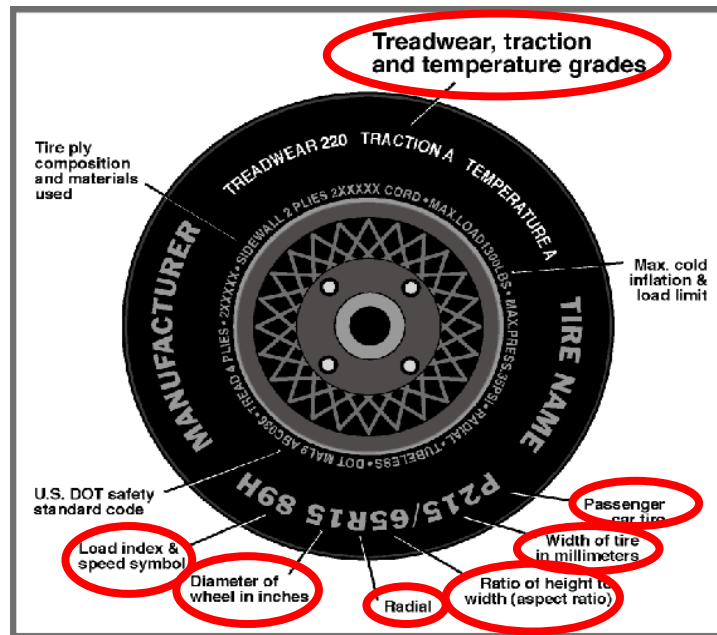
Steering Column Tilt Position	Degrees
Lowermost Position	64.3
Geometric Center Position	66.2
Uppermost Position	68.4

Steering Column Telescoping Position	(mm)
Full In Position	0
Full Out Position	42
Test Position	21

Table 2 Test Vehicle Tire Information

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	225	225
Recommended Tire Size	P205/65R16	P205/65R16
Tire Size on Vehicle	P205/65R16	P205/65R16
Tire Manufacturer	Kumho	Kumho
Tire Name	Solus	Solus
Radial	Yes	Yes
Wheel Diameter	16	16
Load Index & Speed Symbol	94T	94T
Tread wear	680	680
Traction Grade	A	A
Temperature Grade	B	B

Table 3 Post-Test Observations

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat WorldSID	Left Rear Seat
Dummy Type / Serial No.	WorldSID / WSID 016 w 014 head	WorldSID / 236
Head Contact	Headliner; SCAB	SCAB, C-Pillar
Upper Torso Contact	Torso Airbag	Door panel
Lower Torso Contact	Torso Airbag	Door panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	N/A	N/A

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Unlocked	Unlocked
Left Side Door Opening	Jammed Shut	Jammed Shut
Right Side Door Opening	Closed & Operational	Closed & Operational
Seat Movement	None	None
Seat Back Failure	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No
Sill Separation	No
Windshield Damage	None
Window Damage	Broken
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 01		Left Rear (Passenger) Occupant Location 04	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No ¹	N/A	N/A
Torso Airbag	Yes	Yes	N/A	N/A
Head Airbag	N/A	N/A	N/A	N/A
Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pre-tensioner	N/A	N/A	N/A	N/A
Seat Belt Load Limiter	N/A	N/A	N/A	N/A

¹ The driver front airbag was disabled for this test.

Section 4

Occupant, Vehicle and MDB Information

Table 4 WorldSID Instrumentation Data

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Driver Dummy Serial Number: 016

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	7.8	214.0	-14.7	62.8
	Y	38.6	58.9	-6.1	110.6
	Z	12.5	22.8	-8.8	17.1
	R	41.1	60.3	---	---
Head Rotational Acceleration (rad/sec ²)	X	2393.8	11.8	-1069.9	33.4
	Y	1184.3	21.4	-769.5	12.2
	Z	1073.2	87.6	-1179.4	13.3
Head Angular Velocity (°/sec)	X	793.7	48.4	-907.4	91.0
	Y	833.6	175.7	-518.2	11.2
	Z	583.9	108.3	-1022.8	62.0
Upper Neck Force (N)	X	219.1	214.0	-185.8	134.0
	Y	142.8	55.3	-231.2	113.4
	Z	661.7	45.5	-346.5	15.9
Upper Neck Moment (N-m)	X	7.1	202.3	-32.5	58.4
	Y	18.0	144.0	-23.0	51.1
	Z	14.9	67.9	-13.3	127.1
Lower Neck Force (N)	X	282.0	214.1	-206.7	117.1
	Y	318.7	41.0	-334.2	113.3
	Z	880.7	46.7	-350.5	16.4
Lower Neck Moment (N-m)	X	9.0	53.3	-54.3	114.0
	Y	42.1	136.2	-57.2	214.5
	Z	15.2	74.3	-6.8	124.9
Shoulder Acceleration (g)	X	140.8	14.2	-74.5	28.6
	Y	110.5	13.8	-56.1	27.7
	Z	125.1	14.3	-166.3	14.9
	R	191.6	14.3	---	---
Shoulder Force (N)	X	167.5	29.3	-457.1	56.2
	Y	517.2	106.9	-1665.6	35.9
	Z	705.5	51.0	-166.2	102.4
Shoulder Displacement (mm)	Y	29.4	54.3	-8.5	105.5

Table 4 WorldSID Instrumentation Data, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Driver Dummy Serial Number: 016

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T1 Acceleration (g)	X	7.0	17.9	-10.1	57.9
	Y	28.9	51.1	-9.4	13.1
	Z	4.8	88.9	-10.0	42.0
	R	31.2	43.8	---	---
Thorax Rib 1 Acceleration (g)	X	36.6	16.3	-33.7	19.3
	Y	48.9	35.6	-24.0	20.2
	Z	32.7	18.2	-25.3	94.9
	R	53.5	35.6	---	---
Thorax Rib 1 Displacement (mm)	Y	8.3	32.2	-3.7	186.9
Thorax Rib 2 Acceleration (g)	X	136.5	12.1	-115.9	14.6
	Y	180.2	11.5	-53.6	12.9
	Z	40.1	19.0	-22.3	12.9
	R	200.9	11.4	---	---
Thorax Rib 2 IRTRAC Compression. (mm)	Y	11.1	30.9	-2.7	196.9
Thorax Rib 2 Rotational Pot (deg)	Z	8.7	36.7	-0.6	110.3
Thorax Rib 2 IRTRAC Deflection (mm)	X	15.8	38.5	-1.2	110.3
Thorax Rib 2 IRTRAC Deflection (mm)	Y	12.0	30.9	-2.6	196.9
Thorax Rib 3 Acceleration (g)	X	109.5	10.2	-81.6	13.0
	Y	224.5	11.3	-77.9	12.2
	Z	37.2	18.4	-37.0	10.1
	R	232.2	11.3	---	---
Thorax Rib 3 IRTRAC Compression. (mm)	Y	15.3	44.9	-0.8	172.6
Thorax Rib 3 Rotational Pot (deg)	Z	8.7	35.8	--- ¹	--- ¹
Thorax Rib 3 IRTRAC Deflection (mm)	X	15.3	35.7	--- ¹	--- ¹
Thorax Rib 3 IRTRAC Deflection (mm)	Y	15.9	43.6	-0.8	172.6
Abdominal Rib 1 Acceleration (g)	X	153.4	10.2	-168.0	11.1
	Y	265.6	10.5	-81.2	15.2
	Z	61.7	16.9	-53.2	77.1
	R	266.4	10.5	---	---

¹ No negative value.

Table 4 WorldSID Instrumentation Data, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Driver Dummy Serial Number: 016

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Abdominal Rib 1 IRTRAC Compression. (mm)	Y	20.3	39.7	-0.8	10.5
Abdominal Rib 1 Rotational Pot (deg)	Z	7.1	38.9	-1.8	62.5
Abdominal Rib 1 IRTRAC Deflection (mm)	X	11.6	38.8	-3.4	62.5
Abdominal Rib 1 IRTRAC Deflection (mm)	Y	21.0	39.6	-0.8	10.5
Abdominal Rib 2 Acceleration (g)	X	270.9	18.3	-247.4	10.8
	Y	319.7	10.5	-199.3	13.5
	Z	86.1	14.7	-74.4	17.4
	R	363.7	10.7	---	---
Abdominal Rib 2 Displacement (mm)	Y	23.6	37.3	-2.5	78.1
T4 Acceleration (g)	X	3.4	151.9	-8.0	44.0
	Y	29.1	43.6	-5.7	13.0
	Z	9.8	42.0	-4.8	89.9
	R	31.6	43.6	---	---
T12 Acceleration (g)	X	1.9	255.5	-13.0	19.6
	Y	41.1	30.0	-11.1	83.4
	Z	5.4	28.3	-6.0	91.2
	R	41.4	30.0	---	---
Pelvis Acceleration (g)	X	7.7	41.0	-19.6	15.9
	Y	58.6	27.9	-16.7	62.7
	Z	19.6	21.6	-22.7	49.5
	R	58.9	27.9	---	---
Pubic Force (N)	Y	29.4	114.9	-1503.0	30.35
Lumbar Force (N)	X	278.6	111.8	-384.0	15.9
	Y	699.5	33.0	-471.5	86.5
	Z	1604.3	53.5	-611.6	93.1
Lumbar Moment (N-m)	X	38.6	40.3	-47.8	89.2
	Y	15.7	16.0	-9.4	40.2
	Z	10.8	47.4	-8.1	183.7

Table 4 WorldSID Instrumentation Data, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Driver Dummy Serial Number: 016

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Sacro-Iliac Right Moment (N-m)	X	50.5	54.4	-54.8	91.7
	Y	10.8	124.8	-24.5	29.9
	Z	36.2	15.9	-18.3	43.9
Sacro-Iliac Right Force (N)	X	87.2	45.4	-287.1	16.0
	Y	3.7	-10.1	-1816.5	30.5
	Z	638.3	54.7	-455.4	91.6
Sacro-Iliac Left Moment (N-m)	X	27.5	55.9	-44.4	33.4
	Y	15.1	118.5	-21.4	25.7
	Z	39.7	15.7	-22.1	47.1
Sacro-Iliac Left Force (N)	X	307.7	15.8	-278.5	39.8
	Y	76.7	94.7	-3158.6	30.4
	Z	137.6	93.7	-677.7	53.9
Left Femoral Neck Force (N)	X	1059.9	32.0	-106.0	103.2
	Y	134.1	113.0	-2014.2	31.4
	Z	82.4	298.2	-2041.5	29.6
Right Femoral Neck Force (N)	X	270.8	45.8	-168.4	63.1
	Y	372.7	57.0	-765.5	29.2
	Z	1042.7	44.0	-203.2	81.6

Positive Direction

Longitudinal: Forward
Lateral: Rightward
Vertical: Downward

Negative Direction

Longitudinal: Rearward
Lateral: Leftward
Vertical: Upward

Table 4 WorldSID Instrumentation Data, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Left Rear Passenger Dummy Serial Number: DG-236

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	6.2	153.8	-8.9	38.3
	Y	57.5	64.3	-10.7	146.3
	Z	4.9	45.8	-33.3	67.2
	R	64.1	65.2	---	---
Head Rotational Acceleration (rad/sec ²)	X	2880.0	49.0	-3889.5	62.9
	Y	1149.9	55.6	-1061.5	67.1
	Z	2165.5	145.5	-1578.9	170.6
Head Angular Velocity (°/sec)	X	1466.9	58.8	-496.8	146.4
	Y	605.3	65.2	-683.2	188.8
	Z	1487.0	213.7	-1685.2	155.9
Upper Neck Force (N)	X	466.4	68.3	-63.5	289.6
	Y	21.4	143.6	-866.2	81.2
	Z	119.2	222.7	-1262.2	67.4
Upper Neck Moment (N-m)	X	16.5	47.9	-31.6	65.1
	Y	25.8	68.7	-11.5	165.2
	Z	9.0	242.4	-22.7	175.5
Lower Neck Force (N)	X	310.7	71.9	-92.0	276.8
	Y	763.9	64.8	-179.8	103.2
	Z	119.5	128.0	-1331.1	68.4
Lower Neck Moment (N-m)	X	4.9	65.0	-65.1	81.8
	Y	12.0	289.0	-34.3	69.2
	Z	10.2	243.8	-22.9	174.4
Shoulder Acceleration (g)	X	95.2	34.6	-72.7	40.7
	Y	180.1	50.4	-28.3	45.3
	Z	62.6	50.0	-48.7	40.8
	R	205.6	50.4	---	---
Shoulder Force (N)	X	238.3	34.6	-111.6	70.4
	Y	188.3	94.9	-1178.0	58.1
	Z	499.8	64.2	-101.0	106.9
Shoulder Displacement (mm)	Y	24.1	63.1	-4.2	96.1

Table 4 WorldSID Instrumentation Data, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Left Rear Passenger Dummy Serial Number: DG-236

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T1 Acceleration (g)	X	7.1	51.0	-16.0	67.8
	Y	59.5	61.3	-10.4	166.5
	Z	10.0	67.7	-1.2	45.2
	R	59.8	61.3	---	---
Thorax Rib 1 Acceleration (g)	X	39.6	46.3	-49.6	50.7
	Y	107.9	52.5	-16.3	106.6
	Z	41.4	105.0	-18.2	53.9
	R	110.5	51.7	---	---
Thorax Rib 1 IRTAC Compression (mm)	Y	11.1	58.0	--- ¹	138.7
Thorax Rib 1 Rotational Pot (deg)	Z	8.0	51.2	--- ¹	258.4
Thorax Rib 1 IRTAC Deflection (mm)	X	11.9	51.1	3.8	258.4
Thorax Rib 1 IRTAC Deflection (mm)	Y	11.7	58.0	-0.2	138.7
Thorax Rib 2 Acceleration (g)	X	21.5	47.4	-29.2	52.4
	Y	60.5	52.3	-7.3	157.7
	Z	21.5	52.9	-17.2	78.1
	R	67.3	52.3	---	---
Thorax Rib 2 IRTAC Compression. (mm)	Y	3.0	57.7	-0.5	199.7
Thorax Rib 2 Rotational Pot (deg)	Z	9.1	53.9	--- ¹	266.4
Thorax Rib 2 IRTAC Deflection (mm)	X	13.9	53.6	--- ¹	266.4
Thorax Rib 2 IRTAC Deflection (mm)	Y	4.0	57.7	-0.4	199.7
Thorax Rib 3 Acceleration (g)	X	62.5	46.8	-78.5	50.7
	Y	104.5	50.8	-79.6	53.7
	Z	44.6	48.9	-47.4	54.7
	R	124.1	50.8	---	---
Thorax Rib 3 IRTAC Compression. (mm)	Y	7.9	58.9	-0.6	230.6
Thorax Rib 3 Rotational Pot (deg)	Z	5.9	51.9	--- ¹	--- ¹
Thorax Rib 3 IRTAC Deflection (mm)	X	8.5	51.8	--- ¹	--- ¹

¹ No negative value.

Table 4 WorldSID Instrumentation Data, Continued

Test Vehicle: 2011 Hyundai Sonata Test Date: 01/24/13
 Left Rear Passenger Dummy Serial Number: DG-236

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 3 IRTRAC Deflection (mm)	Y	8.1	58.9	-0.6	230.6
Abdominal Rib 1 Acceleration (g)	X	110.4	45.4	-104.2	40.2
	Y	154.0	40.3	-71.8	45.9
	Z	118.1	41.3	-99.9	41.0
	R	185.3	40.2	---	---
Abdominal Rib 1 IRTRAC Compression. (mm)	Y	18.1	47.5	-0.2	5.6
Abdominal Rib 1 Rotational Pot (deg)	Z	8.9	52.1	--- ¹	--- ¹
Abdominal Rib 1 IRTRAC Deflection (mm)	X	11.8	52.1	--- ¹	179.3
Abdominal Rib 1 IRTRAC Deflection (mm)	Y	18.5	47.6	-0.2	5.6
Abdominal Rib 2 Acceleration (g)	X	71.8	46.8	-83.0	52.0
	Y	131.9	40.1	-109.0	47.5
	Z	152.9	44.8	-111.0	44.5
	R	160.2	44.8	---	---
Abdominal Rib 2 IRTRAC Compression (mm)	Y	16.7	47.7	-0.1	2.8
Abdominal Rib 2 Rotational Pot (deg)	Z	6.7	52.5	-1.2	81.4
Abdominal Rib 2 IRTRAC Deflection (mm)	X	8.9	52.6	-1.9	81.4
Abdominal Rib 2 IRTRAC Deflection (mm)	Y	16.8	47.7	-0.1	2.8
Pubic Force (N)	Y	22.9	187.8	-1293.7	44.3

¹ No negative value.

Table 4 WorldSID Instrumentation Data, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Left Rear Passenger Dummy Serial Number: DG-236

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	5.7	157.7	-14.5	68.0
	Y	55.5	59.6	-9.1	167.8
	Z	8.3	67.7	-2.6	45.3
	R	55.7	59.6	---	---
T12 Acceleration (g)	X	3.8	149.2	-10.4	45.3
	Y	58.8	46.2	-5.2	92.5
	Z	7.4	68.0	-3.8	49.6
	R	59.7	46.1	---	---
Pelvis Acceleration (g)	X	5.2	44.8	-33.2	36.0
	Y	75.2	36.3	-4.2	87.6
	Z	16.0	71.6	-29.5	35.6
	R	85.4	36.1	---	---

Positive Direction

Longitudinal: Forward

Lateral: Rightward

Vertical: Downward

Negative Direction

Longitudinal: Rearward

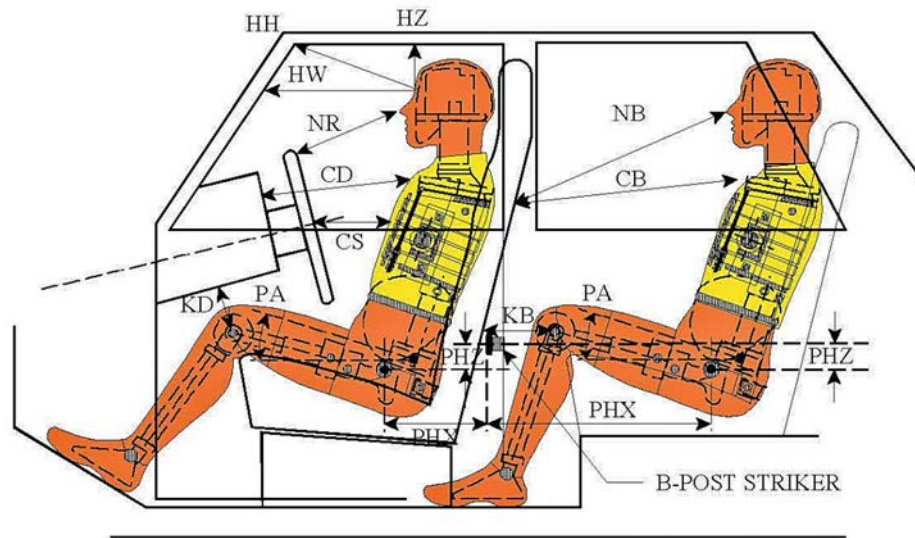
Lateral: Leftward

Vertical: Upward

Figure 1 WorldSID Longitudinal Clearance Dimensions

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



Left Side View

Measurement	Measurement Description	Driver WorldSID #016		Passenger WorldSID #236	
		Length (mm)	Angle	Length (mm)	Angle
HH	Header to Header	448			
HW	Header to Windshield	789			
HZ	Head to Roof Liner	228			
NR	Nose to Rim/Seat Back	527			
CD	Chest to Dash/Seat Back	672			
CS	Chest to Steering Wheel	424			
KD(L)/KDA(L)°	Left Knee to Dash/Seat Back	166	19.8		
KD(R)/KDA(R)°	Right Knee to Dash/Seat Back	177	10.1		
PAX°	Pelvic Tilt Angle X		-0.2		0.5
PAY°	Pelvic Tilt Angle Y		2.5		-14.8
PHX	Hip Point to Striker (X-Axis)	219		246	
PHZ	Hip Point to Striker (Z-Axis)	267		204	
HAX°	Head Tilt Angle X		-0.3		1.5
HAY ¹ °	Head Tilt Angle Y		0		0.5
TAX°	Thorax Tilt Angle X		0.3		-1.6
TAY°	Thorax Tilt Angle Y		2.5		-1.7

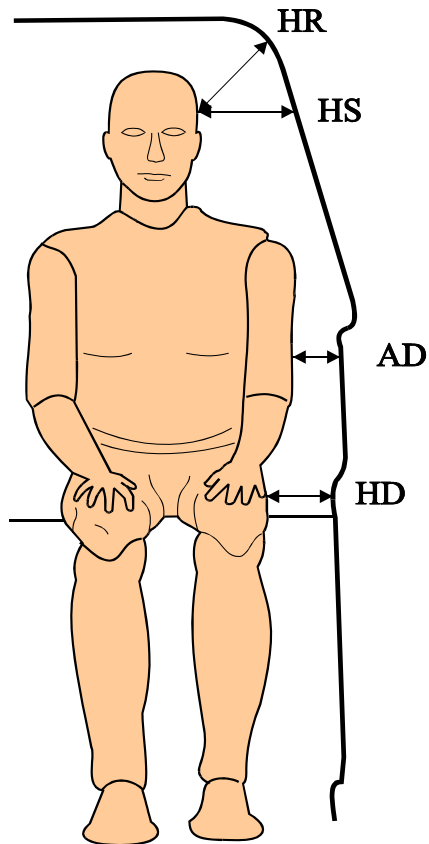
Note: All measurements are in millimeters.

¹NR was measured from bridge of nose

Figure 2 WorldSID Lateral Clearance Dimensions

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



Measurement	Driver WorldSID # 016	Passenger WorldSID # 236
HR	231	268
HS	366	376
AD	Lower: 149 Upper: 110	Lower: 148 Upper: 172
HD	118	147

Note: All measurements are in millimeters.

Table 5 WorldSID Position Relative to Striker

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Location	Driver Dummy Serial Number: 16		Passenger Dummy Serial Number: 236	
	Longitudinal X (mm)	Vertical Z (mm)	Longitudinal X (mm)	Vertical Z (mm)
M_HEAD CG	2319	-730	1391	-654
M_H POINT	2515	-70	1601	-107
M_KNEE	2948	-179	1962	-200
M_ANKLE	3261	83	2121	131
M_RIB 1	2378	-505	1461	-439
M_RIB 2	2415	-430	1491	-381
M_RIB 3	2453	-368	1509	-327
M_RIB 4	2475	-320	1530	-287
M_RIB 5	2498	-266	1557	-243
M_RIB 6	2519	-221	1569	-204

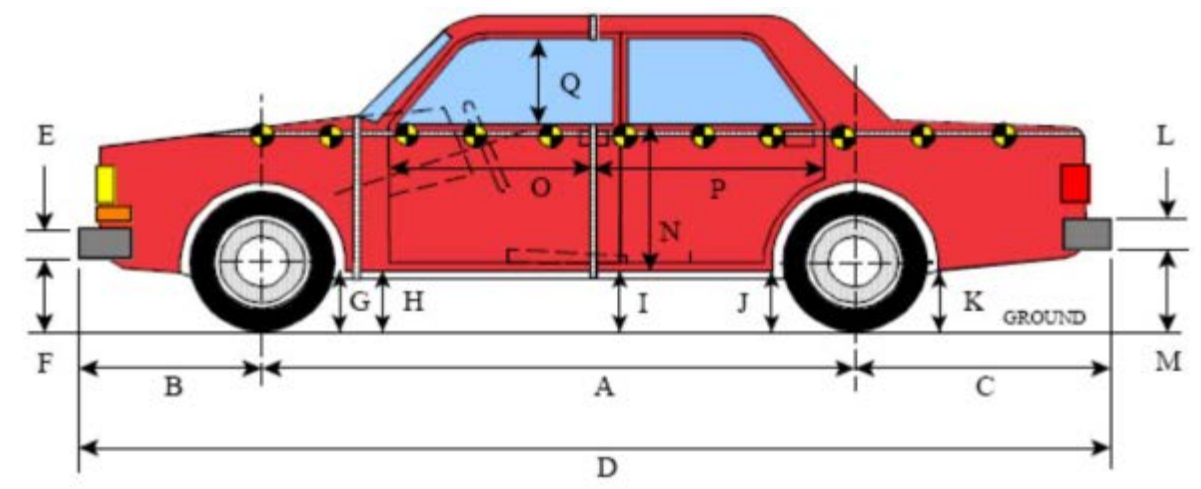
Note: All measurements are in millimeters.

Positive values are forward and down relative to the striker.

Figure 3 Vehicle Pre-Test And Post-Test Measurements

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



Left Side View

Note: Measurements were achieved by using a tape measure.

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	2800	2800	2795	5
B	915	915	915	0
C	1105	1105	1105	0
D	4820	4820	4820	0
E	90	90	90	0
F	400	400	415	-15
G	312	310	310	0
G1	257	244	275	-31
H	252	239	280	-41
I	260	239	370	-131
J1	185	165	193	-28
J2	260	228	370	-142
K	375	340	384	-44
L	185	185	185	0
M	470	435	472	-37
N	760	760	668	92
O	790	790	740	50
P	1423	1423	1390	33
Q	362	362	354	8
R	4650	4650	4650	0
S	4650	4650	4650	0
T	1370	1370	1270	100

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 6 Vehicle Structural Measurements^{1,2}

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

	Elements	Pre-Test
1	Total Length	4820
2	Total Width	1830
3	Bumper Top Height	525
4	Bumper Bottom Height	420
5	Longitudinal Member Top Height	523
6	Longitudinal Member Bottom Height	412
7	Distance Between Longitudinal Members	1070
7'	Longitudinal Member Width	70
8	Engine Top Height	748
9	Engine Bottom Height	128
10	Engine and Gearbox Width	860
11	Front Bumper - Engine Distance	450
12	Front Shock Absorber Fixing Height	875
13	Bonnet Leading Edge Height	724
14	Front Shock Absorber Fixing Width	1210
15	Front Bumper - Front Axle Distance	740
16	Front Axle - A Pillar Distance	600
17	A Pillar - B Pillar Distance	1080
18	B Pillar - Rear Axle Distance	1130
19	B Pillar - C Pillar Distance	1015
20	Roof Sill Bottom Height	1278
21	Roof Sill Top Height	1349
22	Floor Sill Bottom Height	245
23	Floor Sill Top Height	350

All distance measurements are in millimeters and achieved by using a tape measure.

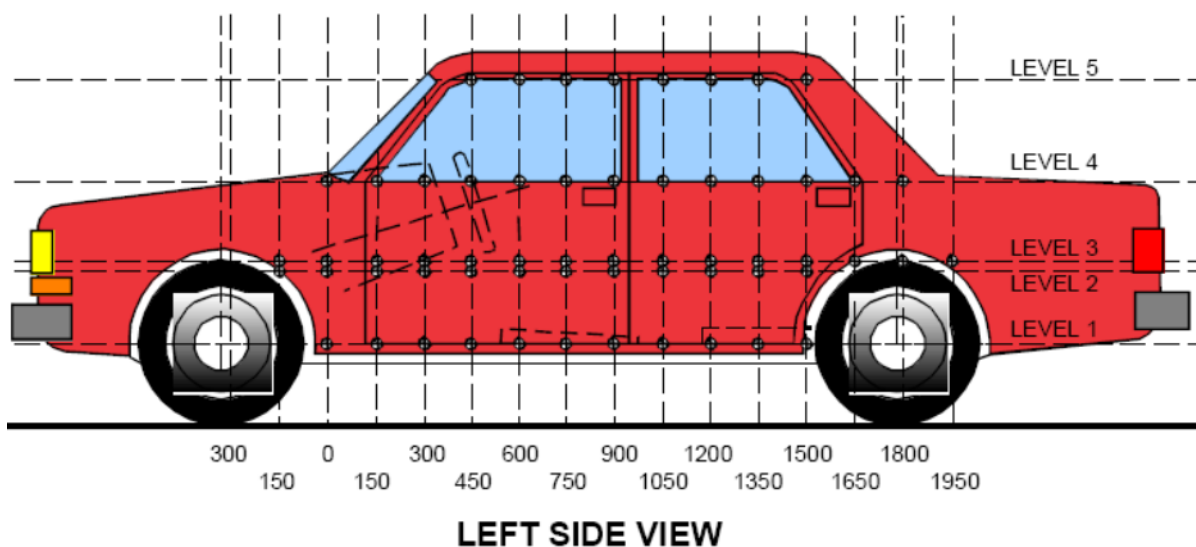
¹ Taken from INSIA report, “Structural Survey of Cars, Methodology of the Main Resistant Elements in the Car Body”, March 1999.

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

Figure 4 Vehicle Side Measurements

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Crush	Distance from Impact
5	Window Top	1412	13	1500
4	Window Sill	907	214	1500
3	Mid Door	646	241	1650
2	Occupant H-Point	540	254	1500
1	Side Sill	358	112	1650

Note: Measurements were taken using a FARO arm at crush grid zero vertical line.
 Measurements are taken when the vehicle is in the "As Tested" configuration.
 Measurements forward of the vehicle impact reference line are negative.
 All measurements are in mm.

Table 7 Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2011 Hyundai Sonata

Location	Height		(mm) From Impact Point													
			-1200	-1050	-900	-750	-600	-450	-300	-150	0	150	300	450	600	750
Level 1	358	Pre									907	893	892	893	896	899
		Post									899	922	884	857	844	831
		Crush									8	-29	8	36	52	68
Level 2	540	Pre									914	911	910	911	911	911
		Post									890	806	760	740	727	720
		Crush									24	105	150	171	184	191
Level 3	646	Pre								919	913	914	915	917	918	919
		Post								920	898	819	778	749	727	733
		Crush								-1	15	95	137	168	191	186
Level 4	907	Pre									819	842	849	853	858	863
		Post									828	839	833	803	759	745
		Crush								-9	3	16	50	99	118	118
Level 5	1412	Pre														
		Post														
		Crush														

Location	Height		(mm) From Impact Point												
			900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700
Level 1	358	Pre	902	901	898	895	892	890							
		Post	822	814	801	794	784	778							
		Crush	80	87	97	101	108	112							
Level 2	540	Pre	911	910	908	907	904	903	905						
		Post	710	699	688	657	650	653	684						
		Crush	201	211	220	250	254	250	221						
Level 3	646	Pre	919	919	917	916	913	910	909	916					
		Post	726	718	732	703	681	669	694	791					
		Crush	193	201	185	213	232	241	215	125					
Level 4	907	Pre	872	876	882	887	894	894	887	879	871	864	854	843	830
		Post	742	747	750	726	680	721	753	781	832	898	851	847	831
		Crush	130	129	132	161	214	173	134	98	39	-34	3	-4	-1
Level 5	1412	Pre		613	618	618	618	615	607						
		Post		610	610	606	605	605	599						
		Crush		3	8	12	13	10	8						

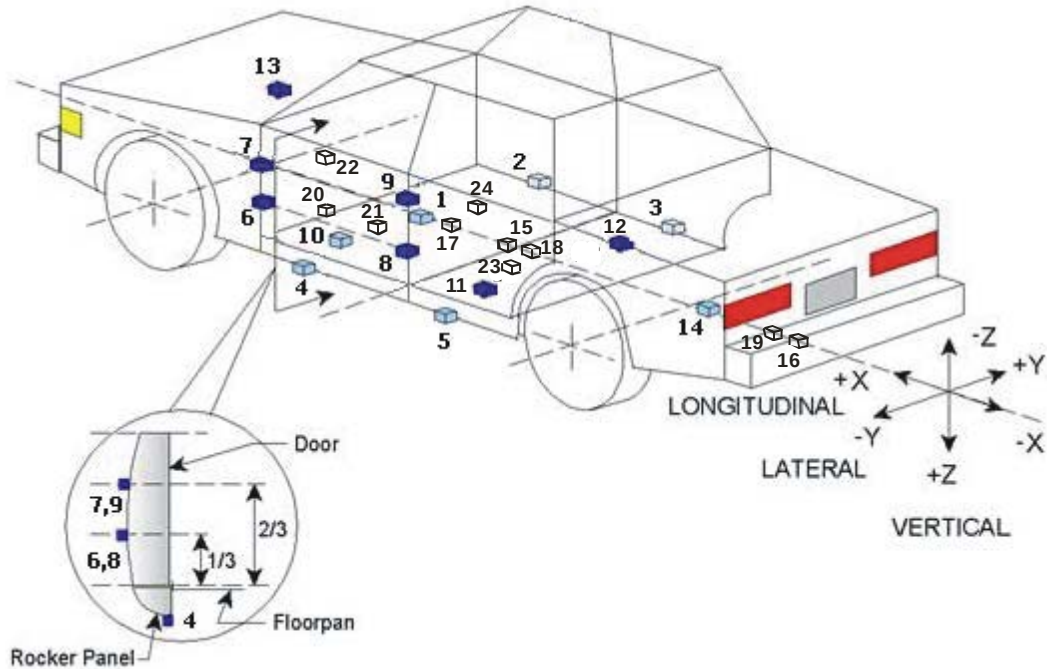
Highlighted data is invalid. Post-test faro points were un-measurable.

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

Figure 5 Test Vehicle Accelerometer Locations and Data Summary

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



- | | |
|-------------------------------------|--------------------------------------|
| 1-Vehicle CG | 13-Engine Block |
| 2-Right Side Sill Front | 14-Rear Floorpan |
| 3-Right Side Sill Rear | 15-Vehicle at EDR ¹ |
| 4-Left Side Sill Front | 16-Rear Deck |
| 5-Left Side Sill Rear | 17-Vehicle CG Gyros |
| 6-Left Side Lower A-Pillar | 18-Vehicle at EDR Gyros ¹ |
| 7-Left Side Middle A-Pillar | 19-Rear Deck Gyros |
| 8-Left Side Lower B-Pillar | 20-Left Front Door Mid Centerline |
| 9-Left Side Middle B-Pillar | 21-Left Front Door Mid Rear |
| 10-Left Front Seat Track | 22-Left Front Door Upper Centerline |
| 11-Left Rear Seat Track | 23-Left Rear Door Mid Rear |
| 12- Right Rear Occupant Compartment | 24-Left Rear Door Upper Centerline |

¹Location of accelerometer may change depending on vehicle EDR location.

Table 8 Test Vehicle Transducer Locations and Data Summary

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	3305	-40	375				
	Longitudinal (g)				3.5	57.6	-8.9	9.4
	Lateral (g)				17.4	7.0	-1.6	128.7
	Vertical (g)				8.7	30.1	-5.5	40.0
	Resultant				18.7	8.7	---	---
2	Right Side Sill Front	3227	680	246				
	Longitudinal (g)				2.8	58.5	-5.9	9.4
	Lateral (g)				25.4	6.1	-1.7	171.7
	Vertical (g)				4.7	63.6	-6.6	13.1
	Resultant				26.2	6.1	---	---
3	Right Side Sill Rear	2277	670	283				
	Longitudinal (g)				3.5	62.1	-5.5	9.7
	Lateral (g)				25.1	5.7	-2.0	120.2
	Vertical (g)				4.1	32.4	-6.8	12.8
	Resultant				25.8	5.8	---	---
4	Left Side Sill Front	3231	680	247				
	Lateral (g)				36.7	3.2	-112.3	23.0
5	Left Side Sill Rear	2320	-670	278				
	Lateral (g)				33.3	4.1	-3.3	13.3
6	Left Side Lower A-Pillar	2693	-820	470				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
7	Left Side Middle A-Pillar	2689	-810	884				
	Lateral (g)				23.0	10.1	-2.1	135.9
8	Left Side Lower B-Pillar	2590	-825	565				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
9	Left Side Middle B-Pillar	2567	-820	917				
	Lateral (g)				122.3	3.9	-45.2	16.6
10	Left Front Seat Track	2820	-600	259				
	Lateral (g)				88.9	22.0	-2.2	129.0

¹See Data Acquisition Explanations

Table 8 Test Vehicle Transducer Locations and Data Summary, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
11	Left Rear Seat Track	2080	-550	347				
	Lateral (g)				23.4	5.1	-1.8	119.9
12	Right Rear Occupant Compartment	2190	710	289				
	Lateral (g)				24.0	5.5	-2.0	120.1
13	Engine Block	4398	5	815				
	Longitudinal (g)				8.0	84.7	-13.4	26.3
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
14	Rear Floorpan	1475	0	470				
	Longitudinal (g)				2.4	5.9	-5.0	23.2
	Lateral (g)				21.5	28.7	-2.2	96.7
	Vertical (g)				0.1	5.4	-18.4	25.5
	Resultant				28.1	25.5	---	---
15	Vehicle at EDR	3625	10	425				
	Longitudinal (g)				4.1	4.6	-8.7	9.2
	Lateral (g)				16.3	5.9	-1.4	128.5
	Vertical (g)				9.6	6.0	-4.4	32.1
	Resultant				18.9	5.9	---	---
16	Rear Deck	565	-100	630				
	Longitudinal (g)				12.2	27.1	-19.0	21.5
	Lateral (g)				28.0	31.9	-3.5	106.0
	Vertical (g)				6.0	20.9	-8.9	47.6
	Resultant				33.2	21.2	---	---
17	Vehicle CG	3305	0	375				
	Roll (°/sec)				195.8	23.6	-69.7	31.1
	Pitch (°/sec)				--- ¹	--- ¹	--- ¹	--- ¹
	Yaw (°/sec)				0.6	75.9	-2.1	17.9
18	Vehicle at EDR	3625	-10	425				
	Roll (°/sec)				239.1	25.3	-58.6	81.1
	Pitch (°/sec)				258.5	30.7	-86.9	24.8
	Yaw (°/sec)				82.5	12.9	-274.1	30.7
19	Rear Deck	565	95	630				
	Roll (°/sec)				175.2	7.7	-178.4	86.6
	Pitch (°/sec)				2.9	146.4	-5.8	24.0
	Yaw (°/sec)				249.1	22.9	-183.1	191.2

¹See Data Acquisition Explanations

Table 8 Test Vehicle Transducer Locations and Data Summary, Continued

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
20	Left Front Door Mid Centerline	3112	-765	535				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
21	Left Front Door Mid Rear	2735	-760	637				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
22	Left Front Door Upper Centerline	3146	-760	910				
	Lateral (g)				102.4	15.1	-38.6	24.7
23	Left Rear Door Mid Rear	1848	-760	670				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
24	Left Rear Door Upper Centerline	2120	-750	960				
	Lateral (g)				117.6	17.4	-40.1	23.9

¹See Data Acquisition Explanations

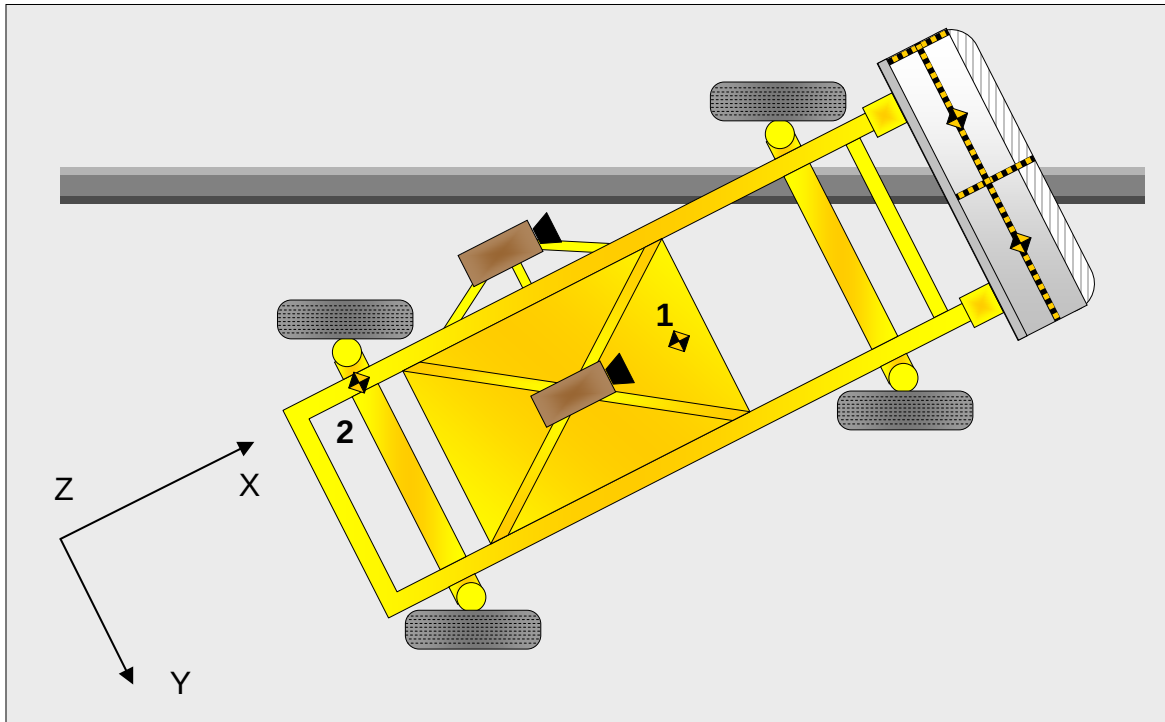
Reference: X: + Forward from rear bumper
Y: + Rightward from vehicle centerline
Z: + Upward from ground level

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

Table 9 MDB Test Data Summary

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
1	MDB CG				
	Longitudinal (g)	3.1	120.3	-21.4	15.2
	Lateral (g)	4.3	63.4	-8.9	29.9
	Vertical (g)	5.6	27.9	-10.0	18.1
	Resultant	21.9	15.4	---	---
2	MDB Rear Frame				
	Longitudinal (g)	2.0	99.3	-22.4	38.9
	Lateral (g)	3.9	47.6	-2.5	147.6

Reference : X - Face of MDB (+ forward)
Y - MDB Centerline (+ to right)
Z - Ground Plane (+ down)

Table 9 MDB Test Data Summary, Continued

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	422.8	261.6	
Right	kg	350.2	332.8	
Ratio	%	56.5	43.5	
Totals	kg	773.2	594.4	1367.6

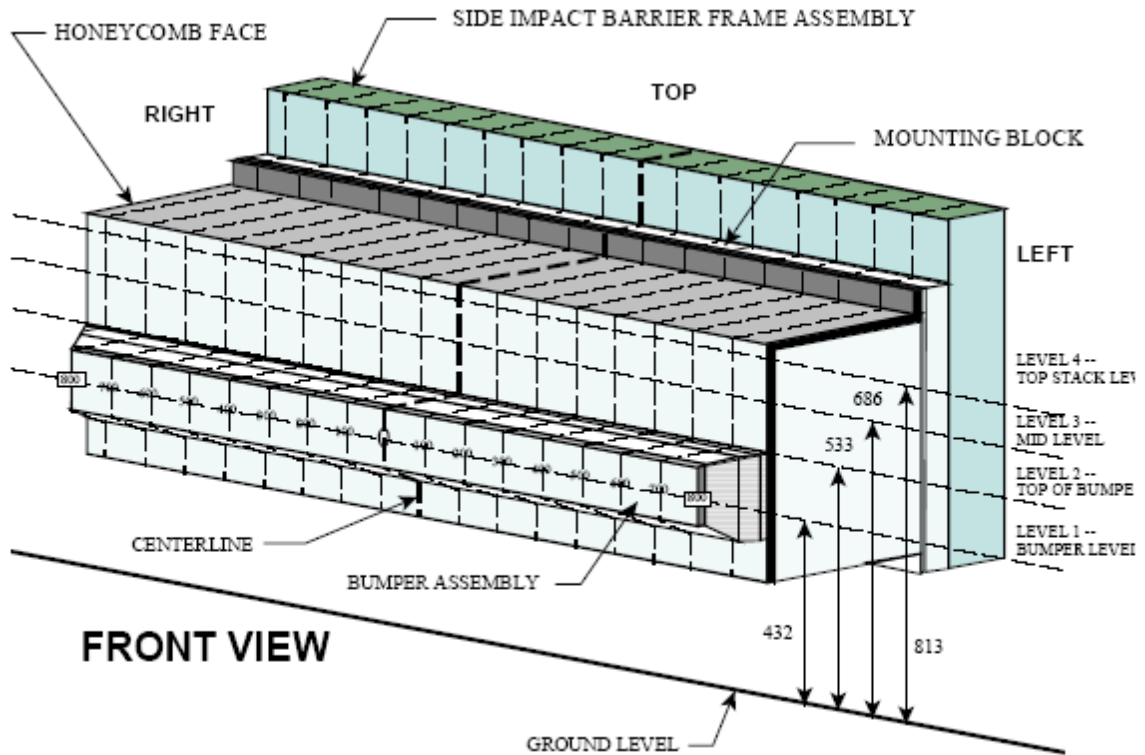
SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.5
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.5
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	91.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.5
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	26.5

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	185
B	Top of Bumper	533	100	Left	372
C	Mid-Level	686	800	Left	110
D	Top of Stack	813	800	Left	152

Table 9 MDB Test Data Summary, Continued



NOTE: Dimensions are shown in millimeters, mm

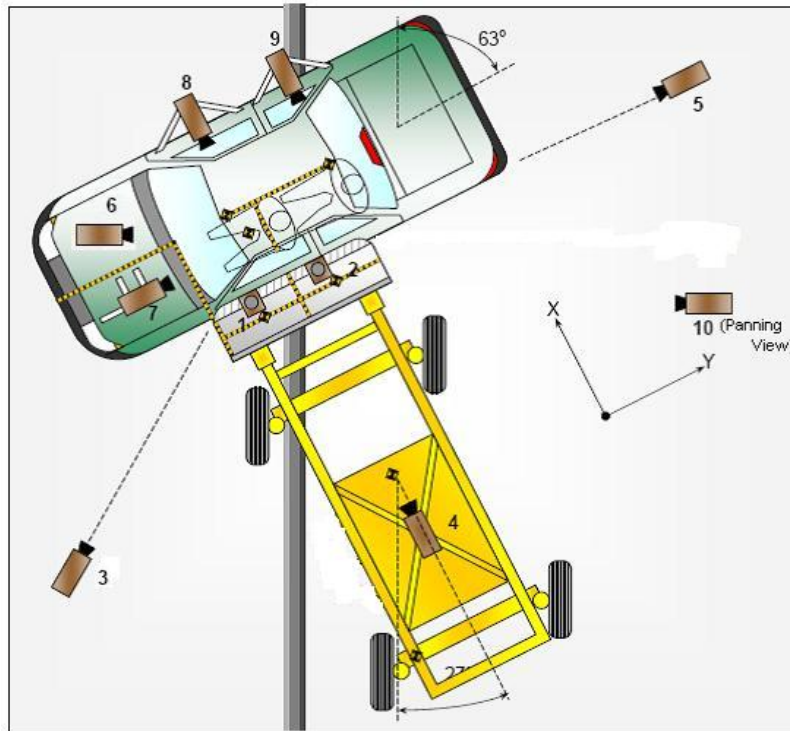
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	-69	-41	-21	-21	-43	-82	-91	-87	-69	-45	-43	-51	-56	-56	-76	-104	-152
2	-77	-19	-23	-29	-40	-69	-77	-48	-31	-22	-19	-19	-23	-31	-49	-72	-110
3	-66	---	---	---	---	---	---	---	-372	-372	-70	-69	-71	-75	-79	-85	-104
4	-78	-83	-95	-109	-124	-137	-144	-149	-148	-146	-144	-145	-147	-150	-154	-168	-185

Figure 6 High-Speed Camera Locations and Data Summary

Test Vehicle: 2011 Hyundai Sonata

Test Date: 01/24/13



No.	Camera View	Lens (mm)	Speed (fps)
1	Overhead wide view	6	1000
2	Overhead close up view	16	1000
3	Left side front oblique view	12.5	1000
4	Struck side view at impact	8.5	1000
5	Rear impact view of struck side	8.5	1000
6	Driver dummy front oblique view	12.5	1000
7	Driver dummy front view	12.5	1000
8	Driver dummy side view	8.5	1000
9	Rear passenger dummy side view	8.5	1000
10	Real-time	Zoom	30

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

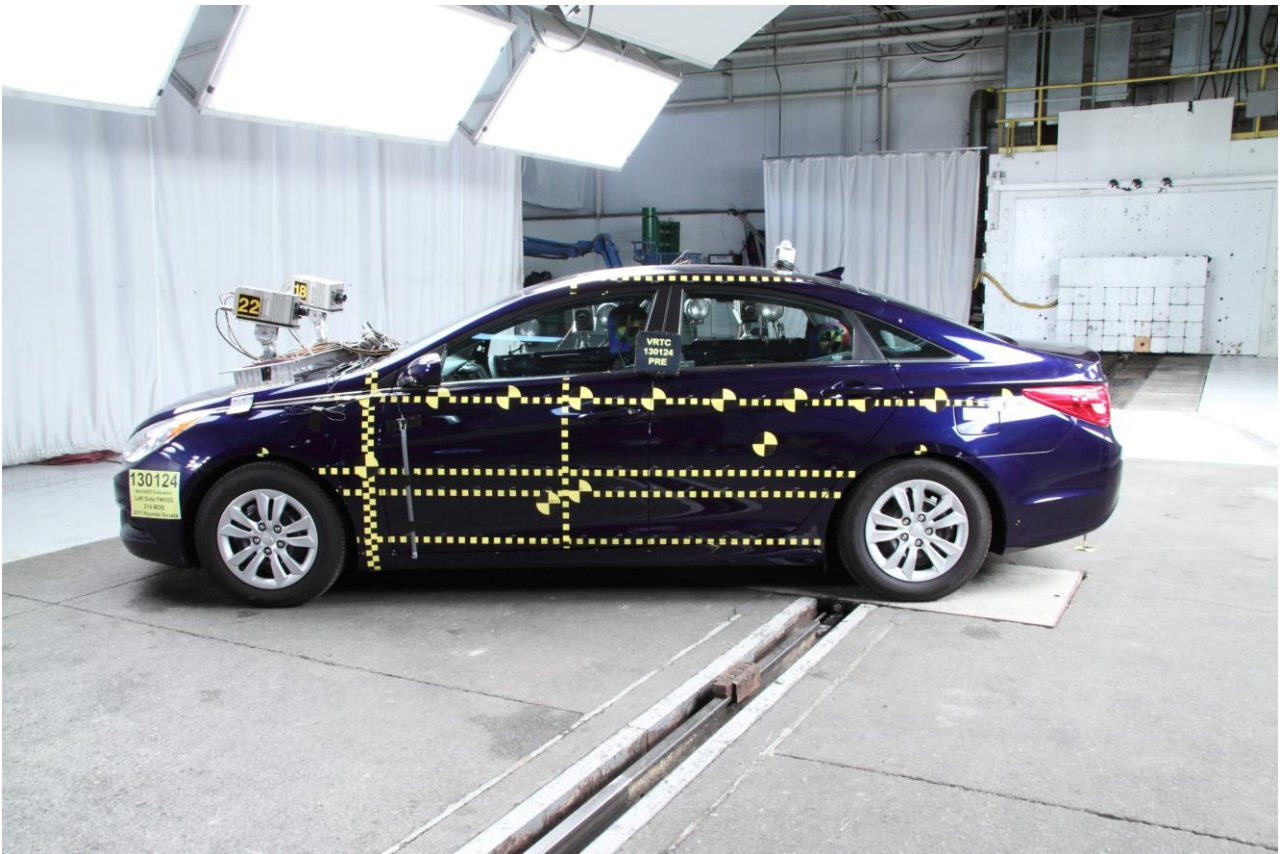


Figure A-5 Pre-Test Left Side View



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

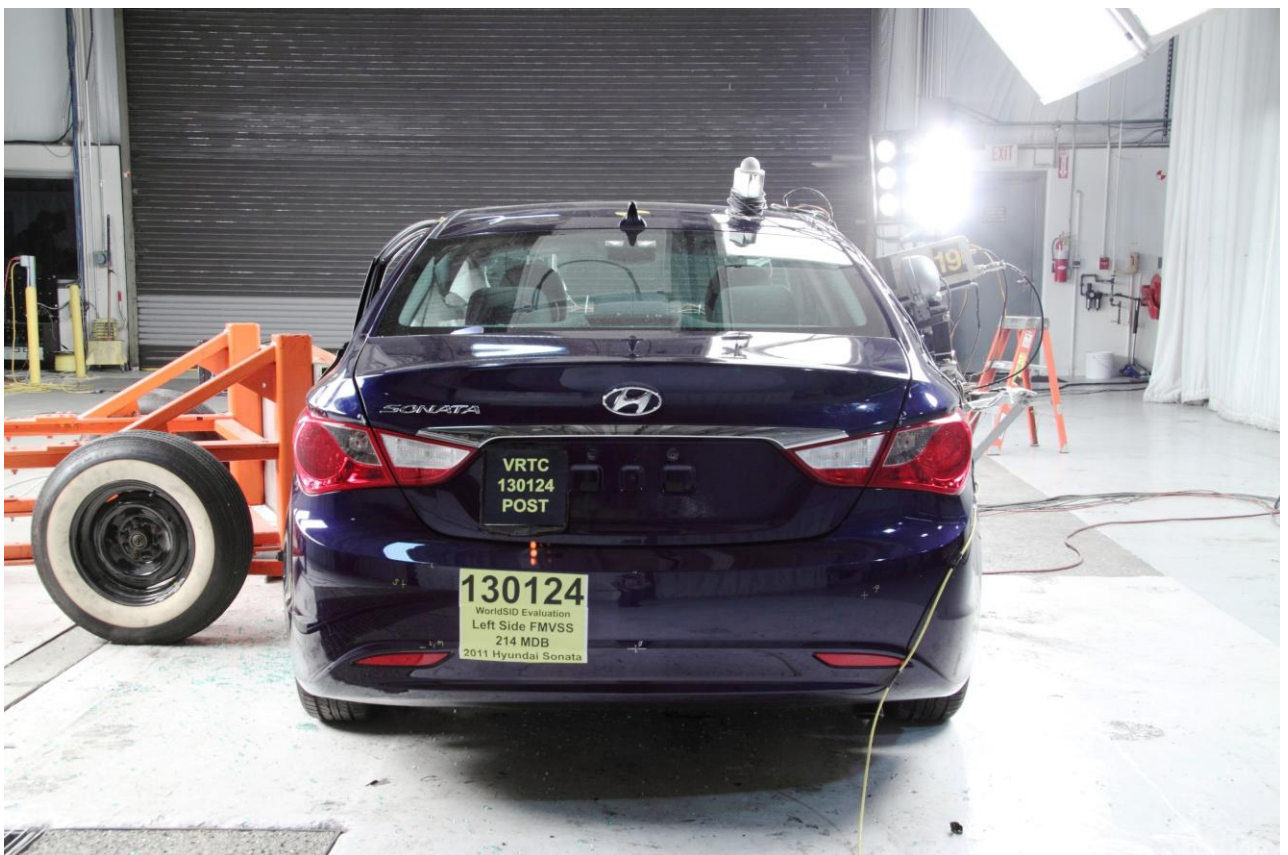


Figure A-10 Post-Test Rear

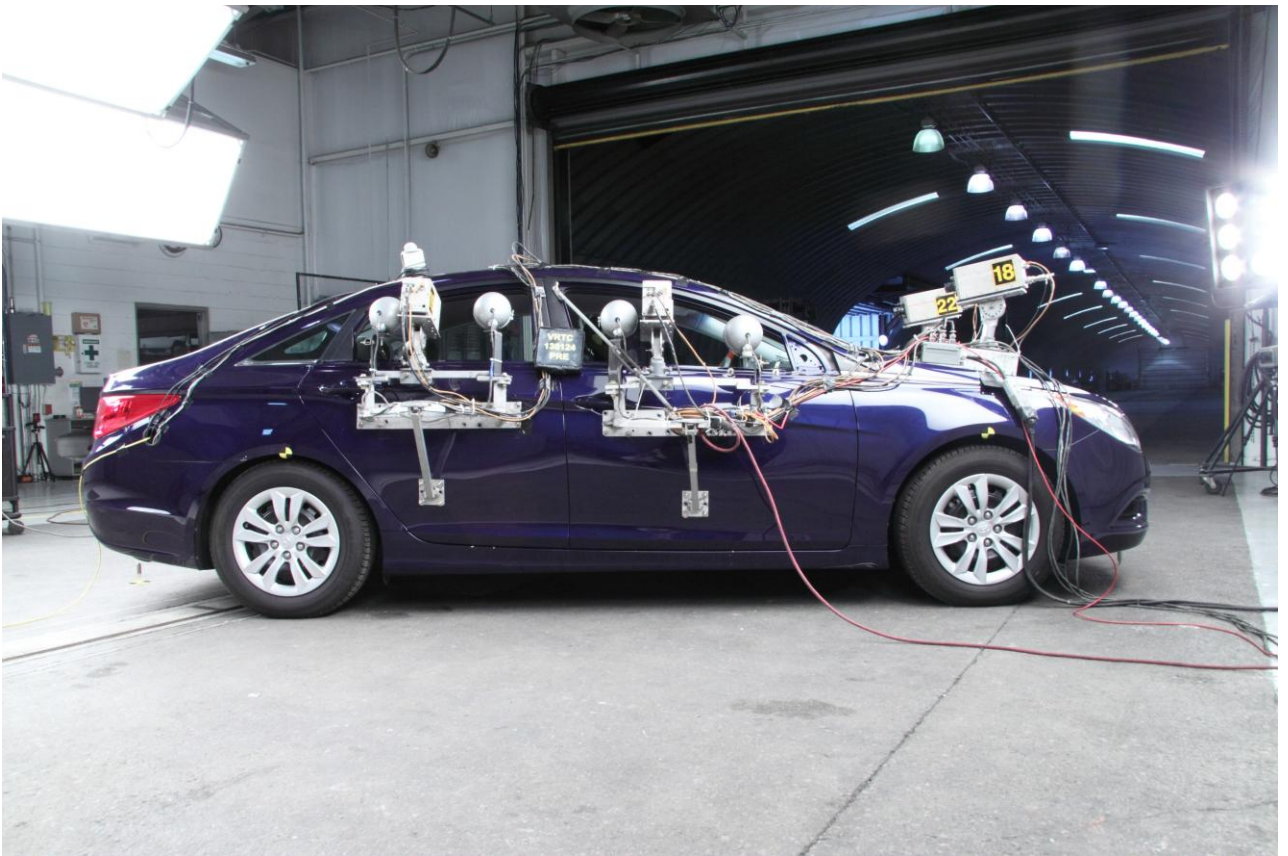


Figure A-11 Pre-Test Right Side View



Figure A-12 Post-Test Right Side View

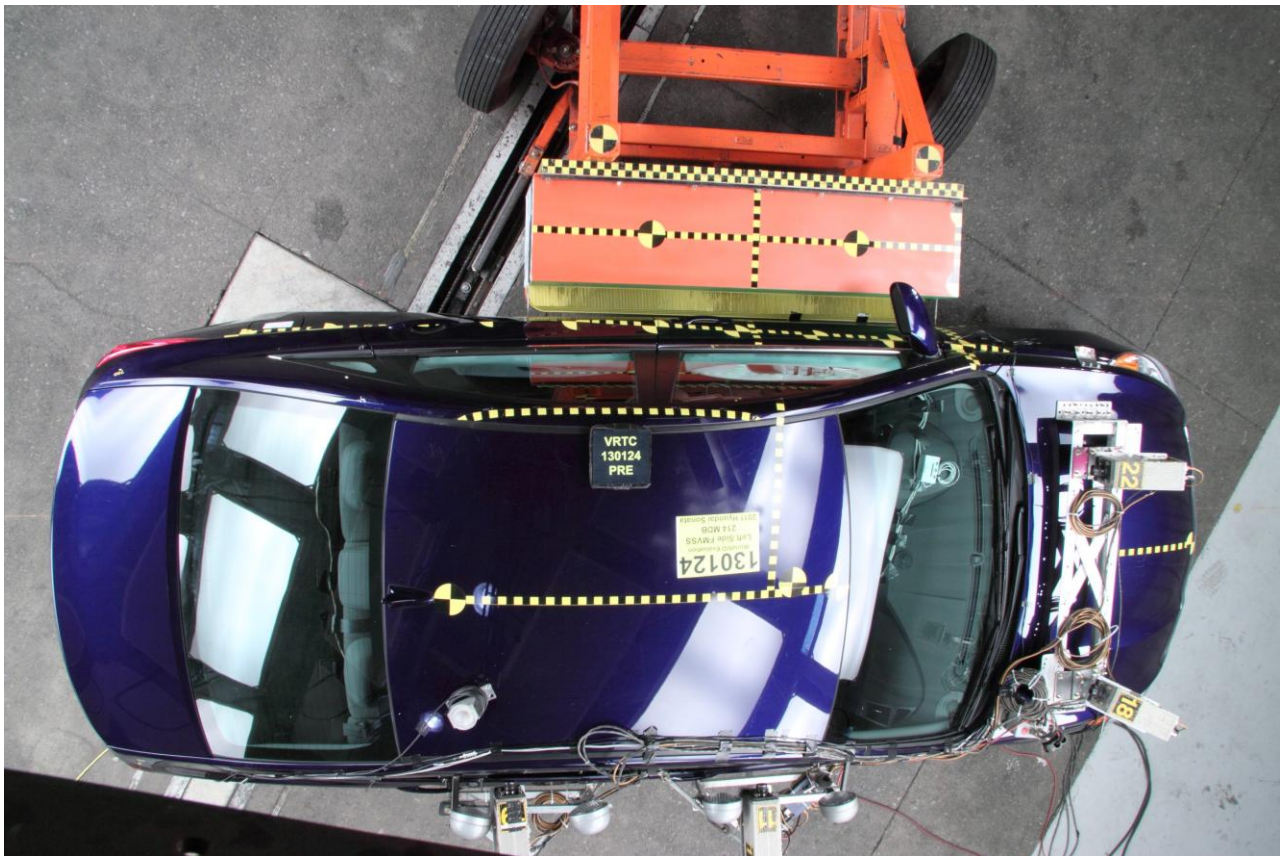


Figure A-13 Pre-Test Overhead View

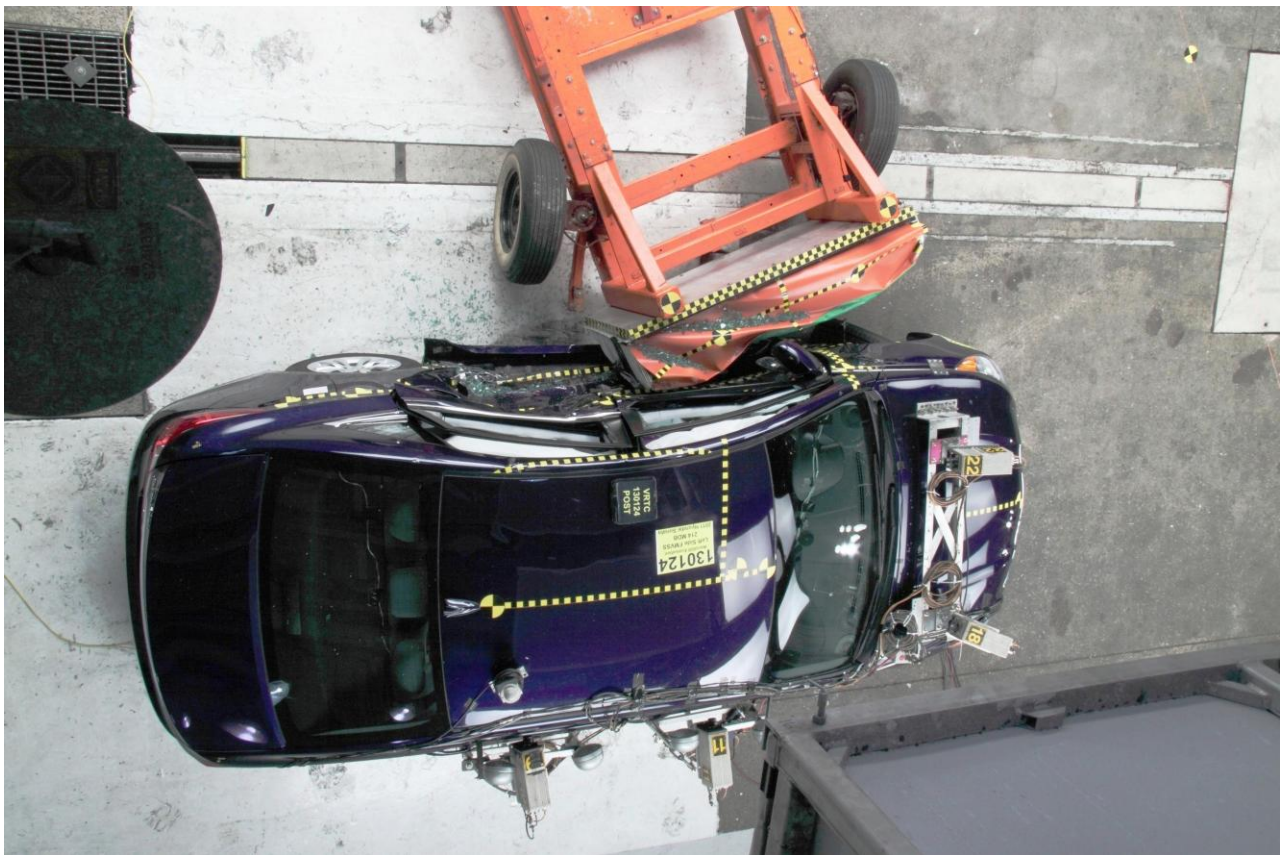


Figure A-14 Post-Test Overhead View



Figure A-15 Pre-Test Primary Impact Point View



Figure A-16 Post-Test Primary Impact Point View



Figure A-17 Pre-Test Secondary Impact Point View



Figure A-18 Post-Test Secondary Impact Point View



Figure A-19 Pre-Test Driver Dummy - View 1



Figure A-20 Post-Test Driver Dummy - View 1



Figure A-21 Pre-Test Driver Dummy - View 2



Figure A-22 Post-Test Driver Dummy - View 2



Figure A-23 Pre-Test Driver Dummy - View 3

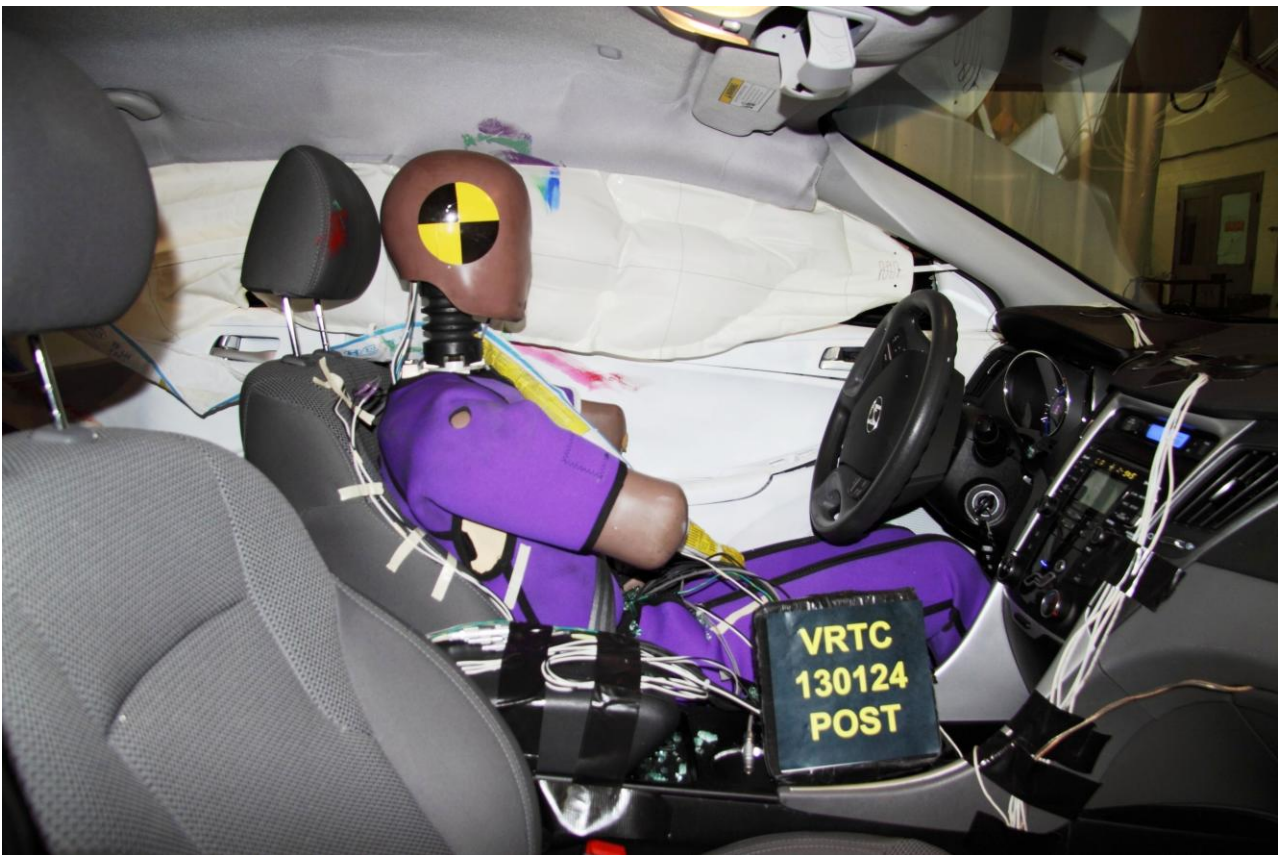


Figure A-24 Post-Test Driver Dummy - View 3

Photo Not Taken

Figure A-25 Pre-Test Driver Dummy Shoulder Clearance View



Figure A-26 Post-Test Driver Dummy Shoulder Clearance Interior View

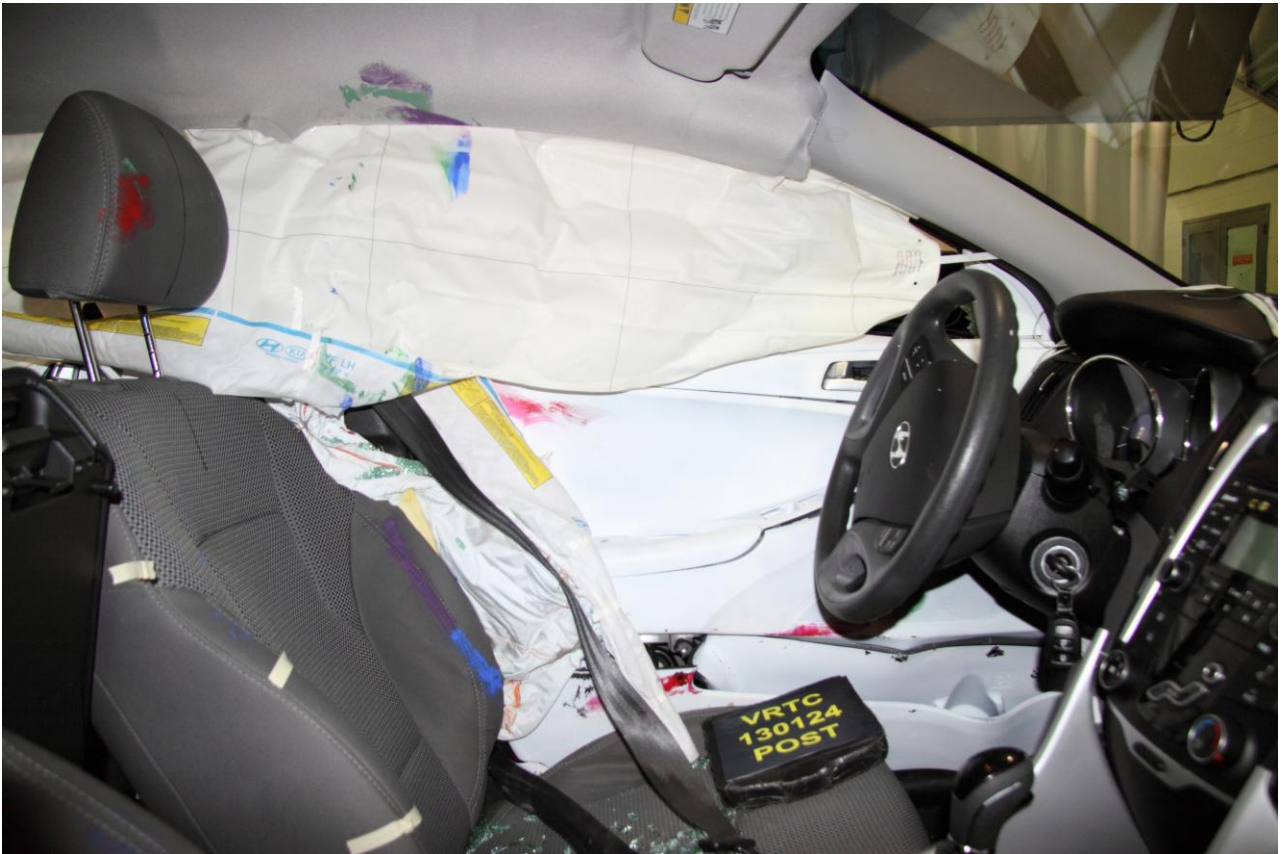


Figure A-27 Post-Test Driver Dummy Contact - View 1



Figure A-28 Post-Test Driver Dummy Contact – View 2



Figure A-29 Pre-Test Rear Passenger Dummy - View 1



Figure A-30 Post-Test Rear Passenger Dummy - View 1



Figure A-31 Pre-Test Rear Passenger Dummy - View 2



Figure A-32 Post-Test Rear Passenger Dummy - View 2



Figure A-33 Pre-Test Rear Passenger Dummy - View 3

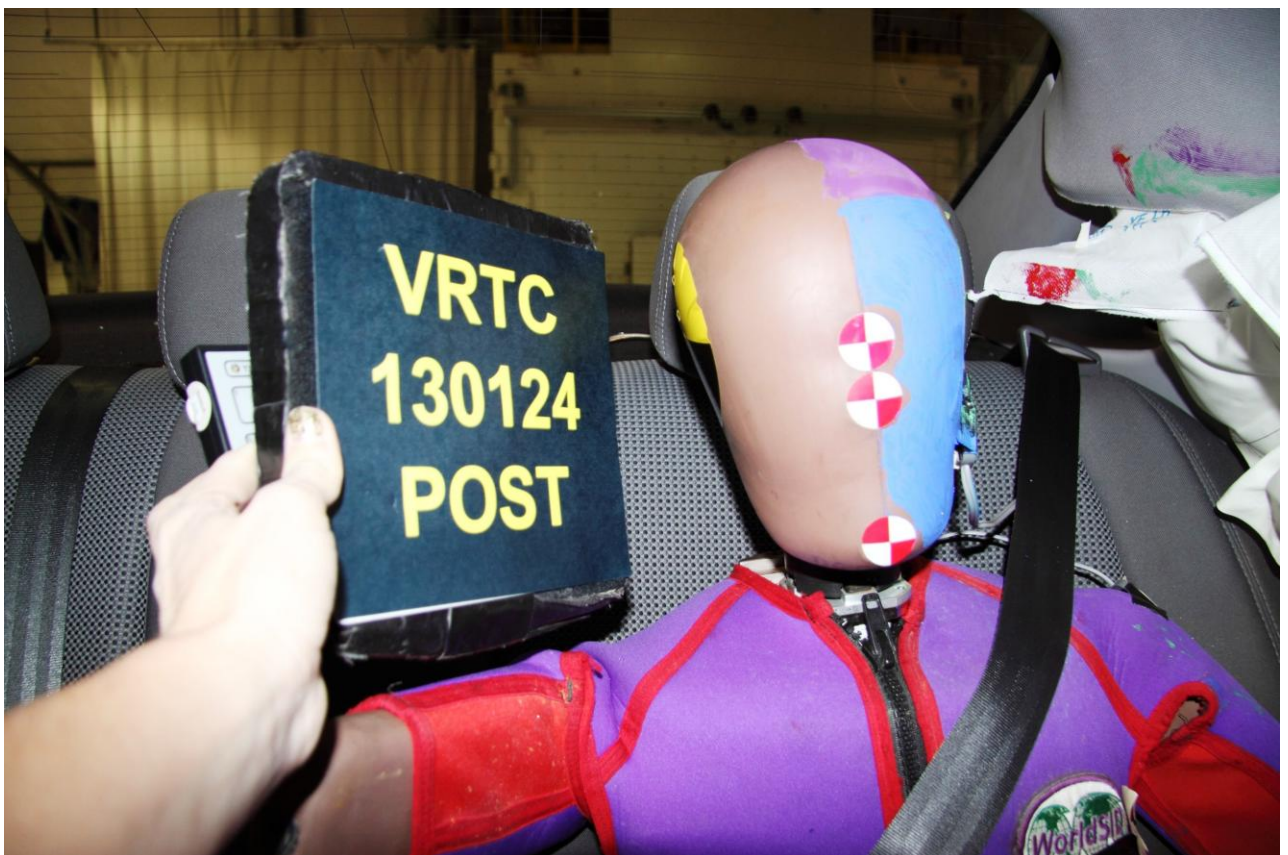


Figure A-34 Post-Test Rear Passenger Dummy - View 3

Photo Not Taken

Figure A-35 Pre-Test Rear Passenger Dummy Clearance between Shoulder and Door



Figure A-36 Post-Test Rear Passenger Dummy Clearance between Shoulder and Door



Figure A-37 Post-Test Rear Passenger Dummy Contact – View 1



Figure A-38 Post-Test Rear Passenger Dummy Contact – View 2

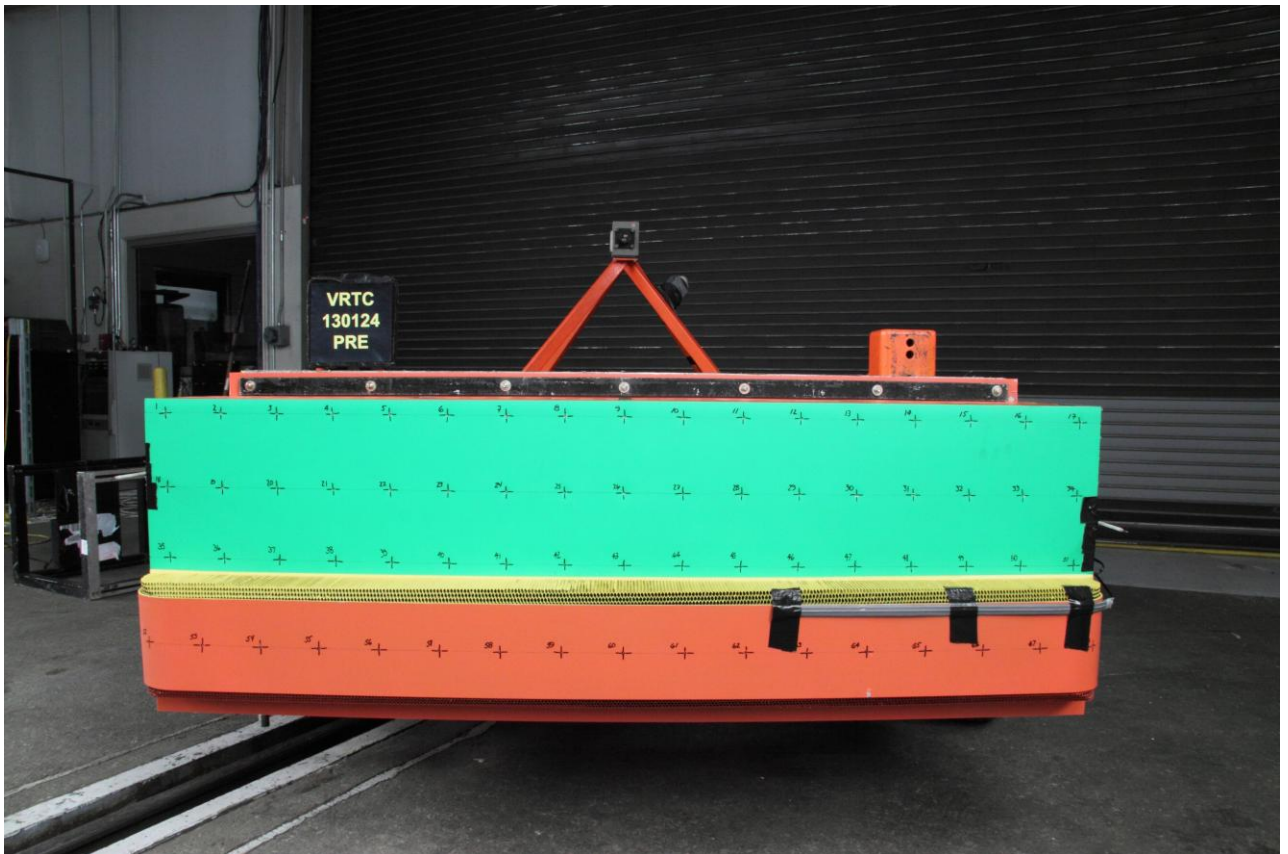


Figure A-39 Pre-Test MDB Face Front View



Figure A-40 Post-Test MDB Face Front View

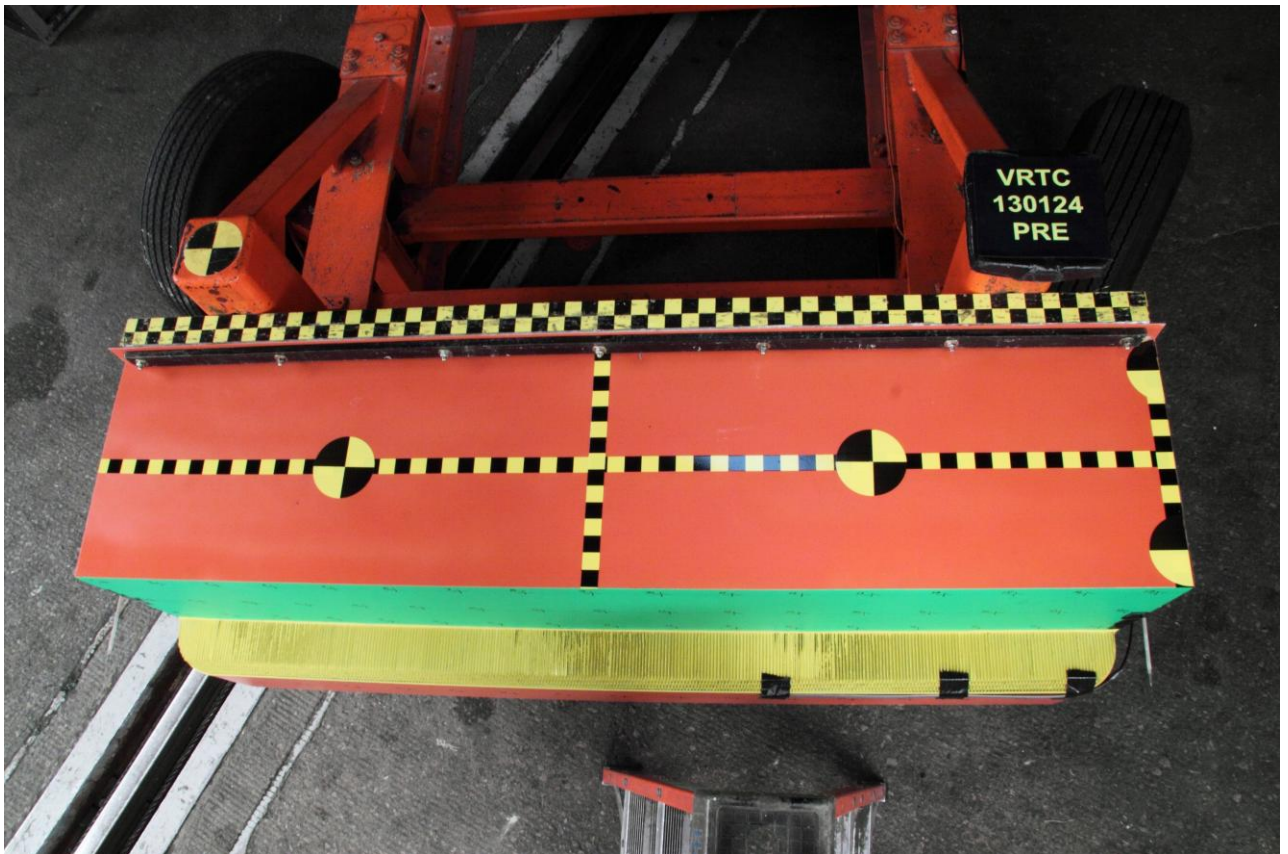


Figure A-41 Pre-Test MDB Face Top View

Photo Not Taken

Figure A-42 Post-Test MDB Face Top View

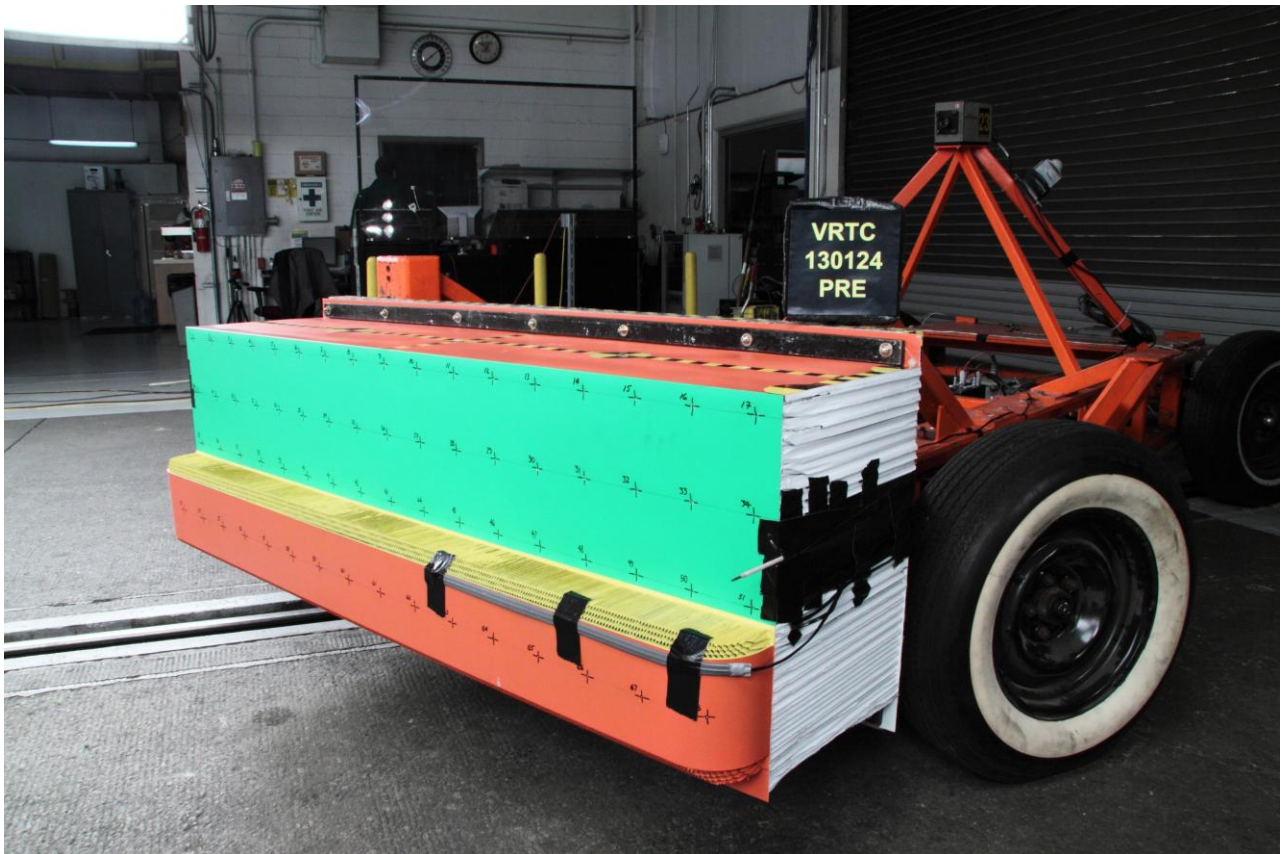


Figure A-43 Pre-Test MDB Face Left Front View



Figure A-44 Post-Test MDB Face Left Front View



Figure A-45 Pre-Test MDB Face Right Front View



Figure A-46 Post-Test MDB Face Right Front View



Figure A-47 Pre-Test MDB Face Left Side View



Figure A-48 Pre-Test MDB Face Right Side View



Figure A-49 Vehicle Certification Label

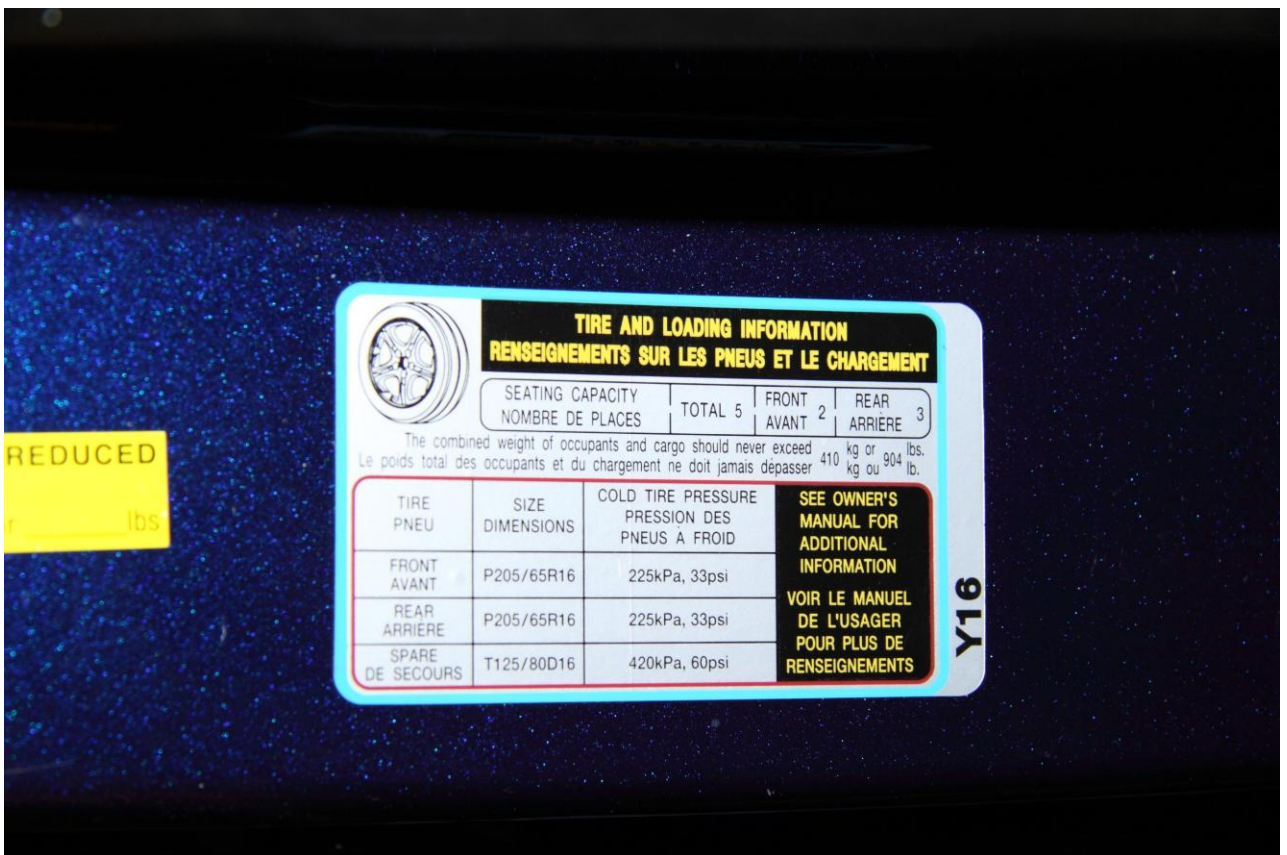


Figure A-50 Tire Pressure Label

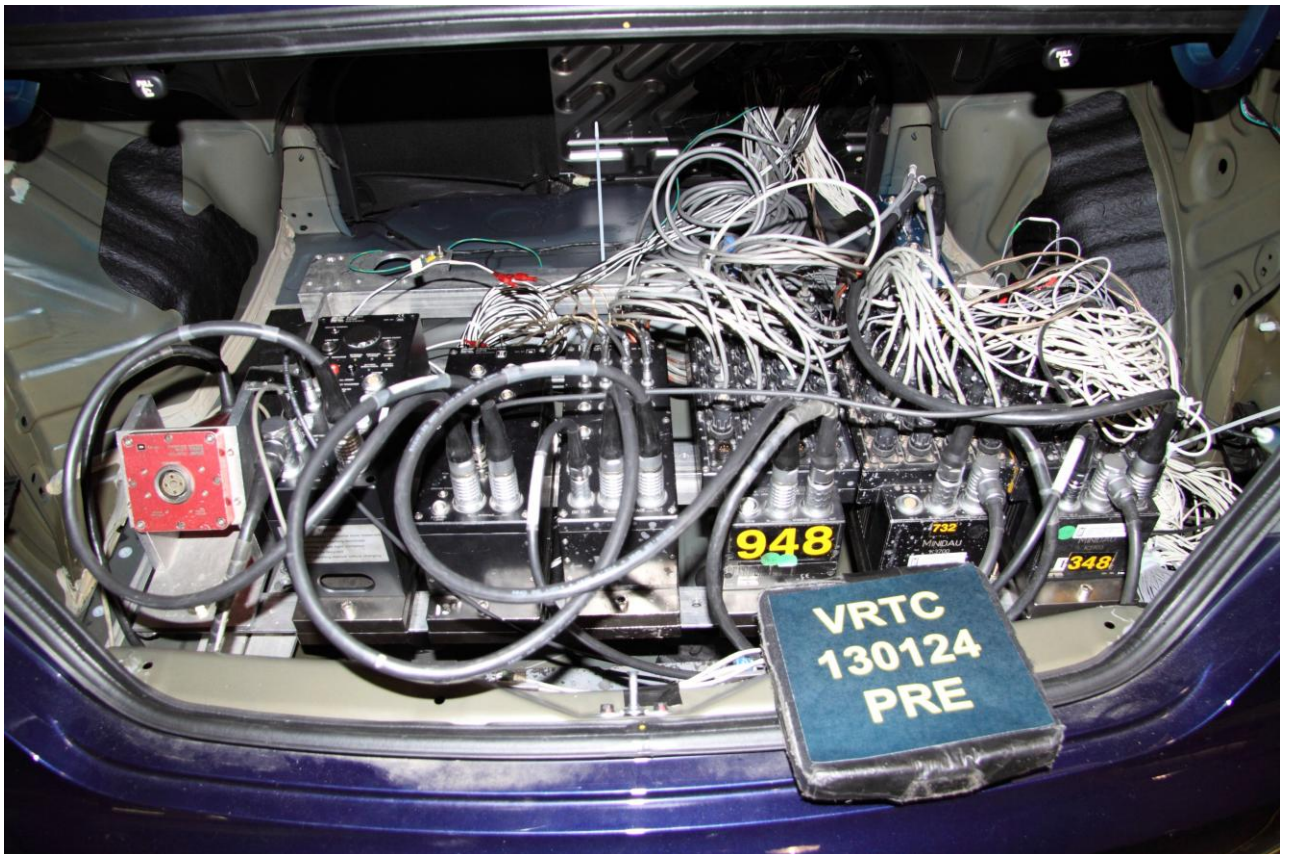


Figure A-51 Pre-Test Instrumentation Location View

Appendix B

Data Plots



FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Longitudinal Ax

Date: 01/24/2013

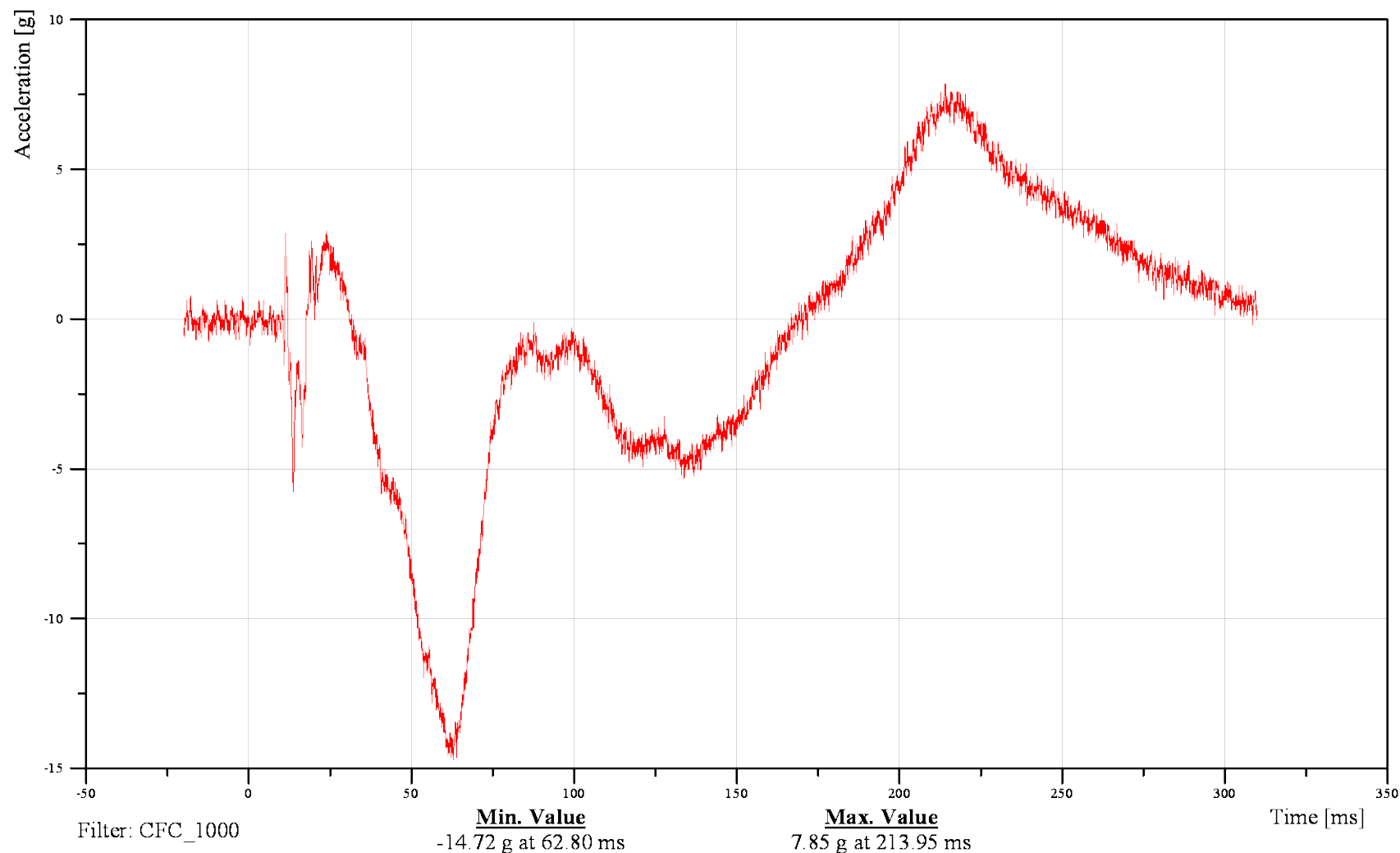
Time: 16:14

Customer: VRTC

11HEADCG00WSACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Lateral Ay

Date: 01/24/2013

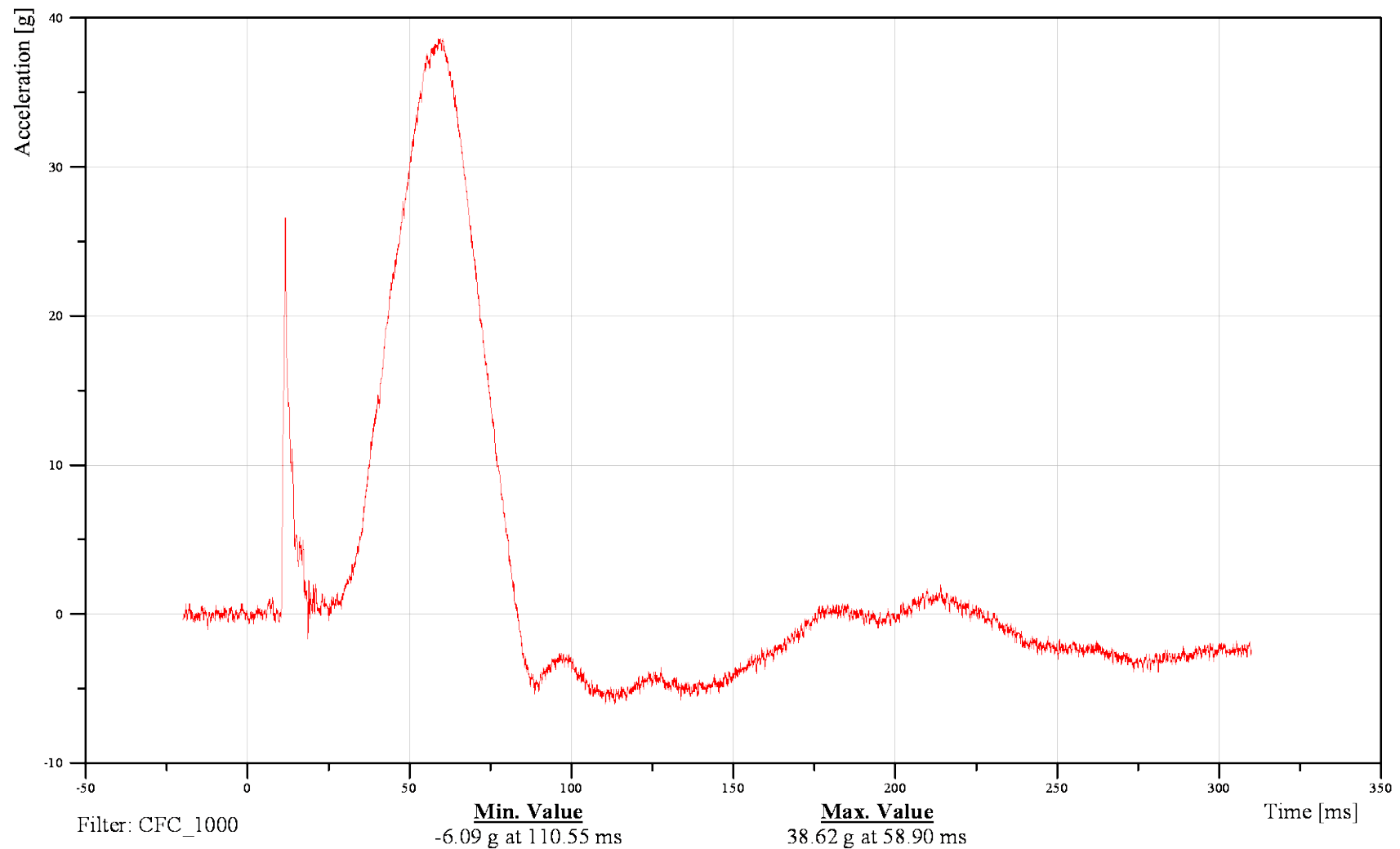
Time: 16:14

Customer: VRTC

11HEADCG00WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Vertical Az

Date: 01/24/2013

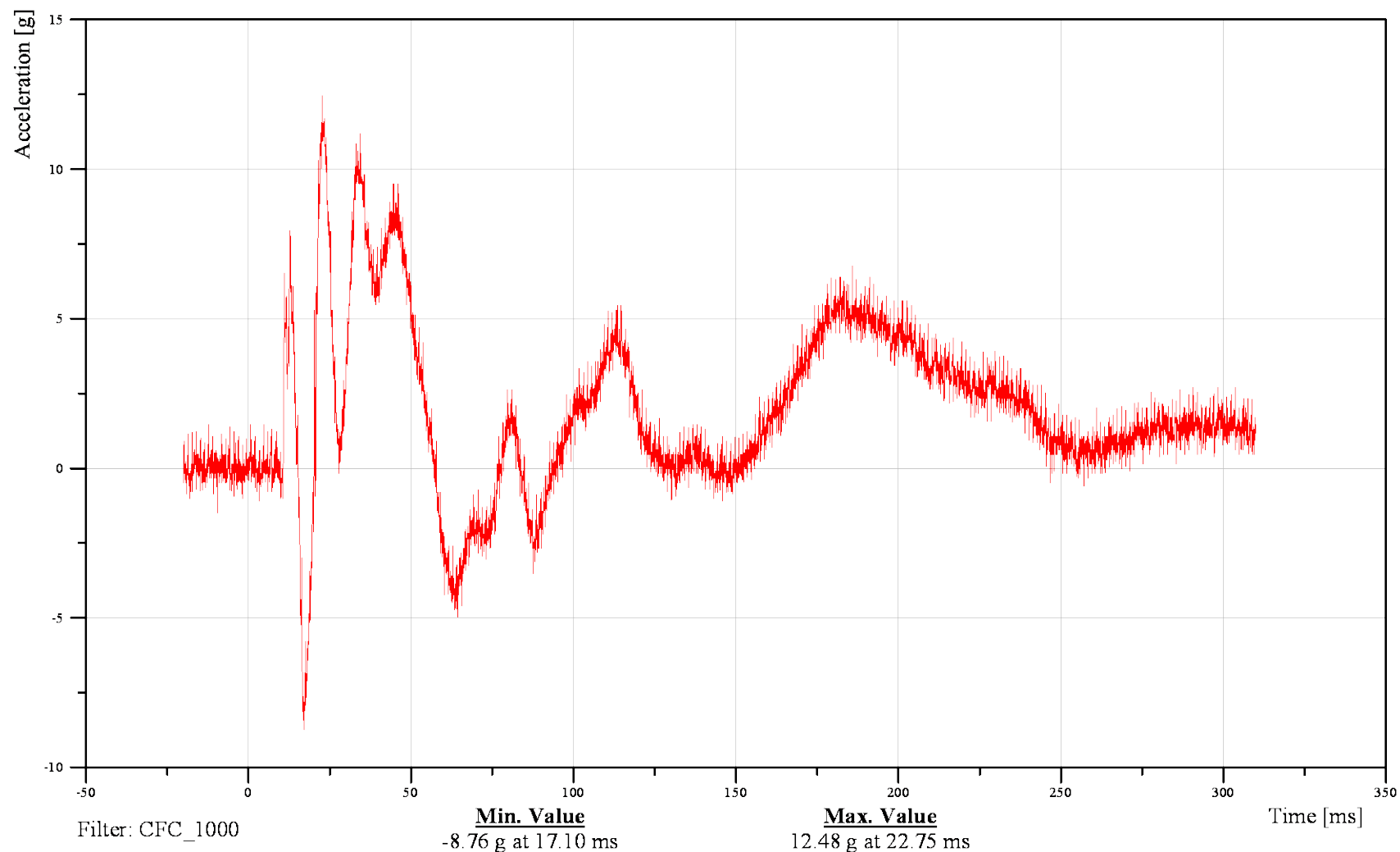
Time: 16:14

Customer: VRTC

11HEADCG00WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head A Resultant

Date: 01/24/2013

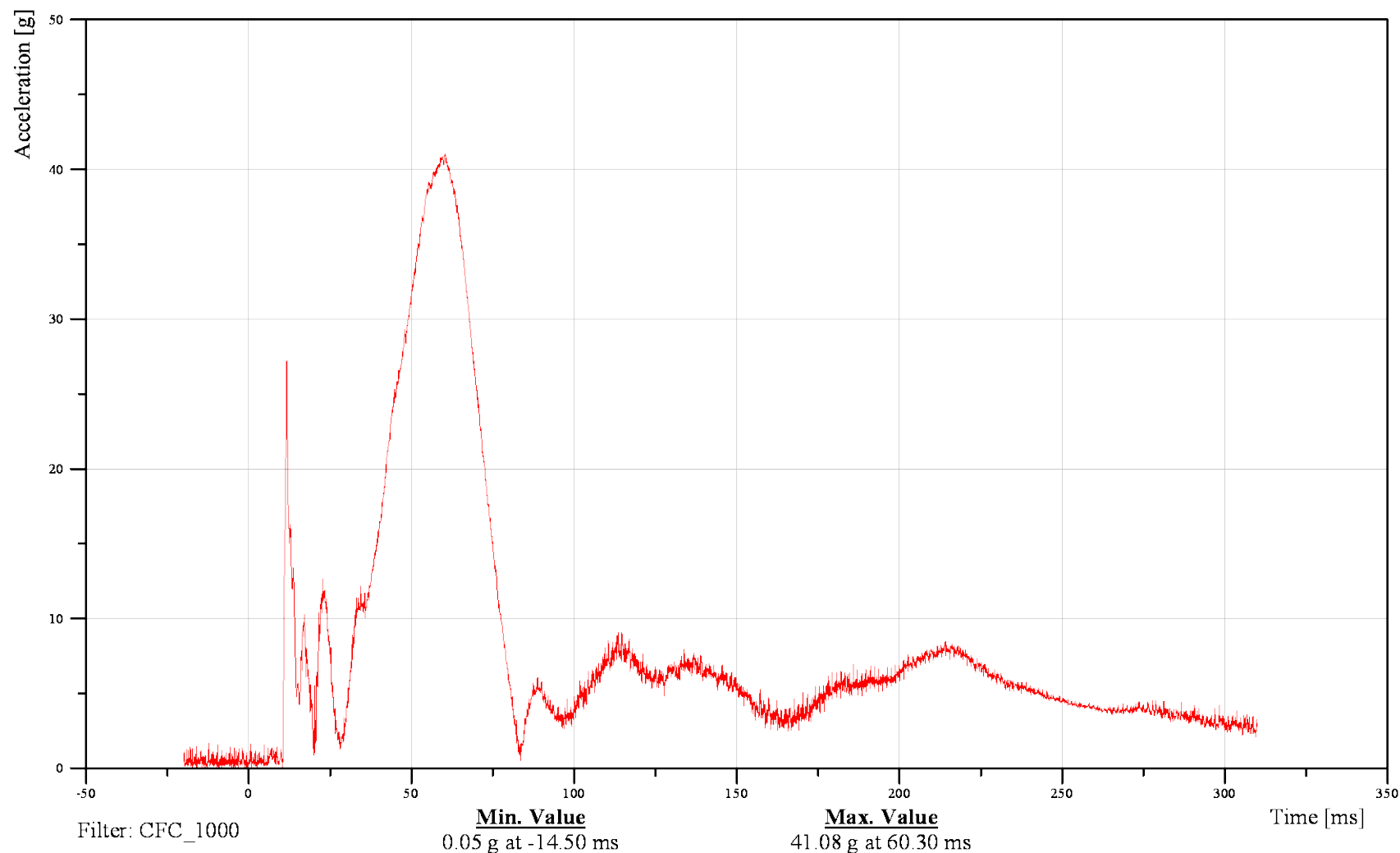
Time: 16:14

Customer: VRTC

11HEADCG00WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Rotational Acceleration Rx

Date: 01/24/2013

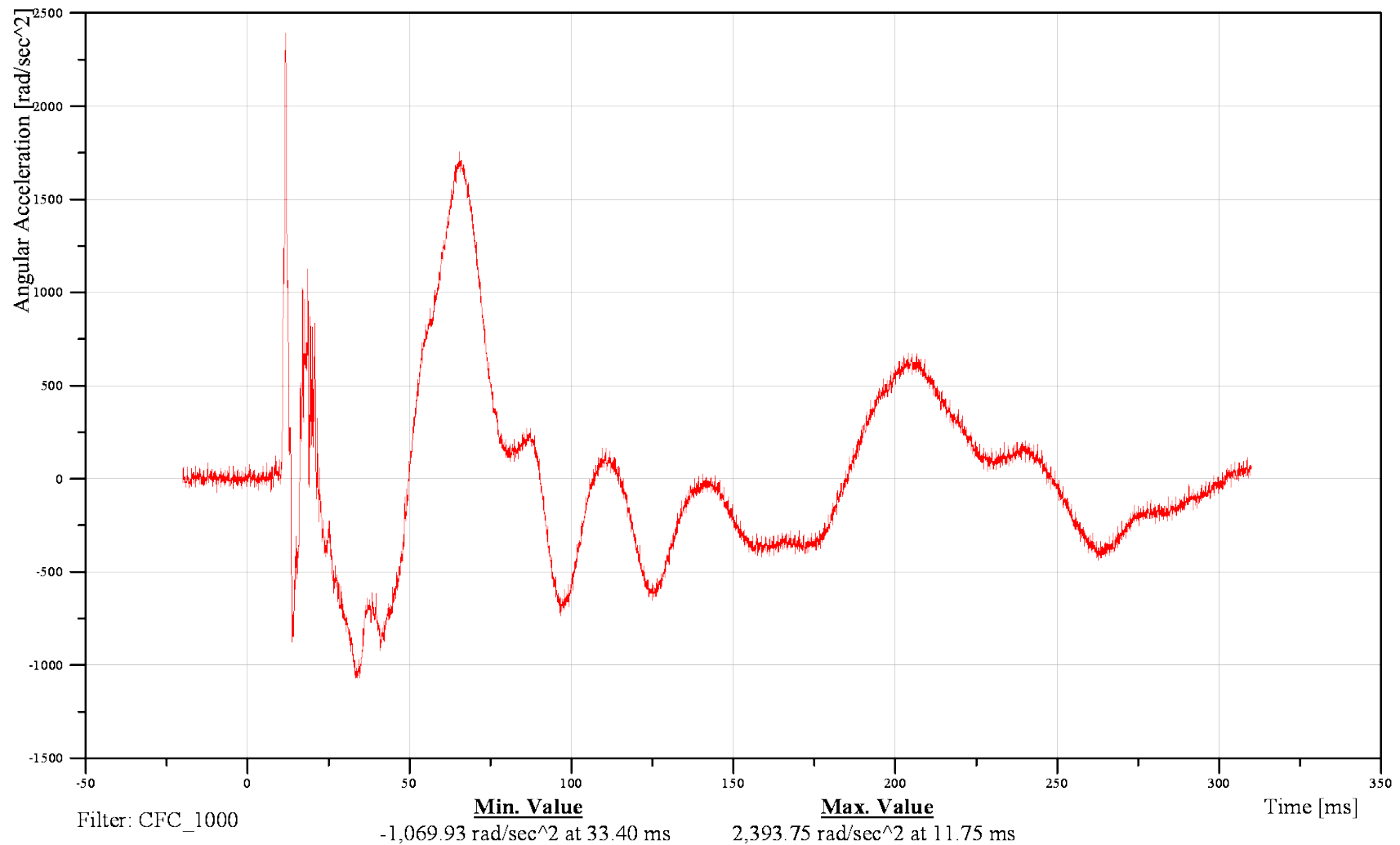
Time: 16:14

Customer: VRTC

11HEAD0000WSAAXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Rotational Acceleration Ry

Date: 01/24/2013

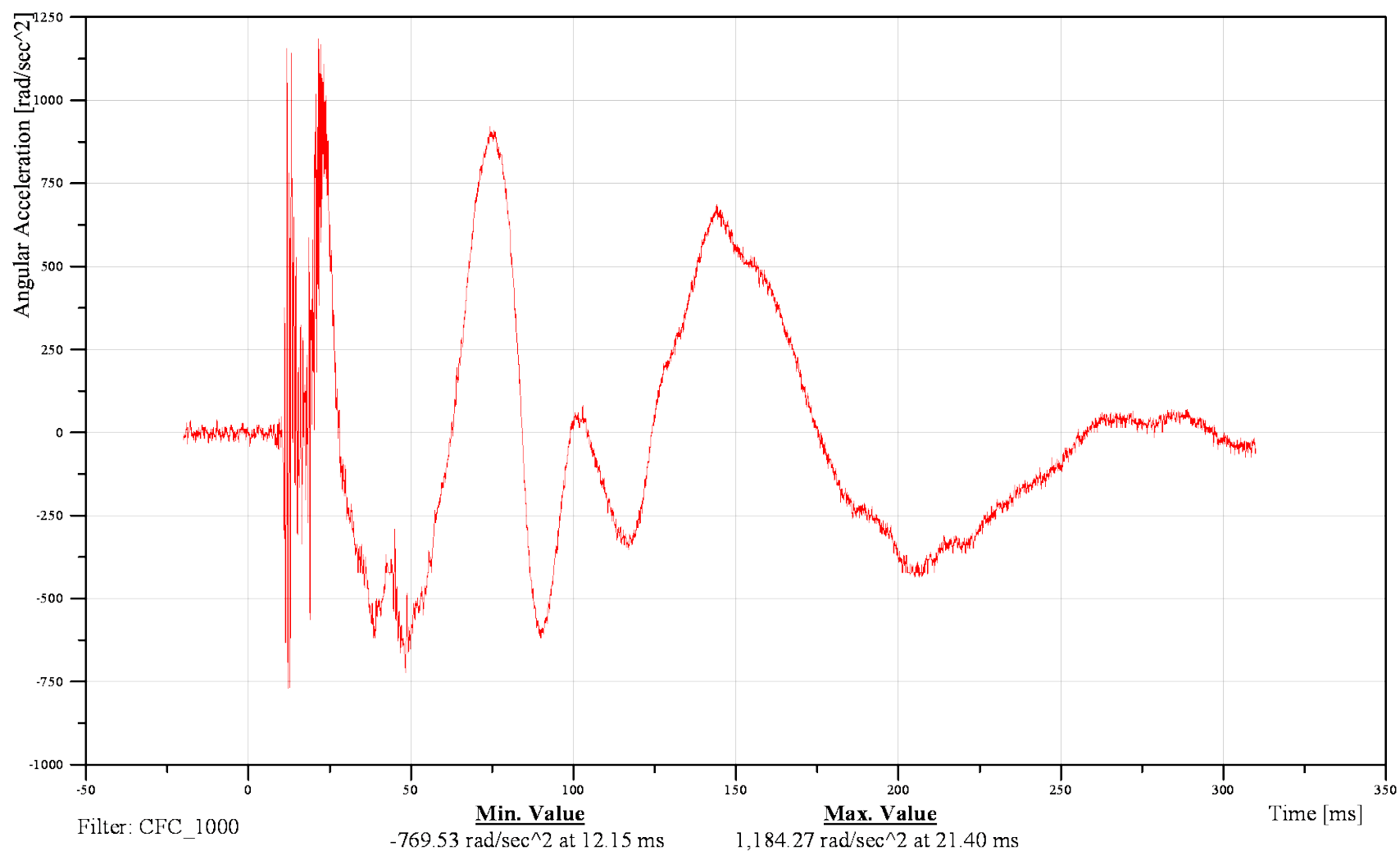
Time: 16:14

Customer: VRTC

11HEAD0000WSAAYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Rotational Acceleration Rz

Date: 01/24/2013

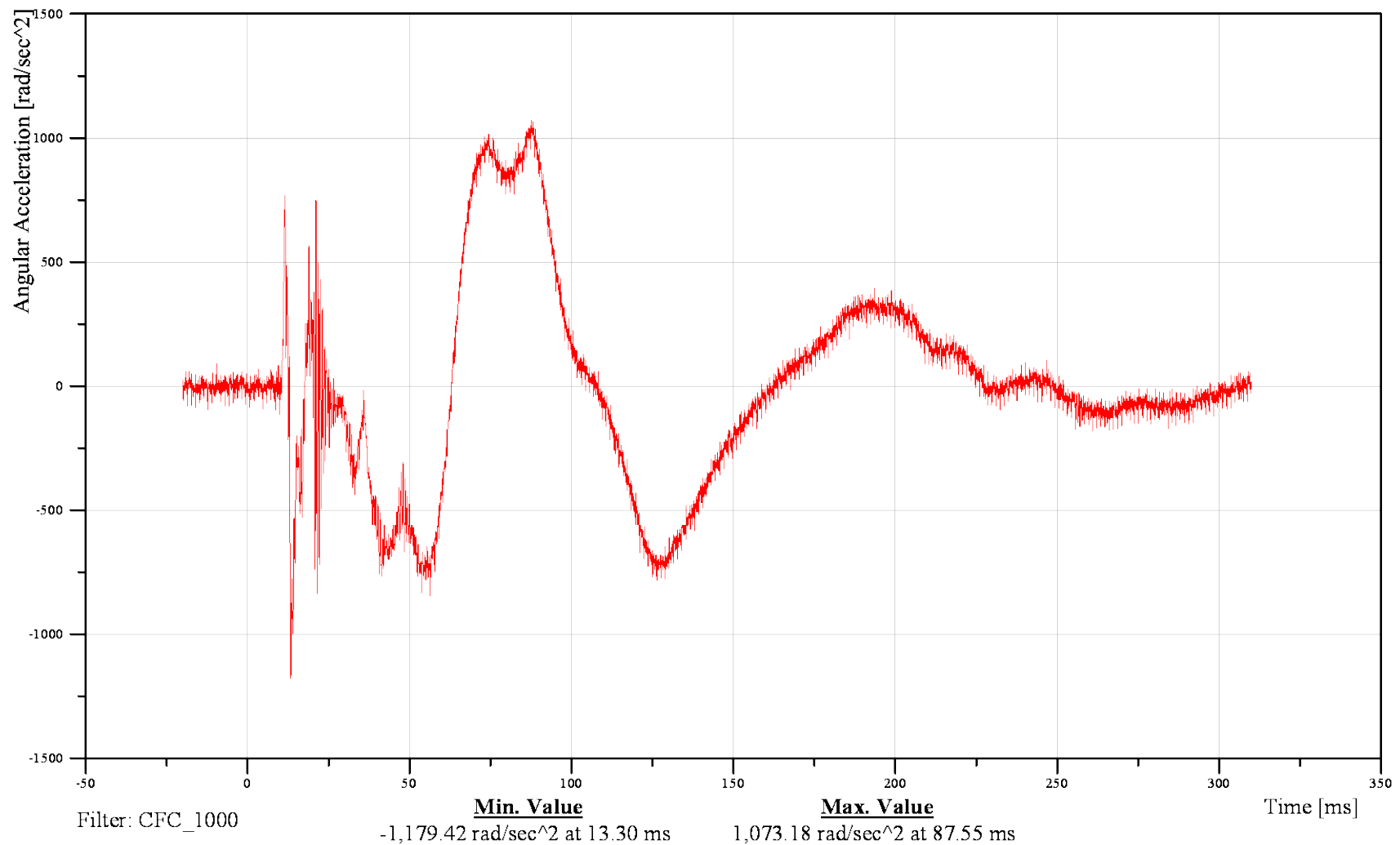
Time: 16:14

Customer: VRTC

11HEAD0000WSAAZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head X-Axis Angular Velocity

Date: 01/24/2013

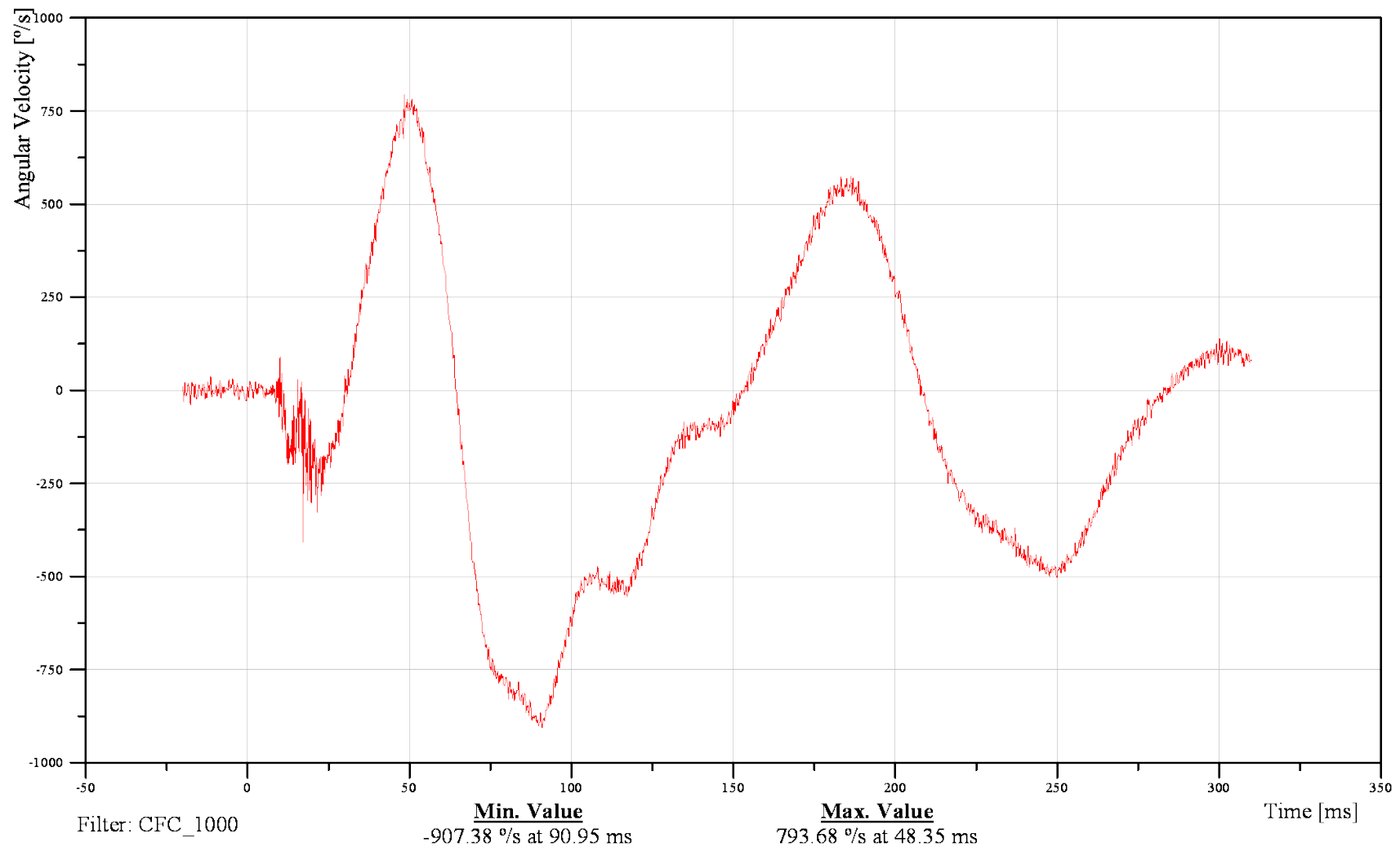
Time: 16:14

Customer: VRTC

11HEADCG00WSA VXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Y-Axis Angular Velocity

Date: 01/24/2013

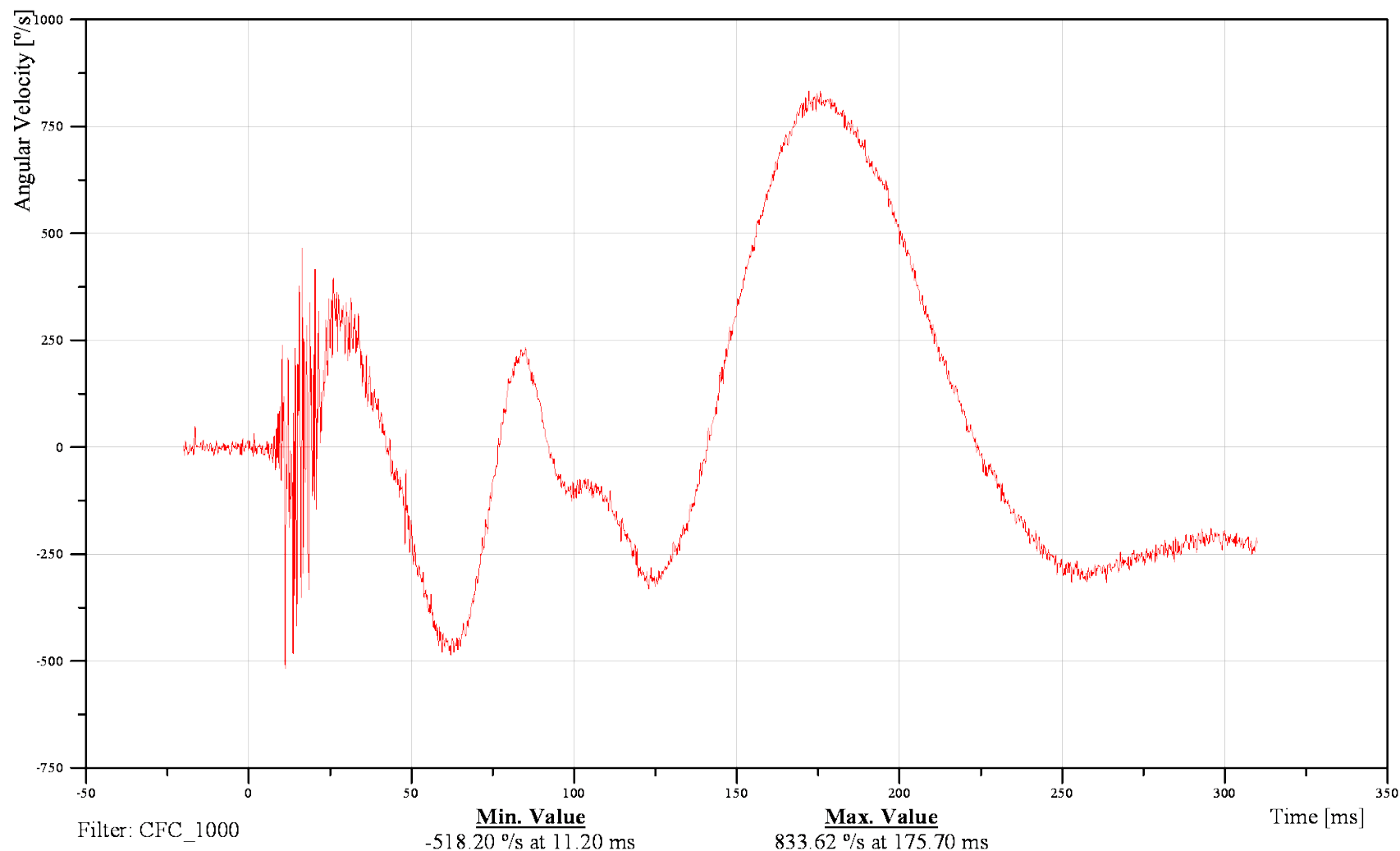
Time: 16:14

Customer: VRTC

11HEADCG00WSAVYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Z-Axis Angular Velocity

Date: 01/24/2013

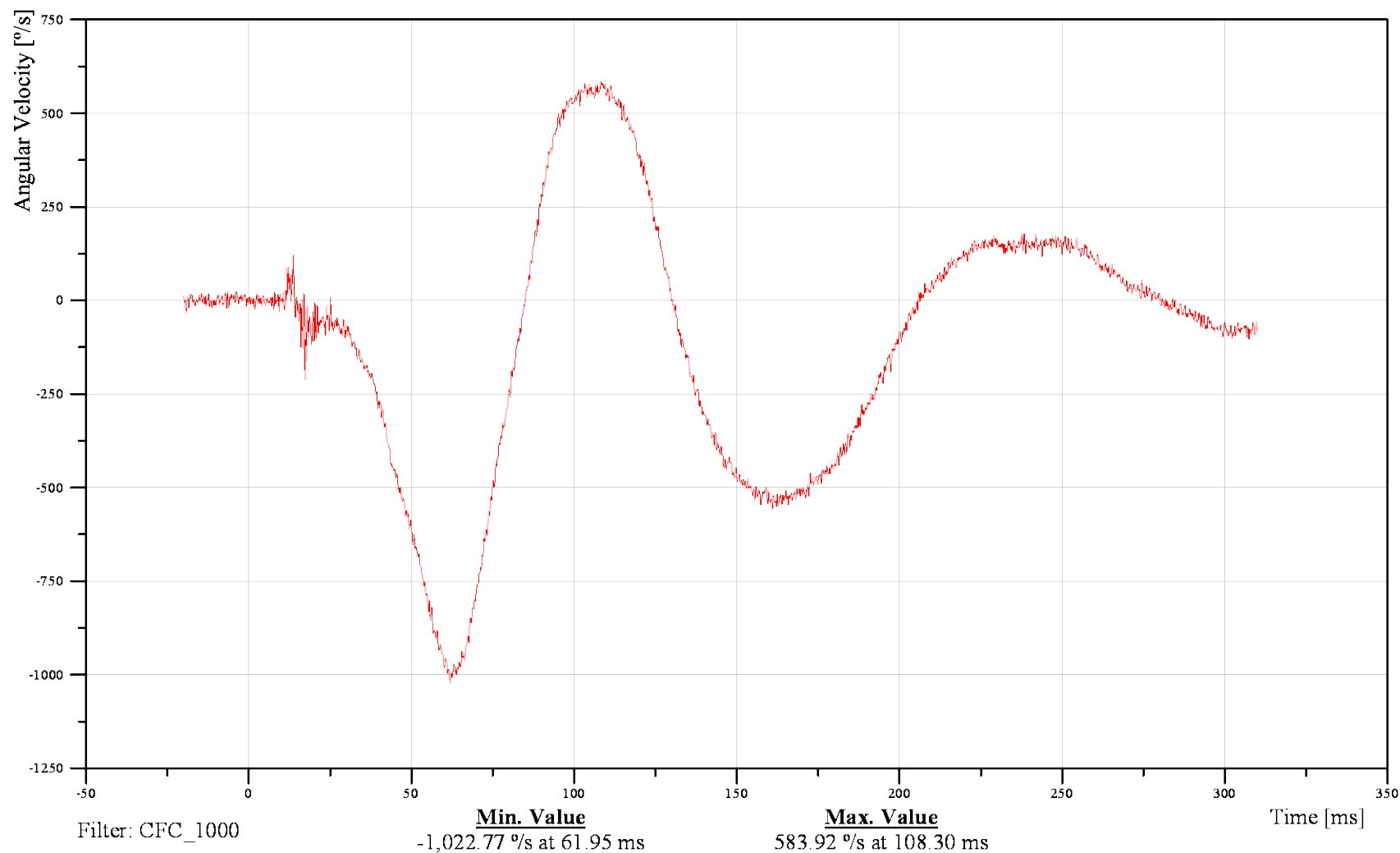
Time: 16:14

Customer: VRTC

11HEADCG00WSA VZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Force Fx

Date: 01/24/2013

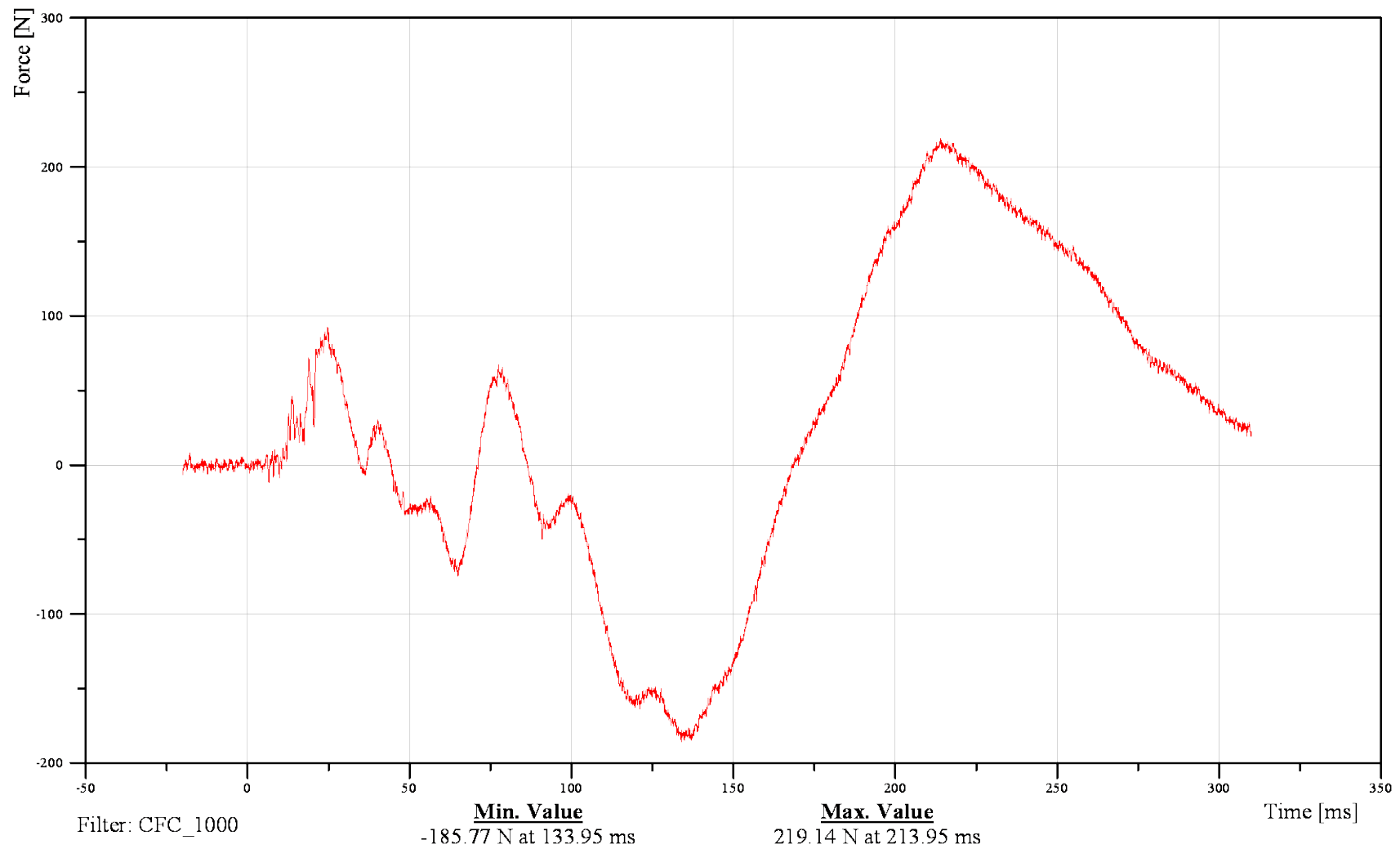
Time: 16:14

Customer: VRTC

11NECKUP00WSFOXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Force Fy

Date: 01/24/2013

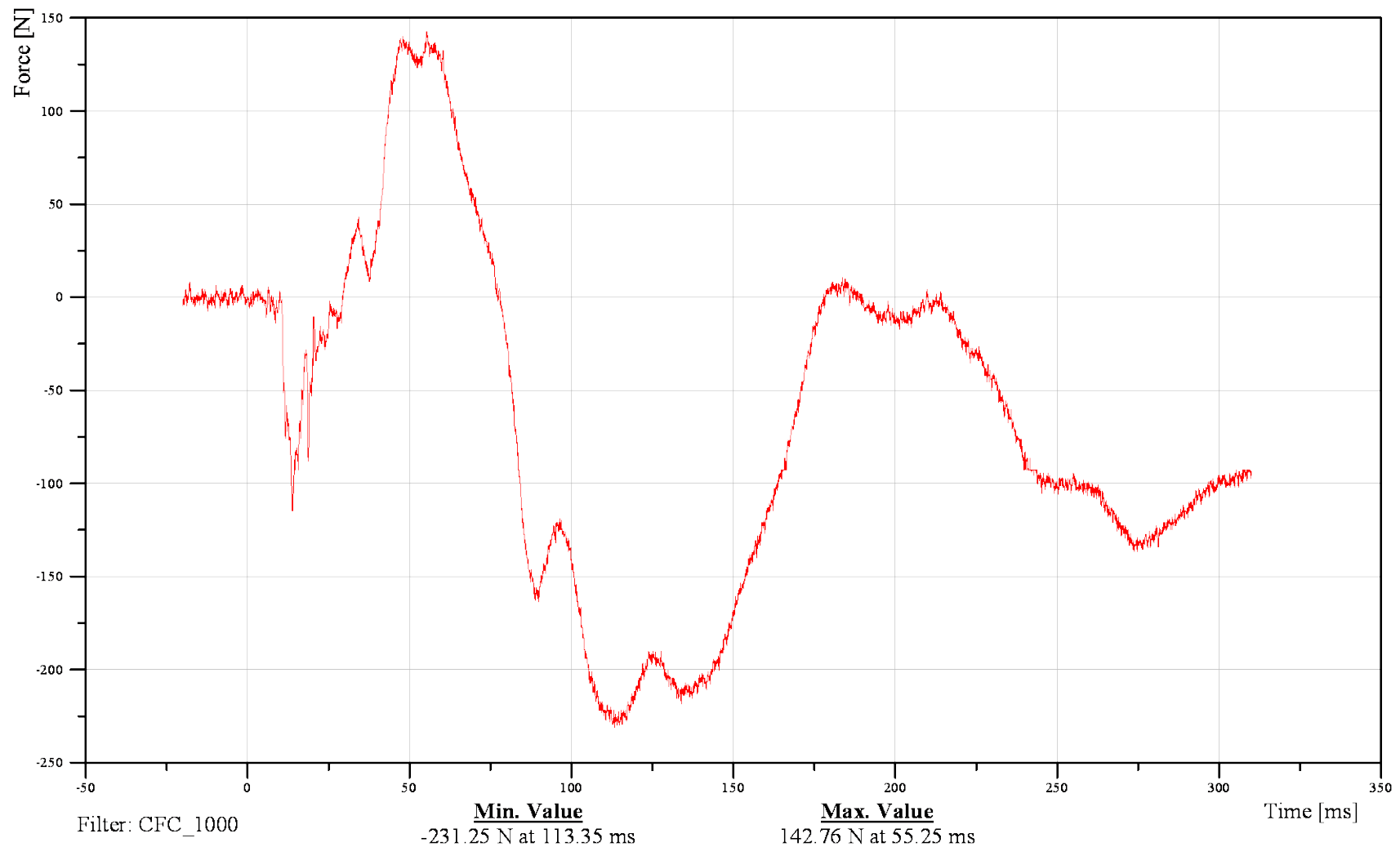
Time: 16:14

Customer: VRTC

11NECKUP00WSFOYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Force Fz

Date: 01/24/2013

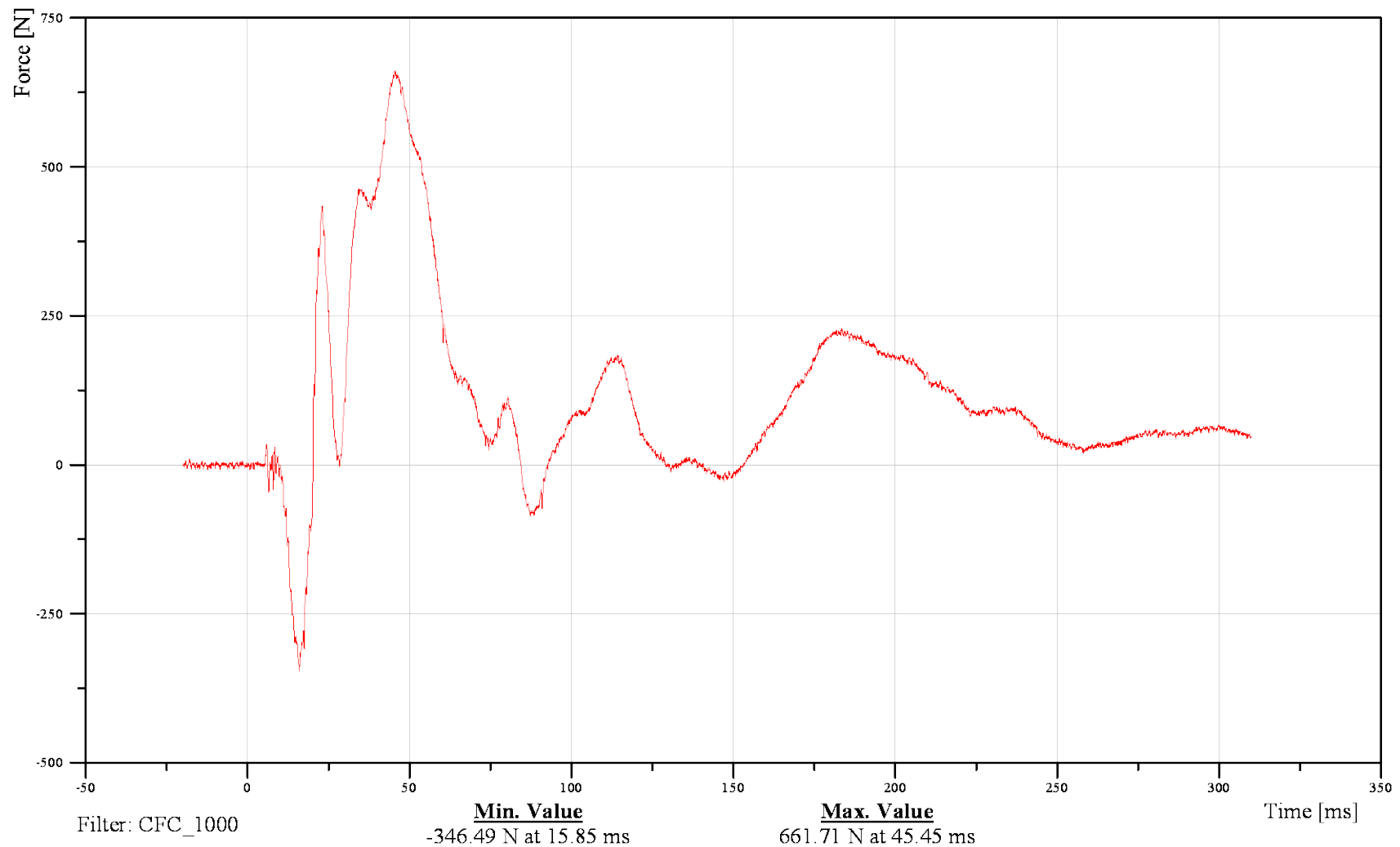
Time: 16:14

Customer: VRTC

11NECKUP00WSFOZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Moment Mx

Date: 01/24/2013

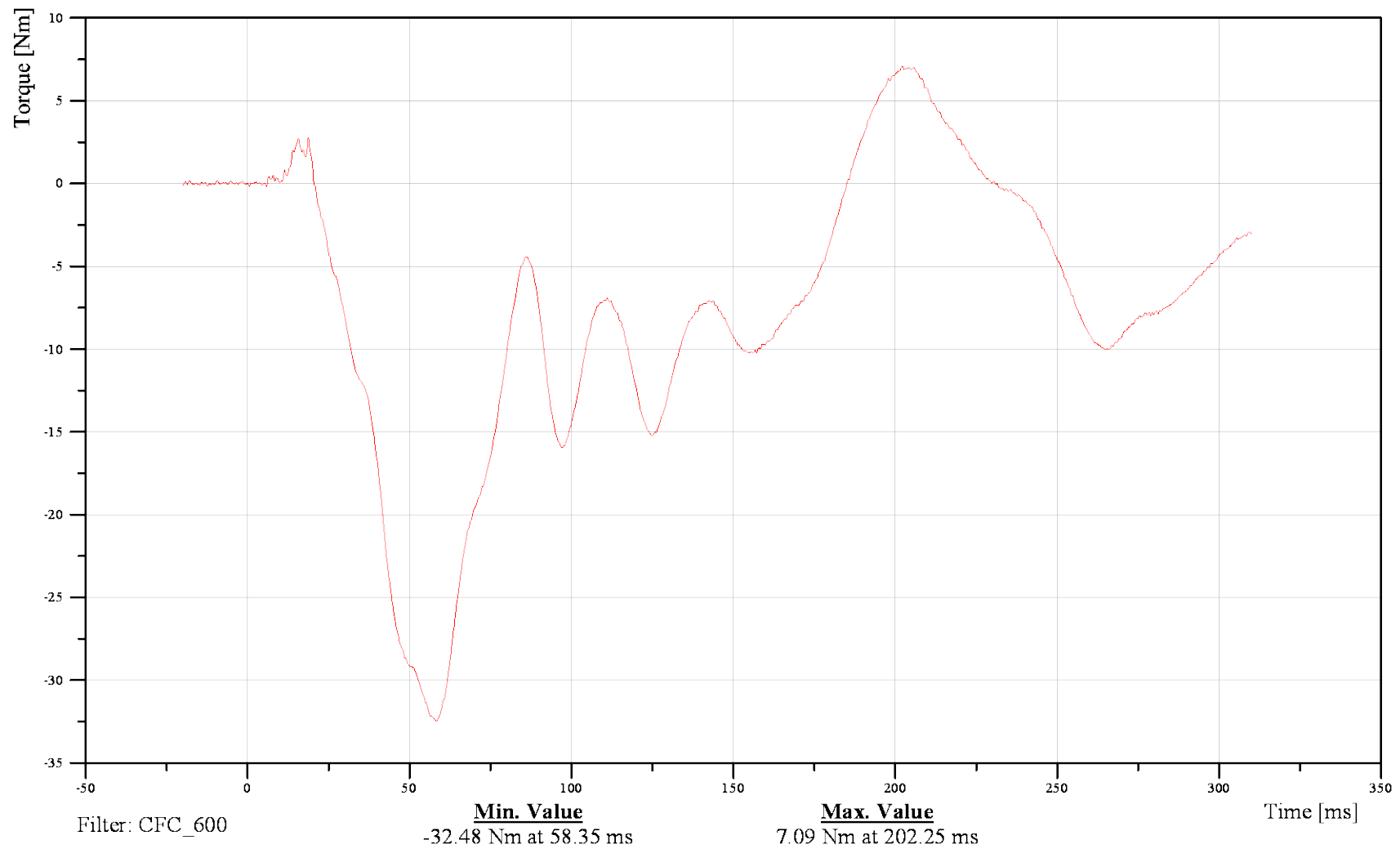
Time: 16:14

Customer: VRTC

11NECKUP00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Moment My

Date: 01/24/2013

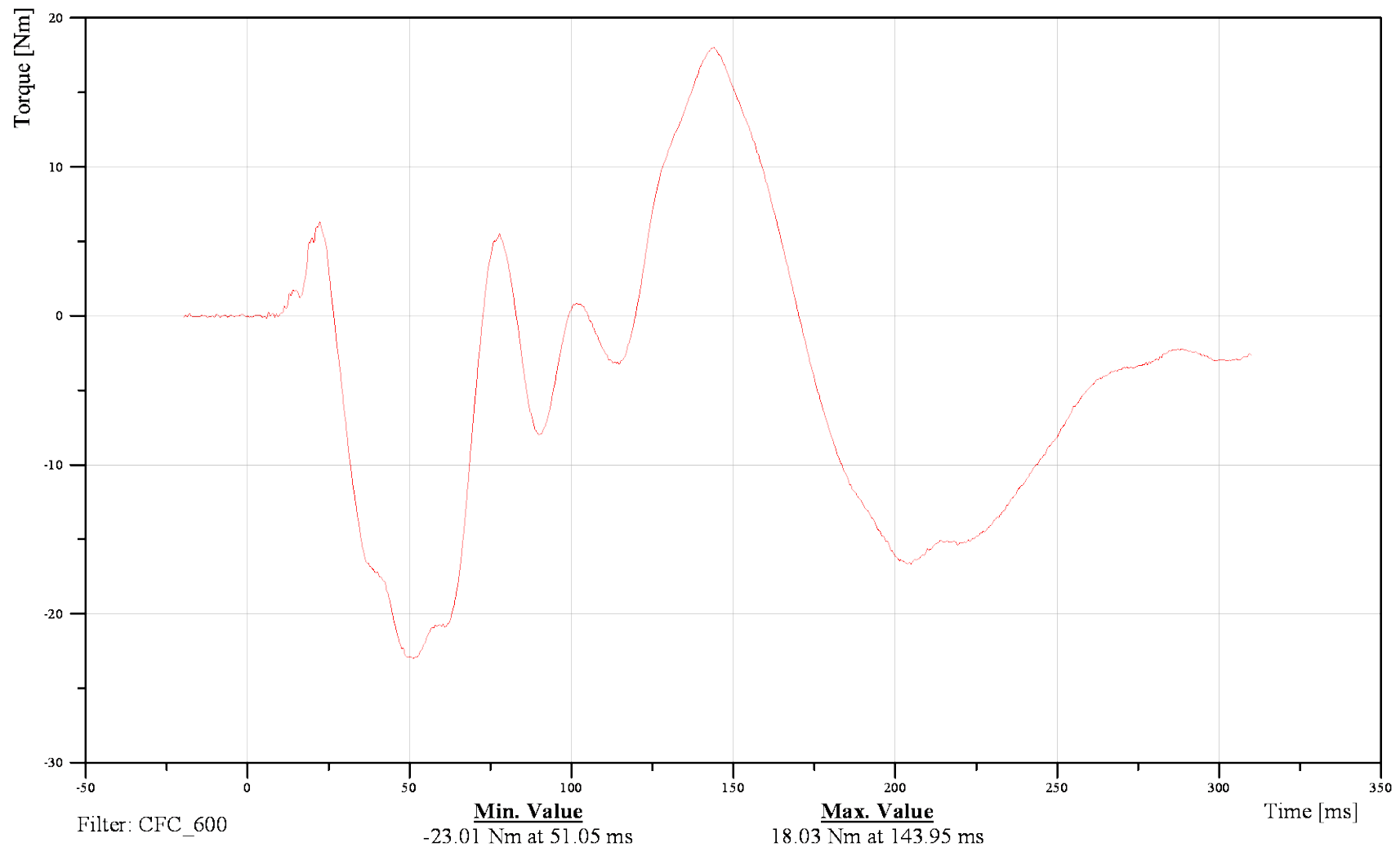
Time: 16:14

Customer: VRTC

11NECKUP00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Moment Mz

Date: 01/24/2013

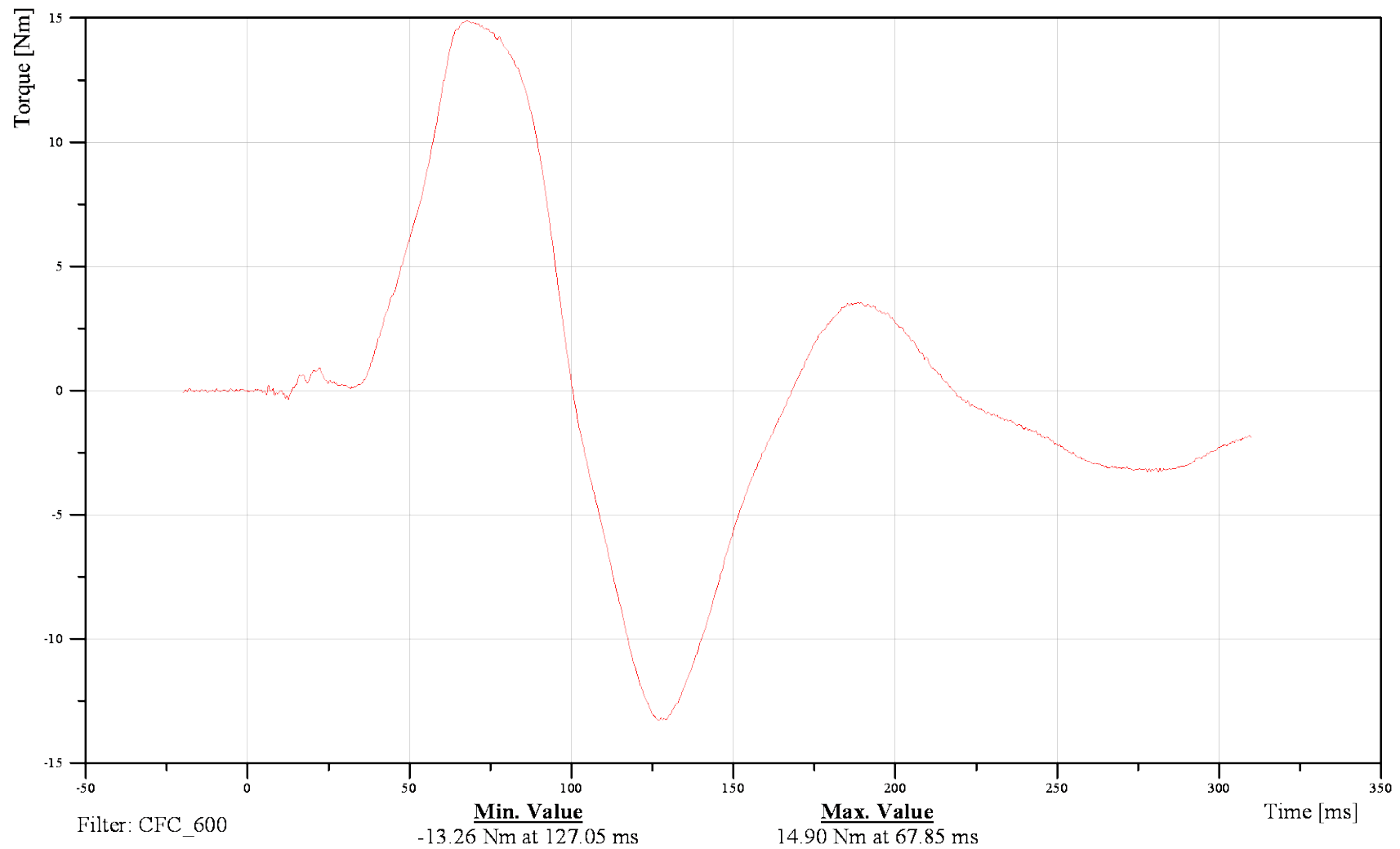
Time: 16:14

Customer: VRTC

11NECKUP00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Force Fx

Date: 01/24/2013

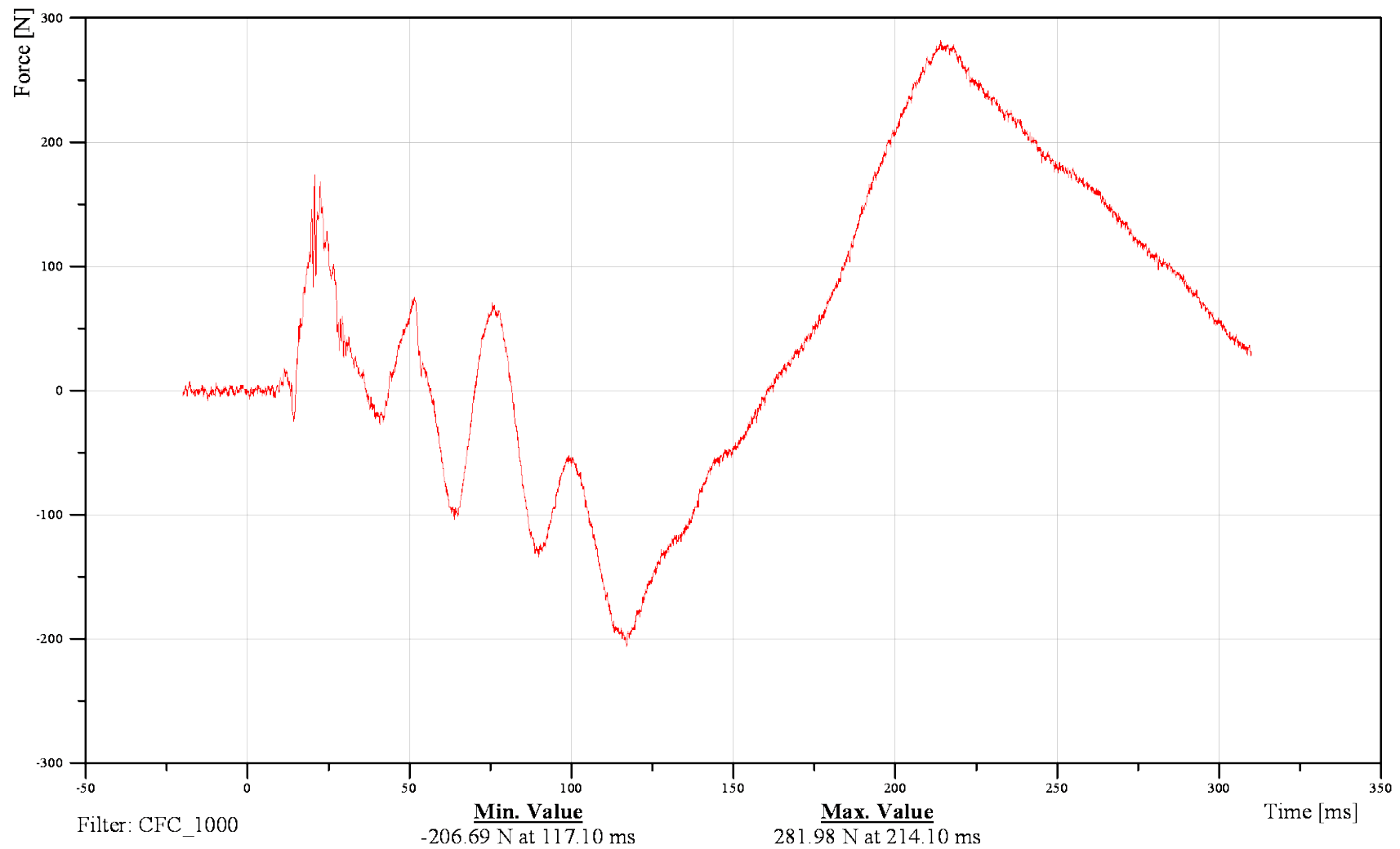
Time: 16:14

Customer: VRTC

11NECKLO00WSFOXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Force Fy

Date: 01/24/2013

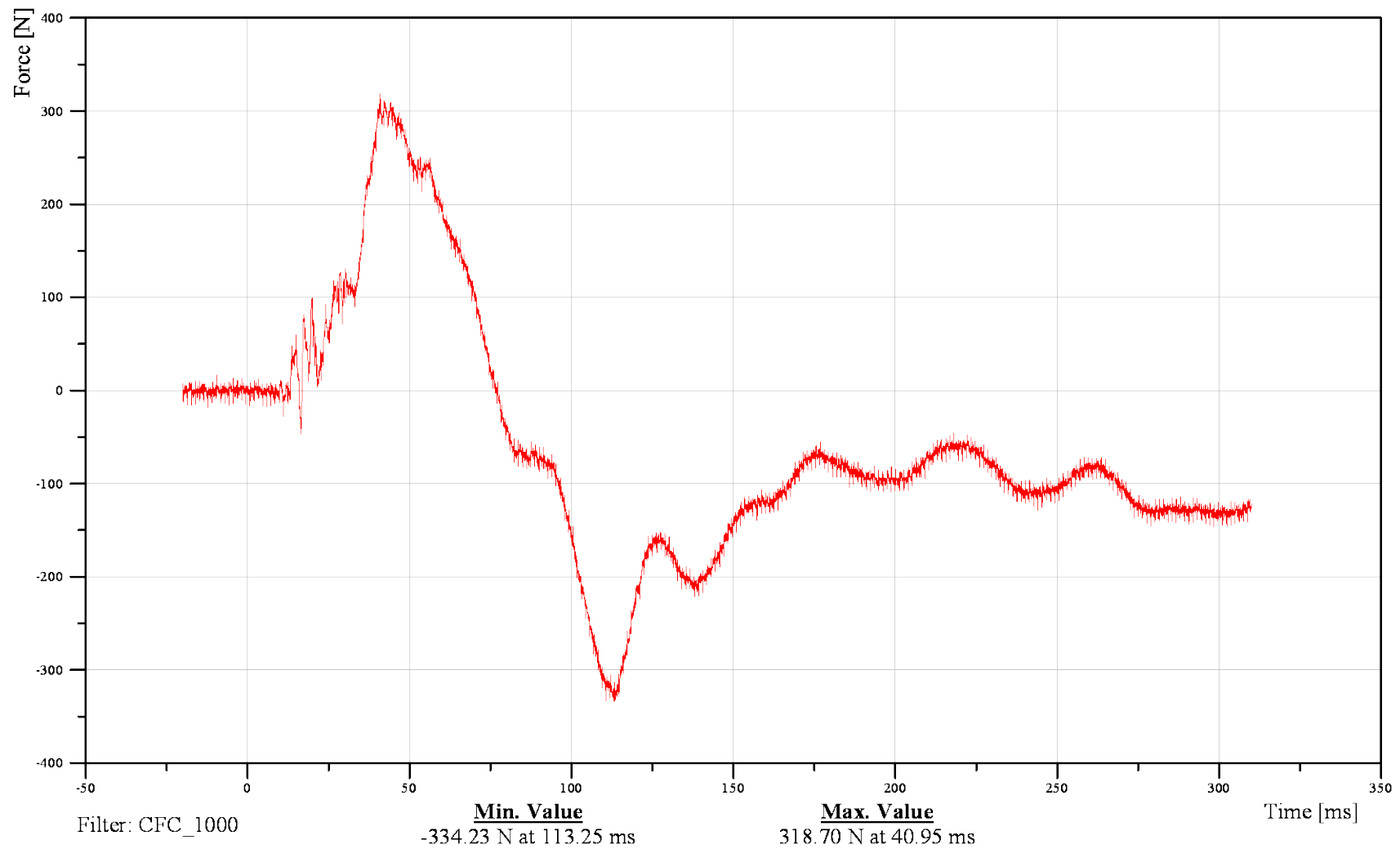
Time: 16:14

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Force Fz

Date: 01/24/2013

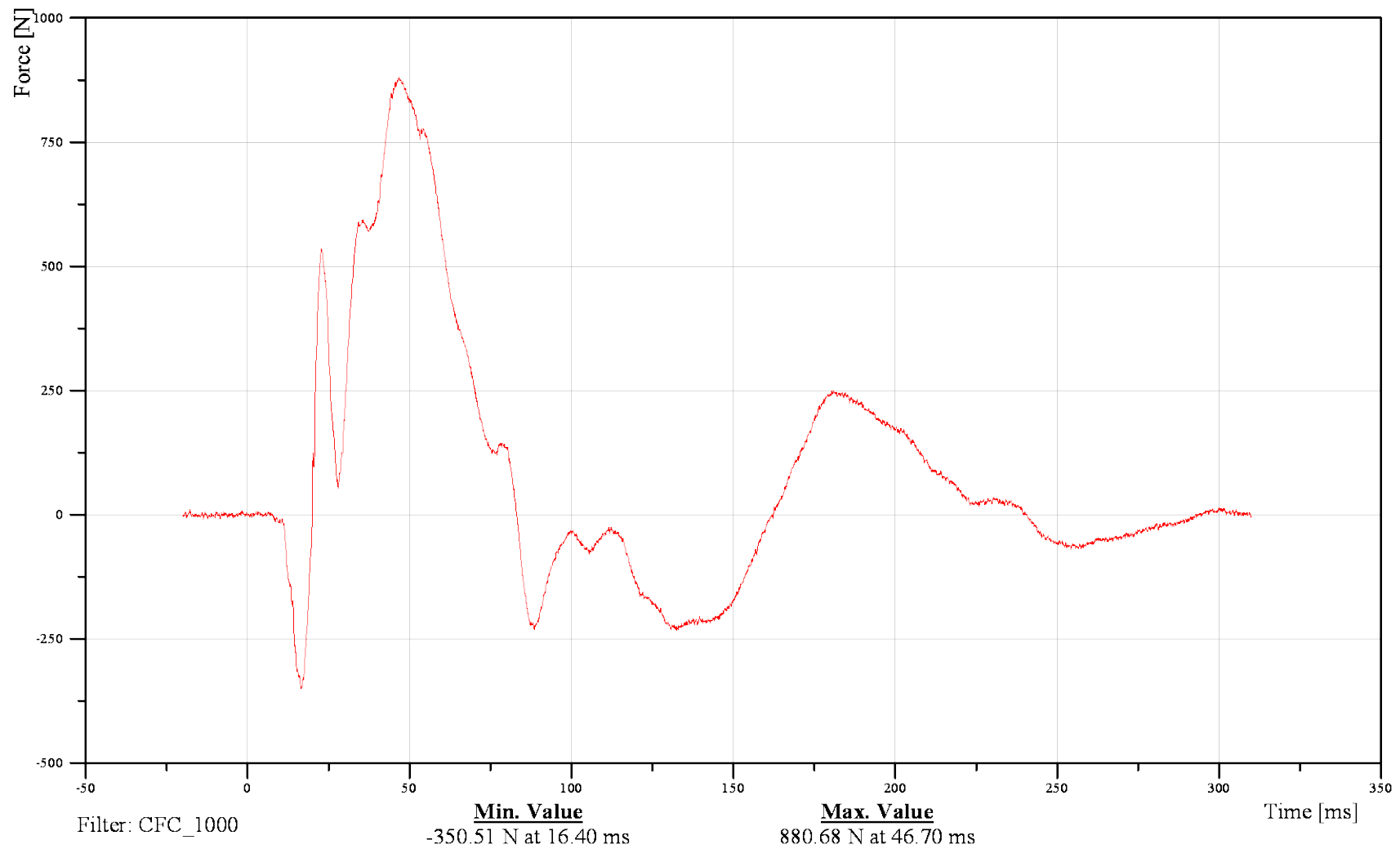
Time: 16:14

Customer: VRTC

11NECKLO00WSFOZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Moment Mx

Date: 01/24/2013

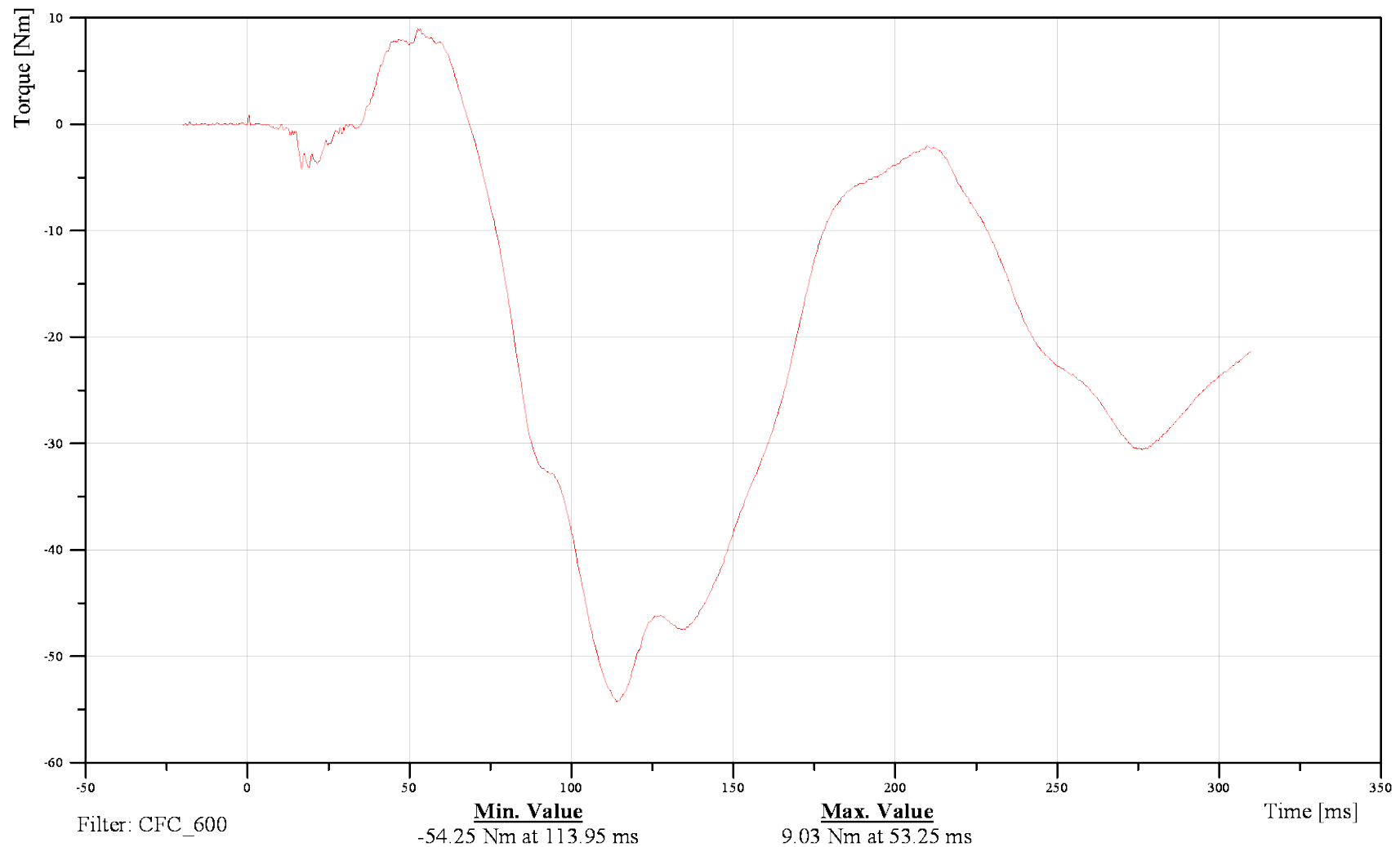
Time: 16:14

Customer: VRTC

11NECKLO00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Moment My

Date: 01/24/2013

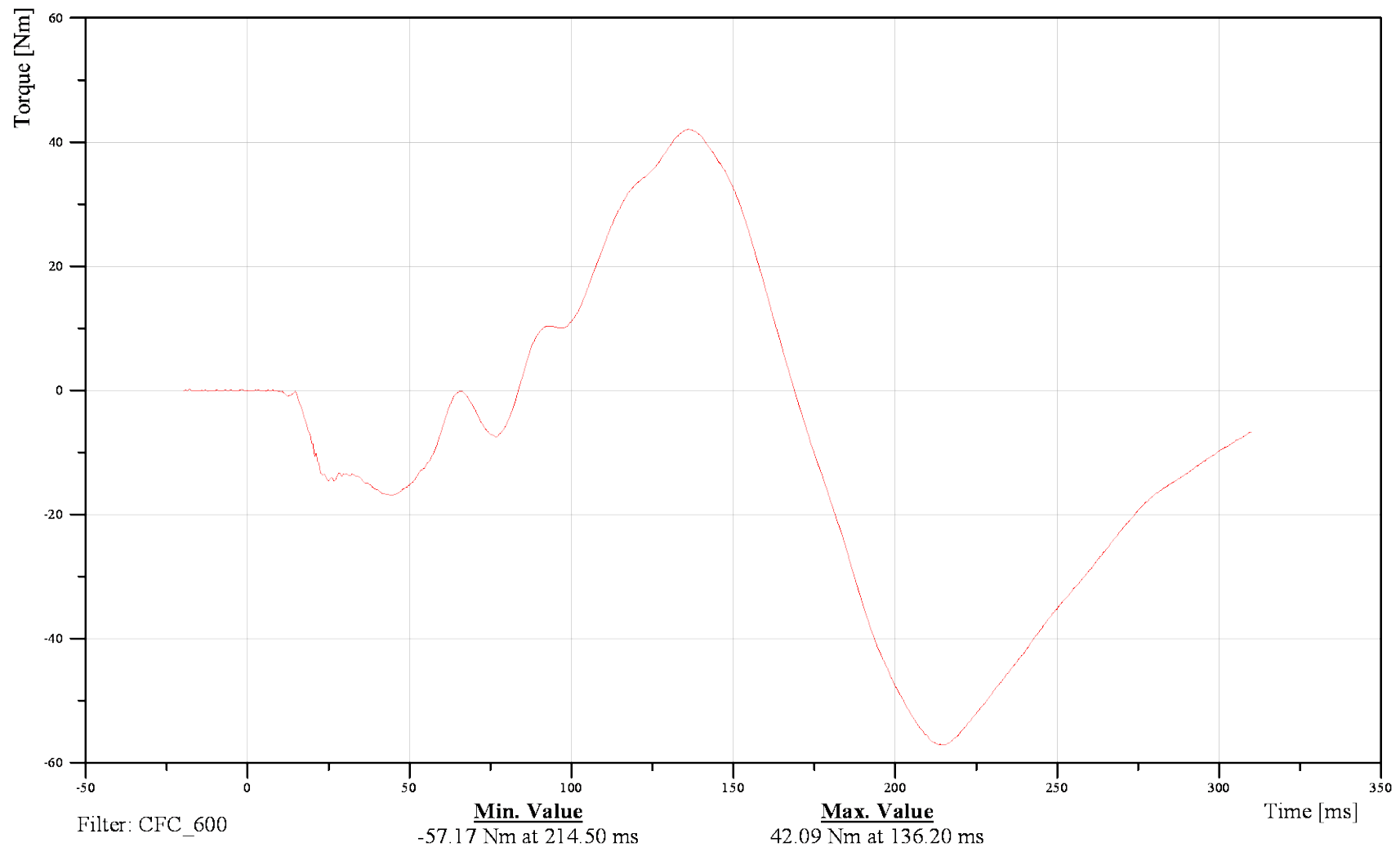
Time: 16:14

Customer: VRTC

11NECKLO00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Moment Mz

Date: 01/24/2013

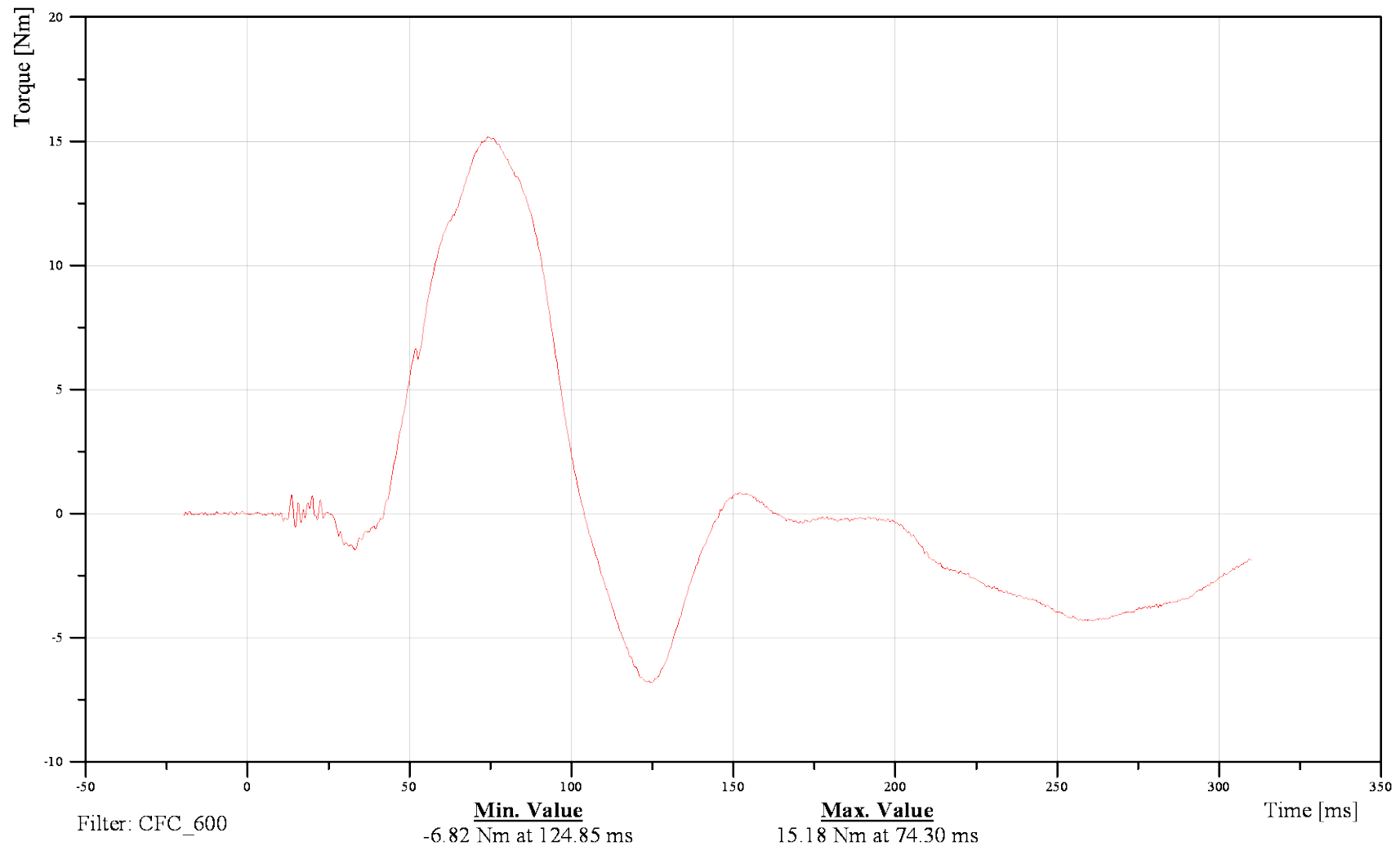
Time: 16:14

Customer: VRTC

11NECKLO00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

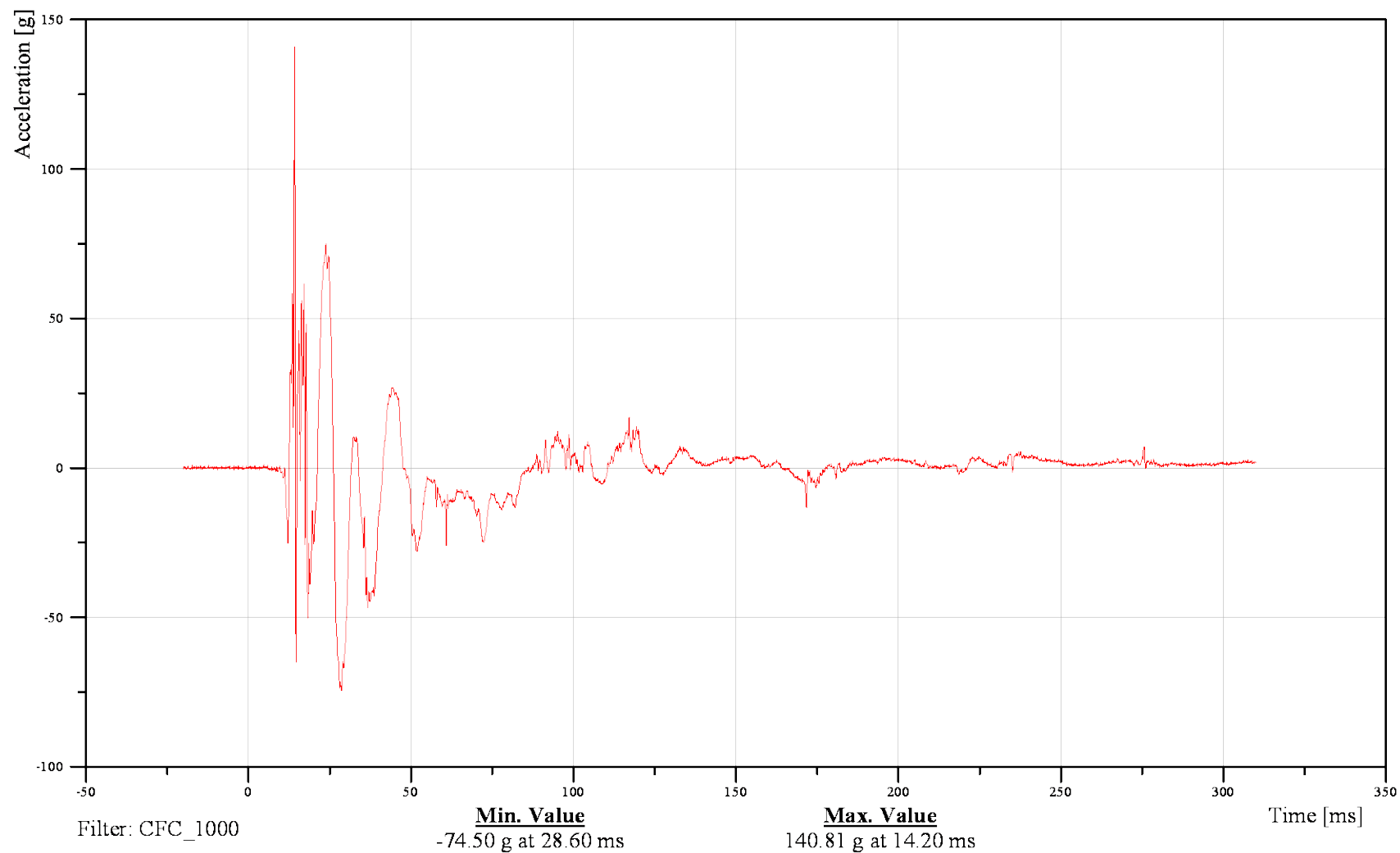
Shoulder Longitudinal Ax

Date: 01/24/2013
Time: 16:14

Customer: VRTC

11SHLDLE00WSACXA

TRC Inc. Test Lab: CTF
Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Lateral Ay

