

Report Number: NCAP-TRC-06-001

New Car Assessment Program

Frontal Barrier Impact Test

Indicant

**Kia Motors America, Inc.
2006 Kia Optima LX 4-door sedan**

NHTSA Number: M60518

**Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319**



Test Date: September 27, 2006

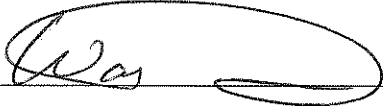
Final Report: October 10, 2006

**U. S. Department Of Transportation
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
Mail Code: NPS-10
400 Seventh Street, S. W., Room 5313
Washington, DC 20590**

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10/10/2006

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Manager, New Car Assessment Program
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Section 1

Purpose and Summary of NCAP Test

PURPOSE

This 56.3 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00029. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.3 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2006 Kia Optima LX 4-door sedan at a velocity of 56.3 kph. The test was performed at Transportation Research Center Inc. on September 27, 2006. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One (1) real-time camera and sixteen (16) high-speed digital cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two (2) Part 572E 50th percentile adult male Hybrid III anthropomorphic test devices (ATDs), were placed in the driver and right front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head (primary and redundant), chest (primary and redundant) and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, left and right knee sliders, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure

dummy torso and pelvic section loading. The driver and passenger seat belts were also instrumented to measure belt spool and elongation. The driver (position 1) ATD (Serial No. 37) and the right front passenger (position 2) ATD (Serial No. 352) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 153 channels of data were recorded on an on-board data acquisition system. Appendix B Contains the vehicle, load cell barrier, and dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 444 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: airbag, head restraint, and dash panel. The passenger's visible contact points were as follows: airbag, head restraint, and dash panel.

The occupant injury assessment values are summarized below. The passenger left upper tibia force exceeded the IAV.

Injury Criterion	Limits	Driver	Right Front Passenger
Head			
HIC 36	1000	268	391
HIC 15	700	152	247
Neck			
Upper Neck Tension (N)	4170	39	1118
Upper Neck Compression (N)	-4000	-710	-69
Neck Injury (NIJ) NTE	1.0	0.01	0.33
Neck Injury (NIJ) NTF	1.0	0.14	0.15
Neck Injury (NIJ) NCE	1.0	0.22	0.01
Neck Injury (NIJ) NCF	1.0	0.23	0.15

Injury Criterion	Limits	Driver	Right Front Passenger
Chest			
3 ms Clip (g)	60	39.9	38.5
Chest Displacement (mm)	63	32	31
Femur			
Left Femur Force (N)	-9040	-3865	-3599
Right Femur Force (N)	-9040	-4945	-1034
Tibia			
Left Upper Tibia Index	0.91	0.57	1.02
Right Upper Tibia Index	0.91	0.61	0.69
Left Lower Tibia Index	0.91	0.34	0.63
Right Lower Tibia Index	0.91	0.42	0.73
Left Upper Tibia Force (N)	-5600	-1,840	-7,018
Right Upper Tibia Force (N)	-5600	-5,446	-3,745
Left Lower Tibia Force (N)	-5200	-2,126	-8,599
Right Lower Tibia Force (N)	-5200	-6,432	-4,885

Data Acquisition Explanations

Electronic data anomalies are summarized below:

Channel Number	Sensor Type	Sensor Location	Sensor Attachment (Name)	Axis	Problem/Action
49	Accel	Dummy	13HEADCGRDH3ACXA	X	Exceeded full-scale at approximately 94 ms
116	Displ	Vehicle	11SEBE000000DS0A	N/A	Questionable data after approximately 50 ms
117	Displ	Vehicle	13SEBE000000DS0A	N/A	String broken during test
147	Accel	Barrier	L0FBAR290000FOX A	X	Questionable data throughout

Section 2.0

Occupant and Vehicle Information/Data Sheets

DATA SHEET NO. 1
CRASH VEHICLE SUMMARY

Vehicle NHTSA No.: M60518 Test Mode: Flat Frontal Load Cell Barrier

Test Date: 09/27/06 Time: 13:00 Temperature: 21 °C

Vehicle Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan

Vehicle Test Weight: 1646.8 kg

Vehicle/Barrier Impact Angle: 0 °

Vehicle/Barrier Impact Accuracy: Not recorded

Impact Velocity: 56.4 km/h

Maximum Static Crush: 444 Mm

Vehicle Rebound: 1173 Mm

DUMMIES:

DRIVER #37

**RIGHT FRONT
PASSENGER #352**

Type: HIII 50th

HIII 50th

Type Lower Leg / Serial Number: Instrumented/Unknown

Instrumented/Unknown

Restraint System: 3-pt. seat belt, airbag

3-pt. seat belt, airbag

Number of Data Channels: 71

Number of Cameras: 1 Real-Time

15 High-Speed Digital

DOOR OPENING DATA:

Easy - Left Front

Easy - Right Front

Easy - Left Rear

Easy - Right Rear

DATA SHEET NO. 1 (continued)
CRASH VEHICLE SUMMARY

<u>FRONT SEAT(S) DATA:</u>	<u>DRIVER</u>	<u>RIGHT FRONT PASSENGER</u>
Seat Track Failure (mm of shift):	None	None
Seat Back Failure:	None	None
<u>REAR SEAT(S) DATA:</u>	<u>LEFT REAR PASSENGER</u>	<u>RIGHT REAR PASSENGER</u>
Seat Track Failure (mm of shift):	N/A	N/A
Seat Back Failure:	N/A	N/A
<u>VISIBLE DUMMY CONTACT POINTS :</u>	<u>DRIVER</u>	<u>RIGHT FRONT PASSENGER</u>
Head:	Airbag, head restraint	Airbag, head restraint
Chest:	Airbag	Airbag
Abdomen:	None	None
Left Knee:	Knee bolster	Knee bolster
Right Knee:	Knee bolster	Knee bolster

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body
Style: 2006/Kia/Optima LX/4-door sedan

NHTSA No.: M60518 VIN: KNAGE123865075194 Color: Ruby Red

Engine Data: 4 Cylinders CID 5 Liters 2400 cc
Placement: Longitudinal or In-line X Transverse or Lateral

Transmission Data: 5 Speeds Manual X Automatic Overdrive
Final Drive: Rear Wheel X Front Wheel Four Wheel

Major Options: X A/C X Pwr. Steering X Pwr. Brakes Pwr. Seats
 Cruise
X Tilt Wheel X Pwr. Windows X Pwr. Locks X Control

Date Received: 09/1/2006 Odometer Reading: 73 miles

Selling Dealer: Ricart Properties, Inc.

& Address: 4255 S. Hamilton Road, Groveport, OH 43125

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:¹

Vehicle Manufactured by: Kia Motors America, Inc.

Date of Manufacture Unknown

GVWR: Unknown kg; GAWR: Unknown kg FRONT; Unknown kg REAR

DATA FROM TIRE OR TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 210 kPa FRONT
210 kPa REAR

Load Index & Speed Symbol: 91H

Recommended Tire Size: P205/60R16

* Recommended Cold Tire Pressure: 210 kPa FRONT; 210 kPa REAR

Tire Grades: 440 Treadwear; AA Temperature; AA Traction

Size of Tires on Test Vehicle: P205/60R16 ; Manufacturer: Kumho, Solus

Vehicle Capacity Data:

Type of Front Seats: Bench; X Bucket; Split Bench

Number of
Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 375 kg

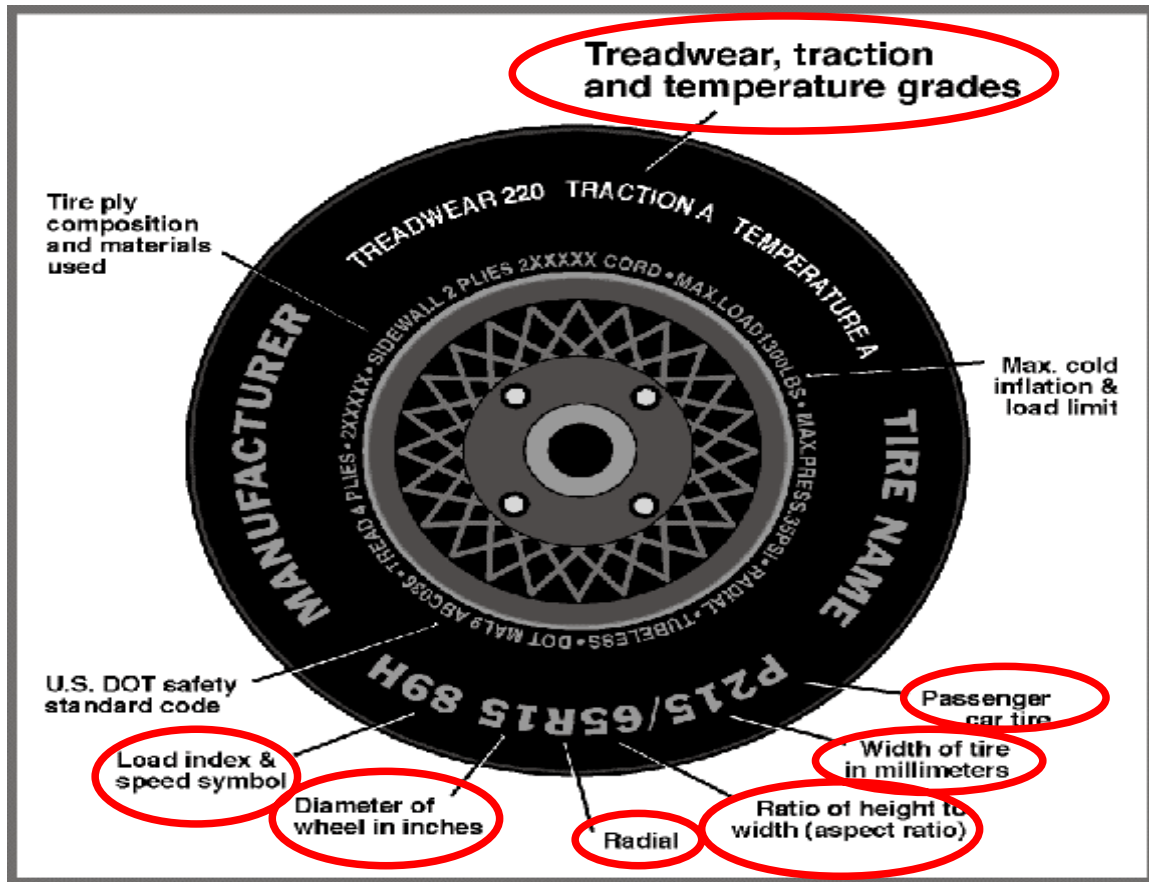
No. of Occupants x 68 kg = 340 kg

Rated Cargo/Luggage Weight (RCLW) = 35 kg

*Tire pressure used for test

¹ Vehicle was not equipped with a certification label. Photo of Driver B-pillar area included as Photo A-81 in Appendix A.

DATA SHEET NO. 2 (continued)
GENERAL TEST AND VEHICLE PARAMETER DATA



DATA RECORDED FROM ACTUAL TIRES ON TEST VEHICLE

	Front	Rear
Manufacturer	Kumho	Kumho
Brand Name	Solus	Solus
Tire Size (ex. P215/65R15)	P205/60R16	P205/60R16
Load Index and Speed Symbol	91H	91H
Treadwear	440	440
Traction	AA	AA
Temperature	A	A

DATA SHEET NO. 2 (continued)
GENERAL TEST AND VEHICLE PARAMETER DATA

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with max. fluids) = UDW:

Right Front	=	442.5	kg	Right Rear	=	289.5	kg
Left Front	=	455.0	kg	Left Rear	=	280.5	kg
TOTAL FRONT	=	897.5	kg	TOTAL REAR	=	570.0	kg
TOTAL DELIVERED WEIGHT =				1467.5	kg		
% of Total Front of Vehicle Weight =				61.2	%		
% of Total Rear of Vehicle Weight =				38.8	%		

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT :

Total Delivered Weight (UDW)	=	1467.5	kg
Rated Cargo/Luggage Weight (RCLW)	=	35	kg
Weight of 2 Part 572E Dummies @ 76 each	=	152.0	kg
TARGET TEST WEIGHT	=	1654.5	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES:

Right Front	=	484.6	kg	Right Rear	=	336.0	kg
Left Front	=	491.0	kg	Left Rear	=	335.2	kg
TOTAL FRONT	=	975.6	kg	TOTAL REAR	=	671.2	kg
TOTAL TEST WEIGHT =			1646.8	kg			
% of Total Front of Vehicle Weight =			59.2	%			
% of Total Rear of Vehicle Weight =			40.8	%			
Weight of Ballast Secured in Vehicle Trunk Area =				None			
Vehicle Components Removed for Weight Reduction:				<u>Rear deck lid, taillights, rear door seals, both rear door skins, rear bumper beam, rear fascia, both rear side windows with regulators, 3 seat belts, C-pillar garnishes</u>			

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED : RF	709	LF	710	RR	715	LR	720
FULLY LOADED : RF	681	LF	682	RR	677	LR	678
AS TESTED : RF	682	LF	682	RR	677	LR	678
Vehicle's Wheel Base :	2722	mm					
Location of Vehicle's C.G.:	1109	mm rearward of front wheel center.					

FUEL SYSTEM DATA :

Fuel System Capacity From Owner's Manual =	62.1	liters
Usable Capacity Figure Furnished by COTR =	57.9	liters
Test Volume Range (92 to 94% of Usable Capacity) =	53.3	to 54.4 liters
ACTUAL TEST VOLUME =	57.9	liters (with entire fuel system filled)
Test Fluid Type: Stoddard ;	Specific Gravity =	0.764
Kinematic Viscosity =	0.99	centistokes; Color = Purple
Type of Fuel Pump: Electric- <u>X</u> ;	Mechanical-	
Does Electric Pump operate with ignition switch "ON" & engine "OFF" Yes- <u>X</u> No-		
Details of Fuel System:	<u>The fuel tank is located in front of the rear axle. The fuel filler neck enters the fuel tank at the top left rear corner. The fuel cap is located on left rear quarter panel. The fuel lines run along the inside of the left frame rail.</u>	

DATA SHEET NO. 3
POST IMPACT DATA

TYPE OF TEST:

Type of Test: Left 40% Offset Deformable Barrier Impact Angle: 0 °
Test Date: 09/27/06 Time: 13:00 Temperature: 21 °C
Vehicle NHTSA No.: M60518
Required Impact Velocity Range: 55.5 to 57.1 km/h

BARRIER IMPACT VELOCITY:¹

Trap No. 1 = N/A km/h; Trap No. 2 = N/A km/h

VEHICLE STATIC CRUSH: (mm)

Vehicle Length:

Pre-Test Right = 4564 ; C/L = 4722 ; Left = 4563
Post-Test Right = 4224 ; C/L = 4278 ; Left = 4219
Crush Right = 340 ; C/L = 444 ; Left = 344
AVERAGE = 376 mm

VEHICLE REBOUND: (mm) (From rigid barrier only.)

Distance from front of test vehicle to impact point:

Right = N/A ; C/L = N/A ; Left = N/A
AVERAGE = N/A mm

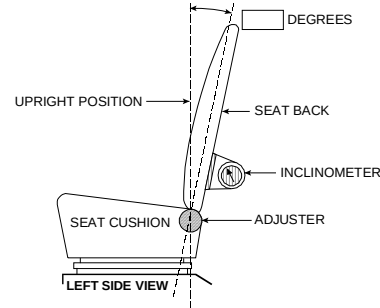
¹ Light traps failed to record impact velocity. Cable speed used to determine impact velocity.

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan

NHTSA Test No.: M60518 Test Date: 09/27/06

Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



FRONT SEAT ASSEMBLY

Left Front Seat Cushion Placement: Detent 13 of 25

Total Length of Fore/Aft Adjustment Travel: 240 mm

Total Number of Adjustment Positions or Detents: 25

Left Front Seat Back Adjustment Position: 12th latch position

Left Front Head Restraint Placement: Detent 1 of 5

Left D-Ring Placement: Detent 3 of 5

Right Front Seat Cushion Placement: Detent 12 of 22

Total Length of Fore/Aft Adjustment Travel: 240 mm

Total Number of Adjustment Positions or Detents: 25

Right Front Seat Back Adjustment Position: 12th latch position

Right Front Head Restraint Placement: Detent 3 of 5

Right D-Ring Placement: Detent 1 of 5

Adjustable Steering Column Position: 23.2°; center of geometric range of travel

Window Positions:

Right Front: Open

Right Rear: Open

Left Front: Open

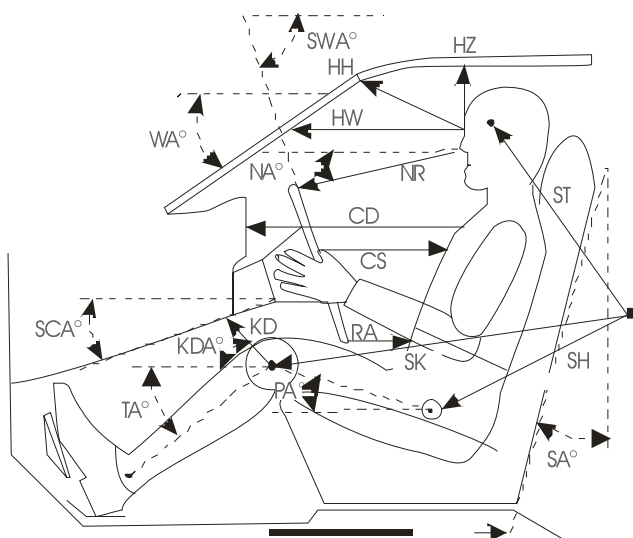
Left Rear: Open

Amount of Stoddard Solvent In Fuel Tank:

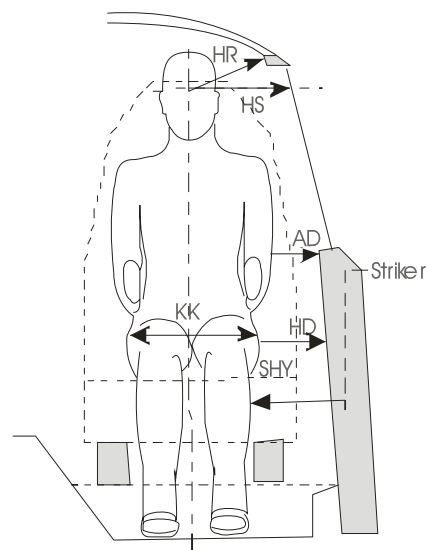
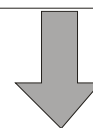
62.1 liters (fuel tank usable capacity)

57.9 liters used in test (92% - 94% of fuel tank usable capacity)

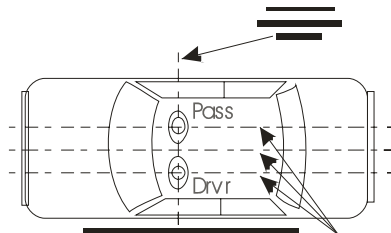
Dummy Measurement for Front Seat Passengers



AD Arm to Door
HD H-Point to Door
HR Head to Side Header
HS Head to Side Window
KK Knee to Knee
SHY Striker to H-Point (Y-Axis)



CD Chest to Dash
CS Chest to Steering Wheel Hub
HH Head to Header
HW Head to Windshield
HZ Head to Roof
KDA Knee to Dash Angle
KDL Left Knee to Dash
NA Nose to Rim Angle
NR Nose to Rim
PA Pelvic Angle
RA Rim to Abdomen
SA Seat Back Angle
SCA Steering Column Angle
SH Striker to H-Point
SK Striker to Knee
ST Striker to Head
SWA Steering Wheel Angle
TA Tibial Angle
WA Windshield Angle



DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

	DRIVER (Serial #37)			RIGHT FRONT PASSENGER (Serial #352)		
WA°	29.4°					
SWA°	23.2°					
SCA°	66.8°					
SA°	10.8°			10.4°		
HZ	226 mm			197 mm		
HW	597 mm			608 mm		
HH	352 mm			335 mm		
HR	235 mm			205 mm		
NR	413 mm	Angle (NA)	10.4 °	149 mm		
CD	544 mm			535 mm		
CS	329 mm					
RA	165 mm					
KDL	144 mm	Angle (KDA)	24.7 °	149 mm		
KDR	30.5 mm			179 mm	Angle (KDA)	30.1 °
PA°	24.7°			24.4°		
TA°	47.4°			43.2°		
KK	328 mm			270 mm		
ST	488 mm	Angle	12.4°	498 mm	Angle	14.6°
SK	597 mm	Angle	8.7°	605 mm	Angle	10.7°
SH	277 mm	Angle	47.1°	283 mm	Angle	44.2°
SHY	265 mm			260 mm		
HS	269 mm			230 mm		
HD	163 mm			147 mm		
AD	135 mm			110 mm		

Descriptions of Dummy Measurements

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

The following measurements are to be made within a vertical longitudinal plane.

- * HH Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header.
- * HW Head to Windshield, taken from the point where the dummy's nose meets his forehead (between his eyes) to a point on the windshield. Use a level.

HZ Head to Roof, taken from the point where the dummy's nose meets his forehead (between his eyes) to the point on the roof directly above it. Use a level.
- * CS Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level.
- * CD Chest to Dash, place a tape measure on the tip of the dummy's chin and rotate five inches of it downward toward the dummy to the point of contact on the transverse center of the dummy's chest. Then measure from this point to the closest point on the dashboard either between the upper part of the steering wheel between the hub and the rim, or measure to the dashboard placing the tape measure above the rim, whichever is a shorter measurement. See diagram.
- RA Steering Wheel Rim to Abdomen, taken from the bottommost point of the steering wheel rim horizontally rearward to the dummy. Use a level.
- NR Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA).

* Measurement used in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd.

*¹ KDL, KDR Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard. Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA). See diagram.

SH, SK, ST Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z plane measured from the forward most center point on the striker to the center of the H-point, outer knee bolt, and head target. When taking this measurement a firm device that can be rigidly connected to the striker should be used. Use a level. The angles of these measurements with respect to the horizontal should also be recorded. The measurement in the Y (transverse) direction from the striker to the H-point should also be taken (SHY). See diagram.

The following measurements are to be made within a vertical transverse plane.

HS Head to Side Window, taken from the point where the dummy's nose meets his forehead (between his eyes) to the outside of the side window. In order to make this measurement, roll the window down to the exact height which allows a level measurement. Use a level. See diagram.

* AD Arm to Door, taken from the outer surface of the elbow pivot bolt on a Hybrid II dummy to the first point it hits on the door. In the case of a Hybrid III dummy, measure from the bolt on the outer biceps. When a SID is used make the measurement from the center of the bottom of the arm segment where it meets the dummy's torso.

* HD H-point to Door, taken from the H-point on the dummy to the closest point on the door. Use a level.

* HR Head to Side Header, measure the shortest distance from the point where the dummy's nose meets his forehead (between his eyes) to the side edge of the header just above the window frame, directly adjacent to the dummy.

* Measurement used in Data Tape Reference Guide

¹ Only outboard measurement is referenced in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd.

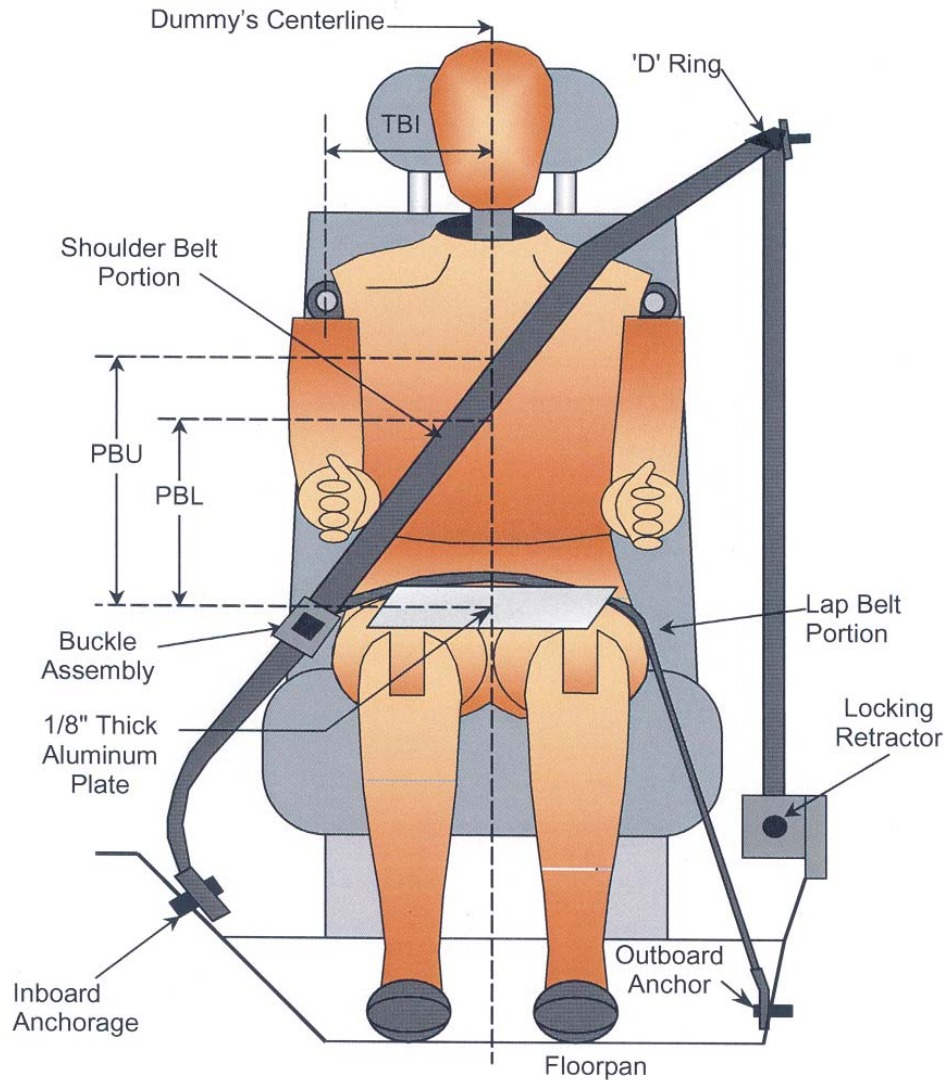
- SHY Striker to H-point, taken from a rod rigidly connected to the forward most center point on the striker to the H-point. Use a level. See diagram.
- KK Knee to Knee, for Hybrid II dummies measure the distance between knee pivot bolt head outer surfaces. For Hybrid III dummies measure the distance between the outboard knee clevis flange surfaces. (This measurement may not be exactly transverse.)

Angles

- SA Seat Back Angle, find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR.
- PA Pelvis or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the point hole and the outer knee pivot bolt hole on a Hybrid II dummy with respect to the horizontal, to find the femur angle.
- H-
- SWA Steering Wheel Angle, find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.
- SCA Steering Column Angle, measured with respect to the horizontal by placing an inclinometer on the center of the underside of the steering column.
- NA Measure the angle made when taking the measurement NR with respect to the horizontal.
- KDA Knee to Dash Angle, the angle that the measurement KD is taken at with respect to the horizontal. Only get this angle for the outboard knee. See diagram.
- WA Windshield Angle, place an inclinometer along the transverse center of the windshield exterior (measurement is made with respect to horizontal).
- TA Tibia Angle, use a straight edge to connect the dummy's knee and ankle bolts. Then place an inclinometer on the straight edge and measure the angle with respect to the horizontal.

* Measurement used in Data Tape Reference Guide

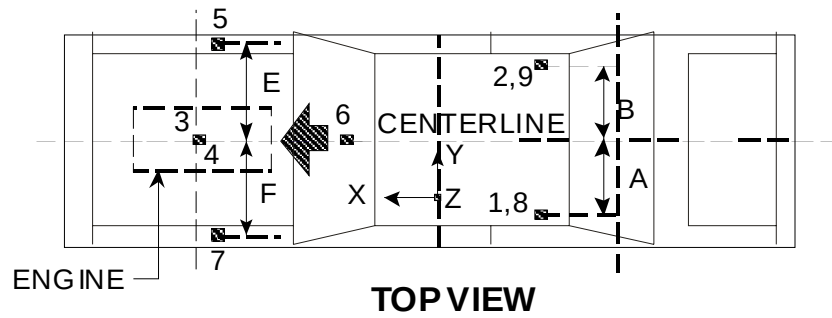
DATA SHEET NO. 6
SEAT BELT POSITIONING DATA



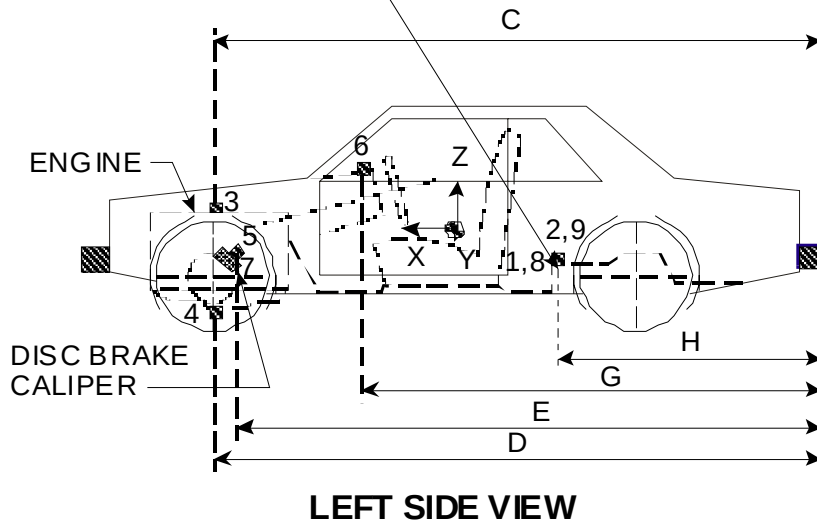
	Driver Dummy	Passenger Dummy
PBU - Top surface of aluminum plate to belt upper edge, mm	340	355
PBL - Top surface of aluminum plate to belt lower edge, mm	265	265
Lap Belt Tension, N	7513	6691
Shoulder Belt Tension, N	5108	5418

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



NOTE: Vehicle accelerometer location and data summary shown in DATA SHEET NO. 6.

DATA SHEET NO. 7 (continued)
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

DIMENSION	LENGTH (mm)
	PRE-TEST VALUES
A Left Rear Seat Crossmember X	2083
B Right Rear Seat Crossmember X	2080
C Top of Engine X	4240
D Bottom of Engine X	4140
E Right Disc Brake Calipers X	3885
F Left Disc Brake Calipers X	3885
G Instrument Panel X	3516
H Left Rear Seat Cross Member Z	433
I Right Rear Seat Cross Member Z	426

DATA SHEET NO. 7 (continued)
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

LOCATION NUMBER	<u>DESCRIPTION</u>	MAXIMUM VALUE (g's)			
		Positive	Time, ms	Negative	Time, ms
1	Left Rear Seat Cross Member X	5.5	121.4	35.9	50.8
2	Right Rear Seat Cross Member X	4.3	121.0	36.0	63.0
3	Top of Engine Block X	62.2	46.2	159.9	31.8
4	Bottom of Engine Block X	85.4	41.4	172.5	29.3
5	Disc Brake Caliper @ Right Side X	12.8	67.2	68.5	36.7
6	Instrument Panel X	17.4	38.0	76.6	46.6
7	Disc Brake Caliper @ Left Side X	15.8	57.3	88.8	42.6
8	Left Rear Seat Cross Member Z	5.5	25.5	7.5	36.4
9	Right Rear Seat Cross Member Z	4.4	29.1	11.8	36.1

DATA SHEET NO. 8
DUMMY INJURY CRITERIA VALUES

		MAXIMUM VALUE							
		Driver				Right Front Passenger			
DESCRIPTION	Unit	Positive	Time, ms	Negative	Time, ms	Positive	Time, ms	Negative	Time, ms
Head X	g	1.8	232.5	40.9	79.0	1.9	249.2	49.6	82.7
Head Y	g	2.2	147.8	9.7	80.6	3.4	61.7	13.1	93.2
Head Z	g	17.3	58.2	4.1	82.4	21.9	51.7	1.7	146.6
Head Resultant	g	42.1	79.0			52.0	82.7		
Head Redundant X ¹	g	1.9	243.3	42.2	78.2	----	----	----	----
Head Redundant Y	g	2.3	147.8	10.2	81.1	3.4	61.6	12.9	93.1
Head Redundant Z	g	17.1	59.1	3.6	82.7	21.8	51.2	1.7	146.6
Head Resultant Red. ¹	g	43.3	78.5			----	----	----	----
Neck Fx	N	664.9	79.3	440.8	132.1	66.0	255.1	431.4	139.4
Neck Fy	N	136.1	147.9	59.5	100.1	166.9	64.3	194.2	109.4
Neck Fz	N	38.6	148.3	710.2	55.8	1117.5	70.4	68.8	140.9
Neck Mx	N-m	7.7	146.8	15.4	109.8	21.7	76.3	12.9	128.1
Neck My	N-m	53.1	62.5	27.4	100.1	36.2	146.5	36.8	99.6
Neck Mz	N-m	10.7	100.0	3.9	148.8	18.1	98.4	7.3	152.1
Chest X	g	1.4	153.2	40.3	62.9	2.2	158.8	39.3	65.0
Chest Y	g	3.9	108.5	7.1	51.4	5.6	52.7	6.0	75.8
Chest Z	g	7.2	47.2	9.2	75.0	12.8	50.4	4.5	70.9
Chest Resultant	g	40.5	62.9			39.5	65.0		
Chest Redundant X	g	1.0	151.4	40.8	62.2	2.2	158.8	38.7	65.0
Chest Redundant Y	g	4.2	108.4	6.8	53.4	5.4	52.6	5.9	75.8
Chest Redundant Z	g	7.1	47.2	9.4	74.9	12.7	50.5	4.3	70.9
Chest Resultant Redundant	g	41.0	62.2			39.0	65.0		
Chest Displacement	mm	0.0	10.6	32.1	64.6	0.0	7.4	30.8	65.7
Pelvis X	g	3.3	224.9	75.7	51.6	3.1	109.7	55.1	47.9
Pelvis Y	g	7.8	88.6	11.7	46.8	10.6	48.2	8.1	97.2
Pelvis Z	g	2.4	228.4	31.8	68.5	1.7	256.9	36.1	69.2
Pelvis Resultant	g	77.2	51.6			57.4	66.3		
Left Femur Z	N	886.6	46.2	3864.9	52.9	522.7	38.8	3598.6	67.3
Right Femur Z	N	718.8	41.9	4945.4	53.8	1231.2	69.8	1033.7	46.1

¹ See Data Acquisition Explanations

DATA SHEET NO. 8 (continued)
DUMMY INJURY CRITERIA VALUES

DESCRIPTION	Unit	MAXIMUM VALUE							
		Driver				Right Front Passenger			
		Positive	Time, ms	Negative	Time, ms	Positive	Time, ms	Negative	Time, ms
Left Upper Tibia Fx	N	181.4	29.4	279.7	72.0	185.2	41.7	1659.2	67.0
Left Upper Tibia Fy	N	317.6	59.3	94.3	39.6	101.4	111.4	592.8	65.3
Left Upper Tibia Fz	N	68.2	145.4	1839.5	58.5	180.3	30.2	7018.5	47.5
Left Upper Tibia Mx	N-m	28.4	86.0	14.7	36.6	44.6	80.5	10.4	64.5
Left Upper Tibia My	N-m	21.0	136.6	120.2	52.0	28.3	36.7	190.1	45.8
Left Lower Tibia Fx	N	862.4	57.0	67.6	131.8	1480.2	46.2	288.8	58.2
Left Lower Tibia Fy	N	249.5	70.6	62.9	34.1	383.6	59.0	84.6	189.8
Left Lower Tibia Fz	N	2126.1	67.1	31.5	310.0	159.7	149.8	8598.5	47.6
Left Lower Tibia Mx	N-m	4.3	184.7	63.5	66.3	26.2	47.0	2.4	253.9
Left Lower Tibia My	N-m	22.6	72.0	30.5	51.4	99.9	51.0	36.9	44.6
Left Foot X	g	52.4	34.5	5.6	72.4	162.7	47.4	32.4	40.1
Left Foot Z	g	4.8	58.1	39.9	37.0	47.3	40.4	101.5	49.4
Left Toe Z	g	93.2	58.0	109.9	27.1	188.3	40.1	258.8	43.8
Right Upper Tibia Fx	N	445.2	70.0	446.4	49.5	870.8	64.8	152.4	33.1
Right Upper Tibia Fy	N	122.7	69.8	254.8	48.6	109.3	114.6	859.8	46.3
Right Upper Tibia Fz	N	5446.4	54.0	83.2	32.2	183.0	144.5	3745.4	45.8
Right Upper Tibia Mx	N-m	31.4	88.1	23.8	107.8	40.4	118.5	72.4	43.5
Right Upper Tibia My	N-m	13.7	196.3	123.4	46.6	37.2	63.6	117.1	46.0
Right Lower Tibia Fx	N	1392.5	50.6	71.9	140.3	865.6	45.8	254.7	63.9
Right Lower Tibia Fy	N	236.1	53.0	70.3	113.3	129.6	47.0	746.5	45.6
Right Lower Tibia Fz	N	6432.4	53.3	67.2	157.0	149.3	156.4	4885.3	45.8
Right Lower Tibia Mx	N-m	21.2	47.5	33.6	69.7	126.3	46.3	24.6	43.1
Right Lower Tibia My	N-m	74.9	71.6	52.6	45.8	50.8	47.6	24.0	35.4
Right Foot X	g	156.2	49.7	20.3	79.5	54.7	46.1	18.3	45.6
Right Foot Z	g	27.3	66.9	110.2	49.4	123.2	45.7	150.6	46.1
Right Toe Z	g	131.8	46.4	227.7	44.7	113.4	45.8	173.8	46.2
Lap Belt Load	N	181.4	29.4	279.7	72.0	185.2	41.7	1659.2	67.0
Shoulder Belt	N	317.6	59.3	94.3	39.6	101.4	111.4	592.8	65.3

DATA SHEET NO. 8 (continued)
DUMMY INJURY CRITERIA VALUES

	HEAD INJURY CRITERIA			
	HIC**	t ₁ (ms)	t ₂ (ms)	Average Acceleration t ₁ to t ₂ (g's)
Left Front - Driver	268	57.7	93.7	35.35
Right Front - Passenger	391	68.0	104.0	41.10

** Head Injury Criteria (HIC) is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 0.036 seconds.

	CLIP SUMMARY*			
	CLIP (g's)	t ₁ (ms)	t ₂ (ms)	Chest Severity Index
Left Front - Driver	39.9	61.0	64.0	398
Right Front - Passenger	38.5	62.8	65.8	354

* The maximum chest resultant acceleration (clip) is defined as the maximum acceleration that exceeds 0.003 seconds in duration.

DATA SHEET NO. 9
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

<u>BELT LENGTH DATA:</u>	<u>Driver*</u>	<u>Right Front Passenger *</u>
Total belt length.	2696	2721
Shoulder belt length as measured on Part 572 Dummy.	855	857
Lap belt length as measured on Part 572 Dummy.	633	825
 <u>SHOULDER BELT SPOOL-OFF DATA:</u>	 <u>Driver*</u>	 <u>Right Front Passenger*</u>
As determined mechanically.	230	227

NOTE:

* All measurements in millimeters.

¹ Belt spool data not part of test request.

DATA SHEET NO. 10
SUMMARY OF FMVSS 212 DATA

FMVSS No. 212 – “Windshield Mounting” Data

Details Of Windshield Mounting Such As

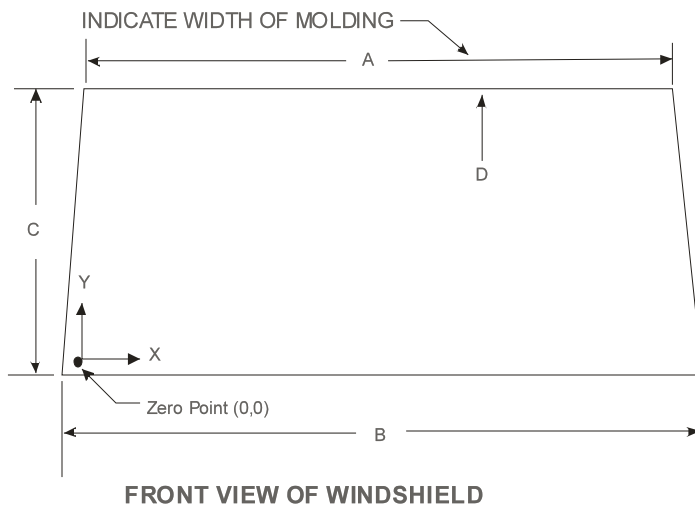
Retention Method, Trim Type, Etc.: Adhesive mounting, Plastic trim, No retention clips or brackets

FMVSS 212 Requirements

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants.

	Windshield Periphery		% of Retention
	Pre-Test (mm)	Post-Test (mm)	
Right Side	2175	2175	100.0
Left Side	2175	2175	100.0
Total	4350	4350	100.0

Area of Retention Failure:



Dimensions (mm)	
A	1170
B	1520
C	830
D	17

Failure Details - None

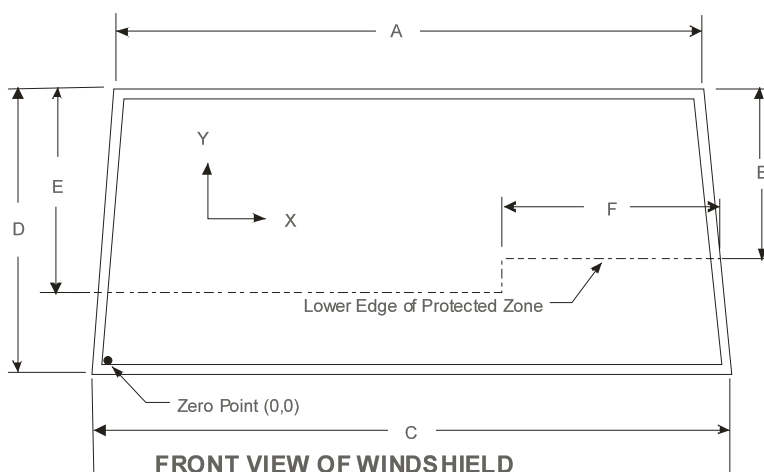
DATA SHEET NO. 11
FMVSS 219 (PARTIAL) – “WINDSHIELD ZONE INTRUSION” DATA

Protected Zone Lower Edge Requirement

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield; then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 Test Data

(Dimensions in mm)



Dimensions	
A	1170
B	500
C	1520
D	830
E	500
F	565

(Show location of penetration on the above sketch)

Details of Windshield Glass Penetration Greater Than 6 mm: None

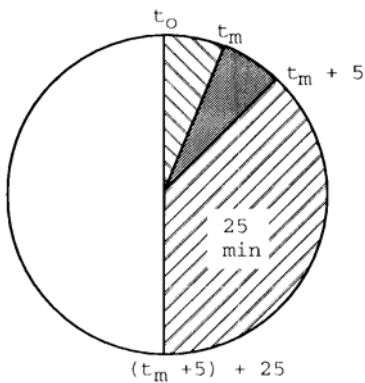
DATA SHEET NO. 12**FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA**

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

The test vehicle was filled from 92% to 94% of the manufacturer's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

TEST VEHICLE IMPACT TYPE

X	Frontal (56 kph)
	Oblique (48 kph) with _____ deg. barrier face first contacting _____ side (driver / passenger)
	Rear Moving Barrier (48 kph)
	Lateral Moving Barrier (32 kph)

FUEL SPILLAGE MEASUREMENT

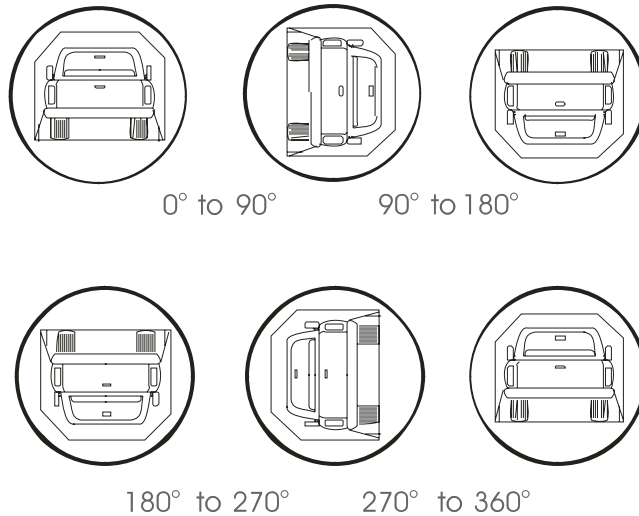
	ACTUAL	MAX. ALLOWED
1. From impact until vehicle motion ceases	0.0 g	28 g
2. For 5 minute period after vehicle motion ceases	0.0 g	141 g
3. For next 25 minutes	0.0 g	28 g/min.

SOLVENT SPILLAGE DETAILS

None

DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER DATA SHEET

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
NHTSA Test No.: M60518 Test Date: 09/27/06



1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).

Details of Stoddard Solvent Spillage Locations

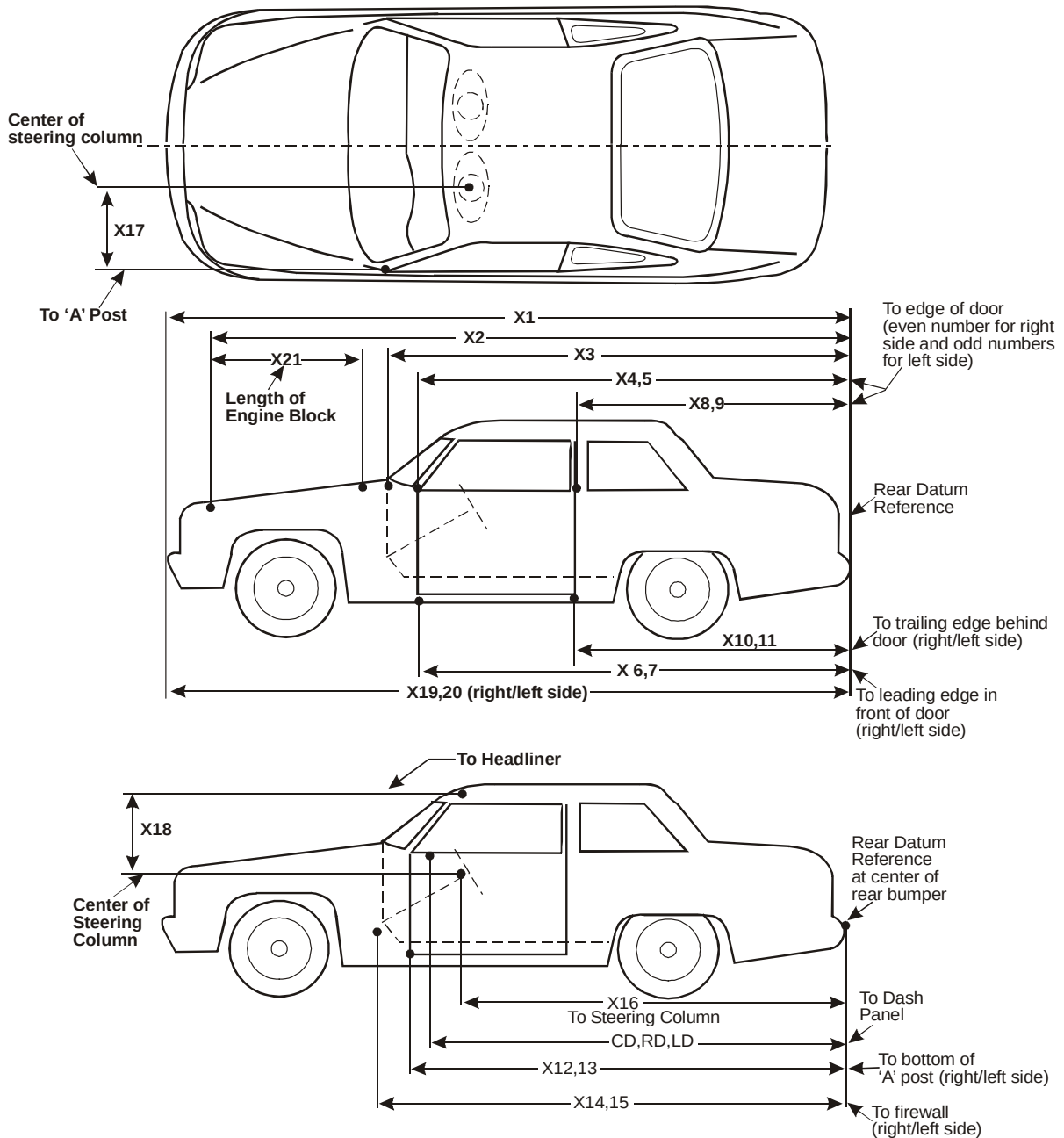
None

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	60	300	0
90° to 180°	60	300	0
180° to 270°	60	300	0
270° to 360°	60	300	0

DATA SHEET NO. 14
TEST VEHICLE MEASUREMENTS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan

NHTSA Test No.: M60518 Test Date: 09/27/06



DATA SHEET NO. 14 (continued)
VEHICLE MEASUREMENTS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan

NHTSA Test No.: M60518 Test Date: 09/27/06

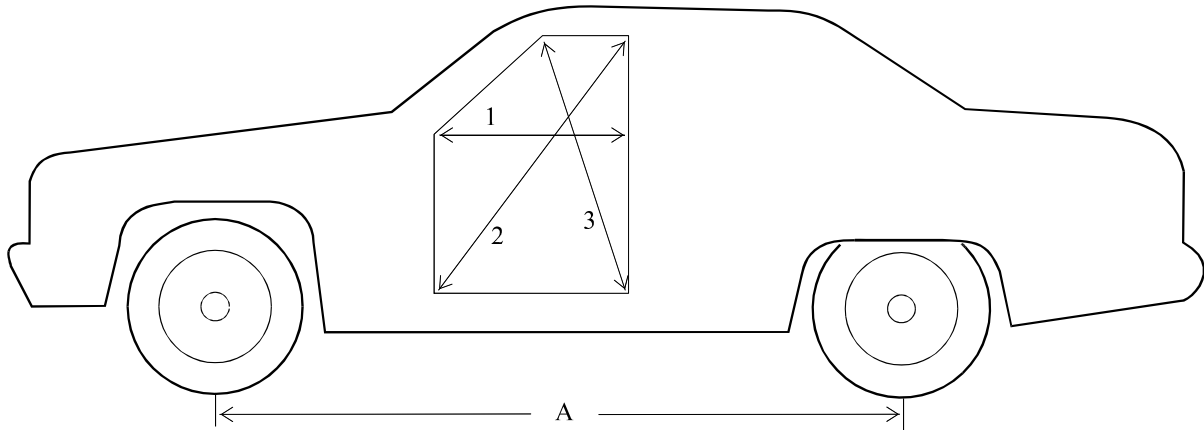
No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4722	4278	-444
X2	Rear Surface of Vehicle to Front of Engine Block	4249	3998	-251
X3	Rear Surface of Vehicle to Firewall	3663	3628	-35
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3282	3275	-7
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3273	3282	9
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3267	3260	-7
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3261	3265	-4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2229	2230	1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2227	2229	2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2237	2235	-2
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2235	2235	0
X12	Rear Surface of Vehicle to Bottom of " A " Post on Right Side	3252	3249	-3
X13	Rear Surface of Vehicle to Bottom of " A " Post on Left Side	3250	3248	-2
X14	Rear Surface of Vehicle to Firewall-Right Side	3662	3621	-41
X15	Rear Surface of Vehicle to Firewall-Left Side	3662	3596	-66
X16	Rear Surface of Vehicle to Steering Wheel Center	2810	2830	20
X17	Center of Steering Column to " A " Post	427	424	-3
X18	Center of Steering Column to Headliner	459	454	-5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4563	4219	-344
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4564	4224	-340
X21	Length of Engine Block	598	598	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel			
CD	Rear Surface of Vehicle to Center of Dash Panel	3018	3016	-2
LD	Rear Surface of Vehicle to Left Side of Dash Panel			

All measurements are in millimeters.

DATA SHEET NO. 14 (continued)
VEHICLE MEASUREMENTS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

DOOR OPENING WIDTH



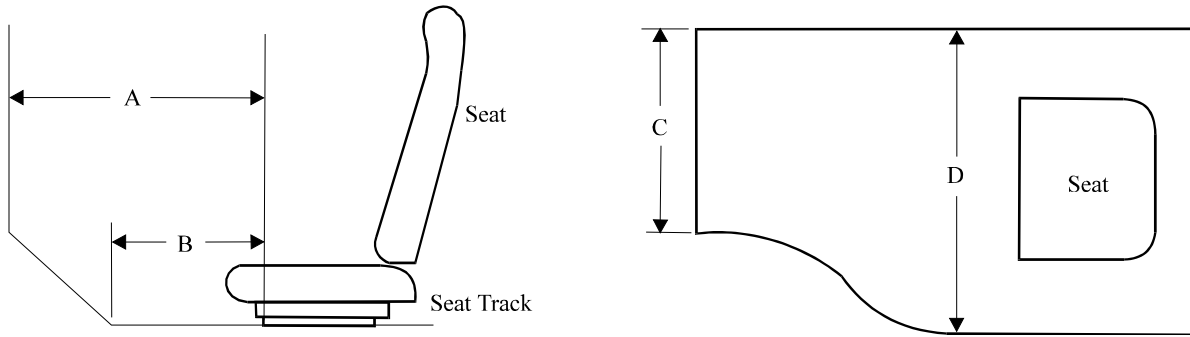
Units (mm)	Left			Right		
Measurement	1	2	3	1	2	3
Before Test	999	1455	944	999	1450	946
After Test	996	1455	943	996	1448	946
Difference	3	0	1	3	2	0

Units (mm)	A = Wheelbase Left	A = Wheelbase Right
Before Test	2722	2722
After Test	2637	2617
Difference	85	105

DATA SHEET NO. 14 (continued)
VEHICLE MEASUREMENTS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

VEHICLE INTRUSION MEASUREMENTS
STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	911	845	66
B	565	532	33
C	487	498	-11
D	437	598	-161

All units in millimeters

PASSENGER

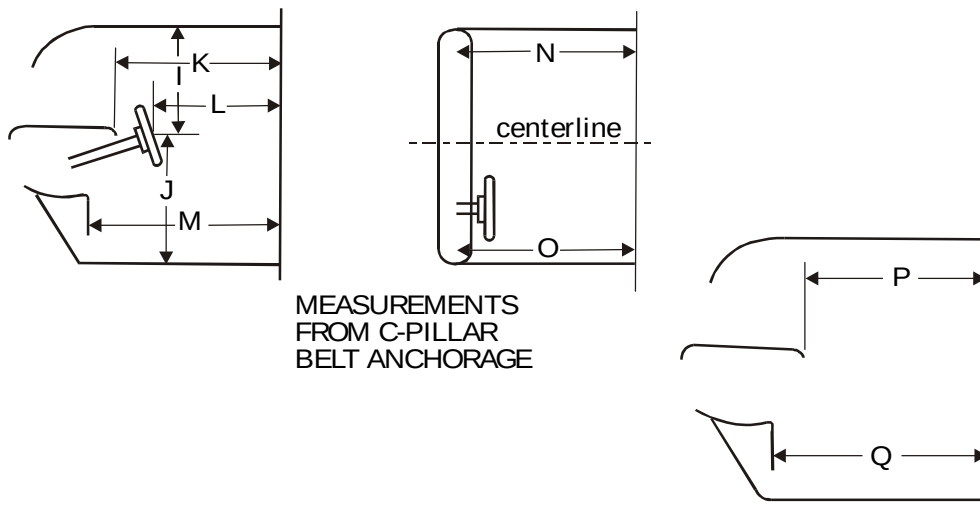
Measurement	Pre-Test	Post-Test	Difference
A	911	869	42
B	554	537	17
C	458	459	-1
D	562	543	19

All units in millimeters

DATA SHEET NO. 14 (continued)
VEHICLE MEASUREMENTS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

STATIC PASSENGER COMPARTMENT INTRUSION



Measurement	Pre-Test	Post-Test	Difference
I	459	454	5
J	606	622	-16
K	3037	3035	-2
L	2810	2830	20
M	3103	3101	-2
N	3078	3077	-1
O	3024	3020	-4
P = K (PASS.)	3040	3036	-4
Q = M (PASS.)	3096	3093	-3

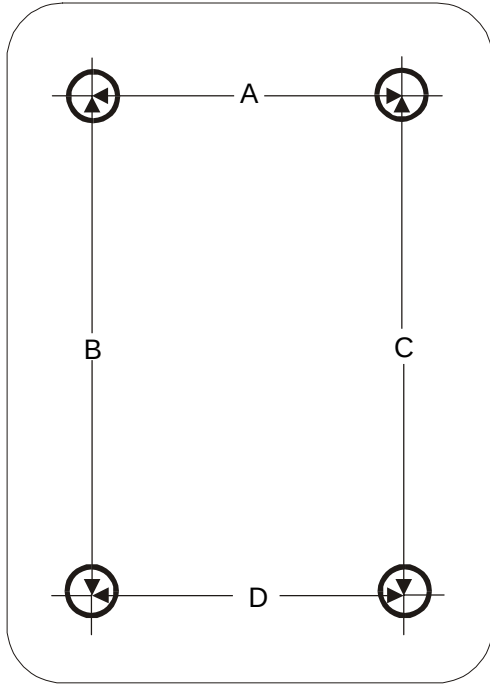
All units in millimeters

DATA SHEET NO. 14 (continued)
VEHICLE MEASUREMENTS

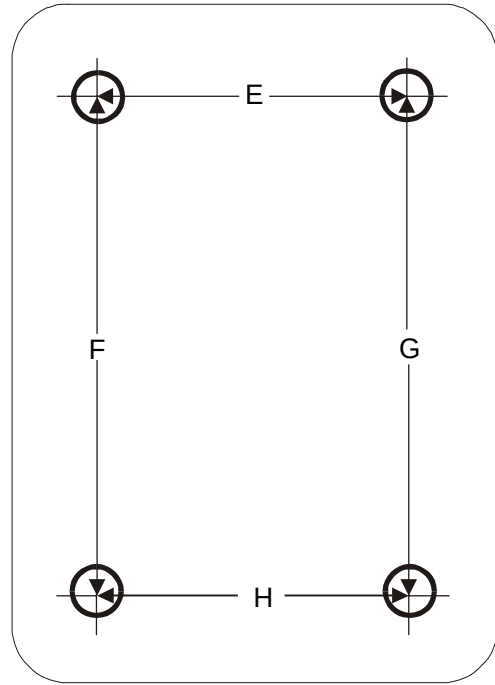
Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

FLOORBOARD DEFORMATION

DRIVERS SIDE



PASSENGERS SIDE



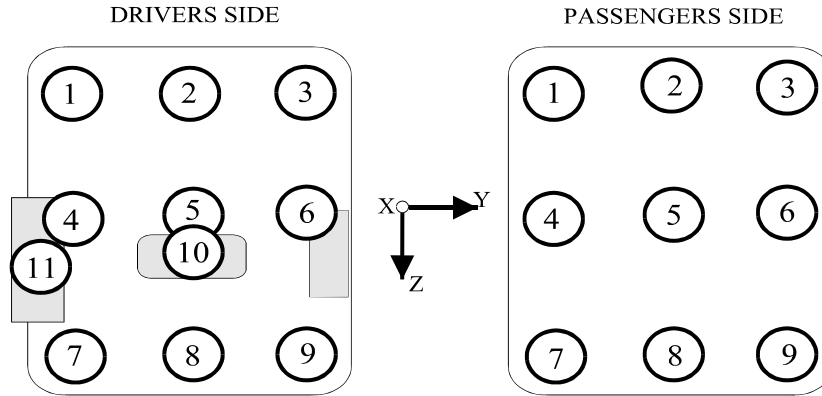
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	487	498	-11
B	553	433	120
C	664	542	122
D	437	598	-161
E	458	459	-1
F	441	439	2
G	692	614	78
H	562	543	19

All units in millimeters

DATA SHEET NO. 14 (continued)
VEHICLE MEASUREMENTS

TOE PAN FLOORBOARD INTRUSION



Driver Side Toe Pan and Floorboard Measurements

Floorpan Location	X Deformation			Z Deformation		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3400	3386	-14	100	107	7
2	3539	3476	-63	136	123	-13
3	3509	3442	-67	149	141	-8
4	3318	3294	-24	253	265	12
5	3316	3284	-32	254	273	19
6	3324	3273	-51	255	264	9
7	2847	2845	-2	262	264	2
8	2844	2839	-5	261	282	21
9	2849	2845	-1	256	270	14
10	3322	3372	50	52	101	49
11	3331	3319	-12	150	152	2

Reference: X = Rear Bumper; Z = Ground
 All units in millimeters

Passenger Side Toe Pan and Floorboard Measurements

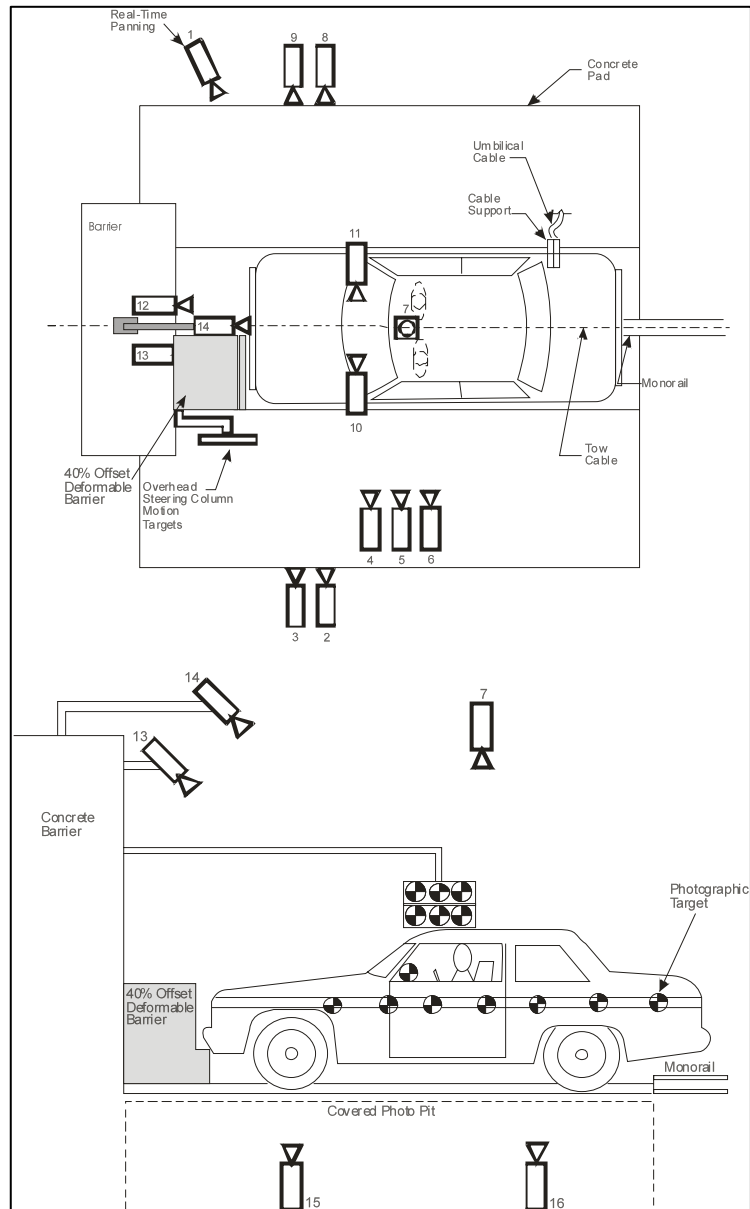
Floorpan Location	X Deformation			Z Deformation		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3400	3441	41	100	101	1
2	3539	3494	-45	136	104	-32
3	3509	3379	-130	149	104	-45
4	3318	3283	-35	253	262	9
5	3316	3288	-28	254	235	-19
6	3324	3297	-27	255	259	4
7	2847	2827	-20	262	277	15
8	2844	2820	-24	261	288	24
9	2846	2836	-10	256	265	9

Reference: X = Rear Bumper; Z = Ground
 All units in millimeters

DATA SHEET NO. 15
CAMERA POSITIONS FOR FRONTAL IMPACTS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
NHTSA Test No.: M60518 Test Date: 09/27/06

NOTE: Camera information shown in DATA SHEET NO. 14.



DATA SHEET NO. 15 (continued)
HIGH-SPEED CAMERA LOCATIONS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE (deg)**	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	---	---	---	---	---	zoom	30
2	Overall Left Side	2900	7000	1000	1.1	7450	12.5	1000
3	Left Side View	1000	7900	1200	2.2	7450	25	1000
4	Driver View	5000	3250	1600	4.5	3900	50	1000
5	Steering Column Top	2250	6900	1400	1.7	6450	50	1000
6	Steering Column Bottom	2250	7300	2200	8.7	6850	50	1000
7	Left Belt ¹							
8	Overall Right Side	2300	7900	1350	2.0	7400	12.5	1000
9	Right Side View	1000	7900	1350	4.8	8400	25	1000
10	Left Driver Foot View	1500	6500	1200	0.5	6100	50	1000
11	Right Driver Foot View	4700	2400	1850	9.7	3200	50	1000
12	Right Belt ¹							
13	Passenger Front View	0	520	2150	41.8	2600	25	1000
14	Driver Front View	0	520	2150	41.8	2600	25	1000
15	Windshield View	0	0	2150	41.8	2600	12.5	1000
16	Pit View of Engine	700	0	-3100	90	N/A	25	1000
17	Pit View of Fuel Tank	2300	0	-3100	90	N/A	12.5	1000

*X = film plane to impact location

Y = film plane to monorail centerline

Z = film plane to ground

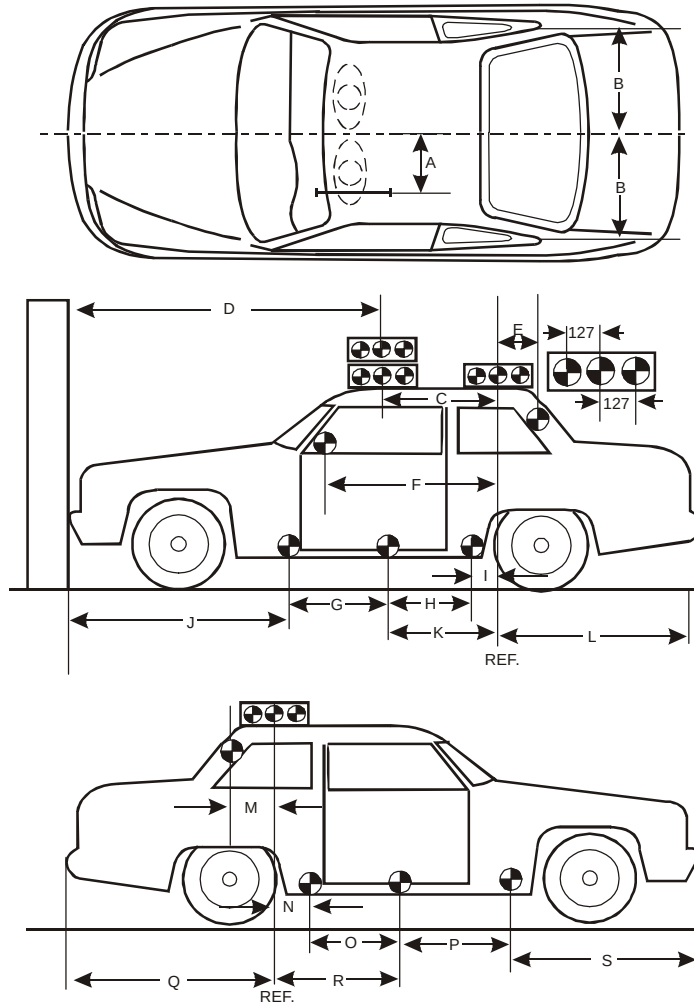
**Angle = referenced to horizontal plane

¹ Cameras 7 and 12 removed at direction of NHTSA COTR to maintain vehicle test weight.

DATA SHEET NO. 16
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

A	380
B	650
C	610
D	2095
E	603
F	1276
G	890
H	912
I	-236
J	1215
K	682
L	1771
M	660
N	-230
O	912
P	890
Q	1768
R	677
S	1223

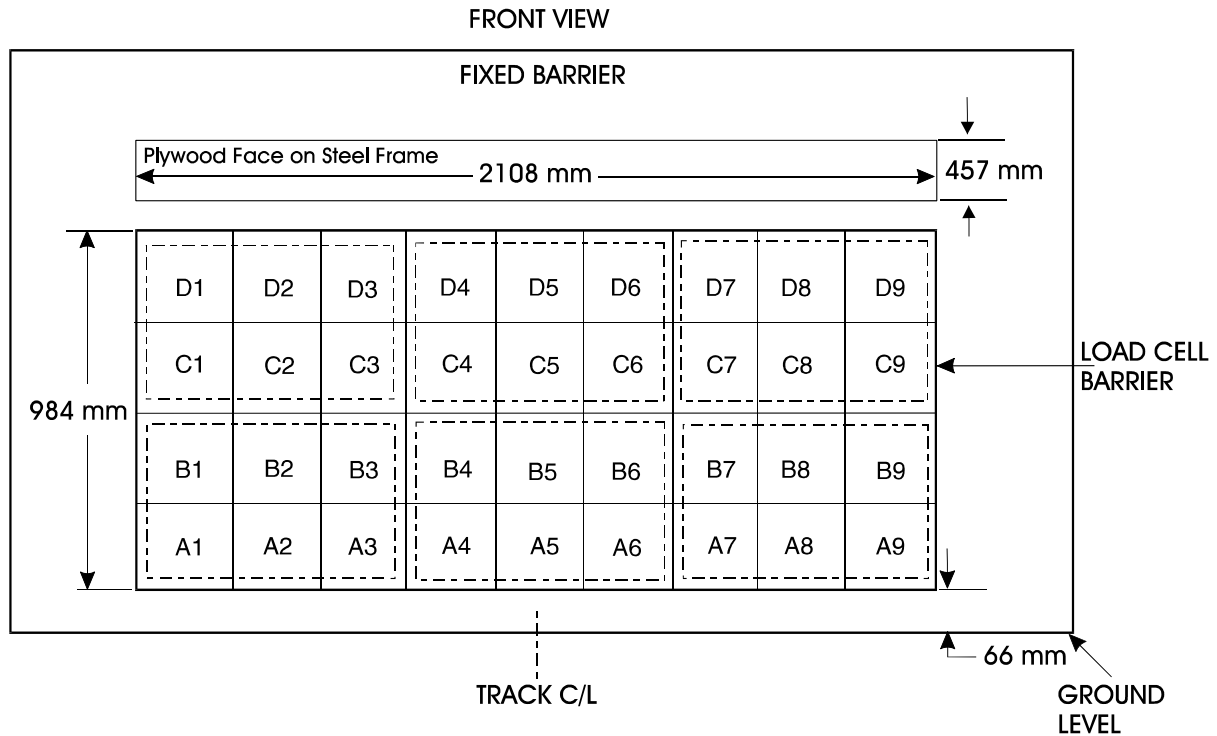


All measurements in millimeters

DATA SHEET NO. 17
LOAD CELL LOCATIONS ON FIXED BARRIER

Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

36 LOAD CELLS
 4 ROWS
 9 COLUMNS
 6 GROUPINGS (6 cells/group)



6 Groups of 6 Load Cells Each

The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or Sum of 36 individual load cells
- (3) Data from 6 Groupings shown above (6 cells/group)

DATA SHEET NO. 18
POST TEST AIR BAG DATA

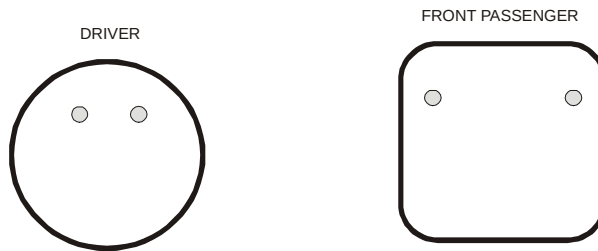
Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
NHTSA Test No.: M60518 Test Date: 09/27/06

NHTSA No.: M60518 Test Date: 09/27/06 Technician: William Millis

Vehicle Model Year/Make/Model: 2006/Kia/Optima LX

- A. No. of vent holes: 2 -Driver 2 -Passenger
- B. Size of vent holes: (mm²) 1257 -Driver 2376 -Passenger
- C. Total vent area: (mm²) 2514 -Driver 4752 -Passenger
- D. Deflated air bag length and width dimensions or, if round, diameter. (mm)
- Driver: 580 -Height; 460 -Width; -Depth
- Passenger: 770 -Height; 430 -Width; -Depth
- E. Is the air bag tethered?
- Driver: -Yes; X -No; If yes, record length of tether (mm)-
- Passenger: -Yes; X -No; If yes, record length of tether (mm)-

Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.



(Note: Not to scale; V_n = Vent hole_n , T_n = Tether_n).

- F. Record part numbers and manufacturer name of the air bag and gas generator.

Driver: Kolon Airbag No. 6050346

Passenger: Kolon Airbag No. 6061294

DATA SHEET NO. 19
ACCIDENT INVESTIGATION DIVISION DATA

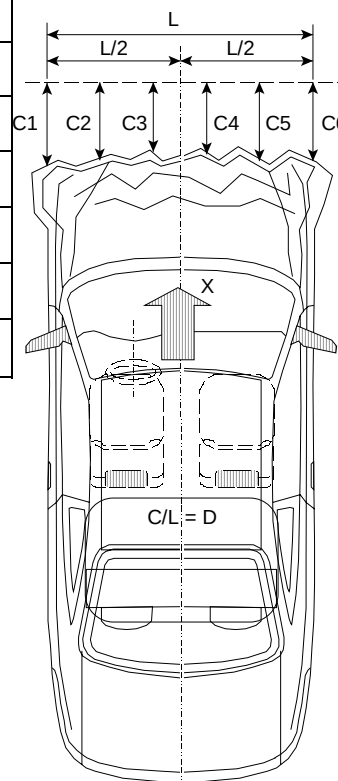
Vehicle Year/Make/Model/Body Style: 2006/Kia/Optima LX/4-door sedan
 NHTSA Test No.: M60518 Test Date: 09/27/06

FOR FRONTAL BARRIER IMPACT

NHTSA Test No.: M60518 VIN: KNAGE123865075194
 Model Year: 2006 Build Date: Test Date: 09/27/06
 Vehicle Size Category: 4-door sedan Test Weight: 1646.8 kg
 Vehicle Wheelbase: 2722 mm; Front Overhang: mm; Overall Width: 1562 mm
 Collision Deformation Classification (CDC) Code: 12FDGW2

Crush Depth Dimensions with Bumper

	PRE-TEST	POST-TEST	DIFFERENCE	
C1 =	4564	4224	340	mm
C2 =	4676	4248	428	mm
C3 =	4722	4278	444	mm
C4 =	4721	4278	443	mm
C5 =	4676	4241	436	mm
C6 =	4563	4219	344	mm



Midpoint of Damage: $D = \underline{\text{Vehicle Centerline (Longitudinal)}}$

Length of Damaged Region $L1 = \underline{1472} \text{ mm}$
 $L2 = \underline{736} \text{ mm}$
 $L3 = \underline{736} \text{ mm}$

Appendix A

Photographs

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Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Front View

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Figure A-4 Post-Test Left Front View



Figure A-5 Pre-Test Left Side View



Figure A-6 Post-Test Left Side View

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Figure A-7 Pre-Test Left Rear View



Figure A-8 Post-Test Left Rear View

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Figure A-9 Pre-Test Rear View



Figure A-10 Post-Test Rear View



Figure A-11 Pre-Test Right Rear View



Figure A-12 Post-Test Right Rear View



Figure A-13 Pre-Test Right Side View



Figure A-14 Post-Test Right Side View



Figure A-15 Pre-Test Right Front View

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Figure A-16 Post-Test Right Front View



Figure A-17 Pre-Test Overhead View



Figure A-18 Post-Test Overhead View



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



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

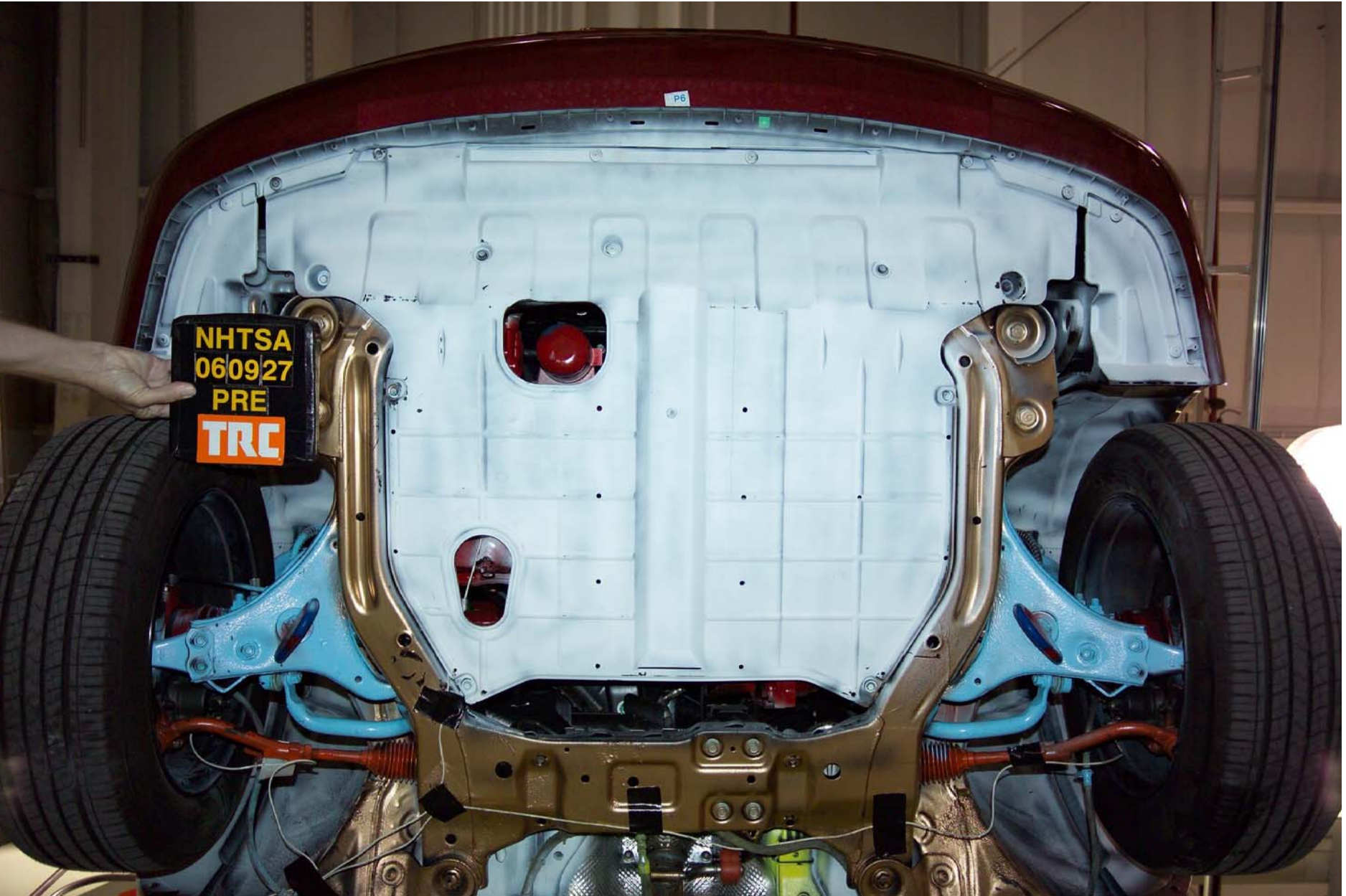


Figure A-21 Pre-Test Front Underbody View



Figure A-22 Post-Test Front Underbody View

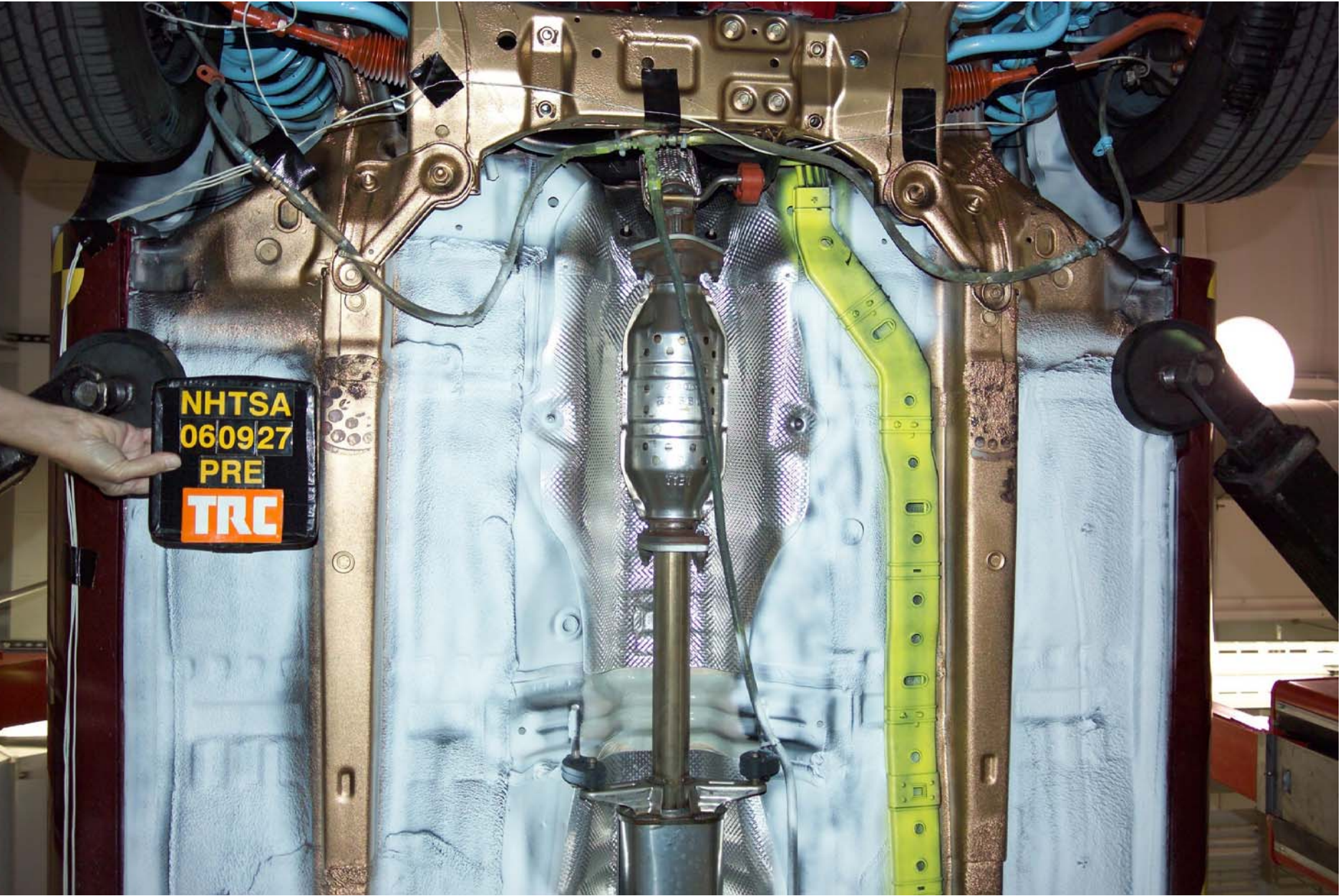


Figure A-23 Pre-Test Mid Front Underbody View

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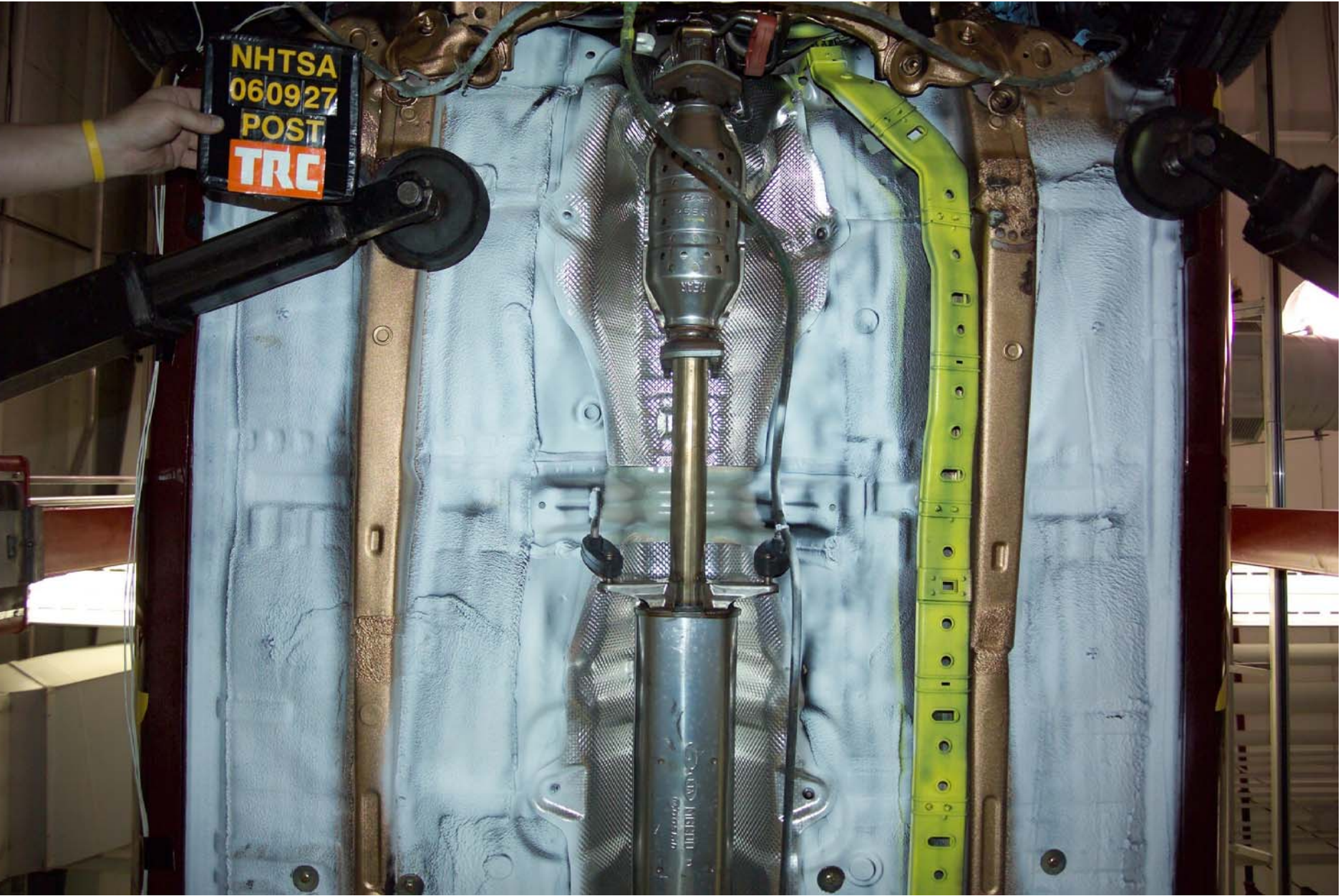


Figure A-24 Post-Test Mid Front Underbody View

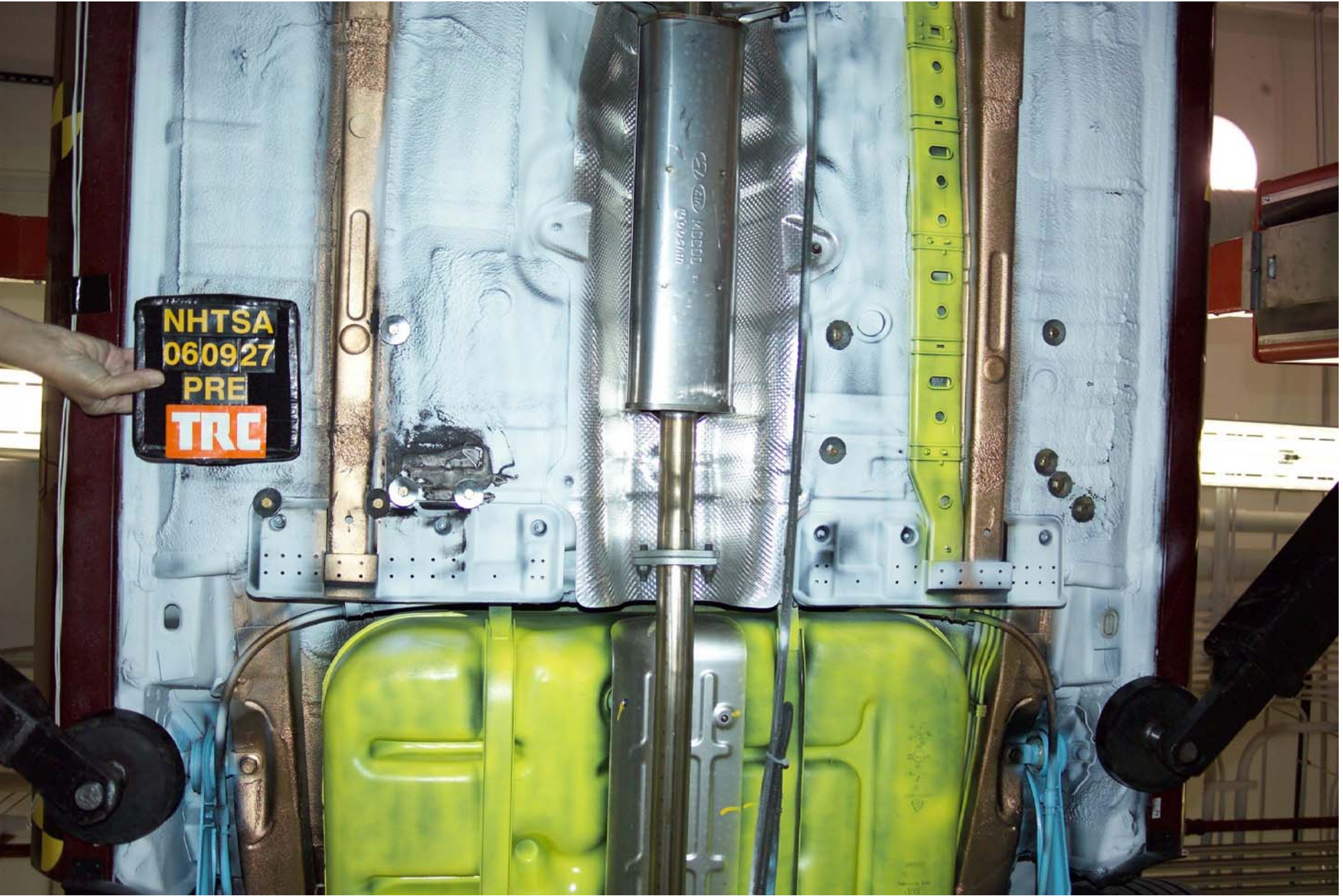


Figure A-25 Pre-Test Mid Underbody View



Figure A-26 Post-Test Mid Underbody View

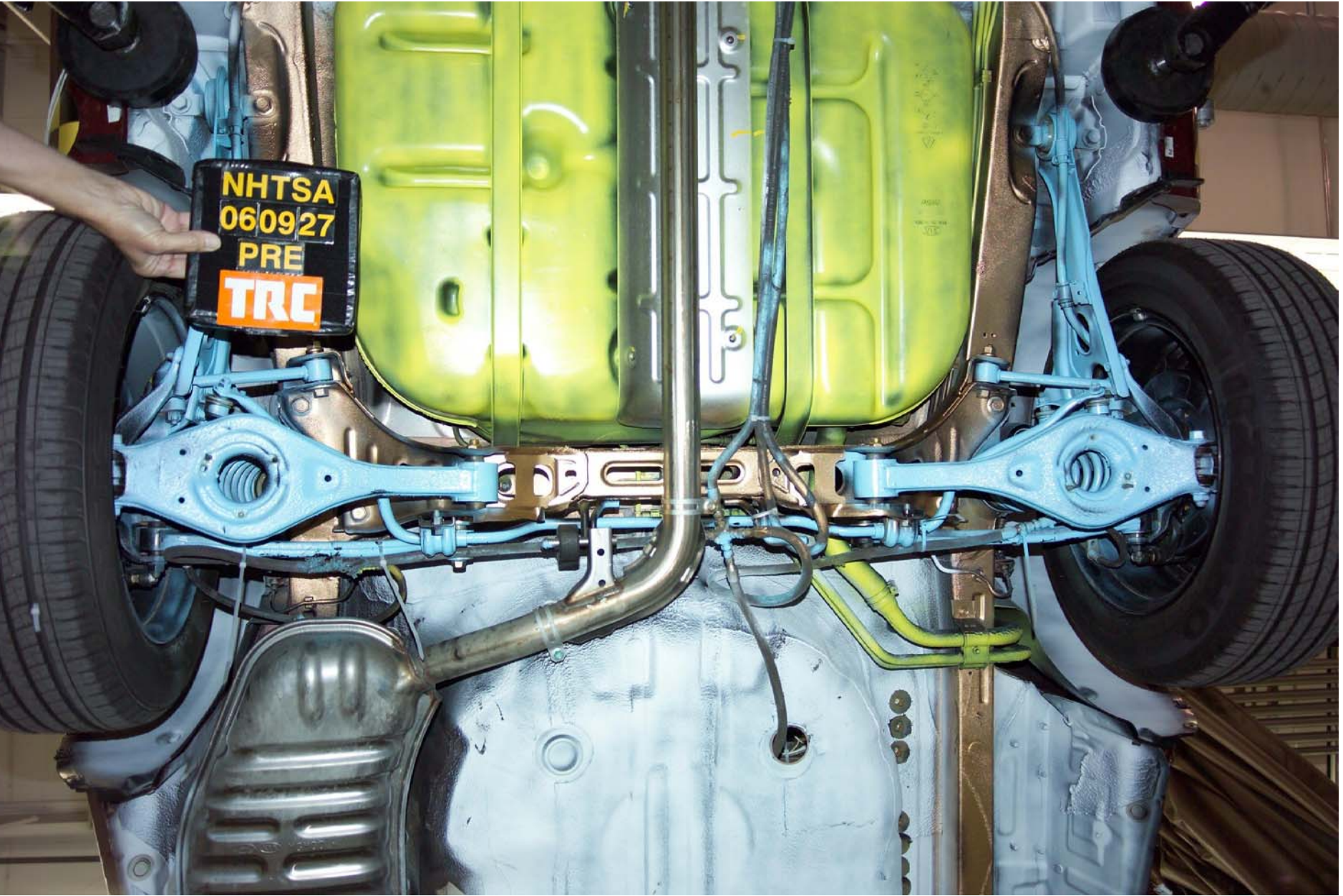


Figure A-27 Pre-Test Mid Rear Underbody View

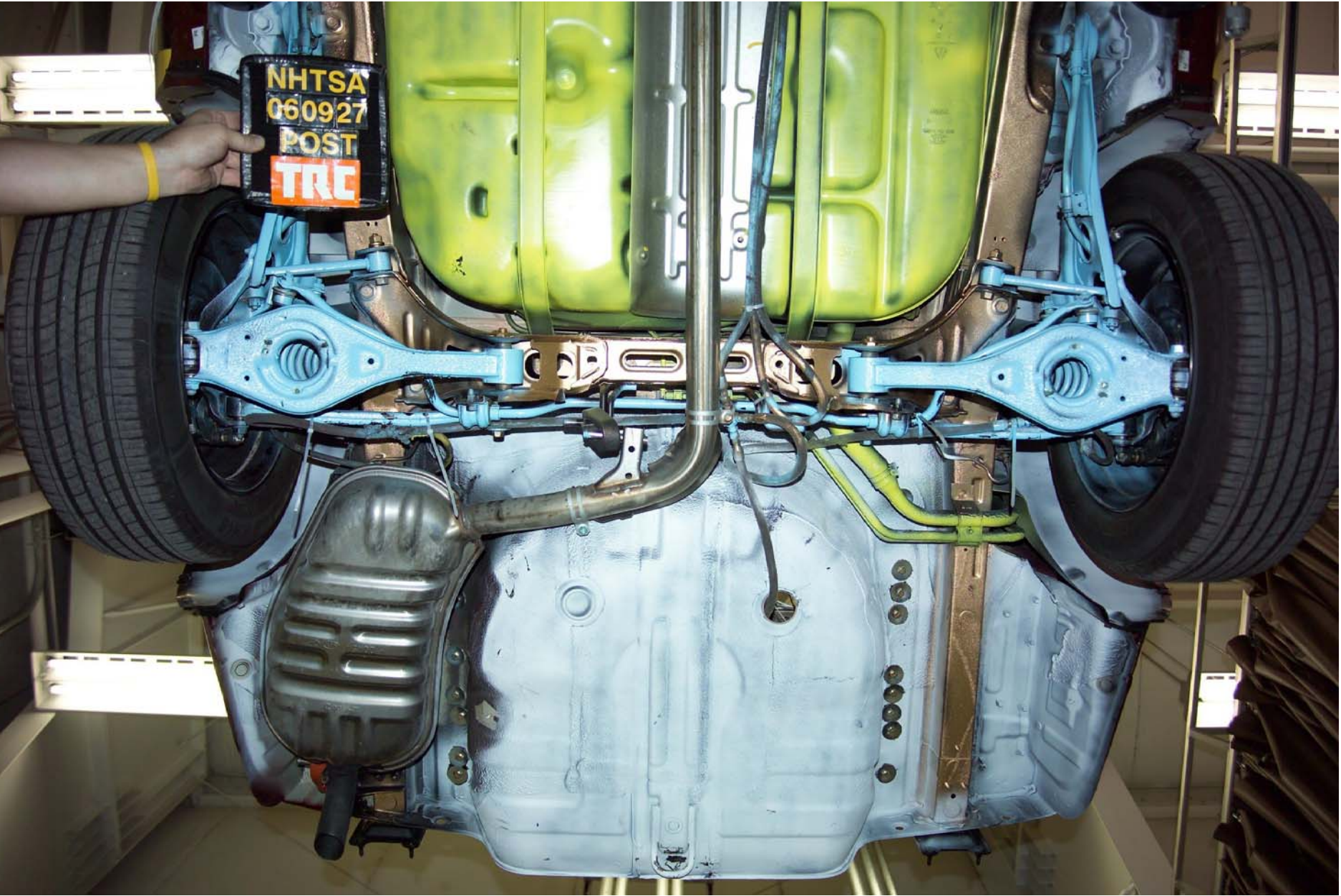


Figure A-28 Post-Test Mid Rear Underbody View

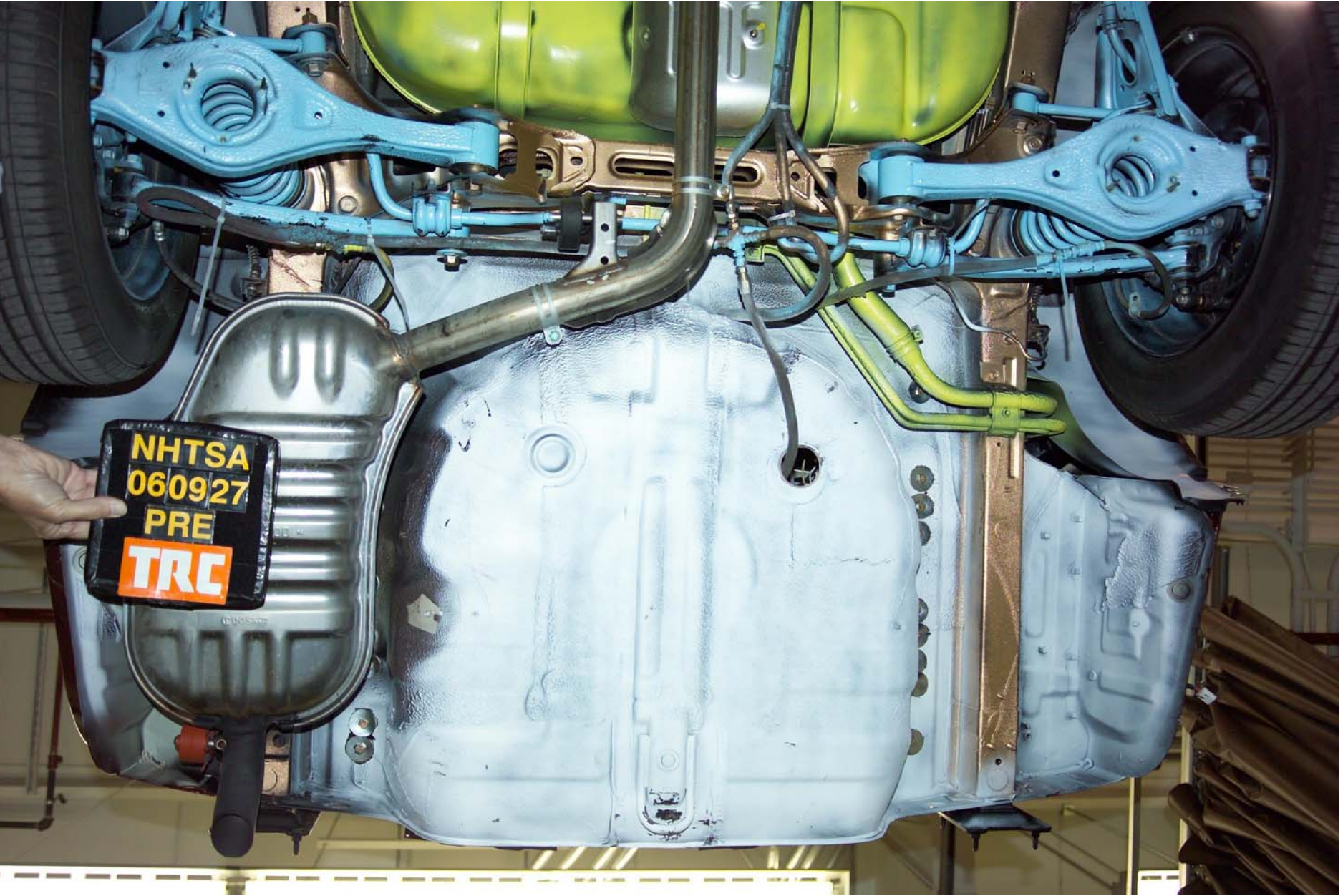


Figure A-29 Pre-Test Rear Underbody View

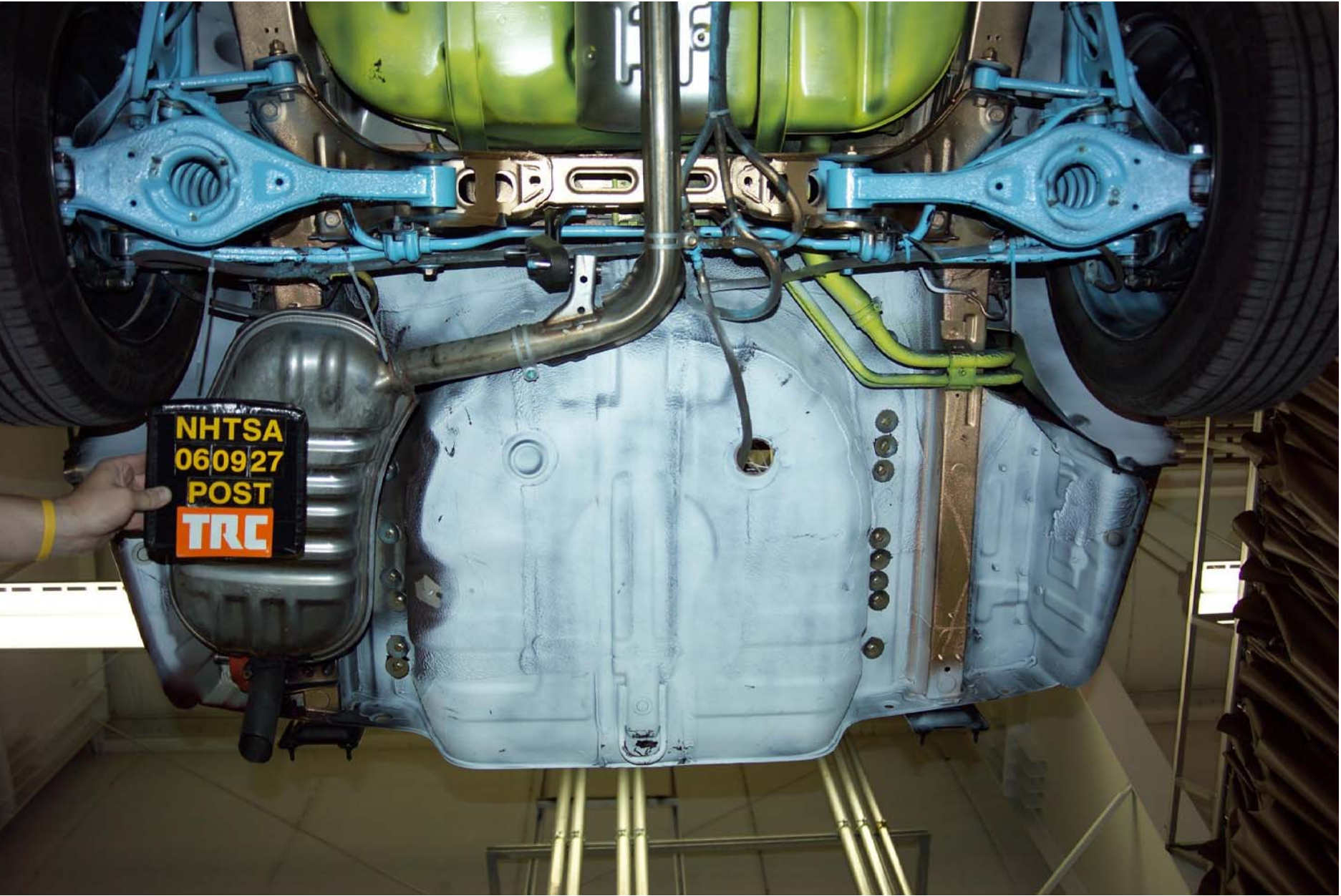


Figure A-30 Post-Test Rear Underbody View

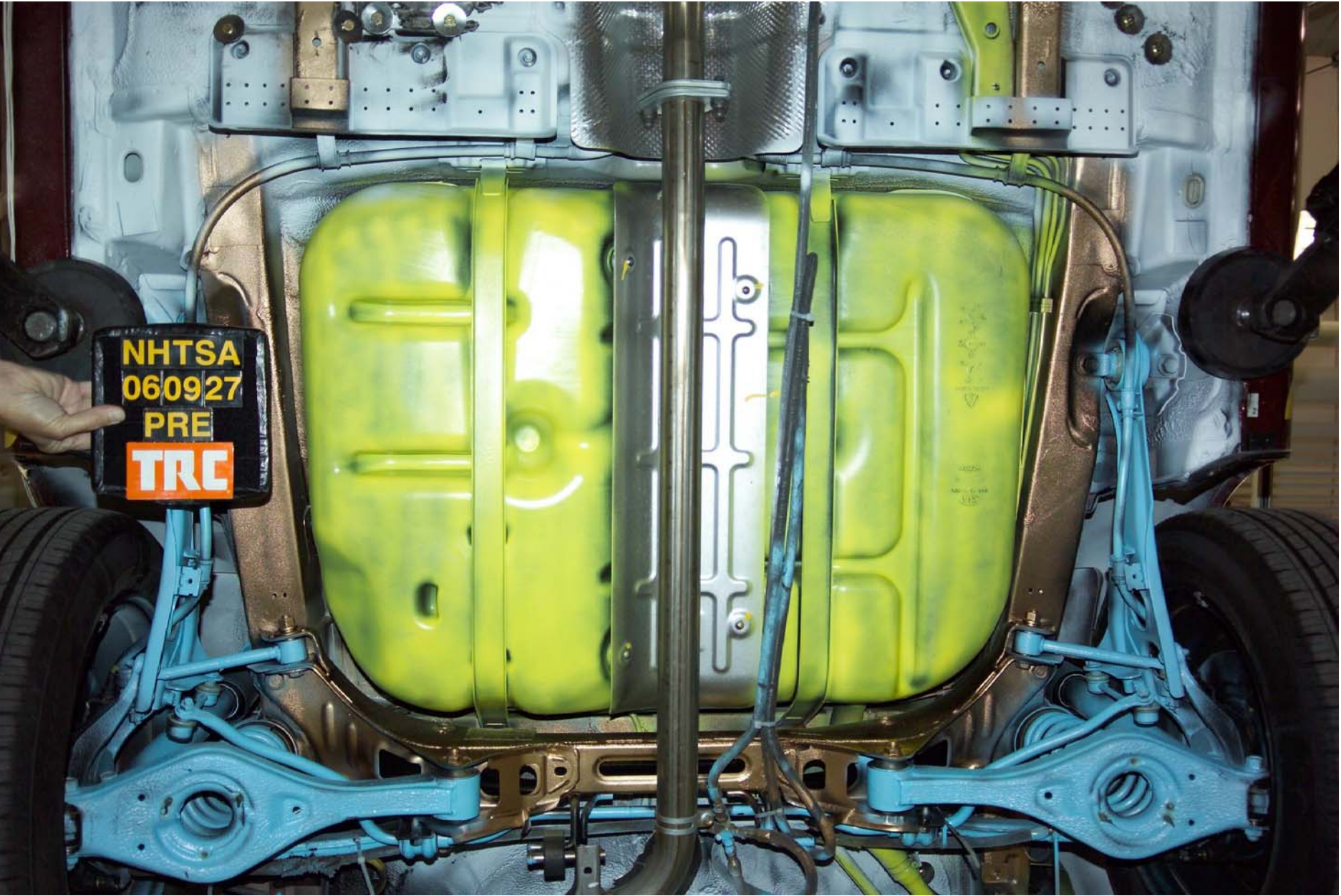


Figure A-31 Pre-Test Fuel Tank View



Figure A-32 Post-Test Fuel Tank View



Figure A-33 Pre-Test Fuel Filler Neck View

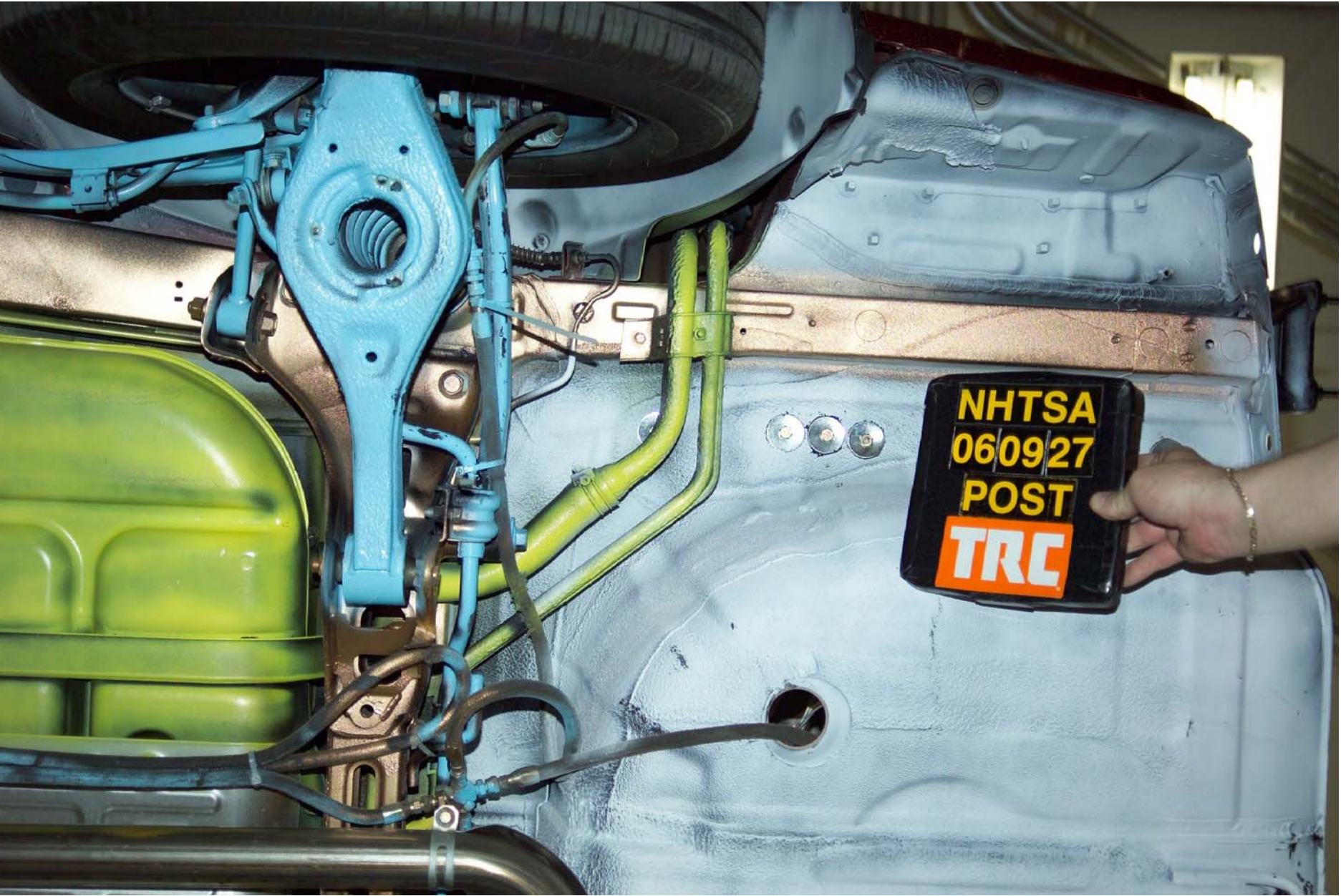


Figure A-34 Post-Test Fuel Filler Neck View



Figure A-35 Pre-Test Fuel Filler Cap View



Figure A-36 Post-Test Fuel Filler Cap View



Figure A-37 Pre-Test Engine Compartment View



Figure A-38 Post-Test Engine Compartment View

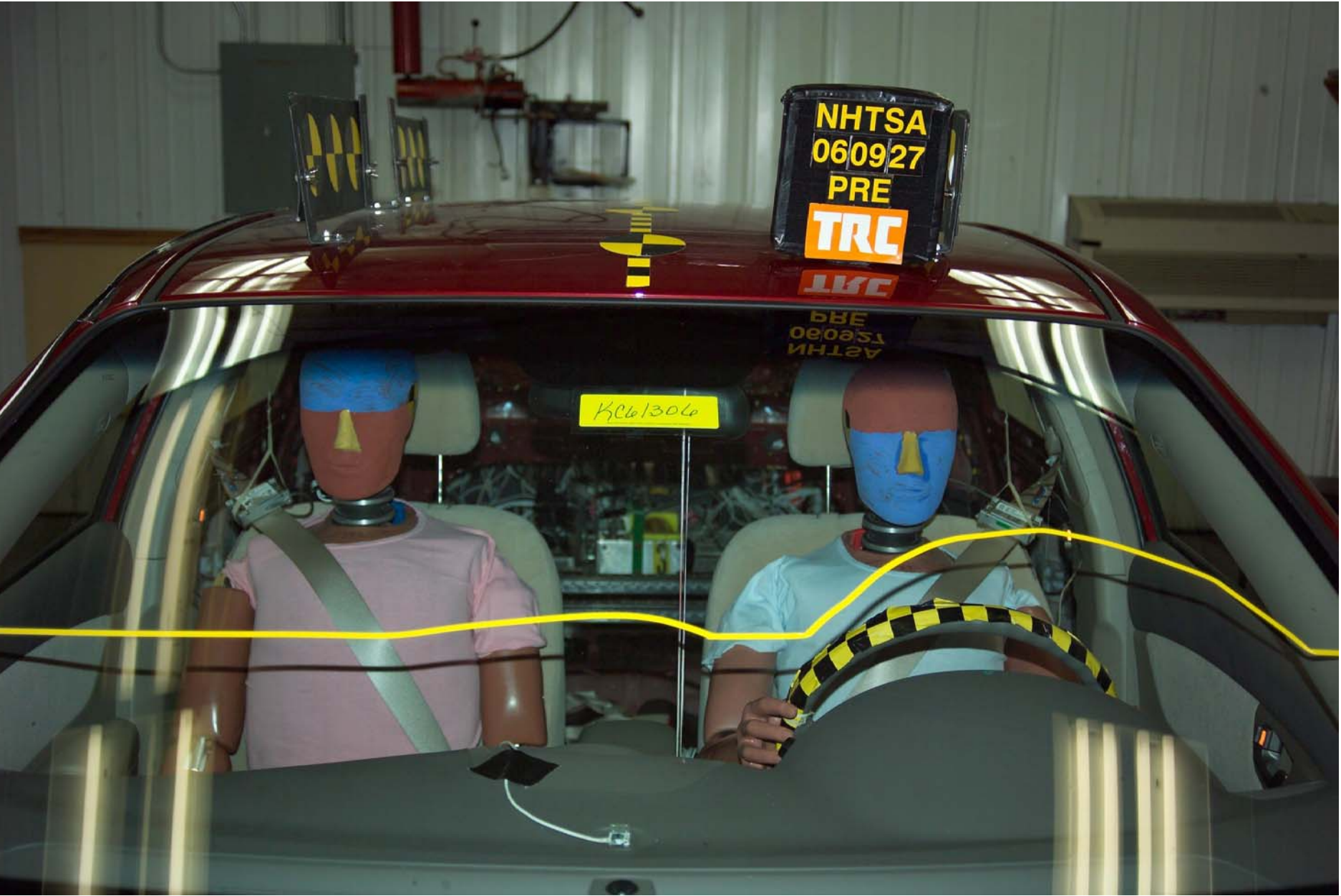


Figure A-39 Pre-Test Windshield View



Figure A-40 Post-Test Windshield View



Figure A-41 Pre-Test Driver Dummy - View 1

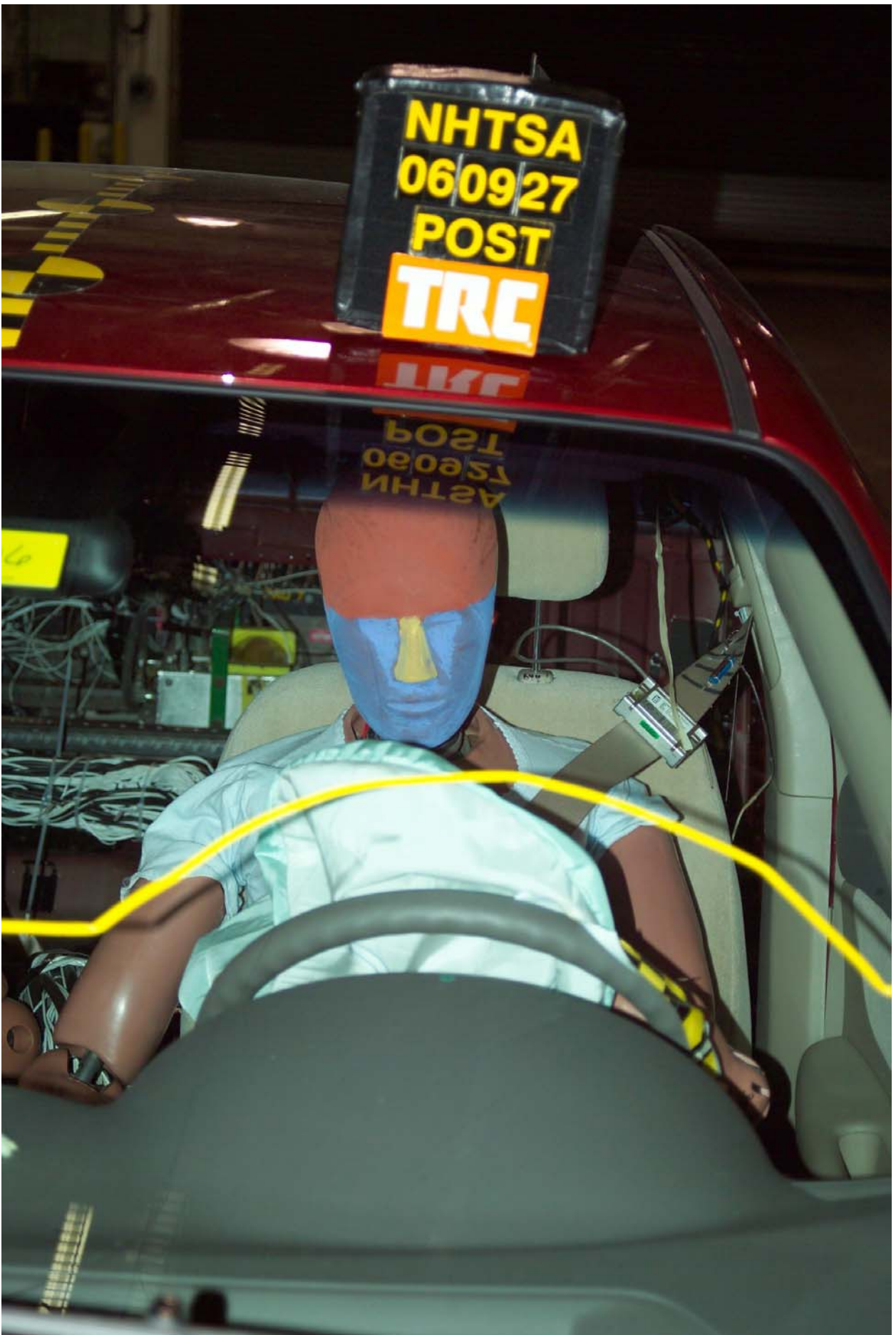


Figure A-42 Post-Test Driver Dummy - View 1



Figure A-43 Pre-Test Driver Dummy - View 2



Figure A-44 Post-Test Driver Dummy - View 2



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Figure A-47 Pre-Test Driver Dummy - View 4



