

**Vehicle Research and Test Center
2005 Dodge Ram 2500 into
Rigid Pole Barrier
TRC Inc. Test Number: 051006**

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Section 1.0

Purpose and Test Procedure

Purpose

This 32.0 km/h (19.9 mph) oblique pole impact test was conducted for the National Highway Traffic Safety Administration (NHTSA) and Vehicle Research and Test Center (VRTC) by Transportation Research Center Inc. (TRC Inc.).

The purpose of this test was to evaluate vehicle and occupant response to an oblique pole side impact in a 2005 Dodge Ram 2500. The test was conducted in accordance with the FMVSS 214 Notice of Proposed Rulemaking (Federal Register, May 17, 2004) and the NHTSA Draft TP-214P-00.

Test Procedure

This test was conducted in accordance with VRTC instructions for a rigid pole oblique side impact test. Data was obtained relative to NHTSA TP214P-00 Draft Test Procedure using one (1) ES-2re with rib extenders anthropomorphic test device. The test vehicle was equipped with wheel dollies, which were crabbed to provide correct vehicle impact alignment with the pole.

The test vehicle, a 2005 Dodge Ram 2500 Pickup, was instrumented with twenty-five (25) accelerometers to measure longitudinal, lateral and vertical axis accelerations. The driver's front airbag signal was monitored with an inductive pickup. The driver's curtain airbag was deployed by TRC Inc. The vehicle impacted a pole on the driver's side at an oblique angle. The vehicle's specified impact velocity range was 31.2 to 32.8 km/h.

The test vehicle contained one (1) ES-2re dummy. The dummy was positioned in the left front outboard designated seating position according to the May 17, 2004 FMVSS 214 NPRM. The dummy was restrained with a 3-point seat belt and a curtain airbag.

The dummy was instrumented with head, shoulder, upper spine, lower spine, and pelvis accelerometers to measure longitudinal, lateral, and vertical accelerations; upper neck, lower neck, abdomen, torso, lower spine, lumbar, and femur load cells to measure forces and moments; and rib lateral acceleration accelerometers and deflection potentiometers.

The data channels were digitally sampled and recorded at 12,500 samples per second and processed per SAE J211 March 1995.

The crash event was recorded by one (1) real-time panning motion picture camera and ten (10) high-speed digital motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The oblique pole impact test summary data are presented in Section 2.0. The summary of test data is presented in Section 3.0. The occupant, camera, and vehicle measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the dummy verification data. Appendix D contains test equipment and instrumentation calibration information. Appendix E contains a copy of the INSIA Report on Structural Measurements.

Section 2.0

Oblique Pole Impact Test Summary

Test Results Summary

This oblique pole side impact test was conducted by TRC Inc. on October 6, 2005.

The test vehicle, a 2005 Dodge Ram 2500 pickup, was equipped with a 5.9-liter diesel inline engine, automatic transmission, power steering, power brakes, dual stage front airbags, and side curtain airbags. The vehicle's test weight was 3159.4 kg. The vehicle's impact speed was 31.8 km/h. The vehicle impacted 1 mm to the right of the target point (1441 mm rearward of front axle).

Injury Criteria Data Summary	
	Driver
HIC (15 ms)	314
HIC (36 ms)	331
Upper Rib Displacement (mm)	35
Middle Rib Displacement (mm)	41
Lower Rib Displacement (mm)	50
Lower Spine Acceleration (g)	67
Abdominal Force (N)	3,244
Pubic Force (N)	1,931

Data Acquisition Explanations

The vehicle's left side sill at front seat Y-axis acceleration data channel, 14SILBFR0000ACYA, recorded questionable data after approximately 65 milliseconds. Post-test inspection revealed the accelerometer was destroyed during the impact event. The velocity and displacement were also affected.

The vehicle's left bottom B-post at sill Y-axis acceleration data channel, 14BPILBO0000ACYA, exceeded full-scale at approximately 38 milliseconds.

The vehicle's left lower A-post Y-axis acceleration data channel, 11APILLO0000ACYA, exceeded full-scale at approximately 72 milliseconds.

The vehicle's left middle A-post Y-axis acceleration data channel, 11APILMI0000ACYA, recorded questionable data throughout the event.

The vehicle's left front seat track Y-axis acceleration data channel, 11SETRFR0000ACYA, recorded questionable data throughout the event.

The vehicle's driver door Y-axis acceleration data channel at dummy arm, 11DOOR000001ACYA, recorded questionable data throughout the event.

The vehicle's driver door Y-axis acceleration data channel at dummy rib, 11DOOR000002ACYA, exceeded full-scale at approximately 34 milliseconds.

The vehicle's driver door Y-axis acceleration data channel at dummy pelvis, 11DOOR000003ACYA, recorded questionable data throughout the event.

Table 1 Crash Test Summary

Test mode:	Oblique pole left side impact			
Test date:	10/06/05			
Test time:	1556			
Ambient temperature:	21° C			
Vehicle year/make/ model/body style:	2005/Dodge/Ram 2500/Pickup			
Vehicle test weight:	3159.4 kg			
Impact angle ¹ :	285°			
Impact velocity ² :	31.8 km/h			
Maximum vehicle static crush:	485 mm			
Number of data channels:	100			
Number of cameras:	High-speed	10	Real-time	1
<u>Dummies:</u>	<u>Driver #009</u>			
Type:	ES-2re			
Location:	Left front			
Restraint:	3-point seat belt, curtain airbag			
<u>Seat track position for test:</u>				
Driver:	Middle; 120 mm of 240 mm range of travel			
<u>Seat back position for test:</u>				
Driver:	14.7° at headrest			
<u>Head restraint position for test:</u>				
Driver:	Full down			
<u>Steering column position:</u>	24.5°; middle of the geometric range of travel			

¹ With respect to tow track centerline.

² Speed trap measurement (± .08 km/h accuracy)

Table 2 General Test and Vehicle Parameter Data

Vehicle year/make/
model/body style: 2005/Dodge/Ram 2500/Pickup

VIN: 3D3KS26C25G713556

Model year: 2005

Body style: Pickup

Color: Gray

Engine data:

 Cylinders: 6

 Displacement 5.9-liters Diesel

 Cylinder placement: V

 Engine placement: Inline

Transmission data: 3 speed, ___ manual, X automatic, ___ overdrive

 Final drive: ___ FWD, ___ RWD, X 4WD

Date vehicle received: 9/16/2005

Odometer reading: 536 miles

Dealer's name and address: Vehicle supplied by VRTC

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	Driver only	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	Yes
Clock	Yes	Rear window defroster	Yes
Other	None	Power door locks	Yes

Certification data from vehicle's label:

Vehicle manufactured by: DaimlerChrysler Corporation

Date of manufacture: 08/04

VIN: 3D3KS26C25G713556

GVWR: 4083 kg (9000 lbs.)

GAWR: Front: 2359 kg (5200 lbs.)

 Rear: 2727 kg (6010 lbs.)

Table 2 General Test and Vehicle Parameter Data, Continued

Tires on vehicle (mfr., line, size): BF Goodrich, Rugged Trails T/A, LT 265/70R17

Tire pressure with maximum capacity vehicle load:

Front: 80 psi (550 kPa)

Rear: 80 psi (550 kPa)

Spare tire (mfr., line, size): BF Goodrich, Rugged Trails T/A, LT 265/70R17

Type of seats:

Front Split bench

Maximum width: 2010 mm

Wheelbase: 3570 mm

Location of "Recommended Tire Pressure" label:

The label was located on the driver's door.

Data from vehicle's "Recommended Tire Pressure" label":

Recommended tire size: LT 265/70R17E

Recommended cold tire pressure:

Front: 60 psi (410 kPa)

Rear: 60 psi (410 kPa)

Vehicle Capacity Data:

Number of Occupants (Designated seating capacity):

Front 3

Total 3

Vehicle capacity weight: 948 kg

Rated cargo/luggage weight¹ 136 kg

Test vehicle attitude:

Delivered attitude: LF 1012 mm; RF 1012 mm; LR 1065 mm; RR 1065 mm

Fully loaded attitude: LF 1010 mm; RF 1015 mm; LR 1060 mm; RR 1067 mm

Pre-test attitude: LF 1029 mm; RF 1020 mm; LR 1074 mm; RR 1066 mm

Post-test attitude: LF 1010 mm; RF 1013 mm; LR 1075 mm; RR 1049 mm

¹ RCLW = VCW - (68 kg * designated seating capacity). Note: RCLW is the amount calculated from this equation or 136 kg, whichever is less.

Table 2 General Test and Vehicle Parameter Data, Continued

Test vehicle attitude:

	Left Sill Pitch	Right Sill Pitch	Front Bumper L-R Roll	Rear Bumper L-R Roll
As Delivered:	-0.2°	-0.3°	-0.2°	-0.6°
As Tested:	-0.2°	-0.5°	-0.5° ¹	-0.3°
Fully Loaded:	0.0°	-0.2°	-0.2°	1.1°

Negative Pitch Angle = Vehicle front down

Negative Roll Angle = Driver side down

Weight of test vehicle as received (with maximum fluids)=UDW:

Right front	910.5 kg	Right rear	595.0 kg
Left front	963.0 kg	Left rear	588.0 kg
Total front weight	1873.5 kg	(61.3 % of total vehicle weight)	
Total rear weight	1183.0 kg	(38.7 % of total vehicle weight)	
Total delivered weight	3056.5 kg		

Calculation of test vehicle's target test weight:

Total Delivered Weight (UDW) =	3056.5 kg
Rated Cargo/Luggage Weight (RCLW) =	136.0 kg
Weight of 1 ES-2re Dummy @ 77 kg each =	77.0 kg
Target test weight =	3269.5 kg

Weight of test vehicle with required dummy and equipment:¹

Right front	949.0 kg	Right rear	616.8 kg
Left front	983.6 kg	Left rear	610.0 kg
Total front weight	1932.6 kg	(61.2% of total vehicle weight)	
Total rear weight	1226.8 kg	(38.8% of total vehicle weight)	
Total test weight	3159.4 kg		

¹ Final test weight set by customer to match previous testing.

Table 2 General Test and Vehicle Parameter Data, Continued

Weight of ballast secured in vehicle: 18.1 kg

Components removed to meet target test weight: Spare tire

Location of Vehicle's CG: 1386 mm rearward of front wheel centerline

Fuel System Data:

Usable fuel system capacity 132.5 liters (from owner's manual)

Actual test volume: 123.4 liters (93% of usable)

Table 3 Post-Impact Data

Test number: 051006
Test date: 10/06/05
Test time: 1556
Test type: Oblique pole left side impact
Impact angle: 285°
Ambient temperature
at impact area: 21° C
Required impact velocity range: 31.2 to 32.8 km/h

MDB impact velocity:

Primary: 31.8 km/h
Secondary: 32.0 km/h
Distance from vehicle to barrier:
Entering velocity trap: 661 mm
Exiting velocity trap: 51 mm

Location of Impact Point On Test Vehicle Side To Be Impacted:

Wheelbase = 3570 millimeters
Intended impact point is 1440 millimeters rearward of front axle centerline
(which is 940 millimeters forward of the wheelbase midpoint)
Actual Impact Point is 1441 millimeters rearward of front axle centerline

Impact Point:

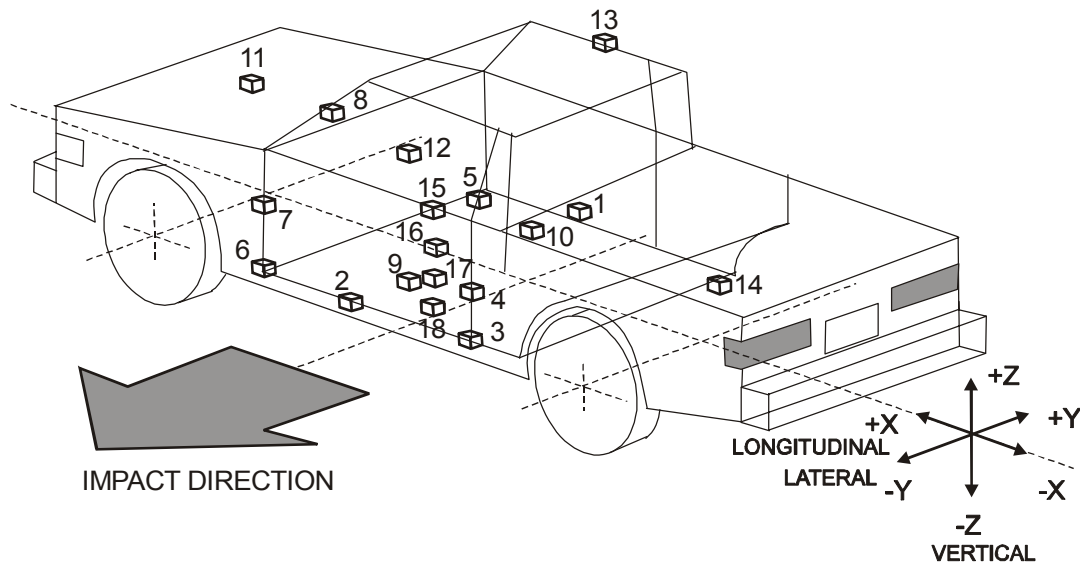
Actual Impact Point is 1 mm right of nominal impact ref. line (Lateral)

Maximum Exterior Static Crush:

1. Level 1 (455 mm above ground) = 389 mm
2. Level 2 (1045 mm above ground) = 484 mm
3. Level 3 (925 mm above ground) = 485 mm
4. Level 4 (1340 mm above ground) = 420 mm
5. Level 5 (1903 mm above ground) = 189 mm

Maximum Post-Test Intrusion = 485 mm

Figure 1 Vehicle Accelerometer and String Potentiometer Placement



- | | |
|---|--------------------------------|
| 1-Right Front Side Sill | 10-Vehicle Center of Gravity |
| 2-Left Front Side Sill | 11-Engine Top |
| 3-Left Side Lower B-pillar | 12-Firewall |
| 4-Left Side Lower B-pillar-1/3 up | 13-Right Side Roof Rail |
| 5-Left Side Middle B-pillar-2/3 up | 14-Rear Bed |
| 6-Left Side Lower A-pillar | 15-Driver Door at Dummy Arm |
| 7-Left Side Lower A-pillar-1/3 up | 16-Driver Door at Dummy Rib |
| 8-Left Side Middle A-pillar-2/3 up | 17-Driver Door at Dummy Pelvis |
| 9-Left Side Front Seat Track at H-point | 18-Driver Door at Dummy Knee |

Table 4 Test Vehicle Accelerometer Locations and Data Summary

Accel. No.	Location		Positive Direction		Negative Direction	
			Max. (g)	Time (ms)	Max. (g)	Time (ms)
1	Right Side Sill at Front Seat	Y	17.9	64.7	4.4	53.8
2	Left Side Sill at Front Seat ¹	Y	----	----	----	----
3	Left Lower B-Pillar at Sill ¹	Y	----	----	----	----
4	Left Lower B-Pillar - 1/3 up	Y	43.4	28.8	7.6	84.8
5	Left Middle B-Pillar - 2/3 up	Y	52.9	27.3	14.8	61.0
6	Left Lower A-Pillar at Sill	Y	20.8	26.6	8.1	13.0
7	Left Lower A-Pillar - 1/3 up ¹	Y	----	----	----	----
8	Left Middle A-Pillar - 2/3 up ¹	Y	----	----	----	----
9	Left Front Seat Track ¹	Y	----	----	----	----
10	Vehicle Center of Gravity Resultant	X	8.6	59.2	9.4	66.4
		Y	23.9	51.1	8.5	46.0
		Z	35.6	47.1	71.2	51.5
			75.0	51.5		
11	Top of Engine	X	2.7	109.8	9.5	88.7
		Y	10.5	94.3	3.7	50.9
12	Firewall	X	2.1	81.7	7.0	42.3
		Y	9.7	61.0	1.5	32.2
13	Right Roof Rail	X	5.2	96.9	6.7	115.0
		Y	16.7	71.9	2.5	22.9
14	Rear Bed	X	3.2	67.3	5.3	58.5
		Y	9.6	126.6	1.7	76.0
15	Driver Door at Dummy Arm ¹	Y	----	----	----	----
16	Driver Door at Dummy Rib ¹	Y	----	----	----	----
17	Driver Door at Dummy Pelvis ¹	Y	----	----	----	----
18	Driver Door at Dummy Knee	Y	79.4	13.6	62.8	18.2

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

¹ See Data Acquisition Explanations.

Section 3.0

Summary of Test Data

Table 5 Dummy Injury Criteria Data

Driver Dummy S/N 009

Location	Positive Direction		Negative Direction	
	Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)				
Longitudinal X	8.6	20.5	29.7	49.5
Lateral Y	56.3	50.8	11.1	120.7
Vertical Z	14.5	18.6	14.5	51.0
Resultant	65.0	50.8		
HIC (36 ms)	331			
Head Left Acceleration (g)				
Longitudinal X	14.9	20.4	33.5	45.8
Vertical Z	26.5	44.9	23.1	54.0
Head Front Acceleration (g)				
Lateral Y	60.8	55.0	14.8	112.4
Vertical Z	30.0	45.2	18.1	59.7
Head Top Acceleration (g)				
Longitudinal X	17.9	116.2	39.5	58.8
Vertical Y	66.7	55.3	15.7	128.4
Upper Neck Force (N)				
X-Axis Shear	22.1	128.5	592.4	49.8
Y-Axis Shear	336.5	46.9	315.5	89.7
Z-Axis Axial	476.2	118.2	505.8	22.4
Upper Neck Moment (N-m)				
About X-Axis	4.9	112.2	85.9	47.8
About Y-Axis	22.9	84.2	73.5	47.4
About Z-Axis	21.5	66.2	20.0	128.6
Lower Neck Force (N)				
X-Axis Shear	90.0	96.6	821.1	47.5
Y-Axis Shear	1699.6	48.2	416.0	115.4
Z-Axis Axial	415.3	44.5	579.3	52.4

Table 5 Dummy Injury Criteria Data, Cont'd.

Driver Dummy S/N 009

Location	Positive Direction		Negative Direction	
	Max.	Time (ms)	Max.	Time (ms)
Lower Neck Moment (N-m)				
About X-Axis	130.9	48.4	47.6	115.5
About Y-Axis	86.9	47.5	13.6	125.6
About Z-Axis	21.9	60.5	23.1	126.3
Shoulder Force (N)				
X-Axis	3247.3	40.1	60.0	72.6
Y-Axis	4842.1	40.2	21.2	101.4
Z-Axis	652.8	39.7	90.2	68.4
Upper Spine Acceleration (g)				
Longitudinal X	9.4	45.4	27.1	37.3
Lateral Y	62.7	41.8	12.6	82.2
Vertical Z	4.6	74.2	8.1	46.3
Resultant	64.7	41.7		
Torso Back Plate Force (N)				
Longitudinal X	651.1	43.9	64.1	31.7
Lateral Y	32.6	102.3	651.4	49.4
Torso Back Plate Moment (N-m)				
Lateral Y	24.8	44.1	23.0	44.8
Vertical Z	21.4	44.2	9.5	82.2
Upper Rib Acceleration (g)				
Lateral Y	140.2	37.8	22.6	44.4
Mid Rib Acceleration (g)				
Lateral Y	122.1	38.2	73.4	47.8
Lower Rib Acceleration (g)				
Lateral Y	245.1	39.6	86.8	44.8
Upper Rib Displacement (mm)				
Lateral Y	34.7	55.3	0.0	-13.3

Table 5 Dummy Injury Criteria Data, Cont'd.

Driver Dummy S/N 009

Location	Positive Direction		Negative Direction	
	Max.	Time (ms)	Max.	Time (ms)
Mid Rib Displacement (mm)				
Lateral Y	40.8	56.3	2.9	119.9
Lower Rib Displacement (mm)				
Lateral Y	50.0	53.4	1.6	82.5
Lower Spine Acceleration (g)				
Longitudinal X	13.0	65.0	12.4	47.8
Lateral Y	66.1	50.3	17.8	81.6
Vertical Z	3.1	71.8	9.2	45.9
Resultant	66.5	50.3		
Lower Spine Force (N)				
Longitudinal X	1193.2	50.2	222.6	37.3
Lateral Y	2225.2	39.7	681.8	46.5
Lower Spine Moment (N-m)				
Longitudinal X	53.9	79.8	192.9	40.3
Lateral Y	139.1	69.5	72.4	42.7
Lumbar Force (N)				
Y-Axis	834.8	50.5	393.1	100.7
Z-Axis	1870.6	59.9	821.1	42.1
Lumbar Moment (N-m)				
About X-Axis	33.9	59.8	30.7	41.0
Front Abdominal Force (N)				
Lateral Y	281.0	40.0	11.1	27.8
Mid Abdominal Force (N)				
Lateral Y	1527.3	40.5	18.1	118.6
Rear Abdominal Force (N)				
Lateral Y	1445.5	40.6	7.6	120.2
Abdominal Total Force (N)	3243.8	40.6		

Table 5 Dummy Injury Criteria Data, Cont'd.

Driver Dummy S/N 009

Location	Positive Direction Max. Time (ms)		Negative Direction Max. Time (ms)	
Pubic Force (N)				
Lateral Y	1.9	21.4	1931.0	51.1
Pelvis Acceleration (g)				
Longitudinal X	11.1	56.0	5.2	89.5
Lateral Y	63.1	45.4	16.3	90.1
Vertical Z	12.0	50.1	9.8	44.0
Resultant	63.6	49.4		
Left Femur Force (N)				
X-Axis	317.5	51.4	173.8	151.4
Y-Axis	1004.2	64.6	12.7	18.3
Z-Axis	1784.6	57.1	84.9	179.6
Left Femur Moment (N-m)				
About Longitudinal	15.7	83.1	86.5	61.3
About Lateral	24.6	51.2	20.4	76.6
About Vertical	24.4	53.4	9.2	65.1
Right Femur Force (N)				
X-Axis	252.3	81.1	251.5	120.3
Y-Axis	908.6	64.2	402.7	47.8
Z-Axis	1201.3	60.4	1298.9	201.7
Right Femur Moment (N-m)				
About Longitudinal	71.1	48.5	92.0	95.2
About Lateral	35.6	53.8	36.6	127.4
About Vertical	13.3	83.3	38.4	61.9

Positive Direction:

Longitudinal: Forward

Lateral: Rightward

Vertical: Downward

Negative Direction:

Longitudinal: Rearward

Lateral: Leftward

Vertical: Upward

Table 6 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver</u>
Head	Headliner, airbag curtain, head restraint
Shoulder	None
Abdomen	Door panel
Left knee	Door panel
Right knee	None

Door opening:

	<u>Left</u>	<u>Right</u>
Front	Jammed and latched	Easy

Seat movement:

	<u>Seat back failure</u>	<u>Seat shift</u>
Left Front	None, bent frame	None

Glazing damage: Front and rear windows broken.

Other notable impact effects: None

Section 4.0

Occupant, Camera, and Vehicle Information

Table 7 Vehicle Structural Measurements^{1,2}

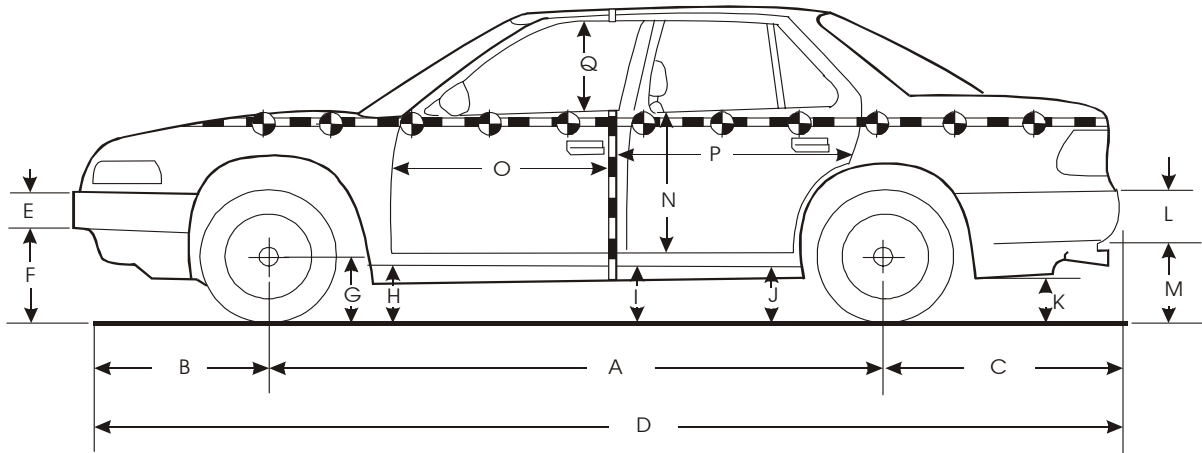
	Elements	Pre-Test
1	Total Length	5845
2	Total Width	2055
3	Bumper Top Height	813
4	Bumper Bottom Height	505
5	Longitudinal Member Top Height	683
6	Longitudinal Member Bottom Height	503
7	Distance Between Longitudinal Members	995
7'	Longitudinal Member Width	50
8	Engine Top Height	1294
9	Engine Bottom Height	392
10	Engine and Gearbox Width	1450
11	Front Bumper - Engine Distance	580
12	Front Shock Absorber Fixing Height	1032
13	Bonnet Leading Edge Height	1215
14	Front Shock Absorber Fixing Width	1010
15	Front Bumper - Front Axle Distance	1005
16	Front Axle - A Pillar Distance	600
17	A Pillar - B Pillar Distance	1203
18	B Pillar - Rear Axle Distance	1743
19	B Pillar - C Pillar Distance	N/A
20	Roof Sill Bottom Height	1880
21	Roof Sill Top Height	1963
22	Floor Sill Bottom Height	638
23	Floor Sill Top Height	676

All distance measurements are in millimeters.

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

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

Figure 2 Vehicle Pre-Test And Post-Test Measurements



Left Side View

Note: All dimensions are in millimeters with tolerance of ± 3 mm

	Pre-Test (as delivered)	Pre-Test (as tested)	Post-Test (as tested)	Change
A	3570	3570	3380	190
B	1005	1005	963	42
C	1270	1270	1241	29
D	5845	5845	5731	114
E	235	235	235	0
F	500	518	550	-32
G	375	380	380	0
H	501	495	500	-5
I	530	518	510	8
J1	496	497	485	12
J2	550	551	535	16
K	568	571	614	-43
L	195	195	195	0
M	636	631	710	-79
N	N/A	N/A	N/A	N/A
O	867	867	832	35
P	N/A	N/A	N/A	N/A
Q	535	535	490	45
R	5606	5606	5597	9
S	5605	5605	5321	284
T	1574	1574	1315	259

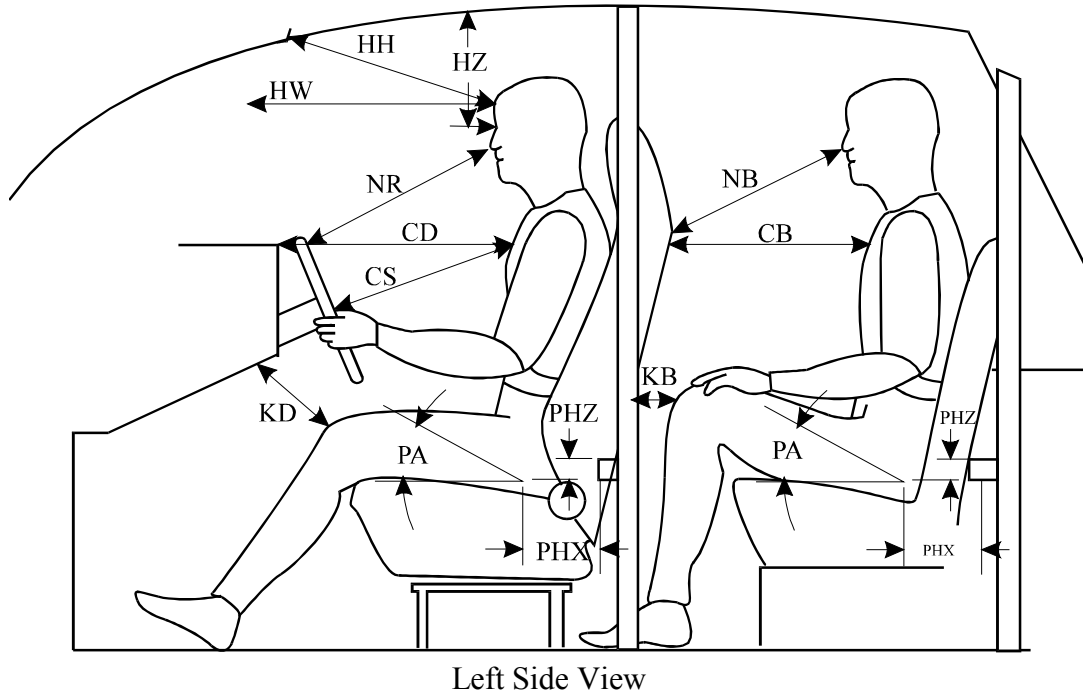
D = Length at centerline
T = Width at B-pillar

E&L = Bumper Thickness
J1 = To Pinch Weld

R = Right Side Length
J2 = To Sill

S = Left Side Length

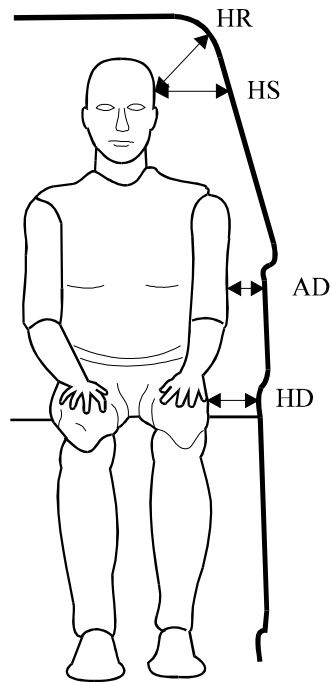
Figure 3 ES-2re Longitudinal Clearance Dimensions



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

Measurement	Driver ES-2re #009
HH	447
HW	667
HZ	200
NR	486
CD	627
CS	321
KDL (KDL°)	91 (14.2°)
KDR (KDA°)	92 (21.1°)

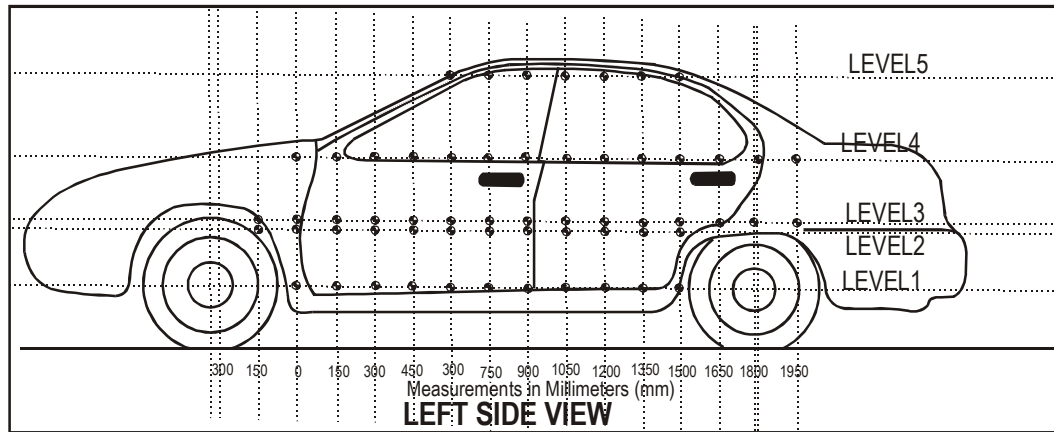
Figure 4 ES-2re Lateral Clearance Dimensions



Note: All measurements are in millimeters with tolerance of ± 3 mm

Measurement	Driver ES-2re # 009
HR	154
HS	294
AD	160
HD	172

Figure 5 Vehicle Side Measurements



Level 5 - Window Top

Level 4 - Window Sill

Level 3 - Mid-Door

Level 2 - Occupant H-Point

Level 1 - Axle Centerline Height or Sill Top Height

Measurements Are Taken When The Vehicle Is In The “As Tested” Configuration.

Measurements along the vertical 750 mm line shown above:

Level 5 @ Window Top	=	<u>1903</u>	mm
Level 4 @ Window Sill	=	<u>1340</u>	mm
Level 3 @ Mid Door	=	<u>925</u>	mm
Level 2 @ Occupant H-Point	=	<u>1045</u>	mm
Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>455</u>	mm

Table 8 Vehicle Exterior Crush Profiles - All Levels

Location	Height		(mm) From Impact Point												
			-1800	-1650	-1500	-1350	-1200	-1050	-900	-750	-600	-450	-300	-150	0
Level 1 Side Sill	455	Pre	---	---	---	---	---	---	---	904	903	905	908	910	912
		Post	---	---	---	---	---	---	---	823	772	723	674	625	539
		Crush	---	---	---	---	---	---	---	81	131	182	234	285	373
Level 2 H-Point	1045	Pre	987	1001	1007	1010	1013	1015	1016	1016	1015	1013	1011	1011	1011
		Post	972	985	989	990	991	991	993	965	888	812	739	660	570
		Crush	15	16	18	20	22	24	23	51	127	201	272	351	441
Level 3 Mid-Door	925	Pre	987	---	---	---	---	---	1012	1010	1009	1008	1006	1006	1007
		Post	963	---	---	---	---	---	877	855	880	804	728	655	568
		Crush	24	---	---	---	---	---	135	155	129	204	278	351	439
Level 4 Window Sill	1340	Pre	---	---	---	874	898	916	931	940	947	950	953	956	959
		Post	---	---	---	876	899	917	931	934	896	831	755	673	583
		Crush	---	---	---	-2	-1	-1	0	6	51	119	198	283	376
Level 5 Window Top	1903	Pre	---	---	---	---	---	---	---	---	---	---	---	714	720
		Post	---	---	---	---	---	---	---	---	---	---	---	647	578
		Crush	---	---	---	---	---	---	---	---	---	---	---	67	142

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

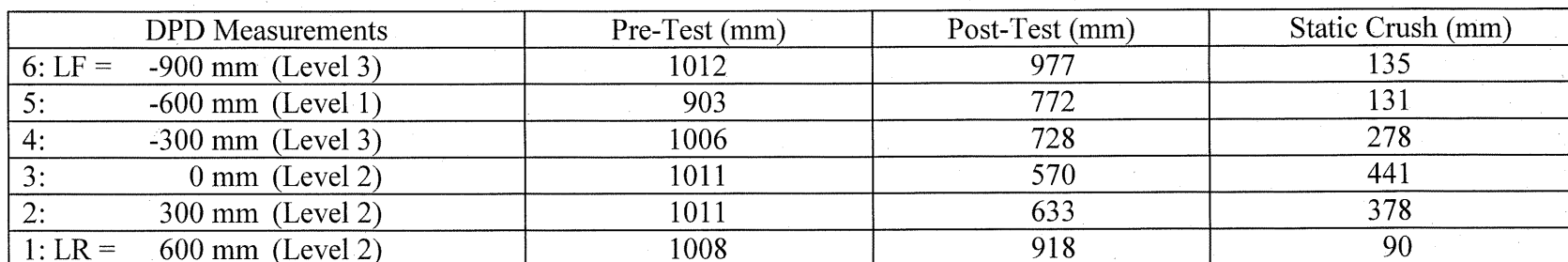
Table 8 Vehicle Exterior Crush Profiles - All Levels, Cont'd.

Location	Height		(mm) From Impact Point												
			150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950
Level 1 Side Sill	455	Pre	909	914	912	914	905	907	910	910	910	911	912	---	---
		Post	520	632	775	907	1177	1217	1258	1299	1337	1377	1418	---	---
		Crush	389	282	137	7	-272	-310	-348	-389	-427	-466	-506	---	---
Level 2 H-Point	1045	Pre	1012	1011	1010	1008	999	998	1000	1000	1002	1004	1006	1008	1010
		Post	528	633	783	918	1297	1322	1362	1403	1444	1484	1525	1565	1603
		Crush	484	378	227	90	-298	-324	-362	-403	-442	-480	-519	-557	-593
Level 3 Mid-Door	925	Pre	1007	1007	1006	1004	995	994	994	994	995	997	999	1000	---
		Post	522	632	782	924	1287	1316	1348	1391	1432	1473	1515	1555	---
		Crush	485	375	224	80	-292	-322	-354	-397	-437	-476	-516	-555	---
Level 4 Window Sill	1340	Pre	961	960	961	961	953	954	954	953	952	950	949	950	954
		Post	541	636	779	894	1269	1304	1340	1375	1410	1443	1478	1515	1554
		Crush	420	324	182	67	-316	-350	-386	-422	-458	-493	-529	-565	-600
Level 5 Window Top	1903	Pre	722	724	725	719	---	---	---	---	---	---	---	---	---
		Post	533	646	693	798	---	---	---	---	---	---	---	---	---
		Crush	189	78	32	-79	---	---	---	---	---	---	---	---	---

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

4-9

051006



Full length of induced damage was 1500 mm.

Figure 7 Camera Positions

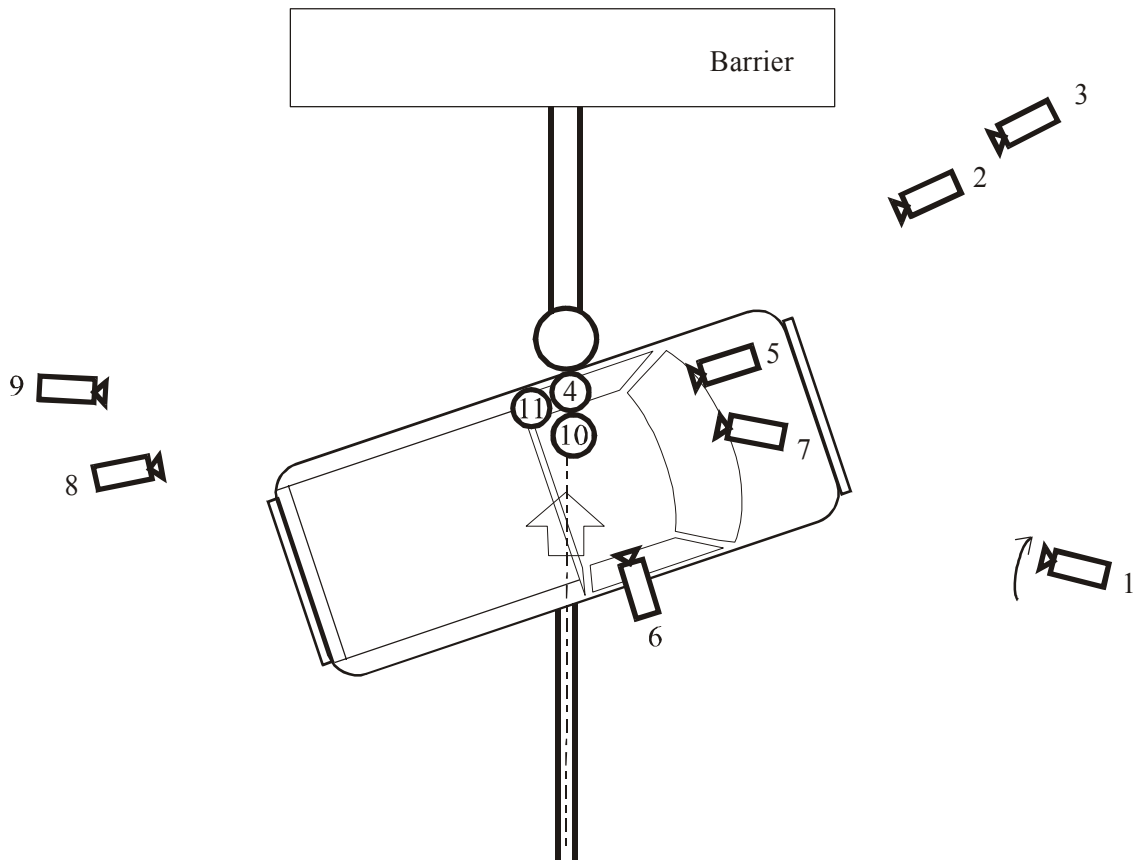


Table 9 Camera Information

Camera Number	Location	Location, mm			Angle (deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	Real-time Panning-Video	N/A	N/A	N/A	N/A		30
2	Left side front wide	2400	7500	-1250	-3.3	25	1000
3	Left side front 45°	2300	5500	-1300	-1.0	25	1000
4	Overhead tight	-400	350	-5700	90.0	50	1000
5	Onboard vehicle hood	-300	1700	-750	3.3	25	1000
6	Onboard passenger door	-1850	300	-1600	-5.3	12.5	1000
7	Onboard vehicle front	-1500	600	-1150	N/A	50	1000
8	Left side rear wide	-2070	-8600	-1300	-3.1	25	1000
9	Left side rear 45°	1600	-6180	-1320	-1.1	12.5	1000
10	Overhead wide	0	0	-5700	90.0	25	1000
11	Underbody at impact point	0	0	3250	90.0	17	1000

+X: Forward from impact point

+Y: Rightward from impact point

+Z: Downward from ground level

Appendix A

Photographs



Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Front View



Figure A-4 Post-Test Left Front View



Figure A-5 Pre-Test Left Side View



Figure A-6 Post-Test Left Side View



Figure A-7 Pre-Test Left Rear View



Figure A-8 Post-Test Left Rear View



Figure A-9 Pre-Test Rear View



Figure A-10 Post-Test Rear V



Figure A-11 Pre-Test Right Rear View



Figure A-12 Post-Test Right Rear View



Figure A-13 Pre-Test Right Side View



Figure A-14 Post-Test Right Side View



Figure A-15 Pre-Test Right Front View



Figure A-16 Post-Test Right Front View



Figure A-17 Pre-Test Overhead View

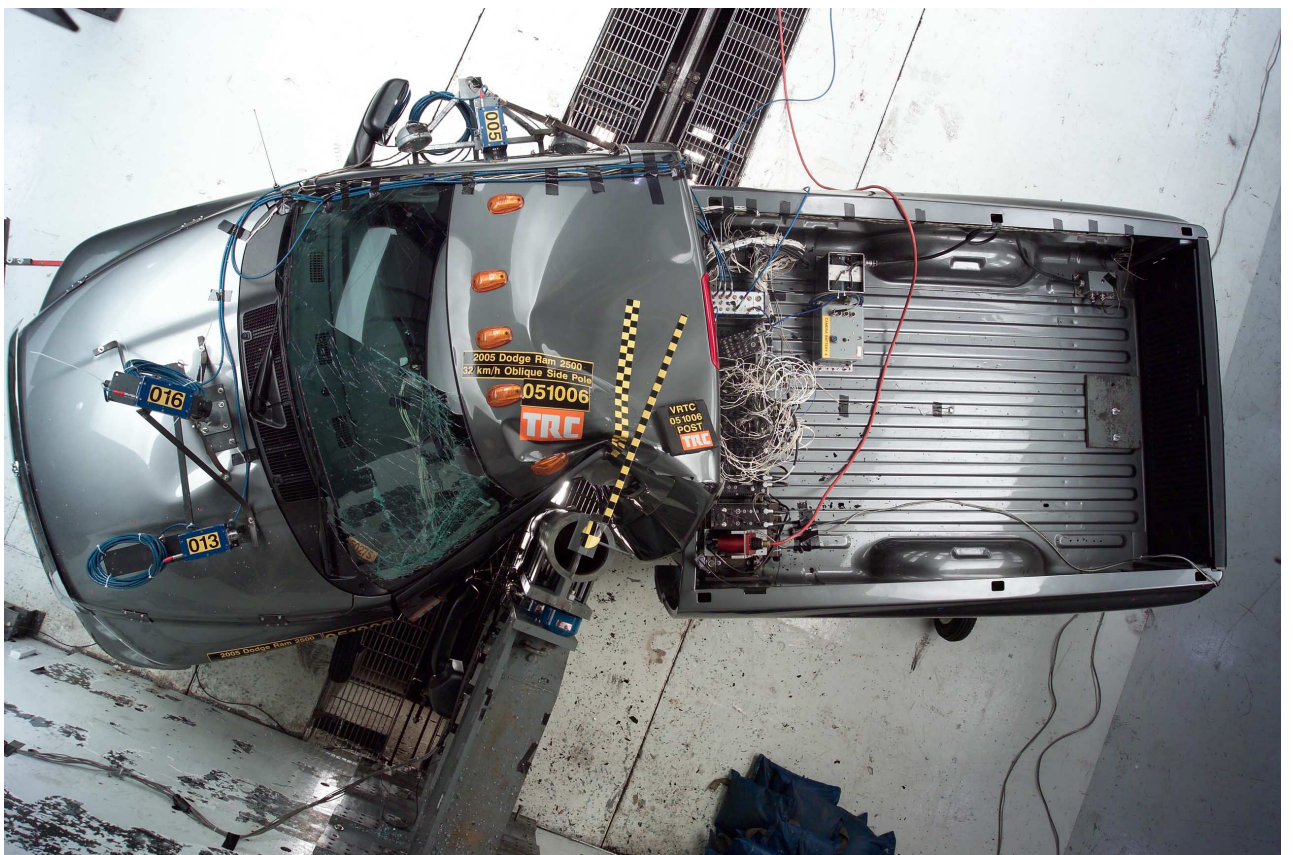


Figure A-18 Post-Test Overhead View



Figure A-19 Pre-Test Overhead Tight View



Figure A-20 Post-Test Overhead Tight View



Figure A-21 Pre-Test Primary Impact Point View



Figure A-22 Pre-Test Secondary Impact Point View



Figure A-23 Post-Test Impact Point - View 1



Figure A-24 Post-Test Impact Point - View 2



Figure A-25 Post-Test Impact Point - View 3



Figure A-26 Post-Test Impact Point - View 4



Figure A-27 Pre-Test Underbody Impact Point View



Figure A-28 Post-Test Underbody Impact Point View



Figure A-29 Pre-Test Dummy - View 1



Figure A-30 Post-Test Dummy - View 1



Figure A-31 Pre-Test Dummy - View 2

Intentionally Left Blank

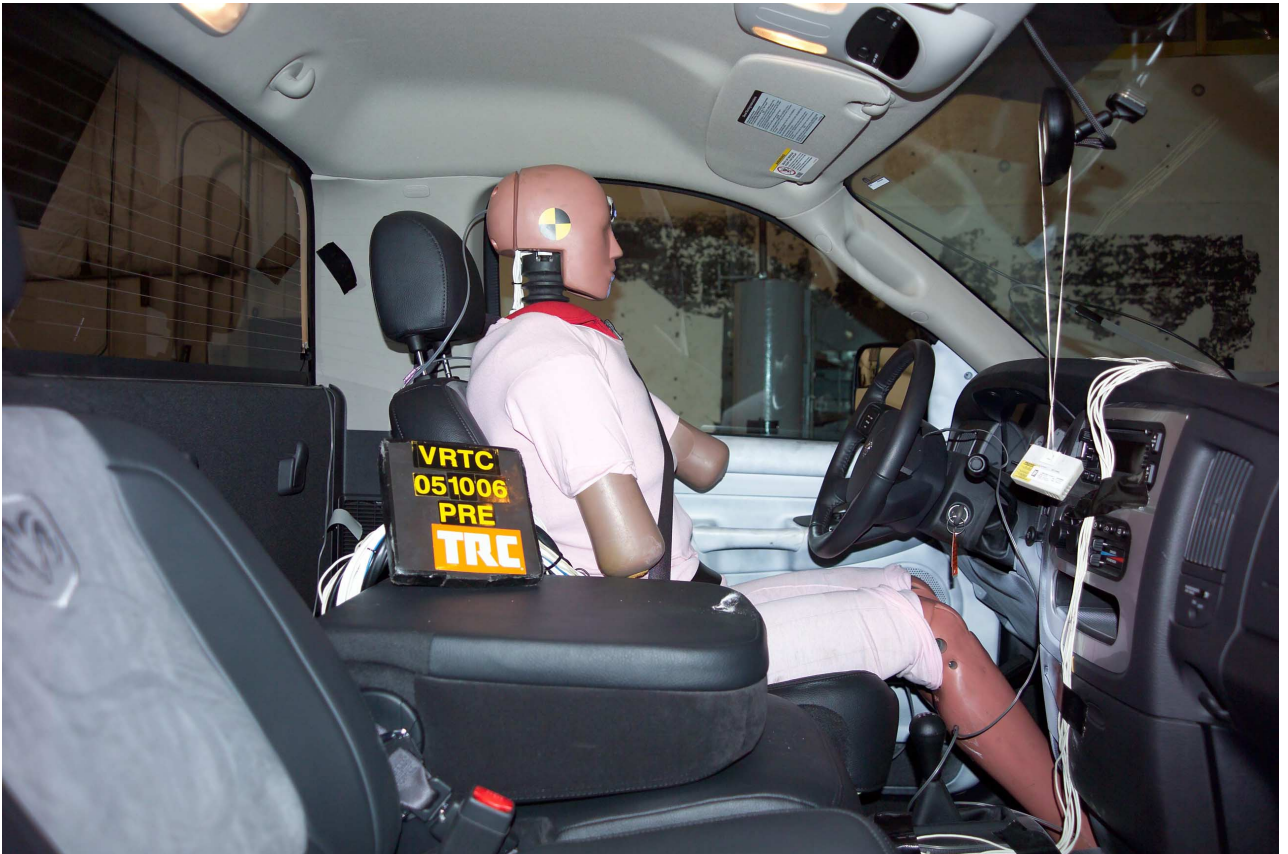


Figure A-32 Pre-Test Dummy - View 3



Figure A-33 Post-Test Dummy - View 3



Figure A-34 Pre-Test Dummy Door Clearance View



Figure A-35 Post-Test Dummy Door Clearance View



Figure A-36 Pre-Test Driver Door Interior View



Figure A-37 Post-Test Driver Door Interior View



Figure A-38 Post-Test Driver Dummy Contact - View 1



Figure A-39 Post-Test Driver Dummy Contact - View 2



Figure A-40 Post-Test Driver Dummy Contact - View 3



Figure A-41 Post-Test Driver Dummy Contact - View 4

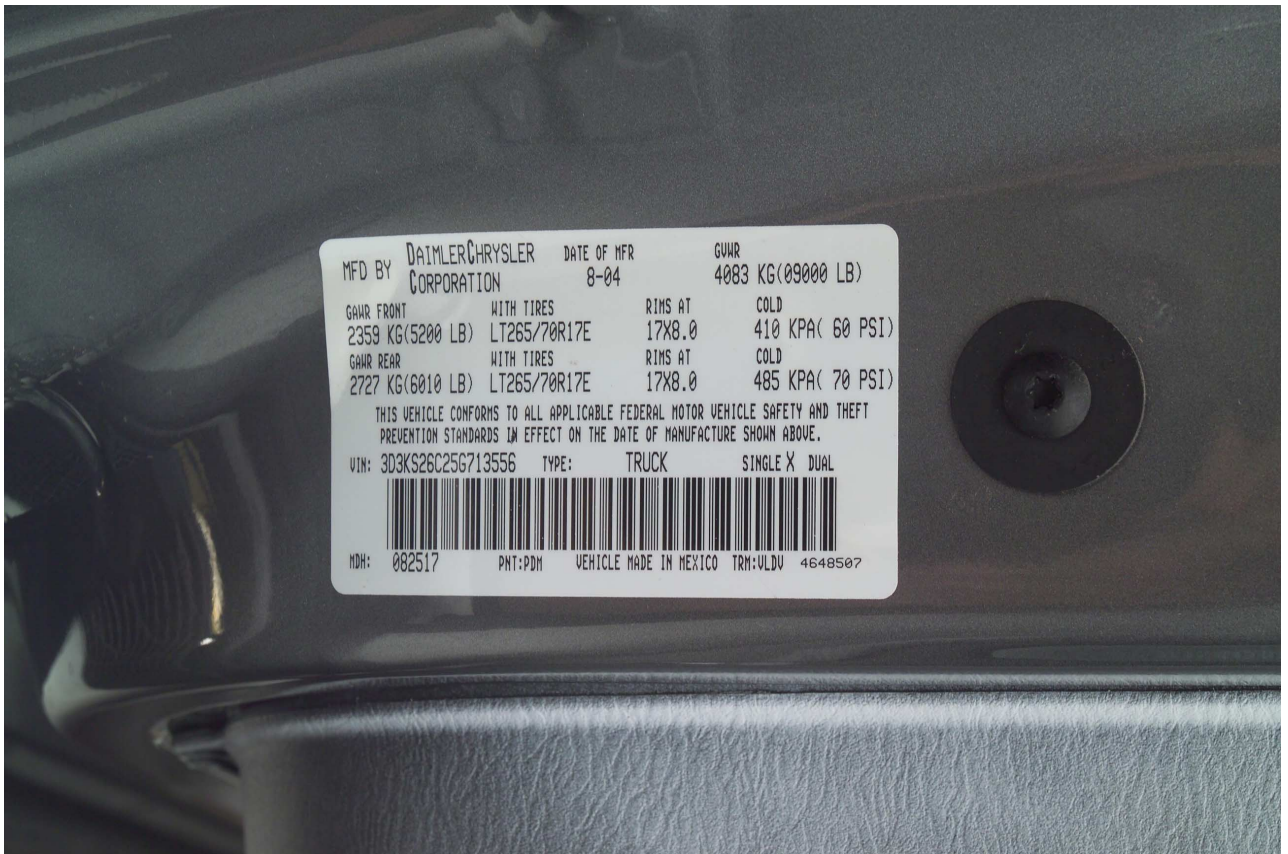


Figure A-42 Vehicle Certification Label View

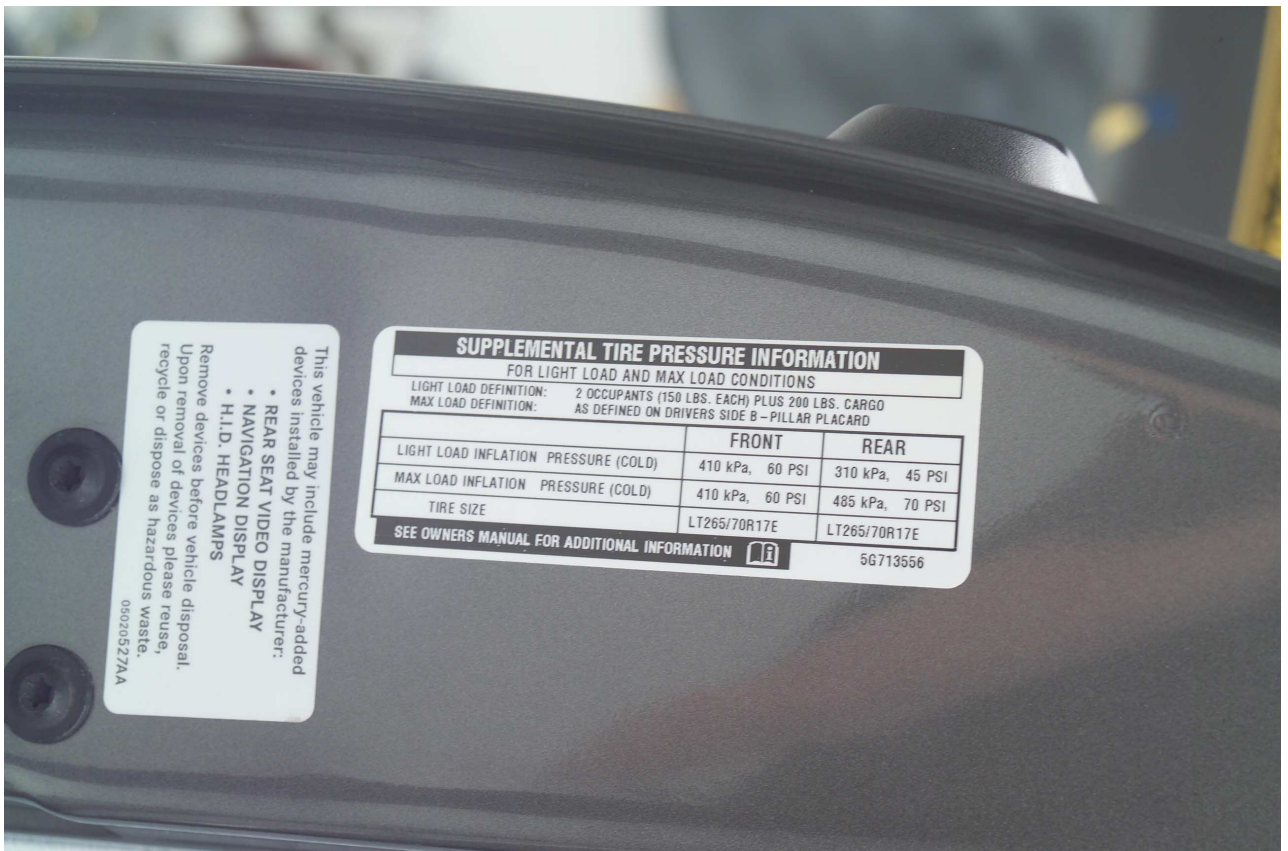


Figure A-43 Vehicle Tire Load Label View



Figure A-44 Pre-Test Ballast View

Appendix B

Data Plots



2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head X-Axis Acceleration

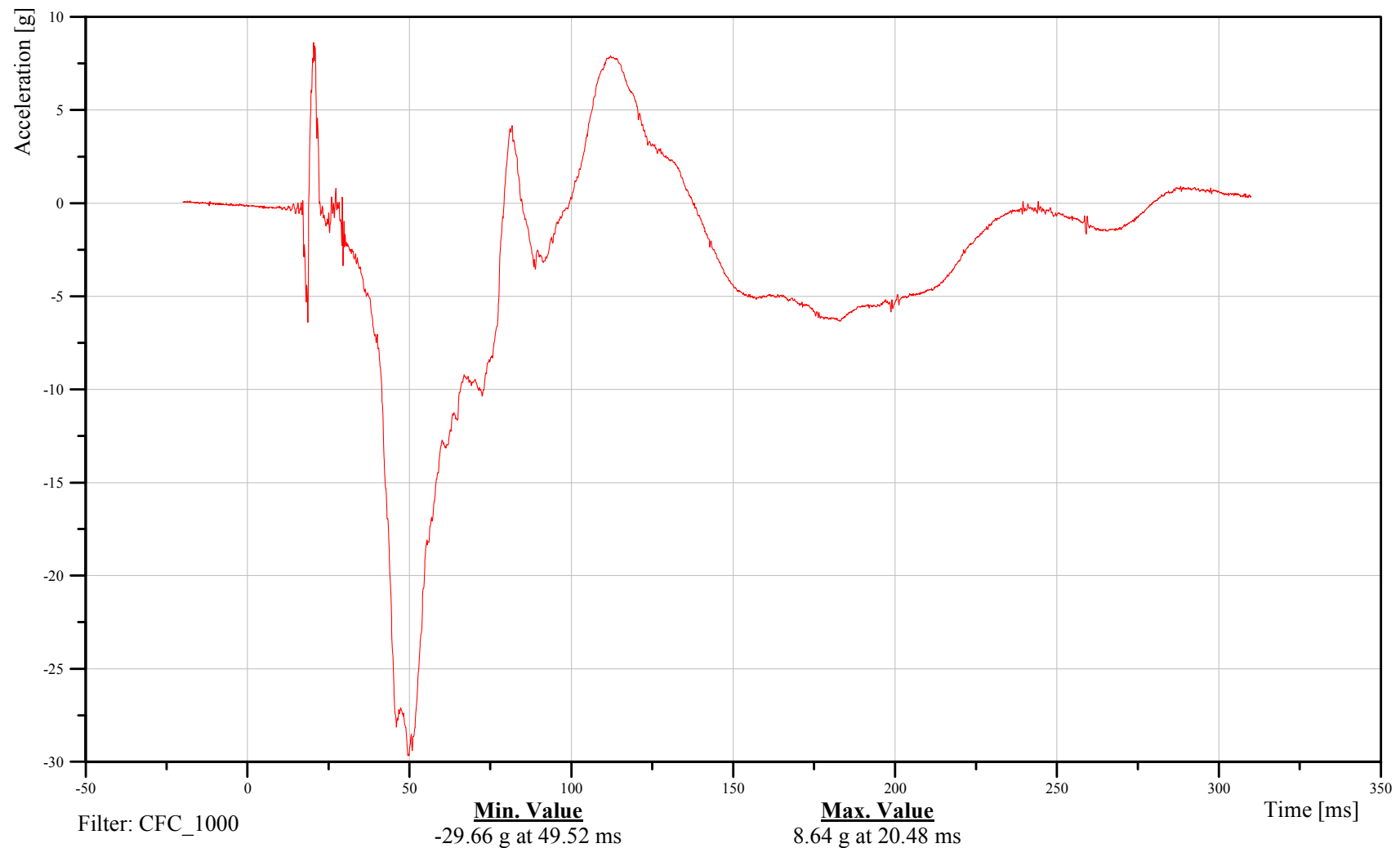
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Time: 16:17

Customer: VRTC

11HEADCG00E2ACXA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head Y-Axis Acceleration

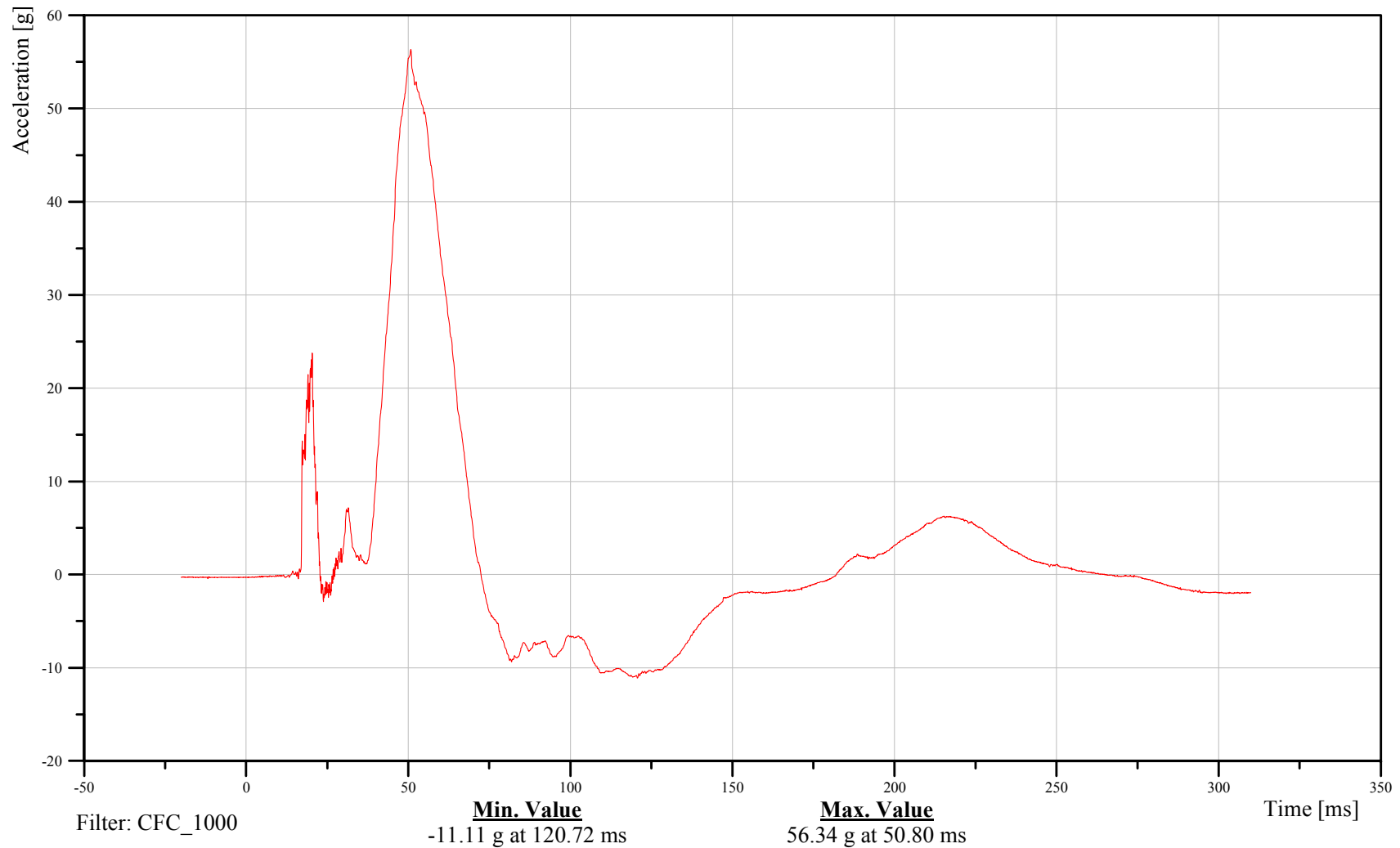
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Time: 16:17

Customer: VRTC

11HEADCG00E2ACYA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head Z-Axis Acceleration

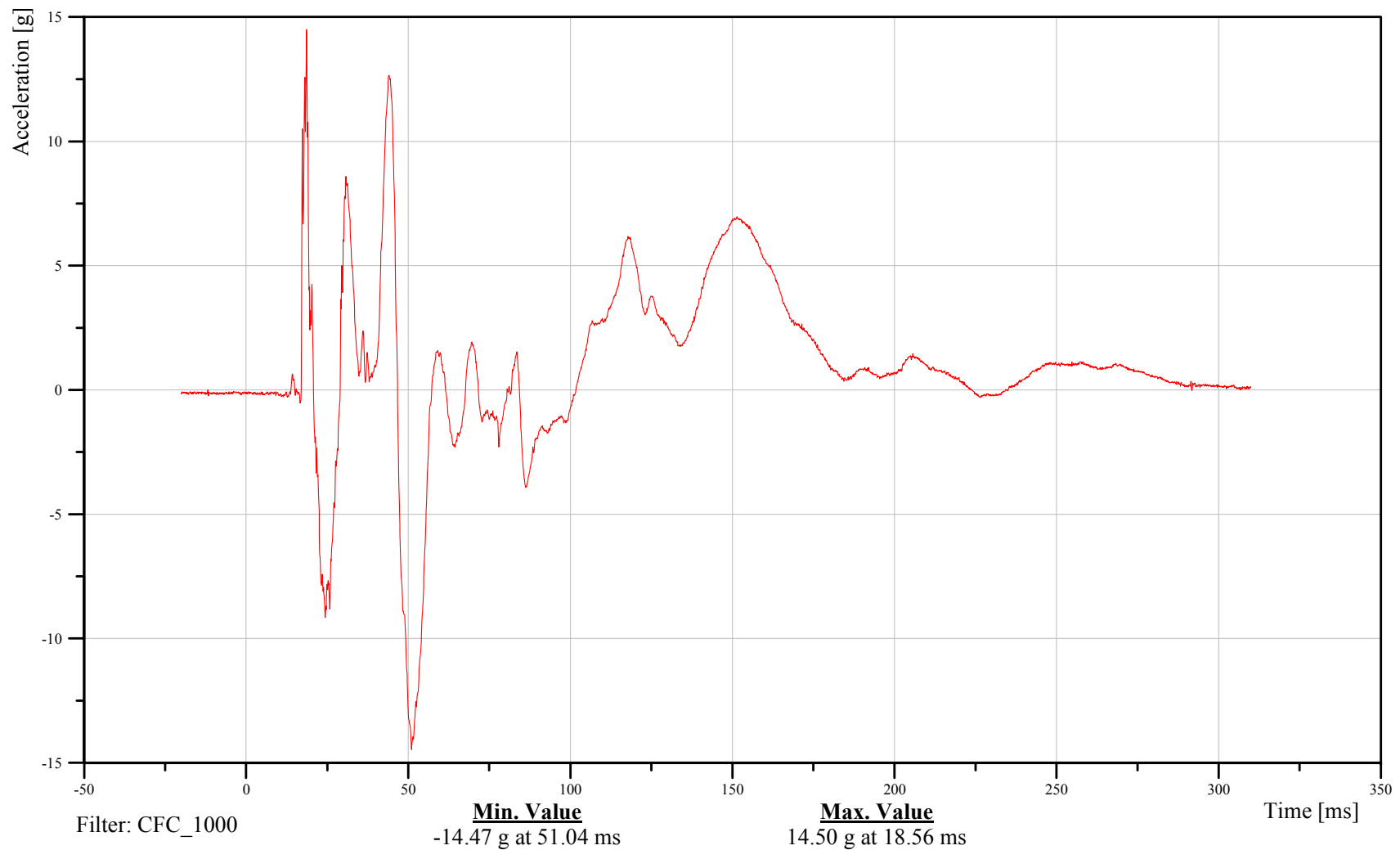
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11HEADCG00E2ACZA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head Resultant Acceleration

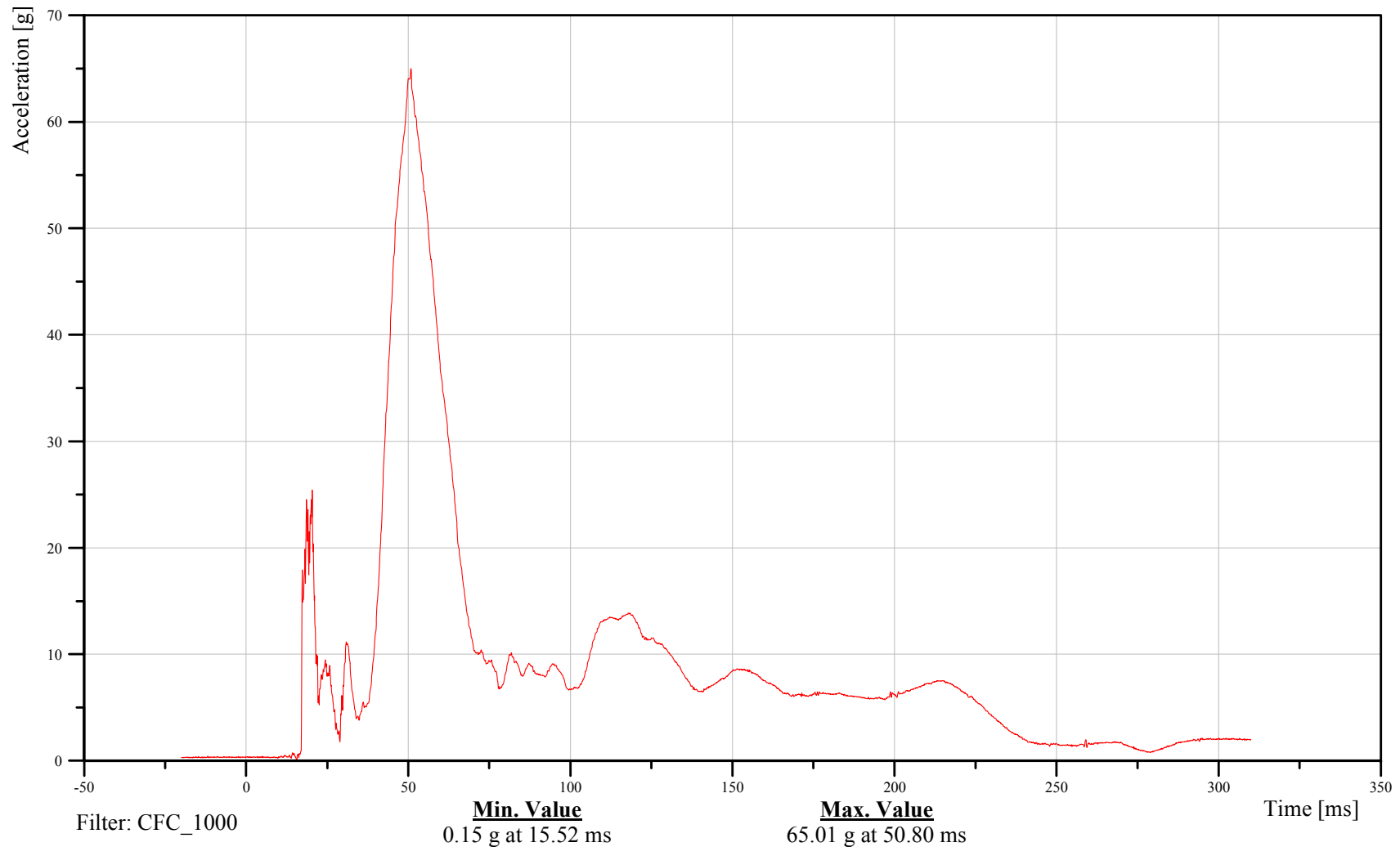
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11HEADCG00E2ACRA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head (LT) X-Axis Acceleration

Date: 10/06/2005

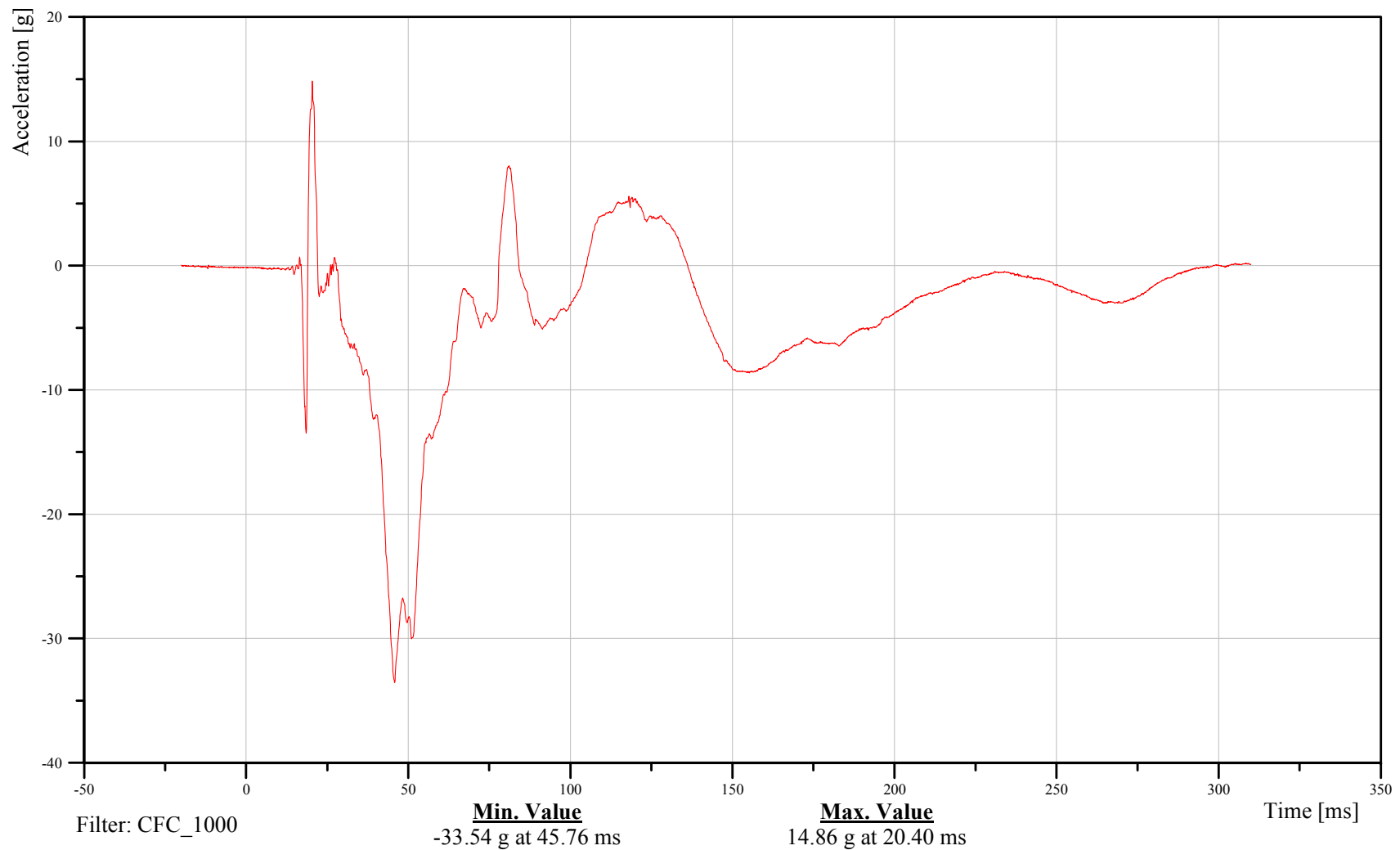
Time: 16:17

Customer: VRTC

11HEADLE00E2ACXA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head (LT) Z-Axis Acceleration

Date: 10/06/2005

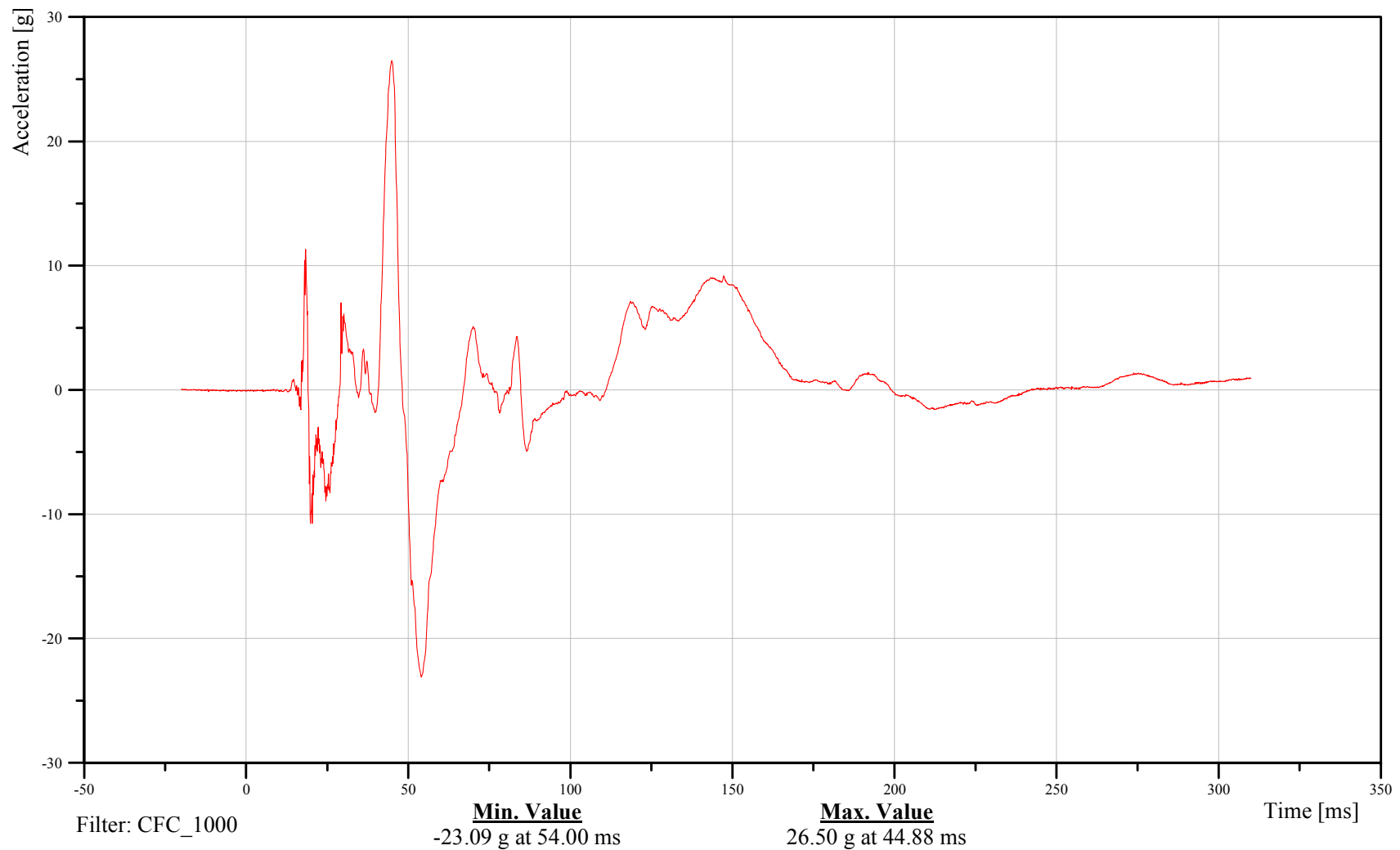
Time: 16:17

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head (FT) Y-Axis Acceleration

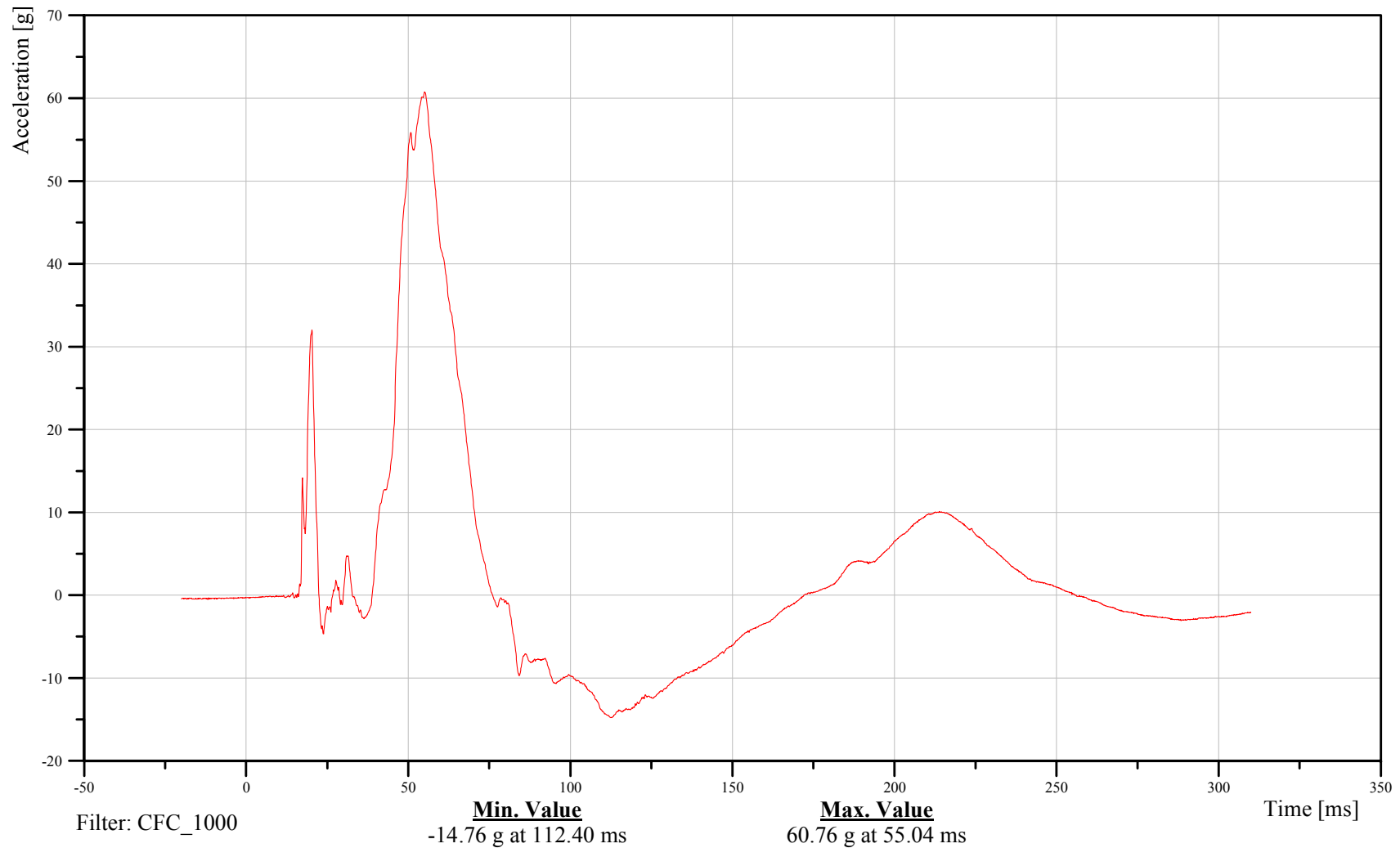
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Time: 16:17