Date: 01/24/2013

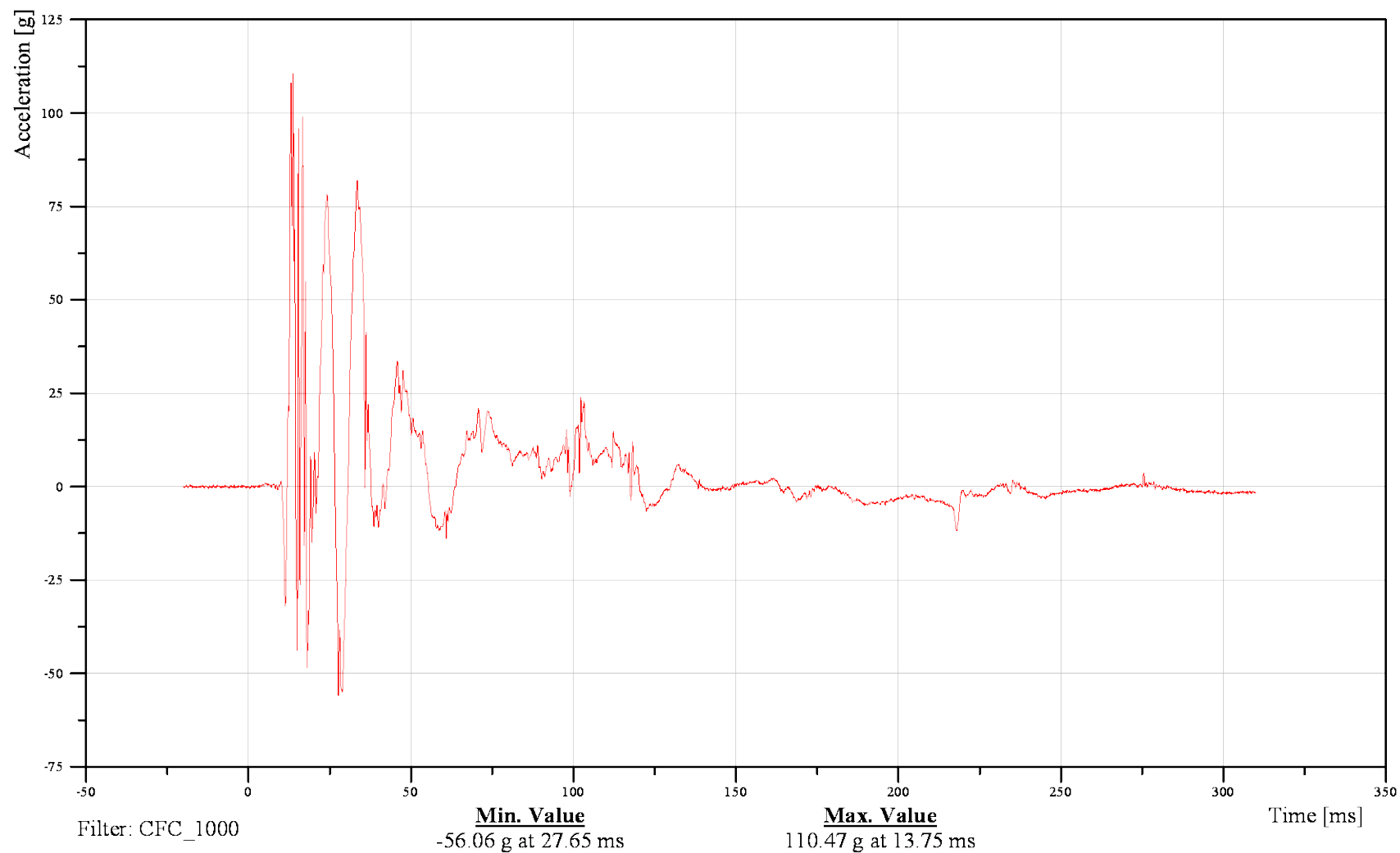
Time: 16:14

Customer: VRTC

11SHLDLE00WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Vertical Az

Date: 01/24/2013

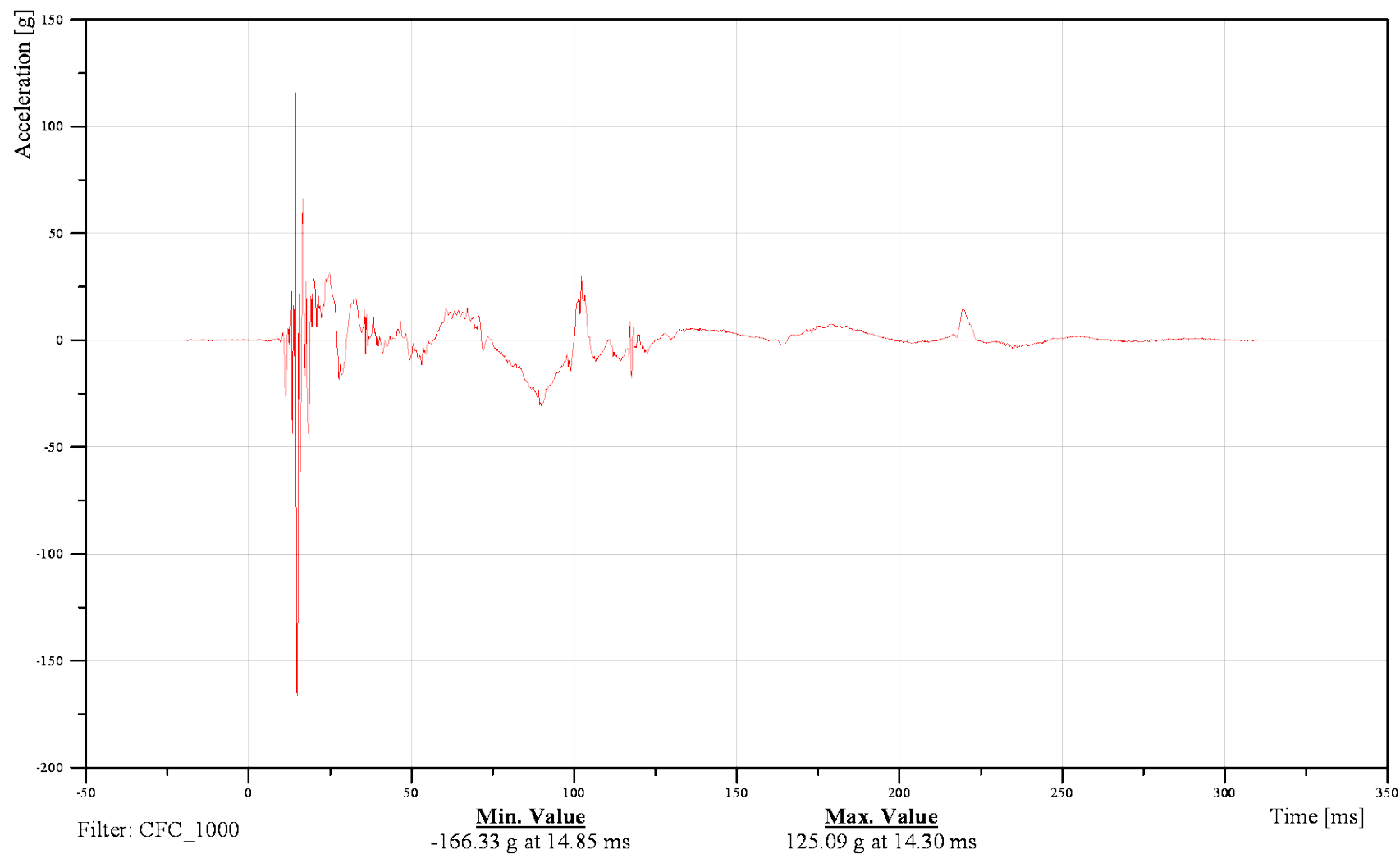
Time: 16:14

Customer: VRTC

11SHLDLE00WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder A Resultant

Date: 01/24/2013

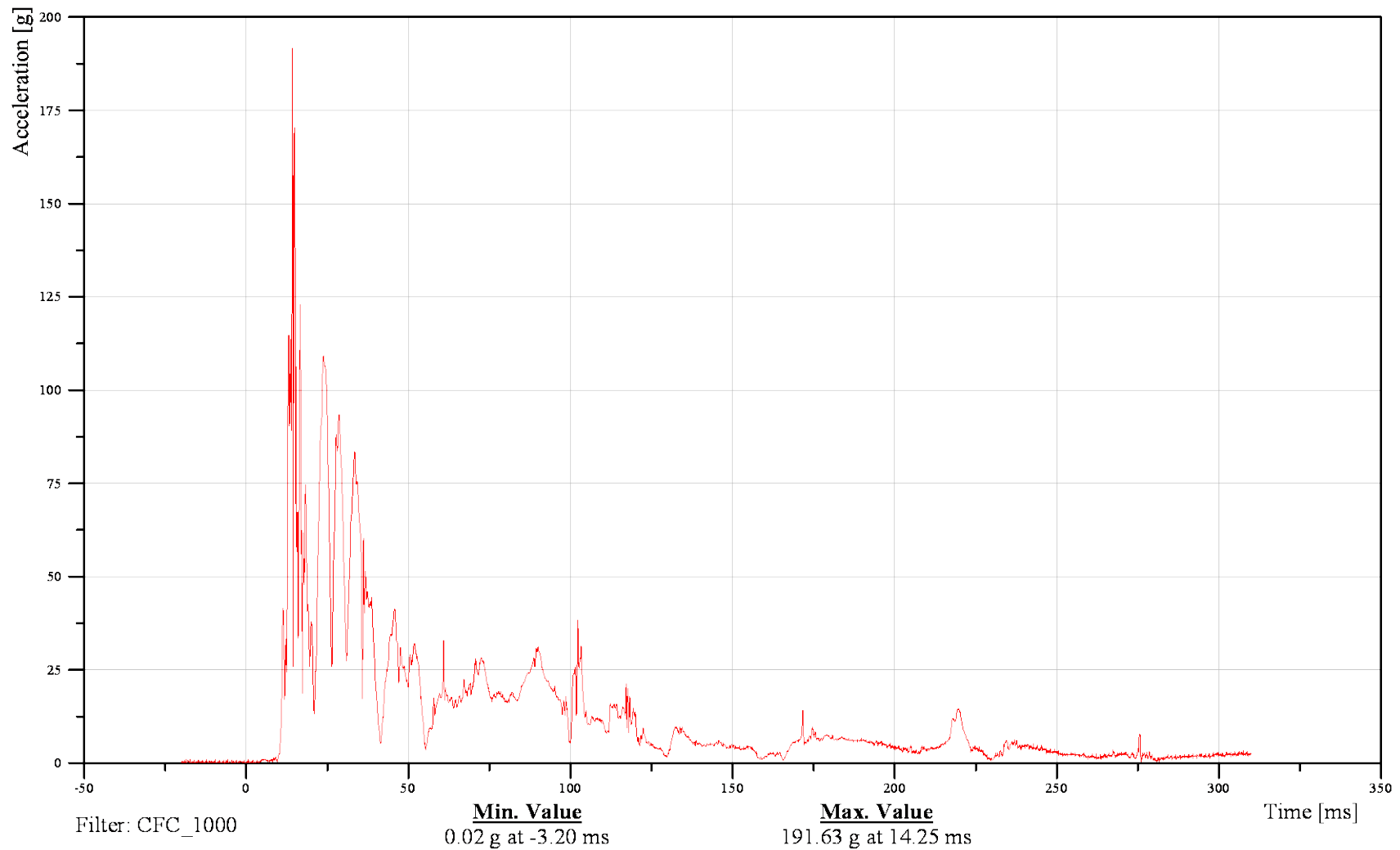
Time: 16:14

Customer: VRTC

11SHLDLE00WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Force Fx

Date: 01/24/2013

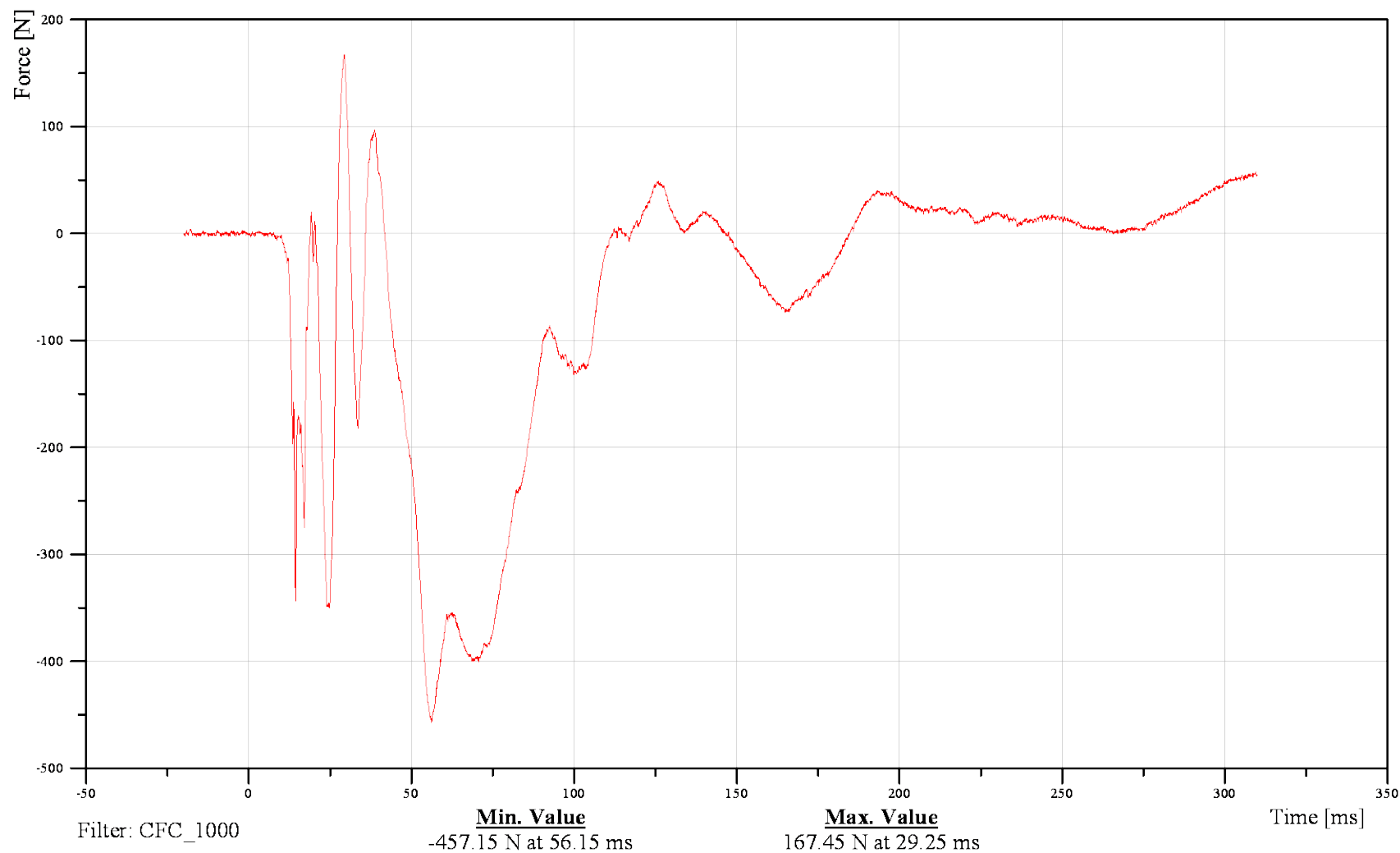
Time: 16:14

Customer: VRTC

11SHLDLE00WSFOXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Force Fy

Date: 01/24/2013

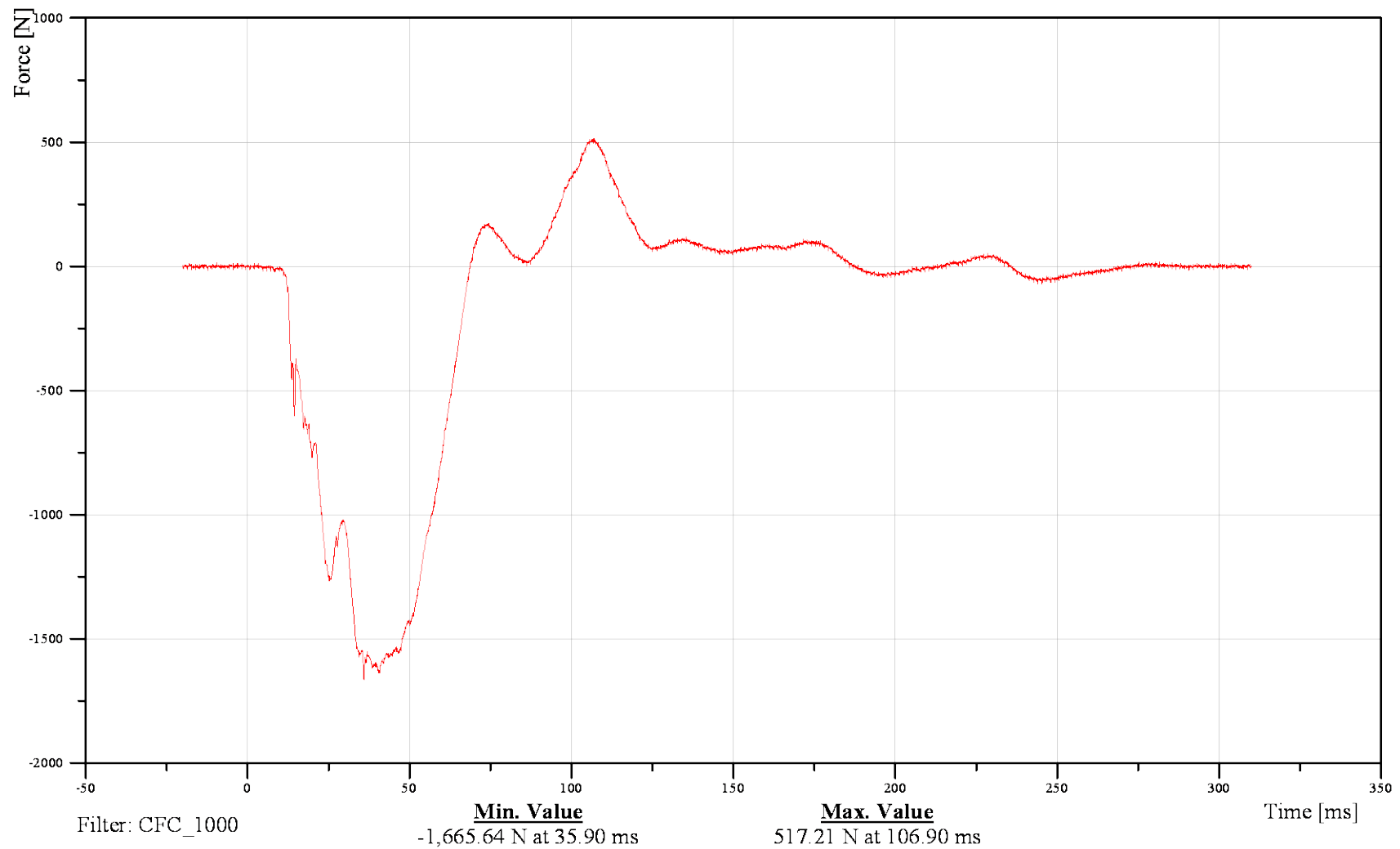
Time: 16:14

Customer: VRTC

11SHLDLE00WSFOYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Force Fz

Date: 01/24/2013

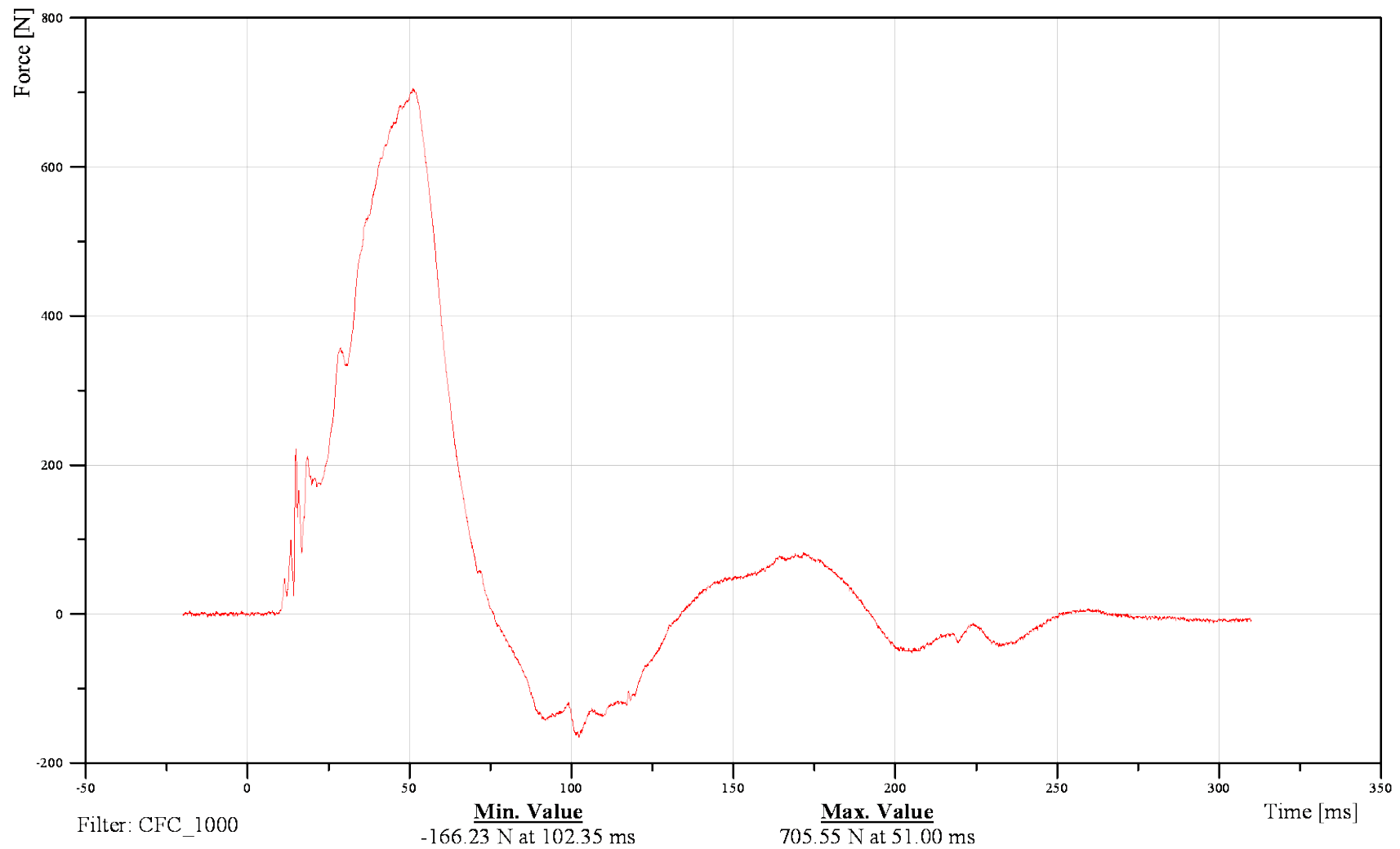
Time: 16:14

Customer: VRTC

11SHLDLE00WSFOZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Y Disp

Date: 01/24/2013

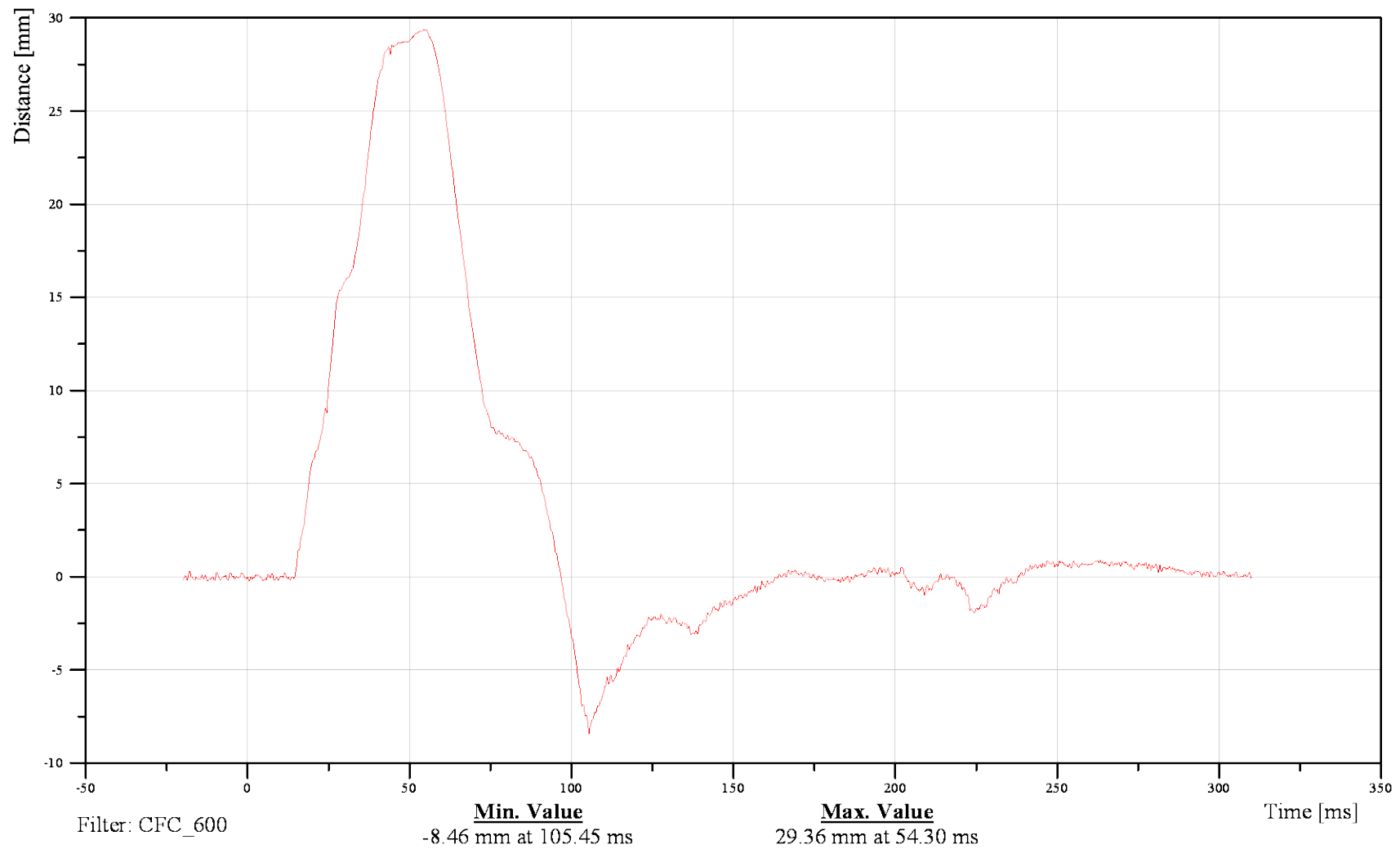
Time: 16:14

Customer: VRTC

11SHRILE00WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 Longitudinal Ax

Date: 01/24/2013

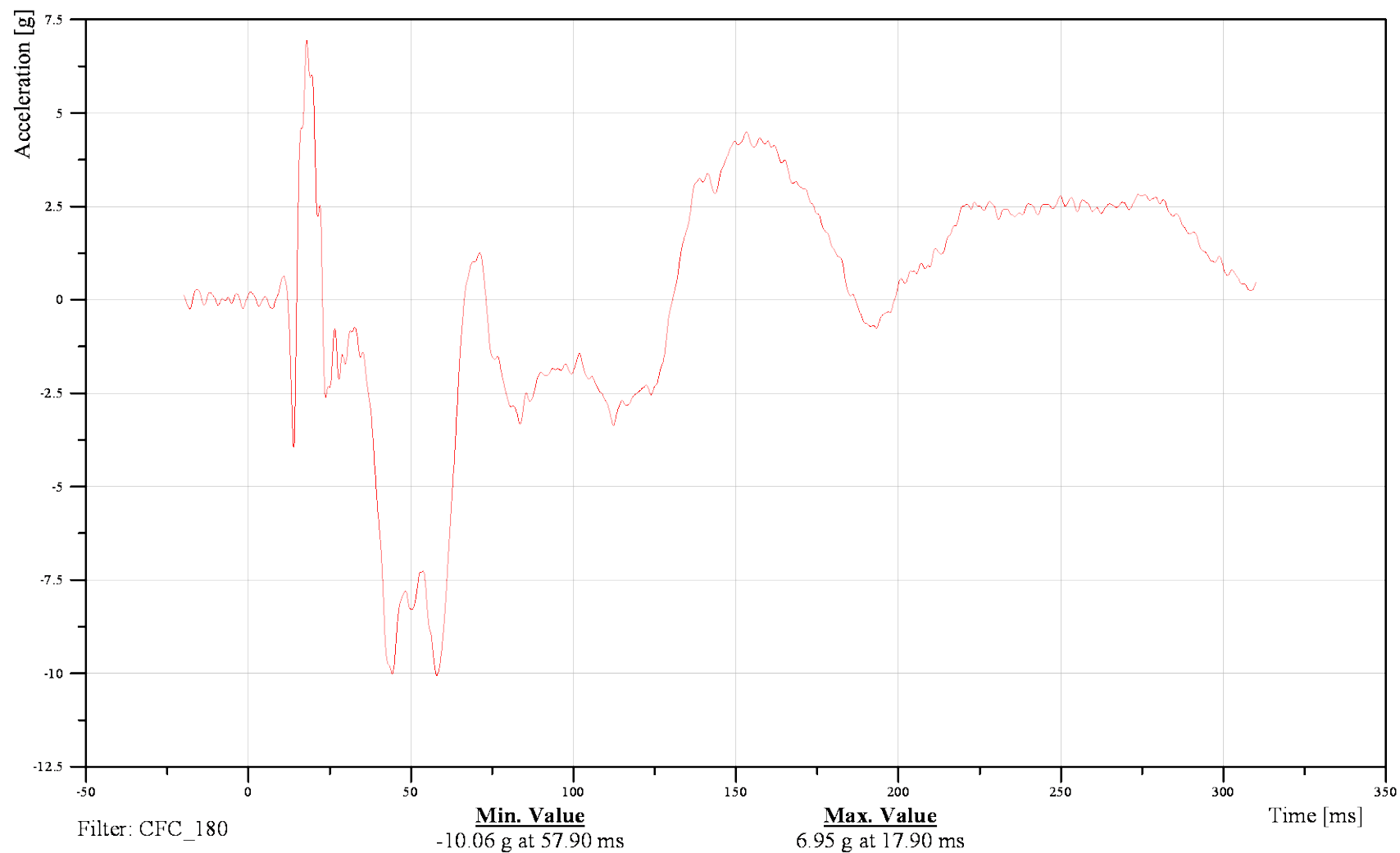
Time: 16:14

Customer: VRTC

11THSP0100WSACXC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 Lateral Ay

Date: 01/24/2013

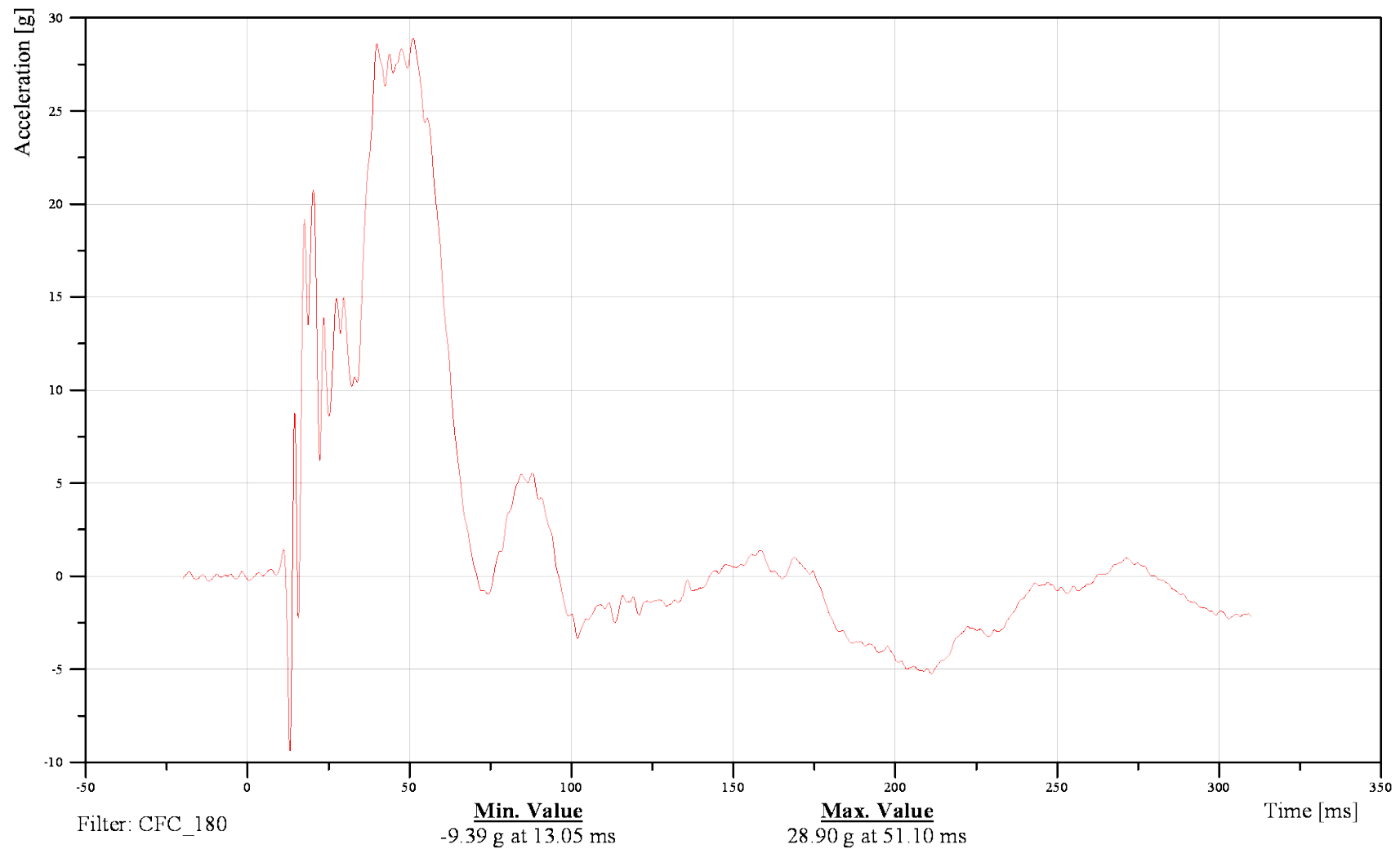
Time: 16:14

Customer: VRTC

11THSP0100WSACYC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 Vertical Az

Date: 01/24/2013

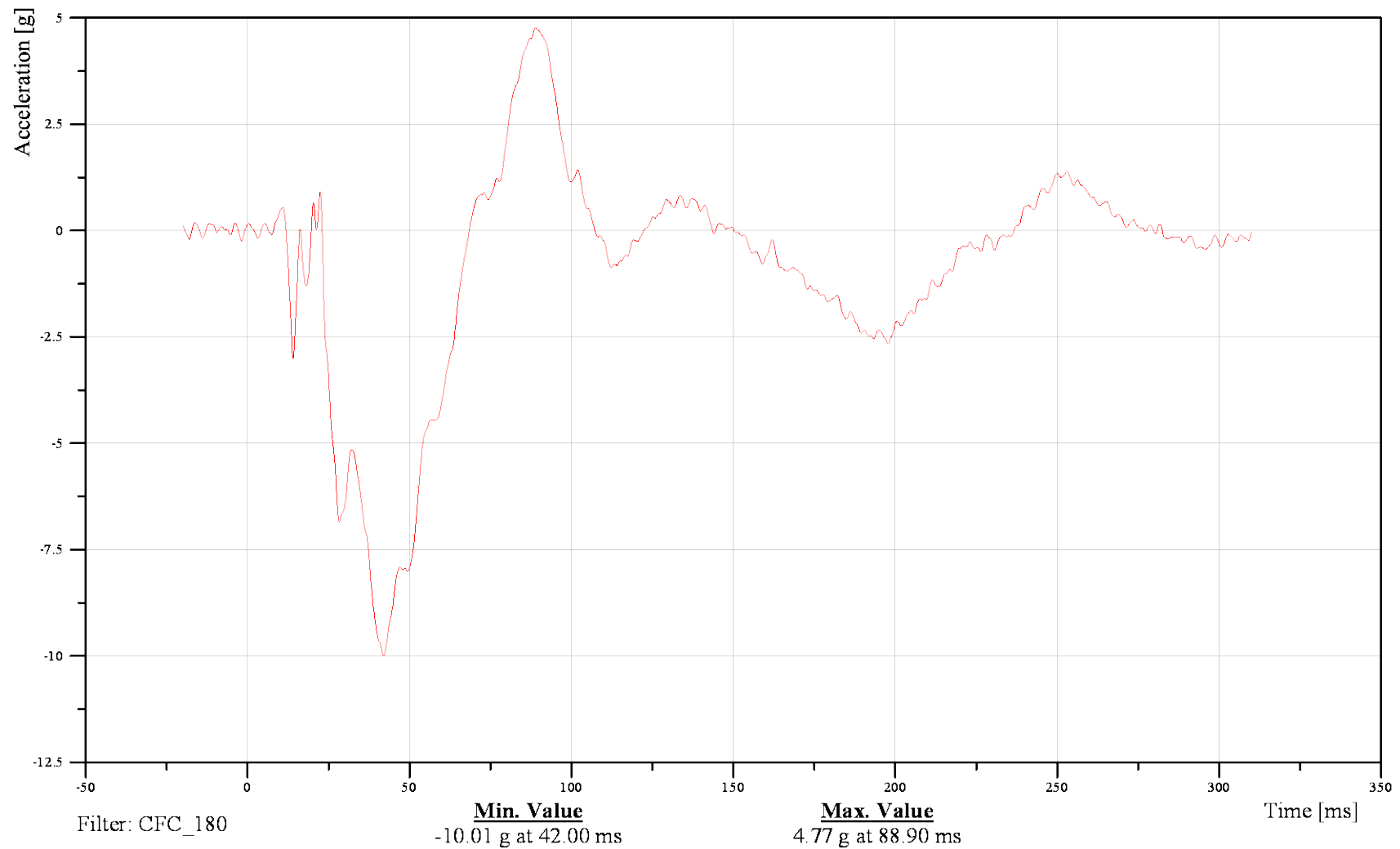
Time: 16:14

Customer: VRTC

11THSP0100WSACZC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 A Resultant

Date: 01/24/2013

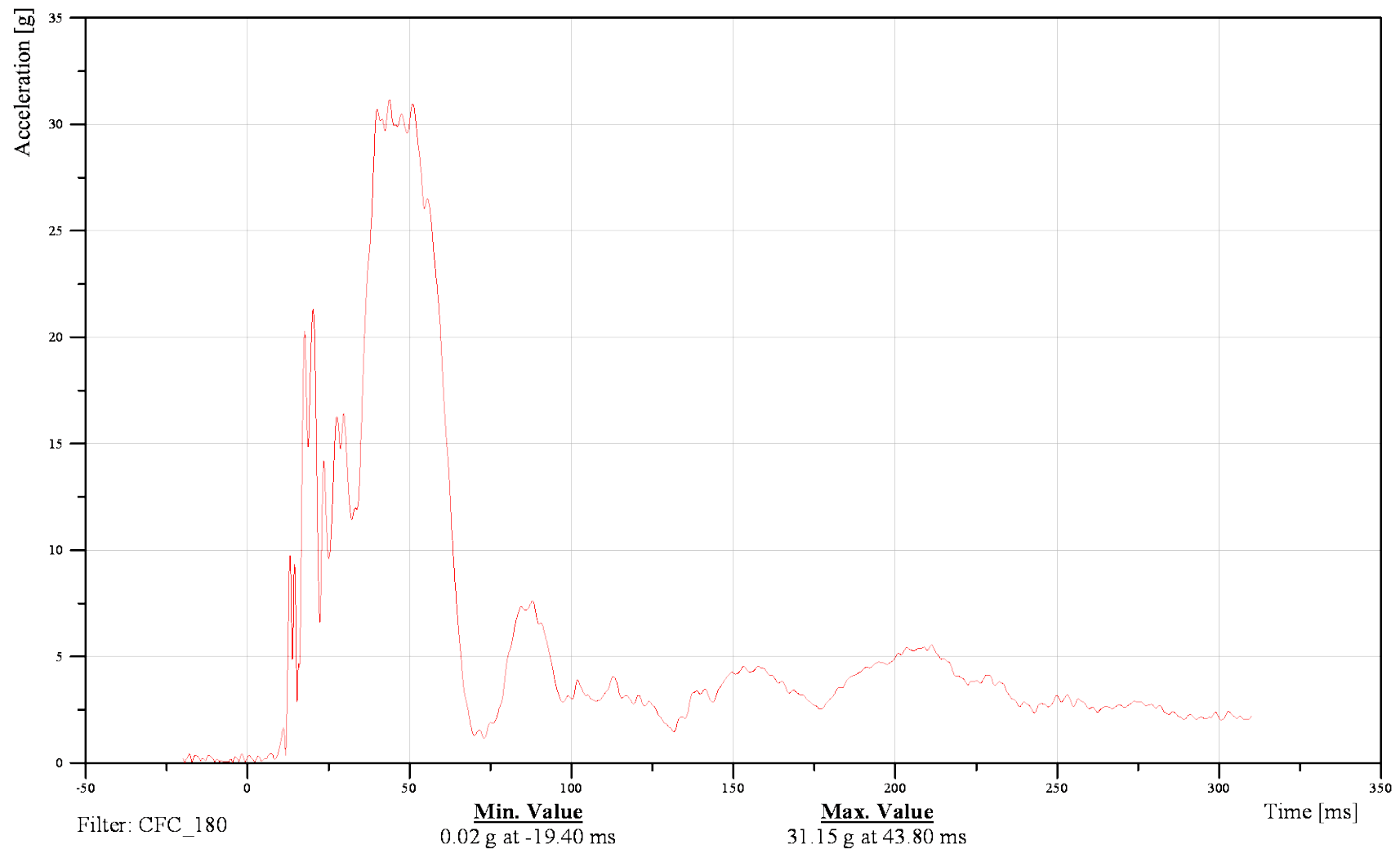
Time: 16:14

Customer: VRTC

11THSP0100WSACRC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Longitudinal Ax

Date: 01/24/2013

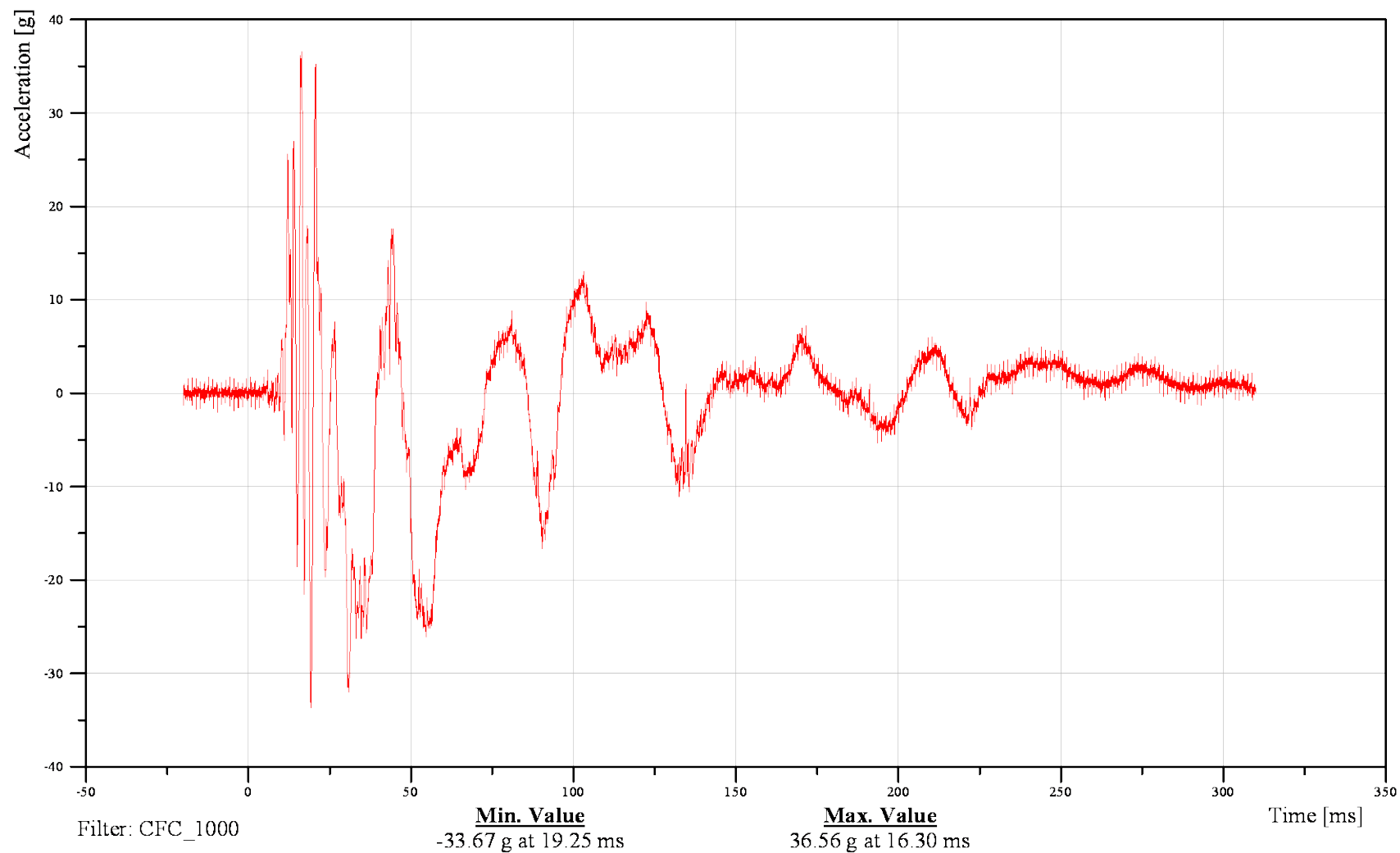
Time: 16:14

Customer: VRTC

11TRRILE01WSACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Lateral Ay

Date: 01/24/2013

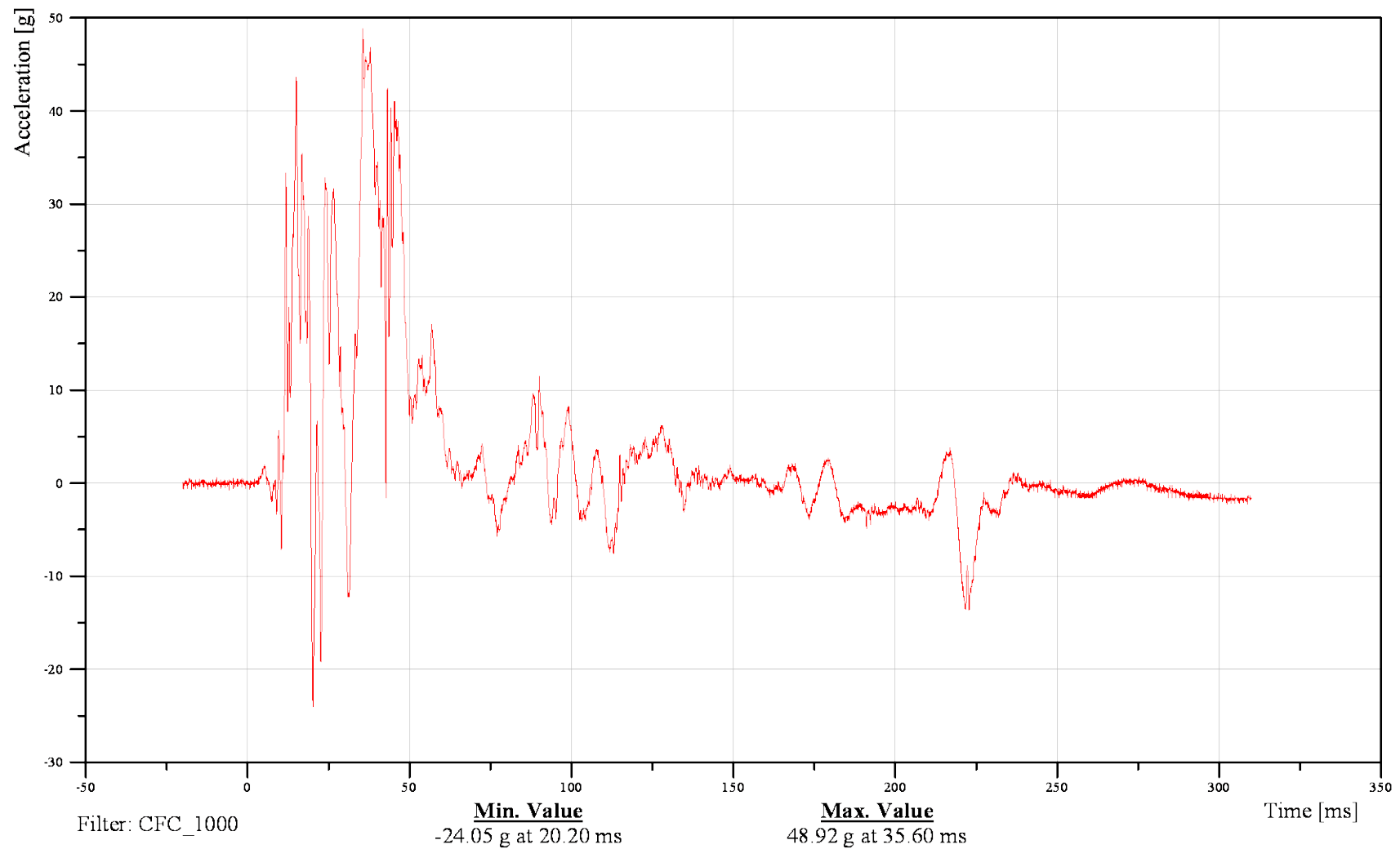
Time: 16:14

Customer: VRTC

11TRRILE01WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Vertical Az

Date: 01/24/2013

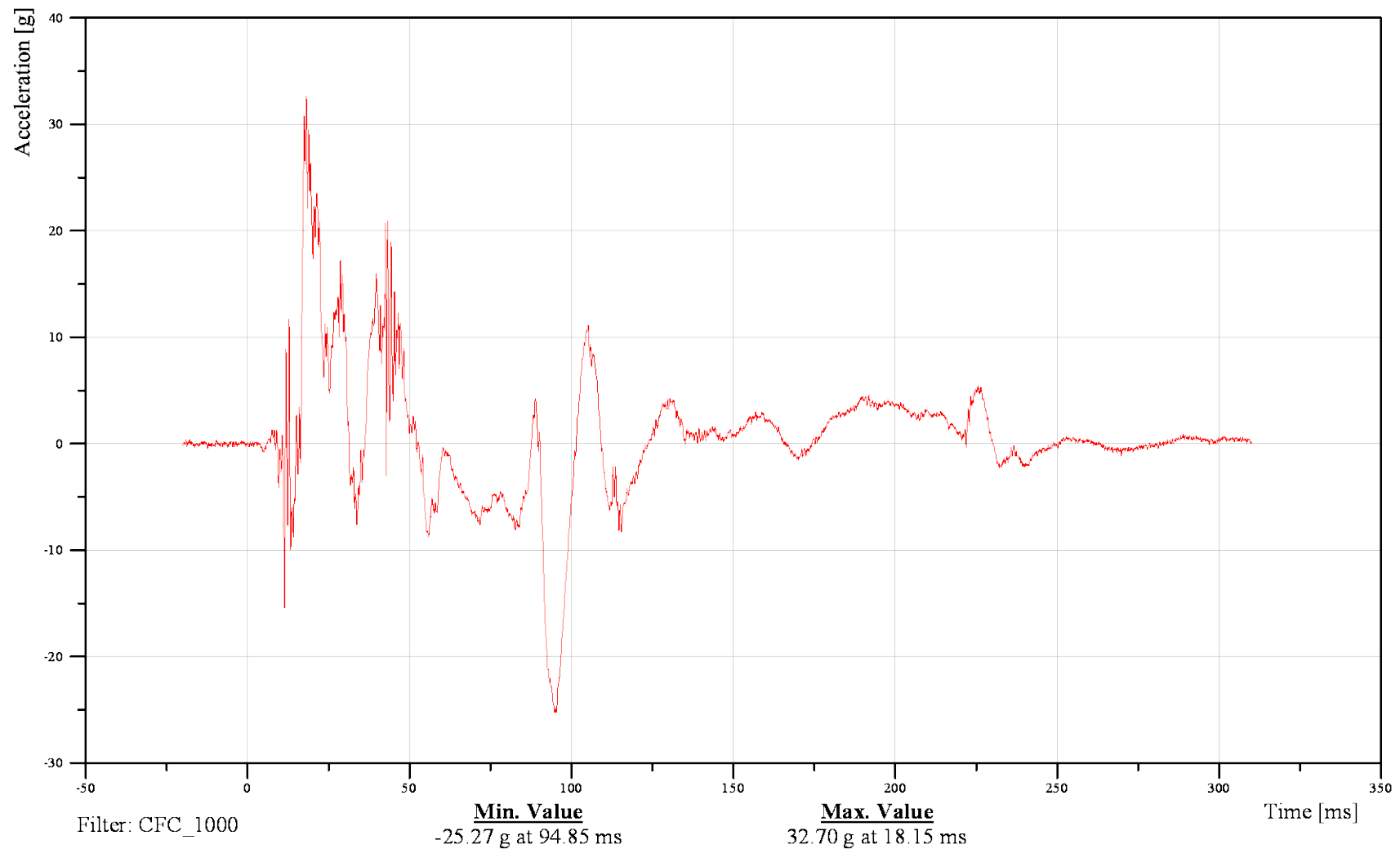
Time: 16:14

Customer: VRTC

11TRRILE01WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 A Resultant

Date: 01/24/2013

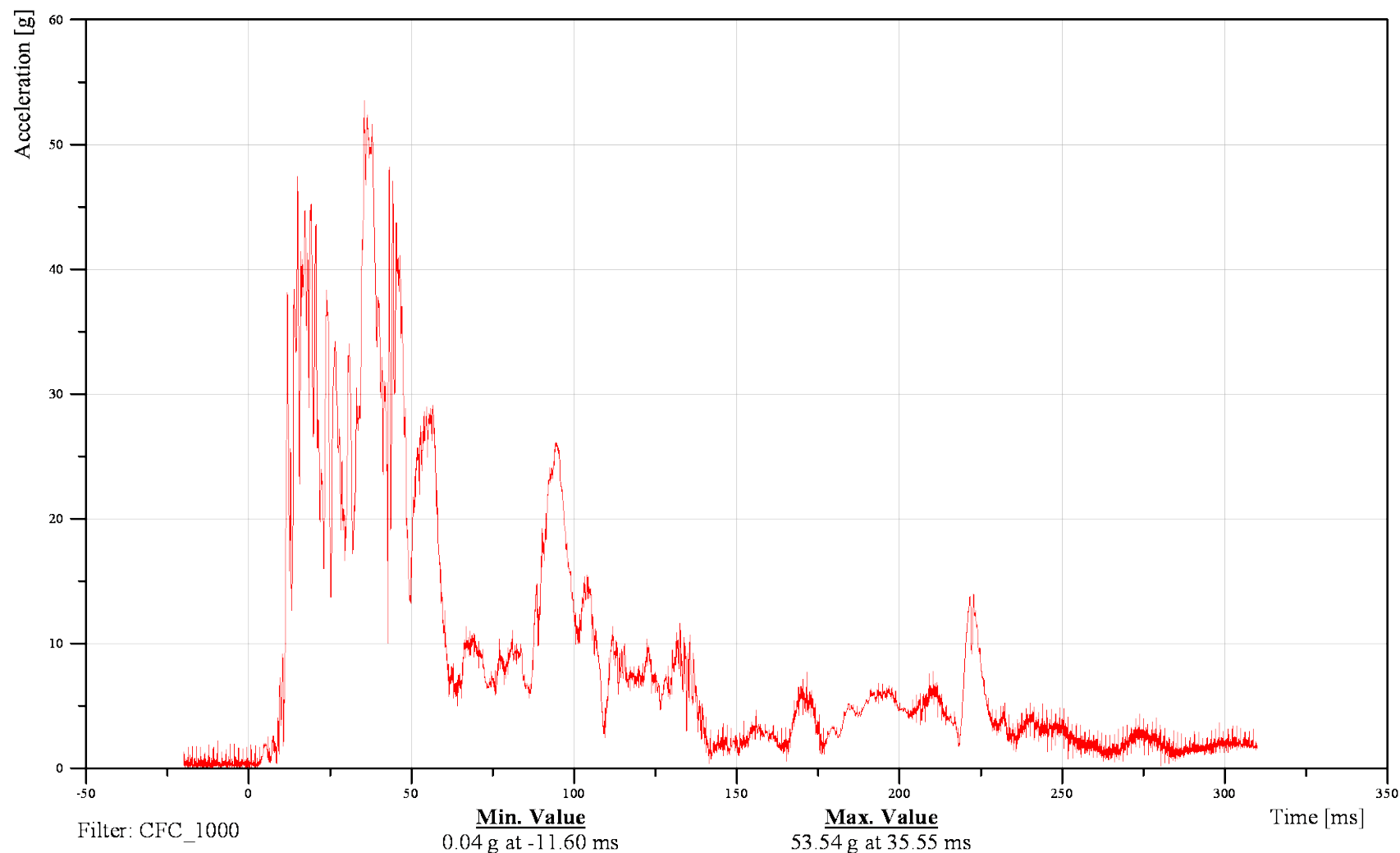
Time: 16:14

Customer: VRTC

11TRRILE01WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Lateral Disp

Date: 01/24/2013

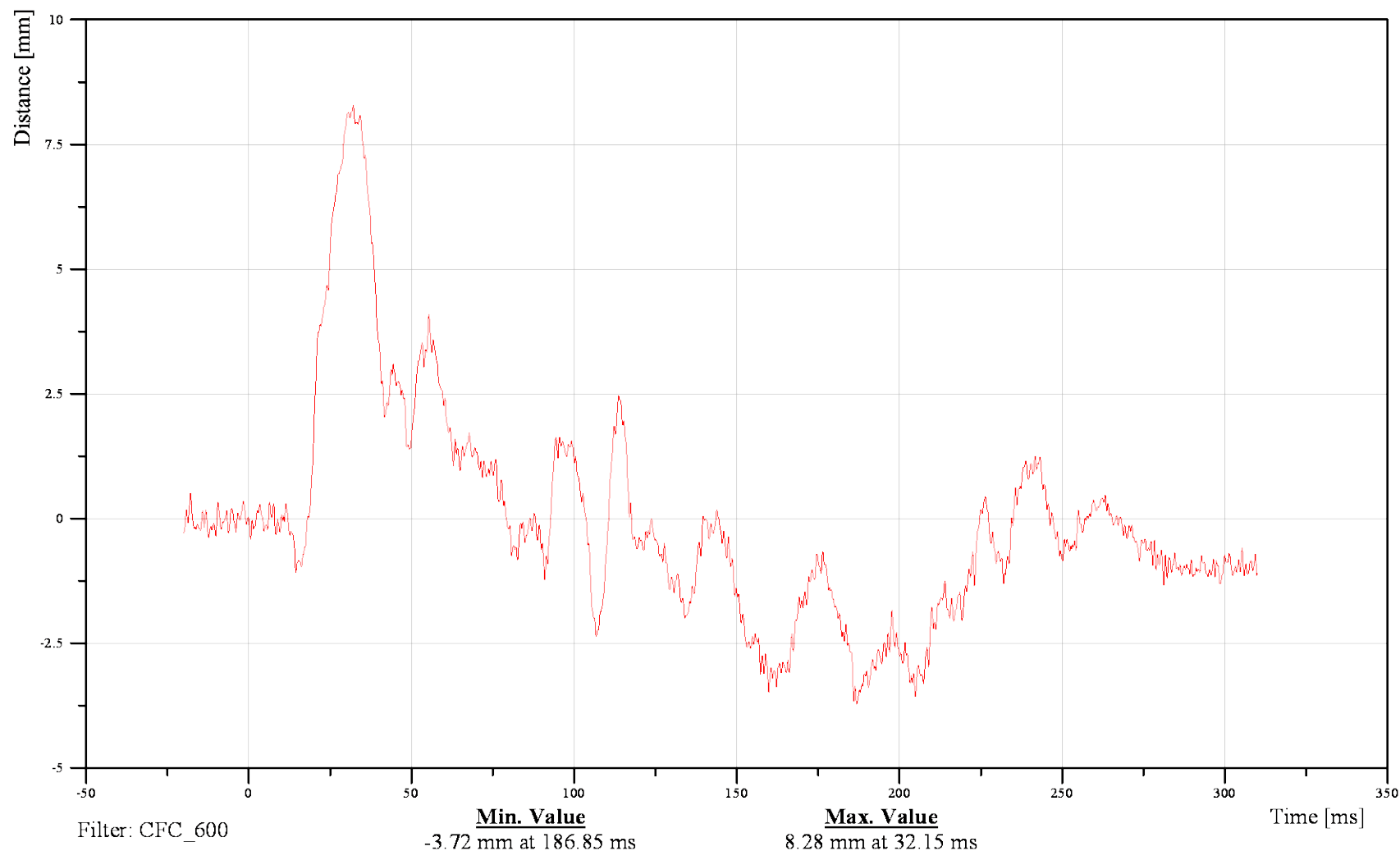
Time: 16:14

Customer: VRTC

11TRRILE01WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Longitudinal Ax

Date: 01/24/2013

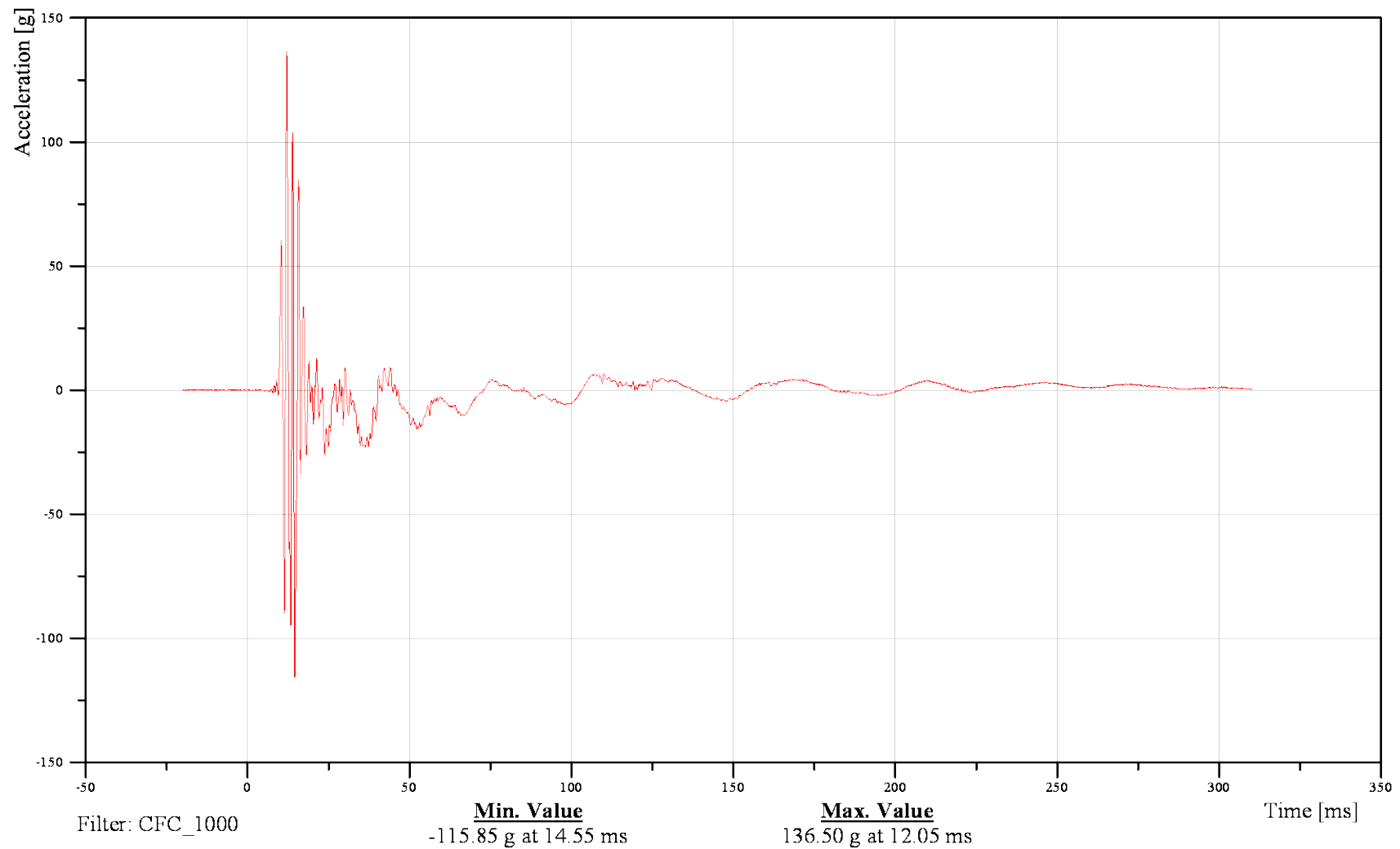
Time: 16:14

Customer: VRTC

11TRRILE02WSACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Lateral Ay

Date: 01/24/2013

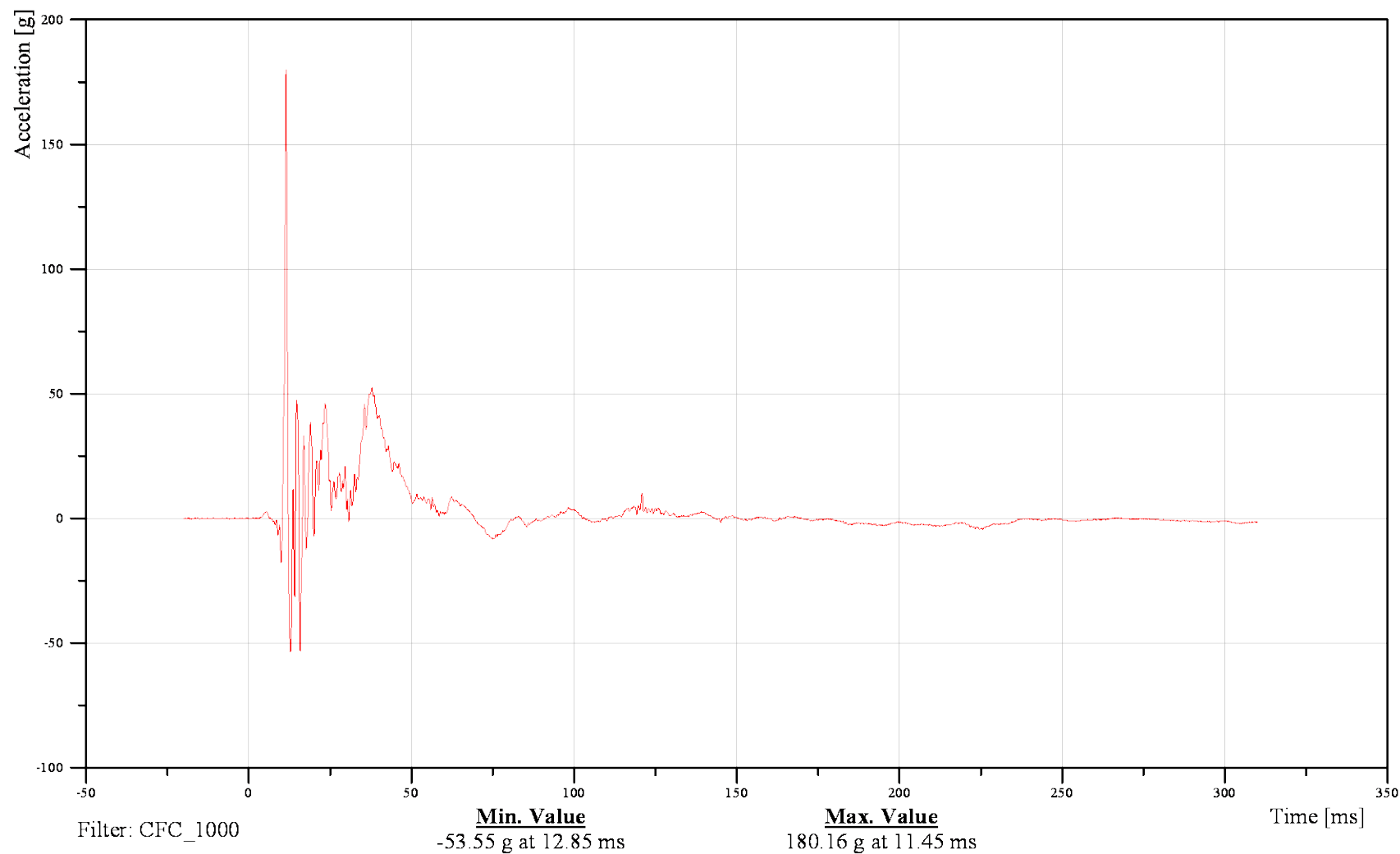
Time: 16:14

Customer: VRTC

11TRRILE02WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Vertical Az

Date: 01/24/2013

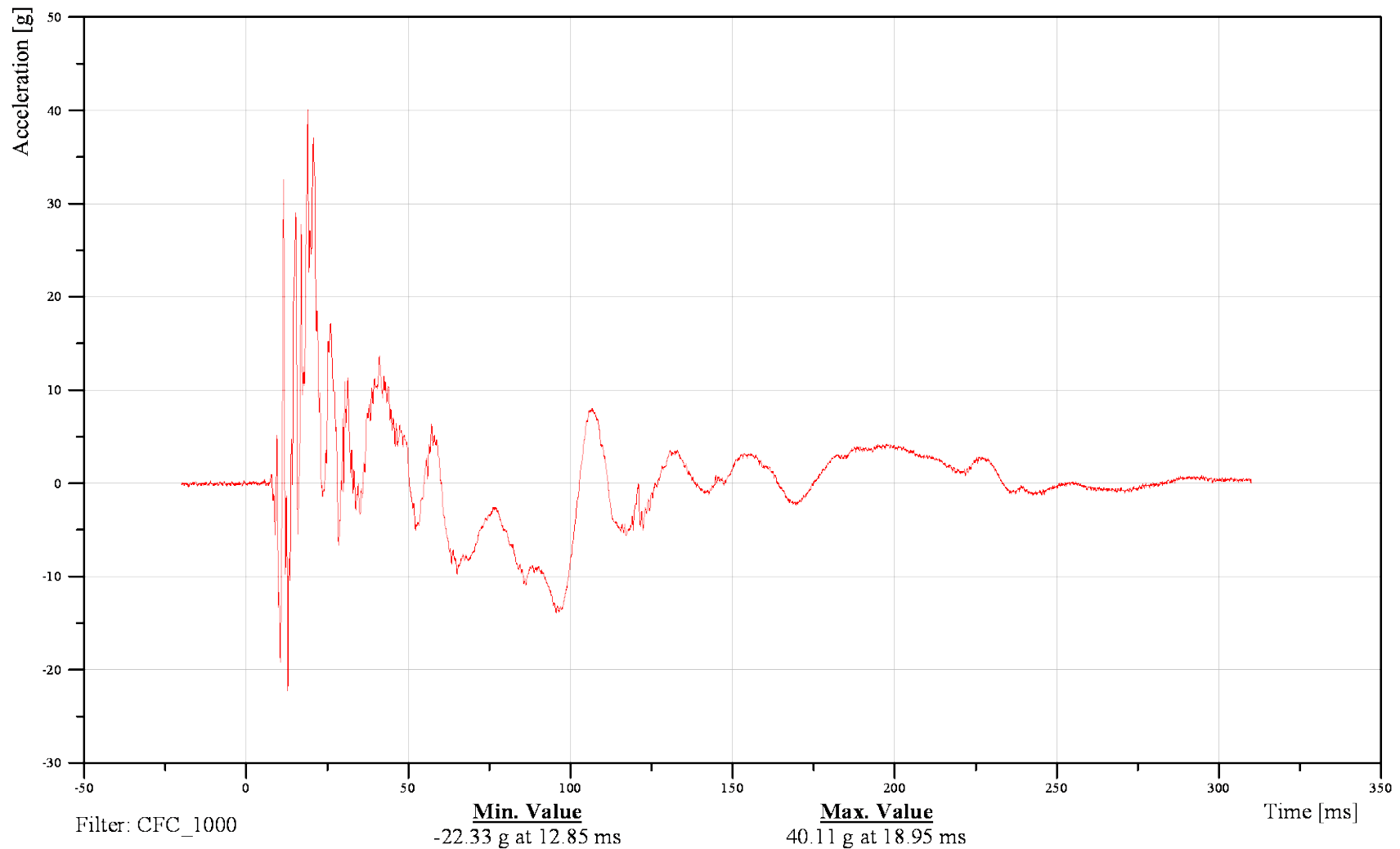
Time: 16:14

Customer: VRTC

11TRRILE02WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 A Resultant

Date: 01/24/2013

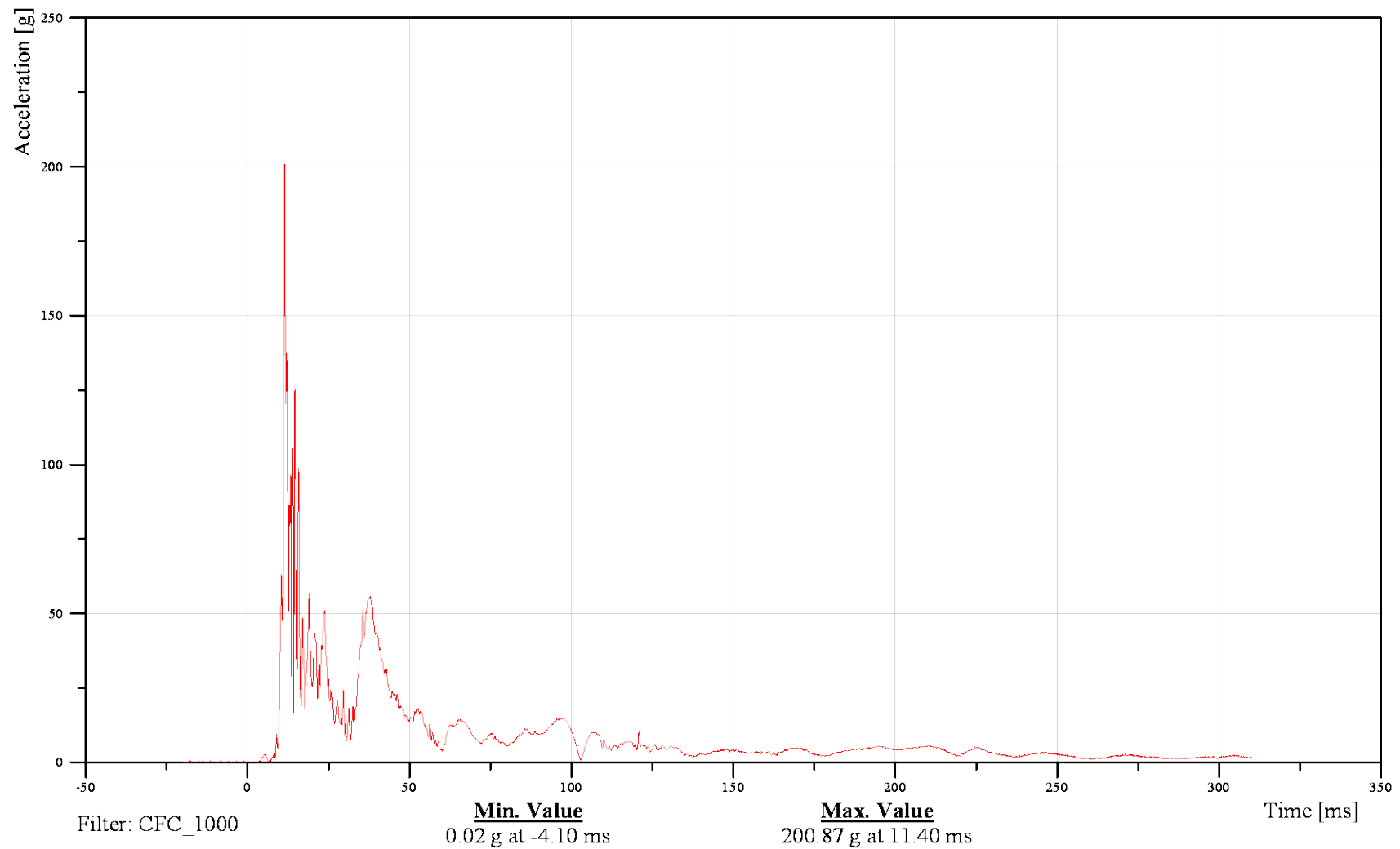
Time: 16:14

Customer: VRTC

11TRRILE02WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 IRTRAC compression

Date: 01/24/2013

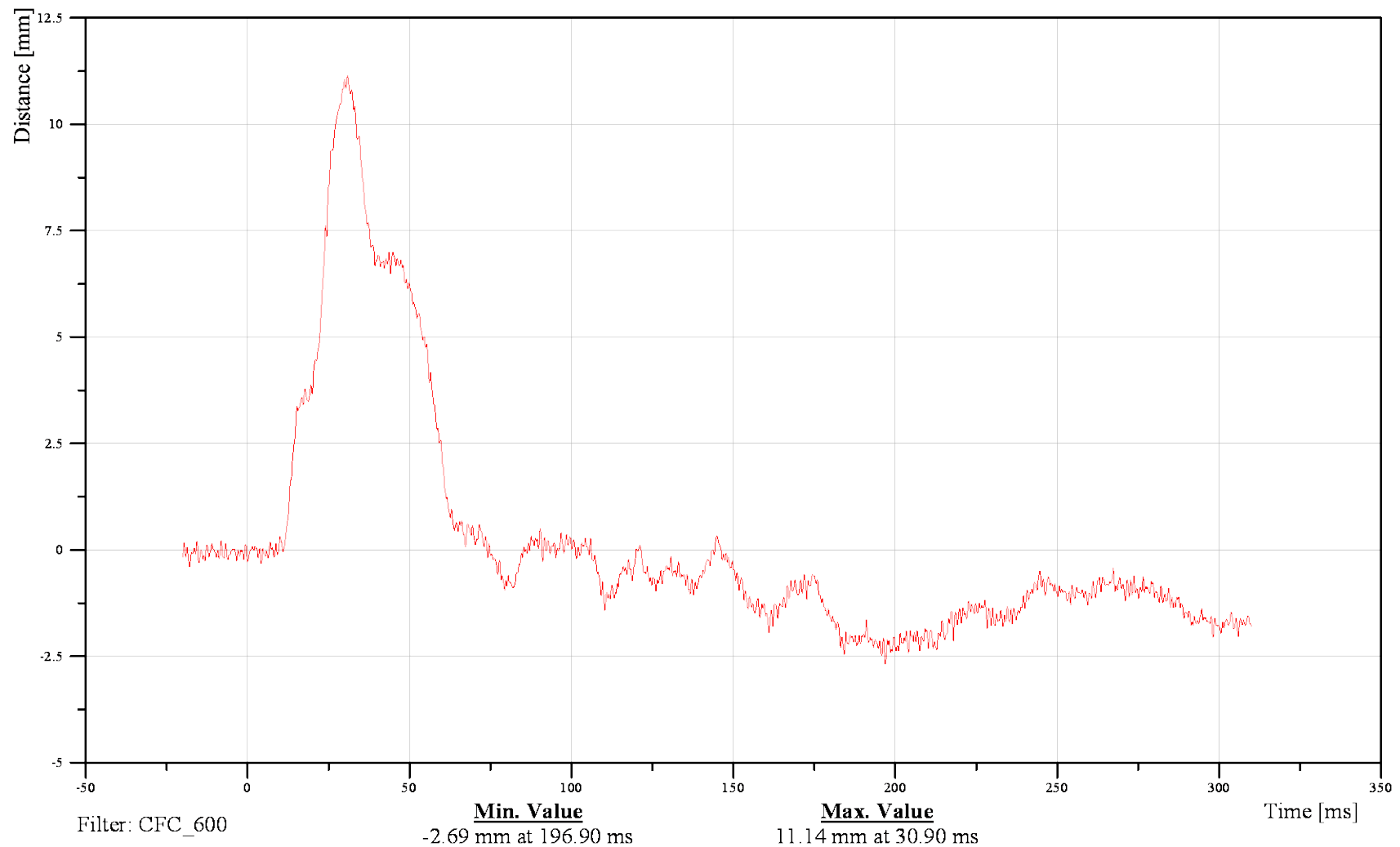
Time: 16:14

Customer: VRTC

11TRRILE02WSDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Rotational angle

Date: 01/24/2013

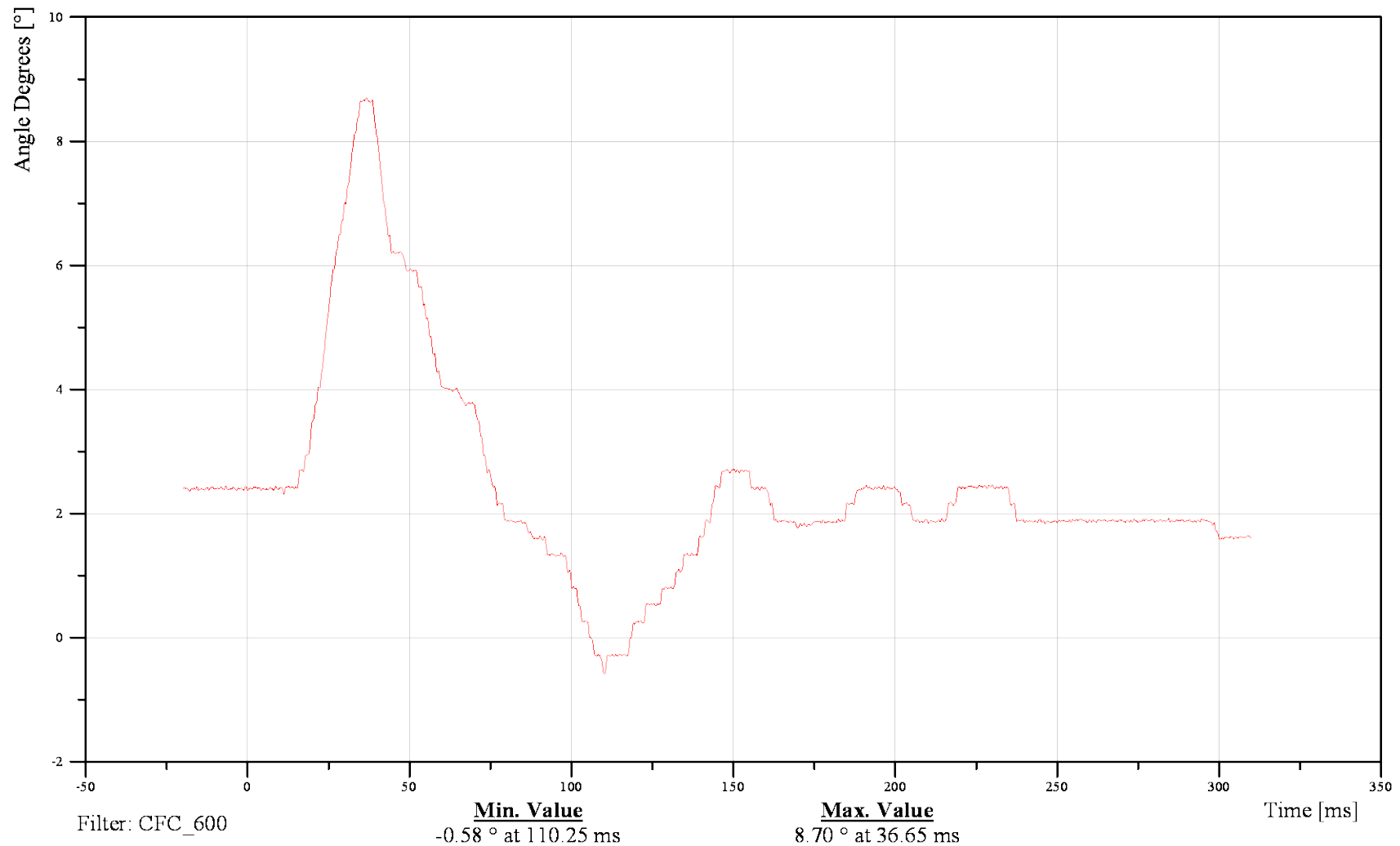
Time: 16:14

Customer: VRTC

11TRRILE02WSANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 IRTRAC X Deflection

Date: 01/24/2013

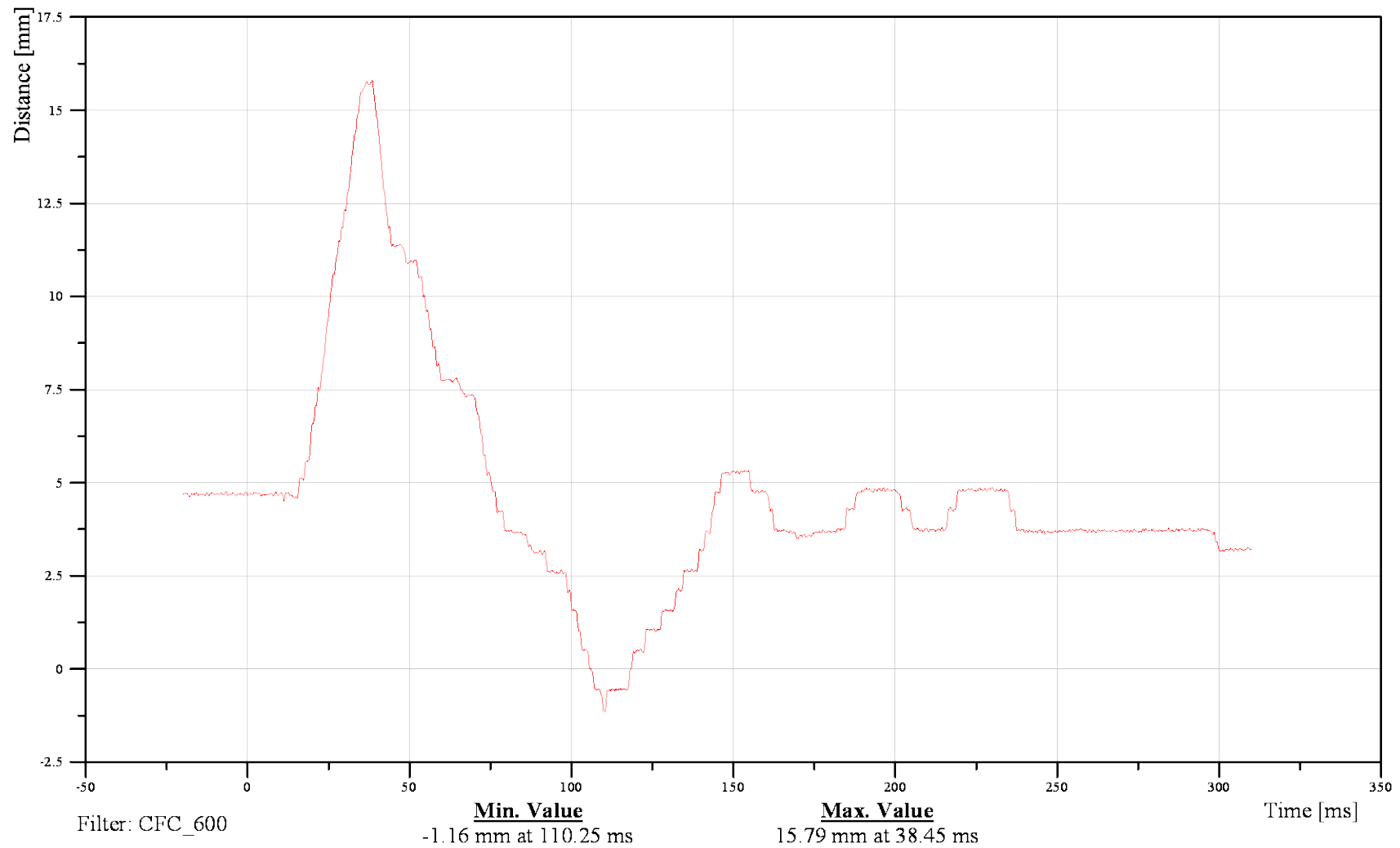
Time: 16:14

Customer: VRTC

11TRRILE02WSDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 IRTRAC Y Deflection

Date: 01/24/2013

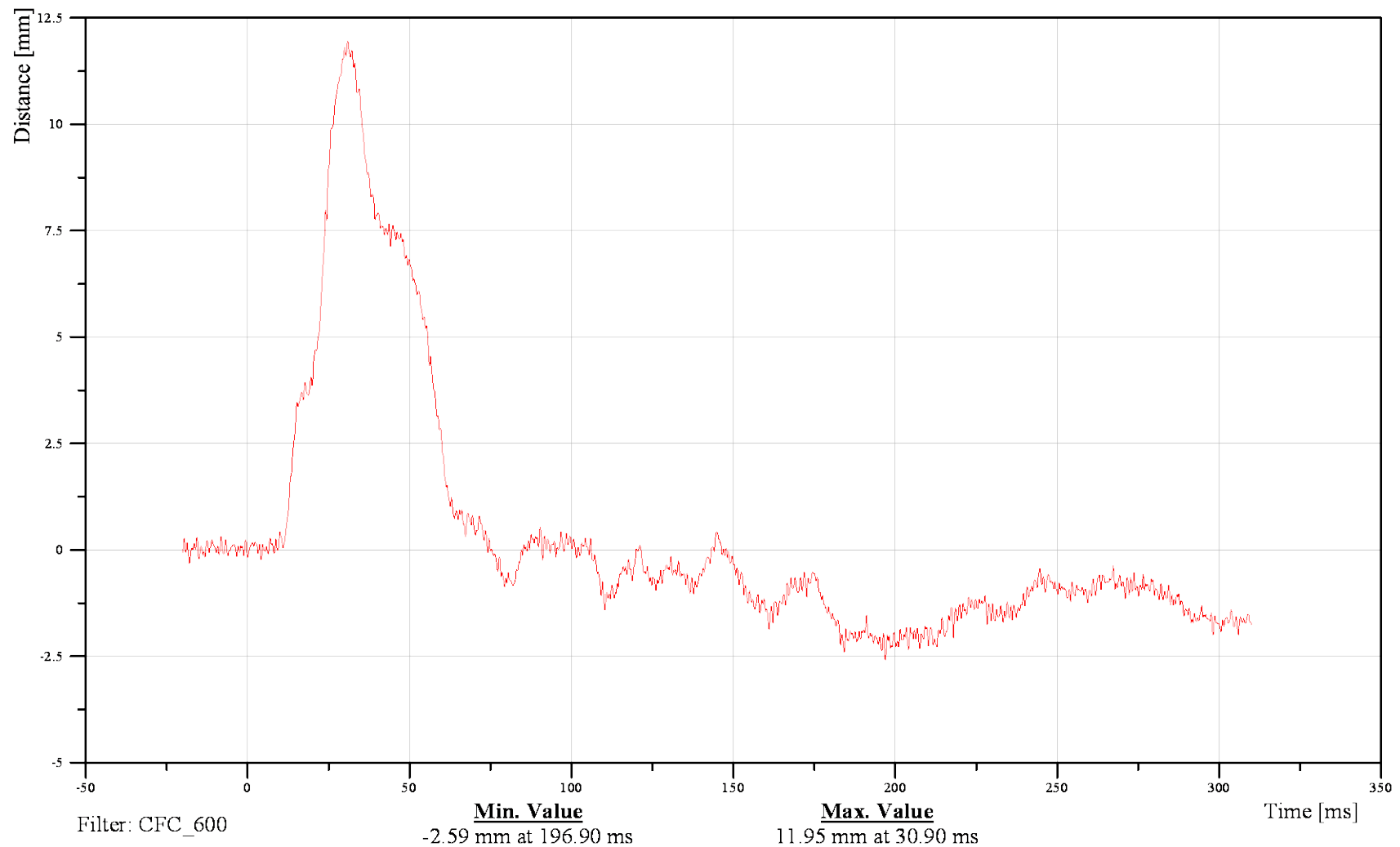
Time: 16:14

Customer: VRTC

11TRRILE02WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Longitudinal Ax

Date: 01/24/2013

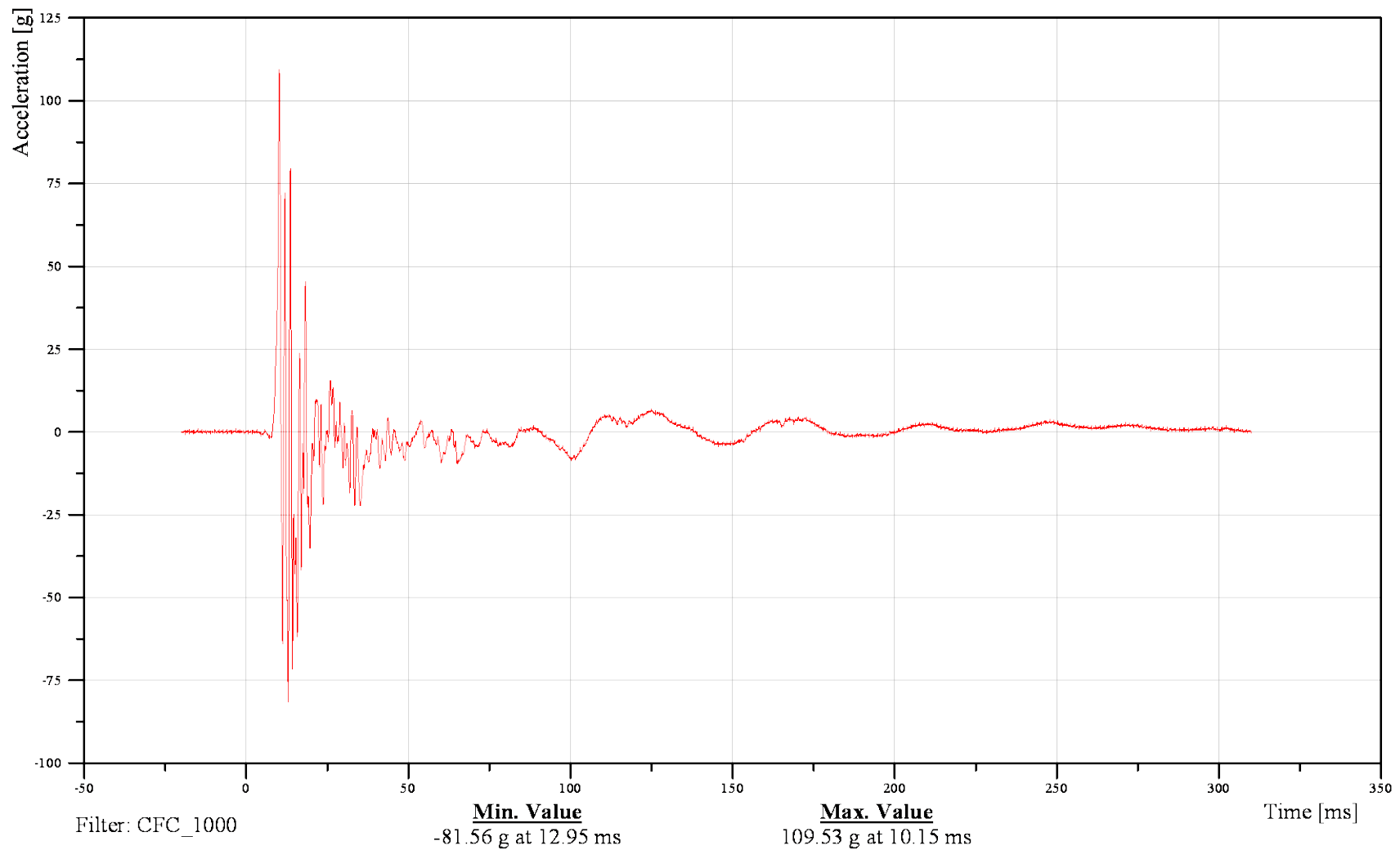
Time: 16:14

Customer: VRTC

11TRRILE03WSACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Lateral Ay

Date: 01/24/2013

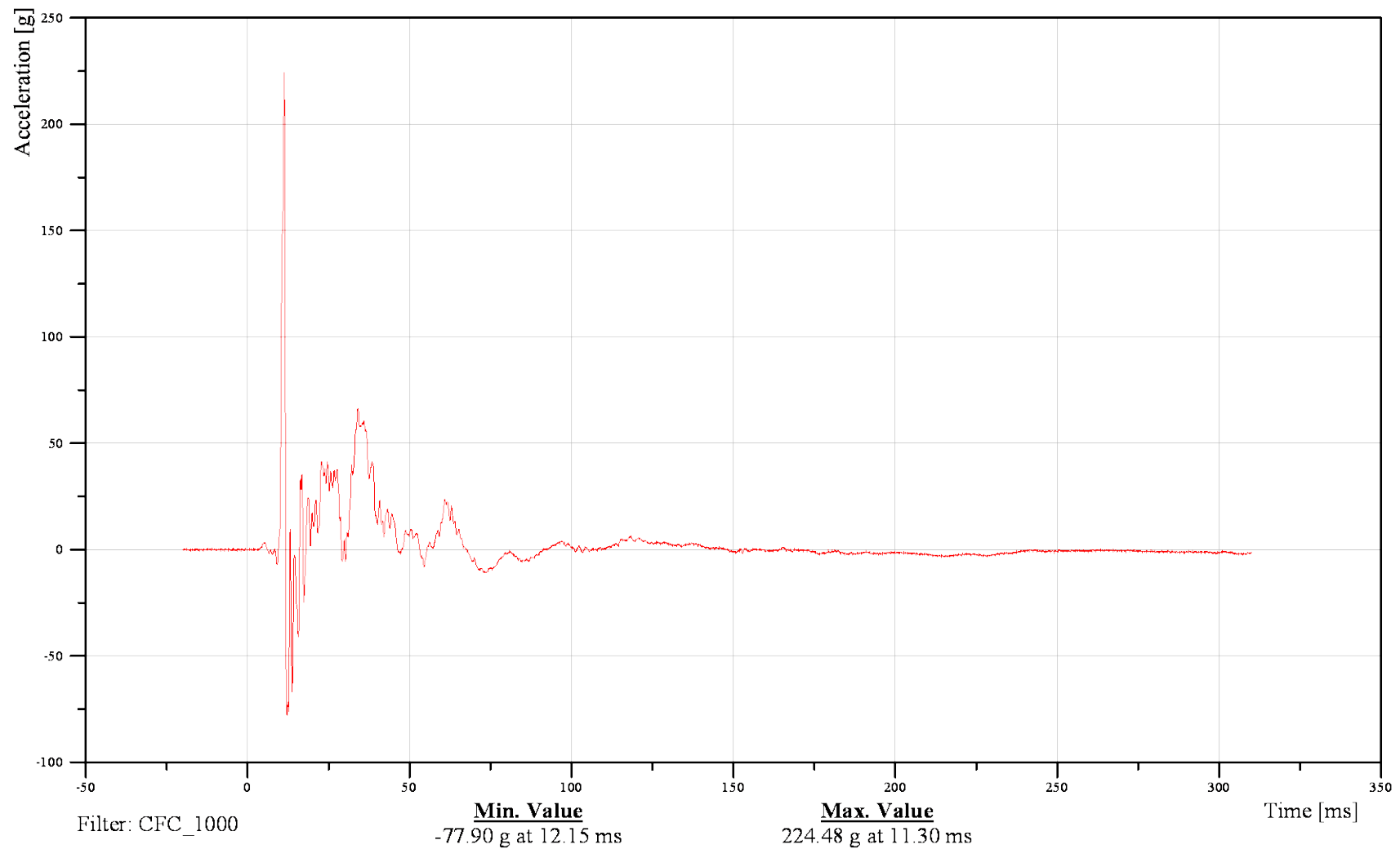
Time: 16:14

Customer: VRTC

11TRRILE03WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Vertical Az

Date: 01/24/2013

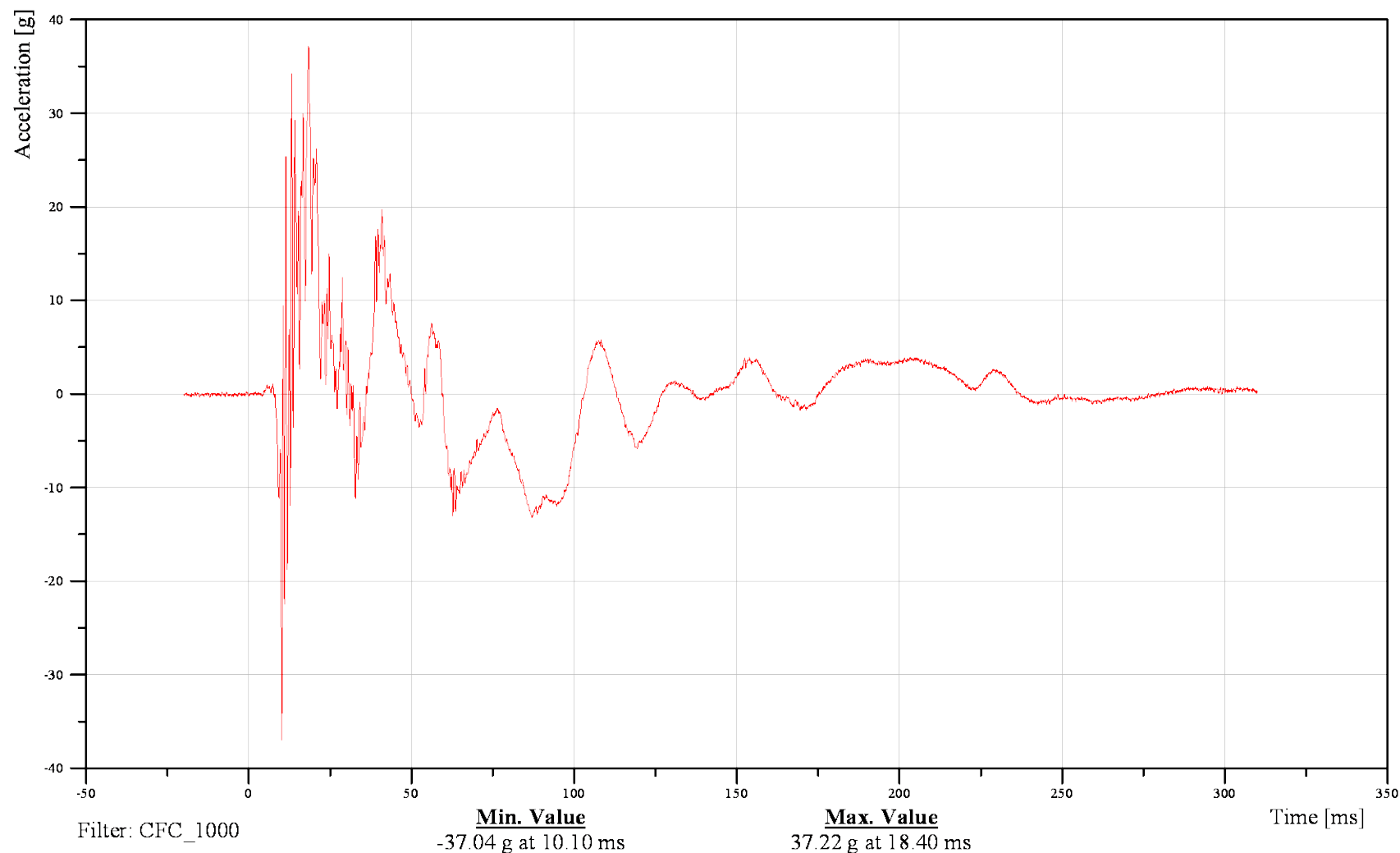
Time: 16:14

Customer: VRTC

11TRRILE03WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 A Resultant

Date: 01/24/2013

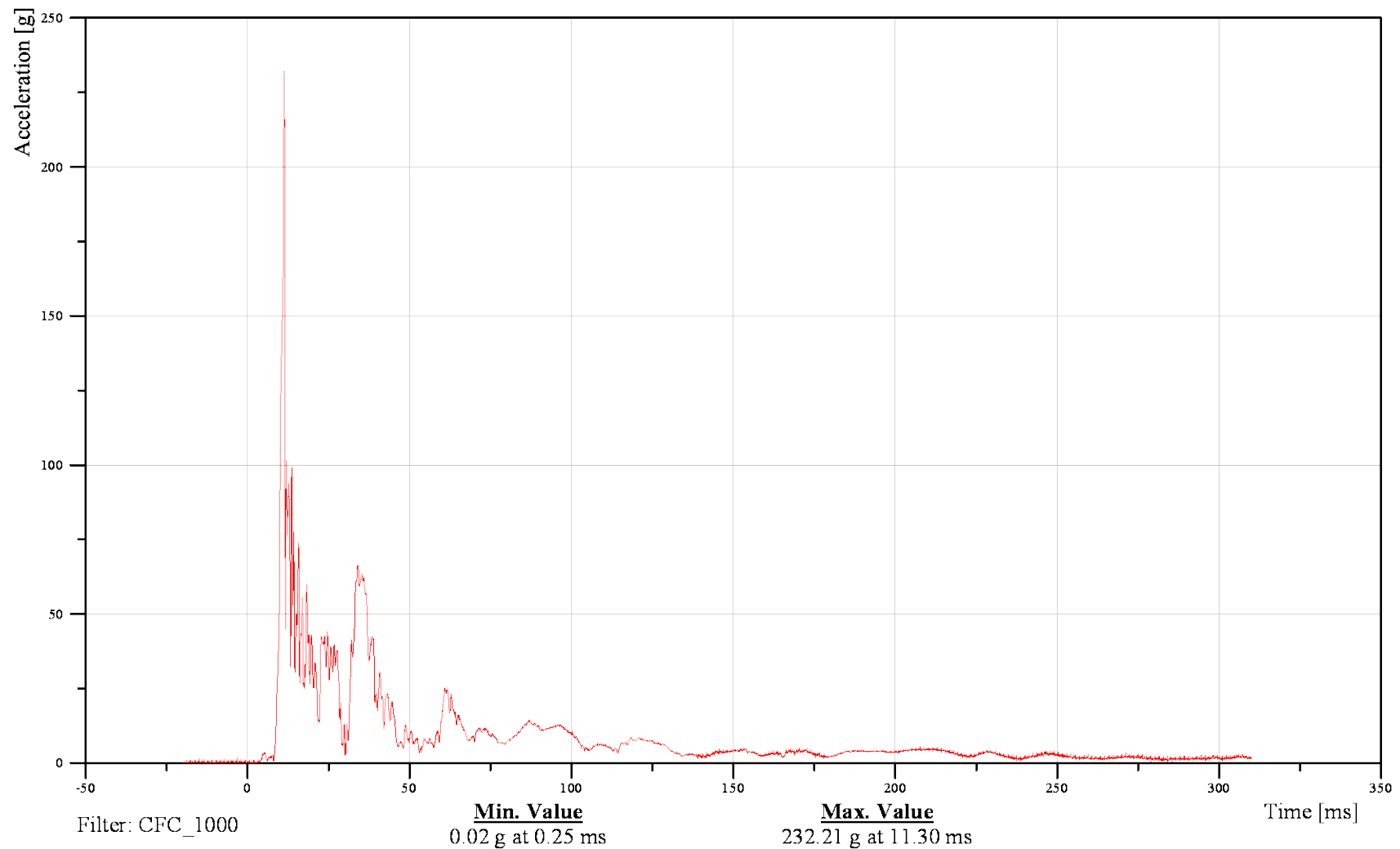
Time: 16:14

Customer: VRTC

11TRRILE03WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 IRTRAC compression

Date: 01/24/2013

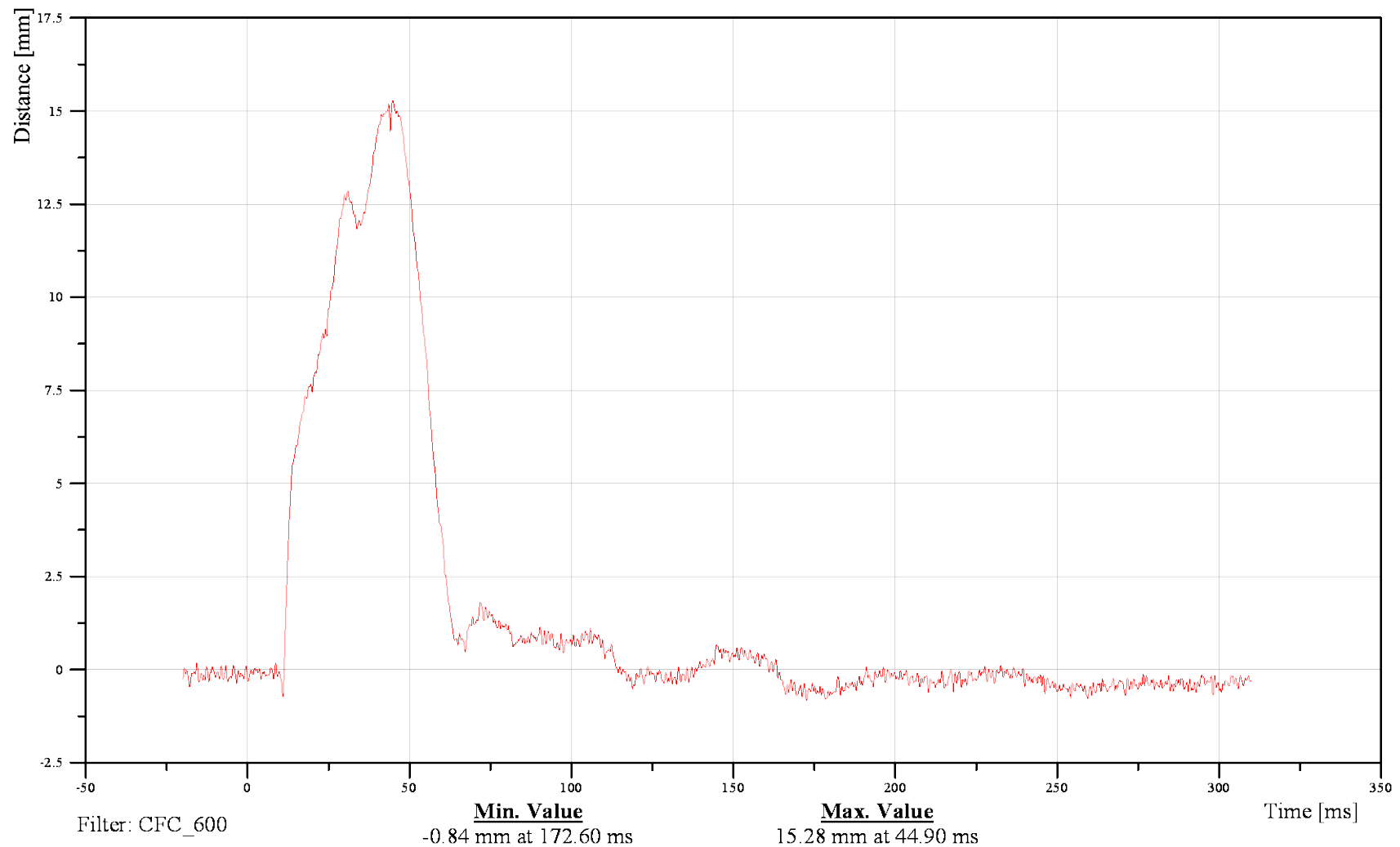
Time: 16:14

Customer: VRTC

11TRRILE03WSDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Rotational angle

Date: 01/24/2013

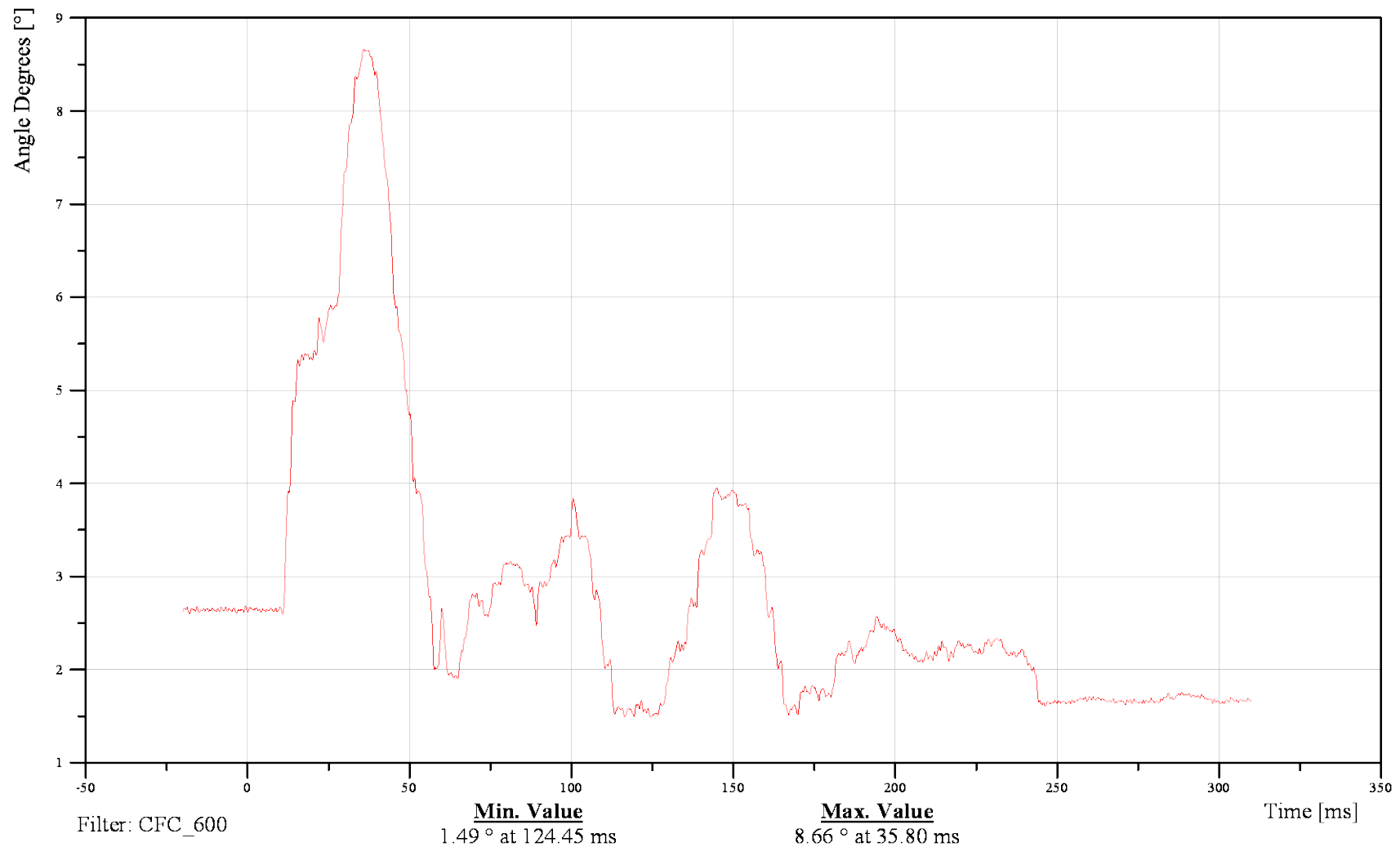
Time: 16:14

Customer: VRTC

11TRRILE03WSANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 IRTRAC X Deflection

Date: 01/24/2013

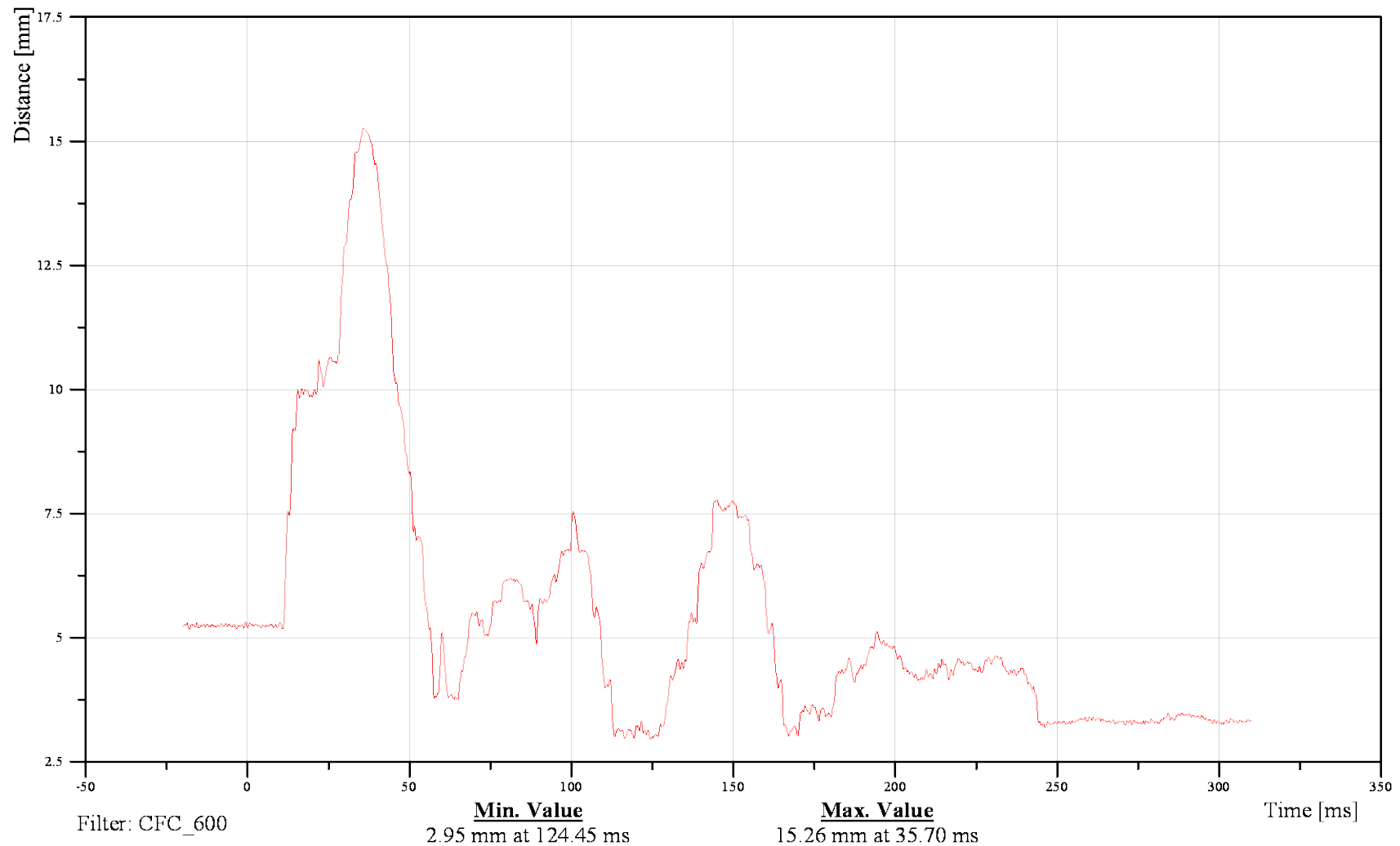
Time: 16:14

Customer: VRTC

11TRRILE03WSDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 IRTRAC Y Deflection

Date: 01/24/2013

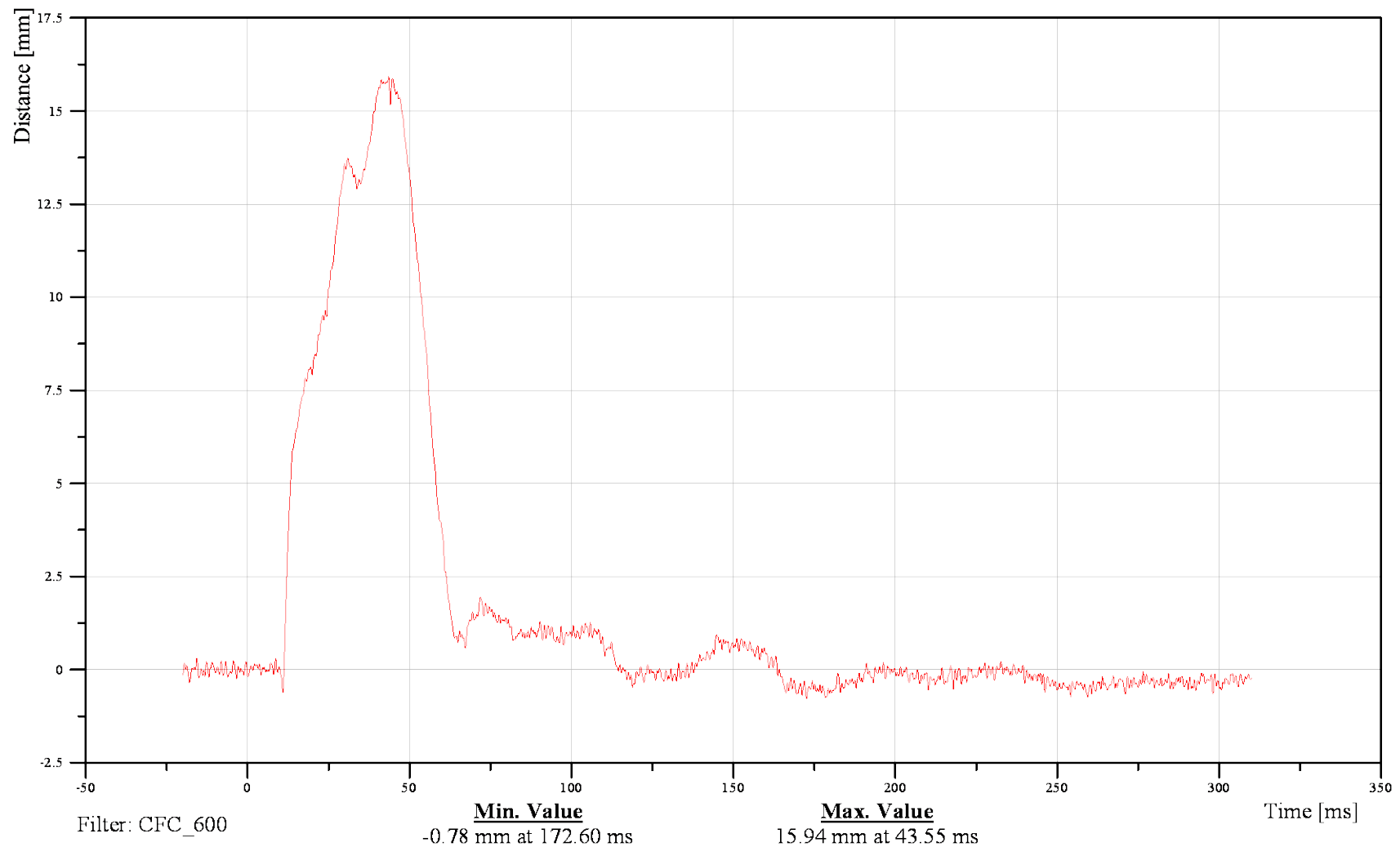
Time: 16:14

Customer: VRTC

11TRRILE03WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Longitudinal Ax

Date: 01/24/2013

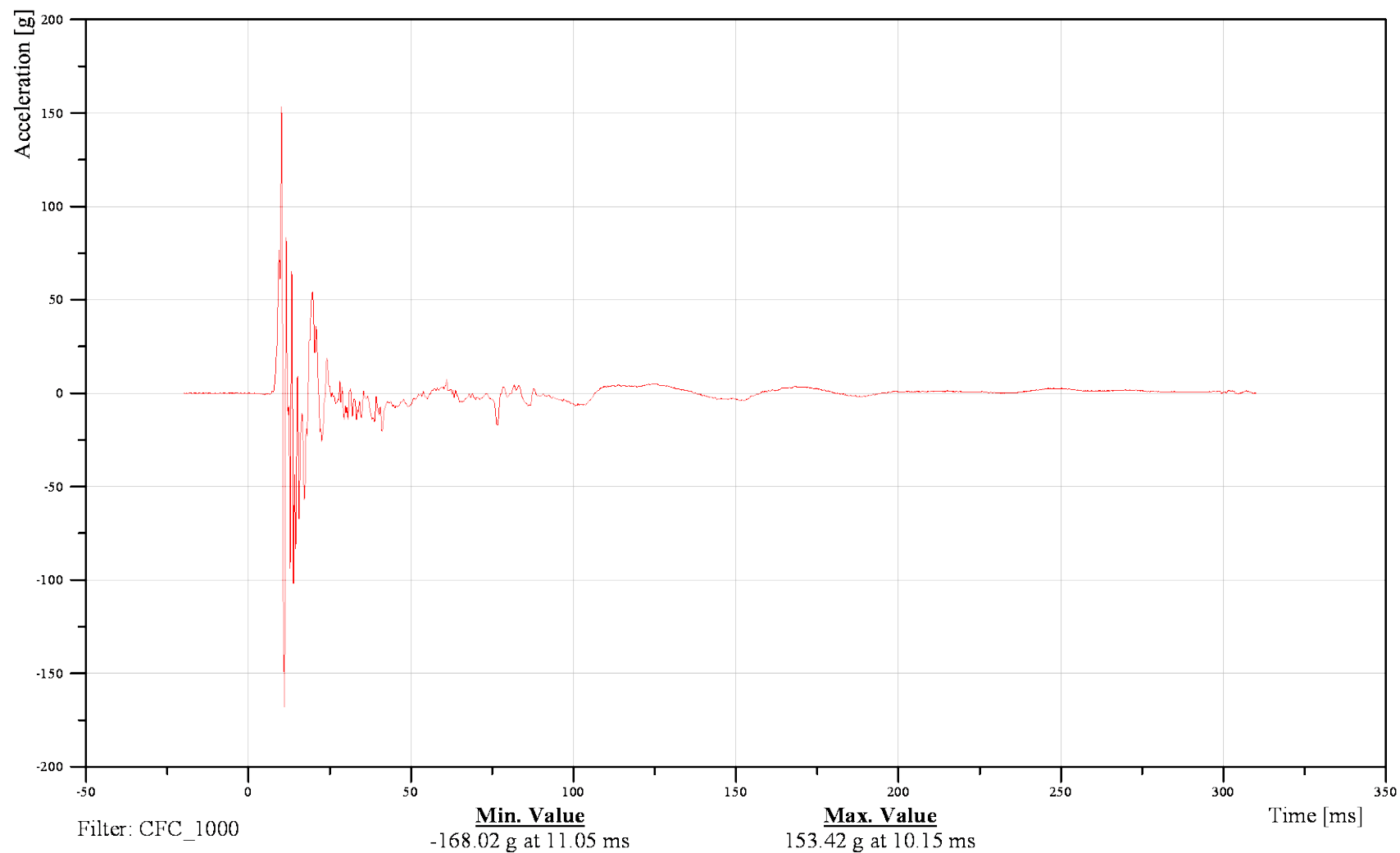
Time: 16:14

Customer: VRTC

11ABRILE01WSACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Lateral Ay

Date: 01/24/2013

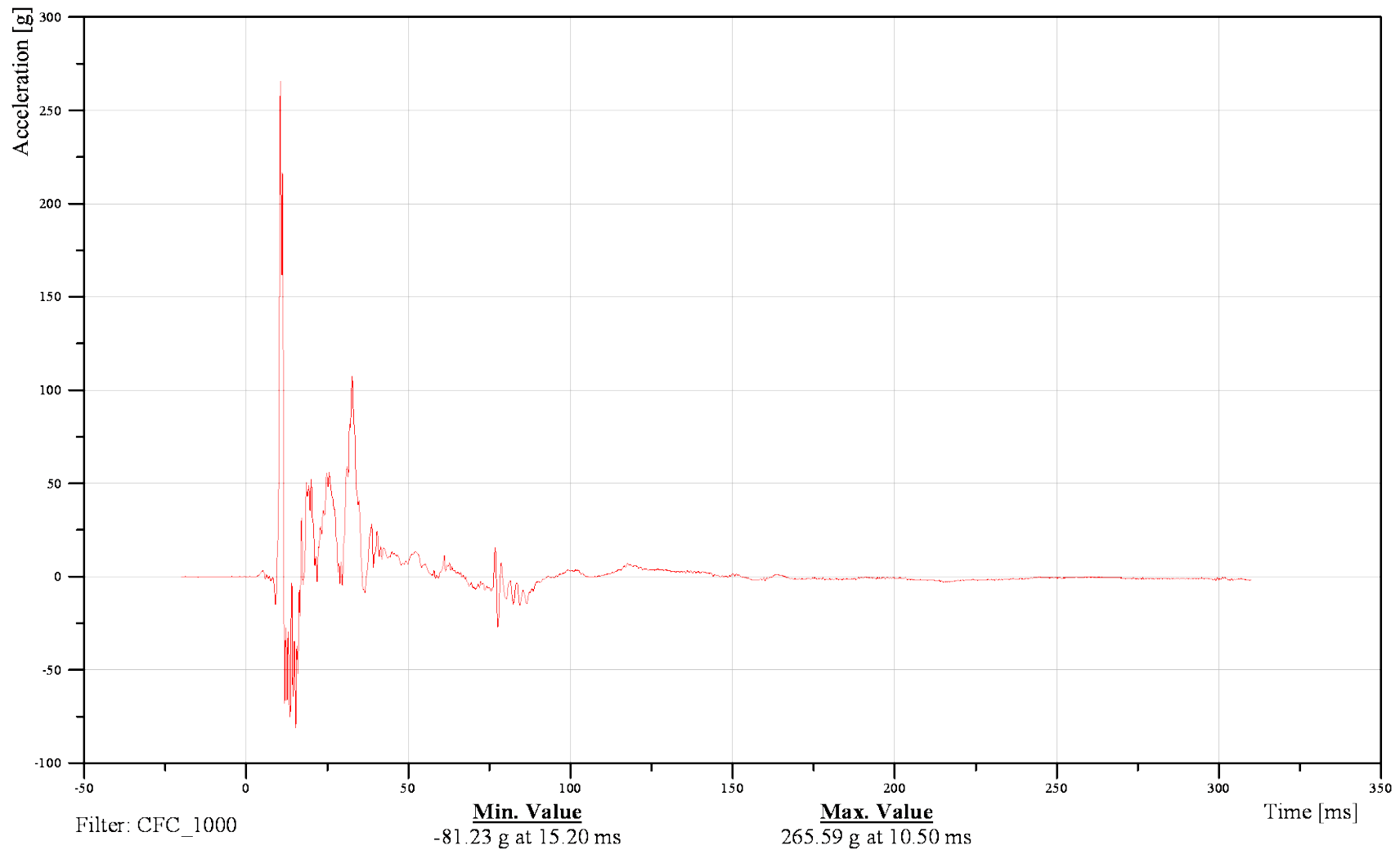
Time: 16:14

Customer: VRTC

11ABRILE01WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Vertical Az

Date: 01/24/2013

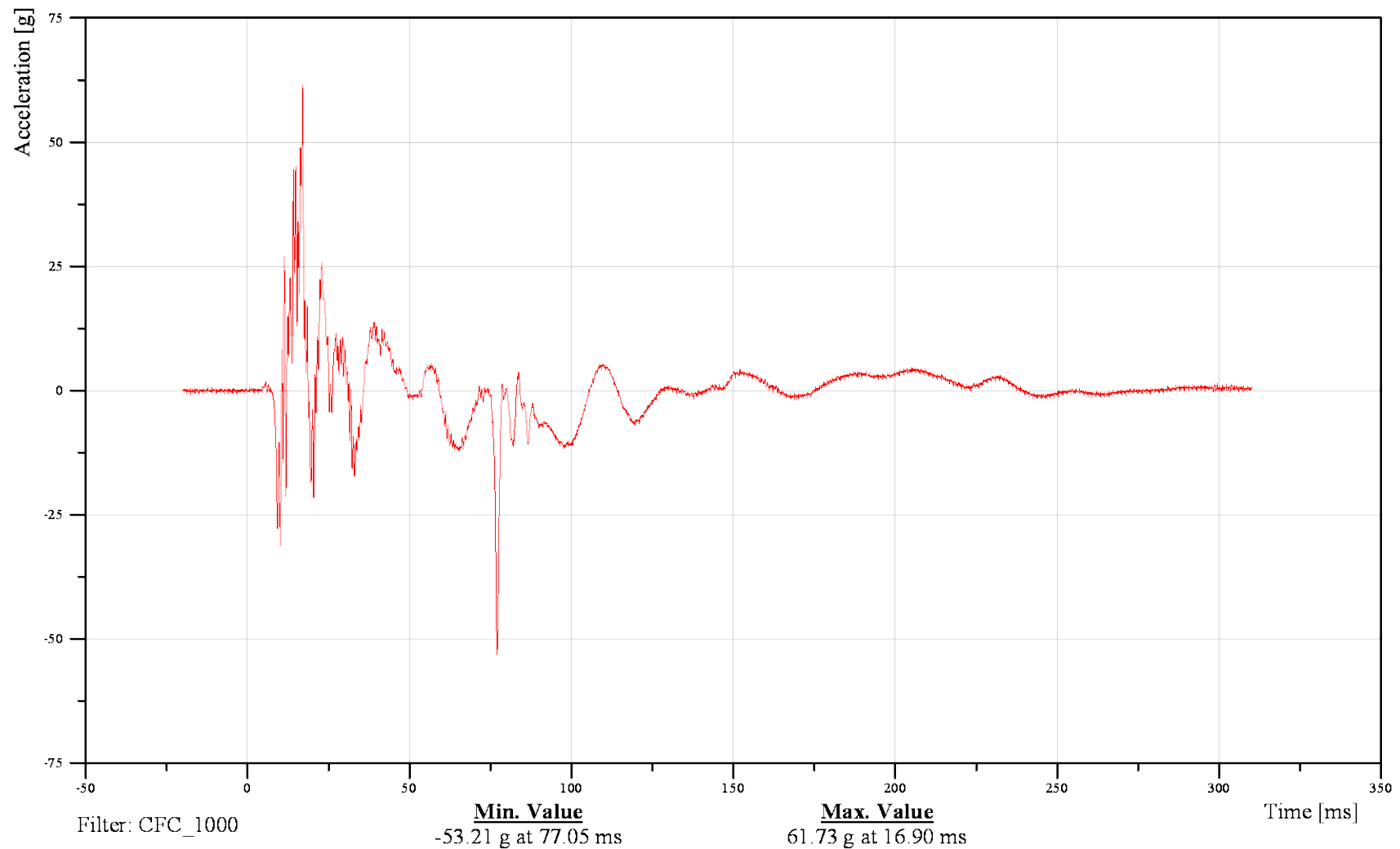
Time: 16:14

Customer: VRTC

11ABRILE01WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 A Resultant

Date: 01/24/2013

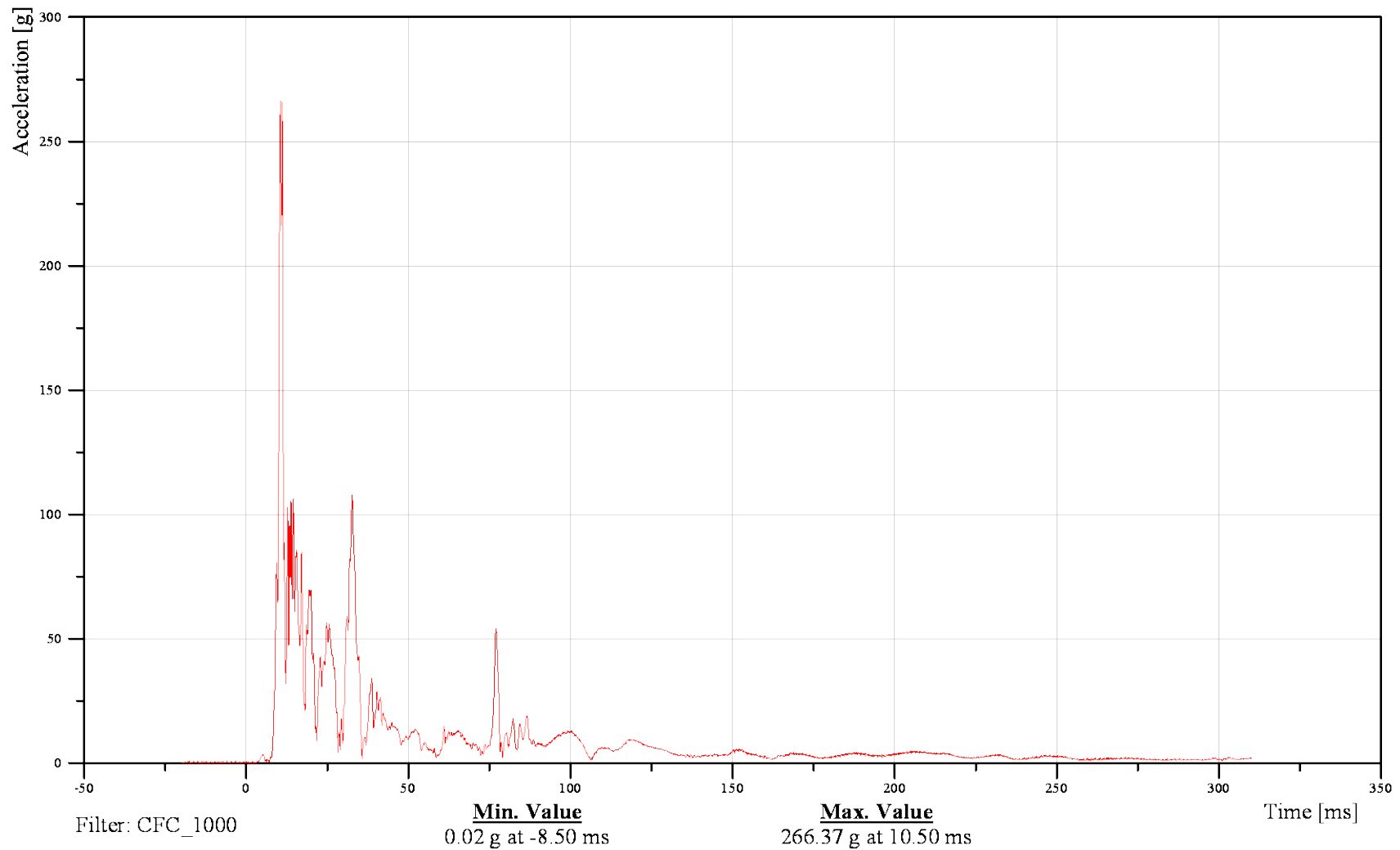
Time: 16:14

Customer: VRTC

11ABRILE01WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 IRTRAC compression

Date: 01/24/2013

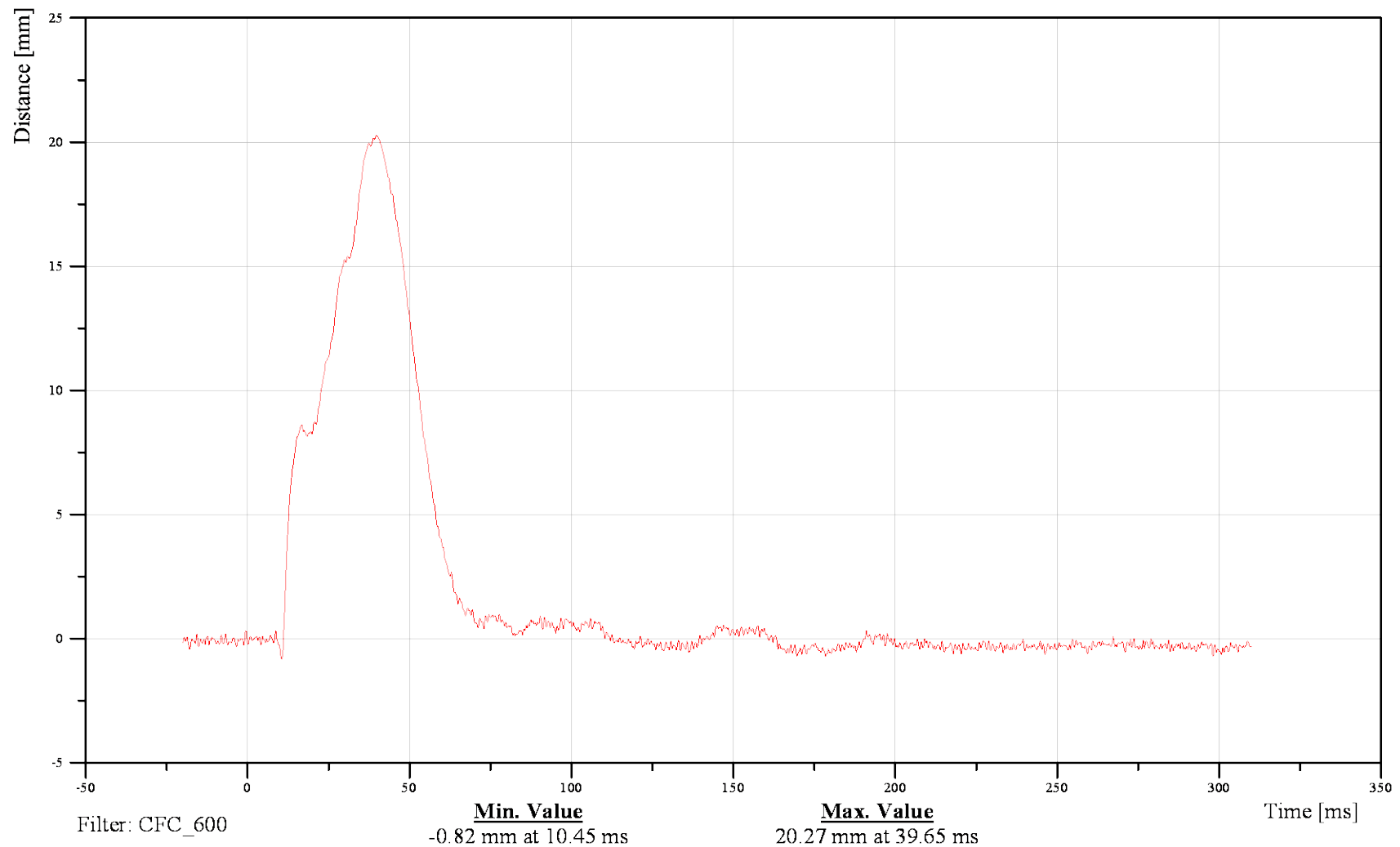
Time: 16:14

Customer: VRTC

11ABRILE01WSDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Rotational angle

Date: 01/24/2013

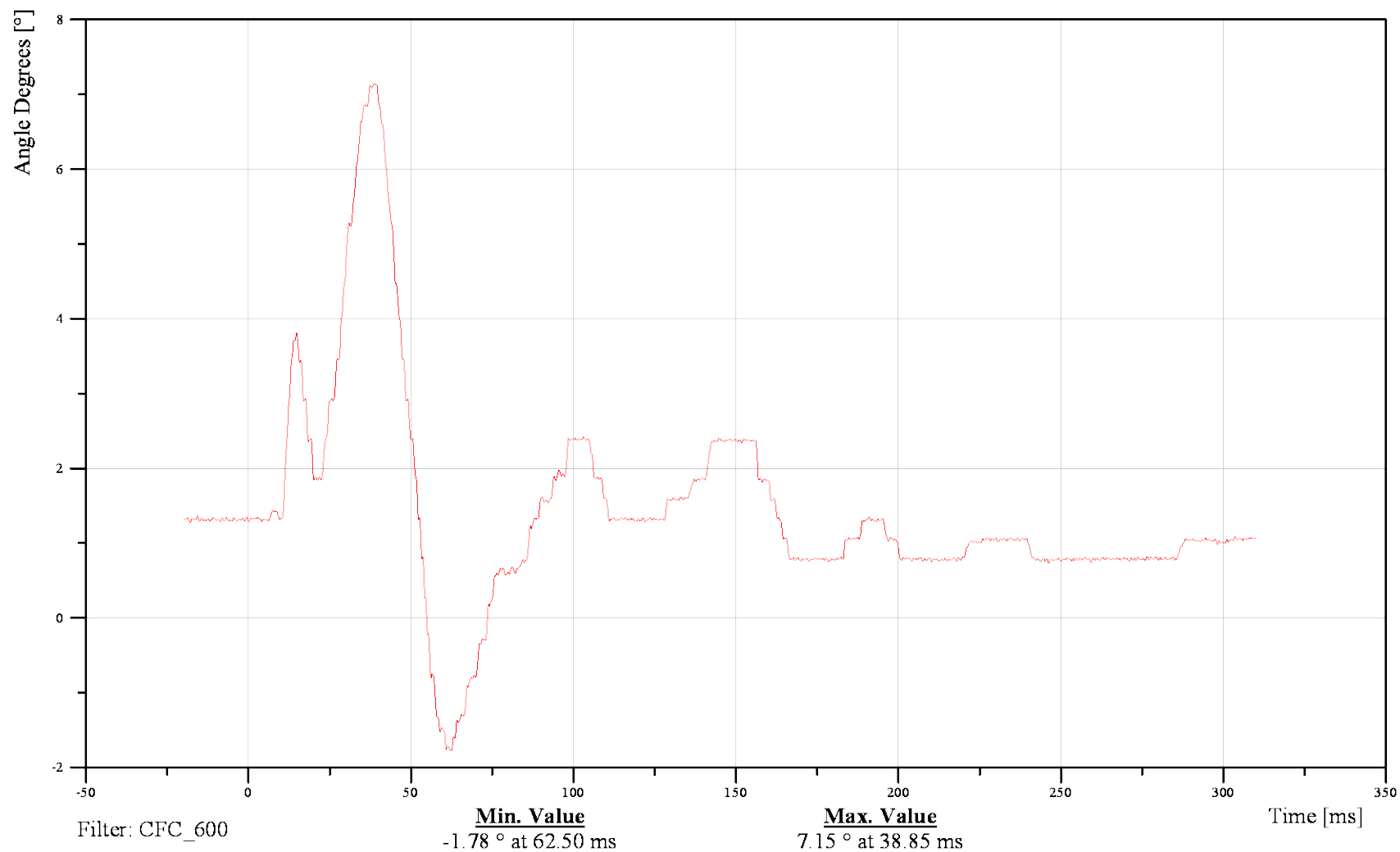
Time: 16:14

Customer: VRTC

11ABRILE01WSANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 IRTRAC X Deflection

Date: 01/24/2013

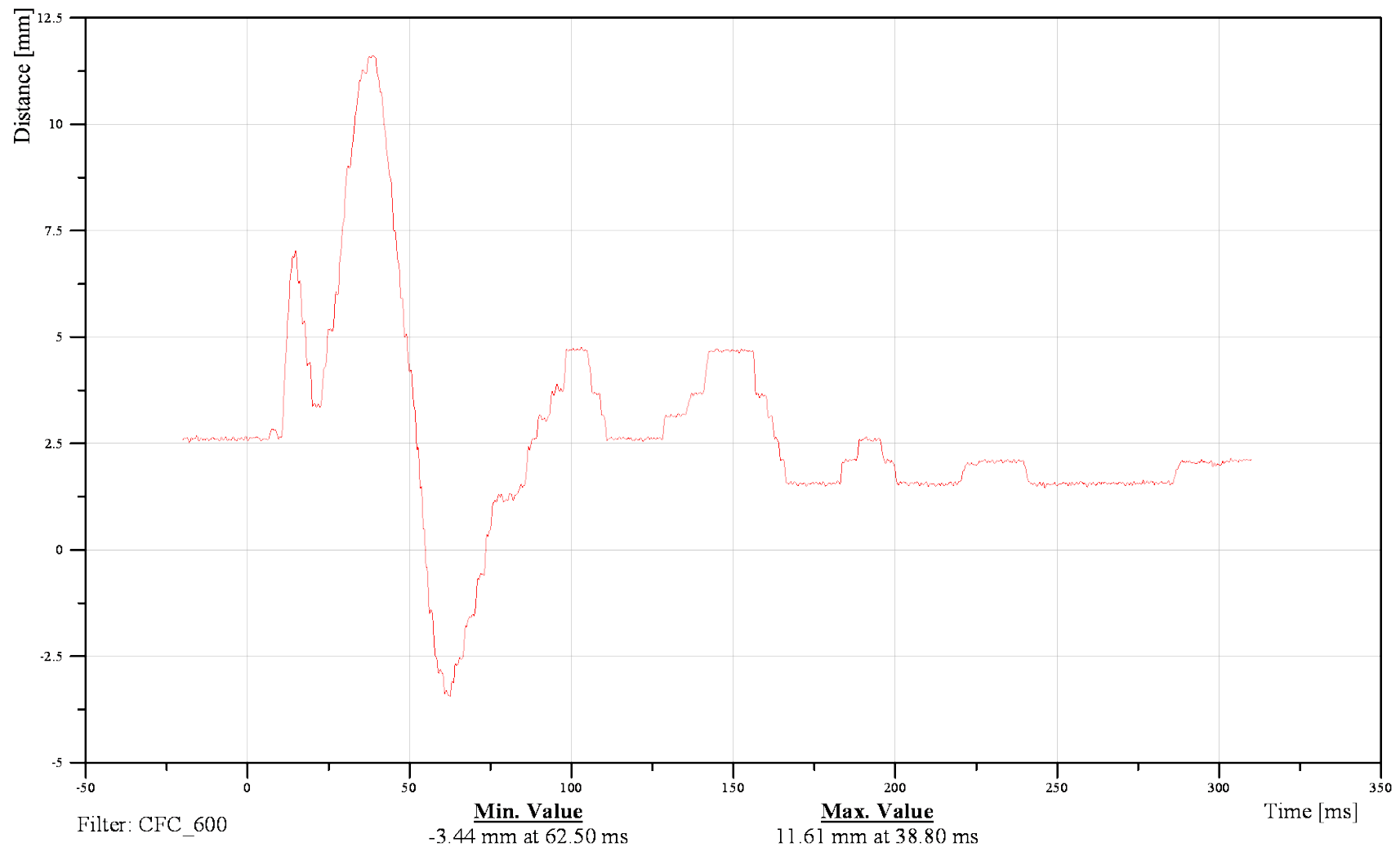
Time: 16:14

Customer: VRTC

11ABRILE01WSDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 IRTRAC Y Deflection

Date: 01/24/2013

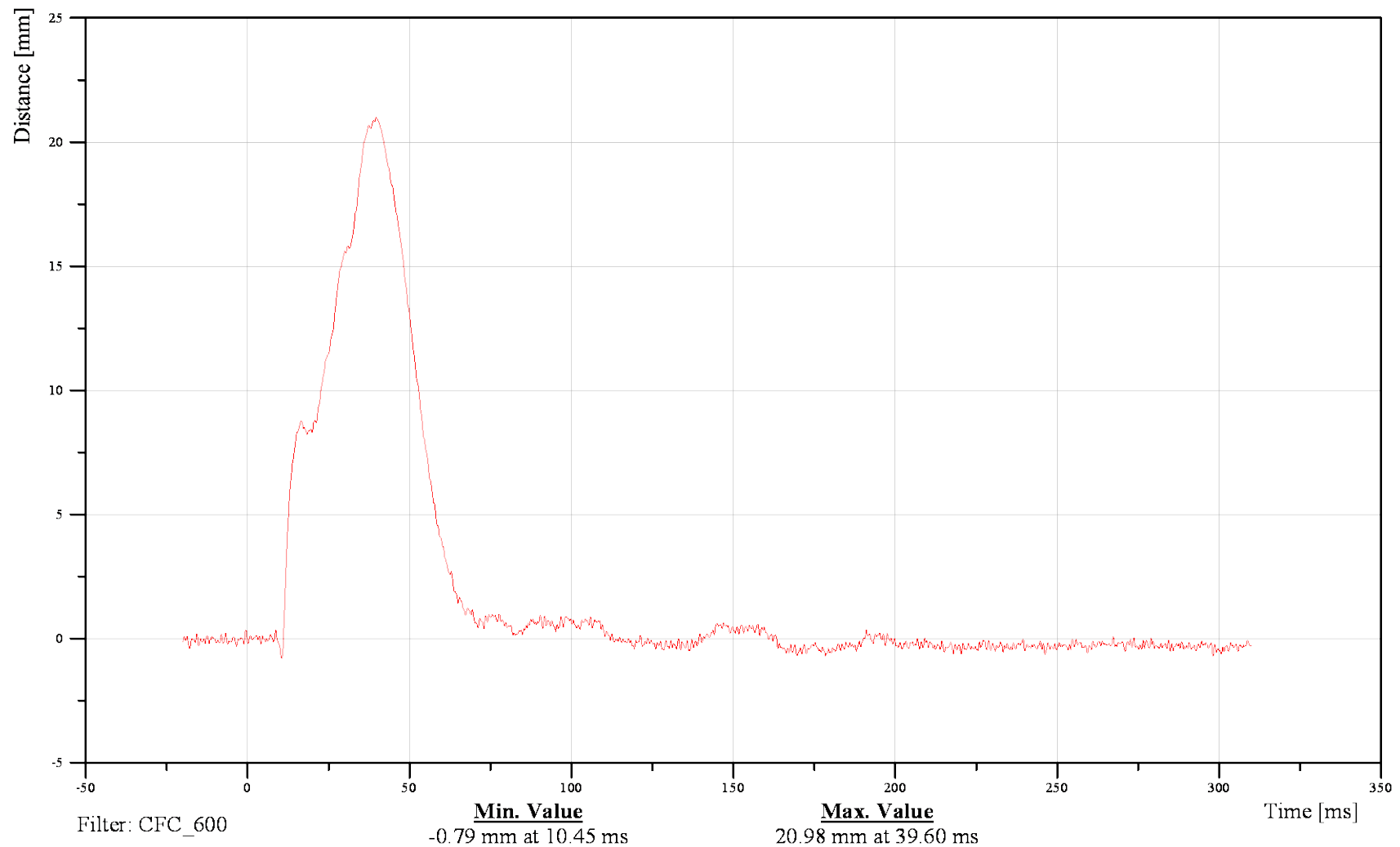
Time: 16:14

Customer: VRTC

11ABRILE01WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Longitudinal Ax

Date: 01/24/2013

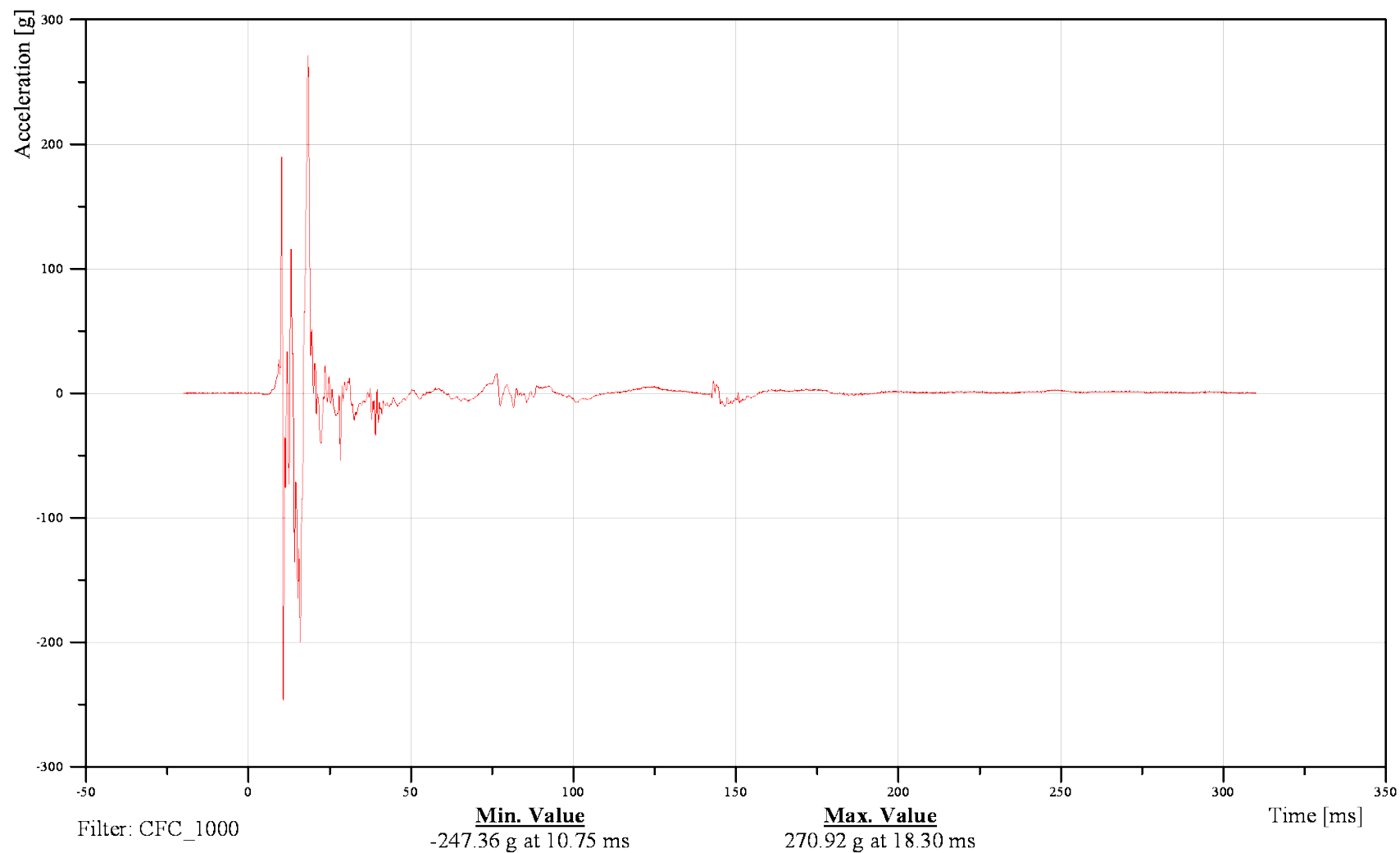
Time: 16:14

Customer: VRTC

11ABRILE02WSACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Lateral Ay

Date: 01/24/2013

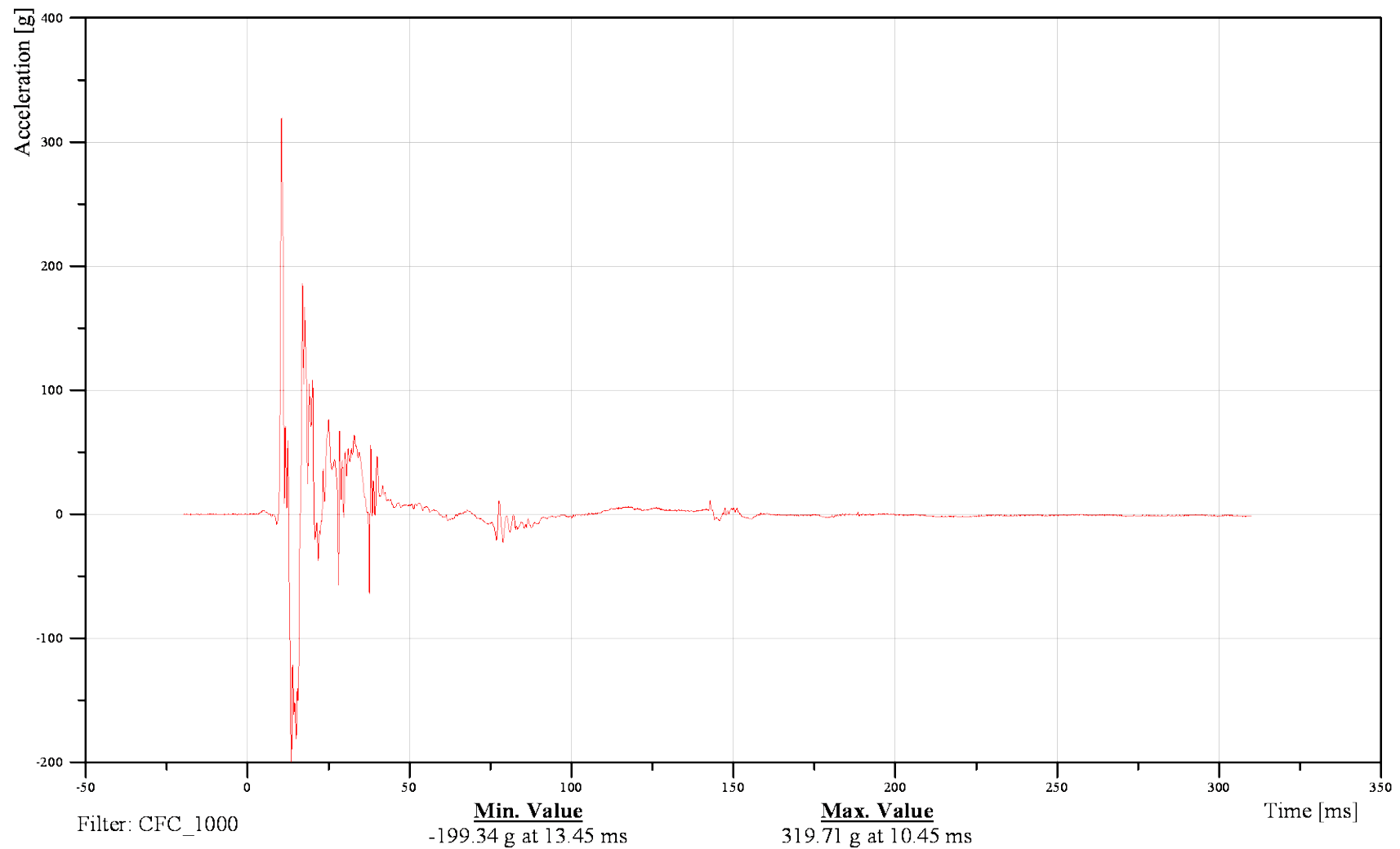
Time: 16:14

Customer: VRTC

11ABRILE02WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Vertical Az

Date: 01/24/2013

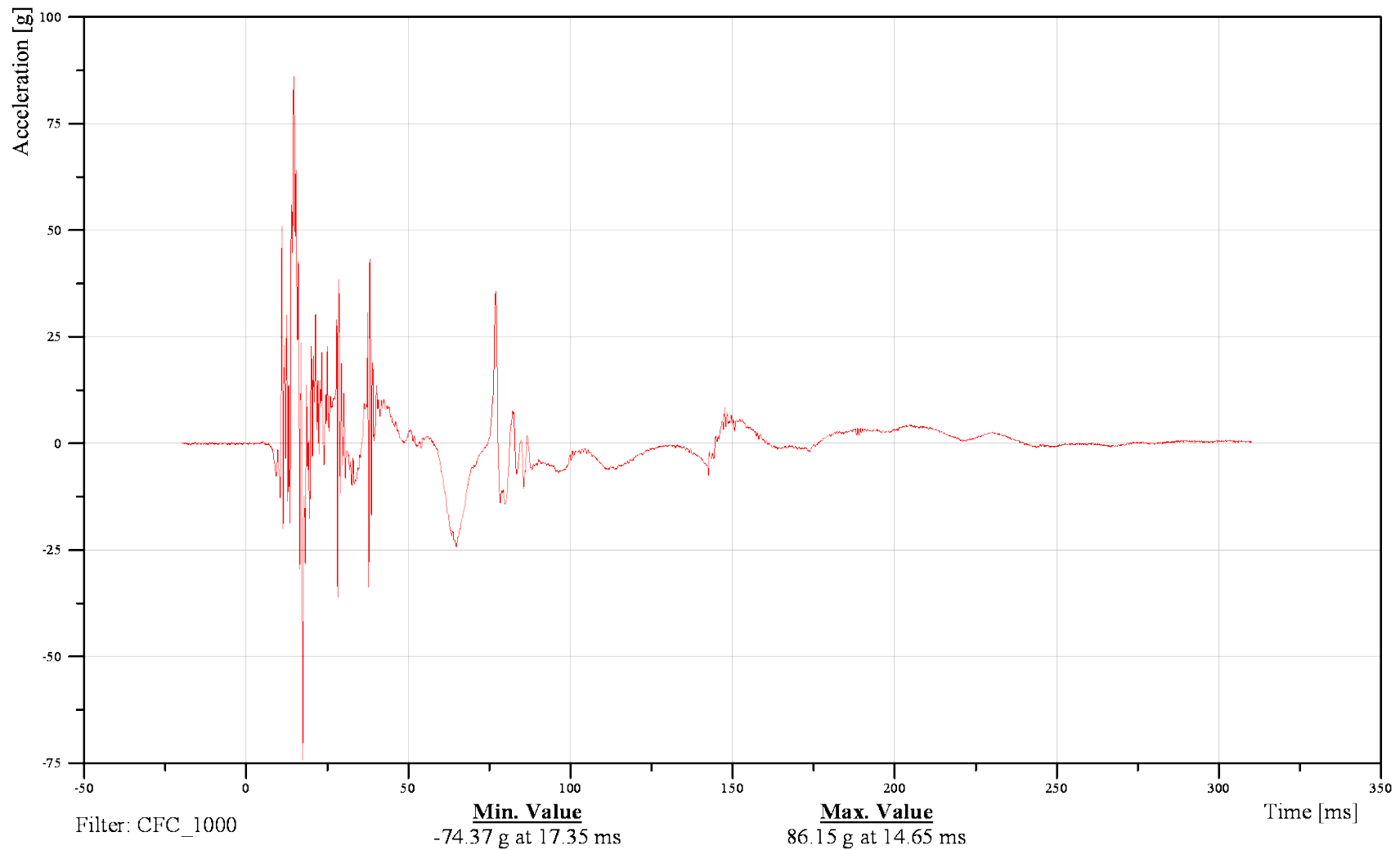
Time: 16:14

Customer: VRTC

11ABRILE02WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 A Resultant

Date: 01/24/2013

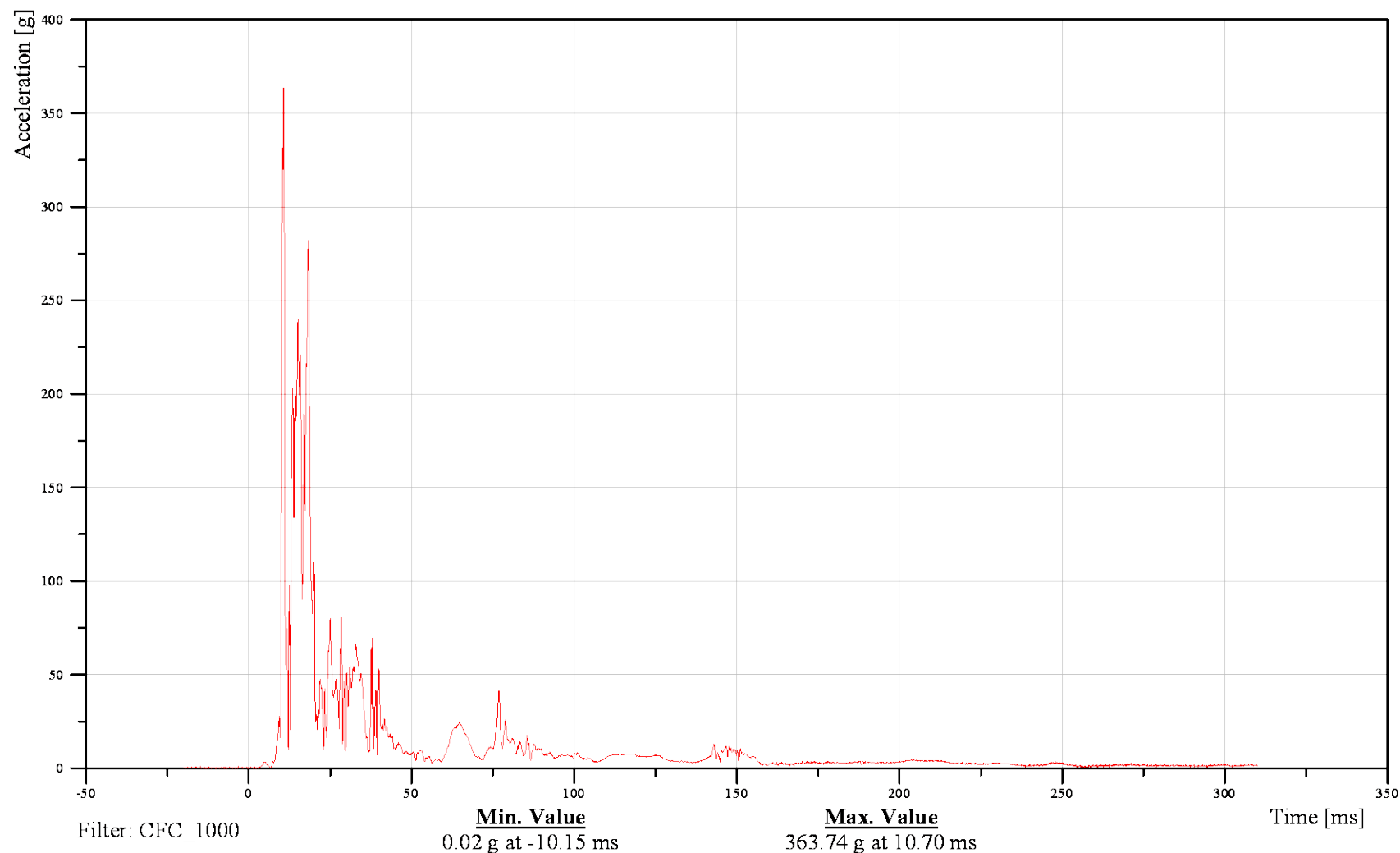
Time: 16:14

Customer: VRTC

11ABRILE02WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Lateral Disp

Date: 01/24/2013

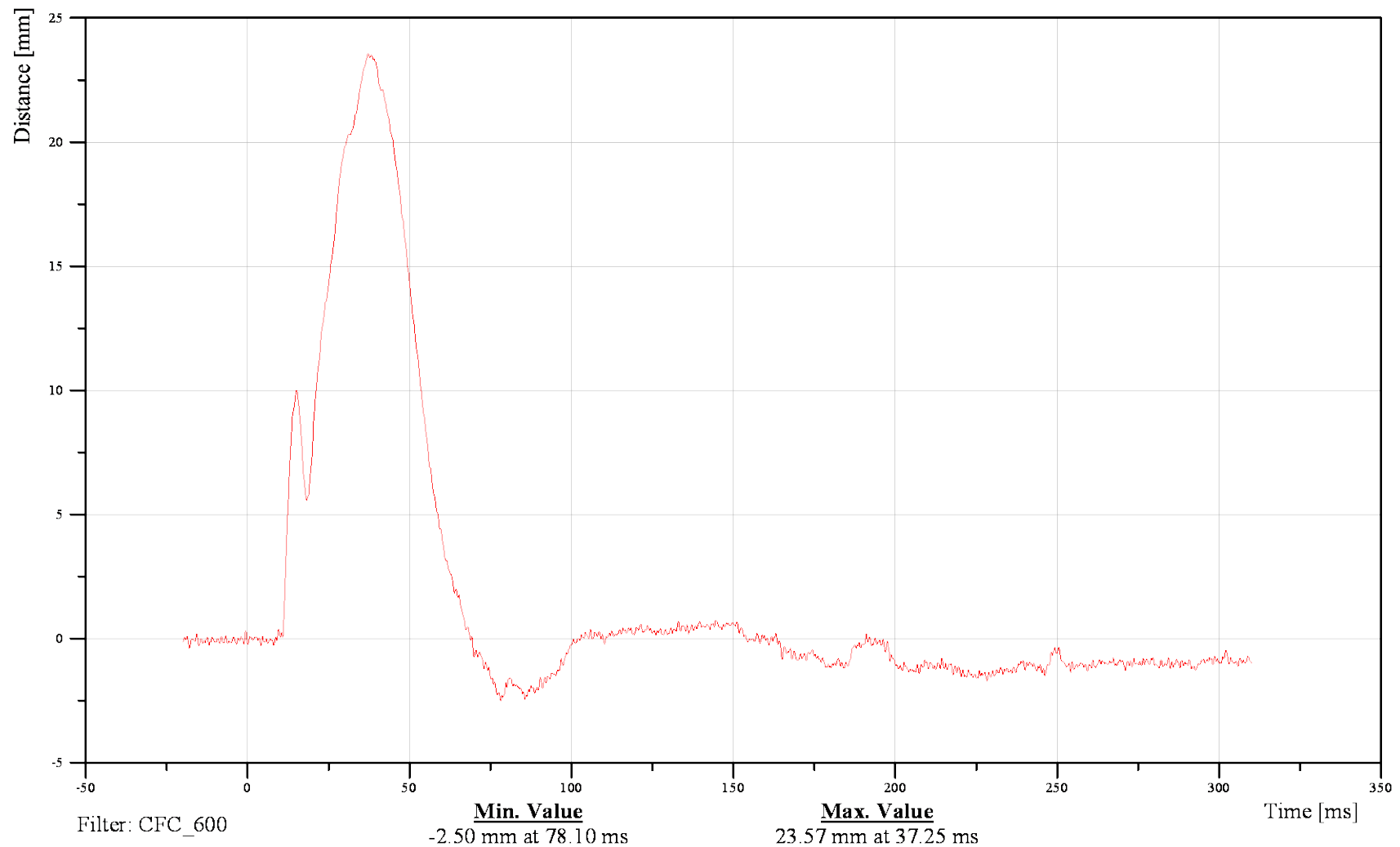
Time: 16:14

Customer: VRTC

11ABRILE02WSDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 Longitudinal Ax