Figure A-48 Post-Test Driver Dummy - View 4



Figure A-49 Pre-Test Driver Dummy Feet - View 1



Figure A-50 Post-Test Driver Dummy Feet - View 1



Figure A-51 Pre-Test Driver Dummy Feet - View 2



Figure A-52 Post-Test Driver Dummy Feet - View 2



Figure A-53 Post-Test Driver Dummy Overall View



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



Figure A-55 Post-Test Driver Dummy Head Contact - View 2



Figure A-56 Post-Test Driver Dummy Head Contact - View 3



Figure A-57 Post-Test Driver Dummy Knee Contact - View 1



Figure A-58 Post-Test Driver Dummy Knee Contact - View 2



Figure A-59 Post-Test Driver Floorboard Deformation View



Figure A-60 Post-Test Driver Toeboard Deformation View



Figure A-61 Pre-Test Right Front Passenger Dummy - View 1



Figure A-62 Post-Test Right Front Passenger Dummy - View 1



Figure A-63 Pre-Test Right Front Passenger Dummy - View 2

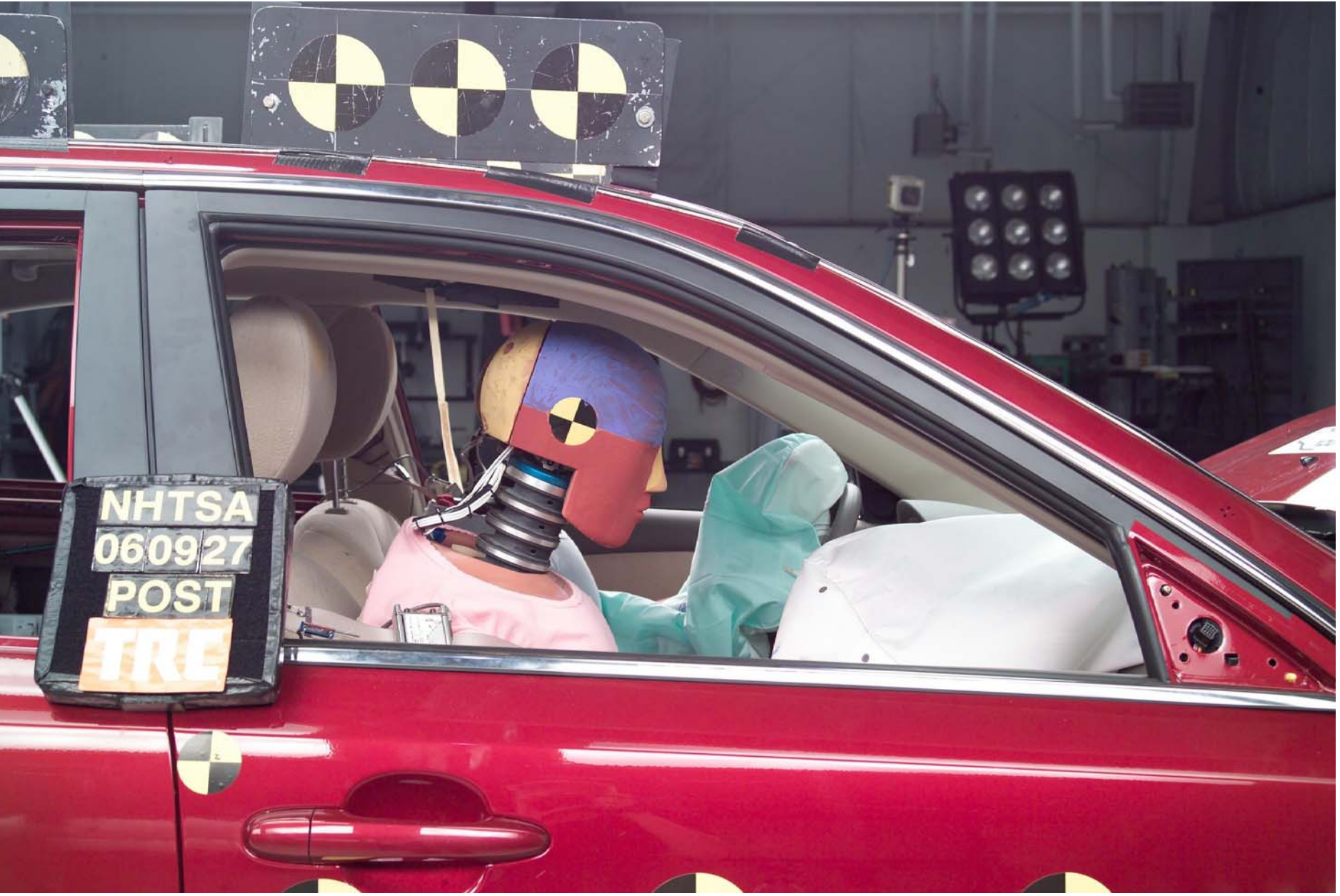


Figure A-64 Post-Test Right Front Passenger Dummy - View 2



Figure A-65 Pre-Test Right Front Passenger Dummy - View 3



Figure A-66 Post-Test Right Front Passenger Dummy - View 3

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Figure A-67 Pre-Test Right Front Passenger Dummy - View 4



Figure A-68 Post-Test Right Front Passenger Dummy - View 4



Figure A-69 Pre-Test Right Front Passenger Dummy Feet View



Figure A-70 Post-Test Right Front Passenger Dummy Feet View



Figure A-71 Post-Test Right Front Passenger Dummy Overall View



Figure A-72 Post-Test Right Front Passenger Dummy Head Contact - View 1



Figure A-73 Post-Test Right Front Passenger Dummy Head Contact - View 2

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Figure A-74 Post-Test Right Front Passenger Dummy Head Contact - View 3



Figure A-75 Post-Test Right Front Passenger Dummy Knee Contact - View 1



Figure A-76 Post-Test Right Front Passenger Dummy Knee Contact - View 2



Figure A-77 Post-Test Right Front Passenger Floorboard Deformation View



Figure A-78 Post-Test Right Front Passenger Toeboard Deformation View

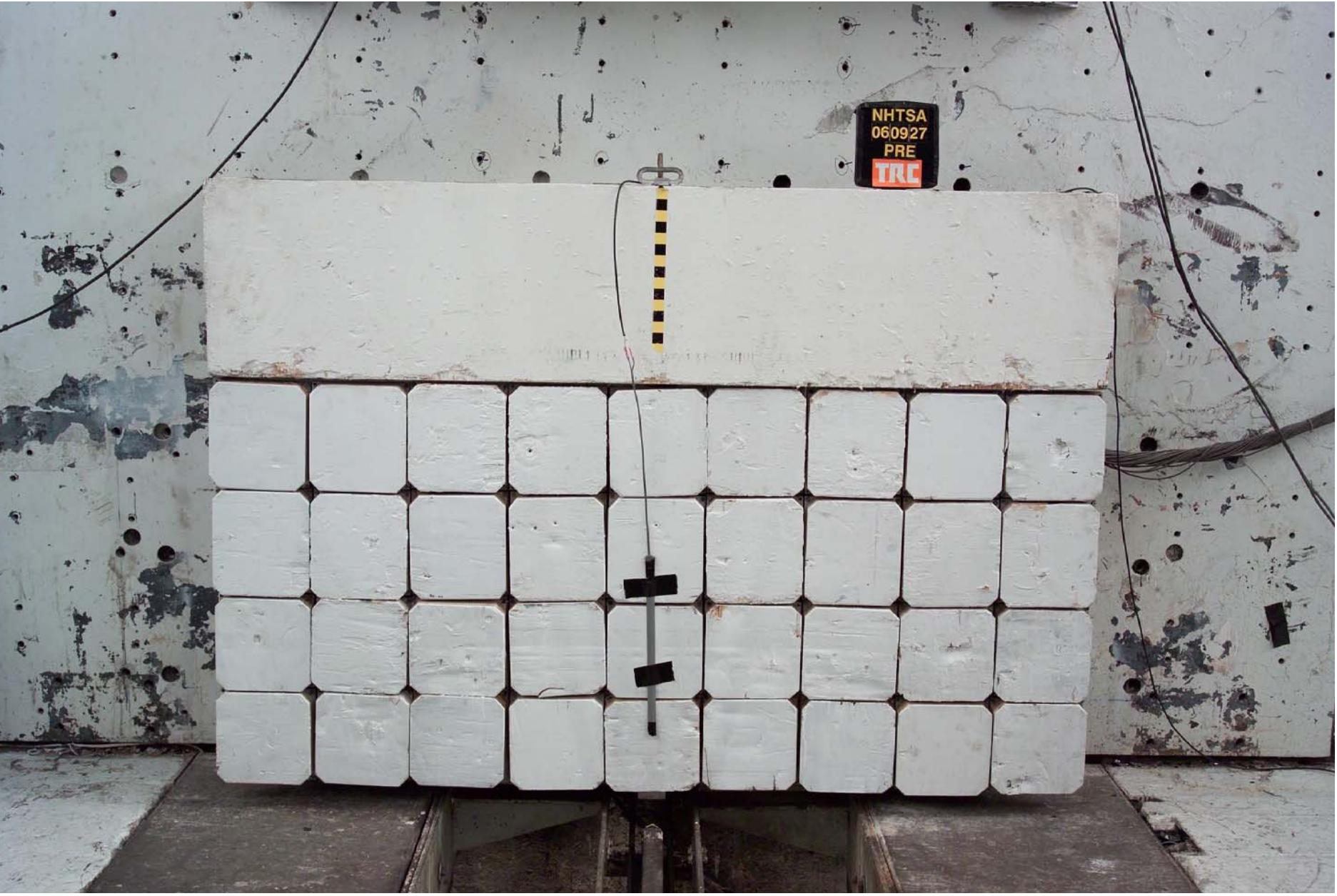


Figure A-79 Pre-Test Barrier Front View

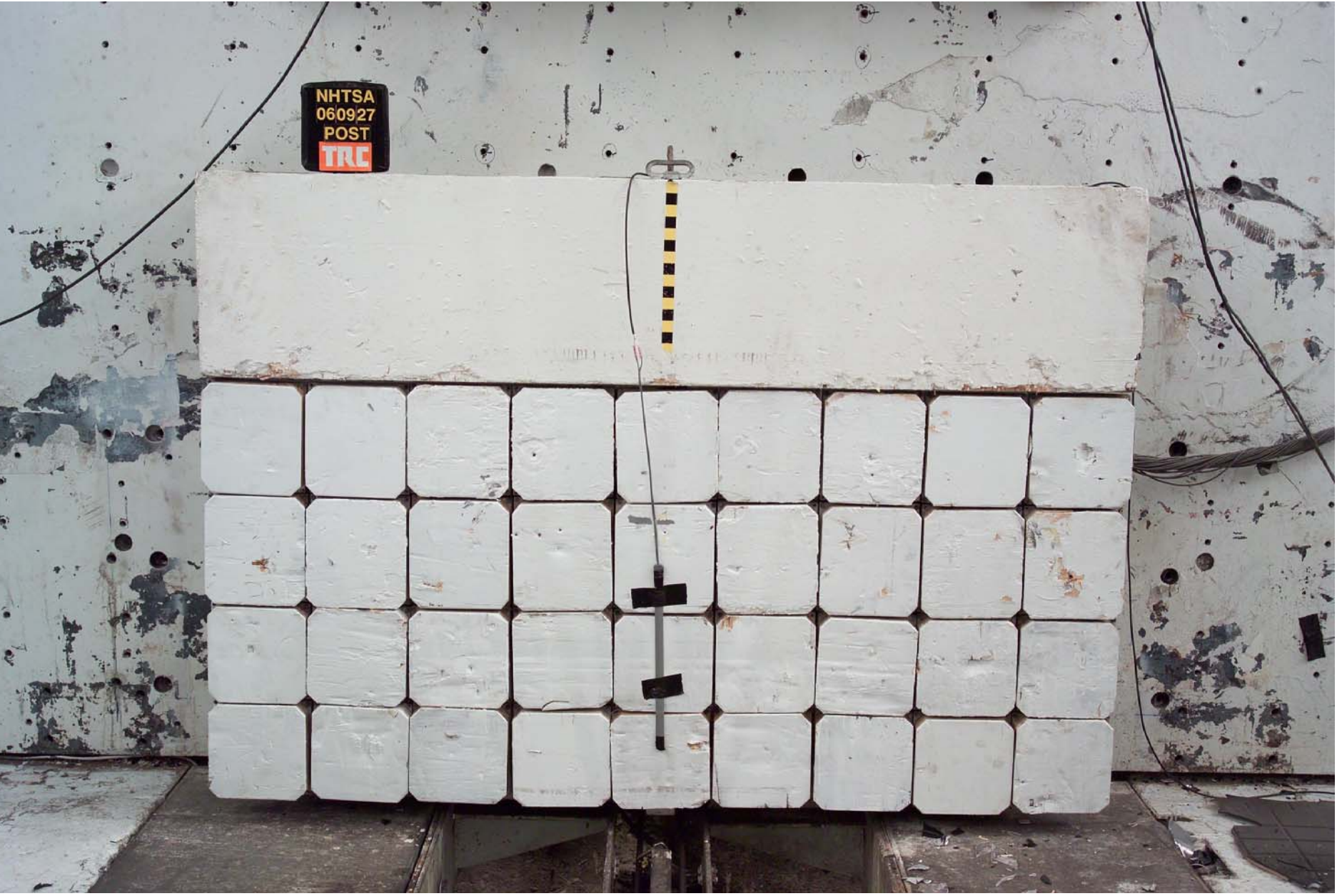


Figure A-80 Post-Test Barrier Front View

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Figure A-81 Pre-Test Driver B-Pillar View



Figure A-82 Vehicle Tire Load Label View



Figure A-83 FMVSS 301 Rollover View at 90°

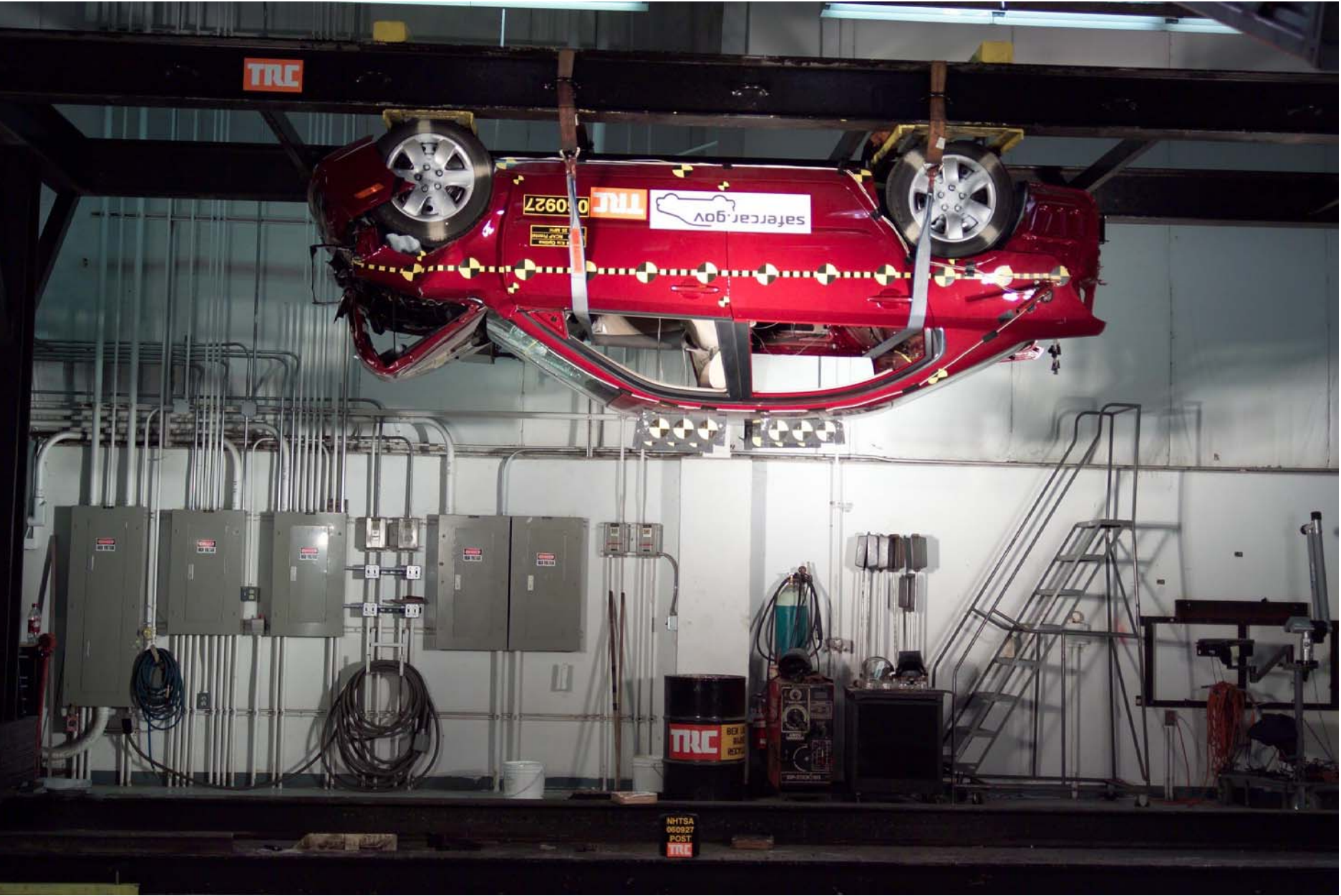


Figure A-84 FMVSS 301 Rollover View at 180°

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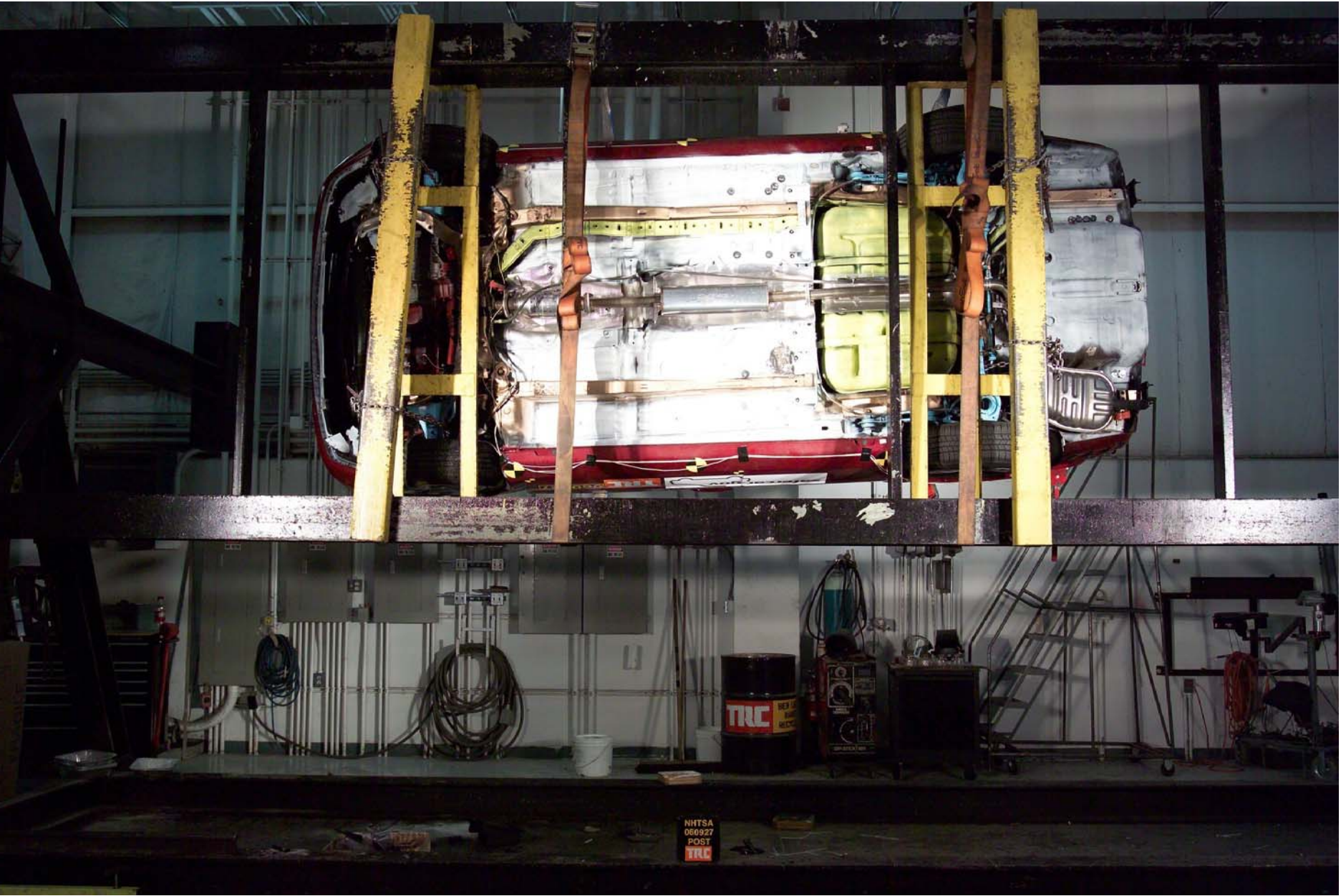


Figure A-85 FMVSS 301 Rollover View at 270°



Figure A-86 FMVSS 301 Rollover View at 360°

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Figure A-87 Impact Event

Appendix B

Dummy, Vehicle, and Load Cell Barrier Data Plots

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3	Driver Head Z-Axis Acceleration	B-10
--- ¹	Driver Head Resultant Acceleration	B-11
4	Driver Head X-Axis Acceleration Redundant	B-12
5	Driver Head Y-Axis Acceleration Redundant	B-13
6	Driver Head Z-Axis Acceleration Redundant	B-14
--- ¹	Driver Head Redundant Resultant Acceleration	B-15
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8	Driver Neck Y-Axis Shear Force	B-17
9	Driver Neck Z-Axis Axial Force	B-18
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11	Driver Neck Moment About Y Axis	B-20
12	Driver Neck Moment About Z Axis	B-21
13	Driver Chest X-Axis Acceleration	B-22
14	Driver Chest Y-Axis Acceleration	B-23
15	Driver Chest Z-Axis Acceleration	B-24
--- ¹	Driver Chest Resultant Acceleration	B-25
16	Driver Chest X-Axis Acceleration Redundant	B-26
17	Driver Chest Y-Axis Acceleration Redundant	B-27
18	Driver Chest Z-Axis Acceleration Redundant	B-28
--- ¹	Driver Chest Redundant Resultant Acceleration	B-29
19	Driver Chest Deflection	B-30
20	Driver Pelvis X-Axis Acceleration	B-31
21	Driver Pelvis Y-Axis Acceleration	B-32
22	Driver Pelvis Z-Axis Acceleration	B-33
--- ¹	Driver Pelvis Resultant Acceleration	B-34
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24	Driver Right Femur Force	B-36
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26	Driver Left Upper Tibia Y-Axis Force	B-38

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29	Driver Left Upper Tibia Moment About Y Axis	B-41
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36	Driver Left Foot Z-Axis Acceleration	B-48
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40	Driver Right Upper Tibia Z-Axis Force	B-52
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42	Driver Right Upper Tibia Moment About Y-Axis	B-54
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44	Driver Right Lower Tibia Y-Axis Force	B-56
45	Driver Right Lower Tibia Z-Axis Force	B-57
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--- ¹	Passenger Head Resultant Acceleration	B-66
54	Passenger Head X-Axis Acceleration Redundant	B-67
55	Passenger Head Y-Axis Acceleration Redundant	B-68
56	Passenger Head Z-Axis Acceleration Redundant	B-69
--- ¹	Passenger Head Redundant Resultant Acceleration	B-70
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65	Passenger Chest Z-Axis Acceleration	B-79
--- ¹	Passenger Chest Resultant Acceleration	B-80
66	Passenger Chest X-Axis Acceleration Redundant	B-81
67	Passenger Chest Y-Axis Acceleration Redundant	B-82
68	Passenger Chest Z-Axis Acceleration Redundant	B-83
--- ¹	Passenger Chest Redundant Resultant Acceleration	B-84
69	Passenger Chest Deflection	B-85
70	Passenger Pelvis X-Axis Acceleration	B-86
71	Passenger Pelvis Y-Axis Acceleration	B-87
72	Passenger Pelvis Z-Axis Acceleration	B-88
--- ¹	Passenger Pelvis Resultant Acceleration	B-89
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76	Passenger Left Upper Tibia Y-Axis Force	B-93
77	Passenger Left Upper Tibia Z-Axis Force	B-94
78	Passenger Left Upper Tibia Moment About X Axis	B-95
79	Passenger Left Upper Tibia Moment About Y Axis	B-96
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¹ Curve is not included in NHTSA database.



2006 Kia Optima 35 mph Frontal Barrier Impact

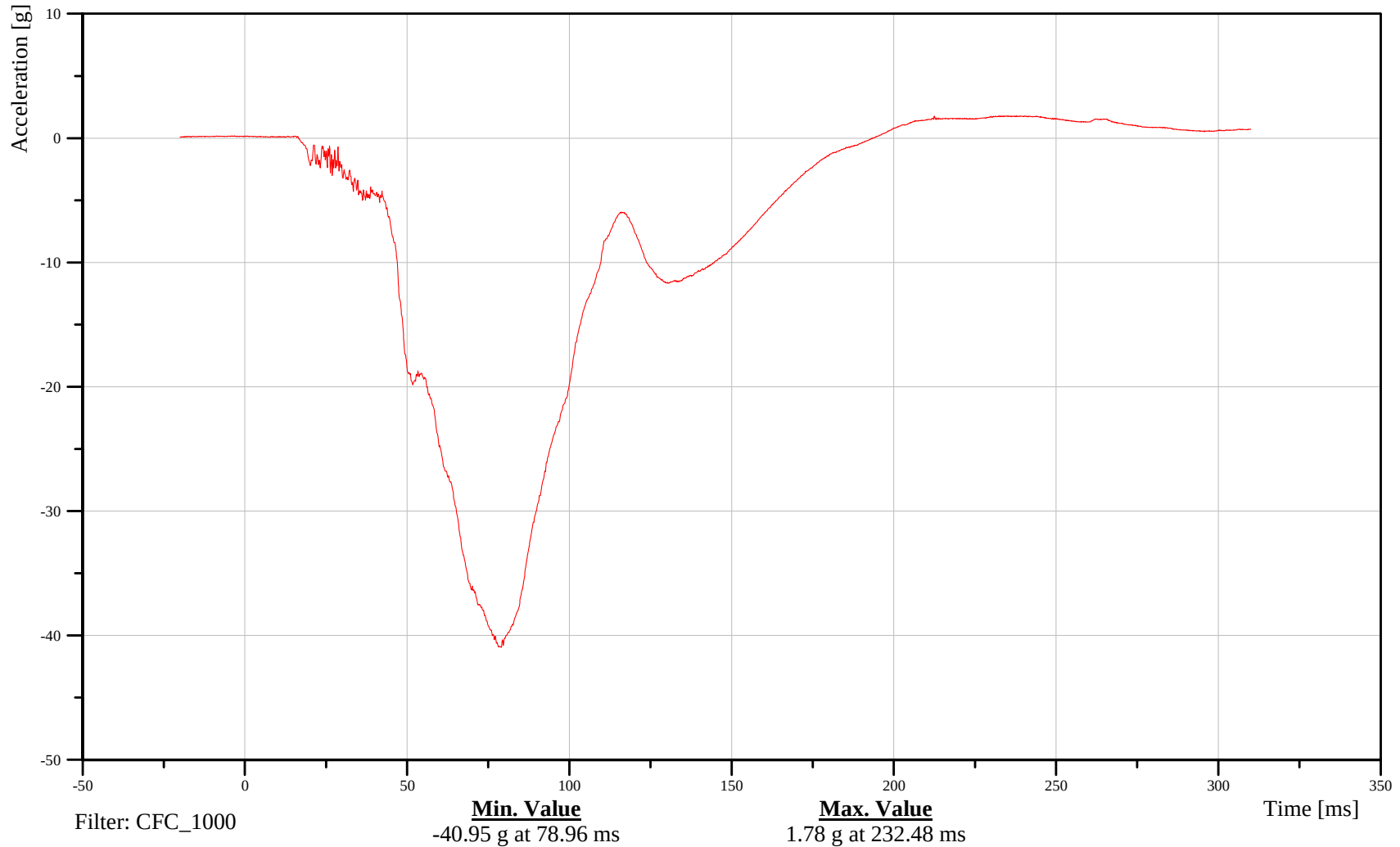
Date: 09/27/2006
Time: 13:07

Driver Head X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

11HEADCG00H3ACXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-8

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

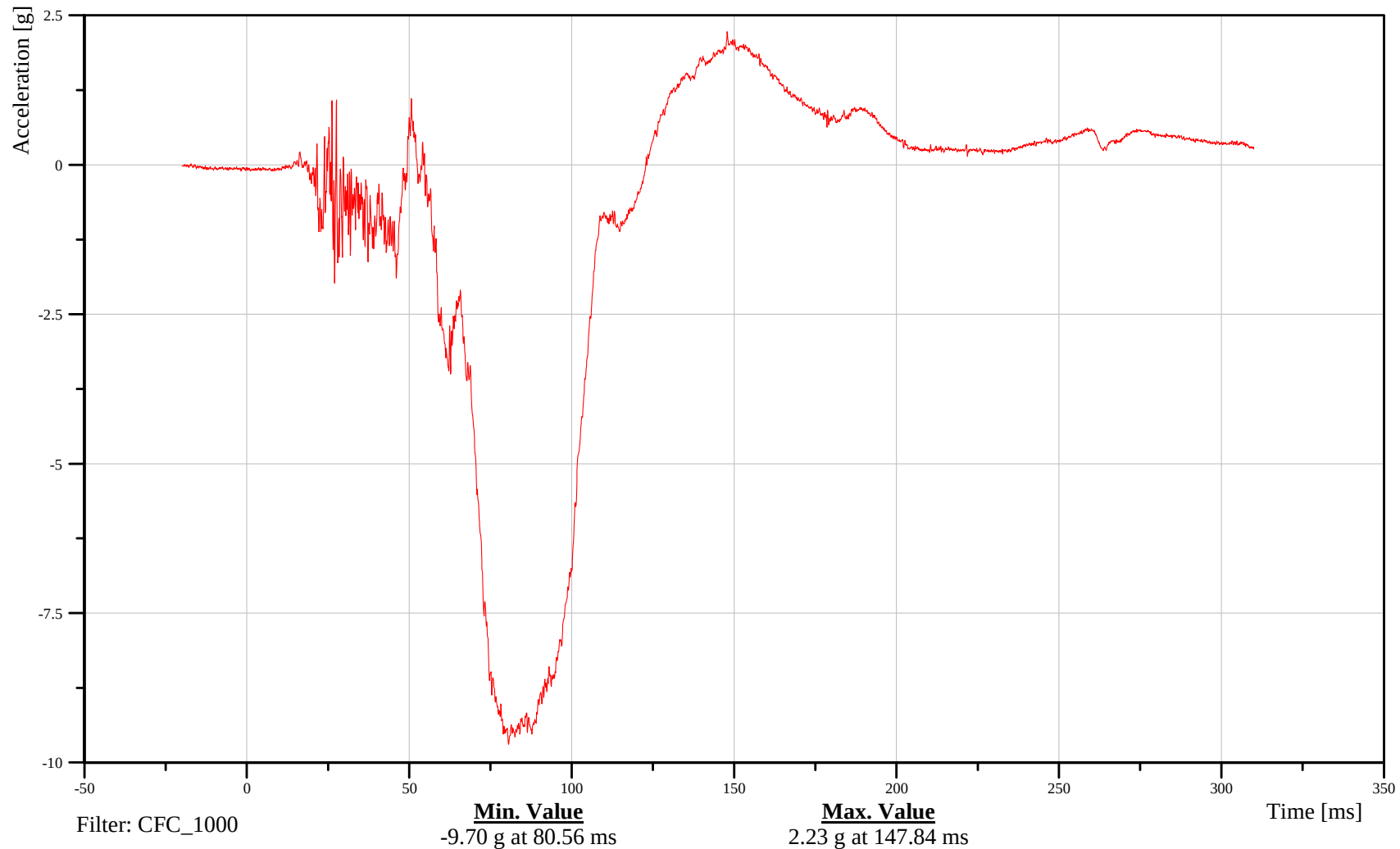
Driver Head Y-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11HEADCG00H3ACYA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-9

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

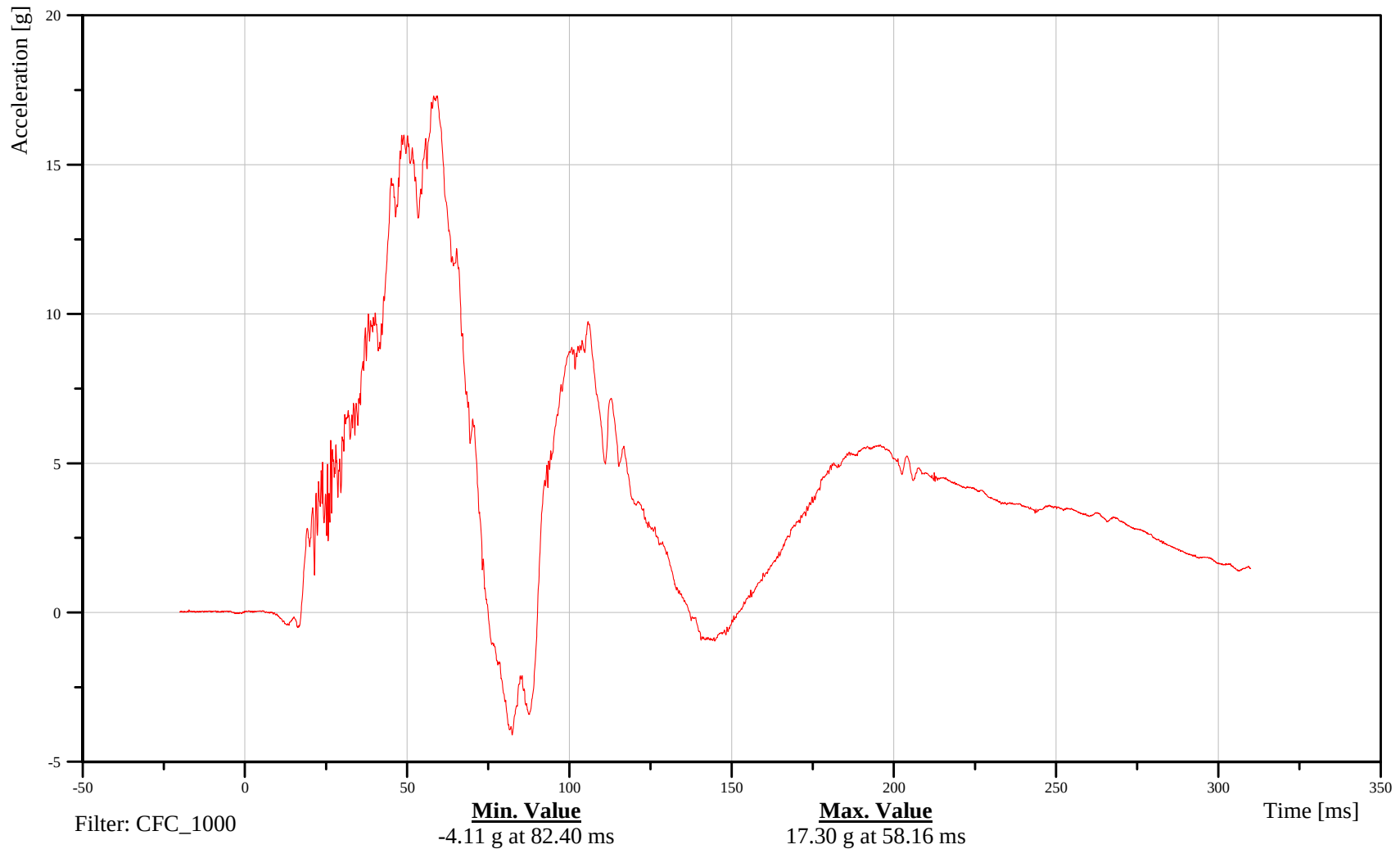
Date: 09/27/2006
Time: 13:07

Driver Head Z-Axis Acceleration

Customer: NHTSA
Test Number: M60518

11HEADCG00H3ACZA

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Driver Head Resultant Acceleration

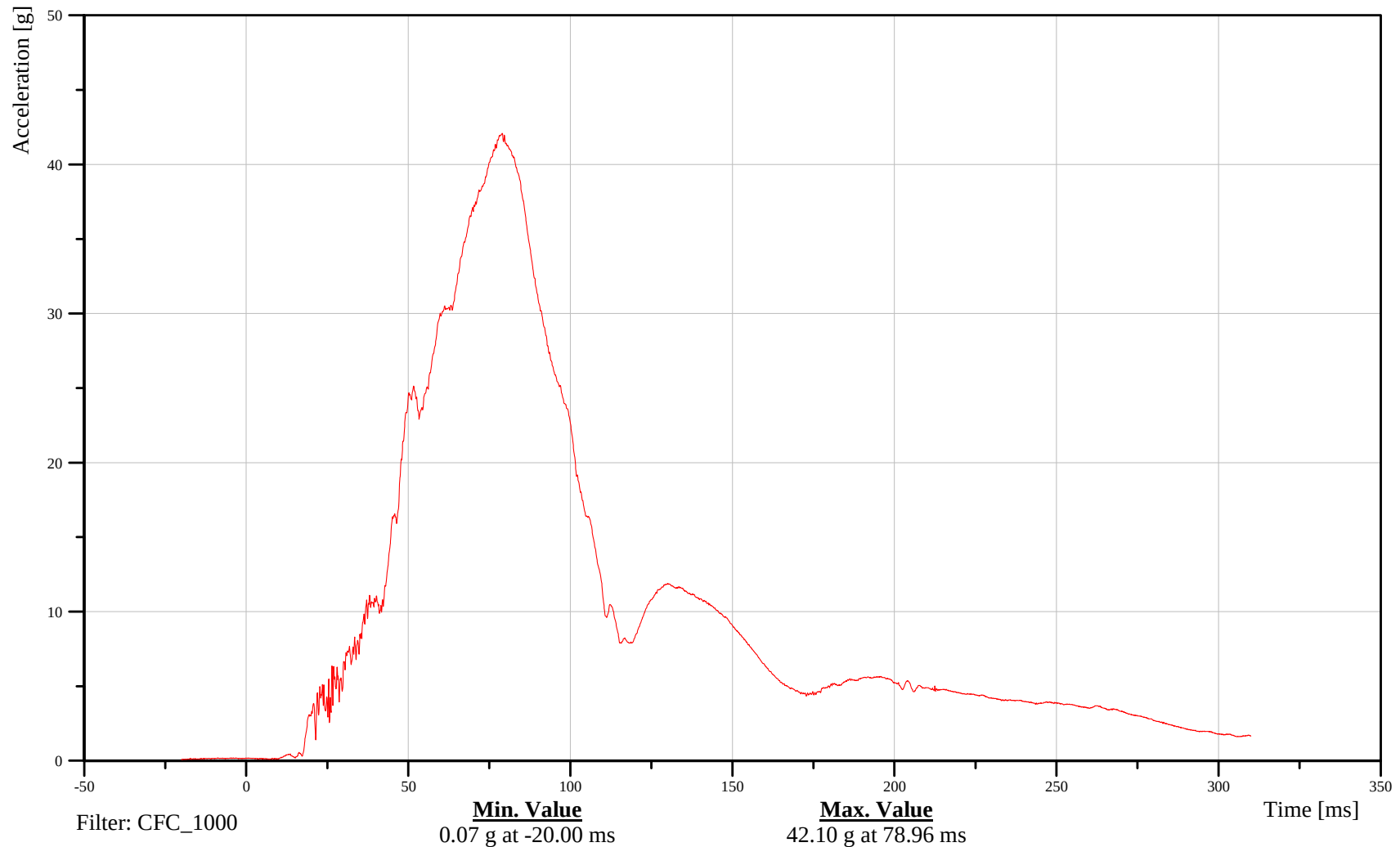
Customer: NHTSA

Test Number: M60518

11HEADCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-11

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

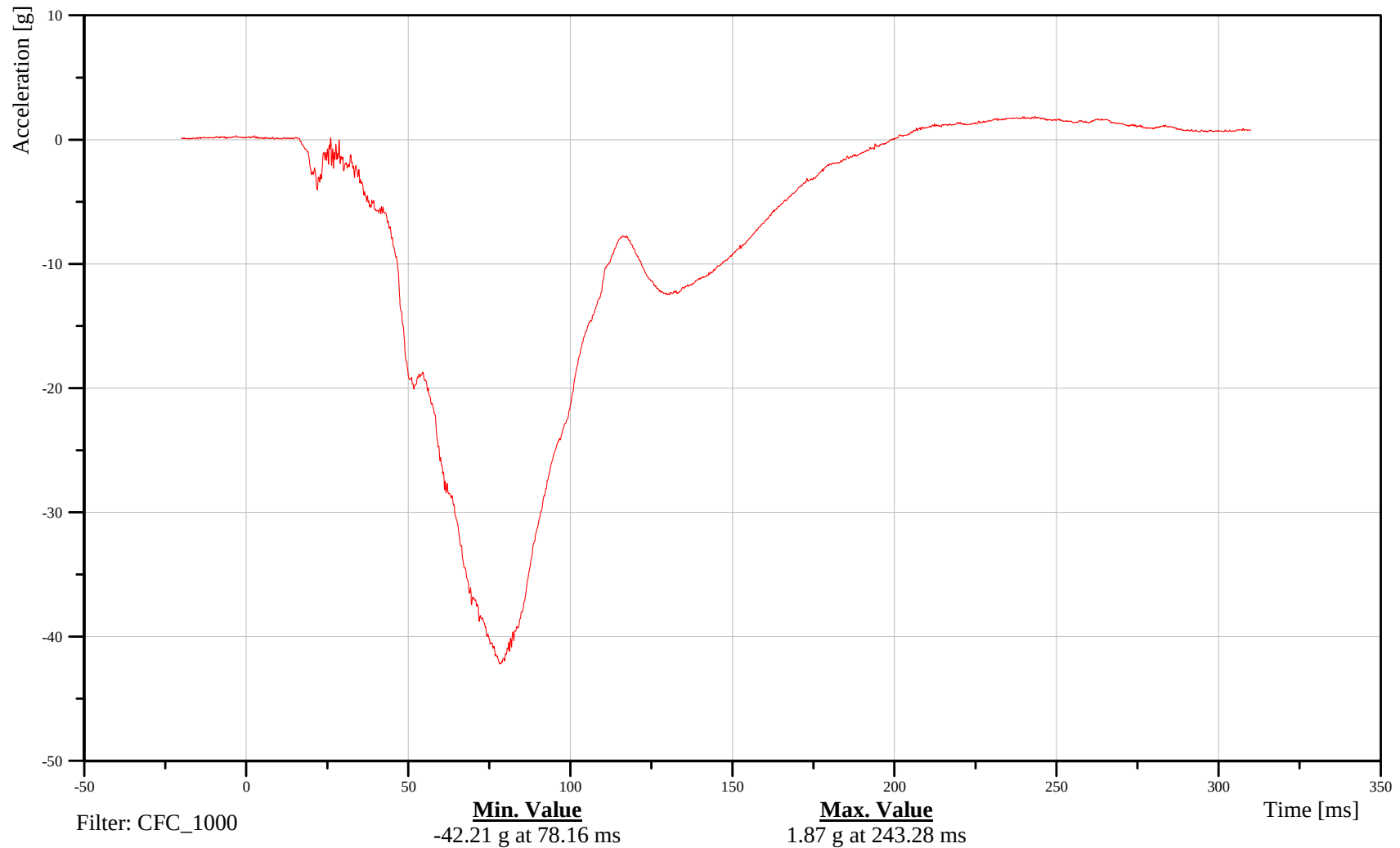
Driver Head Redundant X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11HEADCGRDH3ACXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-12

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

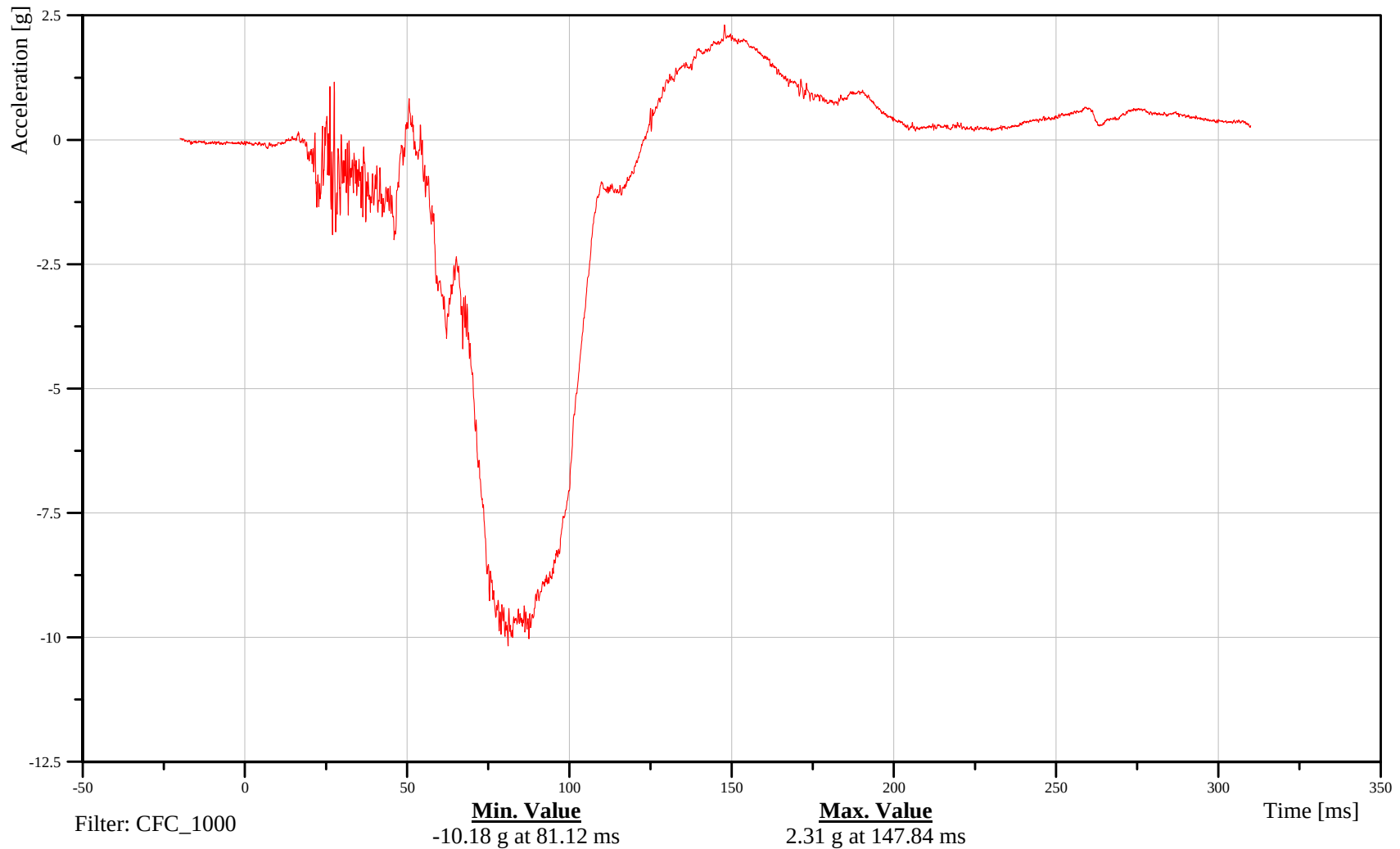
Driver Head Redundant Y-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11HEADCGRDH3ACYA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-13

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

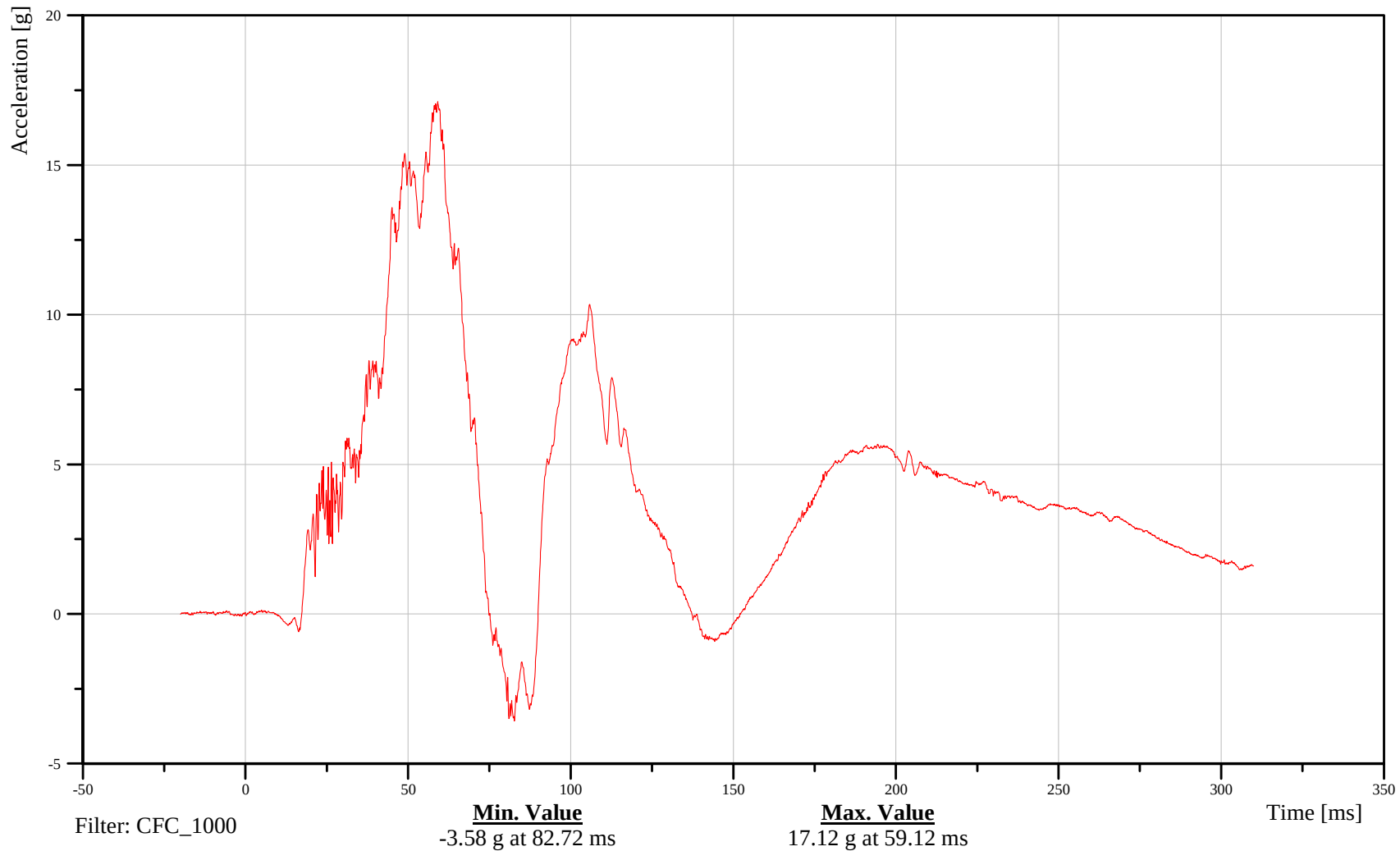
Driver Head Redundant Z-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11HEADCGRDH3ACZA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-14

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Driver Head Redundant Resultant Acceleration

Time: 13:07

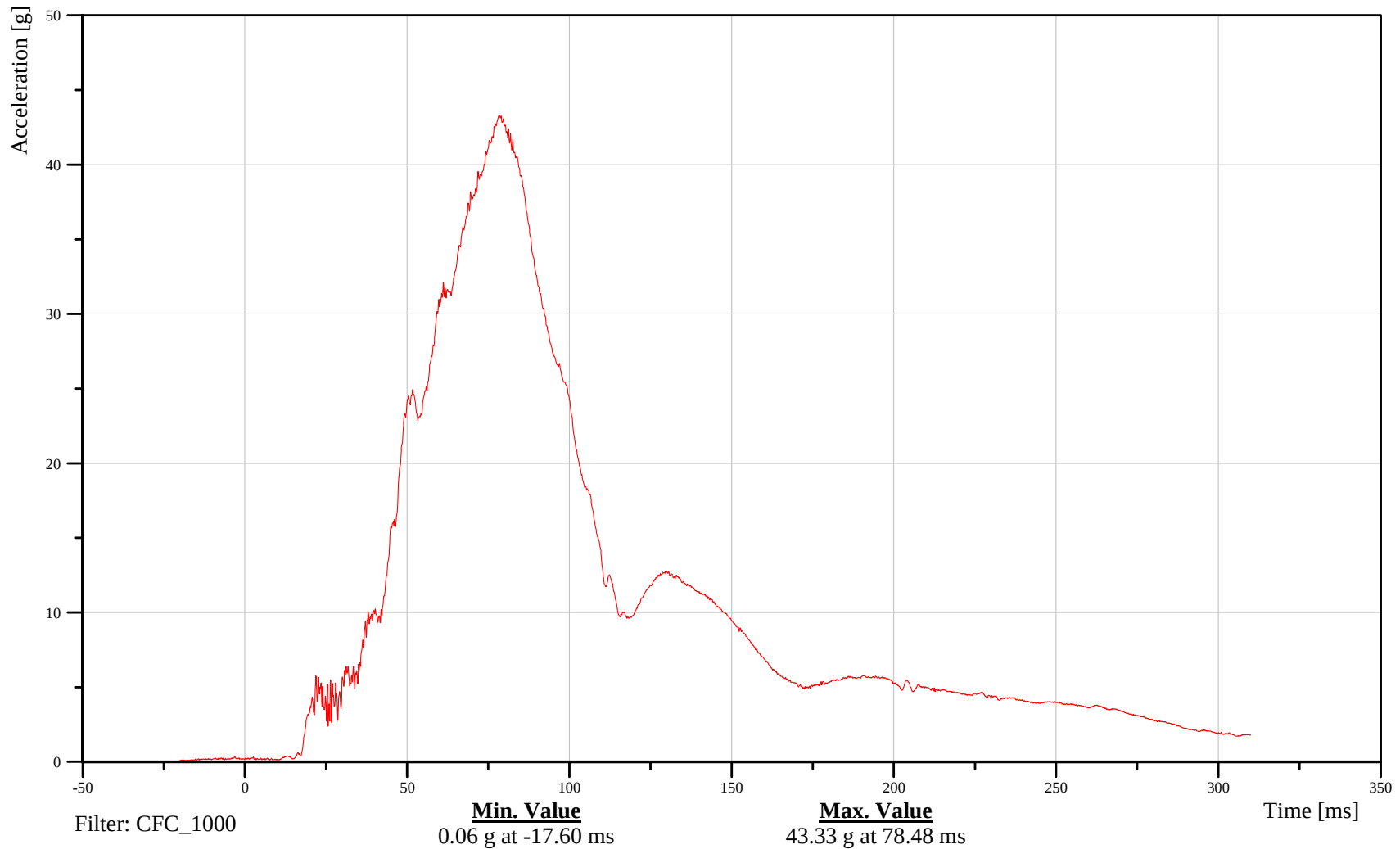
Customer: NHTSA

Test Number: M60518

11HEADCGRDH3ACRA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-15

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

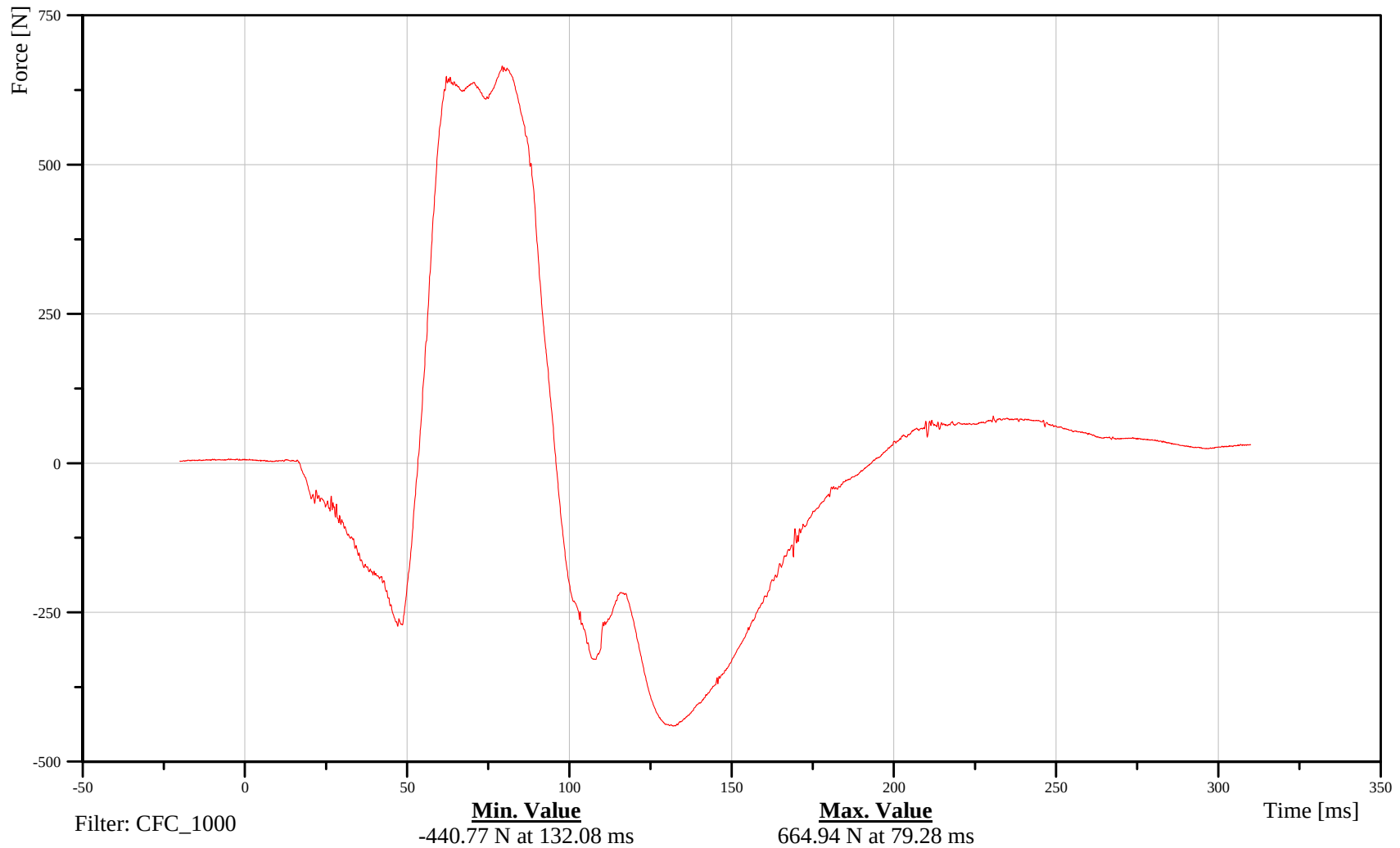
Date: 09/27/2006
Time: 13:07

Driver Neck X-Axis Force

Customer: NHTSA
Test Number: M60518

11NECKUP00H3FOXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-16

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

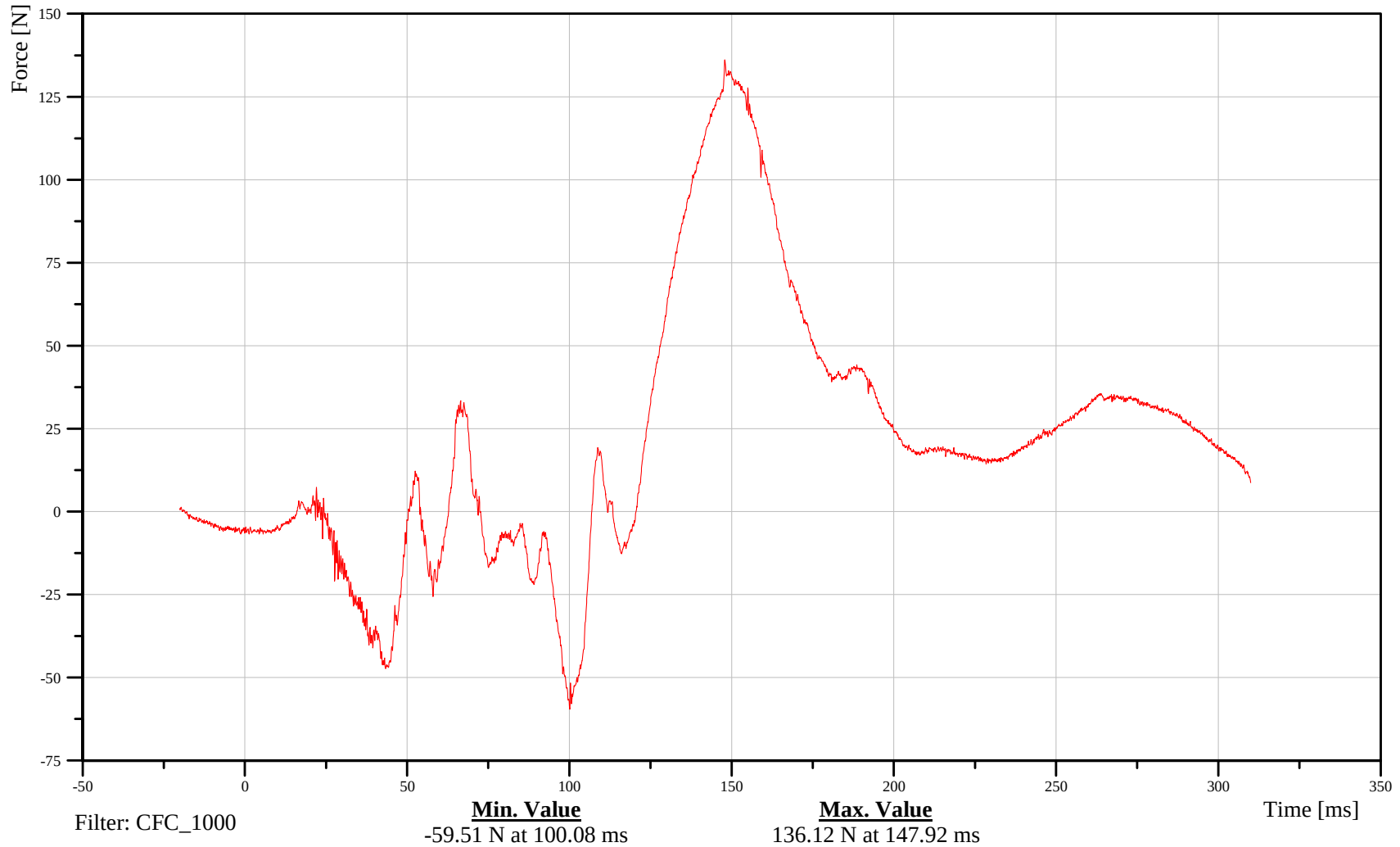
Driver Neck Y-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11NECKUP00H3FOYA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-17

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

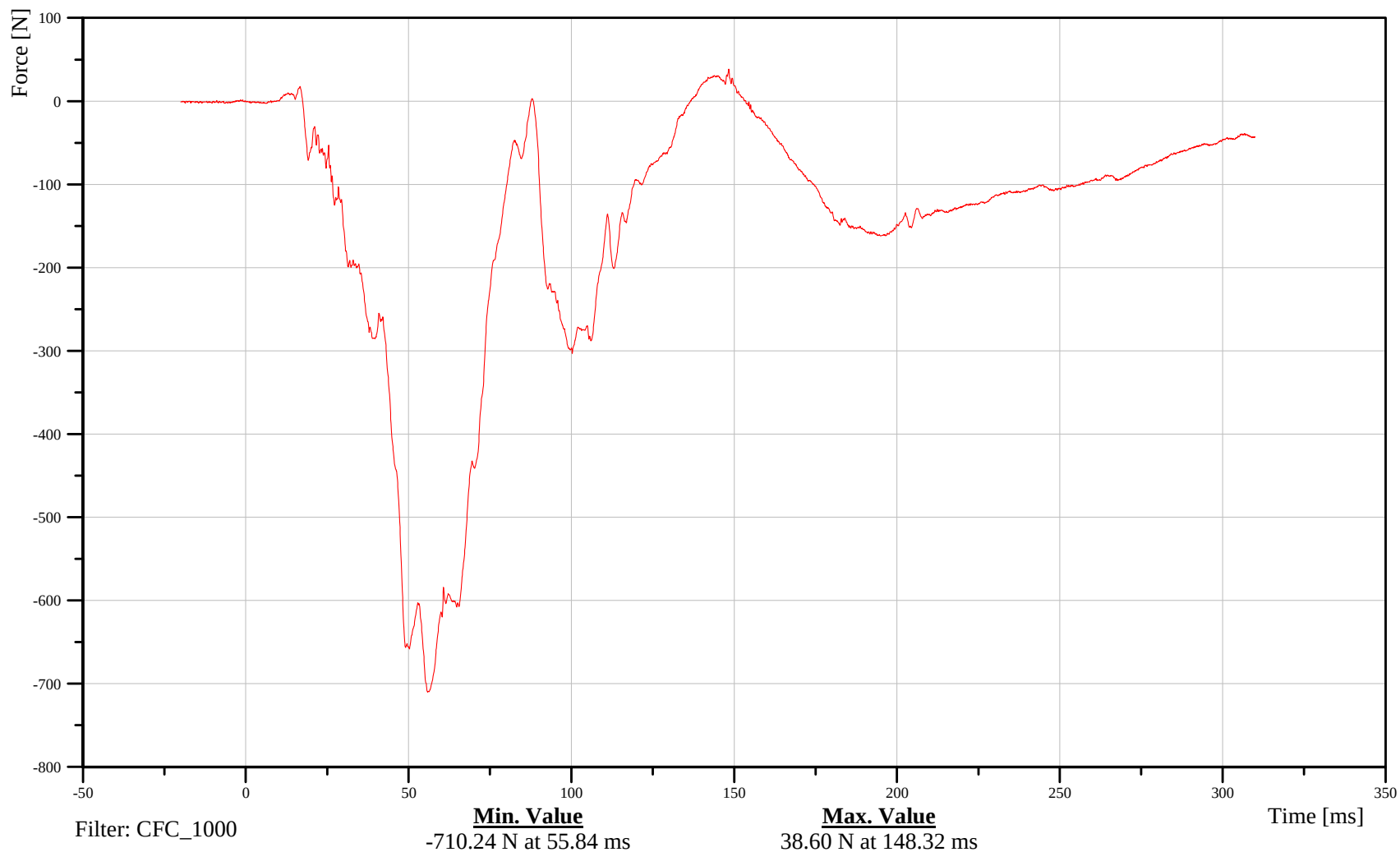
Driver Neck Z-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11NECKUP00H3FOZA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-18

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

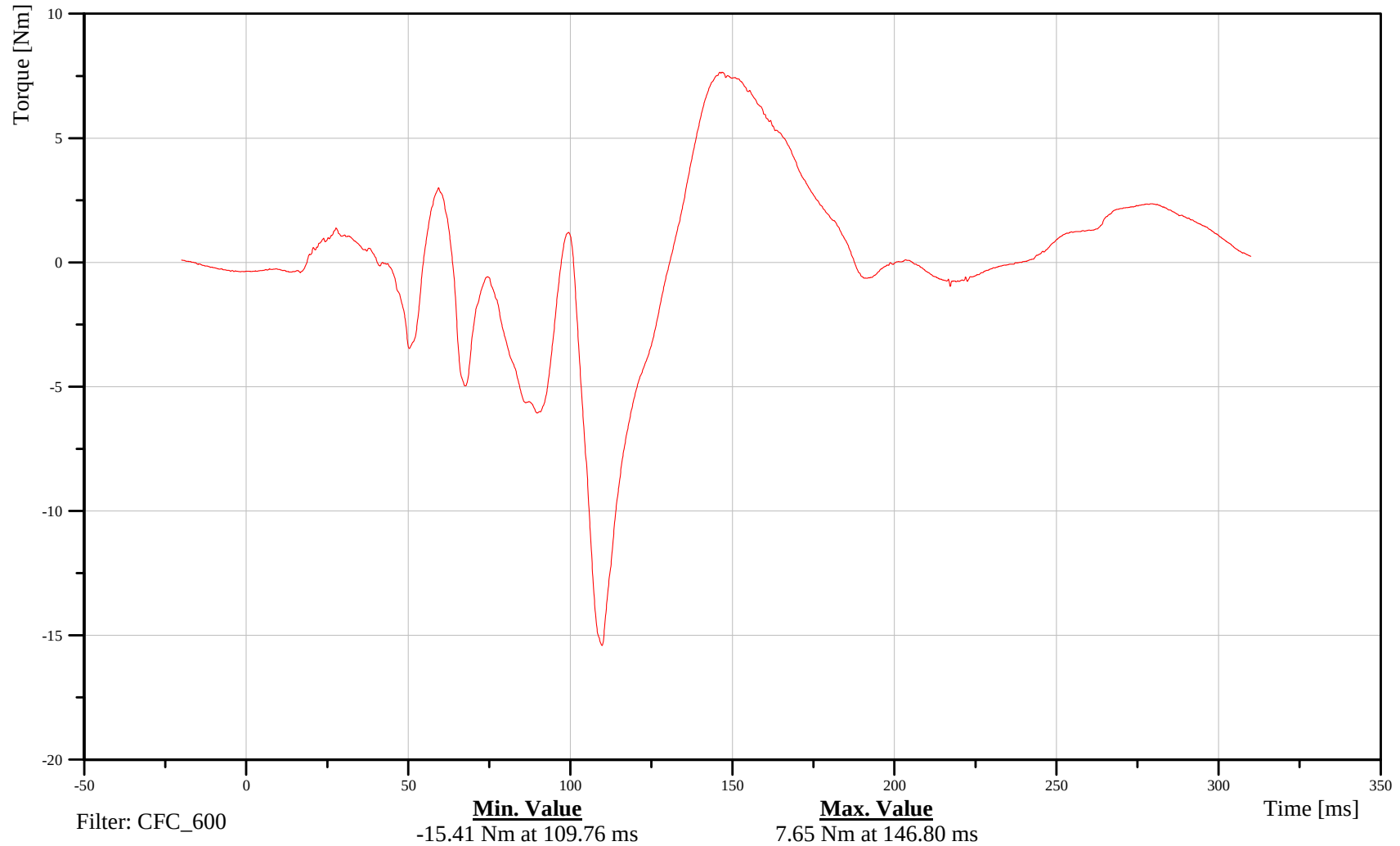
Driver Neck Moment About X Axis

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11NECKUP00H3MOXB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-19

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

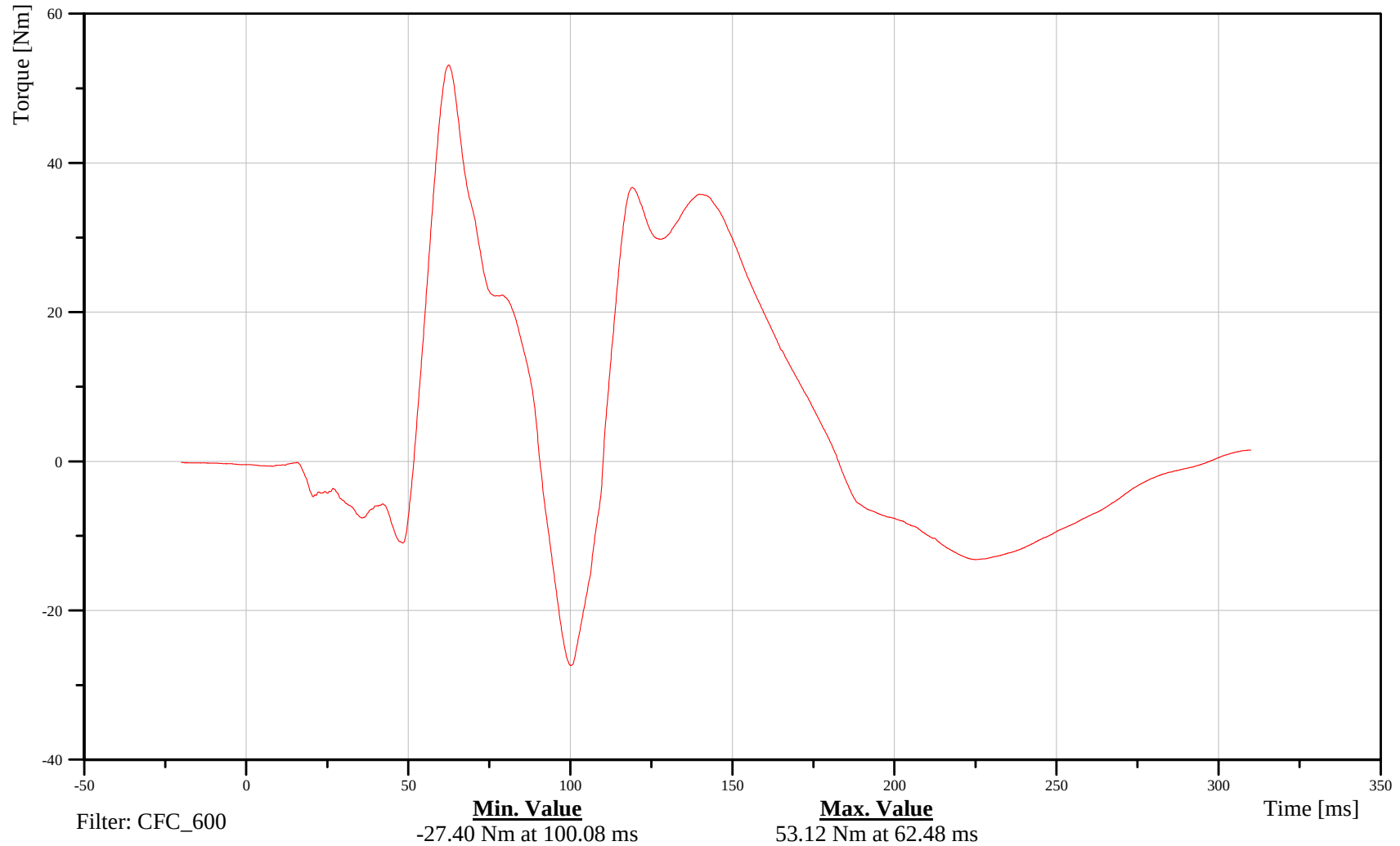
Date: 09/27/2006
Time: 13:07

Driver Neck Moment About Y Axis

Customer: NHTSA
Test Number: M60518

11NECKUP00H3MOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-20

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

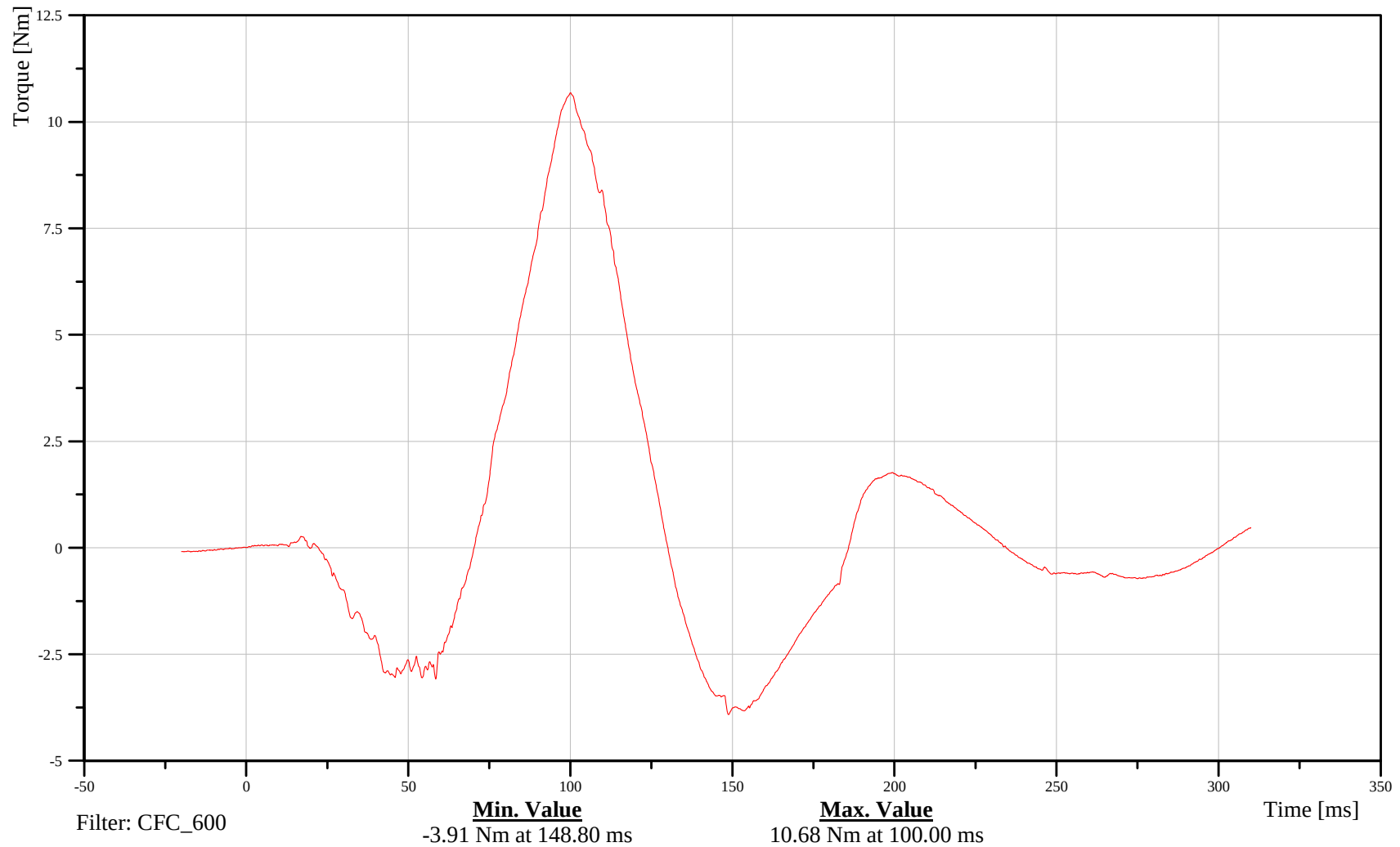
Driver Neck Moment About Z Axis

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11NECKUP00H3MOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-21

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

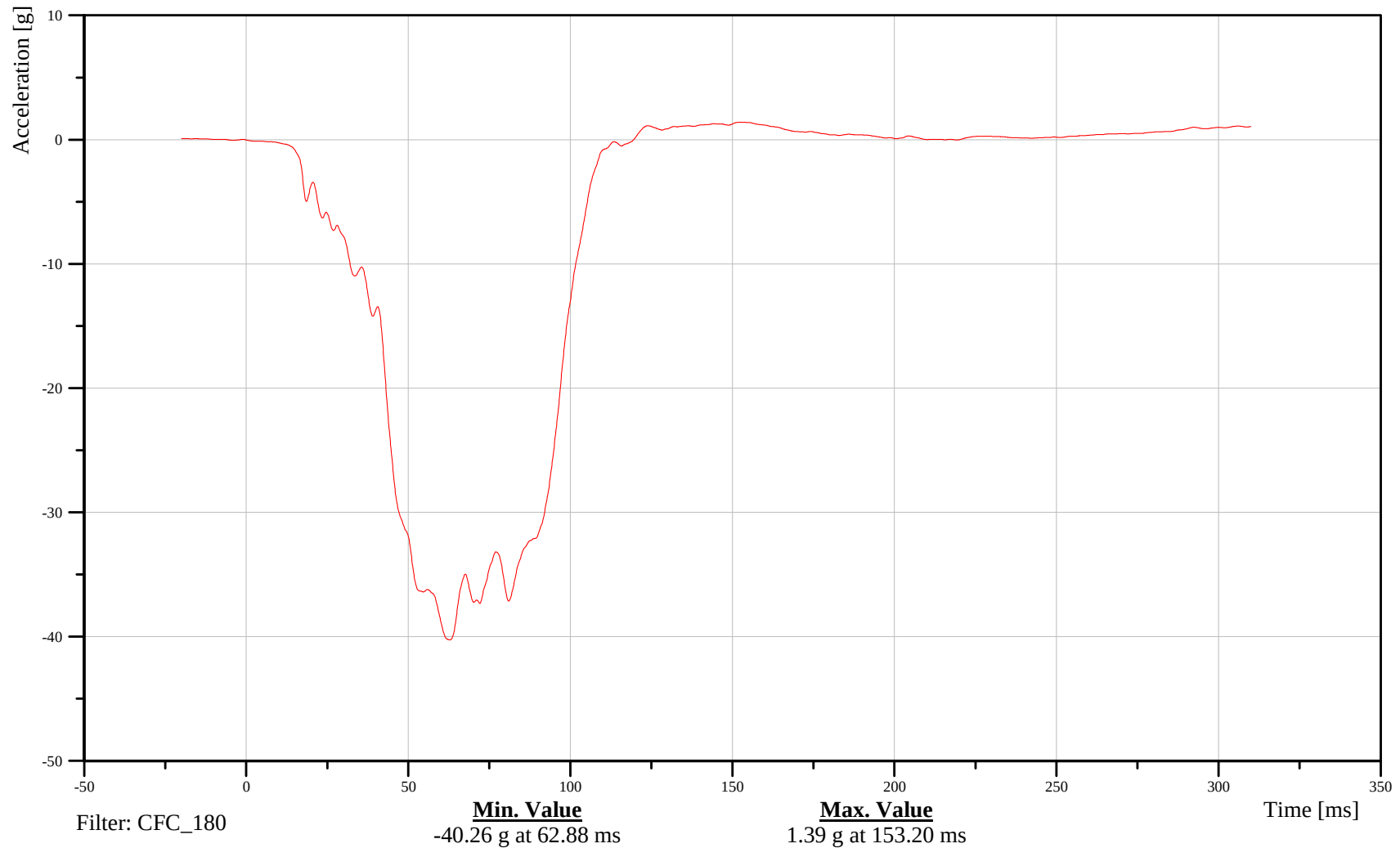
Date: 09/27/2006
Time: 13:07

Driver Chest X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

11CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-22

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

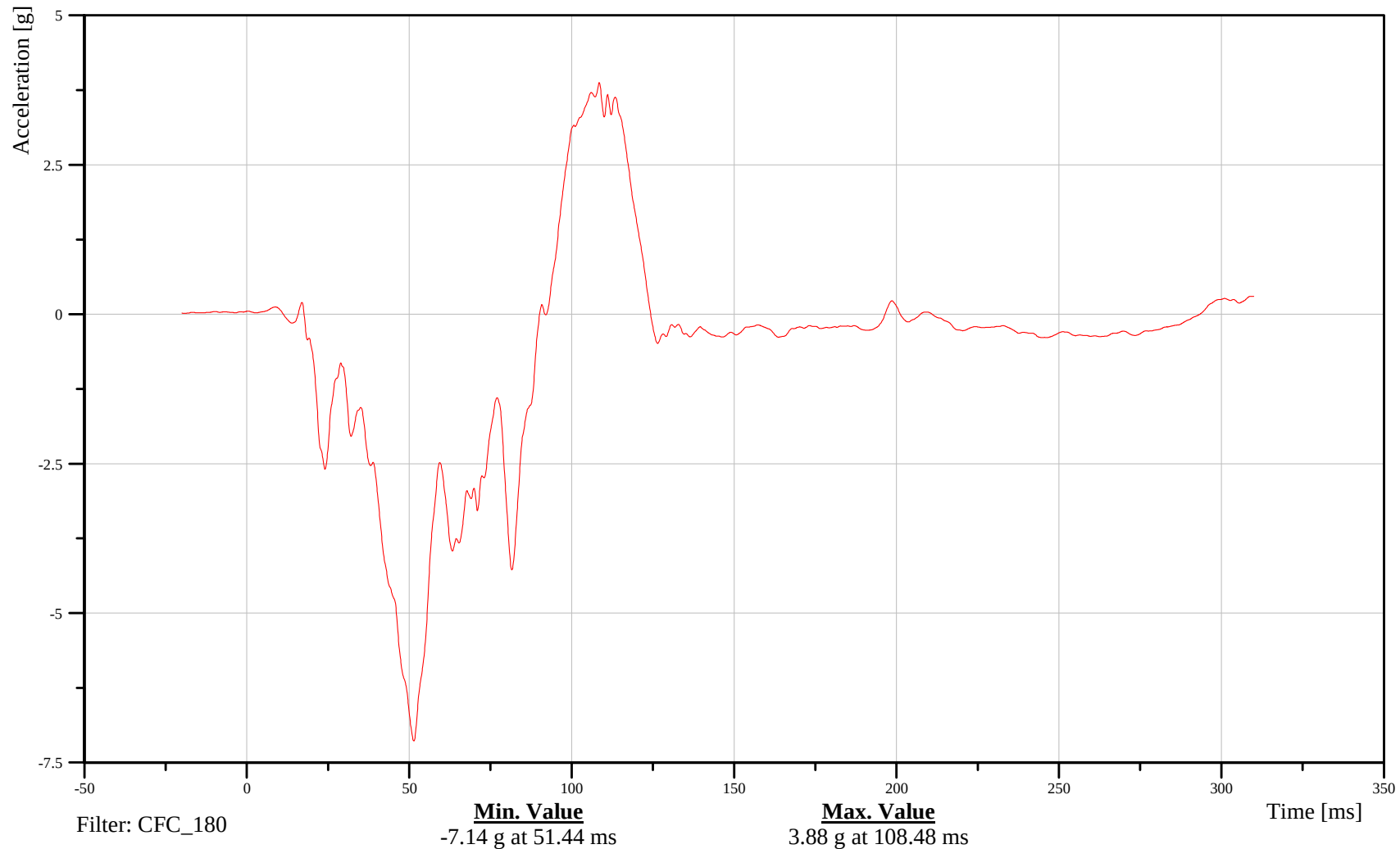
Date: 09/27/2006
Time: 13:07

Driver Chest Y-Axis Acceleration

Customer: NHTSA
Test Number: M60518

11CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-23

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

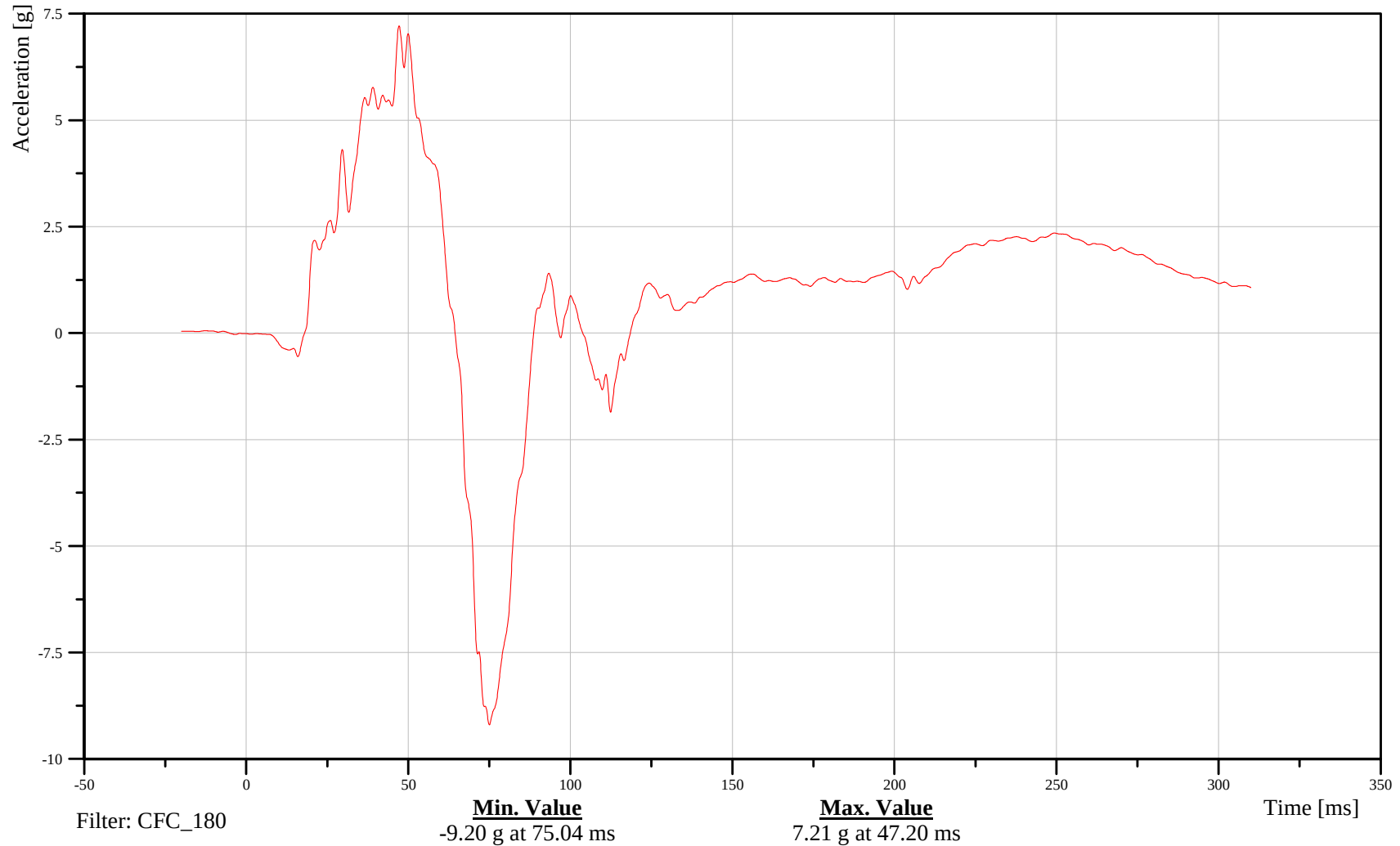
Driver Chest Z-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

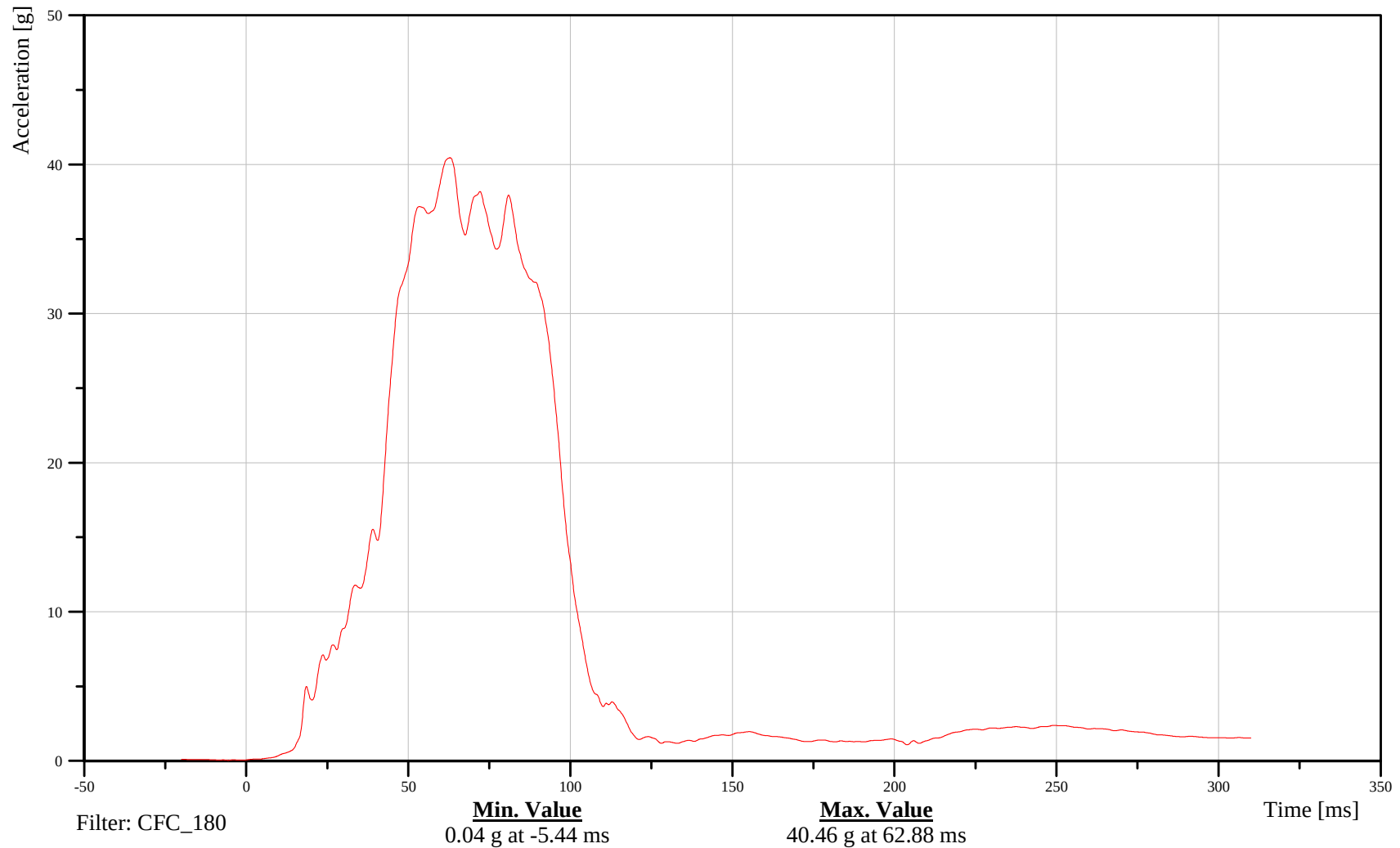
Date: 09/27/2006
Time: 13:07

Driver Chest Resultant Acceleration

Customer: NHTSA
Test Number: M60518

11CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-25

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

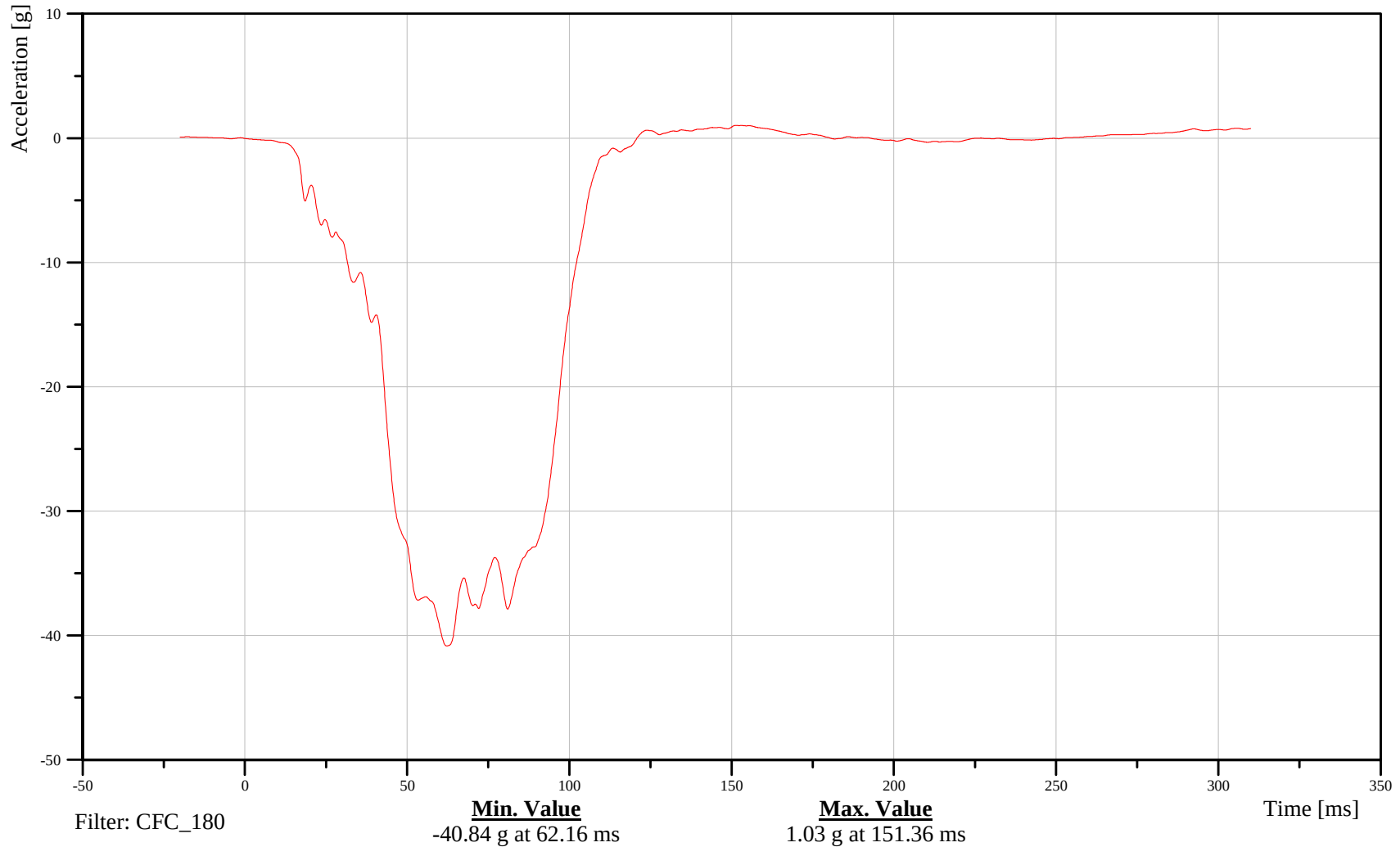
Driver Chest Redundant X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11CHSTCGRDH3ACXC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-26

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

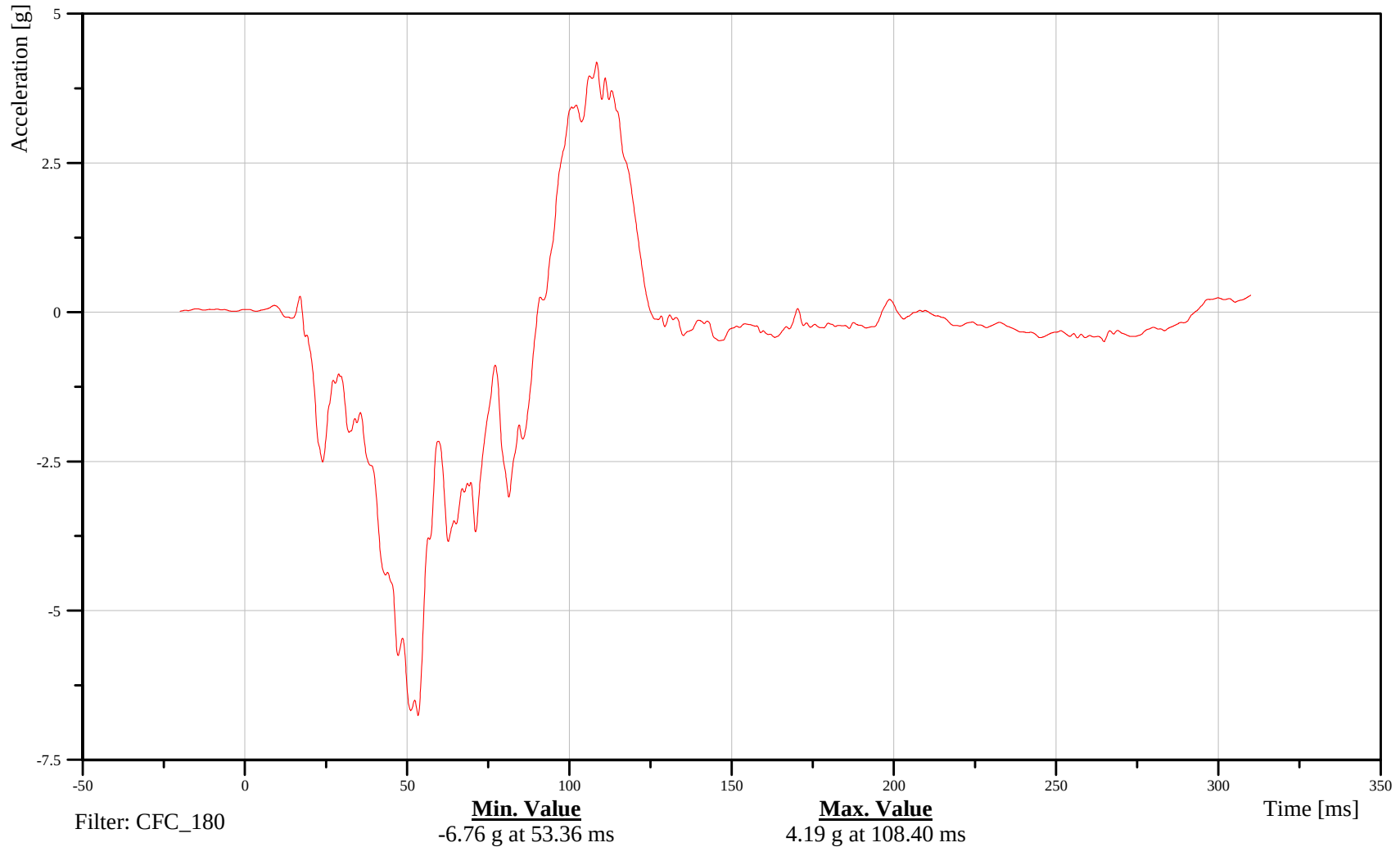
Driver Chest Redundant Y-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11CHSTCGRDH3ACYC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-27

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

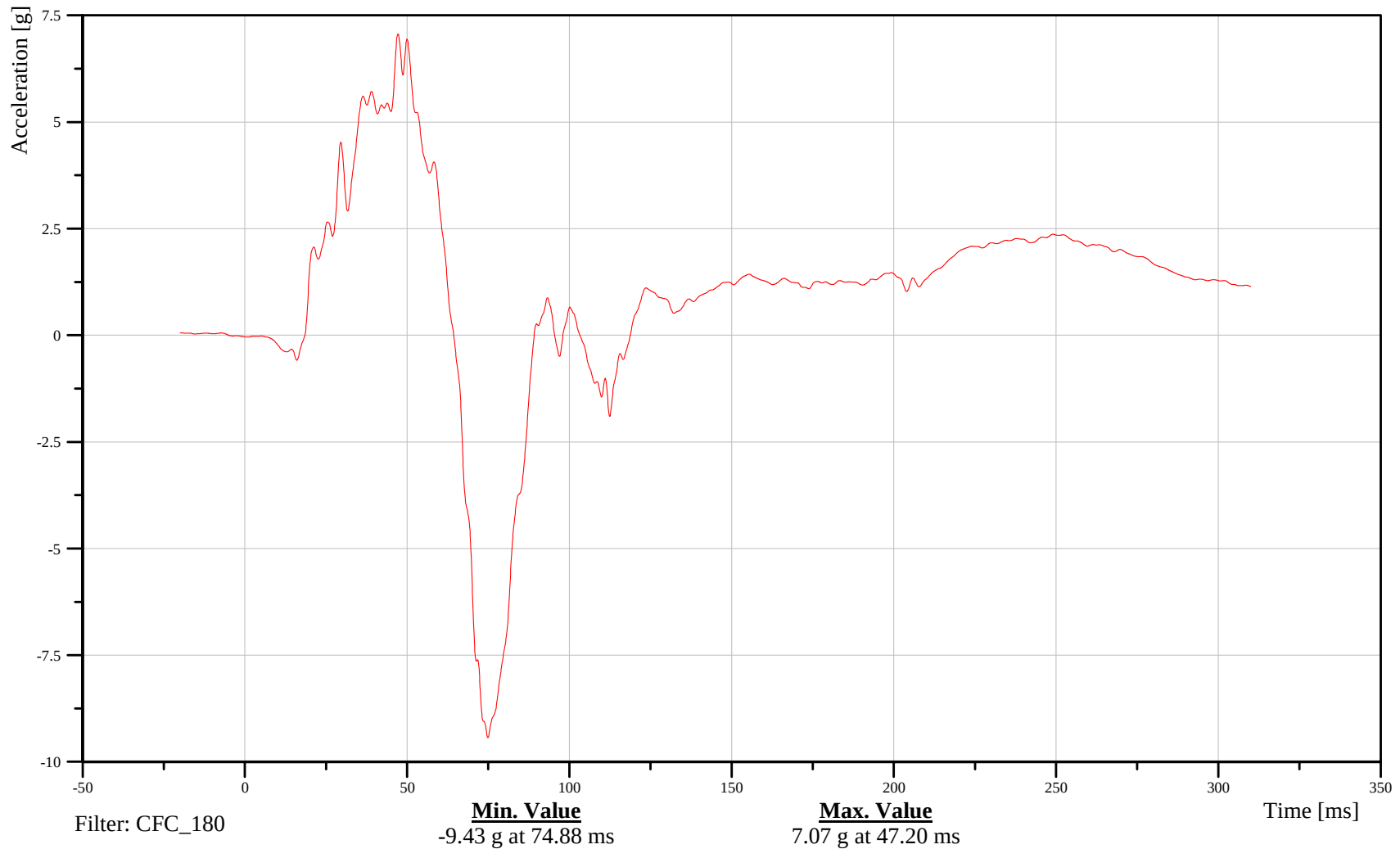
Driver Chest Redundant Z-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11CHSTCGRDH3ACZC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-28

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

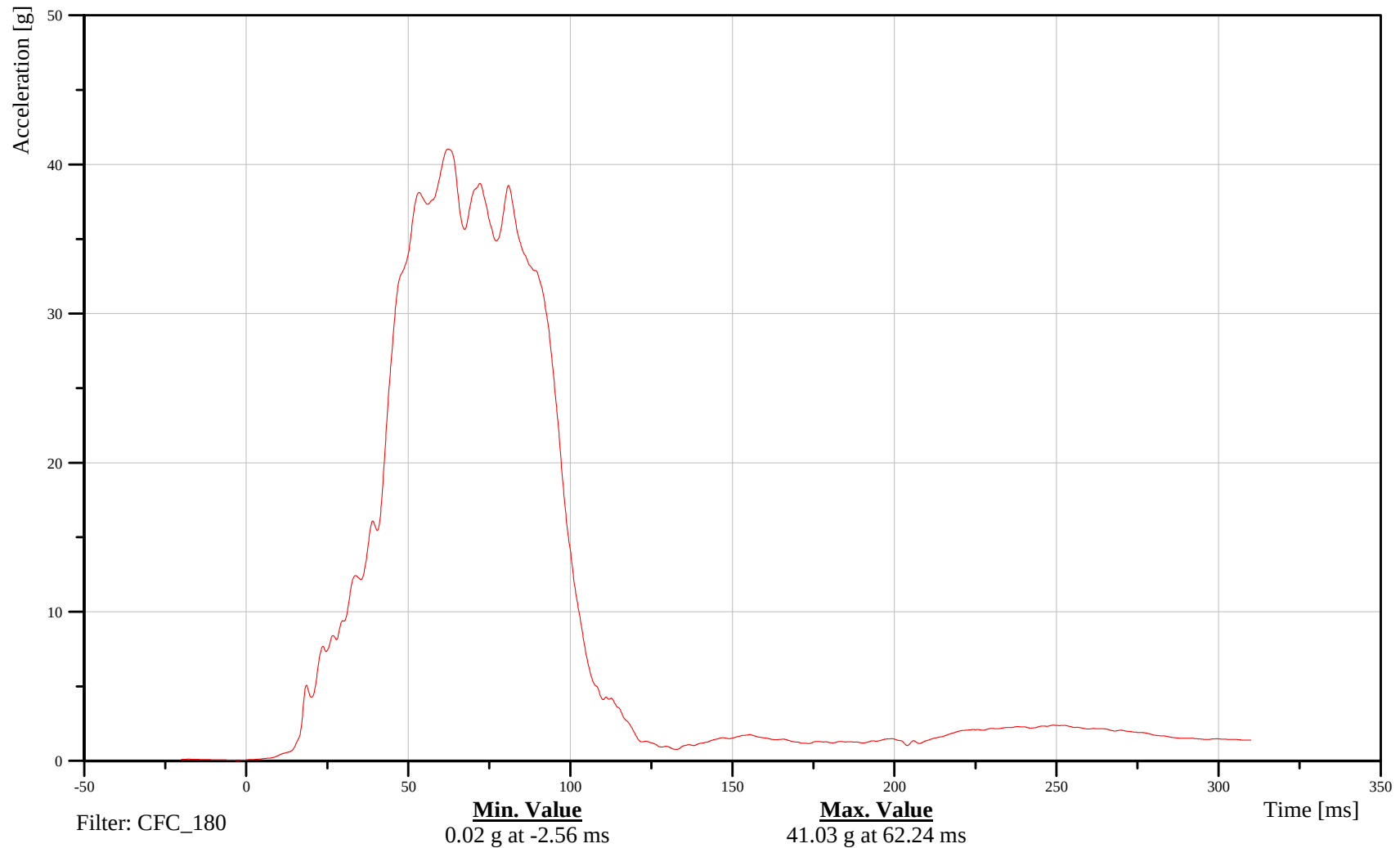
Driver Chest Redundant Resultant Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11CHSTCGRDH3ACRC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-29

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Driver Chest X-Axis Displacement

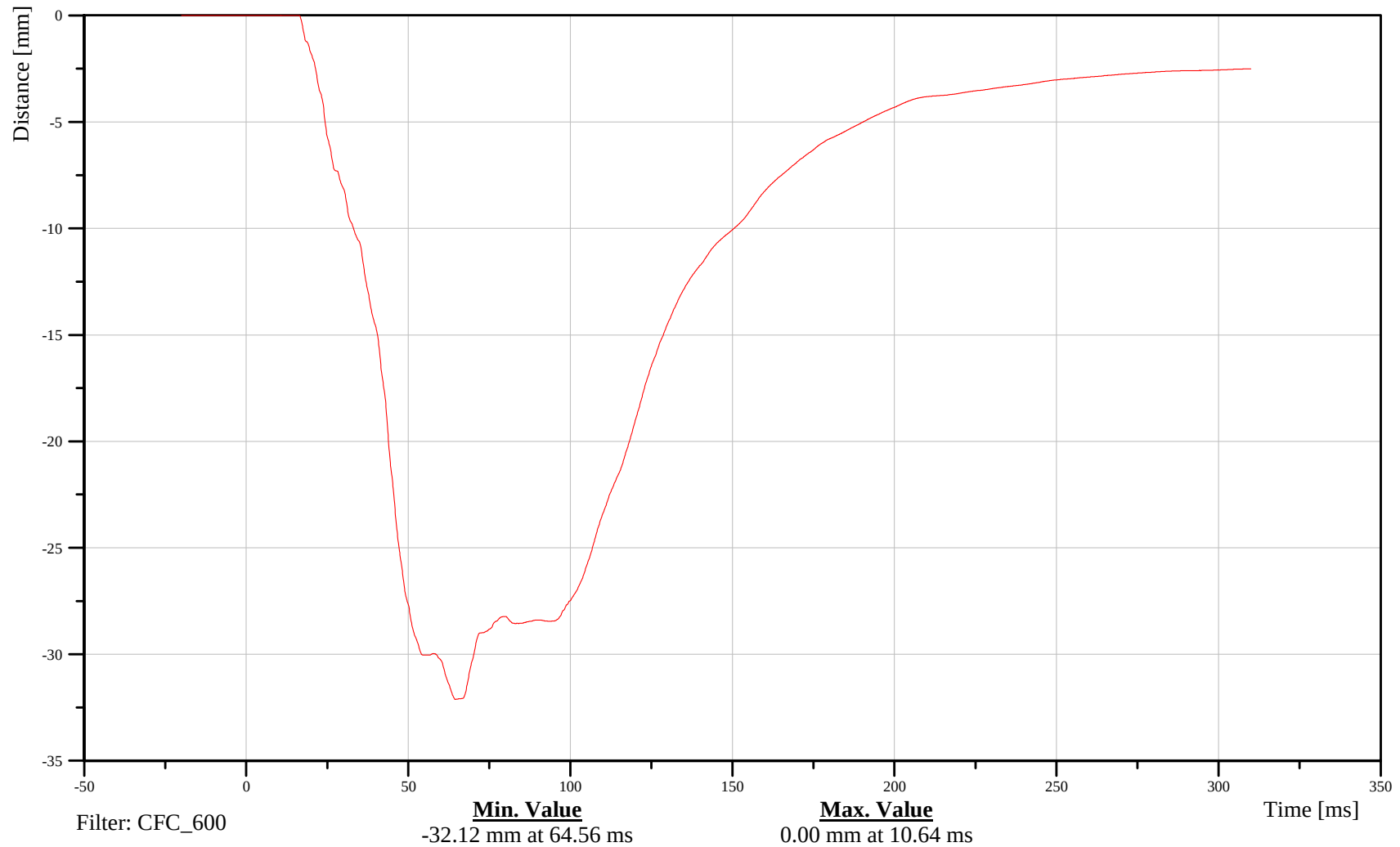
Customer: NHTSA

Test Number: M60518

11CHST0000H3DSXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-30

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

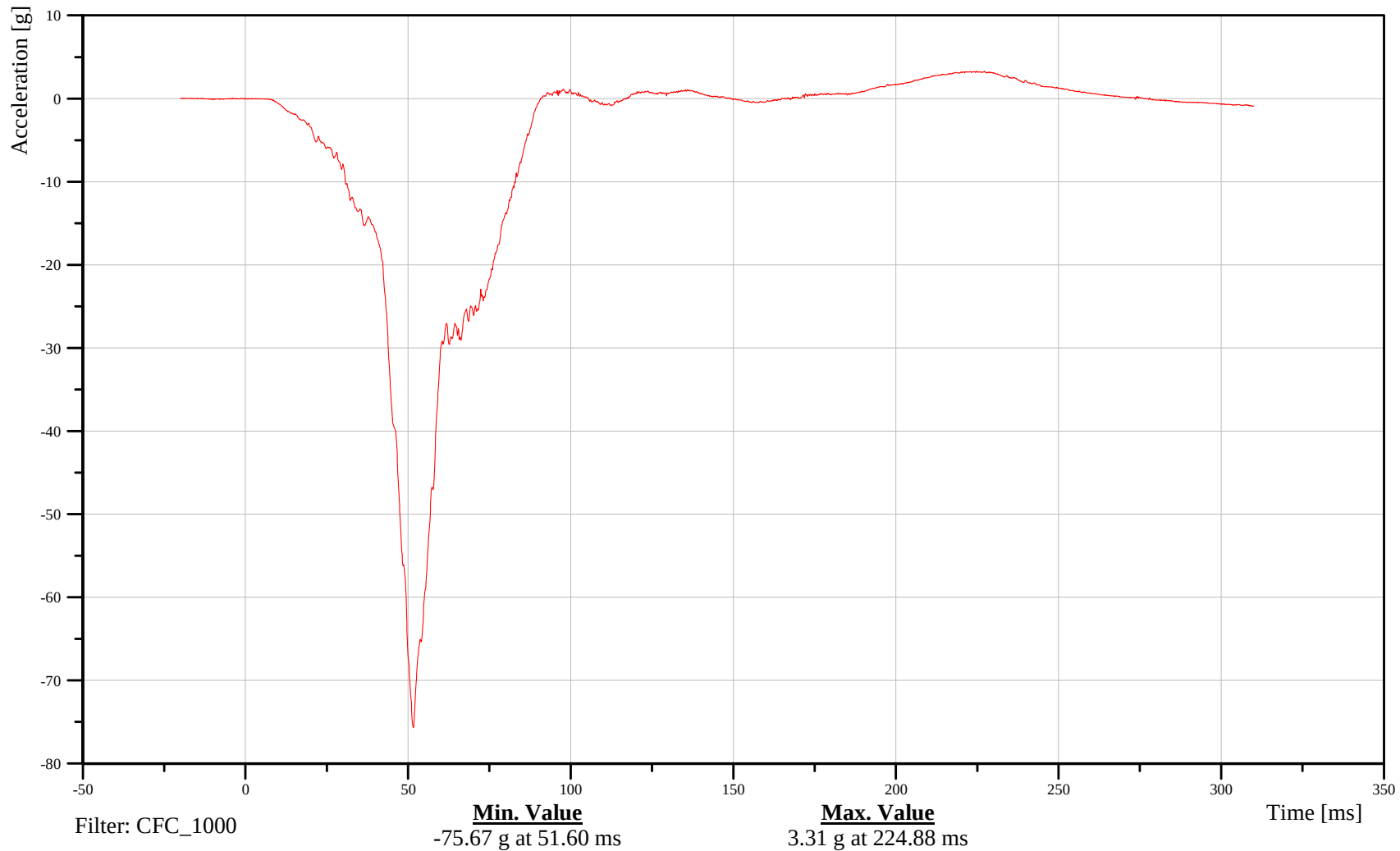
Driver Pelvis X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11PELVCG00H3ACXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-31

