

REPORT NUMBER: MCW-NOSAD-109

**SIDE AIRBAG OCCUPANT RISK
OCCUPANT OUT-OF-POSITION TESTS**

**CHRYSLER GROUP, LLC
2014 JEEP COMPASS 5-DOOR SUV
NHTSA NUMBER: M20140306TWG2**

**PREPARED BY:
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MILWAUKEE, WISCONSIN 53295**



TEST DATE: 13 FEBRUARY 2014

REPORT DATE: 27 FEBRUARY 2014

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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1200 NEW JERSEY AVE, SE, ROOM W43-410
WASHINGTON, D.C. 20590**

Test Vehicle: 2014 Jeep Compass 5-Door SUV
Test Program: Occupant Out-of-Position Test

NHTSA Number: M20140306TWG2
Test Date: February 13, 2014

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Prepared by: _____

Date: _____

Approved by: _____

Date: _____

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

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Technical Report Documentation Page

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	15. Supplementary Notes																																				
16. Abstract A side airbag out of position test was done on a rearward facing HIII 3-Year-Old dummy, seated along the outboard edge of the seat cushion, with the head placed in between the seat bolster and pillar/side trim of the vehicle, in the front passenger seat of a 2014 Jeep Compass 5-Door SUV in accordance with instructions specified in the Technical Working Group's Recommended Procedures For Evaluating Occupant Injury Risk From Deploying Side Airbags, dated July 2008. The test was conducted at the Medical College of Wisconsin's Vehicle Crashworthiness Laboratory in Milwaukee, Wisconsin, on 13 February 2014. The ambient temperature at the passenger side (by the positioned dummy) of the vehicle at the time of deployment was 21.0° C. The test dummy's performance follows: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th colspan="4">Passenger ATD (Hybrid III 3-Year-Old)</th> </tr> <tr> <th></th> <th><u>Units</u></th> <th><u>Threshold</u></th> <th colspan="2"><u>Result</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/a</td> <td>700</td> <td colspan="2">5.80</td> </tr> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/a</td> <td>1000</td> <td colspan="2">5.50</td> </tr> <tr> <td></td> <td><u>Ntf</u></td> <td><u>Nte</u></td> <td><u>Ncf</u></td> <td><u>Nce</u></td> </tr> <tr> <td>Upper Neck (Nij)</td> <td>0.14</td> <td>0.83</td> <td>0.08</td> <td>0.30</td> </tr> <tr> <td>Lower Neck (Nij)</td> <td>0.63</td> <td>0.21</td> <td>0.17</td> <td>0.01</td> </tr> </tbody> </table>				Passenger ATD (Hybrid III 3-Year-Old)					<u>Units</u>	<u>Threshold</u>	<u>Result</u>		Head Injury Criteria (HIC ₁₅)	N/a	700	5.80		Head Injury Criteria (HIC ₃₆)	N/a	1000	5.50			<u>Ntf</u>	<u>Nte</u>	<u>Ncf</u>	<u>Nce</u>	Upper Neck (Nij)	0.14	0.83	0.08	0.30	Lower Neck (Nij)	0.63	0.21	0.17	0.01
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Test Vehicle: 2014 Jeep Compass 5-Door SUV
Test Program: Occupant Out-of-Position Test

NHTSA Number: M20140306TWG2
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SECTION 1

TEST PURPOSE AND PROCEDURE

This occupant out-of-position static side airbag deployment test is part of the Technical Working Group's Occupant Injury Risk from Deploying Side Airbags Testing Program sponsored by Alpha Technology Associate, Inc. under contract number DTNH22-09-D-00123. The purpose of this test was to obtain occupant injury data for a side airbag deployment. The occupant out-of-position side airbag test was conducted in accordance with the Technical Working Group Recommended Procedures for Evaluating Occupant Injury from Deploying Side Airbags dated July 2008.

One HIII 3-Year-Old dummy was placed in the front passenger seat, kneeling and facing rearward. The seat was placed in its lowest height position and in the 17th detent from full-forward in the fore/aft position with the seatback at the manufacturer's design for a 50th percentile male, as stated in section 3.3.1, General Seat Preparation Procedure. The dummy was placed on the outboard edge of the seat cushion, with the centerline of the dummy's sternum contacting the seatback, and the head center-of-gravity centered with the deployment trajectory of the airbag. This orientation complies with section 3.3.3.2 of the TWG Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags as defined by Lund, et al. and the Technical Working Group dated July 2008.

SECTION 2 SUMMARY OF TEST RESULTS

A curtain and front passenger seat-mounted airbag was deployed in a 2014 Jeep Compass 5-Door SUV on 13 February 2014. Previously, in November of 2013, the Jeep Compass was involved in a NCAP side impact. Both tests were conducted by the Medical College of Wisconsin. Pre - and post - test photographs of the test vehicle and the HIII 3-Year-Old are included in Appendix A.

The dummy was placed in the right front designated seating position according to instructions specified in the TWG Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags as defined by Lund, et al. and the Technical Working Group dated July 2008. The Out-of-Position impact event was documented by three cameras. Camera locations are included in this report.

The Part 572V (HIII 3-Year-Old) dummy was instrumented accordingly:

Passenger ATD (HIII 3-Year-Old)

- Head center of gravity tri-axial (X, Y, Z) accelerometers
- Upper neck tri-axial (X, Y, Z) force load cells and tri-axial (X, Y, Z) moment load cells
- Lower neck tri-axial (X, Y, Z) force load cells and tri-axial (X, Y, Z) moment load cells

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION		
Restraint type	Right Front (Passenger)	
	Mounted	Deployed
Frontal Airbag	Yes	Did Not Deploy
Knee Airbag	Yes	Did Not Deploy
Side Curtain Airbag	Yes	Deployed
Side Torso/Pelvis Airbag	Yes	Deployed
Seat Belt Pretensioner	Yes	No
Seat Belt Load Limiter	Yes	N/a
Other	N/a	N/a

SECTION 2
SUMMARY OF TEST RESULTS (CONTINUED)

Dummy injury values were recorded as follows:

DUMMY INJURY VALUES	
Measurement Description	Passenger ATD (HIII 3-Year-Old)
	Result
Head Injury Criteria (HIC ₁₅)	5.80
Head Injury Criteria (HIC ₃₆)	5.50
UNLC	
Ntf	0.14
Nte	0.83
Ncf	0.08
Nce	0.30
LNLC	
Ntf	0.63
Nte	0.21
Ncf	0.17
Nce	0.01

**DATA SHEET NO. 1
 GENERAL TEST AND VEHICLE PARAMETER DATA**

VEHICLE INFORMATION	
NHTSA No.	M20140306
Model Year	2014
Make	Jeep
Model	Compass
Body Style	SUV
VIN	1C4NJCBA2ED620732
Body Color	True Blue Pearl
Odometer Reading (km/mi)	2 mi
Engine Displacement (L)	2.0
Type/No. of Cylinders	DOHC 16-Valve
Engine Placement	Lateral
Transmission Type	5-Speed Manual
Transmission Speeds	5
Overdrive	Yes
Final Drive	FWD
Roof Rack	Yes
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

VEHICLE OPTIONS	
Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	No
Power Window Auto-Reverse	No
Other Optional Features	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	Yes
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	None Noted

Does owner's manual provide instructions to turn off automatic door locks?

No

DATA FROM CERTIFICATION LABEL			
Manufactured By	Chrysler Group, LLC	GVWR (kg)	2012
Date of Manufacture	October 2013	GAWR Front(kg)	1080
Vehicle Type	Sport Utility Vehicle	GAWR Rear (kg)	1044

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION				
	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	0	5
Capacity Weight (VCW) (kg)				419.6
DSC X 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				79.4

(A)

(B)

(A-B)

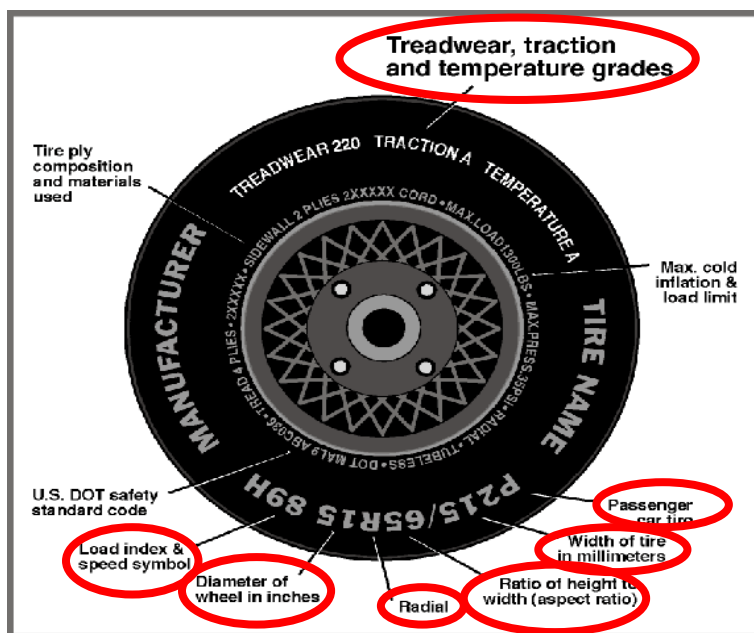
Test Vehicle: 2014 Jeep Compass 5-Door SUV
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DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA (CONTINUED)

VEHICLE SEAT TYPE							
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat			X	X	X	N/a	
Third Row Seat							

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA (CONTINUED)



VEHICLE TIRE INFORMATION		
Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	241.3	241.3
Recommended Tire Size	P205/70R16	P205/70R16
Tire Size on Vehicle	P205/70R16	P205/70R16
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Eagle LS	Eagle LS
Treadwear	400	400
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	4	4
Load Index/Speed Symbol	96T	96T
Tire Material	Polyester & Steel	Polyester & Steel
DOT Safety Code Left	M60W CUER 3413	M60W CUER 3413
DOT Safety Code Right	M60W CUER 3413	M60W CUER 3413

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA (CONTINUED)

TIRE PRESSURES					
	Units	LF	RF	LR	RR
As Delivered	kPa	241.3	241.3	241.3	241.3
Tire Placard	kPa	241.3	241.3	241.3	241.3
Owner's Manual	kPa	241.3	241.3	241.3	241.3
As Tested	kPa	241.3	241.3	241.3	241.3

MDB TIRE SPECIFICATIONS						
	Units	Requirement	LF	RF	LR	RR
Tire Size		205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 +/- 21	200	200	200	200

TEST VEHICLE WEIGHTS										
	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	420.9	289.4		453.6	381.9		455.4	386.9	
Right	kg	404.2	299.4		406.9	369.2		415.0	361.2	
Ratio	%	58.4	41.6		53.4	46.6		53.8	46.2	
Totals	kg	825.1	588.8	1413.9	860.5	751.1	1611.6	870.4	748.1	1618.5

TARGET TEST WEIGHT CALCULATION			
	Units		
Total Delivered Weight (UVW)	kg	1413.9	(A)
Sum of Actual Weight of 2 P572 ATDs used	kg	125.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	79.4	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1618.5	(A + B + C)

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)?

Yes

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA (CONTINUED)

TEST VEHICLE ATTITUDE AND CG				
Measurement description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	802	807	Yes
RF	mm	811	808	Yes
RR	mm	799	795	Yes
LR	mm	804	803	Yes
Vehicle CG (Aft of Front Axle)	mm	1217.9	1228.1	
Vehicle CG (Left(+))/Right(-) from Longitudinal Centerline)	mm	36.0	32.5	

***The "As Tested" vehicle attitude measurements must be equal to or within +/- 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. "Yes" or "No" is indicated.

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW	
Ballast	Weight (kg)
Removed spare tire & floor cover, washer bottle, power steering reservoir, radiator overflow, and jack to achieve calculated "As Tested" weight.	26.3

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

SCRL ANGLE RANGE			
Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	Fixed	Fixed	Set at 0° for test
Front Passenger Seat	Fixed	Fixed	Set at 0° for test
Front Center Seat*			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*			

*If applicable

SCRL ANGLE RANGE						
Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward- Most
Driver's Seat	N/a**	N/a**	Max	N/a**	N/a**	N/a**
	0.0	35	Mid	45	35	25
	N/a**	N/a**	Min	N/a**	N/a**	N/a**
Front Passenger Seat	N/a**	N/a**	Max	N/a**	N/a**	N/a**
	0.0	31	Mid	39	31	21
	N/a**	N/a**	Min	N/a**	N/a**	N/a**
Front Center Seat*			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Rear Center Seat*			Max			
			Mid			
			Min			

*If applicable

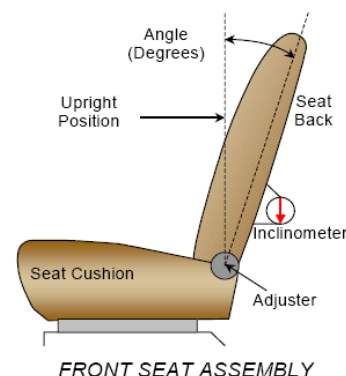
DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA (CONTINUED)

SEAT FORE/AFT POSITION				
Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detent*	mm	Detent*
Driver Seat	260	39	130	19
Front Passenger Seat	260	39	130	17
Front Center Seat*				
Struck Side Rear Seat	Fixed	N/a	Fixed	N/a
Non-Struck Side Rear Seat	Fixed	N/a	Fixed	N/a
Rear Center Seat*				

*If applicable

Seat Back Angle Adjustment

The driver's seat back is positioned to the manufacturer's designated design angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.



SEAT BACK ANGLE ADJUSTMENT				
Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	60.0	41	12.7	5
Front Passenger Seat	60.0	39	6.5	5
Front Center Seat*				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*				

*If applicable

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA (CONTINUED)

Seat Belt Anchorage Adjustment

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

SEAT BELT ANCHORAGE ADJUSTMENT		
	Total # of Positions	Placed in Position #
Driver Seat	4	H
Rear Seat	Fixed	As Positioned

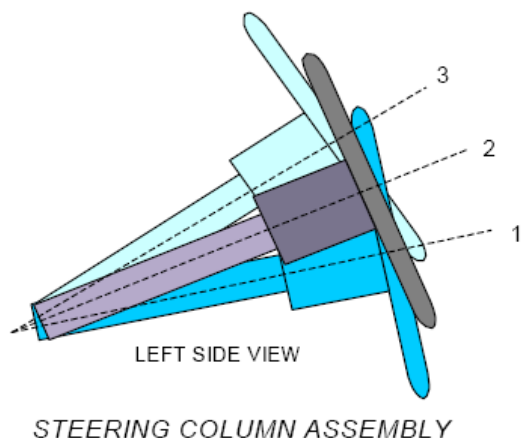
Head Restraint Adjustment

The driver's head restraint is adjusted to the highest and most forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

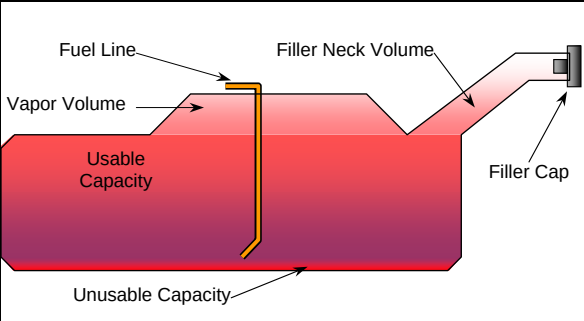
HEAD RESTRAINT ADJUSTMENT		
	Total # of Positions	Placed in Position #
Driver Seat	5	Highest Position
Rear Seat	1	Lowest Detent

Steering Column Adjustment

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

STEERING COLUMN ADJUSTMENT			
	Degrees	Fore/Aft Position (mm)	
Lowermost, Pos. No. 1	62.0	N/a	
Geometric Center, Pos. No. 2	65.2	N/a	
Uppermost, Pos. No. 3	68.4	N/a	
Telescoping Steering Wheel Travel	Non-telescoping	N/a	
Test Position	65.2	N/a	

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA (CONTINUED)

FUEL TANK CAPACITY DATA			
Description	Units	Value	
Usable Capacity of “Standard Tank”	L	51.5	
Usable Capacity of “Optional Tank”	L	0.0	
Usable Capacity of Standard Tank	L	51.5	
Usable Capacity of Optional Tank	L	0.0	
93% of Usable Capacity	%	47.9	
Actual Amount of Solvent Used in Test	L	47.9	
1/3 of Usable Capacity	17.2		

Fuel Pump

The vehicle is equipped with an electronic fuel pump. Key is "ON" position. The fuel pump is on the left side.

Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated in on Form No. 1?

Yes

**DATA SHEET NUMBER 3
 TEST DUMMY MEASUREMENTS**

DUMMY DIMENSION INFORMATION			
Passenger Code	Measurement Description	Passenger	
		Length (mm)	Angle
SA	Seat Back Angle		6.5°
AN	Top of Curtain Airbag Module to Head/Neck Junction	334	
AN	Top of Seat Airbag Module to Head/Neck Junction	41	
SW	Skull Cap to Windshield	859	
BW	Back to Windshield	770	
HS	Head to Side Window	111	
SSC	Skull Cap to Seat Back Centerline	203	
BD	Back to Dash	575	
CS	Chest to Seat Back	46	
RACL	Right Arm to Seat Back Centerline	57	
LACL	Left Arm to Seat Back Centerline	289	
RA	Right Arm to Door Panel	281	
LA	Left Arm to B-Pillar	210	
KK	Knee to Knee	109	
TT	Toe to Toe	45	
KSCR	Right Knee to Seat Cushion Centerline	129	
KSCL	Left Knee to Seat Cushion Centerline	223	
TSCR	Right Toe to Seat Cushion Centerline	100	
TSCL	Left Toe to Seat Cushion Centerline	141	
SD	Skull Cap to Dash	726	
NS	Nose to Seatback	Contact	
HH	Top of Head to Headerliner	192	

DATA SHEET 4
CAMERA AND INSTRUMENTATION DATA

CAMERA COORDINATES & INFORMATION							
Loc. No.	View	Coordinates †			Lens Length	Lens Angle	Operating Frame Rate
		X	Y	Z			
		mm	mm	mm	mm	Deg.	fps
1	Offboard Front	-2365	75	-545	50	14.8	1000
2	Offboard Front-Oblique	-2062	1876	-425	35	13.0	1000
3	Offboard Side	-401	2880	205	25	0.5	1000

Origin

X

Y

Z

Dummy Head CG

Dummy Head CG

Dummy Head CG

Orientation

X

Y

Z

+(X) Forward

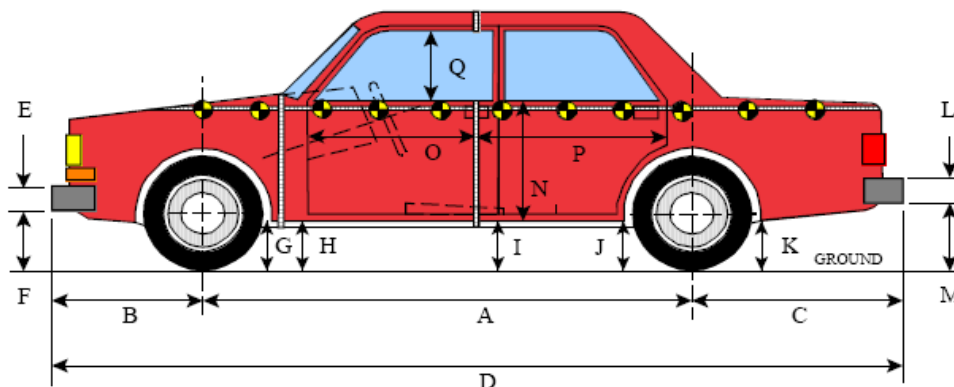
+(Y) Right

+(Z) Down

**All measurements accurate to +/- 6 m*

INSTRUMENTATION	
Dummy Channels	15
Vehicle Structure Accelerometers	0
Total:	15

DATA SHEET NUMBER 5
TEST VEHICLE PROFILE MEASUREMENTS



VEHICLE PRE - AND POST - TEST MEASUREMENT INFORMATION				
Code	Description	Pre test	Post test	Difference
		mm	mm	mm
A	Wheelbase	2635	2621	-14
B	Front Axle to FSOV	645	642	-3
C	Rear Axle to RSOV	662	662	0
D	Total Length at Centerline	4446	4445	-1
E	Front Bumper Thickness	196	196	0
F	Front Bumper Bottom to Ground	334	344	10
G	Sill Height at Front Wheel Well	295	275	-20
H	Sill Height at Front Door Leading Edge	293	303	10
I	Sill Height at B-Pillar	302	292	-10
J1	Sill Height at Rear Wheel Well	268	246	-22
J2	Pinch Weld Height at Rear Wheel Well	308	242	-66
K	Sill Height Aft of Rear Wheel Well	435	395	-40
L	Rear Bumper Thickness	190	190	0
M	Rear Bumper Bottom to Ground	505	467	-38
N	Sill Height to Bottom of Front Window Sill	753	742	-11
O	Front Door Leading Edge to Impact C/L	1038	1015	-23
P	Rear Door Trailing Edge to Impact C/L	895	806	-89
Q	Front Window Opening	435	430	-5
R	Right Side Length	3942	3943	1
S	Left Side Length	3942	3925	-17
T	Vehicle Width at B-Pillar	1765	1663	-102

*From SINCAP Test No. M20140306

**DATA SHEET 6
 DUMMY SENSOR DATA AND INJURY CRITERIA**

DUMMY HEAD PEAK ACCELERATIONS						
Location	Axis	Units	HYBRID III 3-YEAR-OLD			
			Max	Time	Min	Time
Primary Head CG	X	G's	12.0	29.0	-21.6	18.5
Primary Head CG	Y	G's	30.5	11.7	-3.20	278.0
Primary Head CG	Z	G's	62.2	11.7	-12.8	7.10
Primary Head CG Resultant	N/a	G's	69.3	11.7	0.01	-29.7

DUMMY UPPER NECK PEAK FORCES AND MOMENTS						
Location	Axis	Units	HYBRID III 3-YEAR-OLD			
			Max	Time	Min	Time
Neck Force	X	NWT	31.5	300.0	-373.0	13.8
Neck Force	Y	NWT	61.2	28.8	-320.0	11.8
Neck Force	Z	NWT	832.0	8.60	-57.5	19.8
Neck Moment	X	Nm	11.7	10.0	-9.40	27.7
Neck Moment	Y	Nm	5.60	31.9	-16.7	14.6
Neck Moment	Z	Nm	3.34	79.8	-12.2	22.3

DUMMY LOWER NECK PEAK FORCES AND MOMENTS						
Location	Axis	Units	HYBRID III 3-YEAR-OLD			
			Max	Time	Min	Time
Neck Force	X	NWT	40.1	276.0	440.0	13.8
Neck Force	Y	NWT	71.7	29.4	-426.0	14.1
Neck Force	Z	NWT	900.0	8.50	-46.9	43.3
Neck Moment	X	Nm	1.10	200.0	-24.3	16.3
Neck Moment	Y	Nm	22.7	14.7	-5.20	190.0
Neck Moment	Z	Nm	4.90	77.9	-17.2	18.4

DATA SHEET 6
DUMMY SENSOR DATA AND INJURY CRITERIA (CONTINUED)