Date: 01/24/2013

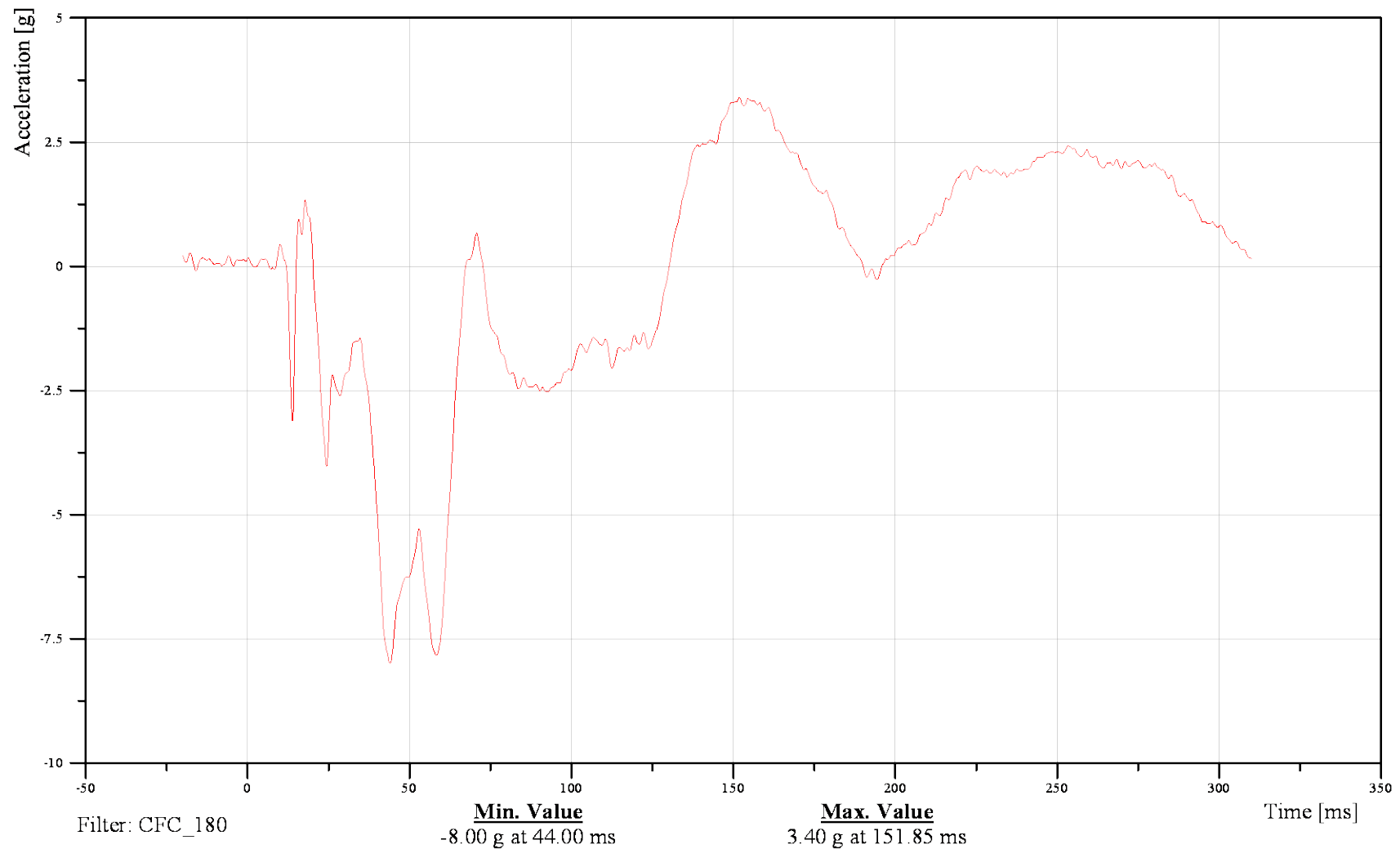
Time: 16:14

Customer: VRTC

11THSP0400WSACXC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 Lateral Ay

Date: 01/24/2013

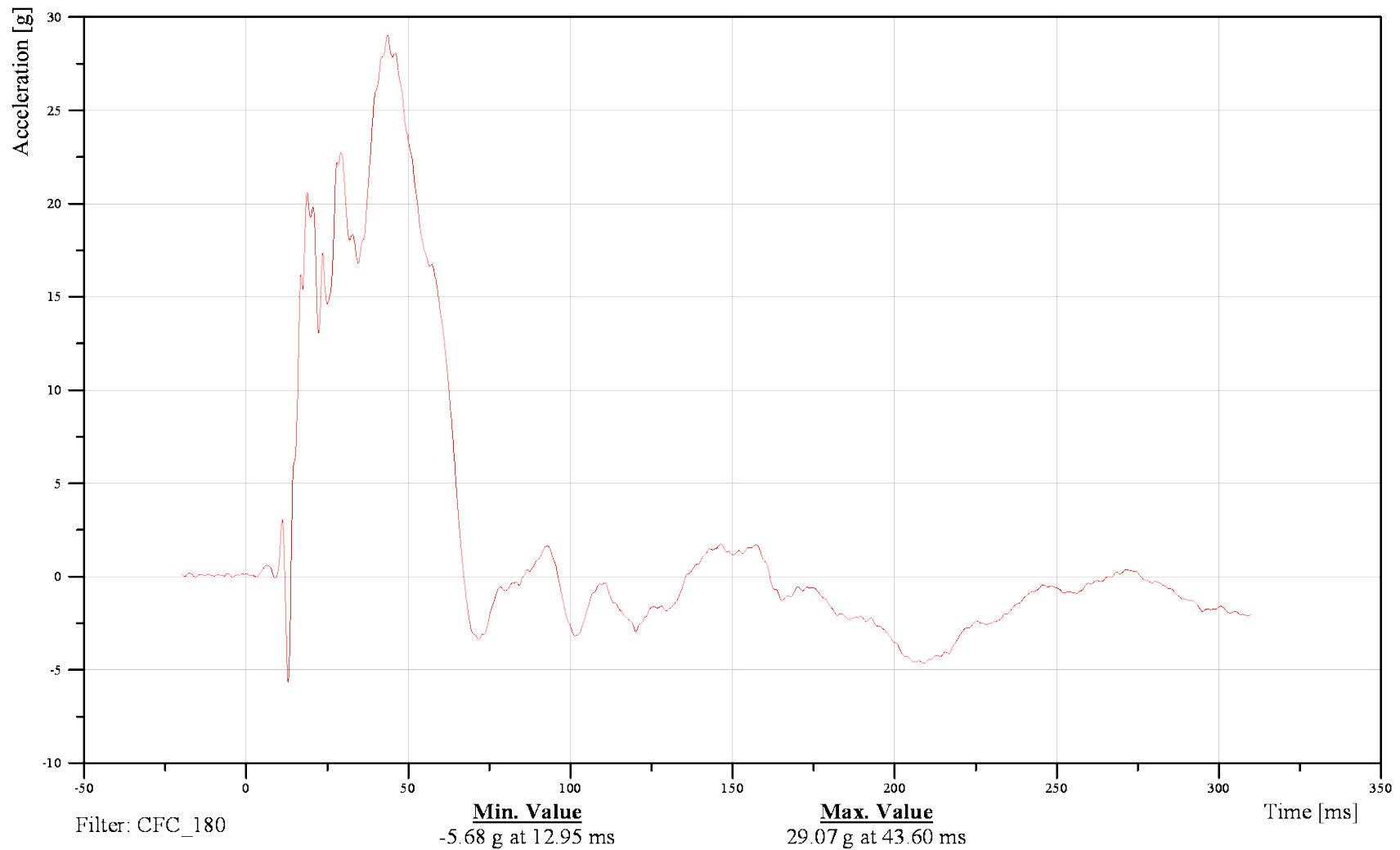
Time: 16:14

Customer: VRTC

11THSP0400WSACYC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 Vertical Az

Date: 01/24/2013

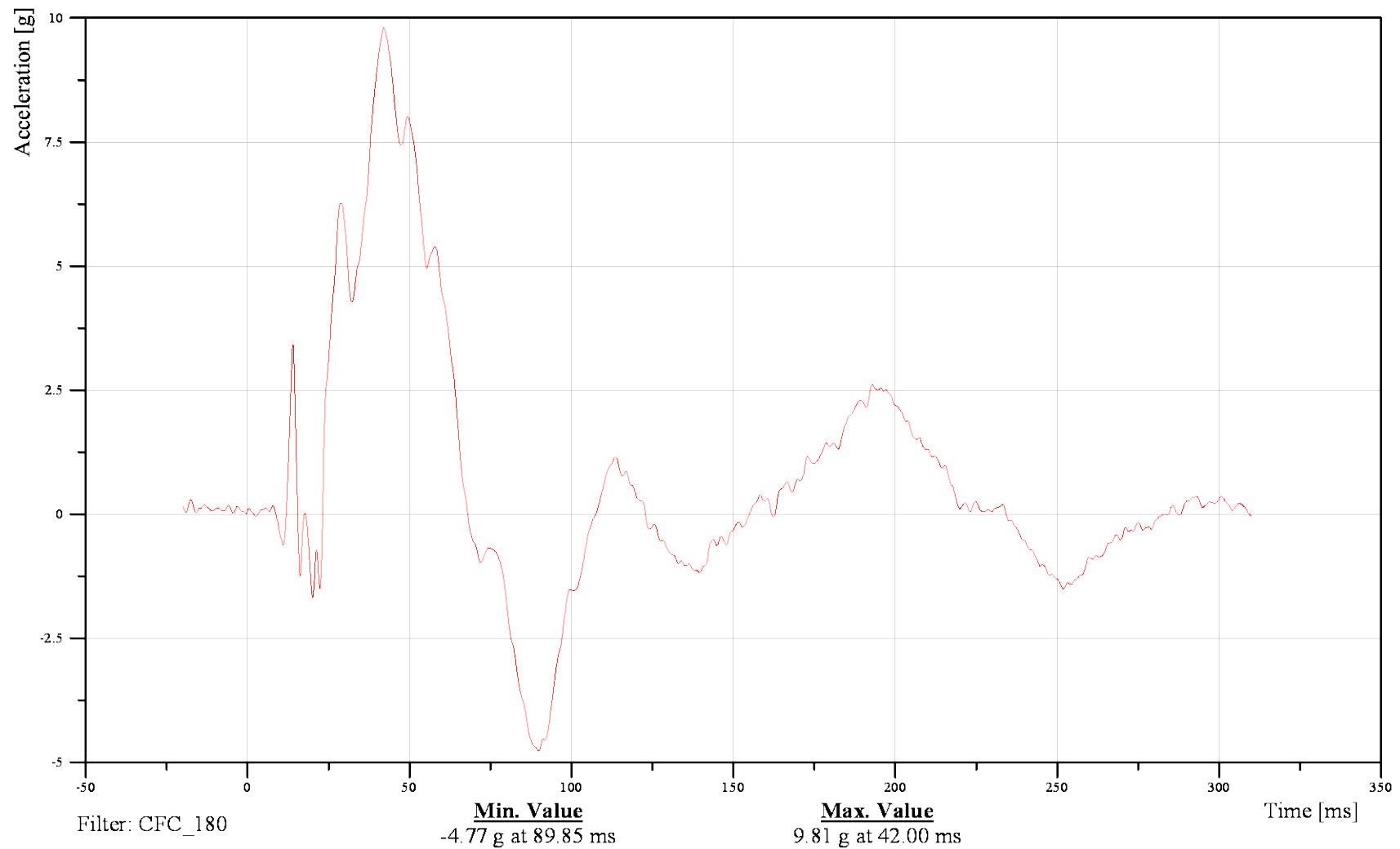
Time: 16:14

Customer: VRTC

11THSP0400WSACZC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 A Resultant

Date: 01/24/2013

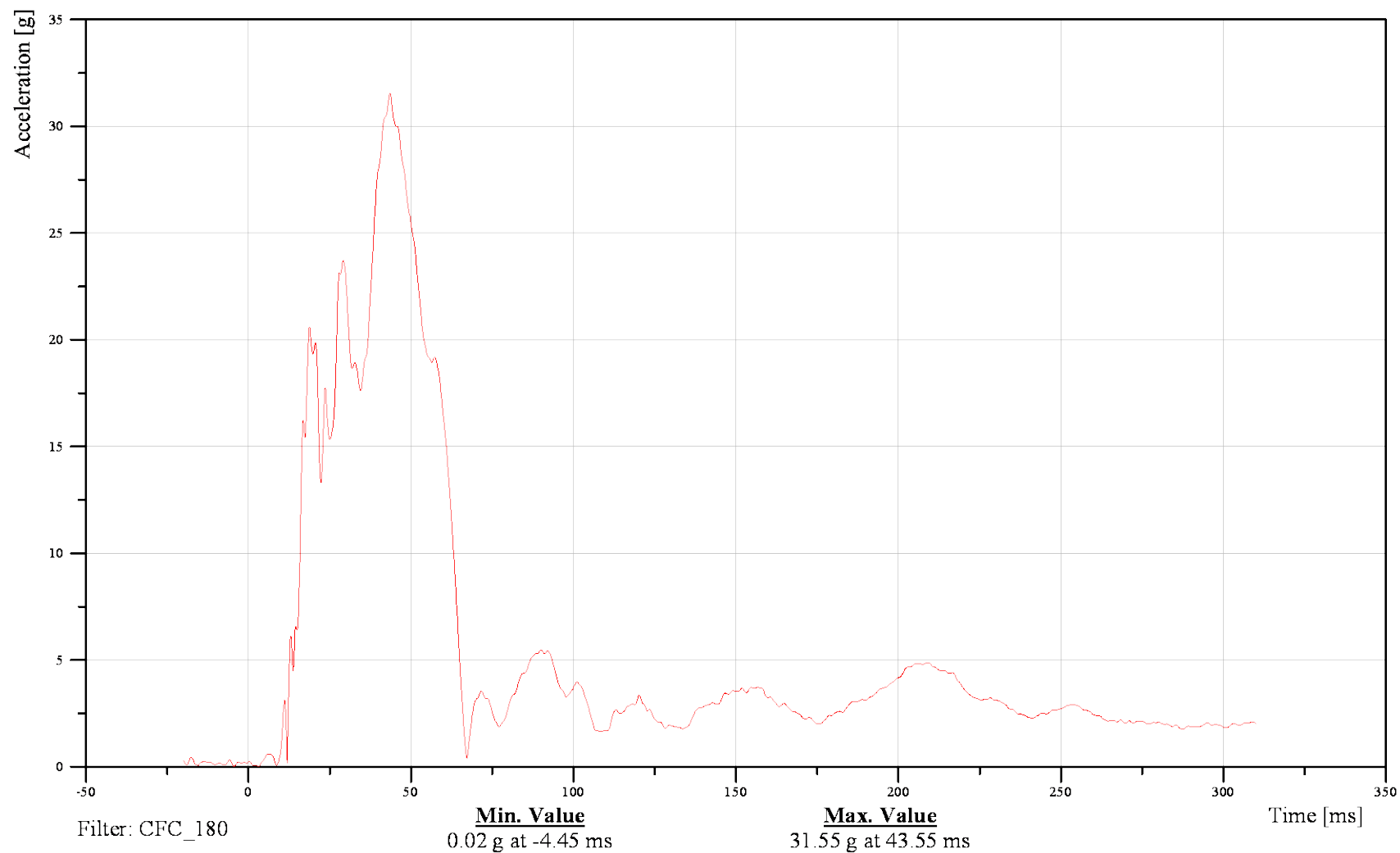
Time: 16:14

Customer: VRTC

11THSP0400WSACRC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 Longitudinal Ax

Date: 01/24/2013

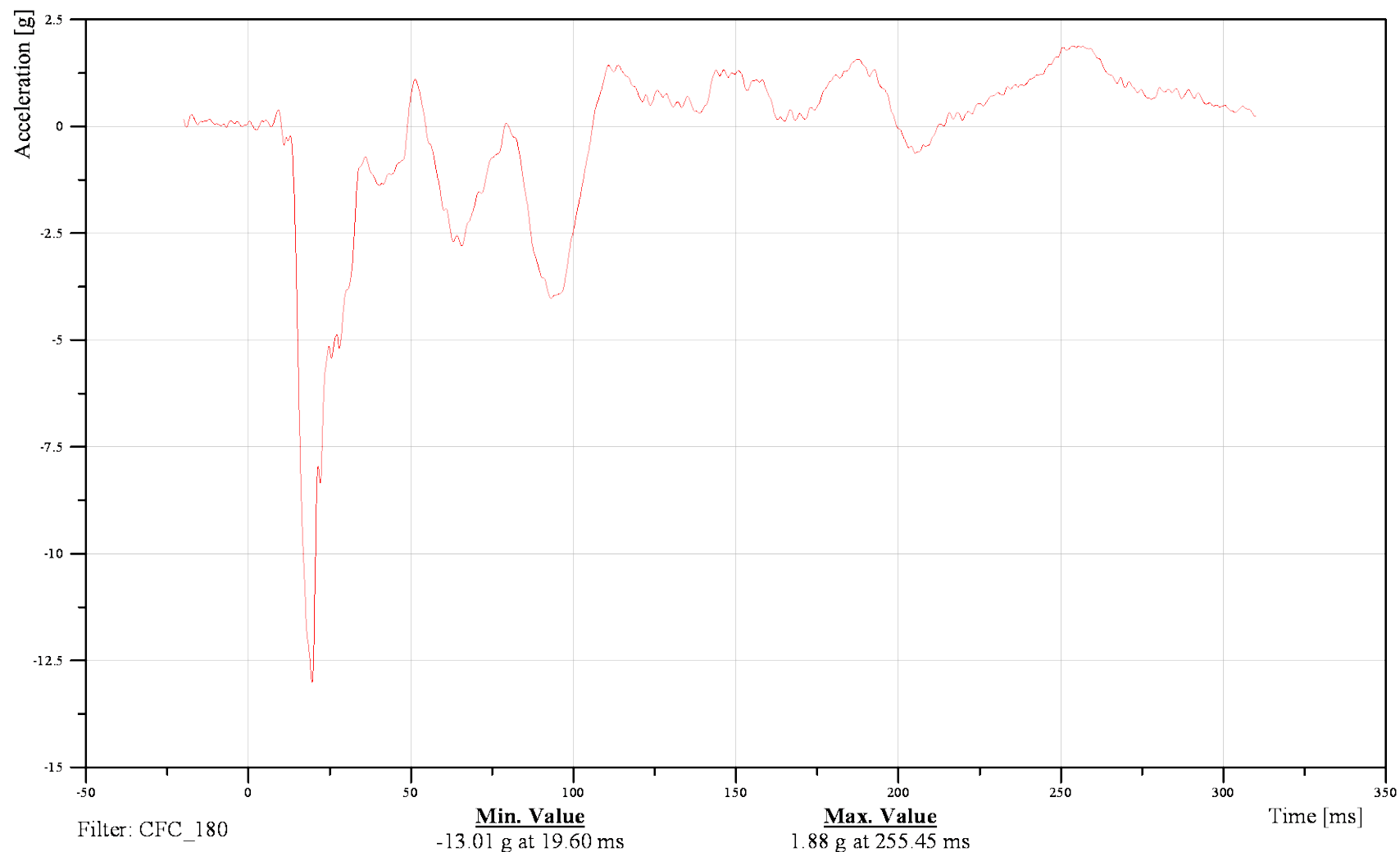
Time: 16:14

Customer: VRTC

11THSP1200WSACXC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 Lateral Ay

Date: 01/24/2013

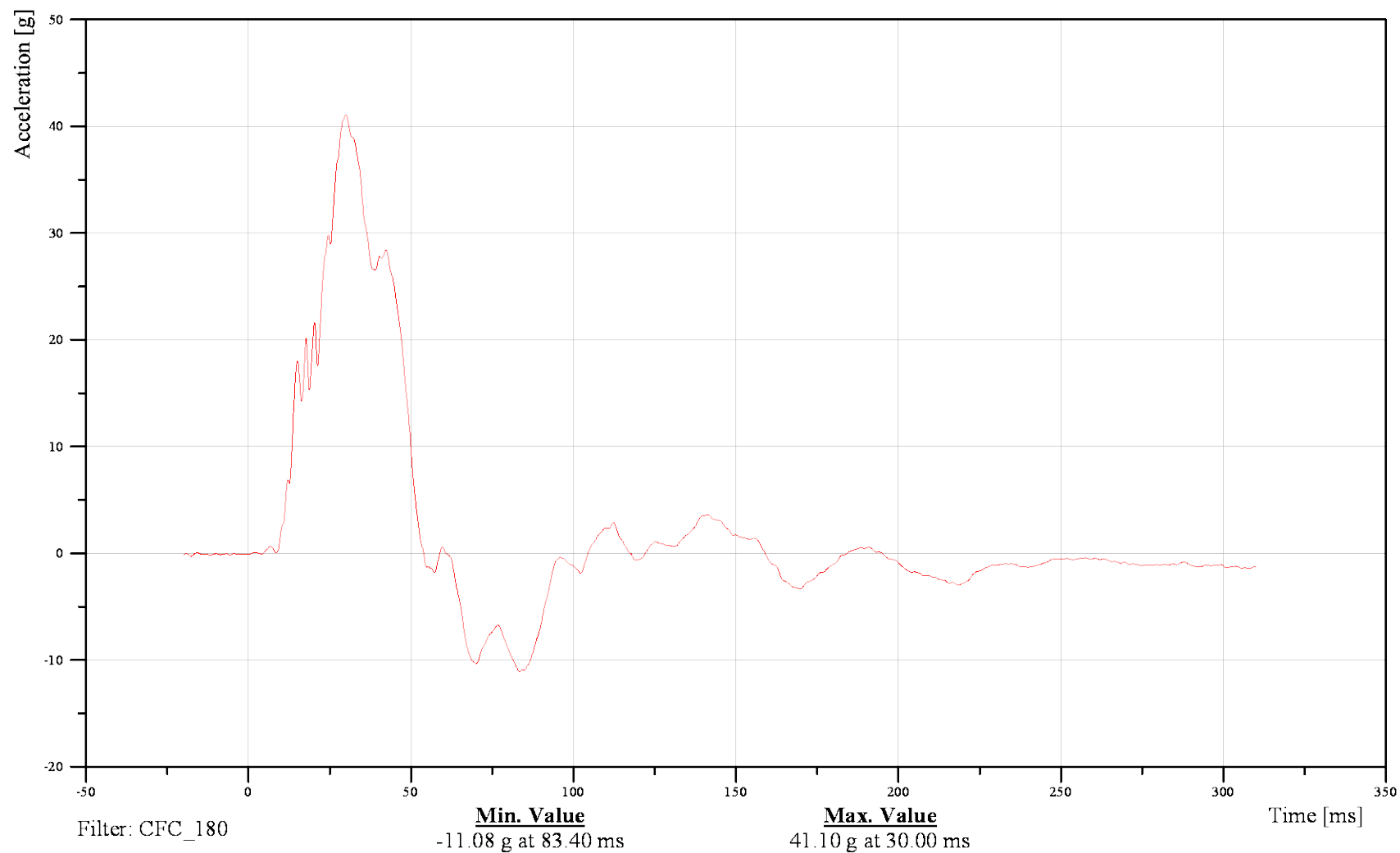
Time: 16:14

Customer: VRTC

11THSP1200WSACYC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 Vertical Az

Date: 01/24/2013

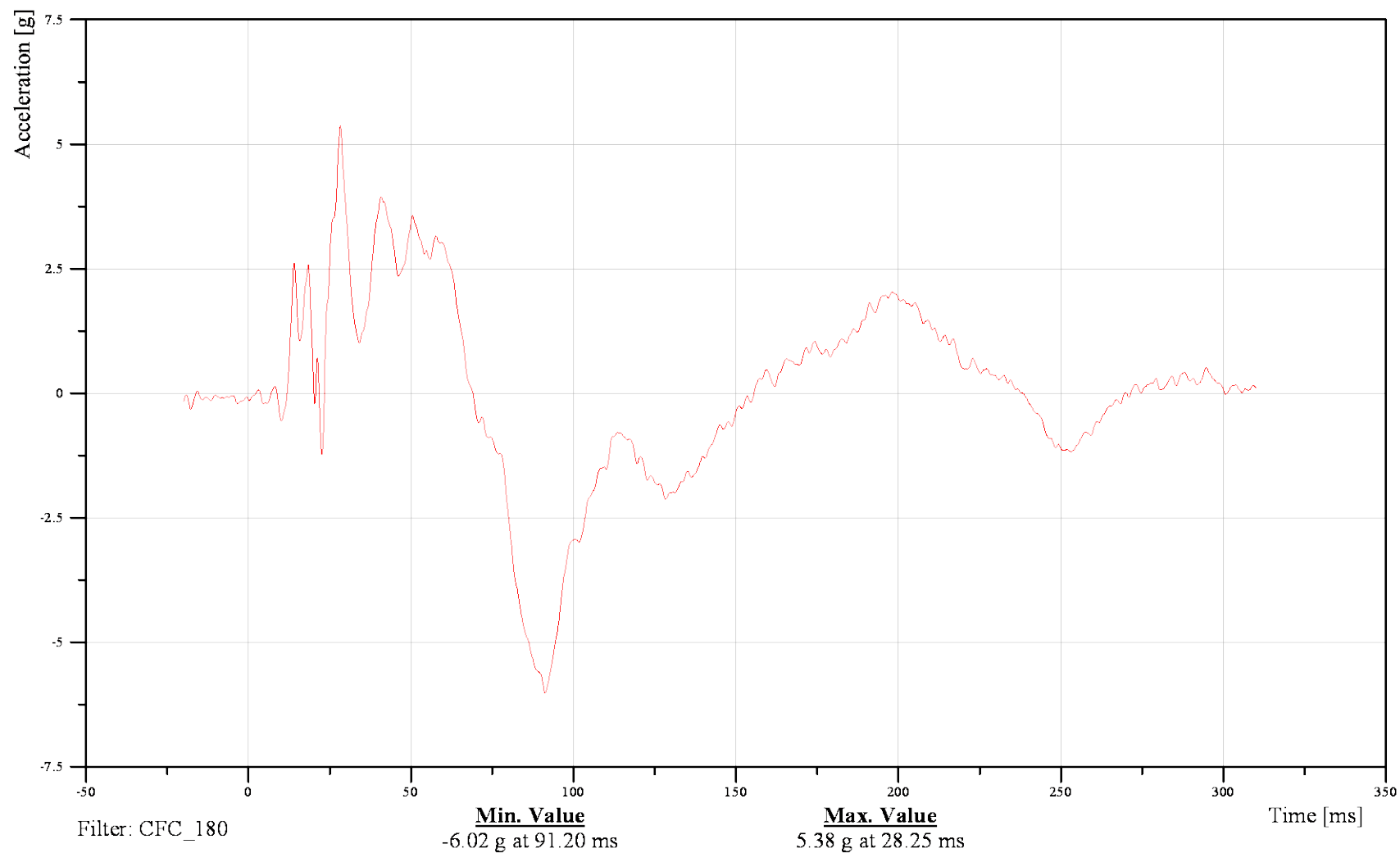
Time: 16:14

Customer: VRTC

11THSP1200WSACZC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 A Resultant

Date: 01/24/2013

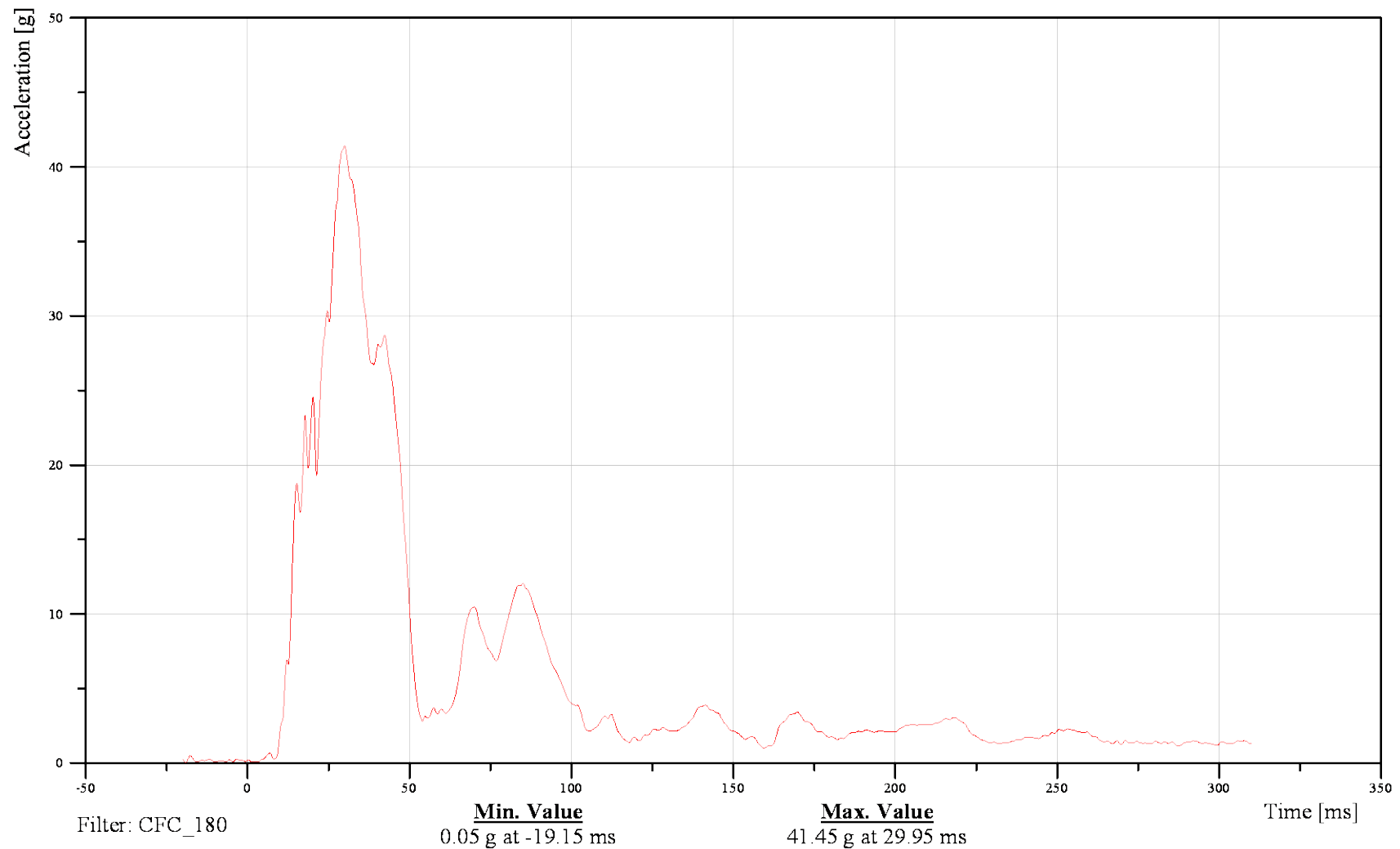
Time: 16:14

Customer: VRTC

11THSP1200WSACRC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis Longitudinal Ax

Date: 01/24/2013

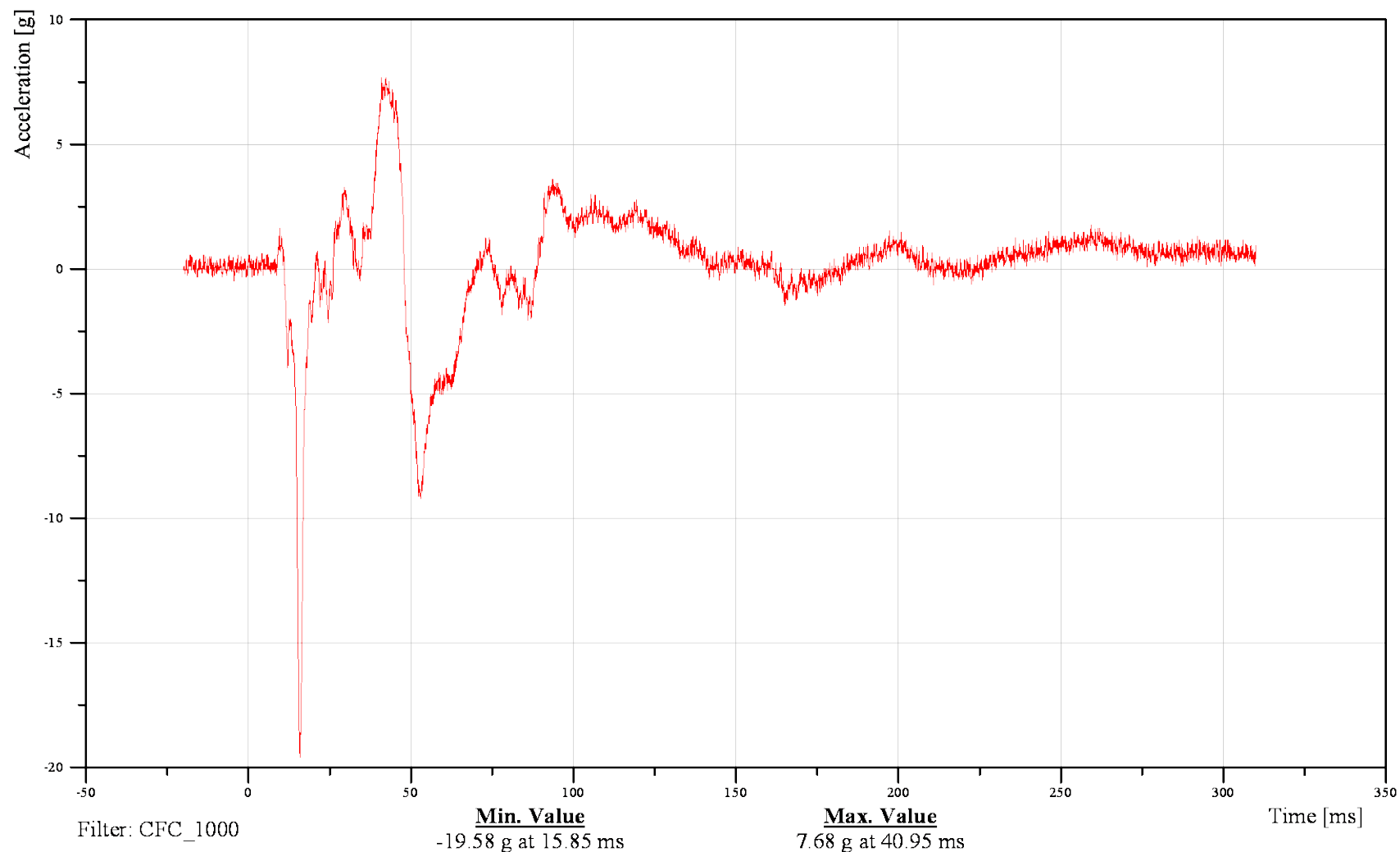
Time: 16:14

Customer: VRTC

11PELV0000WSACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis Lateral Ay

Date: 01/24/2013

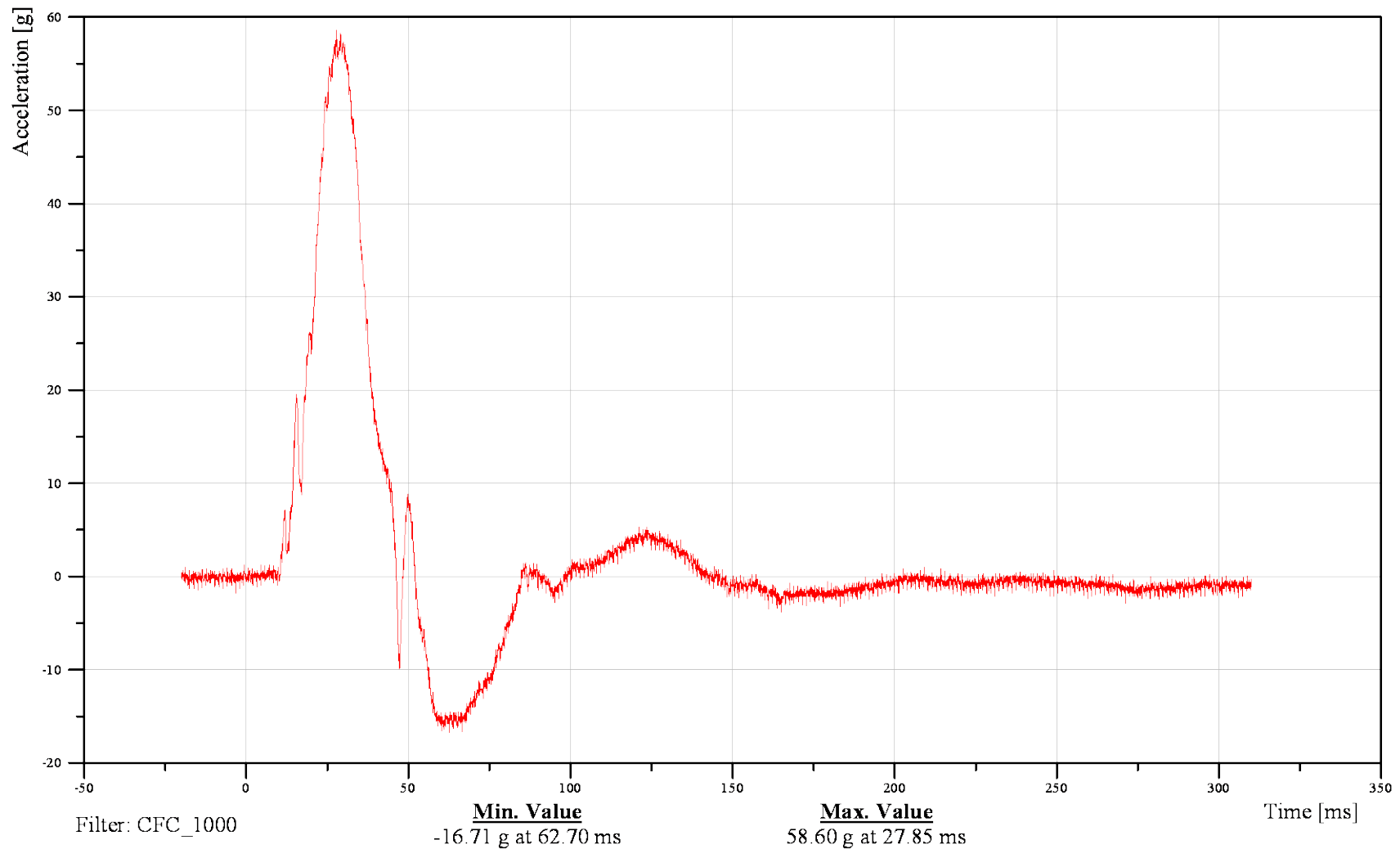
Time: 16:14

Customer: VRTC

11PELV0000WSACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis Vertical Az

Date: 01/24/2013

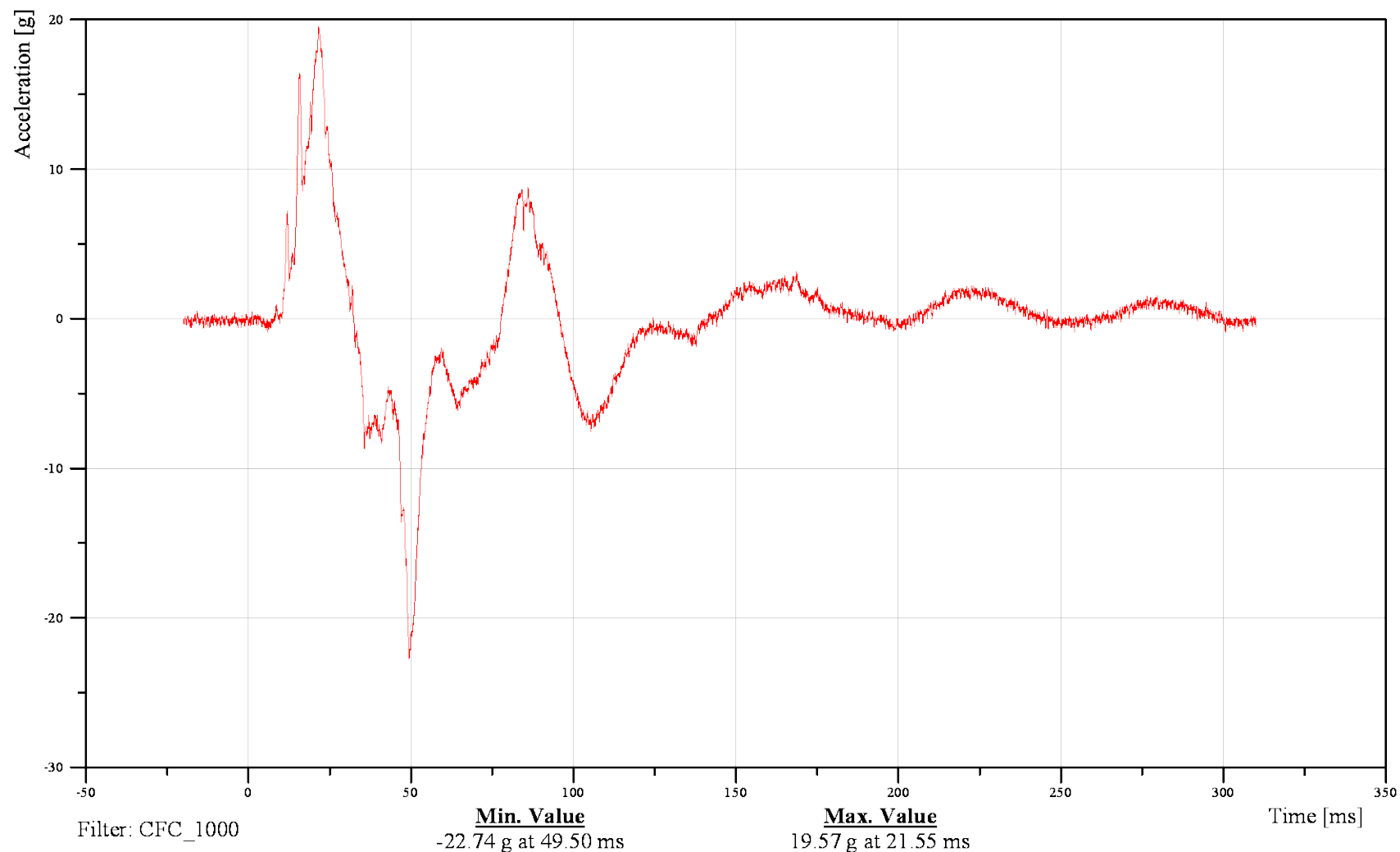
Time: 16:14

Customer: VRTC

11PELV0000WSACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis A Resultant

Date: 01/24/2013

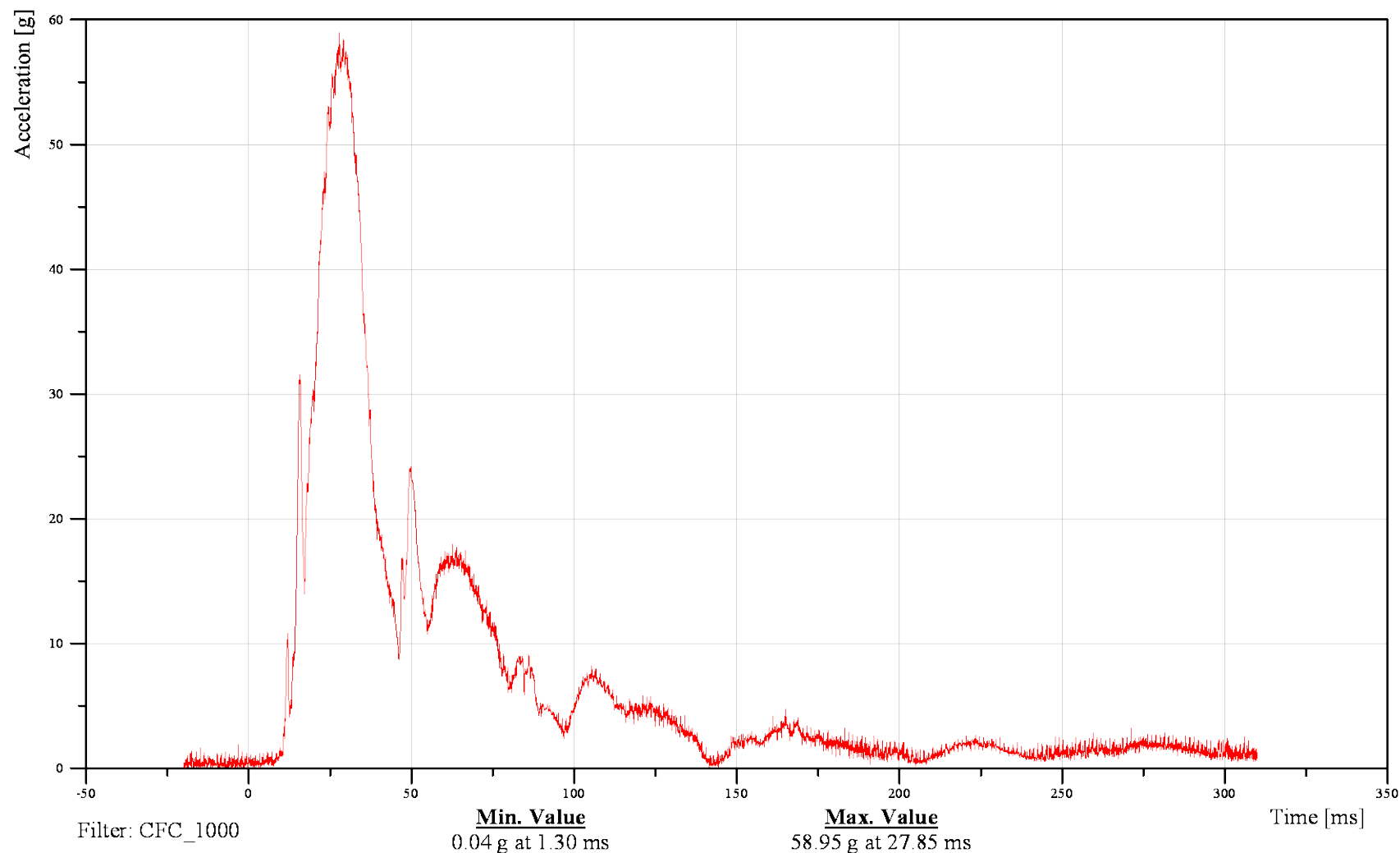
Time: 16:14

Customer: VRTC

11PELV0000WSACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pubic Force Fy

Date: 01/24/2013

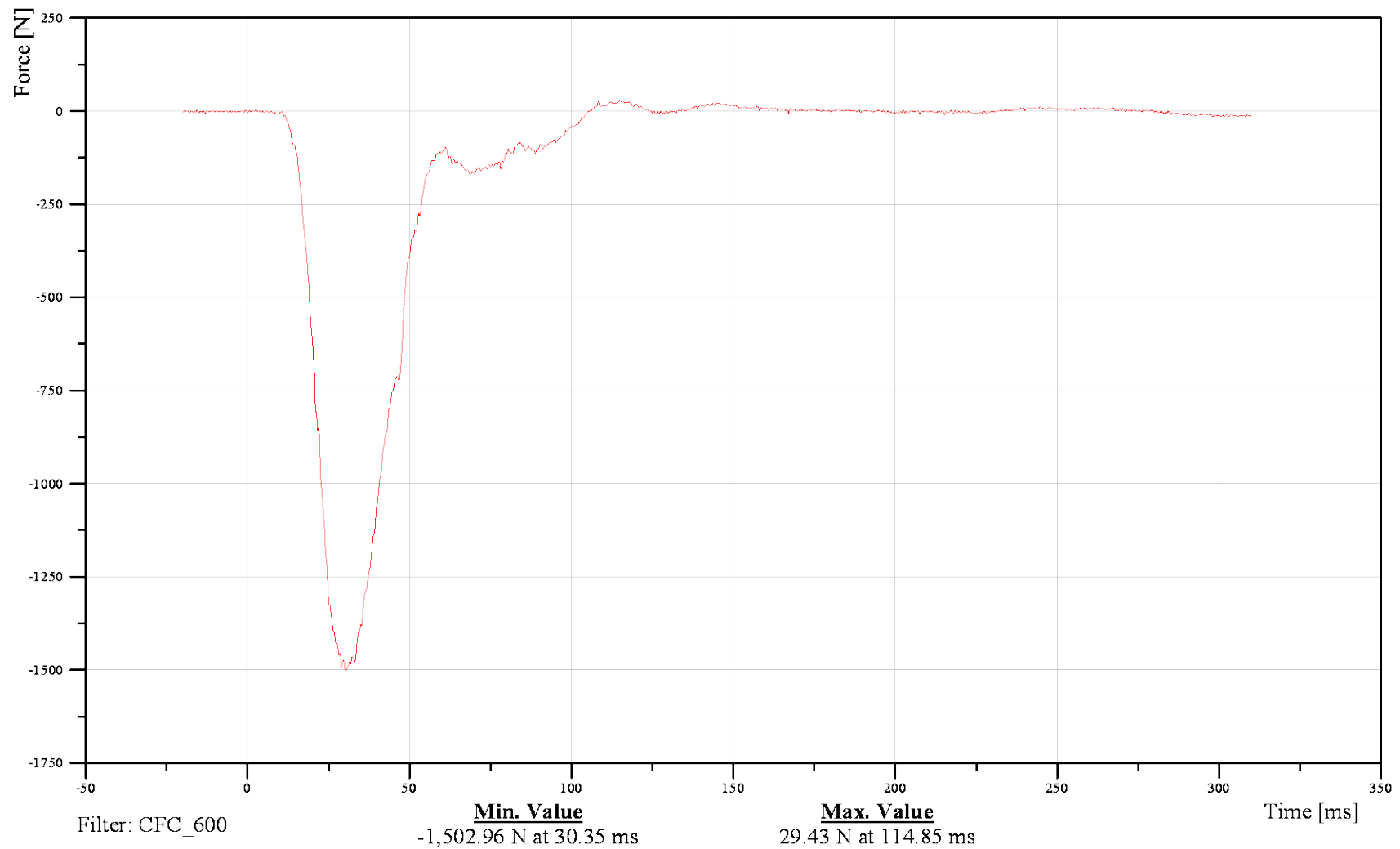
Time: 16:14

Customer: VRTC

11PUBC0000WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Lumbar Force Fx

Date: 01/24/2013

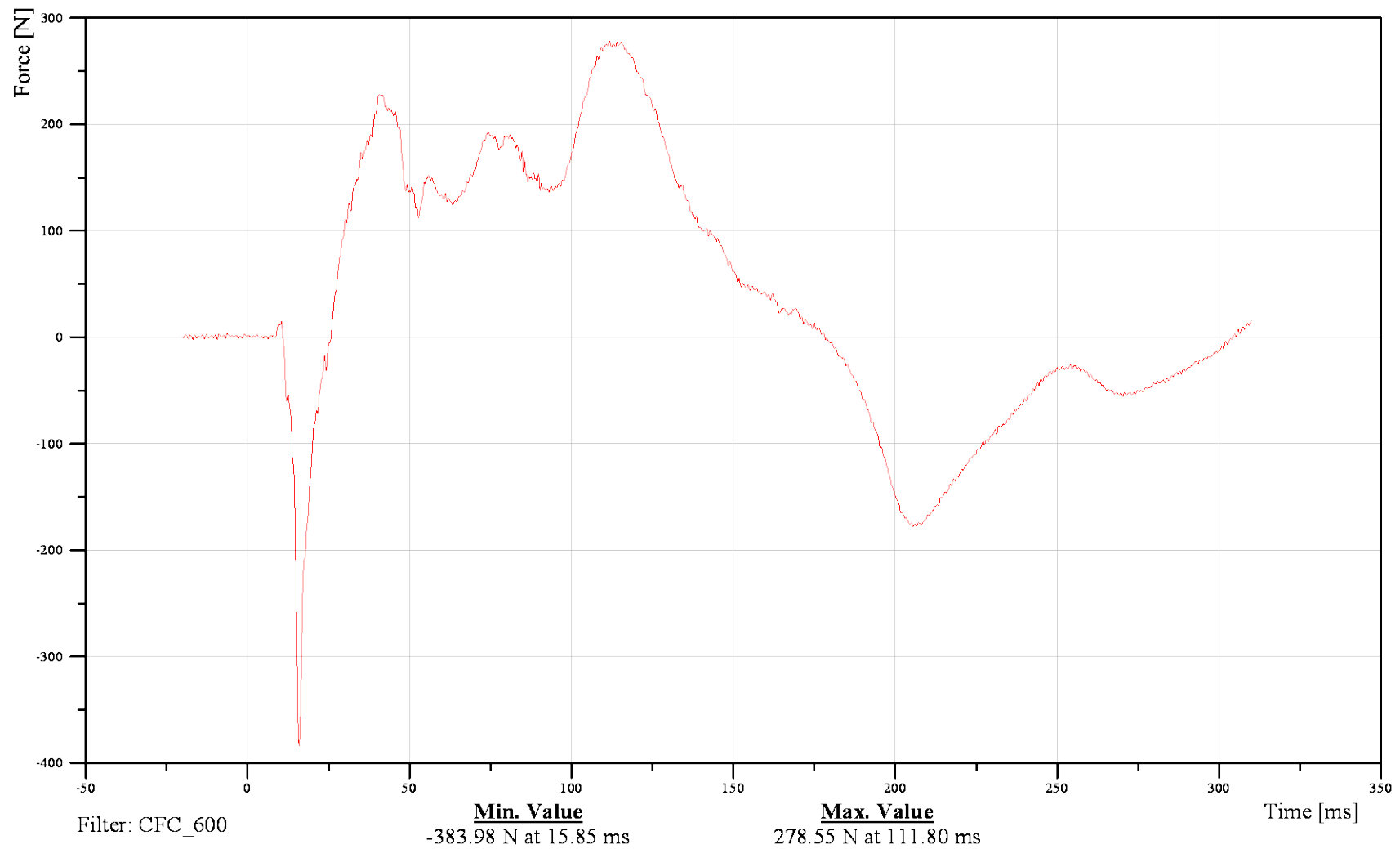
Time: 16:14

Customer: VRTC

11LUSP0000WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Lumbar Force Fy

Date: 01/24/2013

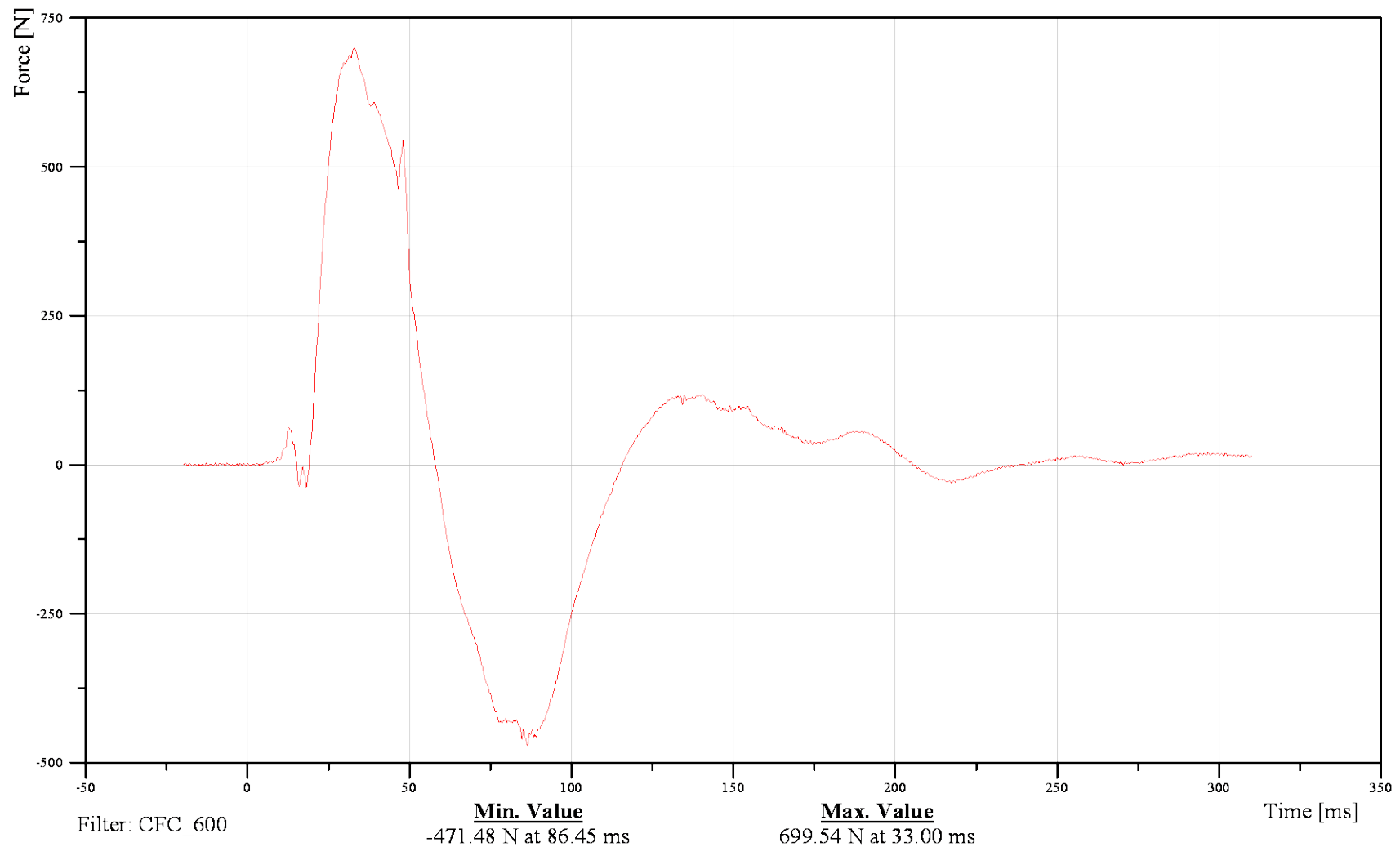
Time: 16:14

Customer: VRTC

11LUSP0000WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Lumbar Force Fz

Date: 01/24/2013

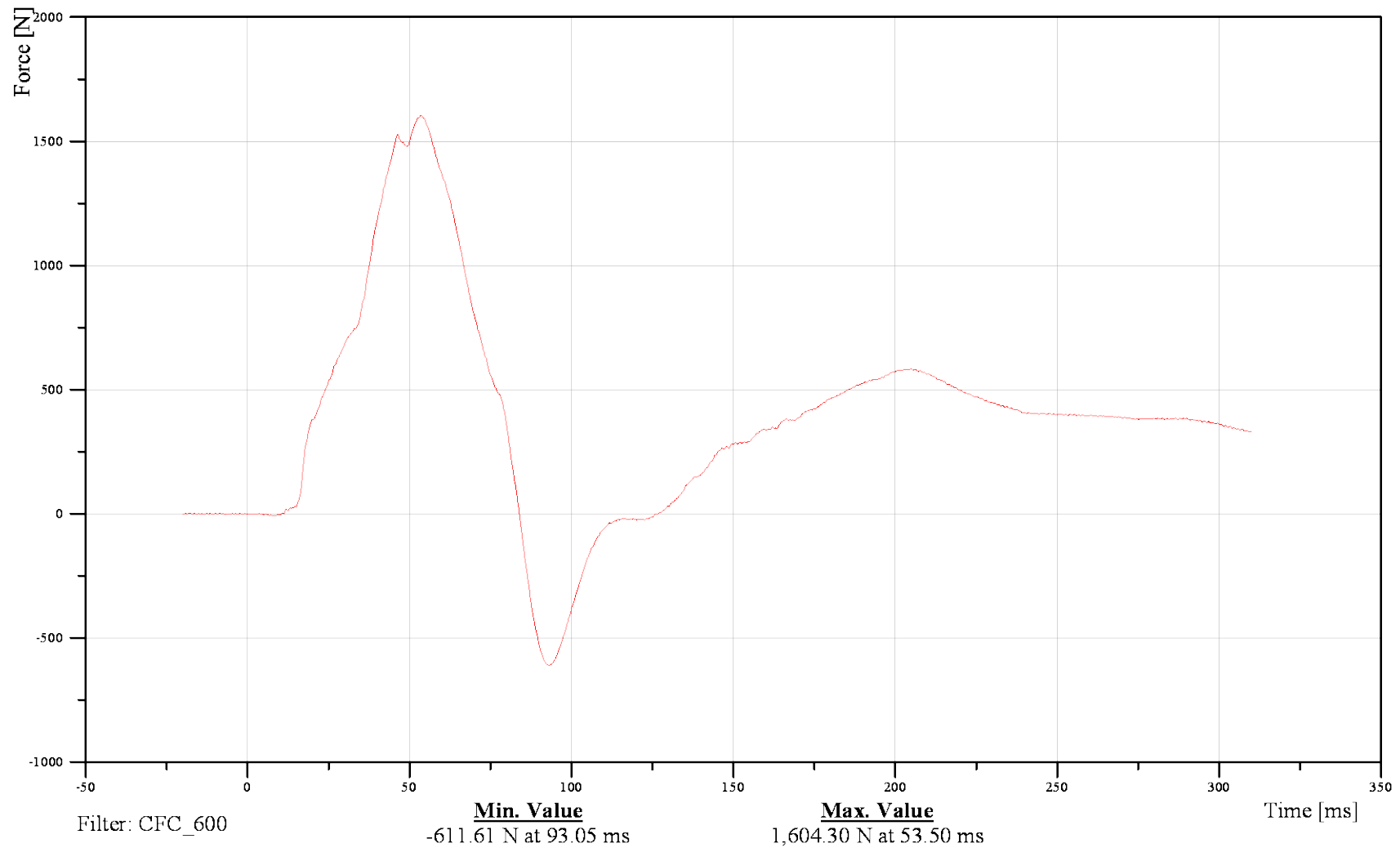
Time: 16:14

Customer: VRTC

11LUSP0000WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Lumbar Moment Mx

Date: 01/24/2013

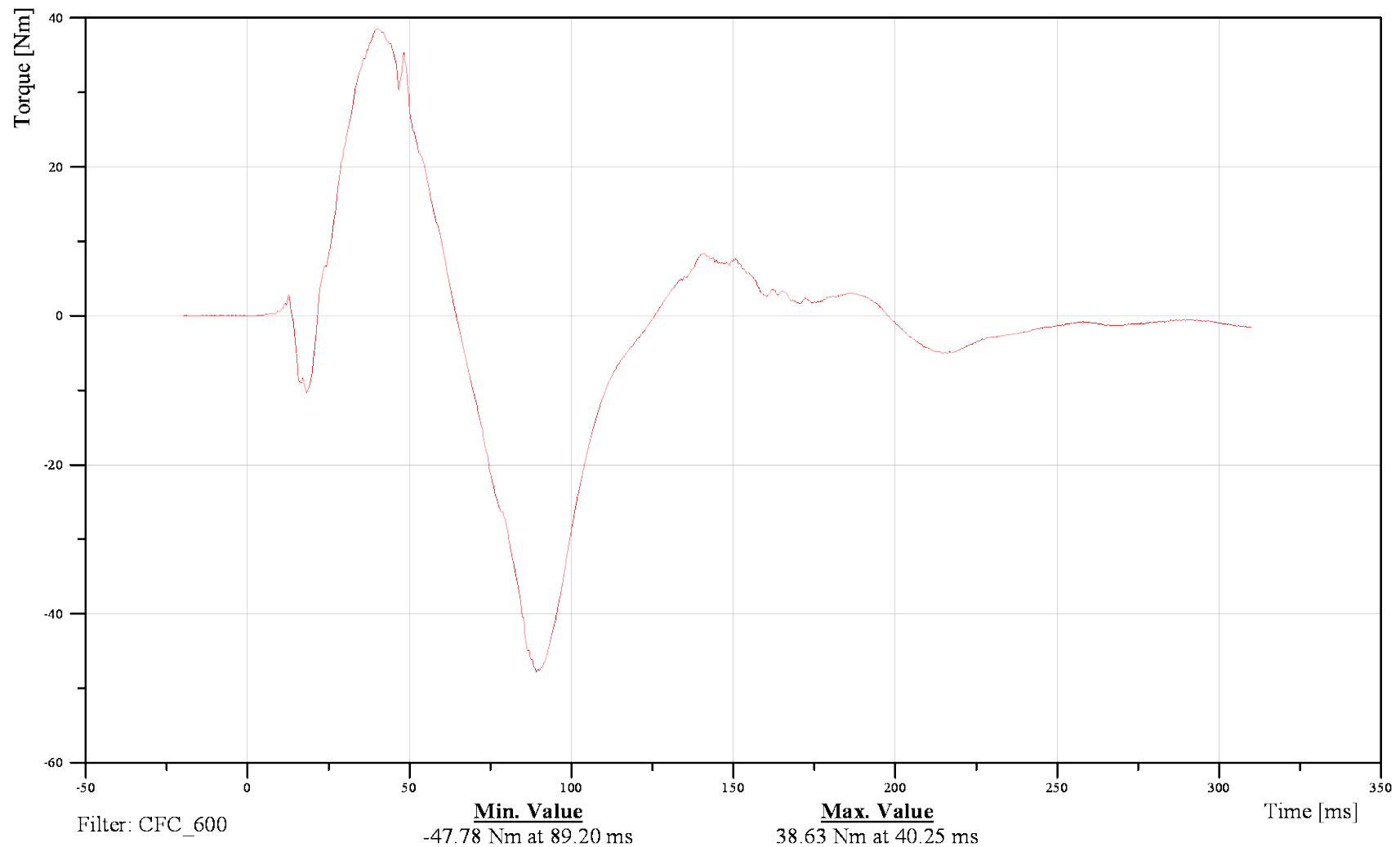
Time: 16:14

Customer: VRTC

11LUSP0000WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Lumbar Moment My

Date: 01/24/2013

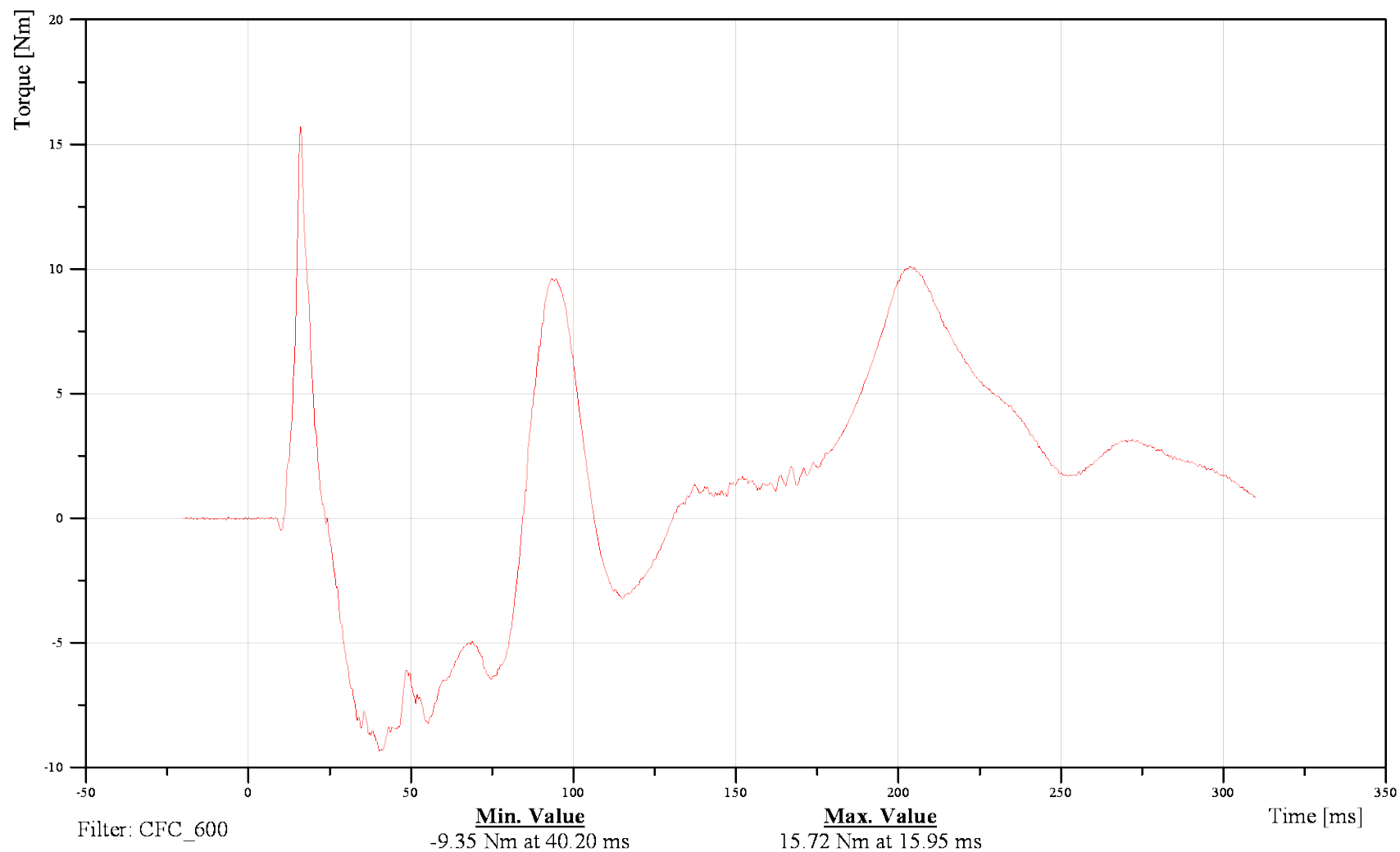
Time: 16:14

Customer: VRTC

11LUSP0000WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Lumbar Moment Mz

Date: 01/24/2013

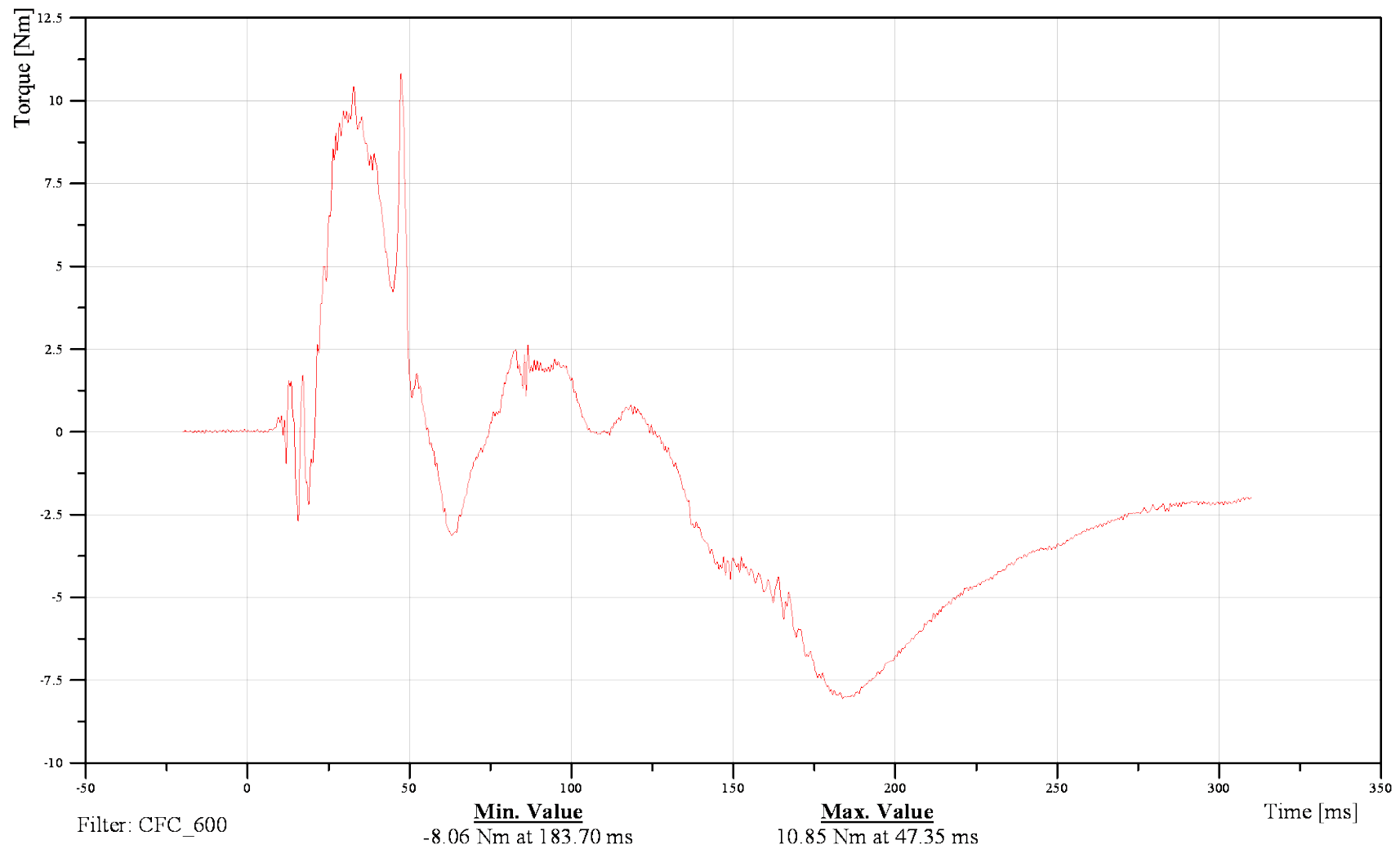
Time: 16:14

Customer: VRTC

11LUSP0000WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Right Moment Mx

Date: 01/24/2013

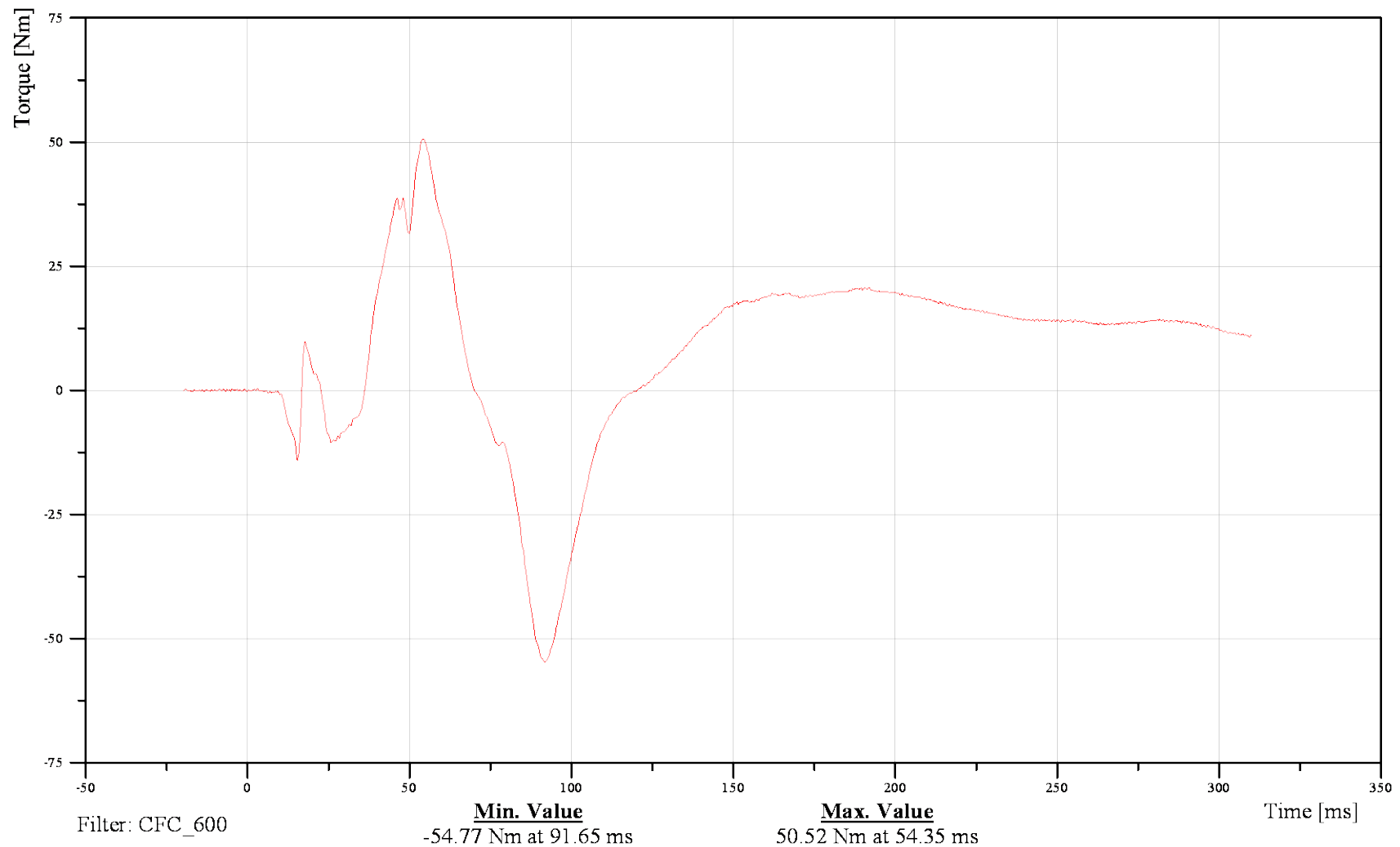
Time: 16:14

Customer: VRTC

11SACRRI00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Right Moment My

Date: 01/24/2013

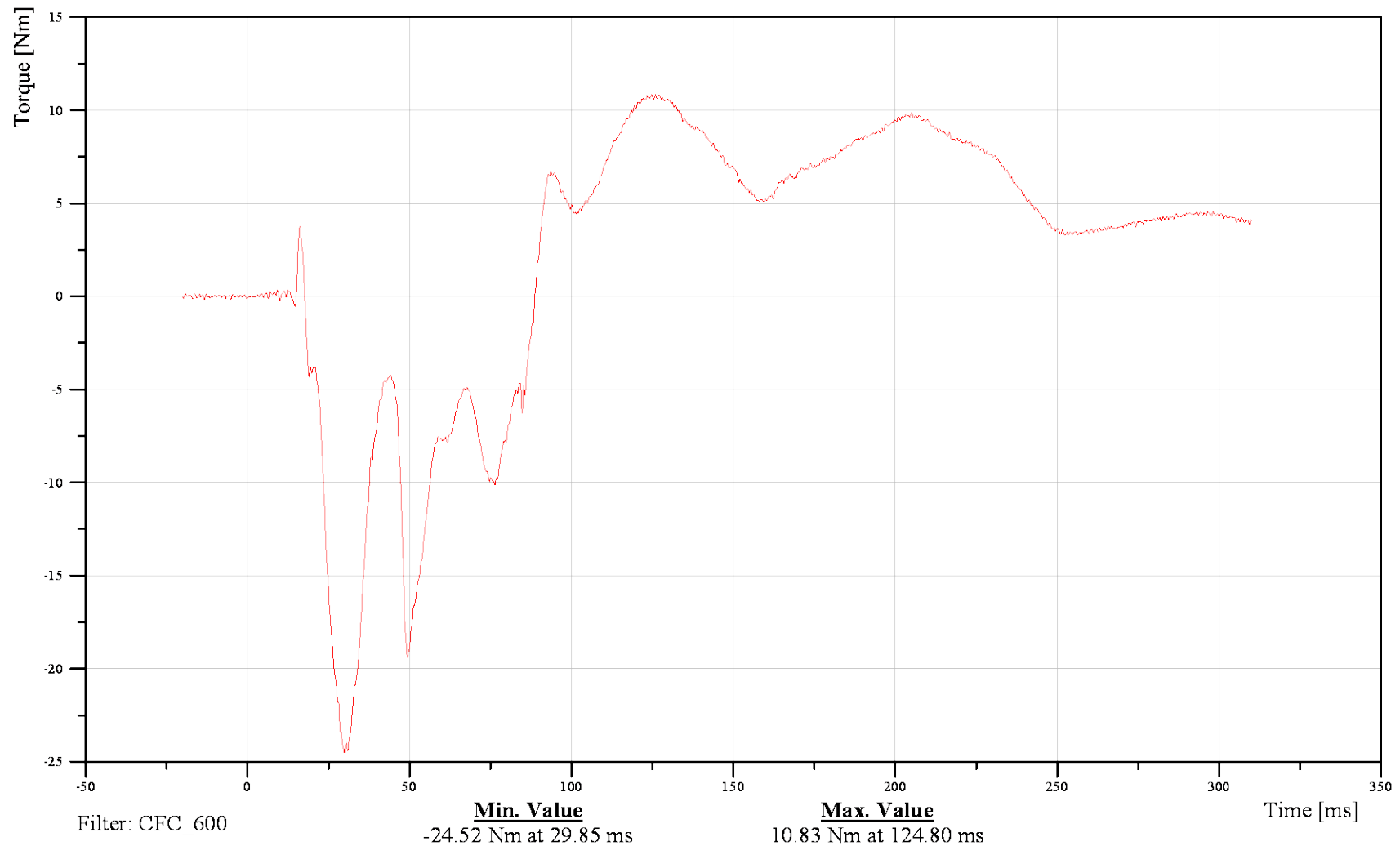
Time: 16:14

Customer: VRTC

11SACRRI00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Right Moment Mz

Date: 01/24/2013

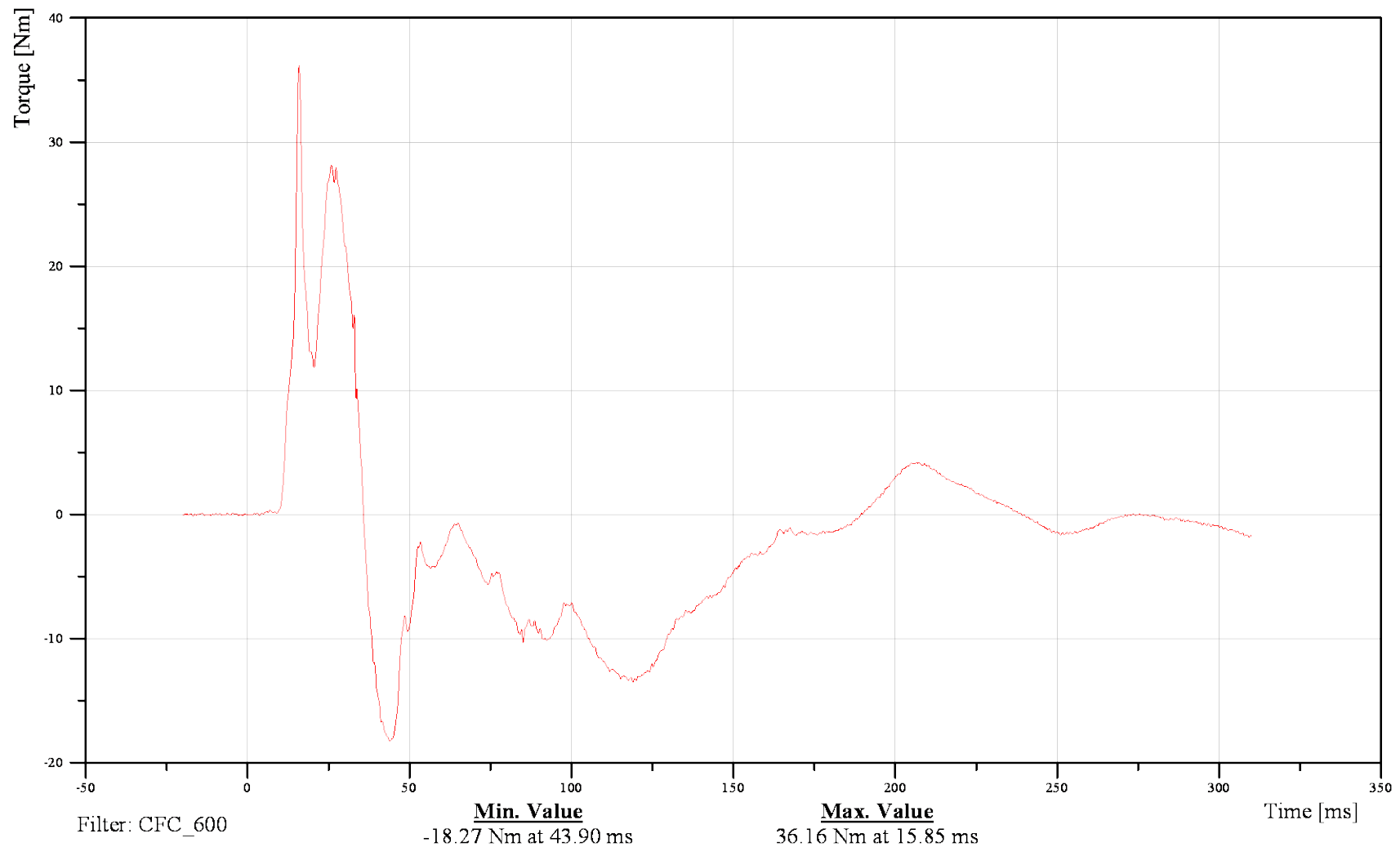
Time: 16:14

Customer: VRTC

11SACRRI00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Right Force Fx

Date: 01/24/2013

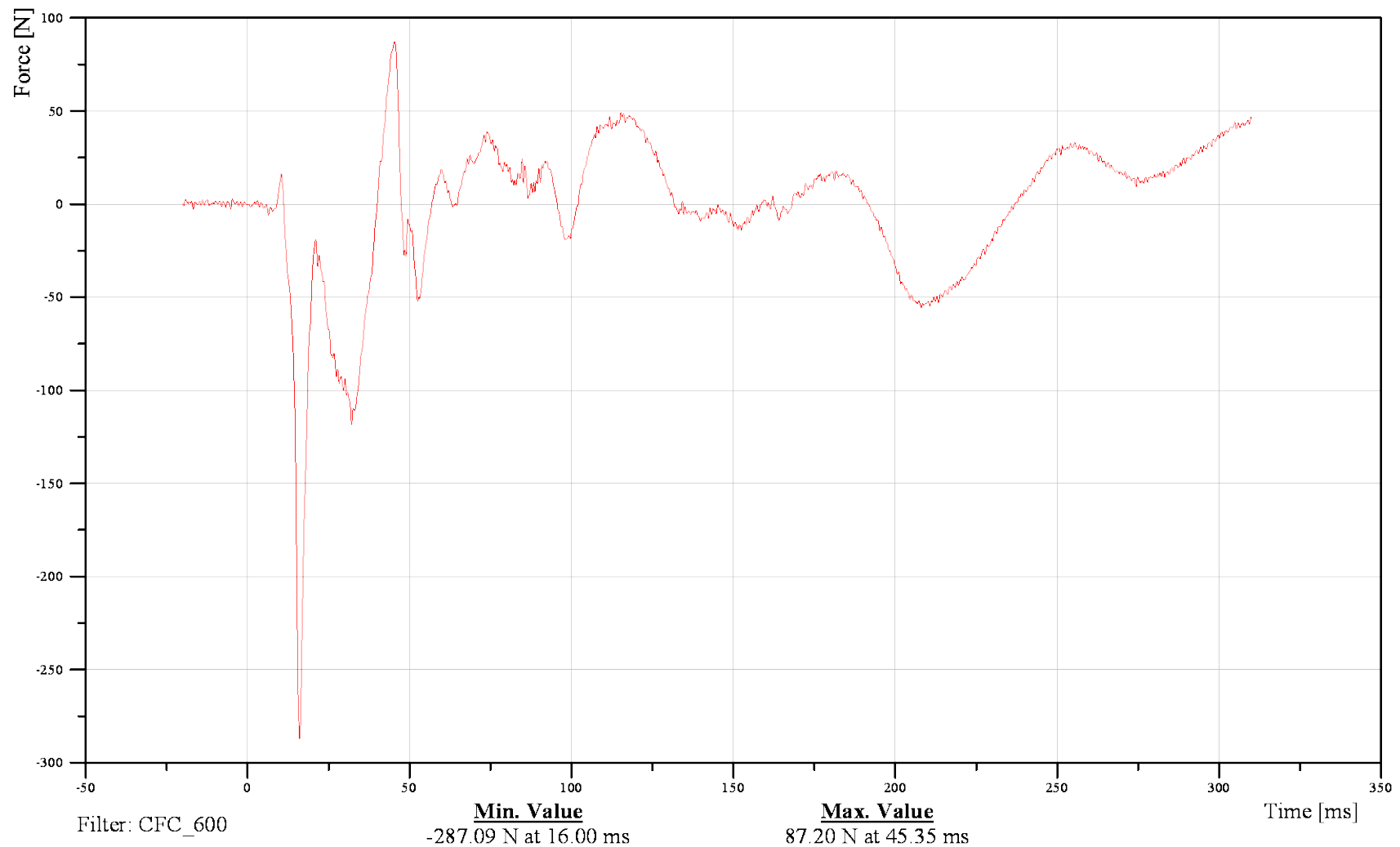
Time: 16:14

Customer: VRTC

11SACRRI00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Right Force Fy

Date: 01/24/2013

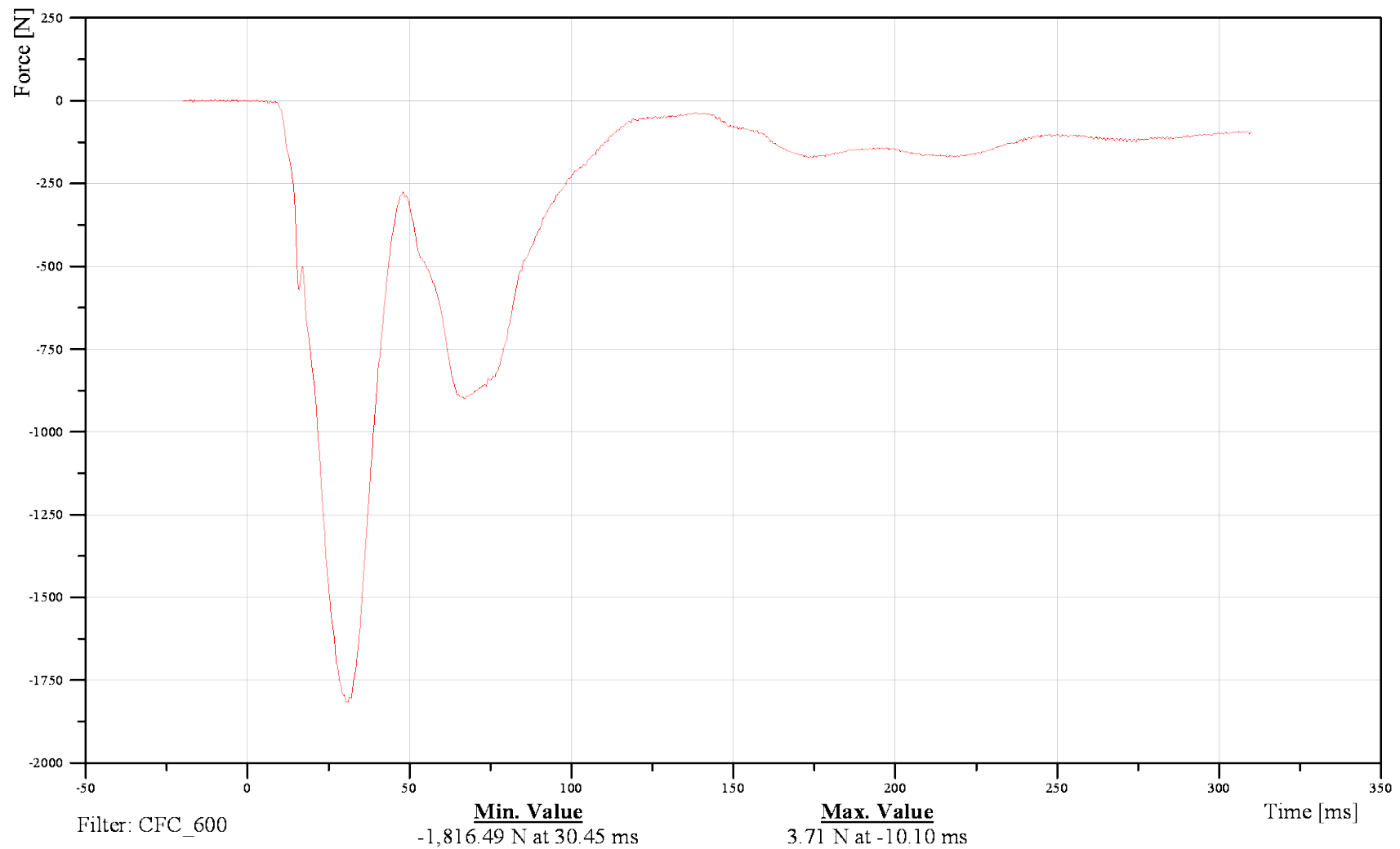
Time: 16:14

Customer: VRTC

11SACRRI00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Right Force Fz

Date: 01/24/2013

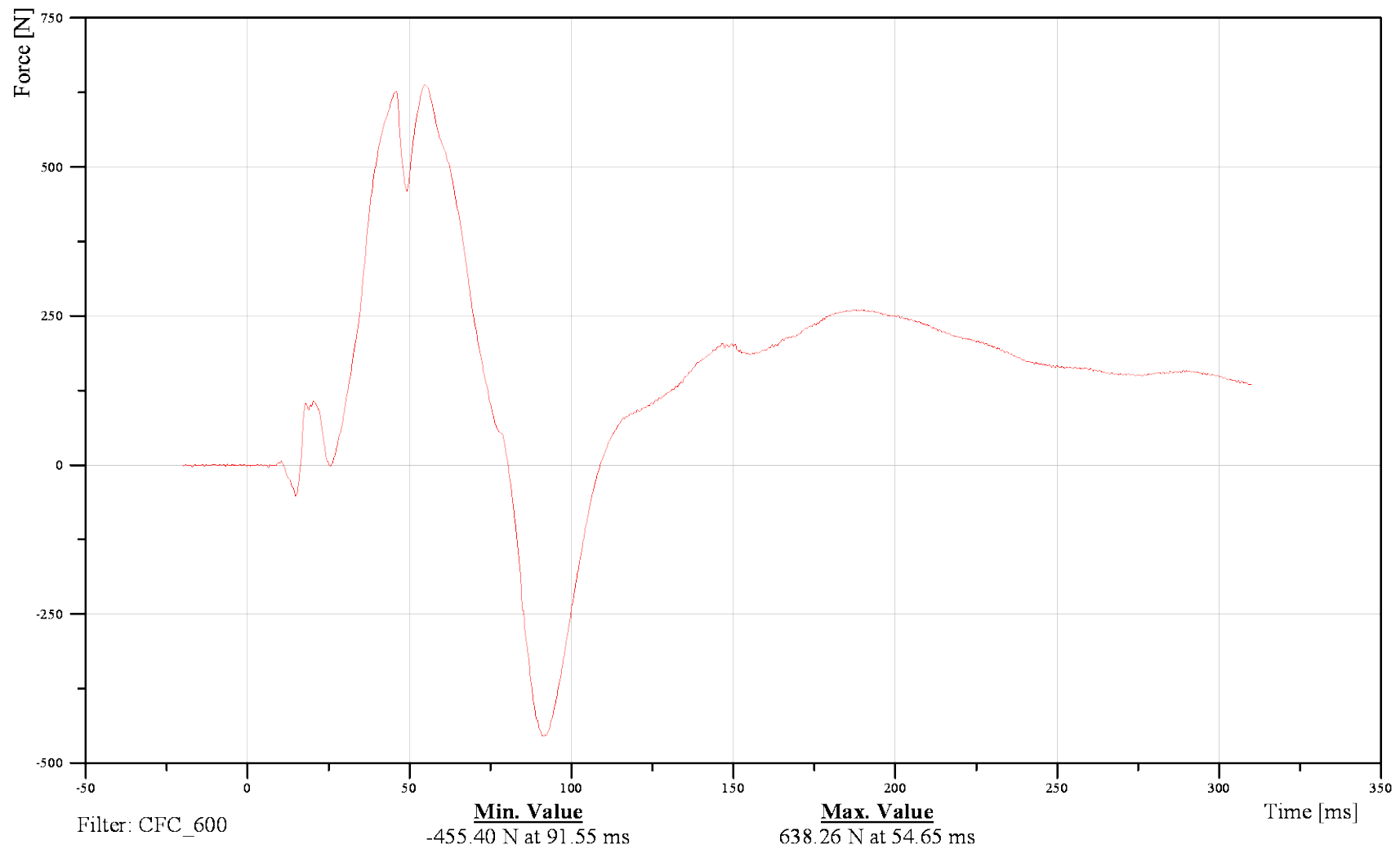
Time: 16:14

Customer: VRTC

11SACRRI00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Left Moment Mx

Date: 01/24/2013

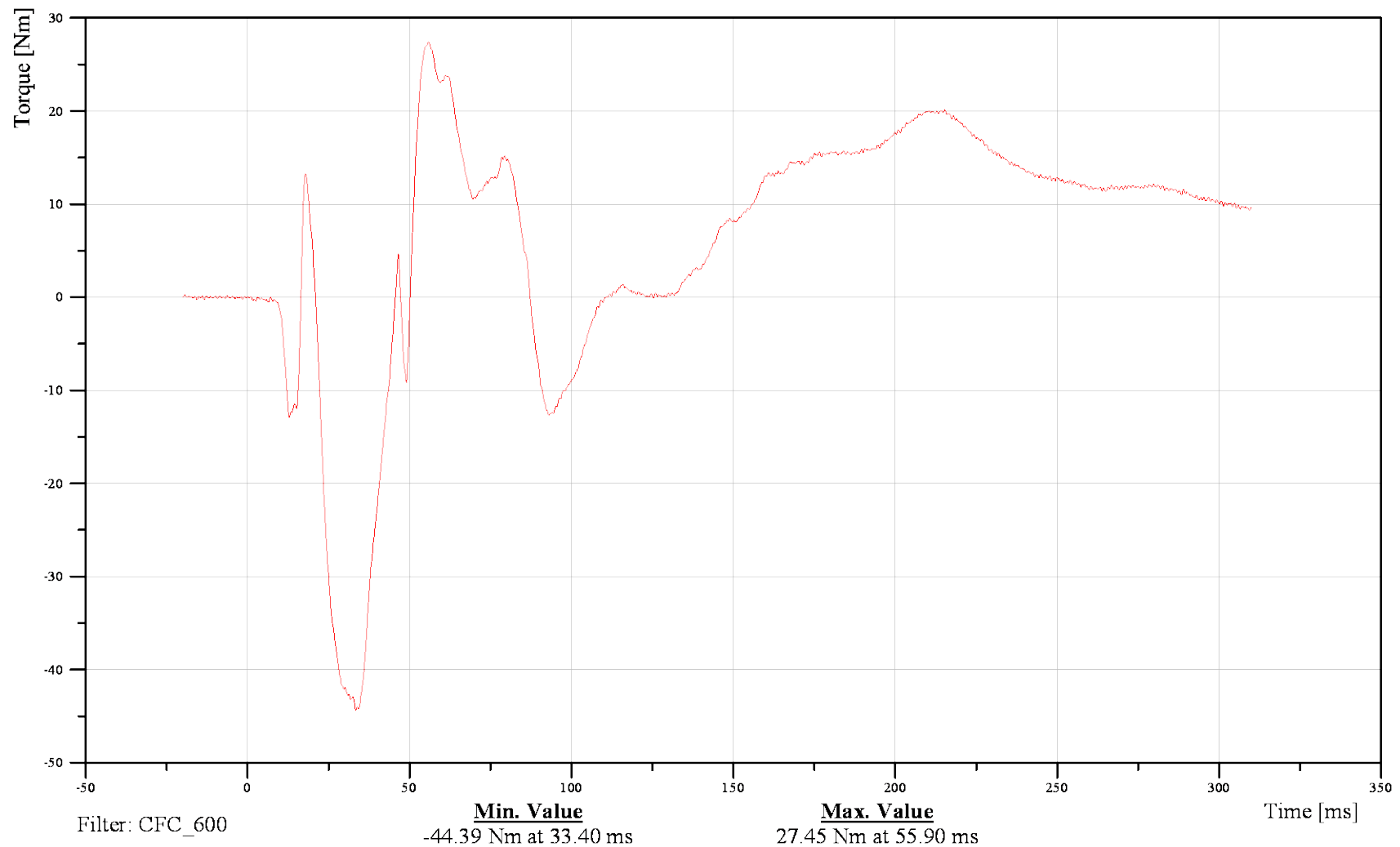
Time: 16:14

Customer: VRTC

11SACRLE00WSMOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Left Moment My

Date: 01/24/2013

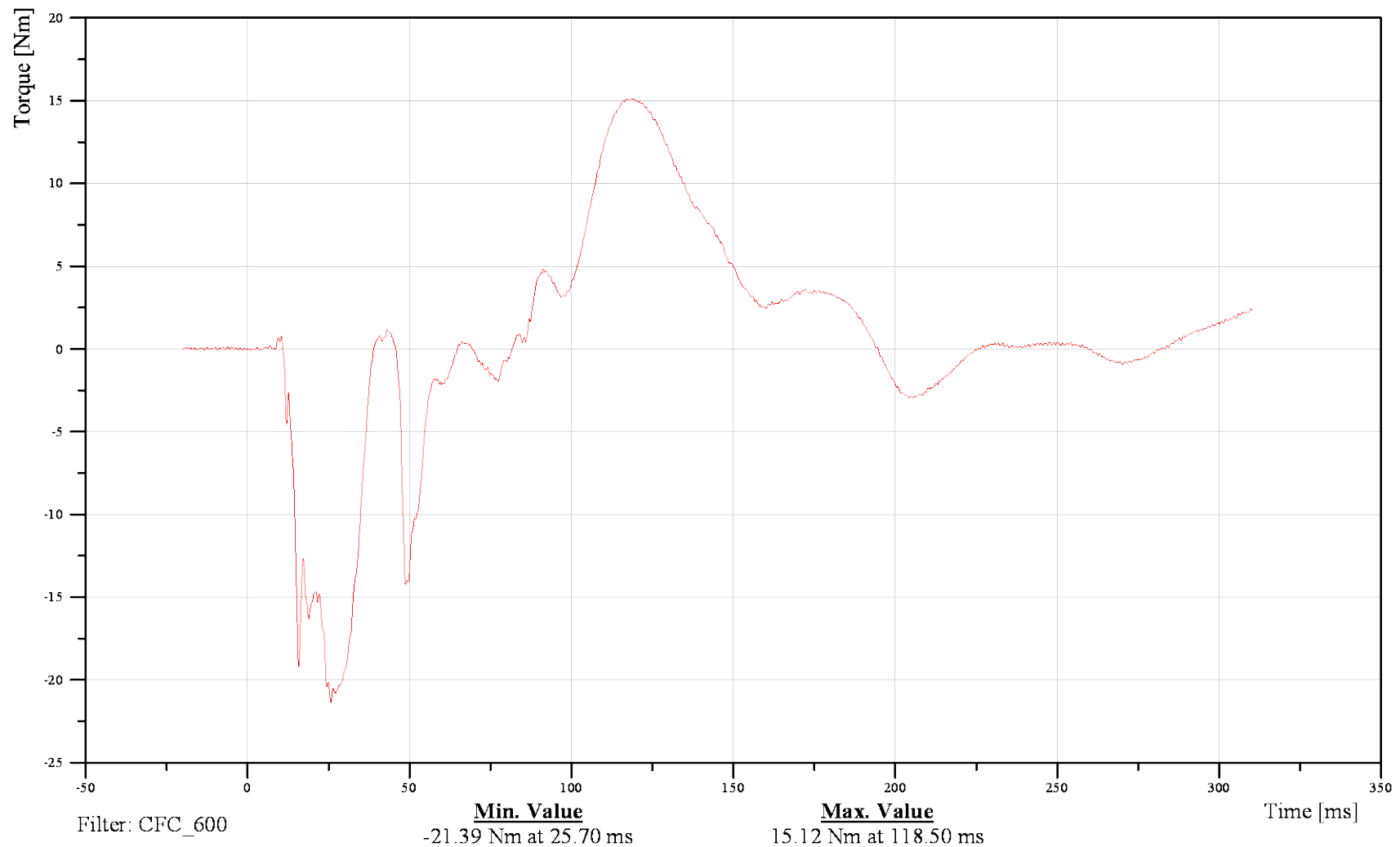
Time: 16:14

Customer: VRTC

11SACRLE00WSMOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Left Moment Mz

Date: 01/24/2013

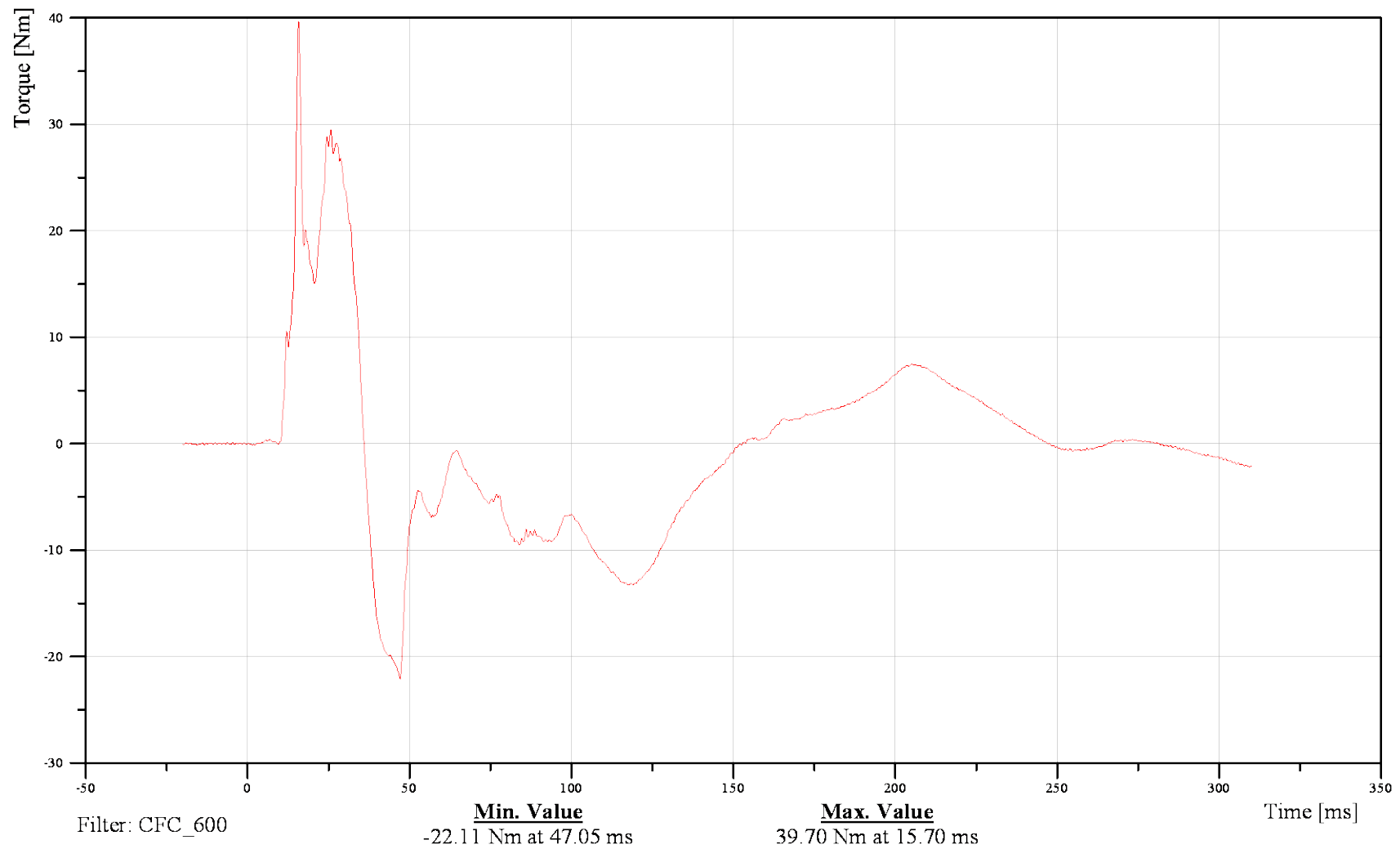
Time: 16:14

Customer: VRTC

11SACRLE00WSMOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Left Force Fx

Date: 01/24/2013

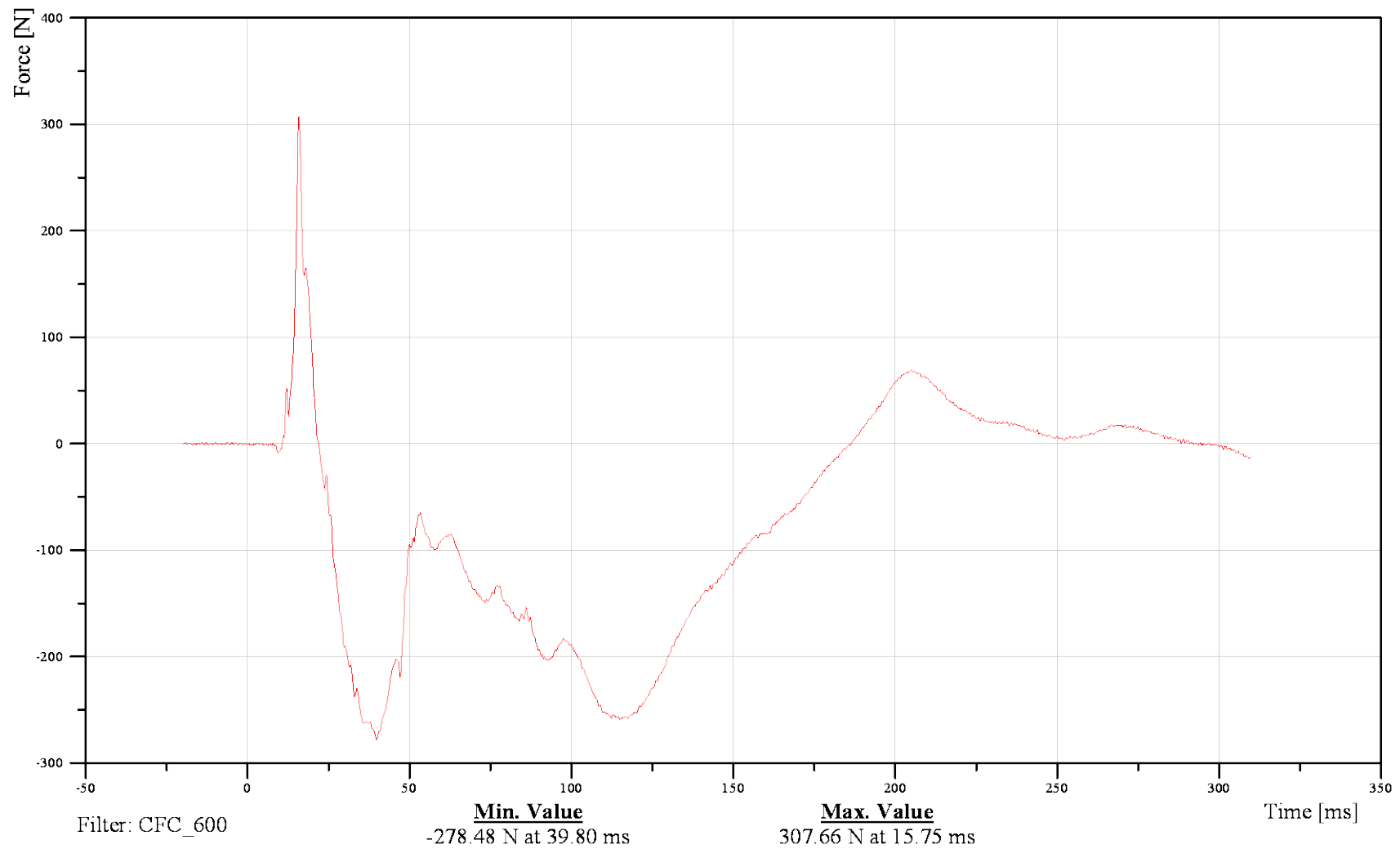
Time: 16:14

Customer: VRTC

11SACRLE00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Left Force Fy

Date: 01/24/2013

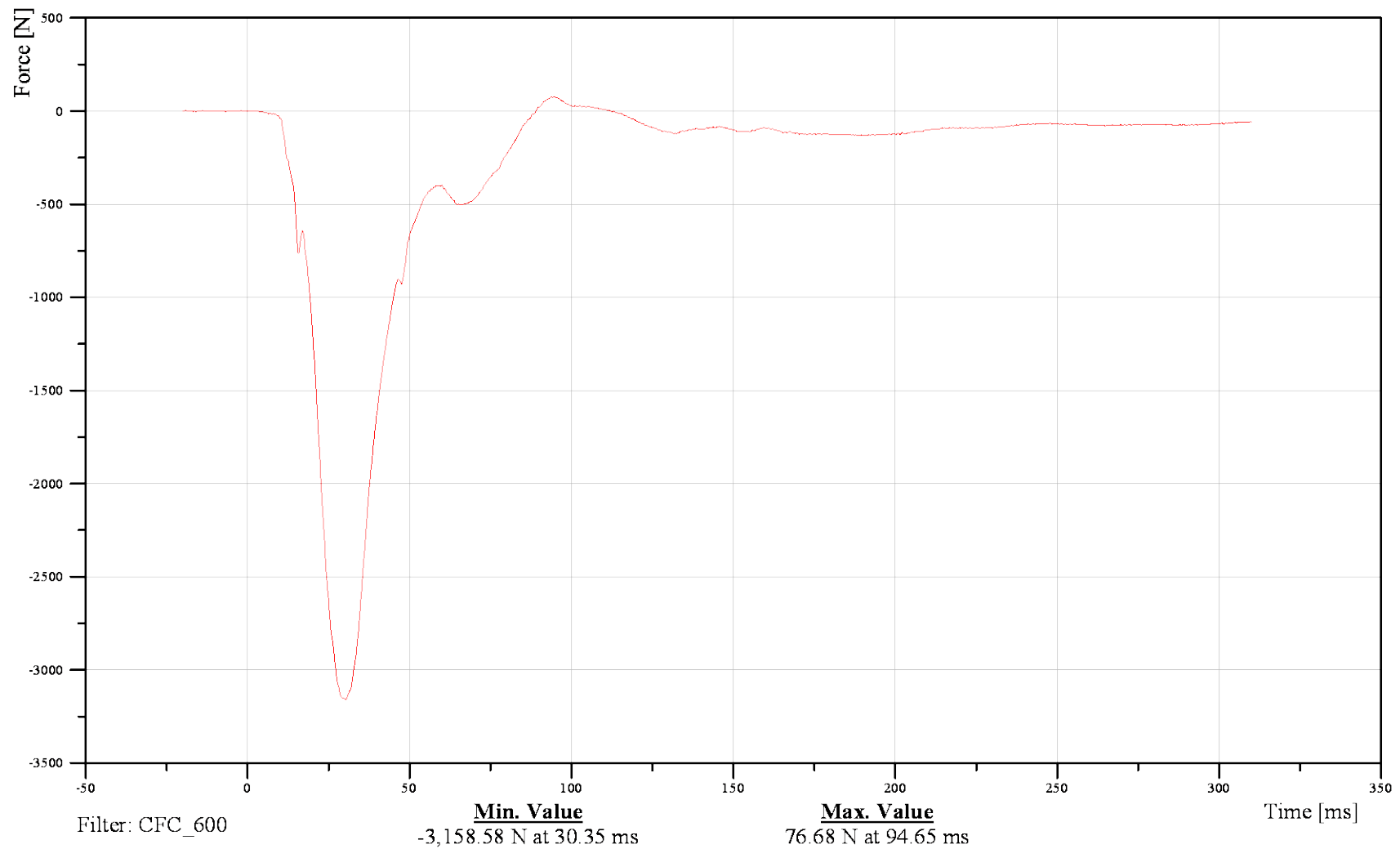
Time: 16:14

Customer: VRTC

11SACRLE00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Sacro-Iliac Left Force Fz

Date: 01/24/2013

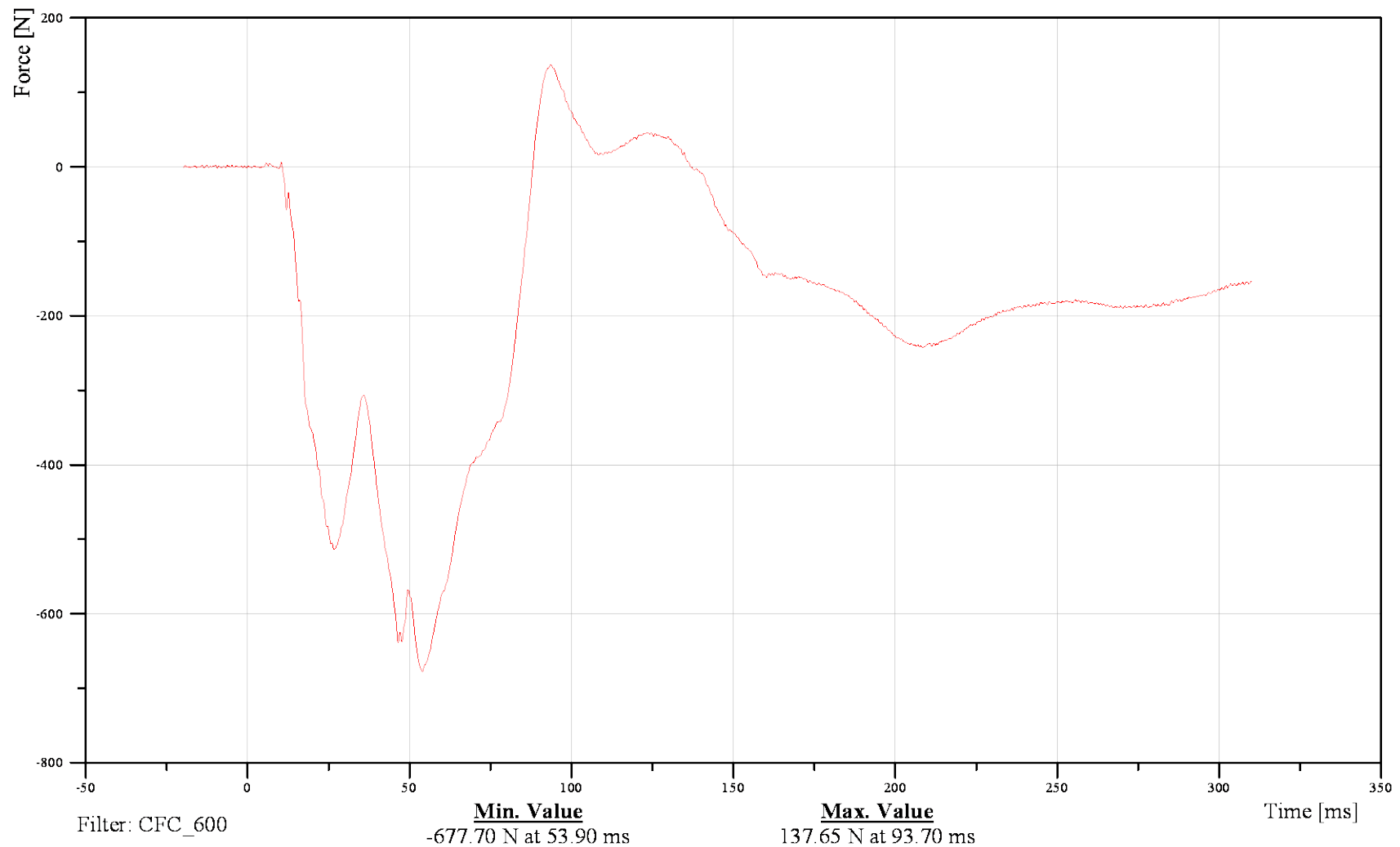
Time: 16:14

Customer: VRTC

11SACRLE00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Femoral Neck Force Fx

Date: 01/24/2013

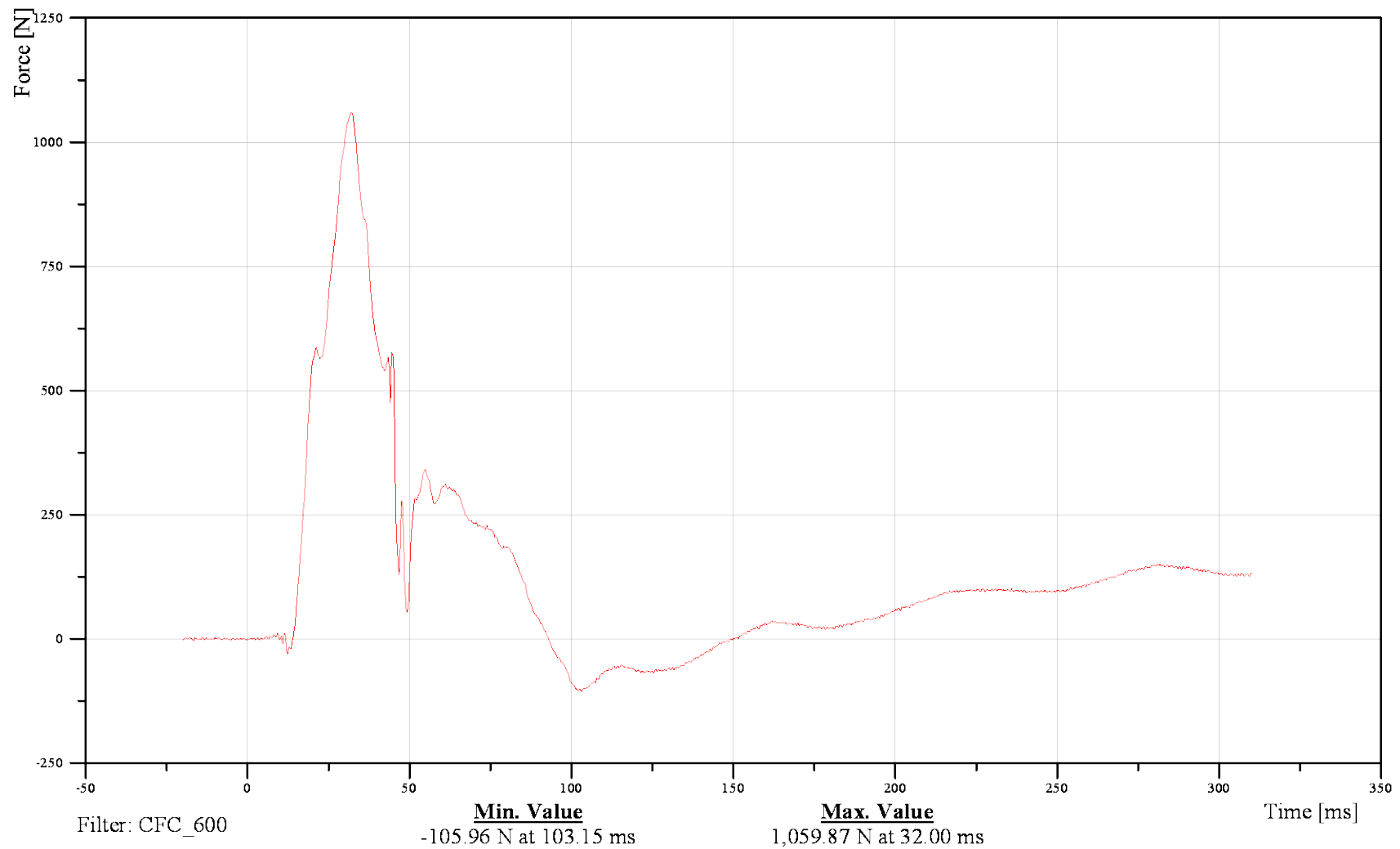
Time: 16:14

Customer: VRTC

11FEACLE00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Femoral Neck Force Fy

Date: 01/24/2013

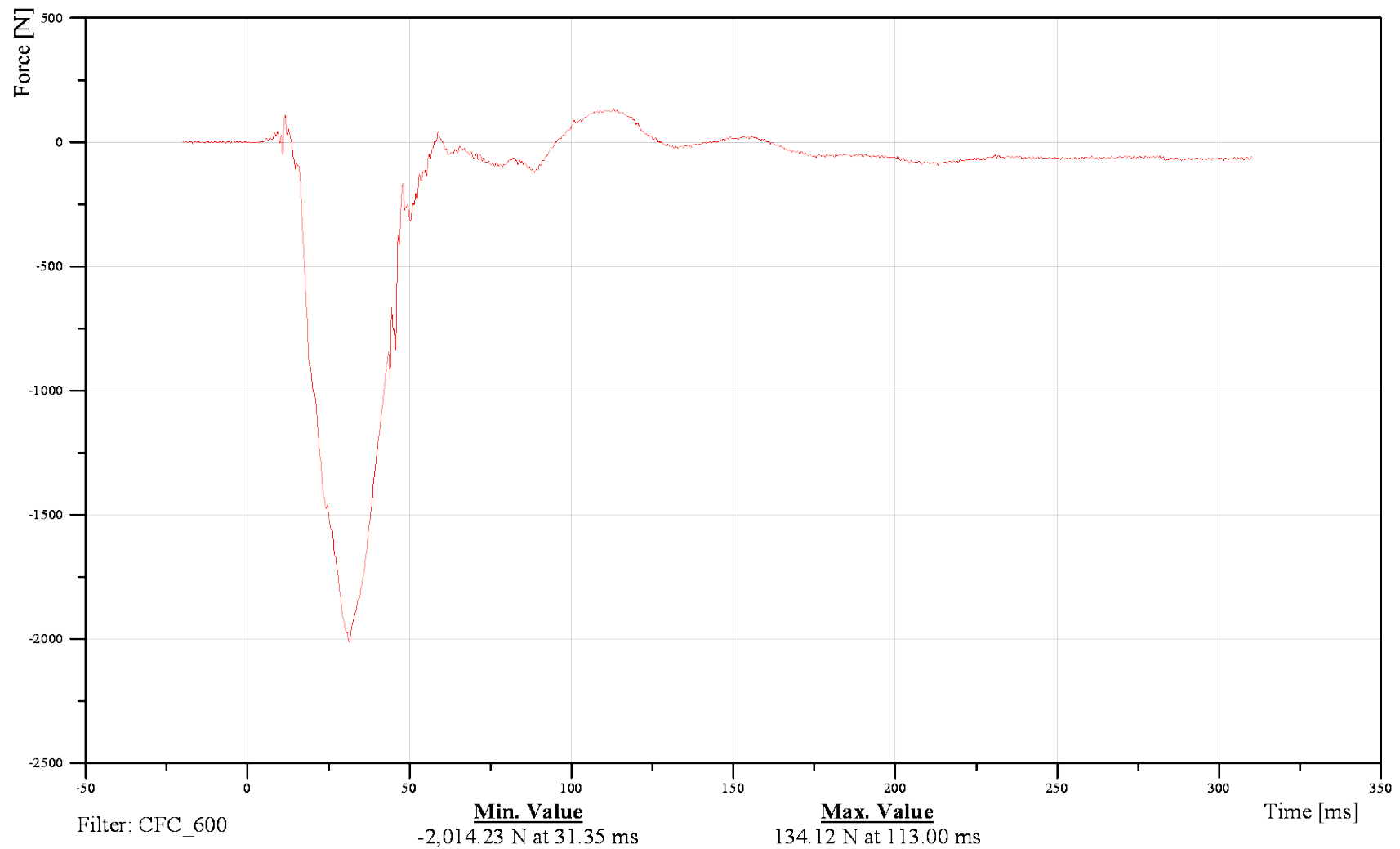
Time: 16:14

Customer: VRTC

11FEACLE00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Femoral Neck Force Fz

Date: 01/24/2013

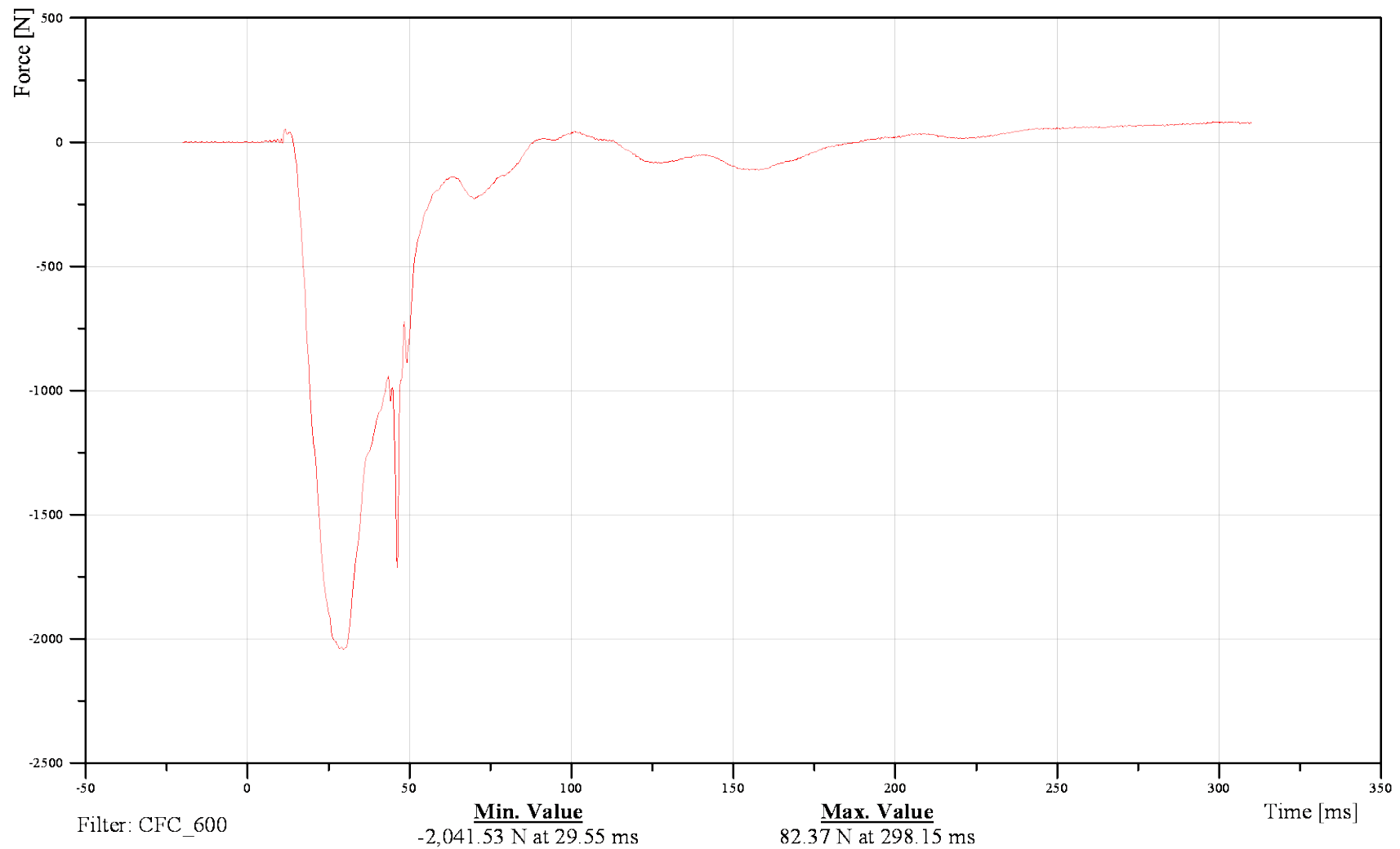
Time: 16:14

Customer: VRTC

11FEACLE00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Femoral Neck Force Fx

Date: 01/24/2013

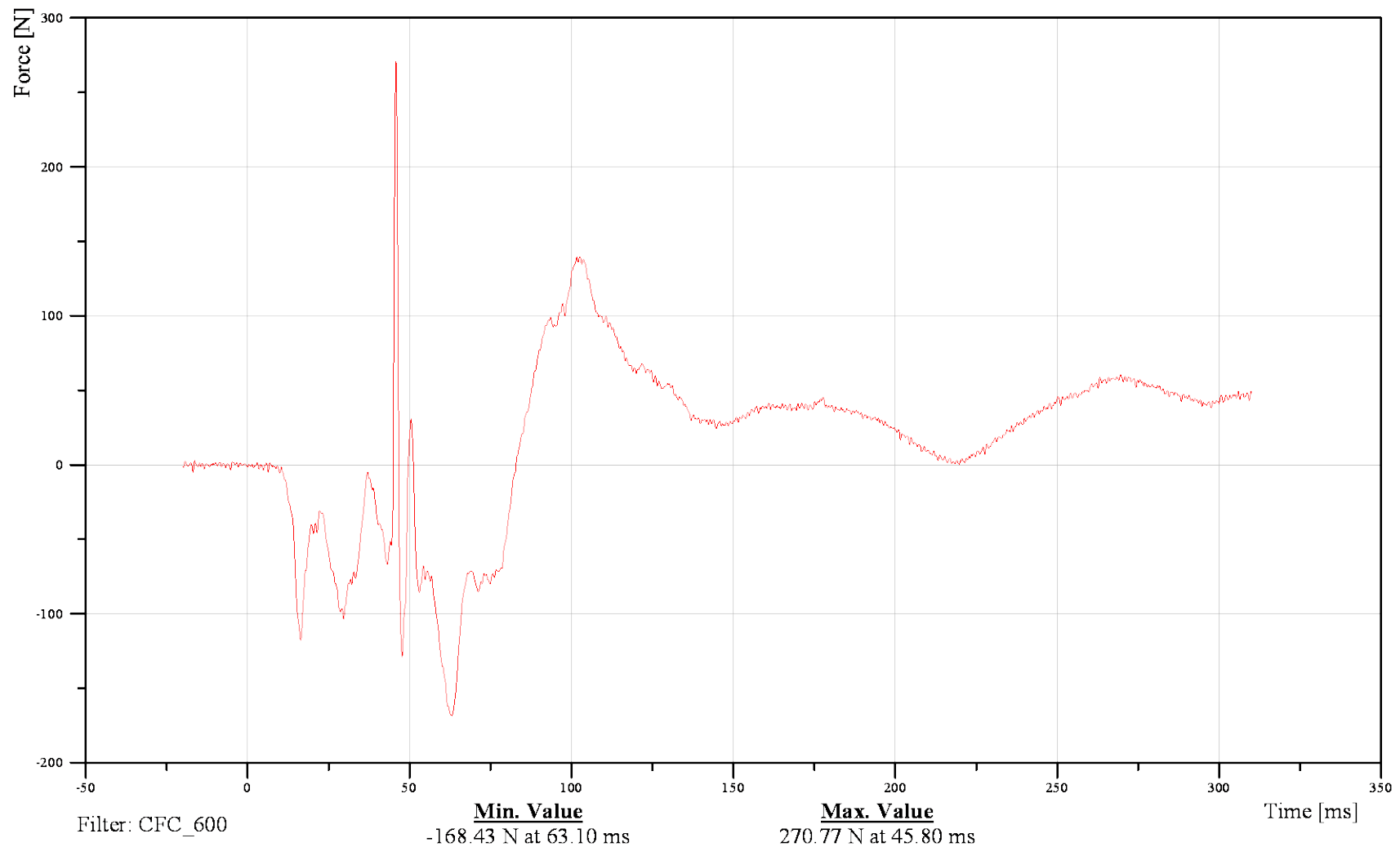
Time: 16:14

Customer: VRTC

11FEACRI00WSFOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Femoral Neck Force Fy

Date: 01/24/2013

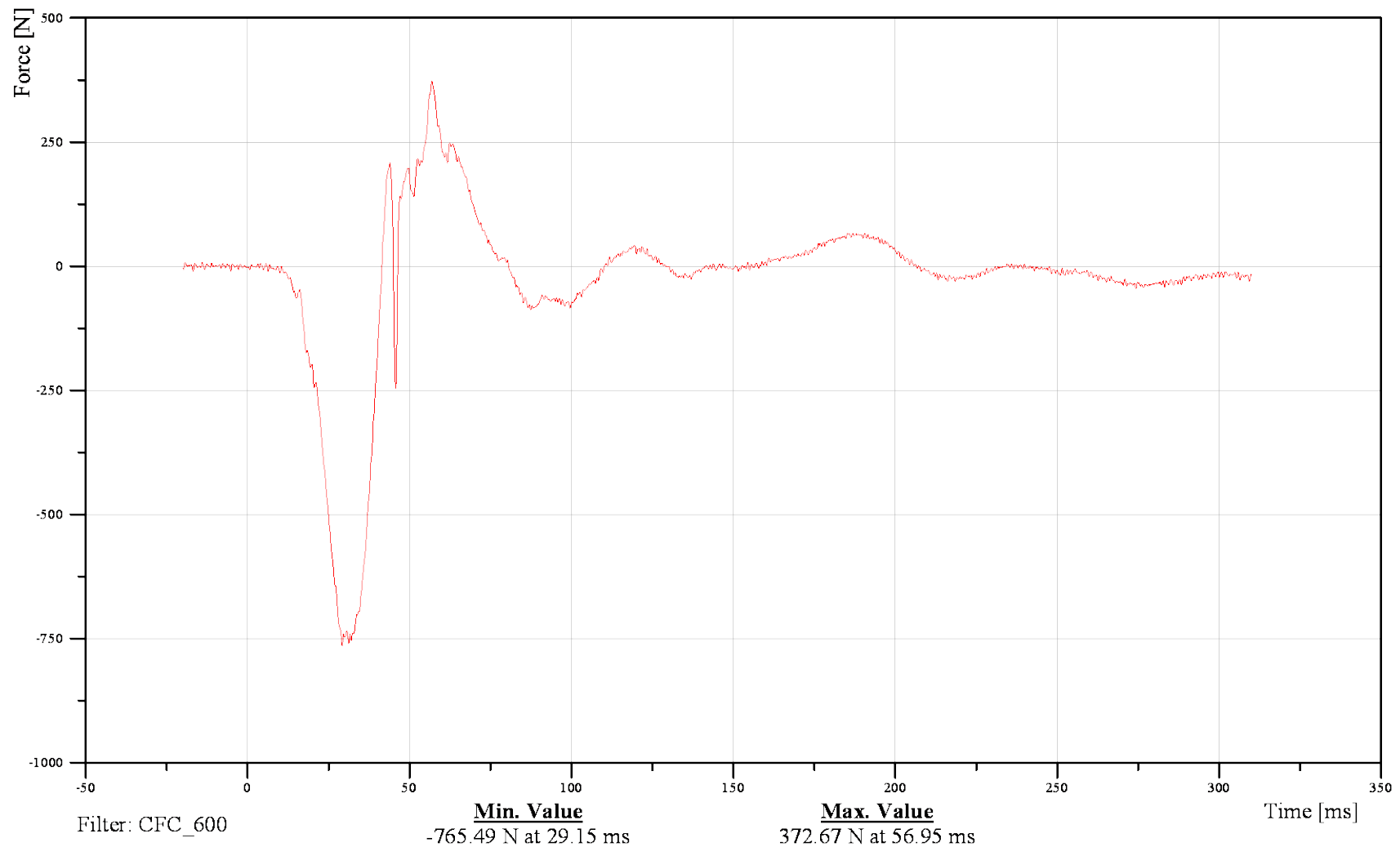
Time: 16:14

Customer: VRTC

11FEACRI00WSFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Femoral Neck Force Fz

Date: 01/24/2013

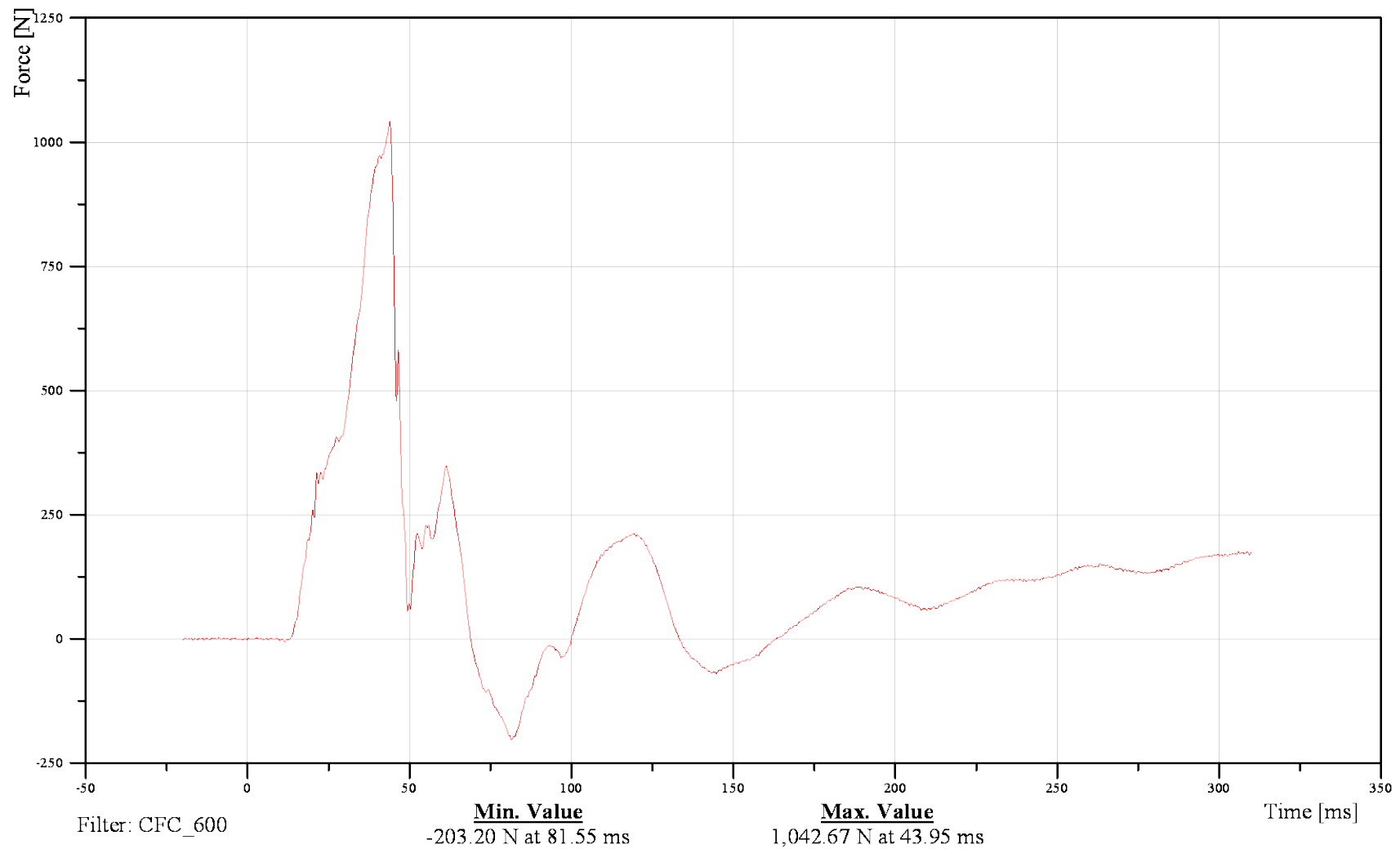
Time: 16:14

Customer: VRTC

11FEACRI00WSFOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Longitudinal Ax

Date: 01/24/2013

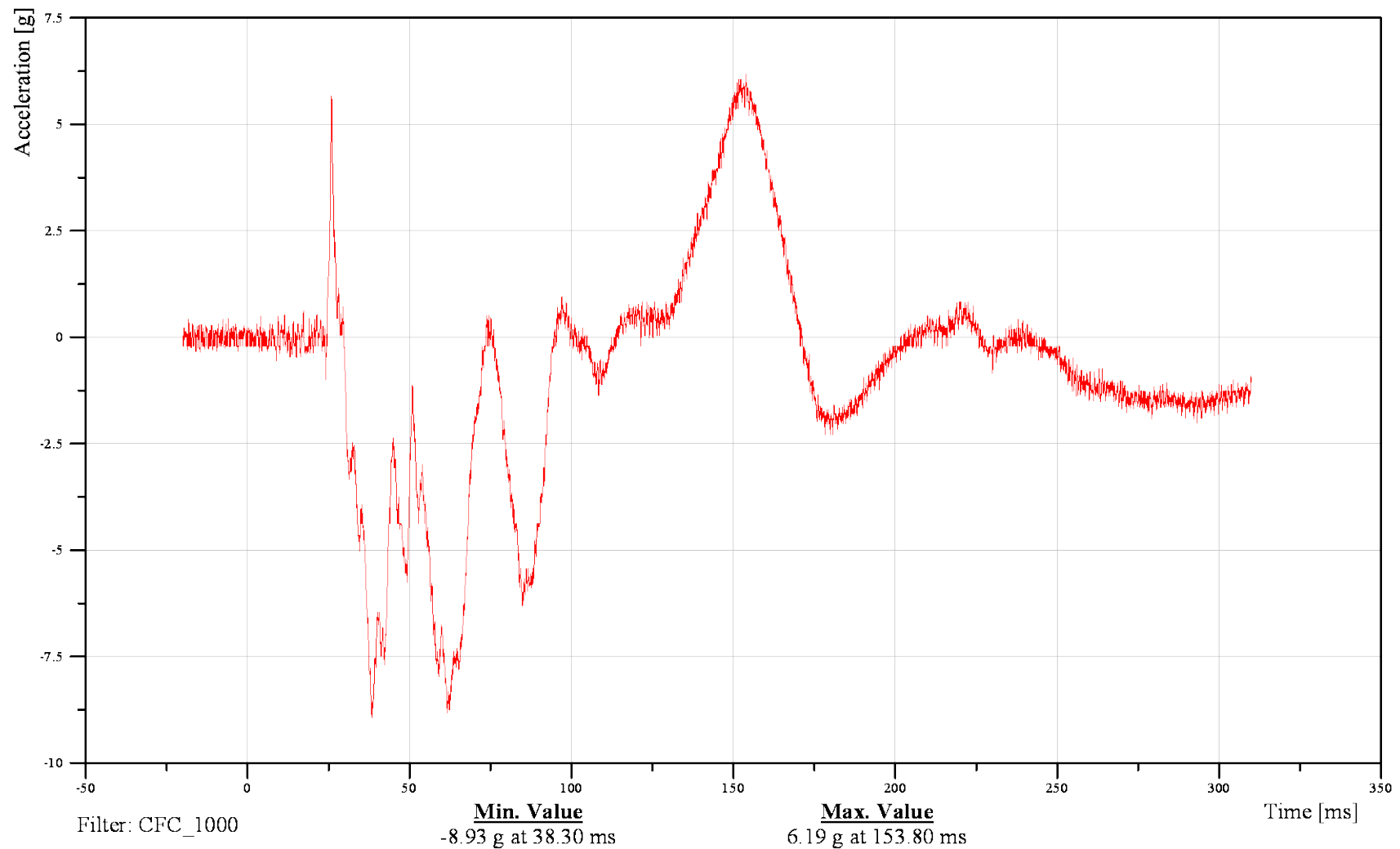
Time: 16:14

Customer: VRTC

14HEADCG00WFACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Lateral Ay

Date: 01/24/2013

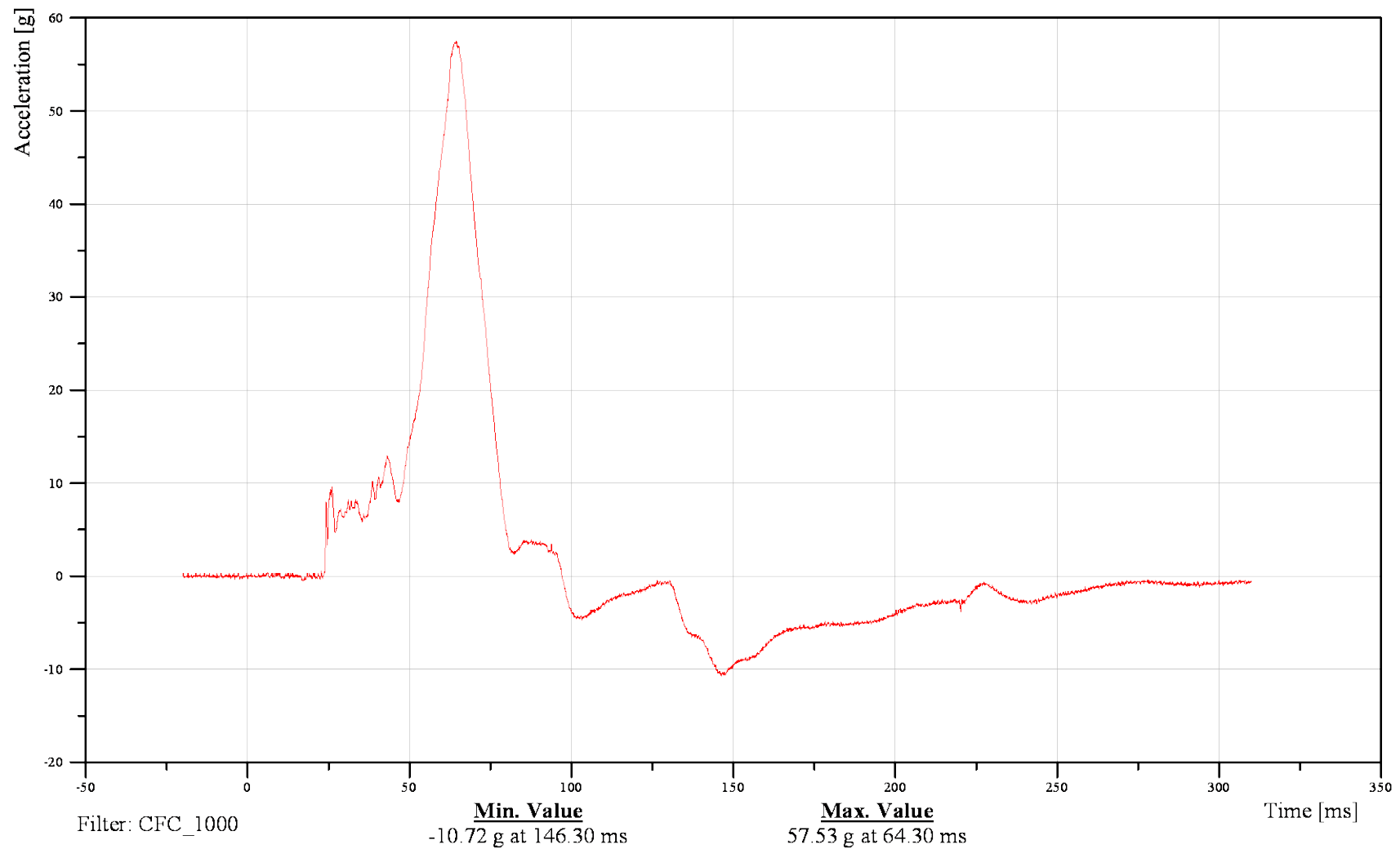
Time: 16:14

Customer: VRTC

14HEADCG00WFACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Vertical Az

Date: 01/24/2013

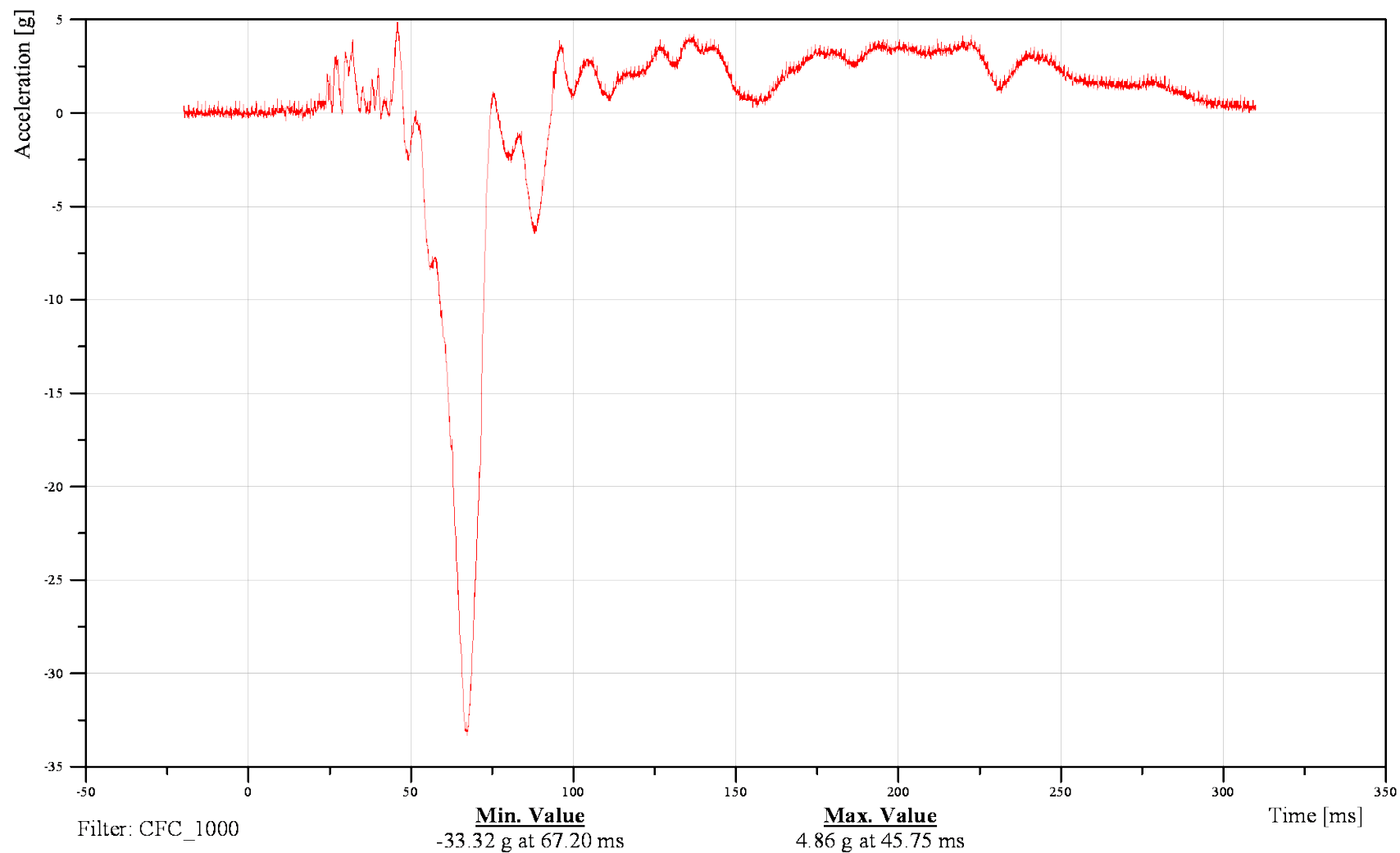
Time: 16:14

Customer: VRTC

14HEADCG00WFACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head A Resultant

Date: 01/24/2013

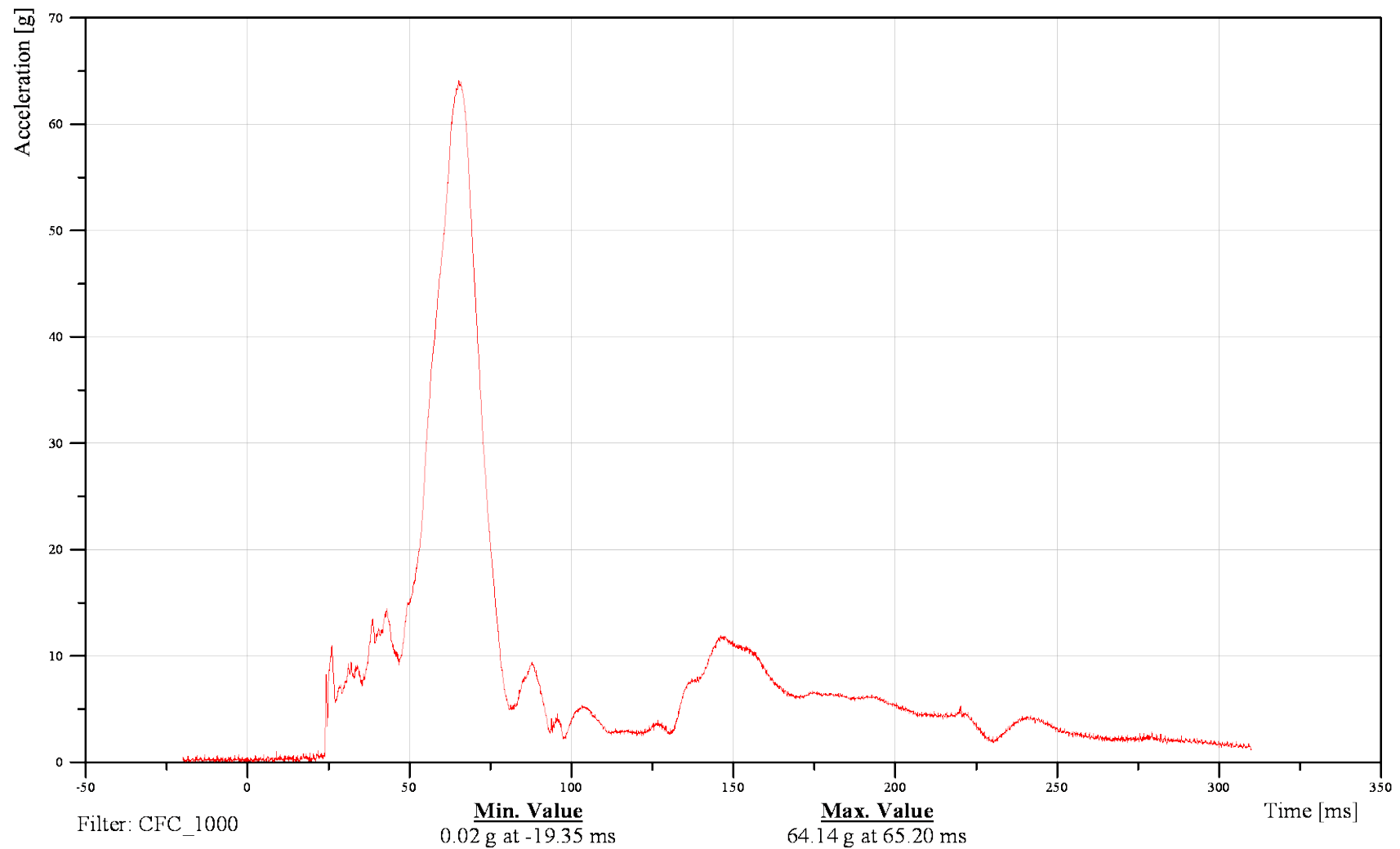
Time: 16:14

Customer: VRTC

14HEADCG00WFACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Rotational Acceleration Rx

Date: 01/24/2013

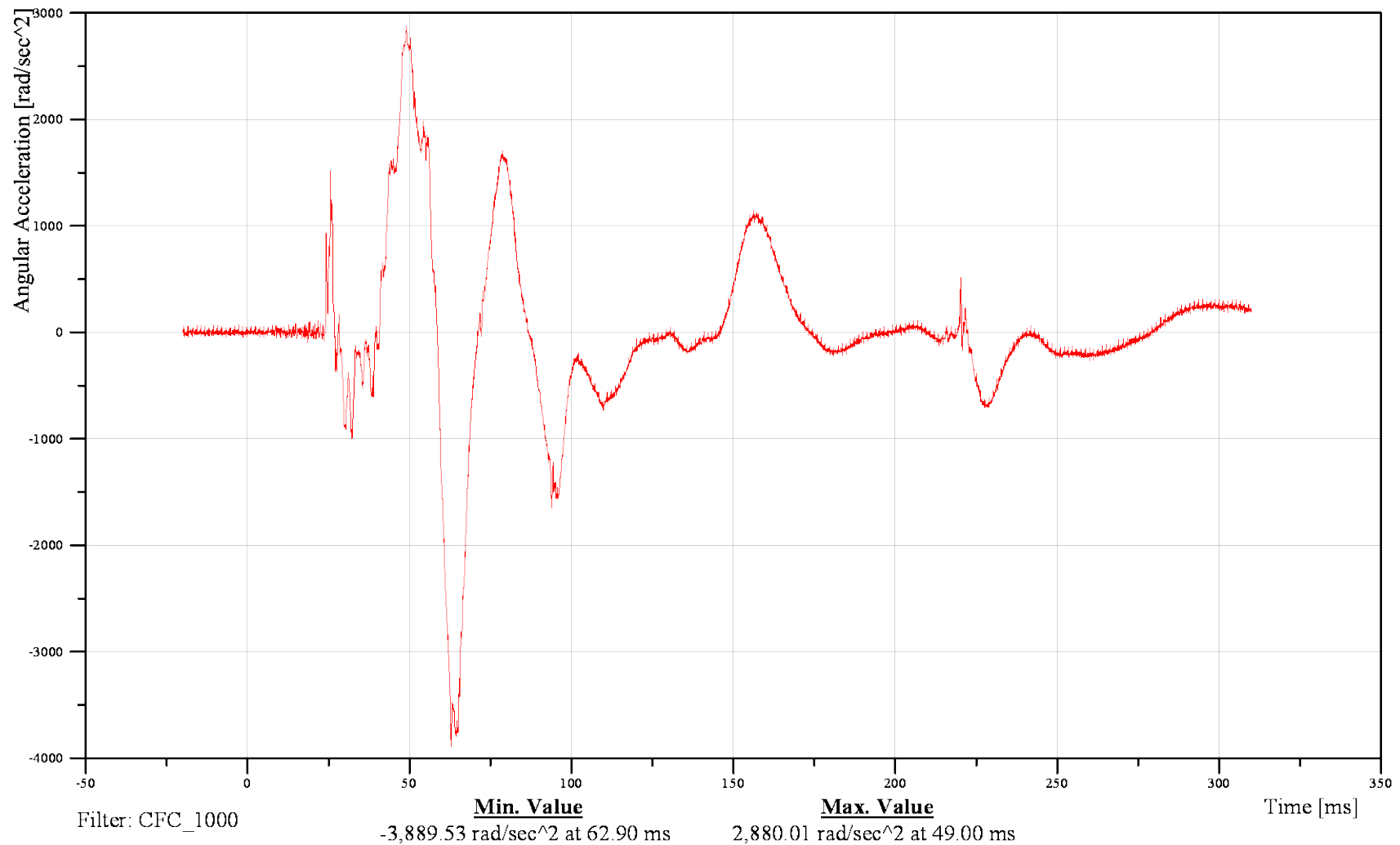
Time: 16:14

Customer: VRTC

14HEAD0000WFAAXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Rotational Acceleration Ry

Date: 01/24/2013

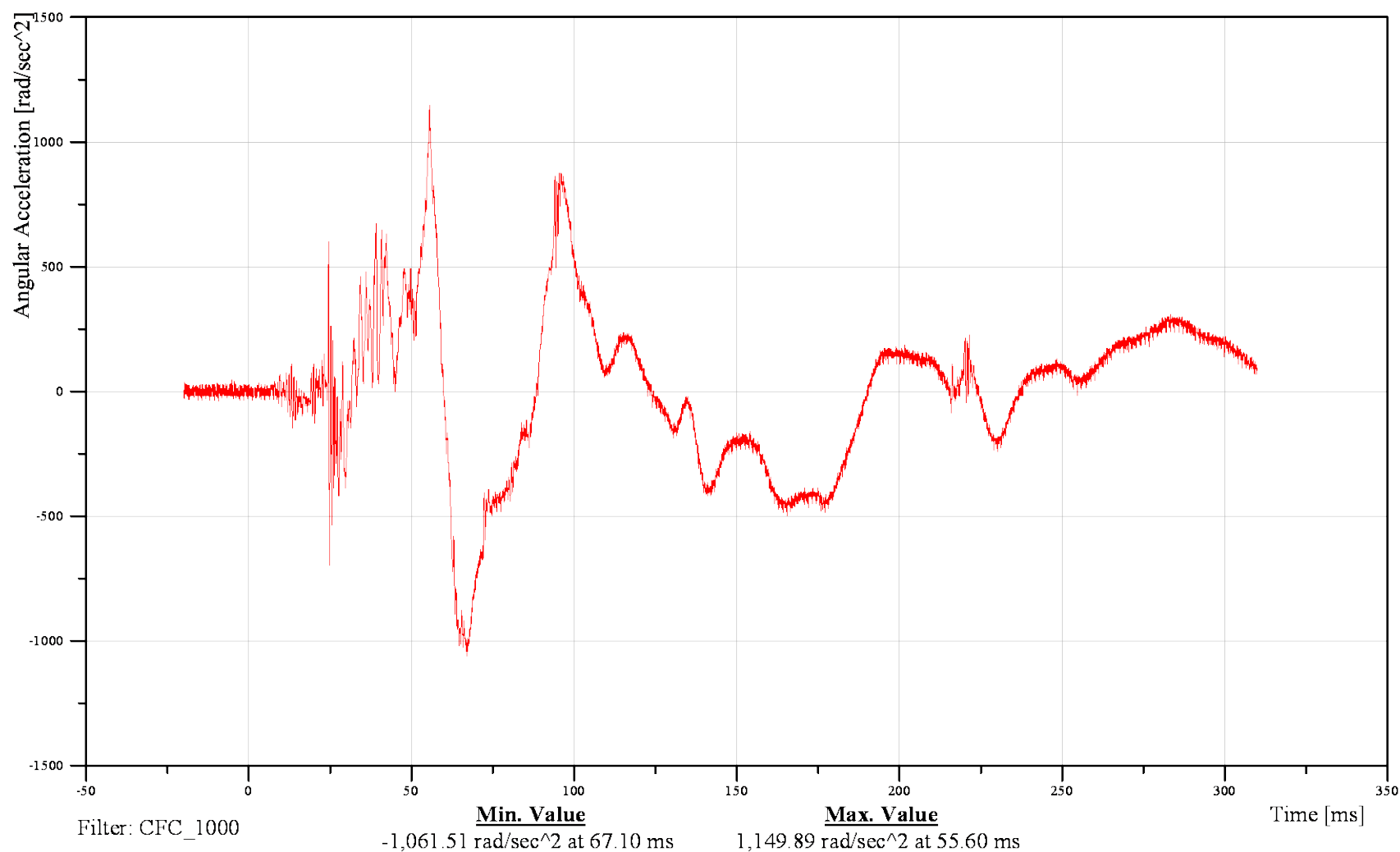
Time: 16:14

Customer: VRTC

14HEAD0000WFAAYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Rotational Acceleration Rz

Date: 01/24/2013

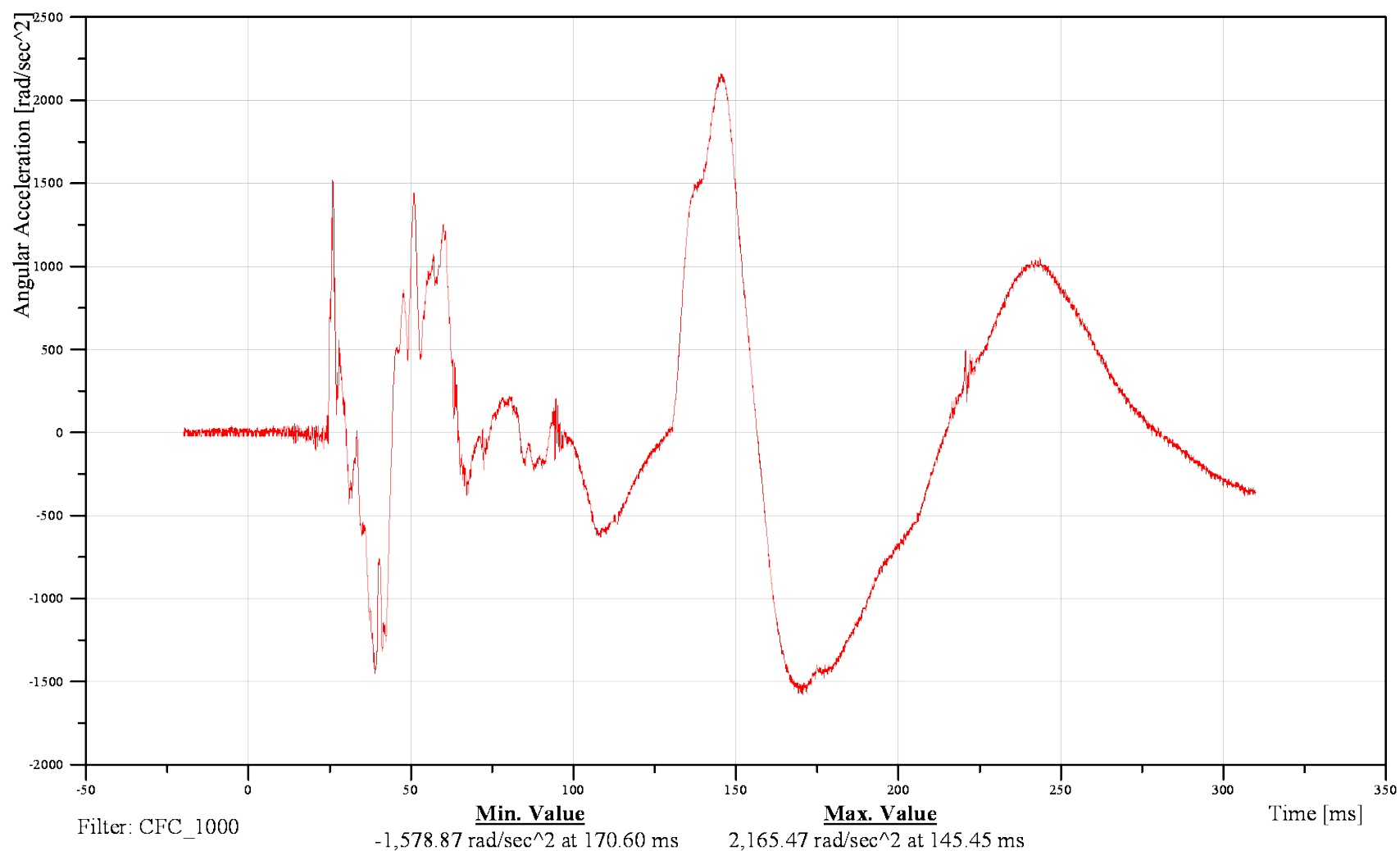
Time: 16:14

Customer: VRTC

14HEAD0000WFAAZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head X-Axis Angular Velocity

Date: 01/24/2013

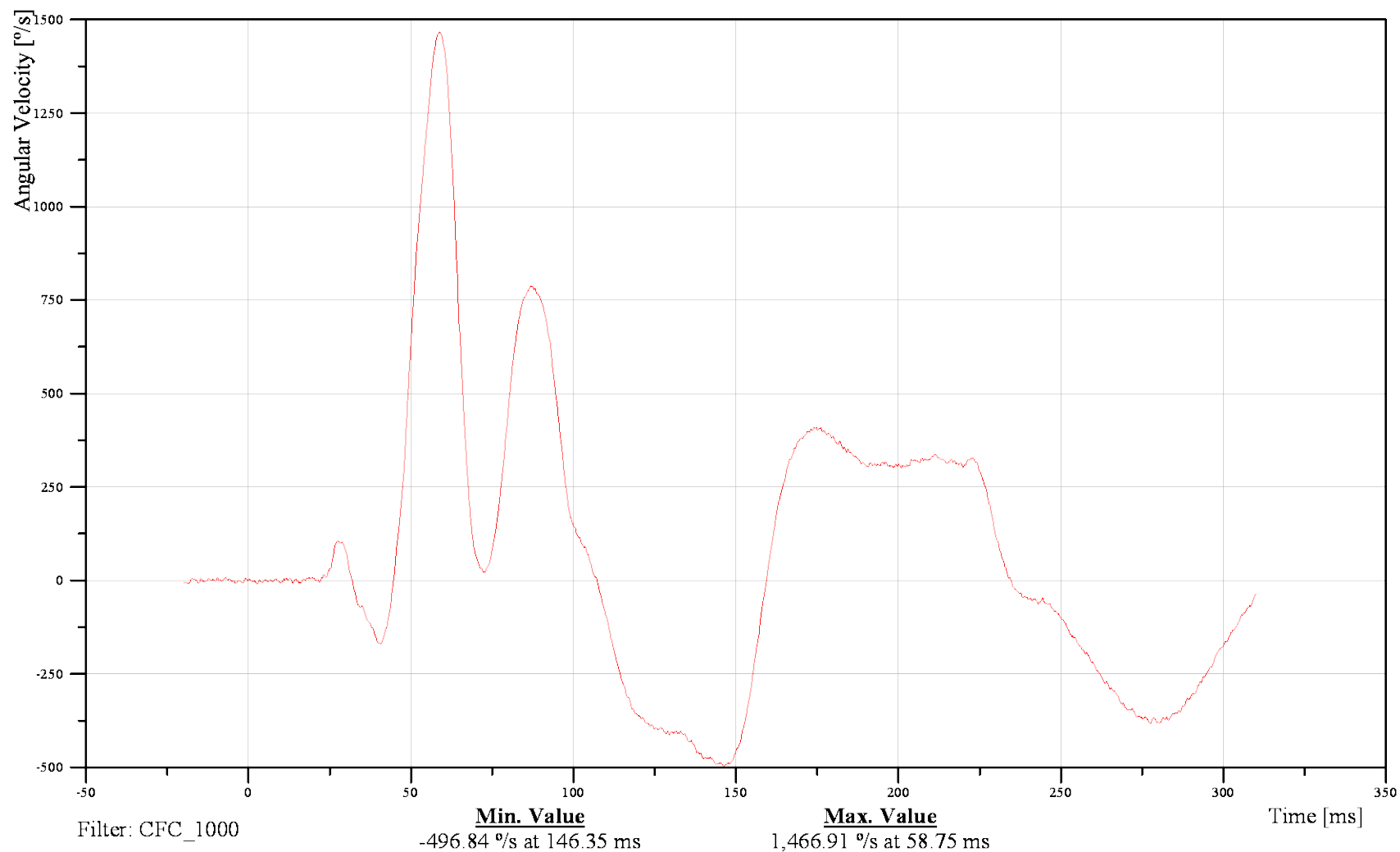
Time: 16:14

Customer: VRTC

14HEADCG00WFAVXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Y-Axis Angular Velocity

Date: 01/24/2013

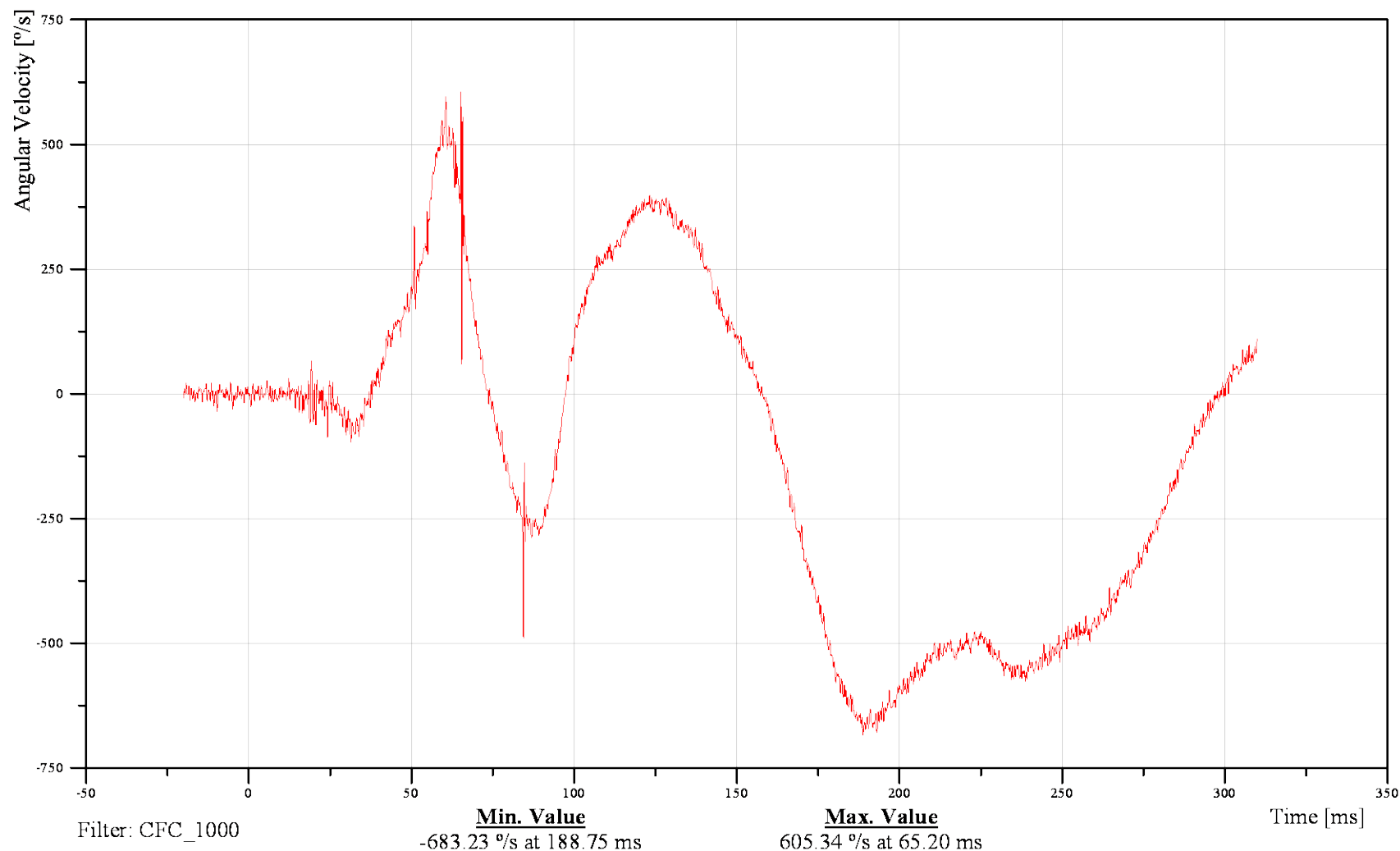
Time: 16:14

Customer: VRTC

14HEADCG00WFAVYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Z-Axis Angular Velocity