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

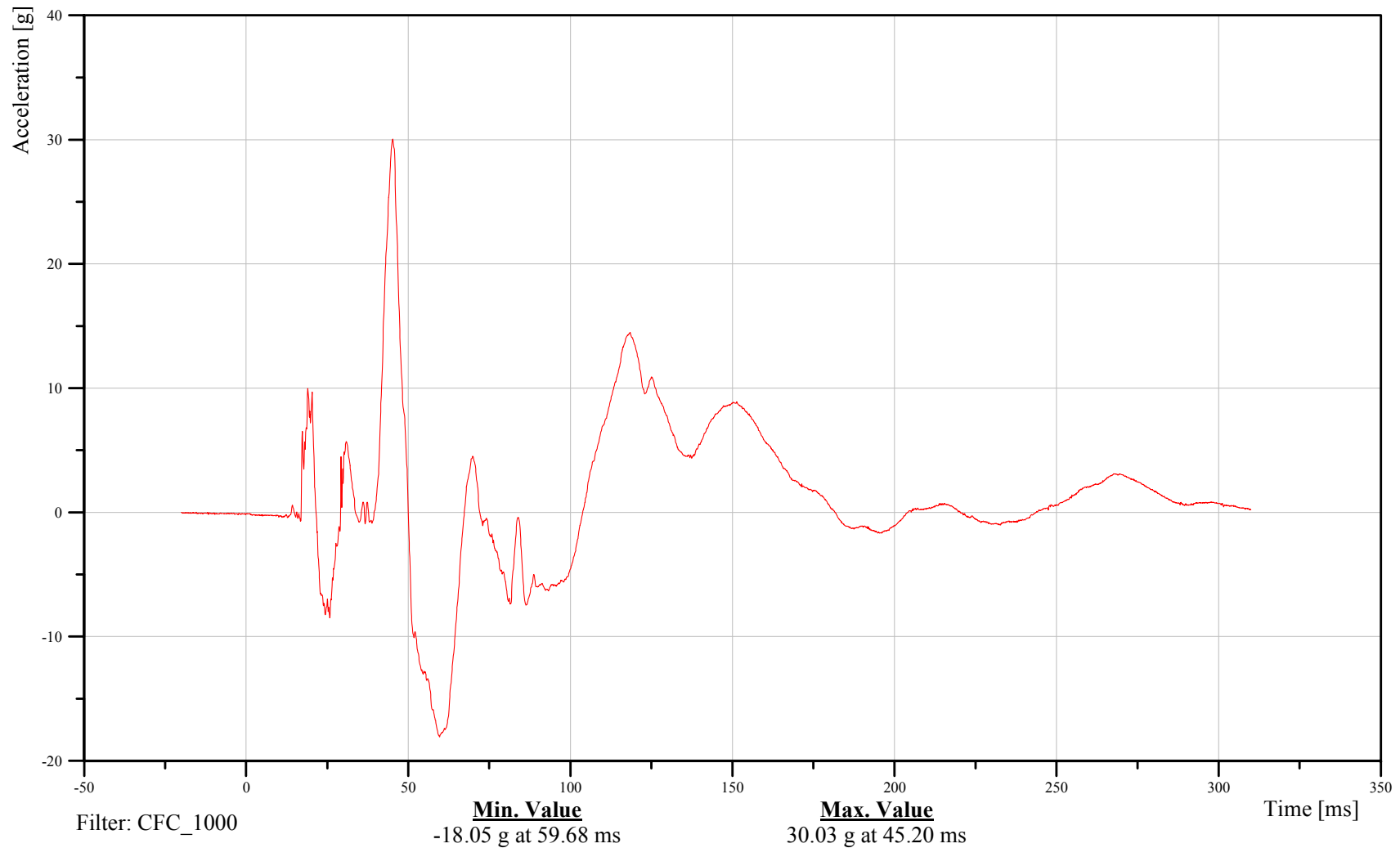
Driver Head (FT) Z-Axis Acceleration

Customer: VRTC

11HEADFR00E2ACZA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

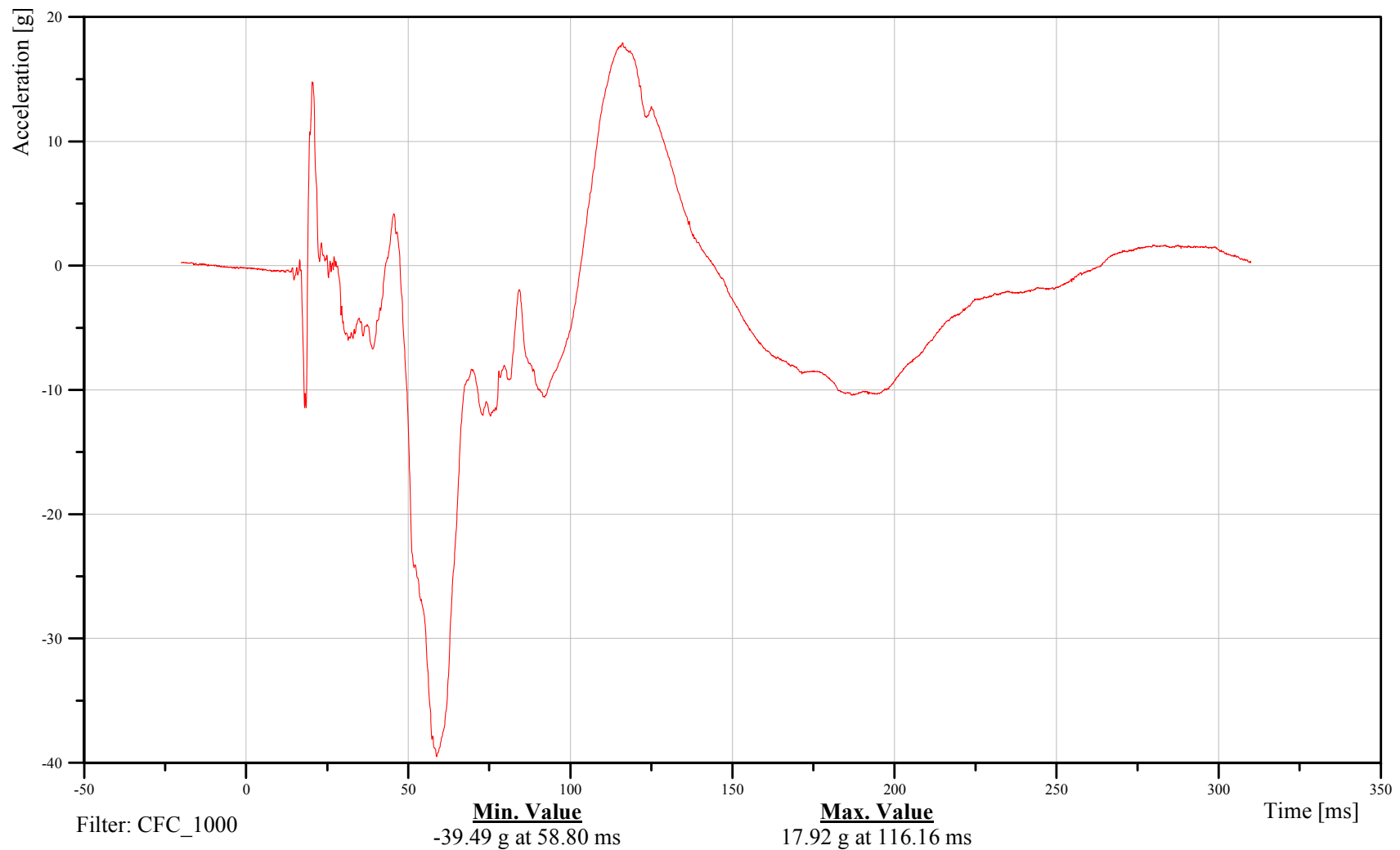
Driver Head (TP) X-Axis Acceleration

Customer: VRTC

11HEADUP00E2ACXA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Head (TP) Y-Axis Acceleration

Date: 10/06/2005

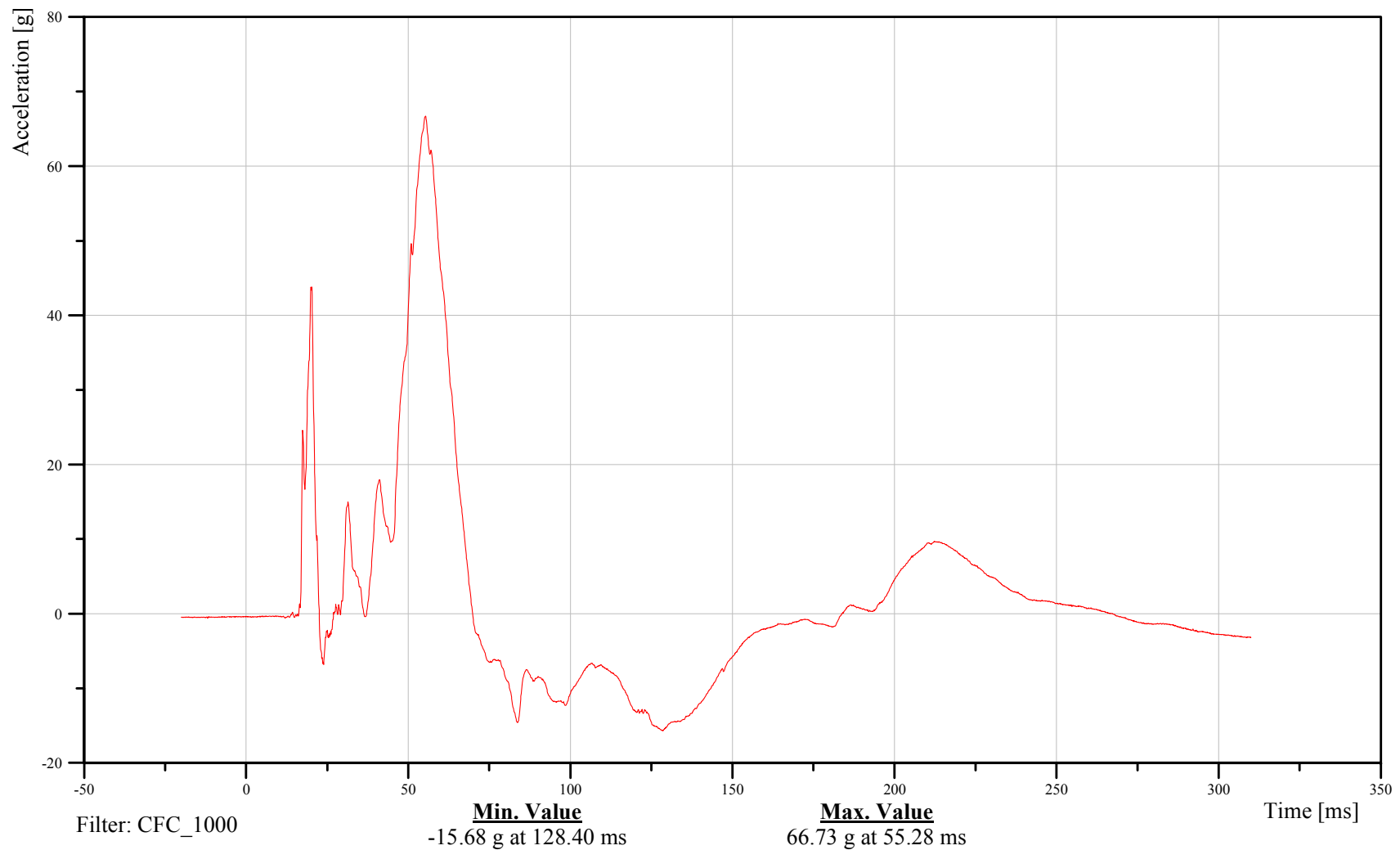
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Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Neck X-Axis Force

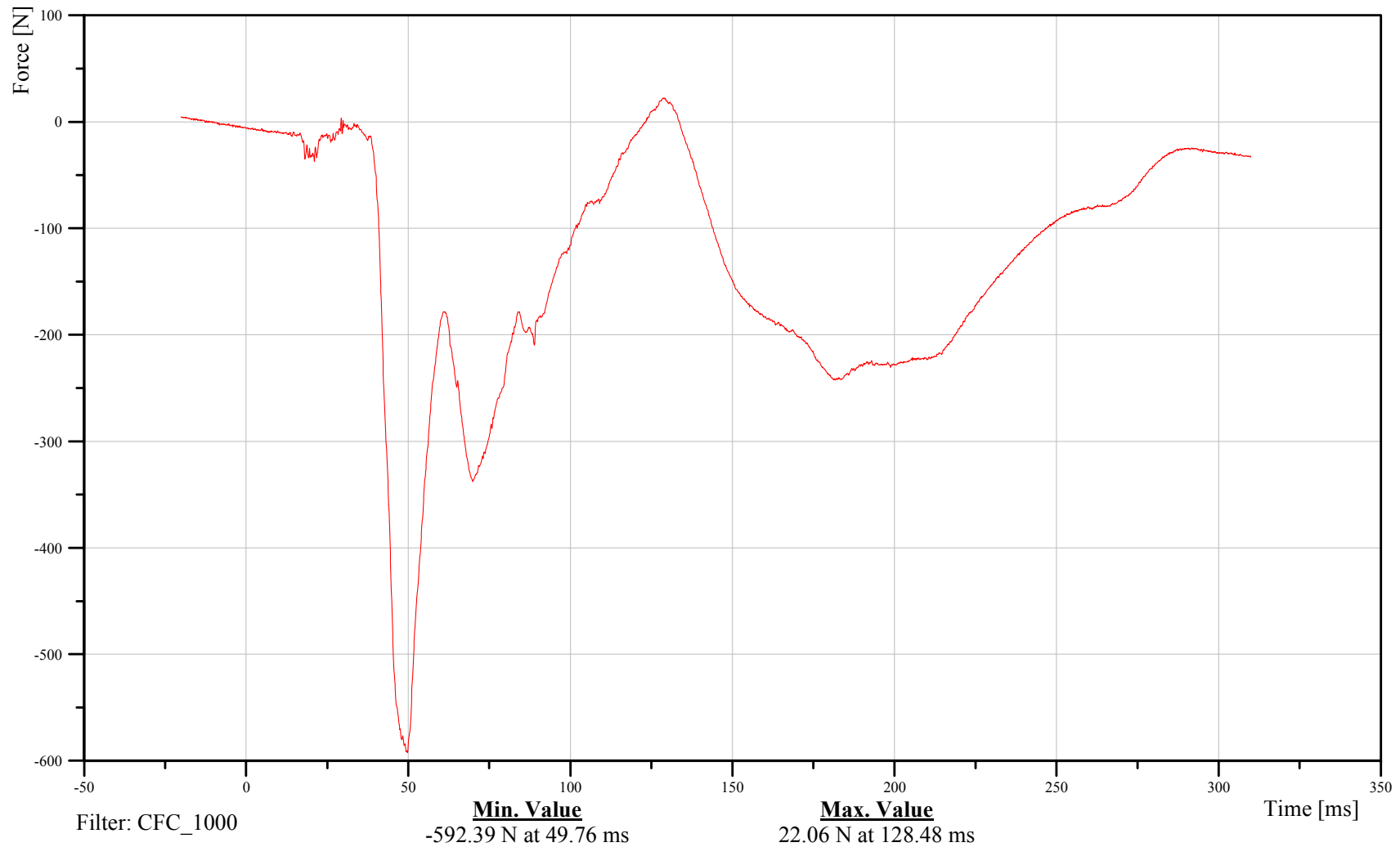
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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Neck Y-Axis Force

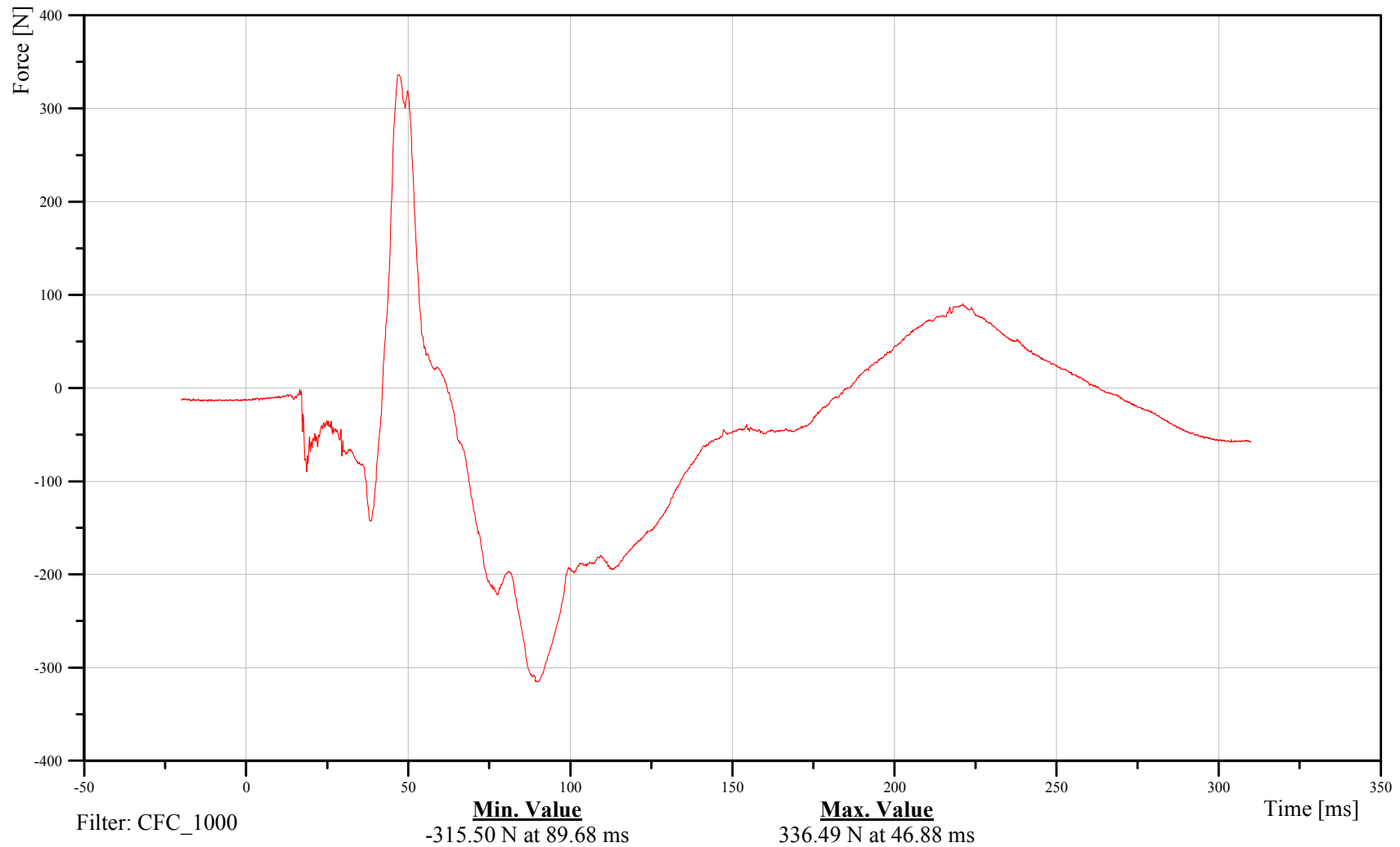
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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Neck Z-Axis Force

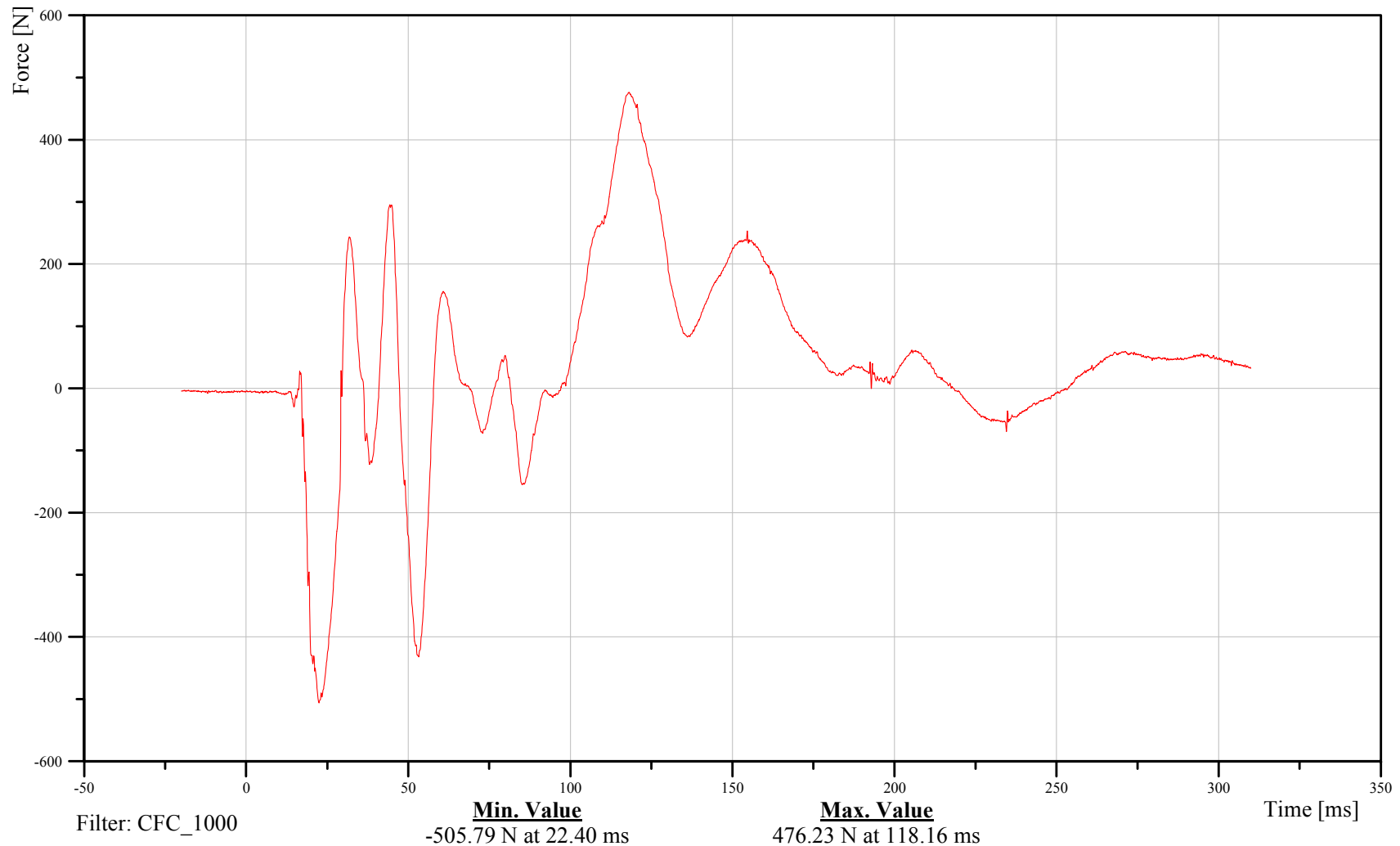
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Time: 16:17

Customer: VRTC

11NECKUP00E2FOZA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Neck Moment About X Axis

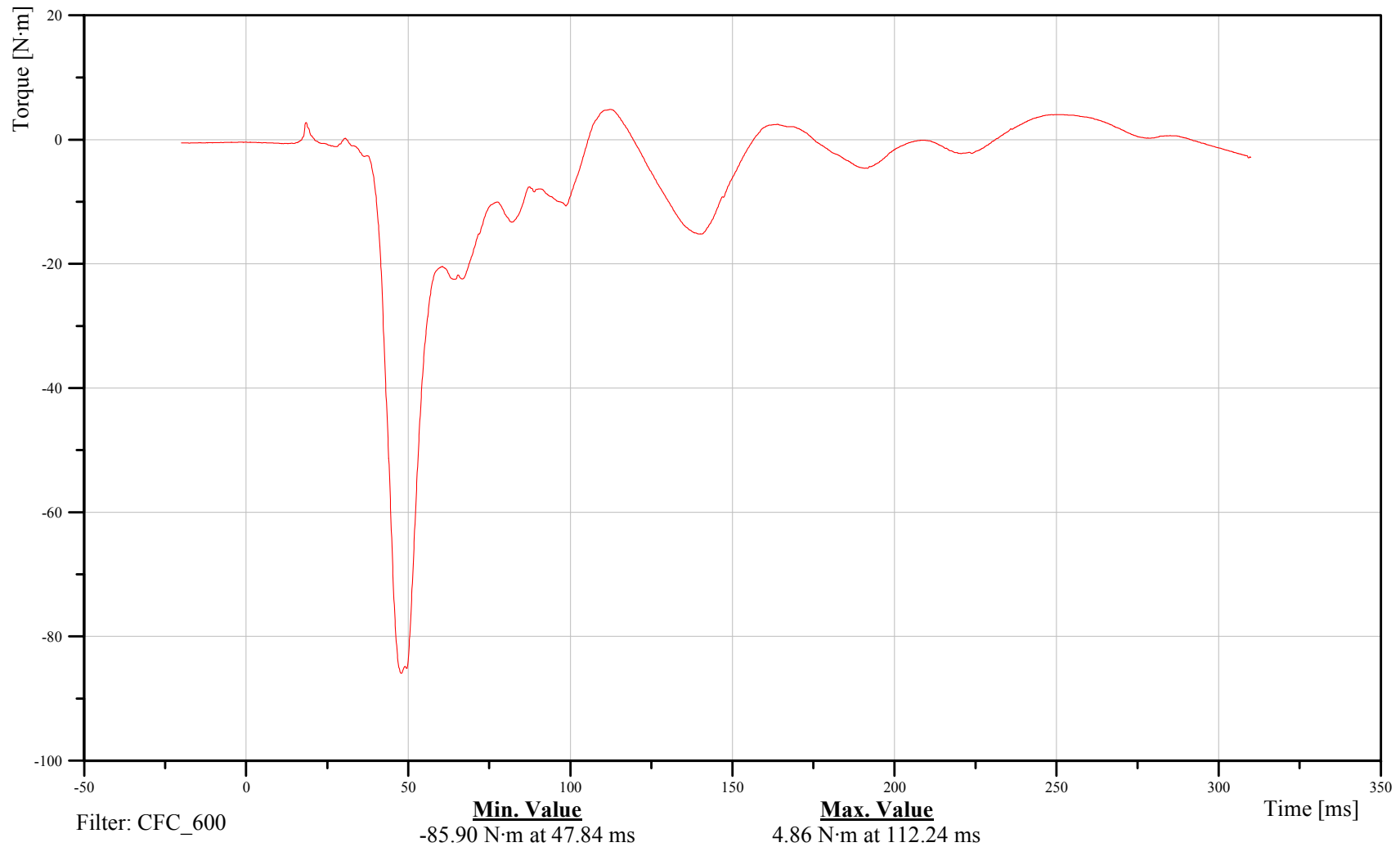
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Time: 16:17

Customer: VRTC

11NECKUP00E2MOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Neck Moment About Y Axis

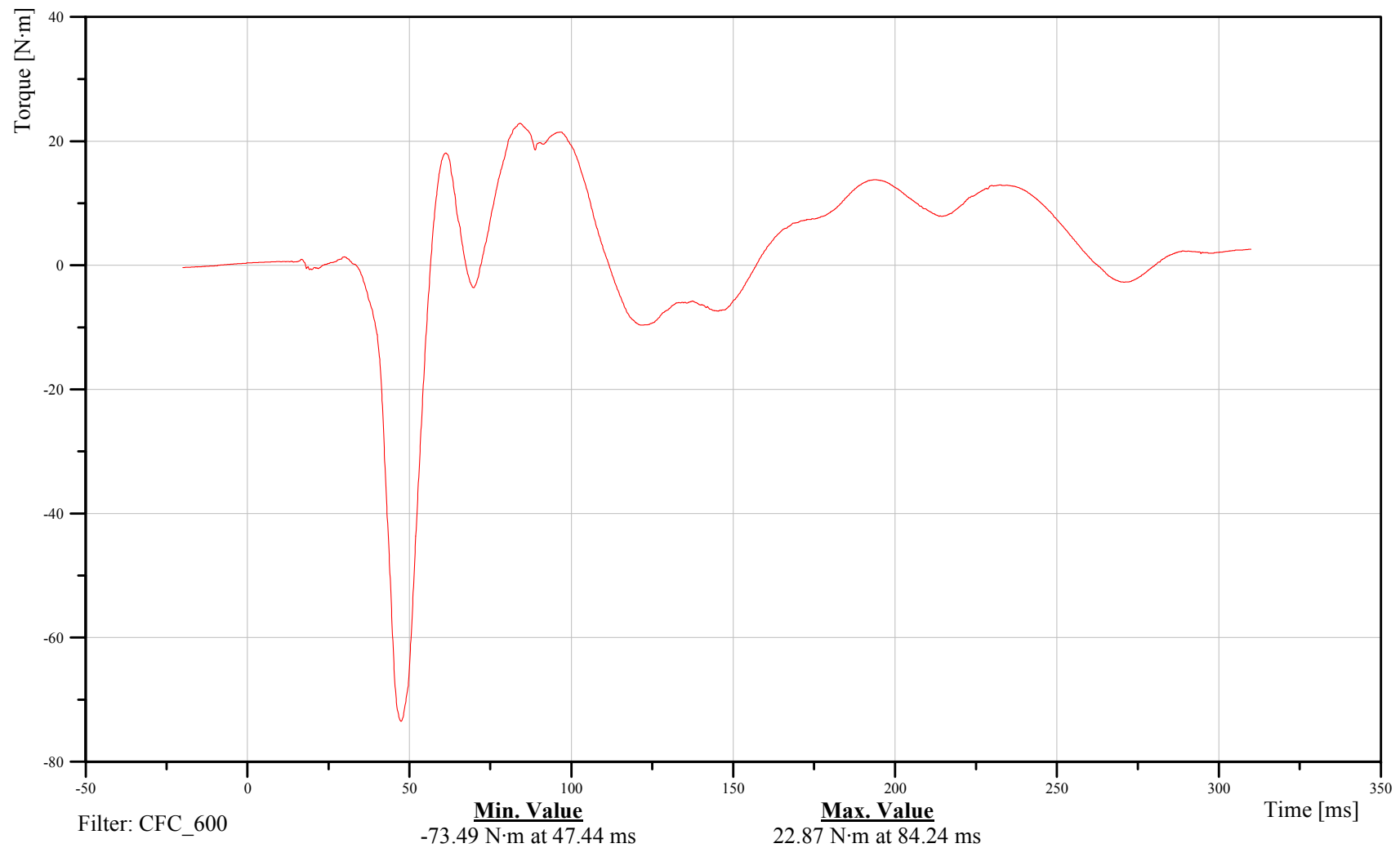
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Time: 16:17

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Neck Moment About Z Axis

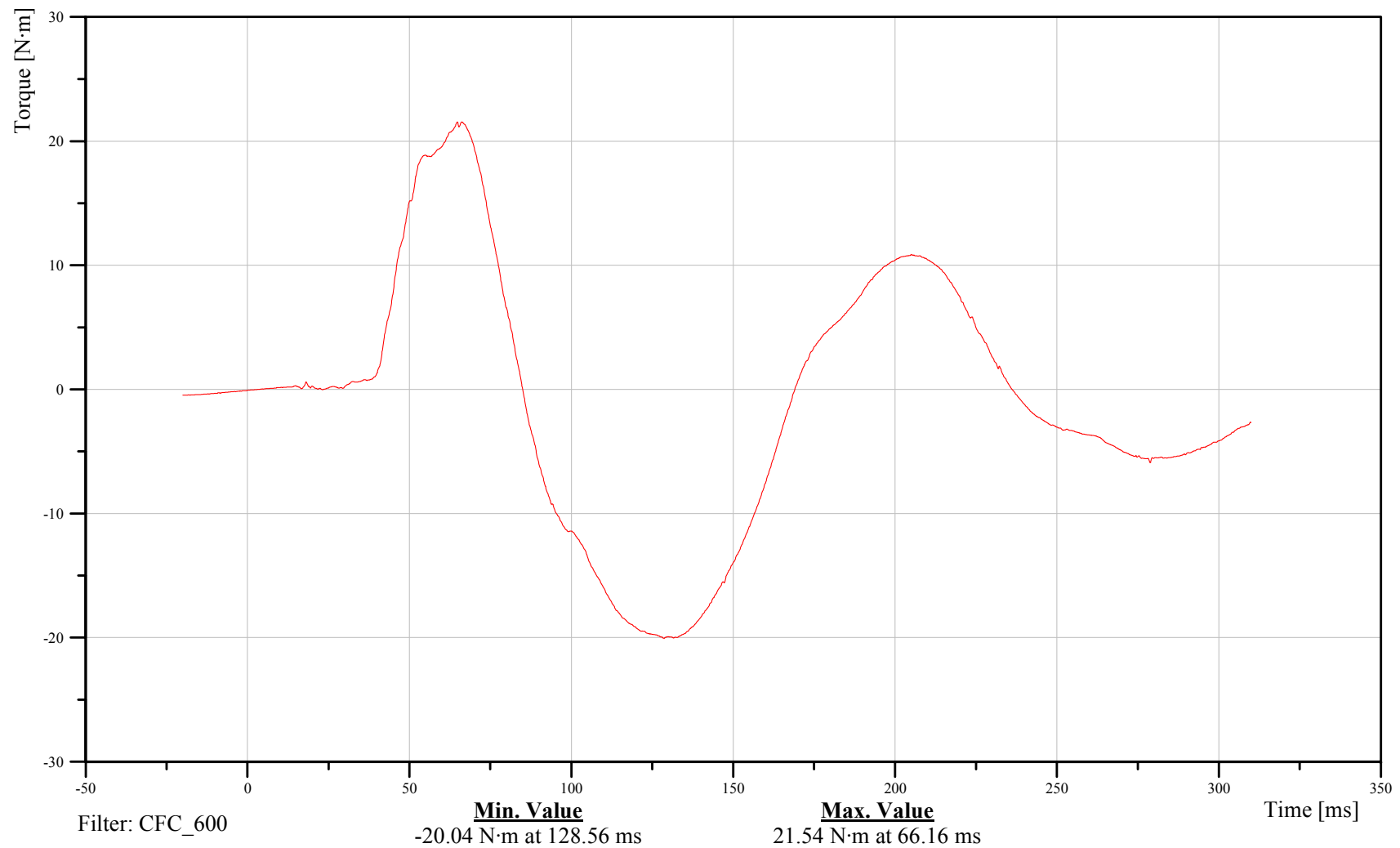
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Time: 16:17

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Neck X-Axis Force

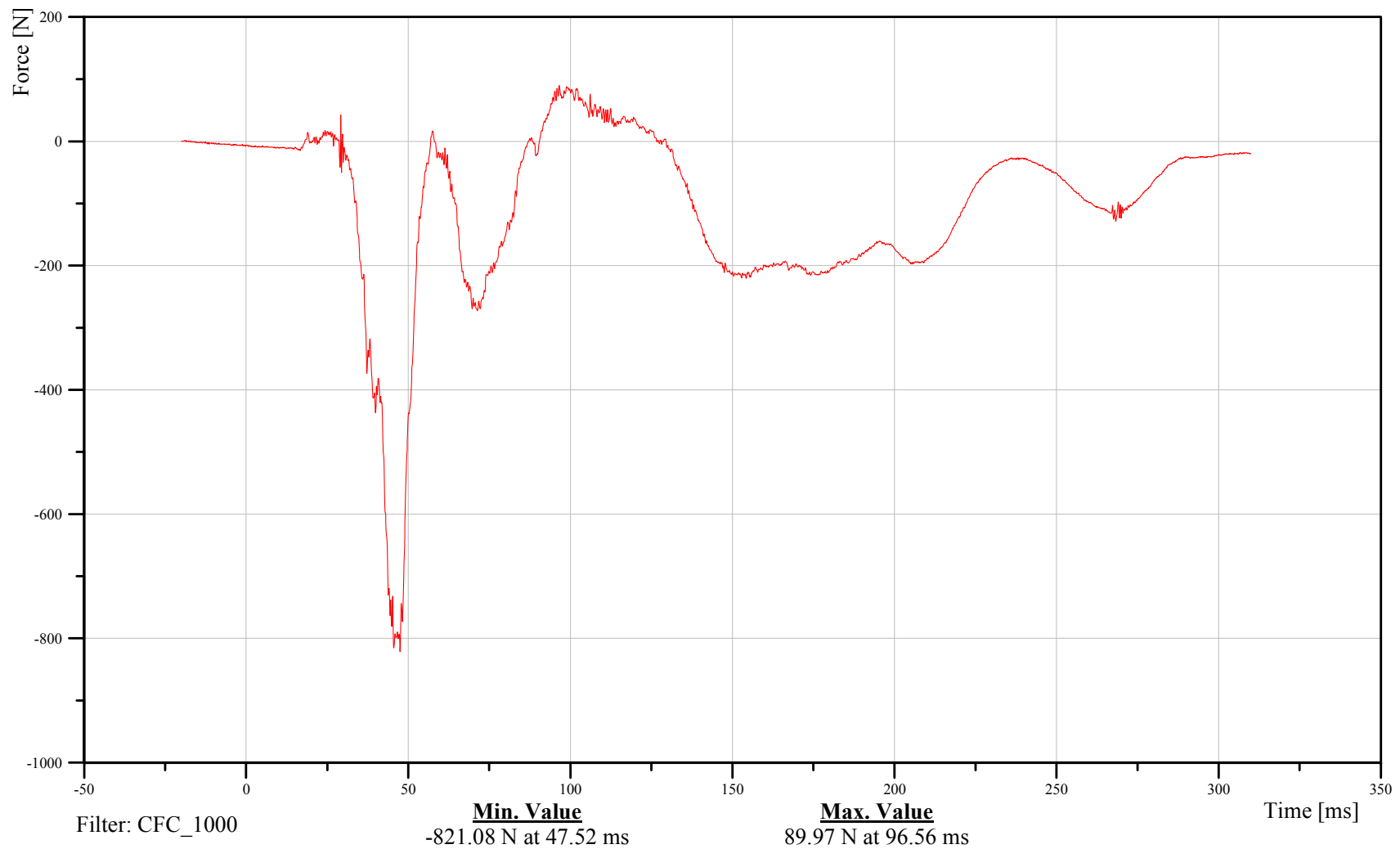
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Time: 16:17

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Neck Y-Axis Force

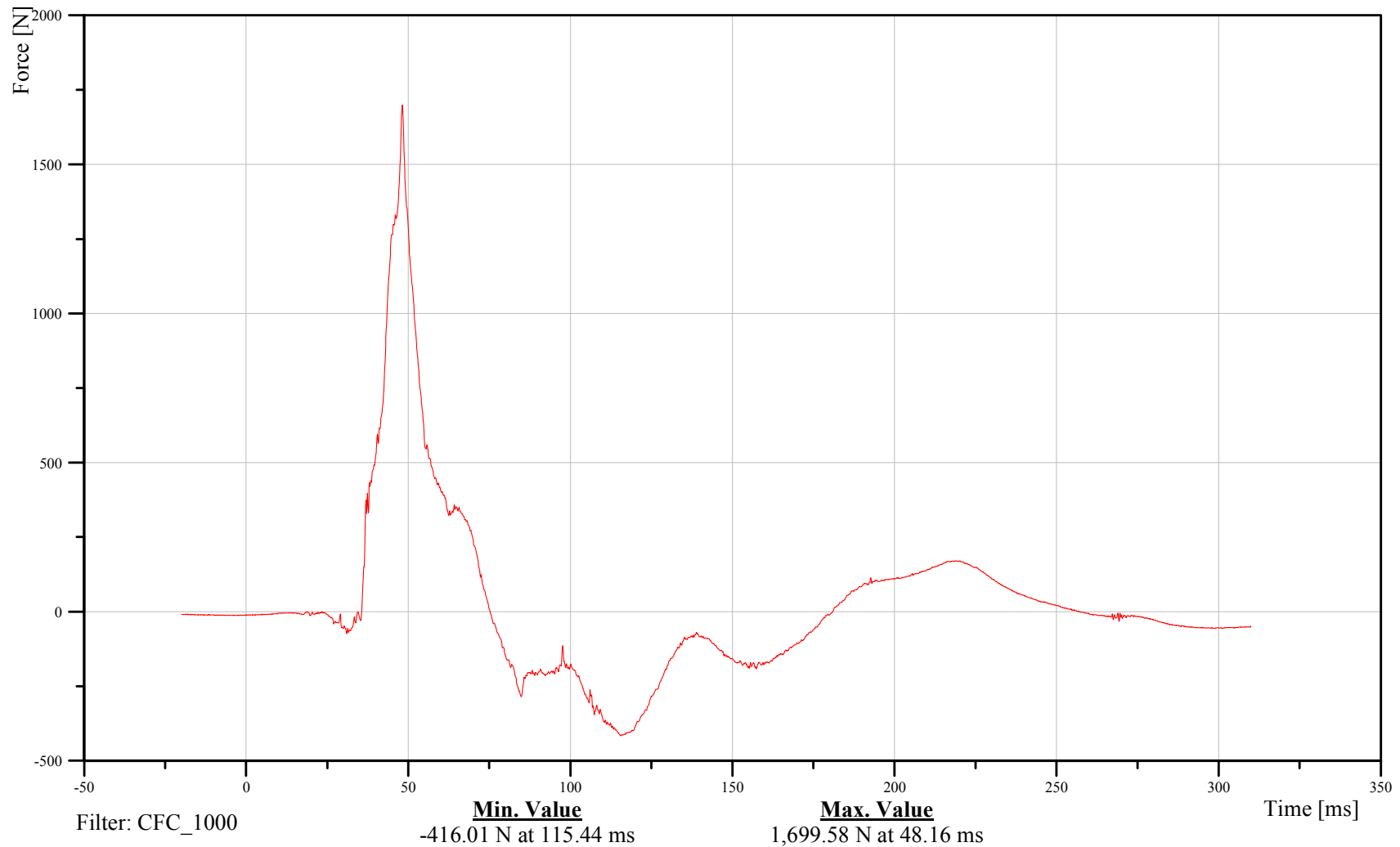
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Time: 16:17

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Neck Z-Axis Force

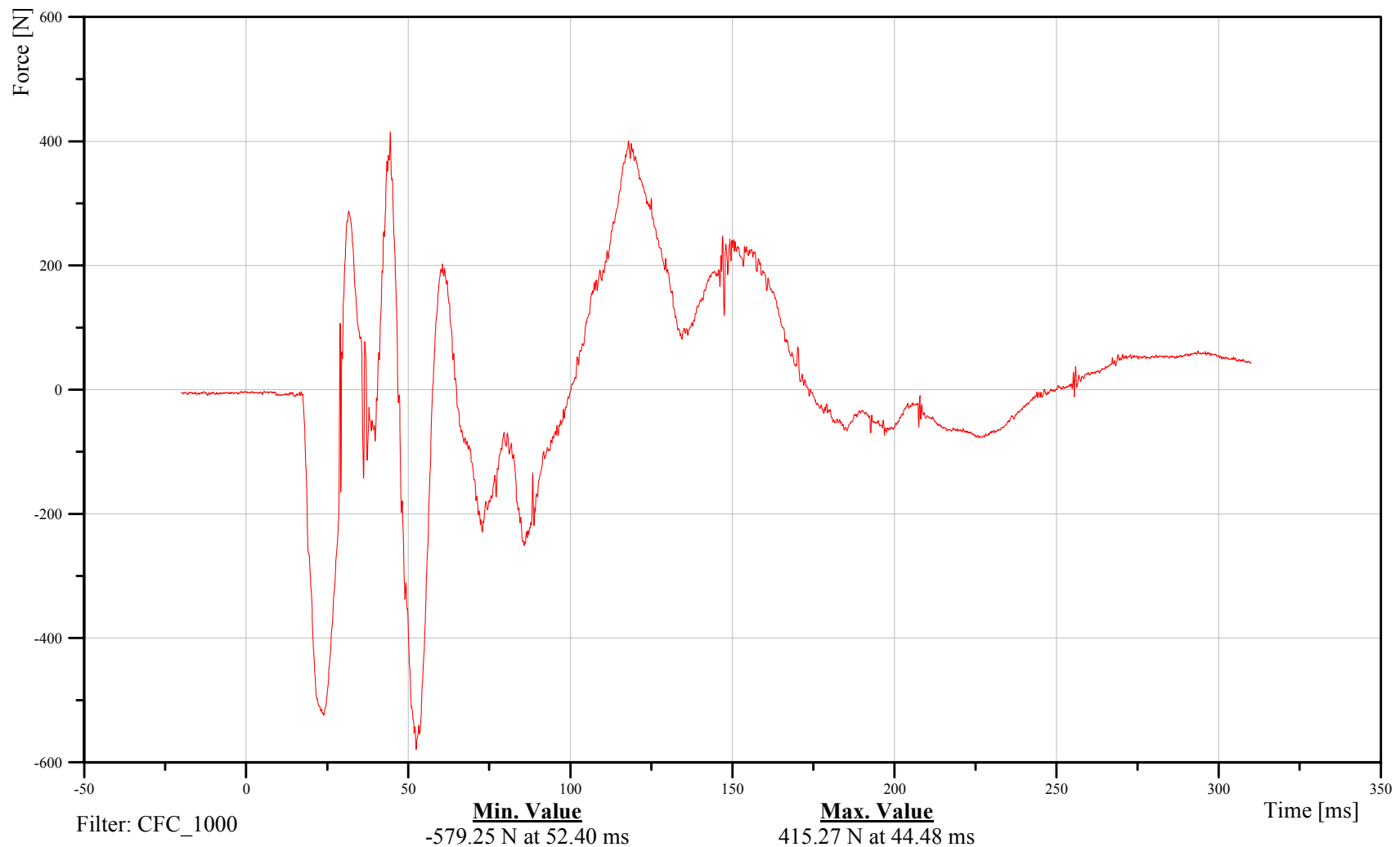
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Time: 16:17

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Neck Moment About X Axis

Date: 10/06/2005

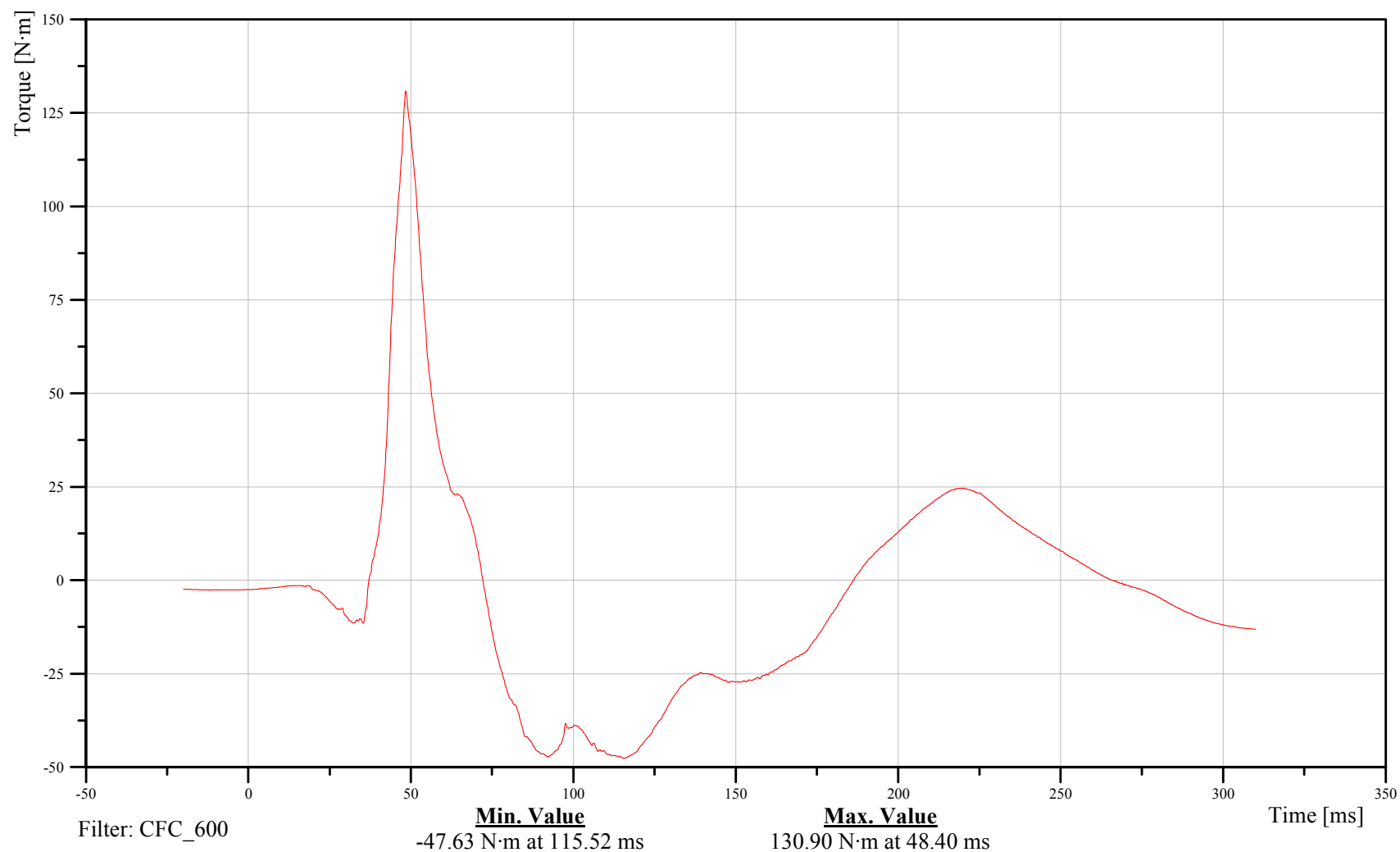
Time: 16:17

Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Neck Moment About Y Axis

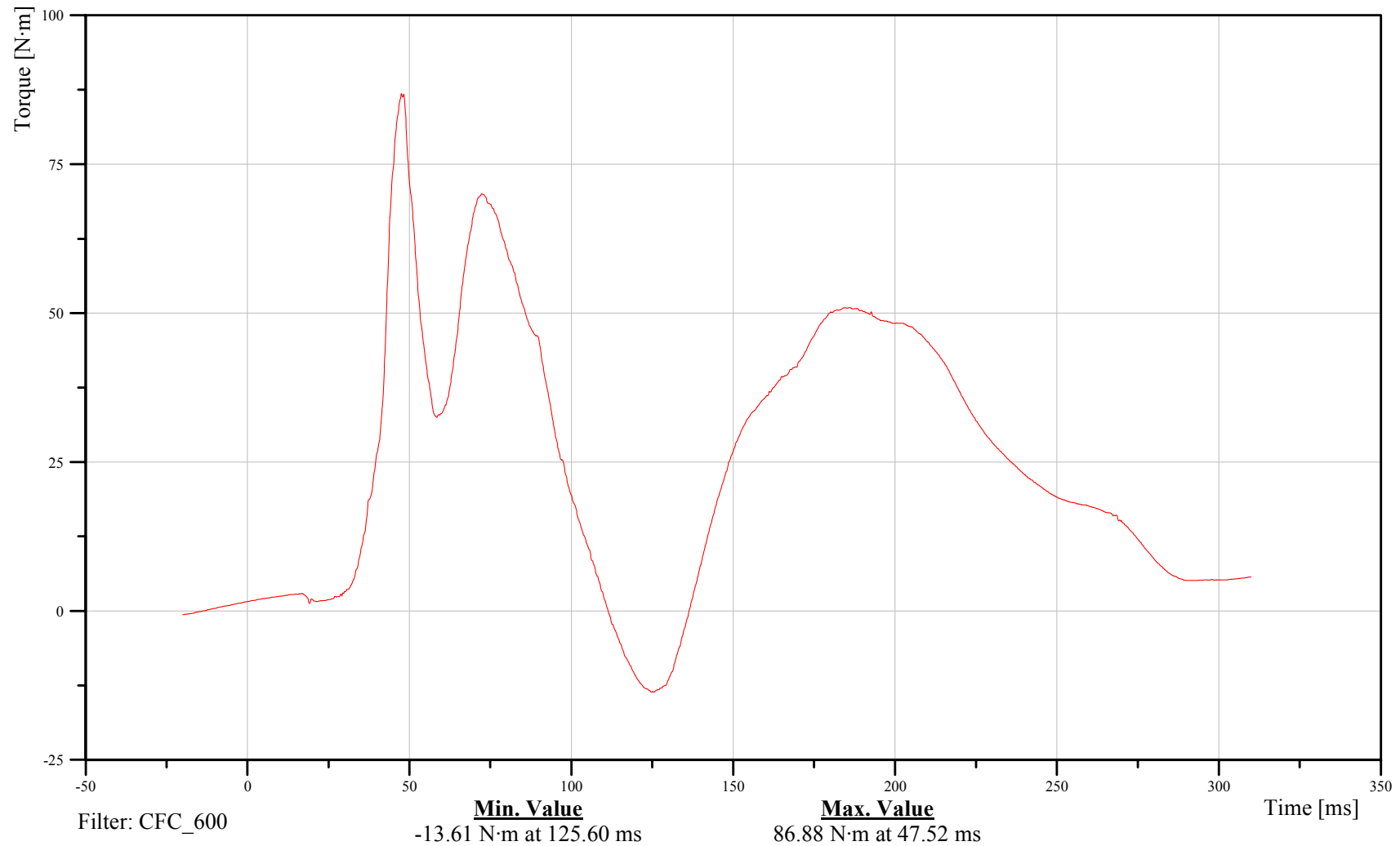
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Customer: VRTC

11NECKLO00E2MOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Neck Moment About Z Axis

Date: 10/06/2005

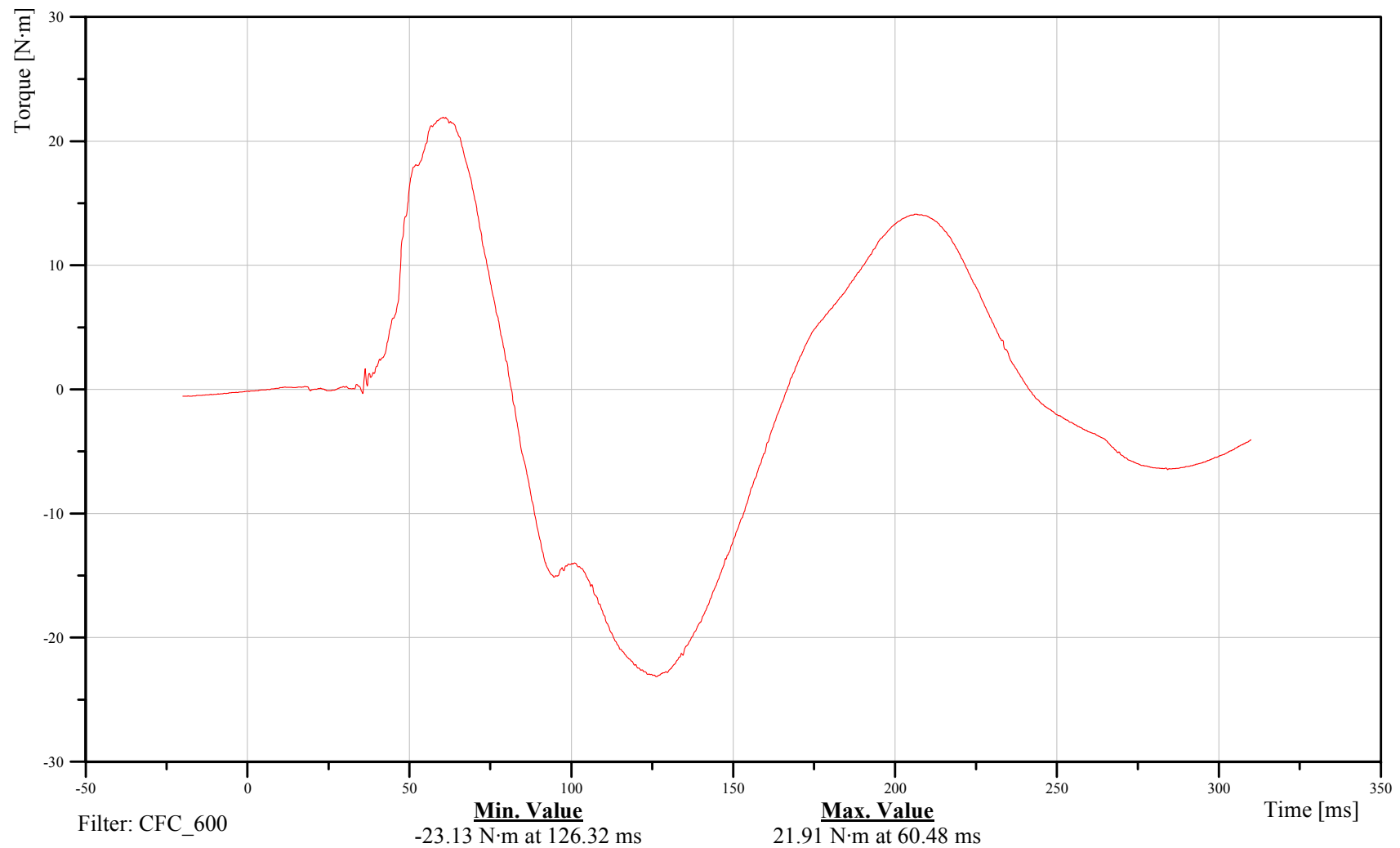
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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Shoulder X-Axis Force

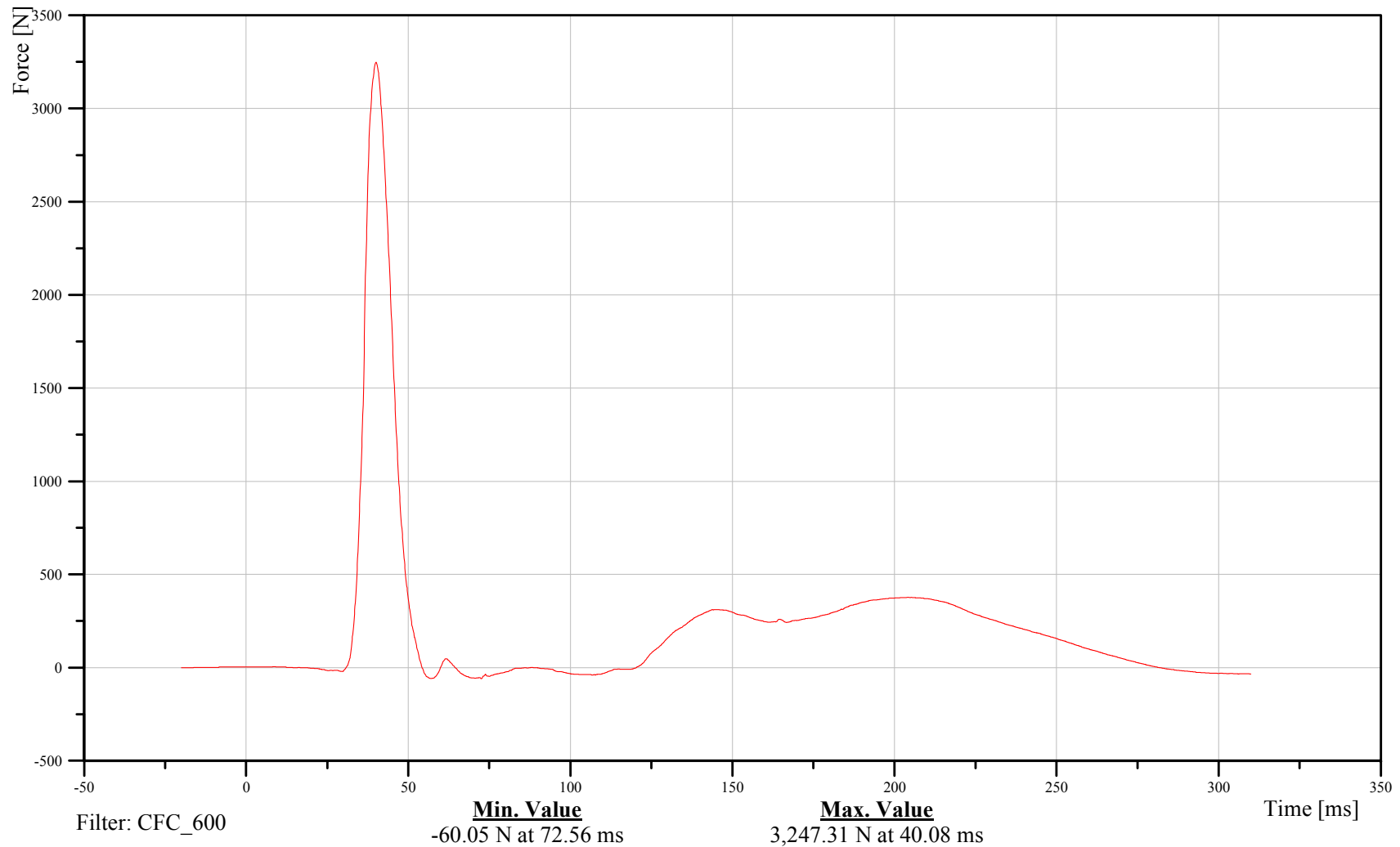
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Time: 16:17

Customer: VRTC

11SHLDLE00E2FOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Shoulder Y-Axis Force

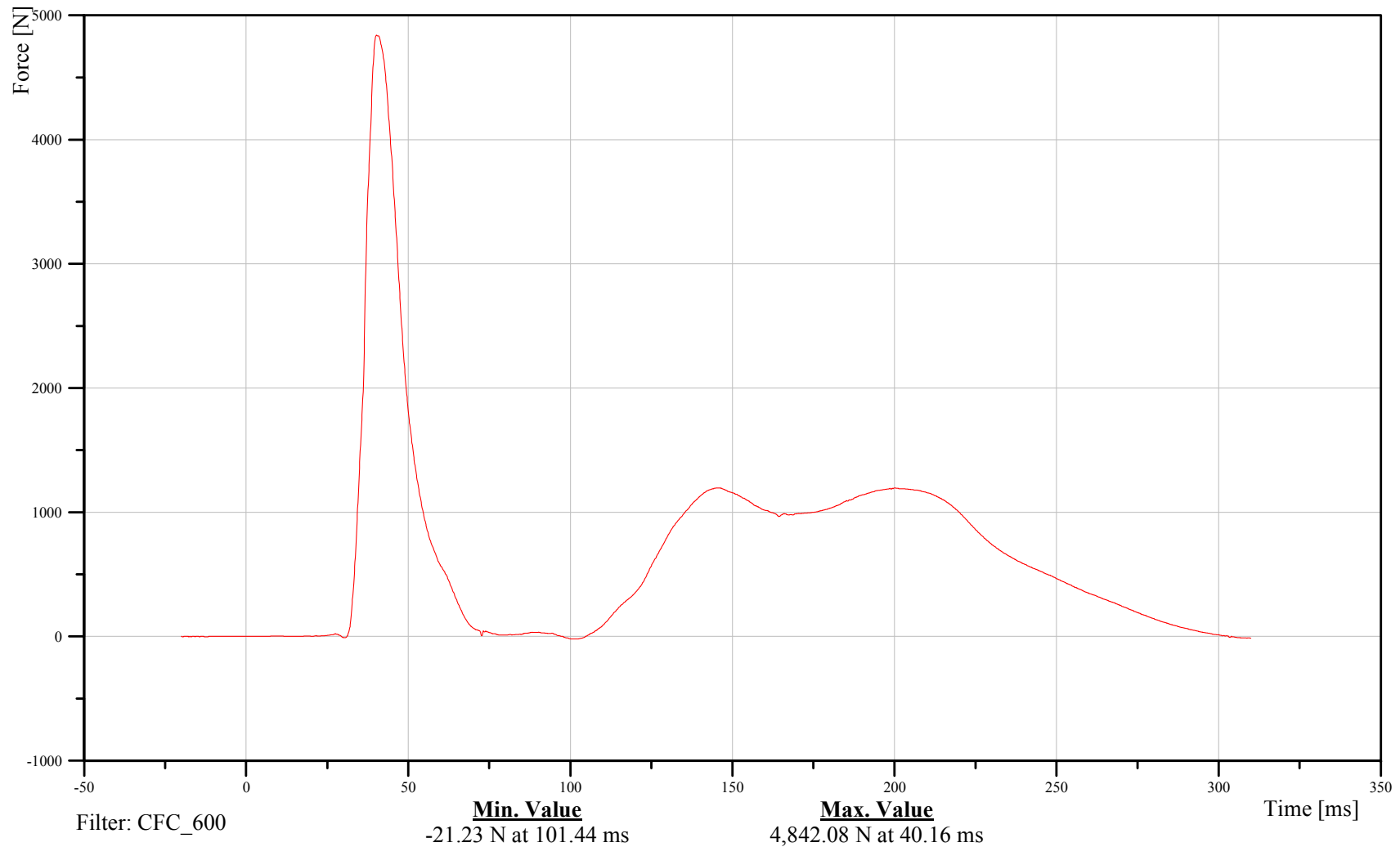
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Time: 16:17

Customer: VRTC

11SHLDLE00E2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Shoulder Z-Axis Force

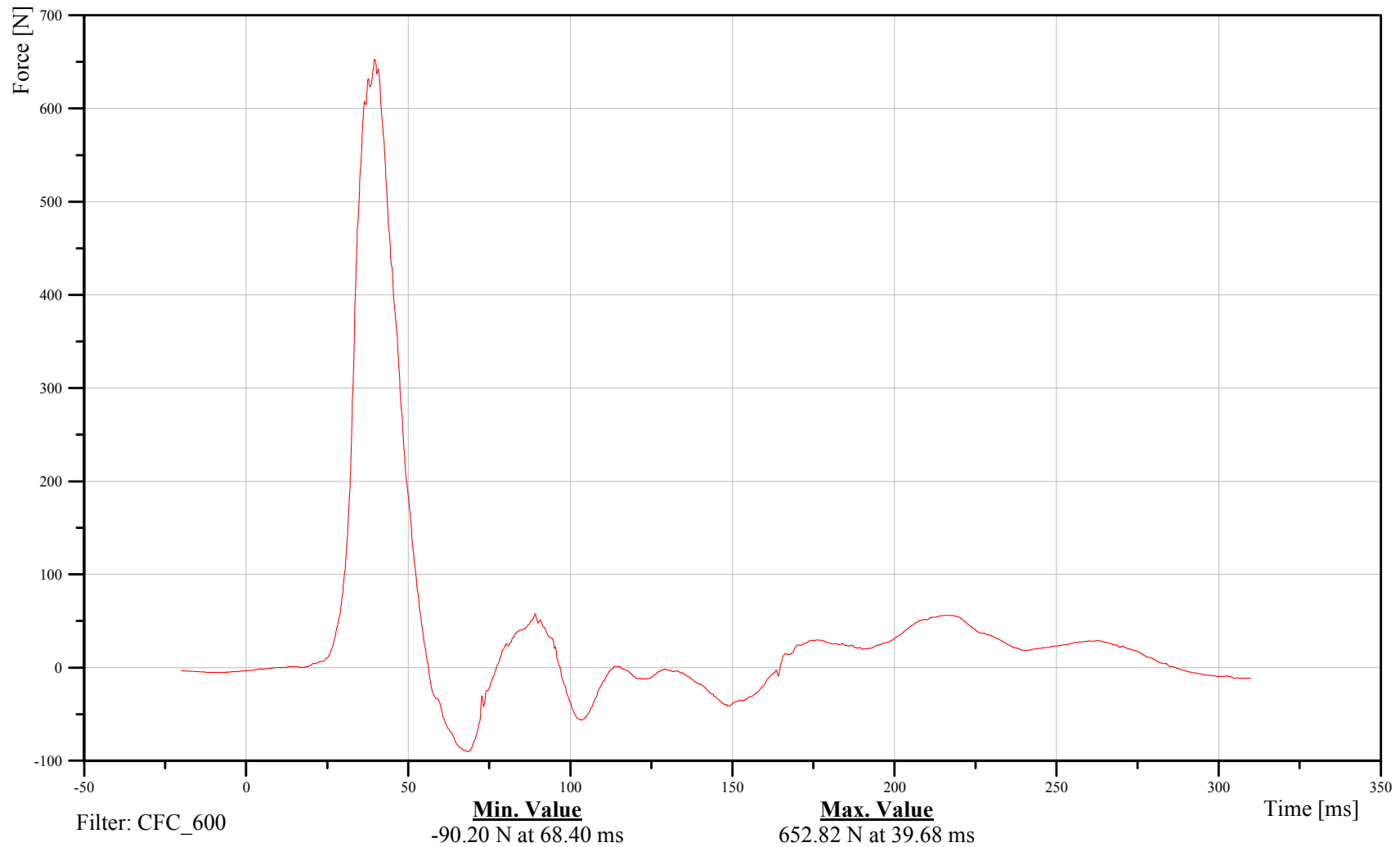
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Customer: VRTC

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TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Upper Spine X-Axis Acceleration

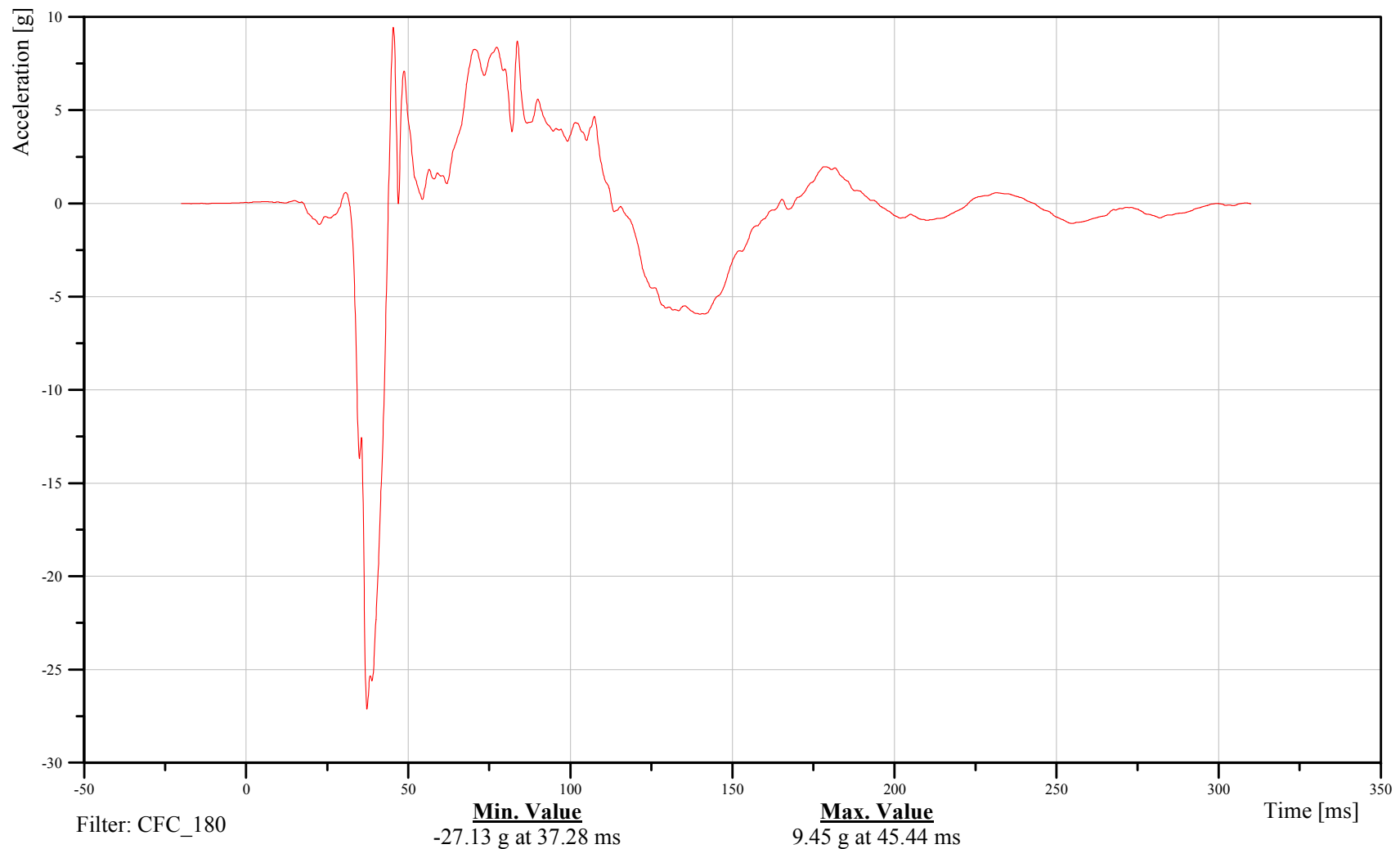
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN0100E2ACXC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Upper Spine Y-Axis Acceleration

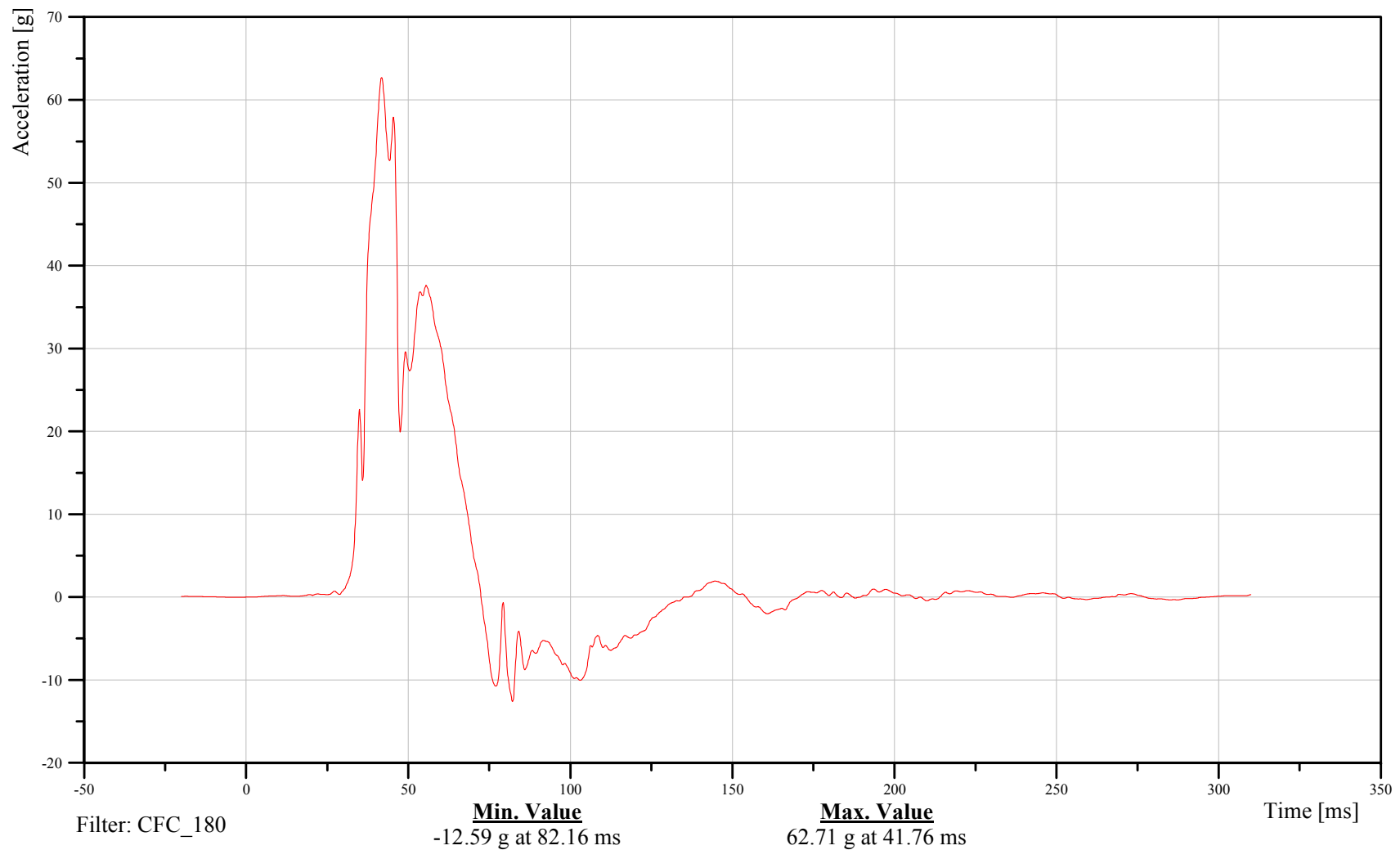
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN0100E2ACYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Upper Spine Z-Axis Acceleration

Date: 10/06/2005

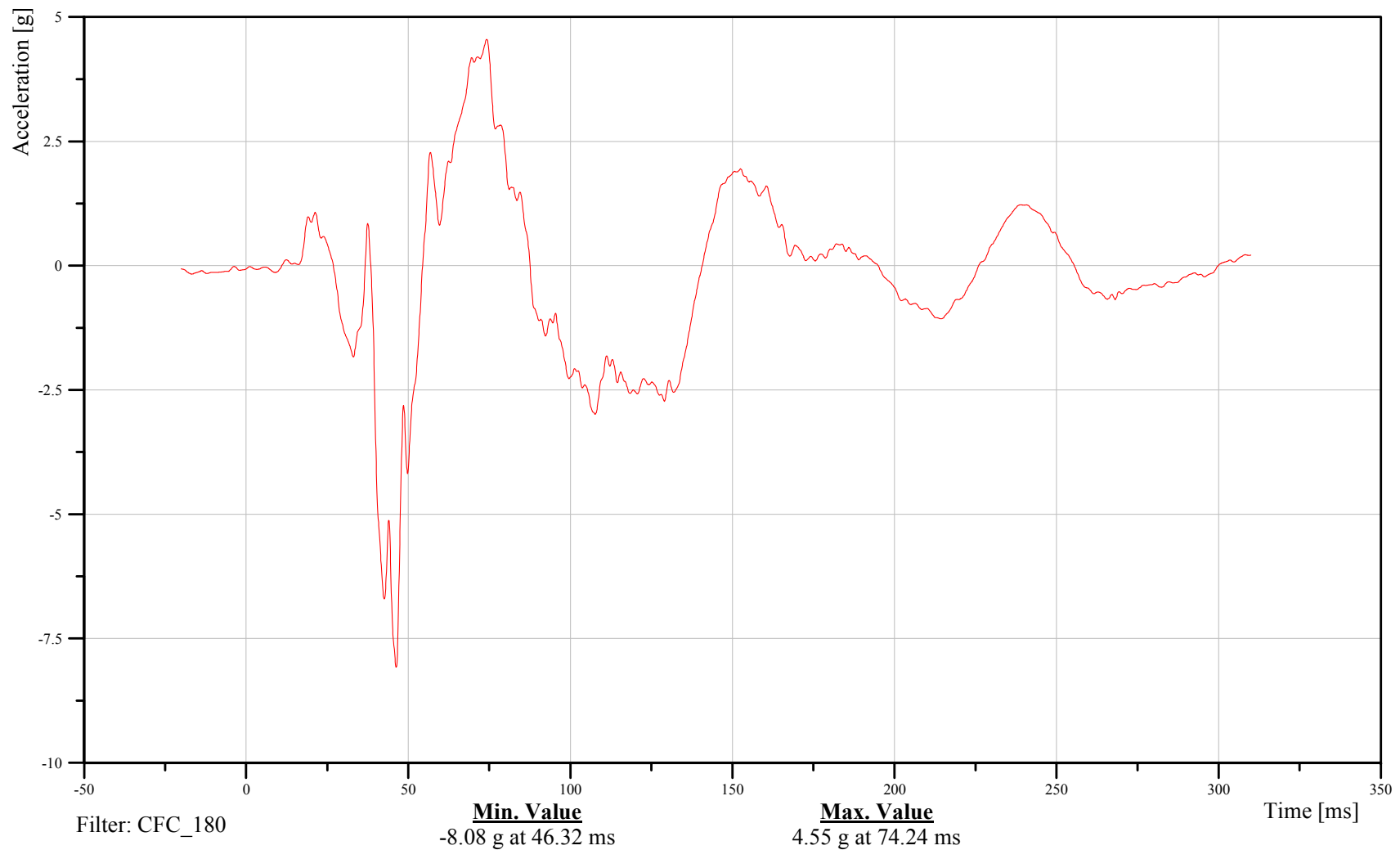
Time: 16:17

Customer: VRTC

11SPIN0100E2ACZC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

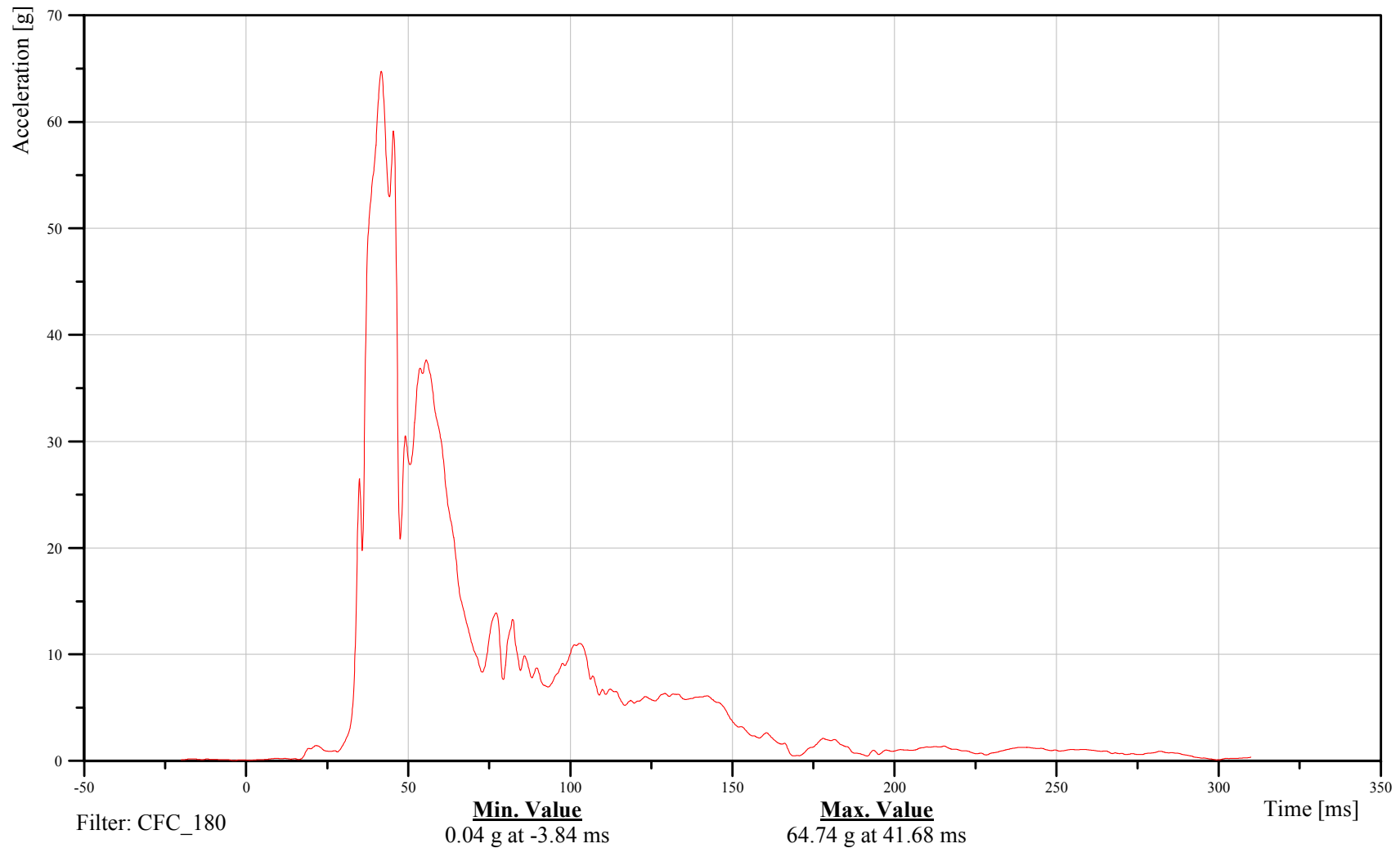
Driver Upper Spine Resultant Acceleration

