

REPORT NUMBER: 201UI-CAL-07-05

**SAFETY COMPLIANCE TESTING FOR FMVSS 201
OCCUPANT PROTECTION IN INTERIOR IMPACT
UPPER INTERIOR HEAD IMPACT PROTECTION**

**GENERAL MOTORS DE MEXICO
2007 CHEVROLET HHR**

NHTSA NUMBER: C70107

CALSPAN TEST NUMBER: 8826-FMH-05

CALSPAN
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



Test Date: July 25, 2007

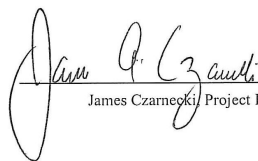
FINAL REPORT

PREPARED FOR:

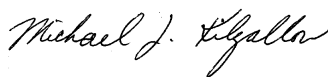
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
Mail Code: NVS-220, West Building 4th Floor
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Washington, DC 20590

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16. <i>Abstract</i> Compliance tests were conducted on the subject vehicle, a 2007 Chevrolet HHR, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure TP-201U-01 for determination of FMVSS 201 compliance. Test failures identified were as follows in the table below:					
Target Point	Horizontal	Vertical	Velocity	HIC	HICd
AP1	136°	47°	23.42	1294.8	1143.3
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SECTION 1

PURPOSE AND TEST PROCEDURE

This head impact compliance test is part of the FMVSS 201 Upper Interior Head Impact Protection Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-04-C-01027. The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2007 Chevrolet HHR, NHTSA No. C70107, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact. The compliance test was conducted in accordance with the OVSC Laboratory Test Procedure No. TP-201U-01 dated April_03, 1998.

SECTION 2

SUMMARY OF UPPER INTERIOR HEAD IMPACTS

A 2007 Chevrolet HHR , NHTSA No.C70107 , was tested at various upper interior locations by a 4.54 kg 50th percentile headform. A total of ten (10) impacts were performed in this test series. The target area impacts were chosen by the NHTSA Contracting Officer's Technical Representative (COTR). A summary of test results can be found on Data Sheet 2-1, Summary of Upper Interior Head Impact Tests. The ten (10) areas chosen for testing were:

OP1	URRSR	BP4	BP1	SR2A
AP3	AP1	UROP	BP2	URBP

The selected impact areas on the test vehicle appeared to comply with the performance requirements of FMVSS 201.

Five Free Motion Headforms (FMH) were used in this test series. All five FMH's were calibrated prior to and after the test series. Calibration information are included in Appendix B. Each FMH weighed 4.54 ± 0.5 kg and had an orthogonal tri-axis accelerometer pack mounted at the headform's center of gravity (c.g.).

A total of three (3) channels of data for each test were recorded on a Keyser-Threde data acquisition system. Data plots, along with still images, can be found in Section 3, Summary of Test Results and Data Plots.

To document each target area impact test, a Weinberger high-speed video camera was placed at an appropriate location to record the headform contact with the selected target area.

DATA SHEET 2-1

SUMMARY OF UPPER INTERIOR HEAD IMPACT TESTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

TARGET CODE	Target Coordinates						Approach Angles (degrees)		Velocity (kph)	FMH HIC	HIC(d)
	Driver Side			Passenger Side							
	X(mm)	Y(mm)	Z(mm)	X(mm)	Y(mm)	Z(mm)	Horizontal	Vertical			
AP1	2704.928	-536.036	1267.159	2706.170	540.410	1271.105	136°	47°	23.42	1294.8	1143.3
AP2	2567.419	-563.837	1178.871	2568.705	565.902	1182.715	-	-	-	-	-
AP3	2514.744	-578.218	1135.321	2513.339	579.134	1139.703	145°	31°	23.66	750.3	732.5
BP1	3295.979	-474.701	1379.712	3292.058	475.448	1380.409	90°	15°	23.51	738.8	723.8
BP2	3280.205	-549.898	1166.592	3281.491	550.216	1169.556	270°	0°	23.36	606.8	624.2
BP3	3259.492	-556.660	1186.037	3259.285	558.177	1189.129	-	-	-	-	-
BP4	3350.817	-611.766	1089.825	3346.129	607.398	1092.414	122°	-10°	23.76	425.4	487.3
FH1	2629.227	-445.889	1323.077	2635.125	454.423	1327.697	-	-	-	-	-
FH2	2599.862	-299.191	1335.102	2602.754	310.910	1340.278	-	-	-	-	-
OP1	4160.676	-543.177	1244.227	4168.151	538.897	1250.090	90°	0°	23.7	741.1	725.5
OP2	4153.743	-552.122	1218.125	4146.701	544.554	1228.142	-	-	-	-	-
RH	4722.717	-330.016	1368.031	4720.158	330.863	1366.610	-	-	-	-	-
RP1	4719.473	-505.212	1312.970	4721.127	508.452	1309.792	-	-	-	-	-
RP2	4772.135	-525.074	1163.480	4770.673	528.618	1164.054	-	-	-	-	-
SR1	2854.996	-499.489	1323.234	2852.755	504.516	1326.154	-	-	-	-	-
SR2A	3004.773	-494.198	1341.755	3003.964	495.508	1344.254	90°	31°	23.69	502	545.1
SR2B	2995.252	-495.198	1340.847	2992.874	496.027	1343.591	-	-	-	-	-
SR3	3446.771	-486.041	1376.532	3443.711	486.197	1376.513	-	-	-	-	-
URAP	2917.562	-370.300	1415.374	2914.081	383.764	1415.116	-	-	-	-	-
URBP	3298.155	-375.380	1421.477	3283.759	377.585	1421.778	270°	48°	23.49	525.5	562.9
UROP	4124.840	-377.535	1447.524	4137.332	387.899	1441.063	270°	42°	23.45	815.3	781.5
URRSR	3824.881	-379.742	1469.231	3822.453	374.211	1471.897	90°	33°	23.41	479.2	527.9

*HIC(d)=0.75446(Free Motion Headform HIC)+166.4

DATA SHEET 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:									
Year/Make/Model/Body Style:				2007 Chevrolet HHR					
VIN:				3GNDA13D97S617345					
Month & Year of Manufacture:				03/07(SEE CERTIFICATION LABEL)					
Vehicle Body Color:				Red					
Engine Data:	4	Cylinders;	-	CID;	2.2	Liters;	-	cc	
Engine Placement:	x		Longitudinal;	or		-		Lateral	
Transmission:	5	Speed;	x	Manual;	-	Automatic;	-	Overdrive	
Final Drive:	-	Rear Wheel Drive;	x	Front Wheel Drive;	-	Four Wheel Drive			
Odometer Reading:	45		km						
Options:	x	A/C;	x	Power Steering;	x	Pwr.Brakes;	x	Pwr. Windows	
Interior Trim Information :									
1. Normal roof									
2. Adjustable seat belt anchorage on B-pillar. Non-adjustable seat belt anchorage on Other Pillar.									
3. No side rail grab handles on vehicle.									

DATA FROM TIRE PLACARD:									
Tire Pressure (at capacity);				210		kPa FRONT			
				210		kPa REAR			
Recommended Tire Size:				P215/55R16					
Tires on Test Vehicle:		P215/55R16		Manufacturer:					
Vehicle Capacity Data:									
Number of Occupants:	2	Front;	3	Rear;	-	3rd Seat;	5	Total	
Type of Front Seats:	x	Bucket;	-	Bench;	-	Split Bench			
Type of Front Seat Back:	-	Fixed;	x	Adjustable with	x	Lever or	-	Knob	
Vehicle Capacity Weight (VCW)=				513		kg (A)			
No. of Occupants x 68 kg. =				340		kg (B)			
Rated Cargo/Luggage Weight (RCLW) =				173		kg (A-B) Max. RCLW = 136 kg.			

DATA SHEET 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:					
Left Front	=	389	kg	Left Rear	= 306.5 kg
Right Front	=	402.5	kg	Right Rear	= 294.5 kg
TOTAL FRONT	=	791.5	kg	TOTAL REAR	= 601 kg
% of Total Weight	=	56.9	%	% of Total Weight	= 43.1 %
TOTAL WEIGHT	=	1392.5		kg	

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:		
Total Test Vehicle Delivered Weight=	1392.5	kg (A)
+ Rated Cargo/Luggage Weight =	136	kg (B)
TEST VEHICLE TARGET WEIGHT =	1528.5	kg (A+B)

WEIGHT OF TEST VEHICLE (FULLY LOADED):					
Left Front	=	385.5	kg	Left Rear	= 374.5 kg
Right Front	=	399	kg	Right Rear	= 364 kg
TOTAL FRONT	=	784.5	kg	TOTAL REAR	= 738.5 kg
% of Total Weight	=	51.5	%	% of Total Weight	= 48.5 %
TOTAL TEST WEIGHT	=	1523			
Weight of vehicle secured in test vehicles cargo area	=	131		kg	

TEST VEHICLE ATTITUDE (all dimensions in millimeters):				
AS DELIVERED:	Left Front	727	Left Rear	750
	Right Front	730	Right Rear	751
FULLY LOADED:	Left Front	725	Left Rear	716
	Right Front	728	Right Rear	720
Test Vehicle Wheelbase:	2636		millimeters	

TEST VEHICLE PITCH AND ROLL ANGLES:				
AS DELIVERED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑0.2↓	Front Bumper	↓0.1↑
	Right Door Sill	↓0.5↑	Rear Bumper	↓0.3↑
FULLY LOADED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↓0.4↑	Front Bumper	↓0.1↑
	Right Door Sill	↑0.2↓	Rear Bumper	↓0.2↑
AS TESTED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑0.1↓	Front Bumper	↓0.1↑
	Right Door Sill	↓0.3↑	Rear Bumper	↓0.3↑

DATA SHEET 2-3

APPROACH ANGLE LIMITS

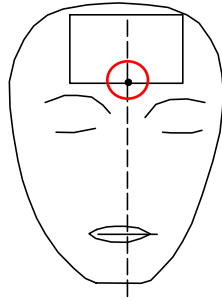
Left Side					Right Side				
Target Code	Horizontal Angles (deg.)		Vertical Angles (deg.)		Target Code	Horizontal Angles (deg.)		Vertical Angles (deg.)	
	Minimum	Maximum	Minimum	Maximum		Minimum	Maximum	Minimum	Maximum
AP1	204	249	-5	47	AP1	114	156	-5	47
AP2	204	249	-5	Not Available	AP2	114	156	-5	Not Available
AP3	204	249	-5	31	AP3	114	156	-5	31
BP1	201	272	-10	15	BP1	87	159	-10	15
BP2	ANY		0	0	BP2	ANY		0	0
BP3	201	272	-10	0	BP3	87	159	-10	0
BP4	201	272	-10	-10	BP4	87	159	-10	-10
OP1	ANY		0	0	OP1	ANY		0	0
OP2	270		-10	0	OP2	90		-10	0
RP1	270	345	-10	Excluded per S6.3(b)	RP1	15	90	-10	Excluded per S6.3(b)
RP2	270	345	-10	Excluded per S6.3(b)	RP2	15	90	-10	Excluded per S6.3(b)
FH1	180		0	50	FH1	180		0	50
FH2	180		0	50	FH2	180		0	50
RH	360		0	Excluded per S6.3(b)	RH	0		0	Excluded per S6.3(b)
SR1	270		0	26	SR1	90		0	26
SR2A	270		0	31	SR2A	90		0	31
SR2B	270		0	31	SR2B	90		0	31
SR3F	270		0	32	SR3F	90		0	32
SR3R	270		0	32	SR3R	90		0	32
URAP	ANY		0	50	URAP	ANY		0	50
URBP	ANY		0	48	URBP	ANY		0	48
UROP	ANY		0	42	UROP	ANY		0	42
URRSR	ANY		0	33	URRSR	ANY		0	33

Note : BP2 target location – Seat belt anchorage
 OP1 target location – Non-adjustable seat belt anchorage

DATA SHEET 2-4

SUMMARY TARGET IMPACT LOCATION ON FMH

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red



ã RIGHT SIDE OF FACE

TARGET	Distance Above Point 0 (mm)	Distance Over From Pt. O (mm)
OP1	0	2L
URRSR	54	1L
BP4	11	27L
BP1	35	3R
SR2A	15	6R
AP3	15	0
AP1	22	2L
UROP	31	0
BP2	0	0
URBP	35	9L

SECTION 3

SUMMARY OF TEST RESULTS AND DATA PLOTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	01
Test Date:	07/24/07
Target Location:	OTHER PILLAR
Target Code:	OP1
Horizontal Impact Angle:	90°
Vertical Impact Angle:	0°
Ambient Temperature:	20.5
Relative Humidity:	45.3
Time of Impact:	10:30
Headform Number:	0062

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	2	mm right	x mm left
On Centerline	0	mm up	



POST-IMPACT OP1 HEADFORM

Free Motion HIC	741.1
HIC(d)	725.5
Impact Velocity (kph)	23.7
HIC T1 (msec)	1.2
HIC T2 (msec)	9.0

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FMH Headform 0062

Location: OP1

Test Date: July 24, 2007

Work File: OP1

-----TEST RESULTS-----

Lab Temperature: 20.5 C

HICd: 725.5

Lab Humidity: 45.3 %

HIC (36ms): 741.1

Velocity at Impact: 23.70 KPH

t1: 1.2 msec

t2: 9.0 msec

Free Flight Distance: 222.46 mm

Duration: 7.8 msec

Maximum: 121.1 g

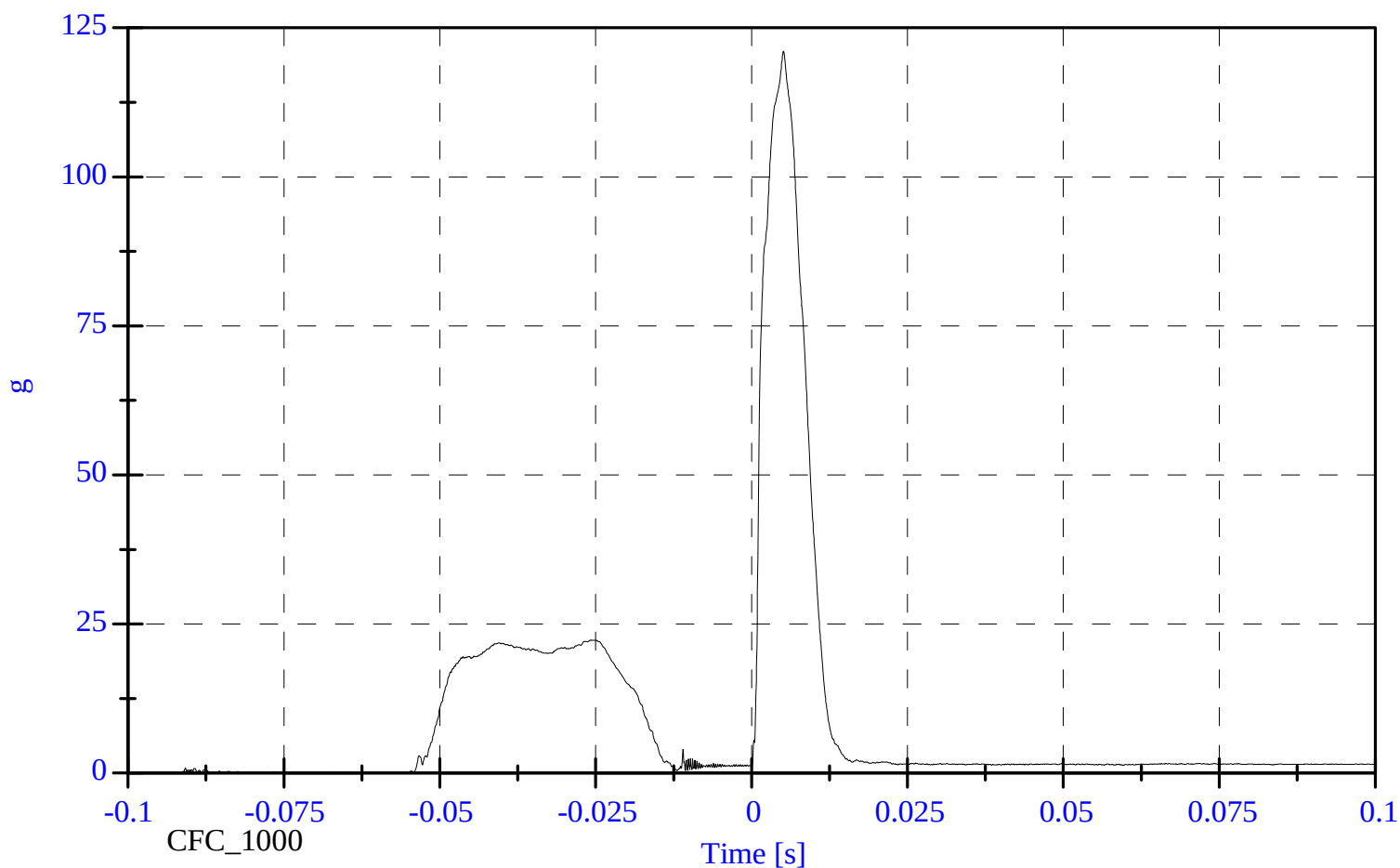
Average Acceleration: 8.6 g

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Max: 121.1 [g] at 0.005 [s]

Headform Resultant

Min: 0.0 [g] at -0.065 [s]



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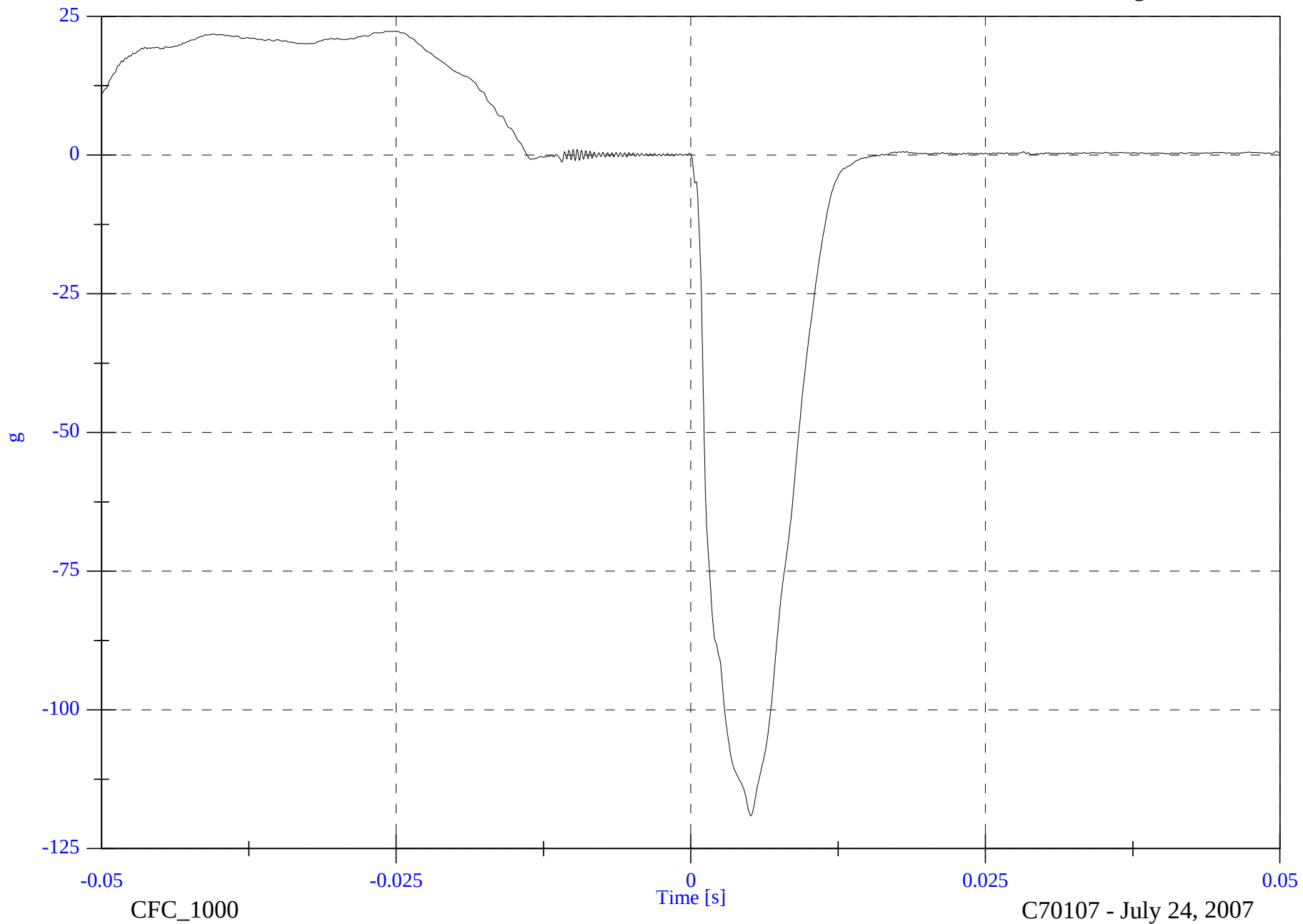
Headform X Acceleration

Max: 22.3 [g] at -0.026 [s]

Min: -119.1 [g] at 0.005 [s]

C70107 OP1 IMPACT PLOT #1

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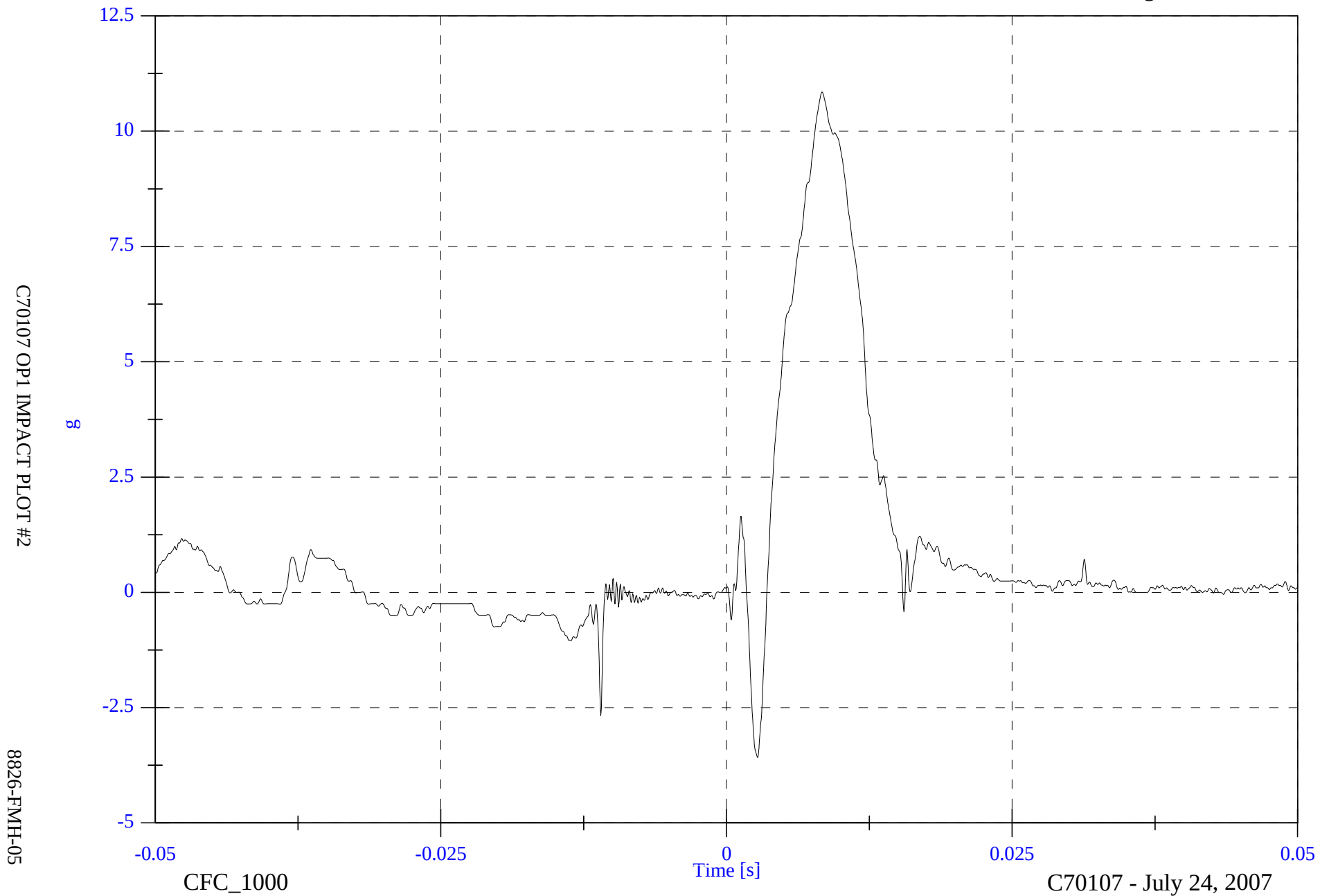


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Headform Y Acceleration

Max: 10.8 [g] at 0.008 [s]

Min: -3.6 [g] at 0.003 [s]



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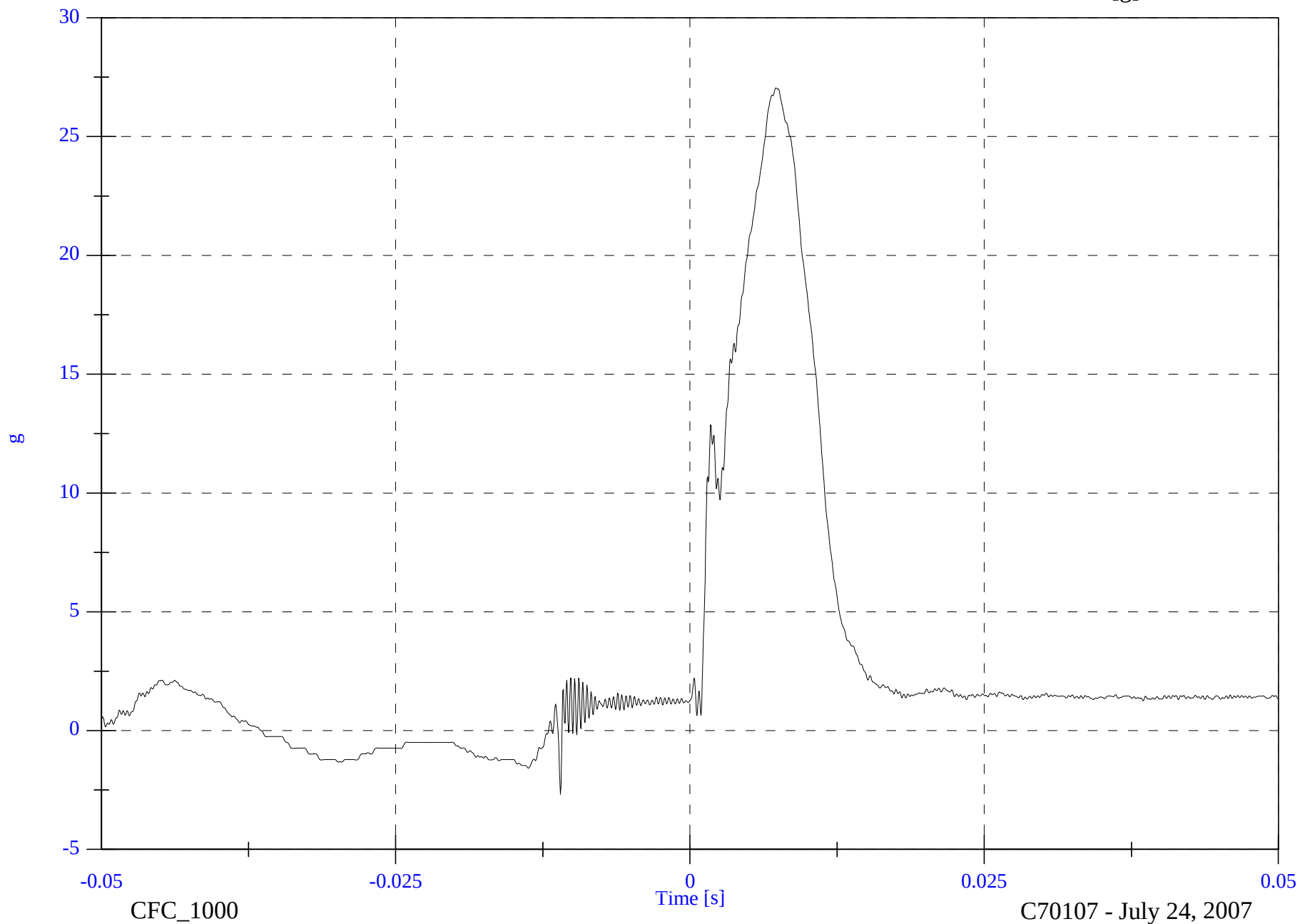
Headform Z Acceleration

Max: 27.1 [g] at 0.007 [s]

Min: -2.7 [g] at -0.011 [s]

C70107 OP1 IMPACT PLOT #3

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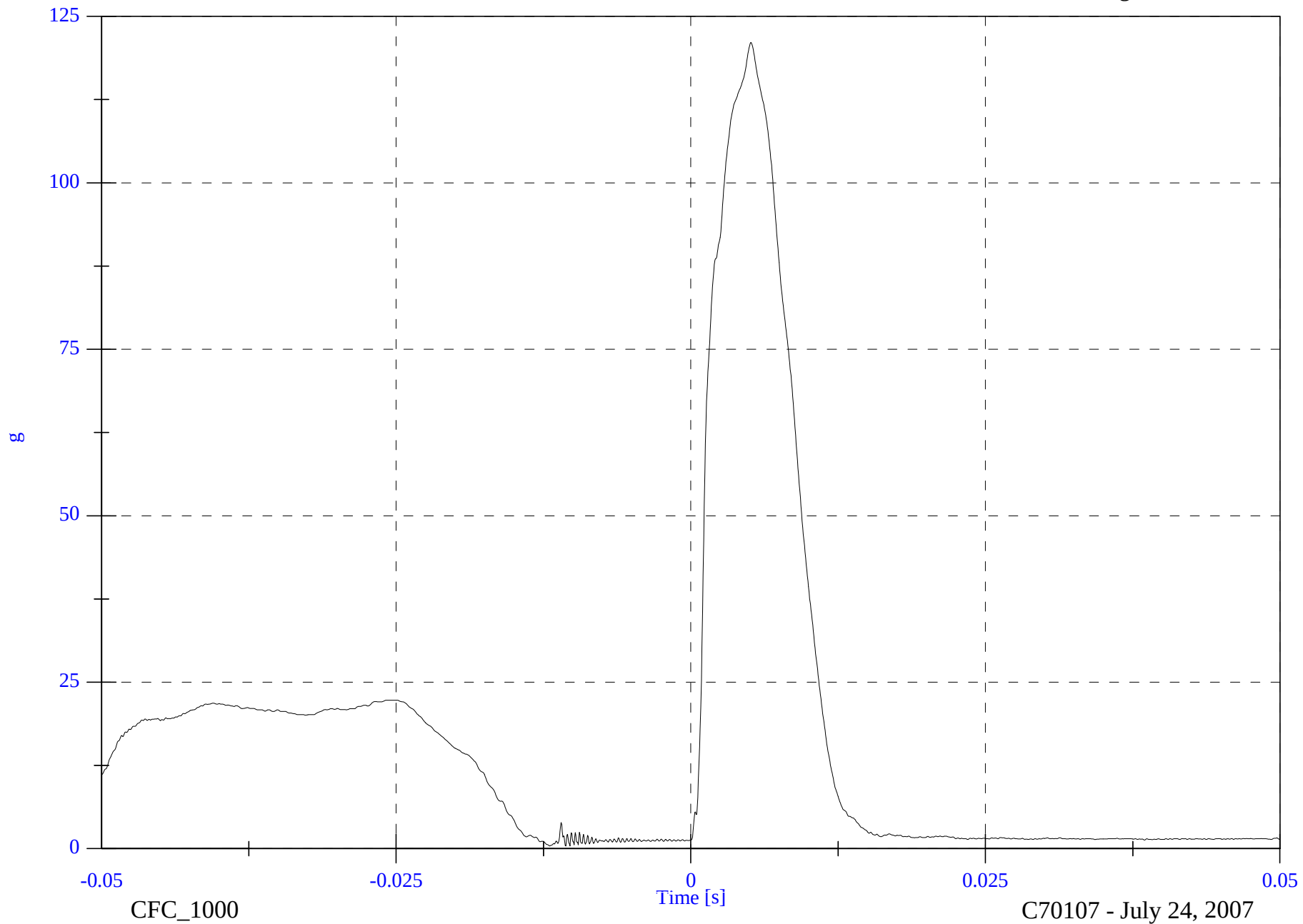
Headform Resultant

Max: 121.1 [g] at 0.005 [s]

Min: 0.4 [g] at -0.012 [s]

C70107 OP1 IMPACT PLOT #4

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR C70107

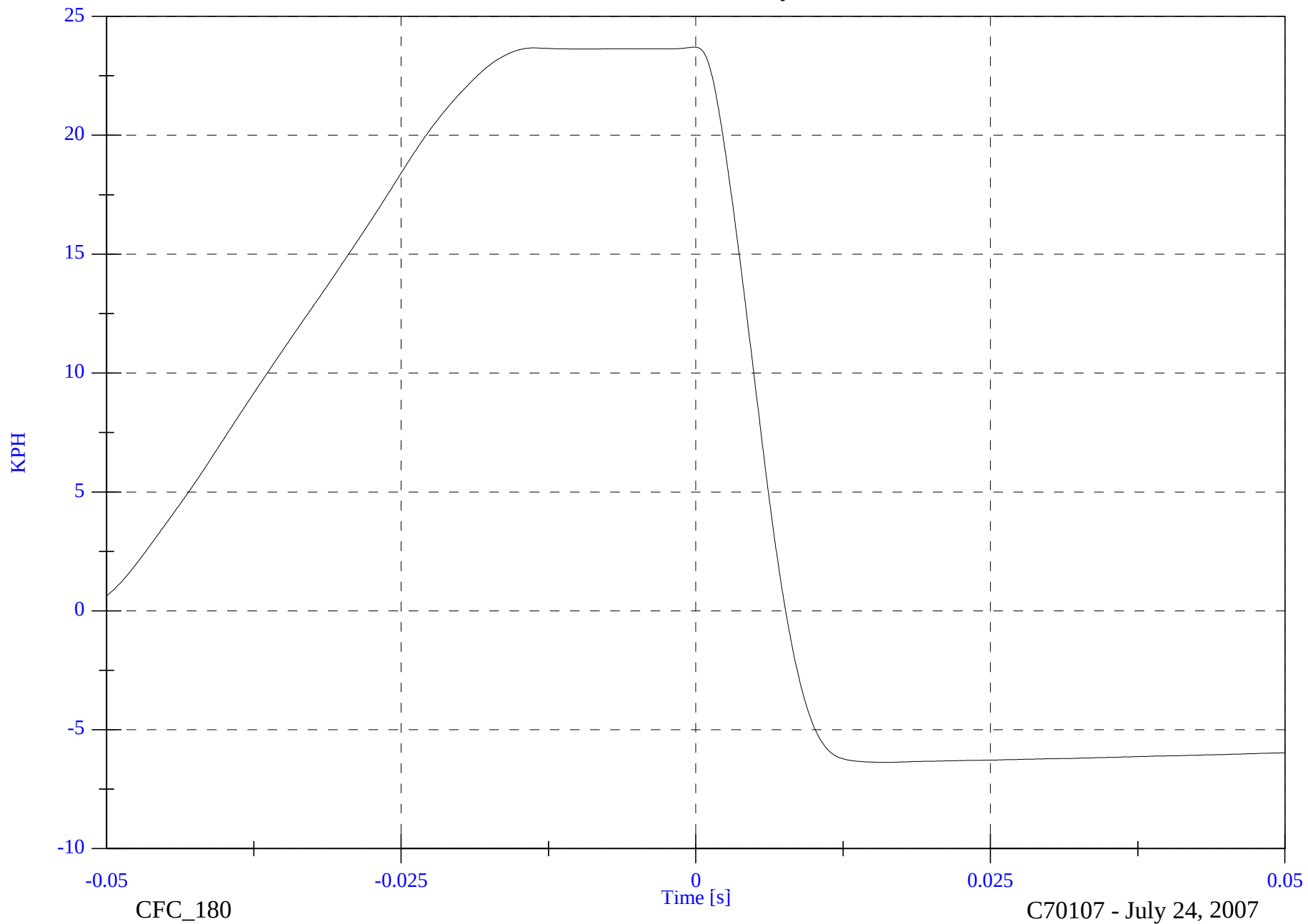
Headform Velocity

Max: 23.7 [KPH] at -0.000 [s]

Min: -6.4 [KPH] at 0.016 [s]

C70107 OP1 IMPACT PLOT #5

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PRE-IMPACT OP1



POST-IMPACT OP1

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	02
Test Date:	07/24/07
Target Location:	UPPER ROOF
Target Code:	URRSR
Horizontal Impact Angle:	90°
Vertical Impact Angle:	33°
Ambient Temperature:	20.6
Relative Humidity:	45.8
Time of Impact:	11:00
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	1	mm right	x mm left
On Centerline	54	mm up	



POST-IMPACT URRSR HEADFORM

Free Motion HIC	479.2
HIC(d)	527.9
Impact Velocity (kph)	23.41
HIC T1 (msec)	2.8
HIC T2 (msec)	13.7

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FMH Headform 0355

Location: URRSR

Test Date: July 24, 2007

Work File: URRSR

-----TEST RESULTS-----

Lab Temperature: 20.6 C

HICd: 527.9

Lab Humidity: 45.8 %

HIC (36ms): 479.2

Velocity at Impact: 23.41 KPH

t1: 2.8 msec

t2: 13.7 msec

Free Flight Distance: 225.95 mm

Duration: 10.9 msec

Maximum: 86.0 g

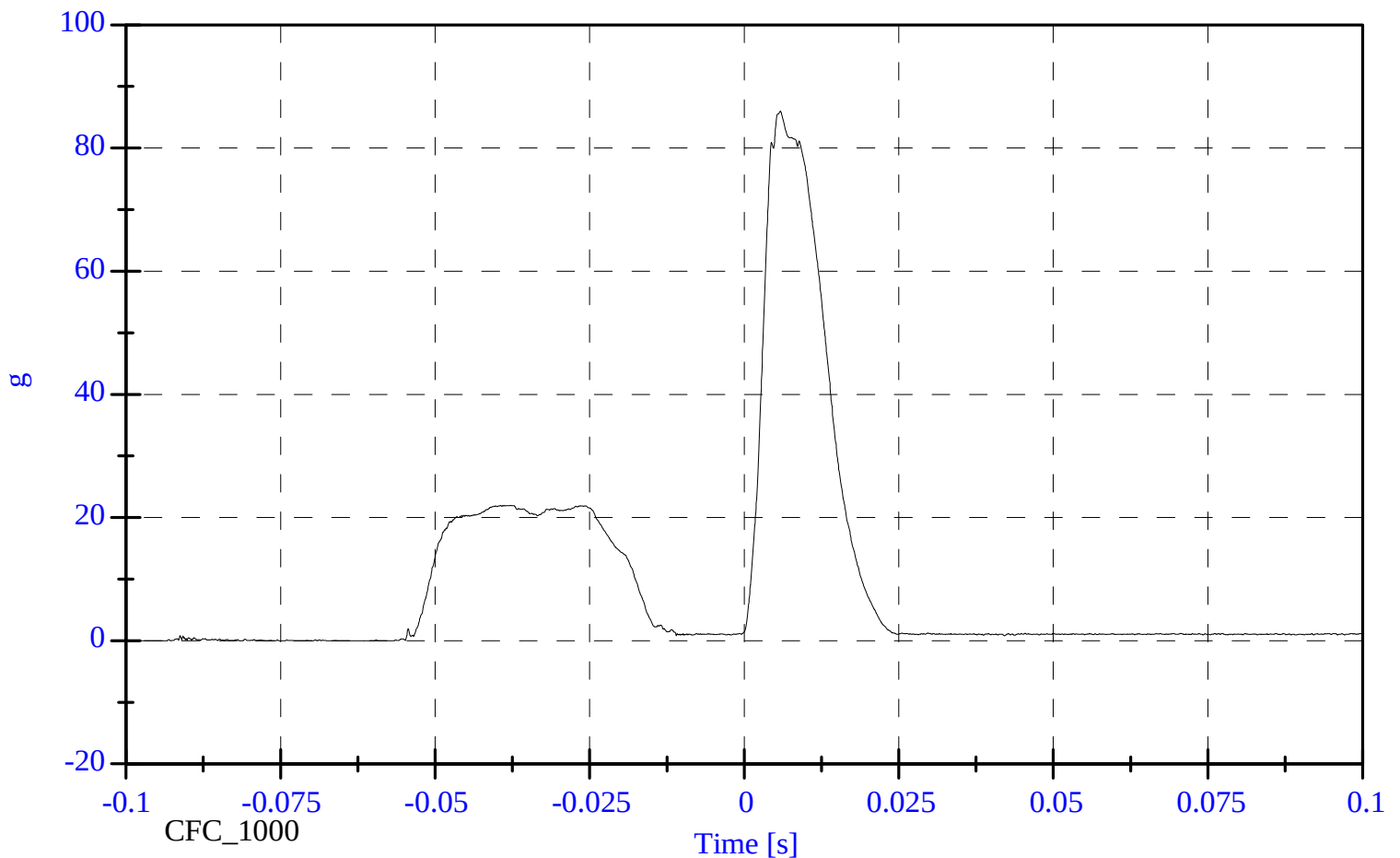
Average Acceleration: 8.8 g

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Max: 86.0 [g] at 0.006 [s]

Headform Resultant

Min: -0.0 [g] at -0.099 [s]