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

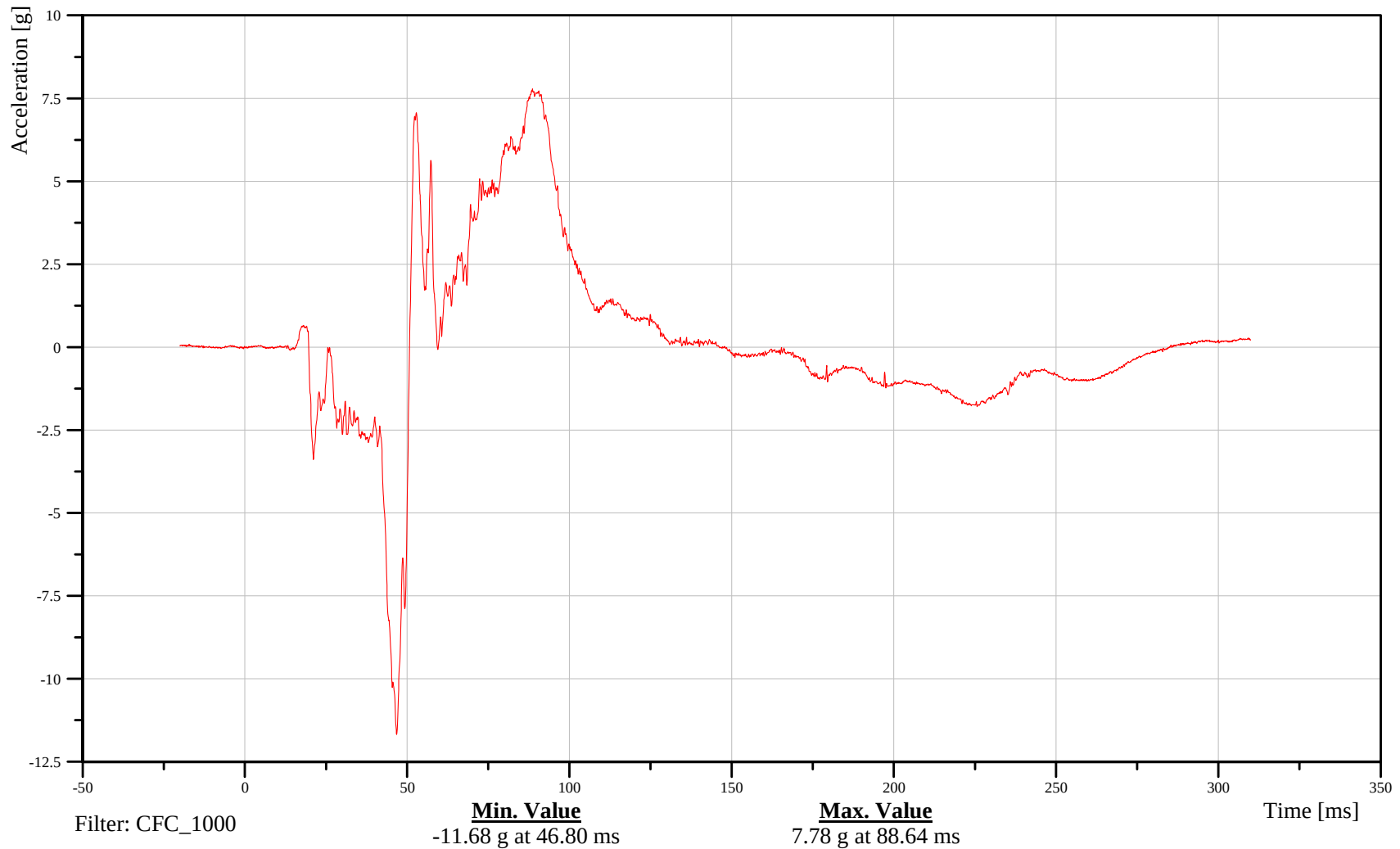
Driver Pelvis Y-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11PELVCG00H3ACYA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-32

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

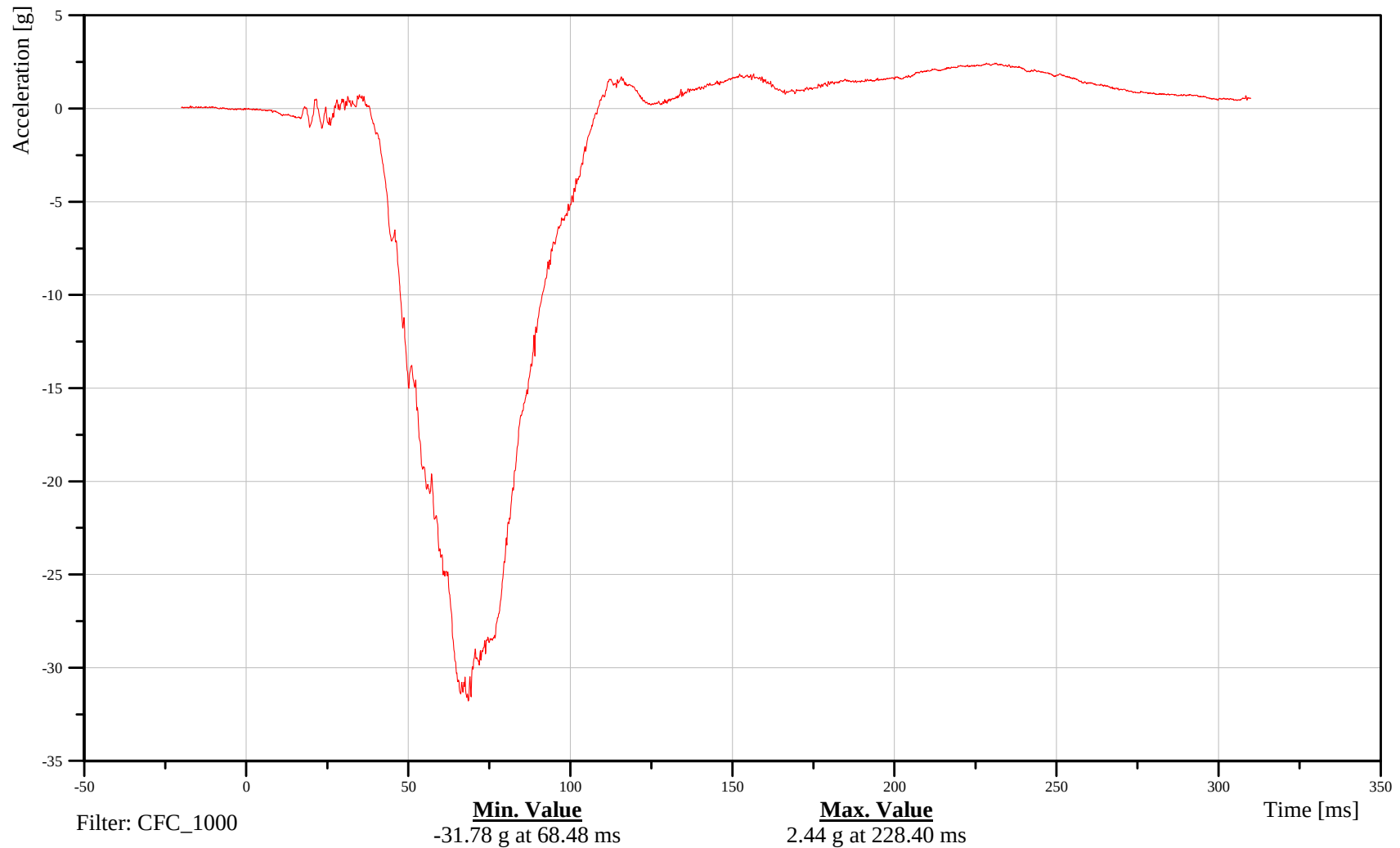
Date: 09/27/2006
Time: 13:07

Driver Pelvis Z-Axis Acceleration

Customer: NHTSA
Test Number: M60518

11PELVCG00H3ACZA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-33

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Driver Pelvis Resultant Acceleration

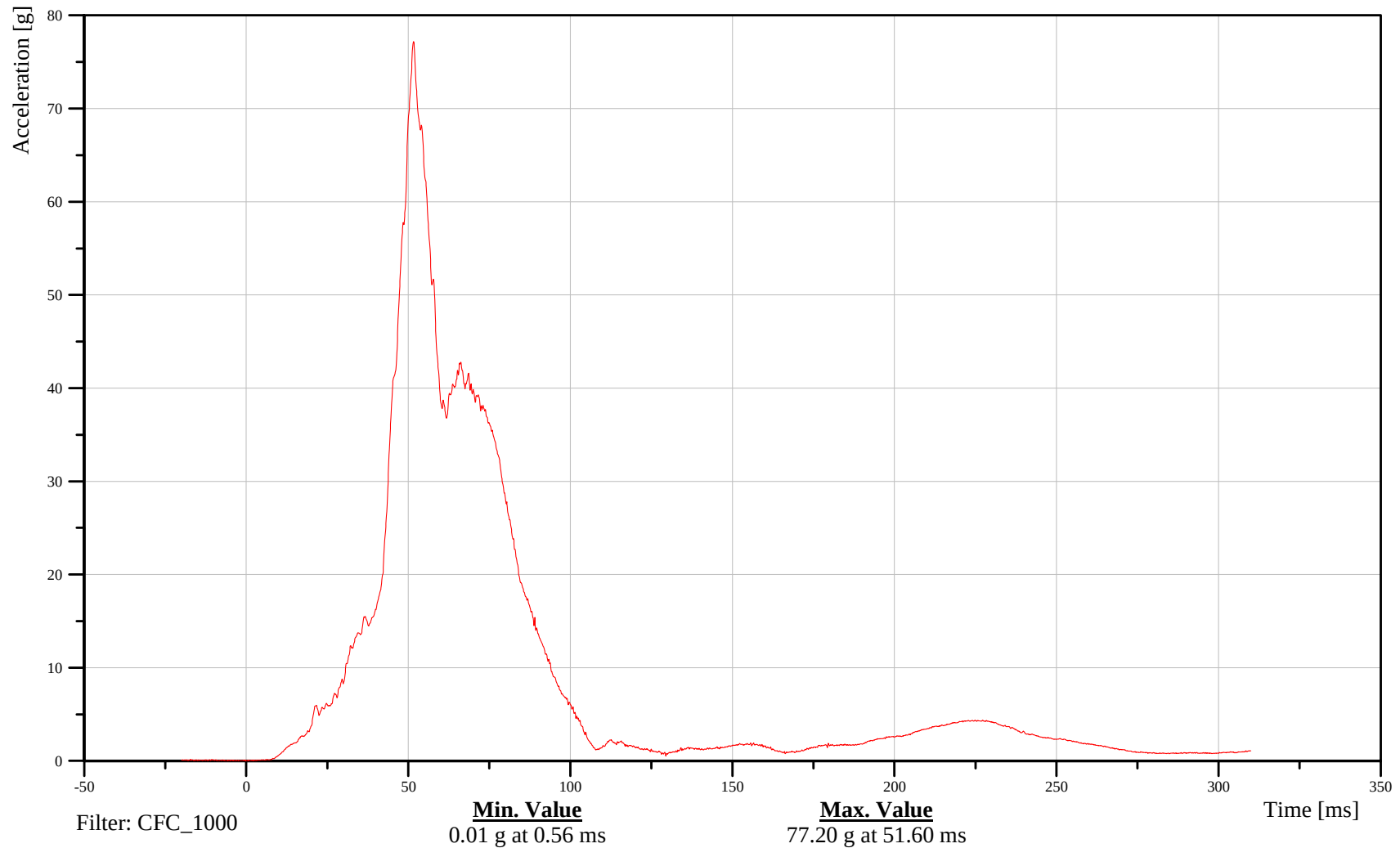
Customer: NHTSA

Test Number: M60518

11PELVCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-34

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

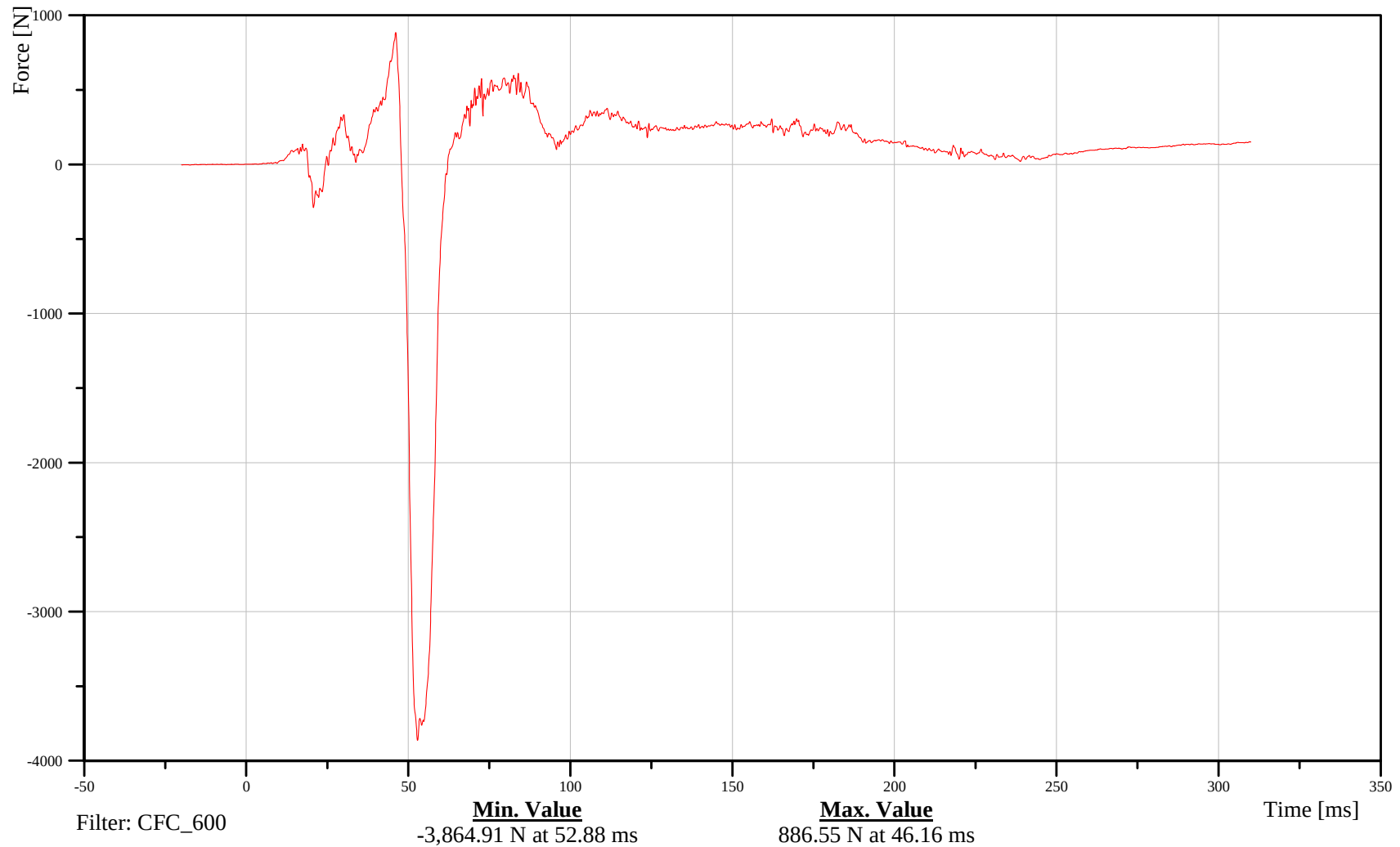
Driver Left Femur Z-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11FEMRLL00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-35

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

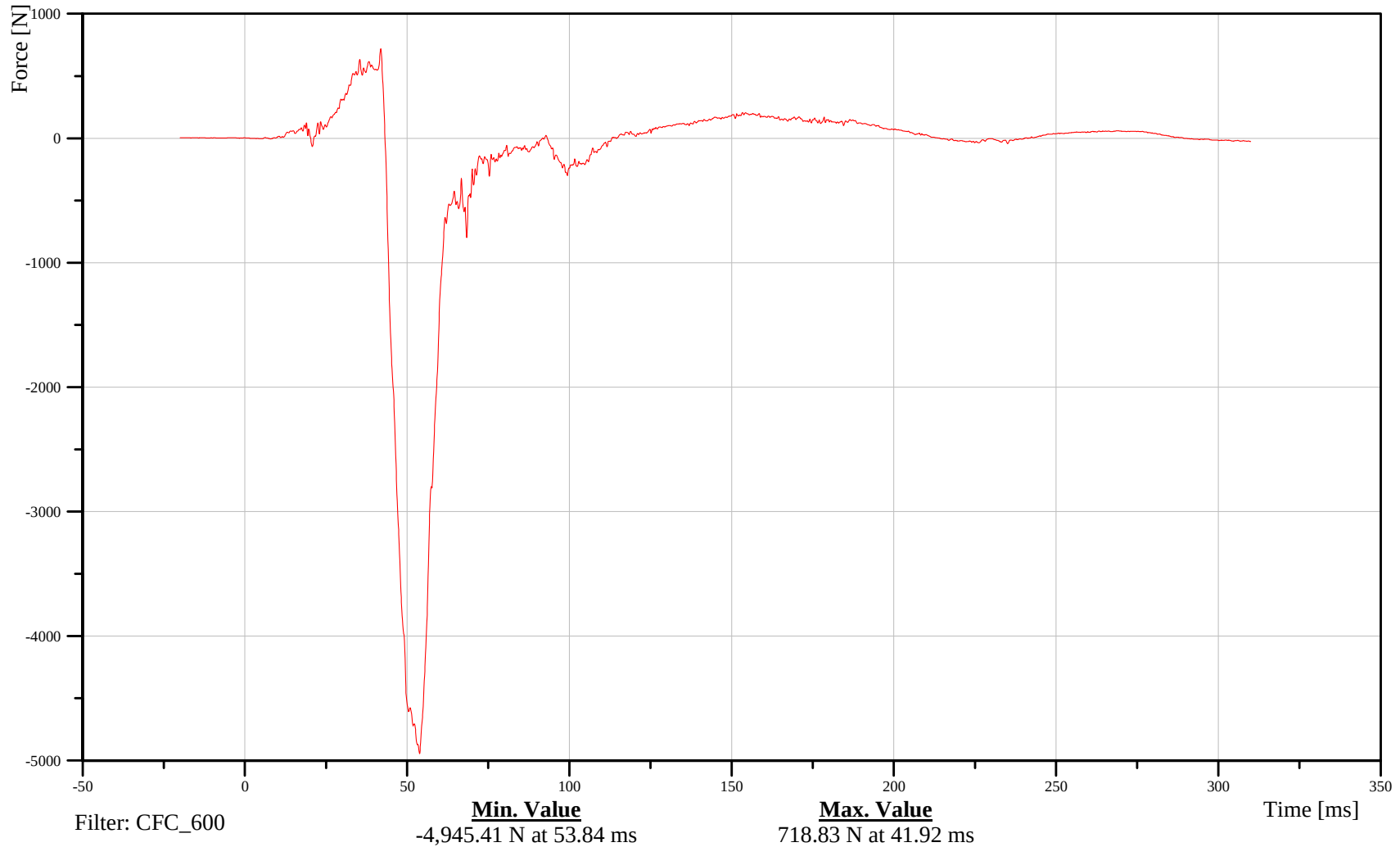
Date: 09/27/2006
Time: 13:07

Driver Right Femur Z-Axis Force

Customer: NHTSA
Test Number: M60518

11FEMRRL00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-36

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Driver Left Upper Tibia X-Axis Force

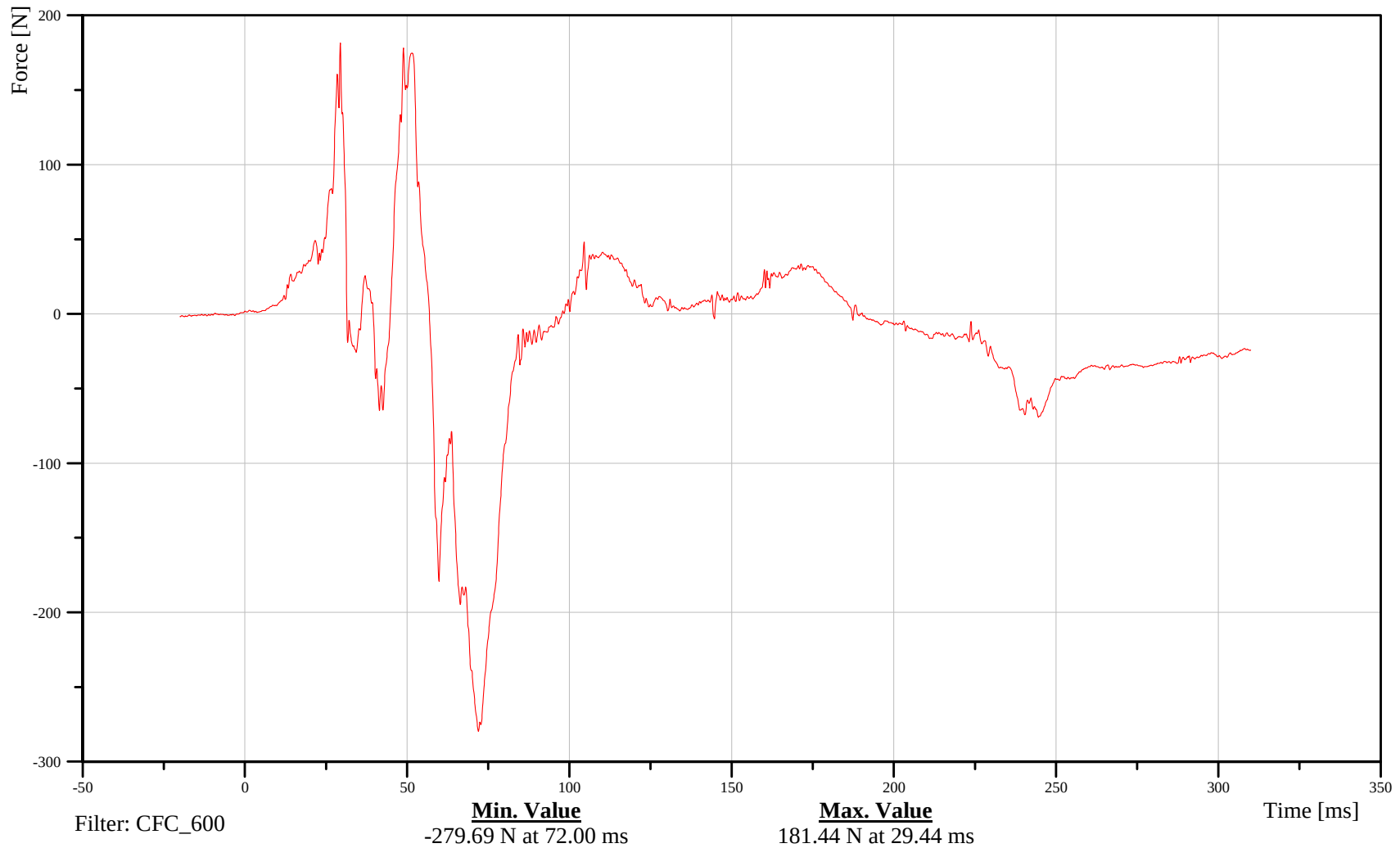
Customer: NHTSA

Test Number: M60518

11TIBILU00H3FOX B

TRC Inc. Test Lab: CTF

Test Number: 060927



B-37

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

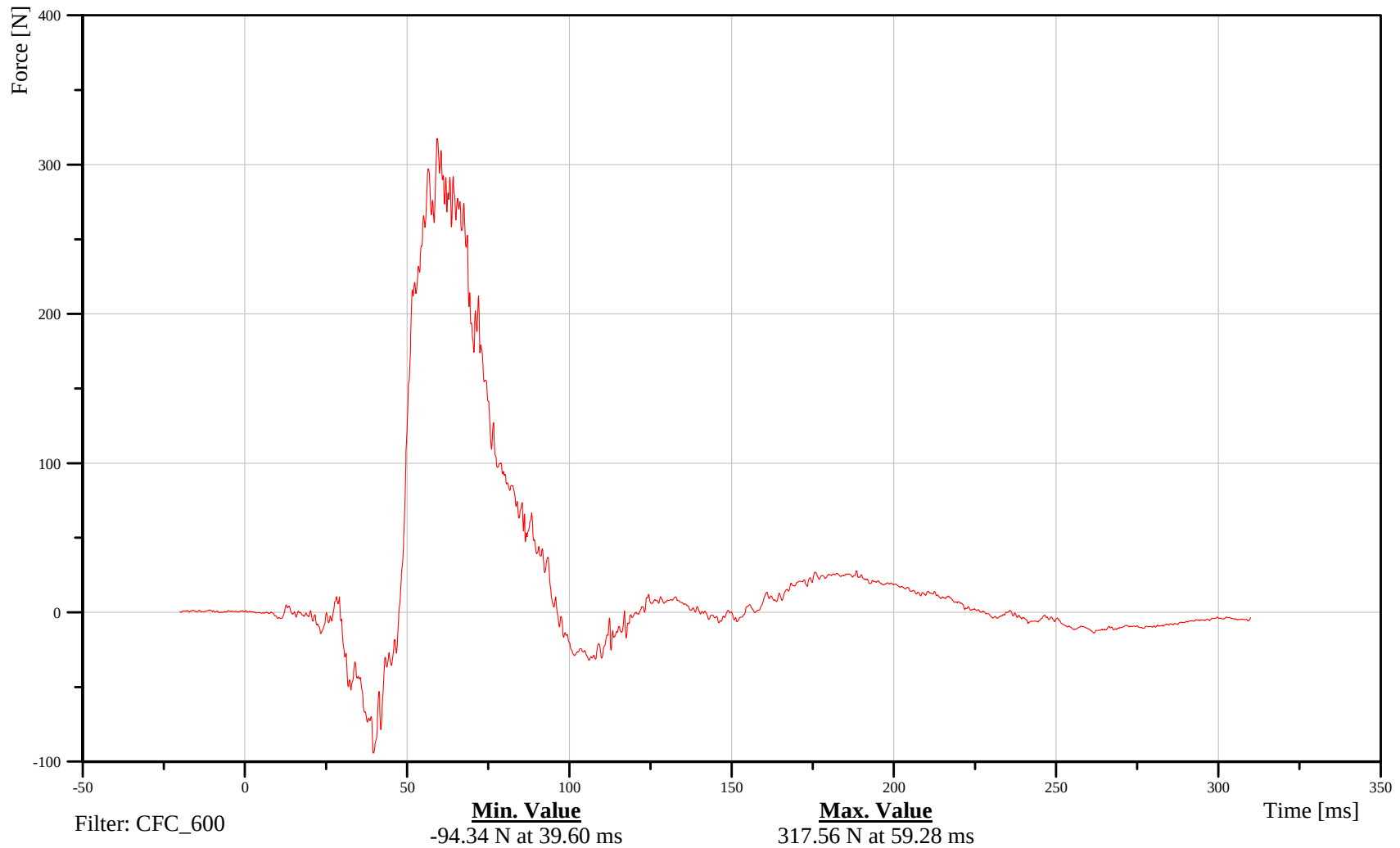
Date: 09/27/2006
Time: 13:07

Driver Left Upper Tibia Y-Axis Force

Customer: NHTSA
Test Number: M60518

11TIBILU00H3FOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-38

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

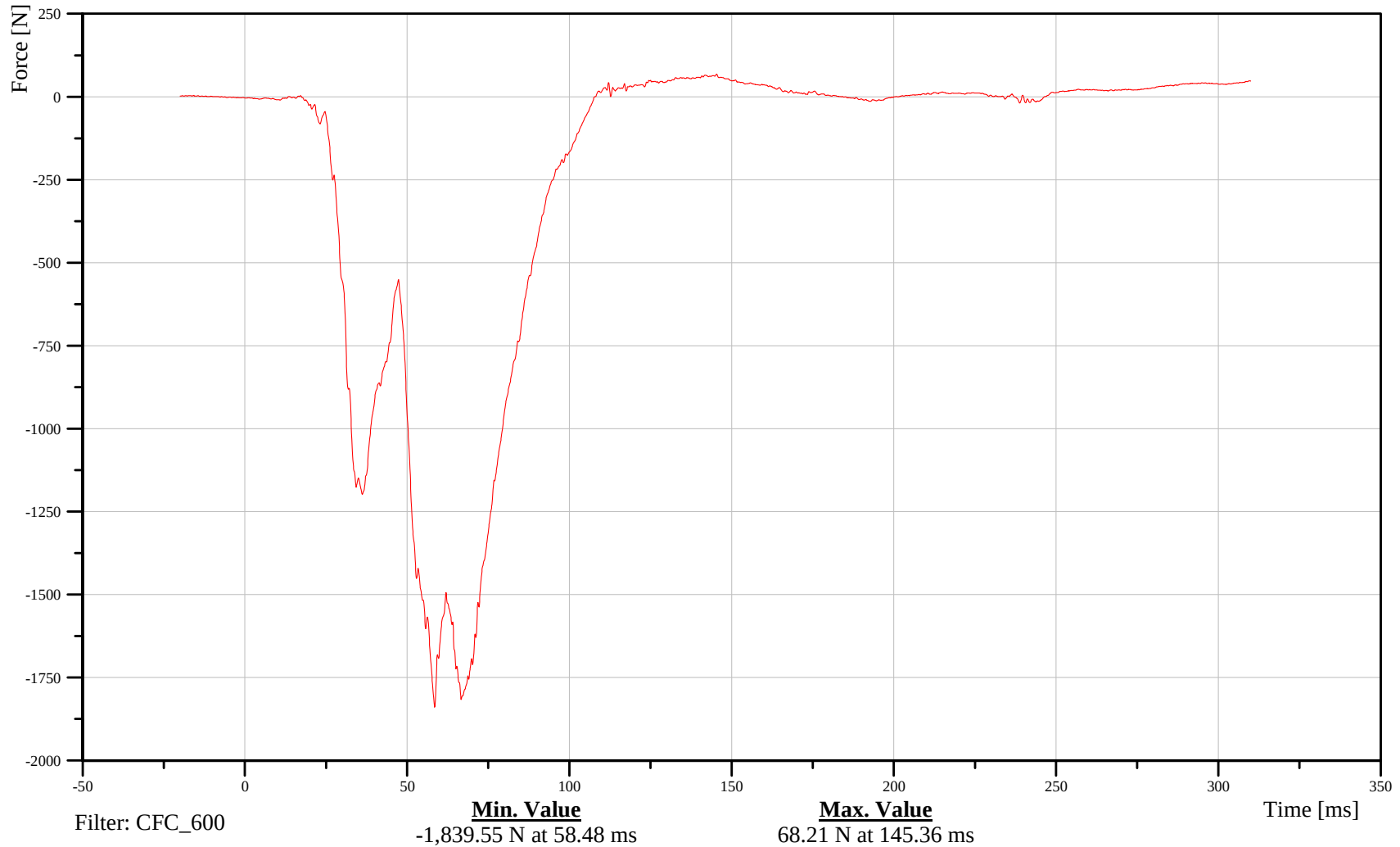
Date: 09/27/2006
Time: 13:07

Driver Left Upper Tibia Z-Axis Force

Customer: NHTSA
Test Number: M60518

11TIBILU00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-39

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Driver Left Upper Tibia Moment About X Axis

Time: 13:07

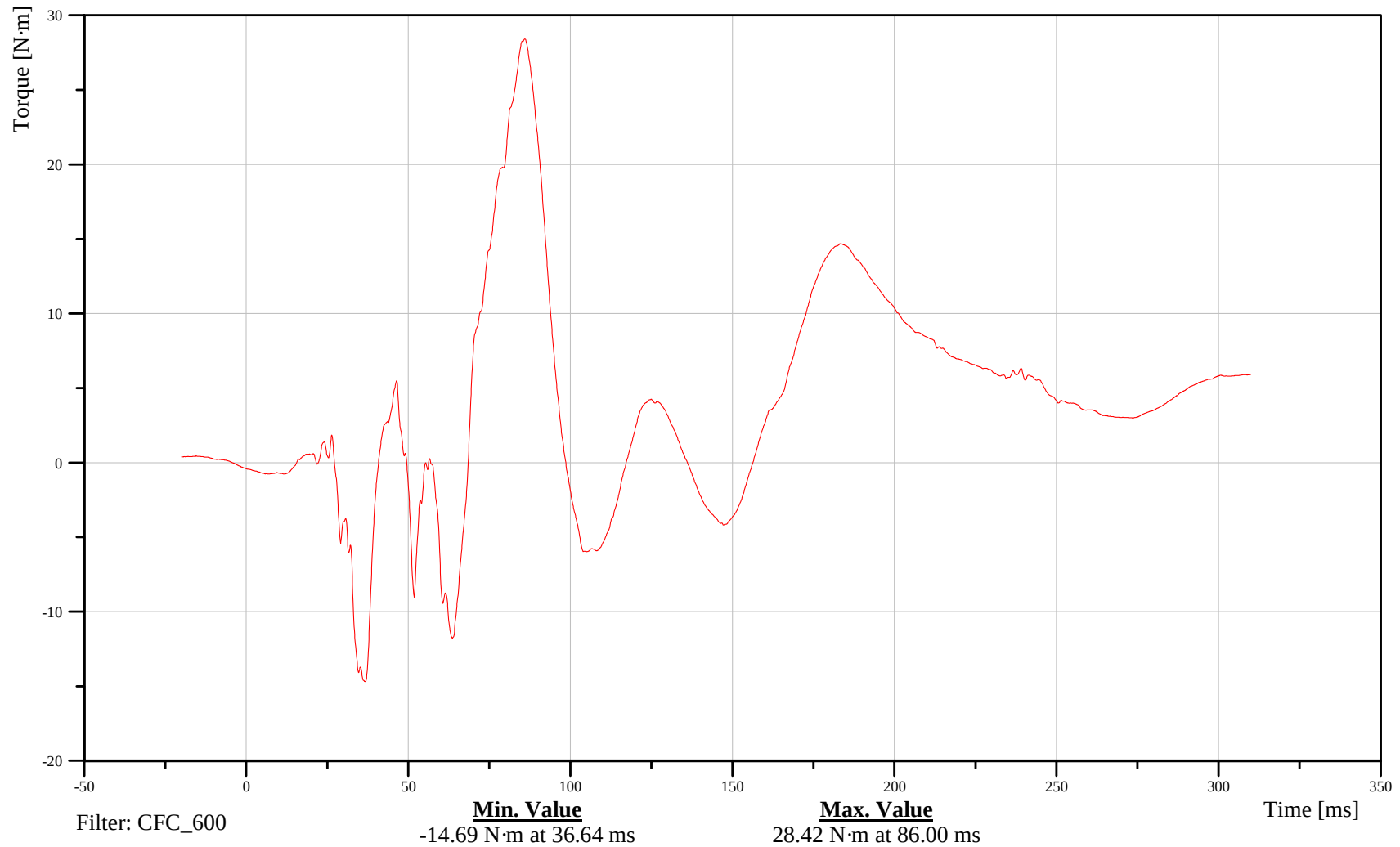
Customer: NHTSA

Test Number: M60518

11TIBILU00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-40

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Driver Left Upper Tibia Moment About Y Axis

Time: 13:07

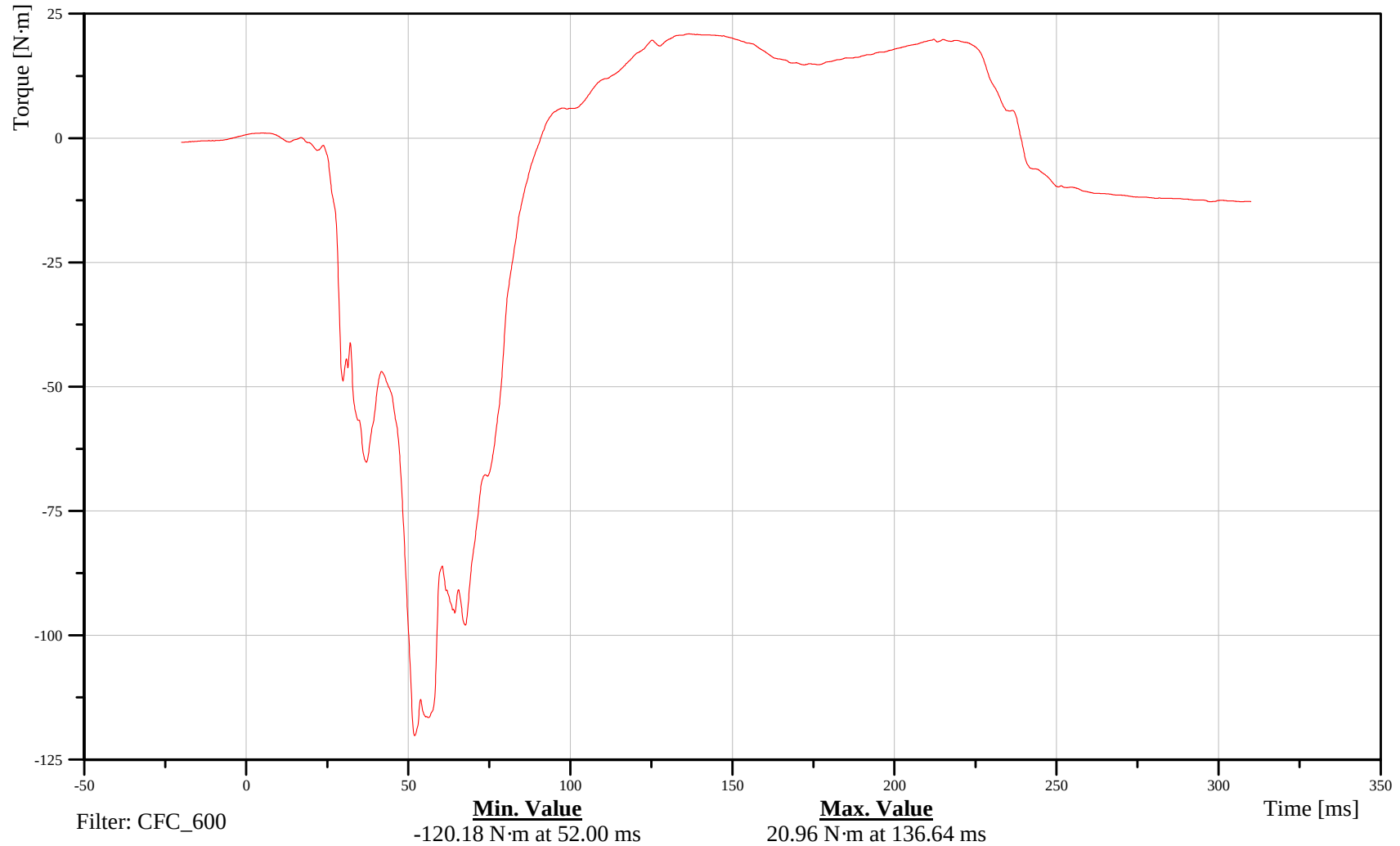
Customer: NHTSA

Test Number: M60518

11TIBILU00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-41

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

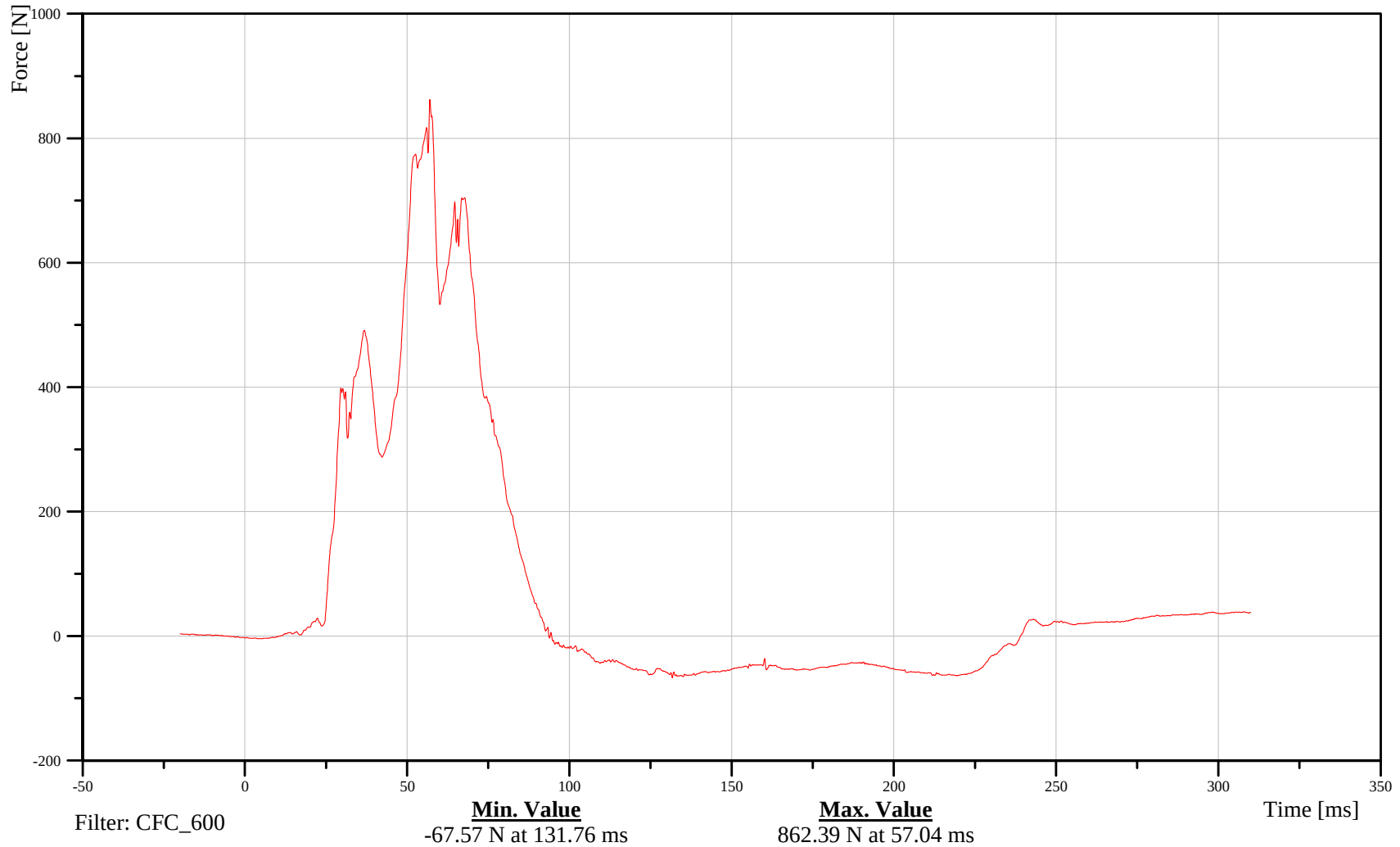
Date: 09/27/2006
Time: 13:07

Driver Left Lower Tibia X-Axis Force

Customer: NHTSA
Test Number: M60518

11TIBILL00H3FOXB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-42

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

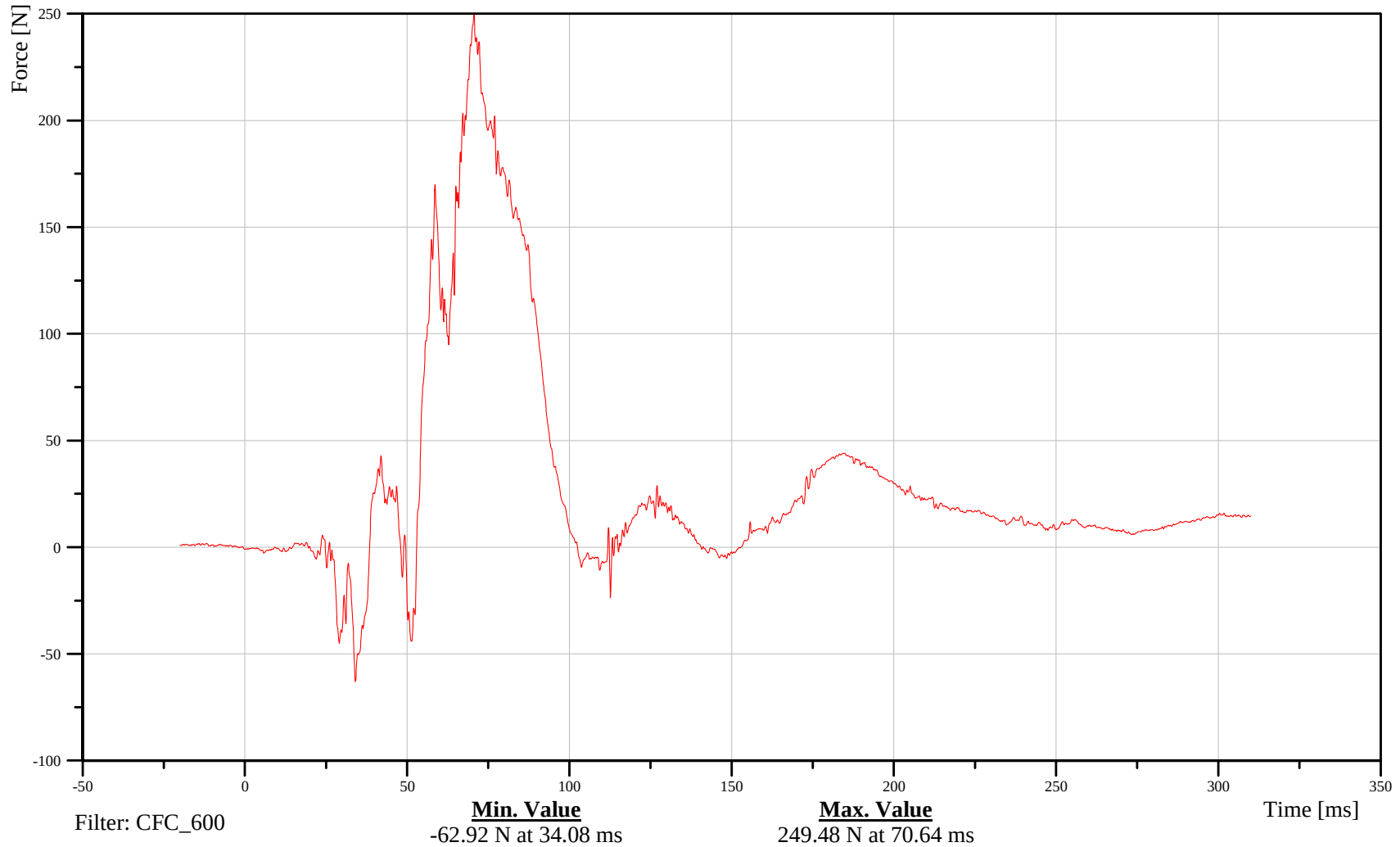
Driver Left Lower Tibia Y-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBILL00H3FOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-43

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

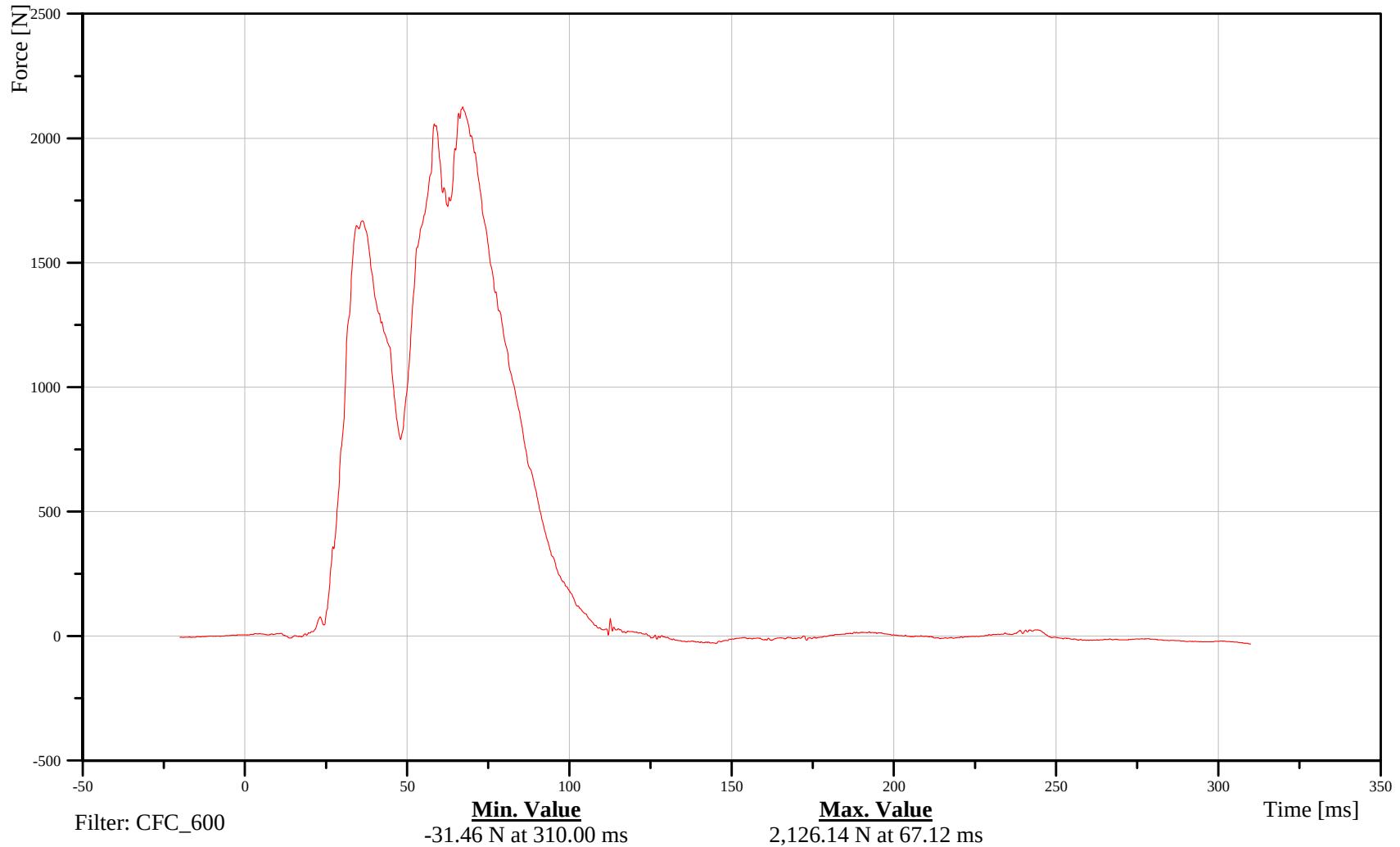
Date: 09/27/2006
Time: 13:07

Driver Left Lower Tibia Z-Axis Force

Customer: NHTSA
Test Number: M60518

11TIBILL00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-44

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

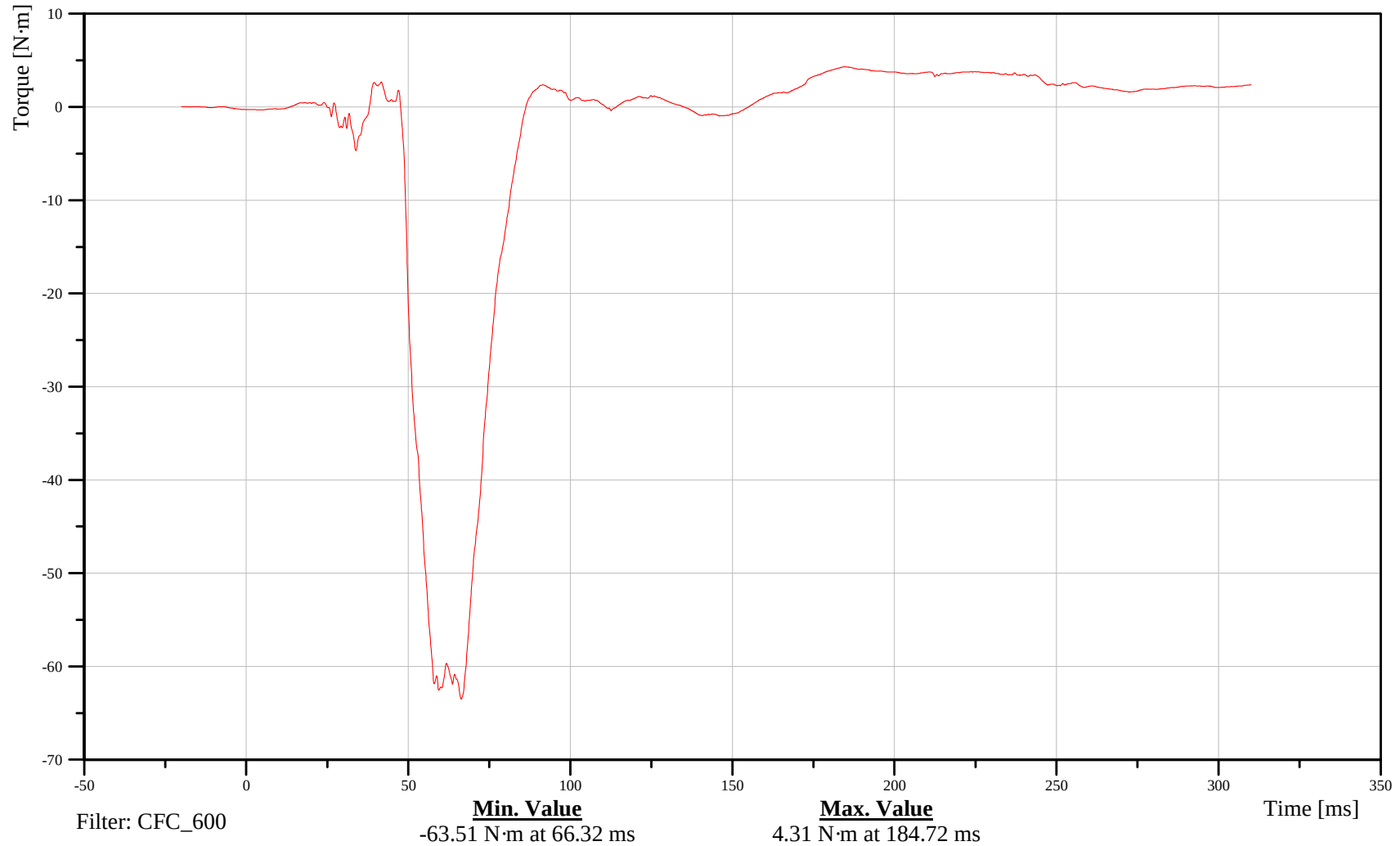
Driver Left Lower Tibia Moment About X Axis

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBILL00H3MOXB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-45

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

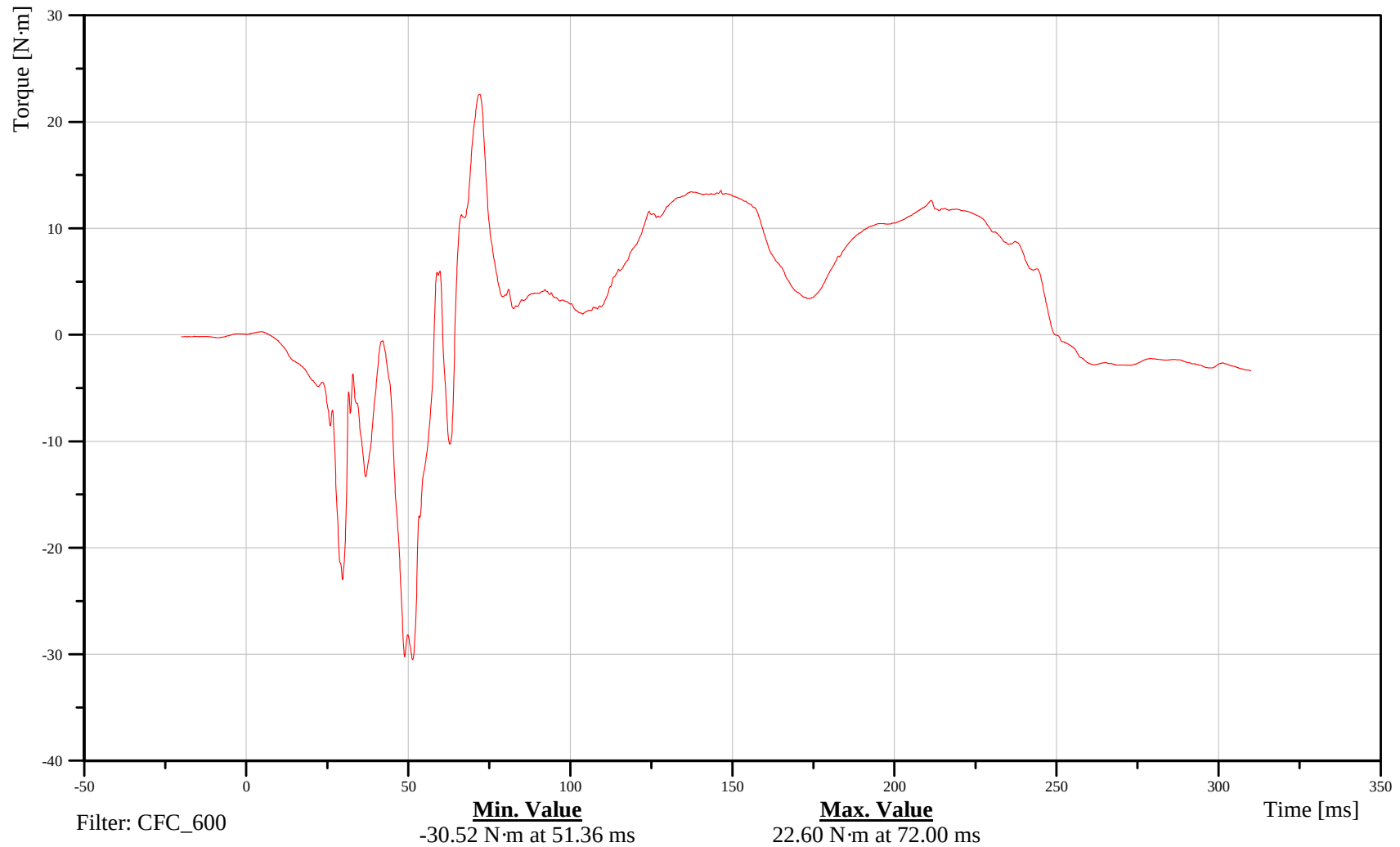
Driver Left Lower Tibia Moment About Y Axis

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBILL00H3MOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

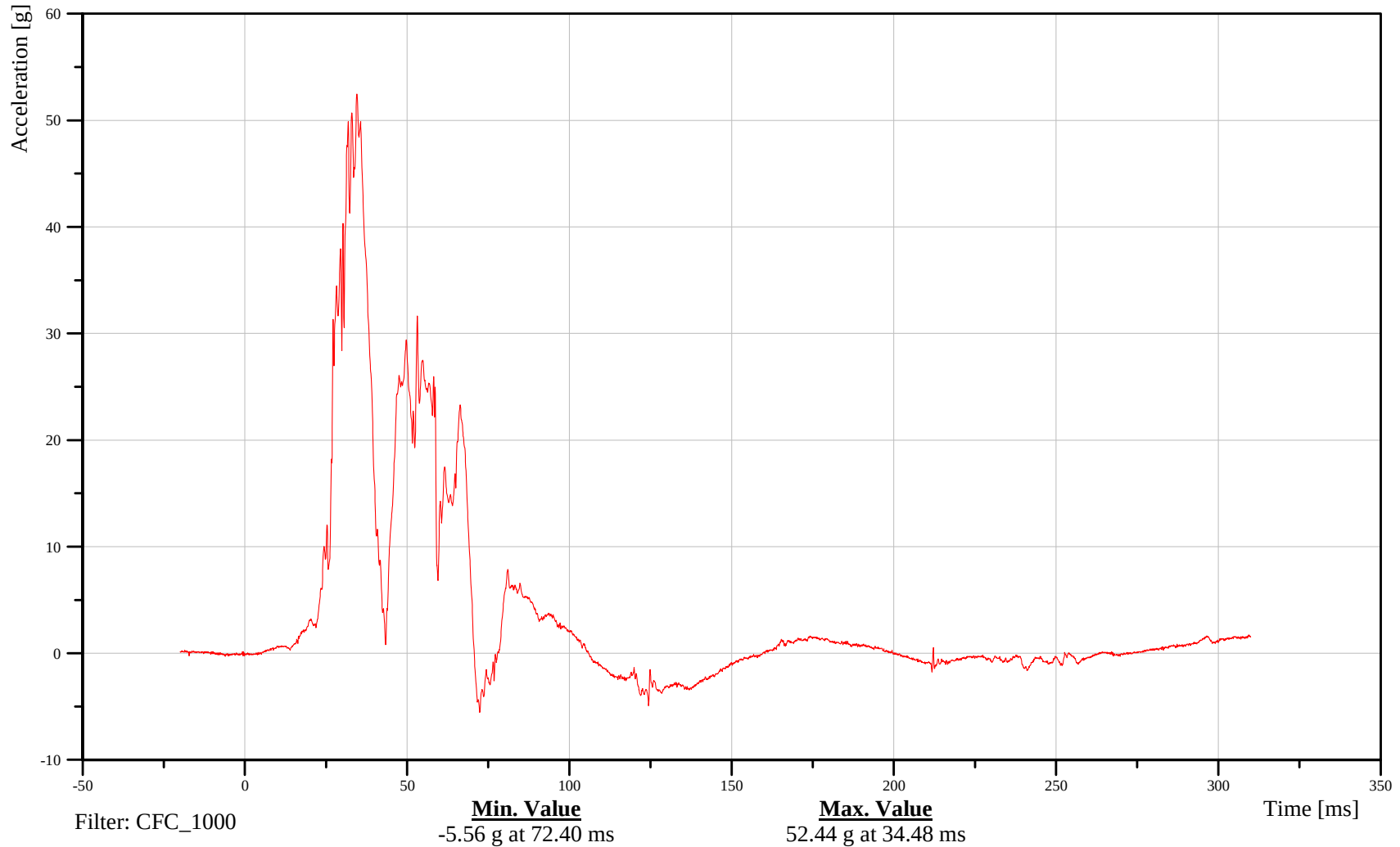
Driver Left Foot X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11FOOTLE00H3ACXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-47

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Driver Left Foot Z-Axis Acceleration

Time: 13:07

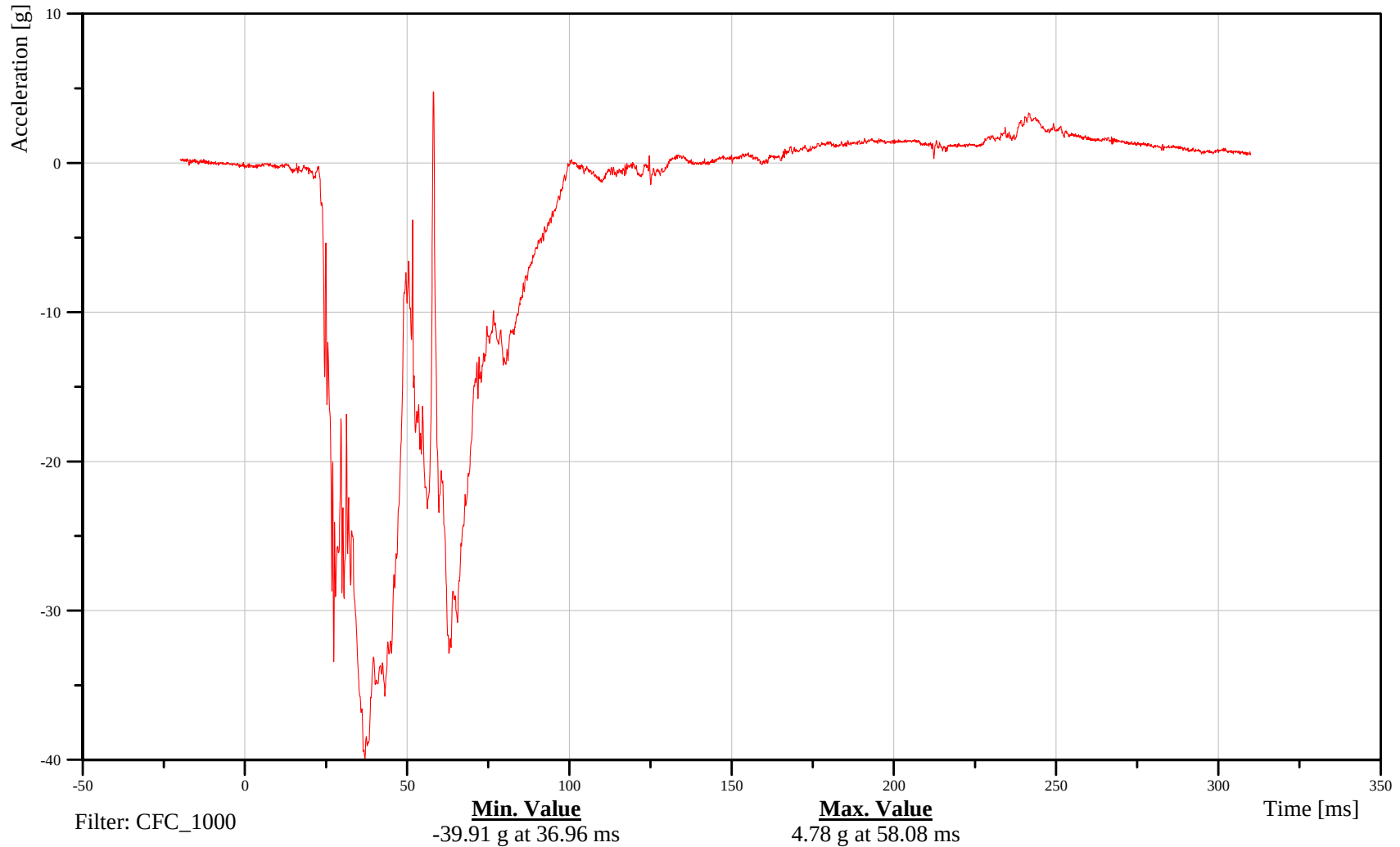
Customer: NHTSA

Test Number: M60518

11FOOTLE00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-48

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

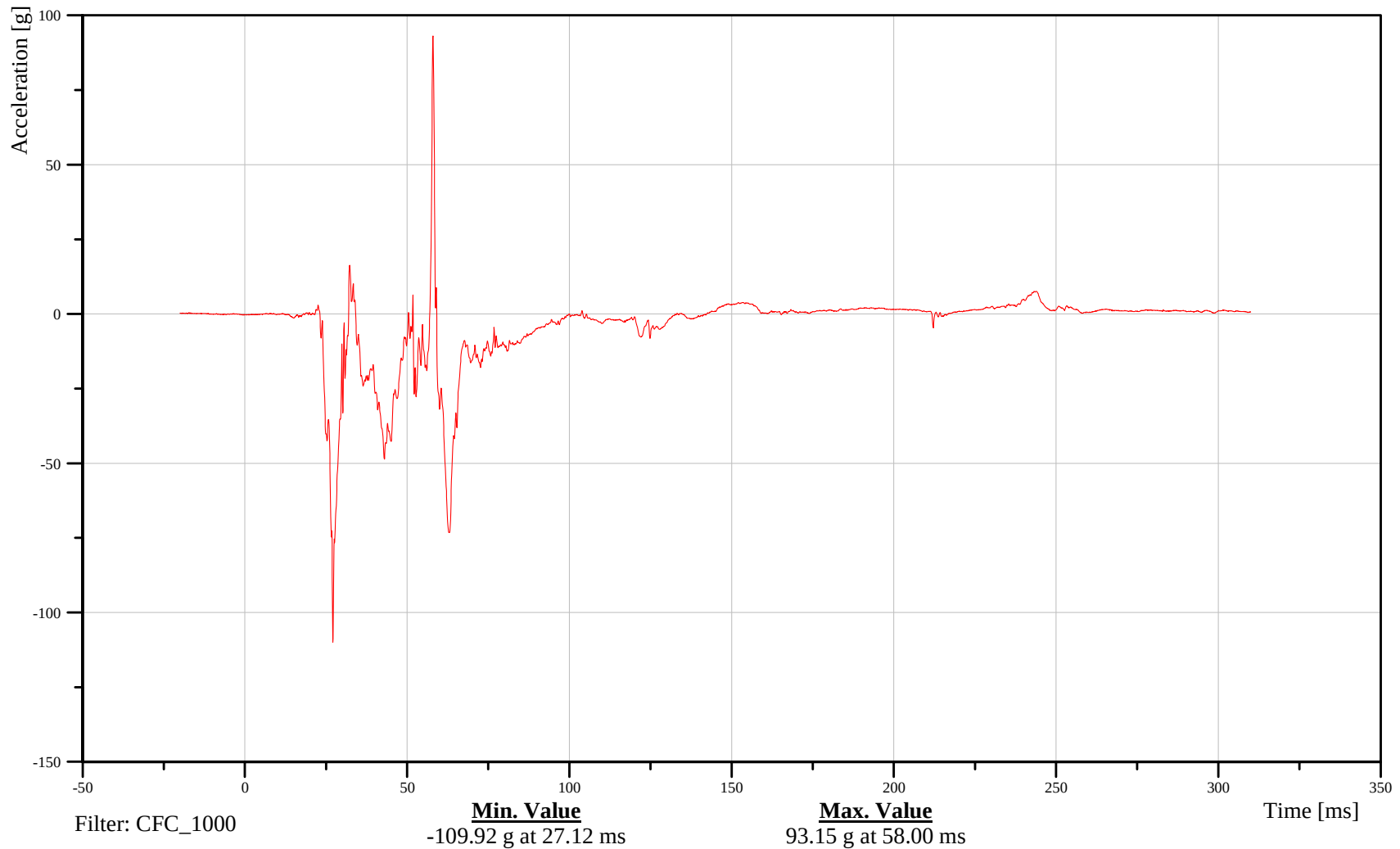
Driver Left Toe Z-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TOESLE00H3ACZA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-49

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

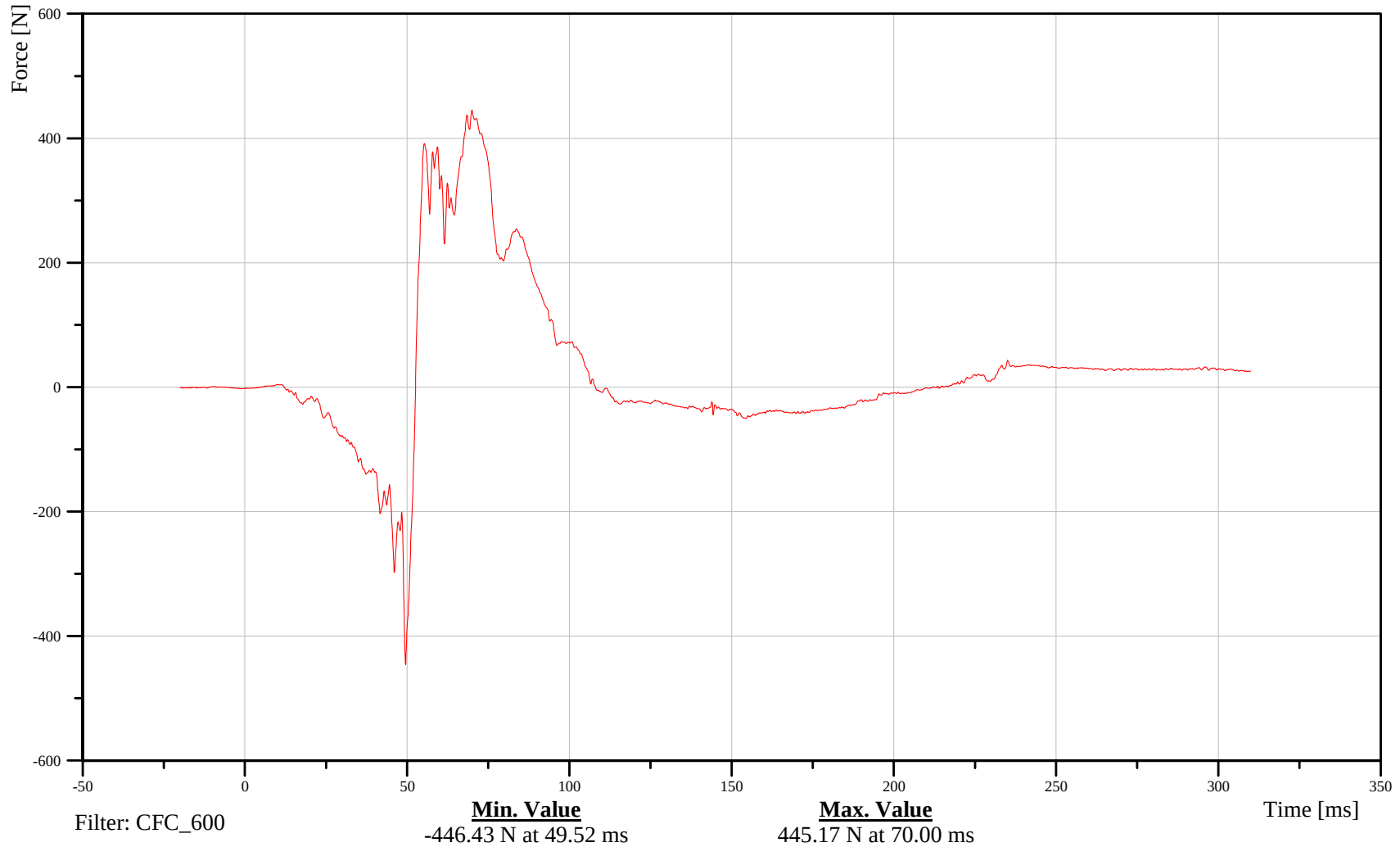
Date: 09/27/2006
Time: 13:07

Driver Right Upper Tibia X-Axis Force

Customer: NHTSA
Test Number: M60518

11TIBIRU00H3FOX B

TRC Inc. Test Lab: CTF
Test Number: 060927



B-50

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

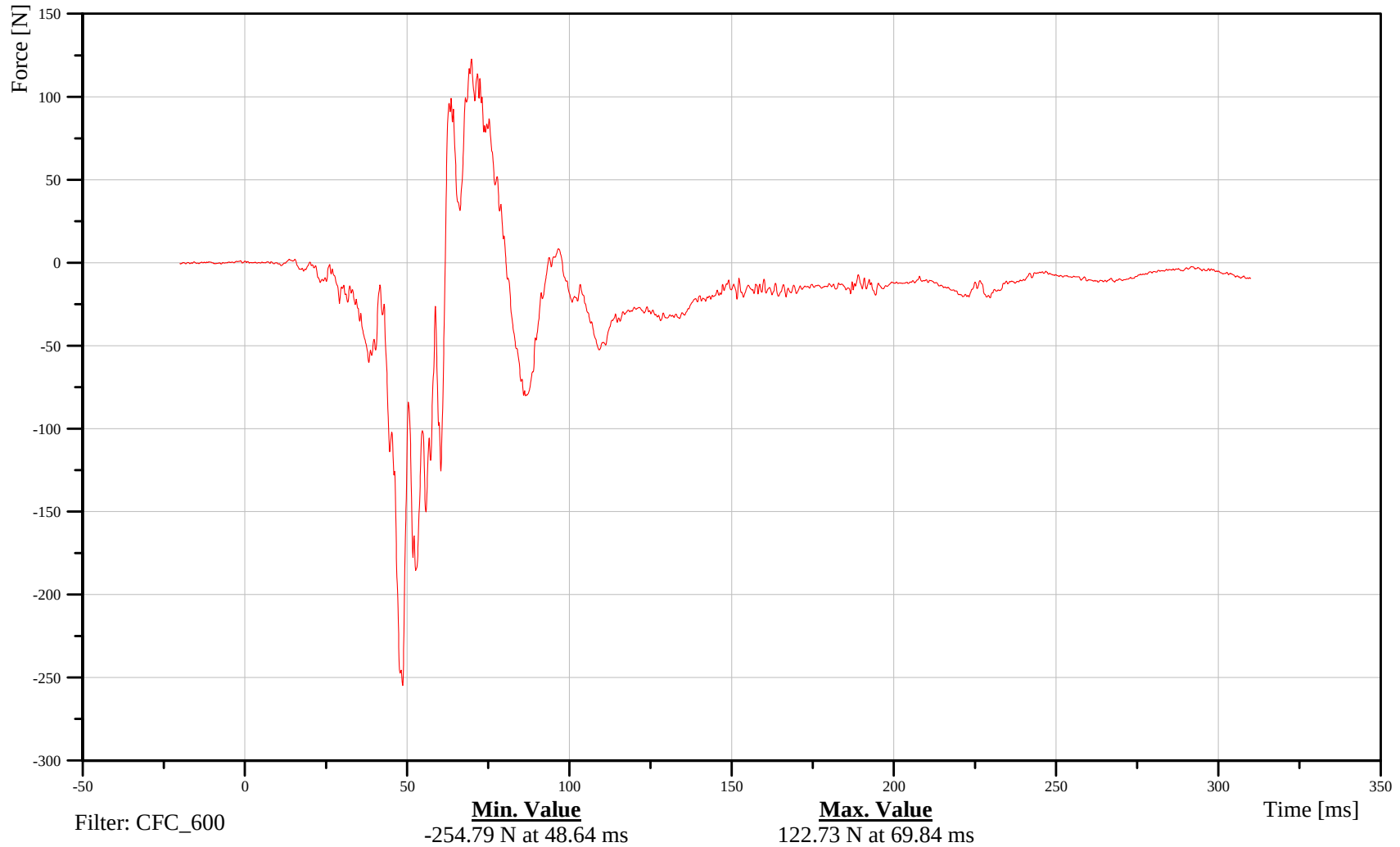
Date: 09/27/2006
Time: 13:07

Driver Right Upper Tibia Y-Axis Force

Customer: NHTSA
Test Number: M60518

11TIBIRU00H3FOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-51

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

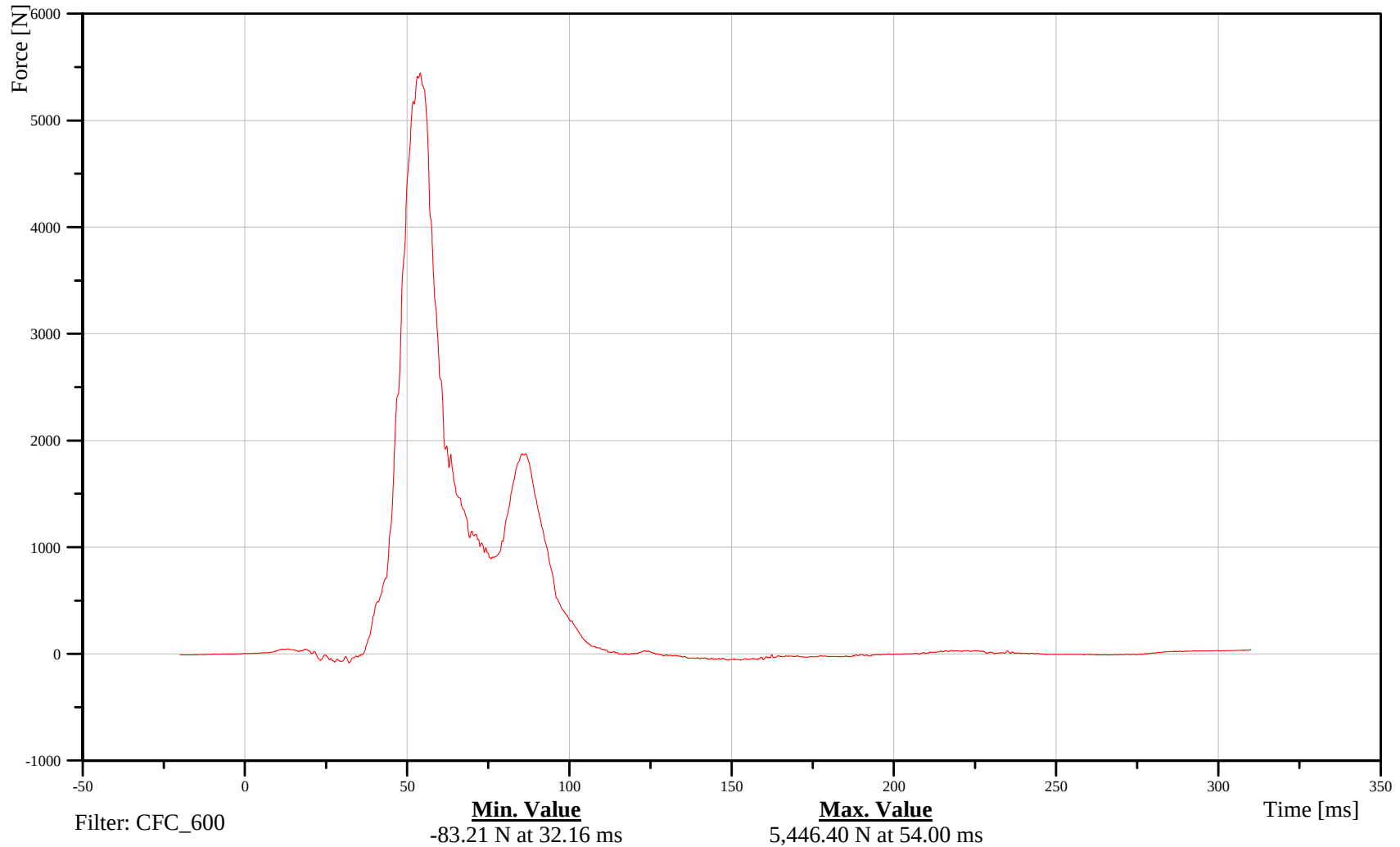
Date: 09/27/2006
Time: 13:07

Driver Right Upper Tibia Z-Axis Force

Customer: NHTSA
Test Number: M60518

11TIBIRU00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-52

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

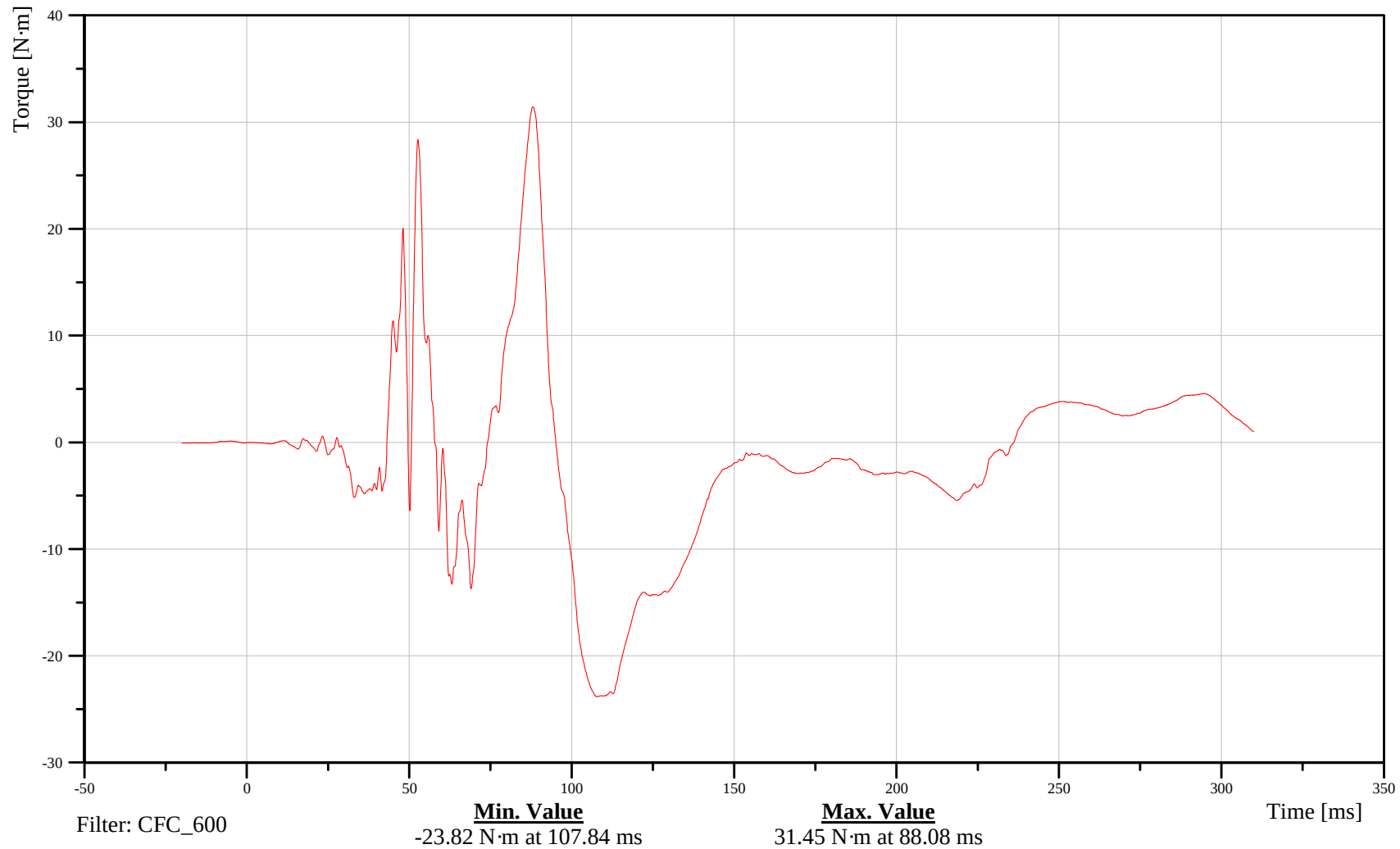
Driver Right Upper Tibia Moment About X Axis

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBIRU00H3MOXB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-53

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Driver Right Upper Tibia Moment About Y Axis

Time: 13:07

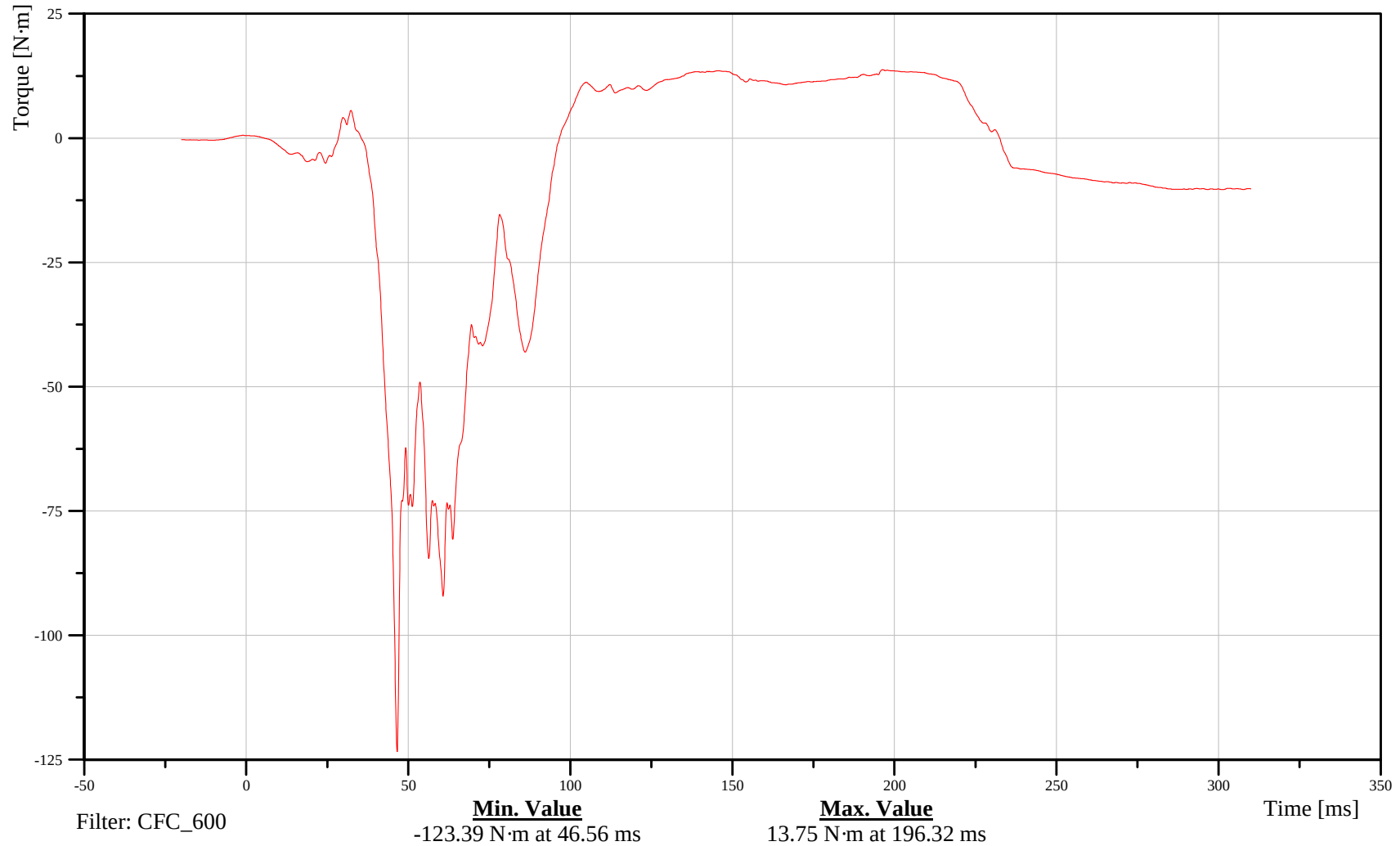
Customer: NHTSA

Test Number: M60518

11TIBIRU00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-54

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

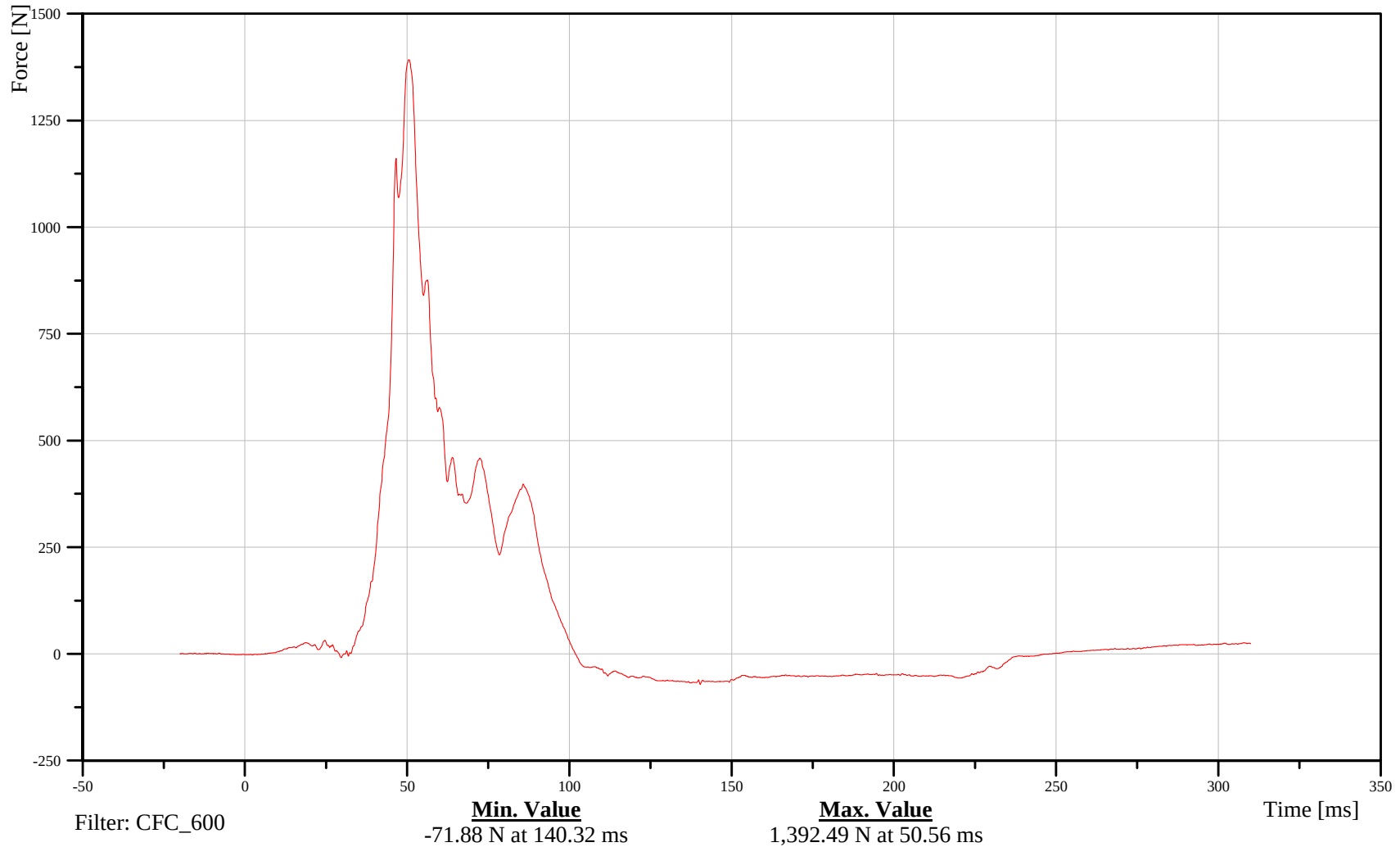
Driver Right Lower Tibia X-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBIRL00H3FOXB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-55

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

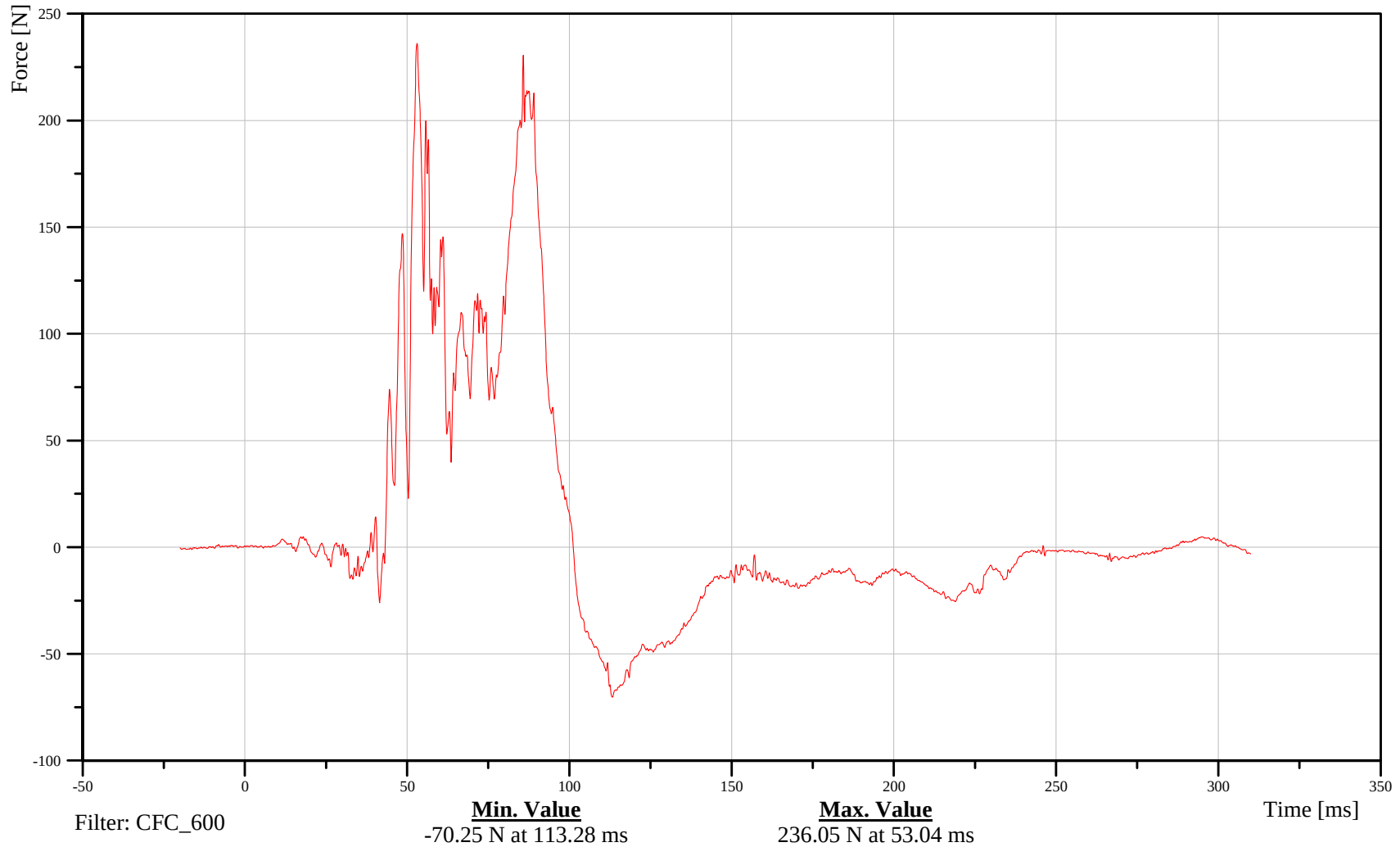
Driver Right Lower Tibia Y-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBIRL00H3FOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-56

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

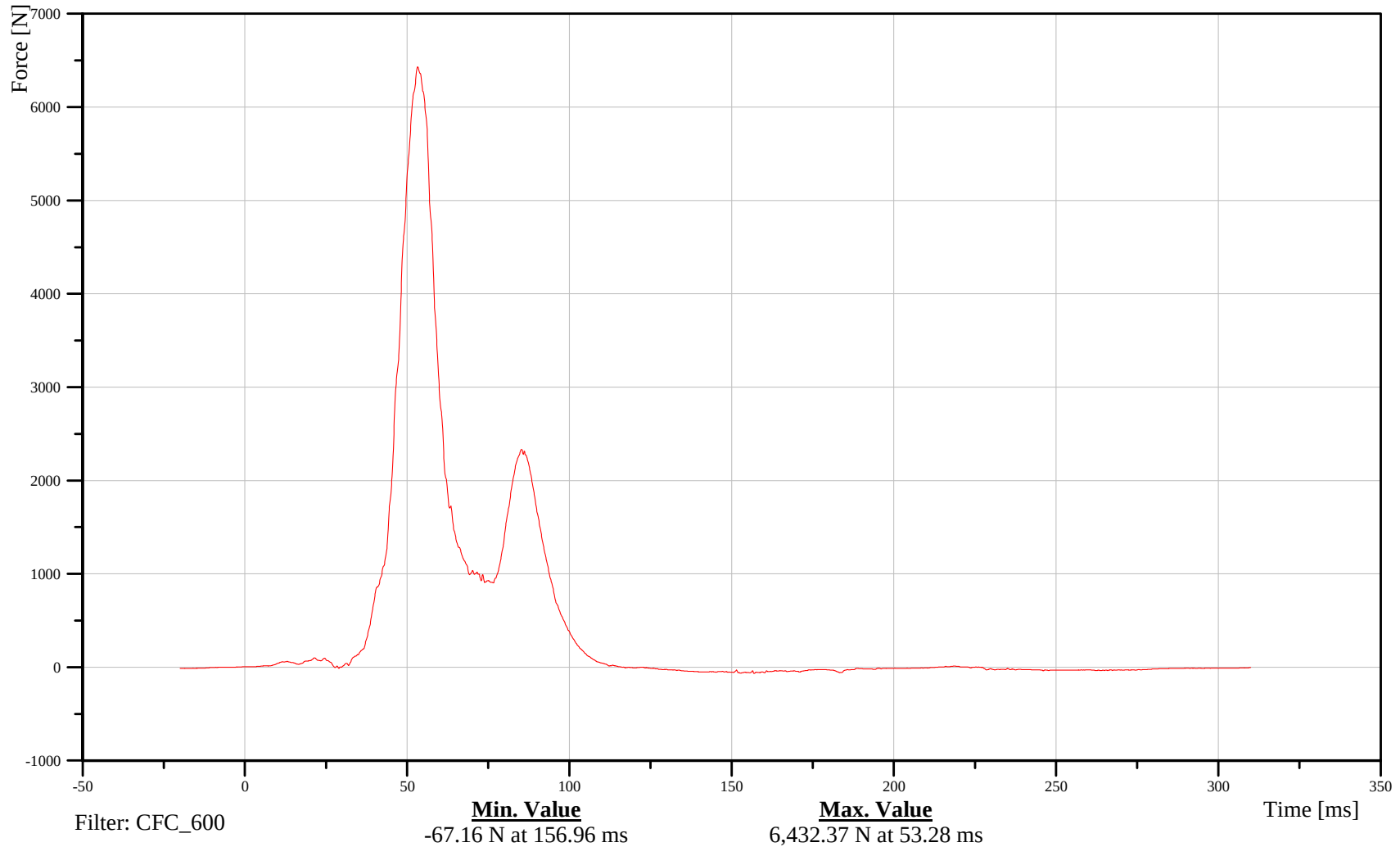
Driver Right Lower Tibia Z-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBIRL00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-57

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

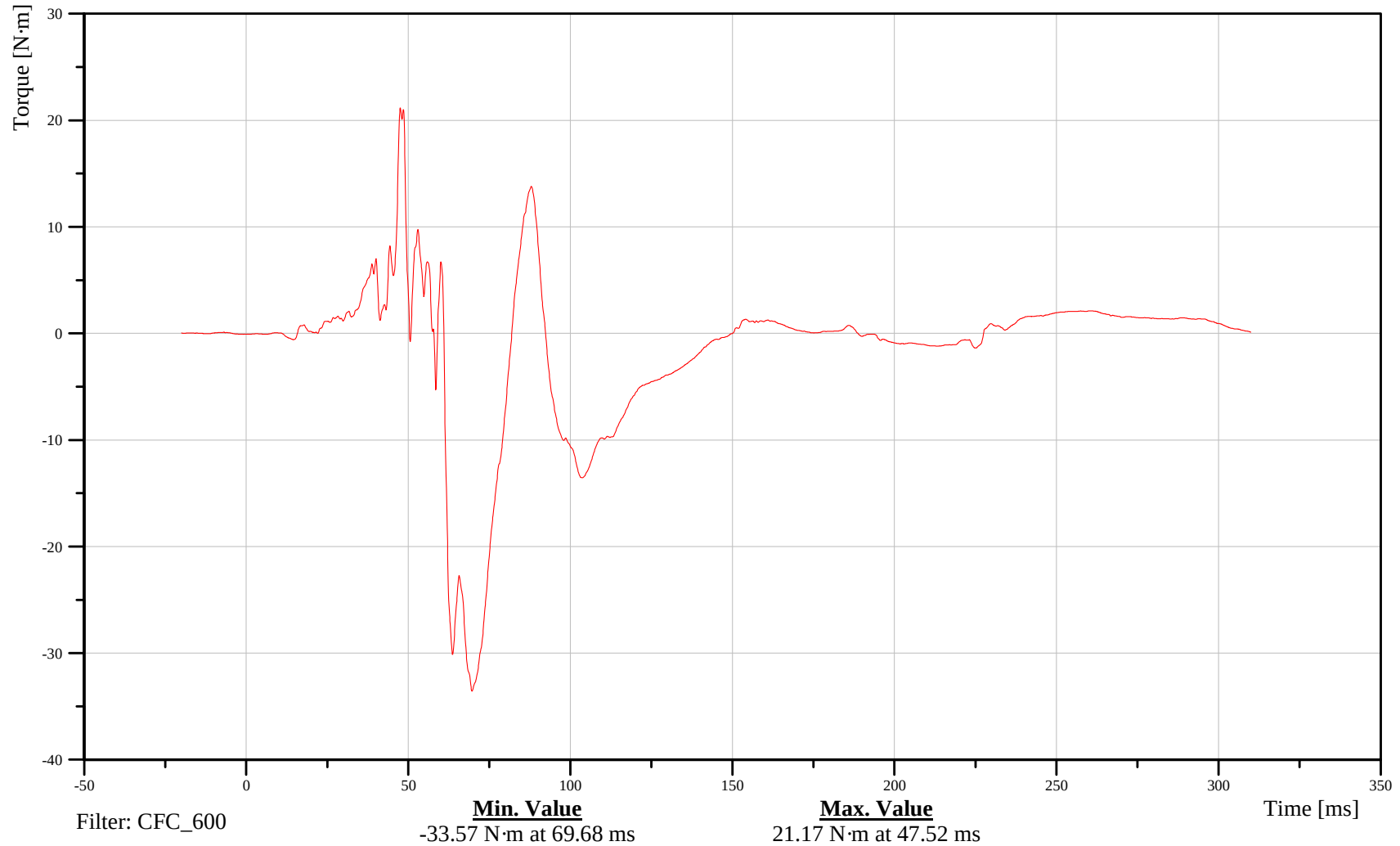
Driver Right Lower Tibia Moment About X Axis

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBIRL00H3MOXB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-58

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

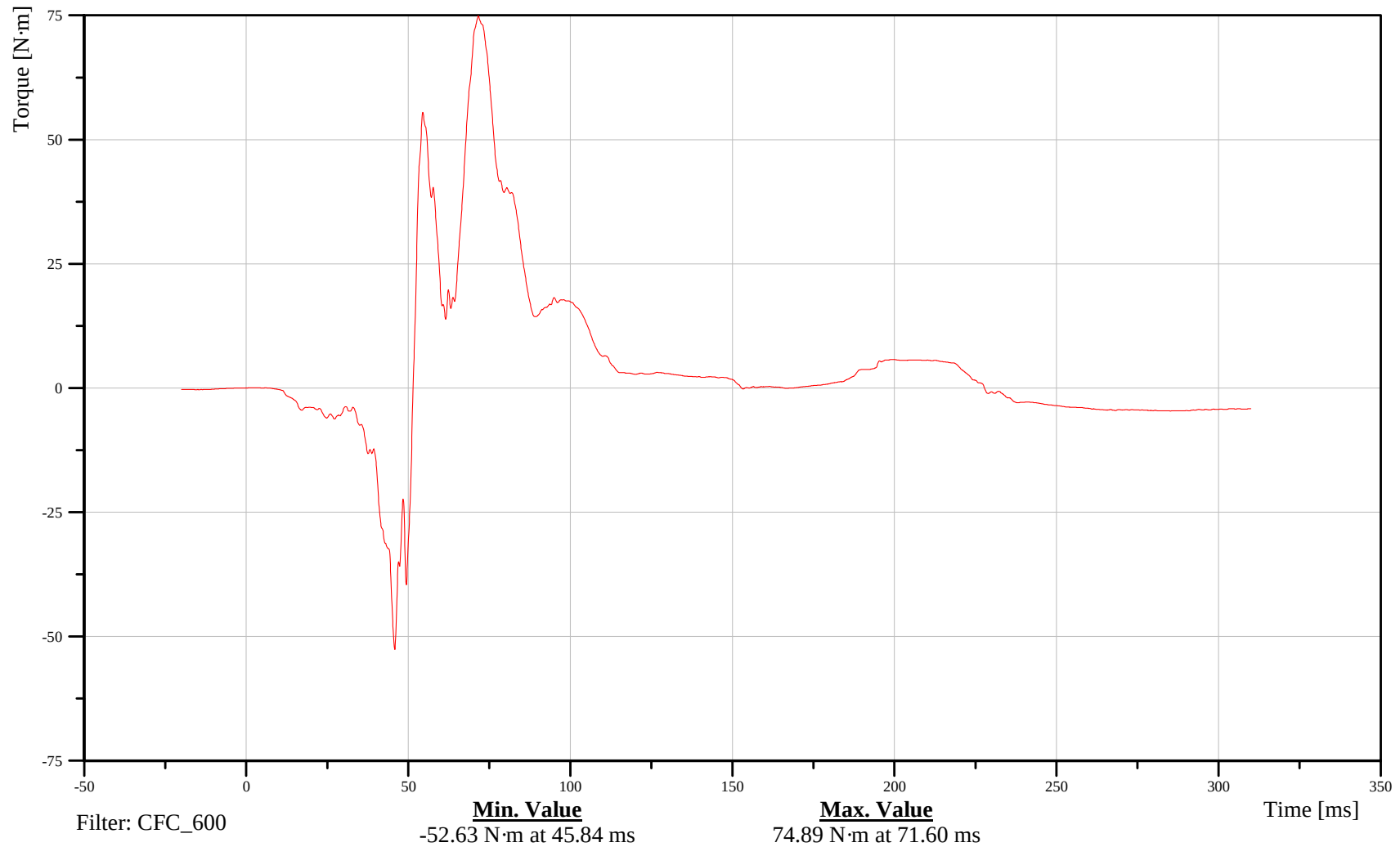
Driver Right Lower Tibia Moment About Y Axis

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11TIBIRL00H3MOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-59

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Driver Right Foot X-Axis Acceleration

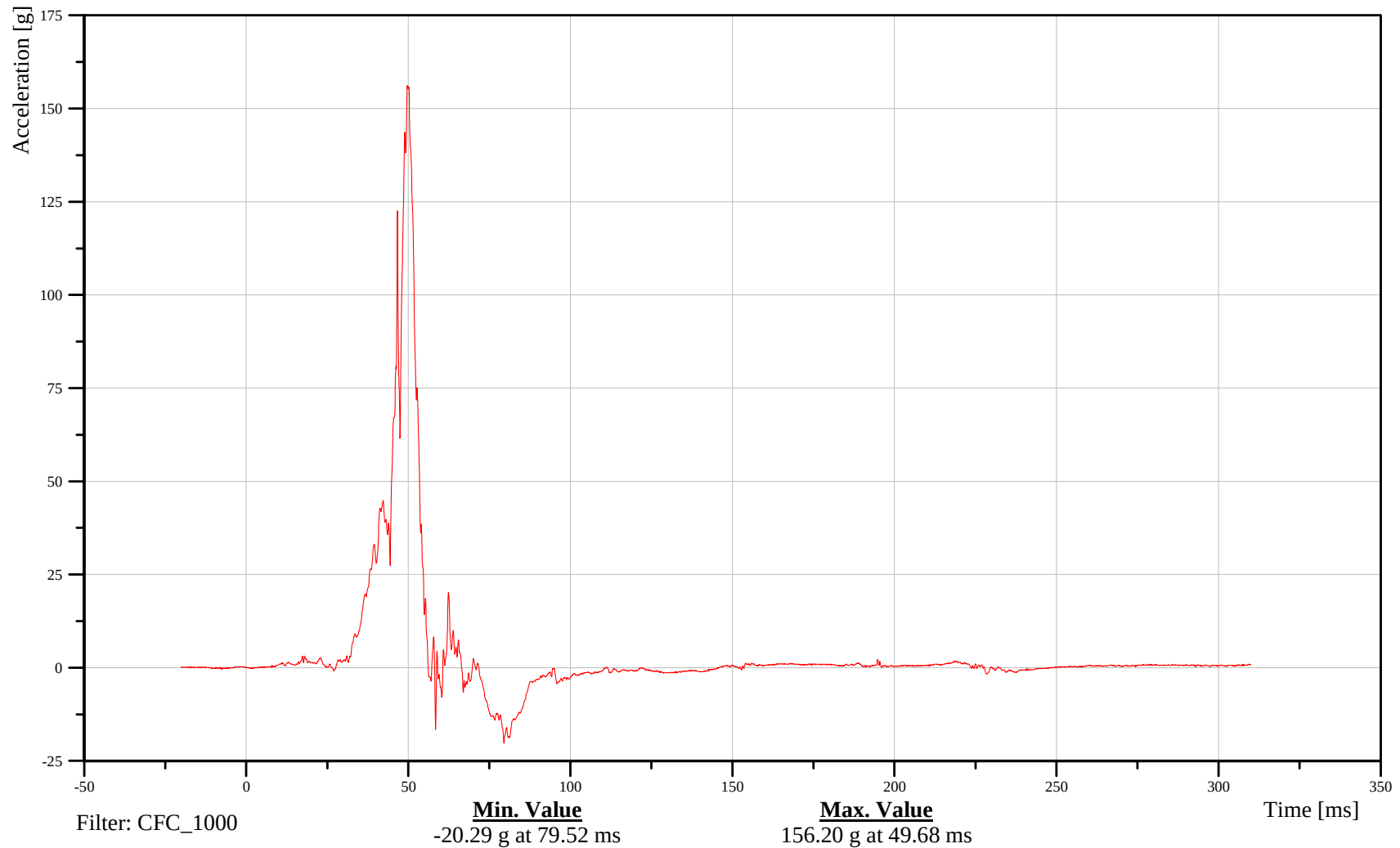
Customer: NHTSA

Test Number: M60518

11FOOTRI00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-60

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Driver Right Foot Z-Axis Acceleration