Customer: VRTC

11SPIN0100E2ACRC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

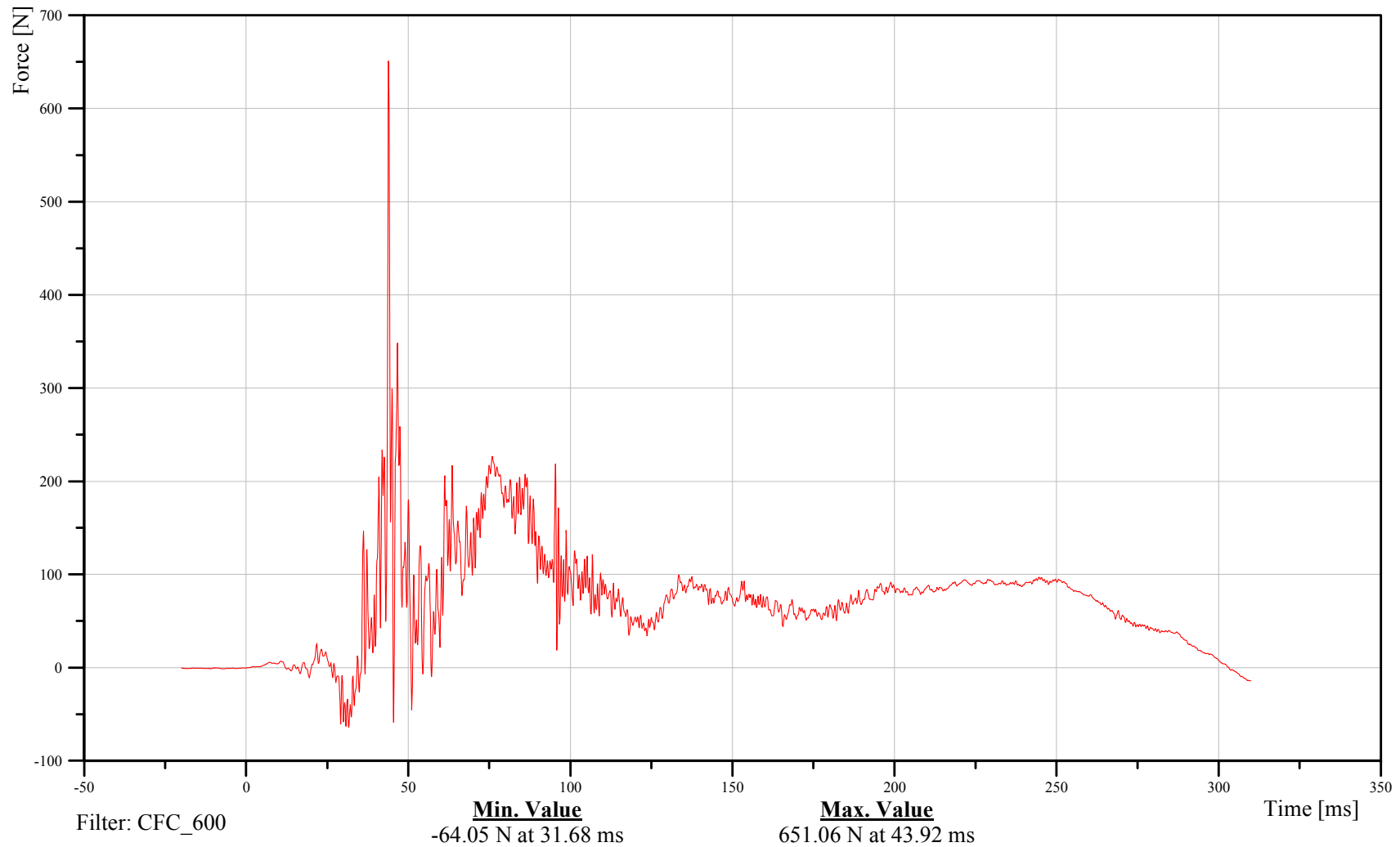
Driver Torso Back Plate X-Axis Force

Customer: VRTC

11BAPL0000E2FOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

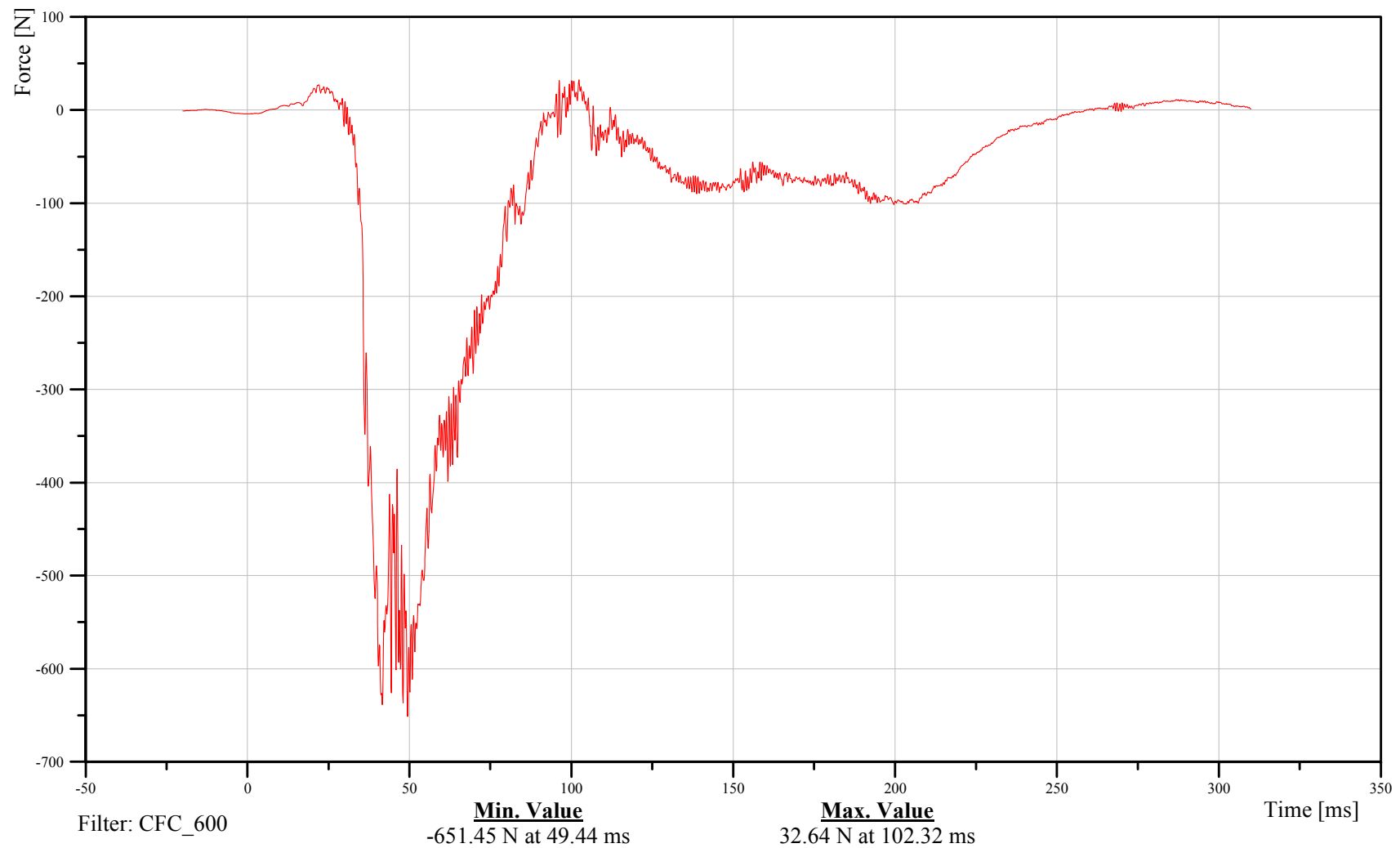
Driver Torso Back Plate Y-Axis Force

Customer: VRTC

11BAPL0000E2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Torso Back Plate Moment About Y Axis

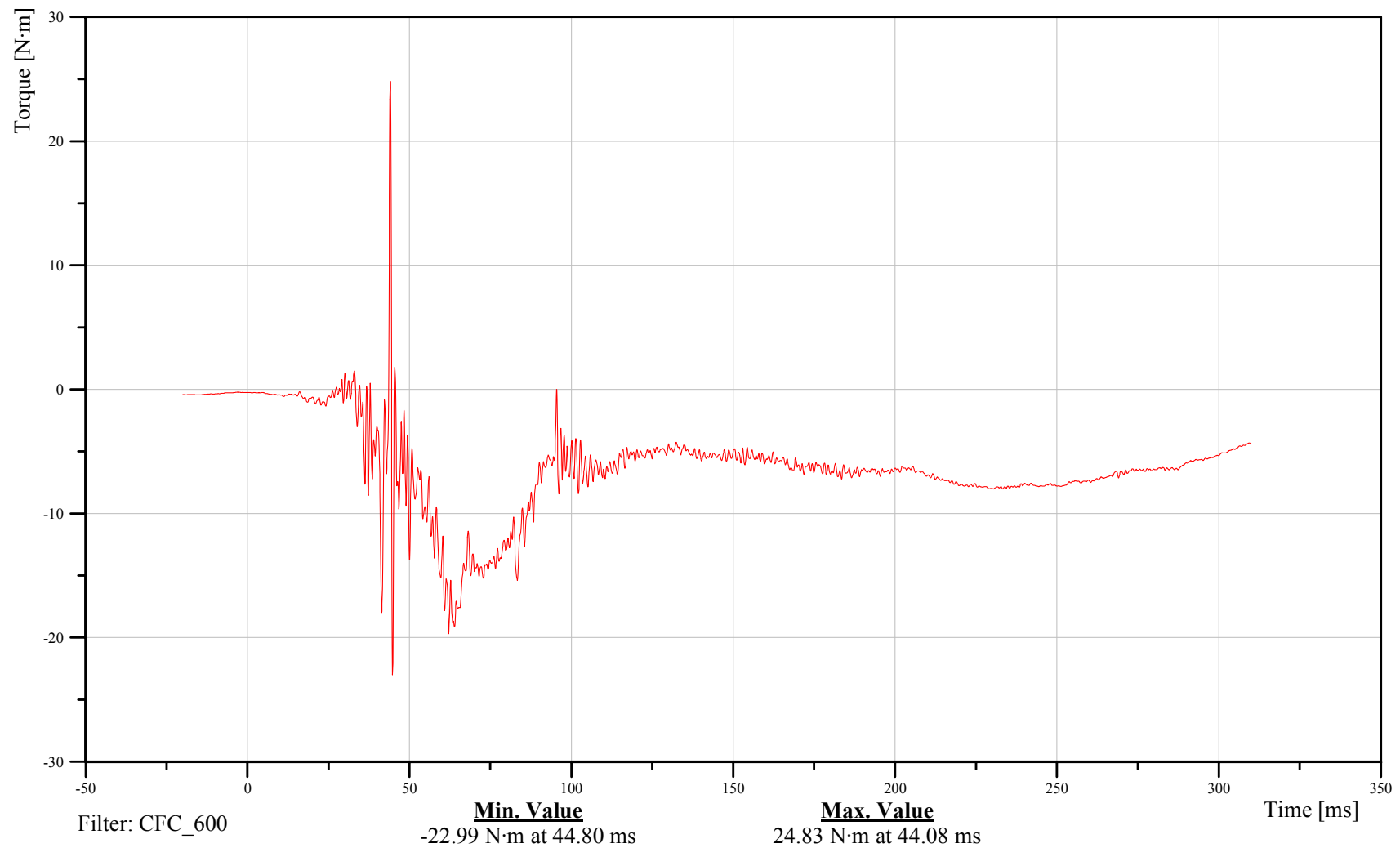
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11BAPL0000E2MOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Torso Back Plate Moment About Z Axis

Date: 10/06/2005

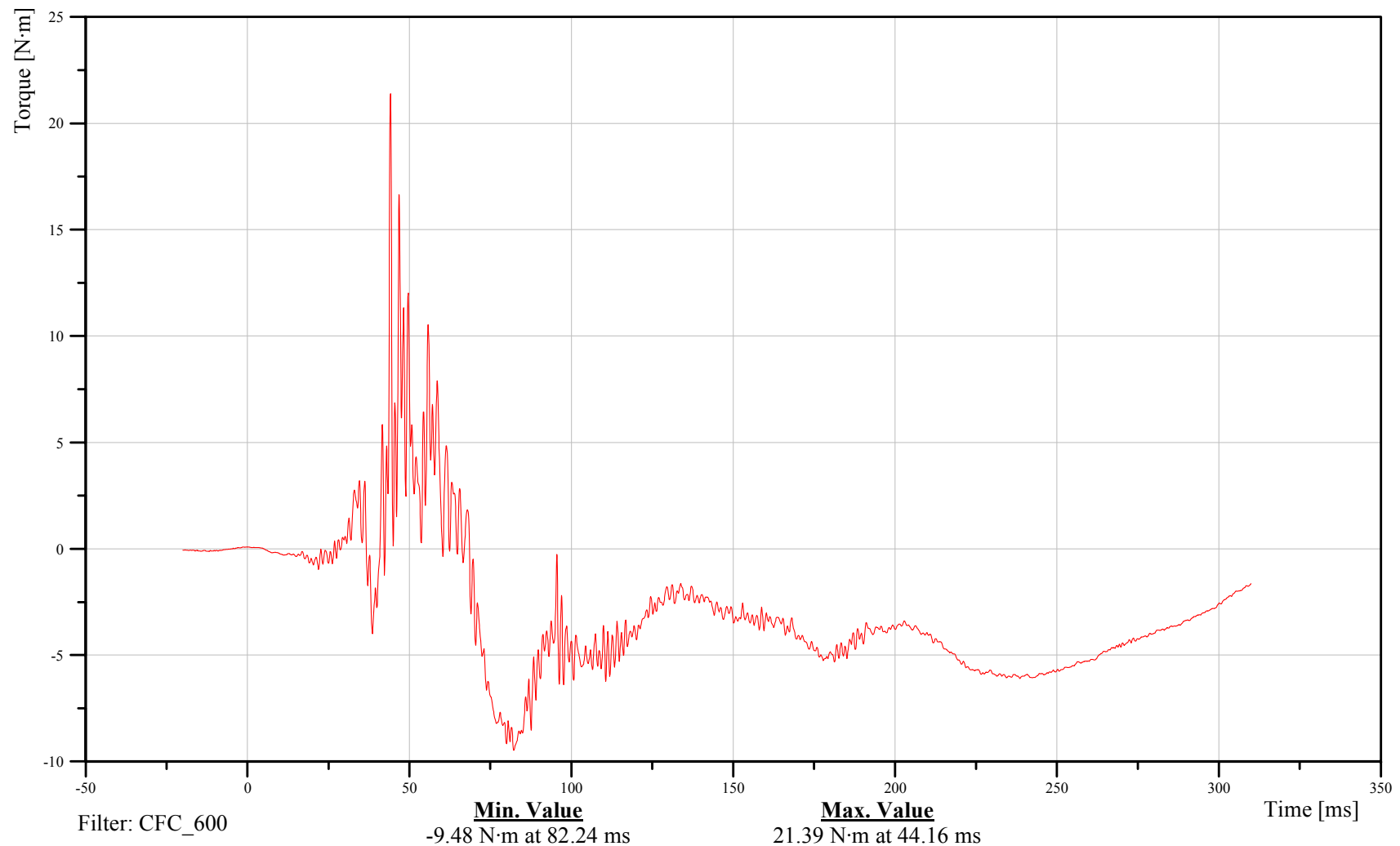
Time: 16:17

Customer: VRTC

11BAPL0000E2MOZB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Upper Rib Y-Axis Acceleration

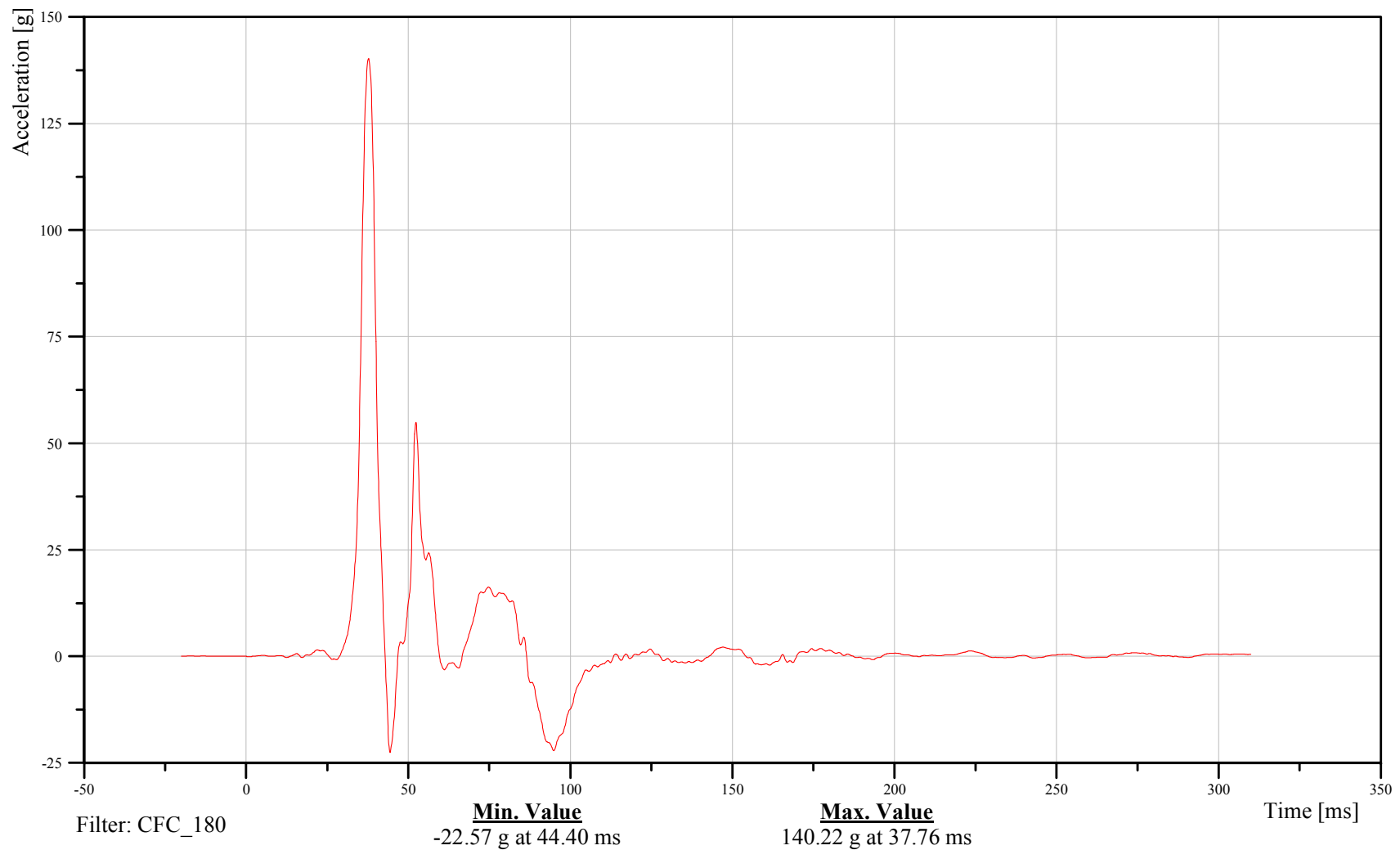
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11RIBSLU00E2ACYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Mid Rib Y-Axis Acceleration

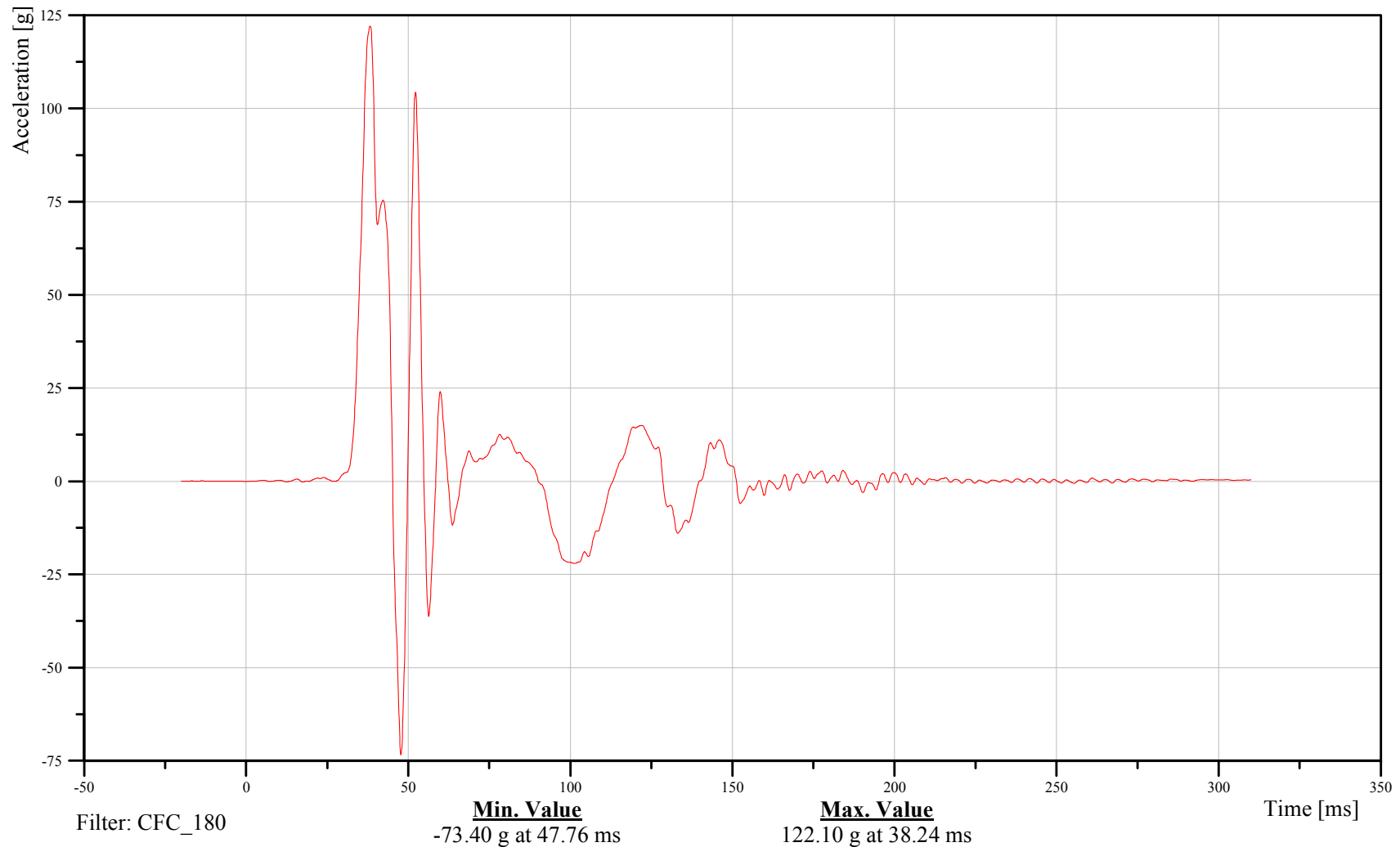
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11RIBSLM00E2ACYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Rib Y-Axis Acceleration

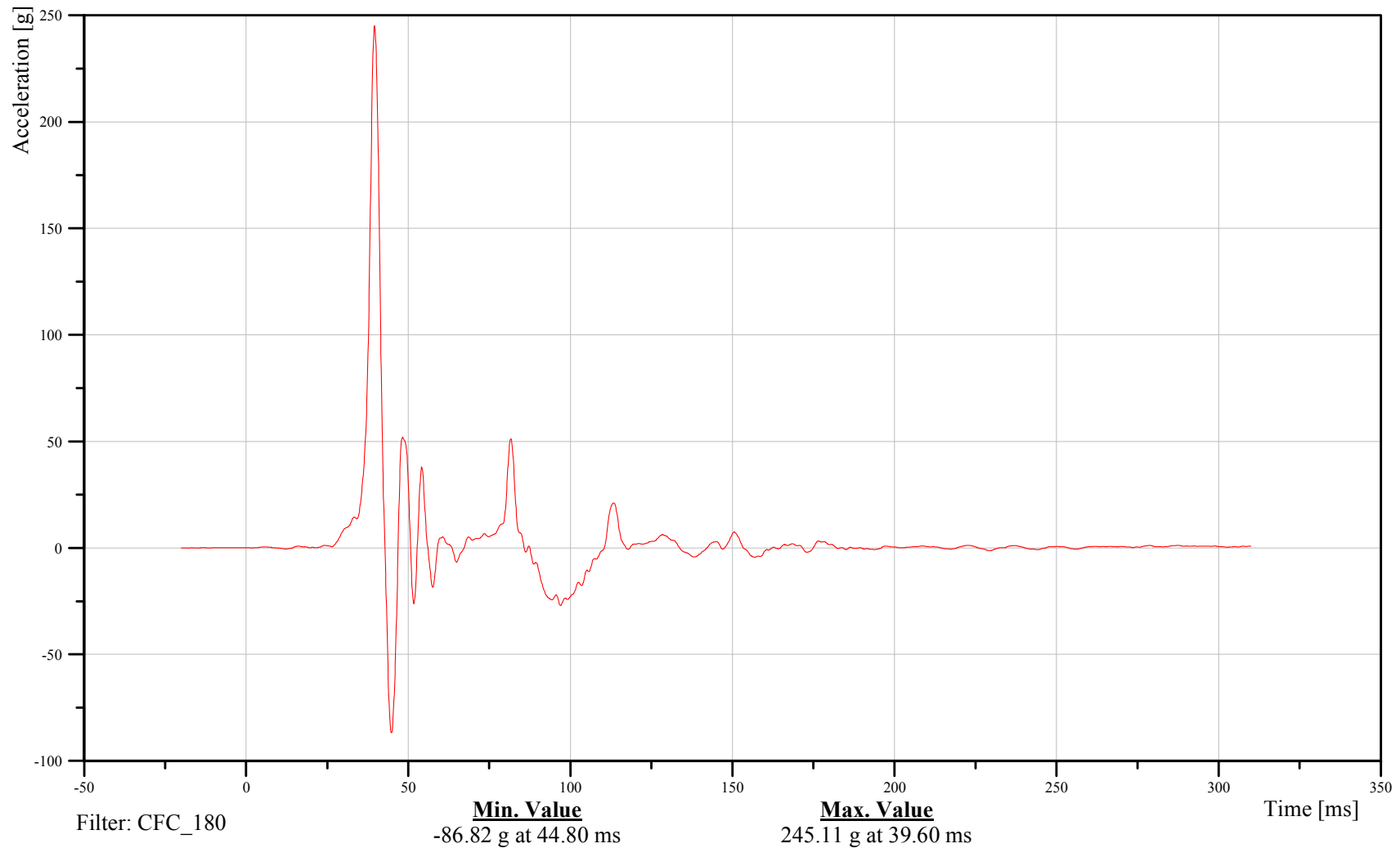
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11RIBSLL00E2ACYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

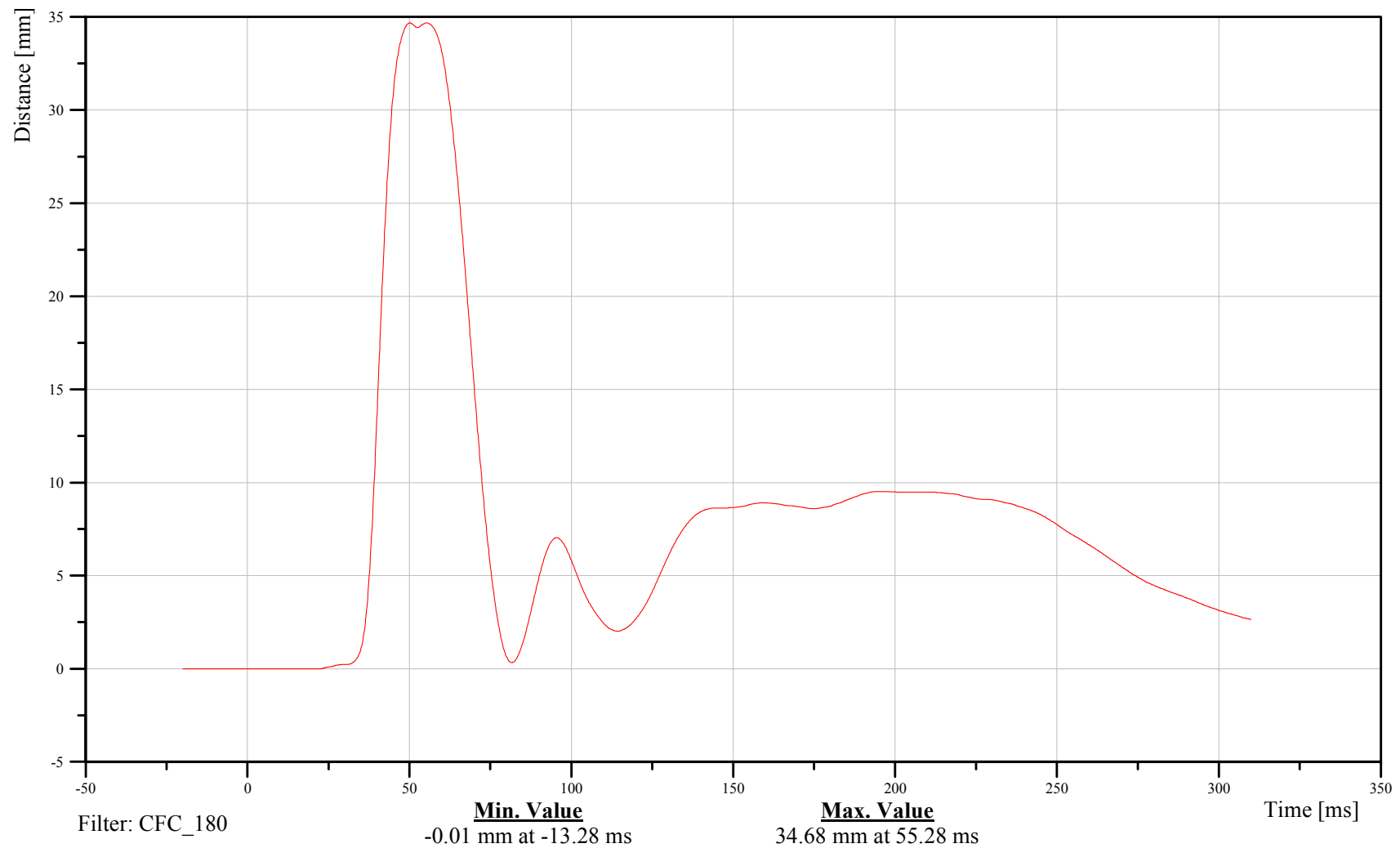
Driver Upper Rib Y-Axis Displacement

Customer: VRTC

11RIBSLU00E2DSYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

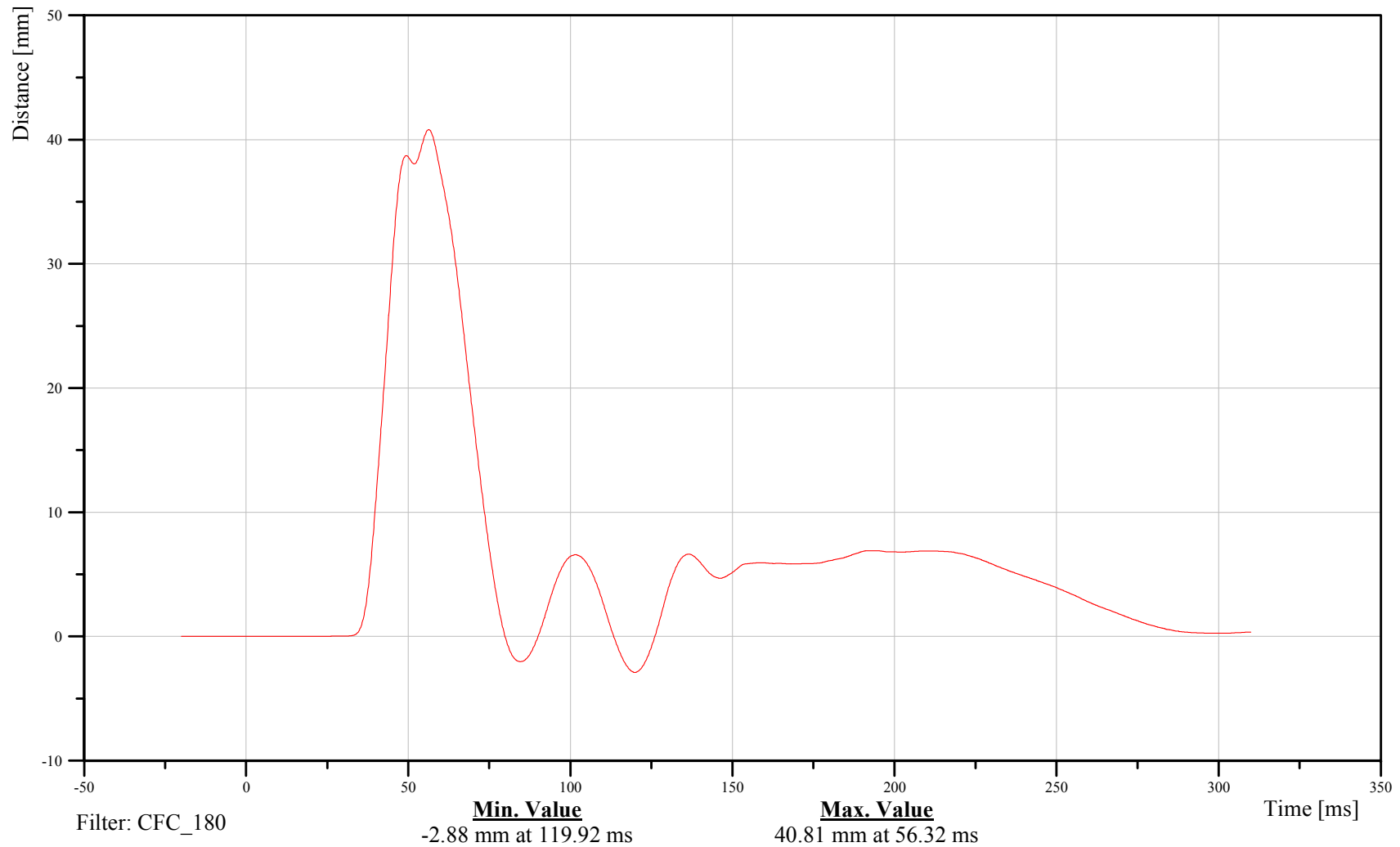
Driver Mid Rib Y-Axis Displacement

Customer: VRTC

11RIBSLM00E2DSYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Rib Y-Axis Displacement

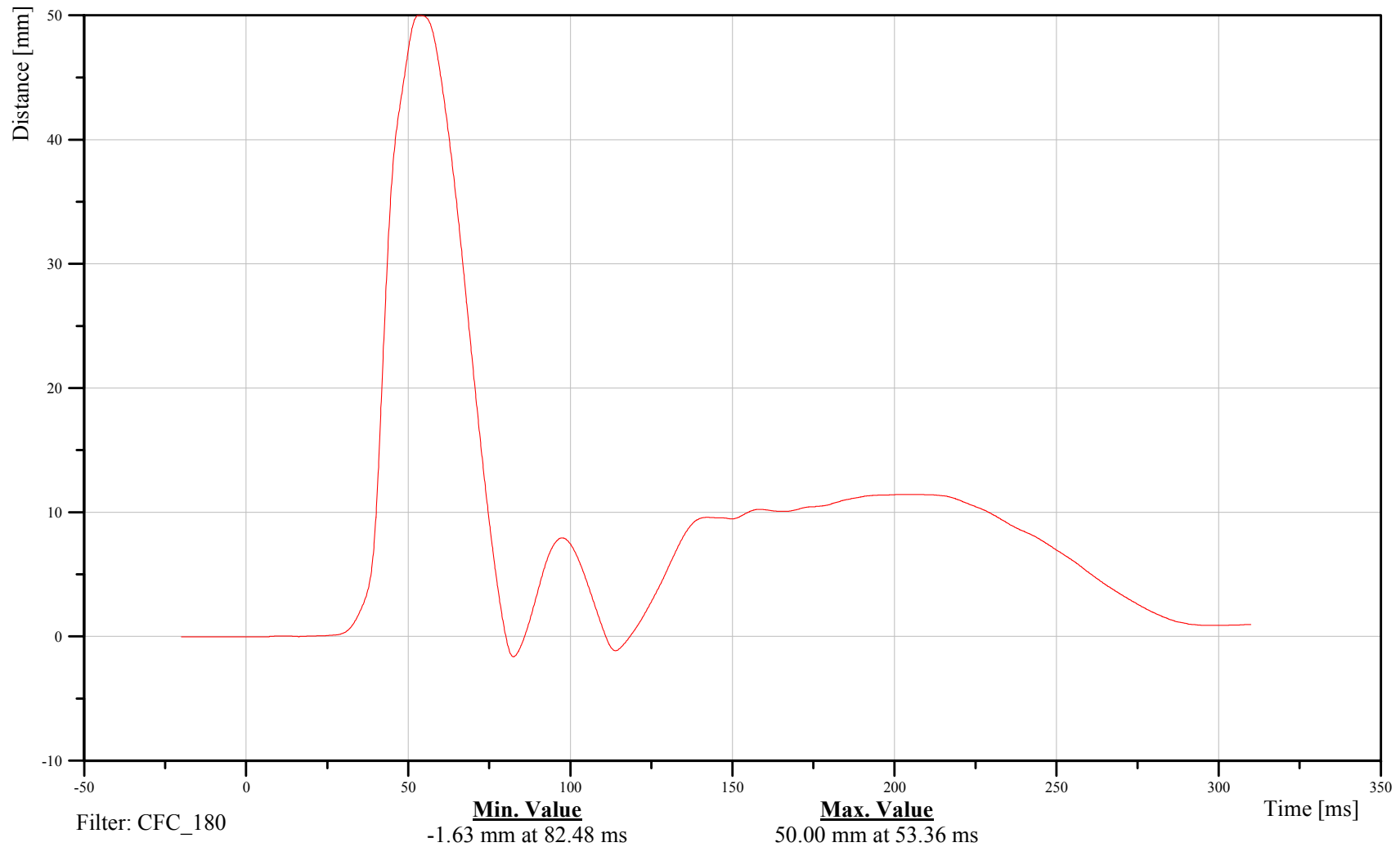
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11RIBSLL00E2DSYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine X-Axis Acceleration

Date: 10/06/2005

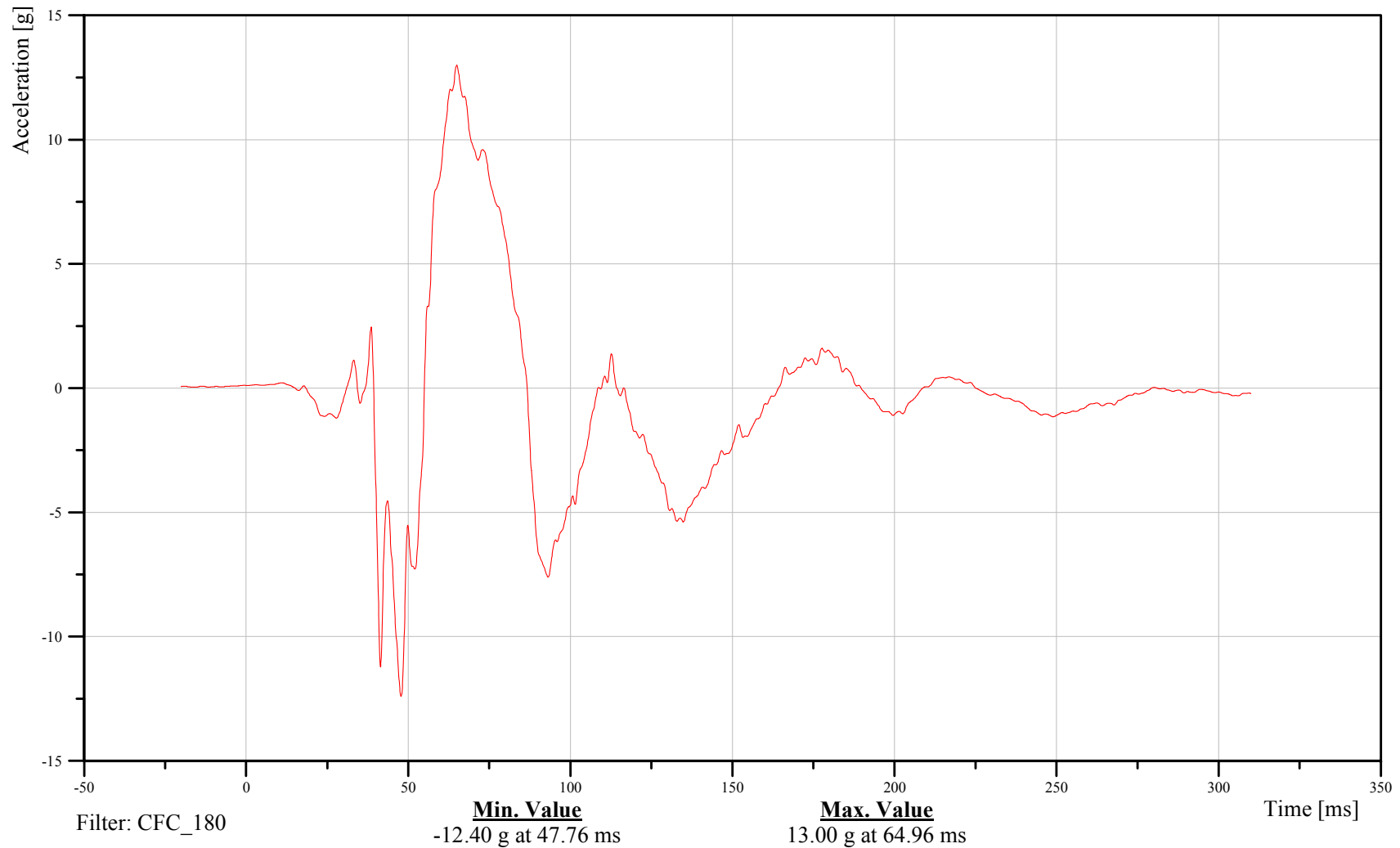
Time: 16:17

Customer: VRTC

11SPIN1200E2ACXC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine Y-Axis Acceleration

Date: 10/06/2005

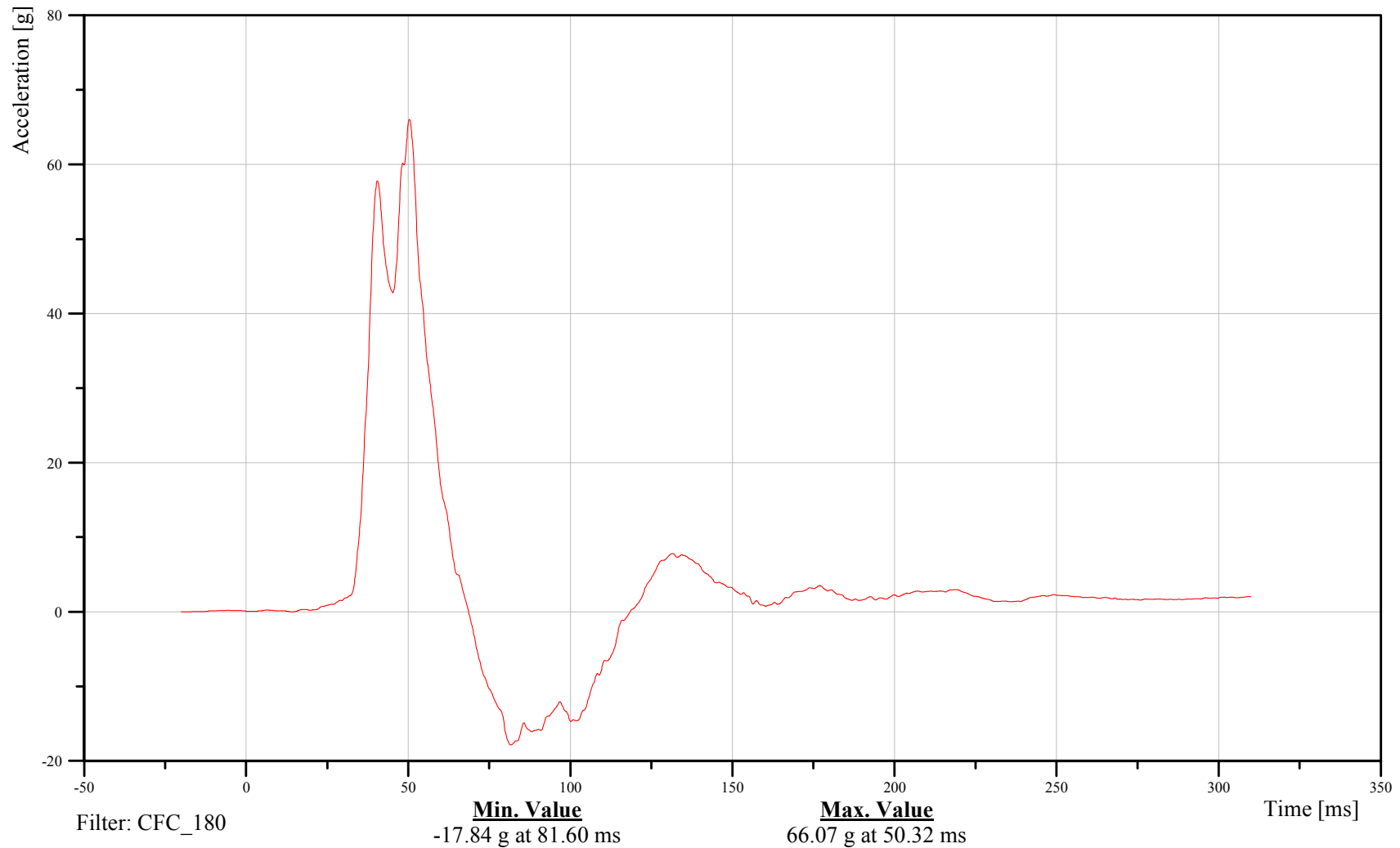
Time: 16:17

Customer: VRTC

11SPIN1200E2ACYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine Z-Axis Acceleration

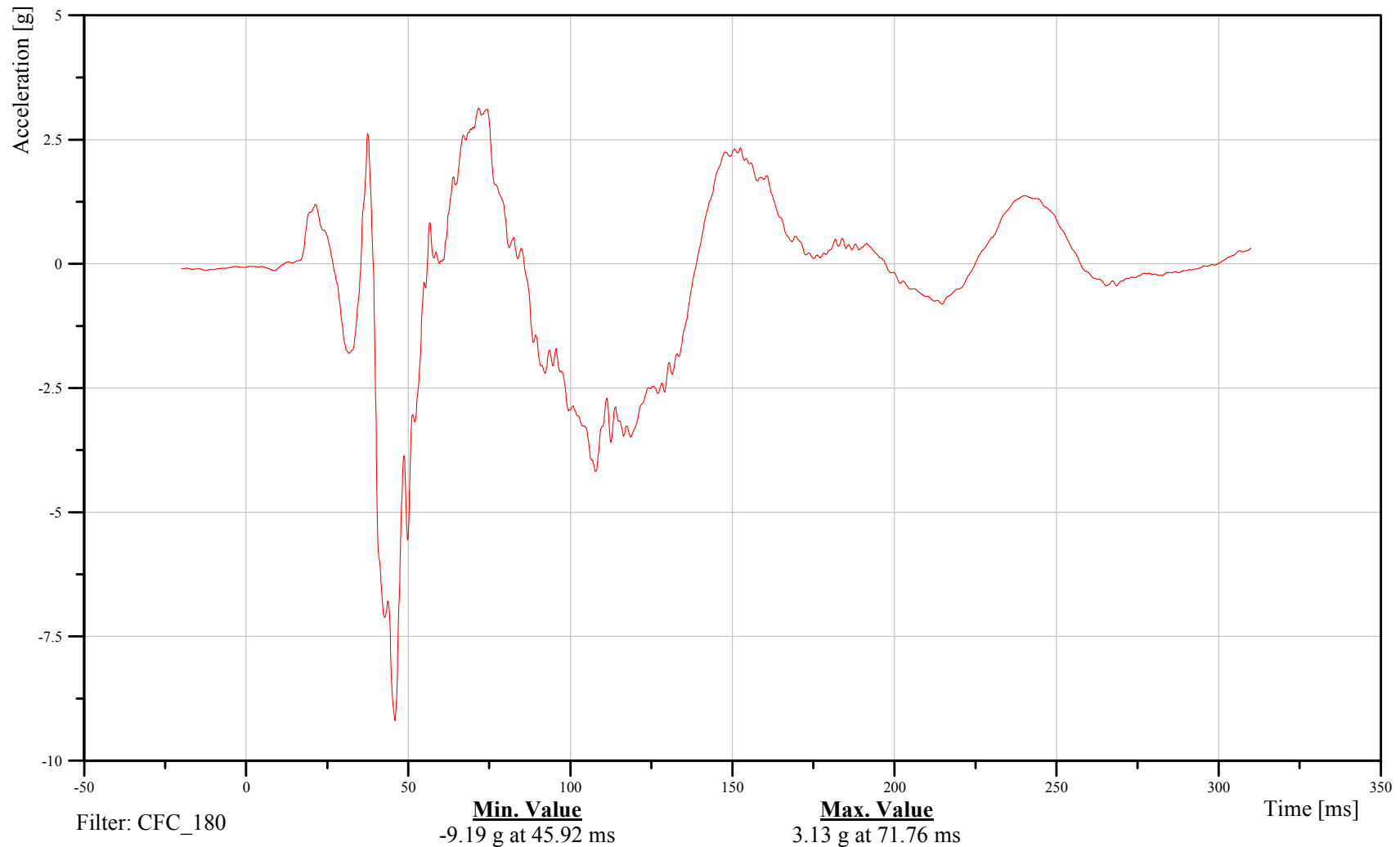
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN1200E2ACZC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine Resultant Acceleration

Date: 10/06/2005

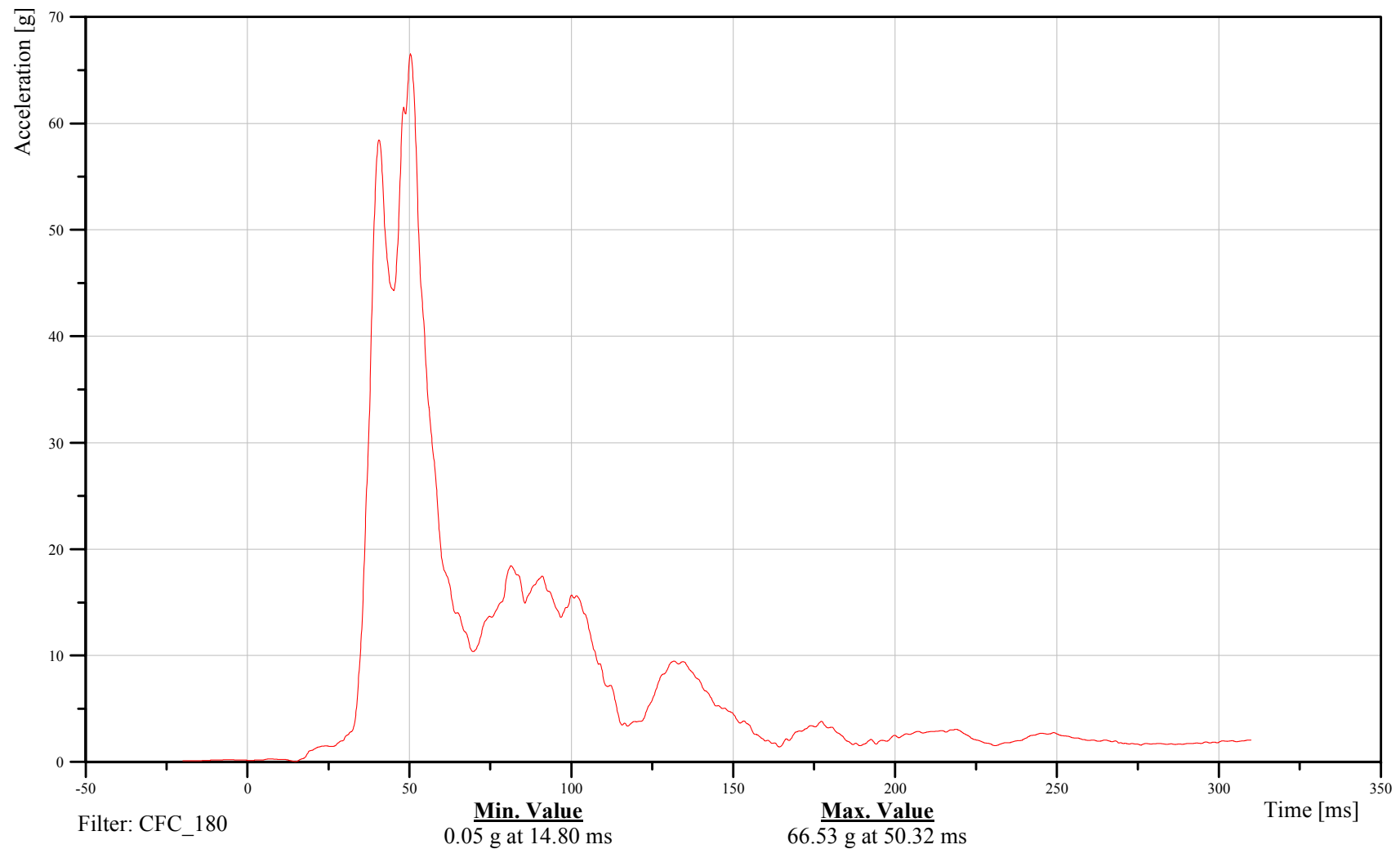
Time: 16:17

Customer: VRTC

11SPIN1200E2ACRC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine X-Axis Force

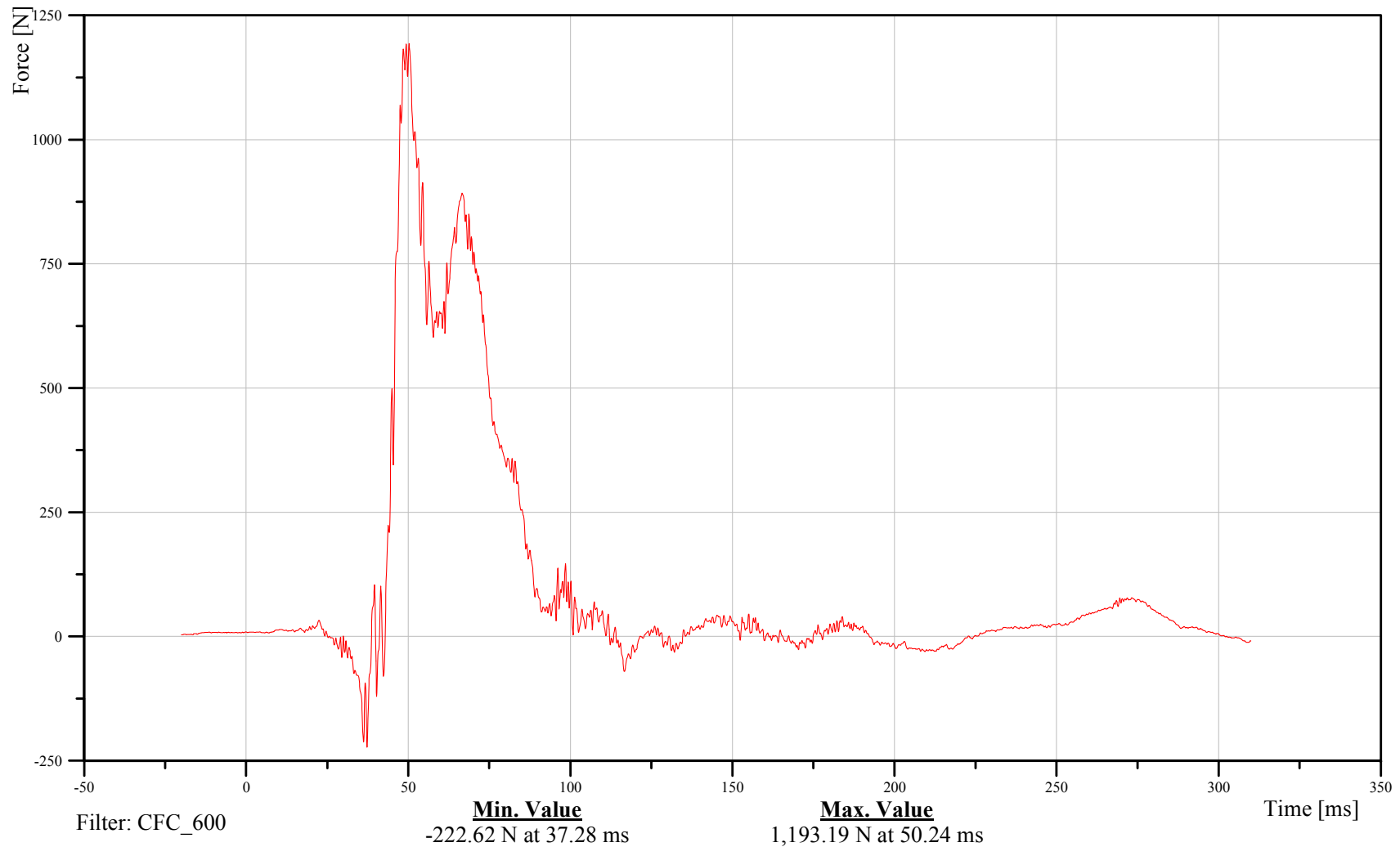
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN1200E2FOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine Y-Axis Force

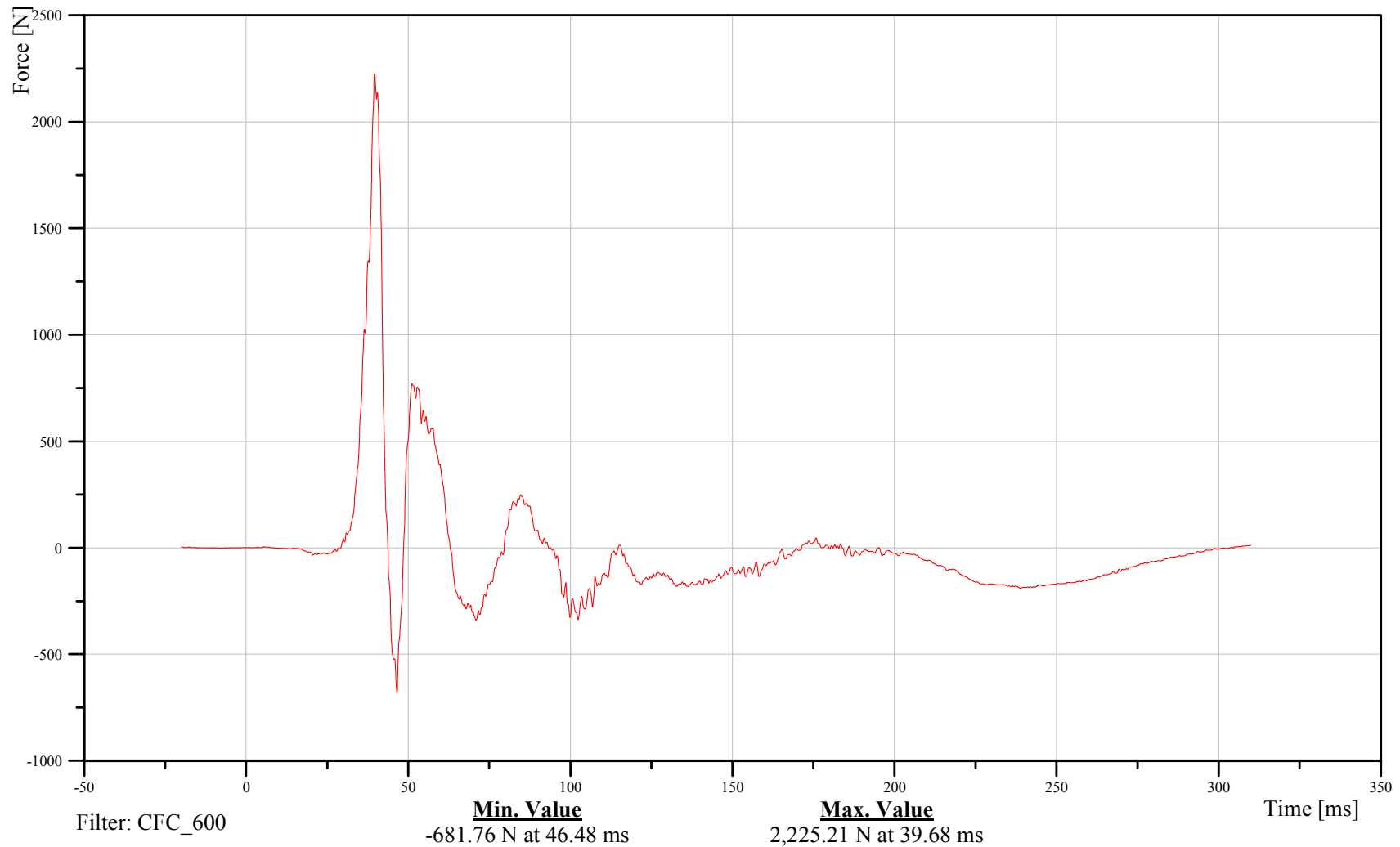
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN1200E2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

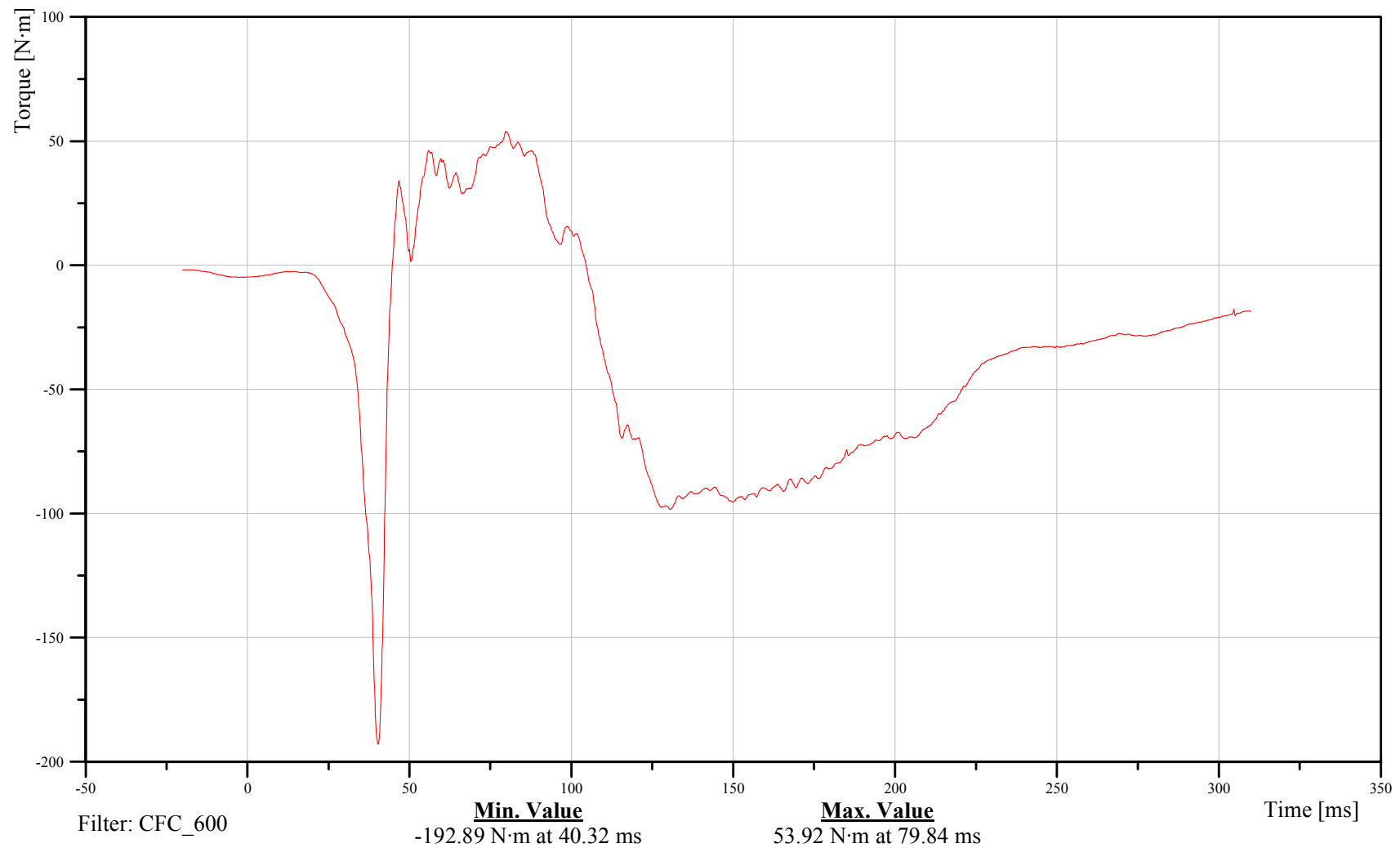
Driver Lower Spine Moment About X Axis

Customer: VRTC

11SPIN1200E2MOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

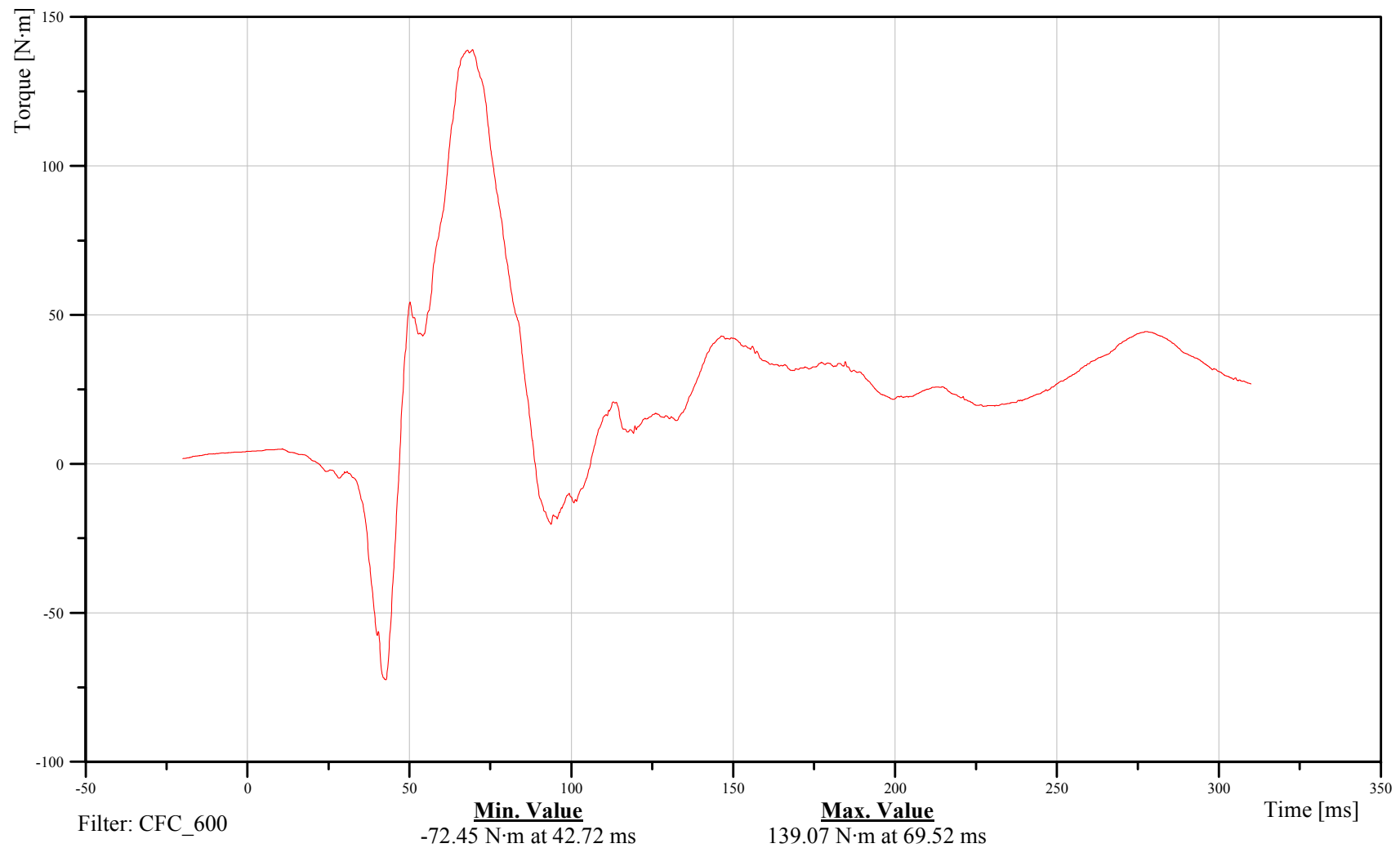
Driver Lower Spine Moment About Y Axis

Customer: VRTC

11SPIN1200E2MOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lumbar Y-Axis Force

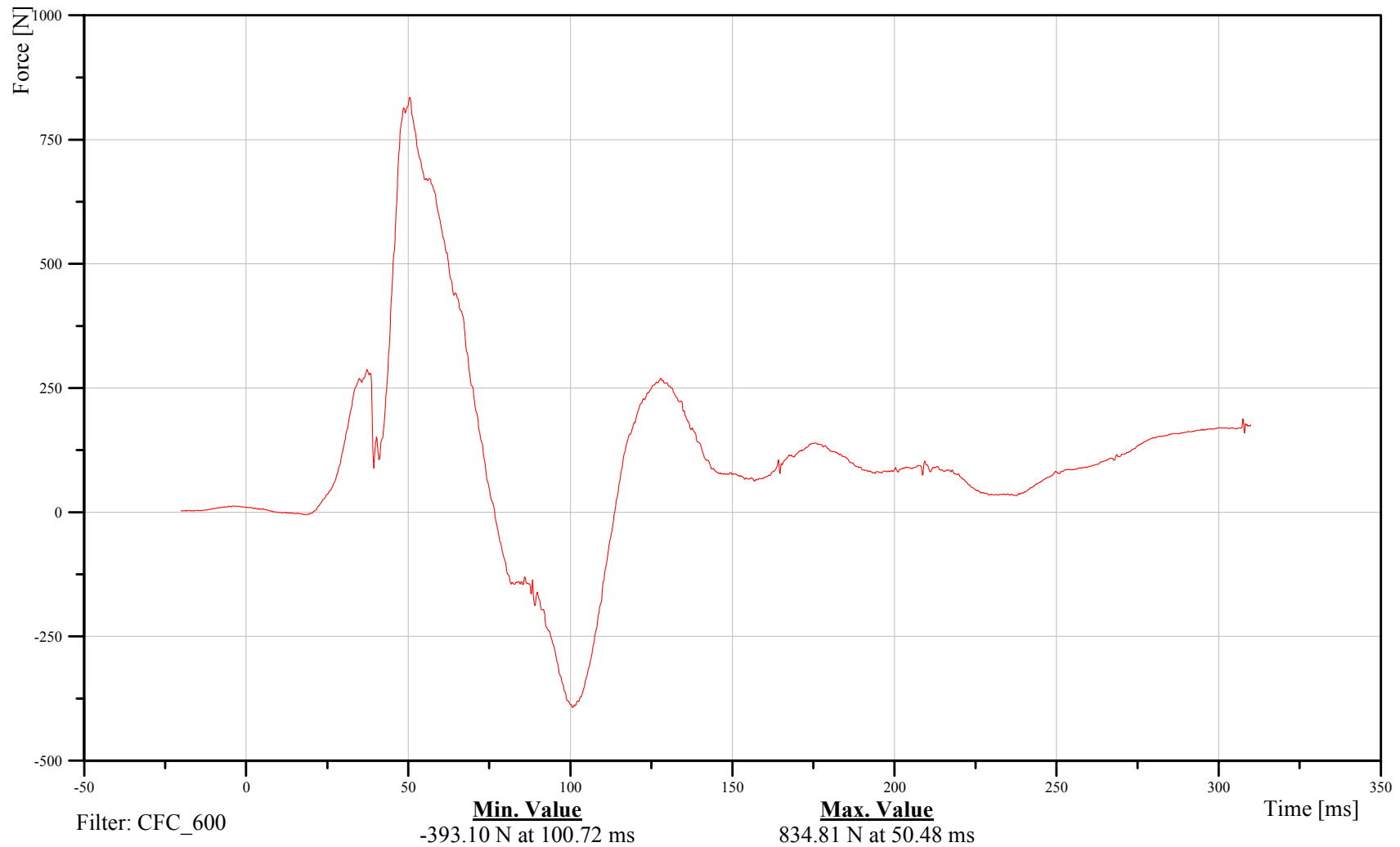
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11LUSP0000E2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lumbar Z-Axis Force

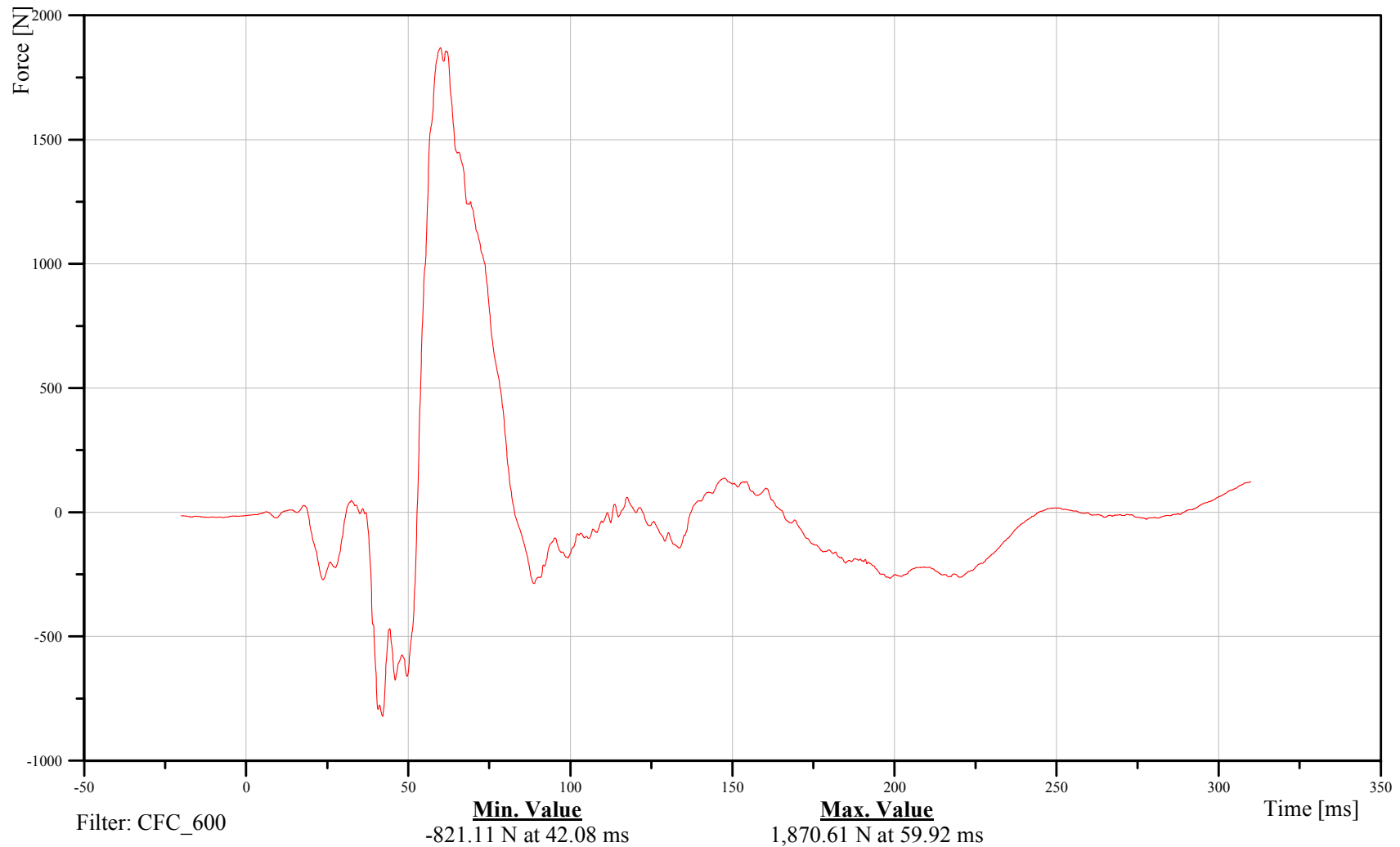
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11LUSP0000E2FOZB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lumbar Moment About X Axis

Date: 10/06/2005

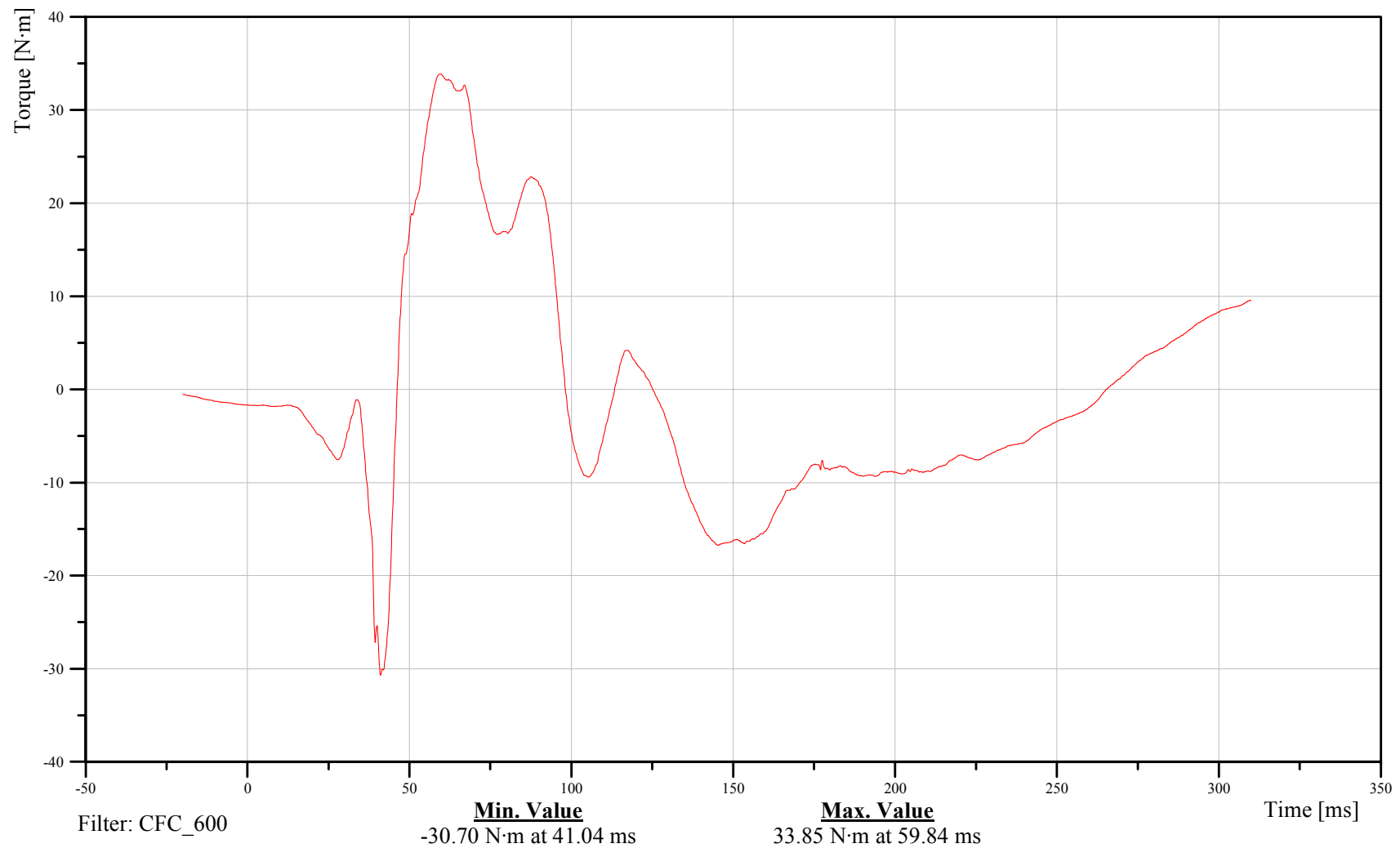
Time: 16:17

Customer: VRTC

11LUSP0000E2MOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Front Abdominal Y-Axis Force

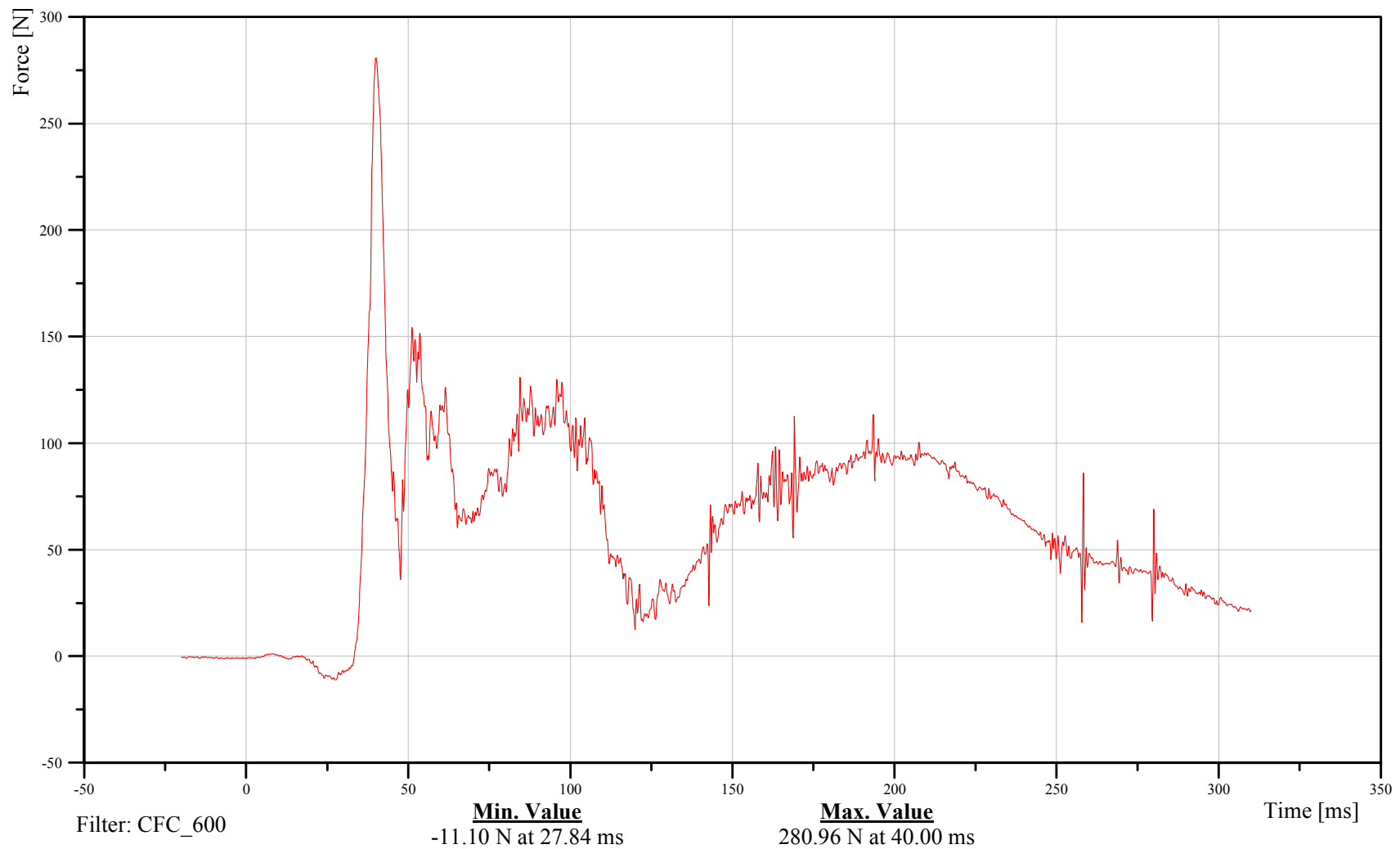
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11ABDOLEFRE2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Mid Abdominal Y-Axis Force