HEAD INJURY CRITERIA			
Criteria	HYBRID III 3-YEAR-OLD		
		T ₁	T ₂
HIC ₁₅	33.2	5.8	20.7
HIC ₃₆	44.8	5.5	35.1

N _{IJ} VALUES				
Location	HYBRID III 3-YEAR-OLD			
	Ntf	Nte	Ncf	Nce
Upper Neck	0.14	0.83	0.08	0.30
Lower Neck	0.63	0.21	0.17	0.01

Test Vehicle: 2014 Jeep Compass 5-Door SUV
Test Program: Occupant Out-Of-Position

NHTSA Number: M20140306TWG2
Test Date: February 13, 2014

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure	Photograph Description	Page
A-1	As-Delivered Front Right $\frac{3}{4}$ View of Test Vehicle	A-3
A-2	Vehicle Certification Label	A-3
A-3	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-4
A-4	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-4
A-5	Pre-Test Dummy Position – Front View of Dummy	A-5
A-6	Pre-Test Dummy Position - Front Left $\frac{3}{4}$ View of Dummy	A-5
A-7	Pre-Test Dummy Position – Left Side View of Dummy	A-6
A-8	Post-Test Dummy Position – Front View of Dummy and Airbag	A-6
A-9	Post-Test Dummy Position - Front Left $\frac{3}{4}$ View of Dummy and Airbag	A-7
A-10	Post-Test Dummy Position – Left Side View of Dummy and Airbag	A-7
A-11	Post-Test Curtain and Side Airbag – Left Side View of Curtain and Side Airbag	A-8



Figure A-1: As-Delivered Right Front 3-4 View of Test Vehicle



Figure A-2: Vehicle Certification Label



Figure A-3: Pre-Test Left Front 3/4 View of Test Vehicle



Figure A-4: Post-Test Left Front 3/4 View of Test Vehicle



Figure A-5: Pre-Test Front View of Dummy



Figure A-6: Pre-Test Left Front 3-4 View of Dummy

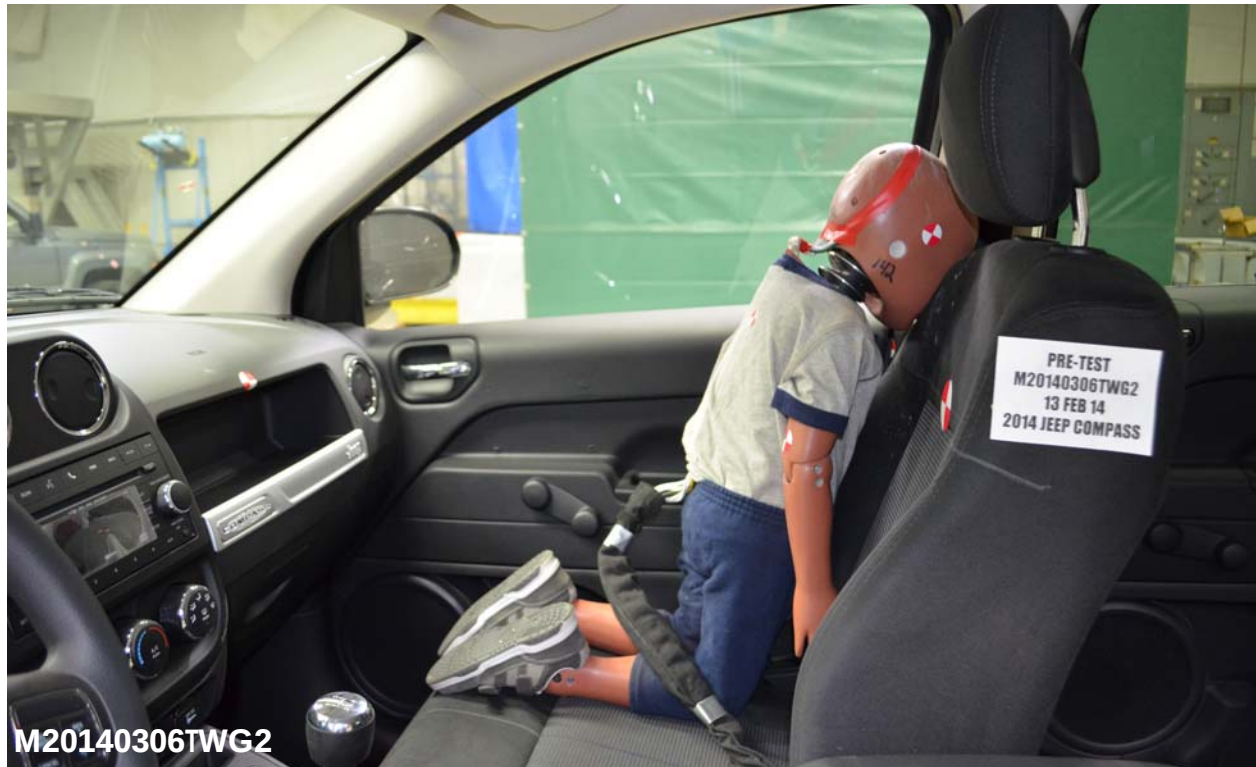


Figure A-7: Pre-Test Left Side View of Dummy



Figure A-8: Post-Test Front View of Dummy and Side Airbag



Figure A-9: Post-Test Front Left 3-4 View of Dummy and Side Airbag



Figure A-10: Post-Test Left Side View of Dummy and Side Airbag



Figure A-11: Post-Test Left Side View of Curtain and Side Airbag

Test Vehicle: 2014 Jeep Compass 5-Door SUV
Test Program: Occupant Out-Of-Position

NHTSA Number: M20140306TWG2
Test Date: February 13, 2014

APPENDIX B
DUMMY INSTRUMENTATION PLOTS

The following plots are provided in the test report

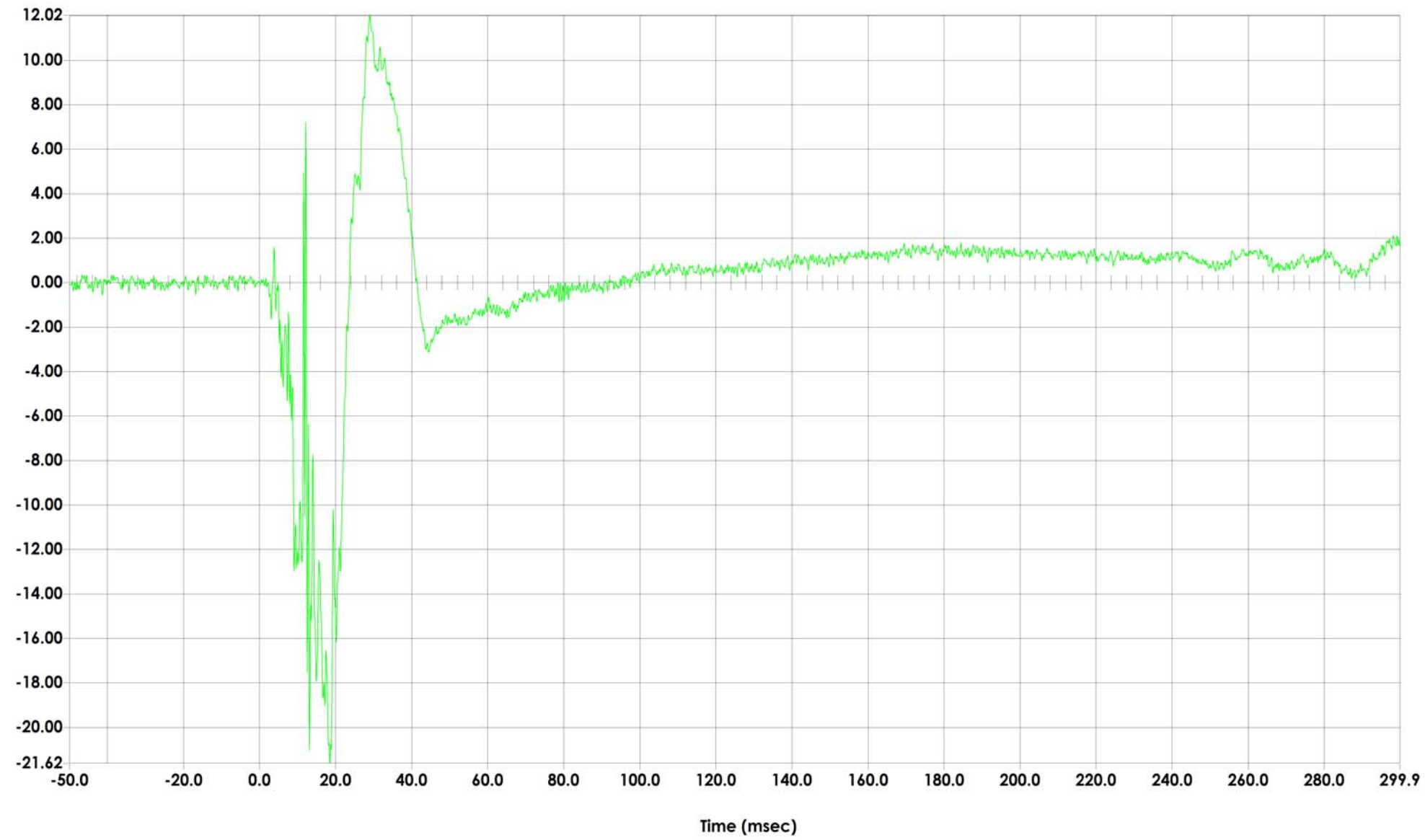
Data Plot	Description	Page
1	Primary Head CG (X) Acceleration vs. Time	B-3
2	Primary Head CG (Y) Acceleration vs. Time	B-4
3	Primary Head CG (Z) Acceleration vs. Time	B-5
4	Primary Head Resultant Acceleration vs. Time	B-6
5	Primary Head HIC15	B-7
6	Primary Head HIC36	B-8
7	Upper Neck (X) Force vs. Time	B-9
8	Upper Neck (Y) Force vs. Time	B-10
9	Upper Neck (Z) Force vs. Time	B-11
10	Upper Neck (X) Moment vs. Time	B-12
11	Upper Neck (Y) Moment vs. Time	B-13
12	Upper Neck (Z) Moment vs. Time	B-14
13	Upper Neck Nij Criteria vs. Time	B-15
14	Upper Neck Nij Forces vs. Time	B-16
15	Upper Neck Nij Moments vs. Time	B-17
16	Upper Neck Nij Kite Plot vs. Time	B-18
17	Lower Neck (X) Force vs. Time	B-19
18	Lower Neck (Y) Force vs. Time	B-20
19	Lower Neck (Z) Force vs. Time	B-21
20	Lower Neck (X) Moment vs. Time	B-22
21	Lower Neck (Y) Moment vs. Time	B-23
22	Lower Neck (Z) Moment vs. Time	B-24
23	Lower Neck Nij Criteria vs. Time	B-25
24	Lower Neck Nij Forces vs. Time	B-26
25	Lower Neck Nij Moments vs. Time	B-27
26	Lower Neck Nij Kite Plot vs. Time	B-28

Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	001
Units	G'S

Max	12.02	G'S
	29.04	msec
Min	-21.62	G'S
	18.48	msec



Primary Head Center of Gravity (X) Acceleration vs. Time

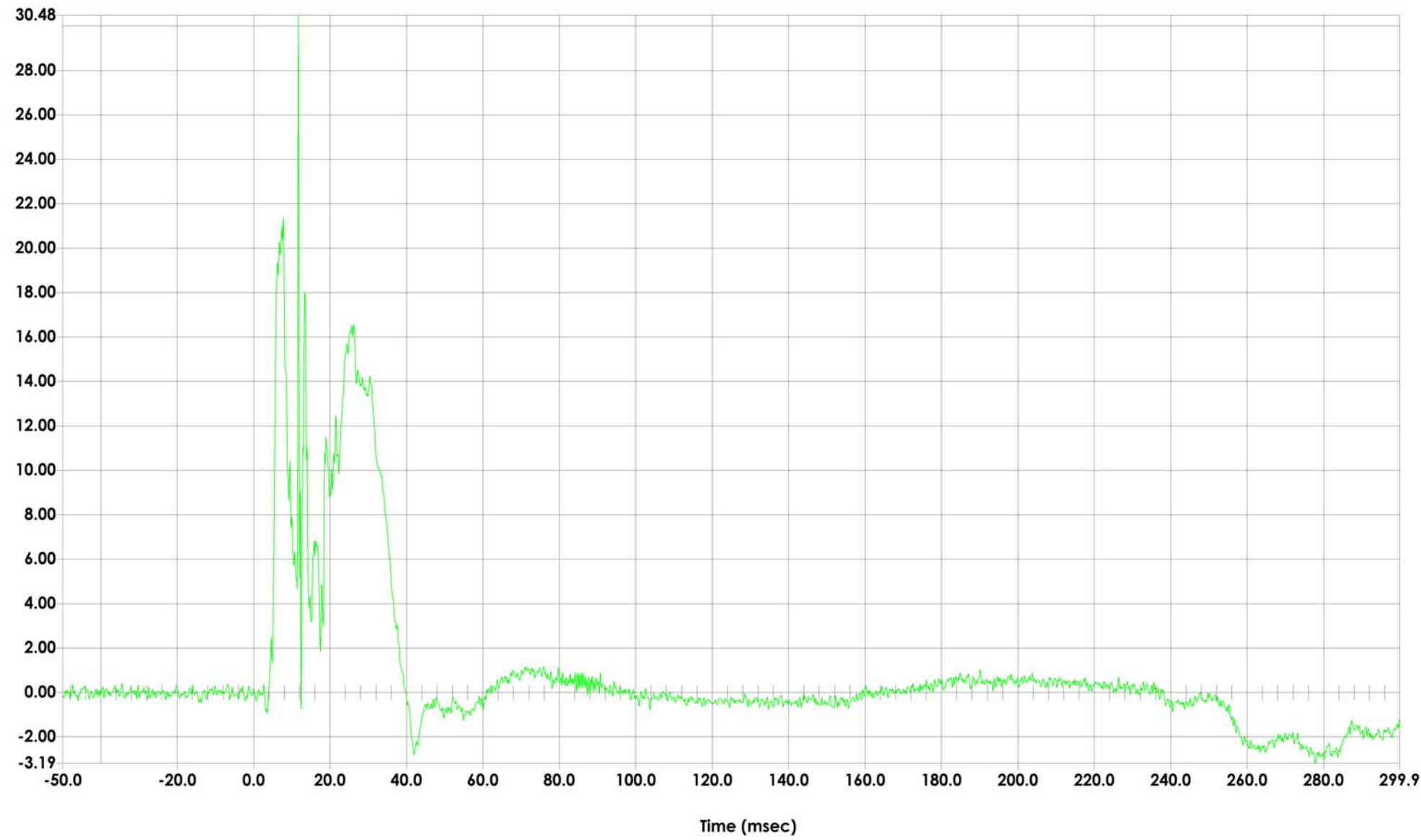


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	002
Units	G'S

Max	30.48	G'S
	11.68	msec
Min	-3.19	G'S
	277.76	msec



Primary Head Center of Gravity (Y) Acceleration vs. Time

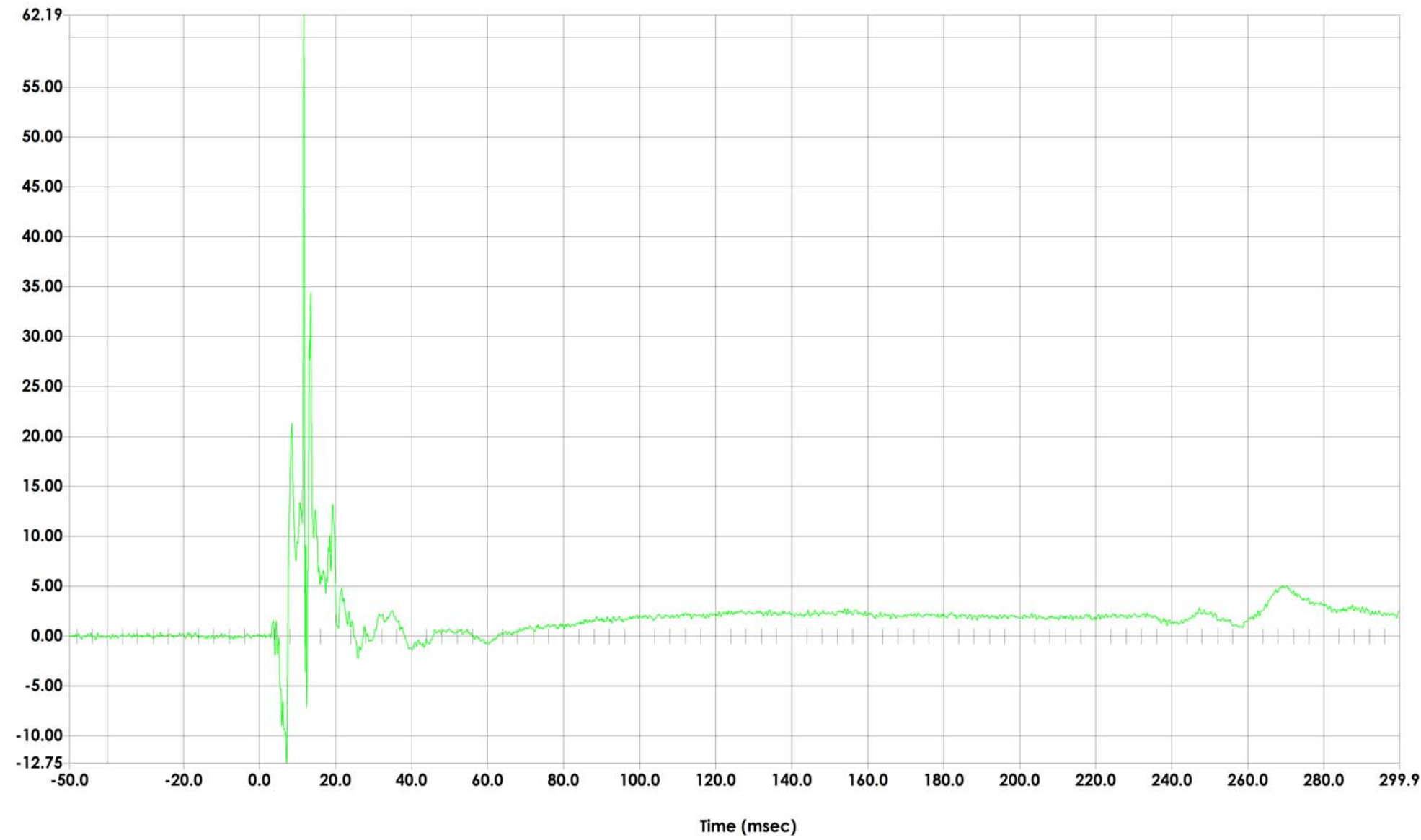


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	003
Units	G'S

Max	62.19	G'S
	11.68	msec
Min	-12.75	G'S
	7.12	msec



Primary Head Center of Gravity (Z) Acceleration vs. Time

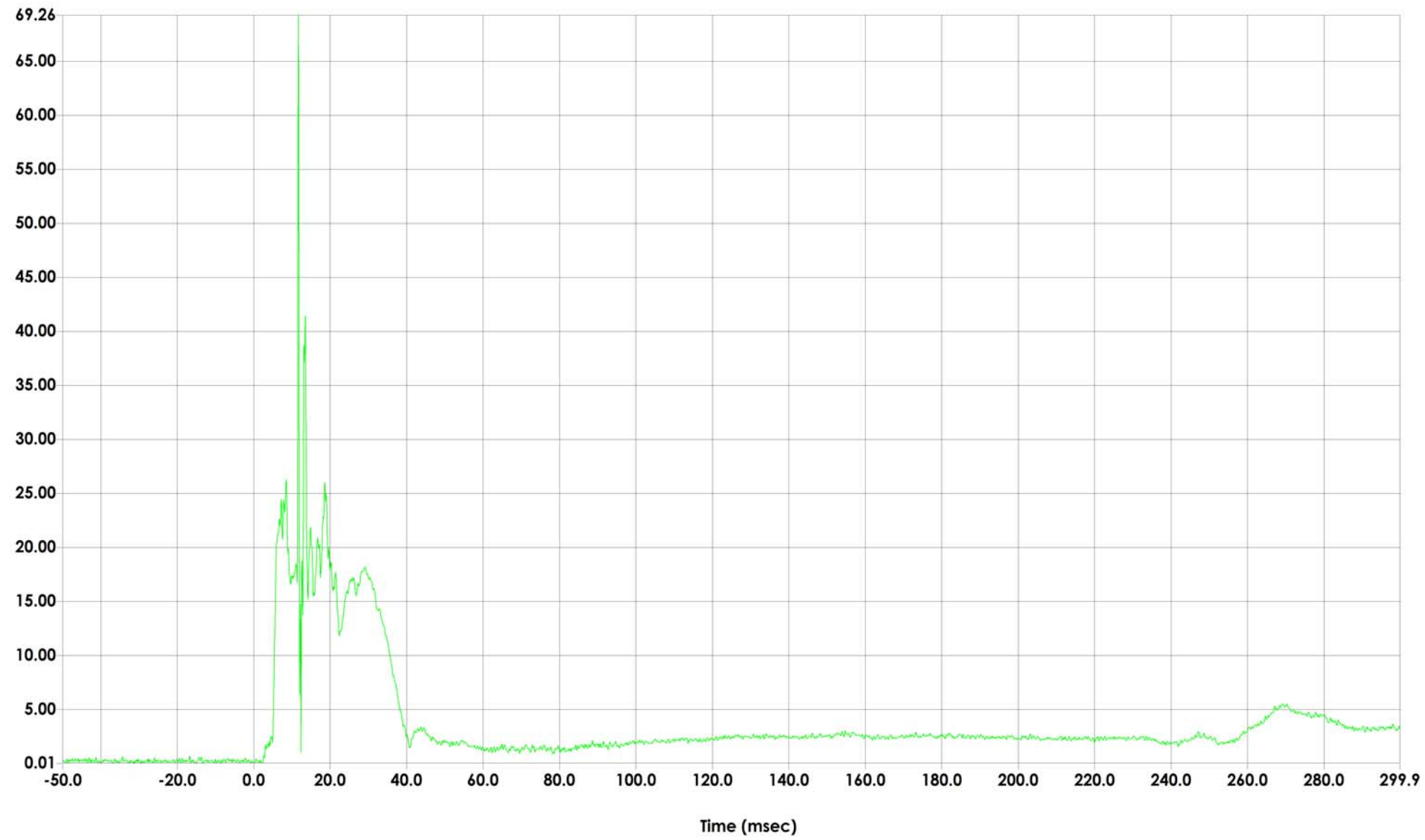


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	016
Units	G'S

Max	69.26	G'S
	11.68	msec
Min	0.01	G'S
	-29.68	msec

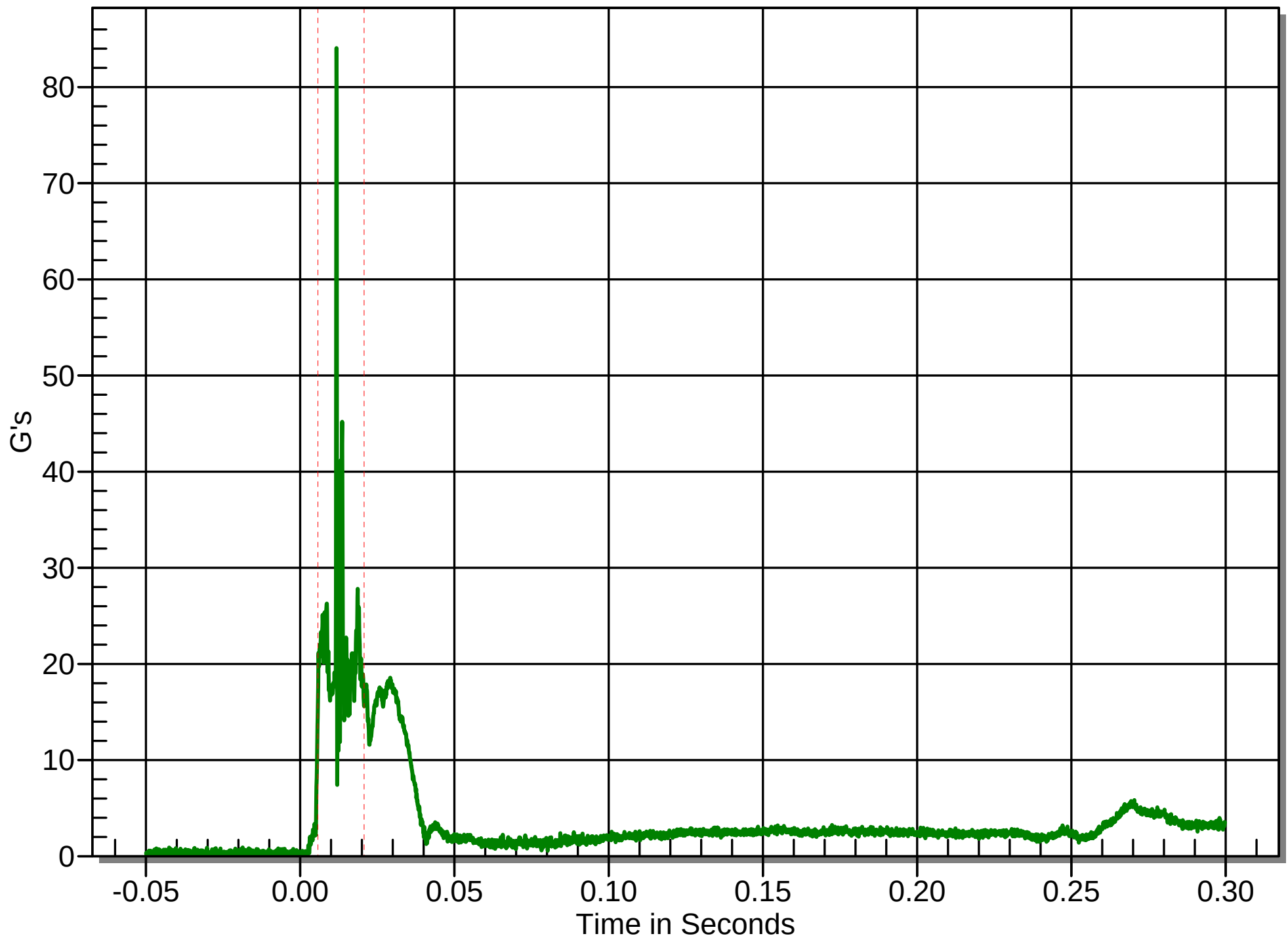


Primary Head Resultant Acceleration Primary vs. Time



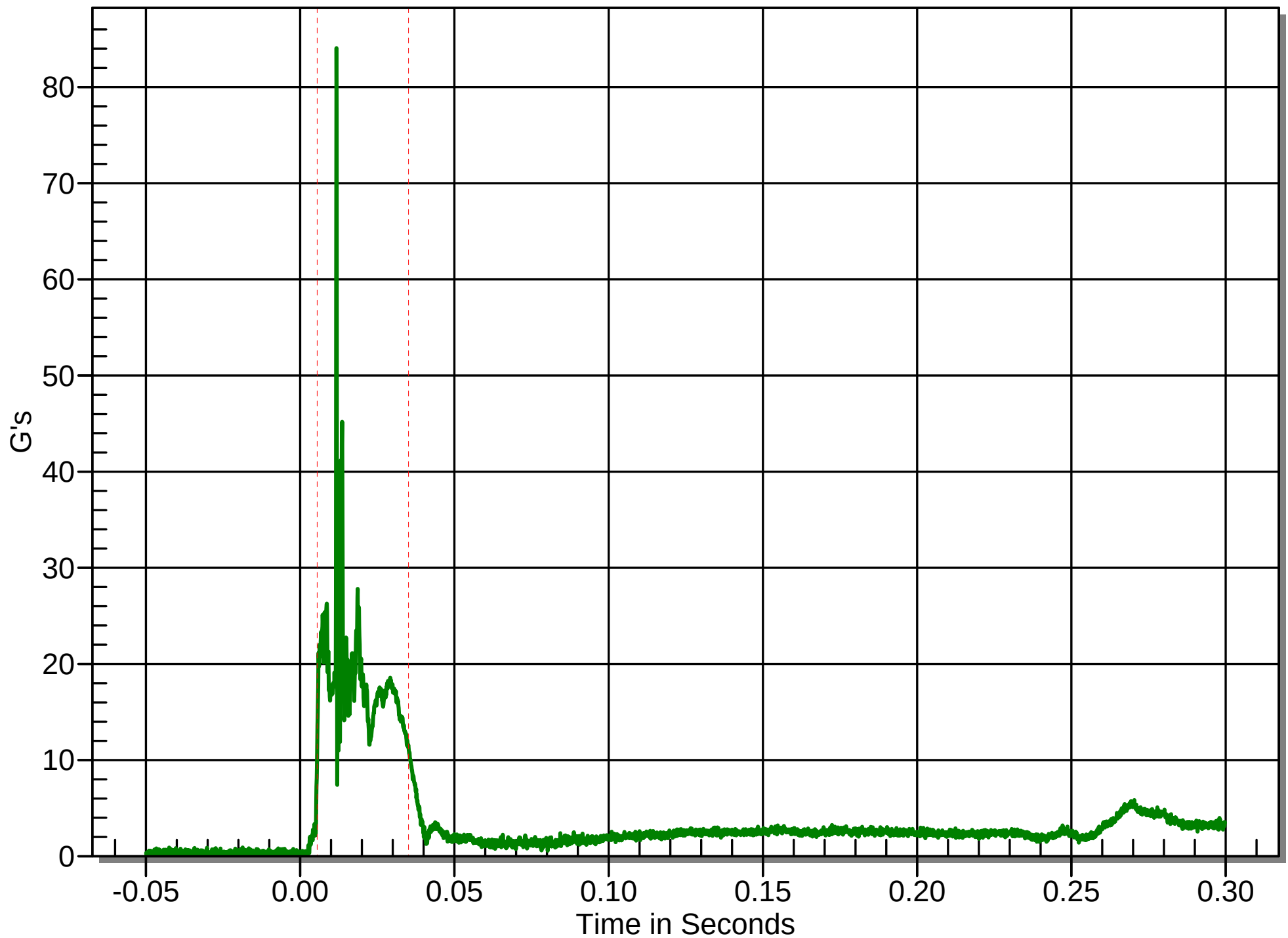
M20140306TWG2

15.0 ms HIC = 33.2 from 5.8 to 20.7 ms (15.0 ms)



M20140306TWG2

36.0 ms HIC = 44.8 from 5.5 to 35.1 ms (29.6 ms)