Date: 01/24/2013

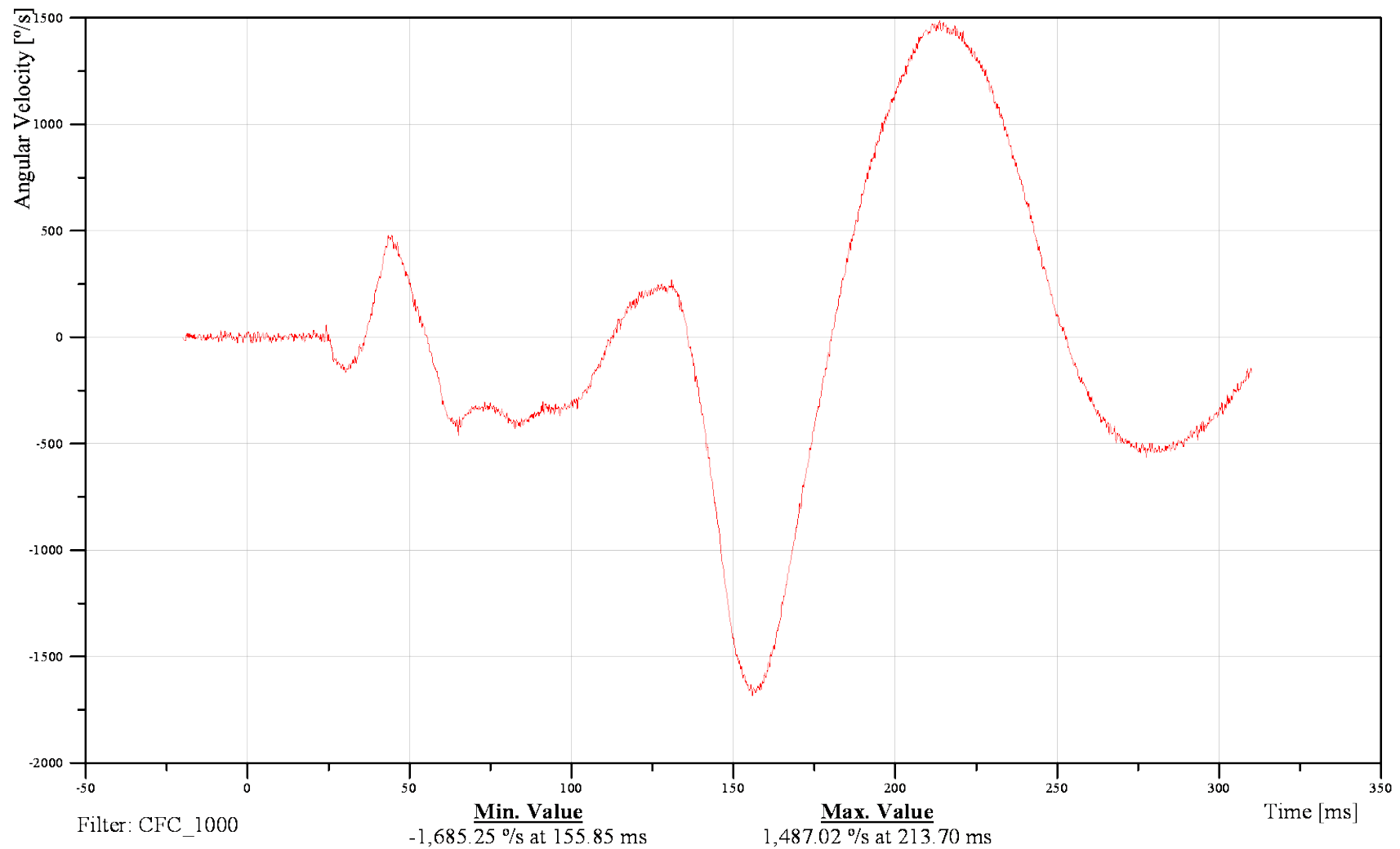
Time: 16:14

Customer: VRTC

14HEADCG00WFAVZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Force Fx

Date: 01/24/2013

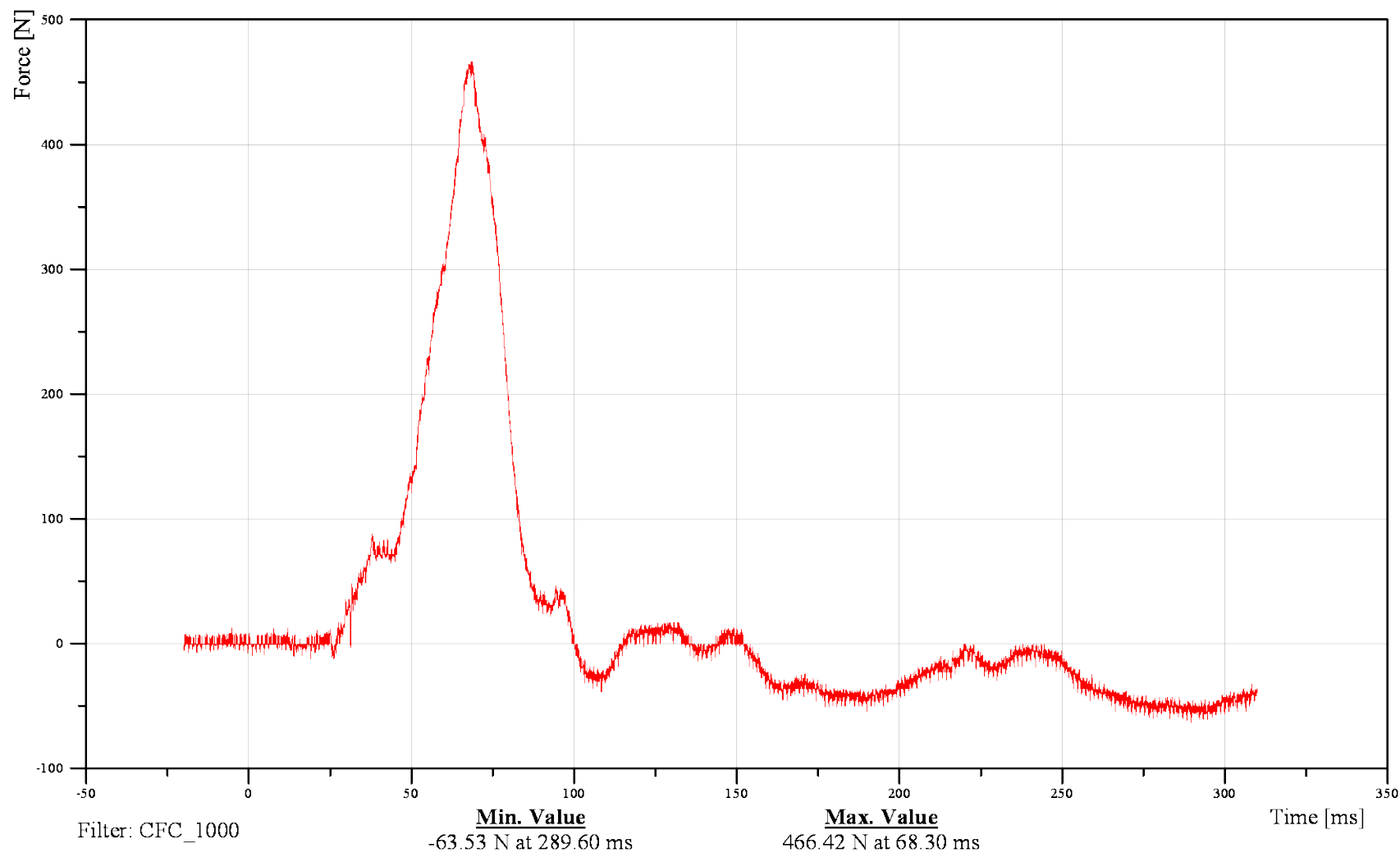
Time: 16:14

Customer: VRTC

14NECKUP00WFFOXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Force Fy

Date: 01/24/2013

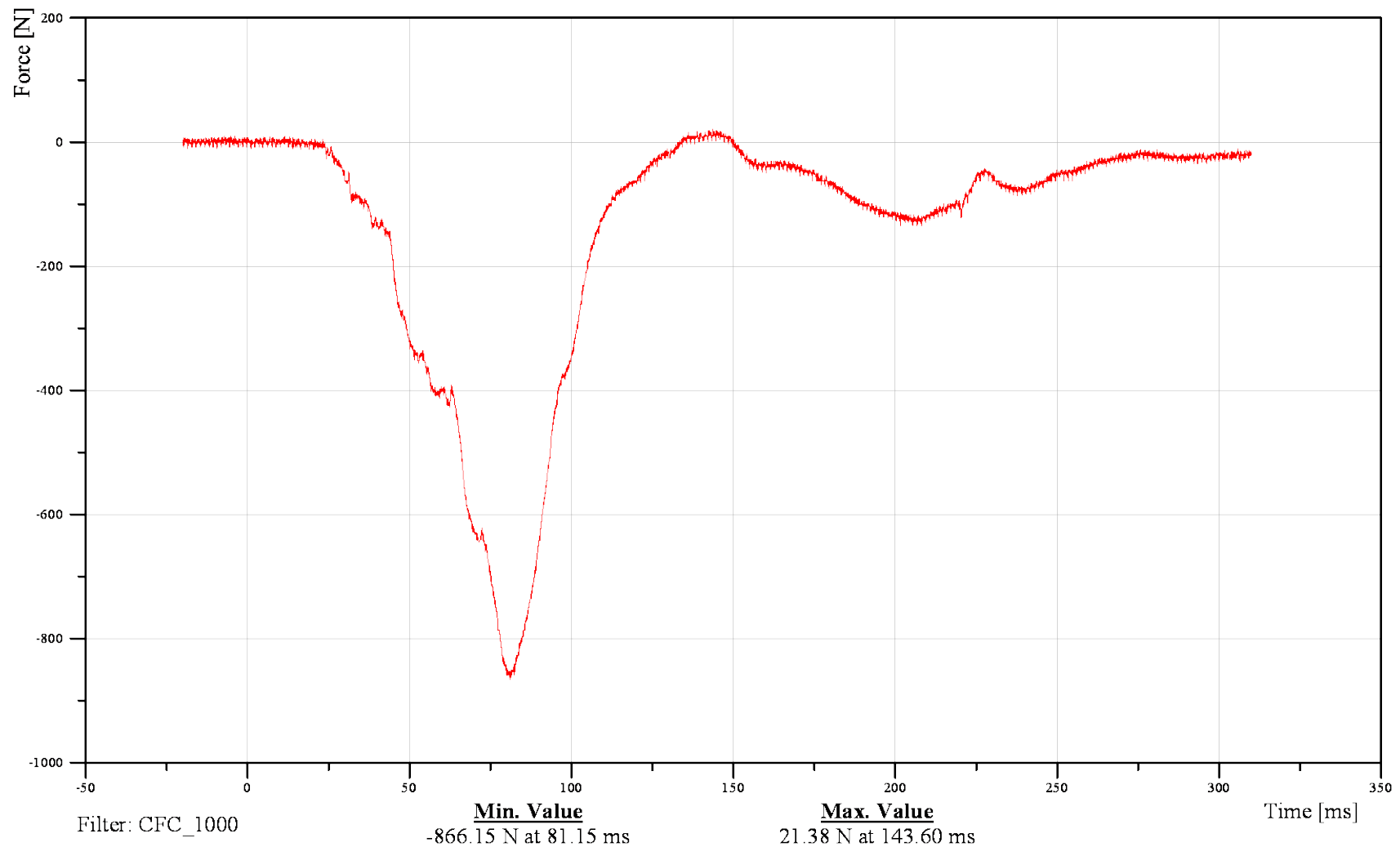
Time: 16:14

Customer: VRTC

14NECKUP00WFFOYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Force Fz

Date: 01/24/2013

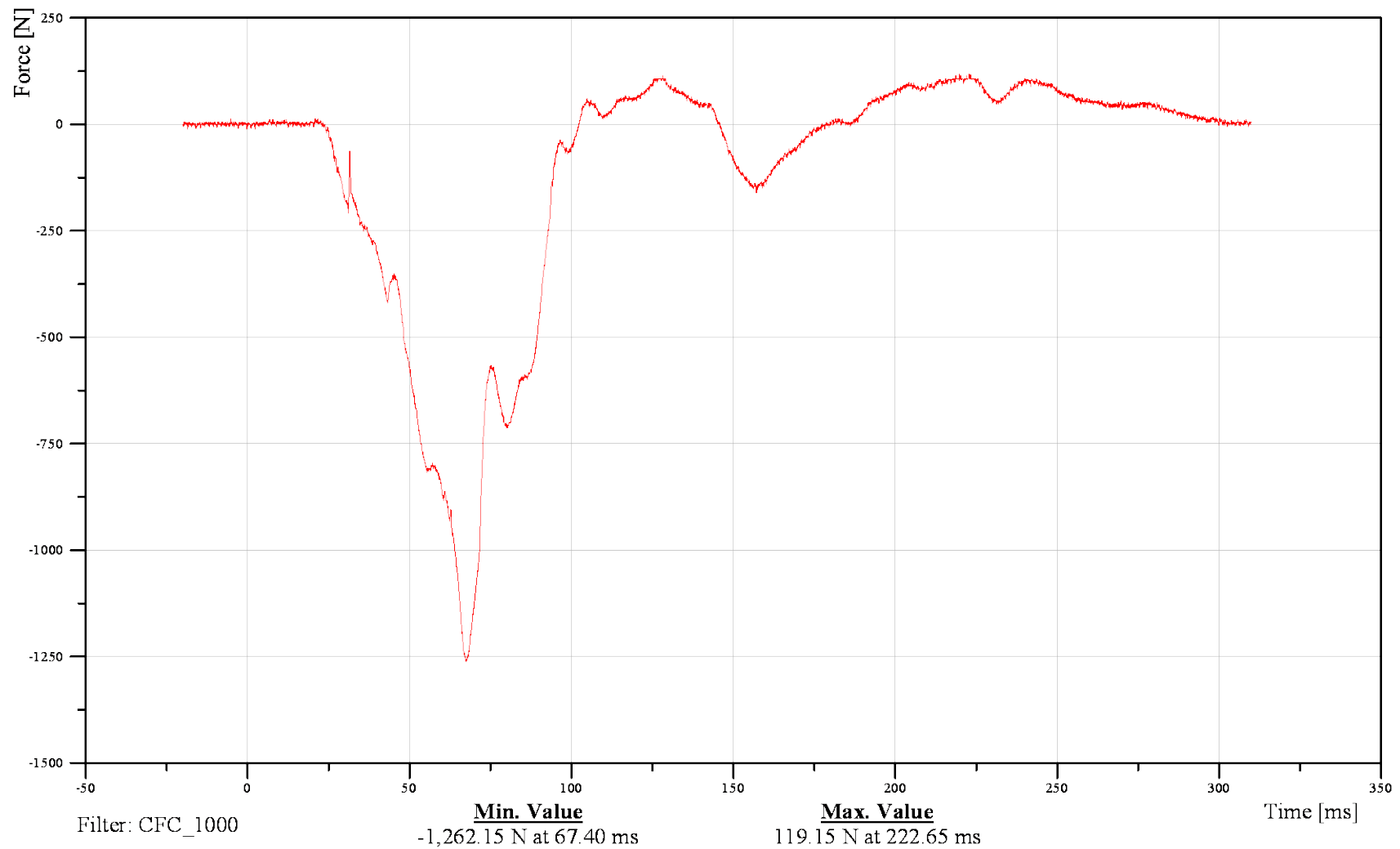
Time: 16:14

Customer: VRTC

14NECKUP00WFFOZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Moment Mx

Date: 01/24/2013

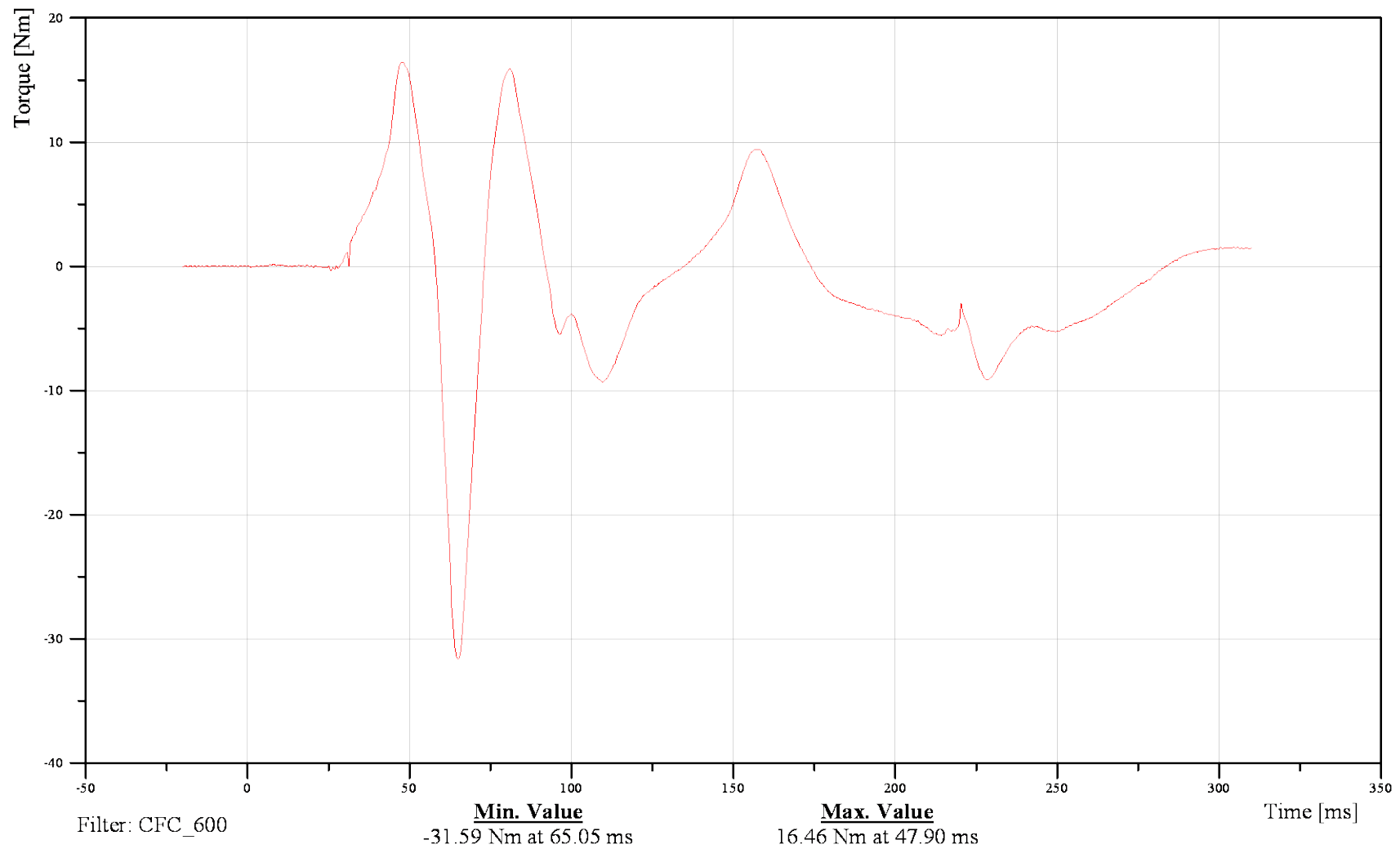
Time: 16:14

Customer: VRTC

14NECKUP00WFM0XB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Moment My

Date: 01/24/2013

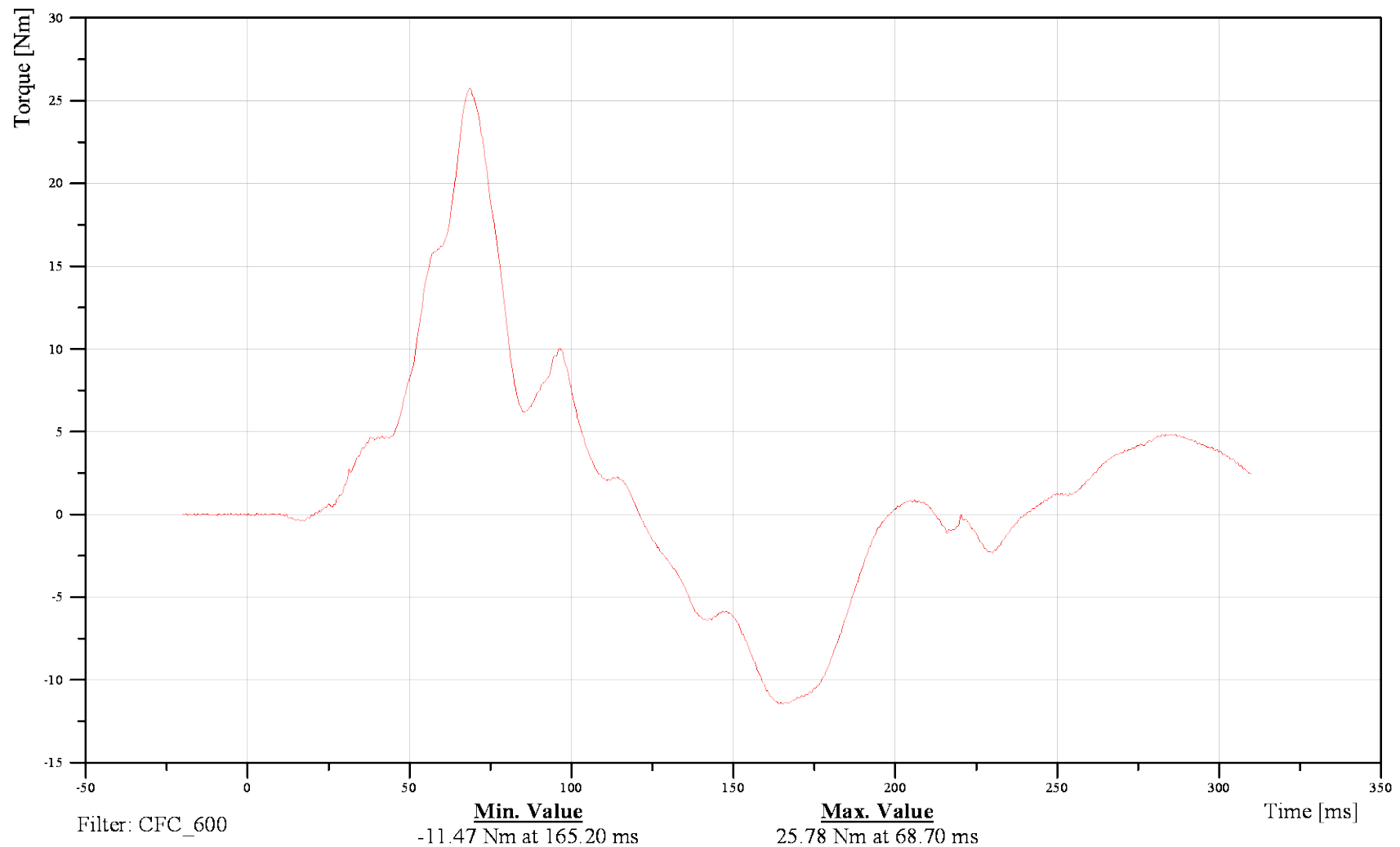
Time: 16:14

Customer: VRTC

14NECKUP00WFM0YB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Upper Moment Mz

Date: 01/24/2013

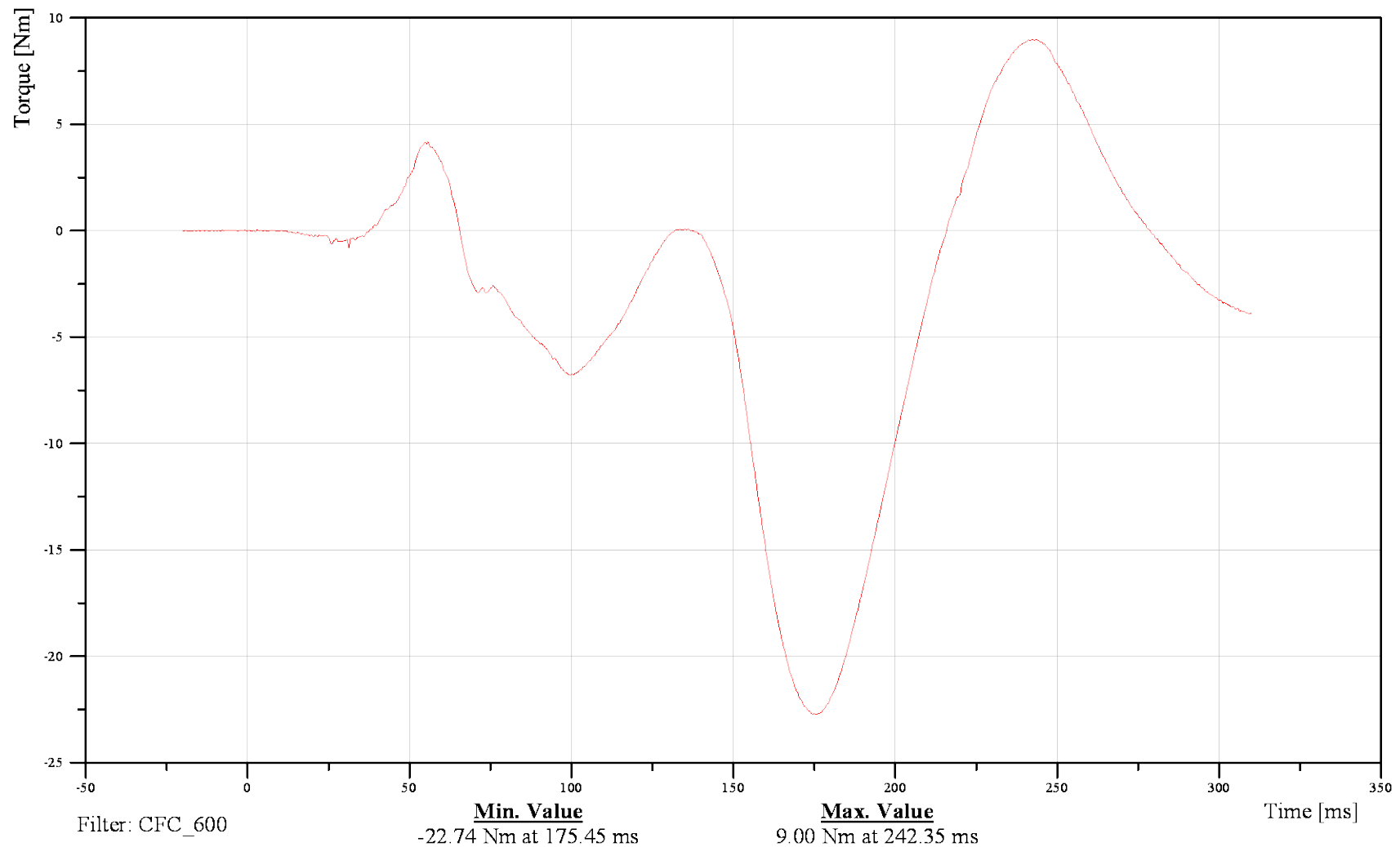
Time: 16:14

Customer: VRTC

14NECKUP00WFMOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Force Fx

Date: 01/24/2013

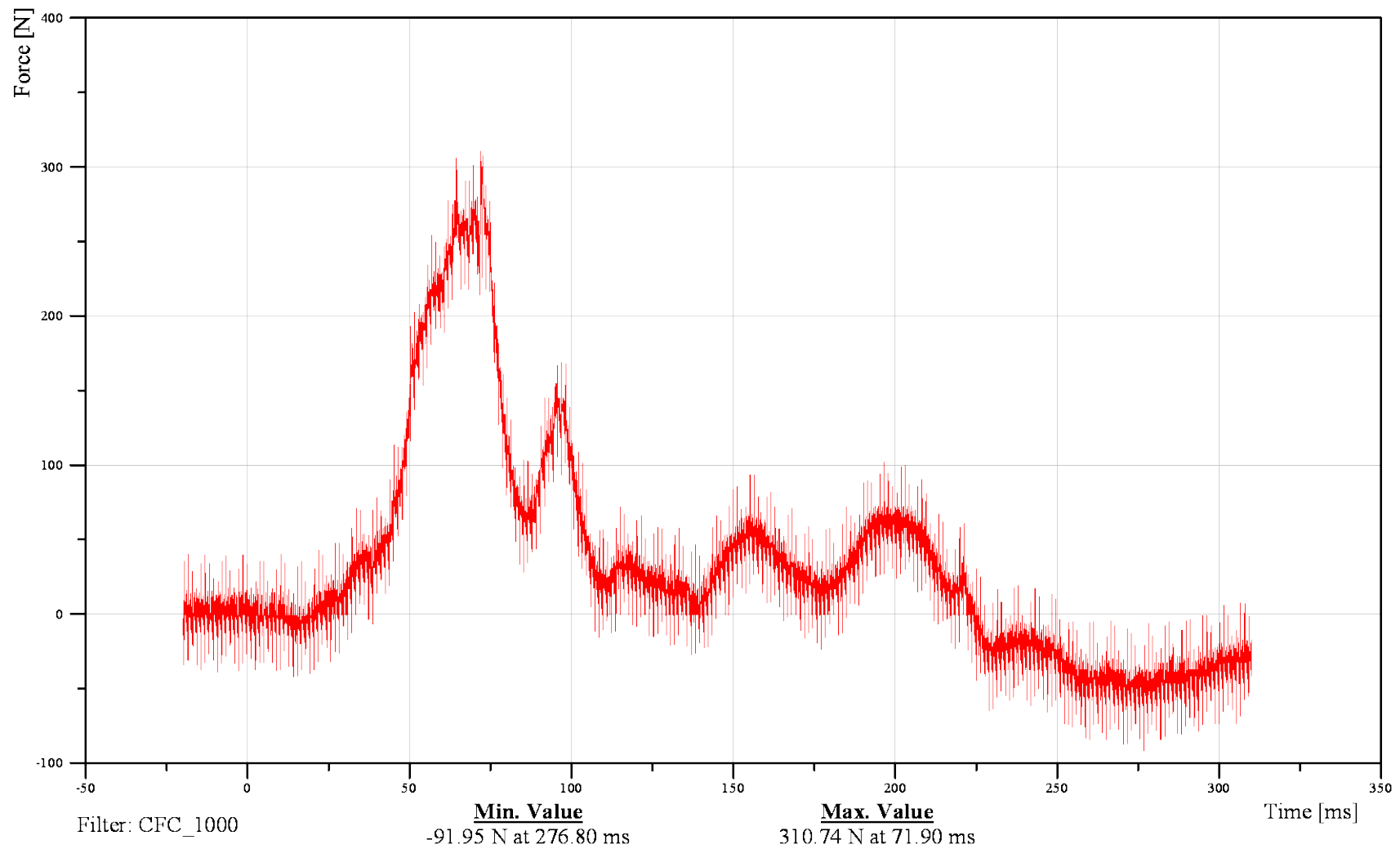
Time: 16:14

Customer: VRTC

14NECKLO00WFFOXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Force Fy

Date: 01/24/2013

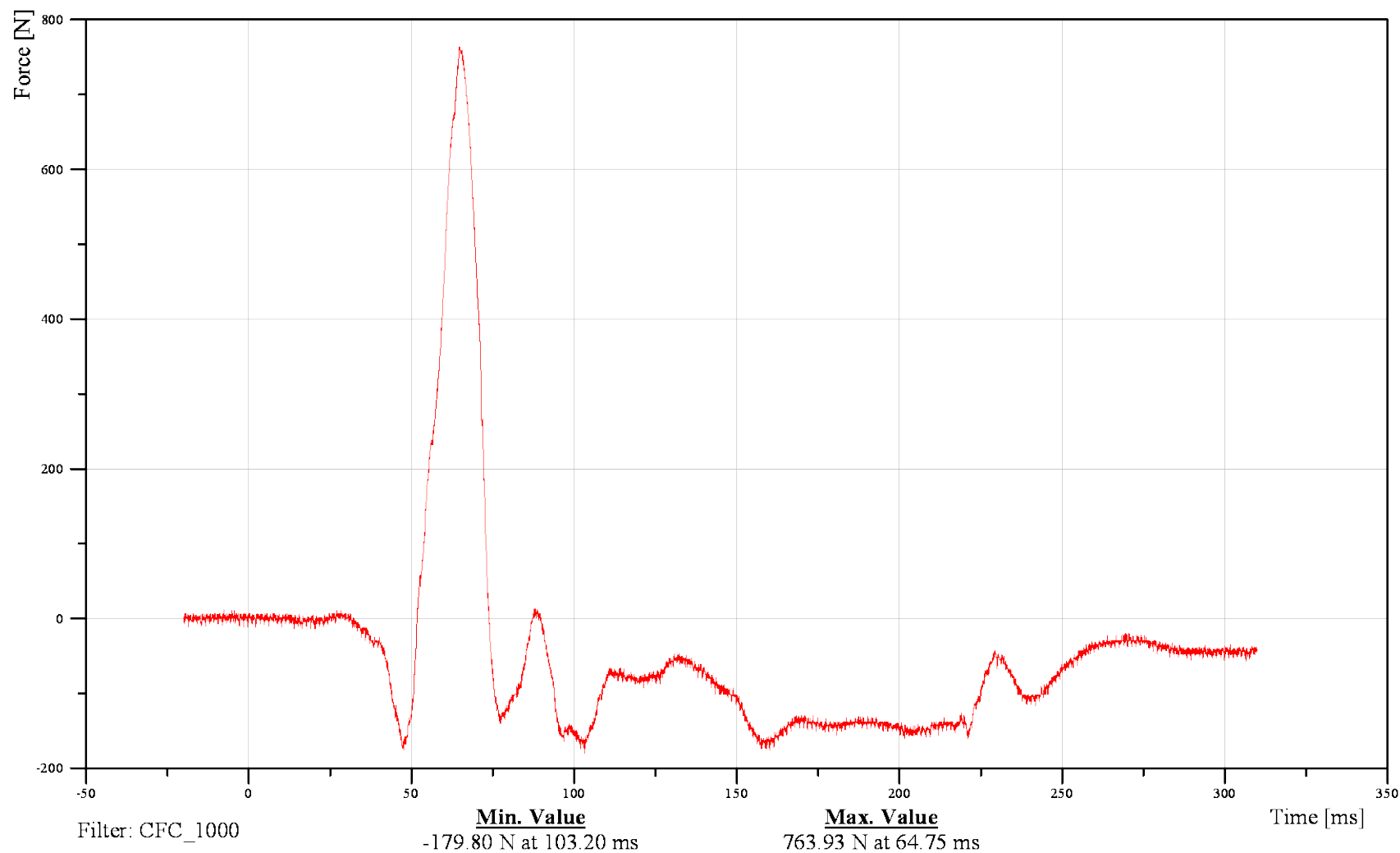
Time: 16:14

Customer: VRTC

14NECKLO00WFFOYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Force Fz

Date: 01/24/2013

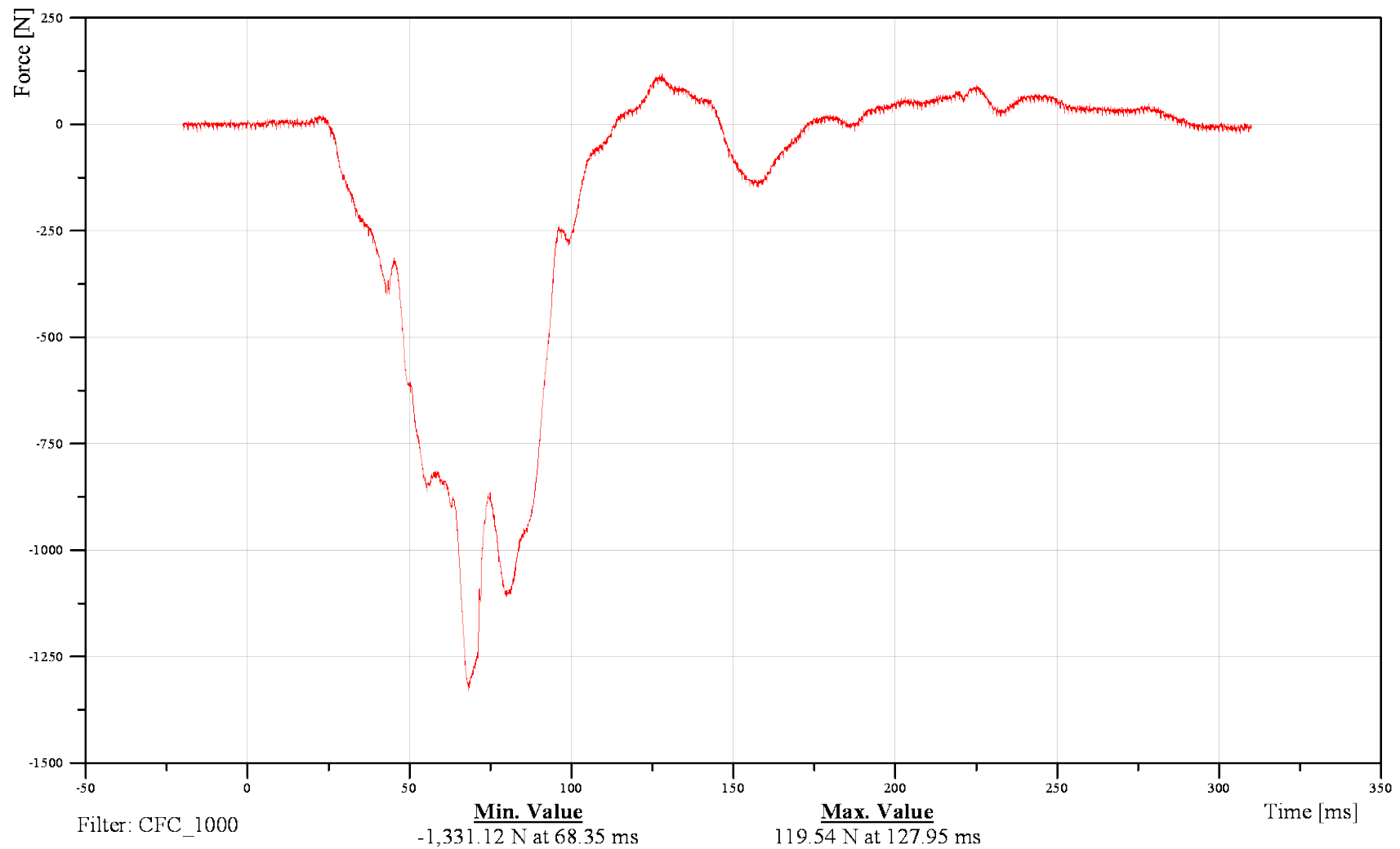
Time: 16:14

Customer: VRTC

14NECKLO00WFFOZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Moment Mx

Date: 01/24/2013

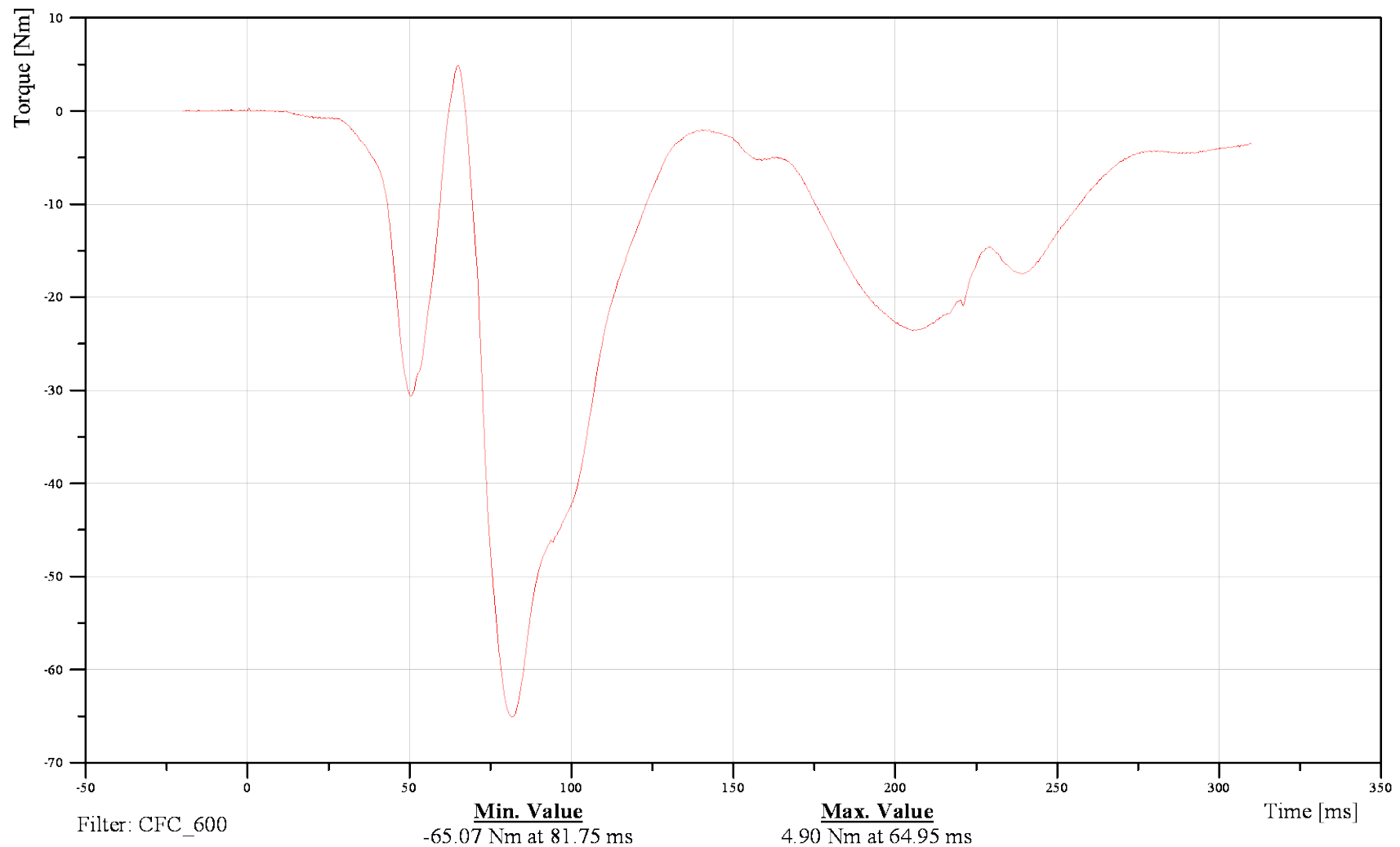
Time: 16:14

Customer: VRTC

14NECKLO00WFM0XB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Moment My

Date: 01/24/2013

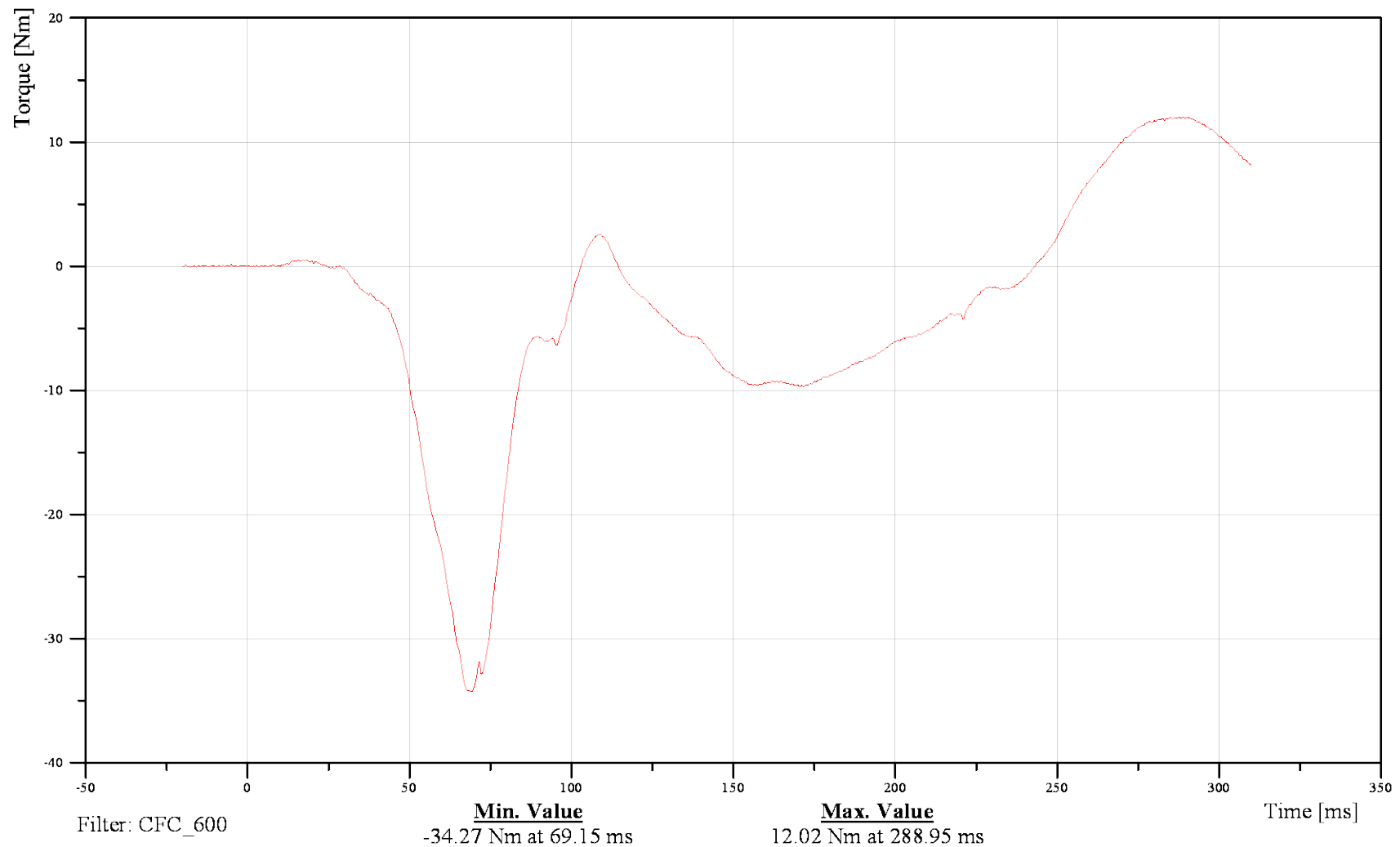
Time: 16:14

Customer: VRTC

14NECKLO00WFM0YB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Neck Lower Moment Mz

Date: 01/24/2013

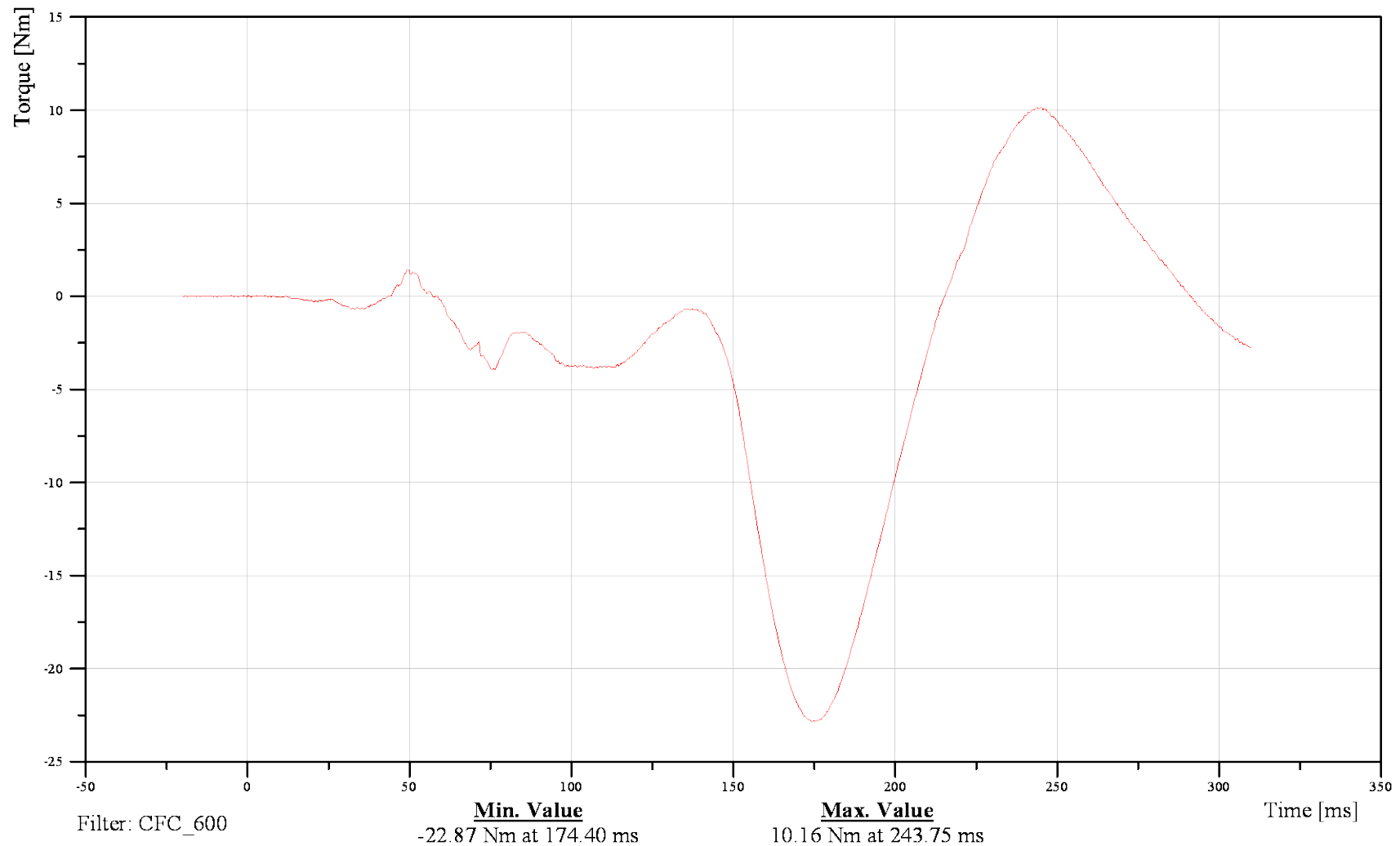
Time: 16:14

Customer: VRTC

14NECKLO00WFMOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Longitudinal Ax

Date: 01/24/2013

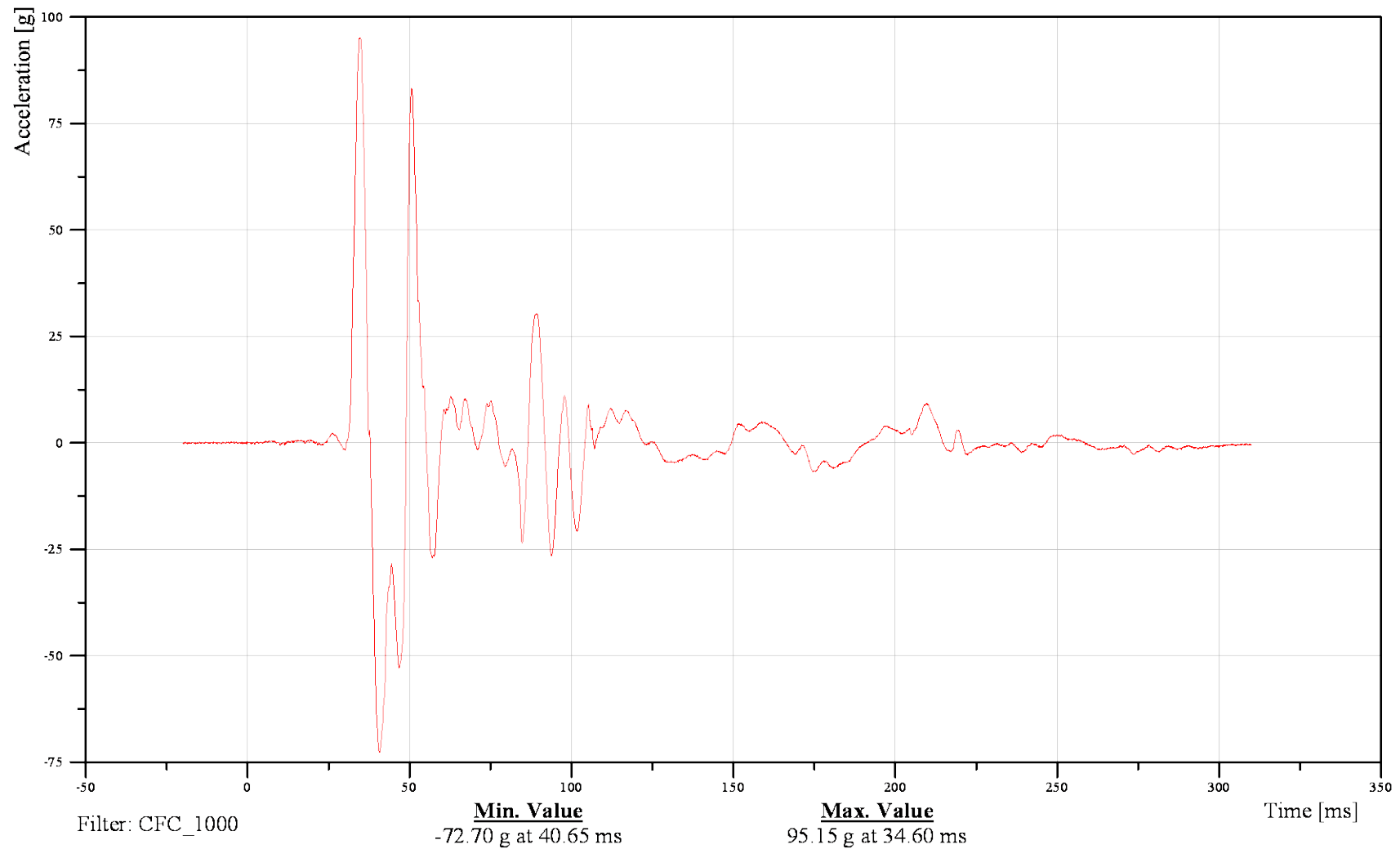
Time: 16:14

Customer: VRTC

14SHLDLE00WFACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Lateral Ay

Date: 01/24/2013

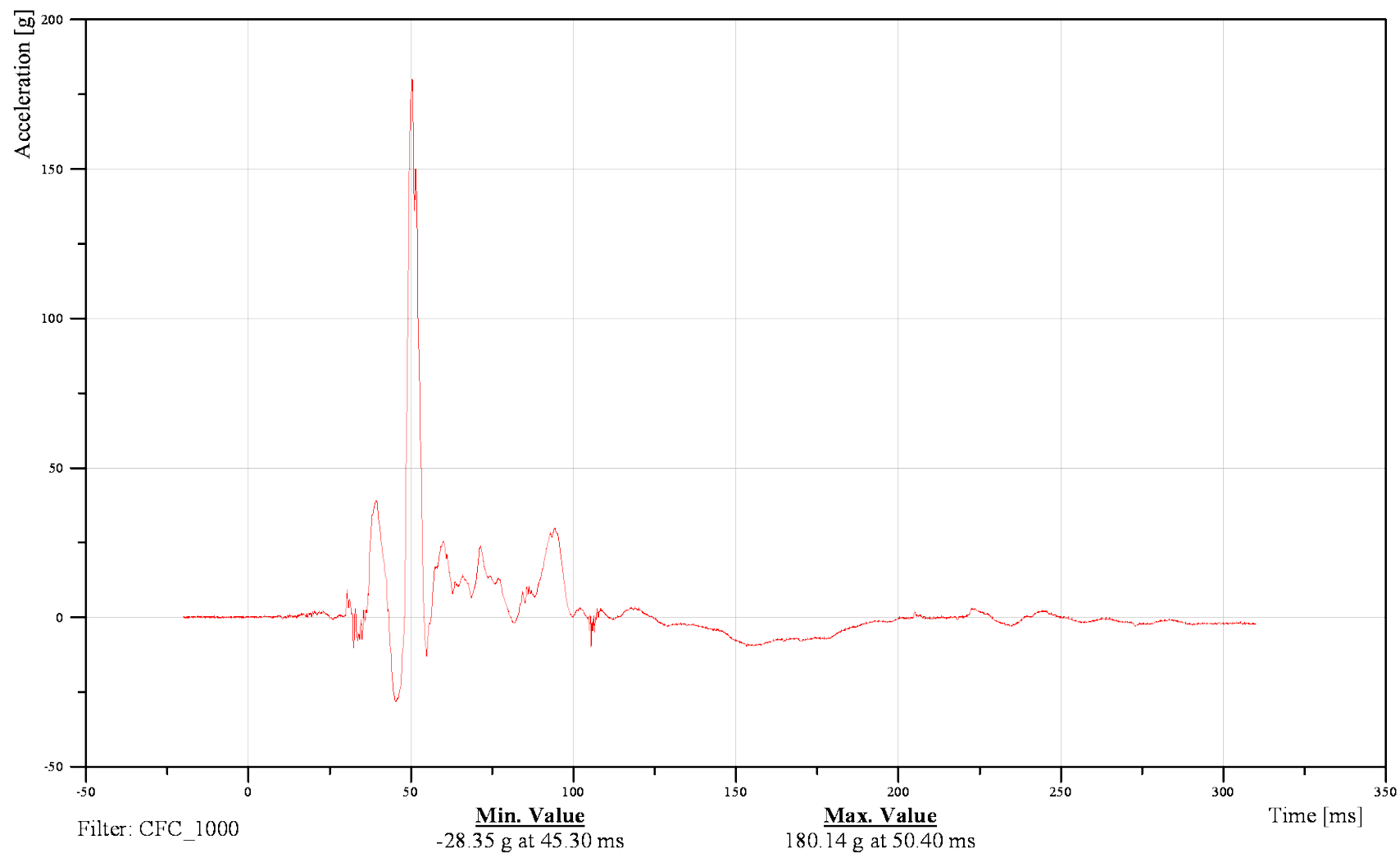
Time: 16:14

Customer: VRTC

14SHLDLE00WFACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Vertical Az

Date: 01/24/2013

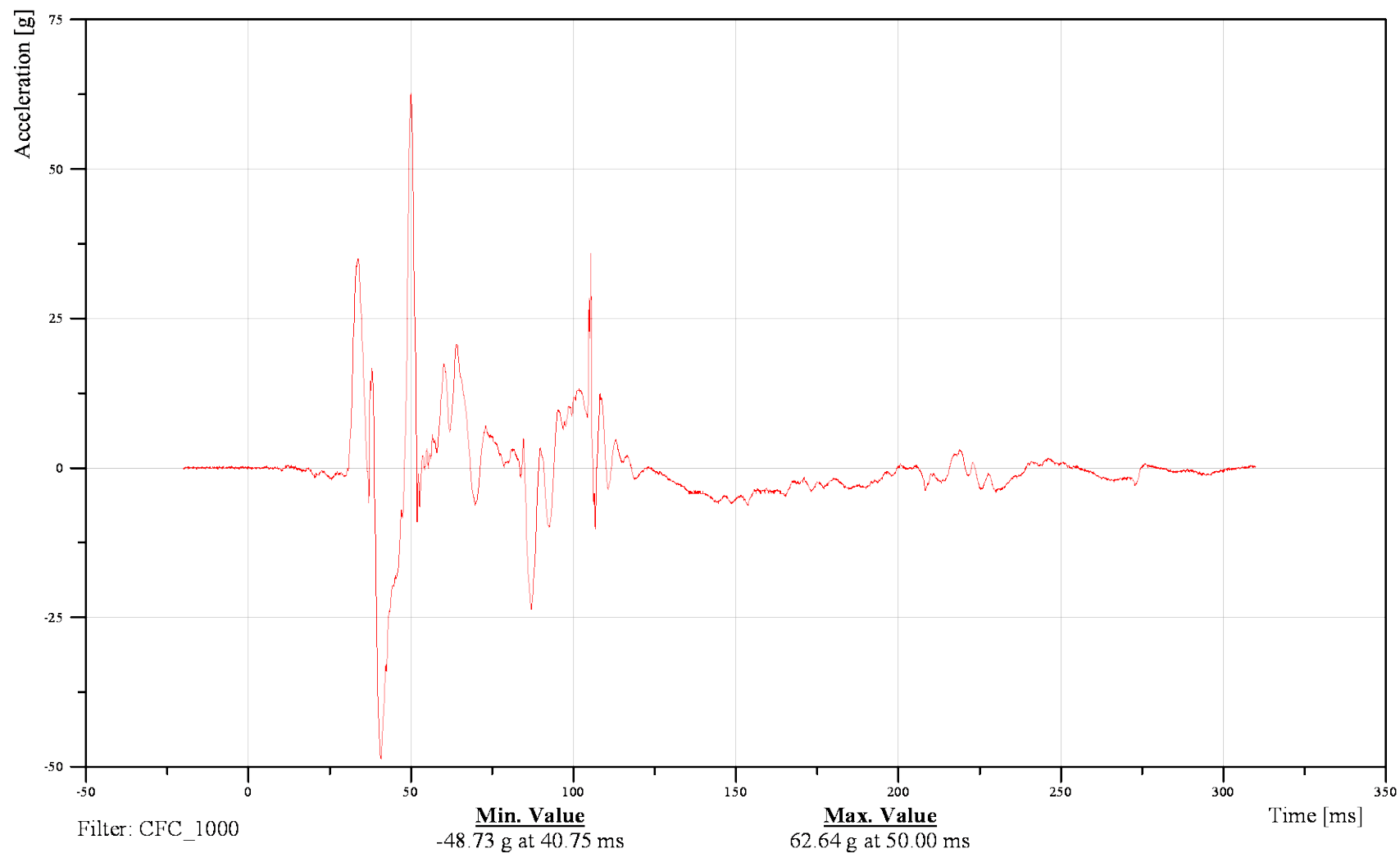
Time: 16:14

Customer: VRTC

14SHLDLE00WFACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder A Resultant

Date: 01/24/2013

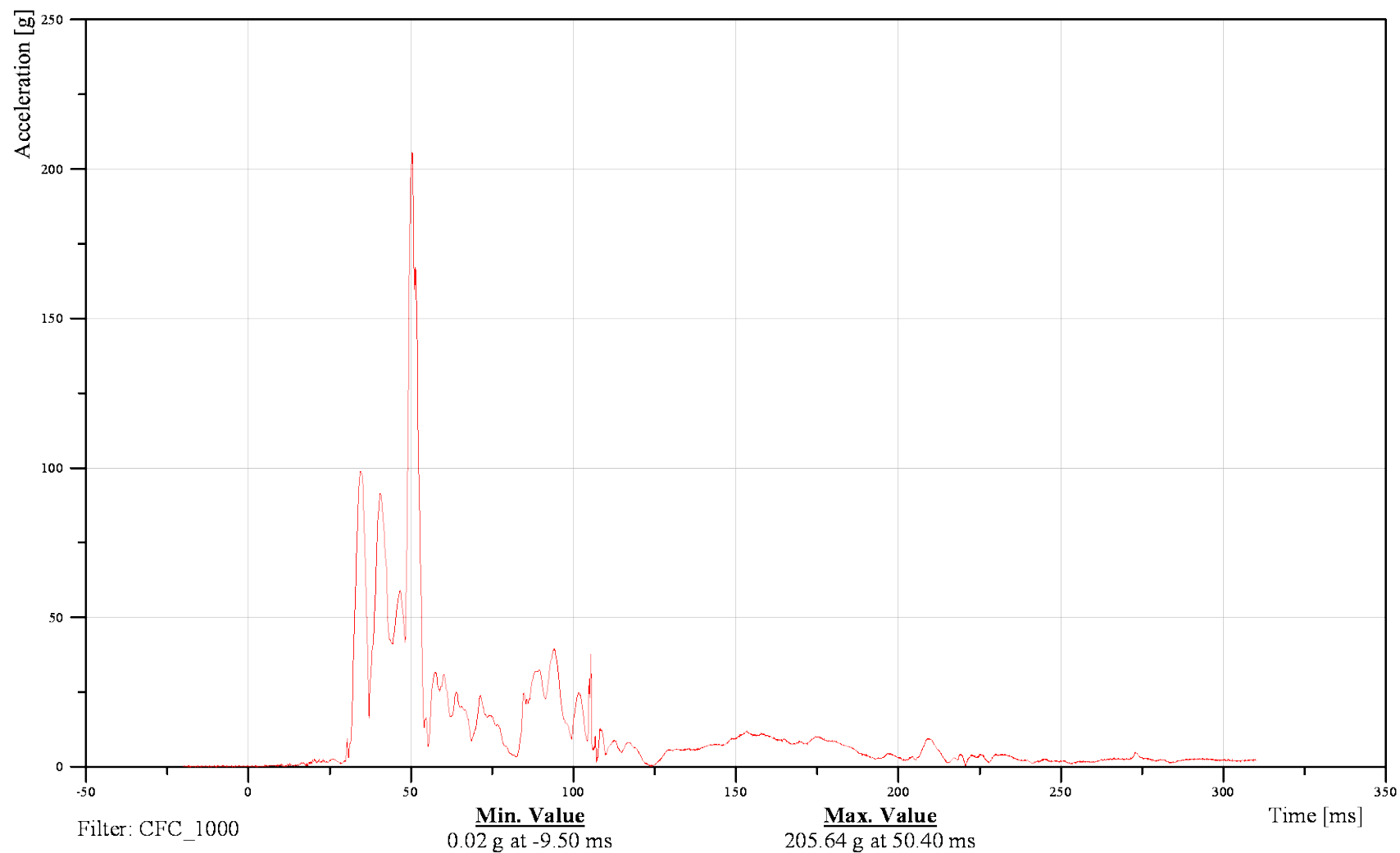
Time: 16:14

Customer: VRTC

14SHLDLE00WFACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Force Fx

Date: 01/24/2013

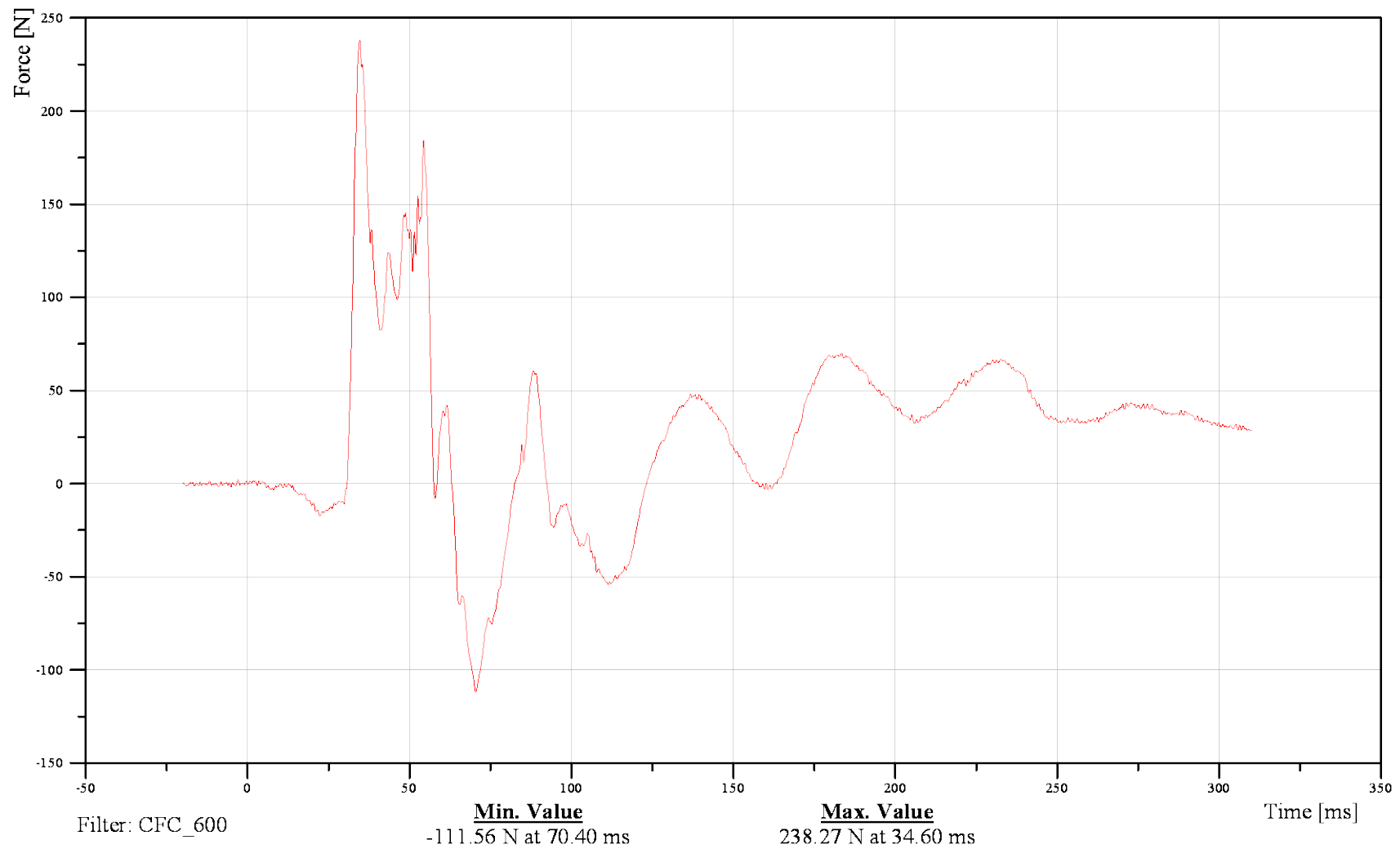
Time: 16:14

Customer: VRTC

14SHLDLE00WFFOXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Force Fy

Date: 01/24/2013

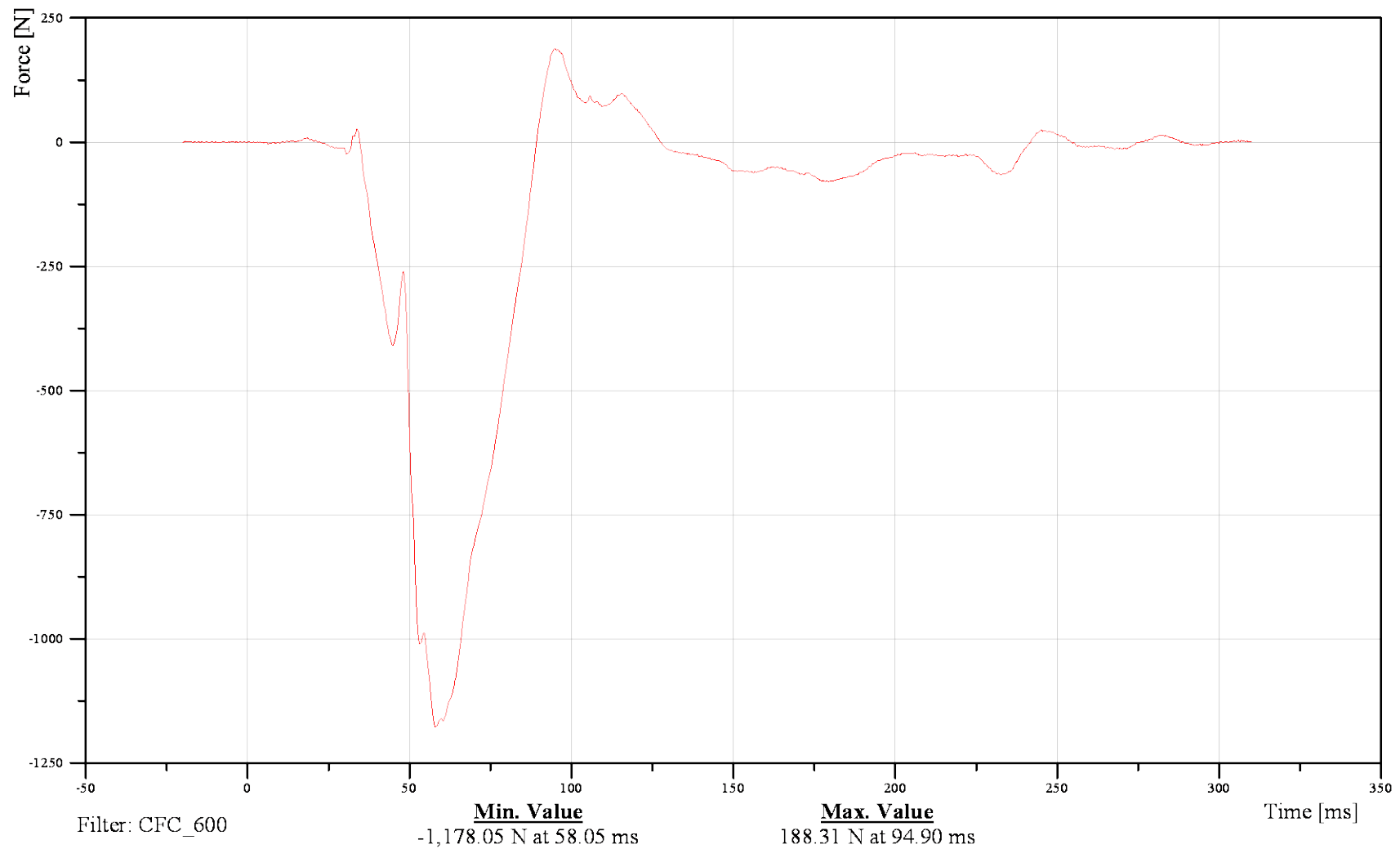
Time: 16:14

Customer: VRTC

14SHLDLE00WFFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Force Fz

Date: 01/24/2013

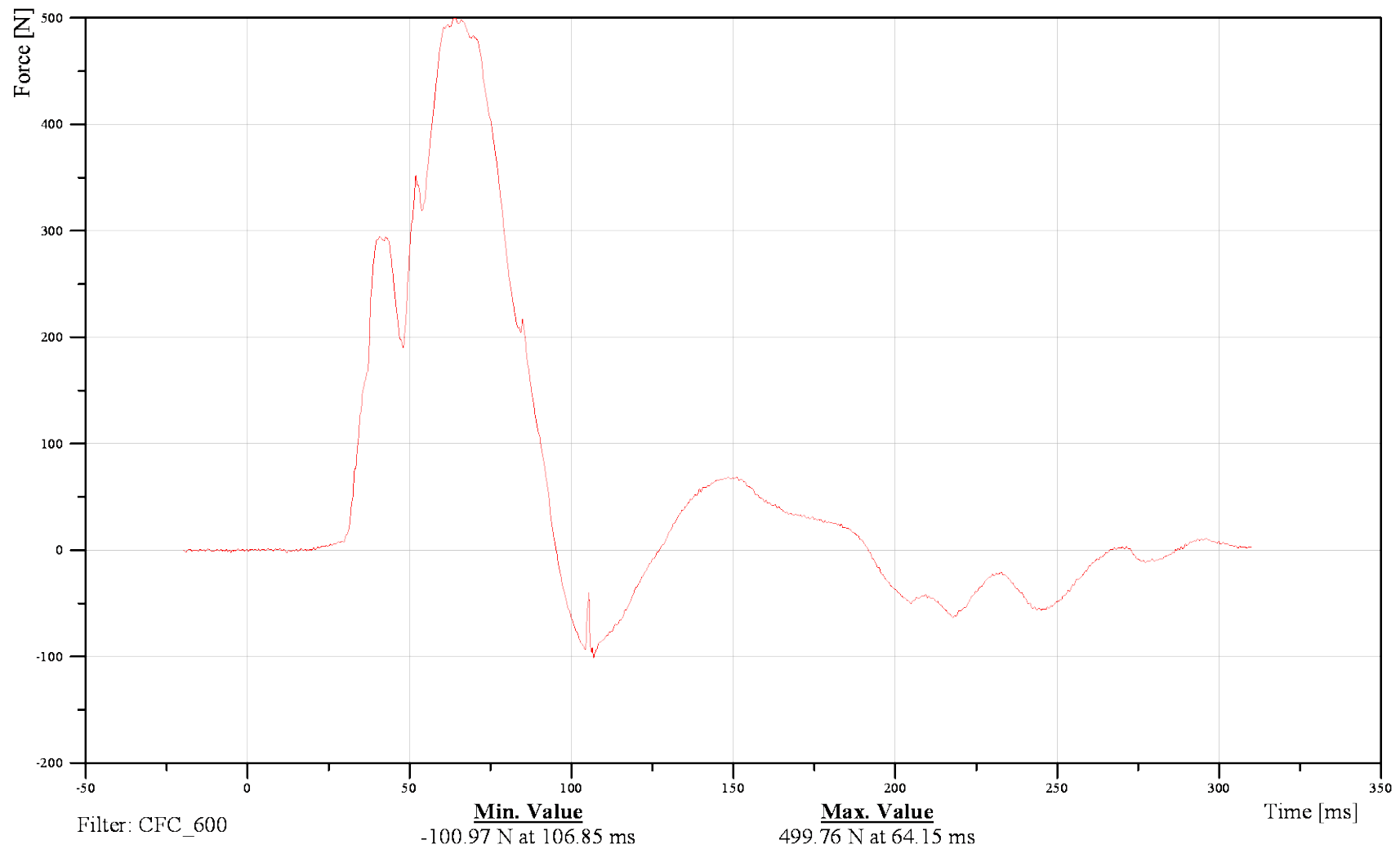
Time: 16:14

Customer: VRTC

14SHLDLE00WFFOZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Displacement Dy

Date: 01/24/2013

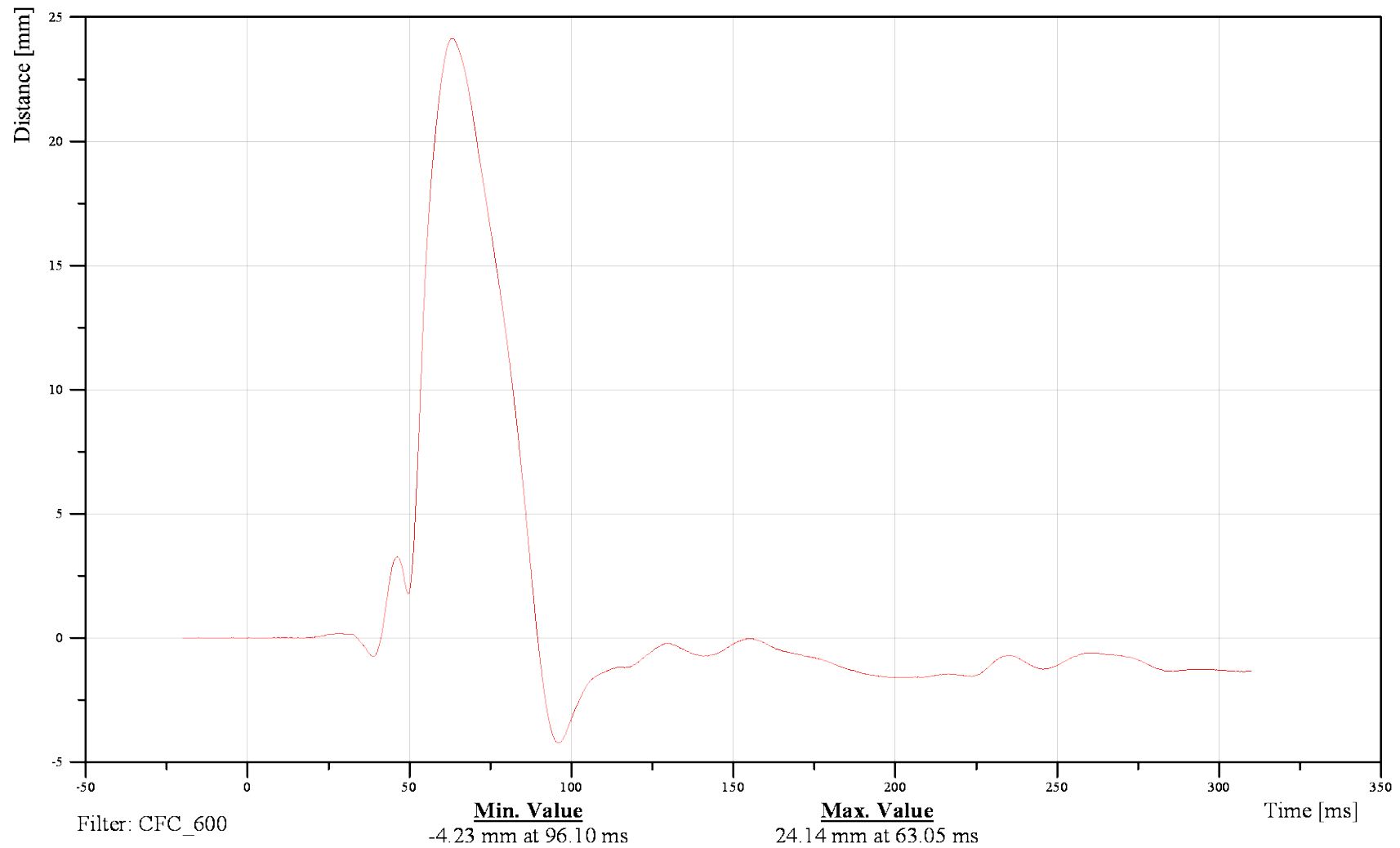
Time: 16:14

Customer: VRTC

14SHLDLE00WFDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 Longitudinal Ax

Date: 01/24/2013

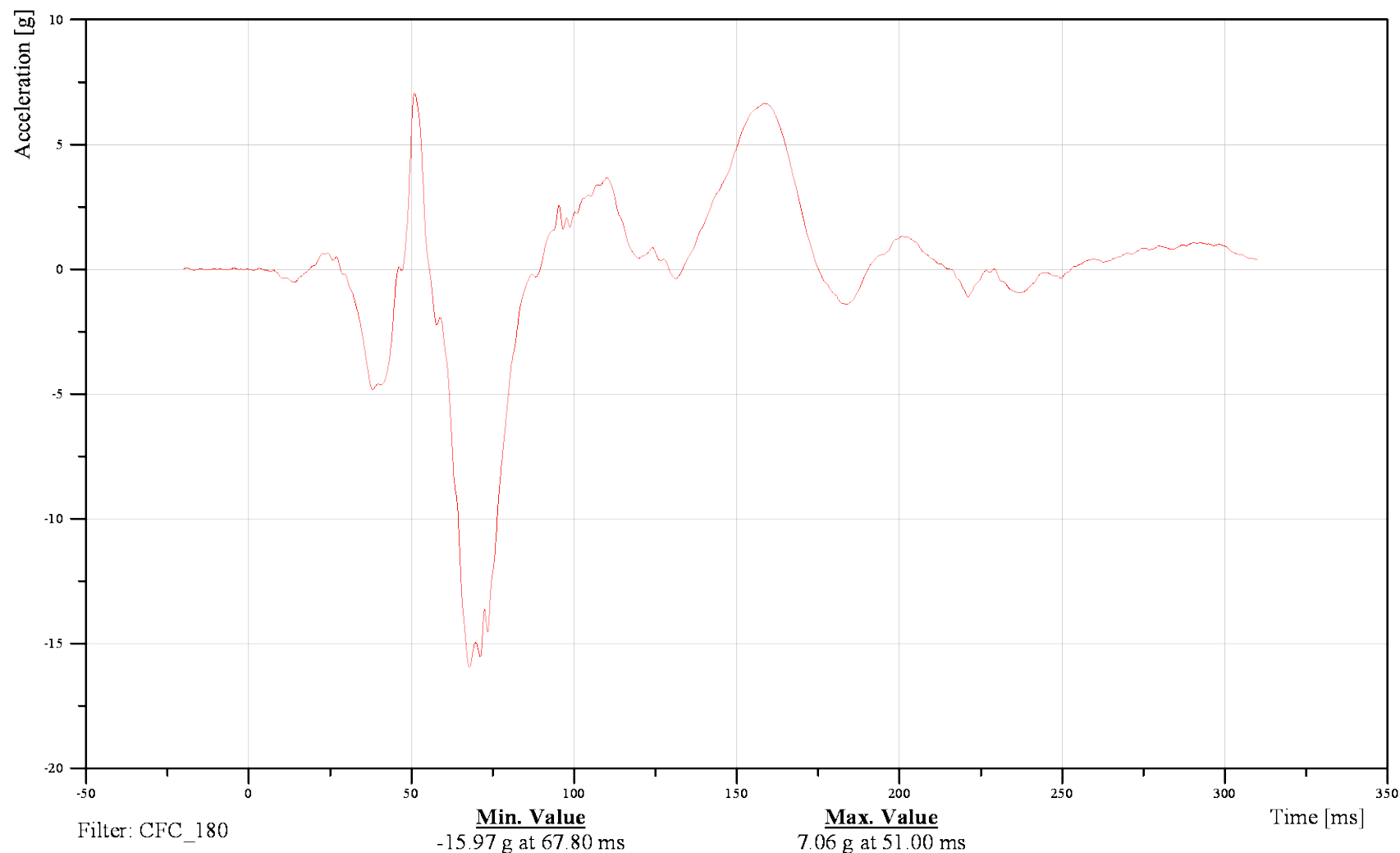
Time: 16:14

Customer: VRTC

14THSP0100WFACXC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 Lateral Ay

Date: 01/24/2013

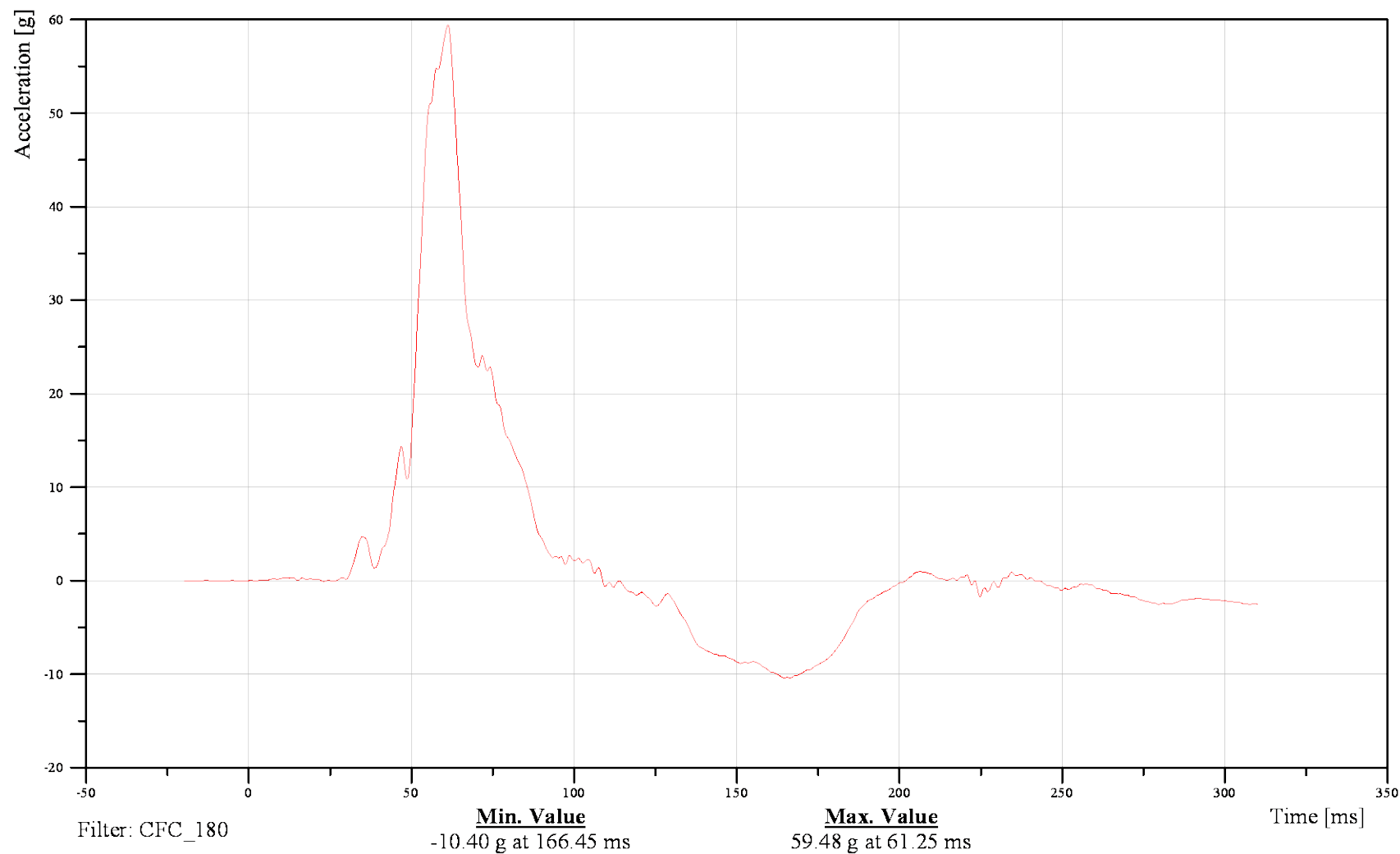
Time: 16:14

Customer: VRTC

14THSP0100WFACYC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 Vertical Az

Date: 01/24/2013

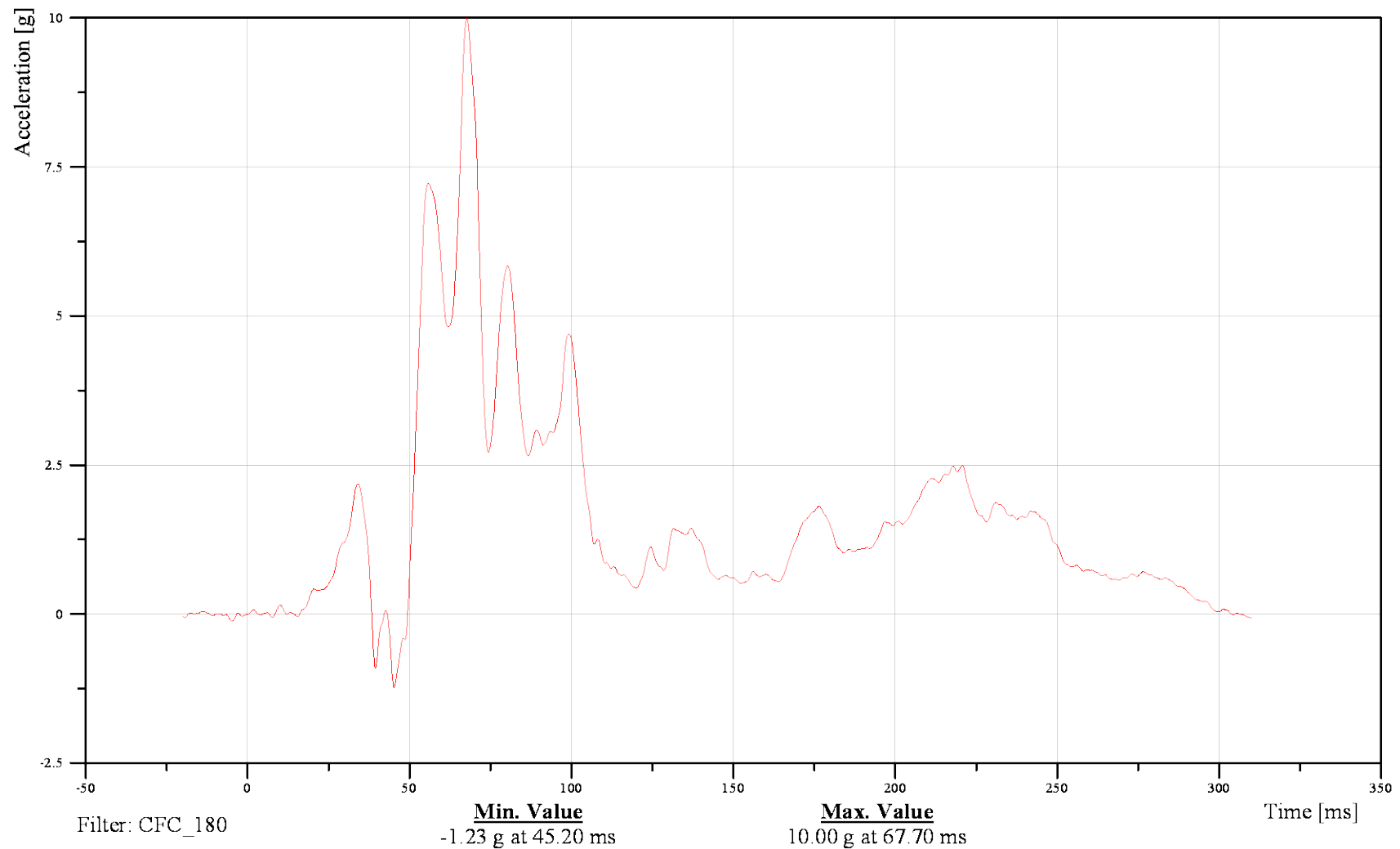
Time: 16:14

Customer: VRTC

14THSP0100WFACZC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T1 A Resultant

Date: 01/24/2013

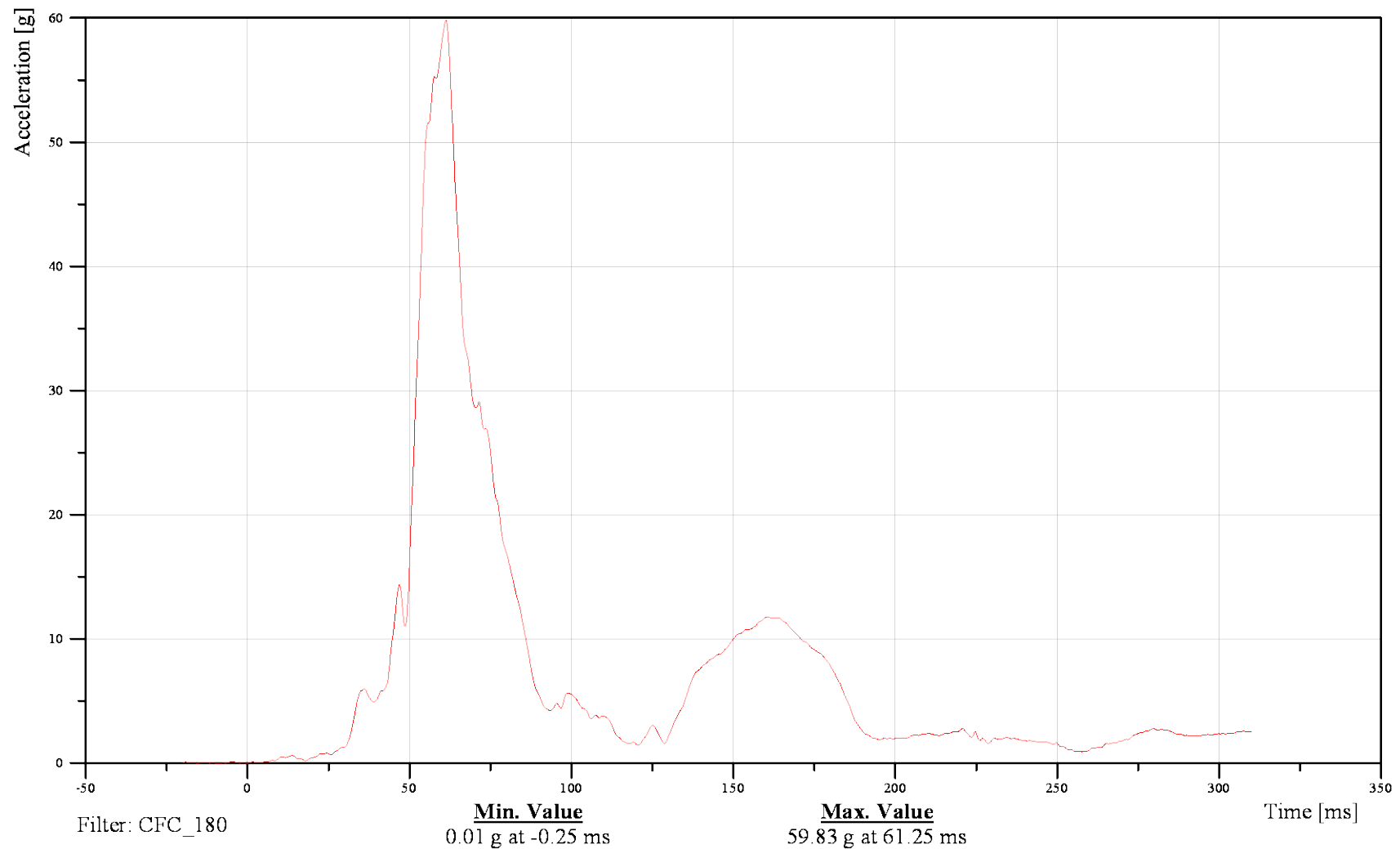
Time: 16:14

Customer: VRTC

14THSP0100WFACRC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Longitudinal Ax

Date: 01/24/2013

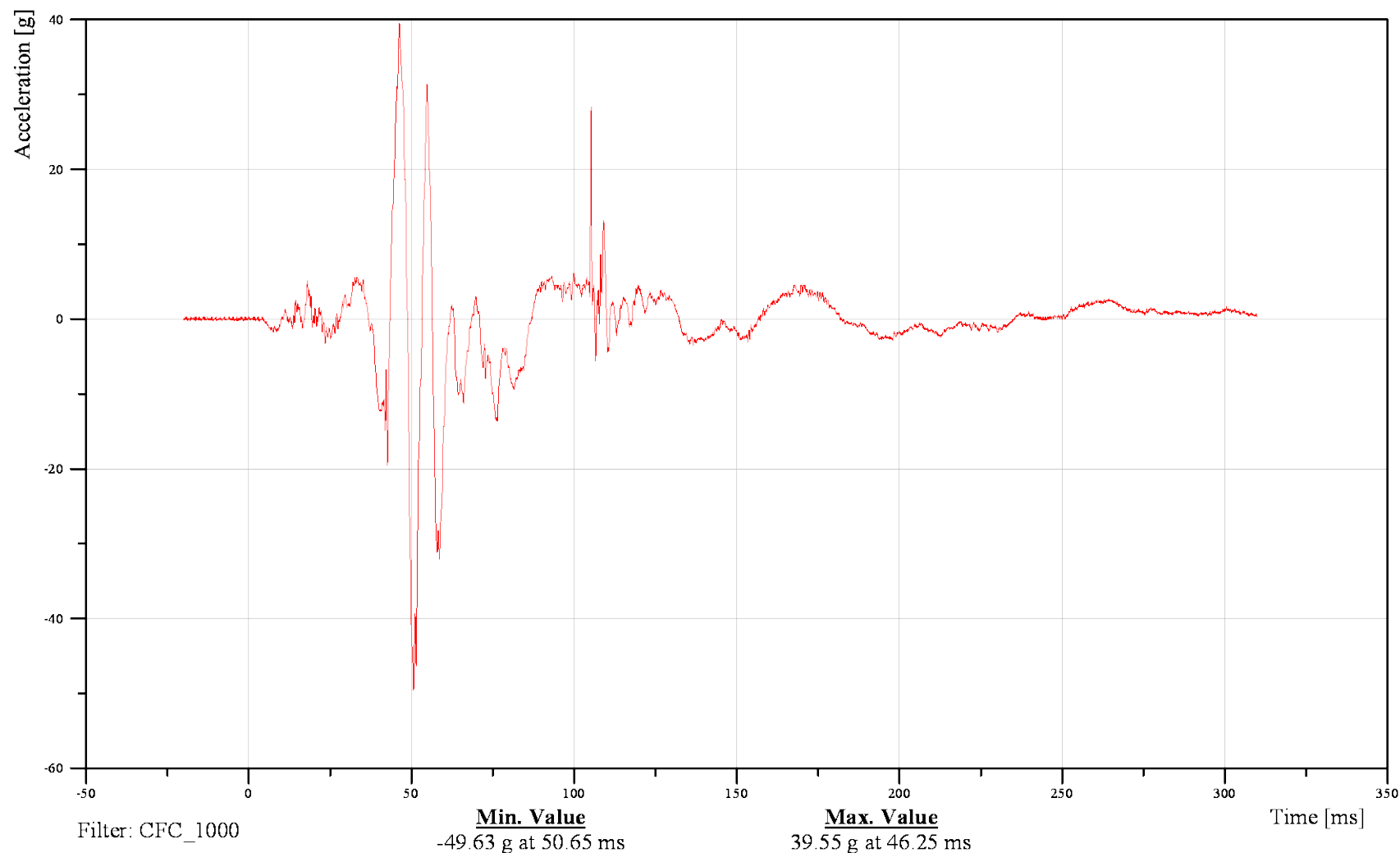
Time: 16:14

Customer: VRTC

14TRRILE01WFACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Lateral Ay

Date: 01/24/2013

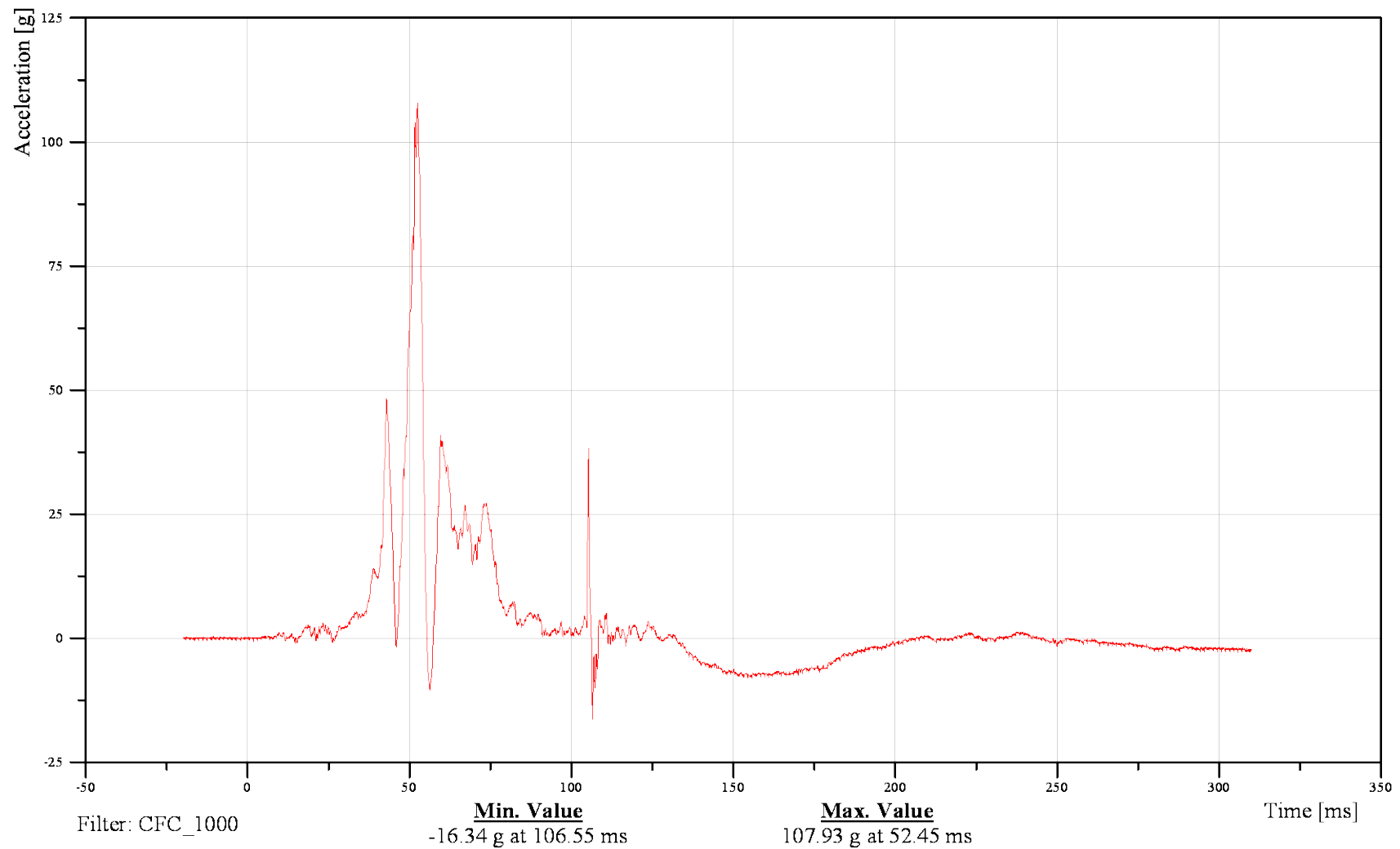
Time: 16:14

Customer: VRTC

14TRRILE01WFACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Vertical Az

Date: 01/24/2013

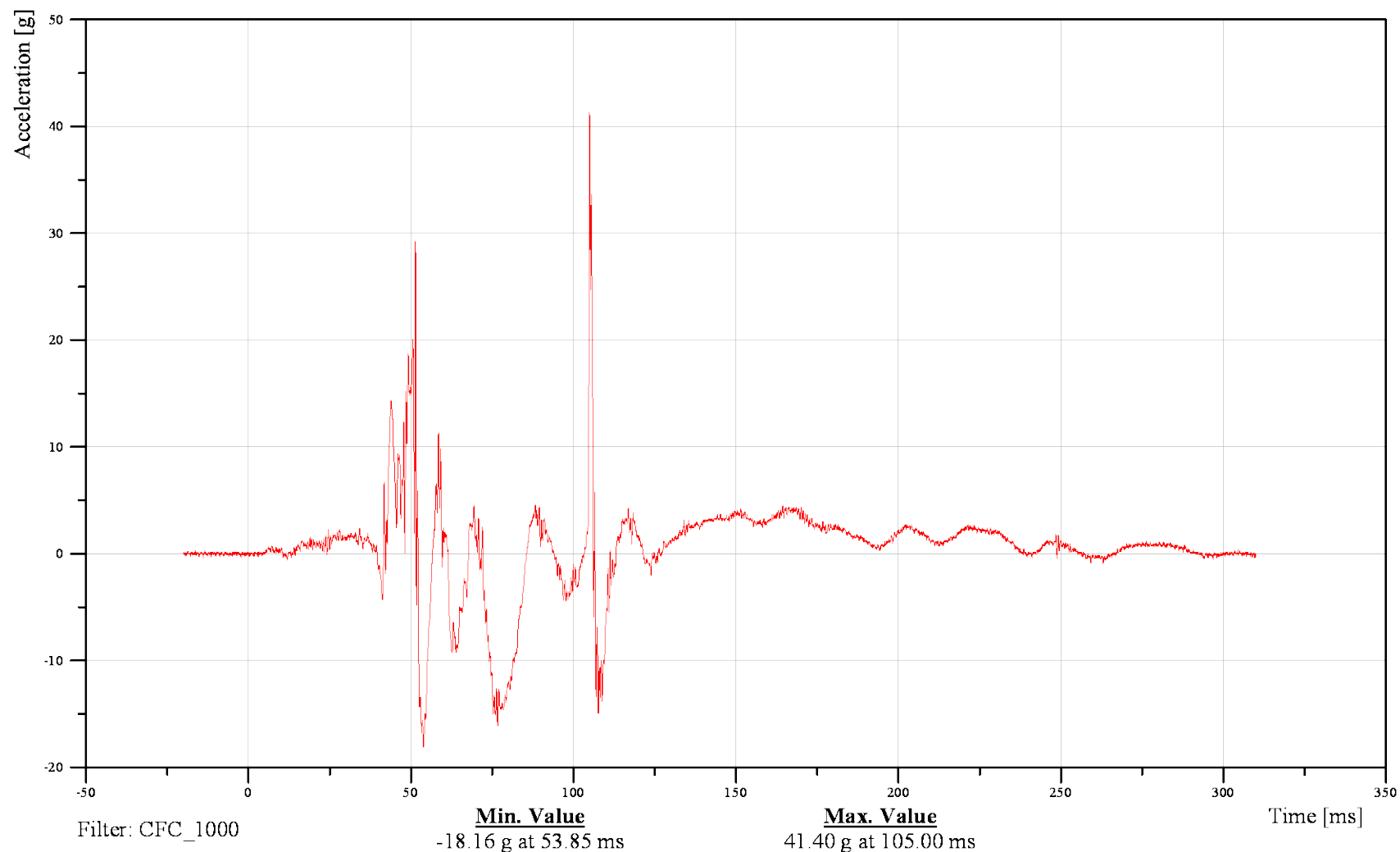
Time: 16:14

Customer: VRTC

14TRRILE01WFACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 A Resultant

Date: 01/24/2013

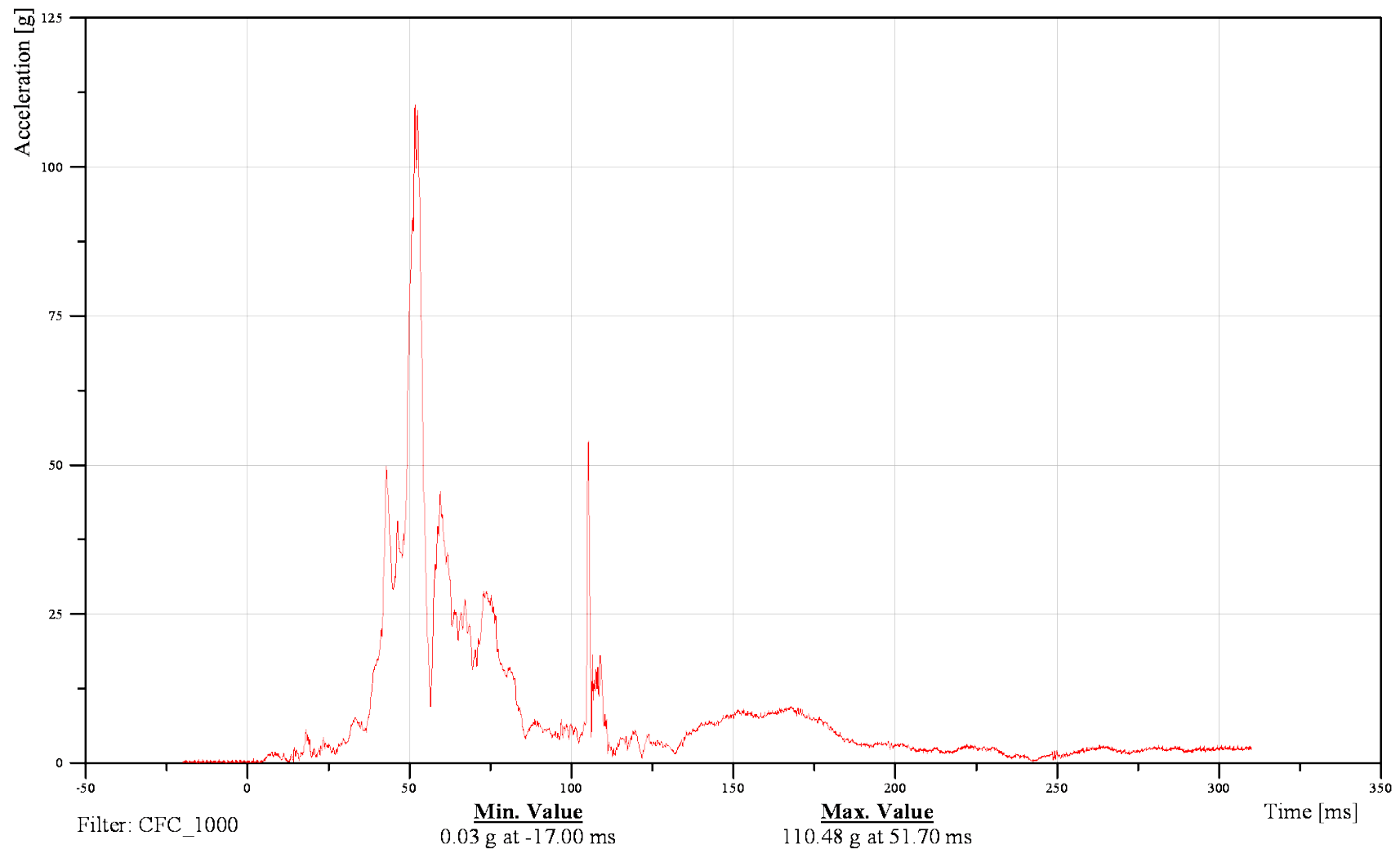
Time: 16:14

Customer: VRTC

14TRRILE01WFACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 IRTRAC compression

Date: 01/24/2013

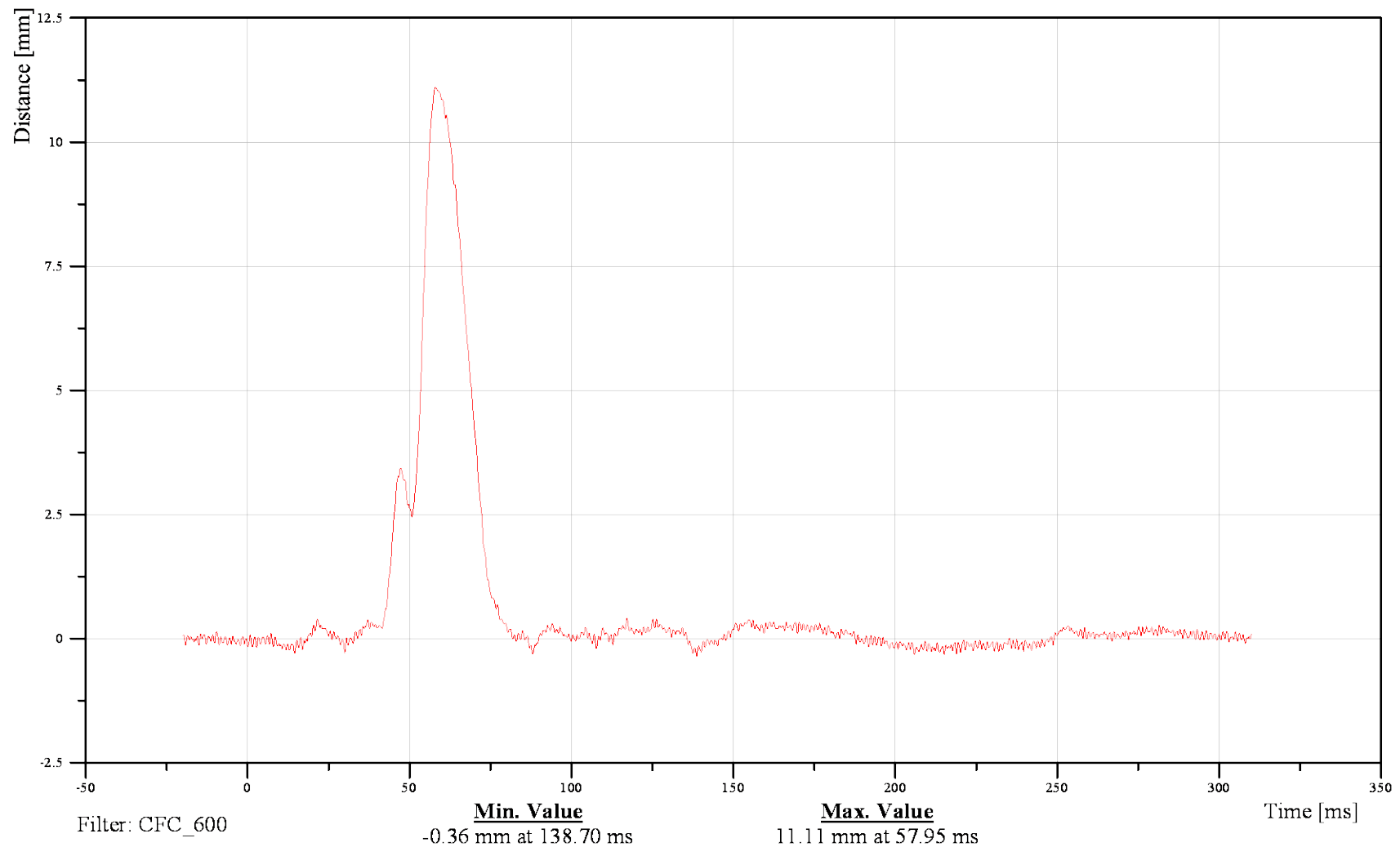
Time: 16:14

Customer: VRTC

14TRRILE01WFDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 Rotational angle

Date: 01/24/2013

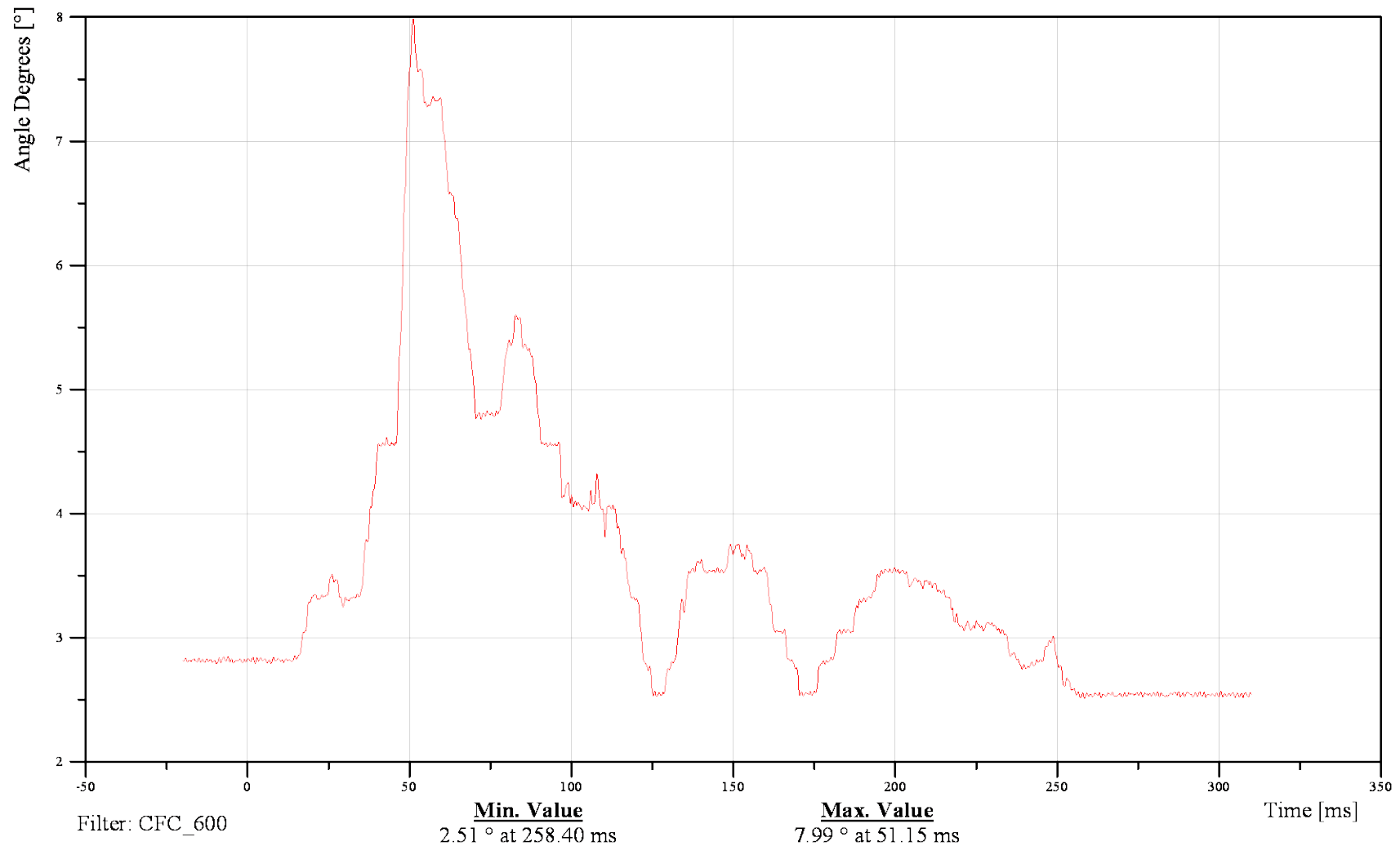
Time: 16:14

Customer: VRTC

14TRRILE01WFANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 IRTRAC X Deflection

Date: 01/24/2013

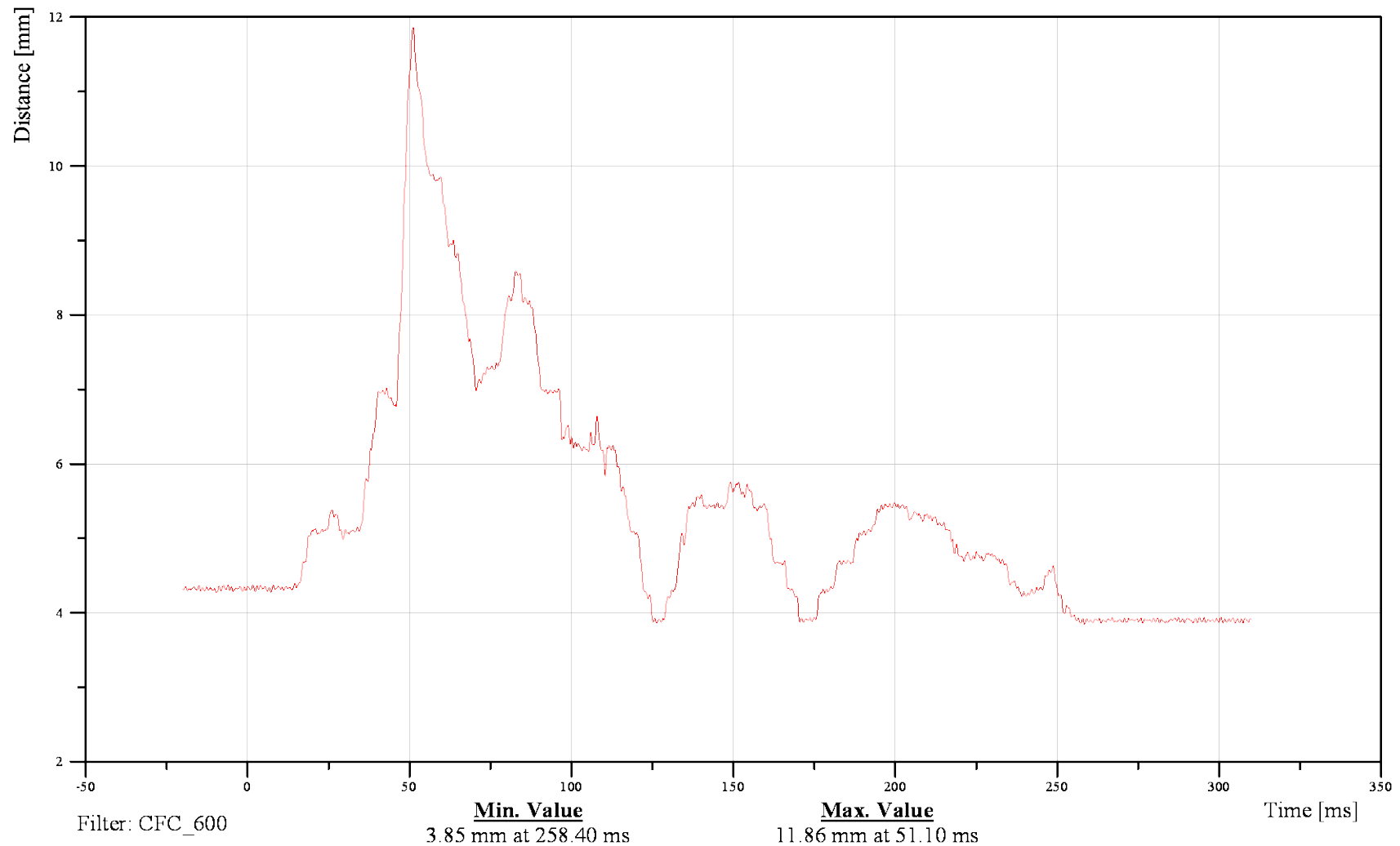
Time: 16:14

Customer: VRTC

14TRRILE01WFDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 1 IRTRAC Y Deflection

Date: 01/24/2013

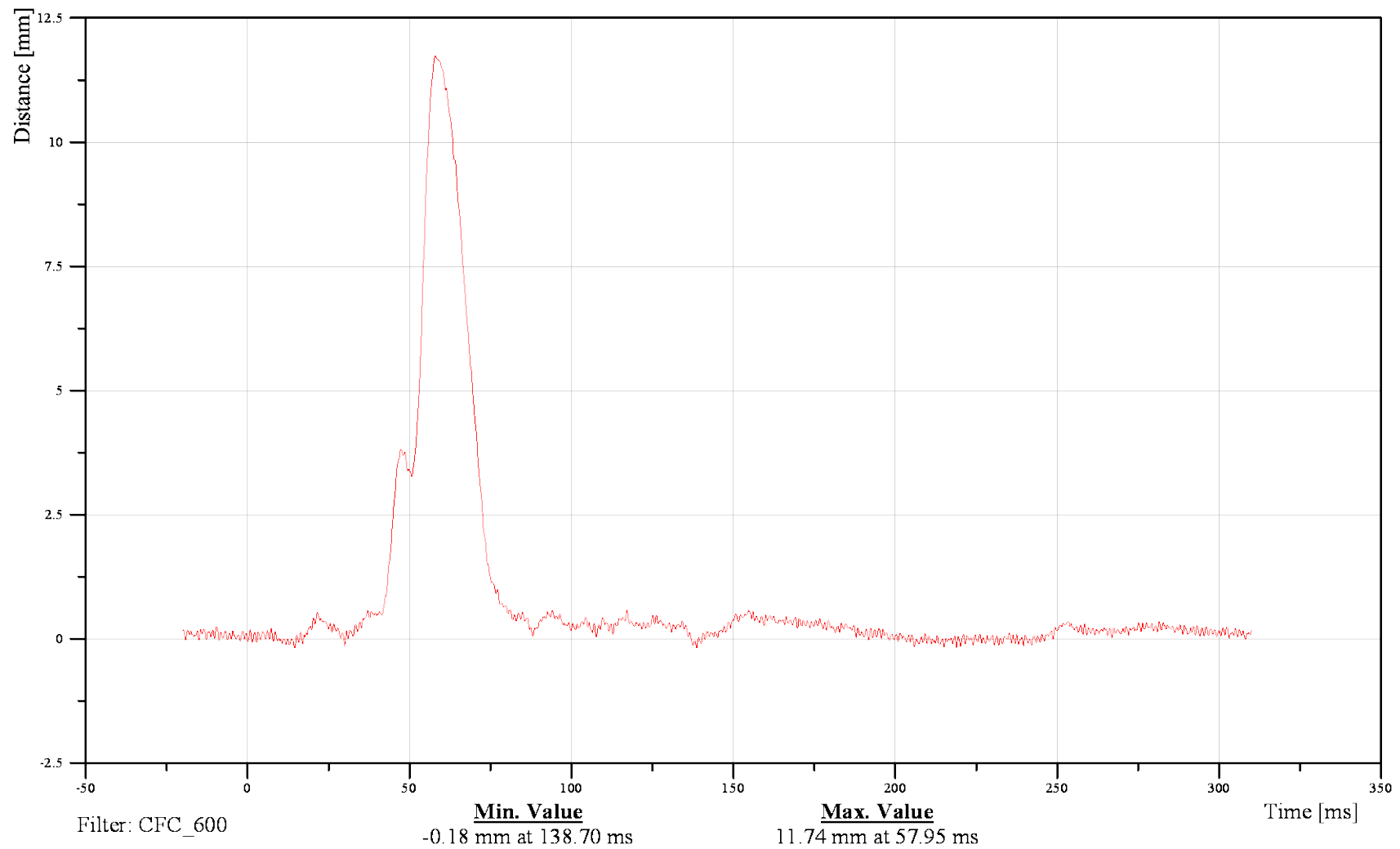
Time: 16:14

Customer: VRTC

14TRRILE01WFDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Longitudinal Ax

Date: 01/24/2013

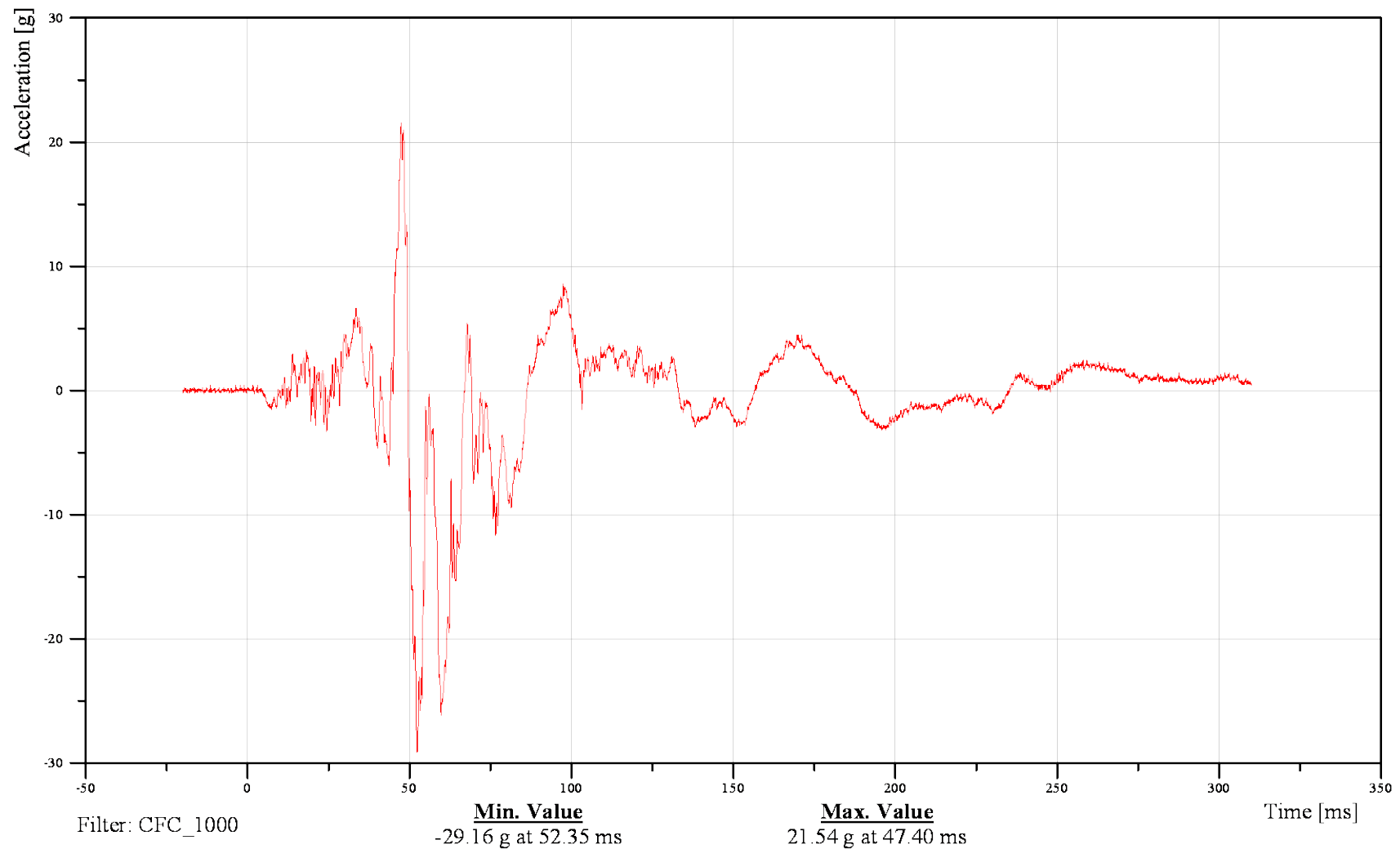
Time: 16:14

Customer: VRTC

14TRRILE02WFACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Lateral Ay

Date: 01/24/2013

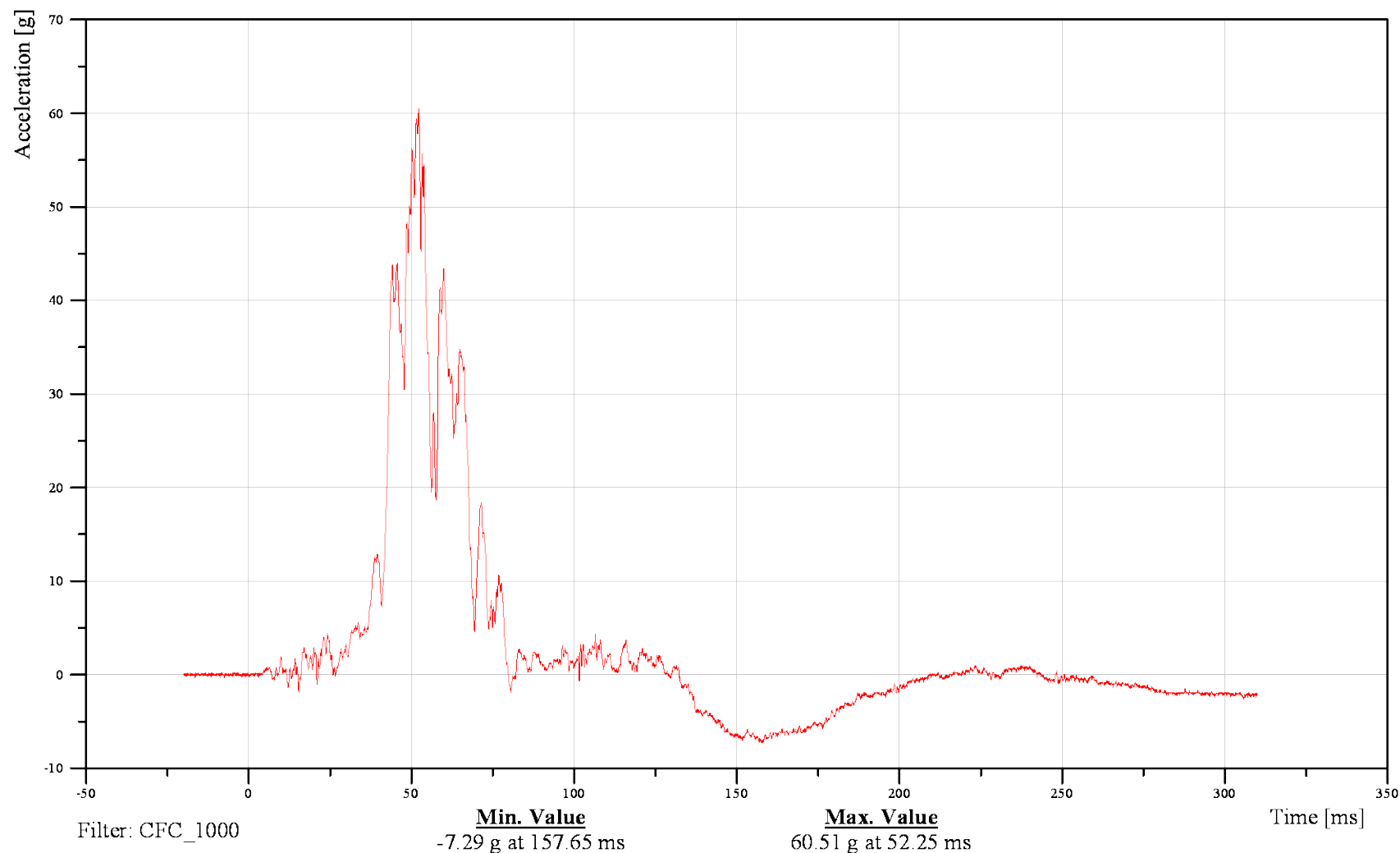
Time: 16:14

Customer: VRTC

14TRRILE02WFACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Vertical Az

Date: 01/24/2013

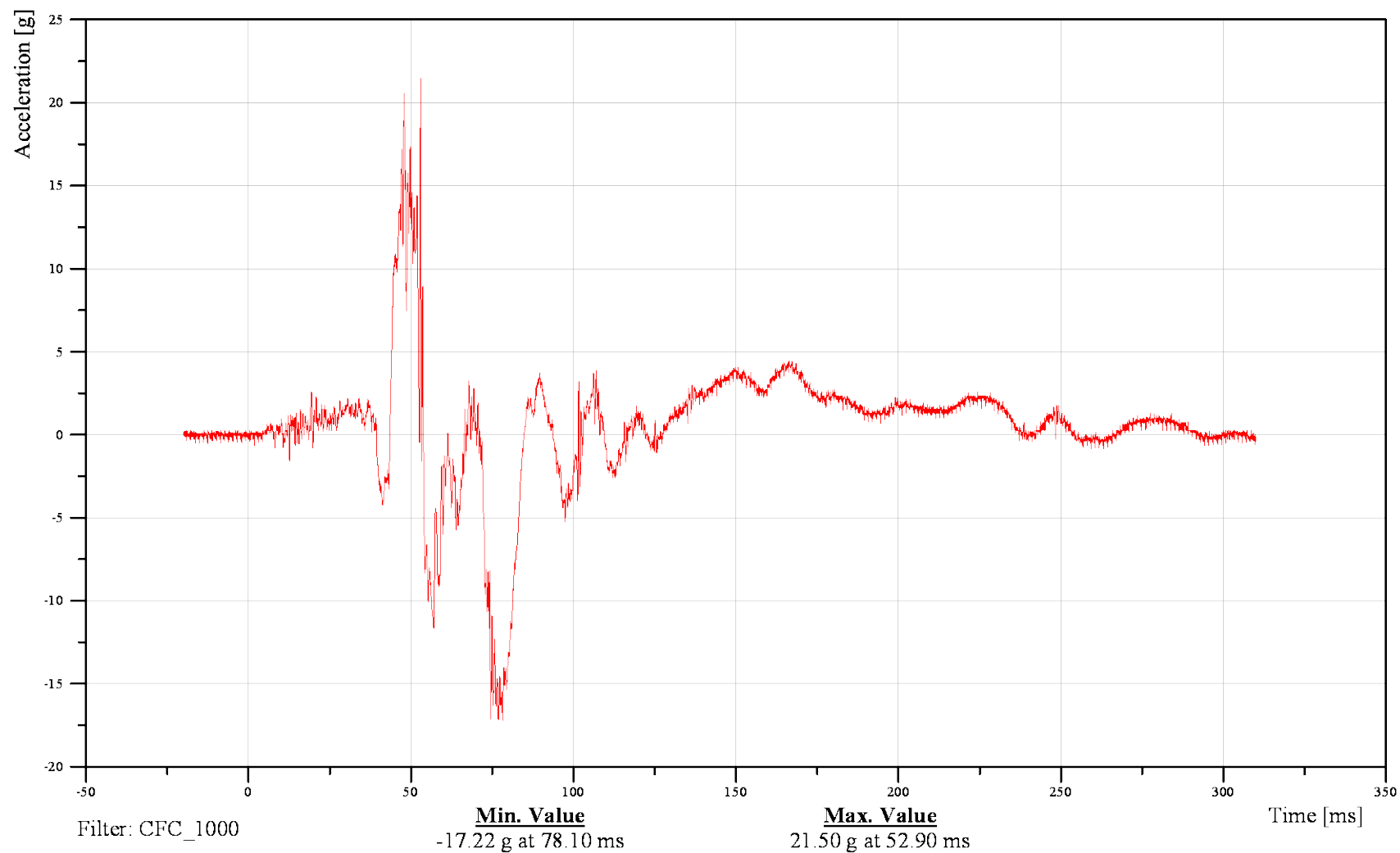
Time: 16:14

Customer: VRTC

14TRRILE02WFACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 A Resultant

Date: 01/24/2013

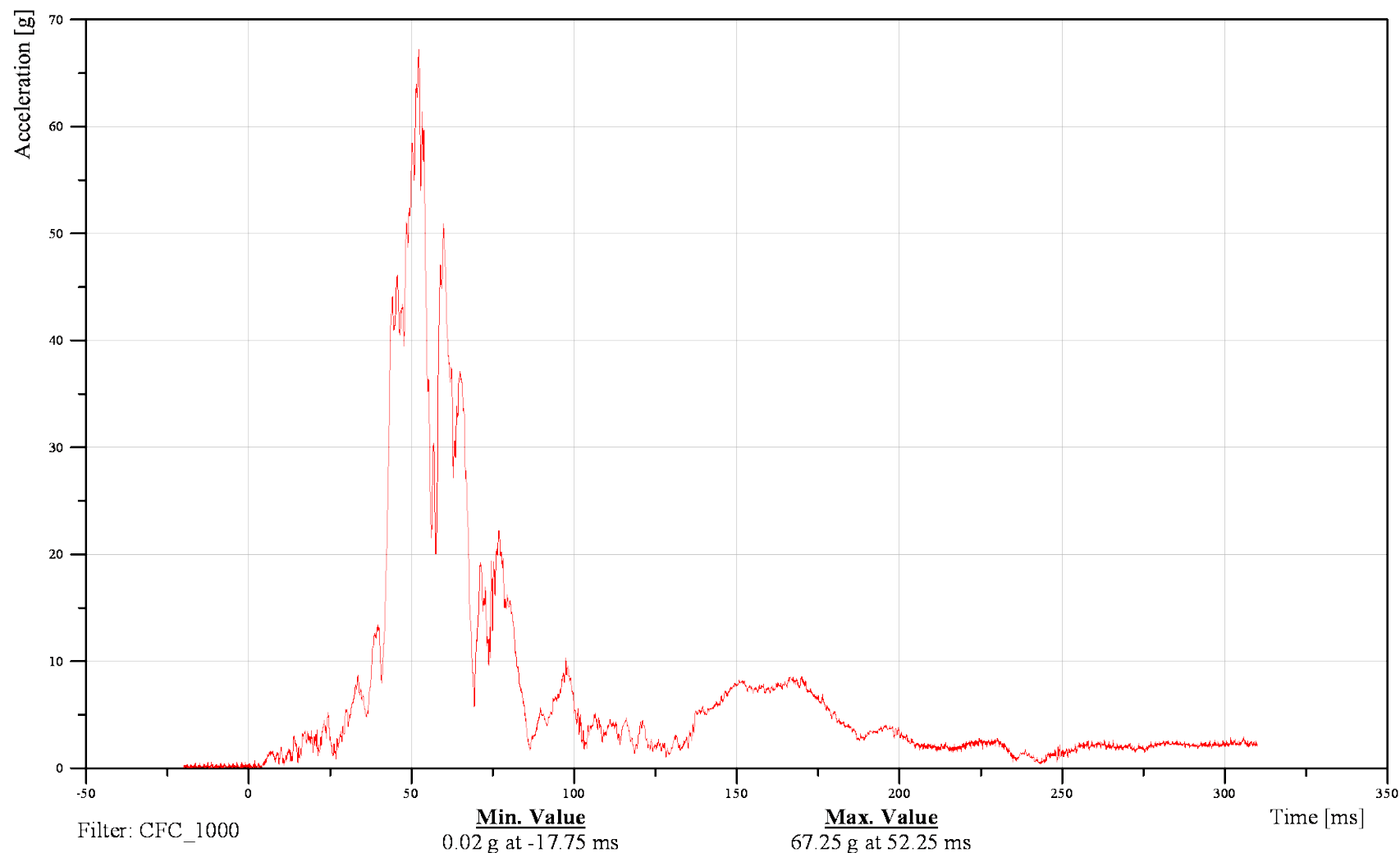
Time: 16:14

Customer: VRTC

14TRRILE02WFACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 IRTRAC compression

Date: 01/24/2013

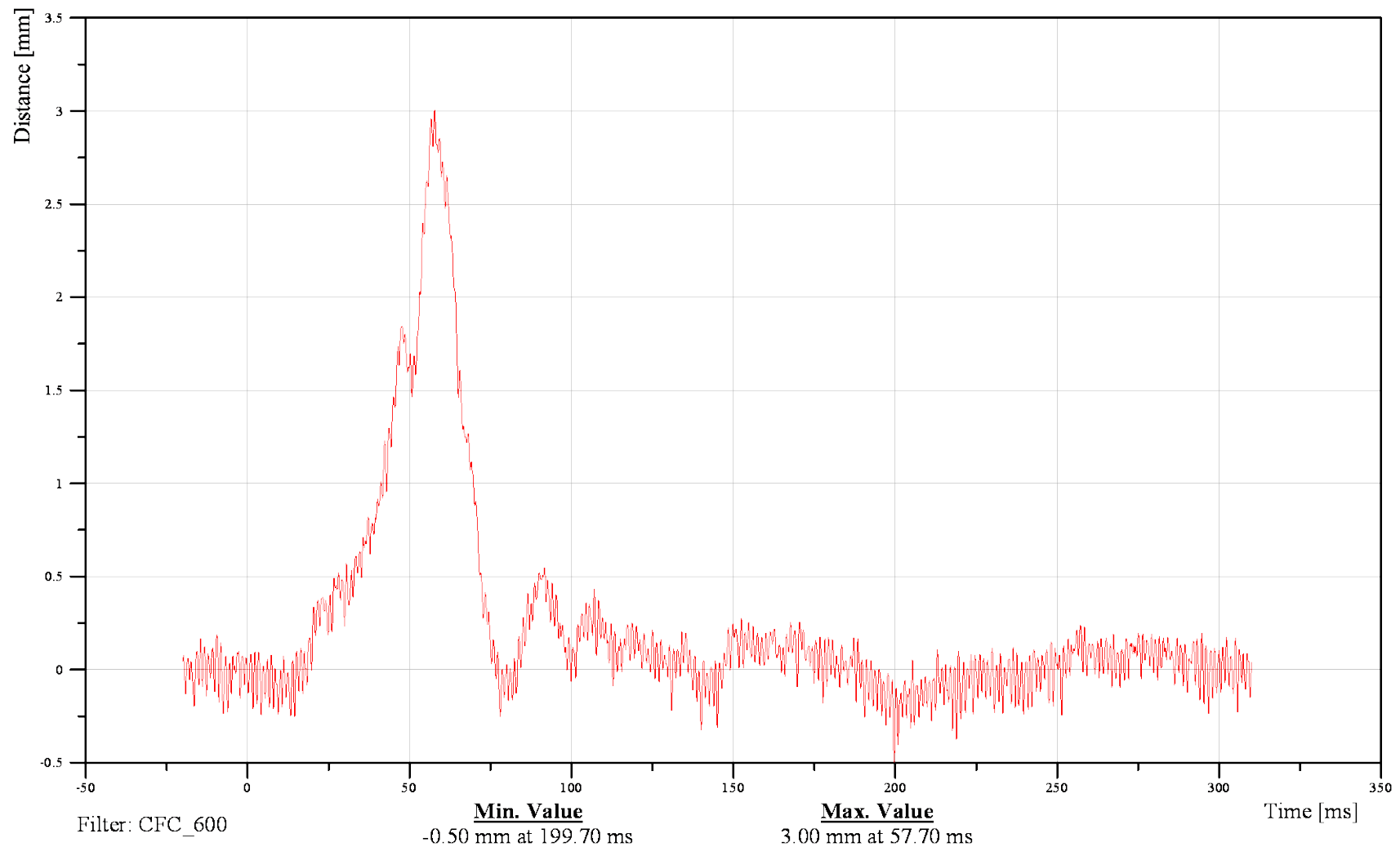
Time: 16:14

Customer: VRTC

14TRRILE02WFDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 Rotational angle

Date: 01/24/2013

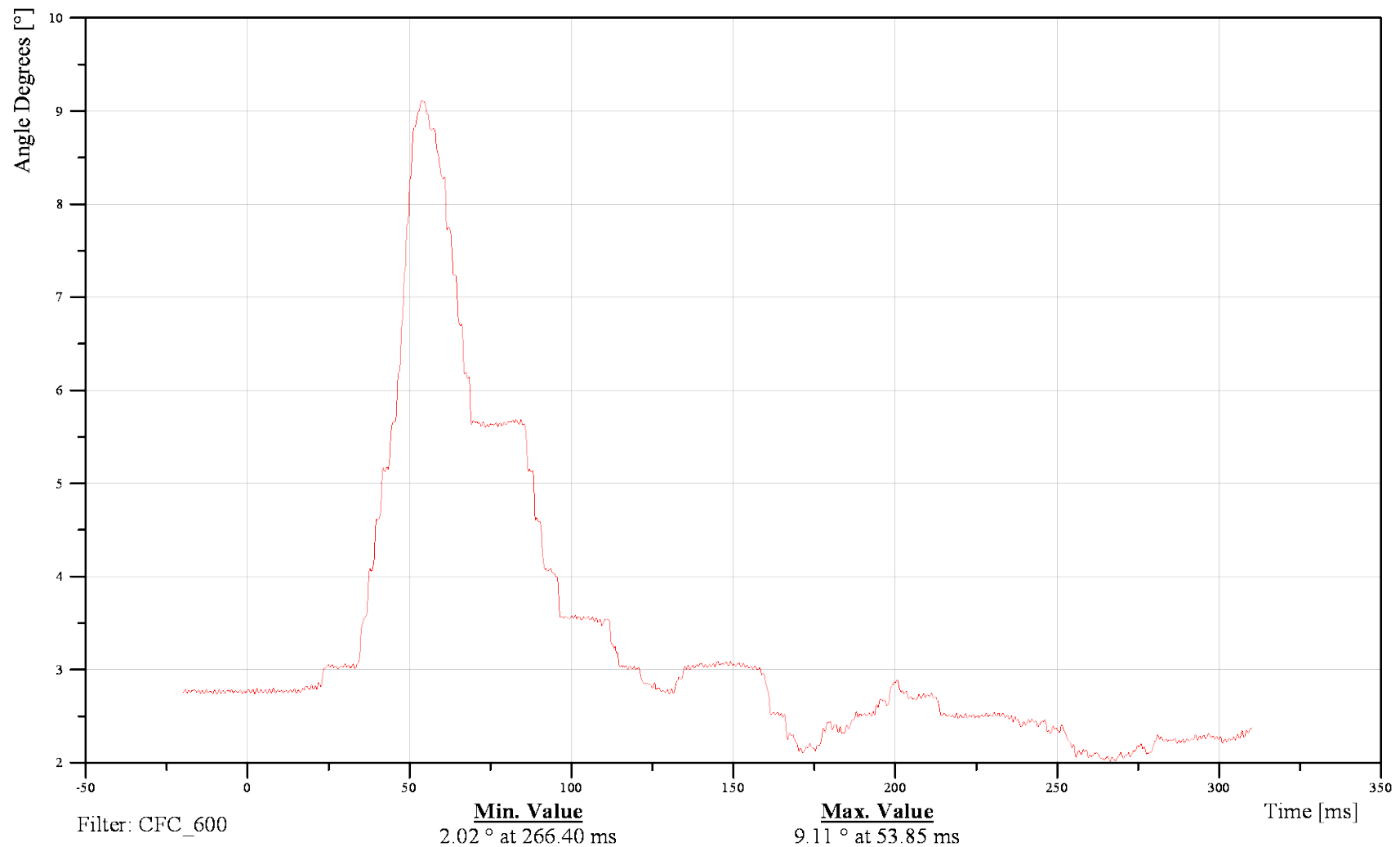
Time: 16:14

Customer: VRTC

14TRRILE02WFANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 IRTRAC X Deflection

Date: 01/24/2013

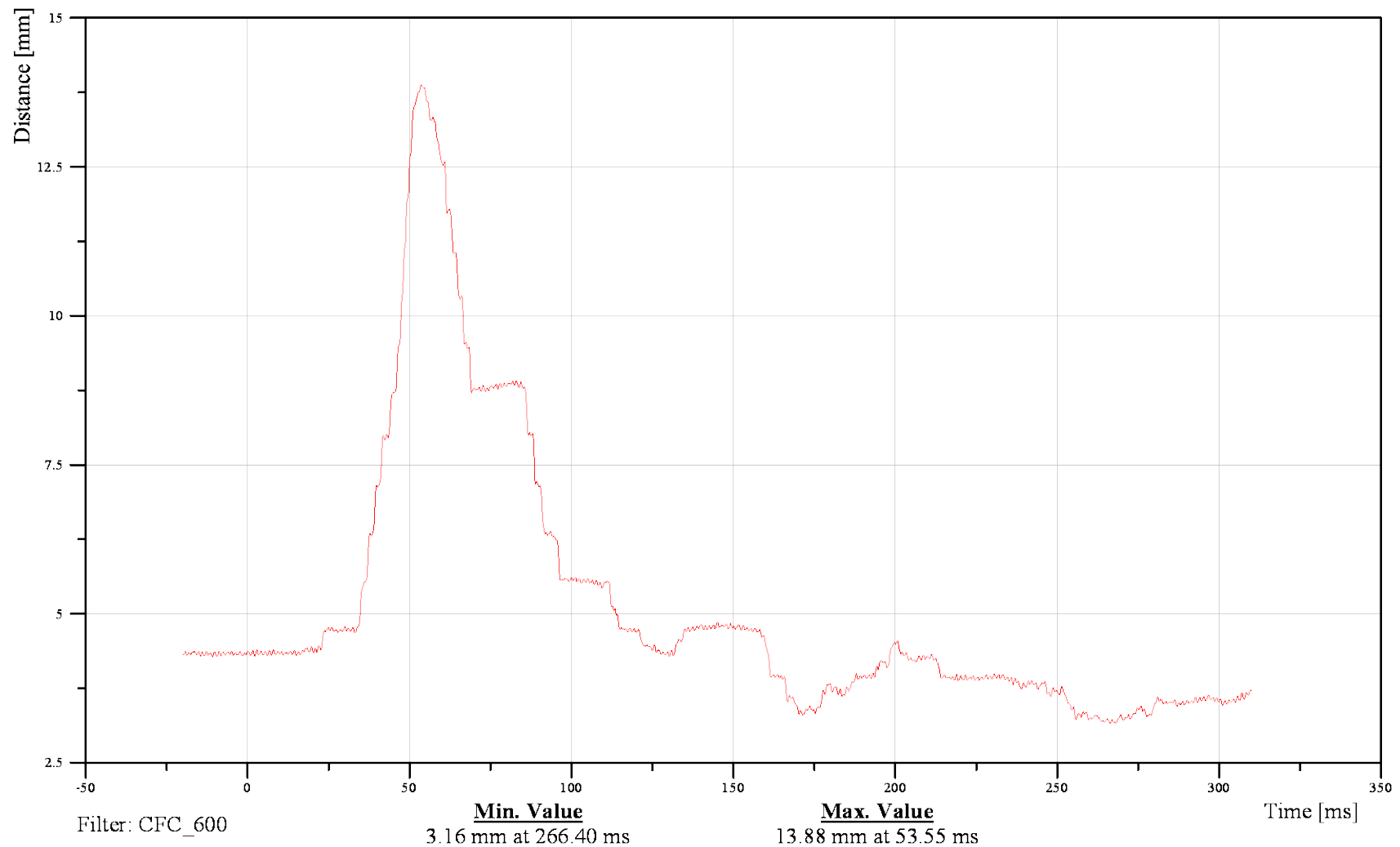
Time: 16:14

Customer: VRTC

14TRRILE02WFDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 2 IRTRAC Y Deflection

Date: 01/24/2013

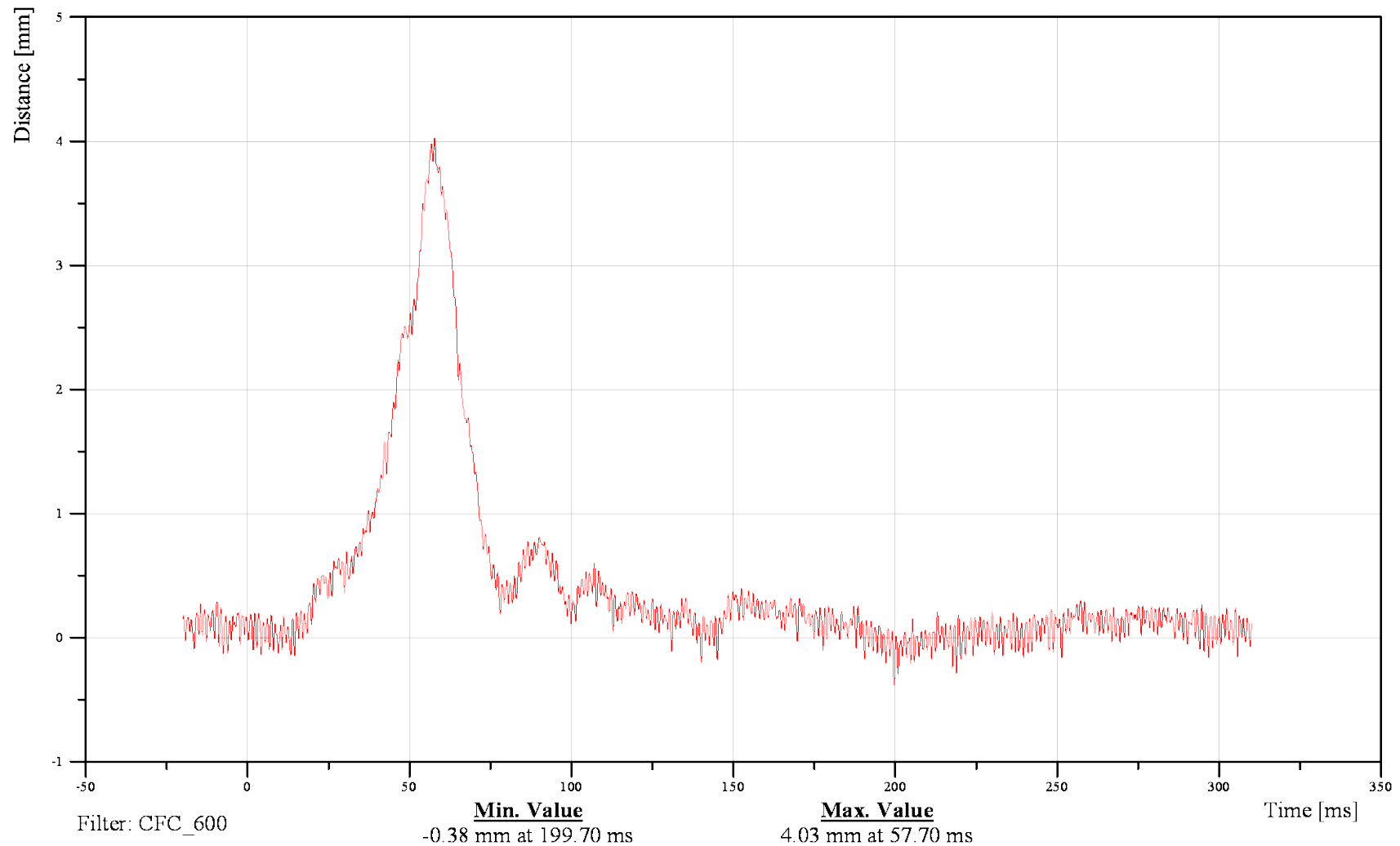
Time: 16:14

Customer: VRTC

14TRRILE02WFDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Longitudinal Ax

Date: 01/24/2013

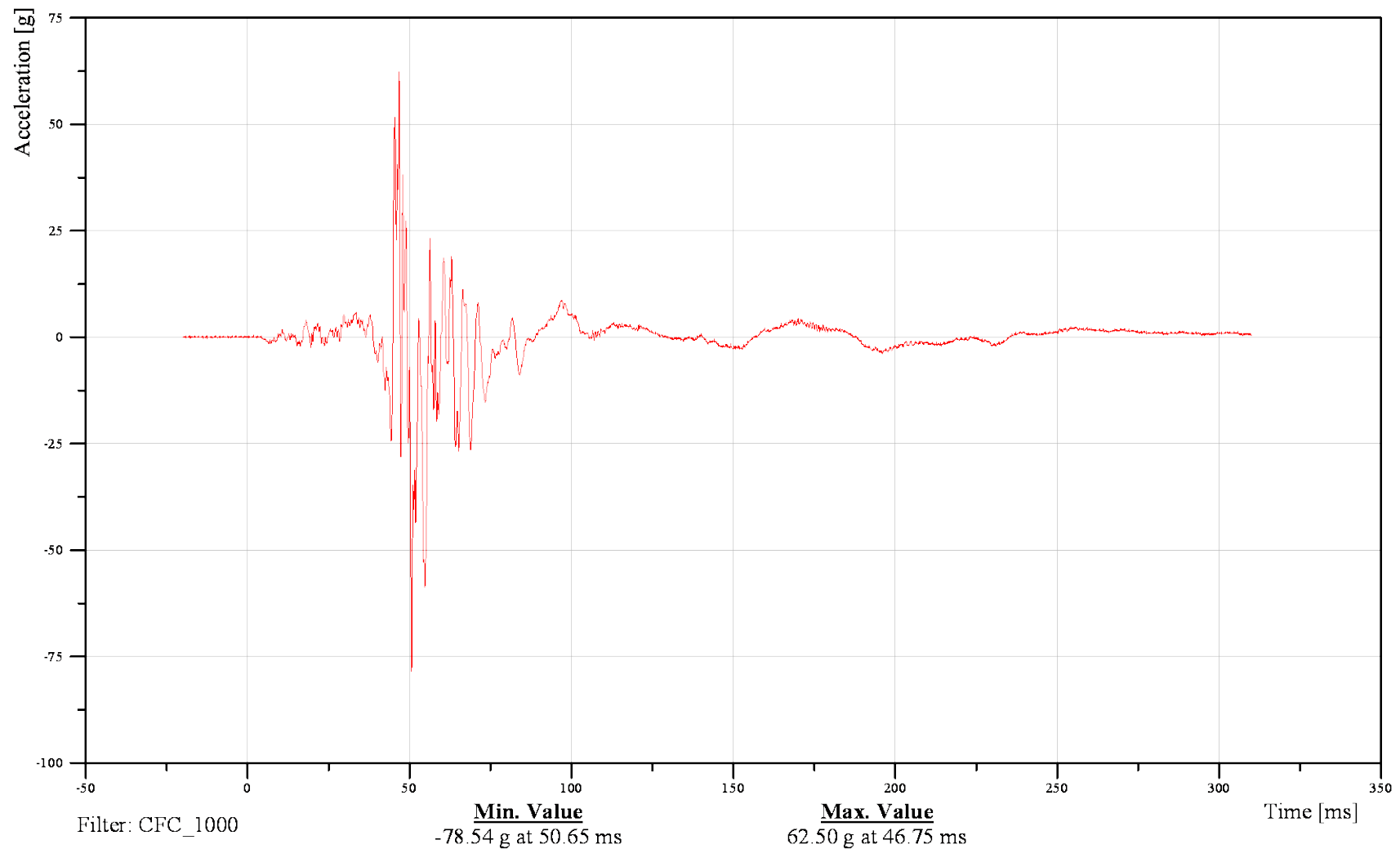
Time: 16:14

Customer: VRTC

14TRRILE03WFACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Lateral Ay

Date: 01/24/2013

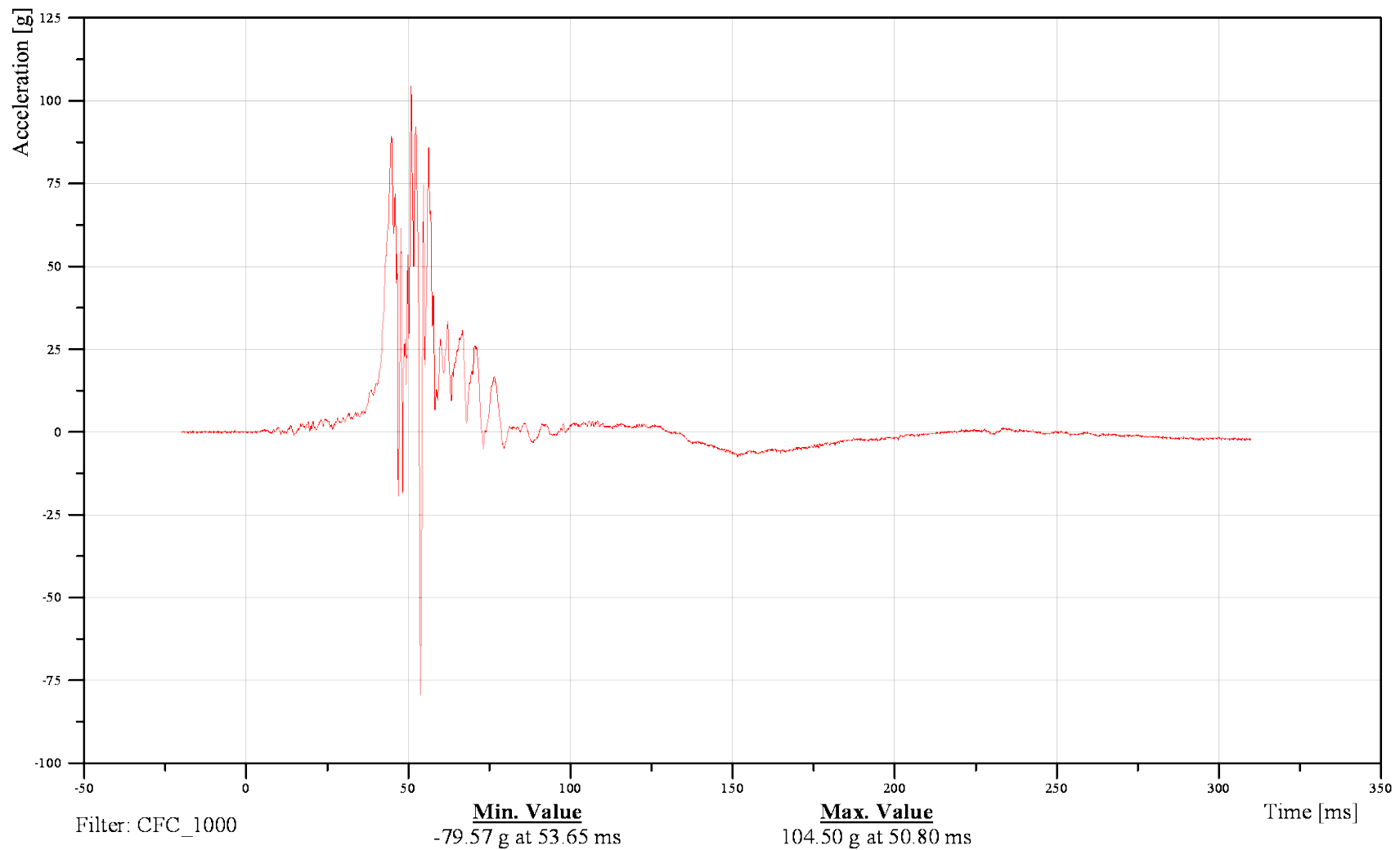
Time: 16:14

Customer: VRTC

14TRRILE03WFACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Vertical Az

Date: 01/24/2013

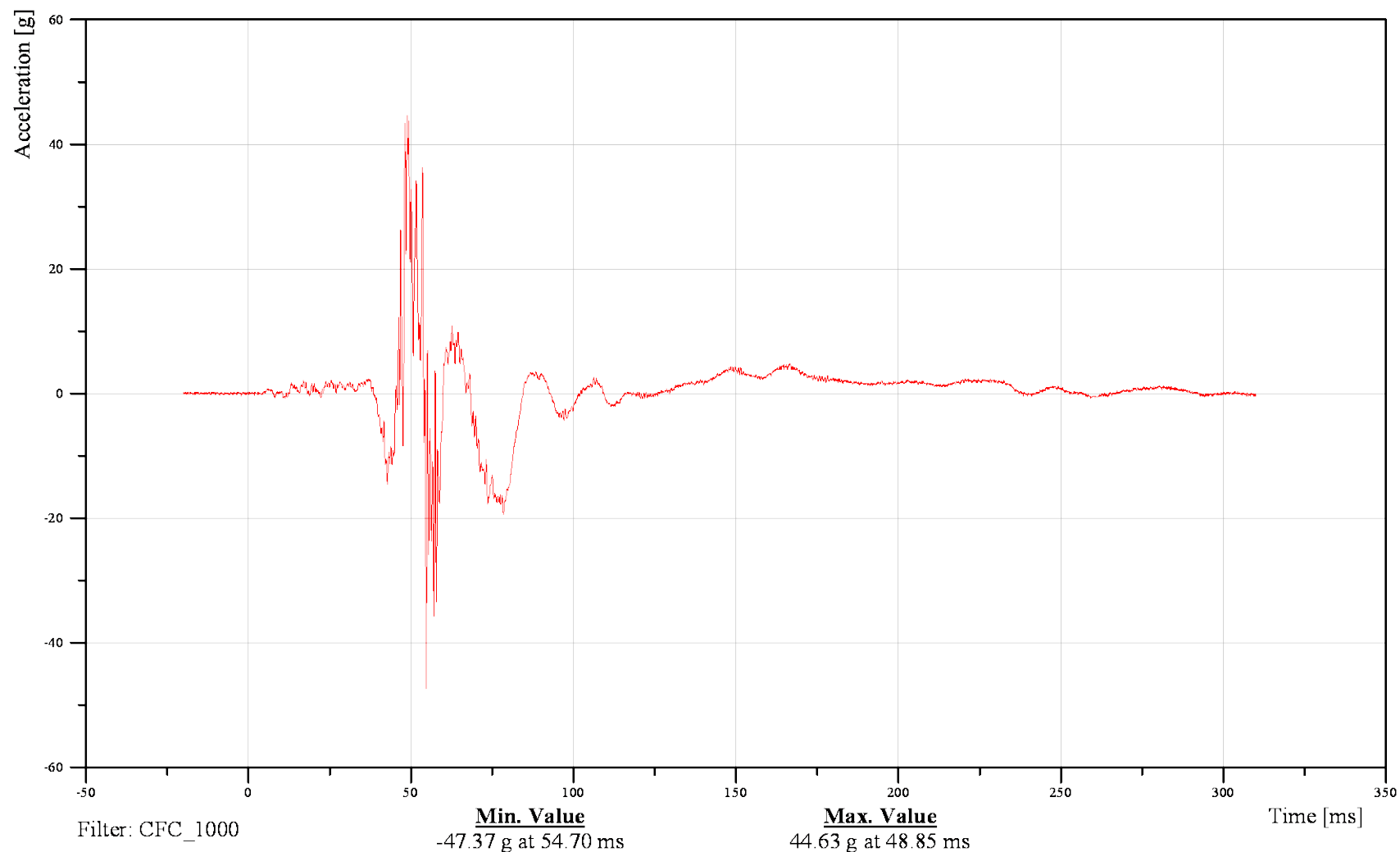
Time: 16:14

Customer: VRTC

14TRRILE03WFACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 A Resultant

Date: 01/24/2013

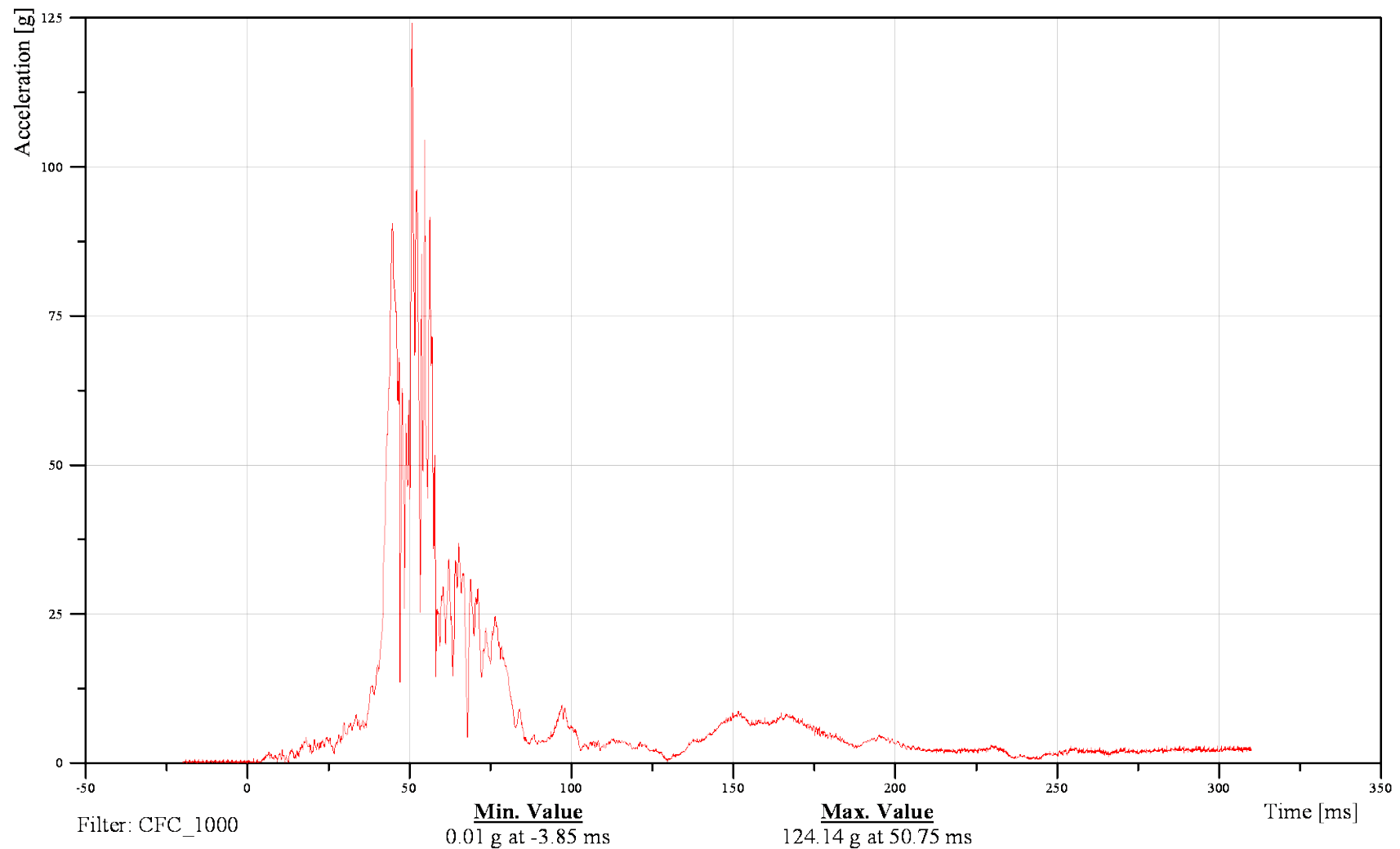
Time: 16:14

Customer: VRTC

14TRRILE03WFACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 IRTRAC compression

Date: 01/24/2013

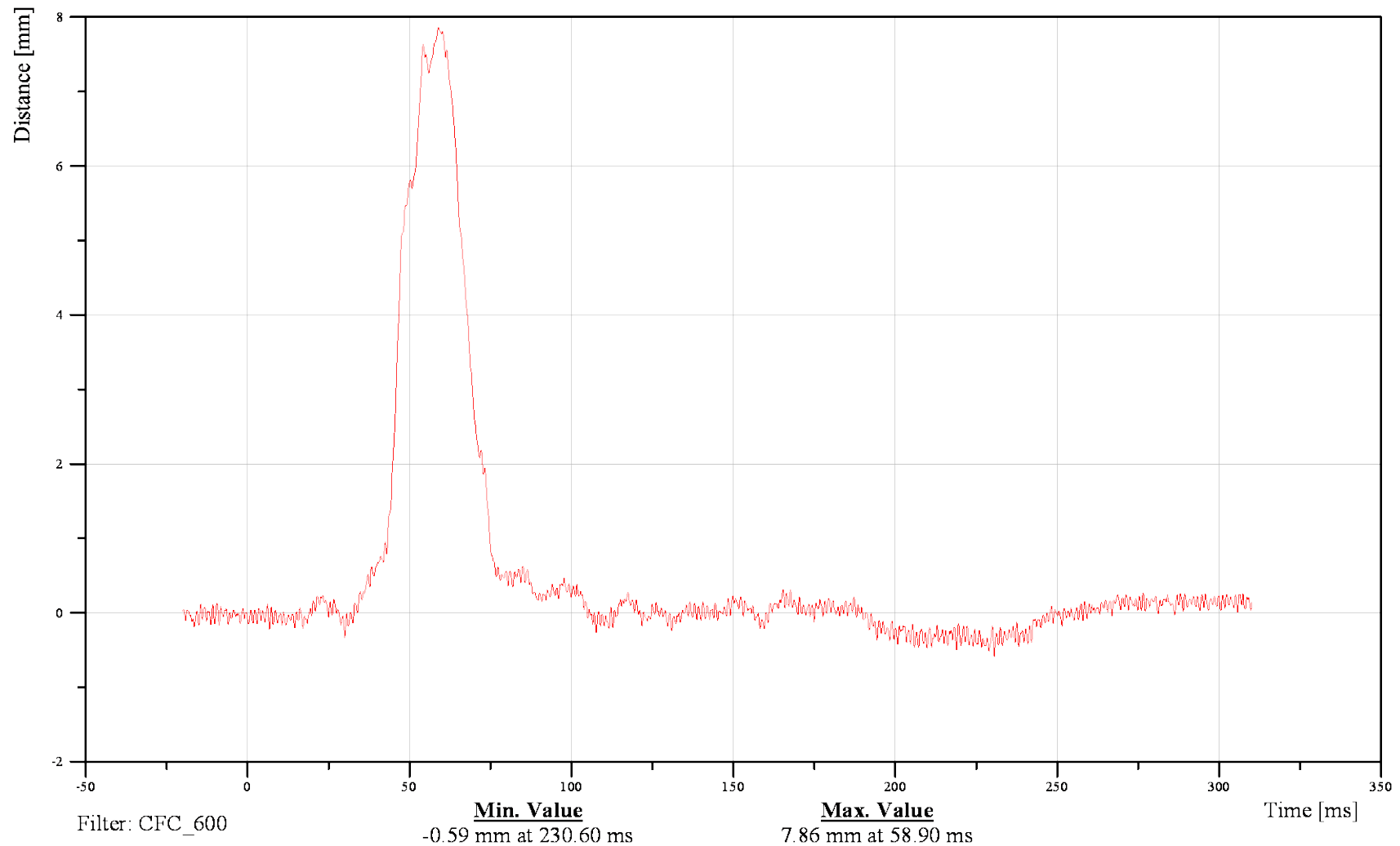
Time: 16:14

Customer: VRTC

14TRRILE03WFDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 Rotational angle

Date: 01/24/2013

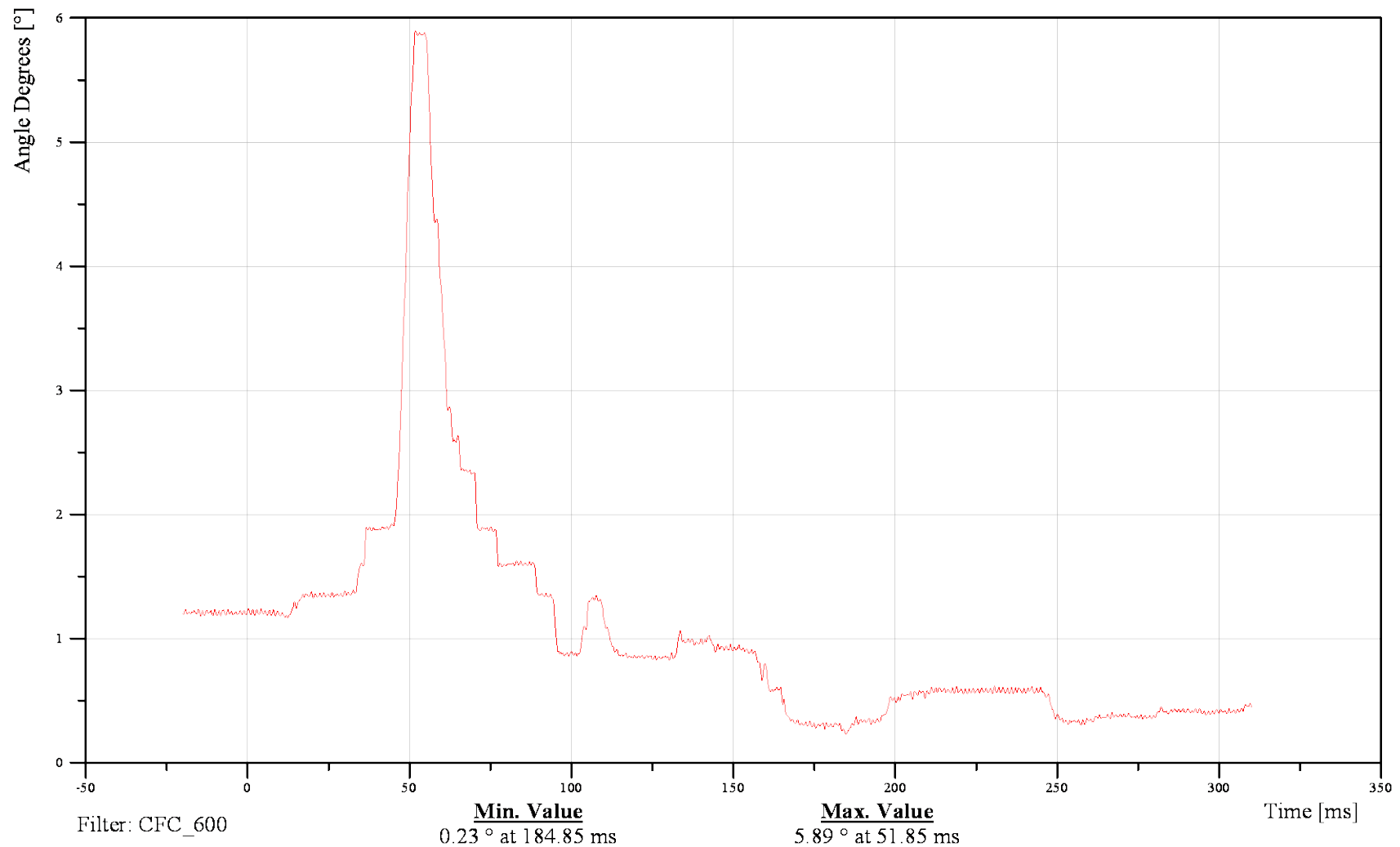
Time: 16:14

Customer: VRTC

14TRRILE03WFANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 IRTRAC X Deflection