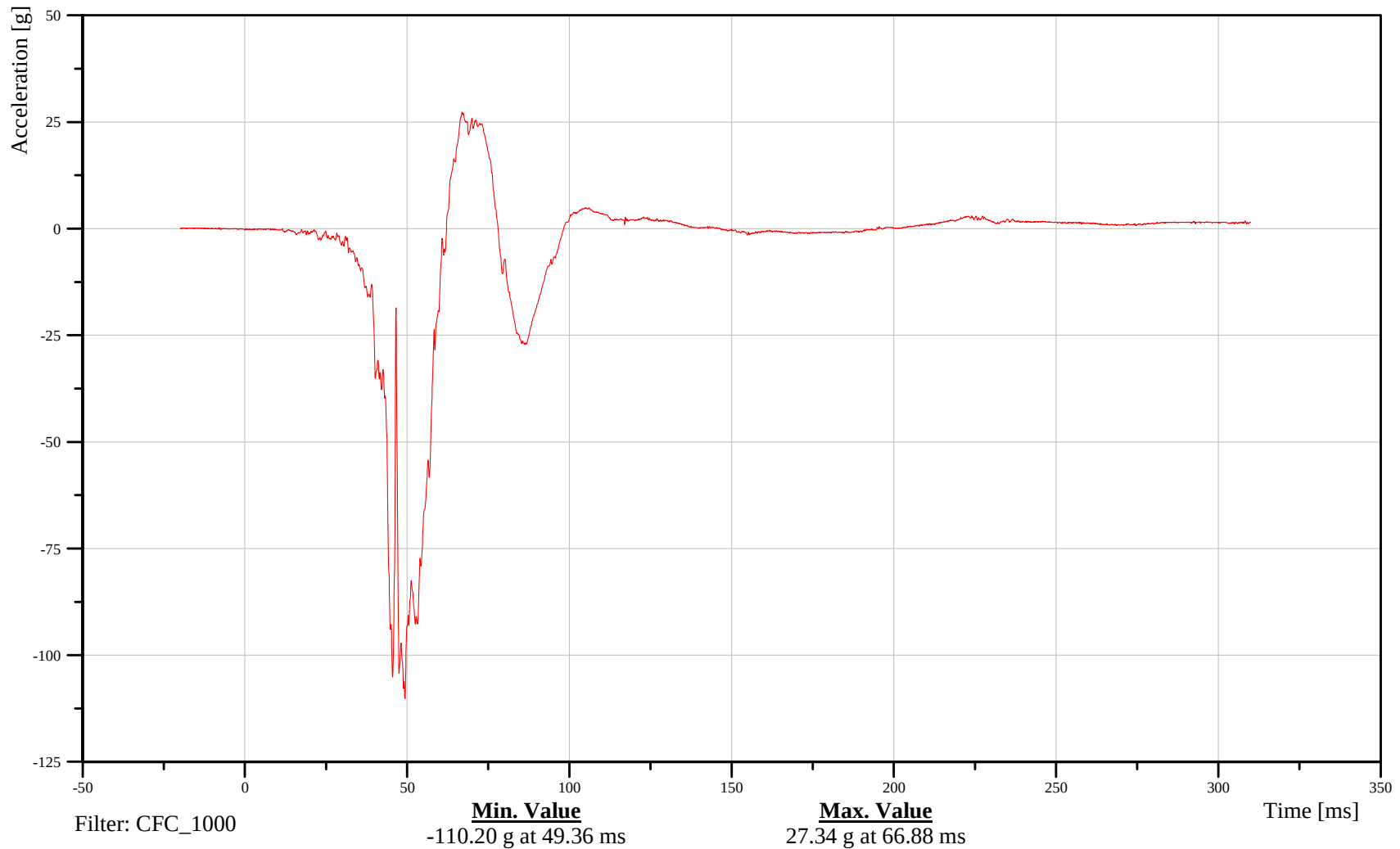
Customer: NHTSA

Test Number: M60518

11FOOTRI00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-61

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

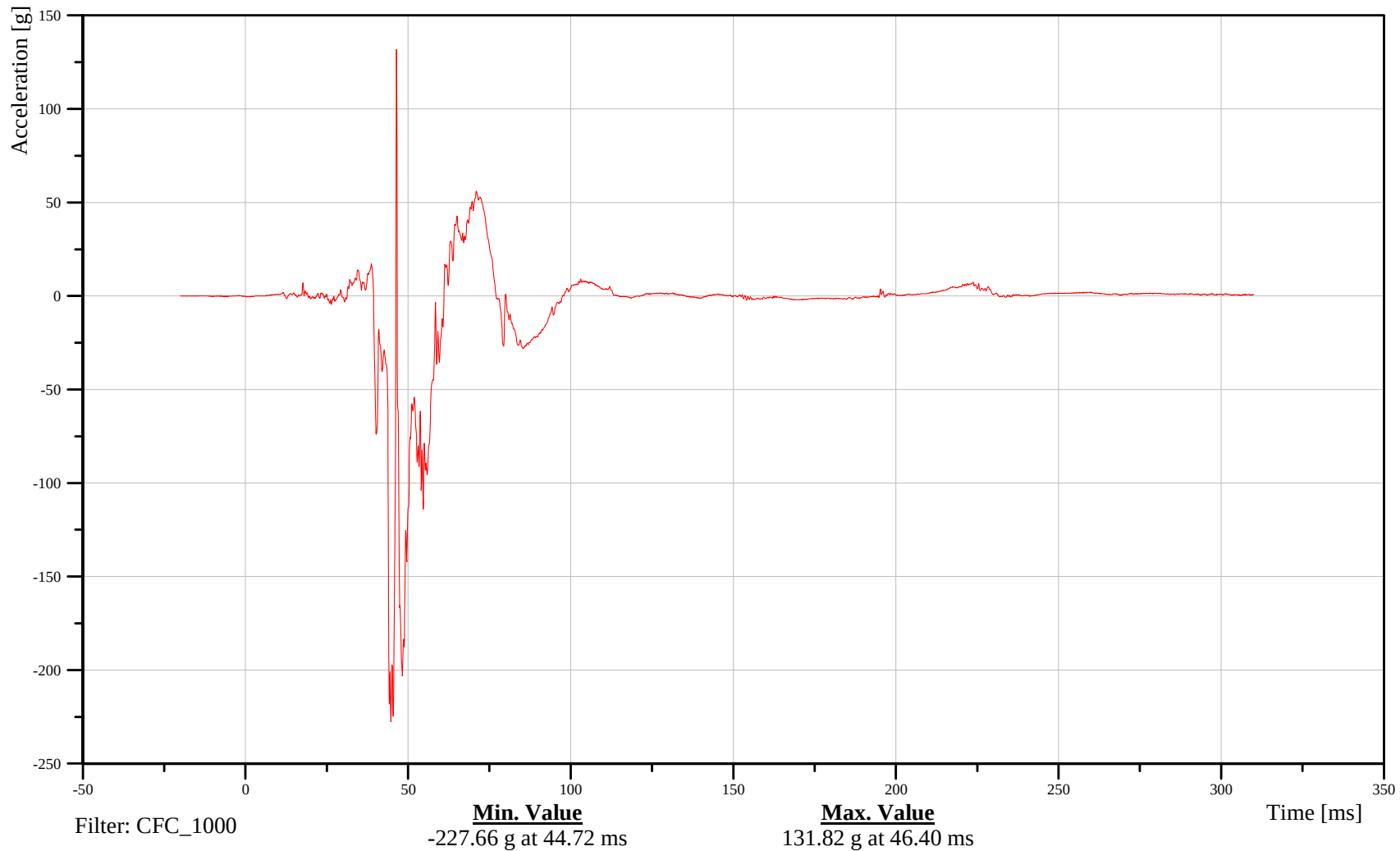
Date: 09/27/2006
Time: 13:07

Driver Right Toe Z-Axis Acceleration

Customer: NHTSA
Test Number: M60518

11TOESRI00H3ACZA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-62

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

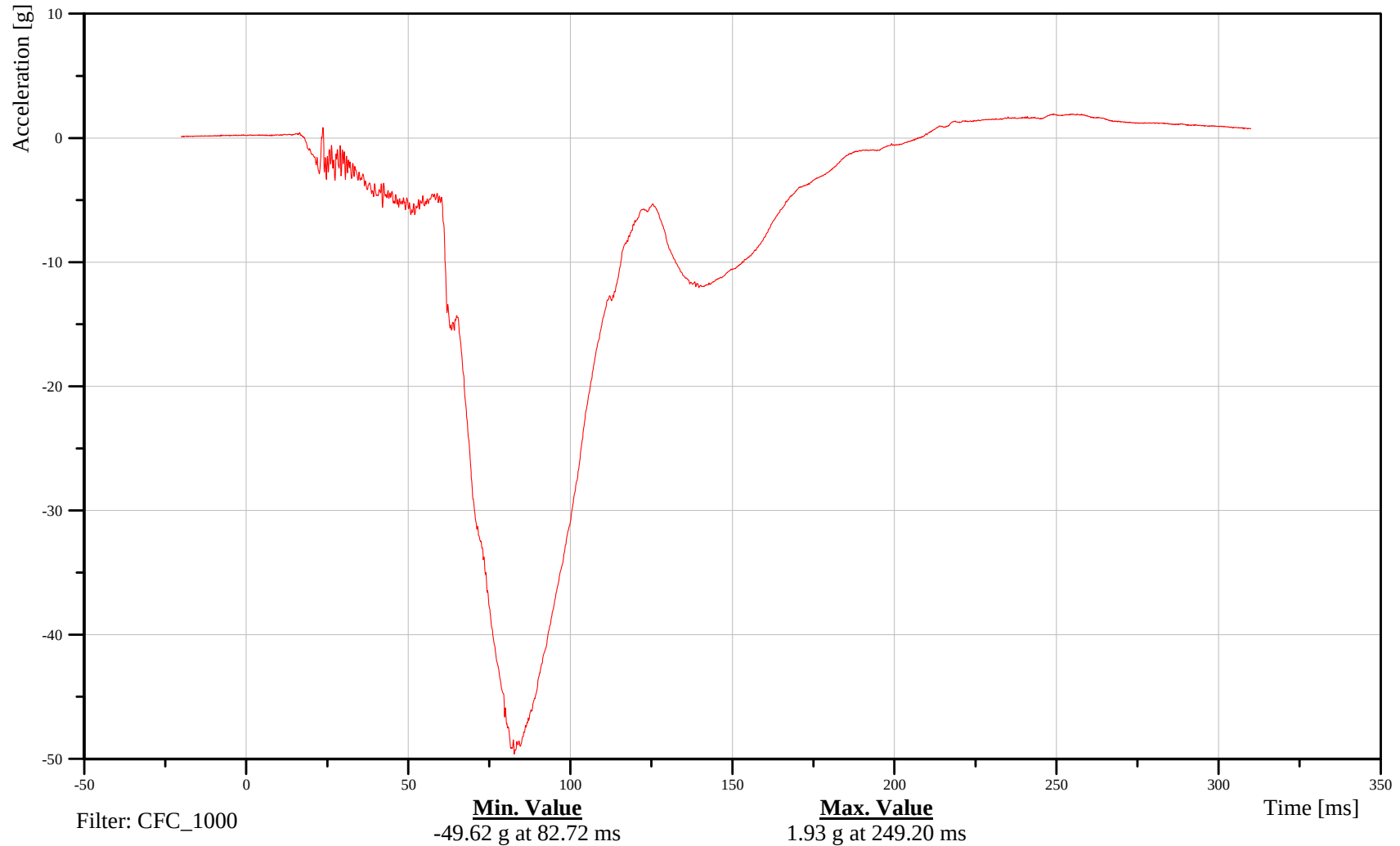
Date: 09/27/2006
Time: 13:07

Passenger Head X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

13HEADCG00H3ACXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-63

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Head Y-Axis Acceleration

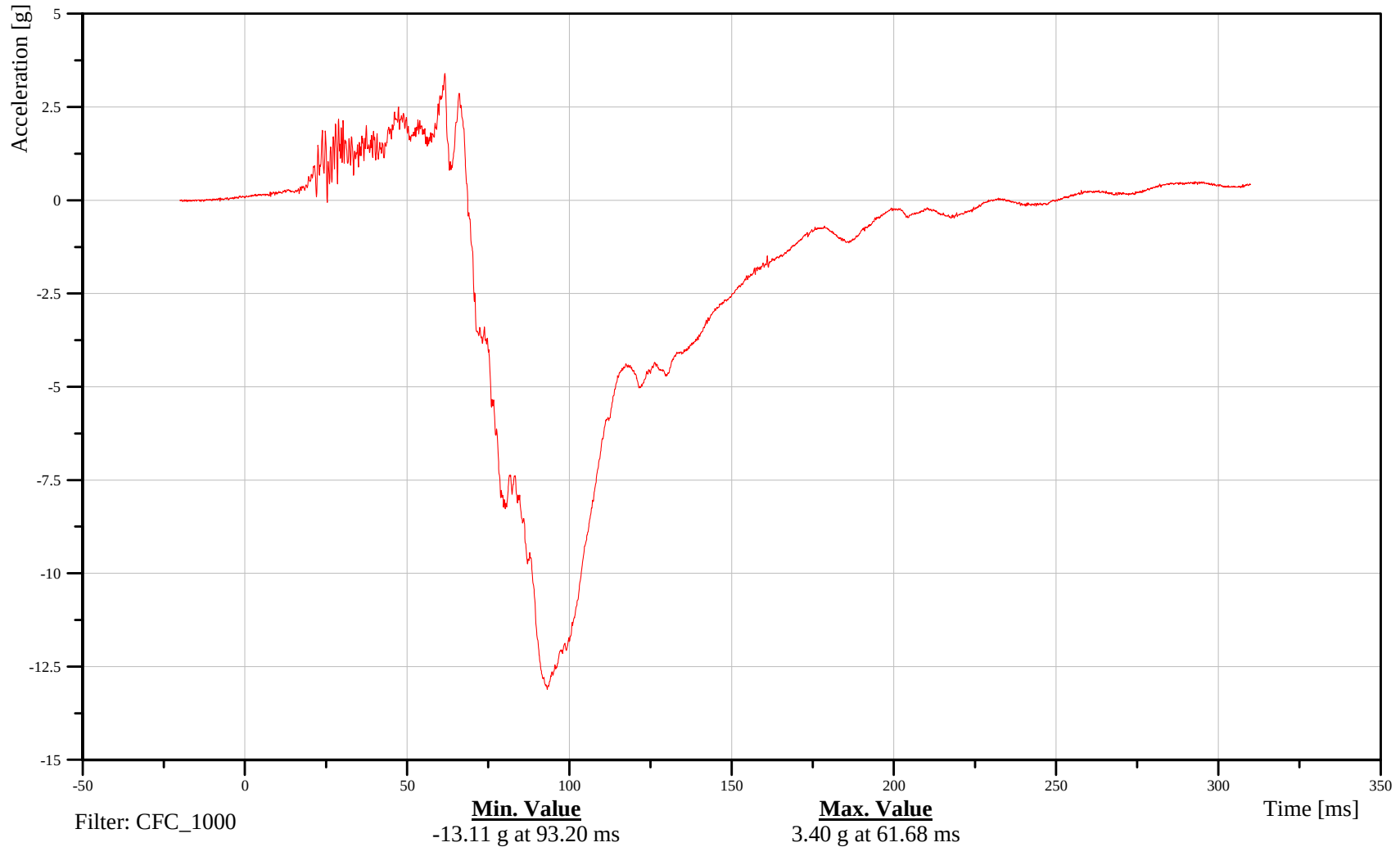
Customer: NHTSA

Test Number: M60518

13HEADCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-64

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Head Z-Axis Acceleration

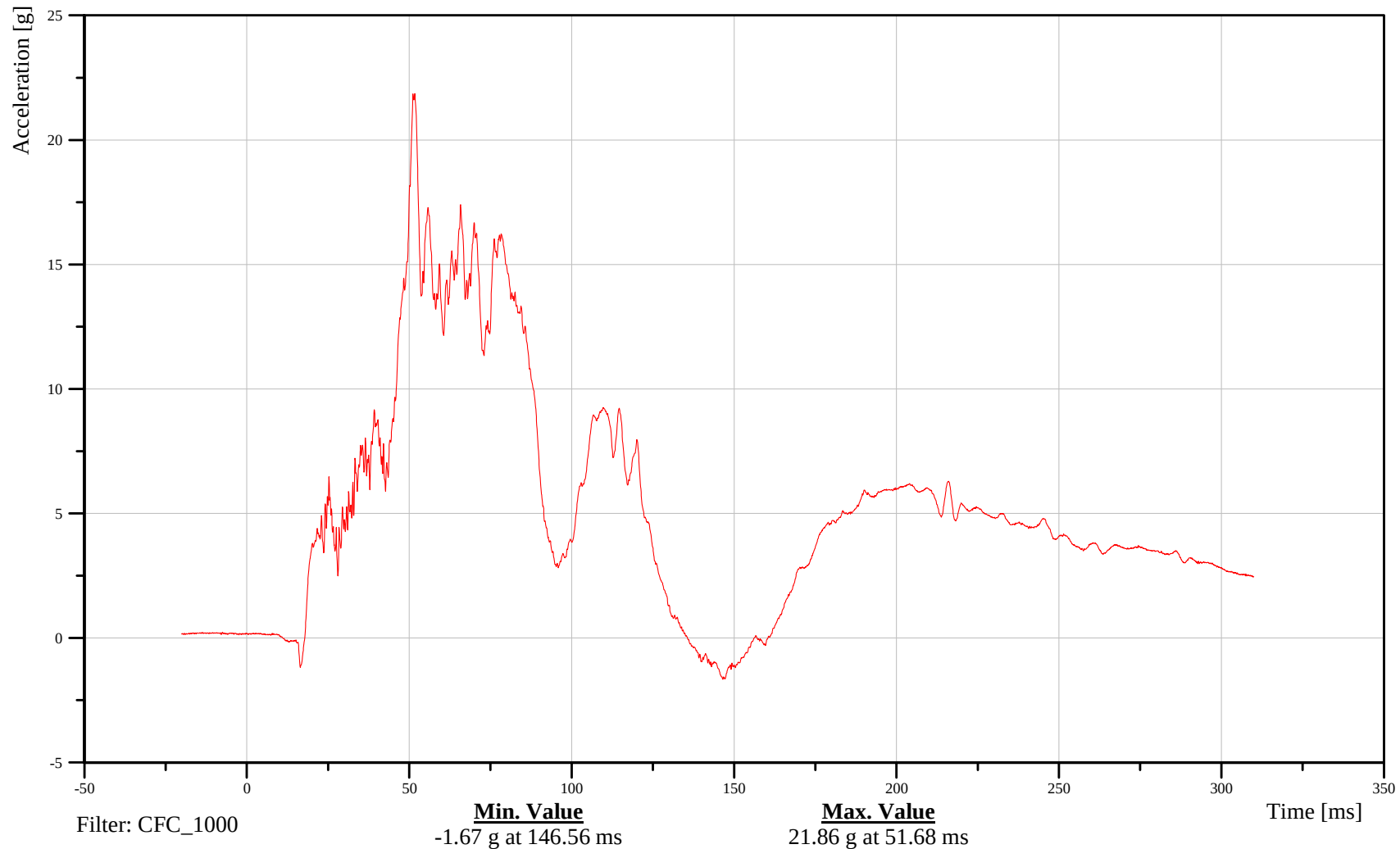
Customer: NHTSA

Test Number: M60518

13HEADCG00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-65

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

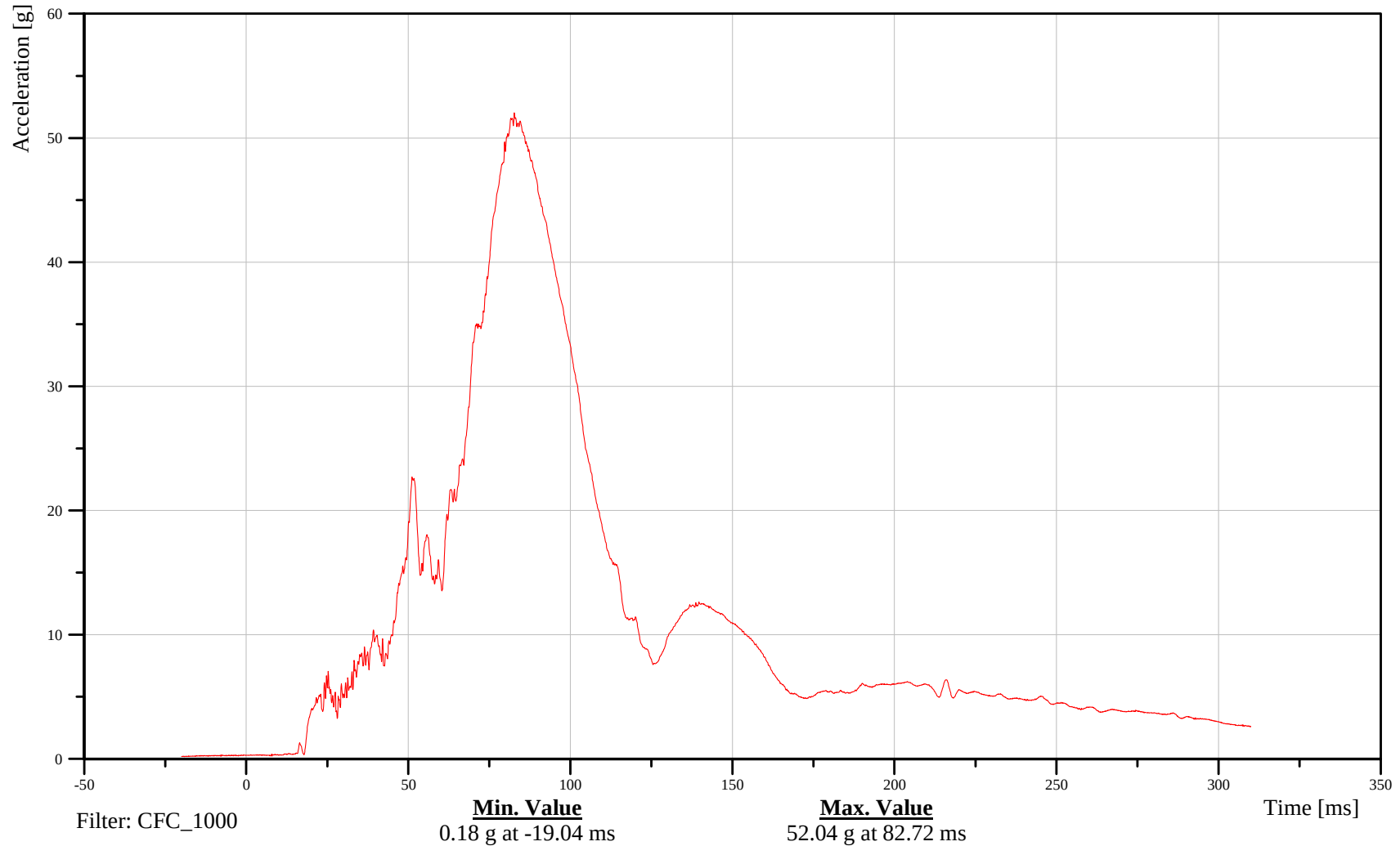
Date: 09/27/2006
Time: 13:07

Passenger Head Resultant Acceleration

Customer: NHTSA
Test Number: M60518

13HEADCG00H3ACRA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-66

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

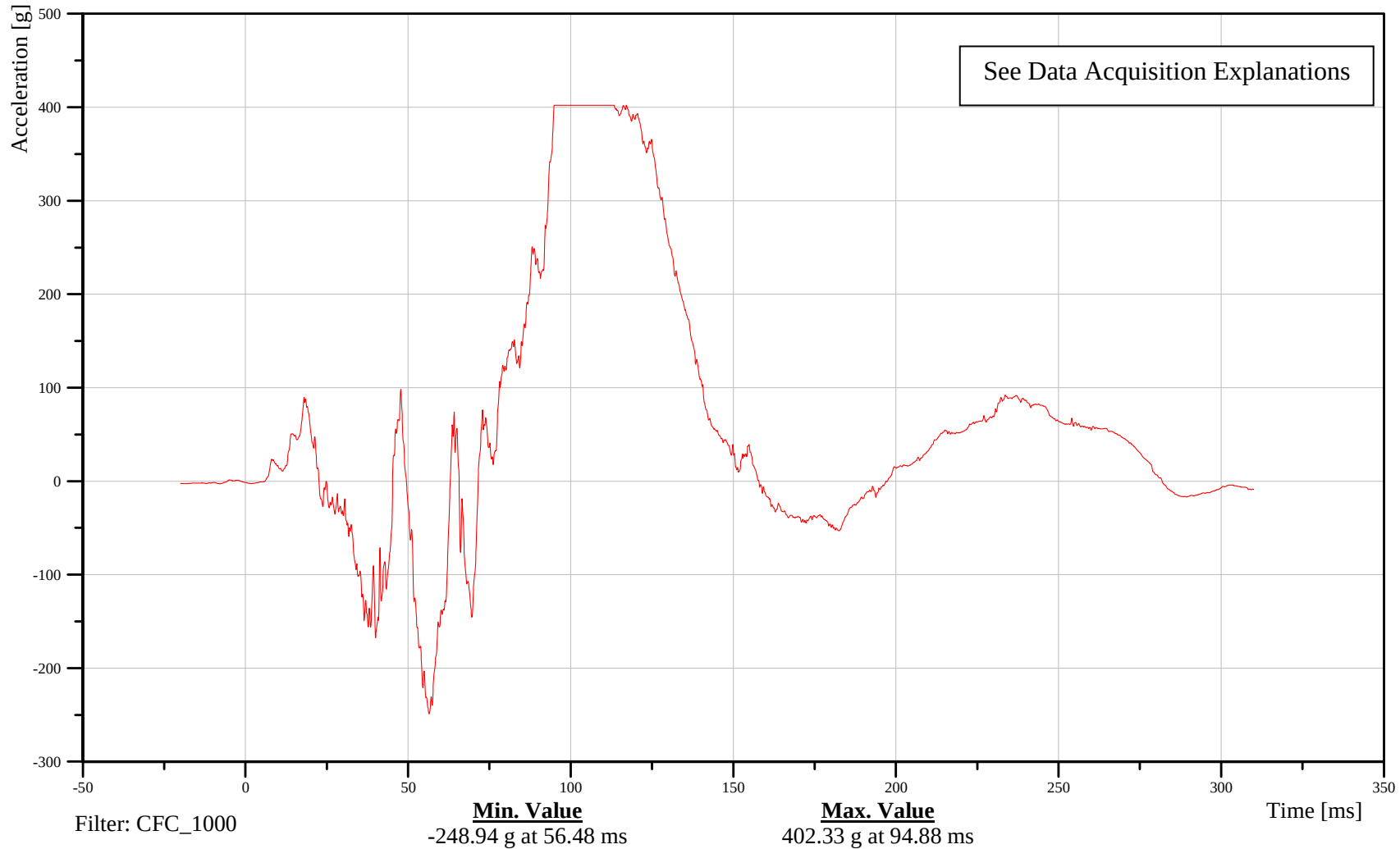
Passenger Head Redundant X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

13HEADCGRDH3ACXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-67

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

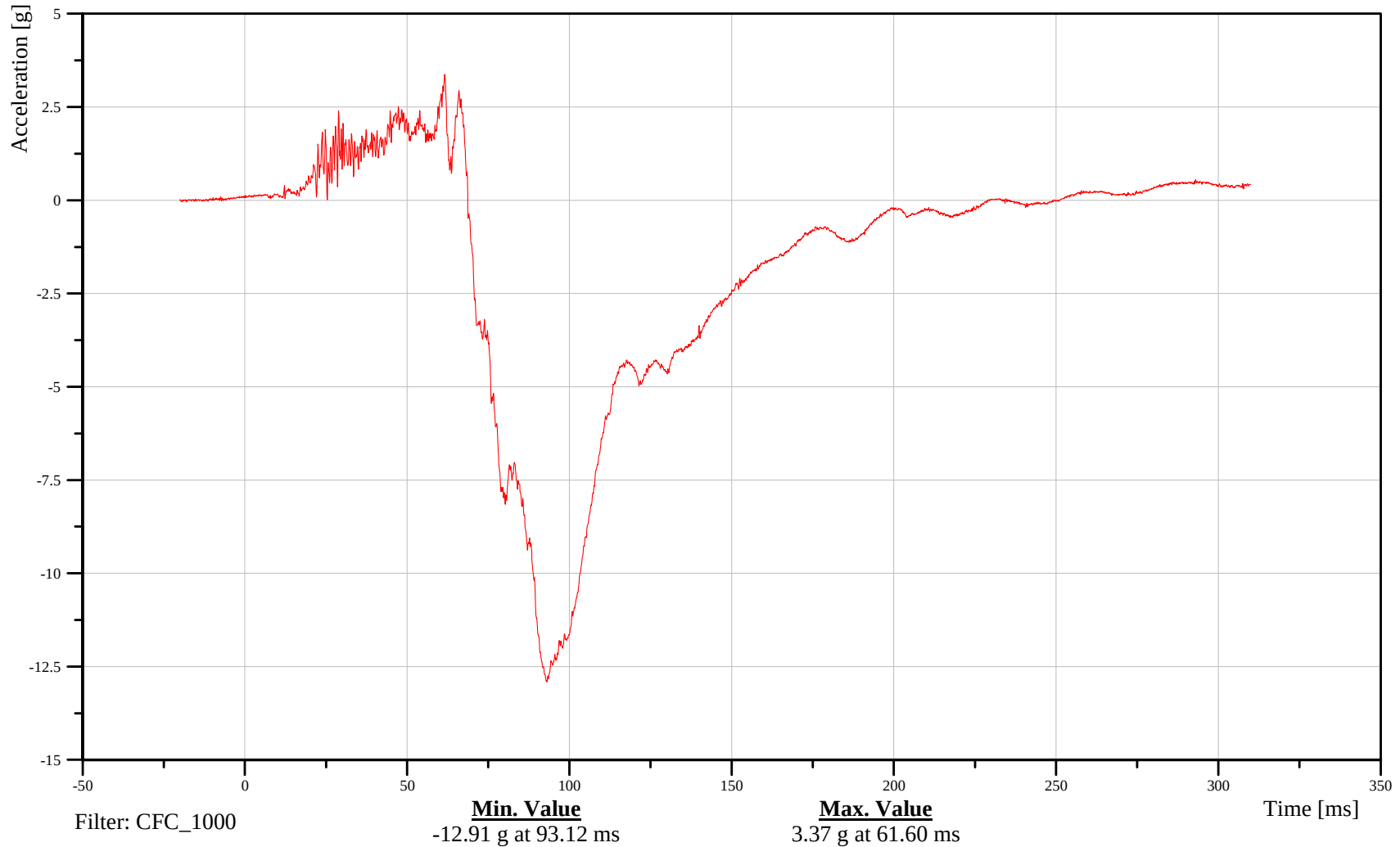
Passenger Head Redundant Y-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

13HEADCGRDH3ACYA

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

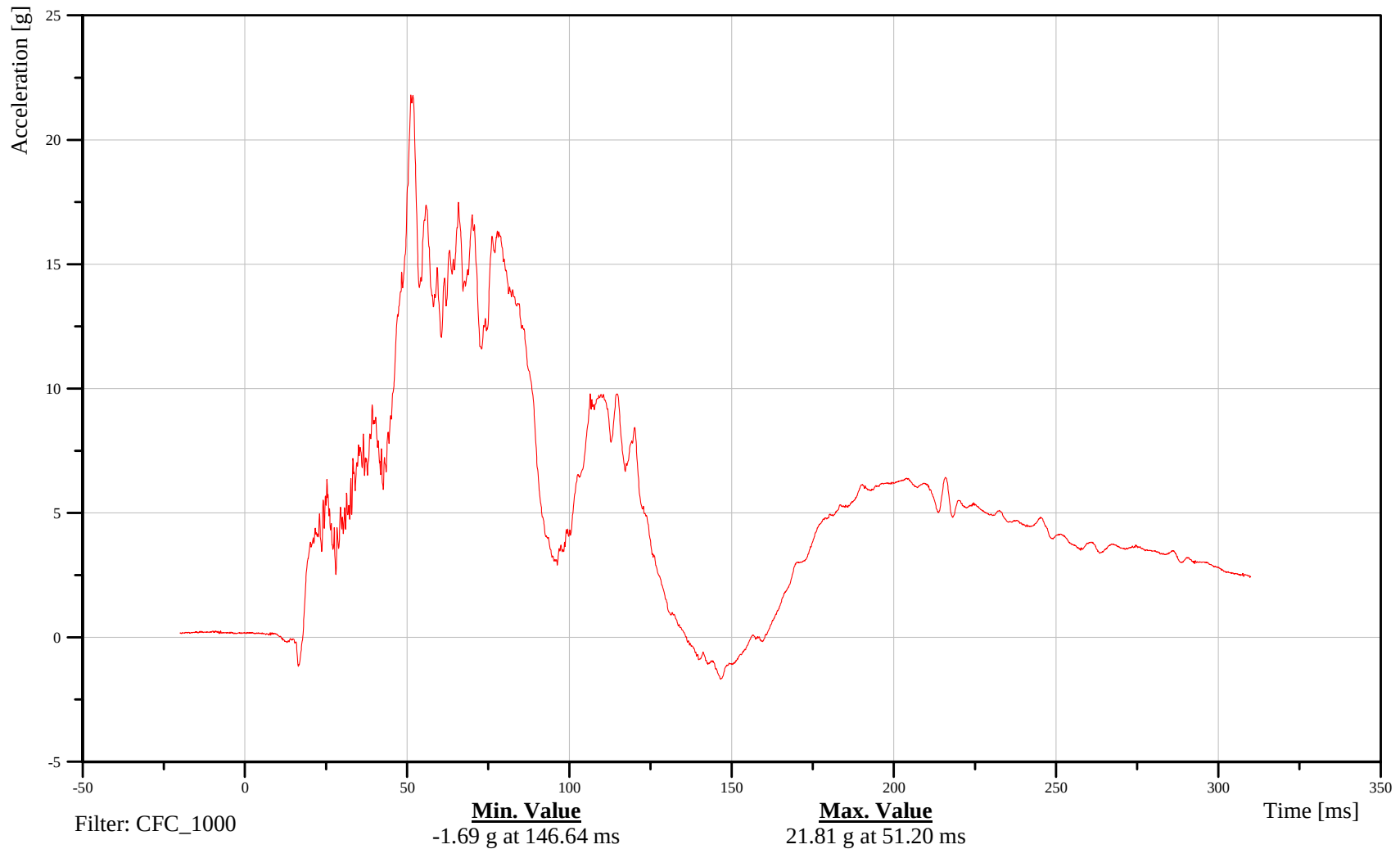
Passenger Head Redundant Z-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

13HEADCGRDH3ACZA

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Head Redundant Resultant Acceleration

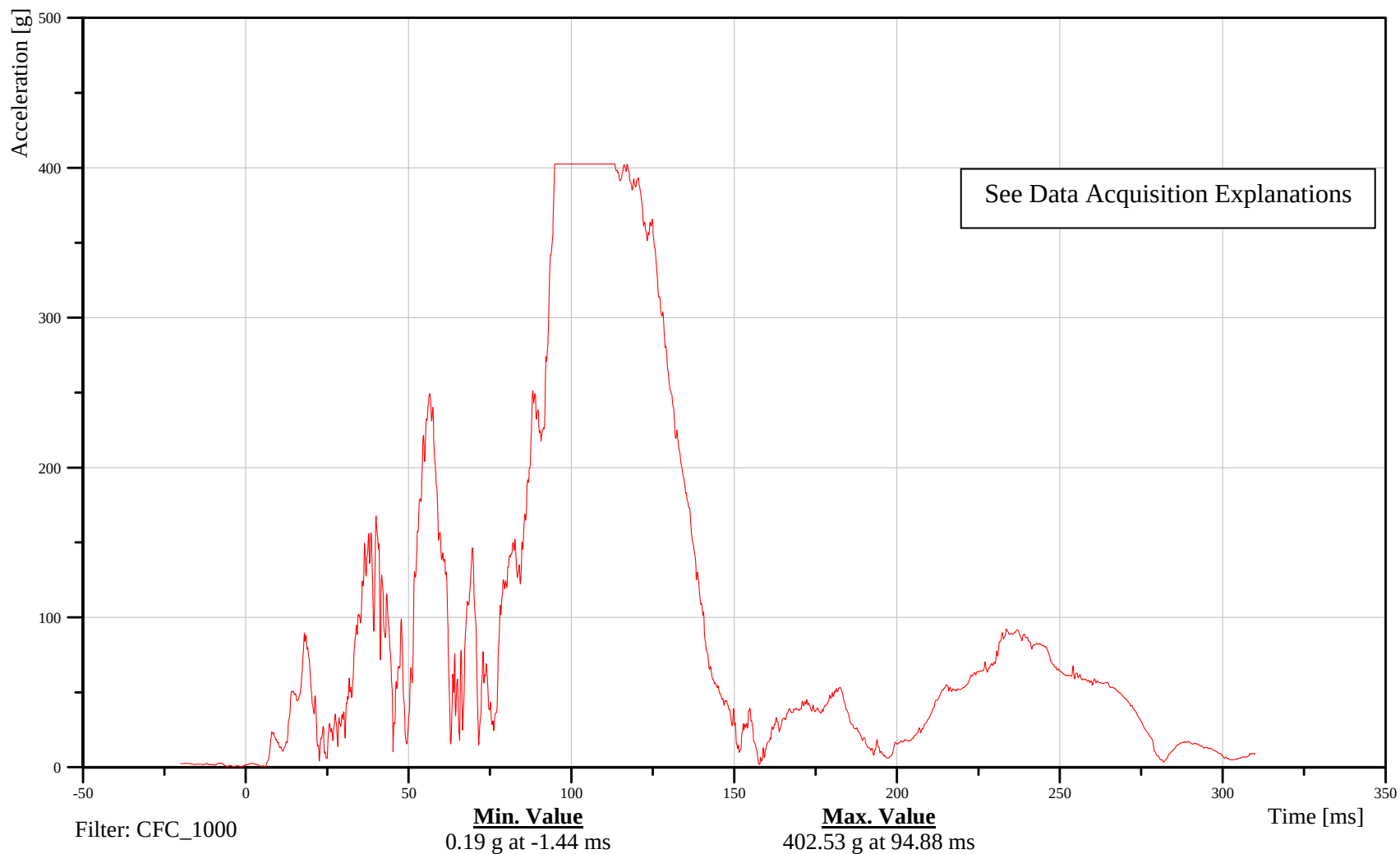
Customer: NHTSA

Test Number: M60518

13HEADCGRDH3ACRA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-70

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

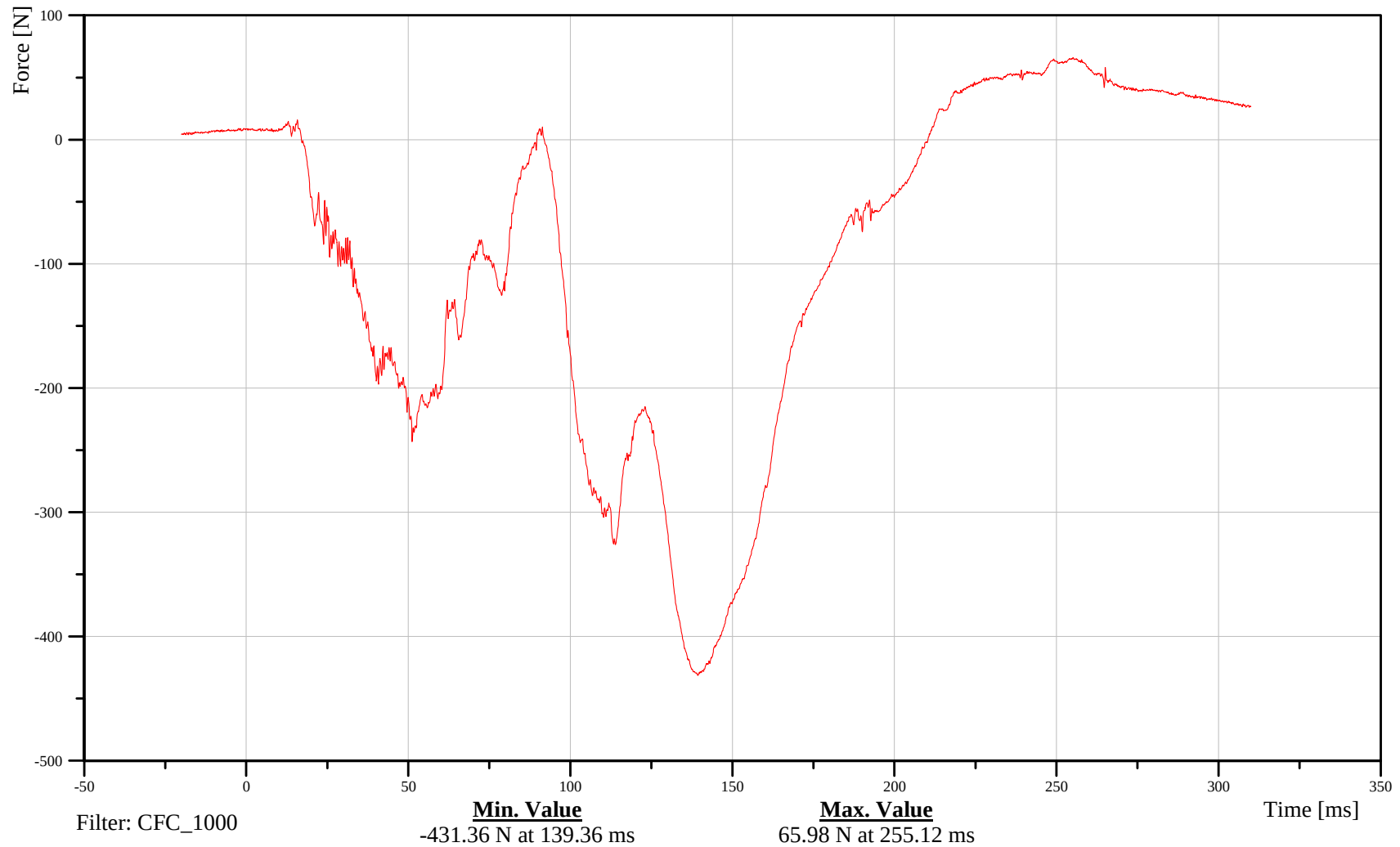
Passenger Neck X-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

13NECKUP00H3FOXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-71

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

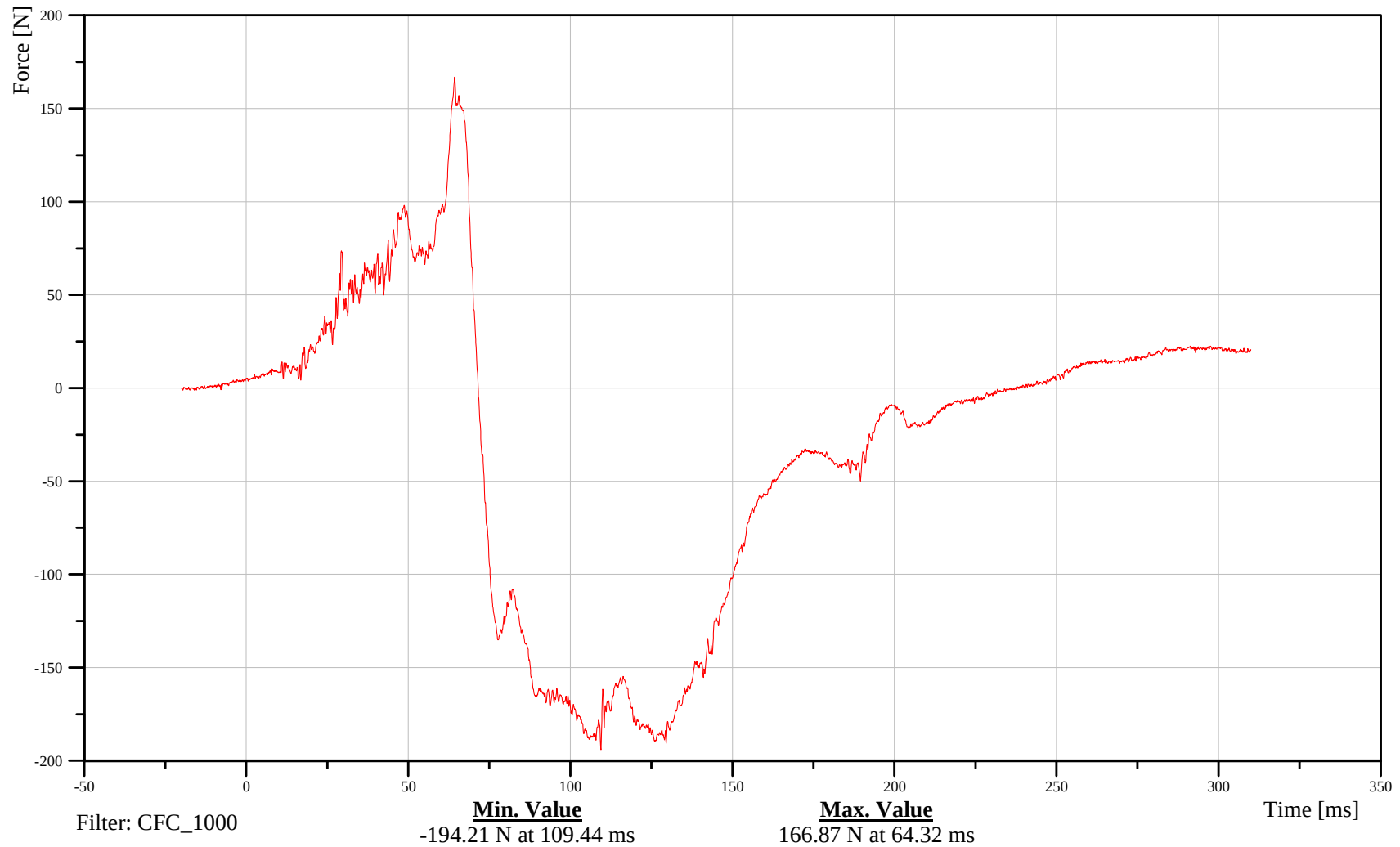
Passenger Neck Y-Axis Force

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

13NECKUP00H3FOYA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-72

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

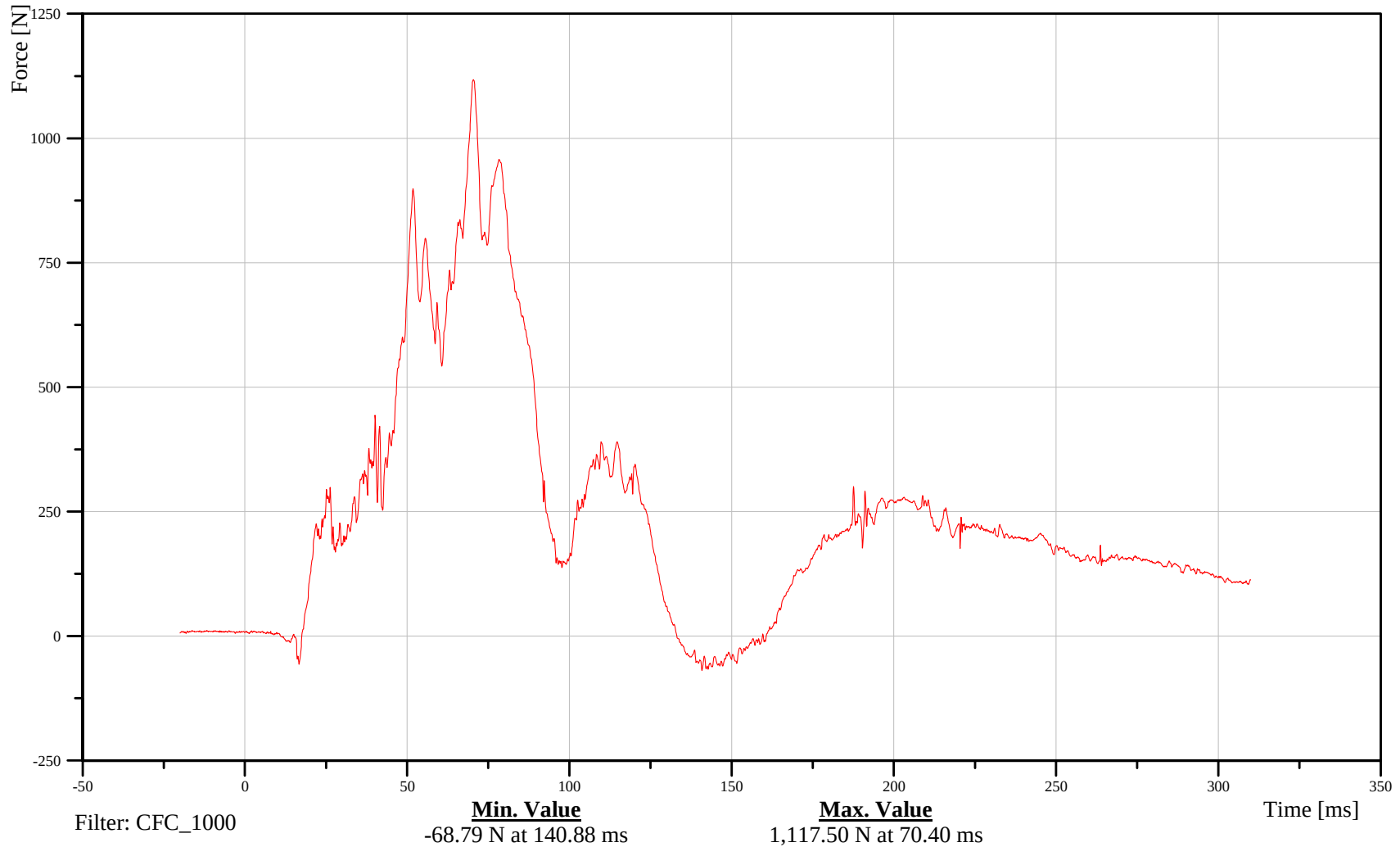
Date: 09/27/2006
Time: 13:07

Passenger Neck Z-Axis Force

Customer: NHTSA
Test Number: M60518

13NECKUP00H3FOZA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-73

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Neck Moment About X Axis

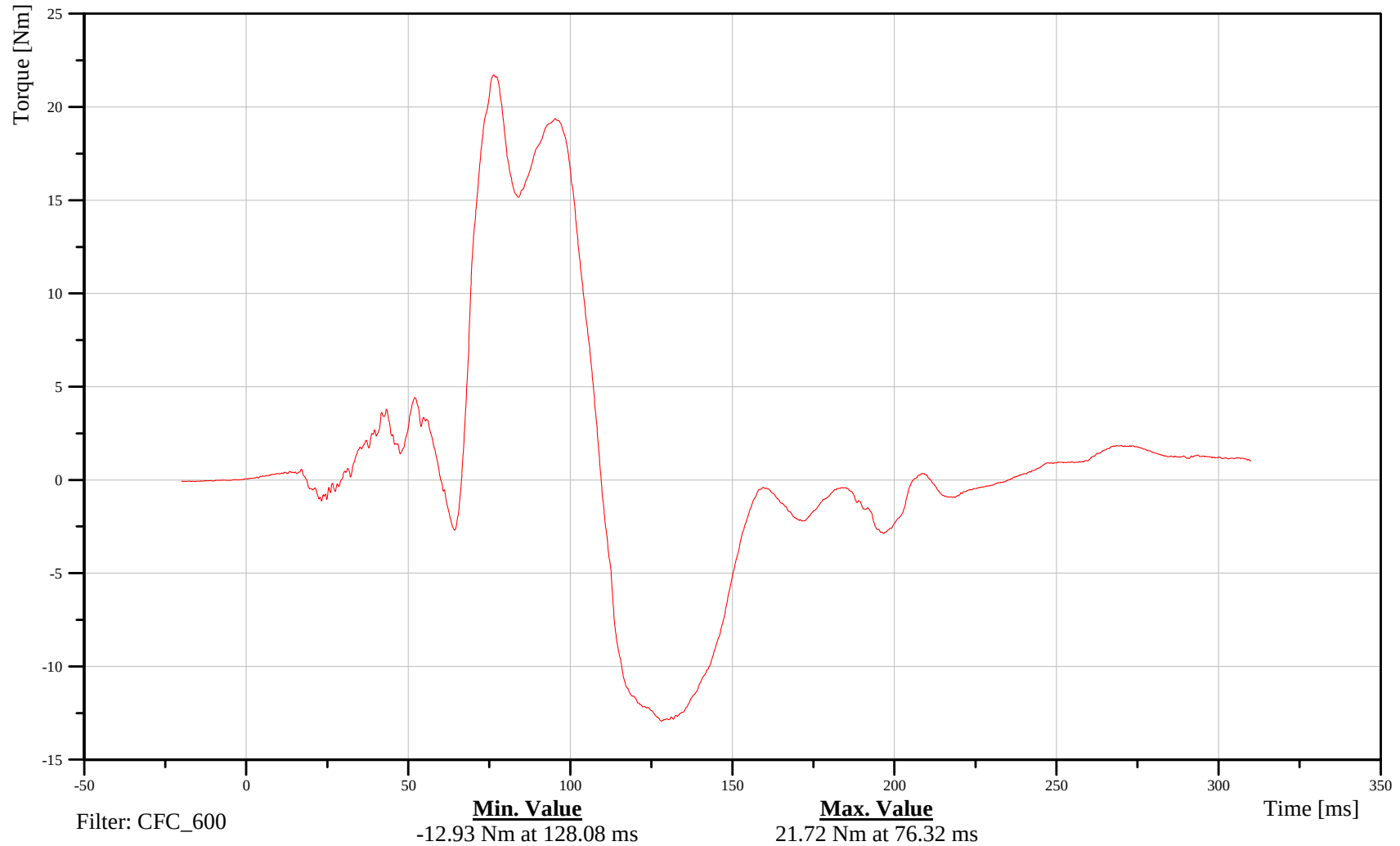
Customer: NHTSA

Test Number: M60518

13NECKUP00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-74

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Neck Moment About Y Axis

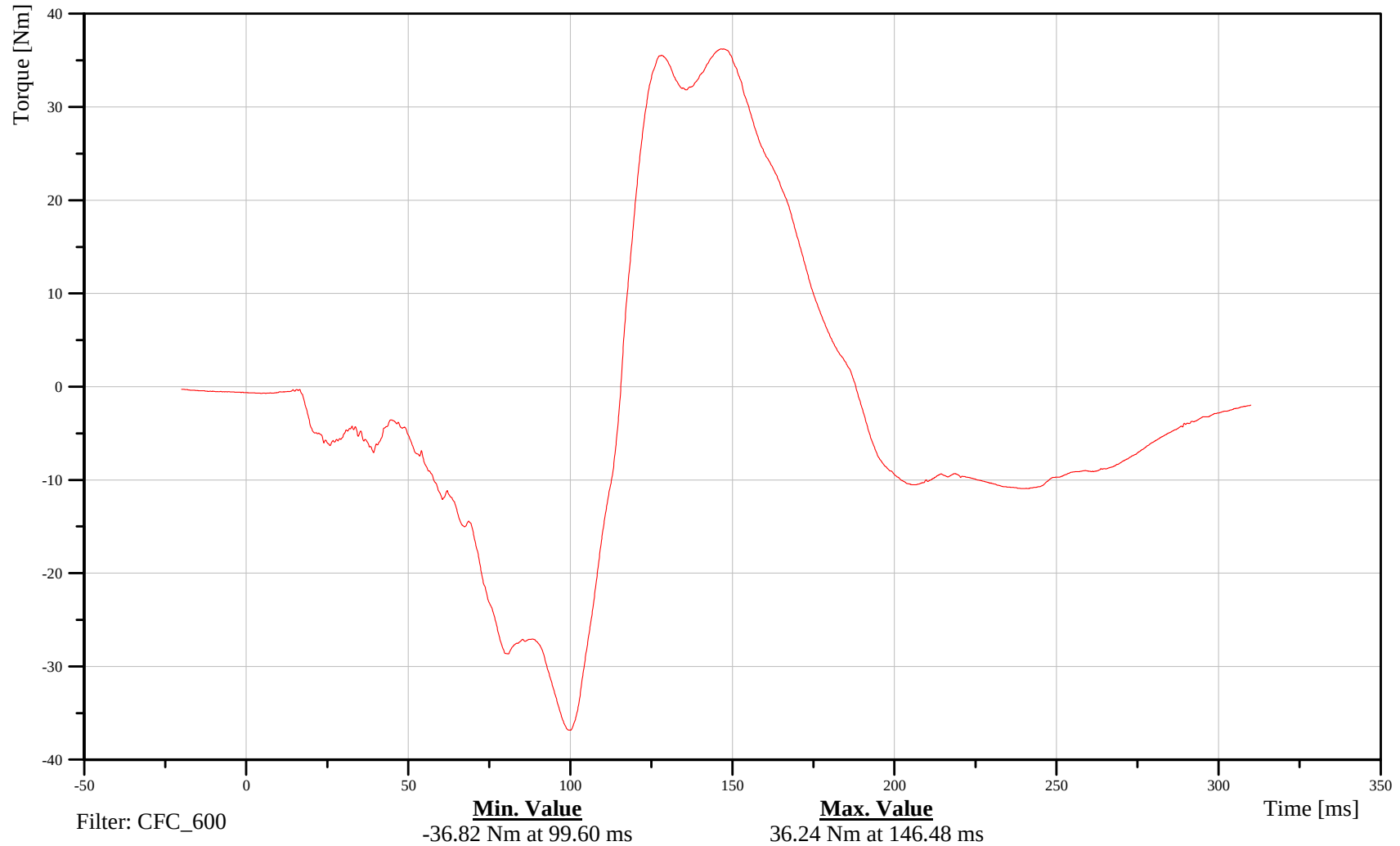
Customer: NHTSA

Test Number: M60518

13NECKUP00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-75

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Neck Moment About Z Axis

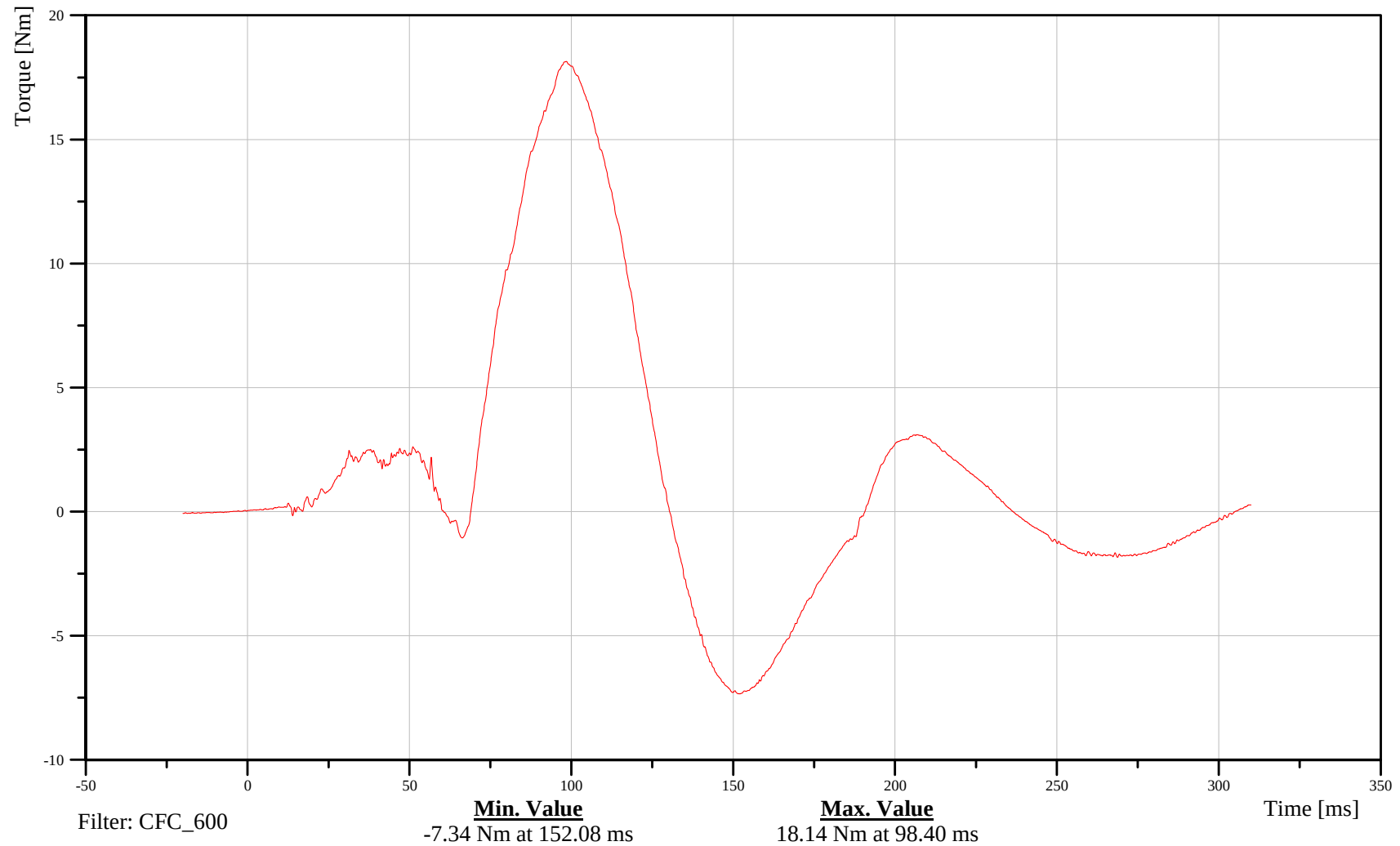
Customer: NHTSA

Test Number: M60518

13NECKUP00H3MOZB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-76

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

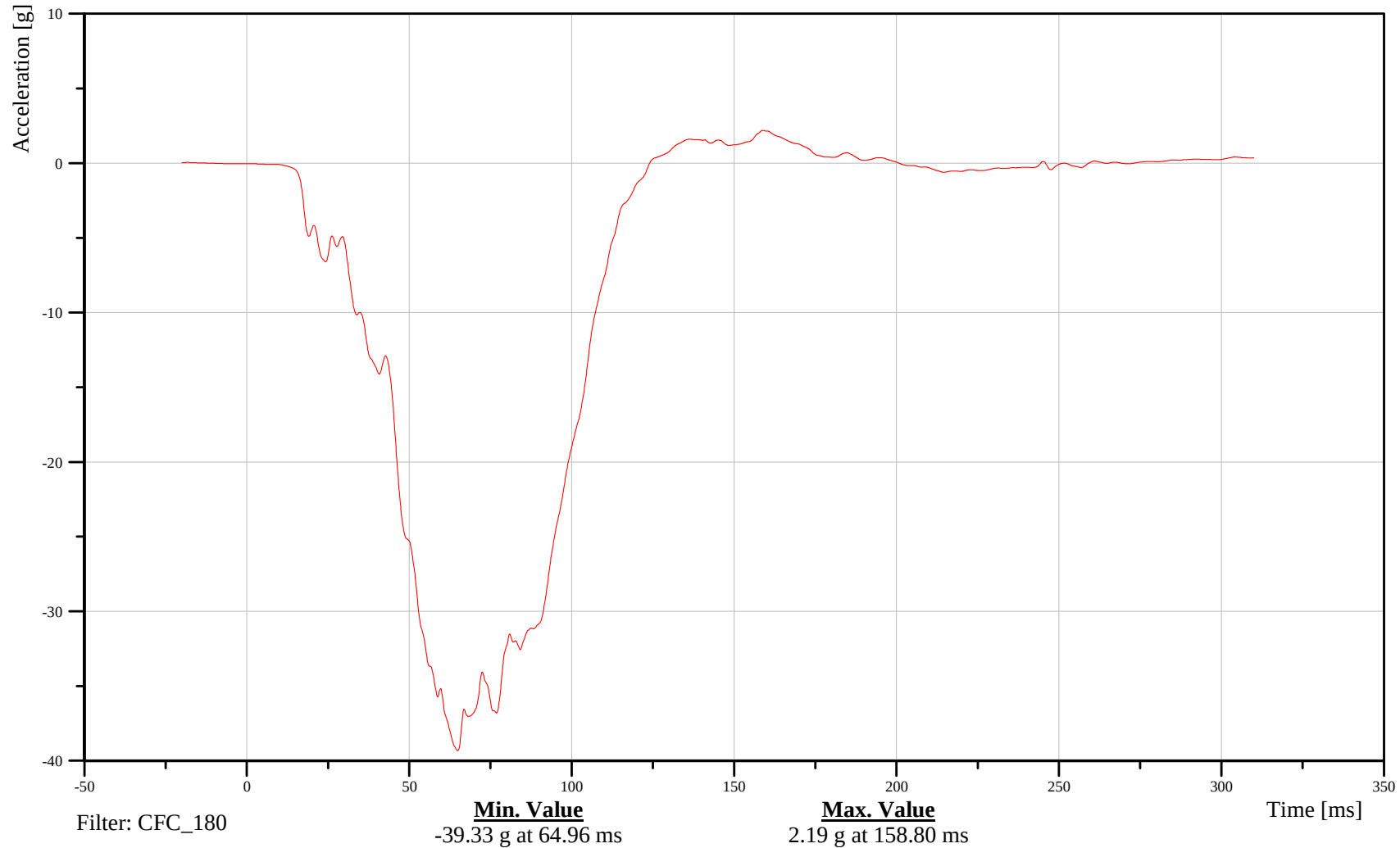
Date: 09/27/2006
Time: 13:07

Passenger Chest X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

13CHSTCG00H3ACXC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-77

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Chest Y-Axis Acceleration

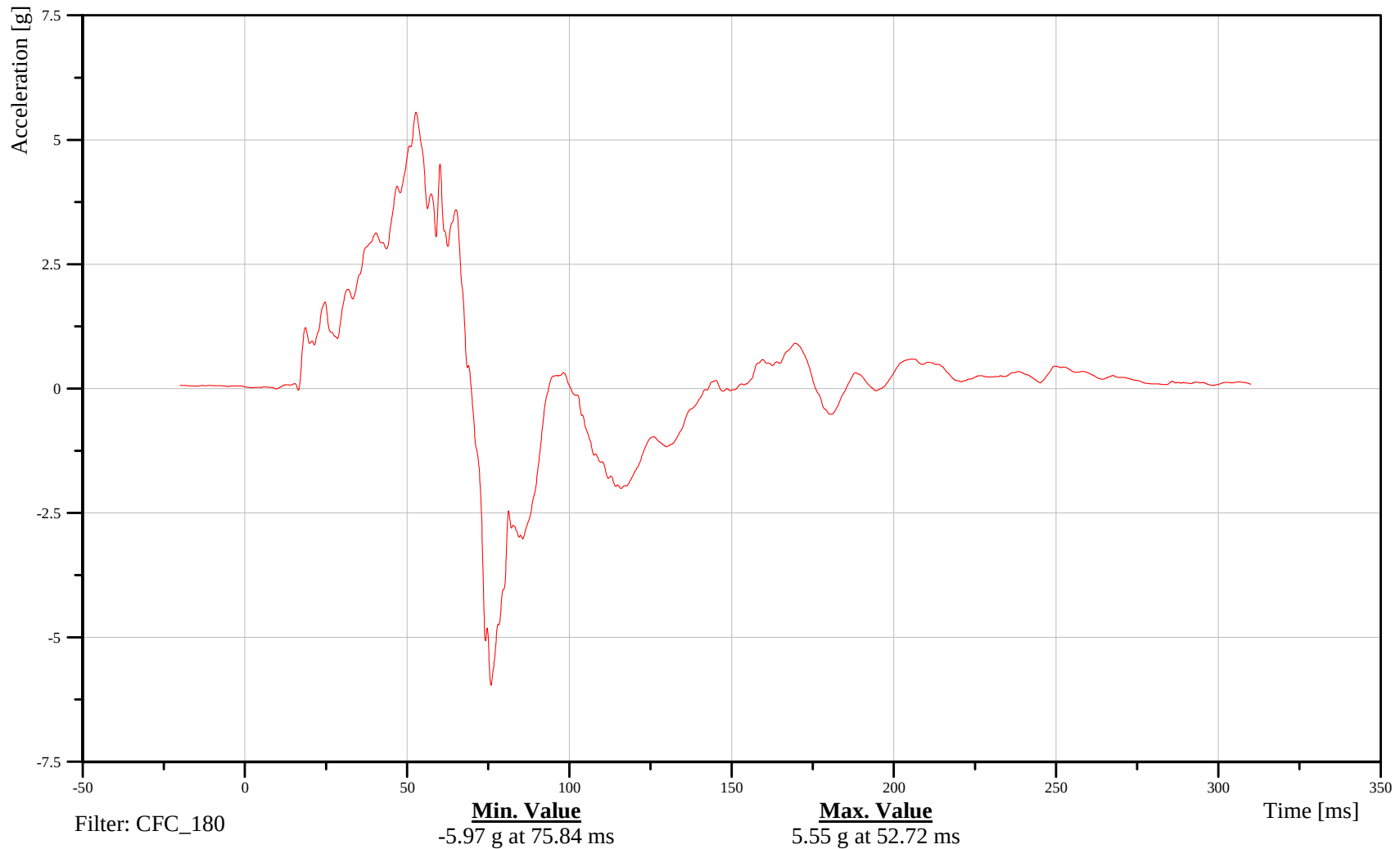
Customer: NHTSA

Test Number: M60518

13CHSTCG00H3ACYC

TRC Inc. Test Lab: CTF

Test Number: 060927



B-78

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Chest Z-Axis Acceleration

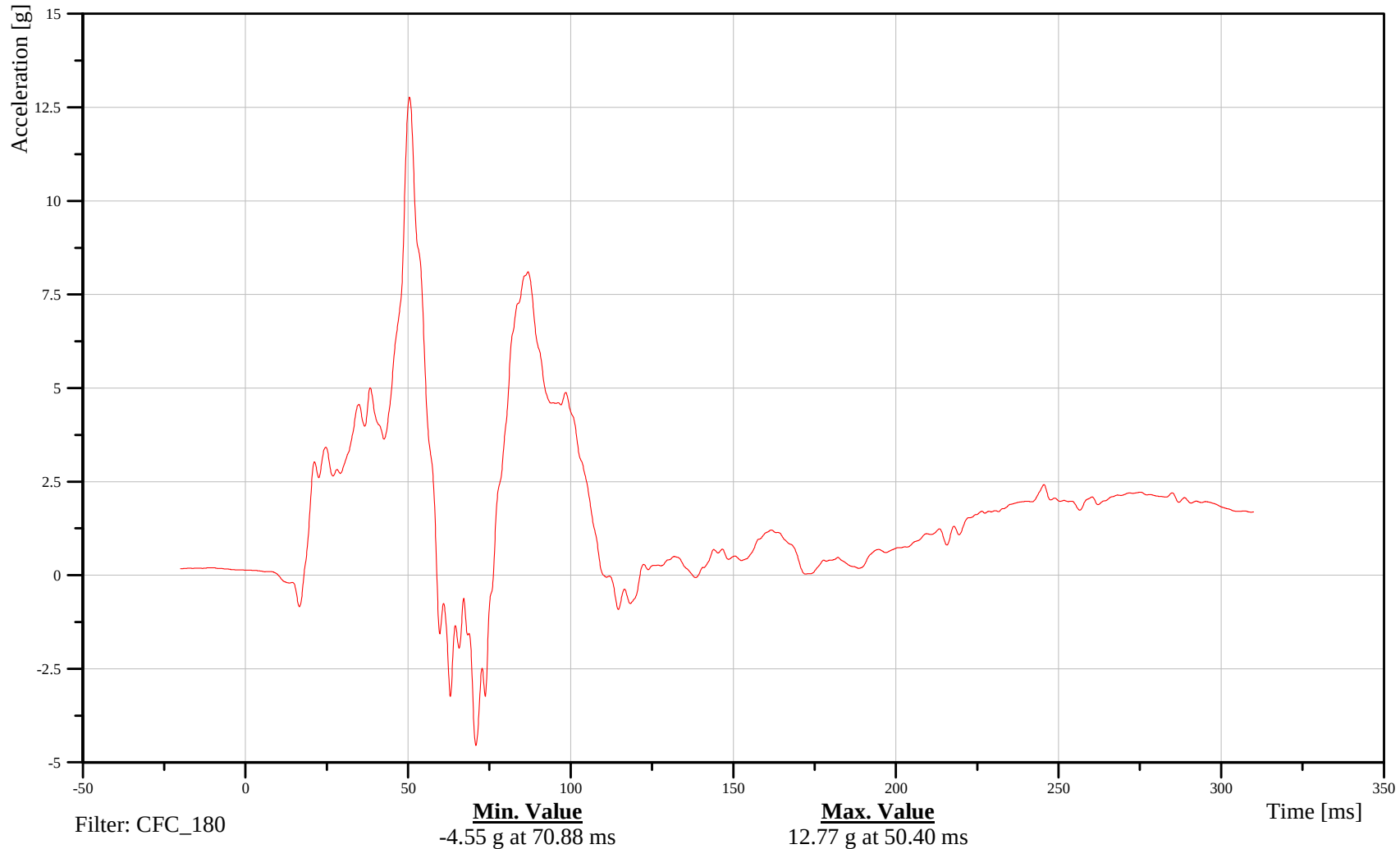
Customer: NHTSA

Test Number: M60518

13CHSTCG00H3ACZC

TRC Inc. Test Lab: CTF

Test Number: 060927



B-79

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

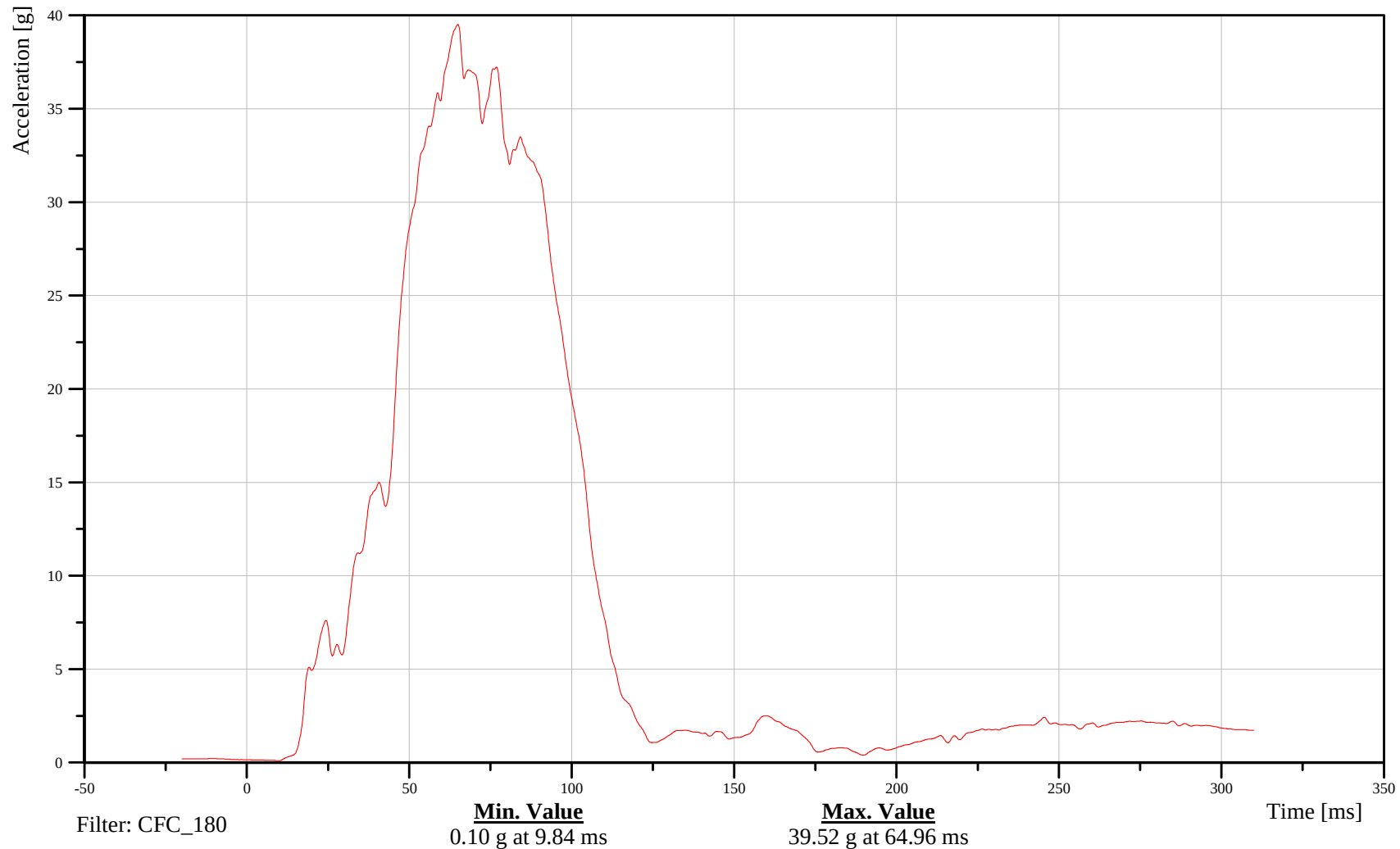
Date: 09/27/2006
Time: 13:07

Passenger Chest Resultant Acceleration

Customer: NHTSA
Test Number: M60518

13CHSTCG00H3ACRC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-80

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

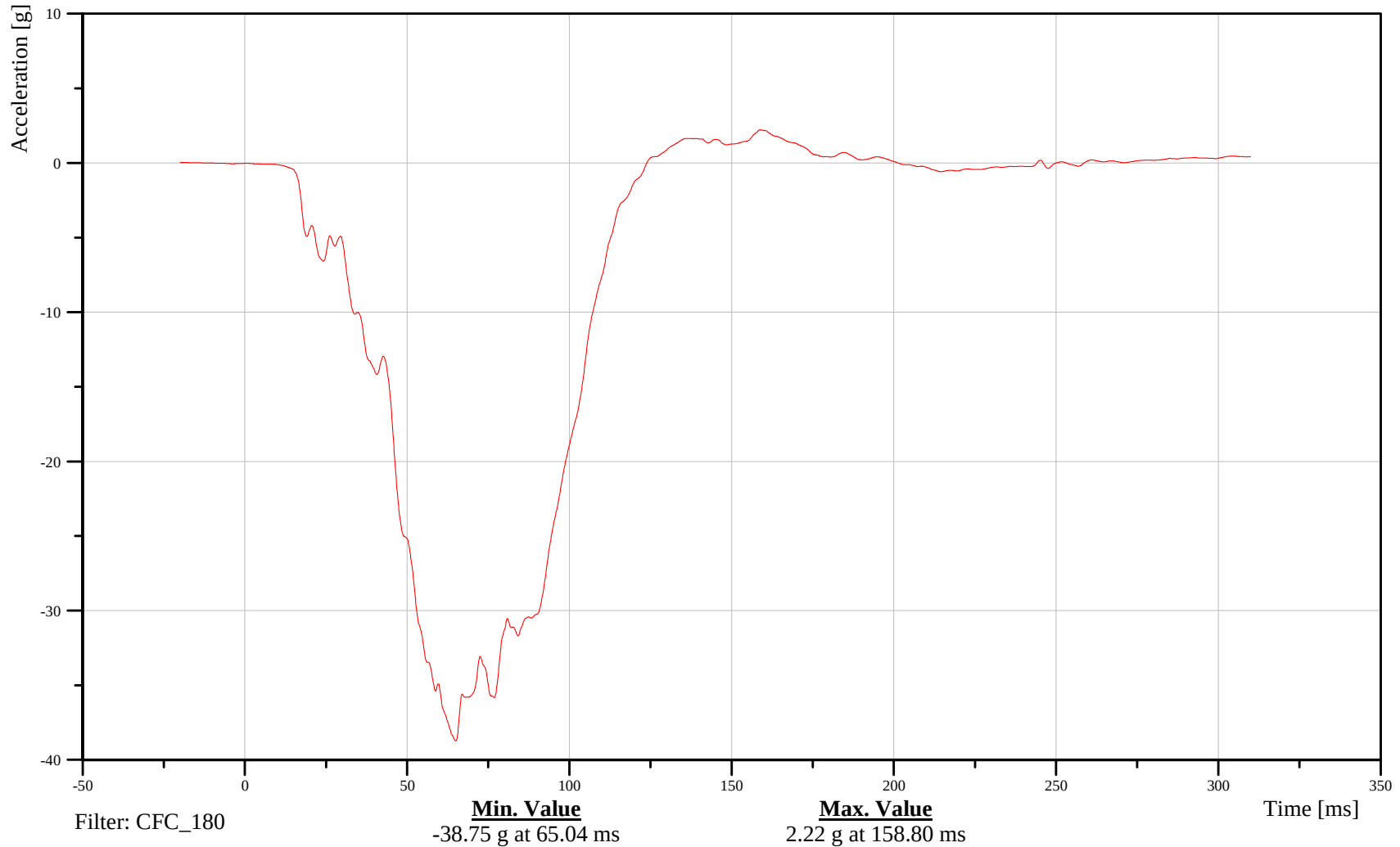
Passenger Chest Redundant X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

13CHSTCGRDH3ACXC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-81

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Passenger Chest Redundant Y-Axis Acceleration

Time: 13:07

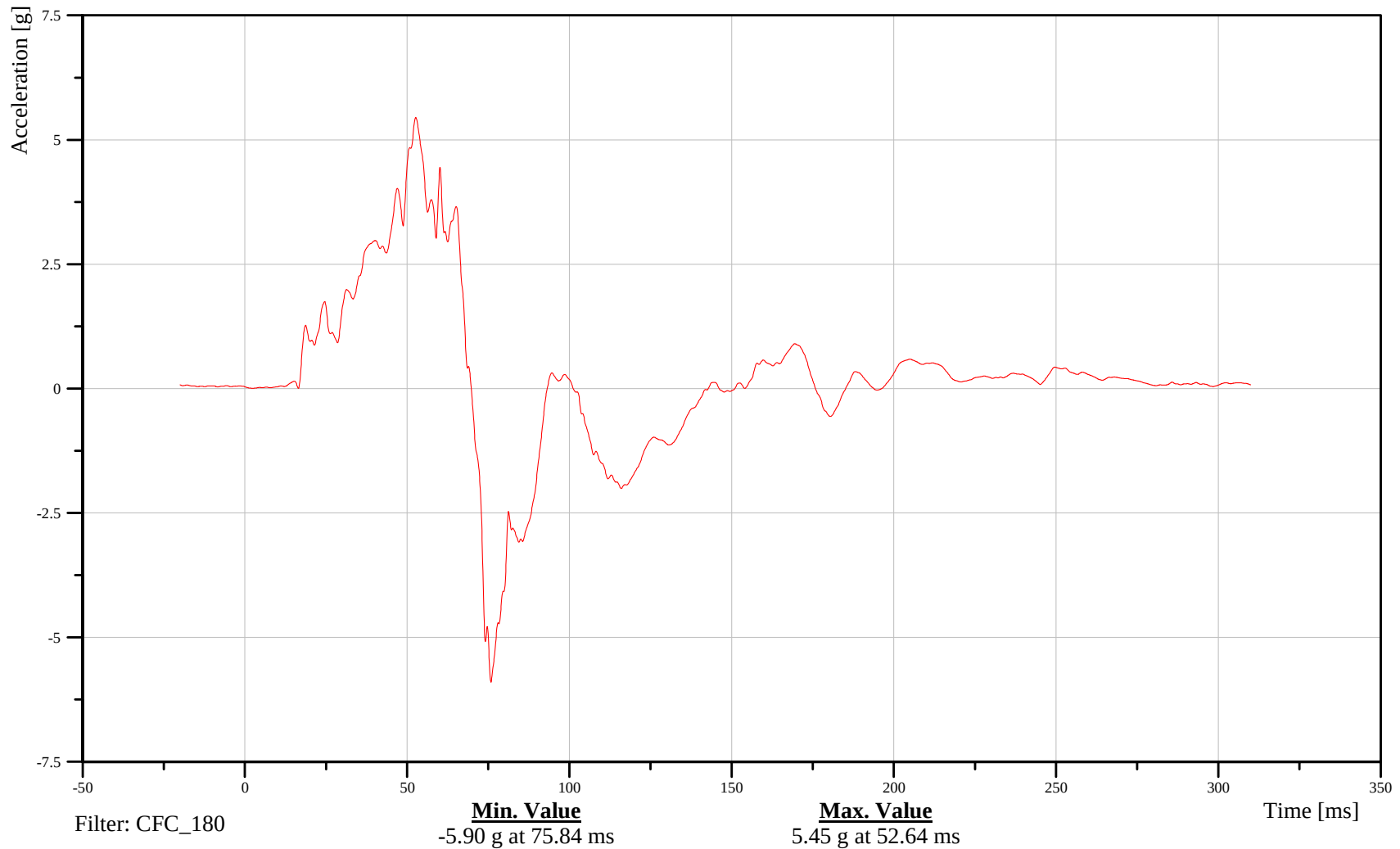
Customer: NHTSA

Test Number: M60518

13CHSTCGRDH3ACYC

TRC Inc. Test Lab: CTF

Test Number: 060927



B-82

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Passenger Chest Redundant Z-Axis Acceleration

Time: 13:07

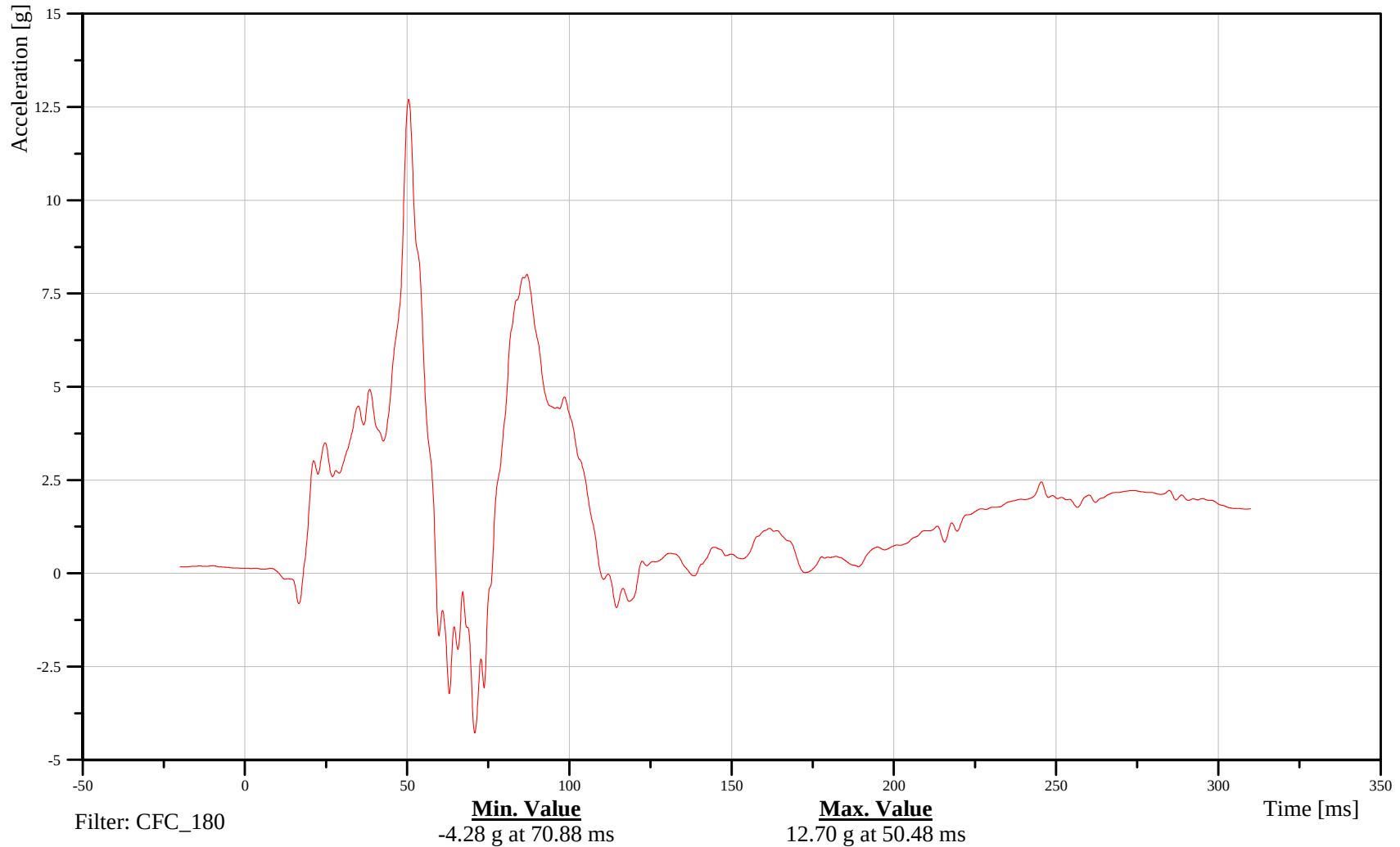
Customer: NHTSA

Test Number: M60518

13CHSTCGRDH3ACZC

TRC Inc. Test Lab: CTF

Test Number: 060927



B-83

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Chest Redundant Resultant Acceleration

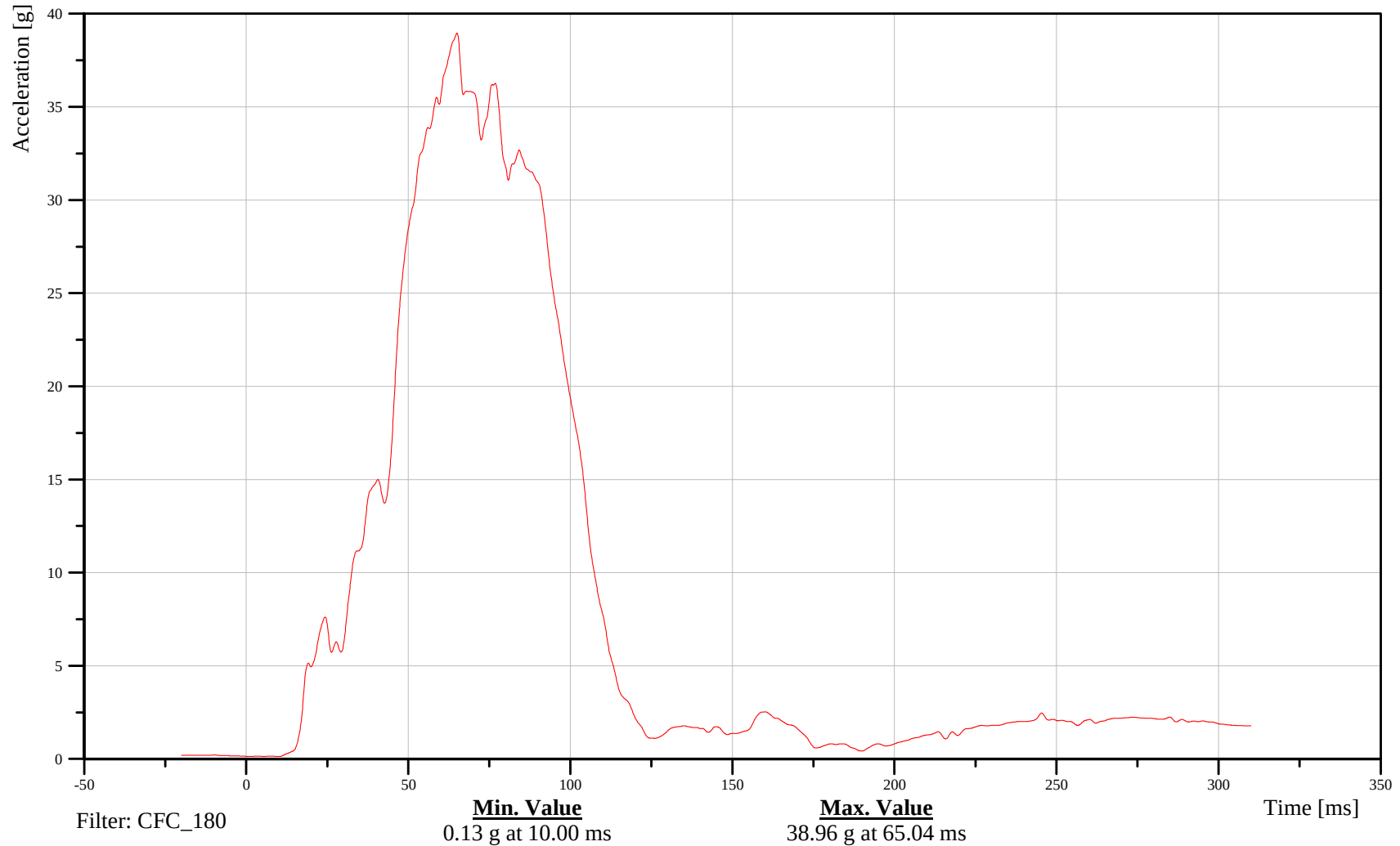
Customer: NHTSA

Test Number: M60518

13CHSTCGRDH3ACRC

TRC Inc. Test Lab: CTF

Test Number: 060927



B-84

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Chest X-Axis Displacement

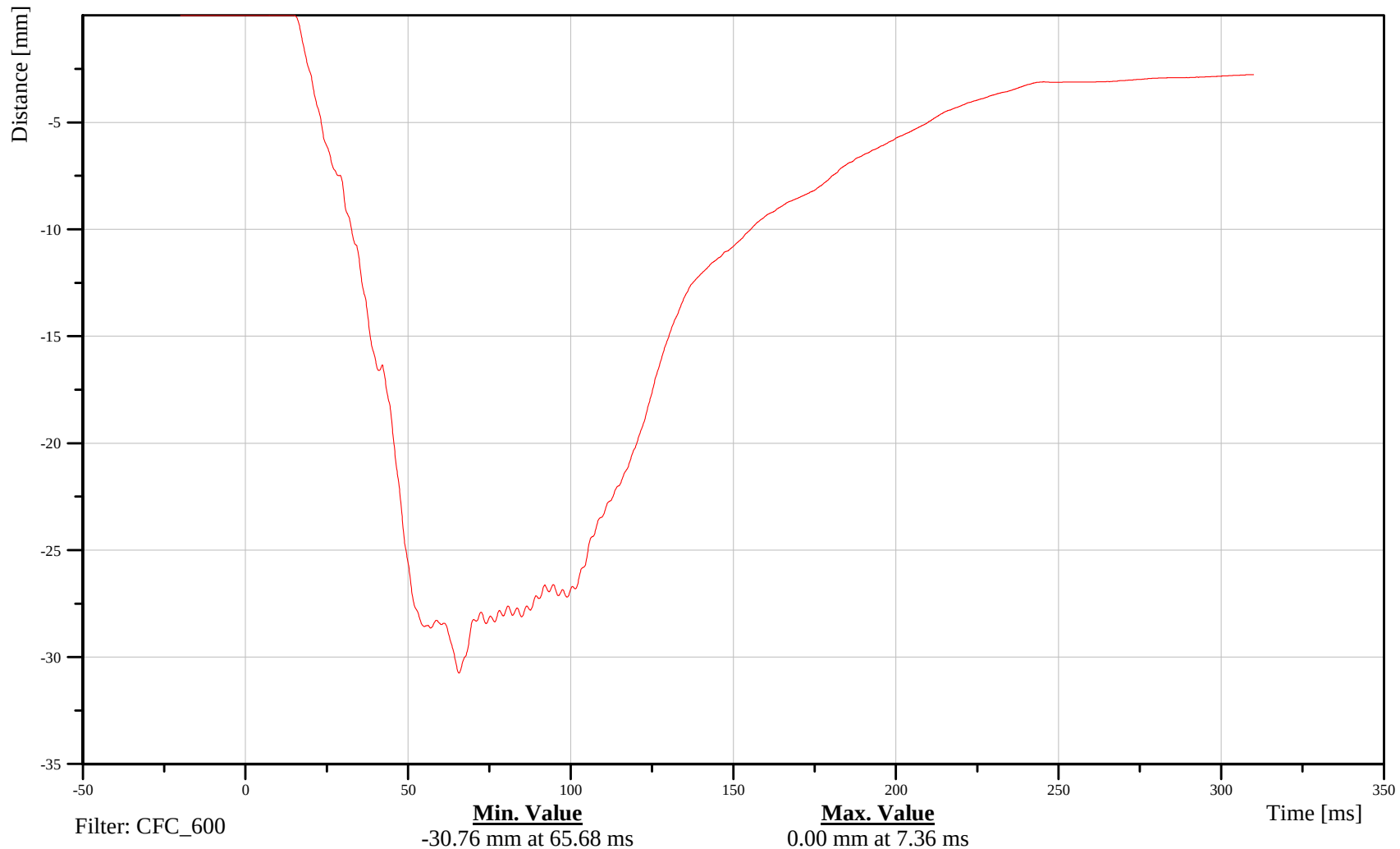
Customer: NHTSA

Test Number: M60518

13CHST0000H3DSXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-85

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Pelvis X-Axis Acceleration

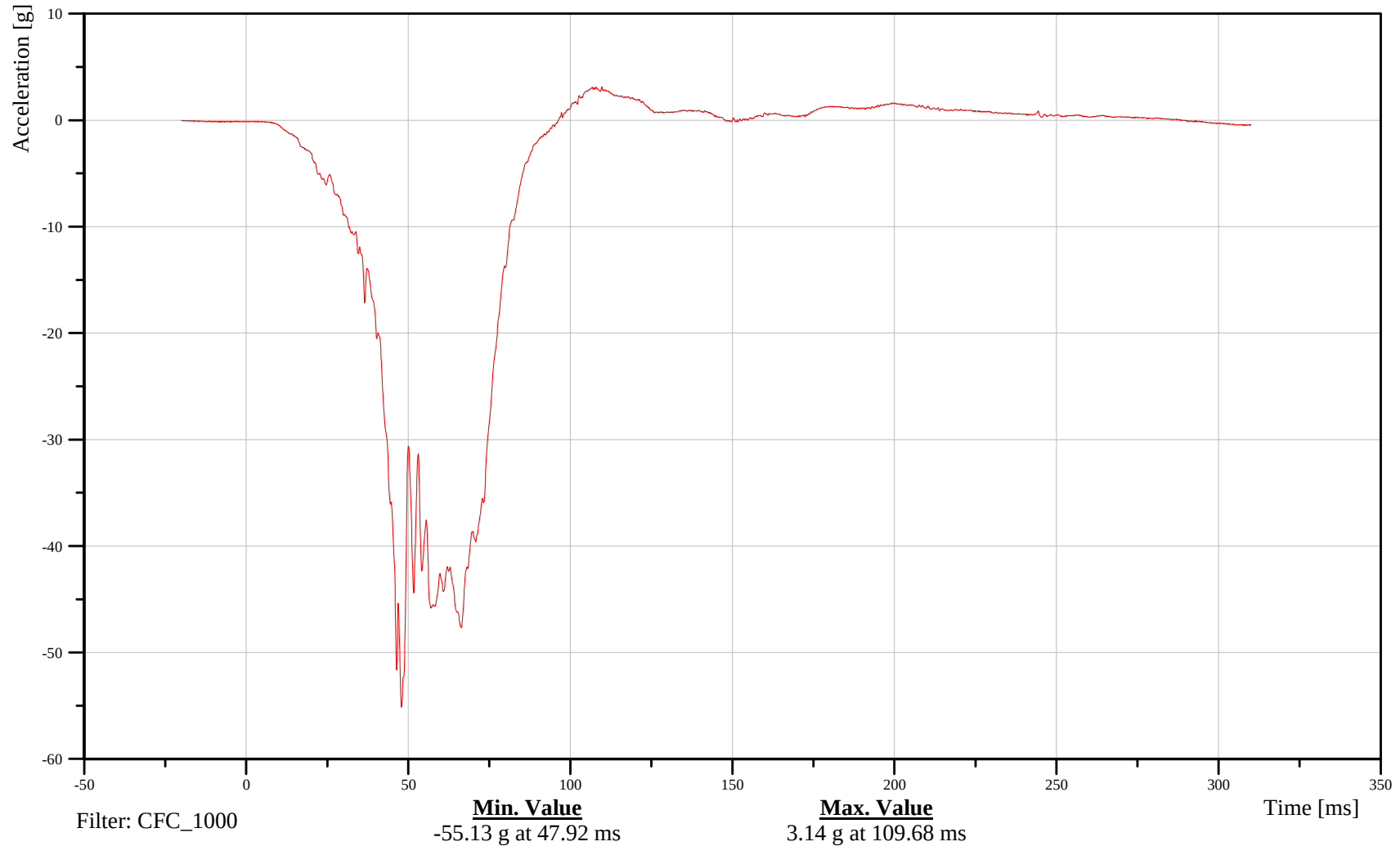
Customer: NHTSA

Test Number: M60518

13PELVCG00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-86

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Pelvis Y-Axis Acceleration

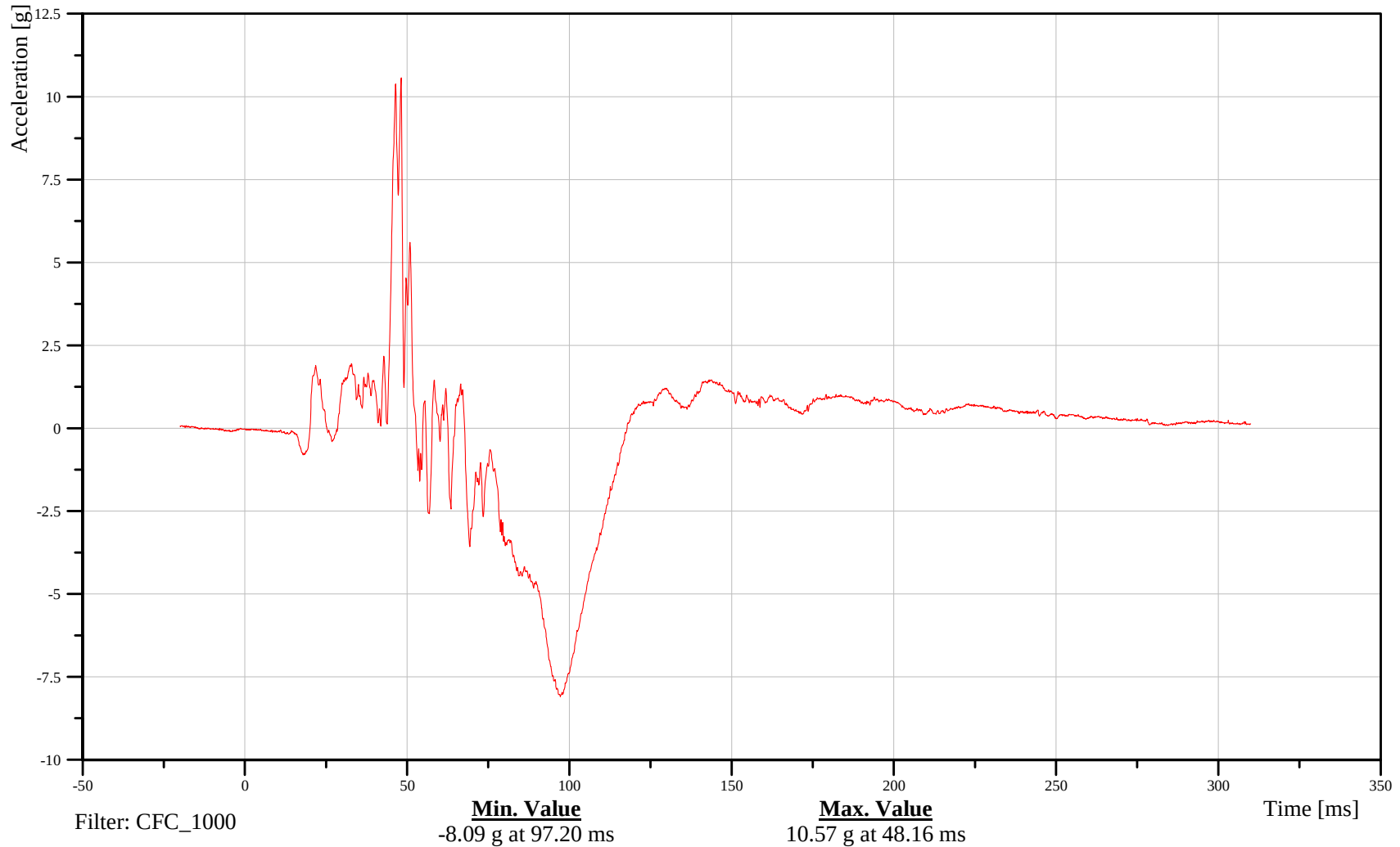
Customer: NHTSA

Test Number: M60518

13PELVCG00H3ACYA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-87

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

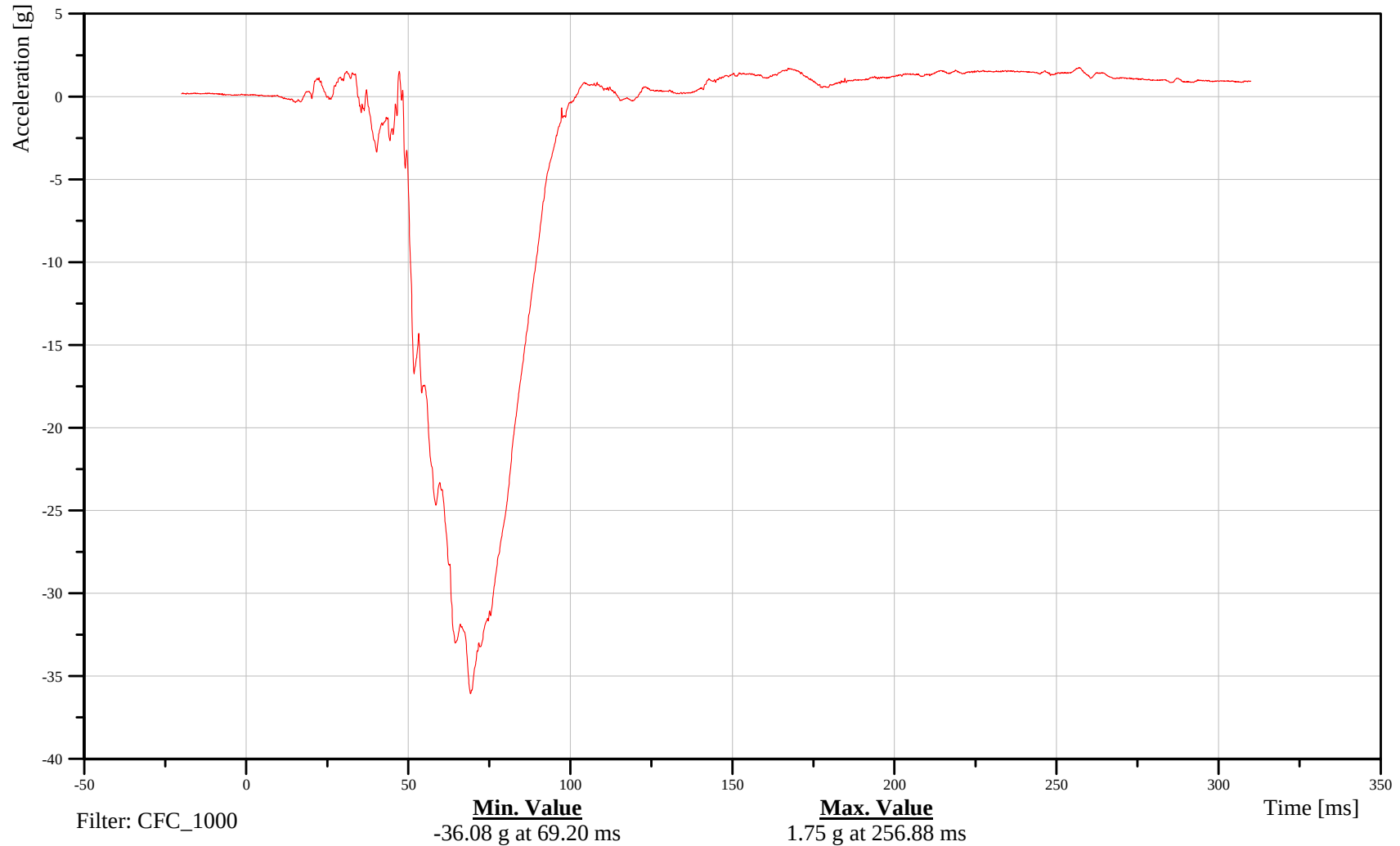
Date: 09/27/2006
Time: 13:07

Passenger Pelvis Z-Axis Acceleration

Customer: NHTSA
Test Number: M60518

13PELVCG00H3ACZA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-88

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Pelvis Resultant Acceleration

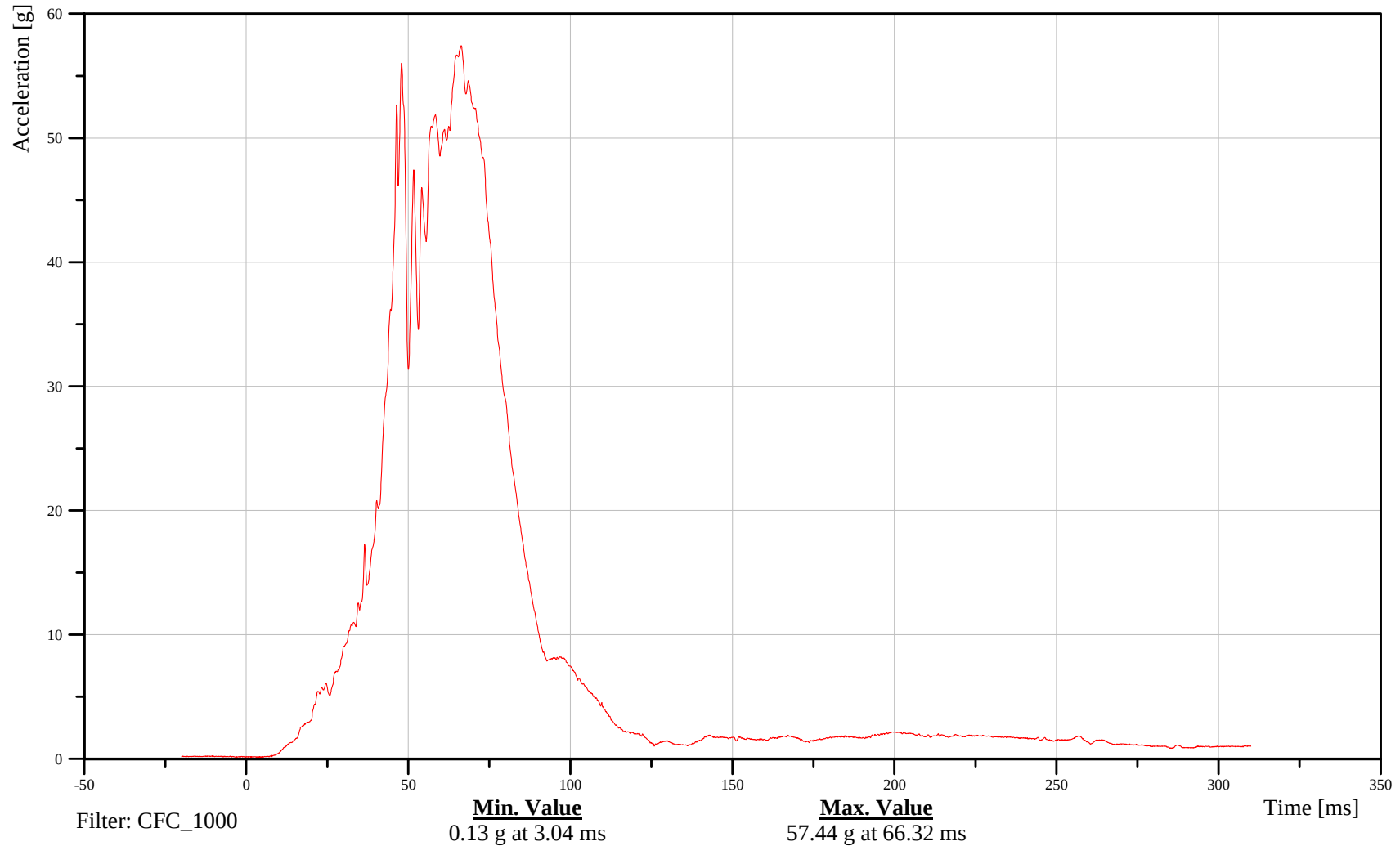
Customer: NHTSA

Test Number: M60518

13PELVCG00H3ACRA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-89

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Femur Z-Axis Force

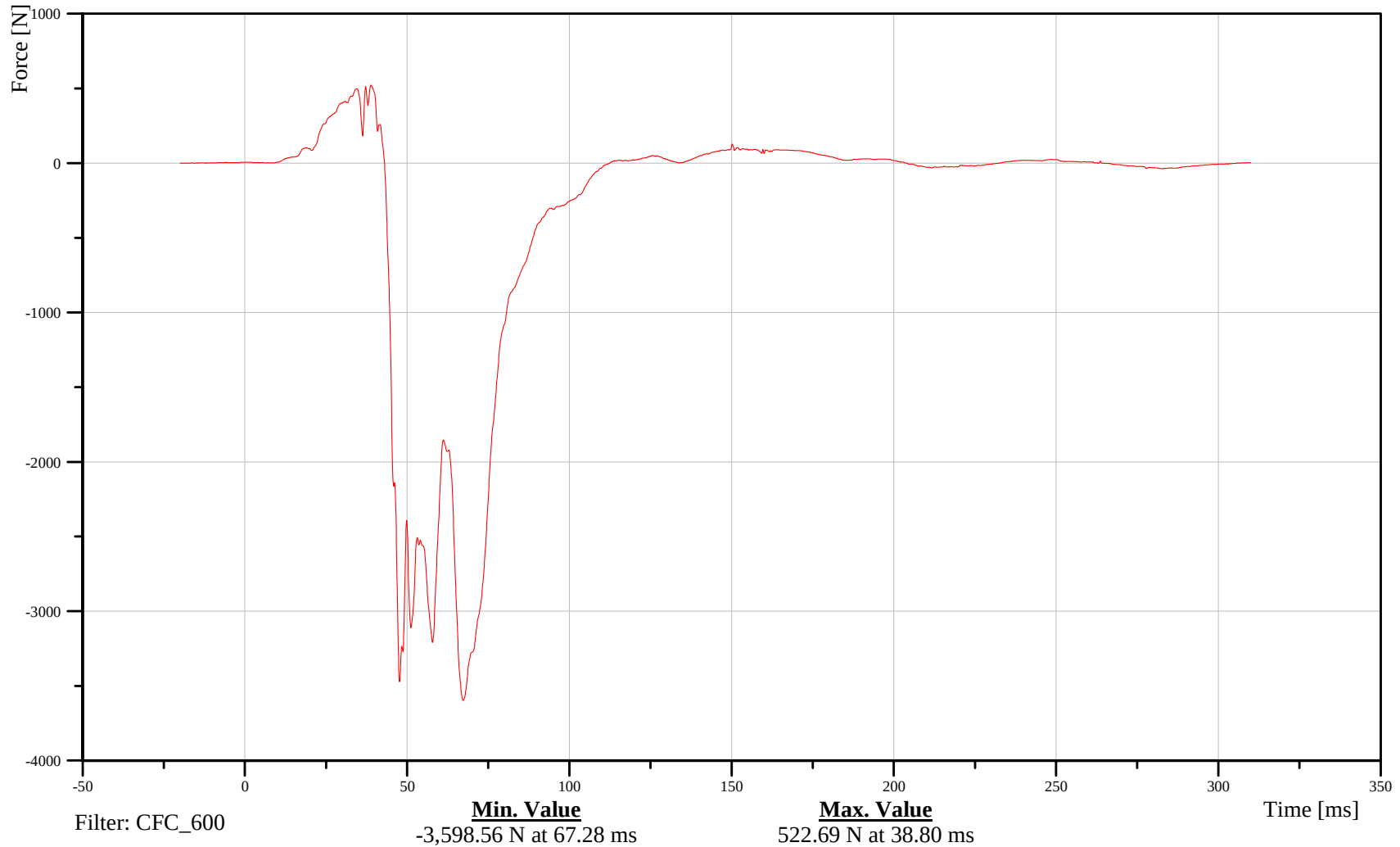
Customer: NHTSA

Test Number: M60518

13FEMRLL00H3FOZB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-90

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

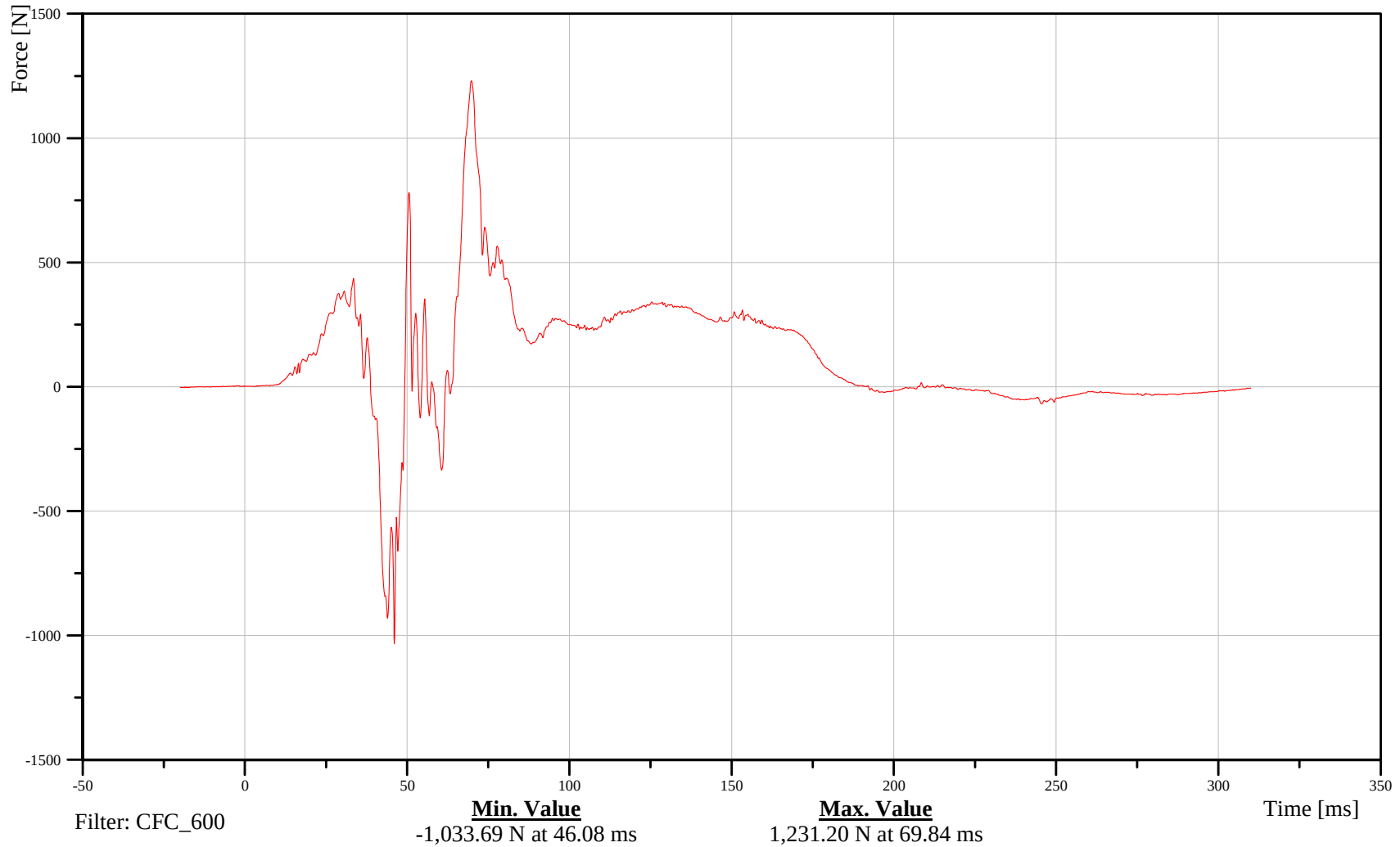
Date: 09/27/2006
Time: 13:07

Passenger Right Femur Z-Axis Force

Customer: NHTSA
Test Number: M60518

13FEMRRL00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

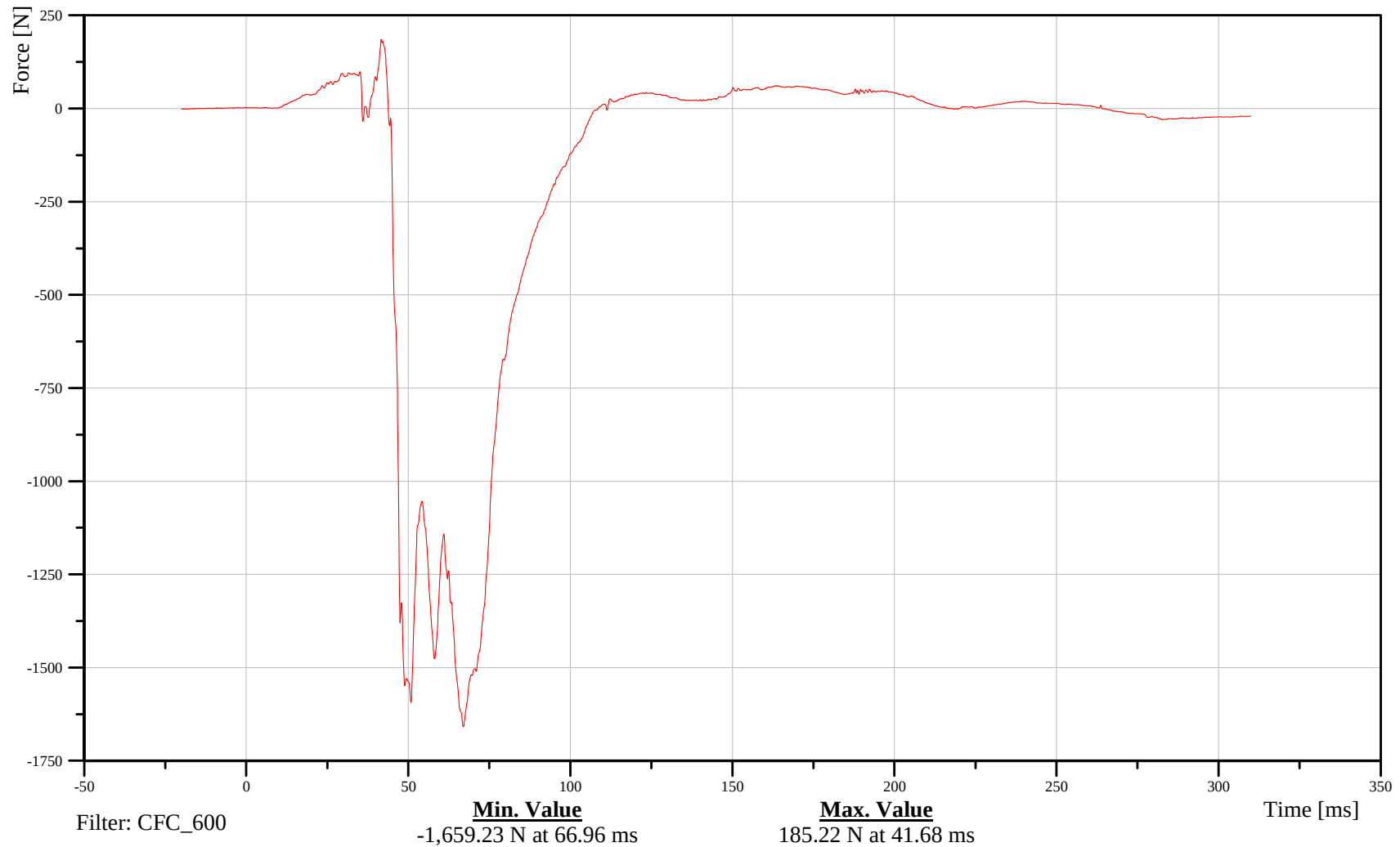
Date: 09/27/2006
Time: 13:07

Passenger Left Upper Tibia X-Axis Force

Customer: NHTSA
Test Number: M60518

13TIBILU00H3FOX B

TRC Inc. Test Lab: CTF
Test Number: 060927



B-92

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Upper Tibia Y-Axis Force

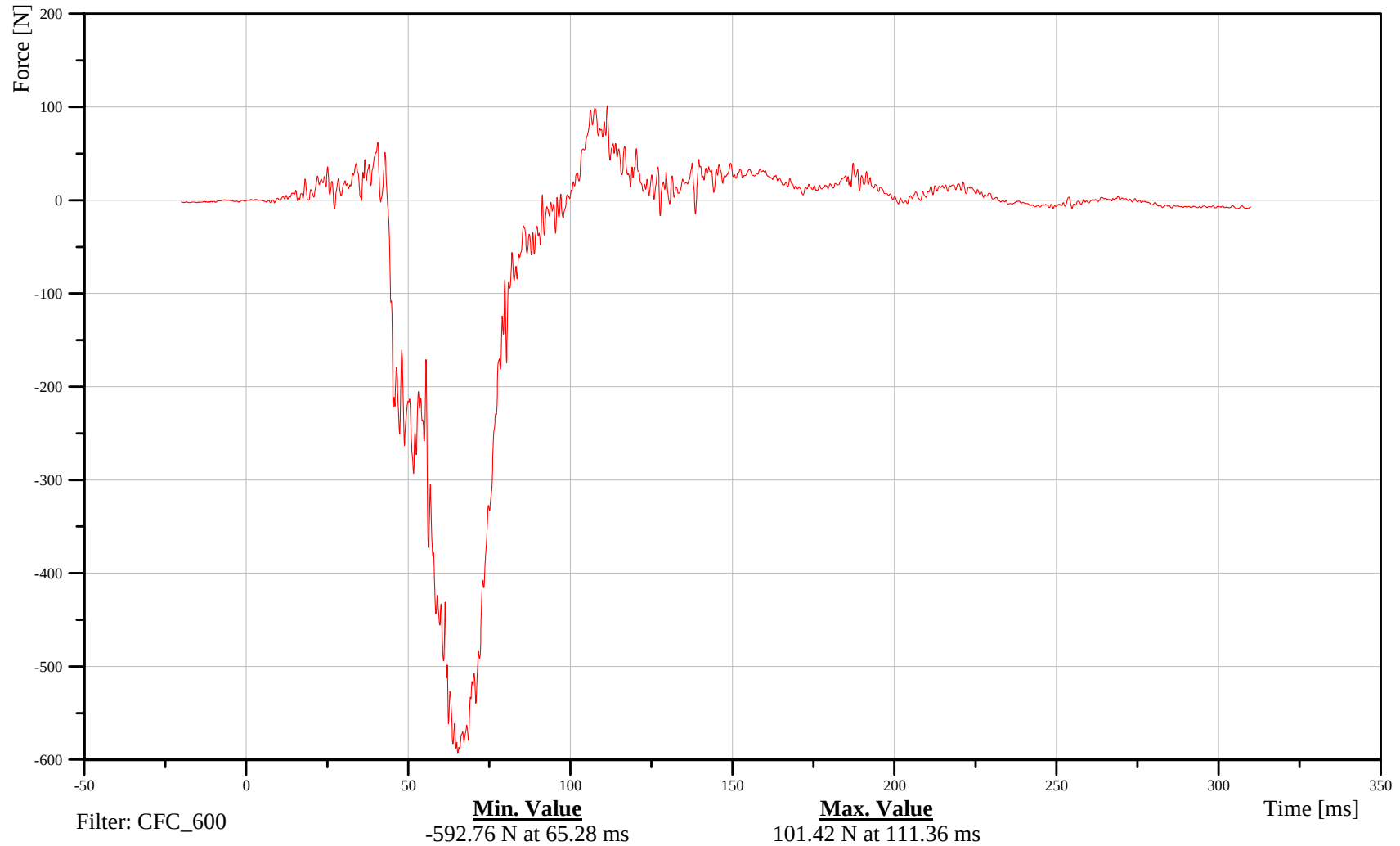
Customer: NHTSA

Test Number: M60518

13TIBILU00H3FOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-93

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Upper Tibia Z-Axis Force

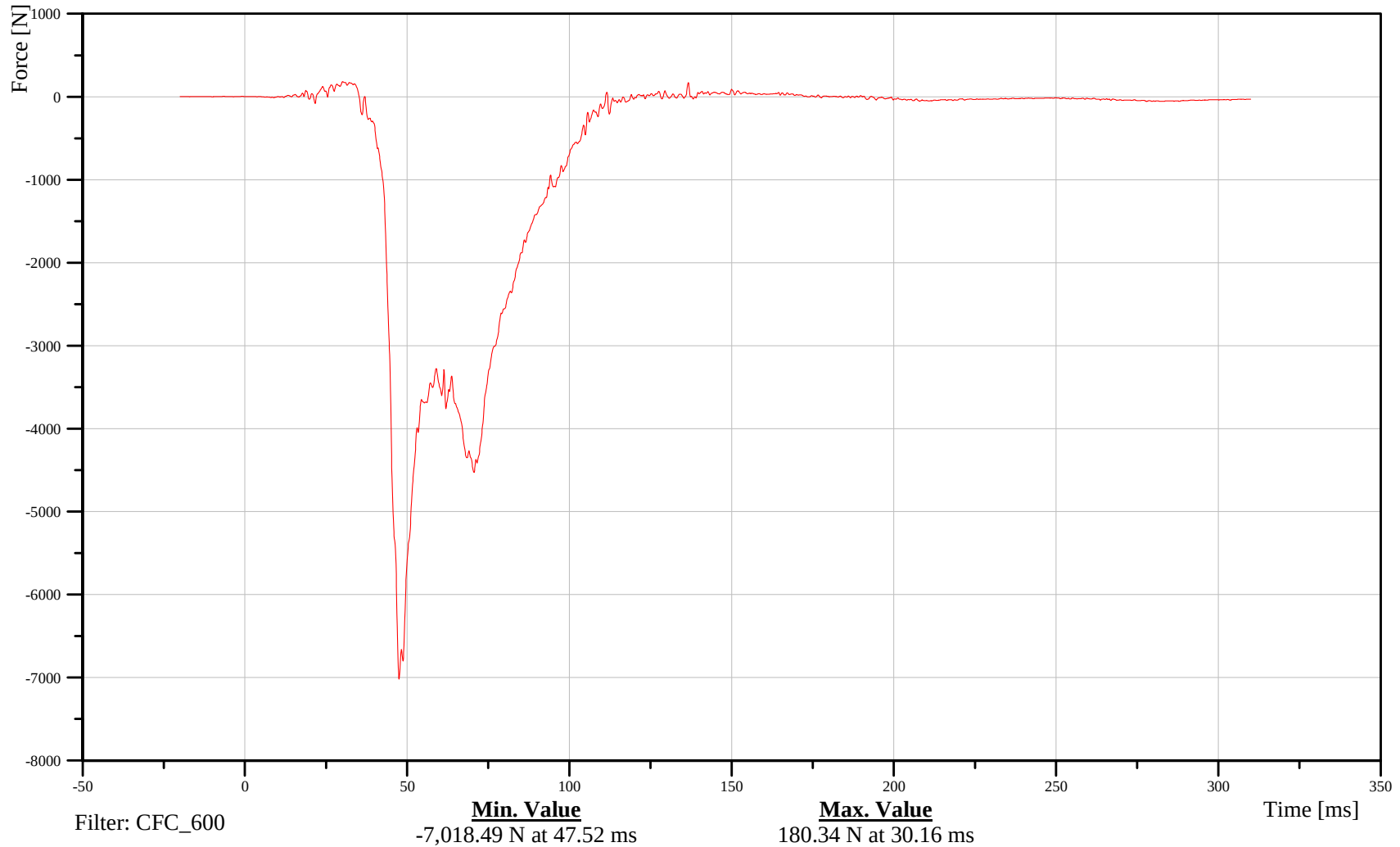
Customer: NHTSA

Test Number: M60518

13TIBILU00H3FOZB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-94

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Passenger Left Upper Tibia Moment About X Axis