FMVSS 201U 2007 Chevrolet HHR C70107

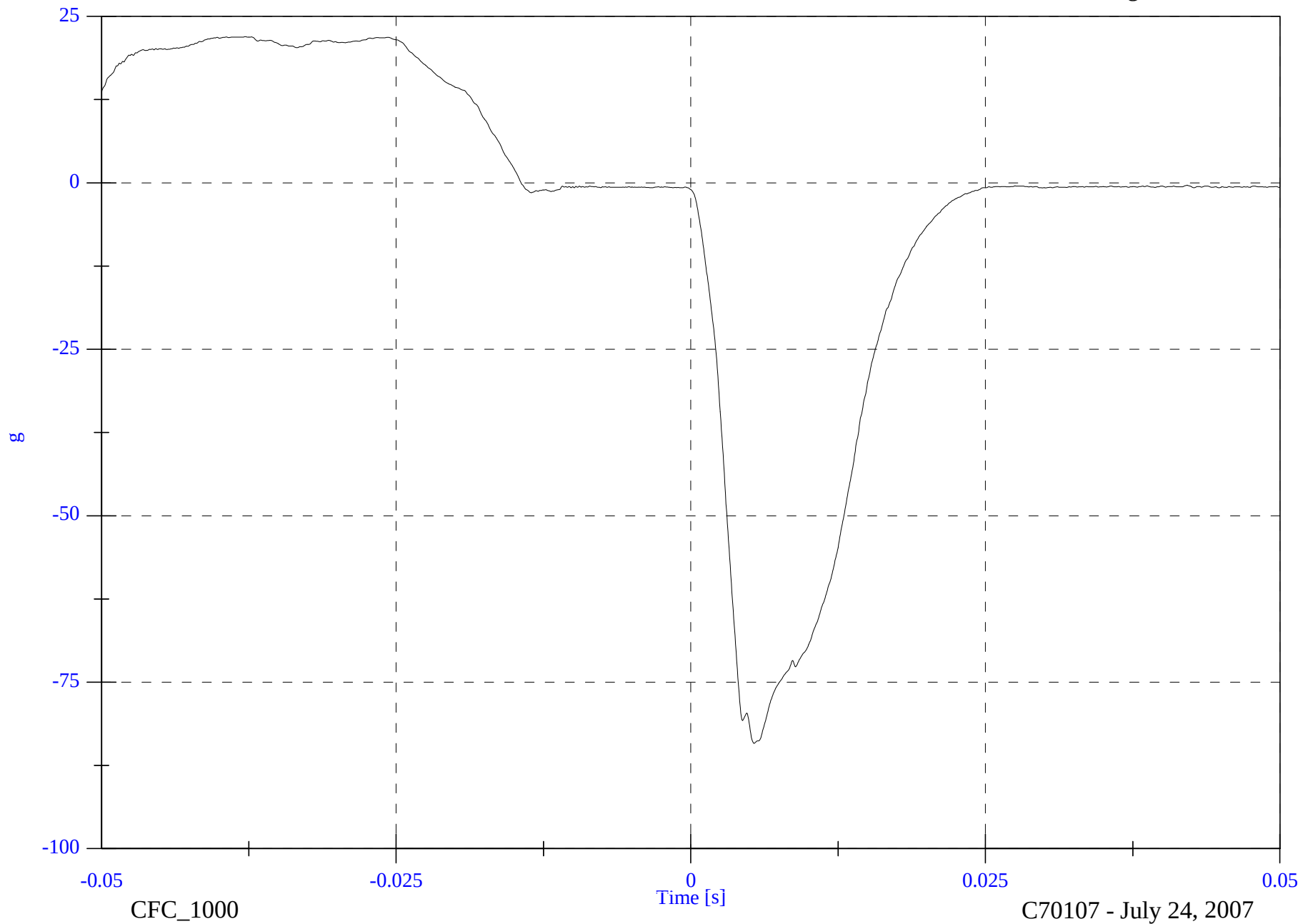
Headform X Acceleration

Max: 21.9 [g] at -0.038 [s]

Min: -84.2 [g] at 0.005 [s]

C70107 URRSR IMPACT PLOT # 1

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FMVSS 201U 2007 Chevrolet HHR C70107

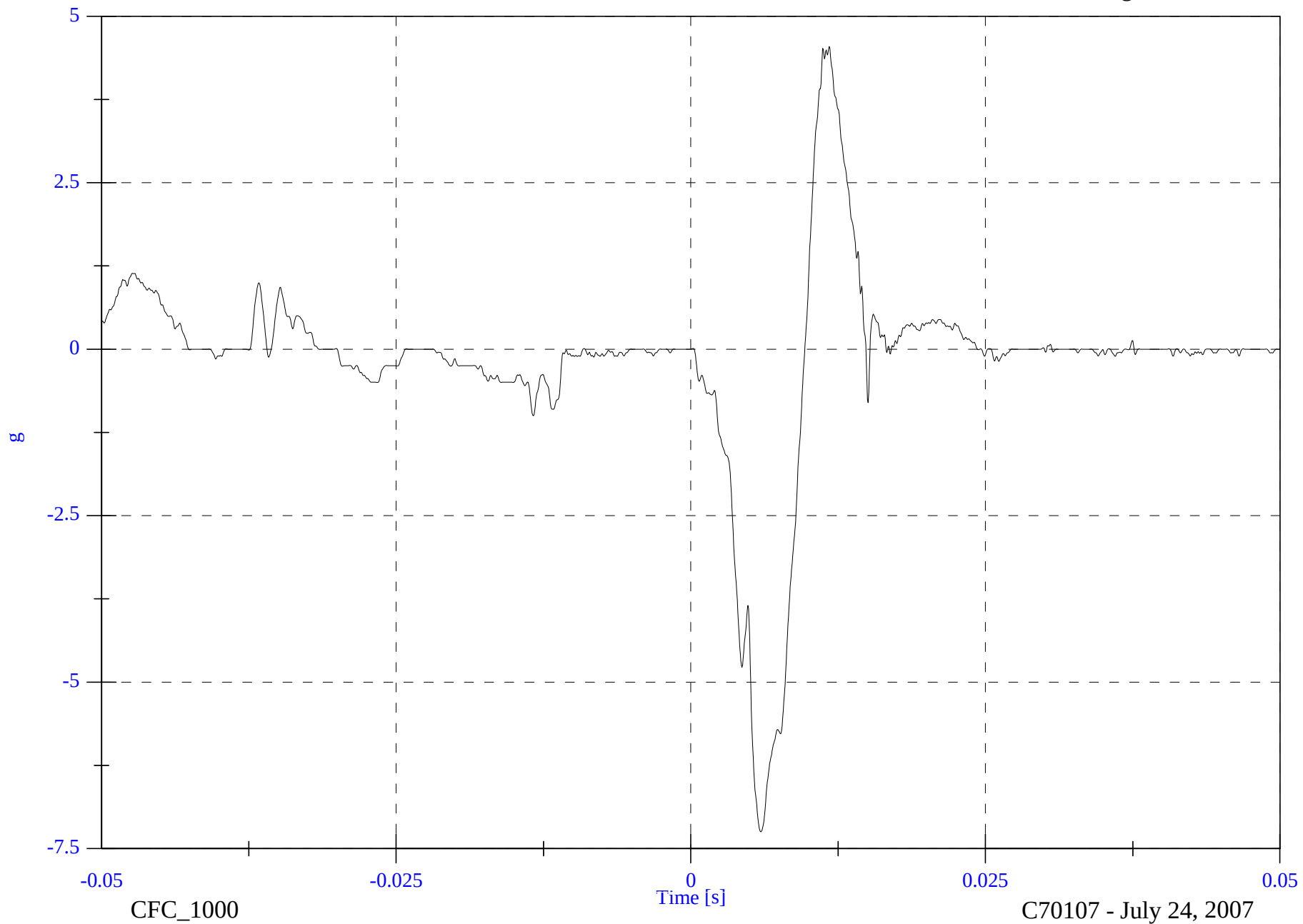
Headform Y Acceleration

Max: 4.5 [g] at 0.012 [s]

Min: -7.2 [g] at 0.006 [s]

C70107 URRSR IMPACT PLOT # 2

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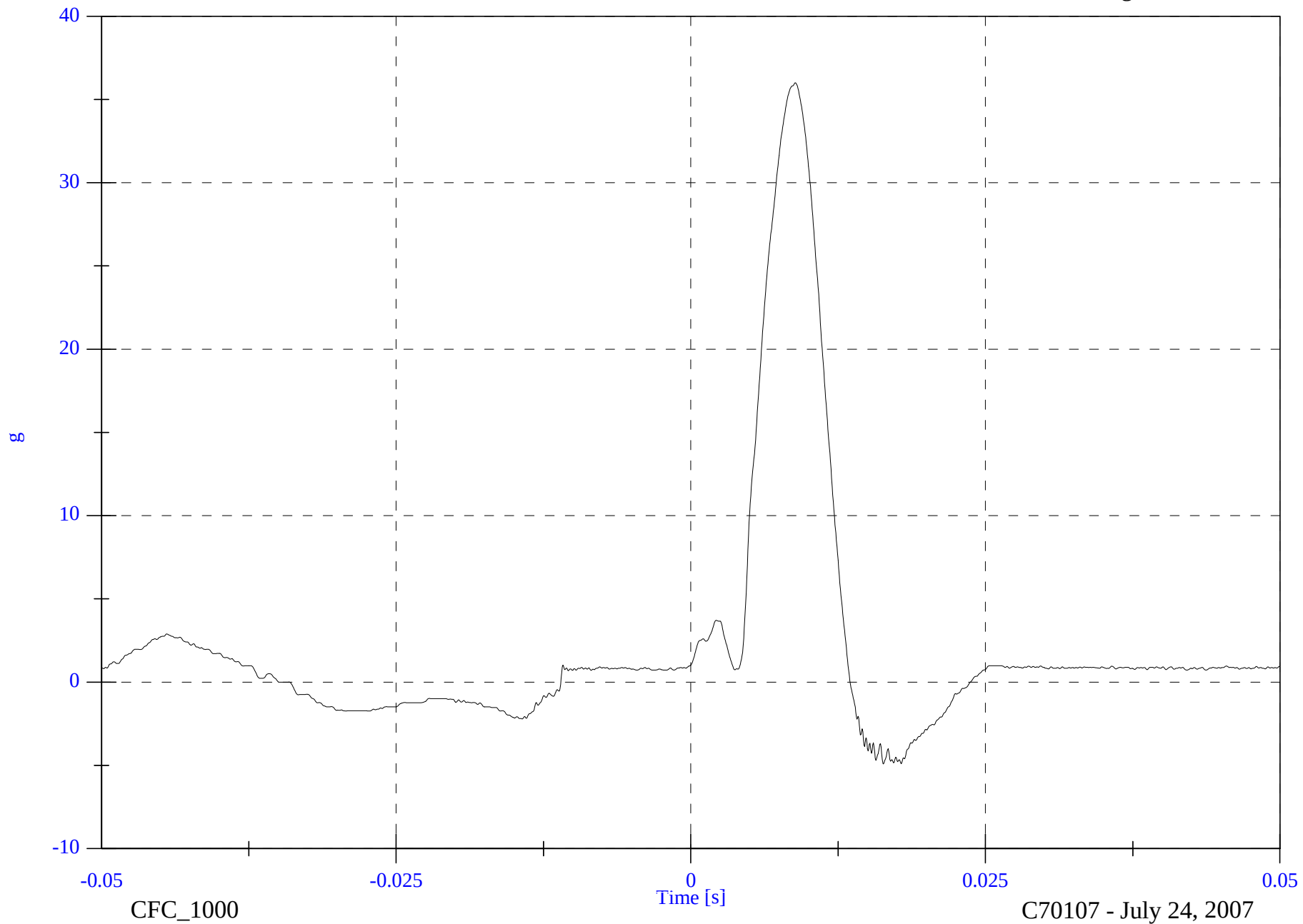
Headform Z Acceleration

Max: 36.0 [g] at 0.009 [s]

Min: -4.9 [g] at 0.016 [s]

C70107 URRSR IMPACT PLOT # 3

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FMVSS 201U 2007 Chevrolet HHR C70107

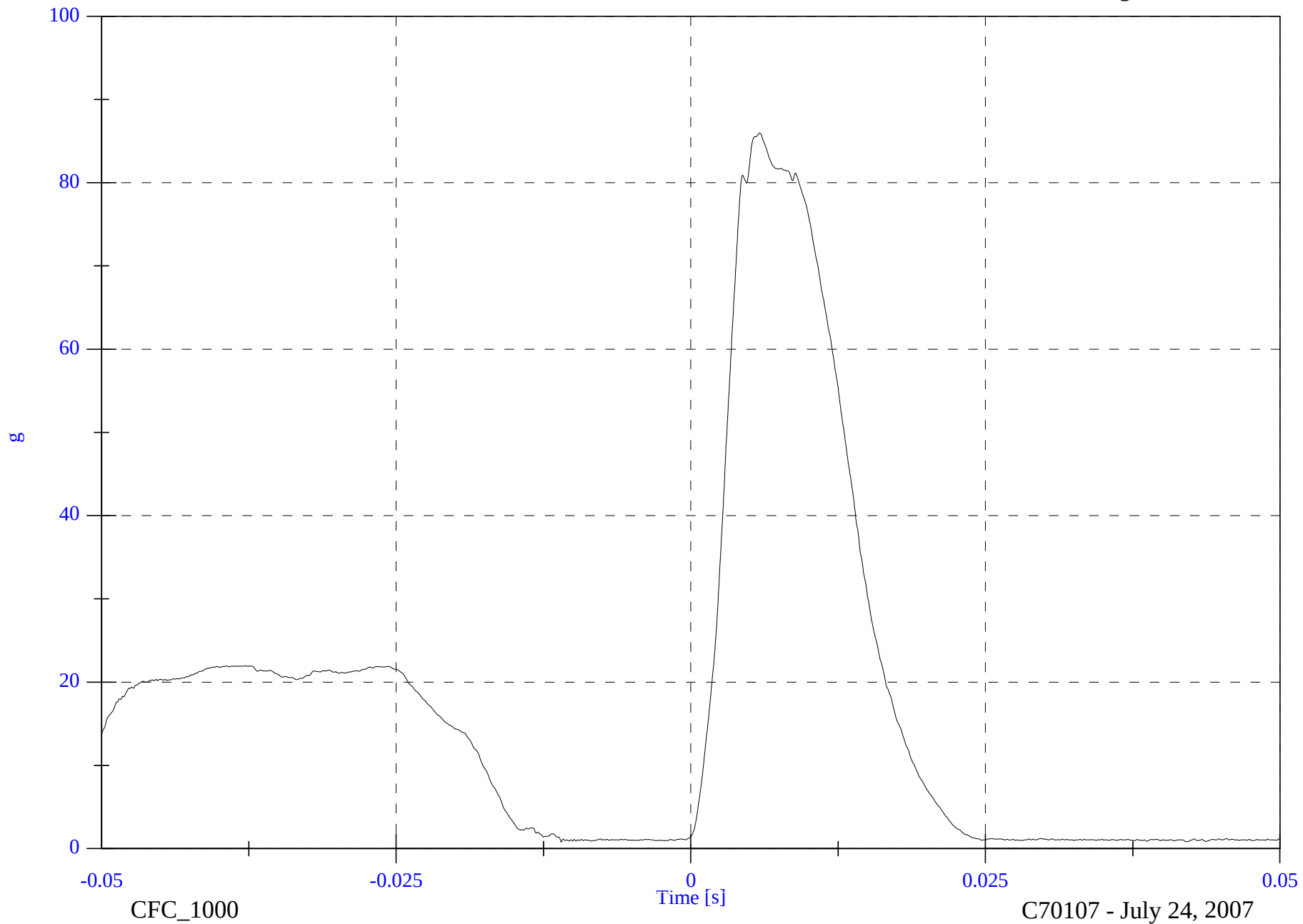
Headform Resultant

Max: 86.0 [g] at 0.006 [s]

Min: 0.8 [g] at -0.011 [s]

C70107 URRSR IMPACT PLOT # 4

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR C70107

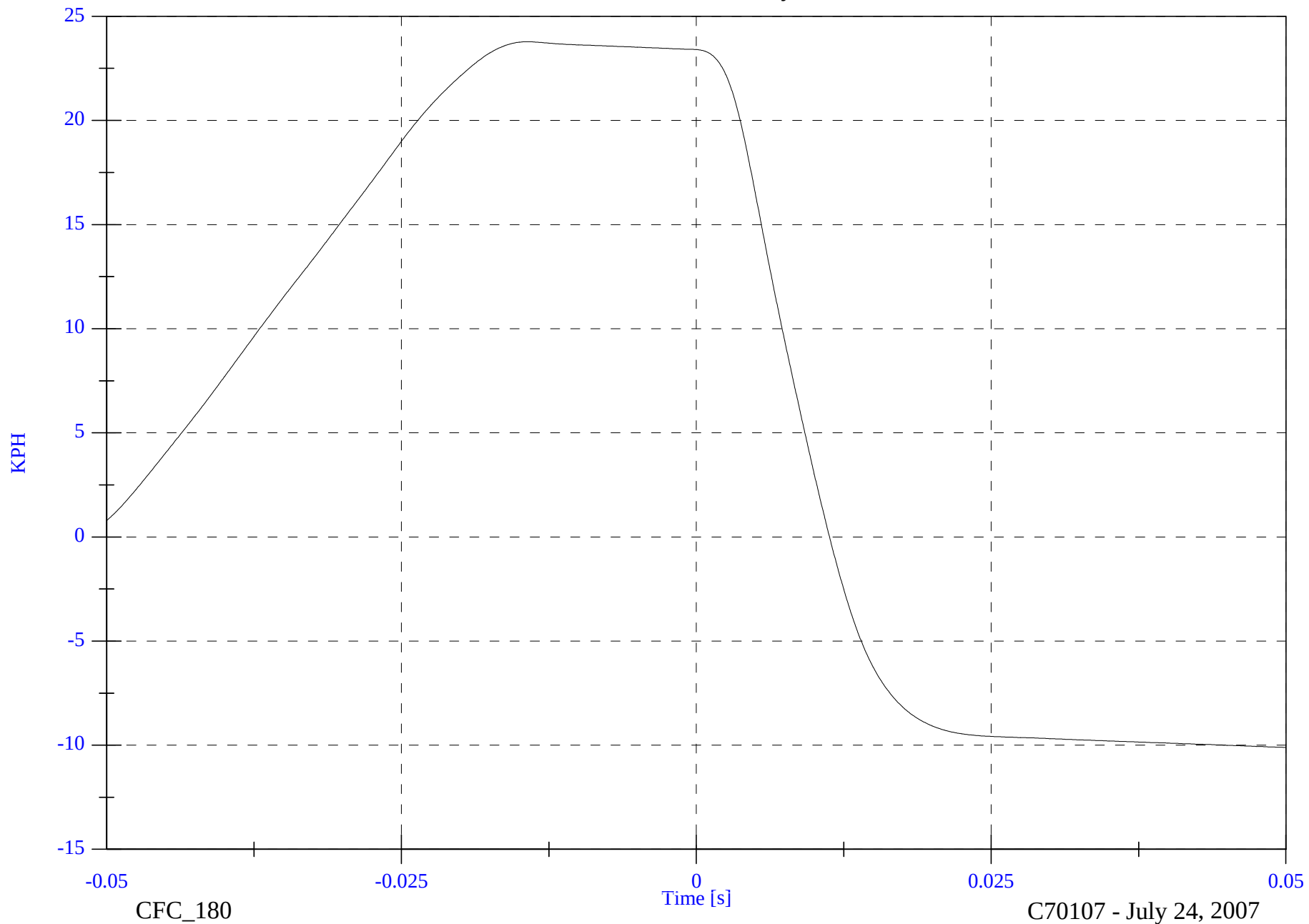
Headform Velocity

Max: 23.8 [KPH] at -0.014 [s]

Min: -10.1 [KPH] at 0.050 [s]

C70107 URRSR IMPACT PLOT # 5

8826-FMH-05





PRE-IMPACT URRSR



POST-IMPACT URRSR

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	03
Test Date:	07/24/07
Target Location:	B-PILLAR
Target Code:	BP4
Horizontal Impact Angle:	122°
Vertical Impact Angle:	-10°
Ambient Temperature:	21.1
Relative Humidity:	48.6
Time of Impact:	11:46
Headform Number:	0642

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	27	mm right	x mm left
On Centerline	11	mm up	



POST-IMPACT BP4 HEADFORM

Free Motion HIC	425.4
HIC(d)	487.3
Impact Velocity (kph)	23.76
HIC T1 (msec)	1.9
HIC T2 (msec)	11.0

FMVSS 201U 2007 Chevrolet HHR C70107 - BP4

FMH Headform 0642

Location: BP4

Test Date: July 24, 2007

Work File: BP4

-----TEST RESULTS-----

Lab Temperature: 21.1 C

HICd: 487.3

Lab Humidity: 48.6 %

HIC (36ms): 425.4

Velocity at Impact: 23.76 KPH

t1: 1.9 msec

t2: 11.0 msec

Free Flight Distance: 222.62 mm

Duration: 9.0 msec

Maximum: 123.5 g

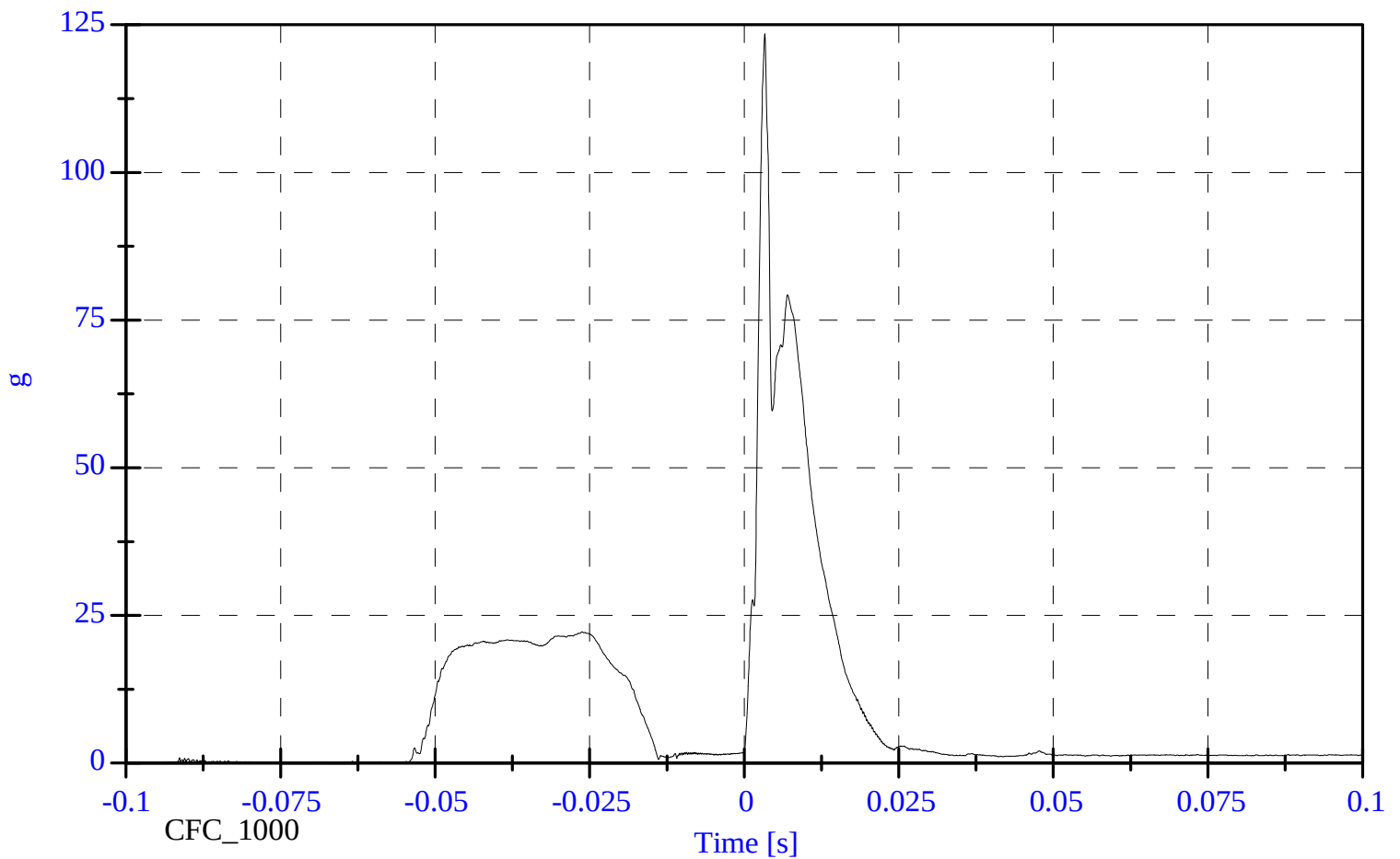
Average Acceleration: 8.6 g

FMVSS 201U 2007 Chevrolet HHR

Max: 123.5 [g] at 0.003 [s]

Headform Resultant

Min: 0.0 [g] at -0.098 [s]

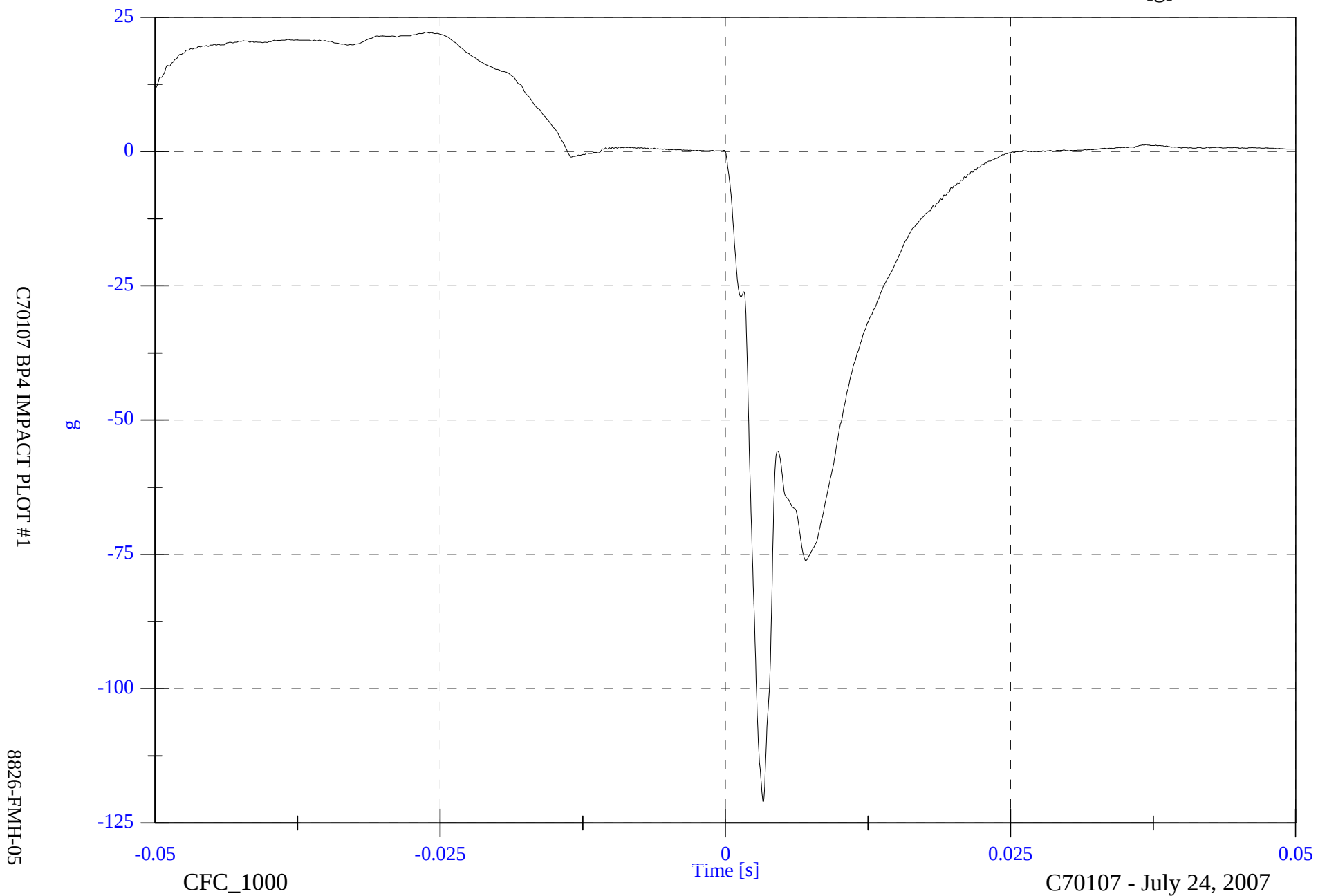


FMVSS 201U 2007 Chevrolet HHR

Headform X Acceleration

Max: 22.2 [g] at -0.026 [s]

Min: -121.0 [g] at 0.003 [s]



FMVSS 201U 2007 Chevrolet HHR

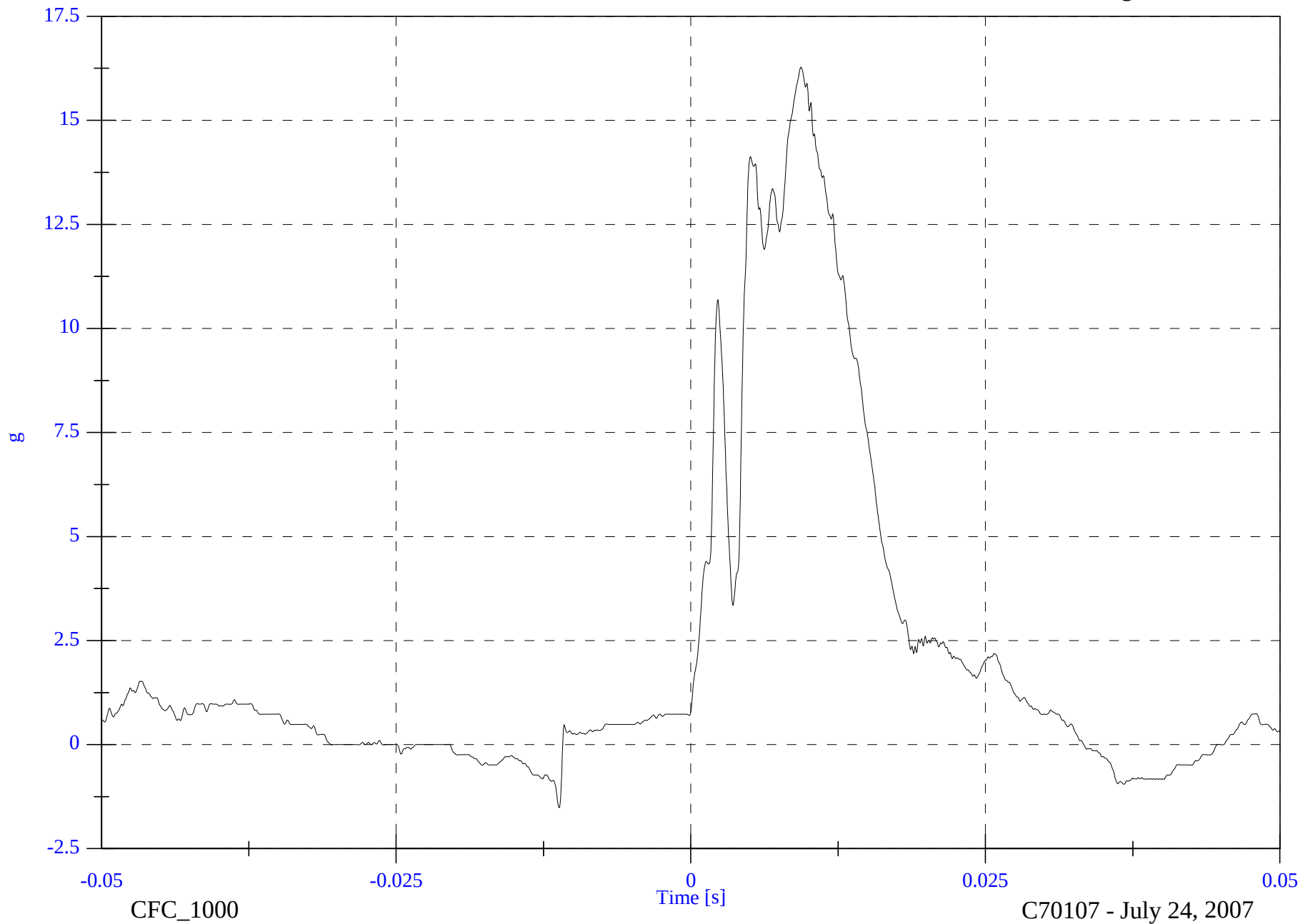
Headform Y Acceleration

Max: 16.3 [g] at 0.009 [s]

Min: -1.5 [g] at -0.011 [s]

C70107 BP4 IMPACT PLOT #2

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

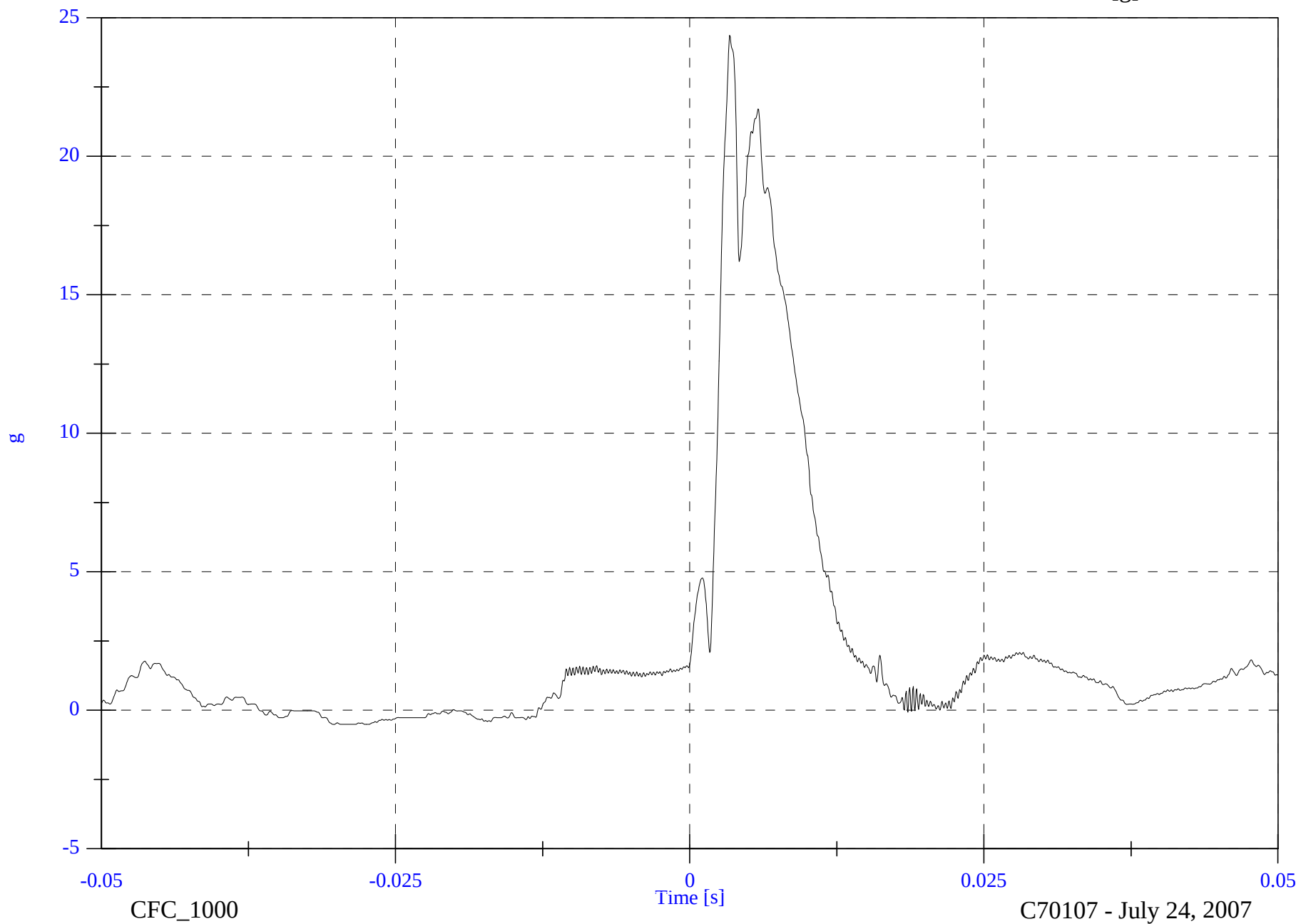
Headform Z Acceleration

Max: 24.4 [g] at 0.003 [s]

Min: -0.5 [g] at -0.030 [s]

C70107 BP4 IMPACT PLOT #3

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

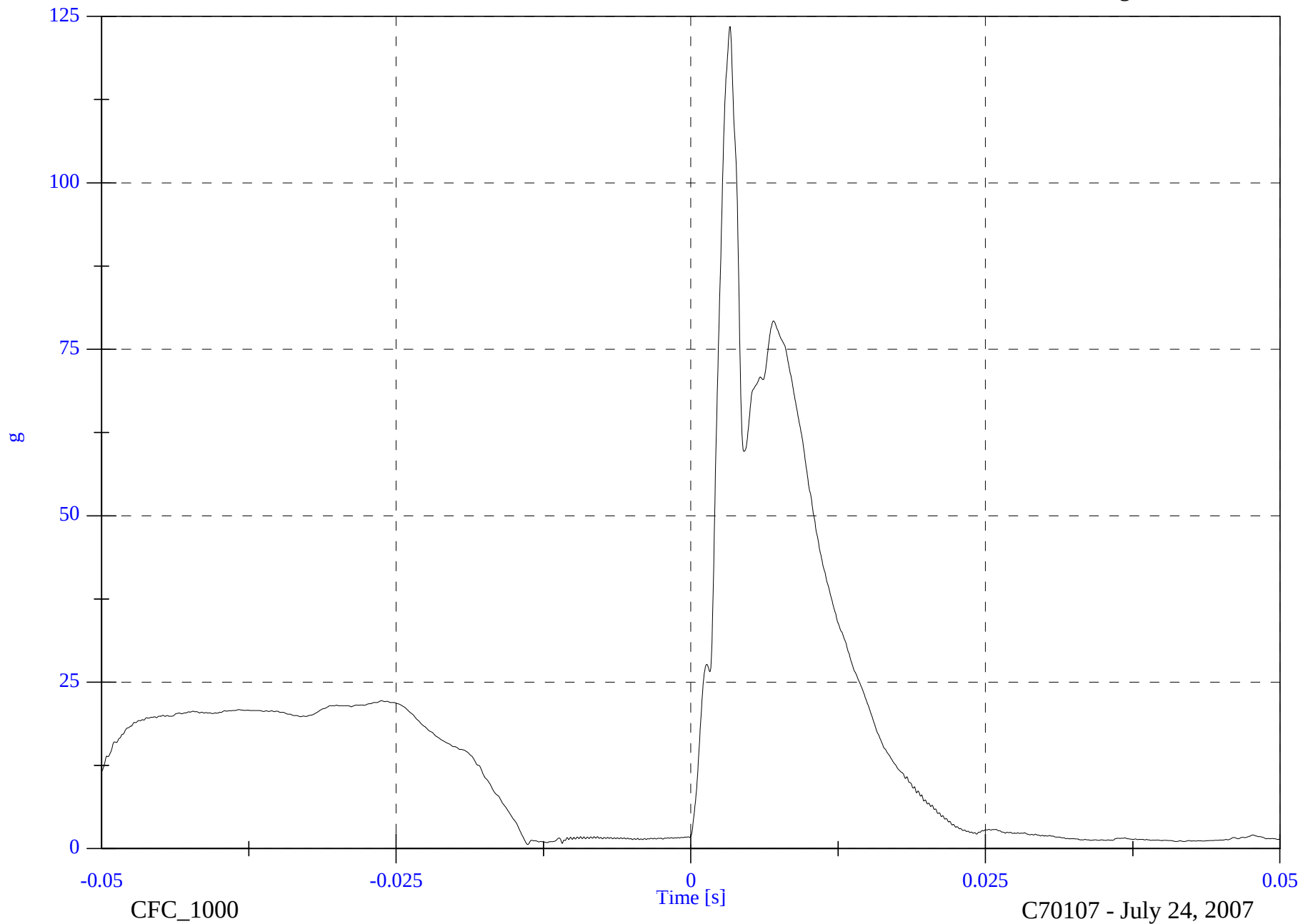
Headform Resultant

Max: 123.5 [g] at 0.003 [s]

Min: 0.6 [g] at -0.014 [s]

C70107 BP4 IMPACT PLOT #4

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

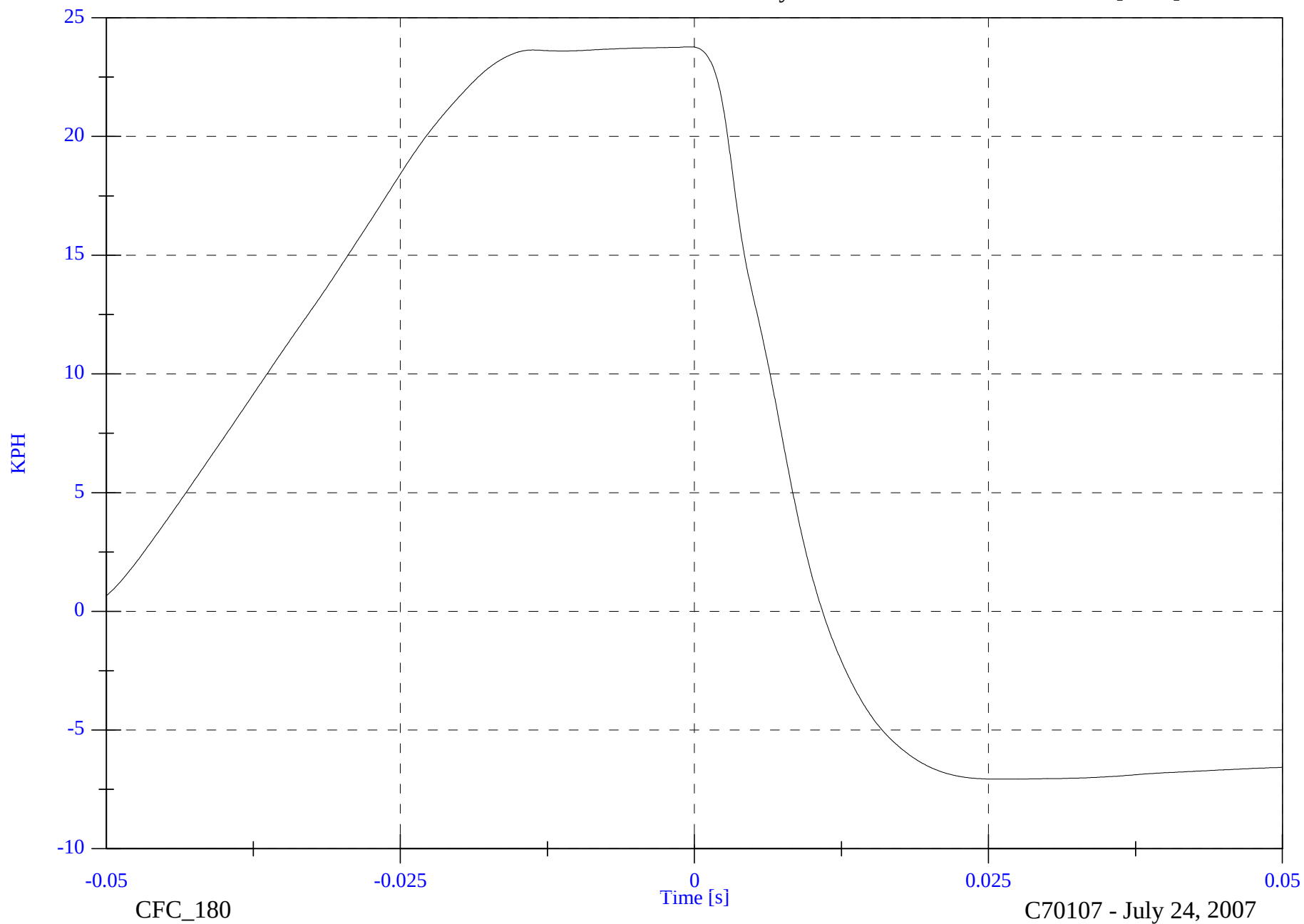
Headform Velocity

Max: 23.8 [KPH] at -0.000 [s]