Date: 01/24/2013

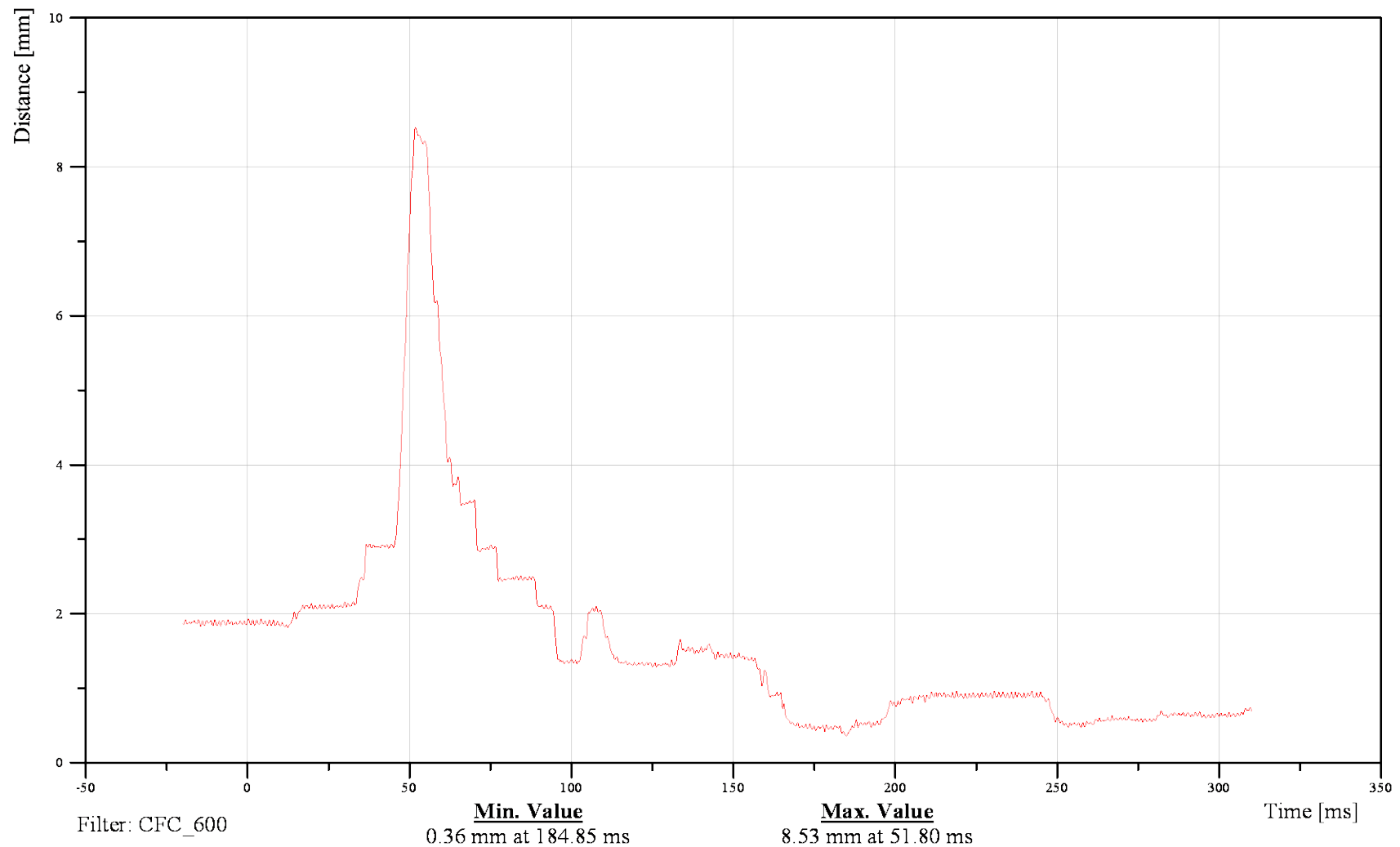
Time: 16:14

Customer: VRTC

14TRRILE03WFDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Rib 3 IRTRAC Y Deflection

Date: 01/24/2013

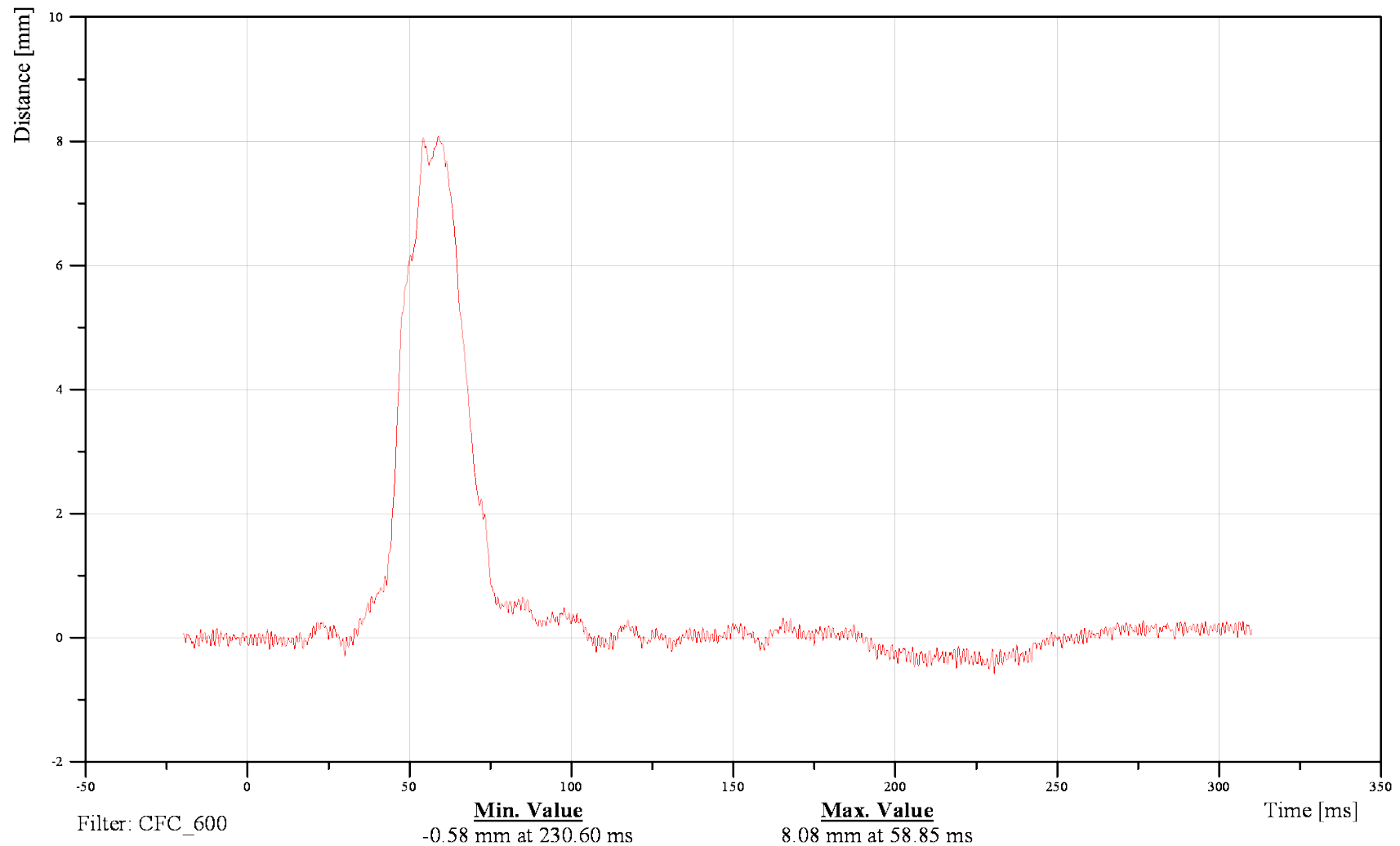
Time: 16:14

Customer: VRTC

14TRRILE03WFDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Longitudinal Ax

Date: 01/24/2013

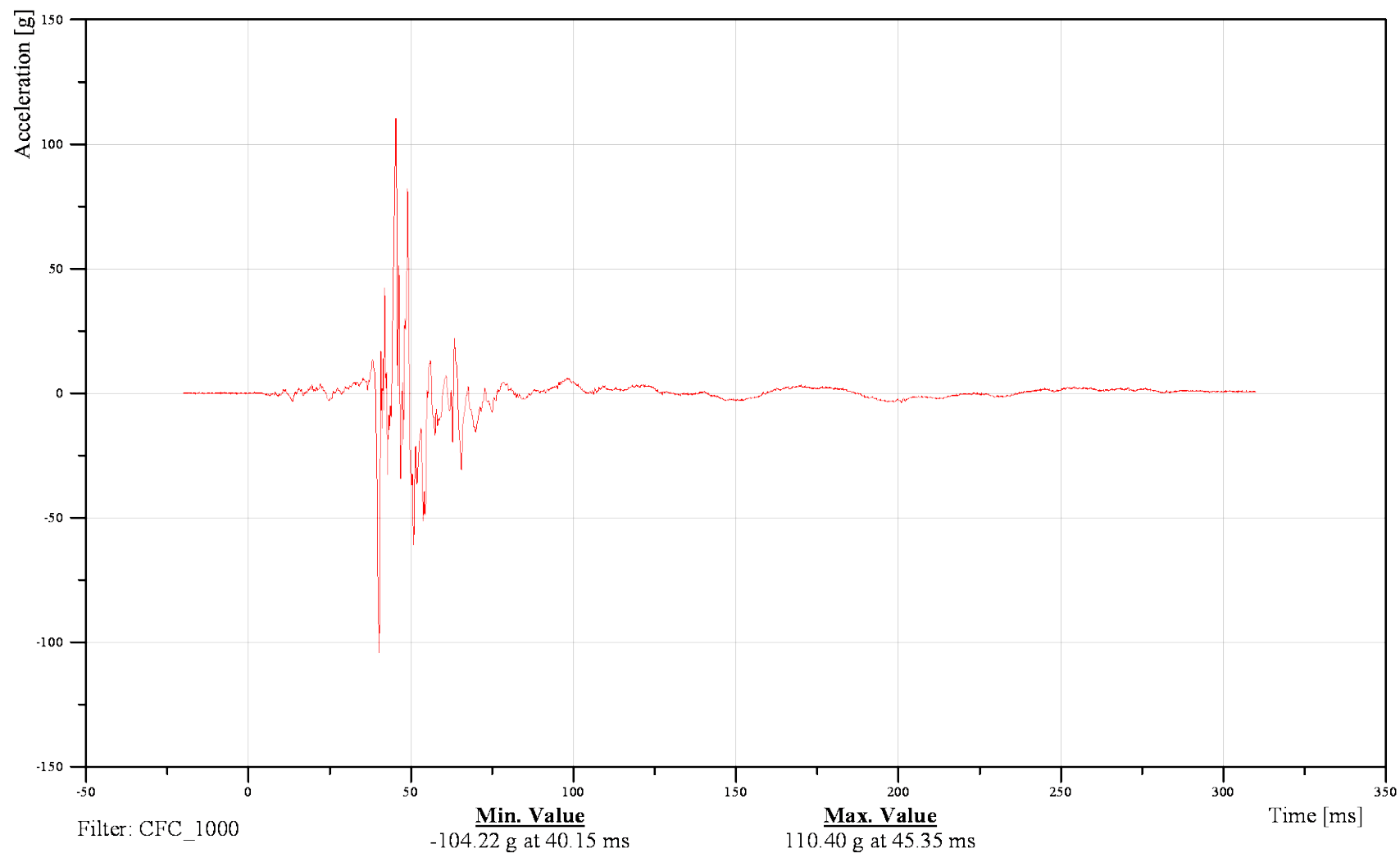
Time: 16:14

Customer: VRTC

14ABRILE01WFACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Lateral Ay

Date: 01/24/2013

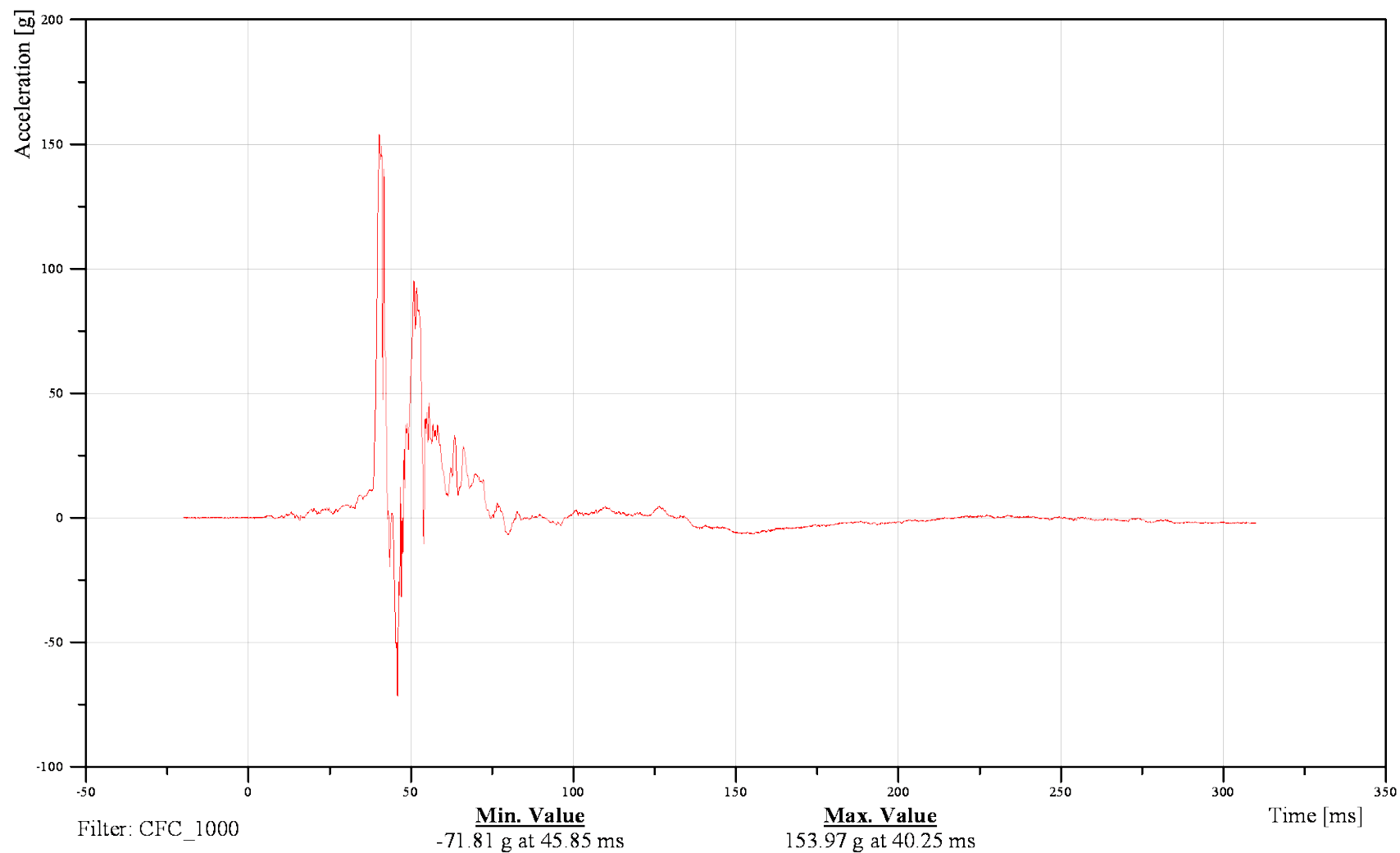
Time: 16:14

Customer: VRTC

14ABRILE01WFACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Vertical Az

Date: 01/24/2013

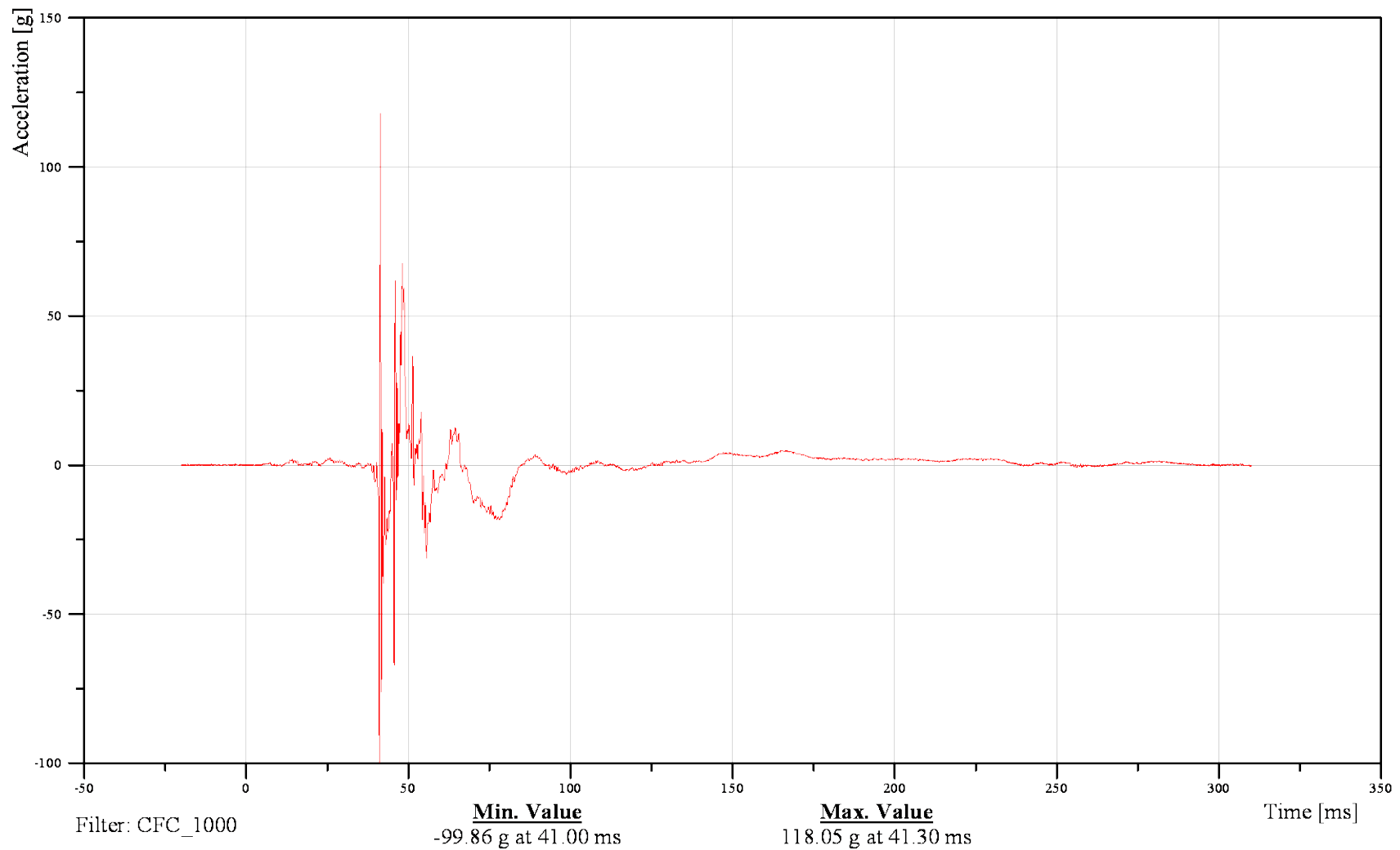
Time: 16:14

Customer: VRTC

14ABRILE01WFACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 A Resultant

Date: 01/24/2013

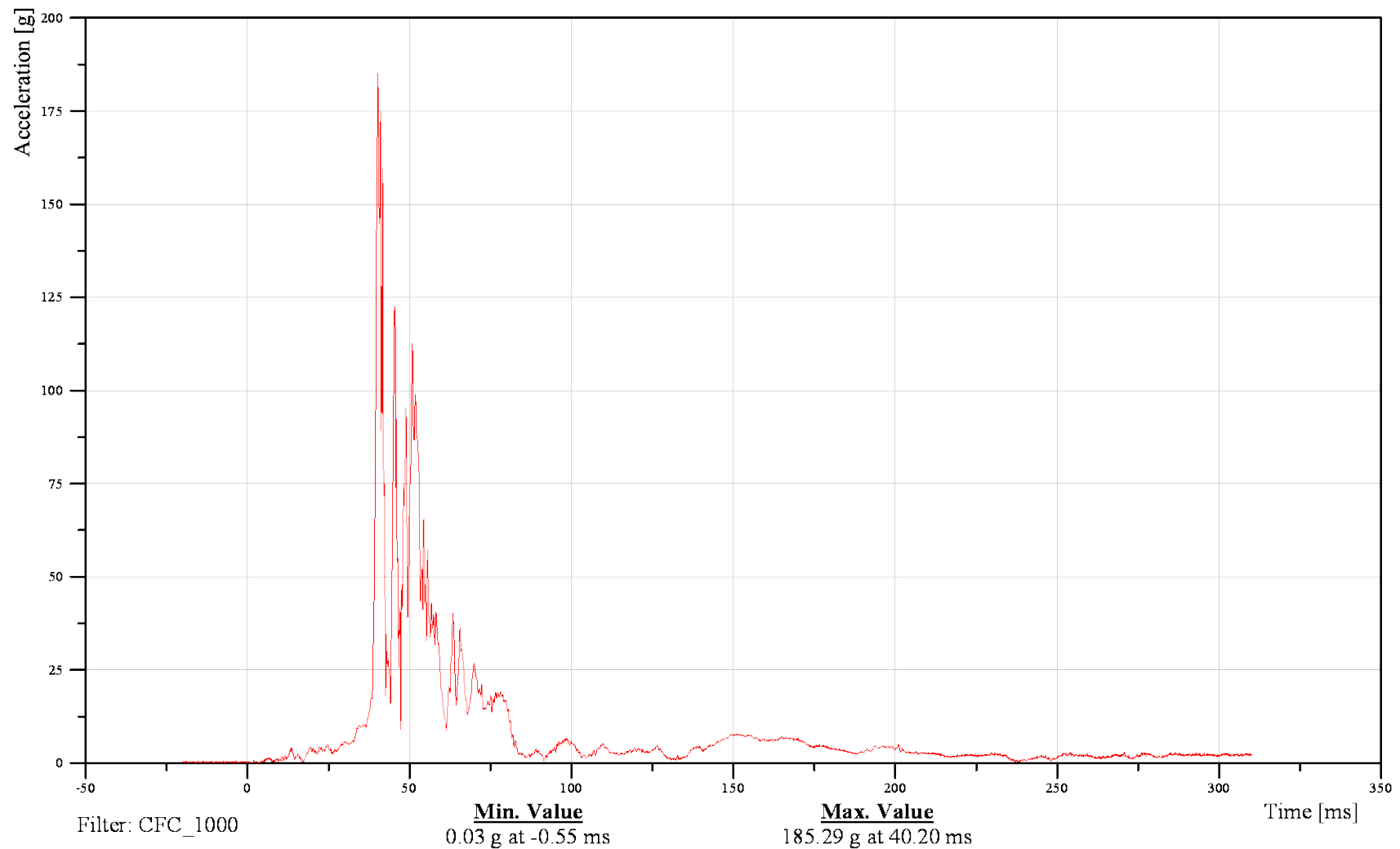
Time: 16:14

Customer: VRTC

14ABRILE01WFACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 IRTRAC compression

Date: 01/24/2013

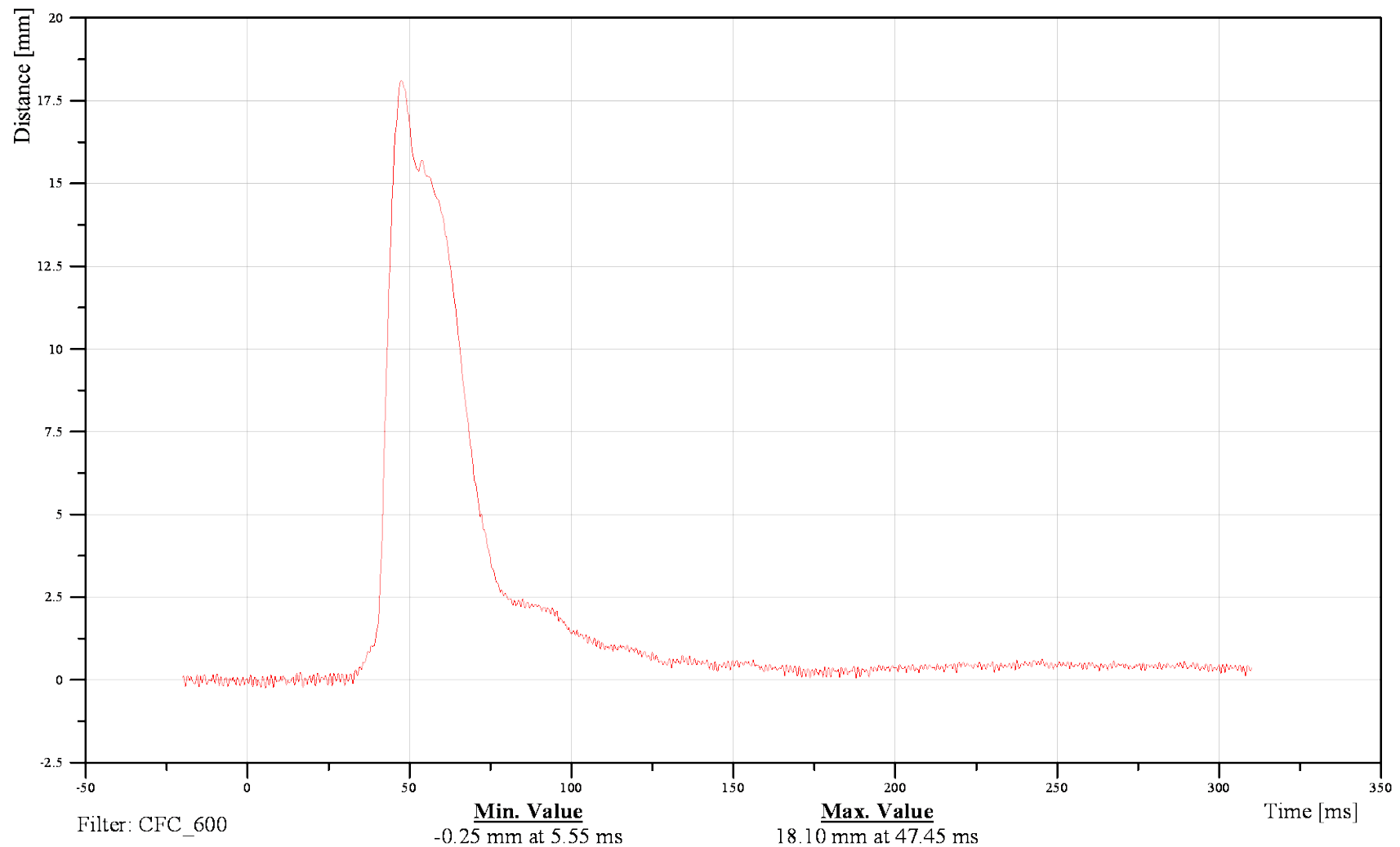
Time: 16:14

Customer: VRTC

14ABRILE01WFDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 Rotational angle

Date: 01/24/2013

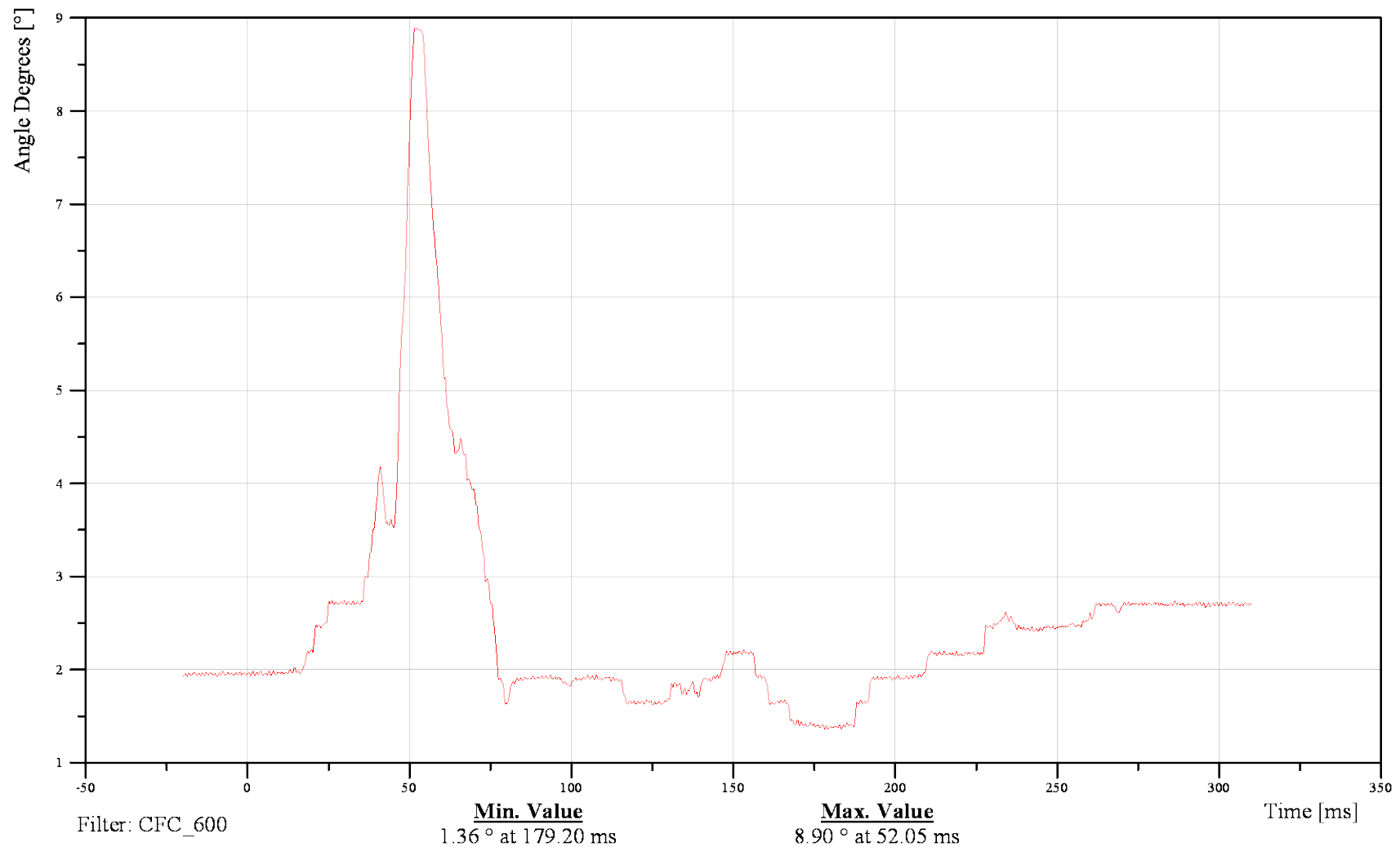
Time: 16:14

Customer: VRTC

14ABRILE01WFANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 IRTRAC X Deflection

Date: 01/24/2013

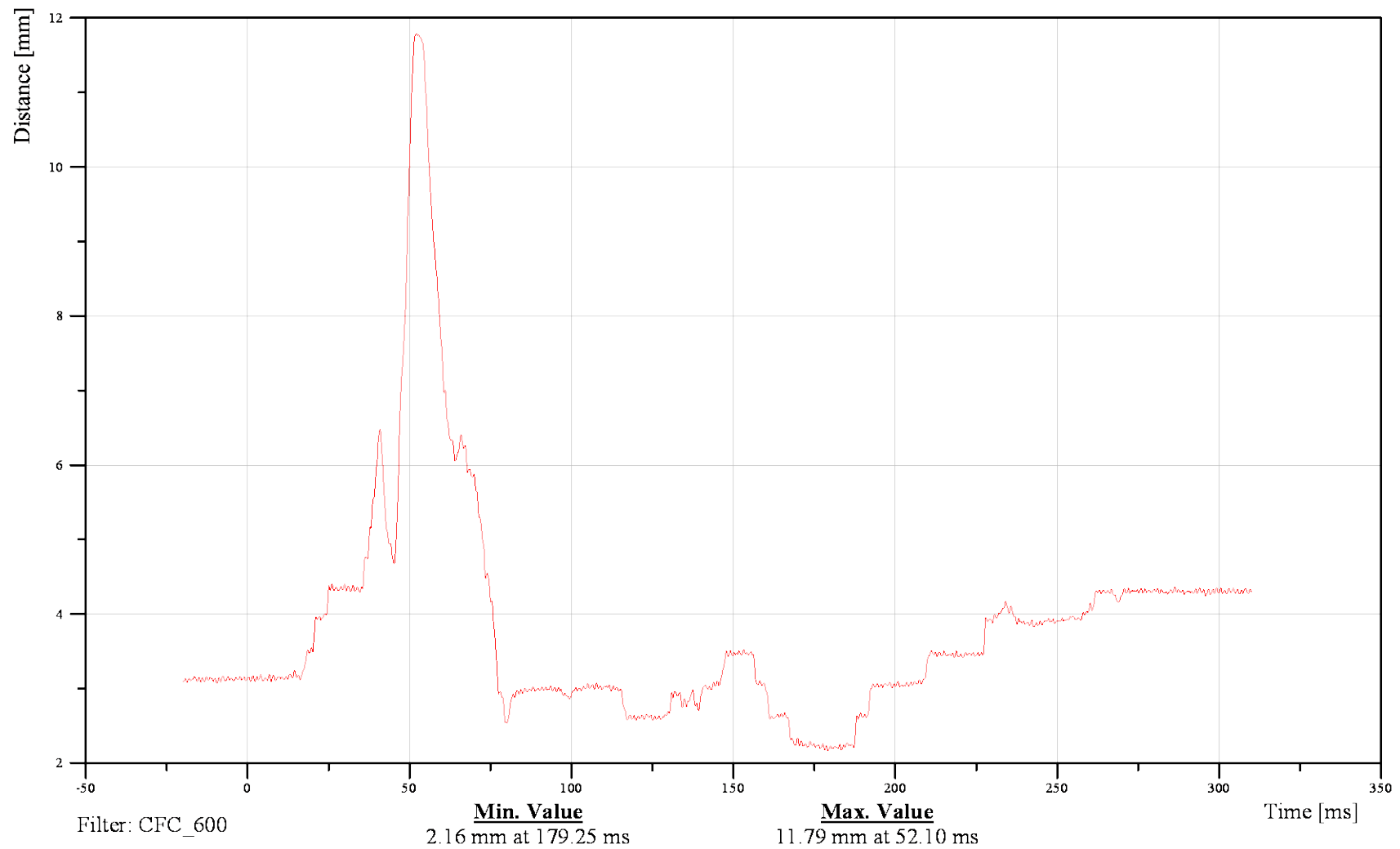
Time: 16:14

Customer: VRTC

14ABRILE01WFDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 1 IRTRAC Y Deflection

Date: 01/24/2013

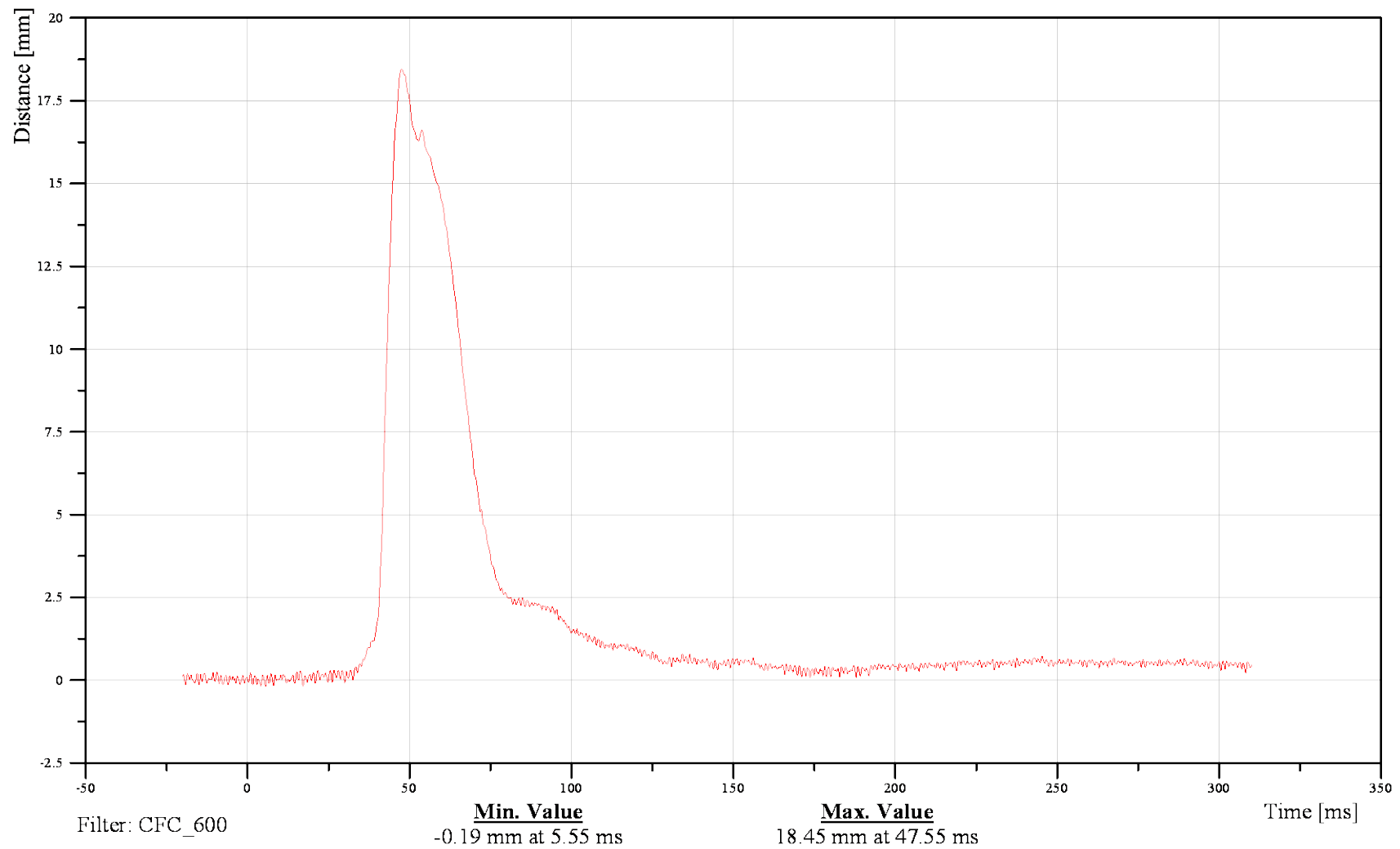
Time: 16:14

Customer: VRTC

14ABRILE01WFDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Longitudinal Ax

Date: 01/24/2013

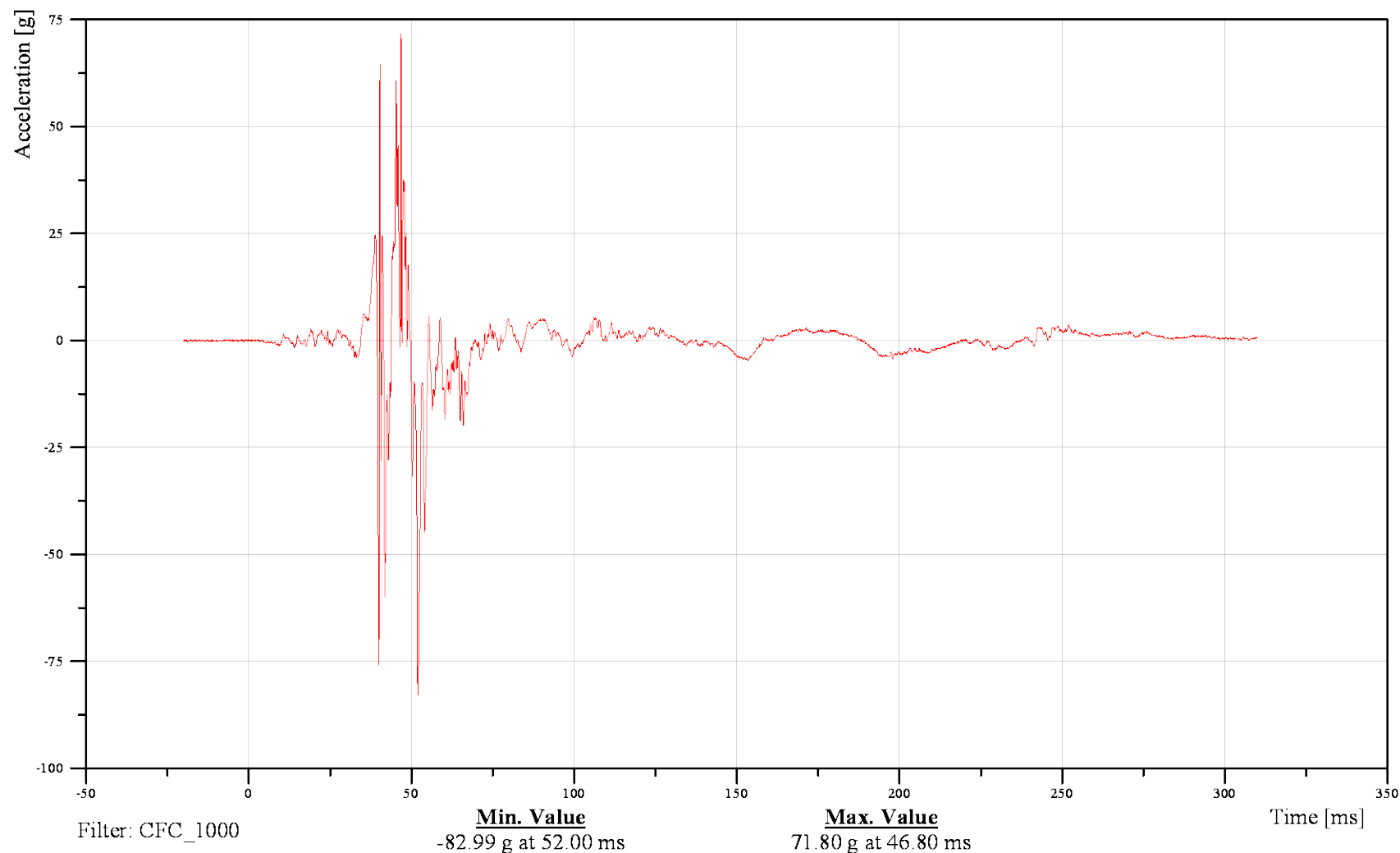
Time: 16:14

Customer: VRTC

14ABRILE02WFACXA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Lateral Ay

Date: 01/24/2013

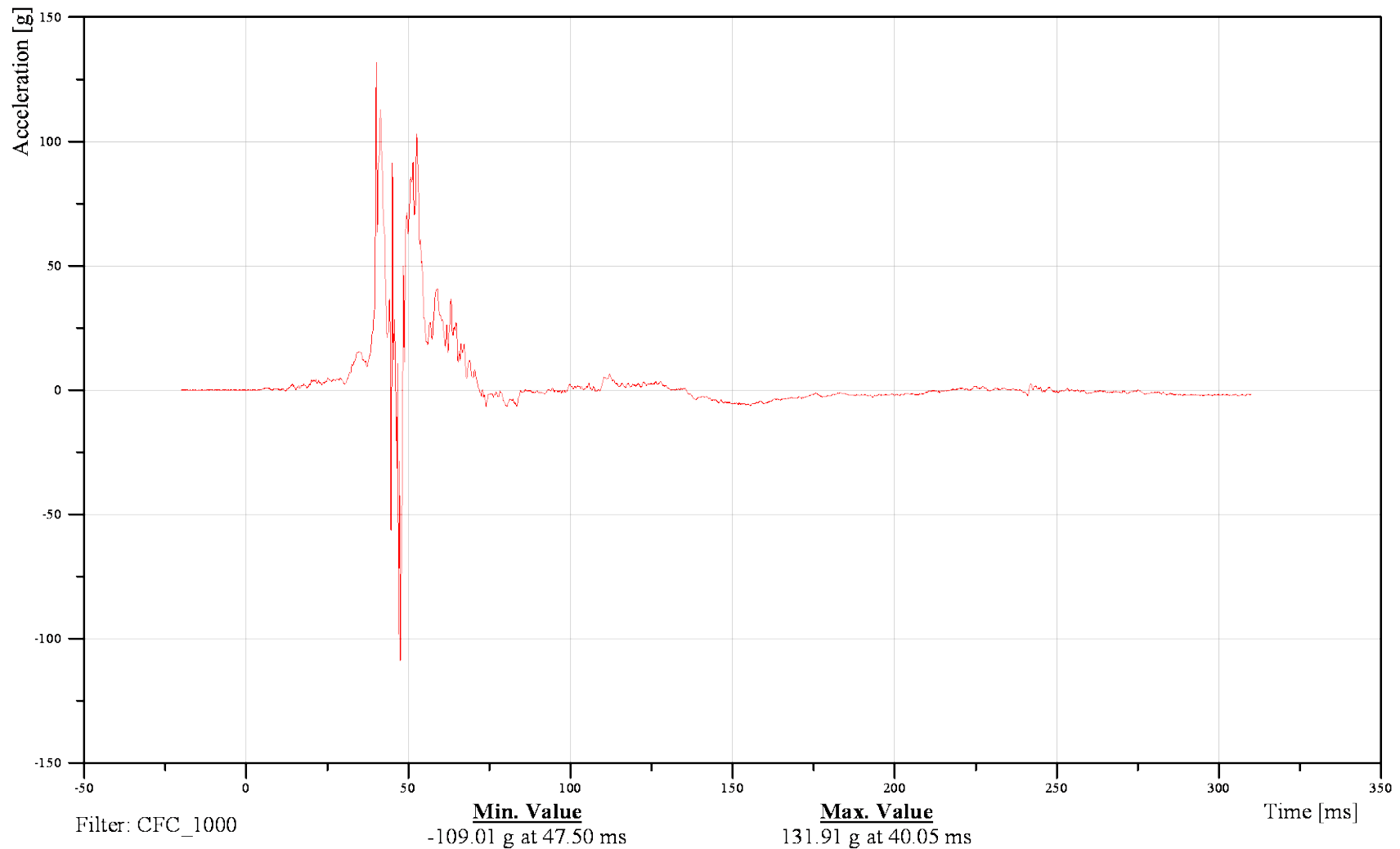
Time: 16:14

Customer: VRTC

14ABRILE02WFACYA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Vertical Az

Date: 01/24/2013

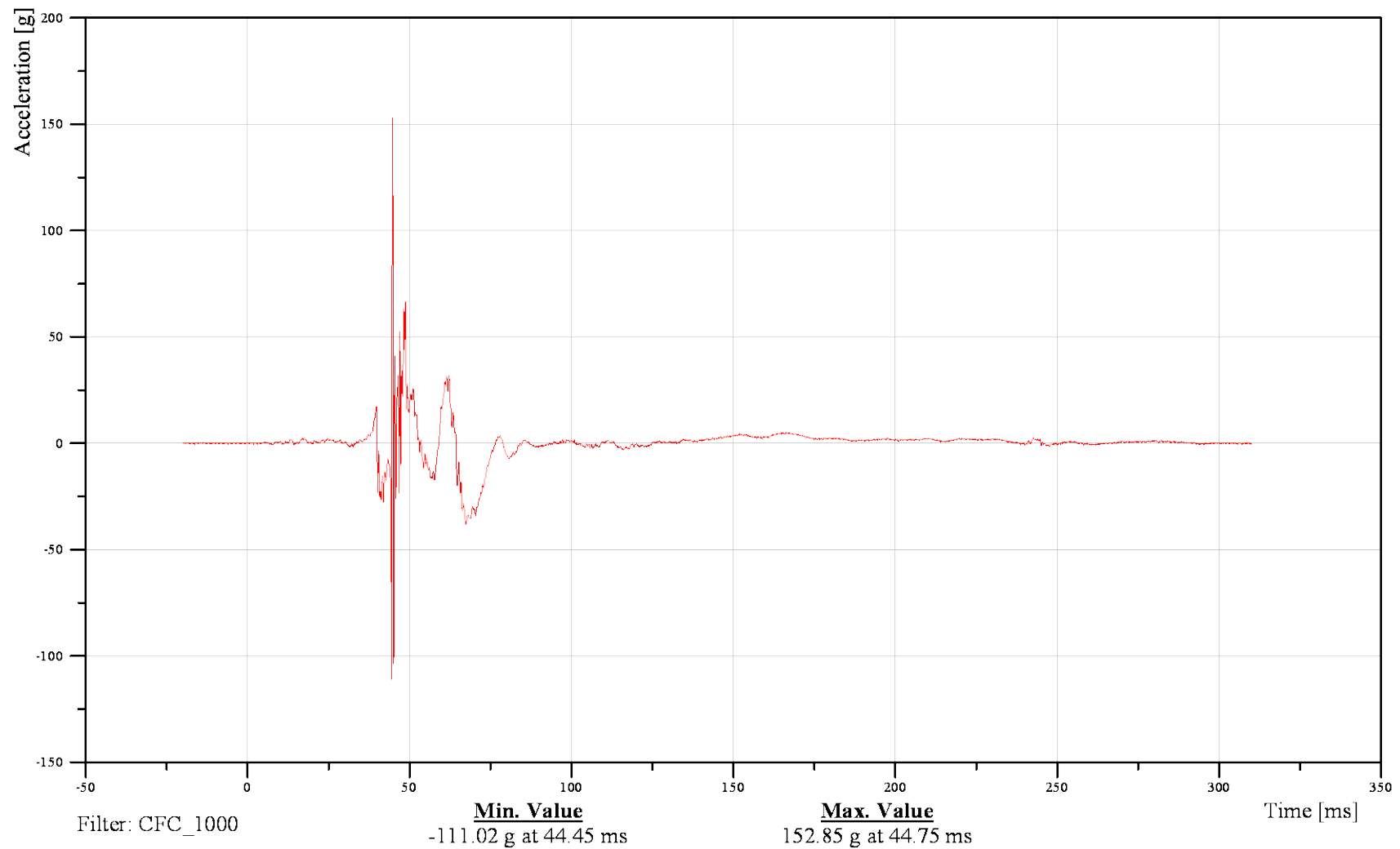
Time: 16:14

Customer: VRTC

14ABRILE02WFACZA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 A Resultant

Date: 01/24/2013

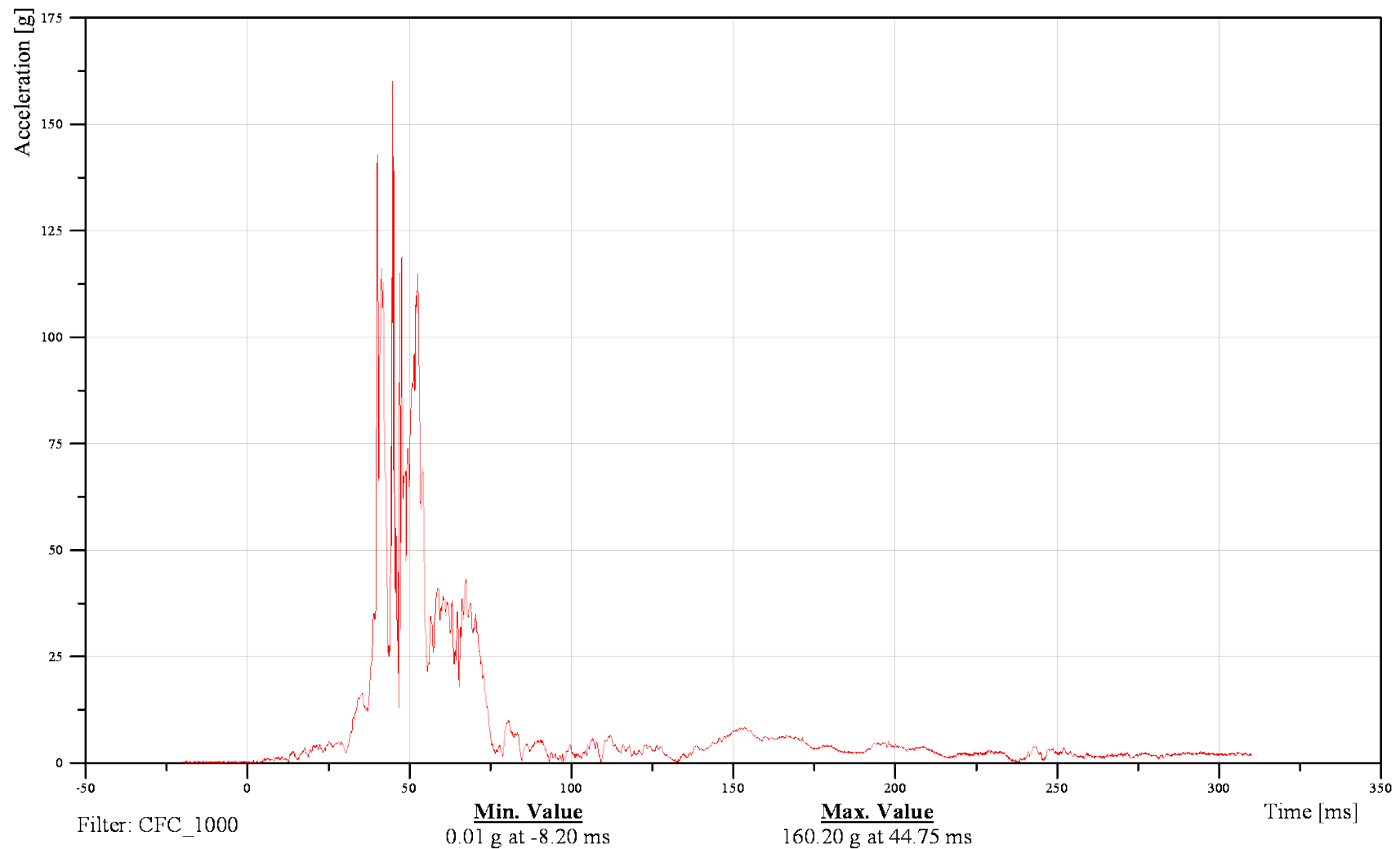
Time: 16:14

Customer: VRTC

14ABRILE02WFACRA

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 IRTRAC compression

Date: 01/24/2013

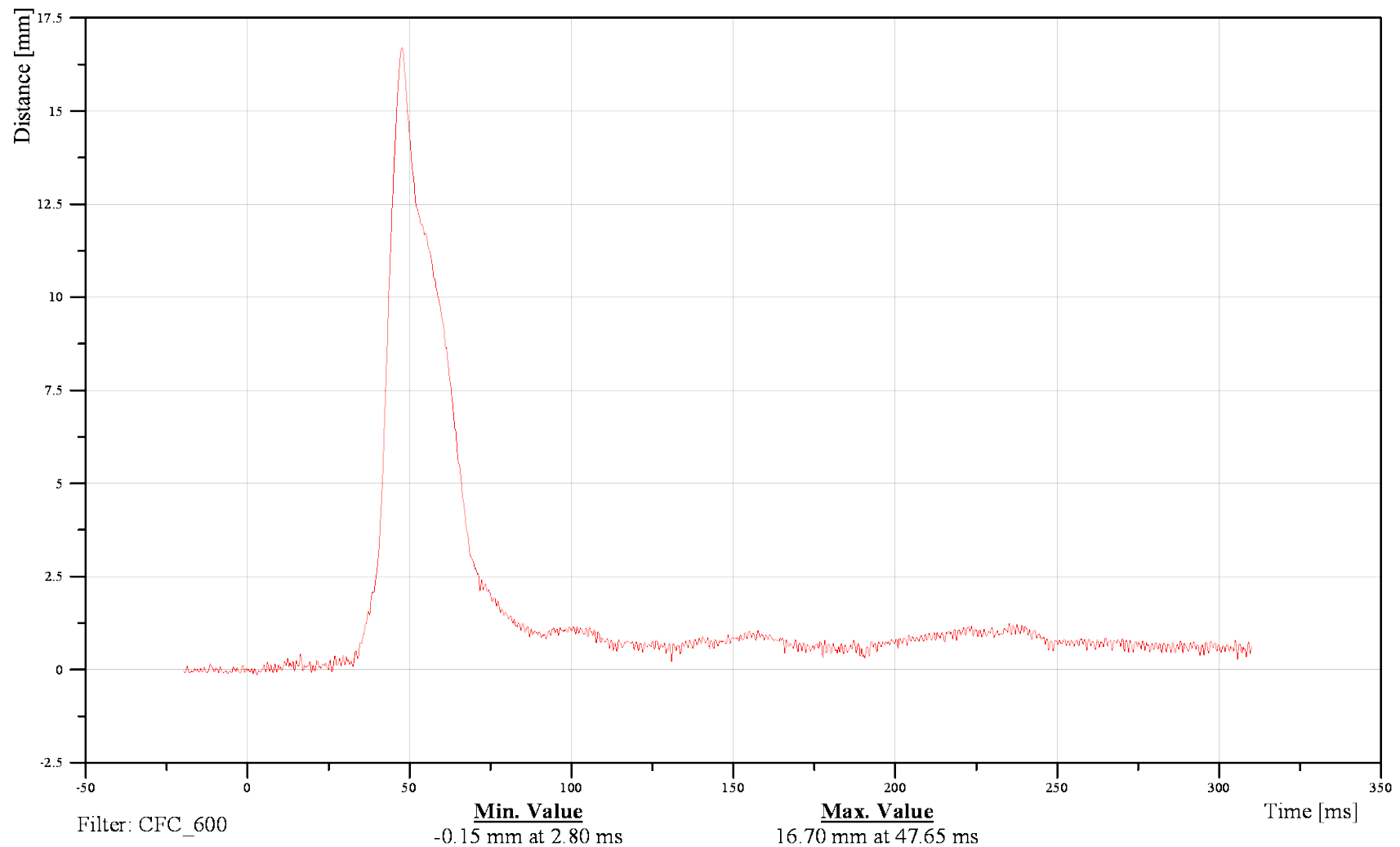
Time: 16:14

Customer: VRTC

14ABRILE02WFDC0B

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 Rotational angle

Date: 01/24/2013

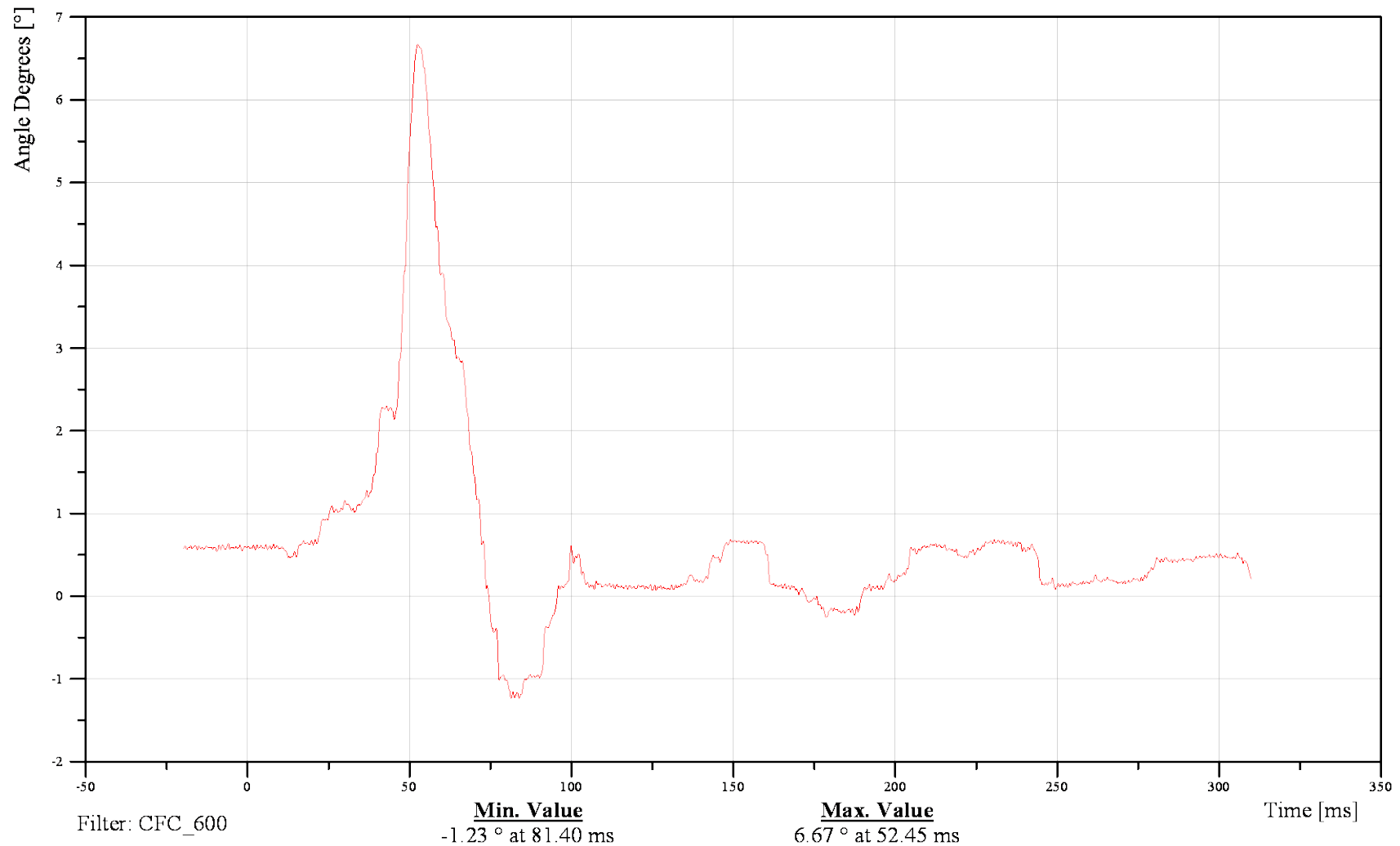
Time: 16:14

Customer: VRTC

14ABRILE02WFANZB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 IRTRAC X Deflection

Date: 01/24/2013

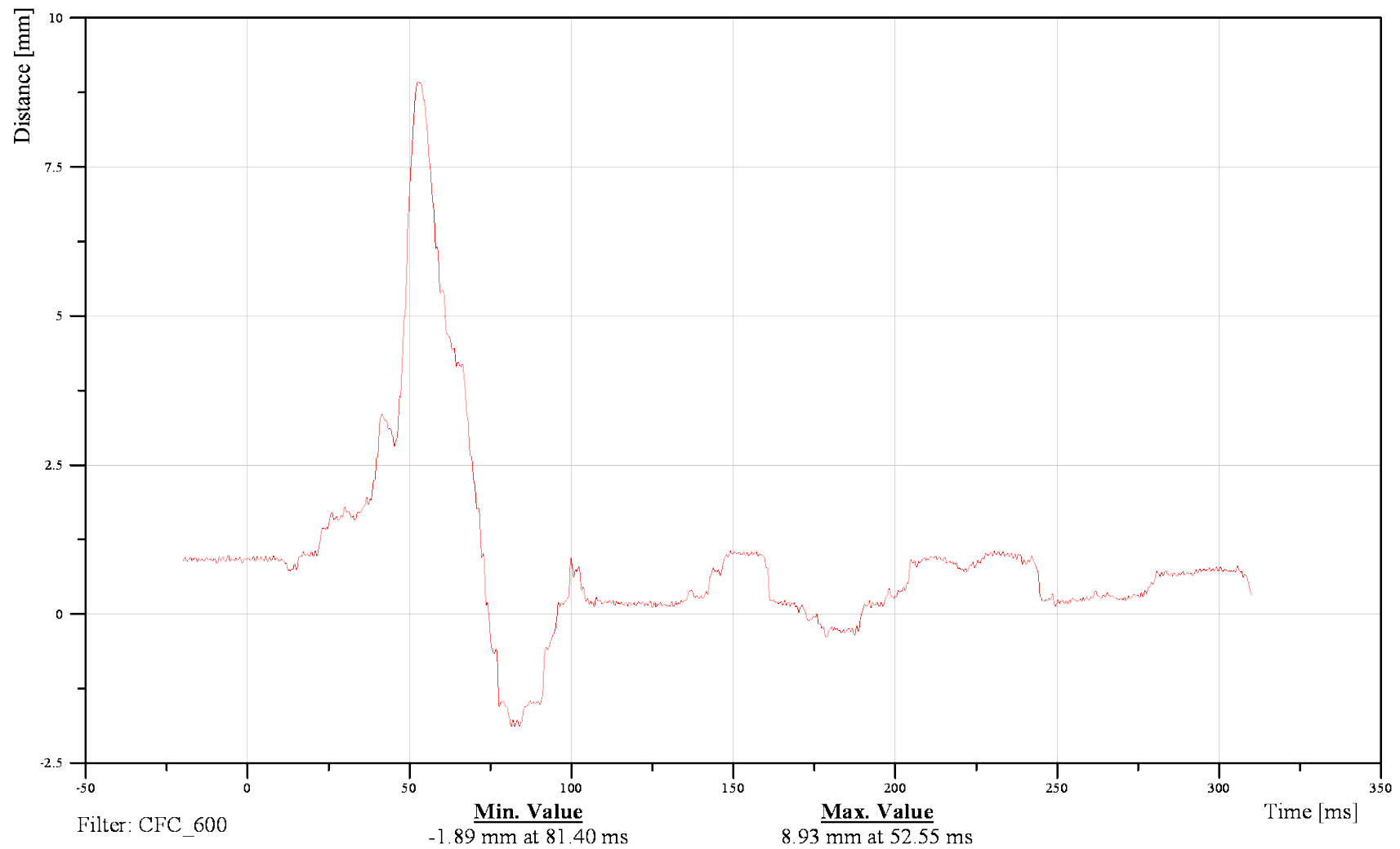
Time: 16:14

Customer: VRTC

14ABRILE02WFDSXB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Abdominal Rib 2 IRTRAC Y Deflection

Date: 01/24/2013

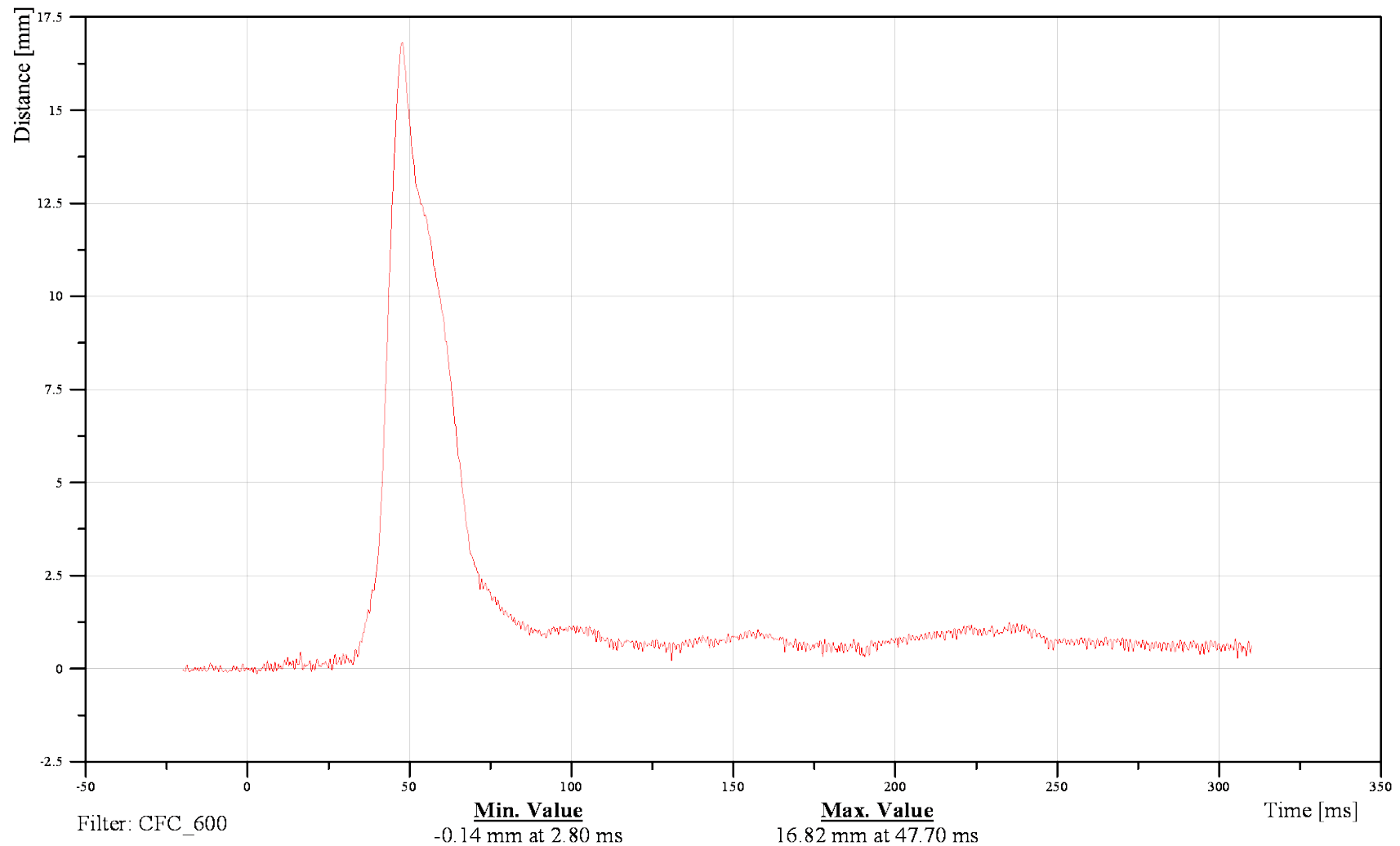
Time: 16:14

Customer: VRTC

14ABRILE02WFDSYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 Longitudinal Ax

Date: 01/24/2013

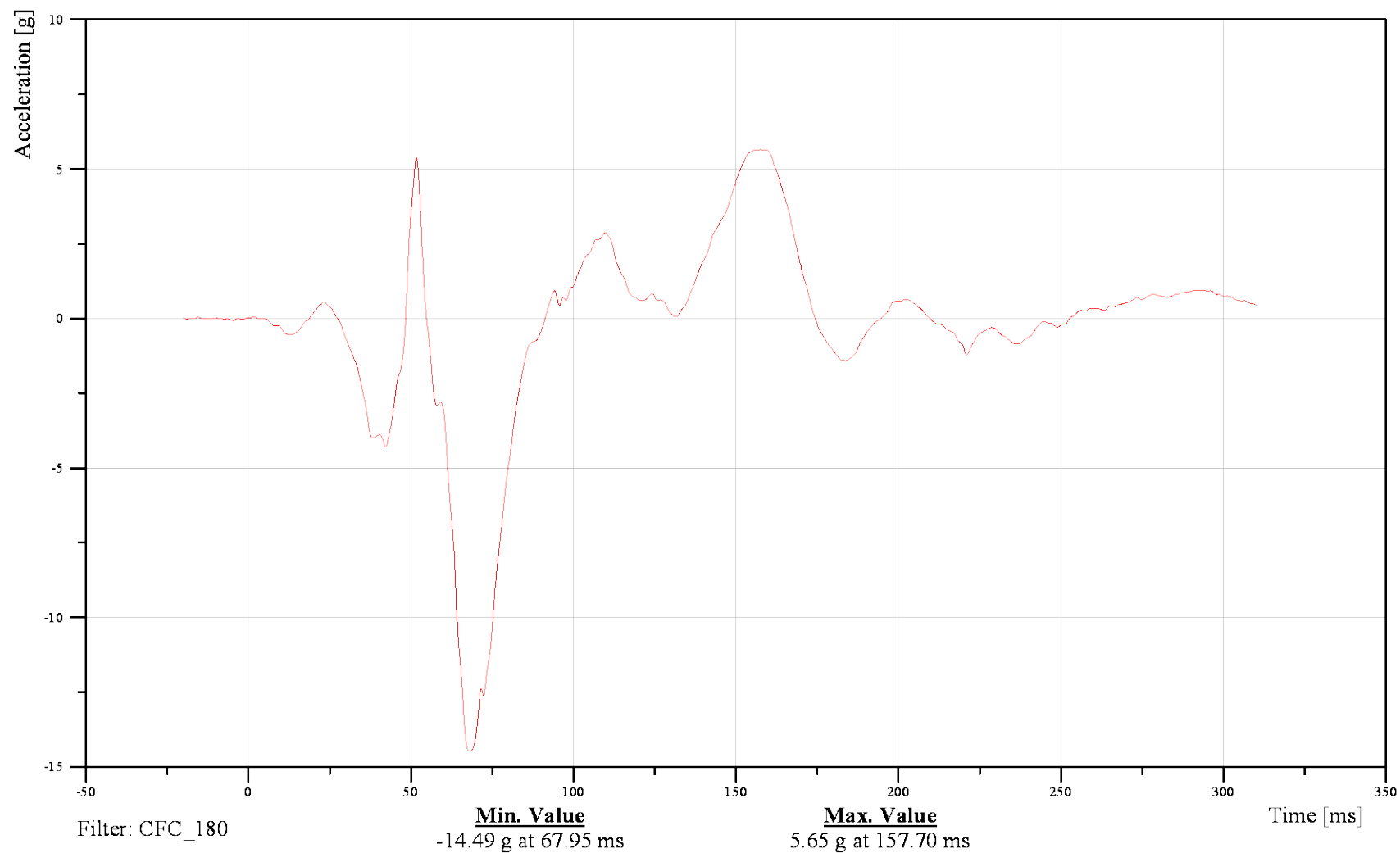
Time: 16:14

Customer: VRTC

14THSP0400WFACXC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 Lateral Ay

Date: 01/24/2013

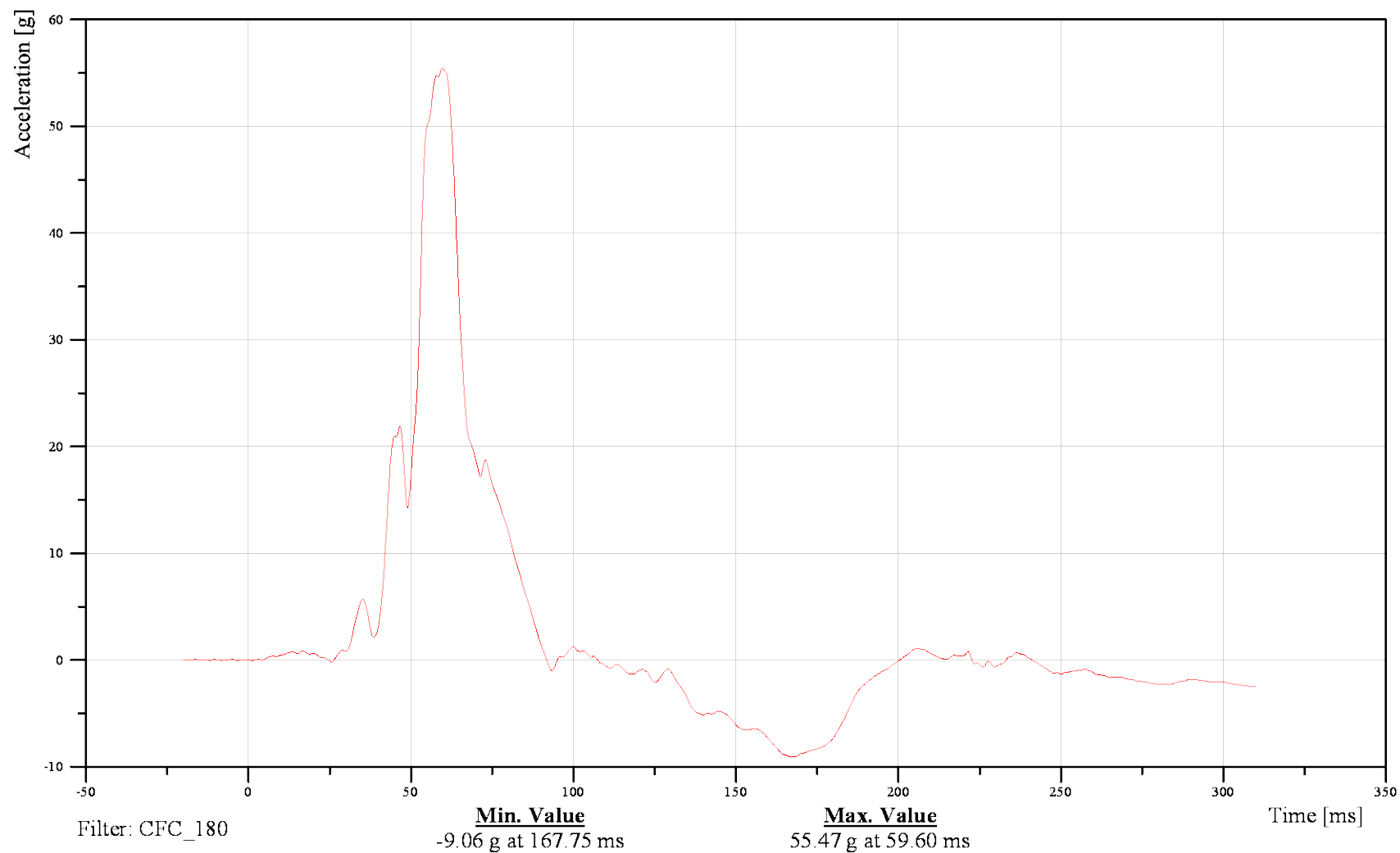
Time: 16:14

Customer: VRTC

14THSP0400WFACYC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 Vertical Az

Date: 01/24/2013

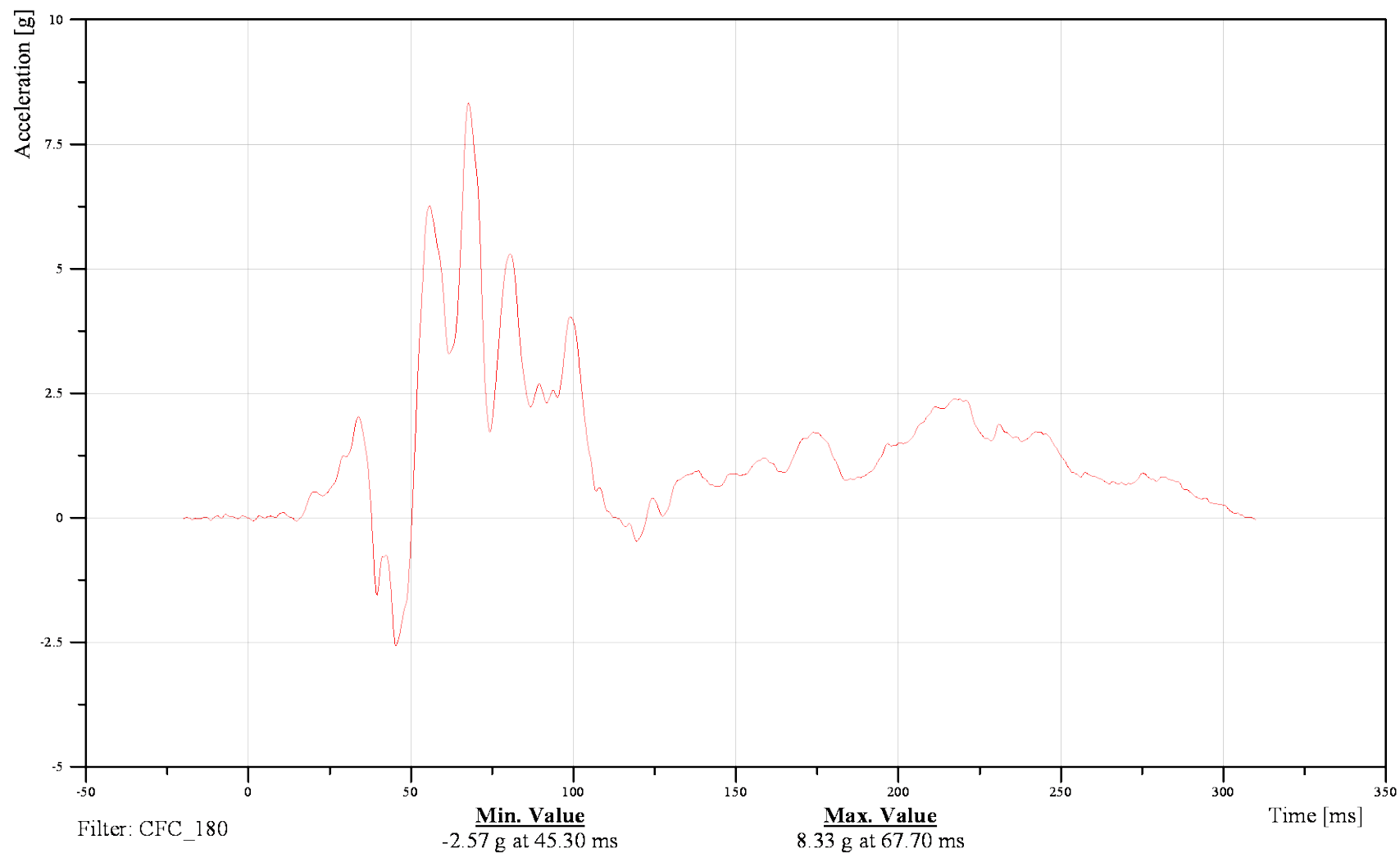
Time: 16:14

Customer: VRTC

14THSP0400WFACZC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T4 A Resultant

Date: 01/24/2013

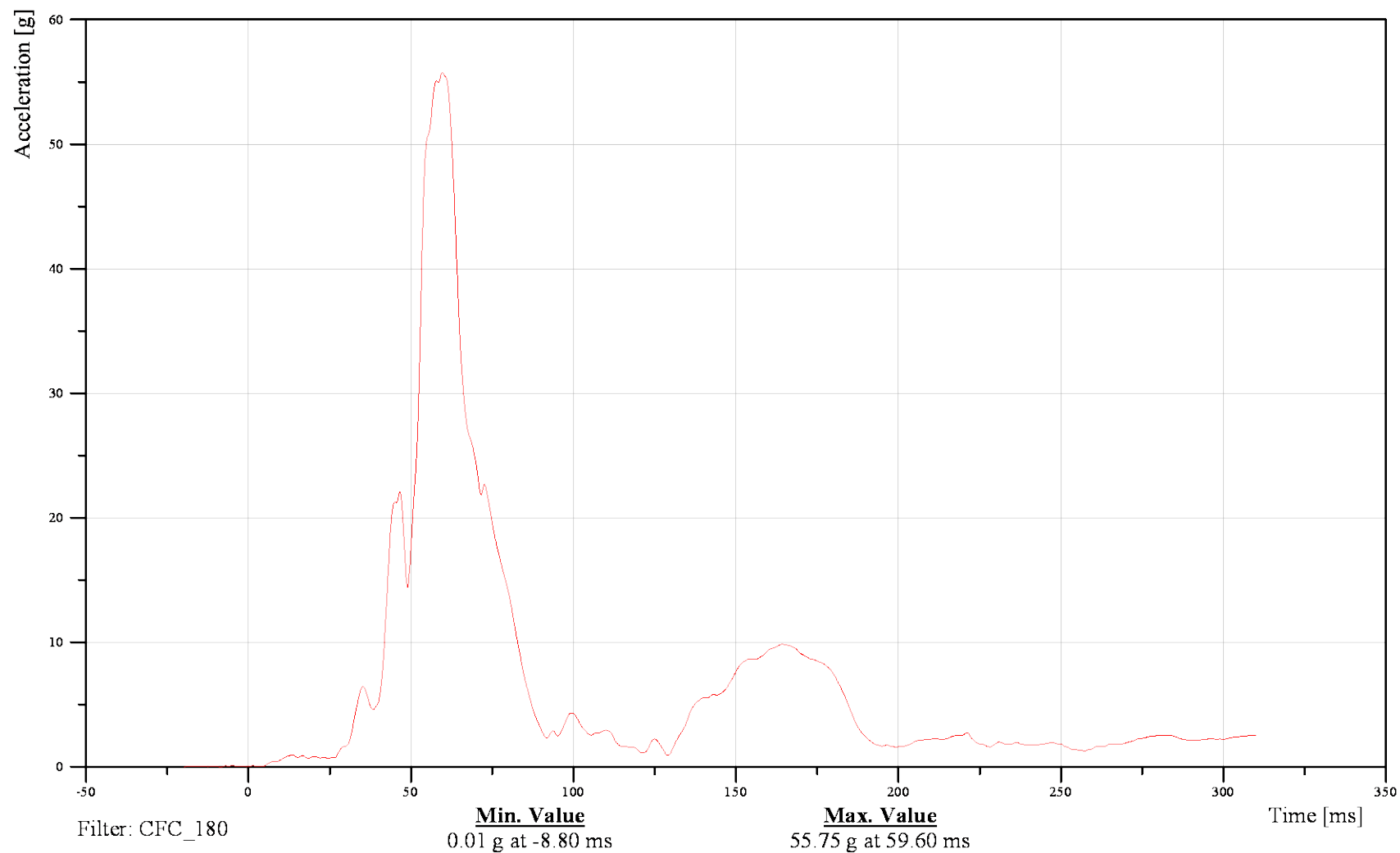
Time: 16:14

Customer: VRTC

14THSP0400WFACRC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 Longitudinal Ax

Date: 01/24/2013

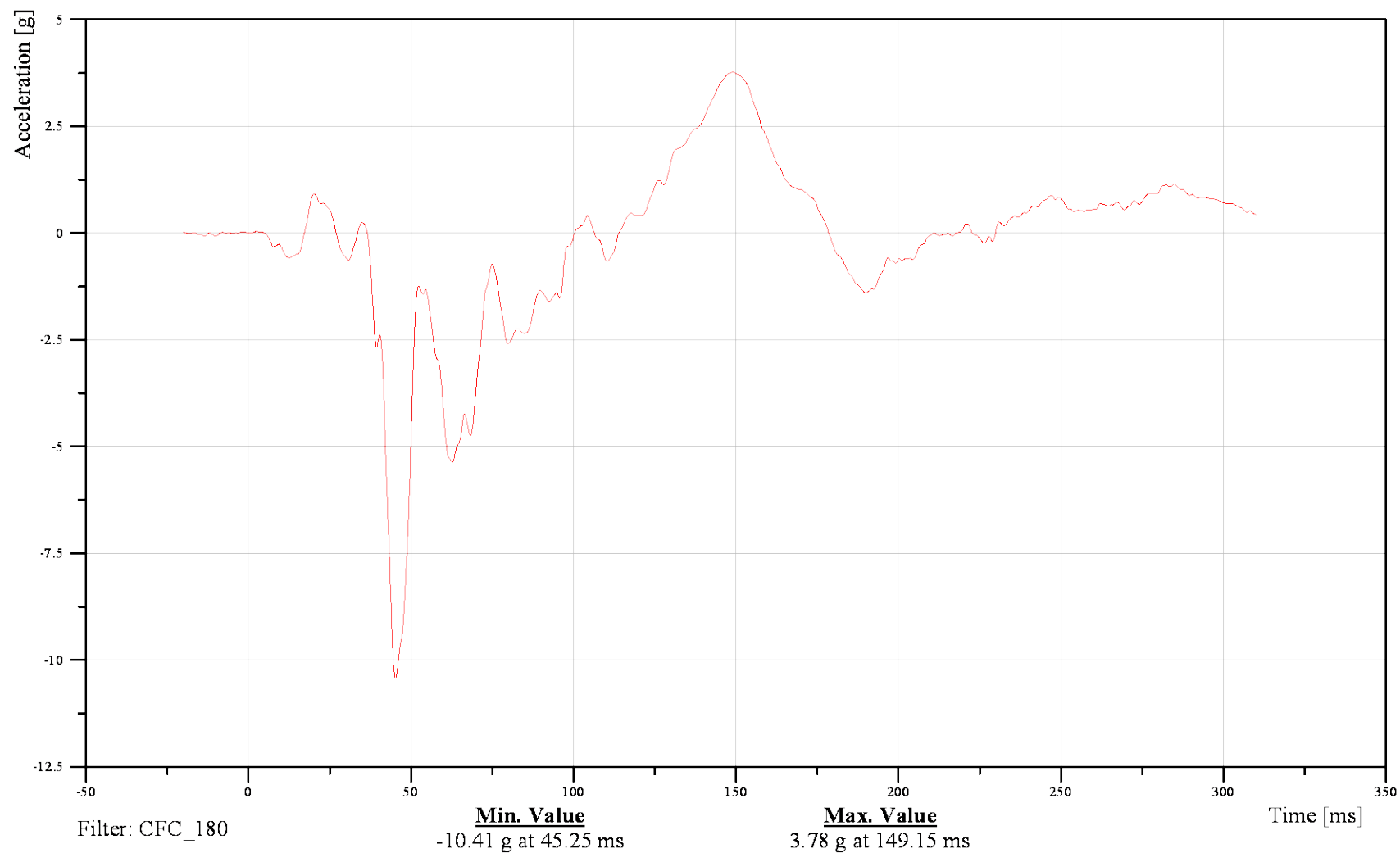
Time: 16:14

Customer: VRTC

14THSP1200WFACXC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 Lateral Ay

Date: 01/24/2013

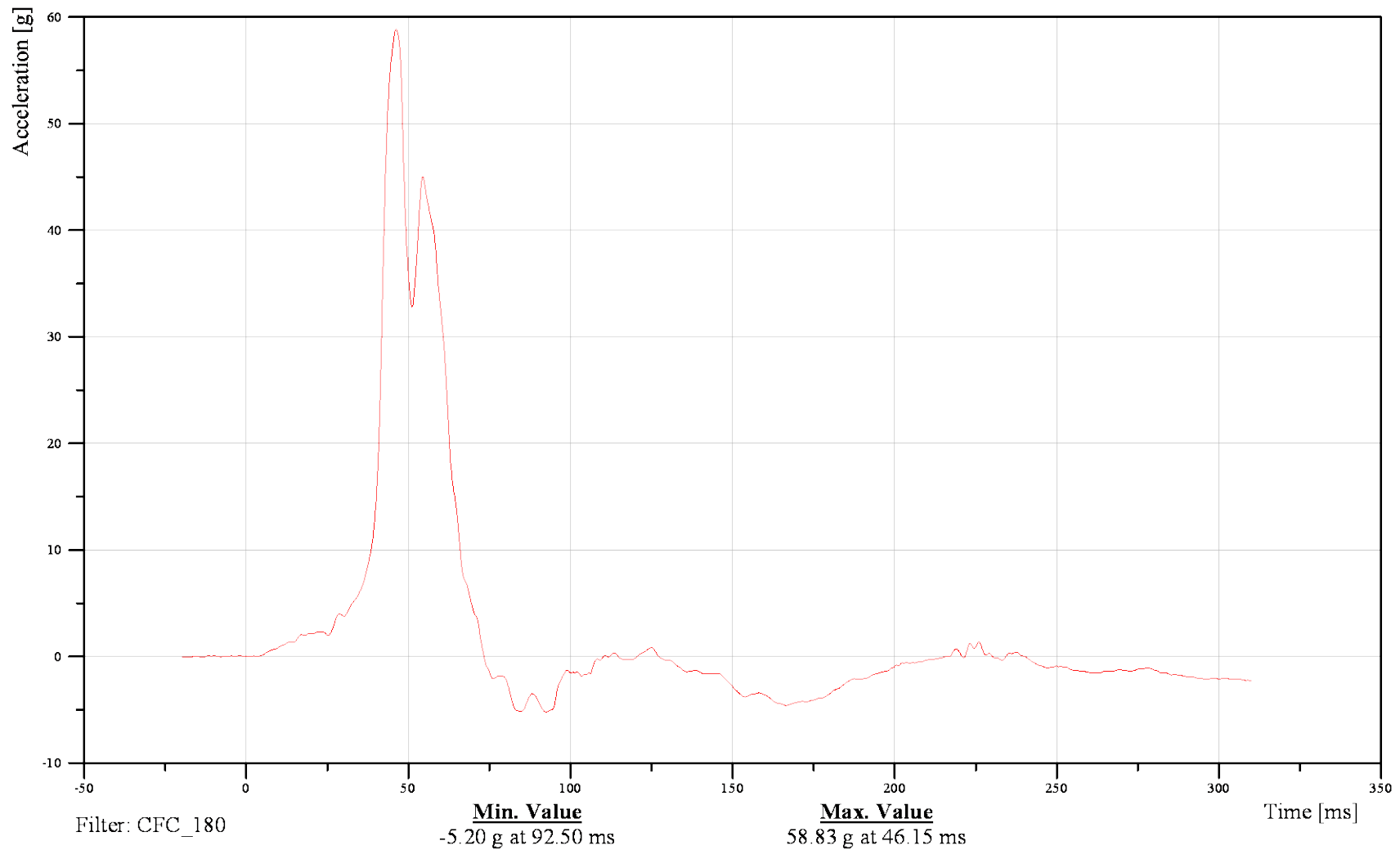
Time: 16:14

Customer: VRTC

14THSP1200WFACYC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 Vertical Az

Date: 01/24/2013

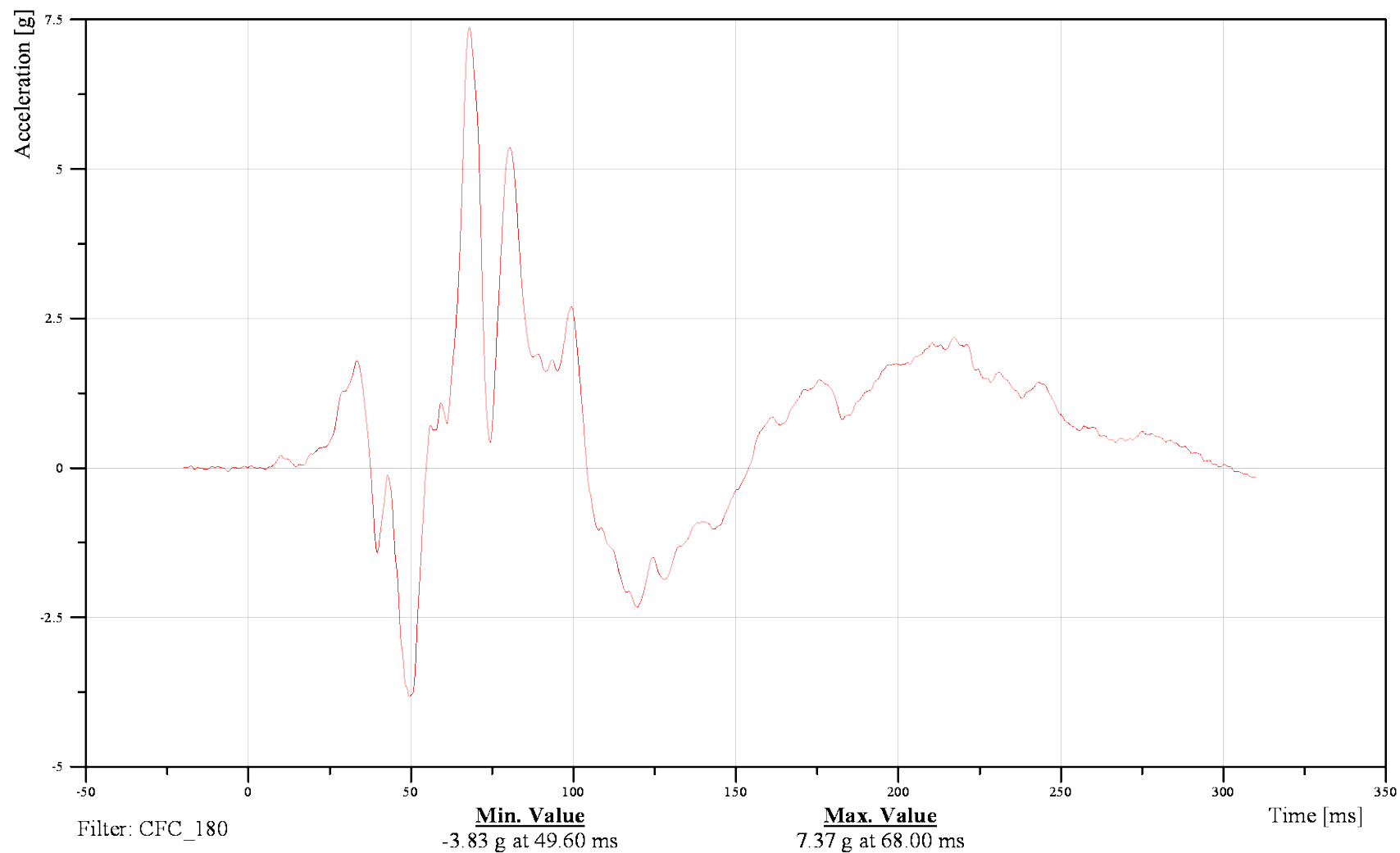
Time: 16:14

Customer: VRTC

14THSP1200WFACZC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

T12 A Resultant

Date: 01/24/2013

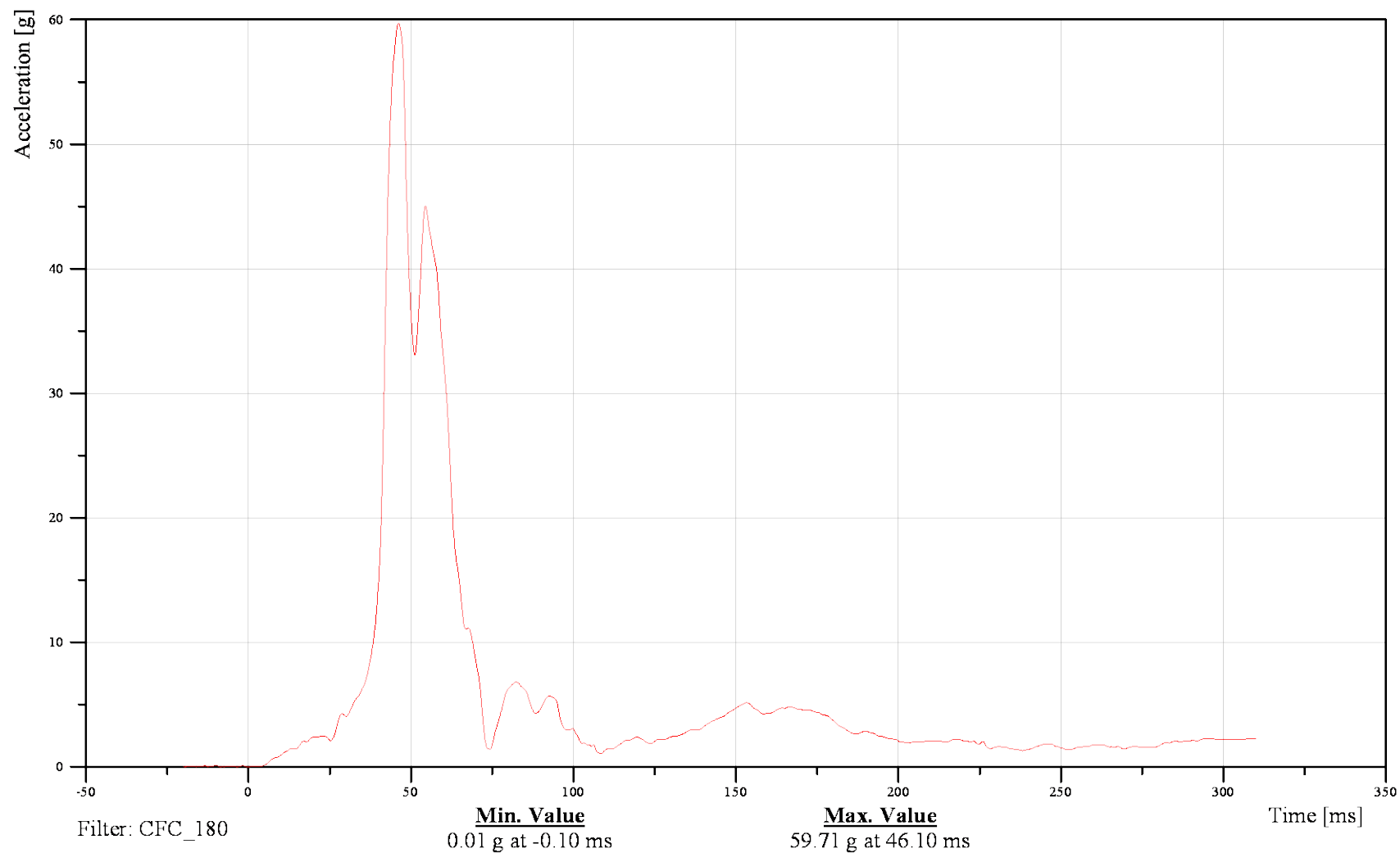
Time: 16:14

Customer: VRTC

14THSP1200WFACRC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis Longitudinal Ax

Date: 01/24/2013

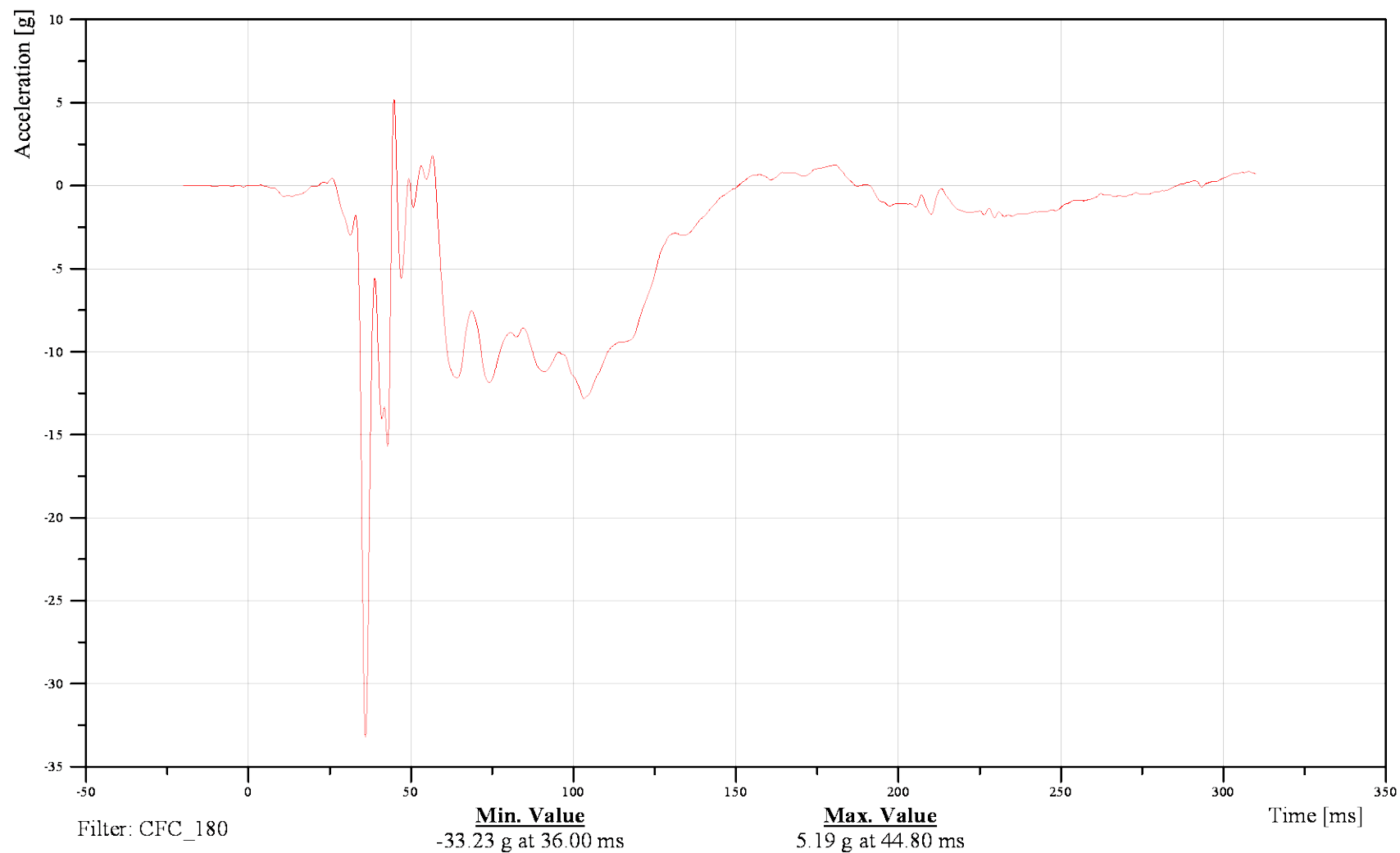
Time: 16:14

Customer: VRTC

14PELV0000WFACXC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis Lateral Ay

Date: 01/24/2013

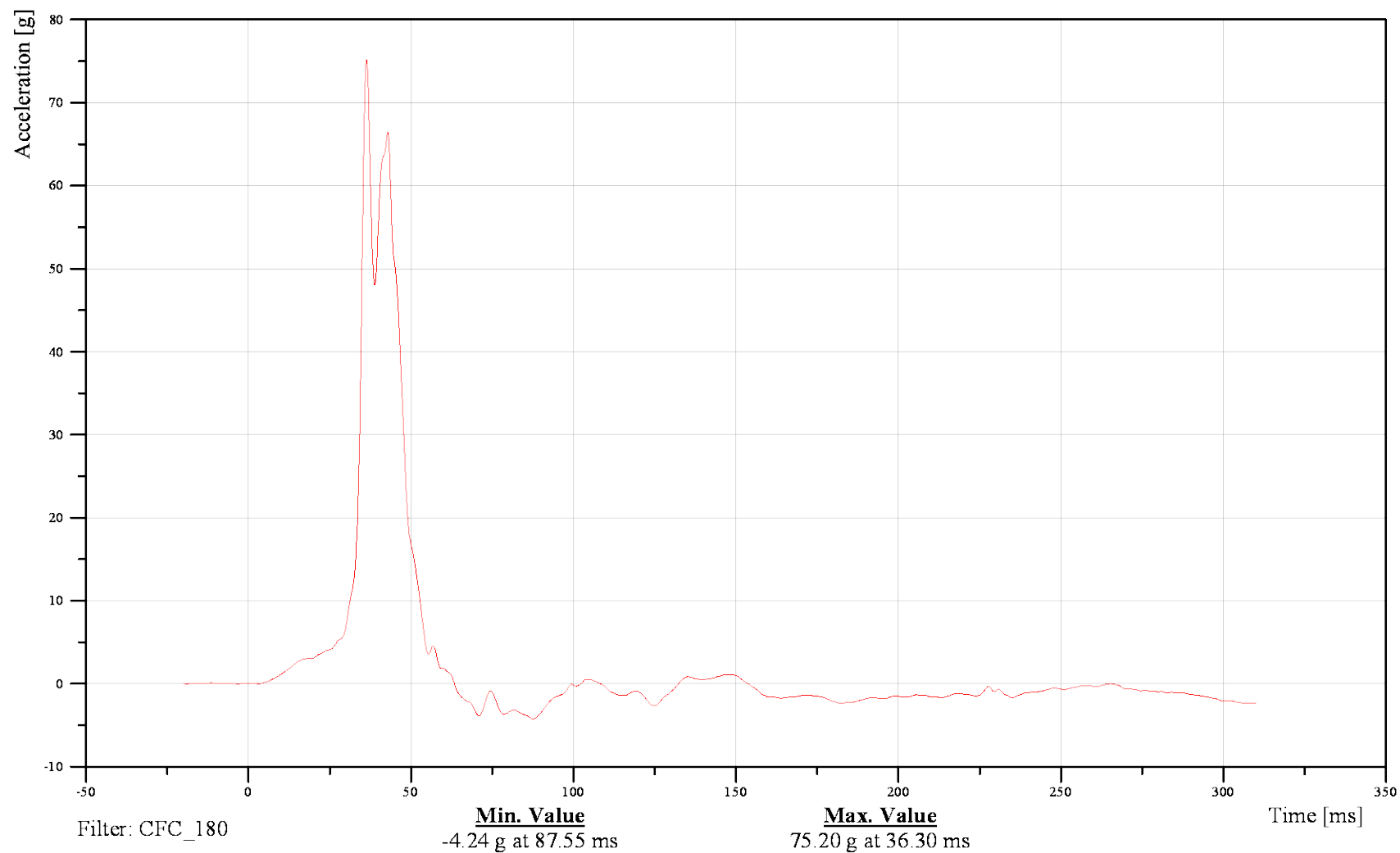
Time: 16:14

Customer: VRTC

14PELV0000WFACYC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis Vertical Az

Date: 01/24/2013

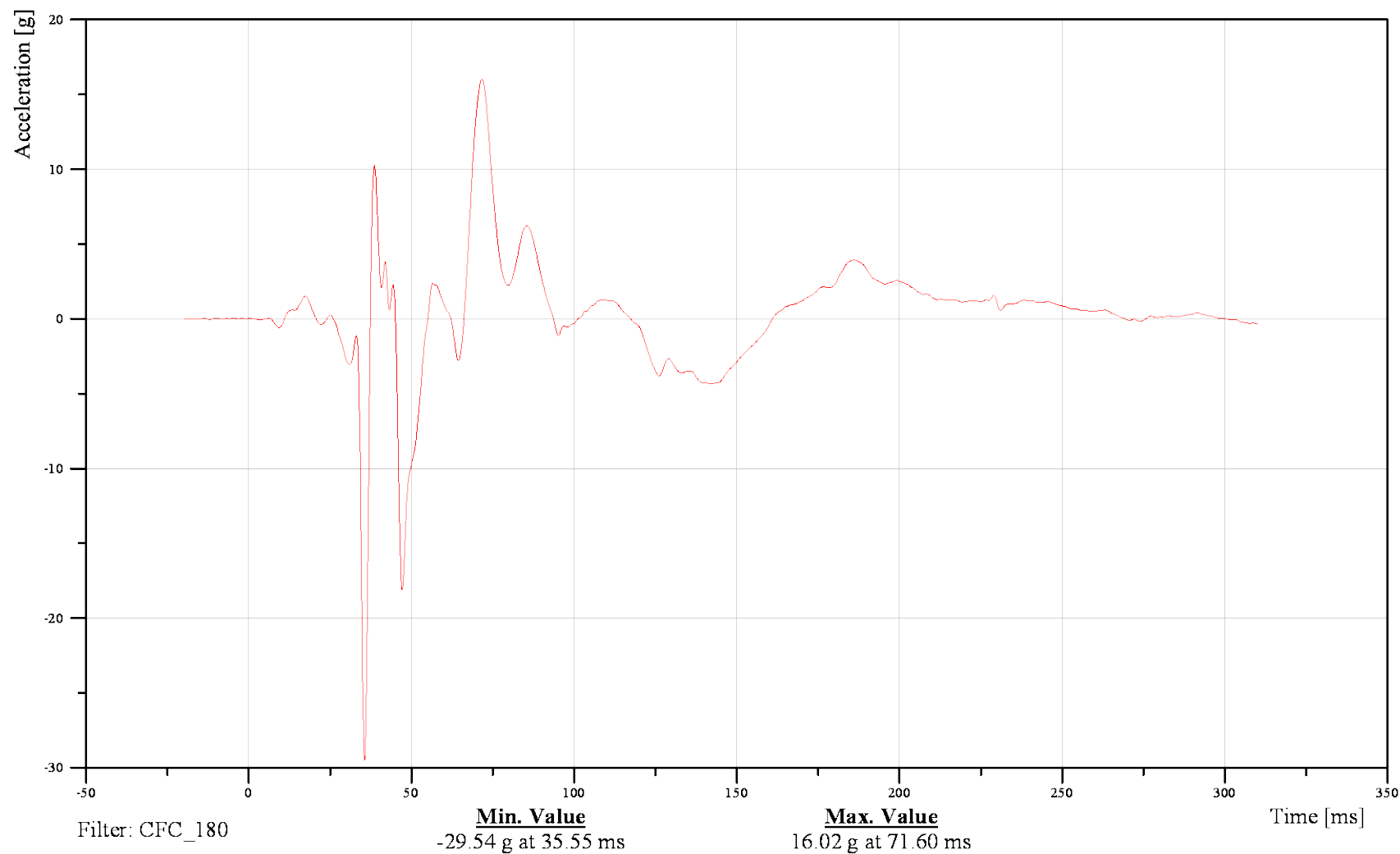
Time: 16:14

Customer: VRTC

14PELV0000WFACZC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pelvis A Resultant

Date: 01/24/2013

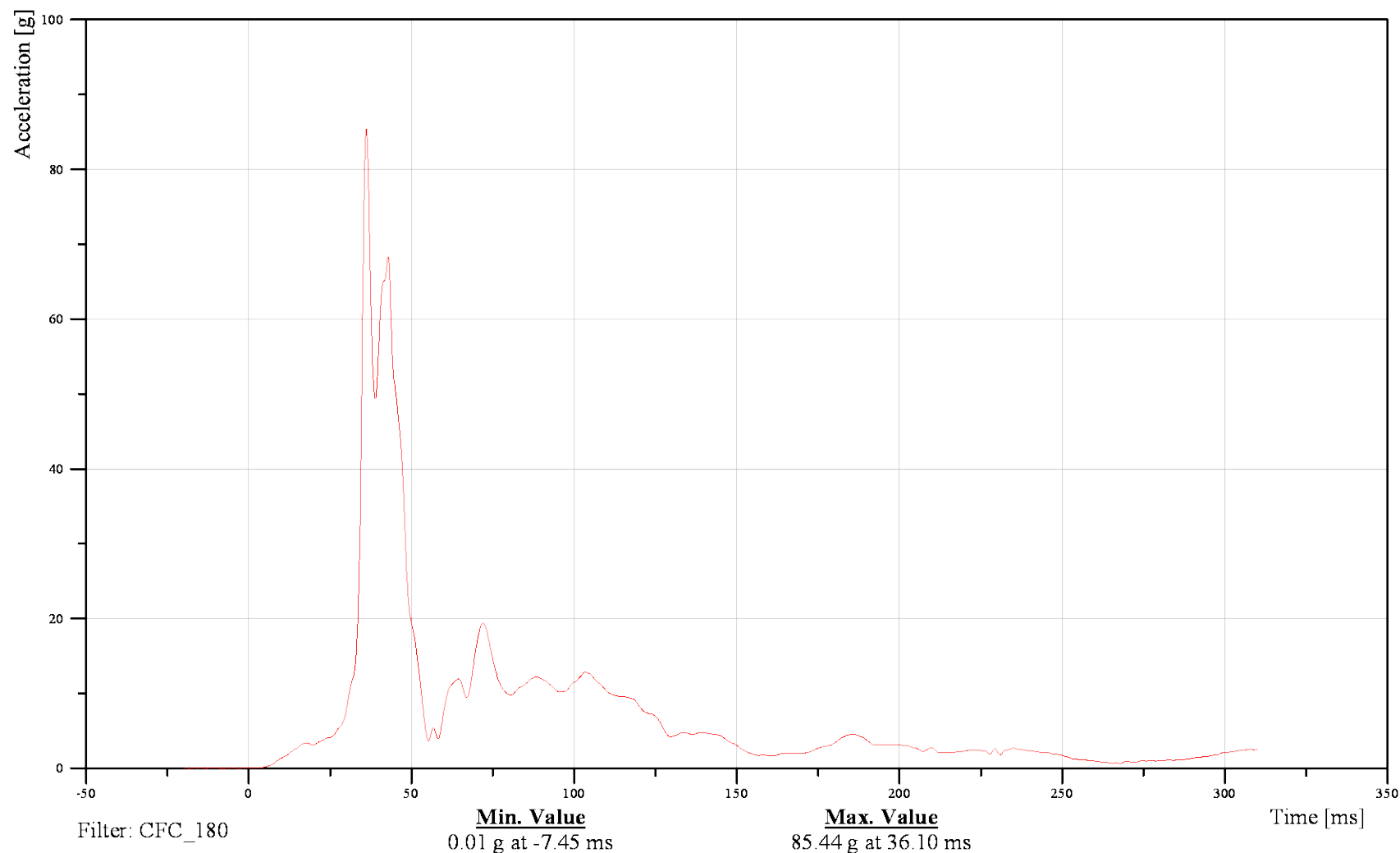
Time: 16:14

Customer: VRTC

14PELV0000WFACRC

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Pubic Force Fy

Date: 01/24/2013

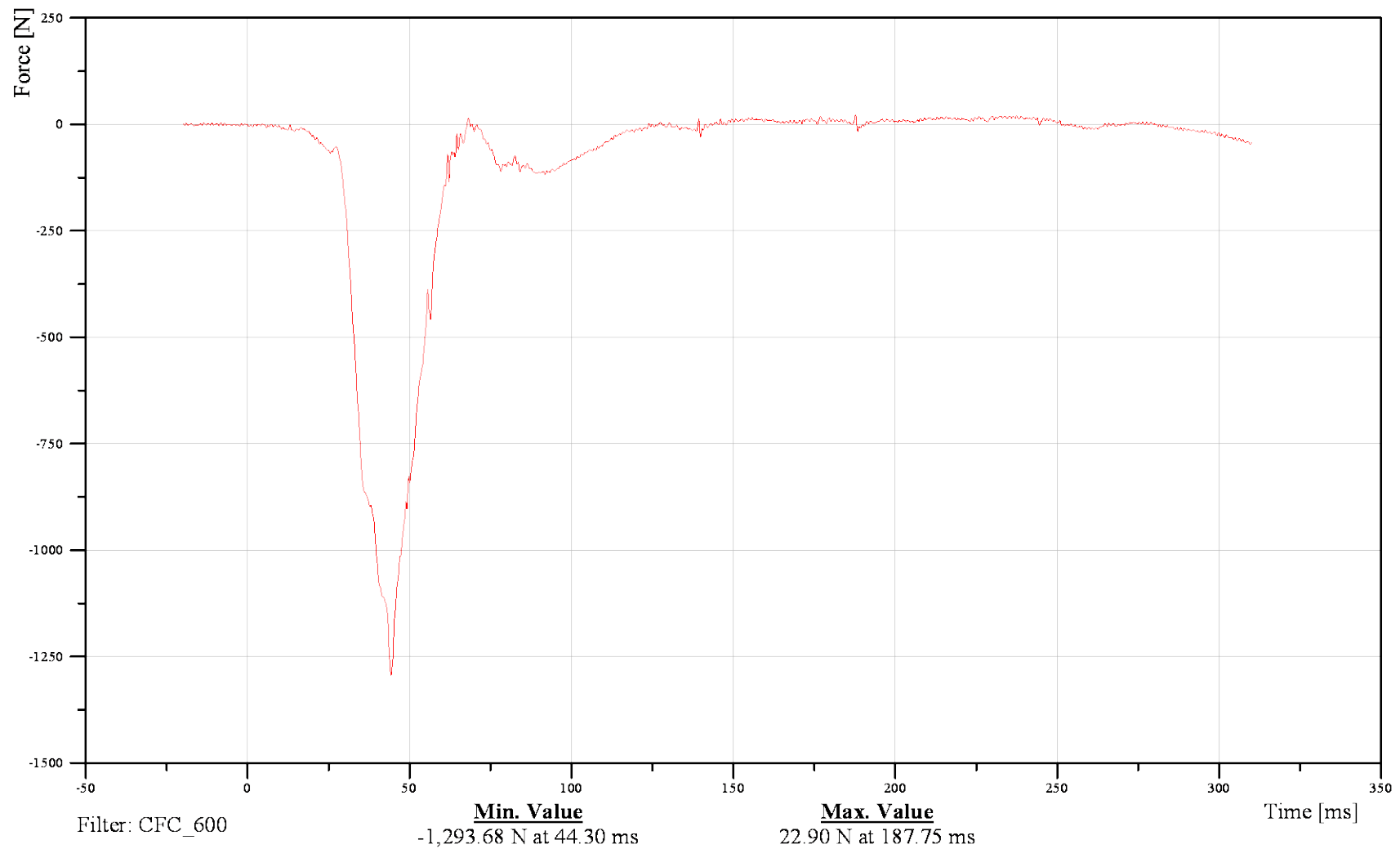
Time: 16:14

Customer: VRTC

14PUBC0000WFFOYB

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle CG (X)

Date: 01/24/2013

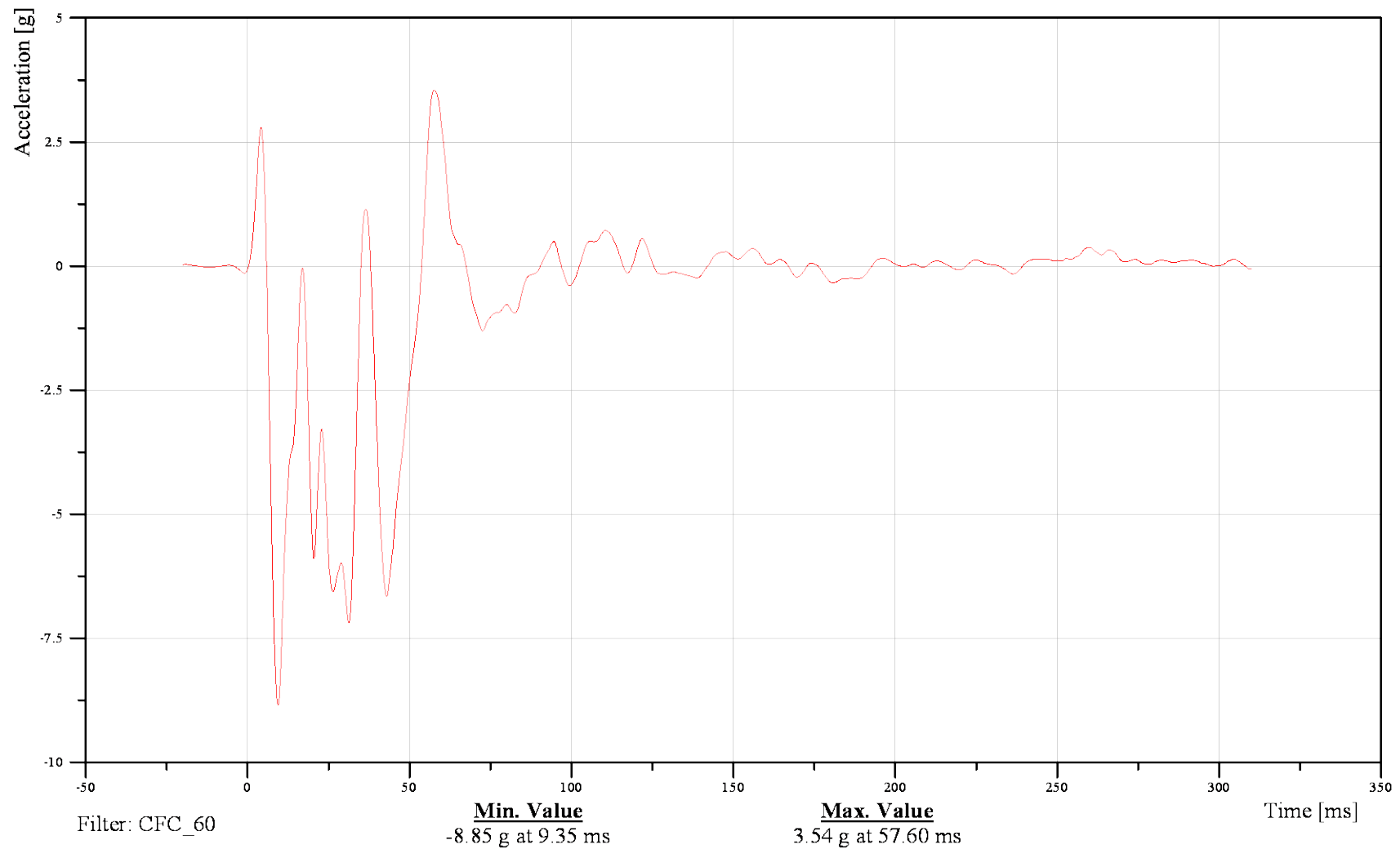
Time: 16:14

Customer: VRTC

11VEHCCG0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle CG (Y)

Date: 01/24/2013

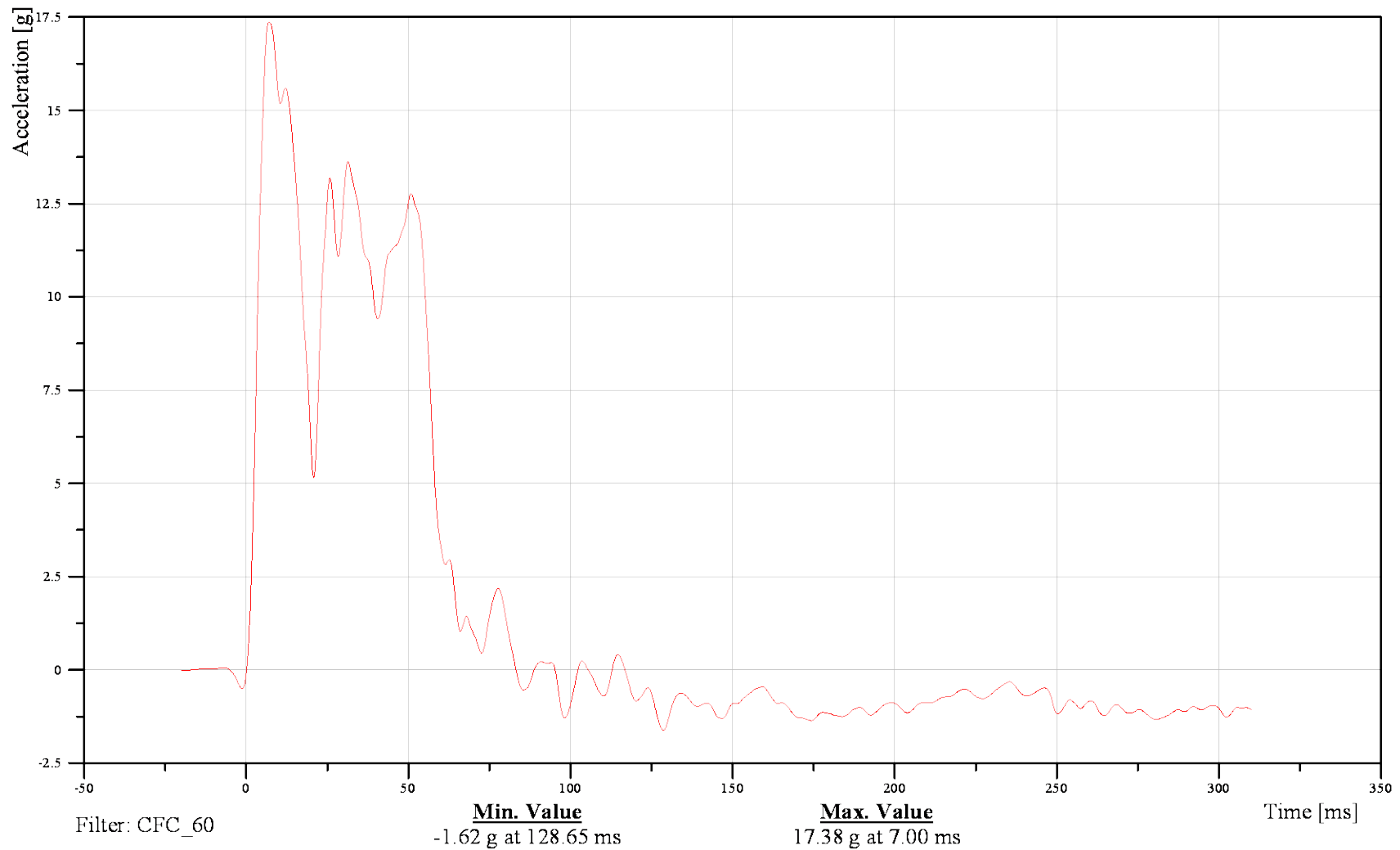
Time: 16:14

Customer: VRTC

11VEHCCG0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle CG (Z)

Date: 01/24/2013

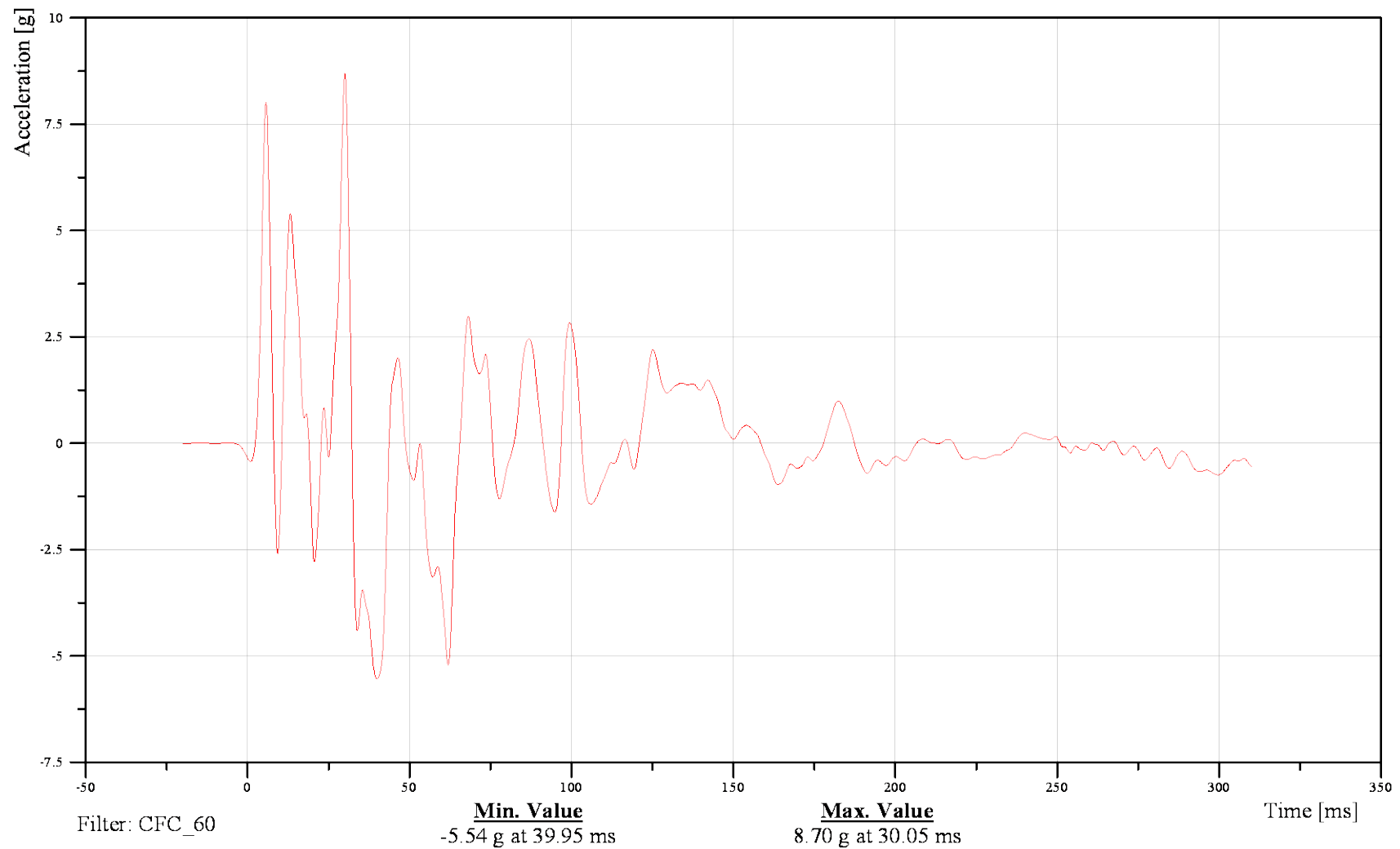
Time: 16:14

Customer: VRTC

11VEHCCG0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle CG Resultant

Date: 01/24/2013

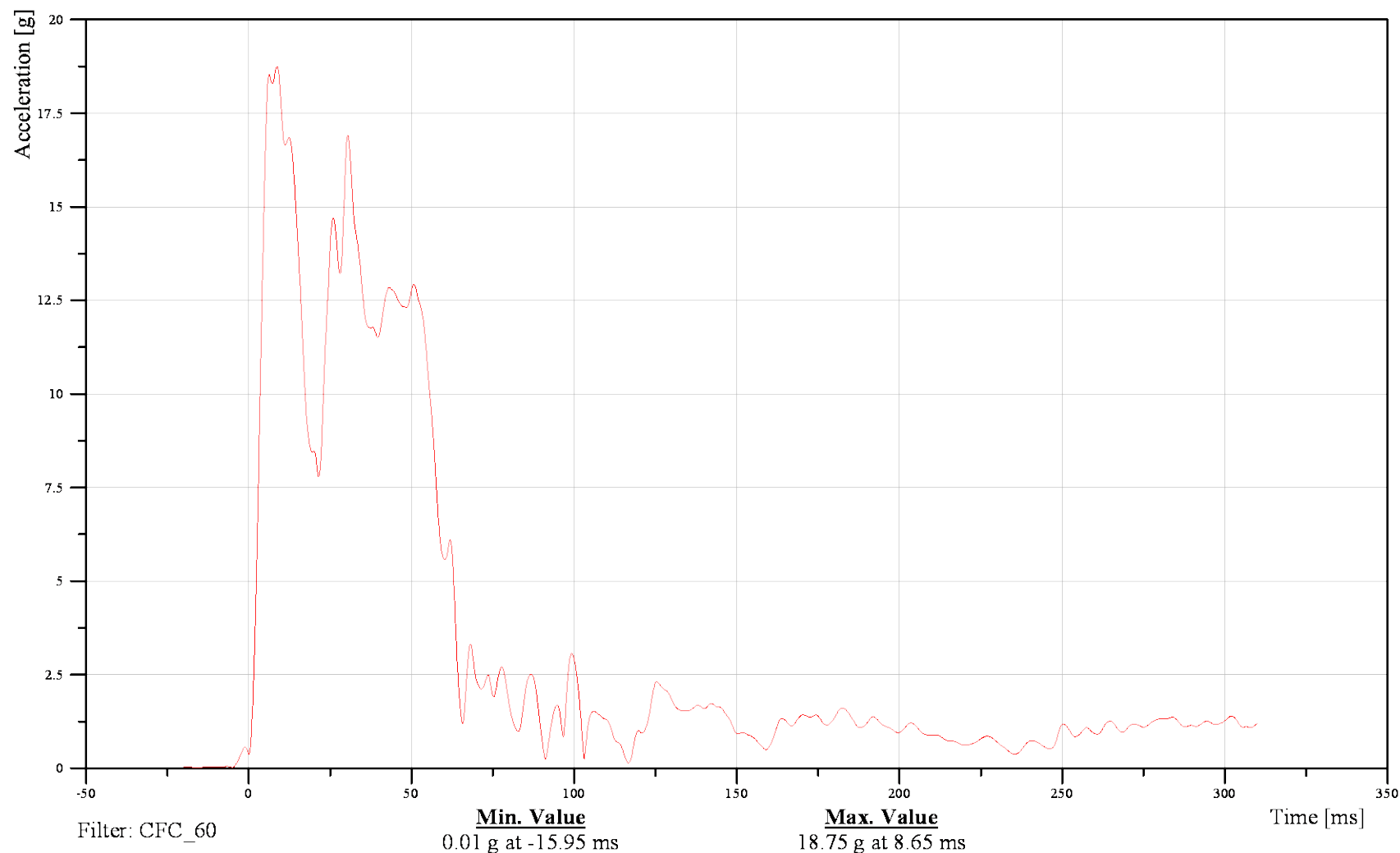
Time: 16:14

Customer: VRTC

11VEHCCG0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Front Sill at Front Seat (X)

Date: 01/24/2013

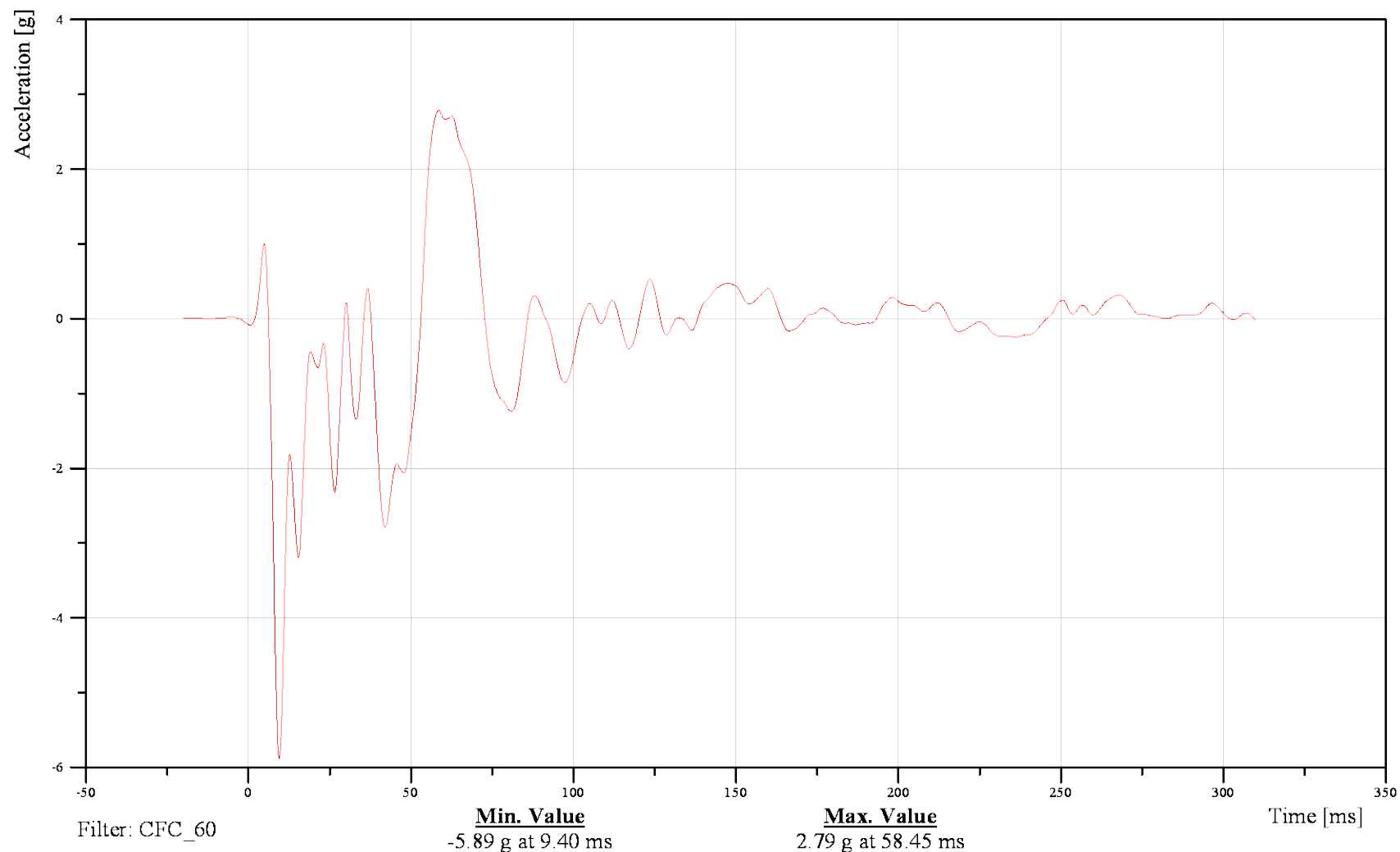
Time: 16:14

Customer: VRTC

11SILBRIFR00ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Front Sill at Front Seat (Y)

Date: 01/24/2013

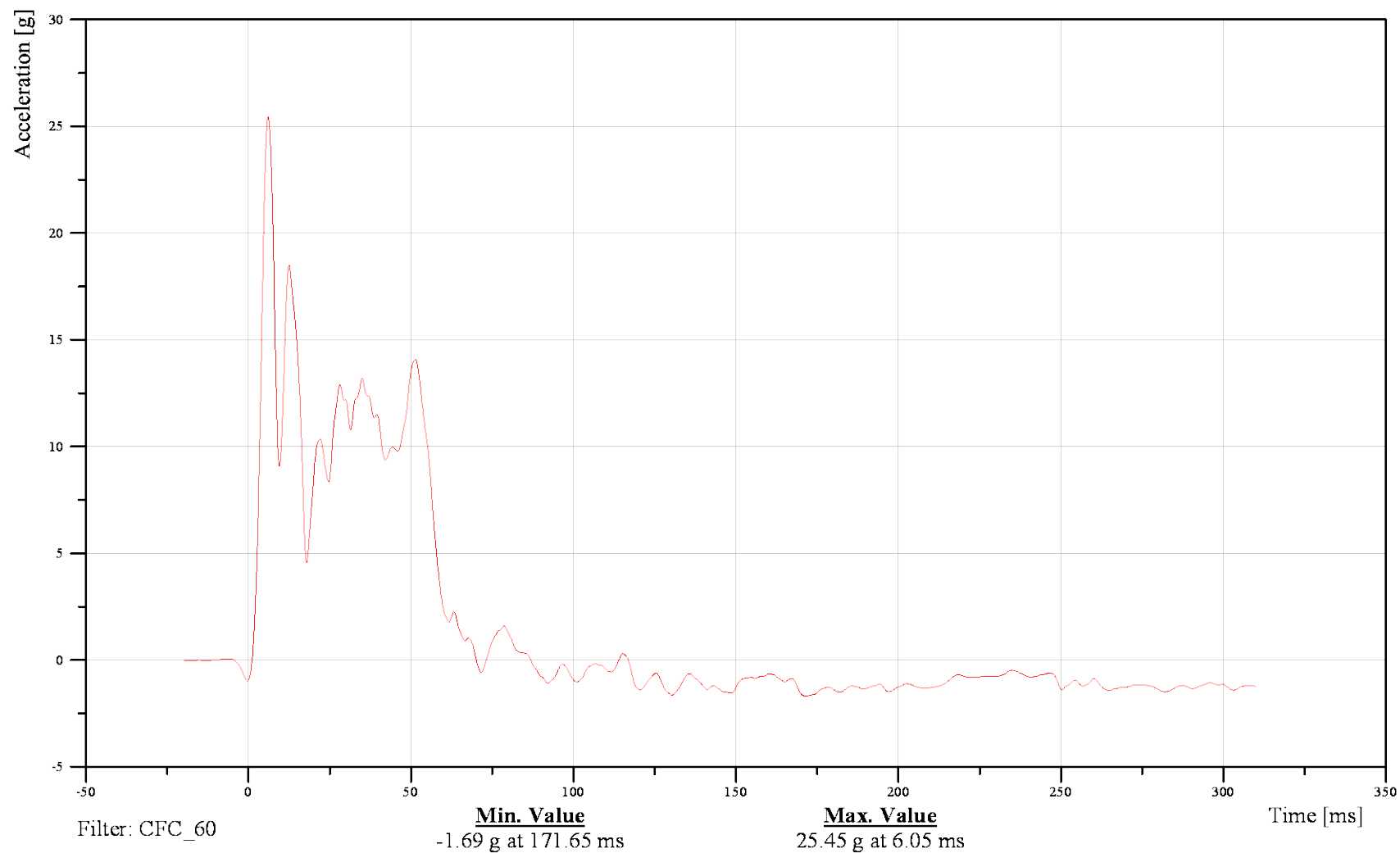
Time: 16:14

Customer: VRTC

11SILBRIFR00ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Front Sill at Front Seat (Z)

Date: 01/24/2013

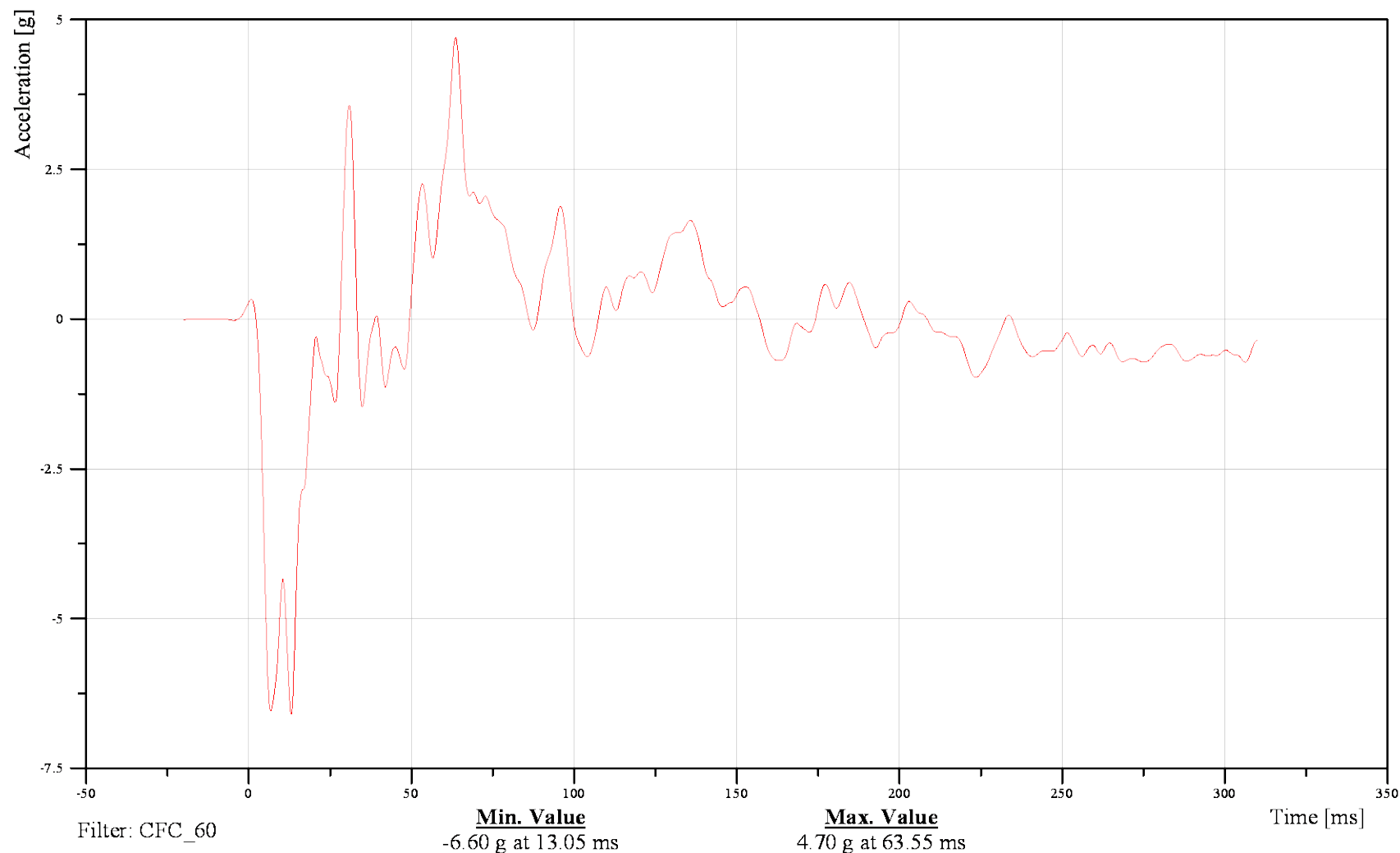
Time: 16:14

Customer: VRTC

11SILBRIFR00ACZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Front Sill at Front Seat Resultant

Date: 01/24/2013

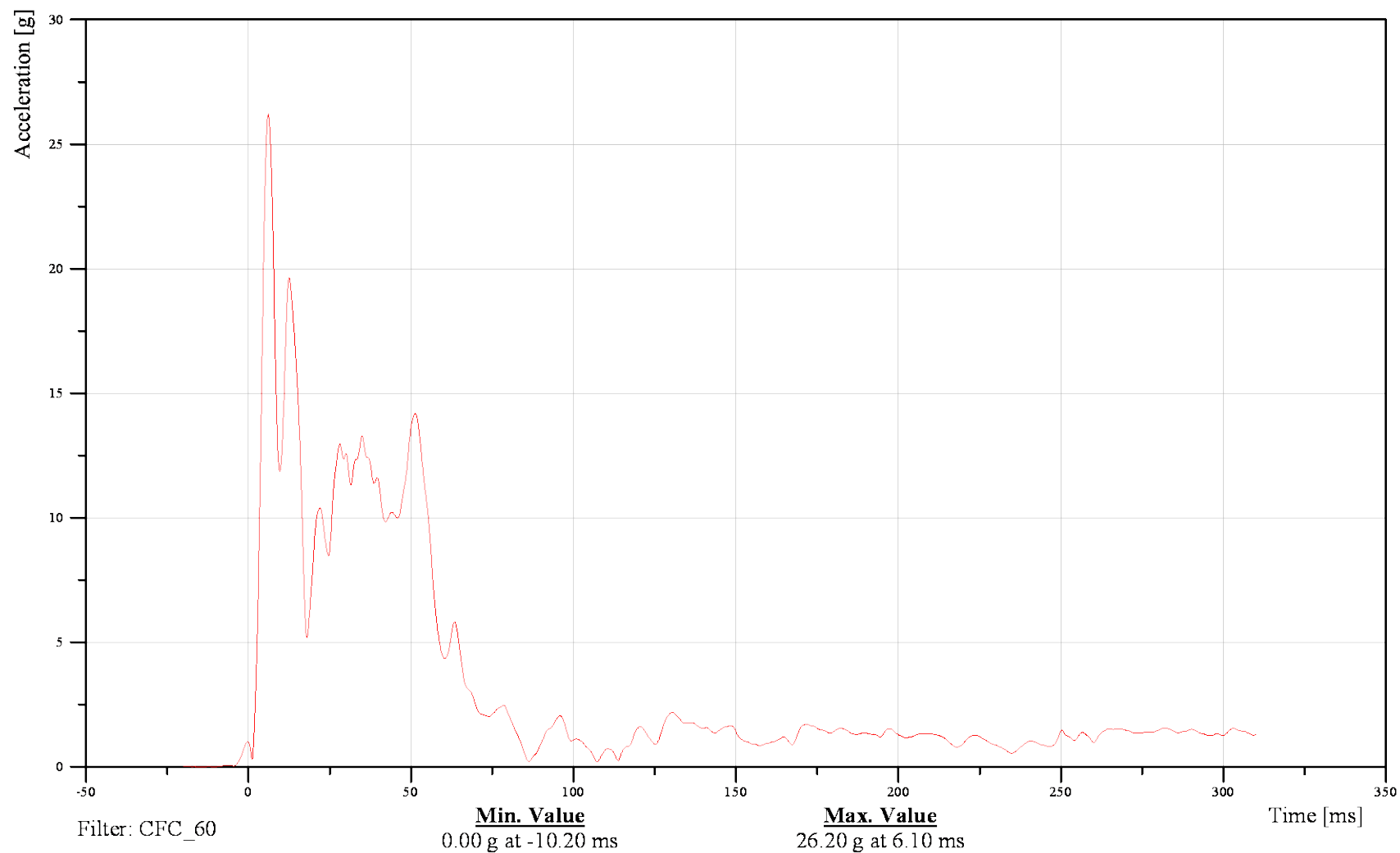
Time: 16:14

Customer: VRTC

11SILBRIFR00ACRD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Rear Sill at Rear Seat (X)

Date: 01/24/2013

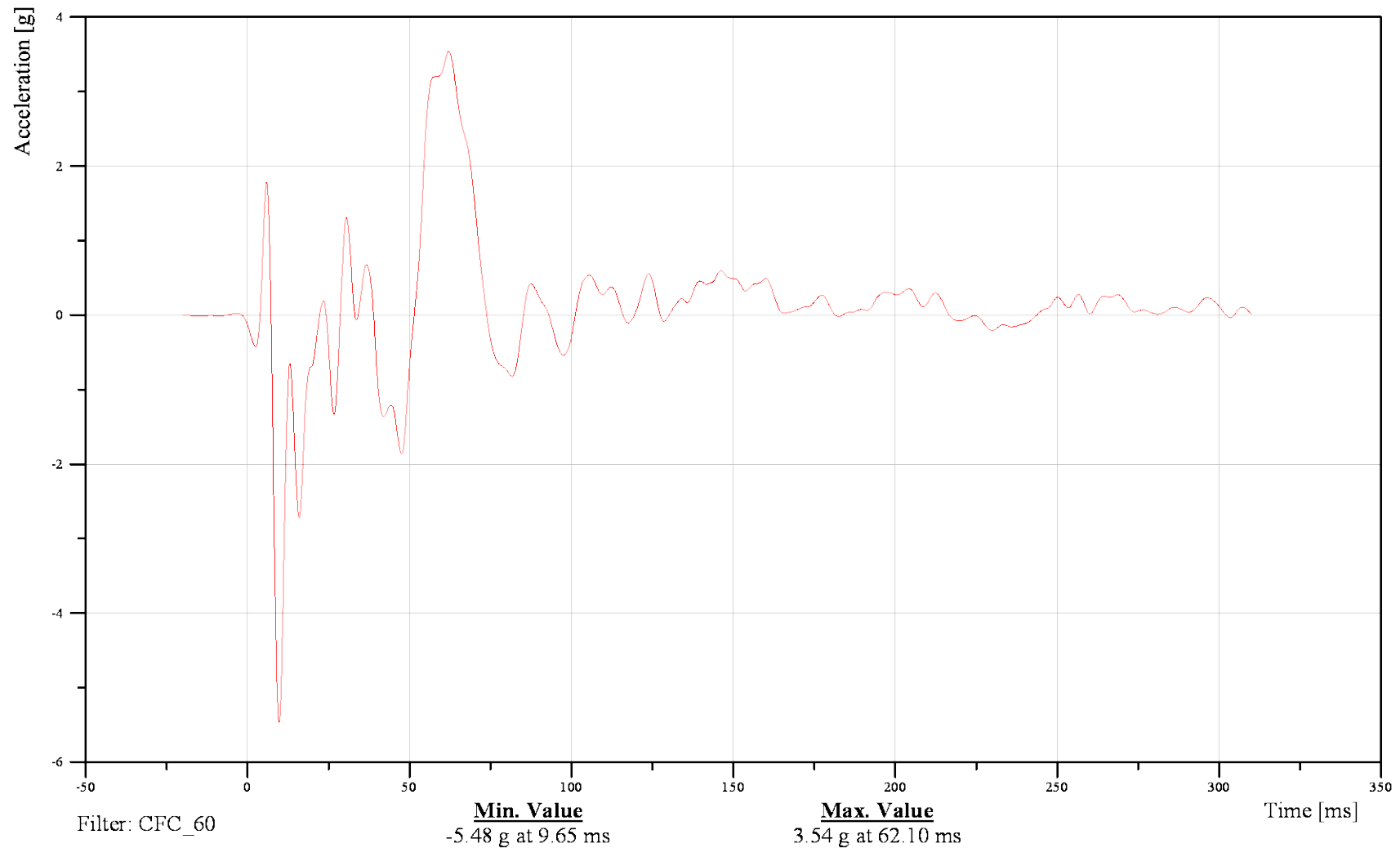
Time: 16:14

Customer: VRTC

11SILBRIRE00ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Rear Sill at Rear Seat (Y)

Date: 01/24/2013

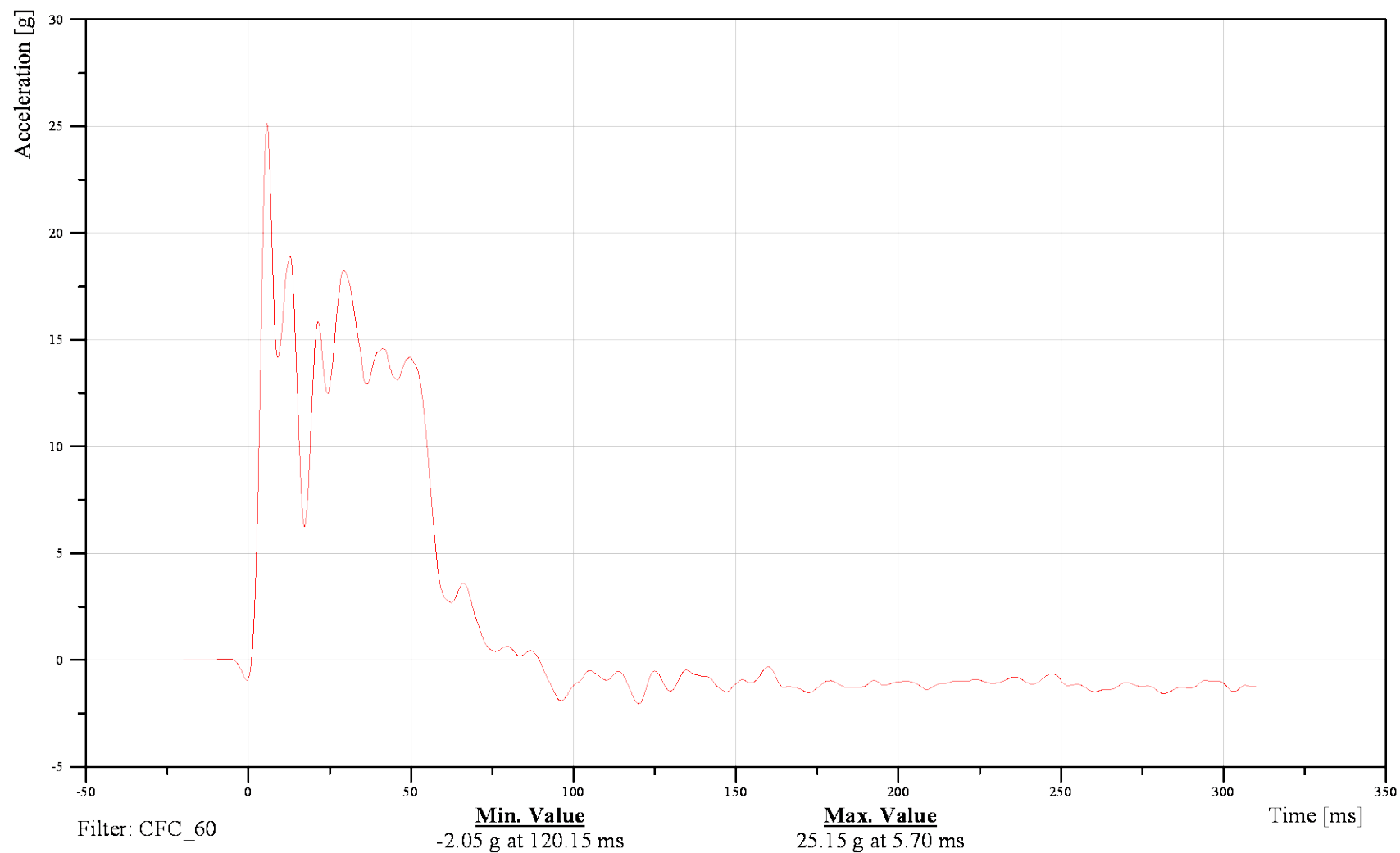
Time: 16:14

Customer: VRTC

11SILBRIRE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Rear Sill at Rear Seat (Z)

Date: 01/24/2013

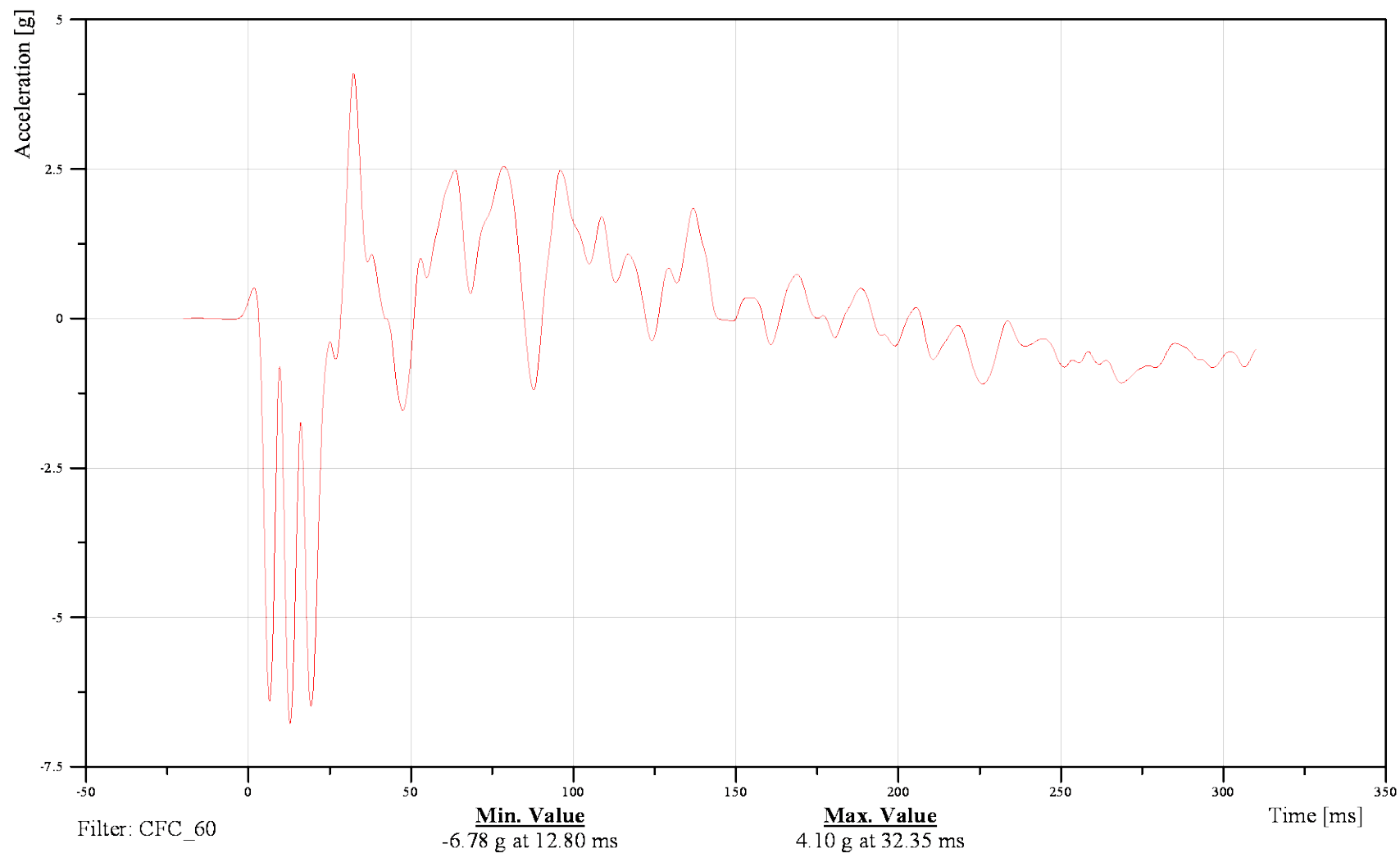
Time: 16:14

Customer: VRTC

11SILBRIRE00ACZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Right Rear Sill at Rear Seat Resultant

Date: 01/24/2013

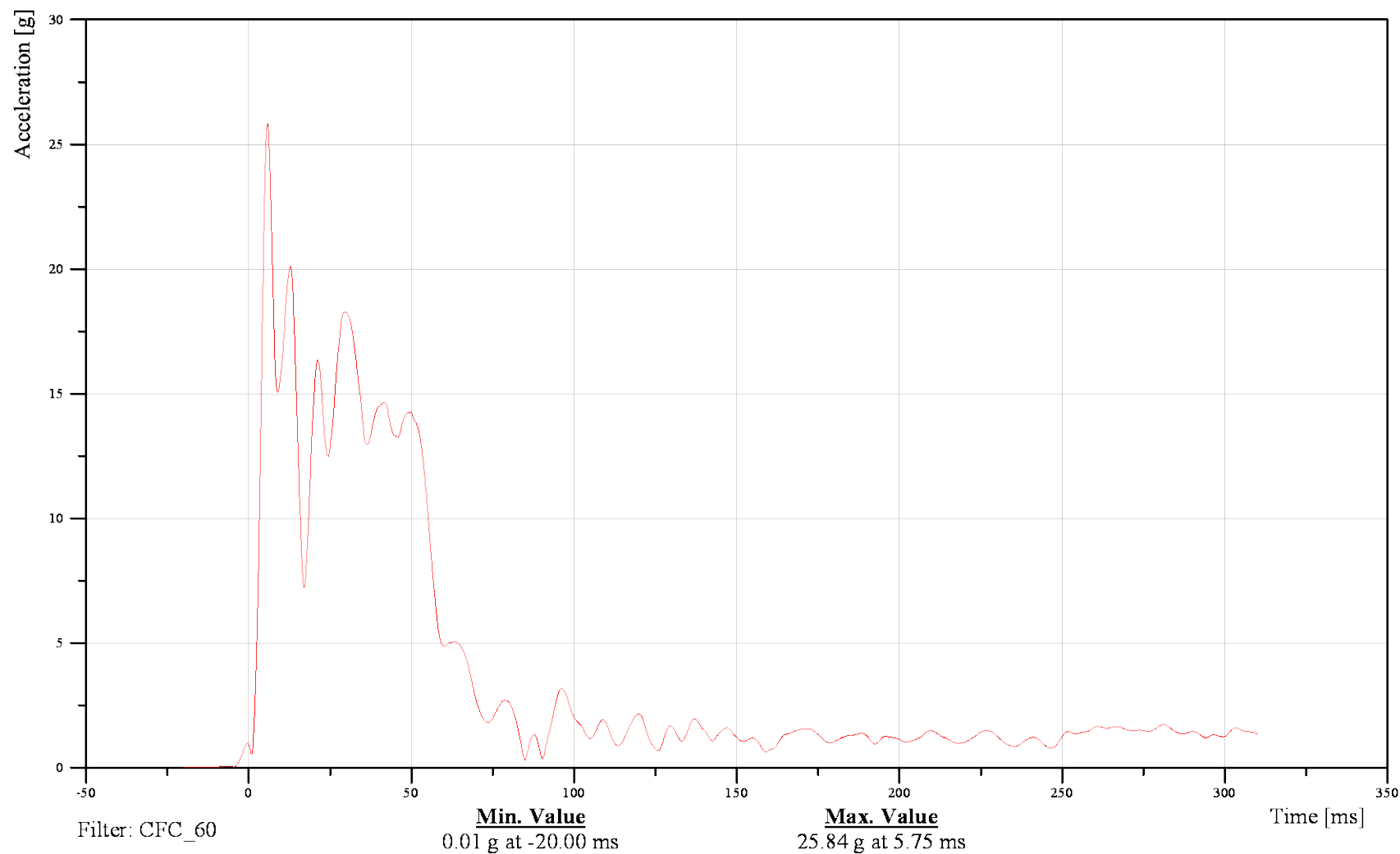
Time: 16:14

Customer: VRTC

11SILBRIRE00ACRD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Side Sill at Front Seat (Y)

Date: 01/24/2013

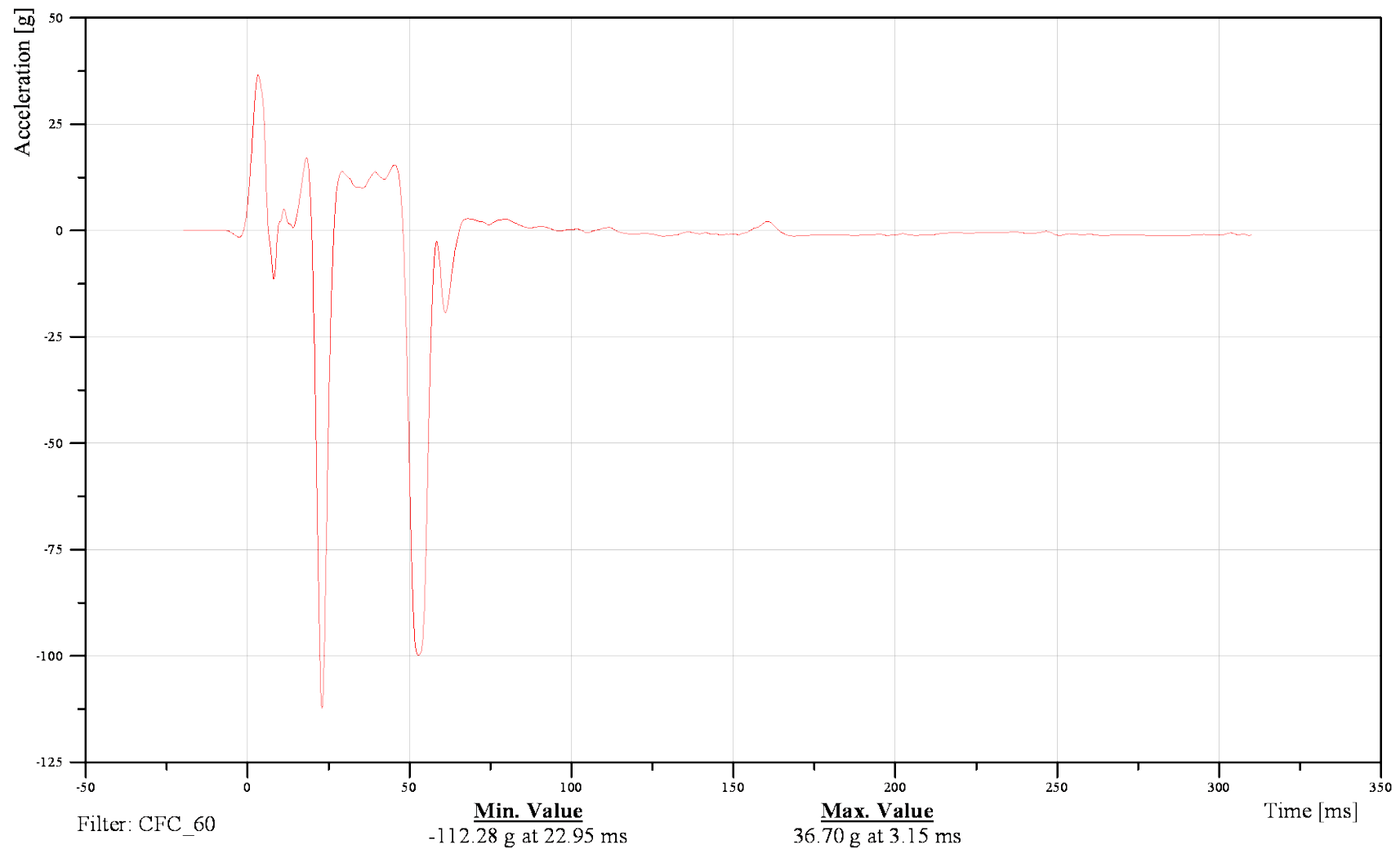
Time: 16:14

Customer: VRTC

11SILBLEFR00ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Side Sill at Rear Seat (Y)

Date: 01/24/2013

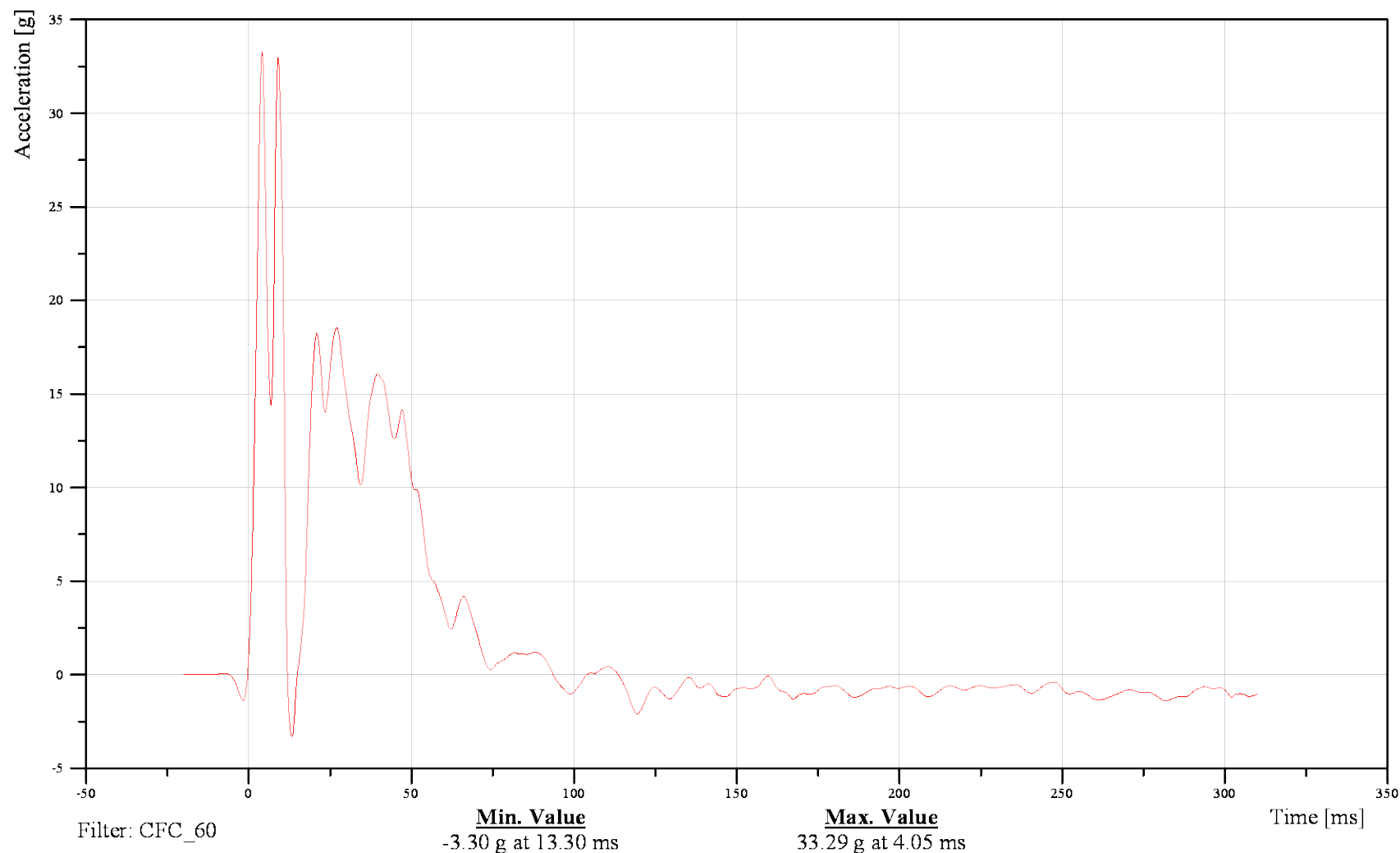
Time: 16:14

Customer: VRTC

11SILBLERE00ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Lower A Post (Y)

Date: 01/24/2013

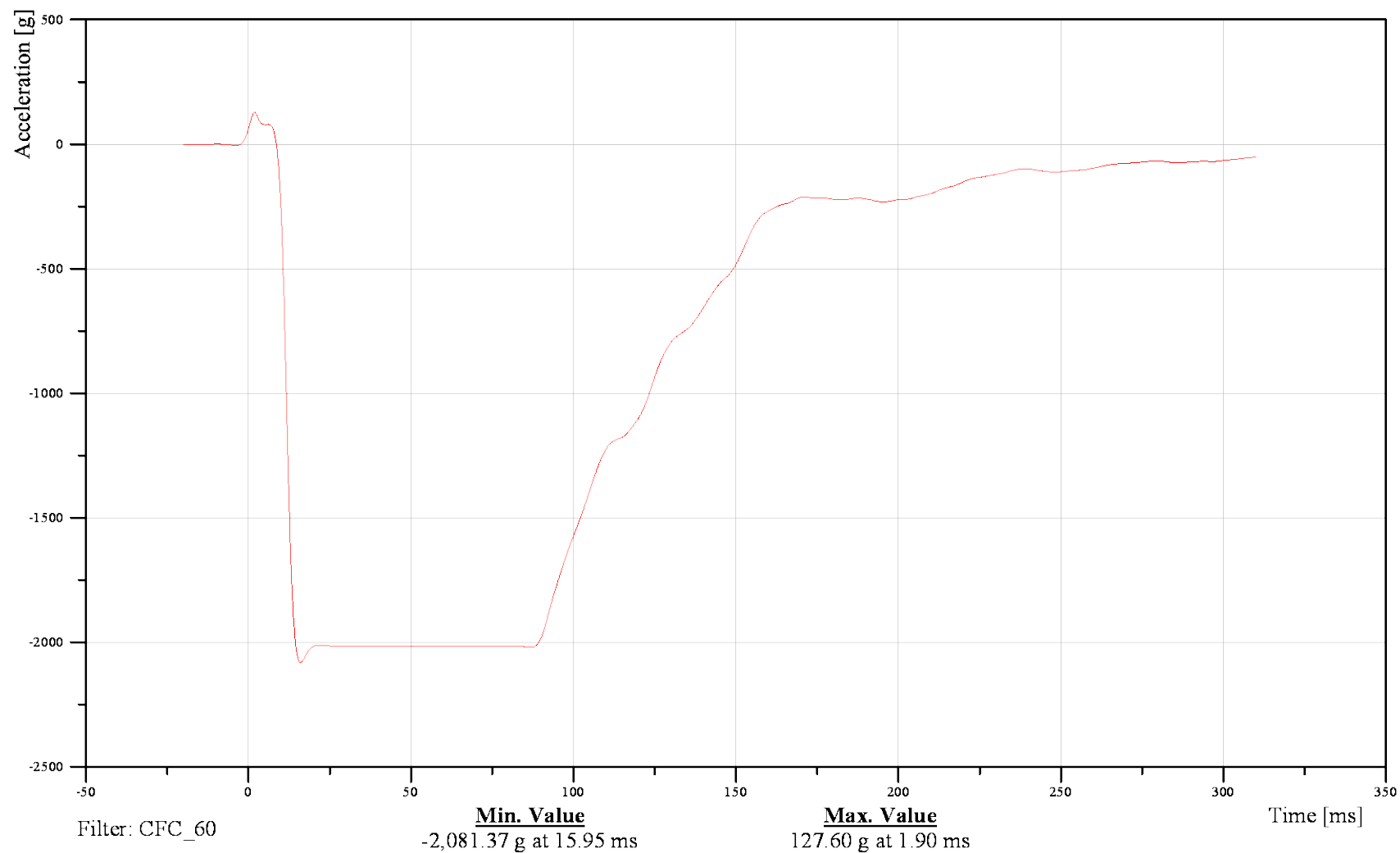
Time: 16:14

Customer: VRTC

11APILO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Middle A-Post (Y)