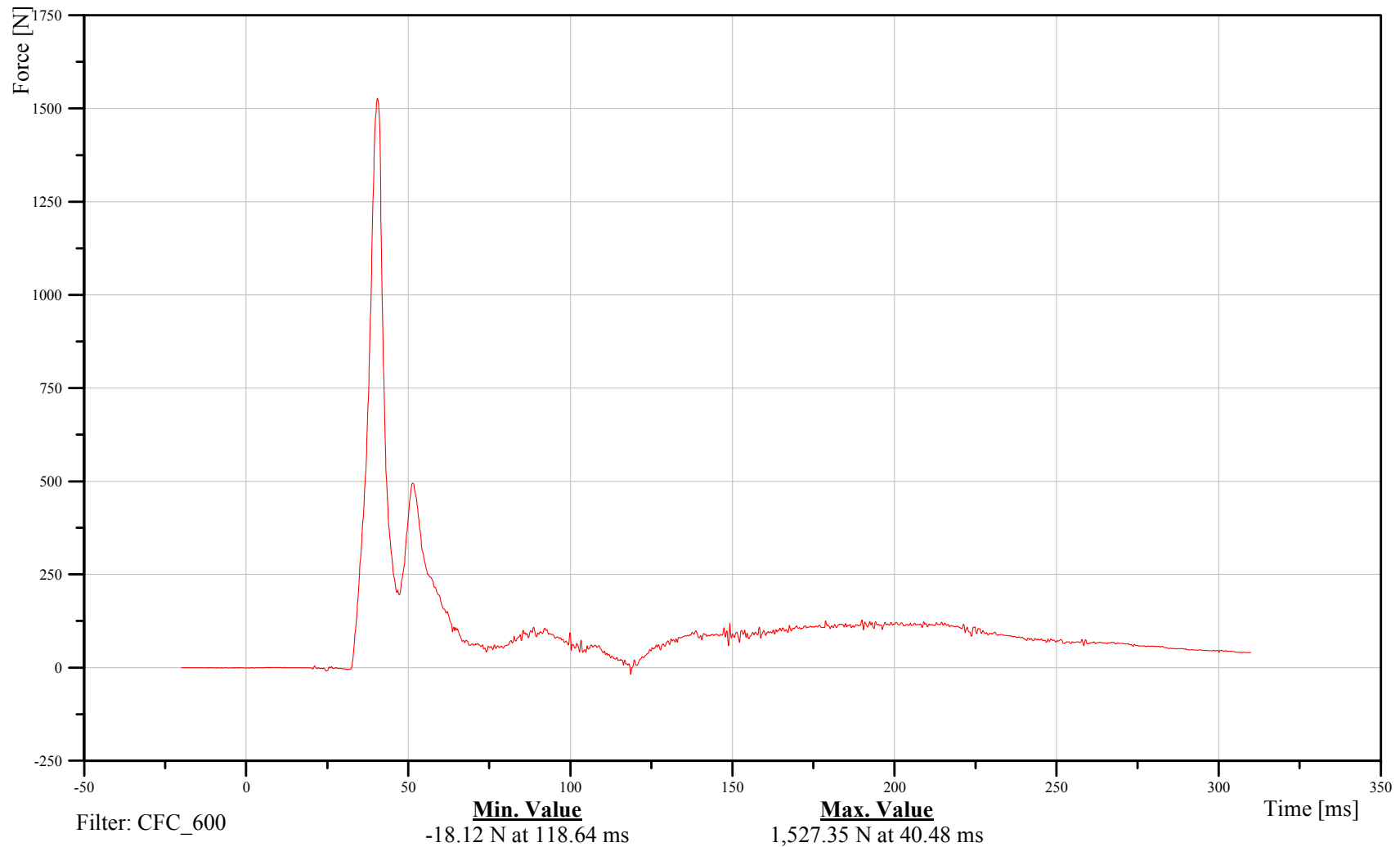
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11ABDOLEMIE2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Rear Abdominal Y-Axis Force

Date: 10/06/2005

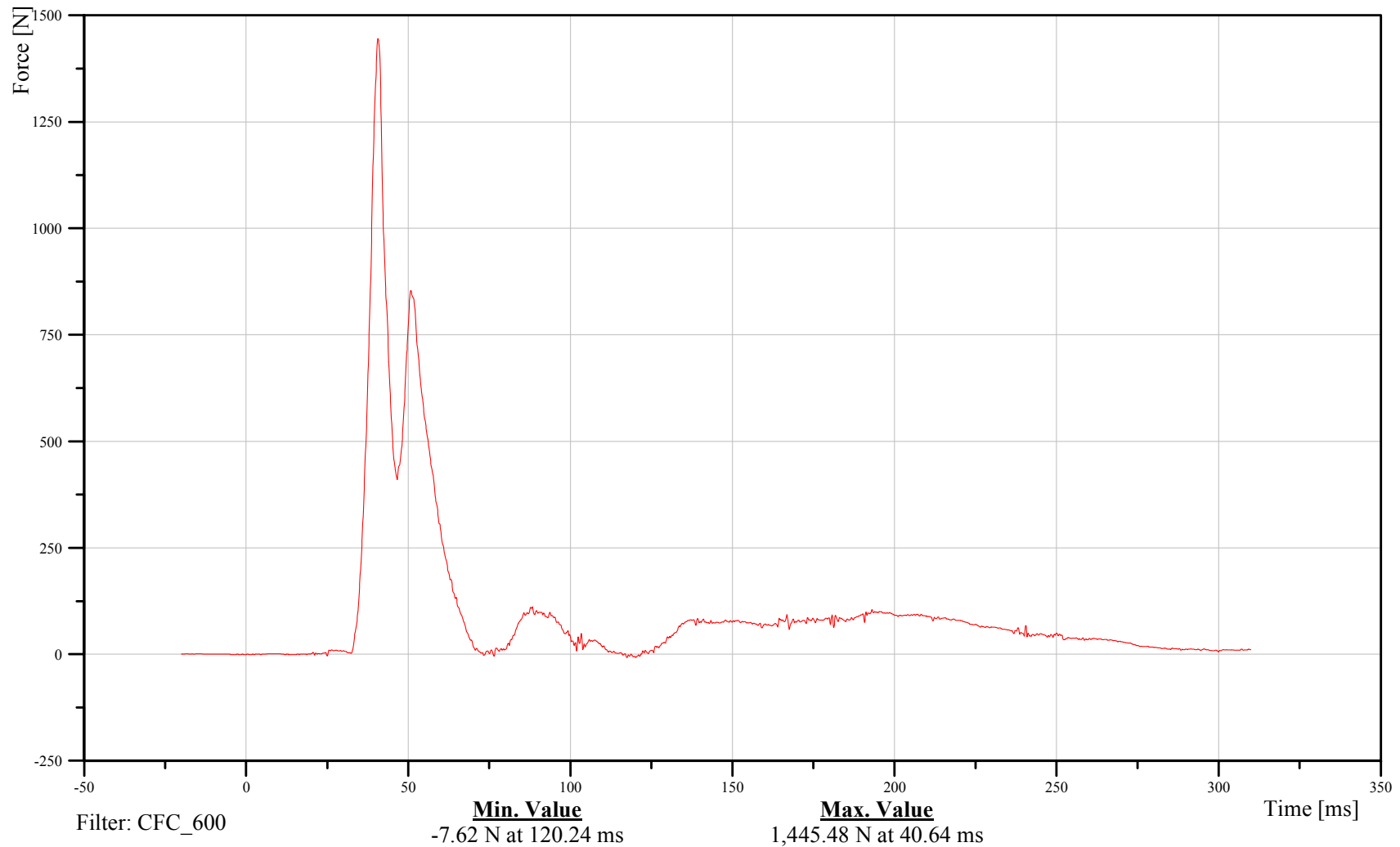
Time: 16:17

Customer: VRTC

11ABDOLEREE2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pubic Y-Axis Force

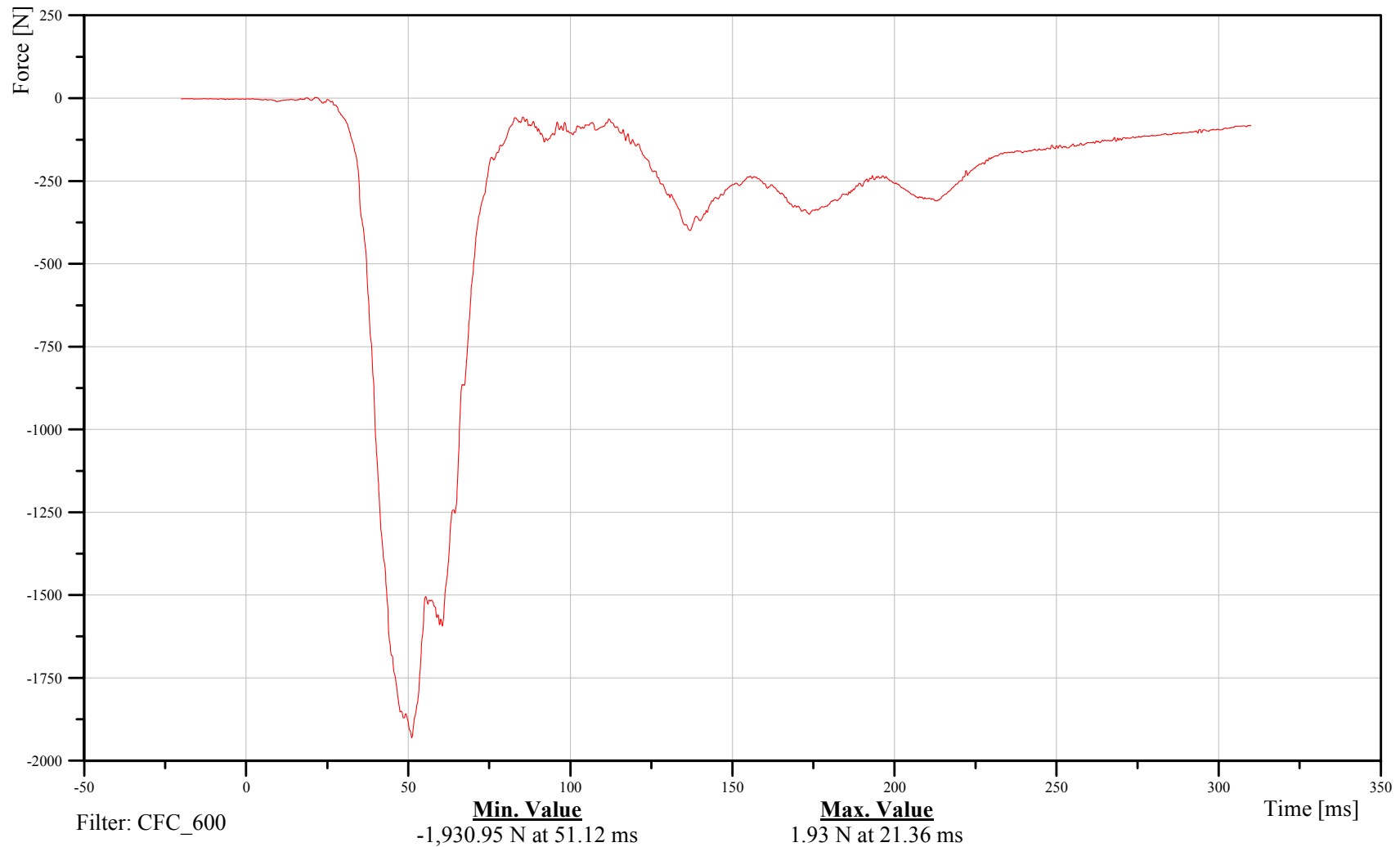
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PUBC0000E2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis X-Axis Acceleration

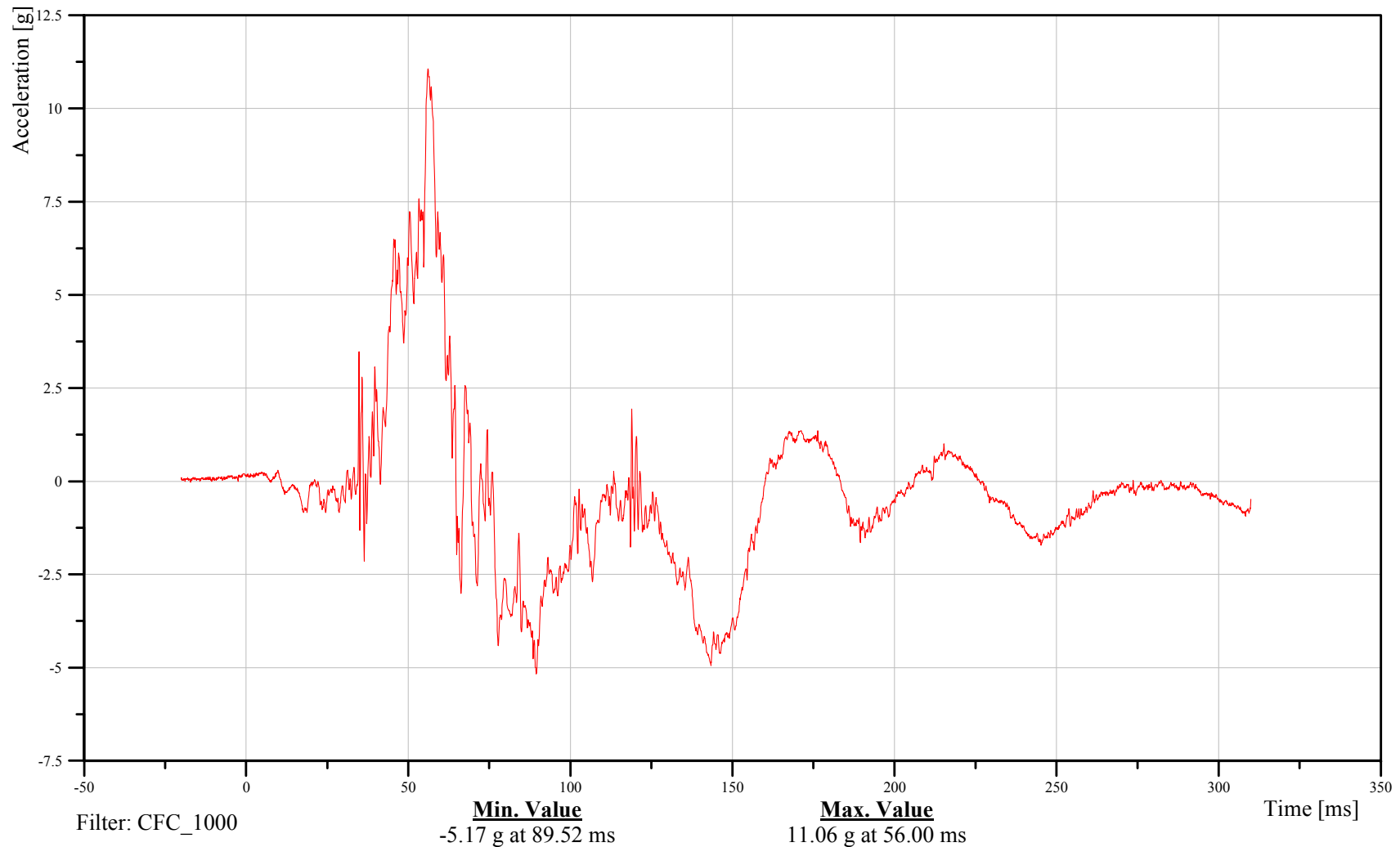
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACXA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis Y-Axis Acceleration

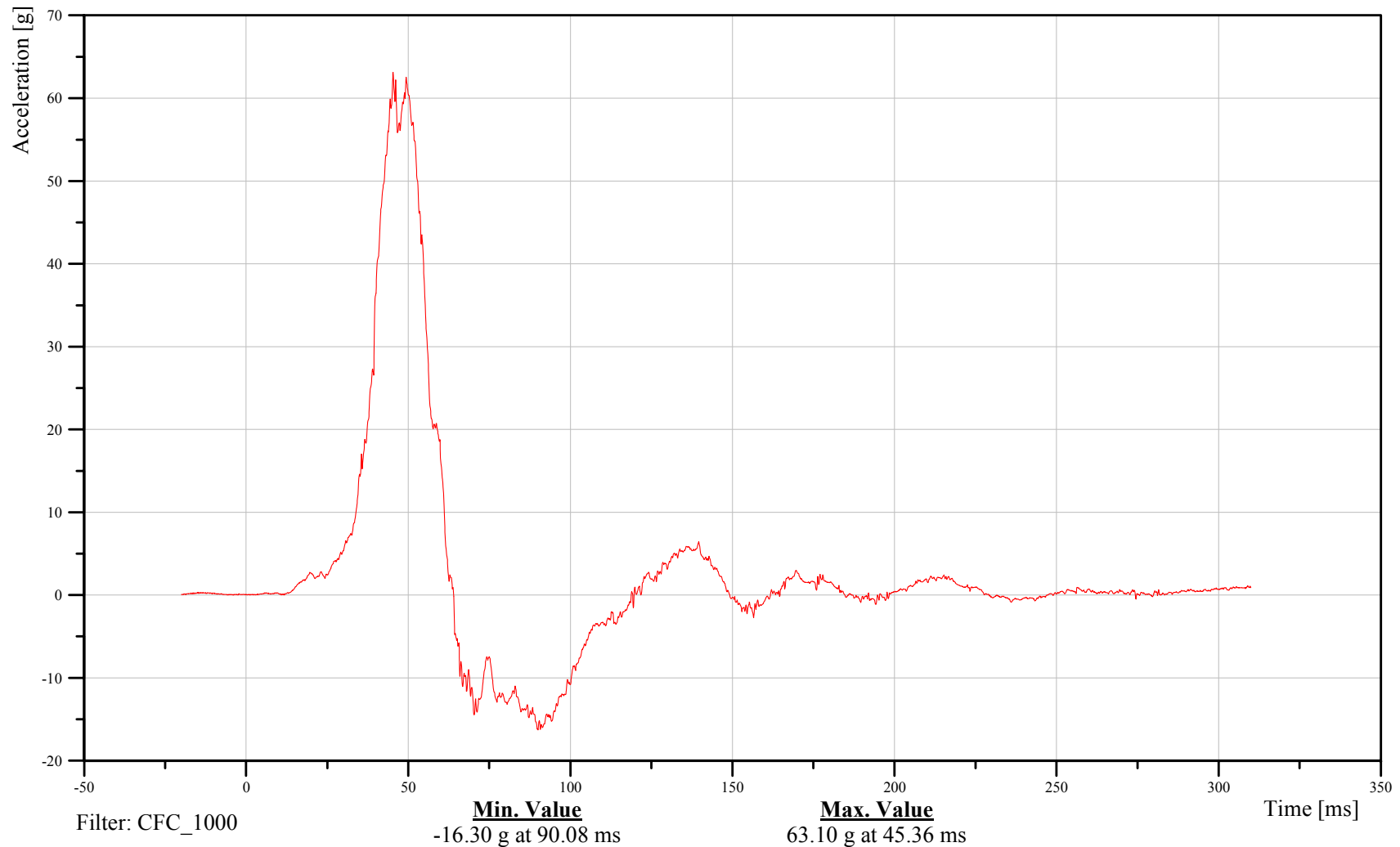
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACYA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis Z-Axis Acceleration

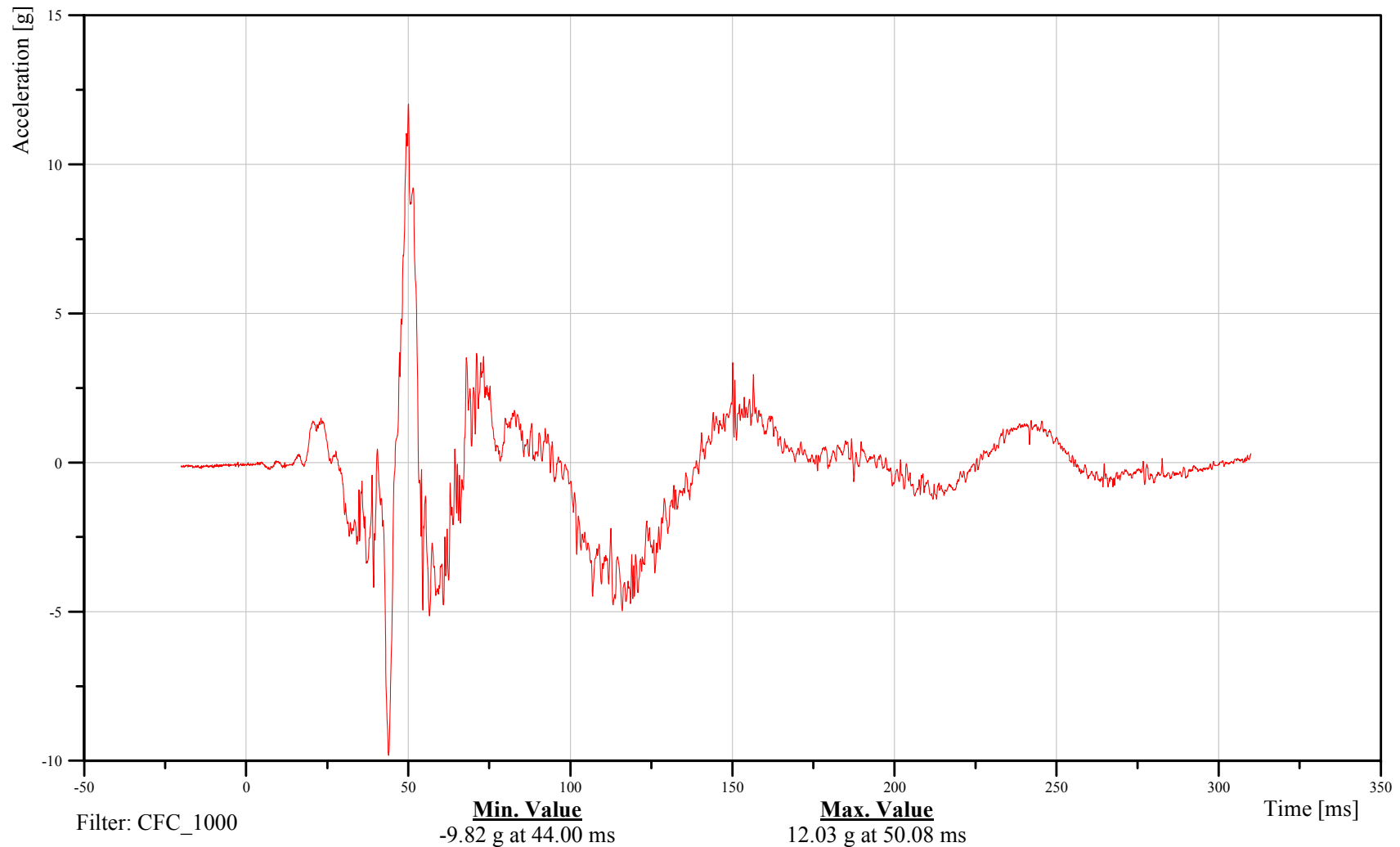
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACZA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis Resultant Acceleration

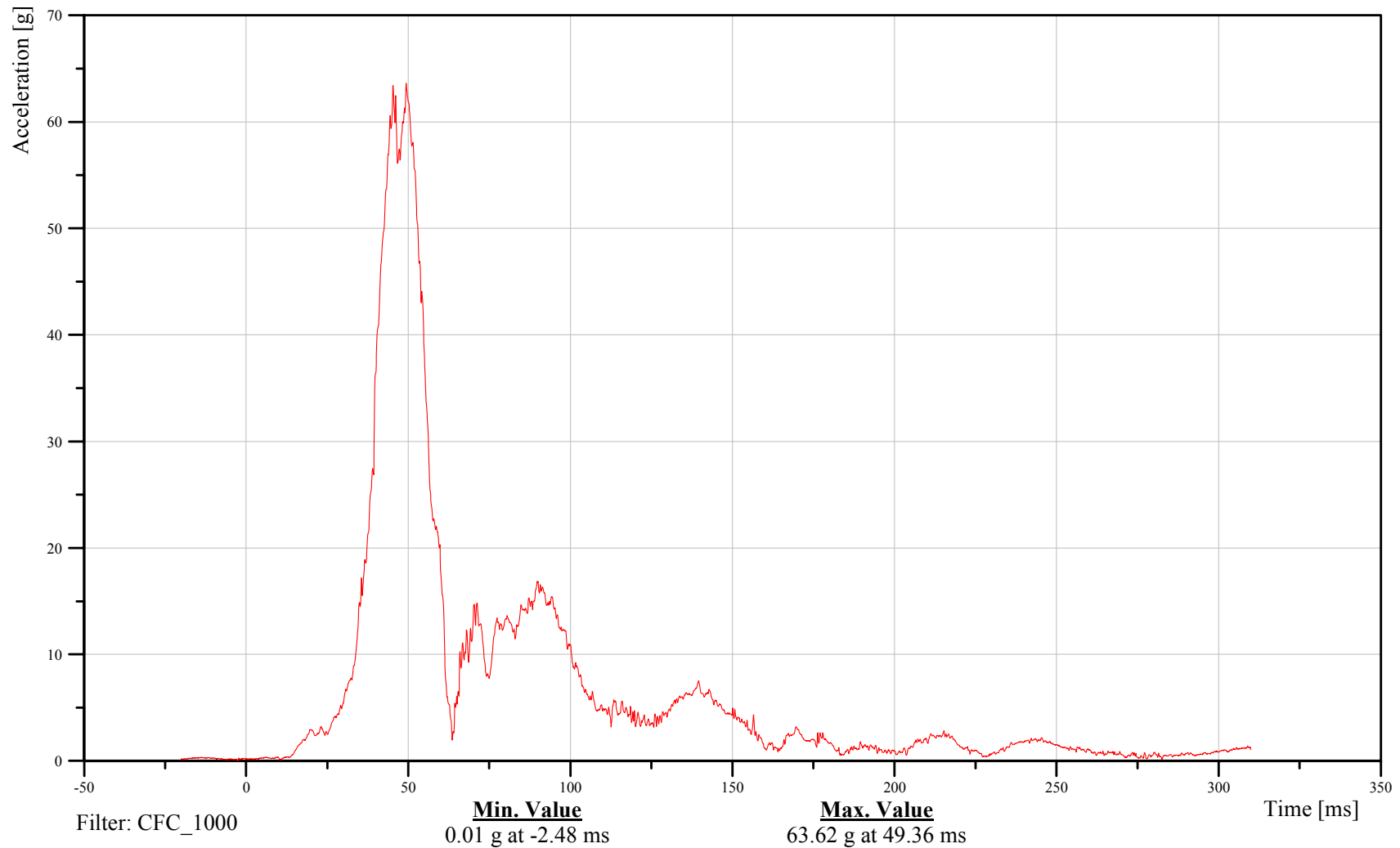
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACRA

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Femur X-Axis Force

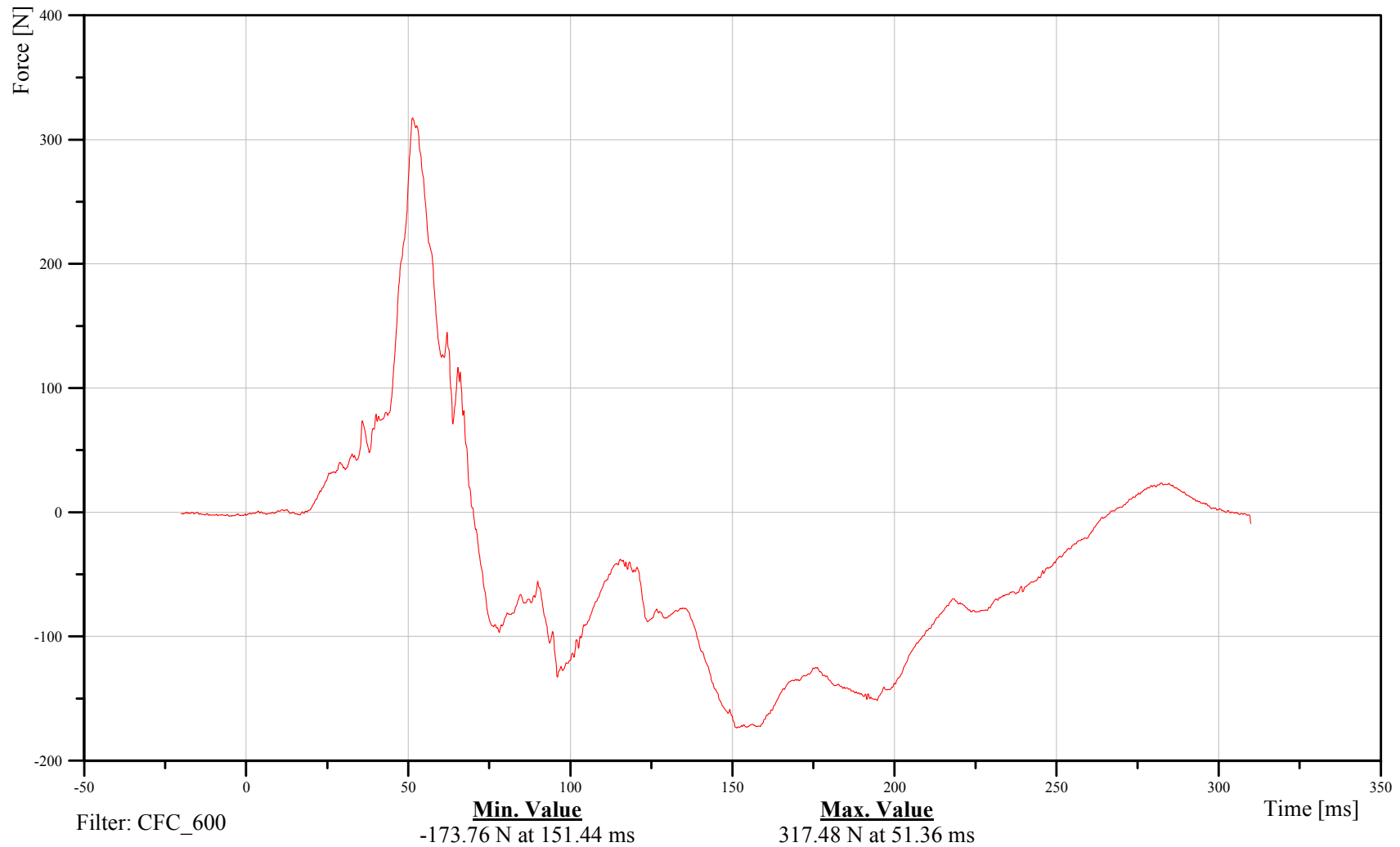
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRLE00E2FOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Femur Y-Axis Force

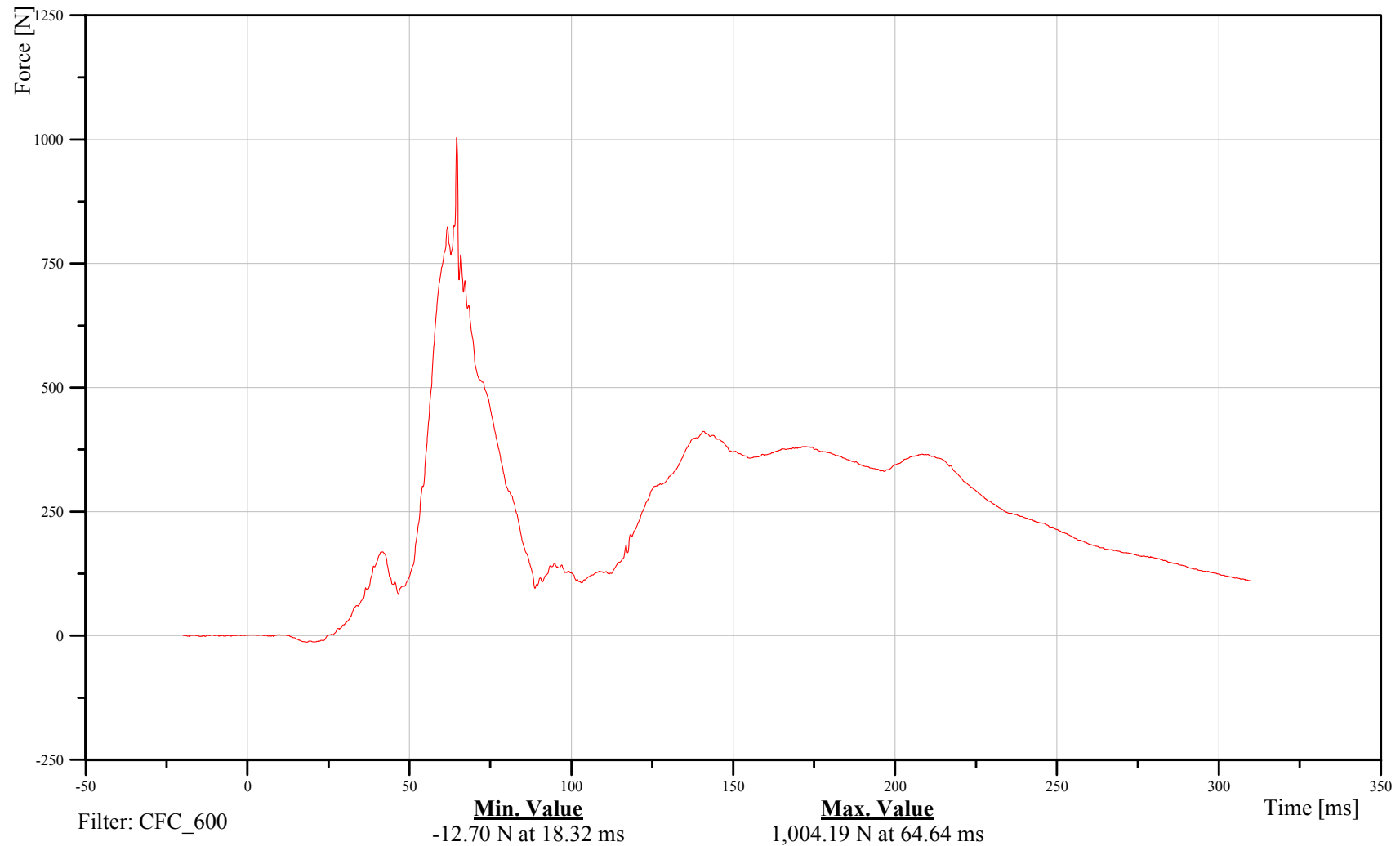
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRLE00E2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Femur Z-Axis Force

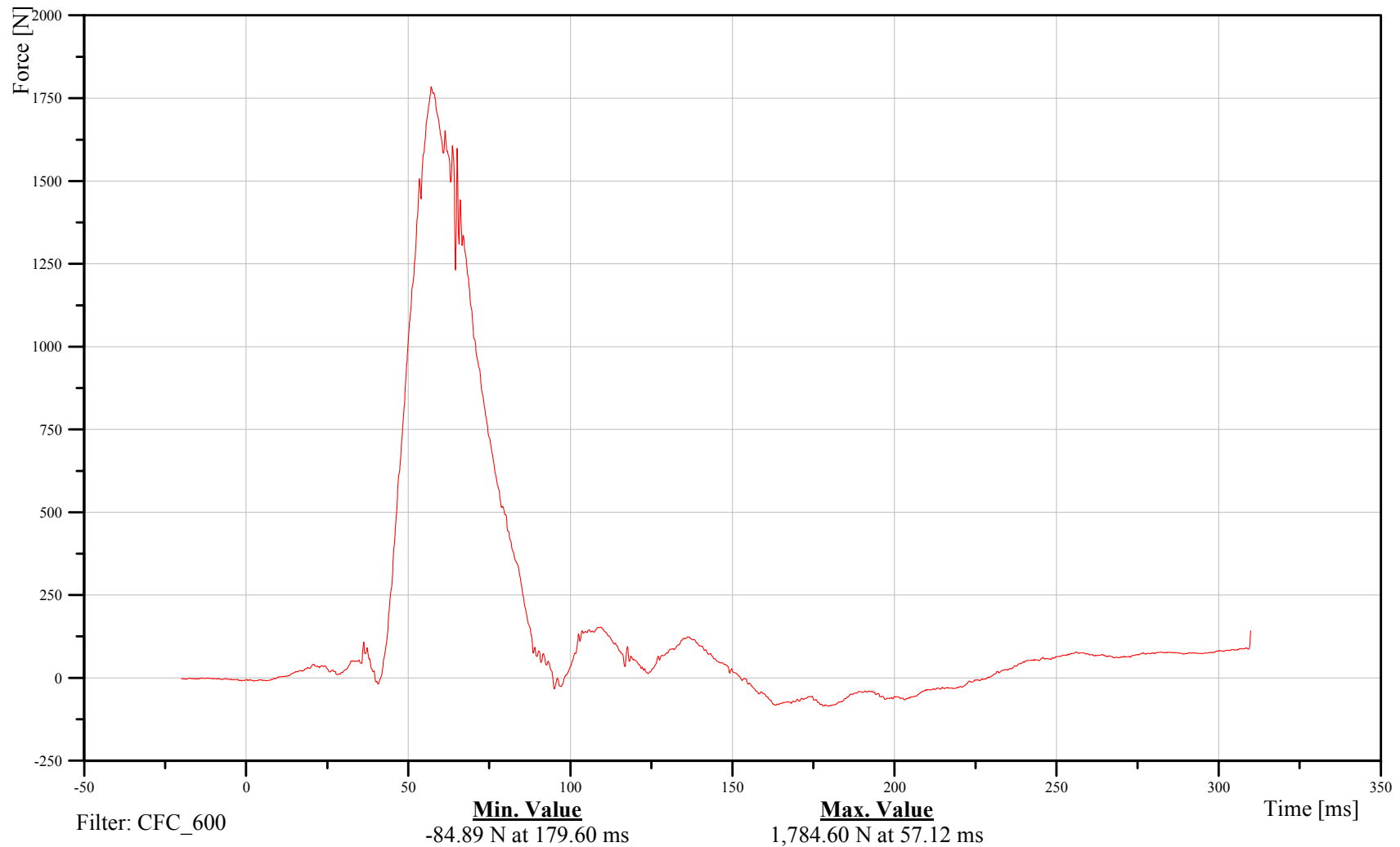
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRLE00E2FOZB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Femur Moment About X Axis

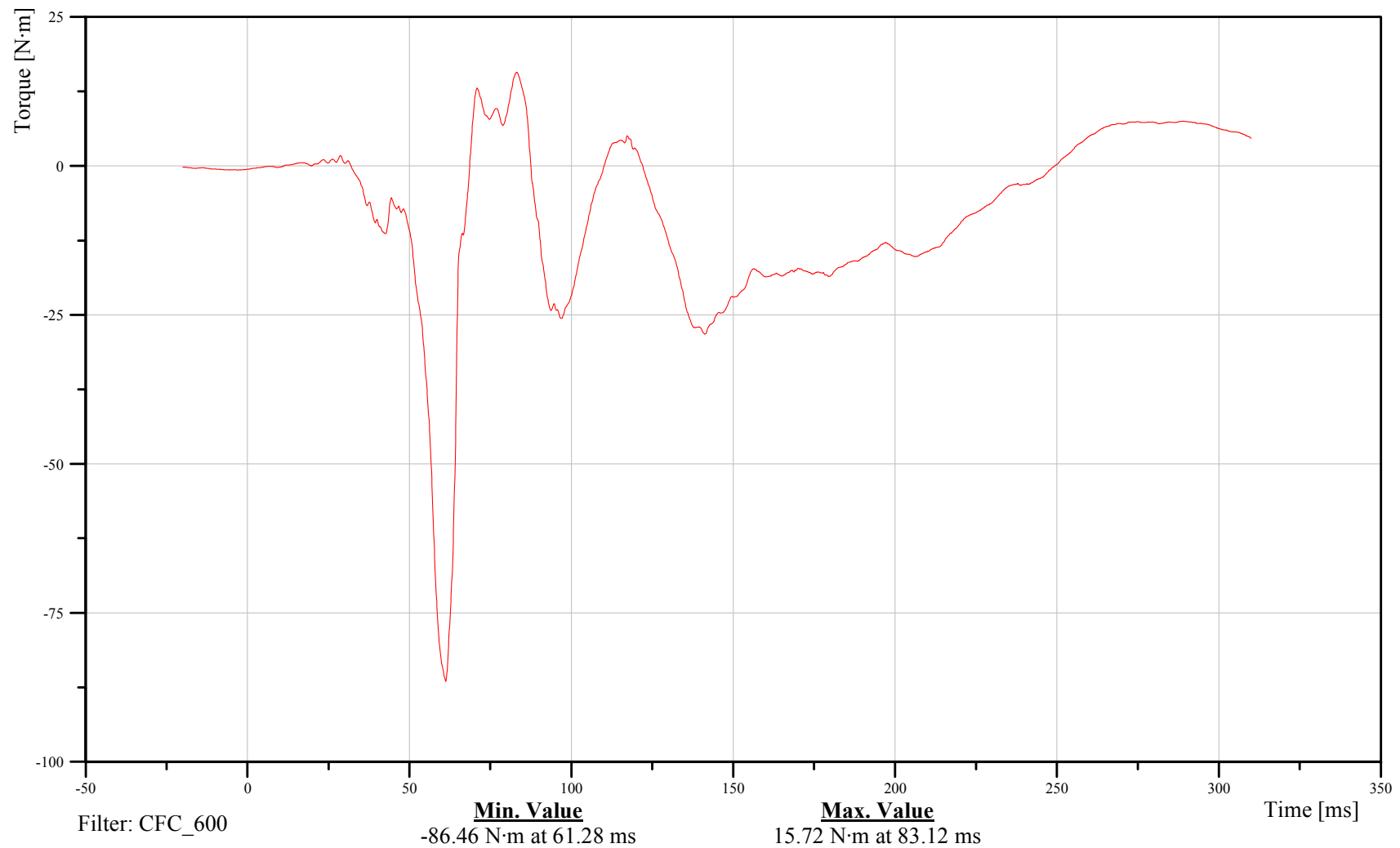
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRLE00E2MOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Femur Moment About Y Axis

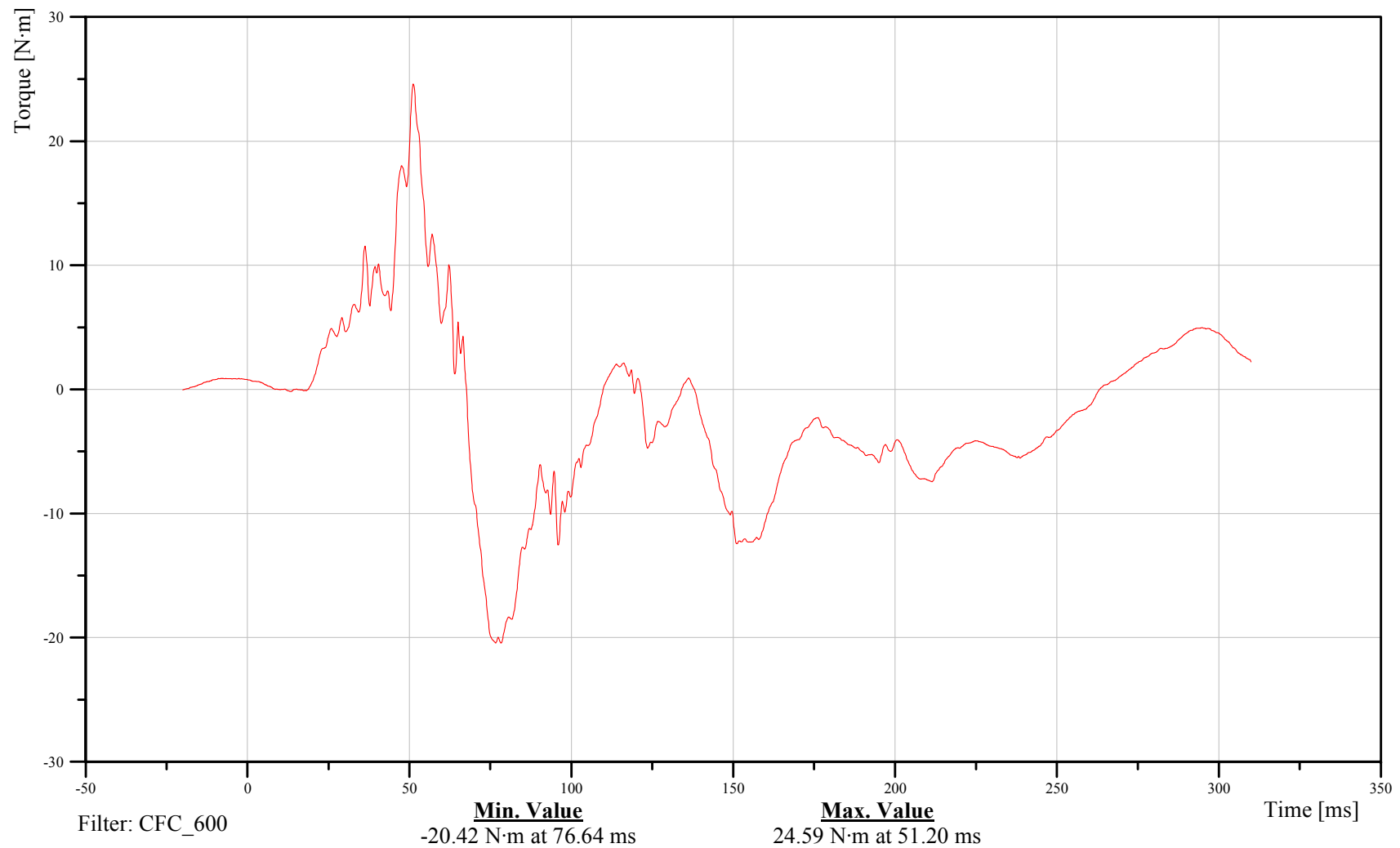
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRLE00E2MOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Left Femur Moment About Z Axis

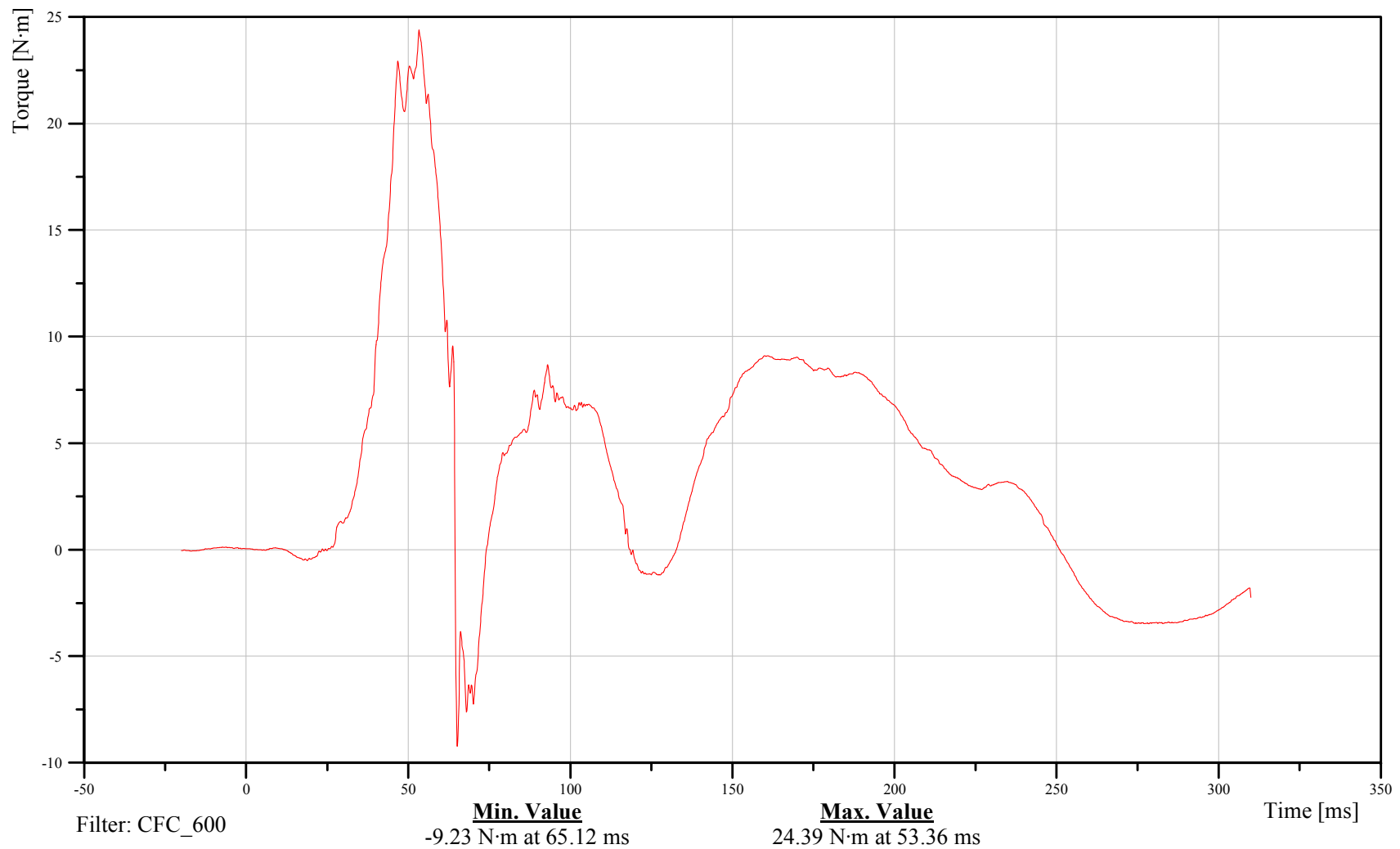
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRLE00E2MOZB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

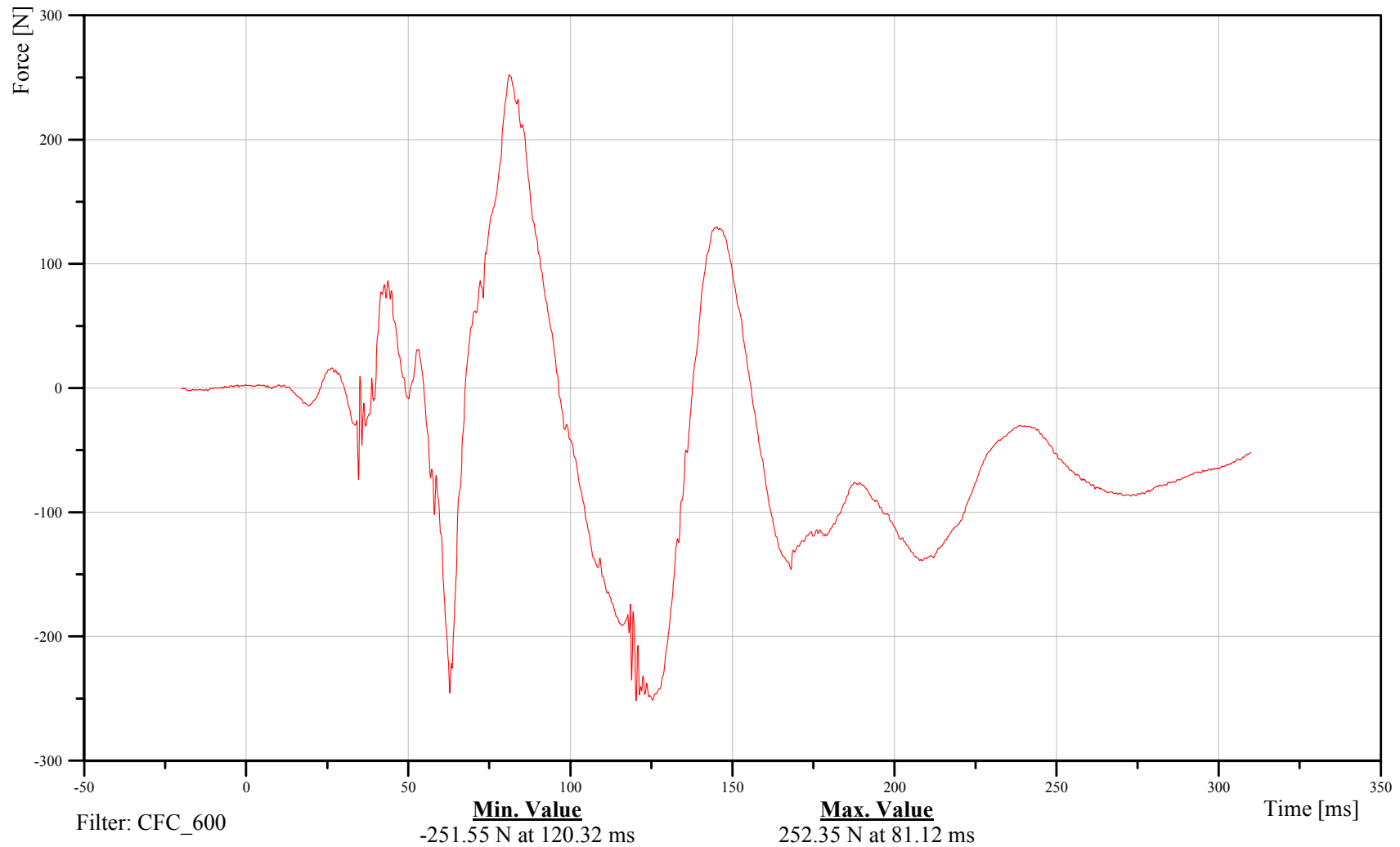
Driver Right Femur X-Axis Force

Customer: VRTC

11FEMRRI00E2FOX B

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

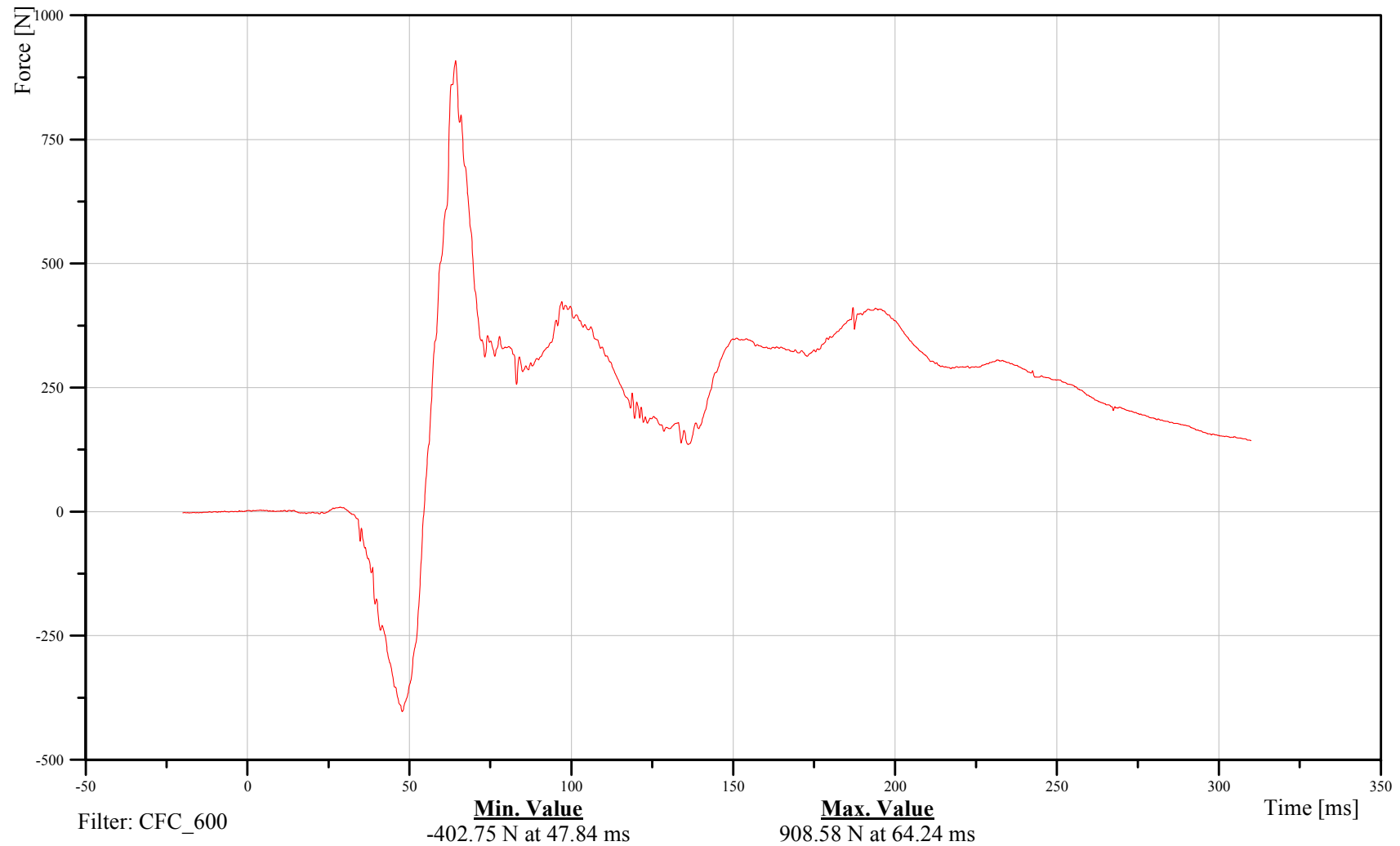
Driver Right Femur Y-Axis Force

Customer: VRTC

11FEMRRI00E2FOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Right Femur Z-Axis Force

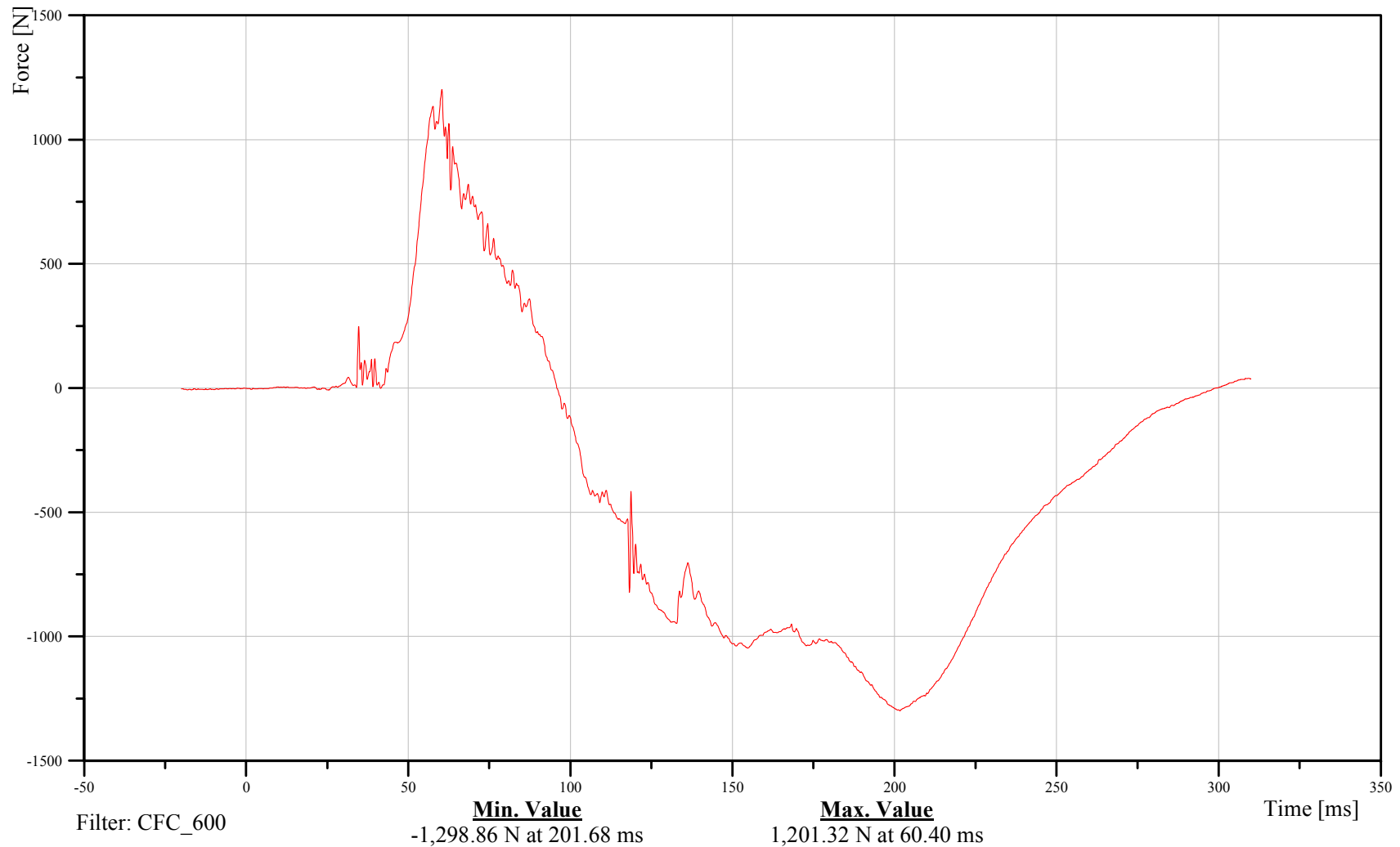
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRRI00E2FOZB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Right Femur Moment About X Axis

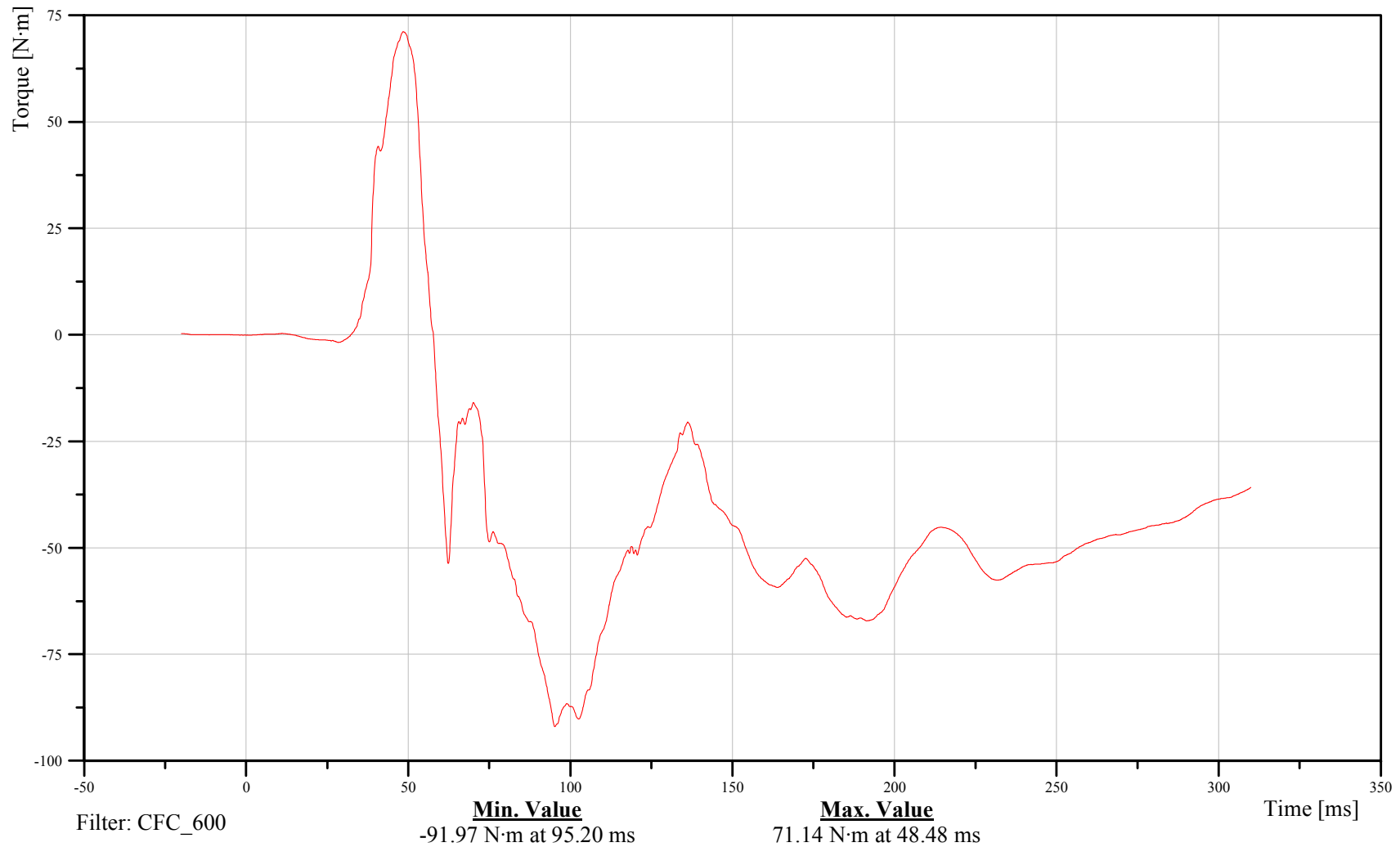
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11FEMRRI00E2MOXB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Right Femur Moment About Y Axis

Date: 10/06/2005

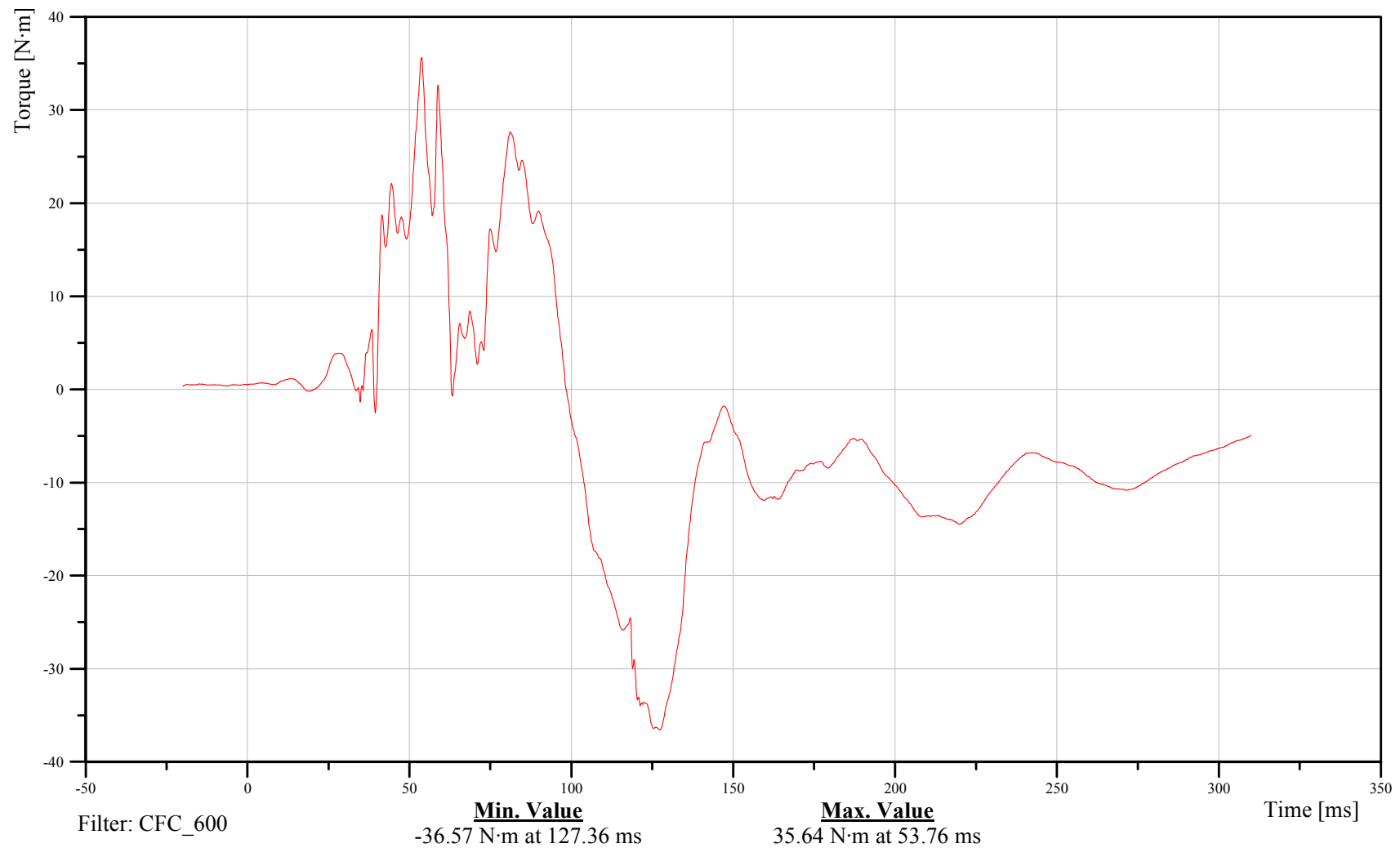
Time: 16:17

Customer: VRTC

11FEMRRI00E2MOYB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Right Femur Moment About Z Axis

Date: 10/06/2005

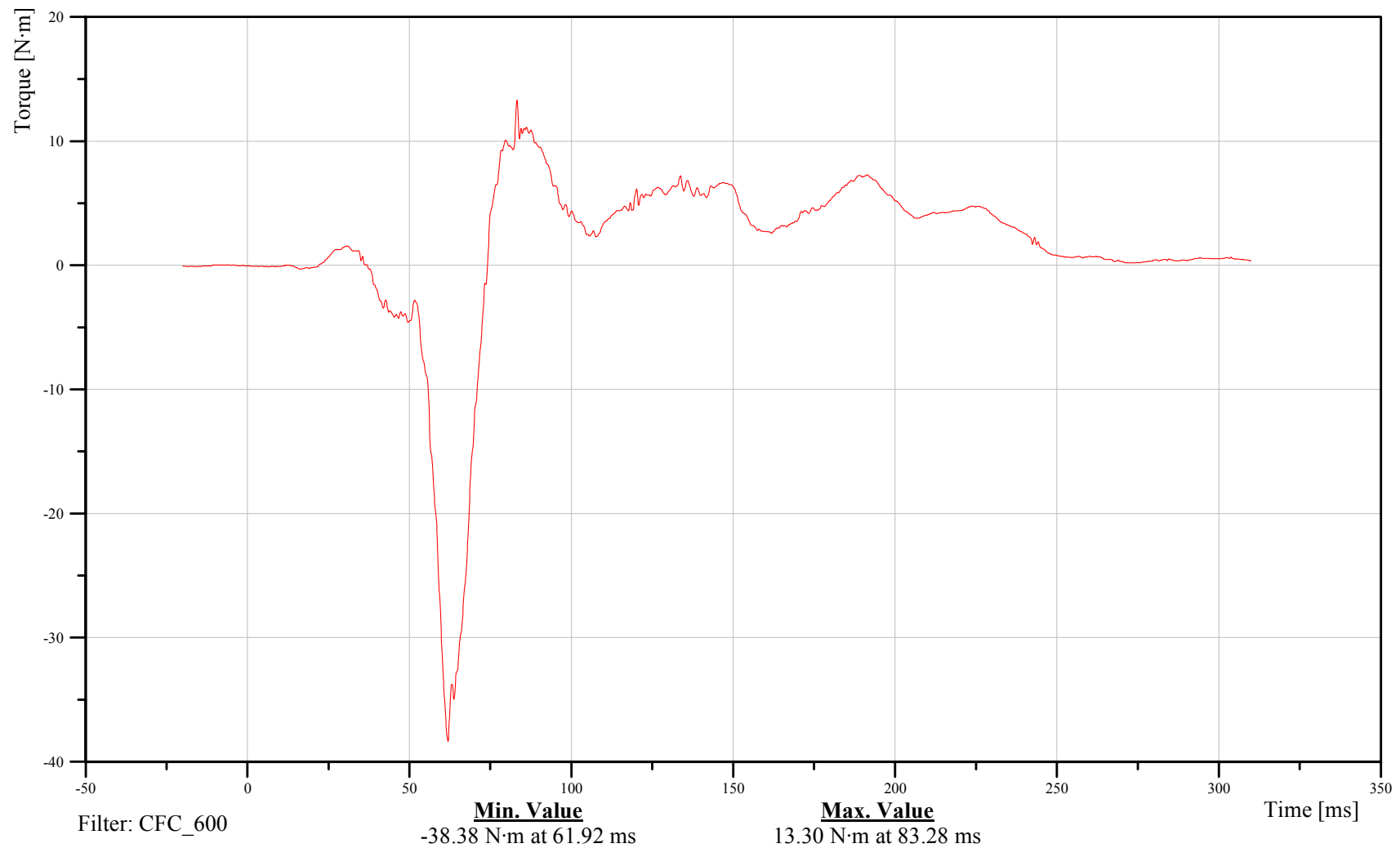
Time: 16:17

Customer: VRTC

11FEMRRI00E2MOZB

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Right Side Sill at Front Seat Y-axis Acceleration

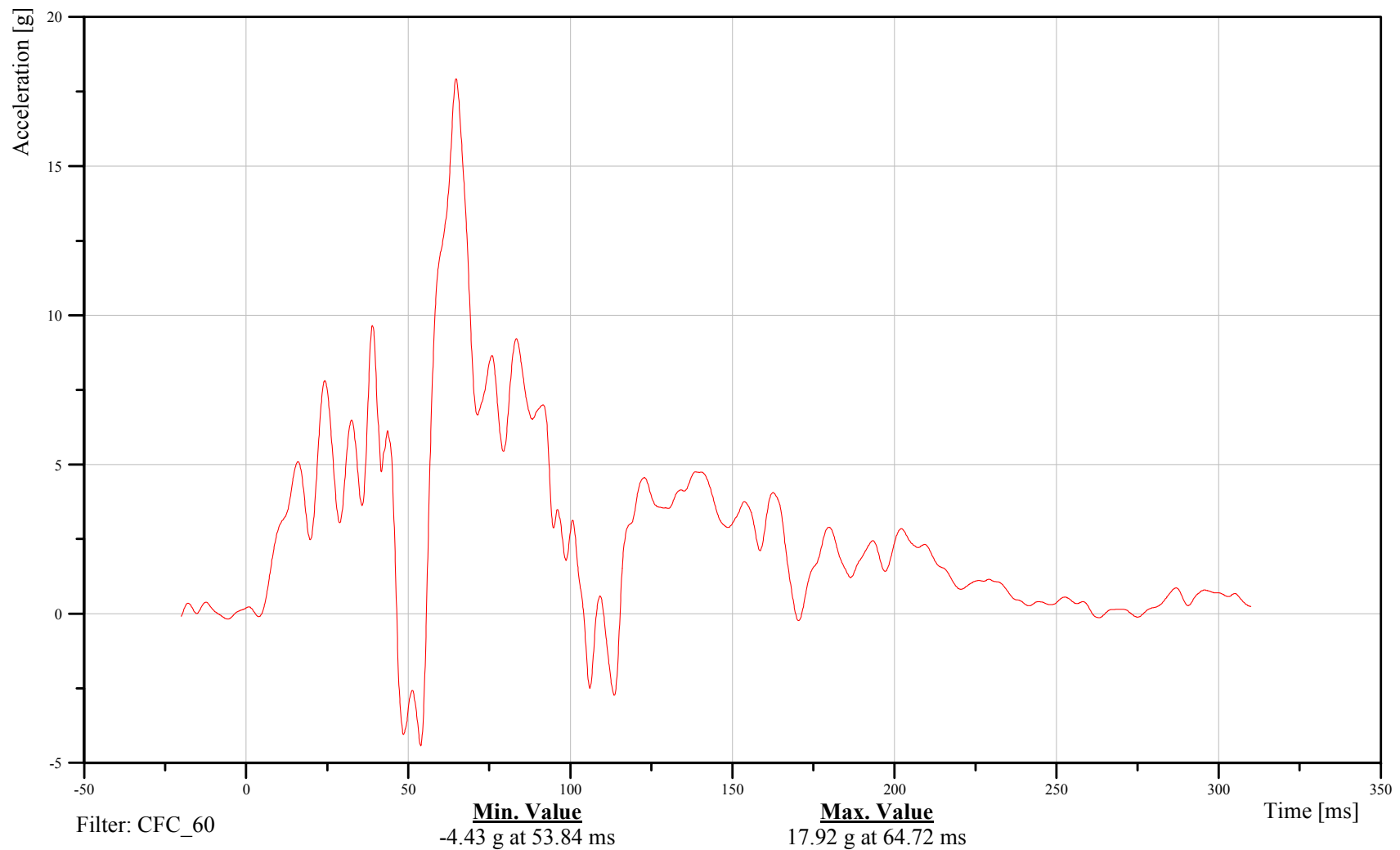
Time: 16:17

Customer: VRTC

16SILBFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

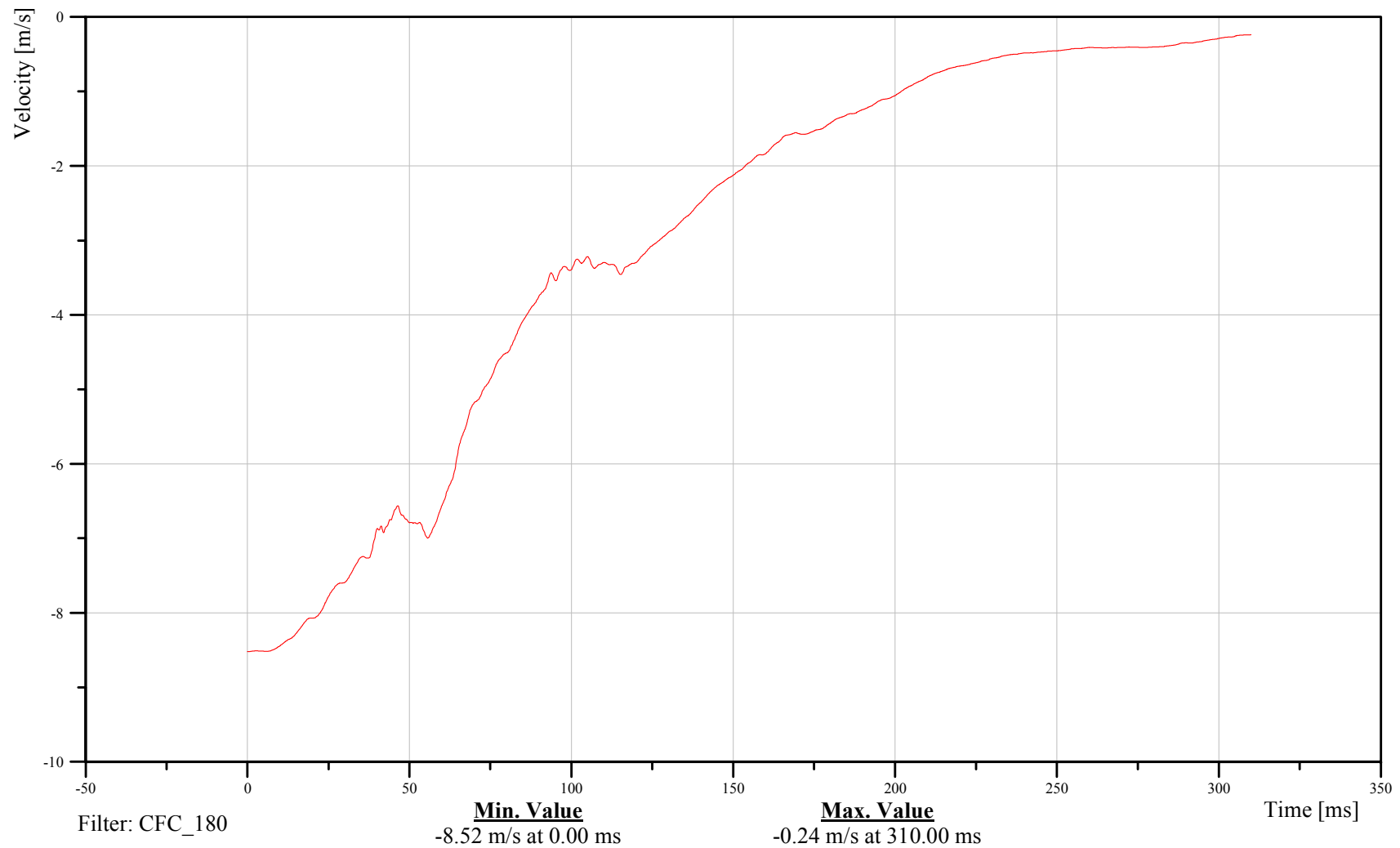
Right Side Sill at Front Seat Y-axis Velocity

Customer: VRTC

16SILBFR0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

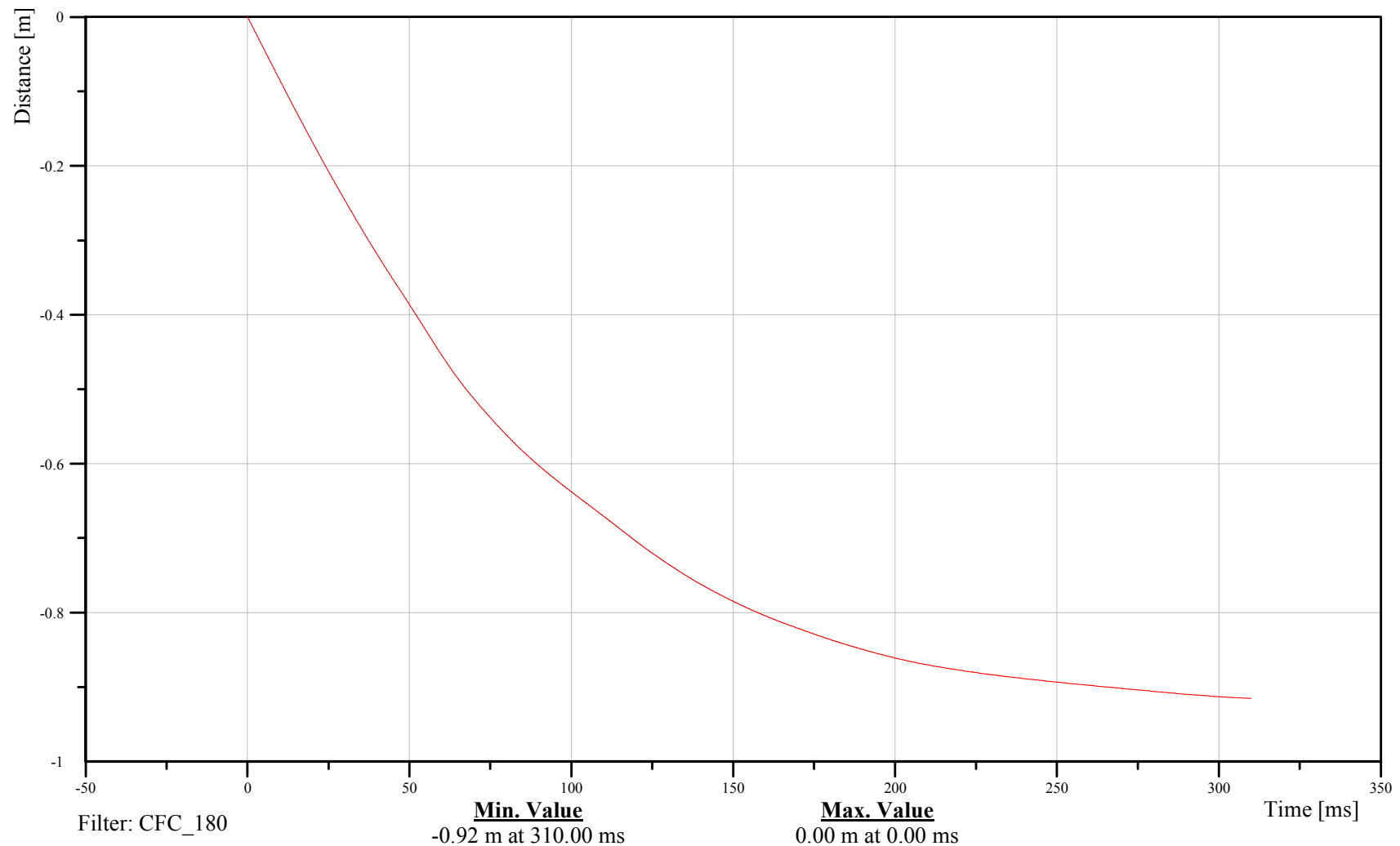
Right Side Sill at Front Seat Y-axis Displacement