Min: -7.1 [KPH] at 0.026 [s]

C70107 BP4 IMPACT PLOT #5

8826-FMH-05





PRE-IMPACT BP4



POST-IMPACT BP4

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	04
Test Date:	07/24/07
Target Location:	B-PILLAR
Target Code:	BP1
Horizontal Impact Angle:	90°
Vertical Impact Angle:	15°
Ambient Temperature:	21.3
Relative Humidity:	50.3
Time of Impact:	13:35
Headform Number:	0805

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	3	x	mm right
On Centerline	35		mm left
			mm up



POST-IMPACT BP1 HEADFORM

Free Motion HIC	738.8
HIC(d)	723.8
Impact Velocity (kph)	23.51
HIC T1 (msec)	3.9
HIC T2 (msec)	11.6

FMVSS 201U 2007 Chevrolet HHR C70107 - BP1

FMH Headform 0805

Location: BP1

Test Date: July 24, 2007

Work File: BP1

-----TEST RESULTS-----

Lab Temperature: 21.3 C

HICd: 723.8

Lab Humidity: 50.3 %

HIC (36ms): 738.8

Velocity at Impact: 23.51 KPH

t1: 3.9 msec

t2: 11.6 msec

Free Flight Distance: 222.98 mm

Duration: 7.7 msec

Maximum: 140.7 g

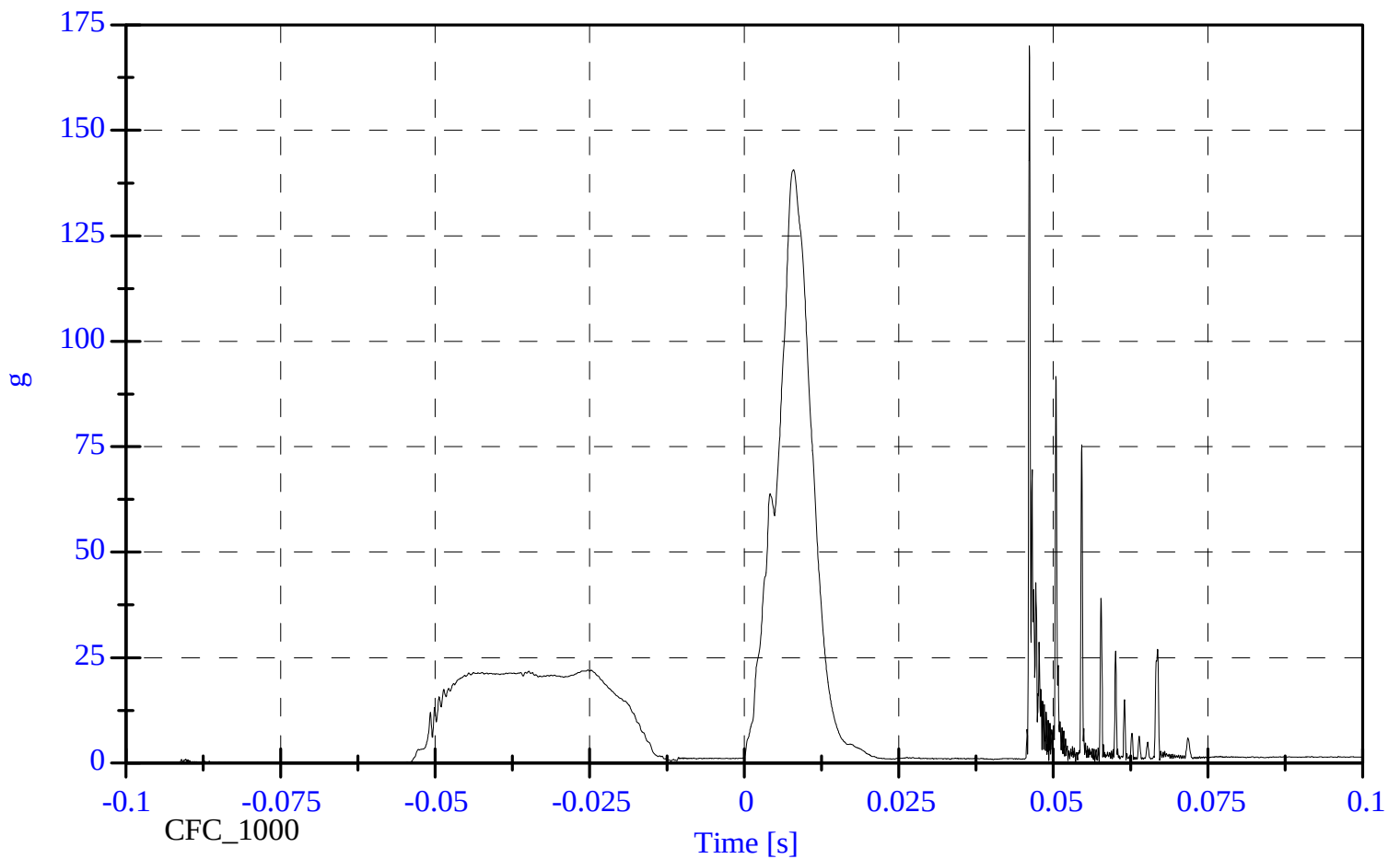
Average Acceleration: 9.9 g

FMVSS 201U 2007 Chevrolet HHR

Headform Resultant

Max: 140.7 [g] at 0.008 [s]

Min: 0.0 [g] at -0.075 [s]



FMVSS 201U 2007 Chevrolet HHR

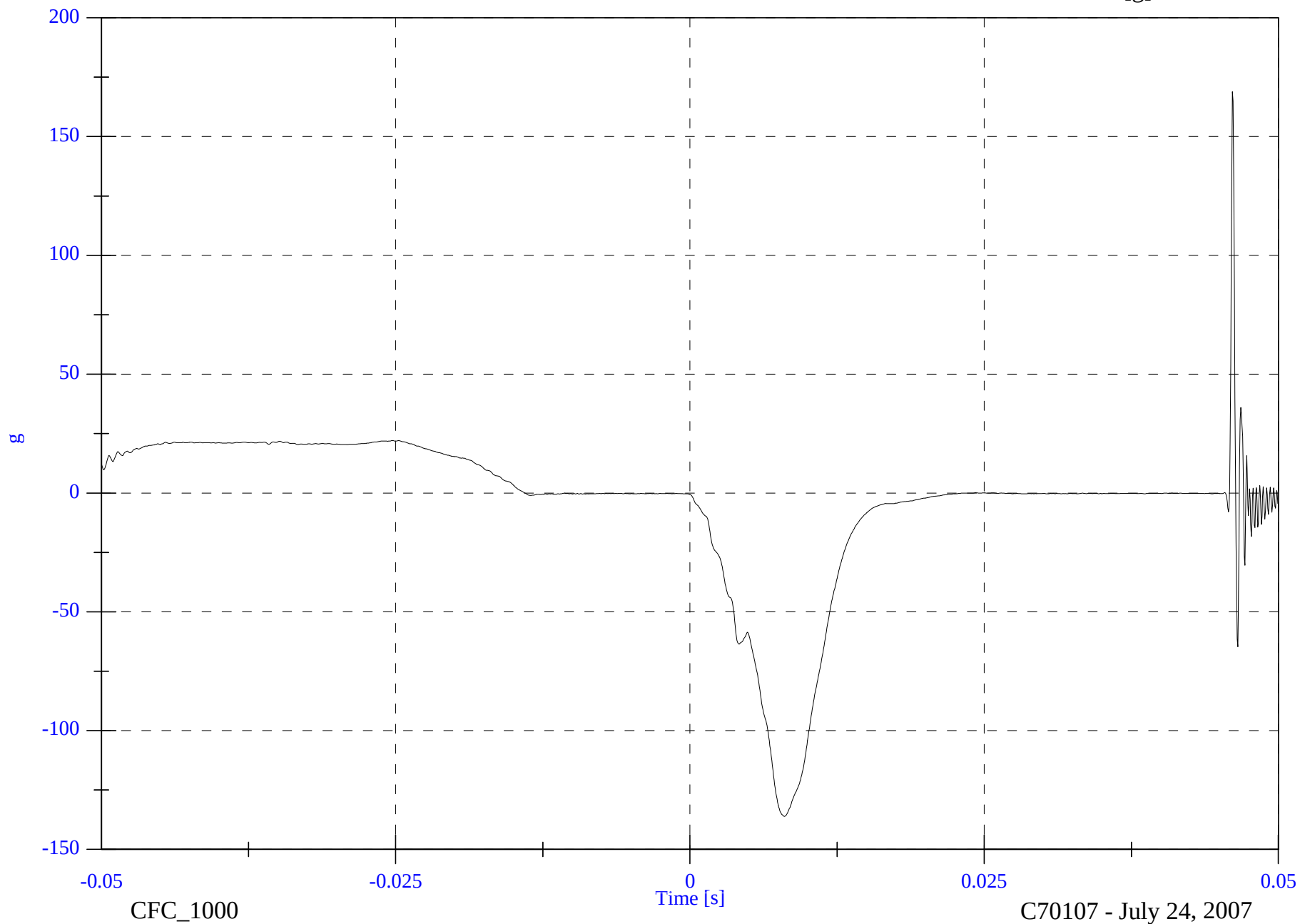
Headform X Acceleration

Max: 168.9 [g] at 0.046 [s]

Min: -136.1 [g] at 0.008 [s]

C70107 BP1 IMPACT PLOT #1

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

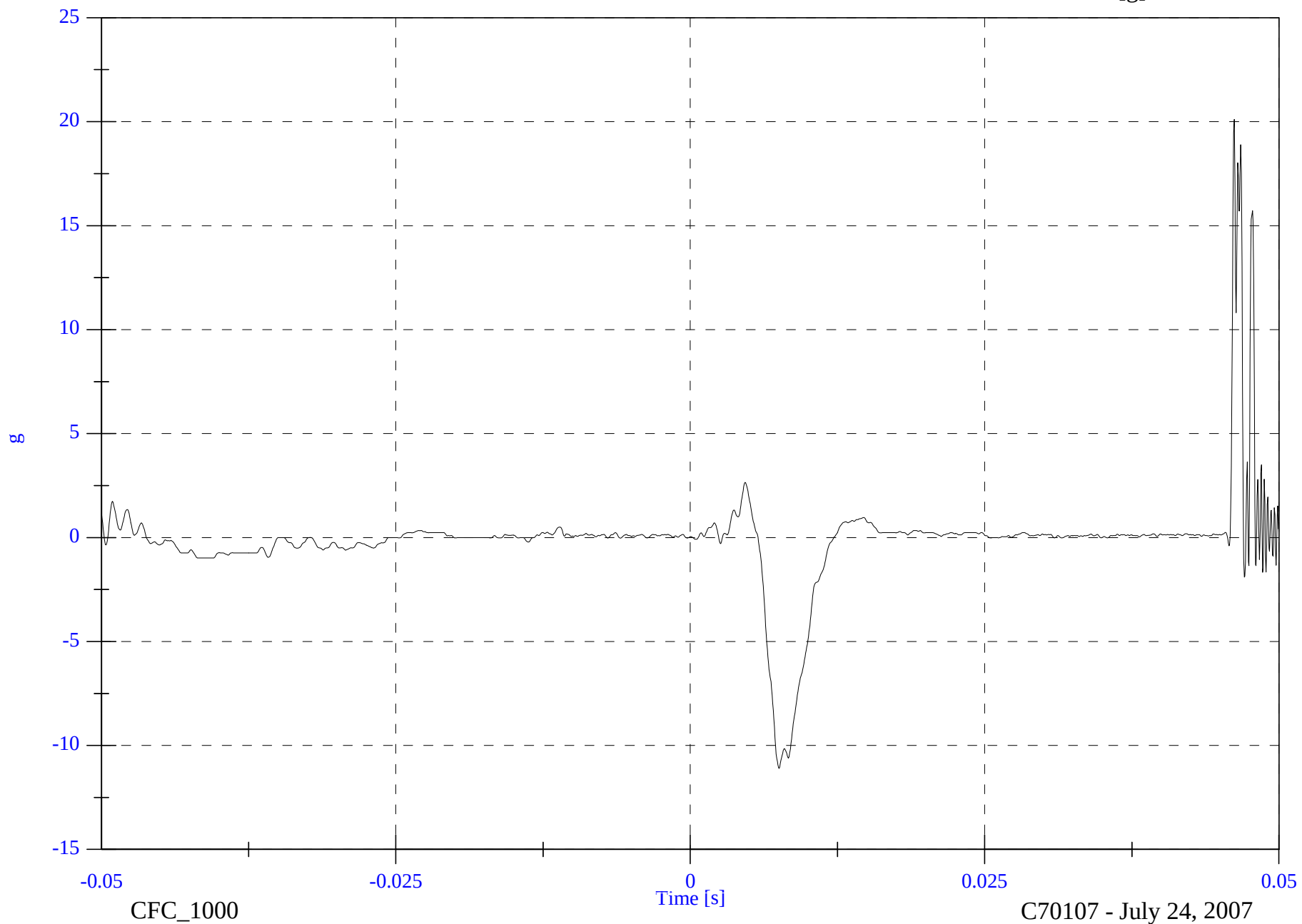
Headform Y Acceleration

Max: 20.1 [g] at 0.046 [s]

Min: -11.1 [g] at 0.008 [s]

C70107 BP1 IMPACT PLOT #2

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

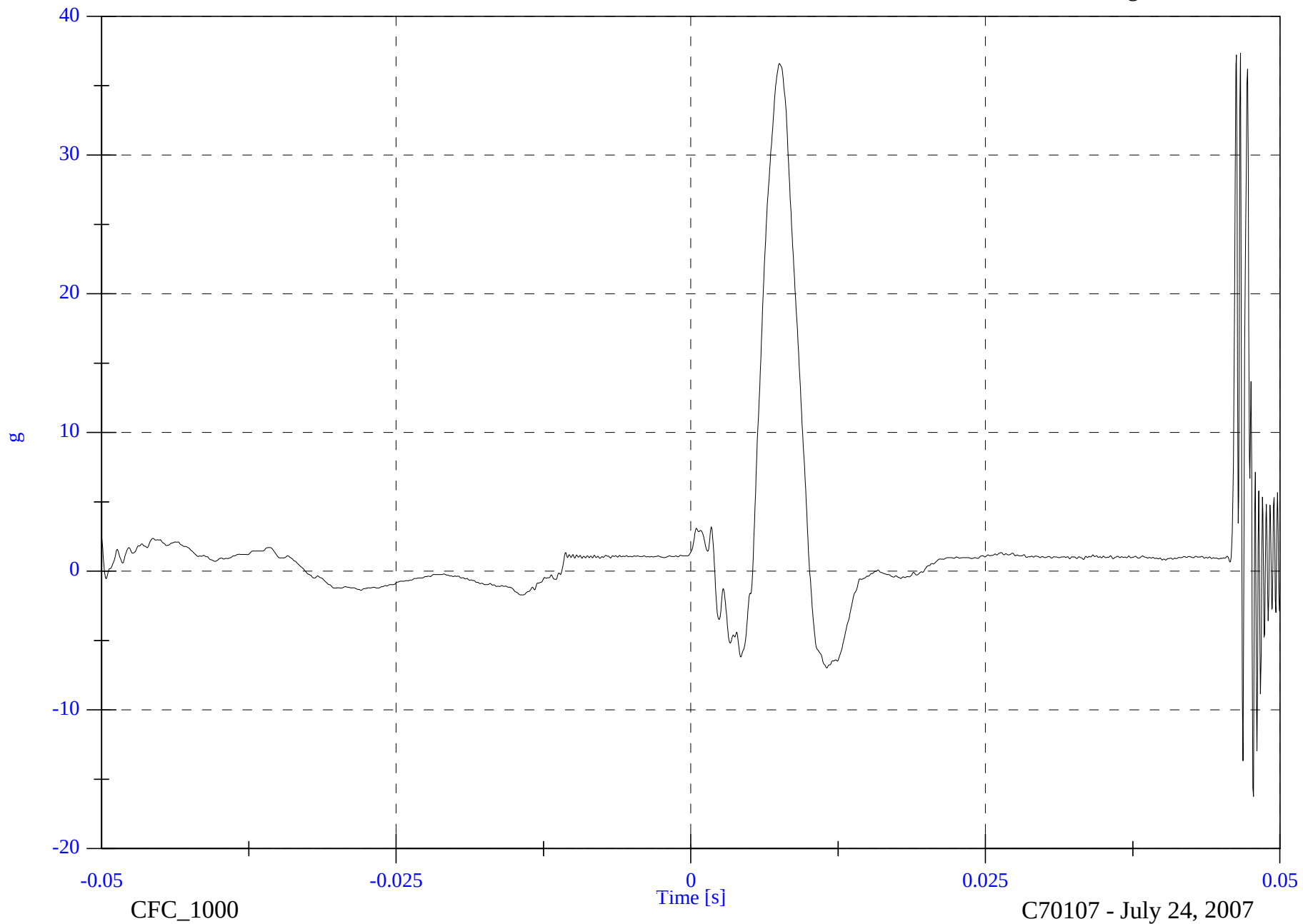
Headform Z Acceleration

Max: 37.3 [g] at 0.047 [s]

Min: -16.2 [g] at 0.048 [s]

C70107 BP1 IMPACT PLOT #3

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

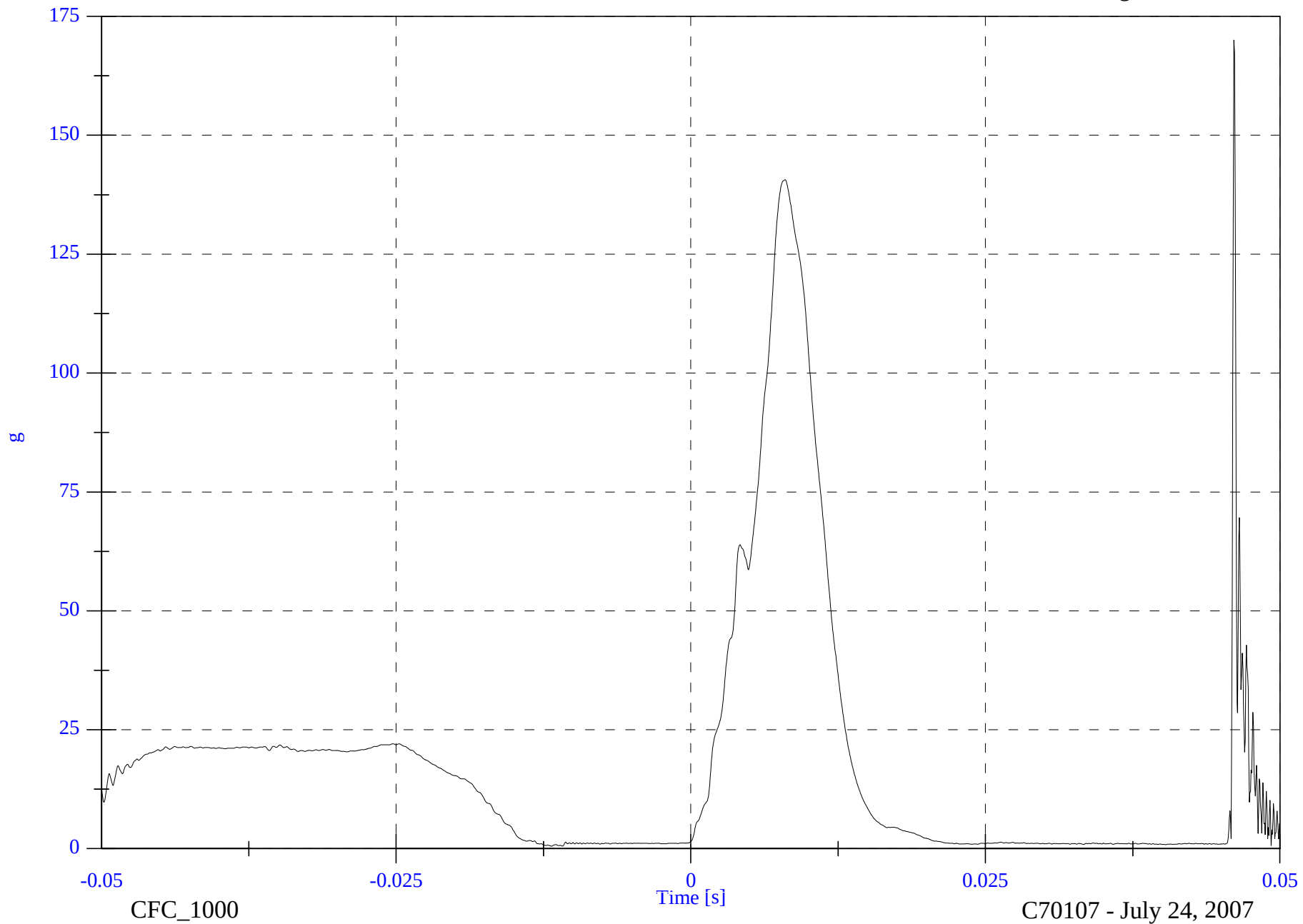
Headform Resultant

Max: 170.0 [g] at 0.046 [s]

Min: 0.5 [g] at -0.012 [s]

C70107 BP1 IMPACT PLOT #4

8826-FMH-05

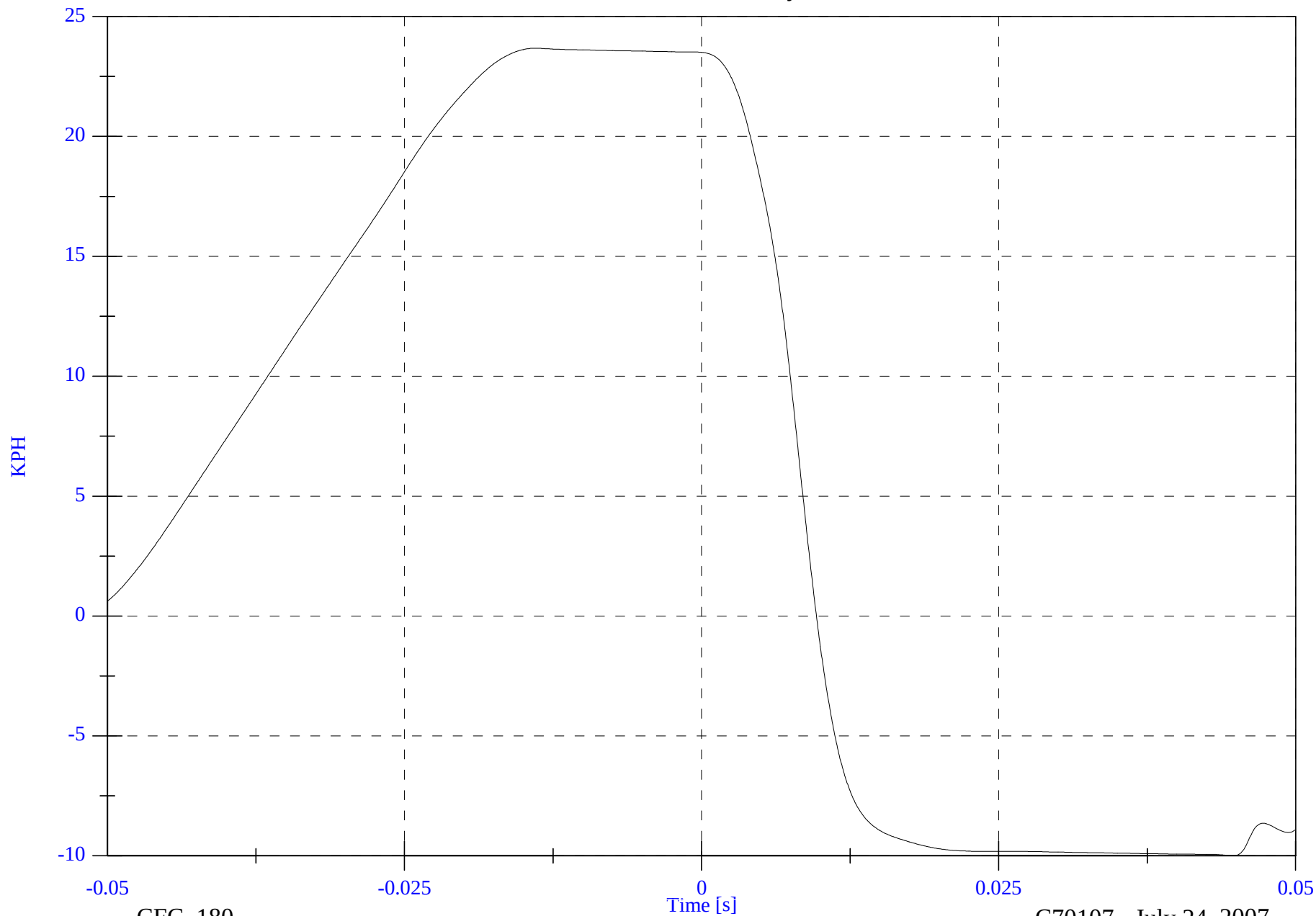


FMVSS 201U 2007 Chevrolet HHR

Headform Velocity

Max: 23.7 [KPH] at -0.014 [s]

Min: -10.0 [KPH] at 0.045 [s]



C70107 BP1 IMPACT PLOT #5

8826-FMH-05

CFC_180

C70107 - July 24, 2007



PRE-IMPACT BP1



POST-IMPACT BP1

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	05
Test Date:	07/24/07
Target Location:	SIDE RAIL
Target Code:	SR2A
Horizontal Impact Angle:	90°
Vertical Impact Angle:	31°
Ambient Temperature:	21
Relative Humidity:	50.2
Time of Impact:	14:20
Headform Number:	1255

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	6	☒ mm right	☐ mm left
On Centerline	15	mm up	



POST-IMPACT SR2A HEADFORM

Free Motion HIC	502
HIC(d)	545.1
Impact Velocity (kph)	23.69
HIC T1 (msec)	3.4
HIC T2 (msec)	13.2

FMVSS 201U 2007 Chevrolet HHR C70107 - SR2A

FMH Headform 1255

Location: SR2A

Test Date: July 24, 2007

Work File: SR2A

-----TEST RESULTS-----

Lab Temperature: 21.0 C

HICd: 545.1

Lab Humidity: 50.2 %

HIC (36ms): 502.0

Velocity at Impact: 23.69 KPH

t1: 3.4 msec

t2: 13.2 msec

Free Flight Distance: 219.88 mm

Duration: 9.7 msec

Maximum: 94.7 g

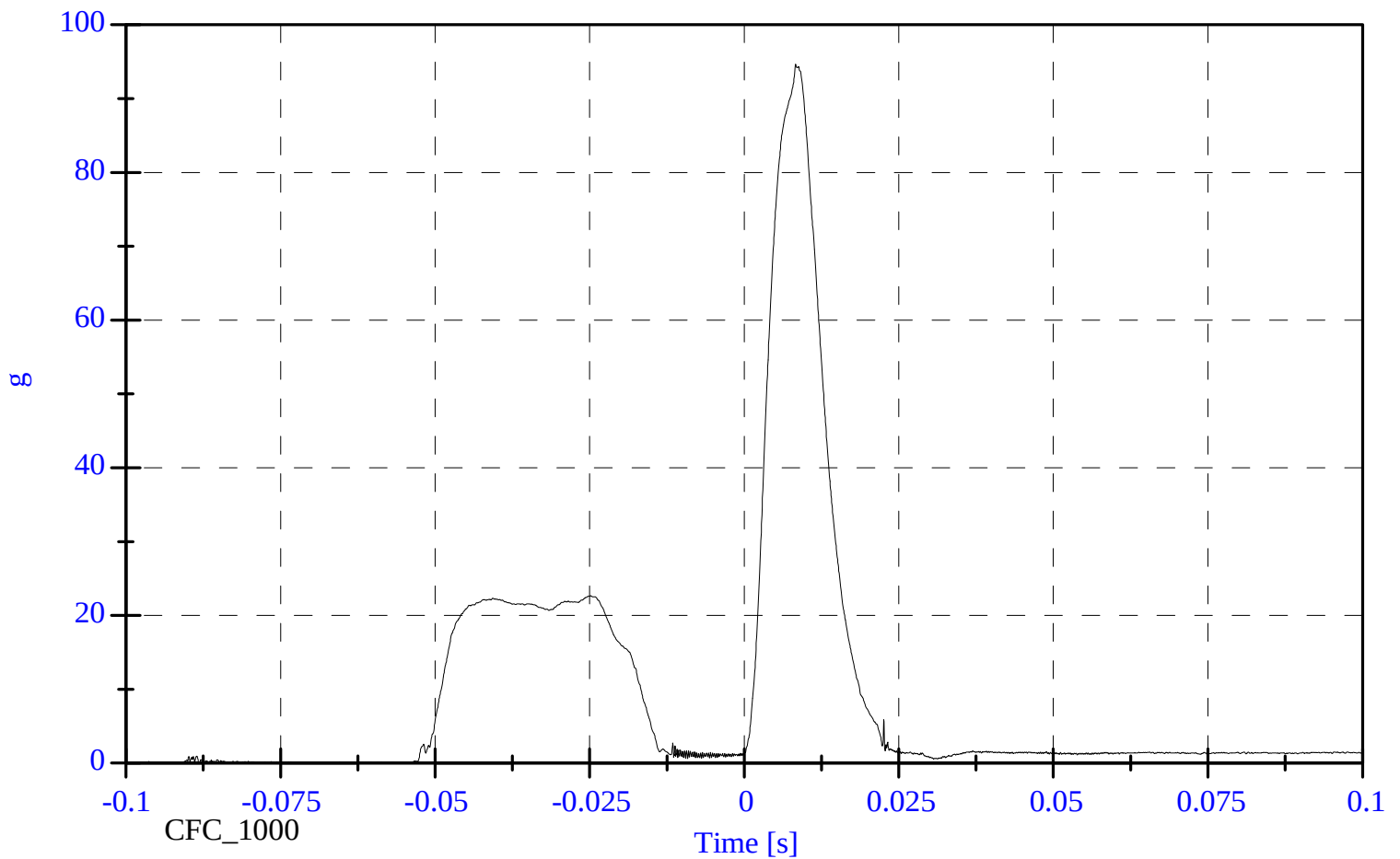
Average Acceleration: 8.9 g

FMVSS 201U 2007 Chevrolet HHR

Headform Resultant

Max: 94.7 [g] at 0.008 [s]

Min: 0.0 [g] at -0.058 [s]



FMVSS 201U 2007 Chevrolet HHR

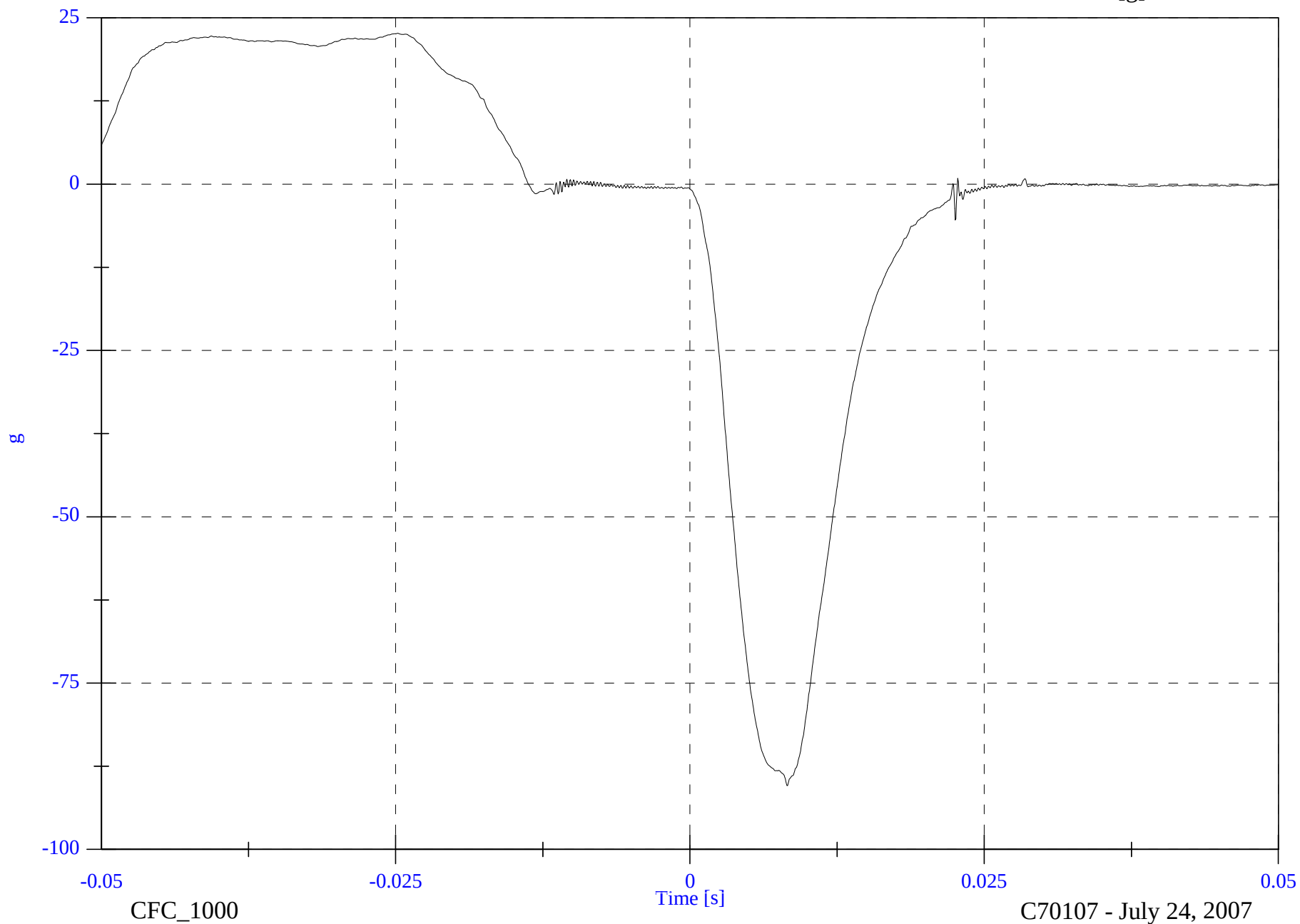
Headform X Acceleration

Max: 22.7 [g] at -0.025 [s]

Min: -90.4 [g] at 0.008 [s]

C70107 SR2A IMPACT PLOT #1

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

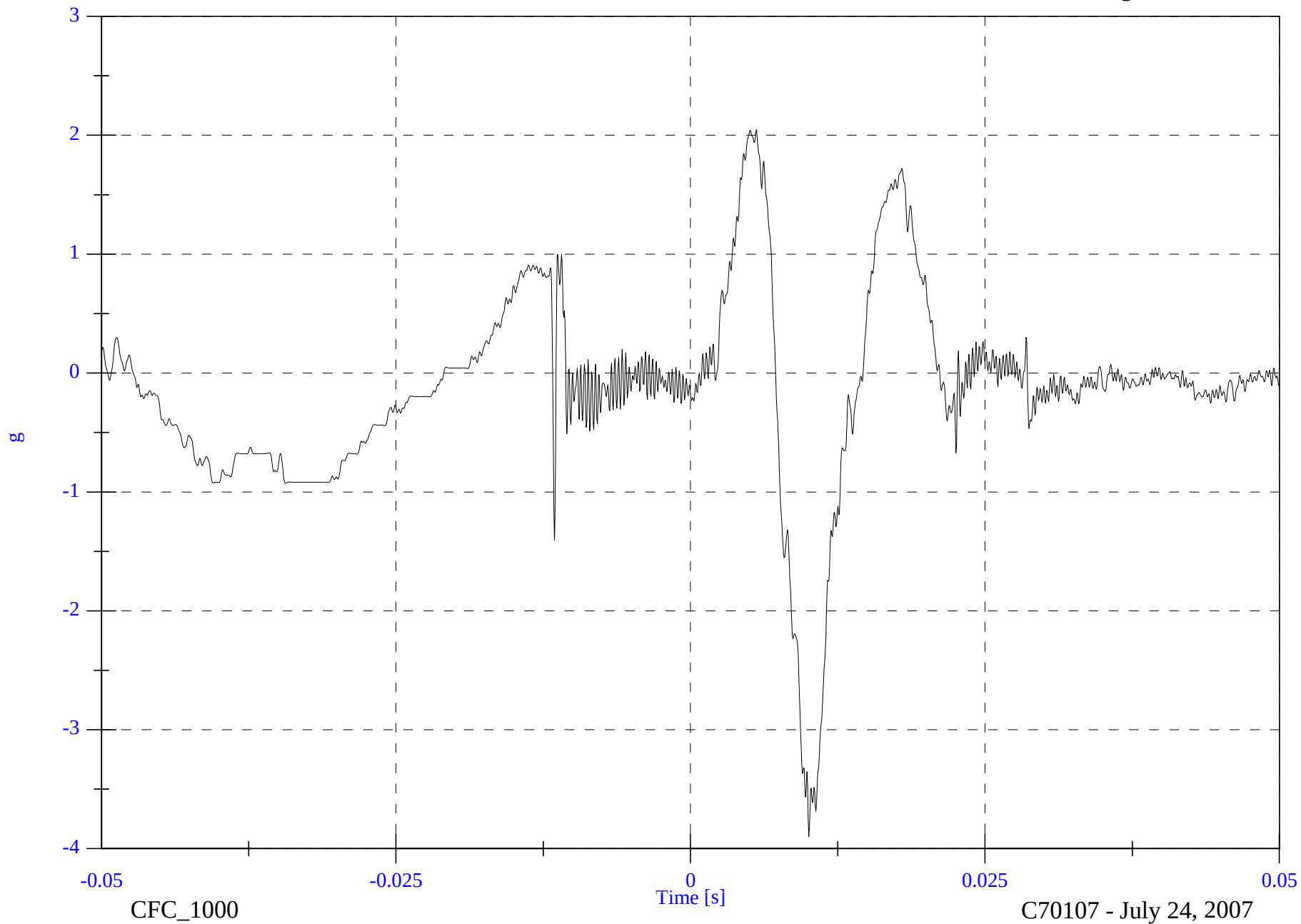
Headform Y Acceleration

Max: 2.0 [g] at 0.006 [s]

Min: -3.9 [g] at 0.010 [s]

C70107 SR2A IMPACT PLOT #2

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

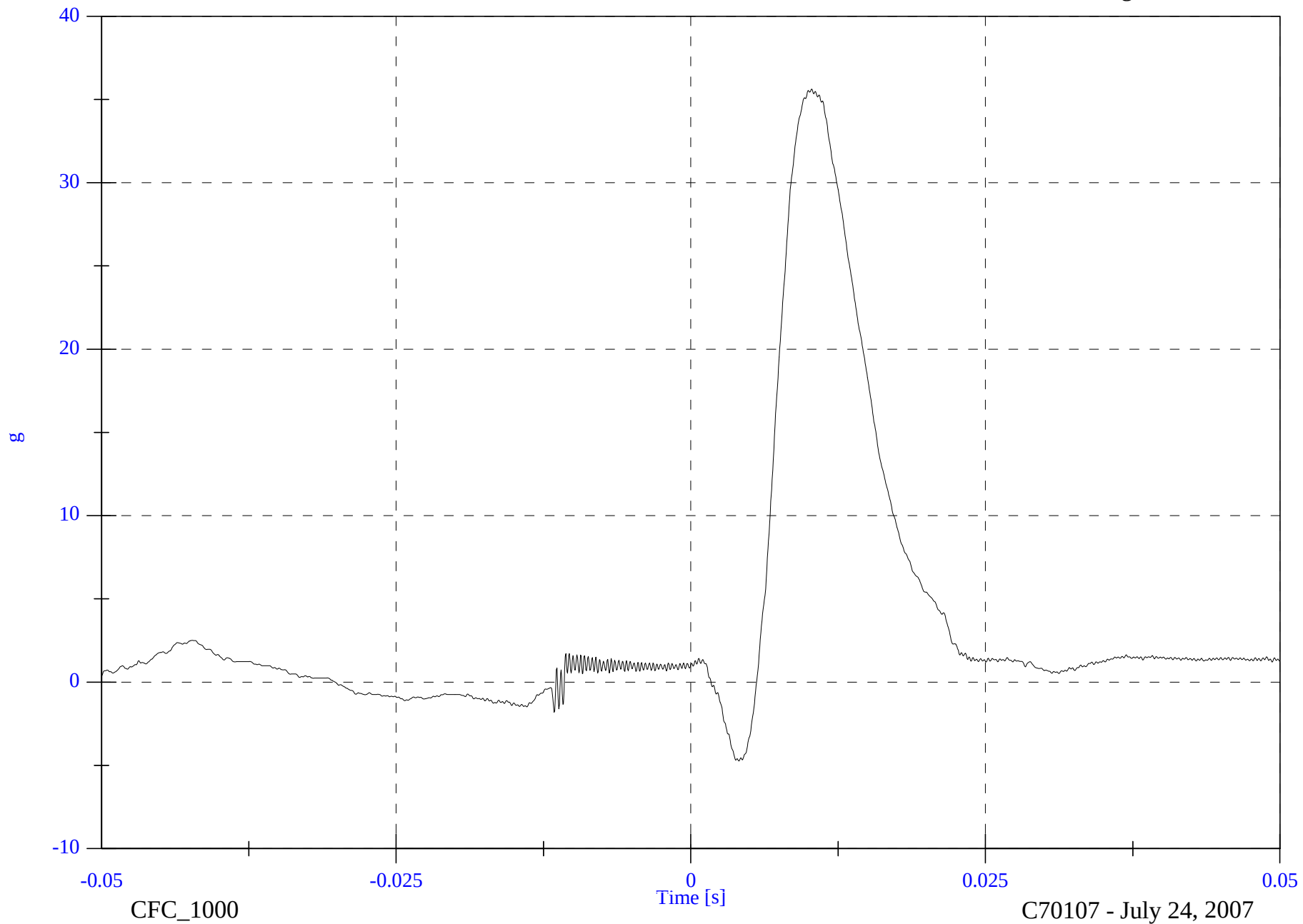
Headform Z Acceleration

Max: 35.6 [g] at 0.010 [s]