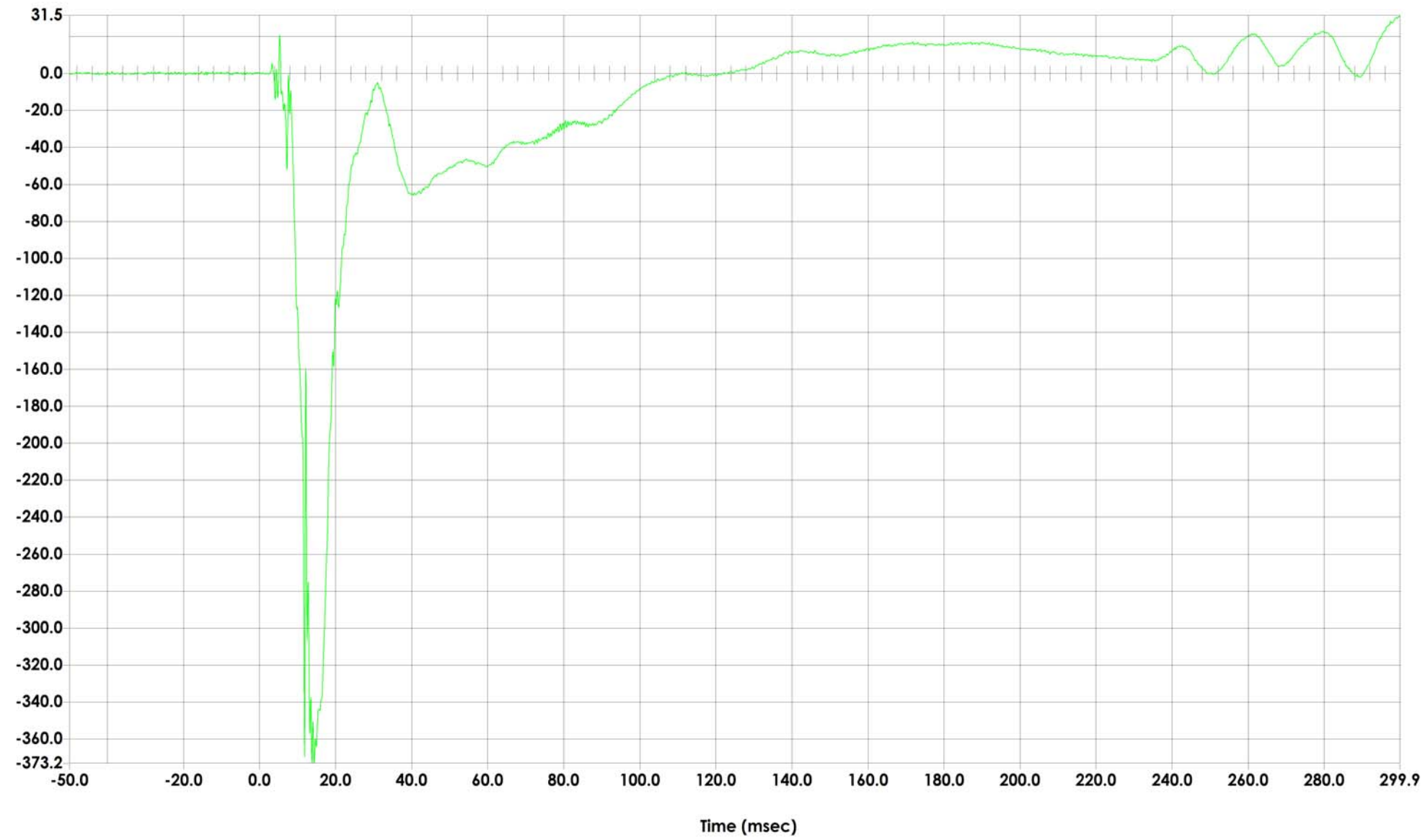


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	004
Units	NWT

Max	31.47	NWT
	299.84	msec
Min	-373.18	NWT
	13.76	msec



Hybrid III 3-Year-Old UNLC (X) Force vs. Time

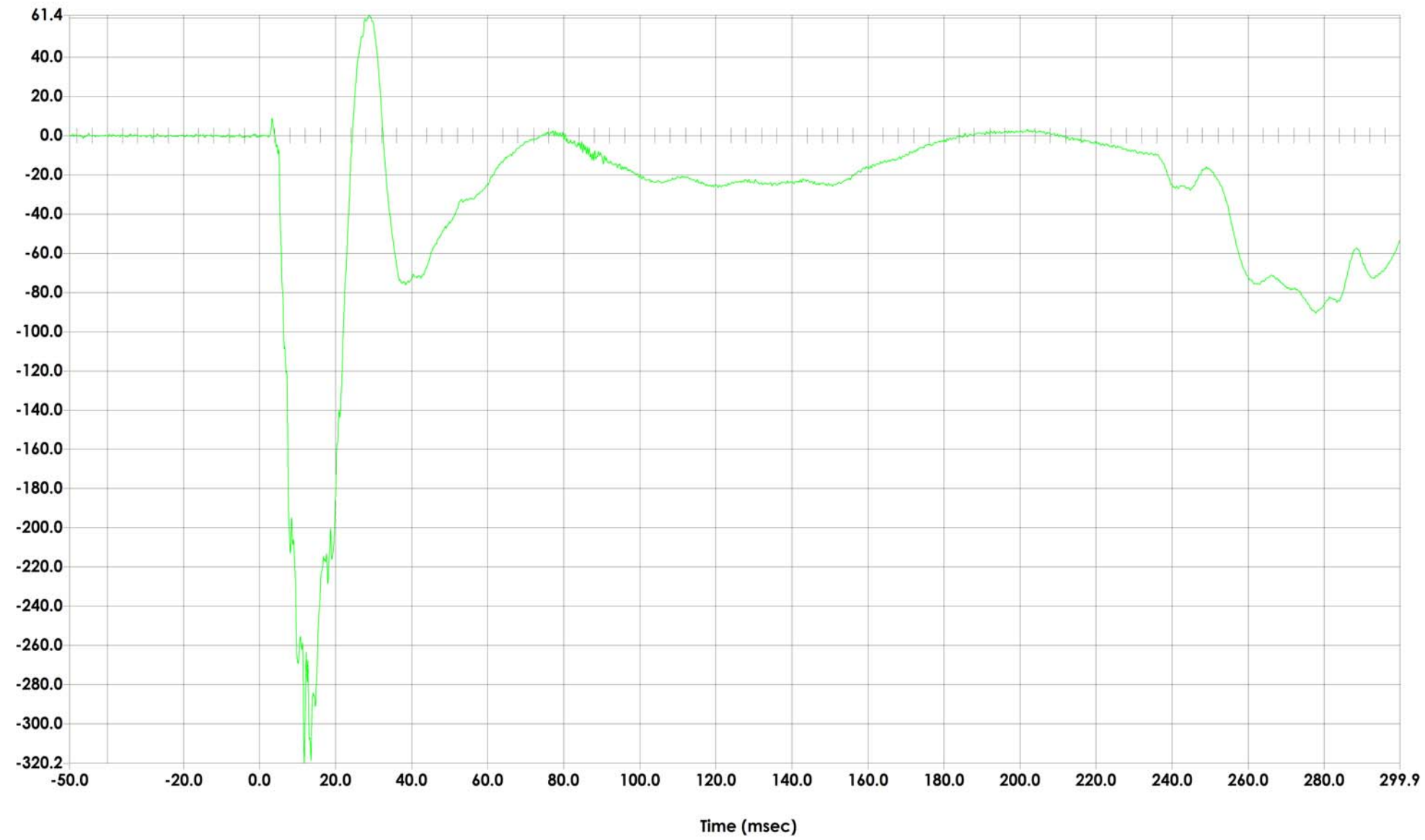


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	005
Units	NWT

Max	61.36	NWT
	28.80	msec
Min	-320.16	NWT
	11.76	msec



Hybrid III 3-Year-Old UNLC (Y) Force vs. Time

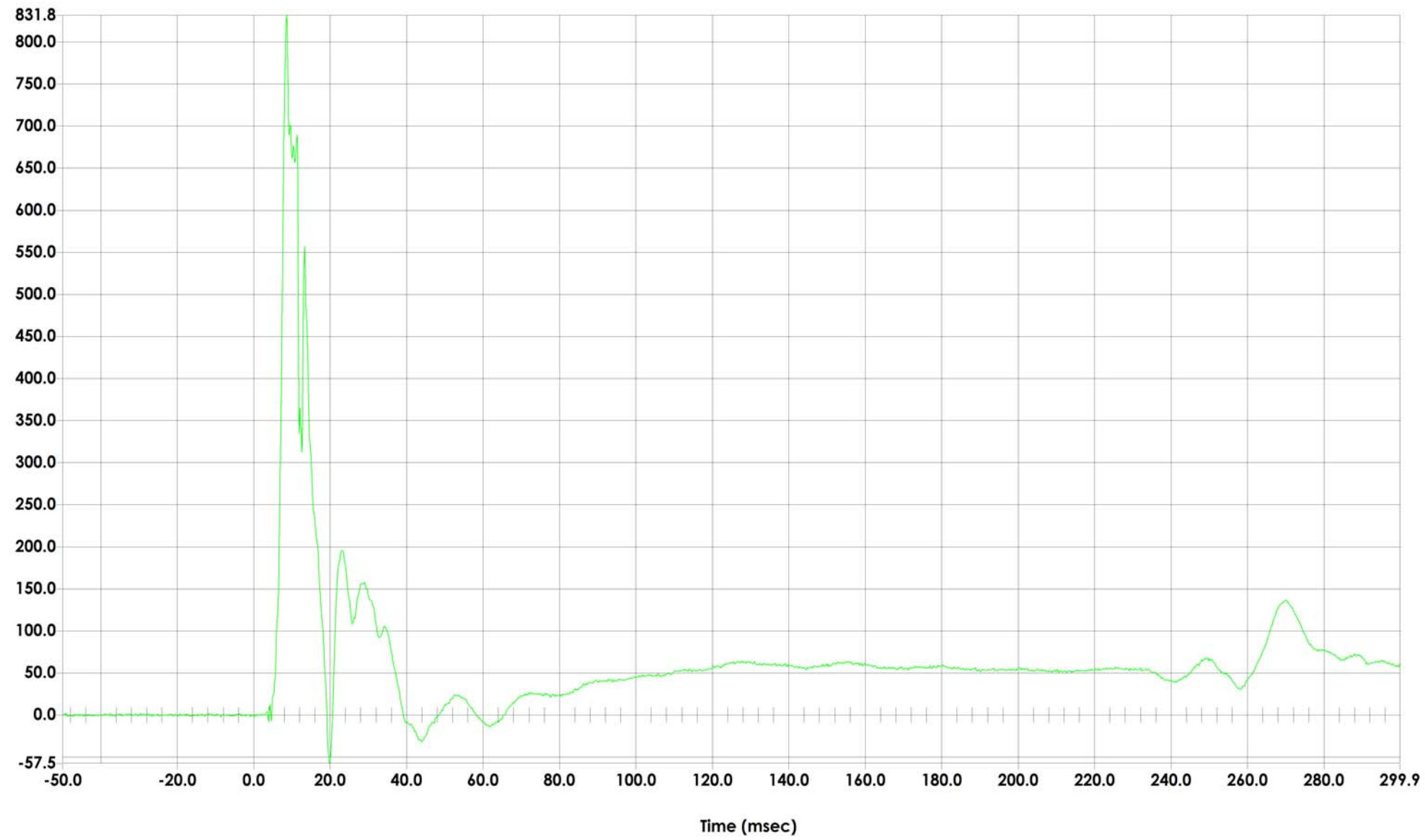


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	006
Units	NWT

Max	831.76	NWT
	8.56	msec
Min	-57.49	NWT
	19.84	msec



Hybrid III 3-Year-Old UNLC (Z) Force vs. Time

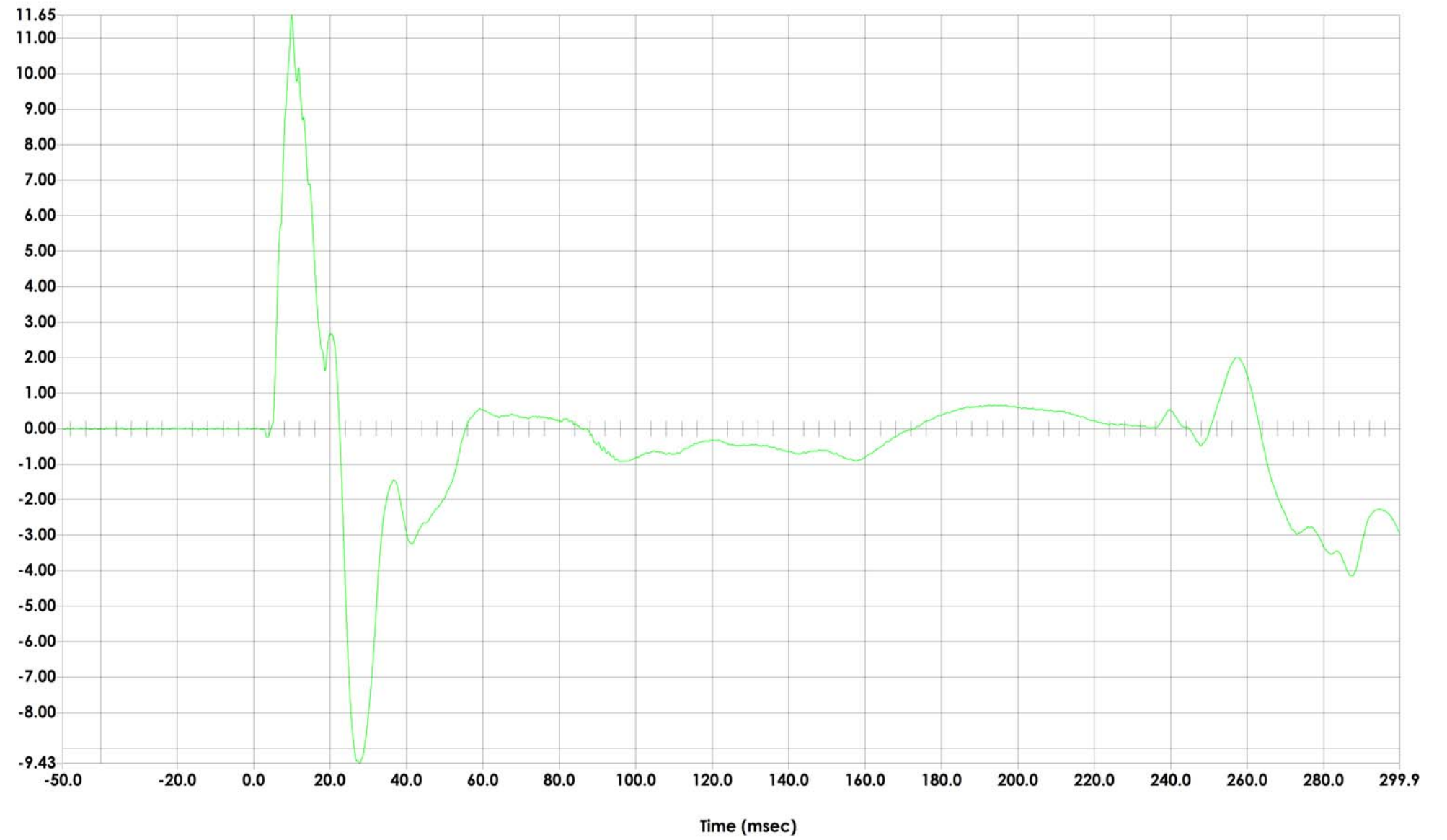


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	007
Units	NWM

Max	11.65	NWM
	9.92	msec
Min	-9.43	NWM
	27.68	msec



Hybrid III 3-Year-Old UNLC (X) Moment vs. Time

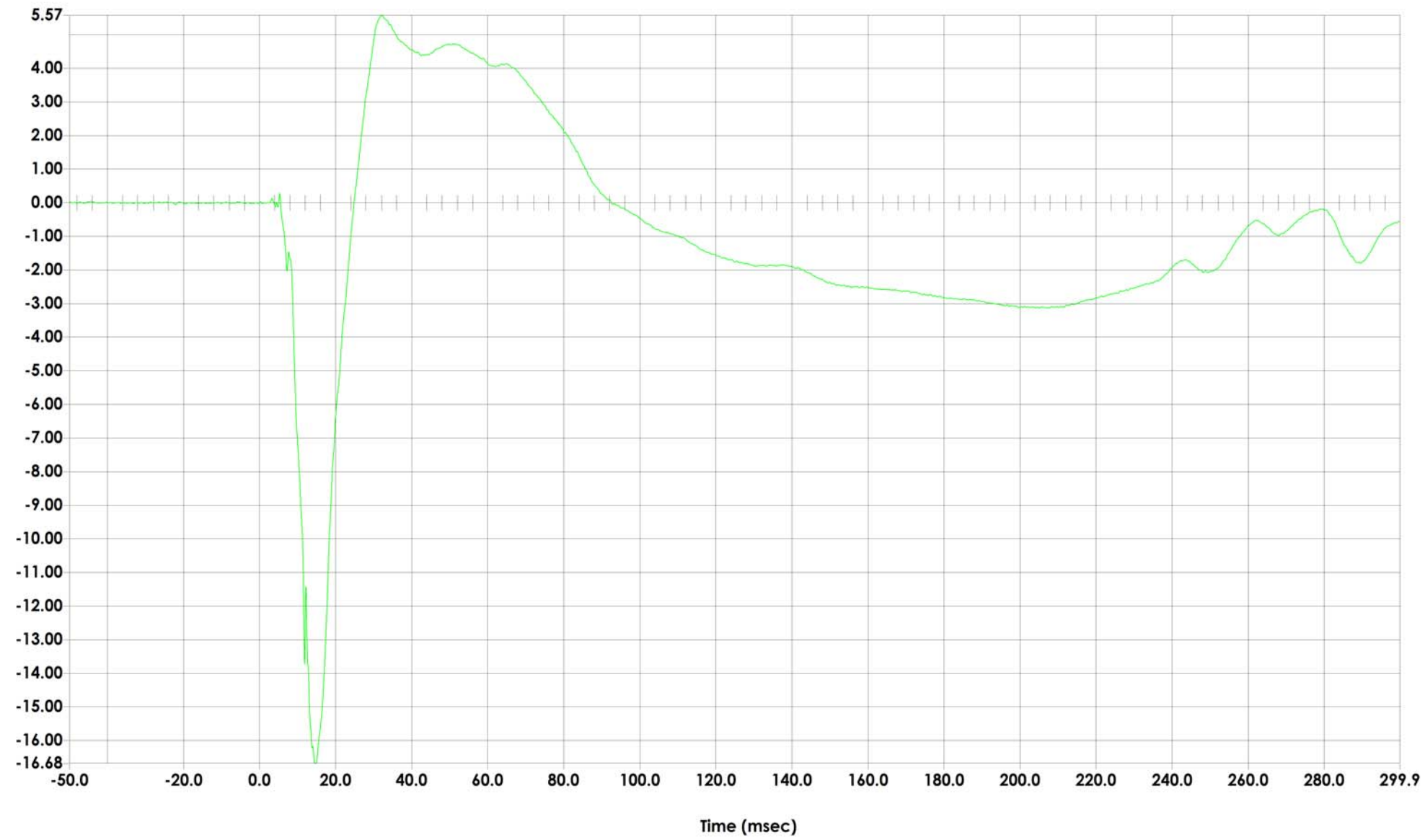


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	008
Units	NWM

Max	5.57	NWM
	31.92	msec
Min	-16.68	NWM
	14.56	msec



Hybrid III 3-Year-Old UNLC (Y) Moment vs. Time

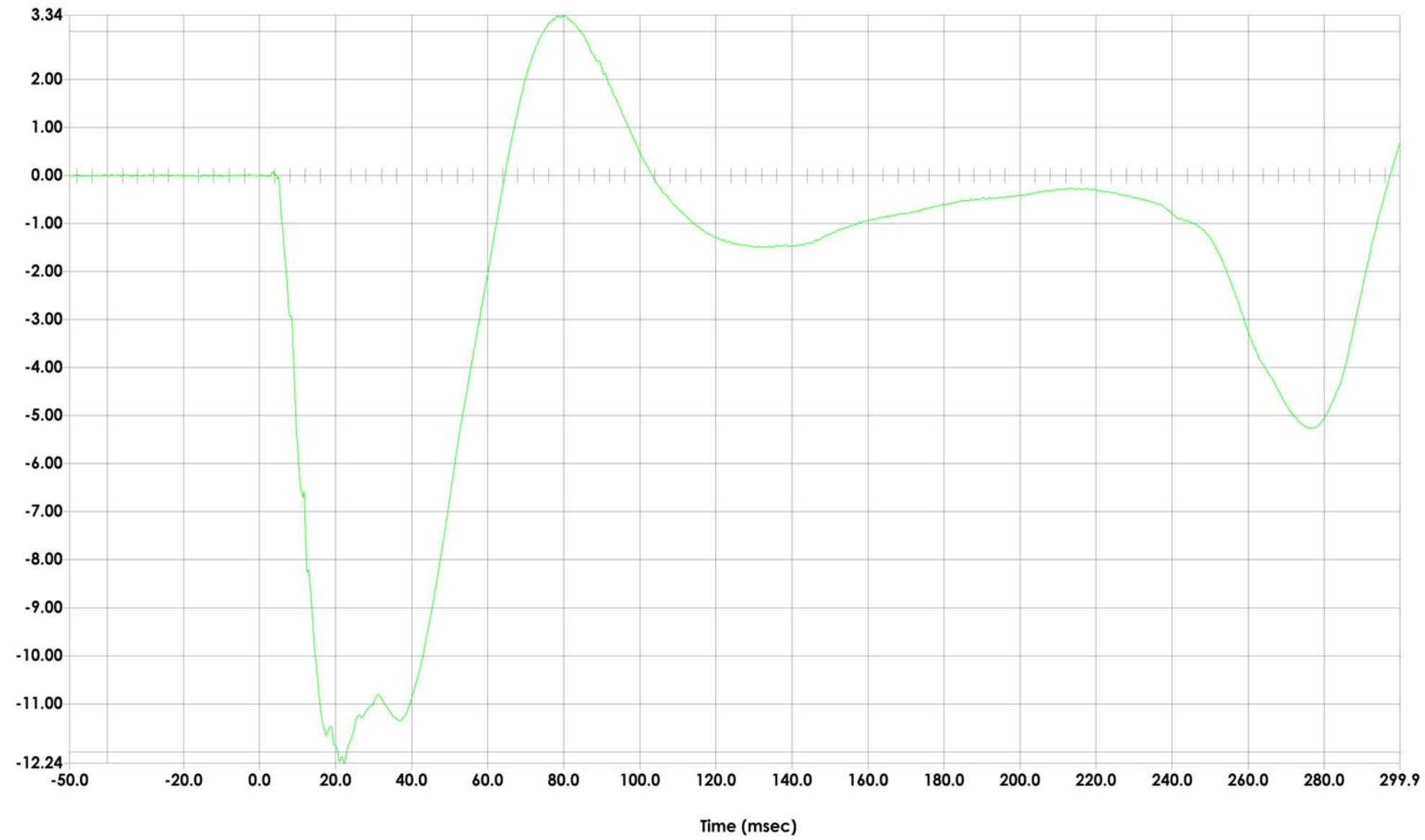


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	009
Units	NWM

Max	3.34	NWM
	79.76	msec
Min	-12.24	NWM
	22.32	msec



Hybrid III 3-Year-Old UNLC (Z) Moment vs. Time



Nij Version 10

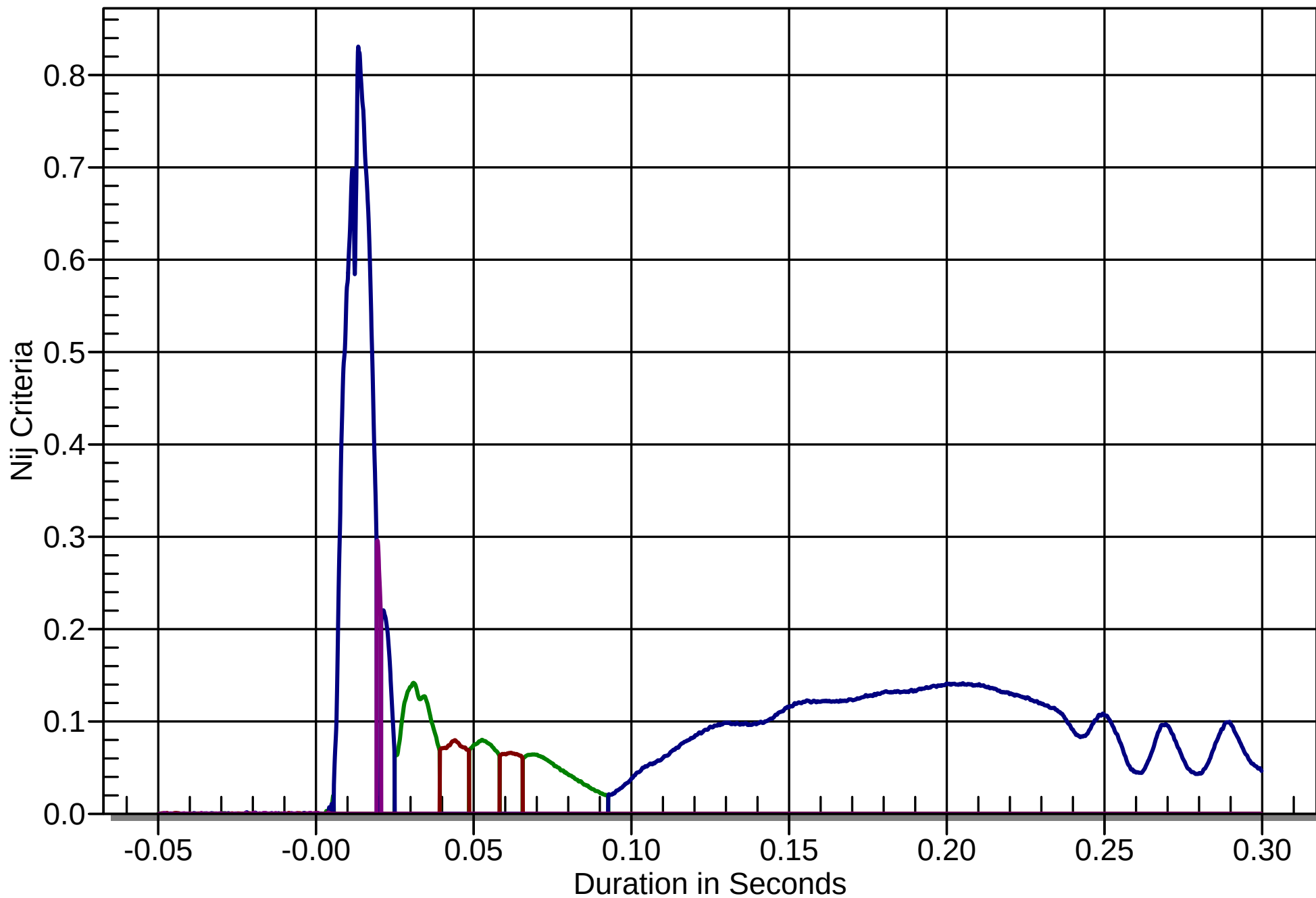
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Ten-Flex