Customer: VRTC

16SILBFR0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Side Sill at Front Seat Y-axis Acceleration

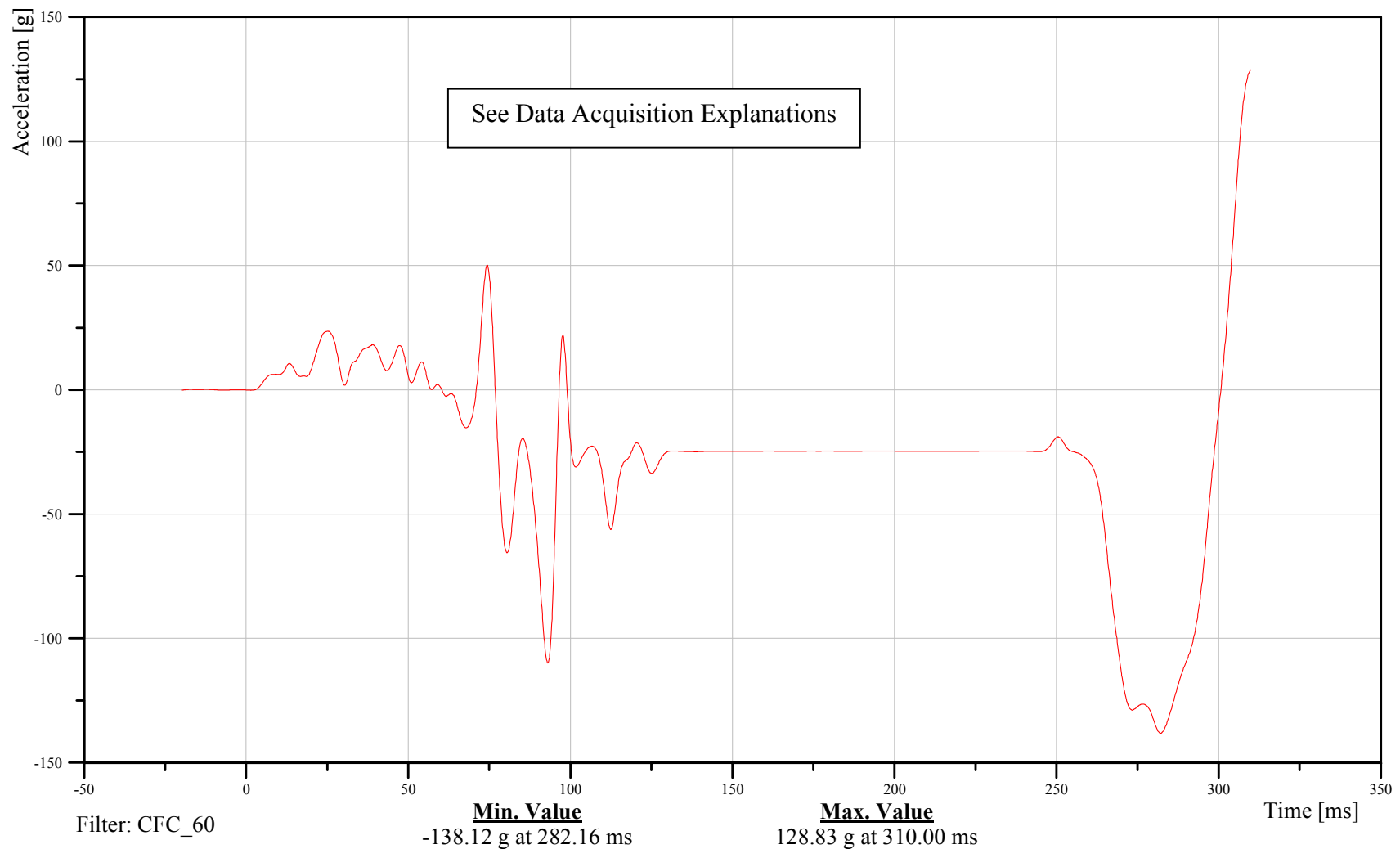
Date: 10/06/2005
Time: 16:17

Customer: VRTC

14SILBFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Side Sill at Front Seat Y-axis Velocity

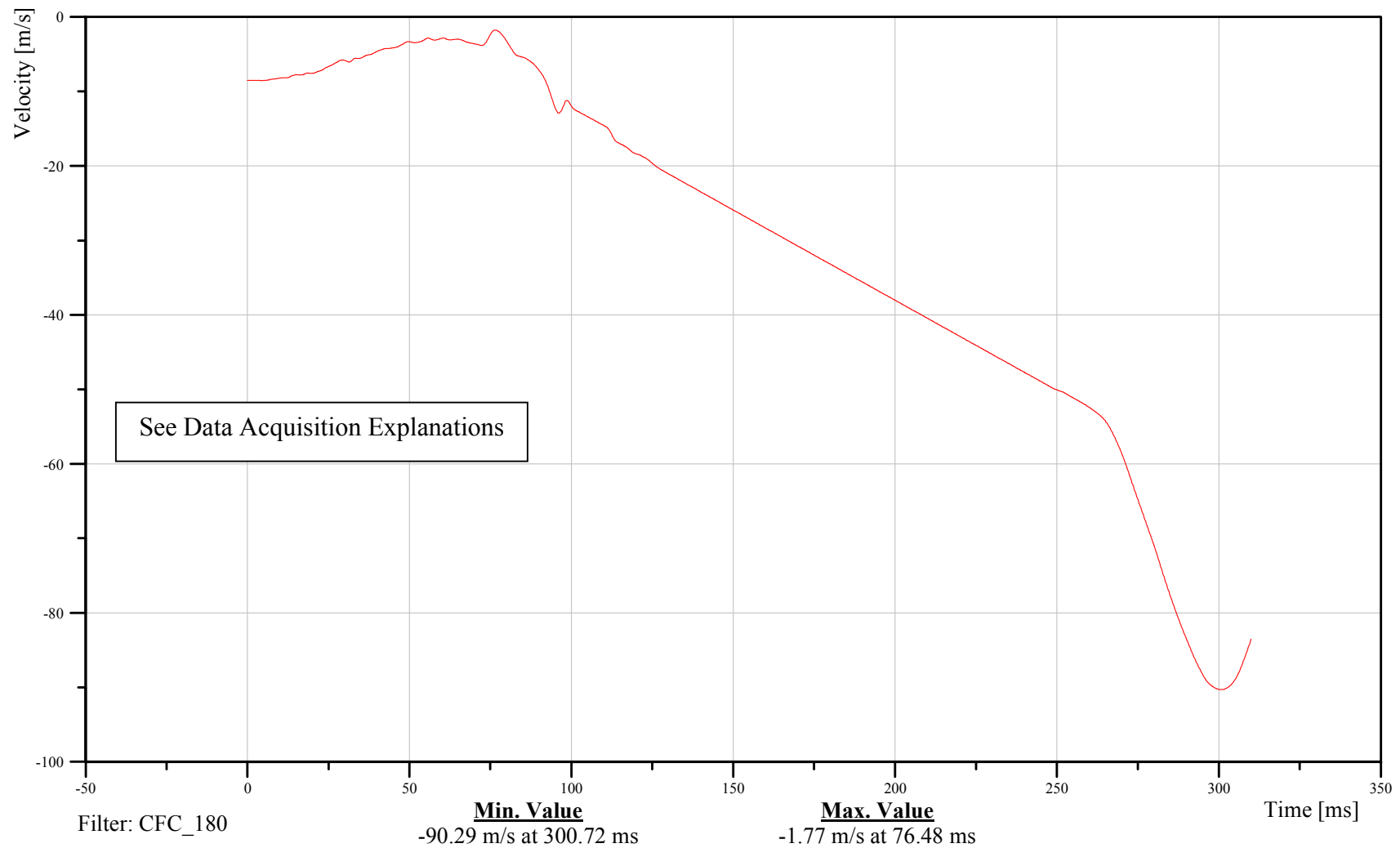
Date: 10/06/2005
Time: 16:17

Customer: VRTC

14SILBFR0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Side Sill at Front Seat Y-axis Displacement

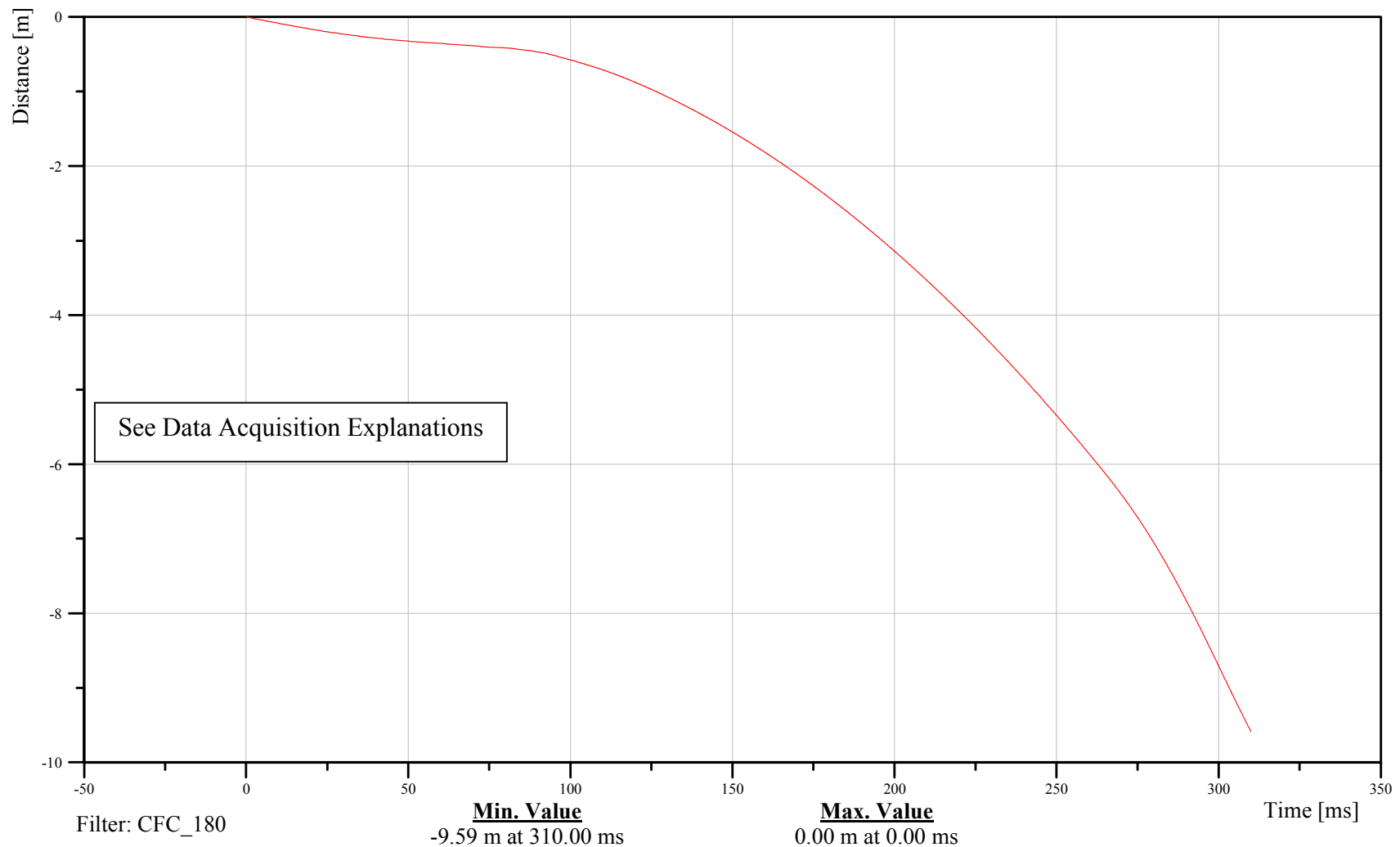
Date: 10/06/2005
Time: 16:17

Customer: VRTC

14SILBFR0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Bottom B-Post Y-Axis Acceleration

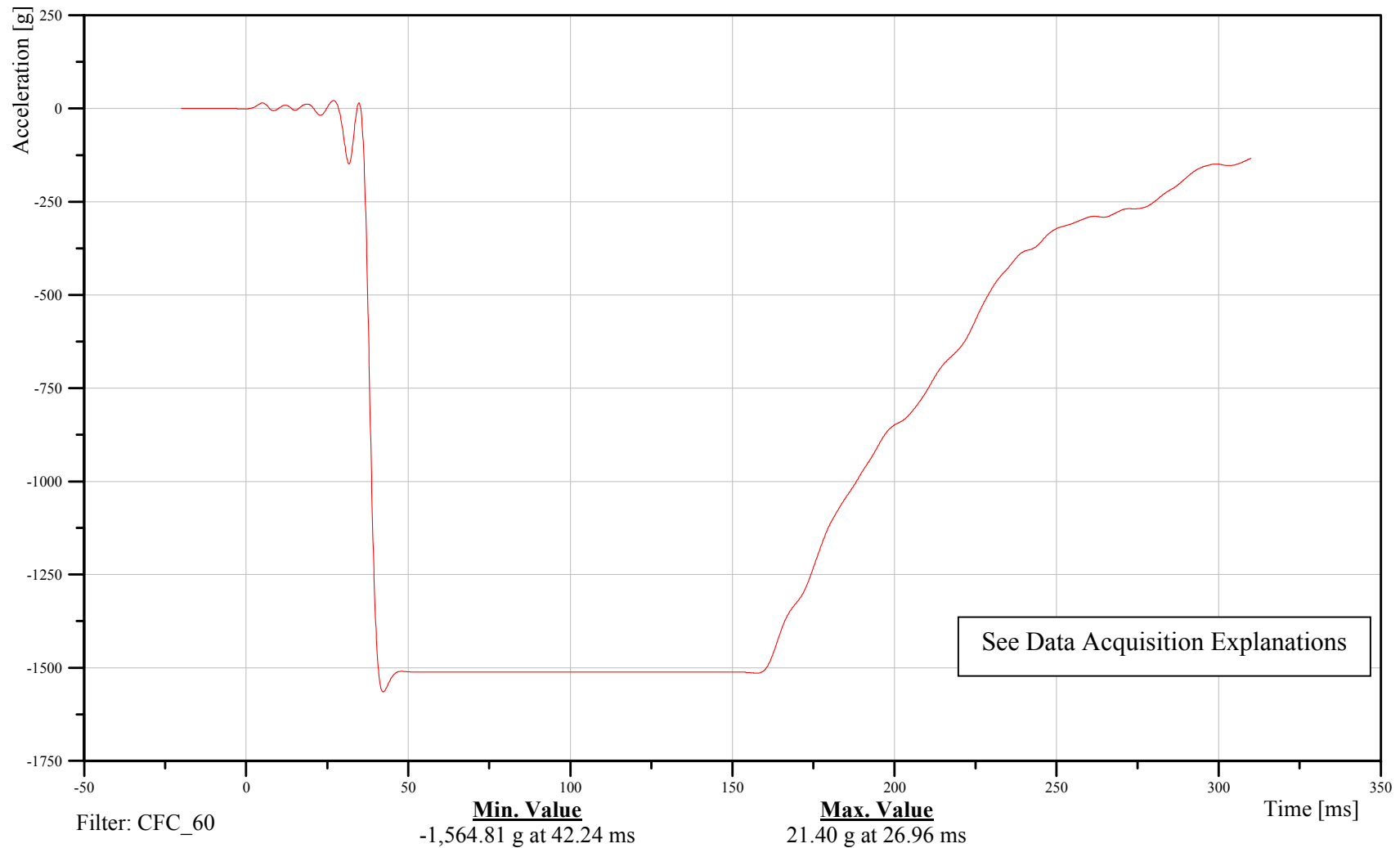
Date: 10/06/2005
Time: 16:17

Customer: VRTC

14BPILBO00000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Lower B-Post Y-Axis Acceleration

Date: 10/06/2005

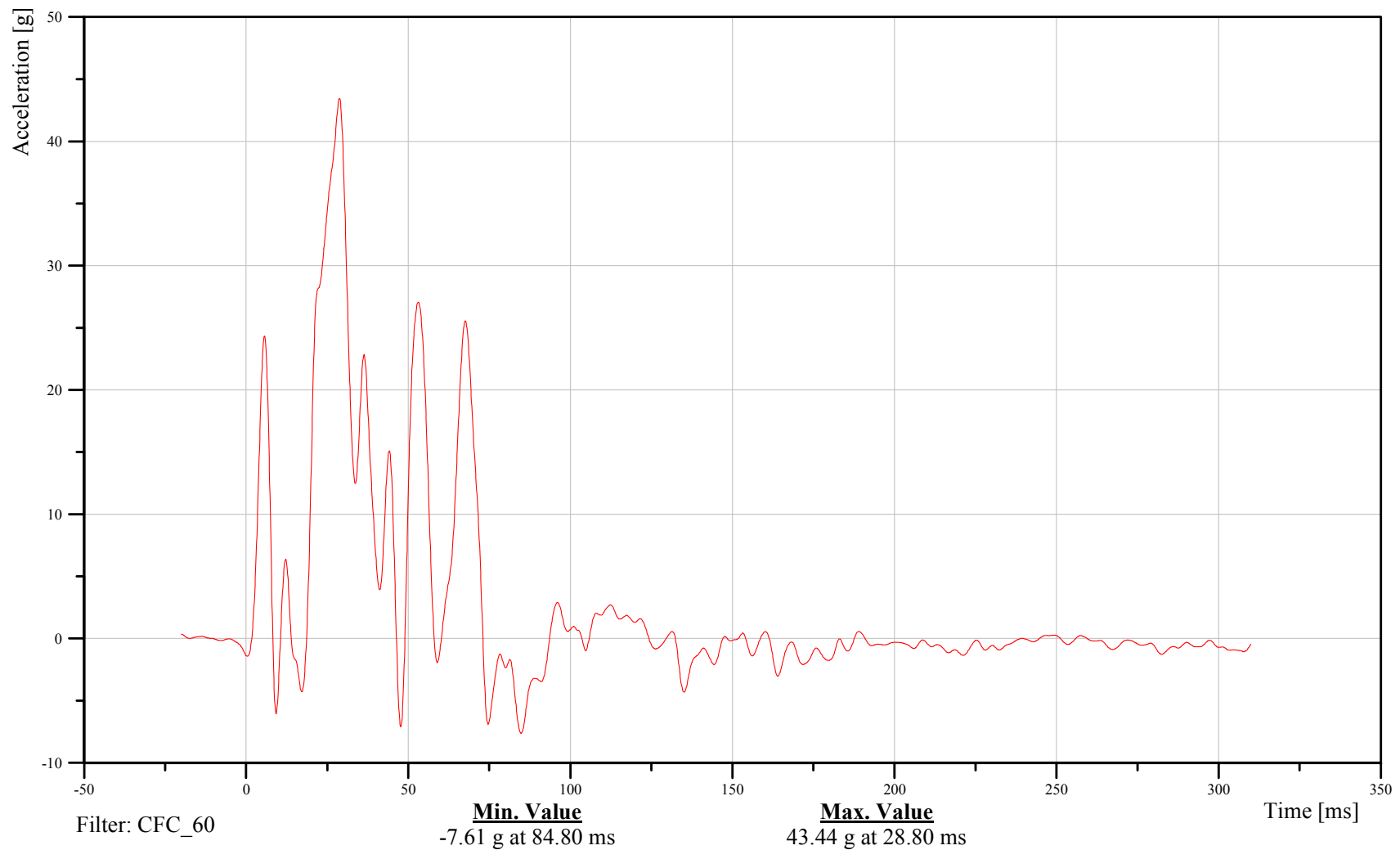
Time: 16:17

Customer: VRTC

14BPILLO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Middle B-Post Y-Axis Acceleration

Date: 10/06/2005

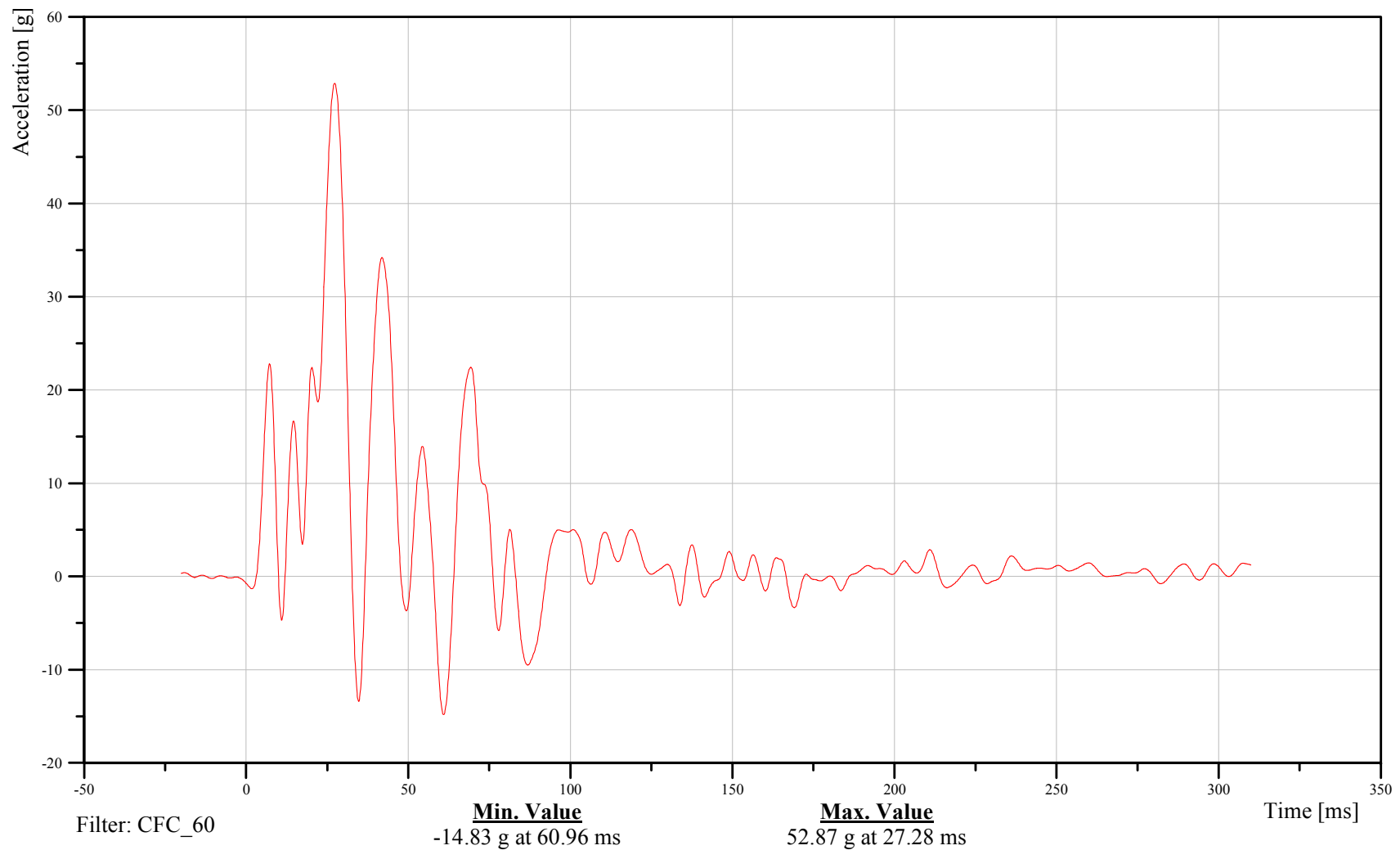
Time: 16:17

Customer: VRTC

14BPILMI0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Bottom A-Post Y-Axis Acceleration

Date: 10/06/2005

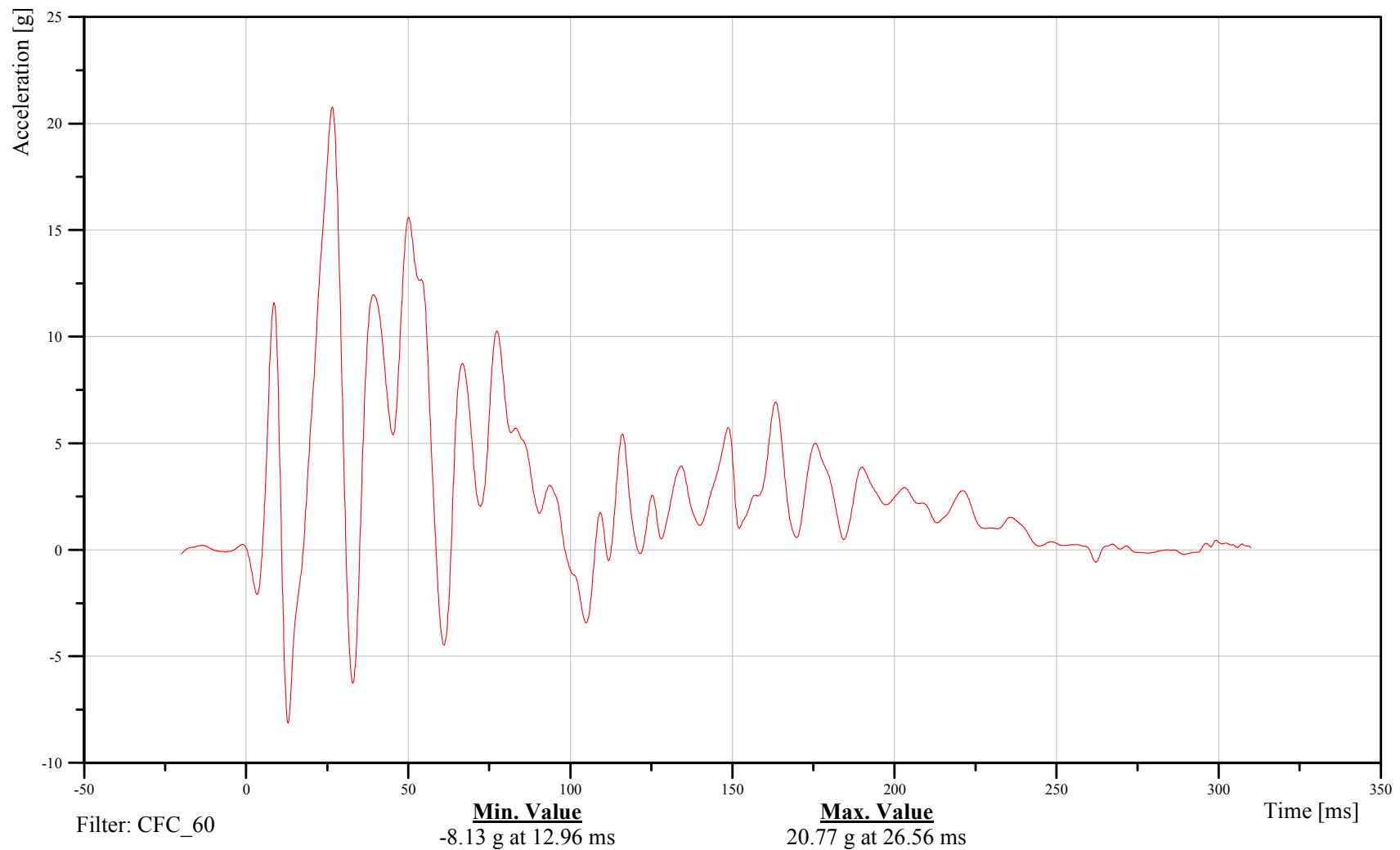
Time: 16:17

Customer: VRTC

11APILBO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Lower A-Post Y-Axis Acceleration

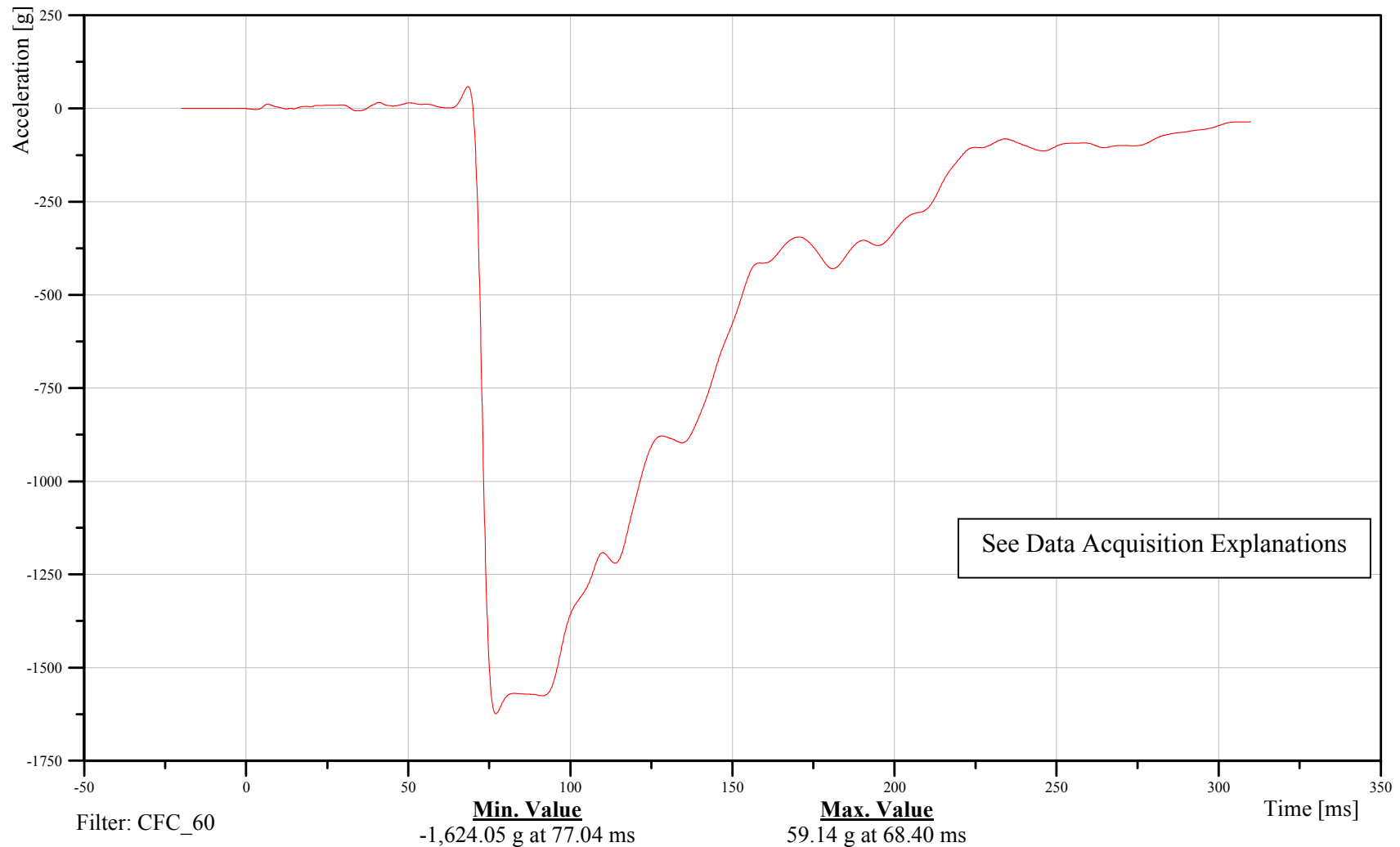
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11APILO0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Middle A-Post Y-Axis Acceleration

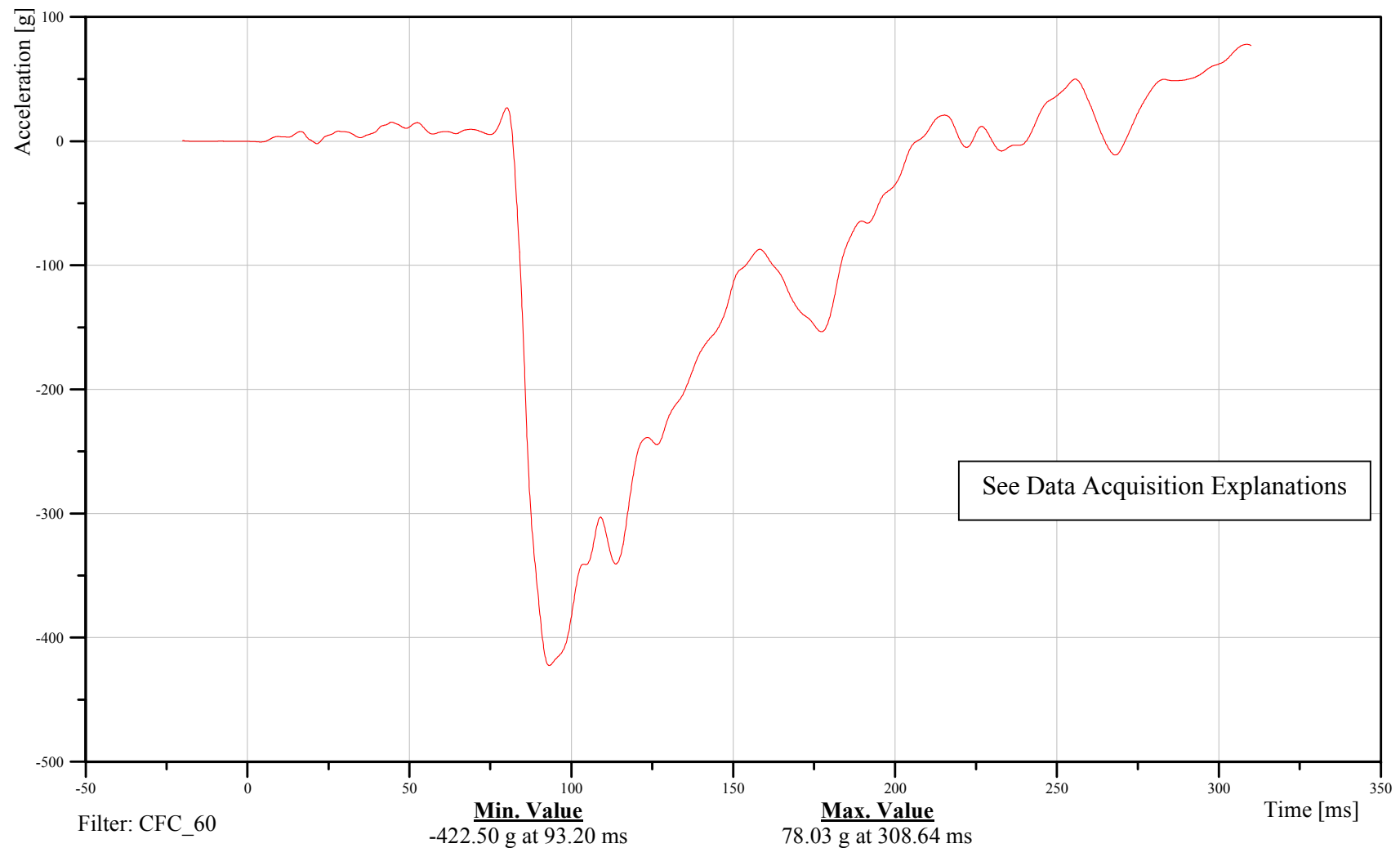
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11APILMI0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Left Front Seat Track Y-Axis Acceleration

Date: 10/06/2005

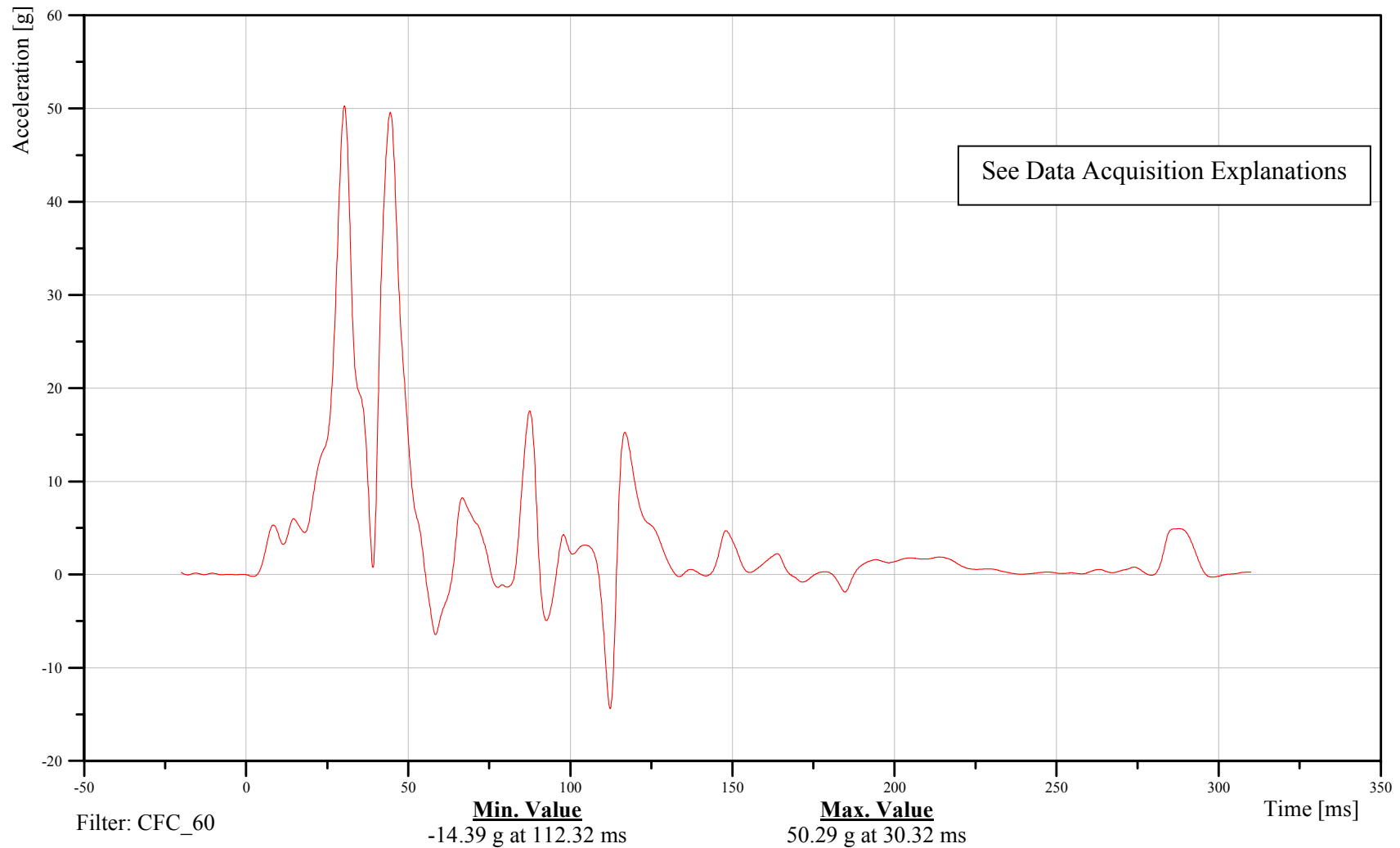
Time: 16:17

Customer: VRTC

11SETRFR0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Vehicle Center of Gravity X-Axis Acceleration

Date: 10/06/2005

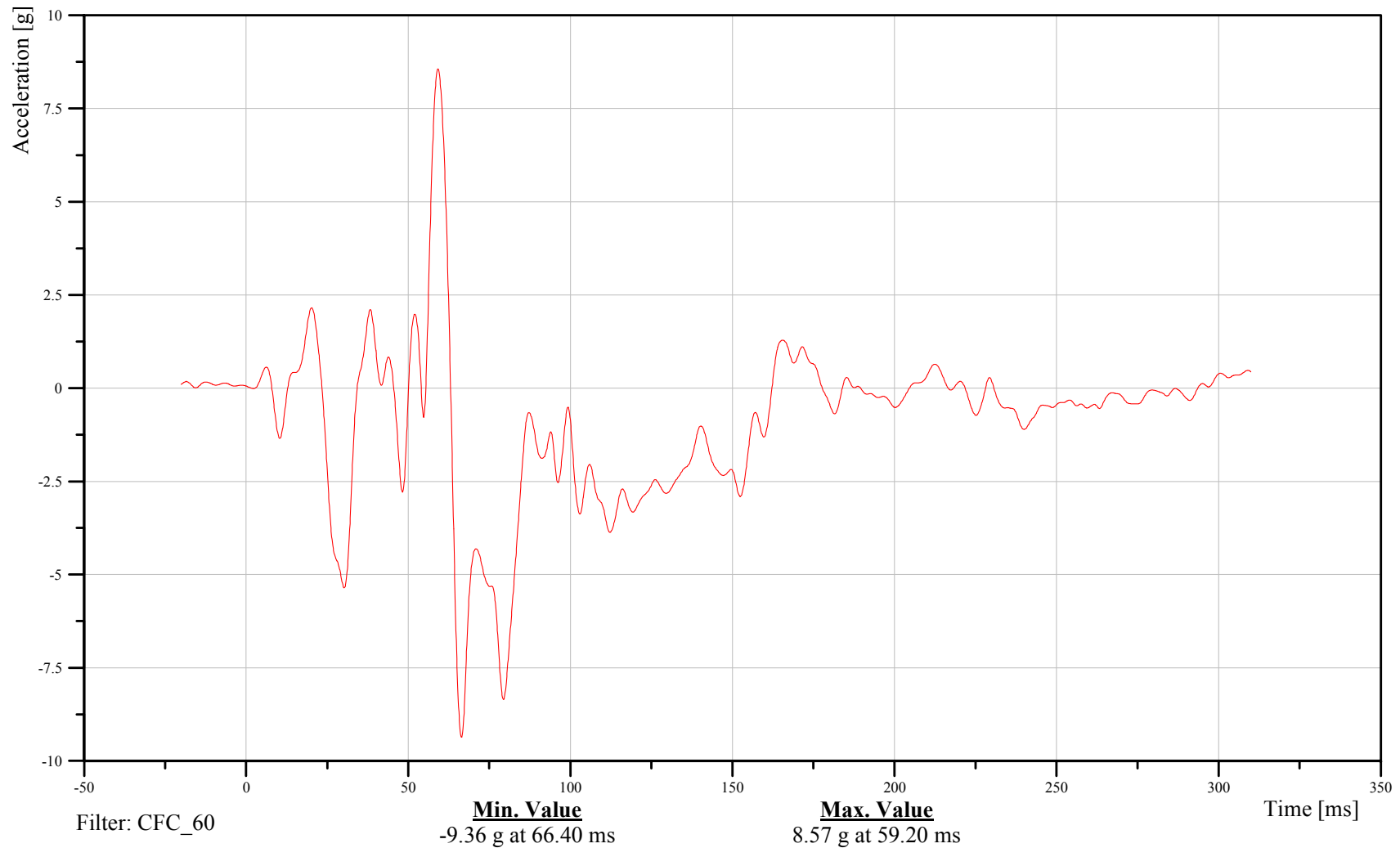
Time: 16:17

Customer: VRTC

10VEHCCG0000ACXD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Vehicle Center of Gravity X-Axis Velocity

Date: 10/06/2005

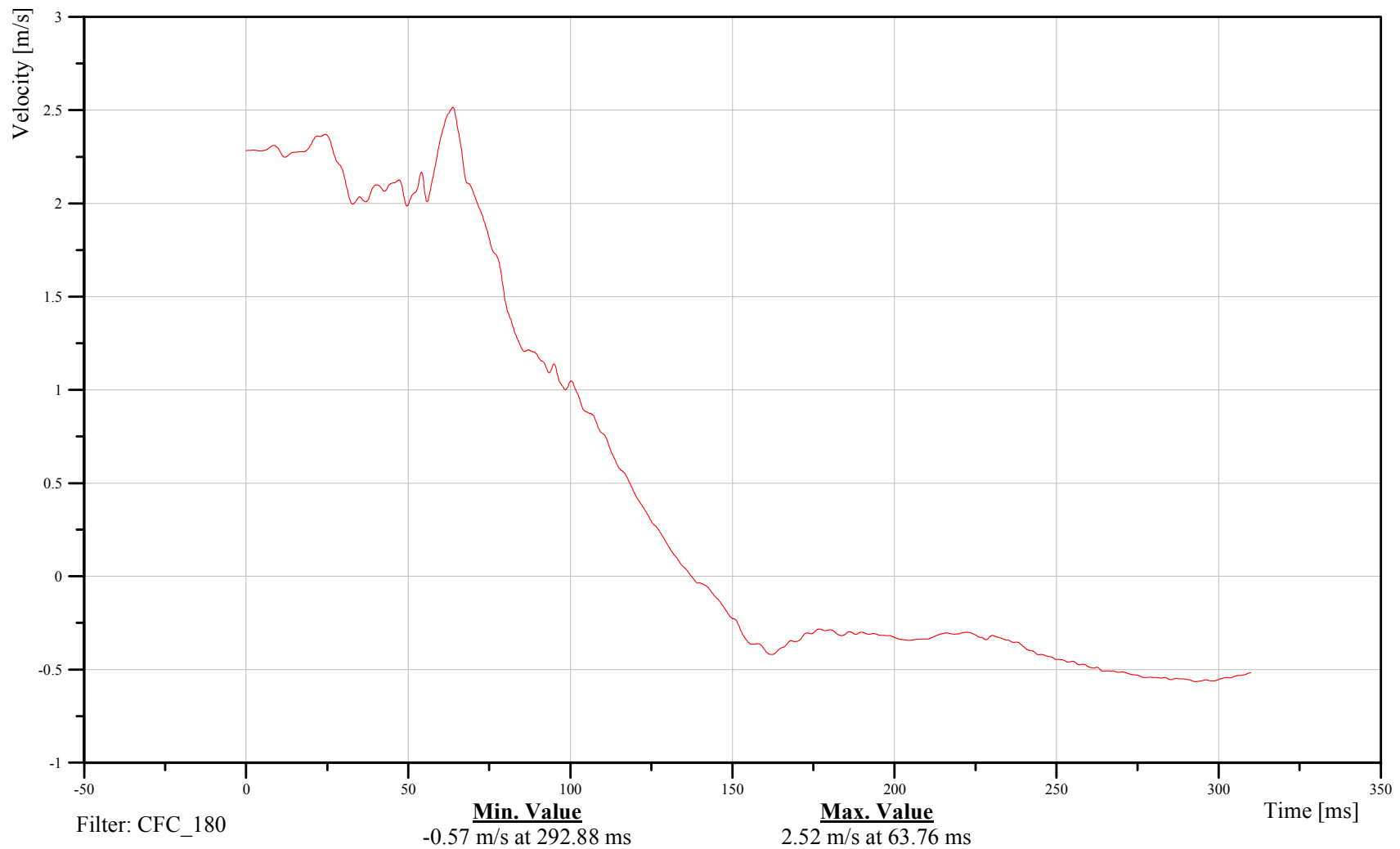
Time: 16:17

Customer: VRTC

10VEHCCG0000VEXC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

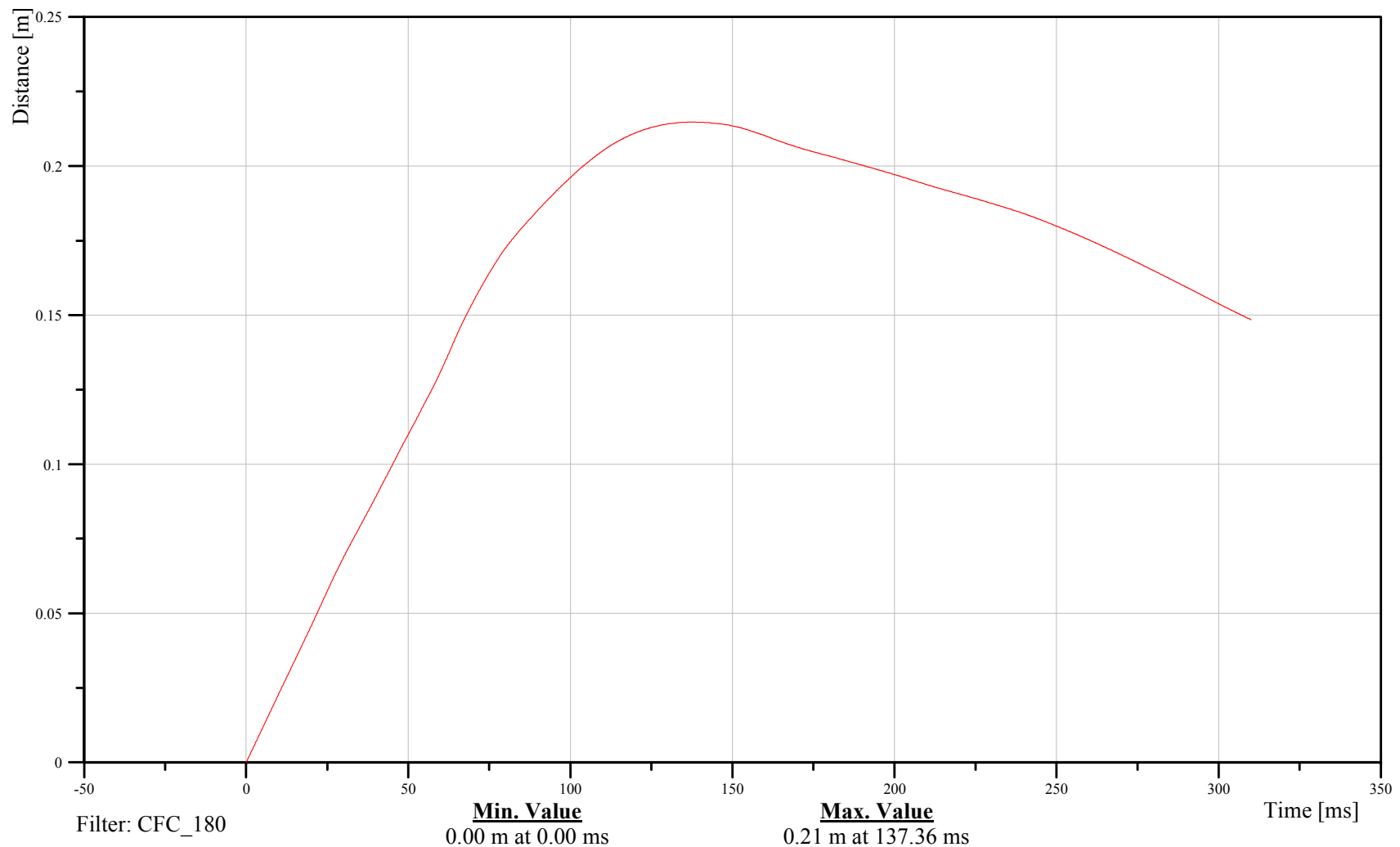
Vehicle Center of Gravity X-Axis Displacement

Customer: VRTC

10VEHCCG0000DCXC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Vehicle Center of Gravity Y-Axis Acceleration

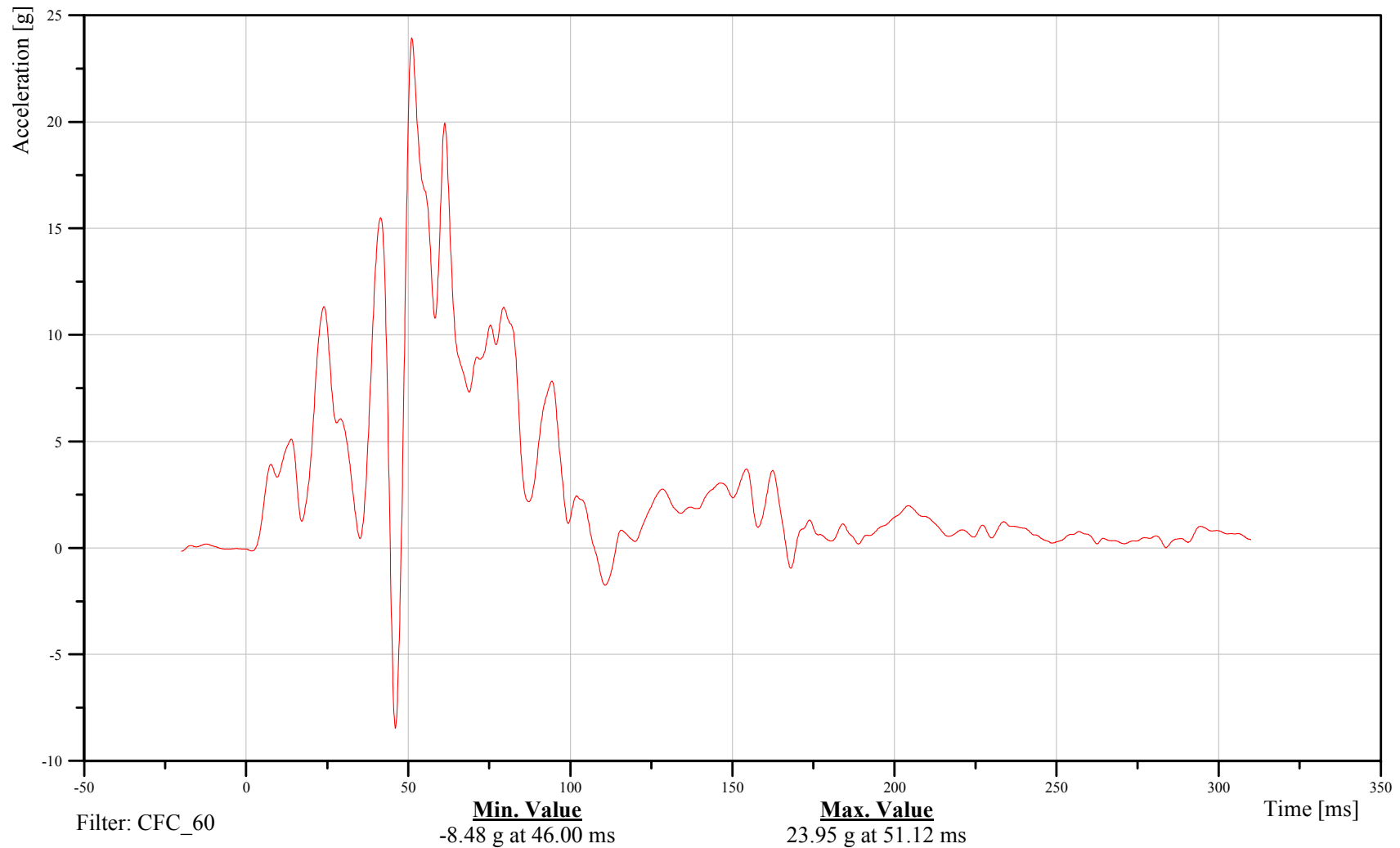
Date: 10/06/2005
Time: 16:17

Customer: VRTC

10VEHCCG0000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

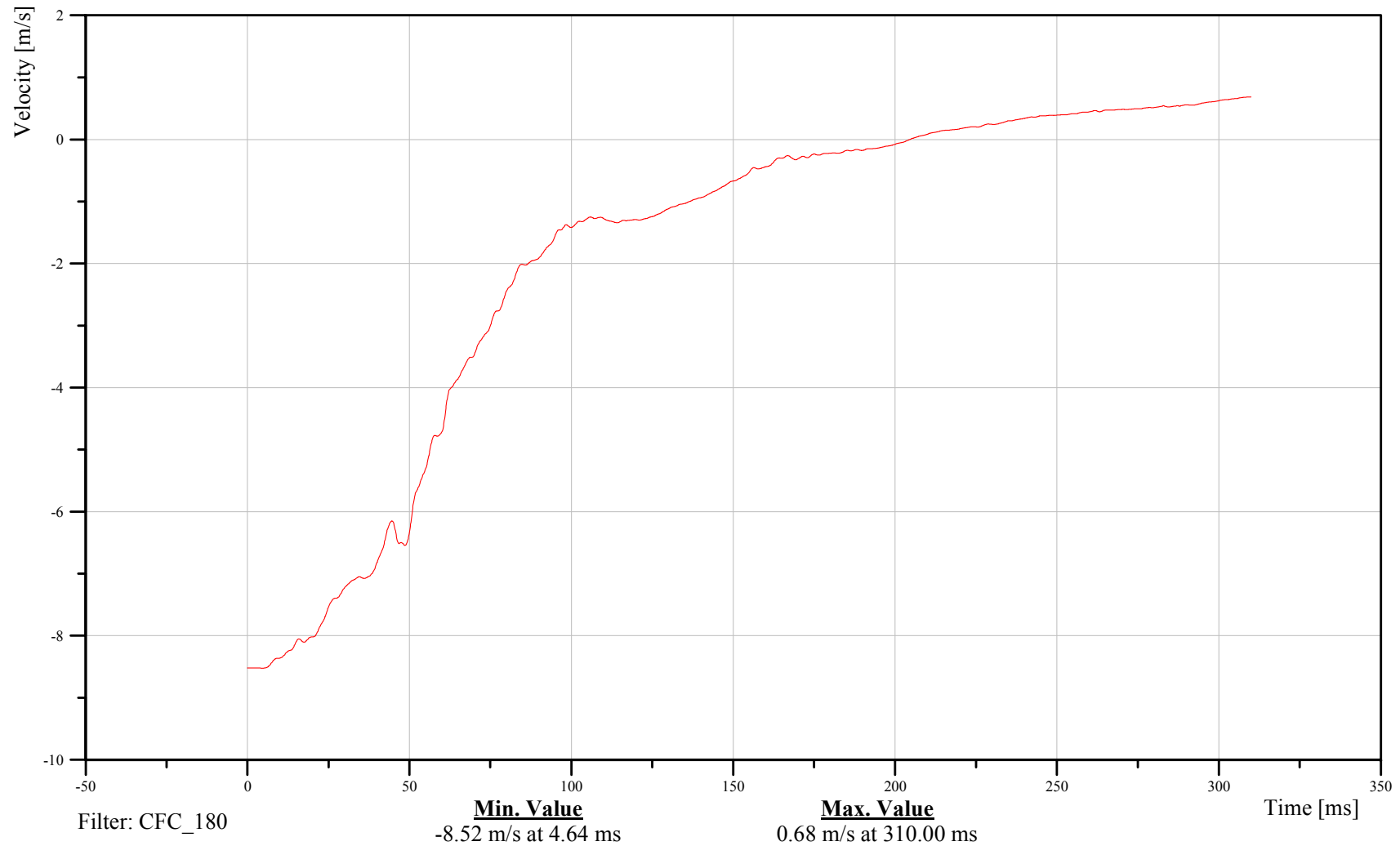
Vehicle Center of Gravity Y-Axis Velocity

Customer: VRTC

10VEHCCG0000VEYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Vehicle Center of Gravity Y-Axis Displacement

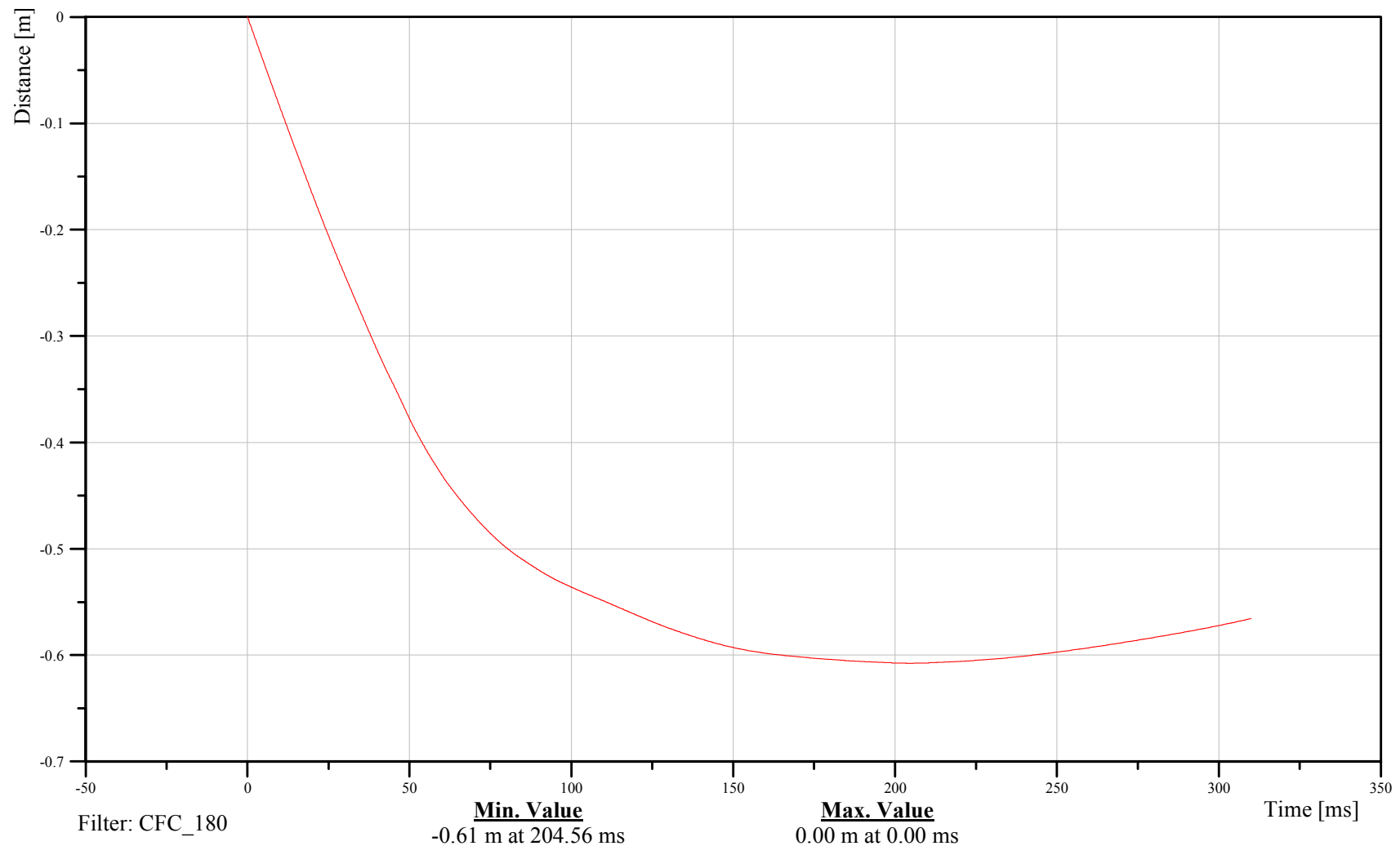
Date: 10/06/2005
Time: 16:17

Customer: VRTC

10VEHCCG0000DCYC

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Vehicle Center of Gravity Z-Axis Acceleration

Date: 10/06/2005

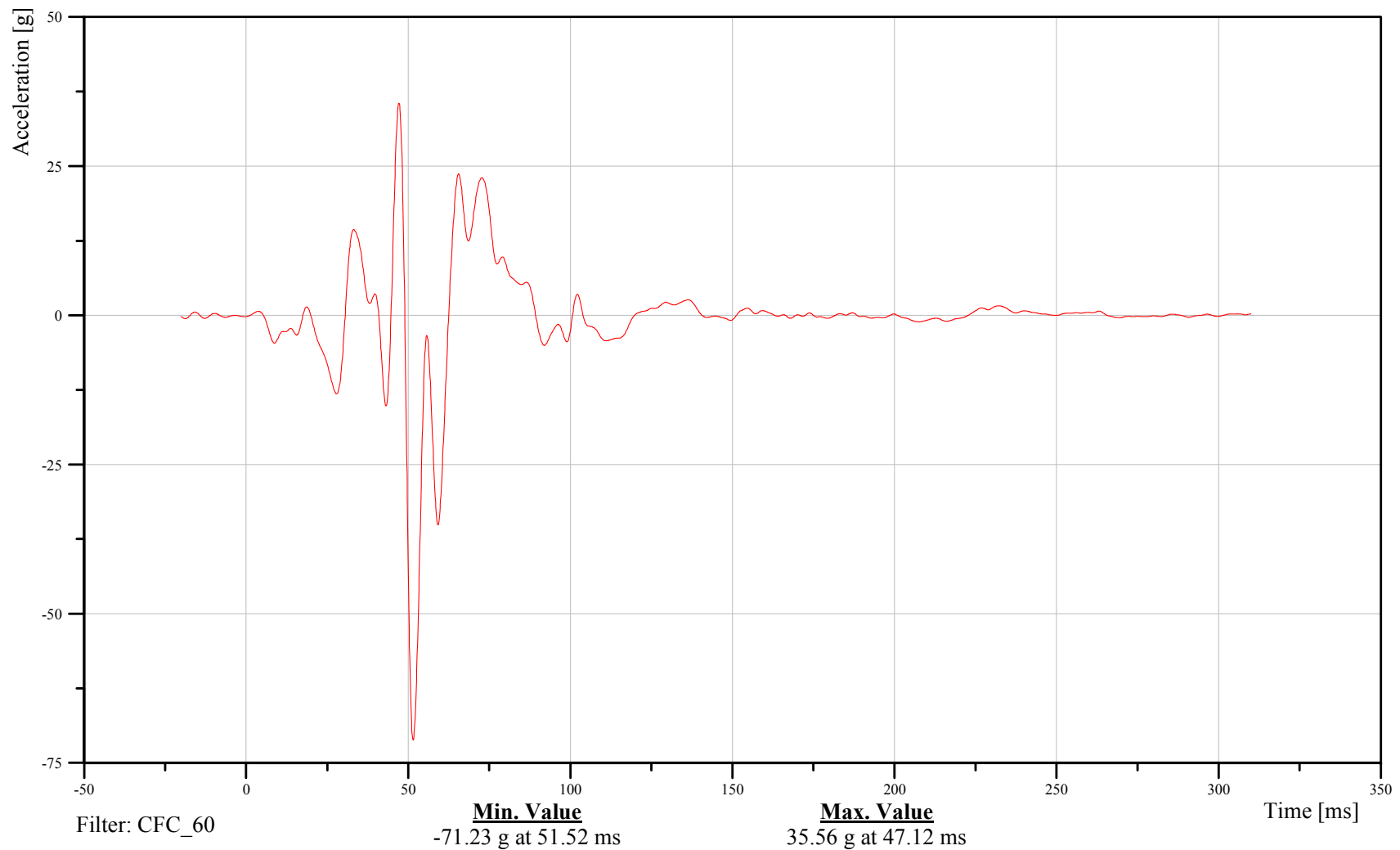
Time: 16:17

Customer: VRTC

10VEHCCG0000ACZD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

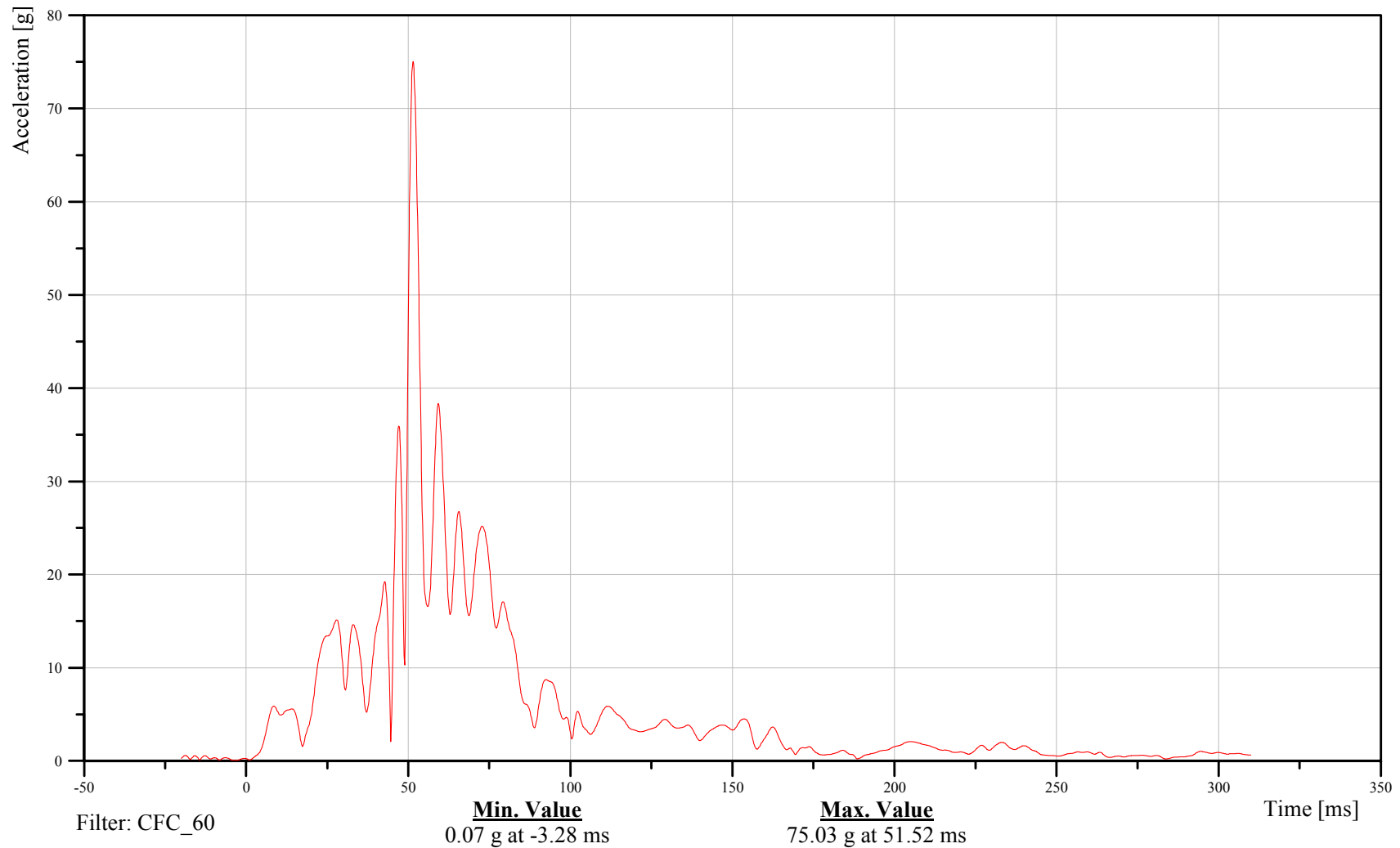
Vehicle Center of Gravity Resultant Acceleration

Customer: VRTC

10VEHCCG0000ACRD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

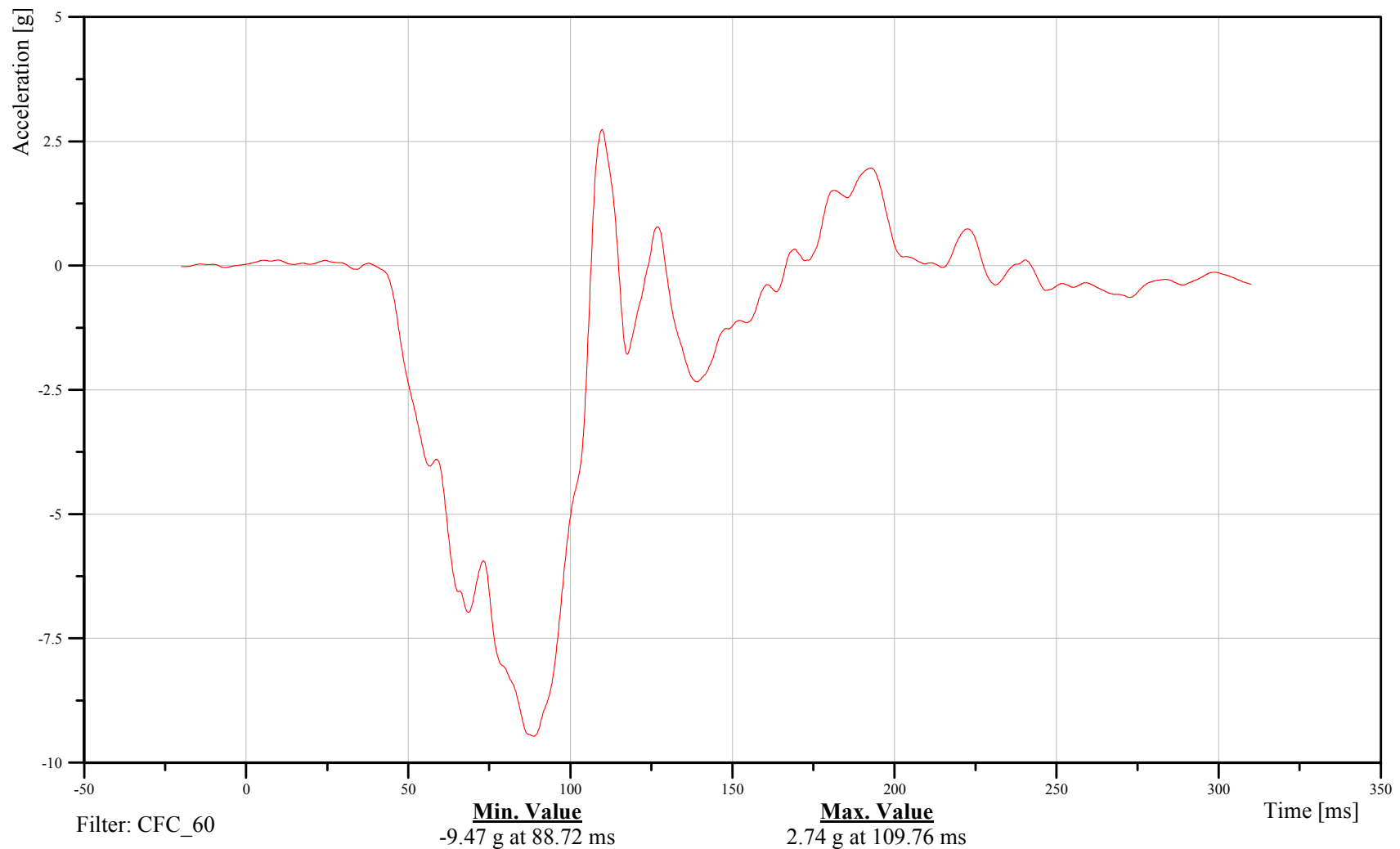
Top of Engine X-Axis Acceleration

Customer: VRTC

12ENG000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Top of Engine Y-Axis Acceleration

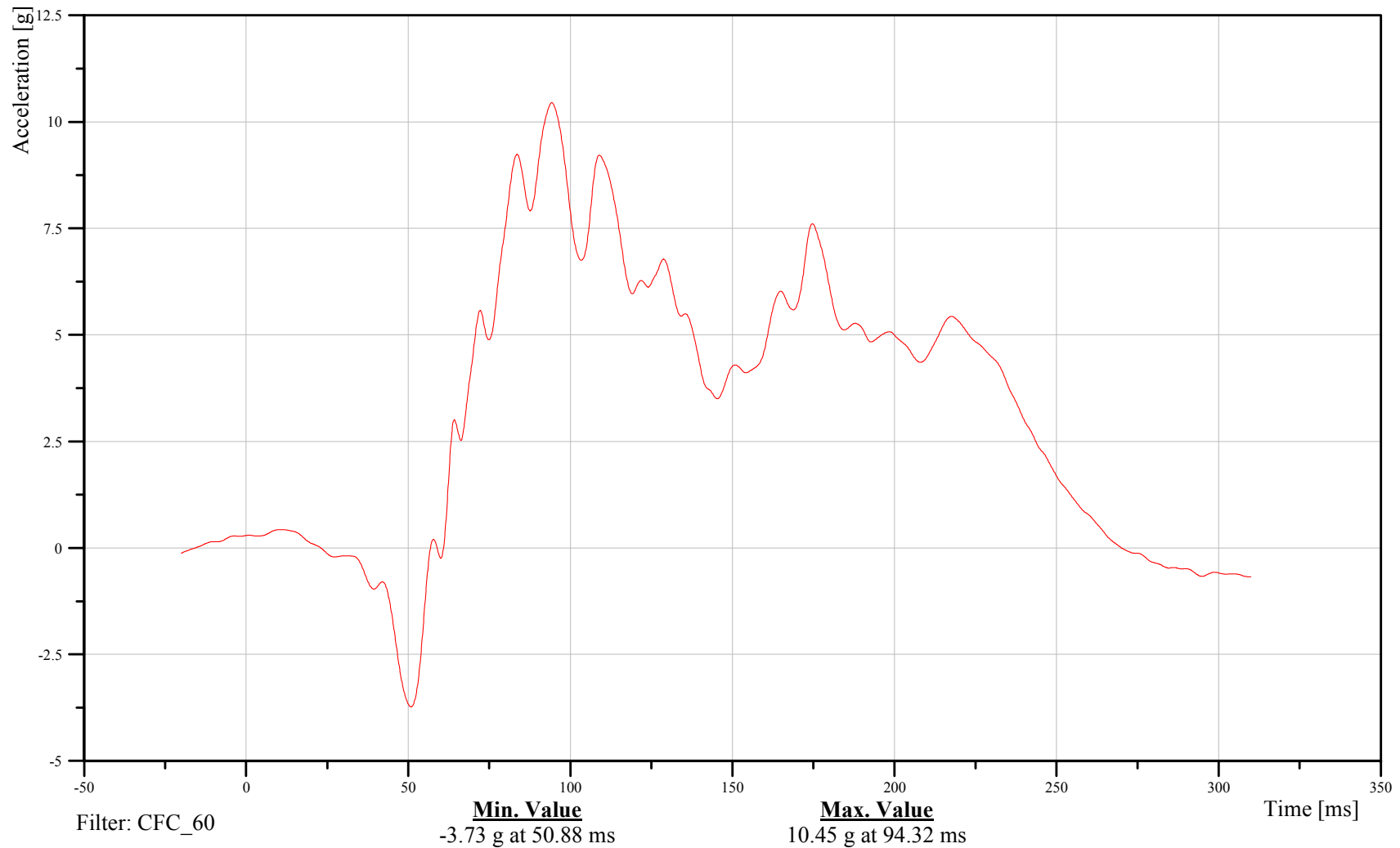
Date: 10/06/2005
Time: 16:17

Customer: VRTC

12ENG000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Firewall X-Axis Acceleration

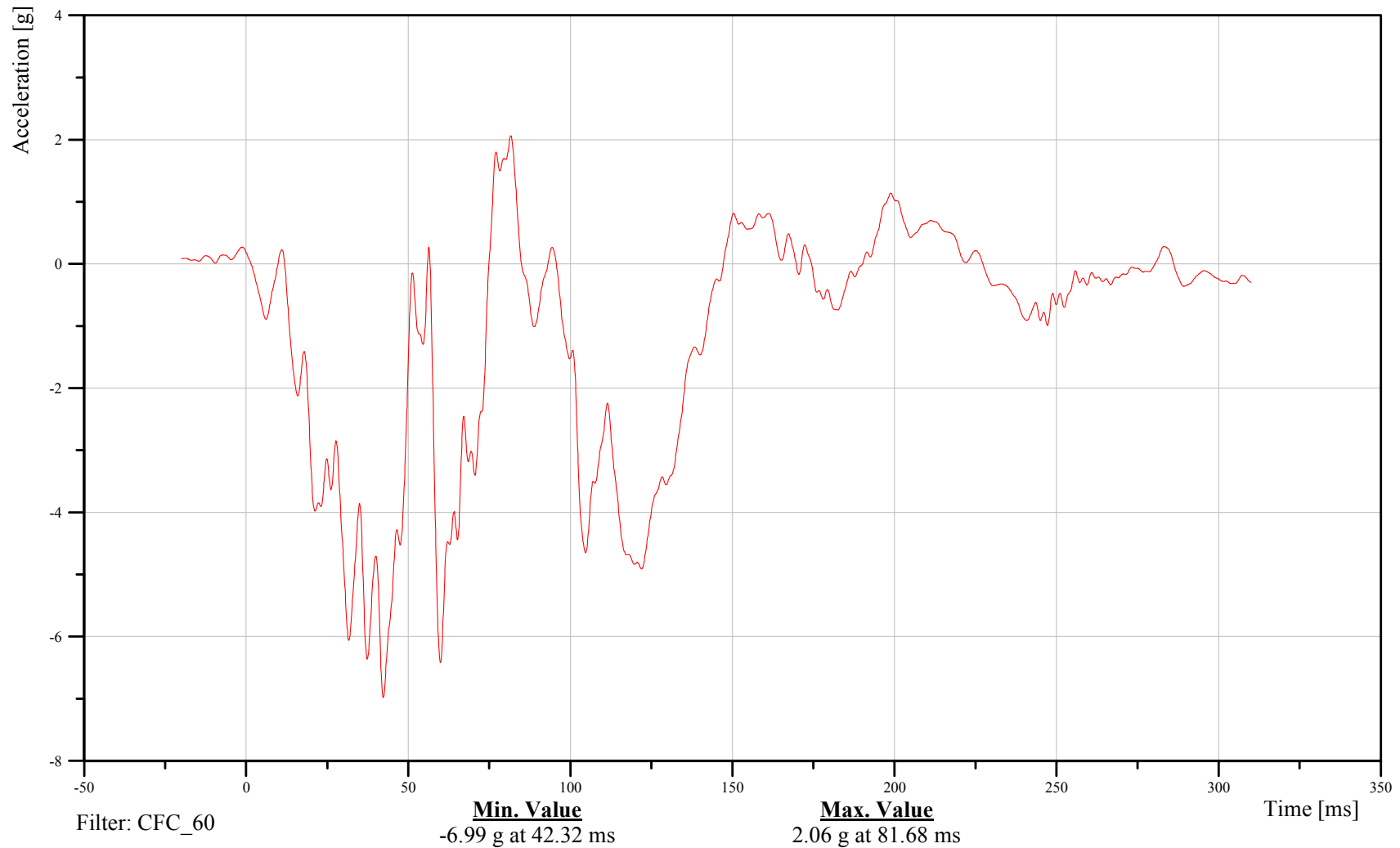
Date: 10/06/2005
Time: 16:17

Customer: VRTC

12VEHC000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Firewall Y-Axis Acceleration