Min: -4.7 [g] at 0.004 [s]

C70107 SR2A IMPACT PLOT #3

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

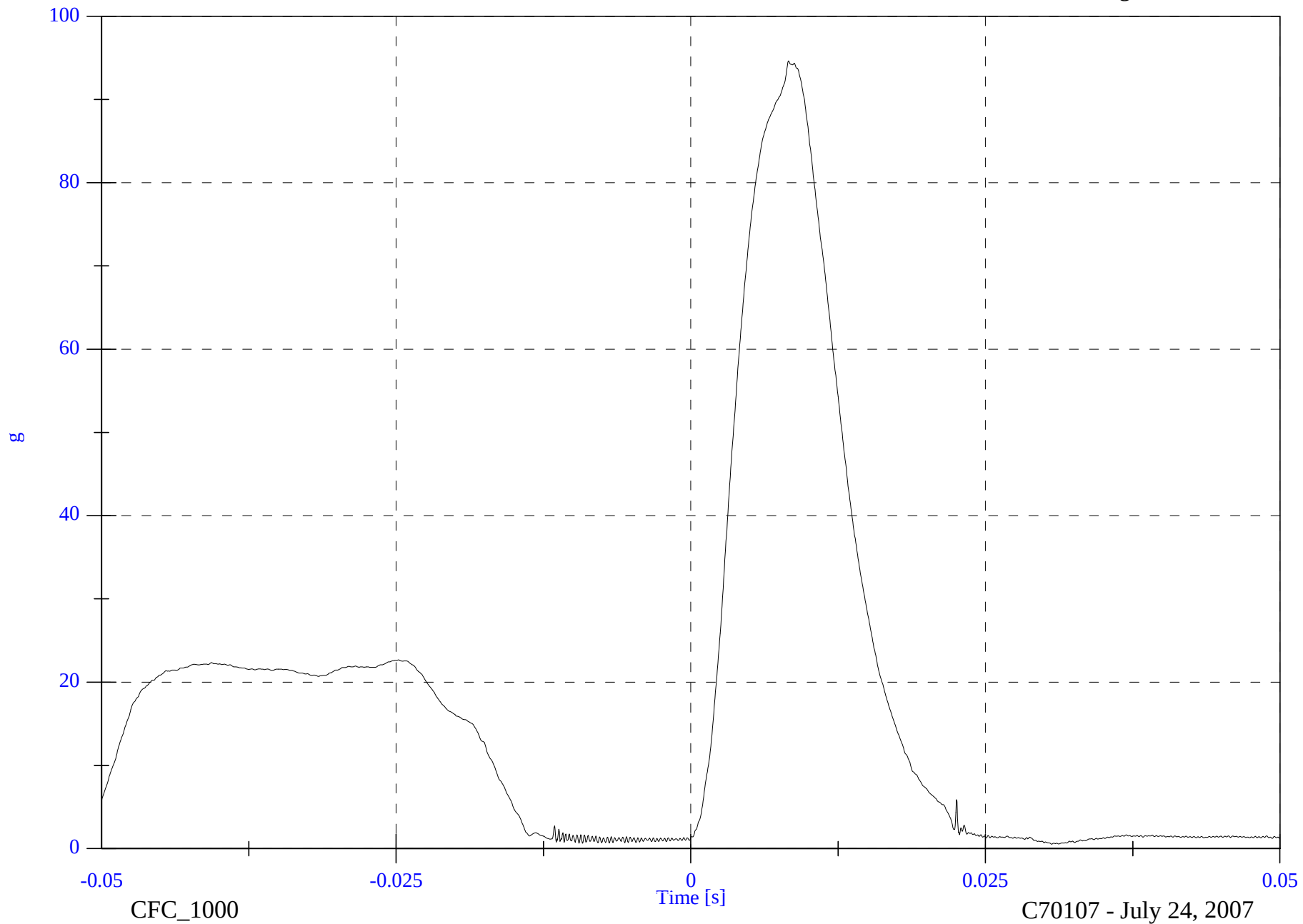
Headform Resultant

Max: 94.7 [g] at 0.008 [s]

Min: 0.5 [g] at 0.031 [s]

C70107 SR2A IMPACT PLOT #4

8826-FMH-05

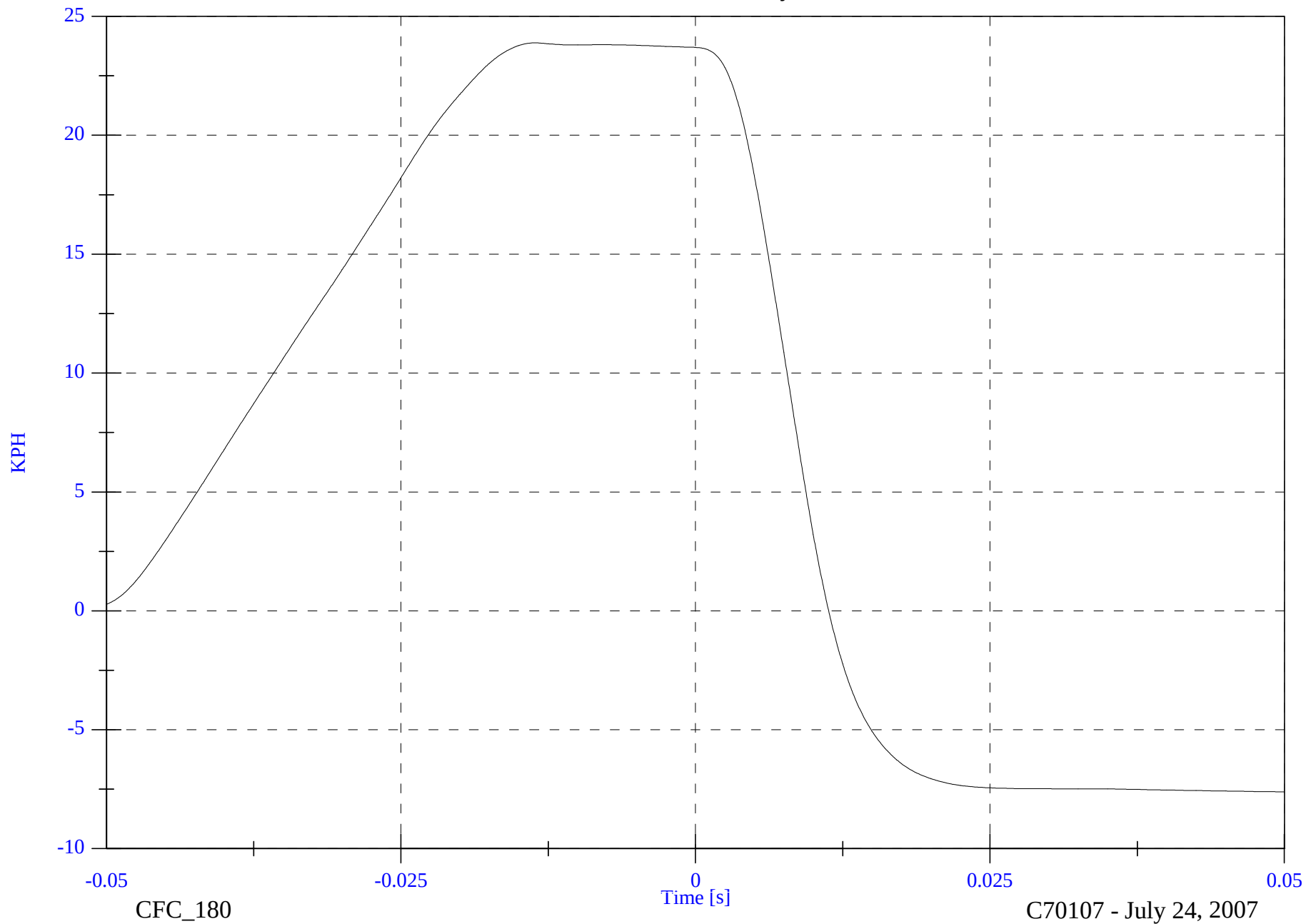


FMVSS 201U 2007 Chevrolet HHR

Headform Velocity

Max: 23.9 [KPH] at -0.014 [s]

Min: -7.6 [KPH] at 0.050 [s]



C70107 SR2A IMPACT PLOT #5

8826-FMH-05

CFC_180

C70107 - July 24, 2007



PRE-IMPACT SR2A



POST-IMPACT SR2A

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	06
Test Date:	07/24/07
Target Location:	A-PILLAR
Target Code:	AP3
Horizontal Impact Angle:	145°
Vertical Impact Angle:	31°
Ambient Temperature:	21
Relative Humidity:	48.6
Time of Impact:	15:15
Headform Number:	0062

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	0	☐	mm right ☐ mm left
On Centerline	15		mm up



POST-IMPACT AP3 HEADFORM

Free Motion HIC	750.3
HIC(d)	732.5
Impact Velocity (kph)	23.66
HIC T1 (msec)	2.3
HIC T2 (msec)	10.2

FMVSS 201U 2007 Chevrolet HHR C70107 - AP3

FMH Headform 0062

Location: AP3

Test Date: July 24, 2007

Work File: AP3

-----TEST RESULTS-----

Lab Temperature: 21.0 C

HICd: 732.5

Lab Humidity: 48.6 %

HIC (36ms): 750.3

Velocity at Impact: 23.66 KPH

t1: 2.3 msec

t2: 10.2 msec

Free Flight Distance: 210.64 mm

Duration: 7.9 msec

Maximum: 120.1 g

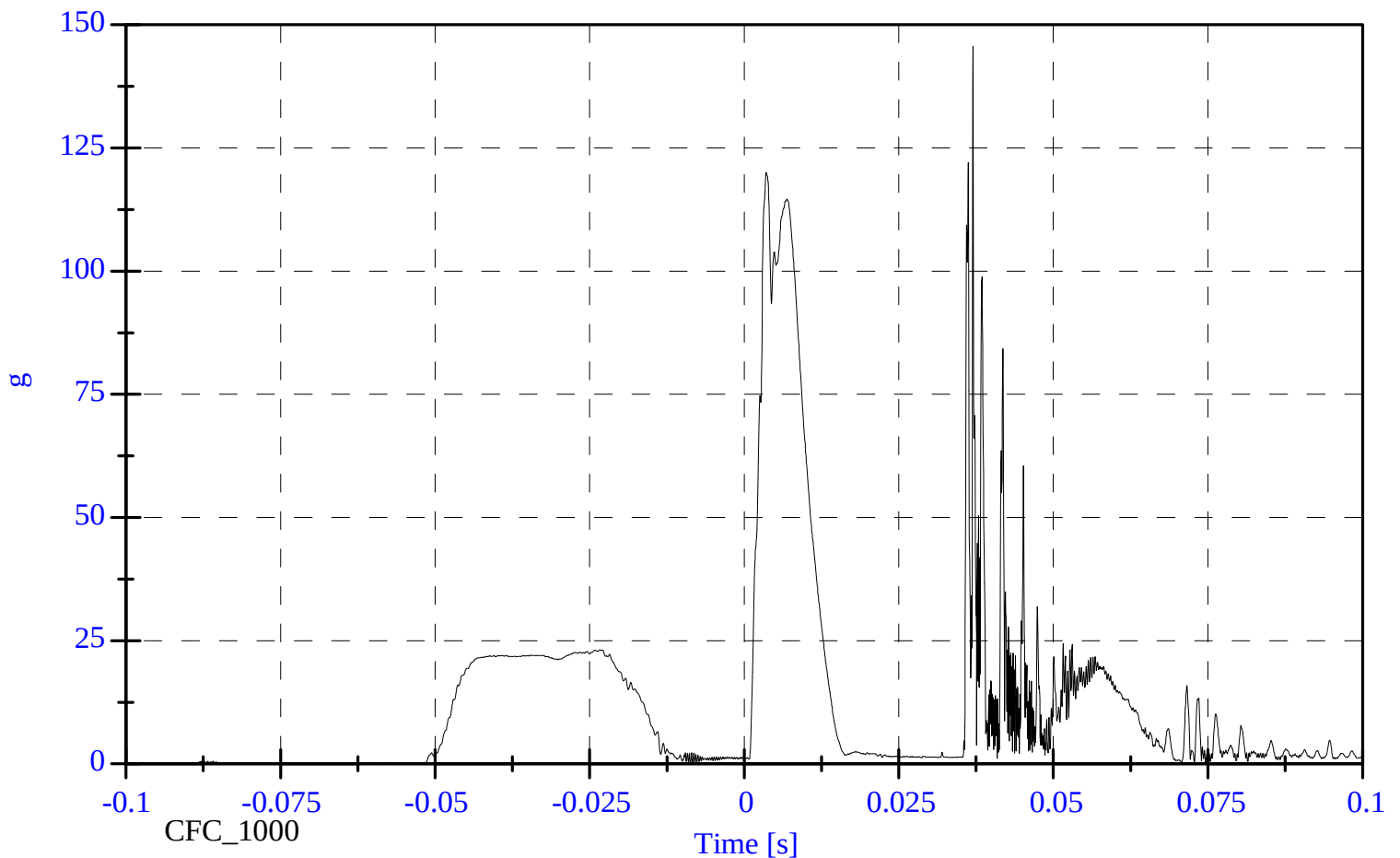
Average Acceleration: 12.0 g

FMVSS 201U 2007 Chevrolet HHR

Headform Resultant

Max: 120.1 [g] at 0.004 [s]

Min: 0.0 [g] at -0.067 [s]



FMVSS 201U 2007 Chevrolet HHR

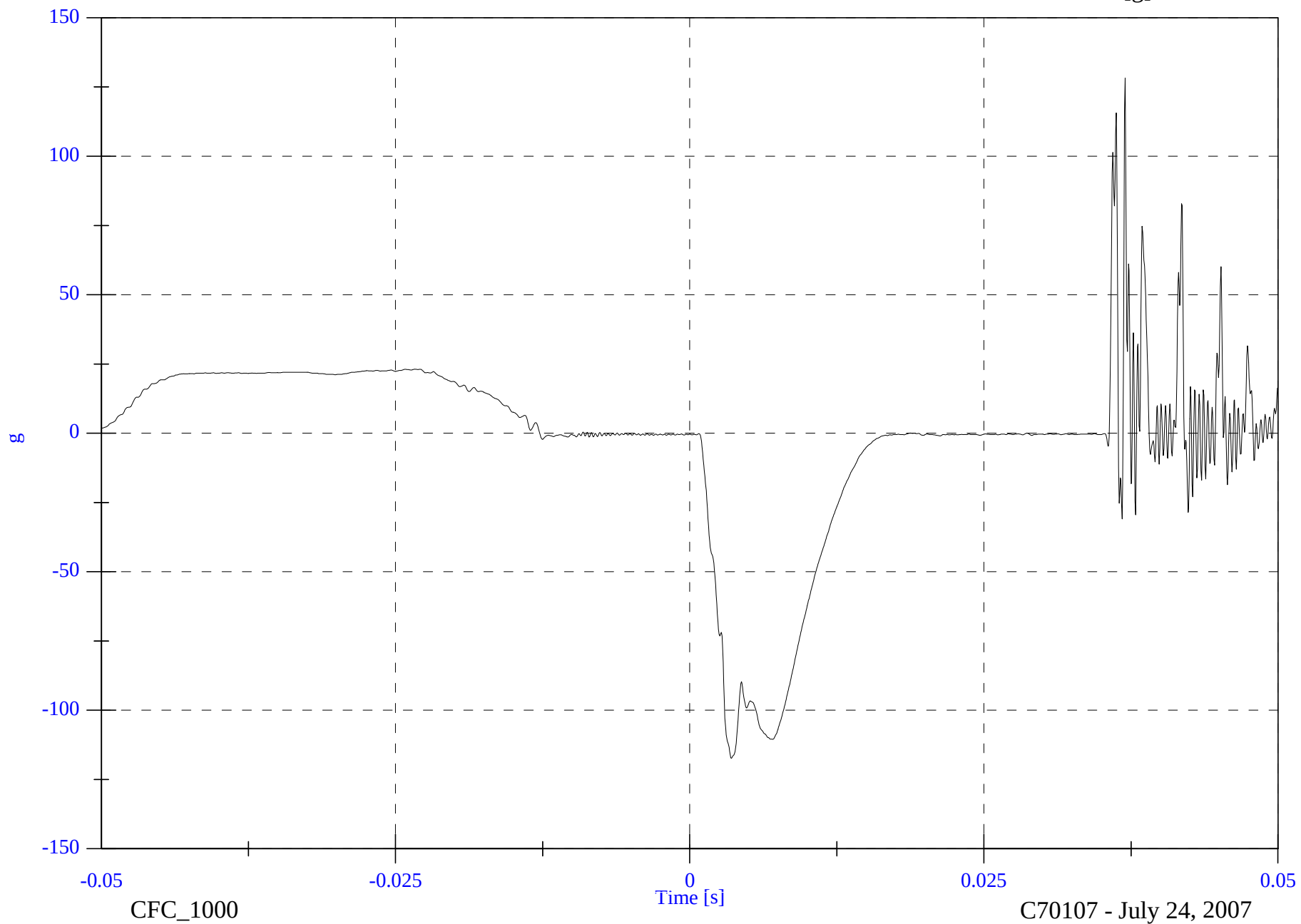
Headform X Acceleration

Max: 128.2 [g] at 0.037 [s]

Min: -117.4 [g] at 0.004 [s]

C70107 AP3 IMPACT PLOT #1

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

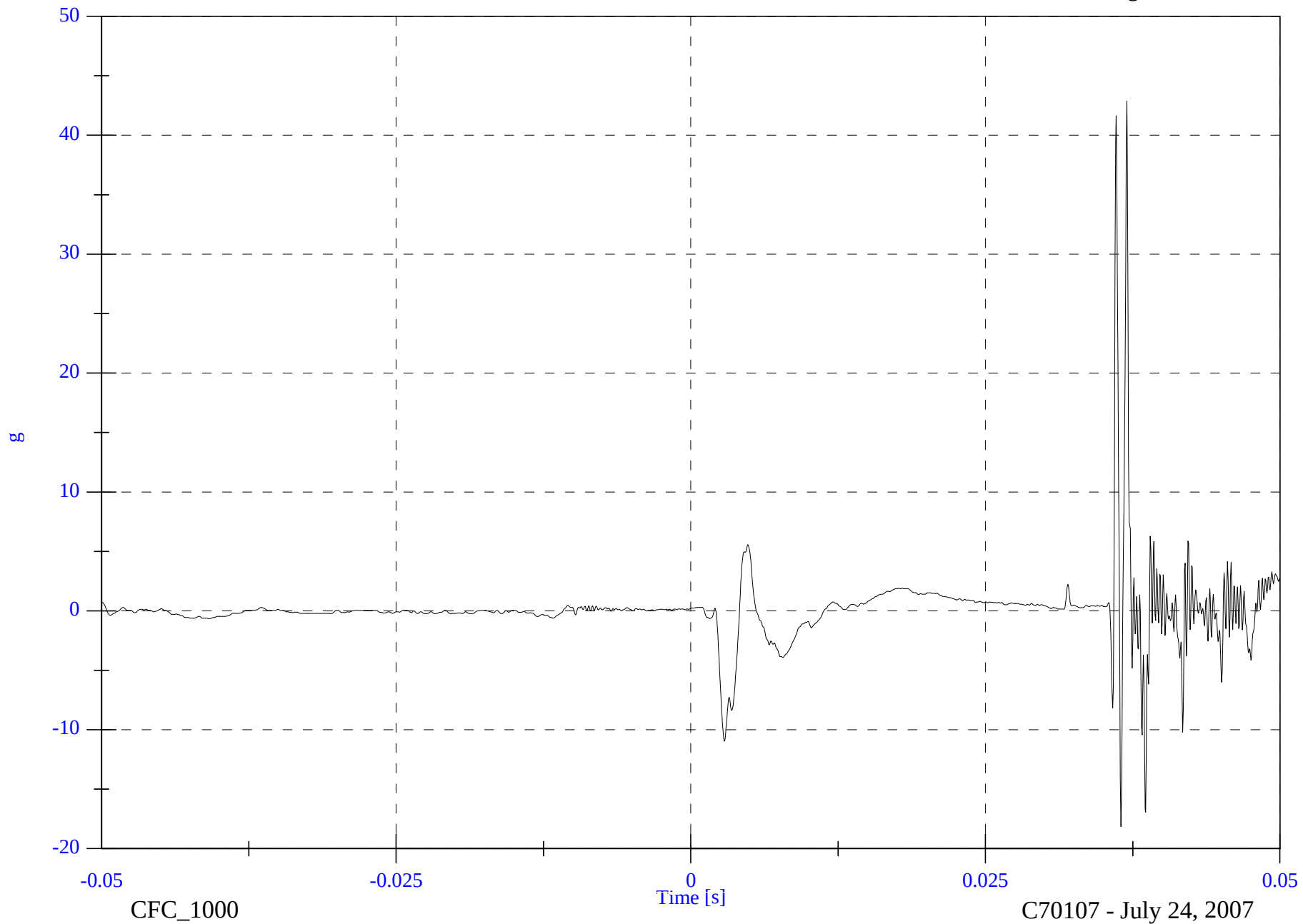
Headform Y Acceleration

Max: 42.9 [g] at 0.037 [s]

Min: -18.1 [g] at 0.036 [s]

C70107 AP3 IMPACT PLOT #2

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

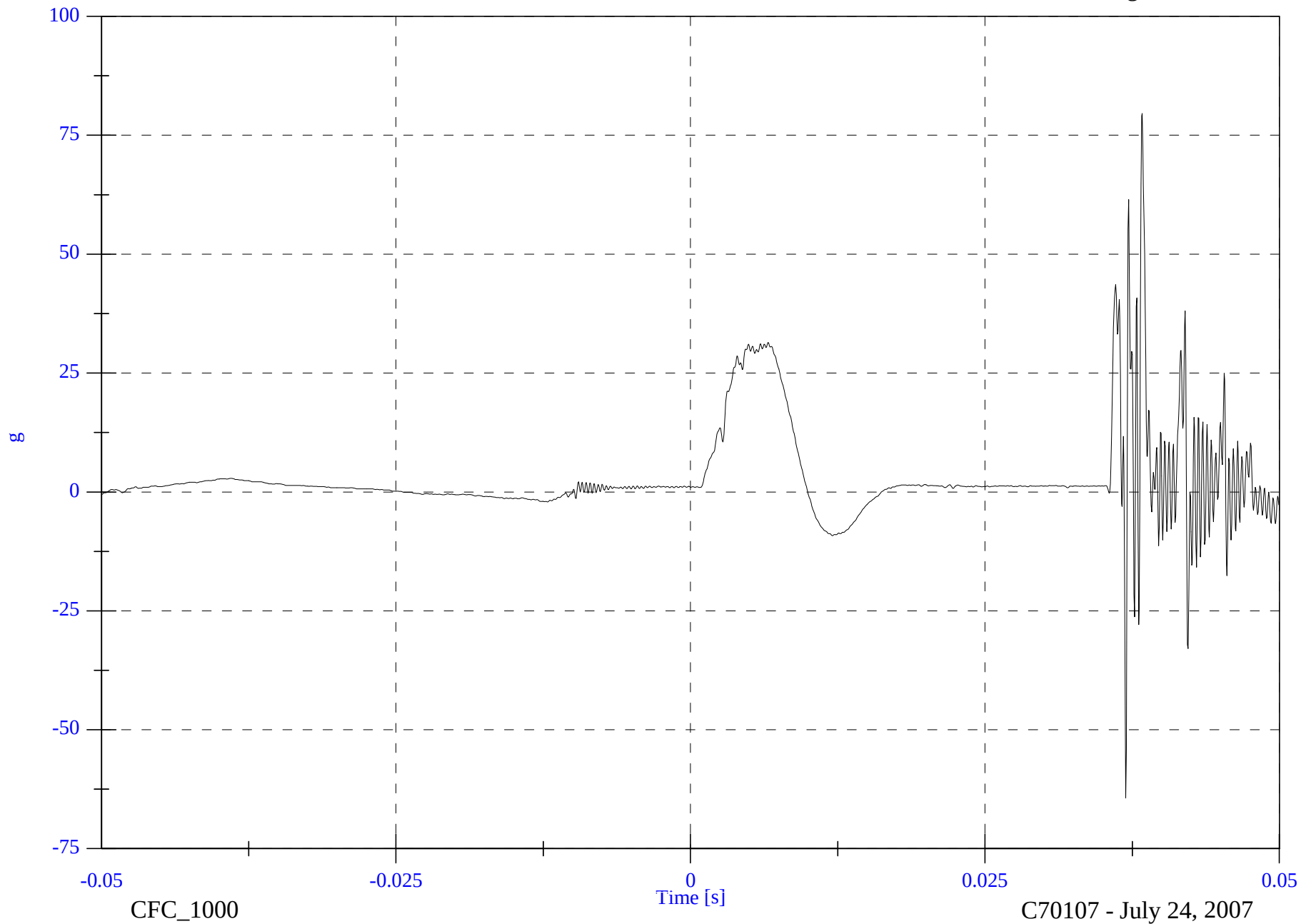
Headform Z Acceleration

Max: 79.6 [g] at 0.038 [s]

Min: -64.4 [g] at 0.037 [s]

C70107 AP3 IMPACT PLOT #3

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

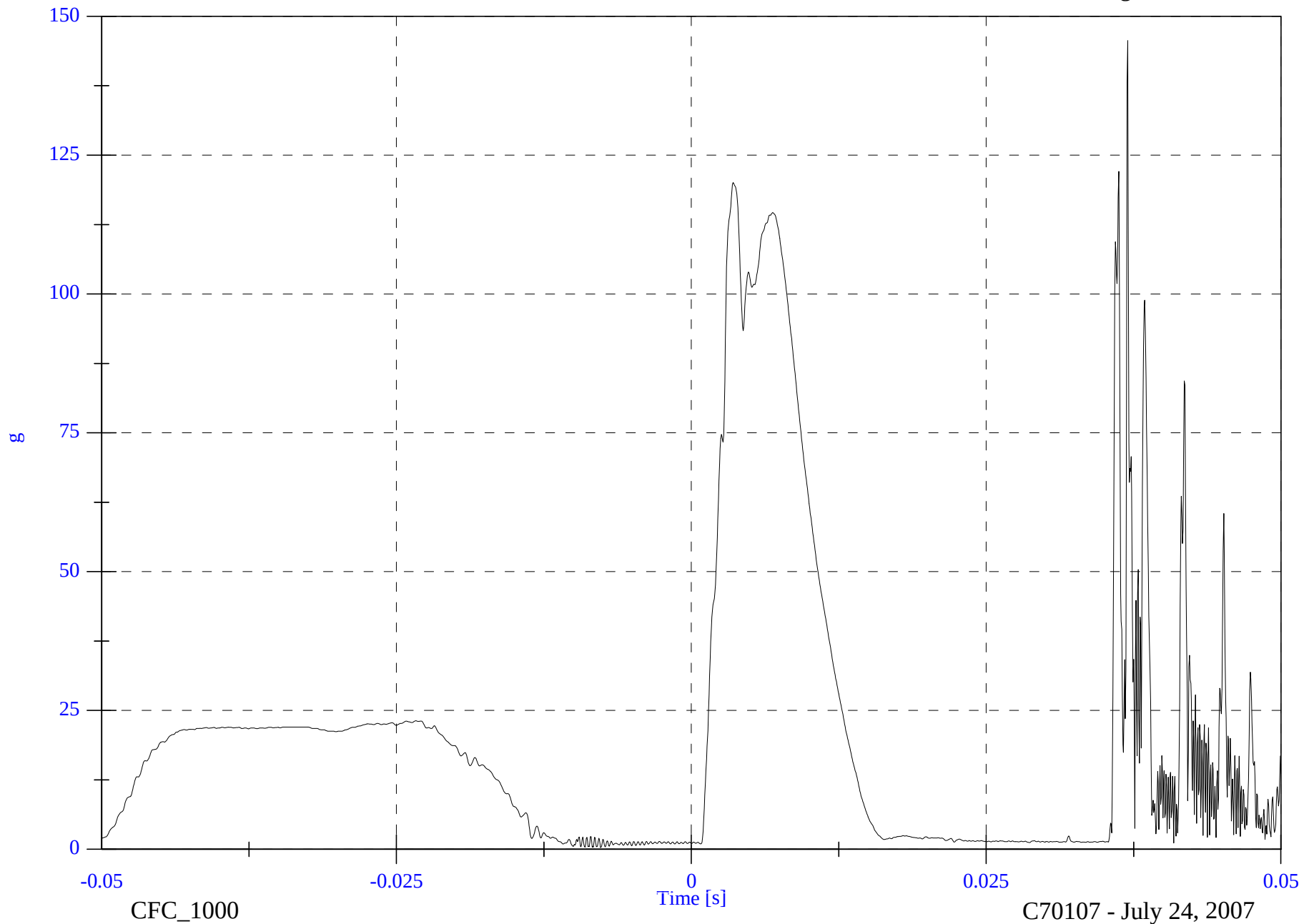
Headform Resultant

Max: 145.6 [g] at 0.037 [s]

Min: 0.3 [g] at -0.008 [s]

C70107 AP3 IMPACT PLOT #4

8826-FMH-05

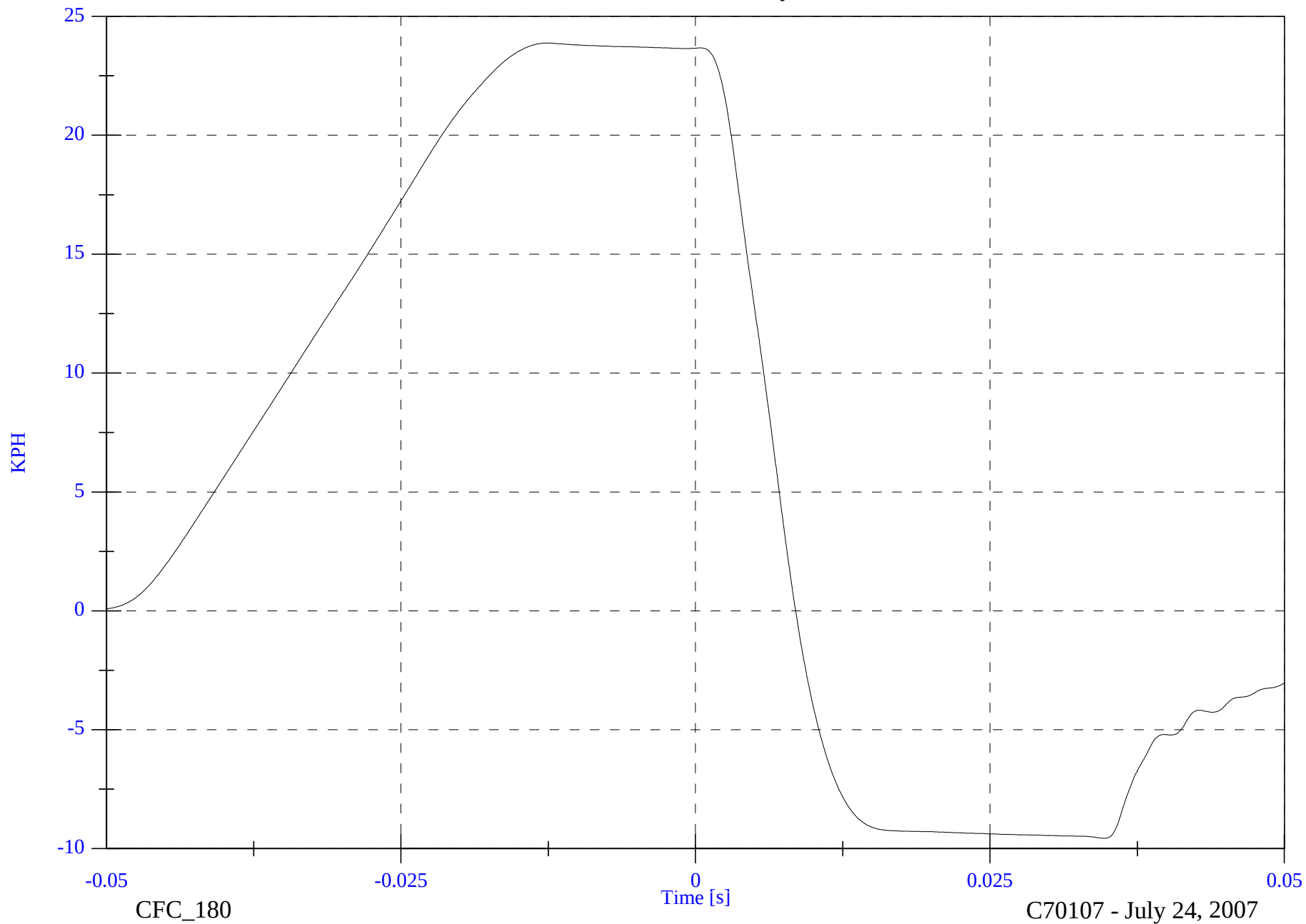


FMVSS 201U 2007 Chevrolet HHR

Headform Velocity

Max: 23.9 [KPH] at -0.013 [s]

Min: -9.6 [KPH] at 0.035 [s]



C70107 AP3 IMPACT PLOT #5

8826-FMH-05

CFC_180

C70107 - July 24, 2007



PRE-IMPACT AP3



POST-IMPACT AP3

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	07
Test Date:	07/24/07
Target Location:	A-PILLAR
Target Code:	AP1
Horizontal Impact Angle:	136°
Vertical Impact Angle:	47°
Ambient Temperature:	21.4
Relative Humidity:	47.2
Time of Impact:	16:00
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	2	mm right	x mm left
On Centerline	22	mm up	



POST-IMPACT AP1 HEADFORM

Free Motion HIC	1294.8
HIC(d)	1143.3
Impact Velocity (kph)	23.42
HIC T1 (msec)	5.1
HIC T2 (msec)	8.3

FMVSS 201U 2007 Chevrolet HHR C70107 - AP1

FMH Headform 0355

Location: AP1

Test Date: July 24, 2007

Work File: AP1

-----TEST RESULTS-----

Lab Temperature: 21.4 C

HICd: 1143.3

Lab Humidity: 47.2 %

HIC (36ms): 1294.8

Velocity at Impact: 23.42 KPH

t1: 5.1 msec

t2: 8.3 msec

Free Flight Distance: 224.31 mm

Duration: 3.2 msec

Maximum: 224.9 g

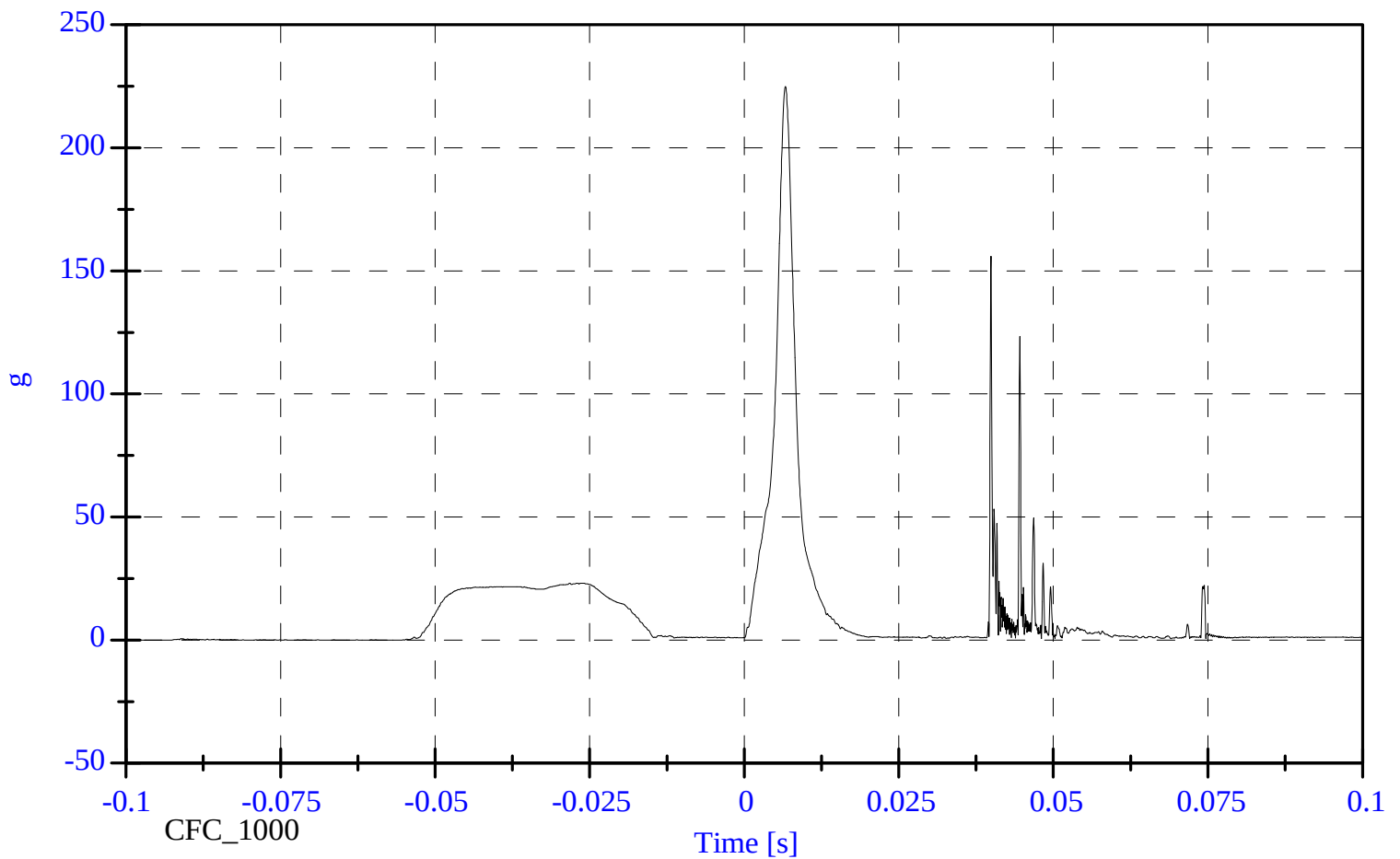
Average Acceleration: 9.9 g

FMVSS 201U 2007 Chevrolet HHR

Headform Resultant

Max: 224.9 [g] at 0.007 [s]

Min: -0.0 [g] at -0.099 [s]



FMVSS 201U 2007 Chevrolet HHR

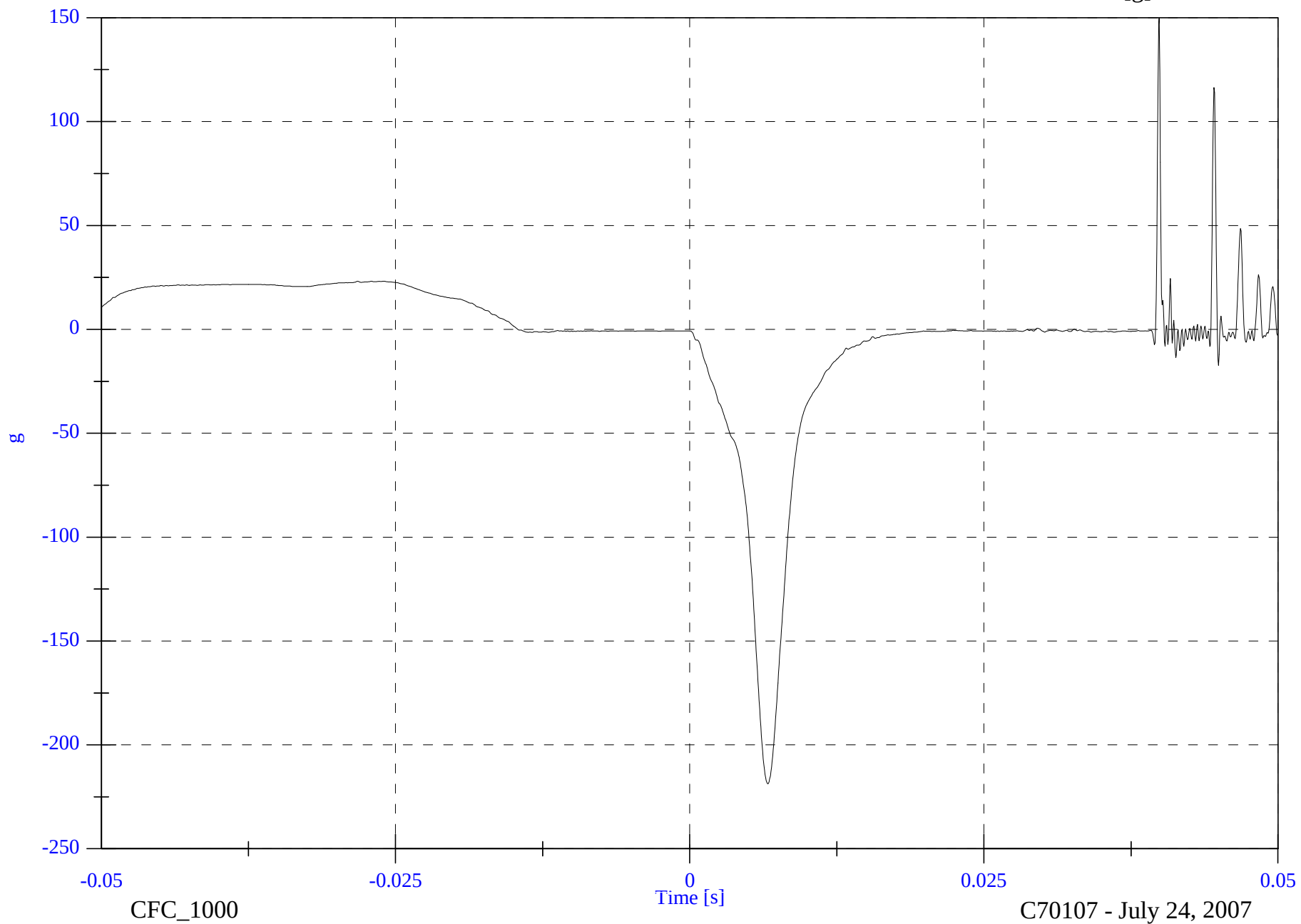
Headform X Acceleration

Max: 149.9 [g] at 0.040 [s]