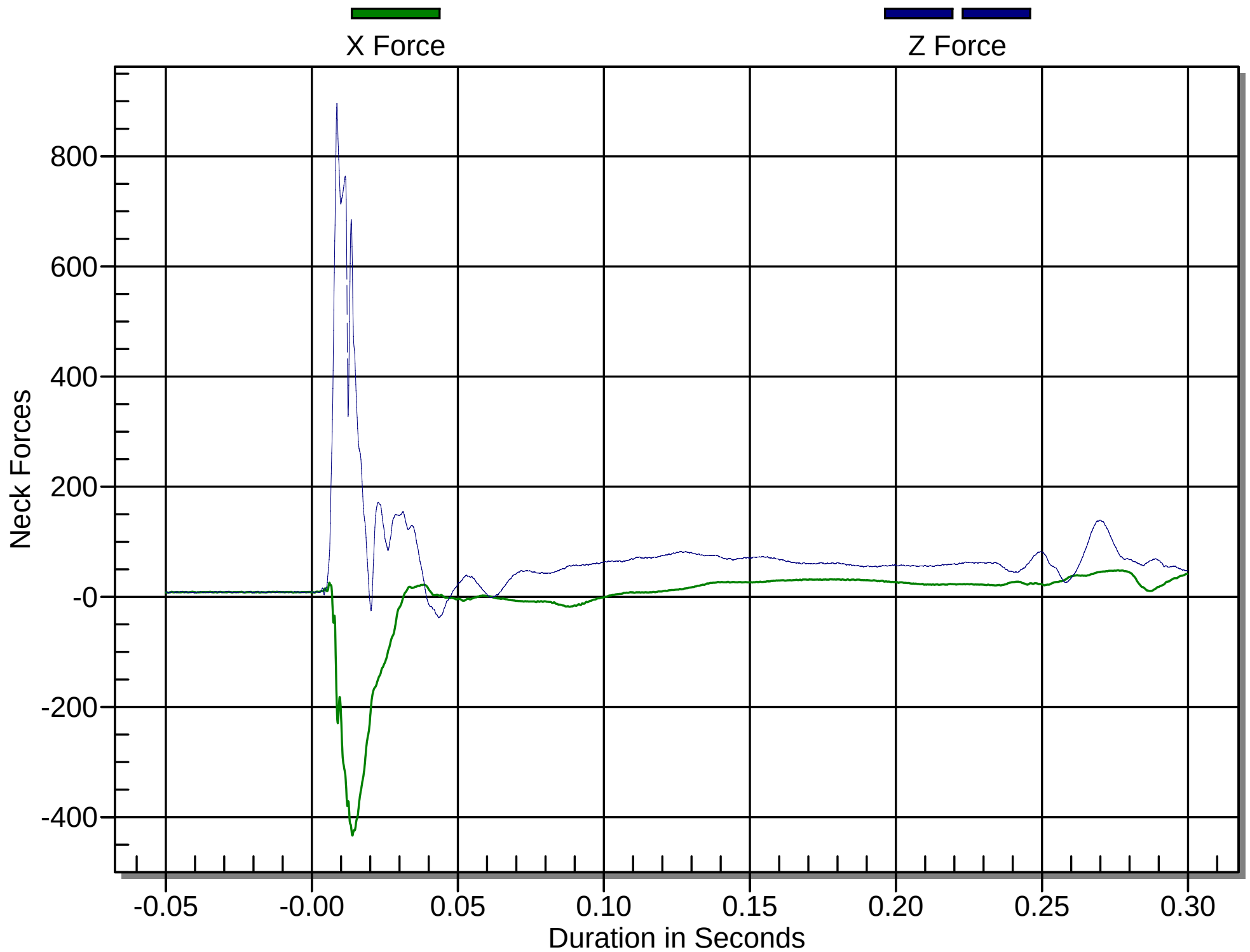
Ten-Ext

Com-Flex

Com-Ext

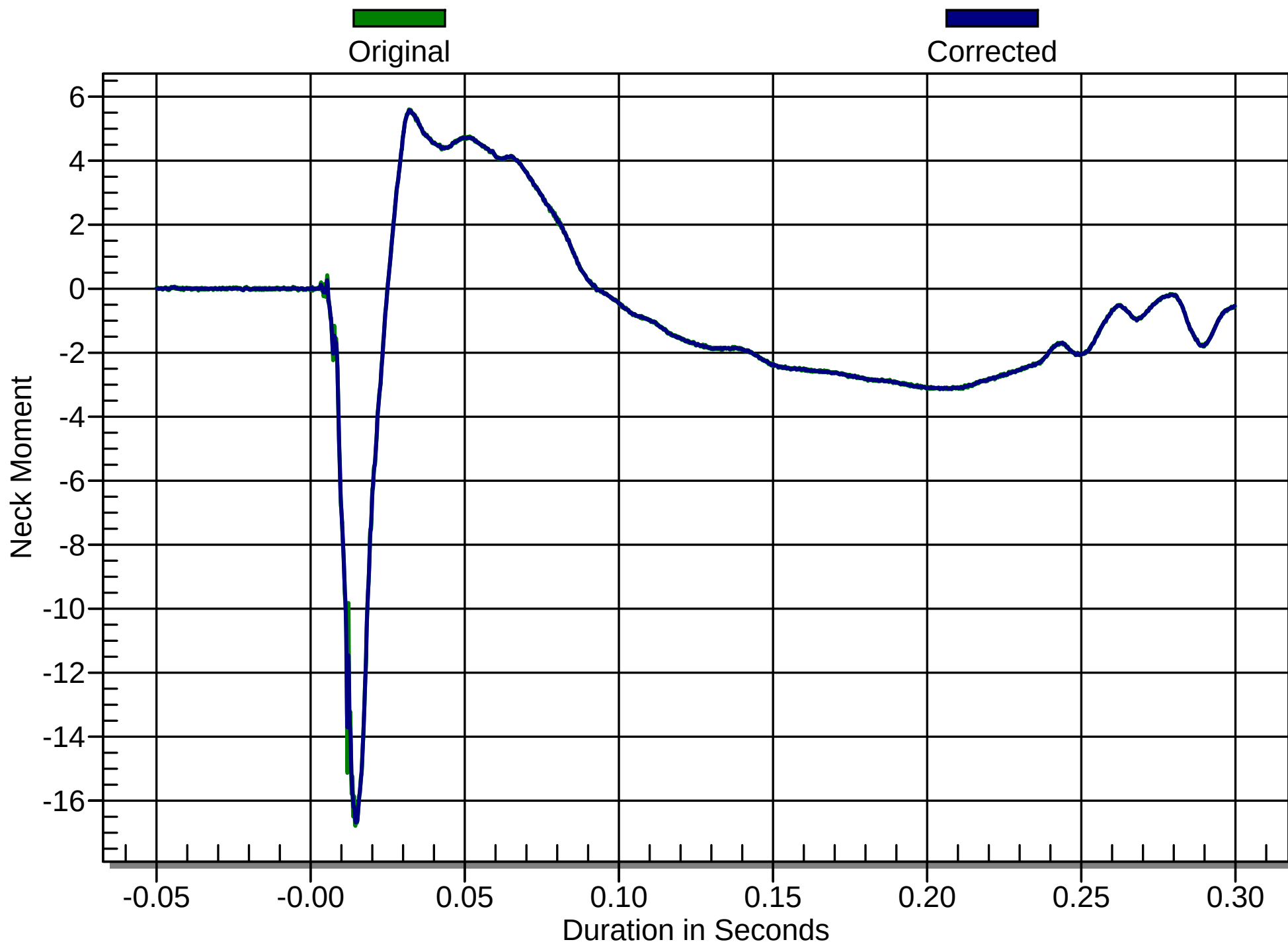


Ntf= 0.63, Nte= 0.21, Ncf= 0.17, Nce= 0.01



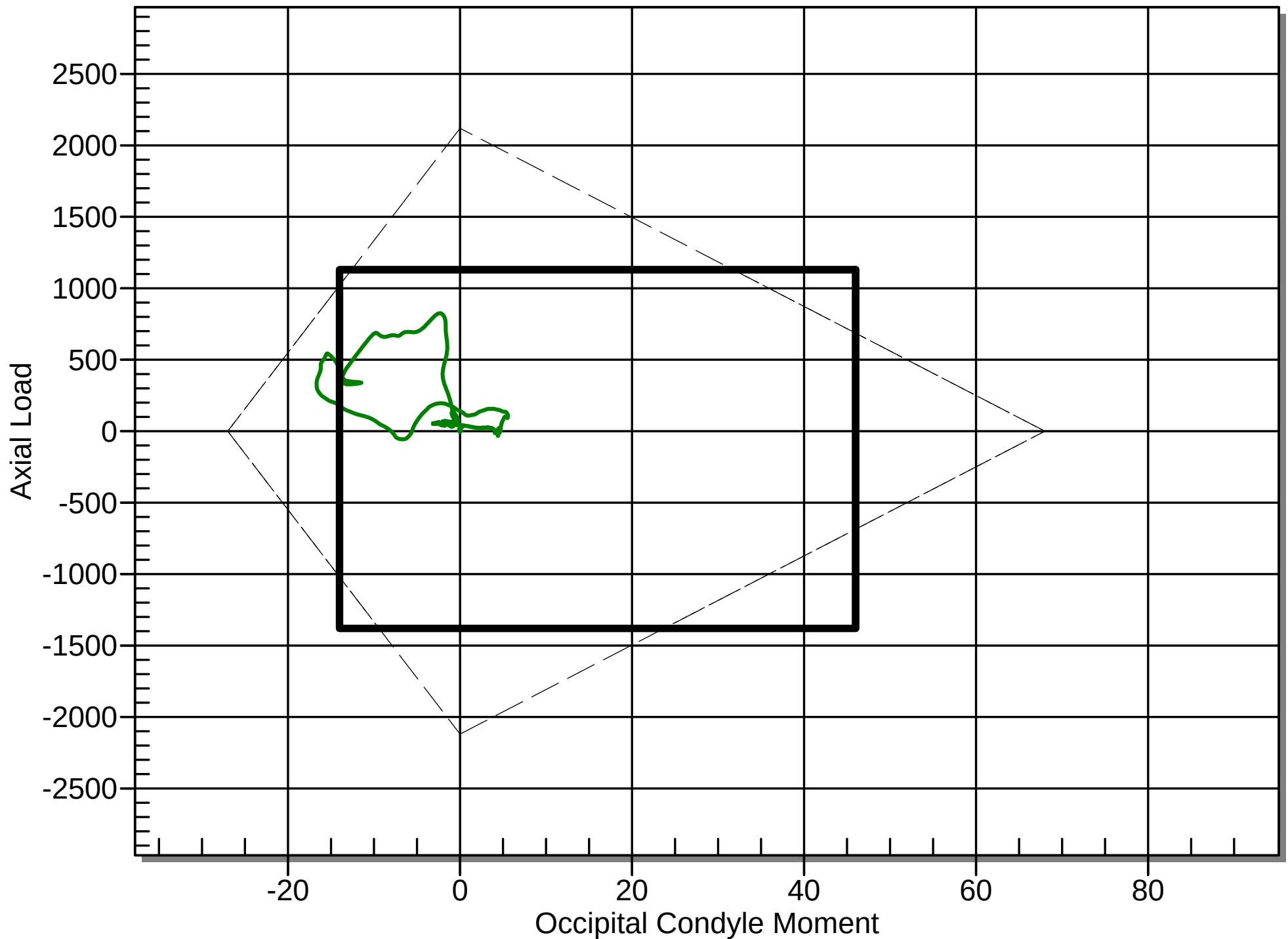
Nij Version 10

Ntf= 0.14, Nte= 0.83, Ncf= 0.08, Nce= 0.30



Nij Version 10

Ntf= 0.14, Nte= 0.83, Ncf= 0.08, Nce= 0.30

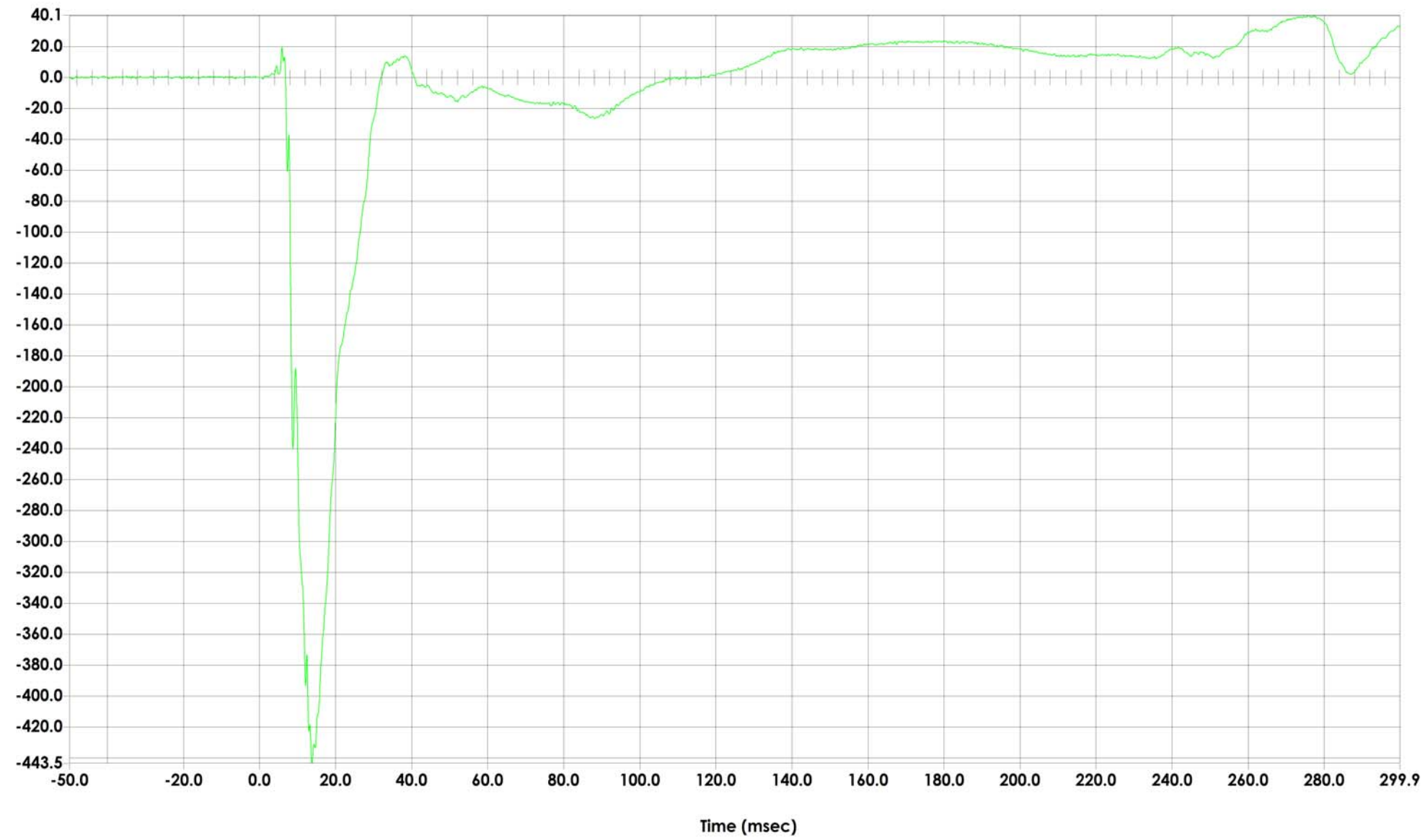


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	010
Units	NWT

Max	40.08	NWT
	276.08	msec
Min	-443.53	NWT
	13.76	msec



Hybrid III 3-Year-Old LNLC (X) Force vs. Time

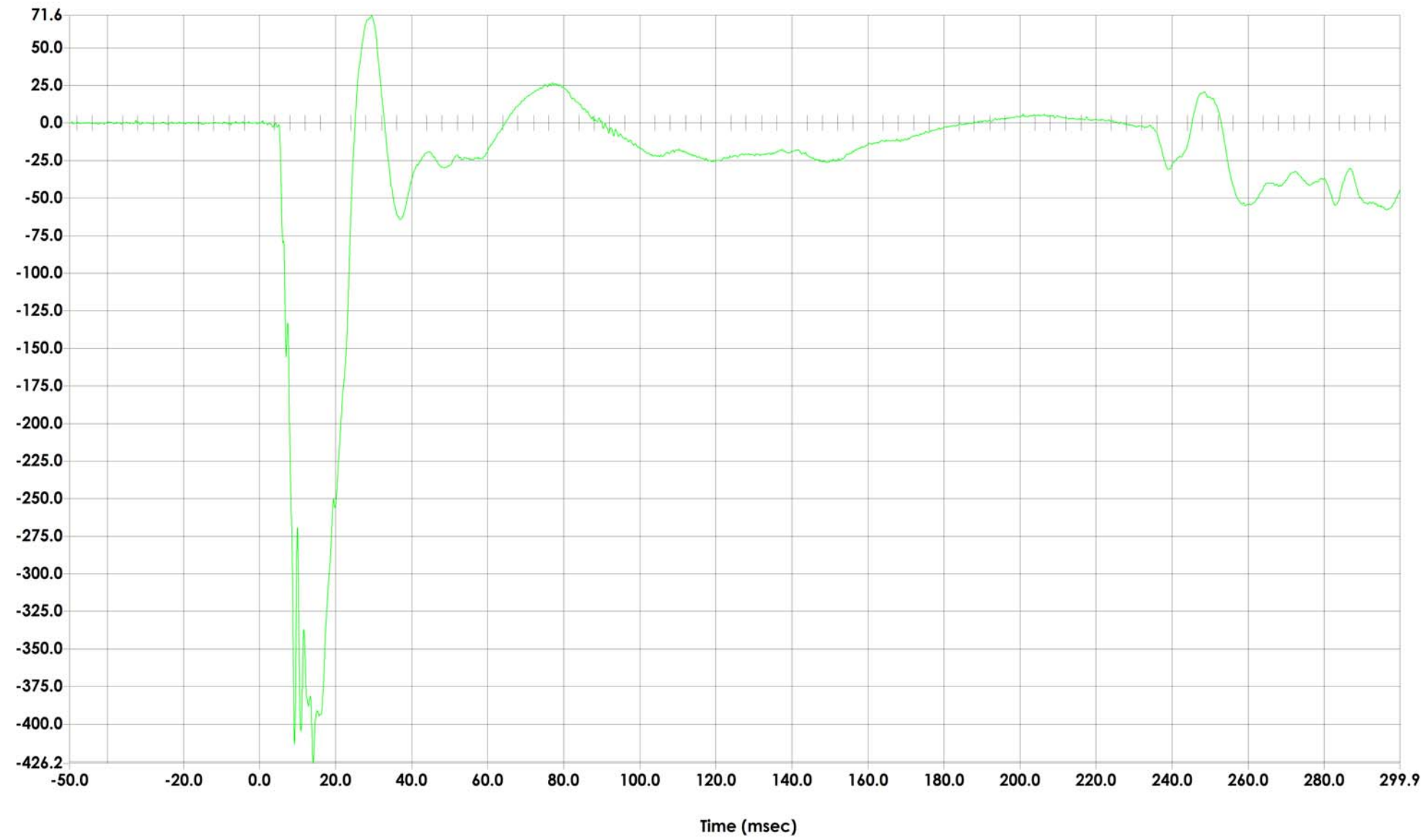


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	011
Units	NWT

Max	71.65	NWT
	29.44	msec
Min	-426.18	NWT
	14.08	msec



Hybrid III 3-Year-Old LNLC (Y) Force vs. Time

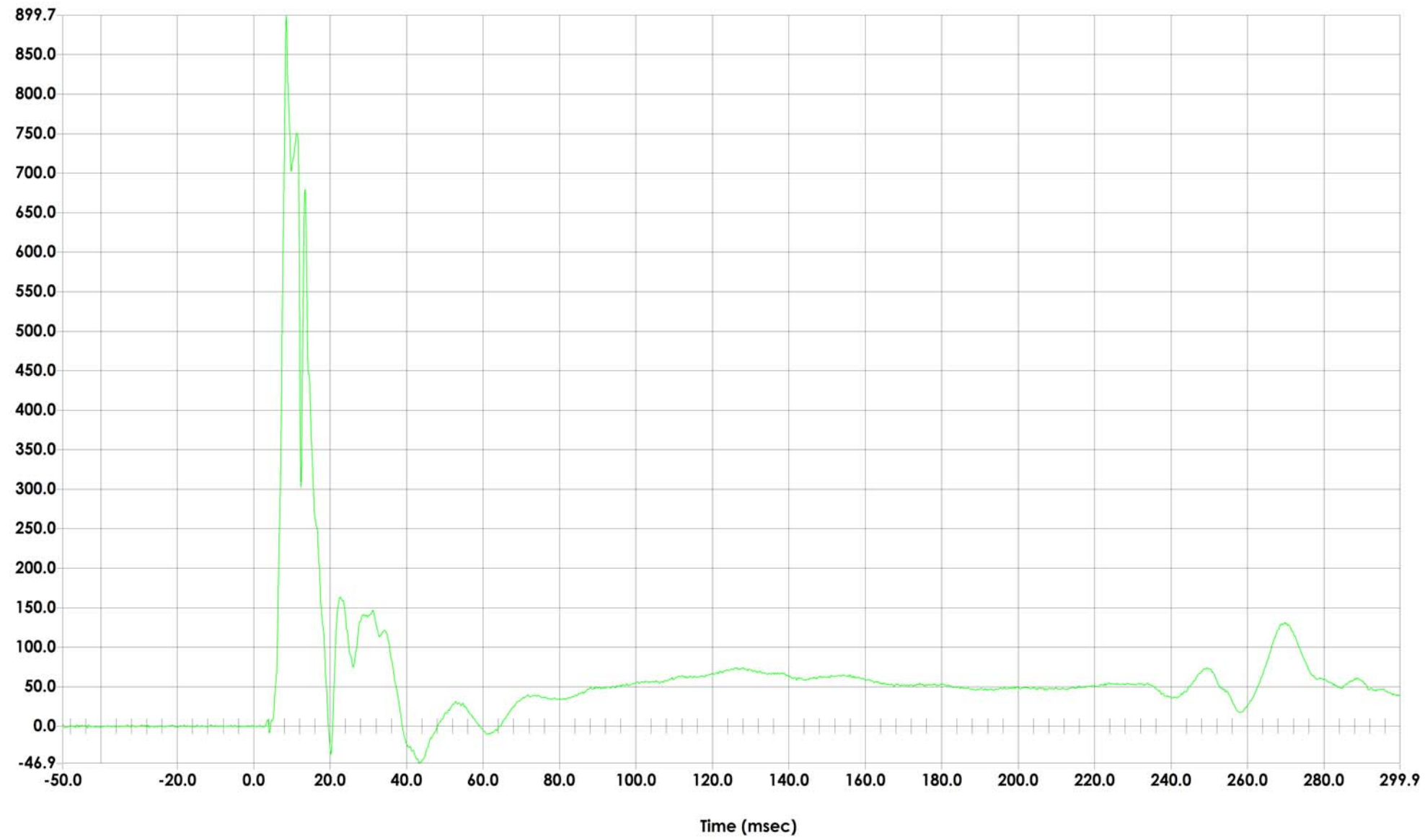


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC1000
Plot number	012
Units	NWT

Max	899.71	NWT
	8.48	msec
Min	-46.91	NWT
	43.28	msec



Hybrid III 3-Year-Old LNLC (Z) Force vs. Time

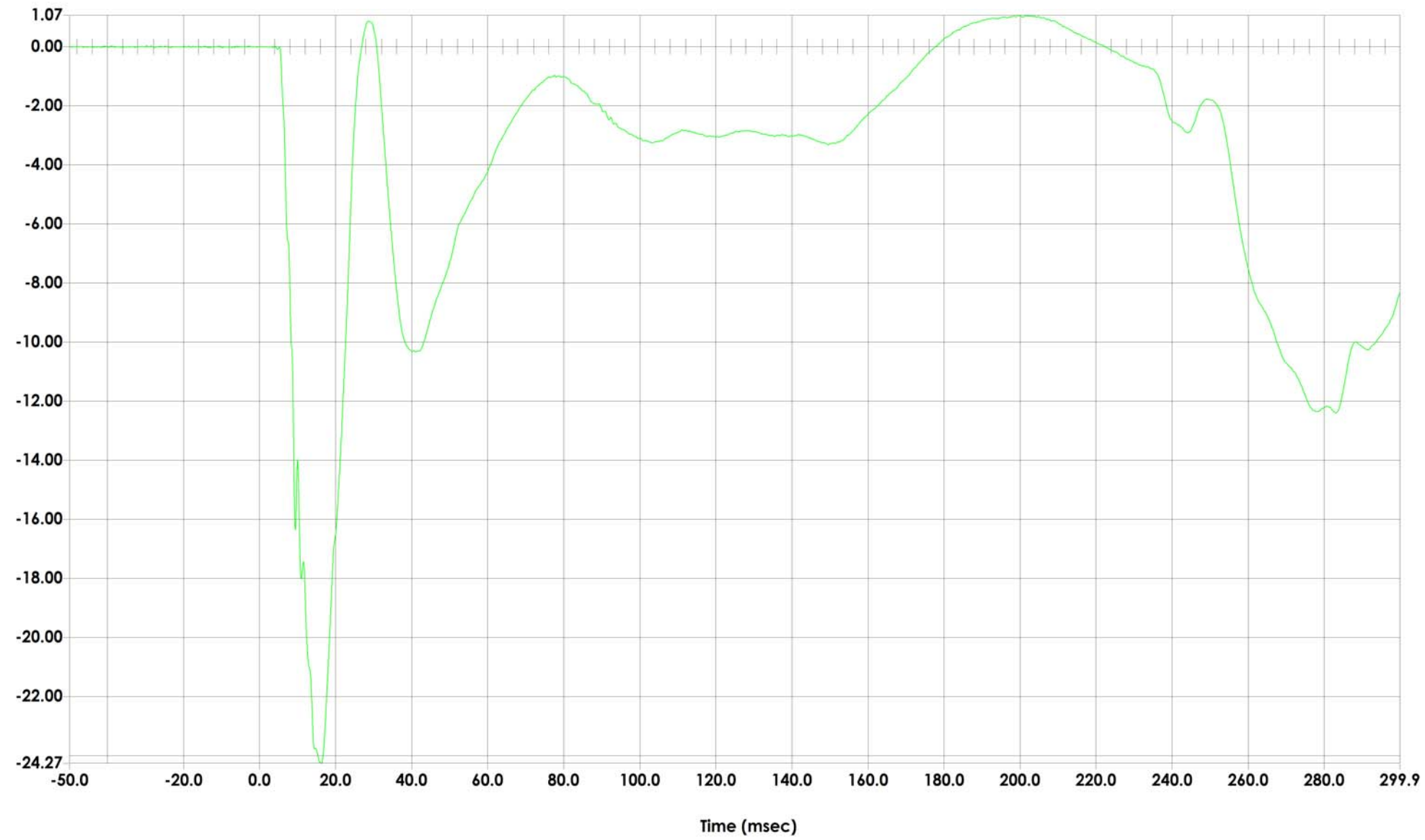


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	013
Units	NWM

Max	1.07	NWM
	199.60	msec
Min	-24.27	NWM
	16.32	msec



Hybrid III 3-Year-Old LNLC (X) Moment vs. Time

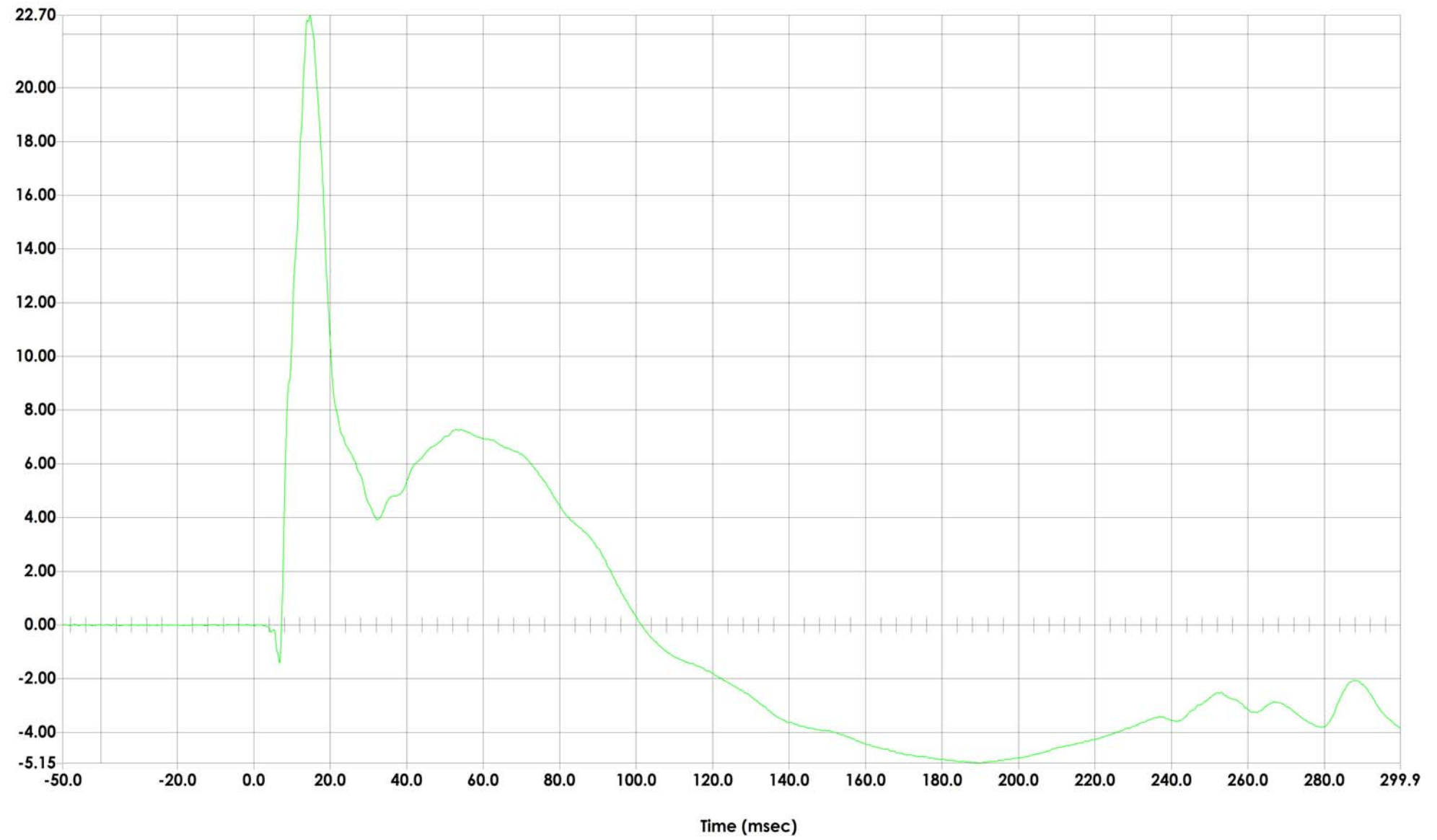


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	014
Units	NWM

Max	22.70	NWM
	14.72	msec
Min	-5.15	NWM
	190.24	msec



Hybrid III 3-Year-Old LNLC (Y) Moment vs. Time

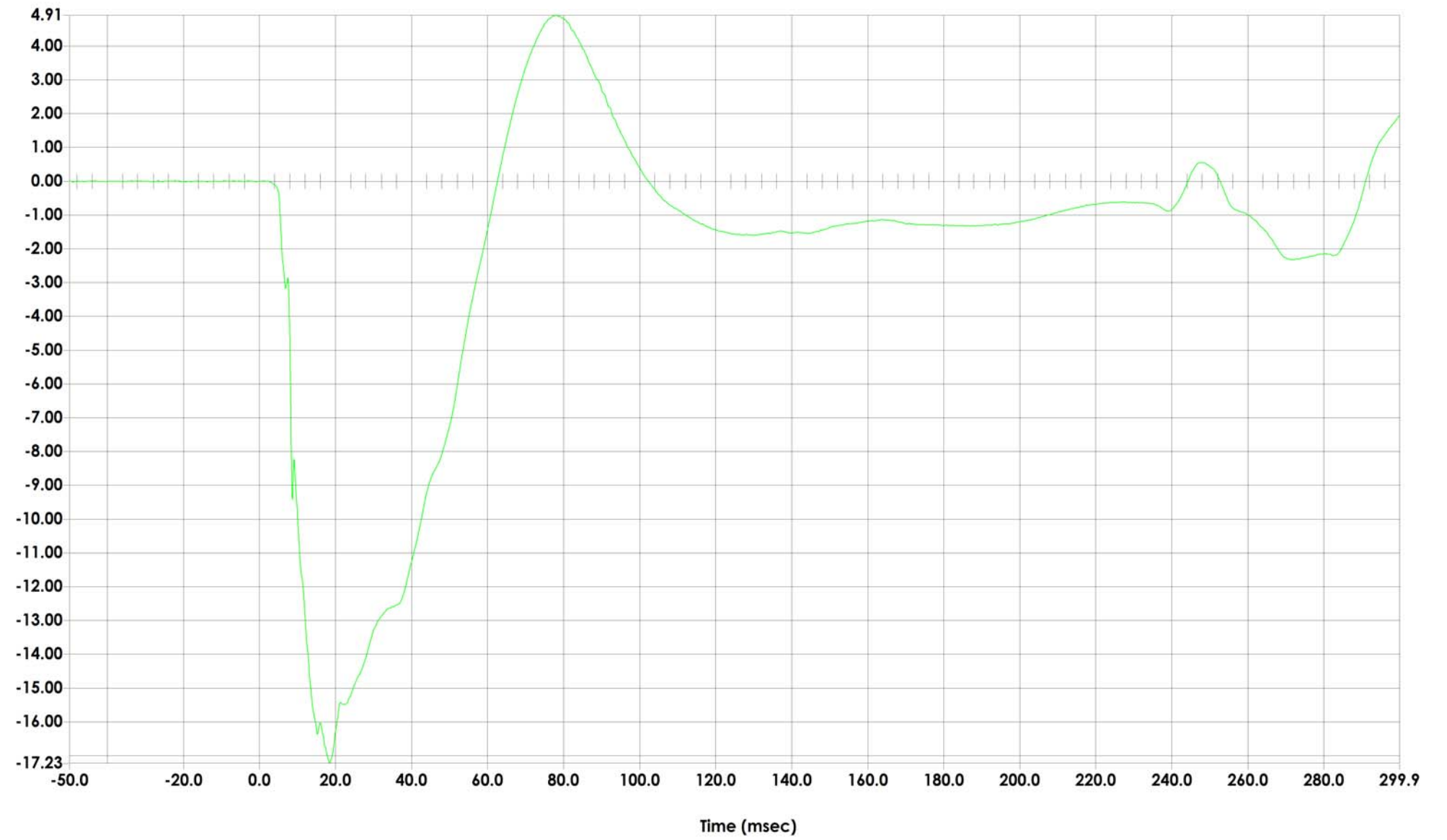


Test ID	M20140306TWG2
Sampling Rate (Hz)	12500
Filter	CFC600
Plot number	015
Units	NWM