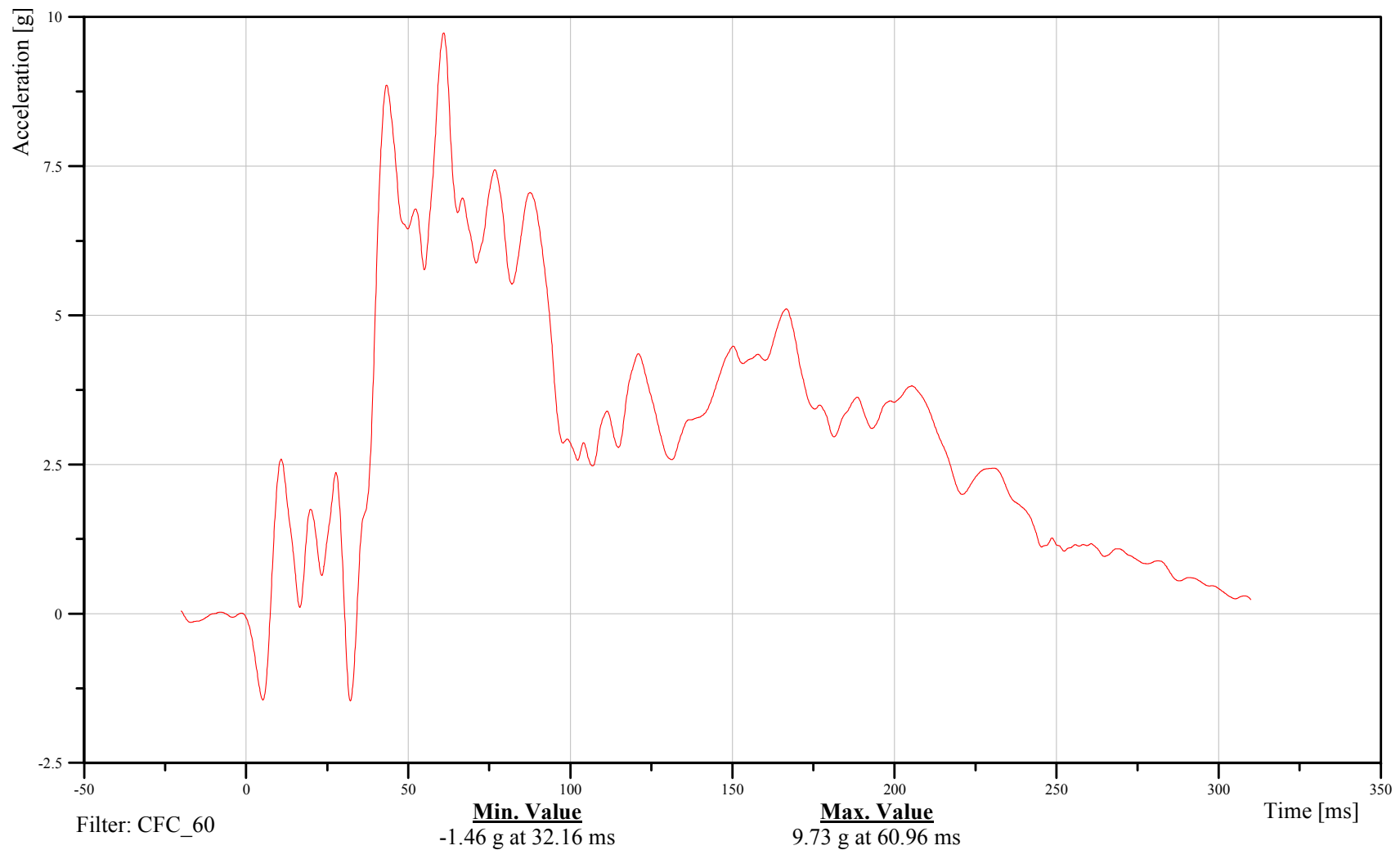
Date: 10/06/2005
Time: 16:17

Customer: VRTC

12VEHC000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

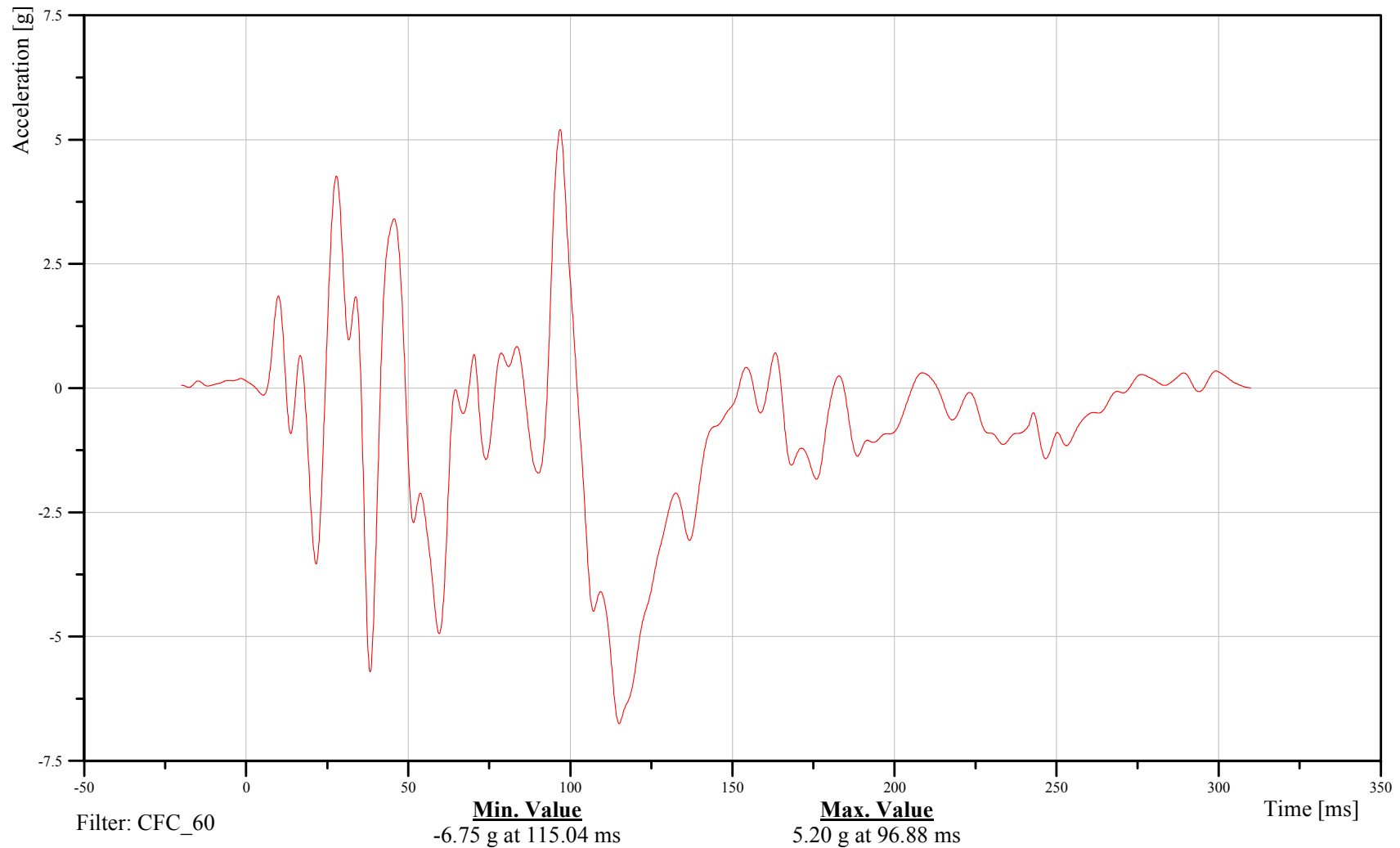
Right Roof Rail X-Axis Acceleration

Customer: VRTC

13ROFR000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

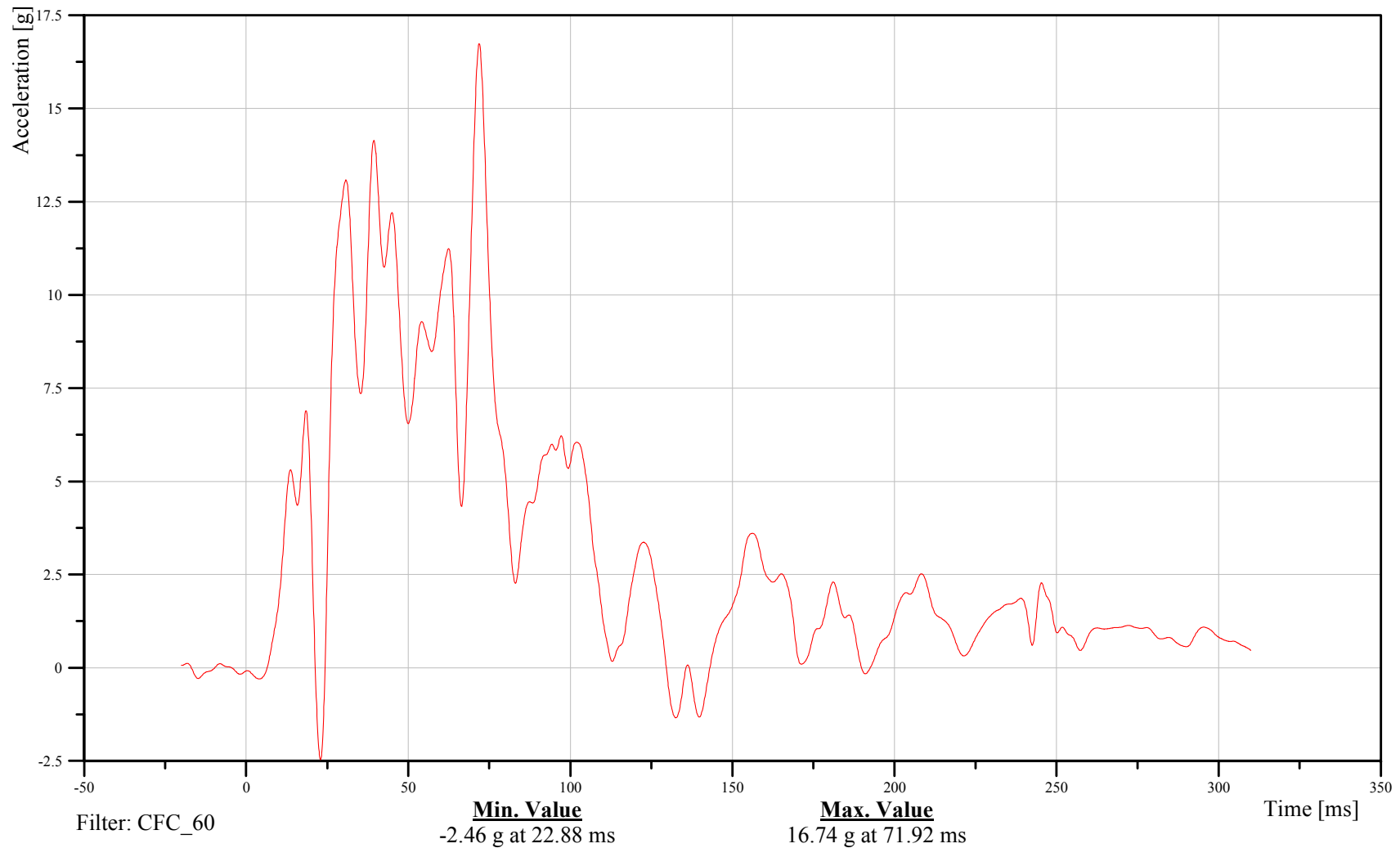
Right Roof Rail Y-Axis Acceleration

Customer: VRTC

13ROFR000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Rear Bed X-Axis Acceleration

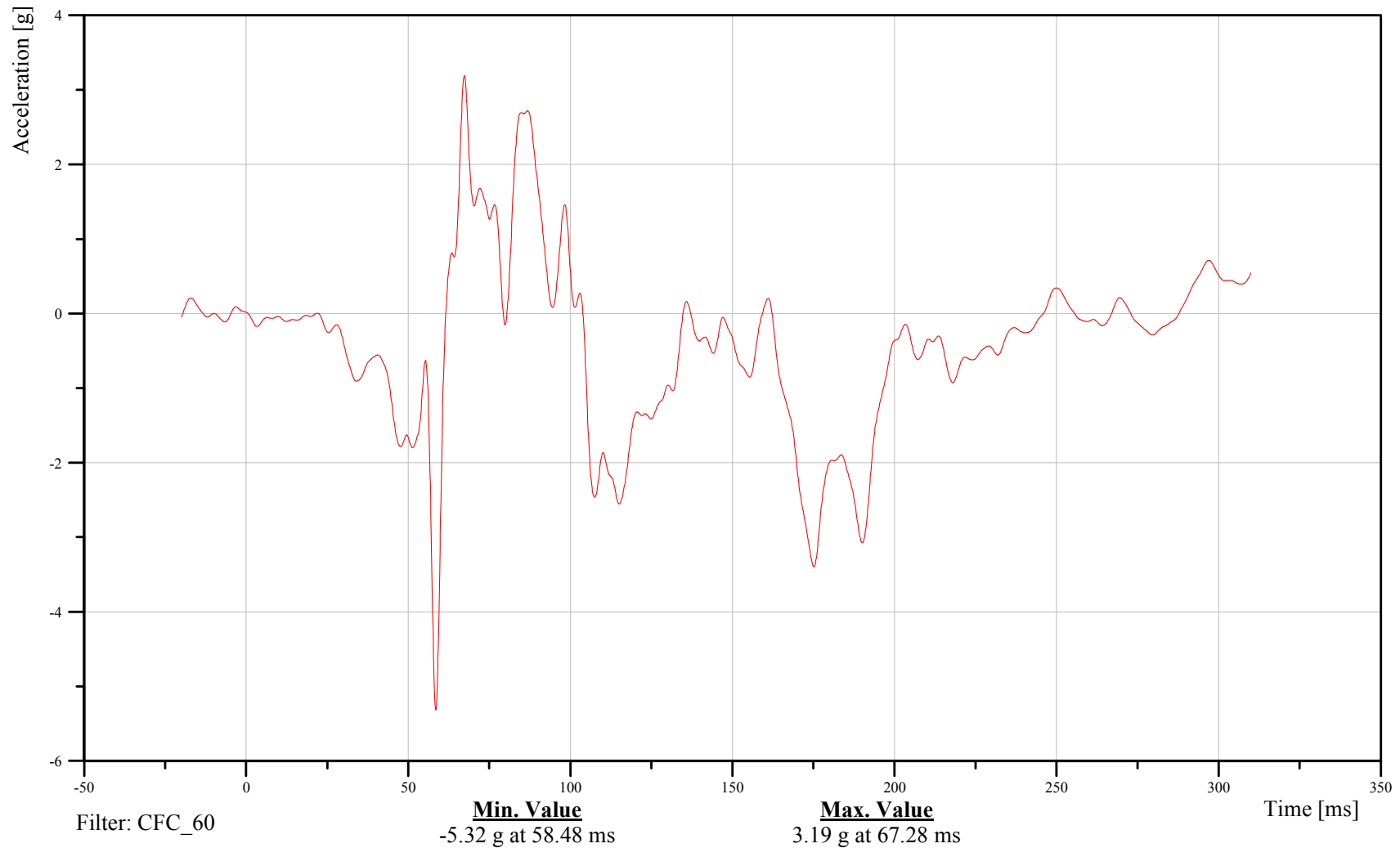
Date: 10/06/2005
Time: 16:17

Customer: VRTC

18VEHC000000ACXD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Rear Bed Y-Axis Acceleration

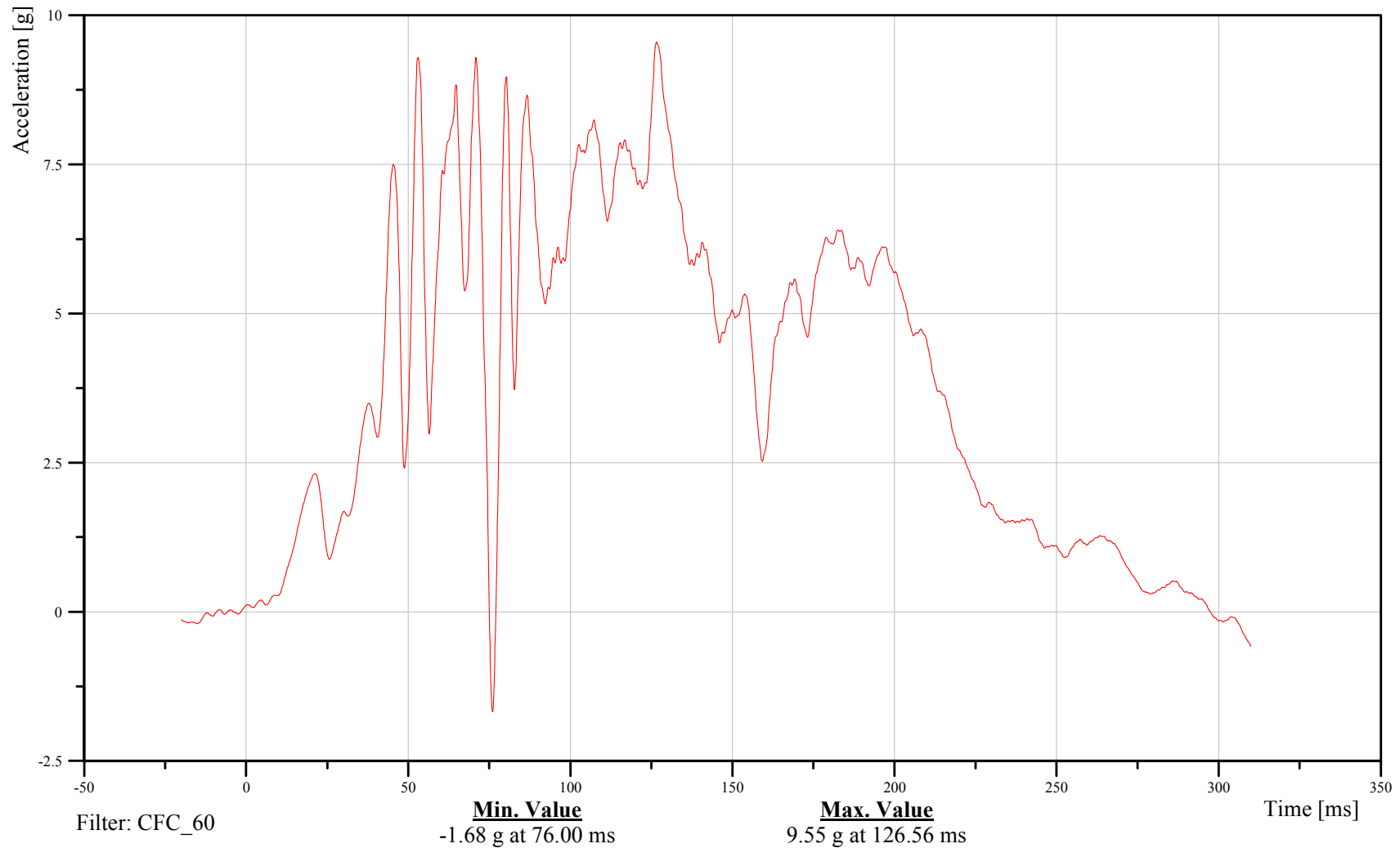
Date: 10/06/2005
Time: 16:17

Customer: VRTC

18VEHC000000ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Door at Dummy Arm Y-Axis Acceleration

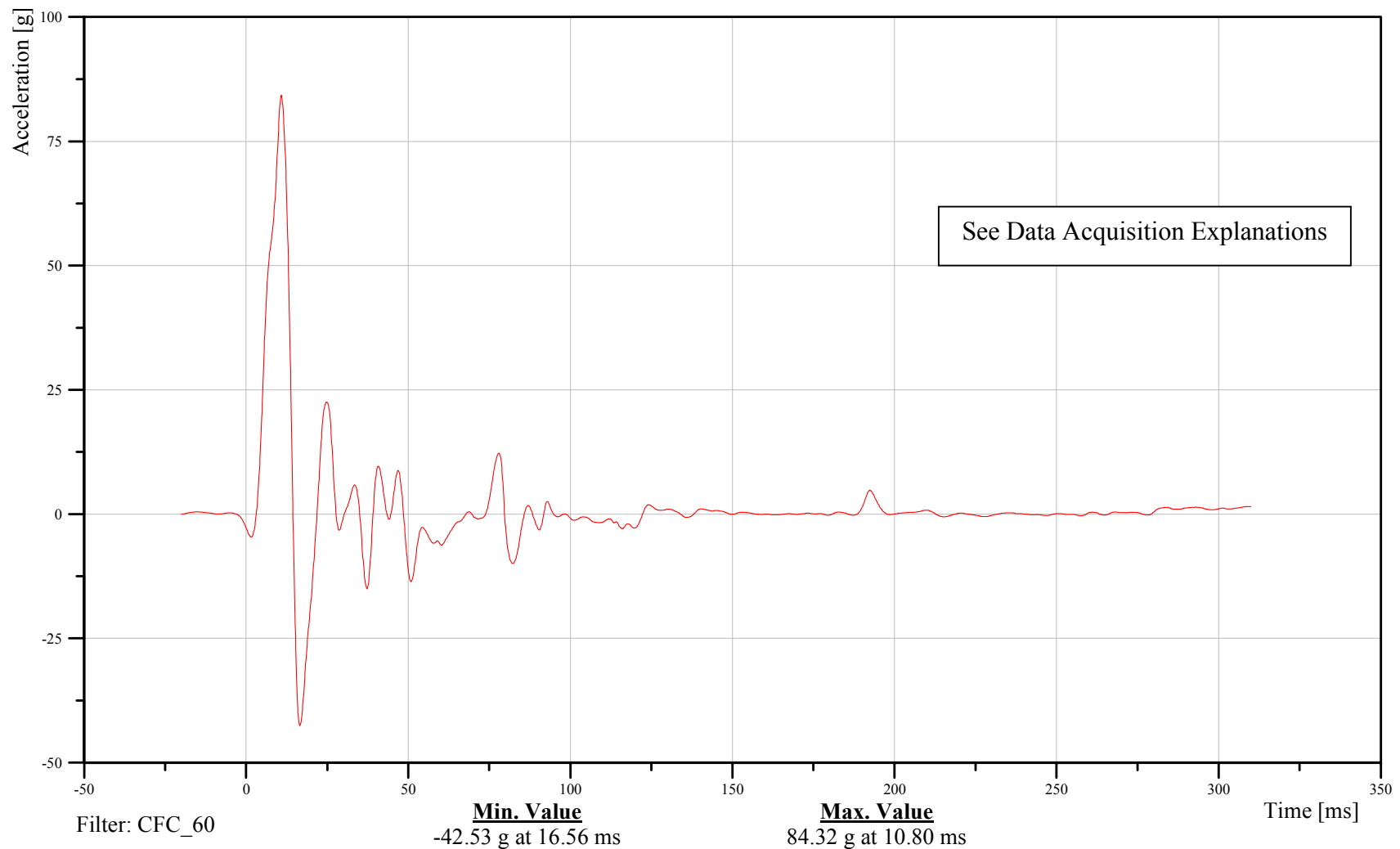
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11DOOR000001ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Door at Dummy Rib Y-Axis Acceleration

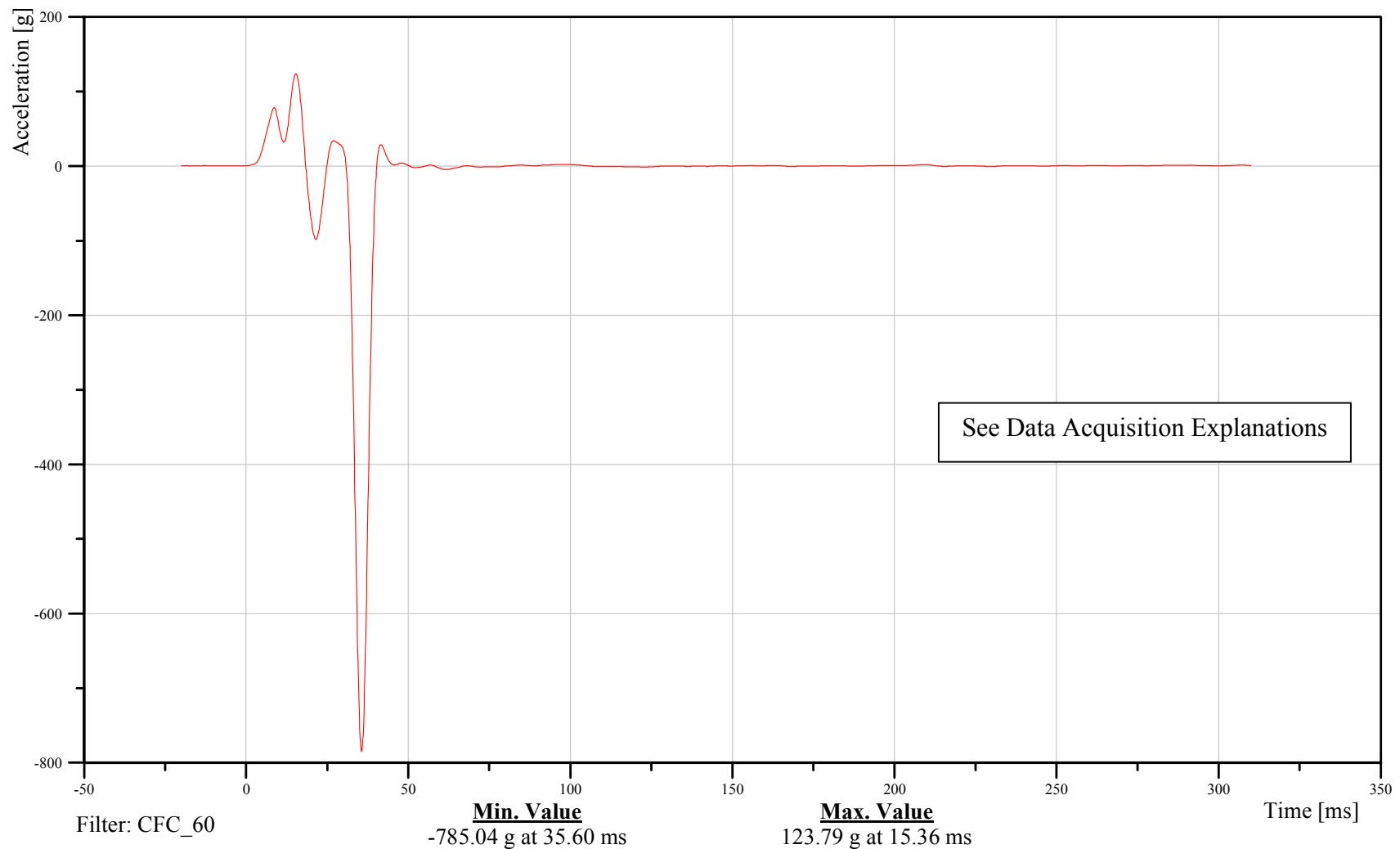
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11DOOR000002ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

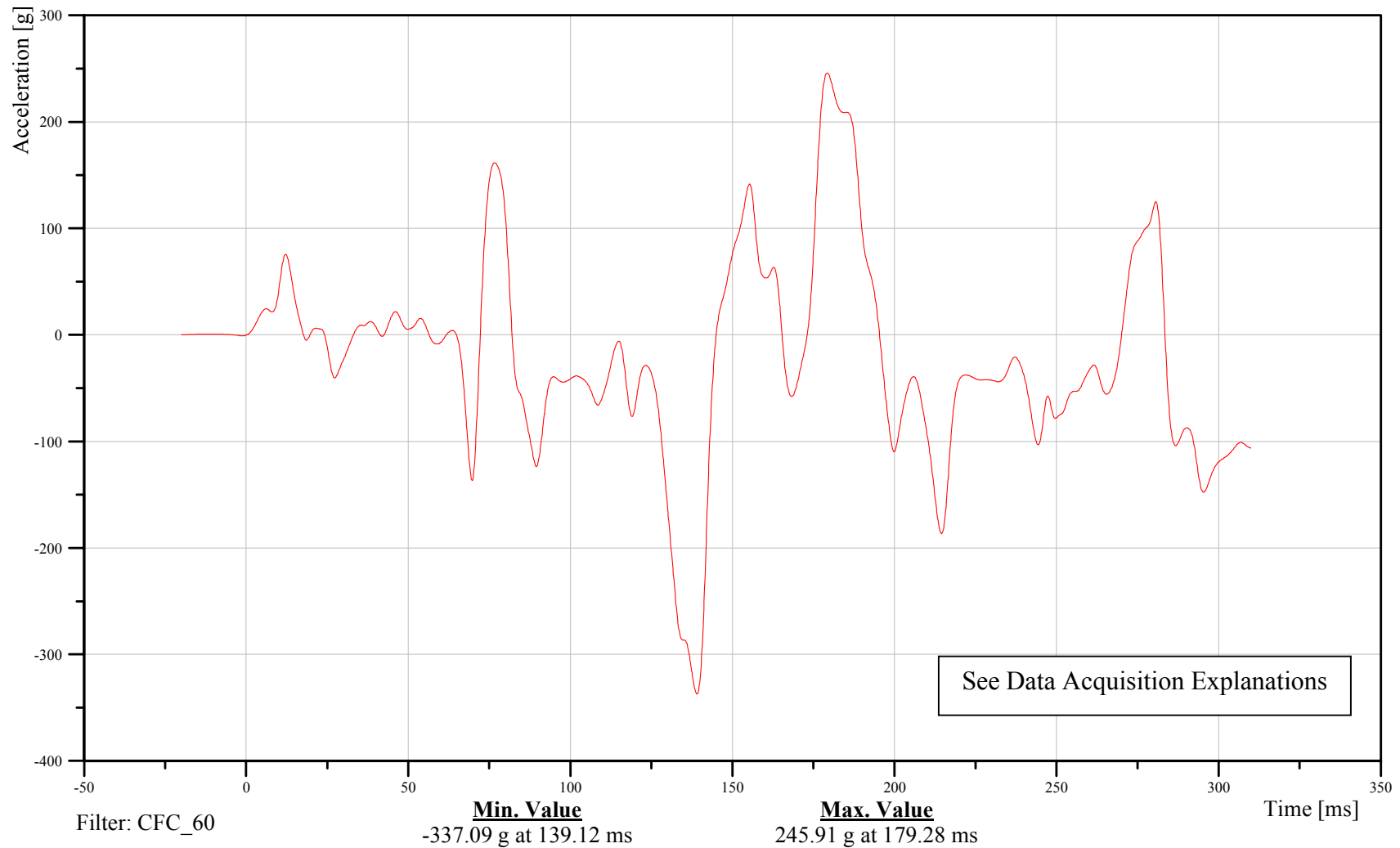
Driver Door at Dummy Pelvis Y-Axis Acceleration

Customer: VRTC

11DOOR000003ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Door at Dummy Knee Y-Axis Acceleration

Date: 10/06/2005

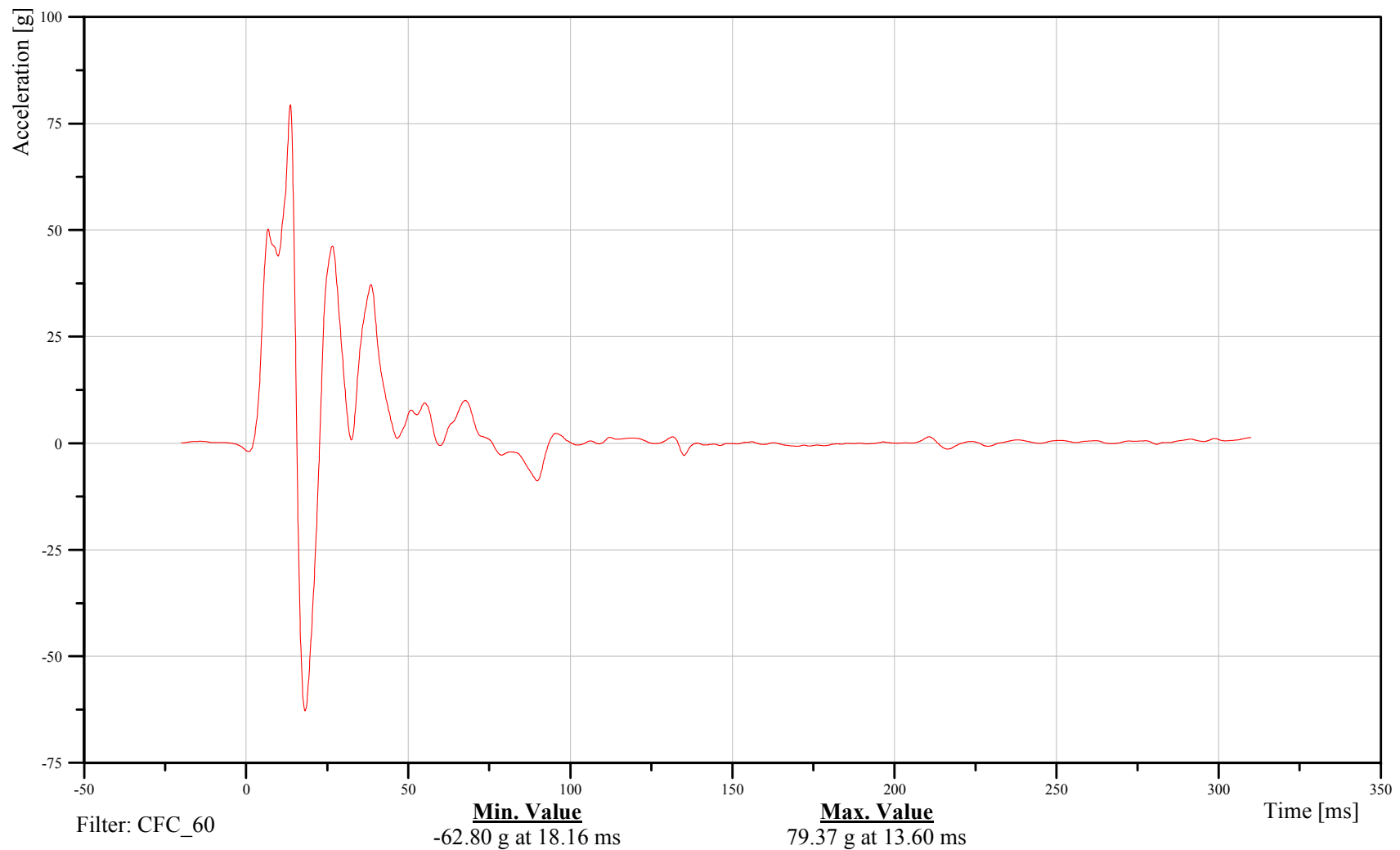
Time: 16:17

Customer: VRTC

11DOOR000004ACYD

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Front Airbag Fire Inductor

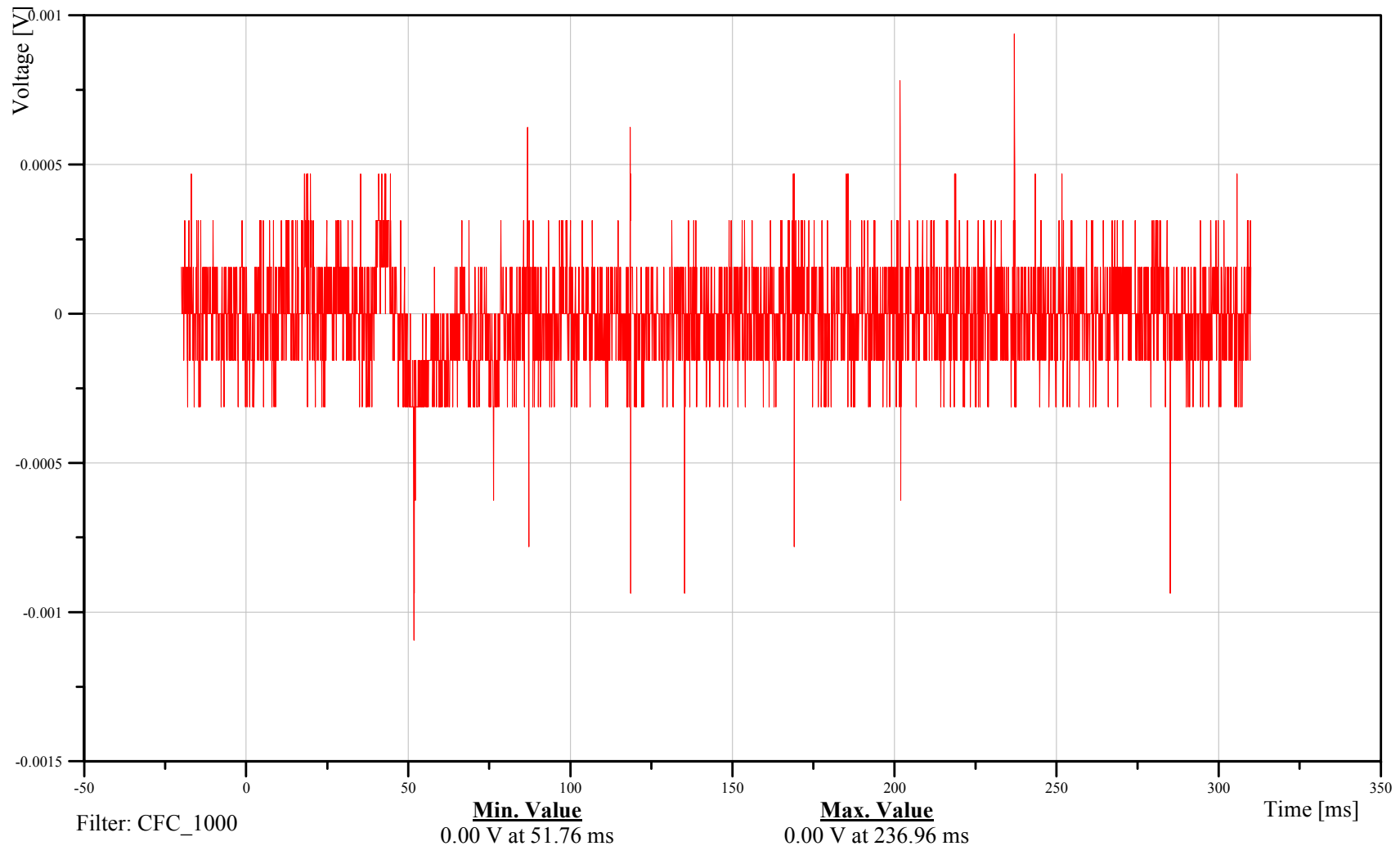
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SENS000002VO0A

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Non-Struck Side Front Airbag Fire (Disabled Bag)

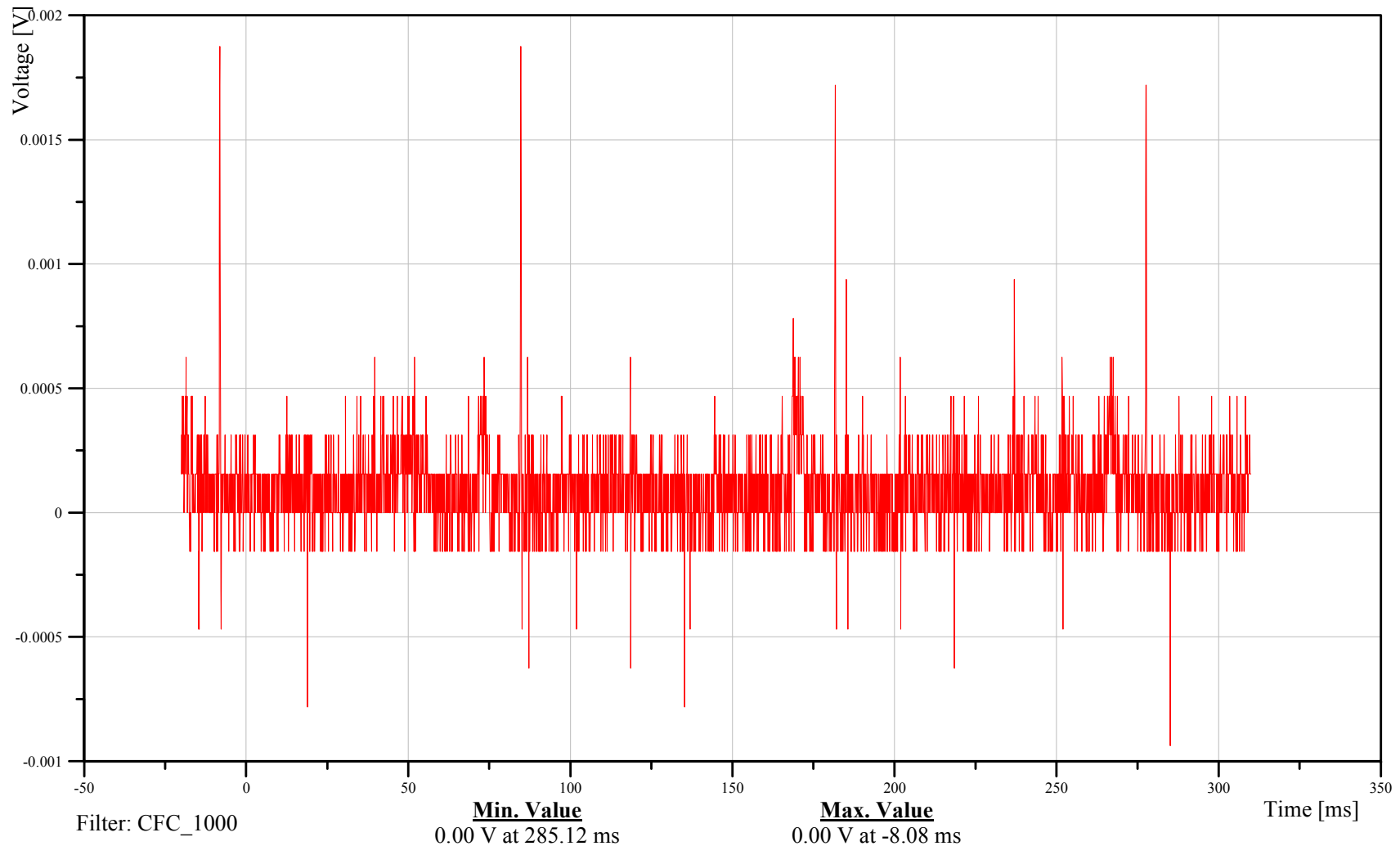
Date: 10/06/2005
Time: 16:17

Customer: VRTC

13SENS000001V00A

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Non-Struck Side Curtain Airbag Fire (Disabled Bag)

Date: 10/06/2005

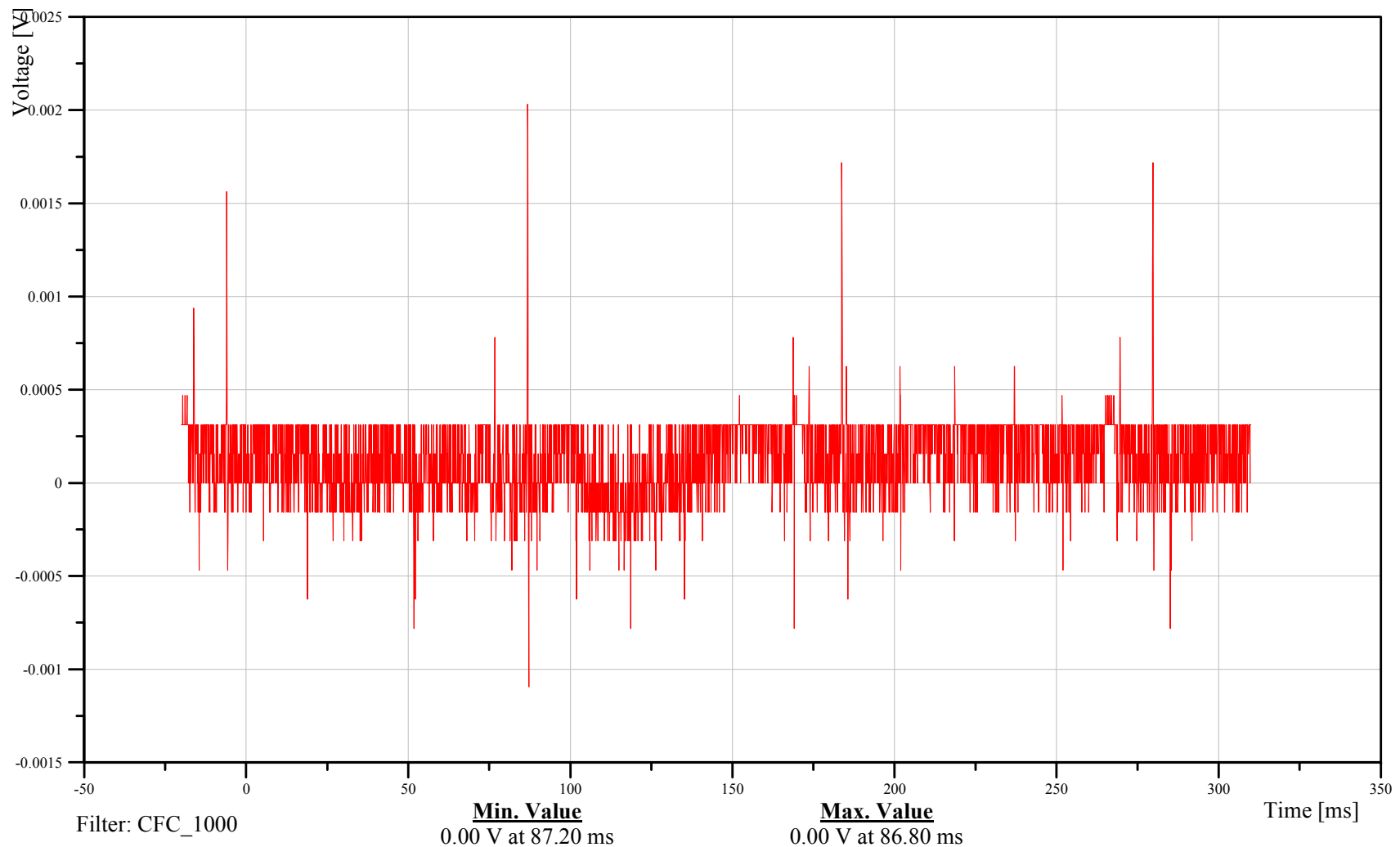
Time: 16:17

Customer: VRTC

13SENS000002VO0A

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Dummy Head Contact

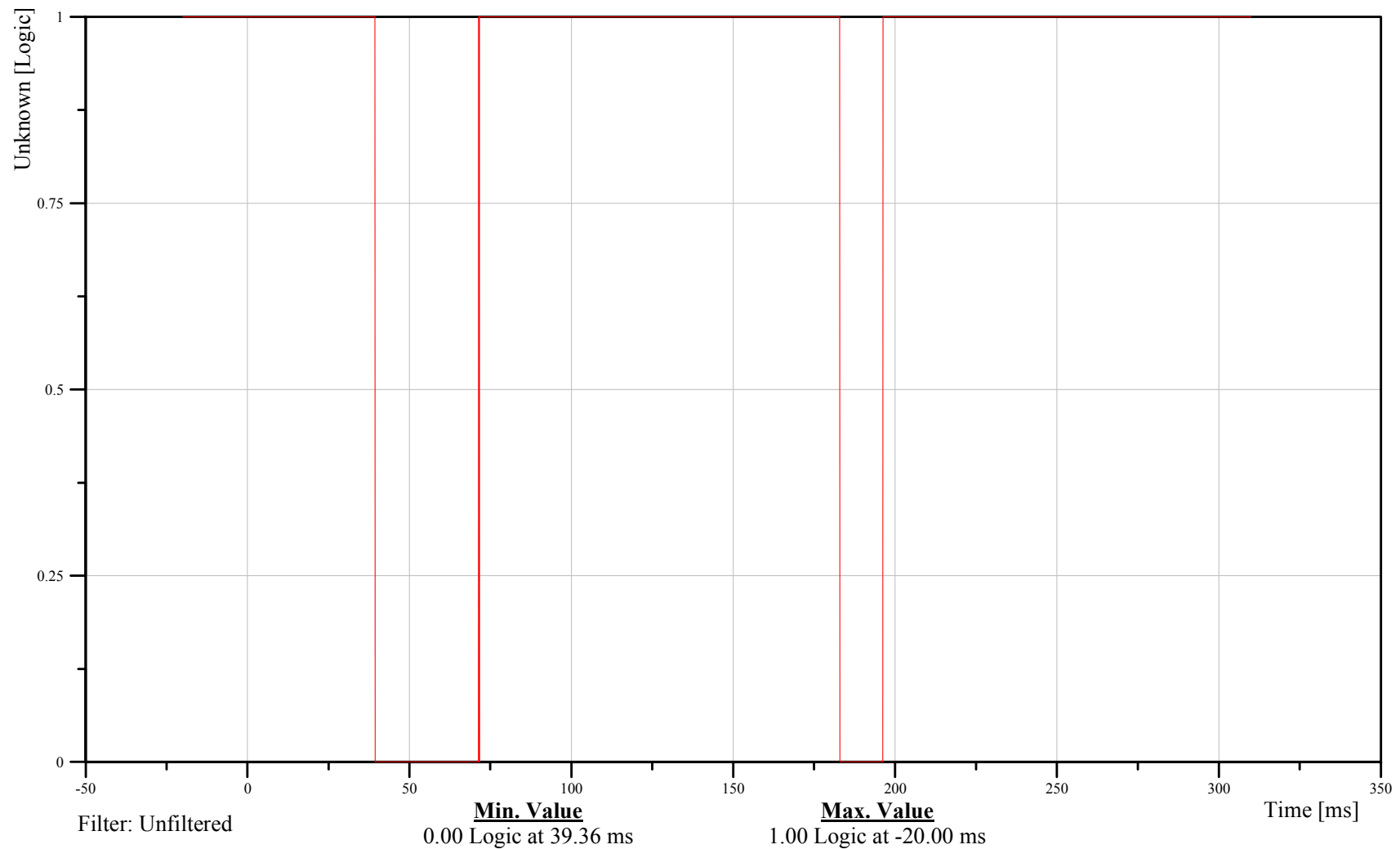
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11CONT000001EV00

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Dummy Shoulder Contact

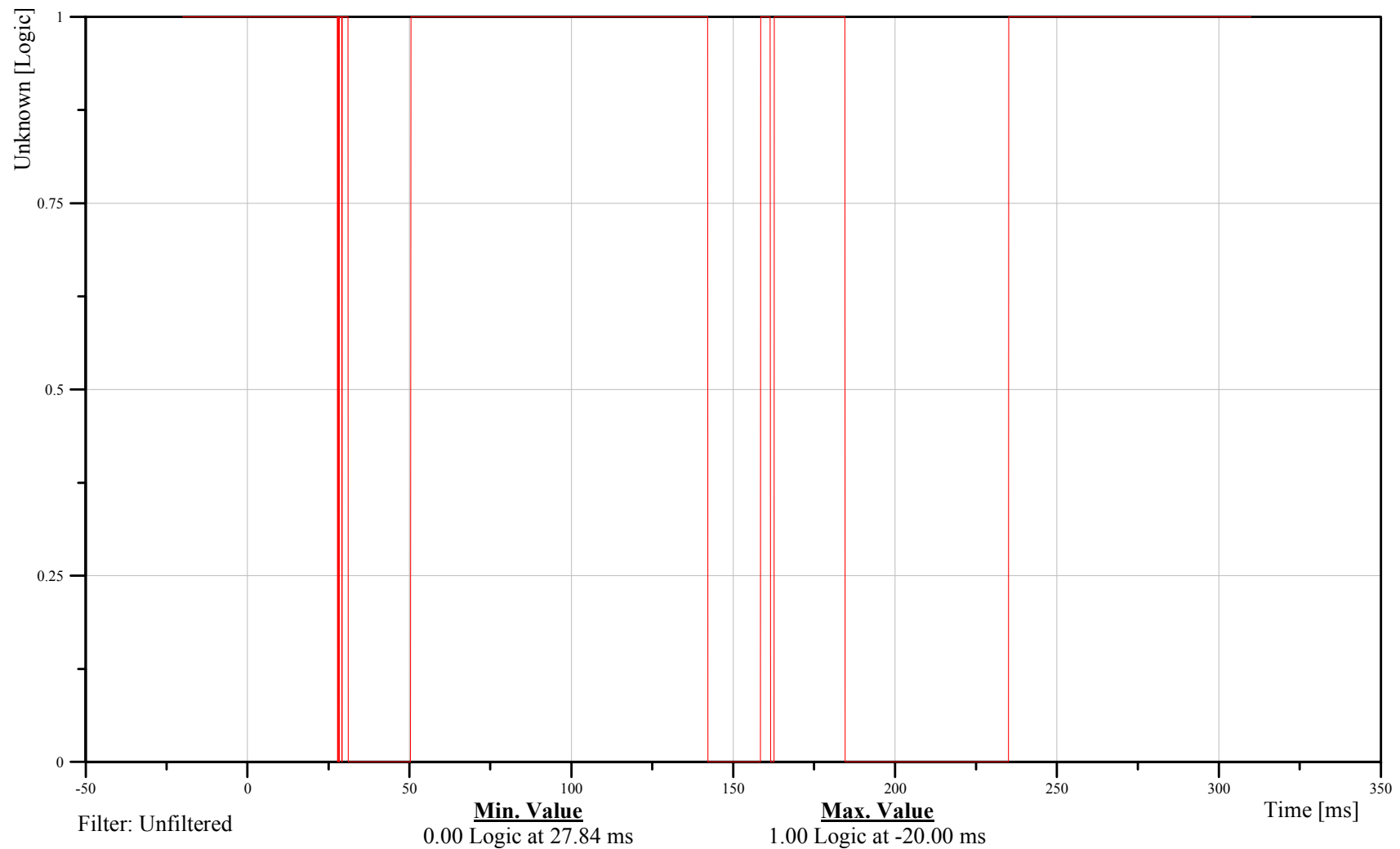
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11CONT000002EV00

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Dummy Torso Contact

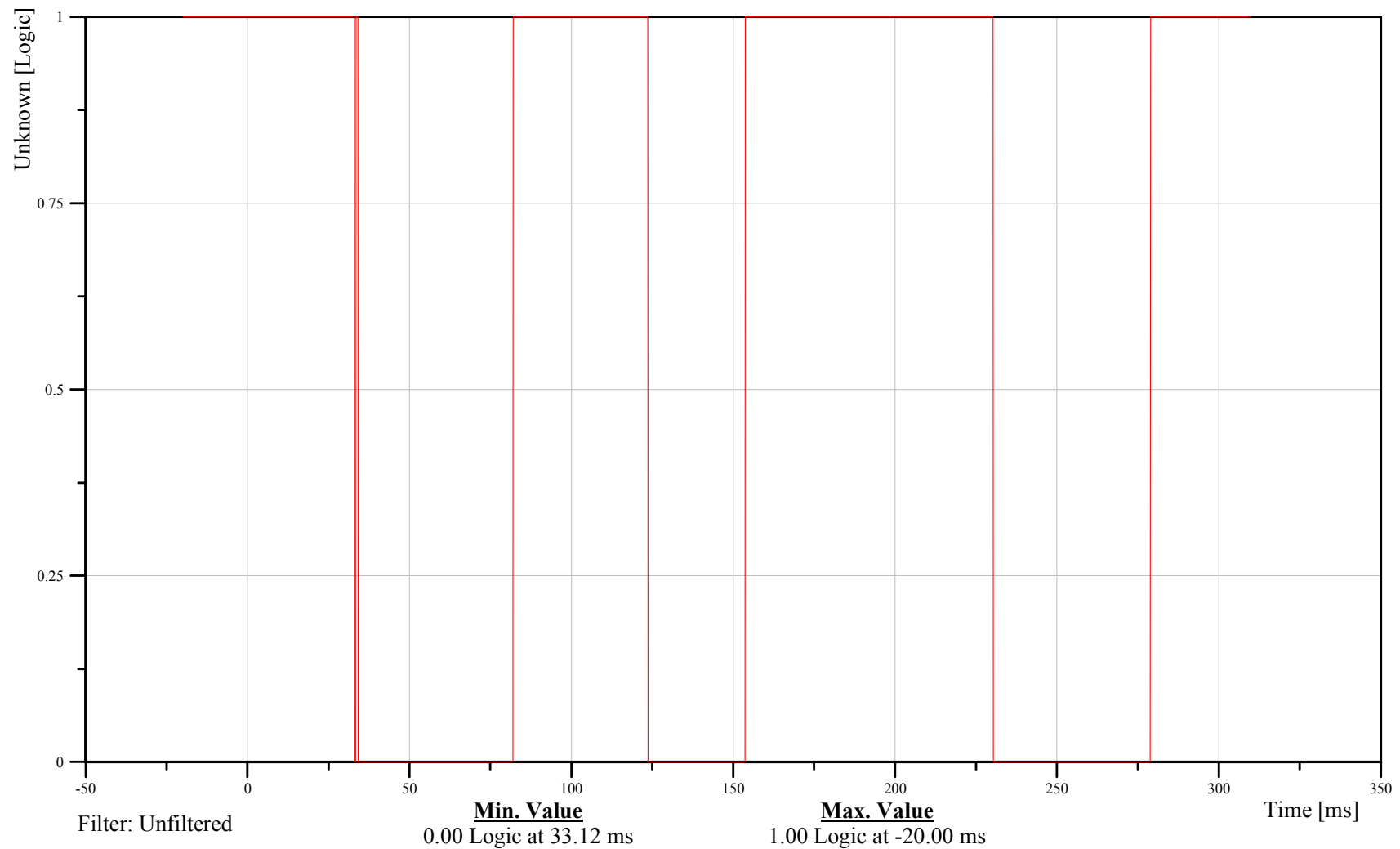
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11CONT000003EV00

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Dummy Leg Contact

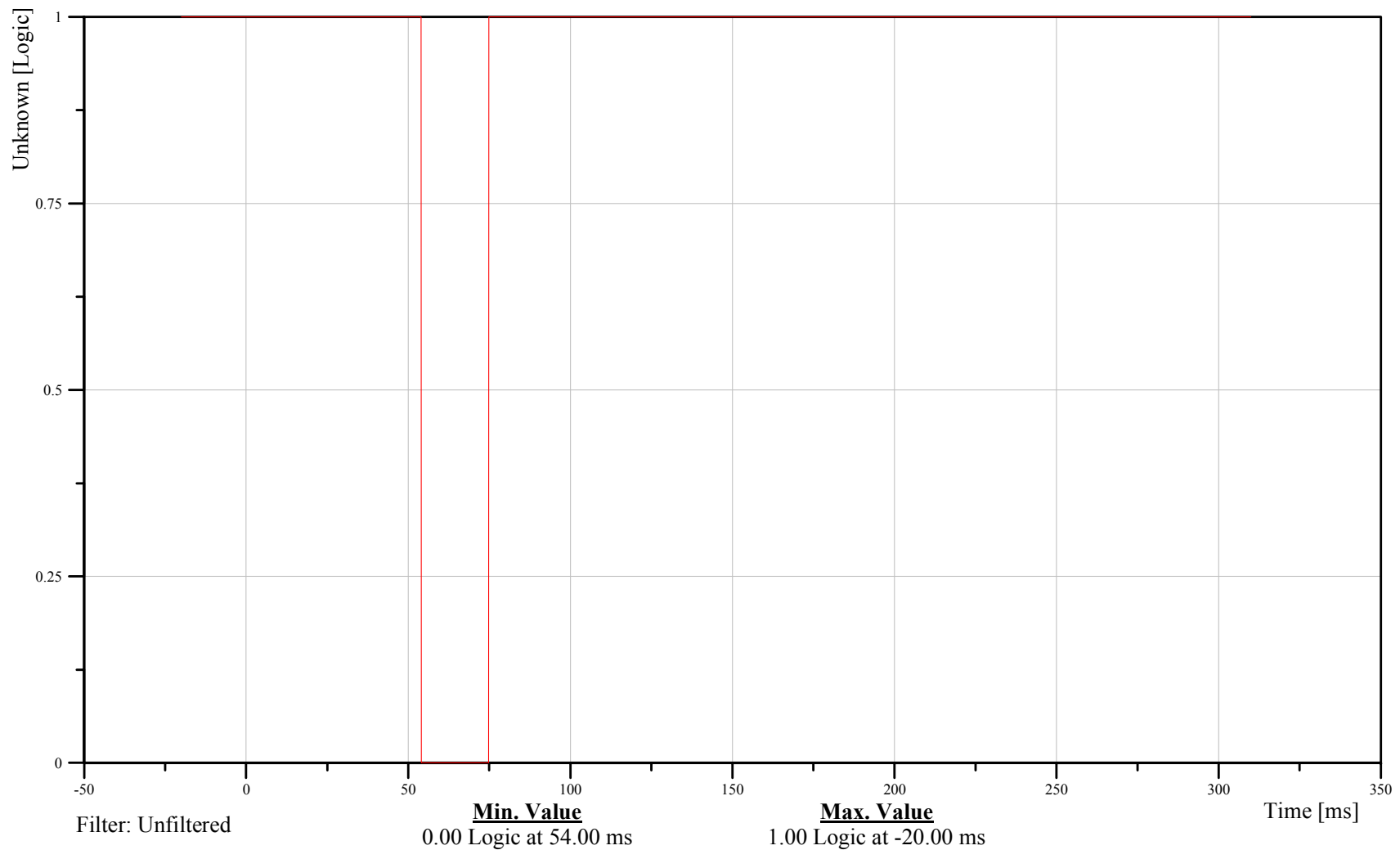
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11CONT000004EV00

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

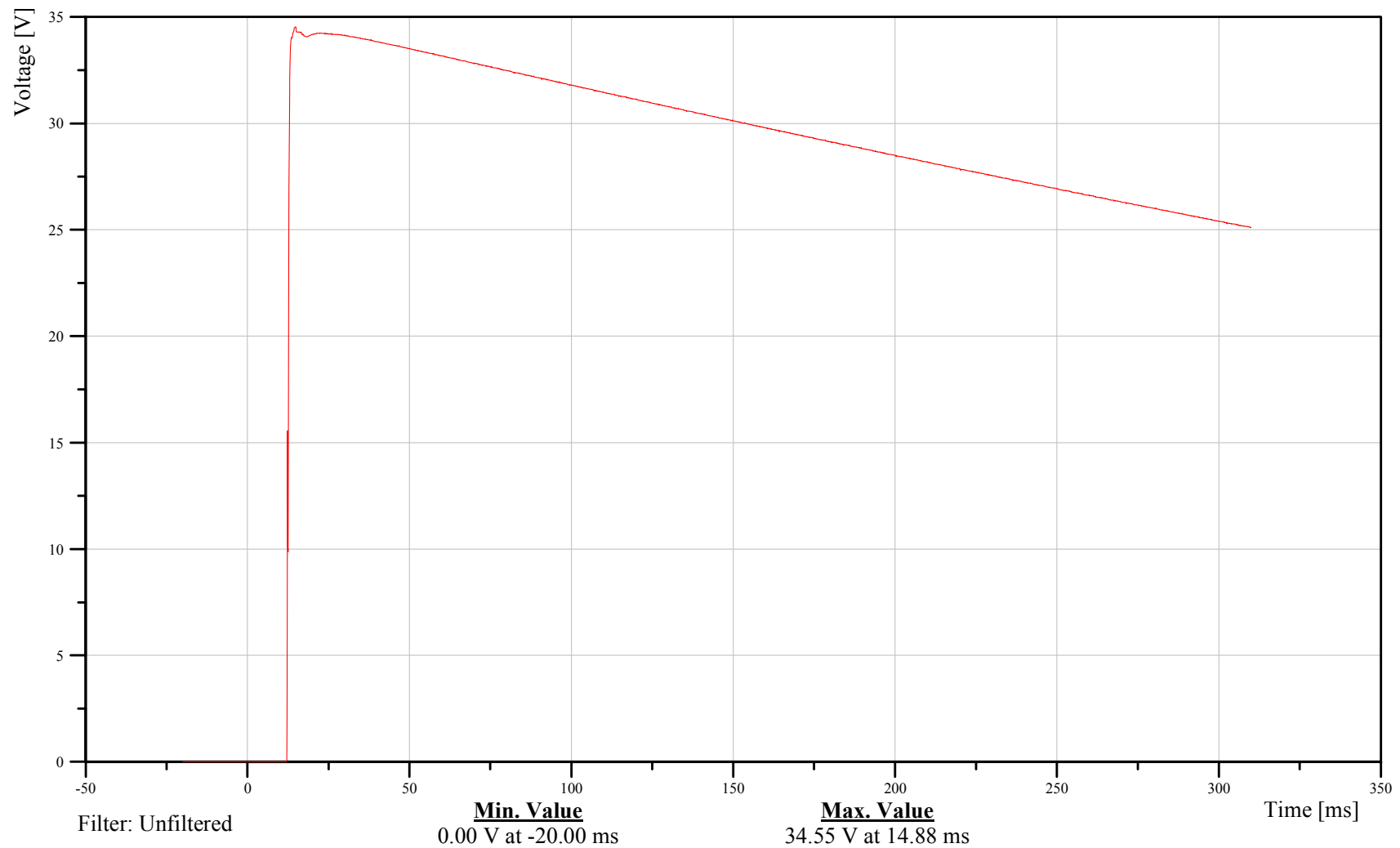
Side Curtain Airbag Fire Voltage

Customer: VRTC

11AIRBRITP00VO00

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Side Curtain Airbag Fire Current

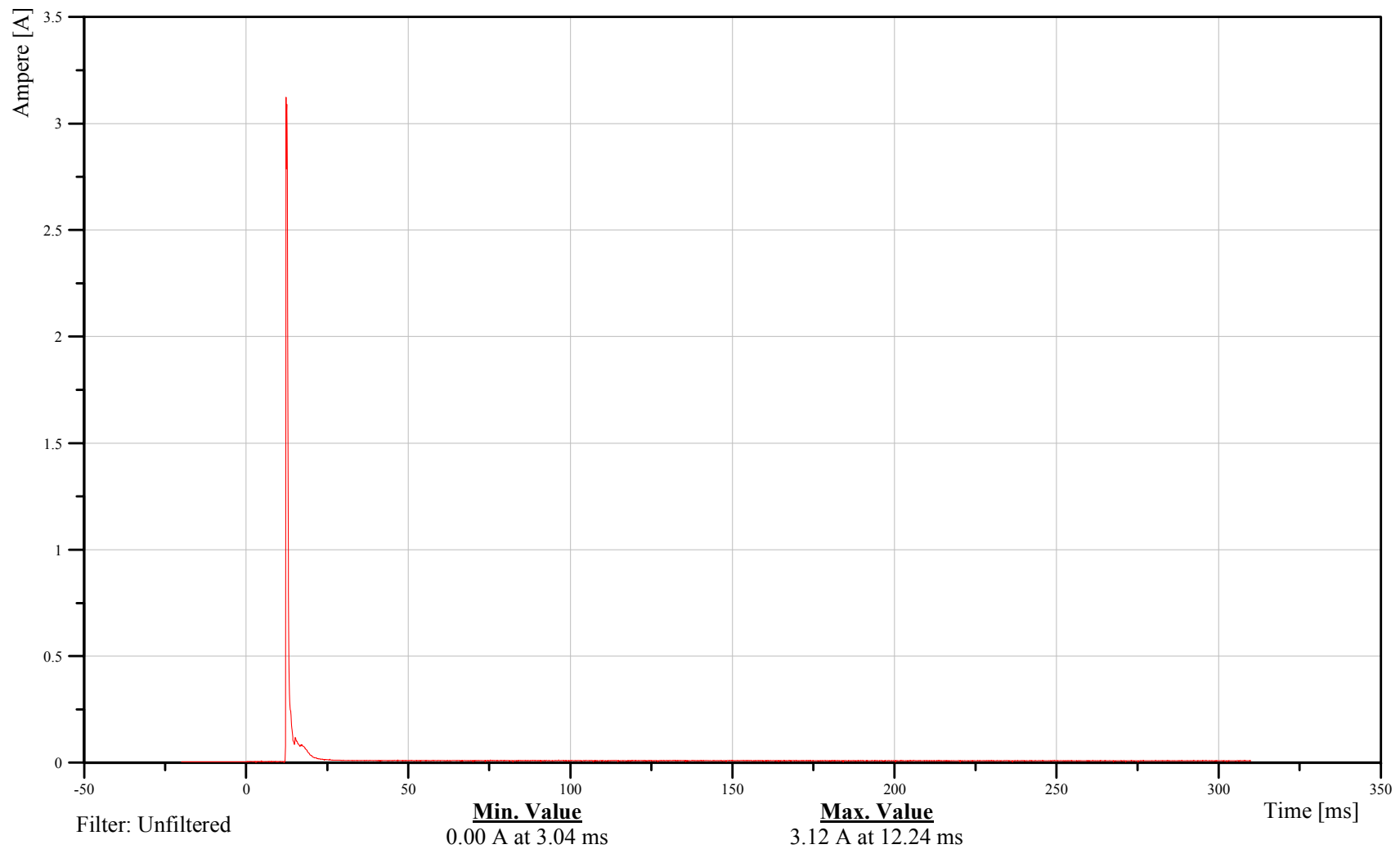
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11AIRBRITP00CO00

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Upper Spine X-Axis Acceleration

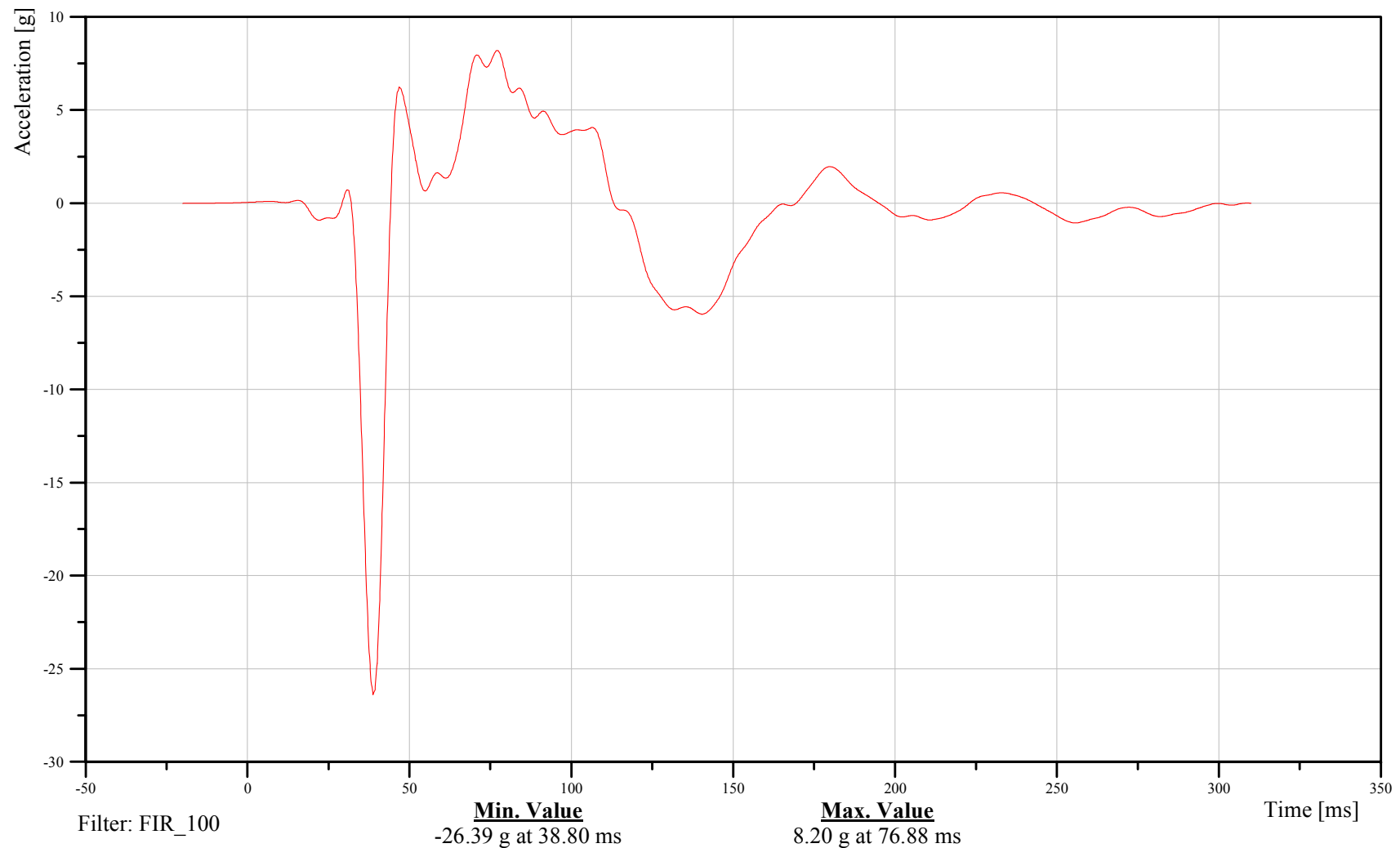
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN0100E2ACX1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Upper Spine Y-Axis Acceleration

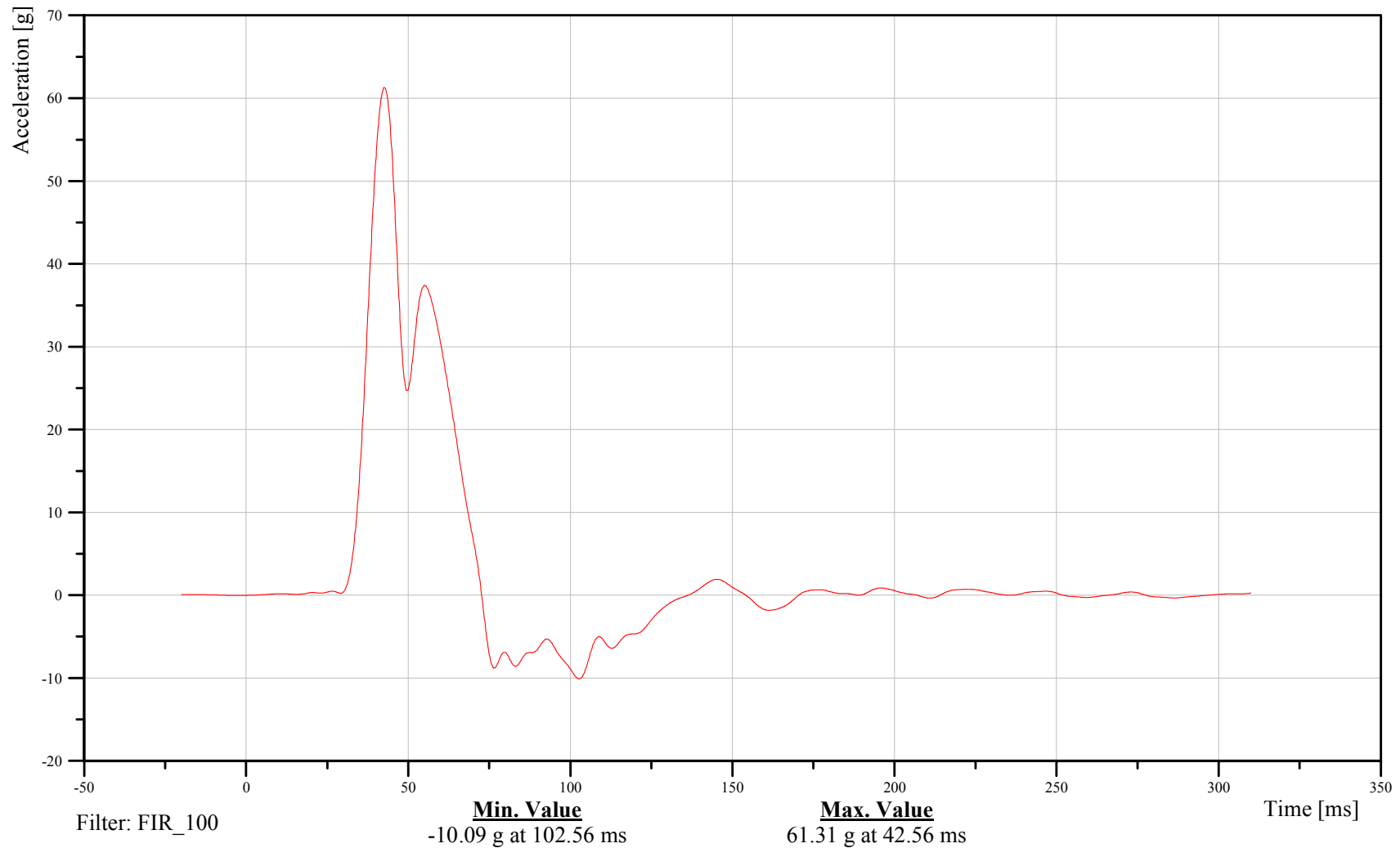
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN0100E2ACY1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Upper Spine Z-Axis Acceleration

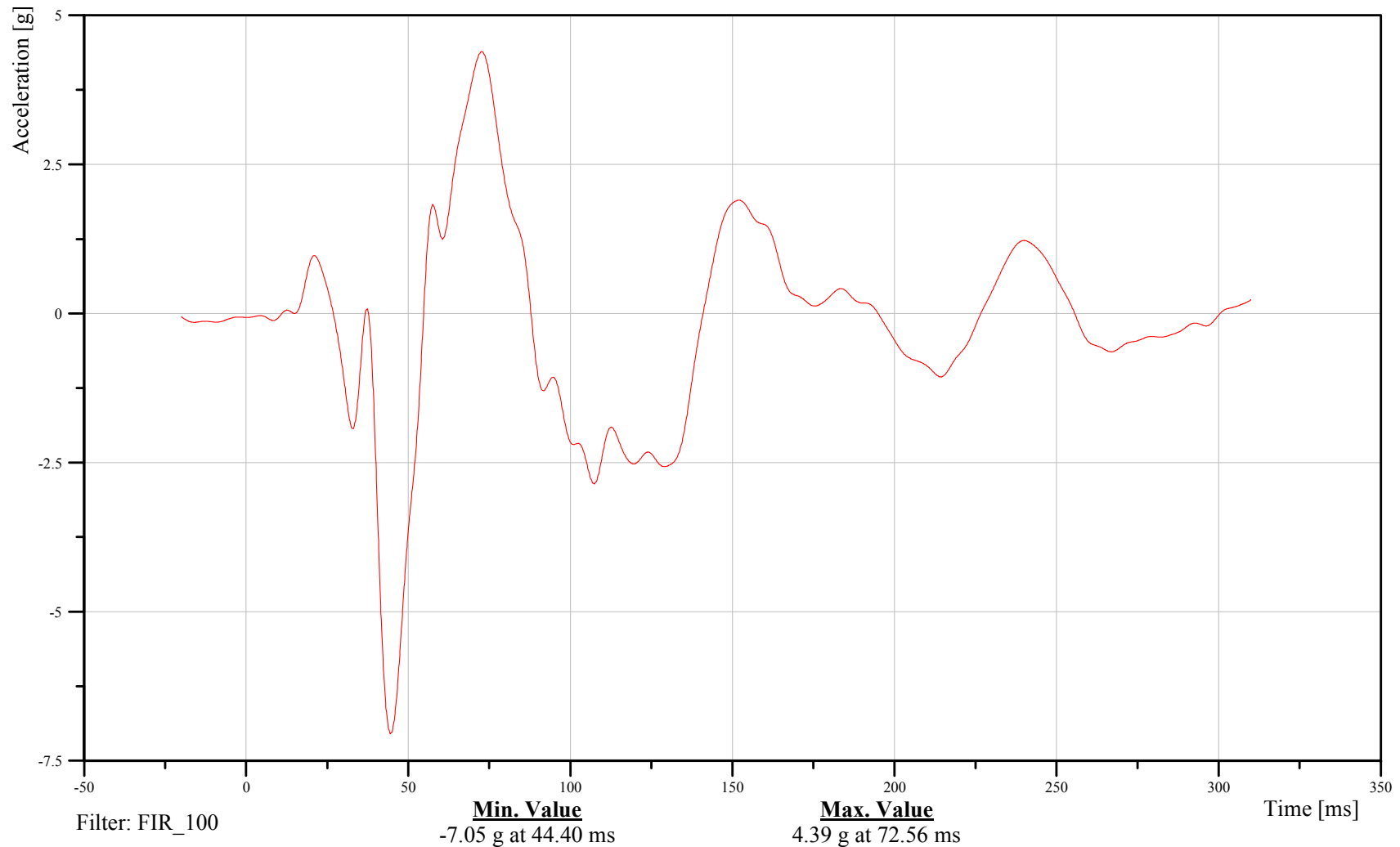
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN0100E2ACZ1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

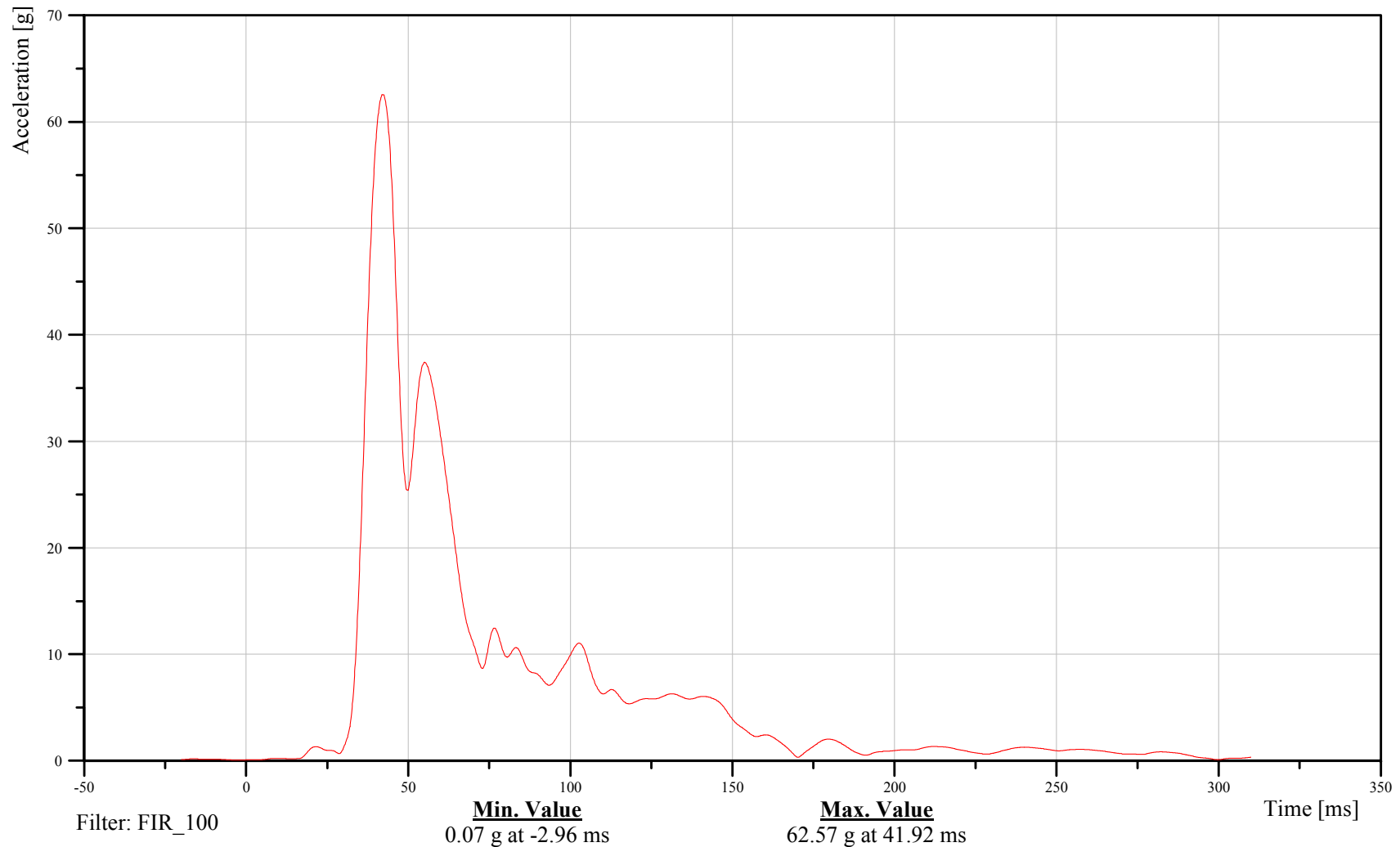
Driver Upper Spine Resultant Acceleration

Customer: VRTC

11SPIN0100E2ACR1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005
Time: 16:17