Min: -218.8 [g] at 0.007 [s]

C70107 AP1 IMPACT PLOT #1

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

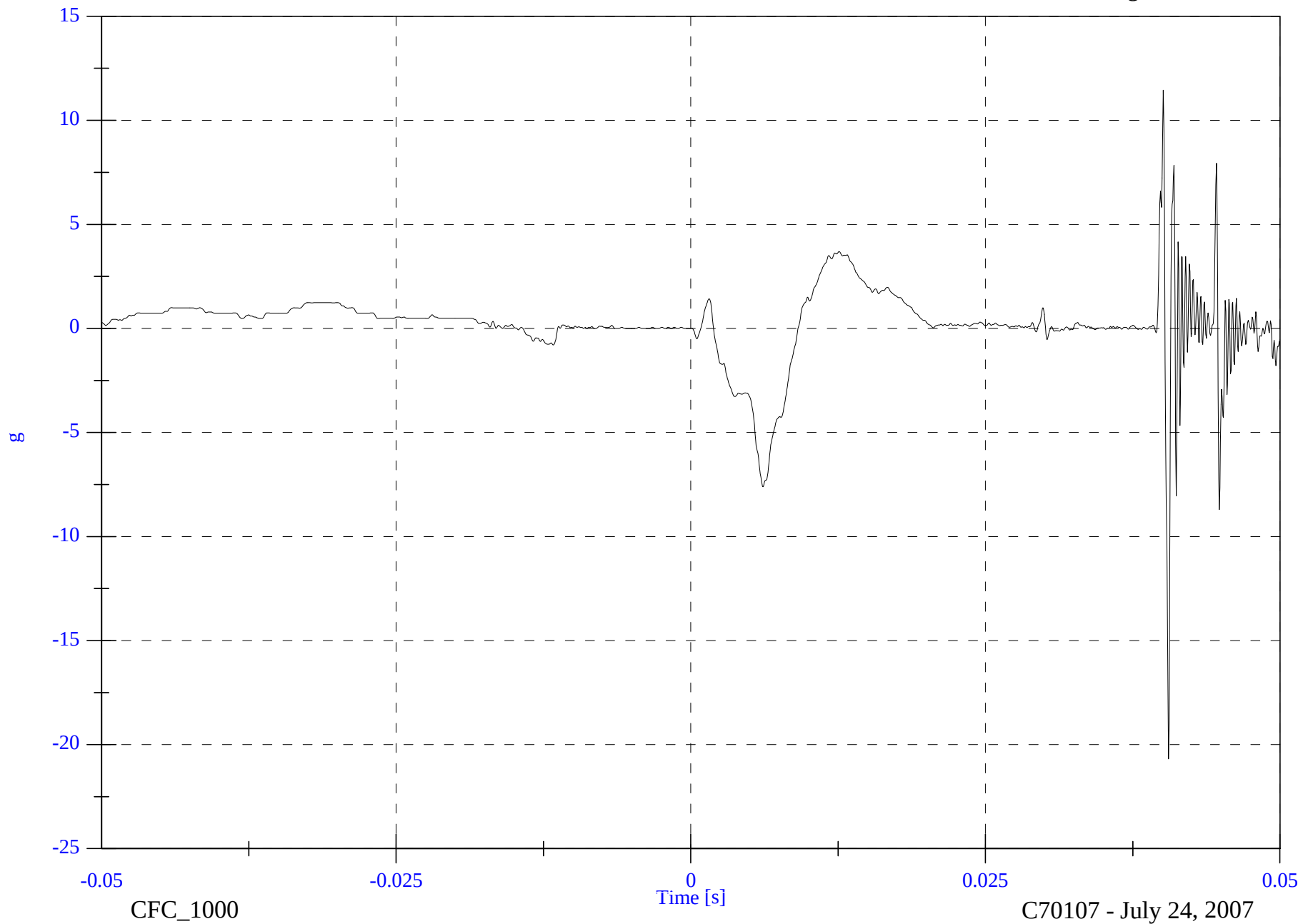
Headform Y Acceleration

Max: 11.4 [g] at 0.040 [s]

Min: -20.7 [g] at 0.041 [s]

C70107 AP1 IMPACT PLOT #2

8826-FMH-05

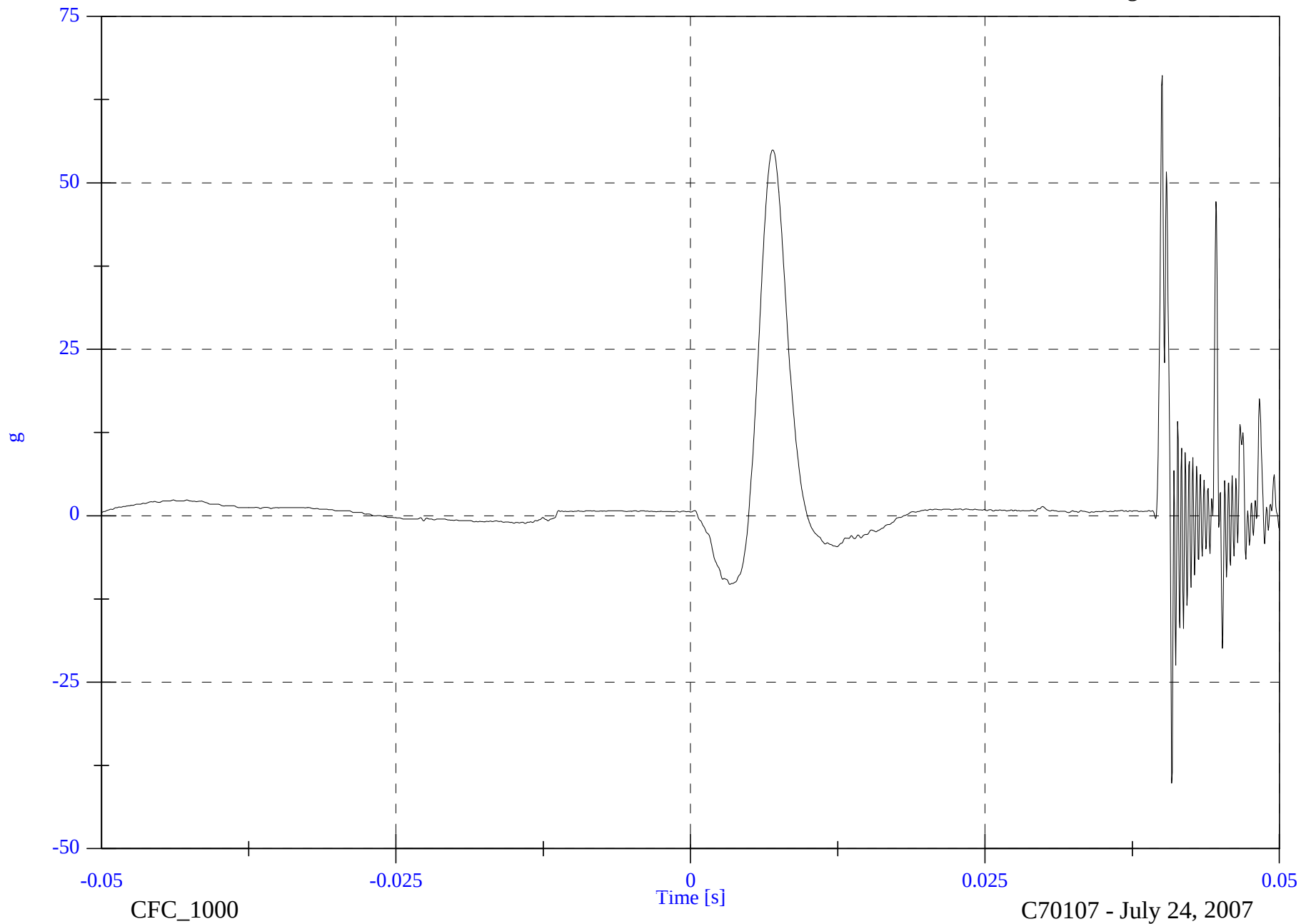


FMVSS 201U 2007 Chevrolet HHR

Headform Z Acceleration

Max: 66.1 [g] at 0.040 [s]

Min: -40.2 [g] at 0.041 [s]



C70107 AP1 IMPACT PLOT #3

8826-FMH-05

CFC_1000

C70107 - July 24, 2007

FMVSS 201U 2007 Chevrolet HHR

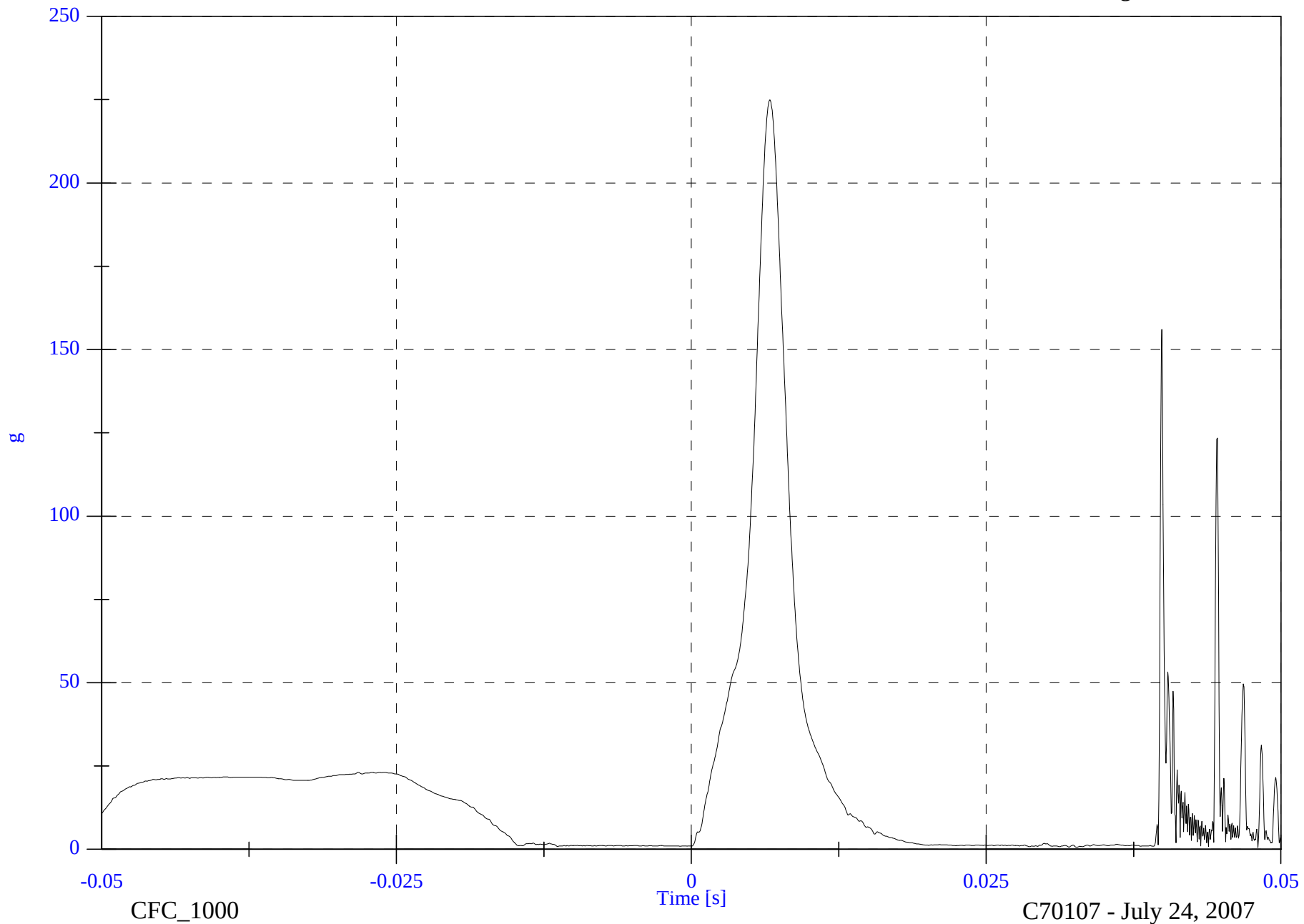
Headform Resultant

Max: 224.9 [g] at 0.007 [s]

Min: 0.5 [g] at 0.048 [s]

C70107 AP1 IMPACT PLOT #4

8826-FMH-05

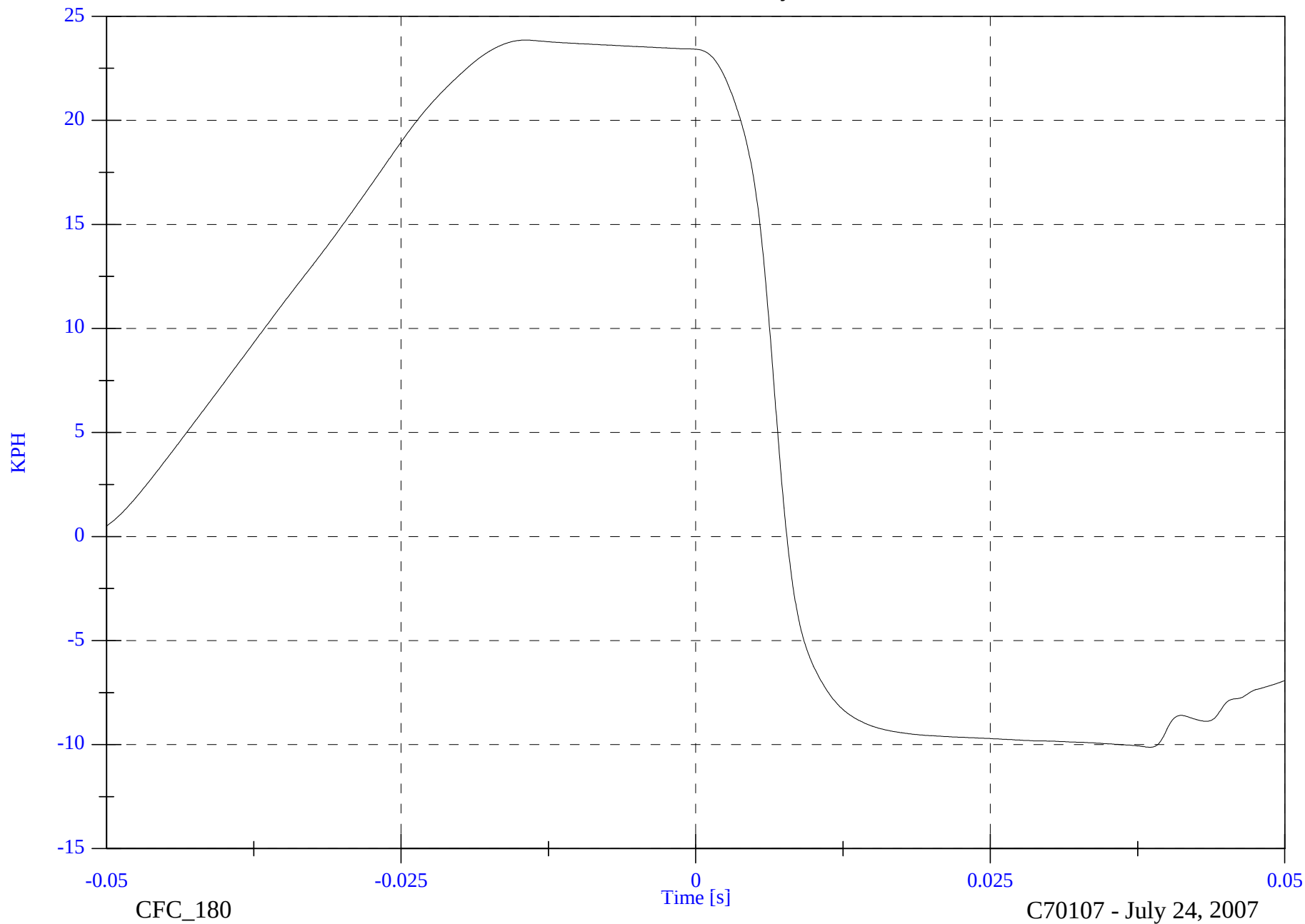


FMVSS 201U 2007 Chevrolet HHR

Headform Velocity

Max: 23.9 [KPH] at -0.014 [s]

Min: -10.1 [KPH] at 0.039 [s]



C70107 AP1 IMPACT PLOT #5

8826-FMH-05

CFC_180

C70107 - July 24, 2007



PRE-IMPACT AP1

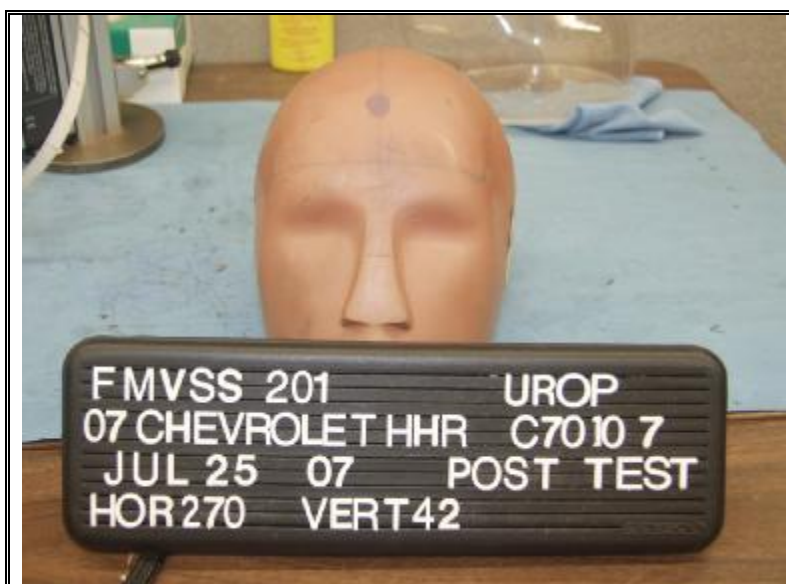


POST-IMPACT API

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	08
Test Date:	07/25/07
Target Location:	UPPER ROOF
Target Code:	UROP
Horizontal Impact Angle:	270°
Vertical Impact Angle:	42°
Ambient Temperature:	20.8
Relative Humidity:	51.9
Time of Impact:	10:00
Headform Number:	0642

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	0	☐	mm right ☐ mm left
On Centerline	31		mm up



POST-IMPACT UROP HEADFORM

Free Motion HIC	815.3
HIC(d)	781.5
Impact Velocity (kph)	23.45
HIC T1 (msec)	11.1
HIC T2 (msec)	14.4

FMVSS 201U 2007 Chevrolet HHR C70107 - UROP

FMH Headform 0642

Location: UROP

Test Date: July 25, 2007

Work File: UROP

-----TEST RESULTS-----

Lab Temperature: 20.8 C

HICd: 781.5

Lab Humidity: 51.9 %

HIC (36ms): 815.3

Velocity at Impact: 23.45 KPH

t1: 11.1 msec

t2: 14.4 msec

Free Flight Distance: 215.14 mm

Duration: 3.3 msec

Maximum: 182.8 g

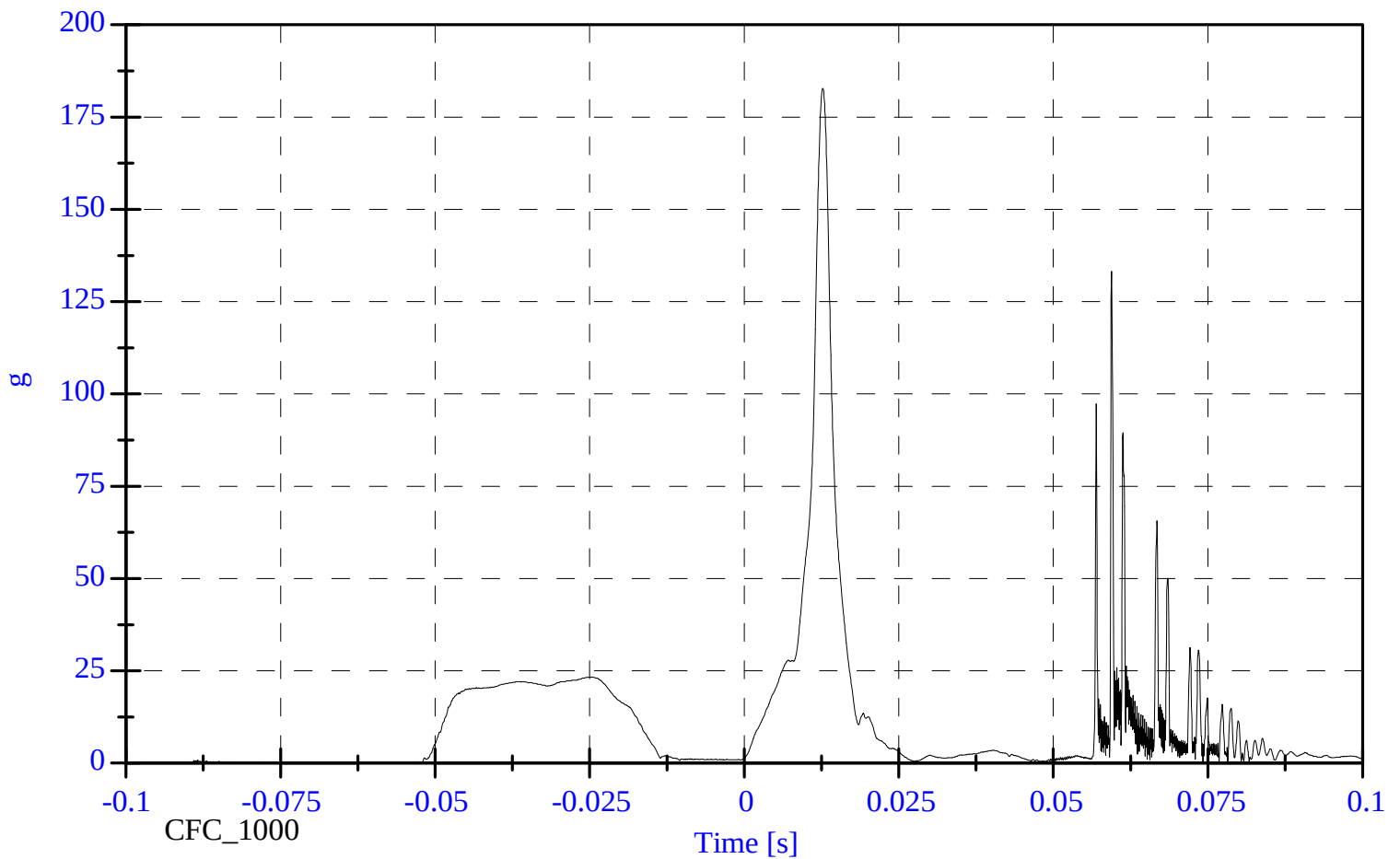
Average Acceleration: 10.7 g

FMVSS 201U 2007 Chevrolet HHR

Headform Resultant

Max: 182.8 [g] at 0.013 [s]

Min: 0.0 [g] at -0.061 [s]



FMVSS 201U 2007 Chevrolet HHR

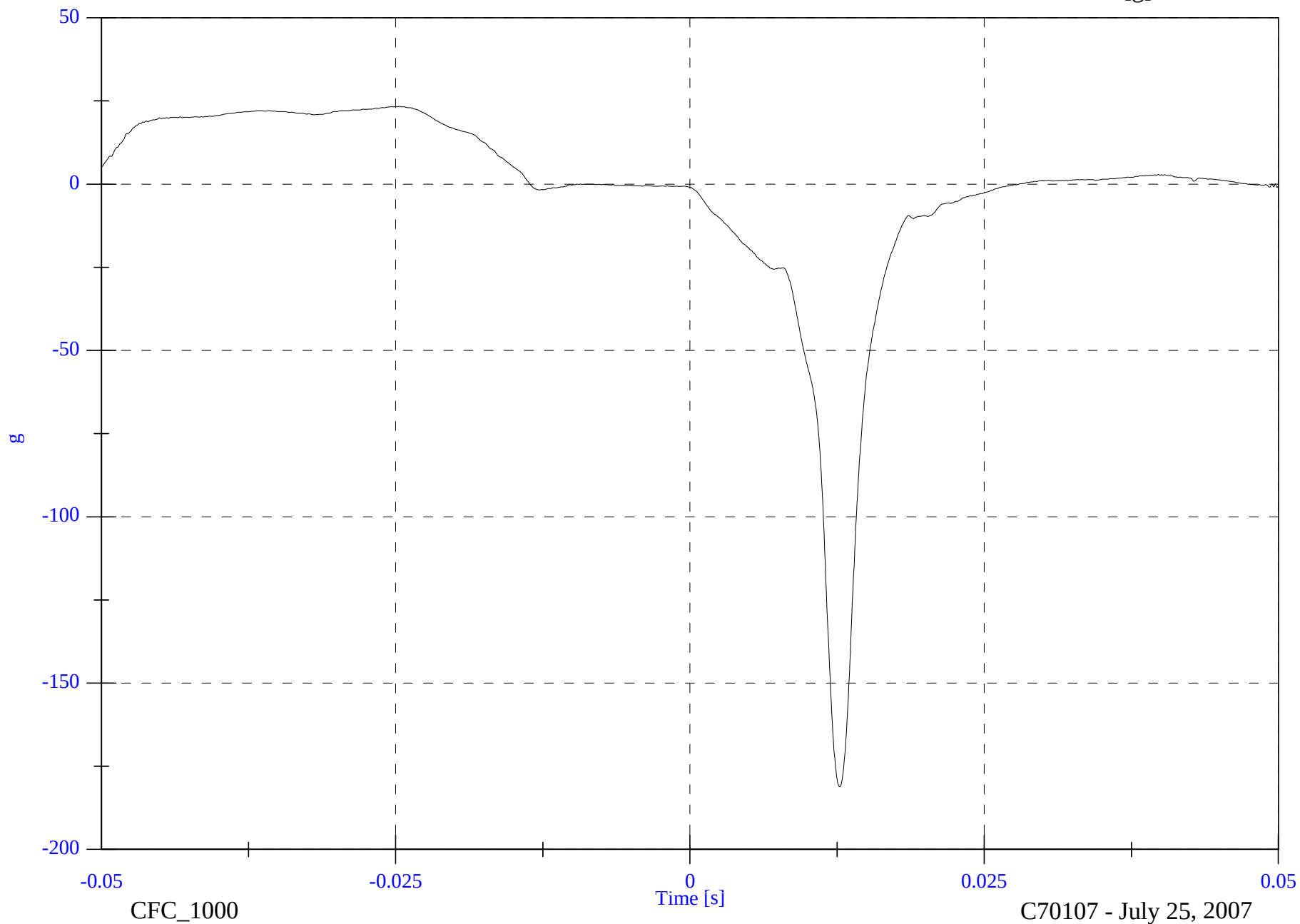
Headform X Acceleration

Max: 23.3 [g] at -0.025 [s]

Min: -181.2 [g] at 0.013 [s]

C70107 UROP IMPACT PLOT #1

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

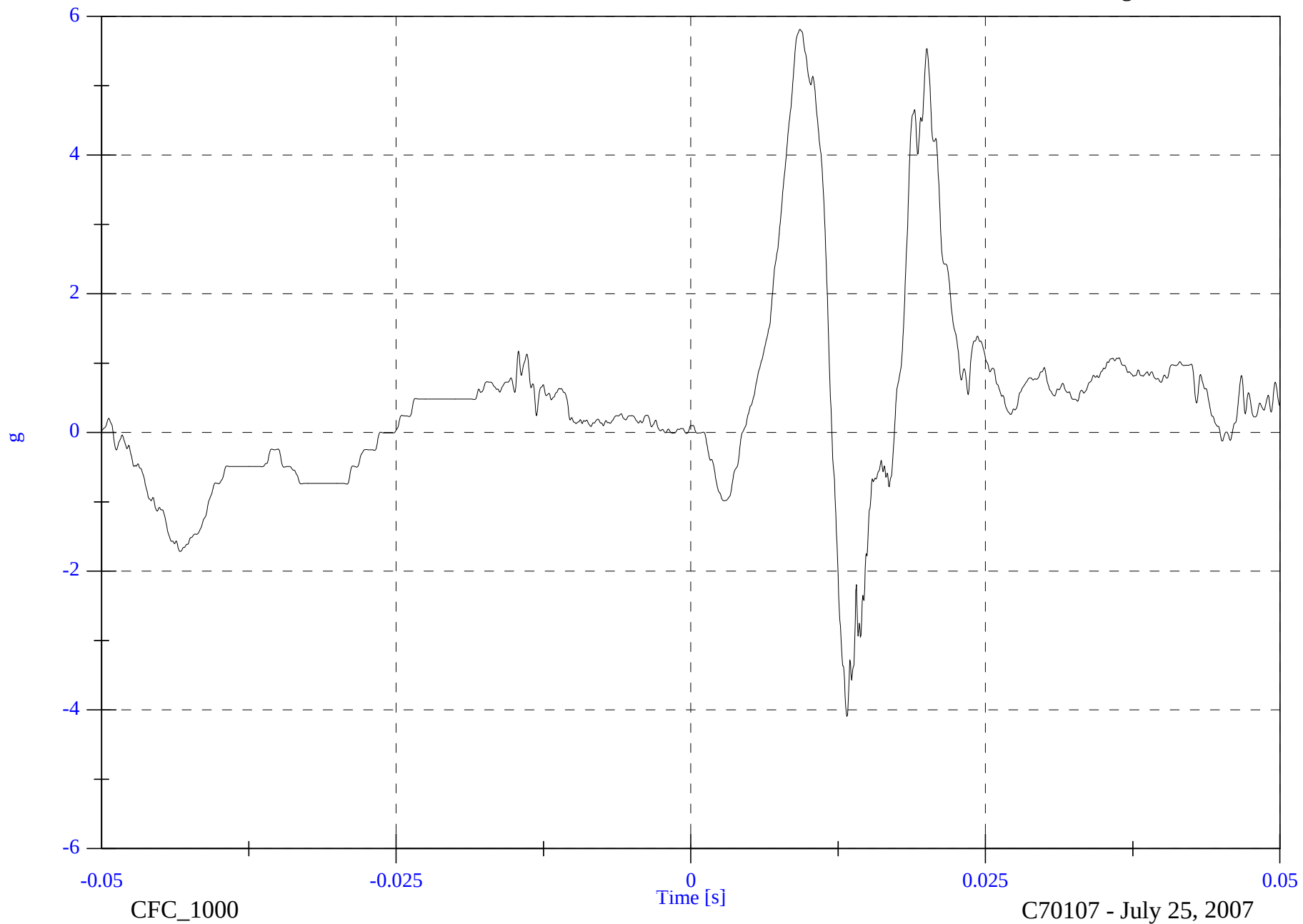
Headform Y Acceleration

Max: 5.8 [g] at 0.009 [s]

Min: -4.1 [g] at 0.013 [s]

C70107 UROP IMPACT PLOT #2

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

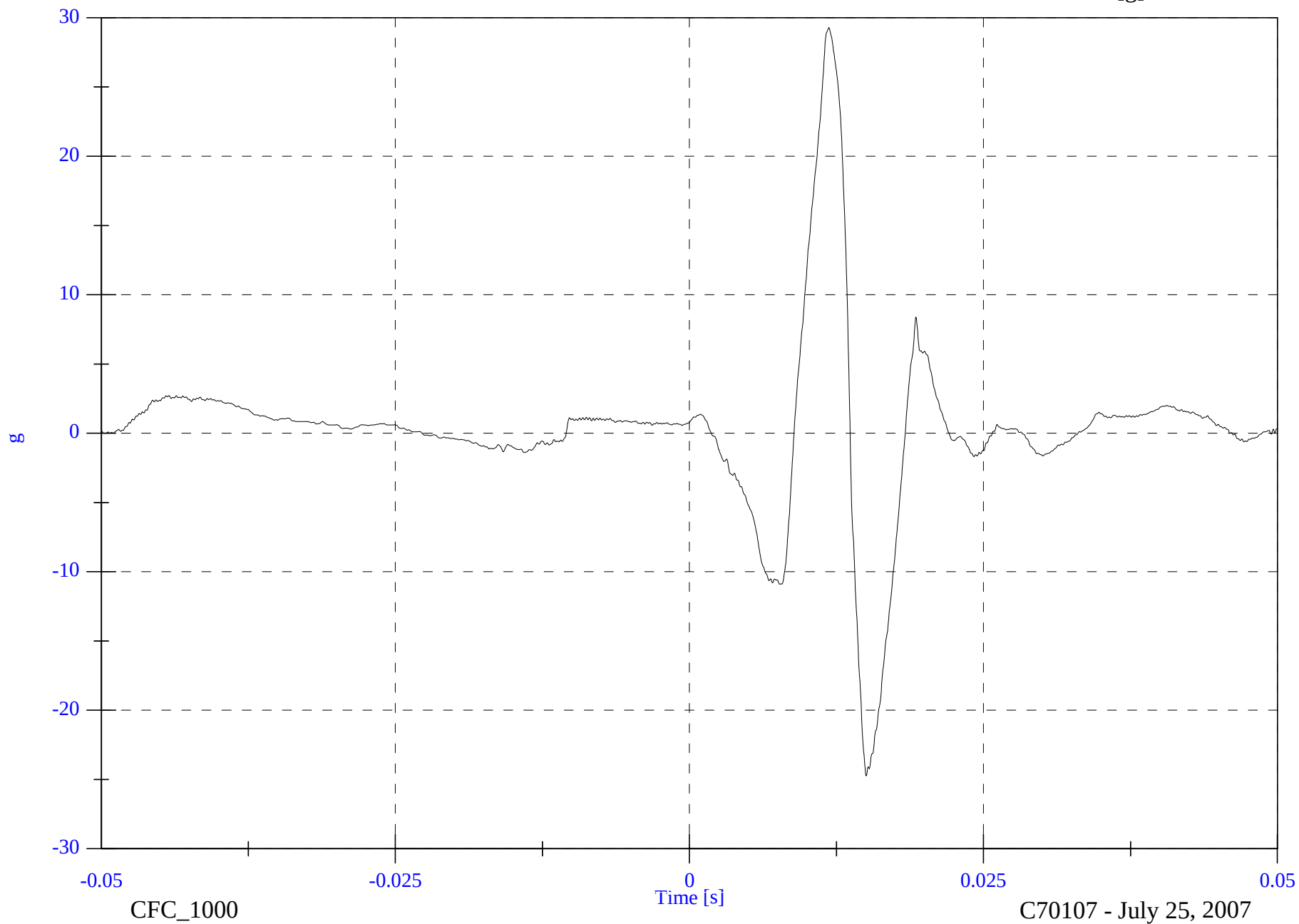
Headform Z Acceleration

Max: 29.3 [g] at 0.012 [s]

Min: -24.7 [g] at 0.015 [s]

C70107 UROP IMPACT PLOT #3

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

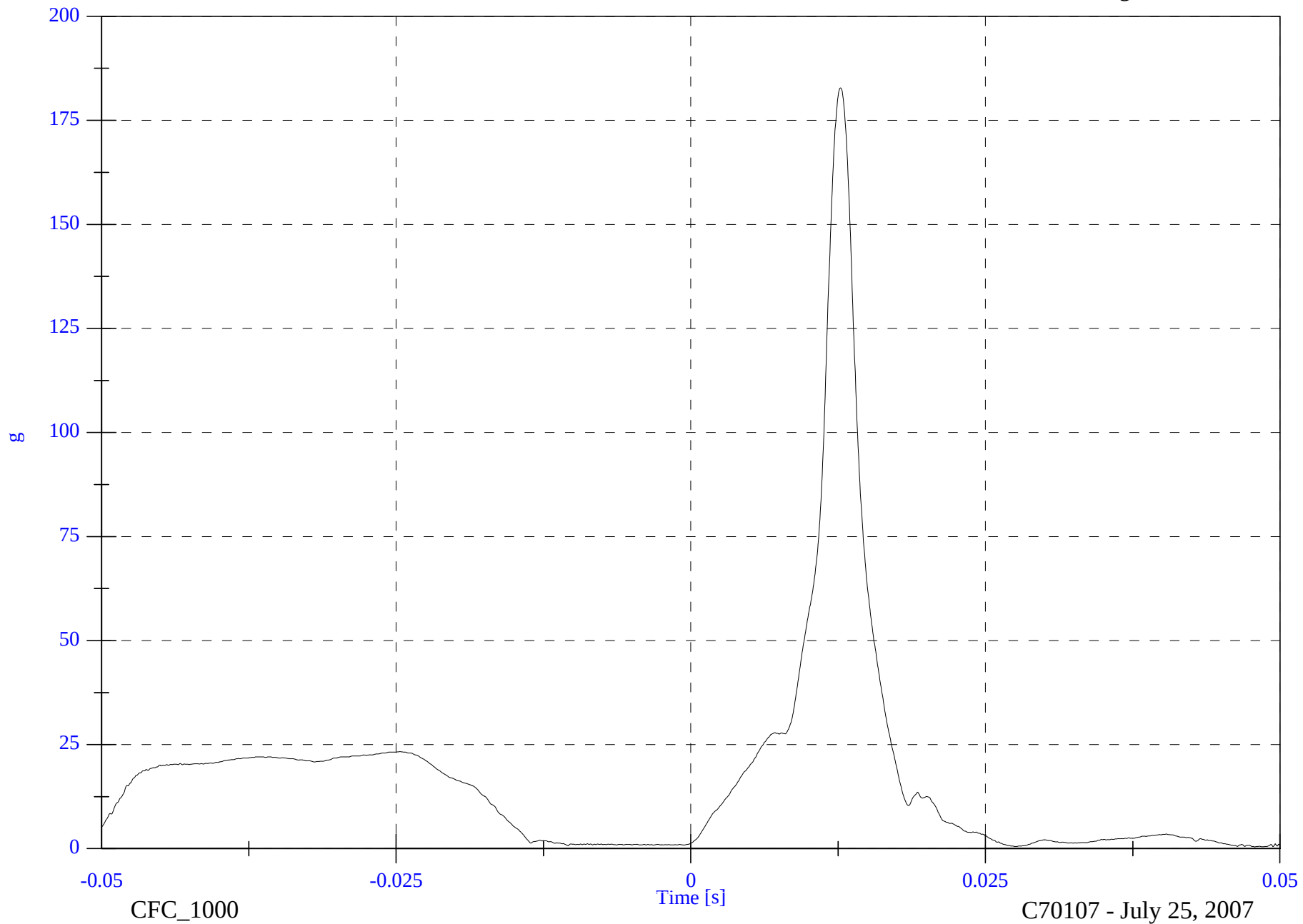
Headform Resultant

Max: 182.8 [g] at 0.013 [s]

Min: 0.4 [g] at 0.048 [s]

C70107 UROP IMPACT PLOT #4

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

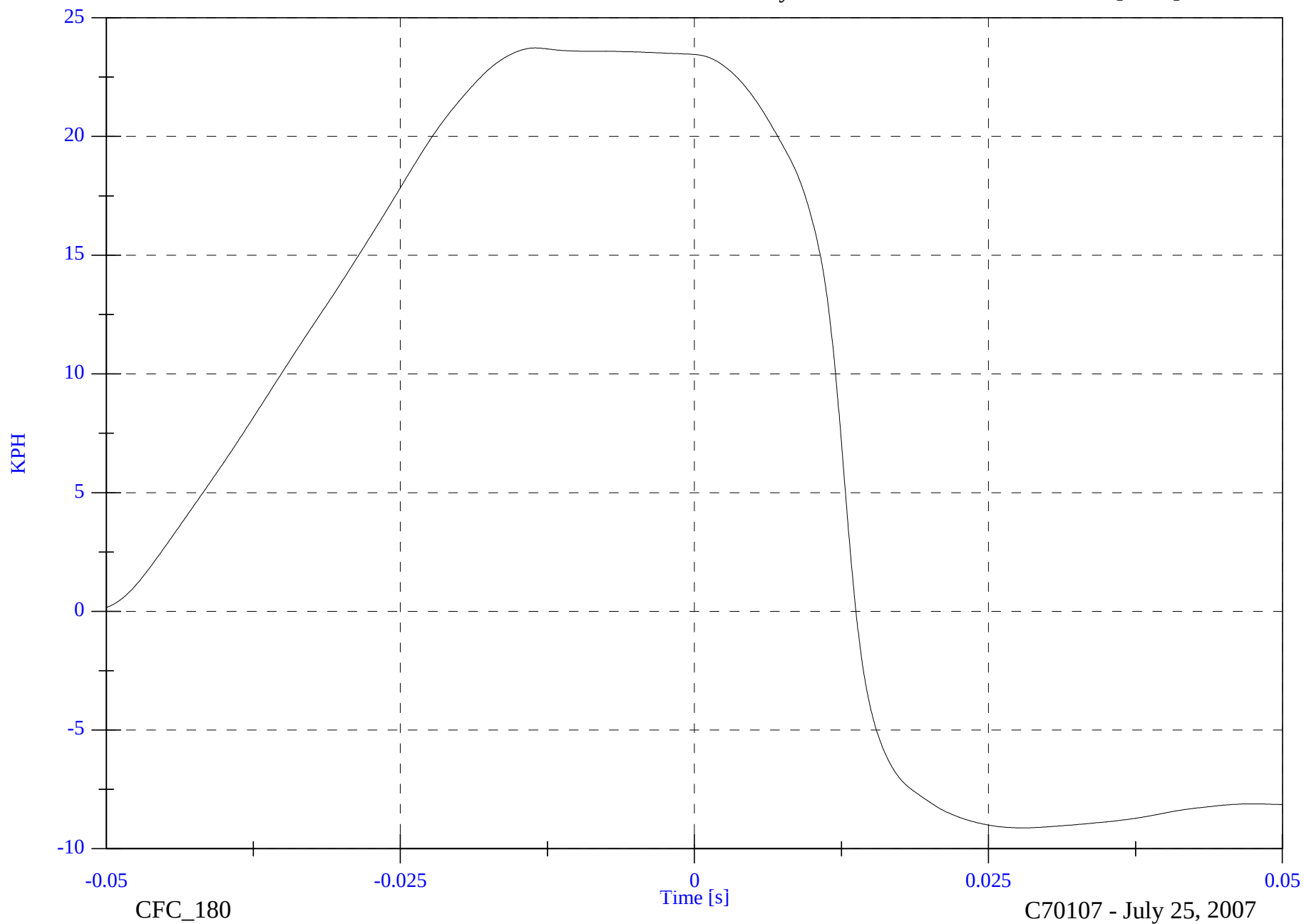
Headform Velocity

Max: 23.7 [KPH] at -0.014 [s]