Date: 01/24/2013

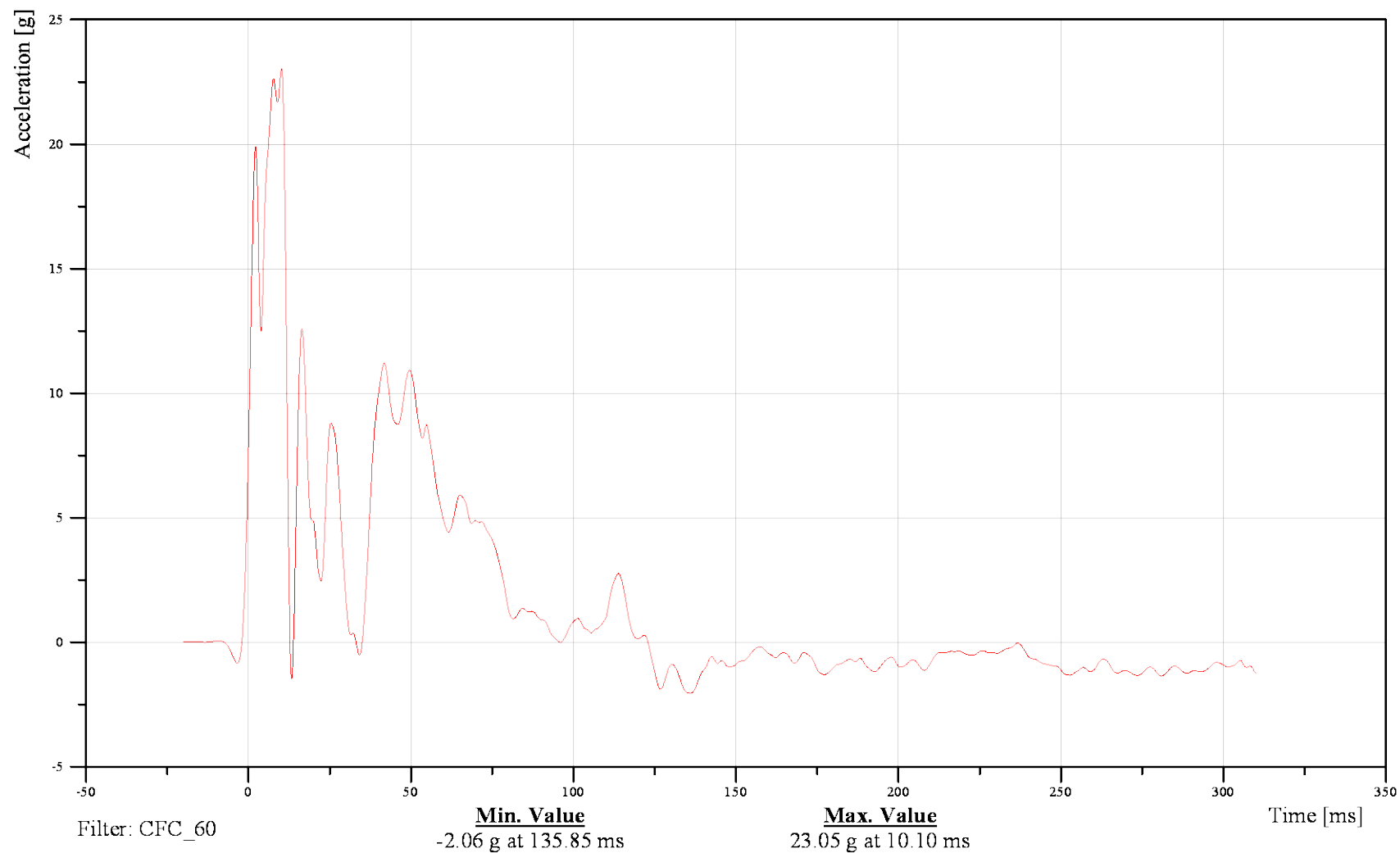
Time: 16:14

Customer: VRTC

11APILMI0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Lower B Post (Y)

Date: 01/24/2013

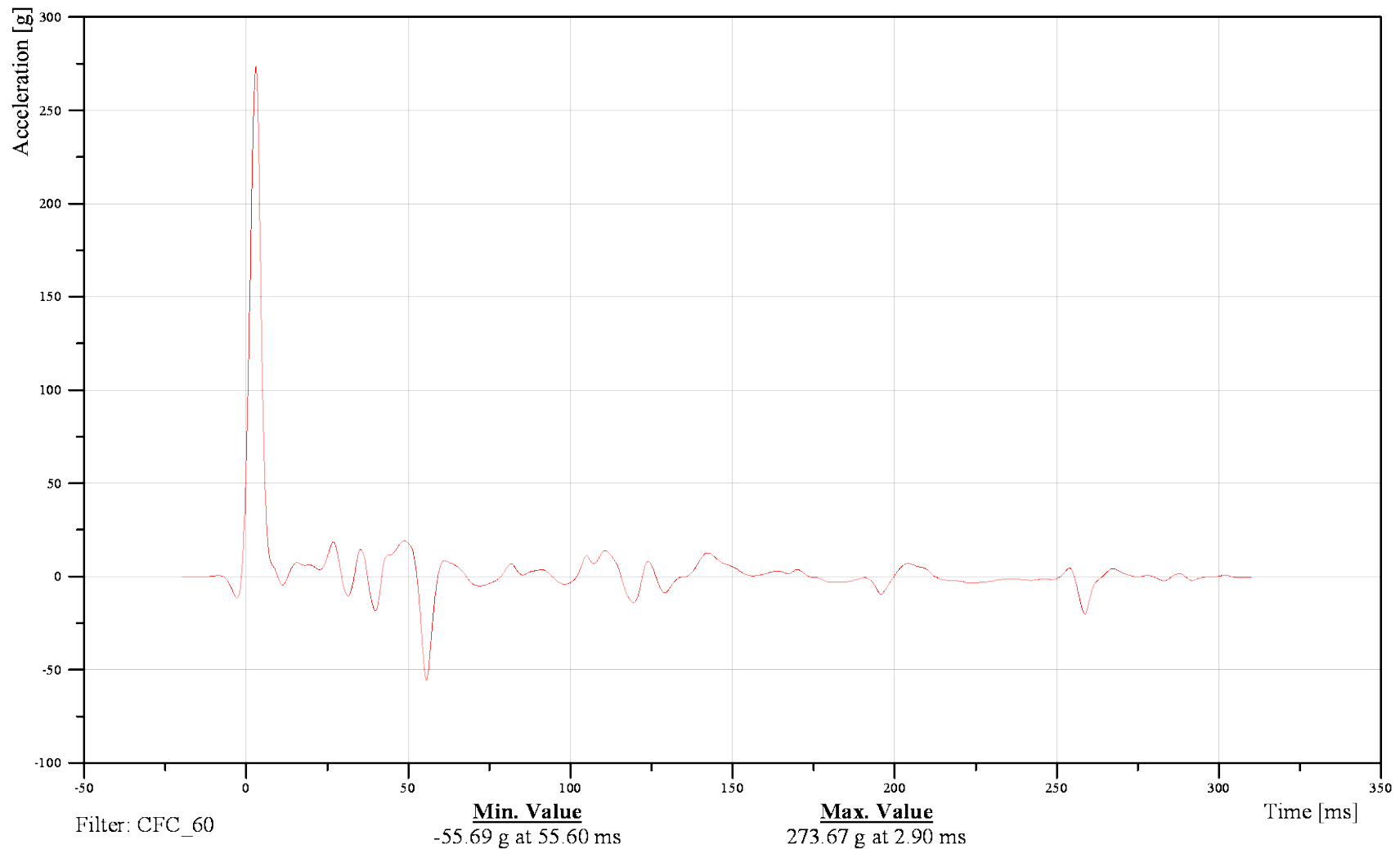
Time: 16:14

Customer: VRTC

11BPILLO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Middle B Post (Y)

Date: 01/24/2013

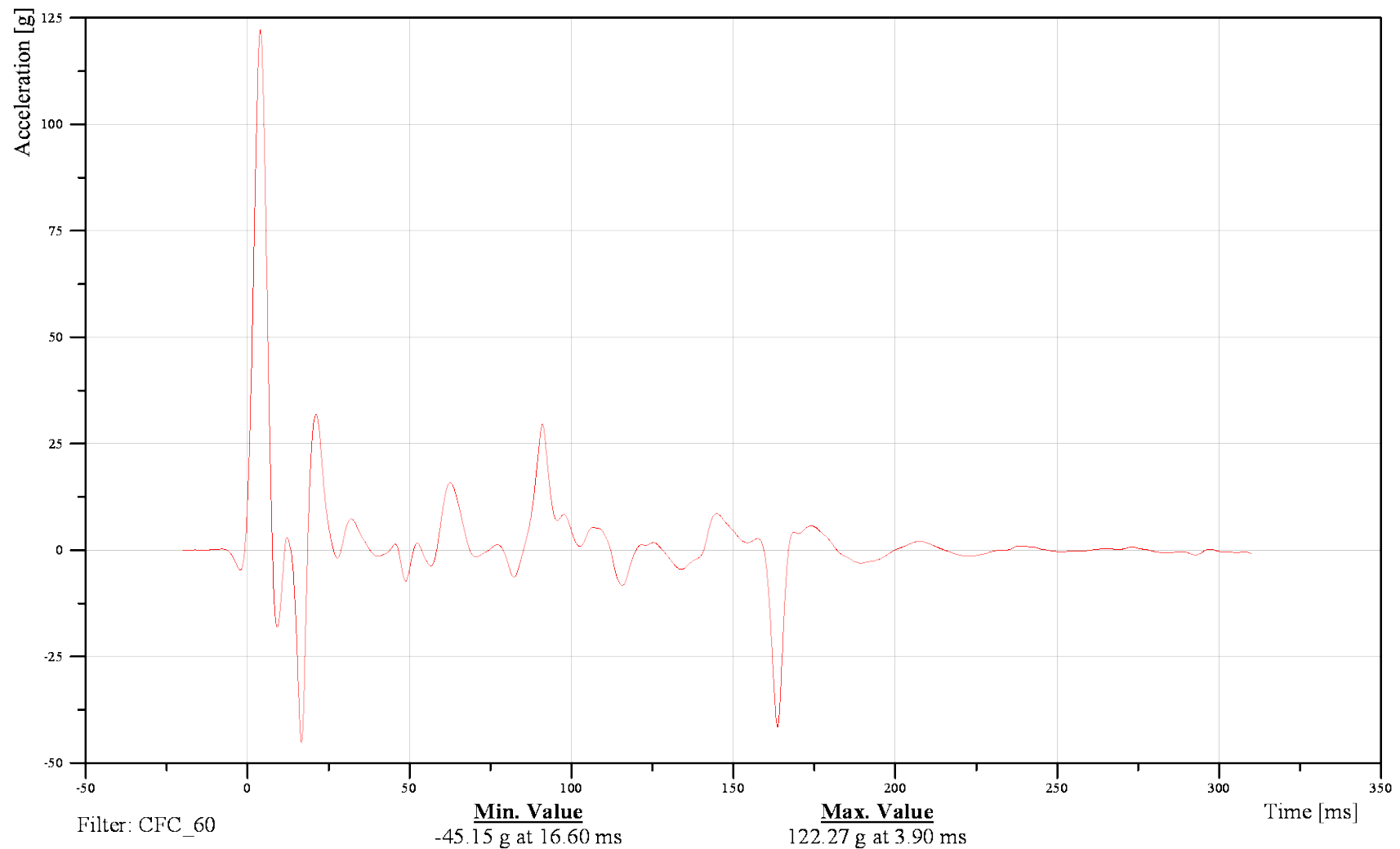
Time: 16:14

Customer: VRTC

11BPILMI0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Front Seat Track (Y)

Date: 01/24/2013

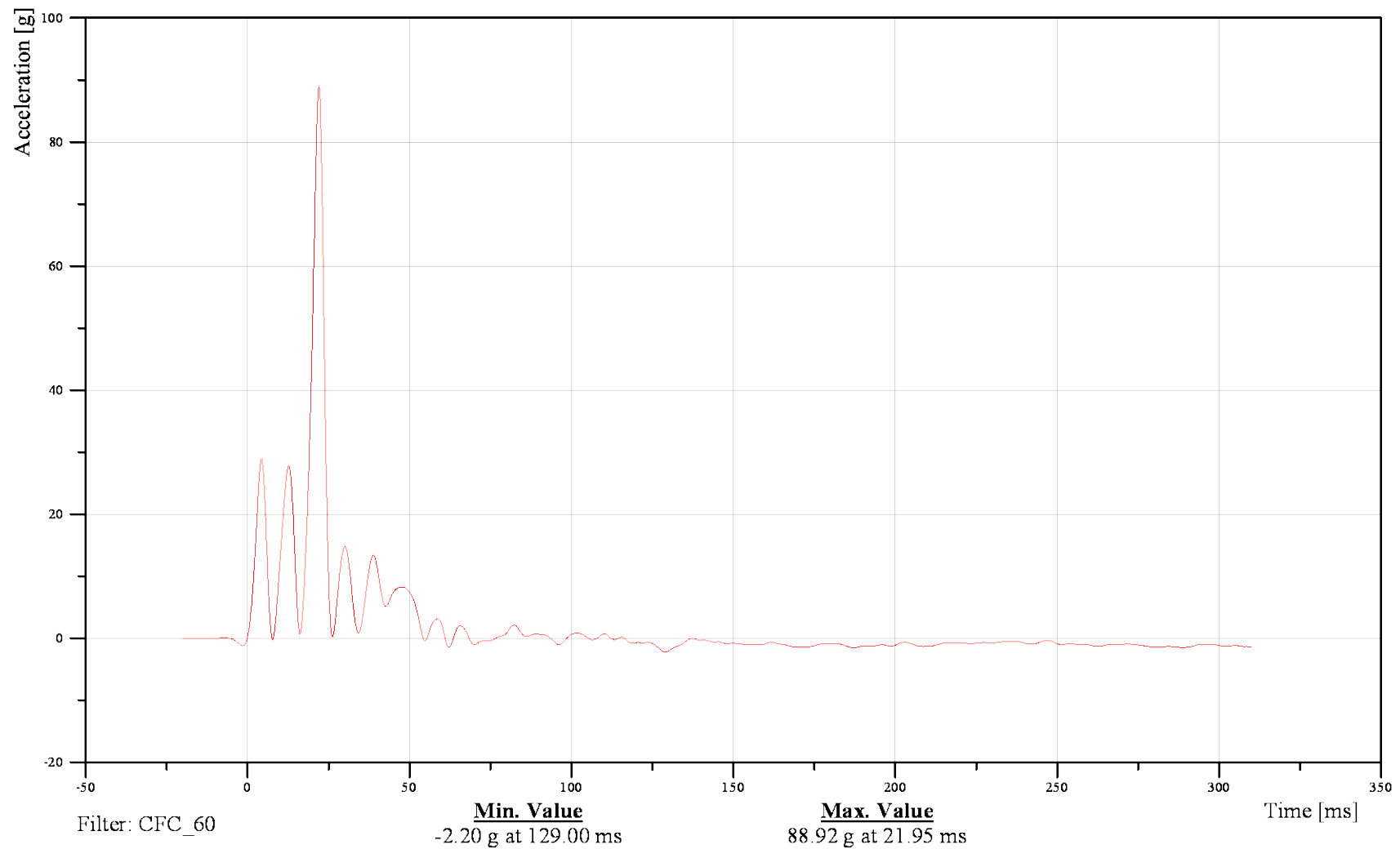
Time: 16:14

Customer: VRTC

11SETR000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





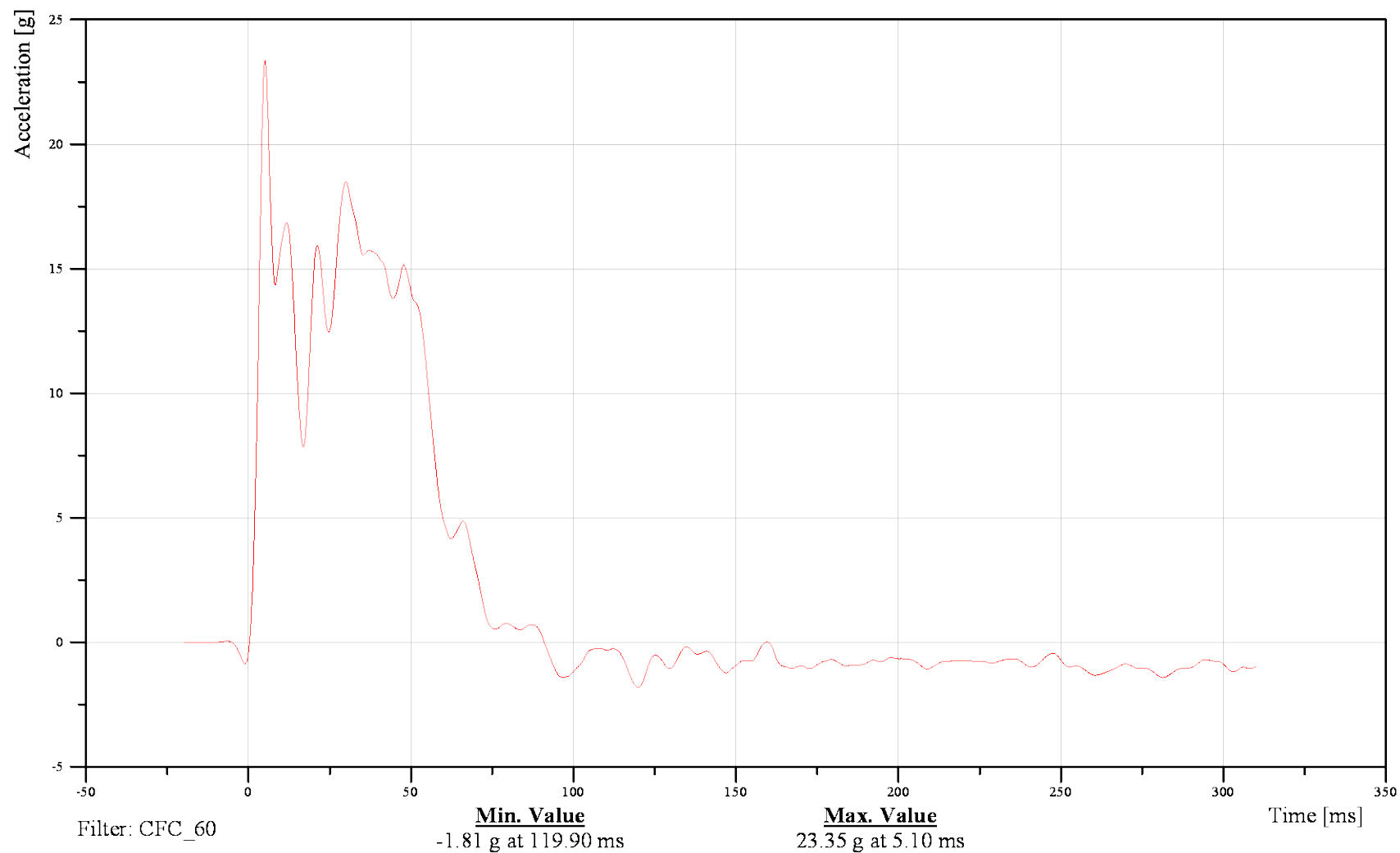
FMVSS 214 Side Impact 2011 Hyundai Sonata
LEFT REAR SEAT STRUCTURE AY

Date: 01/24/2013
Time: 16:14

Customer: VRTC

11SETRLERE00ACYD

TRC Inc. Test Lab: CTF
Test Number: 130124





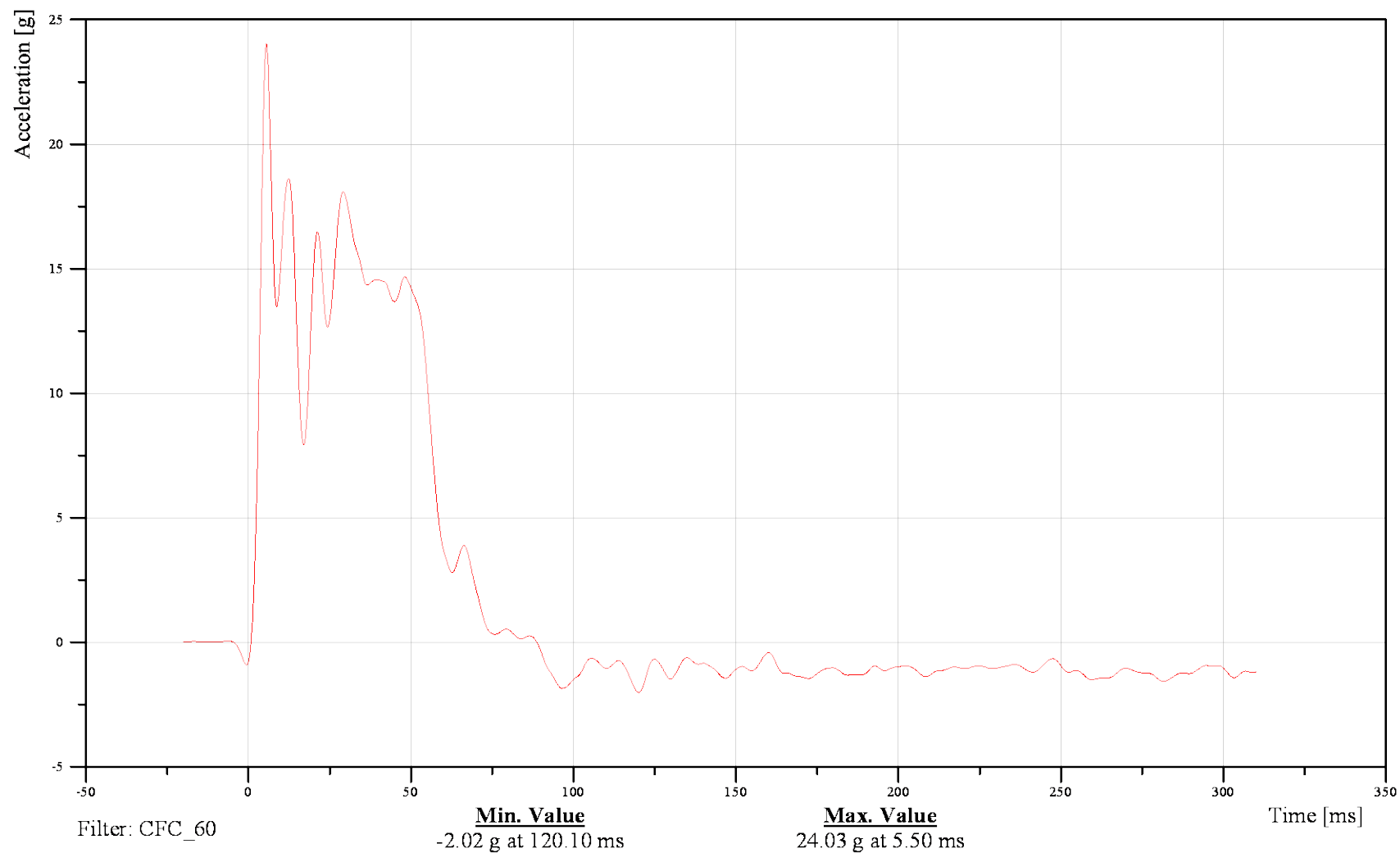
FMVSS 214 Side Impact 2011 Hyundai Sonata
RIGHT REAR OCCUPANT COMPARTMENT AY

Date: 01/24/2013
Time: 16:14

Customer: VRTC

11VEHCRIRE00ACYD

TRC Inc. Test Lab: CTF
Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

ENGINE BLOCK AX

Date: 01/24/2013

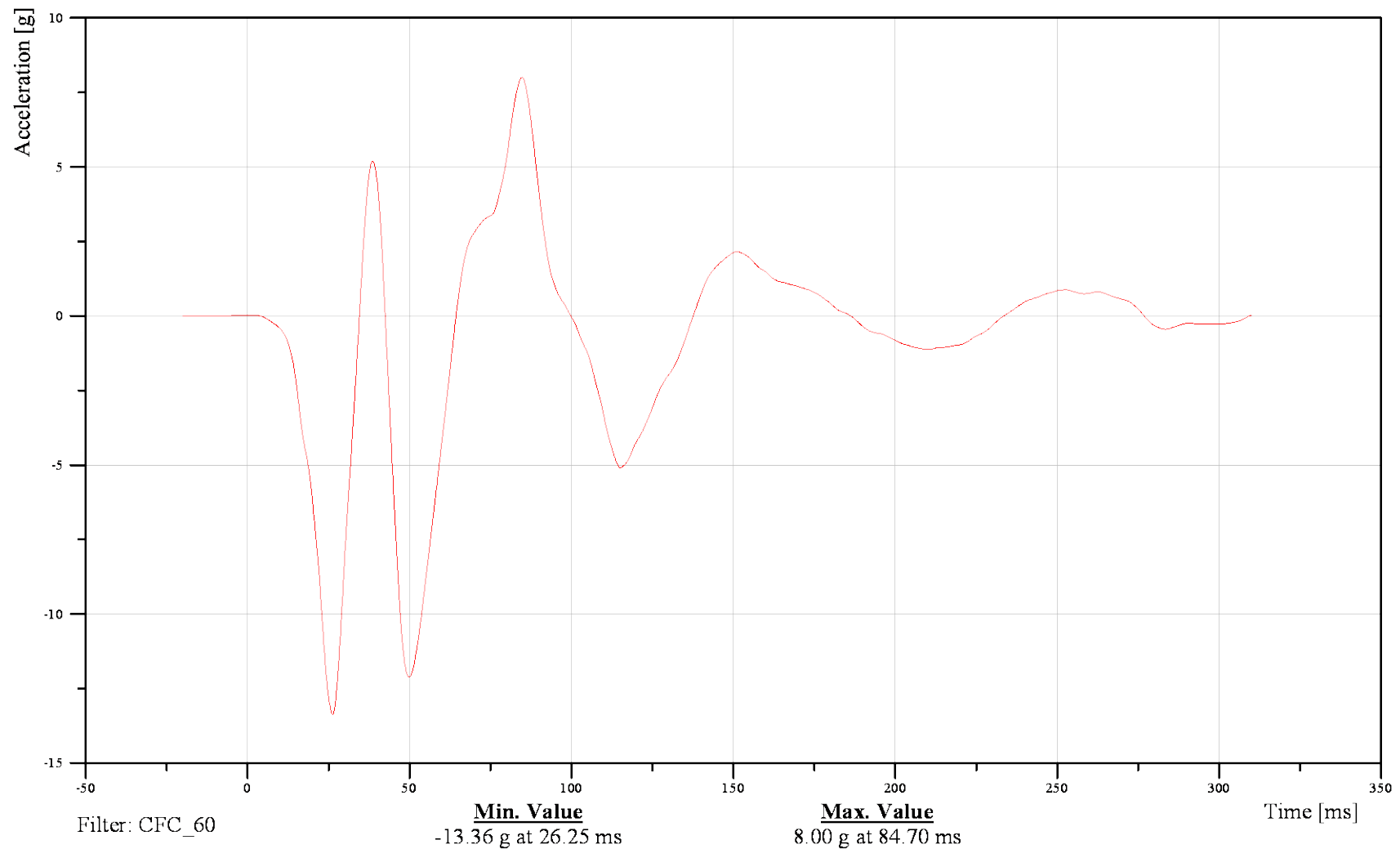
Time: 16:14

Customer: VRTC

11ENGNTTP0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

ENGINE BLOCK AY

Date: 01/24/2013

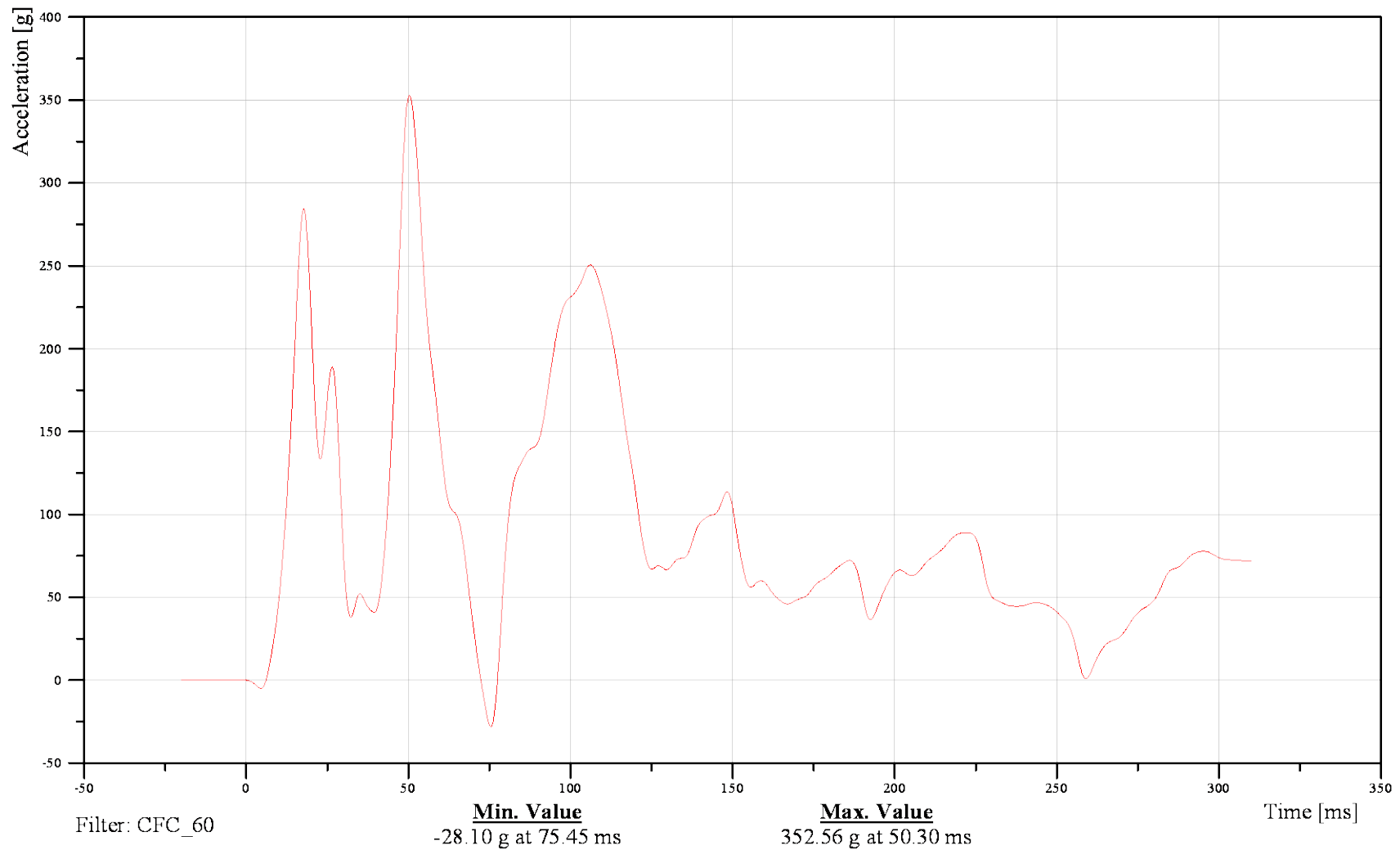
Time: 16:14

Customer: VRTC

11ENGNTTP0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Rear Floor Pan Above Axle (X)

Date: 01/24/2013

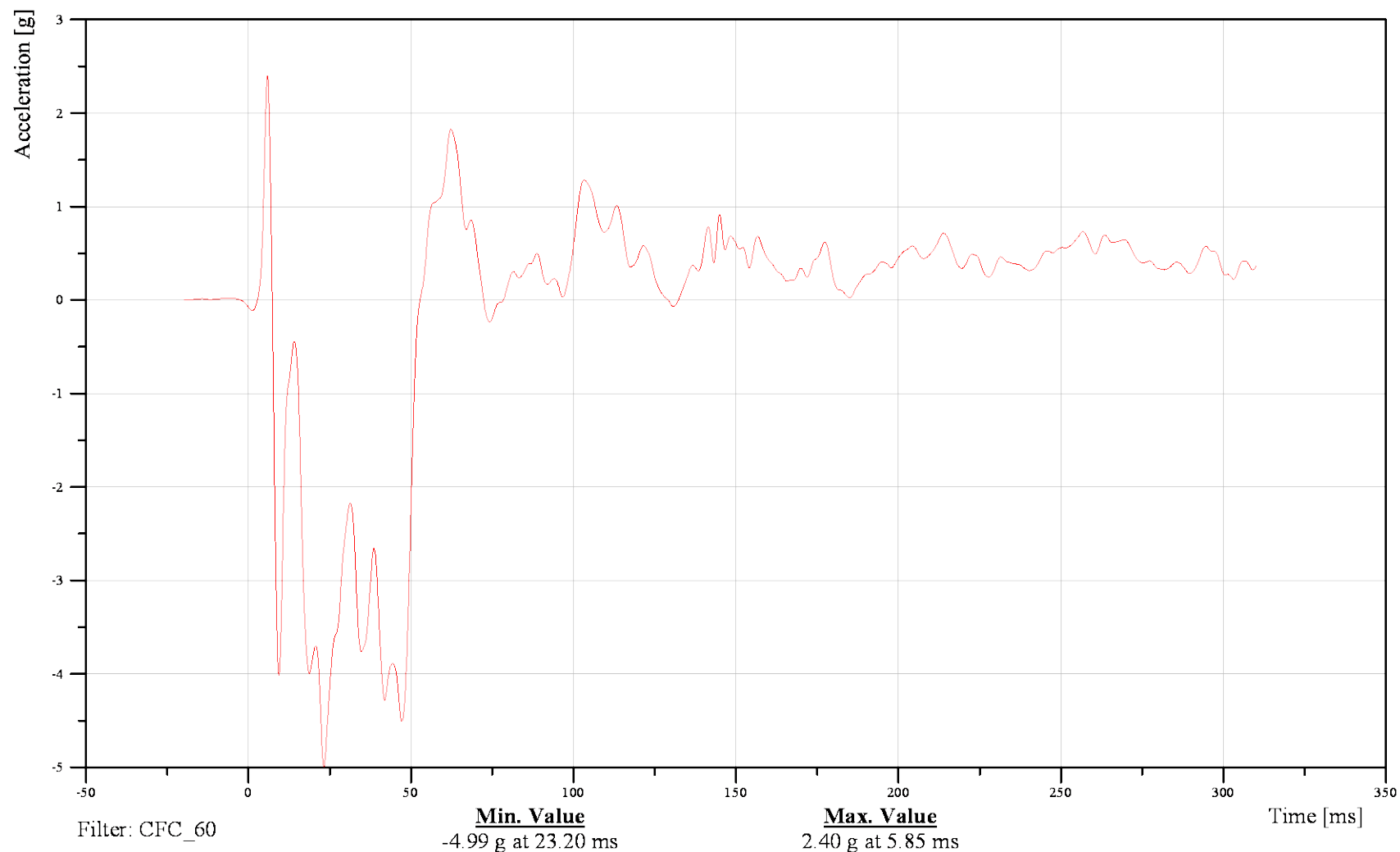
Time: 16:14

Customer: VRTC

11FORA000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Rear Floor Pan Above Axle (Y)

Date: 01/24/2013

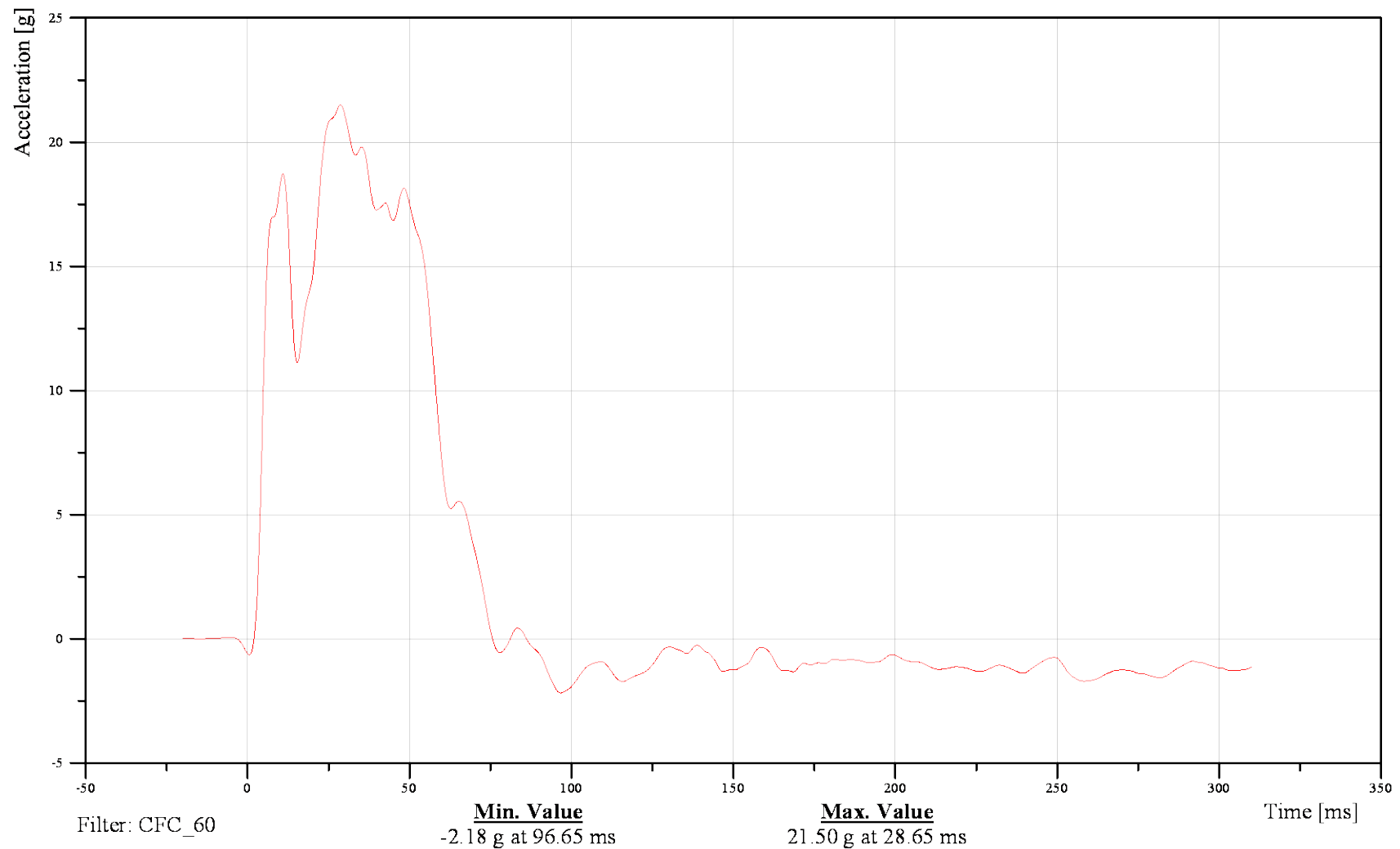
Time: 16:14

Customer: VRTC

11FORA000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Rear Floor Pan Above Axle (Z)

Date: 01/24/2013

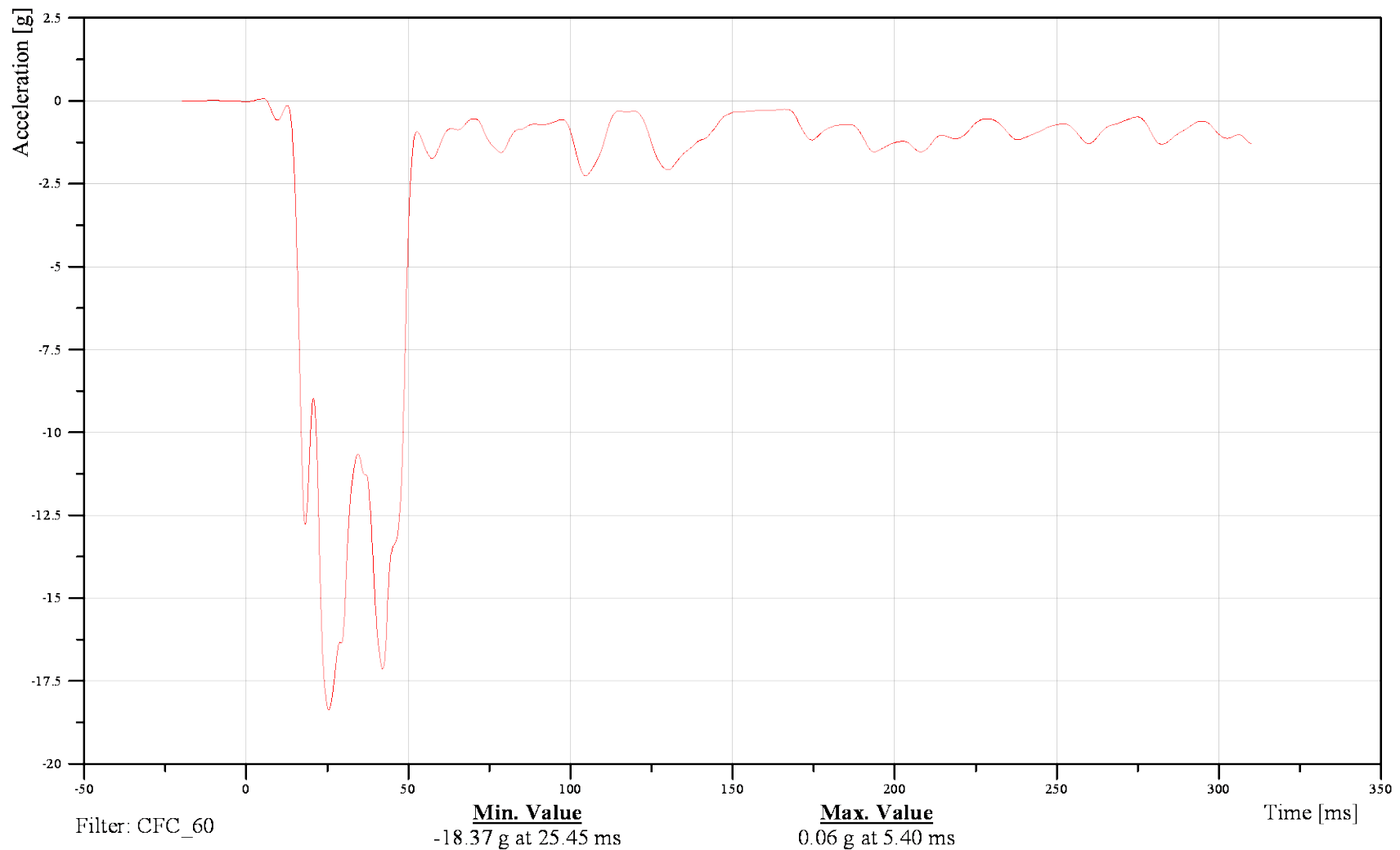
Time: 16:14

Customer: VRTC

11FORA000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Rear Floor Pan Above Axle Resultant

Date: 01/24/2013

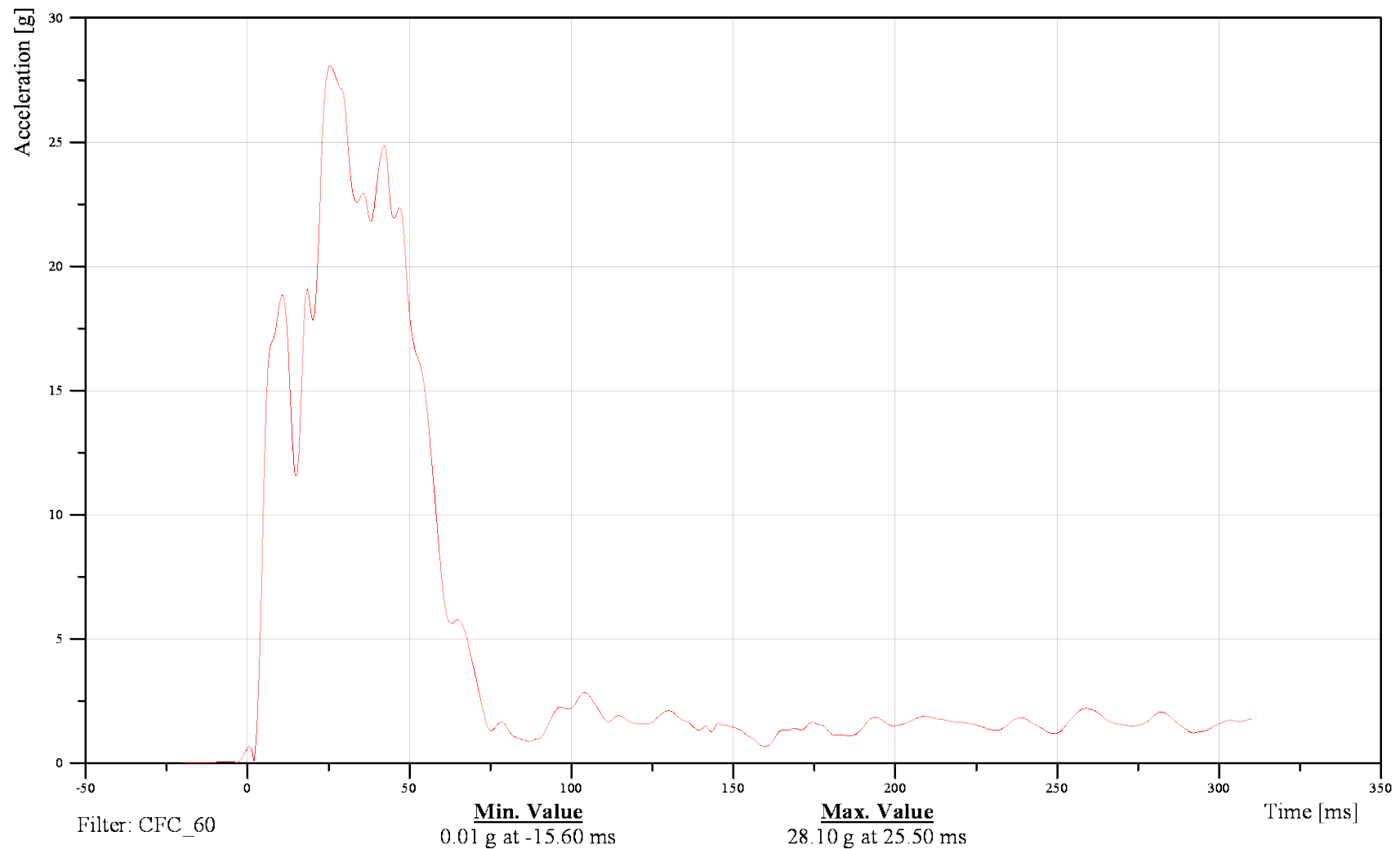
Time: 16:14

Customer: VRTC

11FORA000000ACRD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle at EDR (X)

Date: 01/24/2013

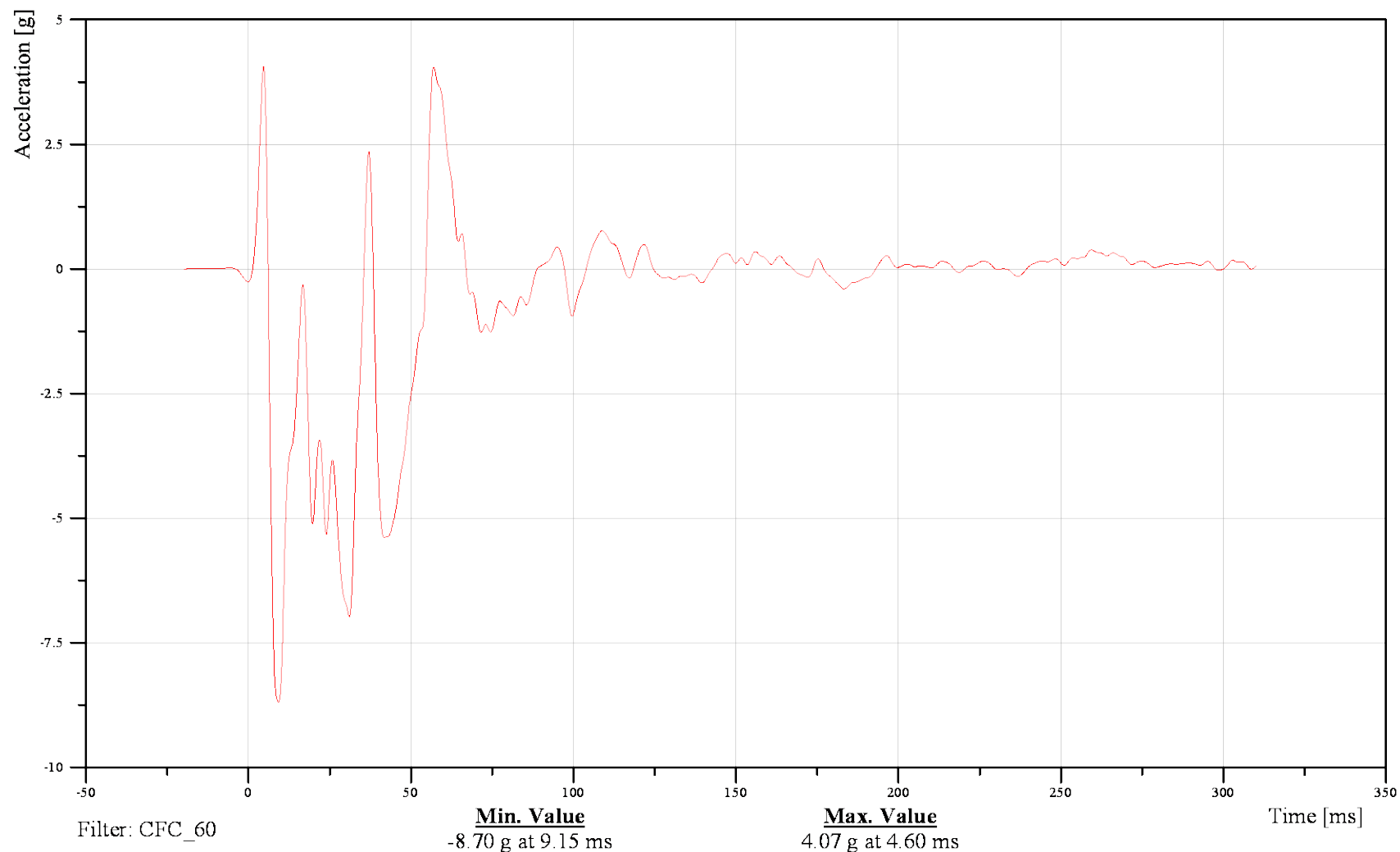
Time: 16:14

Customer: VRTC

11VEHCEDR000ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle at EDR (Y)

Date: 01/24/2013

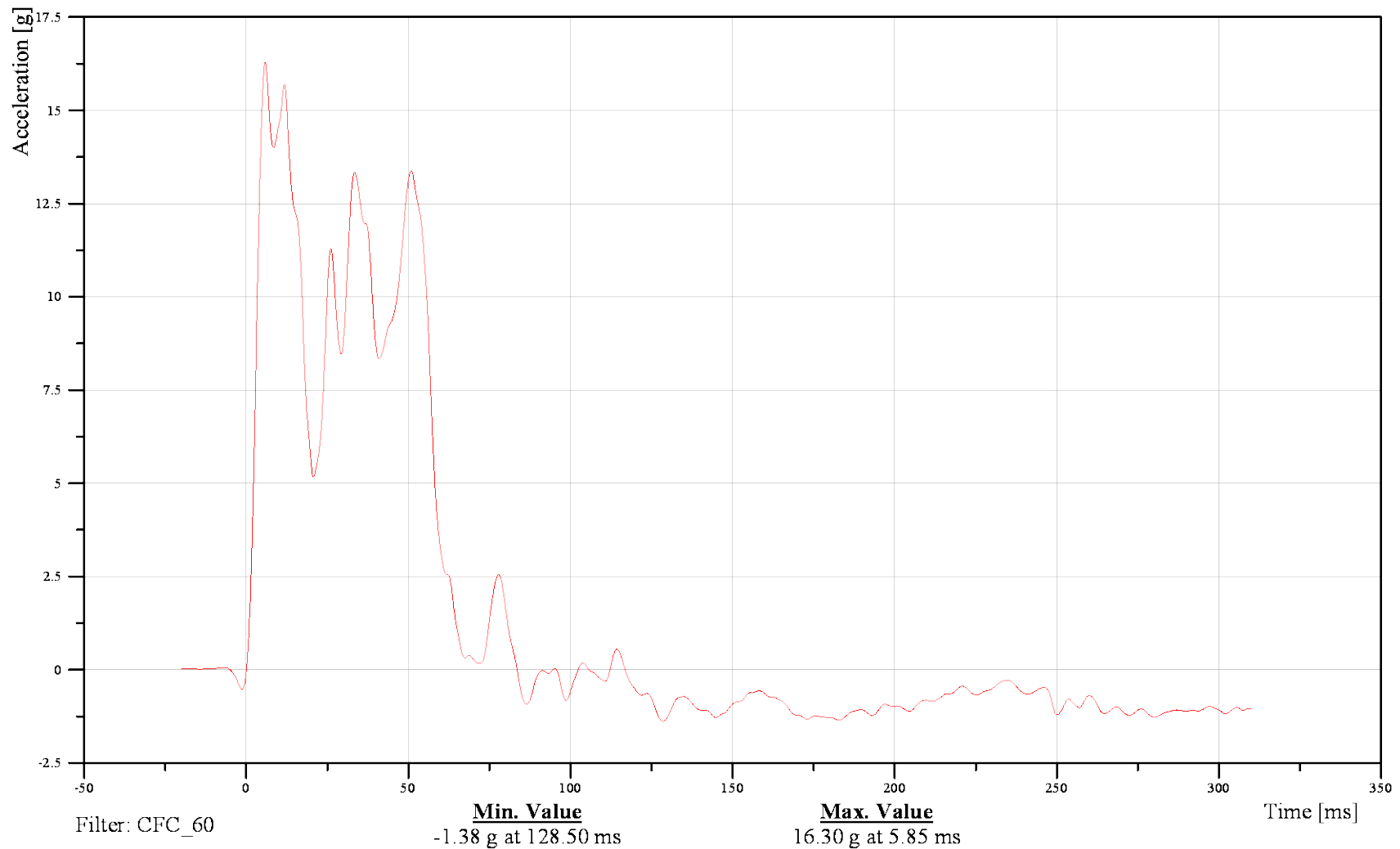
Time: 16:14

Customer: VRTC

11VEHCEDR000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle at EDR (Z)

Date: 01/24/2013

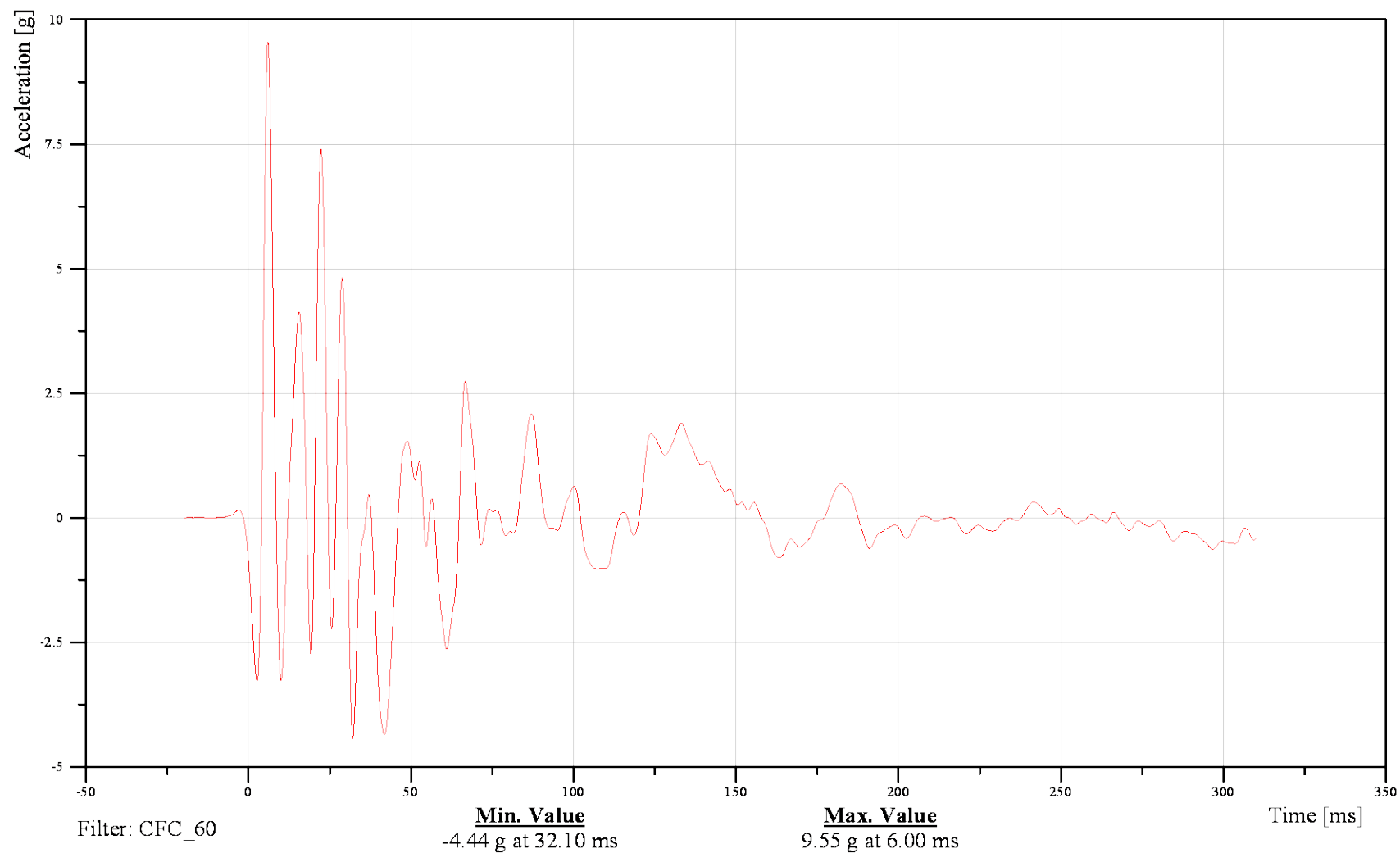
Time: 16:14

Customer: VRTC

11VEHCEDR000ACZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Vehicle at EDR Resultant

Date: 01/24/2013

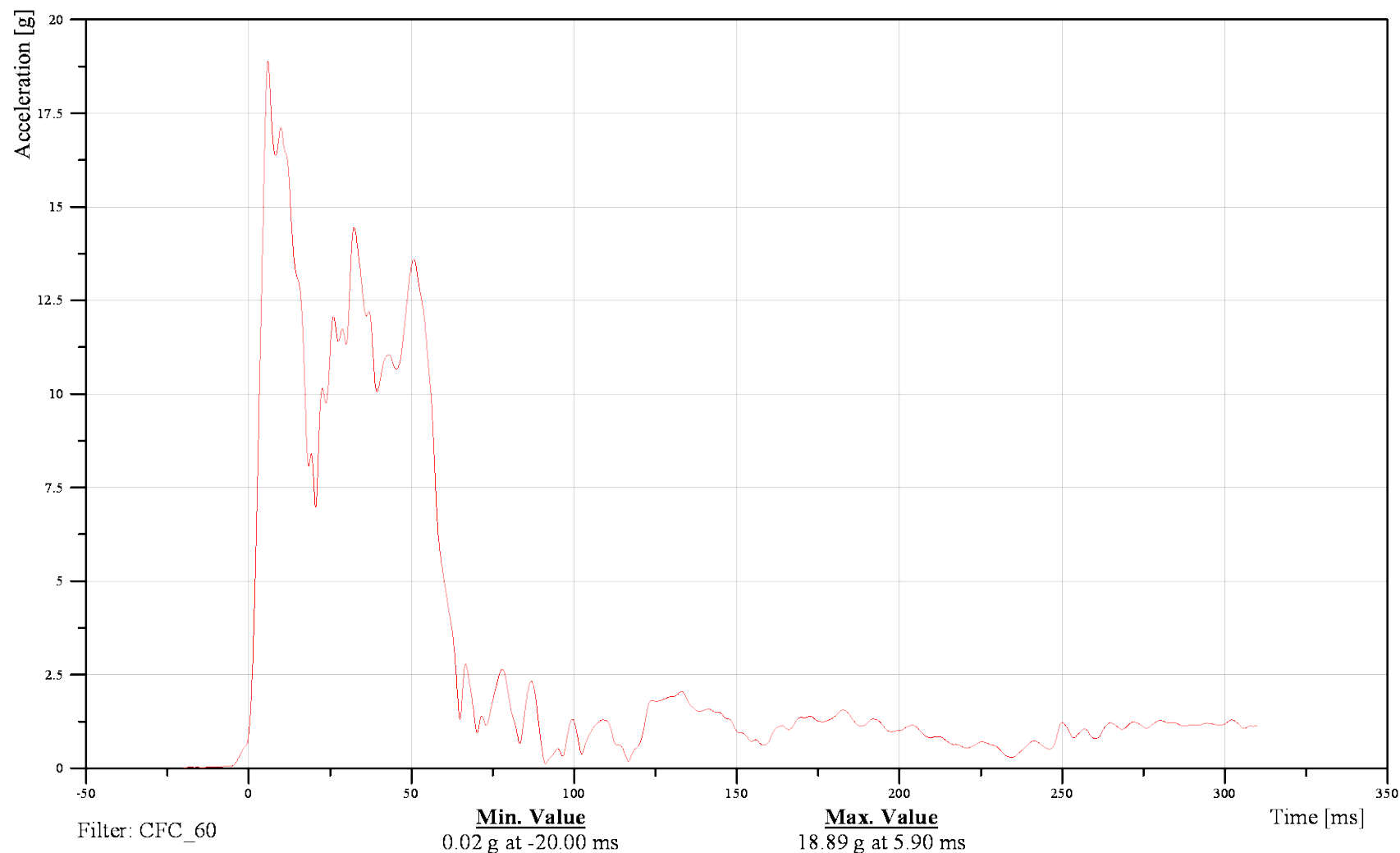
Time: 16:14

Customer: VRTC

11VEHCEDR000ACRD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

REAR DECK AX

Date: 01/24/2013

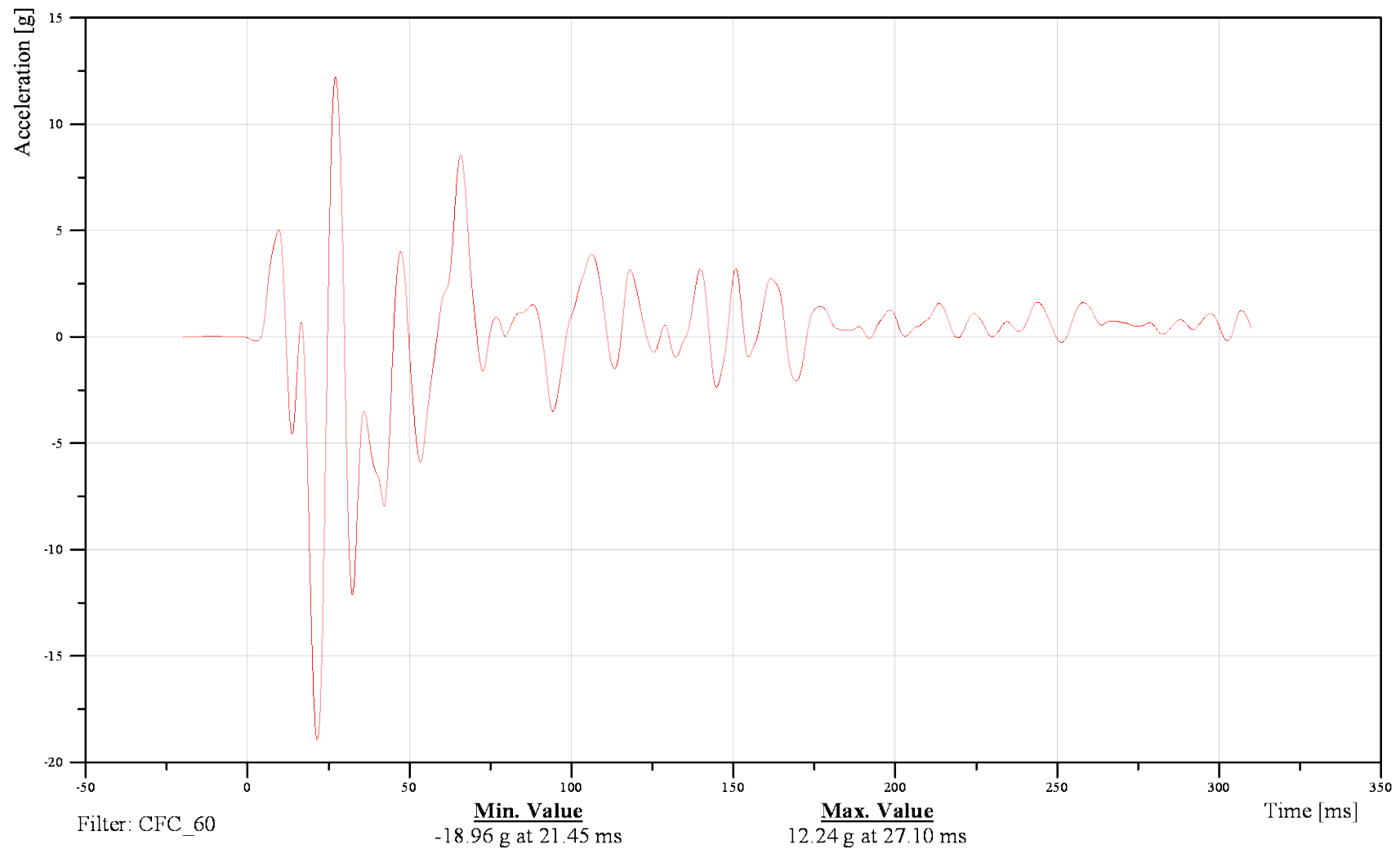
Time: 16:14

Customer: VRTC

10FORARD0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

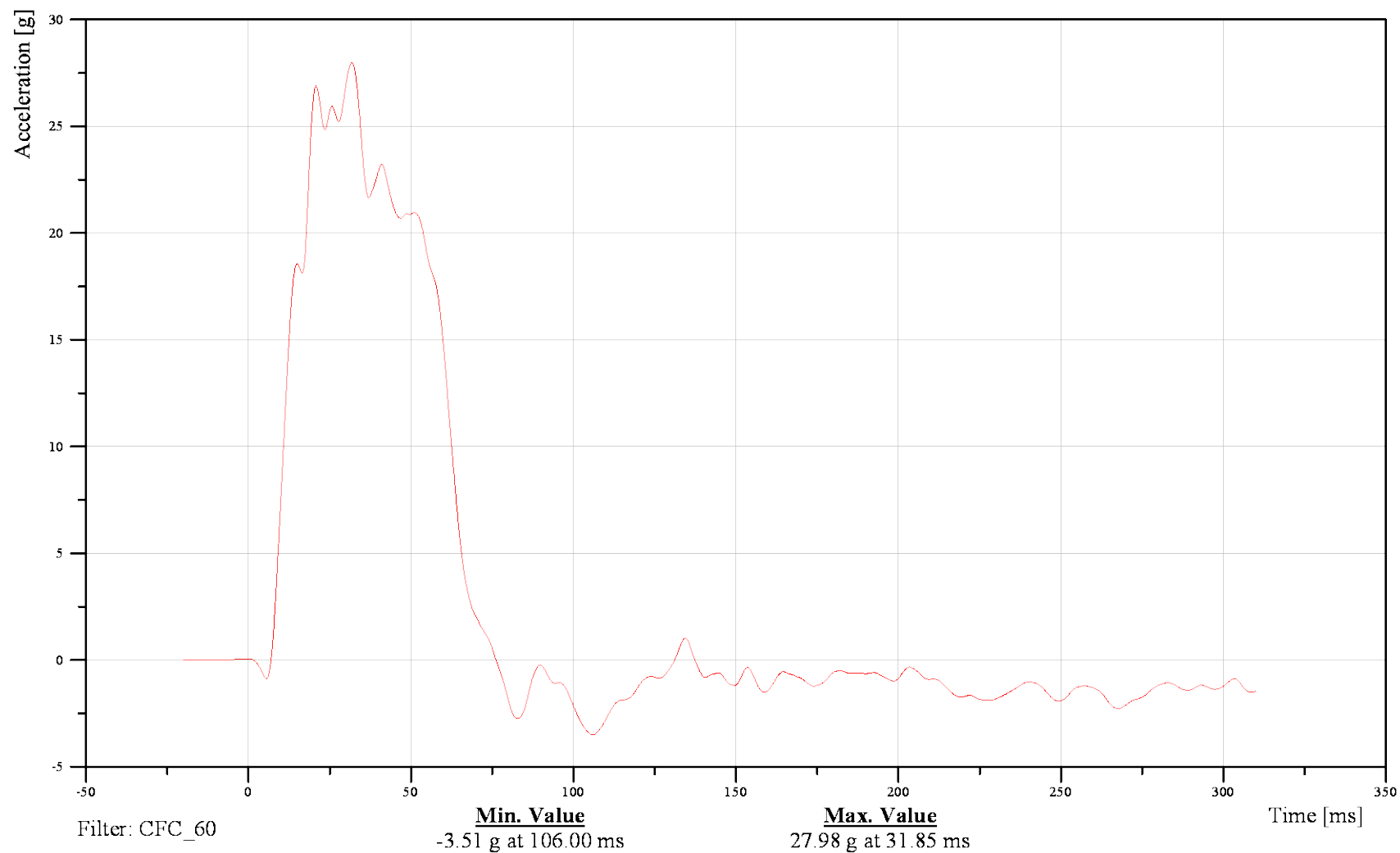
REAR DECK AY

Date: 01/24/2013
Time: 16:14

Customer: VRTC

10FORARD0000ACYD

TRC Inc. Test Lab: CTF
Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

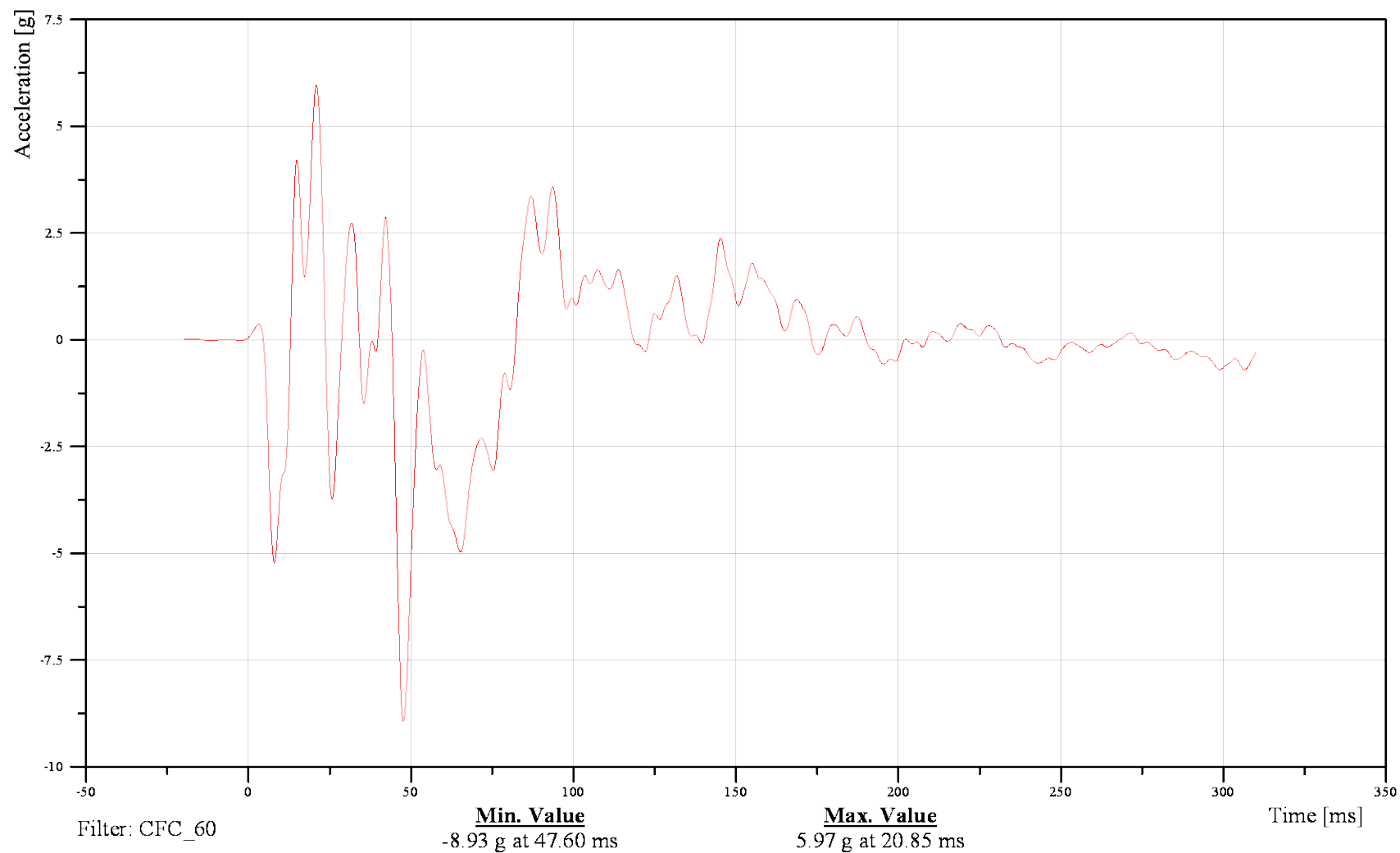
REAR DECK AZ

Date: 01/24/2013
Time: 16:14

Customer: VRTC

10FORARD0000ACZD

TRC Inc. Test Lab: CTF
Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

REAR DECK A Resultant

Date: 01/24/2013

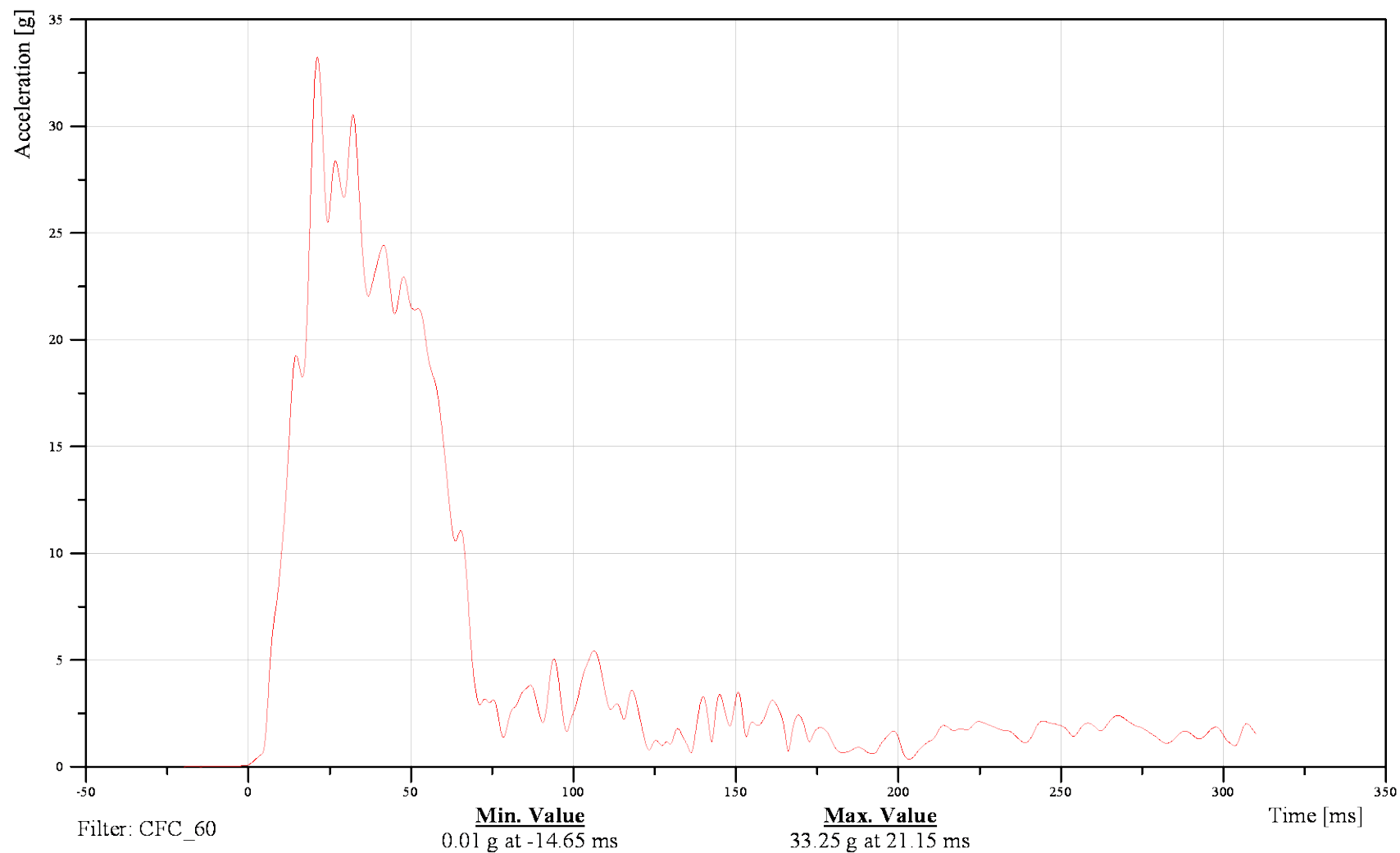
Time: 16:14

Customer: VRTC

10FORARD0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 130124





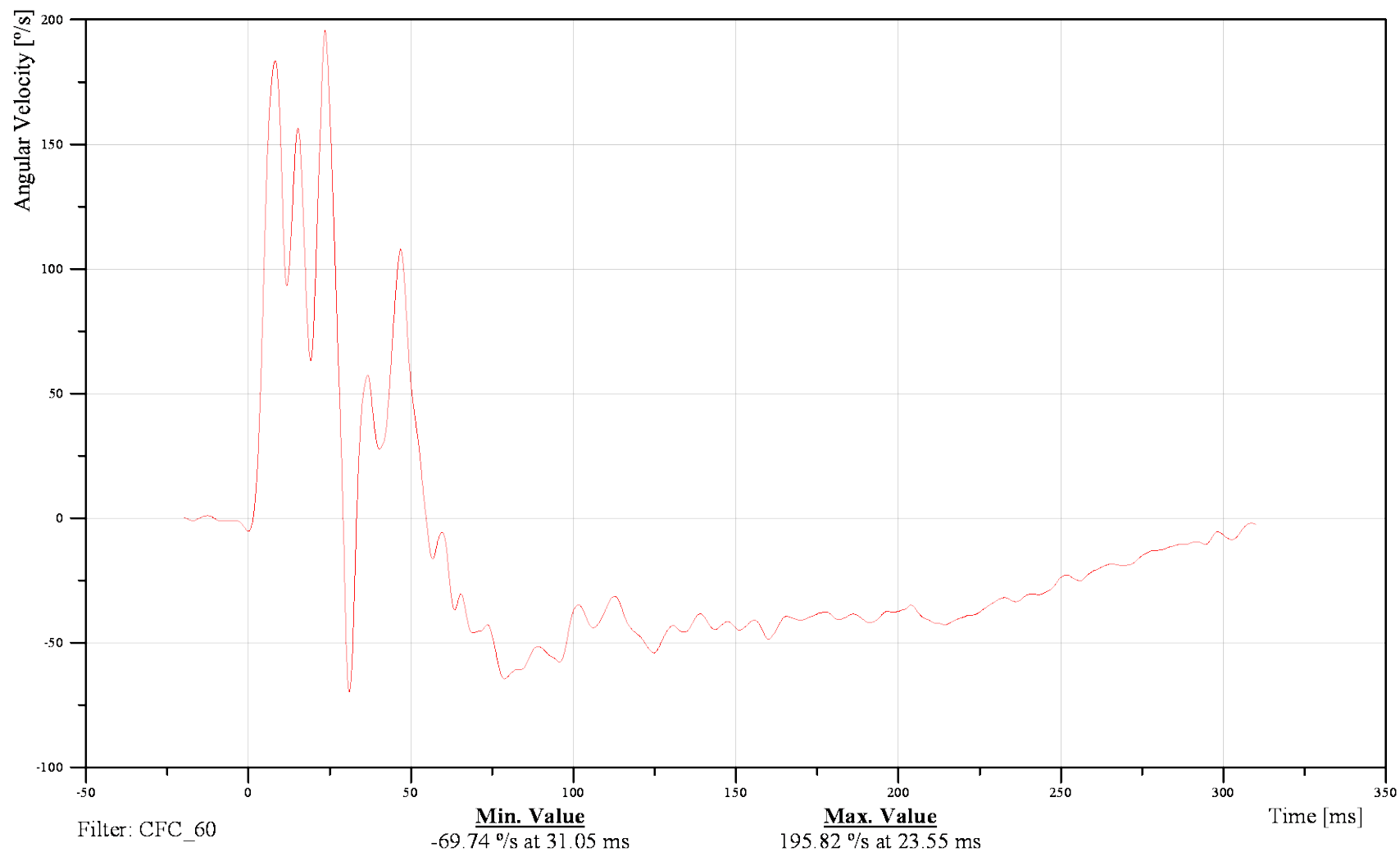
FMVSS 214 Side Impact 2011 Hyundai Sonata
VEHICLE CENTER OF GRAVITY (X) ROLL RATE GYRO

Date: 01/24/2013
Time: 16:14

Customer: VRTC

10VEHCCG0000AVXD

TRC Inc. Test Lab: CTF
Test Number: 130124





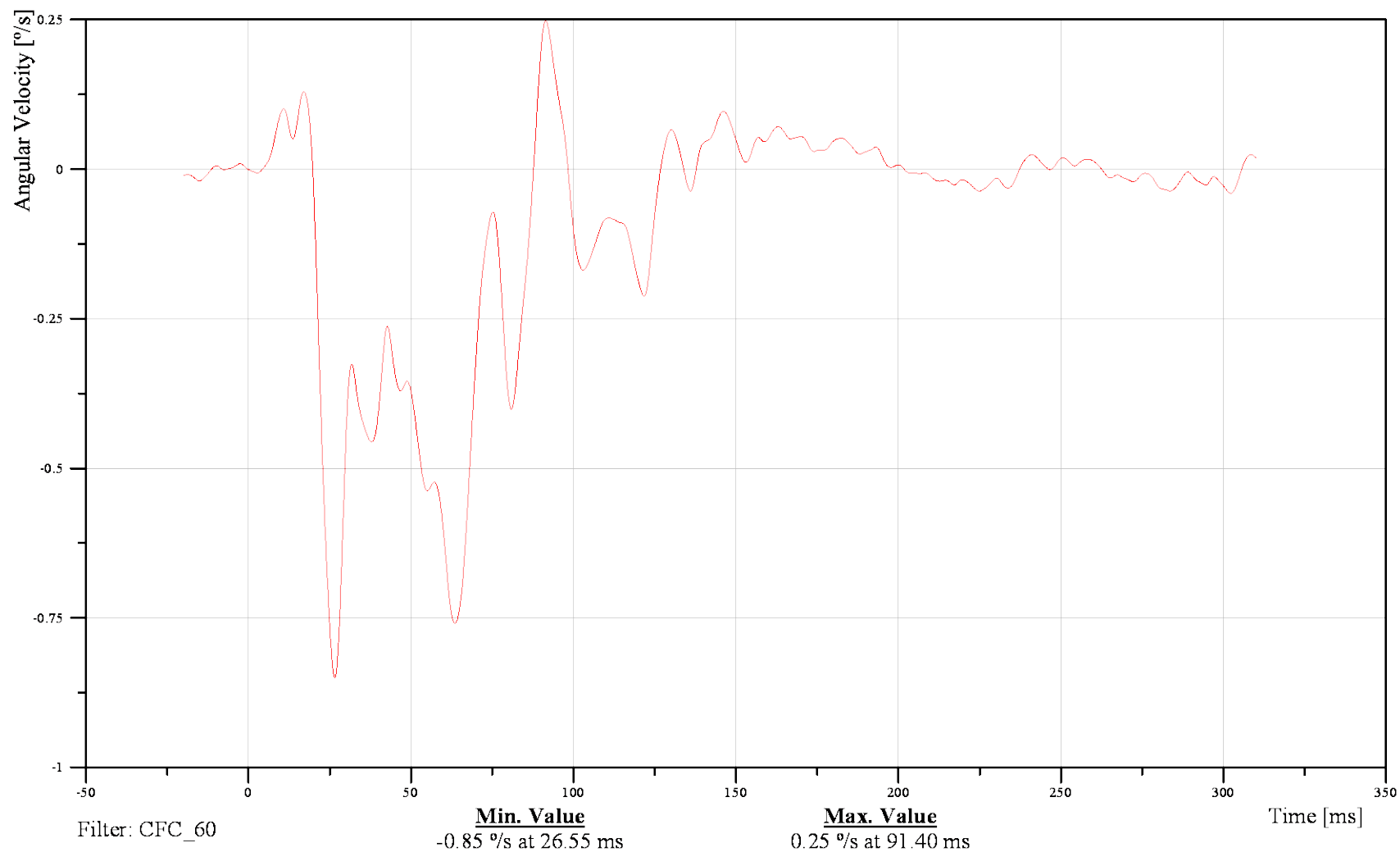
FMVSS 214 Side Impact 2011 Hyundai Sonata
VEHICLE CENTER OF GRAVITY (Y) PITCH RATE GYRO

Date: 01/24/2013
Time: 16:14

Customer: VRTC

10VEHCCG0000AVYD

TRC Inc. Test Lab: CTF
Test Number: 130124





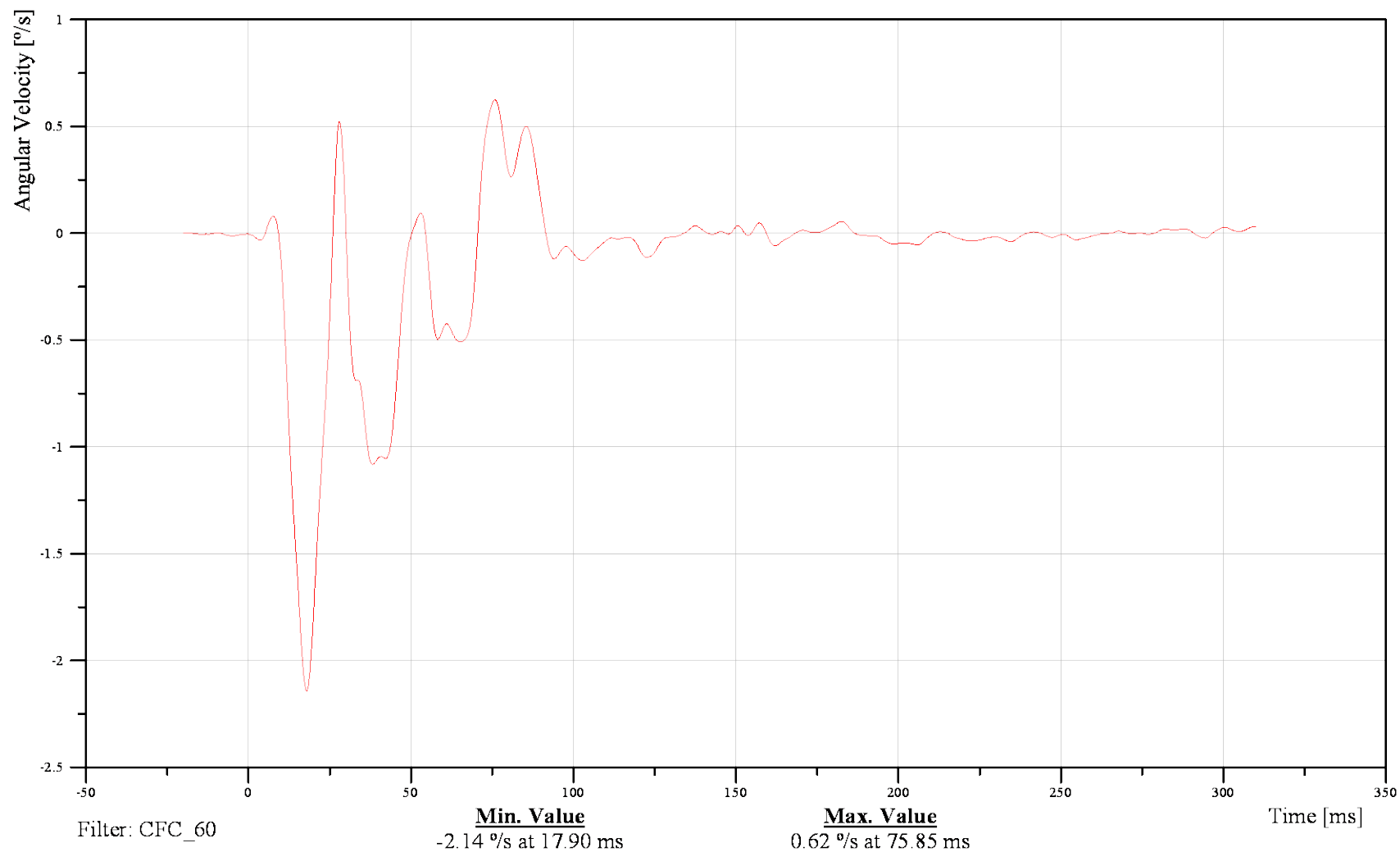
FMVSS 214 Side Impact 2011 Hyundai Sonata
VEHICLE CENTER OF GRAVITY (Z) YAW RATE GYRO

Date: 01/24/2013
Time: 16:14

Customer: VRTC

10VEHCCG0000AVZD

TRC Inc. Test Lab: CTF
Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

VEHICLE AT EDR (X) ROLL RATE GYRO

Date: 01/24/2013

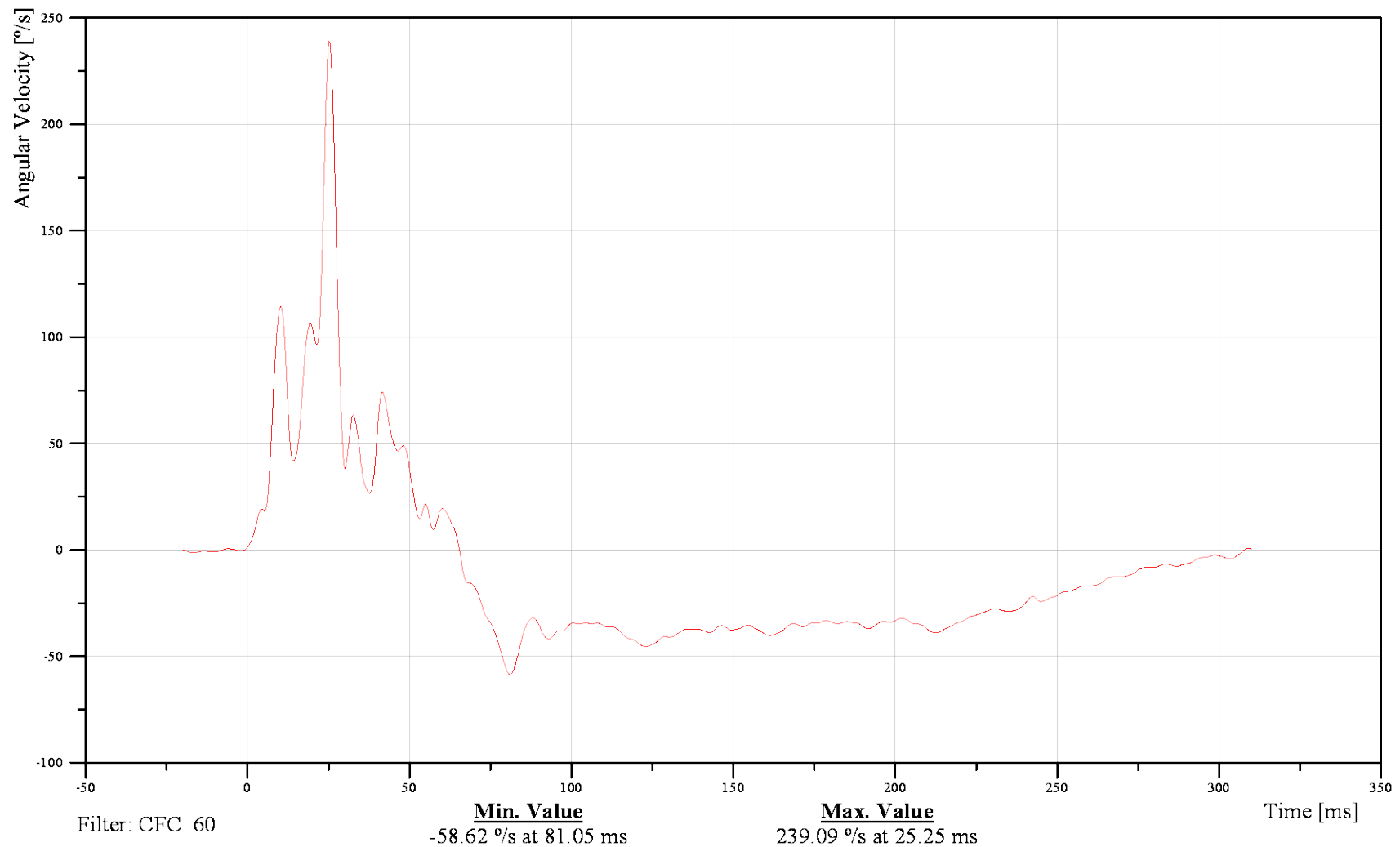
Time: 16:14

Customer: VRTC

10VEHCEDR000AVXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

VEHICLE AT EDR (Y) PITCH RATE GYRO

Date: 01/24/2013

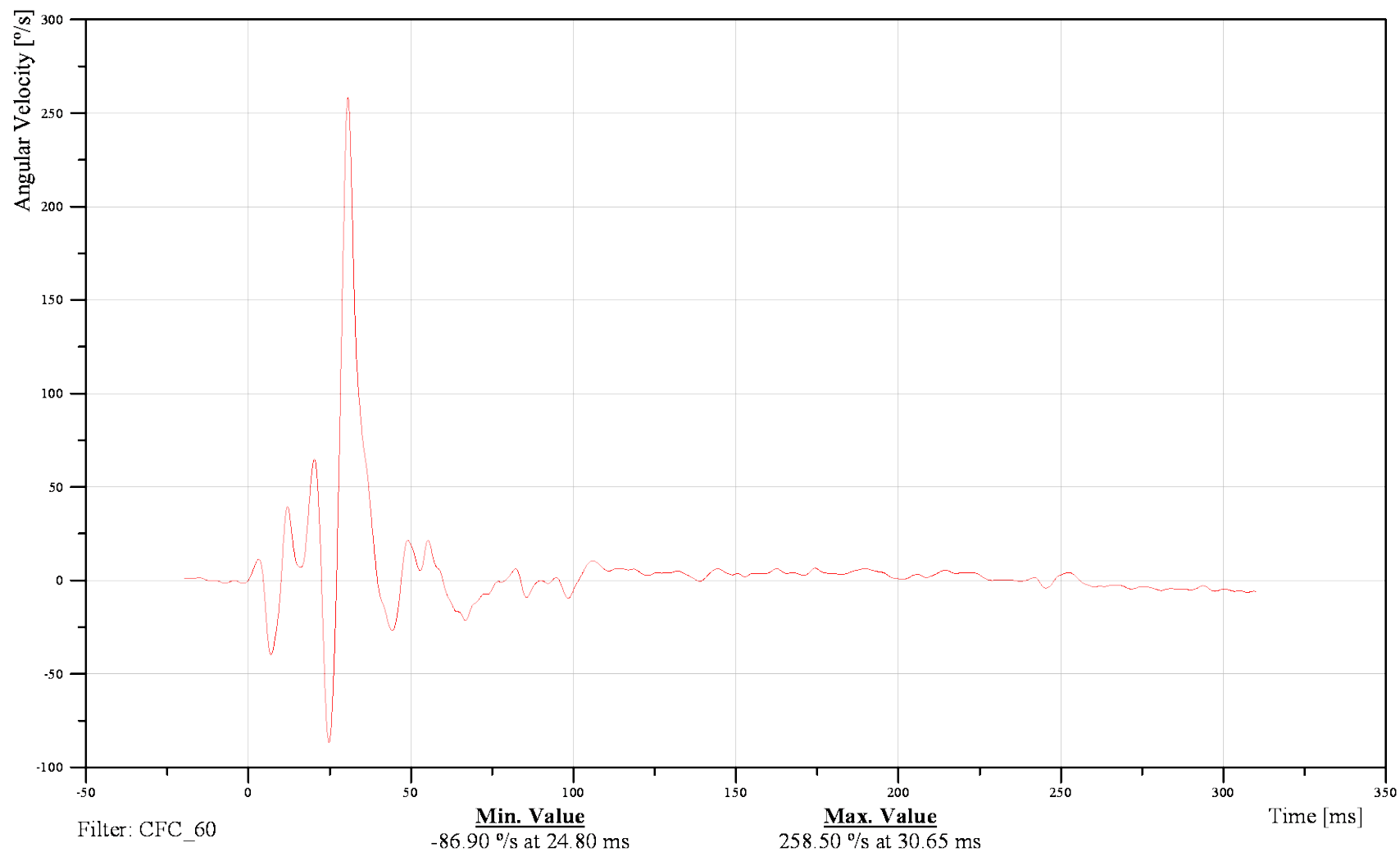
Time: 16:14

Customer: VRTC

10VEHCEDR000AVYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

VEHICLE AT EDR (Z) YAW RATE GYRO

Date: 01/24/2013

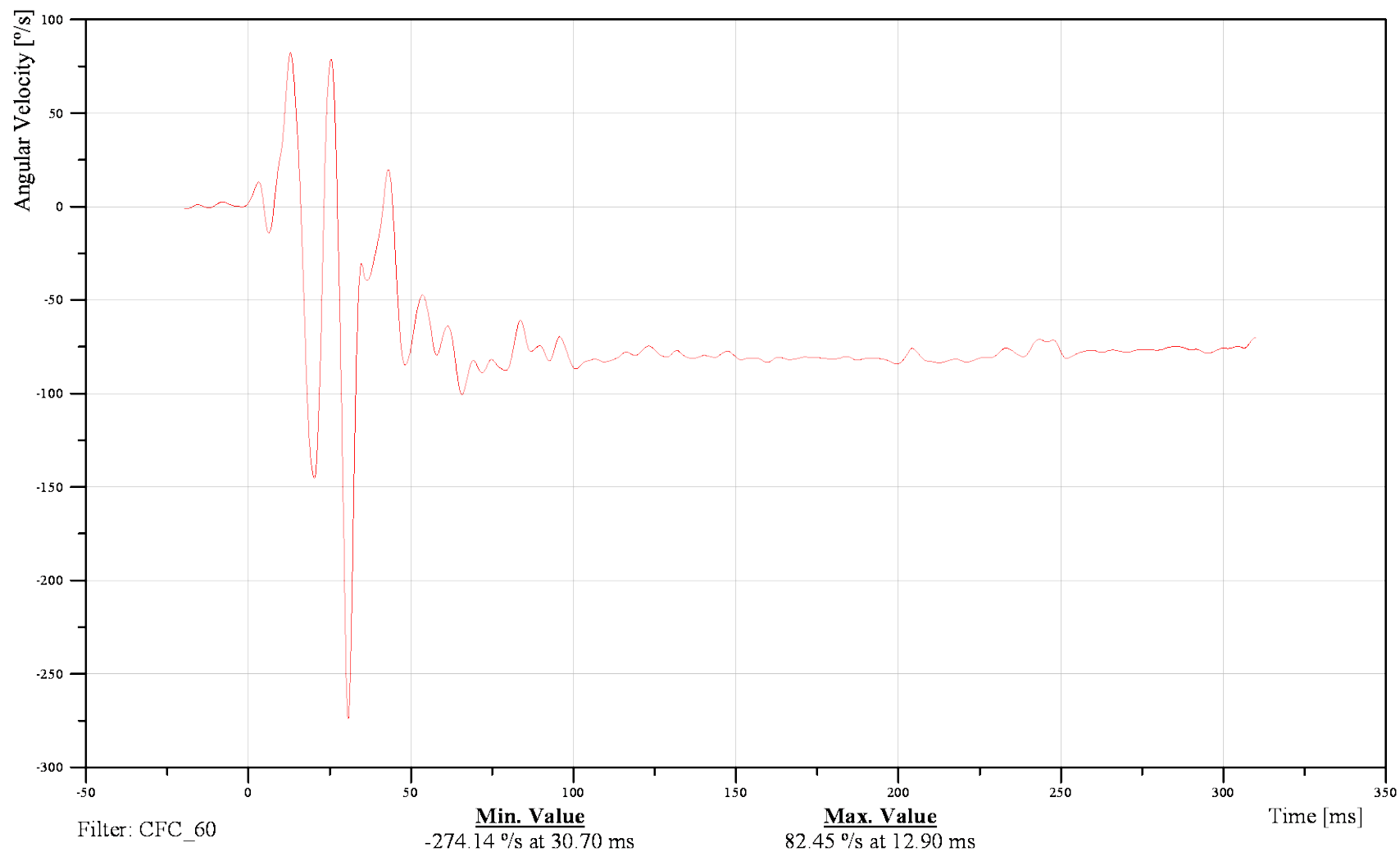
Time: 16:14

Customer: VRTC

10VEHCEDR000AVZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

REAR DECK (X) ROLL RATE GYRO

Date: 01/24/2013

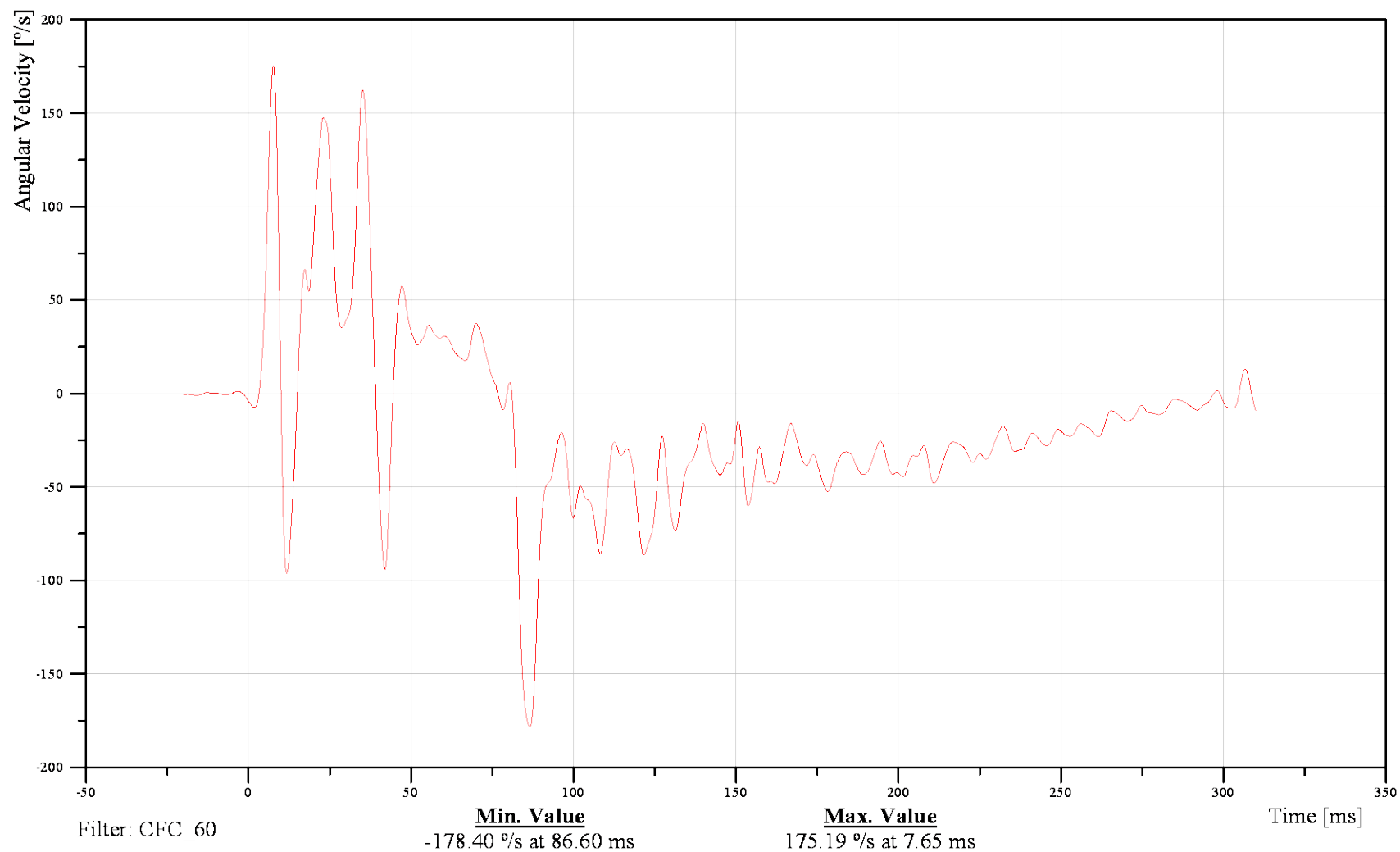
Time: 16:14

Customer: VRTC

10FORARD0000AVXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

REAR DECK (Y) PITCH RATE GYRO

Date: 01/24/2013

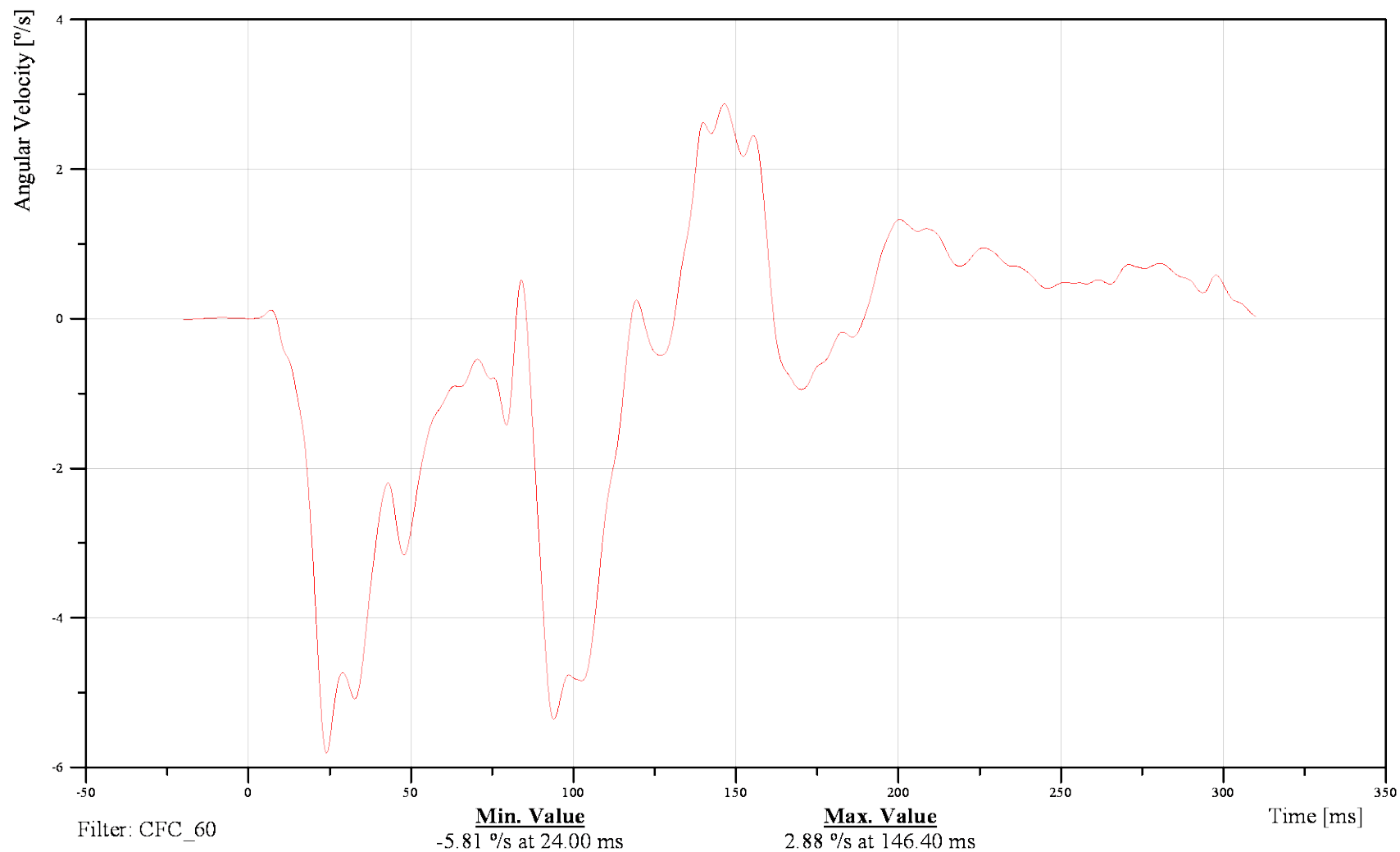
Time: 16:14

Customer: VRTC

10FORARD0000AVYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

REAR DECK (Z) YAW RATE GYRO

Date: 01/24/2013

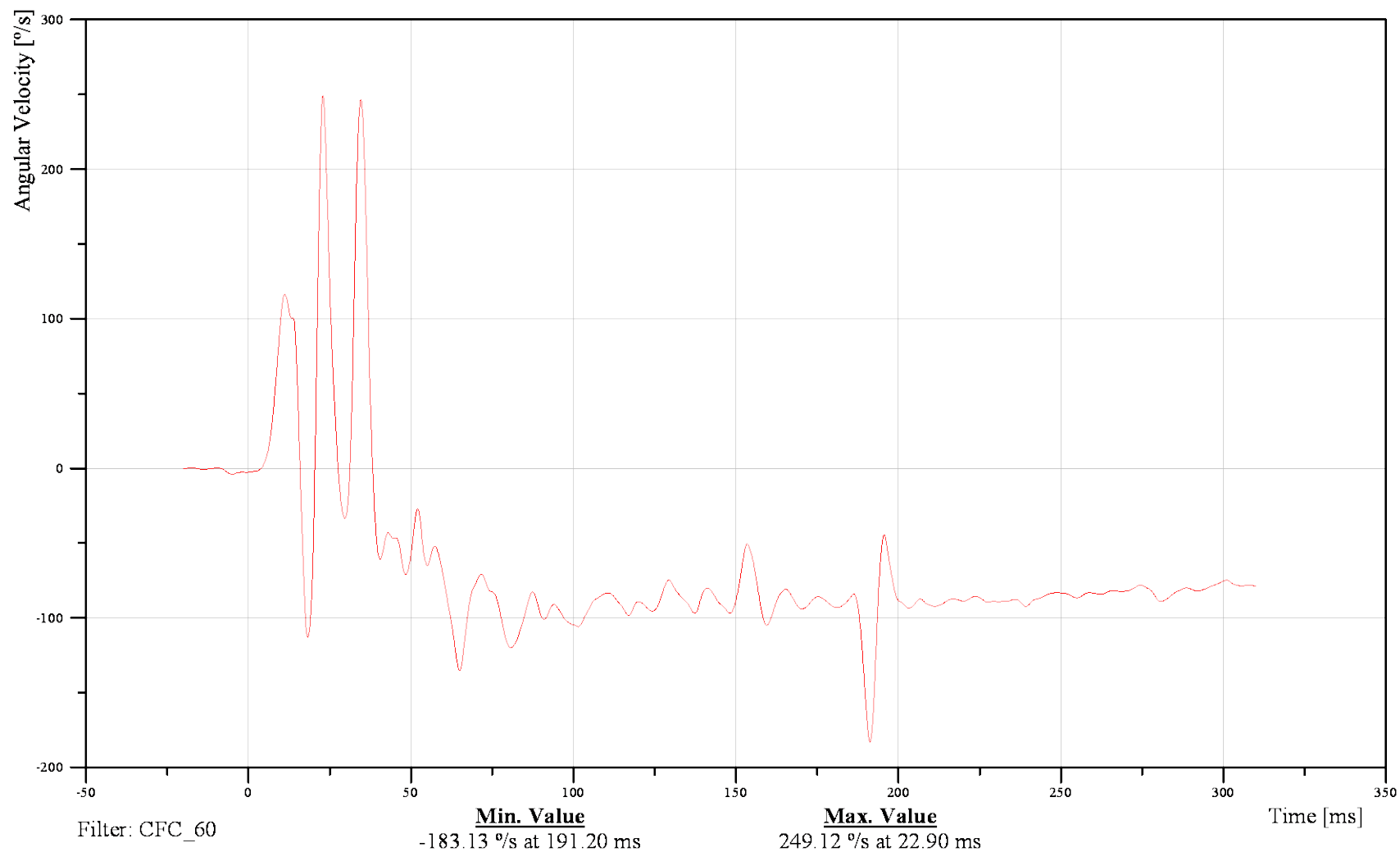
Time: 16:14

Customer: VRTC

10FORARD0000AVZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Front Door Mid Centerline (Y)

Date: 01/24/2013

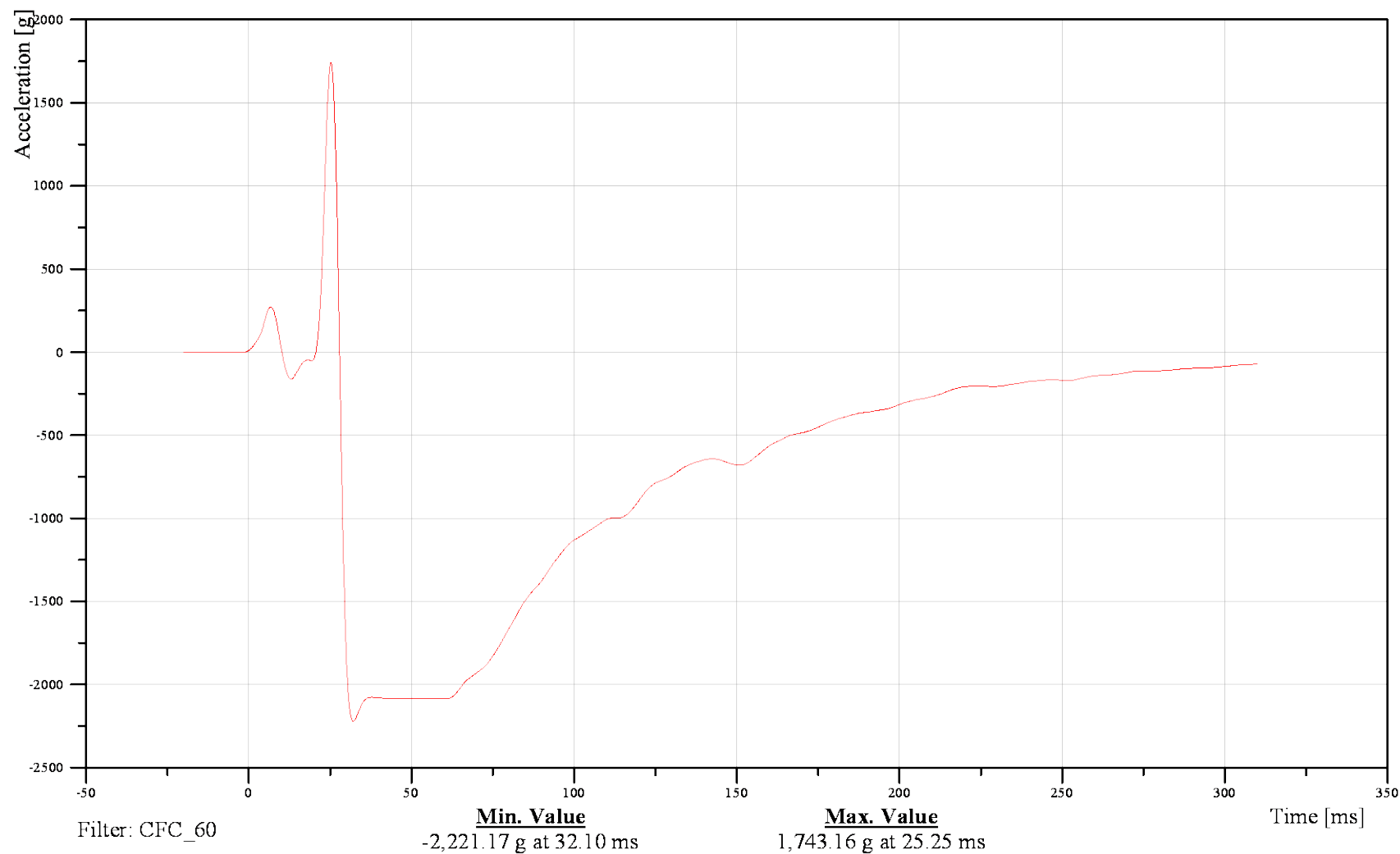
Time: 16:14

Customer: VRTC

11DOORMIMI71ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Front Door Mid Rear (Y)

Date: 01/24/2013

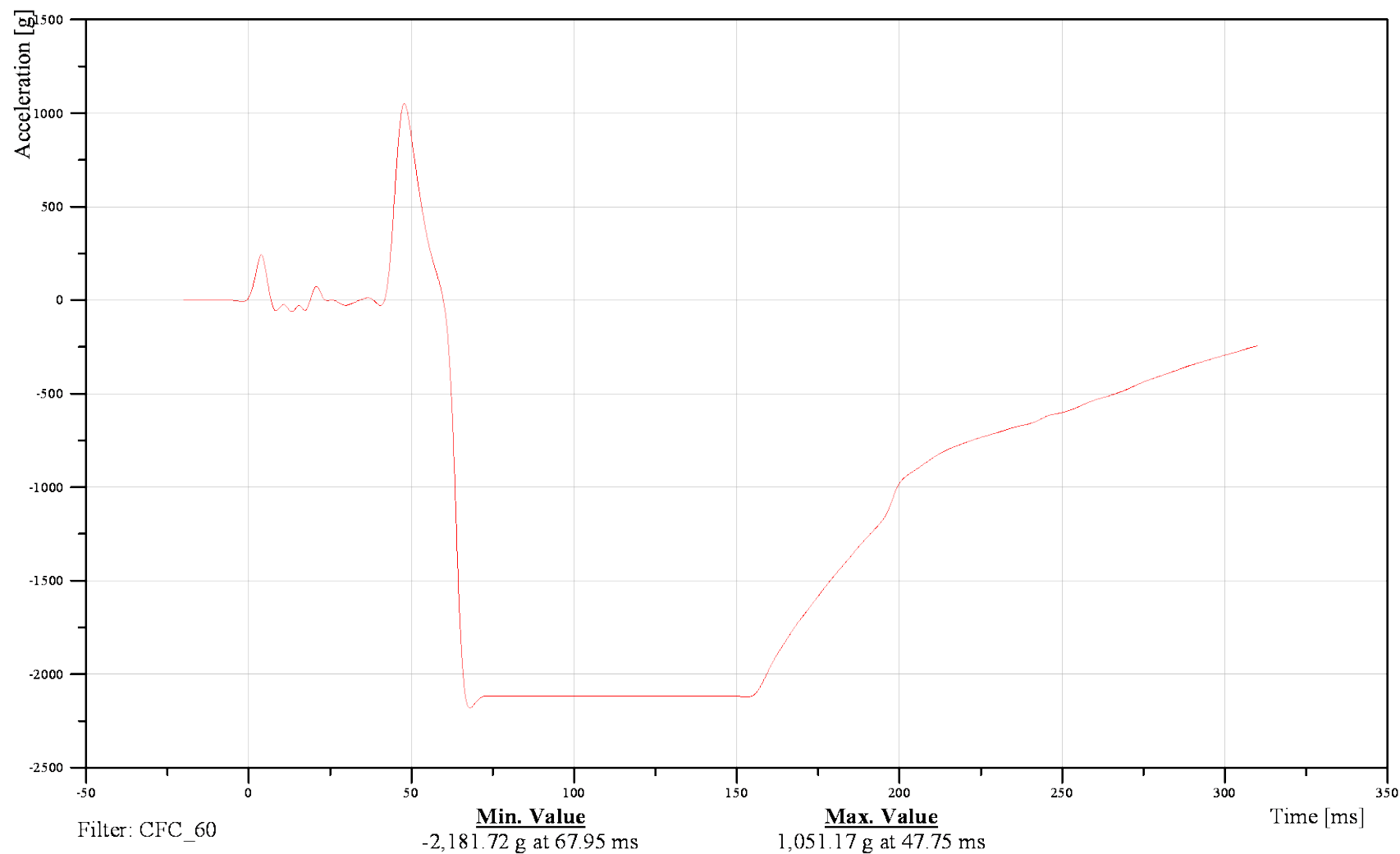
Time: 16:14

Customer: VRTC

11DOORMIRE71ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Front Door Upper Centerline (Y)

Date: 01/24/2013

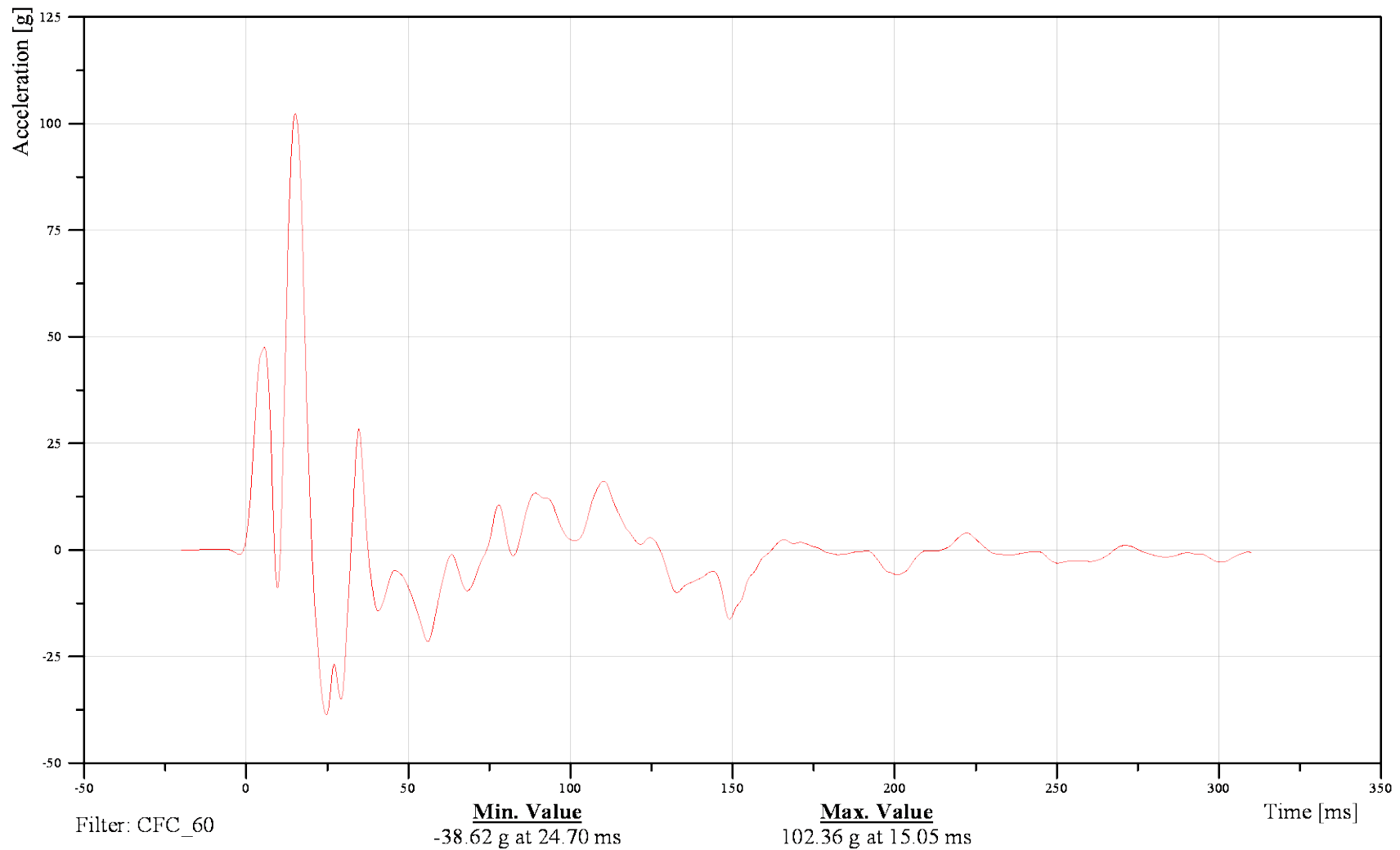
Time: 16:14

Customer: VRTC

11DOORMIUP71ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Rear Door Mid Rear (Y)

Date: 01/24/2013

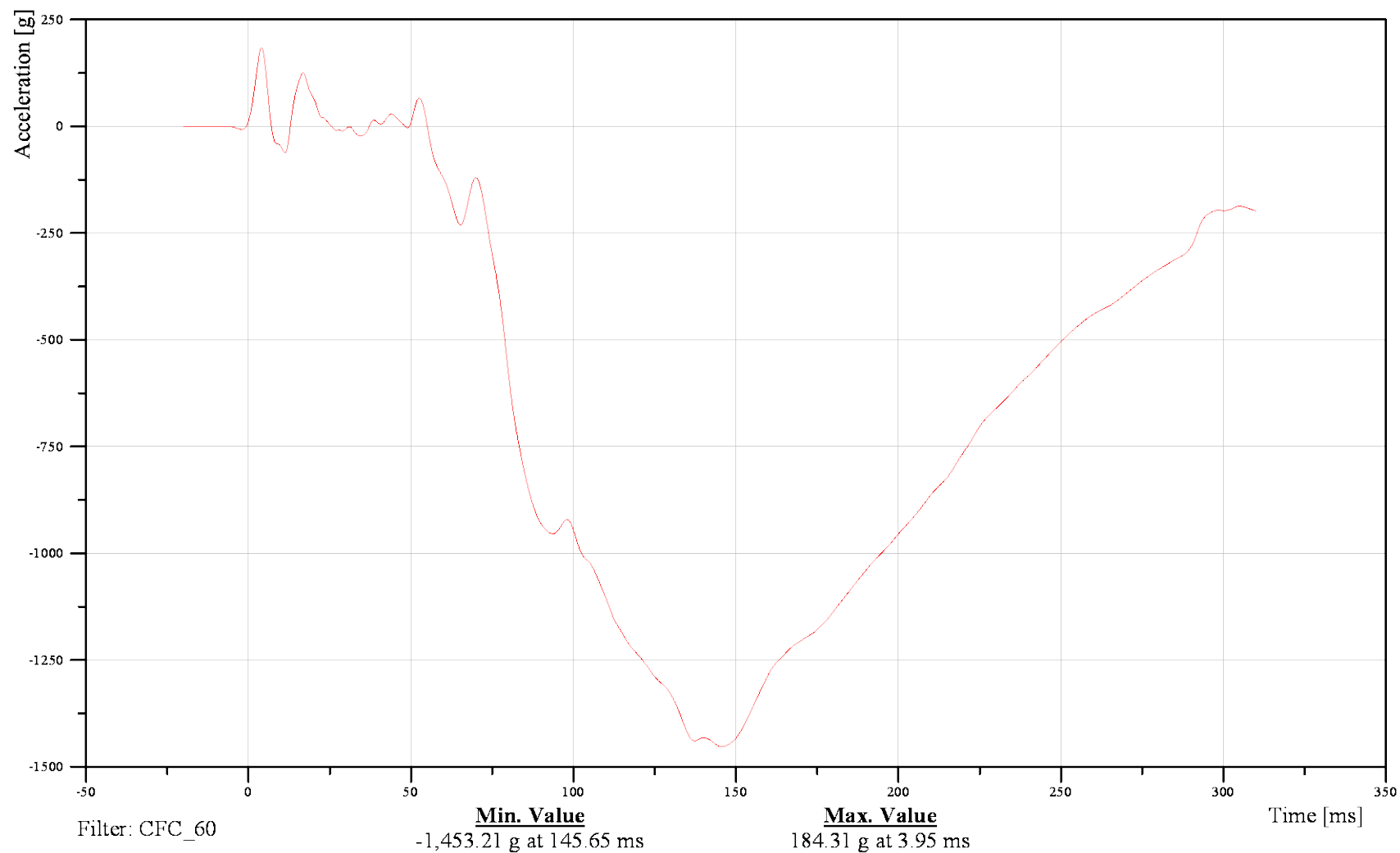
Time: 16:14

Customer: VRTC

14DOORMIRE71ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Left Rear Door Upper Centerline (Y)

Date: 01/24/2013

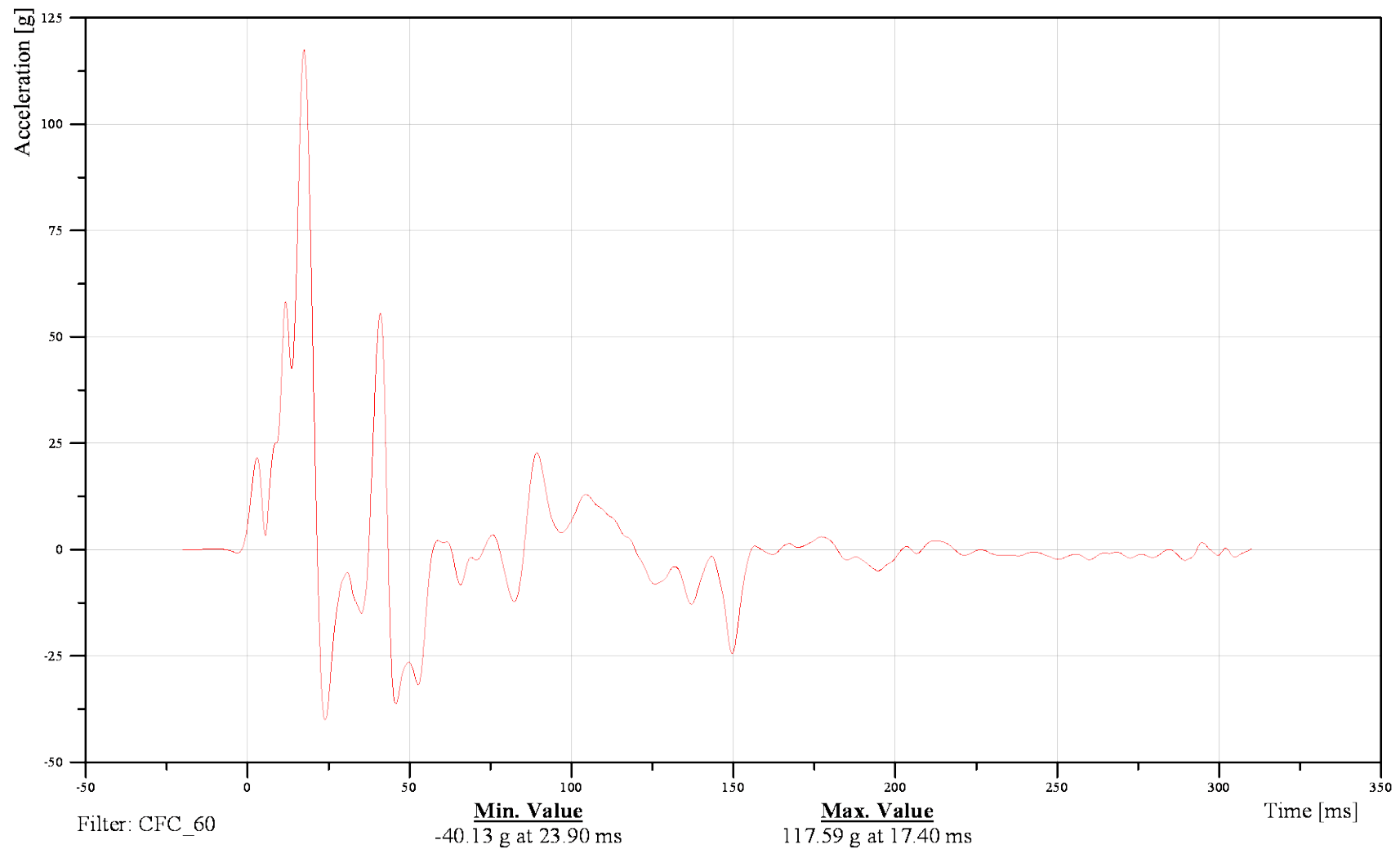
Time: 16:14

Customer: VRTC

14DOORMIUP71ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

SAB TIMING IND

Date: 01/24/2013

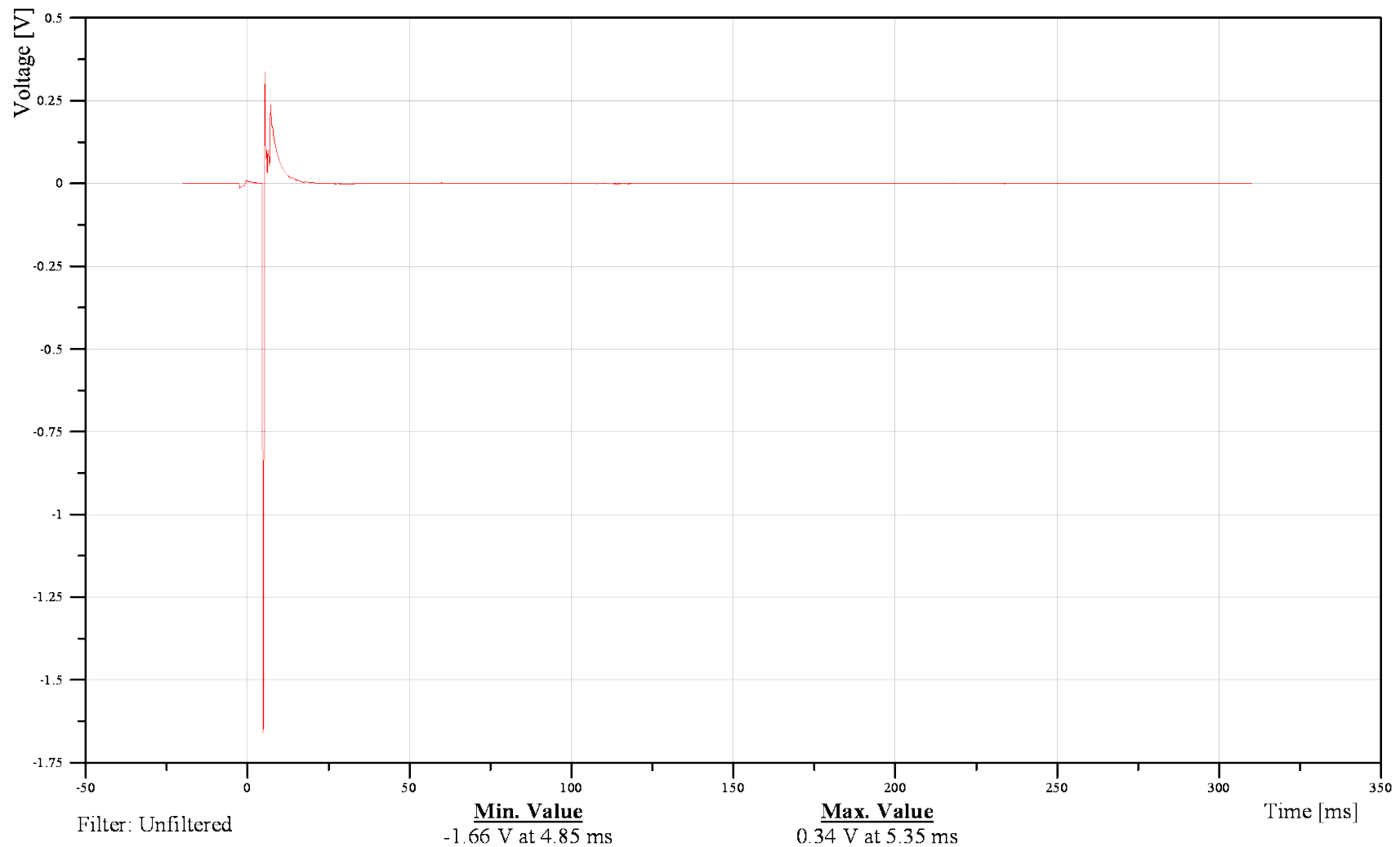
Time: 16:14

Customer: VRTC

11SENS010000VO00

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

SCAB TIMING IND

Date: 01/24/2013

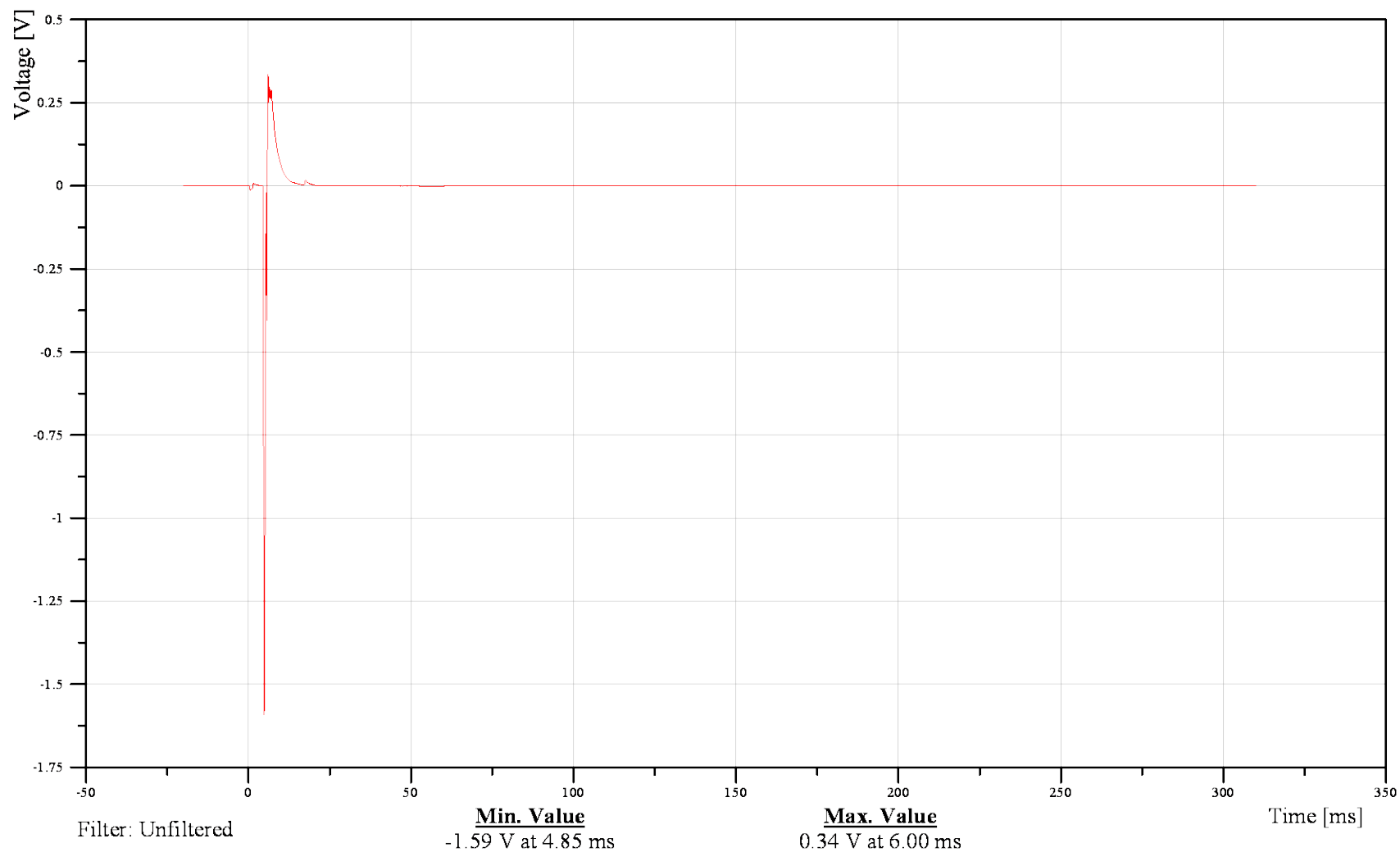
Time: 16:14

Customer: VRTC

11SENS020000VO00

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Contact

Date: 01/24/2013

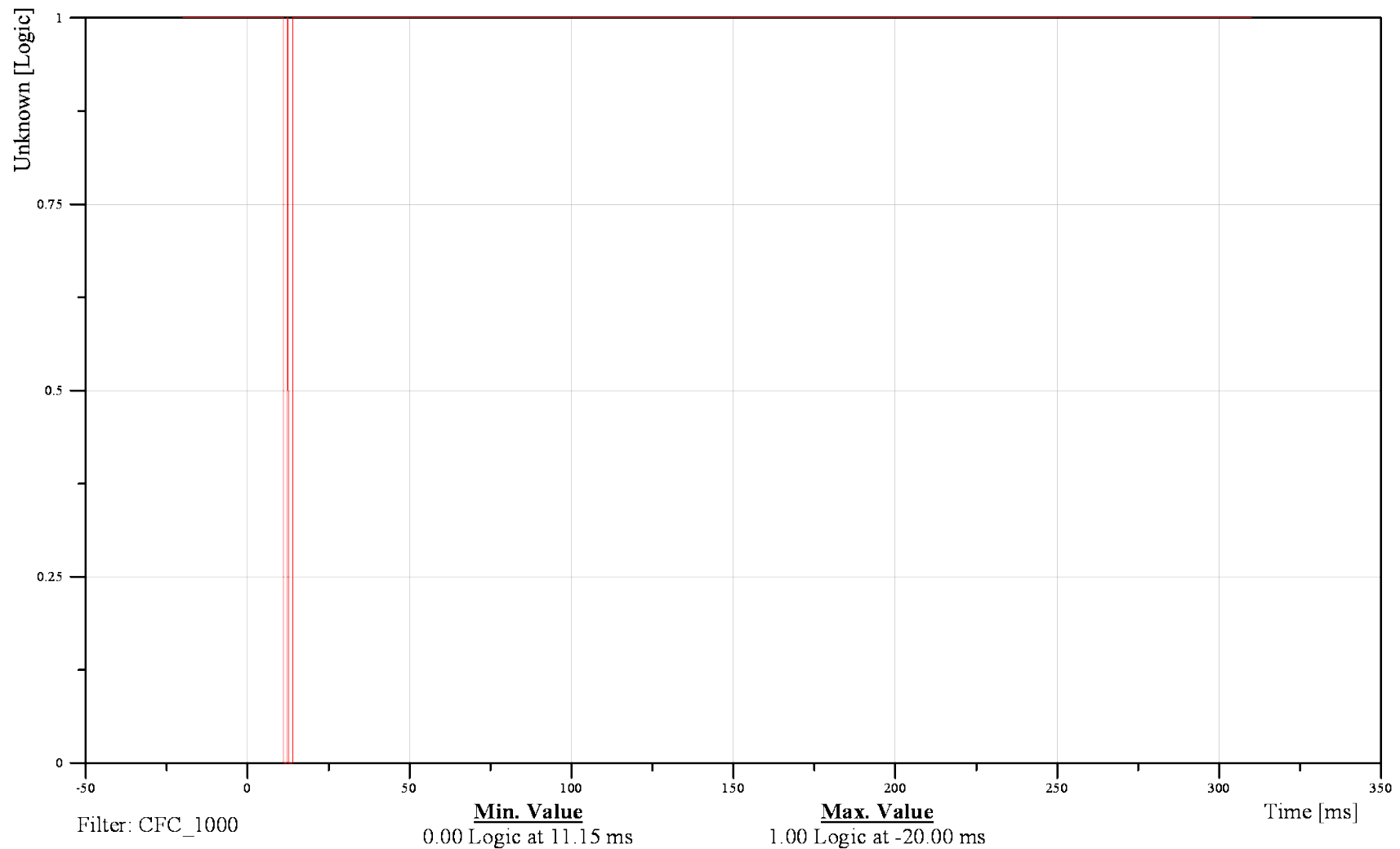
Time: 16:14

Customer: VRTC

11HEADCONT00VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Contact

Date: 01/24/2013

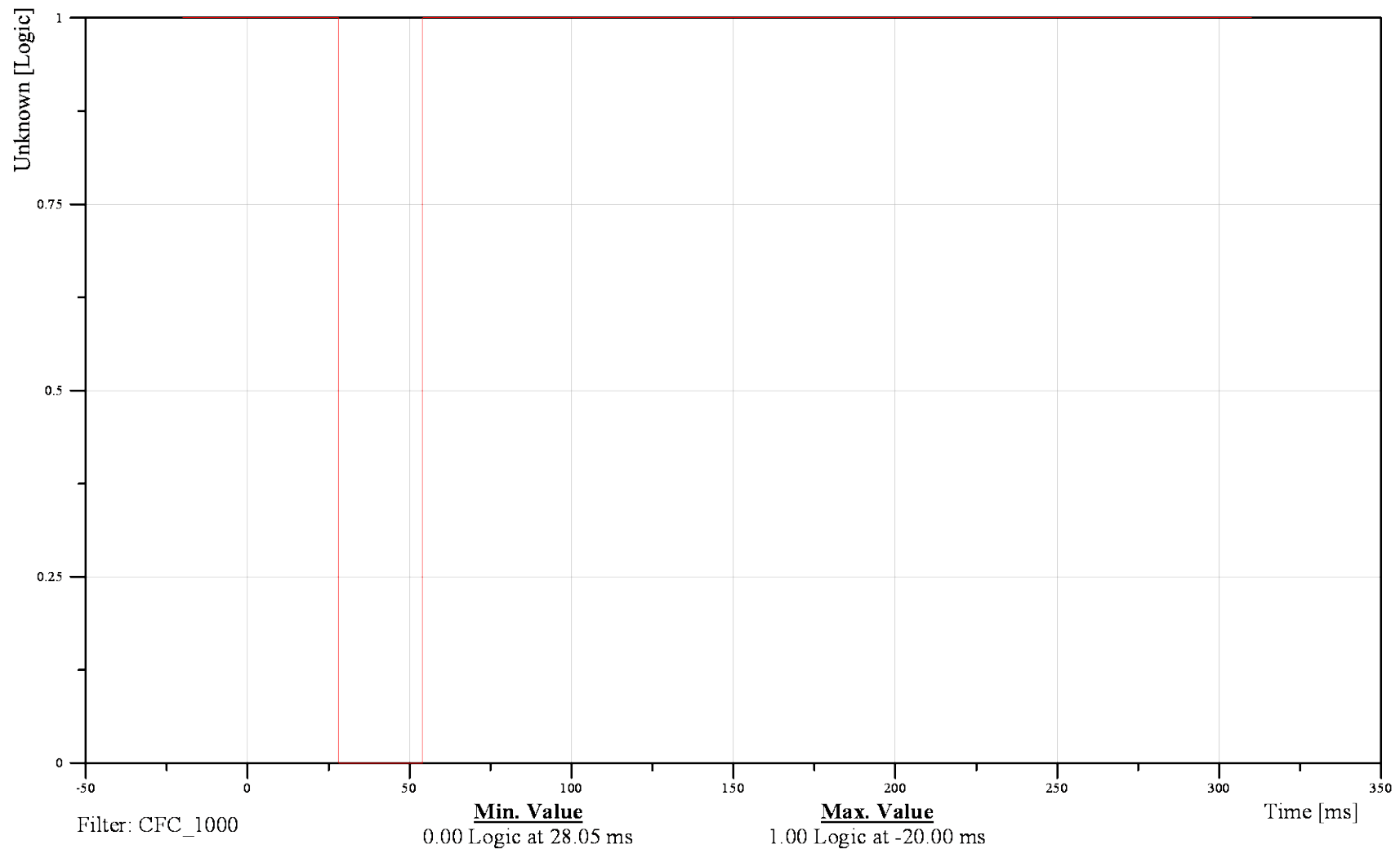
Time: 16:14

Customer: VRTC

11SHLDCONT00VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Contact

Date: 01/24/2013

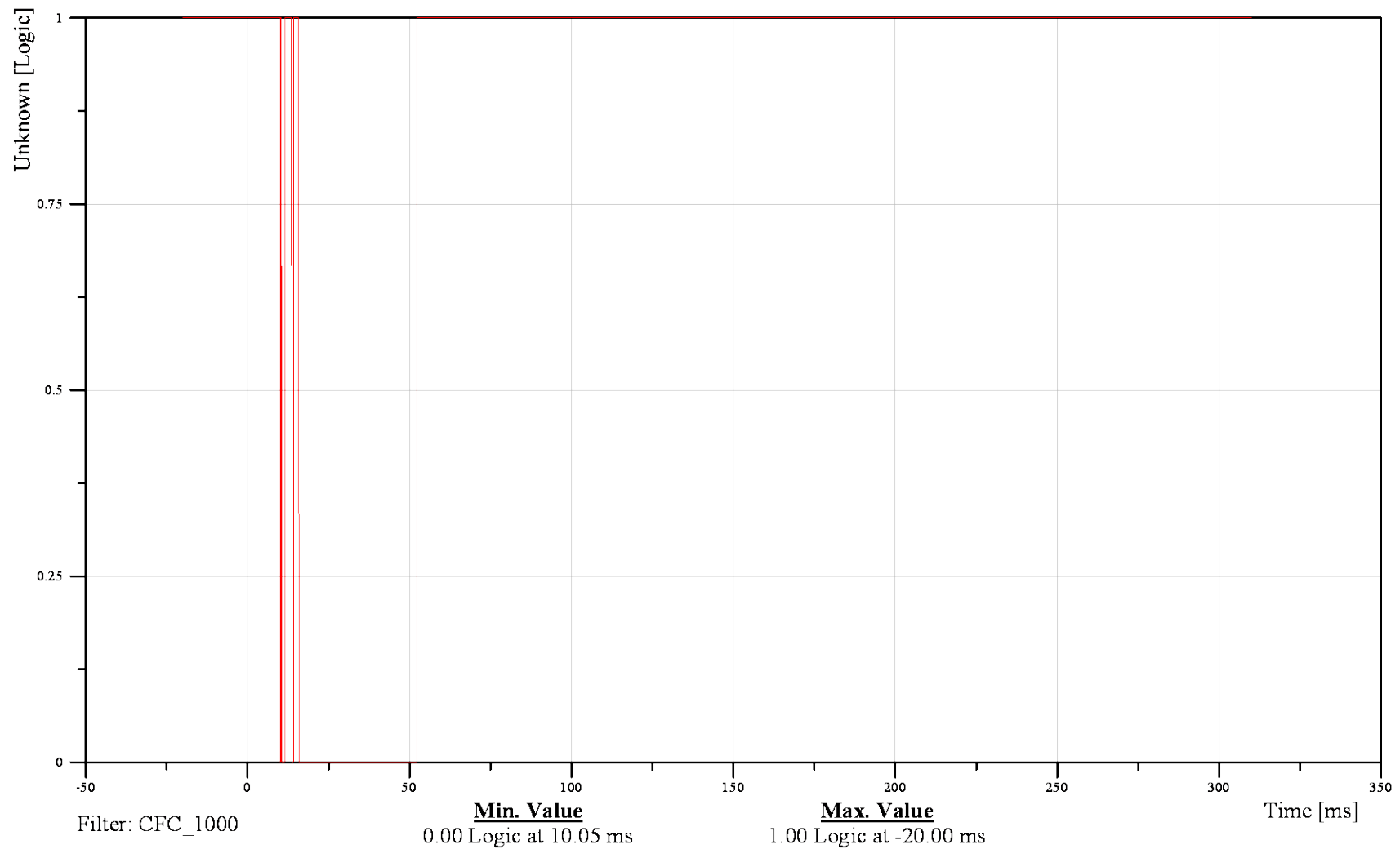
Time: 16:14

Customer: VRTC

11THORCONT00VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Date: 01/24/2013

Time: 16:14

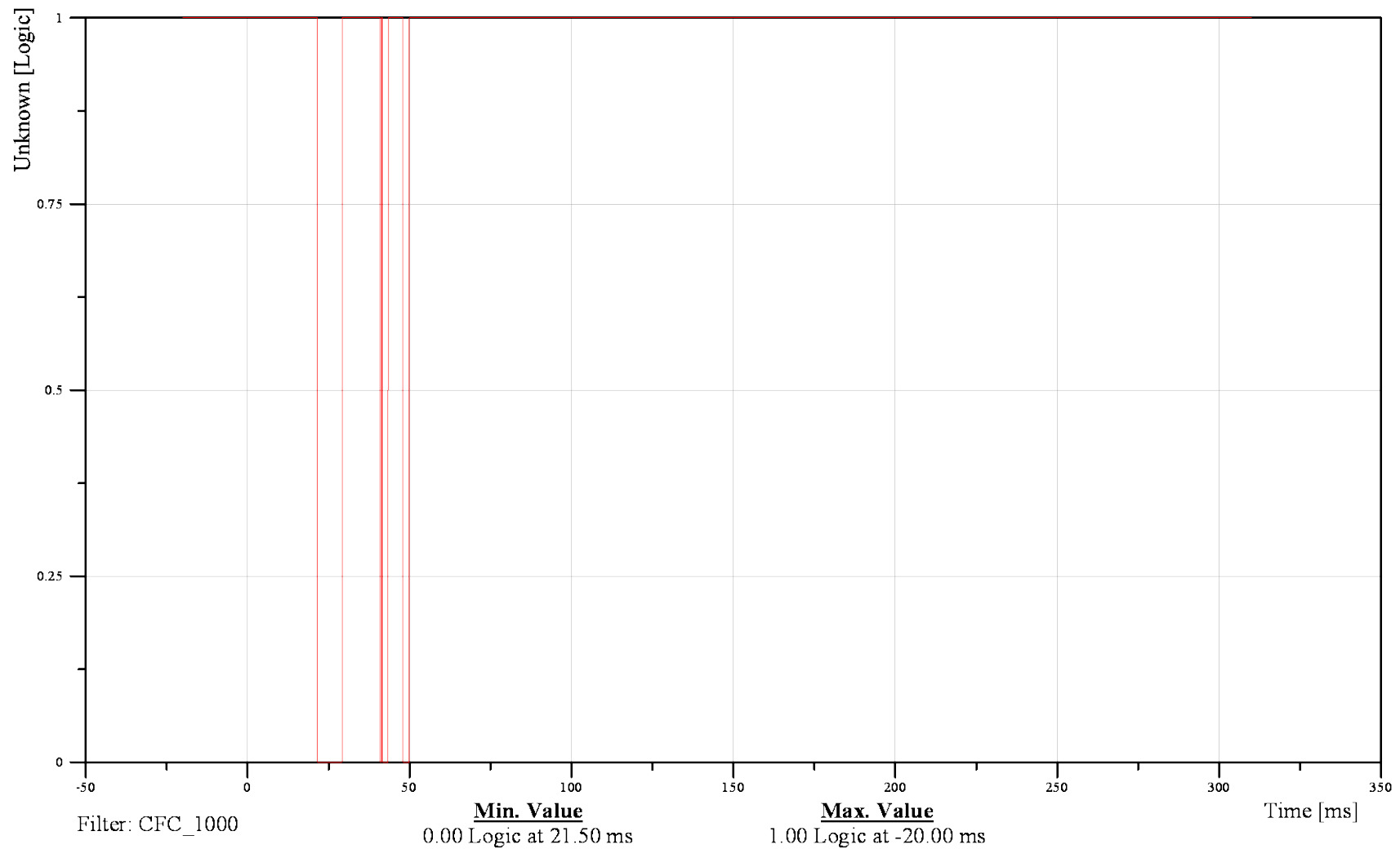
Leg Contact

Customer: VRTC

11LEGCONT000VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Head Contact

Date: 01/24/2013

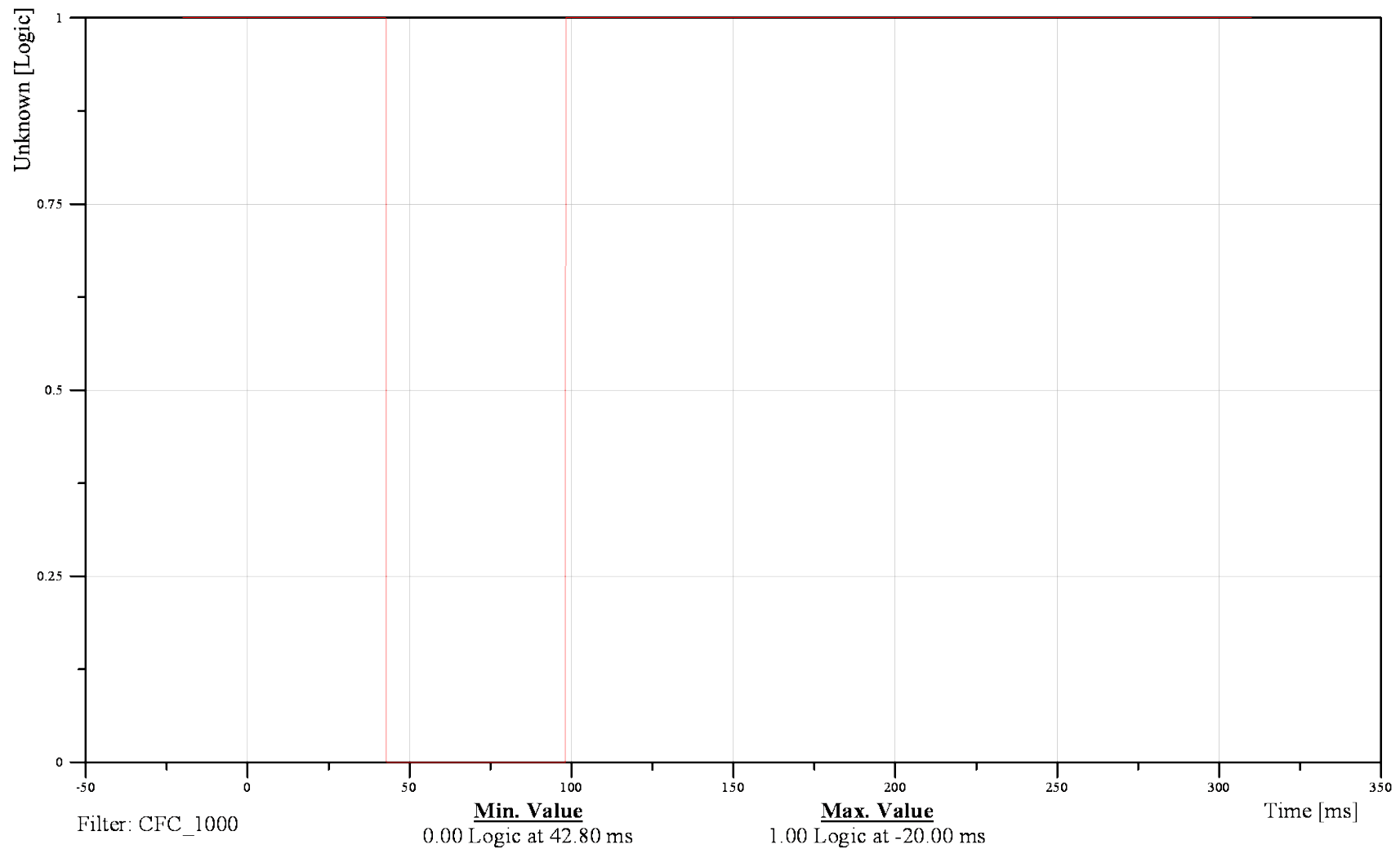
Time: 16:14

Customer: VRTC

14HEADCONT00VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Shoulder Contact