Max	4.91	NWM
	77.92	msec
Min	-17.23	NWM
	18.40	msec



Hybrid III 3-Year-Old LNLC (Z) Moment vs. Time



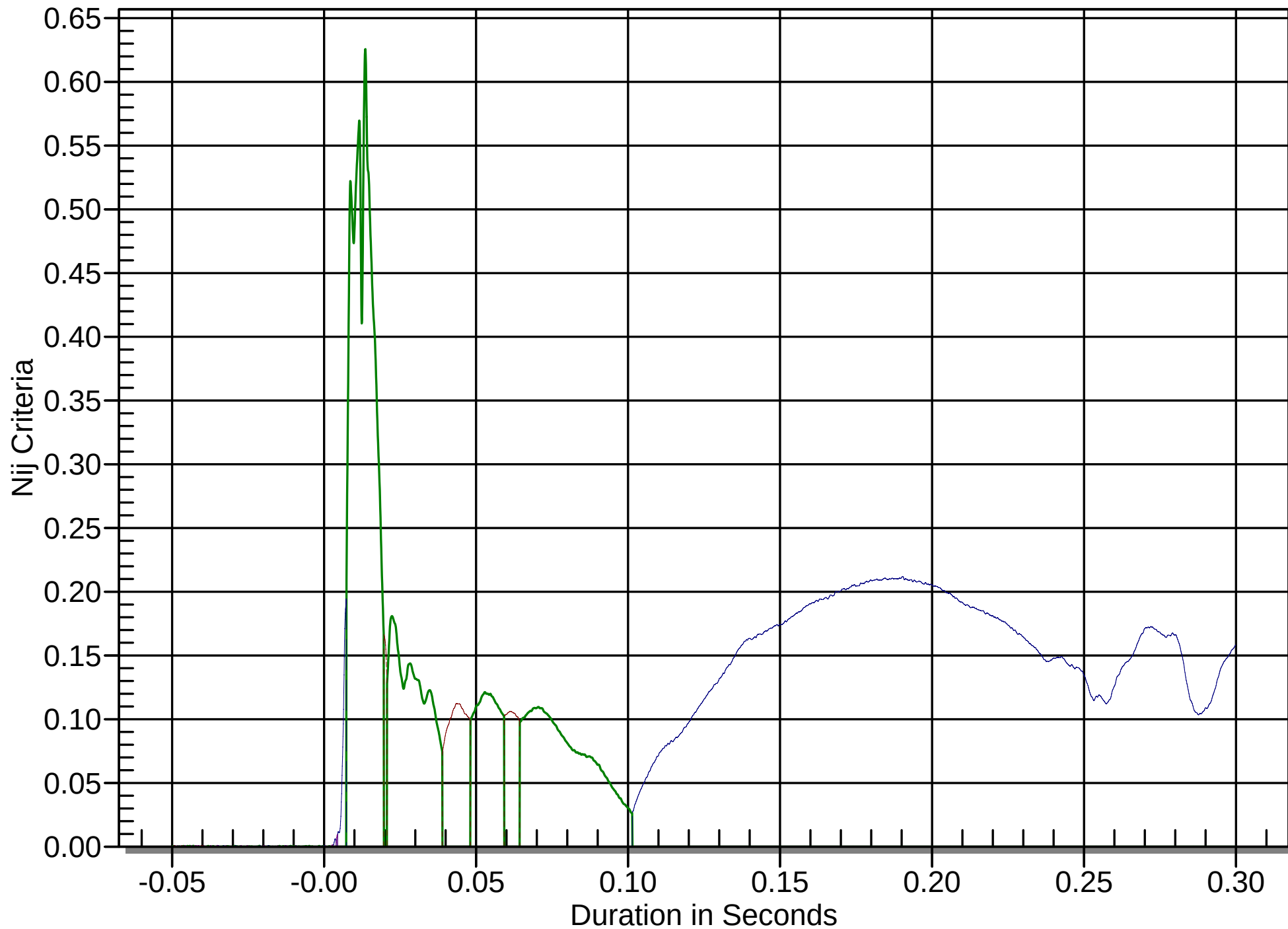
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Ten-Flex

Ten-Ext

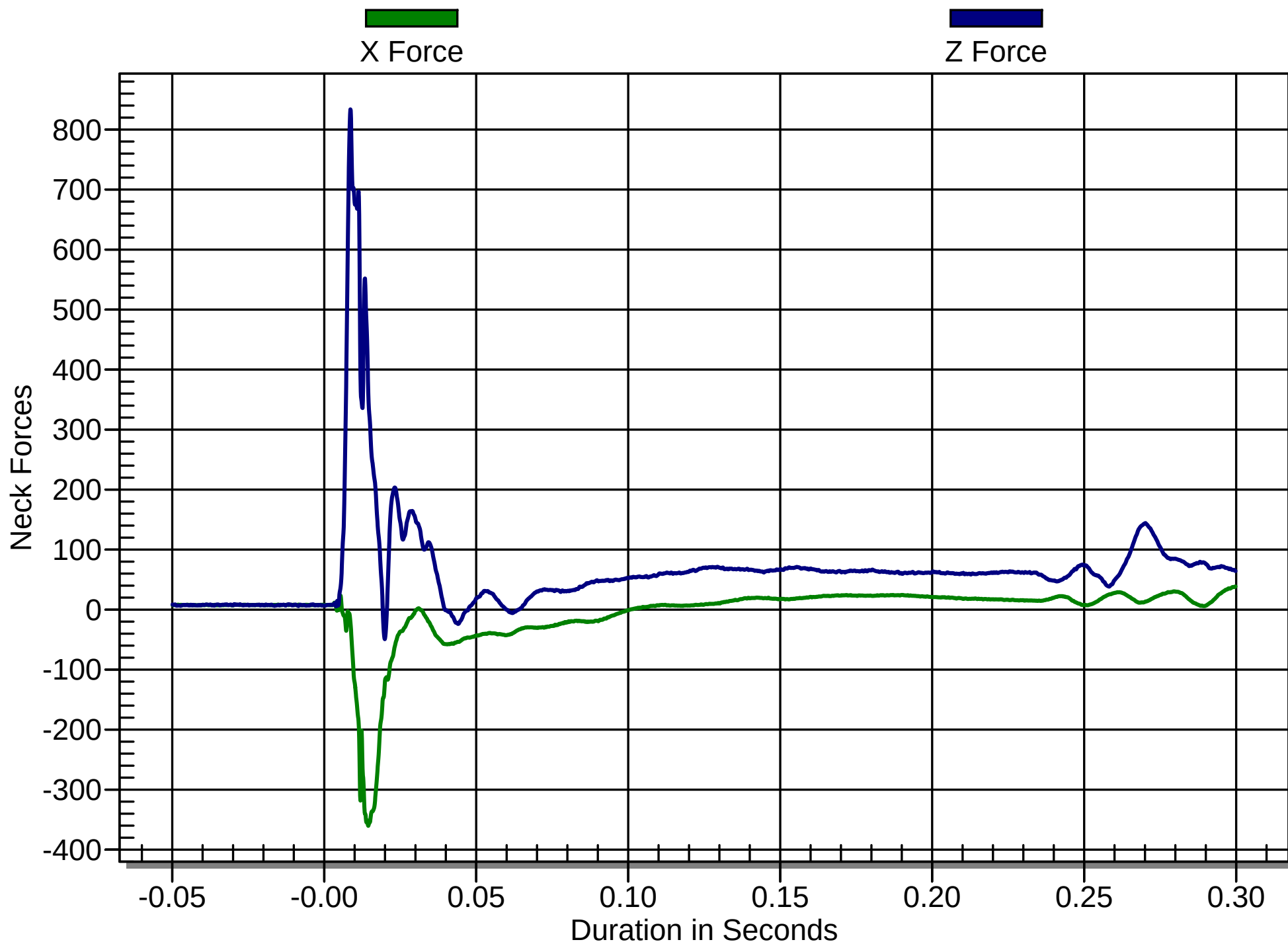
Com-Flex

Com-Ext

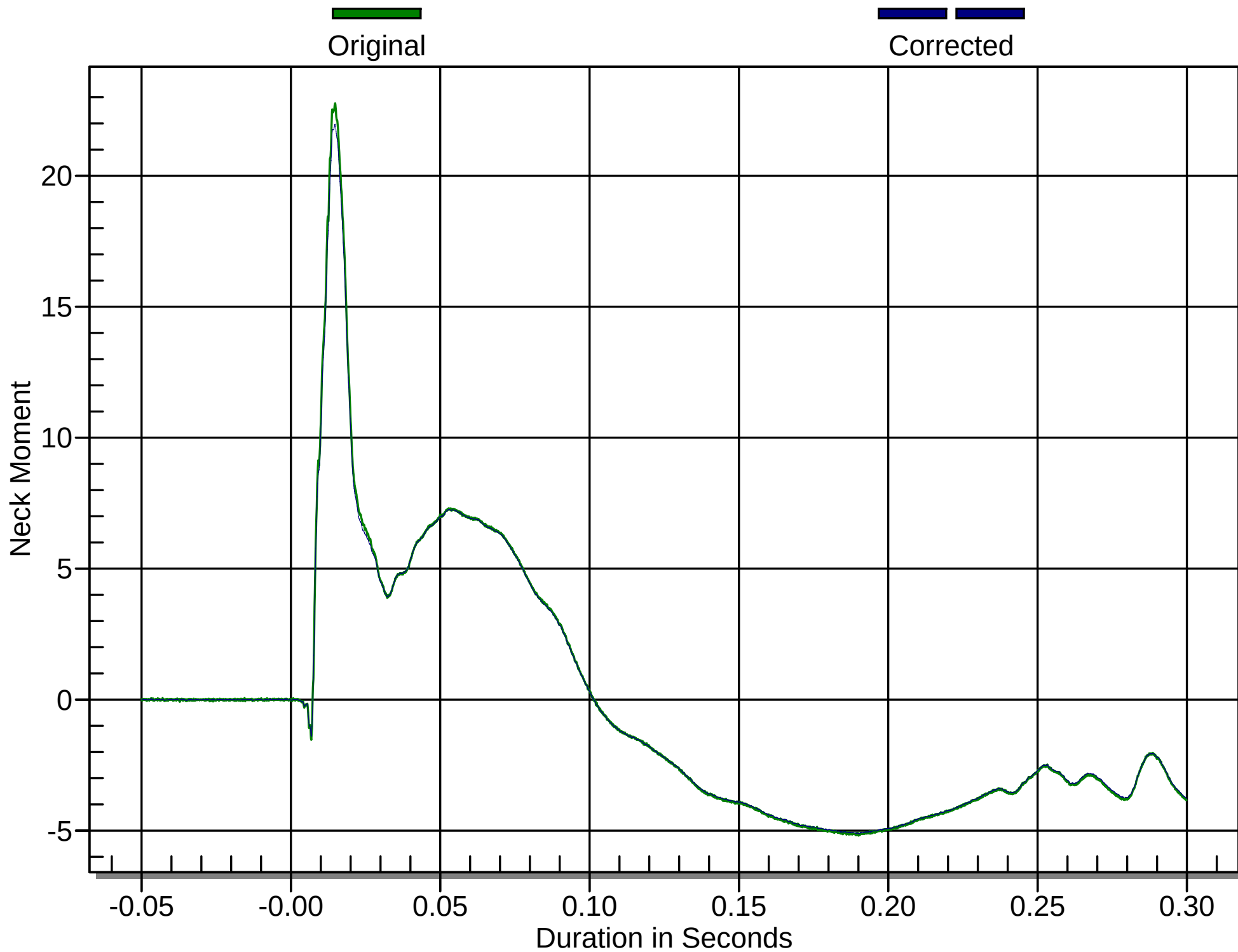


Nij Version 10

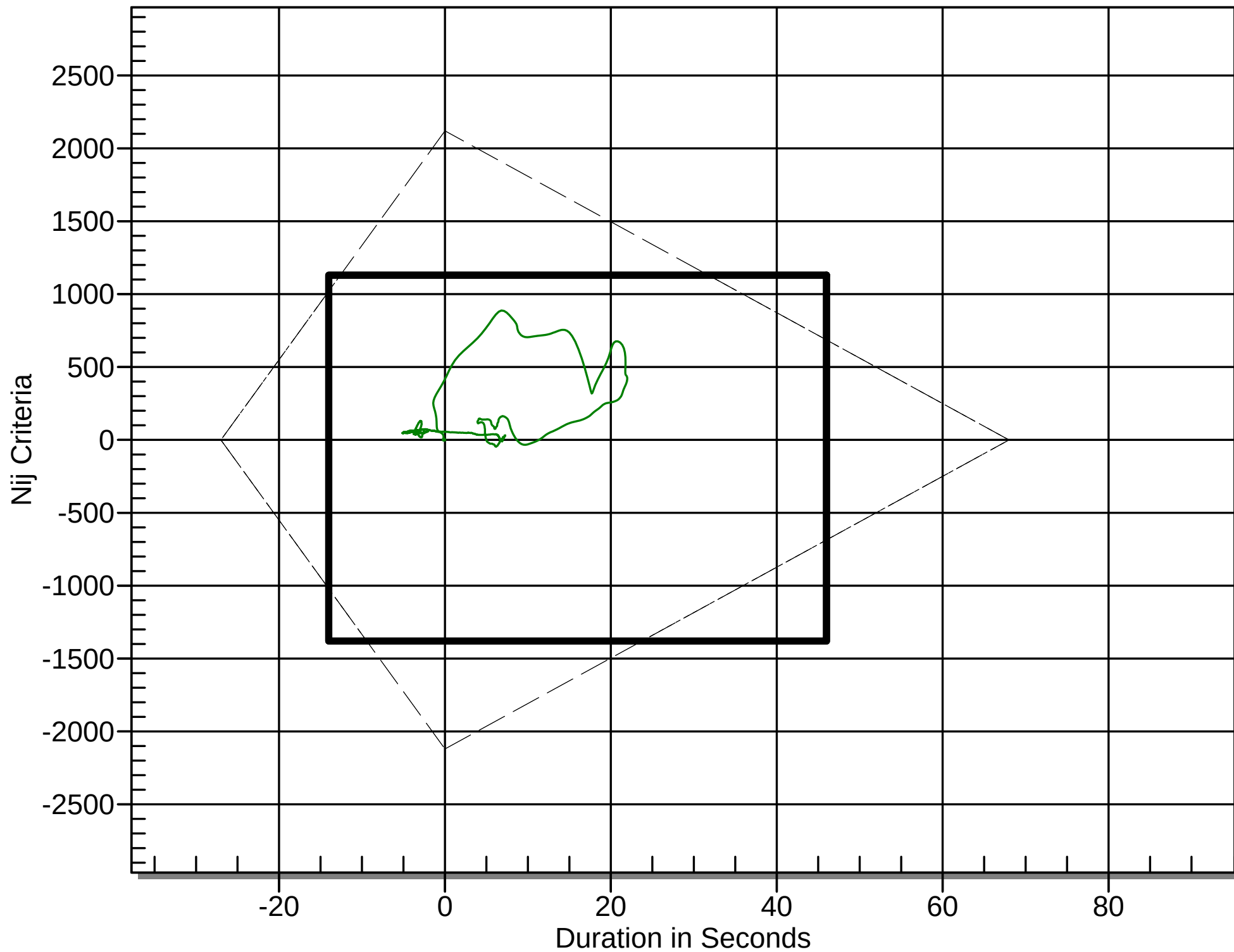
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Ntf= 0.63, Nte= 0.21, Ncf= 0.17, Nce= 0.01



Ntf= 0.63, Nte= 0.21, Ncf= 0.17, Nce= 0.01



Transportation Research Center Inc.

ATD Calibration Report

for

VRTC

**HIII 3-Year-Old Serial No. 142
Calibration No. 03**



**Transportation Research Center Inc.
P.O. Box B-67
10820 St. Rt. 347
East Liberty, OH 43319-0367**

Transportation Research Center Inc.

Front Head Drop

HIII 3YO Serial No. 142 Certification No. 3-1

Test Date: 12/27/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	250 - 280 g	256.7 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-2.6 g	Yes
Is Acceleration Curve Unimodal?	Yes	Yes	Yes

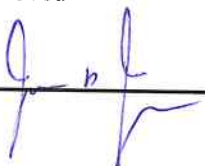
Test meets specifications.

Comments:

Technician



Approved



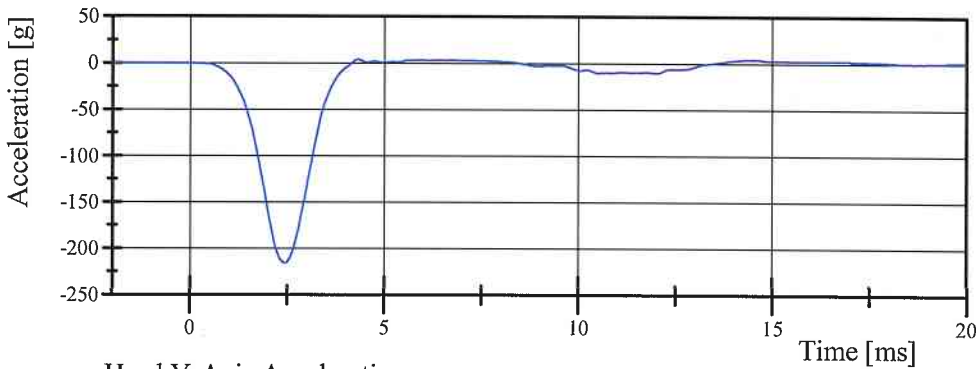
Transportation Research Center Inc.

Front Head Drop

HIII 3YO Serial No. 142 Certification No. 3-1

Test Date: 12/27/2013

Head X-Axis Acceleration

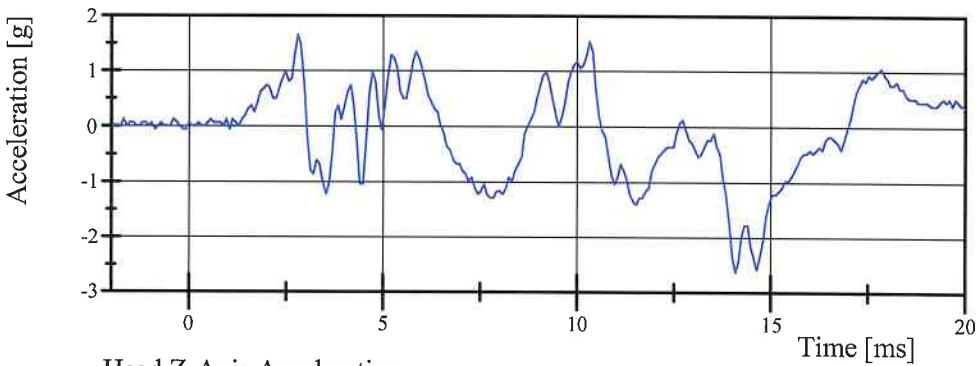


Filter Class: CFC_1000

Max: 4.0 g at 14.2 ms

Min: -216.0 g at 2.4 ms

Head Y-Axis Acceleration

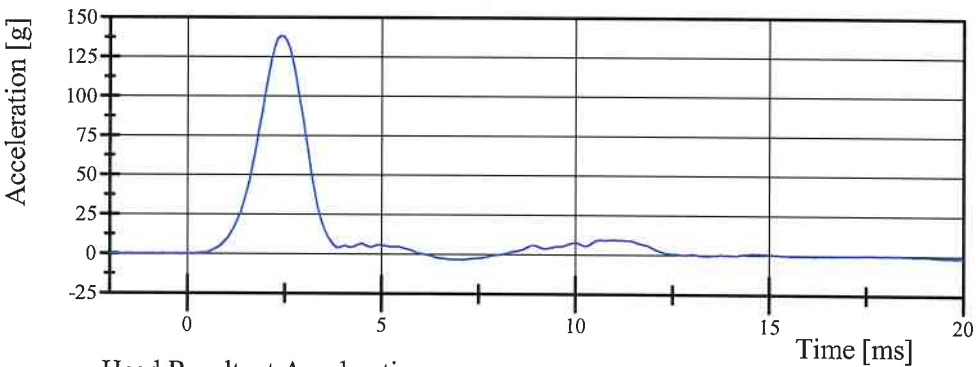


Filter Class: CFC_1000

Max: 1.7 g at 2.8 ms

Min: -2.6 g at 14.1 ms

Head Z-Axis Acceleration

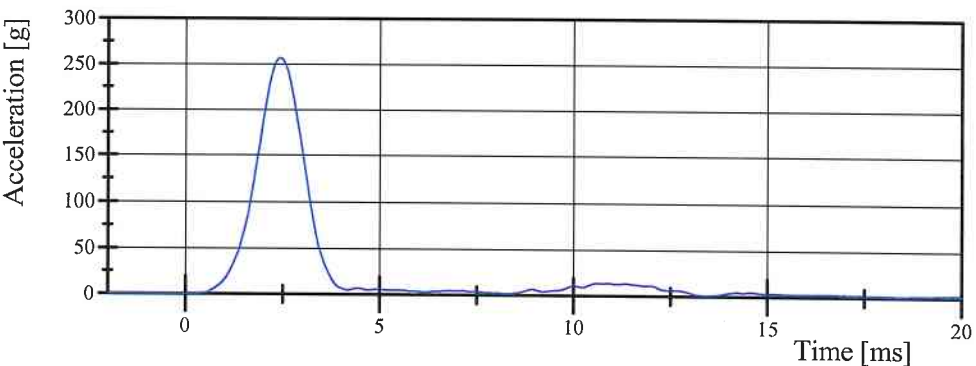


Filter Class: CFC_1000

Max: 138.7 g at 2.4 ms

Min: -3.3 g at 7.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 256.7 g at 2.4 ms

Min: 0.0 g at -0.6 ms

Transportation Research Center Inc.

Neck Flexion

HIII 3YO Serial No. 142 Certification No. 3-1

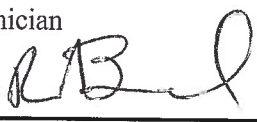
Test Date: 12/27/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Impact Velocity	5.40 - 5.60 m/s	5.571 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	(-2.0) - (-2.7) m/s	-2.20 m/s	Yes
Pendulum Integrated Velocity Change at 15 ms	(-3.0) - (-4.0) m/s	-3.24 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	(-4.0) - (-5.1) m/s	-4.36 m/s	Yes
Total Headform D-Plane Rotation	(-70) - (-82) °	-74.9 °	Yes
Peak Neck Occipital Condyles Moment	42 - 53 Nm	43.4 Nm	Yes
Neck Occipital Condyles Moment Decay to 10 Nm	60 - 80 ms	71.8 ms	Yes

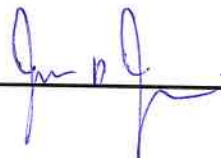
Test meets specifications.