Min: -9.1 [KPH] at 0.028 [s]

C70107 UROP IMPACT PLOT #5

8826-FMH-05





PRE-IMPACT UROP



POST-IMPACT UROP

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	09
Test Date:	07/25/07
Target Location:	B-PILLAR
Target Code:	BP2
Horizontal Impact Angle:	270°
Vertical Impact Angle:	0°
Ambient Temperature:	20.9
Relative Humidity:	50.3
Time of Impact:	10:45
Headform Number:	0805

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	0	☐	mm right ☐ mm left
On Centerline	0		mm up



POST-IMPACT BP2 HEADFORM

Free Motion HIC	606.8
HIC(d)	624.2
Impact Velocity (kph)	23.36
HIC T1 (msec)	1.3
HIC T2 (msec)	11.0

NOTE: BP2 trim shattered upon impact

FMVSS 201U 2007 Chevrolet HHR C70107 - BP2

FMH Headform 0805

Location: BP2

Test Date: July 25, 2007

Work File: BP2

-----TEST RESULTS-----

Lab Temperature: 20.9 C

HICd: 624.2

Lab Humidity: 50.3 %

HIC (36ms): 606.8

Velocity at Impact: 23.36 KPH

t1: 1.3 msec

t2: 11.0 msec

Free Flight Distance: 220.62 mm

Duration: 9.7 msec

Maximum: 117.2 g

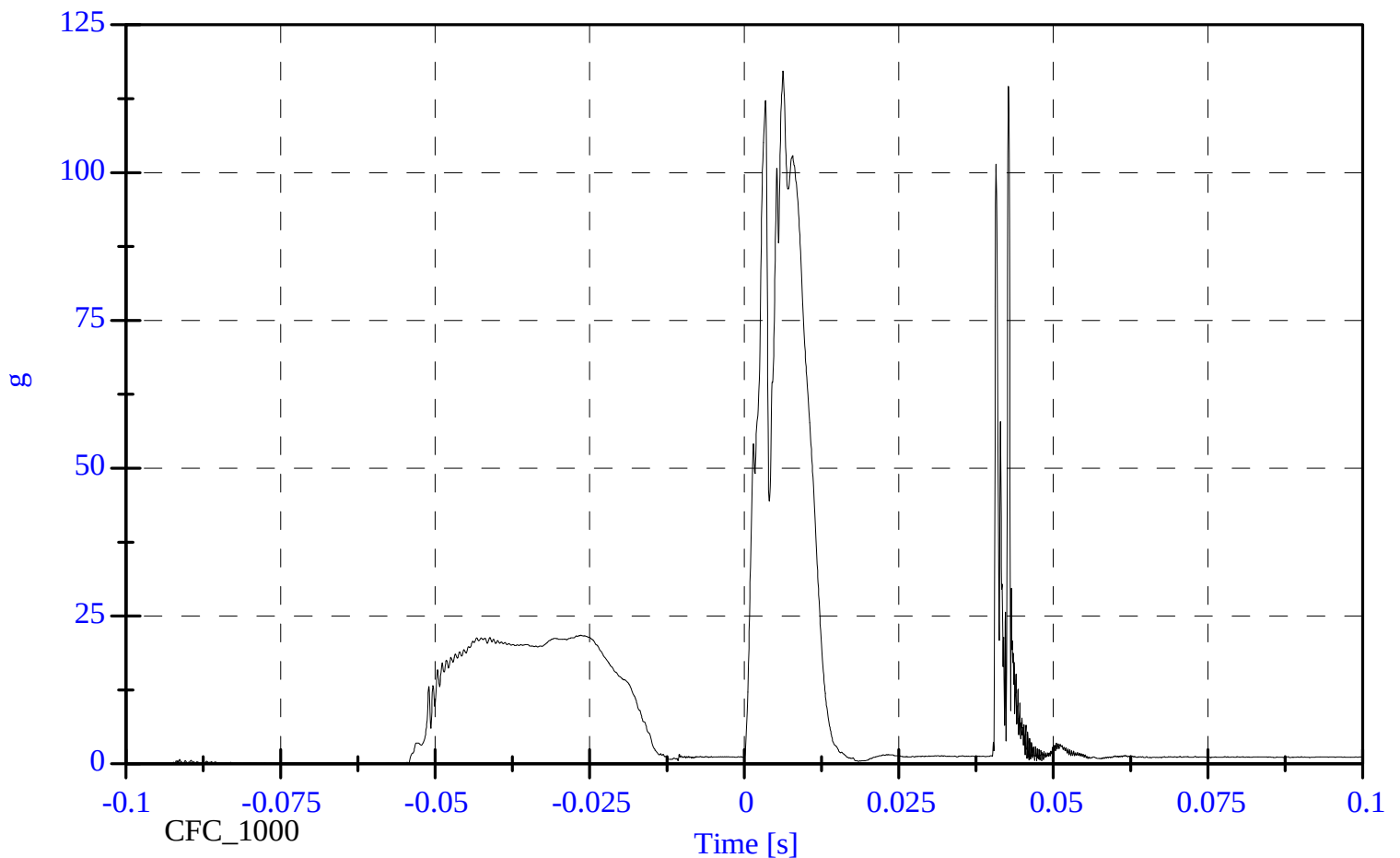
Average Acceleration: 9.3 g

FMVSS 201U 2007 Chevrolet HHR

Headform Resultant

Max: 117.2 [g] at 0.006 [s]

Min: 0.0 [g] at -0.061 [s]

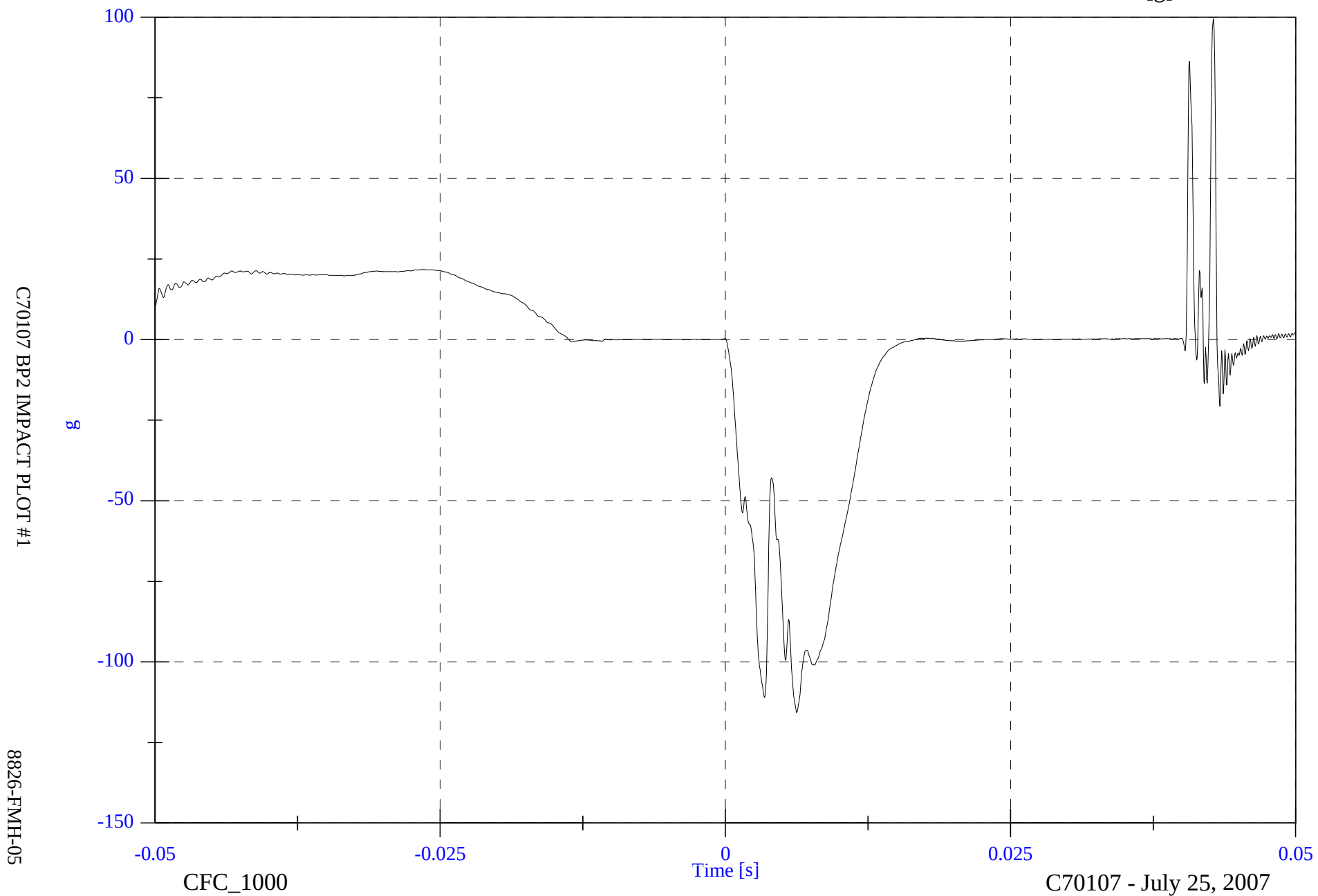


FMVSS 201U 2007 Chevrolet HHR

Headform X Acceleration

Max: 99.5 [g] at 0.043 [s]

Min: -115.7 [g] at 0.006 [s]



FMVSS 201U 2007 Chevrolet HHR

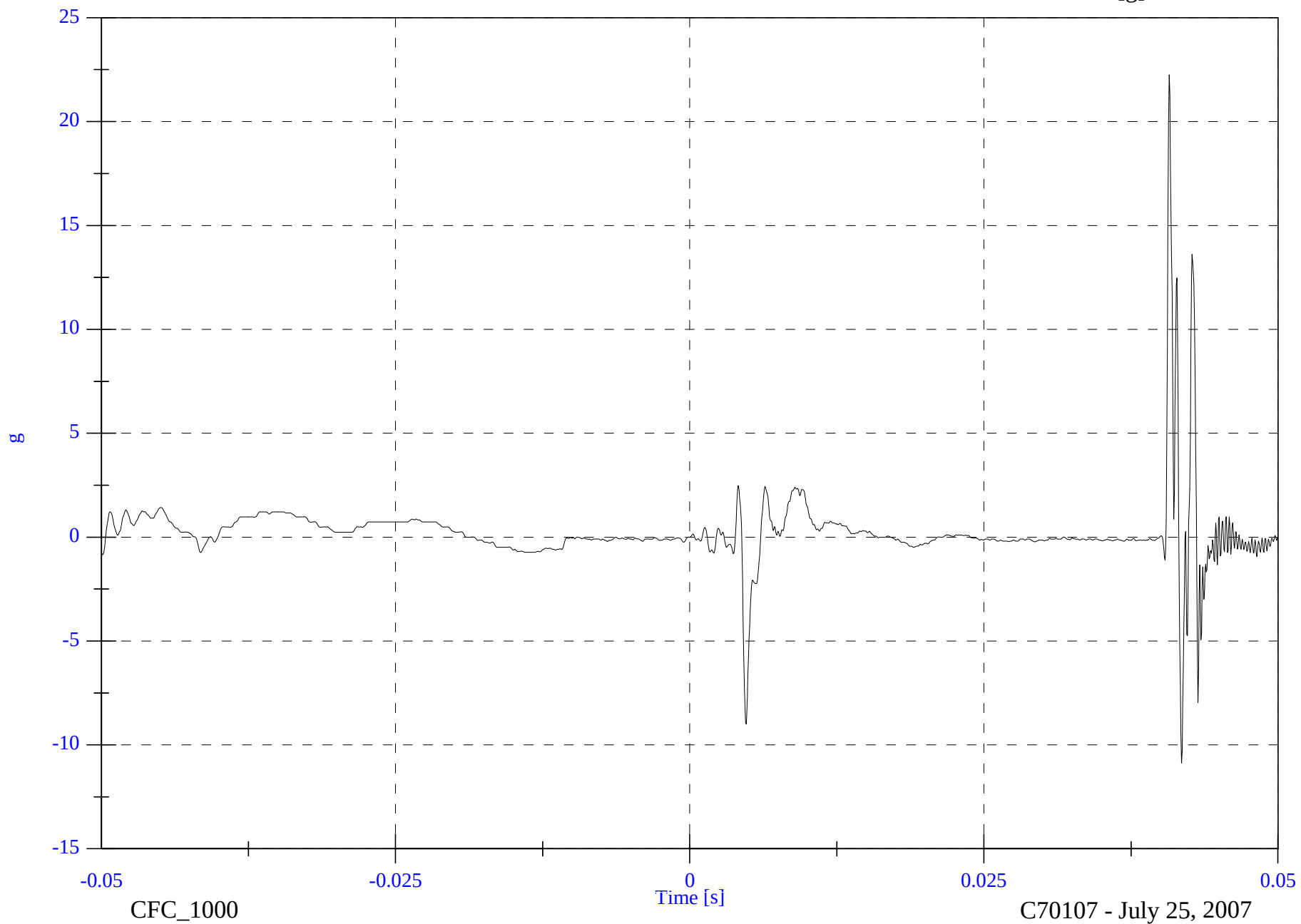
Headform Y Acceleration

Max: 22.3 [g] at 0.041 [s]

Min: -10.9 [g] at 0.042 [s]

C70107 BP2 IMPACT PLOT #2

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

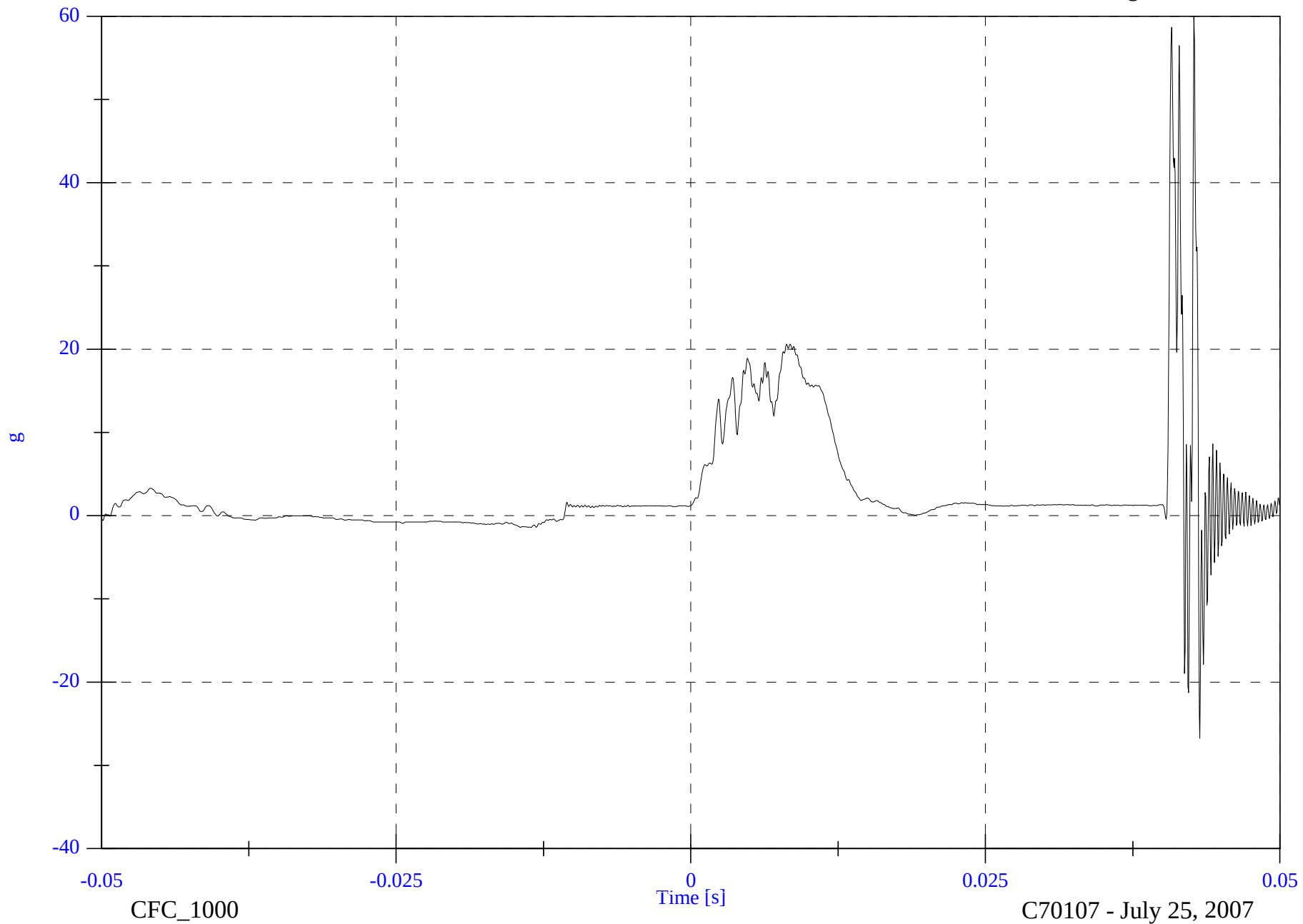
Headform Z Acceleration

Max: 59.9 [g] at 0.043 [s]

Min: -26.8 [g] at 0.043 [s]

C70107 BP2 IMPACT PLOT #3

8826-FMH-05



CFC_1000

C70107 - July 25, 2007

FMVSS 201U 2007 Chevrolet HHR

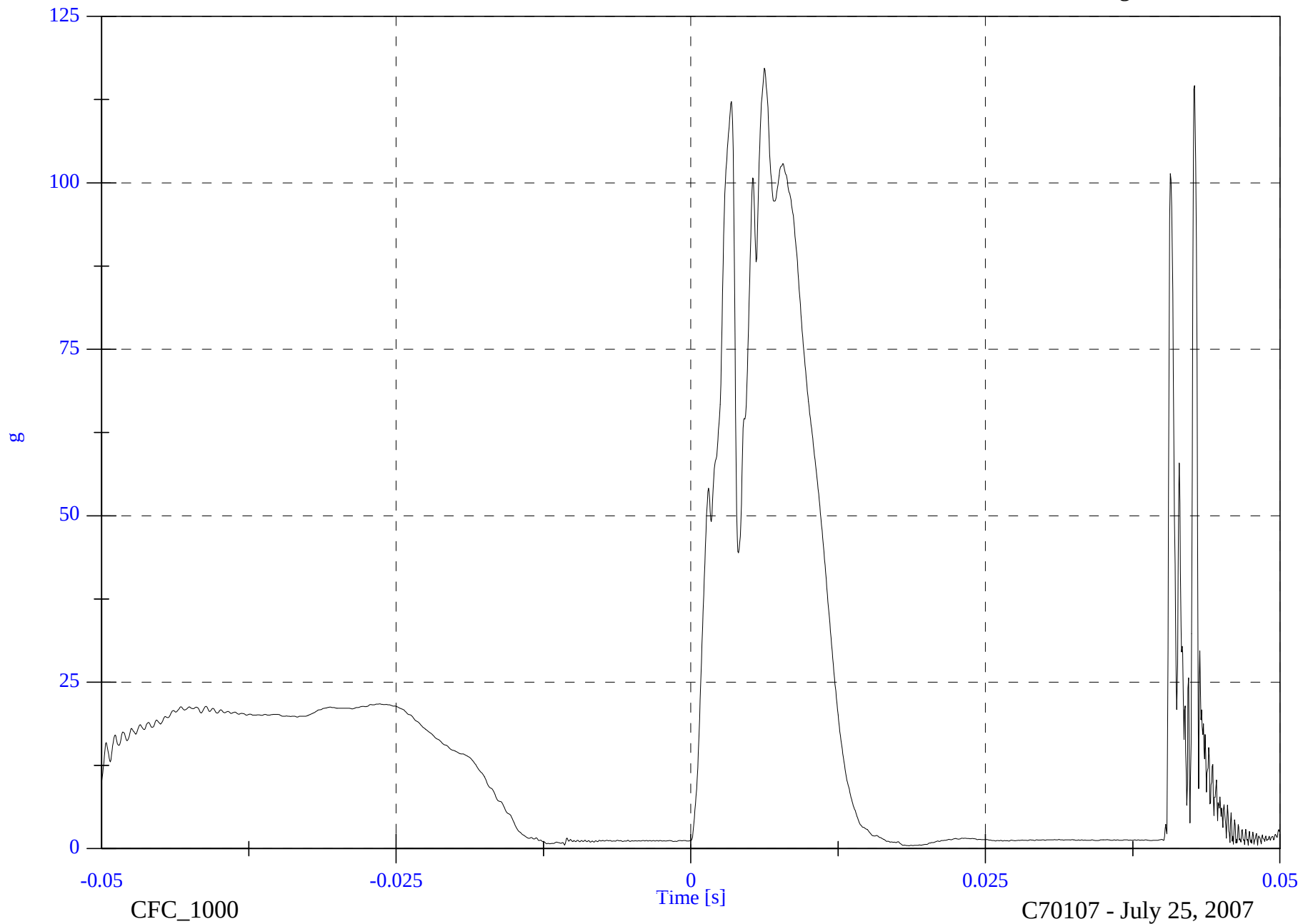
Headform Resultant

Max: 117.2 [g] at 0.006 [s]

Min: 0.4 [g] at 0.019 [s]

C70107 BP2 IMPACT PLOT #4

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

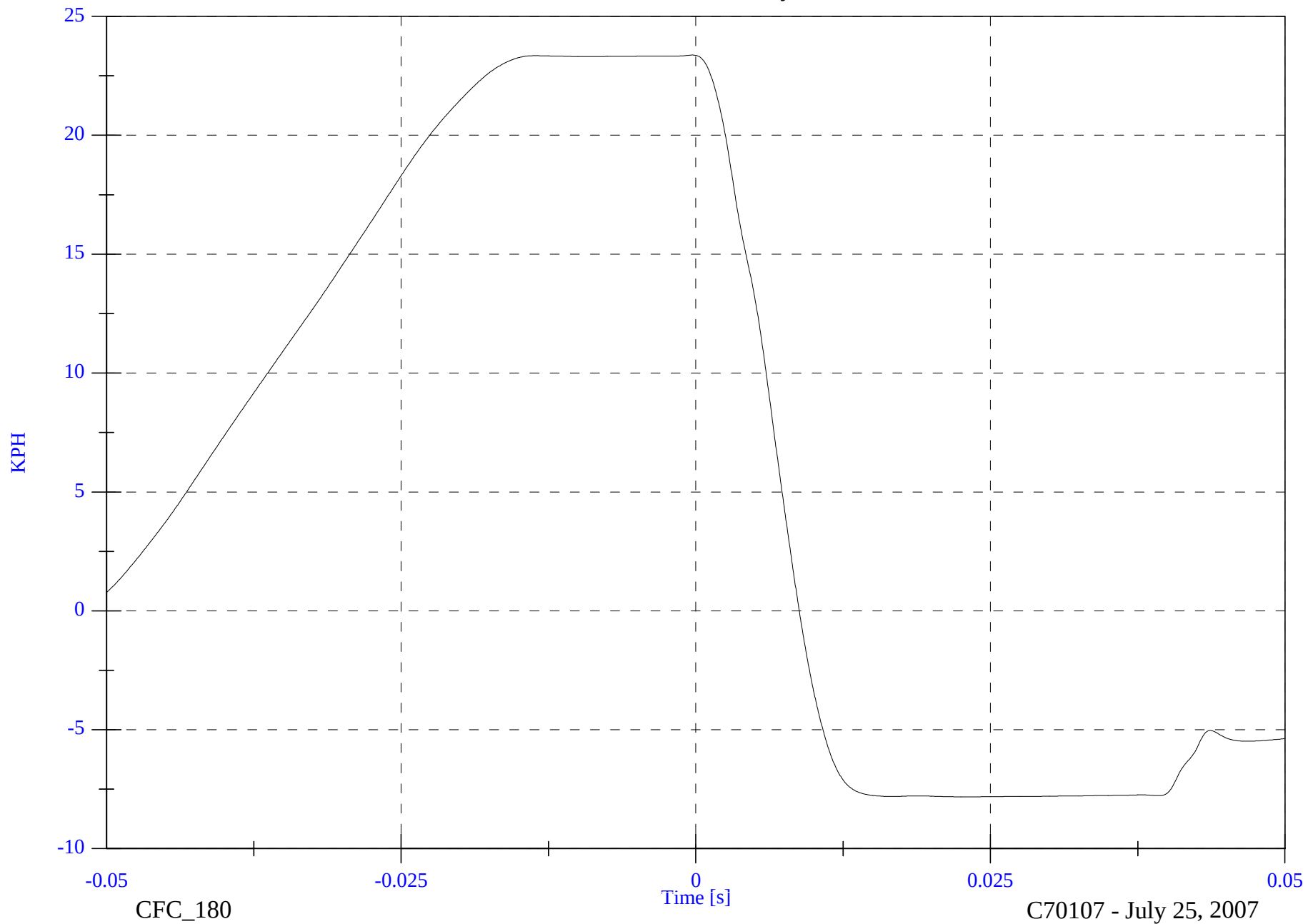
Headform Velocity

Max: 23.4 [KPH] at -0.000 [s]

Min: -7.8 [KPH] at 0.023 [s]

C70107 BP2 IMPACT PLOT #5

8826-FMH-05





PRE-IMPACT BP2



POST-IMPACT BP2

VEHICLE YEAR/MAKE/MODEL/STYLE:	2007 Chevrolet HHR
VIN:	3GNDA13D97S617345
DATE OF MANUFACTURE:	03/07(SEE CERTIFICATION LABEL)
COLOR:	Red

Test Number:	10
Test Date:	07/25/07
Target Location:	UPPER ROOF
Target Code:	URBP
Horizontal Impact Angle:	270°
Vertical Impact Angle:	48°
Ambient Temperature:	21.1
Relative Humidity:	48.6
Time of Impact:	11:15
Headform Number:	1255

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	9	mm right	x mm left
On Centerline	35	mm up	



POST-IMPACT URBP HEADFORM

Free Motion HIC	525.5
HIC(d)	562.9
Impact Velocity (kph)	23.49
HIC T1 (msec)	4.6
HIC T2 (msec)	14.2

FMVSS 201U 2007 Chevrolet HHR C70107 - URBP

FMH Headform 1255

Location: URBP

Test Date: July 25, 2007

Work File: URBP

-----TEST RESULTS-----

Lab Temperature: 21.1 C

HICd: 562.9

Lab Humidity: 48.6 %

HIC (36ms): 525.5

Velocity at Impact: 23.49 KPH

t1: 4.6 msec

t2: 14.2 msec

Free Flight Distance: 216.77 mm

Duration: 9.6 msec

Maximum: 93.6 g

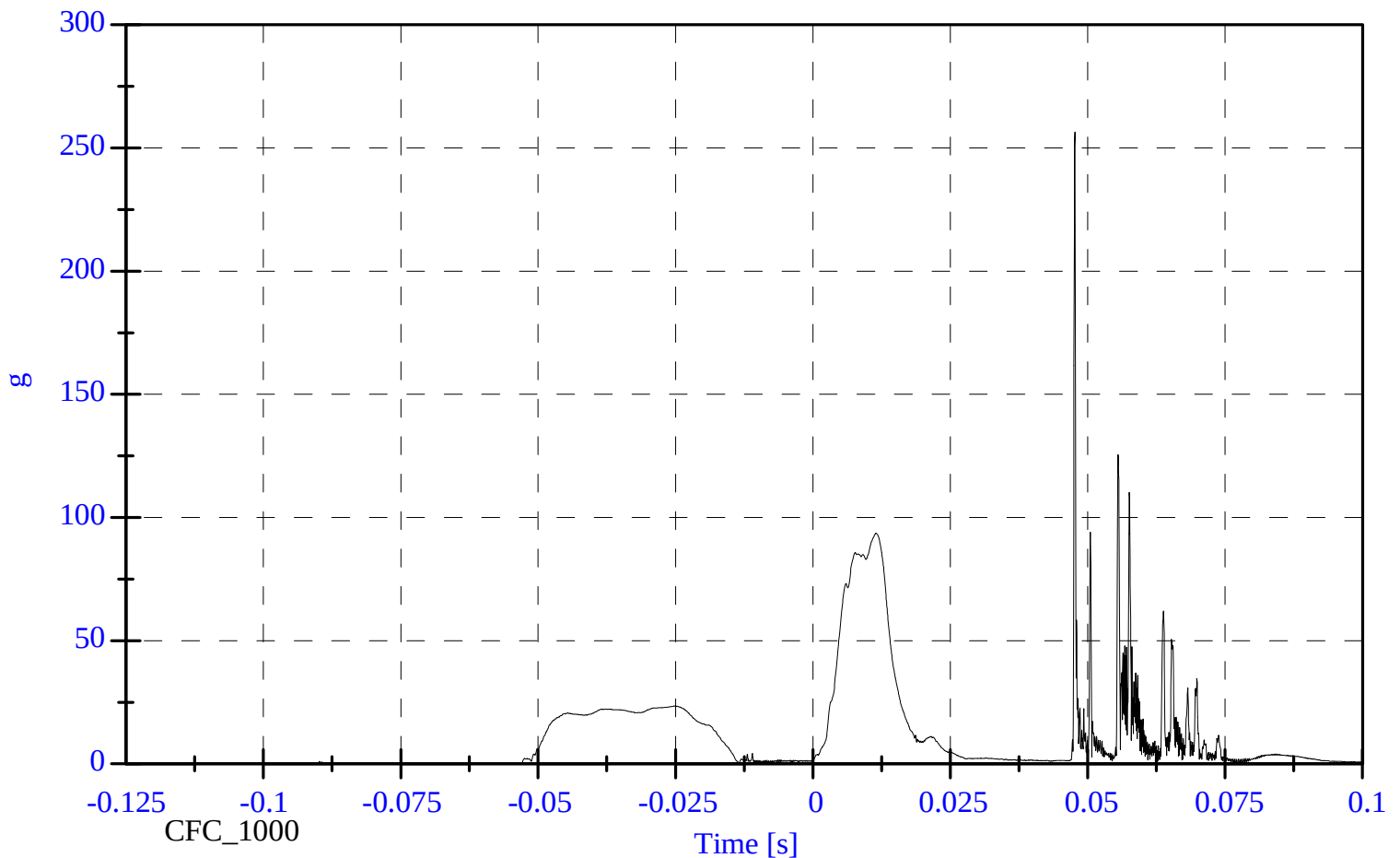
Average Acceleration: 11.5 g

FMVSS 201U 2007 Chevrolet HHR

Headform Resultant

Max: 93.6 [g] at 0.011 [s]

Min: 0.0 [g] at -0.063 [s]



FMVSS 201U 2007 Chevrolet HHR

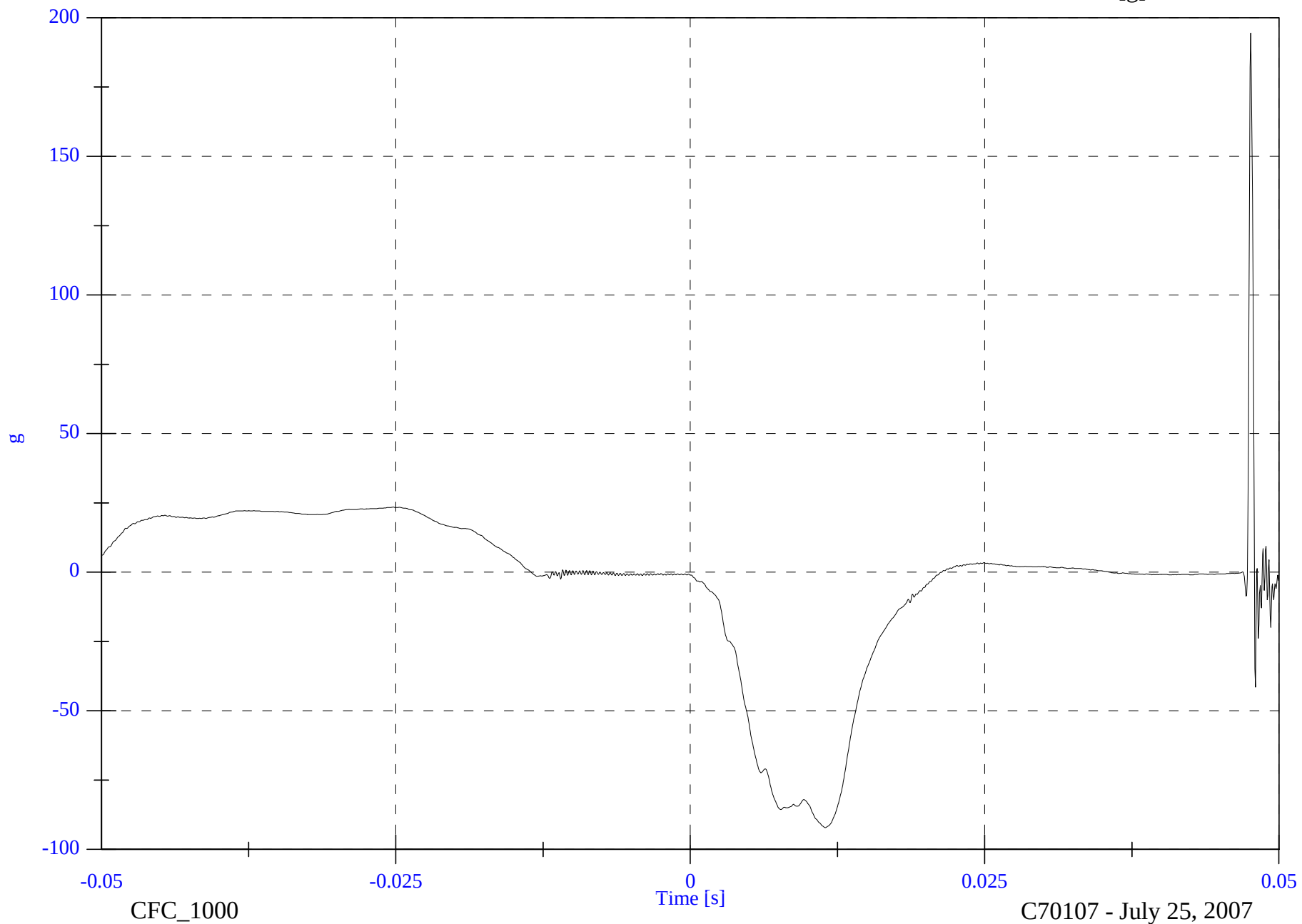
Headform X Acceleration

Max: 194.5 [g] at 0.048 [s]

Min: -92.2 [g] at 0.011 [s]

C70107 URBP IMPACT PLOT #1

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

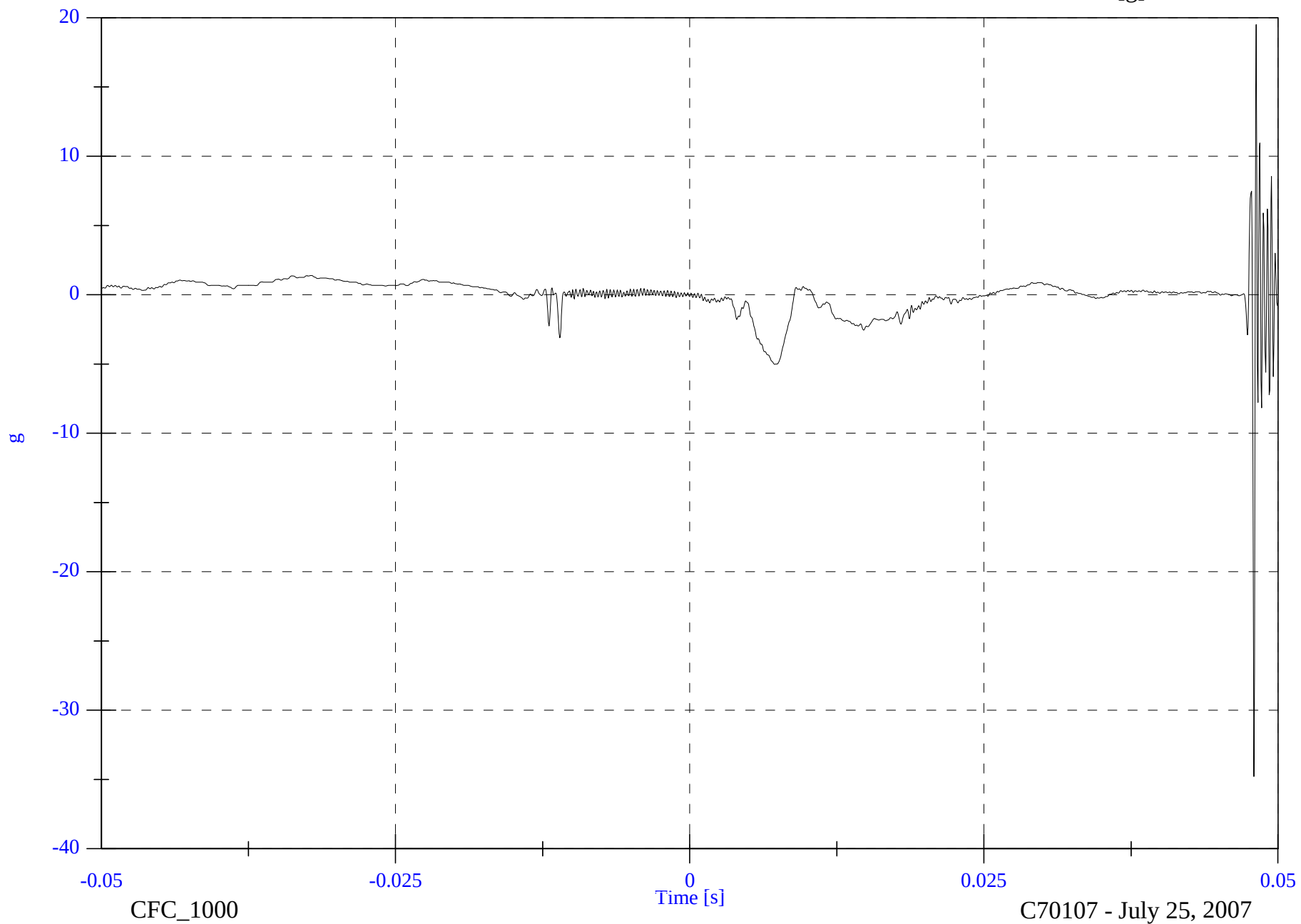
Headform Y Acceleration

Max: 19.5 [g] at 0.048 [s]

Min: -34.8 [g] at 0.048 [s]

C70107 URBP IMPACT PLOT #2

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

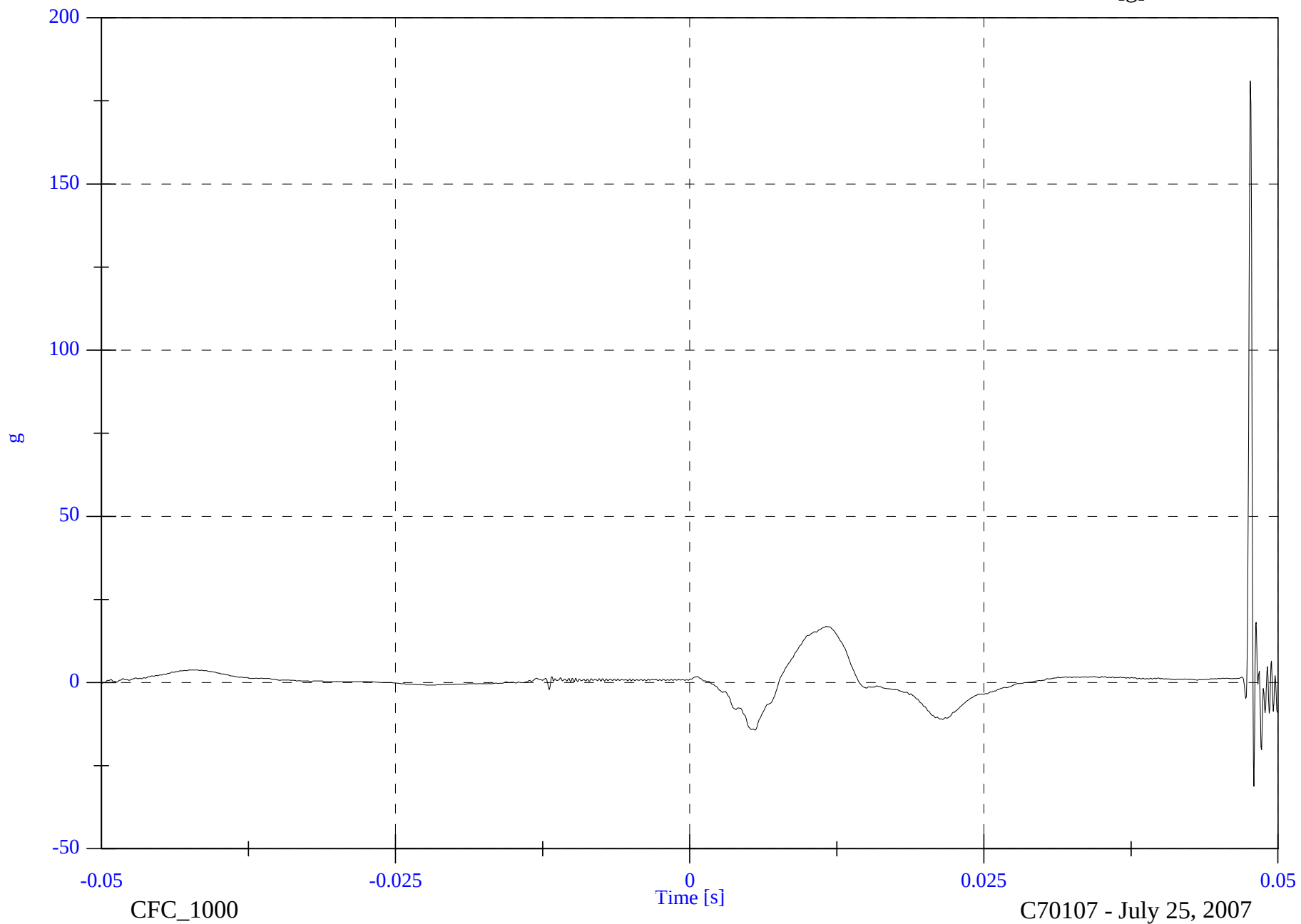
Headform Z Acceleration

Max: 181.0 [g] at 0.048 [s]