Time: 13:07

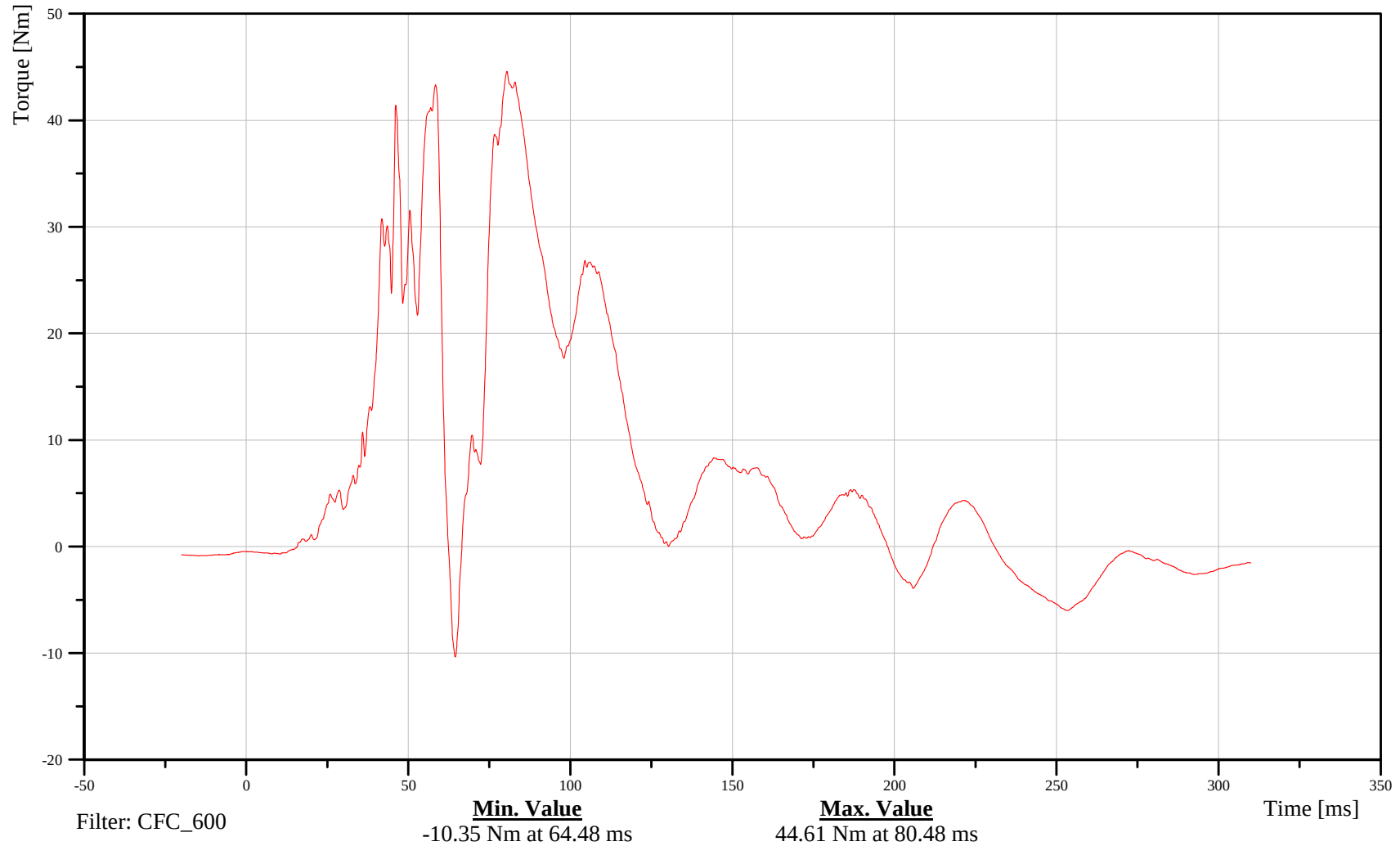
Customer: NHTSA

Test Number: M60518

13TIBILU00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-95

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Passenger Left Upper Tibia Moment About Y Axis

Time: 13:07

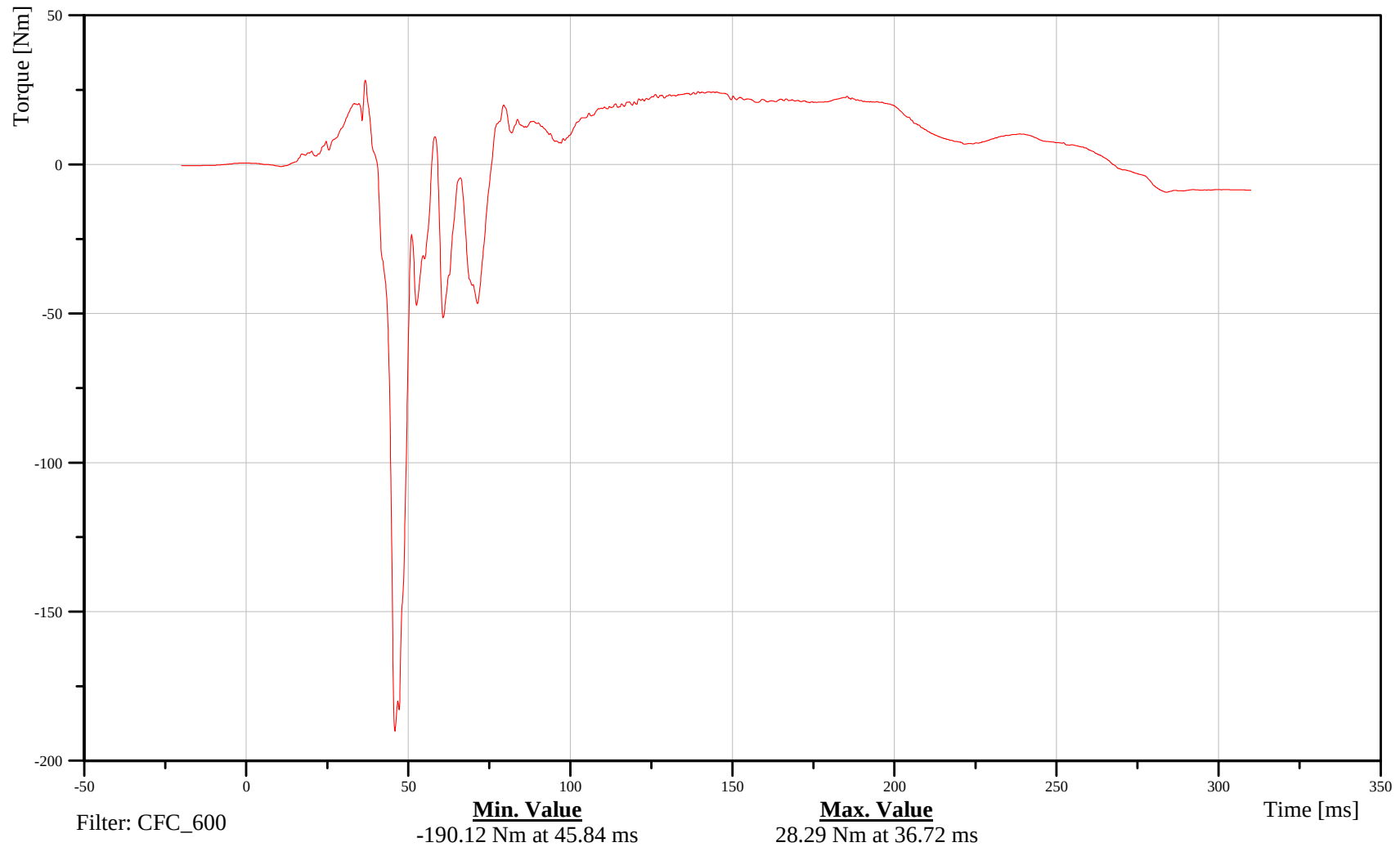
Customer: NHTSA

Test Number: M60518

13TIBILU00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-96

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Lower Tibia X-Axis Force

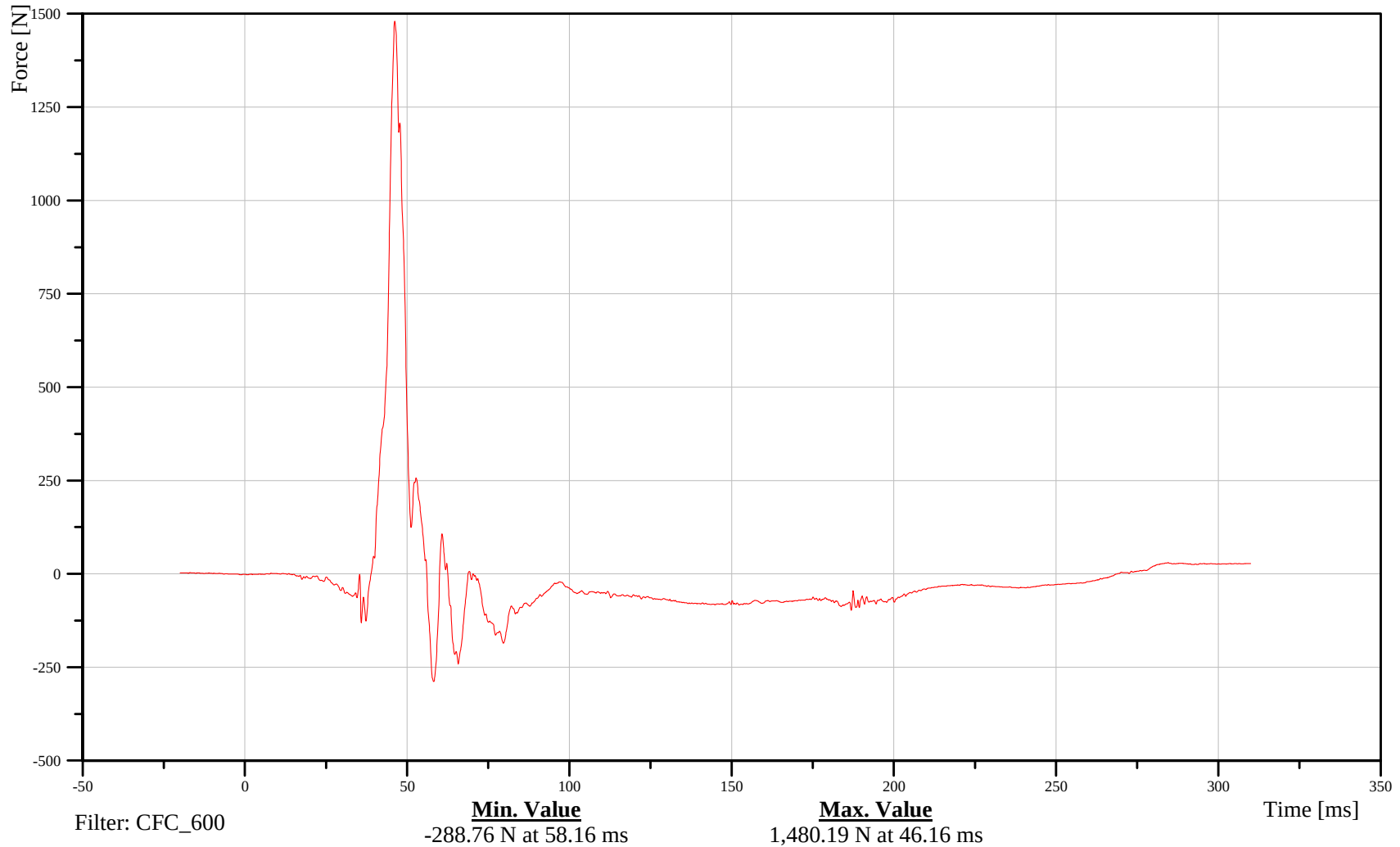
Customer: NHTSA

Test Number: M60518

13TIBILL00H3FOXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-97

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

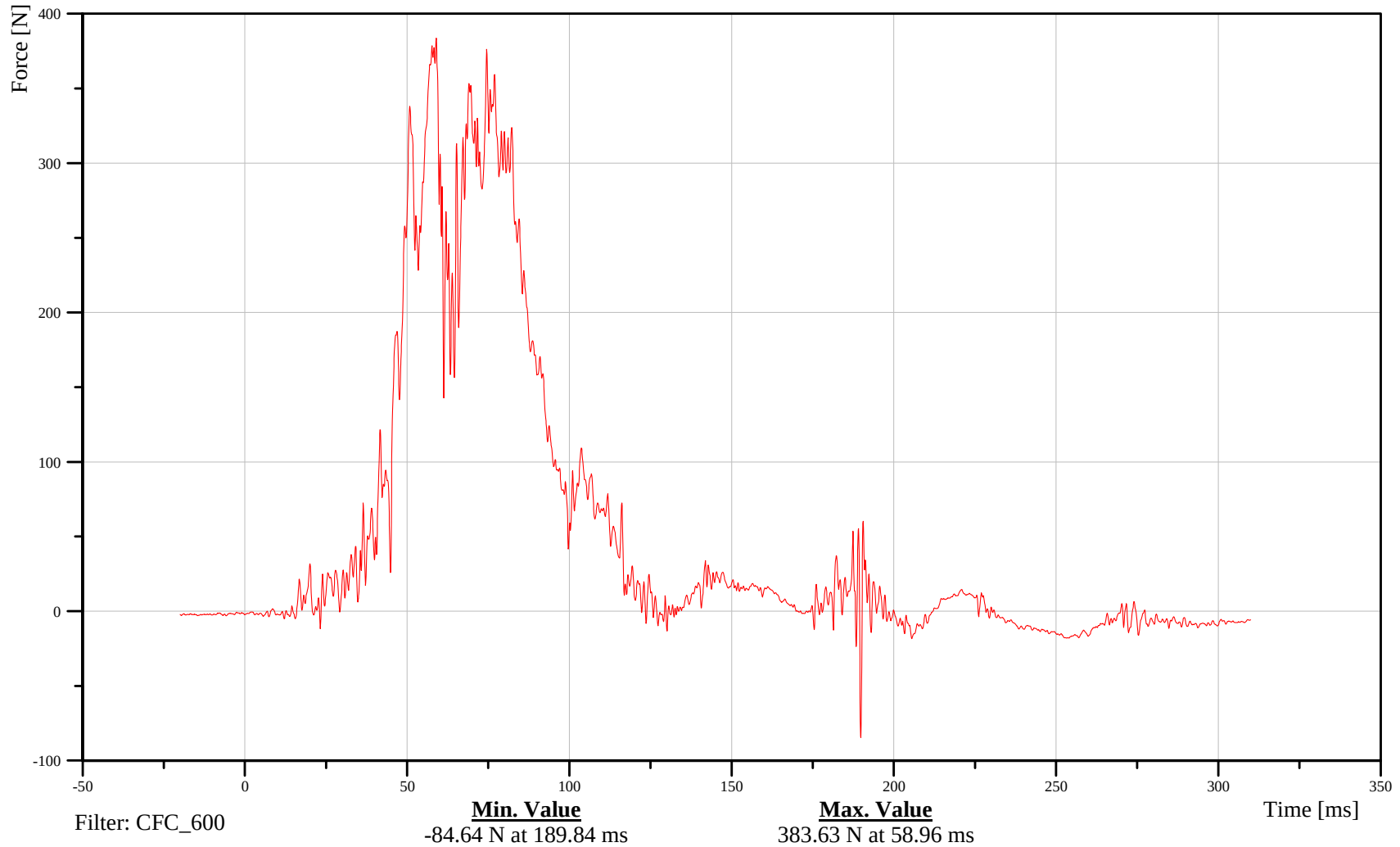
Date: 09/27/2006
Time: 13:07

Passenger Left Lower Tibia Y-Axis Force

Customer: NHTSA
Test Number: M60518

13TIBILL00H3FOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Lower Tibia Z-Axis Force

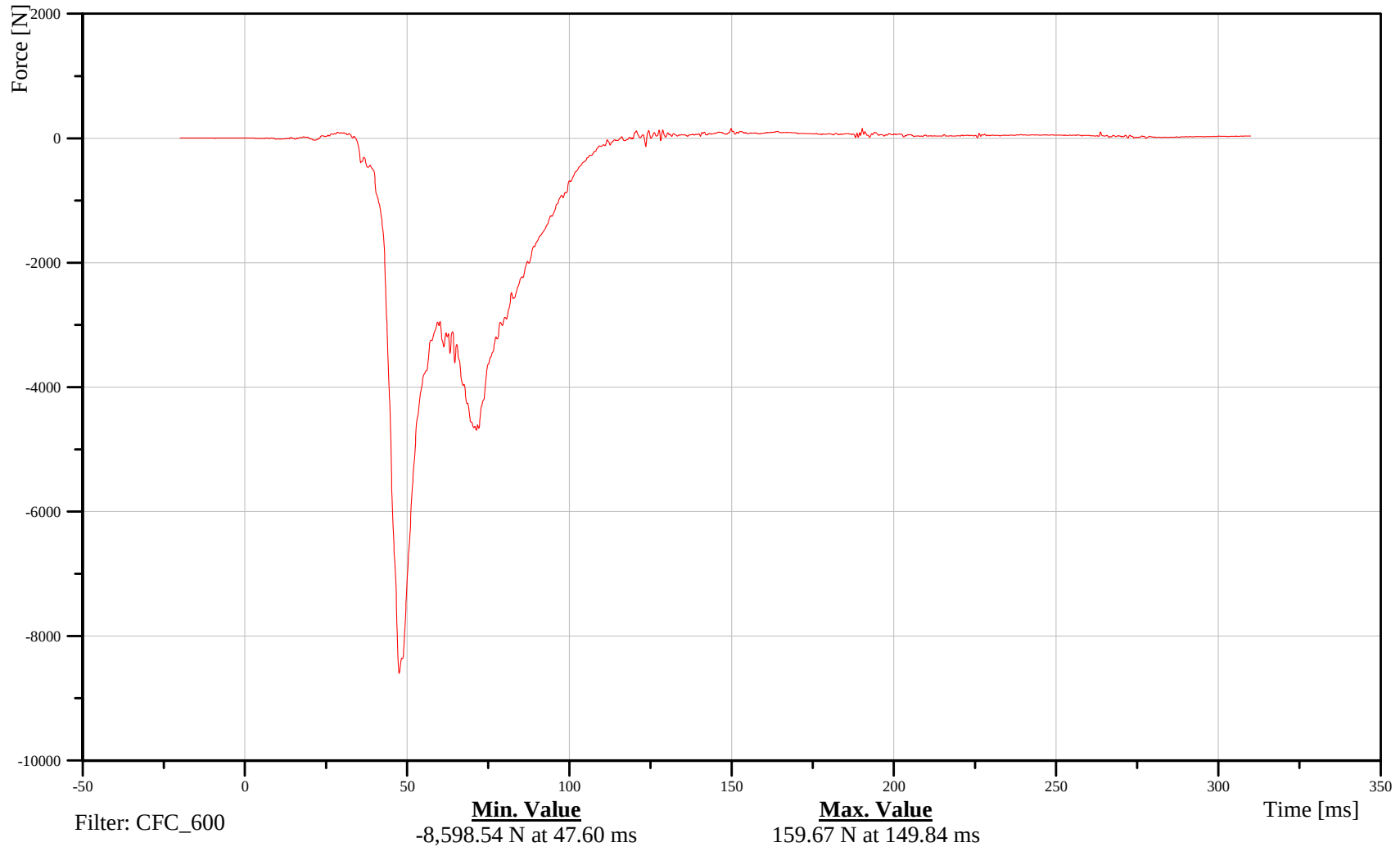
Customer: NHTSA

Test Number: M60518

13TIBILL00H3FOZB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-99

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Passenger Left Lower Tibia Moment About X Axis

Time: 13:07

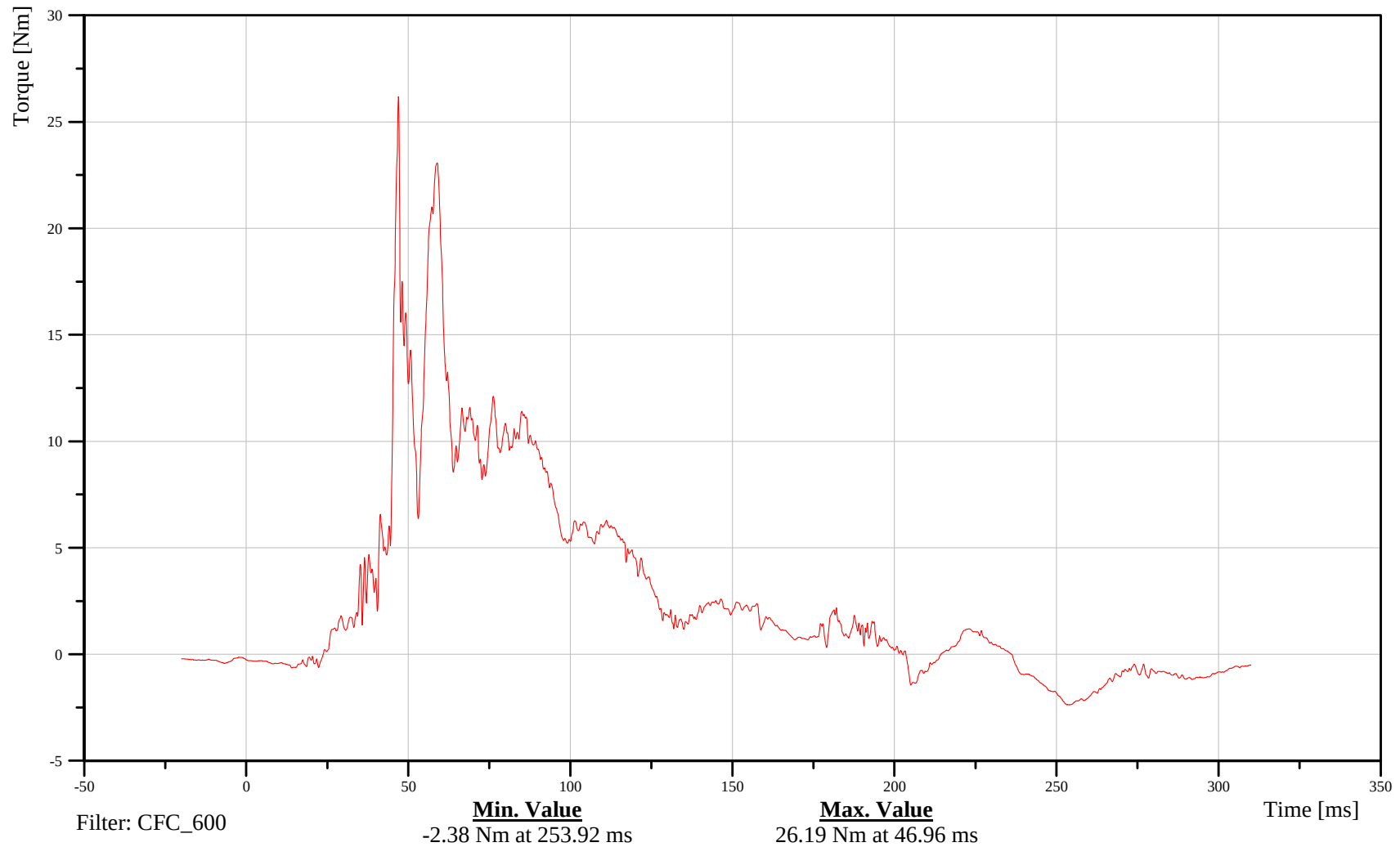
Customer: NHTSA

Test Number: M60518

13TIBILL00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-100

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Lower Tibia Moment About Y Axis

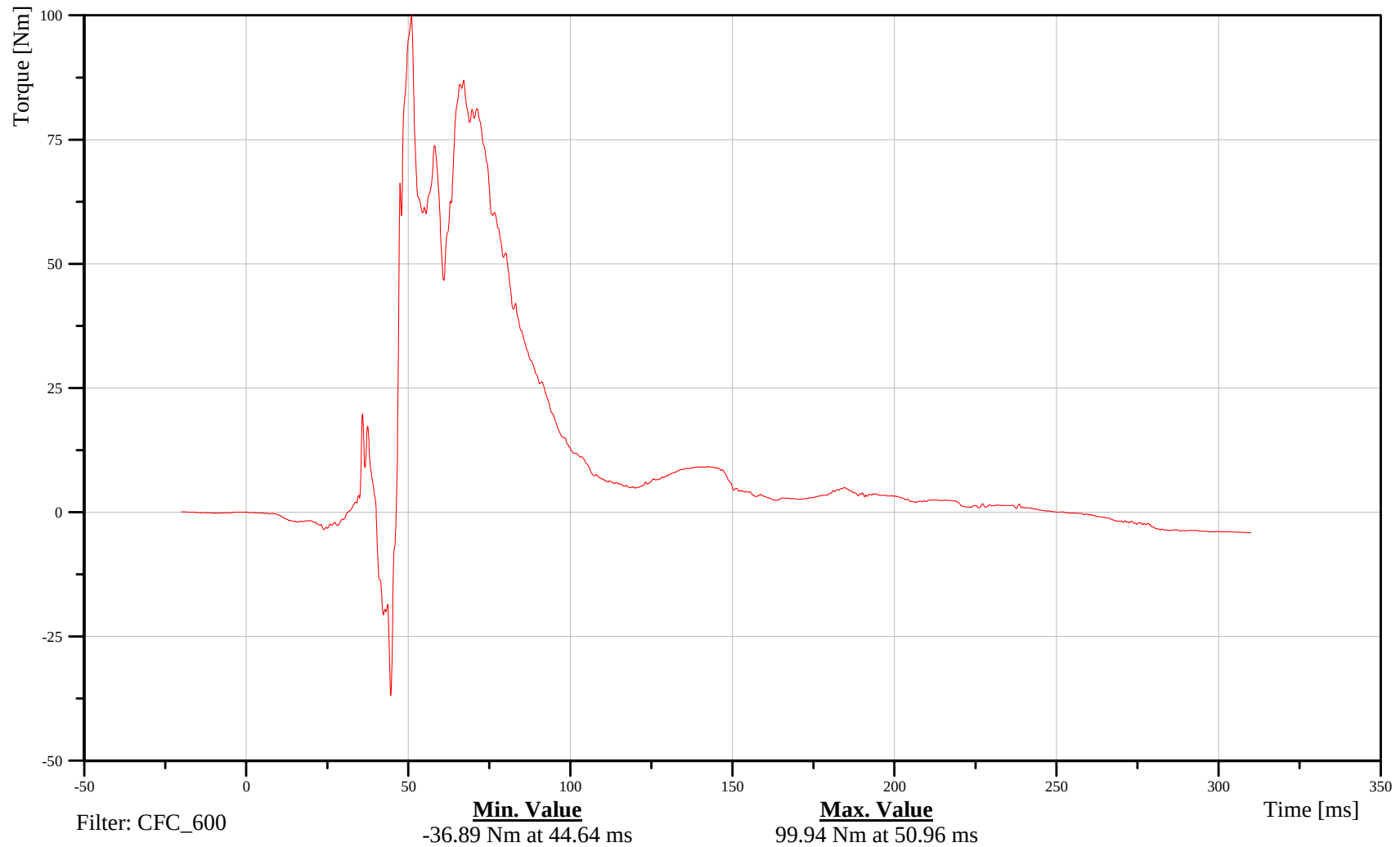
Customer: NHTSA

Test Number: M60518

13TIBILL00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-101

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Foot X-Axis Acceleration

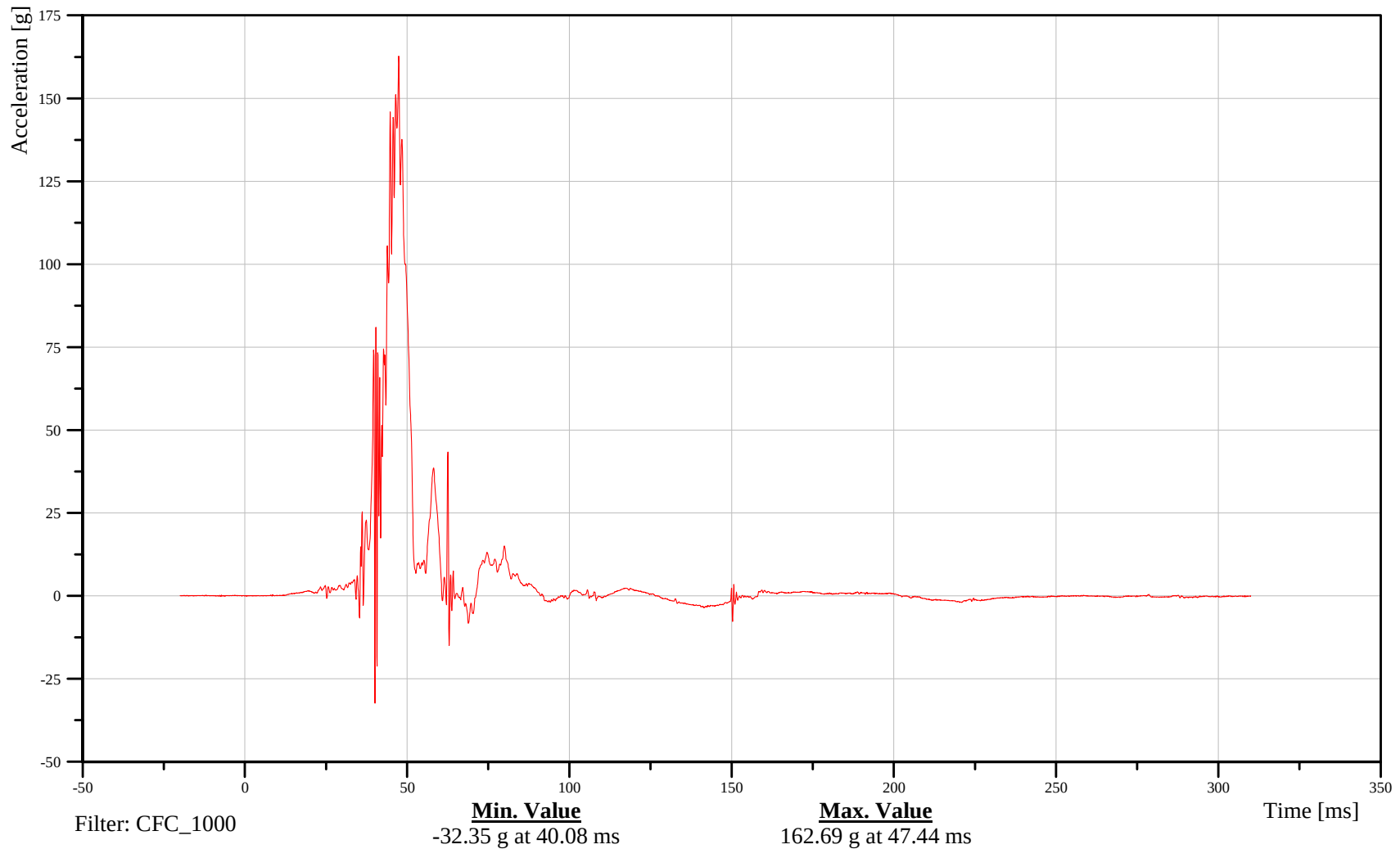
Customer: NHTSA

Test Number: M60518

13FOOTLE00H3ACXA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-102

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Foot Z-Axis Acceleration

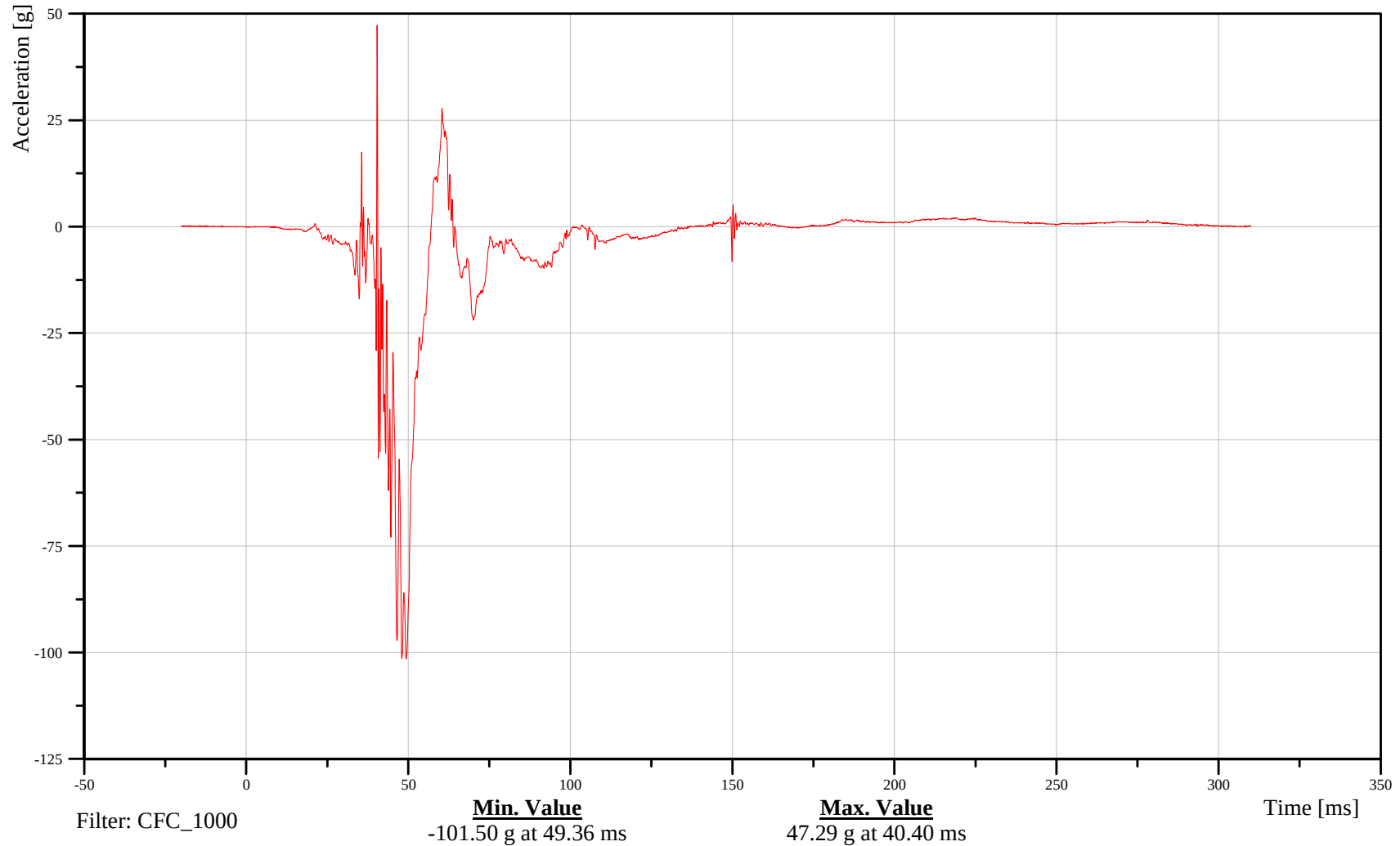
Customer: NHTSA

Test Number: M60518

13FOOTLE00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-103

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Left Toe Z-Axis Acceleration

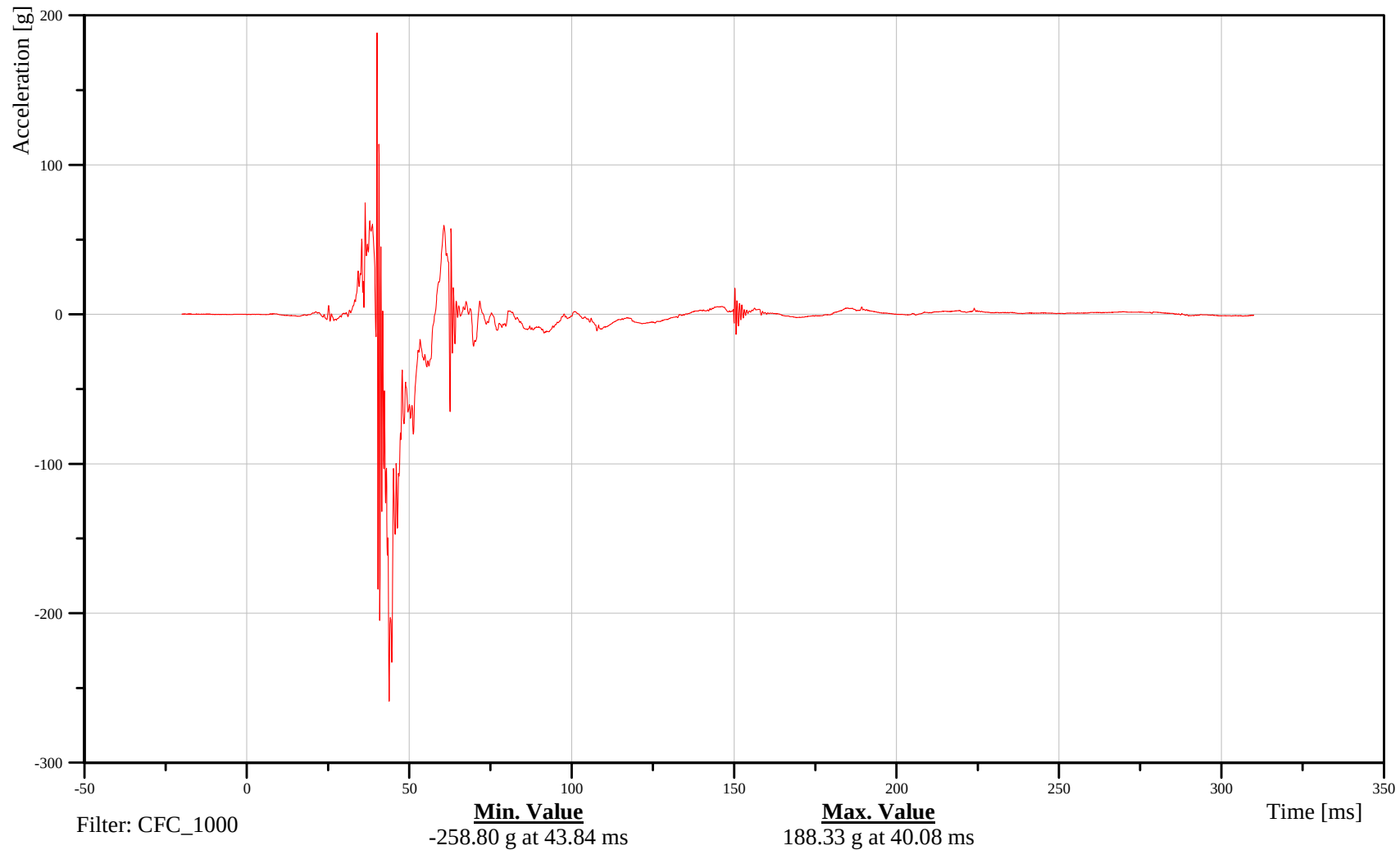
Customer: NHTSA

Test Number: M60518

13TOESLE00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-104

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

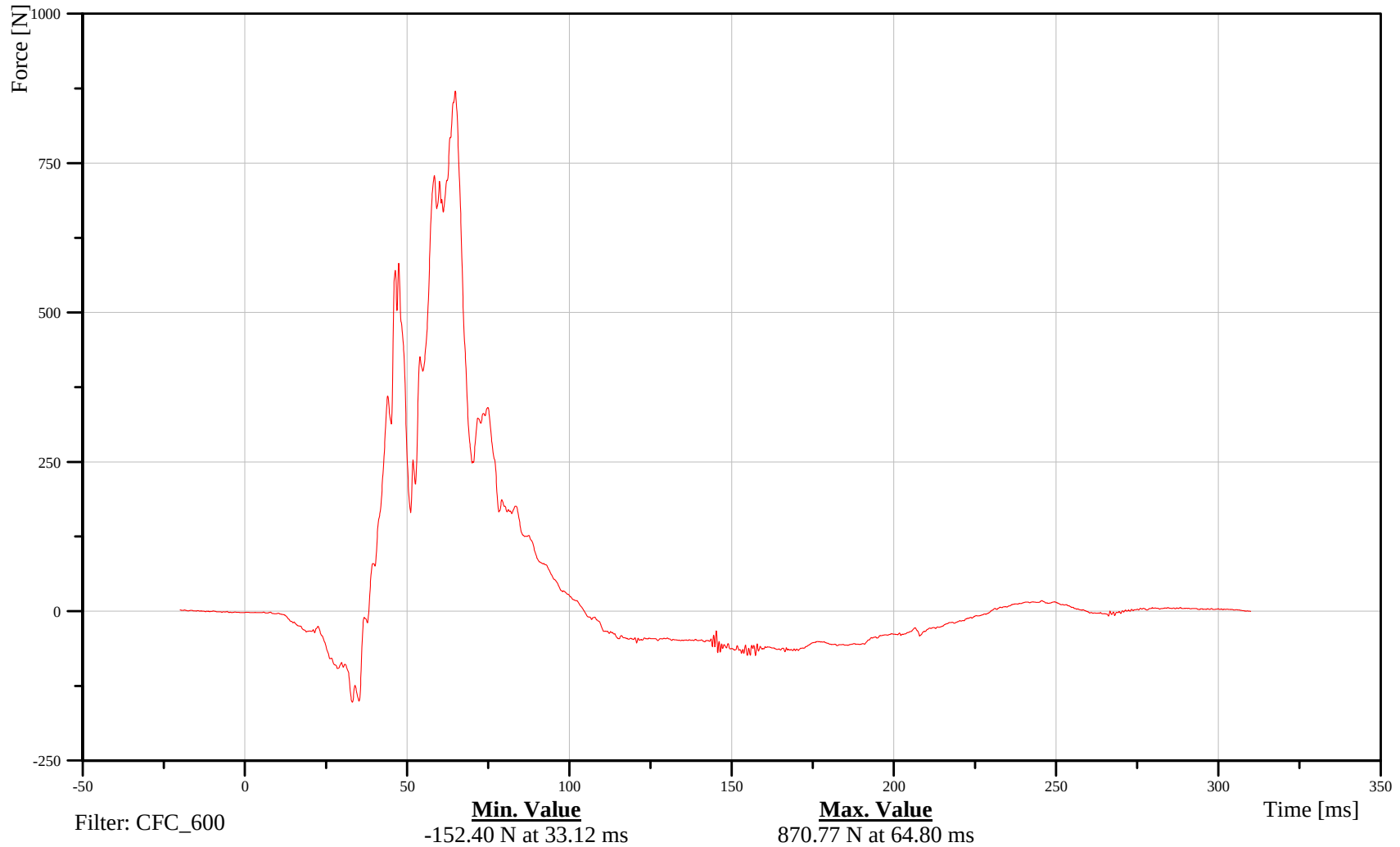
Date: 09/27/2006
Time: 13:07

Passenger Right Upper Tibia X-Axis Force

Customer: NHTSA
Test Number: M60518

13TIBIRU00H3FOX B

TRC Inc. Test Lab: CTF
Test Number: 060927



B-105

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

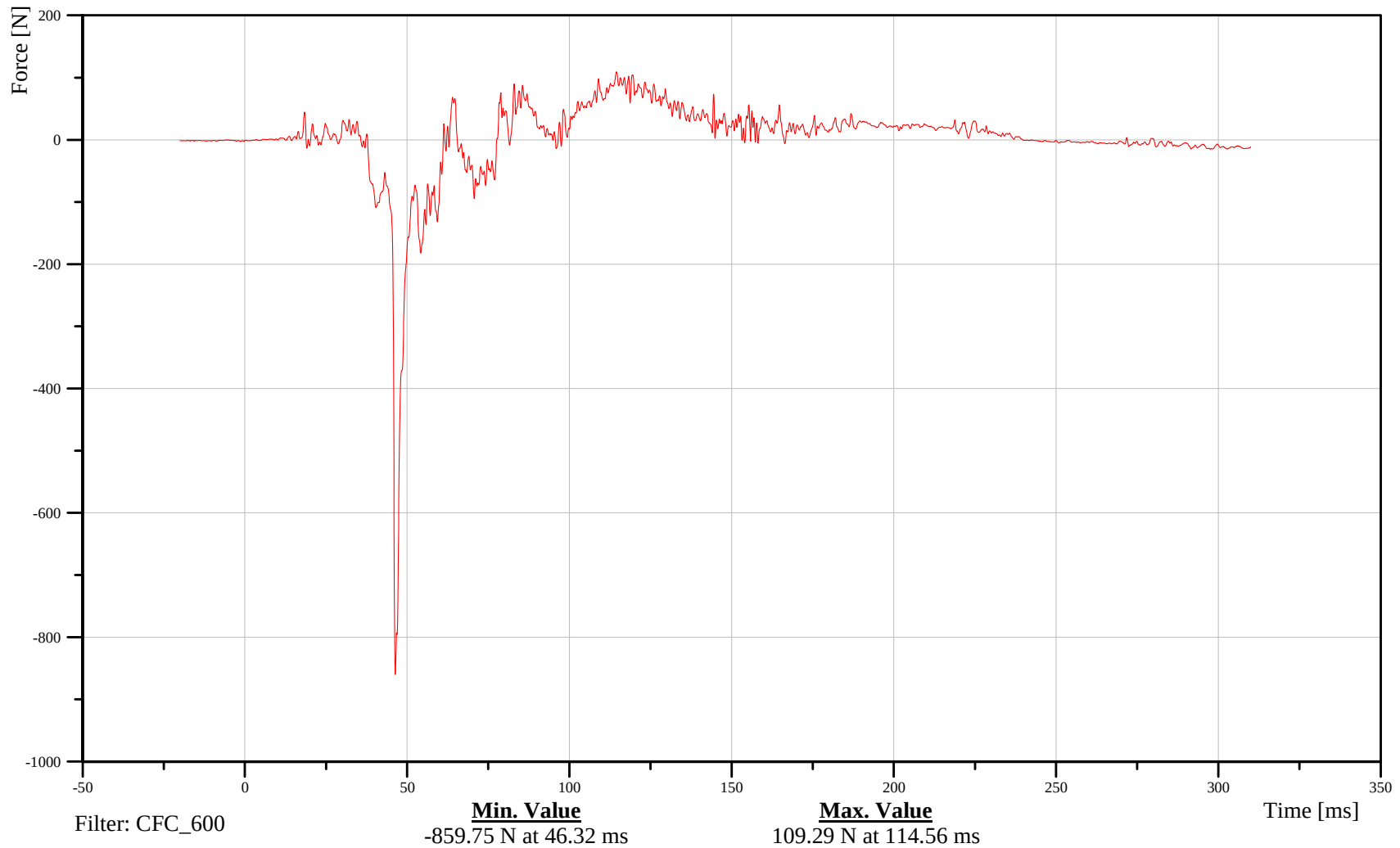
Date: 09/27/2006
Time: 13:07

Passenger Right Upper Tibia Y-Axis Force

Customer: NHTSA
Test Number: M60518

13TIBIRU00H3FOYB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-106

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Upper Tibia Z-Axis Force

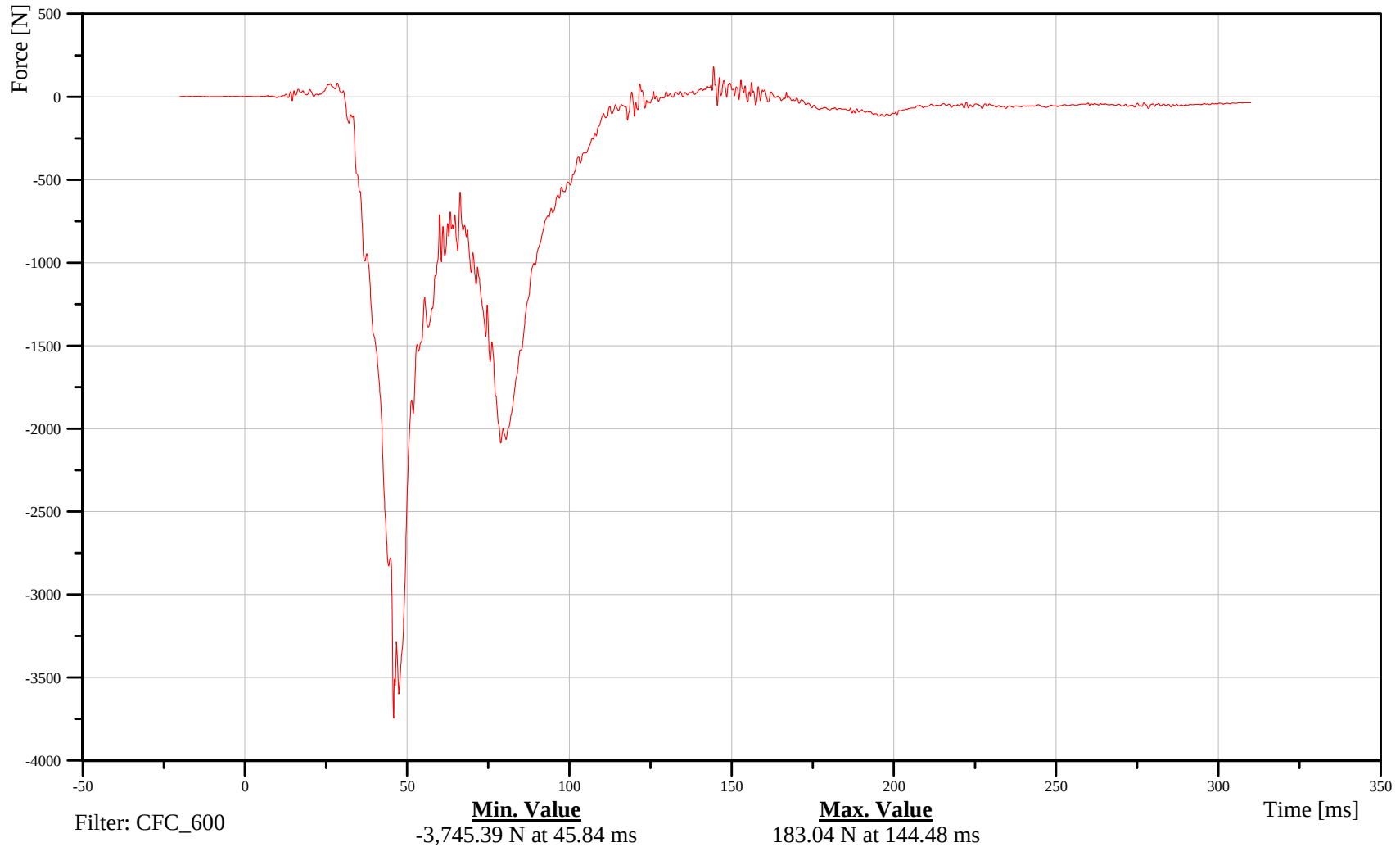
Customer: NHTSA

Test Number: M60518

13TIBIRU00H3FOZB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-107

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Upper Tibia Moment About X Axis

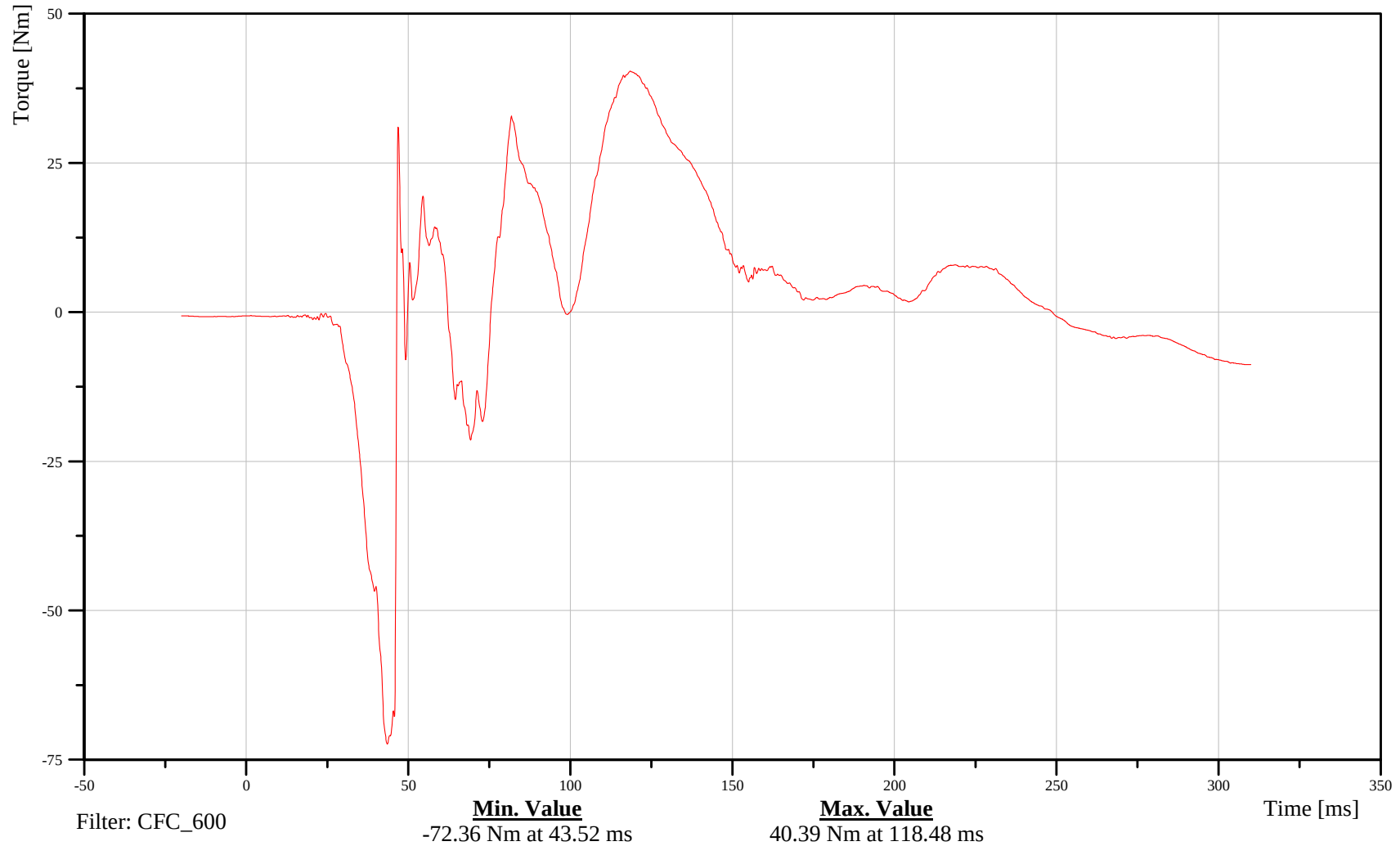
Customer: NHTSA

Test Number: M60518

13TIBIRU00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-108

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Upper Tibia Moment About Y Axis

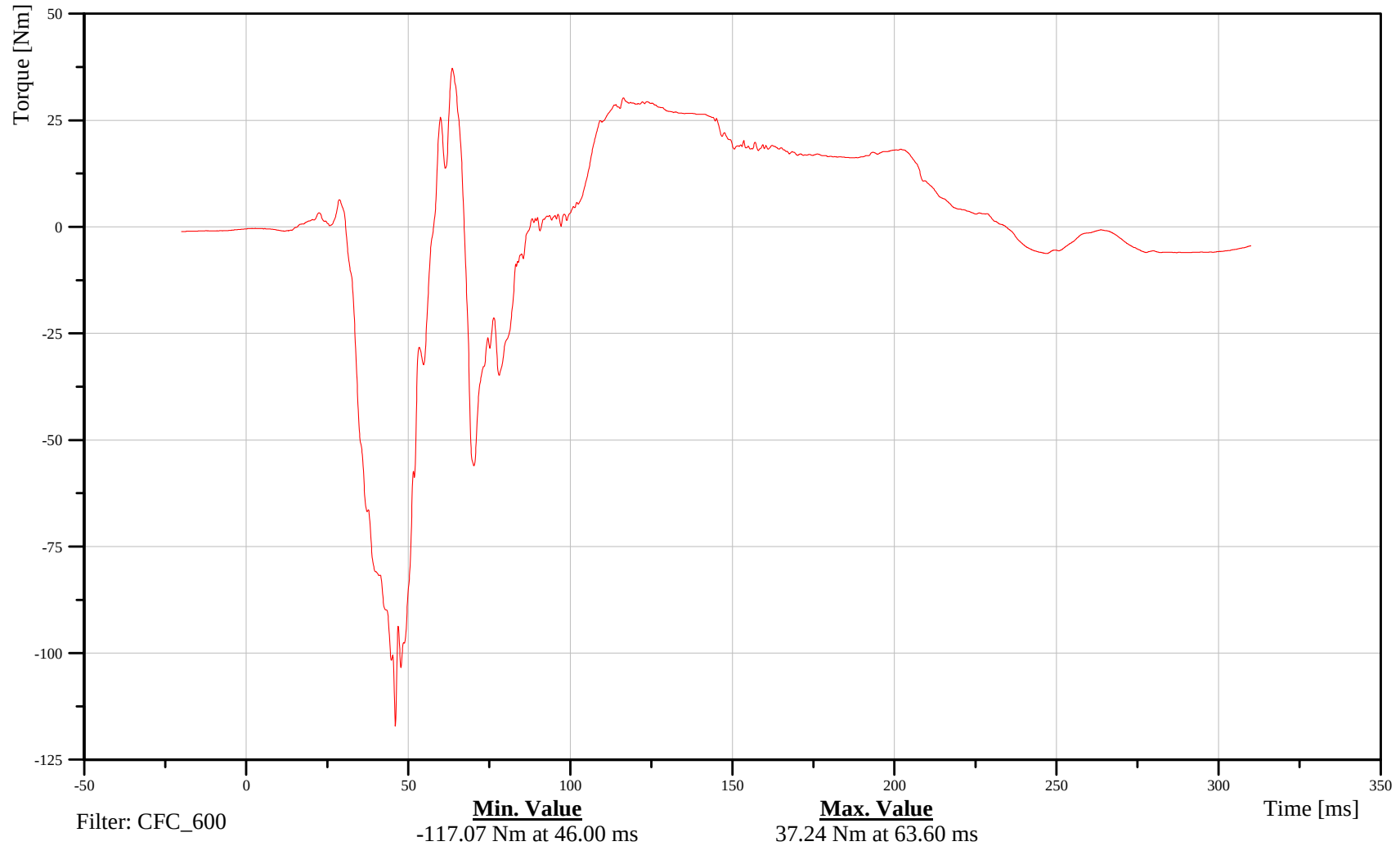
Customer: NHTSA

Test Number: M60518

13TIBIRU00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-109

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

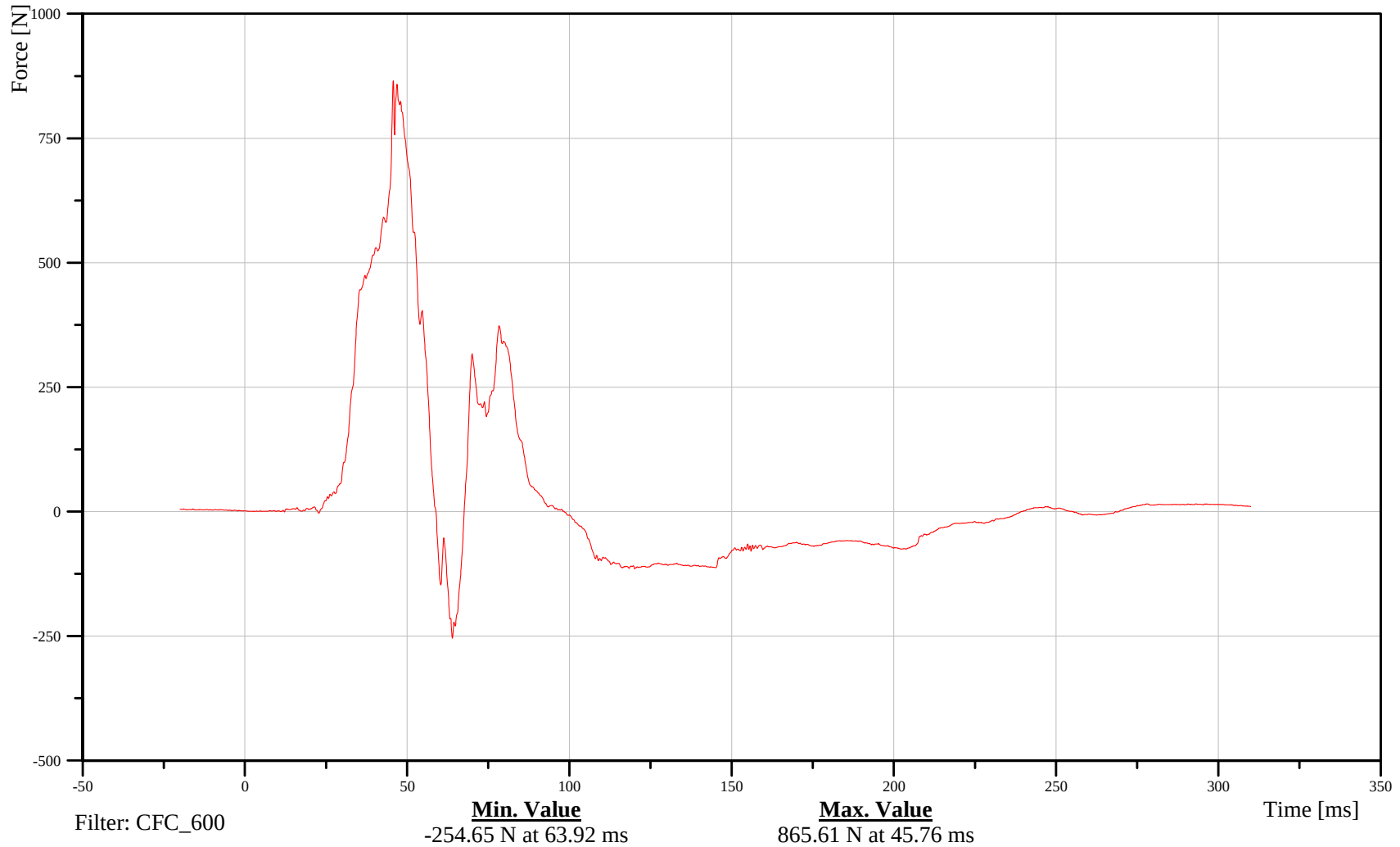
Date: 09/27/2006
Time: 13:07

Passenger Right Lower Tibia X-Axis Force

Customer: NHTSA
Test Number: M60518

13TIBIRL00H3FOXB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-110

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Lower Tibia Y-Axis Force

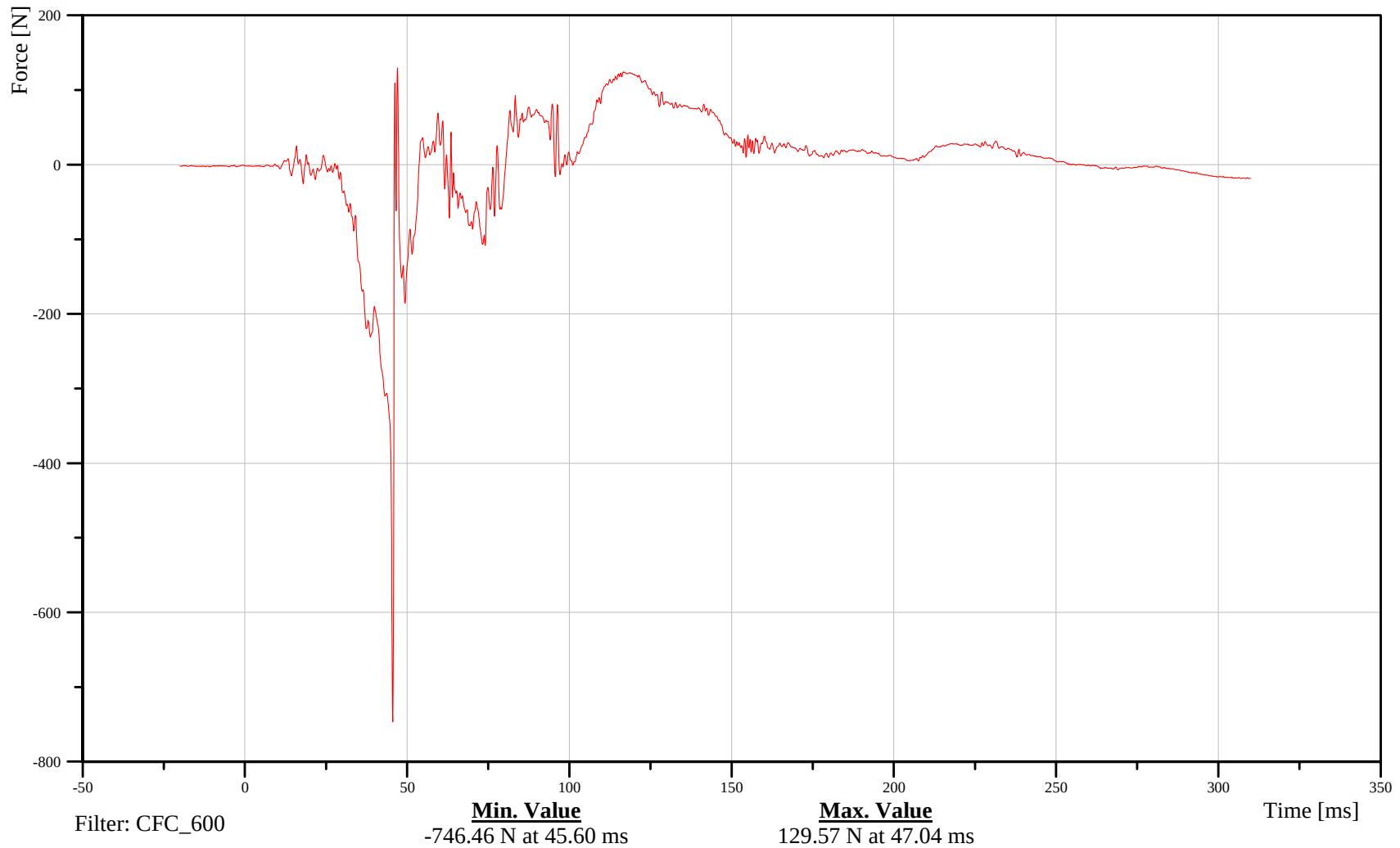
Customer: NHTSA

Test Number: M60518

13TIBIRL00H3FOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-111

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

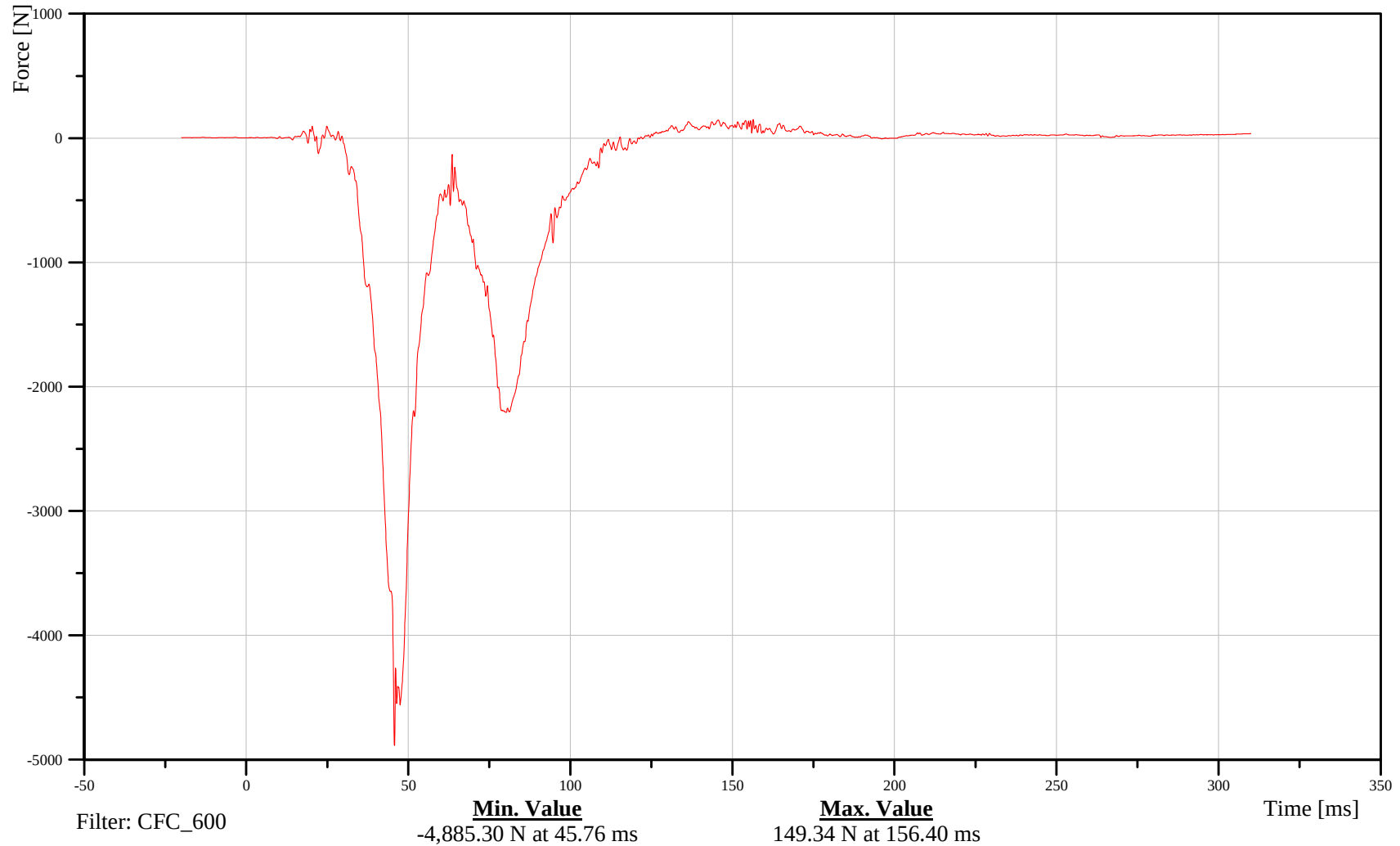
Date: 09/27/2006
Time: 13:07

Passenger Right Lower Tibia Z-Axis Force

Customer: NHTSA
Test Number: M60518

13TIBIRL00H3FOZB

TRC Inc. Test Lab: CTF
Test Number: 060927



B-112

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Lower Tibia Moment About X Axis

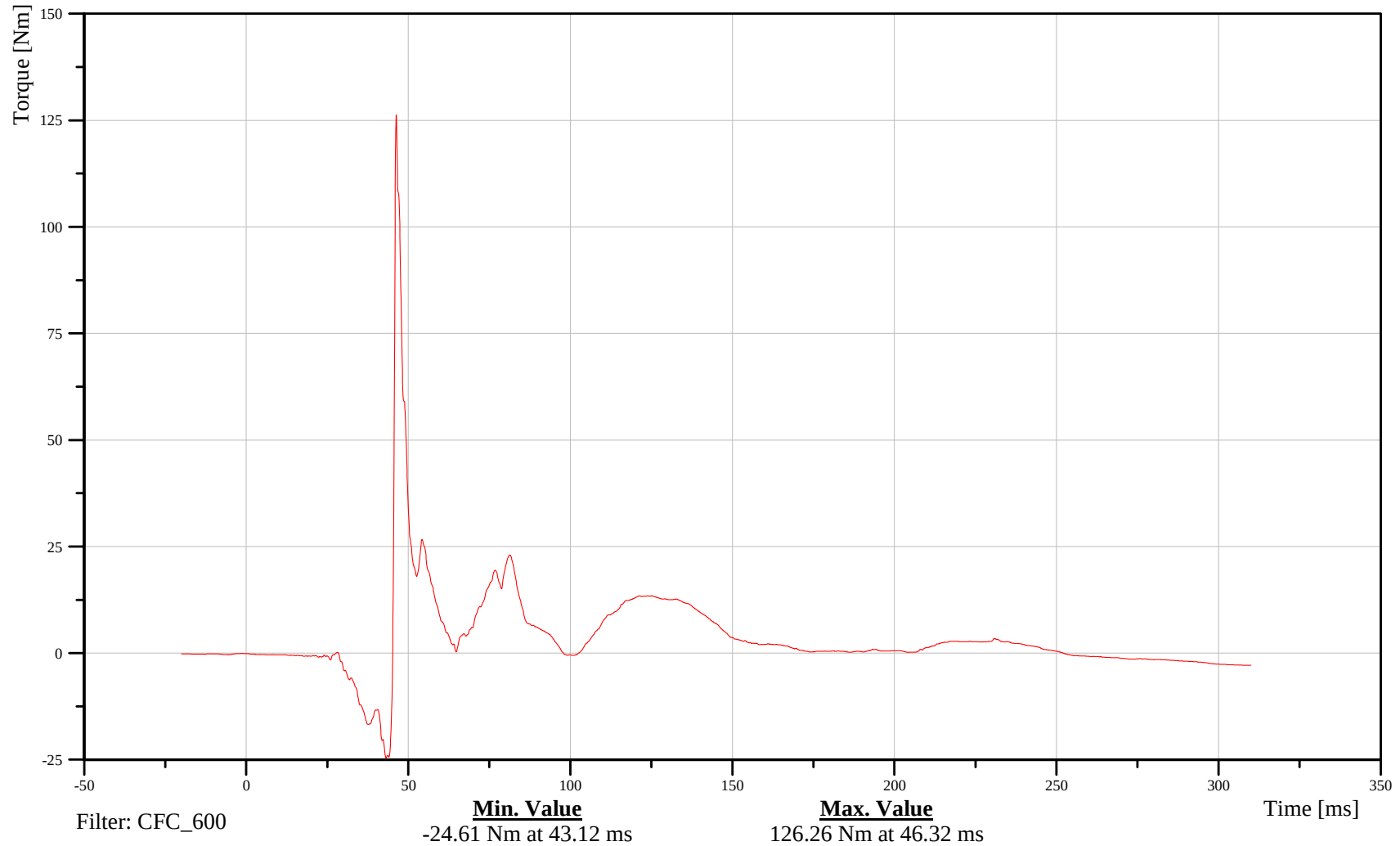
Customer: NHTSA

Test Number: M60518

13TIBIRL00H3MOXB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-113

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Lower Tibia Moment About Y Axis

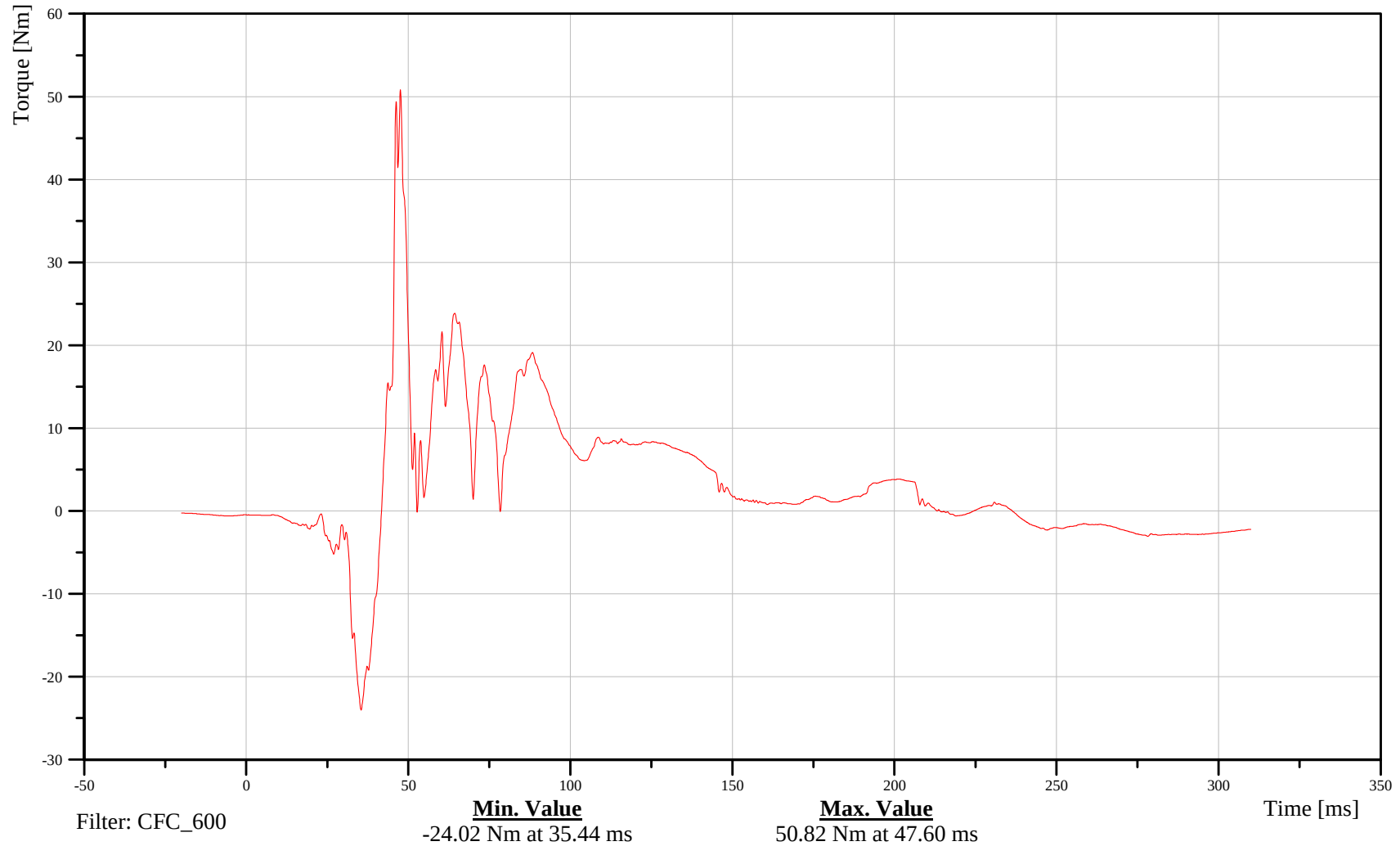
Customer: NHTSA

Test Number: M60518

13TIBIRL00H3MOYB

TRC Inc. Test Lab: CTF

Test Number: 060927



B-114

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

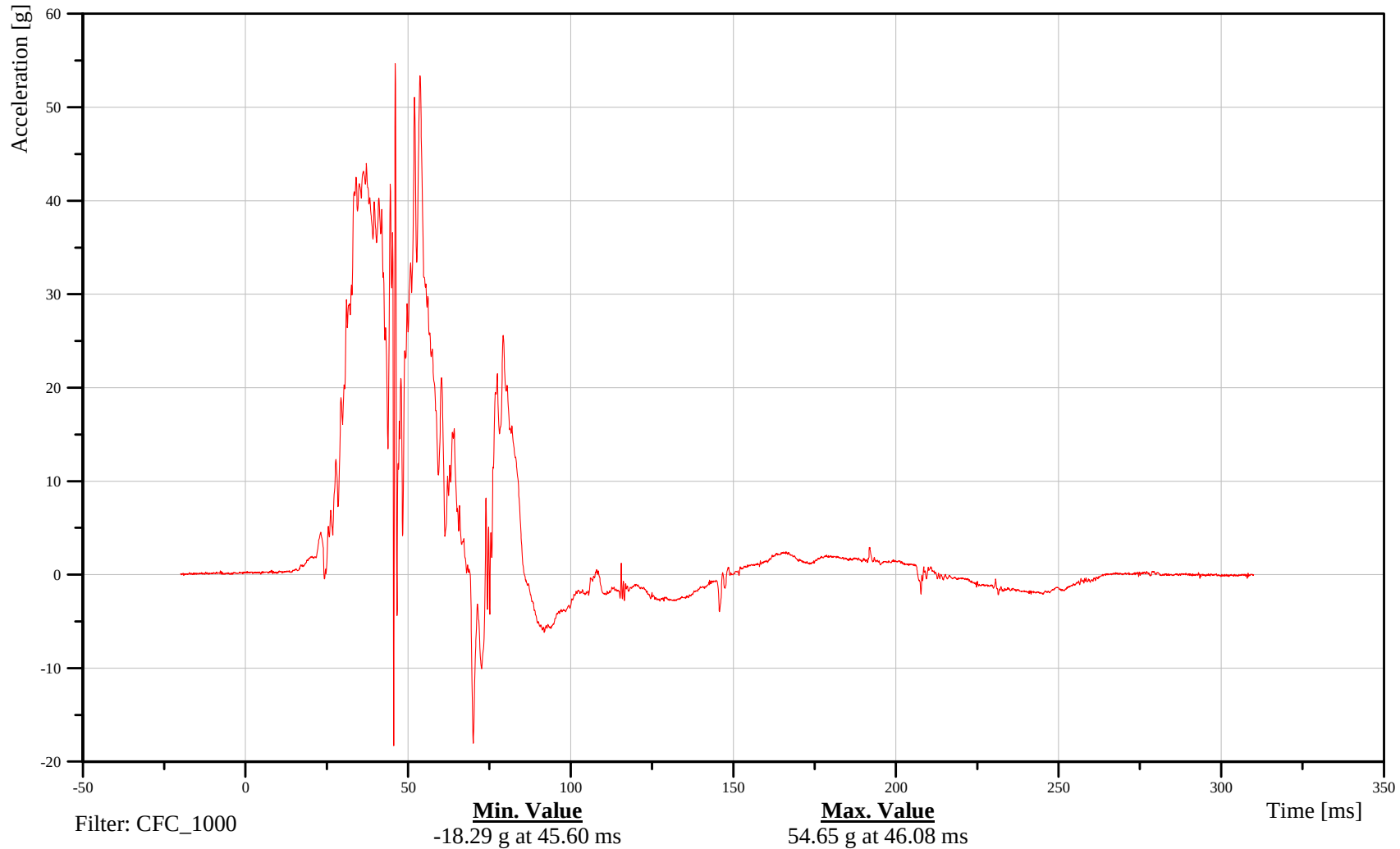
Date: 09/27/2006
Time: 13:07

Passenger Right Foot X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

13FOOTRI00H3ACXA

TRC Inc. Test Lab: CTF
Test Number: 060927



B-115

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Foot Z-Axis Acceleration

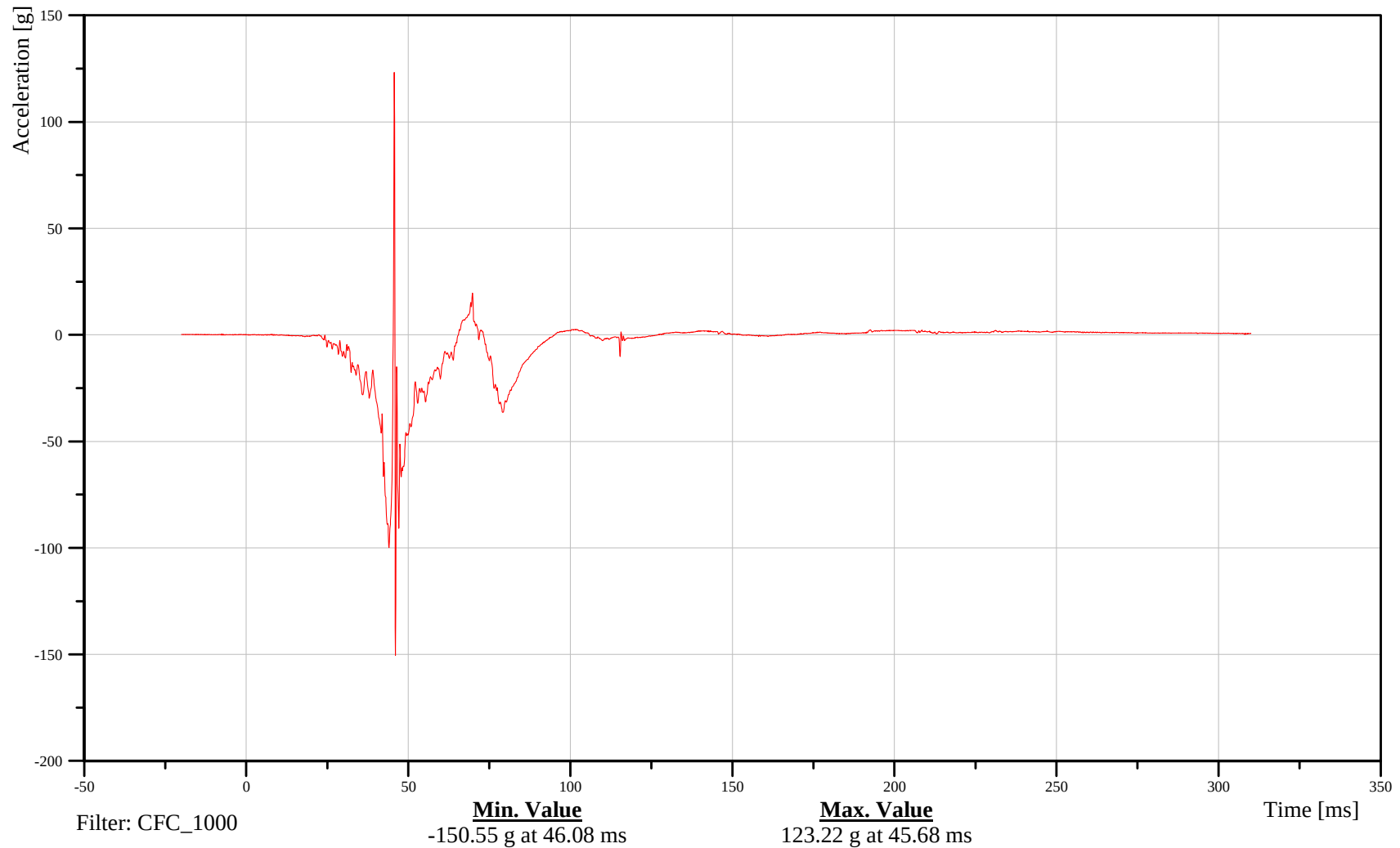
Customer: NHTSA

Test Number: M60518

13FOOTRI00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-116

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Right Toe Z-Axis Acceleration

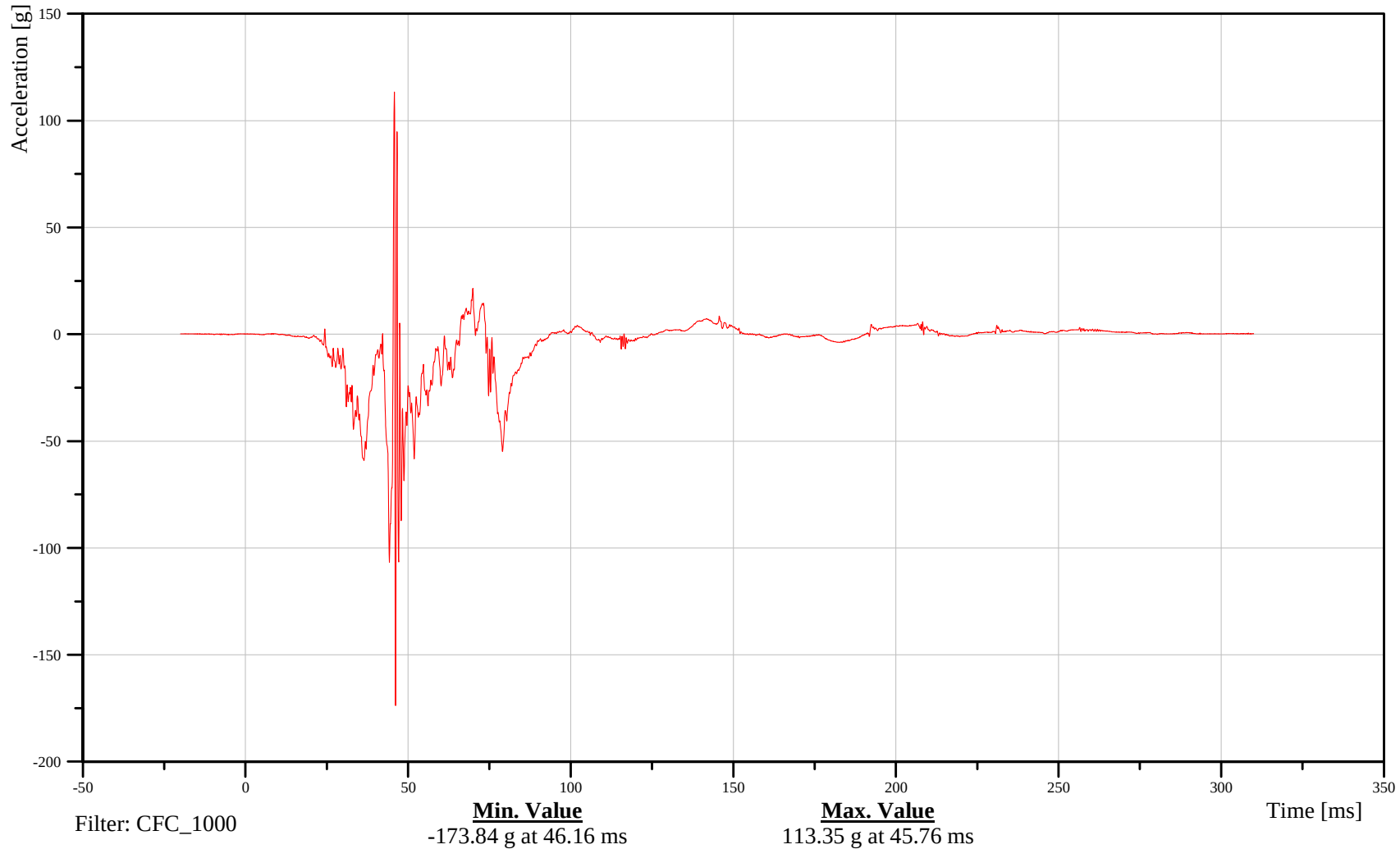
Customer: NHTSA

Test Number: M60518

13TOESRI00H3ACZA

TRC Inc. Test Lab: CTF

Test Number: 060927



B-117

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

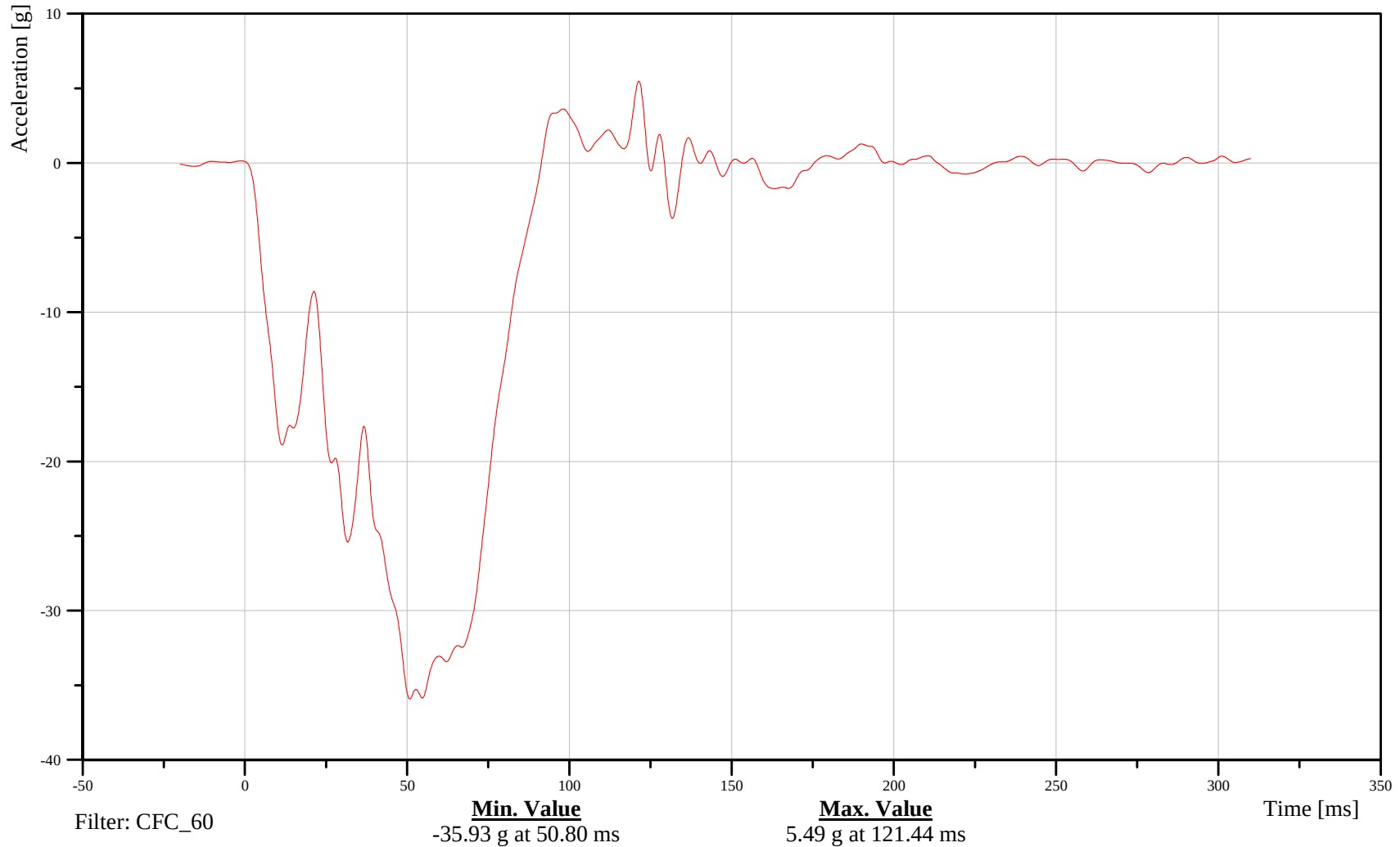
Left Rear Seat Crossmember X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

14CRME000000ACXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-118

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Right Rear Seat Crossmember X-Axis Acceleration

Time: 13:07

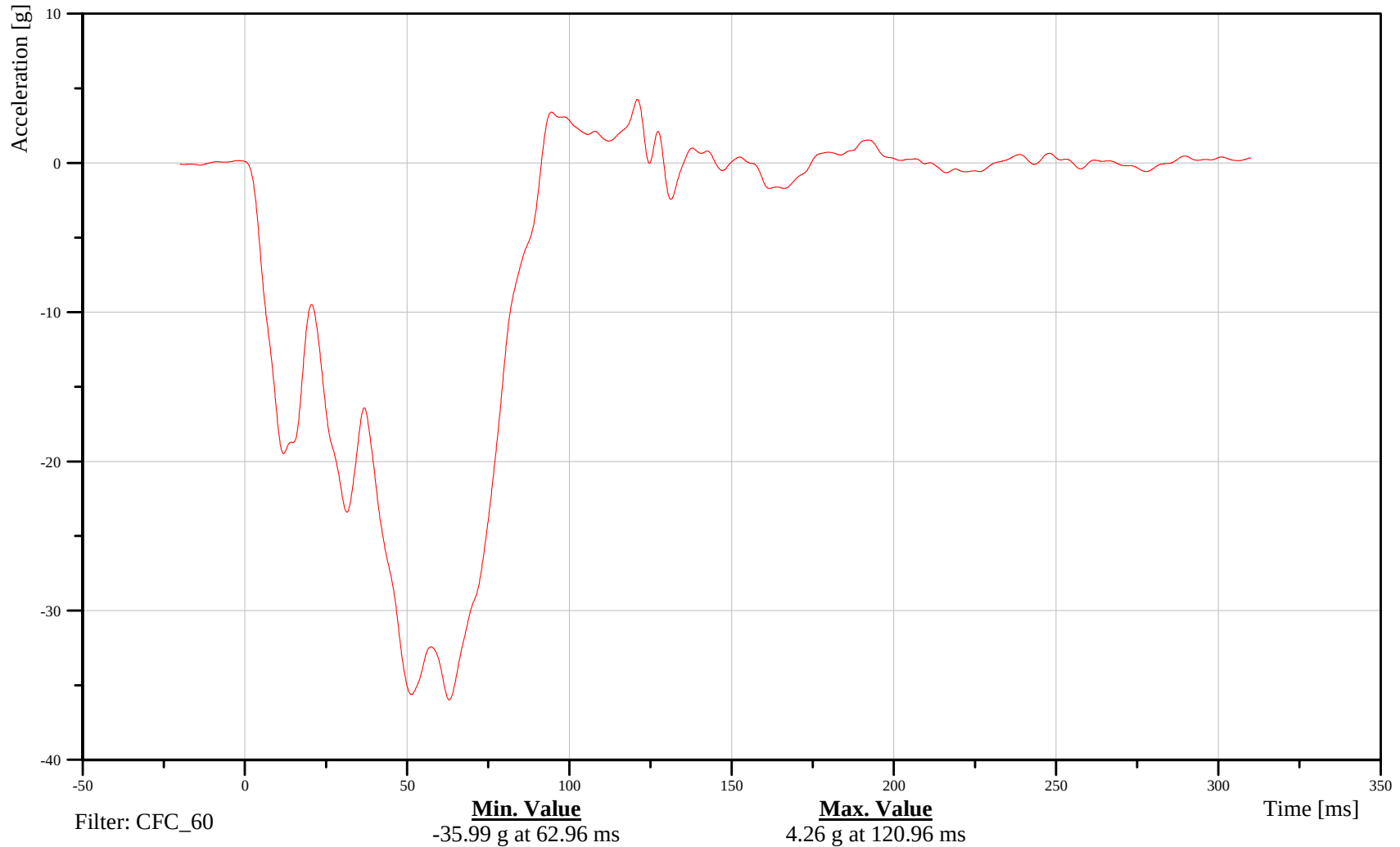
Customer: NHTSA

Test Number: M60518

16CRME000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 060927



B-119

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Left Rear Seat Crossmember Z-Axis Acceleration

Date: 09/27/2006

Time: 13:07

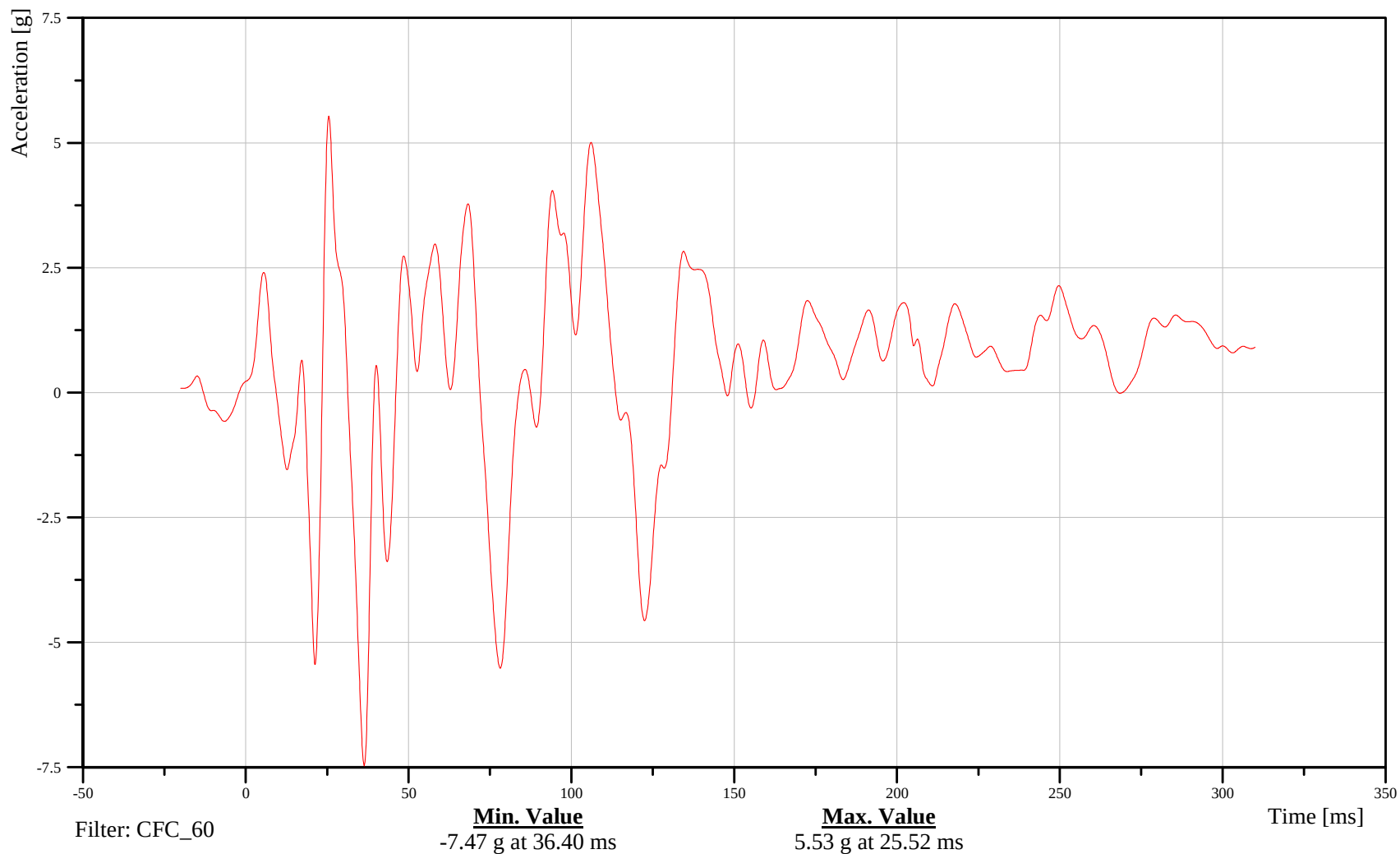
Customer: NHTSA

Test Number: M60518

14CRME000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 060927



B-120

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Right Rear Seat Crossmember Z-Axis Acceleration

Time: 13:07

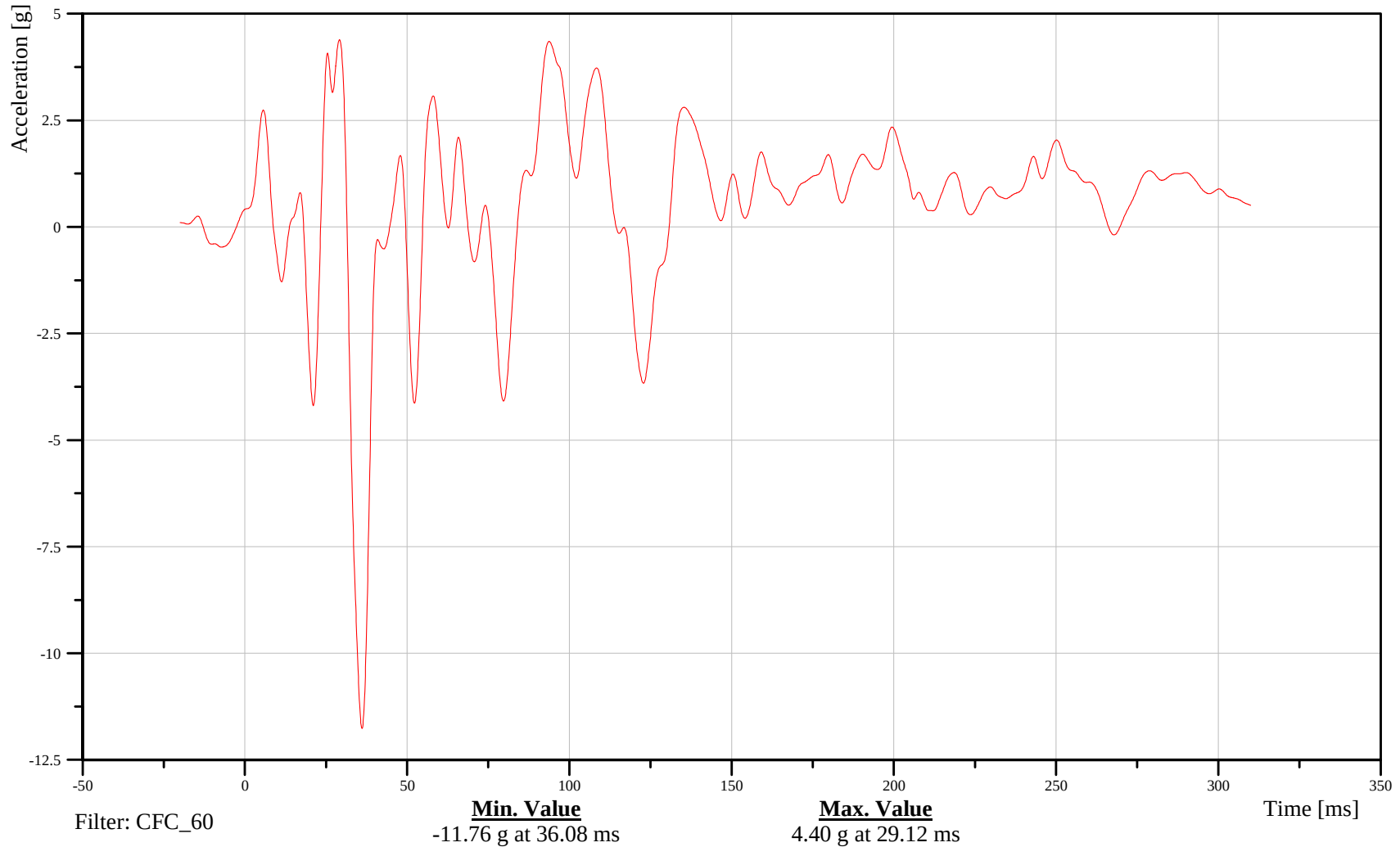
Customer: NHTSA

Test Number: M60518

16CRME000000ACZD

TRC Inc. Test Lab: CTF

Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Top of Engine Block X-Axis Acceleration

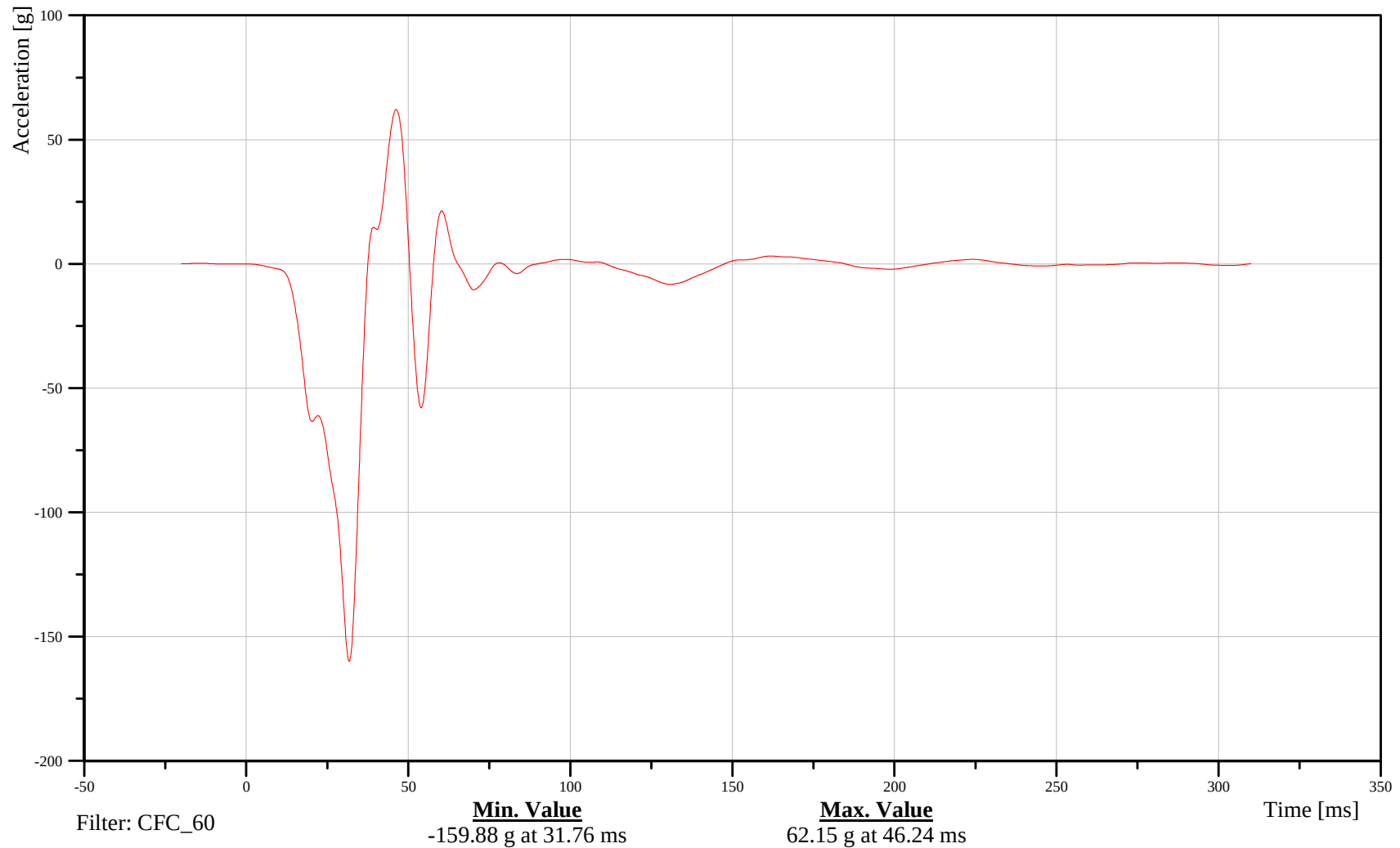
Customer: NHTSA

Test Number: M60518

12ENGNTTP0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 060927



B-122

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

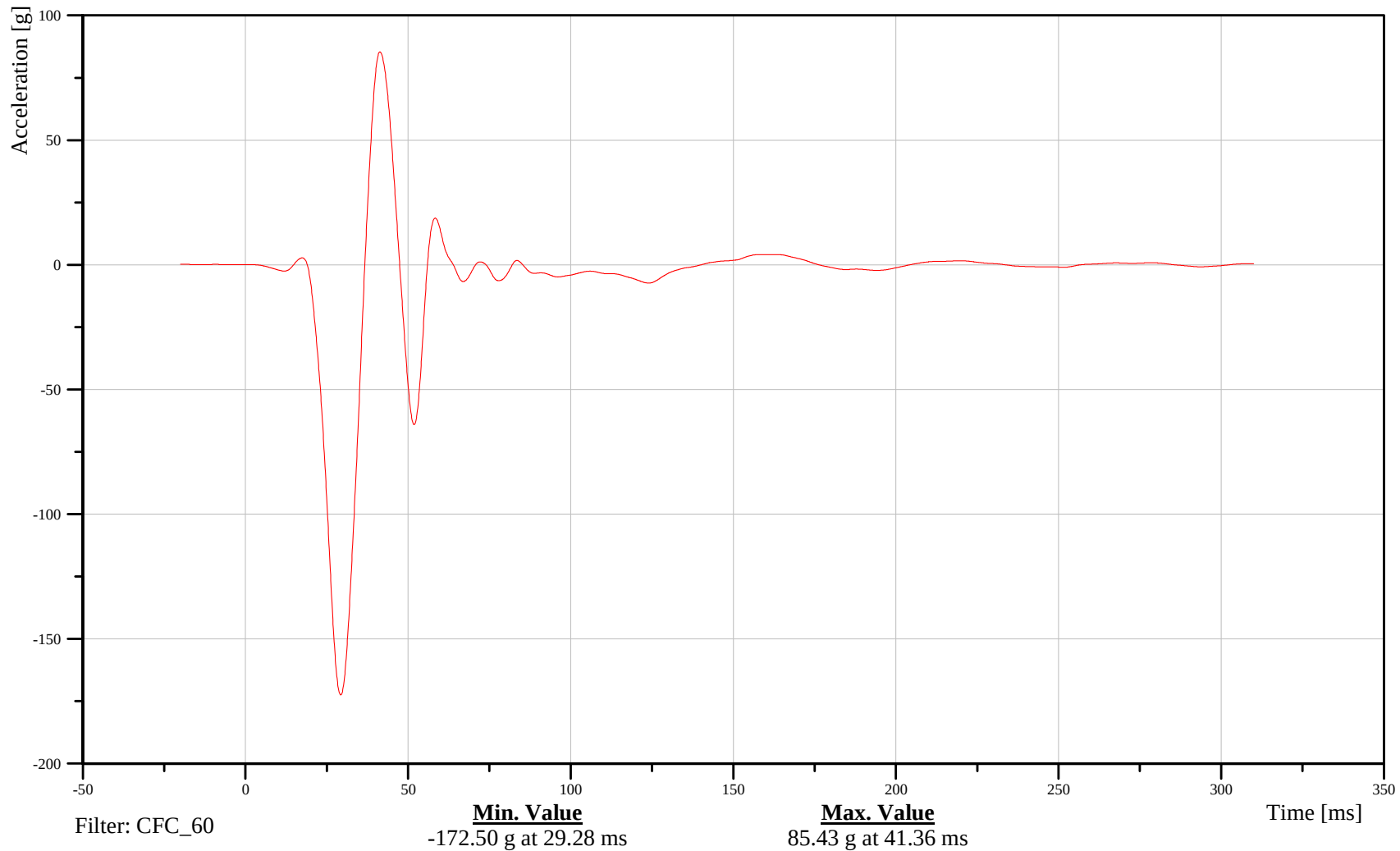
Date: 09/27/2006
Time: 13:07

Bottom of Engine Block X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

12ENGNBO0000ACXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-123

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

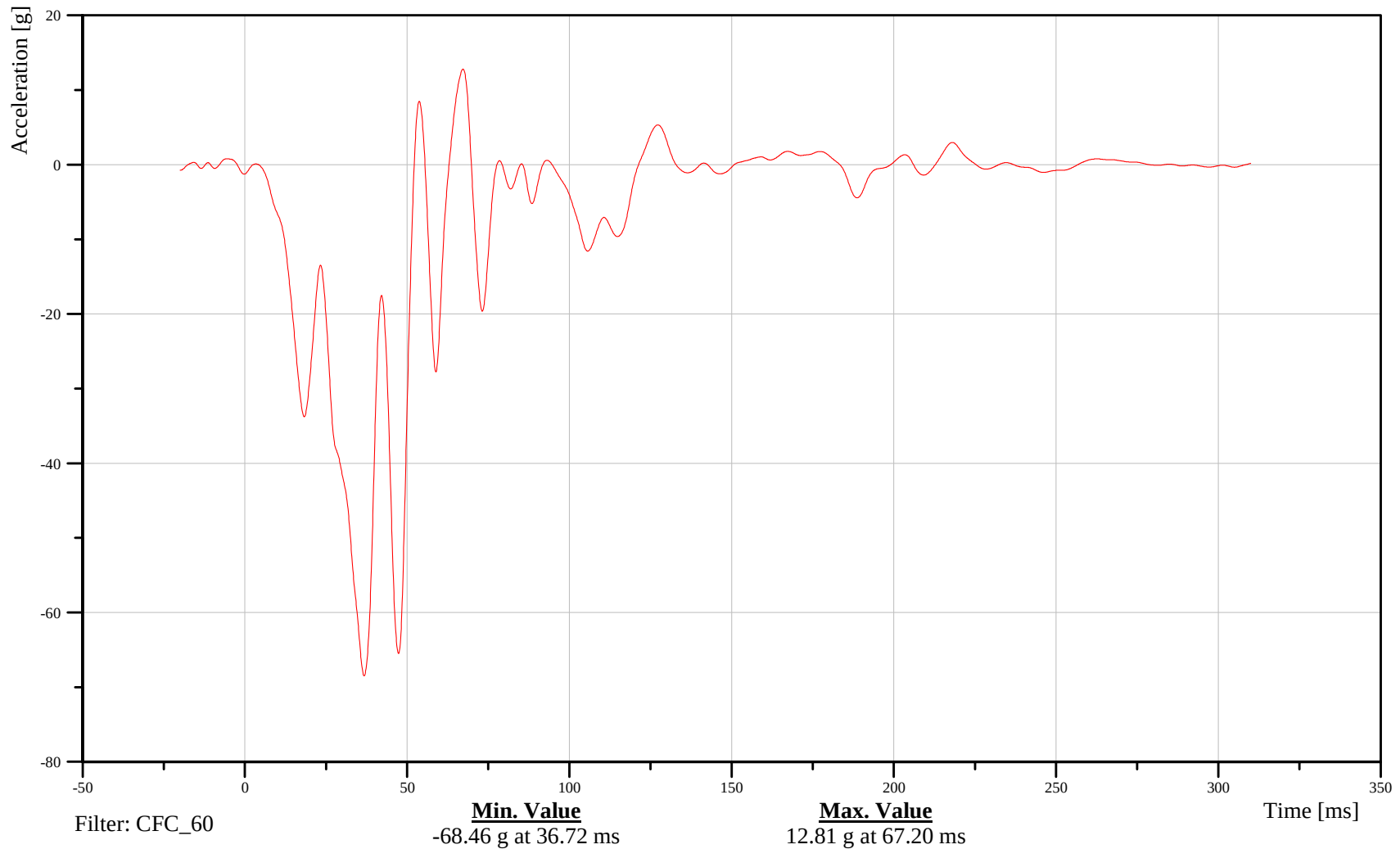
Date: 09/27/2006
Time: 13:07

Right Brake Caliper X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

13VEHCRI0000ACXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-124

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

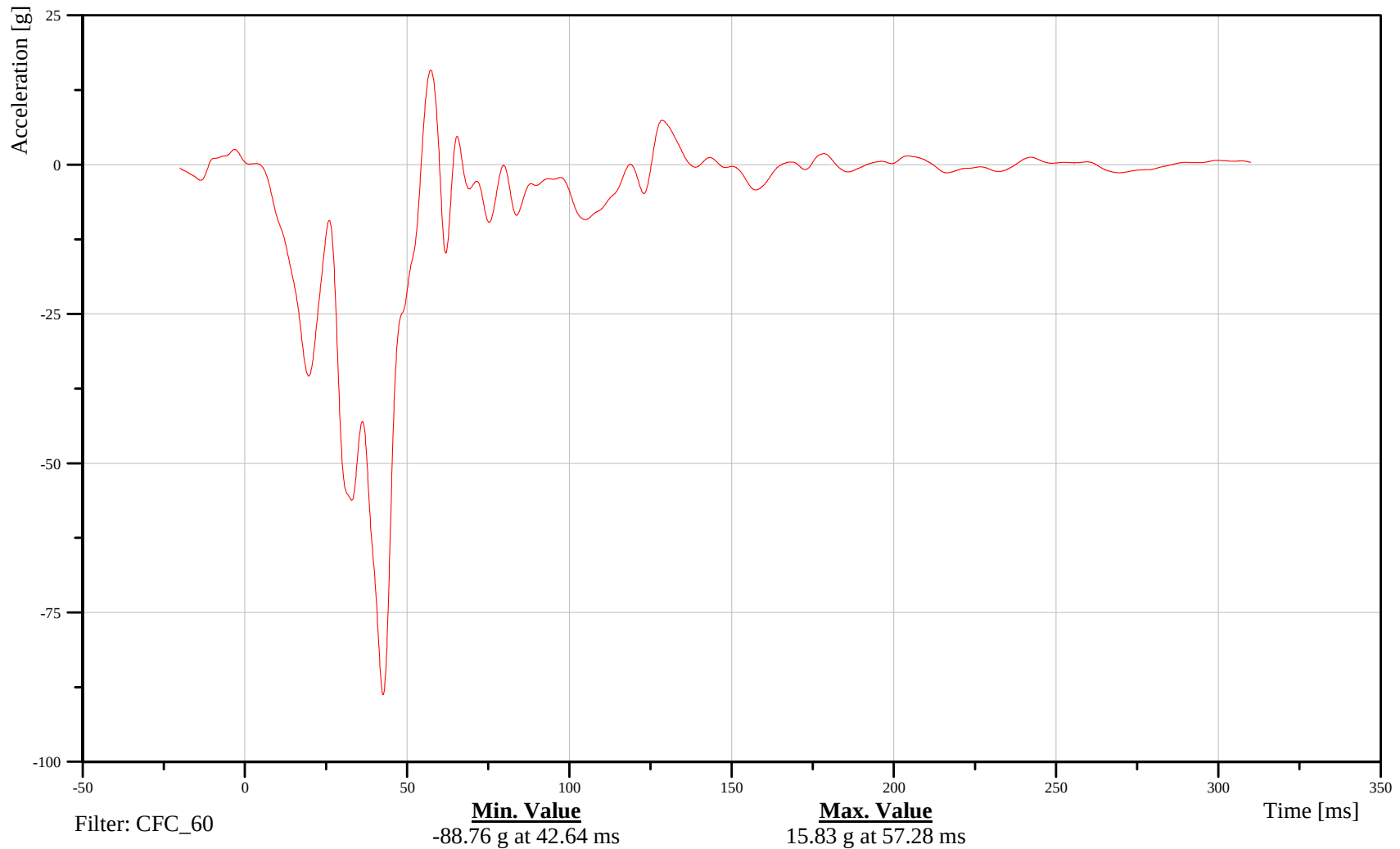
Left Brake Caliper X-Axis Acceleration

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11VEHICLE0000ACXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-125