Comments:

Technician



Approved



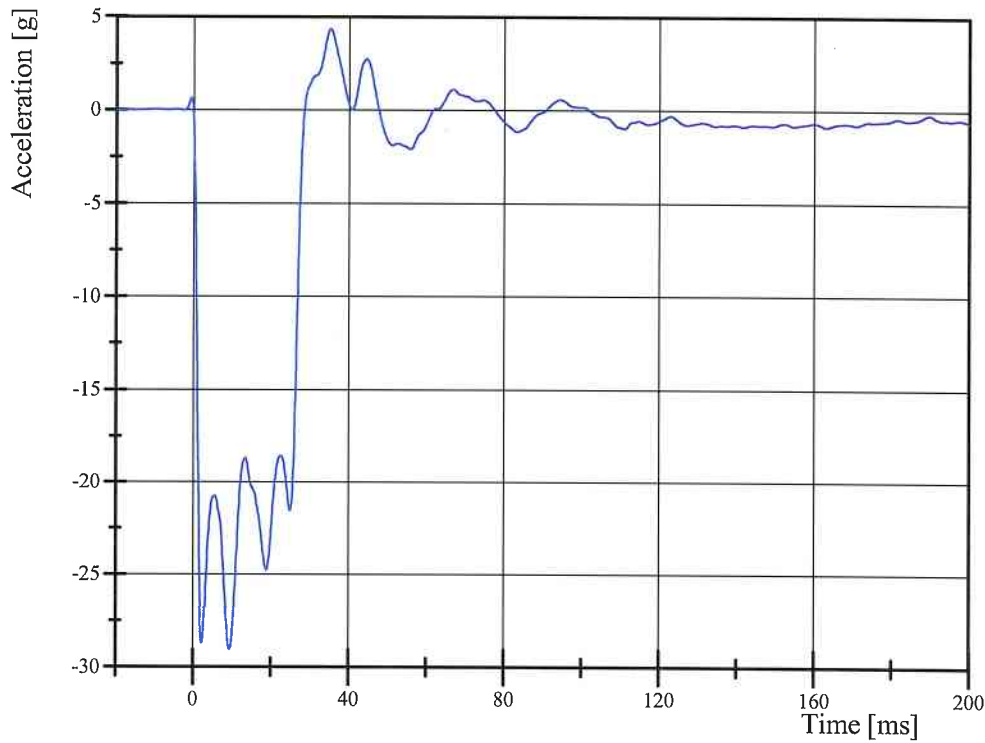
Transportation Research Center Inc.

Neck Flexion

HIII 3YO Serial No. 142 Certification No. 3-1

Test Date: 12/27/2013

Pendulum Acceleration

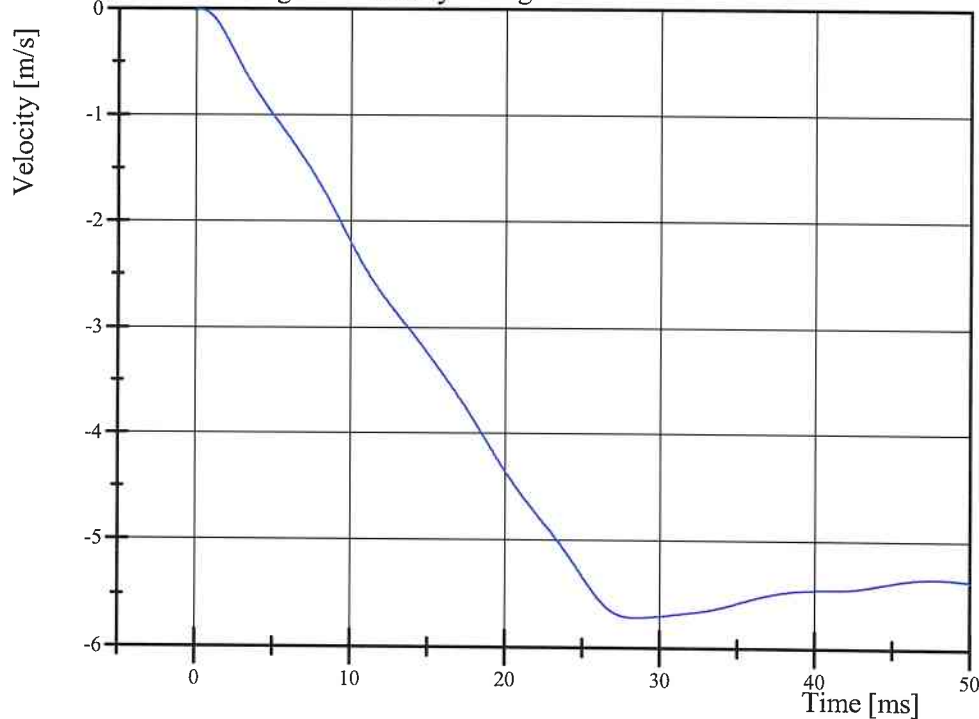


Filter Class: CFC_180

Max: 4.3 g at 35.2 ms

Min: -29.0 g at 9.4 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -5.7 m/s at 28.5 ms

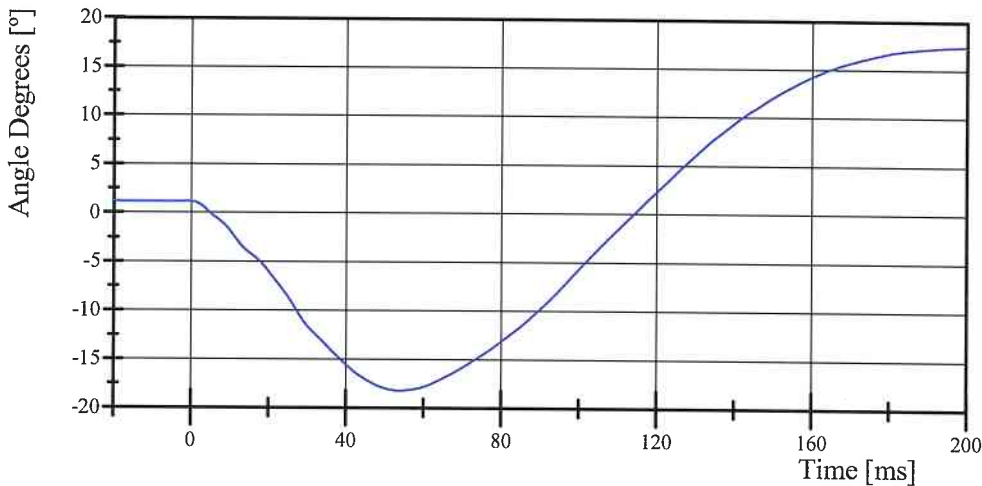
Transportation Research Center Inc.

Neck Flexion

HIII 3YO Serial No. 142 Certification No. 3-1

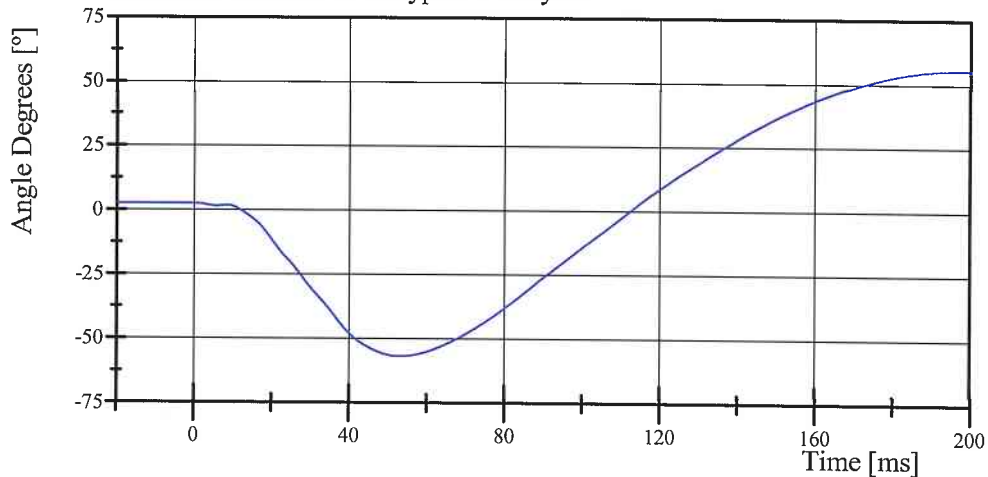
Test Date: 12/27/2013

Pot Rotation at the Base of Neck



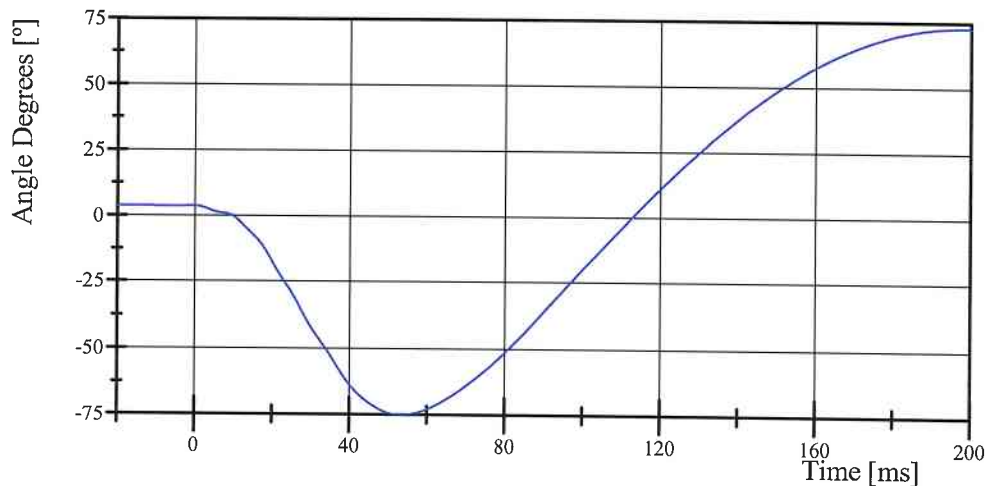
Filter Class: CFC_60
Max: 17.3 ° at 198.4 ms
Min: -18.2 ° at 53.8 ms

Headform Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 55.2 ° at 199.4 ms
Min: -56.7 ° at 53.0 ms

Total Headform D-Plane Rotation



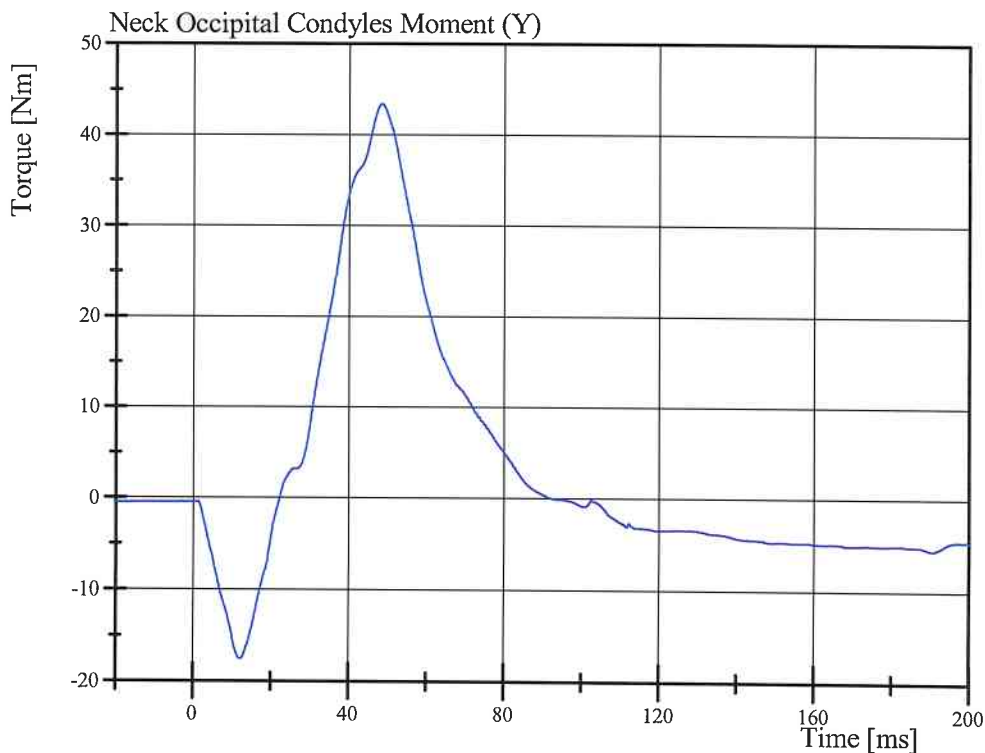
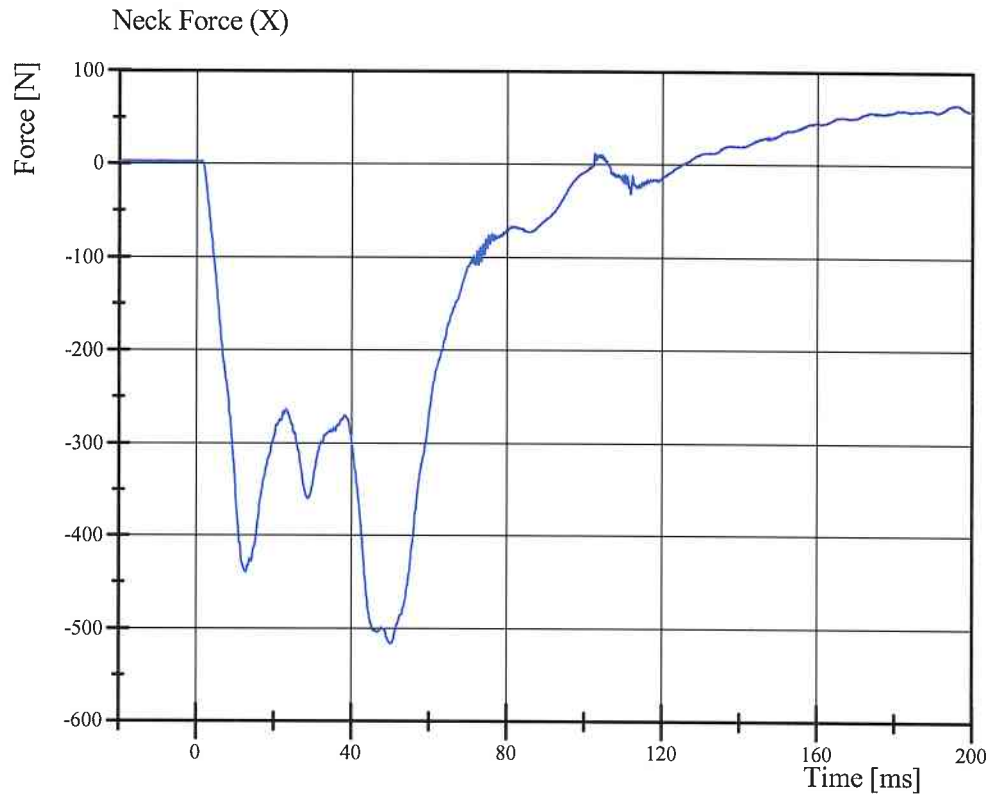
Filter Class: CFC_60
Max: 72.5 ° at 198.7 ms
Min: -74.9 ° at 53.2 ms

Transportation Research Center Inc.

Neck Flexion

HIII 3YO Serial No. 142 Certification No. 3-1

Test Date: 12/27/2013



Transportation Research Center Inc.

Neck Extension

HIII 3YO Serial No. 142 Certification No. 3-1

Test Date: 12/27/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Impact Velocity	(-3.55) - (-3.75) m/s	-3.722 m/s	Yes
Pendulum Integrated Velocity Change at 6 ms	1.0 - 1.4 m/s	1.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.9 - 2.5 m/s	2.25 m/s	Yes
Pendulum Integrated Velocity Change at 14 ms	2.8 - 3.5 m/s	3.22 m/s	Yes
Total Headform D-Plane Rotation	83 - 93 °	88.8 °	Yes
Peak Neck Occipital Condyles Moment	(-43.7) - (-53.3) Nm	-44.62 Nm	Yes
Neck Occipital Condyles Moment Decay to 10 Nm	60 - 80 ms	70.0 ms	Yes

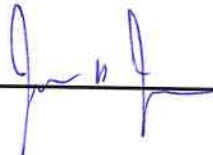
Test meets specifications.

Comments:

Technician



Approved



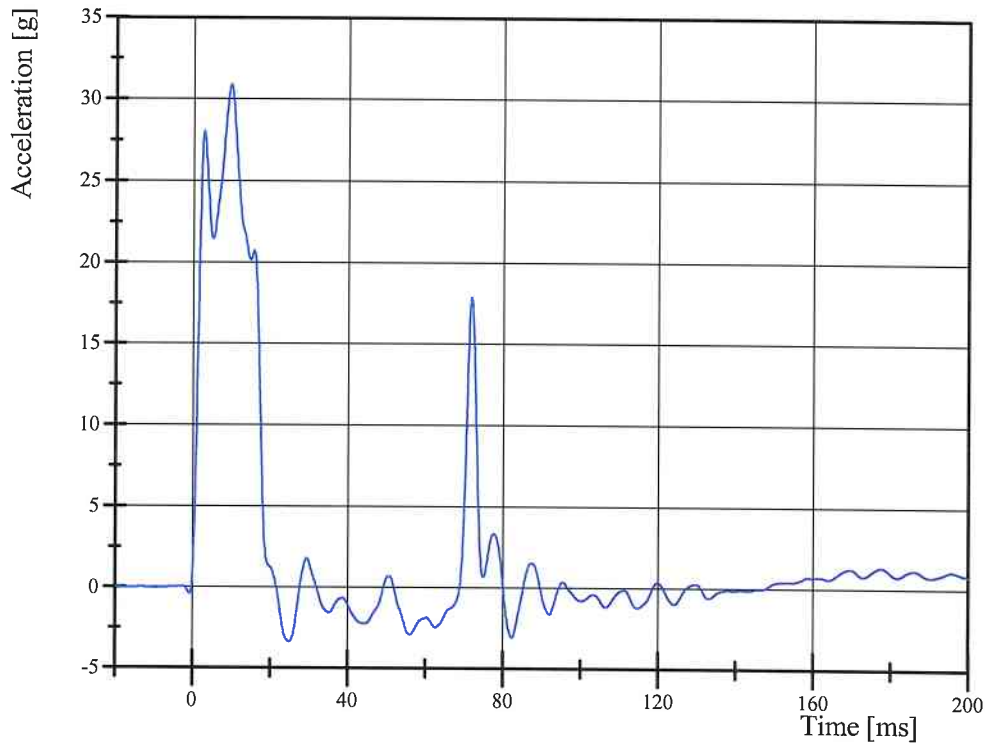
Transportation Research Center Inc.

Neck Extension

HIII 3YO Serial No. 142 Certification No. 3-1

Test Date: 12/27/2013

Pendulum Acceleration

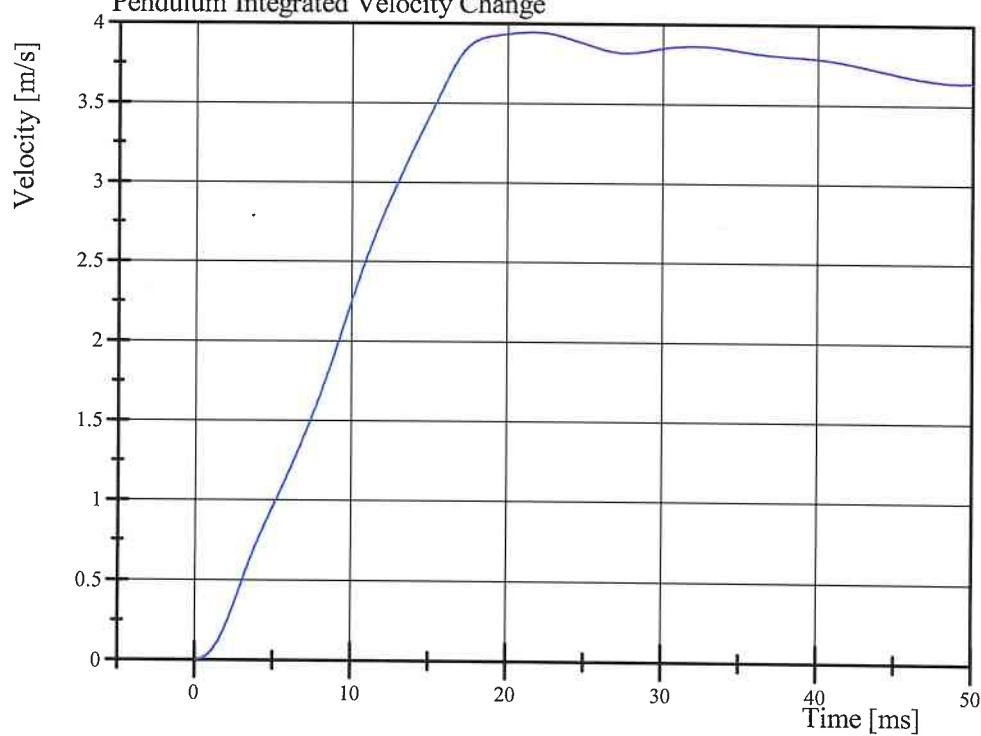


Filter Class: CFC_180

Max: 30.9 g at 9.7 ms

Min: -3.3 g at 25.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 3.9 m/s at 21.6 ms

Min: 0.0 m/s at 0.0 ms

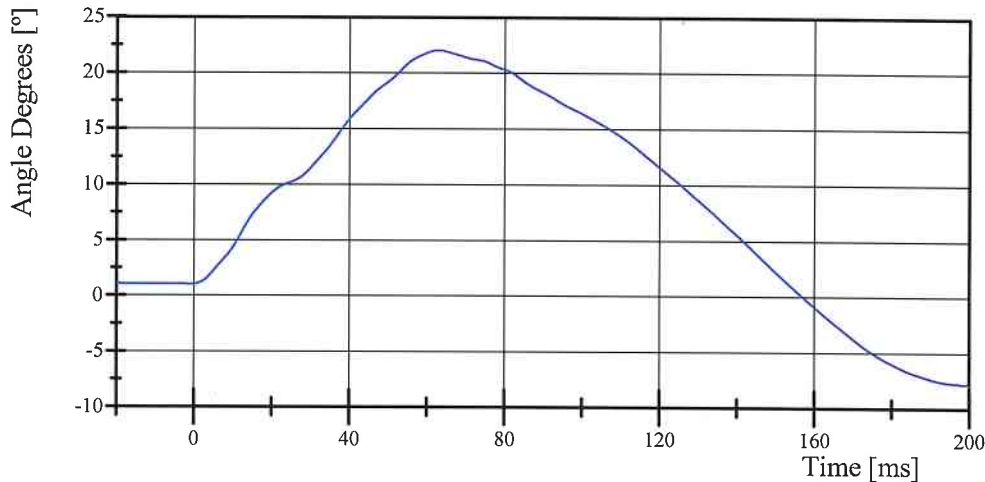
Transportation Research Center Inc.