Min: -31.2 [g] at 0.048 [s]

C70107 URBP IMPACT PLOT #3

8826-FMH-05



FMVSS 201U 2007 Chevrolet HHR

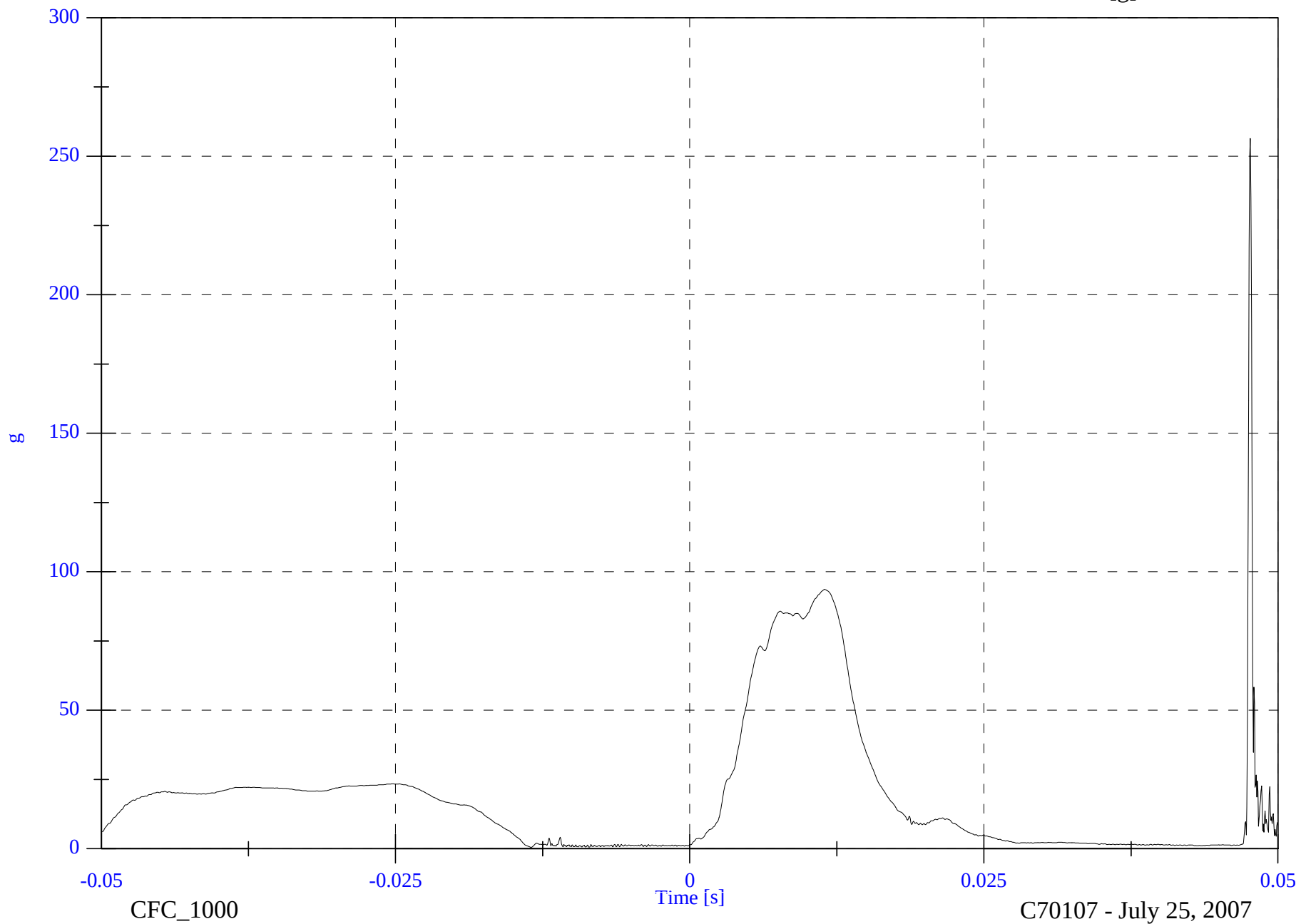
Headform Resultant

Max: 256.5 [g] at 0.048 [s]

Min: 0.4 [g] at -0.013 [s]

C70107 URBP IMPACT PLOT #4

8826-FMH-05

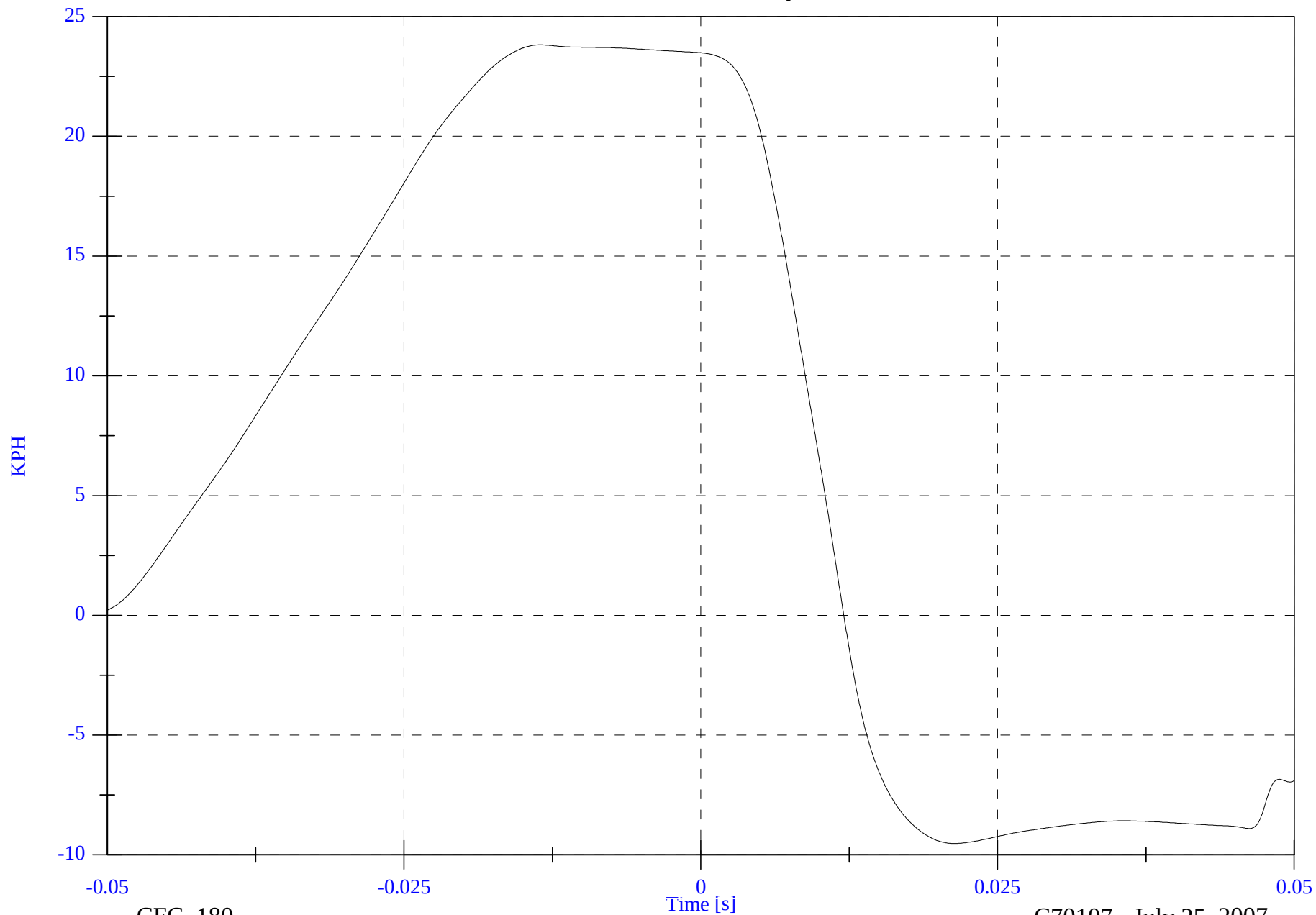


FMVSS 201U 2007 Chevrolet HHR

Headform Velocity

Max: 23.8 [KPH] at -0.013 [s]

Min: -9.5 [KPH] at 0.021 [s]



C70107 URBP IMPACT PLOT #5

8826-FMH-05

CFC_180

C70107 - July 25, 2007



PRE-IMPACT URBP



POST-IMPACT URBP

APPENDIX A

PHOTOGRAPHS

PHOTOGRAPHS

FIGURE	VIEW
A-1	LEFT SIDE VIEW OF VEHICLE
A-2	RIGHT SIDE VIEW OF VEHICLE
A-3	3/4 FRONTAL VIEW FROM RIGHT SIDE OF VEHICLE
A-4	3/4 REAR VIEW FROM LEFT SIDE OF VEHICLE
A-5	VEHICLE'S CERTIFICATION LABEL
A-6	VEHICLE'S TIRE INFORMATION LABEL
A-7	PRE-TEST DRIVER SIDE A-PILLAR
A-8	PRE-TEST DRIVER SIDE FRONT HEADER
A-9	PRE-TEST DRIVER SIDE SIDE RAIL
A-10	PRE-TEST DRIVER SIDE B-PILLAR
A-11	PRE-TEST DRIVER SIDE OTHER PILLAR
A-12	PRE-TEST DRIVER SIDE REAR PILLAR
A-13	PRE-TEST PASSENGER SIDE A-PILLAR
A-14	PRE-TEST PASSENGER SIDE FRONT HEADER
A-15	PRE-TEST PASSENGER SIDE SIDE RAIL
A-16	PRE-TEST PASSENGER SIDE B-PILLAR
A-17	PRE-TEST PASSENGER SIDE OTHER PILLAR
A-18	PRE-TEST PASSENGER SIDE REAR PILLAR
A-19	POST-TEST DRIVER SIDE A-PILLAR
A-20	POST-TEST DRIVER SIDE FRONT HEADER
A-21	POST-TEST DRIVER SIDE SIDE RAIL
A-22	POST-TEST DRIVER SIDE B-PILLAR
A-23	POST-TEST DRIVER SIDE OTHER PILLAR
A-24	POST-TEST DRIVER SIDE REAR PILLAR
A-25	POST-TEST PASSENGER SIDE A-PILLAR
A-26	POST-TEST PASSENGER SIDE FRONT HEADER
A-27	POST-TEST PASSENGER SIDE SIDE RAIL
A-28	POST-TEST PASSENGER SIDE B-PILLAR
A-29	POST-TEST PASSENGER SIDE OTHER PILLAR
A-30	POST-TEST PASSENGER SIDE REAR PILLAR



Figure A-1 : LEFT SIDE VIEW OF VEHICLE



Figure A-2 : RIGHT SIDE VIEW OF VEHICLE



Figure A-3 : 3/4 FRONTAL VIEW FROM RIGHT SIDE OF VEHICLE



Figure A-4 : 3/4 REAR VIEW FROM LEFT SIDE OF VEHICLE



Figure A-5 : VEHICLE'S CERTIFICATION LABEL



Figure A-6 : VEHICLE'S TIRE INFORMATION LABEL



Figure A-7 : PRE-TEST DRIVER SIDE A-PILLAR



Figure A-8 : PRE-TEST DRIVER SIDE FRONT HEADER



Figure A-9 : PRE-TEST DRIVER SIDE SIDE RAIL



Figure A-10 : PRE-TEST DRIVER SIDE B-PILLAR



Figure A-11 : PRE-TEST DRIVER SIDE OTHER PILLAR



Figure A-12 : PRE-TEST DRIVER SIDE REAR PILLAR



Figure A-13 : PRE-TEST PASSENGER SIDE A-PILLAR



Figure A-14 : PRE-TEST PASSENGER SIDE FRONT HEADER



Figure A-15 : PRE-TEST PASSENGER SIDE SIDE RAIL



Figure A-16 : PRE-TEST PASSENGER SIDE B-PILLAR



Figure A-17 : PRE-TEST PASSENGER SIDE OTHER PILLAR



Figure A-18 : PRE-TEST PASSENGER SIDE REAR PILLAR



Figure A-19 : POST-TEST DRIVER SIDE A-PILLAR



Figure A-20 : POST-TEST DRIVER SIDE FRONT HEADER



Figure A-21 : POST-TEST DRIVER SIDE SIDE RAIL



Figure A-22 : POST-TEST DRIVER SIDE B-PILLAR



Figure A-23 : POST-TEST DRIVER SIDE OTHER PILLAR



Figure A-24 : POST-TEST DRIVER SIDE REAR PILLAR



Figure A-25 : POST-TEST PASSENGER SIDE A-PILLAR



Figure A-26 : POST-TEST PASSENGER SIDE FRONT HEADER



Figure A-27 : POST-TEST PASSENGER SIDE SIDE RAIL



Figure A-28 : POST-TEST PASSENGER SIDE B-PILLAR



Figure A-29 : POST-TEST PASSENGER SIDE OTHER PILLAR



Figure A-30 : POST-TEST PASSENGER SIDE REAR PILLAR

APPENDIX B

PART 572L PERFORMANCE CALIBRATION IN SUPPORT OF VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT PROTECTION IN INTERIOR IMPACT

Appendix B contains the results from certification tests performed on the Free Motion Headforms utilized in this test program. The results indicate that the headforms meet all of the performance specifications given in 49 CFR Part 572 Subpart L.

The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation. A summary of the test results are included in this Appendix.

**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		0642	
CALIBRATION DATE:		JULY 19,2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		21.1
RELATIVE HUMIDITY	10% to 70%		53.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		230.1
PEAK LATERAL ACCELERATION	15 Gs Maximum		3.9
IS ACCELERATION CURVE UNIMODAL?	YES		YES

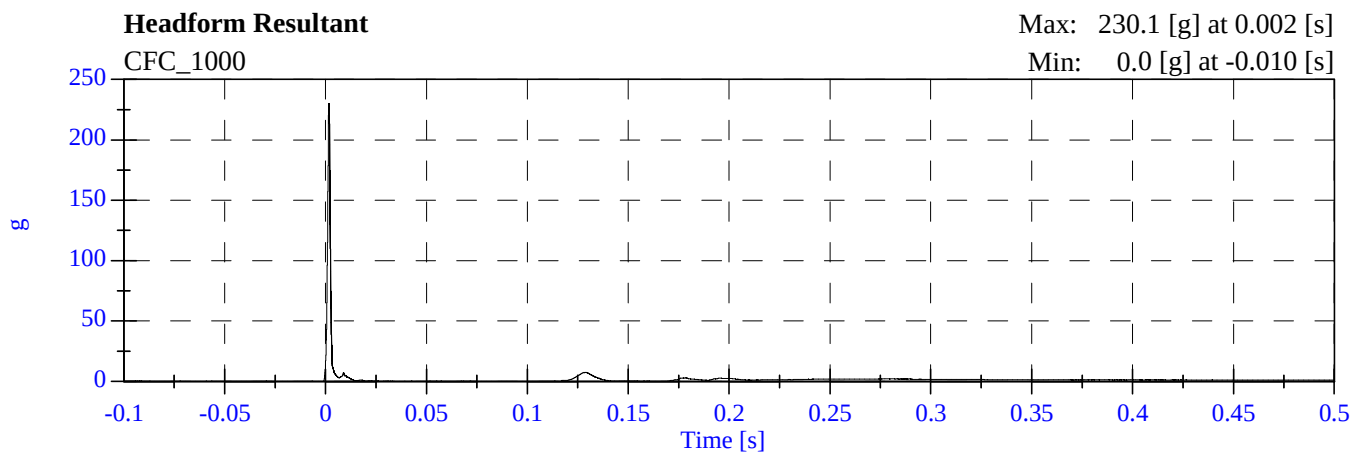
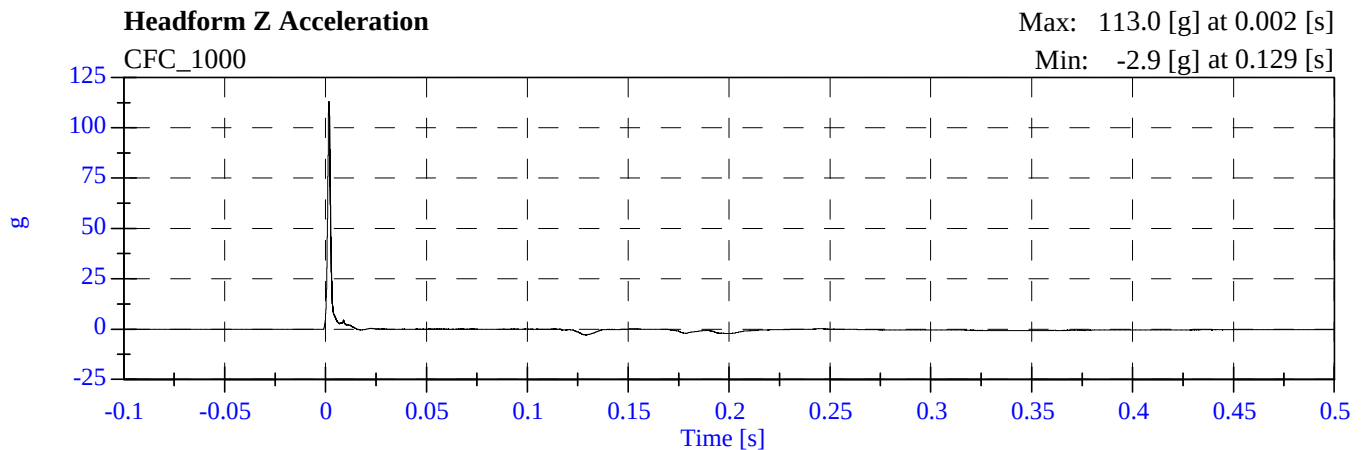
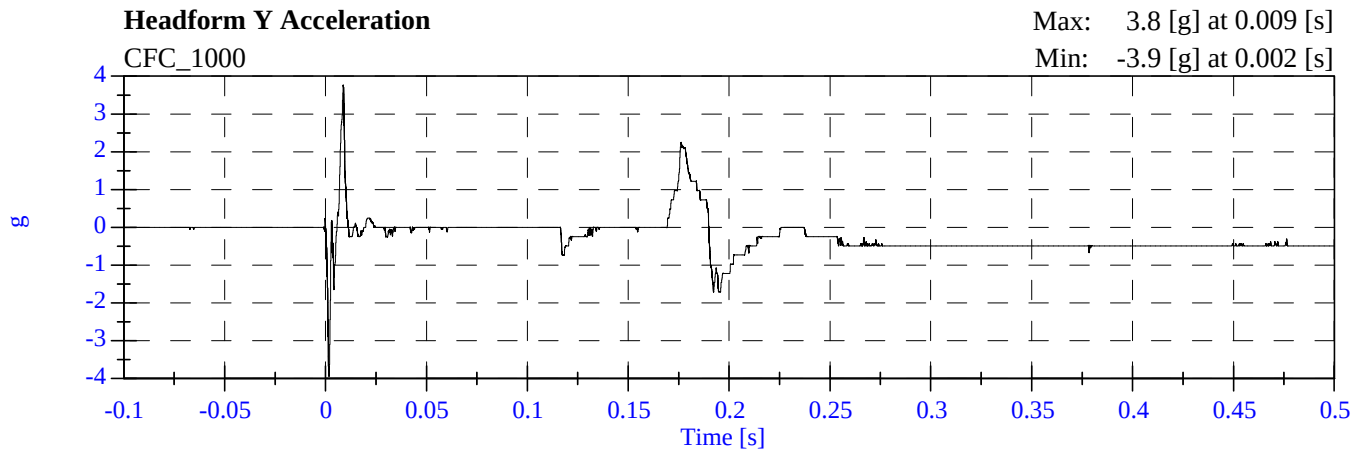
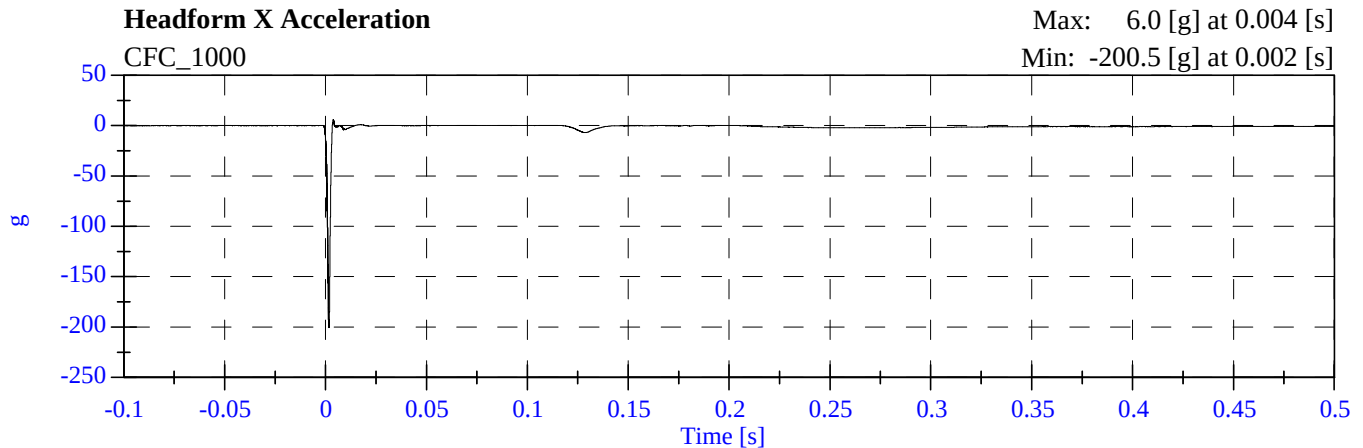
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J24876	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J33030	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

C71017 - July 19, 2007



**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0062	
CALIBRATION DATE:		JULY 19,2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		21.1
RELATIVE HUMIDITY	10% to 70%		53.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		247.2
PEAK LATERAL ACCELERATION	15 Gs Maximum		10.4
IS ACCELERATION CURVE UNIMODAL?	YES		YES

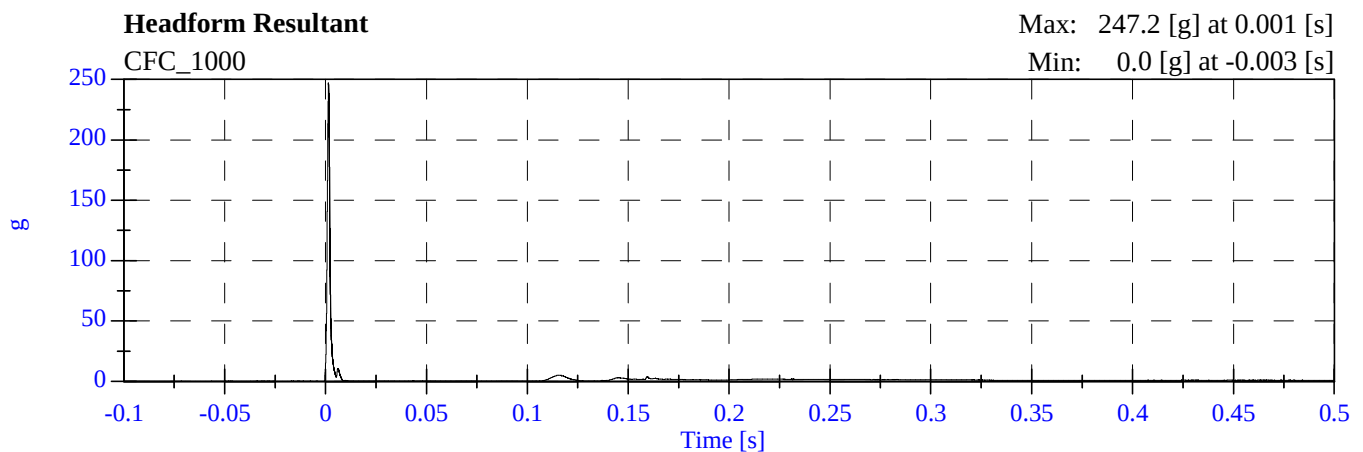
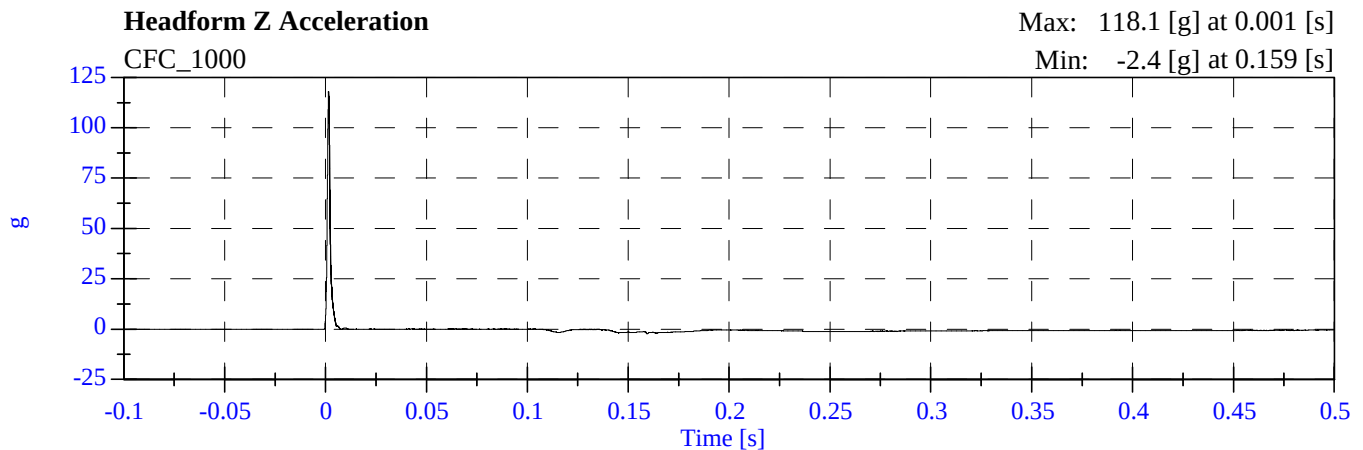
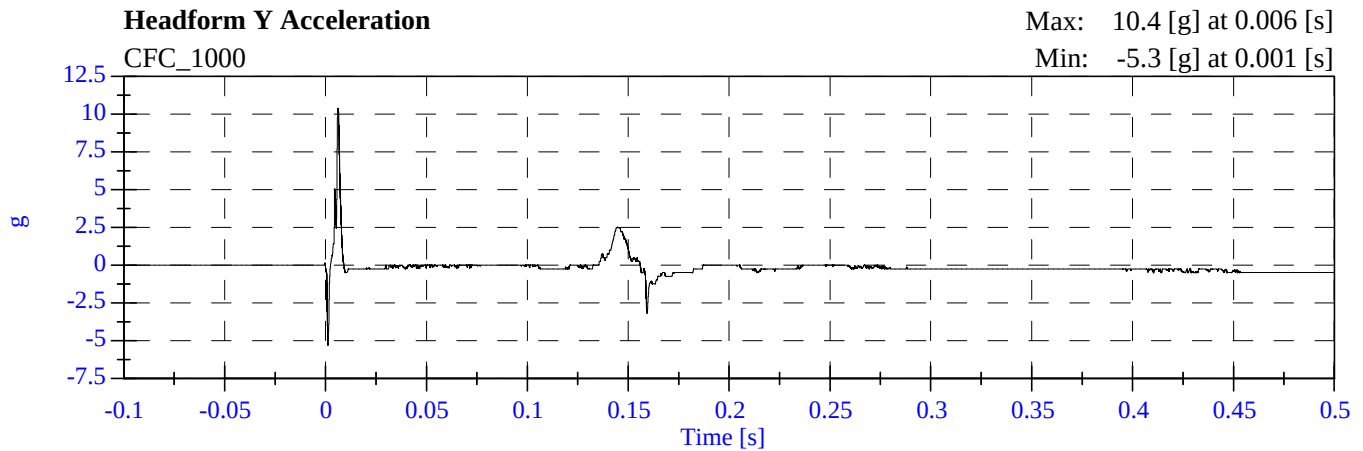
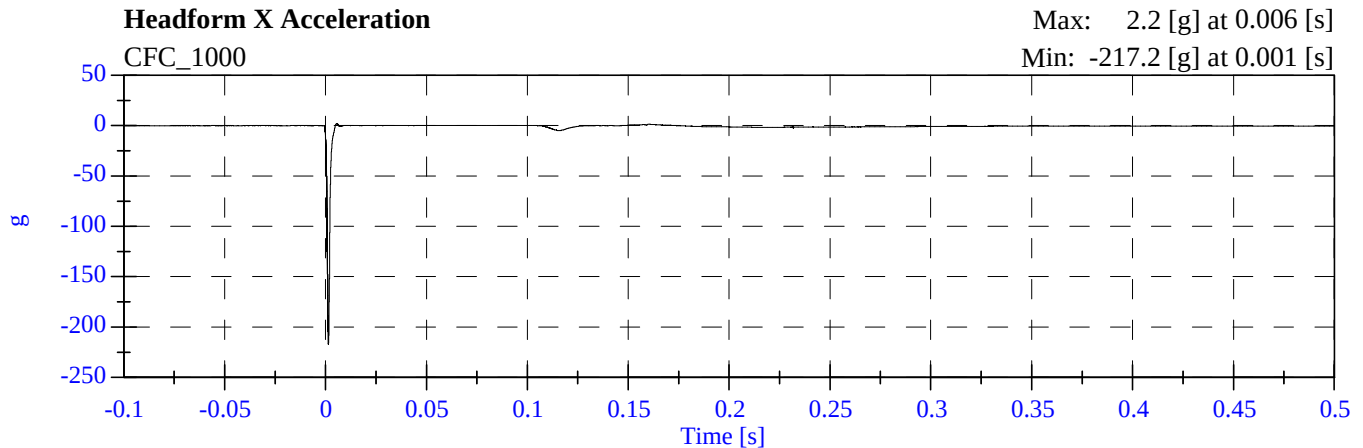
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 -LONGITUDINAL	ENDEVCO	7264-2000T	J33127	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J33019	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J32782	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

C70107 - July 19, 2007



**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		805	
CALIBRATION DATE:		JULY 19,2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		21.1
RELATIVE HUMIDITY	10% to 70%		53.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		272.1
PEAK LATERAL ACCELERATION	15 Gs Maximum		3.2
IS ACCELERATION CURVE UNIMODAL?	YES		YES

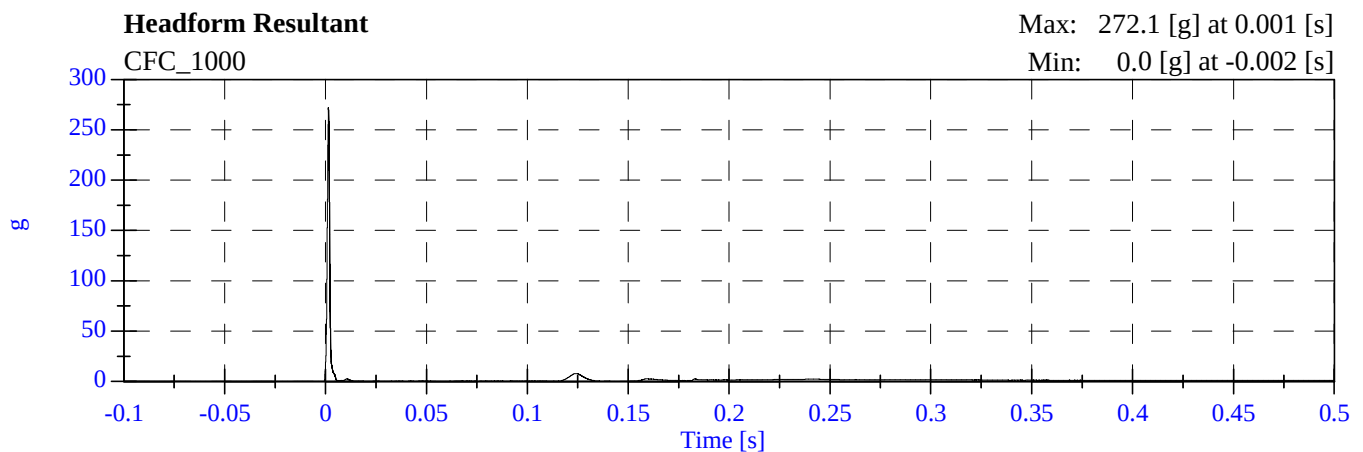
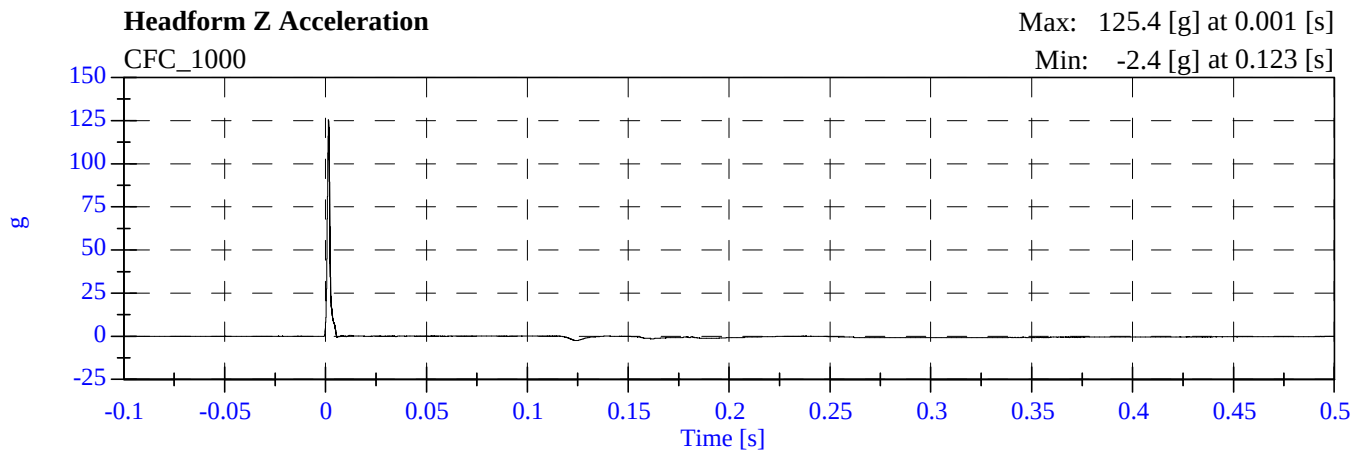
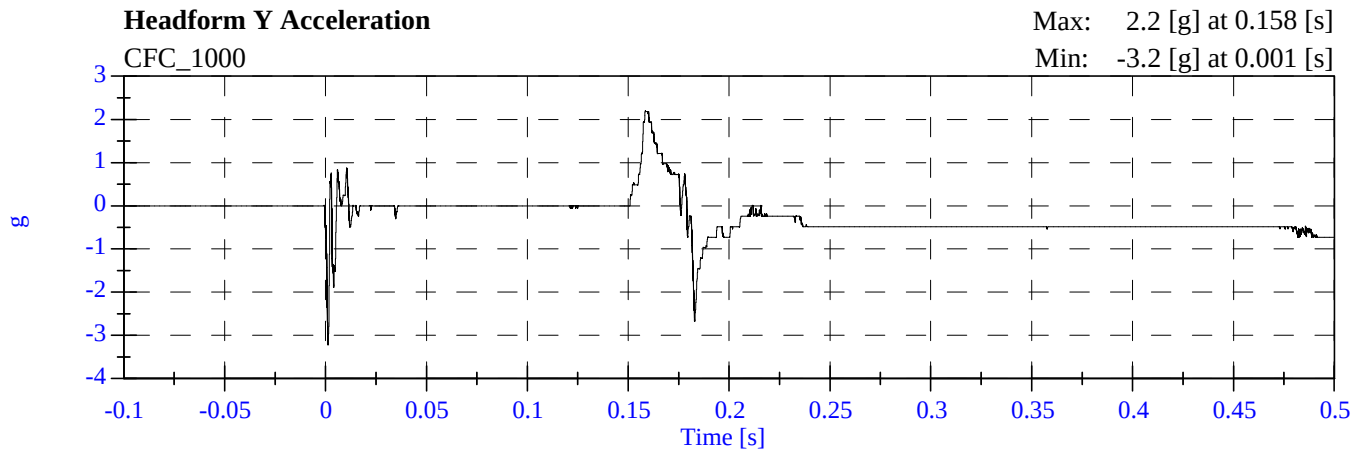
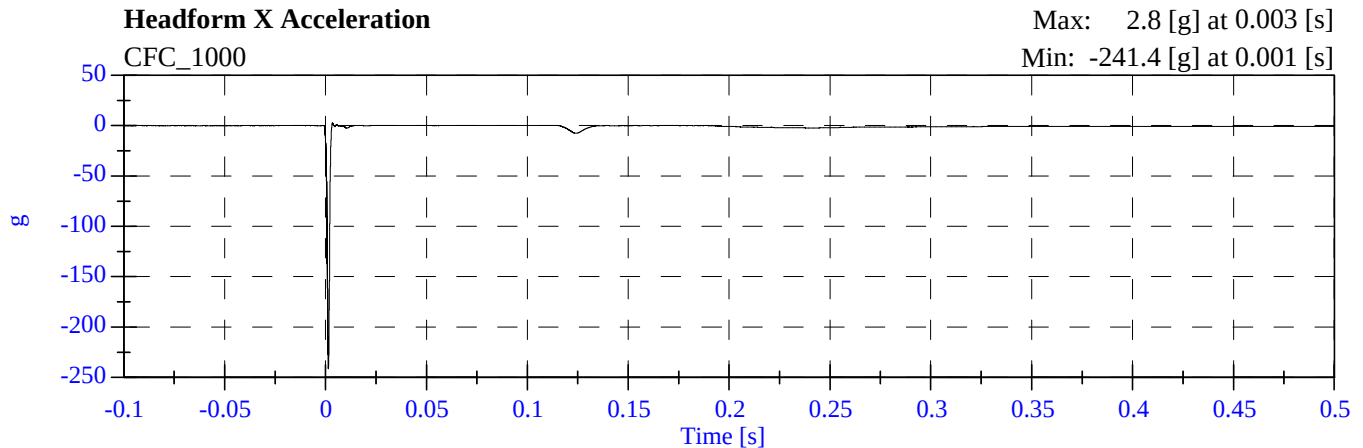
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 -LONGITUDINAL	ENDEVCO	7264-2000T	J38127	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J37980	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J37854	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

C70107 - July 19, 2007



**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0355	
CALIBRATION DATE:		JULY 19,2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		21.1
RELATIVE HUMIDITY	10% to 70%		53.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		230.7
PEAK LATERAL ACCELERATION	15 Gs Maximum		2.0
IS ACCELERATION CURVE UNIMODAL?	YES		YES

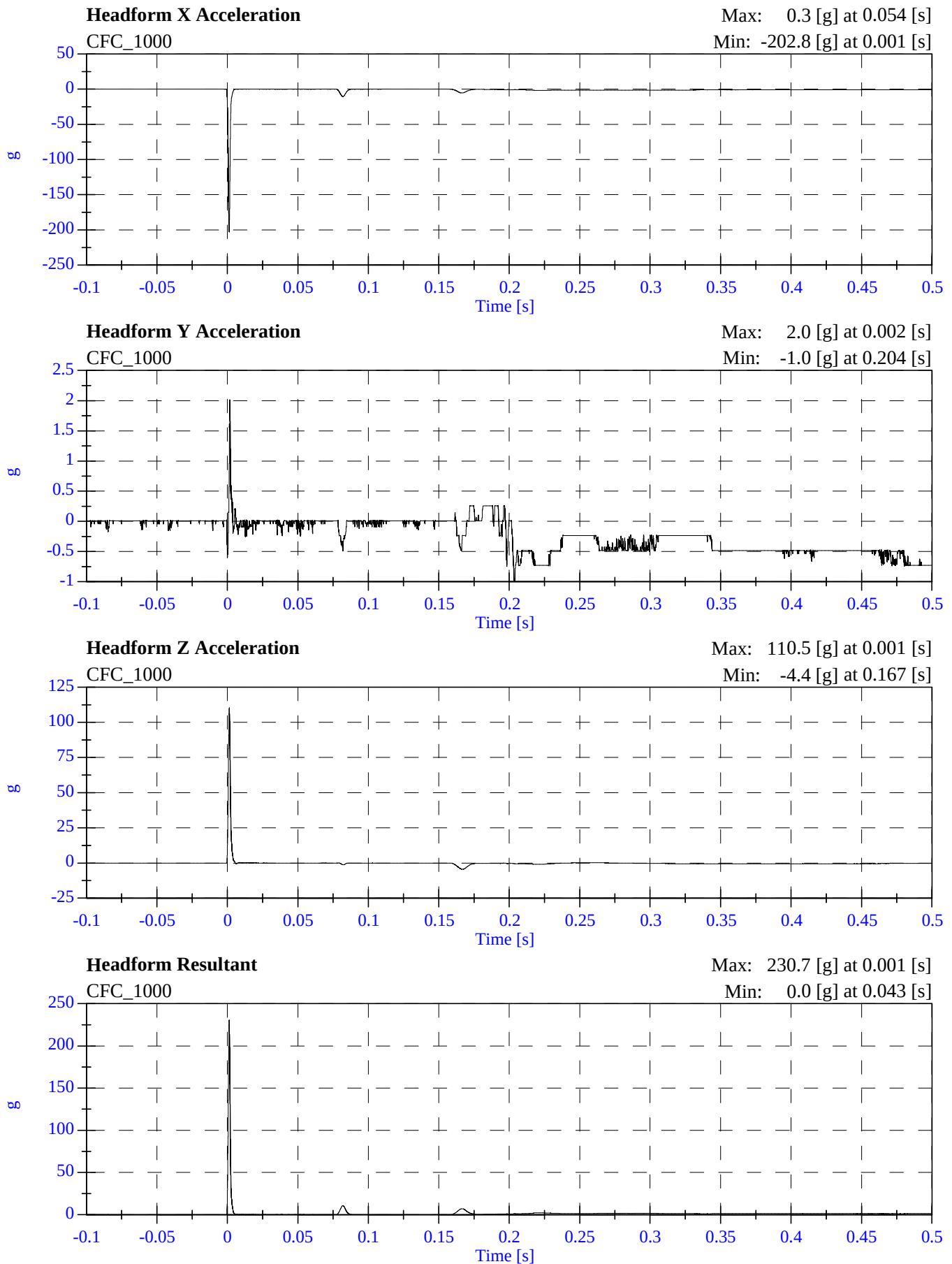
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 -LONGITUDINAL	ENDEVCO	7264-2000T	J28671	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J32779	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J25854	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