Date: 01/24/2013

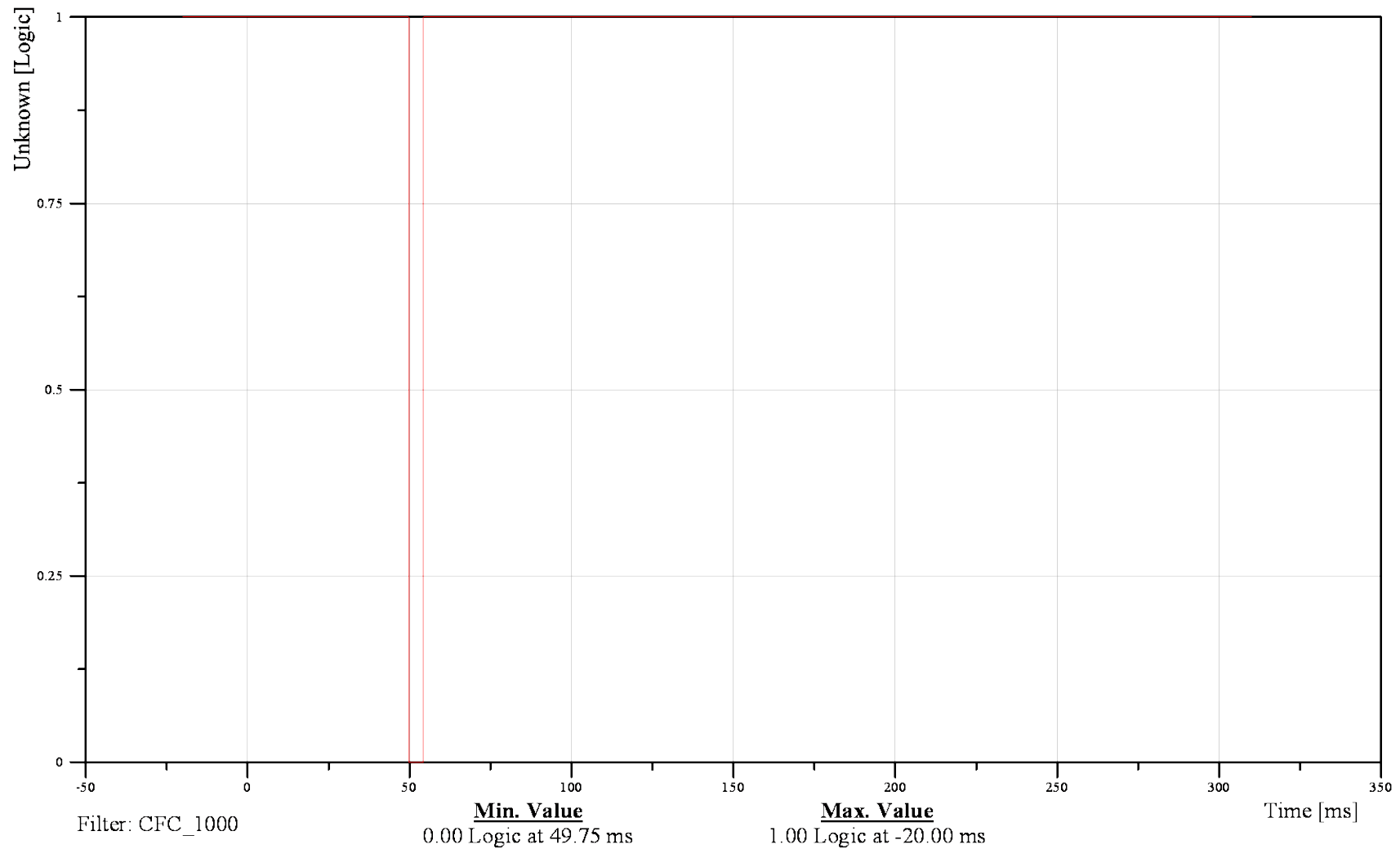
Time: 16:14

Customer: VRTC

14SHLDCONT00VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Thorax Contact

Date: 01/24/2013

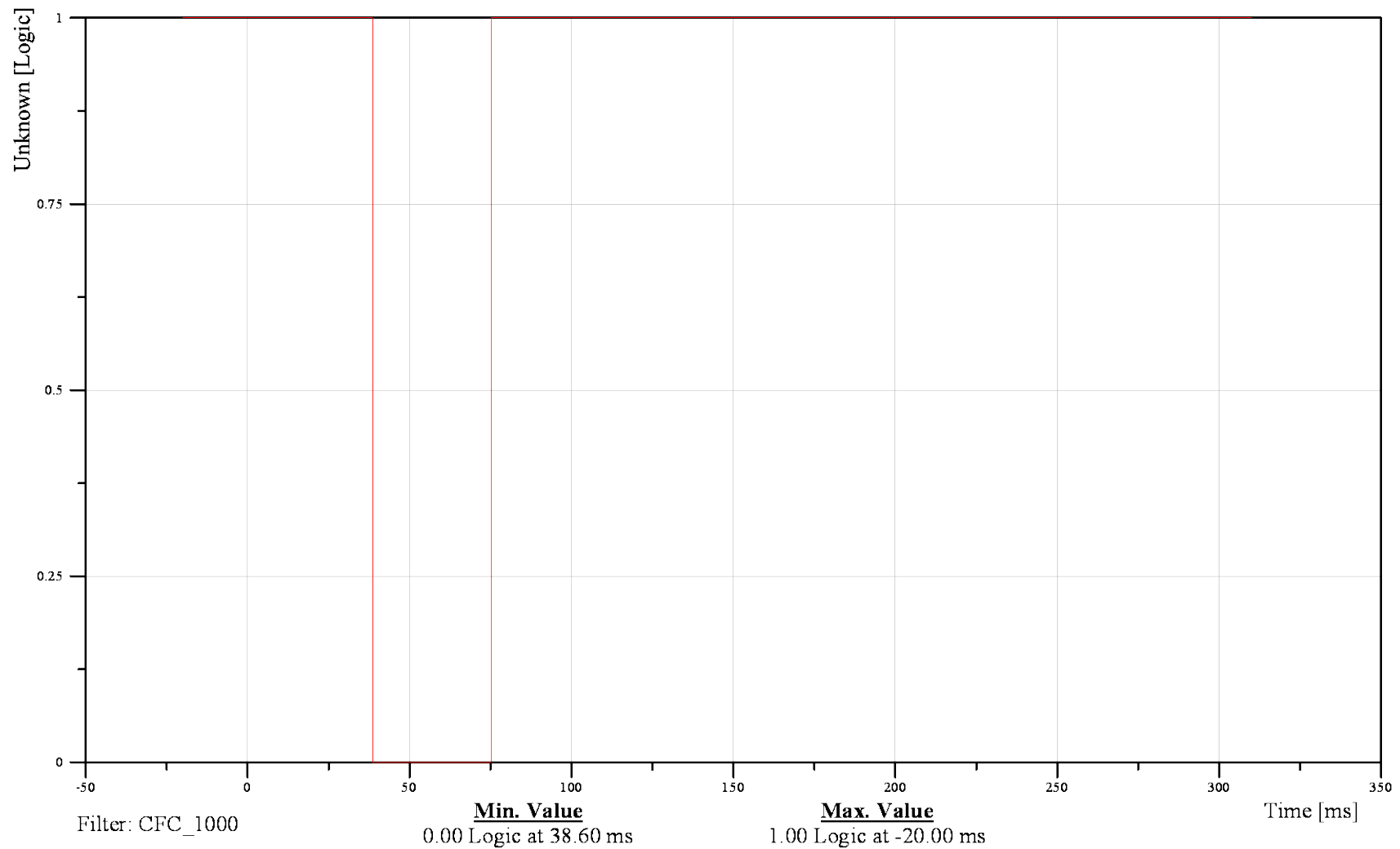
Time: 16:14

Customer: VRTC

14THORCONT00VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

Date: 01/24/2013

Time: 16:14

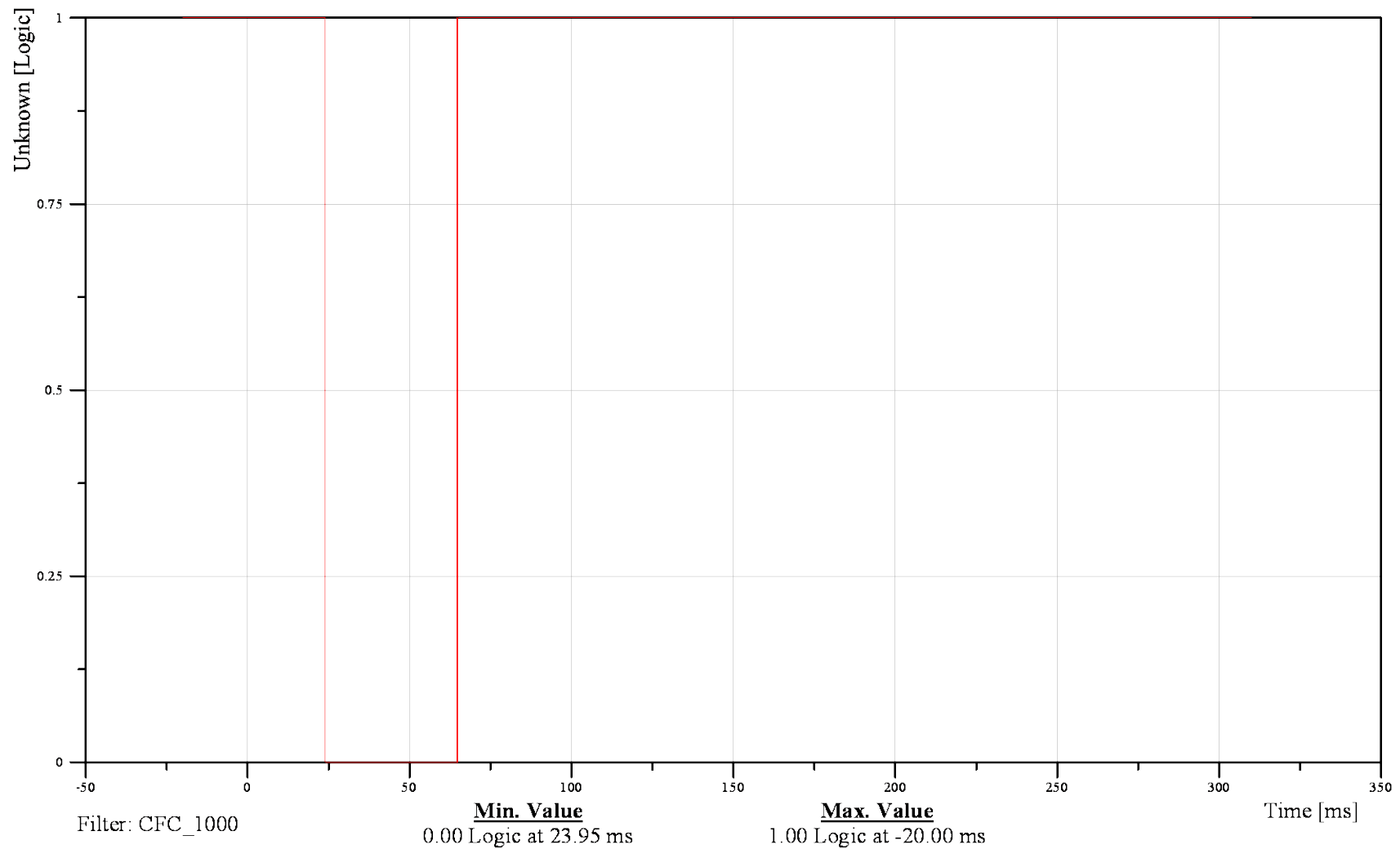
Leg Contact

Customer: VRTC

14LEGCONT000VO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 1

Date: 01/24/2013

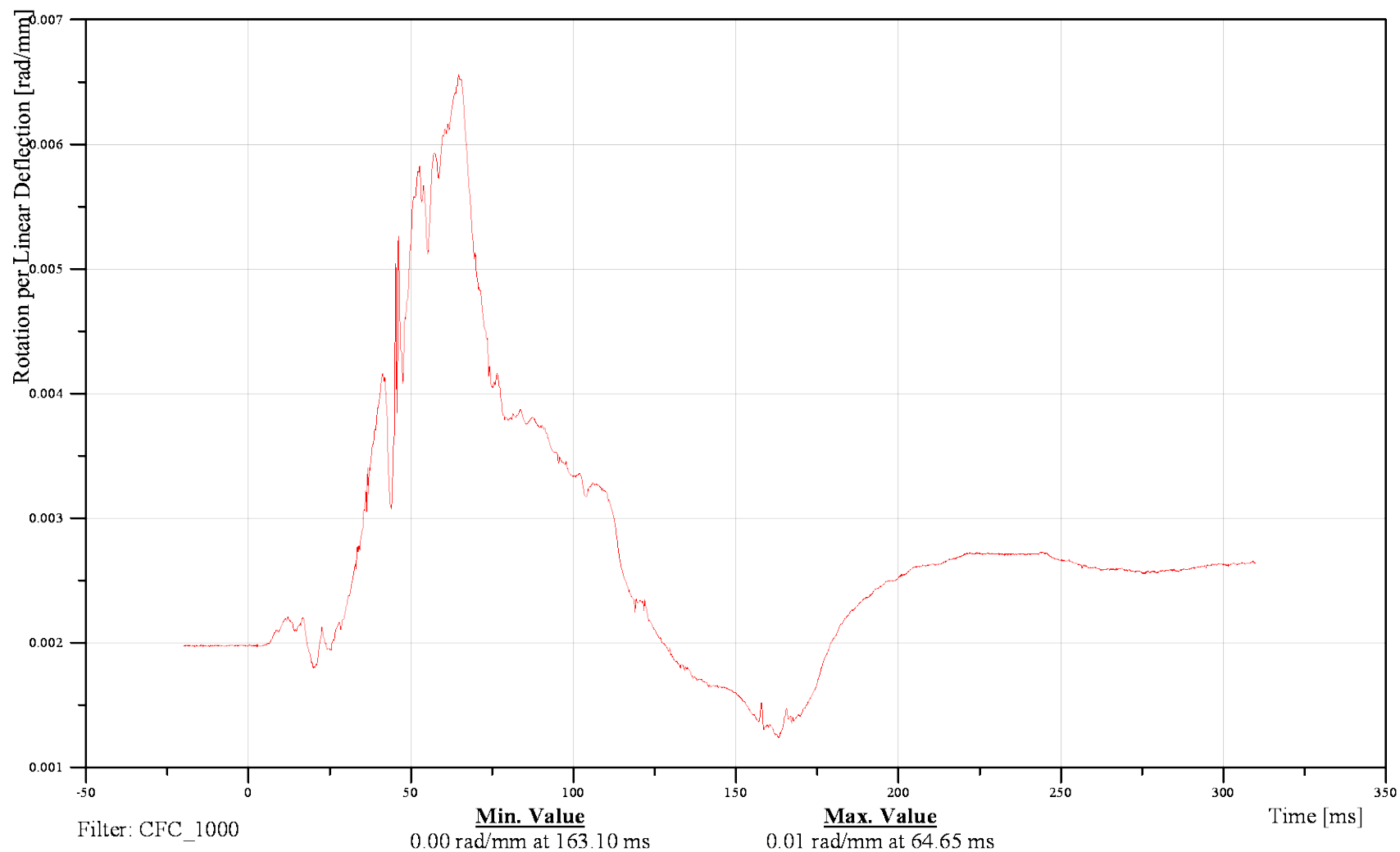
Time: 16:14

Customer: VRTC

14CHBA4001WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 2

Date: 01/24/2013

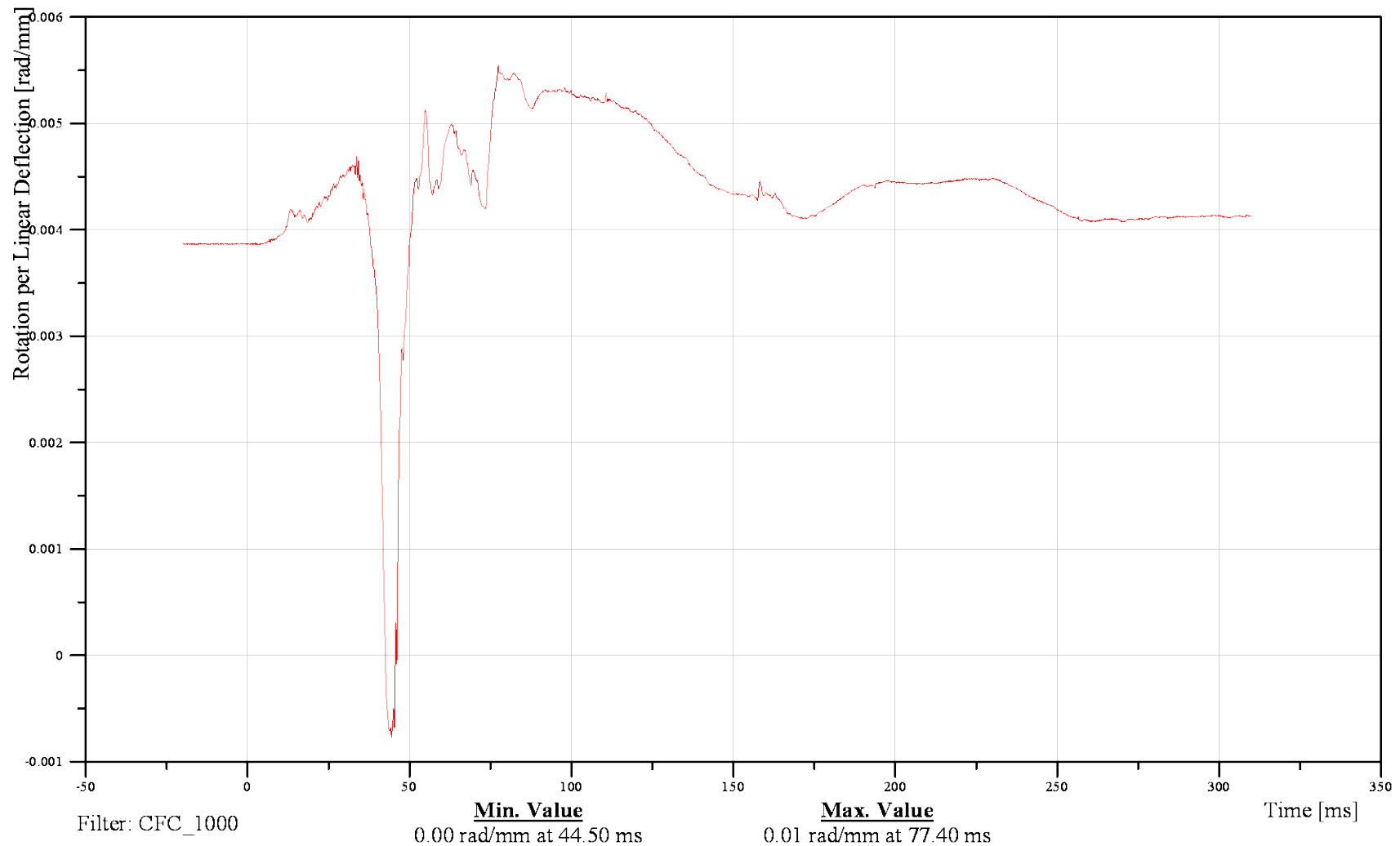
Time: 16:14

Customer: VRTC

14CHBA4002WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 3

Date: 01/24/2013

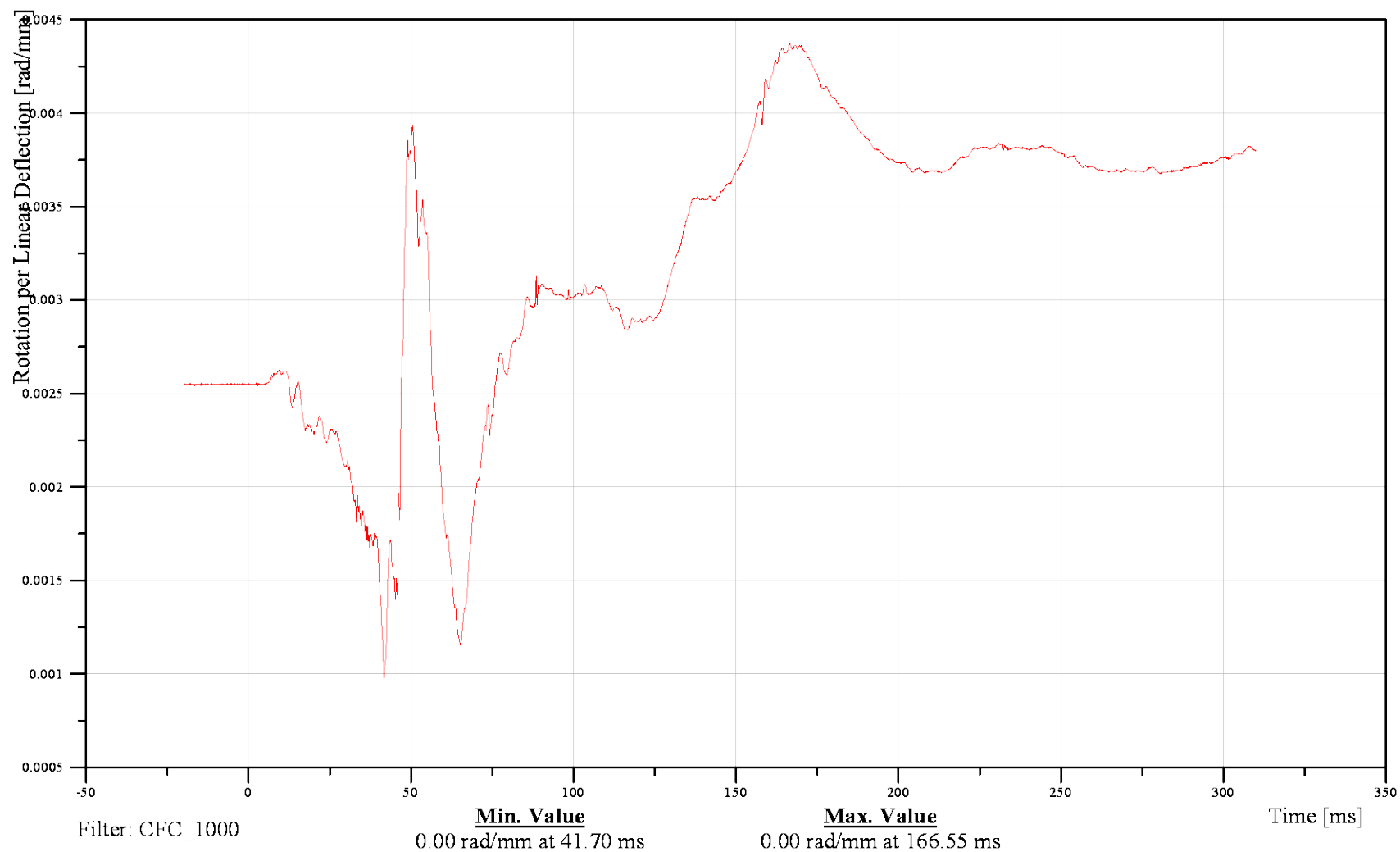
Time: 16:14

Customer: VRTC

14CHBA4003WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 4

Date: 01/24/2013

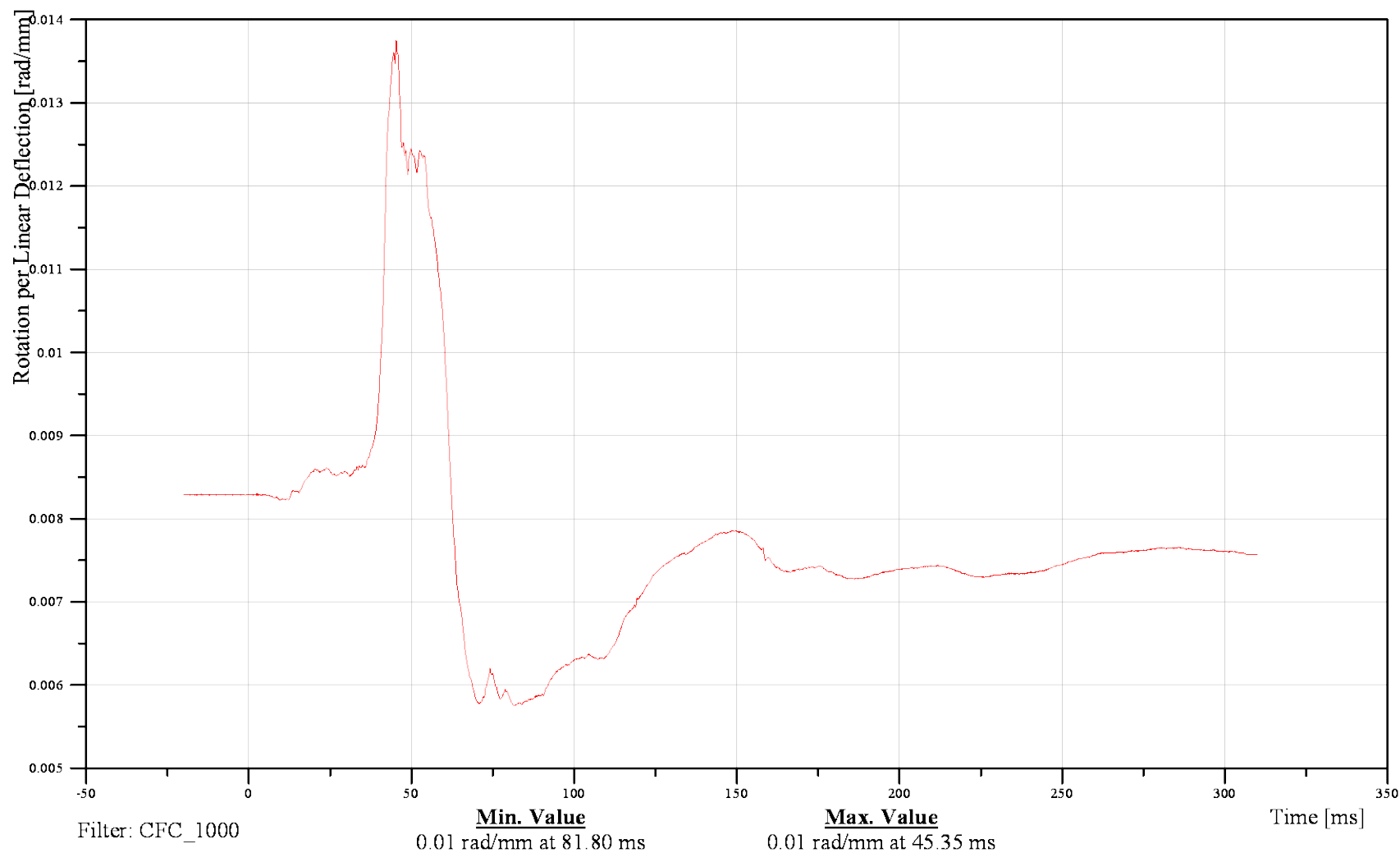
Time: 16:14

Customer: VRTC

14CHBA4004WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 5

Date: 01/24/2013

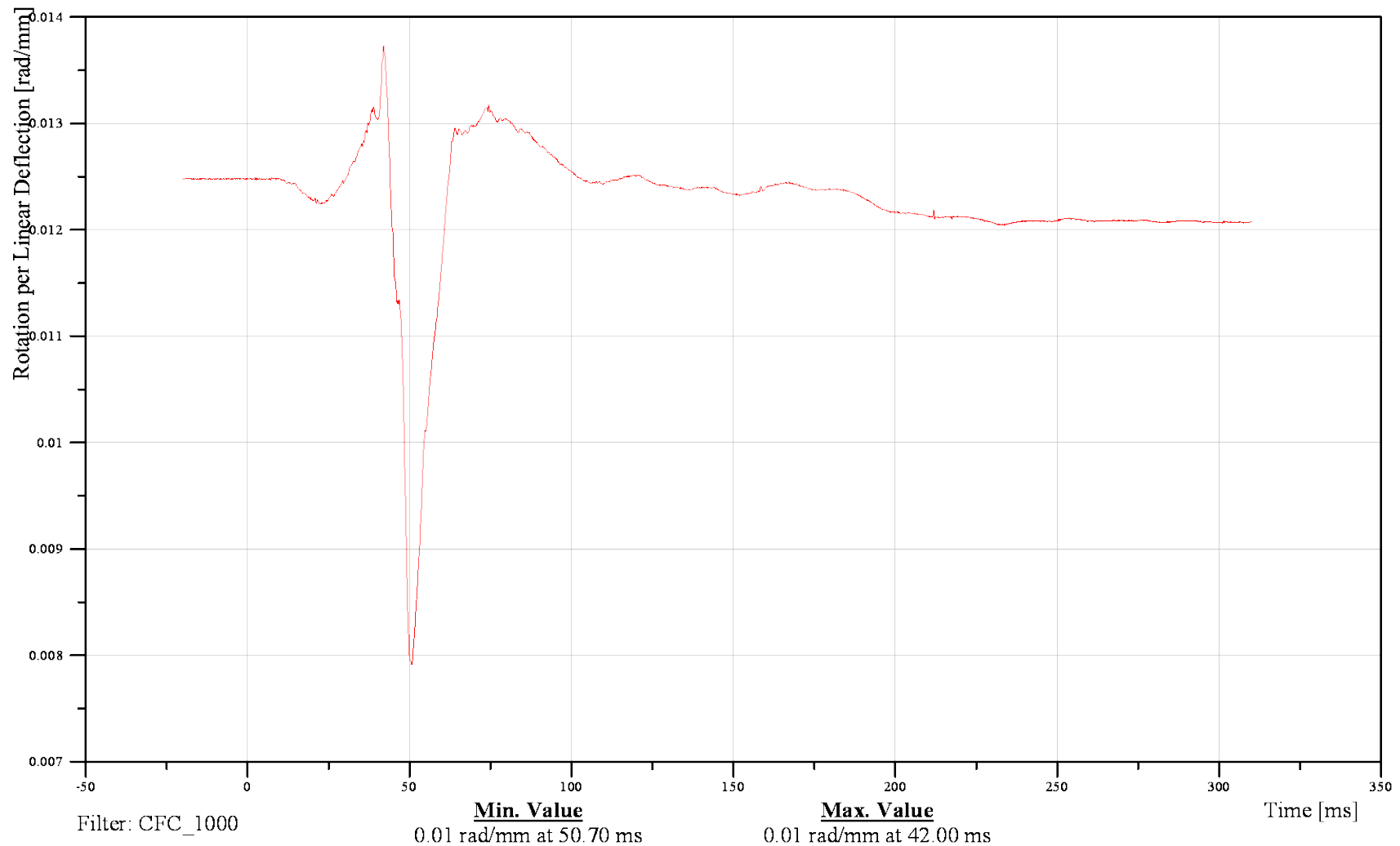
Time: 16:14

Customer: VRTC

14CHBA4005WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 6

Date: 01/24/2013

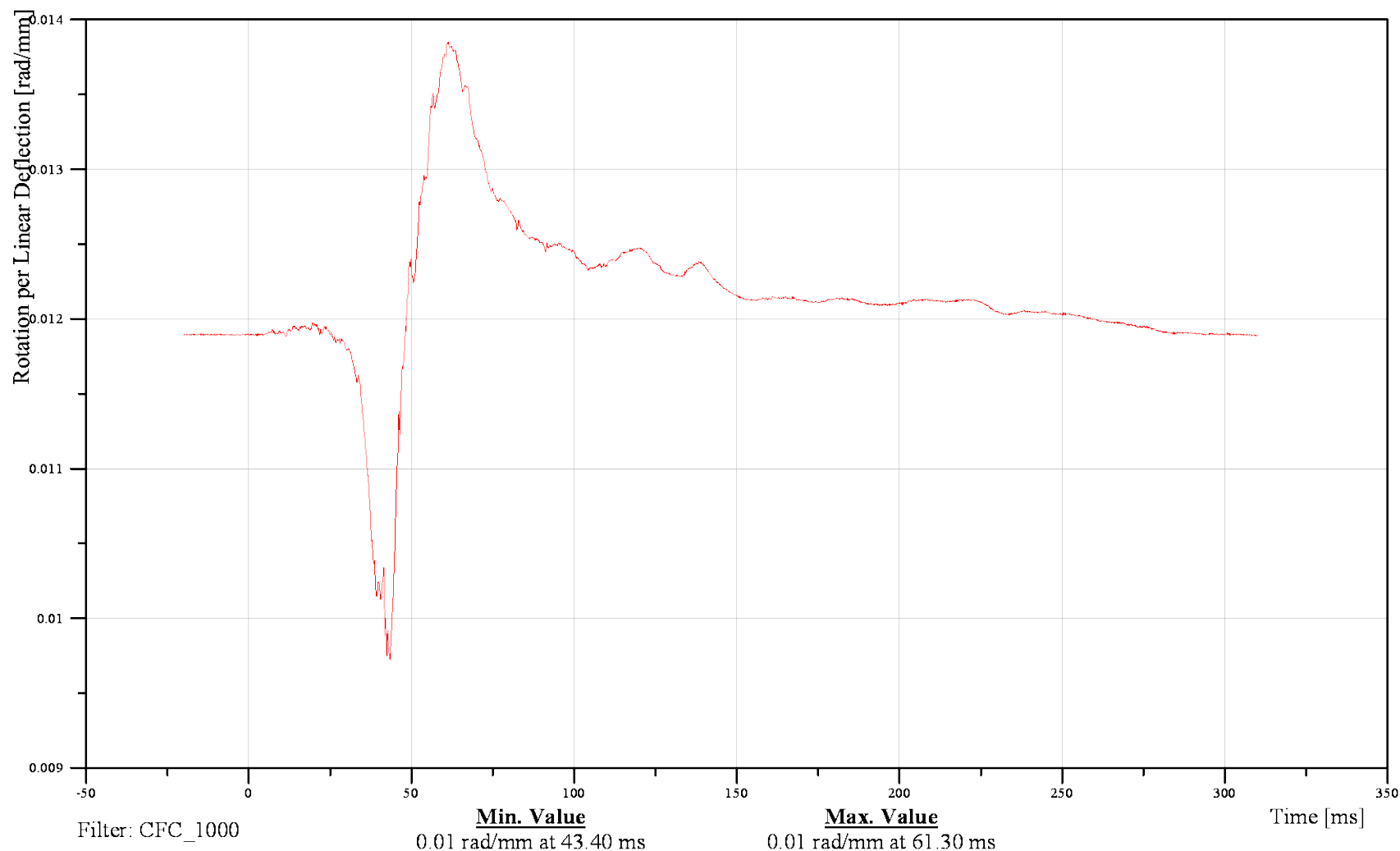
Time: 16:14

Customer: VRTC

14CHBA4006WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 7

Date: 01/24/2013

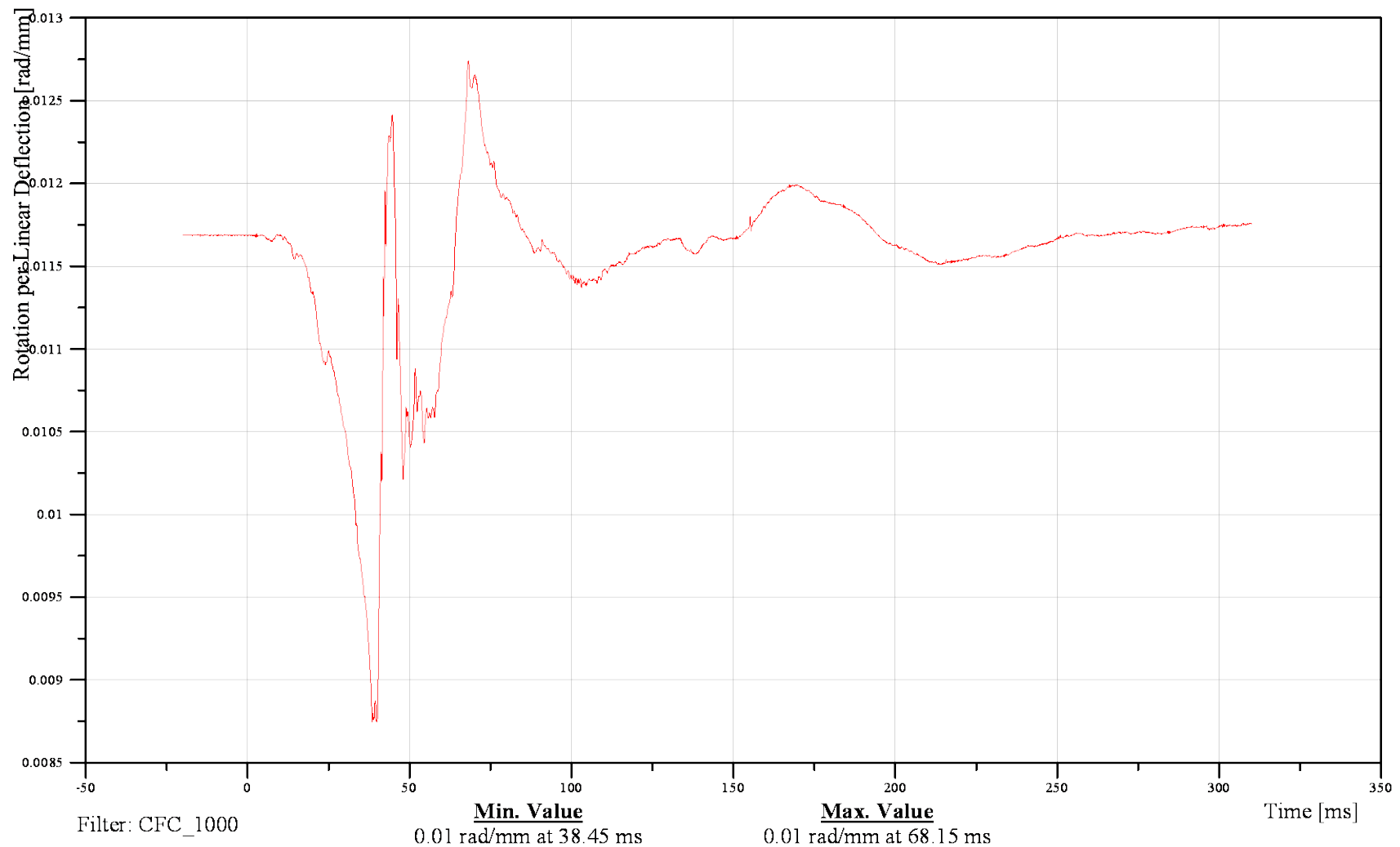
Time: 16:14

Customer: VRTC

14CHBA4007WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 8

Date: 01/24/2013

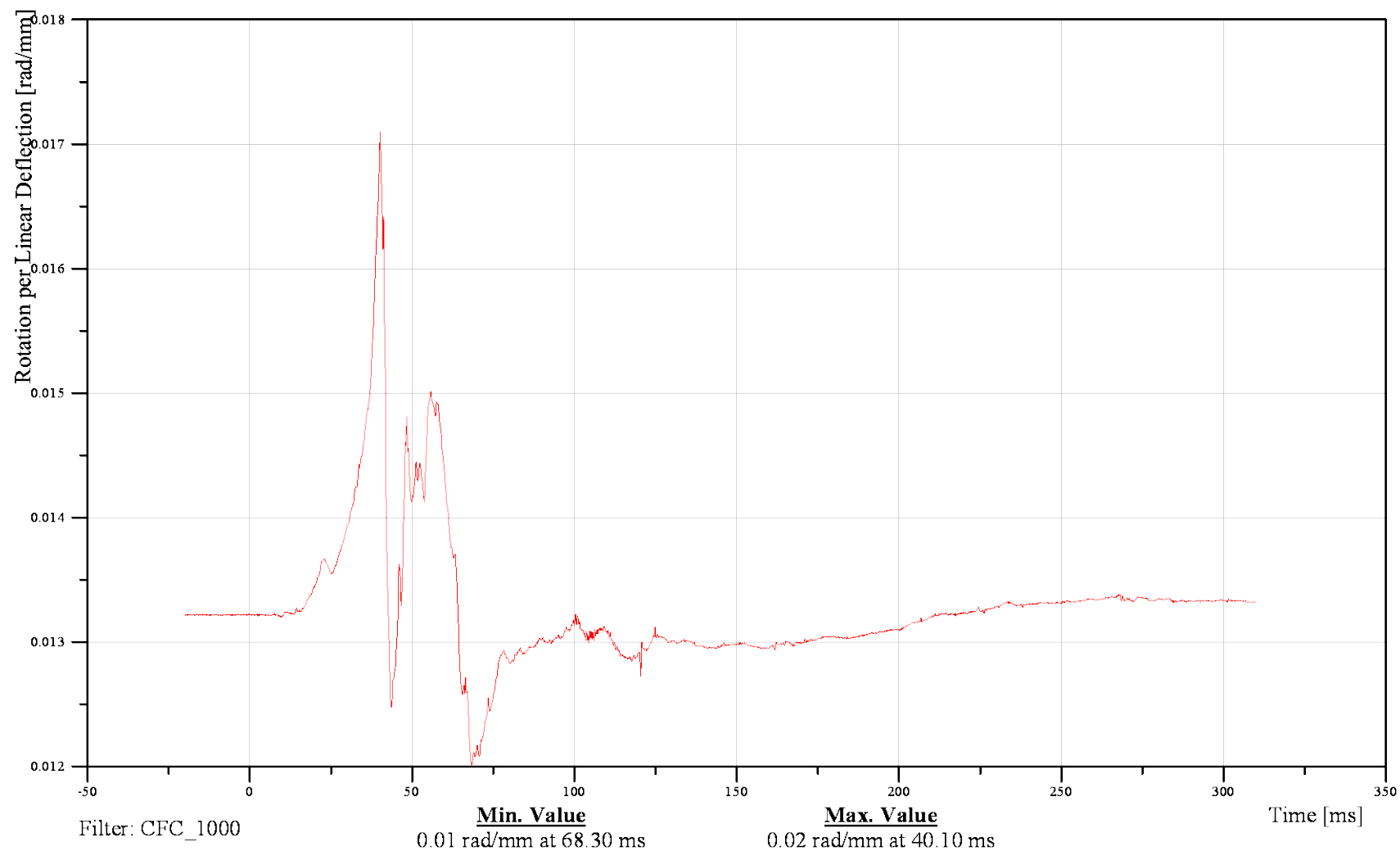
Time: 16:14

Customer: VRTC

14CHBA4008WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 9

Date: 01/24/2013

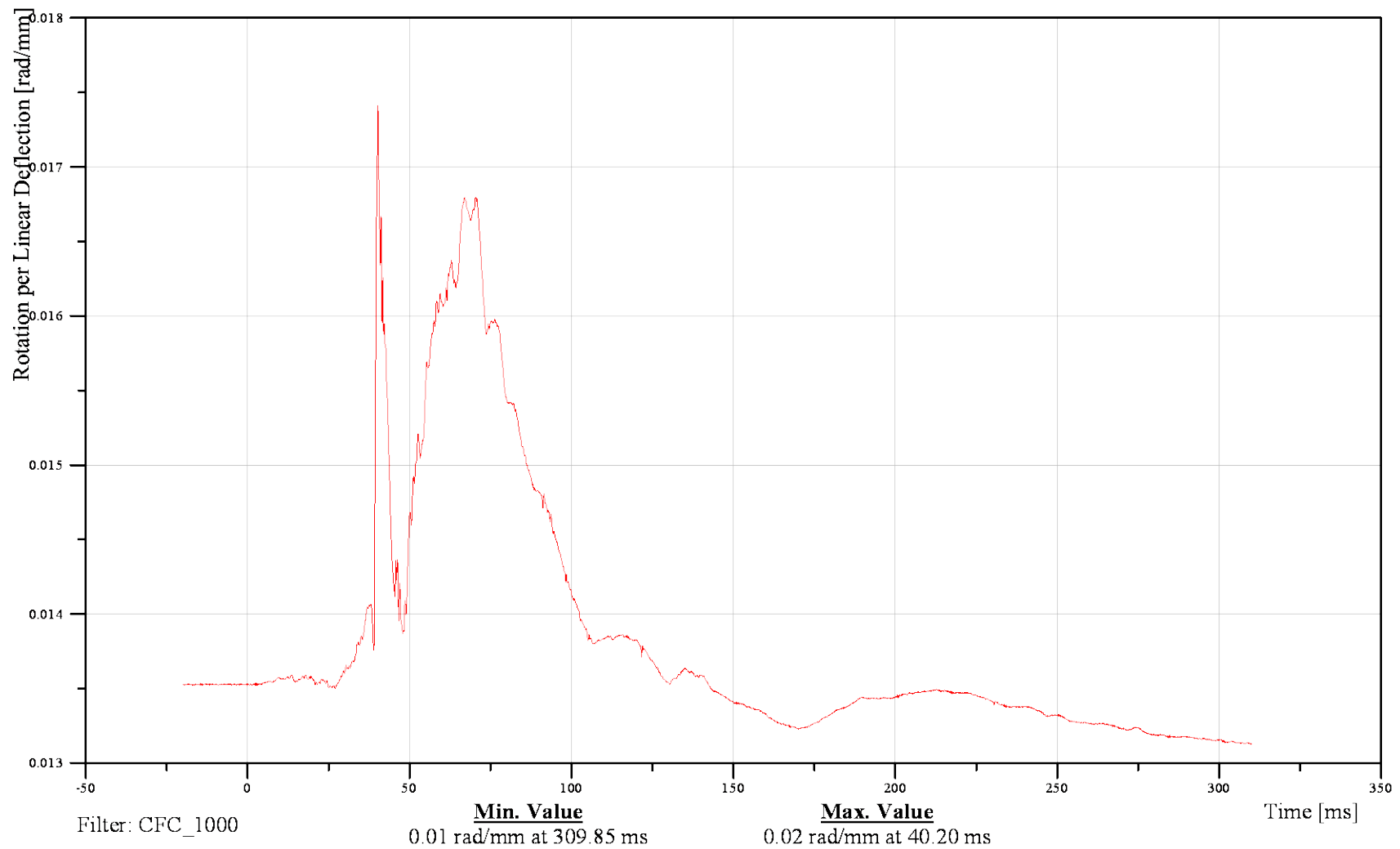
Time: 16:14

Customer: VRTC

14CHBA4009WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 10

Date: 01/24/2013

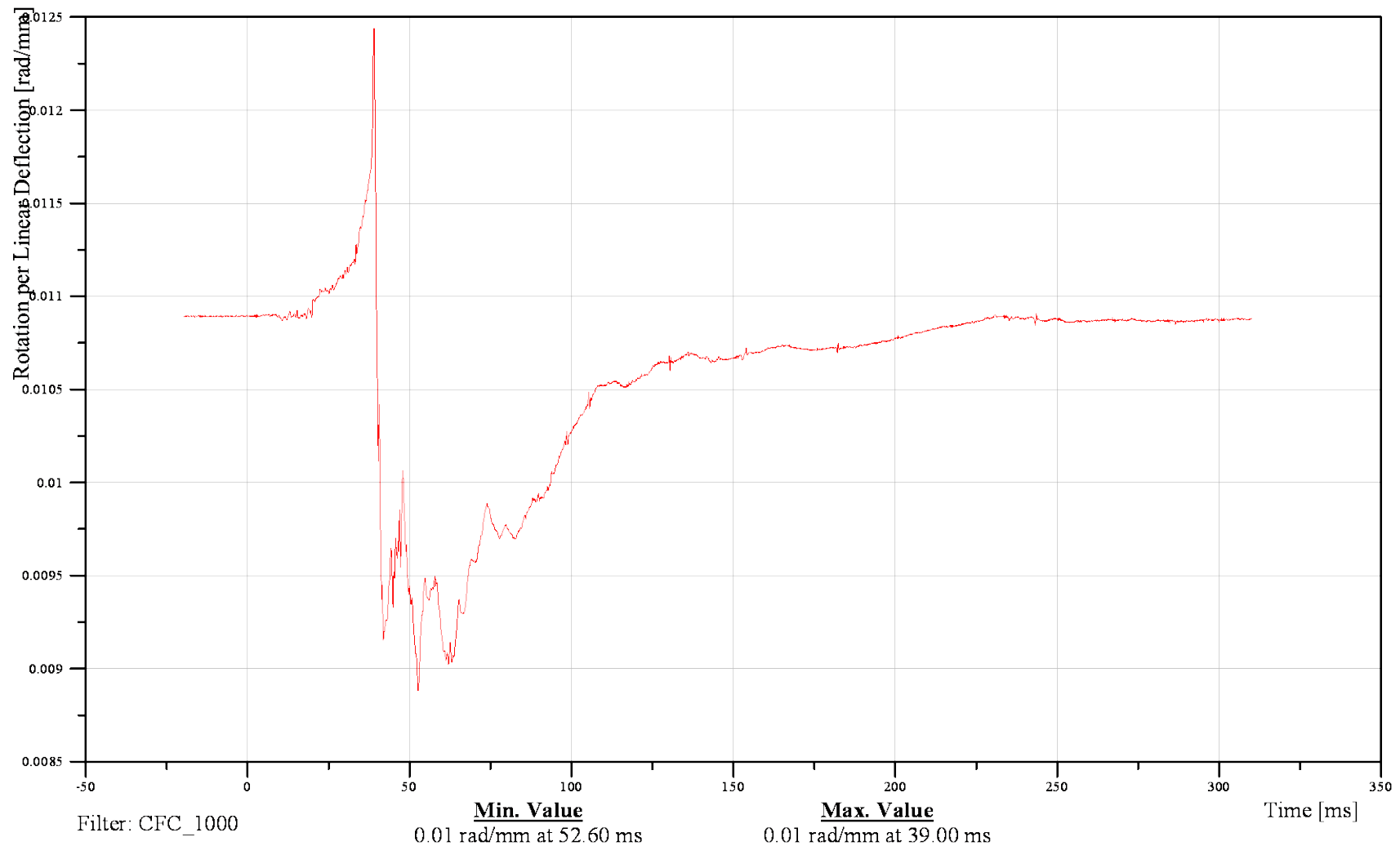
Time: 16:14

Customer: VRTC

14CHBA4010WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 11

Date: 01/24/2013

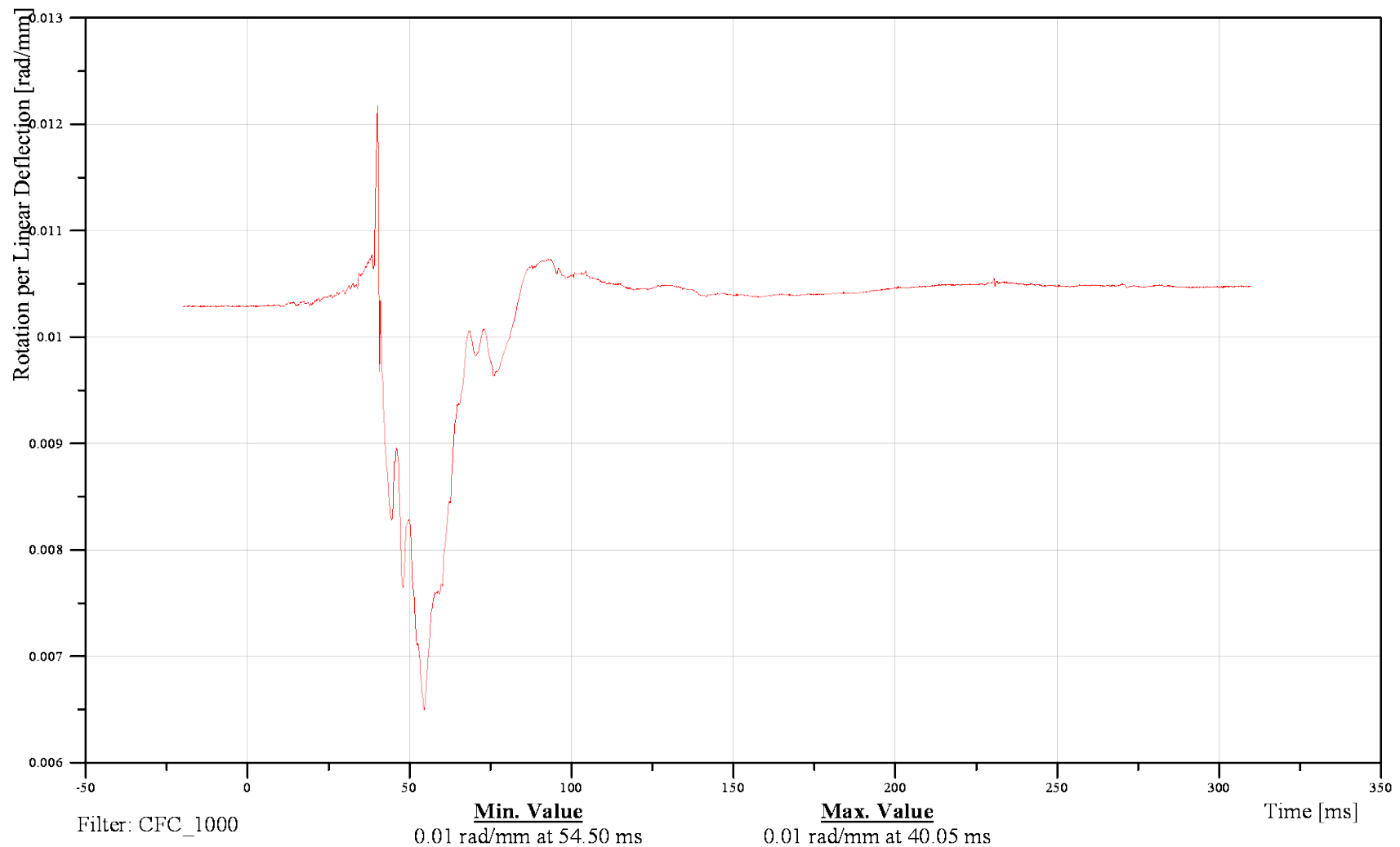
Time: 16:14

Customer: VRTC

14CHBA4011WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 12

Date: 01/24/2013

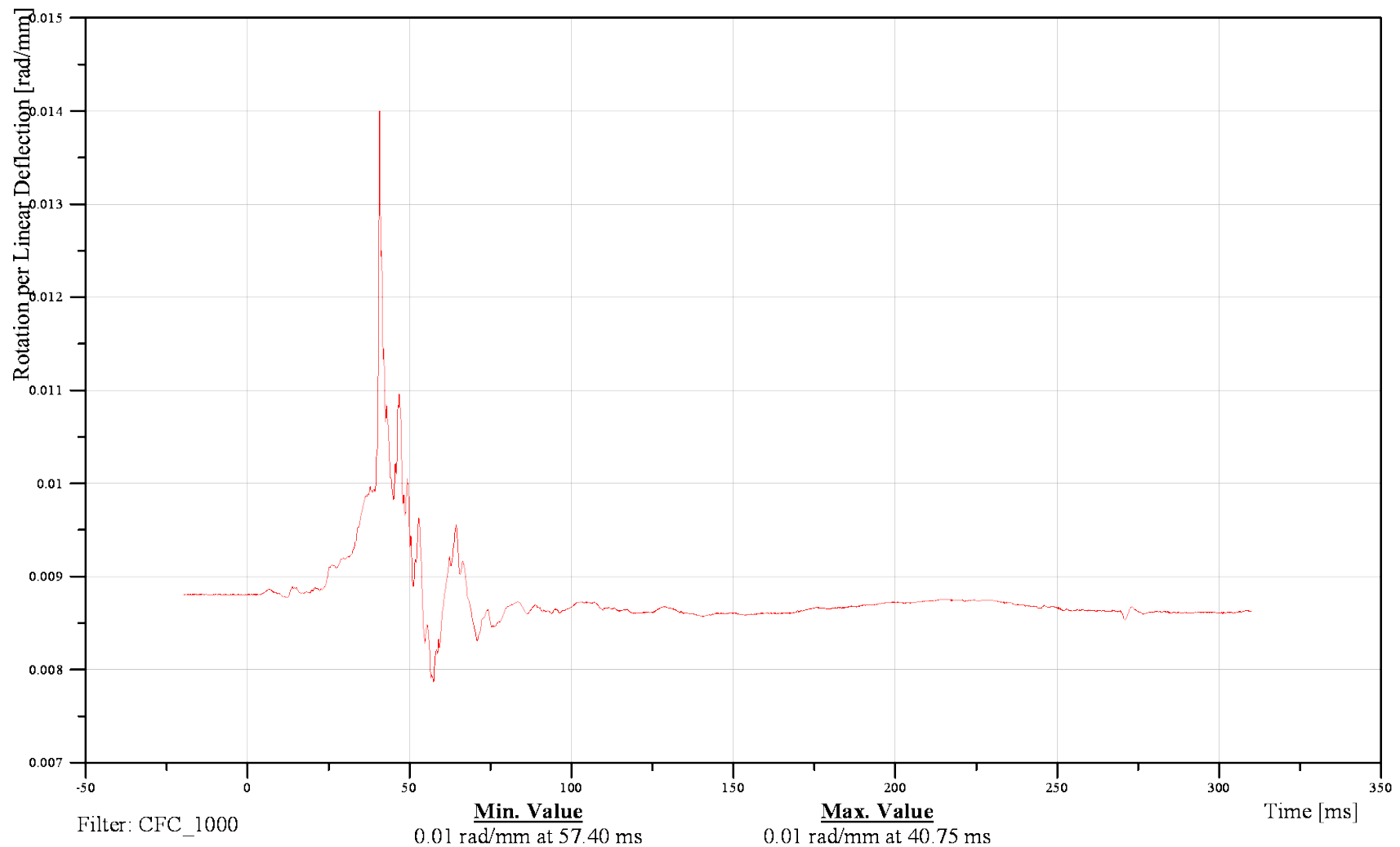
Time: 16:14

Customer: VRTC

14CHBA4012WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 13

Date: 01/24/2013

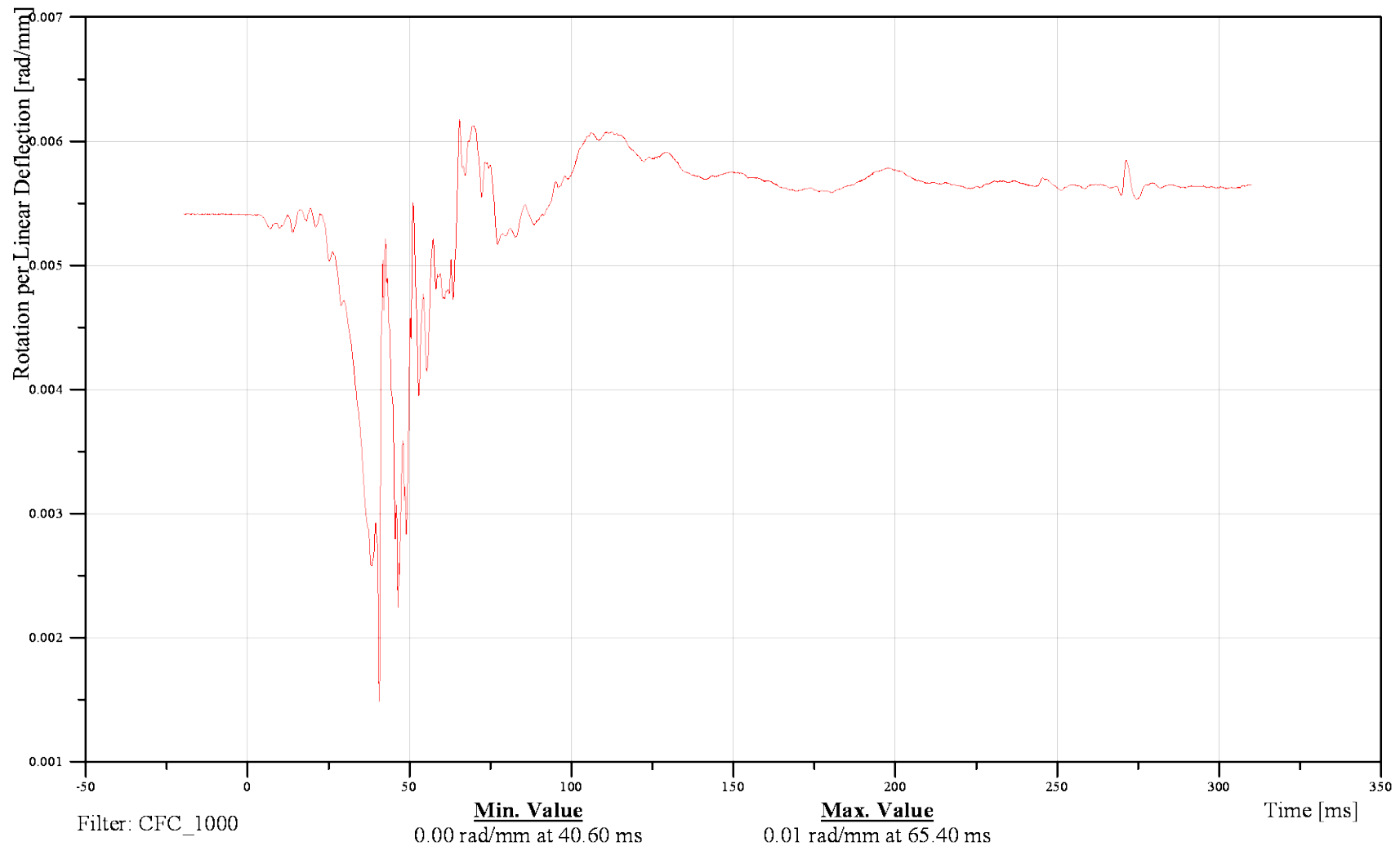
Time: 16:14

Customer: VRTC

14CHBA4013WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 14

Date: 01/24/2013

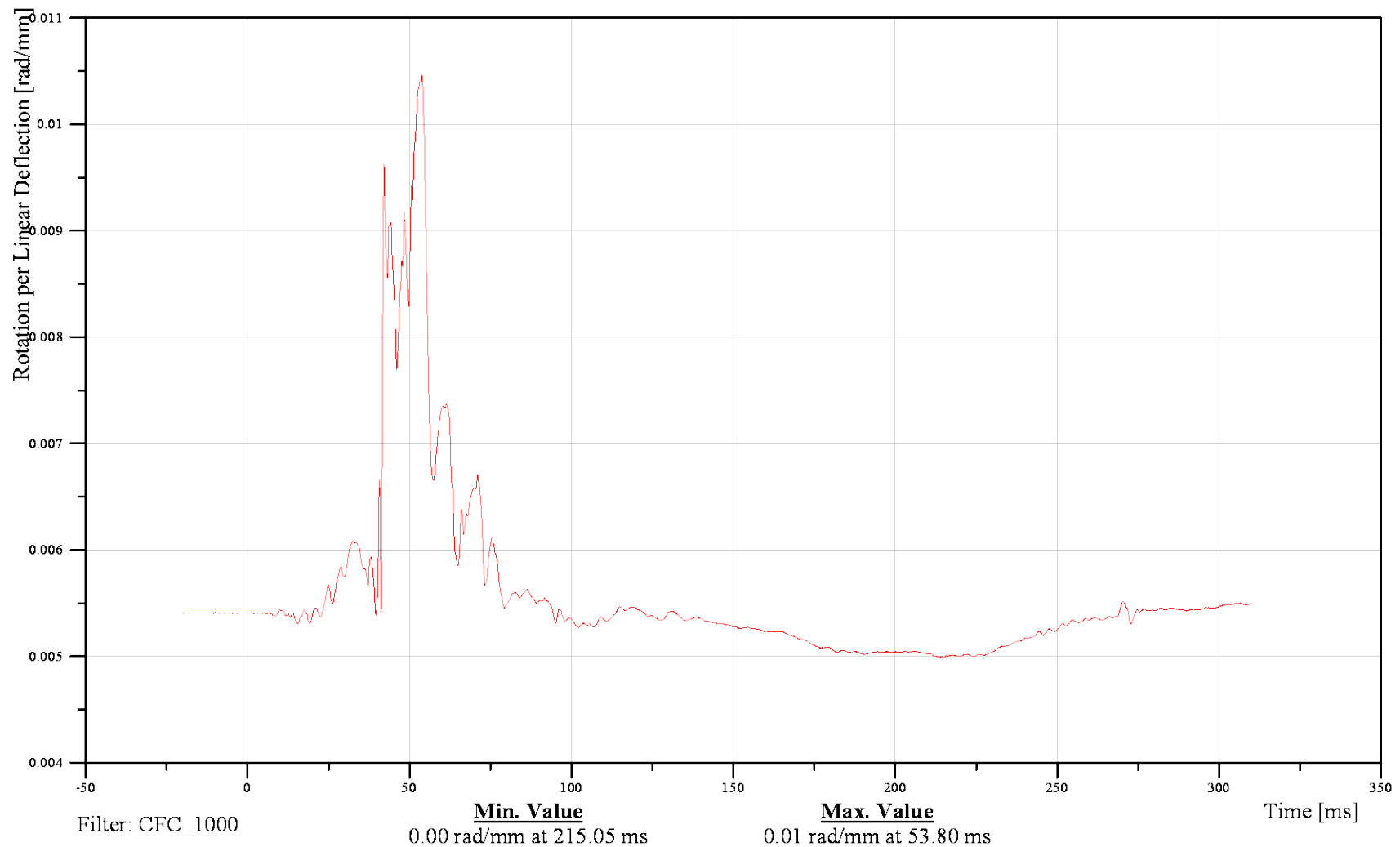
Time: 16:14

Customer: VRTC

14CHBA4014WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 15

Date: 01/24/2013

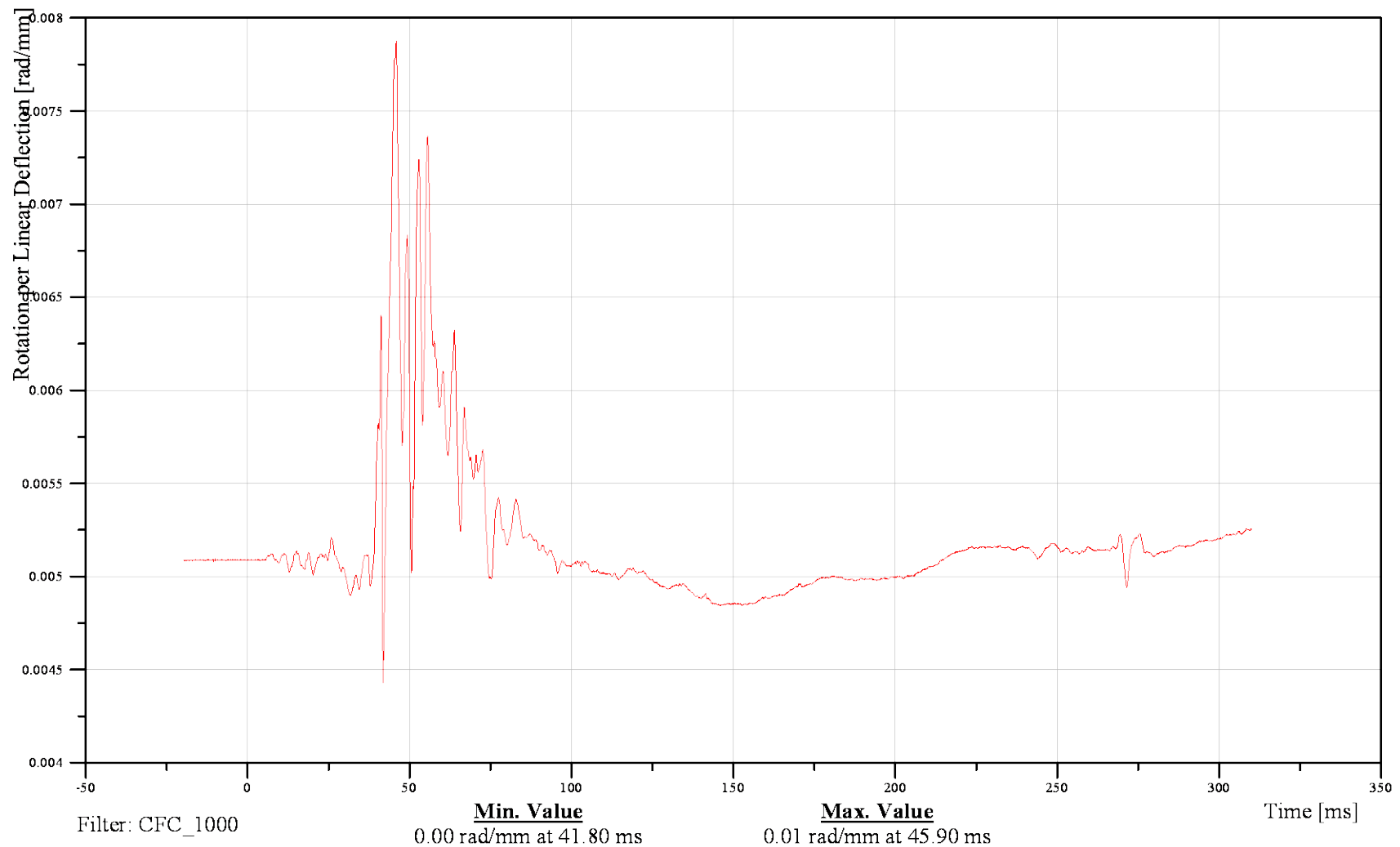
Time: 16:14

Customer: VRTC

14CHBA4015WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 16

Date: 01/24/2013

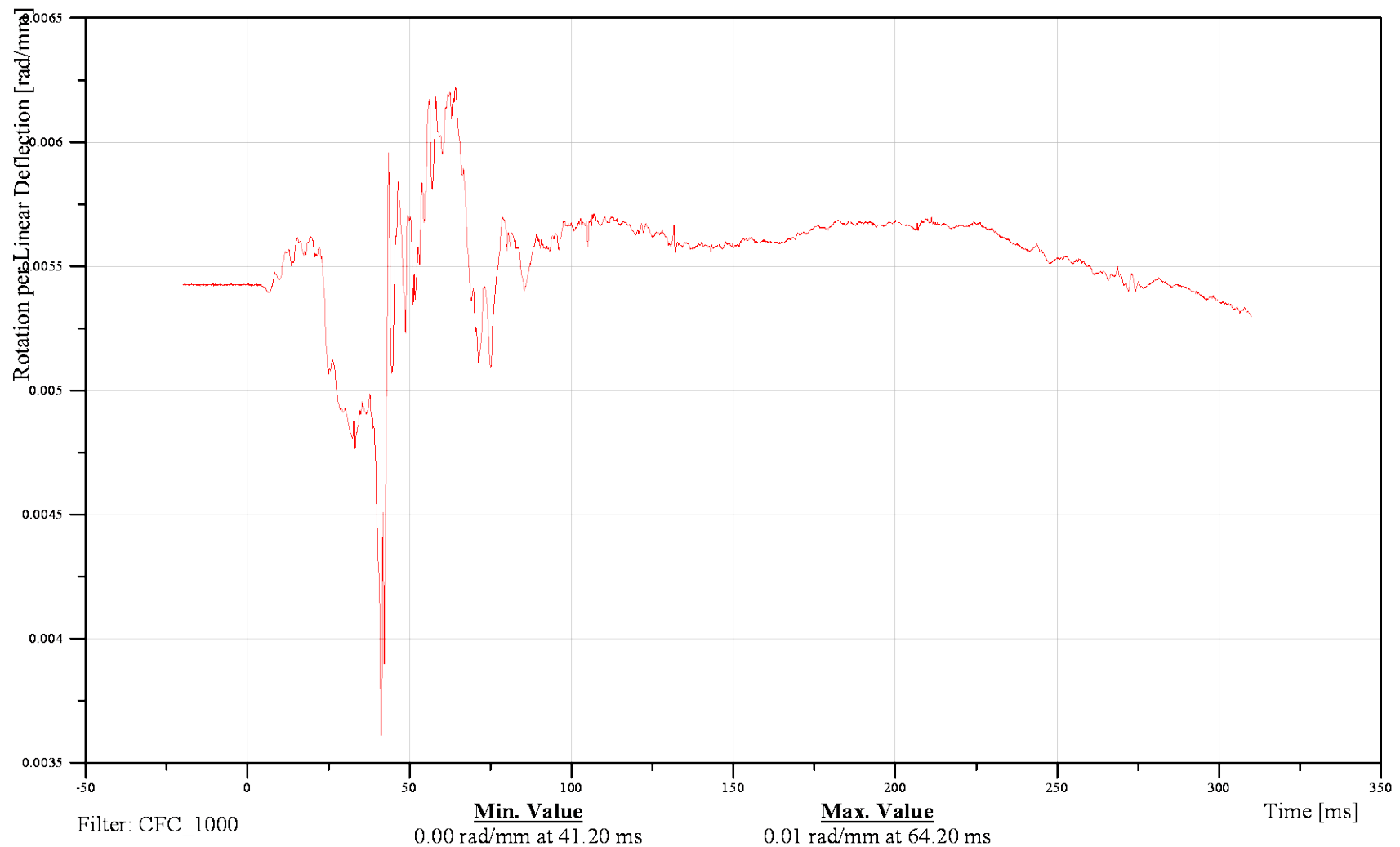
Time: 16:14

Customer: VRTC

14CHBA4016WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 17

Date: 01/24/2013

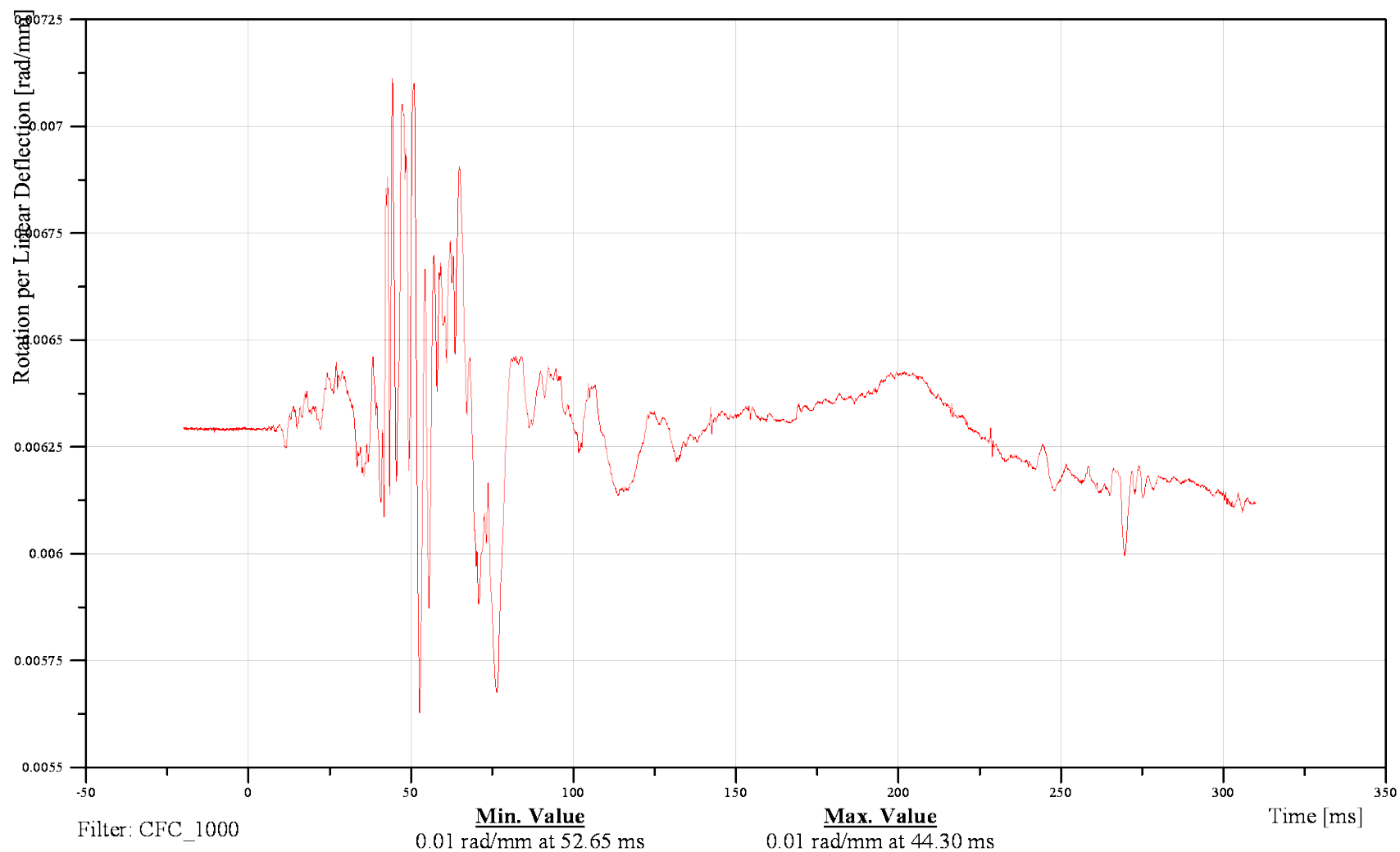
Time: 16:14

Customer: VRTC

14CHBA4017WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 18

Date: 01/24/2013

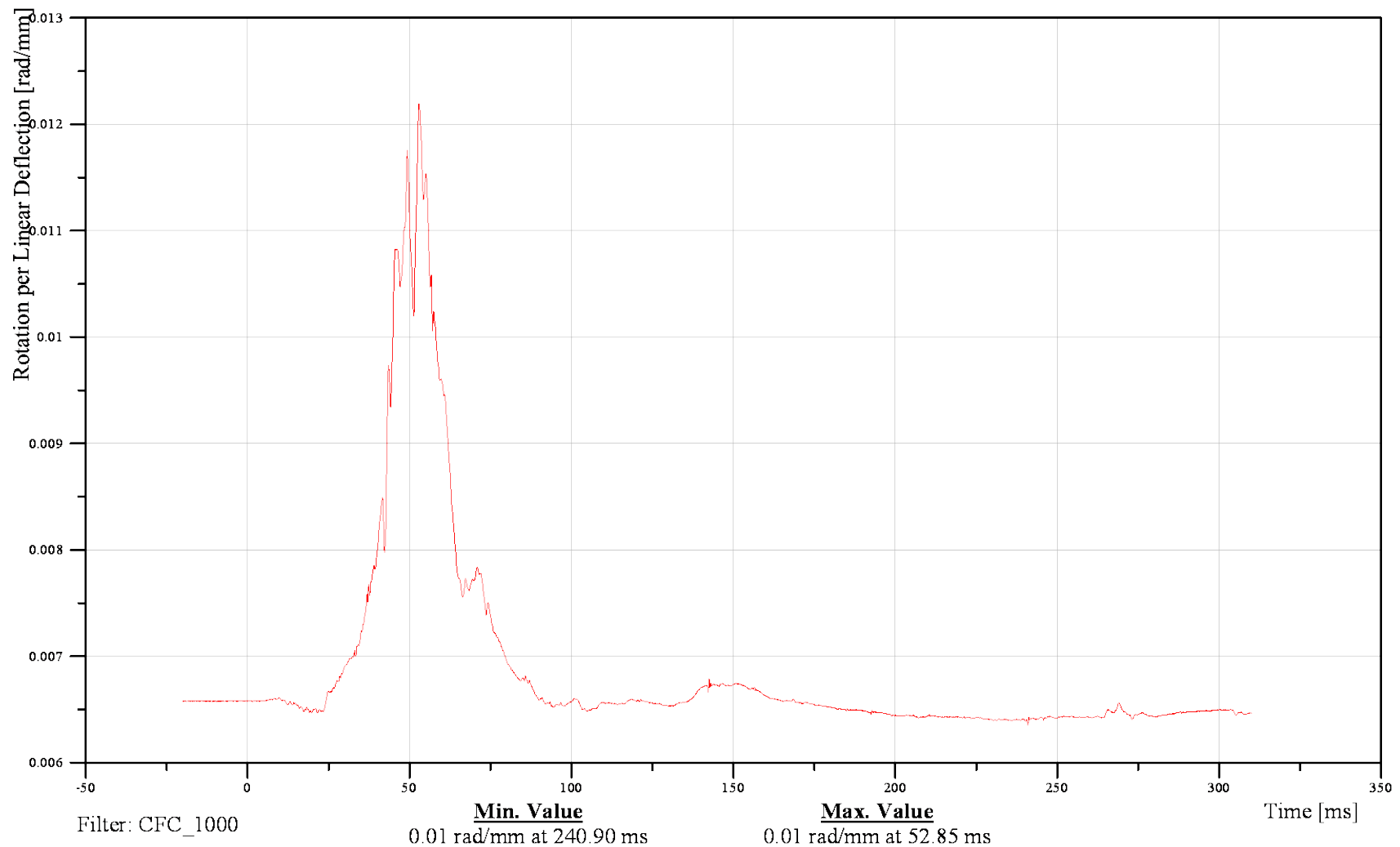
Time: 16:14

Customer: VRTC

14CHBA4018WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 19

Date: 01/24/2013

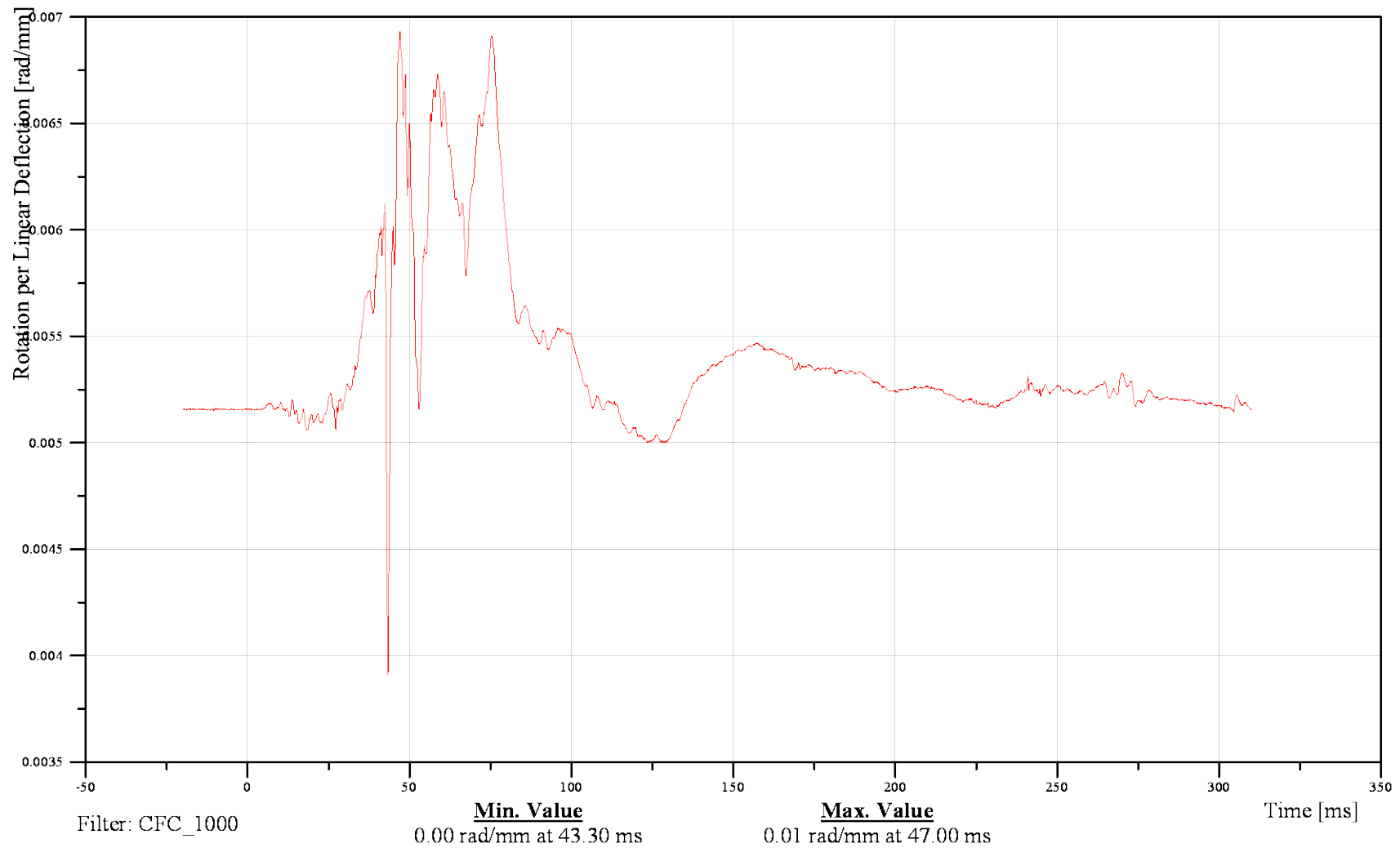
Time: 16:14

Customer: VRTC

14CHBA4019WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 20

Date: 01/24/2013

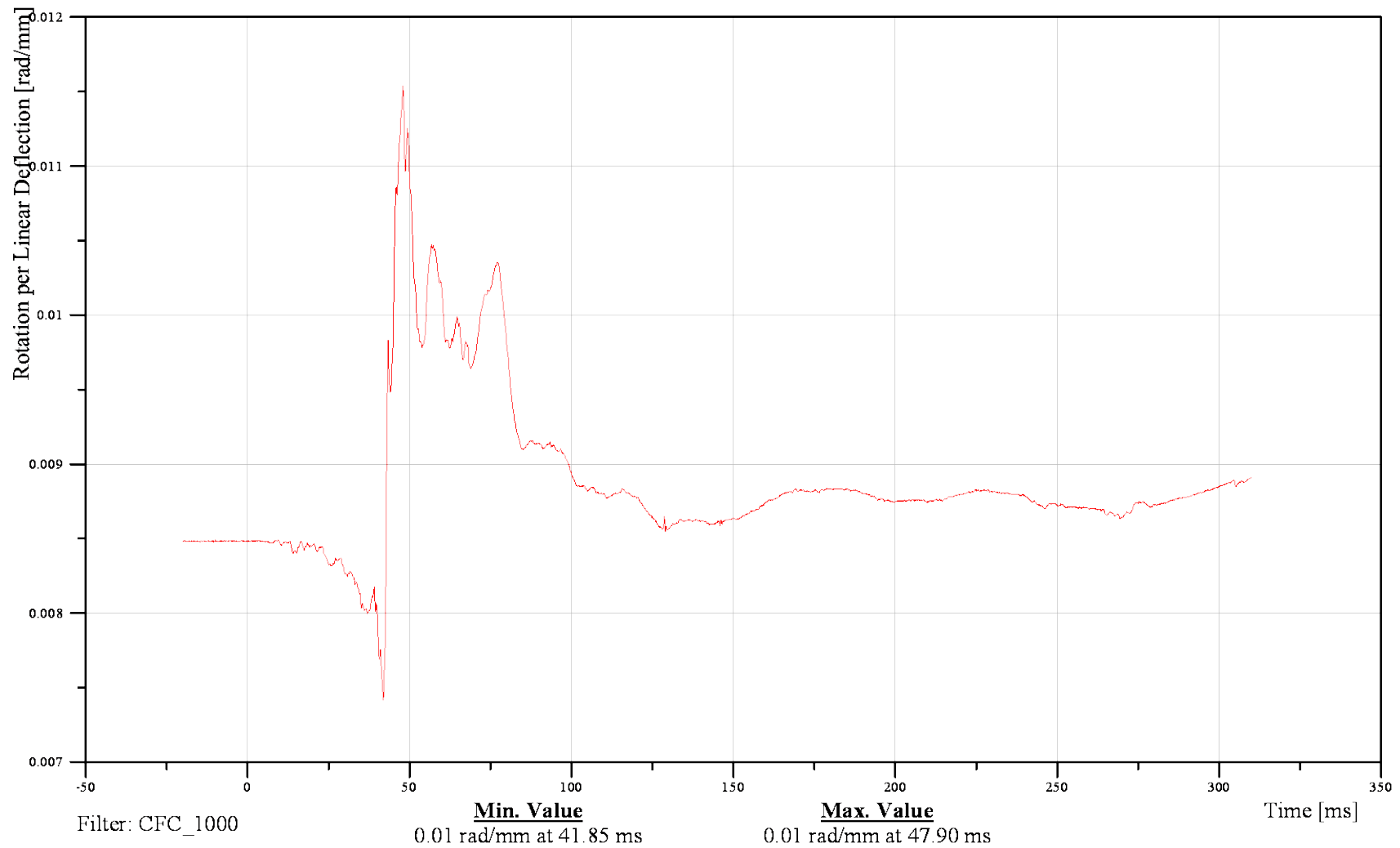
Time: 16:14

Customer: VRTC

14CHBA4020WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 21

Date: 01/24/2013

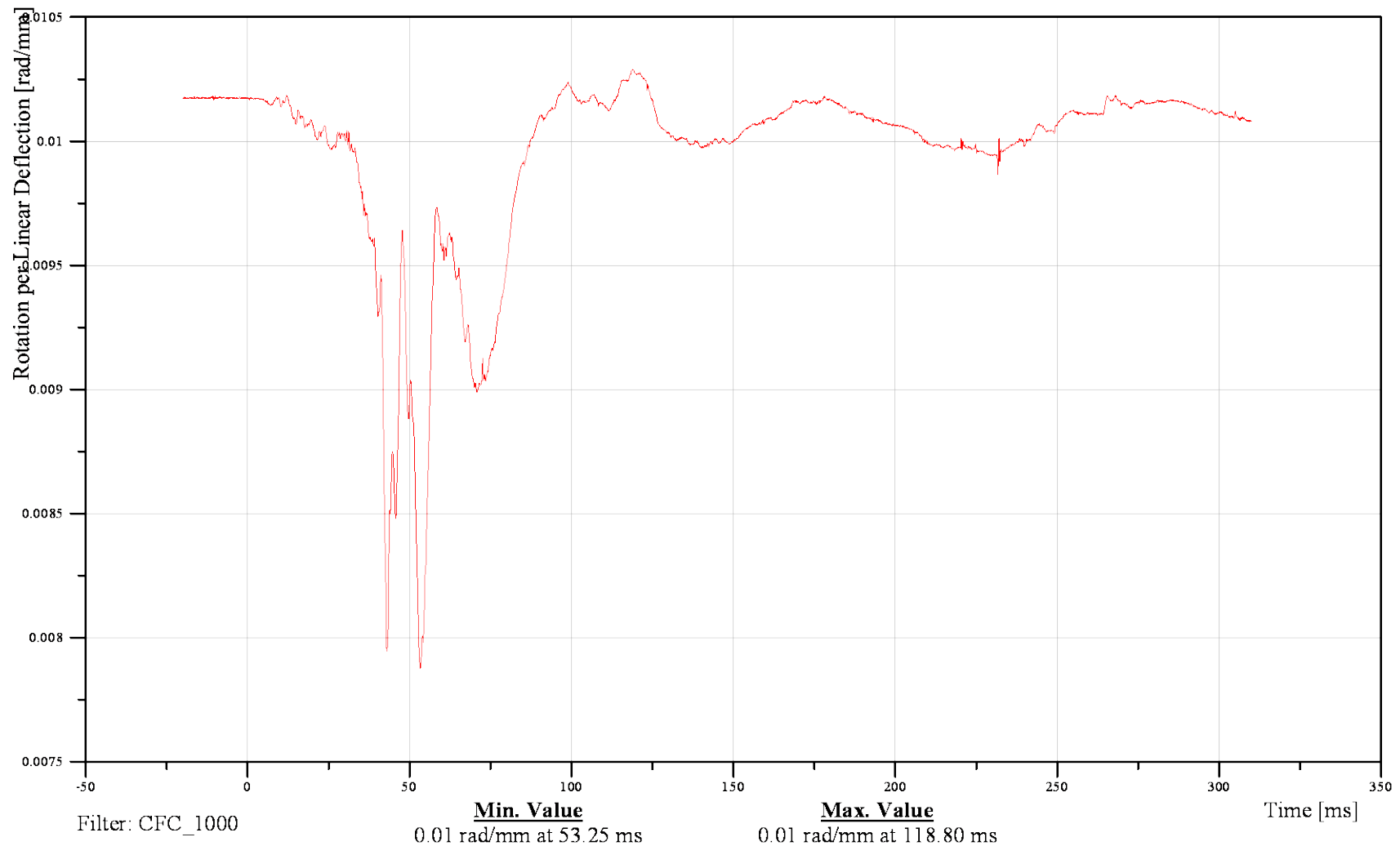
Time: 16:14

Customer: VRTC

14CHBA4021WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 22

Date: 01/24/2013

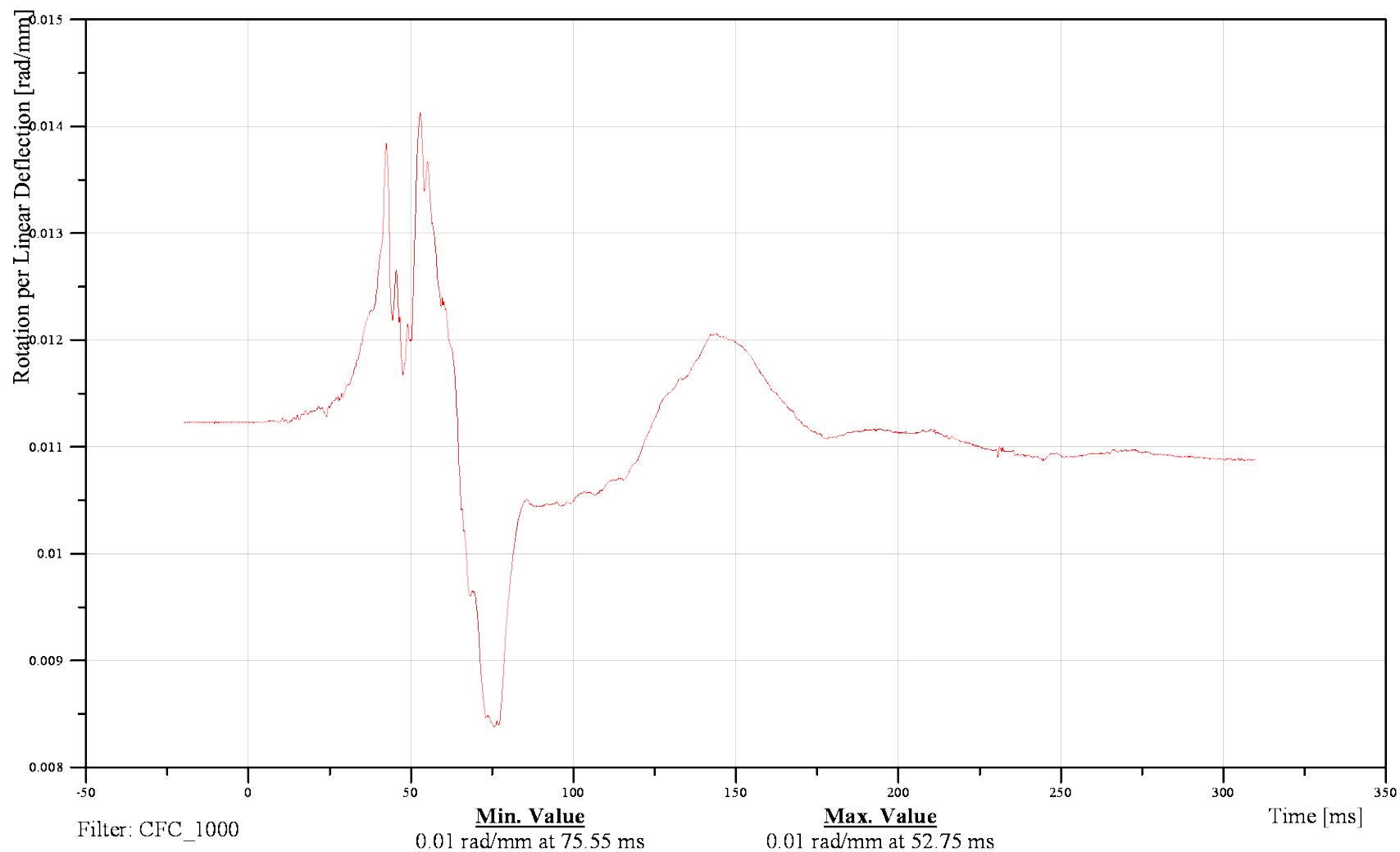
Time: 16:14

Customer: VRTC

14CHBA4022WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 23

Date: 01/24/2013

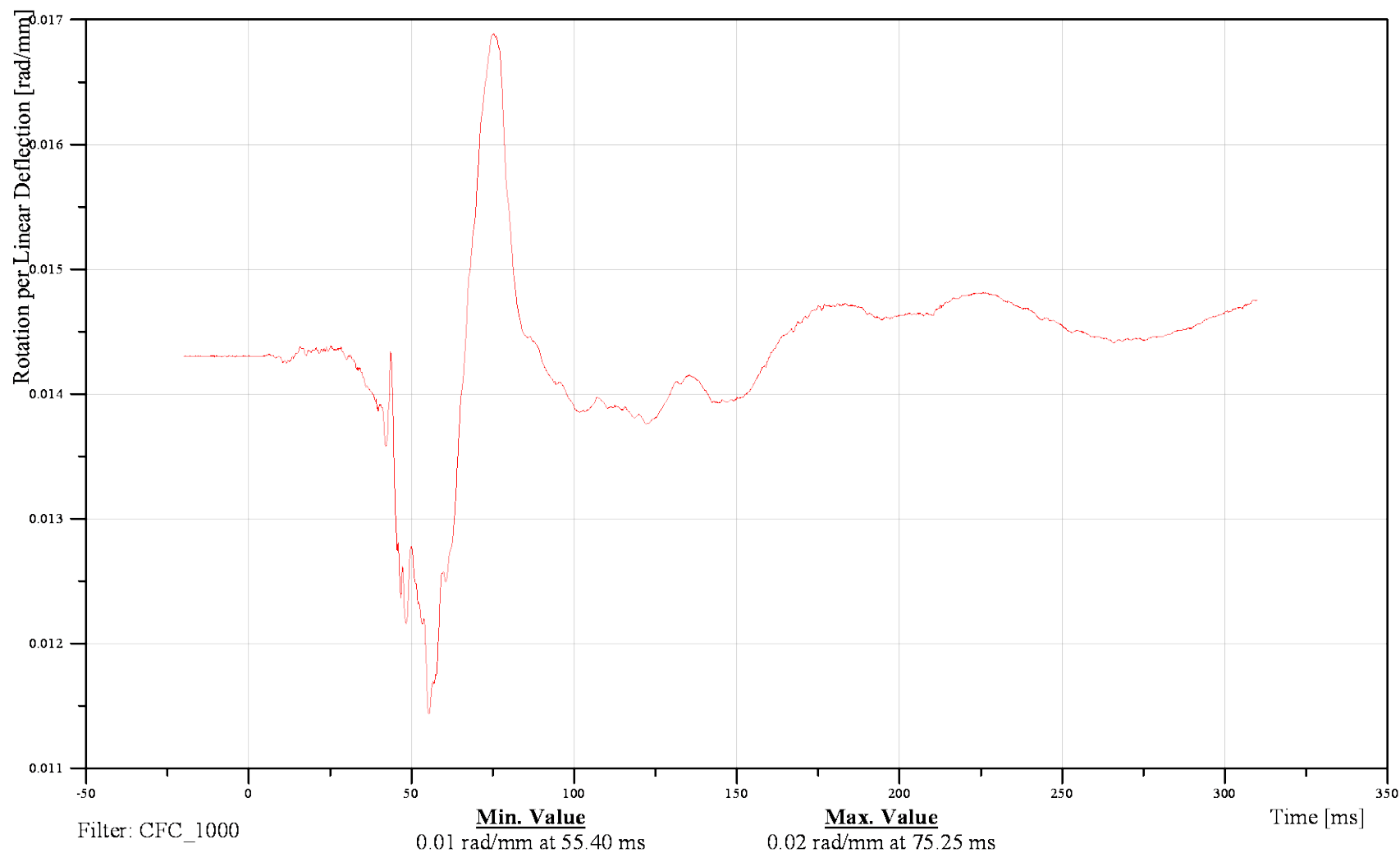
Time: 16:14

Customer: VRTC

14CHBA4023WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 24

Date: 01/24/2013

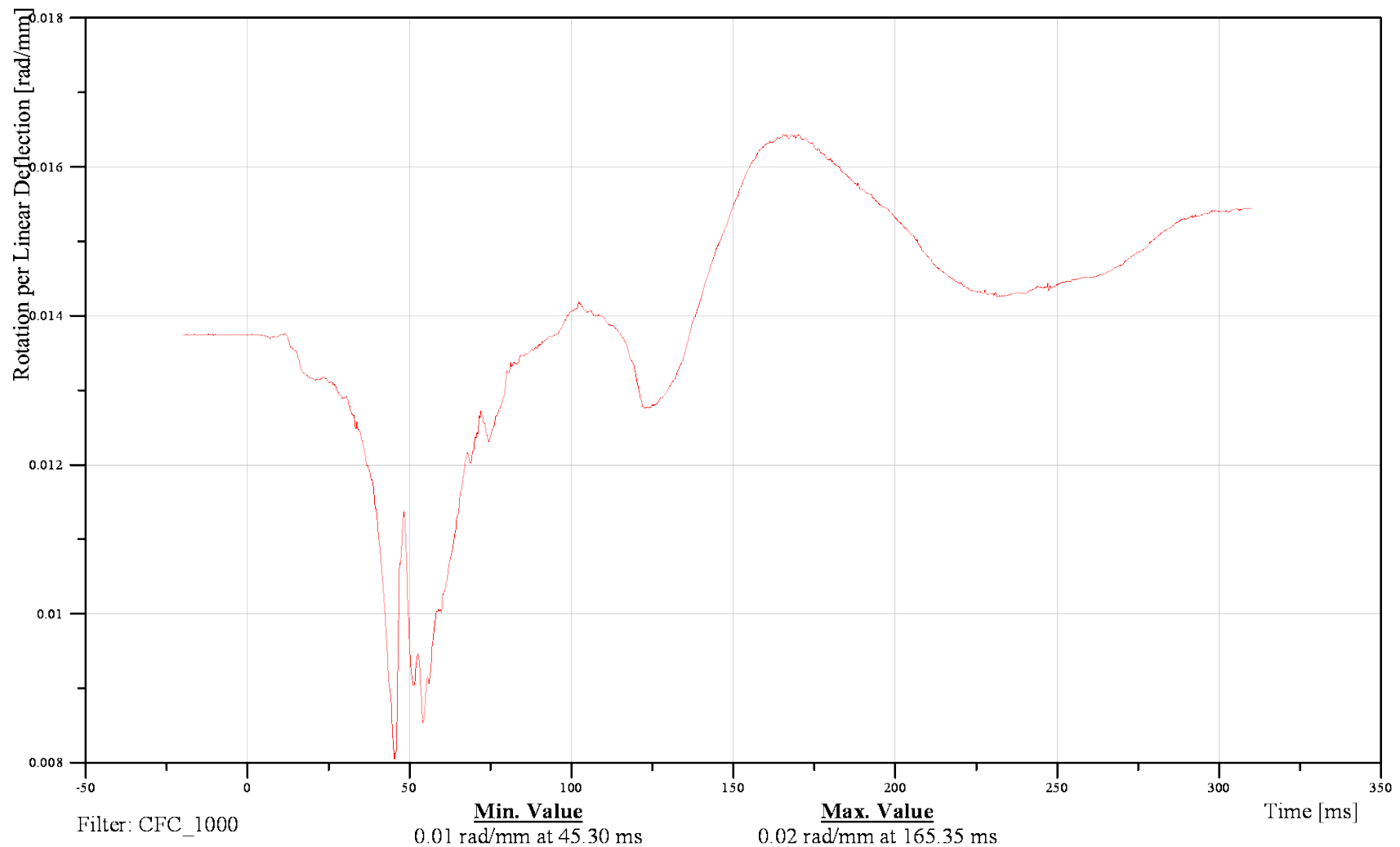
Time: 16:14

Customer: VRTC

14CHBA4024WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 25

Date: 01/24/2013

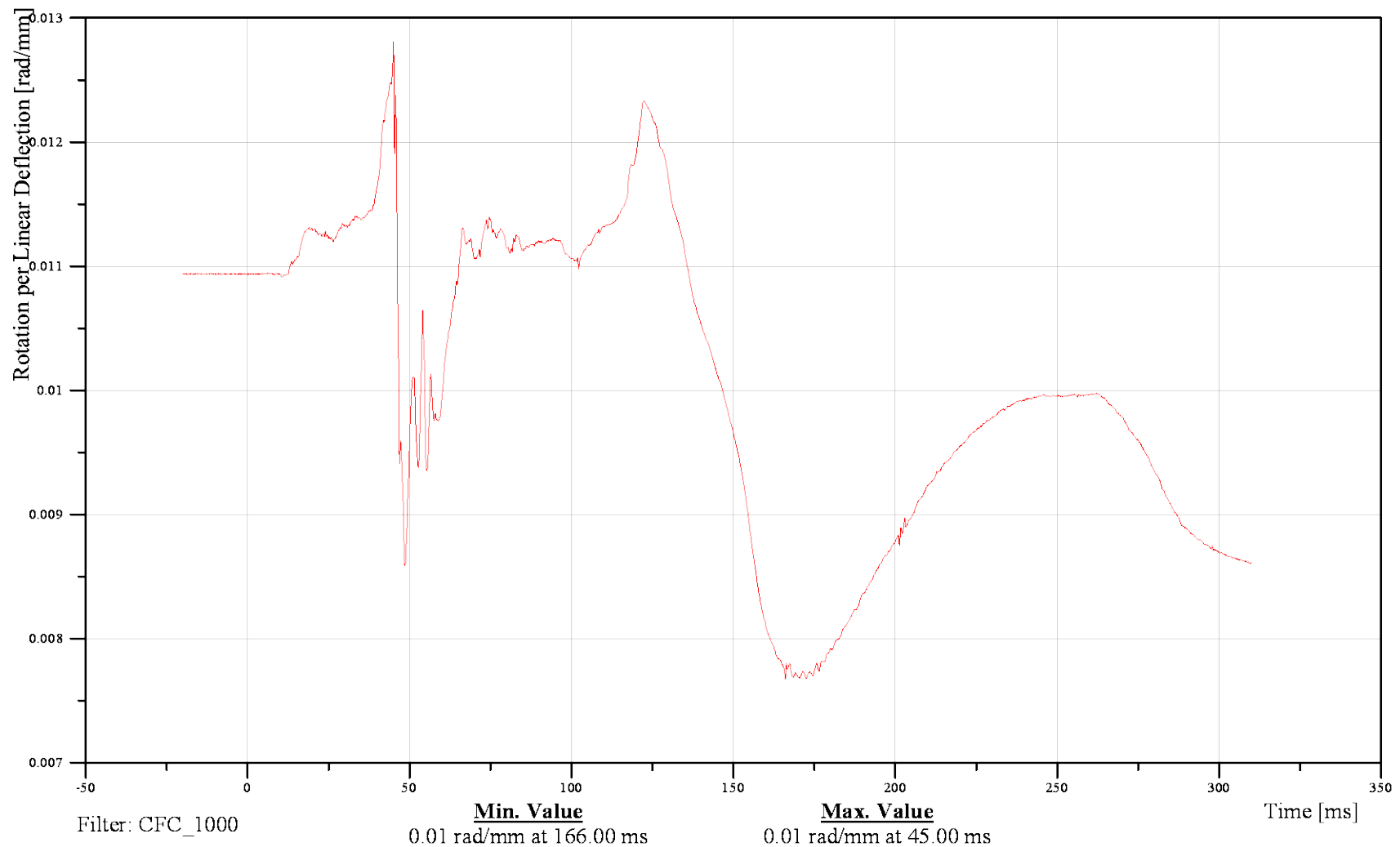
Time: 16:14

Customer: VRTC

14CHBA4025WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 26

Date: 01/24/2013

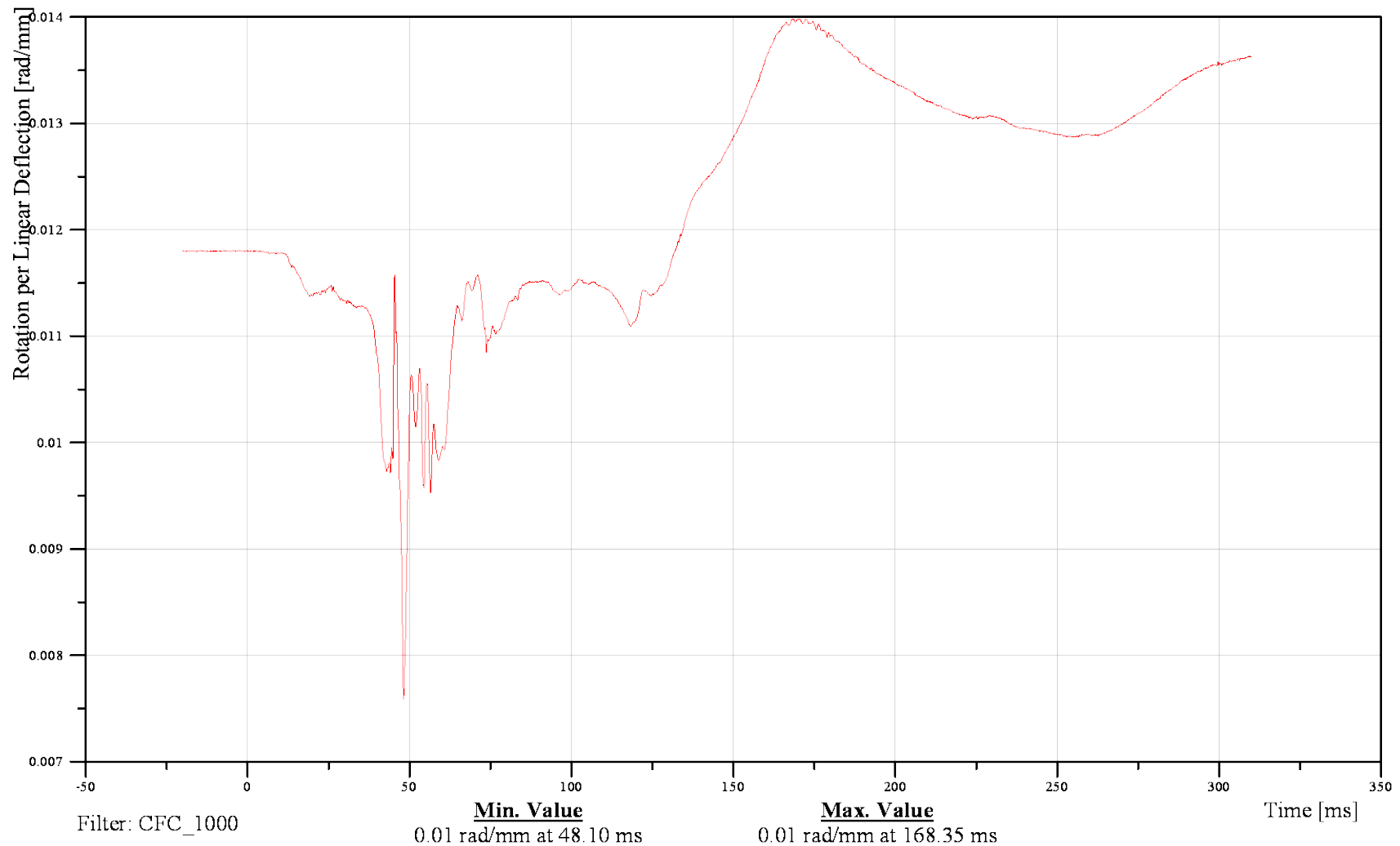
Time: 16:14

Customer: VRTC

14CHBA4026WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 27

Date: 01/24/2013

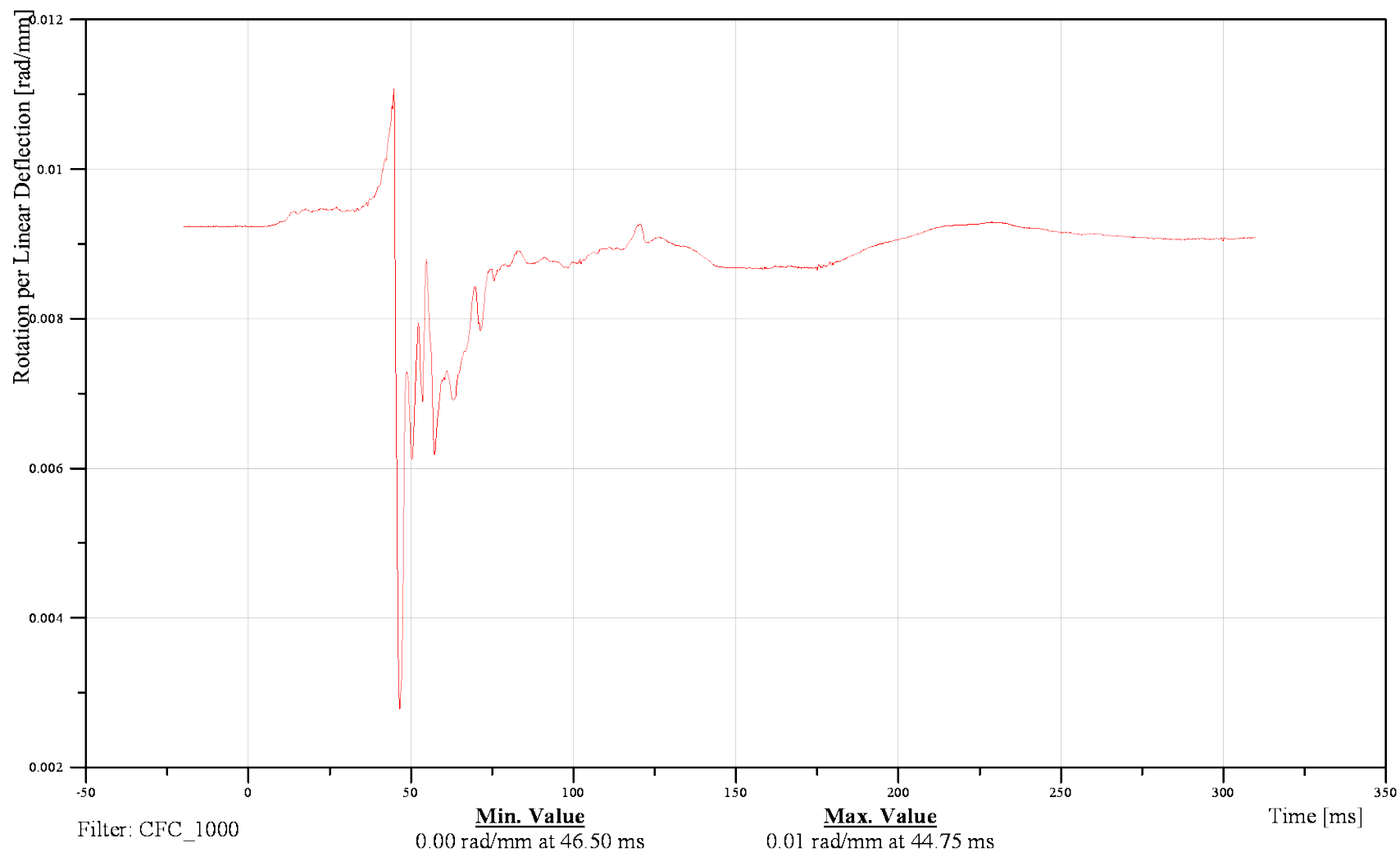
Time: 16:14

Customer: VRTC

14CHBA4027WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 28

Date: 01/24/2013

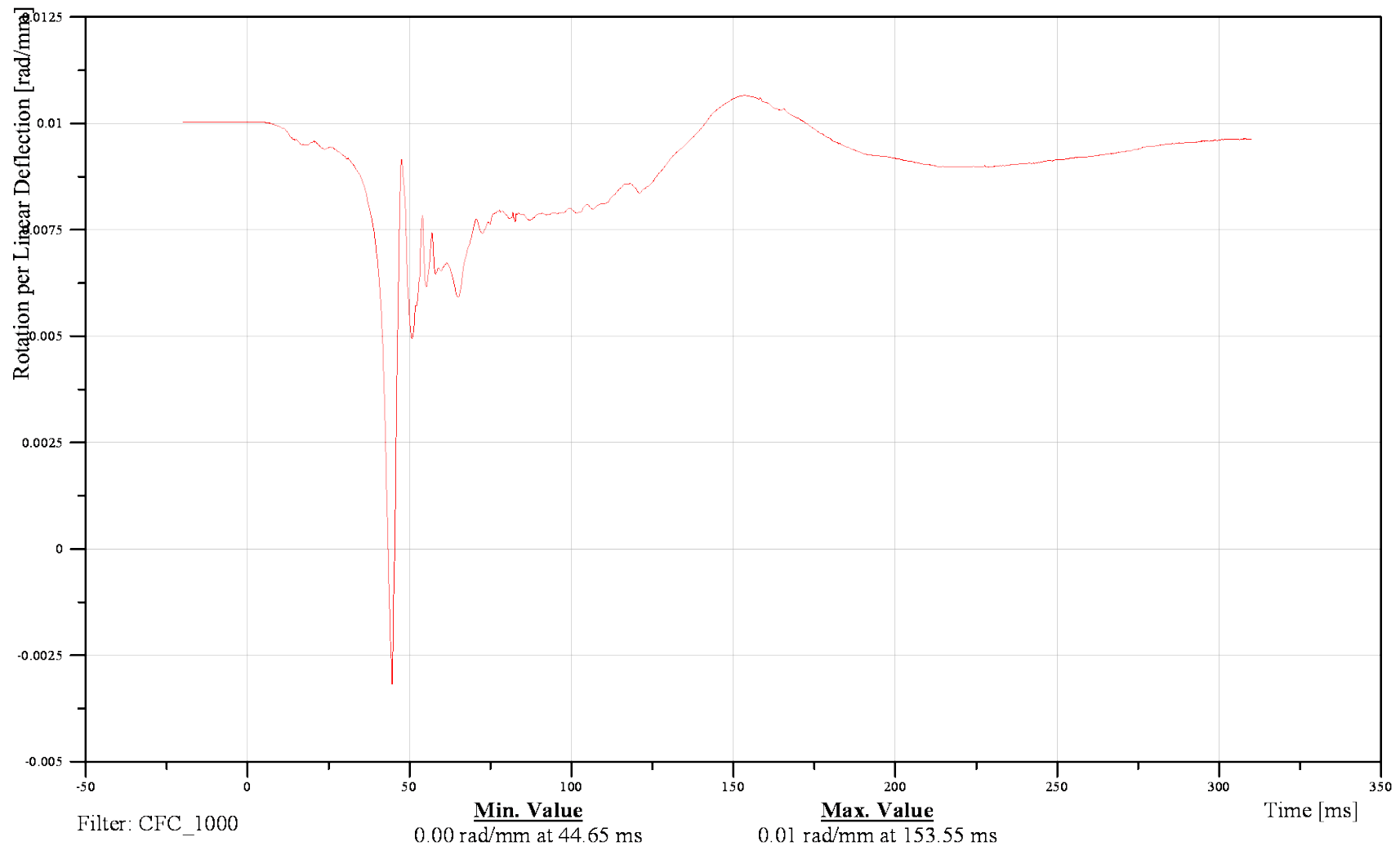
Time: 16:14

Customer: VRTC

14CHBA4028WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 29

Date: 01/24/2013

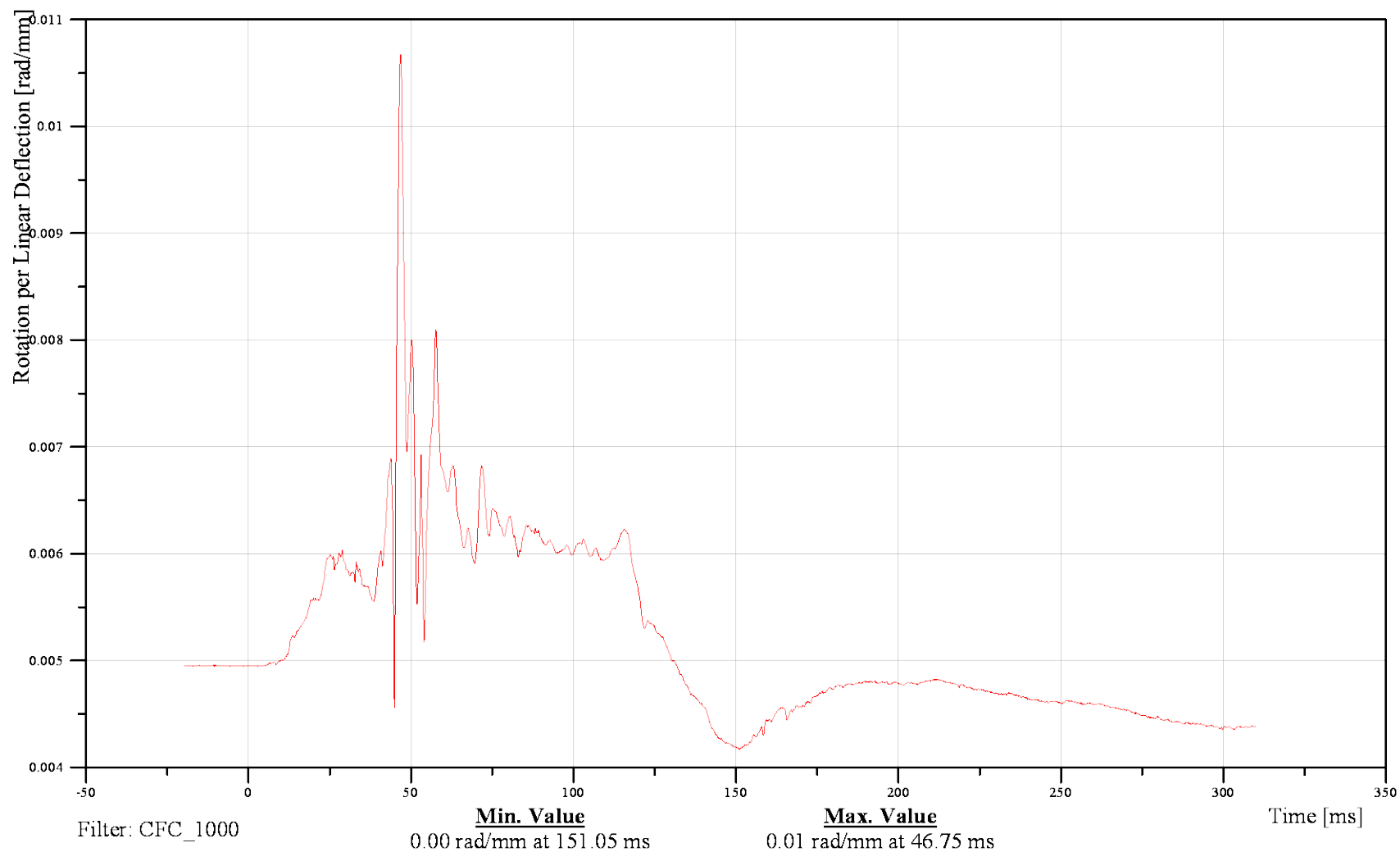
Time: 16:14

Customer: VRTC

14CHBA4029WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 30

Date: 01/24/2013

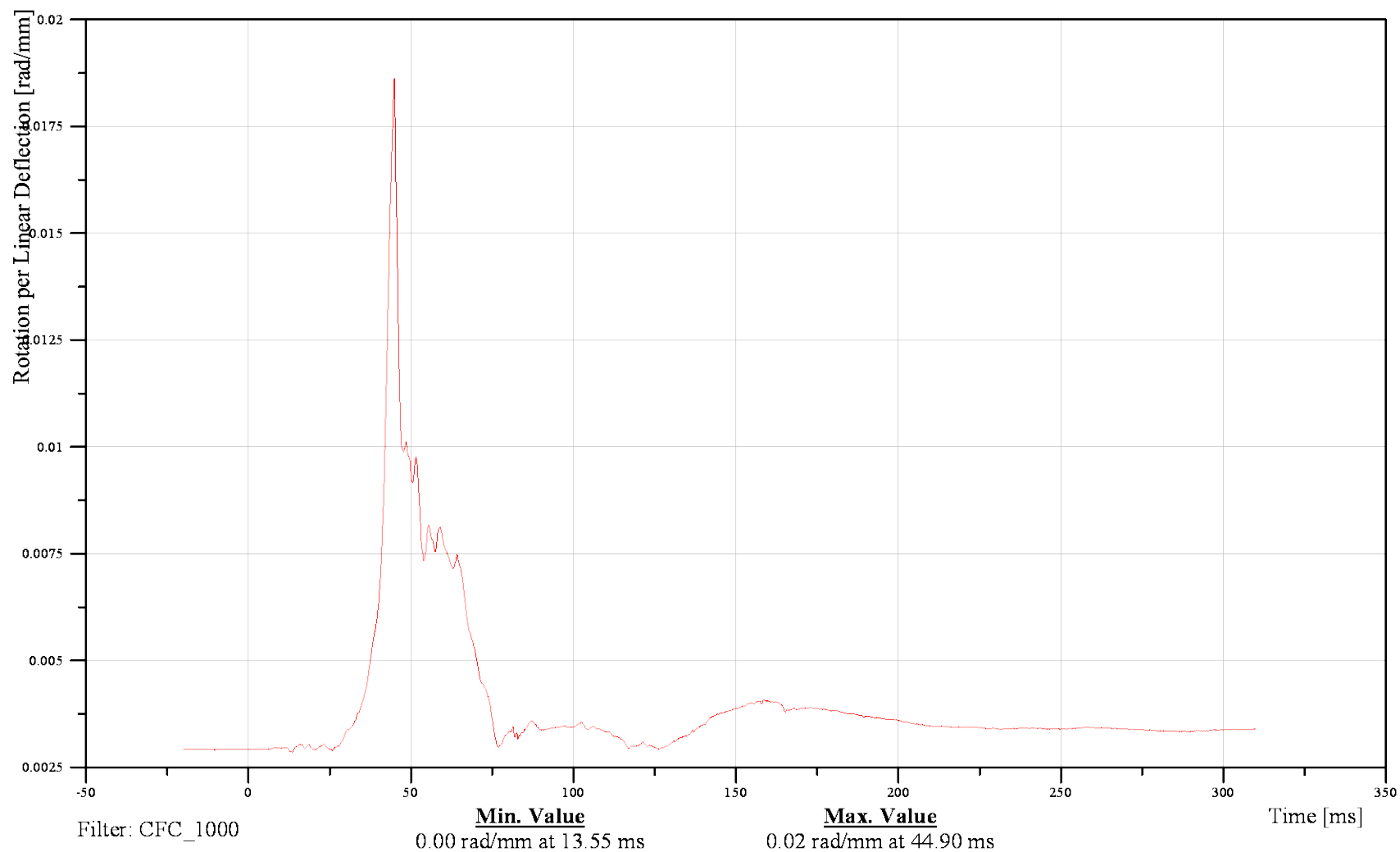
Time: 16:14

Customer: VRTC

14CHBA4030WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

chest band w/40 gages, gage 31

Date: 01/24/2013

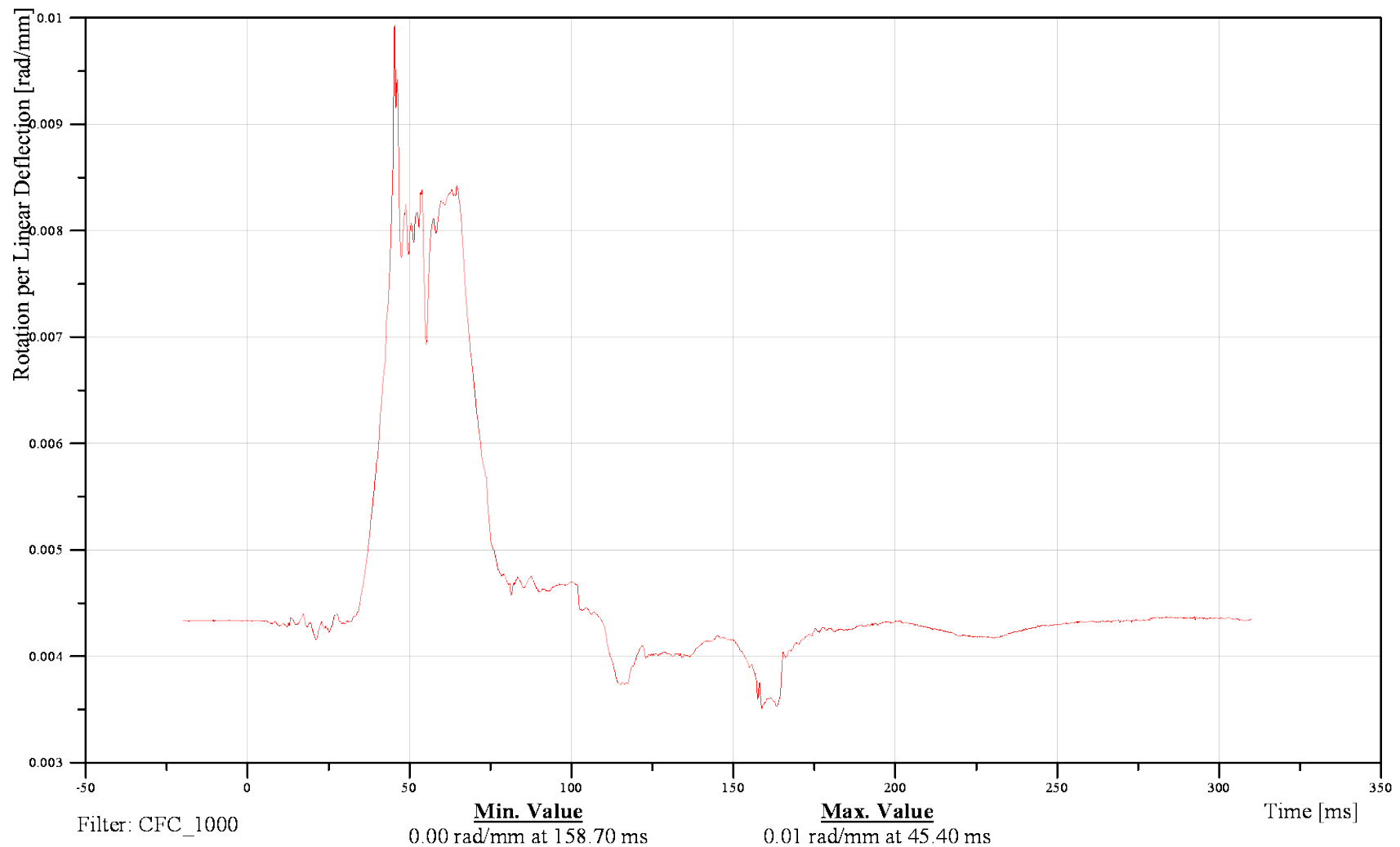
Time: 16:14

Customer: VRTC

14CHBA4031WFVO0A

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

MDB CG AX

Date: 01/24/2013

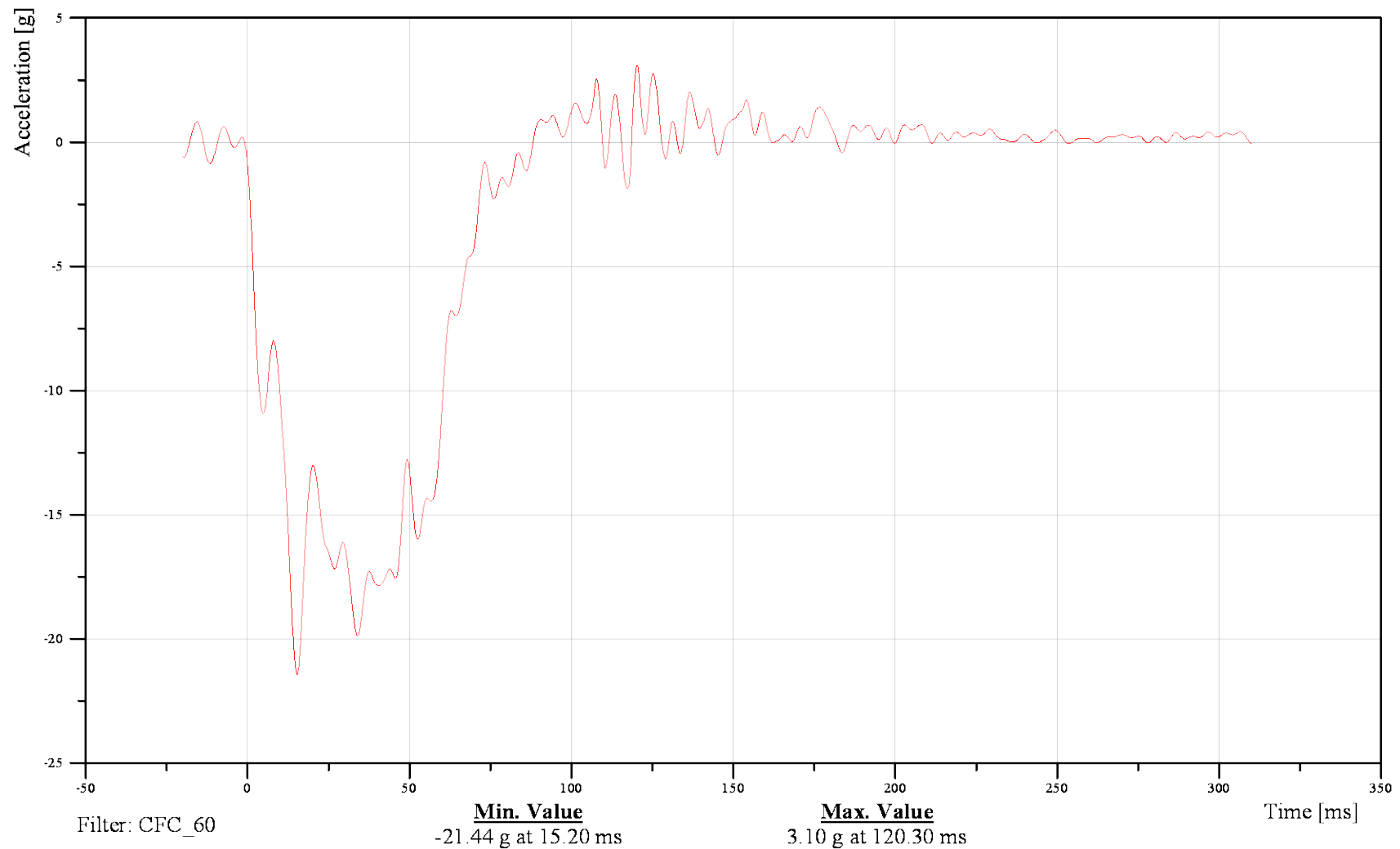
Time: 16:14

Customer: VRTC

M0MBARCG0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

MDB CG AY

Date: 01/24/2013

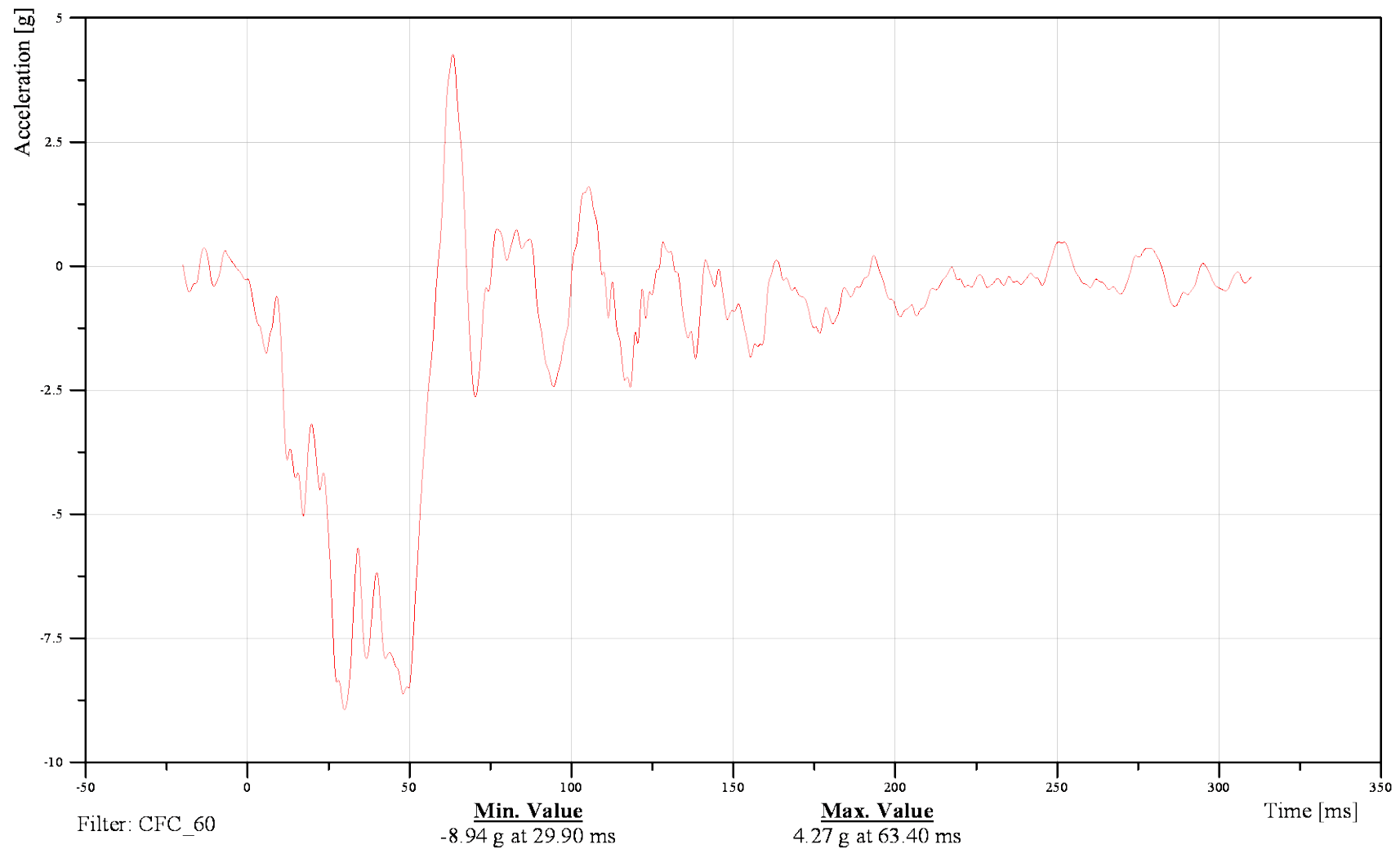
Time: 16:14

Customer: VRTC

M0MBARCG0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

MDB CG AZ

Date: 01/24/2013

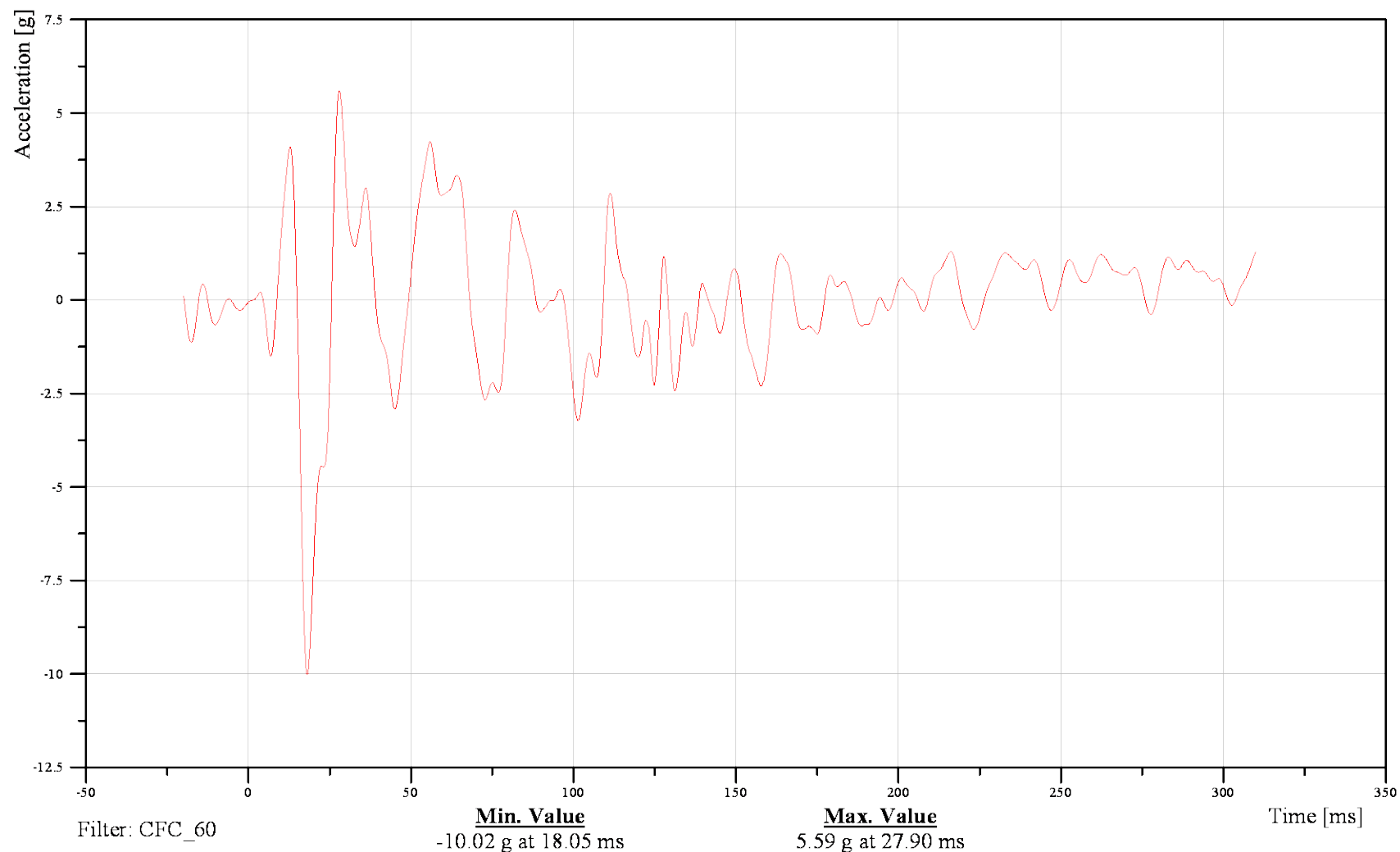
Time: 16:14

Customer: VRTC

M0MBCRG0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

MDB CG A Resultant

Date: 01/24/2013

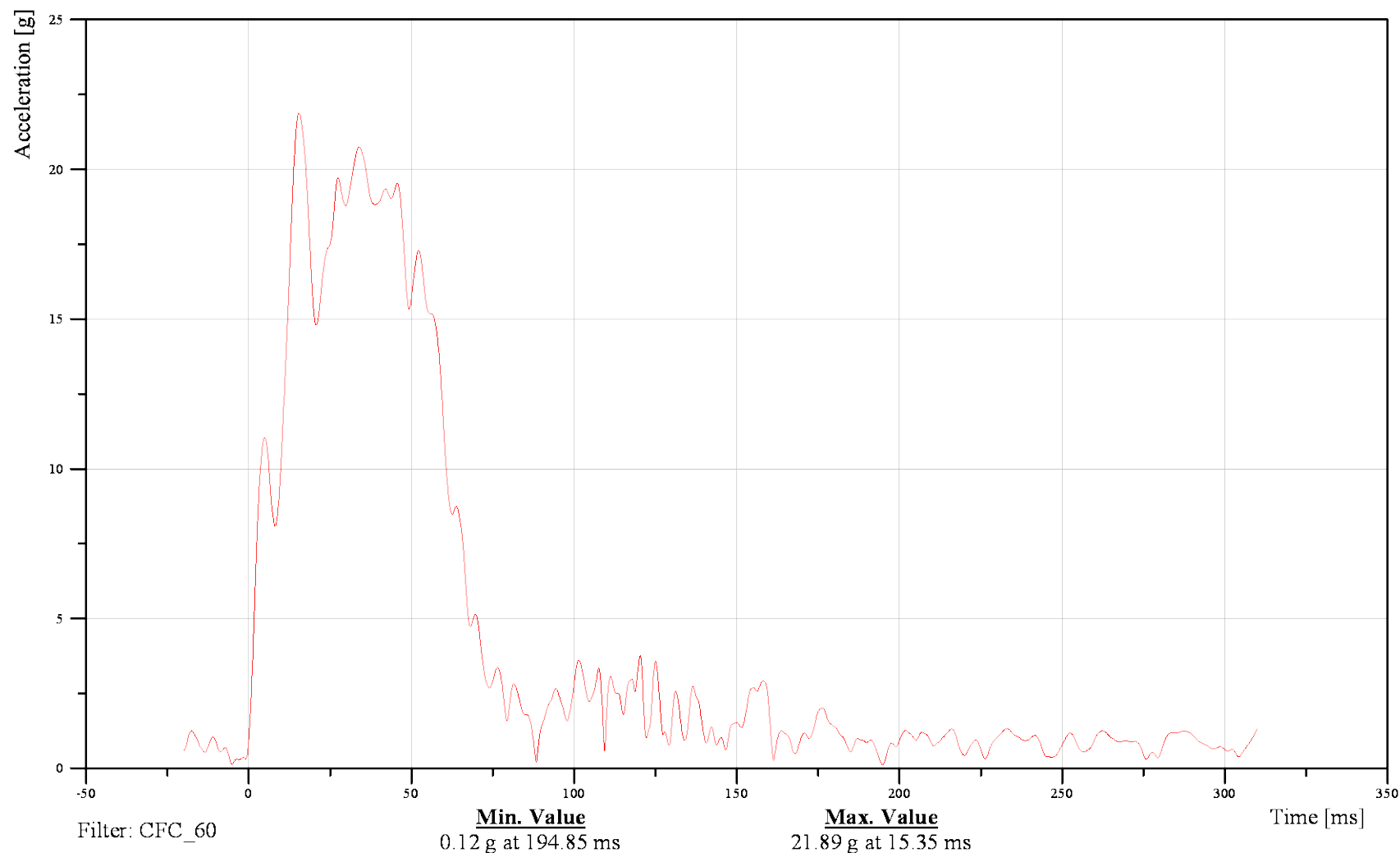
Time: 16:14

Customer: VRTC

M0MBARCG0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

MDB REAR AX

Date: 01/24/2013

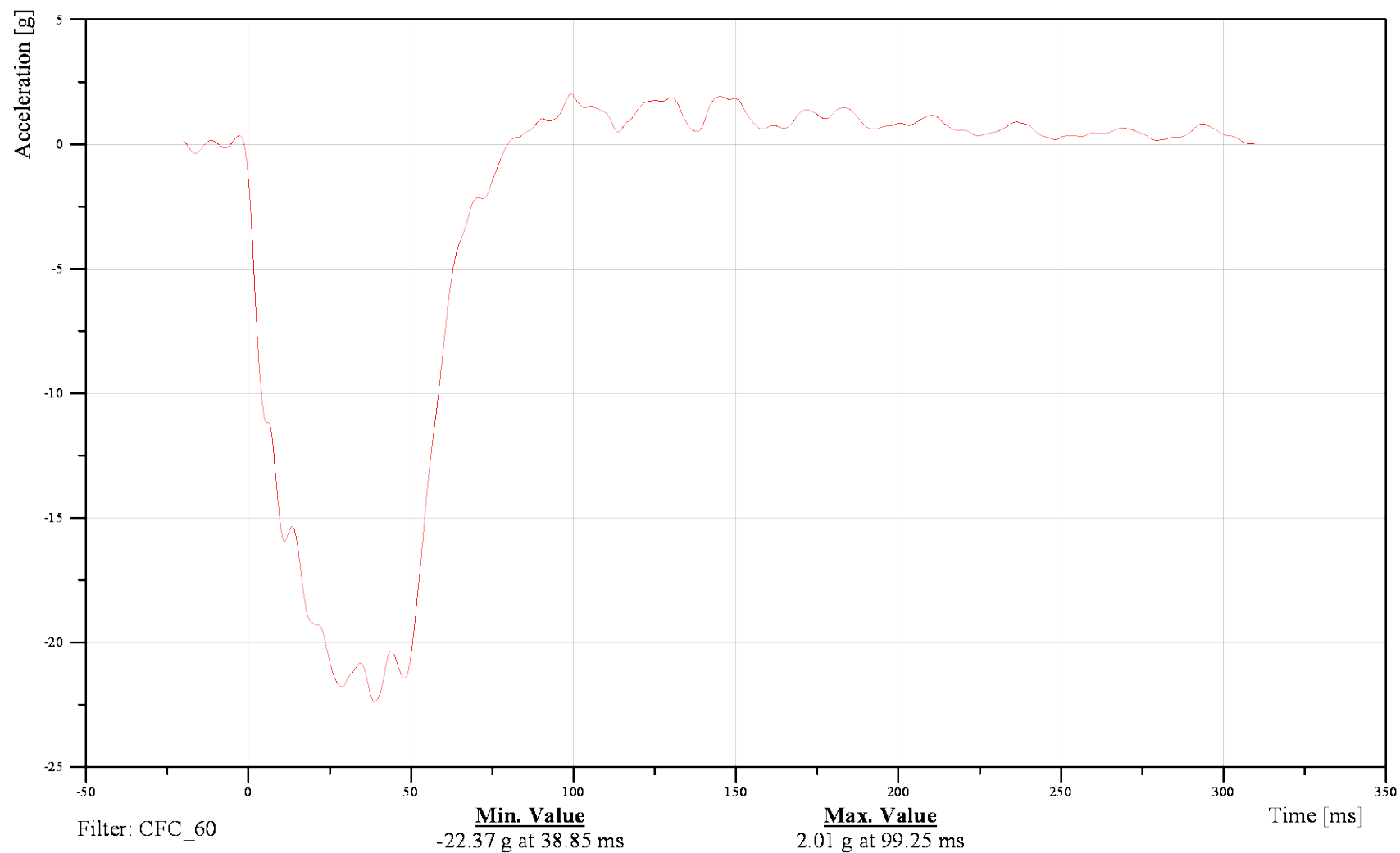
Time: 16:14

Customer: VRTC

M0FRAMRE0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 130124





FMVSS 214 Side Impact 2011 Hyundai Sonata

MDB REAR AY

Date: 01/24/2013

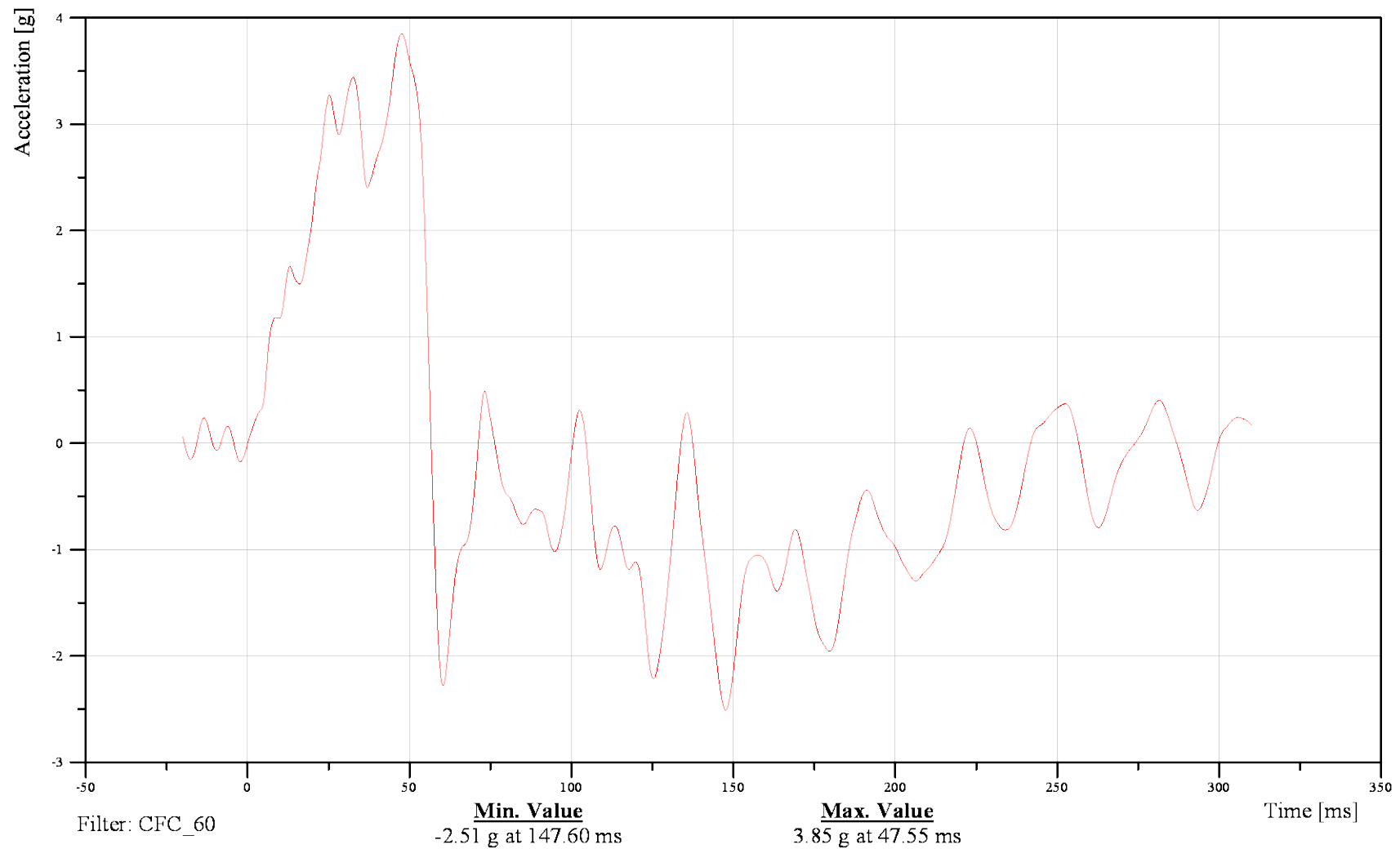
Time: 16:14

Customer: VRTC

M0FRAMRE0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 130124



Appendix C

WorldSID Configuration and Performance Verification Data

Calibration Test Results

Pre-Test

WorldSID: WSID016

Configured for Left Side Impact

Transportation Research Center Inc.

Front Head Drop

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

Test Date: 11/28/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	19 %	Yes
Peak Head Resultant Acceleration	205 - 255 g	219.9 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-3.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

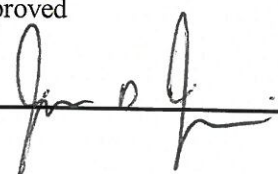
Test meets specifications.

Comments:

Technician



Approved



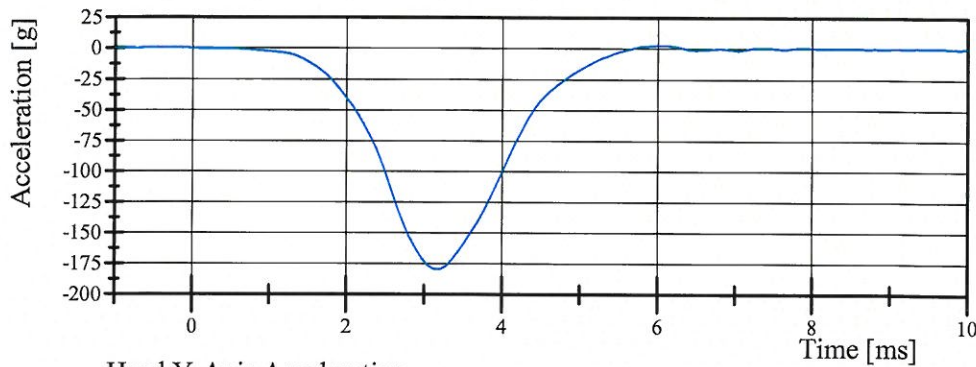
Transportation Research Center Inc.

Front Head Drop

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

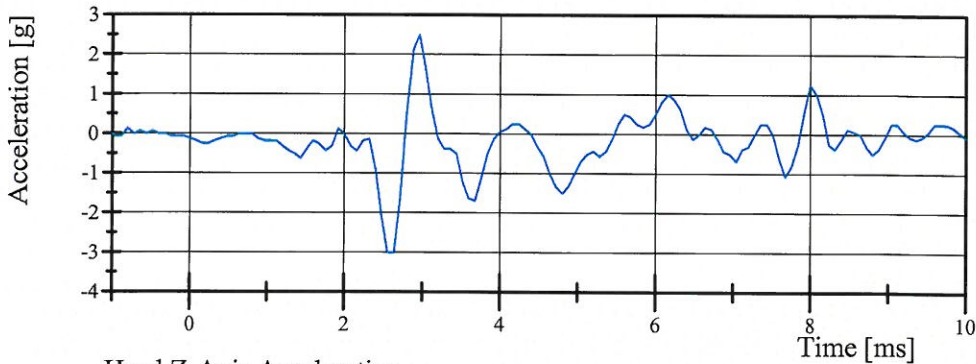
Test Date: 11/28/2012

Head X-Axis Acceleration



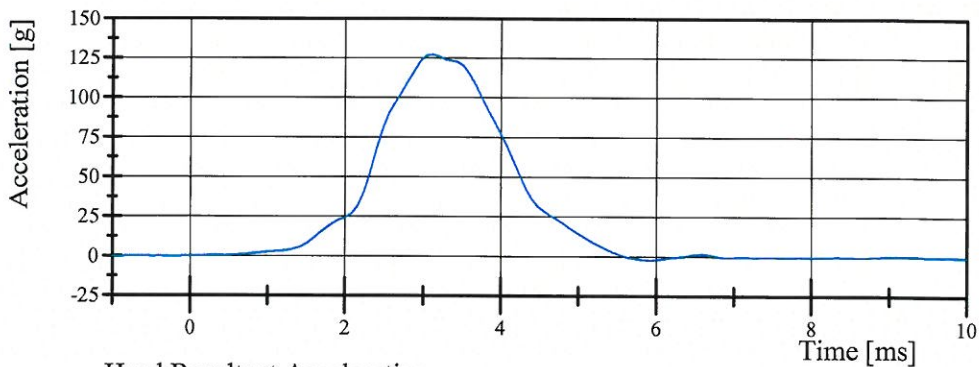
Filter Class: CFC_1000
Max: 2.6 gn at 6.0 ms
Min: -179.6 gn at 3.2 ms

Head Y-Axis Acceleration



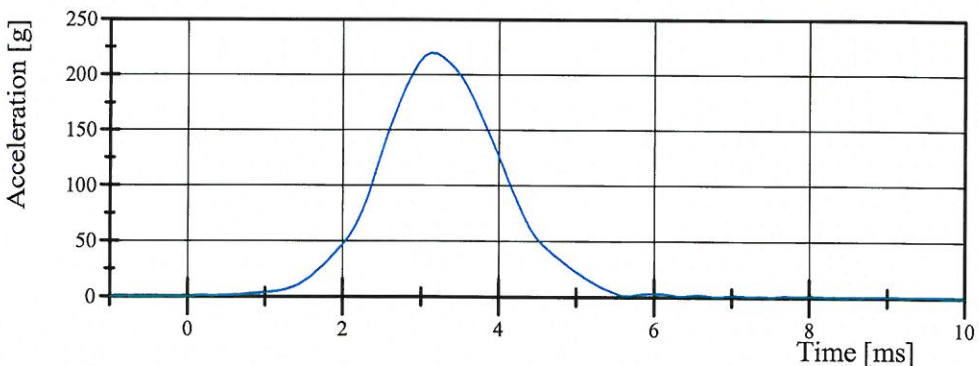
Filter Class: CFC_1000
Max: 2.5 gn at 3.0 ms
Min: -3.0 gn at 2.6 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 127.3 gn at 3.1 ms
Min: -2.2 gn at 5.9 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 219.9 gn at 3.1 ms
Min: 0.0 gn at -0.6 ms

Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

Test Date: 11/28/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	19 %	Yes
Peak Head Resultant Acceleration	104 - 123 g	114.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	4.7 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

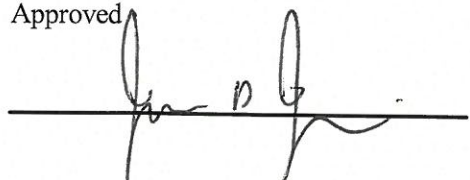
Test meets specifications.

Comments:

Technician



Approved

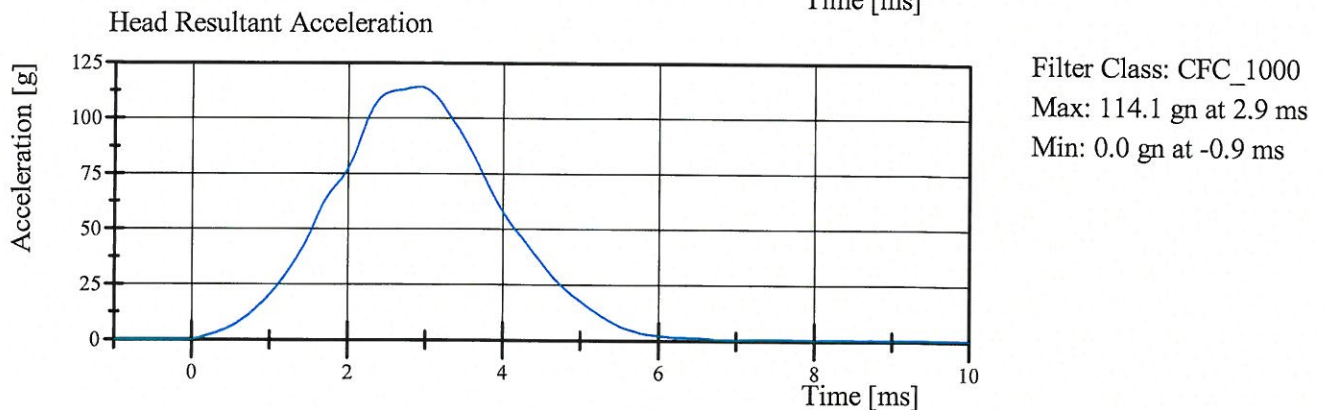
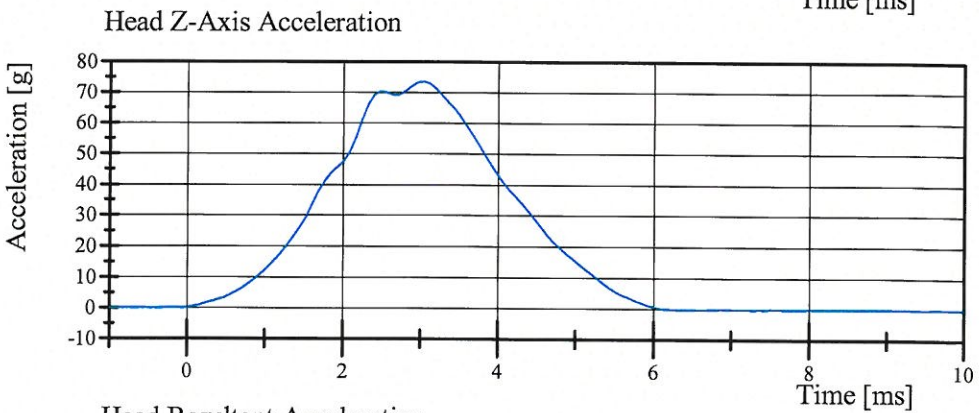
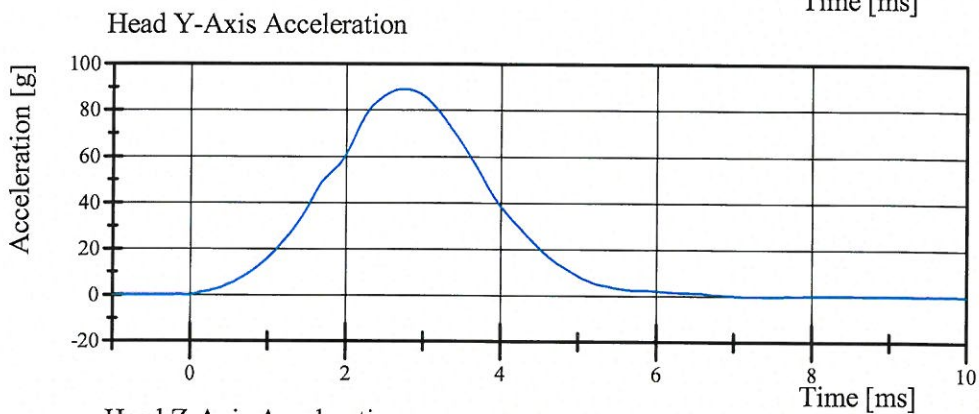
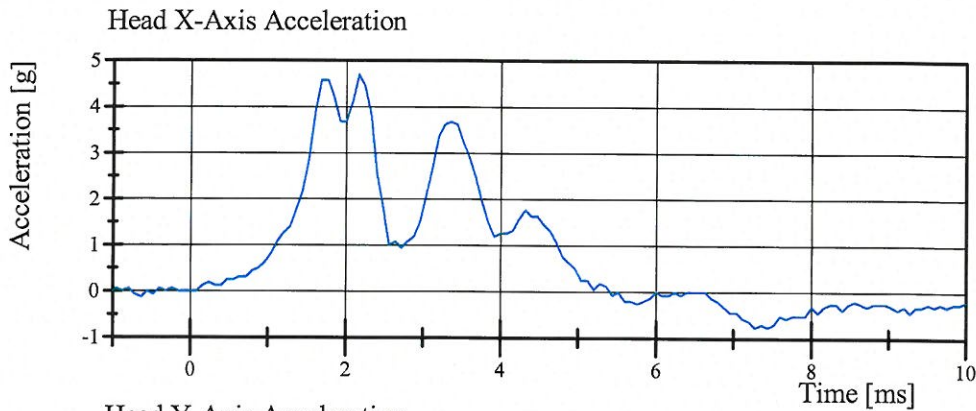


Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

Test Date: 11/28/2012



Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-3

Test Date: 11/28/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	18 %	Yes
Peak Head Resultant Acceleration	104 - 123 g	114.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

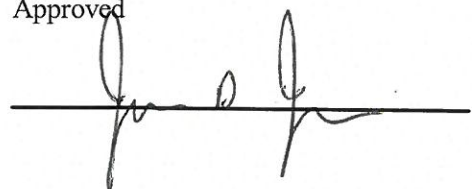
Test meets specifications.

Comments:

Technician



Approved

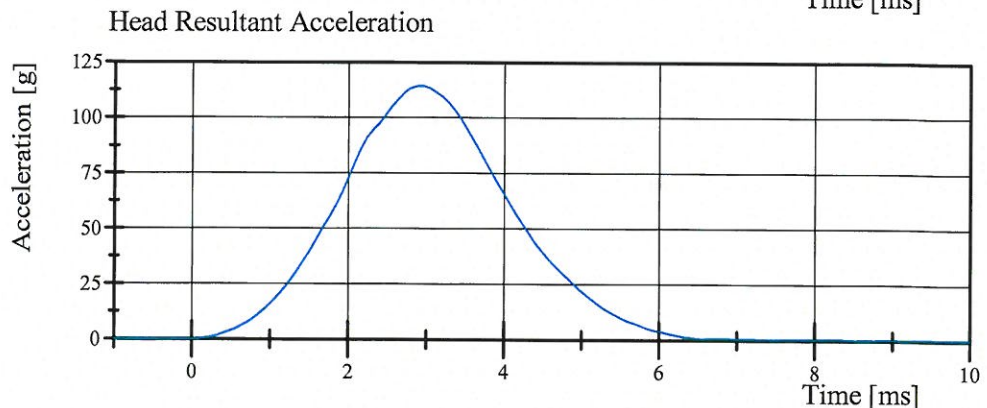
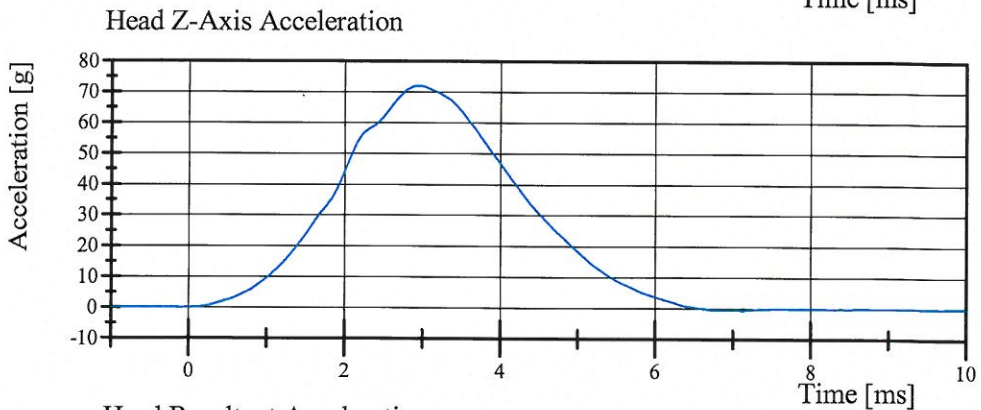
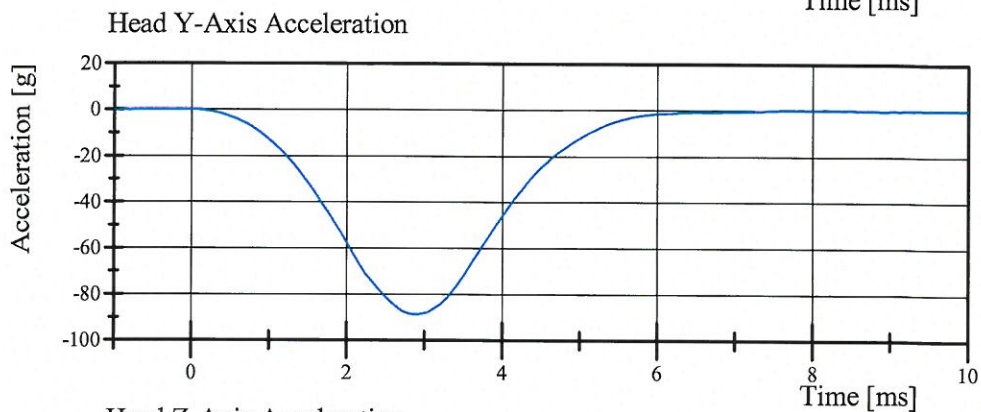
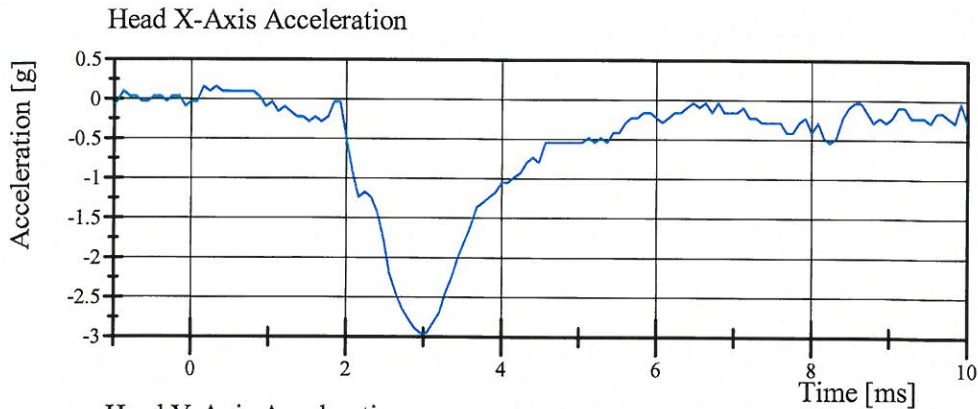


Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-3

Test Date: 11/28/2012



Transportation Research Center Inc.

Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

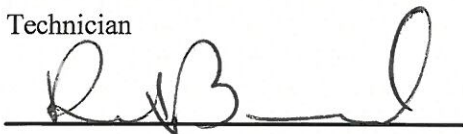
Test Date: 12/4/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.34 m/s	Yes
Pendulum Integrated Velocity			
Change at 4 ms	0.77 - 1.04 m/s	0.832 m/s	Yes
Change at 8 ms	1.6 - 2.16 m/s	1.826 m/s	Yes
Change at 12 ms	2.43 - 3.29 m/s	2.975 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-53.6 deg	Yes
Headform Flexion Decay			
- from Peak to Zero Degrees	58 - 72 ms	60.9 ms	Yes
Total Neck Occipital Condyles Moment	55 - 68 N·m	63.5 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) °	-34.6 °	Yes
Time of Peak	56 - 68 ms	58.5 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-30) - (-37) °	-31.2 °	Yes
Time of Peak	56 - 68 ms	62.5 ms	Yes

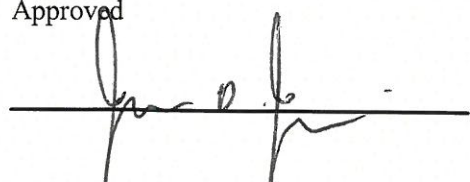
Test meets specifications.

Comments:

Technician



Approved

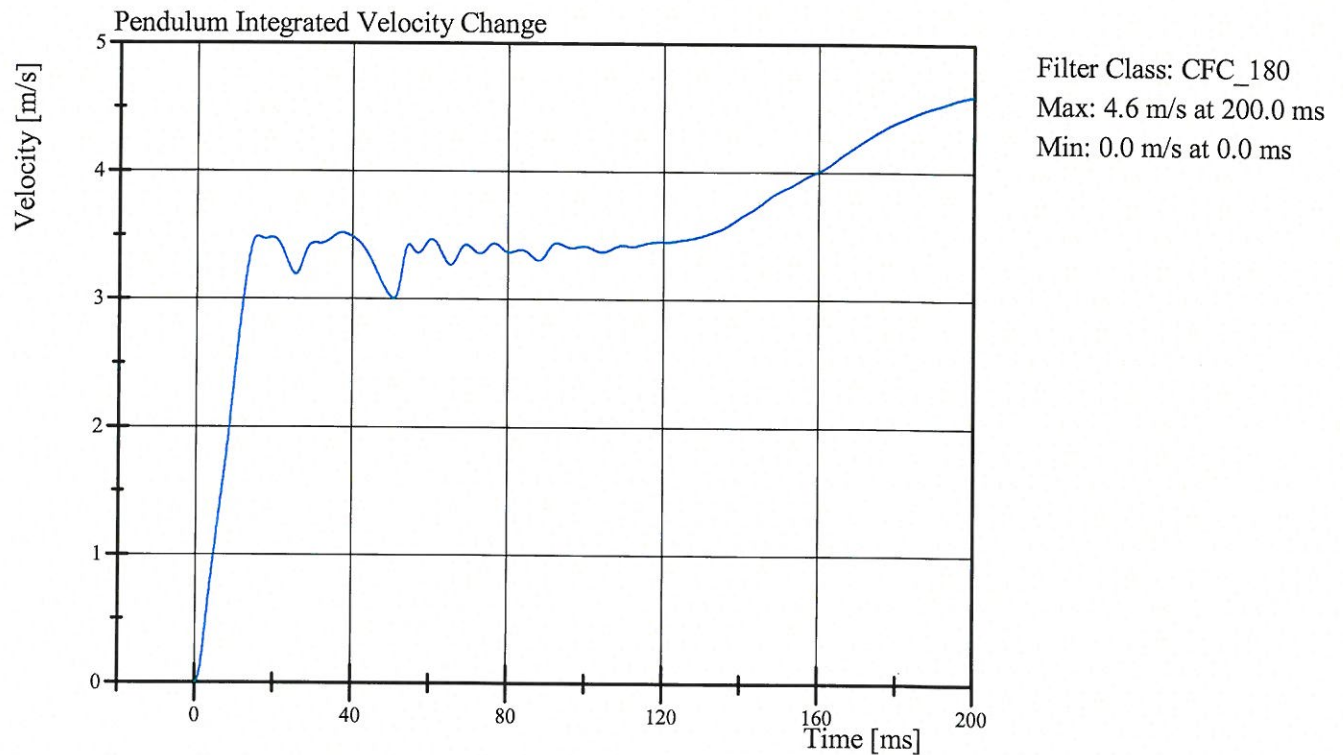
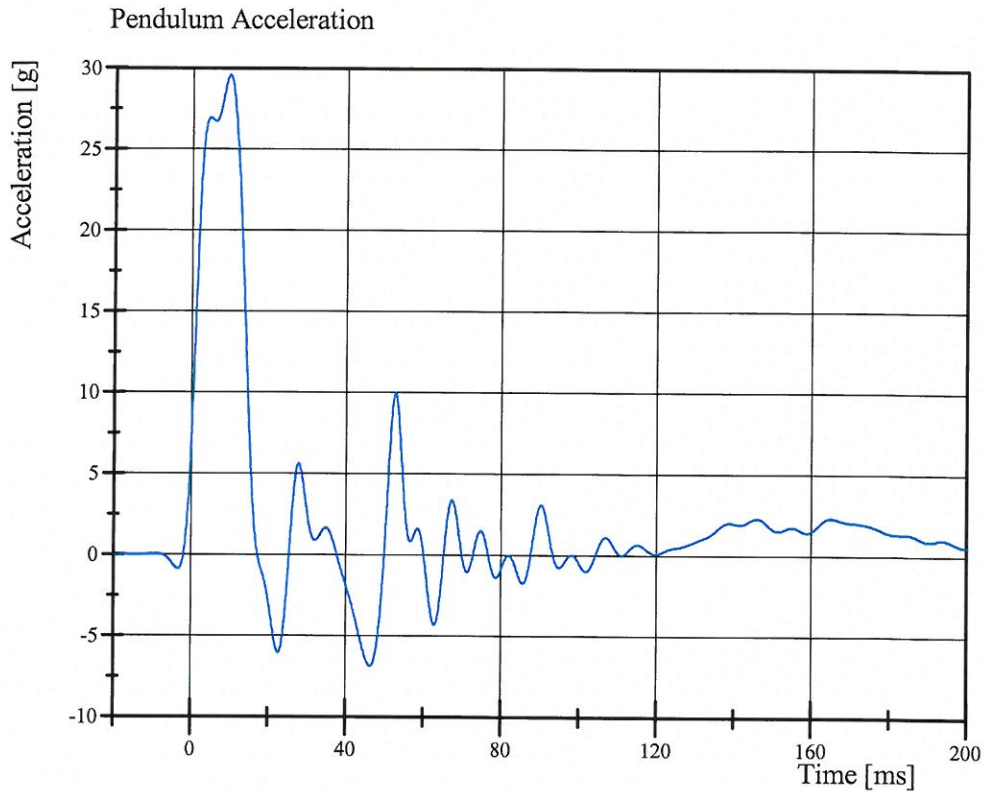


Transportation Research Center Inc.

Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

Test Date: 12/4/2012



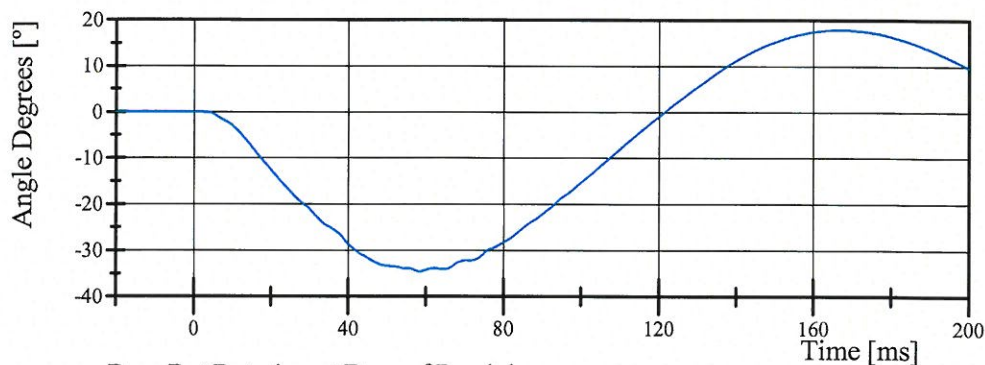
Transportation Research Center Inc.

Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

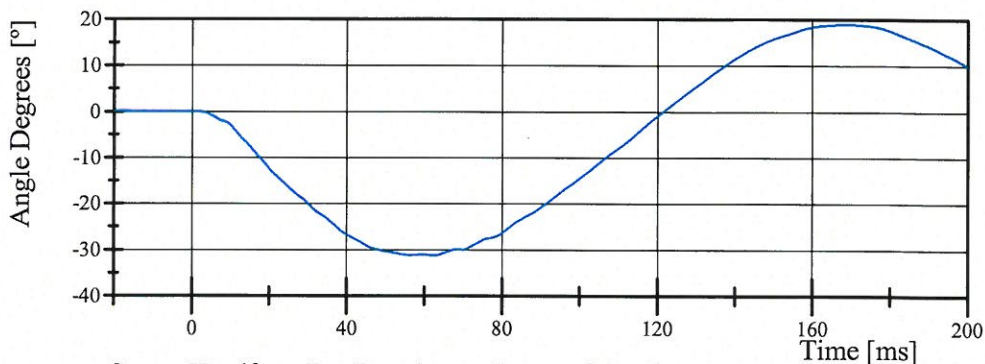
Test Date: 12/4/2012

Forward Pot Rotation at Base of Pendulum



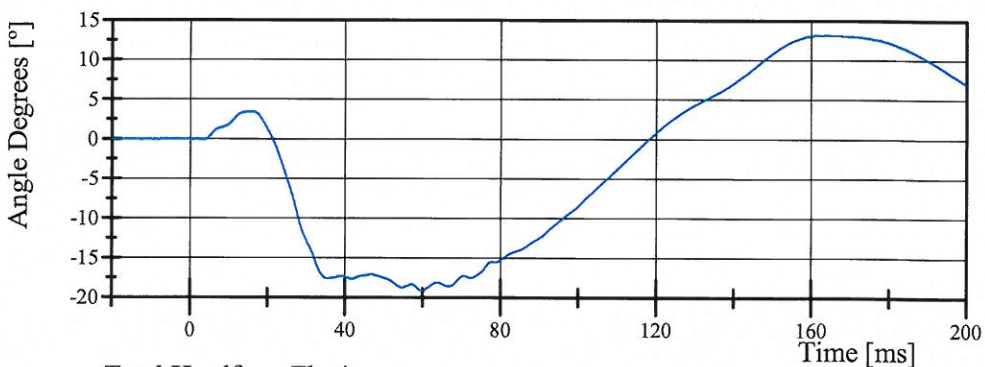
Filter Class: CFC_180
Max: 17.9 ° at 167.0 ms
Min: -34.6 ° at 58.5 ms

Rear Pot Rotation at Base of Pendulum



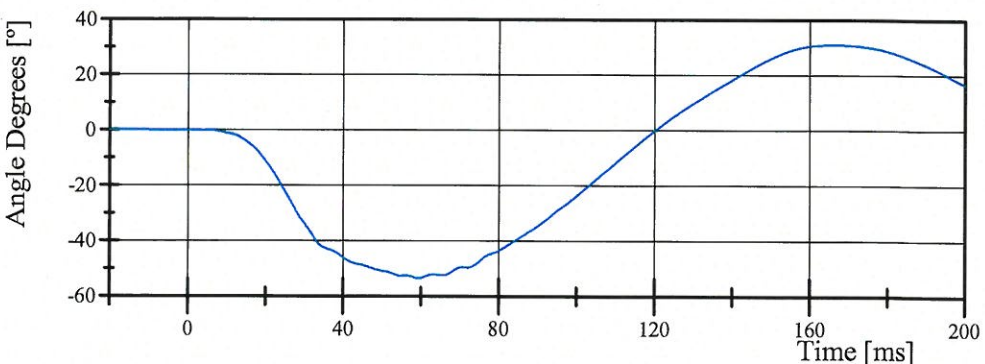
Filter Class: CFC_180
Max: 18.9 ° at 169.1 ms
Min: -31.2 ° at 62.5 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 13.2 ° at 163.7 ms
Min: -19.1 ° at 59.7 ms

Total Headform Flexion



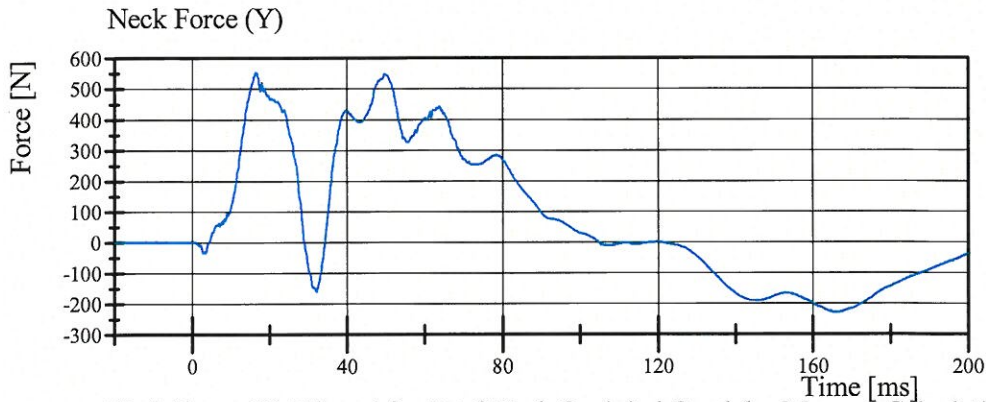
Filter Class: CFC_180
Max: 31.1 ° at 166.2 ms
Min: -53.6 ° at 59.3 ms

Transportation Research Center Inc.

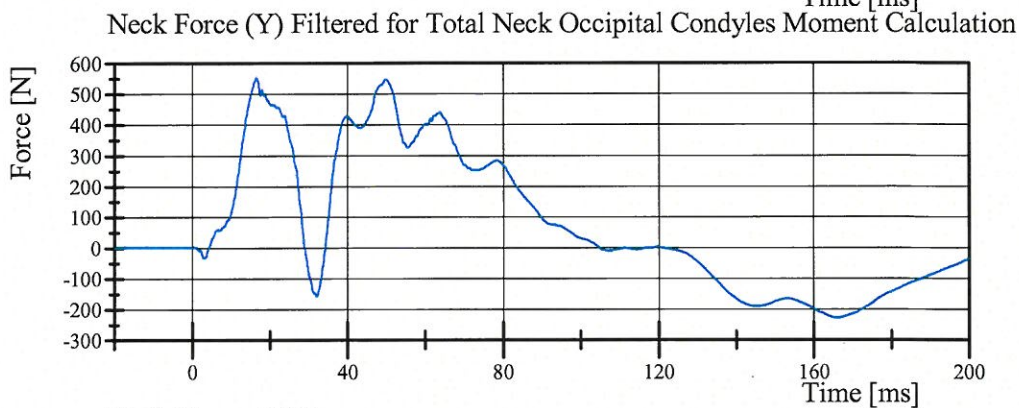
Left Lateral Neck

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

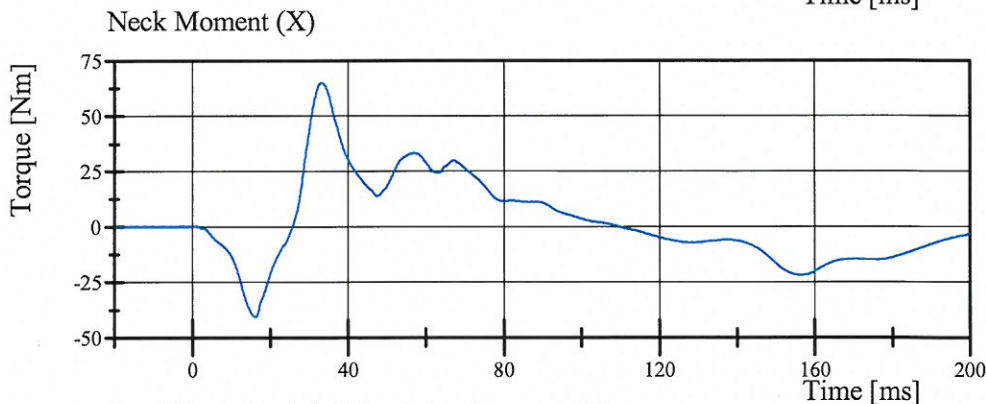
Test Date: 12/4/2012



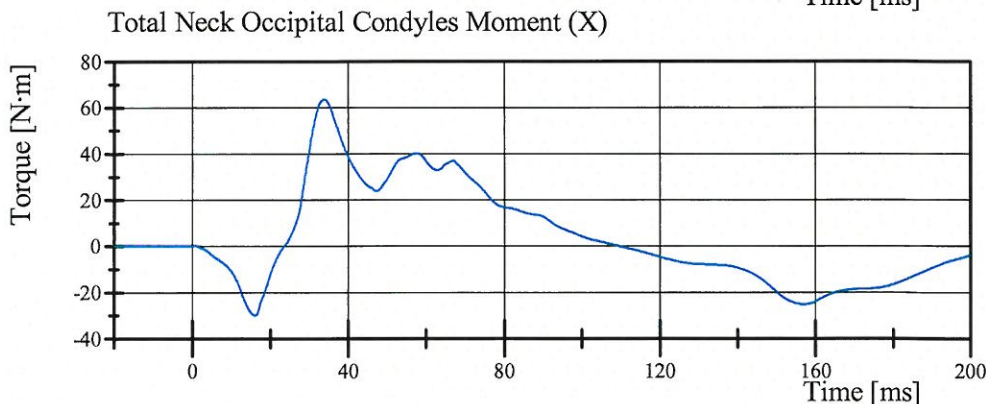
Filter Class: CFC_1000
Max: 551.4 N at 16.3 ms
Min: -228.3 N at 165.6 ms



Filter Class: CFC_600
Max: 551.6 N at 16.5 ms
Min: -228.0 N at 166.0 ms



Filter Class: CFC_600
Max: 64.9 Nm at 33.3 ms
Min: -40.7 Nm at 16.1 ms



Filter Class: Without_(Consta
Max: 63.5 N·m at 33.8 ms
Min: -30.1 N·m at 15.9 ms

Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

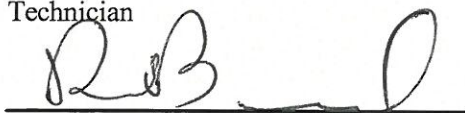
Test Date: 12/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.38 m/s	Yes
Impactor Force	(-2,600) - (-3,300) N	-2,888.0 N	Yes
Shoulder Displacement	35 - 44 mm	39.1 mm	Yes

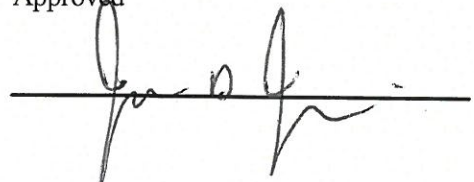
Test meets specifications.

Comments:

Technician



Approved

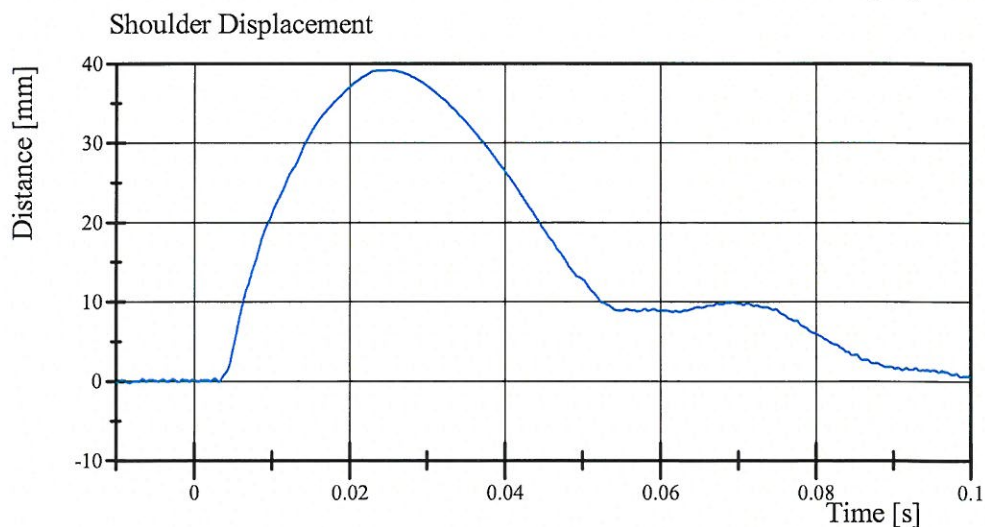
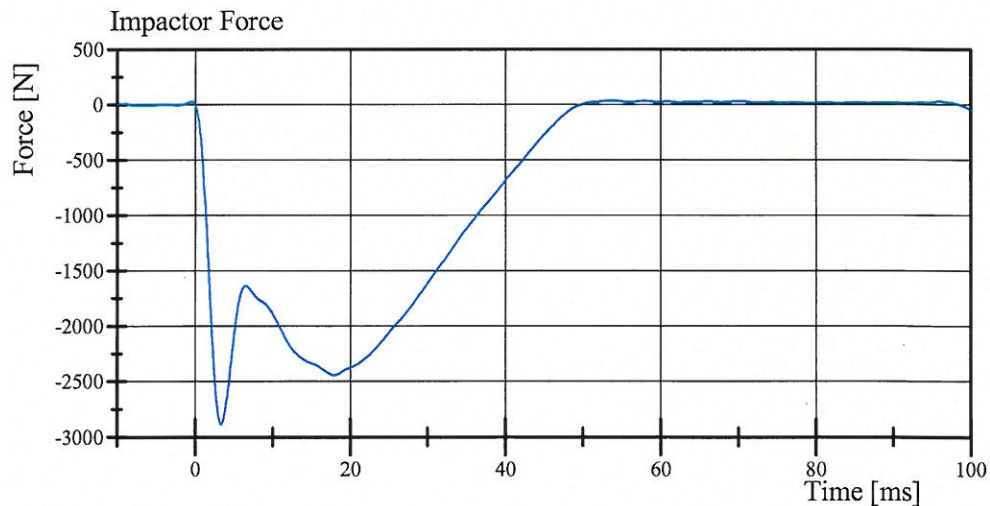
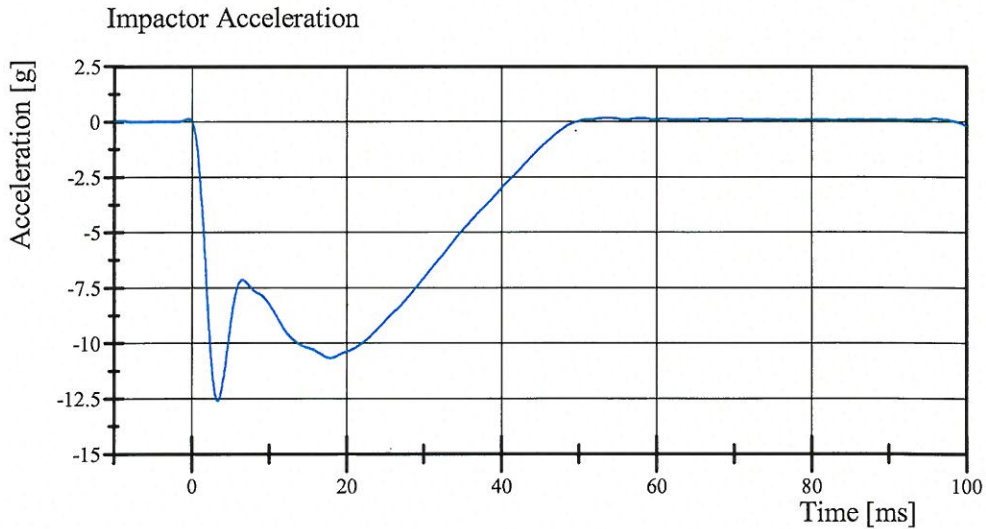


Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

Test Date: 12/6/2012



Transportation Research Center Inc.

Left Lateral Thorax with Arm

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

Test Date: 12/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.77 m/s	Yes
Impactor Force	(-4,900) - (-5,800) N	-5,503.3 N	Yes
Upper Thorax Rib Displacement	35 - 47 mm	40.3 mm	Yes
Center Thorax Rib Displacement	46 - 56 mm	47.6 mm	Yes
Lower Thorax Rib Displacement	39 - 46 mm	40.6 mm	Yes
Upper Spine Lateral Acceleration	28 - 37 g	28.9 g	Yes
Lower Spine Lateral Acceleration	22 - 28 g	21.2 g	No

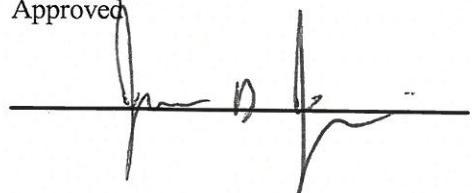
Test does not meet specifications.