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

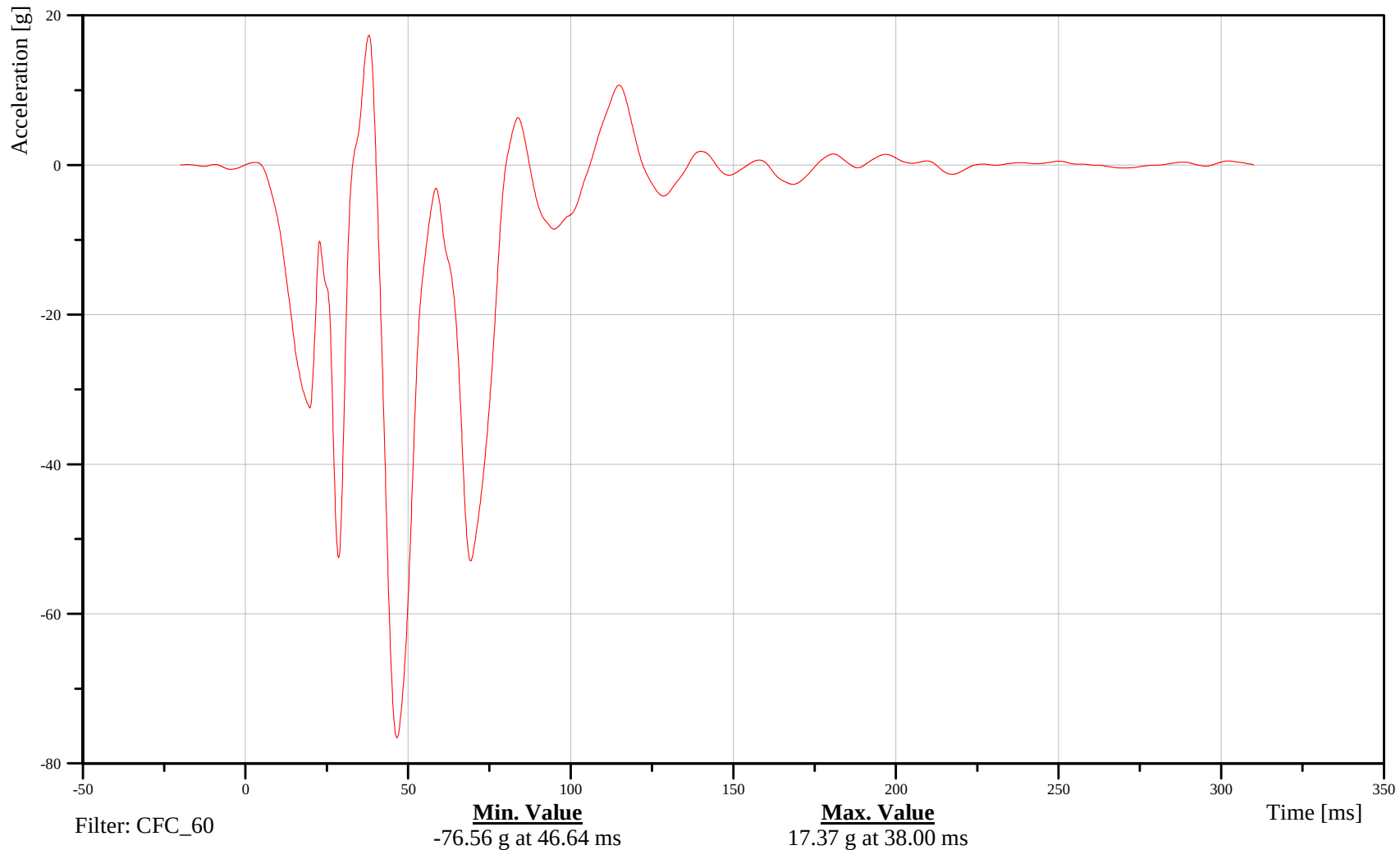
Date: 09/27/2006
Time: 13:07

Instrument Panel X-Axis Acceleration

Customer: NHTSA
Test Number: M60518

12DASH000000ACXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-126

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

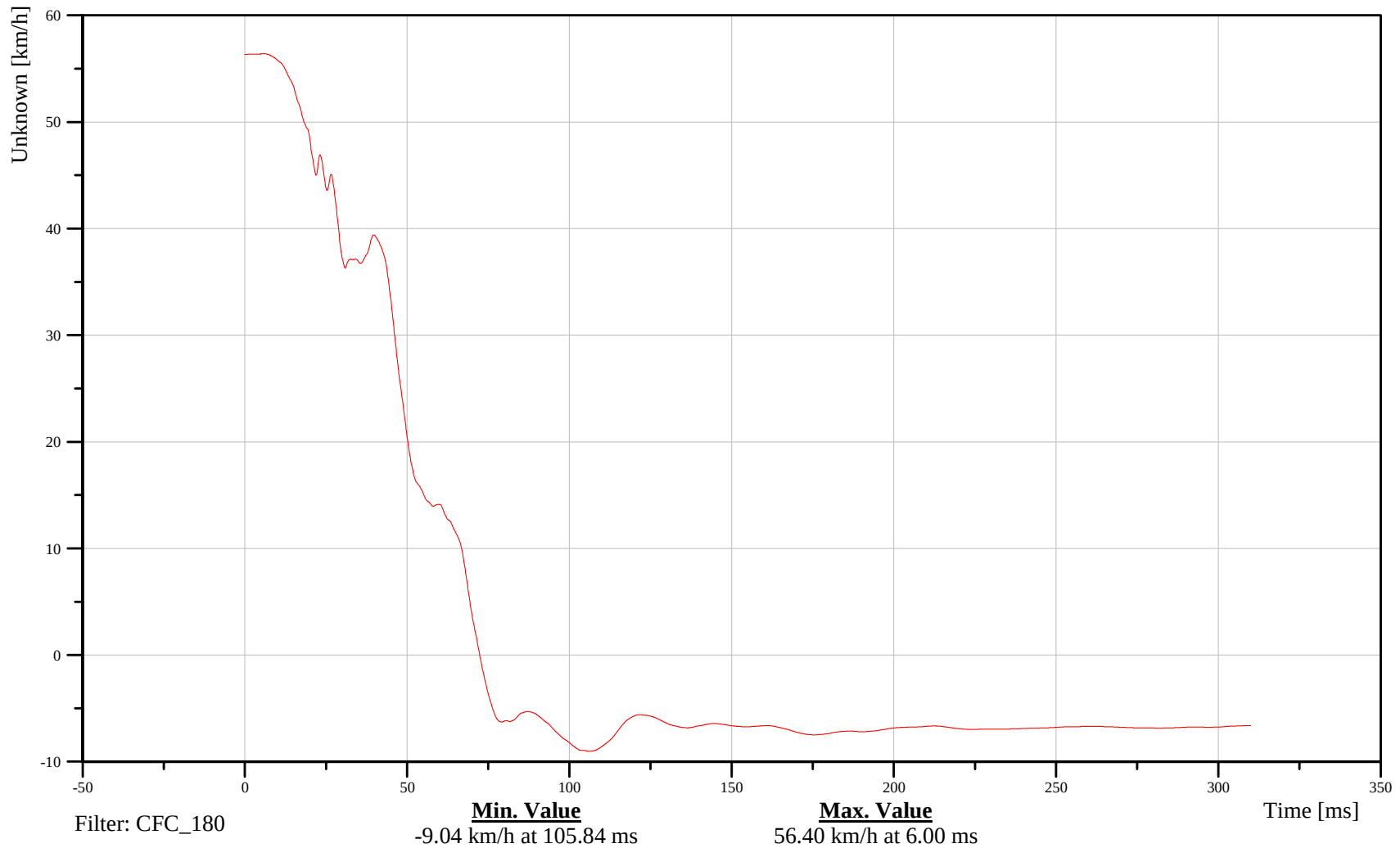
Date: 09/27/2006
Time: 13:07

Instrument Panel X-Axis Velocity

Customer: NHTSA
Test Number: M60518

12DASH000000VEXC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-127

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

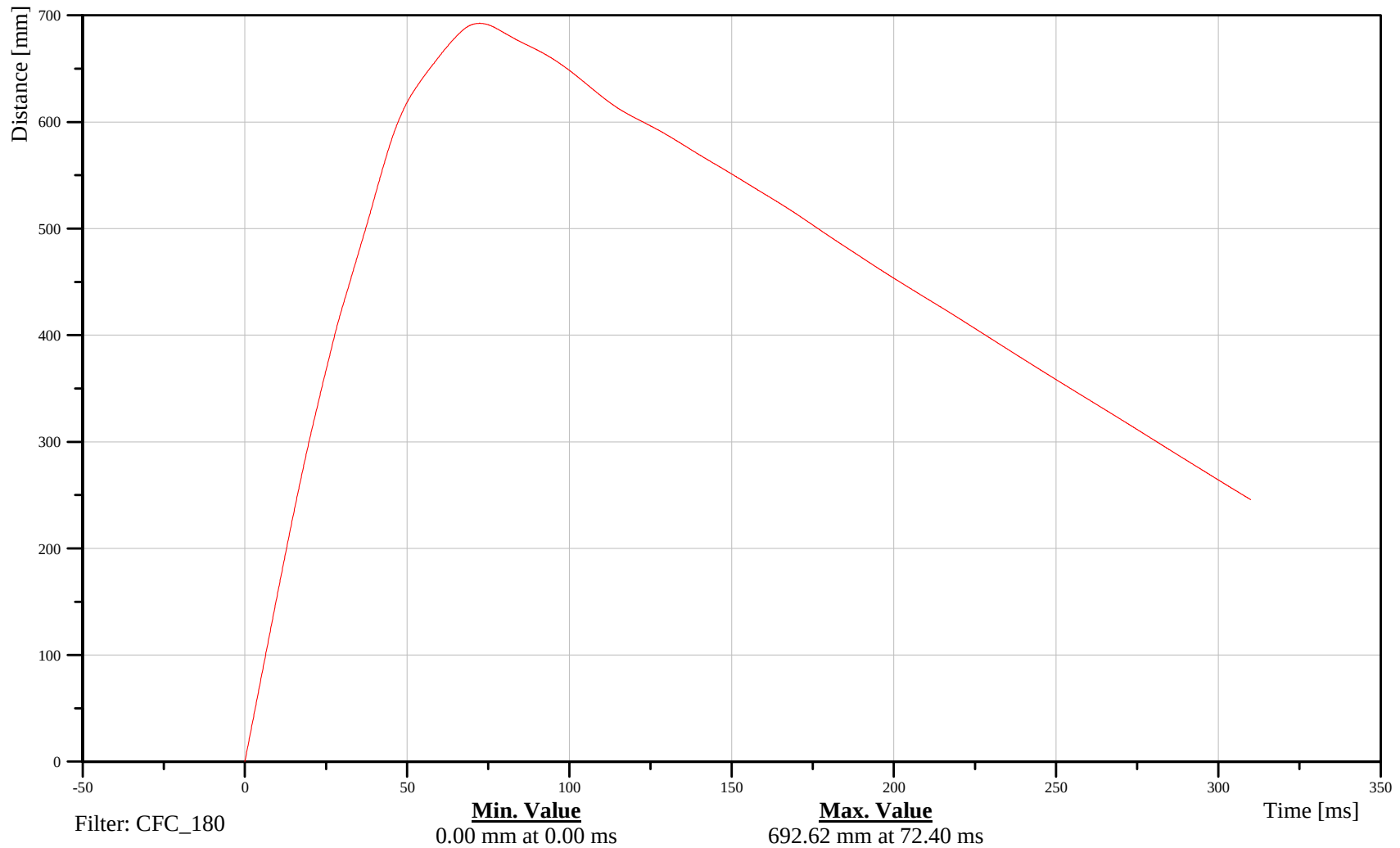
Instrument Panel X-Axis Displacement

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

12DASH000000DCXC

TRC Inc. Test Lab: CTF
Test Number: 060927



B-128

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

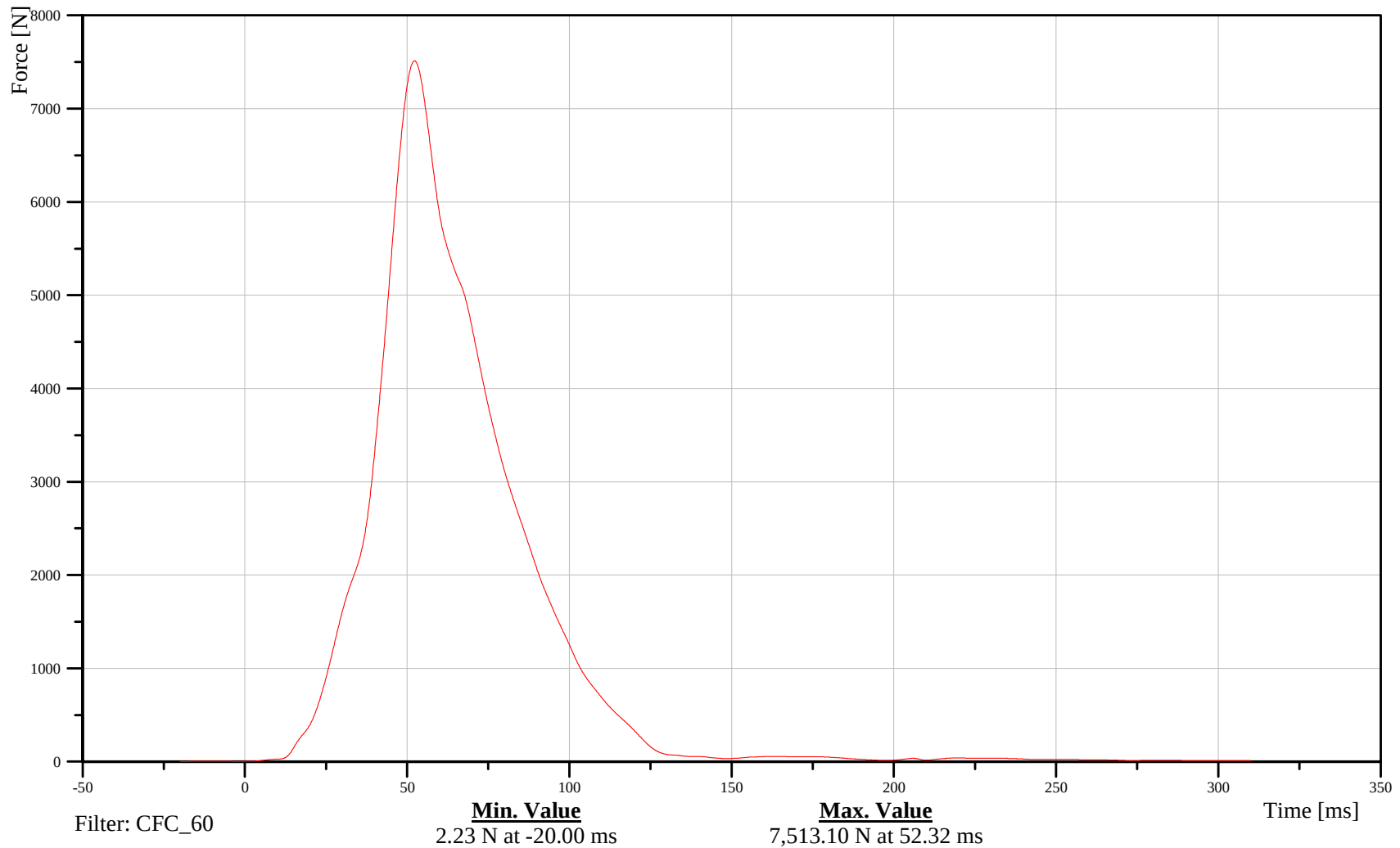
Date: 09/27/2006
Time: 13:07

Driver Lap Belt Force

Customer: NHTSA
Test Number: M60518

11SEBE0000B5FO0D

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

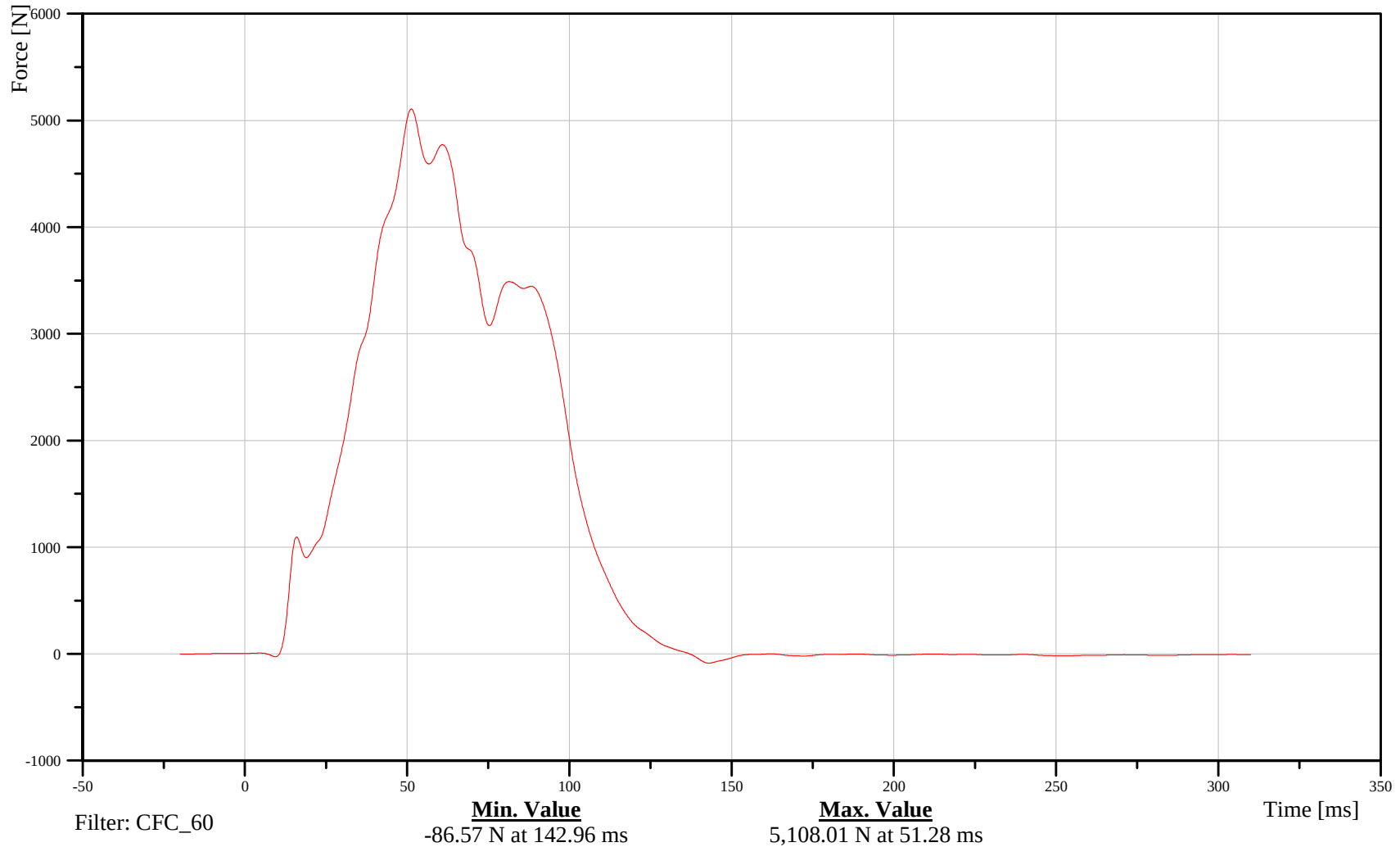
Date: 09/27/2006
Time: 13:07

Driver Shoulder Belt Force

Customer: NHTSA
Test Number: M60518

11SEBE0000B3FO0D

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

Date: 09/27/2006

Time: 13:07

Passenger Lap Belt Force

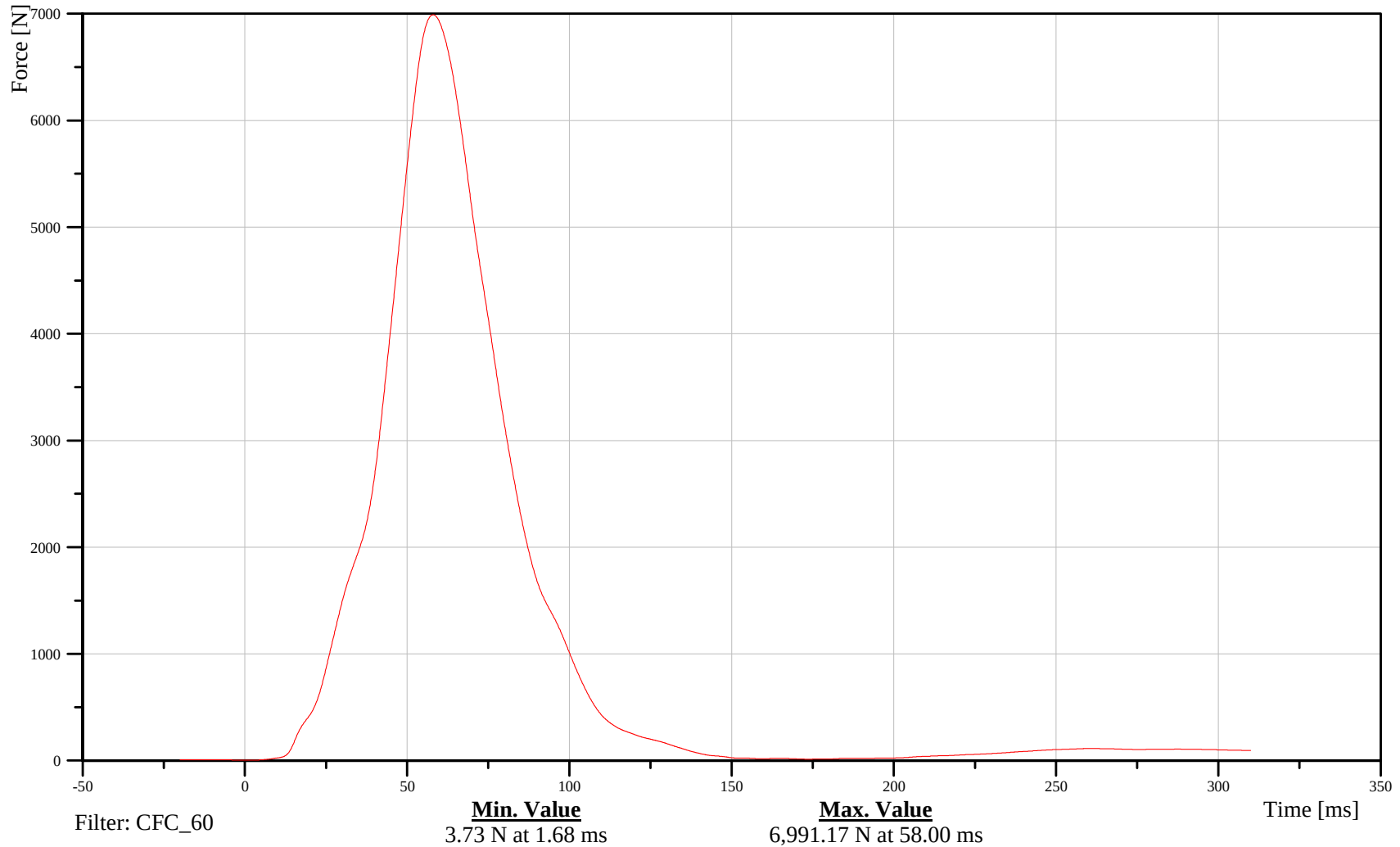
Customer: NHTSA

Test Number: M60518

13SEBE0000B5FO0D

TRC Inc. Test Lab: CTF

Test Number: 060927



B-131

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

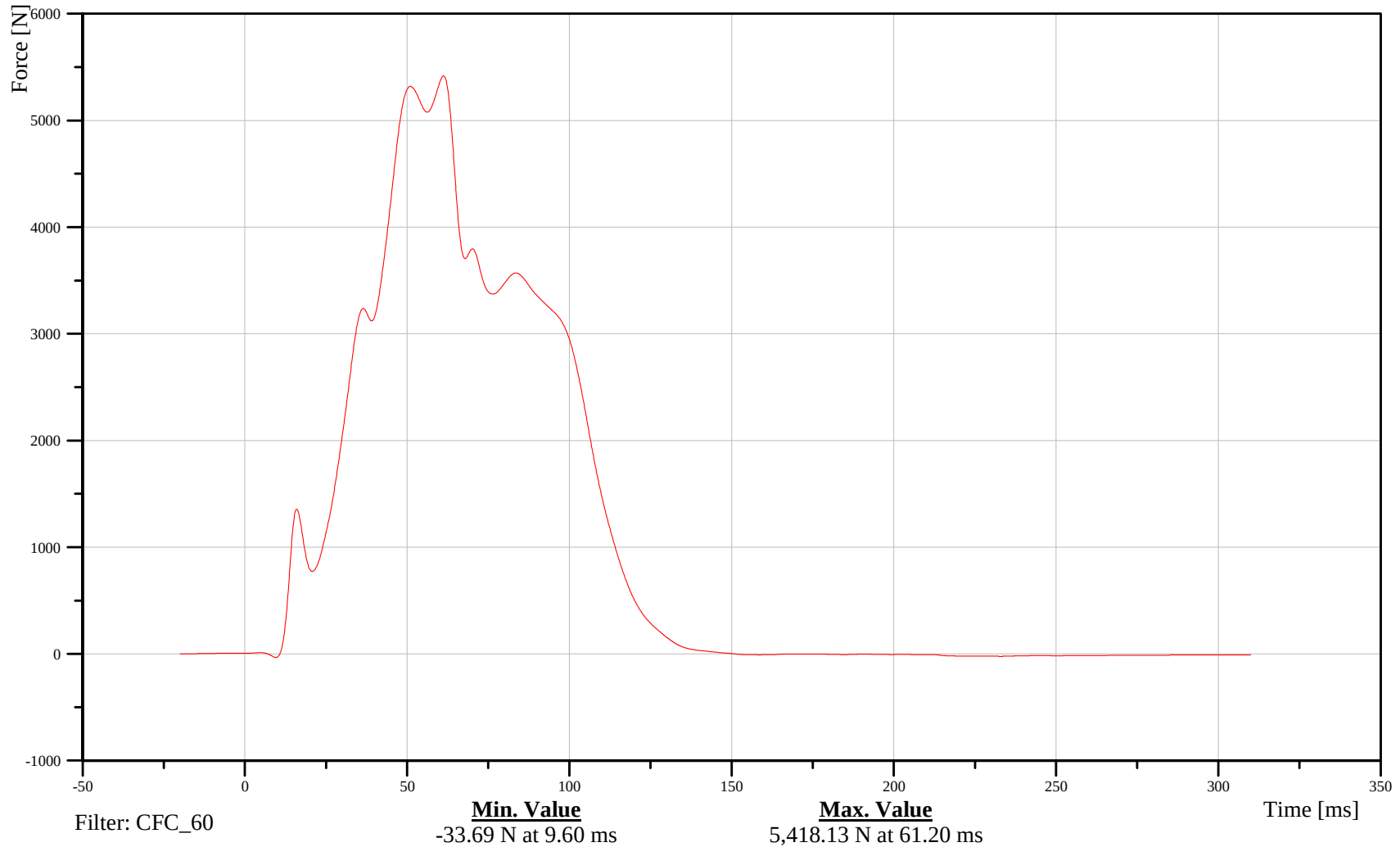
Date: 09/27/2006
Time: 13:07

Passenger Shoulder Belt Force

Customer: NHTSA
Test Number: M60518

13SEBE0000B3FO0D

TRC Inc. Test Lab: CTF
Test Number: 060927



B-132

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

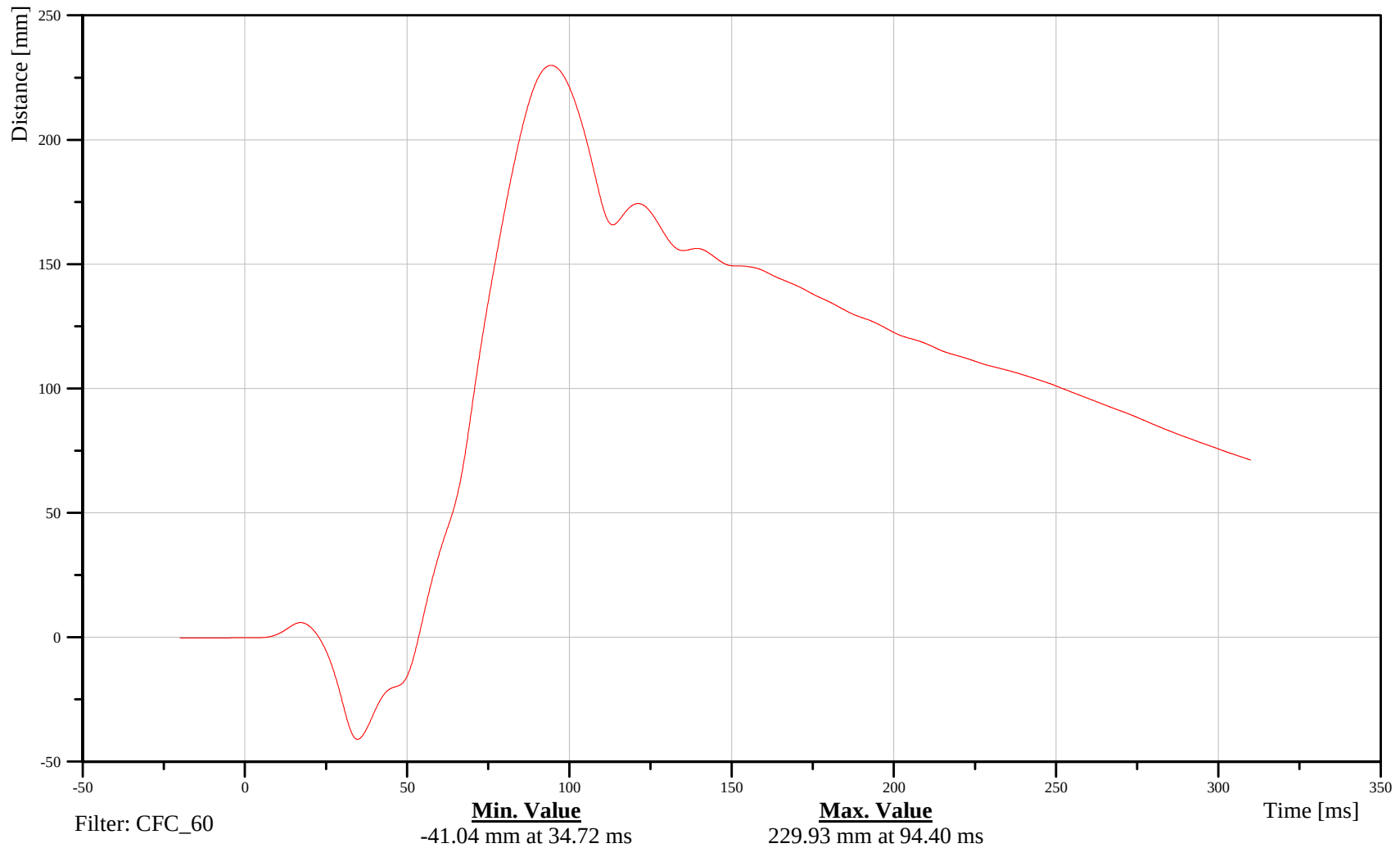
Driver Seat Belt String Pot

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11SEBE000001DS0D

TRC Inc. Test Lab: CTF
Test Number: 060927



B-133

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

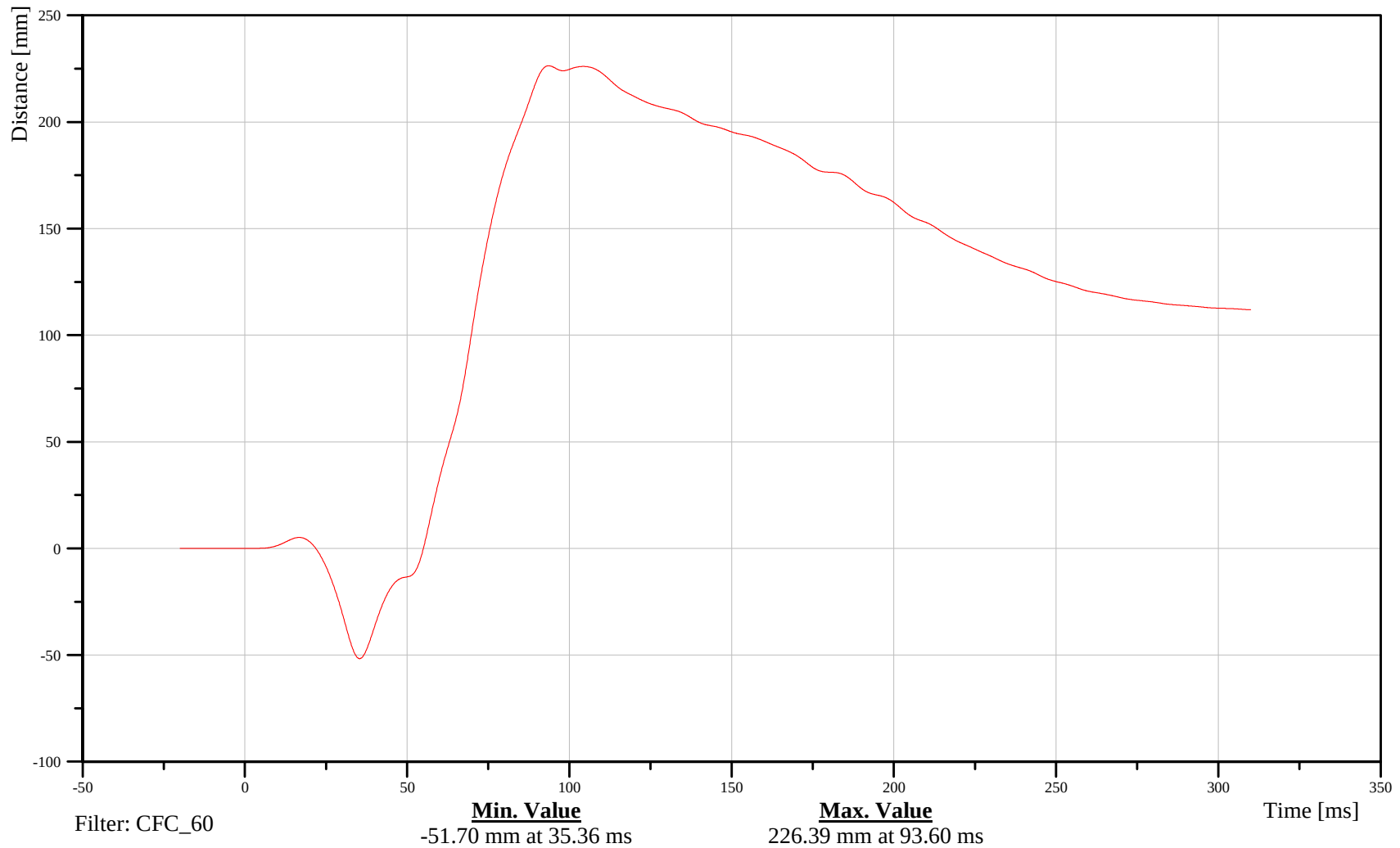
Date: 09/27/2006
Time: 13:07

Passenger Seat Belt String Pot

Customer: NHTSA
Test Number: M60518

13SEBE000001DS0D

TRC Inc. Test Lab: CTF
Test Number: 060927



B-134

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

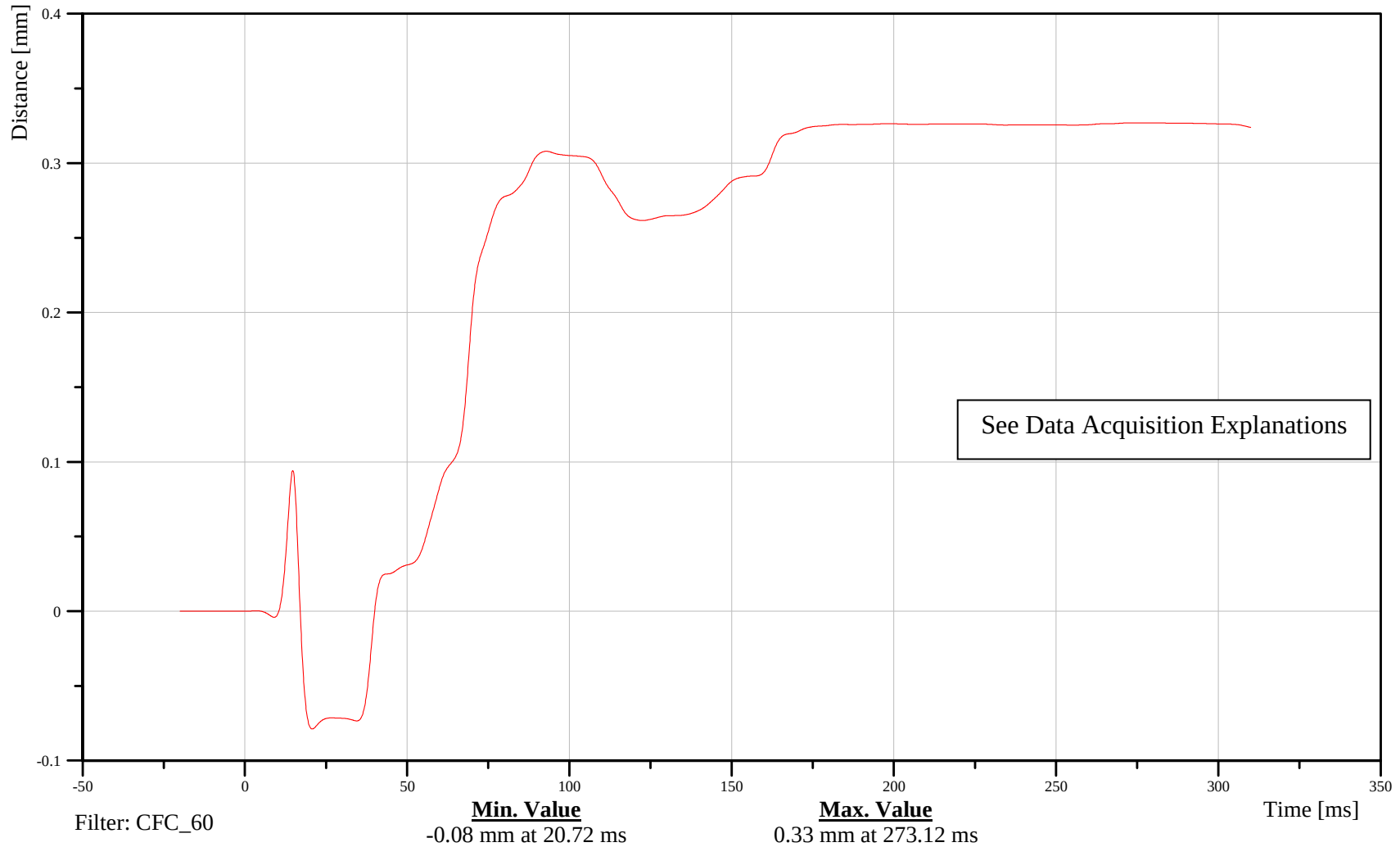
Driver Belt Elongation

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

11SEBE000000DS0D

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

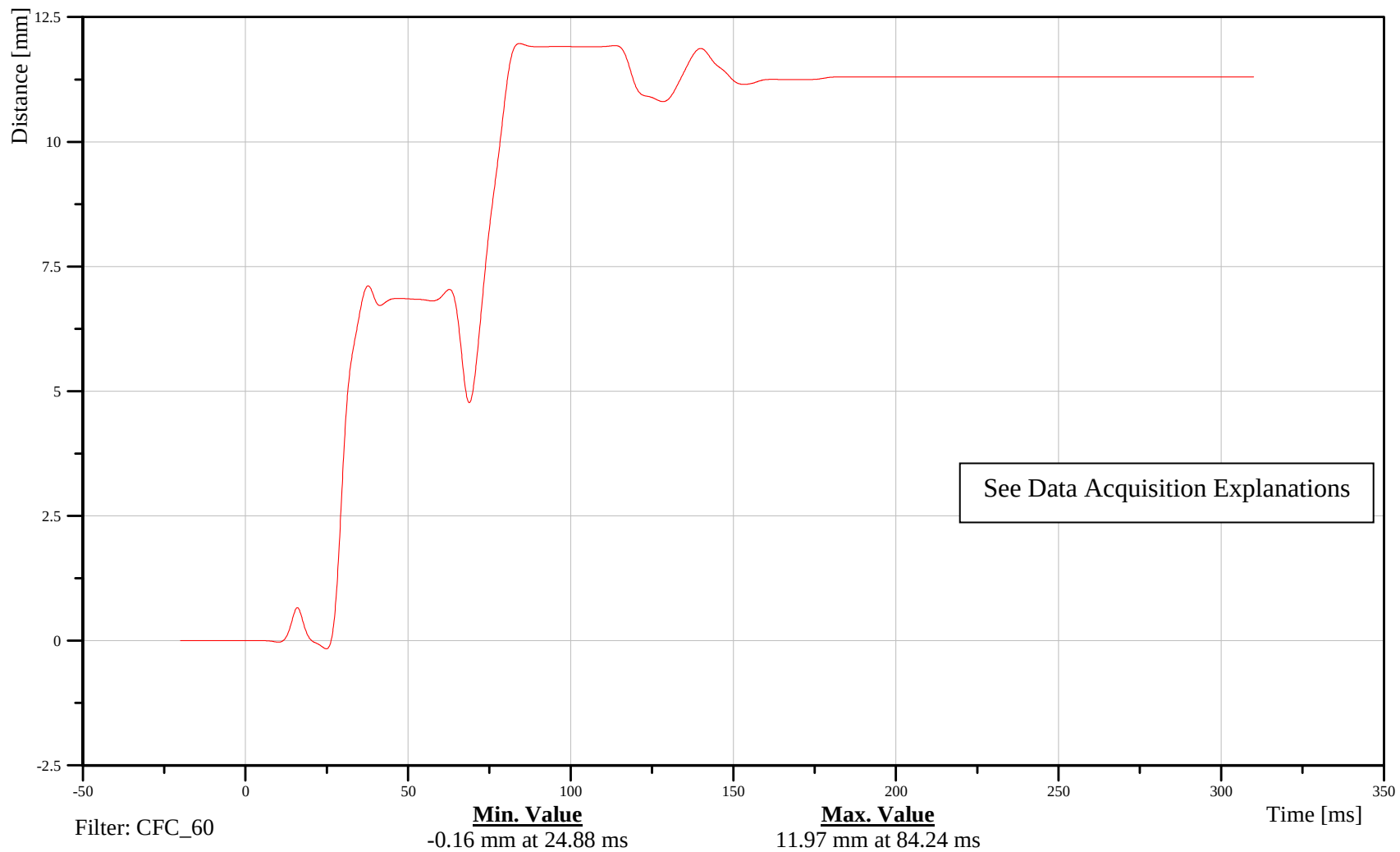
Passenger Belt Elongation

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

13SEBE000000DS0D

TRC Inc. Test Lab: CTF
Test Number: 060927



B-136

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

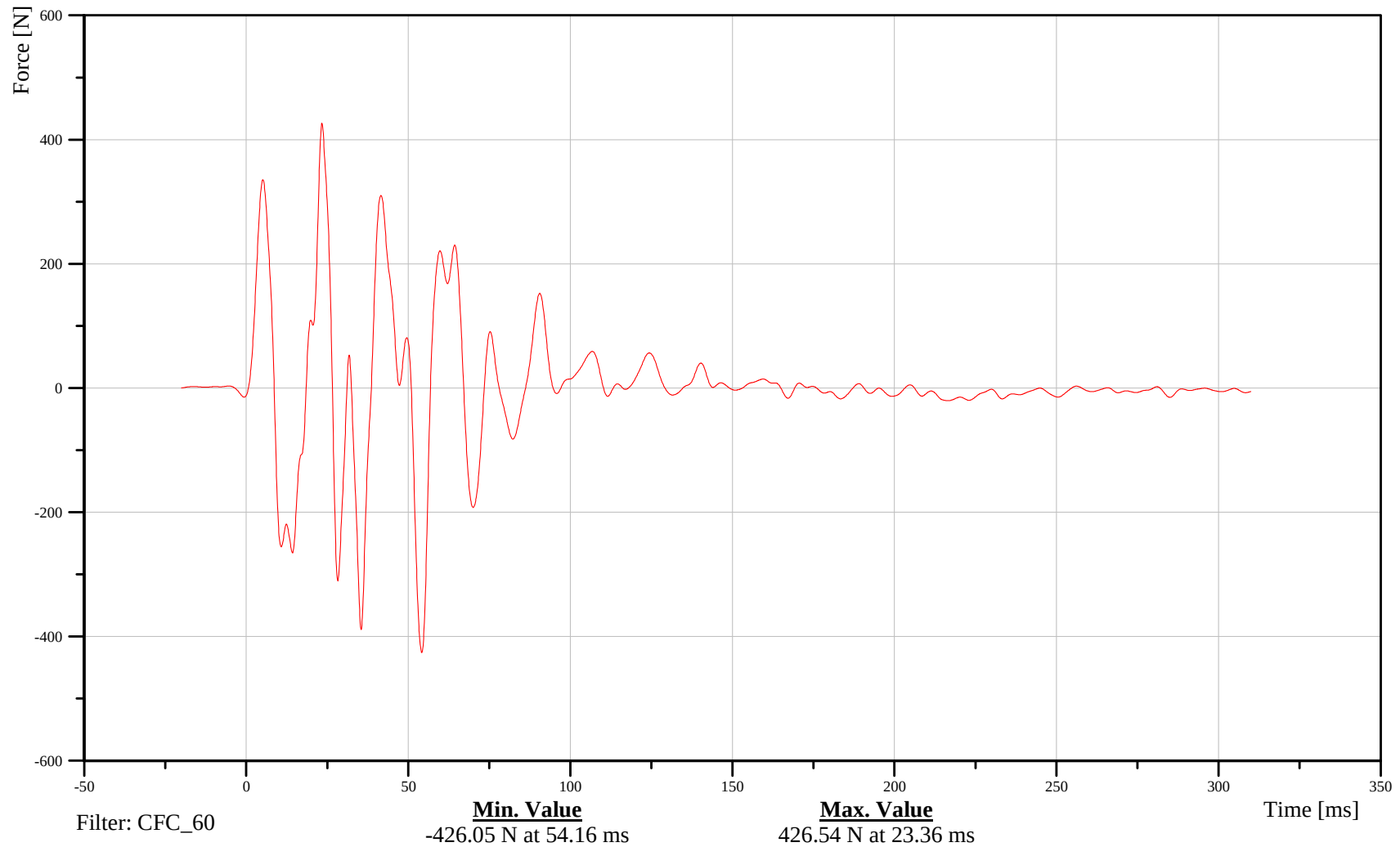
Barrier Load Cell A1

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR010000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-137

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

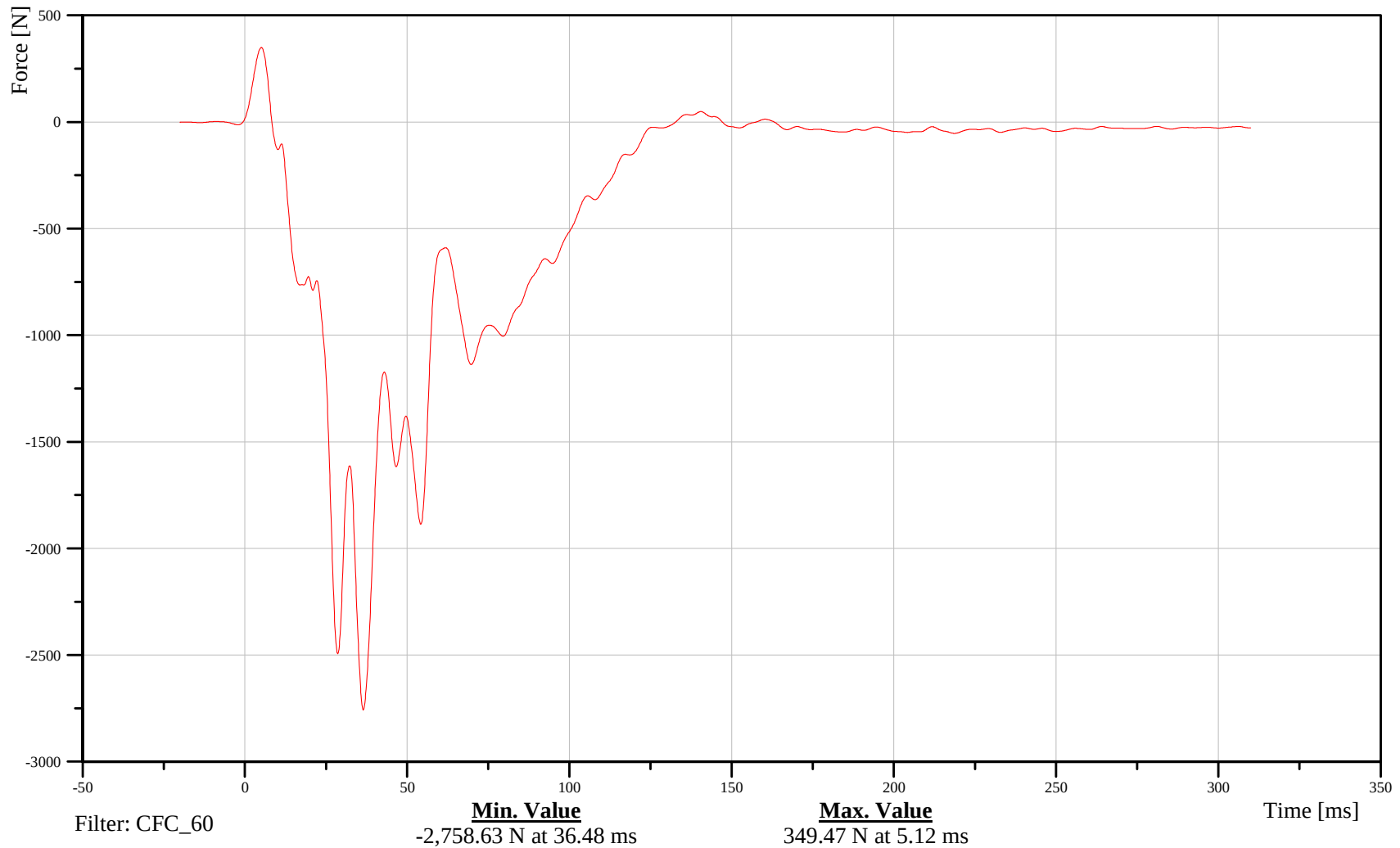
Barrier Load Cell A2

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR020000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-138

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

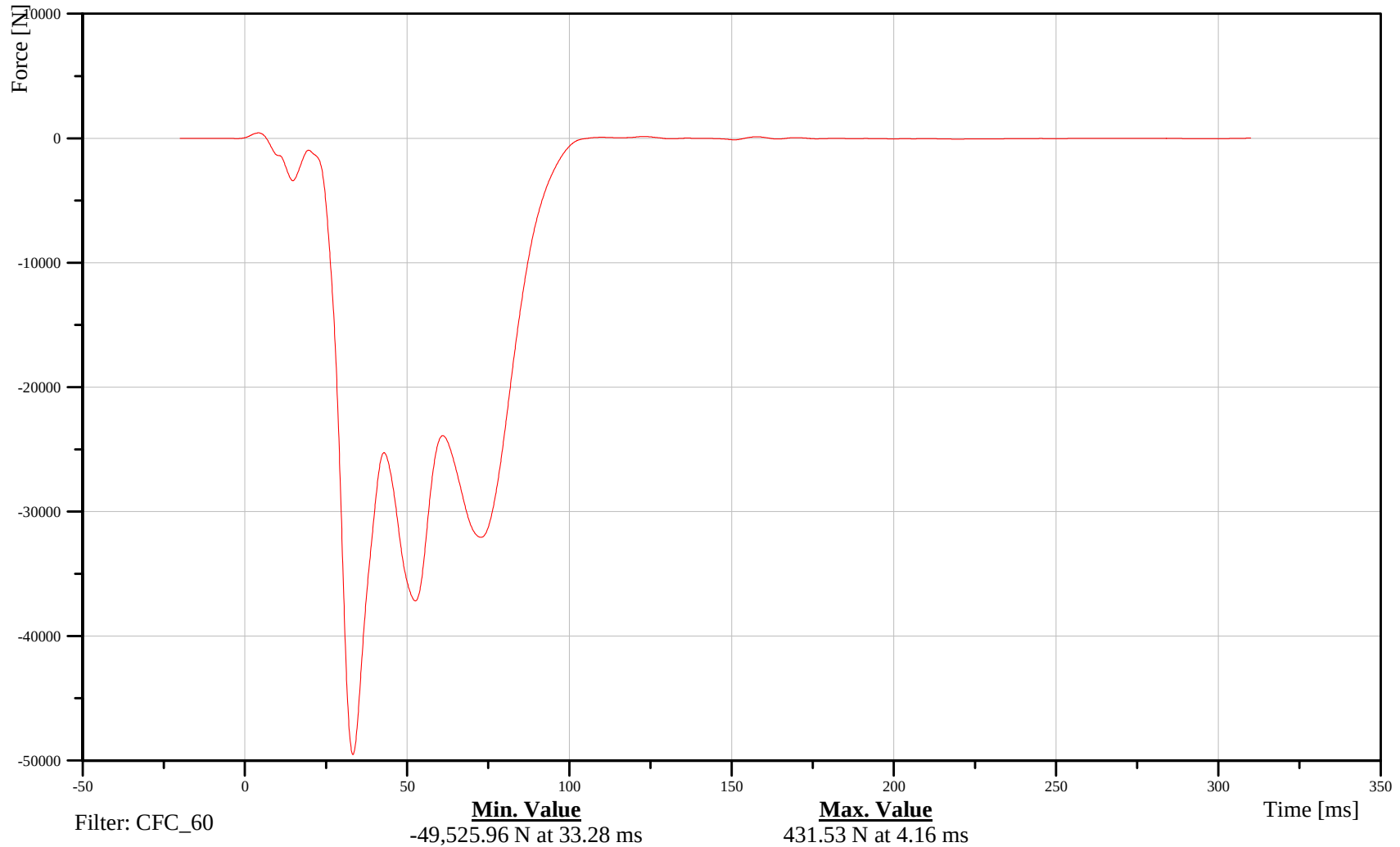
Barrier Load Cell A3

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR030000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-139

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

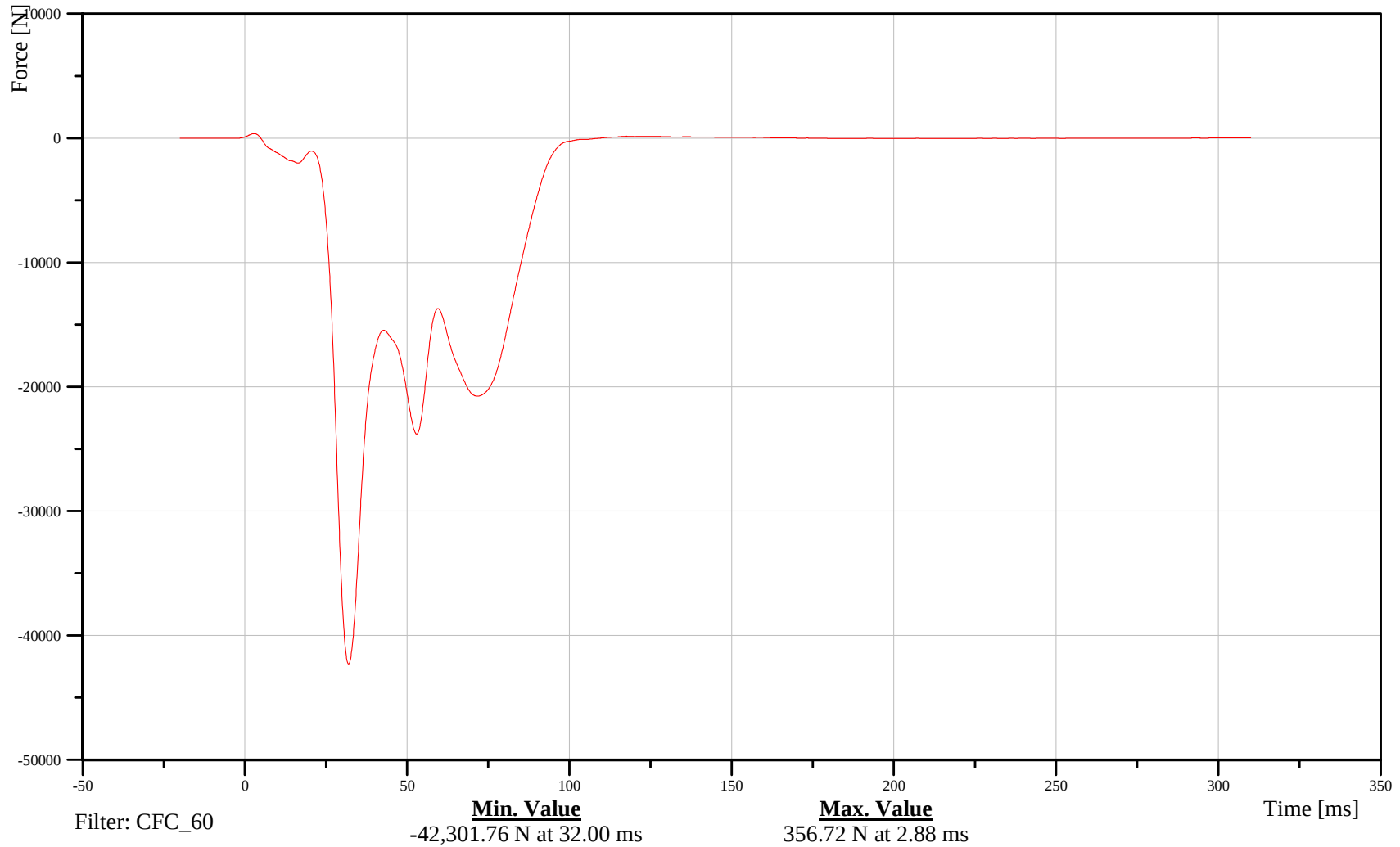
Barrier Load Cell A4

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR040000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-140

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

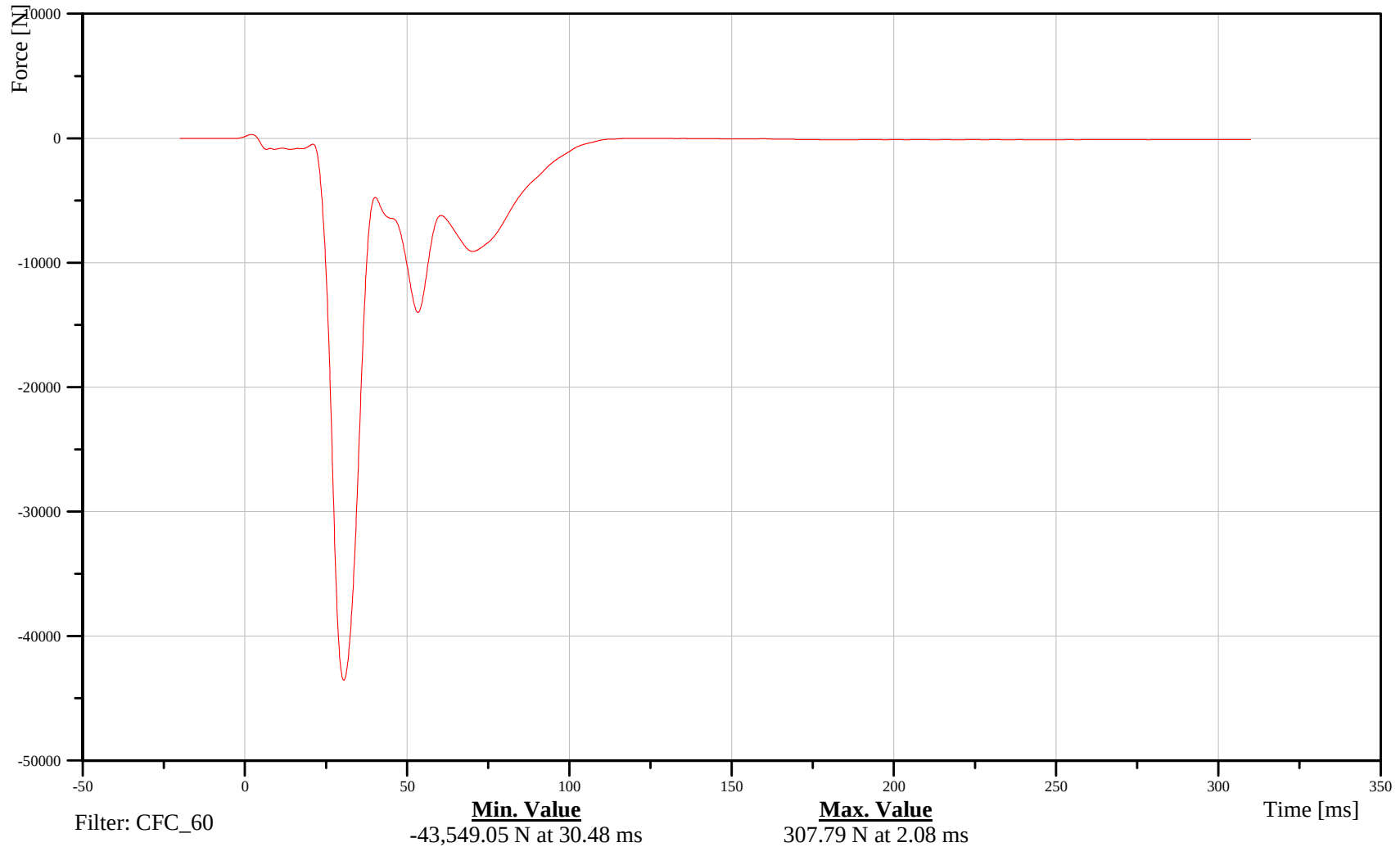
Barrier Load Cell A5

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR050000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-141

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

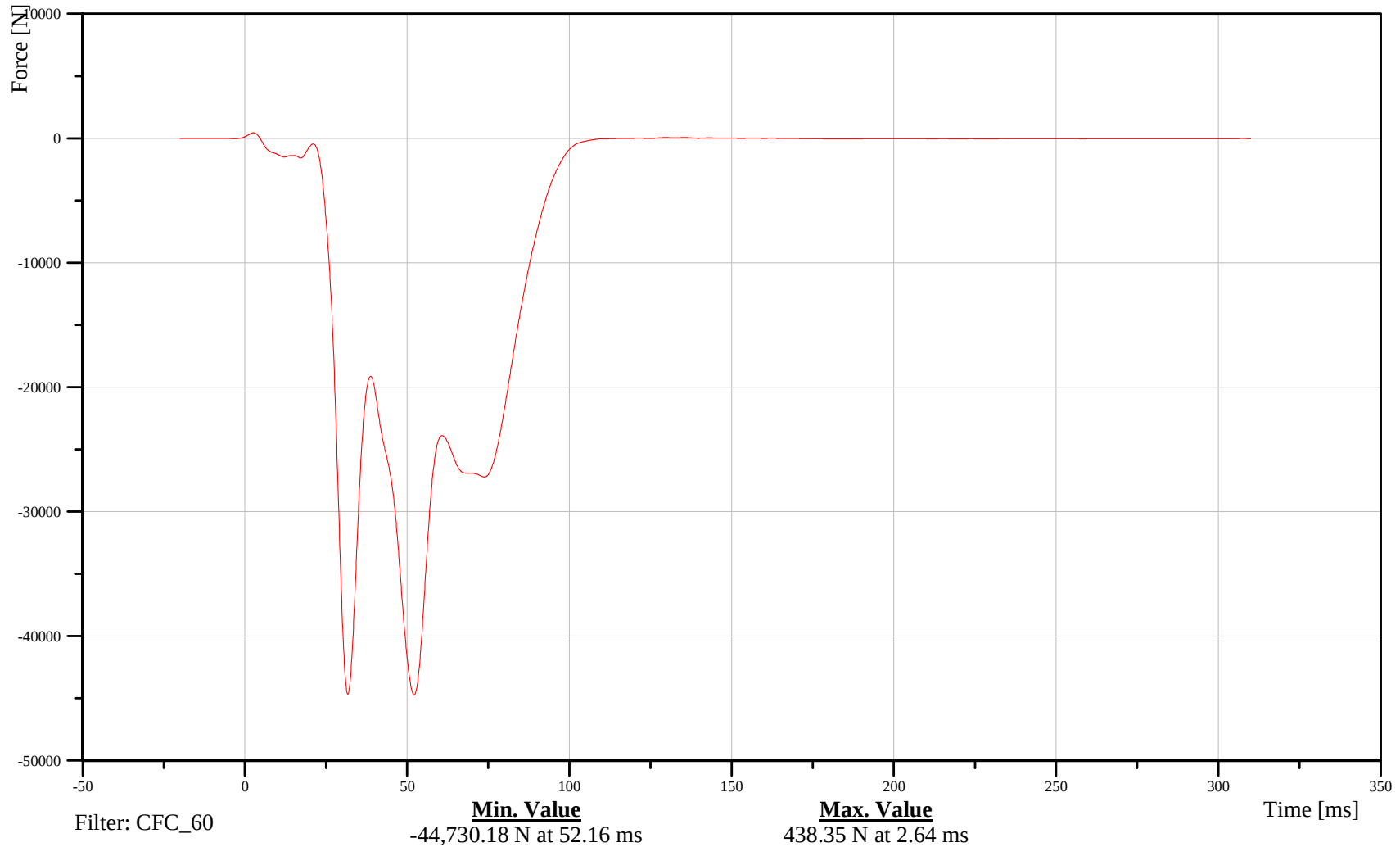
Barrier Load Cell A6

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR060000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-142

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

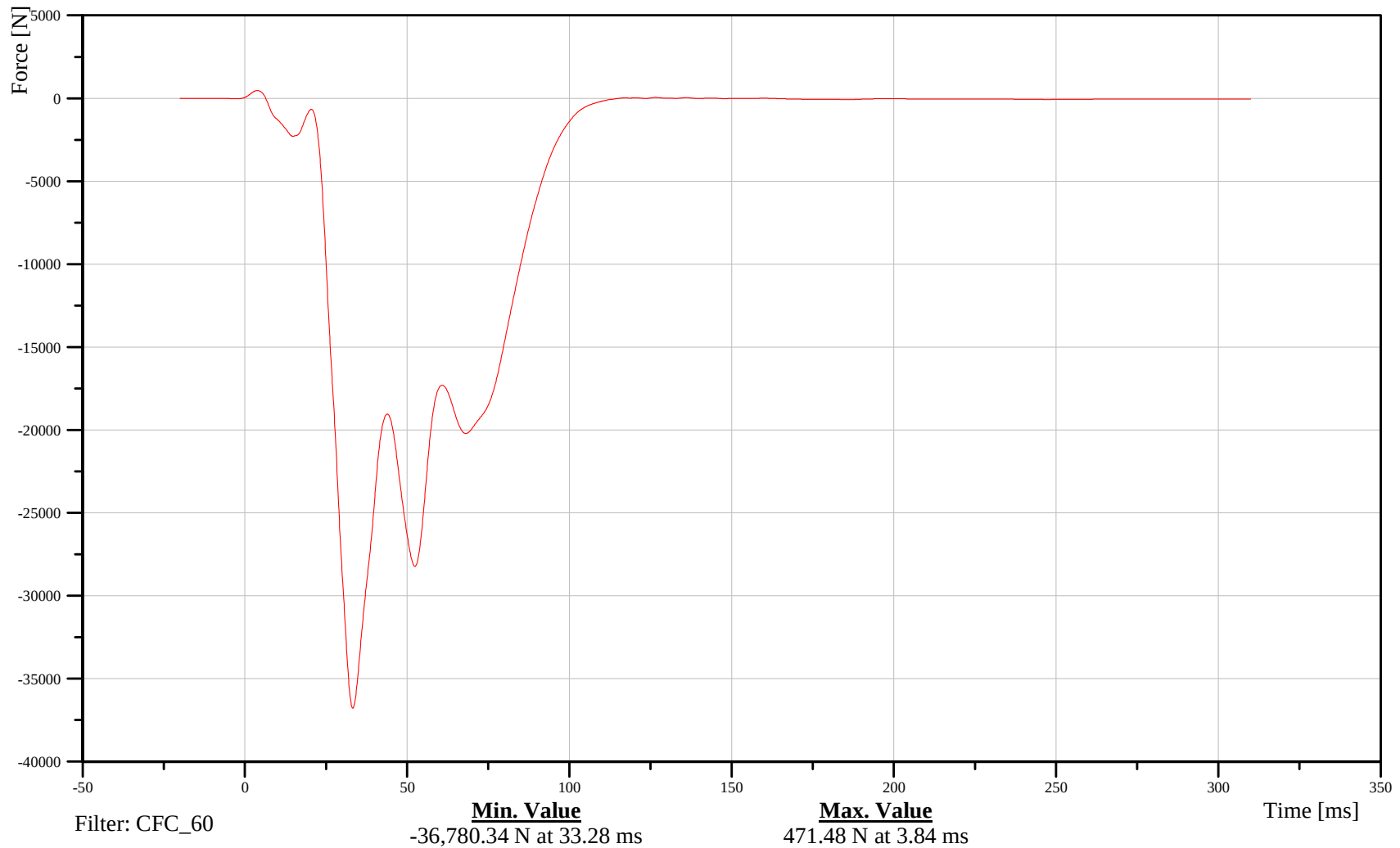
Barrier Load Cell A7

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR070000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-143

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

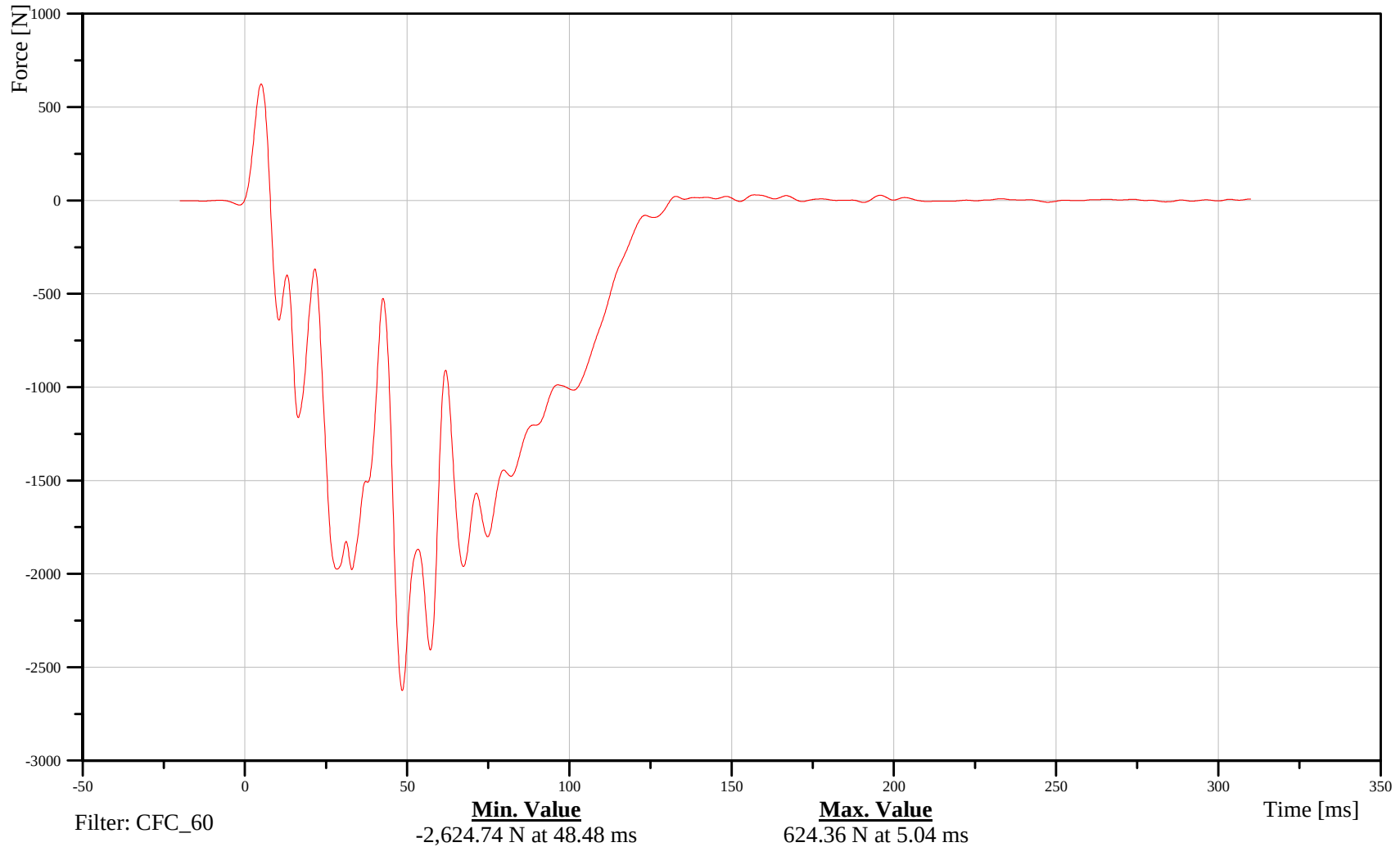
Barrier Load Cell A8

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR080000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-144

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

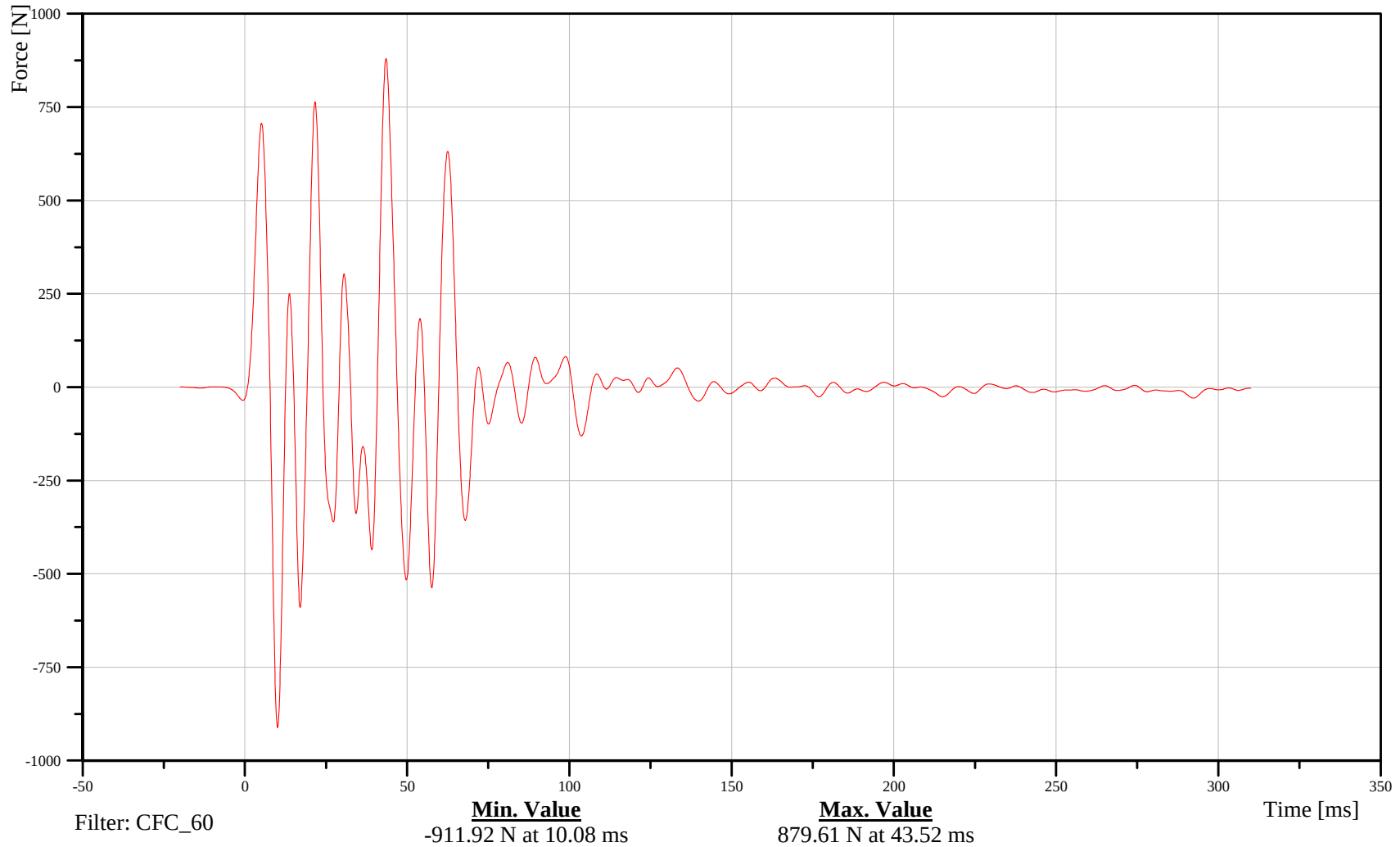
Barrier Load Cell A9

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR090000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-145

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

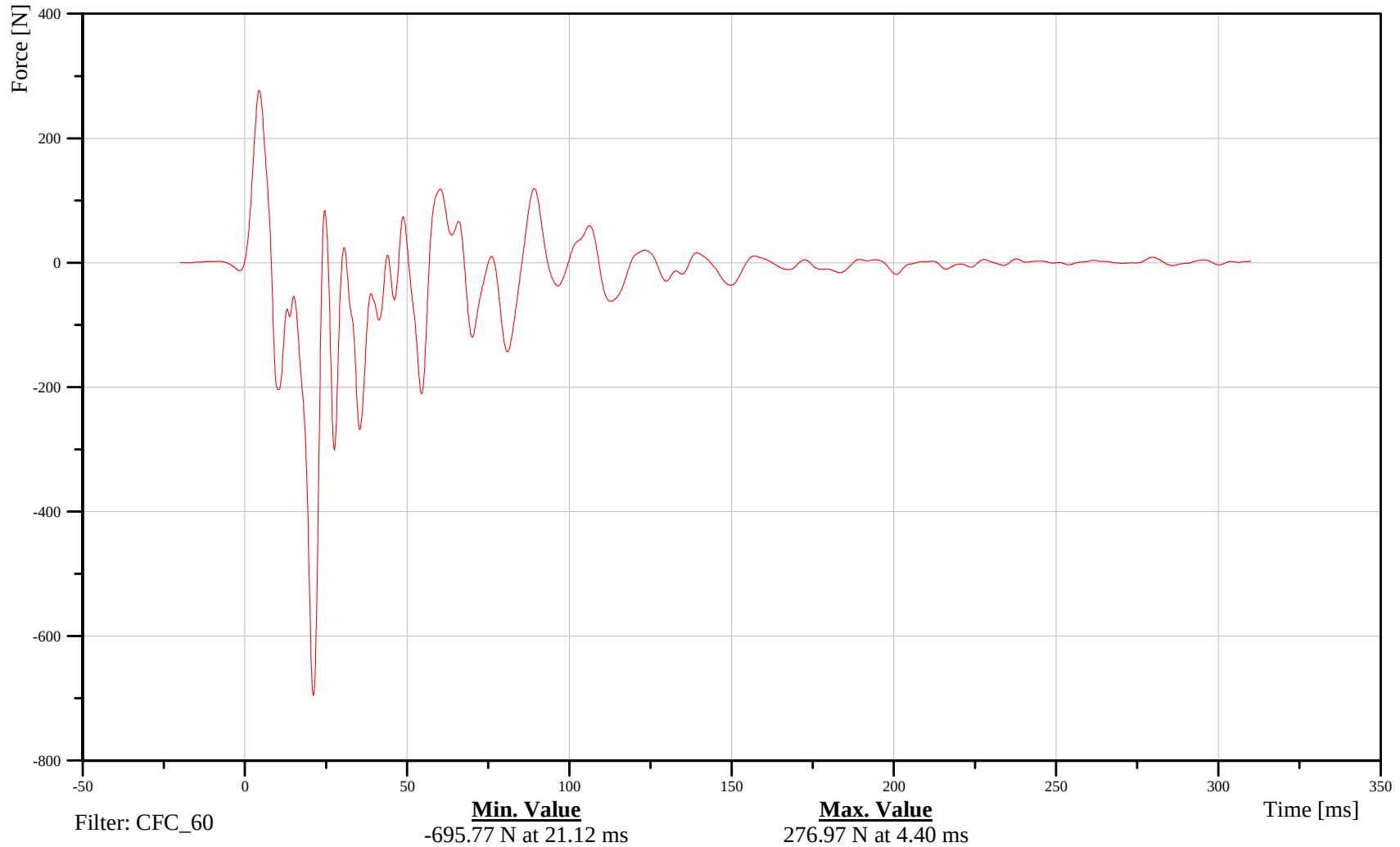
Barrier Load Cell B1

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR100000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-146

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

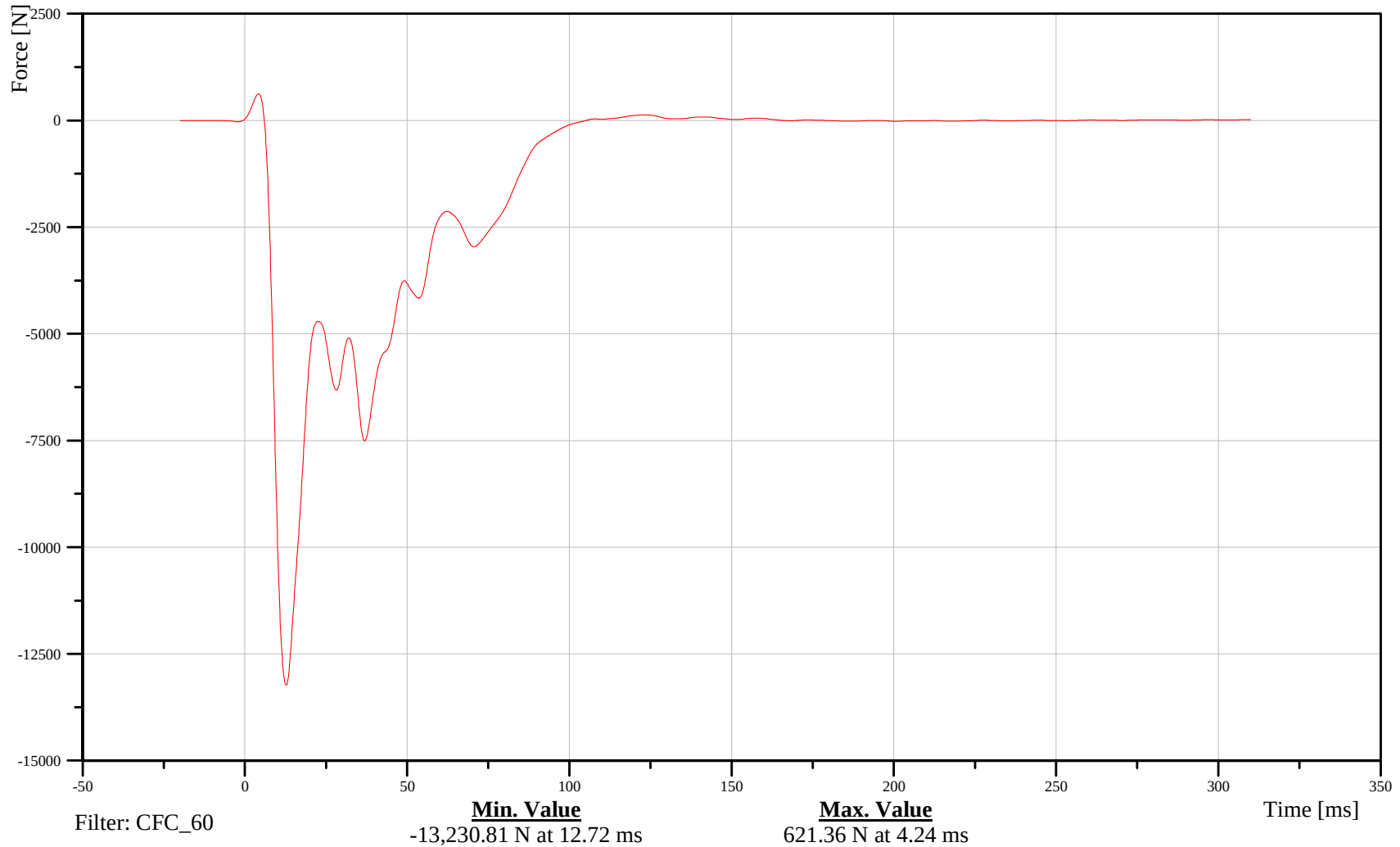
Barrier Load Cell B2

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR110000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-147

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

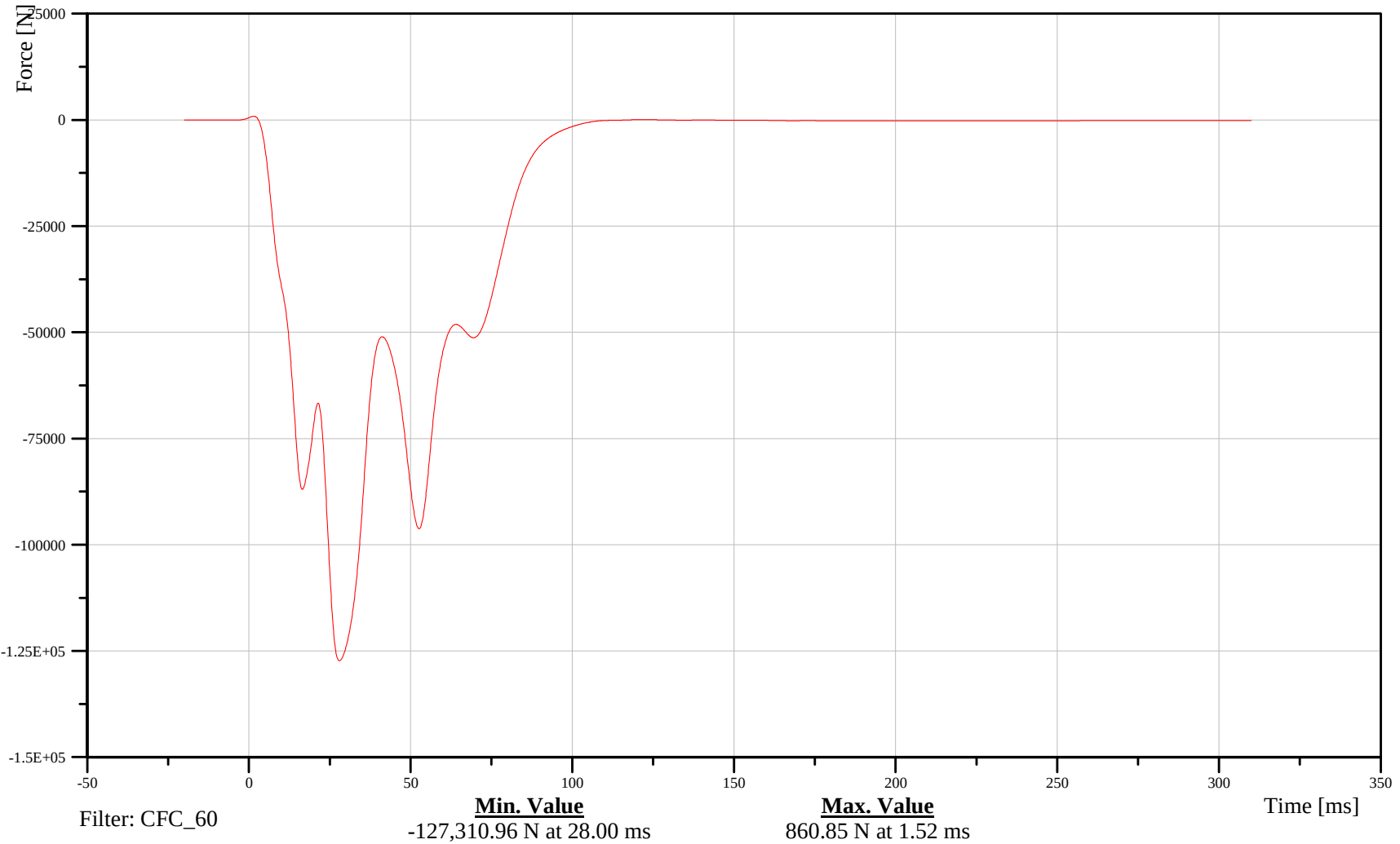
Barrier Load Cell B3

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR120000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-148

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

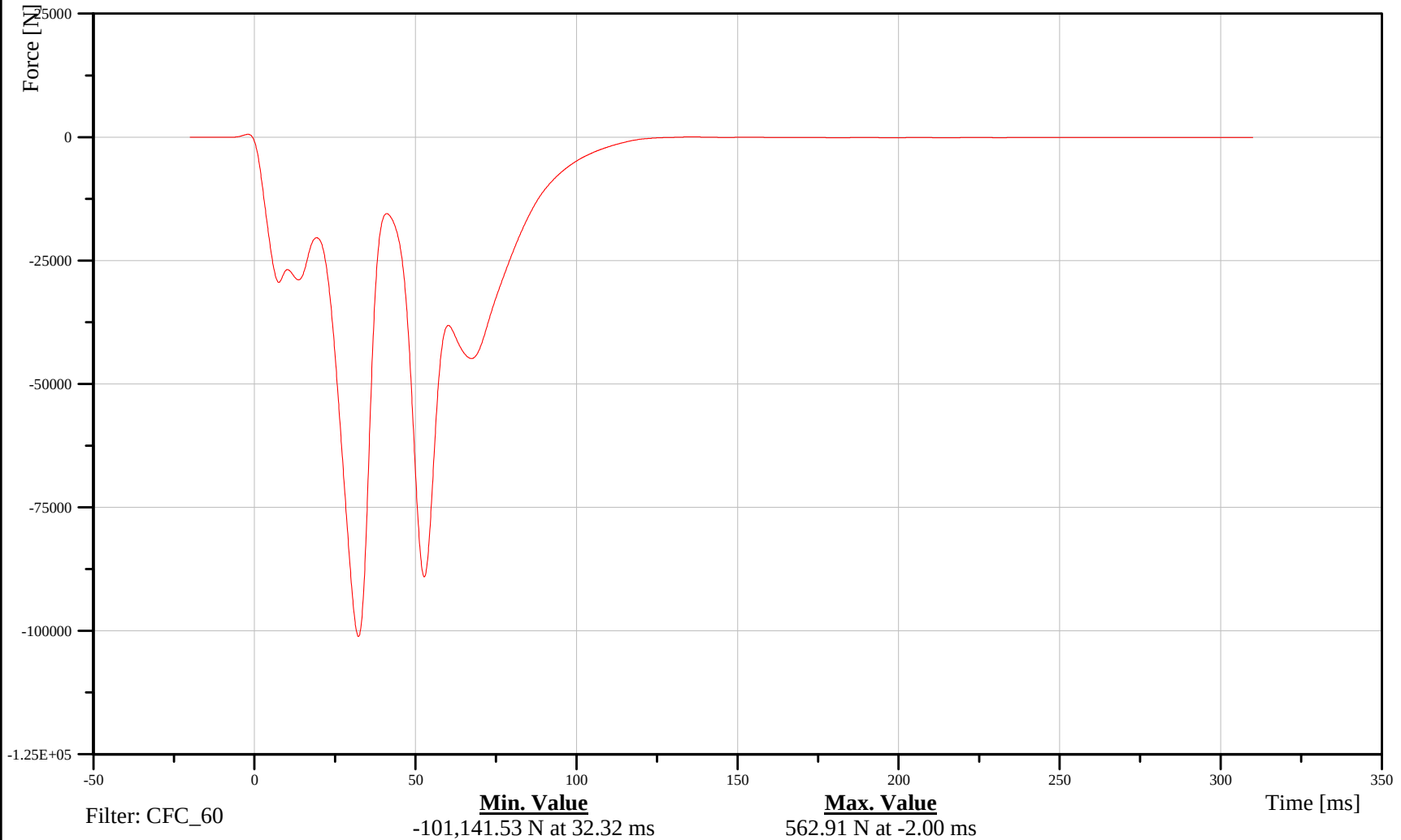
Barrier Load Cell B4

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR130000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-149

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

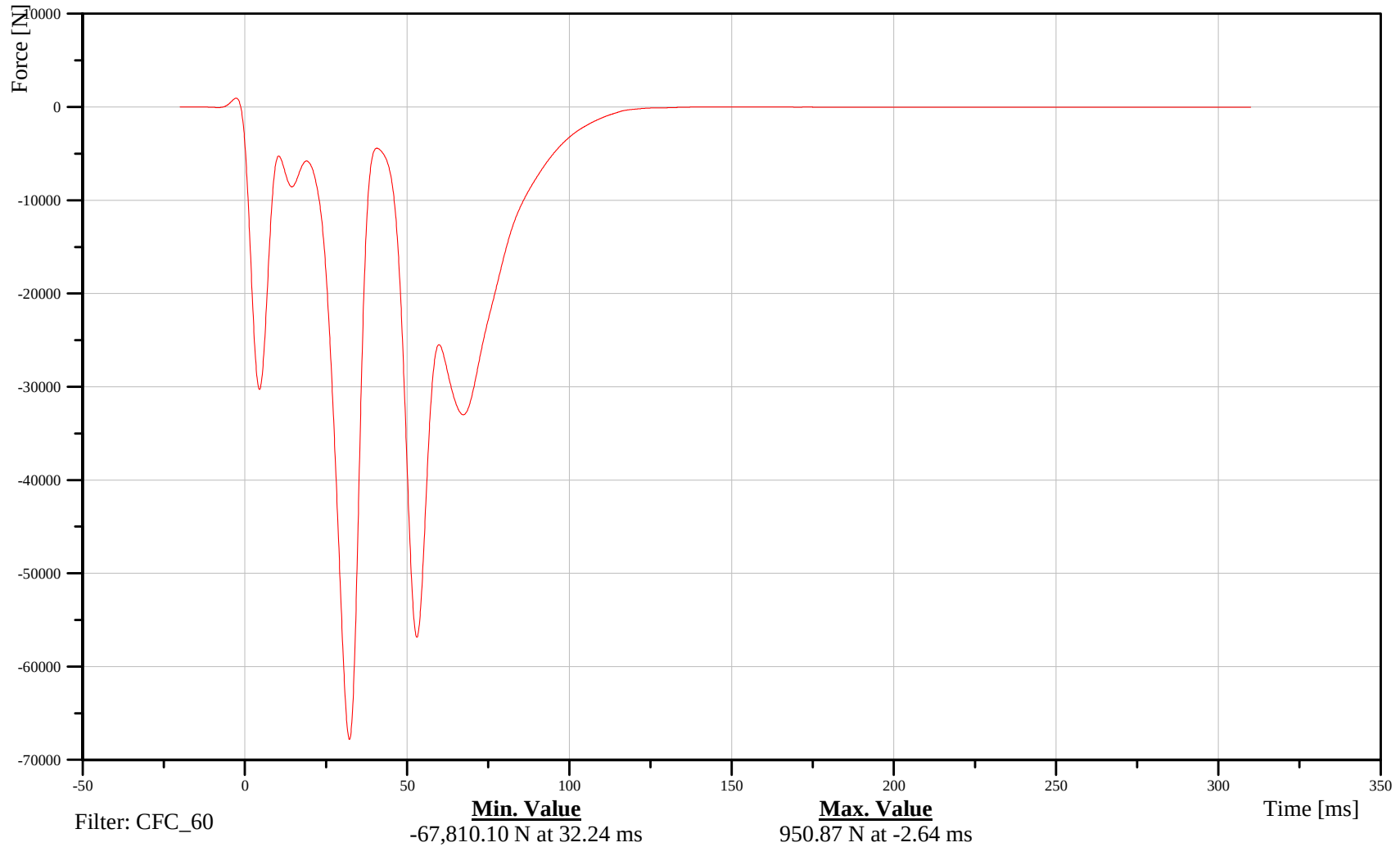
Barrier Load Cell B5

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR140000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-150

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

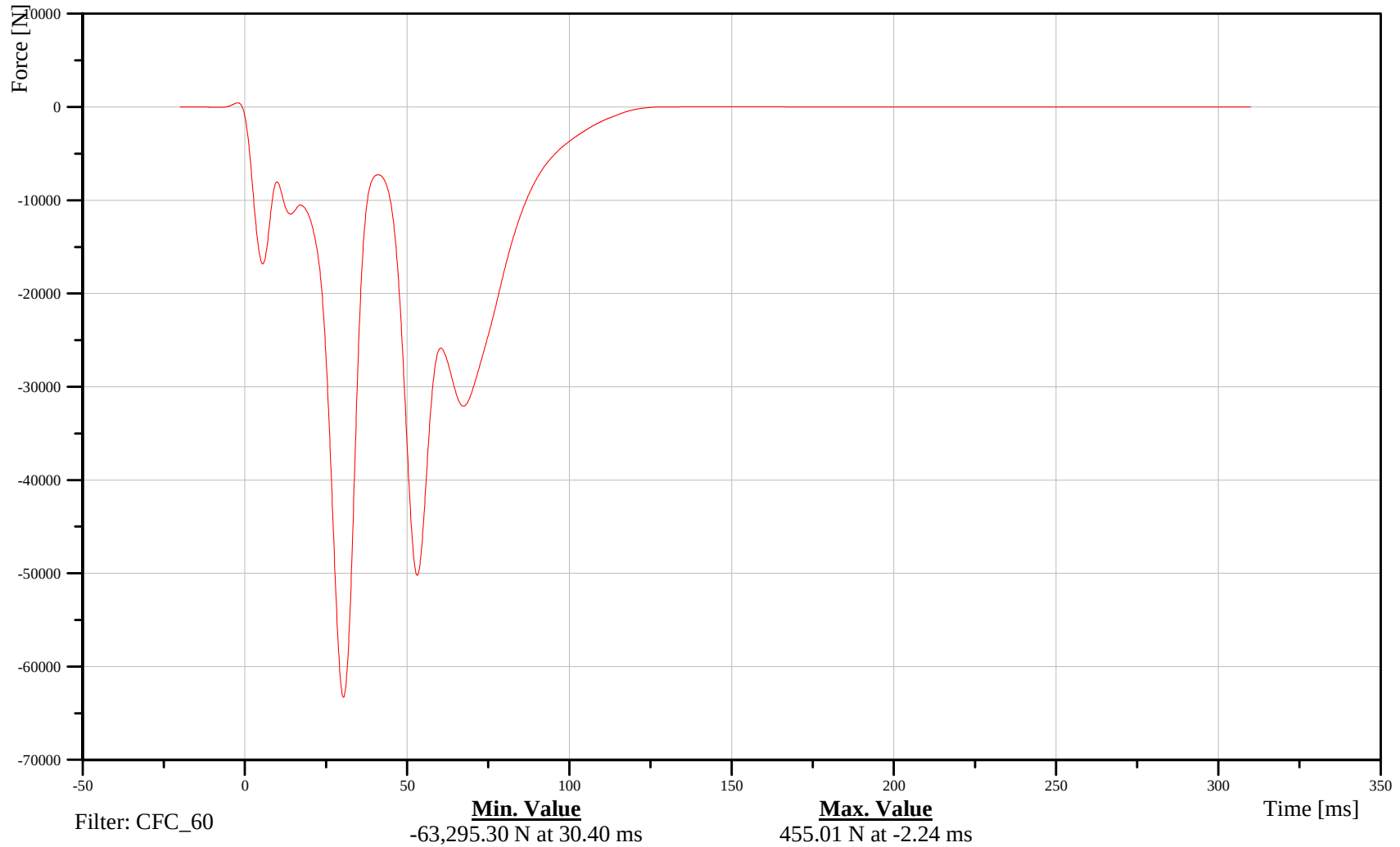
Barrier Load Cell B6

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR150000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-151

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

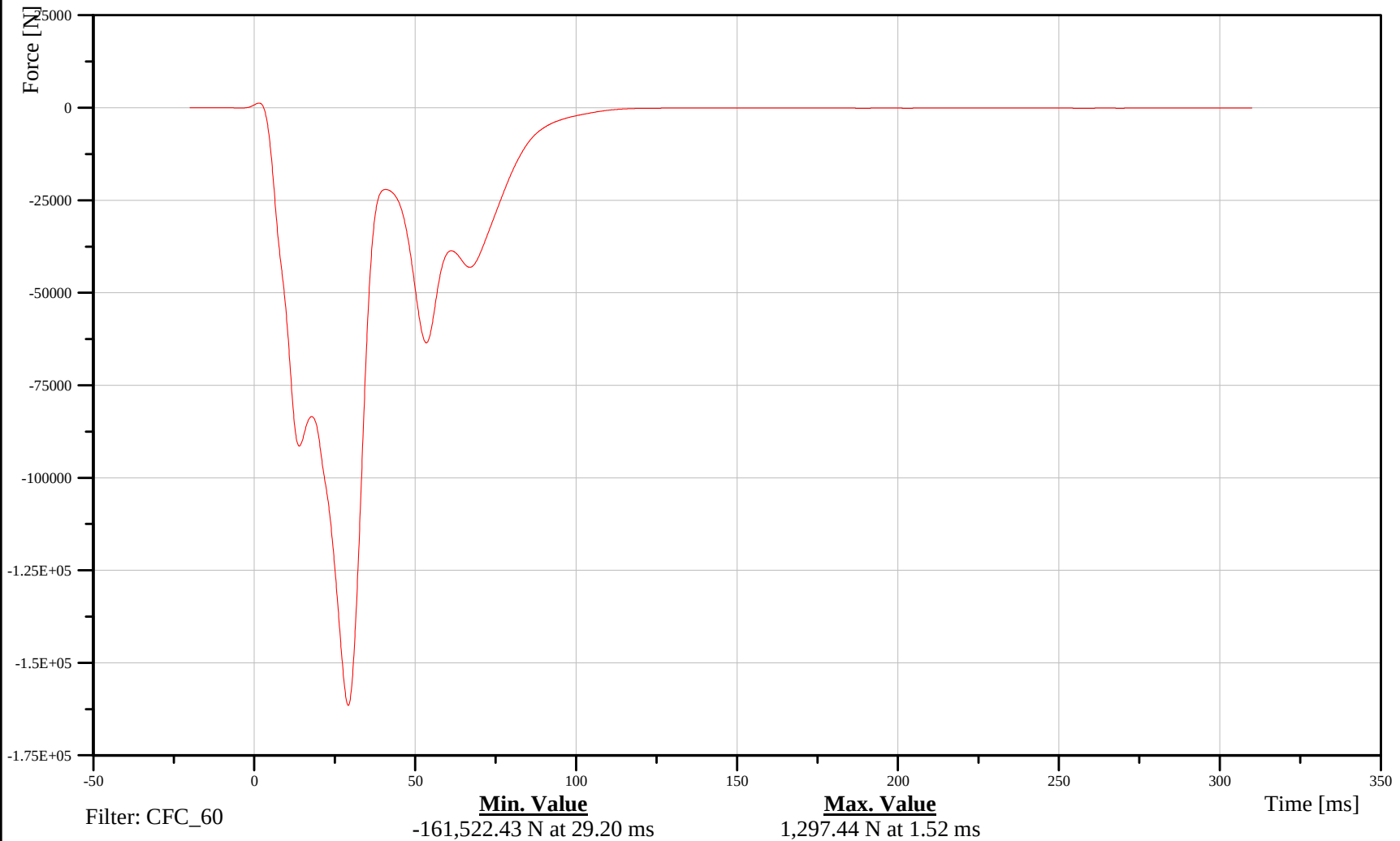
Barrier Load Cell B7

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR160000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

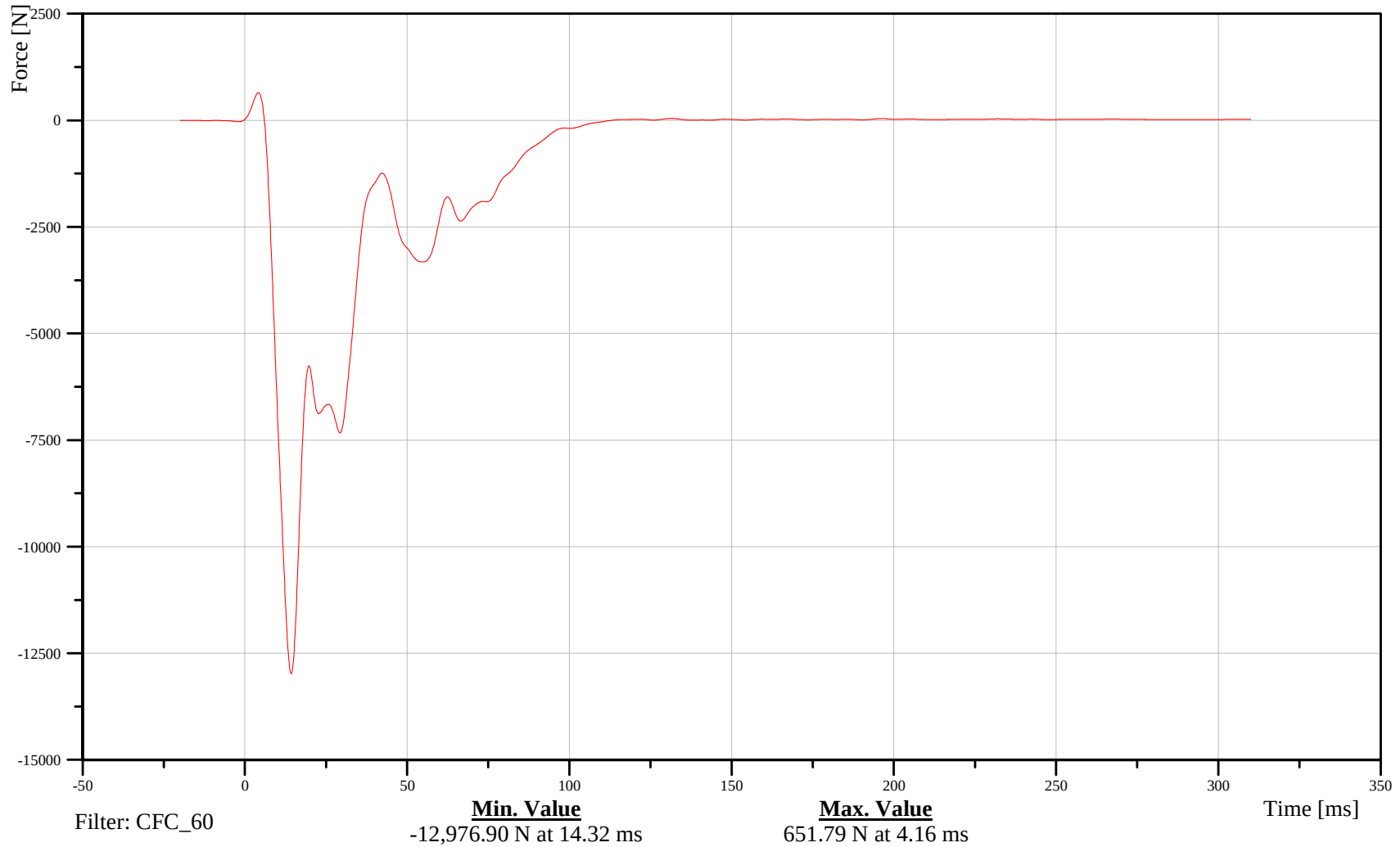
Barrier Load Cell B8

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR170000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

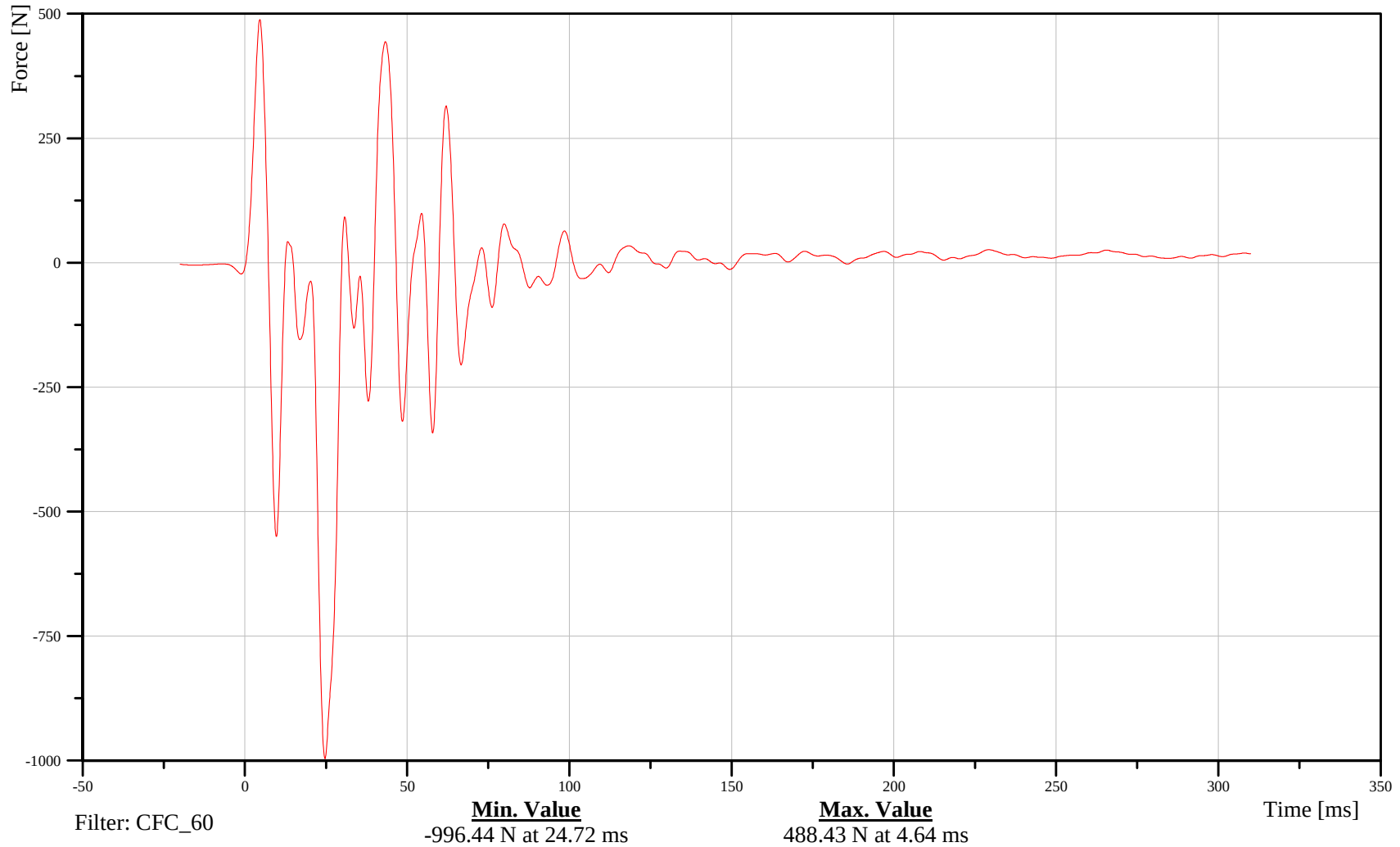
Barrier Load Cell B9

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR180000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

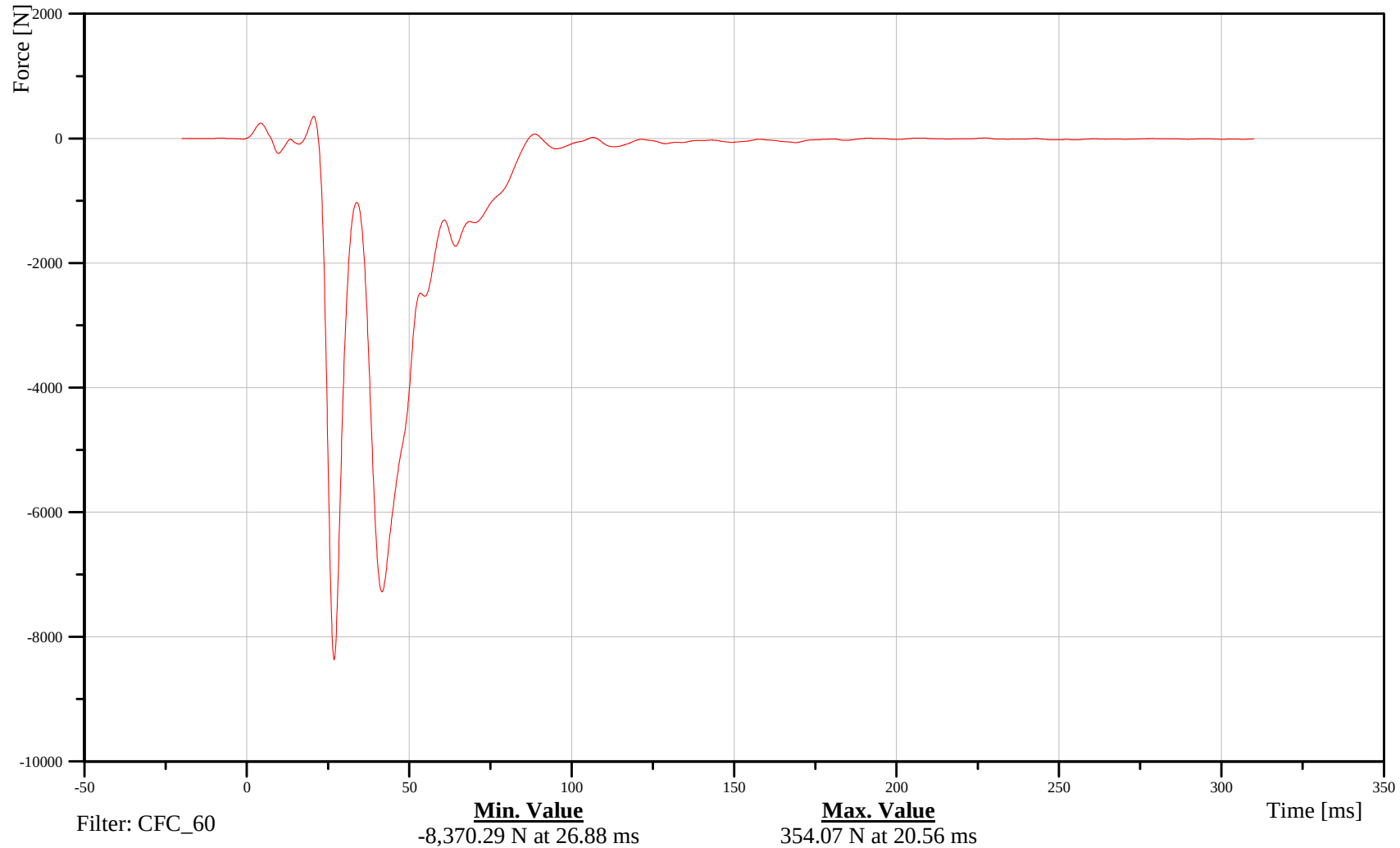
Barrier Load Cell C1

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR190000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