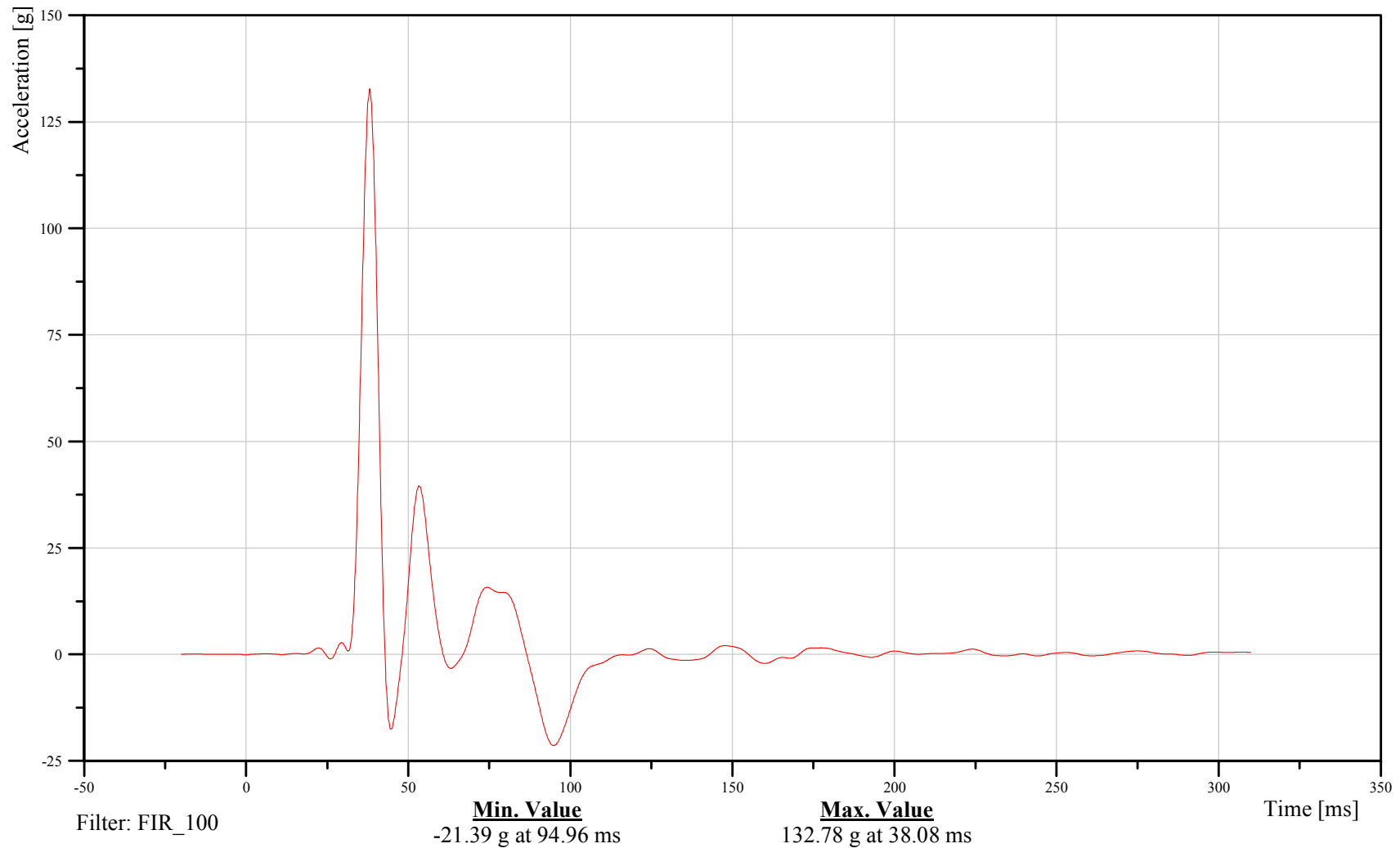
Driver Upper Rib Y-Axis Acceleration

Customer: VRTC

11RIBSLU00E2ACY1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Mid Rib Y-Axis Acceleration

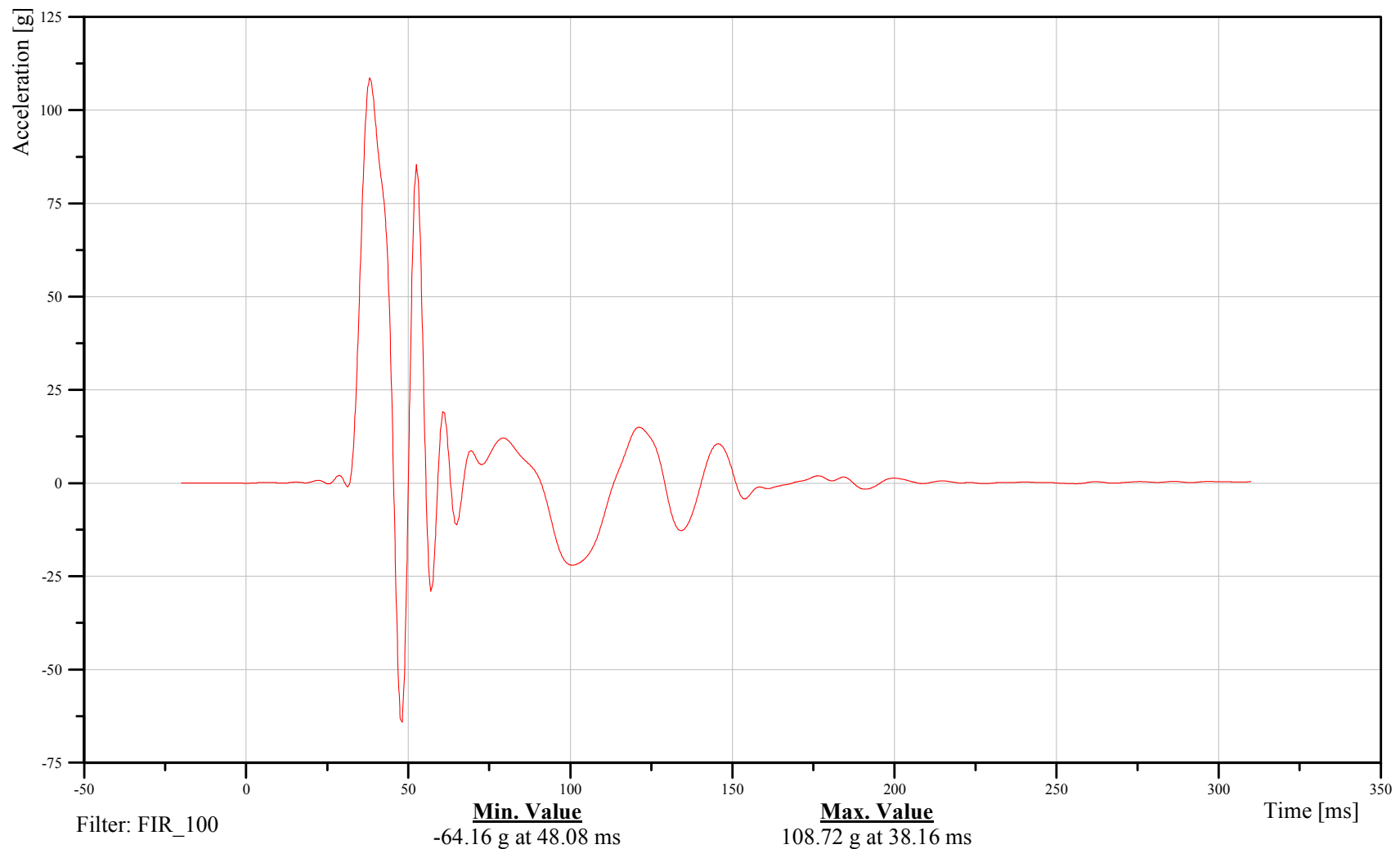
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11RIBSLM00E2ACY1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Rib Y-Axis Acceleration

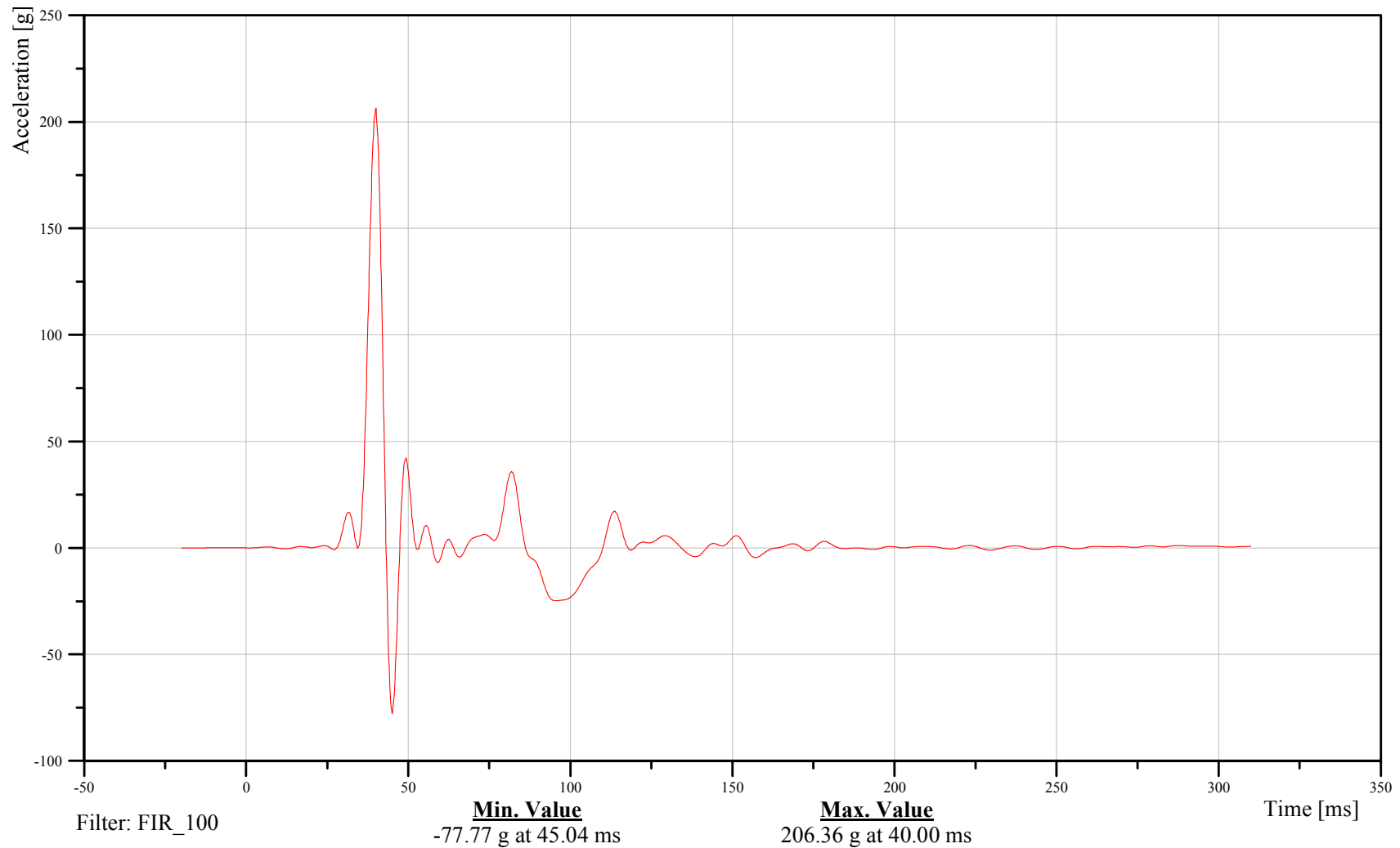
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11RIBSLL00E2ACY1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine X-Axis Acceleration

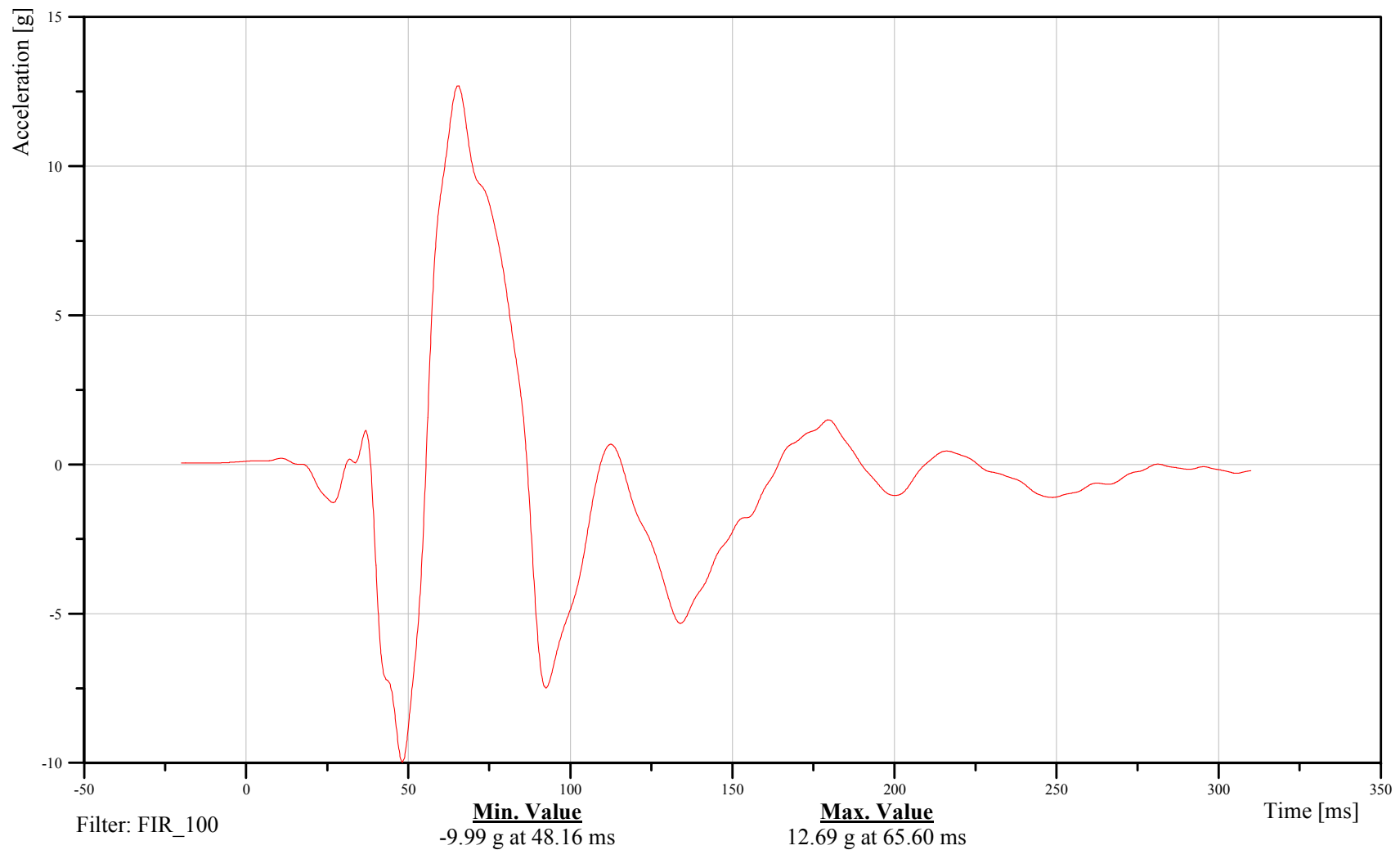
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN1200E2ACX1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine Y-Axis Acceleration

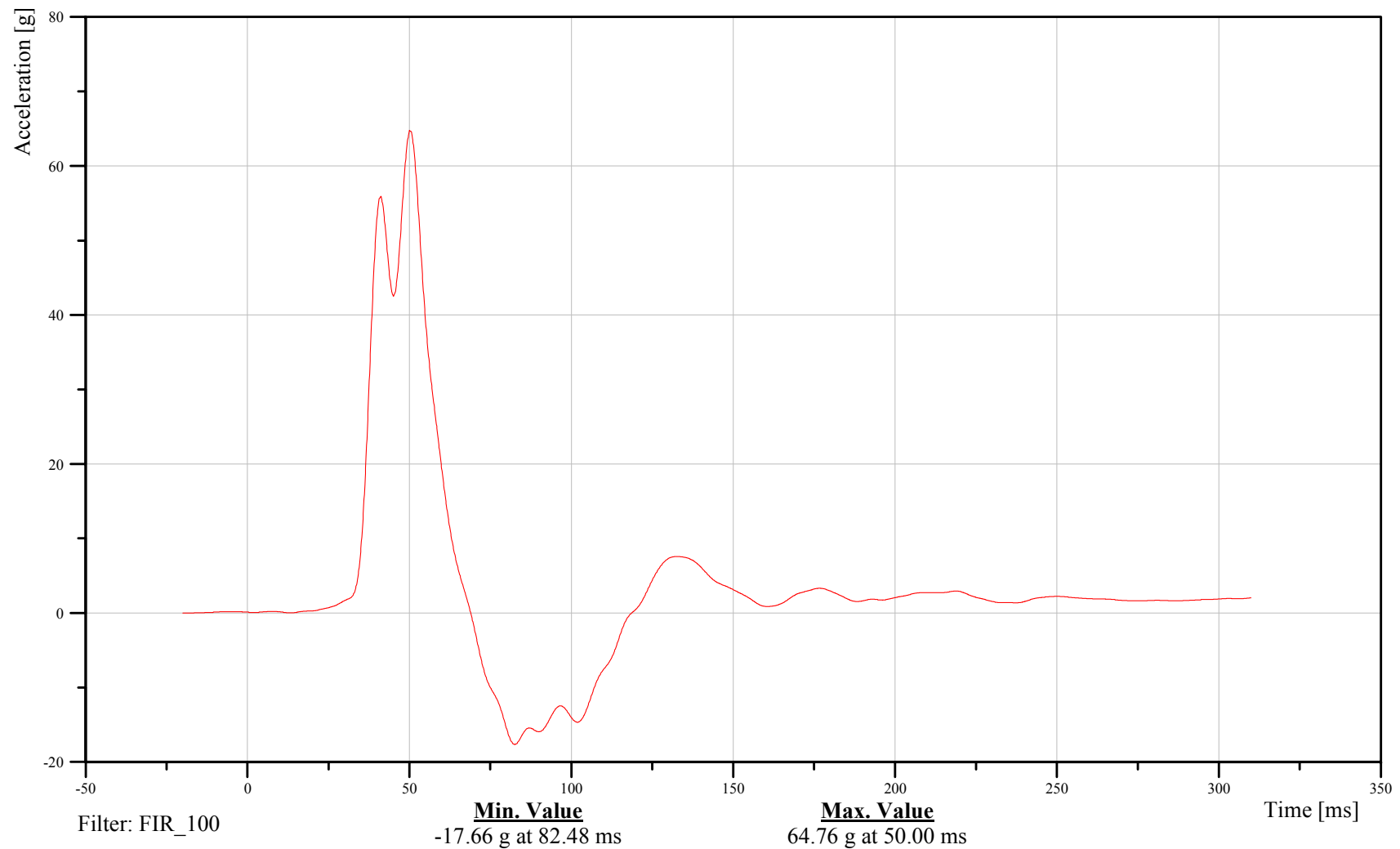
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN1200E2ACY1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine Z-Axis Acceleration

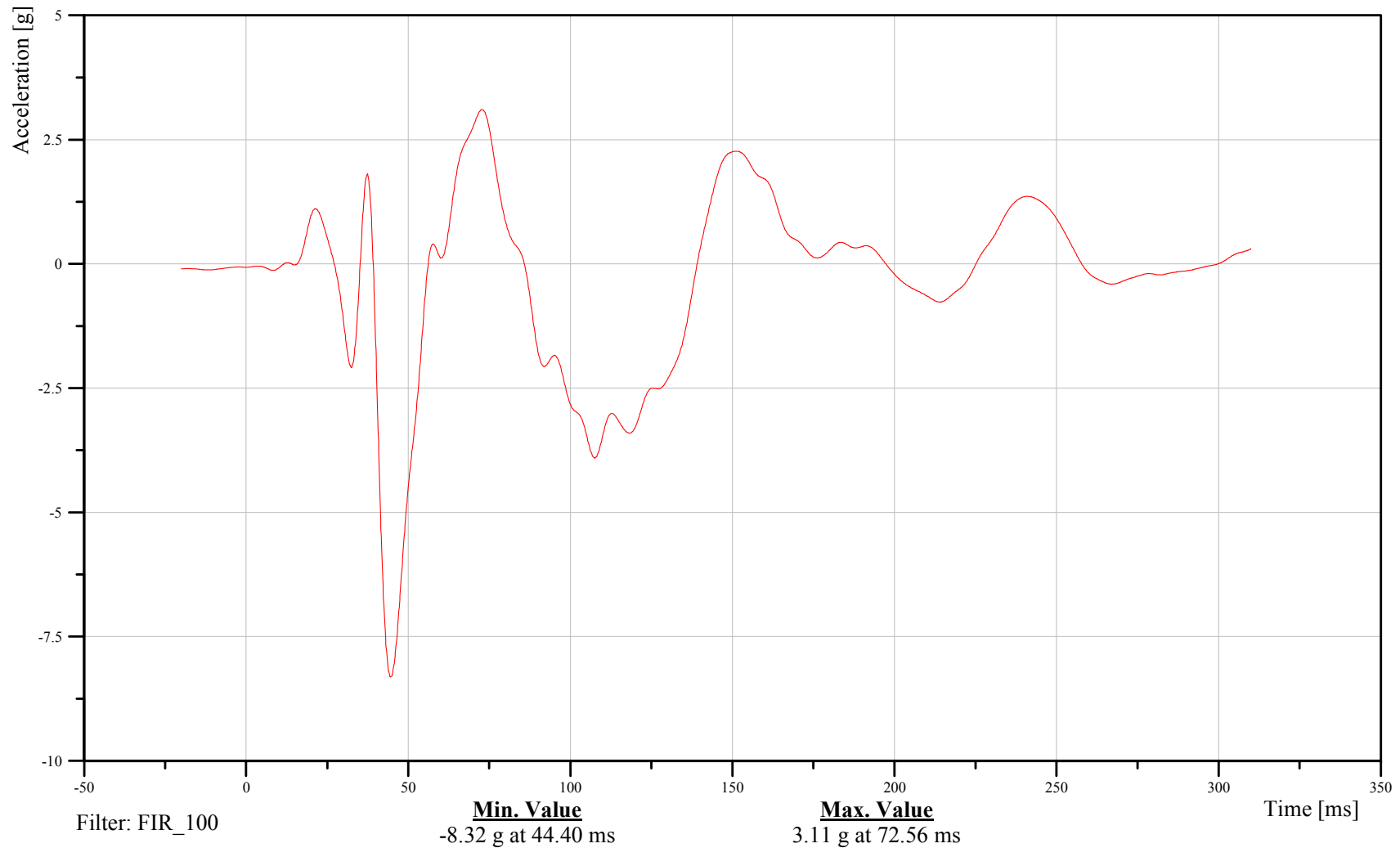
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN1200E2ACZ1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Lower Spine Resultant Acceleration

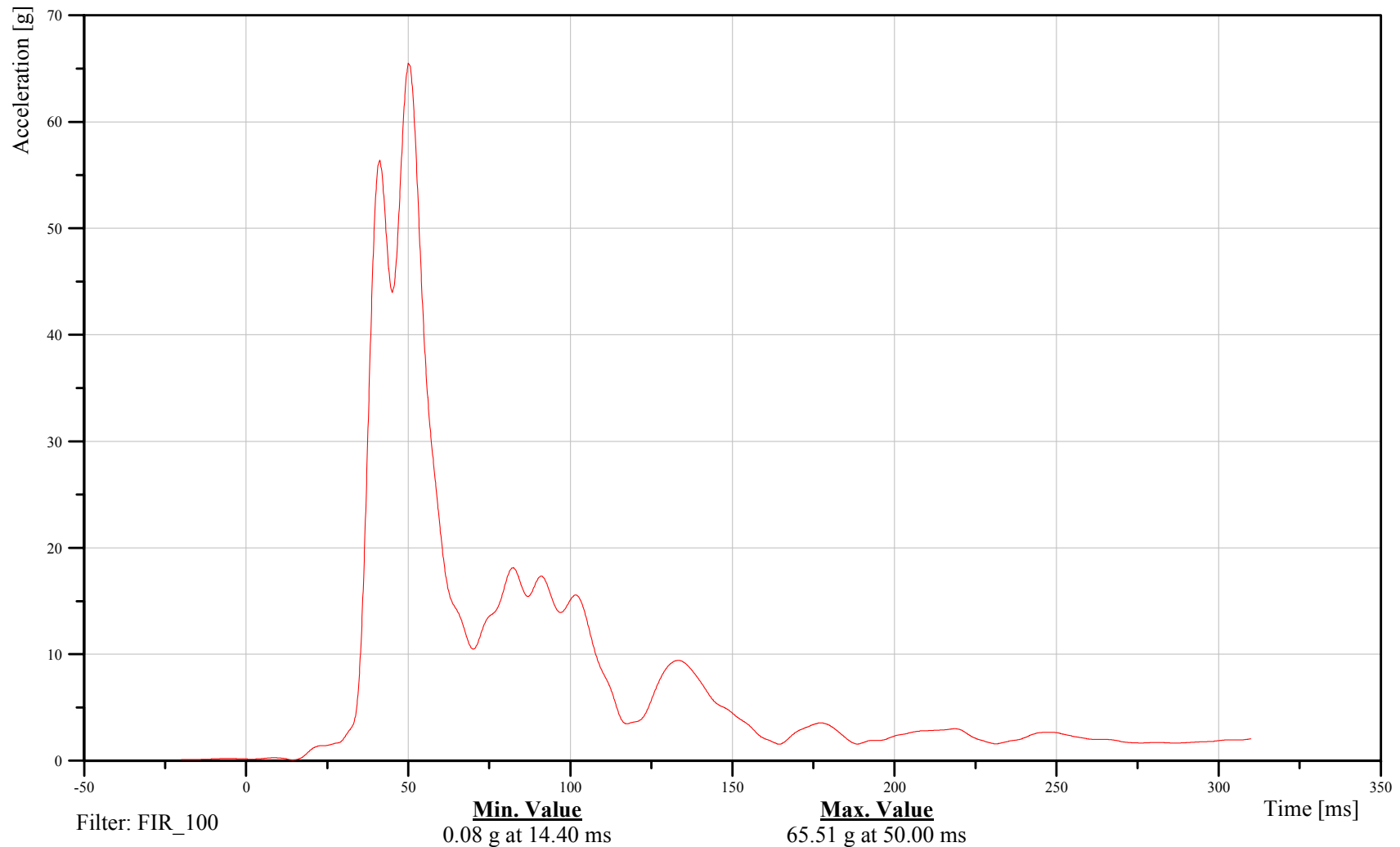
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11SPIN1200E2ACR1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis X-Axis Acceleration

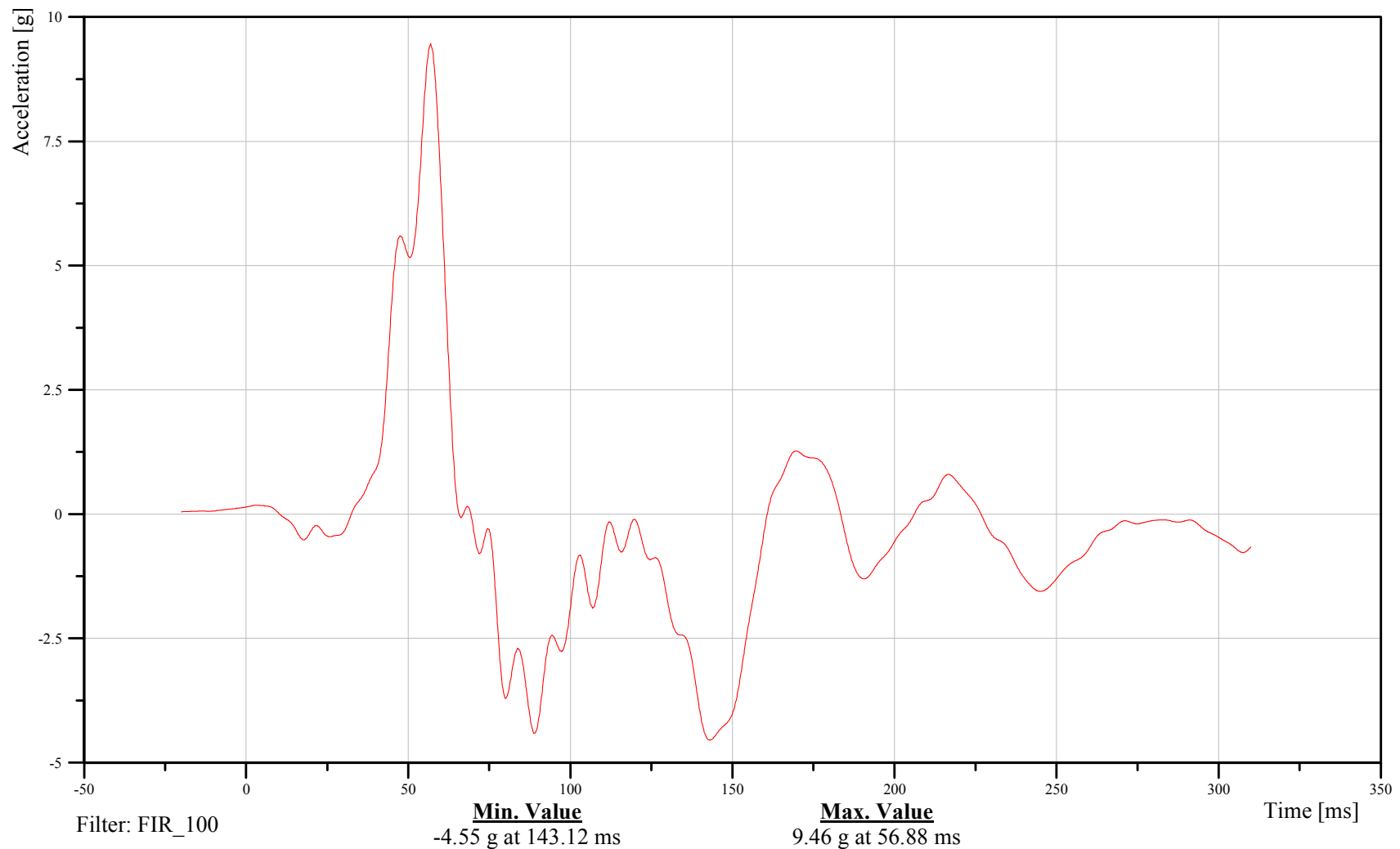
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACX1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis Y-Axis Acceleration

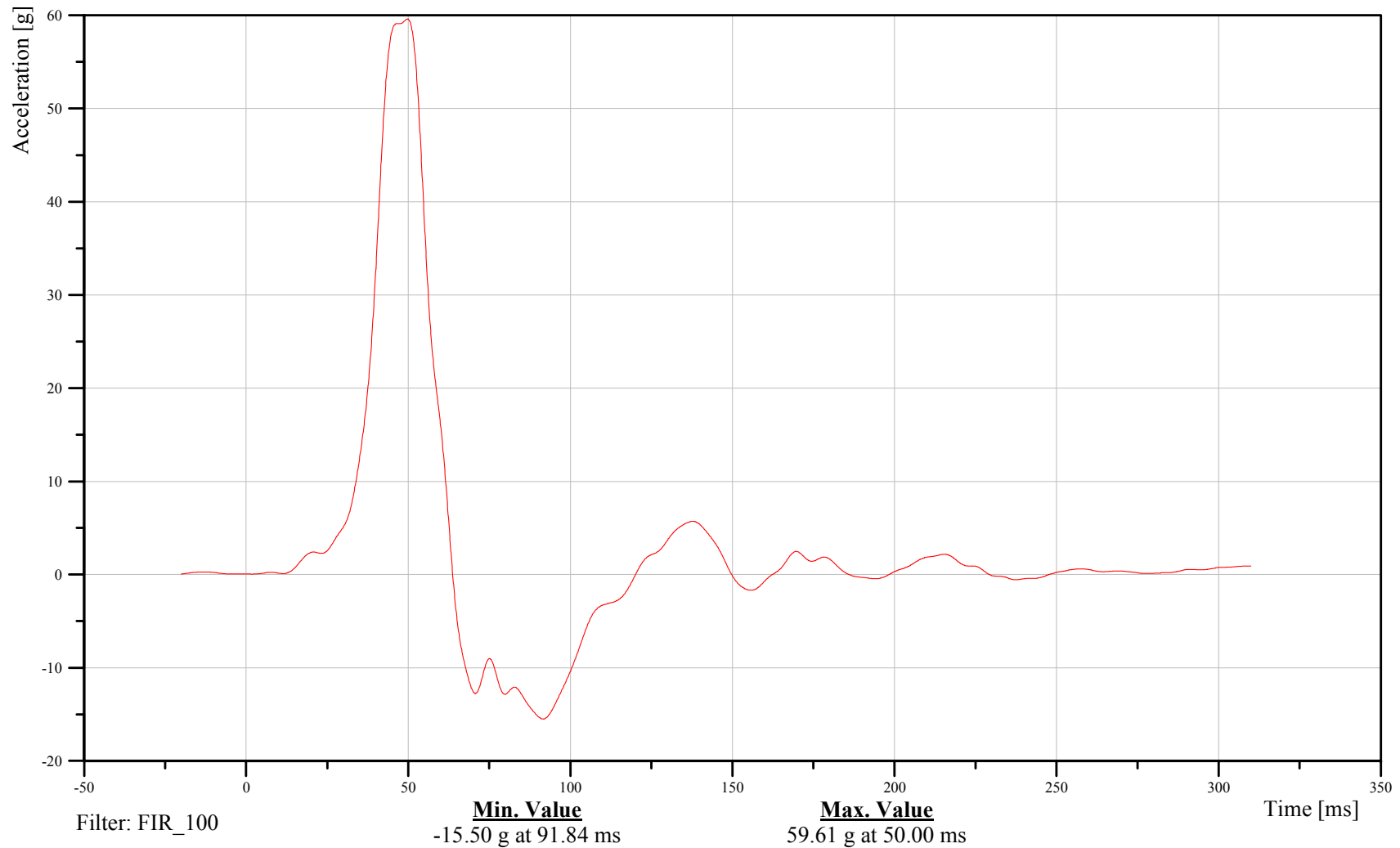
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACY1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis Z-Axis Acceleration

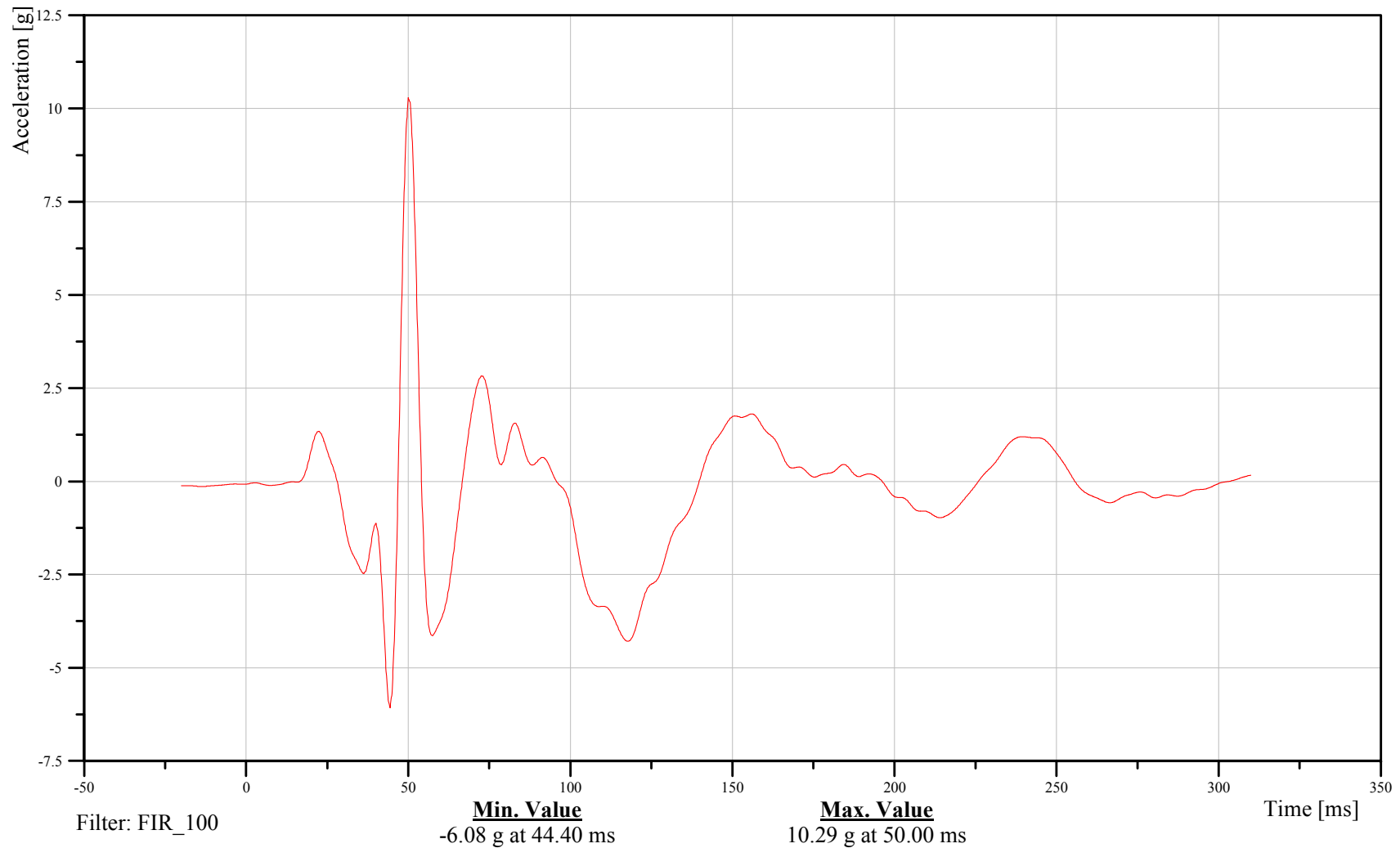
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACZ1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Driver Pelvis Resultant Acceleration

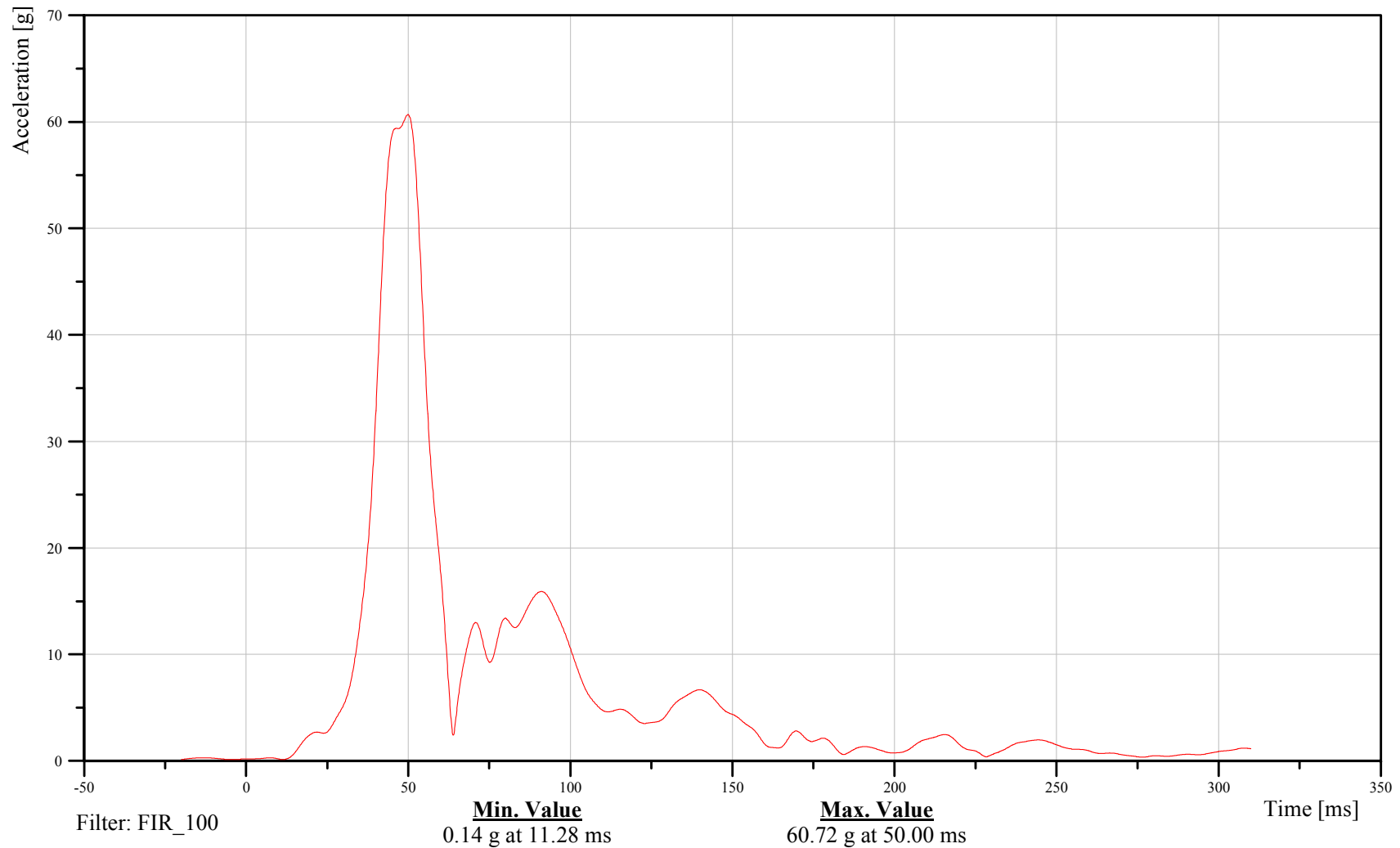
Date: 10/06/2005
Time: 16:17

Customer: VRTC

11PELVCG00E2ACR1

TRC Inc. Test Lab: CTF

Test Number: 051006





2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Head Injury Criterion (HIC)

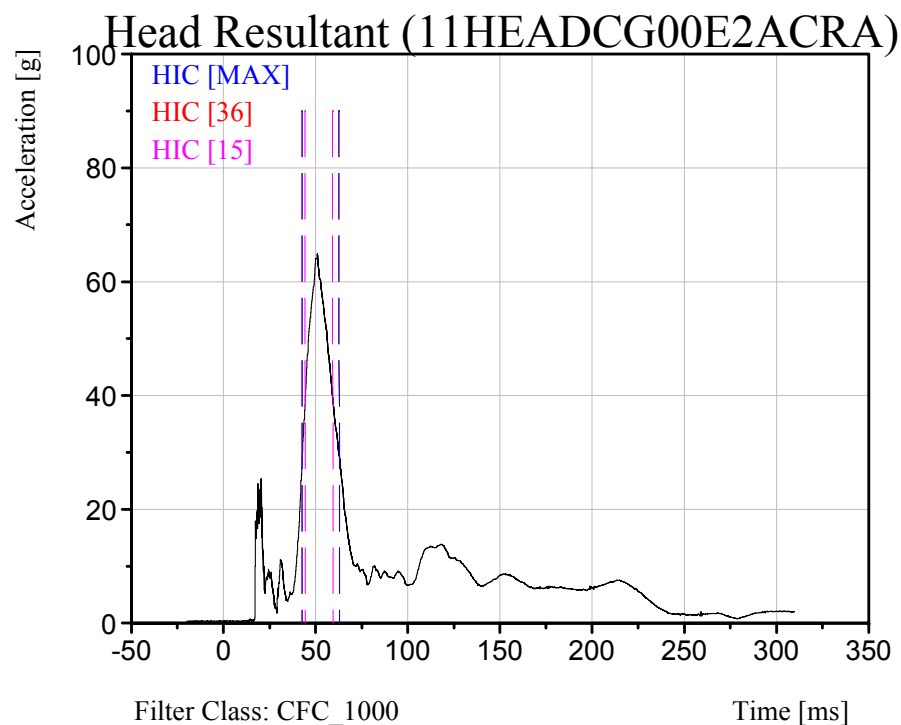
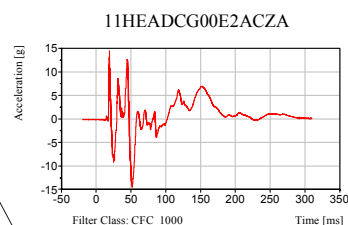
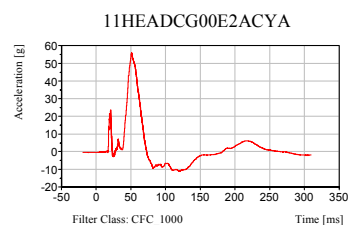
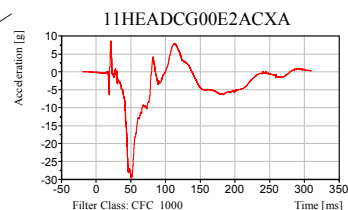
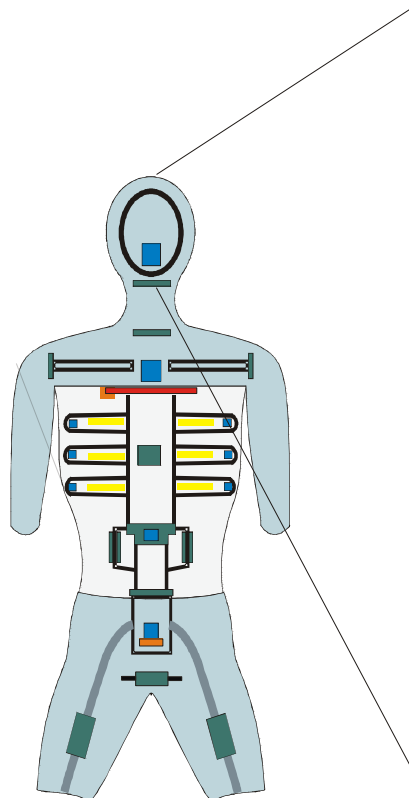
Date: 10/06/2005

Time: 16:17

Customer: VRTC

TRC Inc. Test Lab: CTF

Test Number: 051006



Dummy: Euro SID II
Seating Position:
Driver

	<u>T1</u> (Begin)	<u>T2</u> (End)	<u>Avg. g T1 to T2</u>
HIC [Max.] = 330.69	42.64 ms	62.80 ms	48.45 g
HIC [36] = 330.69	42.64 ms	62.80 ms	48.45 g
HIC [15] = 314.37	44.32 ms	59.36 ms	53.39 g



2005 Dodge Ram 2500 Oblique Pole Impact at 32.0 kph

Date: 10/06/2005

Time: 16:17

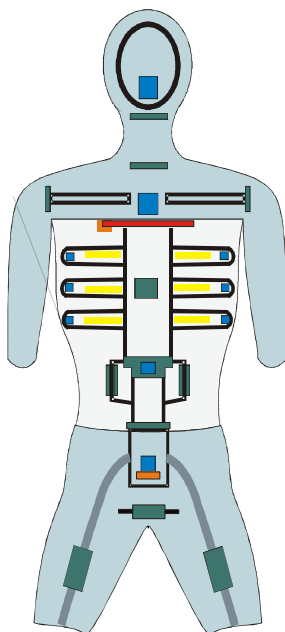
Abdominal(LE) Summation

Customer: VRTC

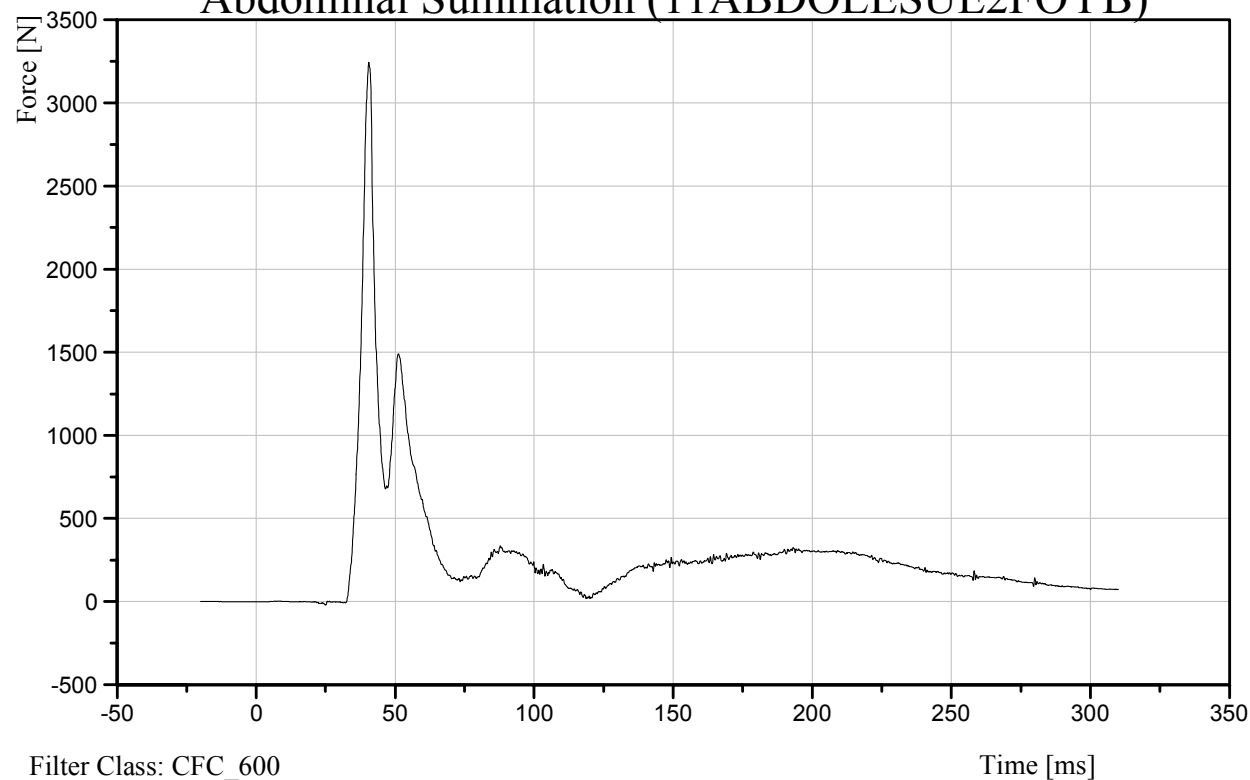
TRC Inc. Test Lab: CTF

Test Number: 051006

Test Orientation = Side



Abdominal Summation (11ABDOLESUE2FOYB)



Dummy: Euro SID II
Seating Position:
Driver

[Max.] 3,243.80 N at 40.56 ms

[Min.] -20.87 N at 24.96 ms

Abdominal Summation Source Code : Summation of Channels 11ABDOLEREE2FOYB,11ABDOLEMIE2FOYB,11ABDOLEFRE2FOYB

Appendix C

Dummy Configuration and Performance Verification Data

Pre-test Dummy Configuration and Performance Verification Data

Driver Dummy S/N: 009

Transportation Research Center Inc.
572U ES-2re Dummy
External Dimensions
Serial No. 009 Calibration No. 07
Date: 10/5/05

Symbol	Description	Specification	Results	Pass
		mm	mm	
1	Sitting Height	900.0 - 918.0	913	Yes
2	Seat to Shoulder Joint	558.0 - 572.0	563	Yes
3	Seat to Lower Face of Thoracic Spine Box	346.0 - 356.0	355	Yes
4	Seat to Hip Joint (center of bolt)	97.0 - 103.0	99	Yes
5	Sole to Seat, Sitting	433.0 - 451.0	451	Yes
6	Head Width	152.0 - 158.0	156	Yes
7	Shoulder/Arm Width	461.0 - 479.0	468	Yes
8	Thorax Width	322.0 - 332.0	322	Yes
9	Abdomen Width	273.0 - 287.0	280	Yes
10	Pelvis Lap Width	359.0 - 373.0	367	Yes
11	Head Depth	196.0 - 206.0	198	Yes
12	Thorax Depth	262.0 - 272.0	269	Yes
13	Abdomen Depth	194.0 - 204.0	199	Yes
14	Pelvis Depth	235.0 - 245.0	235	Yes
15	Back of Buttocks to Hip Joint (center of bolt)	150.0 - 160.0	156	Yes
16	Back of Buttocks to Front of Knee	597.0 - 615.0	606	Yes

Technician



Approved





Baseline 10/07/05

Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Peak Resultant Acceleration	125 - 155 g	140.1 g	Yes
Peak Longitudinal Acceleration	(-15) - 15 g	4.9 g	Yes
Is Resultant Acceleration Curve Unimodal within 15% of Main Pulse?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved

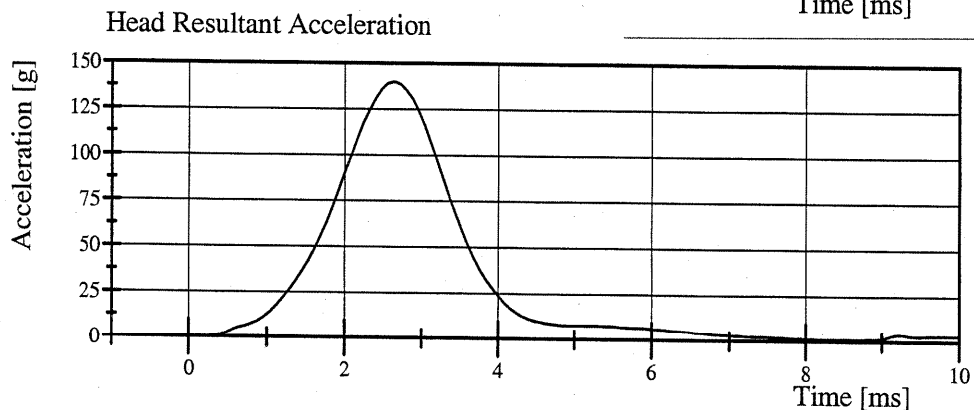
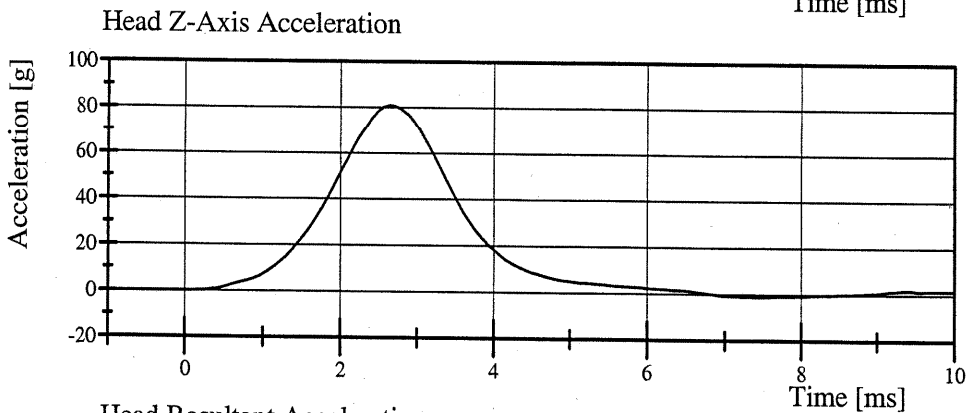
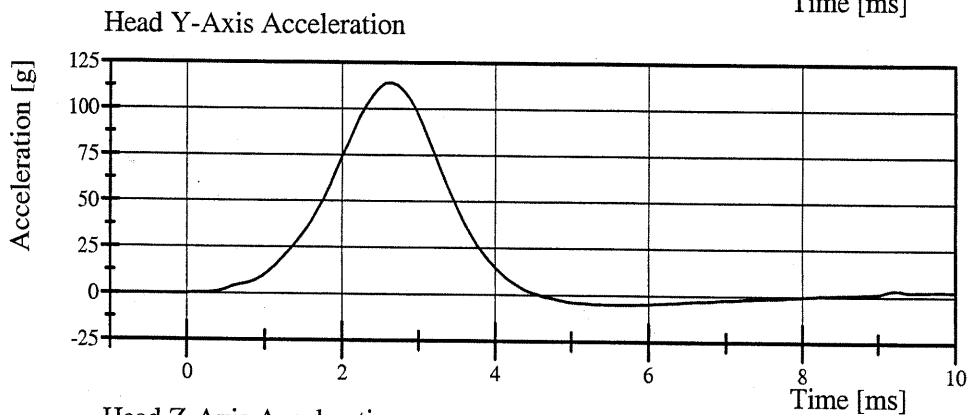
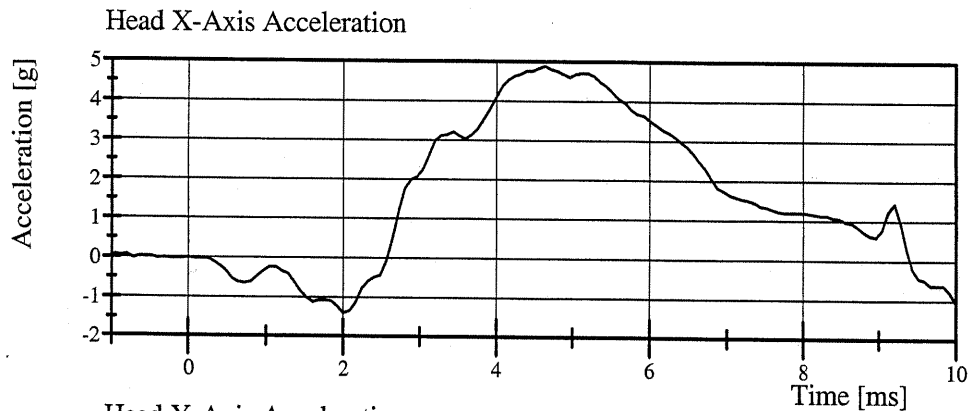


Transportation Research Center Inc.

Left Lateral Head Drop

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/19/2005



Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. 009 Certification No. 7-3

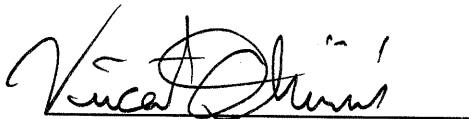
Test Date: 09/20/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Integrated Velocity within Corridor	Yes	Yes	Yes
Pendulum Velocity	3.3 - 3.5 m/s	3.48 m/s	Yes
Maximum Headform Flexion			
Peak	52 - 57 deg	52.3 deg	Yes
Time of Peak	54 - 64 ms	58.8 ms	Yes
Headform Flexion Decay			
- Peak to Zero	55 - 75 ms	58.1 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

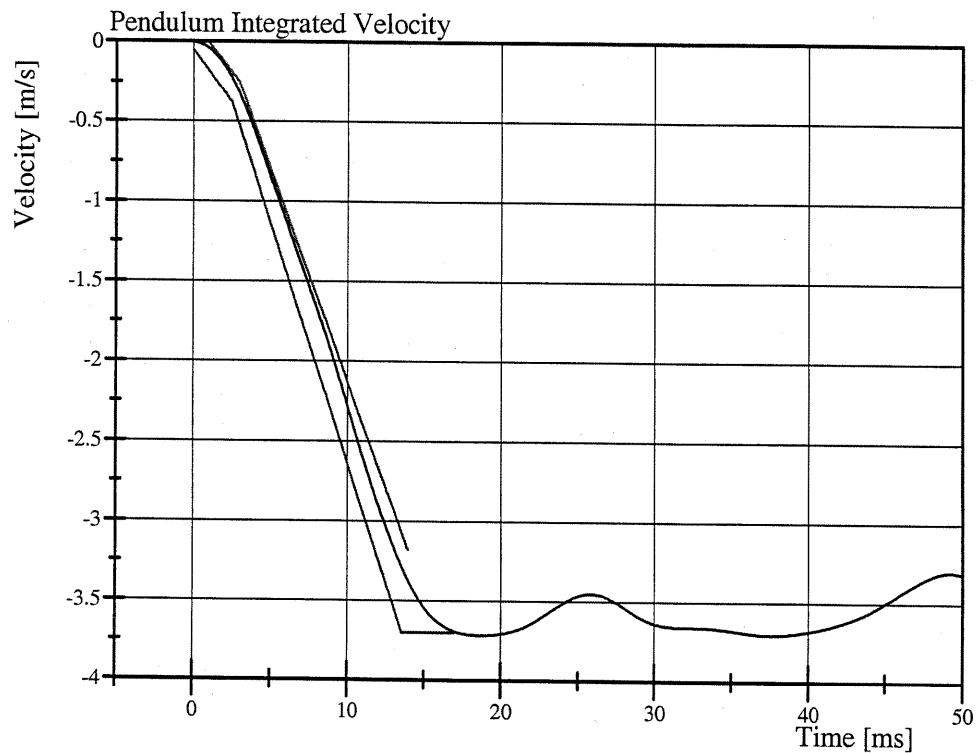
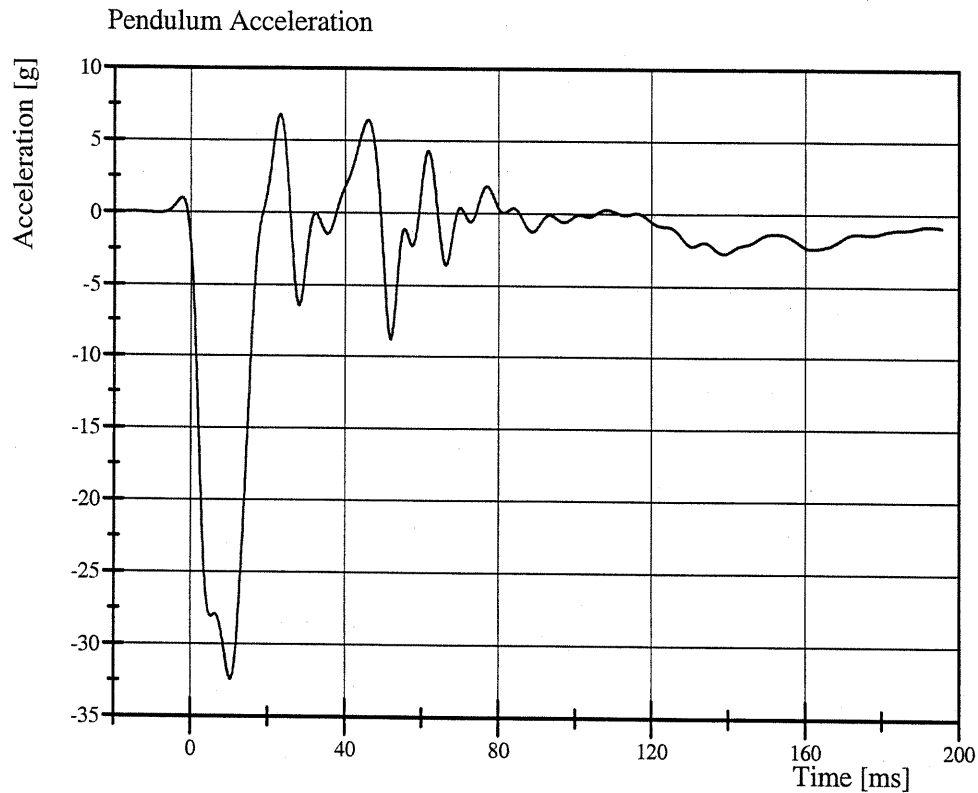


Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. 009 Certification No. 7-3

Test Date: 09/20/2005



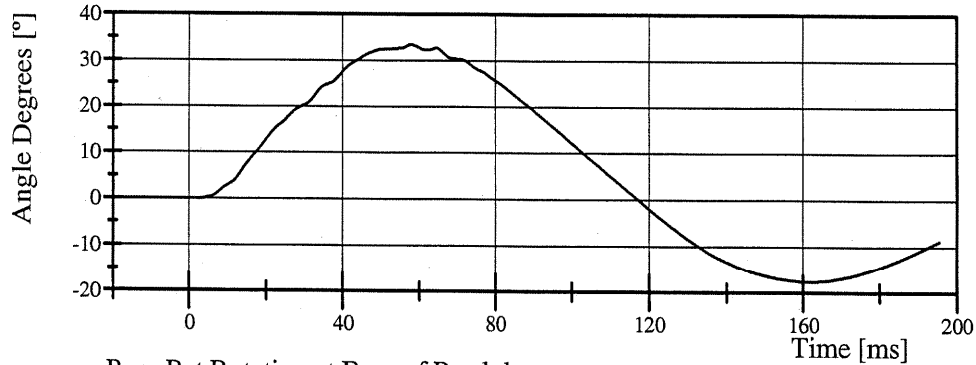
Transportation Research Center Inc.

Left Lateral Neck

ES-2re Serial No. 009 Certification No. 7-3

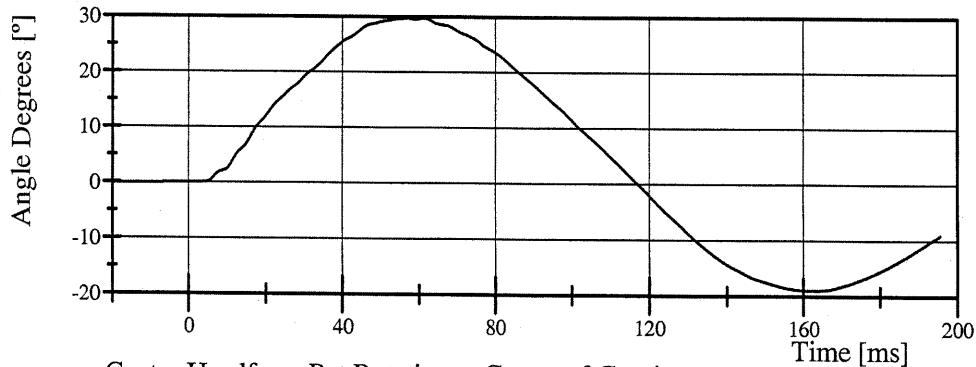
Test Date: 09/20/2005

Forward Pot Rotation at Base of Pendulum



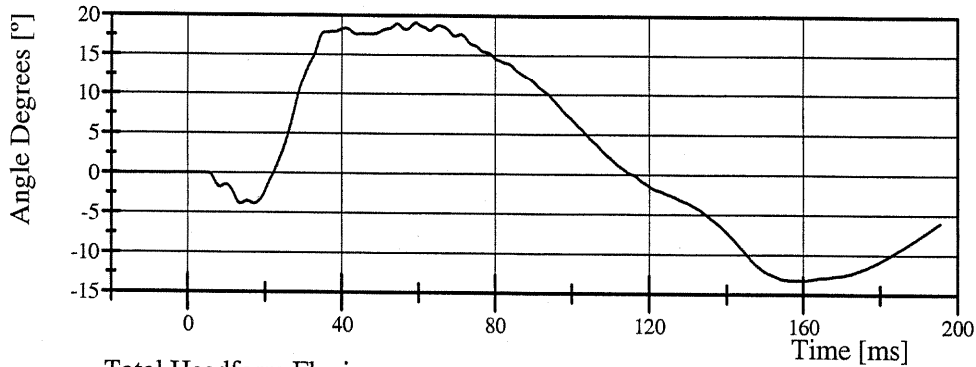
Filter Class: CFC_180
Max: 33.5 ° at 57.8 ms
Min: -17.6 ° at 161.3 ms

Rear Pot Rotation at Base of Pendulum



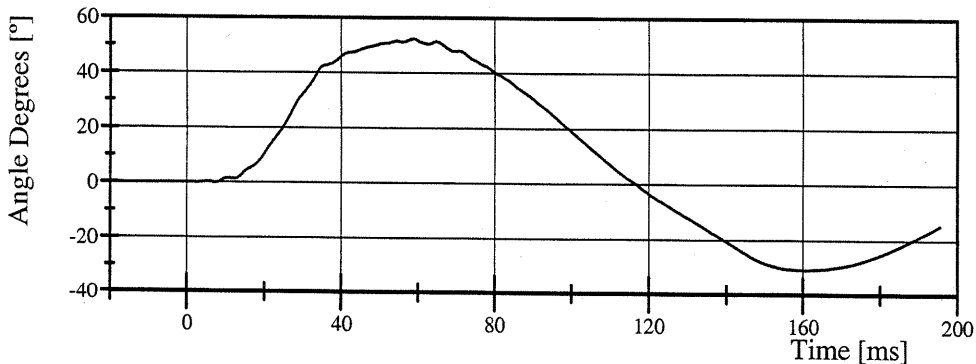
Filter Class: CFC_180
Max: 29.8 ° at 61.3 ms
Min: -19.0 ° at 162.7 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 19.1 ° at 59.2 ms
Min: -13.2 ° at 160.6 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 52.3 ° at 58.8 ms
Min: -30.7 ° at 160.9 ms

Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module

ES-2re Serial No. 009 Certification No. 7-1

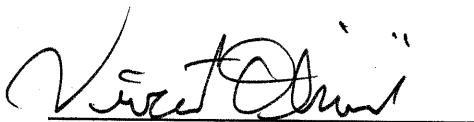
Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
3.0 m/s Test Test Probe Velocity	2.9 - 3.1 m/s	3.00 m/s	Yes
3.0 m/s Test Rib Displacement	36 - 40 mm	38.2 mm	Yes

Test meets specifications.

Comments:

Technician

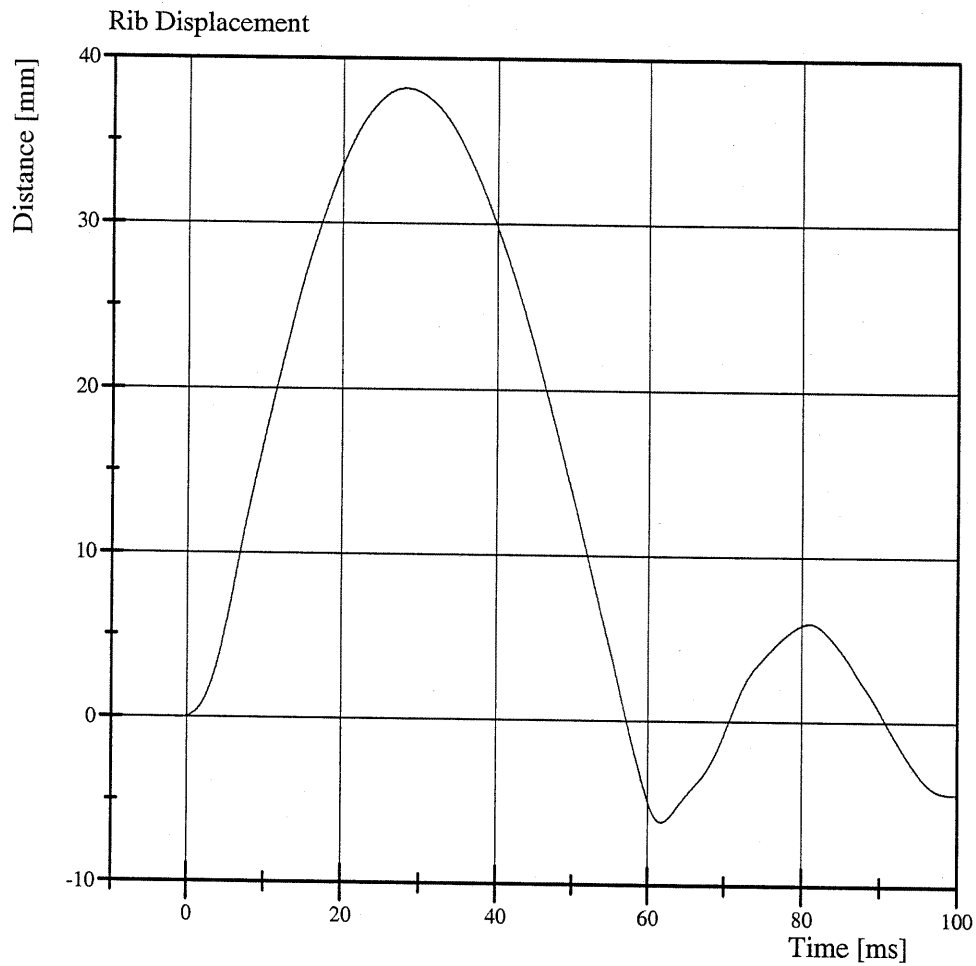


Approved



Transportation Research Center Inc.

3.0 m/s Upper Full Rib Module
ES-2re Serial No. 009 Certification No. 7-1
Test Date: 09/19/2005



Filter Class: CFC_180
Max: 38.2 mm at 28.1 ms
Min: -6.1 mm at 61.8 ms

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module

ES-2re Serial No. 009 Certification No. 7-2

Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
4.0 m/s Test Test Probe Velocity	3.9 - 4.1 m/s	3.94 m/s	Yes
4.0 m/s Test Rib Displacement	46 - 51 mm	49.1 mm	Yes

Test meets specifications.

Comments:

Technician

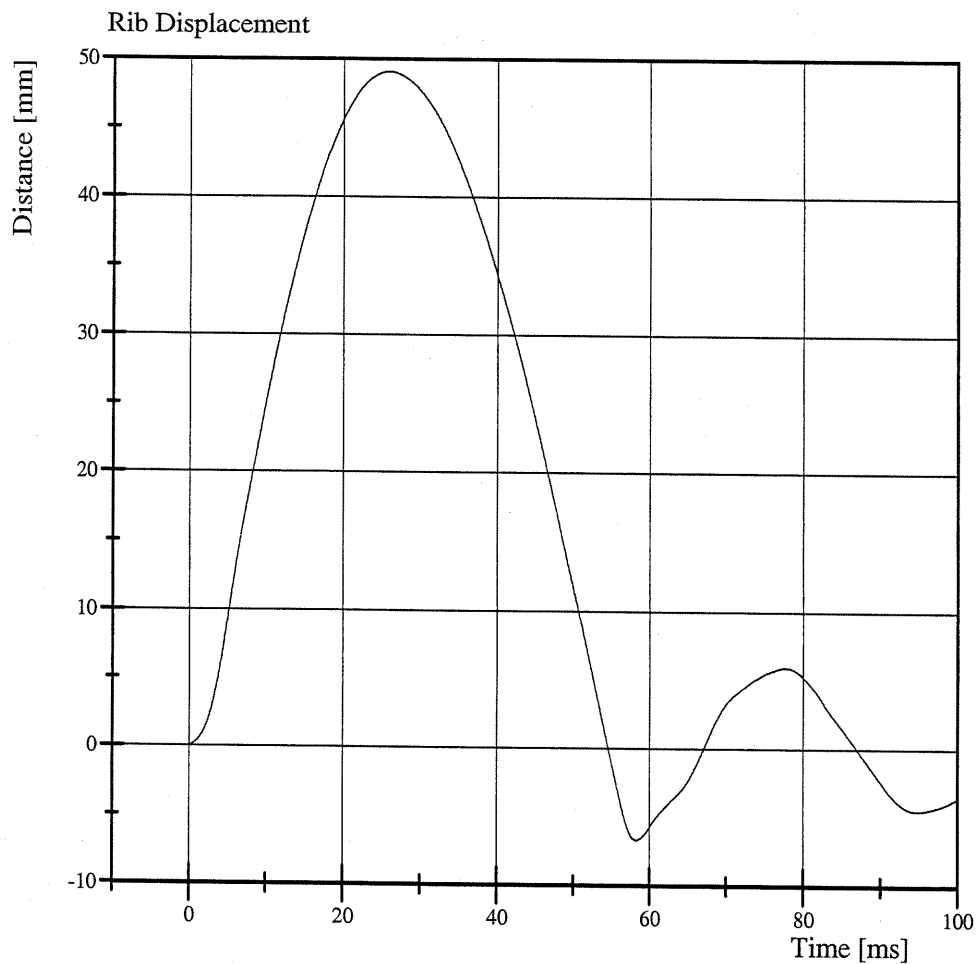
Vincent Dimmi

Approved

V. K. Watter

Transportation Research Center Inc.

4.0 m/s Upper Full Rib Module
ES-2re Serial No. 009 Certification No. 7-2
Test Date: 09/19/2005



Filter Class: CFC_180
Max: 49.1 mm at 25.9 ms
Min: -6.7 mm at 58.2 ms

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
3.0 m/s Test Test Probe Velocity	2.9 - 3.1 m/s	3.01 m/s	Yes
3.0 m/s Test Rib Displacement	36 - 40 mm	37.8 mm	Yes

Test meets specifications.

Comments:

Technician

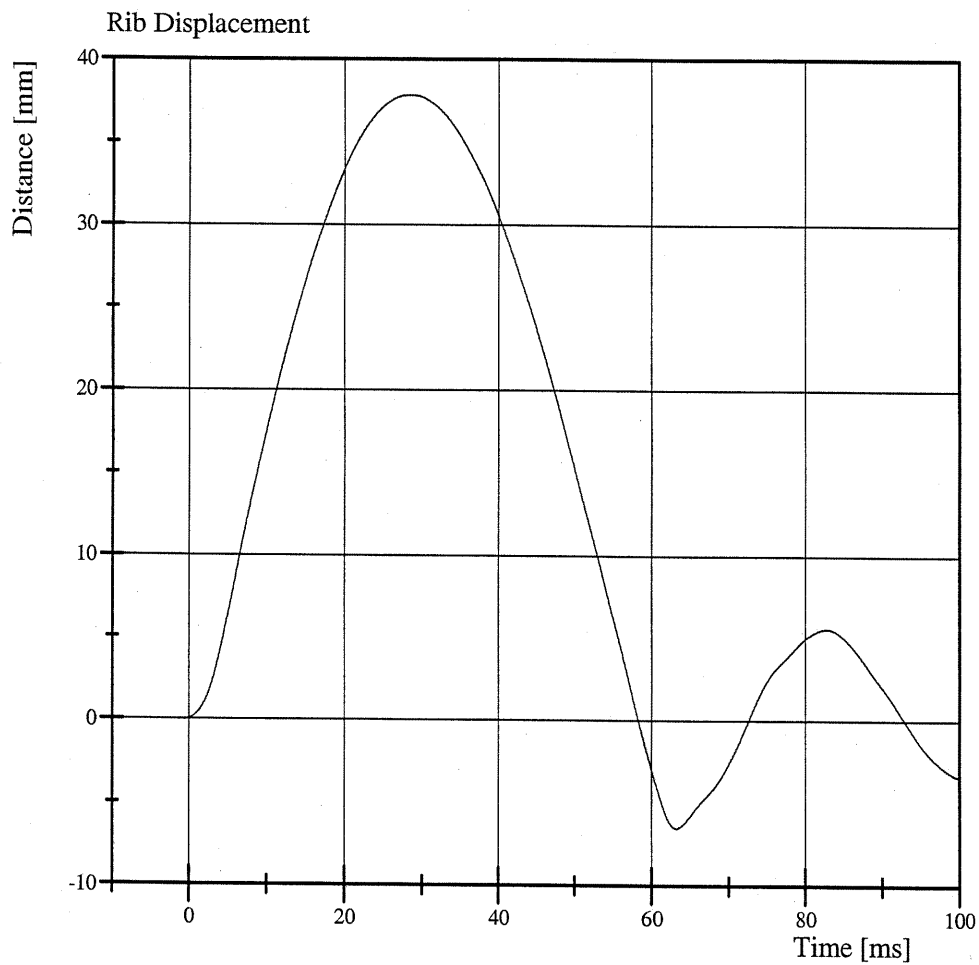
Vincent DiStasio

Approved

K.L. Watter

Transportation Research Center Inc.

3.0 m/s Center Full Rib Module
ES-2re Serial No. 009 Certification No. 7-1
Test Date: 09/19/2005



Filter Class: CFC_180
Max: 37.8 mm at 28.6 ms
Min: -6.5 mm at 63.2 ms

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. 009 Certification No. 7-1
Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
4.0 m/s Test Test Probe Velocity	3.9 - 4.1 m/s	3.97 m/s	Yes
4.0 m/s Test Rib Displacement	46 - 51 mm	49.2 mm	Yes

Test meets specifications.

Comments:

Technician

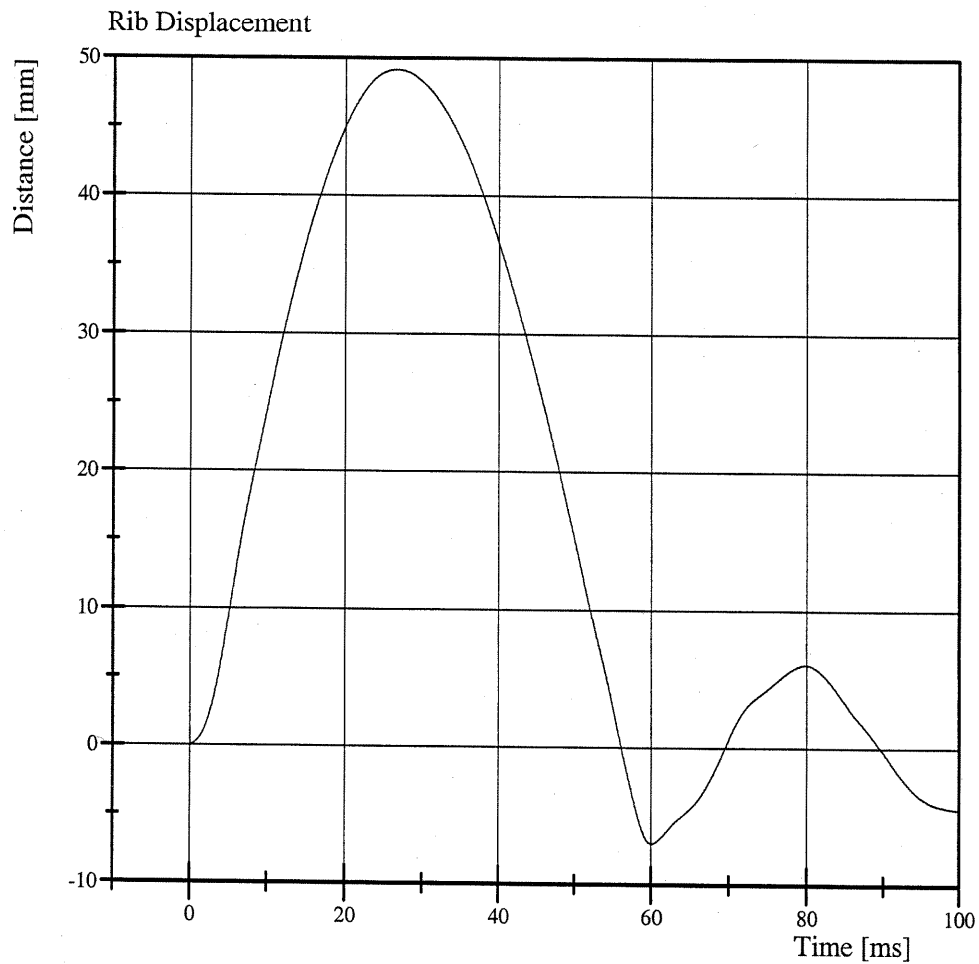
Vince Oliver

Approved

V. F. Watter

Transportation Research Center Inc.

4.0 m/s Center Full Rib Module
ES-2re Serial No. 009 Certification No. 7-1
Test Date: 09/19/2005



Filter Class: CFC_180
Max: 49.2 mm at 26.6 ms
Min: -7.0 mm at 60.1 ms

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
3.0 m/s Test Test Probe Velocity	2.9 - 3.1 m/s	2.97 m/s	Yes
3.0 m/s Test Rib Displacement	36 - 40 mm	38.1 mm	Yes

Test meets specifications.

Comments:

Technician

Vincent D. Quinn

Approved

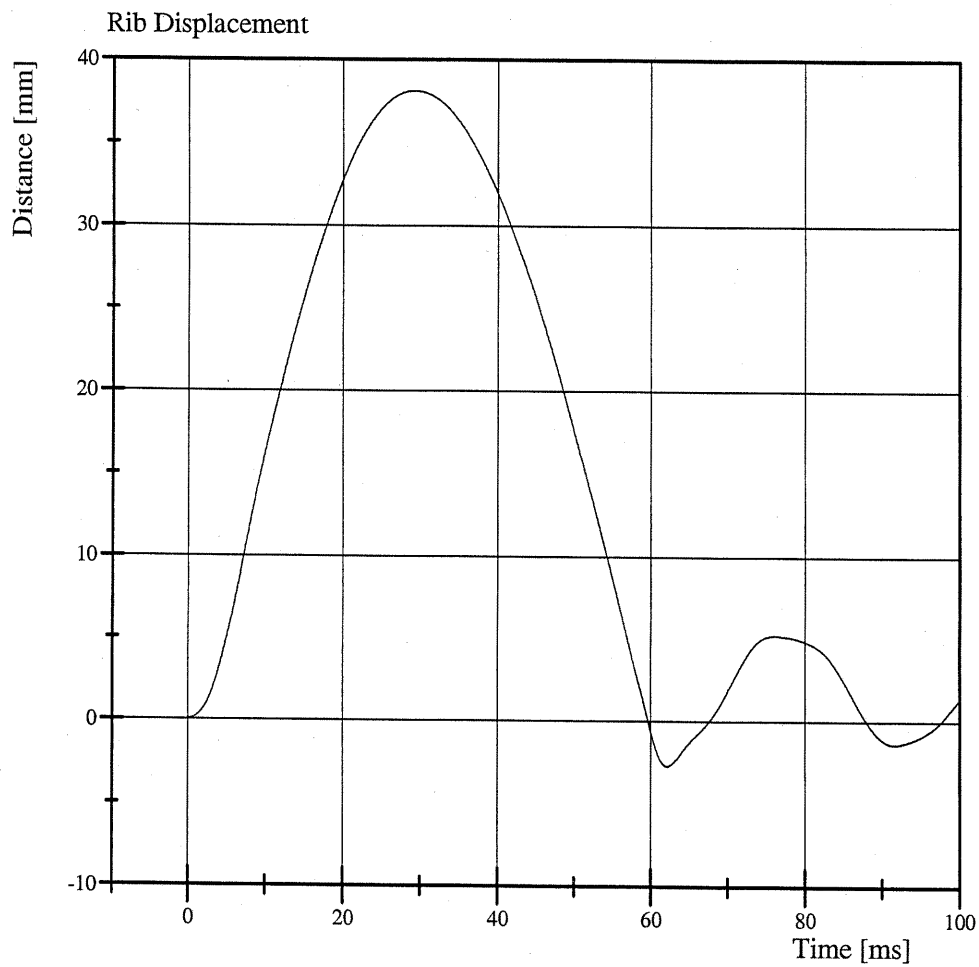
V. F. Watter

Transportation Research Center Inc.