Comments: Ok per A.Louden

Technician



Approved

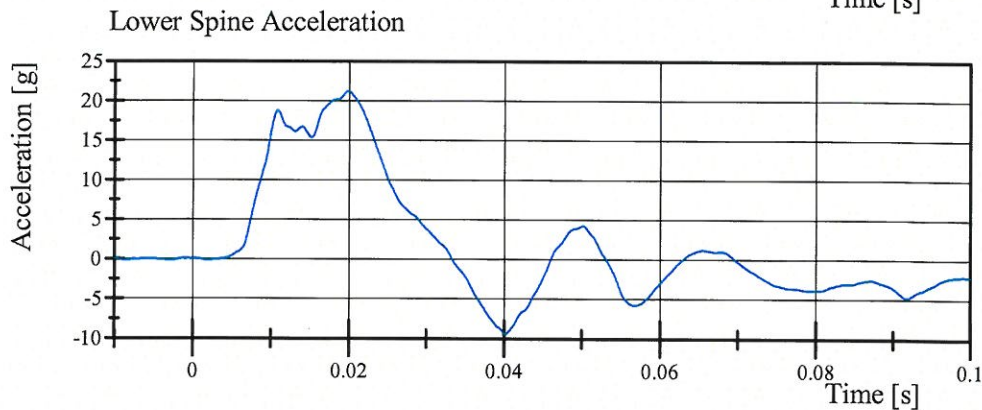
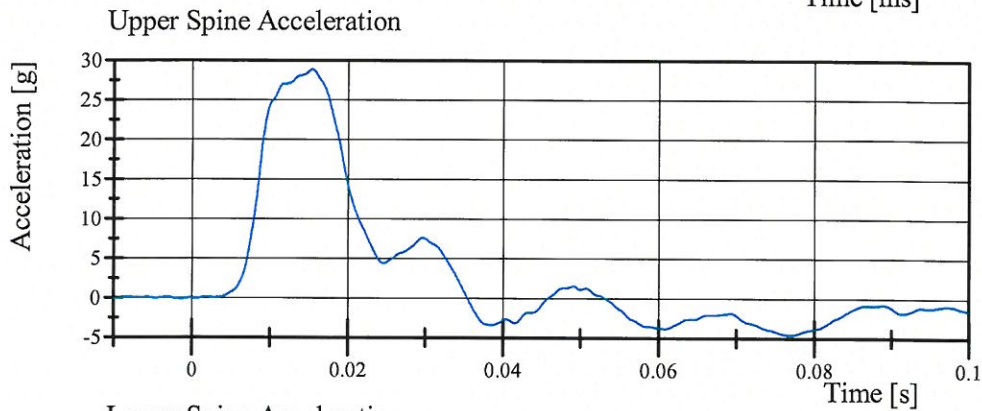
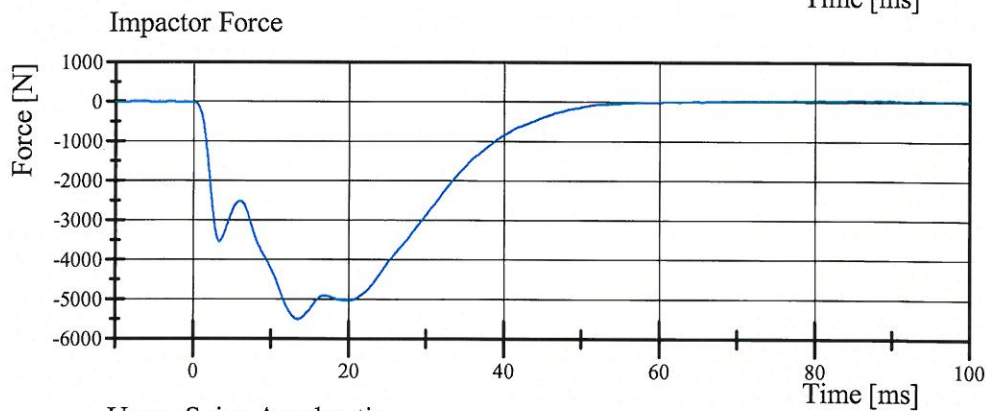
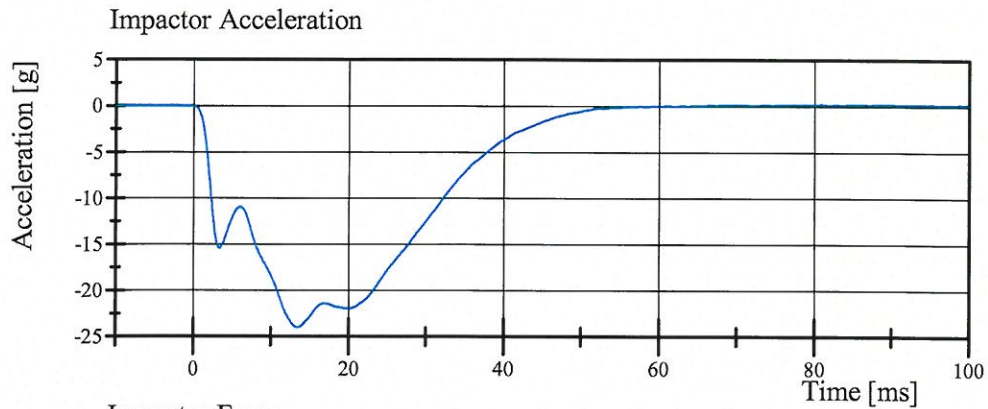


Transportation Research Center Inc.

Left Lateral Thorax with Arm

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

Test Date: 12/6/2012



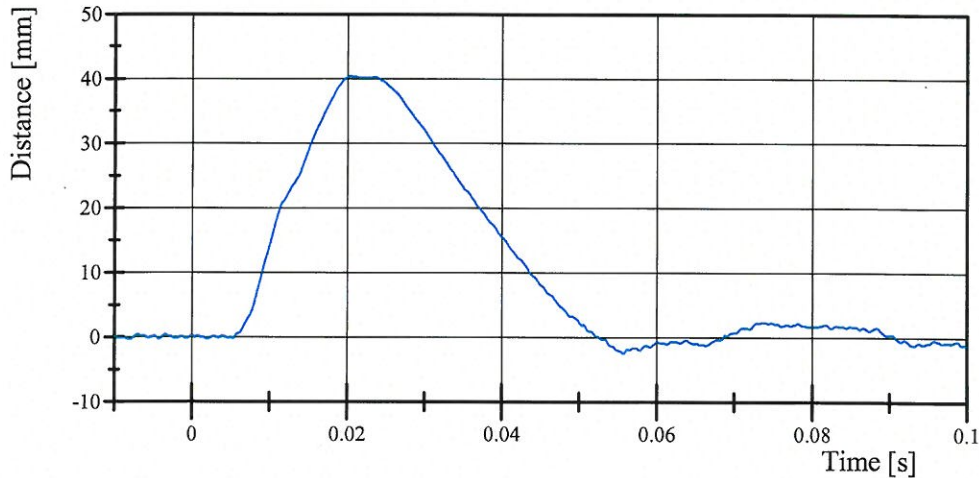
Transportation Research Center Inc.

Left Lateral Thorax with Arm

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

Test Date: 12/6/2012

Upper Thorax Rib Displacement

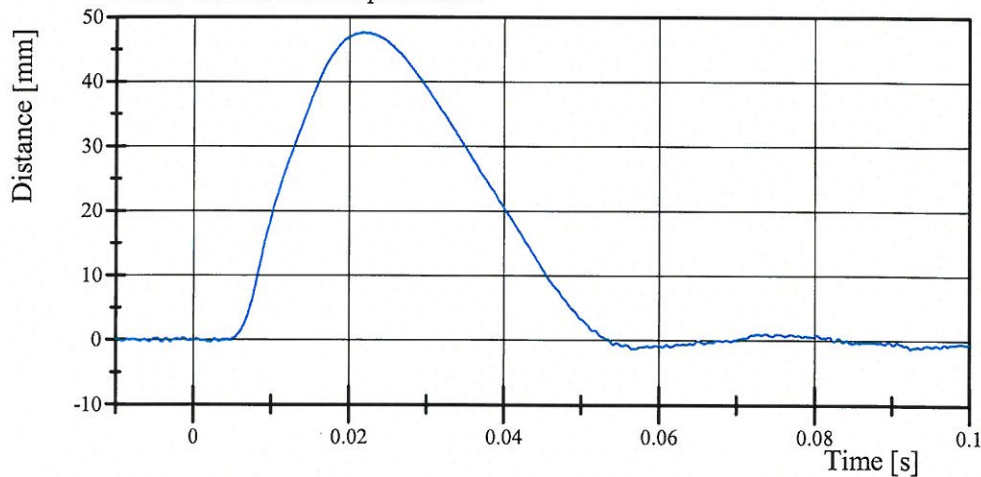


Filter Class: CFC_600

Max: 40.3 mm at 0.0 s

Min: -3.3 mm at 0.2 s

Center Thorax Rib Displacement

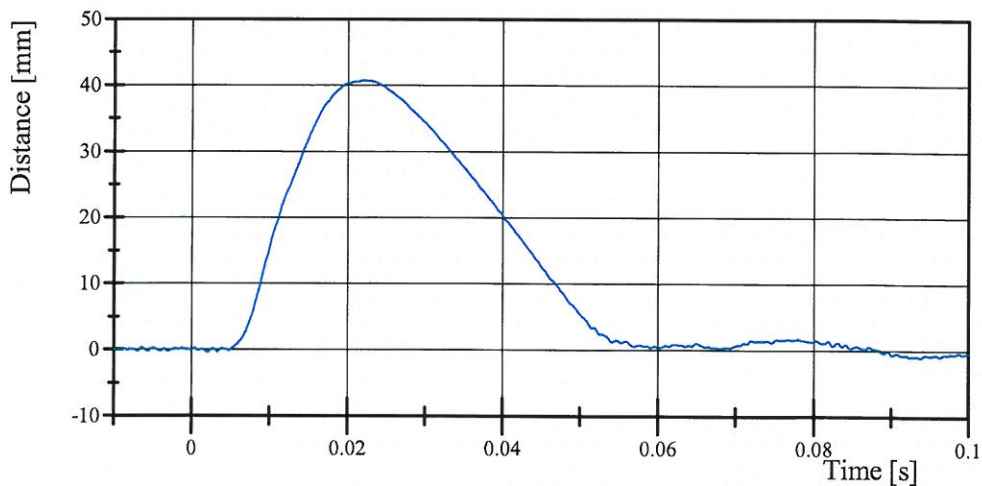


Filter Class: CFC_600

Max: 47.6 mm at 0.0 s

Min: -2.6 mm at 0.2 s

Lower Thorax Rib Displacement



Filter Class: CFC_600

Max: 40.6 mm at 0.0 s

Min: -1.1 mm at 0.3 s

Transportation Research Center Inc.

Left Lateral Thorax without Arm

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

Test Date: 12/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.346 m/s	Yes
Impactor Force	(-3,200) - (-3,800) N	-3,678.2 N	Yes
Upper Thorax Rib Displacement	33 - 43 mm	35.7 mm	Yes
Center Thorax Rib Displacement	35 - 43 mm	36.7 mm	Yes
Lower Thorax Rib Displacement	32 - 40 mm	35.4 mm	Yes
Upper Spine Lateral Acceleration	14 - 20 g	14.5 g	Yes
Lower Spine Lateral Acceleration	14 - 22 g	14.3 g	Yes

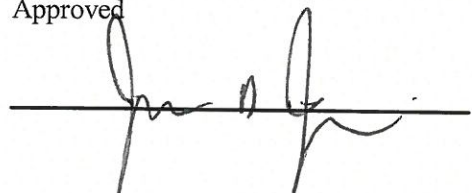
Test meets specifications.

Comments:

Technician



Approved

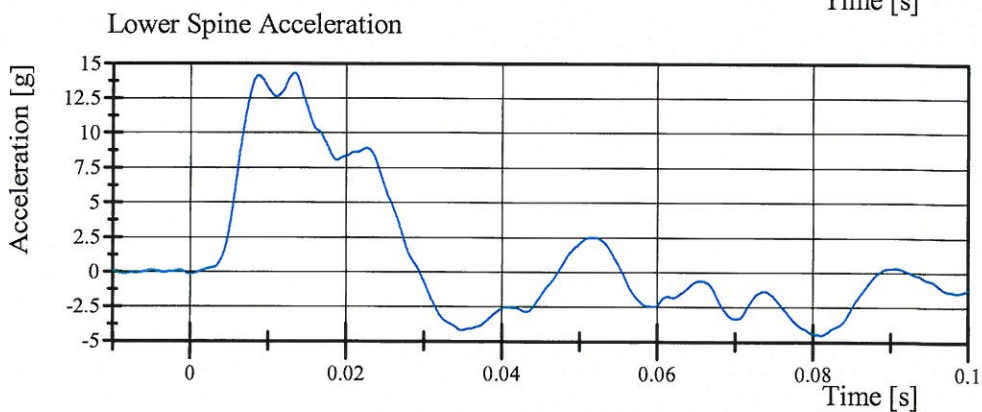
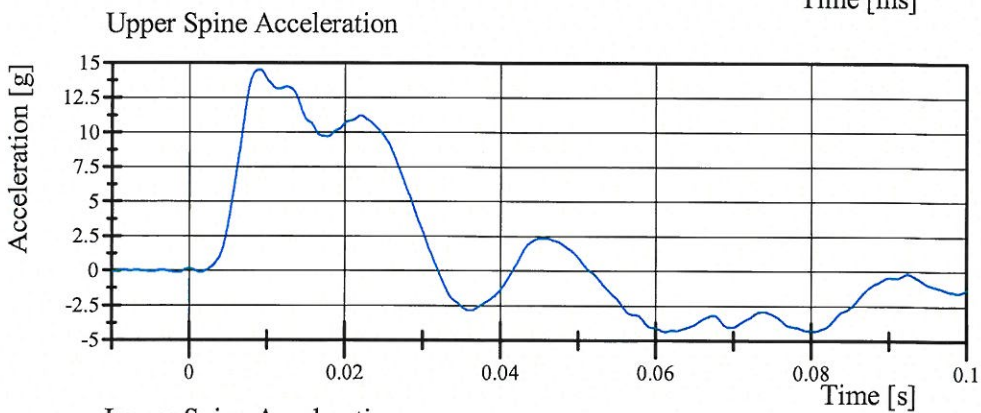
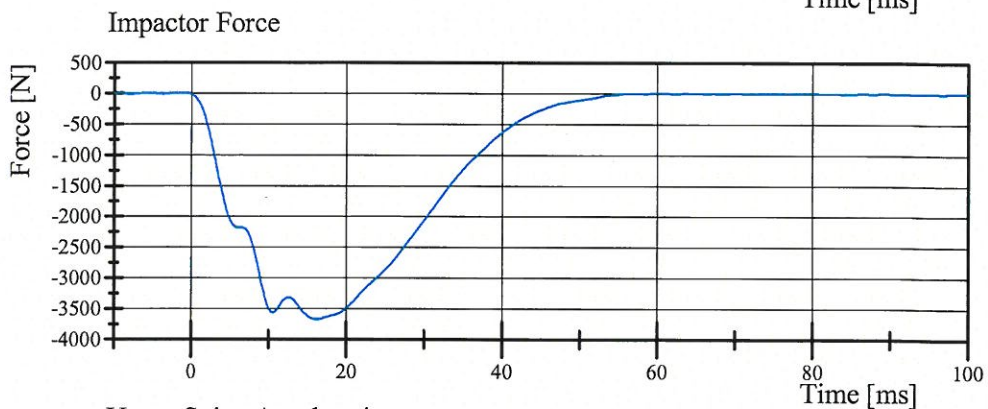
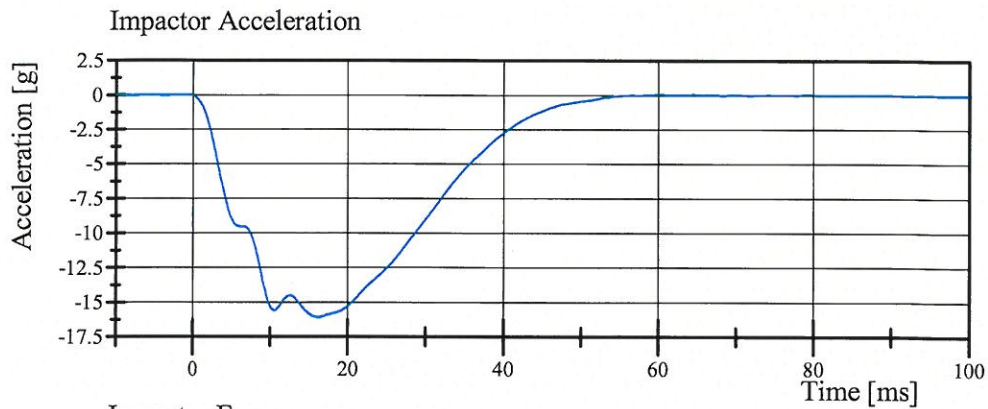


Transportation Research Center Inc.

Left Lateral Thorax without Arm

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

Test Date: 12/6/2012



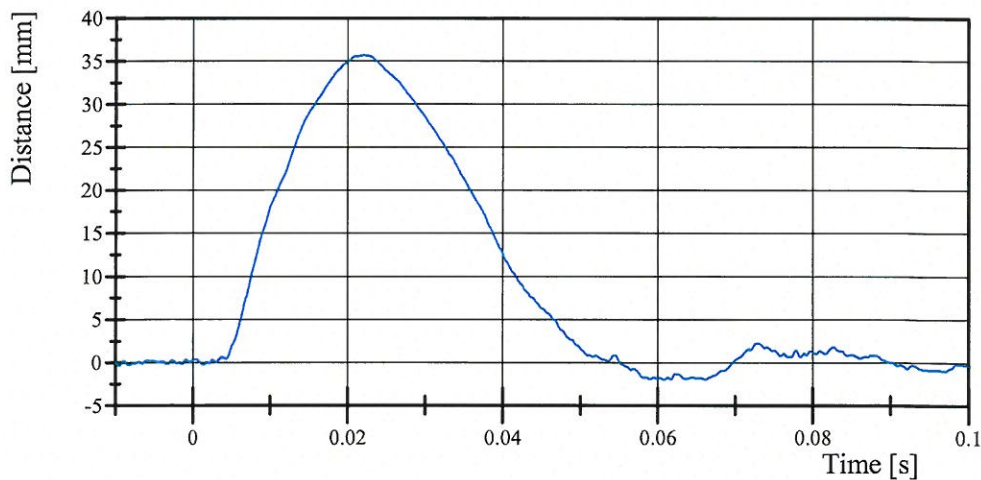
Transportation Research Center Inc.

Left Lateral Thorax without Arm

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

Test Date: 12/6/2012

Upper Thorax Rib Displacement

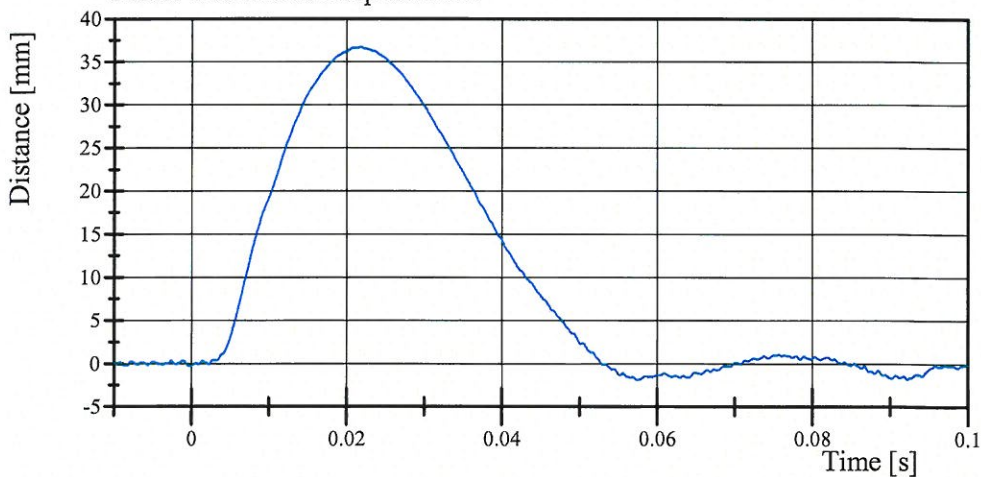


Filter Class: CFC_600

Max: 35.7 mm at 0.0 s

Min: -3.2 mm at 0.2 s

Center Thorax Rib Displacement

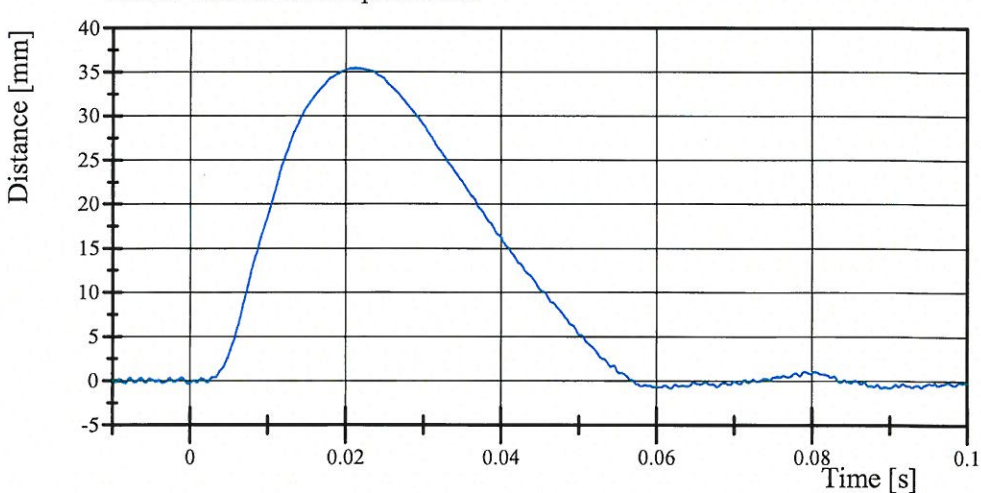


Filter Class: CFC_600

Max: 36.7 mm at 0.0 s

Min: -1.9 mm at 0.1 s

Lower Thorax Rib Displacement



Filter Class: CFC_600

Max: 35.4 mm at 0.0 s

Min: -1.1 mm at 0.1 s

Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

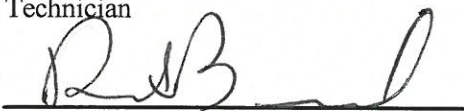
Test Date: 12/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Force	(-2,700) - (-3,100) N	-3,086.5 N	Yes
Upper Abdominal Rib Displacement	33 - 40 mm	33.4 mm	Yes
Lower Abdominal Rib Displacement	30 - 36 mm	30.6 mm	Yes
Lower Spine Lateral Acceleration	15 - 20 g	16.2 g	Yes

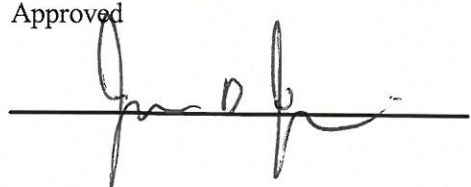
Test meets specifications.

Comments:

Technician



Approved

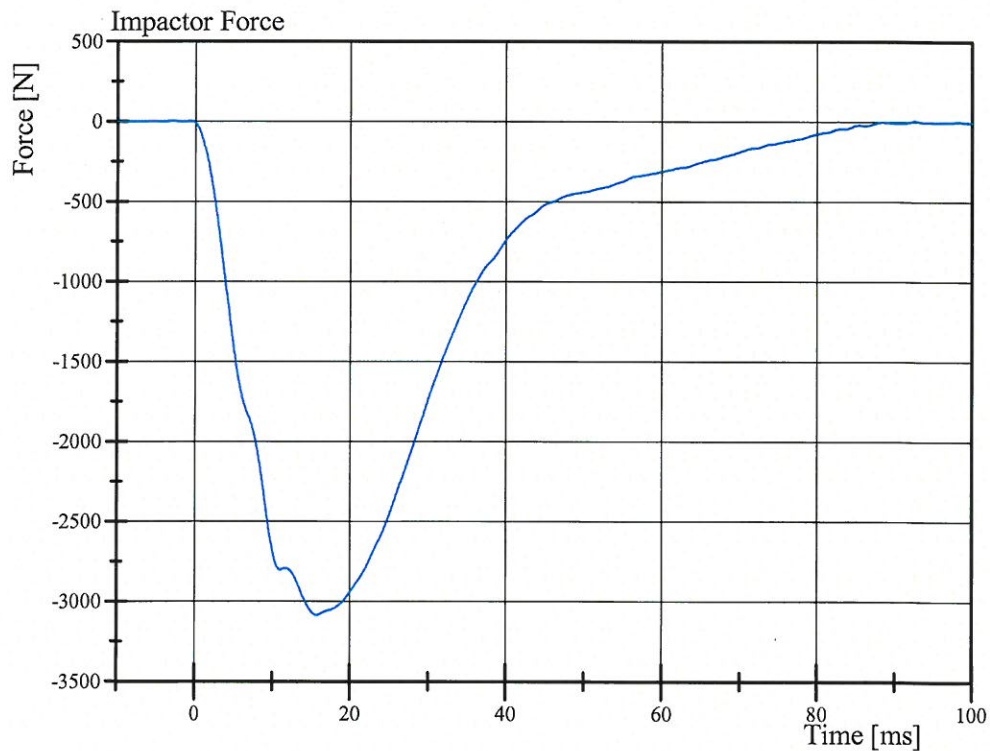
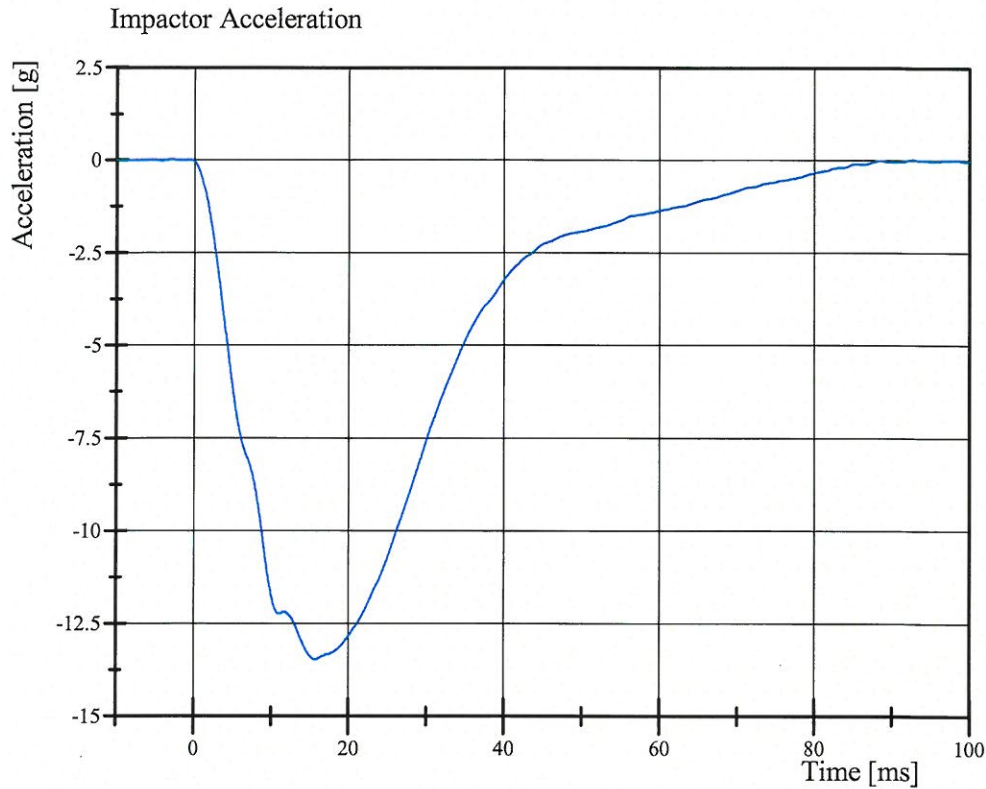


Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

Test Date: 12/6/2012



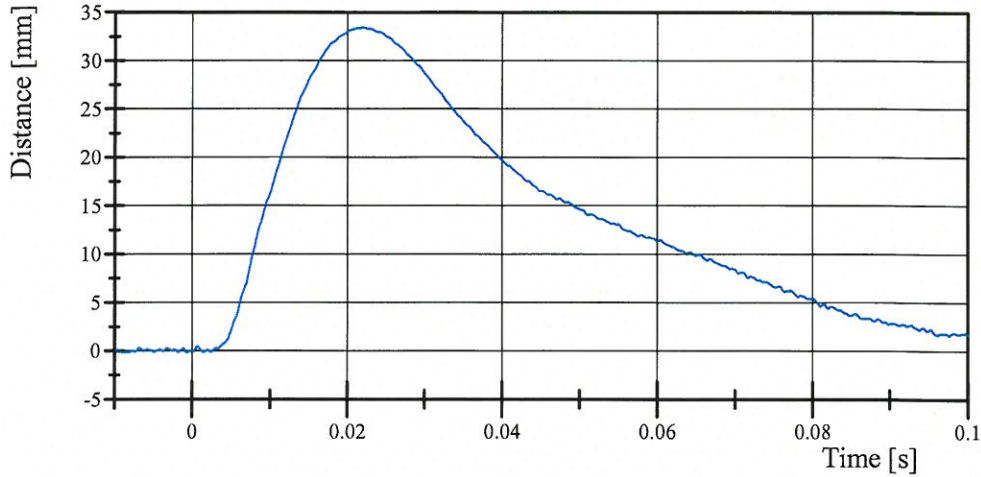
Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-1

Test Date: 12/6/2012

Upper Abdominal Rib Displacement

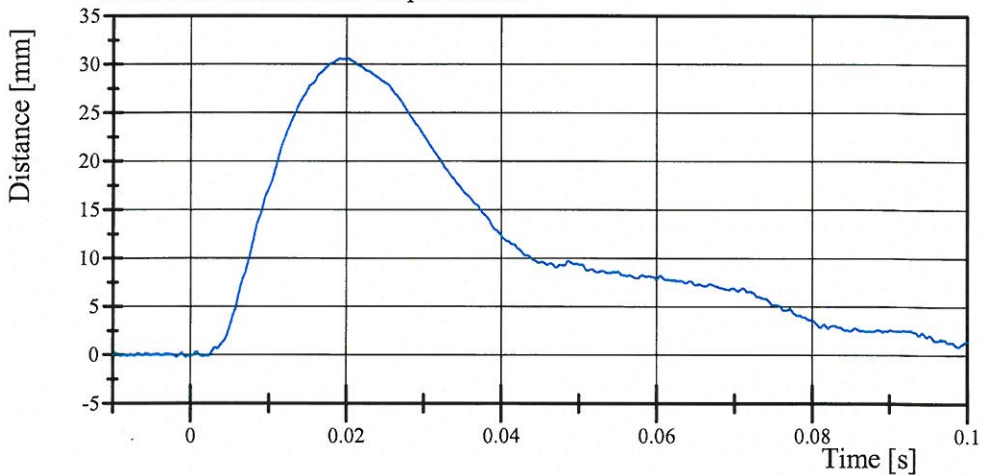


Filter Class: CFC_600

Max: 33.4 mm at 0.0 s

Min: -0.4 mm at -0.0 s

Lower Abdominal Rib Displacement

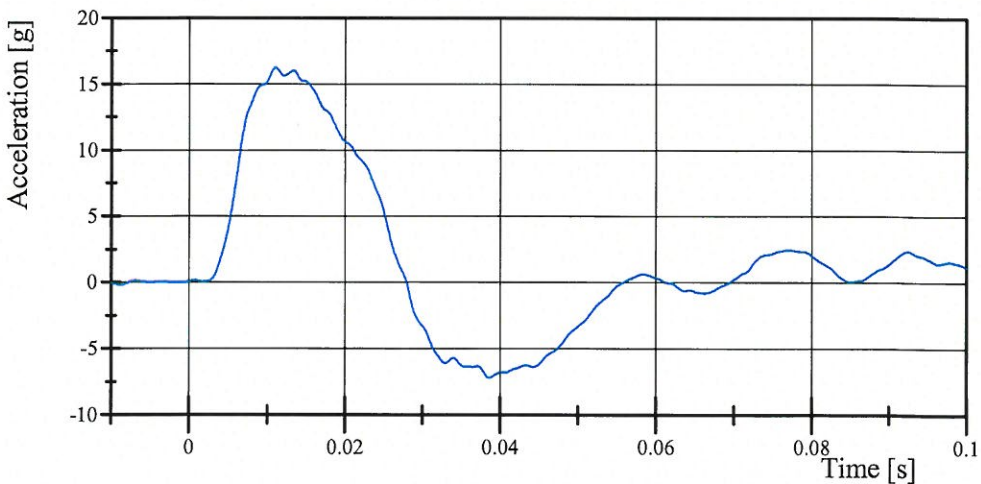


Filter Class: CFC_600

Max: 30.6 mm at 0.0 s

Min: -0.4 mm at -0.1 s

Lower Spine Acceleration (Y)



Filter Class: CFC_180

Max: 16.2 gn at 0.0 s

Min: -7.2 gn at 0.0 s

Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

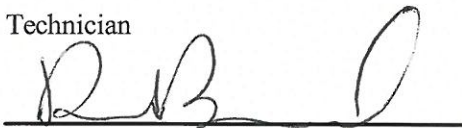
Test Date: 12/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.75 m/s	Yes
Impactor Force	(-6,800) - (-8,200) N	-7,039.0 N	Yes
Pelvis Lateral Acceleration	37 - 47 g	41.1 g	Yes
Lower Spine Lateral Acceleration	10 - 14 g	11.3 g	Yes

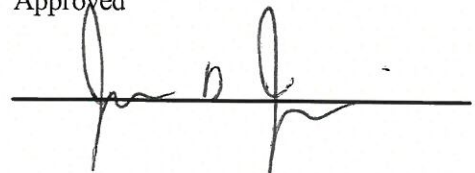
Test meets specifications.

Comments:

Technician



Approved

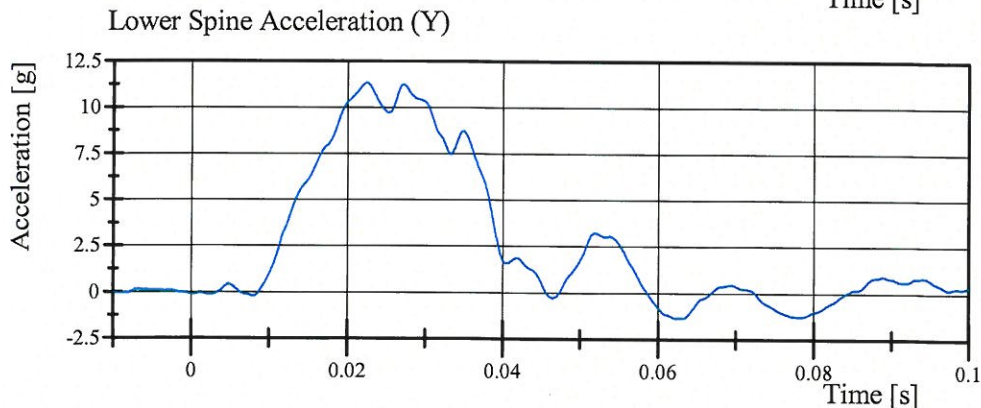
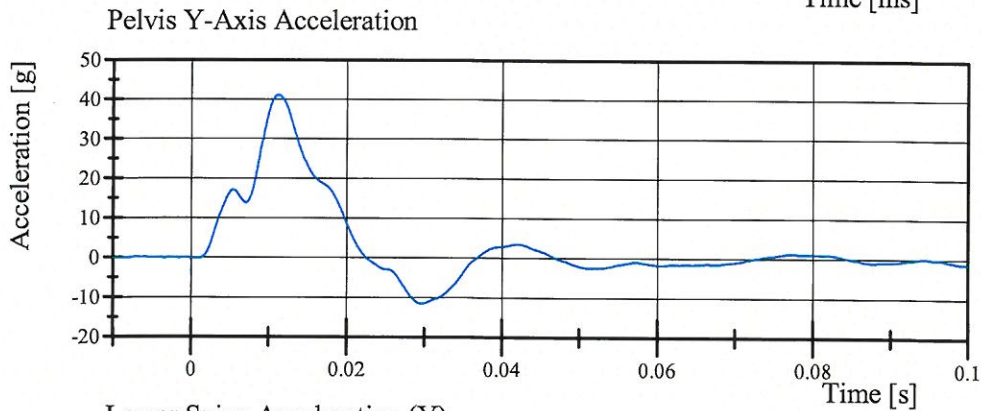
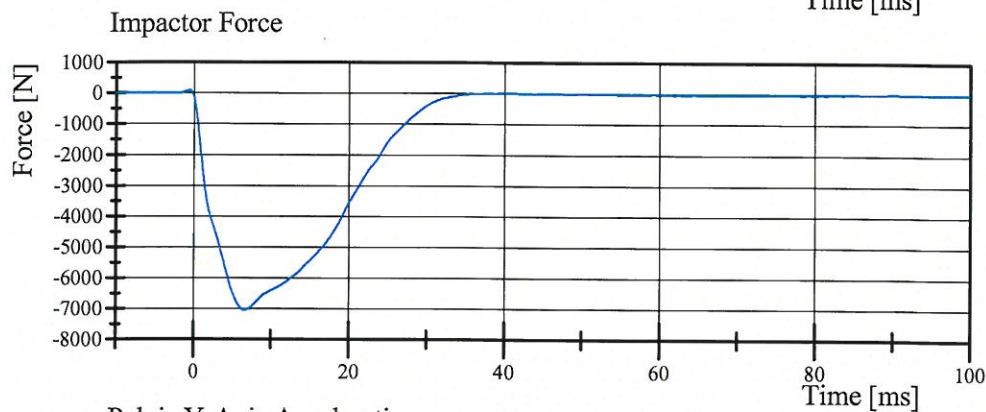
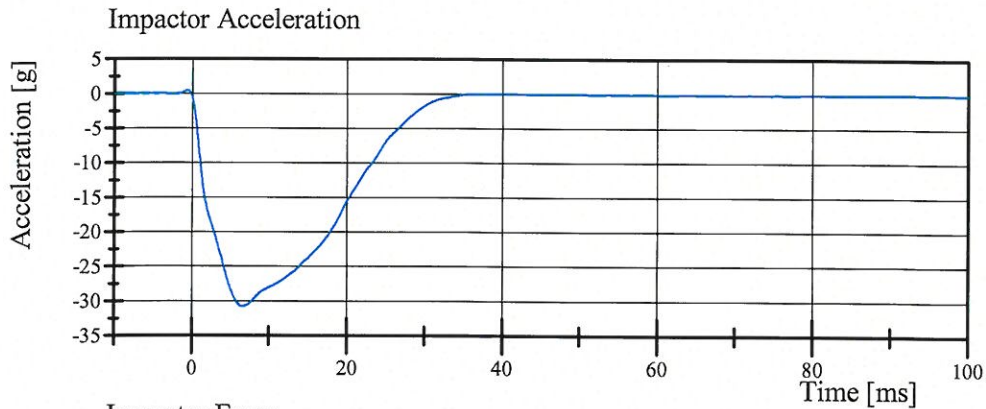


Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID ISO 15830-2 Serial No. 016 Certification No. 11-2

Test Date: 12/6/2012



Calibration Test Results

Pre-Test

WorldSID: 236

Configured for Left Side Impact

Transportation Research Center Inc.

Front Head Drop

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	237.5 g	No
Peak Head Lateral Acceleration	(-15) - 15 g	-6.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

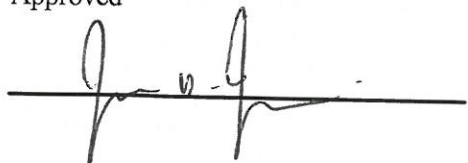
Test does not meet specifications.

Comments: OK per A.Louden

Technician



Approved

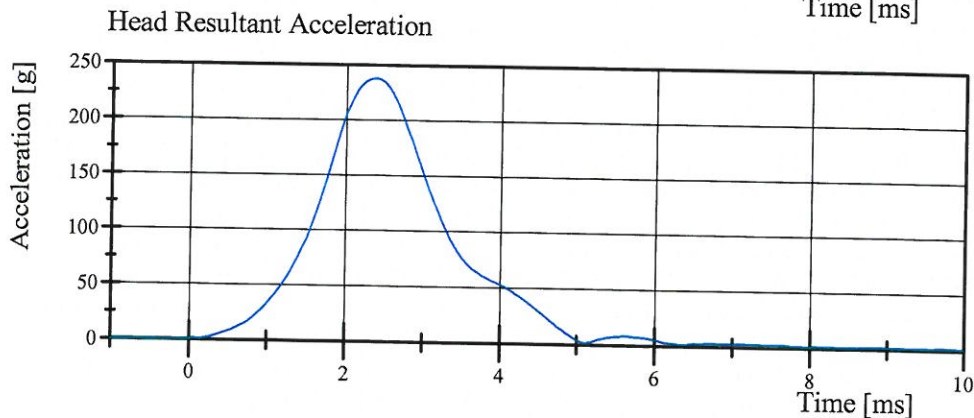
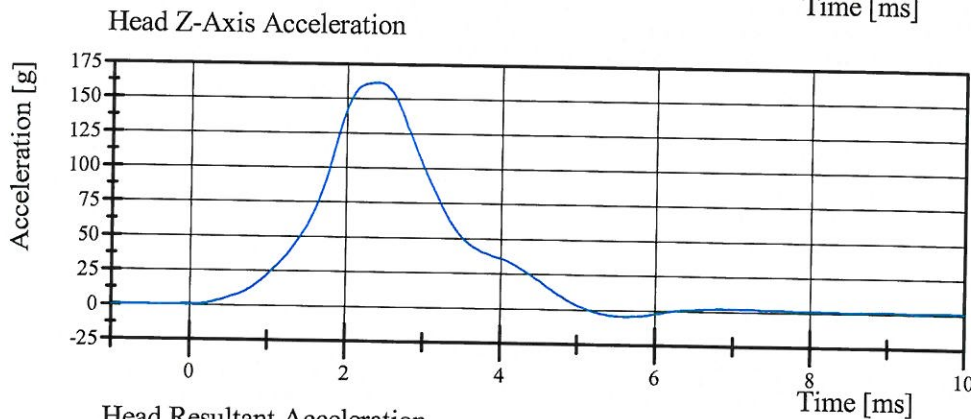
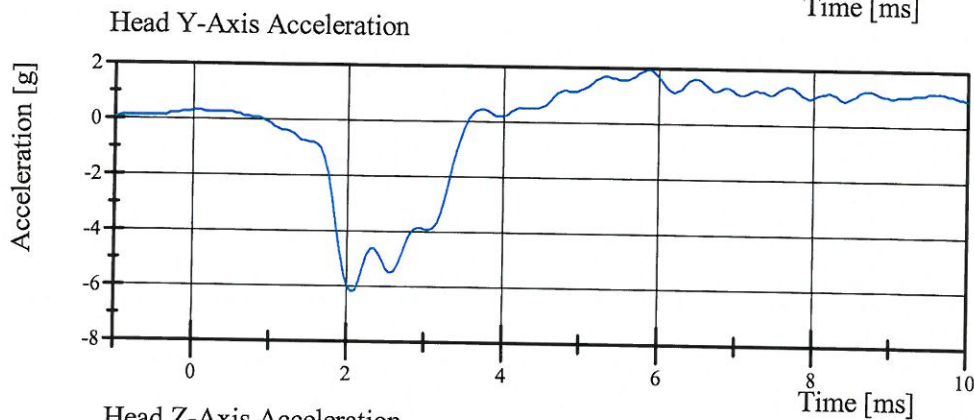
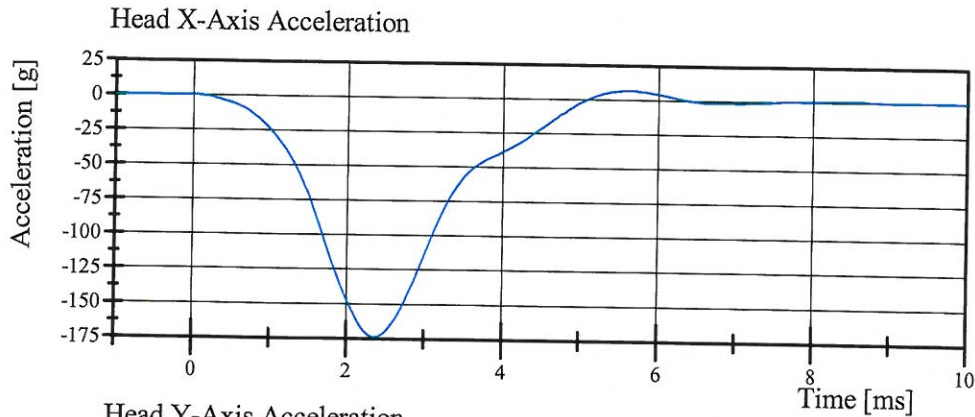


Transportation Research Center Inc.

Front Head Drop

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/8/2013



Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-5

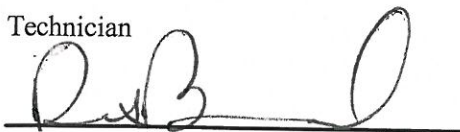
Test Date: 1/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Peak Head Resultant Acceleration	124 - 149 g	107.6 g	No
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.1 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

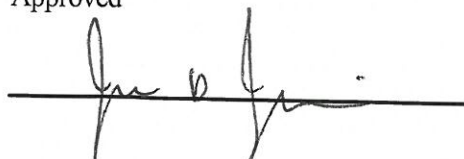
Test does not meet specifications.

Comments: OK per A.Louden

Technician



Approved

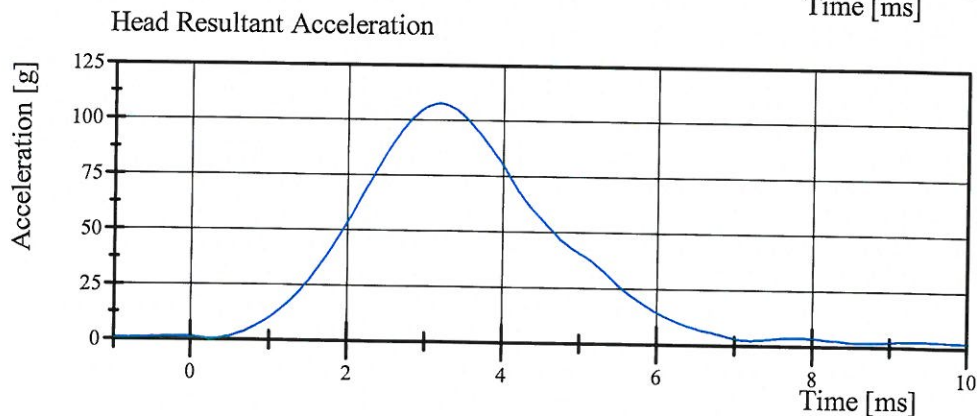
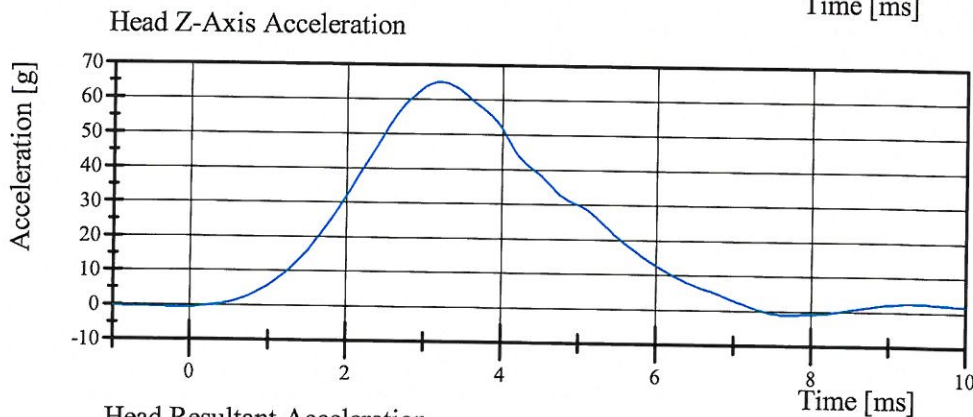
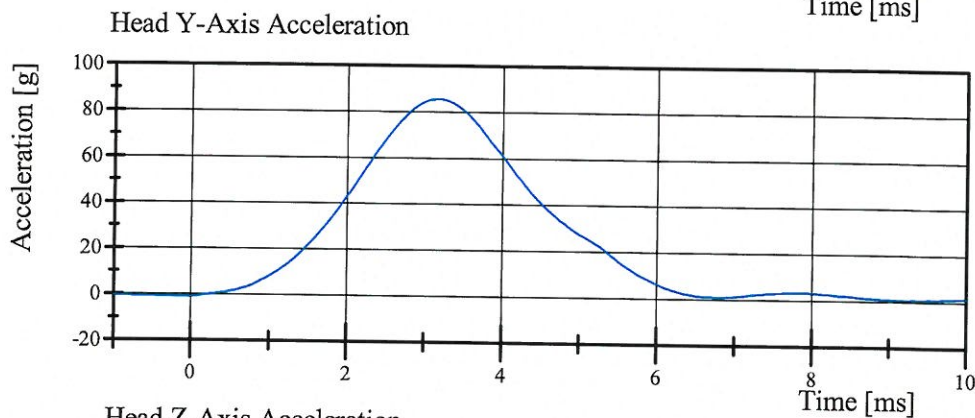
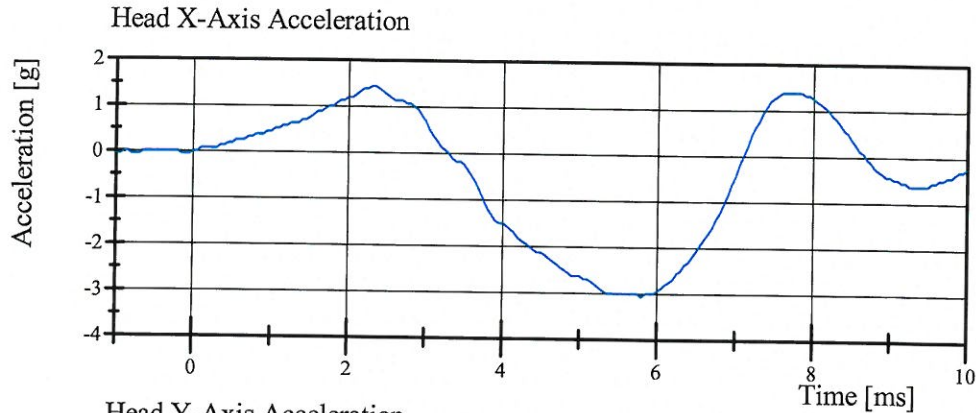


Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-5

Test Date: 1/8/2013



Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Peak Head Resultant Acceleration	124 - 149 g	113.5 g	No
Peak Head Longitudinal Acceleration	(-15) - 15 g	-4.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test does not meet specifications.

Comments: OK per A.Louden

Technician



Approved

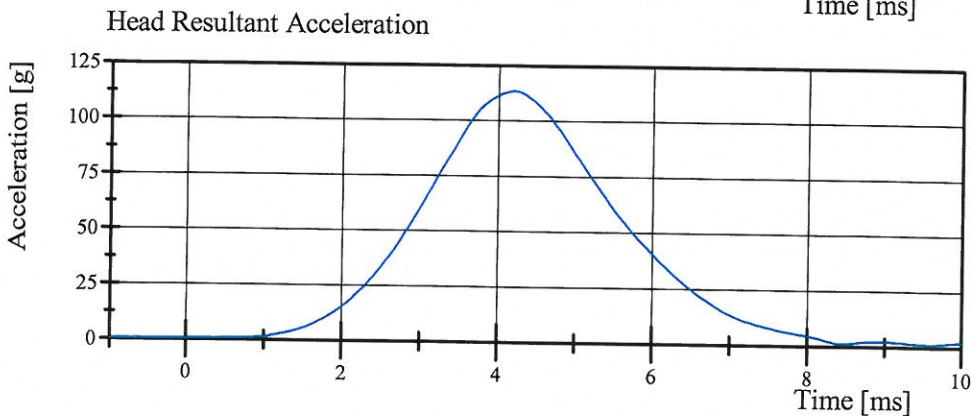
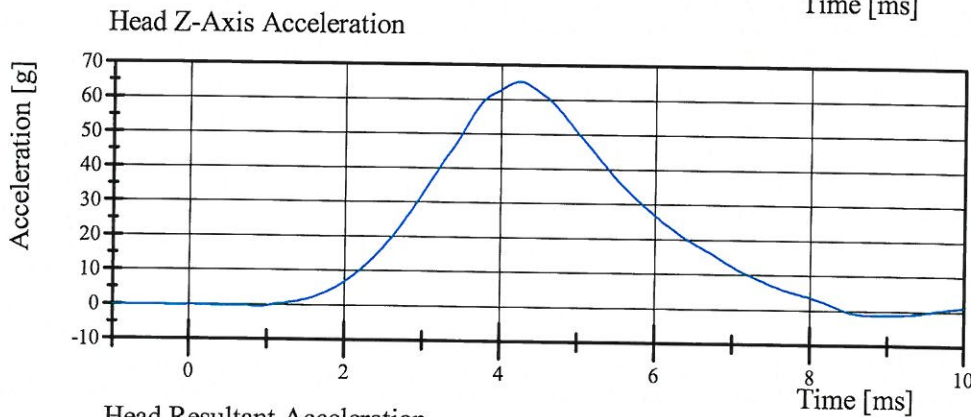
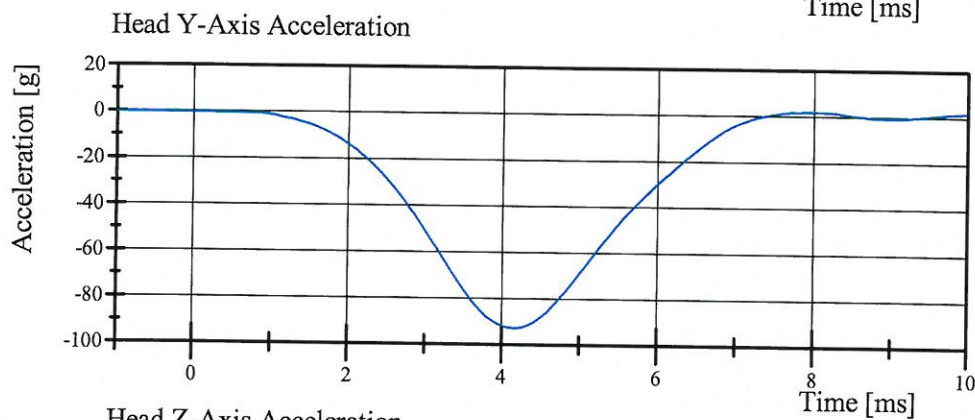
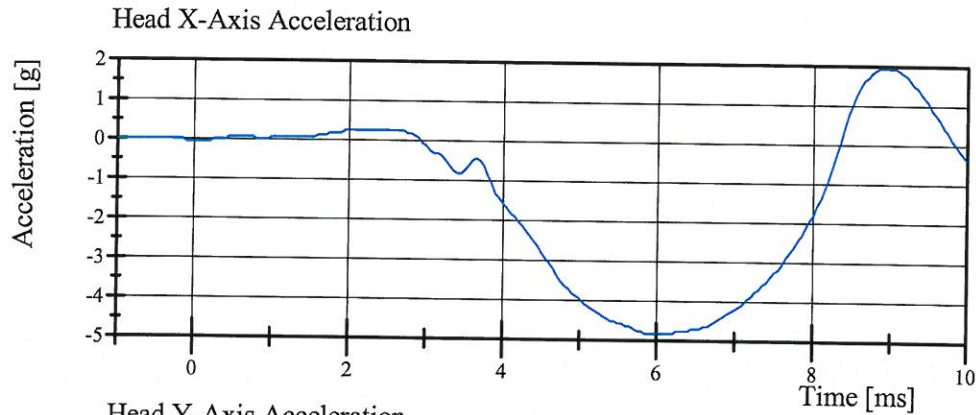


Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/8/2013



Transportation Research Center Inc.

Left Lateral Neck

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/4/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-3.3) - (-3.5) m/s	-3.39 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	0.77 - 1.04 m/s	0.915 m/s	Yes
Change at 8 ms	1.6 - 2.16 m/s	1.854 m/s	Yes
Change at 12 ms	2.43 - 3.29 m/s	2.873 m/s	Yes
Maximum Headform Flexion	(-58.5) - (-71.4) deg	-62.90 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	57.3 - 76.5 ms	60.00 ms	Yes
Total Neck Occipital Condyles Moment	34.2 - 51.0 N·m	44.41 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	69.4 - 93.3 ms	81.35 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-38.4) - (-46.9) °	-39.86 °	Yes
Time of Peak	56.0 - 68.5 ms	60.45 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-33.9) - (-41.5) °	-34.83 °	Yes
Time of Peak	56.5 - 69.1 ms	60.35 ms	Yes

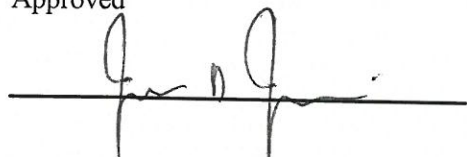
Test meets specifications.

Comments:

Technician



Approved

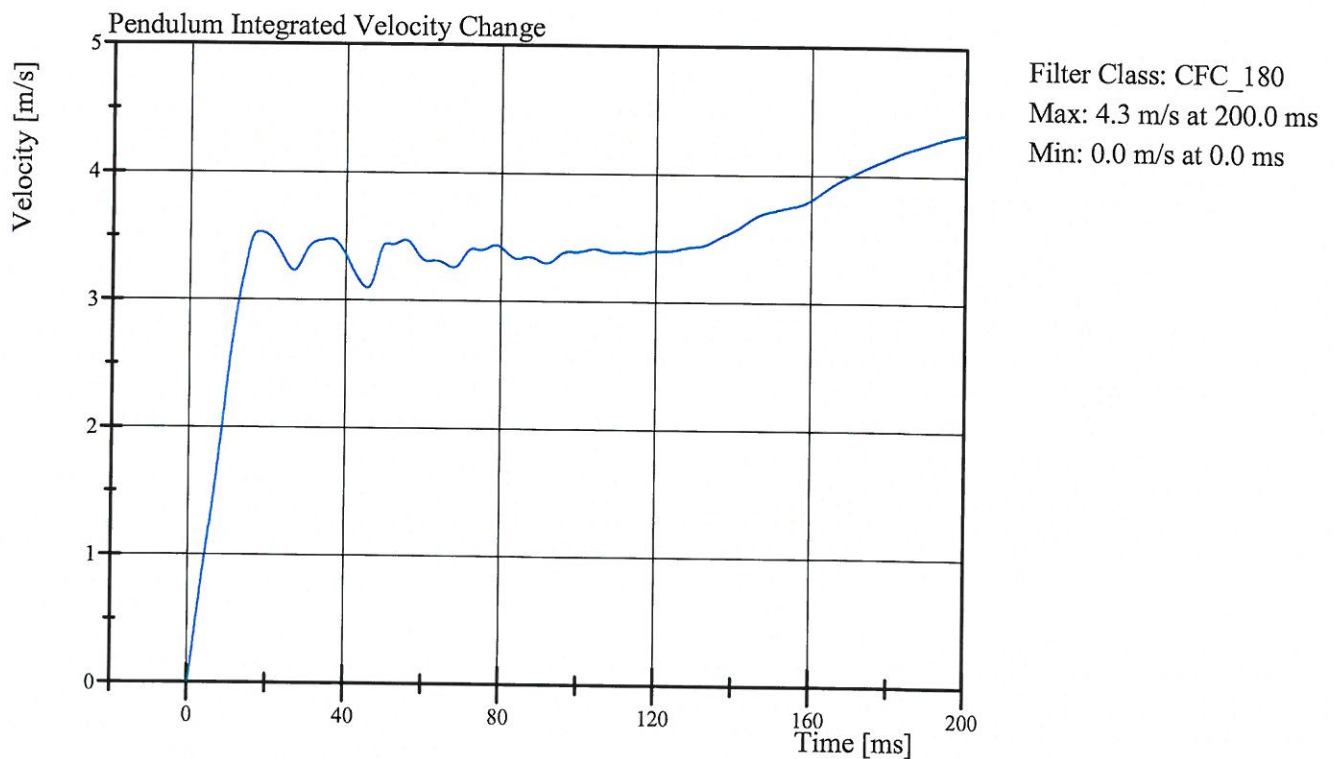
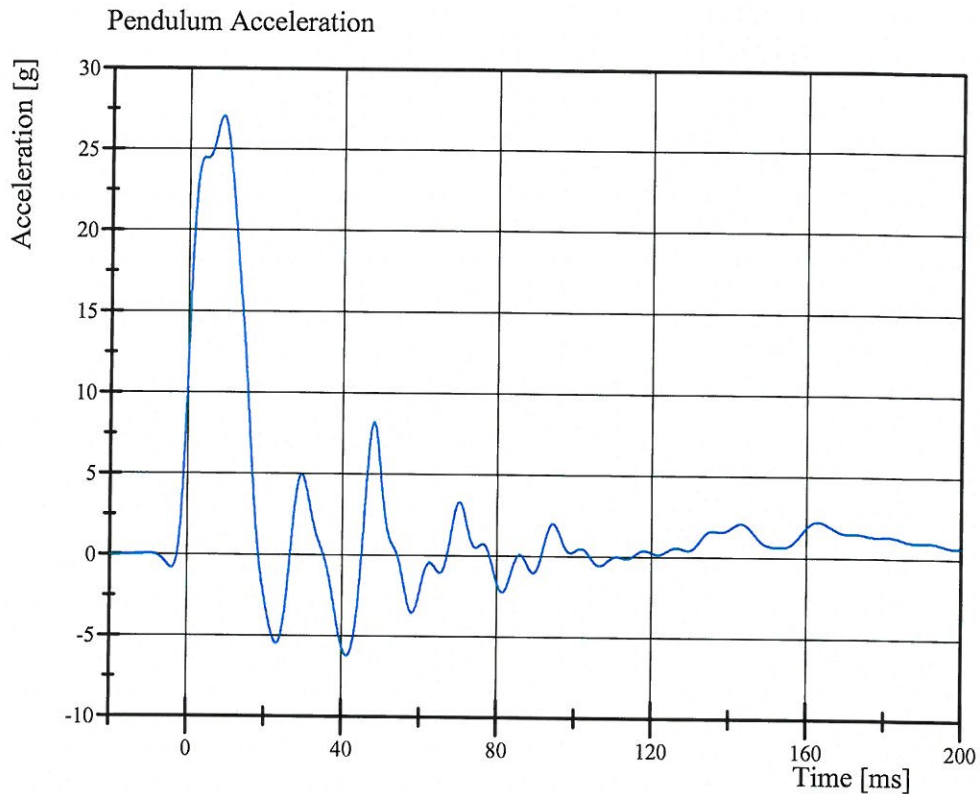


Transportation Research Center Inc.

Left Lateral Neck

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/4/2013



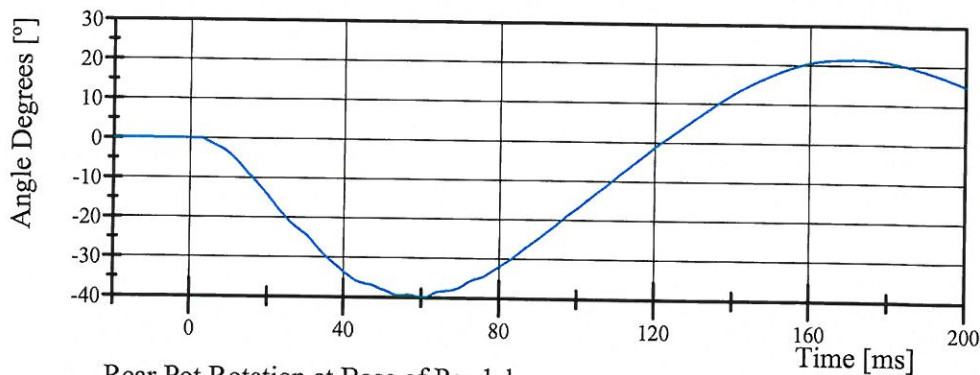
Transportation Research Center Inc.

Left Lateral Neck

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

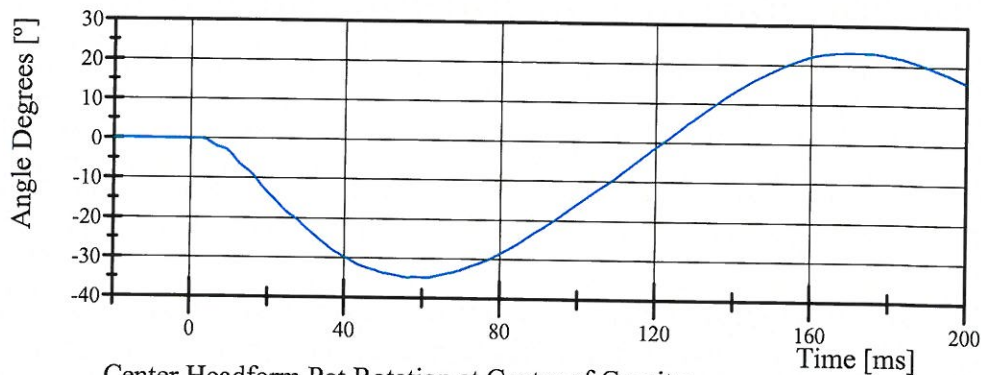
Test Date: 1/4/2013

Forward Pot Rotation at Base of Pendulum



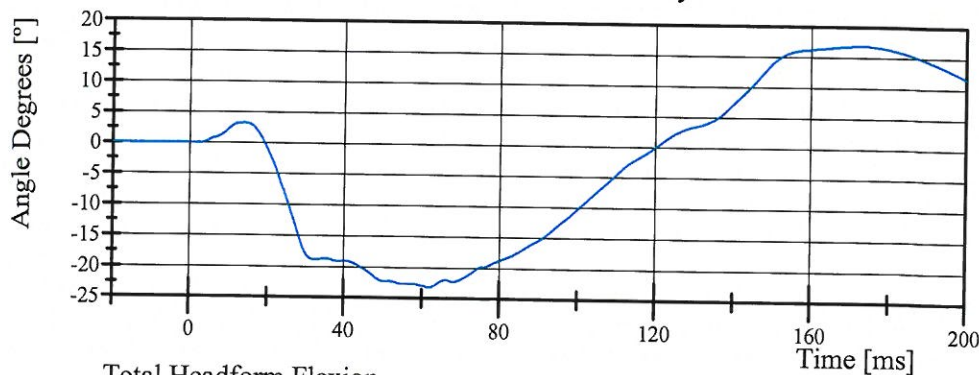
Filter Class: CFC_180
Max: 21.6 ° at 171.0 ms
Min: -39.9 ° at 60.5 ms

Rear Pot Rotation at Base of Pendulum



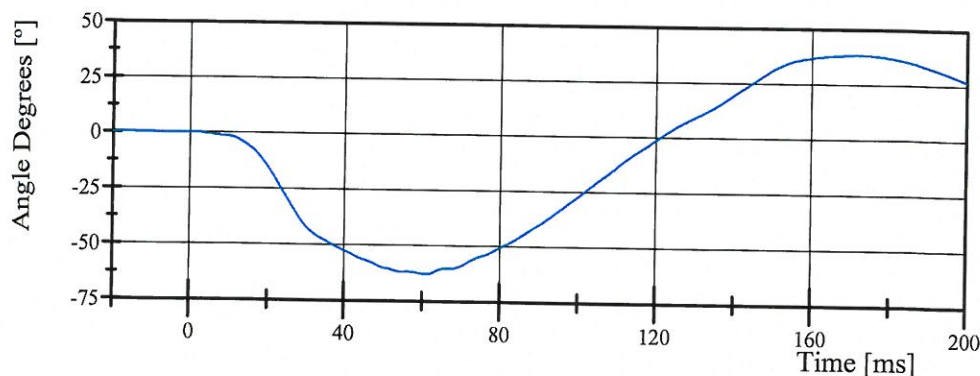
Filter Class: CFC_180
Max: 23.3 ° at 171.8 ms
Min: -34.8 ° at 60.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 16.8 ° at 173.2 ms
Min: -23.2 ° at 61.9 ms

Total Headform Flexion



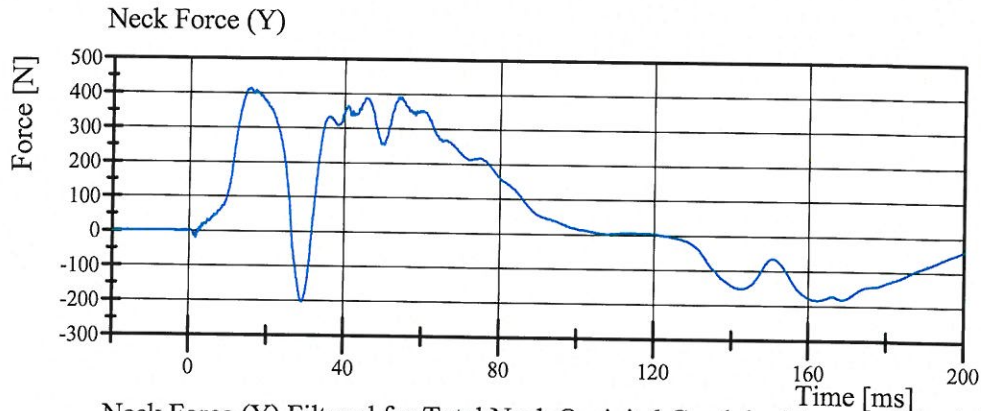
Filter Class: CFC_180
Max: 38.4 ° at 172.0 ms
Min: -62.9 ° at 61.1 ms

Transportation Research Center Inc.

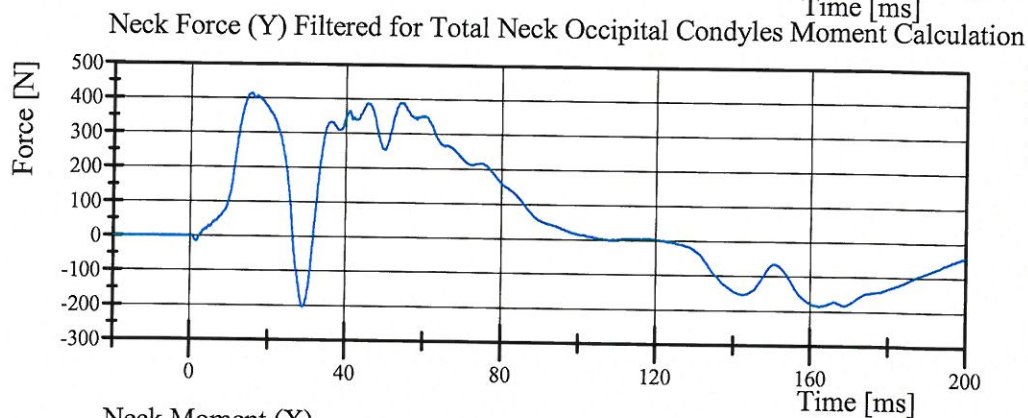
Left Lateral Neck

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

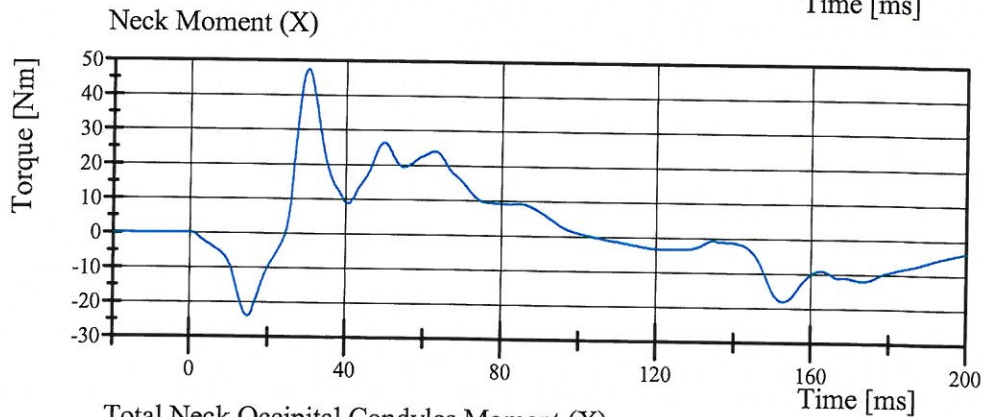
Test Date: 1/4/2013



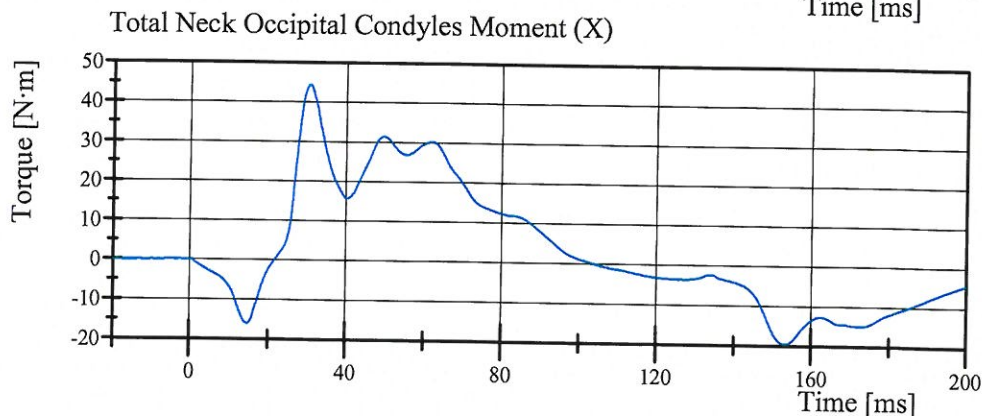
Filter Class: CFC_1000
Max: 413.3 N at 15.5 ms
Min: -204.5 N at 29.1 ms



Filter Class: CFC_600
Max: 412.9 N at 15.5 ms
Min: -203.9 N at 29.1 ms



Filter Class: CFC_600
Max: 47.4 Nm at 30.1 ms
Min: -24.1 Nm at 14.9 ms



Filter Class: Without_(Consta
Max: 44.4 N·m at 30.5 ms
Min: -19.6 N·m at 153.2 ms

Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-2

Test Date: 1/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.21 m/s	Yes
Impactor Force	(-1,580) - (-2,280) N	-2,124.0 N	Yes
Shoulder Displacement	23.4 - 36.6 mm	29.94 mm	Yes

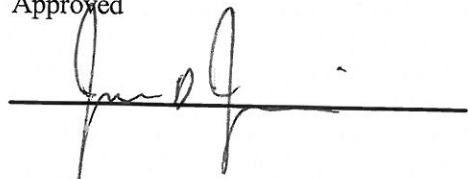
Test meets specifications.

Comments:

Technician



Approved



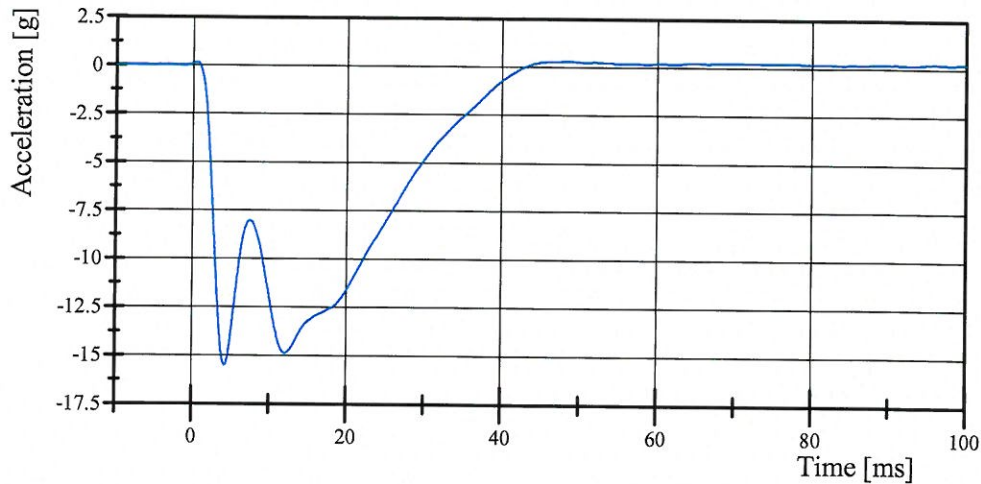
Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-2

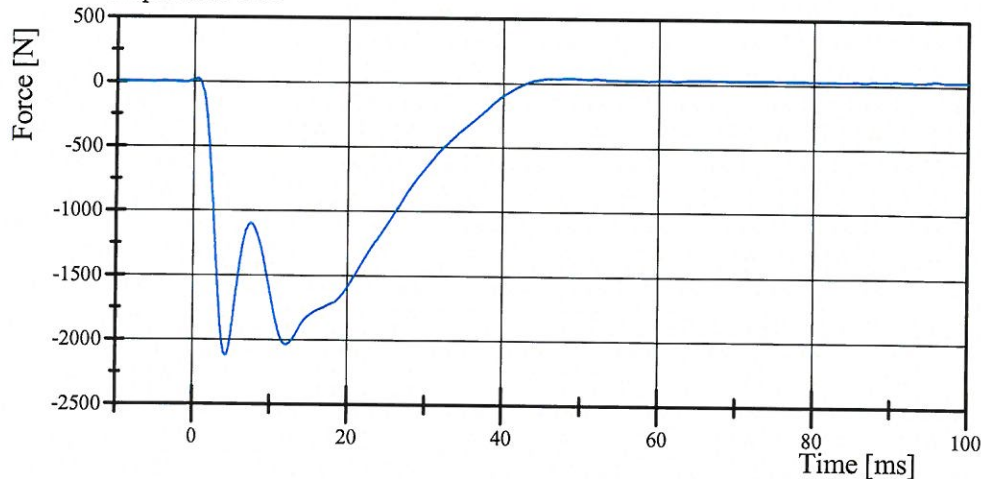
Test Date: 1/8/2013

Impactor Acceleration



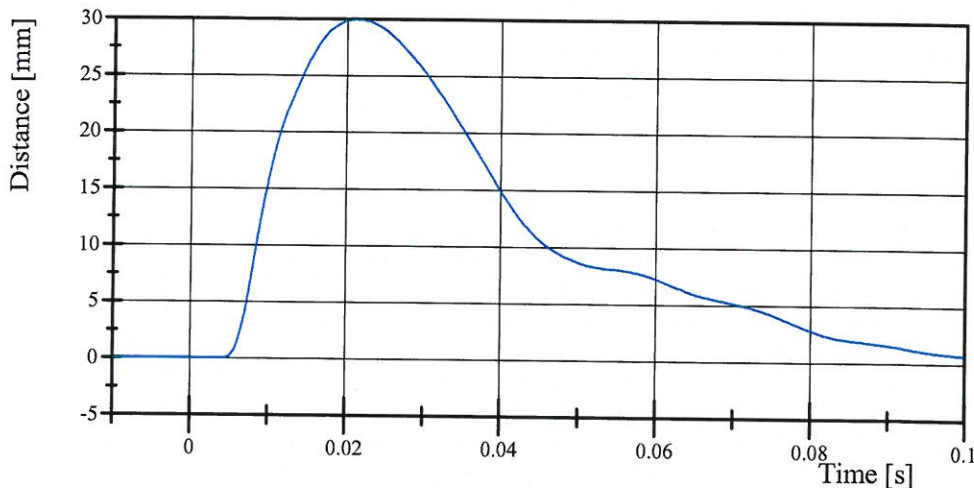
Filter Class: CFC_180
Max: 0.3 gn at 48.5 ms
Min: -15.5 gn at 4.3 ms

Impactor Force



Filter Class: CFC_180
Max: 40.3 N at 48.5 ms
Min: -2,124.0 N at 4.3 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 29.9 mm at 0.0 s
Min: -0.1 mm at 0.2 s

Transportation Research Center Inc.

Left Lateral Thorax with Arm

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.67 m/s	Yes
Impactor Force	(-5,020) - (-6,130) N	-5,800.0 N	Yes
Upper Thorax Rib Displacement	18.3 - 26.4 mm	20.00 mm	Yes
Center Thorax Rib Displacement	21.6 - 26.4 mm	23.18 mm	Yes
Lower Thorax Rib Displacement	19.7 - 26.6 mm	22.84 mm	Yes
Upper Spine Lateral Acceleration	34.7 - 52 g	46.13 g	Yes
Lower Spine Lateral Acceleration	44.5 - 54.9 g	53.46 g	Yes

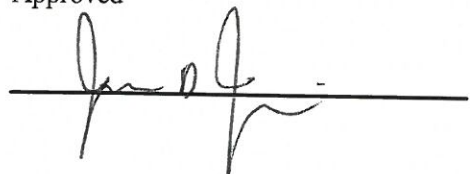
Test meets specifications.

Comments:

Technician



Approved

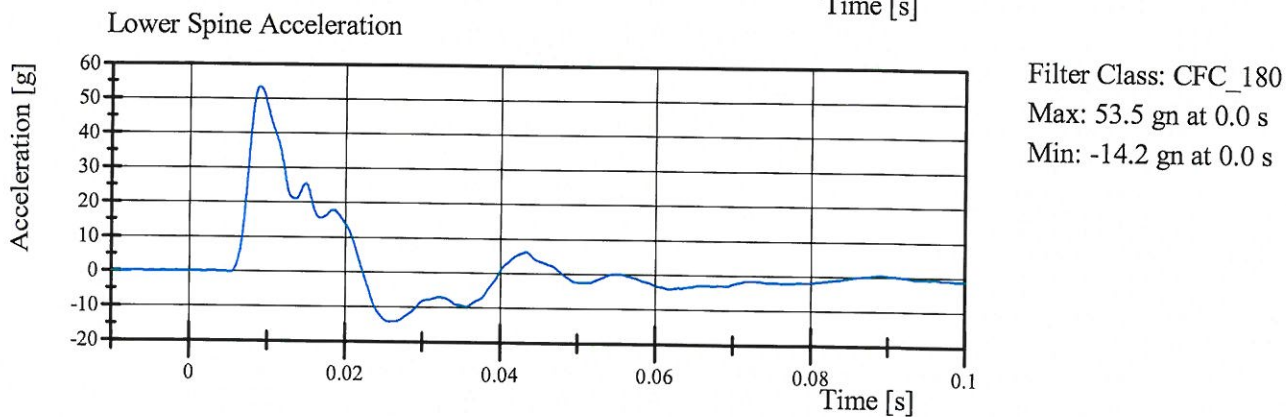
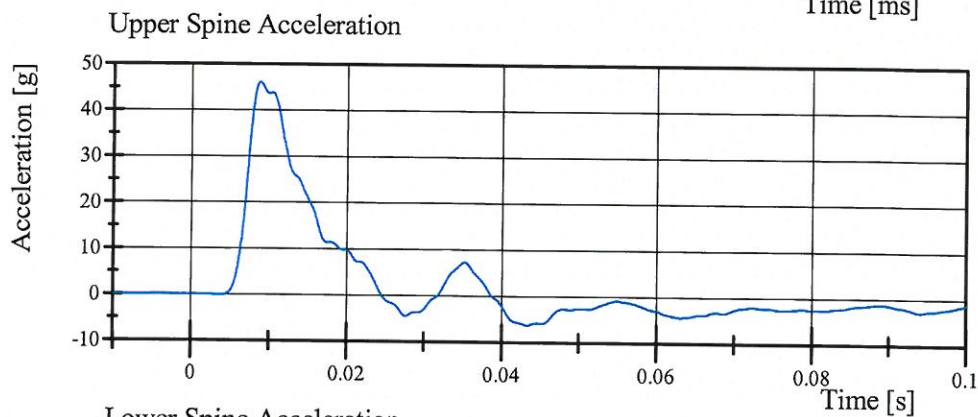
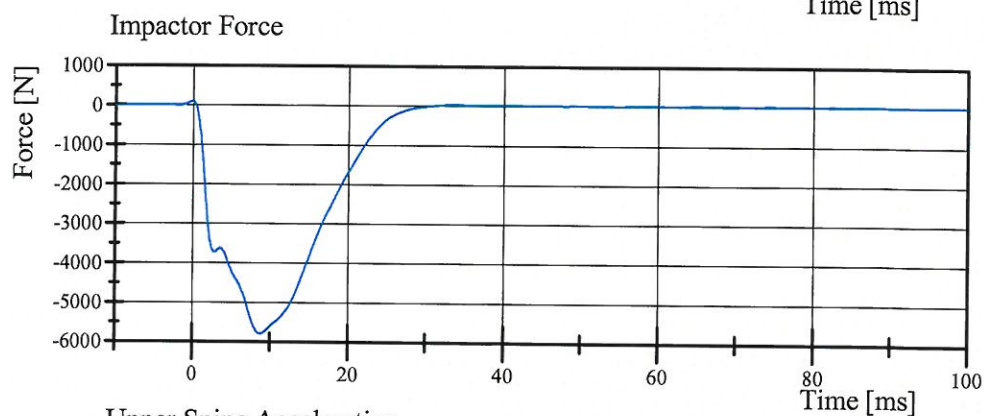
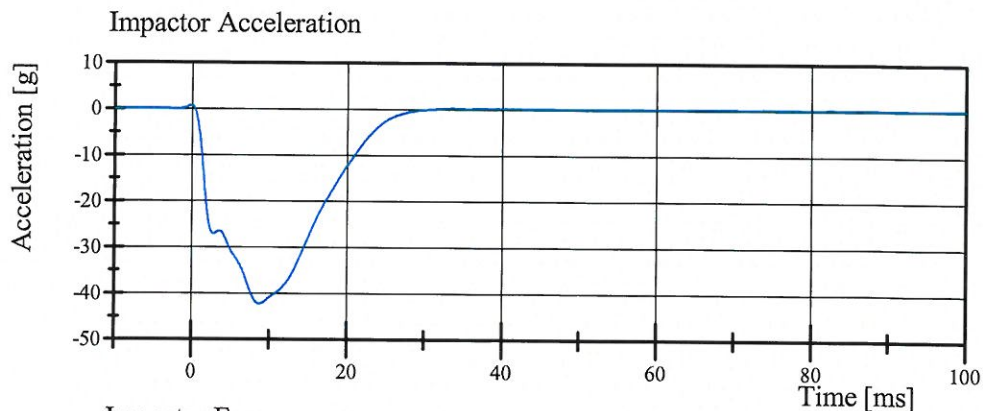


Transportation Research Center Inc.

Left Lateral Thorax with Arm

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/8/2013



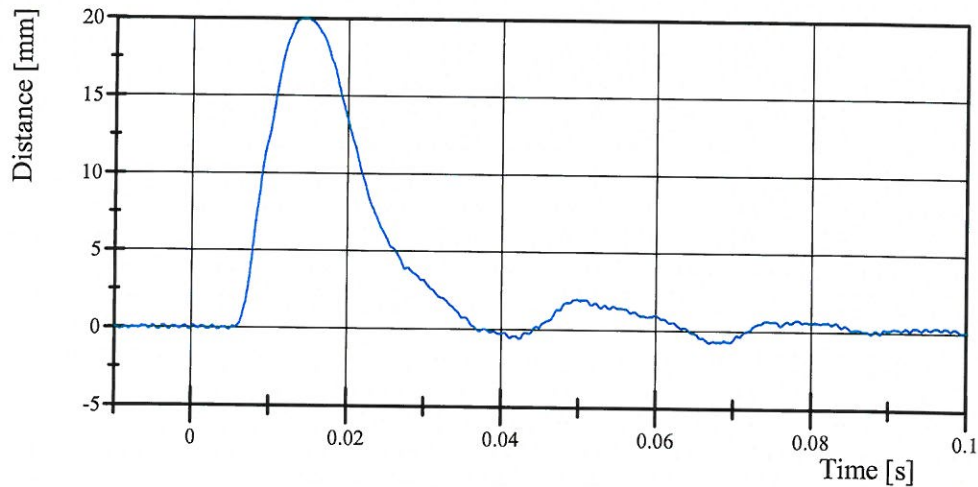
Transportation Research Center Inc.

Left Lateral Thorax with Arm

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-1

Test Date: 1/8/2013

Upper Thorax Rib Displacement

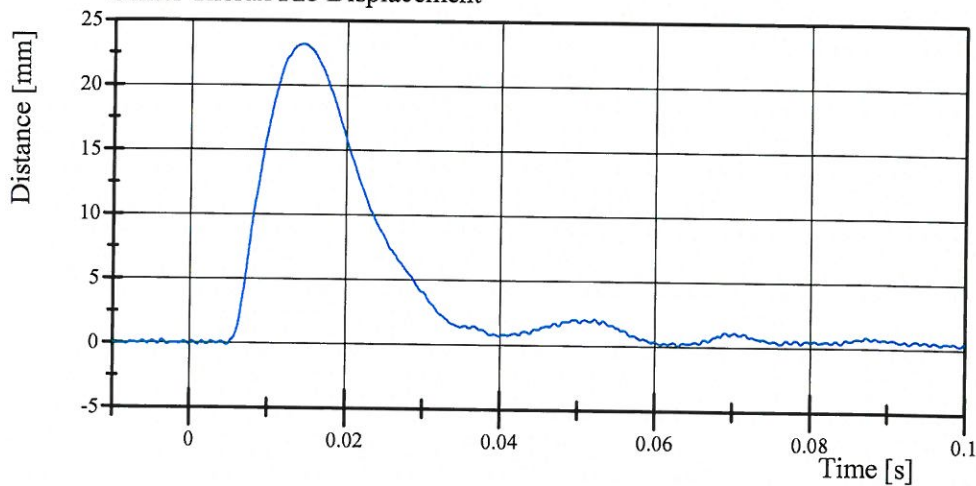


Filter Class: CFC_600

Max: 20.0 mm at 0.0 s

Min: -0.7 mm at 0.1 s

Center Thorax Rib Displacement

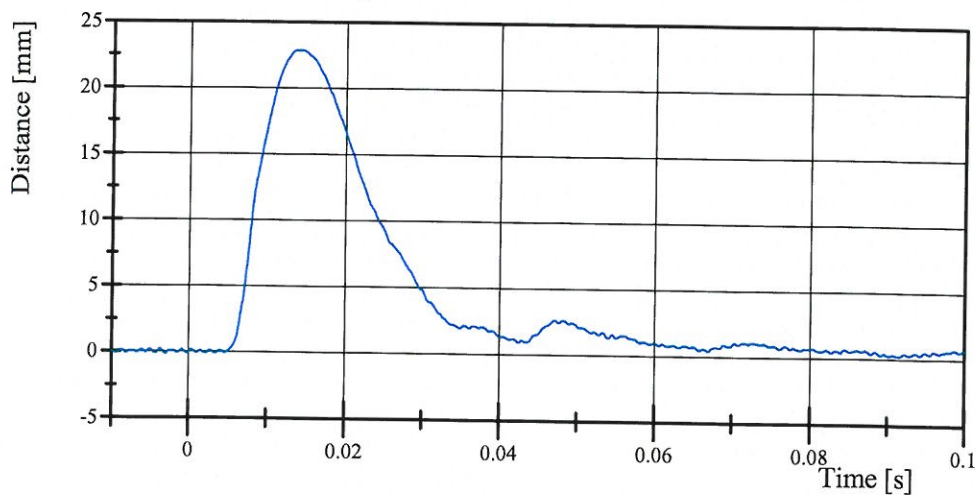


Filter Class: CFC_600

Max: 23.2 mm at 0.0 s

Min: -0.2 mm at -0.1 s

Lower Thorax Rib Displacement



Filter Class: CFC_600

Max: 22.8 mm at 0.0 s

Min: -0.4 mm at 0.2 s

Transportation Research Center Inc.

Left Lateral Thorax without Arm

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-3

Test Date: 1/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.21 m/s	Yes
Impactor Force	(-2,640) - (-3,220) N	-3,336.1 N	No
Upper Thorax Rib Displacement	20.5 - 27.7 mm	20.56 mm	Yes
Center Thorax Rib Displacement	21.7 - 26.7 mm	22.19 mm	Yes
Lower Thorax Rib Displacement	20.9 - 27.3 mm	23.02 mm	Yes
Upper Spine Lateral Acceleration	21.2 - 27.5 g	24.95 g	Yes
Lower Spine Lateral Acceleration	20.6 - 28.9 g	25.20 g	Yes

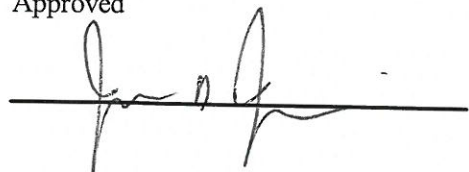
Test does not meet specifications.

Comments: OK per A.Louden

Technician



Approved

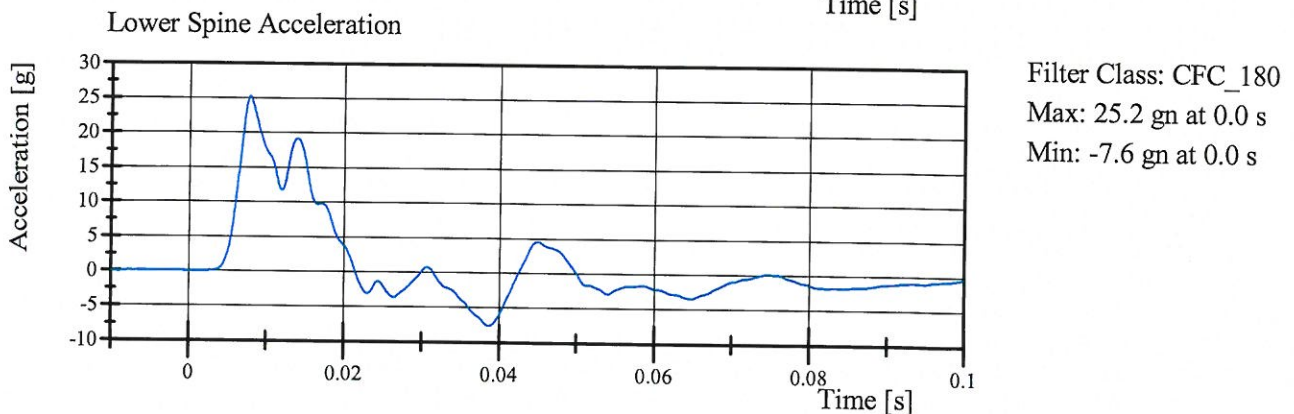
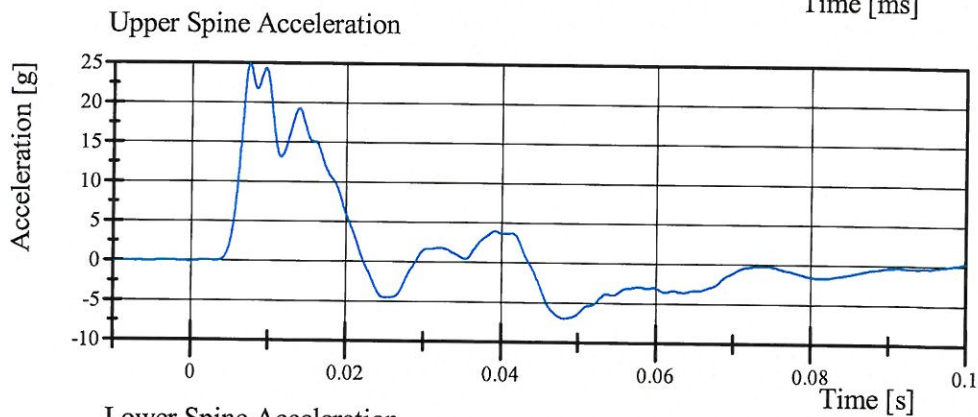
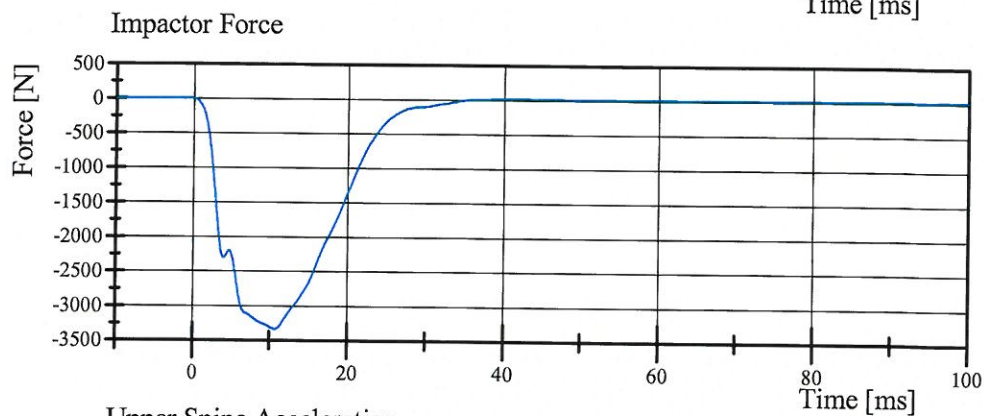
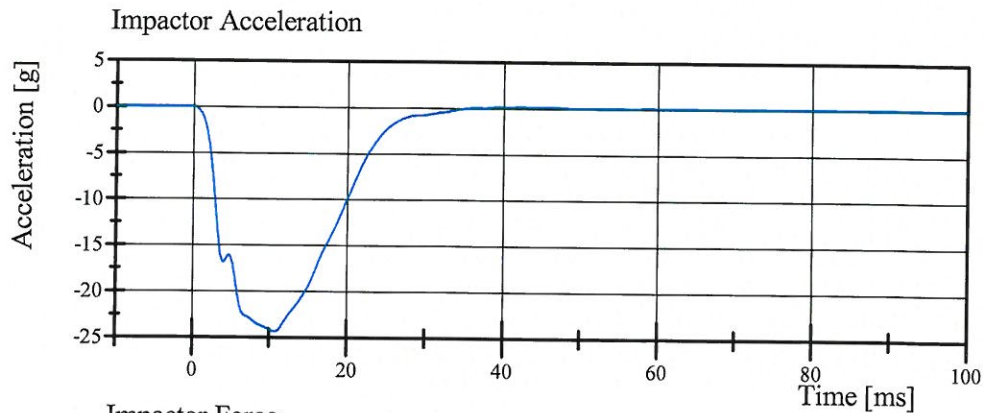


Transportation Research Center Inc.

Left Lateral Thorax without Arm

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-3

Test Date: 1/8/2013



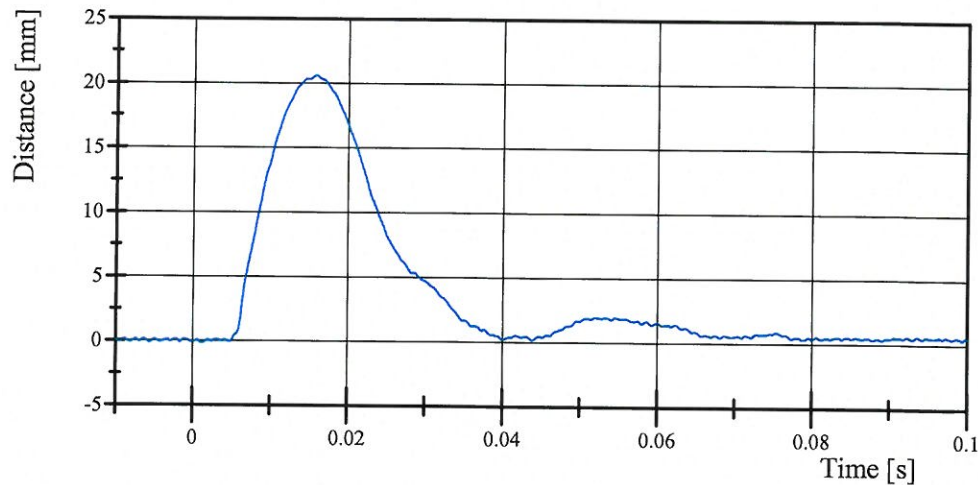
Transportation Research Center Inc.

Left Lateral Thorax without Arm

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-3

Test Date: 1/8/2013

Upper Thorax Rib Displacement

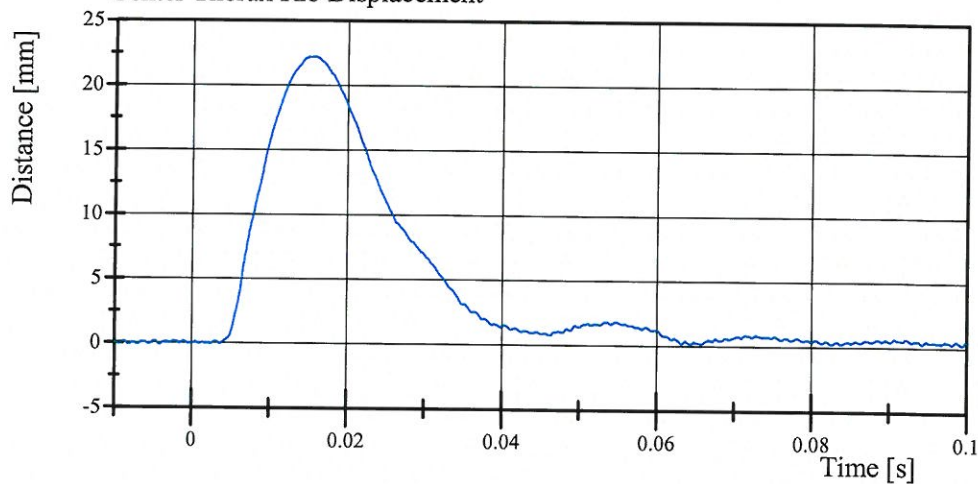


Filter Class: CFC_600

Max: 20.6 mm at 0.0 s

Min: -0.2 mm at -0.1 s

Center Thorax Rib Displacement

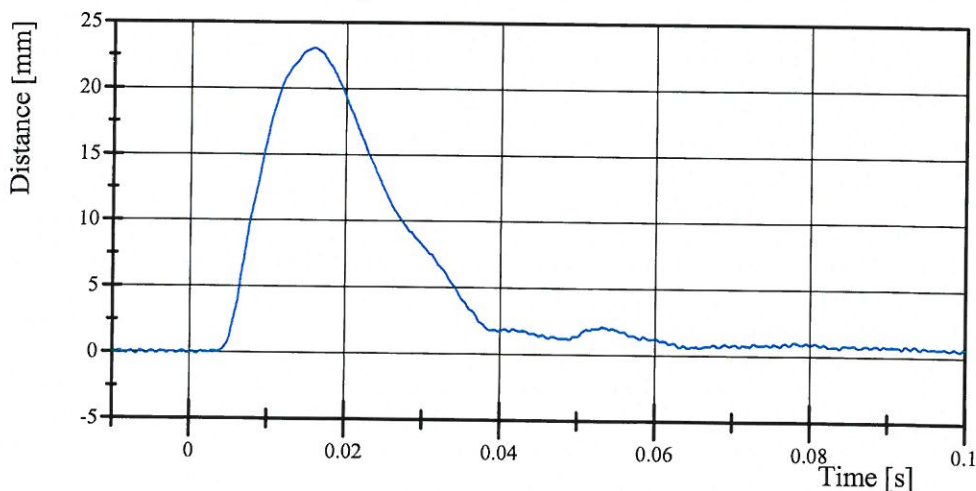


Filter Class: CFC_600

Max: 22.2 mm at 0.0 s

Min: -0.2 mm at -0.1 s

Lower Thorax Rib Displacement



Filter Class: CFC_600

Max: 23.0 mm at 0.0 s

Min: -0.2 mm at -0.1 s

Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-5

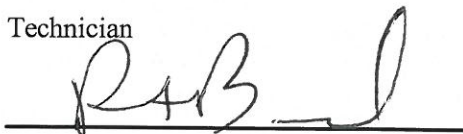
Test Date: 1/9/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.38 m/s	Yes
Impactor Force	(-2,210) - (-2,700) N	-2,694.9 N	Yes
Upper Abdominal Rib Displacement	23.1 - 31.2 mm	26.80 mm	Yes
Lower Abdominal Rib Displacement	22.7 - 27.8 mm	23.31 mm	Yes
Lower Spine Lateral Acceleration	24.4 - 30.6 g	27.63 g	Yes

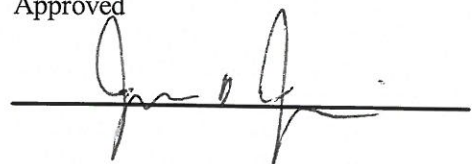
Test meets specifications.

Comments:

Technician



Approved

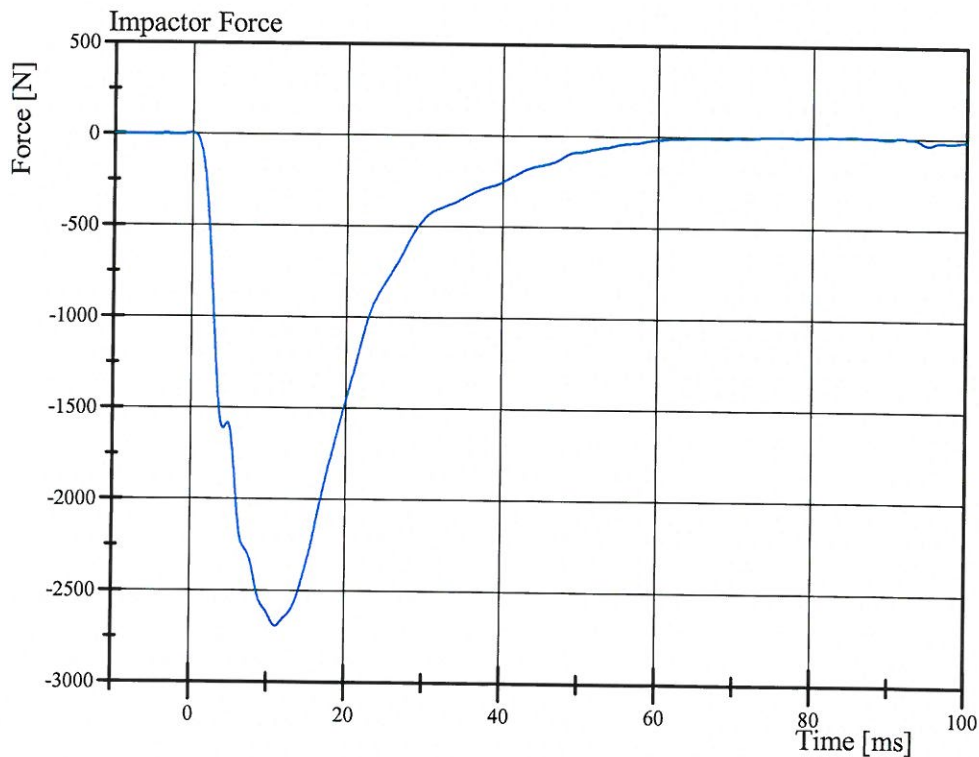
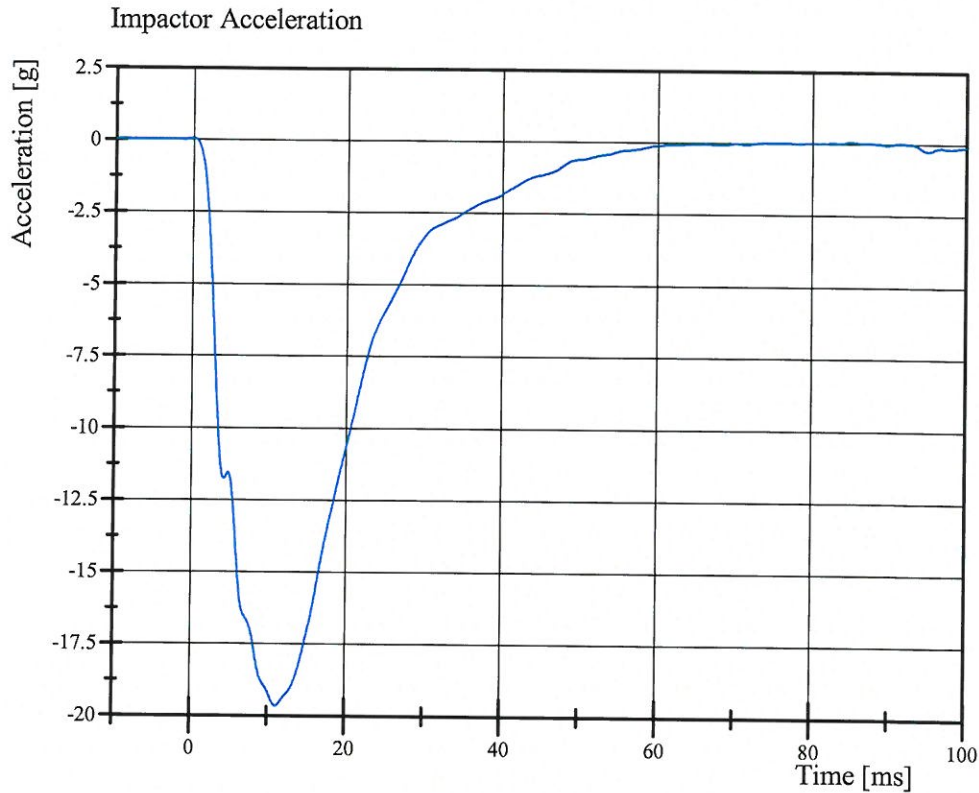


Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-5

Test Date: 1/9/2013



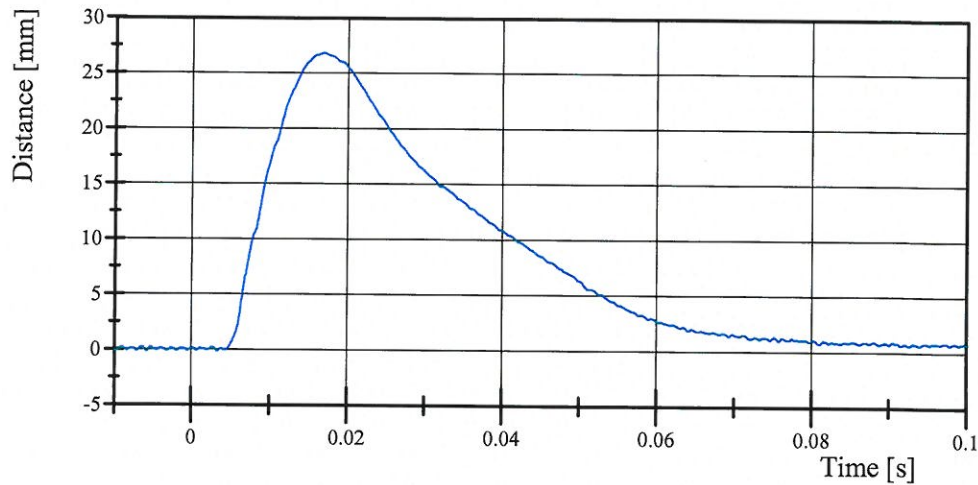
Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-5

Test Date: 1/9/2013

Upper Abdominal Rib Displacement

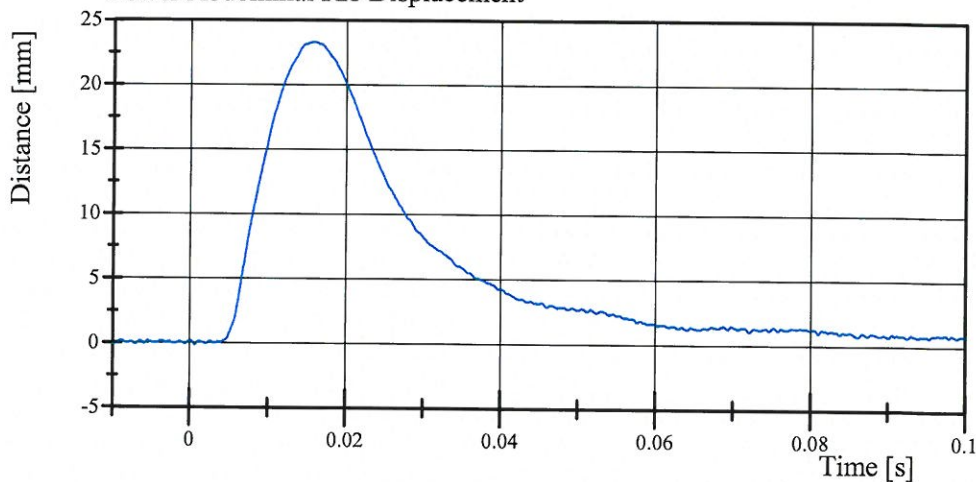


Filter Class: CFC_600

Max: 26.8 mm at 0.0 s

Min: -0.3 mm at -0.0 s

Lower Abdominal Rib Displacement

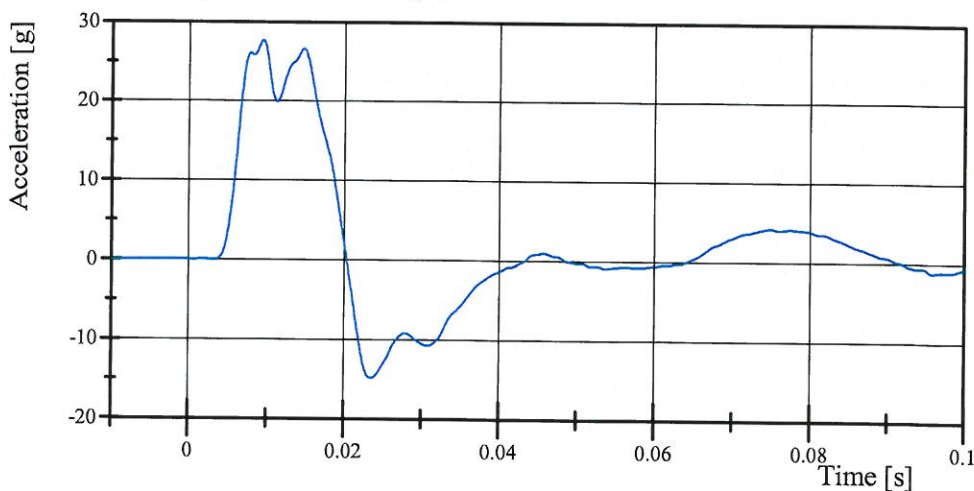


Filter Class: CFC_600

Max: 23.3 mm at 0.0 s

Min: -0.3 mm at -0.1 s

Lower Spine Acceleration (Y)



Filter Class: CFC_180

Max: 27.6 gn at 0.0 s

Min: -14.9 gn at 0.0 s

Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-4

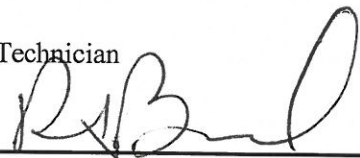
Test Date: 1/9/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.68 m/s	Yes
Impactor Force	(-4,620) - (-5,650) N	-4,658.5 N	Yes
Pelvis Lateral Acceleration	48.6 - 74.4 g	59.79 g	Yes
Lower Spine Lateral Acceleration	11.8 - 15.8 g	15.22 g	Yes
Pubic Lateral Force	(-770) - (-1,200) N	-1,104.9 N	Yes

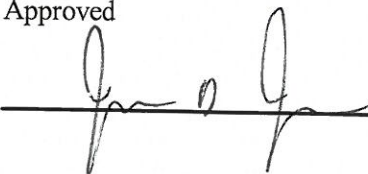
Test meets specifications.

Comments:

Technician



Approved

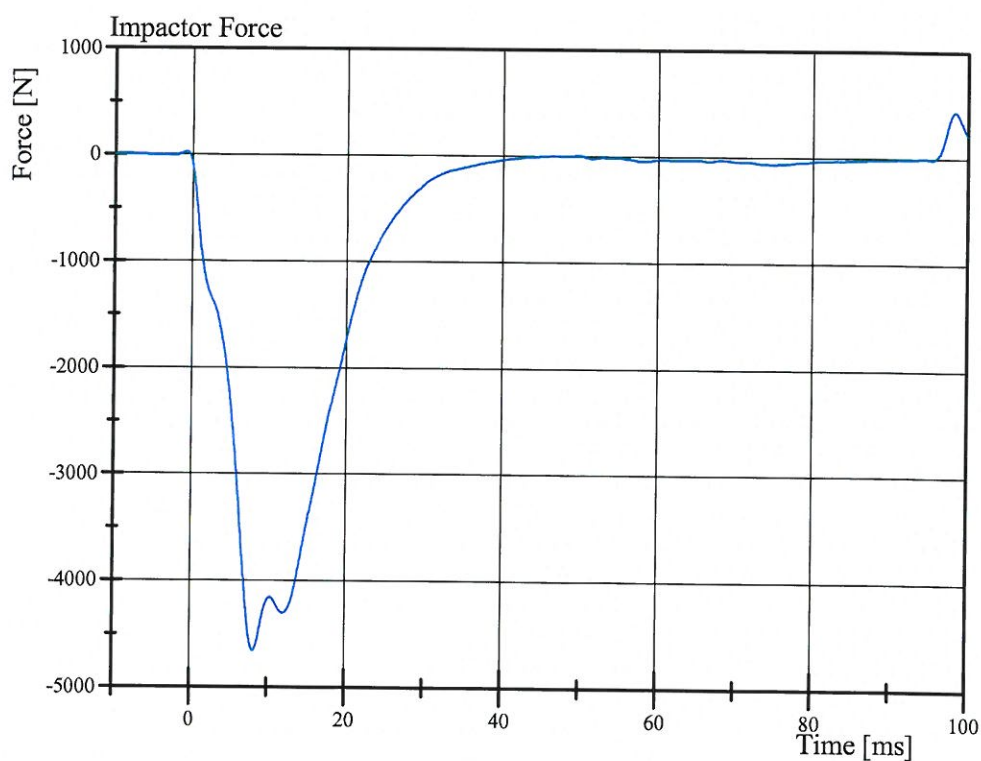
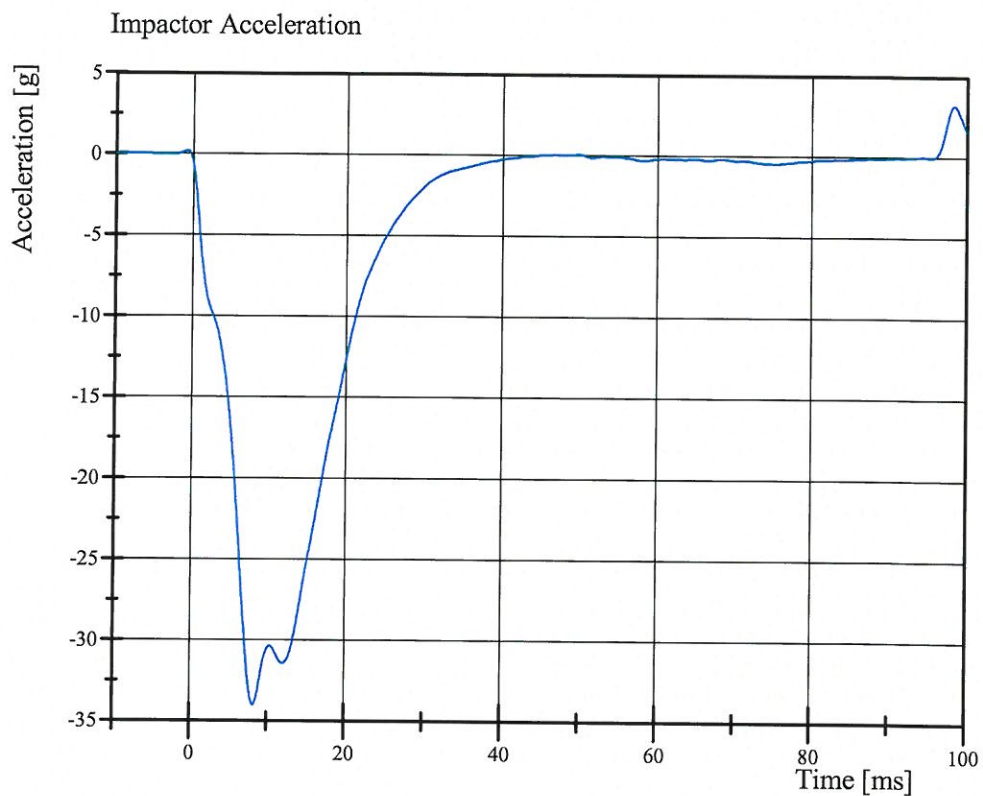


Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-4

Test Date: 1/9/2013



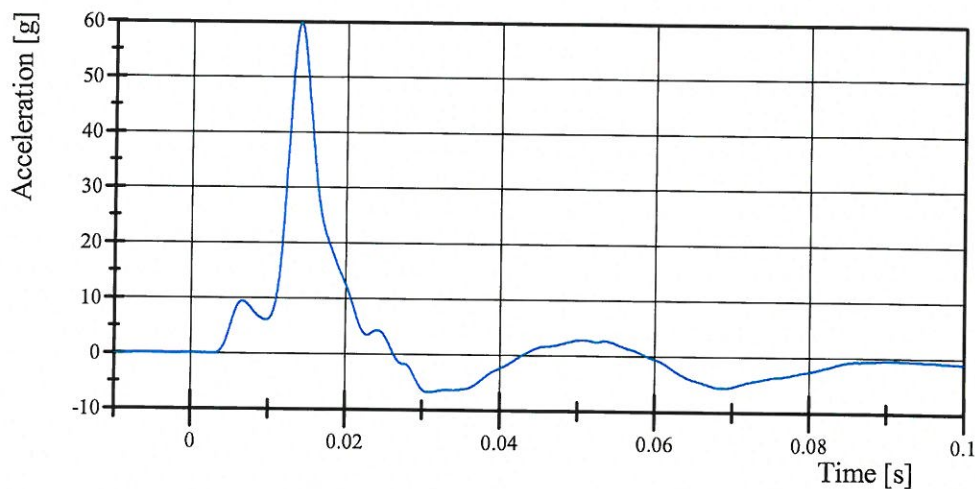
Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID W5-9900 Rev C Serial No. DG0236 Certification No. 3-4

Test Date: 1/9/2013

Pelvis Y-Axis Acceleration

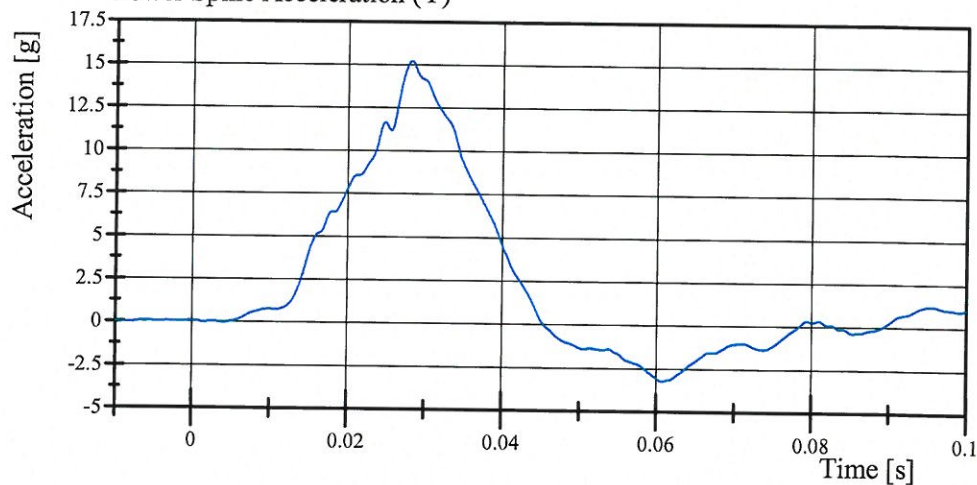


Filter Class: CFC_180

Max: 59.8 gn at 0.0 s

Min: -6.8 gn at 0.0 s

Lower Spine Acceleration (Y)

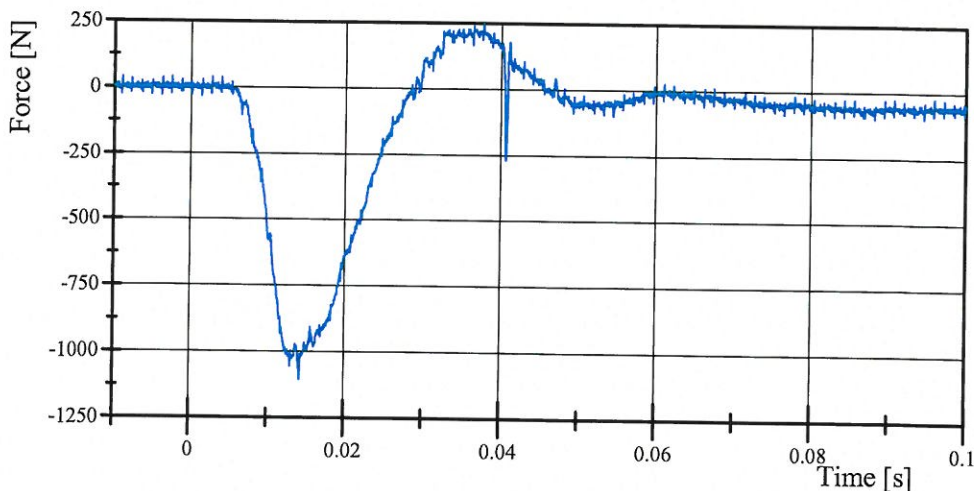


Filter Class: CFC_180

Max: 15.2 gn at 0.0 s

Min: -3.2 gn at 0.1 s

Pubic Lateral Force



Filter Class: CFC_1000

Max: 248.8 N at 0.0 s

Min: -1,104.9 N at 0.0 s

Appendix D

Miscellaneous Test 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 130124

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity
1	Trig D1	10ZERO000000VO0A	EVENT	1	Logic	Bipolar
2	ARS-12K-ARS0238	11HEADCG00WSANXA	Head X-Axis Angular Displacement	12000	°/s	Bipolar
3	ARS-12K-ARS0253	11HEADCG00WSANYA	Head Y-Axis Angular Displacement	12000	°/s	Bipolar
4	ARS-12K-ARS2799	11HEADCG00WSANZA	Head Z-Axis Angular Displacement	12000	°/s	Bipolar
5	ARS-8K-ARS2338	14HEADCG00WFANXA	Head X-Axis Angular Displacement	8000	°/s	Bipolar
6	ARS-12K-ARS2350	14HEADCG00WFANYA	Head Y-Axis Angular Displacement	12000	°/s	Bipolar
7	ARS-12K-ARS2629	14HEADCG00WFANZA	Head Z-Axis Angular Displacement	12000	°/s	-Bipolar
8	P76411	11VEHCCG0000ACXA	Vehicle CG (X)	2000	g	Bipolar
9	P75254	11VEHCCG0000ACYA	Vehicle CG (Y)	2000	g	-Bipolar
10	P78114	11VEHCCG0000ACZA	Vehicle CG (Z)	2000	g	-Bipolar
11	P75770	11SILBRIFR00ACXA	Right Front Sill at Front Seat (X)	2000	g	Bipolar
12	P61744	11SILBRIFR00ACYA	Right Front Sill at Front Seat (Y)	2000	g	-Bipolar
13	P74248	11SILBRIFR00ACZA	Right Front Sill at Front Seat (Z)	2000	g	-Bipolar
14	P74496	11SILBRIRE00ACXA	Right Rear Sill at Rear Seat (X)	2000	g	Bipolar
15	P66710	11SILBRIRE00ACYA	Right Rear Sill at Rear Seat (Y)	2000	g	-Bipolar
16	P78112	11SILBRIRE00ACZA	Right Rear Sill at Rear Seat (Z)	2000	g	-Bipolar
17	P74431	11SILBLEFR00ACYA	Left Side Sill at Front Seat (Y)	2000	g	Bipolar
18	P76171	11SILBLERE00ACYA	Left Side Sill at Rear Seat (Y)	2000	g	Bipolar
19	P76254	11APILLO0000ACYA	Left Lower A Post (Y)	2000	g	-Bipolar
20	P76397	11APILMI0000ACYA	Left Middle A-Post (Y)	2000	g	-Bipolar
21	P76453	11BPILLO0000ACYA	Left Lower B Post (Y)	2000	g	-Bipolar
22	P76452	11BPILMI0000ACYA	Left Middle B Post (Y)	2000	g	-Bipolar
23	P76395	11SETR000000ACYA	Front Seat Track (Y)	2000	g	-Bipolar
24	P75528	11SETRLERE00ACYA	LEFT REAR SEAT STRUCTURE AY	2000	g	-Bipolar
25	P78116	11VEHCRIRE00ACYA	RIGHT REAR OCCUPANT COMPARTMENT AY	2000	g	-Bipolar

Channel Report Test Number 130124 Continued

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity
26	P75992	11ENGNTPO000ACXA	ENGINE BLOCK AX	2000	g	Bipolar
27	P75519	11ENGNTPO000ACYA	ENGINE BLOCK AY	2000	g	-Bipolar
28	P75994	11FORA000000ACXA	Rear Floor Pan Above Axle (X)	2000	g	Bipolar
29	P74480	11FORA000000ACYA	Rear Floor Pan Above Axle (Y)	2000	g	-Bipolar
30	P75240	11FORA000000ACZA	Rear Floor Pan Above Axle (Z)	2000	g	-Bipolar
31	P75590	11VEHCEDR000ACXA	Vehicle at EDR (X)	2000	g	Bipolar
32	P76399	11VEHCEDR000ACYA	Vehicle at EDR (Y)	2000	g	-Bipolar
33	P78118	11VEHCEDR000ACZA	Vehicle at EDR (Z)	2000	g	-Bipolar
34	P76105	10FORARD0000ACXA	REAR DECK AX	2000	g	Bipolar
35	P75236	10FORARD0000ACYA	REAR DECK AY	2000	g	-Bipolar
36	P75765	10FORARD0000ACZA	REAR DECK AZ	2000	g	-Bipolar
37	P78138	11DOORMIMI71ACYA	Left Front Door Mid Centerline (Y)	2000	g	Bipolar
38	P78134	11DOORMIRE71ACYA	Left Front Door Mid Rear (Y)	2000	g	Bipolar
39	P75754	11DOORMIUP71ACYA	Left Front Door Upper Centerline (Y)	2000	g	Bipolar
40	P75104	14DOORMIRE71ACYA	Left Rear Door Mid Rear (Y)	2000	g	Bipolar
41	P75526	14DOORMIUP71ACYA	Left Rear Door Upper Centerline (Y)	2000	g	Bipolar
42	ARS-1500-ARS0330	10VEHCCG0000AVXA	VEHICLE CENTER OF GRAVITY (X) ROLL RATE GYRO	1500	°/s	Bipolar
43	ARS-1500-ARS0010	10VEHCCG0000AVYA	VEHICLE CENTER OF GRAVITY (Y) PITCH RATE GYRO	1500	°/s	Bipolar
44	ARS-1500-ARS4511	10VEHCCG0000AVZA	VEHICLE CENTER OF GRAVITY (Z) YAW RATE GYRO	1500	°/s	Bipolar
45	ARS-1500-ARS0323	10VEHCEDR000AVXA	VEHICLE AT EDR (X) ROLL RATE GYRO	1500	°/s	Bipolar
46	ARS-1500-ARS0300	10VEHCEDR000AVYA	VEHICLE AT EDR (Y) PITCH RATE GYRO	1500	°/s	Bipolar
47	ARS-1500-ARS2331	10VEHCEDR000AVZA	VEHICLE AT EDR (Z) YAW RATE GYRO	1500	°/s	Bipolar
48	ARS-1500-ARS3812	10FORARD0000AVXA	REAR DECK (X) ROLL RATE GYRO	1500	°/s	Bipolar
49	ARS-1500-ARS4512	10FORARD0000AVYA	REAR DECK (Y) PITCH RATE GYRO	1500	°/s	Bipolar
50	ARS-1500-ARS3811	10FORARD0000AVZA	REAR DECK (Z) YAW RATE GYRO	1500	°/s	Bipolar
51	ABFire2	11SENS010000VO00	SAB TIMING IND	5	V	Bipolar

Channel Report Test Number 130124 Continued

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity
52	ABFire3	11SENS020000VO00	SCAB TIMING IND	5	V	Bipolar
53	Bit.00	11HEADCONT00VO0A	Head Contact	1	Logic	Bipolar
54	Bit.01	11SHLDCONT00VO0A	Shoulder Contact	1	Logic	Bipolar
55	Bit.02	11THORCONT00VO0A	Thorax Contact	1	Logic	Bipolar
56	Bit.03	11LEGCONT000VO0A	Leg Contact	1	Logic	Bipolar
57	Bit.04	14HEADCONT00VO0A	Head Contact	1	Logic	Bipolar
58	Bit.05	14SHLDCONT00VO0A	Shoulder Contact	1	Logic	Bipolar
59	Bit.06	14THORCONT00VO0A	Thorax Contact	1	Logic	Bipolar
60	Bit.07	14LEGCONT000VO0A	Leg Contact	1	Logic	Bipolar
61	VRTC Chestbands	14CHBA4001WFVO0A	chest band w/40 gages, gage 1	100	mV	Bipolar
62	VRTC Chestbands	14CHBA4002WFVO0A	chest band w/40 gages, gage 2	100	mV	Bipolar
63	VRTC Chestbands	14CHBA4003WFVO0A	chest band w/40 gages, gage 3	100	mV	Bipolar
64	VRTC Chestbands	14CHBA4004WFVO0A	chest band w/40 gages, gage 4	100	mV	Bipolar
65	VRTC Chestbands	14CHBA4005WFVO0A	chest band w/40 gages, gage 5	100	mV	Bipolar
66	VRTC Chestbands	14CHBA4006WFVO0A	chest band w/40 gages, gage 6	100	mV	Bipolar
67	VRTC Chestbands	14CHBA4007WFVO0A	chest band w/40 gages, gage 7	100	mV	Bipolar
68	VRTC Chestbands	14CHBA4008WFVO0A	chest band w/40 gages, gage 8	100	mV	Bipolar
69	VRTC Chestbands	14CHBA4009WFVO0A	chest band w/40 gages, gage 9	100	mV	Bipolar
70	VRTC Chestbands	14CHBA4010WFVO0A	chest band w/40 gages, gage 10	100	mV	Bipolar
71	VRTC Chestbands	14CHBA4011WFVO0A	chest band w/40 gages, gage 11	100	mV	Bipolar
72	VRTC Chestbands	14CHBA4012WFVO0A	chest band w/40 gages, gage 12	100	mV	Bipolar
73	VRTC Chestbands	14CHBA4013WFVO0A	chest band w/40 gages, gage 13	100	mV	Bipolar
74	VRTC Chestbands	14CHBA4014WFVO0A	chest band w/40 gages, gage 14	100	mV	Bipolar
75	VRTC Chestbands	14CHBA4015WFVO0A	chest band w/40 gages, gage 15	100	mV	Bipolar
76	VRTC Chestbands	14CHBA4016WFVO0A	chest band w/40 gages, gage 16	100	mV	Bipolar
77	VRTC Chestbands	14CHBA4017WFVO0A	chest band w/40 gages, gage 17	100	mV	Bipolar
78	VRTC Chestbands	14CHBA4018WFVO0A	chest band w/40 gages, gage 18	100	mV	Bipolar

Channel Report Test Number 130124 Continued

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Polarity
79	VRTC Chestbands	14CHBA4019WFVO0A	chest band w/40 gages, gage 19	100	mV	Bipolar
80	VRTC Chestbands	14CHBA4020WFVO0A	chest band w/40 gages, gage 20	100	mV	Bipolar
81	VRTC Chestbands	14CHBA4021WFVO0A	chest band w/40 gages, gage 21	100	mV	Bipolar
82	VRTC Chestbands	14CHBA4022WFVO0A	chest band w/40 gages, gage 22	100	mV	Bipolar
83	VRTC Chestbands	14CHBA4023WFVO0A	chest band w/40 gages, gage 23	100	mV	Bipolar
84	VRTC Chestbands	14CHBA4024WFVO0A	chest band w/40 gages, gage 24	100	mV	Bipolar
85	VRTC Chestbands	14CHBA4025WFVO0A	chest band w/40 gages, gage 25	100	mV	Bipolar
86	VRTC Chestbands	14CHBA4026WFVO0A	chest band w/40 gages, gage 26	100	mV	Bipolar
87	VRTC Chestbands	14CHBA4027WFVO0A	chest band w/40 gages, gage 27	100	mV	Bipolar
88	VRTC Chestbands	14CHBA4028WFVO0A	chest band w/40 gages, gage 28	100	mV	Bipolar
89	VRTC Chestbands	14CHBA4029WFVO0A	chest band w/40 gages, gage 29	100	mV	Bipolar
90	VRTC Chestbands	14CHBA4030WFVO0A	chest band w/40 gages, gage 30	100	mV	Bipolar
91	VRTC Chestbands	14CHBA4031WFVO0A	chest band w/40 gages, gage 31	100	mV	Bipolar
92	P76044	M0MBARCG0000ACXA	MDB CG AX	2000	g	Bipolar
93	P76251	M0MBARCG0000ACYA	MDB CG AY	2000	g	Bipolar
94	P75726	M0MBARCG0000ACZA	MDB CG AZ	2000	g	-Bipolar
95	P75111	M0FRAMRE0000ACXA	MDB REAR AX	2000	g	Bipolar
96	P75774	M0FRAMRE0000ACYA	MDB REAR AY	2000	g	-Bipolar

Command File Test Number 130124

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
3A	1 11HEADCG00WSACXA	Head Longitudinal Ax	1000	+	yes	1000
	2 11HEADCG00WSACYA	Head Lateral Ay	1000	+	yes	1000
	3 11HEADCG00WSACZA	Head Vertical Az	1000	+	yes	1000
	11HEADCG00WSACRA	Head A Resultant	1000			
	4 11HEAD0000WSAAXA	Head Rotational Acceleration Rx	1000	-	yes	50000
	5 11HEAD0000WSAAYA	Head Rotational Acceleration Ry	1000	+	yes	50000
	6 11HEAD0000WSAAZA	Head Rotational Acceleration Rz	1000	+	yes	50000
	7 11HEADCG00WSAVXA	Head X-Axis Angular Velocity	1000	+	yes	5000
	8 11HEADCG00WSAVYA	Head Y-Axis Angular Velocity	1000	+	yes	5000
	9 11HEADCG00WSAVZA	Head Z-Axis Angular Velocity	1000	+	yes	5000
	10 11NECKUP00WSFOXA	Neck Upper Force Fx	1000	-	yes	10000
	11 11NECKUP00WSFOYA	Neck Upper Force Fy	1000	+	yes	10000
	12 11NECKUP00WSFOZA	Neck Upper Force Fz	1000	-	yes	12000
	13 11NECKUP00WSMOXA	Neck Upper Moment Mx	600	+	yes	300
	14 11NECKUP00WSMOYA	Neck Upper Moment My	600	+	yes	300
	15 11NECKUP00WSMOZA	Neck Upper Moment Mz	600	+	yes	200
	16 11NECKLO00WSFOXA	Neck Lower Force Fx	1000	+	yes	10000
	17 11NECKLO00WSFOYA	Neck Lower Force Fy	1000	+	yes	10000
	18 11NECKLO00WSFOZA	Neck Lower Force Fz	1000	-	yes	12000
	19 11NECKLO00WSMOXA	Neck Lower Moment Mx	600	+	yes	300
	20 11NECKLO00WSMOYA	Neck Lower Moment My	600	+	yes	300
	21 11NECKLO00WSMOZA	Neck Lower Moment Mz	600	+	yes	200
	22 11SHLDLE00WSACXA	Shoulder Longitudinal Ax	1000	+	yes	500
	23 11SHLDLE00WSACYA	Shoulder Lateral Ay	1000	+	yes	500
	24 11SHLDLE00WSACZA	Shoulder Vertical Az	1000	+	yes	500
	11SHLDLE00WSACRA	Shoulder A Resultant	1000			
	25 11SHLDLE00WSFOXA	Shoulder Force Fx	1000	+	yes	5000

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
26	11SHLDLE00WSFOYA	Shoulder Force Fy	1000	-	yes	10000
27	11SHLDLE00WSFOZA	Shoulder Force Fz	1000	+	yes	5000
28	11SHRILE00WSDSYA	Shoulder Y Disp	600	+	yes	90
29	11THSP0100WSACXA	T1 Longitudinal Ax	180	+	yes	1000
30	11THSP0100WSACYA	T1 Lateral Ay	180	+	yes	1000
31	11THSP0100WSACZA	T1 Vertical Az	180	-	yes	1000
31A	11THSP0100WSACRA	T1 A Resultant	180			
32	11TRRILE01WSACXA	Thorax Rib 1 Longitudinal Ax	1000	+	yes	500
33	11TRRILE01WSACYA	Thorax Rib 1 Lateral Ay	1000	+	yes	500
34	11TRRILE01WSACZA	Thorax Rib 1 Vertical Az	1000	+	yes	500
34A	11TRRILE01WSACRA	Thorax Rib 1 A Resultant	1000			
35	11TRRILE01WSDSYA	Thorax Rib 1 Lateral Disp	600	+	yes	90
36	11TRRILE02WSACXA	Thorax Rib 2 Longitudinal Ax	1000	+	yes	500
37	11TRRILE02WSACYA	Thorax Rib 2 Lateral Ay	1000	+	yes	500
38	11TRRILE02WSACZA	Thorax Rib 2 Vertical Az	1000	+	yes	500
38A	11TRRILE02WSACRA	Thorax Rib 2 A Resultant	1000			
39	11TRRILE02WSDCOA	Thorax Rib 2 IRTRAC compression	600	+	no	110
40	11TRRILE02WSANZA	Thorax Rib 2 Rotational angle	600	+	no	110
41	11TRRILE02WSDSXA	Thorax Rib 2 IRTRAC X Deflection	600	+	no	110
42	11TRRILE02WSDSYA	Thorax Rib 2 IRTRAC Y Deflection	600	+	no	110
43	11TRRILE03WSACXA	Thorax Rib 3 Longitudinal Ax	1000	+	yes	500
44	11TRRILE03WSACYA	Thorax Rib 3 Lateral Ay	1000	+	yes	500
45	11TRRILE03WSACZA	Thorax Rib 3 Vertical Az	1000	+	yes	500
45A	11TRRILE03WSACRA	Thorax Rib 3 A Resultant	1000			
46	11TRRILE03WSDCOA	Thorax Rib 3 IRTRAC compression	600	+	no	110
47	11TRRILE03WSANZA	Thorax Rib 3 Rotational angle	600	+	no	110
48	11TRRILE03WSDSXA	Thorax Rib 3 IRTRAC X Deflection	600	+	no	110
49	11TRRILE03WSDSYA	Thorax Rib 3 IRTRAC Y Deflection	600	+	no	110

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
50	11ABRILE01WSACXA	Abdominal Rib 1 Longitudinal Ax	1000	+	yes	500
51	11ABRILE01WSACYA	Abdominal Rib 1 Lateral Ay	1000	+	yes	500
52	11ABRILE01WSACZA	Abdominal Rib 1 Vertical Az	1000	+	yes	500
52A	11ABRILE01WSACRA	Abdominal Rib 1 A Resultant	1000	+	yes	
53	11ABRILE01WSDCOA	Abdominal Rib 1 IRTAC compression	600	+	no	110
54	11ABRILE01WSANZA	Abdominal Rib 1 Rotational angle	600	+	no	110
55	11ABRILE01WSDSXA	Abdominal Rib 1 IRTAC X Deflection	600	+	no	110
56	11ABRILE01WSDSYA	Abdominal Rib 1 IRTAC Y Deflection	600	+	no	110
57	11ABRILE02WSACXA	Abdominal Rib 2 Longitudinal Ax	1000	+	yes	500
58	11ABRILE02WSACYA	Abdominal Rib 2 Lateral Ay	1000	+	yes	500
59	11ABRILE02WSACZA	Abdominal Rib 2 Vertical Az	1000	+	yes	500
59A	11ABRILE02WSACRA	Abdominal Rib 2 A Resultant	1000			
60	11ABRILE02WSDSYA	Abdominal Rib 2 Lateral Disp	600	+	yes	90
61	11THSP0400WSACXA	T4 Longitudinal Ax	180	+	yes	1000
62	11THSP0400WSACYA	T4 Lateral Ay	180	+	yes	1000
63	11THSP0400WSACZA	T4 Vertical Az	180	+	yes	1000
63A	11THSP0400WSACRA	T4 A Resultant	180			
64	11THSP1200WSACXA	T12 Longitudinal Ax	180	+	yes	1000
65	11THSP1200WSACYA	T12 Lateral Ay	180	+	yes	1000
66	11THSP1200WSACZA	T12 Vertical Az	180	+	yes	1000
66A	11THSP1200WSACRA	T12 A Resultant	180			
67	11PELV0000WSACXA	Pelvis Longitudinal Ax	1000	+	yes	1000
68	11PELV0000WSACYA	Pelvis Lateral Ay	1000	+	yes	1000
69	11PELV0000WSACZA	Pelvis Vertical Az	1000	+	yes	1000
69A	11PELV0000WSACRA	Pelvis A Resultant	1000			
70	11PUBC0000WSFOYA	Pubic Force Fy	600	+	yes	12000
71	11LUSP0000WSFOXA	Lumbar Force Fx	600	+	yes	10000

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
72	11LUSP0000WSFOYA	Lumbar Force Fy	600	+	yes	10000
73	11LUSP0000WSFOZA	Lumbar Force Fz	600	-	yes	12000
74	11LUSP0000WSMOXA	Lumbar Moment Mx	600	+	yes	300
75	11LUSP0000WSMOYA	Lumbar Moment My	600	+	yes	300
76	11LUSP0000WSMOZA	Lumbar Moment Mz	600	+	yes	200
77	11SACRRI00WSMOXA	Sacro-Iliac Right Moment Mx	600	+	yes	800
78	11SACRRI00WSMOYA	Sacro-Iliac Right Moment My	600	+	yes	400
79	11SACRRI00WSMOZA	Sacro-Iliac Right Moment Mz	600	+	yes	400
80	11SACRRI00WSFOXA	Sacro-Iliac Right Force Fx	600	+	yes	6000
81	11SACRRI00WSFOYA	Sacro-Iliac Right Force Fy	600	-	yes	12000
82	11SACRRI00WSFOZA	Sacro-Iliac Right Force Fz	600	-	yes	6000
83	11SACRLE00WSMOXA	Sacro-Iliac Left Moment Mx	600	+	yes	800
84	11SACRLE00WSMOYA	Sacro-Iliac Left Moment My	600	+	yes	400
85	11SACRLE00WSMOZA	Sacro-Iliac Left Moment Mz	600	+	yes	400
86	11SACRLE00WSFOXA	Sacro-Iliac Left Force Fx	600	+	yes	6000
87	11SACRLE00WSFOYA	Sacro-Iliac Left Force Fy	600	-	yes	12000
88	11SACRLE00WSFOZA	Sacro-Iliac Left Force Fz	600	+	yes	6000
89	11FEACLE00WSFOXA	Left Femoral Neck Force Fx	600	-	yes	10000
90	11FEACLE00WSFOYA	Left Femoral Neck Force Fy	600	-	yes	25000
91	11FEACLE00WSFOZA	Left Femoral Neck Force Fz	600	-	yes	10000
92	11FEACRI00WSFOXA	Right Femoral Neck Force Fx	600	-	yes	10000
93	11FEACRI00WSFOYA	Right Femoral Neck Force Fy	600	-	yes	25000
94	11FEACRI00WSFOZA	Right Femoral Neck Force Fz	600	-	yes	10000
95	14HEADCG00WFACXA	Head Longitudinal Ax	1000	+	yes	400
96	14HEADCG00WFACYA	Head Lateral Ay	1000	+	yes	400
97	14HEADCG00WFACZA	Head Vertical Az	1000	-	yes	400
97A	14HEADCG00WFACRA	Head A Resultant	1000			
98	14HEAD0000WFAAXA	Head Rotational Acceleration Rx	1000	+	yes	50000

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
99	14HEAD0000WFAAYA	Head Rotational Acceleration Ry	1000	+	yes	50000
100	14HEAD0000WFAAZA	Head Rotational Acceleration Rz	1000	+	yes	50000
101	14HEADCG00WFAVXA	Head X-Axis Angular Velocity	1000	+	yes	5000
102	14HEADCG00WFAVYA	Head Y-Axis Angular Velocity	1000	+	yes	5000
103	14HEADCG00WFAVZA	Head Z-Axis Angular Velocity	1000	+	yes	5000
104	14NECKUP00WFFOXA	Neck Upper Force Fx	1000	+	yes	10000
105	14NECKUP00WFFOYA	Neck Upper Force Fy	1000	+	yes	10000
106	14NECKUP00WFFOZA	Neck Upper Force Fz	1000	+	yes	12000
107	14NECKUP00WFMOXA	Neck Upper Moment Mx	600	-	yes	200
108	14NECKUP00WFMOYA	Neck Upper Moment My	600	+	yes	300
109	14NECKUP00WFMOZA	Neck Upper Moment Mz	600	+	yes	200
110	14NECKLO00WFFOXA	Neck Lower Force Fx	1000	+	yes	10000
111	14NECKLO00WFFOYA	Neck Lower Force Fy	1000	+	yes	10000
112	14NECKLO00WFFOZA	Neck Lower Force Fz	1000	+	yes	12000
113	14NECKLO00WFMOXA	Neck Lower Moment Mx	600	+	yes	300
114	14NECKLO00WFMOYA	Neck Lower Moment My	600	+	yes	300
115	14NECKLO00WFMOZA	Neck Lower Moment Mz	600	+	yes	200
116	14SHLDLE00WFACXA	Shoulder Longitudinal Ax	1000	+	yes	400
117	14SHLDLE00WFACYA	Shoulder Lateral Ay	1000	+	yes	400
118	14SHLDLE00WFACZA	Shoulder Vertical Az	1000	+	yes	400
118A	14SHLDLE00WFACRA	Shoulder A Resultant	1000			
119	14SHLDLE00WFFOXA	Shoulder Force Fx	600	-	yes	4000
120	14SHLDLE00WFFOYA	Shoulder Force Fy	600	+	yes	5000
121	14SHLDLE00WFFOZA	Shoulder Force Fz	600	-	yes	4000
122	14SHLDLE00WFDSYA	Shoulder Displacement Dy	600	+	yes	102
123	14THSP0100WFACXA	T1 Longitudinal Ax	180	+	yes	400
124	14THSP0100WFACYA	T1 Lateral Ay	180	+	yes	400

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
125	14THSP0100WFACZA	T1 Vertical Az	180	+	yes	400
125A	14THSP0100WFACRA	T1 A Resultant	180			
126	14TRRILE01WFACXA	Thorax Rib 1 Longitudinal Ax	1000	+	yes	400
127	14TRRILE01WFACYA	Thorax Rib 1 Lateral Ay	1000	+	yes	400
128	14TRRILE01WFACZA	Thorax Rib 1 Vertical Az	1000	+	yes	400
128A	14TRRILE01WFACRA	Thorax Rib 1 A Resultant	1000			
129	14TRRILE01WFDCA	Thorax Rib 1 IRTRAC compression	600	+	no	110
130	14TRRILE01WFANZA	Thorax Rib 1 Rotational angle	600	+	no	110
131	14TRRILE01WFDSXA	Thorax Rib 1 IRTRAC X Deflection	600	+	no	110
132	14TRRILE01WFDSYA	Thorax Rib 1 IRTRAC Y Deflection	600	+	no	110
133	14TRRILE02WFACXA	Thorax Rib 2 Longitudinal Ax	1000	+	yes	400
134	14TRRILE02WFACYA	Thorax Rib 2 Lateral Ay	1000	+	yes	400
135	14TRRILE02WFACZA	Thorax Rib 2 Vertical Az	1000	+	yes	400
135A	14TRRILE02WFACRA	Thorax Rib 2 A Resultant	1000			
136	14TRRILE02WFDCA	Thorax Rib 2 IRTRAC compression	600	+	no	110
137	14TRRILE02WFANZA	Thorax Rib 2 Rotational angle	600	+	no	110
138	14TRRILE02WFDSXA	Thorax Rib 2 IRTRAC X Deflection	600	+	no	110
139	14TRRILE02WFDSYA	Thorax Rib 2 IRTRAC Y Deflection	600	+	no	110
140	14TRRILE03WFACXA	Thorax Rib 3 Longitudinal Ax	1000	+	yes	400
141	14TRRILE03WFACYA	Thorax Rib 3 Lateral Ay	1000	+	yes	400
142	14TRRILE03WFACZA	Thorax Rib 3 Vertical Az	1000	+	yes	400
142A	14TRRILE03WFACRA	Thorax Rib 3 A Resultant	1000			
143	14TRRILE03WFDCA	Thorax Rib 3 IRTRAC compression	600	+	no	110
144	14TRRILE03WFANZA	Thorax Rib 3 Rotational angle	600	+	no	110
145	14TRRILE03WFDSXA	Thorax Rib 3 IRTRAC X Deflection	600	+	no	110
146	14TRRILE03WFDSYA	Thorax Rib 3 IRTRAC Y Deflection	600	+	no	110
147	14ABRILE01WFACXA	Abdominal Rib 1 Longitudinal Ax	1000	+	yes	400
148	14ABRILE01WFACYA	Abdominal Rib 1 Lateral Ay	1000	+	yes	400

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
149	14ABRILE01WFACZA	Abdominal Rib 1 Vertical Az	1000	+	yes	400
149A	14ABRILE01WFACRA	Abdominal Rib 1 A Resultant	1000			
150	14ABRILE01WFDC0A	Abdominal Rib 1 IRTAC compression	600	+	no	110
151	14ABRILE01WFANZA	Abdominal Rib 1 Rotational angle	600	+	no	110
152	14ABRILE01WFDSXA	Abdominal Rib 1 IRTAC X Deflection	600	+	no	110
153	14ABRILE01WFDSYA	Abdominal Rib 1 IRTAC Y Deflection	600	+	no	110
154	14ABRILE02WFACXA	Abdominal Rib 2 Longitudinal Ax	1000	+	yes	400
155	14ABRILE02WFACYA	Abdominal Rib 2 Lateral Ay	1000	+	yes	400
156	14ABRILE02WFACZA	Abdominal Rib 2 Vertical Az	1000	+	yes	400
156A	14ABRILE02WFACRA	Abdominal Rib 2 A Resultant	1000			
157	14ABRILE02WFDC0A	Abdominal Rib 2 IRTAC compression	600	+	no	110
158	14ABRILE02WFANZA	Abdominal Rib 2 Rotational angle	600	+	no	110
159	14ABRILE02WFDSXA	Abdominal Rib 2 IRTAC X Deflection	600	+	no	110
160	14ABRILE02WFDSYA	Abdominal Rib 2 IRTAC Y Deflection	600	+	no	110
161	14THSP0400WFACXA	T4 Longitudinal Ax	180	+	yes	400
162	14THSP0400WFACYA	T4 Lateral Ay	180	+	yes	400
163	14THSP0400WFACZA	T4 Vertical Az	180	+	yes	400
163A	14THSP0400WFACRA	T4 A Resultant	180			
164	14THSP1200WFACXA	T12 Longitudinal Ax	180	+	yes	400
165	14THSP1200WFACYA	T12 Lateral Ay	180	+	yes	400
166	14THSP1200WFACZA	T12 Vertical Az	180	+	yes	400
166A	14THSP1200WFACRA	T12 A Resultant	180			
167	14PELV0000WFACXA	Pelvis Longitudinal Ax	180	+	yes	400
168	14PELV0000WFACYA	Pelvis Lateral Ay	180	-	yes	400
169	14PELV0000WFACZA	Pelvis Vertical Az	180	+	yes	400
169A	14PELV0000WFACRA	Pelvis A Resultant	180			
170	14PUBC0000WFFOYA	Pubic Force Fy	600	-	yes	12000
171	11VEHCCG0000ACXA	Vehicle CG (X)	60	+	yes	2000

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
172	11VEHCCG0000ACYA	Vehicle CG (Y)	60	+	yes	2000
173	11VEHCCG0000ACZA	Vehicle CG (Z)	60	+	yes	2000
173A	11VEHCCG0000ACRA	Vehicle CG Resultant	60			
174	11SILBRIFR00ACXA	Right Front Sill at Front Seat (X)	60	+	yes	2000
175	11SILBRIFR00ACYA	Right Front Sill at Front Seat (Y)	60	+	yes	2000
176	11SILBRIFR00ACZA	Right Front Sill at Front Seat (Z)	60	+	yes	2000
176A	11SILBRIFR00ACRA	Right Front Sill at Front Seat Resultant	60			
177	11SILBRIRE00ACXA	Right Rear Sill at Rear Seat (X)	60	+	yes	2000
178	11SILBRIRE00ACYA	Right Rear Sill at Rear Seat (Y)	60	+	yes	2000
179	11SILBRIRE00ACZA	Right Rear Sill at Rear Seat (Z)	60	+	yes	2000
179A	11SILBRIRE00ACRA	Right Rear Sill at Rear Seat Resultant	60			
180	11SILBLEFR00ACYA	Left Side Sill at Front Seat (Y)	60	+	yes	2000
181	11SILBLERE00ACYA	Left Side Sill at Rear Seat (Y)	60	+	yes	2000
182	11APILLO0000ACYA	Left Lower A Post (Y)	60	+	yes	2000
183	11APILMI0000ACYA	Left Middle A-Post (Y)	60	+	yes	2000
184	11BPILLO0000ACYA	Left Lower B Post (Y)	60	+	yes	2000
185	11BPILMI0000ACYA	Left Middle B Post (Y)	60	+	yes	2000
186	11SETR000000ACYA	Front Seat Track (Y)	60	+	yes	2000
187	11SETRLERE00ACYA	LEFT REAR SEAT STRUCTURE AY	60	+	yes	2000
188	11VEHCRIRE00ACYA	RIGHT REAR OCCUPANT COMPARTMENT AY	60	+	yes	2000
189	11ENGNTPO000ACXA	ENGINE BLOCK AX	60	+	yes	2000
190	11ENGNTPO000ACYA	ENGINE BLOCK AY	60	+	yes	2000
191	11FORA000000ACXA	Rear Floor Pan Above Axle (X)	60	+	yes	2000
192	11FORA000000ACYA	Rear Floor Pan Above Axle (Y)	60	+	yes	2000
193	11FORA000000ACZA	Rear Floor Pan Above Axle (Z)	60	+	yes	2000
193A	11FORA000000ACRA	Rear Floor Pan Above Axle Resultant	60			
194	11VEHCEDR000ACXA	Vehicle at EDR (X)	60	+	yes	2000

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
195	11VEHCEDR000ACYA	Vehicle at EDR (Y)	60	+	yes	2000
196	11VEHCEDR000ACZA	Vehicle at EDR (Z)	60	+	yes	2000
196A	11VEHCEDR000ACRA	Vehicle at EDR Resultant	60			
197	10FORARD0000ACXA	REAR DECK AX	60	+	yes	2000
198	10FORARD0000ACYA	REAR DECK AY	60	+	yes	2000
199	10FORARD0000ACZA	REAR DECK AZ	60	+	yes	2000
199A	10FORARD0000ACRA	REAR DECK A Resultant	60			
200	10VEHCCG0000AVXA	VEHICLE CENTER OF GRAVITY (X) ROLL RATE GYRO	60	+	yes	1500
201	10VEHCCG0000AVYA	VEHICLE CENTER OF GRAVITY (Y) PITCH RATE GYRO	60	+	yes	1500
202	10VEHCCG0000AVZA	VEHICLE CENTER OF GRAVITY (Z) YAW RATE GYRO	60	+	yes	1500
203	10VEHCEDR000AVXA	VEHICLE AT EDR (X) ROLL RATE GYRO	60	+	yes	1500
204	10VEHCEDR000AVYA	VEHICLE AT EDR (Y) PITCH RATE GYRO	60	+	yes	1500
205	10VEHCEDR000AVZA	VEHICLE AT EDR (Z) YAW RATE GYRO	60	+	yes	1500
206	10FORARD0000AVXA	REAR DECK (X) ROLL RATE GYRO	60	+	yes	1500
207	10FORARD0000AVYA	REAR DECK (Y) PITCH RATE GYRO	60	+	yes	1500
208	10FORARD0000AVZA	REAR DECK (Z) YAW RATE GYRO	60	+	yes	1500
209	11DOORMIMI71ACYA	Left Front Door Mid Centerline (Y)	60	+	yes	2000
210	11DOORMIRE71ACYA	Left Front Door Mid Rear (Y)	60	+	yes	2000
211	11DOORMIUP71ACYA	Left Front Door Upper Centerline (Y)	60	+	yes	2000
212	14DOORMIRE71ACYA	Left Rear Door Mid Rear (Y)	60	+	yes	2000
213	14DOORMIUP71ACYA	Left Rear Door Upper Centerline (Y)	60	+	yes	2000
214	11SENS010000VO00	SAB TIMING IND	0	+	no	5
215	11SENS020000VO00	SCAB TIMING IND	0	+	no	5
216	11HEADCONT00VO0A	Head Contact	1000	+	no	1
217	11SHLDCONT00VO0A	Shoulder Contact	1000	+	no	1
218	11THORCONT00VO0A	Thorax Contact	1000	+	no	1
219	11LEGCONT000VO0A	Leg Contact	1000	+	no	1

Command File Test Number 130124 Continued

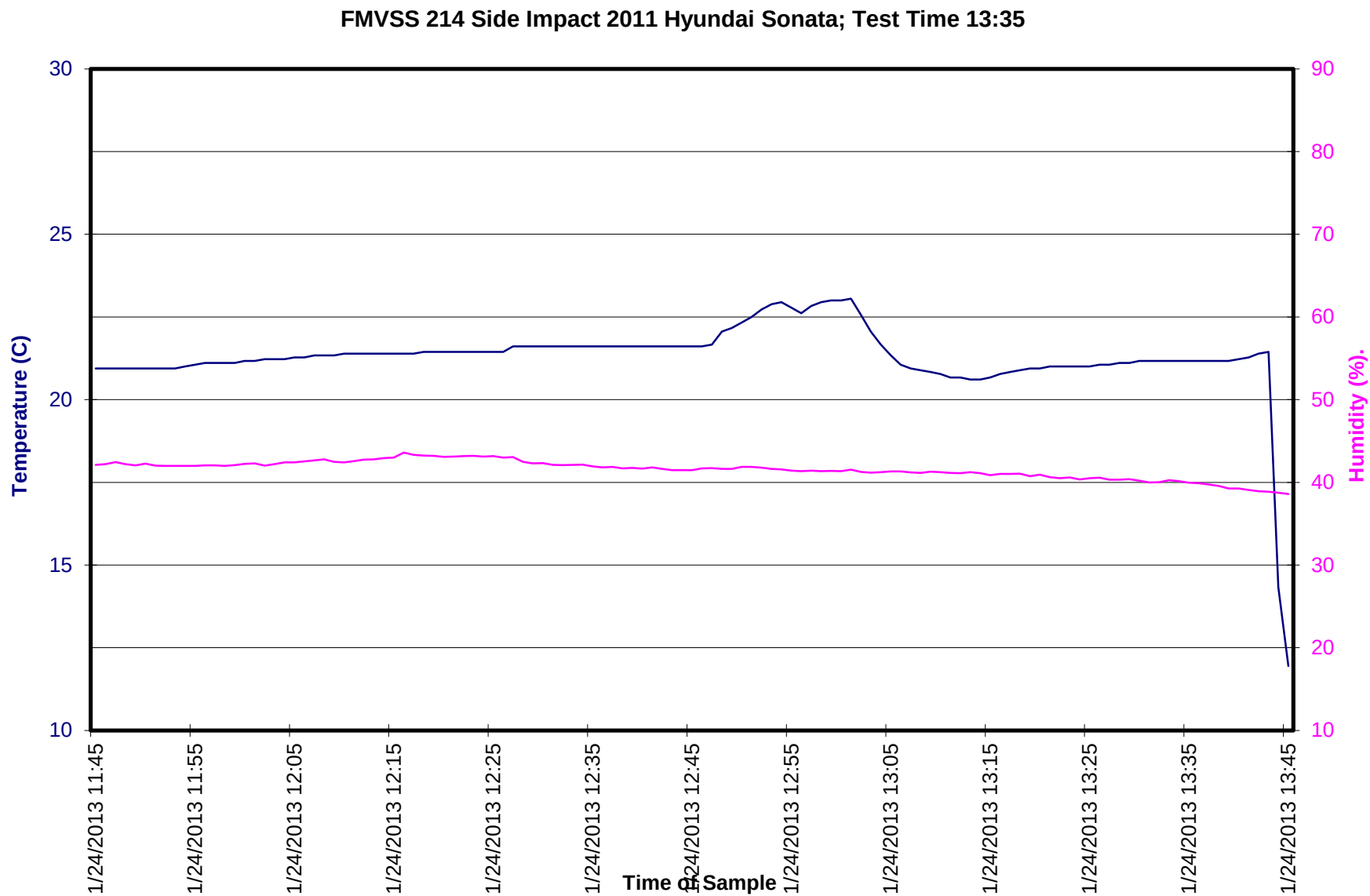
Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
220	14HEADCONT00VO0A	Head Contact	1000	+	no	1
221	14SHLDCONT00VO0A	Shoulder Contact	1000	+	no	1
222	14THORCONT00VO0A	Thorax Contact	1000	+	no	1
223	14LEGCONT000VO0A	Leg Contact	1000	+	no	1
224	14CHBA4001WFVO0A	chest band w/40 gages, gage 1	1000	+	no	1
225	14CHBA4002WFVO0A	chest band w/40 gages, gage 2	1000	+	no	1
226	14CHBA4003WFVO0A	chest band w/40 gages, gage 3	1000	+	no	1
227	14CHBA4004WFVO0A	chest band w/40 gages, gage 4	1000	+	no	1
228	14CHBA4005WFVO0A	chest band w/40 gages, gage 5	1000	+	no	1
229	14CHBA4006WFVO0A	chest band w/40 gages, gage 6	1000	+	no	1
230	14CHBA4007WFVO0A	chest band w/40 gages, gage 7	1000	+	no	1
231	14CHBA4008WFVO0A	chest band w/40 gages, gage 8	1000	+	no	1
232	14CHBA4009WFVO0A	chest band w/40 gages, gage 9	1000	+	no	1
233	14CHBA4010WFVO0A	chest band w/40 gages, gage 10	1000	+	no	1
234	14CHBA4011WFVO0A	chest band w/40 gages, gage 11	1000	+	no	1
235	14CHBA4012WFVO0A	chest band w/40 gages, gage 12	1000	+	no	1
236	14CHBA4013WFVO0A	chest band w/40 gages, gage 13	1000	+	no	1
237	14CHBA4014WFVO0A	chest band w/40 gages, gage 14	1000	+	no	1
238	14CHBA4015WFVO0A	chest band w/40 gages, gage 15	1000	+	no	1
239	14CHBA4016WFVO0A	chest band w/40 gages, gage 16	1000	+	no	1
240	14CHBA4017WFVO0A	chest band w/40 gages, gage 17	1000	+	no	1
241	14CHBA4018WFVO0A	chest band w/40 gages, gage 18	1000	+	no	1
242	14CHBA4019WFVO0A	chest band w/40 gages, gage 19	1000	+	no	1
243	14CHBA4020WFVO0A	chest band w/40 gages, gage 20	1000	+	no	1
244	14CHBA4021WFVO0A	chest band w/40 gages, gage 21	1000	+	no	1
245	14CHBA4022WFVO0A	chest band w/40 gages, gage 22	1000	+	no	1

Command File Test Number 130124 Continued

Channel	ISO mnemonic	Channel Title	Filter	Flip	Zero	Full Scale
246	14CHBA4023WFV00A	chest band w/40 gages, gage 23	1000	+	no	1
247	14CHBA4024WFV00A	chest band w/40 gages, gage 24	1000	+	no	1
248	14CHBA4025WFV00A	chest band w/40 gages, gage 25	1000	+	no	1
249	14CHBA4026WFV00A	chest band w/40 gages, gage 26	1000	+	no	1
250	14CHBA4027WFV00A	chest band w/40 gages, gage 27	1000	+	no	1
251	14CHBA4028WFV00A	chest band w/40 gages, gage 28	1000	+	no	1
252	14CHBA4029WFV00A	chest band w/40 gages, gage 29	1000	+	no	1
253	14CHBA4030WFV00A	chest band w/40 gages, gage 30	1000	+	no	1
254	14CHBA4031WFV00A	chest band w/40 gages, gage 31	1000	+	no	1
255	M0MBARCG0000ACXA	MDB CG AX	60	+	yes	2000
256	M0MBARCG0000ACYA	MDB CG AY	60	+	yes	2000
257	M0MBARCG0000ACZA	MDB CG AZ	60	+	yes	2000
257A	M0MBARCG0000ACRA	MDB CG A Resultant	60			
258	M0FRAMRE0000ACXA	MDB REAR AX	60	+	yes	2000
259	M0FRAMRE0000ACYA	MDB REAR AY	60	+	yes	2000

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Appendix E

Chest Band Information

One 40-channel chest band was installed on the WorldSID 5th female dummy in the rear seat. The chest band was installed directly on the rib denoted in Table 1 using double-sided foam tape to ensure that the band followed the rib's motion (Figures 1-4). The band was used in this test to determine the shape of the rib contour throughout the crash event. Pertinent information regarding the location of the band on the dummy (Table 1) may be used for processing the chest band data in RBandPC or CrashStar software. FARO data locating three points on the chest band prior to the dummy being in pre-test seated ready position are included in Table 2. Table 1 and Figure 5 show results from processing the chest band data using CrashStar. Maximum deflection was determined using the forced angle method by Pintar et al., 2009. Information related to the chest band used in this test may be directed to heather.rhule@dot.gov.



Figure 1. Rear of WorldSID 5th female dummy showing chest band location

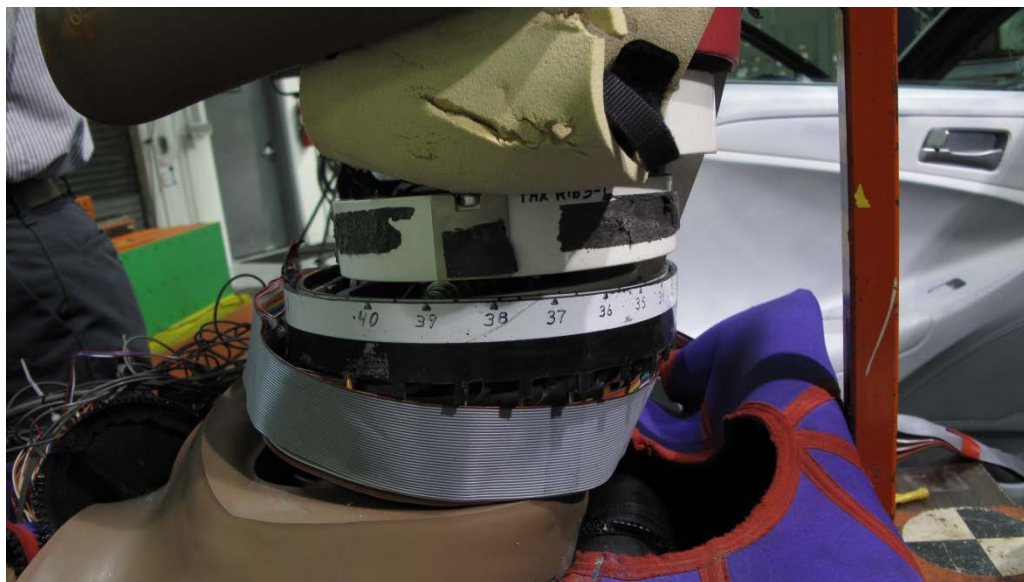


Figure 2. Left side of WorldSID 5th female dummy showing chest band location

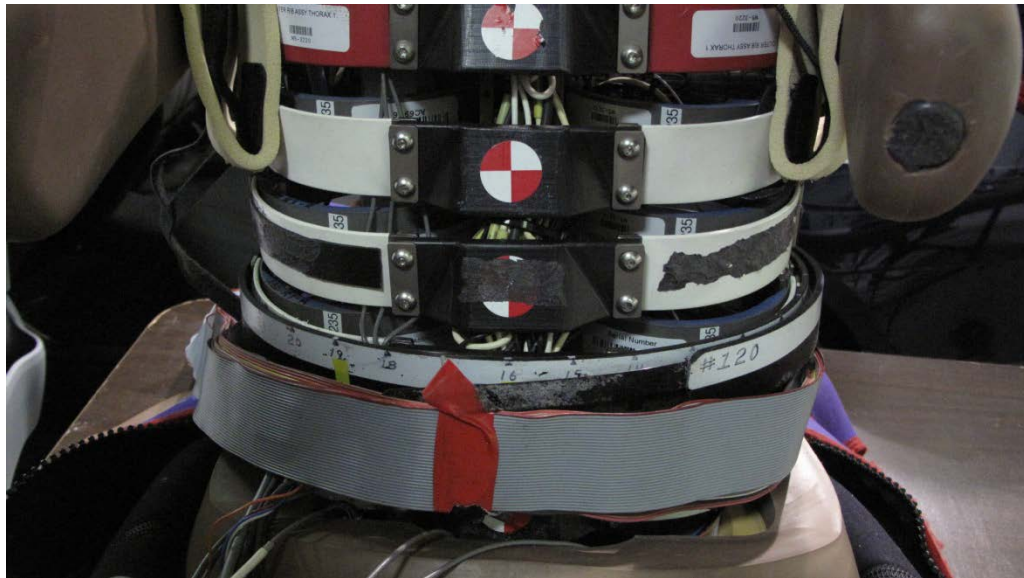


Figure 3. Front of WorldSID 5th female dummy showing chest band location

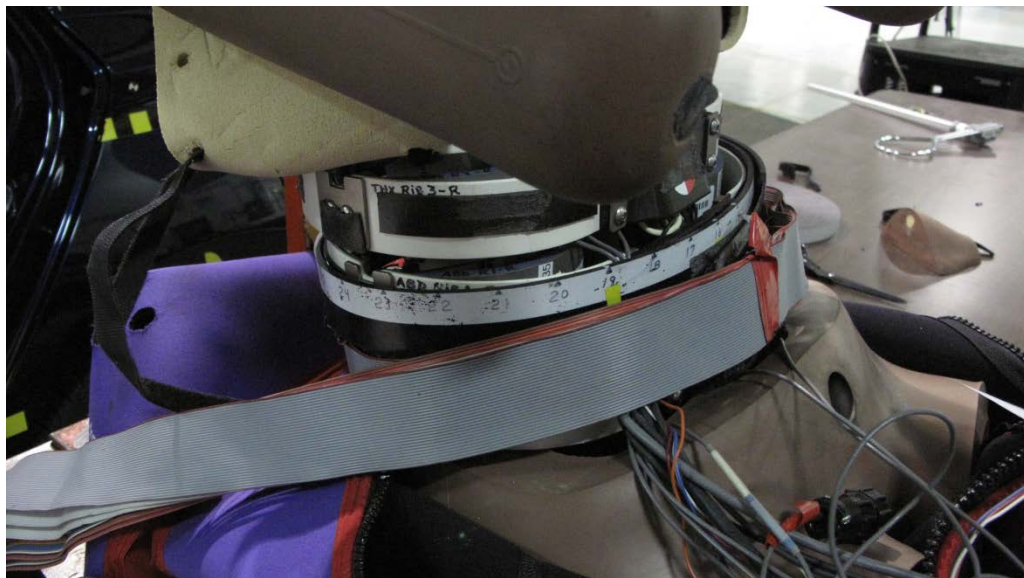


Figure 4. Right side of WorldSID 5th female dummy showing chest band location

Table 1. Chest Band Information

Test date	01/24/2013
Test vehicle	Hyundai Sonata
Dummy	WorldSID 5 th Female
Seating position	Rear seat
Chest band location	Abdomen Rib 1
Chest circumference	770 mm
Number of active gages*	31
Gage closest to spine	1
Distance from spine**	0 mm
Gage closest to sternum	16
Distance from sternum**	0 mm
Maximum half-chest deflection (forced angle method) from chest band data	16.8 mm
Angle from spine-sternum line to maximum deflection (forced angle method) from chest band data	109 deg
*The number of active gages is the number of gages encircling the subject. The contours shown from CrashStar (Figure 5 below) were processed using 1 fewer gage than those which encircled the subject due to an issue with the program. **Distance from anatomical reference (spine or sternum) is positive when the closest gage lies before the anatomical reference when moving around the chest band in a clock-wise direction	

Table 2. Chest Band Faro Data Points

Dummy	WorldSID 5 th Female			
		X	Y	Z
(Anchor)				
Chest Band Gage #	1	-11.5096	0.5546	258.6351
Chest Band Gage #	16	-204.887	-1.3518	250.8298
Chest Band Gage #	9	-118.779	137.8425	250.4254

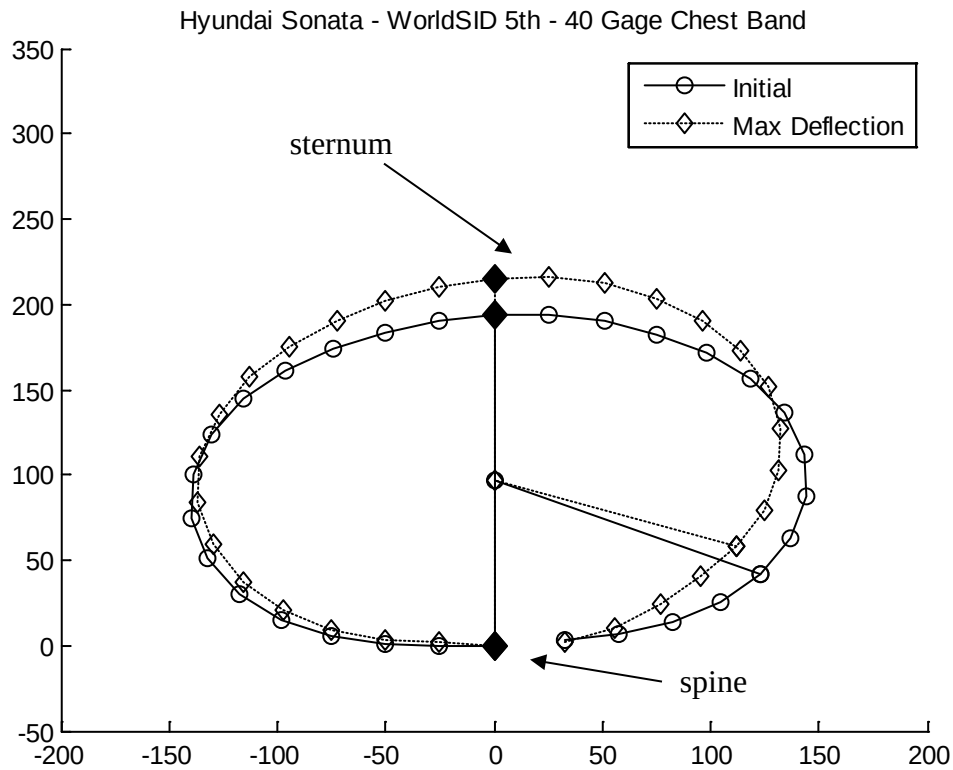


Figure 5. Chest band contours at initial position and maximum deflection for the WorldSID 5th dummy, where maximum deflection was determined using the forced angle method (Pintar et al., 2009). Contours were aligned such that the spine-sternum lines coincide.

REFERENCE:

Pintar, F., Humm, J., Yoganandan, N., Martin, P. (2009) Test Program To Define Oblique Chest Loading In Side Impact. SAE paper number 09-0557. The 19th International Technical Conference on the Enhanced Safety of Vehicles, Washington D.C.