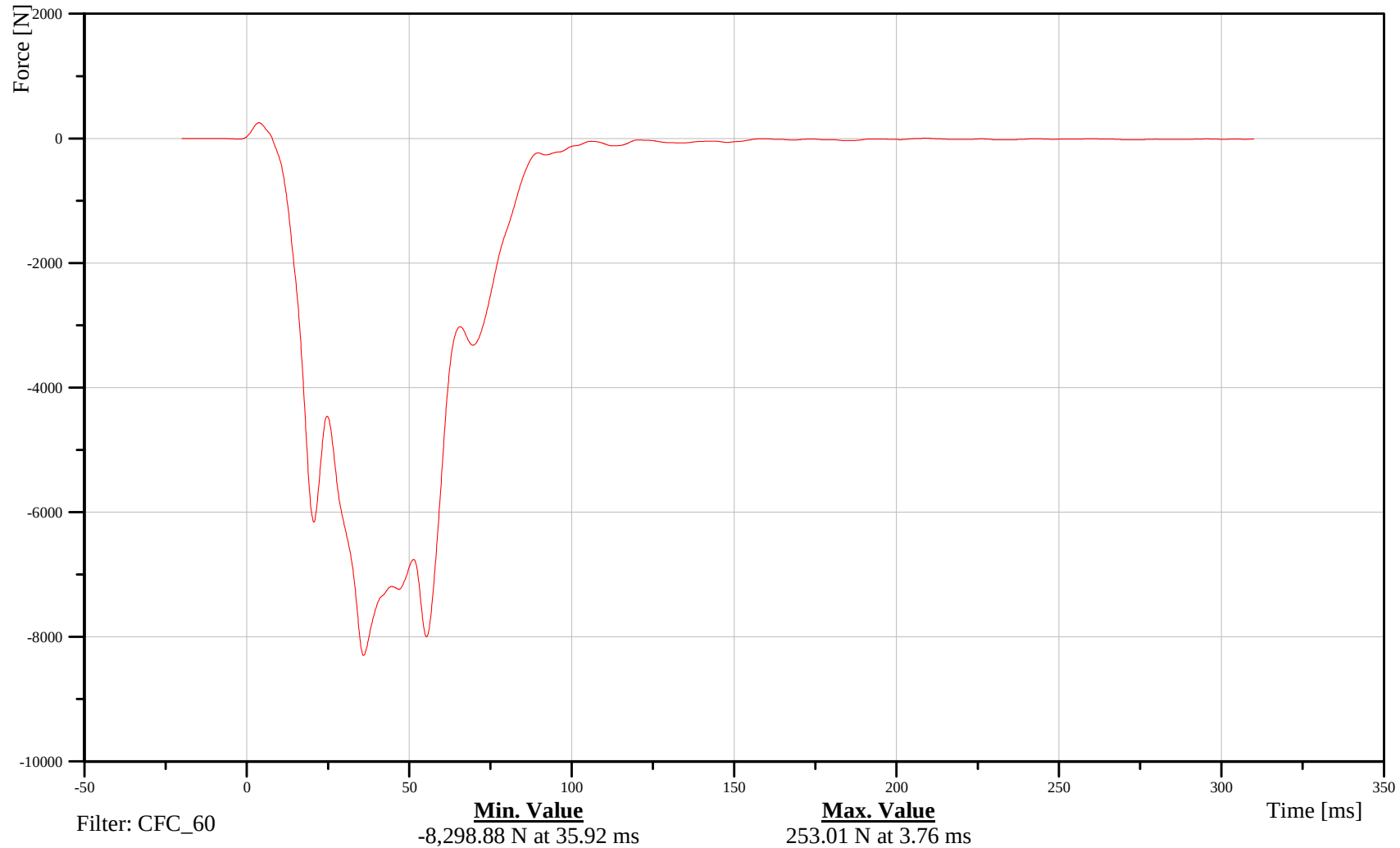
Barrier Load Cell C2

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR200000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

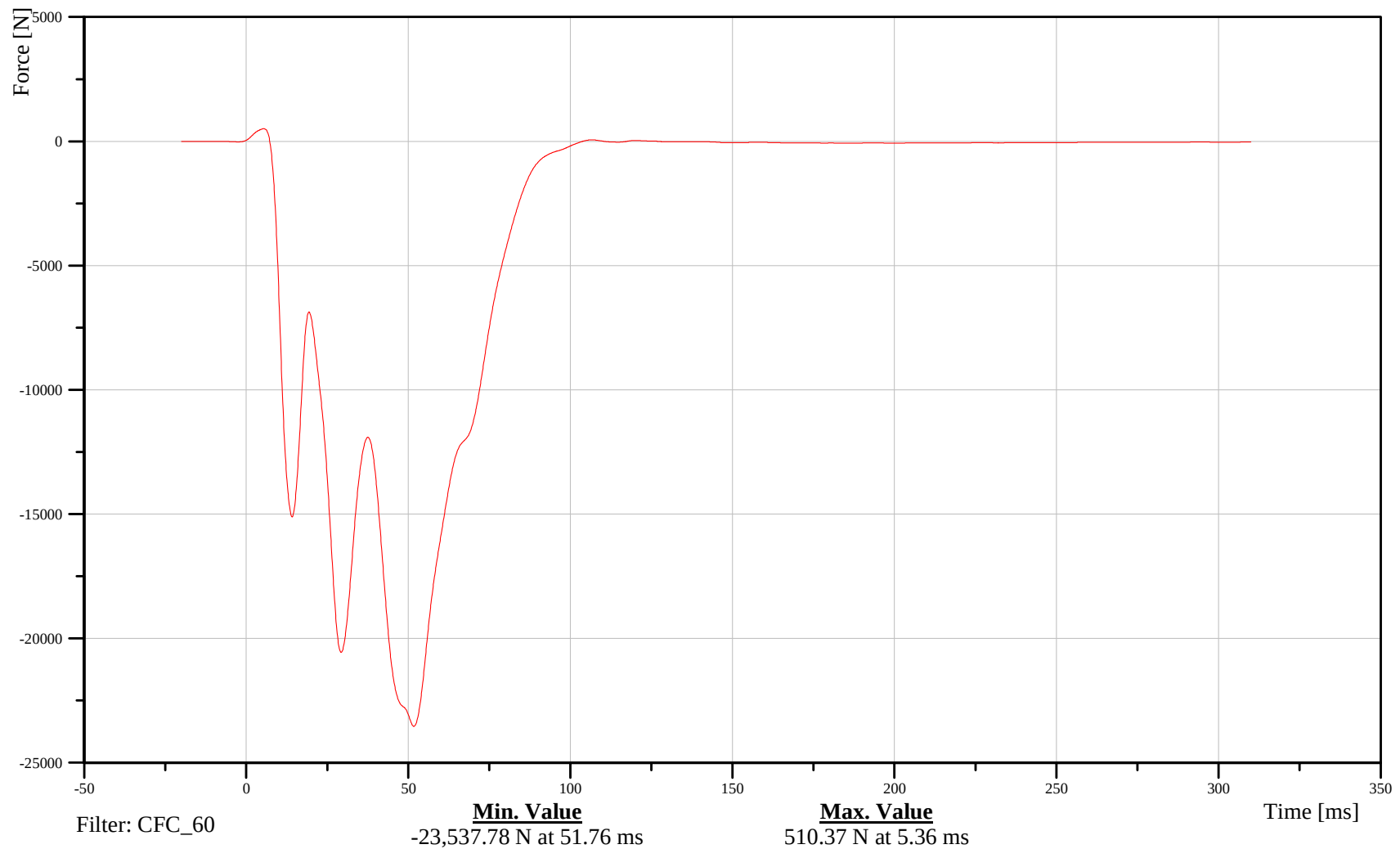
Barrier Load Cell C3

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR210000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

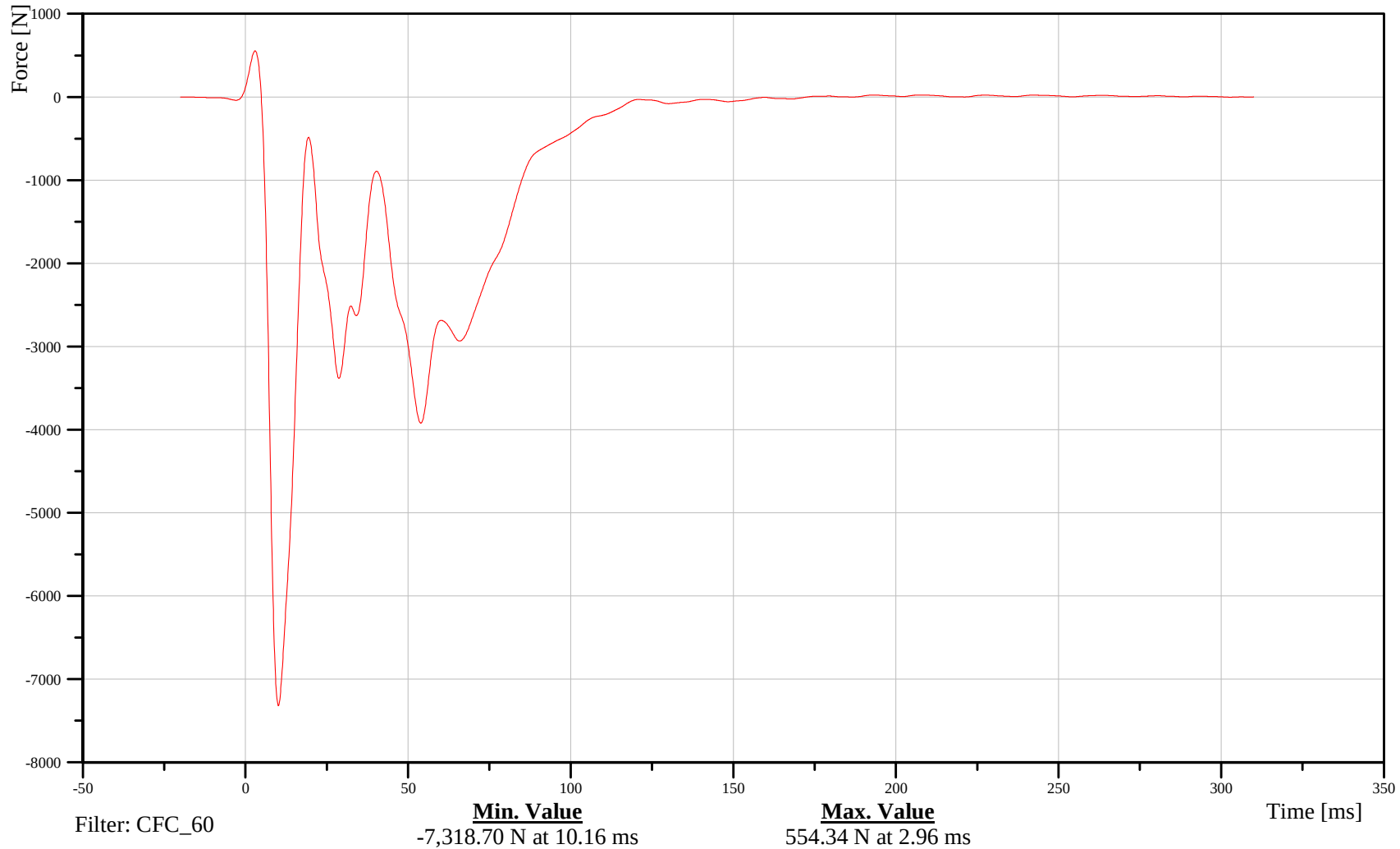
Barrier Load Cell C4

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR220000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



B-158

060927



2006 Kia Optima 35 mph Frontal Barrier Impact

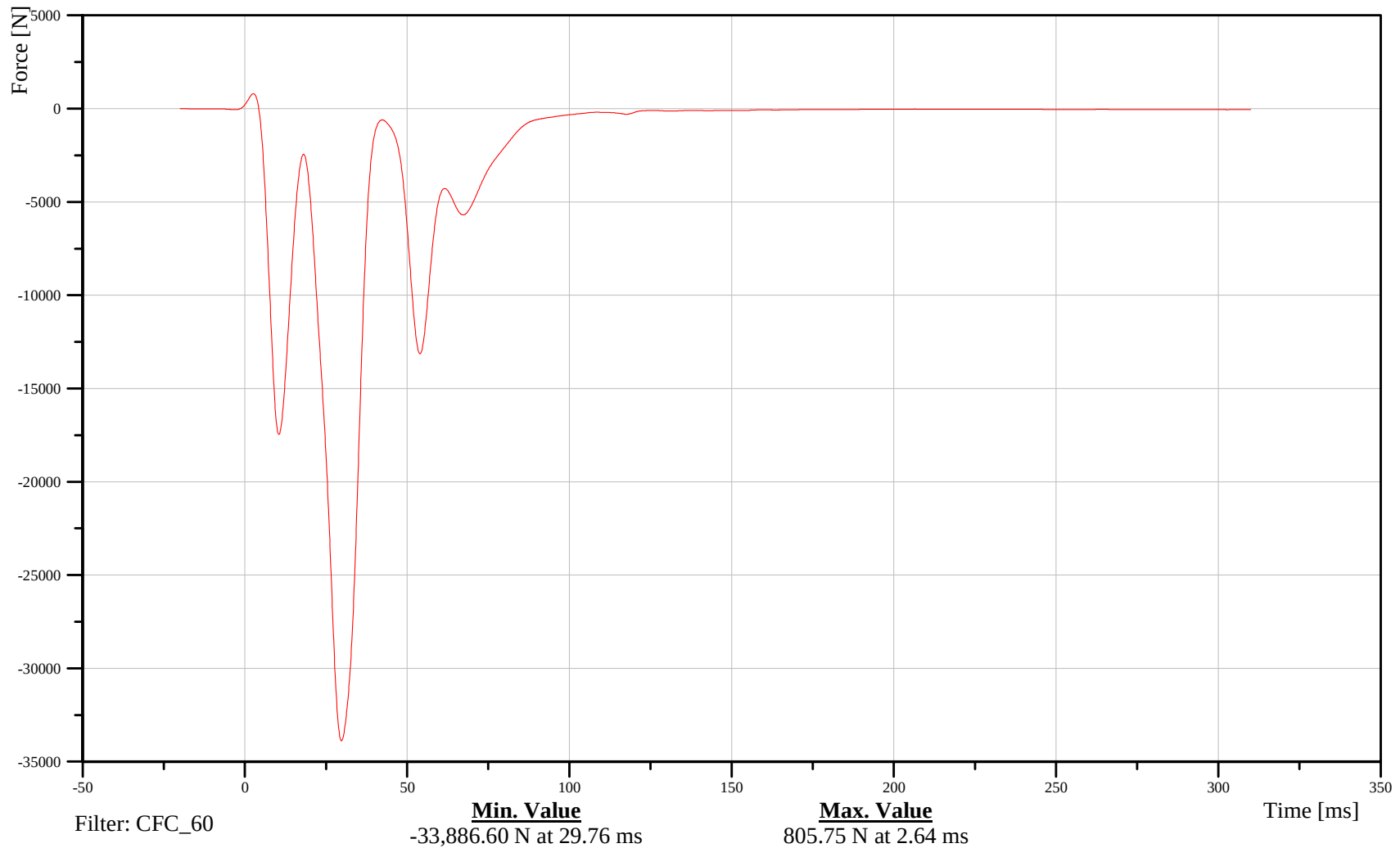
Barrier Load Cell C5

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR230000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

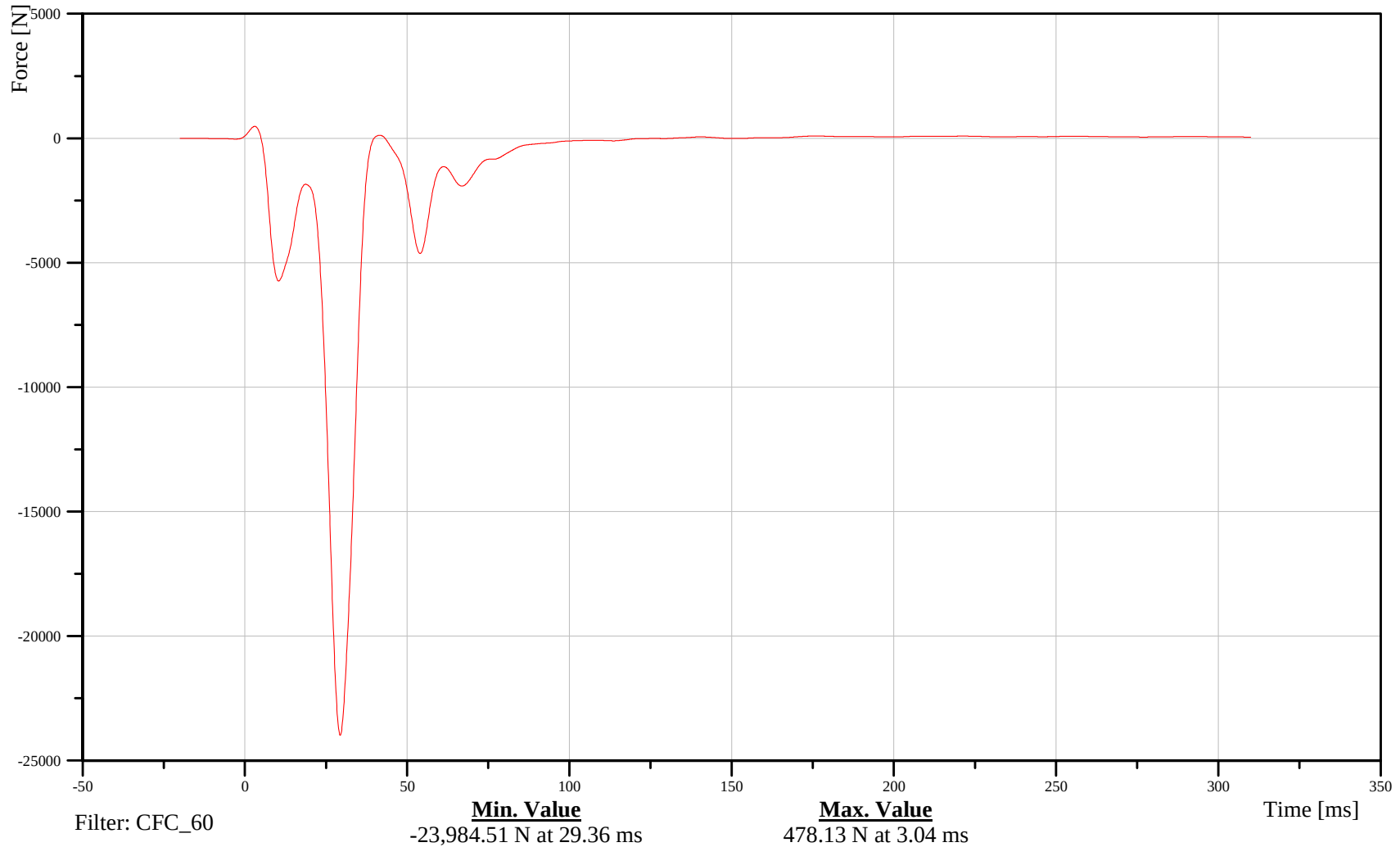
Barrier Load Cell C6

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR240000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

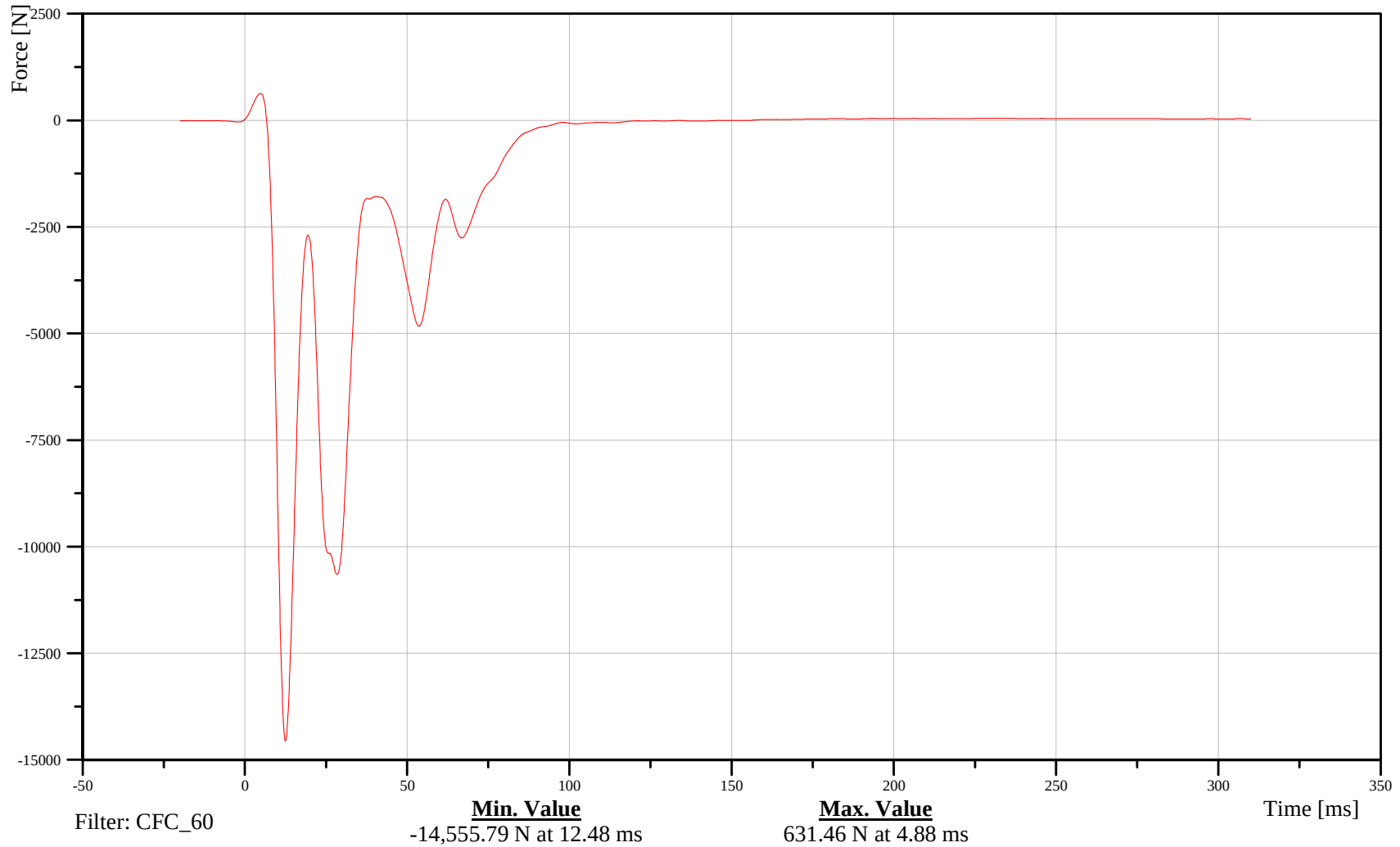
Barrier Load Cell C7

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR250000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

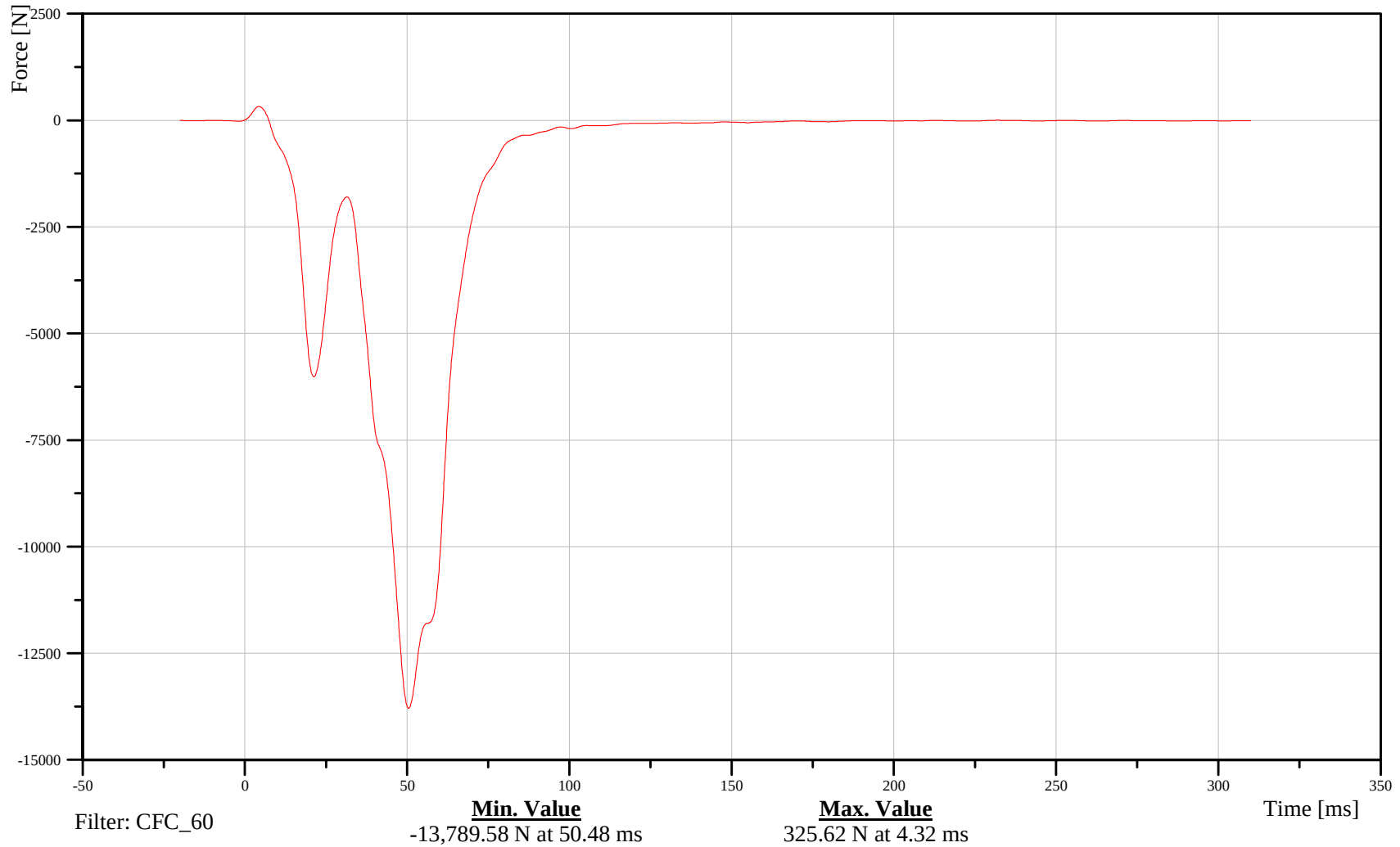
Barrier Load Cell C8

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR260000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

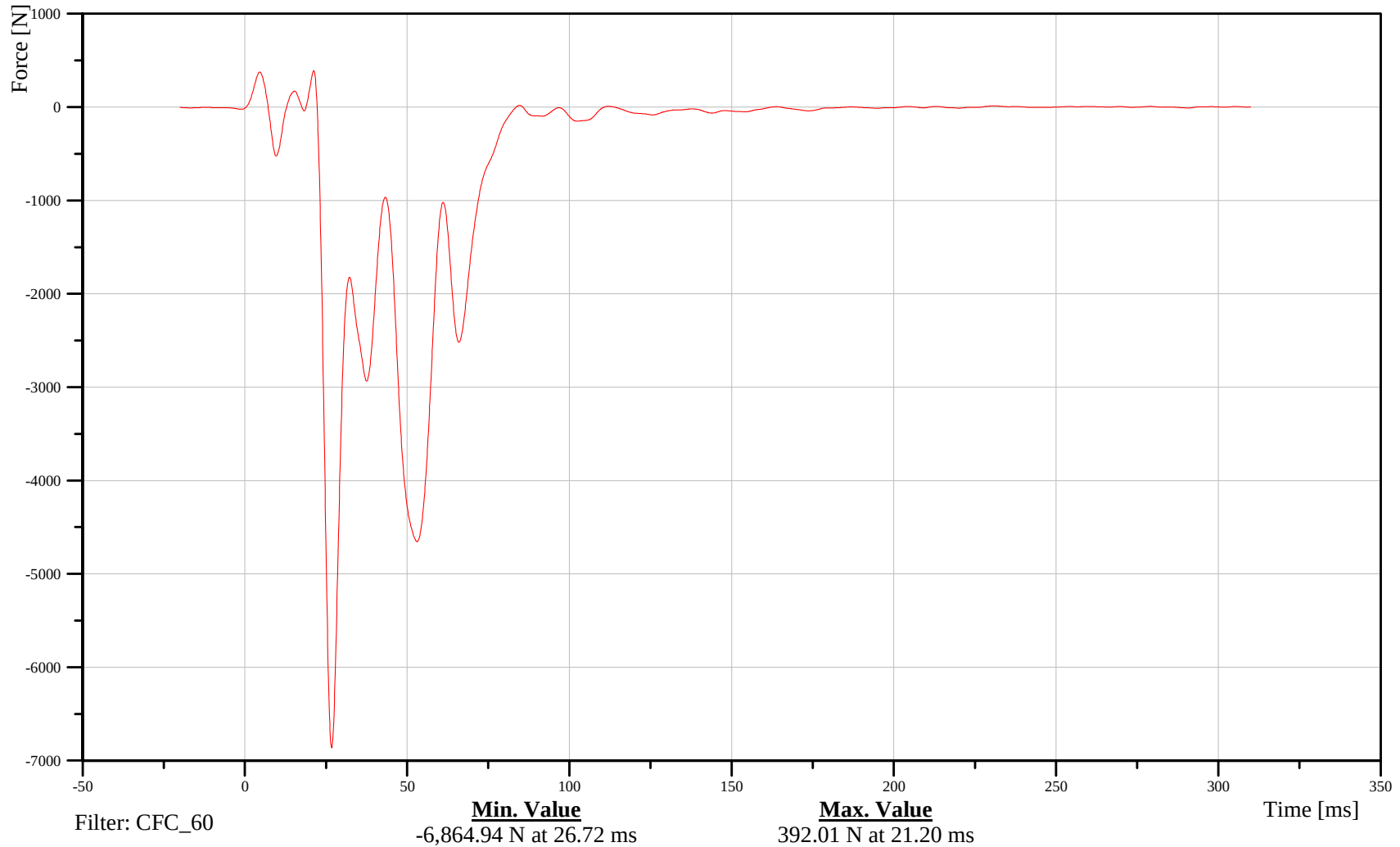
Barrier Load Cell C9

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR270000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

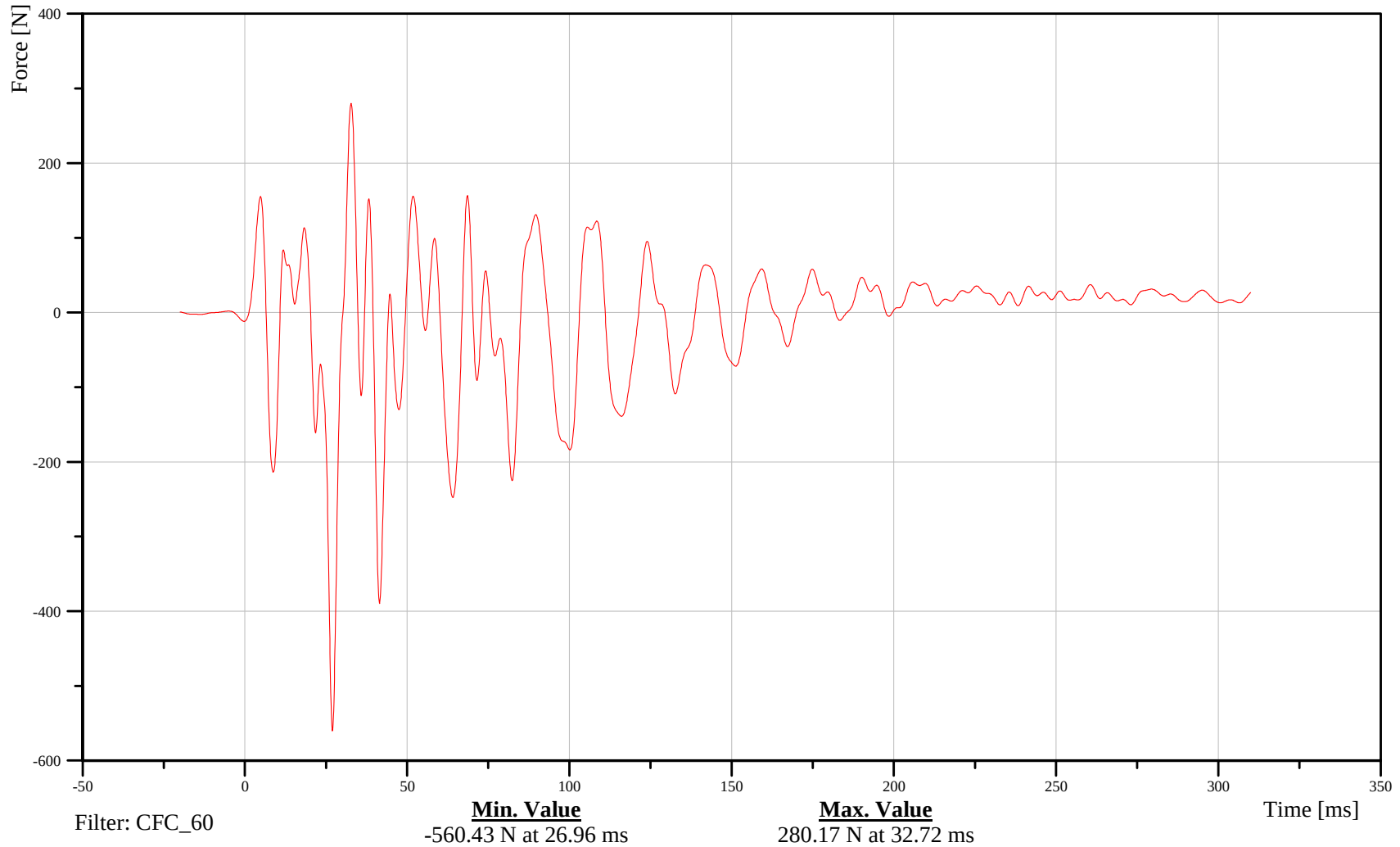
Barrier Load Cell D1

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR280000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

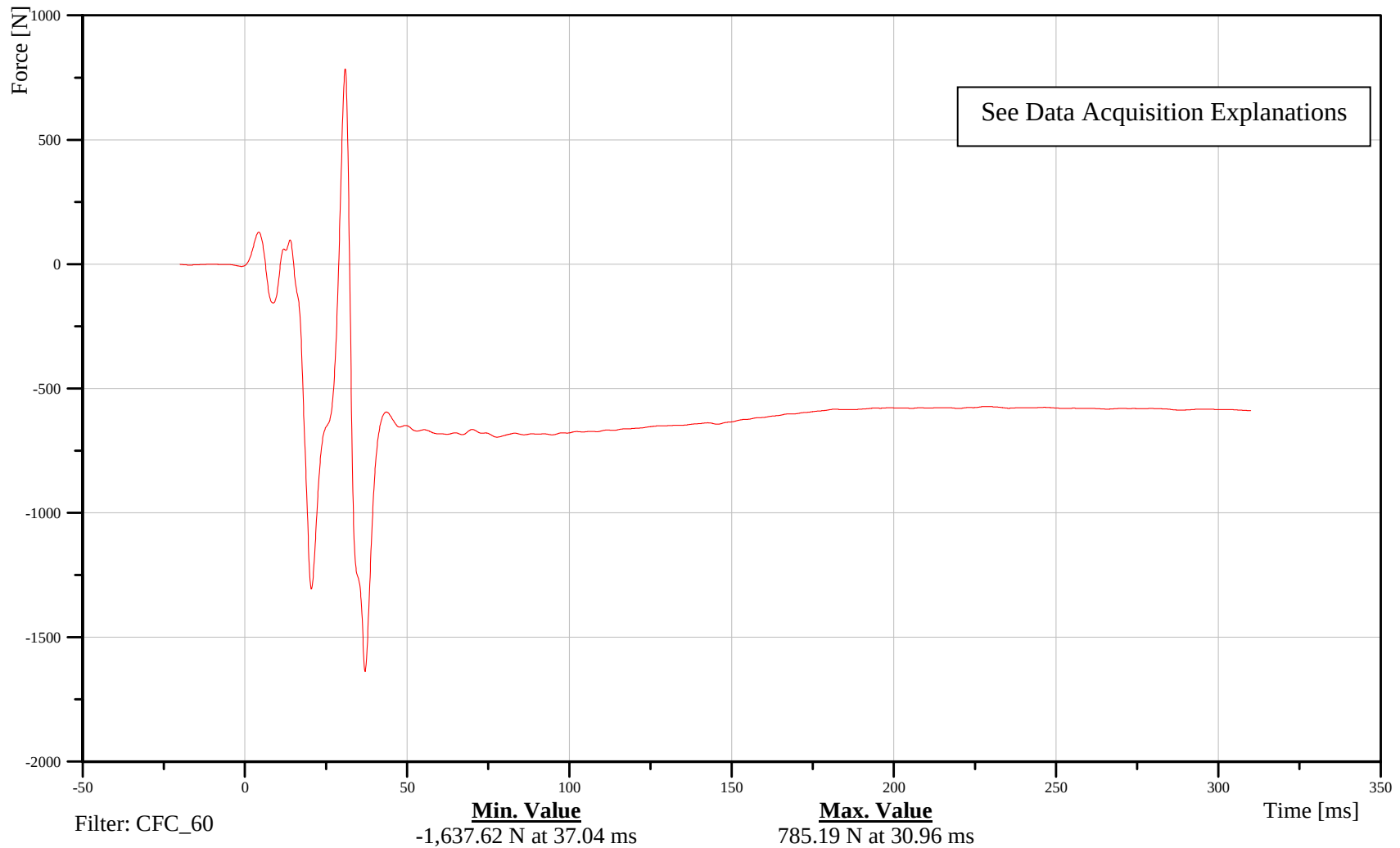
Barrier Load Cell D2

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR290000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

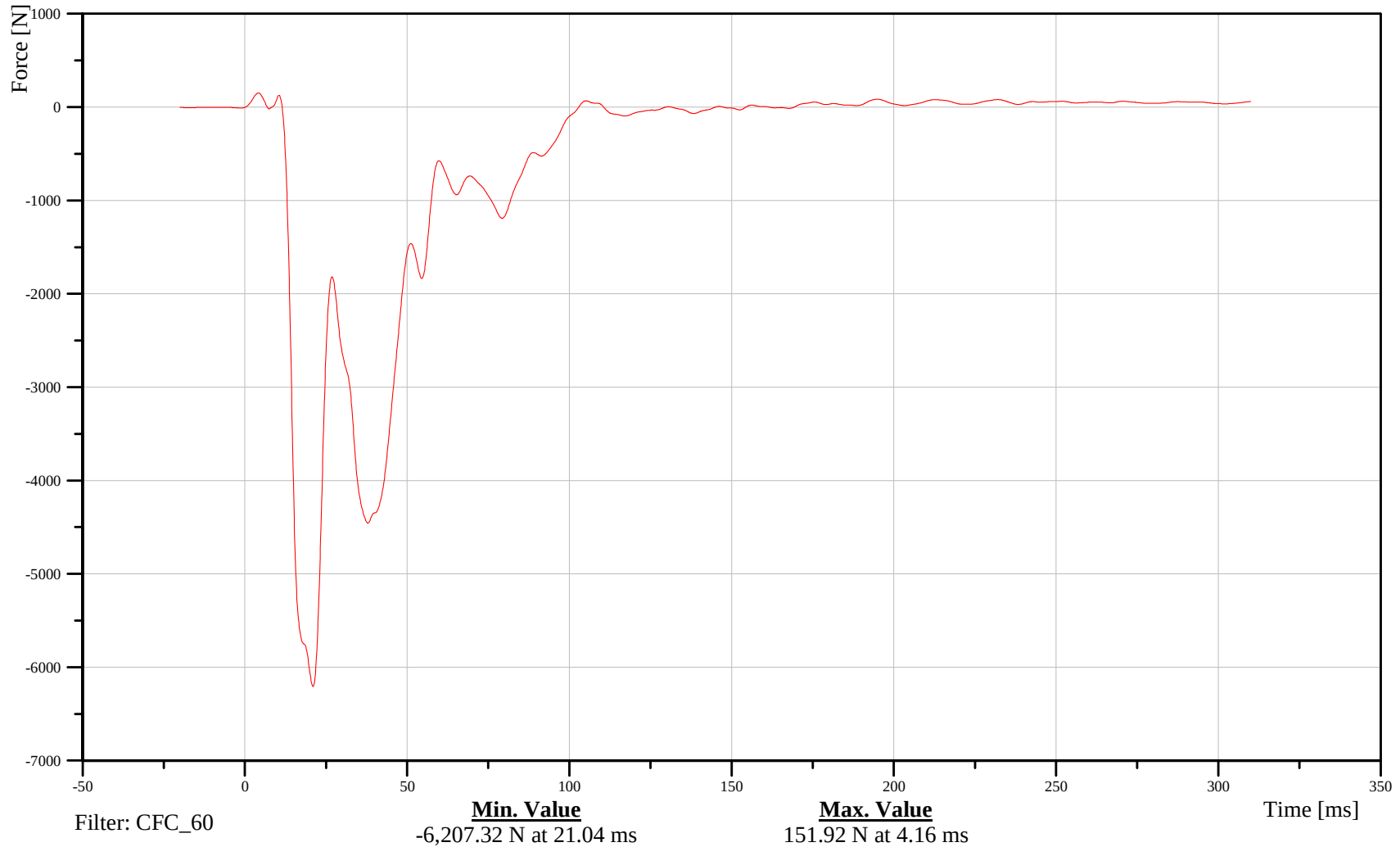
Barrier Load Cell D3

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR300000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

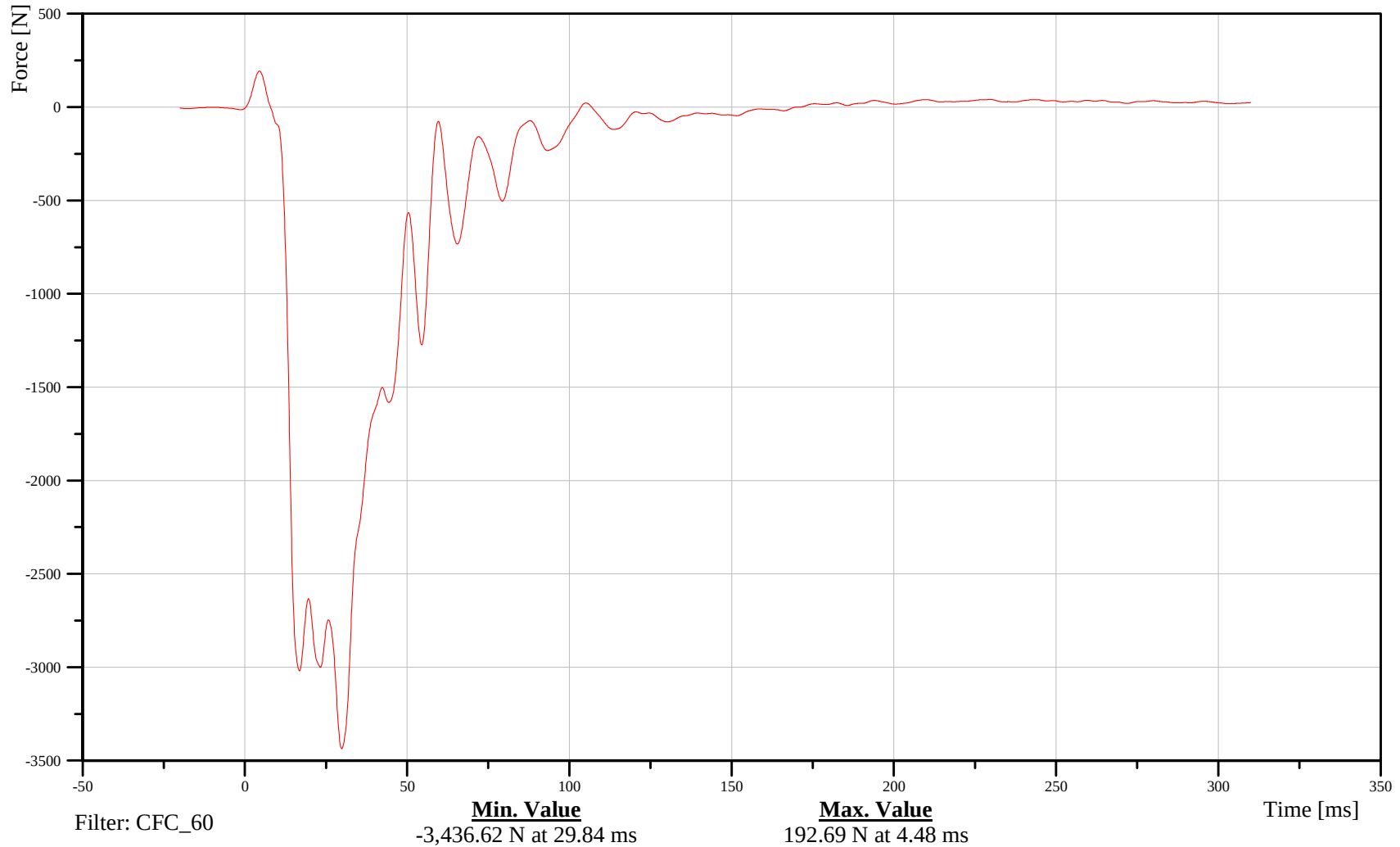
Barrier Load Cell D4

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR310000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

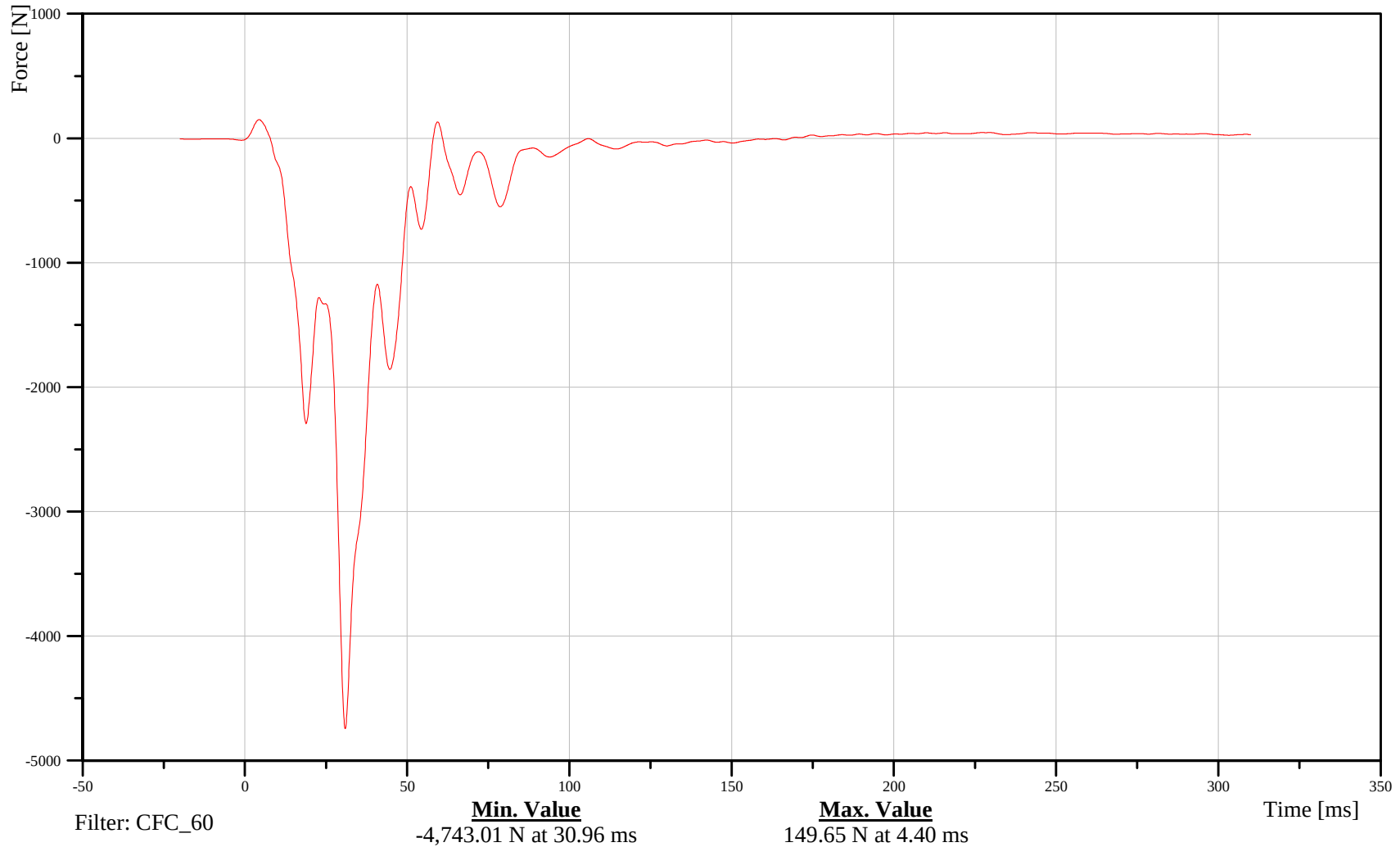
Barrier Load Cell D5

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR320000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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2006 Kia Optima 35 mph Frontal Barrier Impact

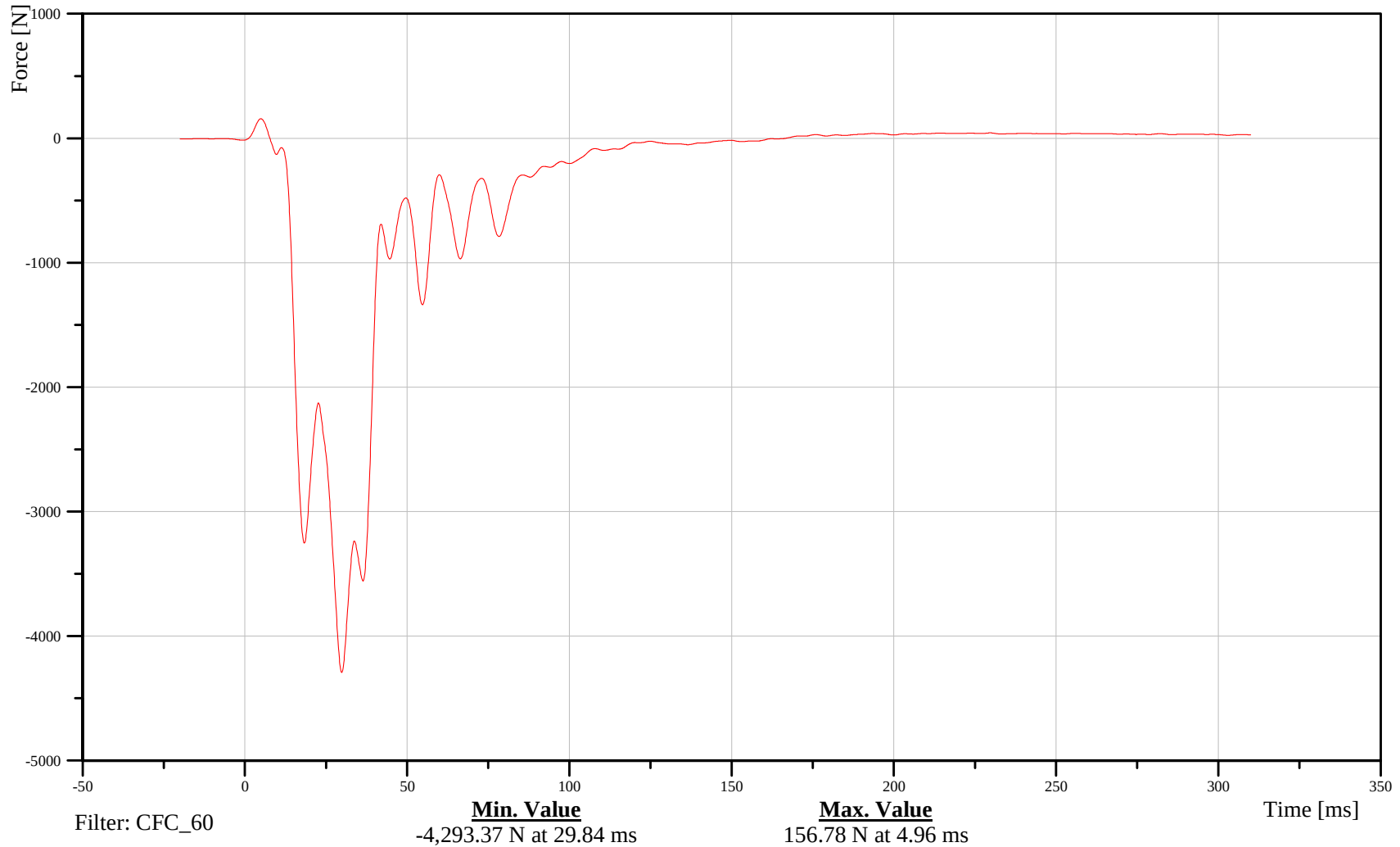
Barrier Load Cell D6

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR330000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

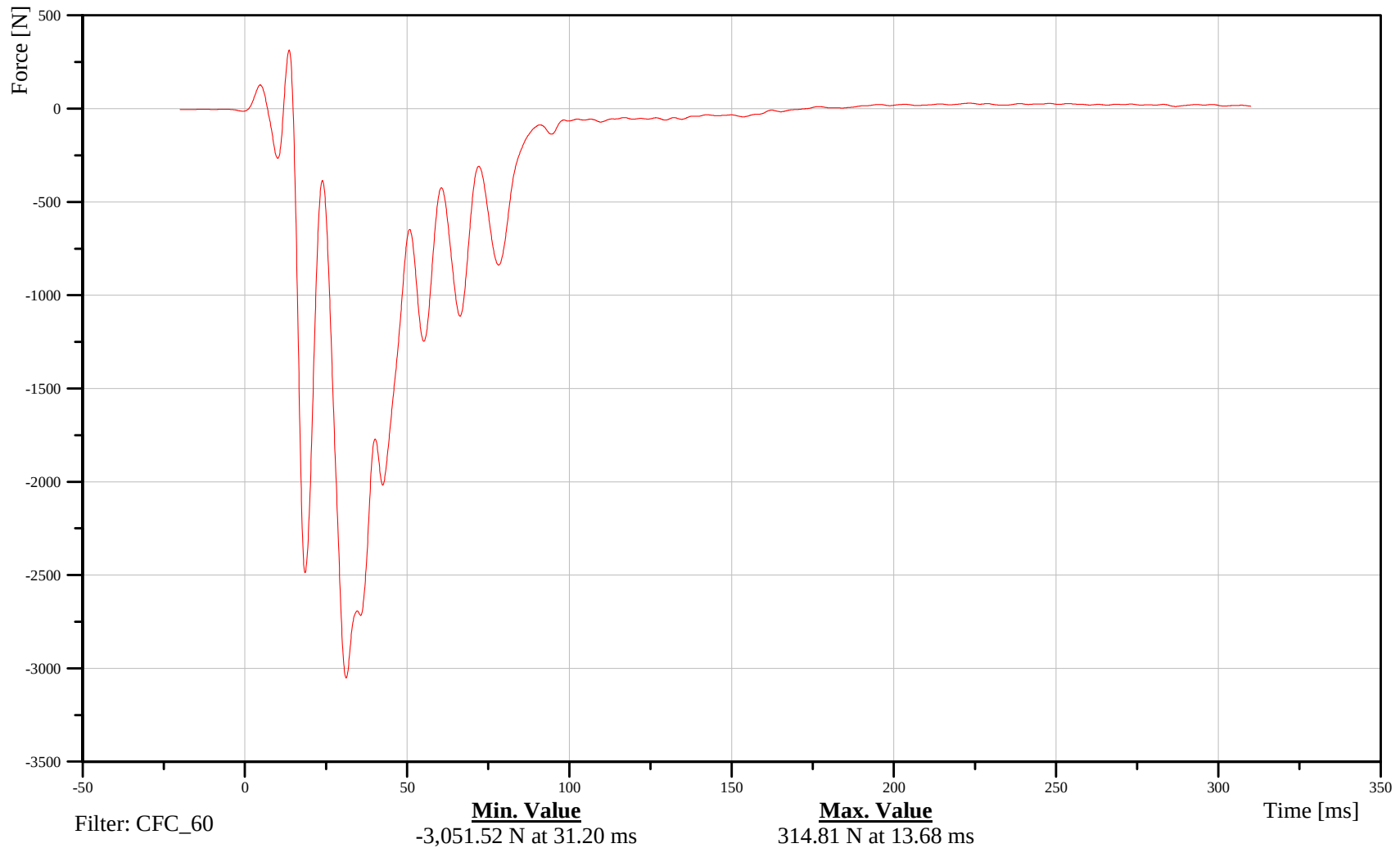
Barrier Load Cell D7

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR340000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

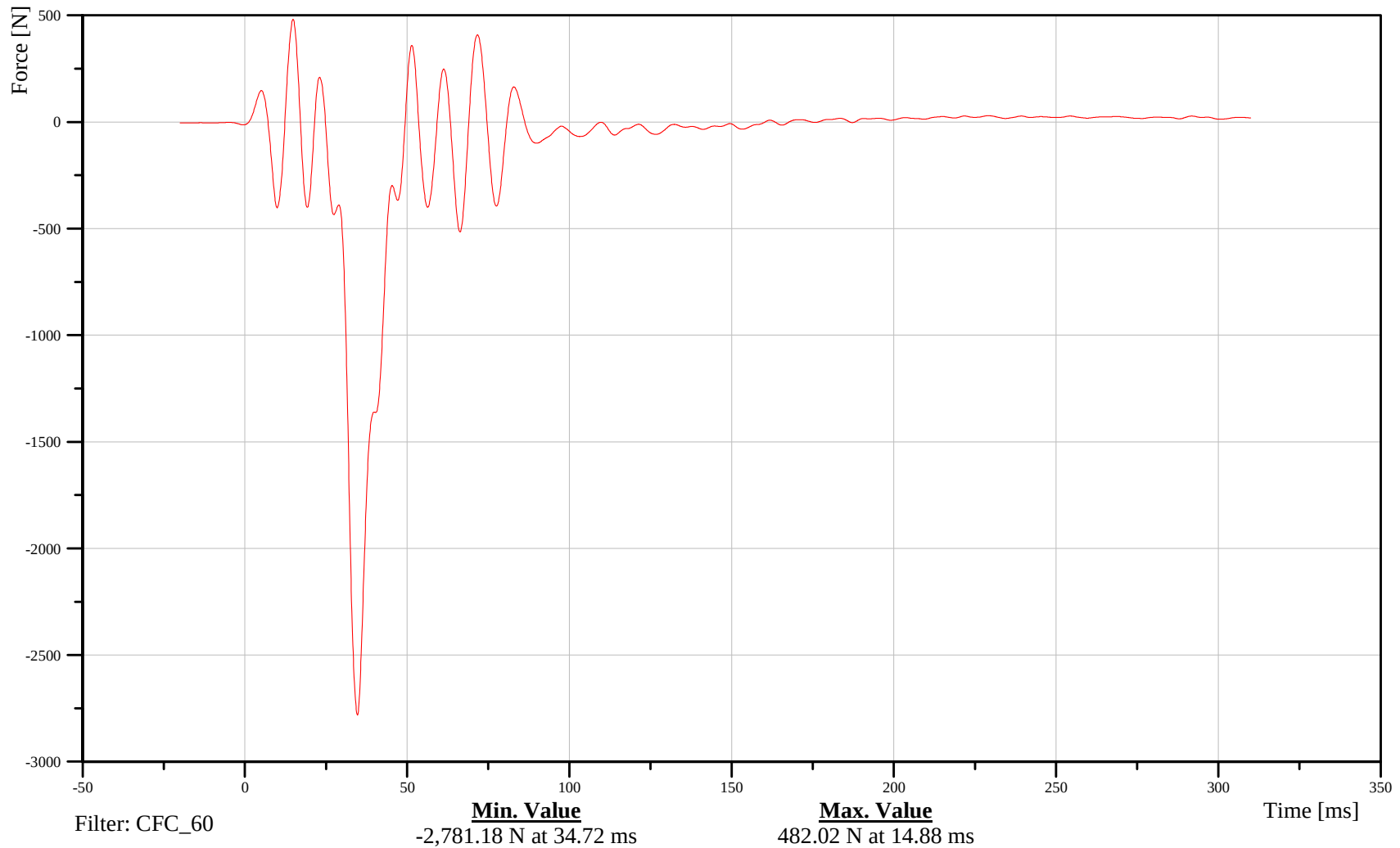
Barrier Load Cell D8

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR350000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927



2006 Kia Optima 35 mph Frontal Barrier Impact

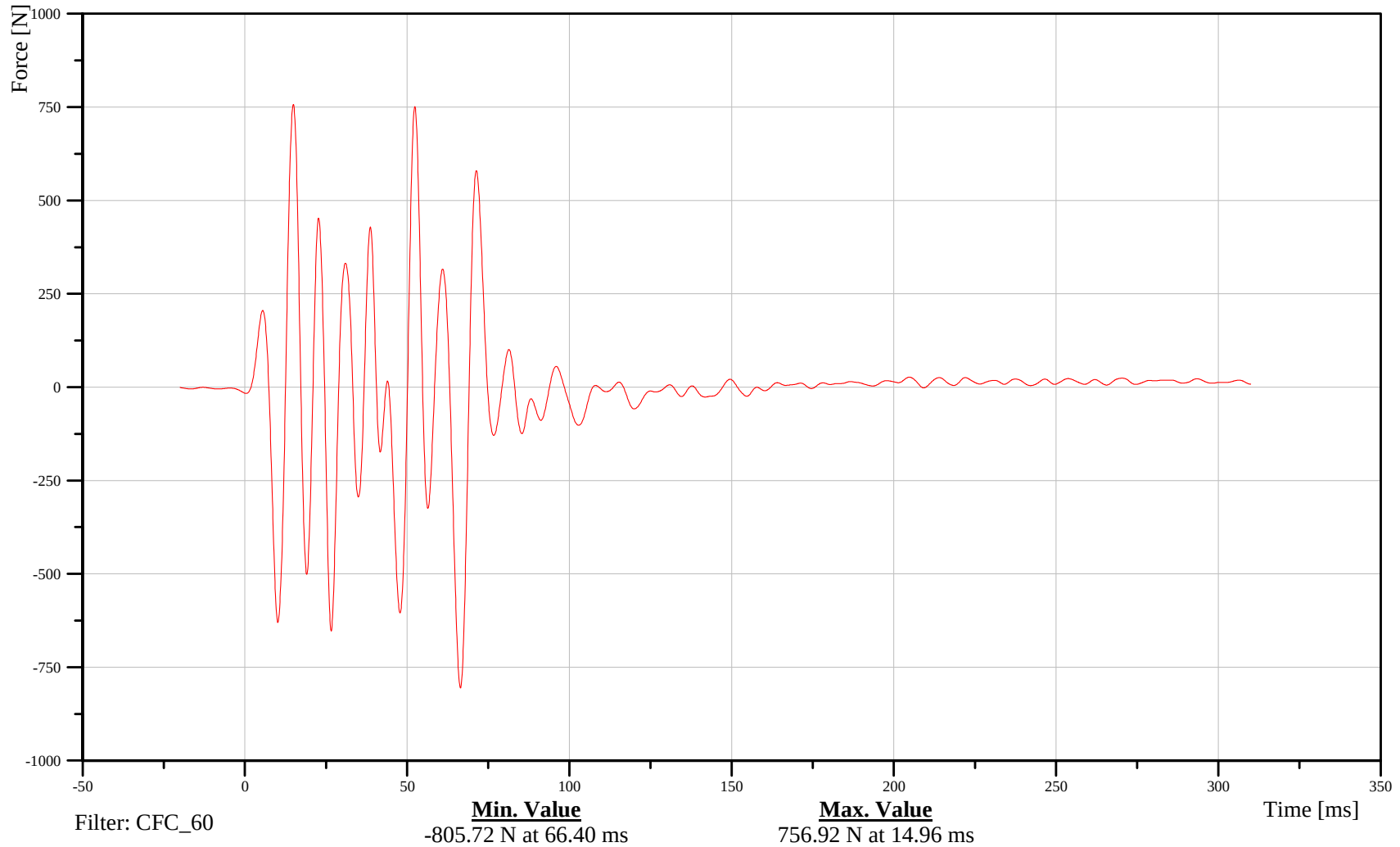
Barrier Load Cell D9

Date: 09/27/2006
Time: 13:07

Customer: NHTSA
Test Number: M60518

L0FBAR360000FOXD

TRC Inc. Test Lab: CTF
Test Number: 060927



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060927

Appendix C

Dummy Certification Data

Pre-test Dummy Configuration and Performance Verification Data

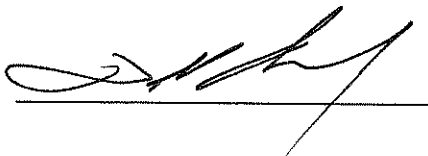
Driver Dummy S/N: 37

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 37
Calibration No. 01

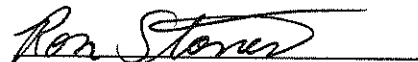
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	880	Yes
B	Shoulder Pivot Height	505.5 - 520.7	519	Yes
C	H-Point Height	83.8 - 88.9	86	Yes
D	H-Point From Seatback	134.6 - 139.7	139	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	89	Yes
F	Thigh Clearance	139.7 - 154.9	153	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	291	Yes
H	Skull Cap To Backline	40.6 - 45.7	43	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	338	Yes
J	Elbow Rest Height	190.5 - 210.8	194	Yes
K	Buttock Knee Length	579.1 - 604.5	603	Yes
L	Popliteal Height	429.3 - 454.7	430	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	221	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	426	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	973	Yes
Z	Waist Circumference	835.7 - 866.1	856	Yes
AA	Location For Chest Circumference	429.3 - 434.3	431	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments: Partial Set

Technician



Approved



Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 37 Certification No. 1-1

Test Date: 09/07/2006

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	255.3 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-2.1 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved

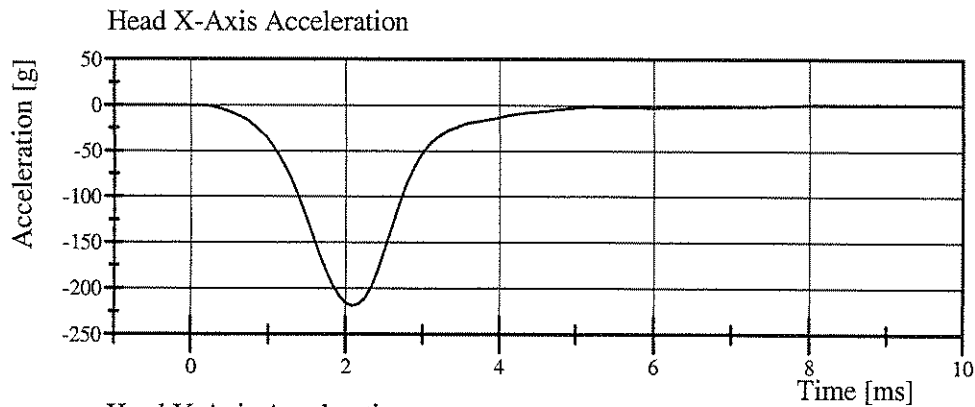


Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 37 Certification No. 1-1

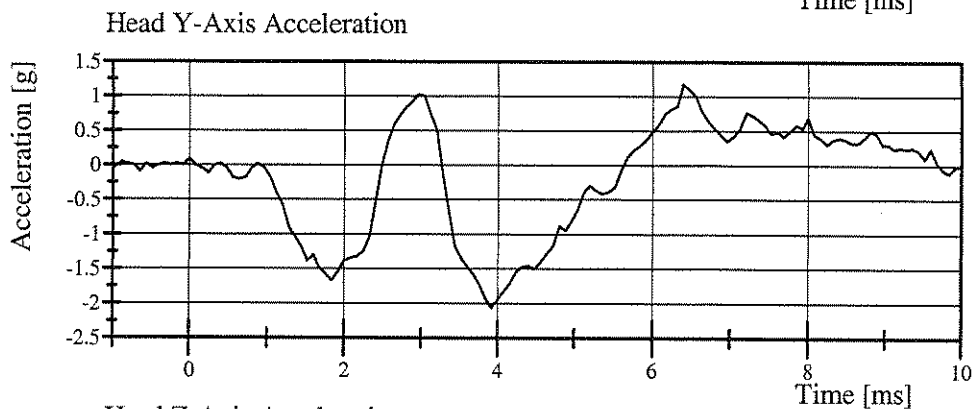
Test Date: 09/07/2006



Filter Class: CFC_1000

Max: 1.2 g at 8.9 ms

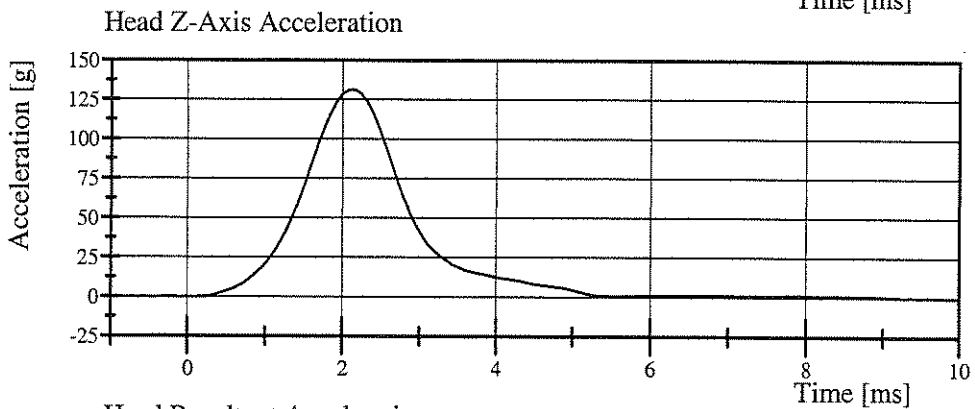
Min: -218.8 g at 2.1 ms



Filter Class: CFC_1000

Max: 1.2 g at 6.4 ms

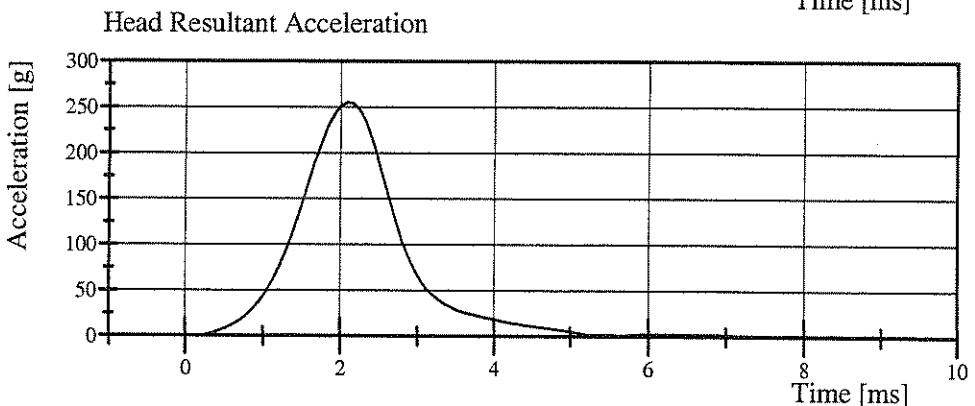
Min: -2.1 g at 3.9 ms



Filter Class: CFC_1000

Max: 131.5 g at 2.1 ms

Min: -0.4 g at 9.8 ms



Filter Class: CFC_1000

Max: 255.3 g at 2.1 ms

Min: 0.0 g at -0.4 ms

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 37 Certification No. 1-1

Test Date: 09/07/2006

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.928 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.6 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.59 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.21 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.39 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.39 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-66.8 °	Yes
Time of Peak	57 - 64 ms	57.8 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	117.7 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	106.2 N·m	Yes
Time of Peak	47 - 58 ms	50.7 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.0 ms	Yes

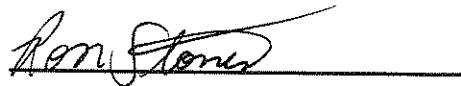
Test meets specifications.

Comments:

Technician



Approved

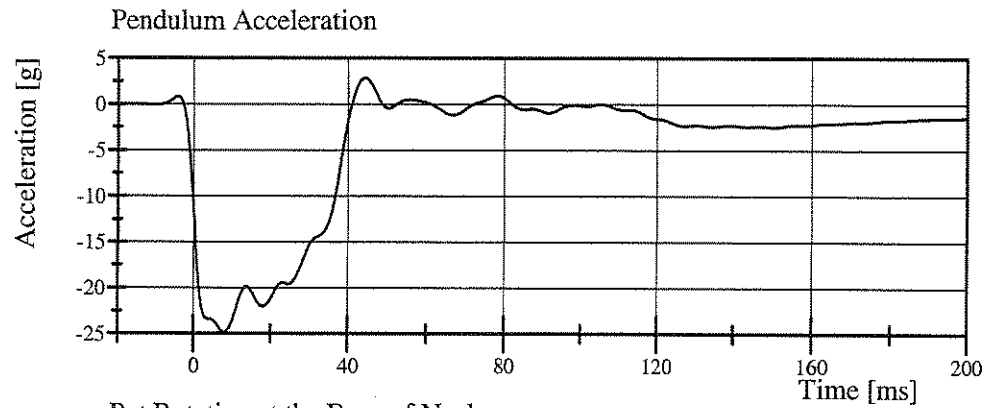


Transportation Research Center Inc.

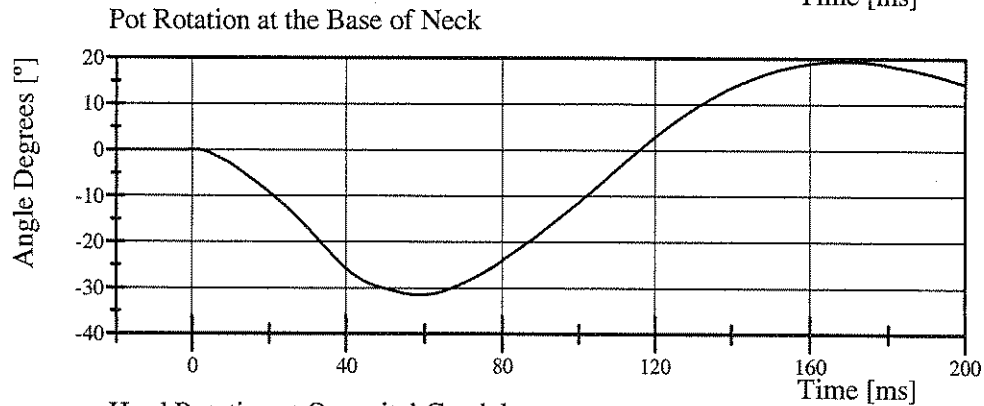
Neck Flexion

HIII 50th Serial No. 37 Certification No. 1-1

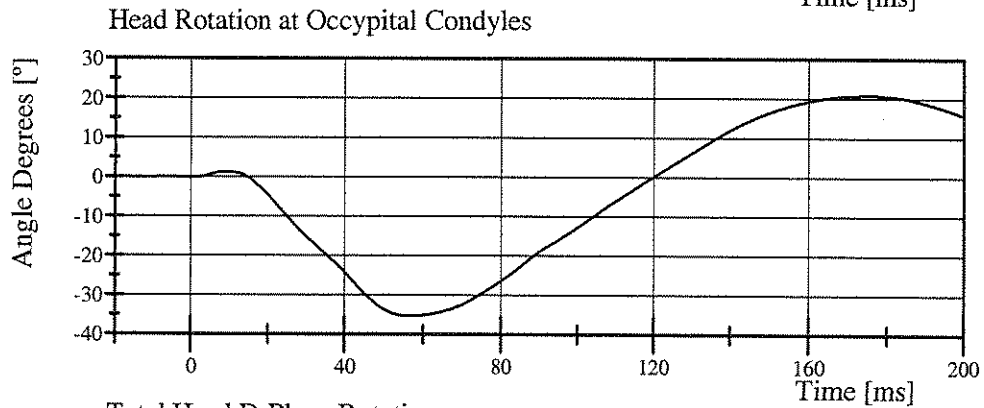
Test Date: 09/07/2006



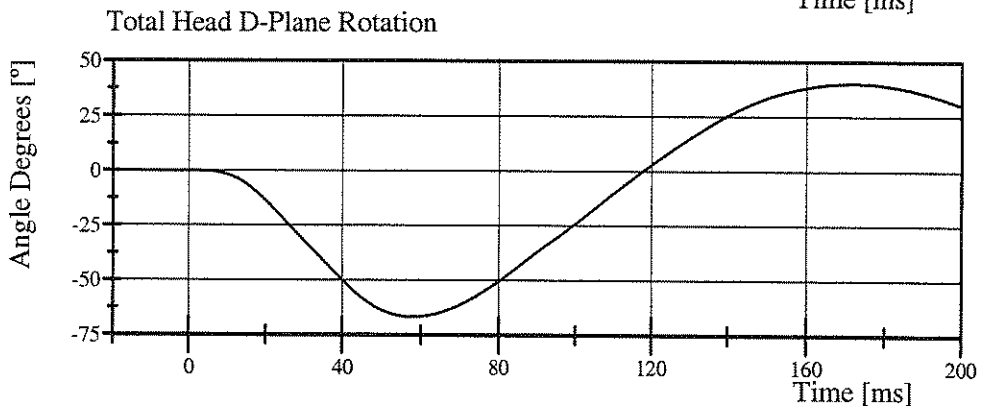
Filter Class: CFC_60
Max: 2.9 g at 44.3 ms
Min: -24.8 g at 7.9 ms



Filter Class: CFC_60
Max: 19.4 ° at 169.3 ms
Min: -31.5 ° at 58.6 ms



Filter Class: CFC_60
Max: 20.9 ° at 175.4 ms
Min: -35.3 ° at 56.9 ms



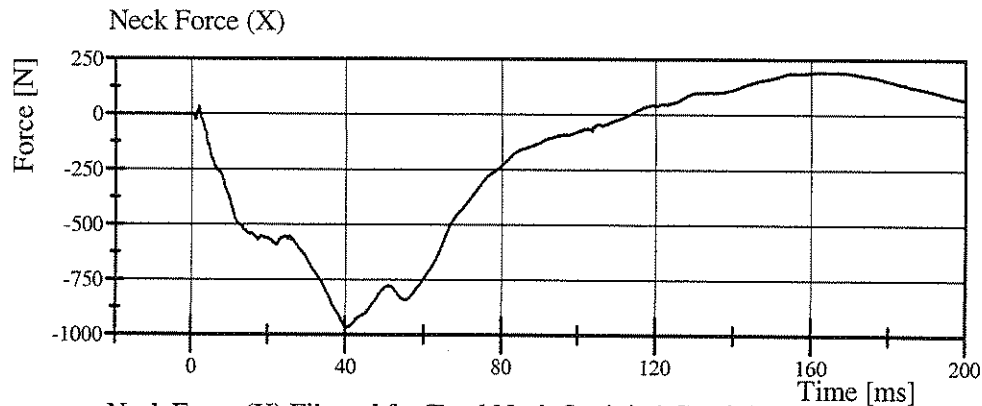
Filter Class: CFC_60
Max: 40.2 ° at 172.0 ms
Min: -66.8 ° at 57.8 ms

Transportation Research Center Inc.

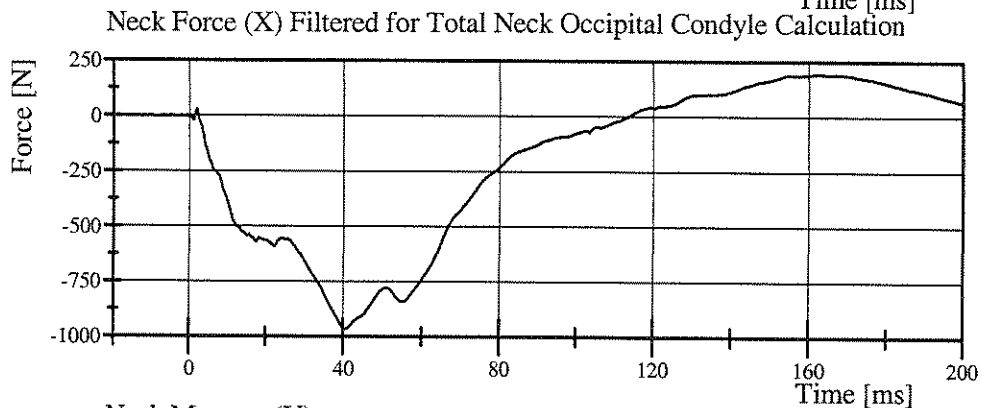
Neck Flexion

HIII 50th Serial No. 37 Certification No. 1-1

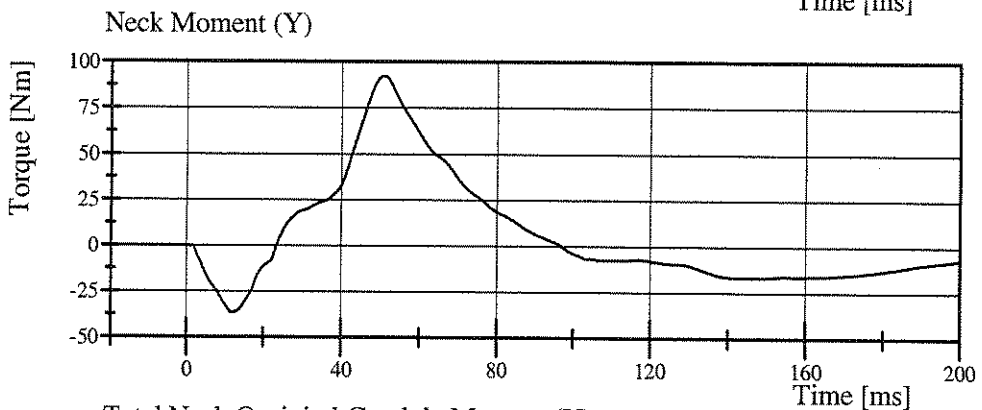
Test Date: 09/07/2006



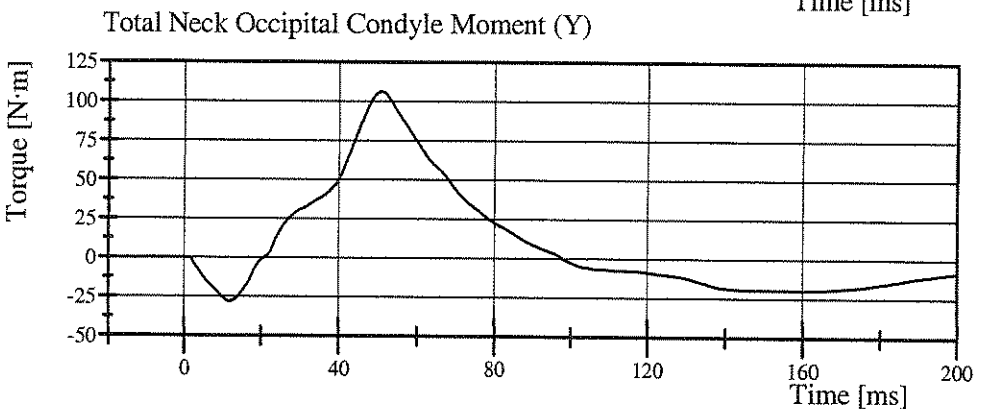
Filter Class: CFC_1000
Max: 196.0 N at 162.4 ms
Min: -968.2 N at 40.3 ms



Filter Class: CFC_600
Max: 194.6 N at 162.3 ms
Min: -967.2 N at 40.4 ms



Filter Class: CFC_600
Max: 92.5 Nm at 50.7 ms
Min: -36.6 Nm at 12.1 ms



Filter Class: CFC_600
Max: 106.2 N·m at 50.7 ms
Min: -27.9 N·m at 11.9 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 37 Certification No. 1-2

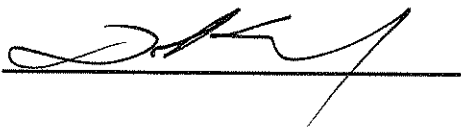
Test Date: 09/07/2006

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.972 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	43.0 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	17.62 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.50 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.17 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.52 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	88.9 °	Yes
Time of Peak	72 - 82 ms	77.2 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	155.8 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-69.0 N·m	Yes
Time of Peak	65 - 79 ms	72.7 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	142.8 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

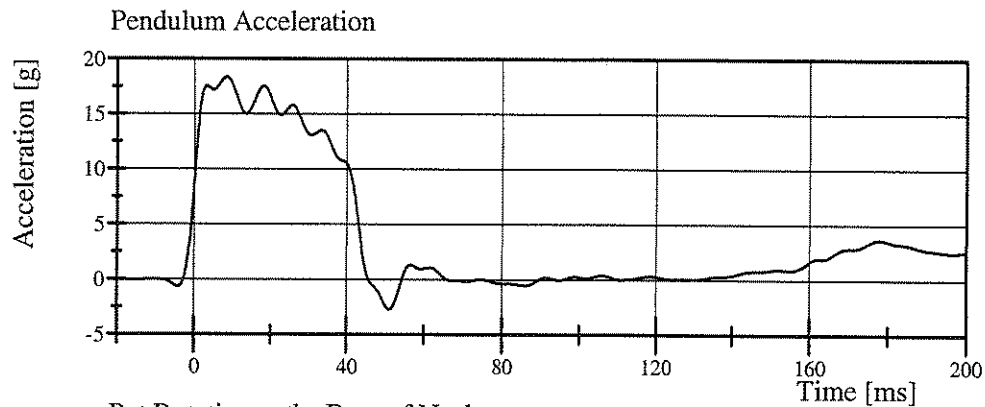


Transportation Research Center Inc.

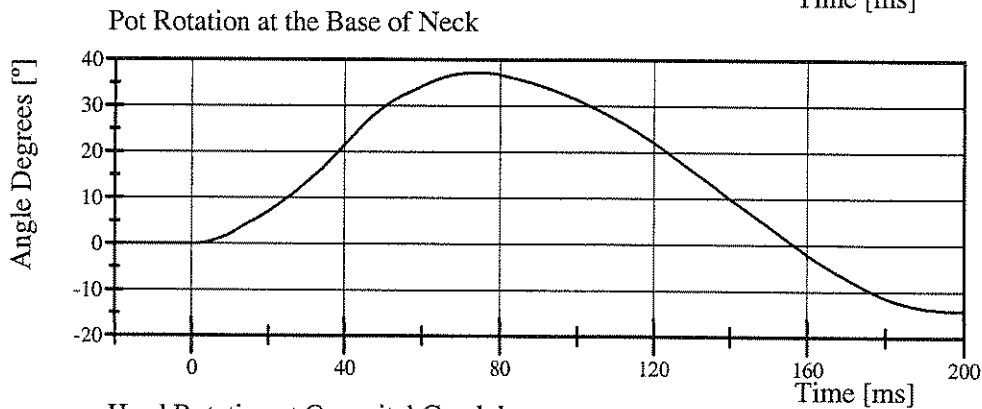
Neck Extension

HIII 50th Serial No. 37 Certification No. 1-2

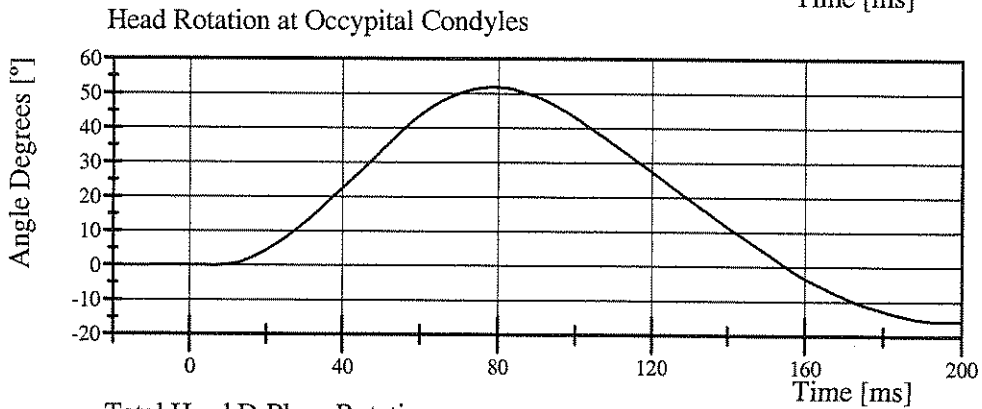
Test Date: 09/07/2006



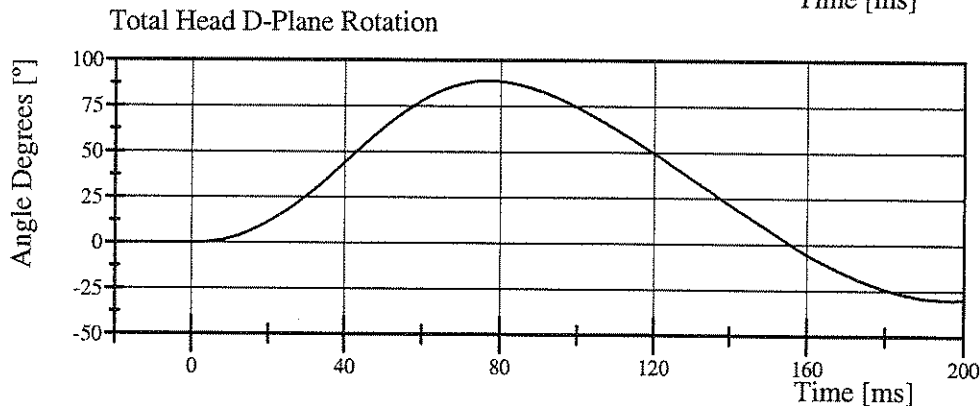
Filter Class: CFC_60
Max: 18.4 g at 8.3 ms
Min: -2.7 g at 51.1 ms



Filter Class: CFC_60
Max: 37.2 ° at 74.7 ms
Min: -14.1 ° at 197.8 ms



Filter Class: CFC_60
Max: 51.8 ° at 78.9 ms
Min: -15.7 ° at 196.4 ms



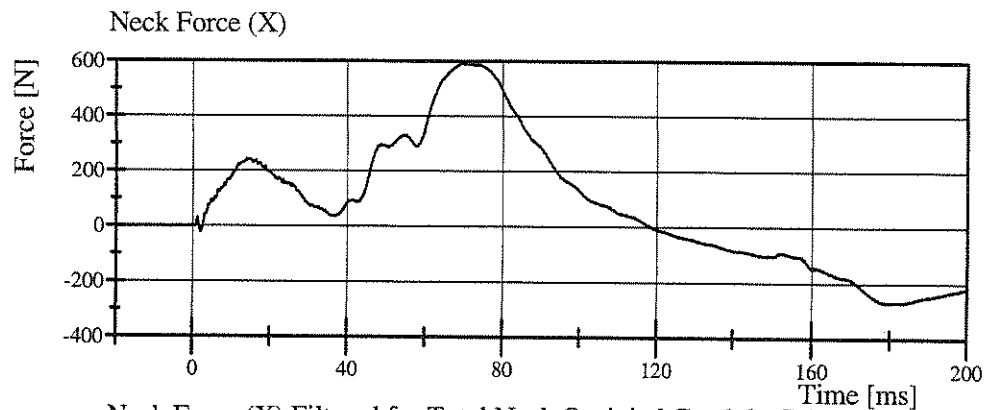
Filter Class: CFC_60
Max: 88.9 ° at 77.2 ms
Min: -29.9 ° at 197.1 ms

Transportation Research Center Inc.

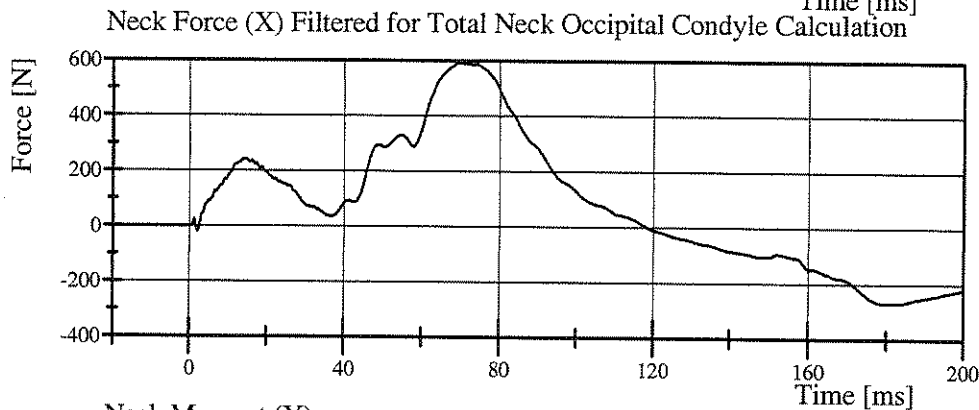
Neck Extension

HIII 50th Serial No. 37 Certification No. 1-2

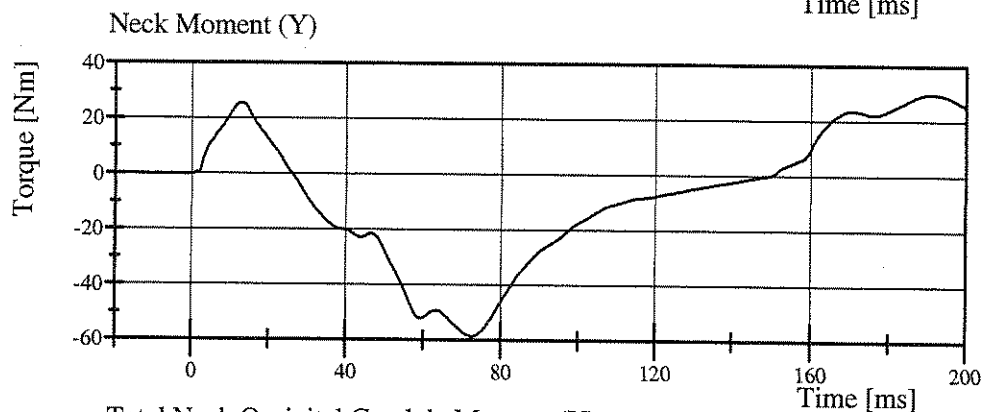
Test Date: 09/07/2006



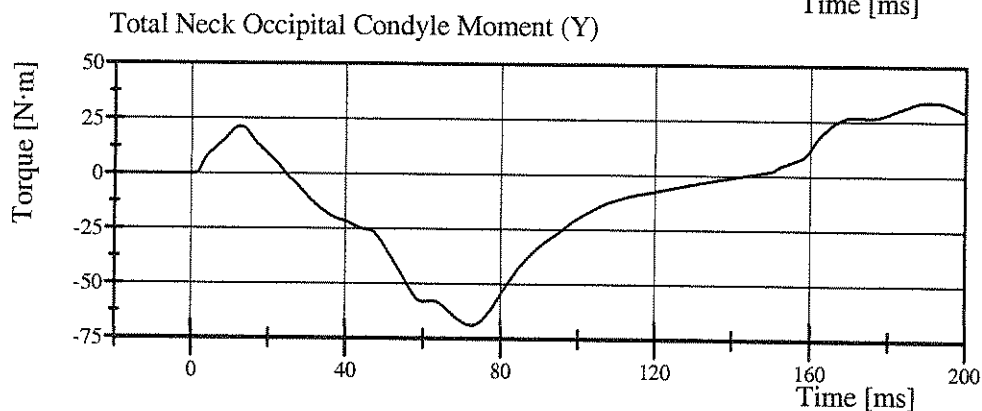
Filter Class: CFC_1000
Max: 594.3 N at 69.8 ms
Min: -270.0 N at 180.4 ms



Filter Class: CFC_600
Max: 592.8 N at 69.8 ms
Min: -269.1 N at 180.5 ms



Filter Class: CFC_600
Max: 29.7 Nm at 191.2 ms
Min: -58.6 Nm at 72.7 ms



Filter Class: CFC_600
Max: 34.1 N·m at 190.5 ms
Min: -69.0 N·m at 72.7 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 37 Certification No. 1-5

Test Date: 09/08/2006

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.604 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,879.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-65.45 mm	Yes
Internal Hysteresis	65 - 85 %	74.1 %	Yes

Test meets specifications.

Comments:

Technician



Approved

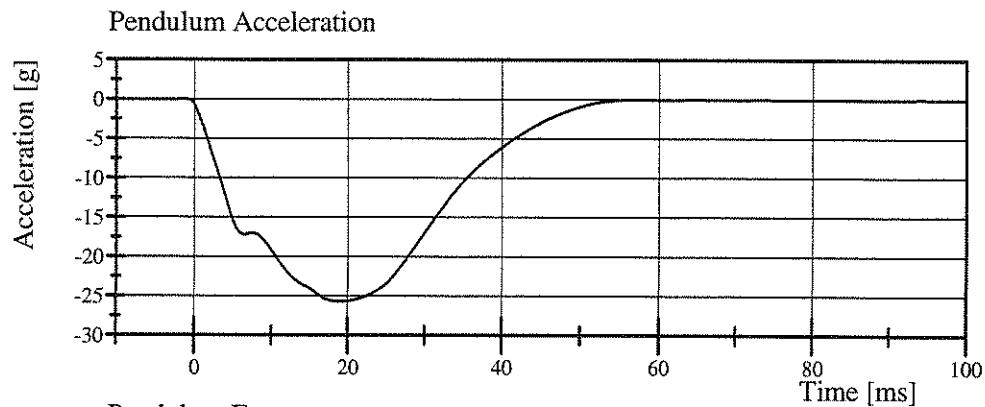


Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 37 Certification No. 1-5

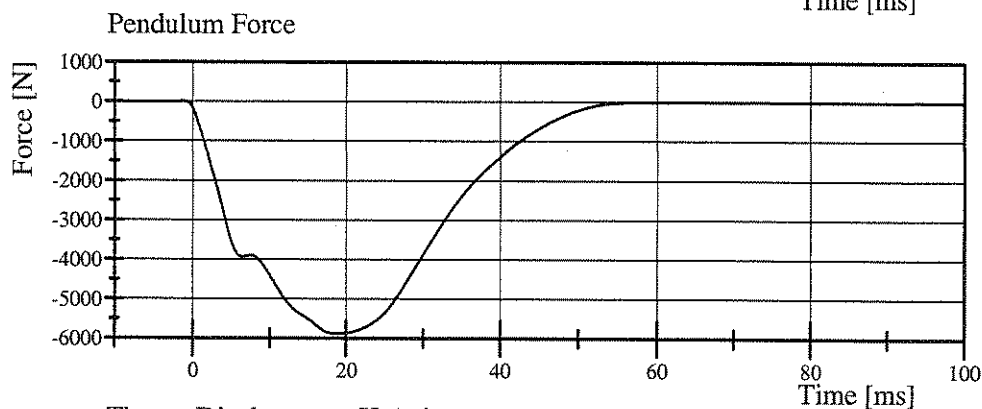
Test Date: 09/08/2006



Filter Class: CFC_180

Max: 0.1 g at -1.1 ms

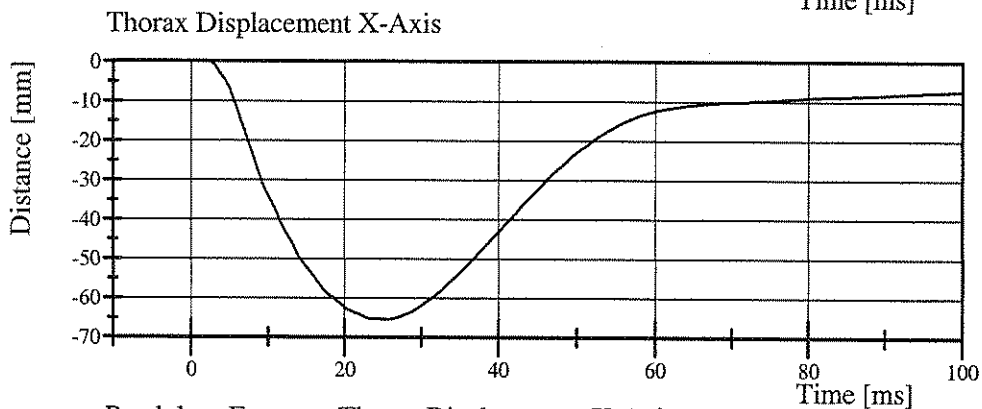
Min: -25.7 g at 19.0 ms



Filter Class: CFC_180

Max: 12.3 N at -1.1 ms

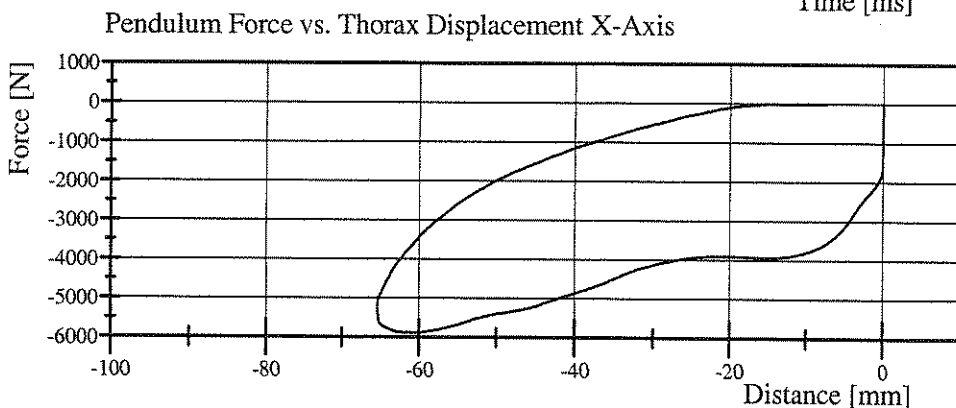
Min: -5,879.5 N at 19.0 ms



Filter Class: CFC_600

Max: 0.0 mm at -4.6 ms

Min: -65.5 mm at 25.4 ms



Filter Class: CFC_180

Max: 12.3 N at -0.0 mm

Min: -5,879.5 N at -60.9 mm

Applied Safety Technologies Corp.

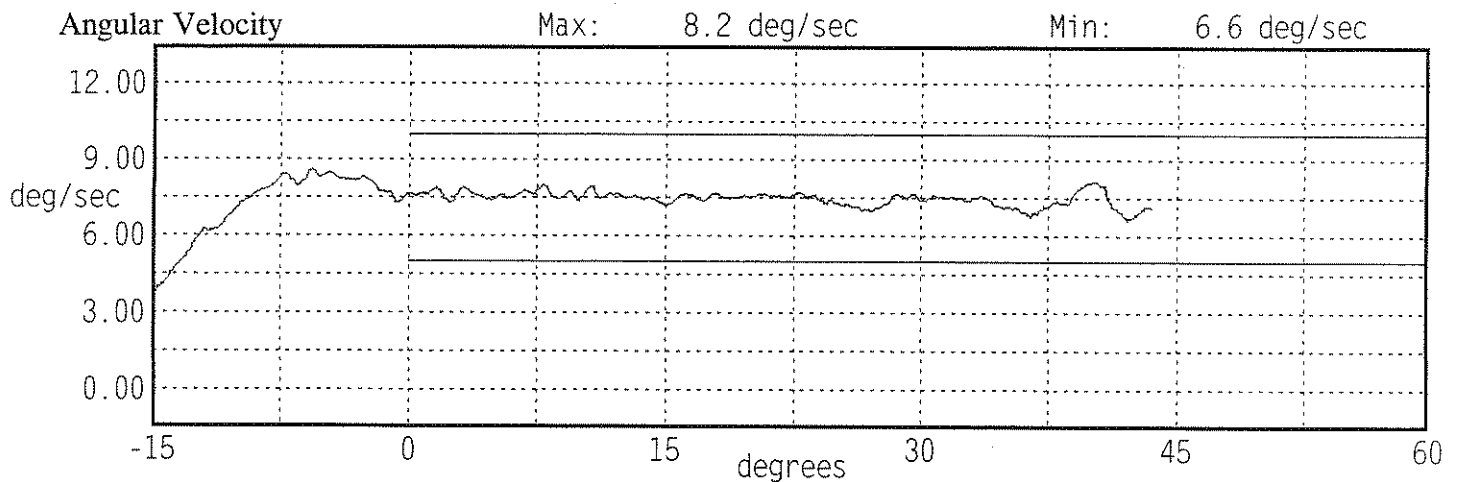
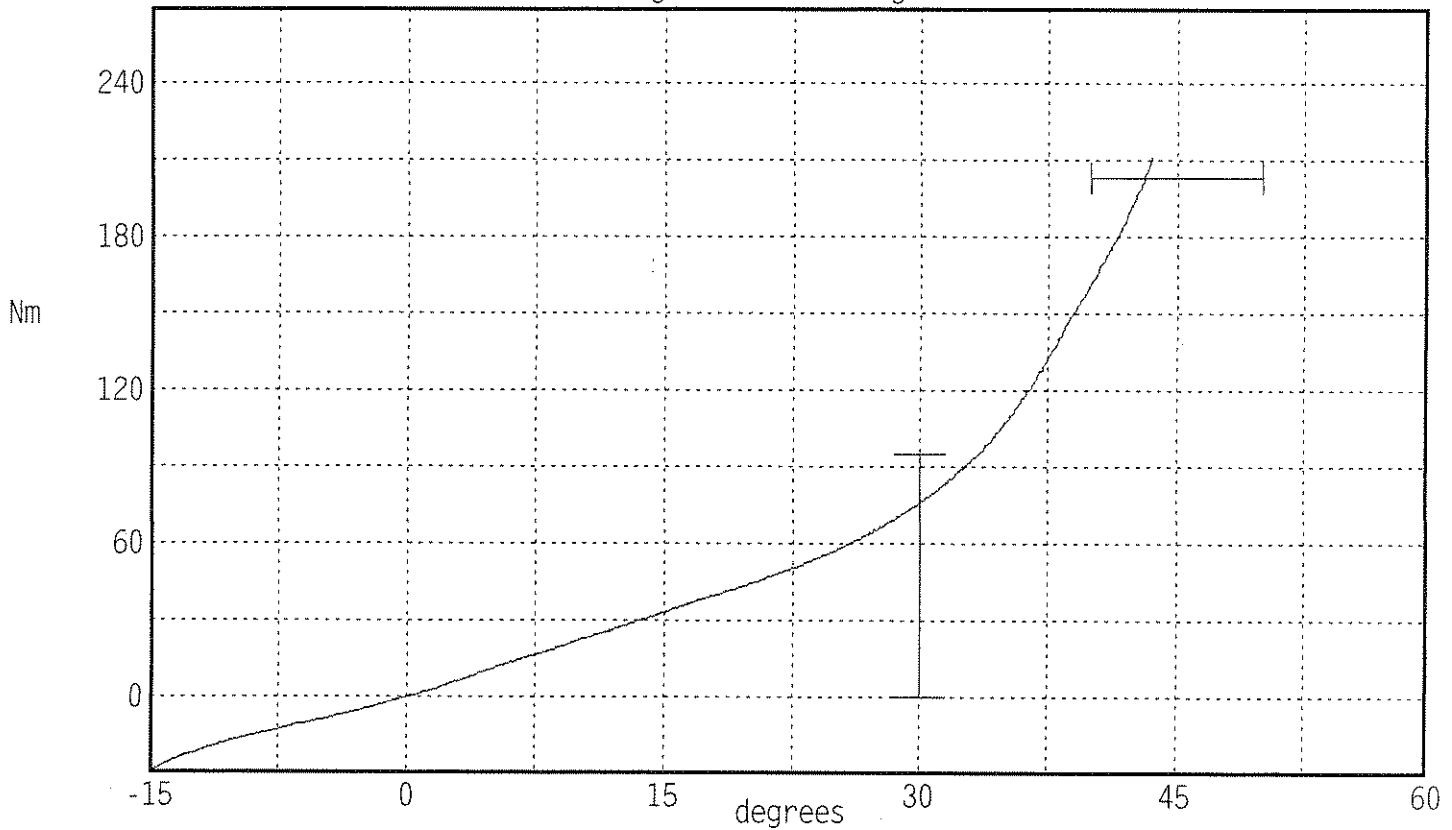
Hybrid III Hip Range of Motion

Serial Number: 37L
Test Number: 37C01
Comments:

Date: 09/07/2006
Time: 12:44

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	20.9 °C Pass
Humidity	10 - 70	53 % Pass
Moment at 30 deg	<= 94.9	76.0 Nm Pass
Angle at 203 Nm	40.0 - 50.0	43.1 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 210.8 Nm at 43.5 deg
Peak Angle: 43.5 deg at 210.8 Nm



Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

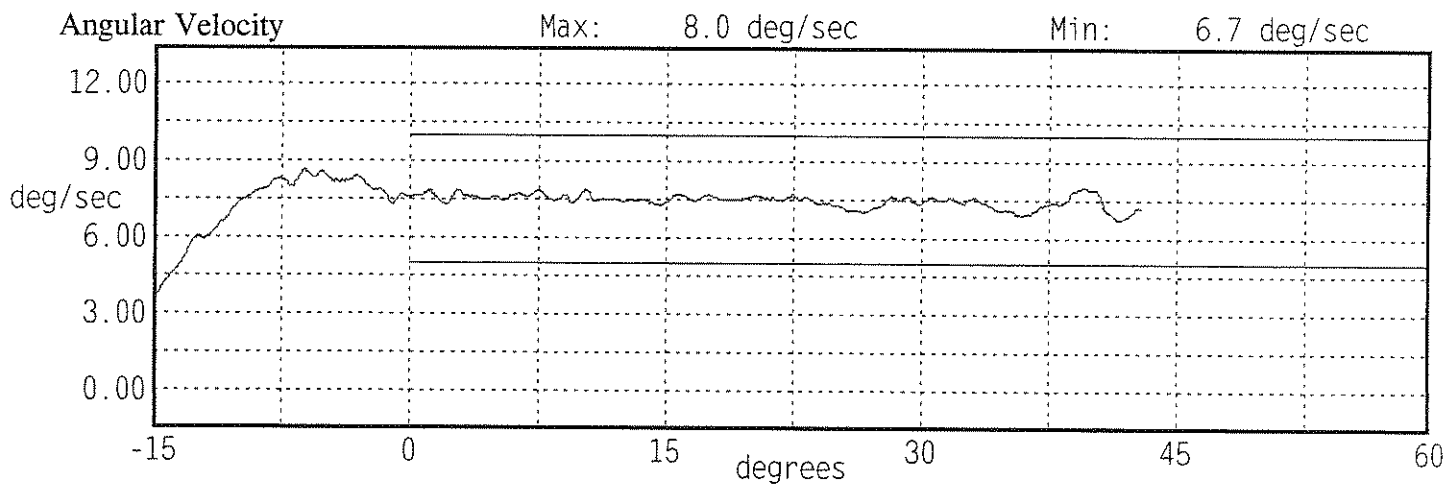
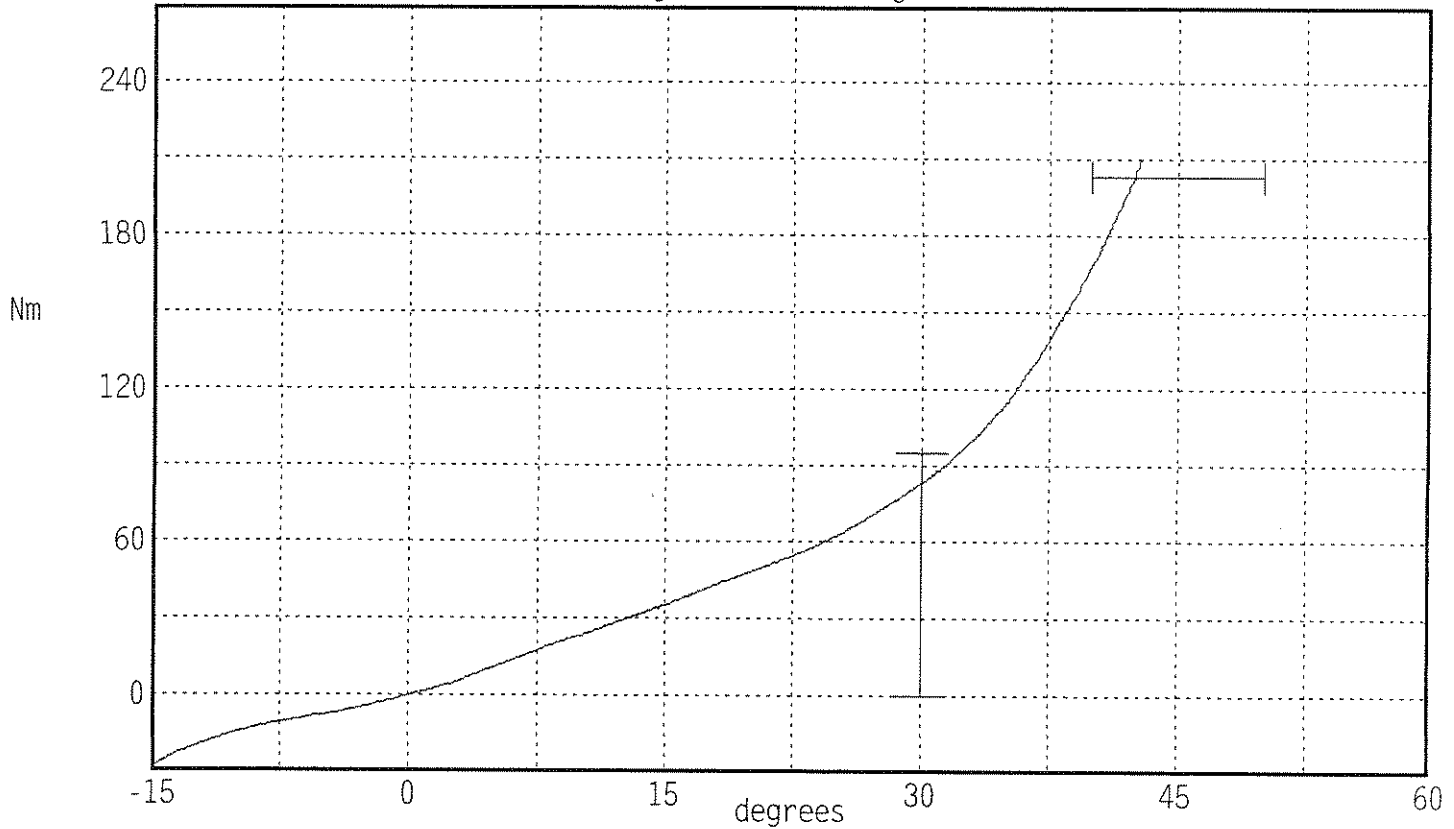
Serial Number: 37R
Test Number: 37C01

Date: 09/07/2006
Time: 12:54

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	20.9 °C Pass
Humidity	10 - 70	57 % Pass
Moment at 30 deg	<= 94.9	83.4 Nm Pass
Angle at 203 Nm	40.0 - 50.0	42.5 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 210.1 Nm at 42.9 deg
Peak Angle: 42.9 deg at 210.1 Nm



Transportation Research Center Inc.

Left Knee Femur Response Test

HIII 50th Serial No. 37 Certification No. 1-2

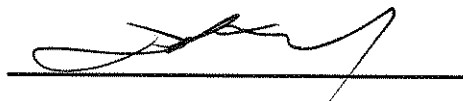
Test Date: 09/07/2006

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.125 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,496.27 N	Yes

Test meets specifications.

Comments:

Technician



Approved

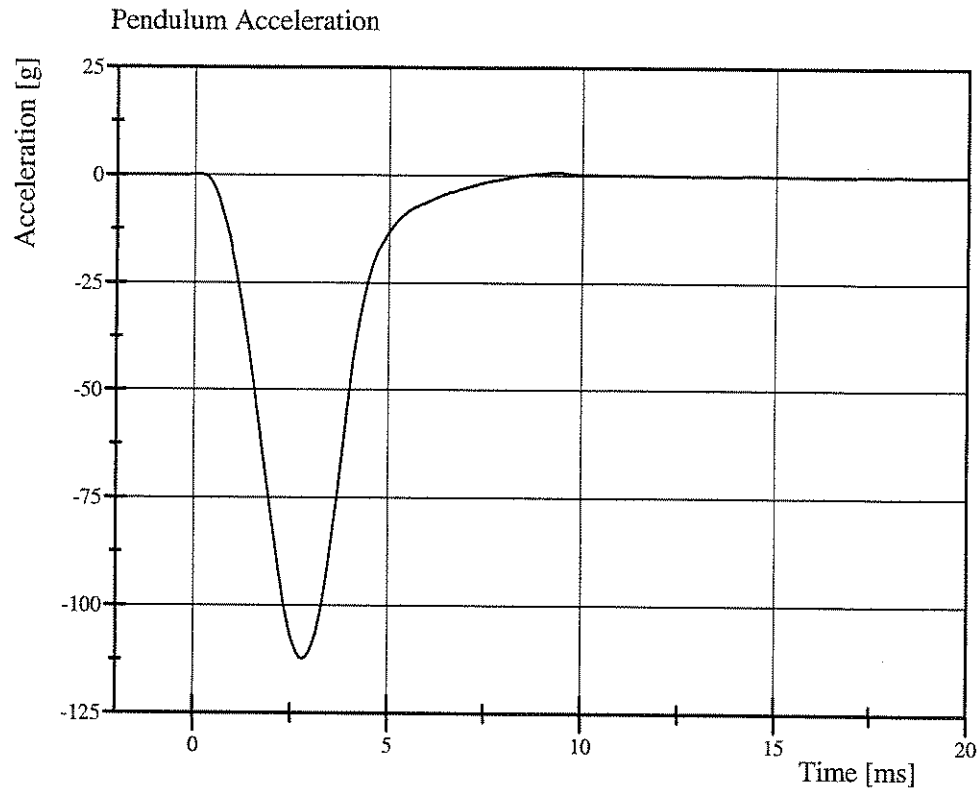


Transportation Research Center Inc.

Left Knee Femur Response Test

HIII 50th Serial No. 37 Certification No. 1-2

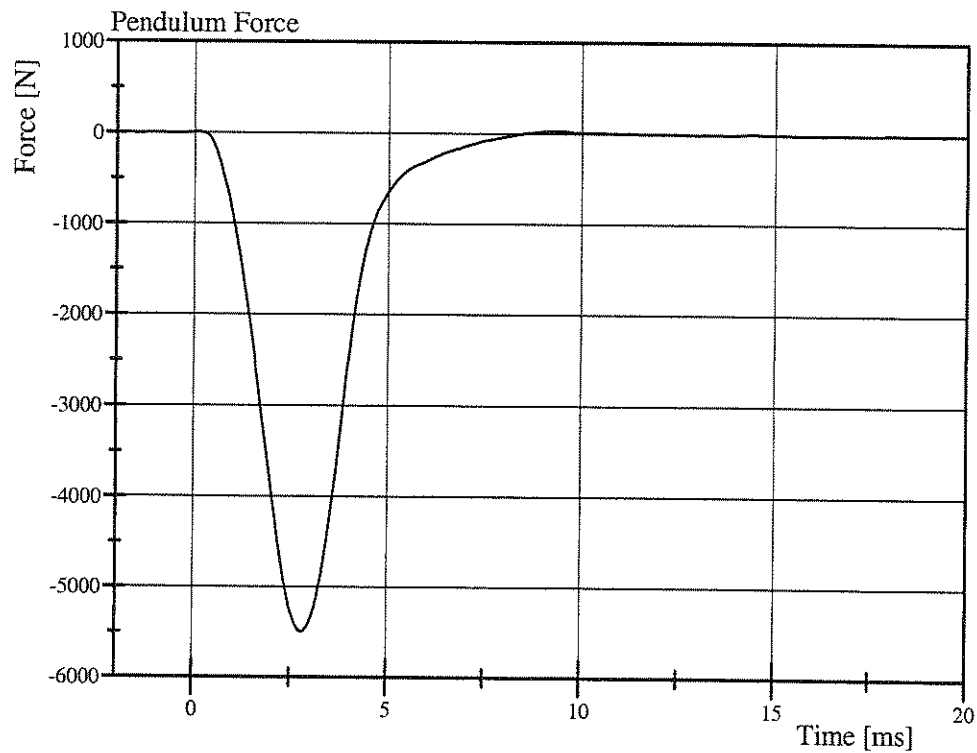
Test Date: 09/07/2006



Filter Class: CFC_600

Max: 0.7 g at 9.3 ms

Min: -112.3 g at 2.8 ms



Filter Class: CFC_600

Max: 34.3 N at 9.3 ms

Min: -5,496.3 N at 2.8 ms

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 37 Certification No. 1-2
Test Date: 09/07/2006

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.127 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-4,911.74 N	Yes

Test meets specifications.