3.0 m/s Lower Full Rib Module

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/19/2005



Filter Class: CFC_180
Max: 38.1 mm at 29.4 ms
Min: -2.7 mm at 62.2 ms

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
4.0 m/s Test Test Probe Velocity	3.9 - 4.1 m/s	3.96 m/s	Yes
4.0 m/s Test Rib Displacement	46 - 51 mm	49.0 mm	Yes

Test meets specifications.

Comments:

Technician

Vincent Oliveri

Approved

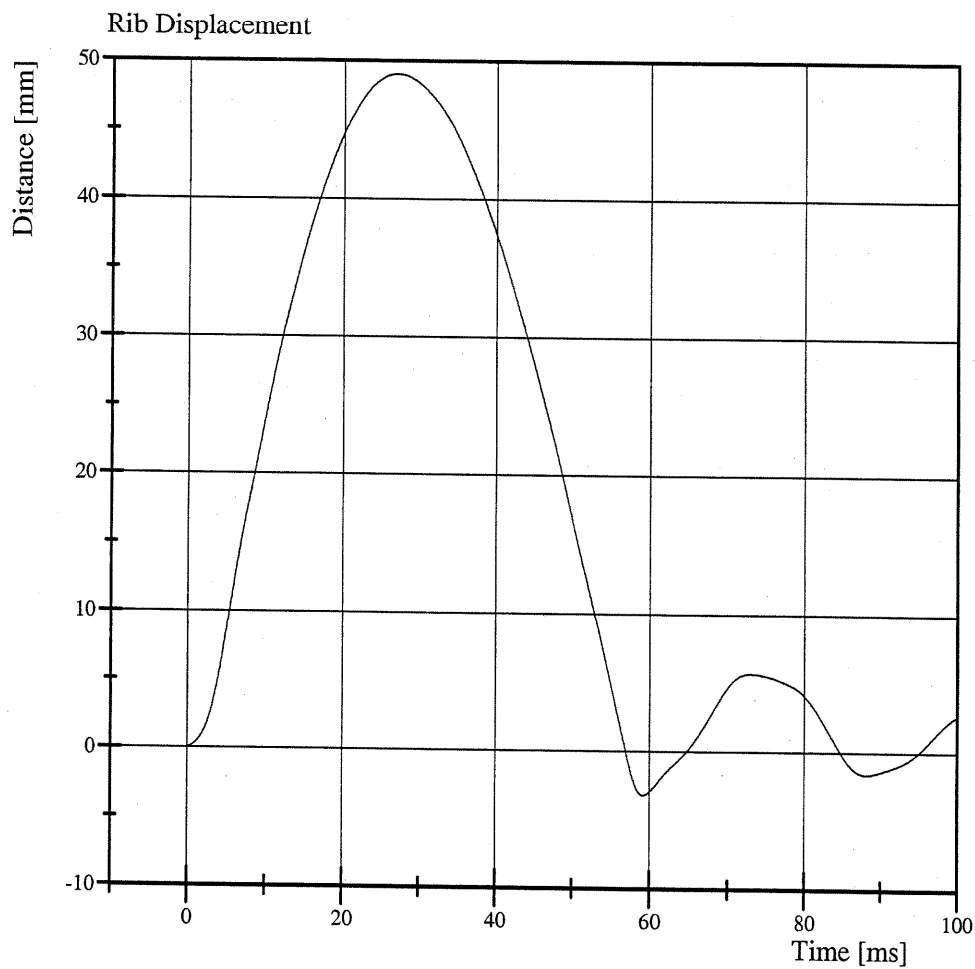
K. J. Walter

Transportation Research Center Inc.

4.0 m/s Lower Full Rib Module

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/19/2005



Filter Class: CFC_180

Max: 49.0 mm at 27.0 ms

Min: -3.2 mm at 59.2 ms

Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. 009 Certification No. 7-3

Test Date: 09/19/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Integrated Velocity within Corridor	Yes	Yes	Yes
Pendulum Velocity	5.95 - 6.15 m/s	6.113 m/s	Yes
Maximum Headform Flexion Peak	45 - 55 deg	45.9 deg	Yes
Time of Peak	39 - 53 ms	45.4 ms	Yes
Headform Flexion Decay - Peak to Zero	40 - 65 ms	42.0 ms	Yes

Test meets specifications.

Comments:

Technician

Vince Quinn

Approved

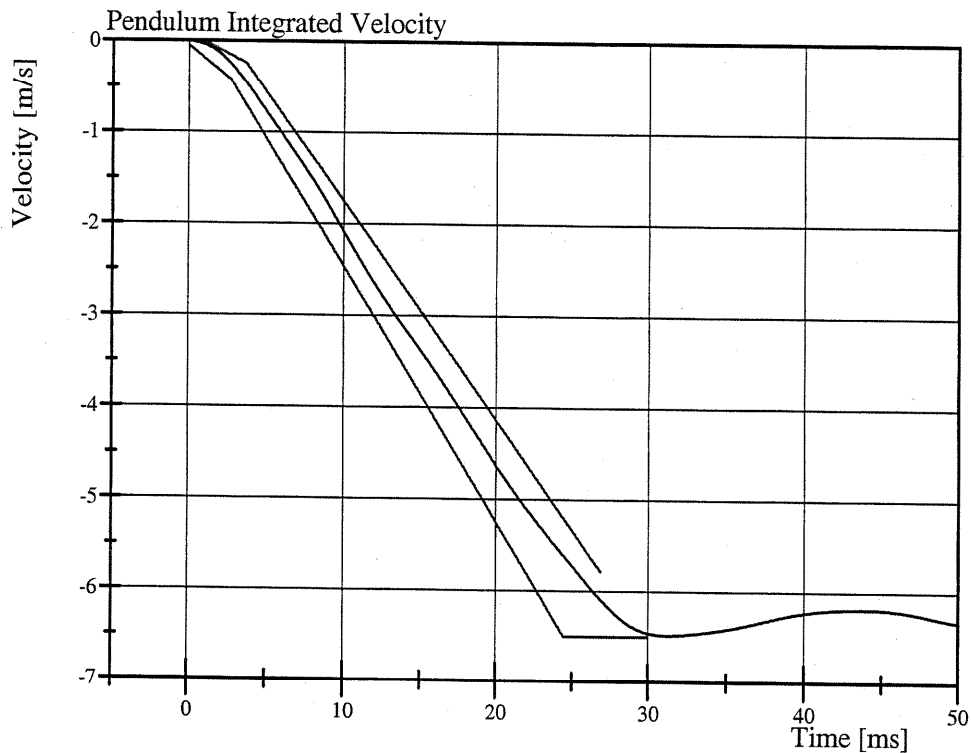
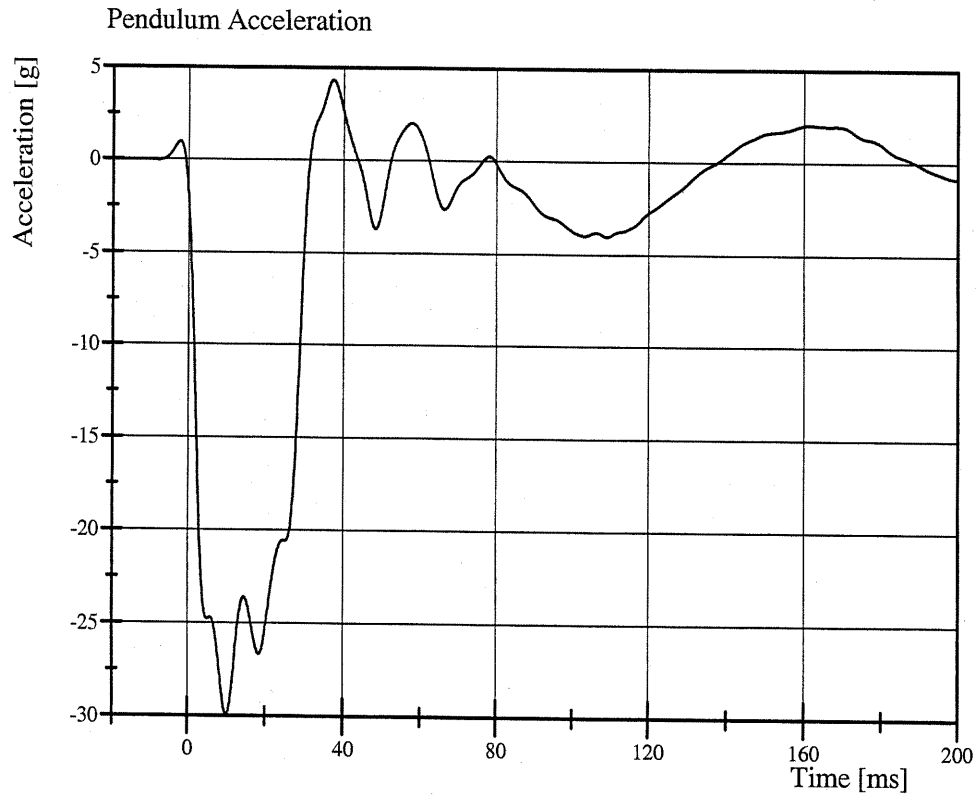
K. H. Walter

Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. 009 Certification No. 7-3

Test Date: 09/19/2005



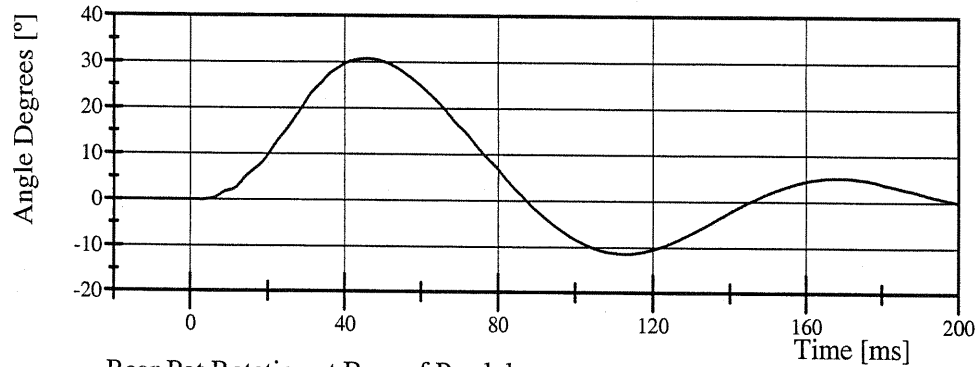
Transportation Research Center Inc.

Left Lateral Lumbar

ES-2re Serial No. 009 Certification No. 7-3

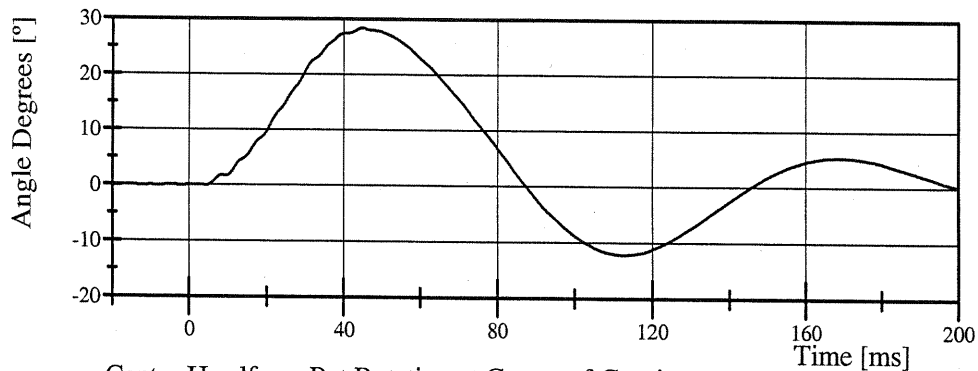
Test Date: 09/19/2005

Forward Pot Rotation at Base of Pendulum



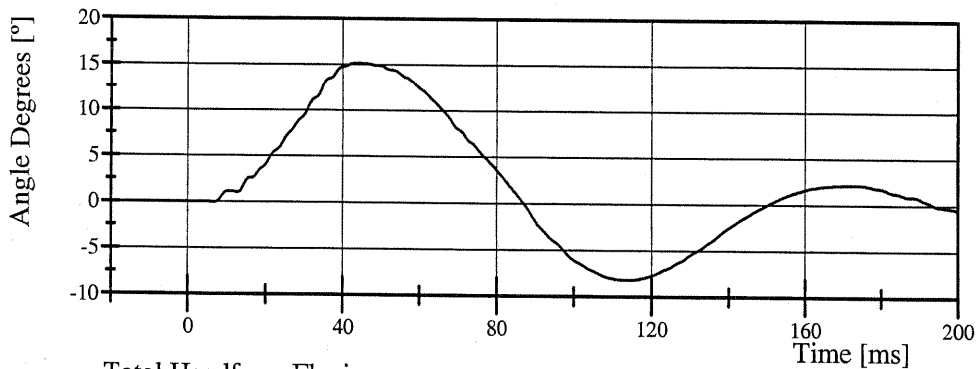
Filter Class: CFC_180
Max: 30.8 ° at 45.6 ms
Min: -11.4 ° at 113.3 ms

Rear Pot Rotation at Base of Pendulum



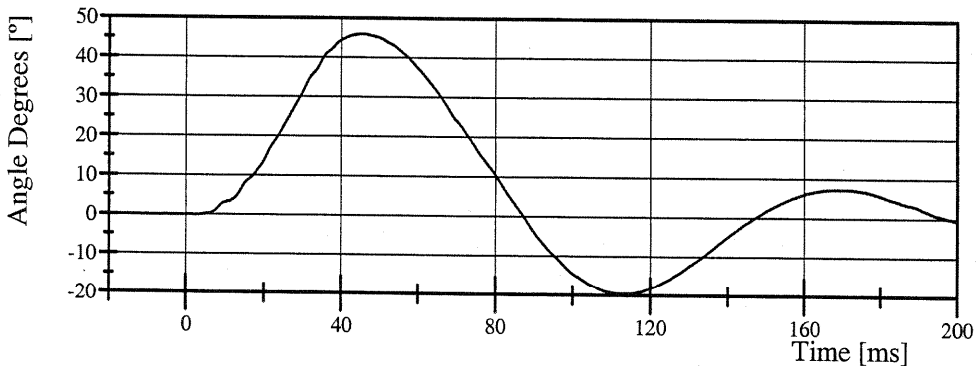
Filter Class: CFC_180
Max: 28.4 ° at 44.7 ms
Min: -12.2 ° at 112.7 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 15.2 ° at 43.3 ms
Min: -8.2 ° at 114.0 ms

Total Headform Flexion



Filter Class: CFC_180
Max: 45.9 ° at 45.4 ms
Min: -19.6 ° at 113.4 ms

Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. 009 Certification No. 7-1

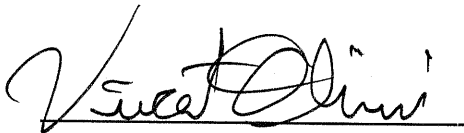
Test Date: 09/27/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.24 m/s	Yes
Test Probe Acceleration	(-7.5) - (-10.5) g	-8.28 g	Yes

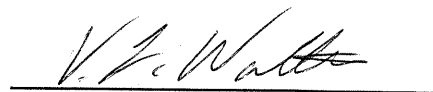
Test meets specifications.

Comments:

Technician



Approved

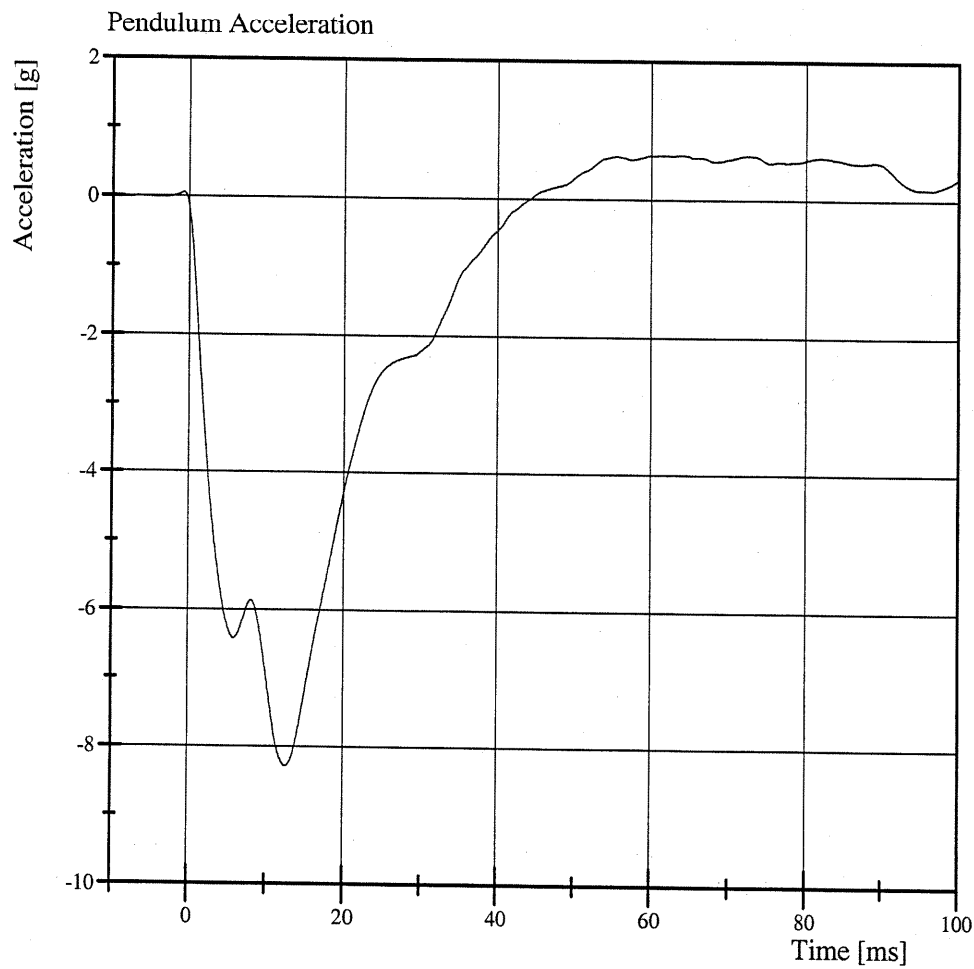


Transportation Research Center Inc.

Left Lateral Shoulder

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/27/2005



Filter Class: CFC_180

Max: 0.6 g at 63.8 ms

Min: -8.3 g at 12.6 ms

Transportation Research Center Inc.

Left Lateral Abdomen Compression
ES-2re Serial No. 009 Certification No. 7-3
Test Date: 09/28/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Test Probe Velocity	3.9 - 4.1 m/s	3.92 m/s	Yes
Test Probe Force			
Peak	(-4,000) - (-4,800) N	-4,649.6 N	Yes
Time of Peak	10.6 - 13.0 ms	11.68 ms	Yes
Total Abdominal Force			
Peak	2,200 - 2,700 N	2,404.4 N	Yes
Time of Peak	10.0 - 12.3 ms	11.28 ms	Yes

Test meets specifications.

Comments:

Technician

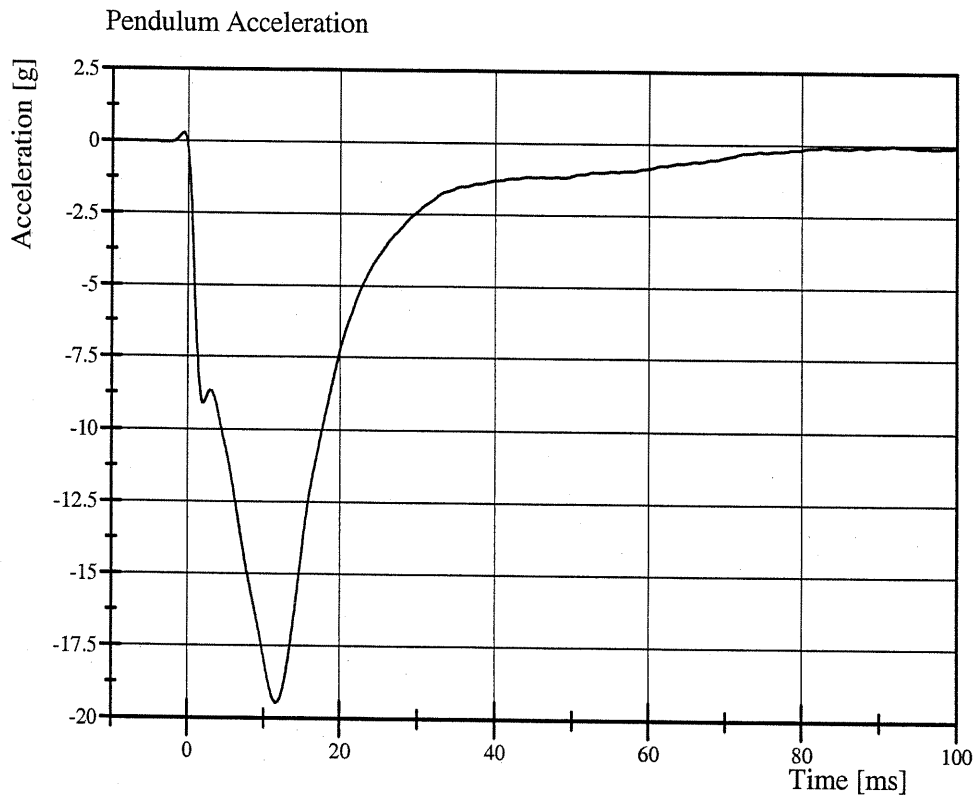
Vincent D. Smith

Approved

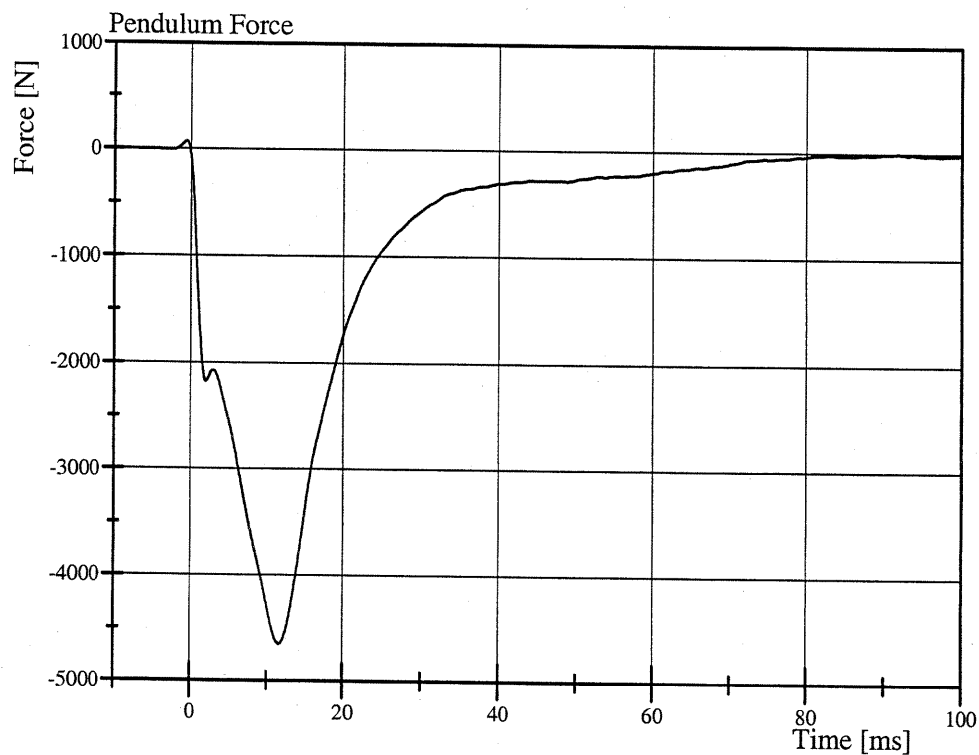
V. J. Walters

Transportation Research Center Inc.

Left Lateral Abdomen Compression
ES-2re Serial No. 009 Certification No. 7-3
Test Date: 09/28/2005



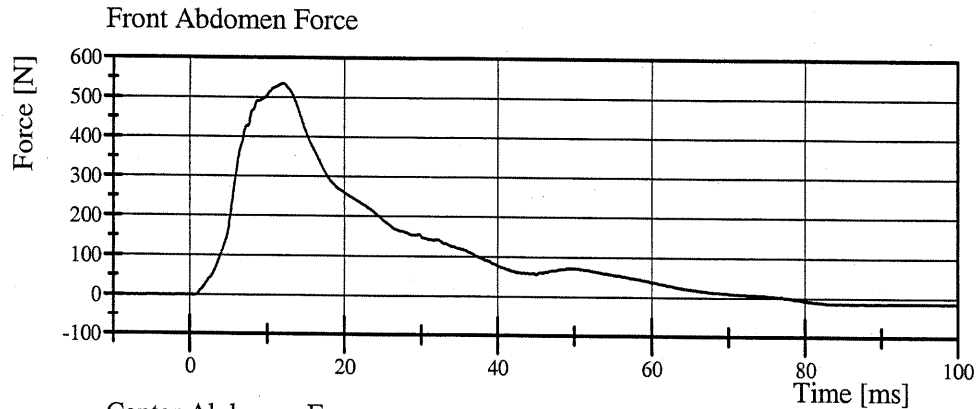
Filter Class: CFC_180
Max: 0.3 g at 41.0 ms
Min: -19.5 g at 53.3 ms



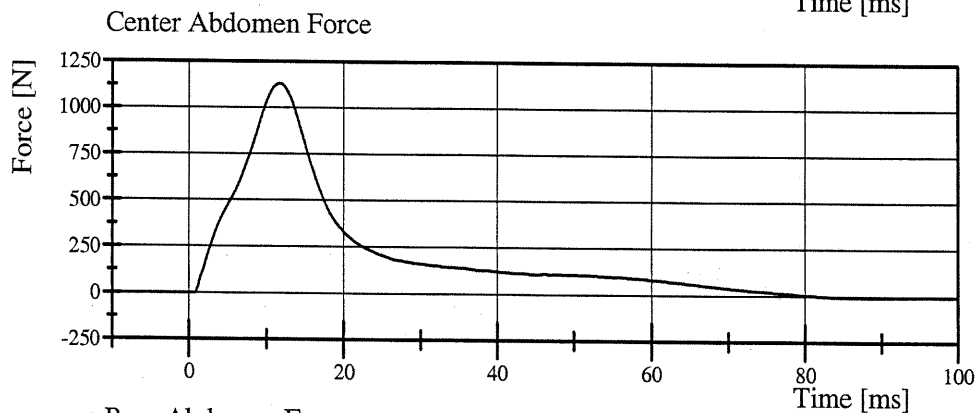
Filter Class: CFC_180
Max: 66.7 N at 41.0 ms
Min: -4,649.6 N at 53.3 ms

Transportation Research Center Inc.

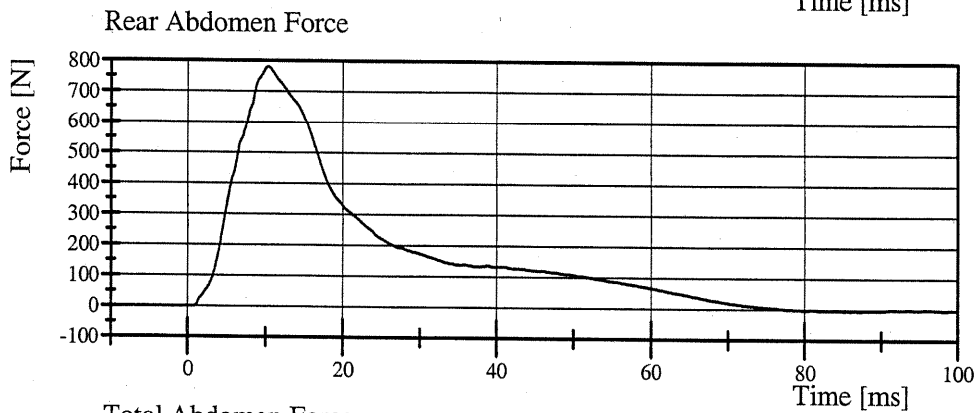
Left Lateral Abdomen Compression
ES-2re Serial No. 009 Certification No. 7-3
Test Date: 09/28/2005



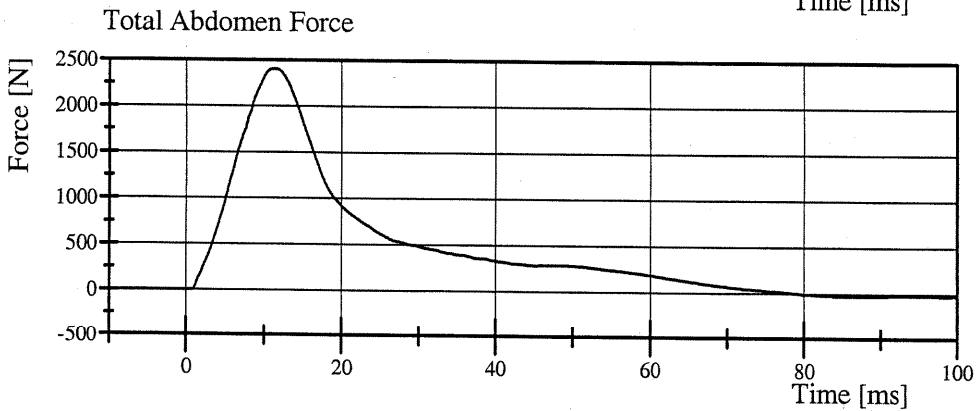
Filter Class: CFC_600
Max: 535.3 N at 12.0 ms
Min: -13.8 N at 90.4 ms



Filter Class: CFC_600
Max: 1,131.8 N at 11.7 ms
Min: -7.1 N at 98.3 ms



Filter Class: CFC_600
Max: 780.1 N at 10.3 ms
Min: -3.8 N at 85.9 ms



Filter Class: CFC_600
Max: 2,404.4 N at 11.3 ms
Min: -23.7 N at 85.9 ms

Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/28/2005

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Test Probe Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Test Probe Force			
Peak	(-4,800) - (-5,500) N	-4,929.3 N	Yes
Time of Peak	10.3 - 15.5 ms	14.48 ms	Yes
Pubic Symphysis Force			
Peak	(-1,310) - (-1,490) N	-1,311.2 N	Yes
Time of Peak	9.9 - 15.9 ms	14.48 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

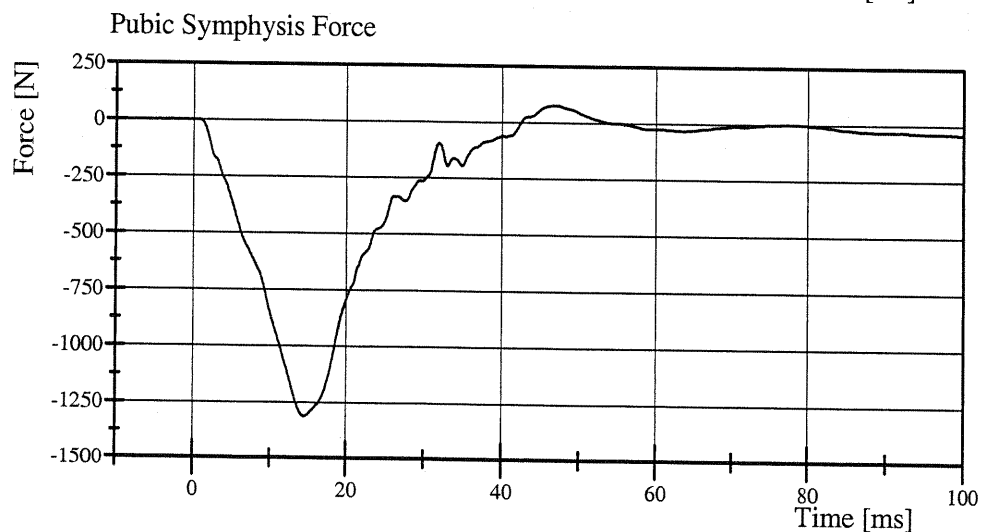
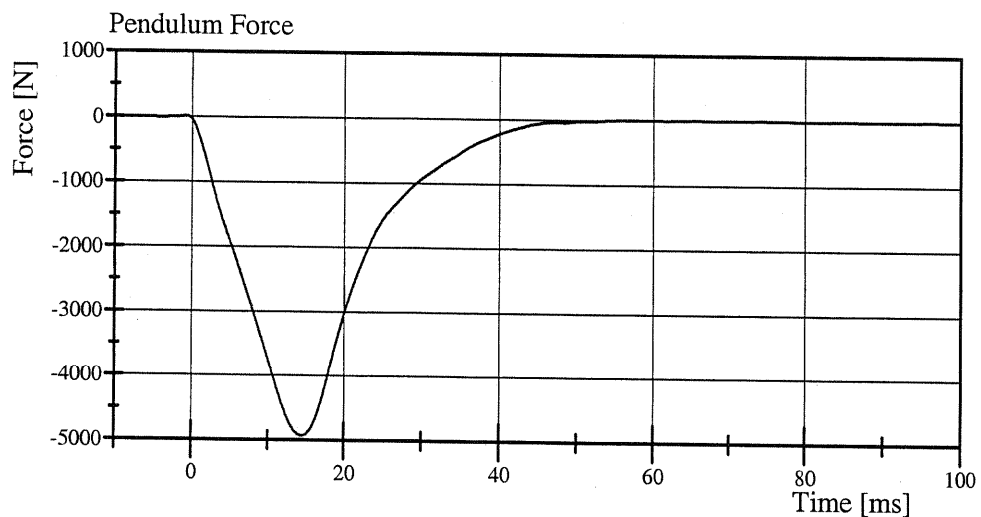
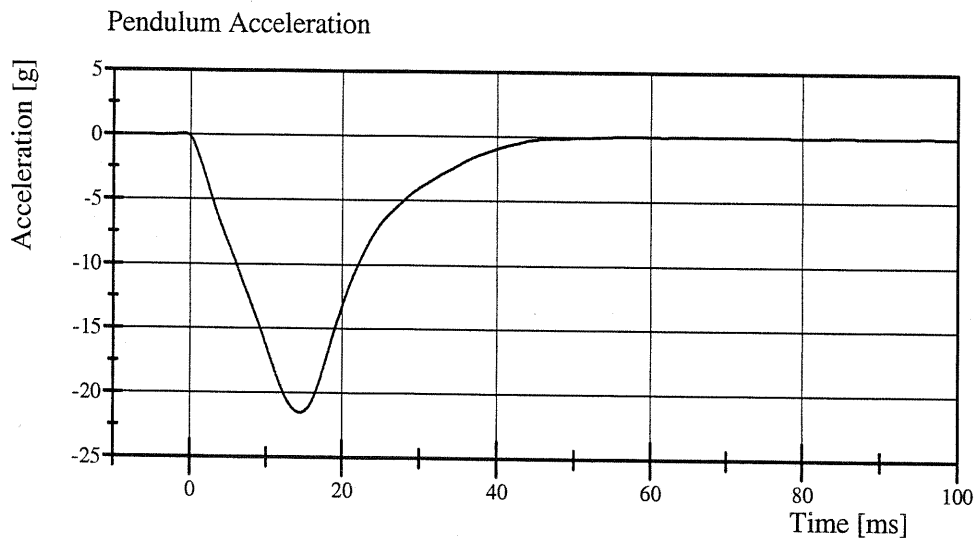


Transportation Research Center Inc.

Left Lateral Pelvis

ES-2re Serial No. 009 Certification No. 7-1

Test Date: 09/28/2005



Appendix D

Test Equipment and Instrumentation Calibration Information

Sign Convention
SAE J211 MAR95

Accelerometers:

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

Potentiometers:

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

Rotation potentiometers:

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

Load cells:

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

Neck load cells:

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

Tibia load cells:

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

Sign Convention, Continued
SAE J211 MAR95

<u>Lumbar load cells:</u>	+X force:	Chest rearward, pelvis forward
	+Y force:	Chest leftward, pelvis rightward
	+Z force:	Chest upward, pelvis downward
	+X moment:	Left shoulder toward left hip
	+Y moment:	Sternum toward front of legs
	+Z moment:	Right shoulder forward, left shoulder rearward

Frequency Response Classes
Used for 051006 Test

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Vehicle Structural Accelerations for use in:	
Total vehicle comparison	60
Integration for velocity or displacement	180
Anthropomorphic Test Device	
Head accelerations	1000
Upper neck force	1000
Upper neck moment	600
Lower neck force	1000
Lower neck moment	600
Shoulder force	600
Upper spine acceleration	180
Upper rib Y-axis acceleration	180
Mid rib Y-axis acceleration	180
Lower rib Y-axis acceleration	180
Upper rib deflection	180
Middle rib deflection	180
Lower rib deflection	180
Lower spine acceleration	180
Torso force	600
Torso moment	600
T12 force	600
T12 moment	600
Abdomen front force	600
Abdomen mid force	600
Abdomen rear force	600
Pubic symphysis force	600
Right femur force	600
Right femur moment	600
Left femur force	600
Left femur moment	600
Pelvis acceleration	1000

Frequency Response Classes, Cont'd.
Used for 051006 Test

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Anthropomorphic Test Device	
Upper spine acceleration	FIR
Lower spine acceleration	FIR
Upper rib acceleration	FIR
Mid rib acceleration	FIR
Lower rib acceleration	FIR
Pelvis acceleration	FIR
TTI acceleration	FIR

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.

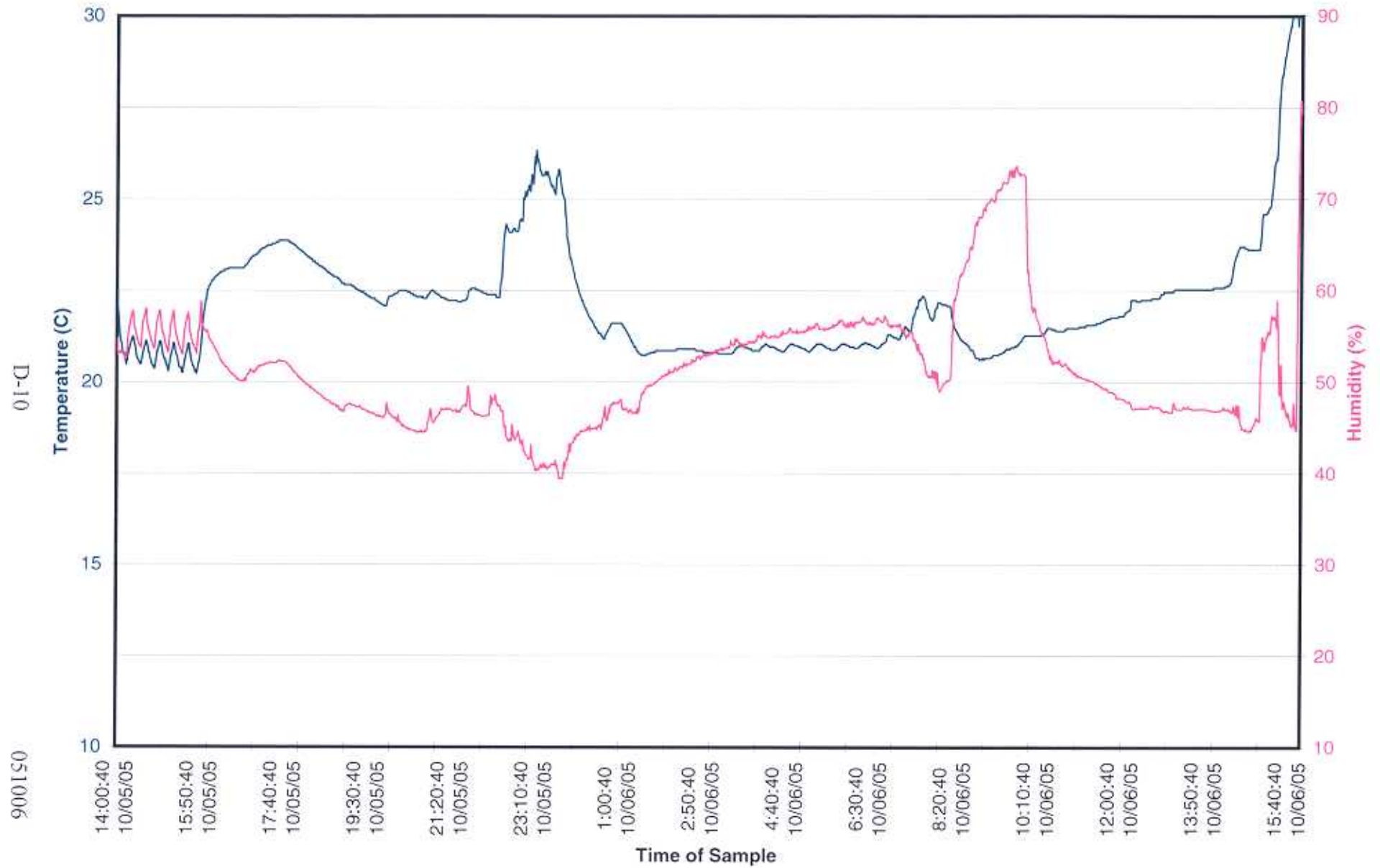
Channel Report Test Number 051006

Ref	Transducer ID	ISO Signal Identifier	Description	FScale	Units	Assembly
1	Trig D1	10ZERO000000EV00	EVENT		1 Logic	
2	J28989	11HEADCG00E2ACXA	Head Accel X	800	g	1-009 ES-2re FTSS.001
3	98H10-F12	11HEADCG00E2ACYA	Head Accel Y	800	g	1-009 ES-2re FTSS.002
4	02I02I10-N14	11HEADCG00E2ACZA	Head Accel Z	800	g	1-009 ES-2re FTSS.003
5	03E03E18-F07	11HEADLE00E2ACXA	Head (LT) Accel X	800	g	1-009 ES-2re FTSS.004
6	03E03D30-N07	11HEADLE00E2ACZA	Head (LT) Accel Z	800	g	1-009 ES-2re FTSS.005
7	03F03F17-N32	11HEADFR00E2ACYA	Head (FT) Accel Y	800	g	1-009 ES-2re FTSS.006
8	03E03E21-M15	11HEADFR00E2ACZA	Head (FT) Accel Z	800	g	1-009 ES-2re FTSS.007
9	03E03D30-N19	11HEADUP00E2ACXA	Head (TP) Accel X	800	g	1-009 ES-2re FTSS.008
10	03E03E20-N02	11HEADUP00E2ACYA	Head (TP) Accel Y	800	g	1-009 ES-2re FTSS.009
11	IF-240-105-FX	11NECKUP00E2FOXA	Neck Force X	9786	N	1-009 ES-2re FTSS.010
12	IF-240-105-FY	11NECKUP00E2FOYA	Neck Force Y	9786	N	1-009 ES-2re FTSS.011
13	IF-240-105-FZ	11NECKUP00E2FOZA	Neck Force Z	15124	N	1-009 ES-2re FTSS.012
14	IF-240-105-MX	11NECKUP00E2MOXA	Neck Moment X	296.6	N·m	1-009 ES-2re FTSS.013
15	IF-240-105-MY	11NECKUP00E2MOYA	Neck Moment Y	296.6	N·m	1-009 ES-2re FTSS.014
16	IF-240-105-MZ	11NECKUP00E2MOZA	Neck Moment Z	296.6	N·m	1-009 ES-2re FTSS.015
17	IF-221-110-FX	11NECKLO00E2FOXA	Neck Lower Force X	12000	N	1-009 ES-2re FTSS.016
18	IF-221-110-FY	11NECKLO00E2FOYA	Neck Lower Force Y	12000	N	1-009 ES-2re FTSS.017
19	IF-221-110-FZ	11NECKLO00E2FOZA	Neck Lower Force Z	14000	N	1-009 ES-2re FTSS.018
20	IF-221-110-MX	11NECKLO00E2MOXA	Neck Lower Moment X	450	N·m	1-009 ES-2re FTSS.019
21	IF-221-110-MY	11NECKLO00E2MOYA	Neck Lower Moment Y	450	N·m	1-009 ES-2re FTSS.020
22	IF-221-110-MZ	11NECKLO00E2MOZA	Neck Lower Moment Z	300	N·m	1-009 ES-2re FTSS.021
23	IF-317-119-FX	11SHLDLE00E2FOXA	Shoulder Left Force X	4000	N	1-009 ES-2re FTSS.022
24	IF-317-119-FY	11SHLDLE00E2FOYA	Shoulder Left Force Y	8000	N	1-009 ES-2re FTSS.023
25	IF-317-119-FZ	11SHLDLE00E2FOZA	Shoulder Left Force Z	4000	N	1-009 ES-2re FTSS.024
26	99108-F30	11SPIN0100E2ACXA	Upper Spine X	400	g	1-009 ES-2re FTSS.025
27	03E03E20-N10	11SPIN0100E2ACYA	Upper Spine Y	400	g	1-009 ES-2re FTSS.026
28	02I02I16-A09	11SPIN0100E2ACZA	Upper Spine Z	400	g	1-009 ES-2re FTSS.027
29	IF-441-102-FX	11BAPL0000E2FOXA	Torso Back Plate Force X	2980	N	1-009 ES-2re FTSS.028
30	IF-441-102-FY	11BAPL0000E2FOYA	Torso Back Plate Force Y	2980	N	1-009 ES-2re FTSS.029
31	IF-441-102-MY	11BAPL0000E2MOYA	Torso Back Plate Moment Y	160	N·m	1-009 ES-2re FTSS.030
32	IF-441-102-MZ	11BAPL0000E2MOZA	Torso Back Plate Moment Z	160	N·m	1-009 ES-2re FTSS.031
33	99H30-Z04	11RIBSLU00E2ACYA	Upper Rib Accel Y	800	g	1-009 ES-2re FTSS.032
34	03E03E21-M04	11RIBSLM00E2ACYA	Mid Rib Accel Y	800	g	1-009 ES-2re FTSS.033
35	99108-F28	11RIBSLL00E2ACYA	Lower Rib Accel Y	800	g	1-009 ES-2re FTSS.034

36	CST-009URD	11RIBSLU00E2DSYA	Upper Rib Disp. Y	68 mm	1-009 ES-2re FTSS.035
37	CST-009MRD	11RIBSLM00E2DSYA	Mid Rib Disp. Y	68 mm	1-009 ES-2re FTSS.036
38	CST-009LRD	11RIBSLL00E2DSYA	Lower Rib Disp. Y	68 mm	1-009 ES-2re FTSS.037
39	01G18-F16	11SPIN1200E2ACXA	Lower Spine X	400 g	1-009 ES-2re FTSS.038
40	98H14-K06	11SPIN1200E2ACYA	Lower Spine Y	400 g	1-009 ES-2re FTSS.039
41	02I02I05-F20	11SPIN1200E2ACZA	Lower Spine Z	400 g	1-009 ES-2re FTSS.040
42	IF-420-103-FX	11SPIN1200E2FOXA	Lower Spine Force X	13789.5 N	1-009 ES-2re FTSS.041
43	IF-420-103-FY	11SPIN1200E2FOYA	Lower Spine Force Y	13789.5 N	1-009 ES-2re FTSS.042
44	IF-420-103-MX	11SPIN1200E2MOXA	Lower Spine Moment X	994 N·m	1-009 ES-2re FTSS.043
45	IF-420-103-MY	11SPIN1200E2MOYA	Lower Spine Moment Y	994 N·m	1-009 ES-2re FTSS.044
46	IF-413-104-FY	11LUSP0000E2FOYA	Lumbar Force Y	5000 N	1-009 ES-2re FTSS.045
47	IF-413-104-FZ	11LUSP0000E2FOZA	Lumbar Force Z	7000 N	1-009 ES-2re FTSS.046
48	IF-413-104-MX	11LUSP0000E2MOXA	Lumbar Moment X	225 N·m	1-009 ES-2re FTSS.047
49	IF-600-122-FY	11ABDOLEFRE2FOYA	Front Abdominal Force Y	4893 N	1-009 ES-2re FTSS.048
50	IF-600-123-FY	11ABDOLEMIE2FOYA	Mid Abdominal Force Y	4893 N	1-009 ES-2re FTSS.049
51	IF-600-124-FY	11ABDOLEREE2FOYA	Rear Abdominal Force Y	4893 N	1-009 ES-2re FTSS.050
52	3096-350-FY	11PUBC0000E2FOYA	Pubic Force Y	20000 N	1-009 ES-2re FTSS.051
53	J32178	11PELVCG00E2ACXA	Pelvis Accel X	800 g	1-009 ES-2re FTSS.052
54	AJ5N5	11PELVCG00E2ACYA	Pelvis Accel Y	800 g	1-009 ES-2re FTSS.053
55	AJ5W4	11PELVCG00E2ACZA	Pelvis Accel Z	800 g	1-009 ES-2re FTSS.054
56	IF-625-136-FX	11FEMRLE00E2FOXA	Left Femur Force X	13344 N	1-009 ES-2re FTSS.055
57	IF-625-136-FY	11FEMRLE00E2FOYA	Left Femur Force Y	13344 N	1-009 ES-2re FTSS.056
58	IF-625-136-FZ	11FEMRLE00E2FOZA	Left Femur Force Z	22241 N	1-009 ES-2re FTSS.057
59	IF-625-136-MX	11FEMRLE00E2MOXA	Left Femur Moment X	339 N·m	1-009 ES-2re FTSS.058
60	IF-625-136-MY	11FEMRLE00E2MOYA	Left Femur Moment Y	339 N·m	1-009 ES-2re FTSS.059
61	IF-625-136-MZ	11FEMRLE00E2MOZA	Left Femur Moment Z	339 N·m	1-009 ES-2re FTSS.060
62	IF-625-135-FX	11FEMRRI00E2FOXA	Right Femur Force X	13344 N	1-009 ES-2re FTSS.061
63	IF-625-135-FY	11FEMRRI00E2FOYA	Right Femur Force Y	13344 N	1-009 ES-2re FTSS.062
64	IF-625-135-FZ	11FEMRRI00E2FOZA	Right Femur Force Z	22241 N	1-009 ES-2re FTSS.063
65	IF-625-135-MX	11FEMRRI00E2MOXA	Right Femur Moment X	339 N·m	1-009 ES-2re FTSS.064
66	IF-625-135-MY	11FEMRRI00E2MOYA	Right Femur Moment Y	339 N·m	1-009 ES-2re FTSS.065
67	IF-625-135-MZ	11FEMRRI00E2MOZA	Right Femur Moment Z	339 N·m	1-009 ES-2re FTSS.066
68	P46013	16SILBFR0000ACYA	Right Side Sill at Front Seat Y-axis Acceleration - in line with pole	1000 g	
69	P46503	14SILBFR0000ACYA	Left Side Sill at Front Seat Y-axis Acceleration - forward of impact line	1000 g	
70	P46501	14BPILBO0000ACYA	Left Lower B-Post Y-axis Accel - at Sill	1500 g	
71	P39849	14BPILLO0000ACYA	Left Lower B-Post Y-axis Accel - 1/3 up	1500 g	
72	P46502	14BPILMI0000ACYA	Left Middle B-Post Y-axis Accel - 2/3 up	1500 g	

73	P41703	11APILBO0000ACYA	Left Lower A-Post Y-axis Accel - at Sill	1500	g	
74	P34812	11APILLO0000ACYA	Left Lower A-Post Y-axis Accel - 1/3 up	1500	g	
75	P41701	11APILMI0000ACYA	Left Middle A-Post Y-axis Accel - 2/3 up	1500	g	
76	P39870	11SETRFR0000ACYA	Left Front Seat Track Y-axis Acceleration - align with h-point	1500	g	
77	P45731	10VEHCCG0000ACXA	Vehicle Center of Gravity X-axis Acceleration	1000	g	
78	P46045	10VEHCCG0000ACYA	Vehicle Center of Gravity Y-axis Acceleration	1000	g	
79	P46494	10VEHCCG0000ACZA	Vehicle Center of Gravity Z-axis Acceleration	1000	g	
80	P46059	12ENGN000000ACXA	Top of Engine X-axis Acceleration	1000	g	
81	P34369	12ENGN000000ACYA	Top of Engine Y-axis Acceleration	1000	g	
82	P42110	12VEHC000000ACXA	Firewall X-axis Acceleration	1000	g	
83	P34021	12VEHC000000ACYA	Firewall Y-axis Acceleration	1000	g	
84	P48654	13ROFR000000ACXA	Right Roof Rail X-axis Acceleration	1000	g	
85	P47528	13ROFR000000ACYA	Right Roof Rail Y-axis Acceleration	1000	g	
86	ABFire1	11SENS000001VO0A	Side torso Airbag fire signal	5	V	
87	ABFire2	11SENS000002VO0A	Front airbag fire inductor	5	V	
88	ABFire3	13SENS000001VO0A	Non-struck Side front Airbag fire (disable bag)	5	V	
89	ABFire4	13SENS000002VO0A	Non-struck Side curtain airbag fire (disable bag)	5	V	
90	P38439	18VEHC000000ACXA	Rear Bed X-axis acceleration	1000	g	
91	P39852	18VEHC000000ACYA	Rear Bed Y-axis acceleration	1000	g	
92	P39863	11DOOR000001ACYA	Driver Door y-axis accel at dummy arm	1000	g	
93	P25874	11DOOR000002ACYA	Driver Door y-axis accel at dummy rib	1000	g	
94	P33531	11DOOR000003ACYA	Driver Door y-axis accel at dummy pelvis	1000	g	
95	P33806	11DOOR000004ACYA	Driver Door y-axis accel at dummy knee	1000	g	
96	Bit.00	11CONT000001EV00	Dummy head contact	1	Logic	
97	Bit.01	11CONT000002EV00	Dummy shoulder contact	1	Logic	
98	Bit.02	11CONT000003EV00	Dummy torso contact	1	Logic	
99	Bit.03	11CONT000004EV00	Dummy leg contact	1	Logic	
100	ABT squib volts	11AIRBRITP00VO00	SIDE CURTAIN AIRBAG FIRE SIGNAL	50	V	
101	122061A	K0FBAR010000FOXA	POLE LOAD CELL 1	222411	N	0-Barrier 201 Pole.001
102	62460	K0FBAR020000FOXA	POLE LOAD CELL 2	222400	N	0-Barrier 201 Pole.002
103	122027A	K0FBAR030000FOXA	POLE LOAD CELL 3	222411	N	0-Barrier 201 Pole.003
104	122067A	K0FBAR040000FOXA	POLE LOAD CELL 4	222400	N	0-Barrier 201 Pole.004
105	114016A	K0FBAR050000FOXA	POLE LOAD CELL 5	222411	N	0-Barrier 201 Pole.005
106	68022	K0FBAR060000FOXA	POLE LOAD CELL 6	222400	N	0-Barrier 201 Pole.006
107	15793	K0FBAR070000FOXA	POLE LOAD CELL 7	222400	N	0-Barrier 201 Pole.007
108	68056	K0FBAR080000FOXA	POLE LOAD CELL 8	222400	N	0-Barrier 201 Pole.008
	ABT squib amps	11AIRBRITP00CO00	SIDE CURTAIN AIRBAG FIRE SIGNAL	5	A	

2005 DODGE RAM 2500 OBLIQUE POLE IMPACT AT 32.0 KPH



Appendix E

INSIA Report on Structural Measurements



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

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March, 1999

REPORT DOCUMENTATION PAGE	
Title:	<i>STRUCTURAL SURVEY OF CARS. MEASUREMENT METHODOLOGY OF THE MAIN RESISTANT ELEMENTS IN THE CAR BODY</i>
Author(s):	Aparicio Izquierdo, Francisco Páez Ayuso, Francisco Javier
Performing Organisation name and address:	INSIA – University Institute for Automobile Research Carretera de Valencia, Km. 7 – Campus Sur de la Universidad Politécnica de Madrid 28031 – Madrid – Spain
Supplementary notes:	Under contract to: THE EUROPEAN COMMUNITY Project: “Improvement of Crash Compatibility between Cars” Contract N°: RO – 97 – SC.1064
Abstract:	The main aim of this working package -<i>Structural Survey of Cars</i>- is the reduction of incompatibilities, both structural and geometric, between passenger vehicles and their potential collision partners. The understanding of these incompatibilities needs a previous step for the knowledge of the existing car fleet. Firstly, it is necessary to select the main resistant elements in the car body. These elements have to be chosen from the point of view of the sort of collision that we want to study, that is to say, frontal and side impacts. Detailed measurements have been taken from exterior and interior elements, spread to a total number of 74 models selected from the main vehicle manufacturers at Spain. All of them are being sold this year. Using the information available from the previous measurements in vehicles, the geometric characteristics of the main resistant elements involved in the geometric compatibility between cars will be defined. This report shows the methodology followed to get these measurements.
Subject terms:	Crash compatibility, geometric compatibility, resistant elements, measure methodology
Date:	March, 1999

1.- METHODOLOGY.

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

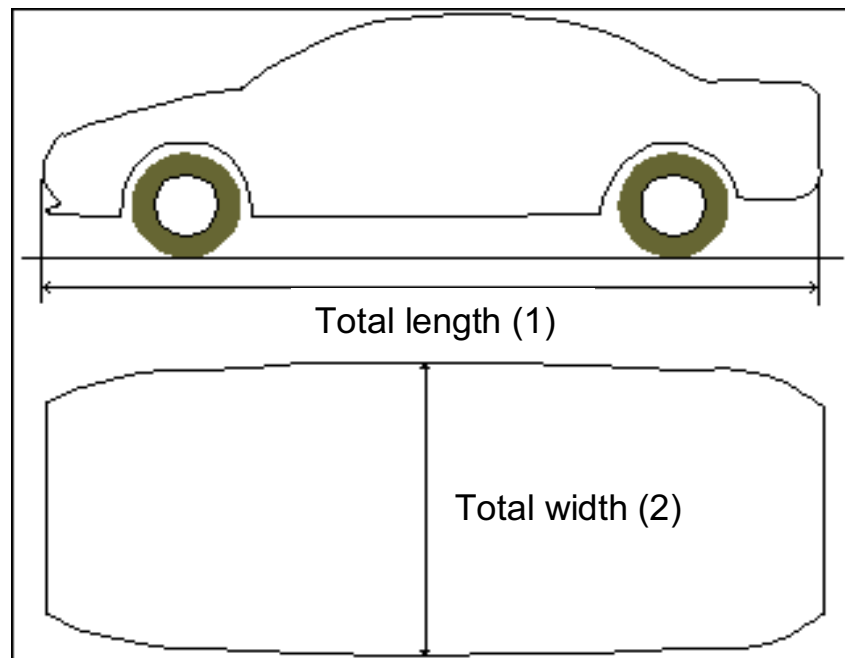


Figure 1.- Definition of the main resistant elements. General dimensions.

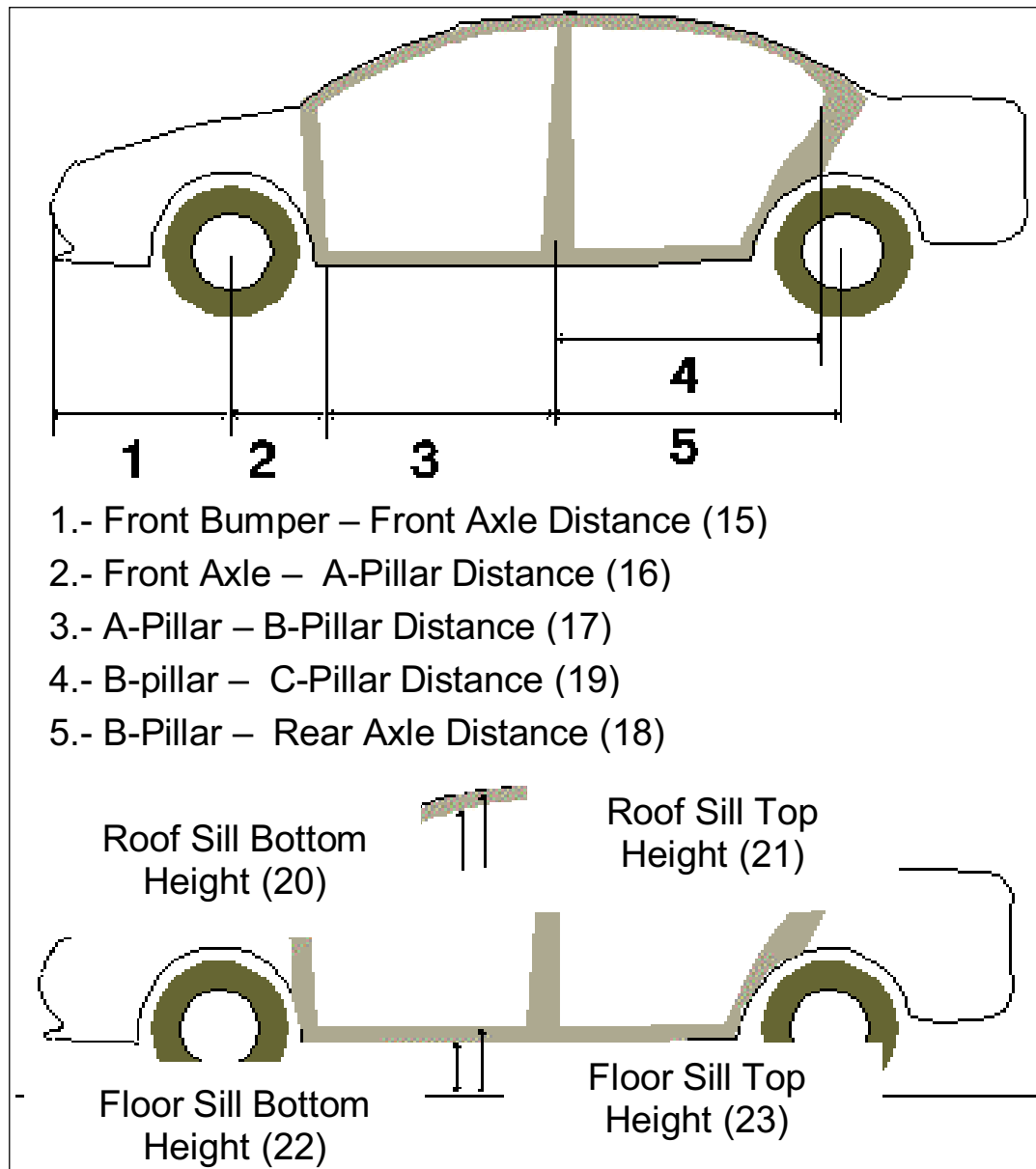


Figure 2.- Definition of the main resistant elements. Side elements.

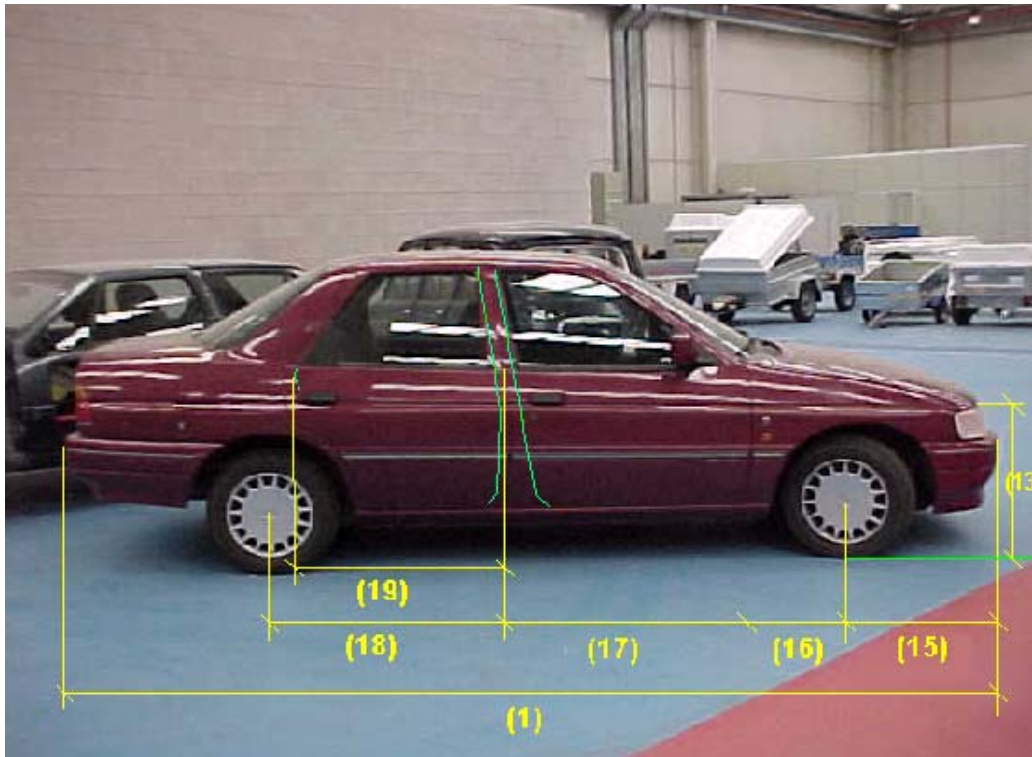


Figure 3.-
Measurements of
the side resistant
elements (outer).

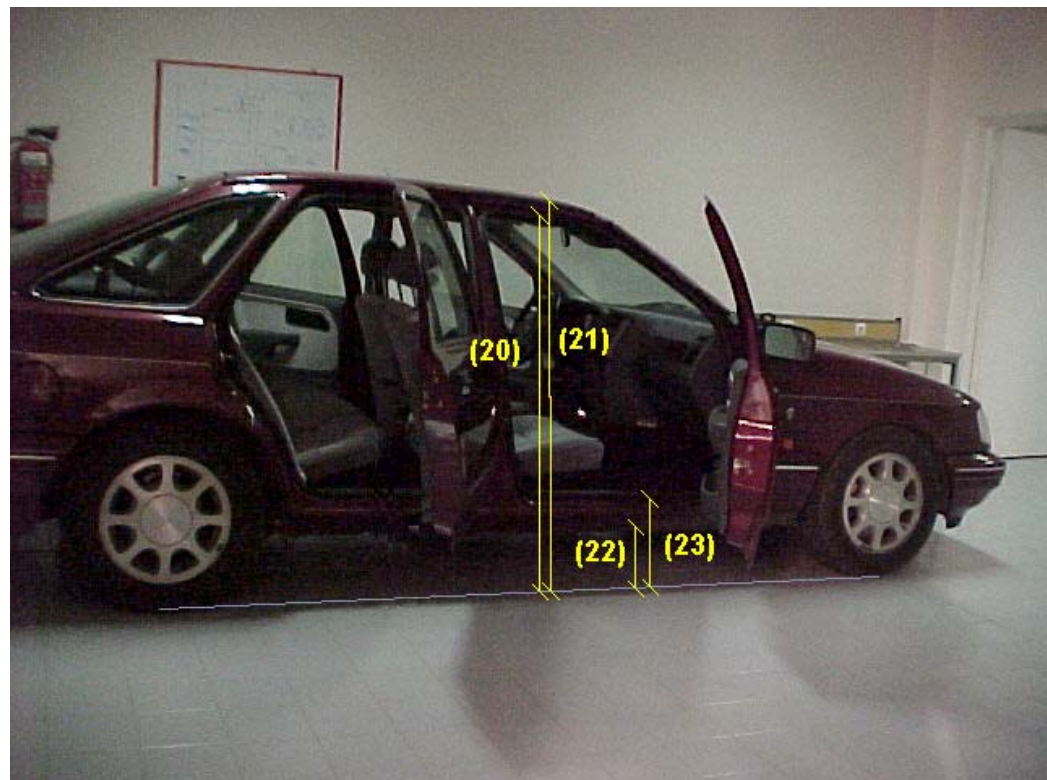


Figure 4.- Measurements
of the side resistant
elements (inner).

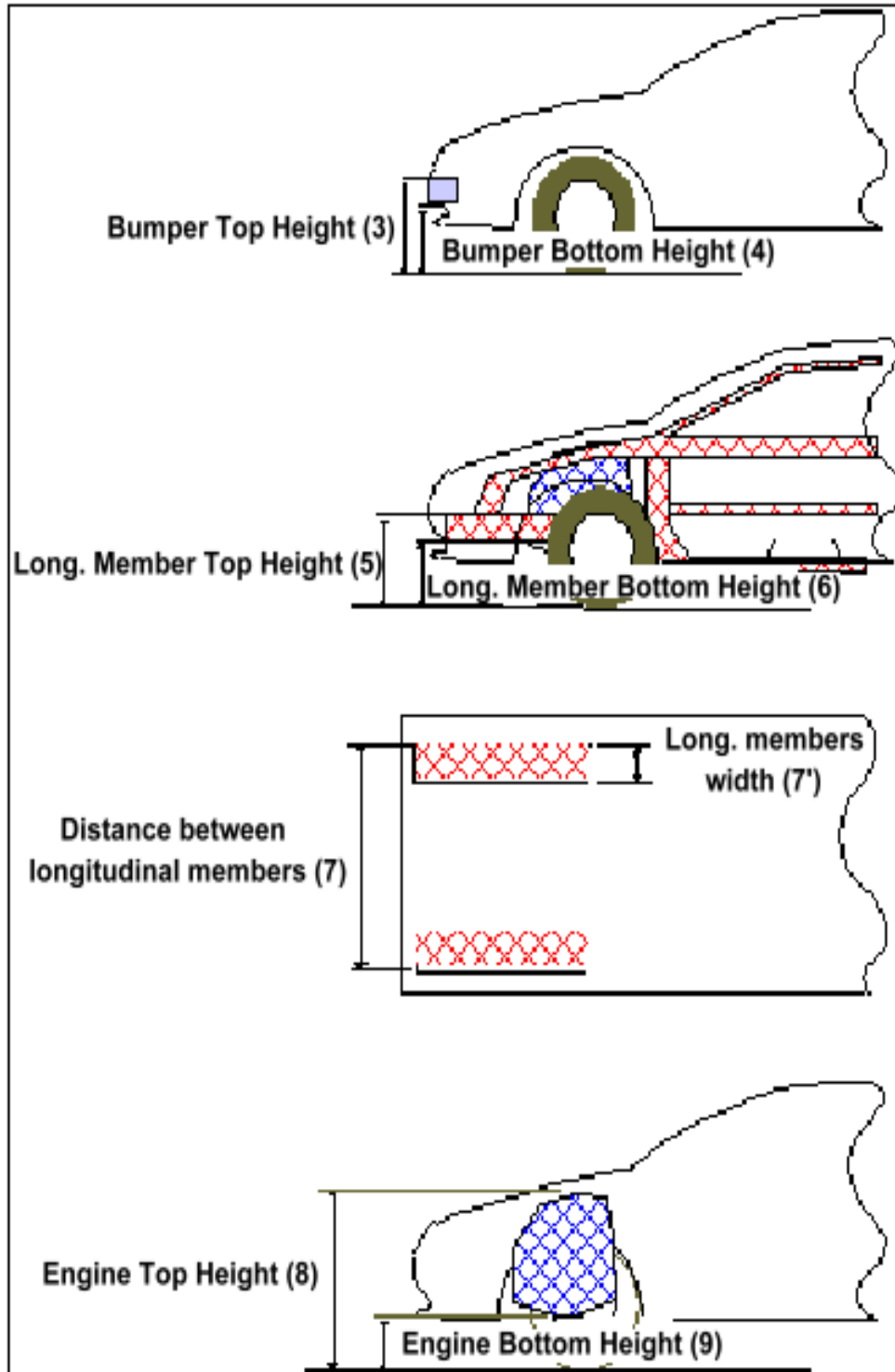


Figure 5.- Definition of the main resistant elements. Front elements.

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

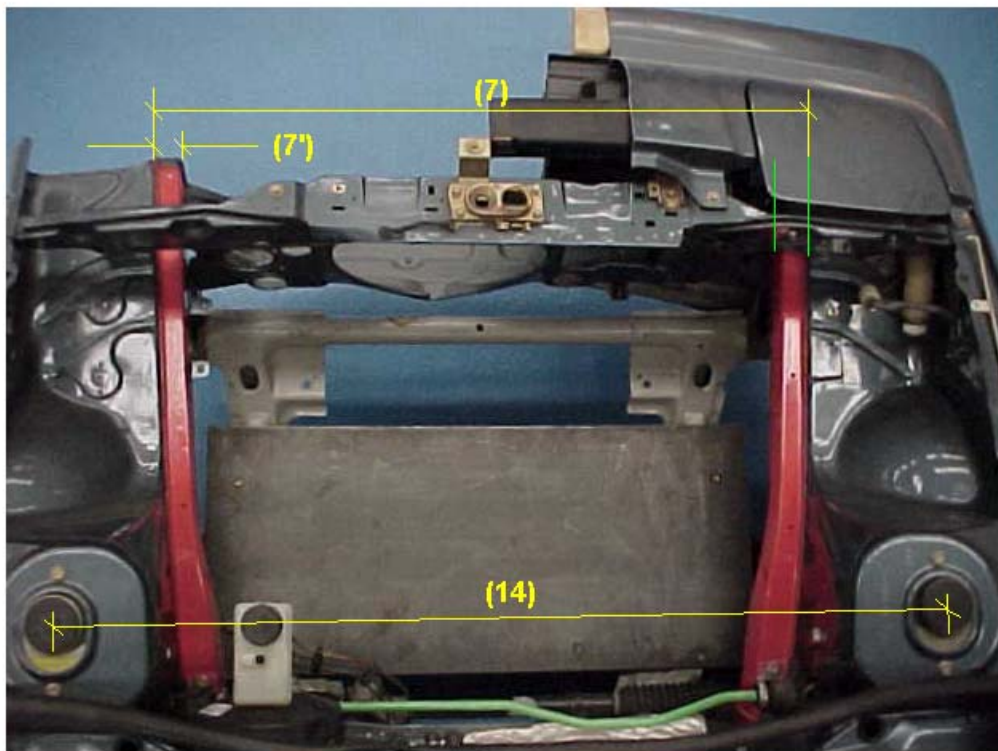
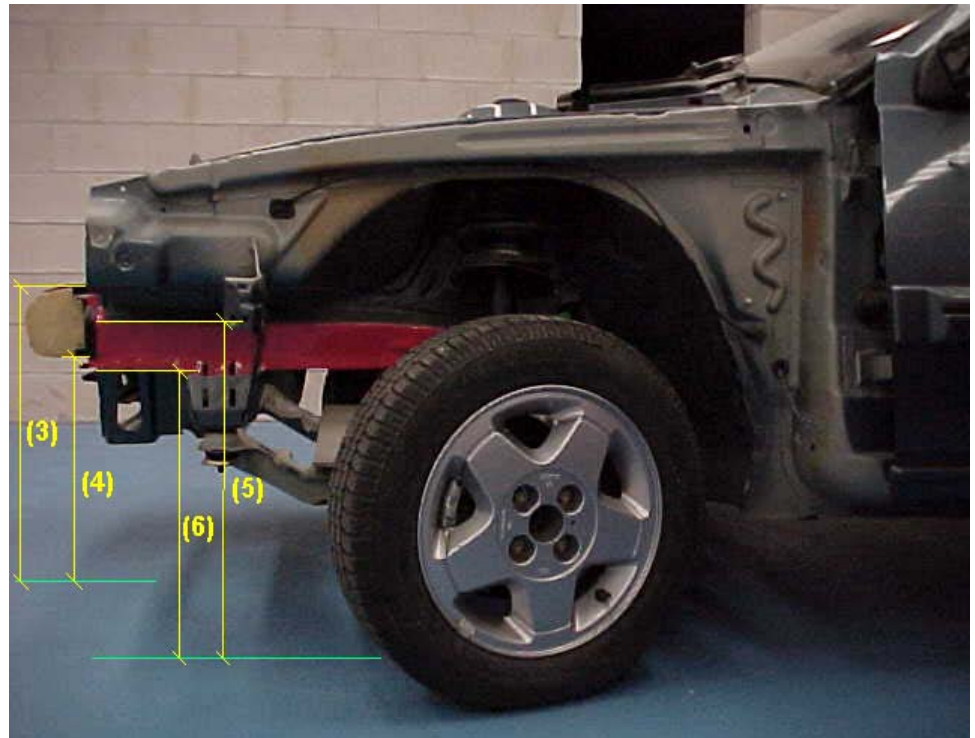


Figure 7.-
Measurements
of the main
resistant
elements. Front
elements 2.

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

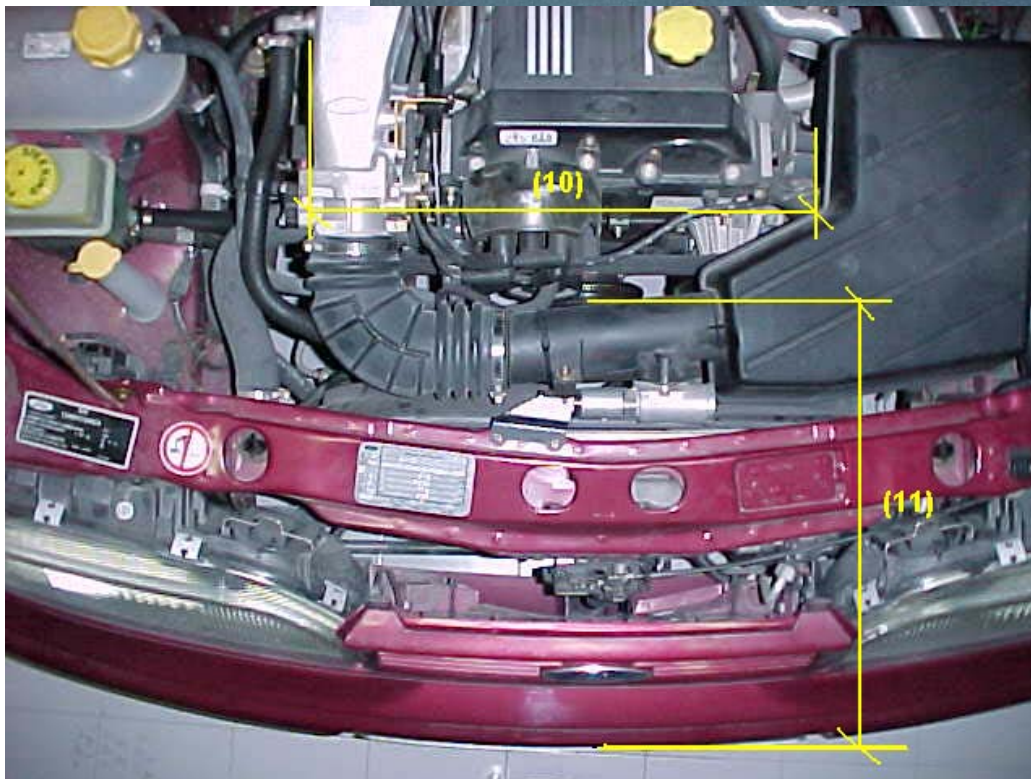
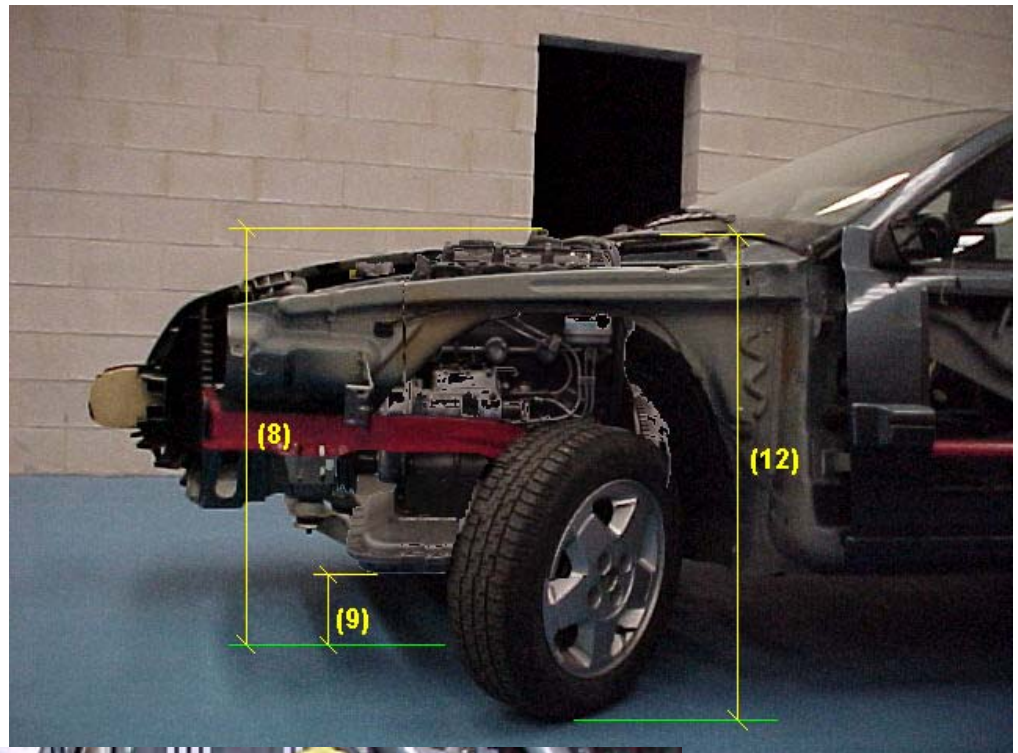


Figure 9.-
Definition of
the main
resistant
elements. Front
elements
(Longitudinal
engine).



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

FRONT ELEMENTS

- **Total Length –(1)- (Side & Front Sheets - C column):** distance between the point in the front bumper further on and the point in the rear bumper further back.
 - **Weight (Side & Front Sheets - D column):** mass, including an average driver weight (70 kg), and the fuel tank mass (at half-capacity).
 - **Total Width –(2)- (Side & Front Sheets - E column):** distance between the outer side points in a transverse plane of the vehicle (middle plane between the front and rear axles).
 - **Bumper bottom height –(4)- (Front Sheet G column):** distance between the ground and the lowest point on the front bumper, being a resistant member (aerodynamic elements under the front bumper are not considered).
 - **Bumper top height –(3)- (Front Sheet H column):** distance between the ground and the highest point on the front bumper, being a resistant member (aerodynamic elements are not considered).
 - **Longitudinal member top height –(5)- (Front Sheet I column):** distance between the ground and the highest point on the longitudinal members, measured approximately in the front bumper-longitudinal member joint (when accessible).
 - **Longitudinal member bottom height –(6)- (Front Sheet J column):** distance between the ground and the lowest point on the longitudinal members, measured approximately in the front bumper-longitudinal member joint.
 - **Distance between longitudinal members (Front Sheet K column):** transverse distance between extreme points in longitudinal members, measured approximately in the front bumper-longitudinal member joint.
- Depending on the accessibility of these members, the extreme points are the inner points (I) or the outer points (O).
- **Longitudinal member width -7'- (Front Sheet L column):** width of one of the longitudinal members, measured approximately in the front bumper-longitudinal member joint.



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

SIDE ELEMENTS

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

NOTE

- N/A: dimension not available.