C70107 - July 18, 2007



**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		1255	
CALIBRATION DATE:		JULY 19,2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		21.1
RELATIVE HUMIDITY	10% to 70%		53.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		233.5
PEAK LATERAL ACCELERATION	15 Gs Maximum		6.2
IS ACCELERATION CURVE UNIMODAL?	YES		YES

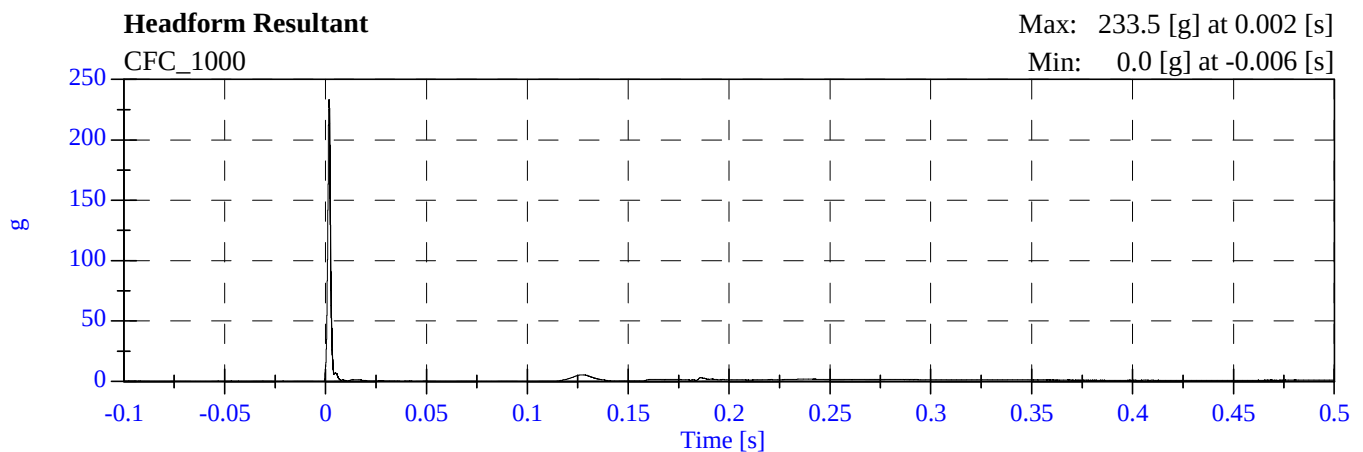
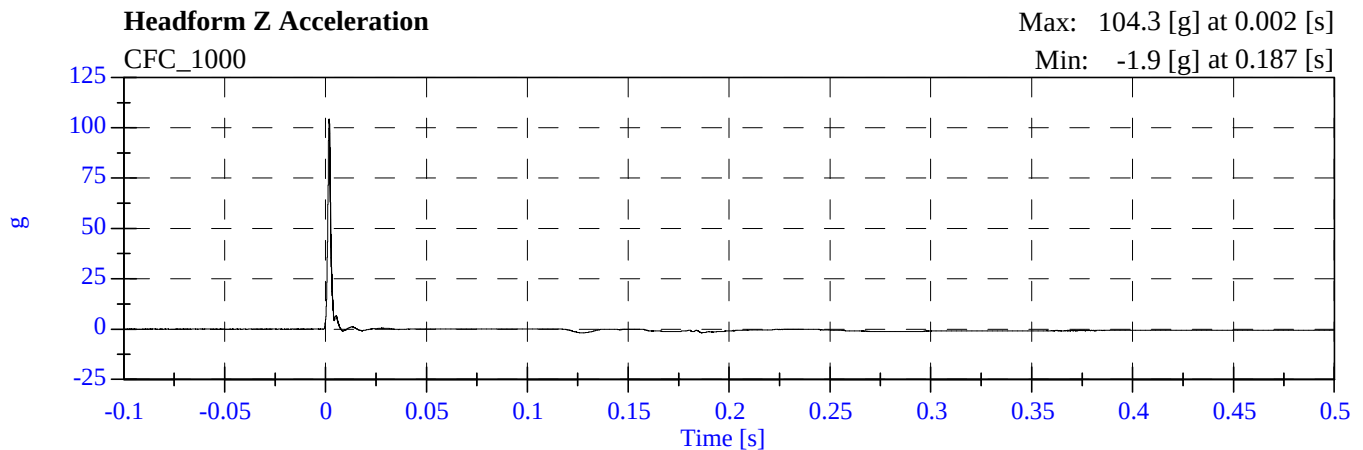
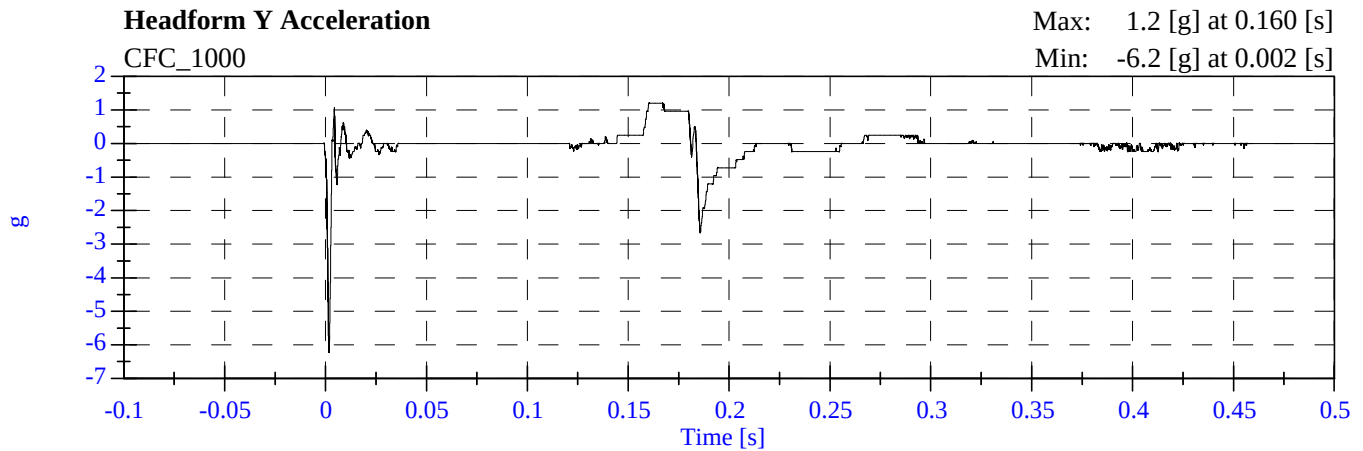
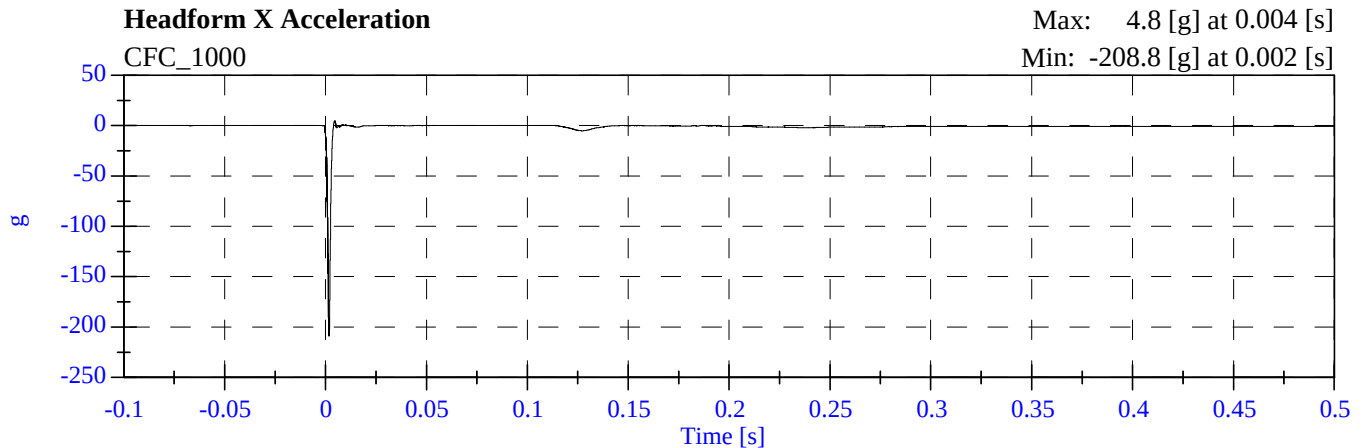
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J41006	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J40994	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

C70107 - July 19, 2007



**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		0642	
CALIBRATION DATE:		JULY 30, 2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		23.3
RELATIVE HUMIDITY	10% to 70%		56.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		263.7
PEAK LATERAL ACCELERATION	15 Gs Maximum		5.7
IS ACCELERATION CURVE UNIMODAL?	YES		YES

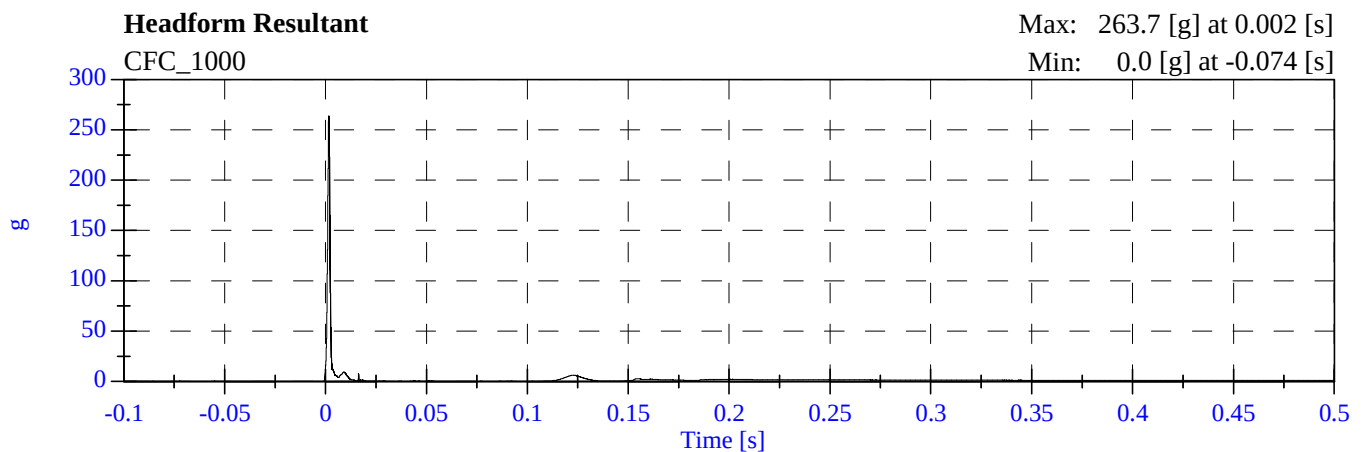
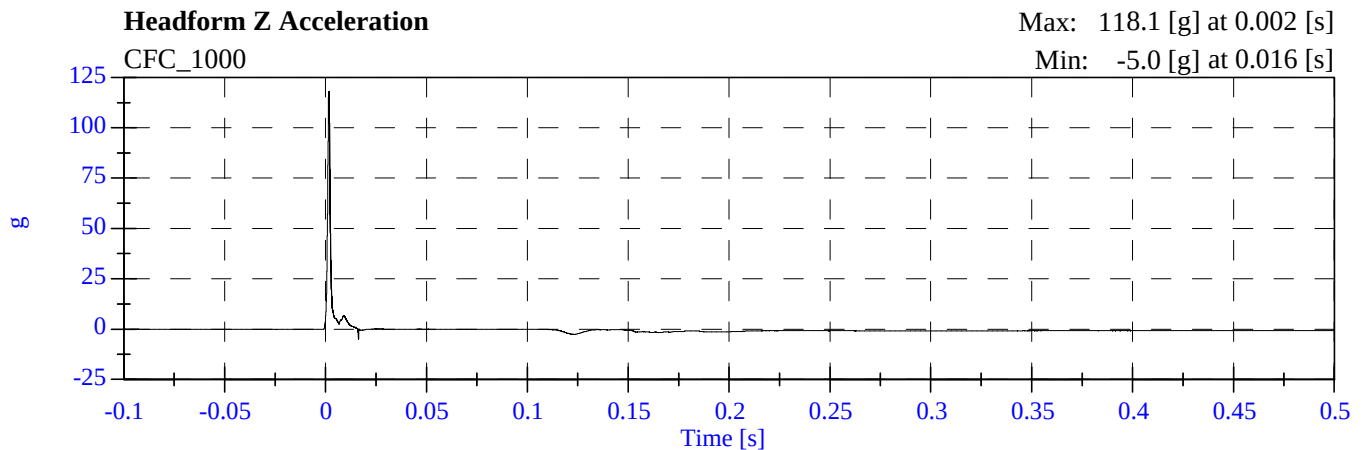
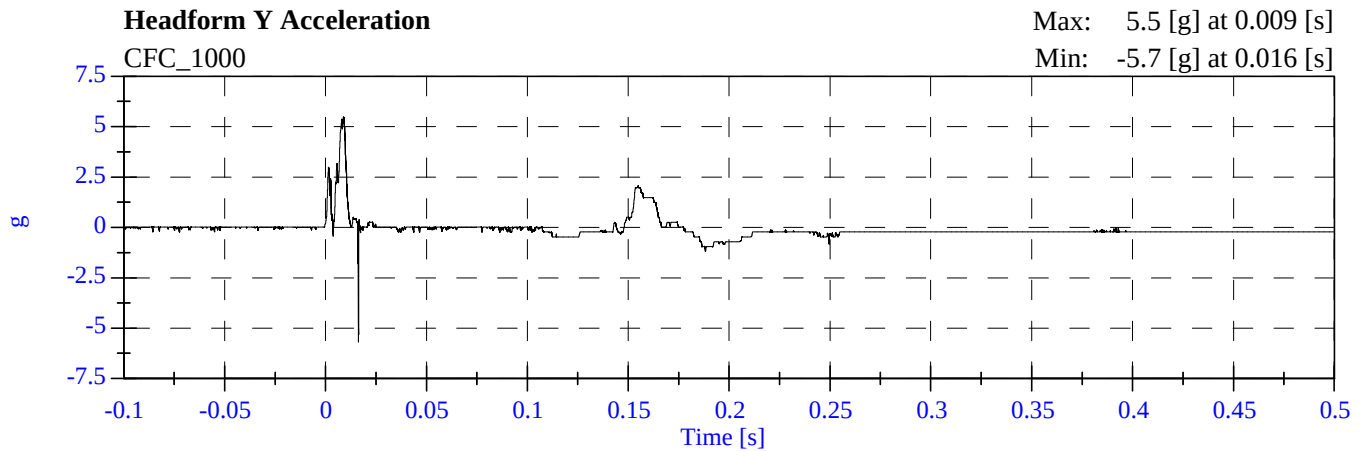
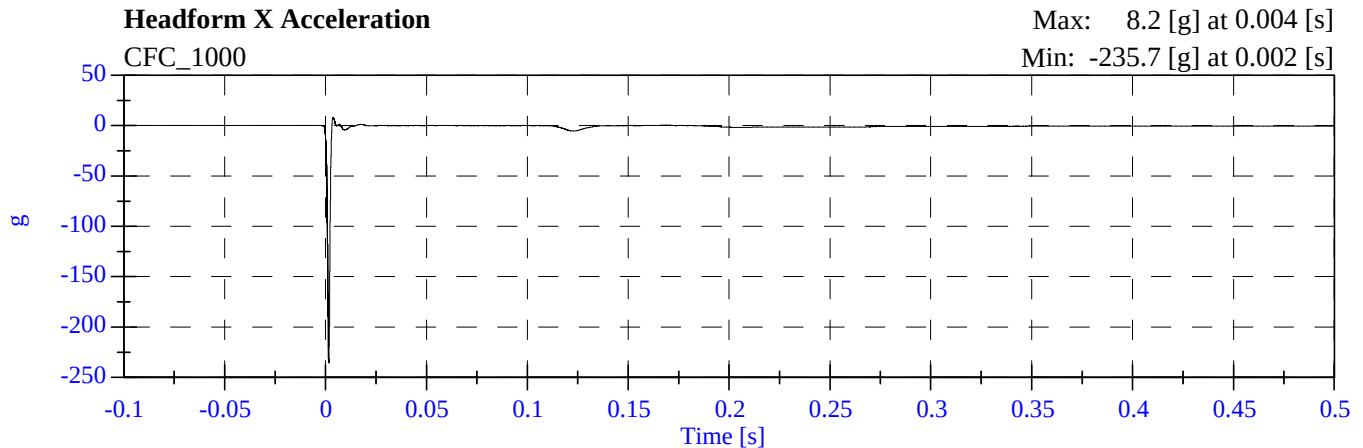
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J24876	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J33030	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

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**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0062	
CALIBRATION DATE:		JULY 30, 2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		23.3
RELATIVE HUMIDITY	10% to 70%		56.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		251.4
PEAK LATERAL ACCELERATION	15 Gs Maximum		14.7
IS ACCELERATION CURVE UNIMODAL?	YES		YES

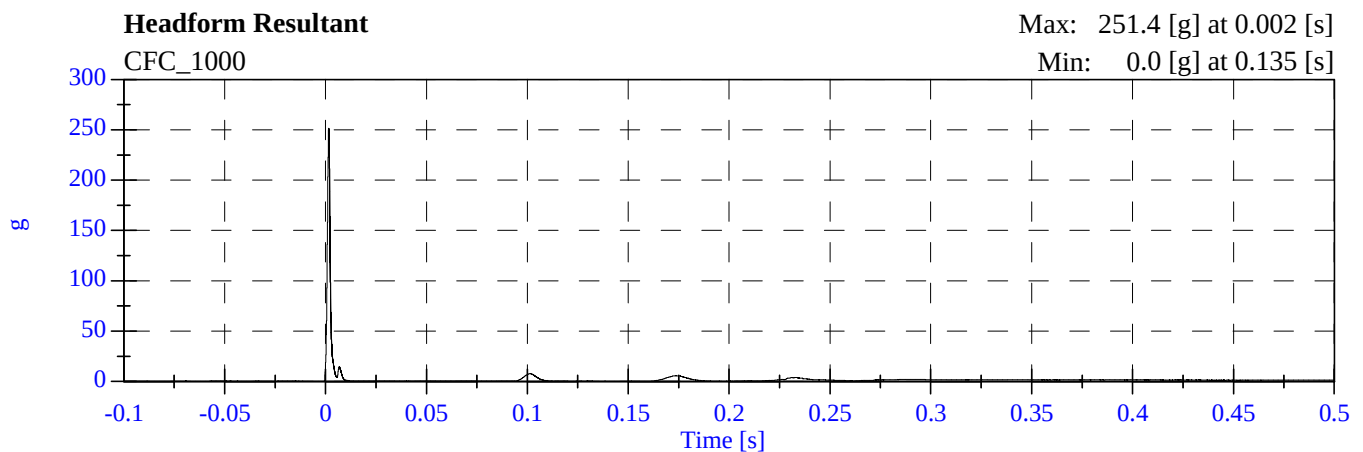
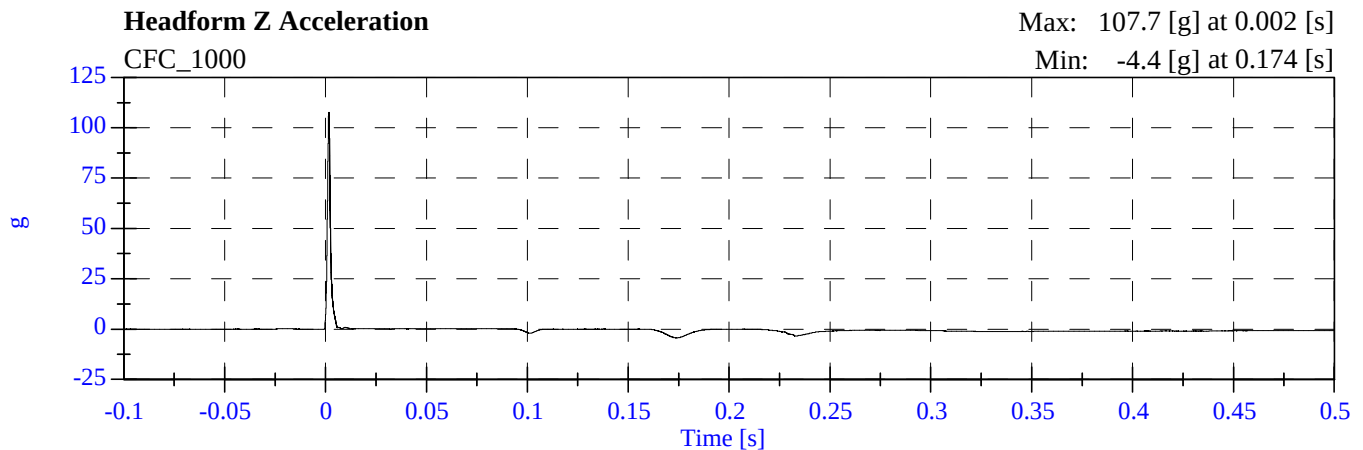
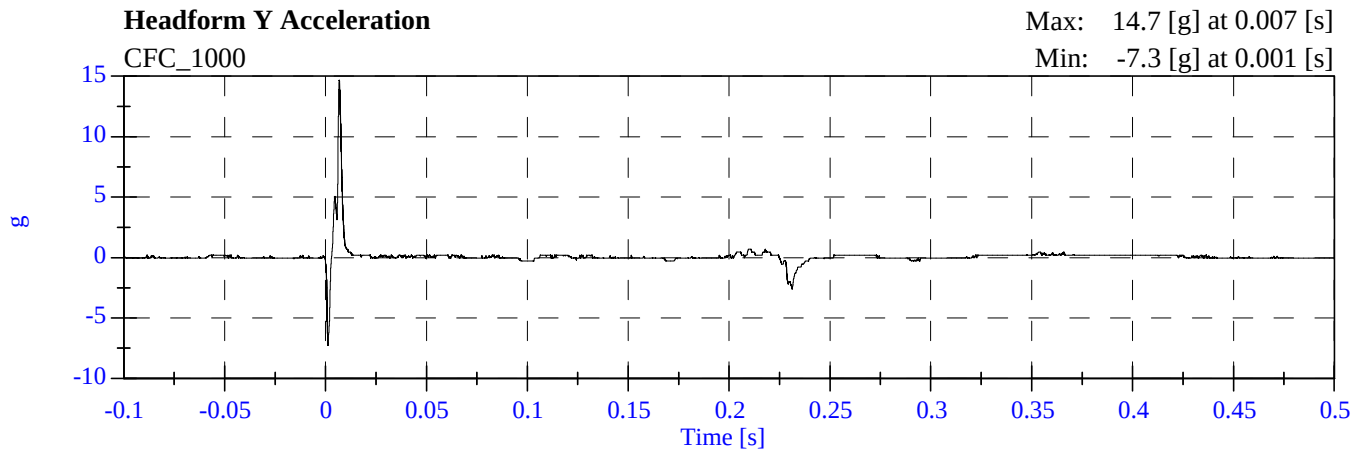
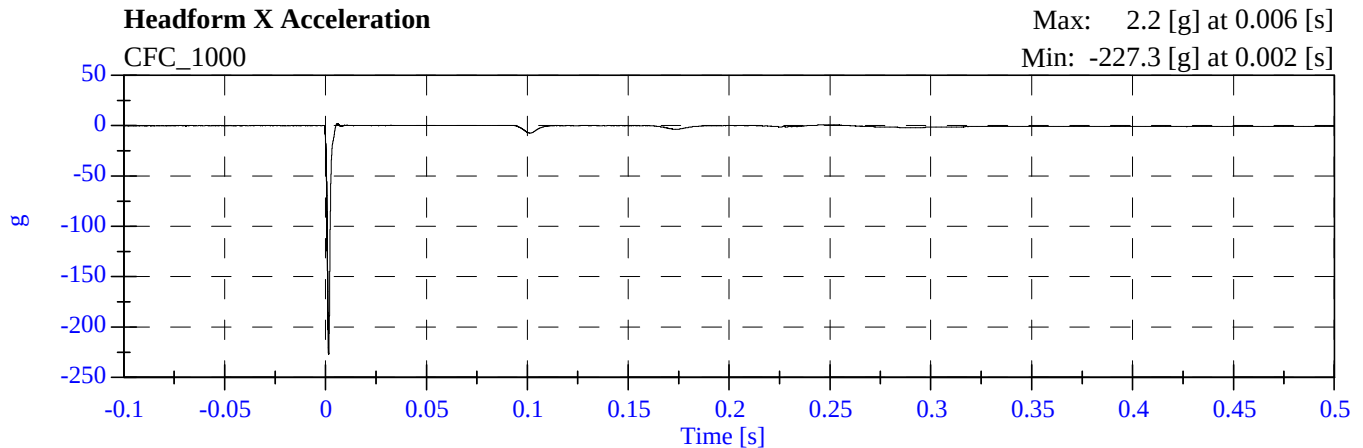
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J33127	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J33019	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J32782	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

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**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		805	
CALIBRATION DATE:		JULY 30, 2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		23.3
RELATIVE HUMIDITY	10% to 70%		56.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		234.3
PEAK LATERAL ACCELERATION	15 Gs Maximum		7.8
IS ACCELERATION CURVE UNIMODAL?	YES		YES

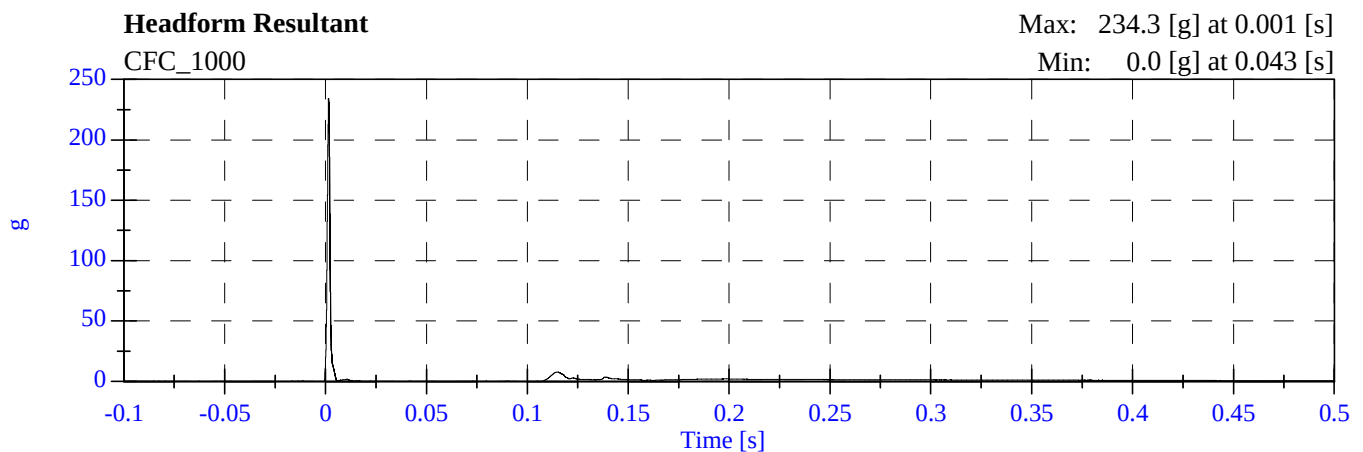
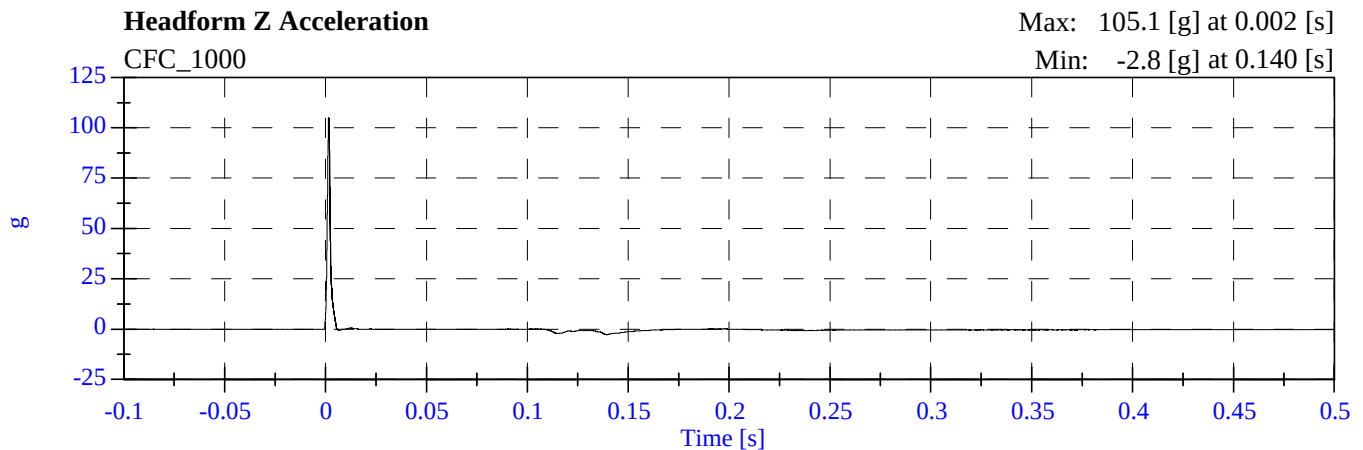
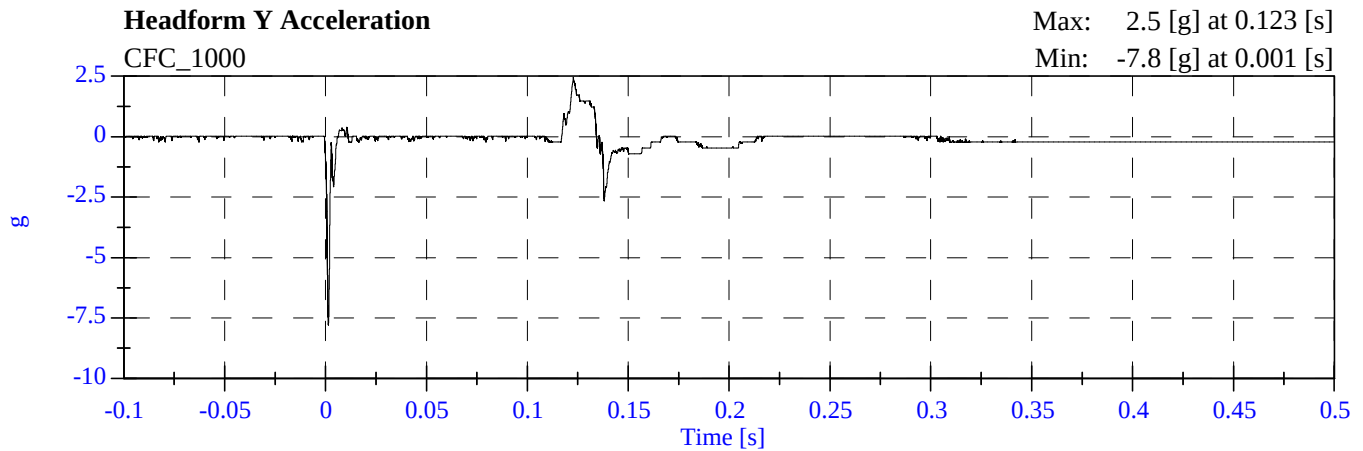
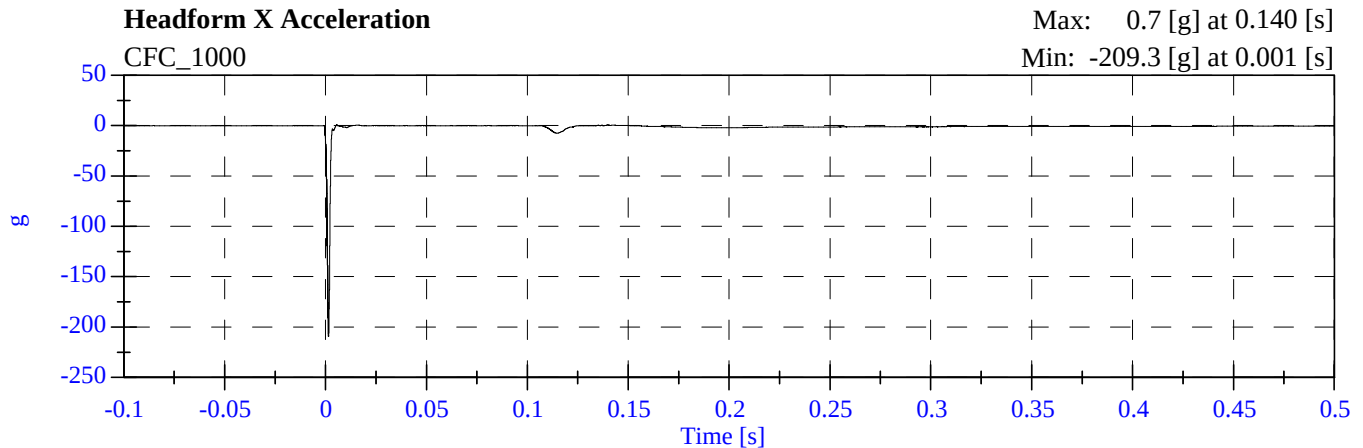
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J38127	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J37980	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J37854	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

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**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0355	
CALIBRATION DATE:		JULY 30, 2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		23.3
RELATIVE HUMIDITY	10% to 70%		56.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		228.7
PEAK LATERAL ACCELERATION	15 Gs Maximum		2.2
IS ACCELERATION CURVE UNIMODAL?	YES		YES

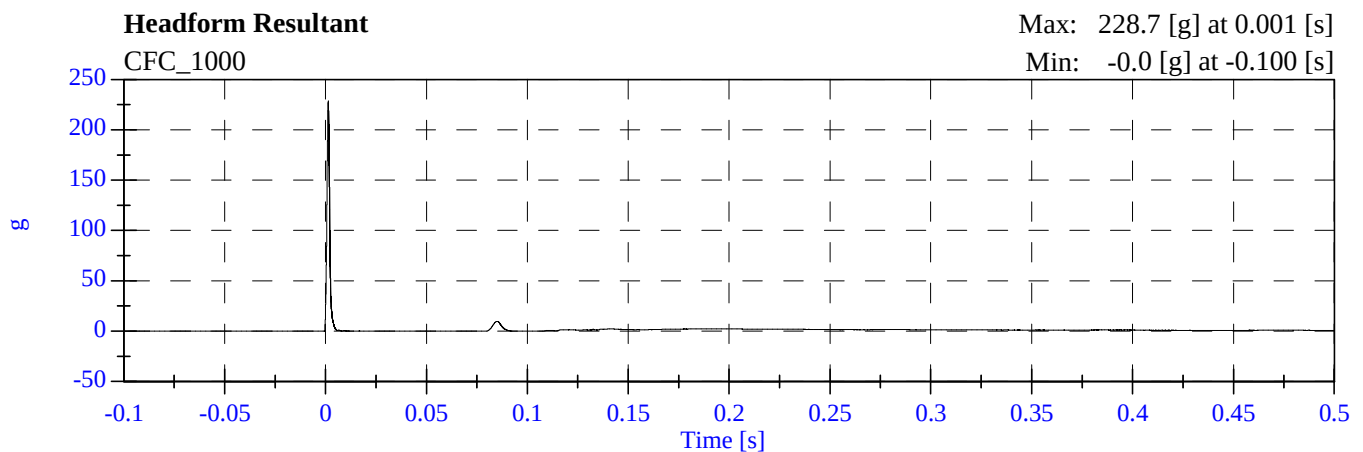
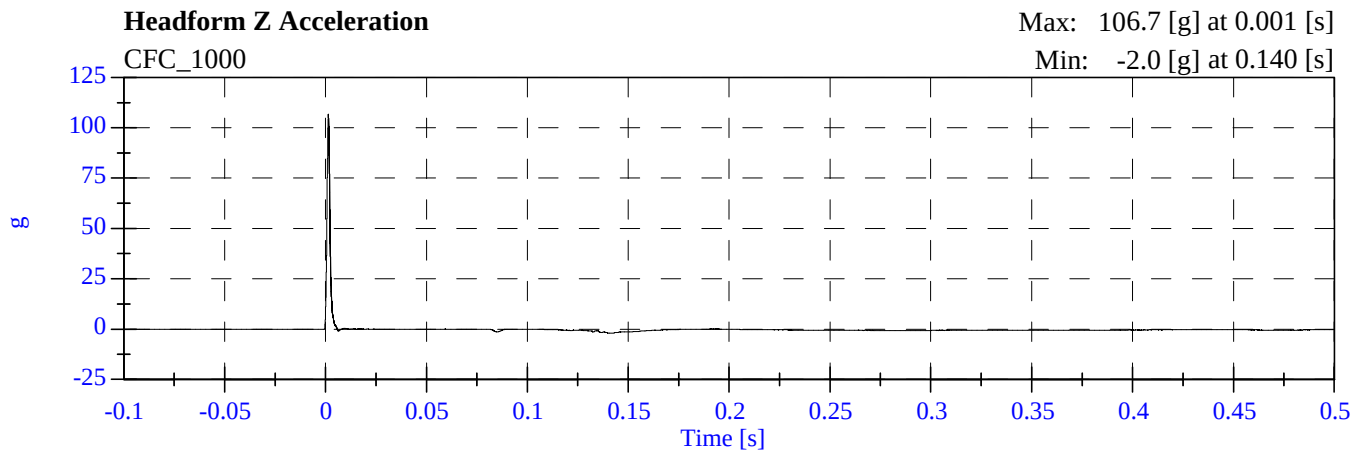
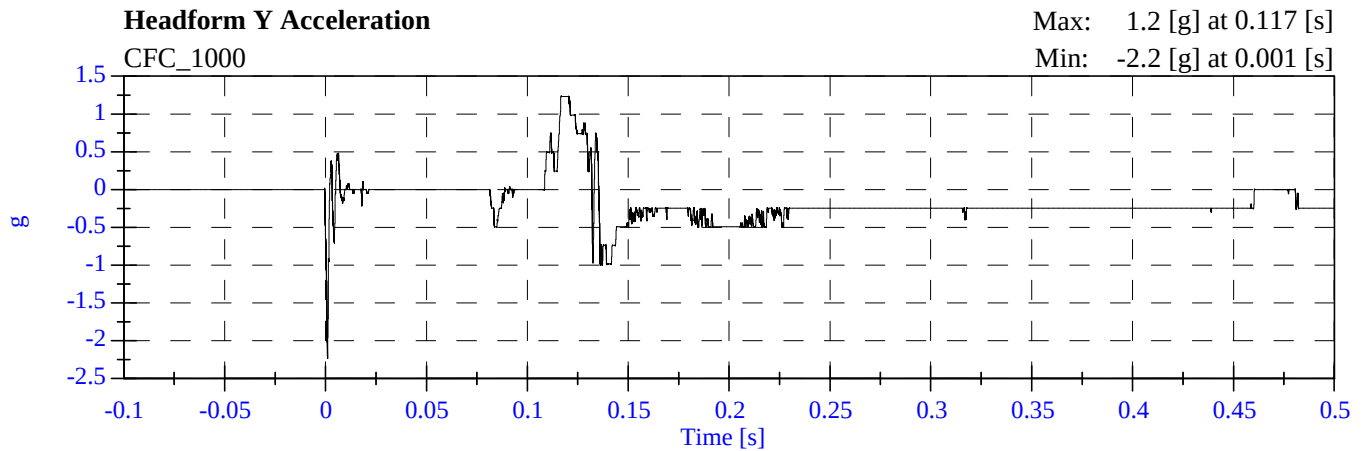
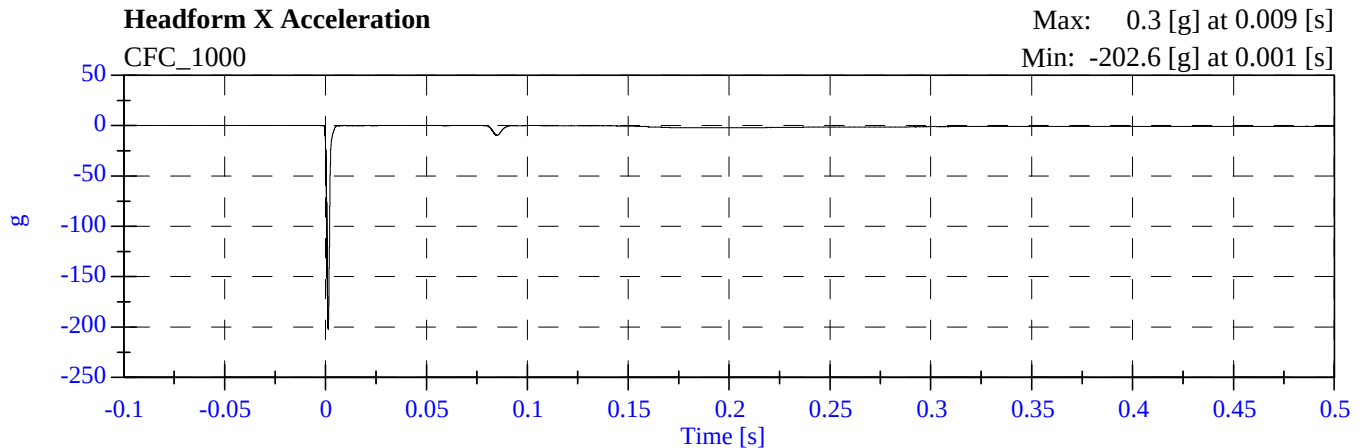
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J28671	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J32779	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J25854	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

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**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		1255	
CALIBRATION DATE:		JULY 30, 2007	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		23.3
RELATIVE HUMIDITY	10% to 70%		56.0
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		245.3
PEAK LATERAL ACCELERATION	15 Gs Maximum		2.5
IS ACCELERATION CURVE UNIMODAL?	YES		YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J41006	7/10/2007	1/10/08
2 - LATERAL	ENDEVCO	7264-2000T	J40994	7/10/2007	1/10/08
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	7/10/2007	1/10/08

REMARKS:

FMVSS 201U - Headform Calibration Drops

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