Comments:

Technician

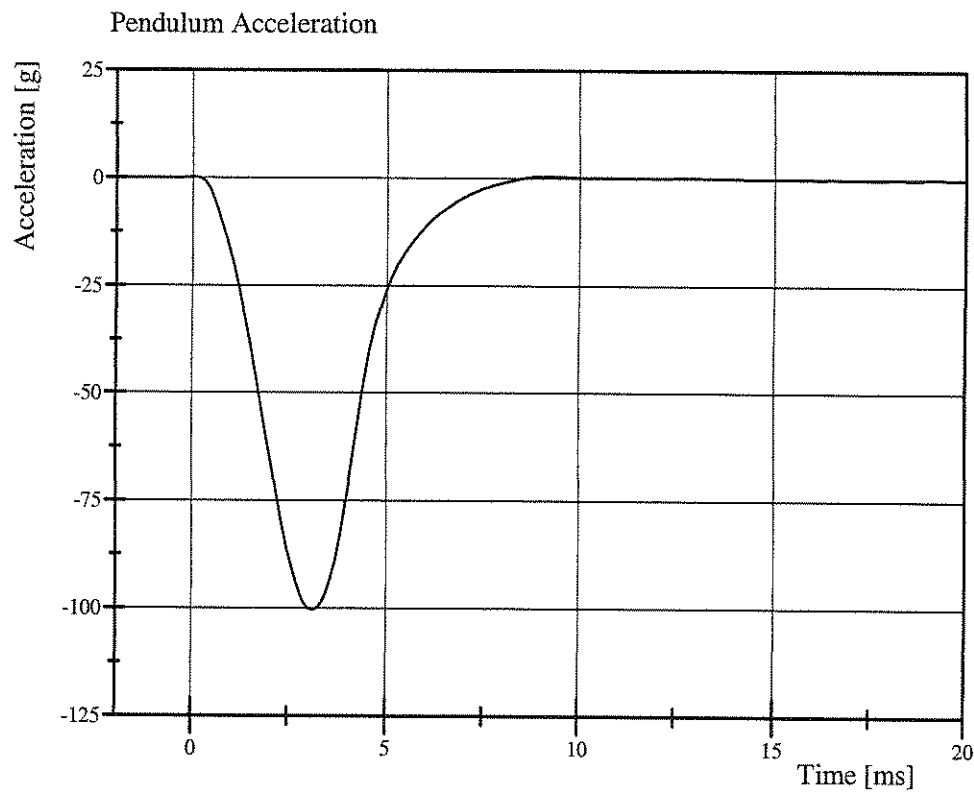


Approved

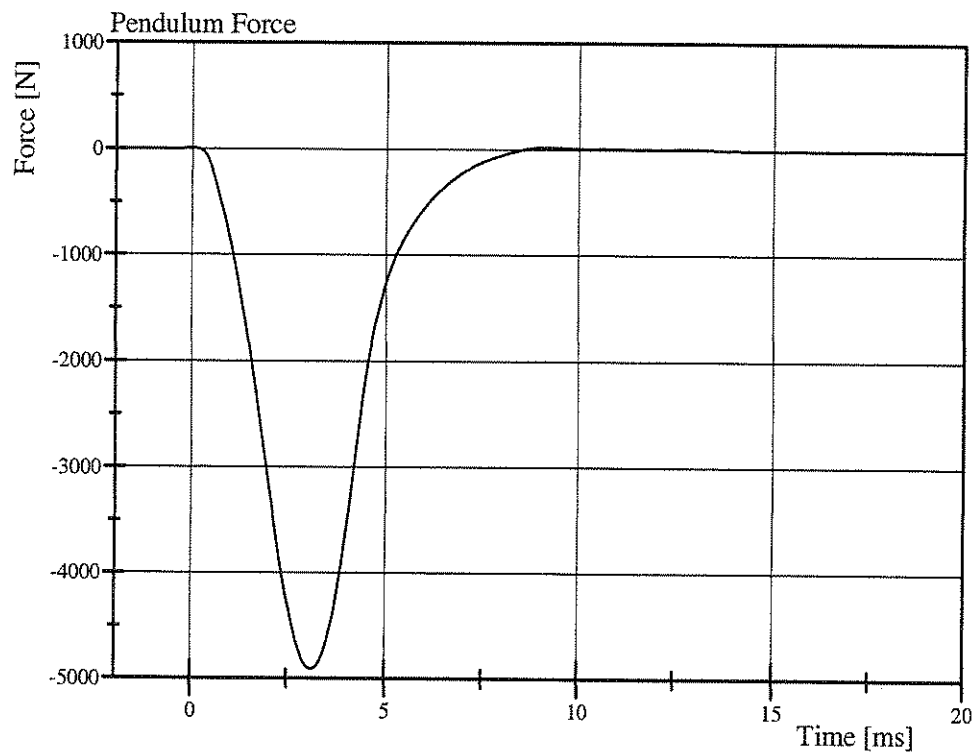


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 37 Certification No. 1-2
Test Date: 09/07/2006



Filter Class: CFC_600
Max: 0.4 g at 9.2 ms
Min: -100.4 g at 3.1 ms



Filter Class: CFC_600
Max: 19.6 N at 9.2 ms
Min: -4,911.7 N at 3.1 ms

Type: IIII 50th S/N: 37 Mfg.: First Tech Test Date: 09/27/06
 Proj./Seg. No.: 20050906-1000 Test Eng. Walter D. Dudek

ITEM	PRE-USE
HEAD:	
Skull Cap Bolts: tight and no wires pinched	X
Head Skin Condition	X
* Neck Load Cell Cables: secure, taped, and with strain relief	X
NECK:	
Bracket at specified setting, Serration Alignment, Bolt Actual: 0	X
Condyle Pin, Set Screws	X
* Rubber Condition	X
* Neck Cable Torque (5 th /50 th /95 th : 10 – 14 in-lb / 6YO 1.8 – 2.2 in-lb) Actual: 12	X
* Nodding Blocks Condition and Position	X
ARMS AND HANDS:	
Clavicle and Shoulder Bumpers Condition	X
Range of Motion Stops: Elbow, Top and Rear Shoulder	X
THORAX:	
Front and Rear Rib Bolts, Rib Ends Position, Rib Spacing	X
Chest Pot Arm, Ball Movement, Set Screws	X
Sternum Bolts and Sternum Bumpers Condition	X
Jacket Condition	X
Abdominal Insert Condition	X
Rib Damping Material and Stiffeners Condition	X
Rib Minimum Depth	X
Accel. Mount Bolts	X
Lumbar Spine Rubber Condition, Spine Angle, (4) Attachment Bolts	X
LUMBAR/PELVIS:	
Iliac Crest Bone	X
Flesh Condition	X
Accel. Mount Bolt	X
Lumbar Block Bolts	X
LEGS AND FEET:	
Femur Load Cell Bolts (5 th /50 th /95 th : 30 ft-lb / 6YO: 16 ft-lb)	X
Knee Joint Function and Range of Motion	X
Knee Skins, Inserts and Castings Condition	X
Knee Slider Zero Position	X
Ankle Range of Motion, Bumper Condition	X
Foot Condition	X
OTHER:	
Cleanliness / Skin Condition & Position	X
Target Position	X
Clothes Blue	X
Shoes	X
One G Joint Adjustments	X
Check connectors for integrity (intact & labeled)	X
Verify channels against assembly	X
ATTACH TEMPERATURE LOGGER TO DUMMY	X

* Items to be checked during calibration.

Inspection Completed By: J. Clarridge

Date: 09/26/06

Transportation Research Center Inc.

Hybrid III Dummy Post-Use Inspection

Type: HIIL 50th S/N: 37 Mfg.: First Tech Test Date: 09/27/06
 Proj./Seg. No.: 20050906-1000 Test Eng. Walter D. Dudek

ITEM	POST-USE
HEAD:	
Head Skin Condition	X
NECK:	
Rubber Condition	X
Nodding Blocks Condition and Position	X
Nodding Joint Function (no lateral motion)	X
Adjustable (upper and lower) Neck Bracket	X
ARMS AND HANDS:	
Skin Condition	X
THORAX:	
Jacket Condition	X
Rib Damping Material and Stiffeners Condition	X
Chest Pot Arm and Ball Movement	X
Spine Condition	X
Sternum Assembly Condition	X
PELVIS:	
Flesh Condition	X
Iliac Crest Bone	X
Range of Motion Bumpers and Leg Cavity	X
LEGS AND FEET:	
Knee Skins, Inserts, and Castings Condition	X
Leg Skin Condition and Position	X
Foot Condition	X
TEMPERATURE:	
Download temperature data logger	X

NOTES: No damage found.

Inspection Completed By: J. Clarridge Date: 10/06/06

Pre-test Dummy Configuration and Performance Verification Data

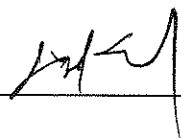
Right Front Passenger Dummy S/N: 352

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 352
Calibration No. 01

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	888	Yes
B	Shoulder Pivot Height	505.5 - 520.7	520	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	93	Yes
F	Thigh Clearance	139.7 - 154.9	154	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	293	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	334	Yes
J	Elbow Rest Height	190.5 - 210.8	206	Yes
K	Buttock Knee Length	579.1 - 604.5	604	Yes
L	Popliteal Height	429.3 - 454.7	430	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	215	Yes
P	Foot Length	251.5 - 266.7	260	Yes
V	Shoulder Breadth	421.6 - 436.9	423	Yes
W	Foot Breadth	91.4 - 106.7	98	Yes
Y	Chest Circumference	970.3 - 1000.8	1000	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	433	Yes
BB	Location For Waist Circumference	226.1 - 231.1	231	Yes

Comments: Partial Set

Technician



Approved



Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 352 Certification No. 1-5

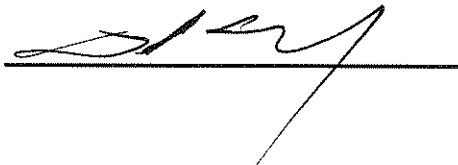
Test Date: 09/08/2006

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	266.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	6.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

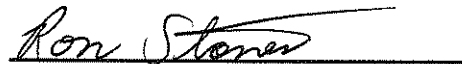
Test meets specifications.

Comments:

Technician



Approved

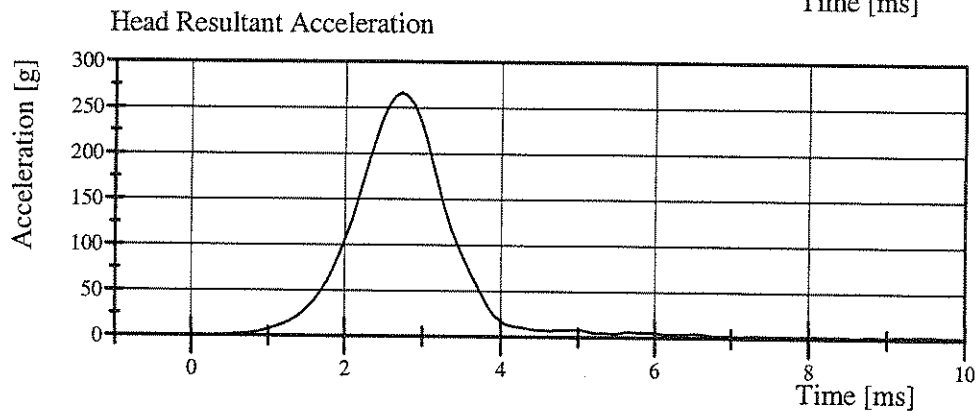
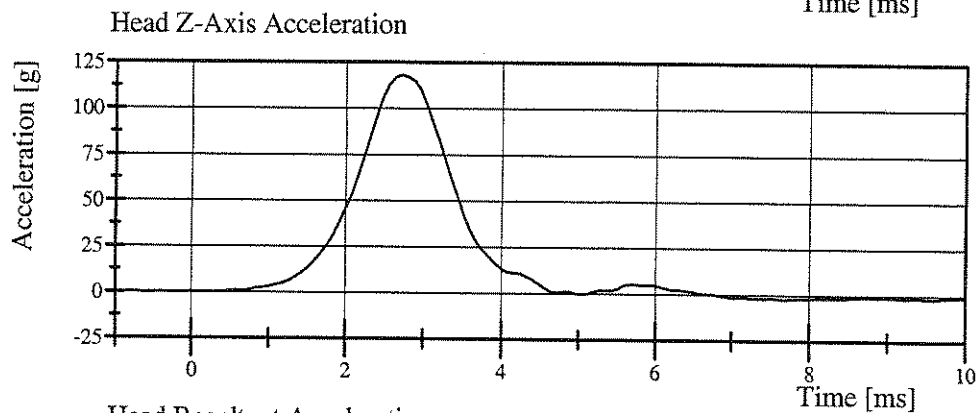
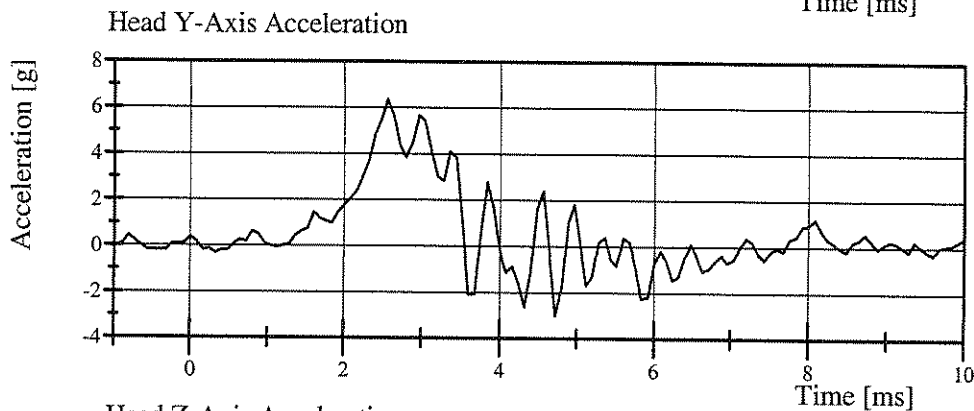
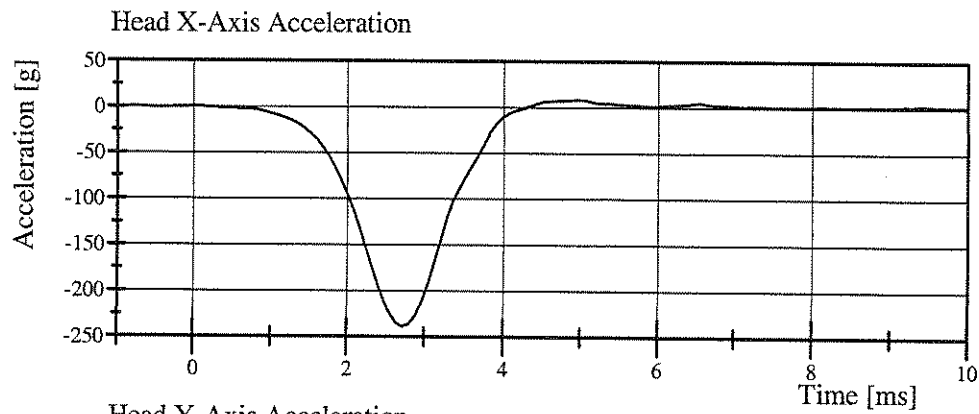


Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 352 Certification No. 1-5

Test Date: 09/08/2006



Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 352 Certification No. 1-2

Test Date: 09/08/2006

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.933 m/s	Yes
Pendulum Acceleration Decay			
Crossing -5g	34 - 42 ms	38.4 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.57 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.94 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.41 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.41 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-68.4 °	Yes
Time of Peak	57 - 64 ms	57.4 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	113 - 128 ms	115.8 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88 - 108 N·m	99.0 N·m	Yes
Time of Peak	47 - 58 ms	50.6 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	97 - 107 ms	97.4 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

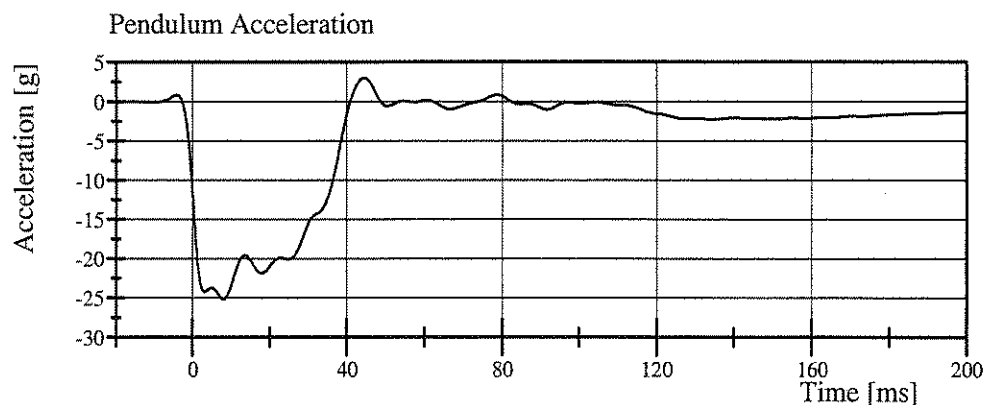


Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 352 Certification No. 1-2

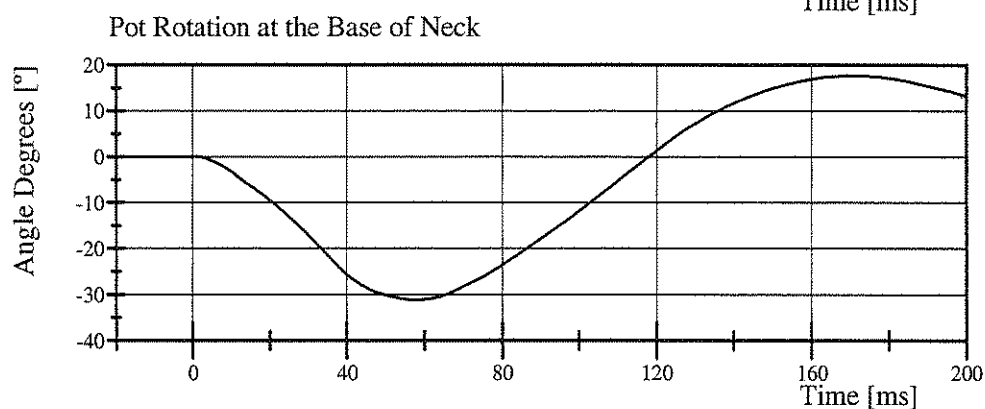
Test Date: 09/08/2006



Filter Class: CFC_60

Max: 3.0 g at 44.5 ms

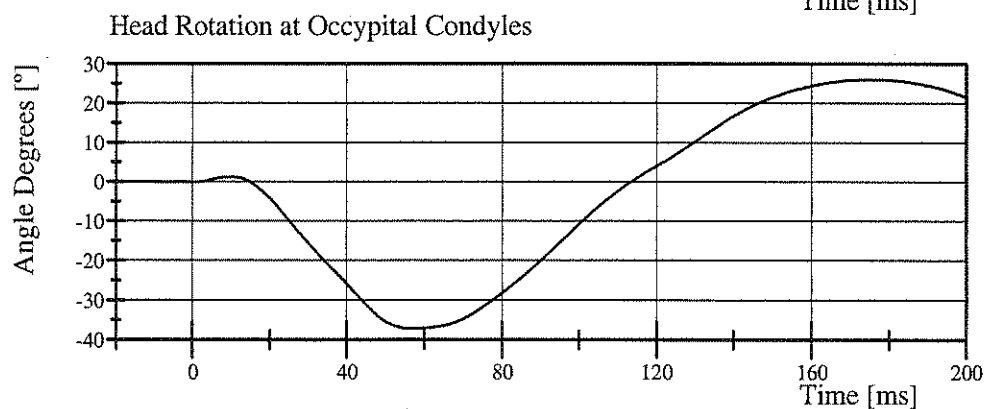
Min: -25.2 g at 8.1 ms



Filter Class: CFC_60

Max: 17.7 ° at 171.2 ms

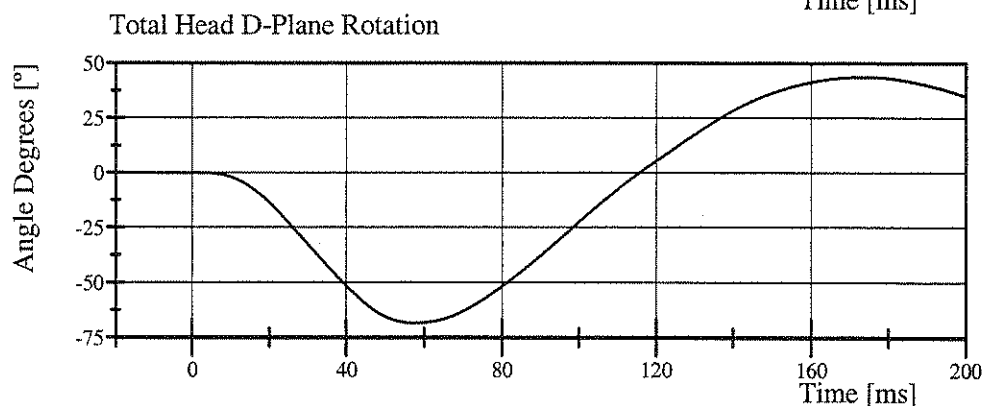
Min: -31.2 ° at 57.8 ms



Filter Class: CFC_60

Max: 26.1 ° at 176.2 ms

Min: -37.2 ° at 57.0 ms



Filter Class: CFC_60

Max: 43.7 ° at 173.9 ms

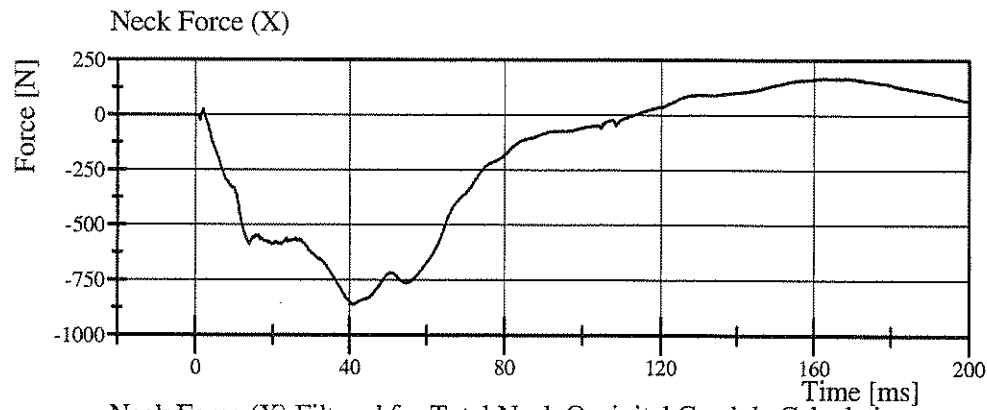
Min: -68.4 ° at 57.4 ms

Transportation Research Center Inc.

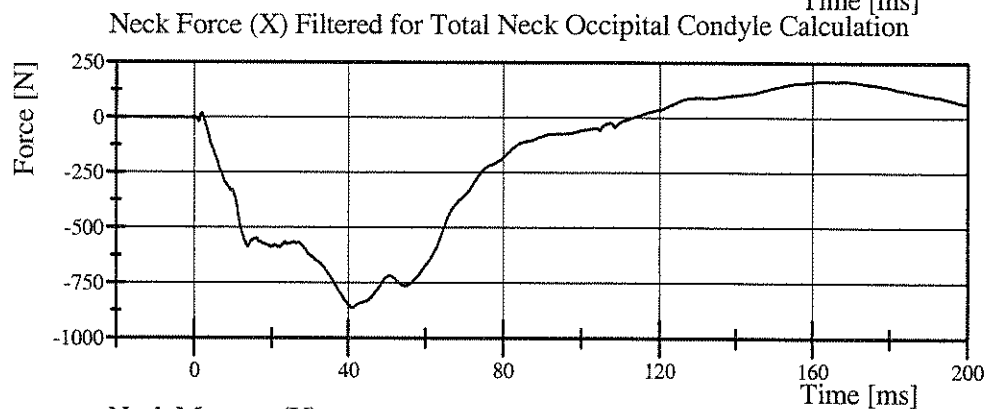
Neck Flexion

HIII 50th Serial No. 352 Certification No. 1-2

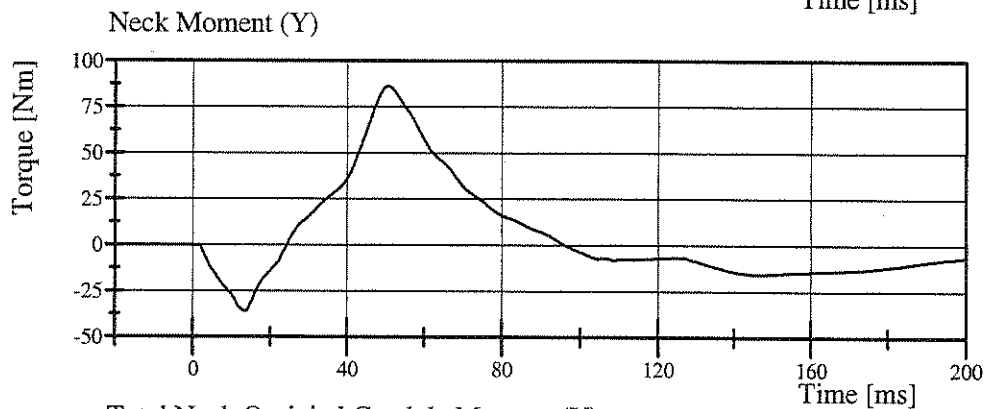
Test Date: 09/08/2006



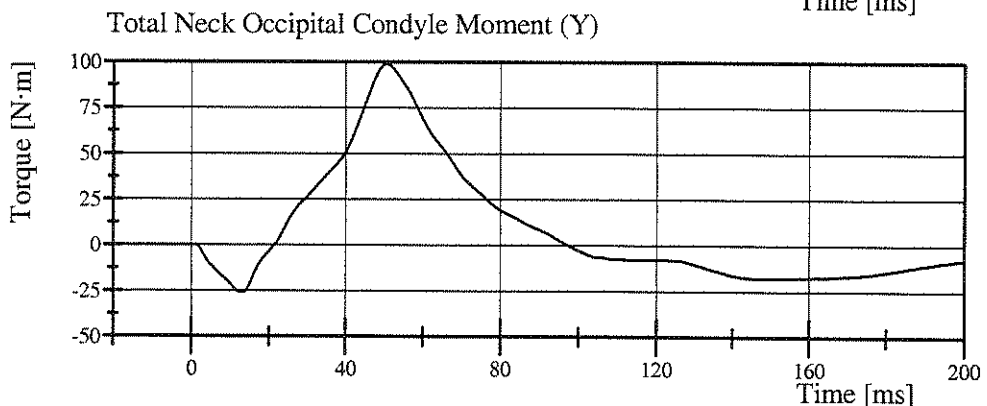
Filter Class: CFC_1000
Max: 169.9 N at 168.8 ms
Min: -862.3 N at 41.1 ms



Filter Class: CFC_600
Max: 168.3 N at 168.7 ms
Min: -861.2 N at 41.0 ms



Filter Class: CFC_600
Max: 86.3 Nm at 50.6 ms
Min: -36.1 Nm at 13.4 ms



Filter Class: CFC_600
Max: 99.0 N·m at 50.6 ms
Min: -25.9 N·m at 13.3 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 352 Certification No. 1-1

Test Date: 09/08/2006

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.998 m/s	Yes
Pendulum Acceleration Decay			
Crossing 5g	38 - 46 ms	43.7 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.40 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.20 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.27 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.27 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	93.1 °	Yes
Time of Peak	72 - 82 ms	78.1 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	147 - 174 ms	157.8 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-61.0 N·m	Yes
Time of Peak	65 - 79 ms	73.2 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	120 - 148 ms	139.9 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

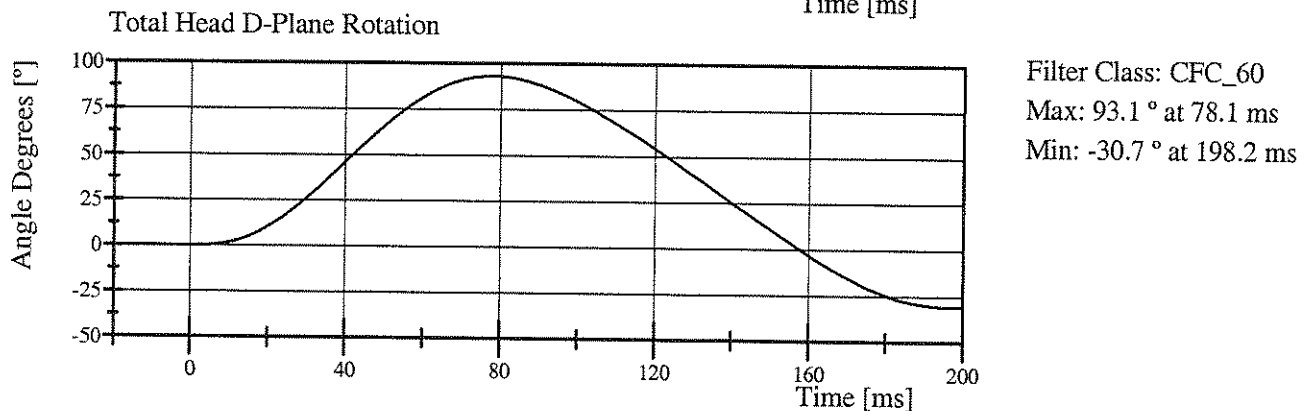
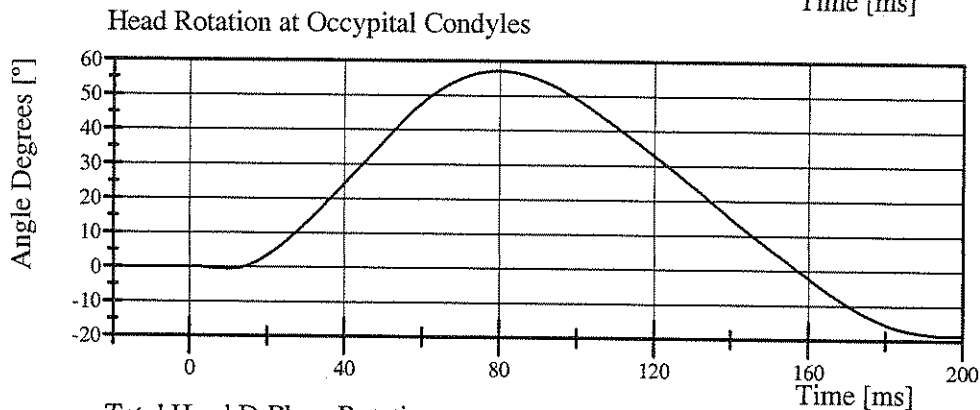
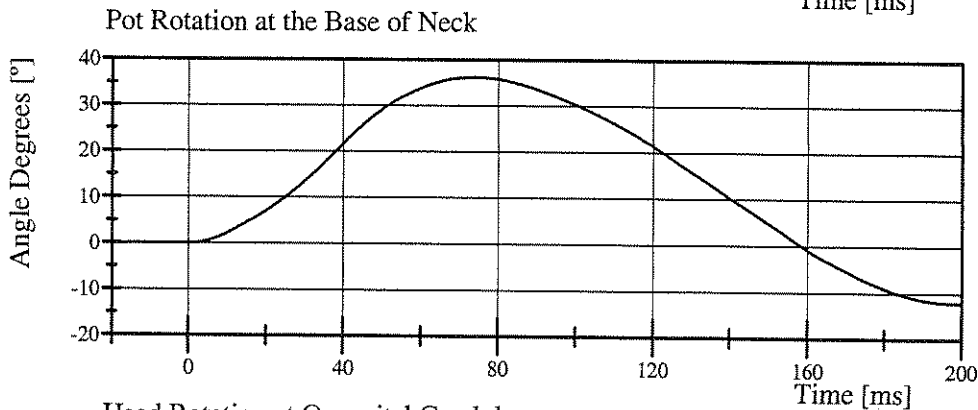
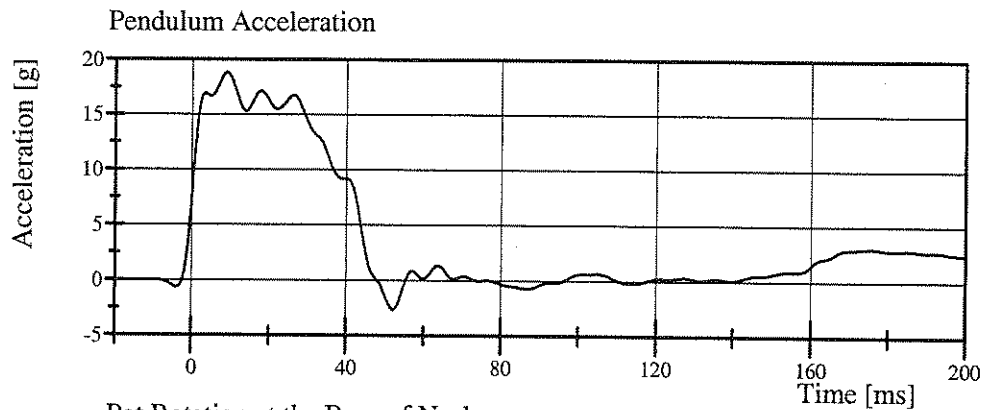


Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 352 Certification No. 1-1

Test Date: 09/08/2006

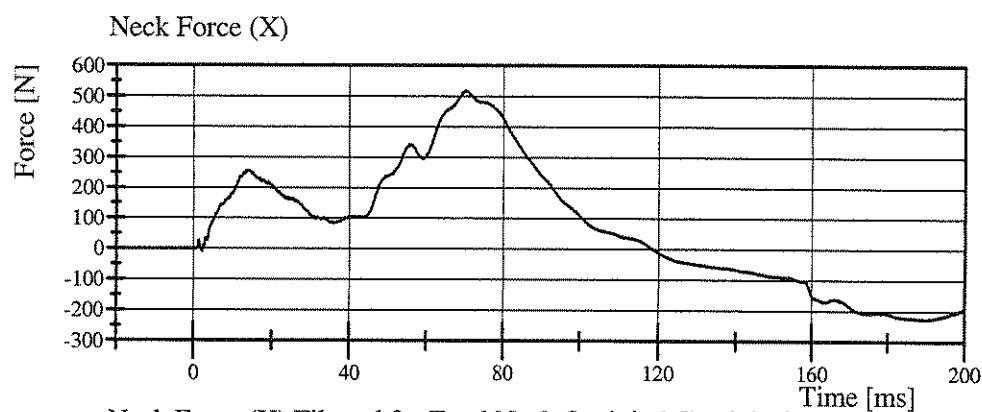


Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 352 Certification No. 1-1

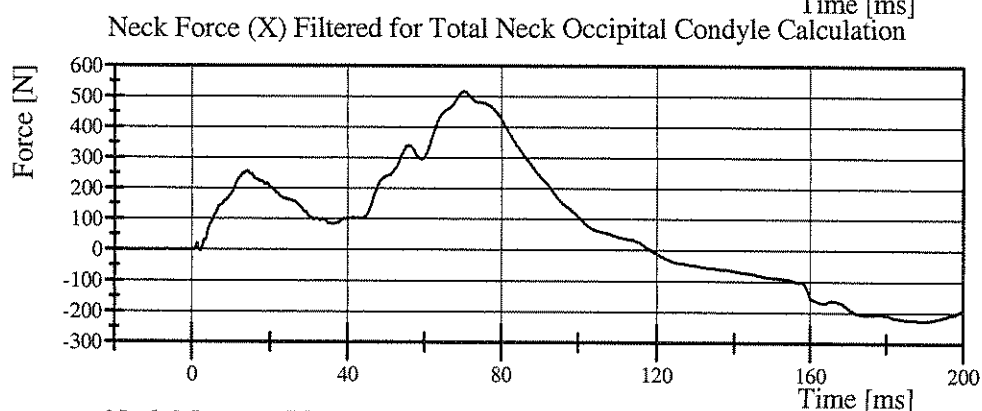
Test Date: 09/08/2006



Filter Class: CFC_1000

Max: 518.8 N at 70.2 ms

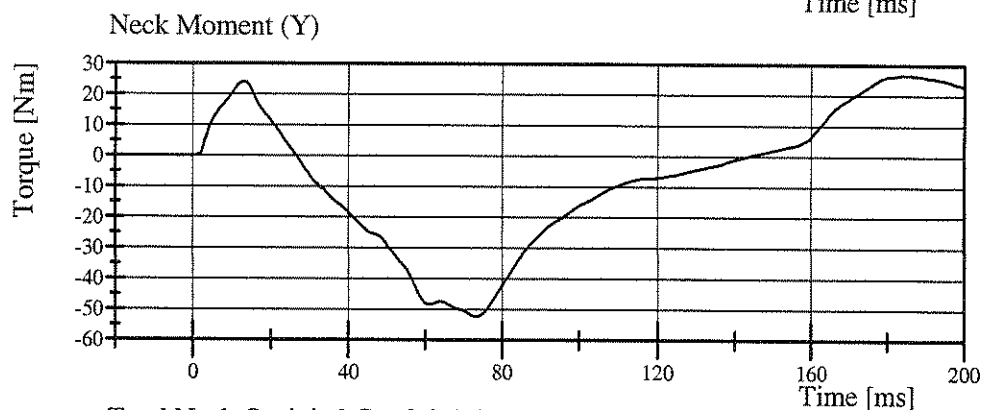
Min: -227.9 N at 191.0 ms



Filter Class: CFC_600

Max: 517.4 N at 70.2 ms

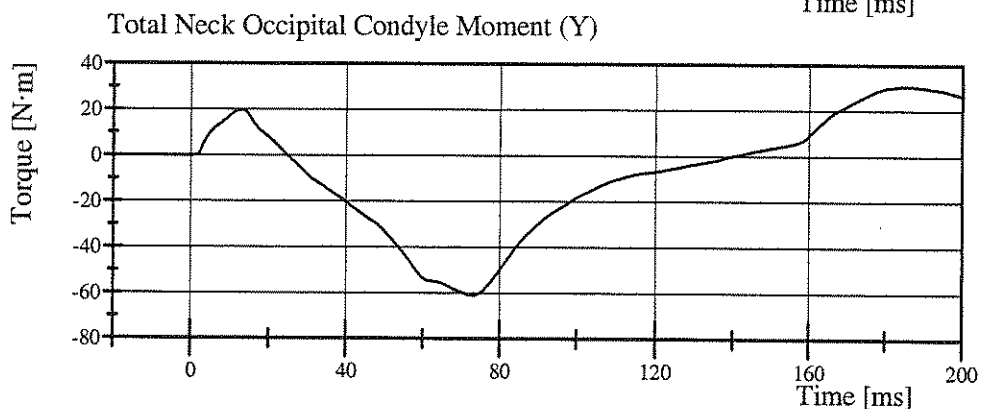
Min: -226.6 N at 188.7 ms



Filter Class: CFC_600

Max: 26.8 Nm at 184.2 ms

Min: -52.4 Nm at 73.4 ms



Filter Class: CFC_600

Max: 30.7 N·m at 184.6 ms

Min: -61.0 N·m at 73.2 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 352 Certification No. 1-1

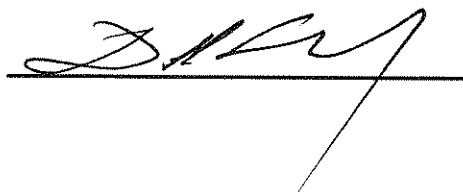
Test Date: 09/08/2006

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.609 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,301.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-69.40 mm	Yes
Internal Hysteresis	65 - 85 %	75.3 %	Yes

Test meets specifications.

Comments:

Technician



Approved

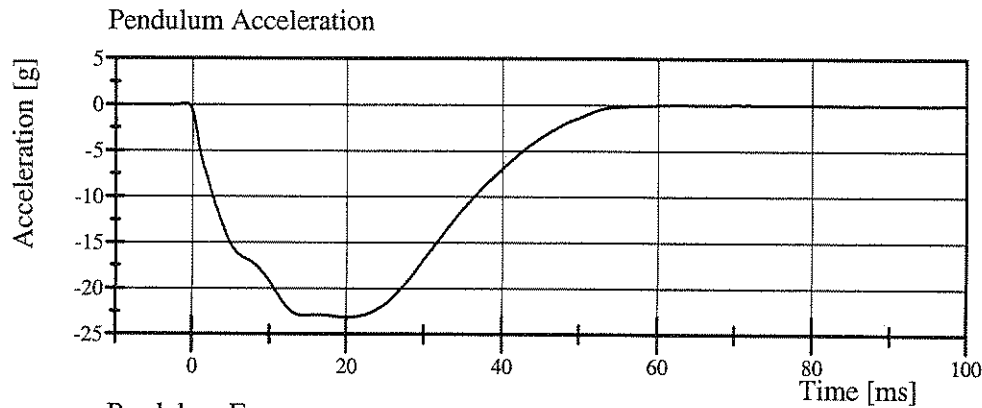


Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 352 Certification No. 1-1

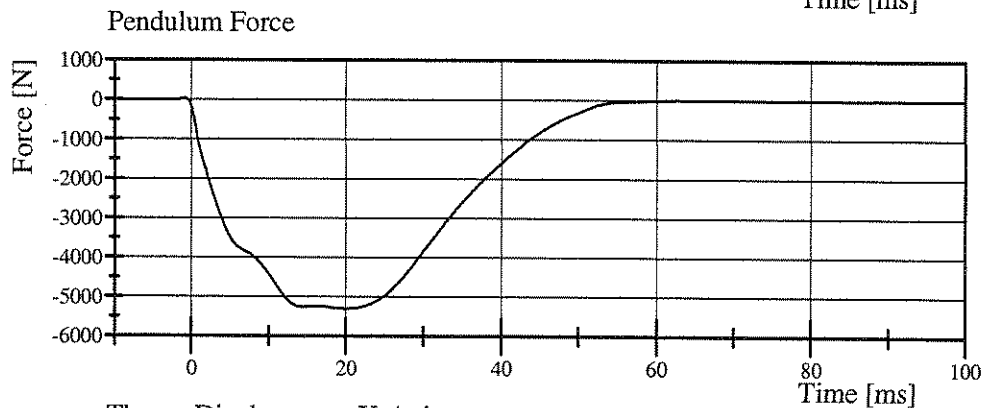
Test Date: 09/08/2006



Filter Class: CFC_180

Max: 0.1 g at -0.9 ms

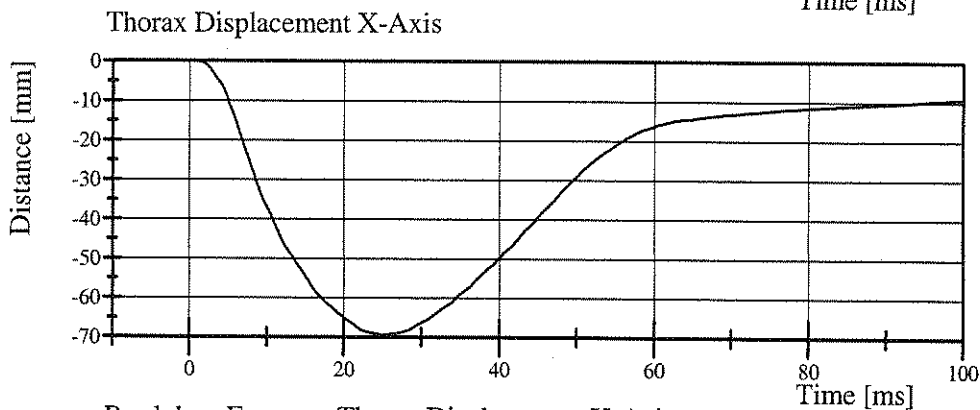
Min: -23.1 g at 19.9 ms



Filter Class: CFC_180

Max: 34.0 N at -0.9 ms

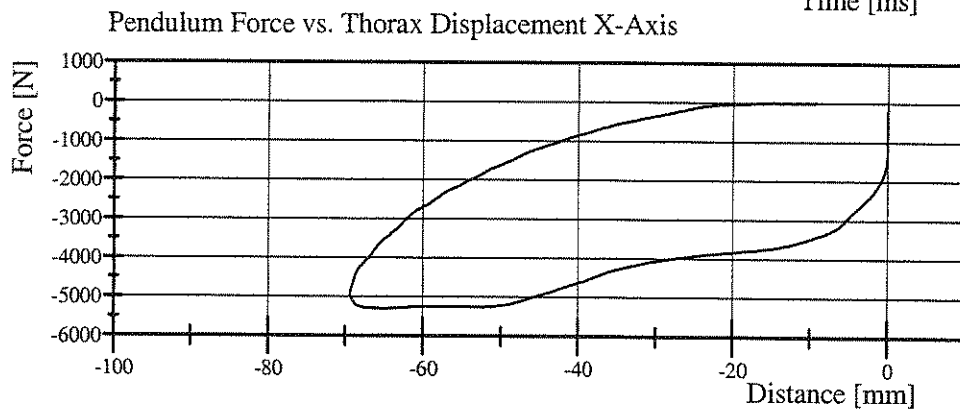
Min: -5,301.5 N at 19.9 ms



Filter Class: CFC_600

Max: 0.0 mm at -3.6 ms

Min: -69.4 mm at 25.1 ms



Filter Class: CFC_180

Max: 34.0 N at -0.0 mm

Min: -5,301.5 N at -64.9 mm

Applied Safety Technologies Corp.

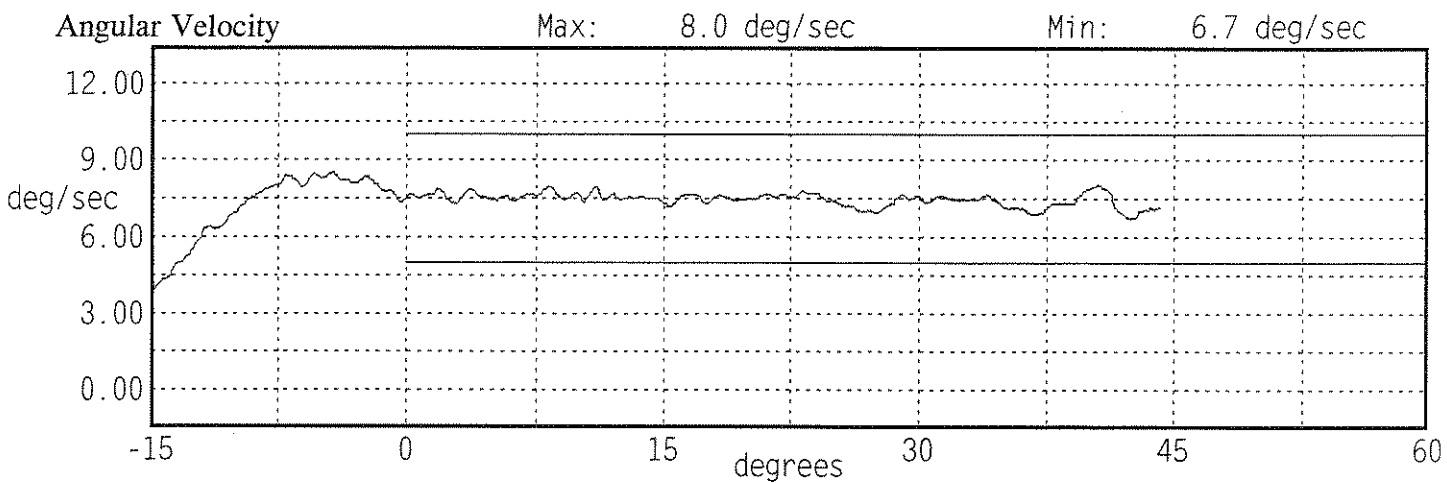
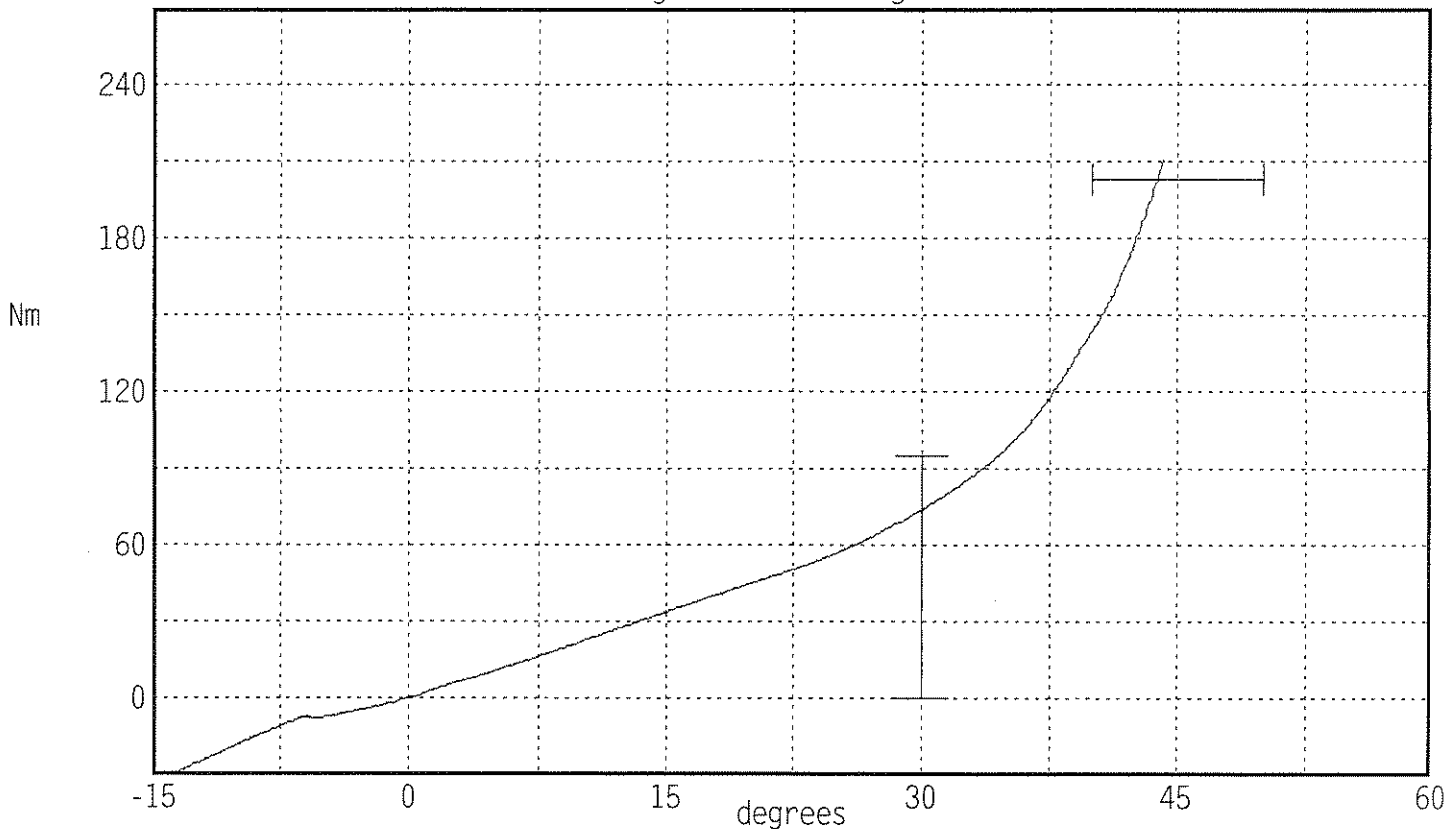
Hybrid III Hip Range of Motion

Serial Number: 352L
Test Number: 352C01
Comments:

Date: 09/08/2006
Time: 08:12

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	20.6 °C Pass
Humidity	10 - 70	51 % Pass
Moment at 30 deg	<= 94.9	74.1 Nm Pass
Angle at 203 Nm	40.0 - 50.0	43.9 deg Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec Pass

Moment About H-Point
Peak Moment: 210.5 Nm at 44.2 deg
Peak Angle: 44.2 deg at 210.5 Nm



Applied Safety Technologies Corp.

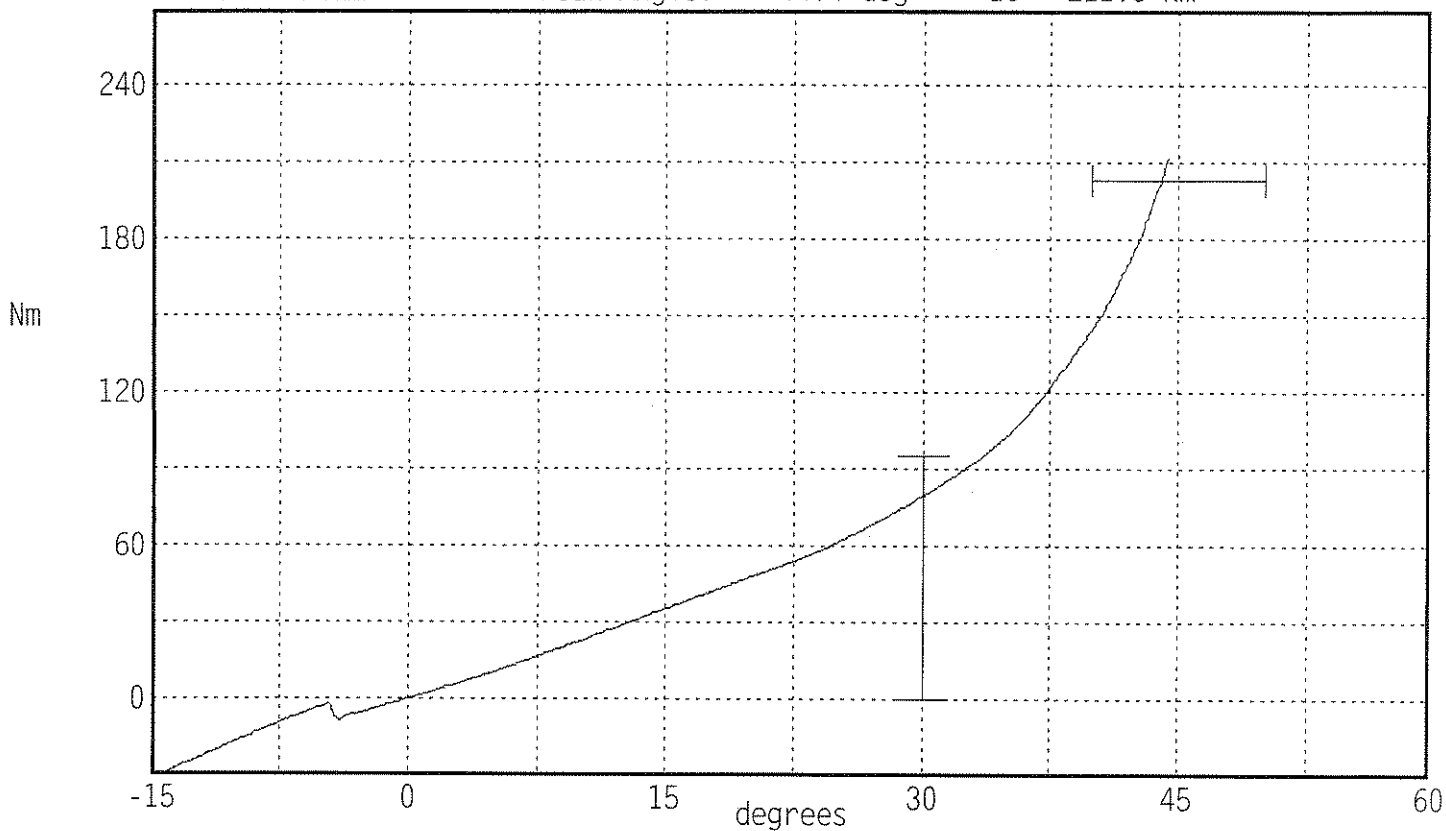
Hybrid III Hip Range of Motion

Serial Number: 352R
Test Number: 352C01
Comments:

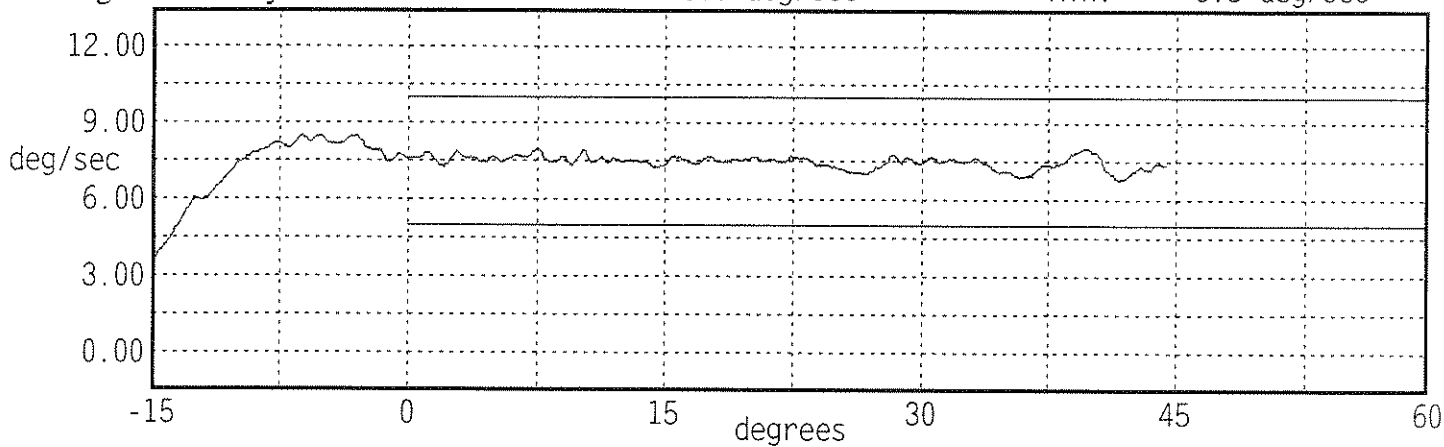
Date: 09/08/2006
Time: 08:44

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.2 °C Pass
Humidity	10 - 70	56 % Pass
Moment at 30 deg	<= 94.9	79.7 Nm Pass
Angle at 203 Nm	40.0 - 50.0	44.0 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 211.6 Nm at 44.4 deg
Peak Angle: 44.4 deg at 211.6 Nm



Angular Velocity Max: 8.0 deg/sec Min: 6.8 deg/sec



Transportation Research Center Inc.

Left Knee Femur Response Test

HIII 50th Serial No. 352 Certification No. 1-2

Test Date: 09/08/2006

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.127 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-4,774.65 N	Yes

Test meets specifications.

Comments:

Technician

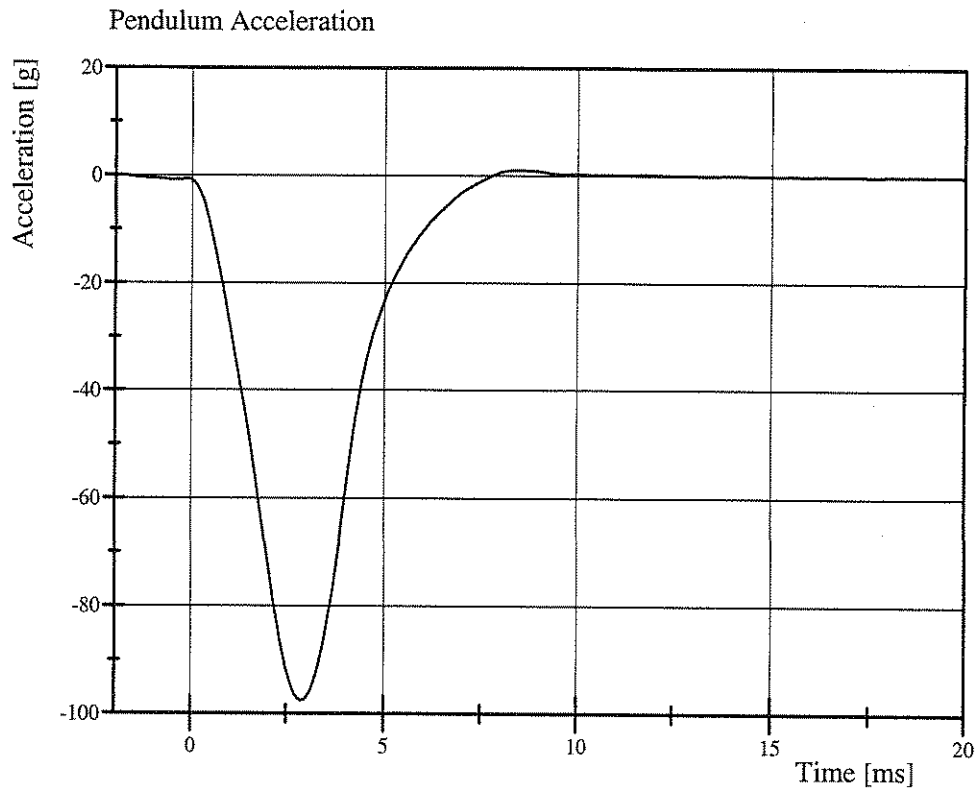


Approved

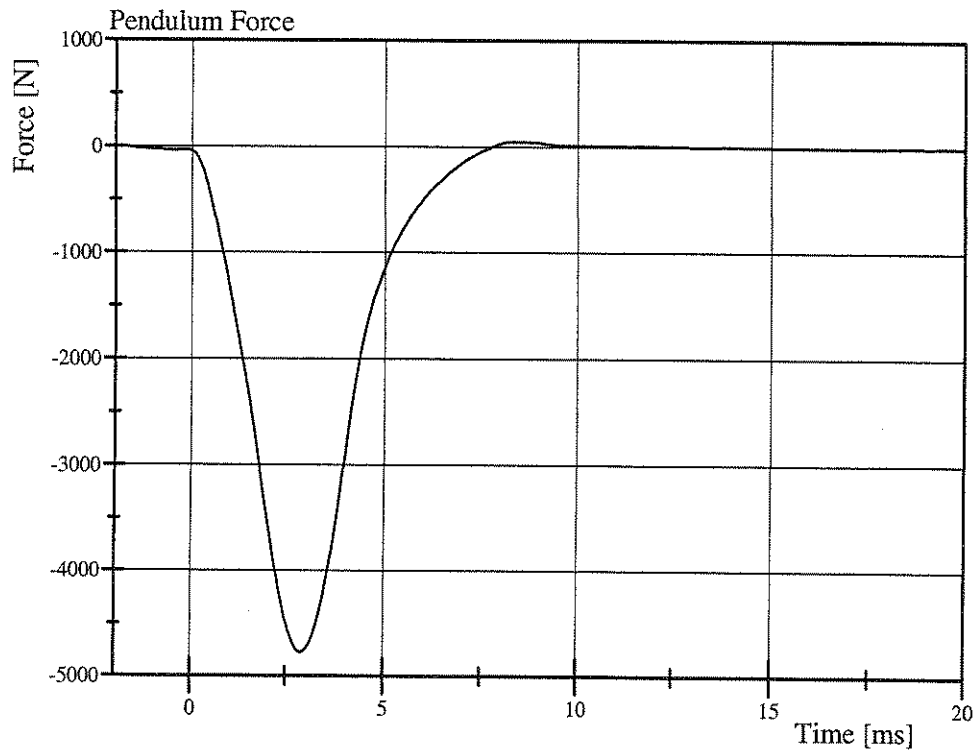


Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 352 Certification No. 1-2
Test Date: 09/08/2006



Filter Class: CFC_600
Max: 1.0 g at 8.5 ms
Min: -97.6 g at 2.9 ms



Filter Class: CFC_600
Max: 49.7 N at 8.5 ms
Min: -4,774.7 N at 2.9 ms

Transportation Research Center Inc.

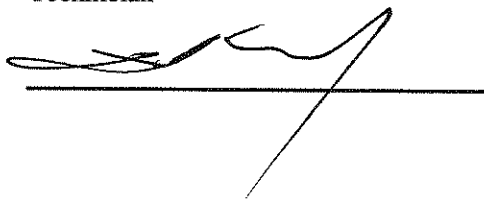
Right Knee Femur Response Test
HIII 50th Serial No. 352 Certification No. 1-2
Test Date: 09/08/2006

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.127 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-4,838.24 N	Yes

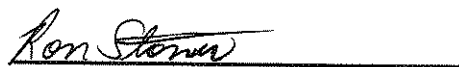
Test meets specifications.

Comments:

Technician



Approved

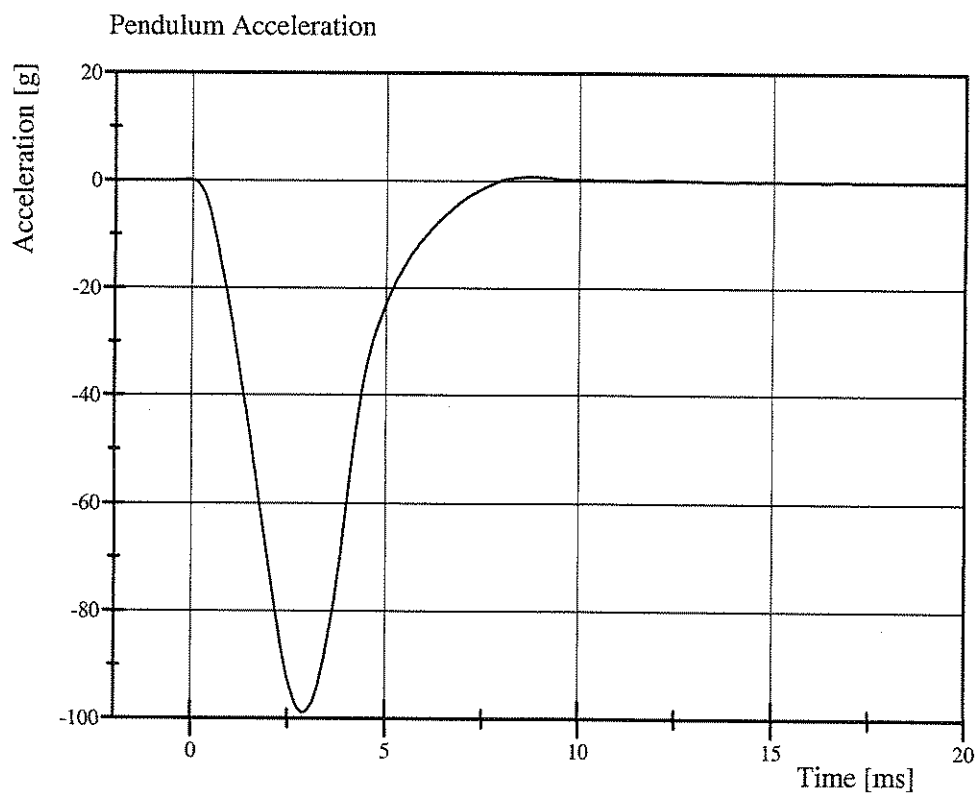


Transportation Research Center Inc.

Right Knee Femur Response Test

HIII 50th Serial No. 352 Certification No. 1-2

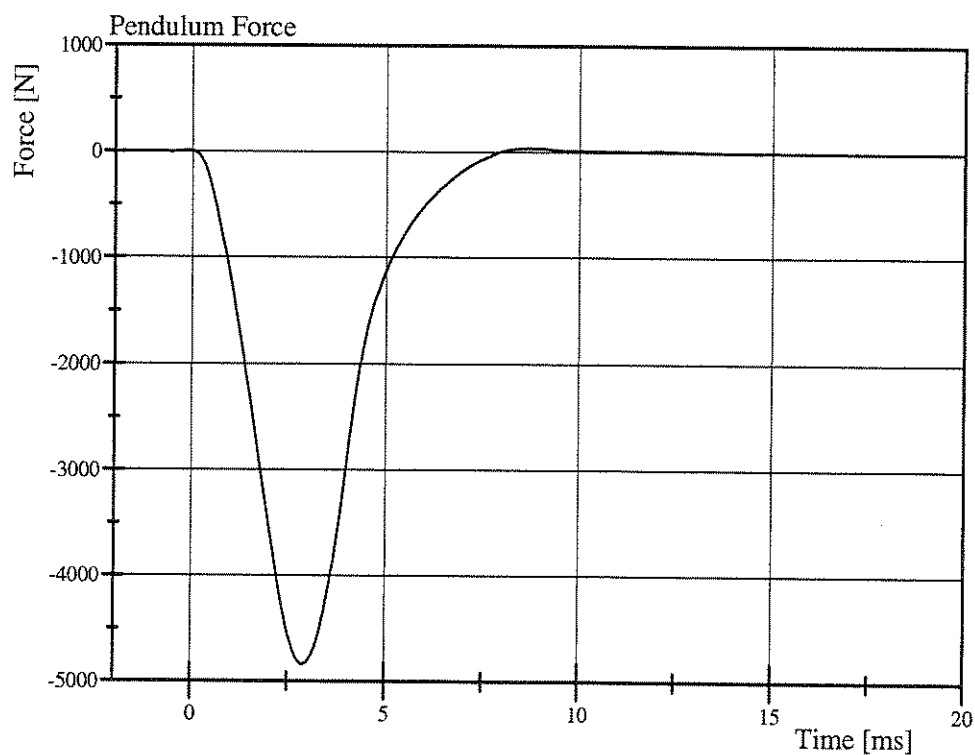
Test Date: 09/08/2006



Filter Class: CFC_600

Max: 0.8 g at 8.7 ms

Min: -98.9 g at 2.9 ms



Filter Class: CFC_600

Max: 37.8 N at 8.7 ms

Min: -4,838.2 N at 2.9 ms

Type: HIH 50th S/N: 352 Mfg.: Denton Test Date: 09/27/06
 Proj./Seg. No.: 20050906-1000 Test Eng. Walter D. Dudek

ITEM	PRE-USE
HEAD:	
Skull Cap Bolts: tight and no wires pinched	X
Head Skin Condition	X
* Neck Load Cell Cables: secure, taped, and with strain relief	X
NECK:	
Bracket at specified setting, Serration Alignment, Bolt Actual: 0	X
Condyle Pin, Set Screws	X
* Rubber Condition	X
* Neck Cable Torque (5 th /50 th /95 th : 10 – 14 in-lb / 6YO 1.8 – 2.2 in-lb) Actual: 12	X
* Nodding Blocks Condition and Position	X
ARMS AND HANDS:	
Clavicle and Shoulder Bumpers Condition	X
Range of Motion Stops: Elbow, Top and Rear Shoulder	X
THORAX:	
Front and Rear Rib Bolts, Rib Ends Position, Rib Spacing	X
Chest Pot Arm, Ball Movement, Set Screws	X
Sternum Bolts and Sternum Bumpers Condition	X
Jacket Condition	X
Abdominal Insert Condition	X
Rib Damping Material and Stiffeners Condition	X
Rib Minimum Depth	X
Accel. Mount Bolts	X
Lumbar Spine Rubber Condition, Spine Angle, (4) Attachment Bolts	X
LUMBAR/PELVIS:	
Iliac Crest Bone	X
Flesh Condition	X
Accel. Mount Bolt	X
Lumbar Block Bolts	X
LEGS AND FEET:	
Femur Load Cell Bolts (5 th /50 th /95 th : 30 ft-lb / 6YO: 16 ft-lb)	X
Knee Joint Function and Range of Motion	X
Knee Skins, Inserts and Castings Condition	X
Knee Slider Zero Position	X
Ankle Range of Motion, Bumper Condition	X
Foot Condition	X
OTHER:	
Cleanliness / Skin Condition & Position	X
Target Position	X
Clothes Pink	X
Shoes	X
One G Joint Adjustments	X
Check connectors for integrity (intact & labeled)	X
Verify channels against assembly	X
ATTACH TEMPERATURE LOGGER TO DUMMY	X

* Items to be checked during calibration.

Inspection Completed By: J. Clarridge

Date: 09/26/06

Hybrid III Dummy Post-Use Inspection

Type: HIH 50th S/N: 352 Mfg.: Denton Test Date: 09/27/06
 Proj./Seg. No.: 20050906-1000 Test Eng. Walter D. Dudek

ITEM	POST-USE
HEAD:	
Head Skin Condition	X
NECK:	
Rubber Condition	X
Nodding Blocks Condition and Position	X
Nodding Joint Function (no lateral motion)	X
Adjustable (upper and lower) Neck Bracket	X
ARMS AND HANDS:	
Skin Condition	X
THORAX:	
Jacket Condition	X
Rib Damping Material and Stiffeners Condition	X
Chest Pot Arm and Ball Movement	X
Spine Condition	X
Sternum Assembly Condition	X
PELVIS:	
Flesh Condition	X
Iliac Crest Bone	X
Range of Motion Bumpers and Leg Cavity	X
LEGS AND FEET:	
Knee Skins, Inserts, and Castings Condition	X
Leg Skin Condition and Position	X
Foot Condition	X
TEMPERATURE:	
Download temperature data logger	X

NOTES: No damage found.

Inspection Completed By: J. Clarridge

Date: 10/06/06

Appendix D

Test Equipment and Instrumentation 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

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 060927

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS		Assembly
						Flip	Positive Polarity	
1	Trig D1	10ZERO00000VO0A	EVENT		1 Logic	+	Bipolar	
2	P52128	11HEADCG00H3ACXA	Head Accel X	400 g		-	Rearward	1-037 H3 VRTC 50th.001
3	P51274	11HEADCG00H3ACYA	Head Accel Y	400 g		-	Leftward	1-037 H3 VRTC 50th.002
4	P51281	11HEADCG00H3ACZA	Head Accel Z	400 g		-	Upward	1-037 H3 VRTC 50th.003
5	1716A-1914-FX	11NECKUP00H3FOXA	Neck Force X	8896 N		-	Head forward, chest rearward	1-037 H3 VRTC 50th.007
6	1716A-1914-FY	11NECKUP00H3FOYA	Neck Force Y	8896 N		+	Head leftward, chest rightward	1-037 H3 VRTC 50th.008
7	1716A-1914-FZ	11NECKUP00H3FOZA	Neck Force Z	13344 N		+	Head upward, chest downward	1-037 H3 VRTC 50th.009
8	1716A-1914-MX	11NECKUP00H3MOXA	Neck Moment X	282 Nm		-	Right ear toward right shoulder	1-037 H3 VRTC 50th.010
9	1716A-1914-MY	11NECKUP00H3MOYA	Neck Moment Y	282 Nm		+	Chin toward sternum	1-037 H3 VRTC 50th.011
10	1716A-1914-MZ	11NECKUP00H3MOZA	Neck Moment Z	282 Nm		+	Chin toward left shoulder	1-037 H3 VRTC 50th.012
11	P49163	11CHSTCG00H3ACXA	Chest Accel X	400 g		+	Forward	1-037 H3 VRTC 50th.013
12	P51309	11CHSTCG00H3ACYA	Chest Accel Y	400 g		-	Leftward	1-037 H3 VRTC 50th.014
13	P51303	11CHSTCG00H3ACZA	Chest Accel Z	400 g		-	Upward	1-037 H3 VRTC 50th.015
14	CST037	11CHST0000H3DSXA	Chest Deflection X	84 mm		+	Forward	1-037 H3 VRTC 50th.019
15	P51328	11PELVCG00H3ACXA	Pelvis Accel X	400 g		+	Forward	1-037 H3 VRTC 50th.020
16	P51329	11PELVCG00H3ACYA	Pelvis Accel Y	400 g		-	Leftward	1-037 H3 VRTC 50th.021
17	P49183	11PELVCG00H3ACZA	Pelvis Accel Z	400 g		-	Upward	1-037 H3 VRTC 50th.022
18	2430-736	11FEMRLL00H3FOZA	Left Femur Force Z VRTC#8	13344 N		+	Knee forward, pelvis rearward	1-037 H3 VRTC 50th.023
19	2430-742	11FEMRRL00H3FOZA	Right Femur Force Z 507	13344 N		+	Knee forward, pelvis rearward	1-037 H3 VRTC 50th.024
20	3643-406-FX	11TIBILU00H3FOXA	Left Upper Tibia Force X	11120 N		-	Tibia rearward, knee forward	1-037 H3 VRTC 50th.025
21	3643-406-FY	11TIBILU00H3FOYA	Left Upper Tibia Force Y	11120 N		+	Tibia rightward, knee leftward	1-037 H3 VRTC 50th.026
22	3643-406-FZ	11TIBILU00H3FOZA	Left Upper Tibia Force Z	11120 N		+	Tibia downward, femur upward	1-037 H3 VRTC 50th.027
23	3643-406-MX	11TIBILU00H3MOXA	Left Upper Tibia Moment X	395 N·m		+	Ankle leftward, hold knee in place	1-037 H3 VRTC 50th.028
24	3643-406-MY	11TIBILU00H3MOYA	Left Upper Tibia Moment Y	395 N·m		+	Ankle forward, hold knee in place	1-037 H3 VRTC 50th.029
25	3644-398-FX	11TIBILL00H3FOXA	Left Lower Tibia Force X	11120 N		+	Ankle forward, knee rearward	1-037 H3 VRTC 50th.030

D-5

060927

Channel Report Test Number 060927

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS Flip	Positive Polarity	Assembly
26	3644-398-FY	11TIBILL00H3FOYA	Left Lower Tibia Force Y	11120	N	+	Ankle rightward, knee leftward	1-037 H3 VRTC 50th.031
27	3644-398-FZ	11TIBILL00H3FOZA	Left Lower Tibia Force Z	11120	N	+	Ankle downward, knee upward	1-037 H3 VRTC 50th.032
28	3644-398-MX	11TIBILL00H3MOXA	Left Lower Tibia Moment X	395	N·m	+	Ankle leftward, hold knee in place	1-037 H3 VRTC 50th.033
29	3644-398-MY	11TIBILL00H3MOYA	Left Lower Tibia Moment Y	395	N·m	+	Ankle forward, hold knee in place	1-037 H3 VRTC 50th.034
30	P51267	11FOOTLE00H3ACXA	Left Foot Accel X	2000	g	+	Foot forward	1-037 H3 VRTC 50th.045
31	P51271	11FOOTLE00H3ACZA	Left Foot Accel Z	2000	g	+	Foot down	1-037 H3 VRTC 50th.046
32	P49179	11TOESLE00H3ACZA	Left Toe Accel Z	2000	g	-	Toe up	1-037 H3 VRTC 50th.050
33	3643-407-FX	11TIBIRU00H3FOXA	Right Upper Tibia Force X	11120	N	+	Tibia forward, knee rearward	1-037 H3 VRTC 50th.035
34	3643-407-FY	11TIBIRU00H3FOYA	Right Upper Tibia Force Y	11120	N	+	Tibia rightward, femur leftward	1-037 H3 VRTC 50th.036
35	3643-407-FZ	11TIBIRU00H3FOZA	Right Upper Tibia Force Z	11120	N	+	Tibia downward, femur upward	1-037 H3 VRTC 50th.037
36	3643-407-MX	11TIBIRU00H3MOXA	Right Upper Tibia Moment X	395	N·m	+	Ankle leftward, hold knee in place	1-037 H3 VRTC 50th.038
37	3643-407-MY	11TIBIRU00H3MOYA	Right Upper Tibia Moment Y	395	N·m	+	Ankle forward, hold knee in place	1-037 H3 VRTC 50th.039
38	3644-399-FX	11TIBIRL00H3FOXA	Right Lower Tibia Force X	11120	N	+	Ankle forward, knee rearward	1-037 H3 VRTC 50th.040
39	3644-399-FY	11TIBIRL00H3FOYA	Right Lower Tibia Force Y	11120	N	+	Ankle rightward, knee leftward	1-037 H3 VRTC 50th.041
40	3644-399-FZ	11TIBIRL00H3FOZA	Right Lower Tibia Force Z	11120	N	+	Ankle downward, knee upward	1-037 H3 VRTC 50th.042
41	3644-399-MX	11TIBIRL00H3MOXA	Right Lower Tibia Moment X	395	N·m	+	Ankle leftward, hold knee in place	1-037 H3 VRTC 50th.043
42	3644-399-MY	11TIBIRL00H3MOYA	Right Lower Tibia Moment Y	395	N·m	+	Ankle forward, hold knee in place	1-037 H3 VRTC 50th.044
43	P51294	11FOOTRI00H3ACXA	Right Foot Accel X	2000	g	+	Foot forward	1-037 H3 VRTC 50th.047
44	P51266	11FOOTRI00H3ACZA	Right Foot Accel Z	2000	g	+	Foot down	1-037 H3 VRTC 50th.048
45	P52133	11TOESRI00H3ACZA	Right Toe Accel Z	2000	g	-	Toe up	1-037 H3 VRTC 50th.049
46	P49187	13HEADCG00H3ACXA	Head Accel X	400	g	-	Rearward	3-352 VRTC III 50th.001

Channel Report Test Number 060927

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS Flip	Positive Polarity	Assembly
47	P52131	13HEADCG00H3ACYA	Head Accel Y	400	g	-	Leftward	3-352 VRTC III 50th.002
48	P51261	13HEADCG00H3ACZA	Head Accel Z	400	g	-	Upward	3-352 VRTC III 50th.003
49	P51300	13HEADCGRDH3ACXA	Head Accel X Red	400	g	+	Forward	3-352 VRTC III 50th.004
50	P49160	13HEADCGRDH3ACYA	Head Accel Y Red	400	g	-	Leftward	3-352 VRTC III 50th.005
51	P52125	13HEADCGRDH3ACZA	Head Accel Z Red	400	g	-	Upward	3-352 VRTC III 50th.006
52	IF-205-197-FX	13NECKUP00H3FOXA	Neck Force X	8896	N	-	Head forward, chest rearward	3-352 VRTC III 50th.007
53	IF-205-197-FY	13NECKUP00H3FOYA	Neck Force Y	8896	N	+	Head leftward, chest rightward	3-352 VRTC III 50th.008
54	IF-205-197-FZ	13NECKUP00H3FOZA	Neck Force Z	13344	N	+	Head upward, chest downward	3-352 VRTC III 50th.009
55	IF-205-197-MX	13NECKUP00H3MOXA	Neck Moment X	282	Nm	-	Right ear toward right shoulder	3-352 VRTC III 50th.010
56	IF-205-197-MY	13NECKUP00H3MOYA	Neck Moment Y	282	Nm	+	Chin toward sternum	3-352 VRTC III 50th.011
57	IF-205-197-MZ	13NECKUP00H3MOZA	Neck Moment Z	282	Nm	+	Chin toward left shoulder	3-352 VRTC III 50th.012
58	P51227	13CHSTCG00H3ACXA	Chest Accel X	400	g	+	Forward	3-352 VRTC III 50th.013
59	P49197	13CHSTCG00H3ACYA	Chest Accel Y	400	g	-	Leftward	3-352 VRTC III 50th.014
60	P49215	13CHSTCG00H3ACZA	Chest Accel Z	400	g	-	Upward	3-352 VRTC III 50th.015
61	P51270	13CHSTCGRDH3ACXA	Chest Accel X Red	400	g	-	Rearward	3-352 VRTC III 50th.016
62	P49181	13CHSTCGRDH3ACYA	Chest Accel Y Red	400	g	-	Leftward	3-352 VRTC III 50th.017
63	P51302	13CHSTCGRDH3ACZA	Chest Accel Z Red	400	g	-	Upward	3-352 VRTC III 50th.018
64	CST352	13CHST0000H3DSXA	Chest Deflection X	84	mm	+	Forward	3-352 VRTC III 50th.019
65	P49189	13PELVCG00H3ACXA	Pelvis Accel X	400	g	+	Forward	3-352 VRTC III 50th.020
66	P51269	13PELVCG00H3ACYA	Pelvis Accel Y	400	g	-	Leftward	3-352 VRTC III 50th.021
67	P49199	13PELVCG00H3ACZA	Pelvis Accel Z	400	g	-	Upward	3-352 VRTC III 50th.022
68	1398	13FEMRLL00H3FOZA	Left Femur Force Z	13344	N	+	Knee forward, pelvis rearward	3-352 VRTC III 50th.023
69	1399	13FEMRRL00H3FOZA	Right Femur Force Z	13344	N	+	Knee forward, pelvis rearward	3-352 VRTC III 50th.024
70	367-FX	13TIBILU00H3FOXA	Left Upper Tibia Force X	11120	N	-	Tibia rearward, knee forward	3-352 VRTC III 50th.025
71	367-FY	13TIBILU00H3FOYA	Left Upper Tibia Force Y	11120	N	+	Tibia rightward, femur leftward	3-352 VRTC III 50th.026
72	367-FZ	13TIBILU00H3FOZA	Left Upper Tibia Force Z	11120	N	+	Tibia downward, femur upward	3-352 VRTC III 50th.027
73	367-MX	13TIBILU00H3MOXA	Left Upper Tibia Moment X	395	Nm	+	Ankle leftward, hold knee in place	3-352 VRTC III 50th.028

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Channel Report Test Number 060927

Ref.	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS Flip	Positive Polarity	Assembly
74	367-MY	13TIBILU00H3MOYA	Left Upper Tibia Moment Y	395	Nm	+	Ankle forward, hold knee in place	3-352 VRTC III 50th.029
75	363-FX	13TIBILL00H3FOXA	Left Lower Tibia Force X	11120	N	+	Ankle forward, knee rearward	3-352 VRTC III 50th.030
76	363-FY	13TIBILL00H3FOYA	Left Lower Tibia Force Y	11120	N	+	Ankle rightward, knee leftward	3-352 VRTC III 50th.031
77	363-FZ	13TIBILL00H3FOZA	Left Lower Tibia Force Z	11120	N	+	Ankle downward, knee upward	3-352 VRTC III 50th.032
78	363-MX	13TIBILL00H3MOXA	Left Lower Tibia Moment X	395	Nm	+	Ankle leftward, hold knee in place	3-352 VRTC III 50th.033
79	363-MY	13TIBILL00H3MOYA	Left Lower Tibia Moment Y	395	Nm	+	Ankle forward, hold knee in place	3-352 VRTC III 50th.034
80	P49190	13FOOTLE00H3ACXA	Left Foot Accel X	2000	g	+	Foot forward	3-352 VRTC III 50th.044
81	P52122	13FOOTLE00H3ACZA	Left Foot Accel Z	2000	g	+	Foot down	3-352 VRTC III 50th.045
82	P49227	13TOESLE00H3ACZA	Left Toe Accel Z	2000	g	-	Toe up	3-352 VRTC III 50th.049
83	373-FX	13TIBIRU00H3FOXA	Right Upper Tibia Force X	11120	N	+	Tibia forward, knee rearward	3-352 VRTC III 50th.035
84	373-FY	13TIBIRU00H3FOYA	Right Upper Tibia Force Y	11120	N	+	Tibia rightward, femur leftward	3-352 VRTC III 50th.036
85	373-FZ	13TIBIRU00H3FOZA	Right Upper Tibia Force Z	11120	N	+	Tibia downward, femur upward	3-352 VRTC III 50th.037
86	373-MX	13TIBIRU00H3MOXA	Right Upper Tibia Moment X	395	Nm	+	Ankle leftward, hold knee in place	3-352 VRTC III 50th.038
87	373-MY	13TIBIRU00H3MOYA	Right Upper Tibia Moment Y	395	Nm	+	Ankle forward, hold knee in place	3-352 VRTC III 50th.039
88	371-FX	13TIBIRL00H3FOXA	Right Lower Tibia Force X	11120	N	+	Ankle forward, knee rearward	3-352 VRTC III 50th.040
89	371-FY	13TIBIRL00H3FOYA	Right Lower Tibia Force Y	11120	N	+	Ankle rightward, knee leftward	3-352 VRTC III 50th.041
90	371-FZ	13TIBIRL00H3FOZA	Right Lower Tibia Force Z	11120	N	+	Ankle downward, knee upward	3-352 VRTC III 50th.050
91	371-MX	13TIBIRL00H3MOXA	Right Lower Tibia Moment X	395	Nm	+	Ankle leftward, hold knee in place	3-352 VRTC III 50th.042

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Channel Report Test Number 060927

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS		Assembly
						Flip	Positive Polarity	
92	371-MY	13TIBIRL00H3MOYA	Right Lower Tibia Moment Y	395	Nm	+	Ankle forward, hold knee in place	3-352 VRTC III 50th.043
93	P51276	13FOOTRI00H3ACXA	Right Foot Accel X	2000	g	+	Foot forward	3-352 VRTC III 50th.046
94	P51272	13FOOTRI00H3ACZA	Right Foot Accel Z	2000	g	+	Foot down	3-352 VRTC III 50th.047
95	P51327	13TOESRI00H3ACZA	Right Toe Accel Z	2000	g	-	Toe up	3-352 VRTC III 50th.048
96	P50832	14CRME000000ACXA	Left Rear Seat Cross-member X-axis Acceleration	1000	g	+	Forward	
97	P50845	16CRME000000ACXA	Right Rear Seat Cross-member X-axis Acceleration	1000	g	+	Forward	
98	P50801	14CRME000000ACZA	Left Rear Seat Cross-member Z-axis Acceleration	1000	g	-	Upward	
99	P50799	16CRME000000ACZA	Right Rear Seat Cross-member Z-axis Acceleration	1000	g	-	Upward	
100	P49396	12ENGNTPO000ACXA	Top of Engine Block X-axis acceleration	1500	g	-	Rearward	
101	P50613	12ENGNB00000ACXA	Bottom of Engine Block X-axis acceleration	1500	g	-	Rearward	
102	P50875	13VEHCRI0000ACXA	Right Brake Caliper X-axis Acceleration	1500	g	+	Forward	
103	P49561	11VEHCLE0000ACXA	Left Brake Caliper X-axis Acceleration	1500	g	-	Rearward	
104	P50937	12DASH000000ACXA	Instrument Panel X-axis Acceleration	1500	g	+	Forward	
105	3419T-828	11SEBE0000B5FO0A	Driver lap belt (R13)	15568	N	+	Tension	
106	3419-829	11SEBE0000B3FO0A	Driver shoulder belt (1015)	15568	N	+	Tension	
107	3419T-840	13SEBE0000B5FO0A	Passenger lap belt (S1510)	15568	N	+	Tension	
108	3419-807	13SEBE0000B3FO0A	Passenger shoulder belt (R12)	15568	N	+	Tension	
109	39312	11SEBE000001DS0A	Driver seatbelt string pot	395	mm	+	Bipolar	
110	39311	13SEBE000001DS0A	Passenger seatbelt string pot	395	mm	+	Bipolar	
111	ST3	11SEBE000000DS0A	Driver Belt Elongation	11.176	mm	+	Bipolar	
112	2091	13SEBE000000DS0A	Passenger belt elongation	11.176	mm	+	Bipolar	
113	00L20-A29	11HEADCGRDH3ACXA	Head Accel X Red	400	g	+	Forward	1-037 H3 VRTC 50th.004
114	00L20-A41	11HEADCGRDH3ACYA	Head Accel Y Red	400	g	-	Leftward	1-037 H3 VRTC 50th.005
115	00L20-A02	11HEADCGRDH3ACZA	Head Accel Z Red	400	g	-	Upward	1-037 H3 VRTC 50th.006
116	00L20-A22	11CHSTCGRDH3ACXA	Chest Accel X Red	400	g	-	Rearward	1-037 H3 VRTC 50th.016
117	J36731	11CHSTCGRDH3ACYA	Chest Accel Y Red	400	g	-	Leftward	1-037 H3 VRTC 50th.017
118	00L20-A30	11CHSTCGRDH3ACZA	Chest Accel Z Red	400	g	-	Upward	1-037 H3 VRTC 50th.018
119	68050A	L0FBAR010000FOXA	BARRIER LOAD A1	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.001
120	68055	L0FBAR020000FOXA	BARRIER LOAD A2	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.002
121	62456	L0FBAR030000FOXA	BARRIER LOAD A3	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.003
122	68015	L0FBAR040000FOXA	BARRIER LOAD A4	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.004
123	68047	L0FBAR050000FOXA	BARRIER LOAD A5	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.005
124	122051A	L0FBAR060000FOXA	BARRIER LOAD A6	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.006
125	62467	L0FBAR070000FOXA	BARRIER LOAD A7	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.007
126	68024	L0FBAR080000FOXA	BARRIER LOAD A8	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.008
127	68027	L0FBAR090000FOXA	BARRIER LOAD A9	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.009
128	68058	L0FBAR100000FOXA	BARRIER LOAD B1	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.010
129	68012	L0FBAR110000FOXA	BARRIER LOAD B2	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.011
130	68014	L0FBAR120000FOXA	BARRIER LOAD B3	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.012

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Channel Report Test Number 060927

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	DAS Flip	Positive Polarity	Assembly
131	62466	L0FBAR130000FOXA	BARRIER LOAD B4	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.013
132	68039	L0FBAR140000FOXA	BARRIER LOAD B5	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.014
133	68051	L0FBAR150000FOXA	BARRIER LOAD B6	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.015
134	68061	L0FBAR160000FOXA	BARRIER LOAD B7	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.016
135	68032	L0FBAR170000FOXA	BARRIER LOAD B8	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.017
136	68026	L0FBAR180000FOXA	BARRIER LOAD B9	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.018
137	68064	L0FBAR190000FOXA	BARRIER LOAD C1	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.019
138	62453	L0FBAR200000FOXA	BARRIER LOAD C2	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.020
139	68028	L0FBAR210000FOXA	BARRIER LOAD C3	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.021
140	62510	L0FBAR220000FOXA	BARRIER LOAD C4	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.022
141	68033A	L0FBAR230000FOXA	BARRIER LOAD C5	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.023
142	122055A	L0FBAR240000FOXA	BARRIER LOAD C6	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.024
143	68018	L0FBAR250000FOXA	BARRIER LOAD C7	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.025
144	68067	L0FBAR260000FOXA	BARRIER LOAD C8	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.026
145	68021	L0FBAR270000FOXA	BARRIER LOAD C9	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.027
146	68034	L0FBAR280000FOXA	BARRIER LOAD D1	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.028
147	68045A	L0FBAR290000FOXA	BARRIER LOAD D2	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.029
148	68069	L0FBAR300000FOXA	BARRIER LOAD D3	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.030
149	68068A	L0FBAR310000FOXA	BARRIER LOAD D4	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.031
150	68054	L0FBAR320000FOXA	BARRIER LOAD D5	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.032
151	68063	L0FBAR330000FOXA	BARRIER LOAD D6	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.033
152	68042	L0FBAR340000FOXA	BARRIER LOAD D7	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.034
153	68052	L0FBAR350000FOXA	BARRIER LOAD D8	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.035
154	122065A	L0FBAR360000FOXA	BARRIER LOAD D9	222400	N	+	Tension force	0-Barrier Flat 36 Load Cell.036

Command File Test Number 060927

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
67	13CHSTCGRDH3ACYA	Passenger Chest Redundant Y-Axis Acceleration	180	+	yes	400
68	13CHSTCGRDH3ACZA	Passenger Chest Redundant Z-Axis Acceleration	180	+	yes	400
68A	13CHSTCGRDH3ACRA	Passenger Chest Redundant Resultant Acceleration	180			
69	13CHST0000H3DSXA	Passenger Chest X-Axis Displacement	600	+	yes	84
70	13PELVCG00H3ACXA	Passenger Pelvis X-Axis Acceleration	1000	+	yes	400
71	13PELVCG00H3ACYA	Passenger Pelvis Y-Axis Acceleration	1000	+	yes	400
72	13PELVCG00H3ACZA	Passenger Pelvis Z-Axis Acceleration	1000	+	yes	400
72A	13PELVCG00H3ACRA	Passenger Pelvis Resultant Acceleration	1000			
73	13FEMRLL00H3FOZA	Passenger Left Femur Z-Axis Force	600	+	yes	13344
74	13FEMRRL00H3FOZA	Passenger Right Femur Z-Axis Force	600	+	yes	13344
75	13TIBILU00H3FOXA	Passenger Left Upper Tibia X-Axis Force	600	+	yes	11120
76	13TIBILU00H3FOYA	Passenger Left Upper Tibia Y-Axis Force	600	+	yes	11120
77	13TIBILU00H3FOZA	Passenger Left Upper Tibia Z-Axis Force	600	+	yes	11120
78	13TIBILU00H3MOXA	Passenger Left Upper Tibia Moment About X Axis	600	+	yes	395
79	13TIBILU00H3MOYA	Passenger Left Upper Tibia Moment About Y Axis	600	+	yes	395
80	13TIBILL00H3FOXA	Passenger Left Lower Tibia X-Axis Force	600	+	yes	11120
81	13TIBILL00H3FOYA	Passenger Left Lower Tibia Y-Axis Force	600	+	yes	11120
82	13TIBILL00H3FOZA	Passenger Left Lower Tibia Z-Axis Force	600	+	yes	11120
83	13TIBILL00H3MOXA	Passenger Left Lower Tibia Moment About X Axis	600	+	yes	395
84	13TIBILL00H3MOYA	Passenger Left Lower Tibia Moment About Y Axis	600	+	yes	395
85	13FOOTLE00H3ACXA	Passenger Left Foot X-Axis Acceleration	1000	+	yes	2000
86	13FOOTLE00H3ACZA	Passenger Left Foot Z-Axis Acceleration	1000	+	yes	2000
87	13TOESLE00H3ACZA	Passenger Left Toe Z-Axis Acceleration	1000	+	yes	2000
88	13TIBIRU00H3FOXA	Passenger Right Upper Tibia X-Axis Force	600	+	yes	11120
89	13TIBIRU00H3FOYA	Passenger Right Upper Tibia Y-Axis Force	600	+	yes	11120
90	13TIBIRU00H3FOZA	Passenger Right Upper Tibia Z-Axis Force	600	+	yes	11120
91	13TIBIRU00H3MOXA	Passenger Right Upper Tibia Moment About X Axis	600	+	yes	395
92	13TIBIRU00H3MOYA	Passenger Right Upper Tibia Moment About Y Axis	600	+	yes	395
93	13TIBIRL00H3FOXA	Passenger Right Lower Tibia X-Axis Force	600	+	yes	11120
94	13TIBIRL00H3FOYA	Passenger Right Lower Tibia Y-Axis Force	600	+	yes	11120
95	13TIBIRL00H3FOZA	Passenger Right Lower Tibia Z-Axis Force	600	+	yes	11120
96	13TIBIRL00H3MOXA	Passenger Right Lower Tibia Moment About X Axis	600	+	yes	395
97	13TIBIRL00H3MOYA	Passenger Right Lower Tibia Moment About Y Axis	600	+	yes	395
98	13FOOTRI00H3ACXA	Passenger Right Foot X-Axis Acceleration	1000	+	yes	2000
99	13FOOTRI00H3ACZA	Passenger Right Foot Z-Axis Acceleration	1000	+	yes	2000
100	13TOESRI00H3ACZA	Passenger Right Toe Z-Axis Acceleration	1000	+	yes	2000
101	14CRME000000ACXA	Left Rear Seat Crossmember X-Axis Acceleration	60	+	yes	1000

Command File Test Number 060927

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
1	11HEADCG00H3ACXA	Driver Head X-Axis Acceleration	1000	+	yes	400
2	11HEADCG00H3ACYA	Driver Head Y-Axis Acceleration	1000	+	yes	400
3	11HEADCG00H3ACZA	Driver Head Z-Axis Acceleration	1000	+	yes	400
3A	11HEADCG00H3ACRA	Driver Head Resultant Acceleration	1000			
4	11HEADCGRDH3ACXA	Driver Head Redundant X-Axis Acceleration	1000	+	yes	400
5	11HEADCGRDH3ACYA	Driver Head Redundant Y-Axis Acceleration	1000	+	yes	400
6	11HEADCGRDH3ACZA	Driver Head Redundant Z-Axis Acceleration	1000	+	yes	400
6A	11HEADCGRDH3ACRA	Driver Head Redundant Resultant Acceleration	1000			
7	11NECKUP00H3FOXA	Driver Neck X-Axis Force	1000	+	yes	8896
8	11NECKUP00H3FOYA	Driver Neck Y-Axis Force	1000	+	yes	8896
9	11NECKUP00H3FOZA	Driver Neck Z-Axis Force	1000	+	yes	13344
10	11NECKUP00H3MOXA	Driver Neck Moment About X Axis	600	+	yes	282
11	11NECKUP00H3MOYA	Driver Neck Moment About Y Axis	600	+	yes	282
12	11NECKUP00H3MOZA	Driver Neck Moment About Z Axis	600	+	yes	282
13	11CHSTCG00H3ACXA	Driver Chest X-Axis Acceleration	180	+	yes	400
14	11CHSTCG00H3ACYA	Driver Chest Y-Axis Acceleration	180	+	yes	400
15	11CHSTCG00H3ACZA	Driver Chest Z-Axis Acceleration	180	+	yes	400
15A	11CHSTCG00H3ACRA	Driver Chest Resultant Acceleration	180			
16	11CHSTCGRDH3ACXA	Driver Chest Redundant X-Axis Acceleration	180	+	yes	400
17	11CHSTCGRDH3ACYA	Driver Chest Redundant Y-Axis Acceleration	180	+	yes	400
18	11CHSTCGRDH3ACZA	Driver Chest Redundant Z-Axis Acceleration	180	+	yes	400
18A	11CHSTCGRDH3ACRA	Driver Chest Redundant Resultant Acceleration	180			
19	11CHST0000H3DSXA	Driver Chest X-Axis Displacement	600	+	yes	84
20	11PELVCG00H3ACXA	Driver Pelvis X-Axis Acceleration	1000	+	yes	400
21	11PELVCG00H3ACYA	Driver Pelvis Y-Axis Acceleration	1000	+	yes	400
22	11PELVCG00H3ACZA	Driver Pelvis Z-Axis Acceleration	1000	+	yes	400
22A	11PELVCG00H3ACRA	Driver Pelvis Resultant Acceleration	1000			
23	11FEMRLL00H3FOZA	Driver Left Femur Z-Axis Force	600	+	yes	13344
24	11FEMRRL00H3FOZA	Driver Right Femur Z-Axis Force	600	+	yes	13344
25	11TIBILU00H3FOXA	Driver Left Upper Tibia X-Axis Force	600	+	yes	11120
26	11TIBILU00H3FOYA	Driver Left Upper Tibia Y-Axis Force	600	+	yes	11120
27	11TIBILU00H3FOZA	Driver Left Upper Tibia Z-Axis Force	600	+	yes	11120
28	11TIBILU00H3MOXA	Driver Left Upper Tibia Moment About X Axis	600	+	yes	395
29	11TIBILU00H3MOYA	Driver Left Upper Tibia Moment About Y Axis	600	+	yes	395
30	11TIBILL00H3FOXA	Driver Left Lower Tibia X-Axis Force	600	+	yes	11120
31	11TIBILL00H3FOYA	Driver Left Lower Tibia Y-Axis Force	600	+	yes	11120
32	11TIBILL00H3FOZA	Driver Left Lower Tibia Z-Axis Force	600	+	yes	11120

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Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
33	11TIBILL00H3MOXA	Driver Left Lower Tibia Moment About X Axis	600	+	yes	395
34	11TIBILL00H3MOYA	Driver Left Lower Tibia Moment About Y Axis	600	+	yes	395
35	11FOOTLE00H3ACXA	Driver Left Foot X-Axis Acceleration	1000	+	yes	2000
36	11FOOTLE00H3ACZA	Driver Left Foot Z-Axis Acceleration	1000	+	yes	2000
37	11TOESLE00H3ACZA	Driver Left Toe Z-Axis Acceleration	1000	+	yes	2000
38	11TIBIRU00H3FOXA	Driver Right Upper Tibia X-Axis Force	600	+	yes	11120
39	11TIBIRU00H3FOYA	Driver Right Upper Tibia Y-Axis Force	600	+	yes	11120
40	11TIBIRU00H3FOZA	Driver Right Upper Tibia Z-Axis Force	600	+	yes	11120
41	11TIBIRU00H3MOXA	Driver Right Upper Tibia Moment About X Axis	600	+	yes	395
42	11TIBIRU00H3MOYA	Driver Right Upper Tibia Moment About Y Axis	600	+	yes	395
43	11TIBIRL00H3FOXA	Driver Right Lower Tibia X-Axis Force	600	+	yes	11120
44	11TIBIRL00H3FOYA	Driver Right Lower Tibia Y-Axis Force	600	+	yes	11120
45	11TIBIRL00H3FOZA	Driver Right Lower Tibia Z-Axis Force	600	+	yes	11120
46	11TIBIRL00H3MOXA	Driver Right Lower Tibia Moment About X Axis	600	+	yes	395
47	11TIBIRL00H3MOYA	Driver Right Lower Tibia Moment About Y Axis	600	+	yes	395
48	11FOOTRI00H3ACXA	Driver Right Foot X-Axis Acceleration	1000	+	yes	2000
49	11FOOTRI00H3ACZA	Driver Right Foot Z-Axis Acceleration	1000	+	yes	2000
50	11TOESRI00H3ACZA	Driver Right Toe Z-Axis Acceleration	1000	+	yes	2000
51	13HEADCG00H3ACXA	Passenger Head X-Axis Acceleration	1000	+	yes	400
52	13HEADCG00H3ACYA	Passenger Head Y-Axis Acceleration	1000	+	yes	400
53	13HEADCG00H3ACZA	Passenger Head Z-Axis Acceleration	1000	+	yes	400
53A	13HEADCG00H3ACRA	Passenger Head Resultant Acceleration	1000			
54	13HEADCGRDH3ACXA	Passenger Head Redundant X-Axis Acceleration	1000	+	yes	400
55	13HEADCGRDH3ACYA	Passenger Head Redundant Y-Axis Acceleration	1000	+	yes	400
56	13HEADCGRDH3ACZA	Passenger Head Redundant Z-Axis Acceleration	1000	+	yes	400
56A	13HEADCGRDH3ACRA	Passenger Head Redundant Resultant Acceleration	1000			
57	13NECKUP00H3FOXA	Passenger Neck X-Axis Force	1000	+	yes	8896
58	13NECKUP00H3FOYA	Passenger Neck Y-Axis Force	1000	+	yes	8896
59	13NECKUP00H3FOZA	Passenger Neck Z-Axis Force	1000	+	yes	13344
60	13NECKUP00H3MOXA	Passenger Neck Moment About X Axis	600	+	yes	282
61	13NECKUP00H3MOYA	Passenger Neck Moment About Y Axis	600	+	yes	282
62	13NECKUP00H3MOZA	Passenger Neck Moment About Z Axis	600	+	yes	282
63	13CHSTCG00H3ACXA	Passenger Chest X-Axis Acceleration	180	+	yes	400
64	13CHSTCG00H3ACYA	Passenger Chest Y-Axis Acceleration	180	+	yes	400
65	13CHSTCG00H3ACZA	Passenger Chest Z-Axis Acceleration	180	+	yes	400
65A	13CHSTCG00H3ACRA	Passenger Chest Resultant Acceleration	180			
66	13CHSTCGRDH3ACXA	Passenger Chest Redundant X-Axis Acceleration	180	+	yes	400

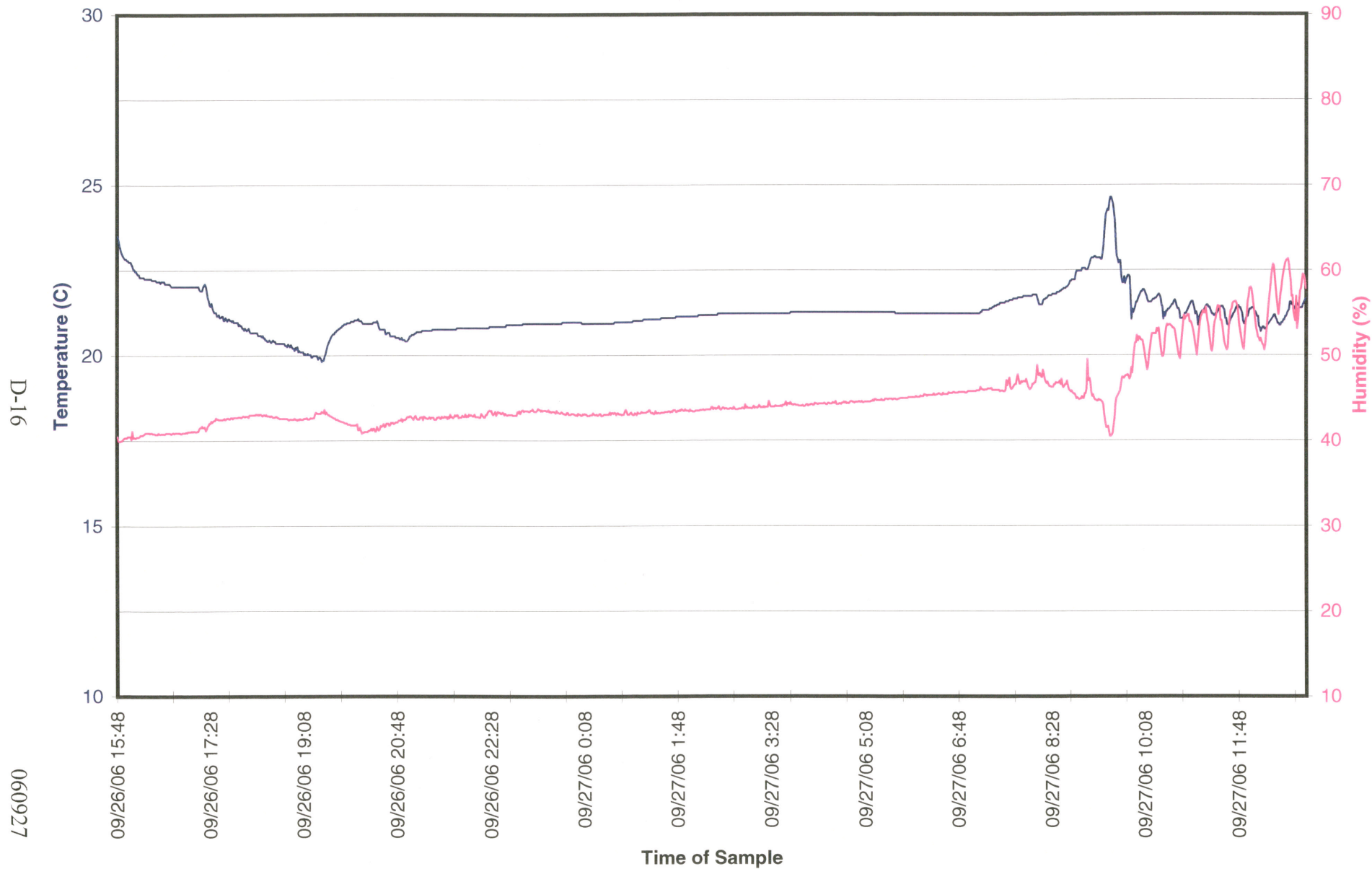
Command File Test Number 060927

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
102	16CRME000000ACXA	Right Rear Seat Crossmember X-Axis Acceleration	60	+	yes	1000
103	14CRME000000ACZA	Left Rear Seat Crossmember Z-Axis Acceleration	60	+	yes	1000
104	16CRME000000ACZA	Right Rear Seat Crossmember Z-Axis Acceleration	60	+	yes	1000
105	12ENGNTPO0000ACXA	Top of Engine Block X-Axis Acceleration	60	+	yes	1500
106	12ENGNB000000ACXA	Bottom of Engine Block X-Axis Acceleration	60	+	yes	1500
107	13VEHCRI0000ACXA	Right Brake Caliper X-Axis Acceleration	60	+	yes	1500
108	11VEHCLE0000ACXA	Left Brake Caliper X-Axis Acceleration	60	+	yes	1500
109	12DASH000000ACXA	Instrument Panel X-Axis Acceleration	60	+	yes	1500
109A	12DASH000000VEXC	Instrument Panel X-Axis Velocity	180			
109B	12DASH000000DCXC	Instrument Panel X-Axis Displacement	180			
110	11SEBE0000B5FO0A	Driver Lap Belt Force	60	+	yes	15568
111	11SEBE0000B3FO0A	Driver Shoulder Belt Force	60	+	yes	15568
112	13SEBE0000B5FO0A	Passenger Lap Belt Force	60	+	yes	15568
113	13SEBE0000B3FO0A	Passenger Shoulder Belt Force	60	+	yes	15568
114	11SEBE000001DS0A	Driver Seat Belt String Pot	60	+	yes	395
115	13SEBE000001DS0A	Passenger Seat Belt String Pot	60	+	yes	395
116	11SEBE000000DS0A	Driver Belt Elongation	60	+	yes	11.176
117	13SEBE000000DS0A	Passenger Belt Elongation	60	+	yes	11.176
118	L0FBAR010000FOXA	Barrier Load Cell A1	60	+	yes	222400
119	L0FBAR020000FOXA	Barrier Load Cell A2	60	+	yes	222400
120	L0FBAR030000FOXA	Barrier Load Cell A3	60	+	yes	222400
121	L0FBAR040000FOXA	Barrier Load Cell A4	60	+	yes	222400
122	L0FBAR050000FOXA	Barrier Load Cell A5	60	+	yes	222400
123	L0FBAR060000FOXA	Barrier Load Cell A6	60	+	yes	222400
124	L0FBAR070000FOXA	Barrier Load Cell A7	60	+	yes	222400
125	L0FBAR080000FOXA	Barrier Load Cell A8	60	+	yes	222400
126	L0FBAR090000FOXA	Barrier Load Cell A9	60	+	yes	222400
127	L0FBAR100000FOXA	Barrier Load Cell B1	60	+	yes	222400
128	L0FBAR110000FOXA	Barrier Load Cell B2	60	+	yes	222400
129	L0FBAR120000FOXA	Barrier Load Cell B3	60	+	yes	222400
130	L0FBAR130000FOXA	Barrier Load Cell B4	60	+	yes	222400
131	L0FBAR140000FOXA	Barrier Load Cell B5	60	+	yes	222400
132	L0FBAR150000FOXA	Barrier Load Cell B6	60	+	yes	222400
133	L0FBAR160000FOXA	Barrier Load Cell B7	60	+	yes	222400
134	L0FBAR170000FOXA	Barrier Load Cell B8	60	+	yes	222400
135	L0FBAR180000FOXA	Barrier Load Cell B9	60	+	yes	222400
136	L0FBAR190000FOXA	Barrier Load Cell C1	60	+	yes	222400

Command File Test Number 060927

Channel	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
137	L0FBAR200000FOXA	Barrier Load Cell C2	60	+	yes	222400
138	L0FBAR210000FOXA	Barrier Load Cell C3	60	+	yes	222400
139	L0FBAR220000FOXA	Barrier Load Cell C4	60	+	yes	222400
140	L0FBAR230000FOXA	Barrier Load Cell C5	60	+	yes	222400
141	L0FBAR240000FOXA	Barrier Load Cell C6	60	+	yes	222400
142	L0FBAR250000FOXA	Barrier Load Cell C7	60	+	yes	222400
143	L0FBAR260000FOXA	Barrier Load Cell C8	60	+	yes	222400
144	L0FBAR270000FOXA	Barrier Load Cell C9	60	+	yes	222400
145	L0FBAR280000FOXA	Barrier Load Cell D1	60	+	yes	222400
146	L0FBAR290000FOXA	Barrier Load Cell D2	60	+	yes	222400
147	L0FBAR300000FOXA	Barrier Load Cell D3	60	+	yes	222400
148	L0FBAR310000FOXA	Barrier Load Cell D4	60	+	yes	222400
149	L0FBAR320000FOXA	Barrier Load Cell D5	60	+	yes	222400
150	L0FBAR330000FOXA	Barrier Load Cell D6	60	+	yes	222400
151	L0FBAR340000FOXA	Barrier Load Cell D7	60	+	yes	222400
152	L0FBAR350000FOXA	Barrier Load Cell D8	60	+	yes	222400
153	L0FBAR360000FOXA	Barrier Load Cell D9	60	+	yes	222400
153A	SUM[118-120,127-129]	Barrier Load Group 1 Force	60			
153B	SUM[121-123,130-132]	Barrier Load Group 2 Force	60			
153C	SUM[124-126,133-135]	Barrier Load Group 3 Force	60			
153D	SUM[136-138,145-147]	Barrier Load Group 4 Force	60			
153E	SUM[139-141,148-150]	Barrier Load Group 5 Force	60			
153F	SUM[142-144,151-153]	Barrier Load Group 6 Force	60			
153G	SUM[118-153]	Barrier Load Cell Total Force	60			

2006 KIA OPTIMA 35 MPH FRONT BARRIER IMPACT / 060927



KIA**SOLD TO:****SHIP TO:**

2006	53222	KIA OPTIMA LX	RUBY RED/BEIGE
MODEL YEAR	MODEL	MODEL DESCRIPTION	EXTERIOR/INTERIOR COLOR

OH028 RICART PROPERTIES, INC. 4255 S. Hamilton Road PO BOX 27130 COLUMBUS OH 43227 GROVEPORT OH 43125

OH028

KNAGE123865075194	G4374054	TACOMA	TRUCK
VEHICLE NUMBER	ENGINE NUMBER	PORT OF ENTRY	MODE OF TRANSPORTATION

STANDARD FEATURES**MANUFACTURER'S SUGGESTED RETAIL PRICE ➤****\$17,650.00****MECHANICAL**

2.4L 16V DOHC 4 Cyl Engine
5-Speed Sportmatic Transmission
MacPherson Strut Front Suspension
Rear Multi-Link Suspension
Power Rack and Pinion Steering
P205/60R16 Tires/Wheel Covers
Front and Rear Disc Brakes

SAFETY

Dual Advanced Front Airbags
Front Seat Mounted Side Airbags
Full-Length Side Curtain Airbags
Front Active Headrests
Front Seat Belt Pretensioners with Force Limiters
3-Point Seatbelts for All Seating Positions
Lower Anchors and Tethers for Children (LATCH)
Tire Pressure Monitoring System (TPMS)

INTERIOR

Air Conditioning w/filter
AM/FM/CD Audio with 6-Speakers
Full Cloth Seat Trim, Floor Mats
6-Way Adjustable Driver's Seat
60/40 Split Folding Rear Seat
Power Windows, Door Locks, Heated Mirrors
Cruise Control, Keyless Entry & Alarm
Audio and Cruise Steering Wheel Remote
Dual Front and Rear Cupholders
Tilt & Telescopic Steering Column
Center Console w/ Armrest/ Cell Phone pass thru

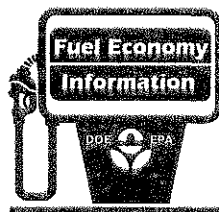
EXTERIOR

Body Color Bodyside Moldings
In-glass Antenna, Gas Strut Hood/Trunk Lifter
10 YEARS/100,000 MILES
LIMITED POWERTRAIN WARRANTY
5 YEARS/60,000 MILES
24-HOUR ROADSIDE ASSISTANCE

ADDITIONAL INSTALLED EQUIPMENT:
(In addition to or in place of standard features)

MSRP INCLUDING OPTIONS**\$17,650.00****INLAND FREIGHT AND HANDLING****\$600.00****TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ➤****\$18,250.00**

Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service.
License and title fees, state and local taxes and other dealer installed options
and accessories are not included in the manufacturer's suggested retail price.

Compare this vehicle to others in the **FREE FUEL ECONOMY GUIDE** available at the dealer.**PARTS CONTENT INFORMATION****CITY MPG****24****HIGHWAY MPG****34**

2006 KIA OPTIMA LX
2.4 LITER ENGINE
FUEL INJECTION
4 CYLINDERS, CATALYST
5 SPEED AUTOMATIC

Estimated Annual Fuel Cost**\$ 1178.00**

Actual Mileage will vary with
options, driving conditions,
driving habits and vehicle's
condition. Results reported to
EPA indicate that the majority
of vehicles with these estimates
will achieve between

20 and 28 mpg in the city, and between
28 and 40 mpg on the highway.

For Comparison Shopping
all vehicles classified as
MID-SIZE
have been issued mileage
ratings ranging from

10 to 60 mpg city and
14 to 51 mpg highway.

see www.fueleconomy.gov**FOR VEHICLES IN THIS CAR LINE**

U.S. / CANADIAN PARTS CONTENT:
3%

**MAJOR SOURCES OF FOREIGN
PARTS:**
KOREA: 95%

NOTE: PARTS CONTENT DOES NOT INCLUDE
FINAL ASSEMBLY, DISTRIBUTION, OR OTHER
NON-PARTS COSTS.

**FOR THIS VEHICLE
FINAL ASSEMBLY POINT:**

KOREA

**COUNTRY OF ORIGIN
ENGINE:**

KOREA**TRANSMISSION:****KOREA**

D-17

060927