Neck Extension

HIH 3YO Serial No. 142 Certification No. 3-1

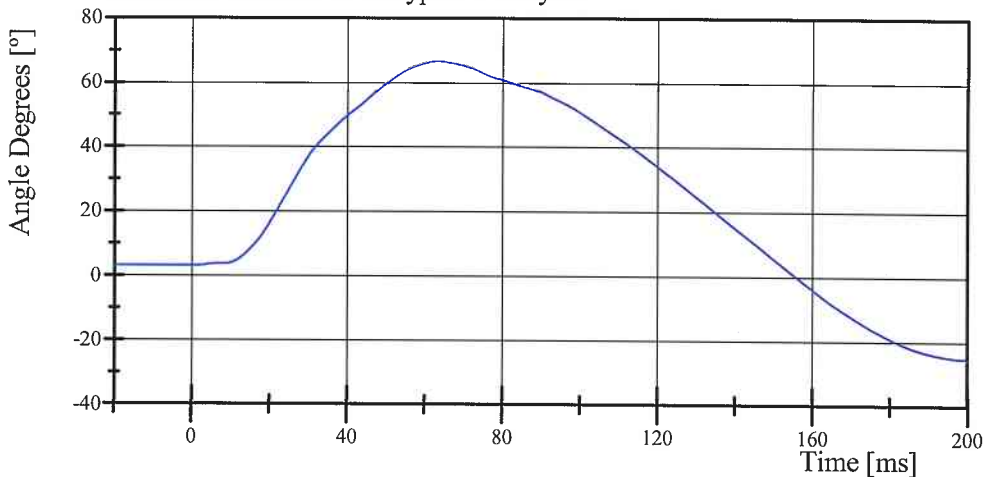
Test Date: 12/27/2013

Pot Rotation at the Base of Neck



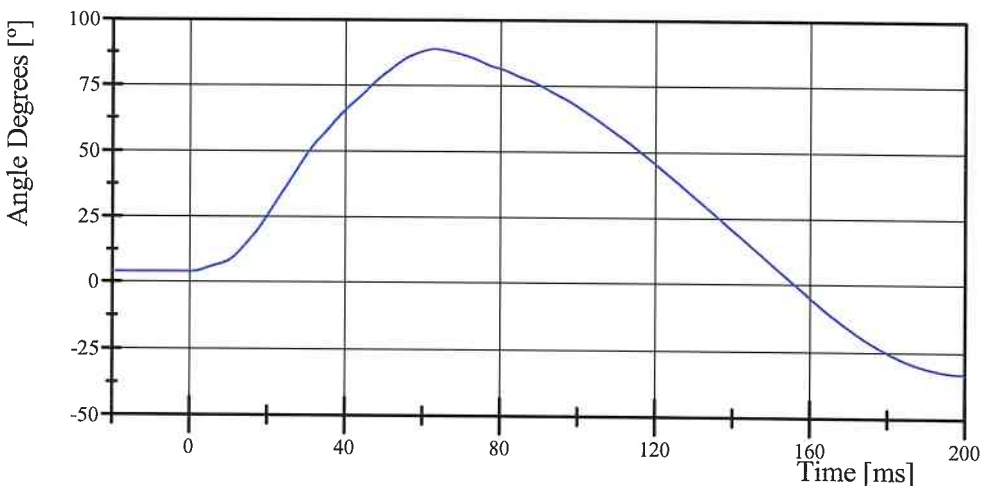
Filter Class: CFC_60
Max: 22.0 ° at 62.8 ms
Min: -7.9 ° at 200.0 ms

Headform Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 66.8 ° at 63.1 ms
Min: -25.4 ° at 200.0 ms

Total Headform D-Plane Rotation



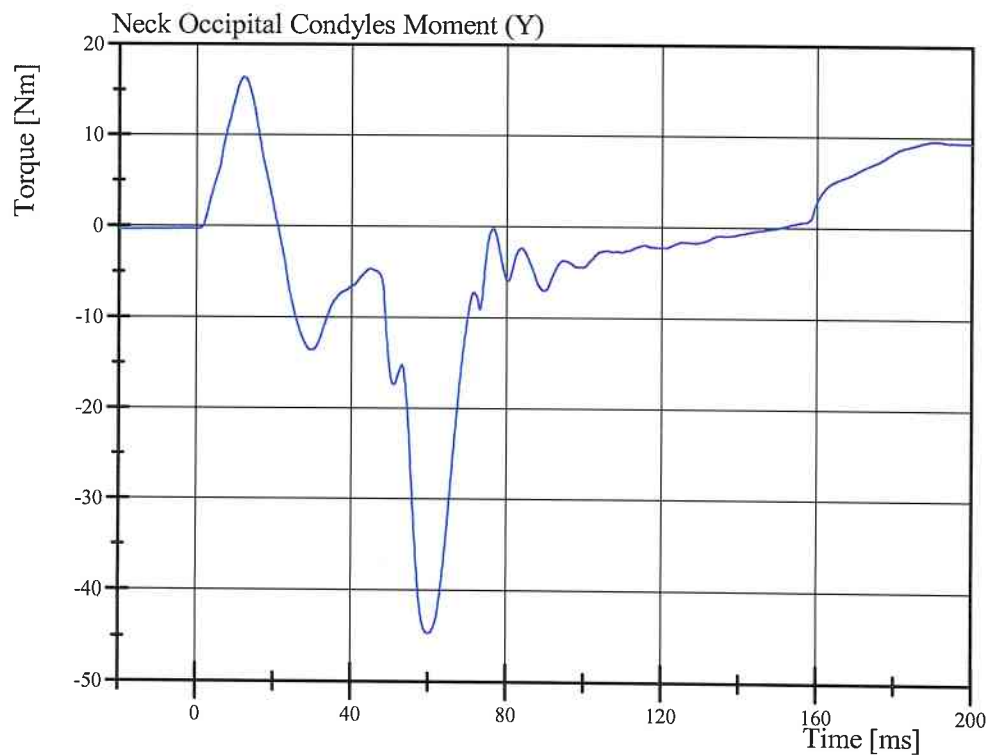
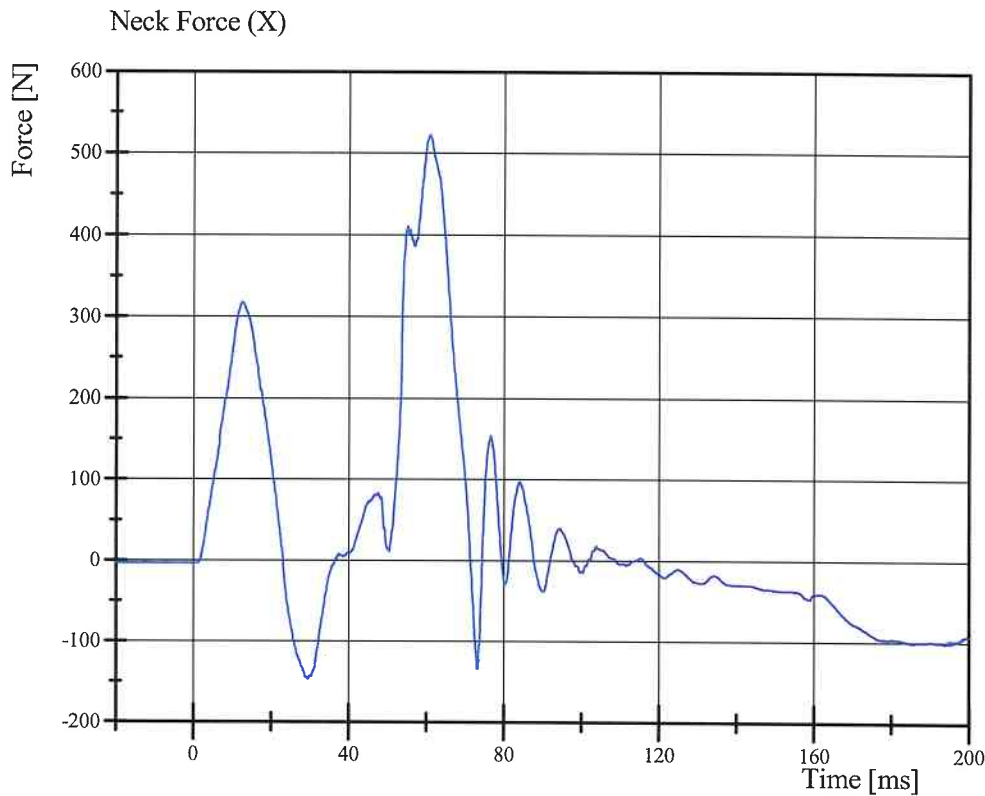
Filter Class: CFC_60
Max: 88.8 ° at 63.0 ms
Min: -33.3 ° at 200.0 ms

Transportation Research Center Inc.

Neck Extension

HIH 3YO Serial No. 142 Certification No. 3-1

Test Date: 12/27/2013



Transportation Research Center Inc.

Front Thorax

HHH 3YO Serial No. 142 Certification No. 3-3

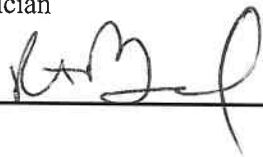
Test Date: 12/27/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Probe Velocity	5.9 - 6.1 m/s	6.09 m/s	Yes
Probe Force Peak Between 32.0 mm and 38.0 mm Chest Deflection	(-680) - (-810) N	-762.9 N	Yes
Probe Force Peak Between 12.5 mm and 32.0 mm Chest Deflection	$\geq$ (-910) N	-760.2 N	Yes
Maximum Chest Compression	(-32) - (-38) mm	-34.3 mm	Yes
Internal Hysteresis	65 - 85 %	71.8 %	Yes

Test meets specifications.

Comments:

Technician



Approved



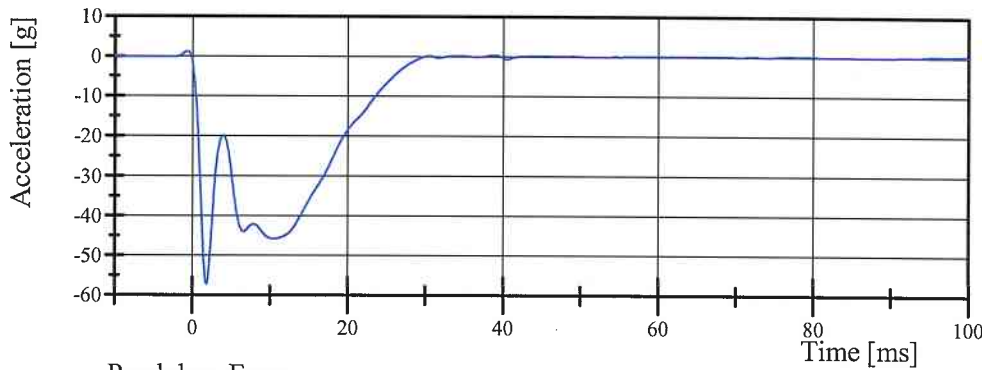
Transportation Research Center Inc.

Front Thorax

HIH 3YO Serial No. 142 Certification No. 3-3

Test Date: 12/27/2013

Pendulum Acceleration

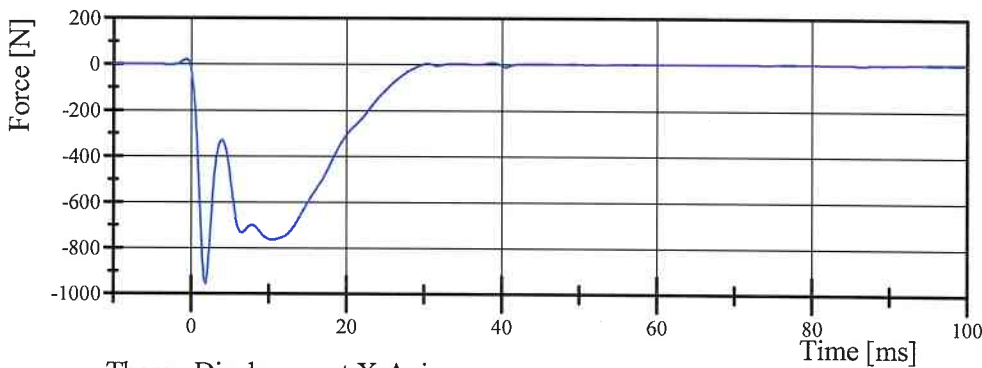


Filter Class: CFC_180

Max: 1.3 g at -0.6 ms

Min: -57.4 g at 1.8 ms

Pendulum Force

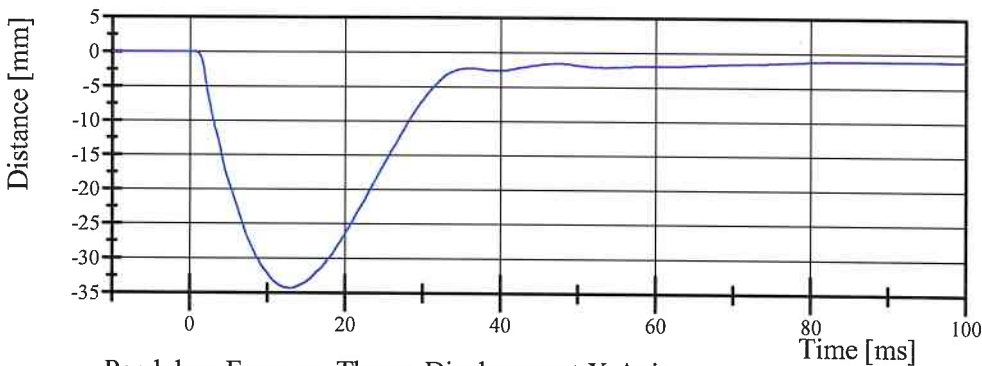


Filter Class: CFC_180

Max: 21.9 N at -0.6 ms

Min: -956.4 N at 1.8 ms

Thorax Displacement X-Axis

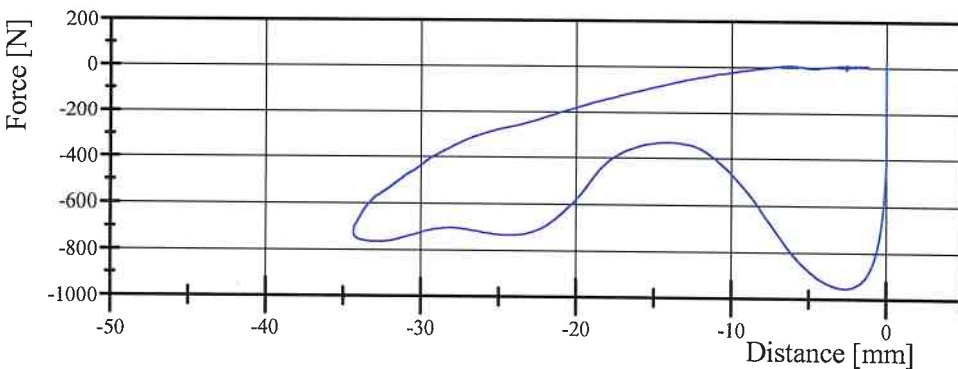


Filter Class: CFC_600

Max: 0.0 mm at 0.7 ms

Min: -34.3 mm at 12.9 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180

Max: 21.9 N at 0.0 mm

Min: -956.4 N at -2.6 mm

Transportation Research Center Inc.

Hybrid III 3-Year Old Child Torso Flexion



Serial Number: 142

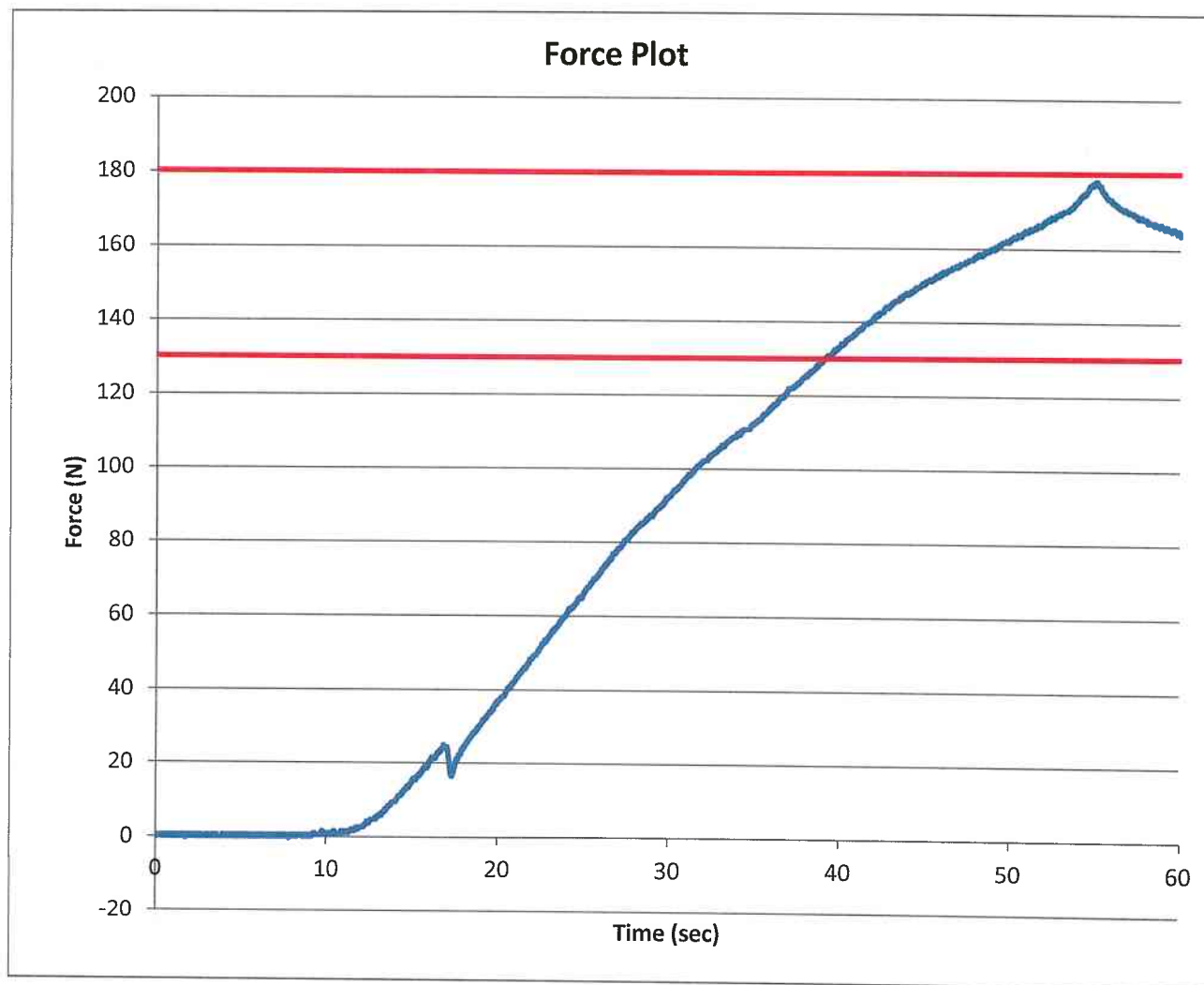
Date: 12/26/2013

Test Number: 1

Time: 14:56

Comments:

TEST PARAMETER	SPECIFICATION		TEST RESULTS		
Temperature	18.9	- 25.6	21.1	°C	Pass
Humidity	10	- 70	39	%	Pass
Average Angular Velocity	0.5	- 1.5	0.9	deg/sec	Pass
Initial Angle	0	- 15	6.47	deg	Pass
Peak Force at 45.26°	130	- 180	178.14	N	Pass
Final Angle	-10	- 10	3.33	deg	Pass



Technician

A handwritten signature in blue ink, likely reading 'R.B. P.', is written over a horizontal line.

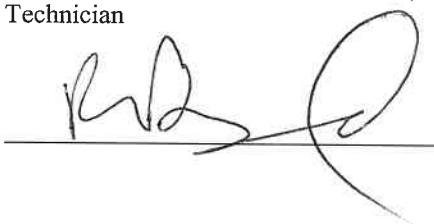
Approved

A handwritten signature in blue ink is written over a horizontal line.

Transportation Research Center Inc.
572P HIII 3 Year Old Dummy
External Dimensions
Serial No. 142 Calibration No. 03

Test Parameter	Dimension	Specification	Results	Pass
Total Sitting Height	A	538.5 - 553.7 mm	543 mm	Yes
Shoulder Pivot Height	B	307.4 - 322.6 mm	315 mm	Yes
Hip Pivot Height	C	34.3 - 44.5 mm	43 mm	Yes
Hip Pivot from Backline	D	56.9 - 67.1 mm	65 mm	Yes
Shoulder Pivot from Backline	E	60.9 - 71.1 mm	66 mm	Yes
Thigh Clearance	F	81.0 - 91.2 mm	85 mm	Yes
Back of Elbow to Finger Tip	G	247.4 - 262.6 mm	252 mm	Yes
Head Back to Backline	H	48.2 - 58.4 mm	52 mm	Yes
Shoulder to Elbow Length	I	185.4 - 207.6 mm	196 mm	Yes
Elbow Rest Height	J	133.6 - 148.8 mm	140 mm	Yes
Buttock to Knee Length	K	284.8 - 300.0 mm	293 mm	Yes
Popliteal Height	L	218.5 - 233.7 mm	226 mm	Yes
Knee to Floor Height	M	241.6 - 256.8 mm	251 mm	Yes
Buttock Popliteal Length	N	218.0 - 233.2 mm	227 mm	Yes
Chest Depth with Jacket	O	138.5 - 153.7 mm	147 mm	Yes
Foot Length	P	137.6 - 147.8 mm	141 mm	Yes
Stature	Q	932.2 - 957.6 mm	945 mm	Yes
Buttock to Knee Pivot Length	R	251.4 - 261.6 mm	255 mm	Yes
Head Breadth	S	128.3 - 143.5 mm	135 mm	Yes
Head Depth	T	167.4 - 182.6 mm	173 mm	Yes
Hip Breadth	U	200.7 - 215.9 mm	209 mm	Yes
Shoulder Breadth	V	236.5 - 251.7 mm	248 mm	Yes
Foot Breadth	W	53.6 - 63.8 mm	60 mm	Yes
Head Circumference	X	500.4 - 515.6 mm	505 mm	Yes
Chest Circumference with Jacket	Y	527.1 - 552.5 mm	538 mm	Yes
Waist Circumference	Z	527.1 - 552.5 mm	540 mm	Yes
Reference Location for Chest Circumference	AA	248.9 - 259.1 mm	255 mm	Yes
Reference Location for Waist Circumference	BB	160.0 - 170.2 mm	165 mm	Yes

Technician



Approved




Test Vehicle: 2014 Jeep Compass 5-Door SUV
Test Program: Occupant Out-Of-Position

NHTSA Number: M20140306TWG2
Test Date: February 13, 2014

APPENDIX D
INSTRUMENTATION CALIBRATION DATA

TABLE 1 - DUMMY INSTRUMENTATION – HYBRID III 3-YEAR-OLD				
		HYBRID III 3-Year-Old S/N: 142		
		Serial Number	Manufacturer	Calibration Date
Primary Head Accelerometers	X	12105	Endevco	02/FEB/2014
	Y	12106	Endevco	02/FEB/2014
	Z	12122	Endevco	02/FEB/2014
Neck Load Cells	Upper	249	Humanetics	21/NOV/2013
	Lower	119	Humanetics	21/NOV/2013